ARMSTRONG

FILE NO.:	62.803
DATE:	Jan. 10, 2010
SUPERSEDES:	New
DATE:	New

INSTALLATION AND OPERATING INSTRUCTIONS

Packaged Pressure Booster Systems

IVS Booster Systems with Standard Controller

Armstrong Packaged Pressure Booster Systems are completely factory-assembled, tested, adjusted, and shipped to the job site as integral units ready to receive suction and discharge piping and incoming power supply. These instructions describe the procedures to be followed during installation, commissioning and operation to ensure optimum performance and reliability. When contacting the factory for assistance, please provide the unit Serial Number and other pertinent data, such as motor amperage, voltage and suction and discharge pressures.

ARMSTRONG

TABLE OF CONTENTS

IVS Booster Systems Installation Instructions

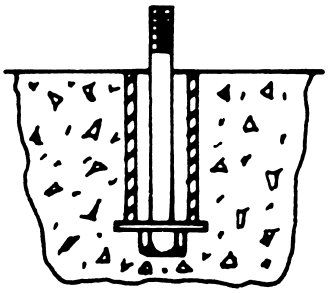
Storage - Make sure that all components are kept as clean as possible. Do not remove the crating or plastic wrapping until the unit is ready for installation.

Uncrating - After removal of the unit from the crate, check to see that the equipment is in good order and that all components are received as called for on the packing slip. Any shortages or damage should be reported immediately.

Location - Locate the unit where it is easily accessible for inspection and servicing. Provide adequate room for pump withdrawal and also for access to the interior of the control panel.

Foundation - The foundation should be sufficiently substantial to absorb any vibration and to form a permanent rigid support for the base plate. A good concrete foundation should be approximately 2-1/2 times the weight of the packaged unit.

Foundation Bolts - Foundation bolts of the proper size should be arranged as shown in the sketch, with a pipe sleeve embedded in the concrete to permit adjustment of the bolts after the concrete has been poured. Use sleeves with a diameter 2-1/2 times the diameter of bolts.



Leveling - When the unit has been placed on its foundation, insert metal wedges approximately 1" thick on either side of the foundation bolts under the base plate. Adjust the wedges until the suction and discharge headers are truly horizontal. Check this by means of a spirit level on the suction and discharge flanges. When leveling is complete, the foundation bolts should be tightened evenly and firmly. Do not over tighten the bolts at this stage.

Piping - Both the suction and discharge pipes should be independently supported so that no strain is imposed on the packaged unit when the pipes are connected. All connecting pipe work should be accurately located-do not attempt to force the suction and discharge pipes into position.

Incoming Supply - The incoming power supply should be brought in through the top of the panel adjacent to the main terminals. Note that this is the only electrical connection required at the panel.

Initial Run - Open the main supply valve and also the isolating valves on the suction and discharge sides of the packaged unit. Turn all the pump selector switches to the "Off" position and close the main disconnect switch. Switch pump No. 1 to the "On" or "Hand" position for a brief period and check the rotation of the motor. This should correspond to the directional arrow i.e. clockwise when looking down on top of the motor.

If the motor is running the wrong way, interchange two of the connections at the main supply terminals in the control panel. This will ensure proper rotation of the other pumps since all motors are phased for the same rotation on test before the unit is shipped.

After correct rotation has been established, switch pump No. 1 to the "On" or "hand" position and run the pump for a few minutes to check for noise, vibration, etc., and any leaks in the pipework. Repeat this procedure for the other pump(s) in the package.

Adjustments – The LCD Interface provides access for the adjustable set points, alarms and timers. No other devices require adjustments.

The operation and adjustment procedures for the set points, alarms and timers are described on pages 5 through 28.

Note carefully, however, that all devices are pre-set at the factory and will normally require no further adjustment.

Automatic Operation – To set the unit for automatic operation, turn all the isolating valves to the fully open position, close the main disconnect and switch all pumps to the "Auto" position.

