PANELLI®

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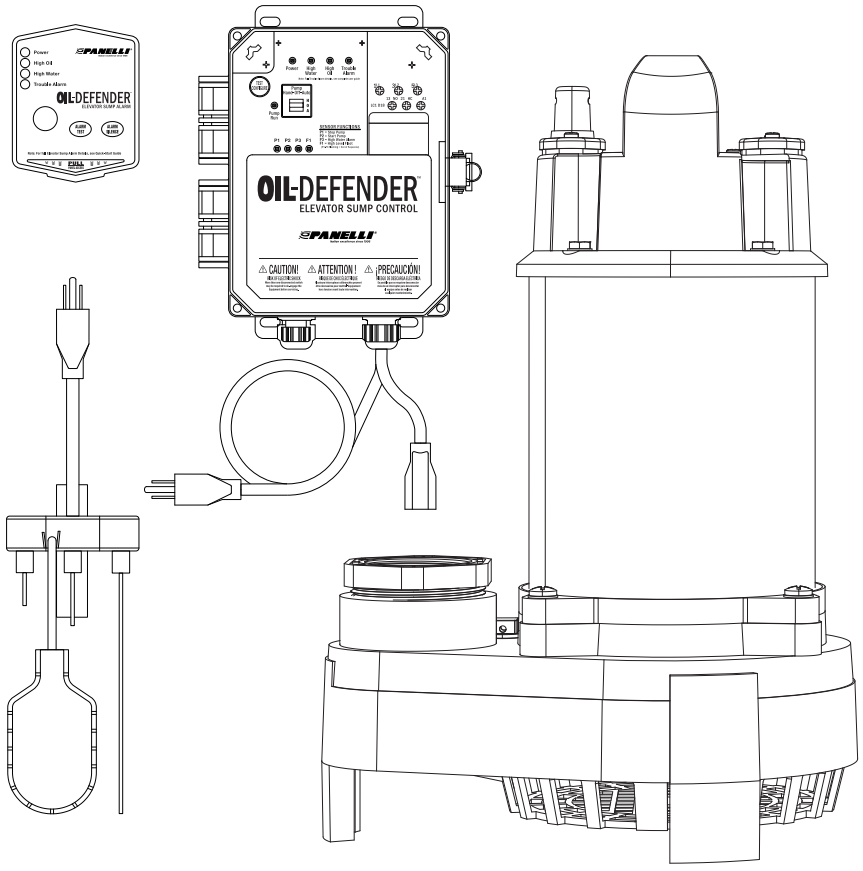
INSTALLATION & OPERATION MANUAL

OIL-DEFENDER™

ELEVATOR SUMP AND CONTROL SYSTEM

Model(s):

PAN92055, PAN92075, PAN92100



c UL us LISTED
Control Panel

C SP US
Pump

Introduction

Read all instructions thoroughly. Installation of the Oil-Defender™ pump and 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 and test this product can result in personal injury or equipment malfunction.

Description

The Oil-Defender™ pump and 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 Oil-Defender™ control panel will activate a pump to remove water from elevator pits in accordance with ASME A17.1, stopping the pump before oil or other harmful substances enter the water supply. The control panel includes LED indicators that will illuminate while monitoring various conditions including but not limited to: power, pump running, high oil, high water, power loss, pump overload, level sensor error detection (if enabled), fire alarm mode (if enabled), and low level alarm/ redundant off (if enabled). The included alarm buzzer and/or auxiliary contacts will activate on power loss, high oil, high water, or the various alarm conditions. The system also includes auxiliary contacts for pump run monitoring. The alarm auxiliary contacts of the control panel can be connected to an optional Oil-Defender™ remote alarm panel, building automation system (BAS) or SCADA system, and phone dialers for remote notification of alarm conditions.

The Oil-Defender™ control system has configurable features including: level sensor error detection, automatic or manual alarm condition reset, function input to be used for a fire system or low level/redundant off float switch, and a weekly pump exerciser. An integrated pump hand-off-auto (HOA) selector switch is included to set the desired operation mode of the pump and a sensitivity adjustment dial enables fine tuning of the water sensors.

SAFETY GUIDELINES

Carefully read, understand and follow all safety instructions in this manual.

⚠ This is the safety alert symbol. When you see this symbol, look for one of the following signal words.

⚠ DANGER Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠WARNING Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE Indicates important information, that if not followed, may result in damage to the equipment.

SAFETY INFORMATION

Read these warnings carefully. Know the application and limitations of this pump. Failure to follow these warnings could result in serious bodily injury and/or property damage.

⚠ DANGER RISK OF ELECTRIC SHOCK. Disconnect and lockout power supply before removing old pump, installing or servicing this pump or handling the OIL-DEFENDER™ System.

⚠ DANGER RISK OF ELECTRIC SHOCK. This pump is supplied with a grounding conductor and grounding type attachment plug. To reduce the risk of electric shock, be certain that it is connected only to a properly grounded, grounding type receptacle. For added safety, it is highly recommended to connect this system to a GFCI (Ground Fault Circuit Interrupter) outlet. Connect only to a receptacle that is adequately rated for the voltage and amperage of this pump and controller. Make sure to plug the OIL-DEFENDER™ control panel into a properly grounded, grounding-type receptacle.

⚠WARNING The installation of this pump must be in accordance with the National Electric Code (NEC), Uniform Plumbing Code (UPC), International Plumbing Code (IPC) as well as all applicable local codes and ordinances.

⚠WARNING Incoming voltage must match OIL-DEFENDER™ control system voltage.

⚠CAUTION Do not install this pump in any location classified as hazardous by the National Electrical Code, ANSI/NFPA70.

⚠CAUTION Do not use this pump to pump flammable or explosive fluids such as gasoline fuel oil, kerosene, etc. Do not use this pump in flammable or explosive environments. Use only with liquids compatible with pump component materials.

⚠WARNING RISK OF ELECTRIC SHOCK. DO NOT use the power cord to handle or transport the pump. The cord may pull apart exposing bare wires which could cause a fire or electric shock. Use the handle supplied with the pump for installing and removing the pump.

⚠WARNING Do not run the pump dry. The seal in this pump relies on water for lubrication and cooling. Running the pump dry can cause damage to the seal/pump and will void the warranty.

⚠WARNING Don't expose pump to freezing temperatures. Discharge lines exposed to freezing temperatures should be positioned with a downward slope to prevent freezing.

⚠WARNING Do not use this pump for potable/drinking water. Use only in applications for which the pump is designed.

⚠WARNING According to the state of California (Prop 65), this product contains chemicals known to the state of California to cause cancer and birth defects or reproductive harm.

⚠WARNING DO NOT UNDER ANY CIRCUMSTANCES REMOVE THE GROUND PIN. The 3-prong plug must be inserted into a mating 3-prong grounded receptacle. If the installation does not have such a receptacle, it must be changed to the proper type, wired and grounded in accordance with the National Electric Code (NEC) and all applicable local codes and ordinances.

