FLEX - Single Phase, Simplex
Model: FLXO1S | Opaque Door, Beacon

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Introduction

The Flex Control Panel Simplex is a control panel capable of controlling and monitoring one pump and five sensor inputs. It can be configured as a five float panel, or as a four float + one transducer panel. Additionally, it features a pump seal fail sensor input, auxiliary cutout input, and an optional current sensor input for the pump. Pump mode control (hand mode, off mode, and auto mode) are controlled via buttons on the inner front door of the control panel. For controlling the pump, the panel can be equipped with either contactors or with a cost saving replaceable power relay board. The Flex Control Panel can also be configured for demand dose or time dose control. An auxiliary dry contact output is also included for interfacing to remote alarms or to building automation systems. This panel also features a menu system to enable maximum field configuration as well as thorough statistics tracking. Finally, the panel can be connected to Vizzysite for remote tracking, control, and configuration.

Before Installation

Before proceeding with the installation or operation of the control panel read all instructions thoroughly, as well as comply with all Federal, State and Local Codes, Regulations and Practices. The control panel must be installed by qualified personnel familiar with all applicable local electrical and mechanical codes. Refer to the National Electrical Code (NFPA 70). Failure to properly install and test this product can result in personal injury or equipment malfunction. All conduit connected to the panel must be sealed with conduit sealant to prevent moisture or gases from entering the panel. NEMA 1 enclosures are for indoor use only while NEMA 4X panel enclosures may be used indoor or outdoor. Refer to panel model name plate on inside of door for enclosure rating. Note: If options are ordered that affect the number of floats, refer to the panel schematic for complete information.

Safety Guidelines

1. DO NOT USE WITH FLAMMABLE OR EXPLOSIVE FLUIDS SUCH AS GASOLINE, FUEL OIL, KEROSENE, ETC. DO NOT USE IN EXPLOSIVE ATMOSPHERES. CONTROL PANEL SHOULD ONLY BE USED IN WATER AND WASTEWATER APPLICATIONS THAT ARE NOT RATED AS A HAZARDOUS LOCATION.

2. DO NOT WORK ON THE CONTROL PANEL WITH LIVE VOLTAGE APPLIED TO THE CONTROL PANEL WITH WET HANDS OR WHEN STANDING ON A WET SURFACE.

3. DISCONNECT ALL ELECTRICAL SERVICE BEFORE WORKING ON OR HANDLING THE CONTROL PANEL

4. INCOMING VOLTAGE MUST MATCH THE CONTROL PANEL VOLTAGE. REFER TO THE PANEL SCHE-
   MATIC FOR COMPLETE INFORMATION.

Menu System

Interface

The user interface of the Flex Control Panel comprises a 16x2 OLED display, three RGB indicator LEDs, and a rotary knob (scroll wheel) used to navigate the menu system. While the system is idle, the menu screen will be turned off to conserve the life of the display. To wake it up, simply make any input on the menu navigation knob.
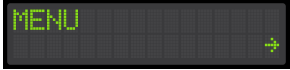
Navigating the Menu

The scroll wheel is used for all user inputs to the menu system. This includes navigation, configuration inputs, alarm clears, and so on. Below is a table summarizing the interface to the menu system.

Action	Result
Pressing the Knob	Navigate Forward, Select, Commit a Change, Clear an Alarm
Scrolling Clockwise	Navigate to the Right, Increase a Config Value
Scrolling Counter-Clockwise	Navigate to the Left, Decrease a Config Value
Activating Test/Silence Switch	Exits the menu system and returns to the main screen. Note that this may start the system test routine; to cancel, make any input with the scroll wheel

Menu Conventions

There are a set of arrow indicators that will appear on the bottom line of the display to aid with menu navigation. Below is a table summarizing these indicators:

Indicator	Image	Meaning
Right Arrow on Bottom Right	`MENU` ⇥	The user can navigate forward or select a config from here. Press the scroll wheel to take this action.
Left Arrow on Bottom Right	`BACK` ⇤	The user can navigate backwards from here. Press the scroll wheel to take this action.
Blinking Right Arrow on Bottom Left	`CONFIG TYPE` `⇥CONFIG VALUE`	A config is being modified when this is shown. Scroll the wheel to change the config. Press the scroll wheel to commit the change. To cancel the input, either wait for the timeout OR press the test/silence switch to exit the menu.
Enter Arrow on Bottom Right	`CONFIG TYPE` `⇥CONFIG VALUE` ↵	This arrow indicates a config can be committed. Press the knob to commit OR cancel the input as described in the entry above.