ARMSTRONG

Intelligent Variable Speed Booster Systems: Basic Operating Function

Every Armstrong Intelligent Variable Speed (IVS) Packaged System – regardless of size or horse power rating – incorporates the twelve (12) basic operating functions as follows:

1. For Continous Run and Intermittent Systems - Sequential starting and stopping of the pumps is achieved by a combination of pump speed, power and set point pressure. A set point pressure control will bring on a lag pump if the lead pump(s) are operating at full speed and not maintaining set point pressure. When the lead pump reaches 100% speed or maximum motor nameplate power and the system pressure is not being satisfied, the second pump (lag pump) is automatically started. When a lag pump is started up, a timeclock in the pump controller keeps it operating for a minimum of a 1 minute period to prevent the pump from cycling on and off. On a three, four or five pump system, the third, fourth and fifth pumps are brought on in the same way when the combined pumps reach 100% speed or maximum motor nameplate power and the system pressure is not being satisfied. A similar sequence of events takes place in reverse on decreasing demand.

2. Pump RPM is controlled by a Variable Frequency Drive (VFD) connected directy to each individual pump motor. An analog signal from the discharge pressure transmitter is compared to a desired set point entered in to the operator panel. The pump logic controller then instructs the VFD to either speed up or slow down in order to meet or maintain the system set point pressure.

3. A low suction pressure or level shutdown alarm is included with every system to protect the pumps from a loss of suction pressure or water supply. If the water supply pressure, as measured by the suction pressure transmitter falls to 5 psi or the tank level switch (supplied by other) sends a signal to the panel, the pump controller will prevent the pumps from running. This condition is indicated by a "low suction pressure" or "low suction level" alarm description on the control panel alarm page.

4. Variable speed plumbing booster systems come with the following standard alarm functions in addition to the Low Suction Pressure/Level Protection;

    - High Suction Pressure Shutdown
    - Low Suction Pressure Shutdown
    - High System Pressure Shutdown
    - Low System Pressure Shutdown

5. Should a motor or drive overload and fail to operate, the next pump in sequence starts up automatically.

6. Lead Pump status is alternated after every 24 hrs of operation, as a default. The first pump placed in the auto position is considered the lead pump. HOA switches are located in the individual pump control screens. Alternation includes all duty and optional standby pumps.

7. No-flow shut down is achieved through drive parameter control and pressure monitoring. Once a no-demand condition is achieved for a period of 5 minute, the controller will increase the pump speed and charge the drawdown tank or system an additional 5 psi before shutting down.

8. A 15 second delay is incorporated in every system restart. Once started, the pumps ramp up to meet the required set point pressure.

9. The Soft Fill Mode is enabled when the booster system is first powered and after any power disruption. Once started, the pumps ramp up slowly to meet the Soft Fill set point pressure or after a 5 minute operational period and return to normal operation.

10. The Pressure Setback Mode is enabled as standard. The system pressure set point is reduced linearly, as a percentage, as flow decreases.

11. When the Emergency Power Mode is enabled and upon receiving an Emergency Power digital signal, power and control will be restricted to the lead pump only, the Low System Pressure Shutdown will be disabled and the Emergency Power Low System Pressure alarm will be enabled. The one pump will operate for the duration of the Emergency Power Mode and the system will switch to Normal Mode when a signal is not present and the minimum run timer has expired.

12. Variable Speed Controllers are supplied with up to 7 Normally Open (NO) dry contacts for remote monitoring. The contacts are located on the upper left hand portion of the pump controller and indicate the following conditions:
    1, 2 – Discharge Pressure Sensor
    3, 4 – Suction Pressure Sensor
    5, 6 – Remote Start
    7, 8 – Level Switch 1 (Signal by Other)
    9, 10 – Emergency Power (Signal by Other)
    11, 12 – System Alarm
    13, 14 – Pump Running

