Sencillo™
Simple.

OPERATION MANUAL

E-KON
DUPLEX BOOSTER PUMP

Printed in USA

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Table of Contents

Safety Instructions

⚠ DANGER

1. Read this manual in its entirety before installing and using the product. Improper use of the product can cause personal injury or death, damage to property, and may void the warranty.
2. The operator must be aware of all safety precautions to prevent physical injury.
3. Any pressurized device can explode or discharge, if contents is over pressurized. Take all necessary measures to avoid over pressurization.
4. Operating, installing, or maintaining the unit, in any way that is not covered in this manual, could cause death, serious injury, or damage to the system. This includes any modifications to the equipment, or use of parts not provided by Sencillo Systems, Inc.™ Please contact Sencillo Systems, Inc.™, for clarification before proceeding.
5. This manual clearly identifies accepted methods for disassembling units and must be adhered to at all times. Trapped liquid can rapidly expand and result in a violent explosion and injury. Never apply heat to impellers, or their retaining devices, to aid in their removal.
6. Do not change the service application without Sencillo Systems, Inc.™ approval.
7. Installation must be in compliance with all local codes.
8. Electrical connections must be made by a certified electrician, in compliance with all international, national, state, and local regulations. For maximum safety, this product should be connected to a grounded circuit equipped with a GFCI (ground fault circuit interrupter) device.
9. Before installing this product, have the electrical circuit checked by an certified electrician to ensure it is properly grounded.
10. Before installing or servicing the pump, BE CERTAIN pump power source is disconnected.
11. Ensure the line voltage and frequency of the electrical current supply agrees with the motor wiring. If motor is a dual voltage type, BE SURE it is wired correctly for the power supply.
12. Complete pump and piping system MUST be protected against below freezing temperature. Failure to do so could cause severe damage and void the warranty.
13. Do not exceed the maximum working pressure of the pump. Avoid system pressures that may exceed one and a half times the operating point selected from the pump performance curve.
14. NEVER run the pump dry to avoid damaging the pump seal.
15. These pumps are not to be used for handling dirty water or water with suspended solids, water containing acids, or corrosive liquids, seawater, and flammable or dangerous liquids.
16. Failure to properly install the impeller and impeller nut could result in damage to the pump and could cause serious personal injury.
17. Avoid all electrical dangers. Pay attention to the risks of electric shock or arc flash hazards.
18. Always keep in mind the risk of electrical accidents and burn injuries.
19. Stay clear of suspended loads.
20. Always lift the system by its lifting device and use the proper equipment. Failure to properly lift and support the equipment can result in serious physical injury and/or equipment damage.
21. Beware of the risk of a sudden start, if the product is used with an automatic pressure control.
22. Do not open any vent or drain valve, or remove any plugs while the system is pressurized. Ensure the pump is isolated from the system and pressure is relieved before pump disassembly, removing any plugs, or disconnecting pipes.
23. Never operate a pump without a properly installed coupling guard.

Observe these safety precautions when working with or in close proximity to the system:

- Never work alone.
- Always keep the work area clean.
- Use necessary safety equipment in accordance with all regulations, including:
  - Safety Goggles
  - Hearing Protection
  - Protective Gloves
  - Steel-toed Shoes
  - Protective Clothing
- Lifting Methods
  - Assembled units are heavy. Always lift the system by its lifting device and use the proper equipment.
  - Never attach ropes to the control panel.
  - Observe tip-over hazard precautions.

Introduction

This manual provides information for the proper installation, operation, and maintenance of the Sencillo Booster System. The Sencillo Booster System is a duplex-packaged, pre-piped, and wired pumping system, designed to provide a constant water pressure with a varying flow demand.

The Sencillo Booster system provides automatic operation:

- Provides variable speed to maintain constant pressure
- Alternates between pumps
- Shuts off during no-flow periods
- Shuts down upon loss of source water with auto-restart
- Shuts down on high outlet pressure with auto-restart
- Switches to backup pump upon pump failure
- Includes the Complete Alarm Package providing audible and visual alarm indication for:
  - Drive faults
  - Transducer failures
  - Low system pressure
  - High system pressure
  - Over voltage
  - Under voltage
  - Phase loss

Customer Support

For installation support, call 610-340-2848.

Technical Specifications

Pump Type	NSF61 listed end suction centrifugal with motor
Pump Qty	2
Power (hp)	Up to 7.5 hp
Controller	NEMA 1 Ventilated
Control Panel Options	Low Voltage (24VDC) Package: • Circuit breaker • Power supply • Programmable Logic Controller (PLC) • Color touch screen with graphics package • All control settings selected on touch screen Power Package: • Main disconnect switch with thru-the-door handle • Customer wire terminal block • Motor circuit breaker for each pump • Variable speed drive for each pump
Pipe Connections	304SS-NPT, flanged or grooved
Valves	Inlet/outlet isolation valves Outlet check valves
Frame	Powder-coated steel
Hydro Tank	All sizes available (ships loose for field mounting and piping)
Pressure Gauges	Liquid-filled
Max. Outlet Pressure	Project specific
Skid Size (Typical)	35”W x 42L x 72”H
Voltage	1/208, 1/240V 3/208-230V 3/480V
Approval	Conforms to NSF 61/372 standard for safe lead-free drinking water. UL/cUL listed pumping system.

E-KON Duplex Booster Pump

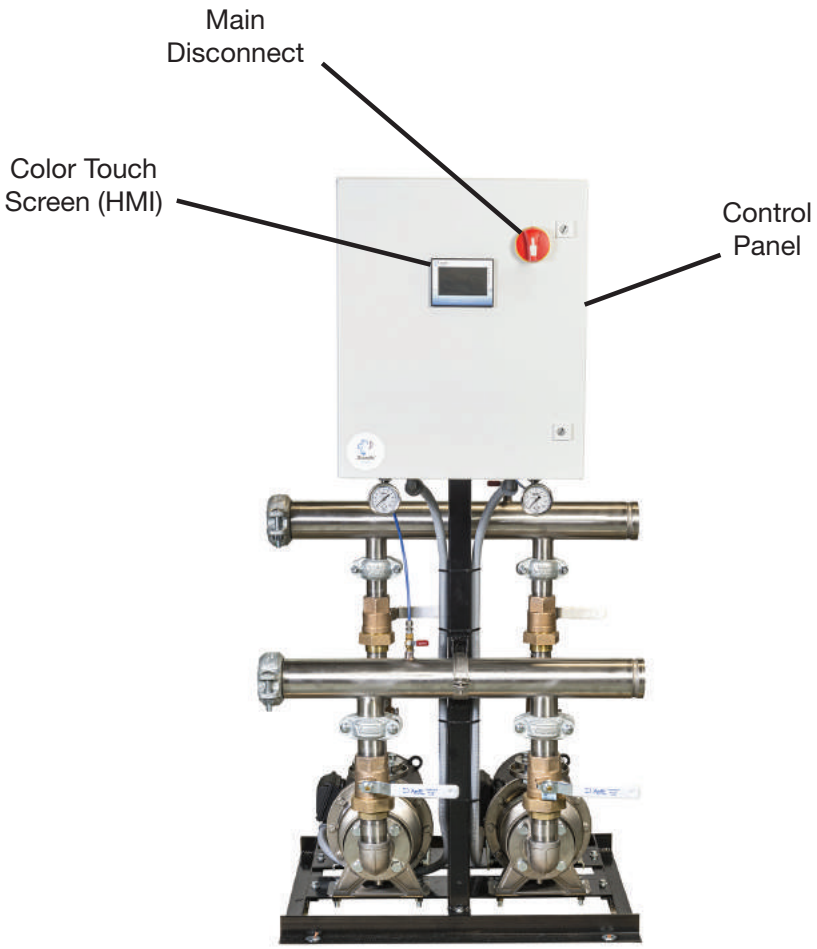
Pump Specifications

	CDU	3UB
Size Suction Discharge	 CDU70 – 1-1/4'' NPT thread CDU120 – 1-1/4'' NPT thread CDU200 – 1-1/2'' NPT thread 1'' NPT thread	150 Lb. ANSI, Female NPT: 3U32 – 2'' ANSI Equivalent 3U40 – 21/2'' ANSI Equivalent 3U50 – 21/2'' ANSI Equivalent 3UB65 – 3'' ANSI Equivalent 3U32 – 11/4'' ANSI Equivalent 3U40 – 11/2'' ANSI Equivalent 3U50 – 2'' ANSI Equivalent
Range of HP	1/2 HP to 3 HP	3U – 3 HP to 7.5 HP
Liquid Handled Type of liquid Temperature (Max. 180°F (82°C)) Max. working pressure	 Water 212°F (100°C) 125 PSI (9 Bar)	 Water 212°F (100°C) 230 PSI (15 Bar)
Materials Casing Impeller (closed type) Shaft Bracket Shaft Seal	 304L Stainless Steel 304L Stainless Steel Stainless Steel Aluminum Mechanical Seal – Type 21 OPTIONAL: High-temperature version OPTIONAL: Mild chemical version	3U / 3UB 304L Stainless Steel / 304L Stainless Steel 304L Stainless Steel / 304L Stainless Steel Cast Iron / Cast Iron Mechanical Seal – Type 21 Carbon/Ceramic/Viton Carbon/Ceramic/Buna Hot water – Carbon/Ni-Resist/Viton, 250°F (121°C) max. OPTIONAL: Consult factory for additional optional seal availability
Direction of Rotation	Clockwise when viewed from motor end	Clockwise when viewed from motor end
Motor Type Speed Three Phase Bearing	 NEMA 56J Frame 60 Hz, 3450 RPM (2 poles) OPTIONAL: 1725 RPM (4 poles) TEFC – 1/2 HP to 3 HP* ODP – 1/2 HP to 3 HP, 208-230/460V Ball Bearing	 NEMA JM, TC, TSC Frame 60 Hz, 3450 RPM (2 poles) OPTIONAL: 4 pole – consult factory TEFC – 3 HP to 30 HP ODP – 3 HP to 30 HP, 208-230/460V* Ball Bearing
Standard Accessories	--	Motor Support