To Change a Setting

Configurations on the Flex Control Panel are organized into a config path type structure similar to a file path on a computer. All configuration "paths" are of the type shown below.

`MENU` ⇥   `SETTINGS` ⇥   `ENTER PASSWORD` `0000`   `CONFIG GROUP` `SET UP` ⇥   `INDIVIDUAL` `CONFIG` ⇥

All configurations are located behind the password in the menu. After the password, configurations are organized into groups, sub-groups, and individual configurations. The config "path" for every configuration is displayed in the table in Available Settings.

Please see the Settings section of this document for an exhaustive list of all available configurations.

To Clear an Alarm

To clear an alarm, simply scroll to it in the main screen (press the test/silence switch to jump there) and then press the rotary knob. A confirmation screen will appear and ask if the alarm should be cleared. Press the knob again to clear the alarm.

Note that if the alarm immediately re-activates and the buzzer activates again, this means that the alarm condition is still present and the system cannot clear the alarm. If this happens, check for the source of the alarm.

Quick Setup Guide

This section will cover all of the information needed to get a panel up and running for its specific application. It will cover running the Setup Wizard, which will configure the most important configurations, as well as several examples of optional configurations that can be used to customize the application. An exhaustive list of configurations can be found in the Settings section of the Wiki (https://wiki.aind.co/ ☑).

System Setup with the Setup Wizard

The Setup Wizard will set the critical system configurations and get a system up and running quickly. It will configure all inputs as well as basic pump configurations. **Refer to the panel schematic to see what each input will be configured as by default.**

Step 1

Run the Setup Wizard by following the menu path shown below.

This will configure all of the primary configurations for the panel, including:

▸ Dosing Type

▸ Transducer Configurations

▸ Float Configurations

▸ Pump Current Monitoring Configurations (only on models with current sensing)

Step 2 (In Setup Wizard)

Set Dosing Configuration. This configures the system for Demand Dosing or Time Dosing. **Note: this is the only way to change this setting**.

In Demand Dose Mode, if the start float triggers the pump will run continuously until the stop float goes down.

▶ `DOSE CONFIG`
`→DEMAND DOSE`

In Time Dose Mode, when the timer enable float triggers the system will time dose until the timer enable float goes down. If this option is selected, the system will ask the user to configure all of the dose time information.

▶ `DOSE CONFIG`
`→TIME DOSE`

Step 3 (In Setup Wizard)

Enable or Disable the Transducer Input This will configure Input 5 to be either a 4-20 mA pressure transducer or a regular float input.

If the transducer is enabled, the system will then ask the user to enter the basic transducer configurations.

▶ `TRANSDUCER`
`→ENABLED`

If the transducer is disabled, the system will skip the transducer configuration options.

▶ `TRANSDUCER`
`→DISABLED`

Step 4 (In Setup Wizard)

Configure the Float Inputs. This will configure the float inputs of the system.

If the transducer was enabled, the system will ask whether or not a 2-float backup should be activated. This will set a Low Alarm/Redundant Off Float and a High Alarm/Redundant Start Float as backups in case the transducer fails.

▸ 2-FLOAT BACKUP?
→ENABLED

Otherwise, if the transducer was disabled, it will ask the user to enable or disable the Low Alarm Float.

▸ LOW ALARM FLT?
→ENABLED

Please refer to the panel schematic to see what each input will be configured as based on the above configurations.

Step 5 (In Setup Wizard)

Enter Full Load Amps (FLA) for the pump (Only if the Panel Has A Current Sensor). This will configure the high and low amps alarm points for the pump. The system will set the trip points at 25% above and below the FLA entered here. Note that both high and low amps can be field modified individually in the Pump Set Up section of the menu.

▸ P1 FLA
12.3 Amps

Optional Configurations

These configurations are not absolutely critical for each application, but can be useful for customizing the behavior of the panel.

Step 6 (Optional)

Set the Pump Exercise Timer for the pump. If set, the exercise timer will run the pump for a set amount of time after it has been idle for the configured number of days. By default, the exercise timer is disabled.

Name	Menu Path	Value	Description
Pump One Exercise Interval	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 EXERCISOR INT	Disabled - 45 Days	This is the exercise timer for pump one. If the pump has been inactive for the indicated number of days, the system will briefly run the pump to maintain long term pump health.
Pump One Exercise Time	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 EXERCISOR TIME	0:00 - 5:00	This is how long in minutes and seconds pump one will run during an exercise event.