⚠WARNING All wiring must be performed by a qualified electrician.

⚠WARNING Keep hands clear of suction and discharge openings. To prevent injury, never insert fingers into pump while it is plugged in.

SAFETY INFORMATION (CONTINUED)

⚠WARNING Sump Basins must be installed according to local plumbing codes.

⚠CAUTION Do not handle the control panel or pump with wet hands or while standing on wet damp surfaces or in water.

⚠WARNING If a flexible discharge hose is used, make sure the pump is secured in the basin to prevent movement. Failure to secure the pump could result in flooding from swiitch malfunction.

⚠CAUTION This pump motor is equipped with an automatic resetting thermal protector and may restart unexpectedly.

⚠CAUTION Use caution on control panel models using an overload relay. The pump motor may start immediately when the overload reset.

⚠CAUTION The control panel can be mounted indoor or outdoor. Alarm panel (optional) must be mounted indoor. For outdoor alarm applications, consult the manufacturer.

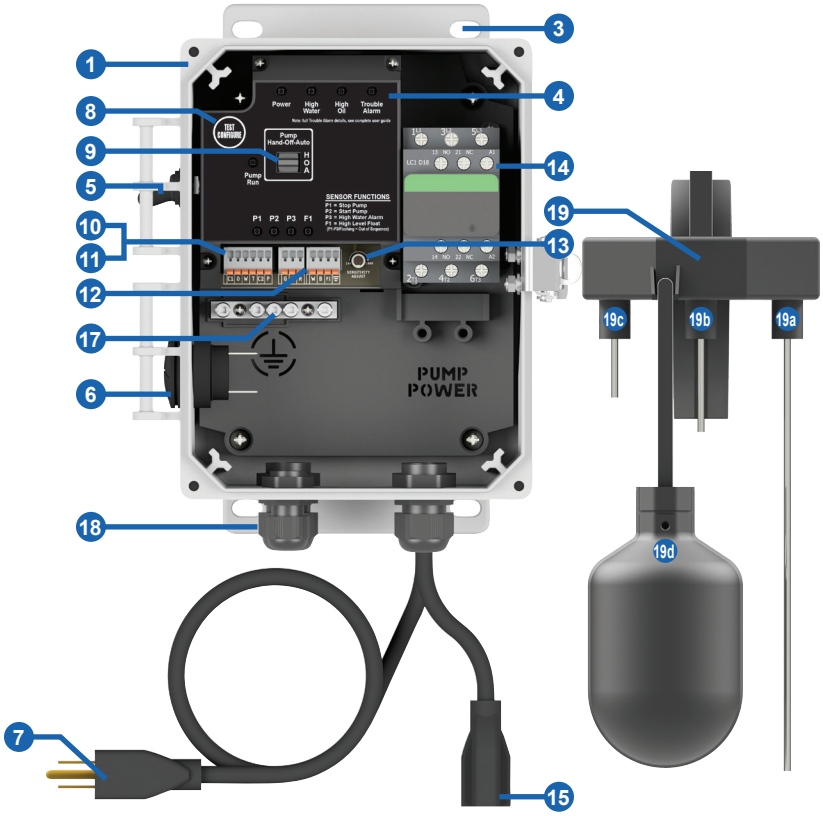
⚠CAUTION Secure the preset level sensor module on the discharge pipe at a level that guarantees partial pump submergence when the water level is just below the pump stop probe (longest prope, see step 2 of this manual). Failure to properly mount the preset level sensor module may cause unintended consequences.

⚠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

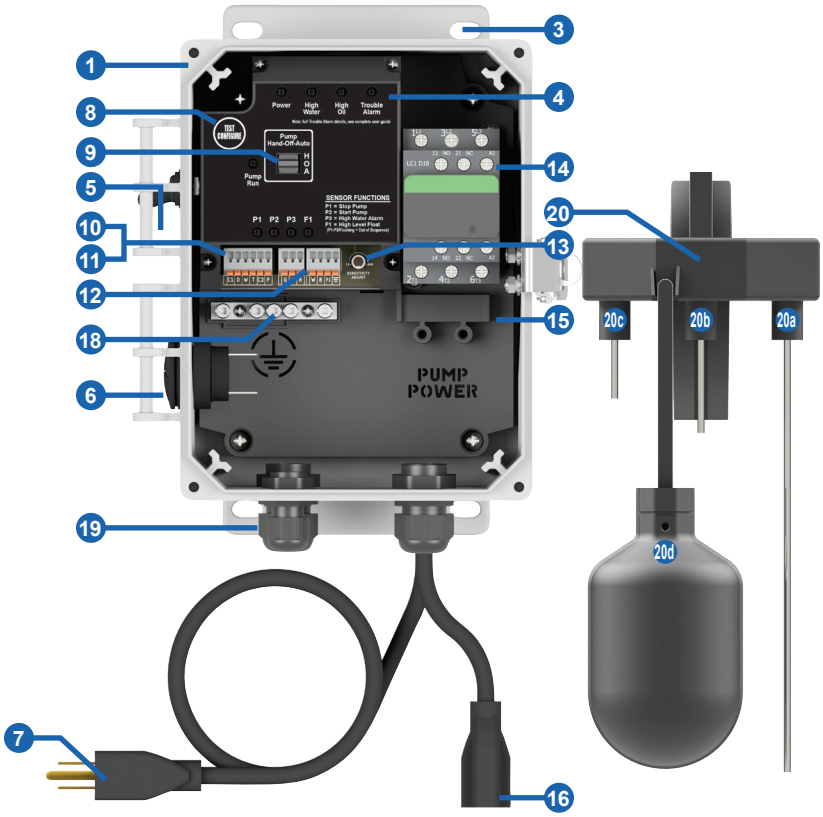
Refer to the included electrical schematic for all incoming power connections and pump connections which may include optional field wiring connections.

STANDARD FEATURES | Standard Models



(1) Type 4X Enclosure (indoor/outdoor rated)
(2) Clear Cover to view Interior Components (not shown)
(3) Mounting Brackets
(4) Oil-Defender™ Circuit Board, Status Indicators
(5) Alarm Test/Silence Switch
(6) Alarm Buzzer
(7) Incoming System Power (control/alarm, pre-wired male plug)
(8) Test/Configure Pushbutton
(9) Pump Hand-Off-Auto Selector Switch
(10) Remote Alarm Panel or BAS Auxiliary Contacts
(11) Pump Run Auxiliary Contacts
(12) Preset Level Sensor/Function Input Terminals (sensor only, pre-wired at factory; not shown)
(13) Sensitivity Adjustment Dial (water sensors)
(14) IEC Motor Contactor
(15) Pump Power Receptacle (pre-wired female plug)
(16) Pump Connection Terminals (pre-wired to female receptacle plug; not shown)
(17) Ground Bar (5-position)
(18) Pre-Installed Cable Grips (4)
(19) Preset Level Sensor
19a) Pump Stop, Sensor Level Probe
19b) Pump Start, Sensor Level Probe
19c) High Water, Sensor Level Probe
19d) Oil Detection, High Liquid Level Switch