* Washdown duty – consult factory

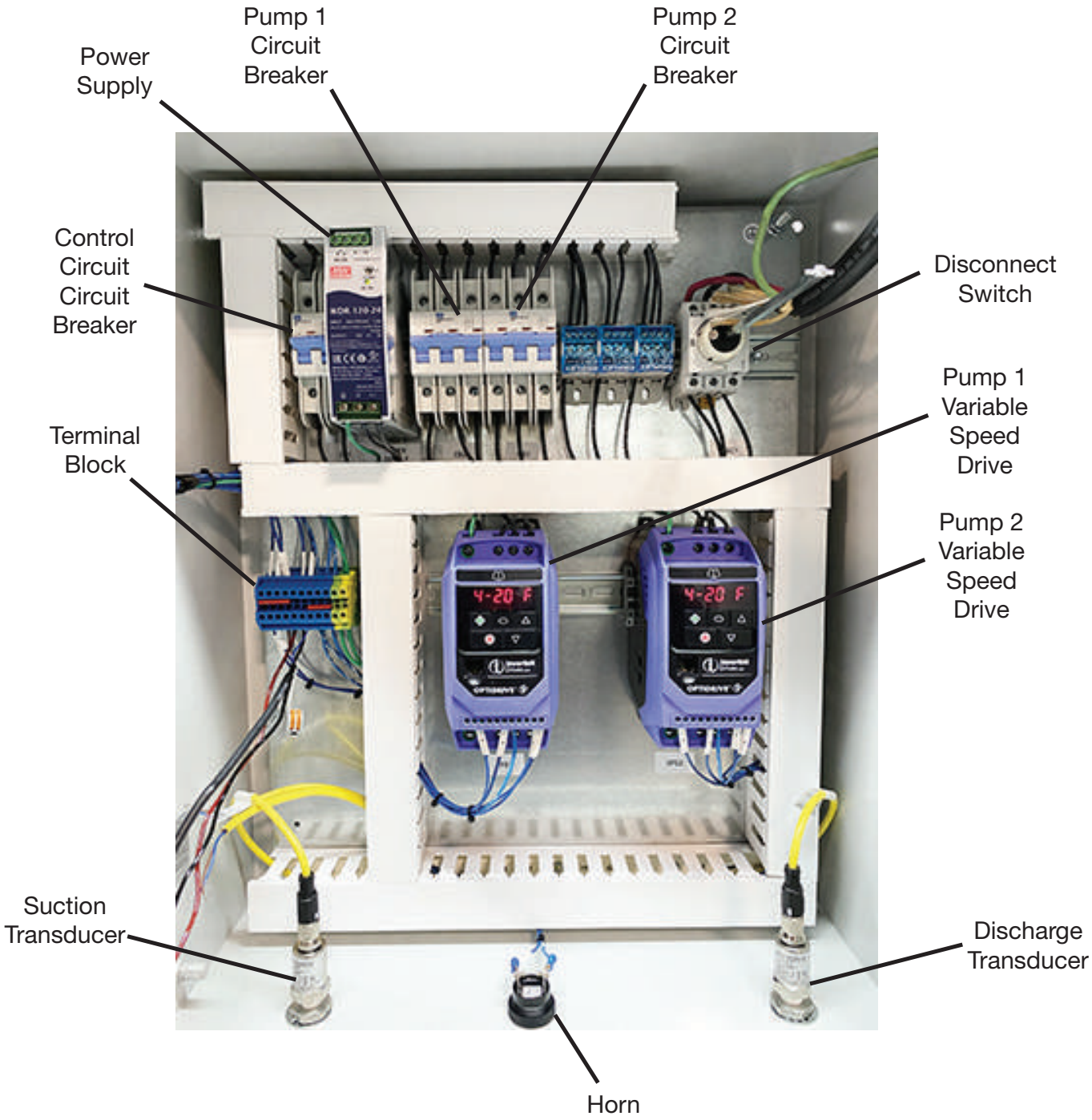
Control Panel

Pump Controller - Exterior



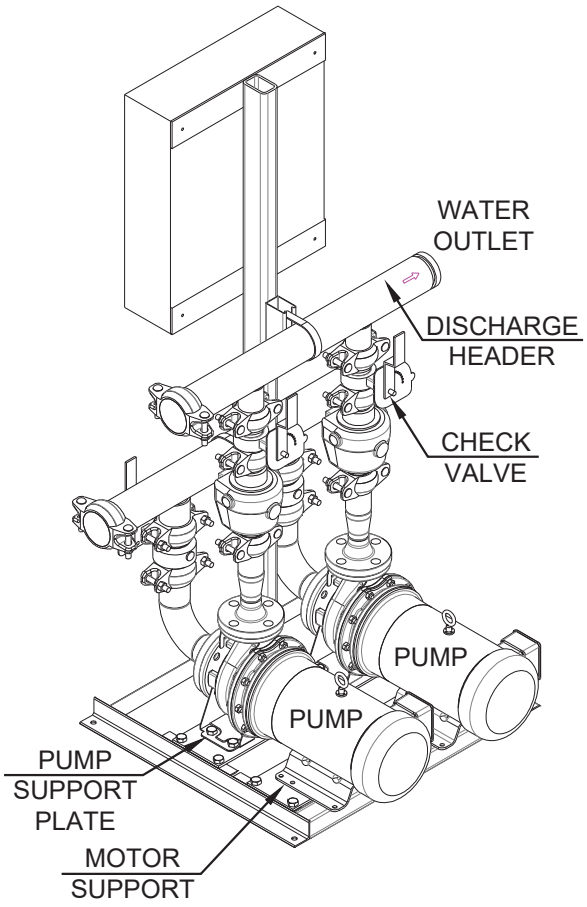
E-KON Duplex Booster Pump

Power Package - Interior

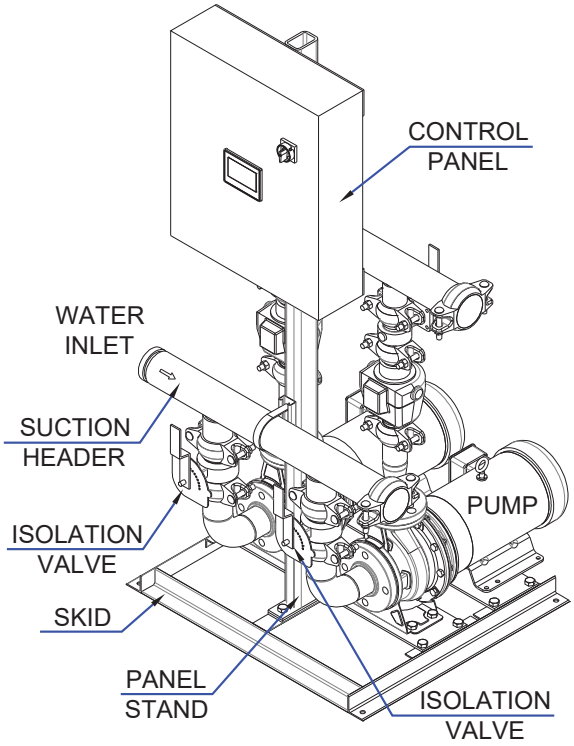


Illustrations

RIGHT SIDE VIEW



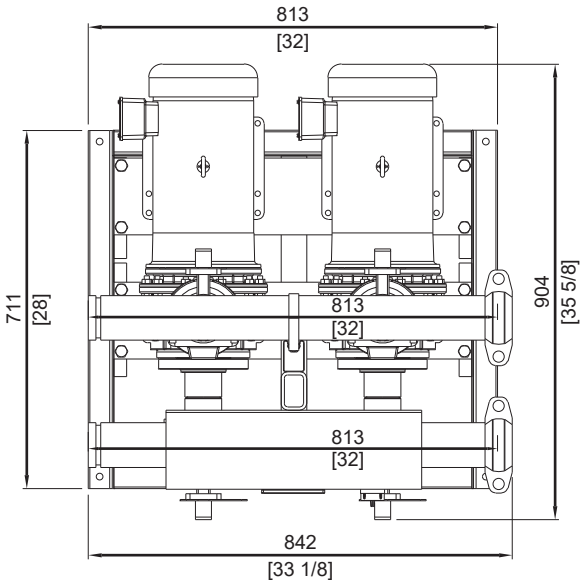
LEFT SIDE VIEW



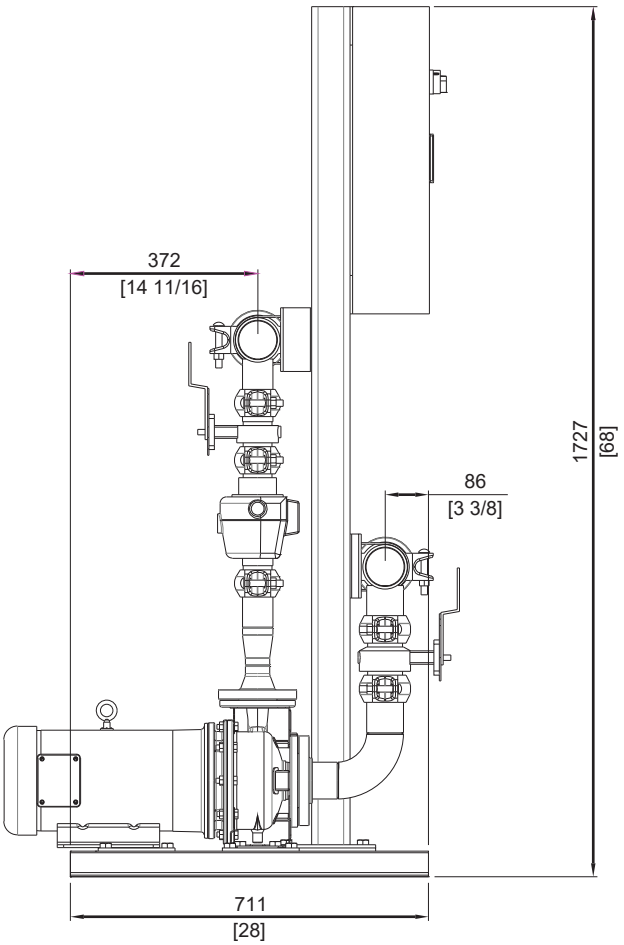
E-KON Duplex Booster Pump

Dimensions

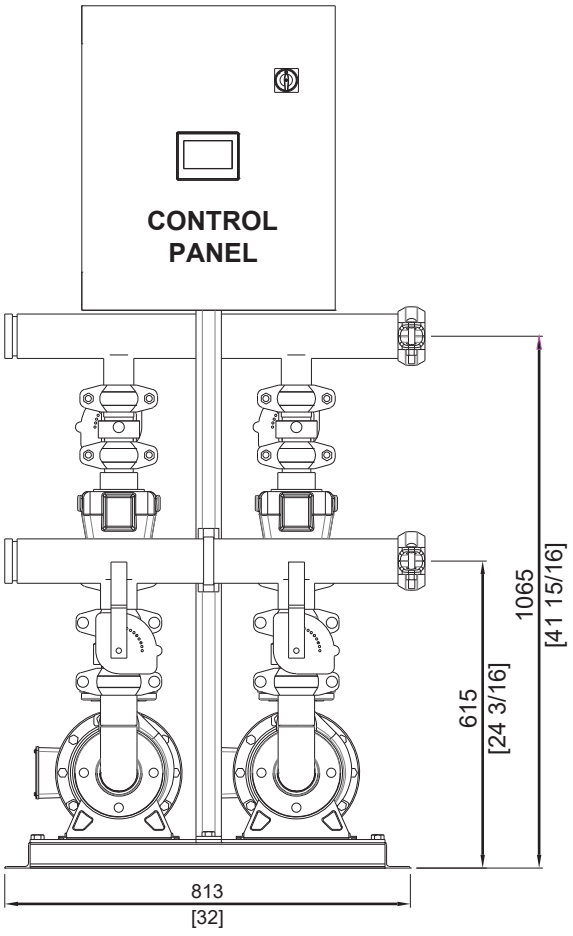
TOP VIEW



SIDE VIEW



FRONT VIEW



Receiving Inspection

1. Verify the equipment on the packing slip has been received. Any shortages should be documented on the freight bill and reported immediately to the shipping company and to Sencillo Systems, Inc.™.
2. Remove product wrapping.
3. Inspect the unit for shipping or rigging damage.

   IF THE UNIT IS DAMAGED:

   1. Record and report any damage immediately to the driver of the trucking company that delivers the unit.
   2. Take photos of the damage from multiple angles showing the areas affected.
   3. If the unit is damaged beyond repair, refuse to take possession of the unit from the shipper.
   4. If the damage is minimal, sign for the unit as DAMAGED on the packing slip.

      FAILURE TO SIGN FOR THE UNIT AS DAMAGED REDUCES YOUR ABILITY TO FILE A CLAIM AND RECEIVE COMPENSATION FOR REPAIRS.

      SENCILLO SYSTEMS IS NOT RESPONSIBLE TO FILE DAMAGE CLAIMS. THE RECEIVING COMPANY MUST COORDINATE AND PROCESS ALL CLAIMS.

Storage Guidelines

Crating and Wrapping

After a successful receiving inspection, prepare the unit for storage by:

1. Add a desiccant, such as silica gel packets, to the inside of the control cabinet.
2. Ensure the header ends are covered with a protective cover to prevent animals / insects / debris from entering the piping.
3. Cover the unit in a protective wrap that can be easily removed for periodic maintenance (inspection, rotating of motors, etc.).
4. If the unit is to be stored longer than 4 months before being put into operation, the following steps should be taken:

    - The unit should be inspected monthly, to ensure water and/or moisture is not accumulating on the unit.
    - The pump motors should be rotated, at least 3 full revolutions, quarterly to ensure bearings and seals are kept lubricated.

Storage Area Conditions

Follow the below storage requirements to protect the equipment from potential damage. Exposure to these conditions is not covered under the equipment warranty.

- Ensure all components are kept clean, out of direct sunlight, and away from heat, moisture, and anything that could scratch the unit surfaces.
- Store the unit in a location that is easily accessible for inspection and servicing. This includes adequate room for pump motor rotation and access to the control panel interior.
- The storage area should be protected from animals, insects, and rodents that may damage wire insulation, motor vents, and other soft materials.
- Do not store in temperatures below freezing unless the pumps, piping, and sensing lines are disassembled and checked for residual water, which may have been present during hydro testing at the factory.
- The unit should be stored in an area that is less than 90ºF.
- Do not expose the equipment to construction dust, like drywall or wood and plastics processing, which can enter the fan and vents and render the equipment unusable.

Installation Instructions

1. Bolt the unit to the floor.
    - Ensure the location protects the pump against flooding and excess moisture.
    - Ensure the location prevents the pump from freezing during cold weather. If there is any possibility of freezing, drain the pump casing by removing the pipe plug in the bottom when not in operation.
    - The pump should be installed as near to the liquid source as is practical so that the static suction head (vertical distance from the center line of the pump to water level) is maximized, and so that a short, direct suction pipe may be used.
    - The capacity of a centrifugal pump is reduced when the unit is operated under a high-suction lift.
    - Place the unit so that it is readily accessible for service and maintenance.
    - The foundation must provide permanent, rigid support for the pump system base plate and be able to absorb operational vibrations.
    - Level the pump through the centerline of the motor/pump assembly suction port.

⚠ CAUTION

The control panel on this unit contains electronic components with open chassis. During the drilling/punching operation to install conduit and wire, it is imperative that the components inside the cabinet be covered or protected to prevent metal and other materials from entering these open devices. Failure to prevent debris from entering the components can cause catastrophic failure. Any component failure that is caused will not be considered a warranty issue.

2. Run power to the panel.
   - Check the nameplate on the control panel inside door to determine the correct wiring procedure for the intended power source and if the system power is single- or three-phase. Connect the disconnect switch to a power source by following the standard procedures as outlined in the National Electrical Code (NEC).
   - Depending on the wiring, three-phase motors may start in reverse. Interchange any two motor power leads to change the starting direction and pump rotation.
   - The power supply should be brought in through the side or top of the panel adjacent to the main terminals. The voltage requirements are located on the submittal package and panel.

     NOTE: This is the only electrical connection required at the panel.
   - The unit should be connected to a separate circuit.
   - A fused disconnect switch or circuit breaker must be used in this circuit. Sharing of a circuit with other equipment may result in Variable Frequency Drive (VFD) faults due to power fluctuations during high amp draw periods.
   - Wire of sufficient size should be used to keep voltage drop to a maximum of 5%.
   - Single-phase motors have built-in overload protection.
   - Flexible metallic conduit should be used to protect the power wiring.

3. Attach the inlet / outlet pipes.
    - The pump system base plate should be shimmed until the suction and discharge headers are truly horizontal. Check this by placing a torpedo level on the face of the suction and discharge flanges. When leveling is complete, the foundation bolts should be tightened evenly and securely.
    - Both the suction and discharge pipes should be independently supported so that no strain is imposed on the unit when the pipes are connected.
    - Failure to support piping prior to its attachment to the system headers can cause damage to the system and void the warranty.
    - All connecting pipes should be accurately located. Pipes must line up and not be forced into position by unions. NEVER force the suction and discharge pipes into position.
    - Piping should be independently supported near the pump so that no strain will be placed on the pump casing.
    - Where any noise is objectionable, pump should be insulated from the piping with rubber connections.
    - Always keep pipe size as large as possible and use a minimum of fittings to reduce friction losses.
    - The suction piping should be direct and as short as possible. It should be at least one size larger than suction inlet tapping and should have a minimum of elbows and fittings (5 to 6 pipe diameters of straight pipe before inlet is recommended).
    - The suction piping should be laid out so it slopes upward to the pump without dips or high points to eliminate air pockets.
    - The highest point in the suction piping should be the pump inlet except where liquid flows to the pump inlet under pressure.
    - The suction pipe must be tight and free of air leaks or the pump will not operate properly.
    - Discharge piping should never be smaller than pump tapping and should preferably be one size larger.
    - An isolation valve should be installed on the main suction header and discharge header to the pump system, to allow major maintenance on the unit.

- Bladder tank installation:
  1. Charge the AIR side of the tank (see Shrader valve under the plastic cap on the opposite side of the tank from the Pipe connection). Air pressure should be 5 psi below desired set point water pressure. Replace the plastic cap.

     NOTE: THIS MUST BE COMPLETED PRIOR TO PRESSURIZING THE TANK WITH WATER.
  2. Remove the plug on the discharge pipe assembly and install the tank on the pipe connection on the pump system.
- The pump must be primed before starting the unit.
  1. The pump casing and suction piping must be filled with water by adding fluid to the volute case through the top plug before starting the motor.
  2. Remove vent plug in top of casing while pouring in priming water.
  3. A hand pump or ejector can be used for priming when desired.
  4. When water is poured into the pump to prime, remove all air before starting the motor.
- All single phase motors are single rotation and leave factory with proper rotation. Three phase motors should be checked to ensure proper rotation.

⚠ WARNING

NEVER allow the pump to run with the discharge valve tightly closed. If the pump runs for an extended period of time without liquid being discharged, the liquid in the pump case can get extremely hot causing severe damage to the pump and possibly cause personal injury.

4. Contact the factory to schedule startup and training on the unit.

Pre-Startup Checklist

The following tasks are the responsibility of the installer, and must be completed prior to the arrival of a startup technician. Failure to complete all these tasks can result in a delay in startup and additional charges to the installer.

