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PUMP COMPANY

Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies.

PIVOT PRO SERIES
PUMP CONTROL PANELS
INSTALLATION, OPERATION, AND TROUBLESHOOTING MANUAL

PREINSTALLATION CHECKLIST

1. Inspect your panel. Occasionally, products are damaged during shipment. If the unit or any of the parts are damaged, contact your dealer before using.
2. Carefully read the literature provided to familiarize yourself with specific details regarding installation and use. These materials should be retained for future reference.

INTRODUCTION AND GENERAL INFORMATION

Thank you for your purchase of this Pivot Pro Series control panel from Zoeller Company. The design and function of this product represents the culmination of decades of experience in the water and wastewater pumping industries. This panel has integrated logic designed to protect operators, equipment, and the environment from common mistakes and failures. As one example, this panel is programmed to recognize if float switches malfunction or are installed out-of-order. If an issue is detected, the panel will make adjustments to keep the pump system operational, while also alerting the user to an issue that needs attention. These features add tremendous value for the system owner and service providers. However, some users most familiar with basic electro-mechanical panels may initially find certain behaviors of the Pivot to be unexpected. It is essential that installers and operators understand the operational characteristics of the Pivot as presented in this manual. We are confident that you will also find these features to be logical, useful, and valuable.

The Pivot Pro Series makes use of certain programmed values to guide its behavior when problems are detected in the field. Zoeller has selected default settings for these values that are appropriate for most applications and should not require modification. However, should adjustments be necessary, please refer to the section entitled 'Adjusting Defaults' for instructions on how to customize these settings. Throughout this manual, adjustable default settings are indicated in this manner: (default).

Caution: Please read the following manual carefully before installing or operating the panel.

This panel must be installed and serviced by a licensed electrician in accordance with the National Electric Code NFPA-70, state, and local requirements/codes.

This panel is housed in a NEMA 4X sealed enclosure for indoor and outdoor use. All conduits and cables connected to the panel must be sealed to protect the panel from moisture and gases.

DO NOT DISCARD THIS MANUAL. It contains important information regarding safe use of this product. This manual should always be referenced during installation and operation. Please store this manual in a safe location.

After removing the panel from its package, inspect for any missing components or damage (cracks, dents, scratches, etc.). Damage claims must be submitted to the panel's sales location or distributor.

"This Technical Guide is aimed at professional users and is only intended to provide them guidelines for the definition of an industrial, tertiary or domestic electrical installation. Information and guidelines contained in this Guide are provided AS IS. Zoeller Pump Company and its parent company Zoeller Company makes no warranty of any kind, whether express or implied, such as but not limited to the warranties of merchantability and fitness for a particular purpose, nor assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed in this Guide, nor represents that its use would not infringe privately owned rights. The purpose of this guide is to facilitate the implementation of International installation standards for designers & contractors, but in all cases the original text of International or local standards in force shall prevail. Professional installers should adapt these guidelines as required for their specific circumstances as required for each application and their specific jurisdiction."

LIMITED WARRANTY

SPECIFICATIONS

This product monitors and controls liquid levels in pump stations, sump pump basins, and other non-potable water applications. The Pivot control panel must be hardwired to an appropriate 60Hz AC power source as specified by the application.

INSTALLATION

The Pivot Pro Panel is designed to control submersible pumps in demand-dosing or timed-dosing applications. The controller uses float switches to monitor the liquid levels in a wet-well, and it will show and sound alarms in response to high-water and other fault conditions. It will also record operating statistics including number of pump cycles and pump elapsed-run times.

Float Installation

The Pivot Pro Panel is designed to operate in most applications (simplex or duplex) with 3 normally-open float switches. See warning below before installing 4 floats into a duplex application. Mark float switches with unique identifiers on both ends of the cable to assist in proper installation and wiring.

WARNING: Most applications for this control panel should only utilize 3 float switches. Installing 4 floats may lead to unintended consequences including property damage. Do not install 4 floats into this application unless you read and understand the panel operations described in the notes below.

NOTE: When duplex Pivot Pro Panels are installed into residential or small commercial systems, the second pump exists for redundancy in case one pump fails. In these applications, one operational pump is typically to be sufficient to handle the incoming flow. Should the water level in the wet well rise enough to engage the second pump, it is indicative of a problem (i.e. pump failure, stuck float, etc.) and an alarm should sound. The addition of a 4th float into this type of system will mask pump failures, stuck floats, etc. unless changes are made to the default settings. To avoid issues, Zoeller recommends the use of only 3 floats.

NOTE: Municipal applications may require more flexibility than residential or small commercial systems. Applications like storm water lift stations can, at times, receive incoming flow that surpasses what one pump can manage. In these situations, a second pump may need to run simultaneously in order to keep up with the incoming water. Such a condition may not warrant an alarm. For this reason, municipal lift stations sometimes use 4 floats in a Stop, Lead, Lag, High Alarm (SLLH) configuration to provide the lag pump with time to function before an alarm occurs. If 4 floats are used, the Pivot Pro Panel expects the float order to be SLLH (default). However, the same 4 float configuration in a residential or small commercial application will simply mask problems until additional critical failures occur.

Caution: Turn off all power sources before performing any work inside the pump chamber. Failure to do so could result in potentially fatal electrical shock hazards.

1) Prepare the required number of float switches (3 for most applications) and choose suitable location levels in the wet well for their operation. Refer to the system design (provided by others) for the correct float locations to ensure the system will function properly.

NOTE: Optimal float positions depend on the application system design (provided by others).

2) Secure the float switches in the appropriate positions in the wet well and verify that they have free range of motion and do not interfere with any other equipment. Verify that the cables cannot be cut, pinched, or otherwise damaged throughout each float's range of motion.

Simplex Pivot Pro Panels operate using three floats. These floats should be installed in the following order from highest to lowest:

• 	High Water Alarm
• 	Start
• 	Stop

Alternating duplex Pivot Pro Panels are designed to utilize just three floats for the majority of applications. These floats should be installed in the following order from highest to lowest:

• 	Lag / High Water Alarm
• 	Lead
• 	Stop

NOTE: Duplex Pivot Pro Panels ship from the factory with a preinstalled jumper wire linking the Lag and High Water Alarm float terminals. In the majority of applications there is no reason to separate the functions of the Lag and High Water Alarm. For this reason, it is recommended that for standard installations, the jumper remain in place and only 3 floats be used. The top float should be connected to the High Water Alarm terminals.