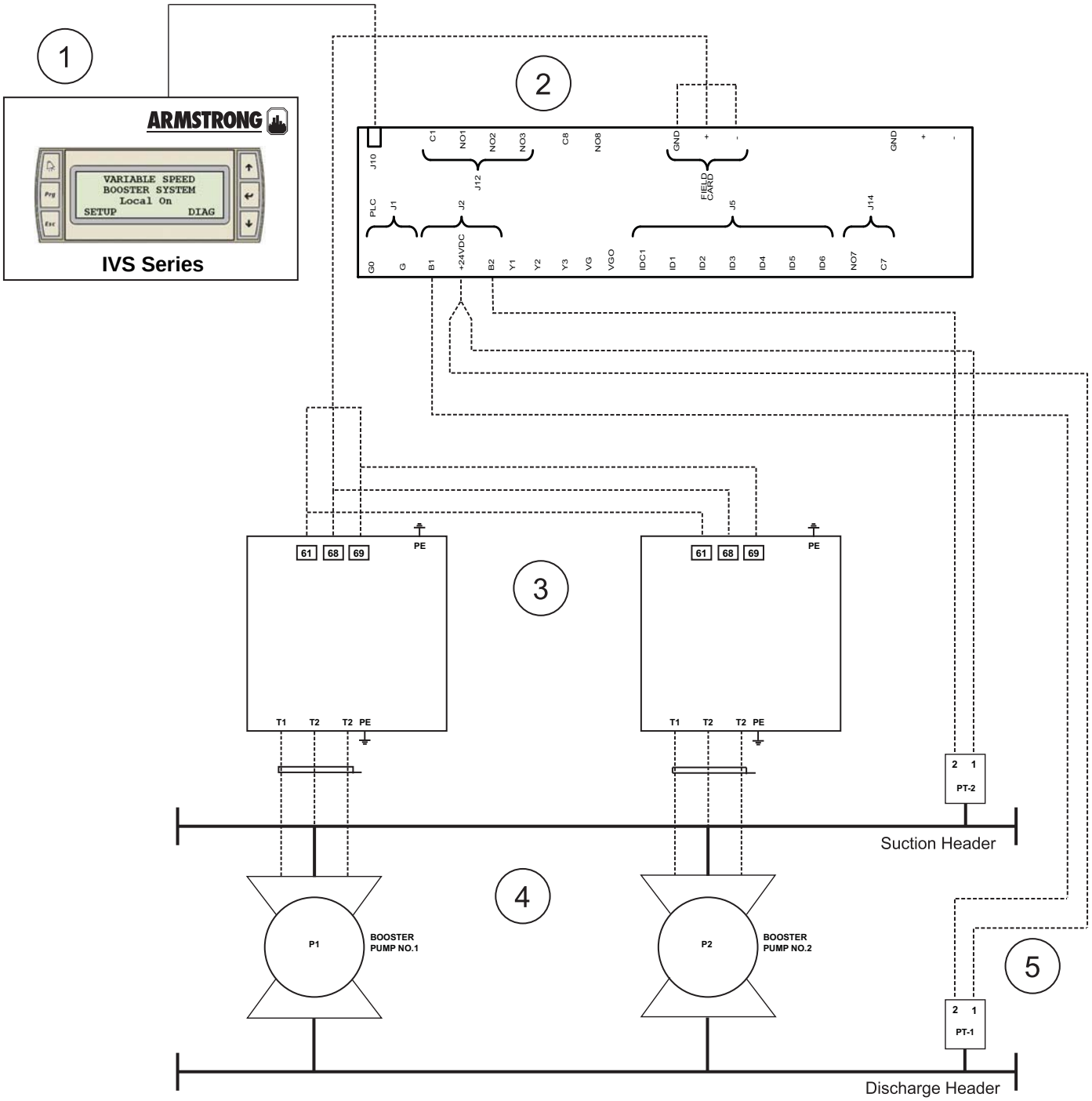
1+	3+	5+	7+	9+	11+	13+
2-	4-	6-	8-	10-	12-	14-

Communication Option
(Serial connection except for BACnet (IP/ENET))

15, 16 – BAS Communication
17, 18 – BAS/VFD Ground
19, 20 – VFD Communication

15+	17+	19+
16-	18-	20-

Variable Speed Booster Systems: General Arrangement Schematic Diagram



1. Operator Interface
2. Programmable Logic Controller (PLC)
3. Variable Frequency Drives (VFD)
4. Booster Pumps
5. Pressure Transmitters

ARMSTRONG

IVS Booster Package Commission Check Sheet

The following is a step-by-step guide to starting up and commissioning Armstrong fire pumps. **One check sheet is to be completed per system!** You must follow and fill out all fields below to ensure that all aspects of the booster is checked and set up for proper operation. Once complete, this sheet requires that end-user / general contractor sign off on the work rendered as final approval that the pump is functioning as intended. Please submit this commissioning check sheet along with your work invoice / startup claim in order to ensure prompt and timely payment of work rendered!

NO CHECK SHEET + STARTUP DATA SHEET = INCOMPLETE STARTUP!

UNLESS STATED OTHERWISE ALL FIELDS ARE MANDATORY!