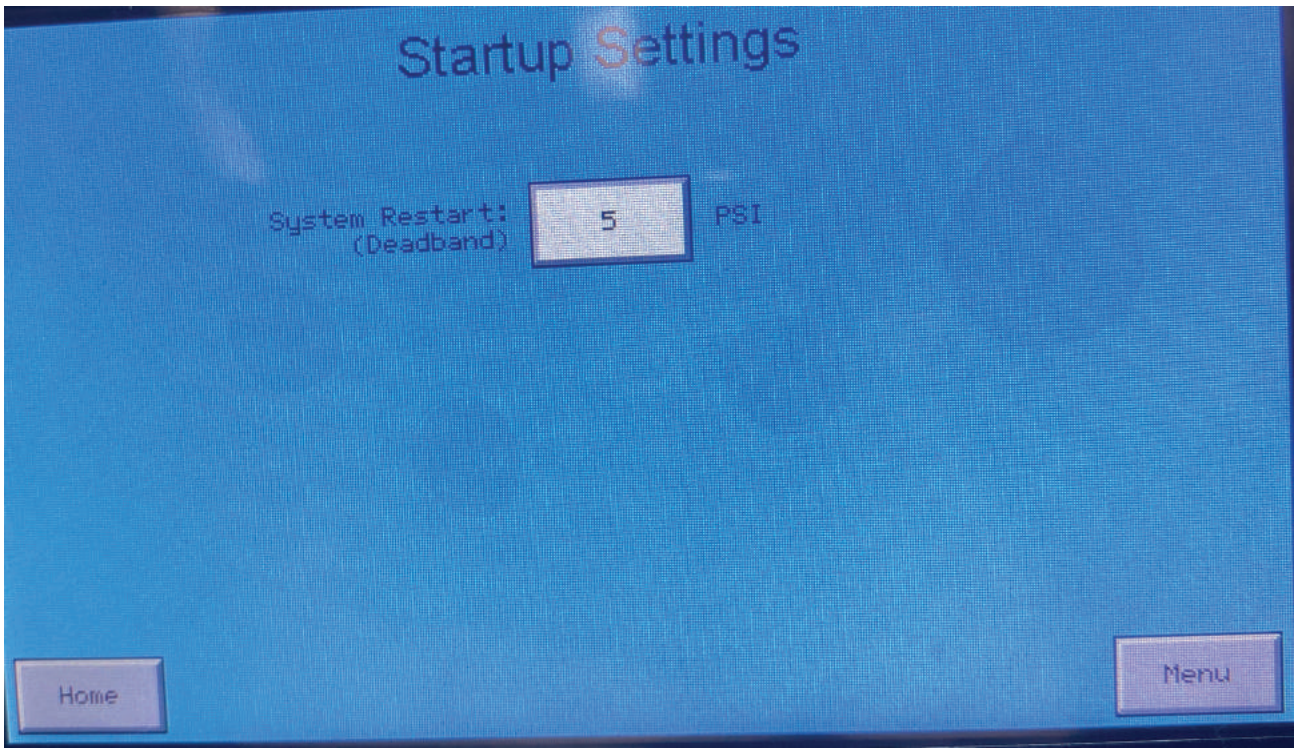
- The unit is installed correctly as outlined in the "Installation Instructions" on page 15.
- The suction and discharge building piping is leak-free.
- A water source is available at the suction of the skid for wet testing.
- It is preferred that the building piping be filled already (but not required).
- A means of using water downstream of the system (toilet flush, sink, hose bib to drain, e.g.) to allow the startup technician to pump water and test all functionality.
- A customer/installer representative familiar with the building/plumbing system has been assigned to meet the service technician at the site to support startup (security access, electrical power source, to run water, check for leaks in building, assemble personnel for training, etc.).
- Personnel to be trained on use/maintenance are identified and will be available when technician is ready to perform training. (Training takes about 30 minutes).

NOTE:
NEVER POWER UP THE CONTROL PANEL (TURN ON THE MAIN DISCONNECT IN THE PANEL) UNTIL A CERTIFIED STARTUP TECHNICIAN HAS CHECKED AND PERFORMED STARTUP ON THE SYSTEM AT THE SITE.

Control Panel Screens

Start Up Settings

The System Restart is the allowable PSI below the Set Point Pressure at which the pump system will restart, after having shut down during a No Flow Shutdown.



Keyboard Screen

The Keyboard Screen appears whenever the user touches a settable value, and provides a means of changing values. The ENTER key must be hit following any changes, to register and save the value.

E-KON Duplex Booster Pump

Home

The round indicators to the right off Pump #1 and Pump #2 indicate the pump status:

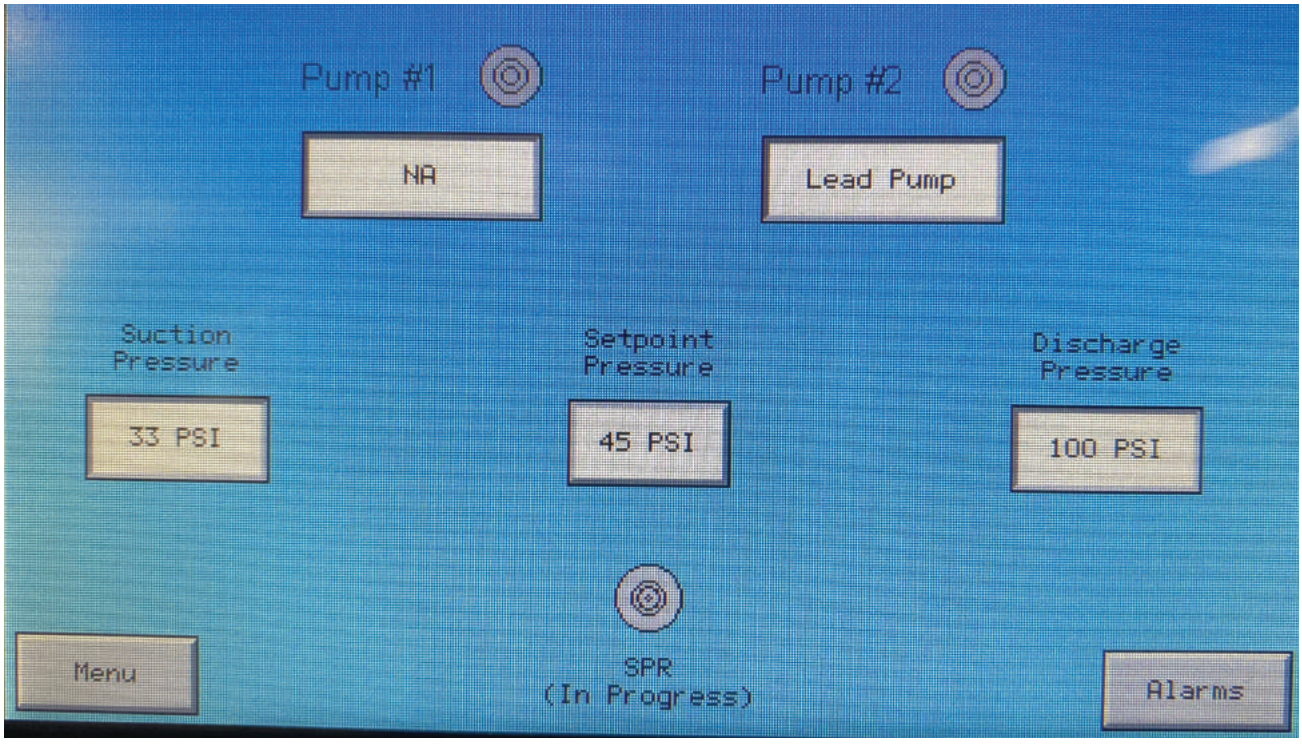
- GRAY - Off
- GREEN - Running
- RED - Fault

Pump #2 can be in the LEAD, LAG, or OFF position.

The Suction Pressure button displays the ACTUAL suction pressure at the suction header.

The Setpoint Pressure button indicates the desired output pressure the booster is to maintain at the discharge header.

The Discharge Pressure button displays the ACTUAL pressure at the discharge header.



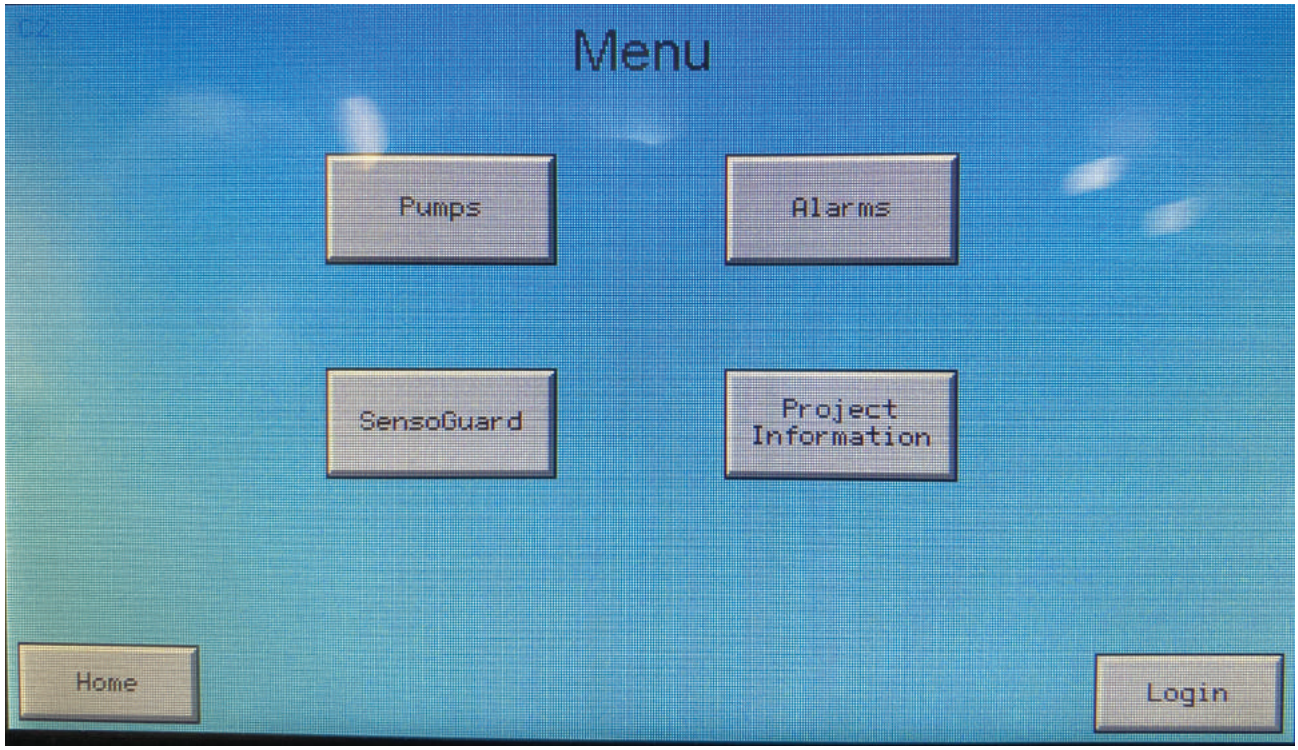
Menu

The Pumps button takes the user to the Pumps screen. See "Pumps" on page 24.

The Alarms button allows the user to check for alarms and silence any alarm horn.

The SensoGuard button allows the user to see all major functions of the system for general status and health.

The Project Information button provides the project number, name, and relevant information in order to get technical help from the factory.



Pumps

The Hand button - Turns blue when pressed to indicate the pump is ON and will run at the Hz displayed in the block to the right of the button. Touch the Hz value to change the pump operating speed (from 0 to 60 Hz) while in the Hand position.

The Off button - Turns red when the pump is OFF and eliminates it from any logic scheme to automatically turn on and off. In the Off position, the Hz displayed in the block to the right of the Auto button shows the minimum speed the pump will run at.

The Auto button - Turns green and sets the pump in the AUTO position, which gives control for ON / OFF and SPEED to the logic controller. The Hz displayed in the block to the right of the button reports the ACTUAL speed (from 0 to 60Hz) of the pump.

The Idle button - Indicates the pump is in the AUTO position, but is not being asked to run by the controller.

The NA button - Indicates if the pump is in the LEAD or LAG position. NA is displayed when the pump is in OFF position.

The Alternate button - Changes the LEAD or LAG position of the pumps immediately. This happens only once when pressed and does not affect the automatic alternation scheme based on time and the ON / OFF status.

The Hours button - Indicates the total number of hours the pump has run since it was last reset.

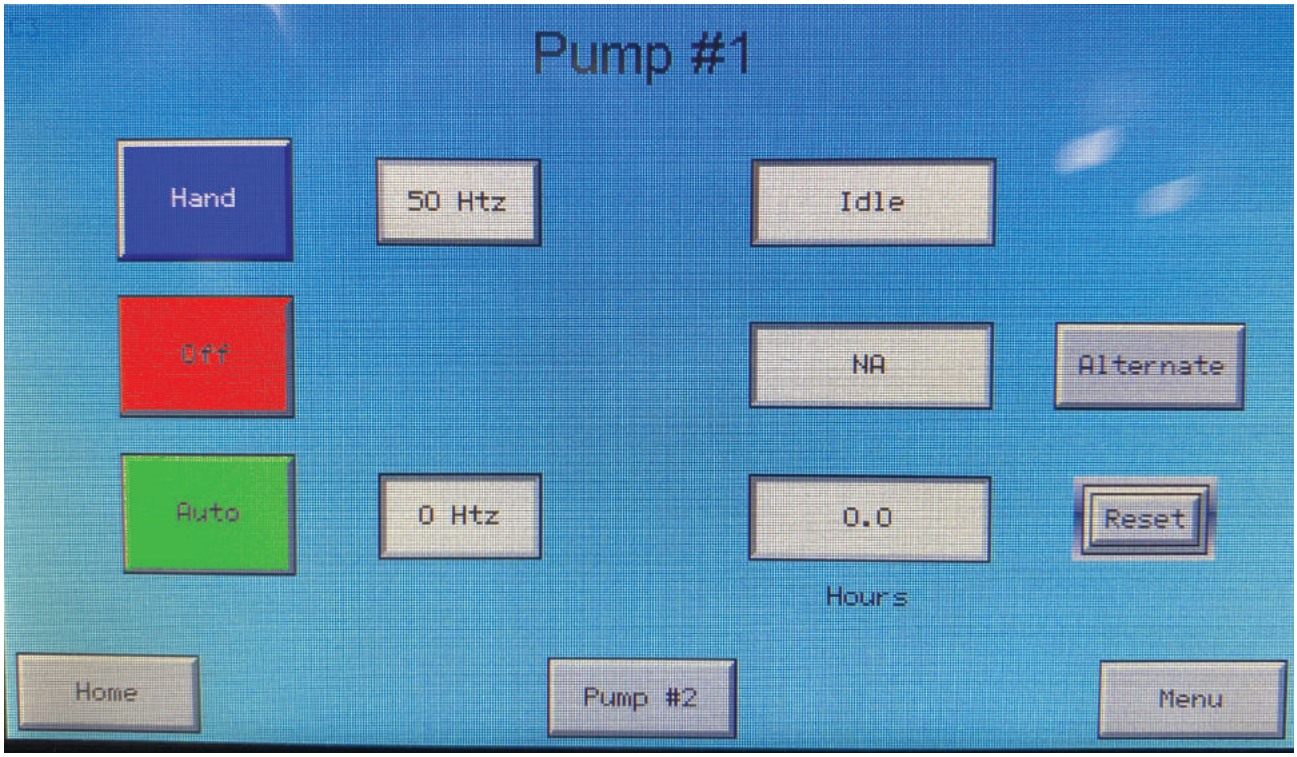
The Reset button - Allows user to reset the run hours to zero if a pump is replaced.

The Pump # button - Takes the user to the other Pump (Pump #1 or Pump #2) screen. See page 25.