In rare cases (mostly municipal), a duplex application may require 4 floats. See warning above. When in doubt about the required number of floats, the conservative (and recommended) approach is to utilize the 3 float installation as indicated above. If 4 floats are necessary, the Pivot Pro Panel's default settings require that they be installed in the following order from highest to lowest:

• 	High Water Alarm
• 	Lag
• 	Lead
• 	Stop
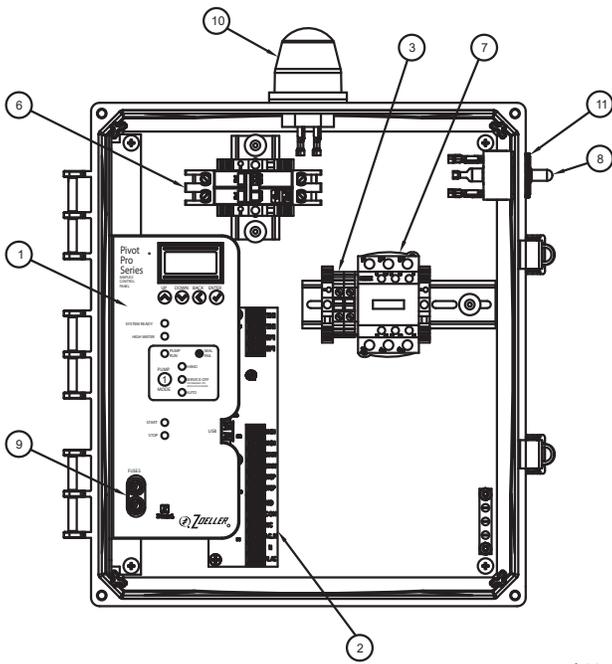
Simplex, 1PH Pivot Pro
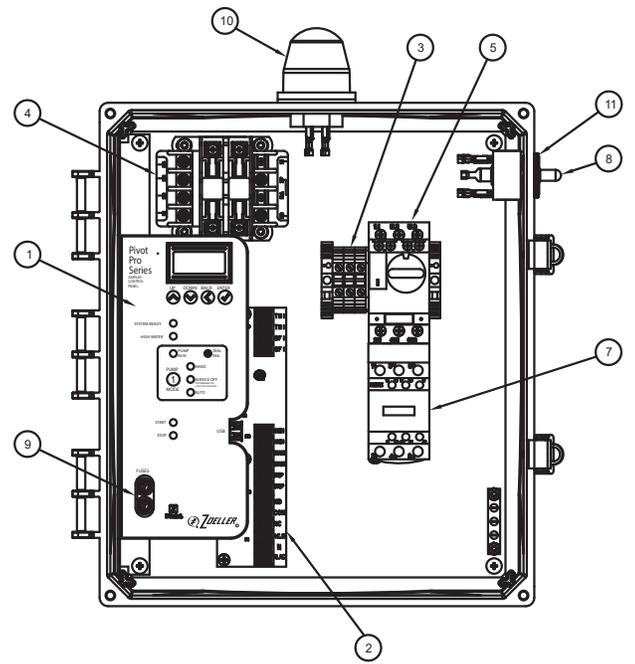
Simplex, 3PH Pivot Pro

1) User Interface
2) Terminal Board
3) Pump Power Terminals (TB1)
4) Transformer (3PH Only)
5) Overload(s) (3PH Only)
6) Circuit Breaker(s) (1PH Only)
7) Motor Contactor(s)
8) Test/Silence/Reset Switch
9) Fuses & Fuse Holders
10) Globe
11) Alarm Buzzer
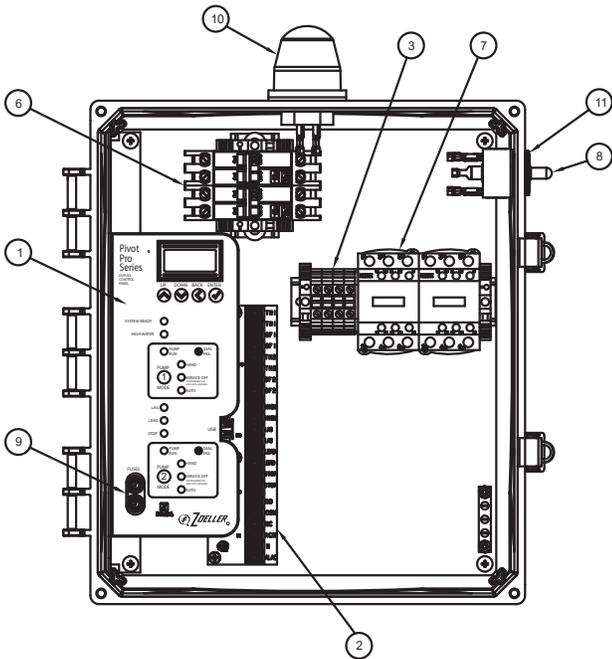
Duplex, 1PH Pivot Pro
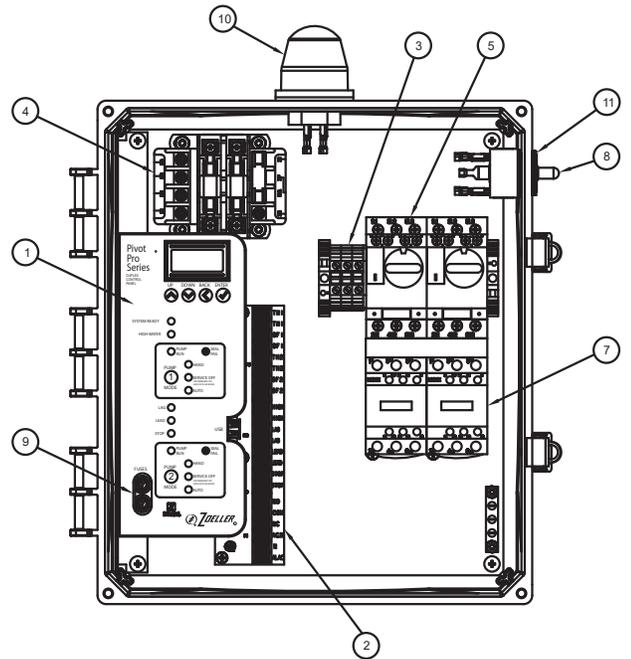
Duplex, 3PH Pivot Pro

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NOTE: The preinstalled jumper wire must be removed from terminal board if 4 floats are used.

NOTE: If local codes require the use of 4 floats in a residential or small commercial duplex application, it will be necessary to modify the Pivot Pro Panel's default settings regarding float order. Residential or small commercial duplex applications typically utilize a Stop, Lead, High Alarm, Lag (SLHL) float order rather than the default Stop, Lead, Lag, High Alarm (SLLH) configuration. Refer to the section entitled 'Adjusting Defaults' for instructions on how to customize these settings.

Mounting the Control Panel

Caution: Do not mount the panel in an area that could become submerged in water or other liquids.

1)   Determine where the panel should be placed. If the distance from the panel to the pump chamber exceeds the length of either the float cables or the pump power cables, ensure that only appropriate conductors and methods are used to extend the leads.

NOTE: Never use extension cords to extend electrical service to pump motors.