STANDARD FEATURES | Overload Models



(1) Type 4X Enclosure (indoor/outdoor rated)
(2) Clear Cover to view Interior Components (not shown)
(3) Mounting Brackets
(4) Oil-Defender™ Circuit Board, Status Indicators
(5) Alarm Test/Silence Switch
(6) Alarm Buzzer
(7) Incoming System Power (control/alarm, pre-wired male plug)
(8) Test/Configure Pushbutton
(9) Pump Hand-Off-Auto Selector Switch
(10) Remote Alarm Panel or BAS Auxiliary Contacts
(11) Pump Run Auxiliary Contacts
(12) Preset Level Sensor/Function Input Terminals (sensor only, pre-wired at factory; not shown)
(13) Sensitivity Adjustment Dial (water sensors)
(14) IEC Motor Contactor
(15) Pump Overload Module (amp ranges vary depending on model)
(16) Pump Power Receptacle (pre-wired female plug)
(17) Pump Connection Terminals (pre-wired to female receptacle plug; not shown)
(18) Ground Bar (5-position)
(19) Pre-Installed Cable Grips (4)
(20) Preset Level Sensor
20a) Pump Stop, Sensor Level Probe
20b) Pump Start, Sensor Level Probe
20c) High Water, Sensor Level Probe
20d) Oil Detection, High Liquid Level Switch

Description of Operation

The Oil-Defender™ single phase simplex control panel is used for the safe operation of pumping, alarming, and monitoring of: elevator sump pits, transformer vaults, and leachate well applications. The control panel will activate a pump to remove water from pits in accordance with ASME A17.1, stopping the pump before oil or other harmful substances enter the water supply. Available in 120VAC and 240VAC, 1.0-14.0 Amps, 14.0-18.0 Amps, or Specified Amp Range (FLA; pump overload), and a Type 4X (indoor/outdoor) enclosure. The control panel comes with a pre-installed female pump power receptacle, incoming system power cable, preset level sensor, alarm test/silence switch, and alarm buzzer. The incoming and pump power must match system voltage. Refer to included electrical schematic for complete wiring and voltage information.

The control panel is operated by the factory wired preset level sensor module for pump stop, pump start, high water alarm, and oil detection alarm (high level float switch). As the water level rises touching the pump start probe (middle), the pump will start and continue to run until the water level recedes below the pump stop probe (longest) to complete the pump cycle. The control panel pump run LED will illuminate when the pump is running and pump run auxiliary contacts will activate. Other LED status indicators are included for: power, high water alarm, high oil alarm, trouble alarm, pump stop sensor, pump start sensor, high water alarm sensor, and high level float switch.

The pump stop probe senses air or oil and when the water level is no longer touching this probe, the pump stops running so the oil layer will not be pumped out of the sump. Oil will float on top of water, so if oil is present and touching this probe, the pump will also stop running. If the water level rises touching the high water probe (shortest), a high water alarm condition occurs, the buzzer annunciates and the pump continues to run (will also act as a redundant pump start/pump run function). If the test/silence switch is toggled upward during an alarm condition, it will silence the buzzer while the red high water alarm LED remains illuminated. The alarm condition automatically resets when water is no longer touching the high water probe.

If oil, hydrocarbon, or other harmful substances are floating on top of the water level touching the high water probe while simultaneously activating the high level float switch, then a high oil alarm (oil detected) condition occurs, the buzzer annunciates and the pump continues to run as long as water and not oil is touching the pump start and pump stop probes. If the pump circuit experiences an overload alarm condition, power to the pump is disconnected (overload models only). During an alarm condition the control panel LED(s) will illuminate, buzzer annunciates, and the auxiliary contacts send a signal to activate an optional Oil-Defender™ remote alarm panel or BAS system. If the test/silence switch is toggled upward during an alarm condition, it will silence the buzzer while the red alarm LED(s) remain illuminated. The alarm auxiliary contacts of the control panel can be connected to an optional Oil-Defender™ remote alarm, building automation system (BAS) or SCADA system, and phone dialers for remote notification of alarm conditions.

The Oil-Defender™ control panel can be configured for: Level Sensor Error Detection, Automatic Alarm Reset, Function Input for Fire Input (pump runs regardless of oil or water on liquid level detection), and Pump Exerciser. See user guide for full product details.

Installation

Your OIL-DEFENDER™ Pump is designed and built to give you reliable performance and long life. It will remove water automatically for years when properly installed in the right environment.

WARNING: Always disconnect the power source before attempting to install, service or perform maintenance on the pump. Failure to do so, may result in fatal electric shock. Always disconnect the power source before servicing the pump.

1. Place the pump in the bottom of the basin on a solid foundation.

2. It is highly recommended to install a full flow, swing type check valve (sold separately) in the discharge line. A new check valve will greatly increase the life of your pump. The check valve should be the same size as the pump discharge.

3. Connect the pump and chek valve together using schedule 40 PVC pipe and fittings. You can also use DWV or ABS pipe, as this is not a pressure installation. Corrugated drain hose is intended for temporary use and SHOULD NOT be used in a permaneant installation. Although there are many types of pipe that work adequetly for this installation, PVC is recommended.

4. Test your installation after you have completed setting up the pump. Plug the cord from the pump into the piggy-back plug of the of the controller, then plug into your grounded outlet. The pump should not run at this point. If the pump runs, the switch is stuck in the upright position or the pump is plugged directly into the outlet and not through the piggy-back switch plug. Fill the elevator shaft by using a hose, and when the preset level on the sensor is reached, the pump will turn on. The pump will turn off, when it reaches the preset level on the sensor.

NOTE: The pump has a built in anti-airlock device. Leakage is normal from this device.

Gallons Per Minute @ Discharge Height							
System Model	Pump Model	**0 Ft.**	**10 Ft.**	**20 Ft.**	**30 Ft.**	**40 Ft.**	**50 Ft.**
PAN92055	**100-00566**	75	64	51			
PAN92075	**100-00567**	80	69	55	29		
PAN92100	**100-00568**	100	82	63	44	25	7

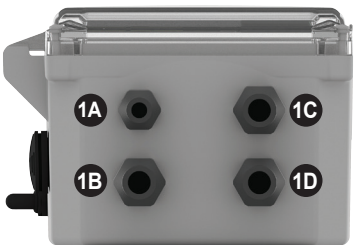
NOTE: Height and/or piping restriction will reduce the pump output performance. See the performance chart to insure you have the proper pump for your application. Use the same size or larger pipe as the pump discharge for optimum performance.

Installation of the Oil-Defender™ Control Panel

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

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

(Fig. 1)



(bottom view)

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

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

Installation of the Oil-Defender™ Control Panel (continued)

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

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.