Project Name:			
Building Address:			
Contractor Name:			
Site Contact Name:		Site Contact Tel. #:	
Your Company:		Your Name:	
Pump Model:		Booster Serial #:	
Pump Serial #(s):		Sales Order #:	

NOTES:

- GC = General Contractor
- BAS = Building Automation System

Pre-Startup Package:

Yes	No	N/A	
☐	☐	☐	Do you have the Booster Order Annexe?
☐	☐	☐	Do you have a copy of the electrical wiring diagram?
☐	☐	☐	Do you have a copy of the IVS Booster Installation and Operation Manual?
☐	☐	☐	OPTIONAL: Do you have the pump-specific variable speed curve with duty point indicated?

Pre-Startup Arrangements:

Yes	No	N/A	
☐	☐	☐	Verify with GC that water and power is available and ready to the pump
☐	☐	☐	Verify with GC that pumps can be run without damage to system
☐	☐	☐	Verify with GC that BAS is wired to IVS Booster controller and ready to go (IF APPLICABLE)
☐	☐	☐	Verify with GC that BAS contractor will be there on site to meet you (IF APPLICABLE)

Before Power Up Checklist:

Done	
☐	Check booster installation for proper mounting as per Installation & Operation Manual instructions
☐	Check incoming voltage across the lines and record here: L1 _____ L2 _____ L3 _____ ***Note:*** *Voltage should be no more than +/- 10% of design voltage*
☐ ☐	Check if booster set is to be controlled remotely by BAS start / stop contact with BAS contractor: **YES:** Check if BAS dry contact is wired across terminals 5 & 6 inside control panel. **NO:** Move on to the next step. ***Note:*** *Contacts close = booster runs. Contacts open = booster stops.*
☐	Open up and bleed pump seal flush line to verify no air is locked inside seal / seal lines. If the pumps are Vertical Multi Stage (VMS) pumps, make sure the vertical column is bled for air by cracking open the bolt located at the top of the stages.
☐	Check alignment of pump (horizontally mounted pumps only)
☐	Record the actual suction pressure from the gauge here: Suction _____ Psi Verify if suction pressure is within range of design suction pressure on Order Annex.

Unit is now safe to turn power on. Once on, make sure all VFDs are in the "AUTO" position and place all pumps in the IVS panel are in the "Off" position to prevent pumps from running!

Booster Panel Parameter Checklist:

Begin the commissioning by logging into the "Setup" screen with the Level 2 password. Go through all parameters, verify against the order annex and record below.

IMPORTANT: Each screen has a "Save" function on the bottom left corner. Make sure all changes are saved in each screen when made! Once setup is complete, make sure the "Save default" is performed!

Parameter Name	Entered Value
System Setup - No. Of Pumps	
System Setup – Standby Pump	
System Setup 2 - Pressure Units	
System Setup 2 - No. Of Lvl Sw	
Disch Press Setup – Sensor (Enabled default)	ENABLED / DISABLED (Circle one)
Disch Press Setup – Range (0-300psi default)	
Suc Press Setup – Sensor (Enabled default)	ENABLED / DISABLED (Circle one)
Suc Press Setup – Range (0-300psi default)	
System Pressure – Setpoint	
System Pressure – Update Limits*	DONE / NOT DONE (Circle one)
Disch Press Limits – High	
Disch Press Limits – Enabled? (Enabled default)	ENABLED / DISABLED (Circle one)
Disch Press Limits – Low	
Factory High System Shutdown Pressure	
Pump Stage Setup – Stage On Spd	
Pump Stage Setup - Stage Factor	
Staging Delays Setup – On Delay (60s default)	
Staging Delays Setup – Off Delay (60s default)	
Staging Setup – Min Run Time (1min default)	
Soft Fill Mode (Disabled default)	ENABLED / DISABLED (Circle one)
No Flow Shutdown – No Flow (Enabled default)	ENABLED / DISABLED (Circle one)
No Flow Shutdown – Delay (300s default)	ENABLED / DISABLED (Circle one)
No Flow Shutdown – Set Speed	
No Flow Shutdown – Wait Time	
No Flow Shutdown – Pressure Boost	
Speed Setup 1 – Min (30% default)	
Speed Setup 1 – Max (100% default)	
Speed Setup 1 – Ramp (30s default)	
Speed Setup 2 – Dflt Speed (70% default)**	
Speed Setup 2 – Rated RPM	
Pump Rated Power – Rated Power	
Emergency Power Mode	
Pump PID – Kc (8000 default)**	
Pump PID – Ti (50 default)**	
Pump PID – Td (0 default)	LEAVE AT ZERO
Lead Pump Switch Time Setup – Sw After (24h default)	
EOC Protection Setup – EOC Head (50% default)	
Pressure Setback (100% default)	
BAS Interface Setup – Protocol**	
BAS Interface Setup – Node**	
BAS Interface Setup – Baud**	

REMEMBER TO SAVE ALL AS DEFAULT AND SET ALL PUMPS BACK TO THE AUTO POSITION!