2)   Fasten the mounting feet to the panel enclosure.
3)   Mount the control panel in the desired location.
4)   Locate the most appropriate positions for the wiring conduits or connectors in the bottom of the panel enclosure. For the required number of power circuits, reference the local electrical codes and schematics. Separate conduits are needed to isolate the float cables from power and pump cables.

Caution: Float switch cables must be wired into the panel separately from pump and power cables. Ensure the power supply voltage, amperage, and number of phases meet the requirements of the pump motor(s) being installed. If in doubt, see the pump identification plate for voltage/phase requirements.

5)   Cut the appropriately sized holes for the wiring conduits or cable connectors.

NOTE: Verify that there is enough space in the wiring conduits or connectors for all the power and pump cables.

6)   Secure the wiring conduits or cable connectors to the control panel.
7)   Pull the appropriate conductors through the conduits to the panel.

WARNING: Ensure all power sources are off before pulling or connecting any wiring. Failure to do so can result in potentially fatal electric shock hazards. Caution: To prevent gases or moisture from entering the panel, wiring conduit seals or panel connector seals must be used. Additionally, the application of a duct seal putty is recommended to seal the conduit ends.

Incoming Power Requirements

Each Pivot Pro is designed with isolated electrical circuits which separate the panel's control functions from its alarm functions. This redundancy is beneficial and may be required by code in some jurisdictions. Likewise, separate circuits are provided for each pump in the system. The following tables indicate the electrical drops necessary to power up Pivot Pro Panels. In some circumstances it may be possible to use jumper wires to service multiple circuits from a single power supply, though providing separate circuits is recommended. The tables categorize the power supply options from Optimal to Adequate.

NOTE: For Single Phase Panels, best practice is to bring in separate electrical feeds for the control power and for the alarm power. This ensures that the alarm circuit will still be operable should an unexpected surge disable the control circuit. If separate circuits are not available, it will be necessary to connect a jumper wire from the Alarm A/C (ALAC) terminal to the Control A/C In (AC.IN) terminal. The jumper wire, if needed, should be sized per local code. If neither separate circuits nor a jumper is used, the panel will not operate properly.

NOTE: For Three Phase Panels, a transformer is included to supply the Pivot with the necessary 120V AC power to operate the control and alarm circuits. For this reason, a jumper wire is pre-installed from the factory between the Alarm A/C (ALAC) terminal to the Control A/C In (AC.IN) terminal. It is neither necessary nor recommended to land additional 120V power supplies to these terminals.

Caution. Always ensure that the source wiring and breakers are sized sufficiently to carry the load required of the circuits they service.

Single Phase, Simplex

	Control Power	Alarm Power	Pump Power
Optimal	120V, 1PH	120V, 1PH	120V or 230V*, 1PH
Standard	120V, 1PH	Jumper** from Control	120V or 230V*, 1PH

Single Phase, Duplex

	Control Power	Alarm Power	Pump 1 Power	Pump 2 Power
Optimal	120V, 1PH	120V, 1PH	120V or 230V*, 1PH	120V or 230V*, 1PH
Standard	120V, 1PH	Jumper** from Control	120V or 230V*, 1PH	120V or 230V*, 1PH

Field Wiring to the Control Panel

All field wiring will connect to either the terminal board, terminal strip (TB1), or the motor contactors directly. Refer to your panel's specific wiring diagram schematic before proceeding with field wiring installation.

NOTE: Refer to the wiring diagram for the appropriate torque specifications for each terminal type.

1)   Connect all ground wiring to the ground bus bar in the panel. Ensure the bus bar is properly grounded per local code.

2) Connect the wiring for each float switch to the appropriately labeled lugs on the terminal board.

3) Connect the power cord wiring from the pump(s) directly to the motor contactor(s).

4) **Single Phase Panels Only:** Connect the control power supply wiring to the terminal board lugs labeled "AC.IN" and "N".

5) **Single Phase Panels Only:** If a dedicated power supply exists for the Alarm circuit, connect the alarm power supply wiring to the terminal board lugs labeled "ALAC" and "N". If only one power supply is used for both the control and alarm circuits, connect a jumper wire between the Alarm A/C (ALAC) terminal to the Control A/C In (AC.IN) lugs.

6) Connect the appropriate pump supply power wiring to the Pump Power Terminal Strip labeled "TB1".

7) **208V, 230V, & 460V Three Phase Panels Only:** Locate the loose wire marked "H" near the transformer. Connect the wire to the lug on the transformer corresponding to pump voltage. H1=460V, H2=230V, and H3=208V. This action will supply the appropriate power to both the control and alarm circuits. It is neither necessary nor recommended to bring in additional outside power sources for either the control or alarm circuits in three phase applications.

8) If the pumps are equipped with seal fail sensors, connect the seal fail wires from the pump cable to the appropriate lugs on the terminal board (SF1/SF1 for Pump 1, SF2/SF2 for Pump 2). It will be necessary to calibrate the Seal Fail Adjustment Screw during the startup procedure for the moisture protection circuit to work properly. See "Seal Fail Adjustment Screw" in the User Interface section of this manual for more information.

9) If the pumps are equipped with thermal sensors, first remove any jumper wires connected to the thermal circuit lugs on the terminal board (TH1/TH1 for Pump 1, TH2/TH2 for Pump 2). Connect each pump's thermal circuit lead wiring to the appropriate lugs. Verify that the menu setting for Thermals is set to Normally Open (NO) for each pump (1 and 2). See "Thermal Protection Settings" in the Operation section of this manual for more information.

10) A normally open (NO) Pump-Run Dry Contact is available on the white façade of each motor contactor. The left-most terminals (top and bottom) of each contactor are labeled 13 and 14. A circuit between these two terminals will close when the motor contactor engages, and open when the motor contactor disengages.

After the equipment is mounted and wired but before power is applied, double-check all wiring by gently tugging on each wire to ensure a tight connection. Power up the panel and test it to verify that the control panel operates correctly.