(Fig. 2)

(front view)

Installation of the Preset Level Sensor

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

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

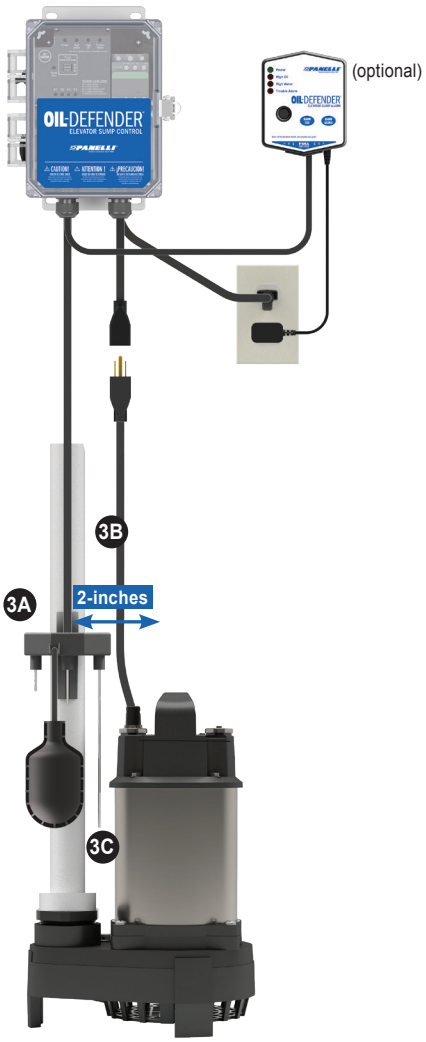
2. The preset level sensor "stop level" (3C) should be mounted at the same height as the top of the pump or slightly below to ensure the pump intake is completely submerged. Securely fasten the preset level sensor using the pipe clamp to maintain system integrity.

3. The preset level sensor comes pre-installed from the factory. If replacing, route the 5-conductor sensor cable through the Oil Alert™ control panel sealed conduit/cable grip or junction box and connect the wires to the circuit board terminals. Refer to the wiring section on page 5 for information on the control panel sensor connections.

Note: If the preset level sensor is disconnected from the control panel and power is applied to the system, the high oil alarm LED and high level float activated sensor LED will illuminate, plus the alarm buzzer will annunciate as these inputs are normally closed contacts. Once the preset level sensor is re-wired, these LEDs and alarm buzzer will deactivate and the system will return to a normal state. Do not connect power until all steps of the wiring and installation are completed.

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

(Fig. 3)

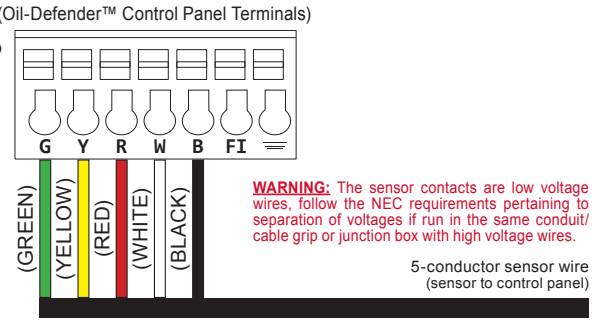


System Wiring | Preset Level Sensor

1. The preset level sensor comes pre-installed from the factory. If replacing, route the 5-conductor sensor cable from the mounting location in the sump through the low voltage conduit/cable grip into the Oil-Defender™ control panel and connect the wires to the terminals listed below and shown in the diagram (Fig. 4).

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

(Fig. 4)



System Wiring | Pump Power Receptacle

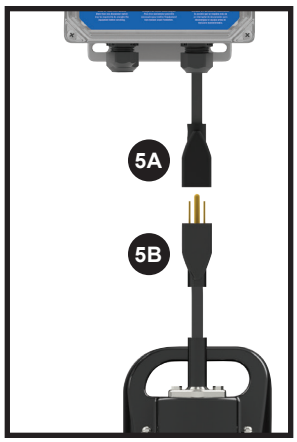
Make sure all the steps of the installation and wiring for the pump, control panel, preset level sensor, and optional remote alarm panel have been completed prior to connecting power to the system or perform testing.

1. The pump power receptacle (female plug; 5A) comes pre-installed from the factory for a quick and easy installation of the Oil-Defender™ control panel (Fig. 5).

2. After all the steps of the installation process have been completed and the panel is ready for testing, connect the pump power cable (5B) into the pre-installed pump power receptacle (5A) of the Oil-Defender™ control panel.

Note: The pump power must match the voltage of the Oil-Defender™ control panel. Refer to the included electrical schematic for complete wiring and voltage information.

(Fig. 5)



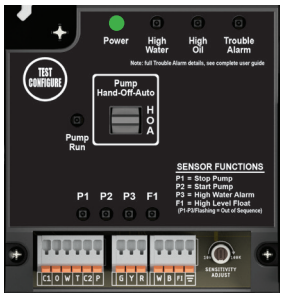
System Wiring | Power Connections

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

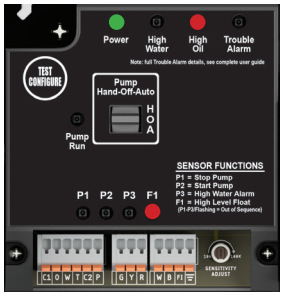
1. After the pump power cable is connected to the Oil-Defender™ control panel's pump power receptacle (Fig. 5) and the Oil-Defender™ control panel's incoming system power cable is plugged into a power outlet or receptacle, the system is ready for device configurations and testing. When power is applied, the green power LED should illuminate on the control panel (Fig. 6) and the pump should be off if the system was installed properly.

   Power Mode if Preset Level Sensor is Disconnected:
   If the preset level sensor is disconnected from the control panel and power is applied to the system, the high oil alarm LED and high level float activated sensor LED (F1) will illuminate (Fig. 7), plus the alarm buzzer will annunciate as these inputs are normally closed contacts. Once the preset level sensor is re-wired, these LEDs and alarm buzzer will deactivate and the system will return to a normal state (Fig. 6).

(Fig. 6)



(Fig. 7)



System Wiring | Optional Remote Alarm

1. Determine the mounting location of the optional Oil-Defender™ remote alarm panel and install following the complete installation and wiring instructions that came with the alarm panel. See below for wiring information on connecting the alarm panel to the Oil-Defender™ control panel.

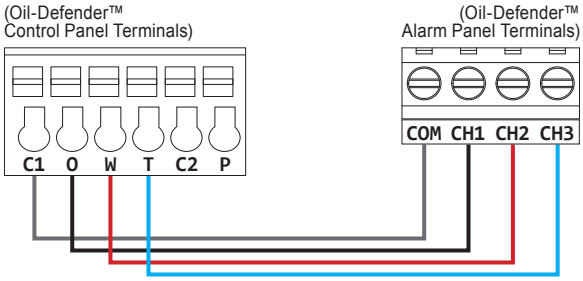
Note: The alarm panel can be mounted up to 2,500 feet from the control panel for remote alarm notification of high oil, high water, and trouble alarm.