Step 7 (Optional)

Change The System Password. This will change the password from the system default of 1919.

Name	Menu Path	Value	Description
Password Change	MENU->SETTINGS->PASSWORD->SYSTEM SET UP->PASSWORD	0000 - 9999	This is the system password. It can be changed from here.

Step 8 (Optional)

Review the Settings section of this manual for any other configurations that may be relevant to the application. The system at this point is configured for a basic application. However, there are several other configurations available in the system that may be useful depending on the specific system requirements.

Stats

The Flex Control Panel panel tracks several statistics for the system. These are accessed through the menu system by following the menu path template shown below. Specific paths for each event's stats are described in the Viewable Events section of the product Wiki page.

Settings

Available Settings

General System Configurations

These settings modify general system behaviors, such as how long the buzzer stays silenced, how bright the pump run LEDs are, etc.

Name	Menu Path	Range	Description
Automatic Error Reset	MENU->SETTINGS->PASSWORD->SYSTEM SET UP->AUTO ERROR RESET	Disabled, Enabled	If enabled, system error events will clear themselves once the error conditions are resolved. Note that this does not apply to pump errors; pump errors will always require user interaction.
Auxiliary Failsafe Mode	MENU->SETTINGS->PASSWORD->SYSTEM SET UP->AUX FAILSAFE	Disabled, Enabled	This setting flips the NO/NC contacts of the auxiliary contacts so that they will trip on system power loss.
Silence Time	MENU->SETTINGS->PASSWORD->SYSTEM SET UP->SILENCE TIME	0 - 99:59:59	This controls how long the buzzer will stay silenced after the silence button is pressed.
Pump Run LED Brightness	MENU->SETTINGS->PASSWORD->SYSTEM SET UP->PUMP RUN LED	High, Med, Low, Off	This controls how bright the pump run indicator LEDs are.

Name	Menu Path	Range	Description
System Normal LED Brightness	MENU->SETTINGS->PASSWORD->SYSTEM SET UP->NORMAL LED	High, Med, Low, Off	This controls how bright the system normal indicator LEDs are.
Password Change	MENU->SETTINGS->PASSWORD->SYSTEM SET UP->PASSWORD	0000 - 9999	This is the system password. It can be changed from here.

General Pump Configurations

These configurations modify the behavior of the pumps in the system.

Name	Menu Path	Range	Description
Seal Alarm Configuration	MENU->SETTINGS->PASSWORD->PUMP SET UP->SEAL ALARM	Alarm Only, Alarm + Stop	This controls whether or not seal fail alarms shut off their pump.
High Amps Alarm Configuration	MENU->SETTINGS->PASSWORD->PUMP SET UP->HIGH AMP ALARM	Alarm Only, Alarm + Stop	This controls whether or not high amp alarms shut off their pump. Note that this is only visible if at least one of the pumps has its current sensor enabled.
Finish Dose Enable	MENU->SETTINGS->PASSWORD->PUMP SET UP->FINISH DOSE	Disabled, Enabled	If enabled, pumps will finish their dose on cycle even if the stop float goes down. If disabled, the pump will stop running immediately if the stop float goes down.
Extra Peak Doses	MENU->SETTINGS->PASSWORD->PUMP SET UP->XTRA PK DOSES	0-10	This is the number of peak doses that are done after the peak timer float has deactivated. This is used to make sure enough water is pumped out during a peak dosing event to prevent a repeat peak dosing event.

Pump One Configurations

Name	Menu Path	Range	Description
Pump One Enable	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 ENABLE	Disabled, Enabled	This enables or disables pump one. If disabled, the HOA inputs will be unresponsive and the pump will never turn on.
Pump One Auxiliary Cutout Configuration	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 AUX CUT OUT	Normally Open, Normally Closed	This sets the contact type of the pump one auxiliary cut off input.
Pump One Current Sensor Enable	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 CURRENT SENSE	Disabled, Enabled	This enables or disables the current sensor for pump one. Note that this is option is only available on systems shipped with a current sensor.
Pump One Over Current Level	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 OVER CURRENT	0 - 50 Amps	This is the over current threshold for pump one. This is only visible if the current sensor is enabled.
Pump One Under Current Level	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 LOW AMP LVL	0 - 50 Amps	This is the under current threshold for pump one. This is only visible if the current sensor is enabled.
Pump One Flow Rate	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 FLOW RATE	0 - 999 GPM	This is the flowrate for pump one. It is used to calculate total gallons pumped.
Pump One Exercise Interval	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 EXERCISER INT	Disabled - 45 Days	This is the exerciser for pump one. If the pump has been inactive for the indicated number of days, the system will briefly run the pump to maintain long term pump health.
Pump One Exercise Time	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 EXERCISER TIME	0:00 - 5:00	This is how long in minutes and seconds pump one will run during an exercise event.