USER INTERFACE

This Pivot® Pro Series Control Panel features a bracket-mounted user interface with LCD screen inside the enclosure and an alarm test/silence/reset toggle switch outside the enclosure (right side). The layout of the internal interface varies slightly depending on the model. The common user interface features are indicated below

** JUMPER BETWEEN AC.IN AND ALAC FOR THREE PHASE PANELS ONLY.

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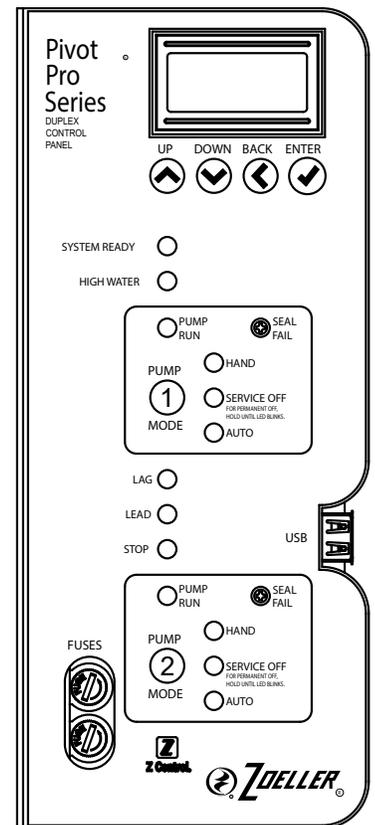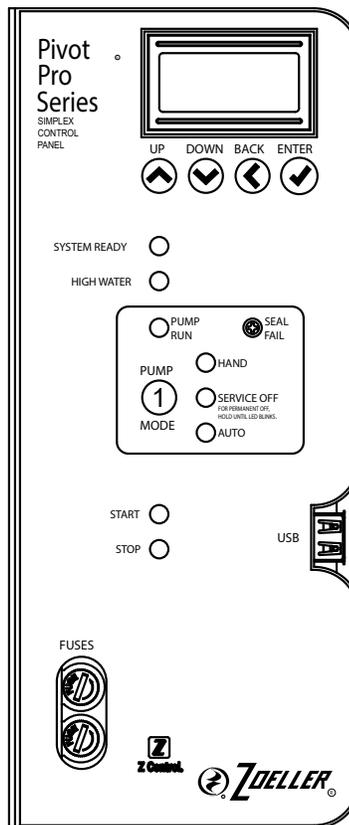
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Terminal Board Connections Simplex and Duplex   **Bracket-Mounted User Interfaces: Simplex and Duplex**

LCD Screen and Interaction Buttons

This Pivot Pro panel features an LCD display screen and four interaction buttons. The LCD screen and buttons provide a means for reporting system statistics and offer the user a means to change system settings. Users are able to see system statistics by scrolling through the main menus. For additional information about the screen menu and for instructions on changing settings, see "LCD Screen Menu & Navigation" in the Operation section of this manual.

System Ready Indicator

This Green LED indicates that power has been successfully applied to both the control and alarm circuits, the pump(s) are placed into Auto Mode, and the panel is ready to function properly without any faults.

High Water Indicator

The Red High Water LED indicates that the high water float is or has been tripped and can mean either A) a high water condition is currently present, or B) a high water condition previously occurred and has been corrected but the alarm has not yet been manually reset. To manually reset the High Water Indicator, hold the Test/Silence switch on the right side of the enclosure in the down (Silence) position for 3 seconds.

Pump Run Indicator

The Pump Run LED may appear Green, Red, or Amber. A Pump Run LED exists for each pump in the system. This indicator illuminates Green whenever the associated pump is being called to operate. An Amber or Red Pump Run LED indicates a less common problem. Refer to the Alarm Condition Faults section for information on deciphering different LED conditions.

Seal Fail Adjustment Screw

The Seal Fail Adjustment Screw is used in applications where the pumps have integrated seal fail circuits. Each adjustment screw establishes the tripping point for the associated pump's seal fail circuit. To use this feature, ensure that each pump's seal fail circuit wiring is connected to the appropriate 'SF' lugs on the terminal boards. Power up the panel and, using a small phillips screwdriver, turn each adjustment screw counter-clockwise until it stops. Then, slowly turn the screw clockwise until the Pump Run LED illuminates red, then reverse the screw about 1/8 turn such that the LED is no longer red. The circuit is now ready for operation. Note: If the Pump Run LED is illuminated red for over 2 seconds, an alarm will sound. Should this occur, reset the alarm by pressing the external panel Silence/Test toggle switch down into its Silence position and holding it for 3 seconds, then releasing it.

Pump Mode Button

The Pump Mode Button toggles between the three possible pump modes: HAND, OFF, and AUTO. A Pump Mode Button exists for each pump in the system.

> **HAND MODE** – Solid Blue LED. Placing a pump into Hand Mode will activate the pump regardless of float status. A pump placed into Hand Mode will run continuously until either the Pump Mode is changed by the user or 5 minutes (default) elapse. If the pump remains in Hand Mode beyond 5 minutes (default), the Pump Mode will automatically revert to Auto Mode.

Caution: Hand mode is meant as a short-term method to manually run a pump. Always monitor the water level and remember to return the panel to Auto Mode. Pumps operating in Hand Mode ignore floats and are at risk of running dry if the liquid in the wet well is depleted. Such a condition may cause damage and/or failure of the pump.

> **OFF MODE 1: SERVICE** – Solid Red LED. Placing a pump into Service Off Mode will prevent the pump from running regardless of float status. A pump placed into Service Off Mode will remain in that state until the Pump Mode is changed by the user. If the pump remains in Service Off Mode beyond 4 Hours (default), audible and visual alarms will activate to remind the user to return the pump to Auto Mode.

> **OFF MODE 2: PERMANENT** – Blinking Red LED. Placing a pump into Permanent Off Mode will prevent the pump from running regardless of float status. To access Permanent Off Mode, press and hold the Pump Mode Button for approximately 5 seconds. A pump placed into Permanent Off Mode will remain in that state until the Pump Mode is changed by the user. No alarms will activate in Permanent Off Mode. To exit Permanent Off Mode press the Pump Mode Button.

WARNING: Off Mode (Service or Permanent) is NOT an appropriate lockout method when performing pump maintenance. Always remove the system AC power to lockout the pump(s) by means of a proper upstream circuit breaker or switch disconnect.

> **AUTO MODE –** Solid Green LED. Auto is the proper mode for normal operation. A pump placed into Auto Mode will be called by the panel to start and stop automatically based on the detected status of the float switches. In a duplex application, the control panel will alternate the lead pump with each cycle.

Float Status Indicators

The Pivot Pro utilizes a series of LEDs to convey the status of the individual float switches in the wet well. When a normally-open float switch is lifted by the liquid, it's corresponding LED will illuminate Green. This feature quickly shows the operator what float switches the panel believes are in the "up", or "closed", position and which are not. It also provides a convenient method for verifying proper float installation and operation. If a particular float is physically lifted, but its corresponding LED does not illuminate, then there is some issue with that float's circuit which must be addressed. Blinking Float Status LEDs are an indication that the panel has detected issues with float operation. The LCD Screen will provide information as to the perceived faults. Also refer to the Alarm Condition Faults section of this manual for information on deciphering different LED conditions.

Alarm Test/Silence/Reset Switch (External)

A momentary toggle switch exists on the right-side exterior of the enclosure and can perform the following functions.

> **Alarm Test –** To verify that the LEDs, globe light, and horn function properly, lift and hold the switch to its 'up' position. Releasing the switch will end the test.

> **Alarm Silence –** To silence an audible alarm, press the switch to the down position and release. The alarm will remain active and the globe light will continue to illuminate but the horn will stop.