2. Connect the Oil-Defender™ control panel auxiliary contacts to the Oil-Defender™ alarm panel signaling device INPUTS terminals listed below and shown in the diagram (Fig. 8).

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
Control Panel TB-T (trouble alarm)	=	Alarm Panel TB-CH3

Note: When installing or connecting an alarm panel or another device, always refer to its installation instructions for complete operating information.

(Fig. 8)



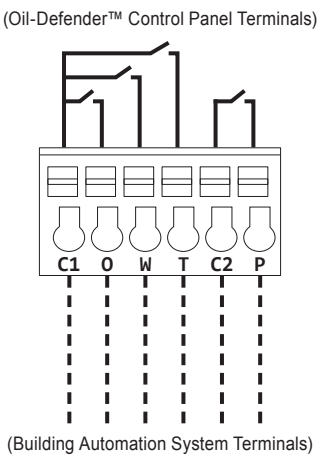
System Wiring | Auxiliary Contacts to Automation Systems

If desired to use the alarm auxiliary contacts of the Oil-Defender™ control panel to connect directly to a building automation system (BAS) for remote notification of alarm conditions and pump run monitoring, see wiring information below and as shown in the diagram (Fig. 9).

1. If connecting to an existing alarm security system or building automation system (BAS), use 18 gauge 6-conductor wire to connect the existing product to the terminal block inputs on control panel listed below and shown in the diagram (Fig. 9).

Note: When connecting the control panel to another device, always refer to its installation instructions for complete wiring and operating information.

(Fig. 9)



<u>Oil-Defender™ Control Panel Auxiliary Contacts:</u>

Normally Open Dry Contacts
Normally open dry contacts can switch 120VAC/24VDC, 250mA maximum (each)

Terminals C1 (common 1) and O
Zone-1 (Oil-Defender™ High Oil Alarm)
Connects to external monitoring device

Terminals C1 (common 1) and W
Zone-2 (Oil-Defender™ High Water Alarm)
Connects to external monitoring device

Terminals C1 (common 1) and T
Zone-3 (Oil-Defender™ Trouble Alarm)
Connects to external monitoring device

Terminals C2 (common 2) and P
Zone-4 (Oil-Defender™ Pump Running)
Connects to external monitoring device

Note: The C1 terminal is common to terminals O, W, and T. The C2 terminal is common only to terminal P.

Settings | Water Sensor Sensitivity Adjustment

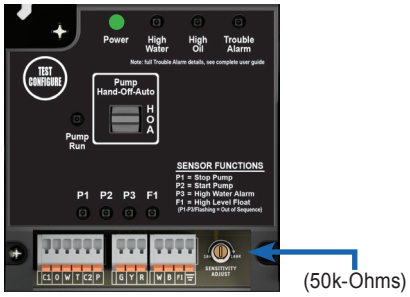
The Oil-Defender™ water sensors can be configured to activate (trip) at equivalent resistance values of 10k-Ohms (least sensitive) to 100k-Ohms (most sensitive).

1. Recommended Value; set the sensitivity adjust potentiometer to 50k-Ohms (Fig. 10) during installation and only adjust if needed.

2. Less Sensitive; use a slotted screwdriver or similar tool and rotate the sensitivity adjust potentiometer counter clockwise.

3. More Sensitive; use a slotted screwdriver or similar tool and rotate the sensitivity adjust potentiometer clockwise.

(Fig. 10)



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

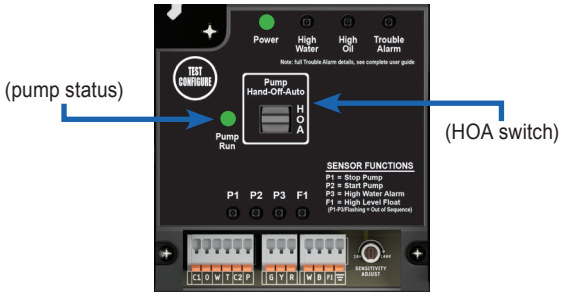
The pump hand-off-auto (HOA) selector switch (Fig. 11) is used to control the desired operation mode of the pump. The pump run LED illuminates when the pump is running (Fig. 11). See below for more information on the three operating positions, the "normal" operating position is Auto Mode.

1. Hand Mode (H); the pump will start and continue to run until the switch is toggled to the off position regardless of sensor status.

2. Off Mode (O); the pump will remain off until the switch is toggled to either the hand or auto positions regardless of sensor status.

3. Auto Mode (A); the pump will operate based only on the status of the system sensors, turning the pump on and off.

(Fig. 11)



Settings | Pump Overload Models (optional)

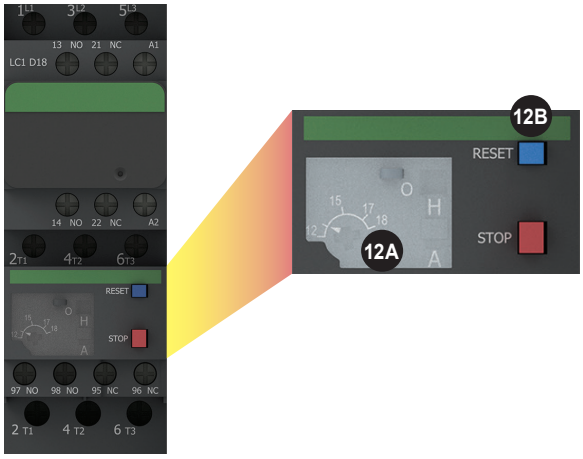
An optional pump overload module (Fig. 12) can be connected to the bottom of the motor contactor and used to stop the pump from running if the pump amps exceed the full load amps (FLA) the pump is rated for. You MUST set the dial on the overload module correctly or the pump will not operate.

1. Determine the full load amps (FLA) of the pump.

2. Set the overload dial (12A) on the module to the pump FLA using a phillips screwdriver or similar tool.

3. If the pump trips, reset by pressing the RESET pushbutton (12B).

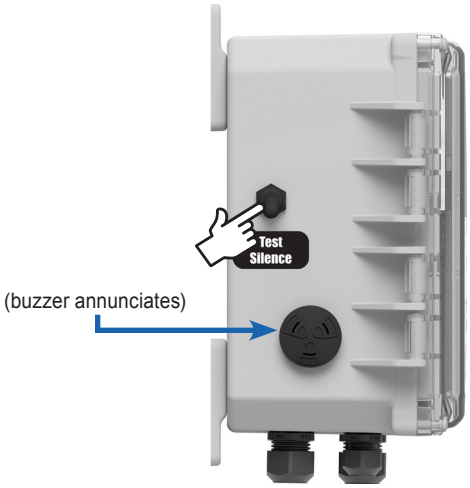
(Fig. 12)



System Operation | Alarm Test/Silence and Buzzer

The alarm test/silence switch of the Oil-Defender™ control panel can be used to either test the alarm system or silence the buzzer during an alarm condition.