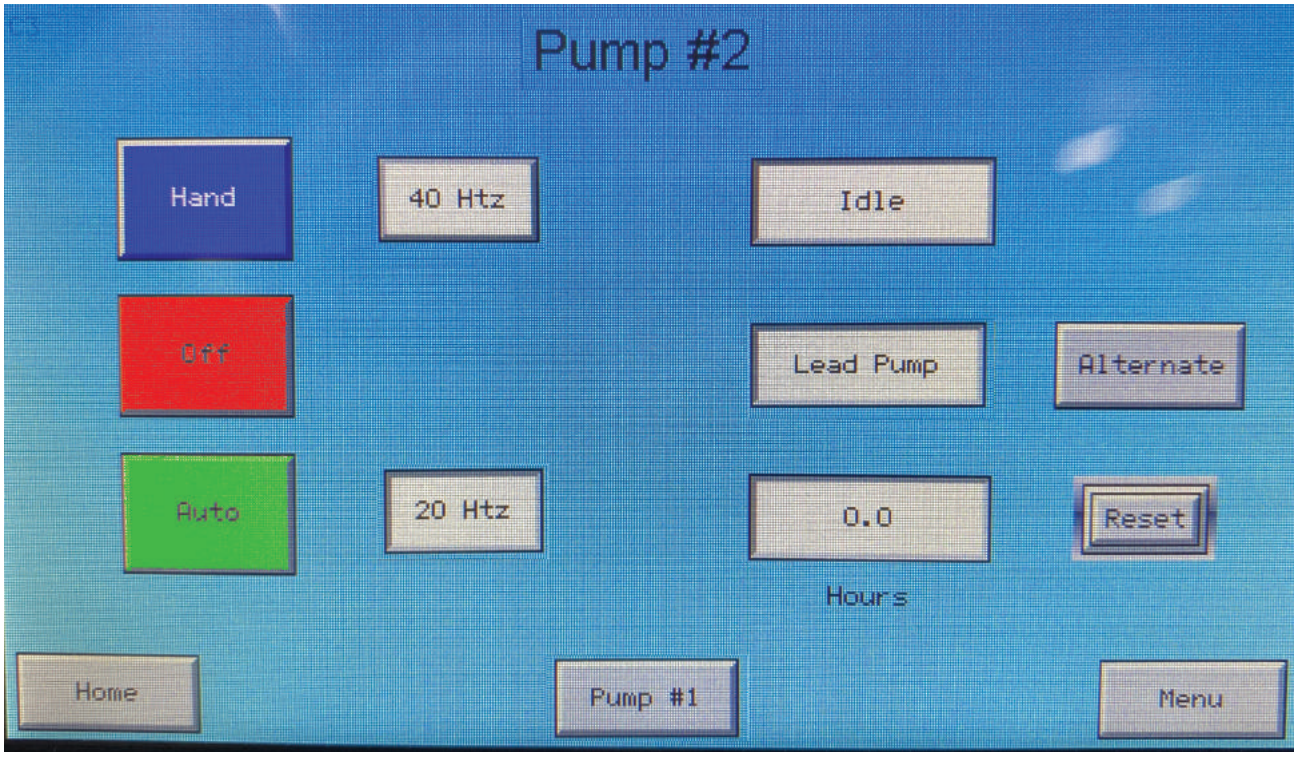
The Home button - Takes the user to the Home screen. See "Home" on page 22.

The Menu button - Takes the user to the Menu screen. See "Menu" on page 23.

Pump #1



Pump #2



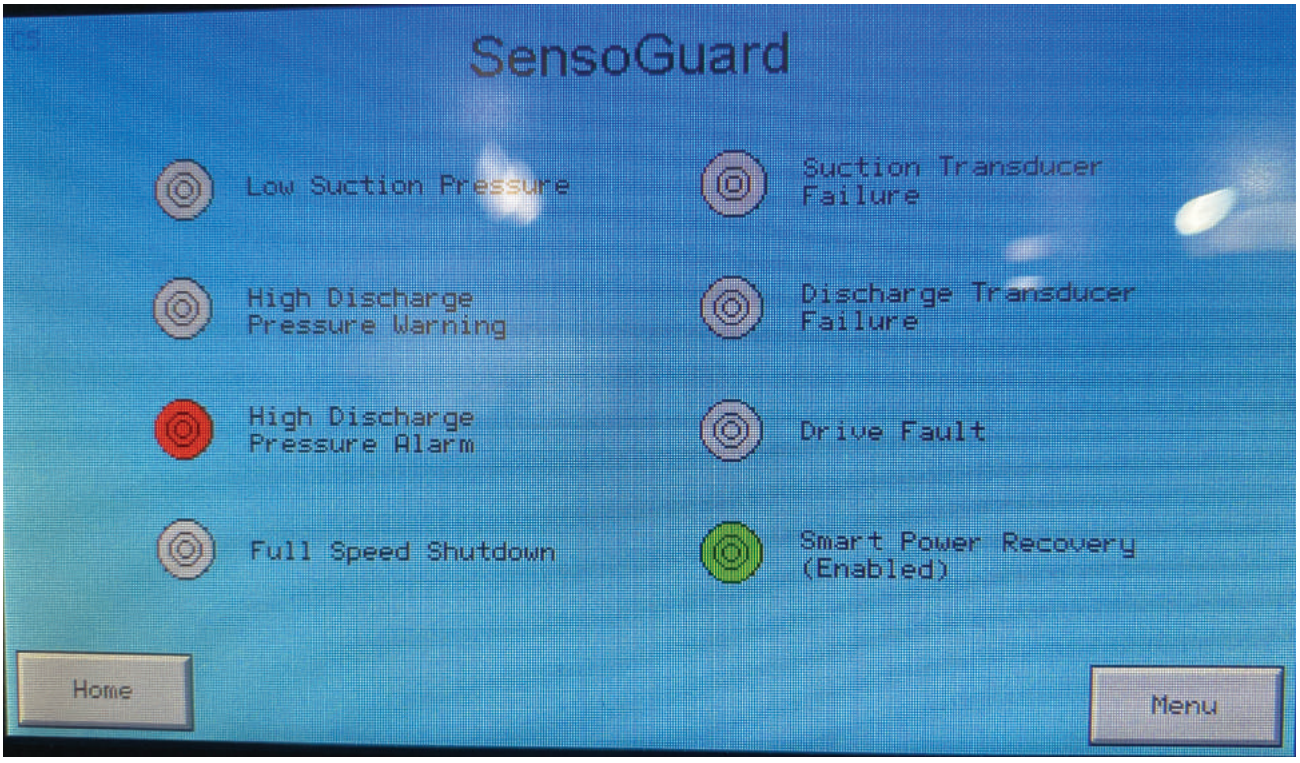
SensoGuard

The items on the SensoGuard screen display the status of the major controller sub-system:

- GREEN - Good
- YELLOW - Warning
- RED - Alarm
  The Alarm screen will show the user more information on any warning or alarm.
  See "Alarms" on page 27.

The Home button - Takes the user to the Home screen. See "Home" on page 22.

The Menu button - Takes the user to the Menu screen. See "Menu" on page 23.



Alarms

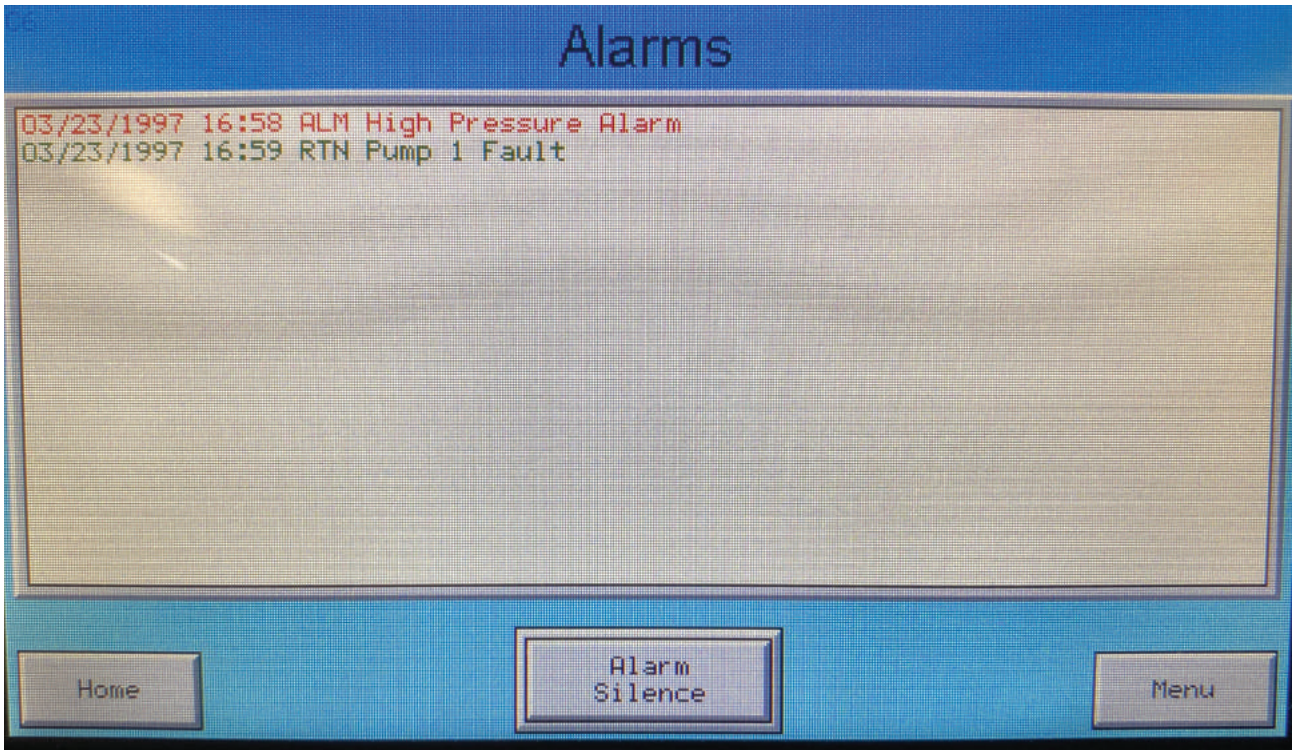
The Alarm screen shows the date and time of the alarm and the nature of the alarm.

Some alarms reset automatically when the condition clears and some must be physically reset.

The Alarm Silence button will turn off the horn if there is a horn associated with an alarm. It does not clear or acknowledge the alarm. It simply turns off the horn.

The Home button - Takes the user to the Home screen. See "Home" on page 22.

The Menu button - Takes the user to the Menu screen. See "Menu" on page 23.

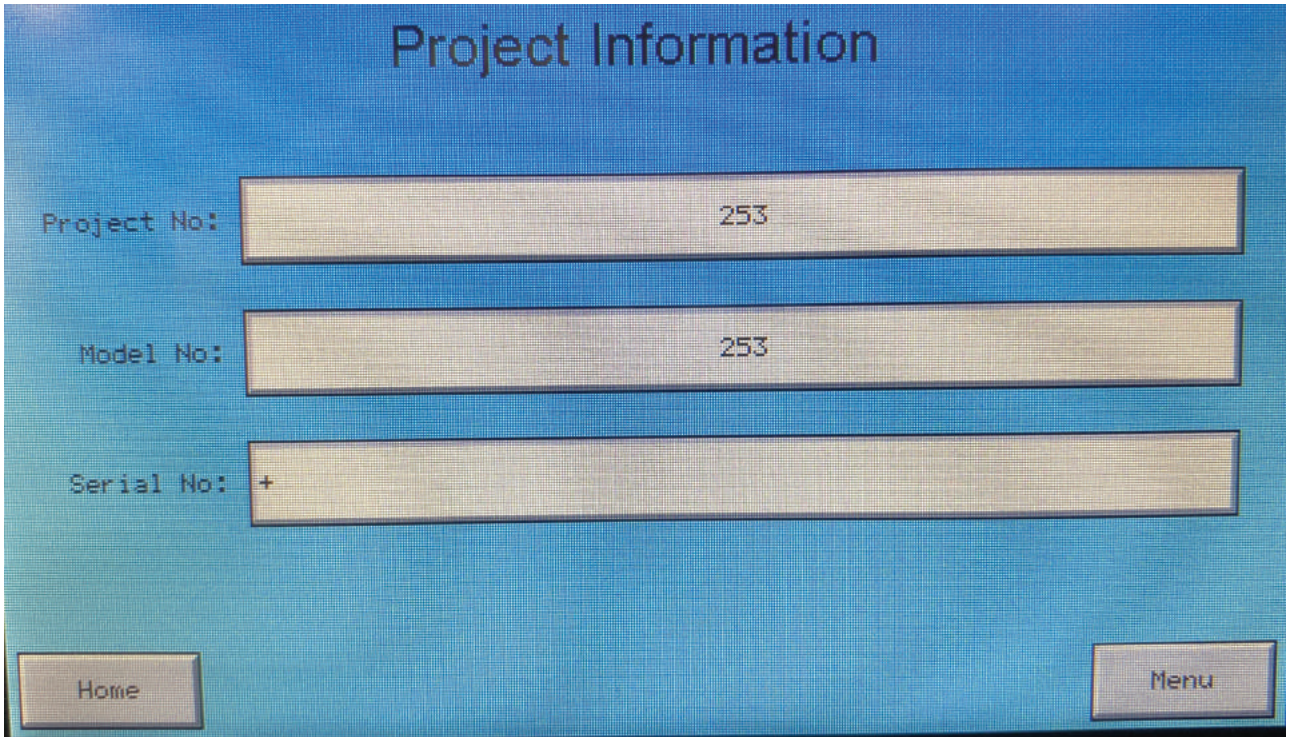


Project Information

This information is valuable when discussing specific data with the factory to identify your specific unit.

The Home button - Takes the user to the Home screen. See "Home" on page 22.

The Menu button - Takes the user to the Menu screen. See "Menu" on page 23.