> **Alarm Reset –** Certain alarms will cause the globe light to persist even if the condition causing the alarm has been remedied. In these circumstances, the alarms must be addressed in person and manually reset. Perform a manual reset by pressing the switch into the 'down' position and holding it for 3 seconds.

ADDITIONAL FEATURES

Dry Contacts

Pivot Pro control panels are equipped with Form 'C' dry contacts for use with remote monitoring and external alarm accessories. They are located on the terminal board between the incoming power supply terminals and the float connection terminals. The dry contacts consist of a Normally-Open (NO) terminal, a shared Common (COM) terminal, and a Normally-Closed (NC) terminal. The 'normal' state occurs when the panel is powered up and no alarm conditions exist. In the event of any alarm, the contacts will change from their 'normal' state to the alarm state (normally-open to closed, and normally-closed to open).

The contacts will also be changed to the alarm state if the panel power is disconnected regardless of system fault conditions.

To use these dry contacts, the installer will need to supply a live conductor to the COM terminal and then connect the external equipment to either the NC terminal or the NO terminal. These Form 'C' dry contacts can carry a maximum of 5 amps and can operate from 120VAC to 240VAC, or from 12VDC to 30VDC.

Fuses

Two fuses are used for circuit protection in this panel and are located in side-by-side black fuse holders on the lower left edge of the user interface bracket. Each fuse is rated as 3A, fast-acting, 120VAC. The upper fuse protects the main circuit board electronics, and the lower fuse protects the globe light, horn, and floats.

To check the continuity of the fuses, first disconnect the panel power. Remove each fuse and measure its resistance using an ohmmeter. A blown fuse will read as an open circuit (infinitely high resistance). If a fuse is blown, replace it with another identical 1A fuse.

WARNING: Disconnect supply power before checking or changing either fuse.

Factory Reset

A factory reset option exists in the LCD screen menu. Performing a factory reset will clear all pump history records in the panel's memory and return the panel's configurable settings back to the default values. The user will be required to unlock the system prior to performing a reset. To unlock the system, press any two Interaction Buttons and hold for 2 seconds. If a custom PIN number or USB Key has been established, it will be necessary to perform the appropriate unlock action before a reset can take place.

Pump and System Counters

The Pivot Pro tracks pump starts, elapsed run times, and other system data. This data is accessible for review using the LCD screen. Additionally, a programmed USB stick can be used to extract this information from the panel. To extract system information using a USB stick: Format a USB thumb-drive as FAT32, create a new .txt file named "PivotConfig.txt", and write the phrase "ReadConfiguration" into the file. Insert the thumb-drive into the USB slot located near the bottom right side of the user interface bracket. The Pivot Pro Panel will automatically read the drive and create a new file named "FirmwareUpdateResults.txt" which will contain the system data. All counter values are reported first behind the phrase 'NonvolatileVariables'. If a "FirmwareUpdateResults.txt" file already exists on the drive, the new system data will be written into the file below any existing data.

Operation

Powerup

Once the panel and floats are appropriately installed and power is routed, ensure that the enclosure is free of debris (wire clippings, tools, etc.) before engaging power from the breaker box or disconnect. Immediately after powerup, the Pivot alarm will briefly test, and the system will become operational. The pump mode(s) will default to the AUTO position and the system will check the float status. If sufficient water is present, the Pivot may begin a pump cycle. In the event that both pumps in a duplex application are called to operate simultaneously, the pump starts will be staggered with a 2 second delay.

Float Functionality
Operation by Float Sequence

a) Simplex System with 3 Floats – **SSH (STOP, START, HIGH ALARM)** – Typical
      1) When water is below the STOP float, the pump is inactive.
      2) When water raises both STOP and START floats, the pump activates.
      3) If water continues to rise and activates the HIGH ALARM float, a high water alarm condition will occur. A high water alarm will continue until manually reset by an individual, even if the high water condition is alleviated.
      4) When water lowers below the STOP float, the pump stops.

b) Duplex System with 3 Floats – **SLH (STOP, LEAD, LAG / HIGH ALARM)** – Typical
      1) When water is below the STOP float, both pumps are inactive.
      2) When water raises both STOP and LEAD floats, the lead pump starts running.
      3) If water continues to rise and activates the LAG / HIGH WATER float, the lag pump will be called to run in addition to the lead pump, and a high water alarm condition will occur. A high water alarm will continue until manually reset by an individual, even if the high water condition is alleviated.
      4) When water lowers below the STOP float, both pumps stop running.

c)   Duplex System with 4 Floats – **SLLH (STOP, LEAD, LAG, HIGH ALARM)** – Less Common
1)   When water is below the STOP float, both pumps are inactive.
2)   When water raises both STOP and LEAD floats, the lead pump starts running.
3)   If water raises the LAG float, the lag pump starts running.
4)   If water continues to rise and activates the HIGH ALARM float, a high water alarm condition will occur. A high water alarm will continue until manually reset by an individual, even if the high water condition is alleviated.
5)   When water lowers below the STOP float, both pumps stop running.

d)   Duplex System with 4 Floats – **SLHL (STOP, LEAD, HIGH ALARM, LAG)** – Rare*
1)   When water is below the STOP float, both pumps are inactive.
2)   When water raises both STOP and LEAD floats, the lead pump starts running.
3)   If water continues to rise and activates the HIGH ALARM float, a high water alarm condition will occur. A high water alarm will continue until manually reset by an individual, even if the high water condition is alleviated.
4)   If water raises the LAG float, the lag pump starts running.
5)   When water lowers below the STOP float, both pumps stop running.

*NOTE: The Pivot Pro is designed to operate using only 3 floats for the majority of applications (simplex and duplex). The use of only 3 floats is recommended. However, if local codes require the use of 4 floats in a residential or small commercial duplex application, it will be necessary to modify the Pivot Pro Panel's default settings regarding float order. To enable alarms for pump problems, residential or small commercial duplex applications should utilize a Stop, Lead, High Alarm, Lag (SLHL) float order rather than the default Stop, Lead, Lag, High Alarm (SLLH) configuration. Refer to the section entitled 'Adjusting Defaults' for instructions on how to customize these settings.

LCD Screen Menu & Navigation

The user is able to view the system counters and current settings through the LCD screen menu. The system settings lock automatically to prevent accidental or unauthorized modifications. To unlock these menus, press and hold the Back and Enter buttons simultaneously for 2 seconds. For increased security, the user can establish a custom PIN number or USB Key which will subsequently be required to unlock the menus.

Caution. If a custom PIN is established to protect the settings of the panel, be certain to record the PIN number in a safe location. Once a PIN is set, it will be required for any system changes in the future.

Progressing down through the menu, the user will encounter the following screens from top to bottom. All screens except the Home Screen and the Alarm Screen can be modified. Refer to the Adjusting Defaults section for information on changing these settings.