Name	Menu Path	Range	Description
Pump One Extended Run Alarm	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 EXT RUN ALARM	00:00:00 - 99:59:59	This is how long the system will run the pump before triggering an extended run time alarm. To disable this, set the time to zero.
Pump One Dose On Time	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 DOSE ON TIME	0 - 30:59	This is the duration of the dose on portion of the dosing cycle.
Pump One Dose Off Time	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 DOSE OFF TIME	0 - 24:00:00	This is the duration of the dose off portion of the dosing cycle.
Pump One Peak On Time	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 PEAK ON TIME	0 - 30:59	This is the duration of the dose on portion of the peak dosing cycle. This cycle is used during high water alarms.
Pump One Peak Off Time	MENU->SETTINGS->PASSWORD->PUMP SET UP->PUMP 1->P1 PEAK OFF TIME	0 - 24:00:00	This is the duration of the dose off portion of the peak dosing cycle. This cycle is used during high water alarms.

Input Configurations

These configurations change the behavior of the inputs of the system.

General Input Configurations

Name	Menu Path	Range	Description
Float Sequence Error Enable	MENU->SETTINGS->PASSWORD->INPUT SET UP->FLOAT ERRORS	Disabled, Enabled	If enabled, the system will alarm if the floats activate out of order. For example, if the start float activates before the stop float an error will be activated for the stop float.
Seal Sensor Type	MENU->SETTINGS->PASSWORD->INPUT SET UP->SEAL INPUT TYPE	Normally Open, Normally Closed	This configures the seal fail sensor input type. A normally open sensor will alarm when the input is closed (sensor in water). A normally closed sensor will trigger an

Name	Menu Path	Range	Description
			alarm when the sensor wires are opened (the seal fail relay on the pump opened).
Water Sensor One Sensitivity	MENU->SETTINGS->PASSWORD->INPUT SET UP->WATER SENSOR ONE	10K - 100K	This is the sensitivity of water sensor (seal fail sensor) one. It represents the approximate resistance at which the input will activate. 100K is the most sensitive, and 10K is the least sensitive

Input Functions

All of the sensor inputs of the Flex Control Panel are configurable to a subset of the functions shown below. The inputs come factory configured to the functions shown in the panel schematic, but can be changed by the installer in the field. These configurations determine what each input does when it activates.

Below is a brief summary of all available input functions.

Option Number	Name	Description
0	Disabled	This disables the input.
1	Low Alarm	This is a low level alarm. Will also act as a redundant off input.
2	Wide Angle	This is a wide angle pump control float. On activation, will start the pump. On deactivation, will turn off the pump.
3	Stop Float	This is a stop float.
4	Lead/Start	This is a pump start float. Starts the pump.
5	Timer Enable	This is the timer enable float. It will start a time dosing cycle for the lead pump.
6	Peak Timer	This is the peak timer start float. It will start a peak time dosing cycle for the currently active pump.
7	High Alarm	This is a high water alarm float. Will start a high water alarm on activation.
8	High Alarm/Start	This is a high water alarm float that will also start the pump.

Option Number	Name	Description
9	Aux Alarm	This is a general use alarm input. Will start the Aux Alarm event on activation.
10	Transducer	This sets the input to function as a transducer. Note that this is only available on input 5.

Below are the configurations for the system inputs. Please reference the above table when reading the range column.

Name	Menu Path	Range	Description
Input One Function	MENU->SETTINGS->PASSWORD->INPUT SET UP->INPUT ONE	0, 1, 9	This controls the function of input one.
Input Two Function	MENU->SETTINGS->PASSWORD->INPUT SET UP->INPUT TWO	0, 2, 3, 5	This controls the function of input two.
Input Three Function	MENU->SETTINGS->PASSWORD->INPUT SET UP->INPUT THREE	0, 4, 6, 9	This controls the function of input three.
Input Four Function	MENU->SETTINGS->PASSWORD->INPUT SET UP->INPUT FOUR	0, 7, 8	This controls the function of input four.
Input Five Function	MENU->SETTINGS->PASSWORD->INPUT SET UP->INPUT FIVE	0, 7, 9, 10	This controls the function of input five.