(Fig. 13)



Alarm Test:

1. Flip upward and hold the test/silence switch (Fig. 13) on the exterior left side of the control panel enclosure, the alarm buzzer and LED test pattern (all except pump run) will begin immediately. See below for more information.

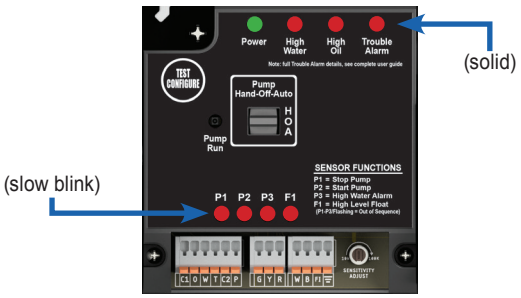
    a. Alarm buzzer will annunciate (Fig. 13).

    b. LEDs will illuminate in a solid and slow blinking pattern (Fig. 14):
        i. High Water, High Oil, and Trouble Alarm (solid)
        ii. P1, P2, P3, and F1 (slow blink)

    c. The alarm buzzer and LED test pattern will continue until the test/silence switch is released.

Note: The test/silence switch on the exterior of the control panel used for the alarm system test will not affect the system settings as described on page 3 and page 7.

(Fig. 14)



Alarm Silence:

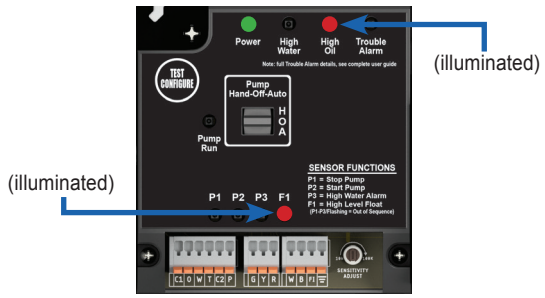
1. Activate the high level float switch on the preset level sensor. When raised, the high oil alarm (oil detected) LED should illuminate (Fig. 15), the high level float (F1) LED should illuminate (Fig. 15), alarm buzzer should annunciate (Fig. 13), the high oil alarm auxiliary contacts on the control panel should activate, and optional remote alarm panel or BAS system contacts should activate.

2. Flip the test/silence switch upward (Fig. 13) on the exterior left side of the control panel enclosure, the alarm buzzer should silence while the alarm LED remains illuminated.

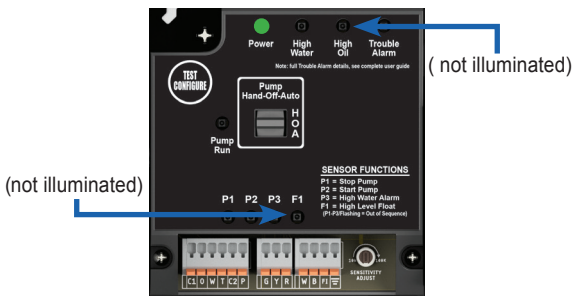
3. When lowered, the high oil alarm (oil detected) alarm condition should deactivate, the alarm and activated sensor LEDs should turn off (Fig. 16), high oil alarm auxiliary contacts should deactivate, and the system should reset for the next alarm cycle (system normal). The optional remote alarm panel or BAS system should also reset for the next alarm cycle after the alarm condition is deactivated on the control panel.

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

(Fig. 15)



(Fig. 16)



Testing | Oil-Defender™ Control Panel System

1. Make sure all the steps of the installation and wiring for the pump, control panel, preset level sensor module, and optional remote alarm panel or BAS system have been completed prior to testing. The incoming voltage and all power receptacles used must match the Oil-Defender™ system voltage. These instructions are written based on the factory default system settings, the system may operate differently if any of these settings have been changed (refer to page 3 and page 7 for system device settings).

2. Verify the pump hand-off-auto (HOA) selector switch is in the OFF position and the incoming power is connected, the green power LED should illuminate and the pump should be off. Toggle the HOA switch to the HAND position and the pump should start, pump run LED should illuminate, and pump run auxiliary contacts should activate. The pump will continue to run until the HOA switch is toggled to the OFF position.

3. With the HOA switch in the AUTO position and the probes on the preset level sensor out of the water, test a high oil alarm condition by raising (activate) and lowering (deactivate) the high level float switch to verify:
    i. When raised, the high oil alarm (oil detected) LED should illuminate, the high level float (F1) LED should illuminate, alarm buzzer should annunciate, the high oil alarm auxiliary contacts on the control panel should activate, and optional remote alarm panel or BAS system contacts should activate. While the alarm is activated, flip the test/silence switch upward to silence the buzzer, the alarm LED should remain illuminated.
    ii. When lowered, the high oil alarm (oil detected) alarm condition should deactivate, the alarm and activated sensor LEDs should turn off, alarm buzzer should turn off (if not silenced in the previous step), high oil alarm auxiliary contacts should deactivate, and the system should reset for the next alarm cycle (system normal). The optional remote alarm panel or BAS system should also reset for the next alarm cycle after the alarm condition is deactivated on the control panel.

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

5. With the HOA switch in the OFF position and the probes on the preset level sensor out of the water, test the remote alarm panel for a power loss event.
    i. Unplug the incoming system power cable from the control panel receptacle and the remote alarm panel should activate a trouble alarm (power loss) condition with activated auxiliary contacts. The alarm condition on the alarm panel will clear when power is restored to the control panel and the system should return to a "normal" condition.

Diagnostic System Test | Test/Configure Button
(Oil-Defender™ Control Panel System)

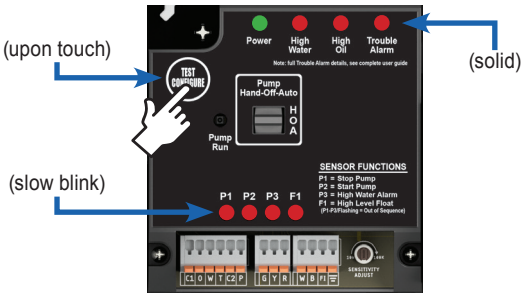
The Oil-Defender™ control panel features a test/configure pushbutton for running a system alarm test and for changing system configurations.

1. Test Mode; press and hold the test/configure pushbutton (Fig. 1) on the Oil-Defender™ control panel for less than 5-seconds, the system will immediately begin a test pattern of the LEDs (all except pump run) while the alarm buzzer annunciates and the alarm auxiliary contacts close. This test will check all alarm circuitry and connections to ensure local building automation systems or remote alarms are functioning properly.

    a. LEDs will illuminate in a solid and slow blinking pattern:
        i. High Water, High Oil, and Trouble Alarm (solid)
        ii. P1, P2, P3, and F1 (slow blink)
    b. Alarm buzzer will annunciate.
    c. Remote alarm panel auxiliary contacts will activate (if used).