1. **Home Screen:** If no alarms are present, the Pivot Pro display reverts to its home screen after approximately 1 minute of inactivity. For simplex panels, the home screen displays the pump cycle count. For duplex panels, the left side of the home screen indicates either an 'A' for Alternating Mode or an 'L' for dedicated Lead Mode, (see #8 below) while the right side provides the cycle counts for each pump; Pump 1 on the top and Pump 2 on the bottom. In Alternating Mode, the 'A' will display in the upper row if Pump 1 is running currently or next-in-line to run, but will display in the bottom row if Pump 2 running currently or is next-in-line to run. In dedicated Lead Mode, the 'L' will always display next to the dedicated lead pump; top row for Pump 1 and bottom row for Pump 2. In Alternating Mode, the lead pump will alternate with each cycle. In dedicated Lead Mode, the lead pump will never change.

2. **Alarm Screen:** If an alarm is present, the alarm type will be indicated on the screen. If multiple alarms are present, the display may cycle to report the different alarm types.

3. **Service Information:** The Pivot Pro has a screen to give service provider information to the user. By default, the screen reports "Zoeller Co." as well as the Zoeller Co. phone number. This screen can be customized by the user or service provider.

4. **Pump 1 Cycle Count:** Display reads "P1 CC" and reports the number of cycles since the last factory reset.

5. **Pump 2 Cycle Count (duplex panels only):** Display reads "P2 CC" and reports the number of cycles since the last factory reset.

6. **Pump 1 Elapsed Run Time:** Display reads "P1 ETM" and reports the cumulative running time since the last factory reset.

7. **Pump 2 Elapsed Run Time (duplex panels only):** Display reads "P2 ETM" and reports the cumulative running time since the last factory reset.

8. **Lead/Lag Select (duplex panels only):** The Lead/Lag Select setting allows the user control over how frequently, and in which order, Pump 1 will run compared with Pump 2. There are three options available on this screen: A ratio of the form '# : #', 'P1 Lead', and 'P2 Lead'. In a conventional duplex alternating arrangement, the pumps will alternate back and forth with each cycle. In the Pivot Pro, this is expressed as the ratio of '1:1', which means that Pump 1 will run one cycle then Pump 2 will run one cycle. A ratio of '3:1' will cause Pump 1 to run three cycles in a row before switching to Pump 2 for the fourth cycle. A ratio of '2:4' will cause Pump 1 to run two cycles, and then Pump 2 will run four cycles. The two other options in this menu are 'P1 Lead' and 'P2 Lead'. 'P1 Lead' will always call Pump 1 to run a cycle and Pump 2 will only be called if the Lag Float rises. 'P2 Lead' will always call Pump 2 to run a cycle and Pump 1 will only be called if the Lag Float rises. If a Lead pump is chosen, the Home Screen will now show "L" instead of "A".

9. **Panel Mode and Float Count:** Panel Mode is shown on the top line of the display. Simplex Pivot Pro panels only have one valid panel mode: 'Simplex'. Duplex Pivot Pro panels have three panel modes: 'Duplex', 'Alt', and 'Simplex'. In 'Duplex' panel mode, the Pivot Pro will run both pumps simultaneously if the Lag float rises. In 'Alt' panel mode, the Pivot Pro will disengage the Lead pump and engage the Lag pump if the Lag Float rises. In 'Alt' mode, the panel will not allow both pumps to run simultaneously, even if the user attempts to put both pumps into Hand Mode. 'Simplex' mode ignores Pump 2 and runs the panel as though it were a typical simplex application. Float Count is shown on the second line. In simplex panels, or

in panels running in Simplex mode, the float count is set to 3 and cannot be changed. In duplex panels, the float count can be set to 3 or 4. Furthermore, 4 float systems provide the option of setting the float order to either 'SLLH' or 'SLHL'. Refer to the section above entitled 'Float Functionality' for more information about float order.

10. **Overload Alarms:** The Overload Alarms (OL Alrms) setting tells the Pivot Pro whether overloads are present in the system. It is almost universally the case that three-phase panels have overloads and single-phase panels do not. The two options are 'enable and disable.

11. **Seal Fail Pump Cutout Circuits:** The Seal Fail setting (SealFail) dictates whether a seal fail alarm condition will deactivate the affected pump. This option is not present on the menu in Simplex applications. The two menu options are 'NoCutout' and 'Cutout', with the default being 'NoCutout'. Unless required by local code, this default should not be changed. If 'Cutout' is selected and a seal fail alarm occurs, the panel will refrain from calling the affected pump to run unless a) both pumps experience simultaneous seal fail alarms, or b) a Lag/High Water event occurs. For more information about the seal fail circuit, see "Seal Fail Adjustment Screw" in the User Interface section of this manual.

12. **Continuous Run Timer**:   The Continuous Run Timer (Cont Run) sets the amount of time that Pivot Pro will allow a pump to run before sounding an alarm. If a pump cycle takes longer than the Continuous Run Timer value, the panel assumes there is a problem and logs an alarm condition.

13. **HOA Settings:** The HOA (Hand/Off/Auto) Settings control the timeout values associated with the Pump Modes. There are two settings to adjust within this menu: HOA Hand Timeout (denoted by '#mH') and HOA Service Off Timeout (denoted by '#hA). HOA Hand Timeout sets the number of minutes that the panel will allow a pump to run in HOA Hand Mode before changing the mode to HOA Service Off. The HOA Service Off Timeout sets the number of hours that Pivot Pro will allow the panel to be in HOA Service Off Mode before sounding an alarm.

14. **Thermal Settings:** The Thermal setting (Thermals) dictates how the panel will monitor each pump for a thermal overload condition. The menu options are either 'NO' or 'NC'. This feature is only applicable when using pumps with thermal circuit lead wires. By default, Pivot Pro thermal settings are normally closed (NC), and small jumper wires are applied to the associated lugs on the terminal board. To use this feature with Zoeller pumps, first power down the panel, remove the jumper wires on lugs TH1/TH1 for Pump 1 and TH2/TH2 for Pump 2, then connect each pump's thermal circuit lead wires to the appropriate lugs.

15. **Horn Settings:** There are two options for the Horn Settings: 'Active' and 'Latching'. When set to 'Active' the panel's audible alarm will stop automatically when the alarm condition is alleviated and the audible alarm has sounded for at least 1 minute. When set to 'Latching' the panel's audible alarm will not stop until a user recognizes the alarm by using the silence switch or resetting the alarm condition.

16. **Globe Settings:** There are three options for the Globe Settings: Alarm Based ('Alarm'), 'Blinking', or 'Solid'. If set to 'Alarm', the globe will use different blinking patterns for different alarm conditions. When set to 'Blinking' or 'Solid', the globe will always respond to alarms in the respective way.