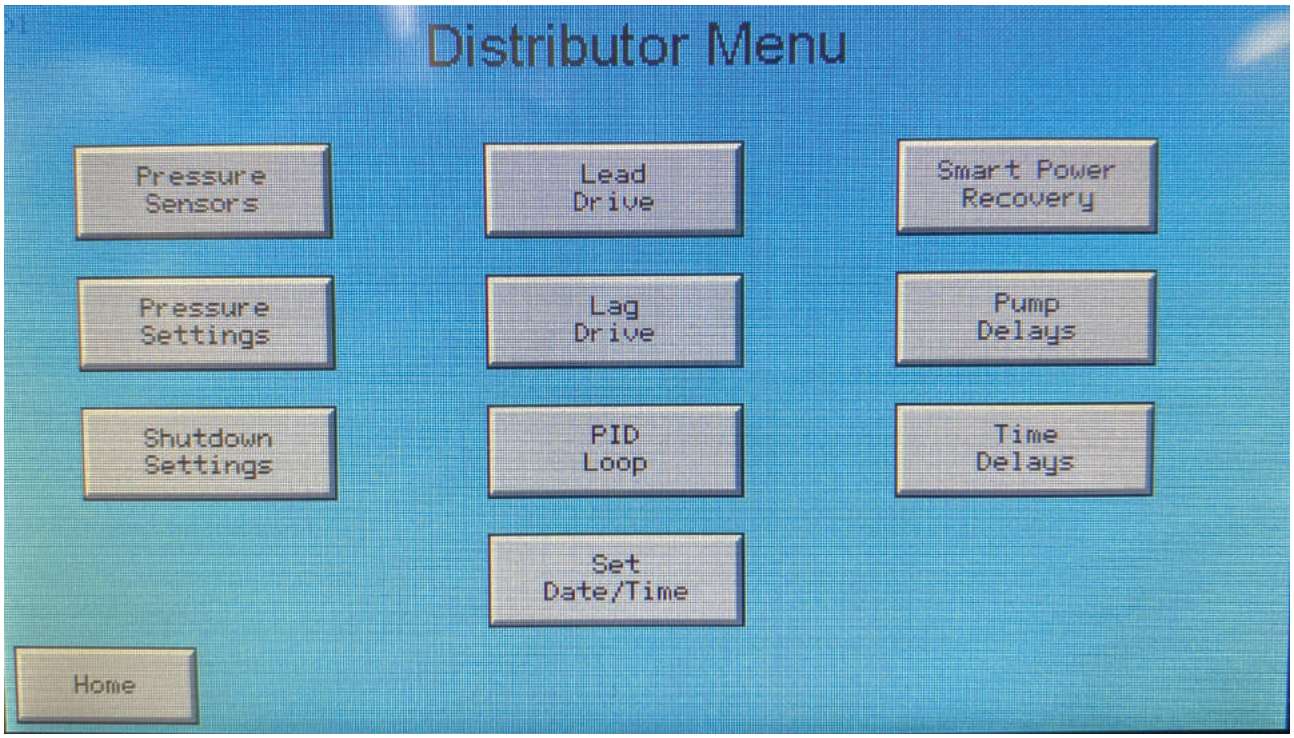


Distributor Menu

Personnel should NOT make changes to these settings without specific professional knowledge and authorization to do so. Changes can result in operations which can damage the unit or over-pressurize the system, resulting in building damage and personal injury.

The Distributor Menu is password protected and are the major settings for operation of the controls.

The Pressure Sensors button - See "Pressure Sensors" on page 30.
The Pressure Settings button - See "Pressure Settings" on page 31.
The Shutdown Settings button - See "Shutdown Settings" on page 32.
The Lead Drive button - See "Lead Drive" on page 33.
The Lag Drive button - See "Lag Drive" on page 34.
The PID Loop button - See "PID Loop" on page 35.
The Set Date / Time button - See "Set Date & Time" on page 36.
The Smart Power Recovery button - See "Smart Power Recovery" on page 37.
The Pump Delays button - See "Pump Delays" on page 38.
The Time Delays button - See "Time Delays" on page 39.
The Home button - Takes the user to the Home screen. See "Home" on page 22.



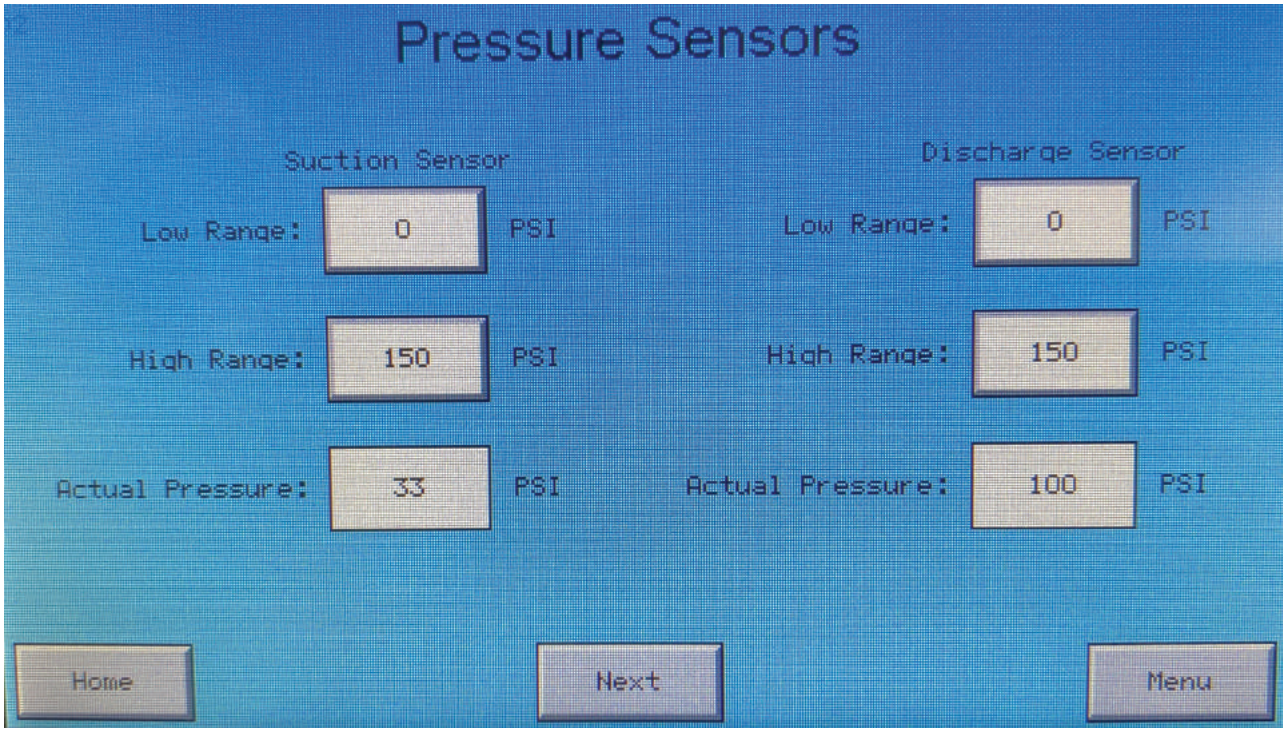
Pressure Sensors

These values are set to match the pressure transducer installed in the controller at the factory. They can also be used to adjust minor inaccuracies in the transducer if the digital pressure reported is different than a calibrated pressure gauge.

The Home button - Takes the user to the Home screen. See "Home" on page 22.

The Next button - Takes the user to the next Distributor Menu screen on the following page.

The Menu button - Takes the user to the Menu screen. See "Menu" on page 23.



Pressure Settings

The System Setpoint can be set on this screen, as well as, the HOME screen. The minimum and maximum values must consider the original design of the system for which the pump set was selected.

The Pressure Transducer Fail Safe Speed is the speed the LEAD pump will operate in the Hand position upon failure of the discharge pressure transducer. The LAG pump will be positioned in the Off position and a Transducer Failure alarm will appear. This value is set at startup based on the specific building and operational parameters.

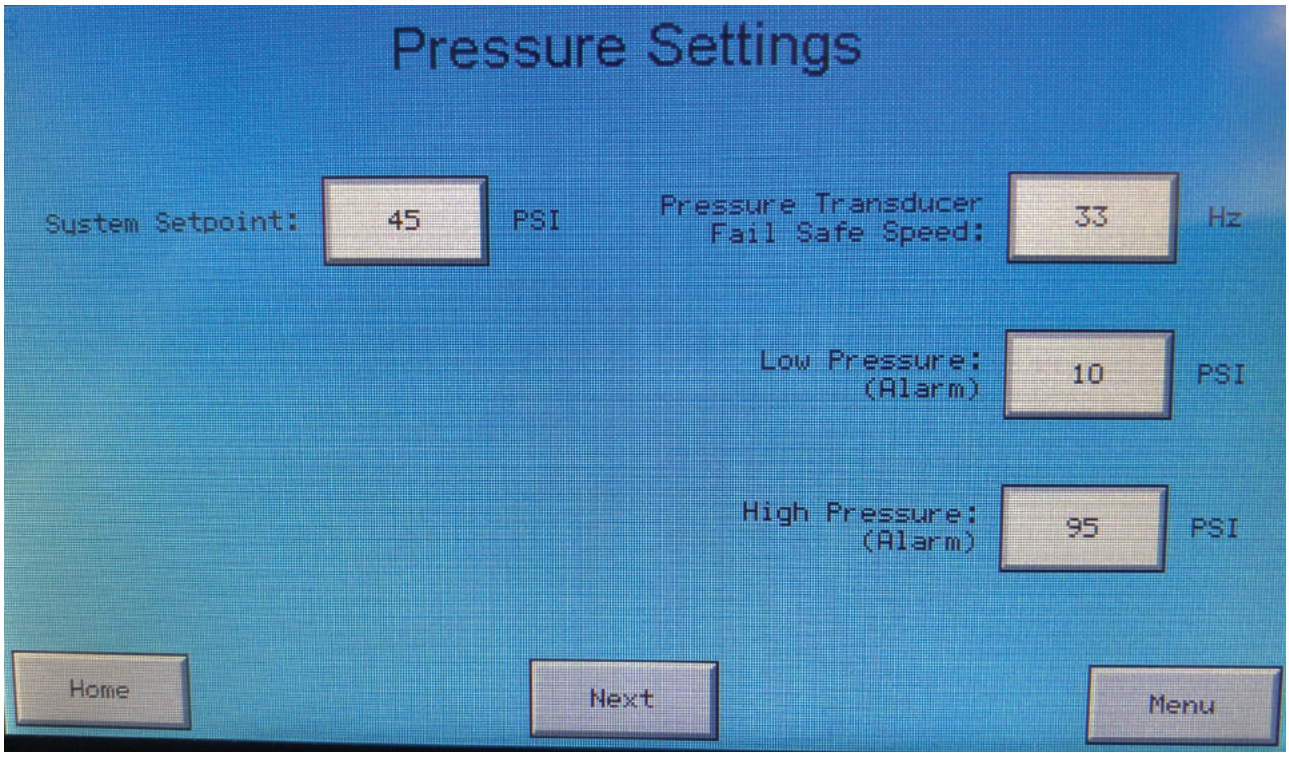
The Low Pressure Alarm occurs when the system pressure reaches the indicated PSI level.

The High Pressure Alarm occurs when the system pressure reaches the indicated PSI level.

The Home button - Takes the user to the Home screen. See "Home" on page 22.

The Next button - Takes the user to the next Distributor Menu screen on the following page.

The Menu button - Takes the user to the Menu screen. See "Menu" on page 23.



Shutdown Settings

This screen manages the shutdown of the lead pump during "no flow" periods.

If the Actual PSI pressure value is no more than Allowable Deadband PSI of the System Set-point PSI, for Stop Delay seconds, then the controller will turn OFF the LEAD pump.

The LEAD pump will remain OFF until the Actual PSI pressure value drops the System Restart Deadband PSI below the System Setpoint PSI.

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The Next button - Takes the user to the next Distributor Menu screen on the following page.

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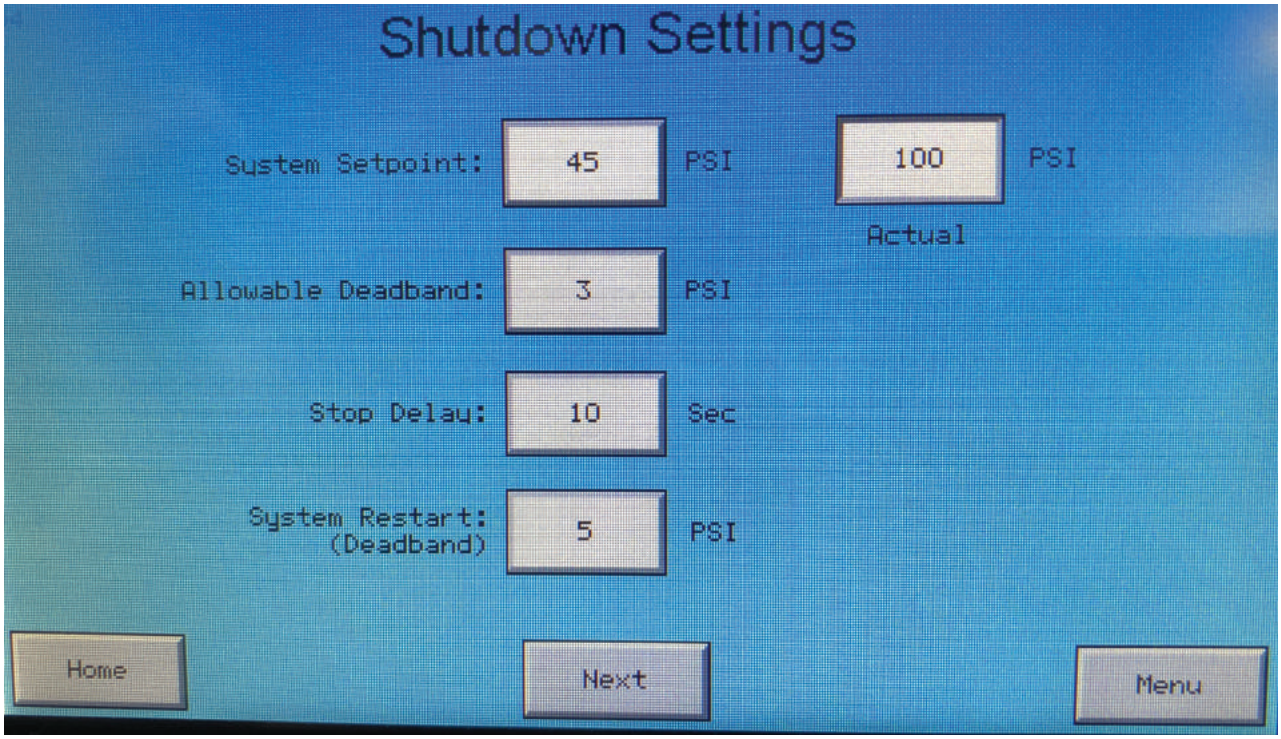

Lead Drive

The PID Output which Starts Lead Drive percentage sets the PID output at which the lead drive turns on.

The PID Output where Lead Drive at Max percentage sets the PID output at which the lead pump will be at full speed.

The Lead Drive Startup Speed is the minimum pump speed when the pump is called on to start. It starts at this Hz and adjusts up from there. Alternately, it will not run lower than this value when preparing to shut down.

The Lead Drive Max Speed is the maximum speed in Hz the pump will operate at.

The graphs at the bottom of the screen are graphical representations of the values above.

The Home button - Takes the user to the Home screen. See "Home" on page 22.