Note: Test pump run auxiliary contacts by placing the pump hand-off-auto (HOA) selector switch in the HAND position, this will activate the pump run auxiliary contacts (if used). Turn the HOA switch to the OFF position, the pump run auxiliary contacts should deactivate. Make sure to return the HOA switch to the AUTO position to ensure the system will operate properly after performing the test.

(Fig. 1)



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

Specifications | Control Panel

Primary Power
120VAC, 1-14A or 1-18A, 60 Hz (120VAC pump)
Models: OA1S120C14-L and OA1S120C18-L

120VAC, Specified Amp Range, 60 Hz (120VAC pump)
Models: OA1S120COX-X-L Series
(X-X, overload range specified per model)

240VAC, 1-14A or 1-18A, 60 Hz (240VAC pump)
Models: OA1S230C14-L and OA1S230C18-L

240VAC, Specified Amp Range, 60 Hz (240VAC pump)
Models: OA1S230COX-X-L Series
(X-X, overload range specified per model)

Phase/Pump Type
Single Phase, Simplex

Pump Power Receptacle Cable
120VAC or 240VAC, 15A or 20A, 60 Hz
Female Plug (voltage/amps depends on model number)

Incoming System Power Cable
120VAC or 240VAC, 15A or 20A, 60 Hz, 6-foot cable
Male Plug (voltage/amps depends on model number)

IEC Motor Contactor (optional overload)
120VAC or 240VAC, 18A, 50/60 Hz
3-Pole, Normally Open
Overload Amp Range (specified per model)

Buzzer
5-30VDC, 95 dB @ 2-feet

Test/Silence Switch
Single Pole, Single Throw

Auxiliary Dry Alarm Contacts (control panel)
120VAC/24VDC, 250mA maximum (each)
Normally Open

Fuses
Positive Temperature Coefficient (PTC), Resettable

LEDs
Green (power and pump run)
Red (alarm, activated sensor, or system setting)

Sensor Input Ratings
Float/Function Inputs, 3.3VDC
Water Probe Inputs, 12V

Preset Level Sensor
25-foot cable
SJEOOW (UL) / SJTOOW (CSA)
18 AWG, 5-conductor, flexible, and water/oil resistant

High Level Switch (preset sensor)
1-foot cable
Narrow Angle, Normally Closed
SJOOW (UL/CSA)
18 AWG, 2-conductor, flexible, and water/oil resistant

Enclosure
Thermoplastic
8 x 6 x 4 (inches)
Type 4X, Indoor/Outdoor
Enclosure Screws

Certifications
UL 508 (US and Canada)

Three-Year Limited Warranty

System Maintenance

1. The preset level sensor module must be kept clean and free of rust, mud, soap, or any conductive material. Clean the probes every year keeping them free of debris, calcium, or iron deposits to ensure proper system operation.