17. **Float Logic Settings:** There are two options for the Float Logic Settings: 'Smart' and 'Relay'. When set to 'Smart', the Pivot Pro will attempt to discern potential float failures and will take action to keep the panel operational despite the failures. If the user is unfamiliar with Pivot Pro panels, the 'Smart' logic reactions may lead to panel behaviors that the user might find unusual. Setting the float logic to 'Relay' disables the panel's attempts to interpret float failures and behaves like more conventional relay-logic panels.

18. **Lock Settings:** The Lock Settings control how the panel is secured against tampering and unauthorized changes to the internal settings. There are three options for the Lock Settings: '2 Button', 'Pin', and 'USB'. When set to '2 Button' the user must hold the Back and Enter buttons simultaneously for 2 seconds to unlock the system for editing. When set to 'Pin', the system will prompt the user to enter a numeric, 4-digit PIN which will be required for future access to the settings. When set to 'USB', the system will first prompt the user to set a numeric, 4-digit PIN, and then prompt the user to enter a 'USB Key'. When the user inserts a USB thumb drive (memory stick) formatted as FAT32, the Pivot Pro will write the PIN number into a file on the USB Key named "PivotUnlock.txt". A USB memory stick with that file will be required to unlock the Pivot Pro for subsequent changes. Leave the USB memory stick in place until all edits to the Pivot Pro's settings are complete, then remove the drive. The Pivot Pro will automatically lock against changes.

19. ***Lock* Display:** When using '2 Button' or 'Pin' locking options, the '*Lock* Display' screen will become available whenever the system is unlocked. Hitting the Enter Button on this screen will lock the system against changes.

20. **Factory Reset:** Factory Reset restores the panel to its original factory settings, including pump counters.

Alarm Condition Faults

System fault conditions which will activate the lighted alarm globe and horn. A list of the most common or serious fault sources are listed below. During a fault, the LCD screen will display identifying information.

•   **High Control Voltage** – The Pivot Pro control circuit is only designed to operate using 120V, single phase, 60 Hz power. If 230V power is mistakenly applied to this circuit, the panel will detect the issue and immediately enter a safe mode to prevent damage to components. Under this condition, most of the LEDs will begin blinking, but neither the globe nor the horn will activate. No panel functions are available when High Control Voltage is detected, and the only course is to cut the power supply and correct the issue. When appropriate 120V power is restored, the system will begin functioning properly.

•   **Disabled Alarm Circuit** – The Pivot Pro maintains circuits separately for control functions versus alarm functions. If the panel does not detect power on the alarm circuit, the panel will institute an emergency alarm in which the globe will double-blink, the horn will engage, and all the

float LEDs will light solid Red. The system cannot be silenced if a Disabled Alarm Circuit is detected. The source of the issue must be identified and corrected, usually by either connecting power to the alarm circuit lugs, installing a jumper wire, or replacing a blown alarm fuse.

- **High Water Alarm** – When a high water condition occurs, the High Water alarm will activate. High water is indicated by the horn, a solidly lit globe, and a Red High Water LED indicator inside. The alarm globe will remain engaged (latched) to notify the user of an issue and will persist even if the water level has subsequently fallen below the lowest float level position. The alarm horn will sound for at least 1 minute unless manually silenced, but it will automatically silence once the high water condition is rectified. The high water alarm can only be cleared (reset) by pressing the external panel Silence/Test toggle switch to its Silence position and holding it for 3 seconds, then releasing it.

- **Float Fault** – Float faults can result from installation error, bad connections, or float malfunction. If the Pivot Pro detects unusual feedback or out-of-order activation from any float, the panel will sound the horn, slow-blink the globe, and cause the status LED of the float in question to blink. A blinking Amber or Red float LED (including the High Water LED) should be checked for proper installation and operation. The alarm can only be cleared (reset) by pressing the external panel Silence/Test toggle switch to its Silence position and holding it for 3 seconds, then releasing it.

- **Continuous Run Alarm** – Pivot Pro monitors the operation of the pump(s). If a pump operates continuously for more than 20 minutes (default), the panel assumes there is a problem and will sound an alarm. A Continuous Run Alarm is indicated by the horn, a solidly lit globe, and a blinking Amber Pump Run LED. The alarm can only be cleared (reset) by pressing the external panel Silence/Test toggle switch to its Silence position and holding it for 3 seconds, then releasing it.

- **Service Off Timeout** – If a pump is placed into Service Off mode (denoted by a solid Red HOA Off LED), the panel will start tracking the time. If the pump remains in Service Off mode after 4 hours (default) elapse, the panel will sound an alarm to remind the user that the pumps are disabled. The alarm is indicated by the horn, a double-blinking globe, and a Red blinking HOA Off LED. Changing the status of the pump with the Pump Mode button will clear the alarm. To place the pump directly into Permanent Off mode, press and hold the Pump Mode button for approximately 5 seconds.

- **Failed Contactor** – The panel monitors the contactor relay position. If a contactor fails to switch and remains in the wrong position it will trigger a failed contactor alarm condition marked by the horn, a fast-blinking globe, and a solid Red Pump Run LED. Correcting this fault requires panel service by a qualified electrician or installer.

- **Overload (3-phase panels only)** – If the current drawn by the pump circuit exceeds the limits of the contactor overload module, the overload module will trip and an overload alarm will occur. The overload alarm is indicated by the horn, fast-blinking globe, solid Red Pump Run LED, and a tripped overload switch. To correct this error, the overload switch must be reset, however the system should be inspected by a qualified electrician or installer to properly diagnose and correct the reason for the initial trip.

- **Seal Fail Alarm** – If the resistance in the seal fail circuit drops below the value set with the Seal Fail Adjustment Screw, the Seal Fail alarm will sound, the associated Pump Run LED will blink red, and the screen will display either P1 or P2 seal fail (Slfl). This is typically indicative of moisture intrusion into the seal fail chamber of a double seal pump. During a seal fail alarm, simplex panels will continue to operate the pumps normally. Duplex panels will operate the pumps according to the Seal Fail menu setting (SealFail). For more information, see "11. Seal Fail Circuits" in the LCD Screen Menu & Navigation section of this manual.

- **Thermal Circuit Alarm** – When pumps with thermal protection circuits are connected to a Pivot Pro, the panel can monitor for a thermal event. If equipped, Zoeller pumps have normally closed circuits. In the event that the thermal circuits in a pump opens, the Pivot Pro will sound an alarm and disable the pump in question for as long as the pump's circuit remains open. When the pump cools and the circuit again closes, the Pivot Pro will automatically put the pump back into active rotation. However, the alarm will continue until it is acknowledged.

The table below describes all the different fault conditions and provides the corresponding behaviors of the globe light and internal LEDs. In addition to the information provided by the LCD screen, the user can match the observed conditions to those listed in the table.