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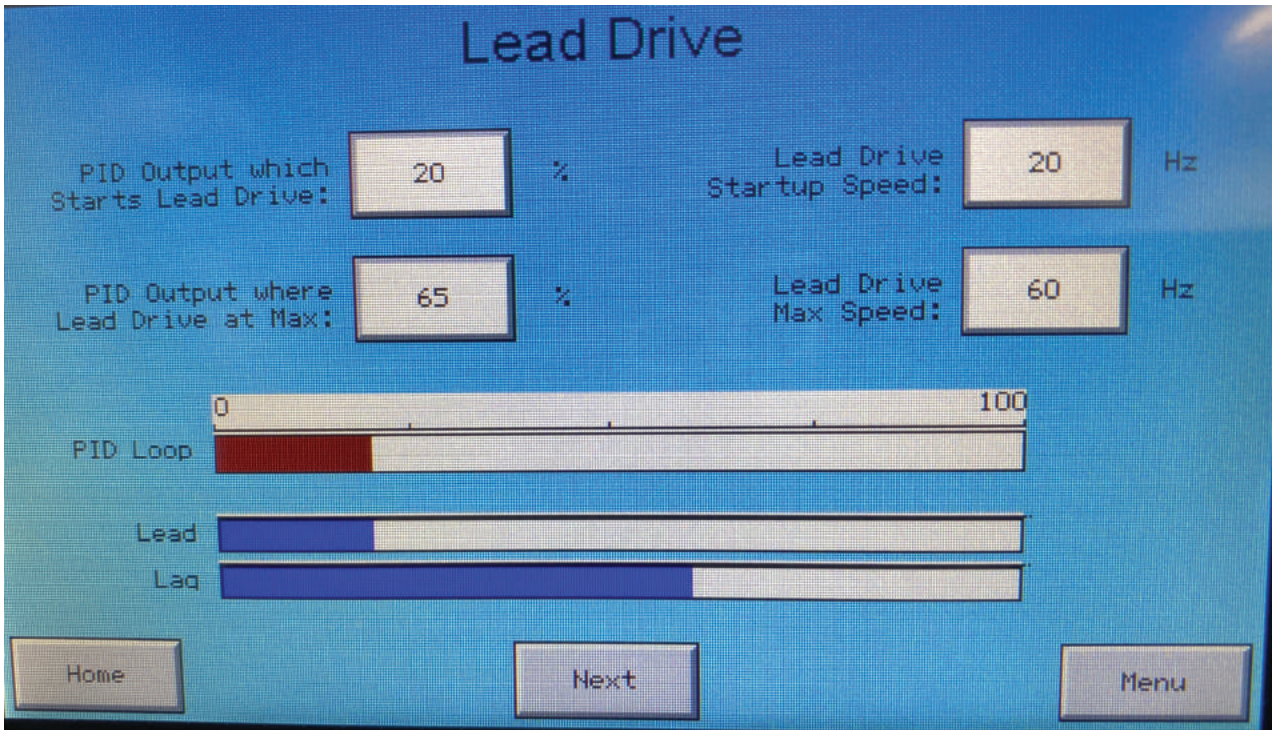

Lag Drive

The PID Output which Starts Lag Drive percentage sets the PID output at which the lag drive turns on.

The PID Output where Lag Drive at Max percentage sets the PID output at which the lag pump will be at full speed.

The Lag Drive Startup Speed is the minimum pump speed when the pump is called on to start. It starts at this Hz and adjusts up from there. Alternately, it will not run lower than this value when preparing to shut down.

The Lag Drive Max Speed is the maximum speed in Hz the pump will operate at.

The graphs at the bottom of the screen are graphical representations of the values above.

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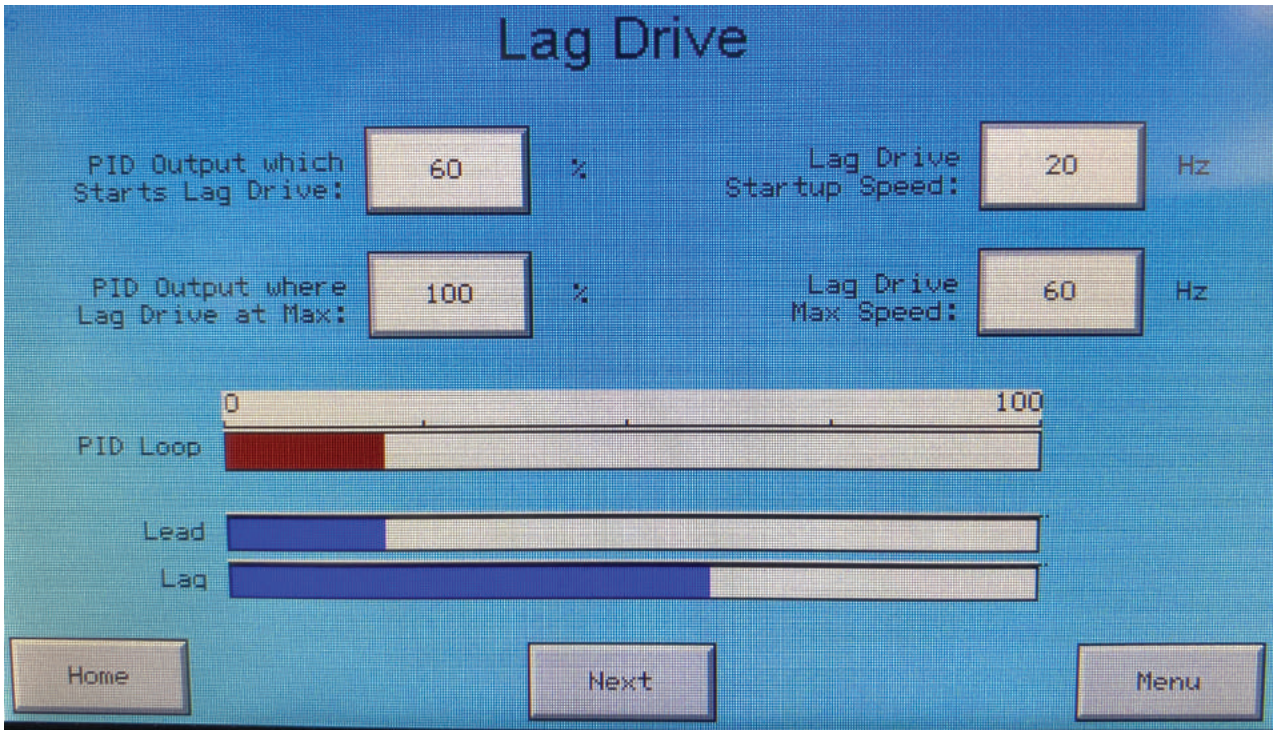

PID Loop

The PID Loop is used to tune the system to make the controller more or less responsive to changes in actual pressure to get the system to maintain a smooth and consistent set point pressure. Tuning involves slight changes to the I (try this first) and P values, to achieve the desired response.

The System Setpoint is the desired output pressure at the discharge header.

The Actual Pressure is the measured pressure at the discharge header.

The PID Output is a calculated value that is used by the PLC, based on how far the actual pressure is from the set point pressure, and tells the PLC information needed to command pump actions.

The Gain (P), P stands for Proportional, decreasing this value makes it less "aggressive" in obtaining the setpoint.

The Reset (I), I stands for Integral, increasing this value makes it less "aggressive" in obtaining the setpoint.

The Rate (D), D stands for Derivative, and should not be an adjusted value.

The Home button - Takes the user to the Home screen. See "Home" on page 22.

The Next button - Takes the user to the next Distributor Menu screen on the following page.

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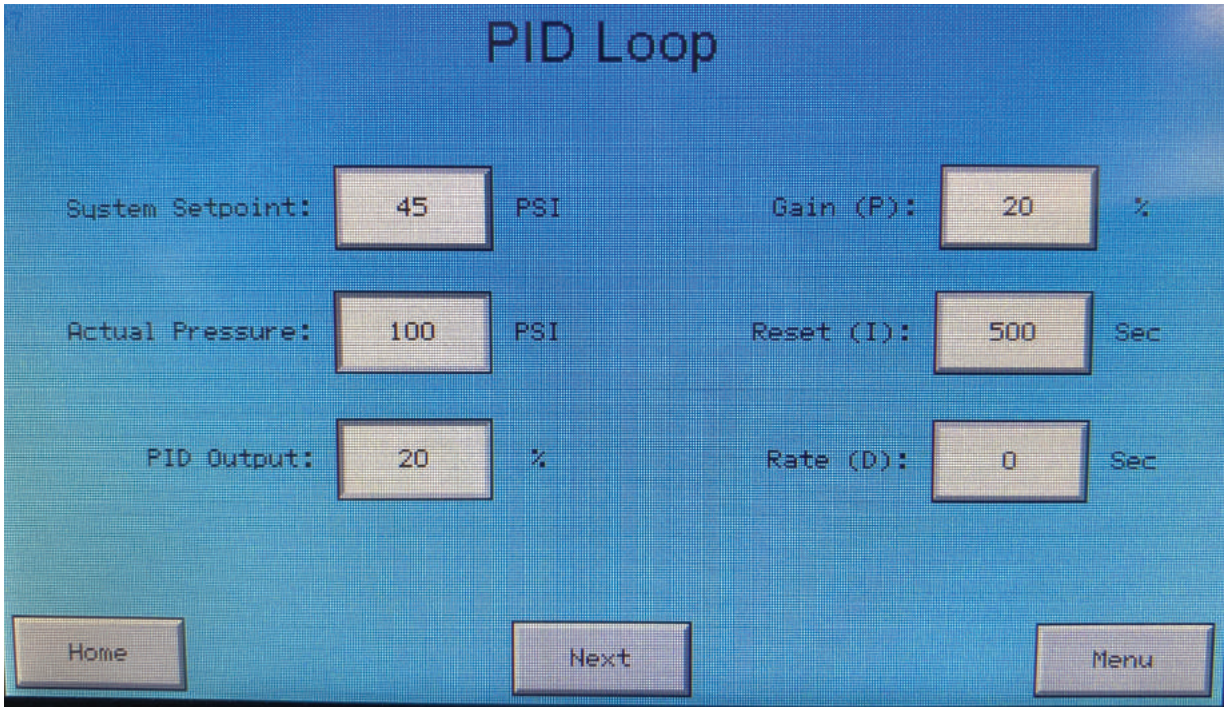
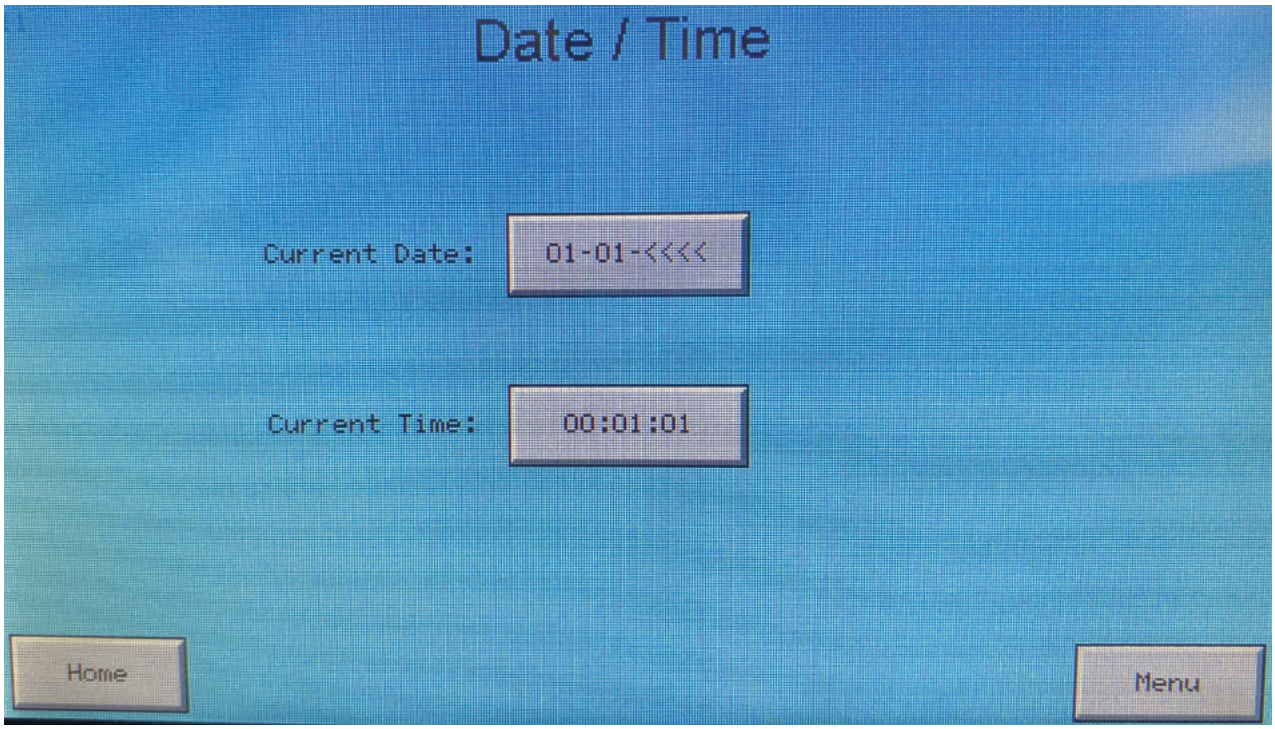


Set Date & Time

The date and time are set at startup by the startup technician.

The Home button - Takes the user to the Home screen. See "Home" on page 22.

The Menu button - Takes the user to the Menu screen. See "Menu" on page 23.



Smart Power Recovery

The PID Startup Ramp is the increase in speed (measured in percent) the pump will receive after each time interval.

The PID Startup Ramp Interval is the amount of time the pump will stay at a particular speed before being commanded to increase to the next higher level of speed, to bring the system up to the desired pressure level.

The Enable SPR button and Disable SPR button allow the Smart Power Recovery functionality to be turned ON or OFF.

The Home button - Takes the user to the Home screen. See "Home" on page 22.

The Next button - Takes the user to the next Distributor Menu screen on the following page.

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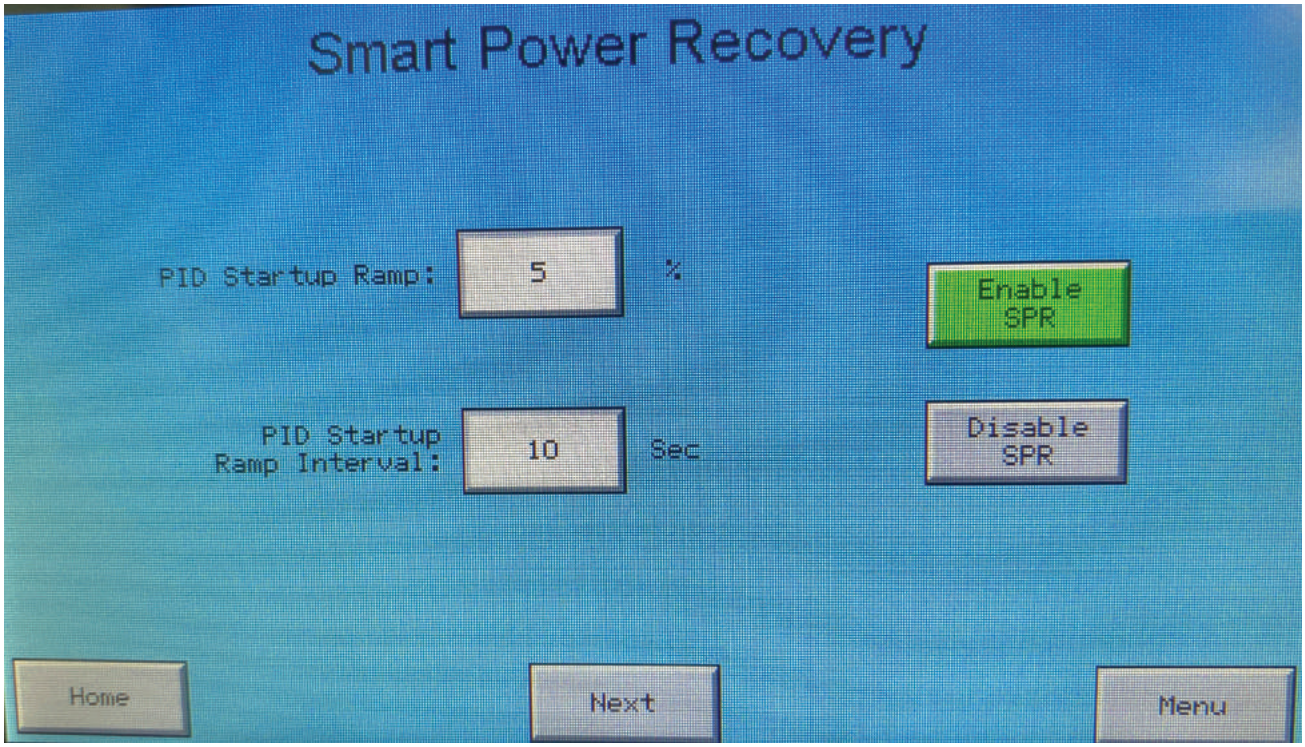

Pump Delays

The Power Up Delay establishes when the LEAD pump will start after the system is powered on.