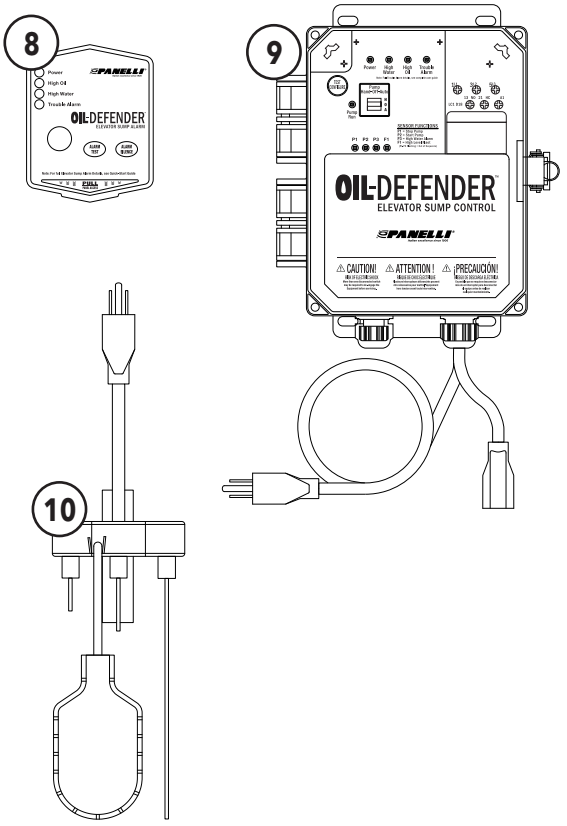
TROUBLESHOOTING

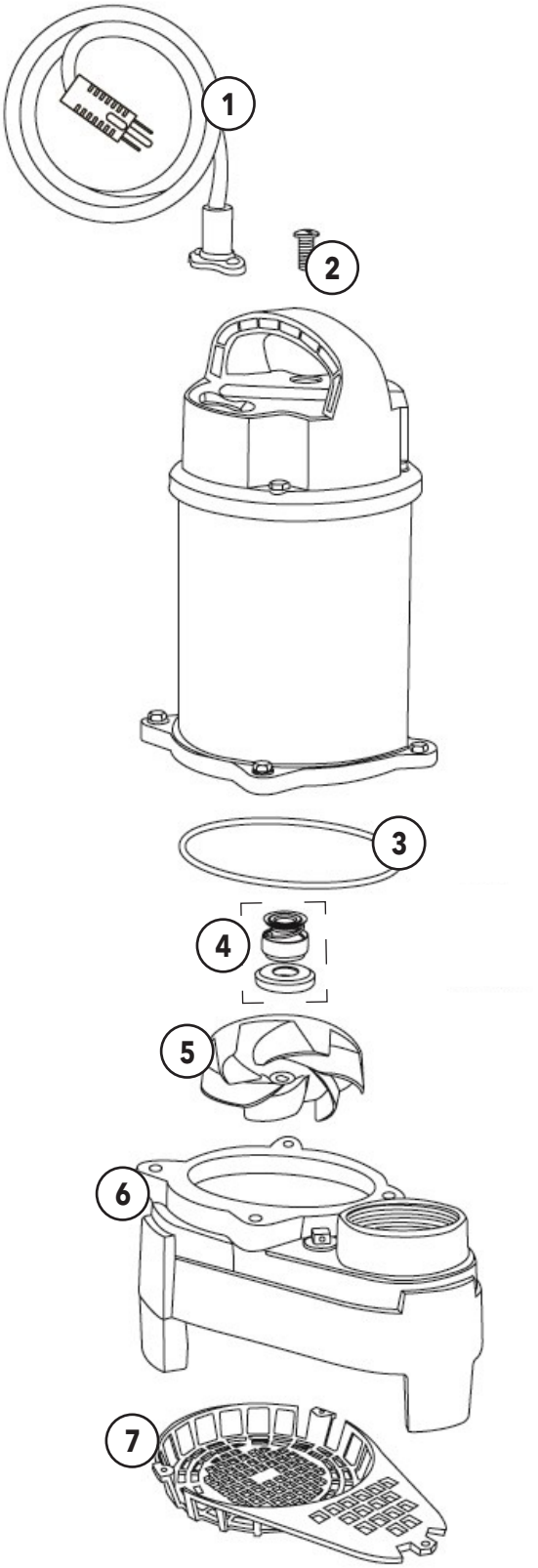
PROBLEM	POSSIBLE CAUSES	HOW TO CORRECT
If the pump does not start or run	Pump is not plugged in, switch or breaker is off	Plug pump in or turn on switch/breaker
	Chck for blown fuses or tripped circuit breakers or tripped GFCI outlet	Replace fuse, reset breaker, reset GFCI outlet
	Switch is defective	Check and replace if necessary.
	Motor thermal protector tripped	Allow pump to cool. Pump will reset.
	Pump power not plugged into panel	Connect power cables
	Pump hand-off-auto (HOA) is OFF	Toggle to HAND or AUTO
	Improper Wiring of Preset Level Sensor	Check Wire Connections
	Defective Motor Contactor or Overload Module	Replace Component
	Pump Failure	Replace Pump
The pump starts and stops too often	Back flow of water from discharge hose/pipe	Install or replace check valve
	Switch is defective	Replace float switch
If the pump runs but moves little or no water	Clogged intake screen	Clean or replace screen
	Clogged discharge hose/pipe	Remove clog
	Frozen discharge hose/pipe	Allow hose/pipe to thaw
	Pump is airlocked	Clean out airlock hole with a paper clip or pipe cleaner
	Low line voltage	Check wire size and increase if necessary
	Check valve is stuck in the closed position	Inspect, repair or replace if necessary
	Check valve is installed backwards	Make sure valv is installed in the correct direction of flow
	Worn, damaged or clogged pump parts	Inspect wear, damage or clog and clean or replace if necessary
	Discharge head exceeds pump capacity	Refer to the performance chart for pump limitations
Pump does not shut off	Float switch is obstructed or stuck	Remove obstruction
	Defective controller	Replace controller
Pump turns off and water level not below pump stop	Poor Pump or System Ground	Check Grounding System and Wires
	Preset Level Sensor Dirty or Damaged Probes	Clean or Replace
Pump runs continuously	Pump Hand-Off-Auto (HOA) in HAND	Toggle to OFF or AUTO
	Preset Level Sensor Improperly Installed	Check Complete Installation
Trouble alarm activated and overload module is tripped	Overload Not Set to Pump FLA	Set Overload Dial to Pump FLA
	Preset Level Sensor Improperly Installed	Check Complete Installation
High oil alarm activated with no oil in sump basin	Preset Level Sensor Improperly Installed	Check Complete Installation
	High Level Switch Obstruction in Basin	Clear Obstruction from Float

REPLACEMENT PARTS

Ref. #	Description	PAN92055 PAN92075	PAN92100
1	Power Cord	315-00016	
2	Oil-Fill Plug with O-Ring	820-00105	
3	Gasket	350-00017	
4	Shaft Seal	820-00108	
5	Impeller	320-00016	320-00019
6	Volute/Base	325-00009	
7	Intake Screen	300-00087	
8	Elevator Sump Alarm	315-00130	
9	Elevator Sump Control	315-00129	
10	Oil-Defender Switch	315-00131	

*If motor fails, replace entire pump.





NOTES

LIMITED WARRANTY
The manufacturer warrants the products specified in this warranty to be free from defects in material or workmanship for three (3) years from date of purchase. During the time period and subject to the terms and conditions, the manufacturer will repair or replace to the original user or consumer any portion of this product which proves to be defective due to materials or workmanship. At all times the manufacturer shall have and possess the sole right and option to determine whether to repair or replace defective equipment, parts, or components. The manufacturer has the option to inspect any product returned under warranty to confirm that the warranty applies before repair or replacement under warranty is approved. This warranty sets forth the manufacturer's sole obligation and purchaser's exclusive remedy for defective product. For warranty consideration, call 1-877-733-7655.

WARRANTY PERIOD - PRODUCTS:
If, within the duration of product use by the original user, this product proves to be defective due to materials or workmanship, the product shall be repaired or replaced at the manufacturer's option, subject to the terms and conditions set forth in this warranty statement. Proof of purchase is required for warranty consideration. In the absence of suitable proof of the purchase date, the effective period of this warranty is 12 months from the product's date of manufacture.

LABOR, ETC. COSTS:
The manufacturer shall IN NO EVENT be responsible or liable for the cost of field labor or other charges incurred by any customer in removing and/or affixing any product, part, or component thereof.

PRODUCT IMPROVEMENTS:
The manufacturer reserves the right to change or improve its products or any portions thereof without being obligated to provide such a change or improvement for units sold and/or shipped prior to such change or improvement.

GENERAL TERMS AND CONDITIONS:
This warranty shall not apply to damage due to acts of God, normal wear and tear, normal maintenance services and the parts used in connection with such service, lightning or conditions beyond the control of the manufacturer, nor shall it apply to products which, in the sole judgment of the manufacturer, have been subject to negligence, abuse, accident, misapplication, tampering, alteration; nor due to improper installation, operation, maintenance or storage; nor to excess of recommended maximums as set forth in the instructions. Warranty will be VOID if any of the following conditions are found:

1. Product is used for purposes other than those for which it was designed and manufactured.
2. Product not installed in accordance with applicable codes, ordinances, and good trade practices.
3. Product connected to voltage other than indicated on nameplate or labels.
4. Pump exposed to but not limited to the following: sand, gravel, cement, grease, plaster, mud, tar, gasoline, solvents or other abrasive or corrosive substances.
5. Pump has been used for pumping liquids above 120°F.
6. Pump allowed to operate dry (liquid supply cut off).

DISCLAIMER:
Any oral statements about the product made by the seller, the manufacturer, the representatives, or any other parties do not constitute warranties, shall not be relied upon by the user, and are not part of the contract for sale. Seller's and the manufacturer's only obligation, and buyer's only remedy, shall be the replacement and/or repair by the manufacturer of the product as described above.
NEITHER SELLER NOR THE MANUFACTURER SHALL BE LIABLE FOR ANY INJURY, LOSS OR DAMAGE, DIRECT, INCIDENTAL OR CONSEQUENTIAL (INCLUDING, BUT NOT LIMITED TO, INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR LOST PROFITS, LOST SALES, INJURY TO PERSON OR PROPERTY, OR ANY OTHER INCIDENTAL OR CONSEQUENTIAL LOSS), ARISING OUT OF THE USE OR THE INABILITY TO USE THE PRODUCT, AND THE USER AGREES THAT NO OTHER REMEDY SHALL BE AVAILABLE TO IT. Before using, the user shall determine the suitability of the product for their intended use, and user assumes all risk and liability whatsoever in connection therewith.

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Some states and countries do not allow the exclusion or limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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