* This parameter needs to be changed when changing the setpoint. Once you change it to "OK" and press the return key, it will revert to "Yes" and take effect immediately.

** This parameter is based on site conditions / data. Please consult with appropriate parties (General contractor, BMS contract, etc.) and perform tests to see if system behavior is acceptable.

PID Tuning:

Done

- ☐ Turn the system main disconnect OFF
- ☐ Wait for the discharge pressure to equalize with suction pressure
- ☐ Turn the system main disconnect ON
- ☐ Time how long system takes to reach within 95% of discharge pressure setpoint - _____ minutes
- ☐ If above time is greater than 2min, adjust PID values no more than 5% at a time and repeat test again

Final system ramp time from suction pressure to 95% of discharge pressure setpoint: _____ minutes

Notes on PID Tuning:
Kc controls the step size – decreasing this value will increase the reaction magnitude, increasing this value will decrease the reaction magnitude.
Ti controls the step rate – decreasing this value will speed up the reaction speed, increasing this value will slow down the reaction speed.
Td adds delay into the system. DO NOT USE THIS.

Remember – if in doubt, stick to factory PID default!

No Flow Shutdown (NFS) Test:

Done

- ☐ Check and make sure all pumps are in the AUTO position (on PLC and VFD)
- ☐ When system is running, isolate booster system from building loop (run it against a deadhead)
- ☐ Pumps should continue to maintain set point while ramping down and eventually shutting down to one pump only
- ☐ The single pump after 300s (default) will ramp up to your NFS Pressure Boost setpoint and then shut down

SIGNOFF:

By signing off on this startup checklist, both parties hereby accept that the equipment listed in this checklist has been properly verified to be fully operational and functioning as per the sales order for the equipment listed.

Startup Technician Name (Please print):
Startup Technician Signature:
Date (mm/dd/yyyy):
/ /

Customer Name (Please print):
Customer Signature:
Date (mm/dd/yyyy):
/ /

Display Overview

The IVS NA Standard VFD Booster HMI is divided in three set of displays: Operation, Setup, and Alarm Management. The Operation Displays are used by the operators to view and control the Booster Pumps. The Setup Screens are used to set, view, save, and restore the system specific settings (i.e. number of pumps, sensor range, etc.). The Alarm Management screens are used to display the current alarms.

The list of displays in each set is as follow:

Operation Displays

- Main Menu
- PLC Diagnostic
- System Overview
- Pressure Overview
- Variable Speed Pump Overview
- Variable Speed Pump Control
- Variable Speed Pump Status

Alarm Management Displays

- Alarm Screens
  - Tank 1 Low Level Shutdown Alarm
  - Tank 2 Low Level Shutdown Alarm
  - Discharge Pressure Sensor Failure Alarm
  - Suction Pressure Sensor Failure Alarm
  - Low Suction Pressure Shutdown Alarm
  - High Suction Pressure Shutdown Alarm
  - Low Discharge Pressure Shutdown Alarm
  - High Discharge Pressure Shutdown Alarm
  - Pump 1 to 5 Run Feedback Alarm
  - Pump 1 to 5 Drive Fault Alarm
  - Factory High System Shutdown Alarm
  - No More Alarms

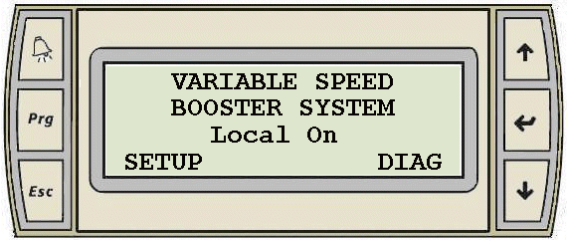
Setup Displays

The Setup Displays are divided in three levels with each level having the same number of displays with different level of access. Level 0 setup displays are for viewing only and no adjustments can be made. Level 1 setup displays can be used for changing the system setup and restoring the system factory defaults. Level 2 setup displays can be used for changing the system setup, and saving and restoring the system factory defaults. To access Level 1 and 2 an operator need to enter the proper password: Level 1 password is 9393, Level 2 password is 2323.