The Lead to Lag establishes how long the LAD pump will wait after the LEAD pump has reached near full speed to help maintain pressure.

The Home button - Takes the user to the Home screen. See "Home" on page 22.

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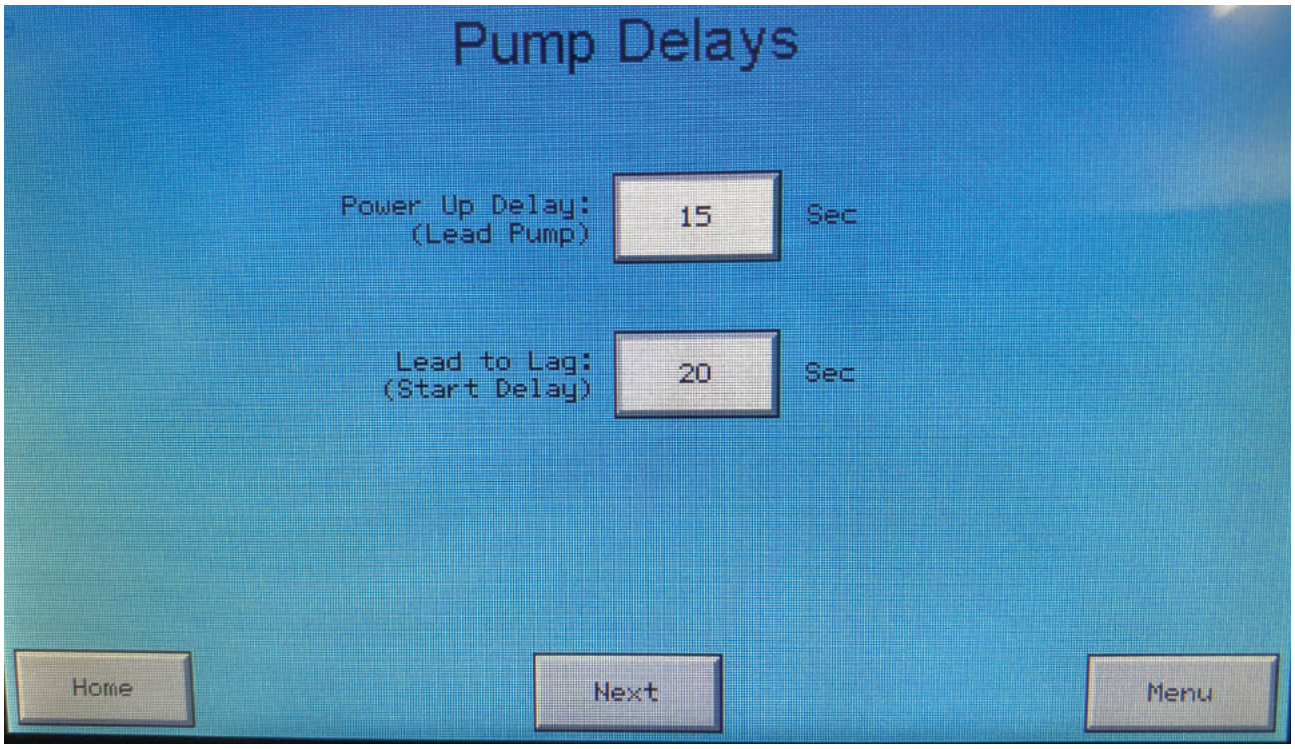
The Menu button - Takes the user to the Menu screen. See "Menu" on page 23.



Time Delays

The Rotation time tells the controller when to automatically rotate the pumps. This value can be changed.

The Alternation button enables or disables the automatic alternation function. When ENABLED is selected, the pumps will alternate according to the Rotation Time (in hours). When DISABLED, the pumps will not alternate.

The Full Speed Shutdown indicates when a major leak in the piping is present because both pumps are running at FULL SPEED for this duration of time. The controller then moves the position of both pumps to the OFF position and a Pipe Leak alarm will appear. This value can be changed.

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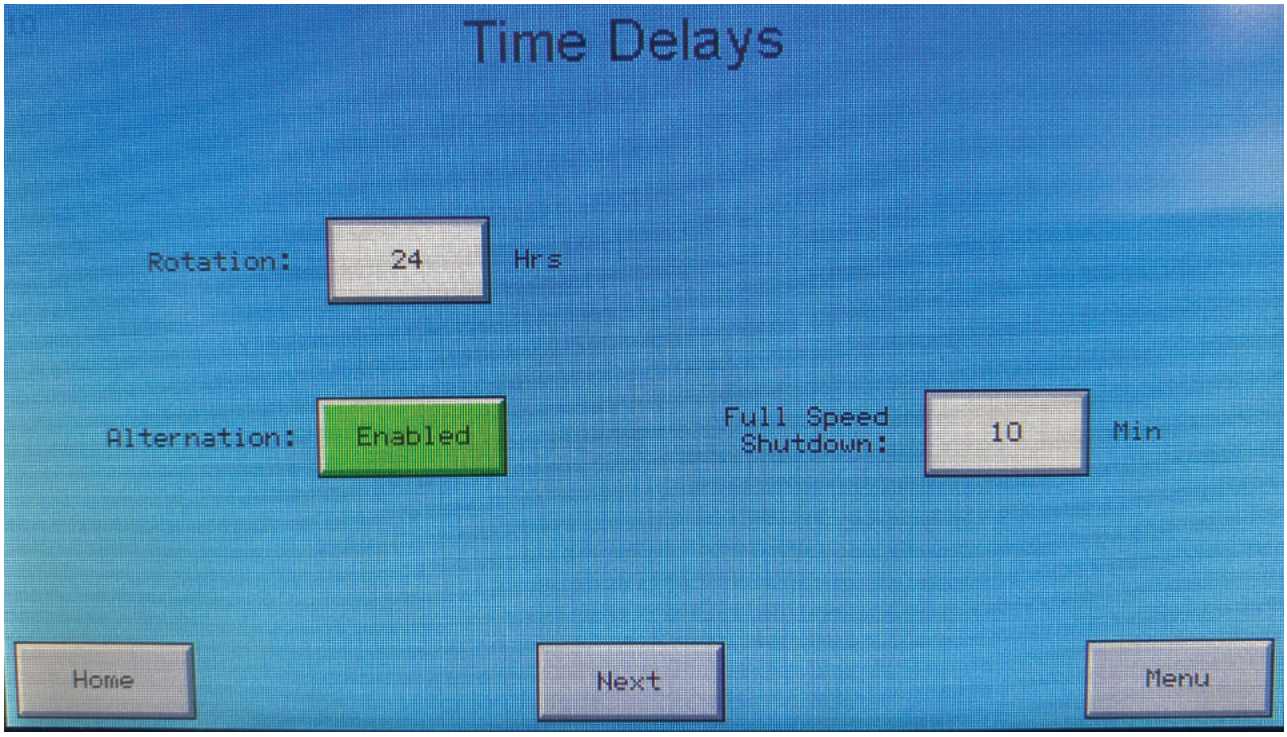


Operational Logic

Sequence of Operations

The SENCILLO E-Kon Variable Speed Packaged Pump System incorporates the following sequence of operations:

Pump Status – Each Pump Status can be seen by viewing the front screen on the touch screen HMI. The pump icon is used to place the drive in the desired position (Hand, Off, Auto).

Lead Pump – One Pump (Lead Pump) operates continuously at various speeds to maintain the System Set-Point Pressure. When the Building demand exceeds the "Lead-Lag" Operating Point of the Lead Pump, the Second Pump (Lag 1) is automatically started. The Sequence of operation acts in reverse when there is a decrease in demand.

Lag Pump (Run Time) – When a Lag Pump has been started, there is a timer that is also activated in the PLC to keep it in operation for a Minimum of One (1) minute to prevent the pump from cycling on and off.

Sequencing of Pumps – Starting and Stopping of the Pump(s) are achieved by a combination of "Lead-Lag" & "System Set-Point". The "Lead-Lag" is pre-determined based on factory tests and Pump characteristics. A pre-determined Minimum/Maximum Hertz Set-Point along with a Minimum Run Hertz setting will bring the Lag Pump(s) on if the Lead Pump is operating and not maintaining System Set-Point Pressure.

Pump Speed – The pump(s) RPM are adjusted up and down by a Variable Frequency Drive (VFD) connected directly to each individual Pump Motor. A Signal from the Discharge Pressure Transducer is constantly being compared to the "System Set-Point" on the HMI. The Drive Controller then sends a signal to the VFD to either speed up or slow down in order to meet or maintain the System Set-Point Pressure.

The speed of response, timing of increase and decrease speed, and run time of the drives are all parameters that are set by the startup technician, tuned to maintain smooth operation on the building.

Alarms – The Pump System comes standard with the following Alarms/Warnings:

- Low Suction Alarm
- High System Alarm
- Drive Fault
- Pressure Transducer Failure

No-flow Shutdown – During low or slow periods of demand, the Lead Pump is operating with a Zero Flow rate which will cause a No-Flow Shutdown. If the Operating Pressure drops below the System Set-Point, then the Pump(s) will automatically restart to maintain the System Set-Point Pressure.

Low Suction Pressure Shutdown/Alarm – If the suction pressure drops below 5 psi (settable value), the controller will stop operation of all pumps, to prevent damage to the pump from dry run situation. When the suction psi moves above the Suction Pressure On Value, the controller will resume automatic operation.

Pump Fault – If a motor were to fail or a drive fault, the Faulted Pump will be displayed on the Drive, the word “Fault” will appear. The next available pump in sequence will start automatically. The controller will skip the “Faulted Pump” during normal operating conditions until the Failure has been resolved.

Pressure Transducer Failure – If the Pressure Transducer were to Fail during normal operating conditions, the PLC is programmed to turn “OFF” the associated Pump and switch operation to the other pump.

Pump Alternation – The Lead Pump is alternated if the System is Shutdown on No-Flow or if the Lead Pump has been running for a pre-determined maximum number of hours and the time of alternation has arrived.

Smart Power Recovery

The Smart Power Recovery (SPR) slowly brings the system output pressure back up to the set-point, while avoiding pressure spikes, after a power loss event. After filling the building, the system will return to its normal pump control logic routines.

Default SPR Parameters

All units are shipped with the following settings:

- **On-Off Switch** – On
- **Pumps** - Off
- **Step Time Interval** – 10 seconds
- **Step Percent** – 5%

NOTE: A typical SPR routine will take no longer than 2-3 minutes from the time the power is resumed.

Adjusting the SPR Parameters

The following SPR parameters can be adjusted by the user with a Distributor-level password:

- **On-Off Switch** – The entire SPR function can be turned On or Off at the SensoGuard Main Screen. This setting is maintained when power is turned off.
  - **On** - Indicated by a green light
  - **Off -** Indicated by a yellow light
- **Step Time Interval** – The length of time the system operates at a specific fixed speed before re-evaluating.
- **Step Percent** – The percent increase in pump speed for each step.

SPR Routine

1. Power is restored to the unit.
2. The SensoGuard Main Screen light is illuminated indicating that SPR is ENGAGED (which means the pump speed is being temporarily controlled by SPR).
3. The PLC has a built-in delay timer set to 90 seconds. This allows the touch screen to fully power up and boot before any operations begin, including the SPR routine.
4. The first available pump with the SPR function turned on will begin pressure restoration.

   NOTE: All HOA's (Hand-Off-Auto) return to the position they were in when power was lost.

   a. The lead pump will start at the minimum RPM (usually 20 HZ) and step up in speed per the Step Time Interval and Step Percent set by the user.

   b. If the set point pressure has not been achieved after the timer is complete, it steps it up in speed again per the Step Time Interval and Step Percent set by the user and continues this until the lead pump is at full speed.

   c. Next the system starts the same step routine with the Lag1 pump, starting at the minimum speed, until it is also at full speed.

   d. Any additional lag pumps in the system will start the same step routine, starting at the minimum speed, until they are also at full speed.

5. Once the pressure set point has been achieved, or all pumps with the SPR function turned on are at full speed, the system will exit SPR and return to their normal operating routine.

Maintenance

Always disconnect the motor/pump assembly from all power sources before servicing the pump or motor.

⚠ WARNING

Failure to properly follow assembly and operating instructions could result in personal injury and / or damage to the pump and motor.

NOTE: Motor bearings are lubricated during manufacture. Additional lubrication is not required during their normal lifetime.

Periodically check:

- Power connections
- Bolts / screws
- Motor mounting
- Ventilation openings are clear of extraneous objects which may hinder free flow of air thru motor.

Failure to properly install the impeller and impeller nut could result in damage to the pump and could cause serious personal injury.

- Replace the impeller if any vane is broken, excessive erosion shows, or if labyrinth surfaces are worn. The impeller nut should be replaced if damaged.
- Seal face, o-ring, and sealing members should be free of burrs and dirt. Complete seal assembly should be replaced if not in perfect condition.
- The shaft surface under the seal must be clean, smooth, and without any grooves. Replace, if necessary.
- Inspect the volute and wear rings. Replace, if necessary. If furnished with pressed in wear rings, only the rings need to be replaced.
- If the pump is not going to be used for a long period, the pump should be drained of water and flushed with clean water.
- Where the pump is exposed to freezing temperatures, it should always be left drained when not in use.
- Each Isolation valve should be exercised on a quarterly basis, to keep the mechanical operation moving and free.
- Check the sensing lines for leaks during normally-scheduled maintenance inspections.

Pump Disassembly

All Models

Before disassembly, open the power supply switch contacts and remove fuses. Disconnect the electrical wiring from the motor.

NOTE: All pumping parts can be removed from the case without disturbing the piping.

1. Drain the pump case by removing the drain plugs.
2. Remove the bolts securing the volute case to the pump bracket.
3. Pry the volute case from casing cover with a screwdriver.
4. Hold the motor shaft with a screwdriver in the shaft end slot. Remove the impeller nut. Grasp and turn the impeller counterclockwise (as viewed from pump end).
5. Remove the rotating part of the seal by pulling it off the shaft.
6. The stationary seat can be pressed from the casing cover.