ALARM CONDITION TABLE

Alarm Condition	Latching	Globe	User Interface LEDs				
			System Ready	High Water	Pump Run (1 or 2)	Pump Off (1 or 2)	Stop, Start/ Lead, or Lag
Overload (3PH only)	No	Fast Blink	Off	Off	Solid Red	Off	Off
Failed Contactor	Yes	Fast Blink	Off	Off	Solid Red	Off	Off
Service Off Timeout	No	Double Blink	Off	Off	Off	Blinking Red	Off
Disabled Alarm Circuit	No	Double Blink	Off	Solid Red	Off	Off	Solid Red
Continuous Run	Yes	Solid	Off	Off	Blinking Amber	Off	Off
High Water Float Logic Error	Yes	Slow Blink	Off	Blinking Red	Off	Off	Off
Float Logic Error	Yes	Slow Blink	Off	Off	Off	Off	Blinking Red
Float Questionable	Yes	Slow Blink	Off	Off	Off	Off	Blinking Amber
High Water	Yes	Solid	Off	Solid Red	Off	Off	Off
Seal Fail Alarm	Yes	Fast Blink	Off	Off	Blinking Red	Off	Off
Thermal Alarm	Yes	Fast Blink	Off	Off	Blinking Red	Off	Off
High Control Voltage	Yes	Off	Blinking Green	Blinking Red	Blinking Red	Blinking Red	Blinking Red

ADJUSTING DEFAULTS

This Pivot Pro Series Control Panel features a microprocessor-based logic that allows for the customization of certain features. The panel comes from the factory with settings appropriate for most applications and, except for rarer instances, shouldn't need to be adjusted. Defaults can be modified in two ways: 1) Via LCD screen and User Interface Buttons or 2) with the use of a programmed USB thumb-drive (memory stick) formatted as FAT32. In order to provide for the most versatility, the Pivot Pro is designed to recognize, accept, and keep the programming that was last modified, regardless of whether that programming came from the USB jump drive or from direct user input to the LCD screen. For more detailed procedures on changing the default values, visit the Pivot product site at www.zoellerpumps.com.

Modifying Defaults Via LCD Screen

Use the Up and Down Buttons to navigate to the appropriate screen and press the Enter Button. For a full listing of screens, refer to the section above entitled, "LCD Screen Menus & Navigation". If the system does not respond to the Enter Button, press and hold the Back and Enter Buttons simultaneously for 2 seconds to unlock the system, or follow the prompts for your PIN or USB Key. Once in edit mode, an asterisk (*) will appear next to the screen heading. Use the interaction buttons to make edits. Changes are saved automatically.

Modifying Defaults Via USB Memory Stick

The second method of modifying the default behavior of the Pivot Pro Panel is through a programmed USB thumb-drive (memory stick). The drive must be formatted as FAT32. The USB method provides greater control over the behaviors of the Pivot Pro. The following list comprises the settings most likely to be adjusted.

System Mode – Sets if two pumps are allowed to run simultaneously (Duplex) or if only one pump is allowed to operate at a time (Alternator). This affects both HOA Hand Mode as well as Lag/High Alarm conditions.
    Simplex Default: Simplex Options: No Options
    Duplex Default: Duplex Options: Alternator

Float Count – Sets the number of floats for which the Pivot Pro expects to receive input.
    Simplex Default: 3   Options: 4
    Duplex Default: 4*   Options: 3

Float Configuration – Sets the expected order (lowest to highest) of floats in the tank
    Simplex Default: SSH Options: No Options
    Duplex Default: SLLH* Options: SLHL

*NOTE: Despite the default settings for Float Count and Float Configuration, duplex Pivot Pro Panels are intended for use with only 3 floats in most applications. These defaults have been selected to provide the installer with the most diverse set of installation options possible without the need to manipulate the defaults. A jumper wire has been preinstalled from the factory in duplex models and links the Lag float terminal with the High Water float terminal. This jumper wire must be removed if 4 floats are used.

Float Logic Type – Sets whether Pivot Pro attempts to intelligently discern float failure.
    Default: Smart   Options: Relay

Globe Mode – Sets the globe's response to alarm conditions. 'Alarm' provides different patterns for different types of alarms.
    Default: Alarm   Options: Solid, Blinking

Horn Mode – Sets the horn's response to alarm conditions. 'Active' will only activate the horn while the alarm condition is present. 'Latching' will continue to sound the horn until the panel is manually silenced.
    Default: Active   Options: Latching

Continuous Run Timeout – Sets the length of time (in tenths of seconds) that the panel will allow a pump to run before intervening.
    Default*: 12000* (20 minutes) Options: Any numeric up to *59400* (99 mins), '0' disables the function

HOA Hand Timeout – Sets the length of time (in tenths of seconds) that the panel will allow a pump to run in Hand Mode before intervening.
    Default: *3000* (5 minutes) Options: Any numeric up to *5400* (9 mins), '0' disables the function

HOA Service Off Timeout – Sets the length of time (in tenths of seconds) that the panel will allow a pump to remain in Service Off Mode before intervening.
    Default: *144000* (4 hours) Options: Any numeric up to *324000* (9 hrs), '0' disables the function

To view the configurable values currently held in a Pivot Pro Panel, use a USB thumb drive formatted as FAT32. To see the list of existing settings, create a new .txt file named "PivotConfig.txt", and write the phrase "ReadConfiguration" into the file. Unlock screen, if locked, by pressing Back and Enter buttons together for 2 seconds. Insert the thumb drive into the USB slot. After a few seconds, you will hear a double chirp. The menu screen will show a prompt reading, "Config?". Select 'Yes' and hit the enter button. The Pivot Pro Panel will read the drive and create a new file named "Firmware Update Results.txt" which will contain the system data. A partial list of variable names and their default values for a simplex panel is provided below:

ControllerConfig.SystemMode = SIMPLEX
ControllerConfig.FloatCount = 3
ControllerConfig.FloatConfiguration = SLLH
ControllerConfig.HornMode = ACTIVE
ControllerConfig.GlobeMode = ALARM
ControllerConfig.FloatLogicType = SMART
ControllerConfig.ContinuousRunTimeout = 12000
ControllerConfig.HOAHandTimeout = 3000
ControllerConfig.HOAServiceOffTimeout = 144000

NOTE: All time-related numbers are displayed in the "PivotConfig.txt" file as tenths of a second. This includes Runtimes and Timeouts. 12000 = 1200 seconds. 3000 = 300 seconds.

To modify specific configurable values using a USB thumb-drive, write the full variable names and new values of the configurations you wish to modify (one per line) into the "PivotConfig.txt" file. Below the last line of your new settings, write the phrase "ReadConfiguration". Insert the thumb-drive into the USB slot located near the bottom right side of the user interface bracket. The Pivot panel will automatically read the drive, modify the appropriate settings, and create a new file named "FirmwareUpdateResults.txt" which will contain the new, updated system data. If the file, "FirmwareUpdateResults.txt" already exists on the drive, the Pivot panel will simply write the new report below the previously written information.

NOTICE!

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