Transducer Configurations

These are the configurations for the transducer. **Note that these settings will only be accessible if input five is set to transducer mode**.

Name	Menu Path	Range	Description
Transducer Voltage	MENU->SETTINGS->PASSWORD->INPUT SET UP->TRANSDUCER	Disabled, Enabled	If disabled, the voltage for the transducer will be 12V. If enabled, the

| Transducer Response | MENU->SETTINGS->PASSWORD->INPUT | "LO/HI: 4/20 mA", | This setting controls the response of the transducer input to higher and |

Name	Menu Path	Range	Description
Type	SET UP->TRANSDUCER CONFIG->RESPONSE TYPE	"LO/HI: 20/4 mA"	lower readings. Use this if the system is using an ultra-sonic transducer with a reversed response to water depth (i.e., a maximum sensor output when the water is lowest).
Transducer Display Mode	MENU->SETTINGS->PASSWORD->INPUT SET UP->TRANSDUCER CONFIG->DISPLAY MODE	Absolute, Relative	In absolute mode, the transducer readings are shown in feet/inches or meters. In relative mode, the readings are shown as a percentage of the total tank height.
Transducer Display Units	MENU->SETTINGS->PASSWORD->INPUT SET UP->TRANSDUCER CONFIG->DISPLAY UNITS	Imperial, Metric	This controls the units transducer readings are displayed in.
Transducer Rated Depth	MENU->SETTINGS->PASSWORD->INPUT SET UP->TRANSDUCER CONFIG->RATED DEPTH	0 - 99' 11" (30.45 meters)	This is the rated depth of a system transducer. Used to calculate depth from the 4 - 20 mA reading of the transducer.
Transducer Field Callibration	MENU->SETTINGS->PASSWORD->INPUT SET UP->TRANSDUCER CONFIG->SET DEPTH	0 - 99' 11" (30.45 meters)	This is used to calibrate the transducer. To calibrate, put the transducer into some known depth of water (or take it completely out of the water for a zero reading) and then set the correct depth with this setting.
Transducer Tank Height	MENU->SETTINGS->PASSWORD->INPUT SET UP->TRANSDUCER CONFIG->TANK HEIGHT	0 - 99' 11" (30.45 meters)	This is the depth of the tank the transducer is monitoring. This is used to calculate depth percentage readings in relative display mode.
Transducer Low Level Alarm Depth	MENU->SETTINGS->PASSWORD->INPUT SET UP->TRANSDUCER CONFIG->LOW LEVEL ALARM DEPTH	0 - 99' 11" (30.45 meters)	This is the low level alarm trip point of the transducer. Set to zero to disable.
Transducer Stop Level	MENU->SETTINGS->PASSWORD->INPUT	0 - 99' 11" (30.45	This is the stop level trip point of the transducer. Set to zero to disable.

Name	Menu Path	Range	Description
Depth	SET UP->TRANSDUCER CONFIG->STOP LEVEL DEPTH	meters)	
Transducer Lead/Start Level Depth	MENU->SETTINGS->PASSWORD->INPUT SET UP->TRANSDUCER CONFIG->LEAD LEVEL DEPTH	0 - 99' 11" (30.45 meters)	This is the lead level trip point of the transducer. Set to zero to disable.
Transducer Timer Override Level Depth	MENU->SETTINGS->PASSWORD->INPUT SET UP->TRANSDUCER CONFIG->TIMER OVERRIDE	0 - 99' 11" (30.45 meters)	This is the level at which peak time dosing will activate. Set to zero to disable.
Transducer High Alarm Level Depth	MENU->SETTINGS->PASSWORD->INPUT SET UP->TRANSDUCER CONFIG->HIGH ALARM LEVEL DEPTH	0 - 99' 11" (30.45 meters)	This is the high alarm level trip point of the transducer. Set to zero to disable.
Transducer Aux Alarm Level Depth	MENU->SETTINGS->PASSWORD->INPUT SET UP->TRANSDUCER CONFIG->AUX ALARM LEVEL	0 - 99' 11" (30.45 meters)	This is the level over which the auxiliary alarm will activate. Set to zero to disable.

Config Code

Config codes on this product can be decoded by customer support to provide a snap-shot for how the system is configured. The code itself is a base 32 number that must be decoded to yield the system configurations.