Pump Assembly

CDU Model

1. Position the motor bracket on the motor with the mounting feet toward the motor. Cross-tighten bolts to the factory recommended 6 ft. lbs.
2. Using finger pressure only, firmly press the stationary seal seat into the casing cover. Press the seat until it evenly bottoms out in the seat cavity.
3. Be careful not to damage the stationary seal.
   a. Position the casing cover over the motor shaft.
   b. Align the casing cover holes with the motor bracket holes.
   c. Firmly press the casing cover into position. (Casing cover may need to be tapped into place by using a rubber mallet.)
4. Ensure all seals have good contact.
   a. Carefully press the rotating seal assembly onto the motor shaft. Ensure the face of the seal assembly has solid, square contact with the stationary seal seat.
   b. The seal retainer must seal against the motor shaft.
   c. Position the seal spring and seal washer. CDX pumps do not require seal spring washers.
5. Failure to properly install the impeller and the impeller nut could result in the impeller spinning off the shaft in three phase applications (when the motor may start in reverse rotation).
   a. While holding the seal spring in place, thread the impeller clockwise onto the motor shaft.
   b. Use a screwdriver to hold the motor shaft stationary. Turn the impeller on the shaft until it spins down and bottoms out. Make certain the impeller is firmly bottomed and sealed.
   c. Install the impeller nut onto the shaft in the same manner as the impeller was installed. Ensure the impeller nut is firmly sealed against the impeller. Apply Loctite® to the impeller nut before installing.
6. Position the Viton o-ring over the casing cover. Do not cut nick or damage the O-ring during installation.

7. The discharge can be positioned in the direction desired.
   a. Position the pump volute casing over the casing cover.
   b. Rotate the discharge to the desired direction.
   c. Align the bolt holes and secure the case to the casing cover with lock washers and cap screws.
   d. Cross tighten the bolts to the factory recommended 3.4 ft. lbs. Over-tightening may result in stripping of the motor bracket threads.
8. Position the mounting base on the pump and secure with capscrews.
9. Place the bolt and lock nut on the back of the mounting base. Adjust the bolt height to support the motor and tighten the lock nut to secure the bolt height.
10. Rotate the impeller to ensure proper alignment.

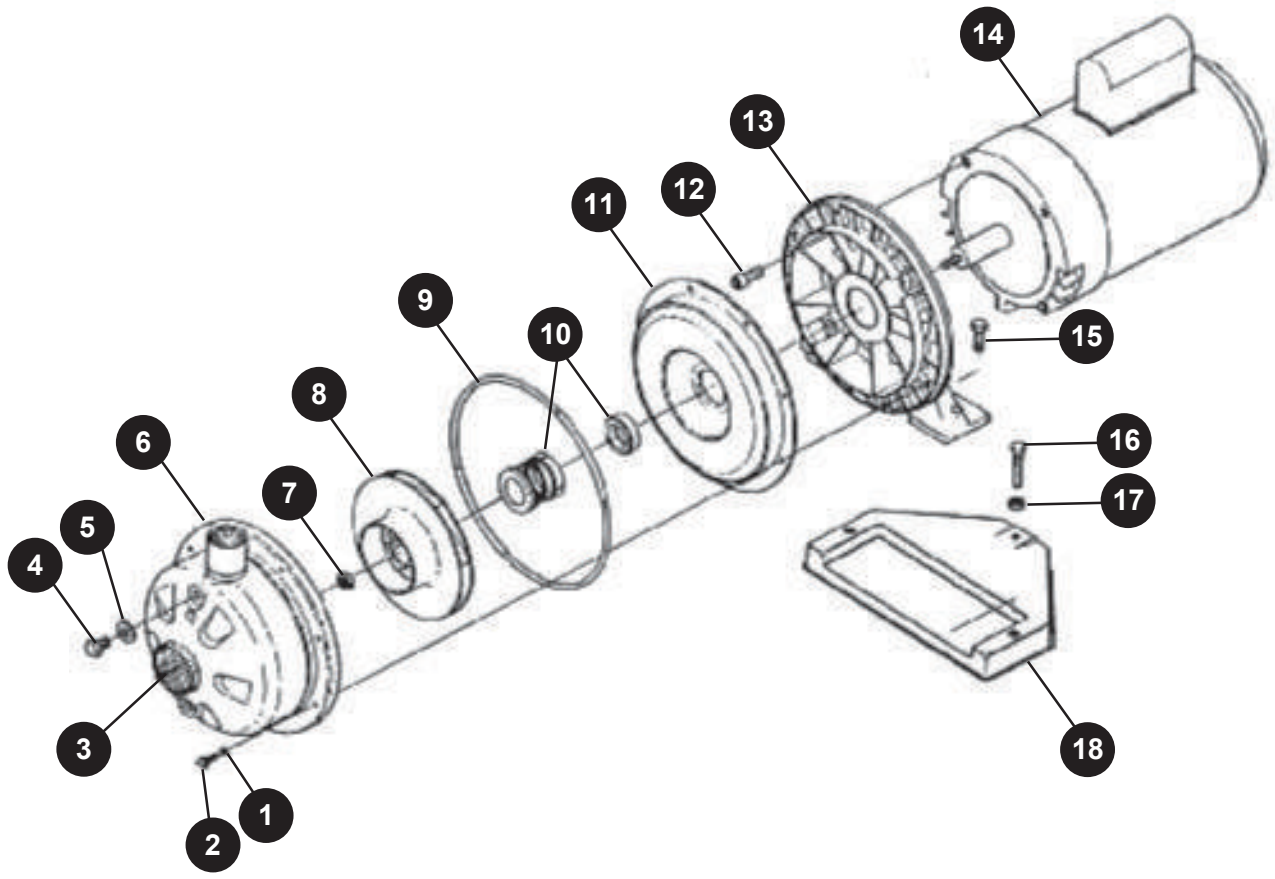
3U / 3UB Model

1. Position a nylon gasket over the motor shaft.
2. Carefully press the rotating seal assembly onto the shaft sleeve. The smooth face of the rotating ring must make good contact with the seal seat and the seal retainer must seal against the shaft sleeve.

   NOTE: Seal faces should be wiped clean with non-oil based solvent or alcohol.
3. Using finger pressure only, insert the seal seat into the casing cover. Press the seal until it evenly bottoms out in the seal cavity.
4. Position the cast iron motor bracket over the shaft. Fasten the bracket to the motor, tightening bolts using a crisscross pattern to the factory recommended 8 ft. lbs. Over-tightening may cause stripping of threads.
5. Carefully position the casing cover and seal over the shaft. Be careful not to damage the stationary seal seat.
6. Slide the stainless steel shaft sleeve, with rotating assembly, over the motor shaft.
7. Position the o-ring around the casing cover. Do not cut, nick, or damage the o-ring during the installation.
8. Install the impeller shaft key (3/16" x 3/16" x 1 3/16").
9. Place the seal spring assembly over the rotating piece of the seal in position to receive the impeller.
10. Place a nylon gasket on top of spring retainer.
11. Firmly press the impeller into position by aligning the slot over the shaft key. Press the impeller down the shaft until it bottoms and seats squarely against the Teflon gasket and shaft sleeve.
12. Place a nylon gasket over the impeller hub and into the impeller eye. Install the impeller bolt to secure the impeller to the shaft. Do not over-tighten the shaft bolt. (Use a thread compound or cement to secure the shaft bolt and prevent it from working loose.)
13. Tighten the impeller bolt to the factory recommended 11 ft. lbs.
14. Install the pump volute over the seal plate. Rotate the volute to align with the bolt holes and secure it with the bolts, washers, and nuts. Cross-tighten the bolts to the factory recommended 8 ft. lbs.
15. Using a socket wrench, rotate the impeller to check for alignment. If the impeller is rubbing against the casing, loosen the bolts on the casing and re-tighten.

Illustrated Parts Lists

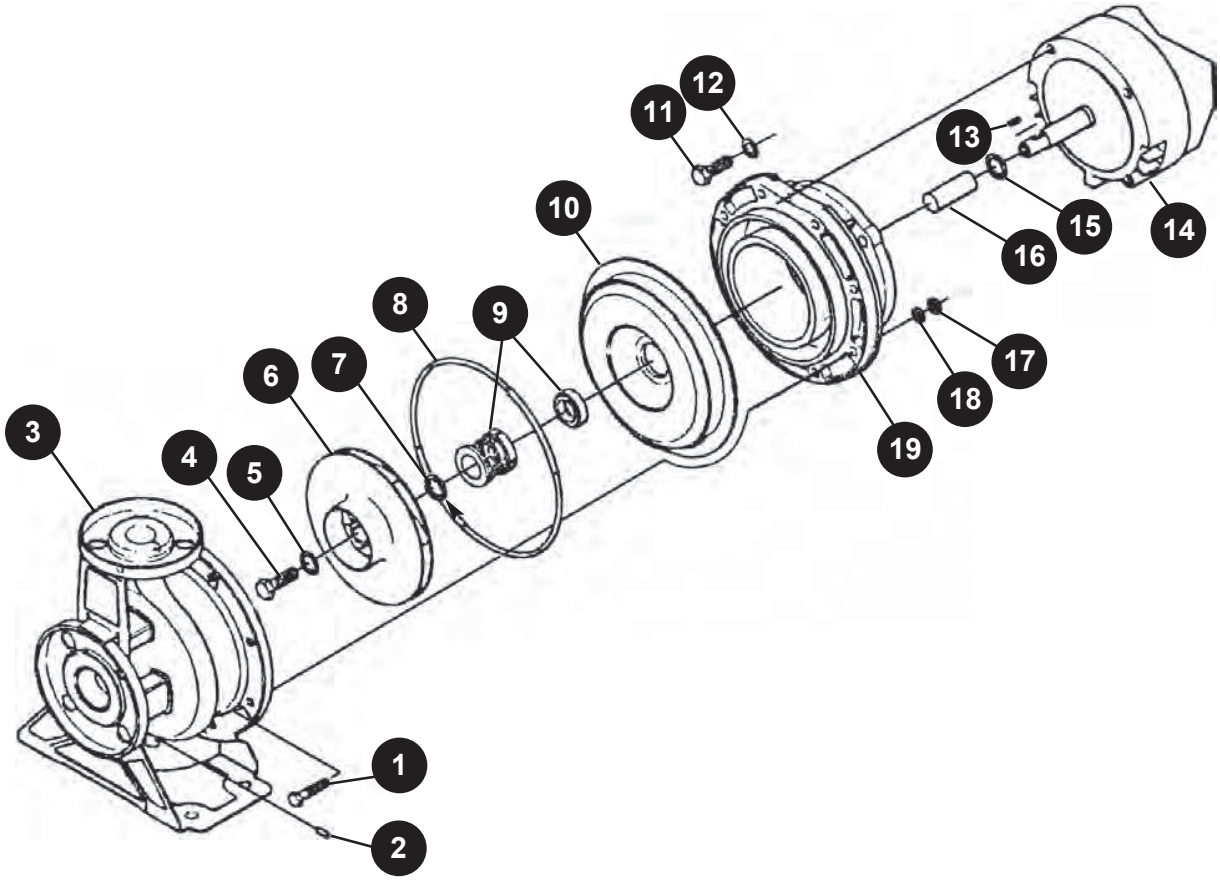
CDU Model



No.	Description	Material	Qty
1	Washer	304L Stainless	8
2	Bolt	304L Stainless	8
3	Casing Ring	Viton	1
4	Plug	304L Stainless	2
5	Washer	304L Stainless	2
6	Casing	304L Stainless	1
7	Impeller Nut	304L Stainless	1
8	Impeller	304L Stainless	1
9	O-ring	Viton	1
10	Mechanical Seal	--	1
11	Casing Cover	304L Stainless	1
12	Bolt	304L Stainless	4
13	Bracket	Aluminum	1
14	Motor	--	1
15	Bolt	304L Stainless	2
16	Bolt	304L Stainless	1
17	Nut	304L Stainless	1
18	Base	Steel	1

E-KON Duplex Booster Pump

3U / 3UB Model



No.	Description	Material	Qty
1	Capscrew	*	*
2	Plug	304L Stainless	1
3	Casing	304L Stainless	1
4	Impeller Bolt	304L Stainless	1
5	Gasket	Nylon	1
6	Impeller (3U)	304L Stainless / Bronze	1
7	Gasket	Nylon	1
8	O-ring	Viton	1
9	Mechanical Seal	--	1
10	Casing Cover	304L Stainless	1
11	Capscrew	*	*
12	Washer	*	*
13	Key	304L Stainless	1
14	Motor	==	1
15	Gasket	Nylon	1
16	Shaft Sleeve	304L Stainless	1
17	*	*	*
18	*	*	*
19	Bracket	Cast Iron	1

* Consult the pump parts manual.

Troubleshooting

Issue	Cause	Solution
Pump does not run	Faulty power supply circuit connection. Wrong wiring of control circuit. Shaft is bound. Mechanical seal faces stuck together. Faulty motor. Damage to bearing.	Check power supply circuit. Correct control circuit. Remove cause of obstruction. Release seal by turning shaft. Repair or replace motor. Repair or replace any damaged bearing.
Pump not pumping water / Inadequate water quantity	Considerable voltage drop. Rotation direction reversed. Lack of priming. High discharge head. Large piping loss. Clogged valve. Leakage from suction piping. Too high suction lift. Low water level.	Check incoming power. Correct rotation direction. Re-prime the pump. Re-examine the plan. Re-examine the plan. Clear foot valve suction. Check and repair suction piping. Re-install as per instructions. Foot valve in ample immersion.
Drive fault	Considerable fluctuation of power supply voltage. Considerable voltage drop. Low head and overflow rate. Damaged bearing.	Check incoming power. Check incoming power. Throttle the flow rate at the outlet. Replace any damaged bearing.
Pump vibrates Excessive operating noise	Beyond rated capacity. Below minimum flow. Improper piping. Damaged bearing. Foreign matter clogging cooling fan.	Reduce the flow rate. Consult the distributor. Secure the piping again. Replace any damaged bearing. Remove foreign matter.
Pressurizing application / Pump starts & soon stops	Too limited pressure switch setting.	Replace pressure switch to wider range. Check and repair leaks.
Pump does not stop	Leakage in system. Too high pressure setting.	Reduce max pressure setting to the lower in pressure switch.

Product Warranty

Coverage

Sencillo Systems, Inc.™ undertakes to remedy faults in products under these conditions:

- The faults are due to defects in design, materials, or workmanship.
- The faults are reported to Sencillo Systems, Inc.™ in writing and within the warranty period.
- The product is used only under the conditions described in this manual.
- All service and repair work is done by Sencillo Systems, Inc.™ authorized personnel.

Limitations

The warranty does not cover faults caused by these conditions:

- Deficient maintenance.
- Improper installation.
- Modifications, changes to the product, or installations made without the written approval of Sencillo Systems, Inc.™.
- Incorrectly executed repair work.
- Normal wear and tear.
- Sencillo Systems, Inc.™ assumes no liability for these conditions:
  - Bodily injuries.
  - Material damages.
  - Economic losses.
  - Debris in the fluid that causes premature seal failure.

Warranty Claim

Sencillo Systems, Inc.™ products are high quality products with expected reliable operation and long life. However, should the need arise for a warranty claim, please contact Sencillo Systems, Inc.™ or your authorized Representative.

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