The list of Setup Displays for every level is as follow:

- Main Setup Screen
- System Setup
- Discharge Pressure Setup
- Suction Pressure Setup
- System Pressure Set Point Setup
- Suction Pressure Alarm Set Points
- Discharge Pressure Alarm Set Points
- Lag 1 to 4 Pump Variable Speed Staging Set Points
- Staging Delay Set Points
- Lag 1 to 4 Pump Minimum Run Time Set Point
- Soft Fill Mode Setup
- Soft Fill Variable Speed Setup
- No Flow Shutdown Delay Set Points
- No Flow Shutdown Speed Set Points
- No Flow Shutdown Pressure Boost Setup
- Variable Speed Range Set Points
- Default Speed Setup
- Pump Rated Power Setup
- PID Control Setup
- Lead Switch Time Set Point
- End of Curve (EOC) Protection Setup
- Pressure Setback
- Building Automation System (BAS) Interface Setup
- PLC Clock Setup

HMI Panel – Description Of Buttons Function



- The display panel has six buttons:

The Alarm Button

- The Alarm Button will stay solid White when there are no active alarms.
- The Alarm Button will flash RED when an alarm is activated.
- Pressing the Alarm Button will call up the Alarm Display.

- The Alarm Button will go solid White when all alarms are reset (acknowledged).
- The Alarm Button will go solid Red when the alarms are reset and there are still some active alarms.
- The Alarm Button will stay solid White when there are no active alarms.

The Prg Button

- Pressing the Prg Button at any time will call up the Main Menu display.

The Esc Button

- Pressing the Esc Button will bring you back to the previous display level.
- For example pressing the Esc button from the Pump Status display will call up the Pump Overview display.

The Up and Down Arrow Button

- When the cursor is at the top left corner of the screen pressing the “Up” or “Down” Arrow buttons will let you navigate between displays.
- When the cursor is over a digital value pressing the “Up” or “Down” Arrow button will toggle the value.

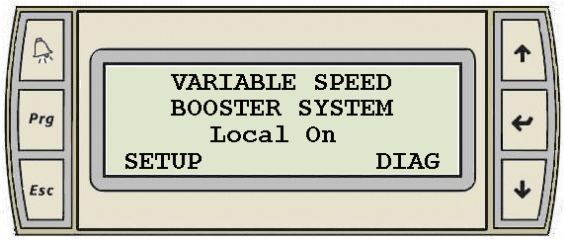
- When the cursor is over an analog value pressing the “Up” or “Down” Arrow button will increase or decrease its value respectively.

The Enter Button

- Pressing the Enter button will move the cursor to the control values within a display from top to bottom, left to right.

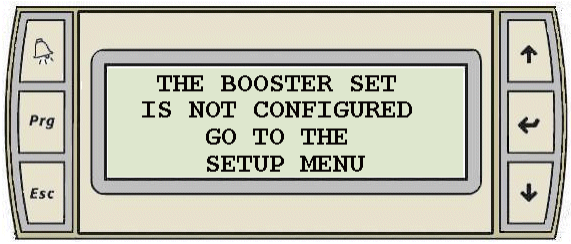
Operation Displays

Main Menu



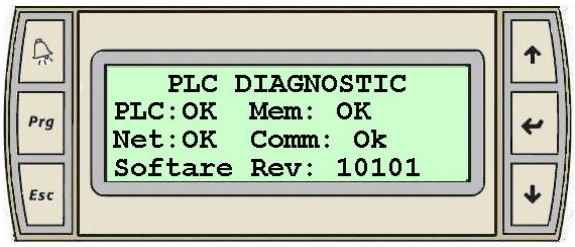
- This is the display for the Main Menu of the Variable Speed Booster.
- Pressing the “Prg” Button at any time will call up the Main Menu display.
- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active Operation displays: Main Menu, System Overview, Pressure Overview, Pump Overview, and Pump Control.
- Pressing the “Enter” key will move the cursor over the “R” of “Remote”, the “S” of “Setup”, and the “D” of “Diag”.
- When the cursor is over “Remote” pressing the “Up” or “Down” arrow will toggle between Remote and Local control. The text will toggle between “Remote” and “Local”.
- When the cursor is over “Setup” pressing the “Up” or “Down” arrow will call up the Main Setup Screen (Level 0).
- When the cursor is over “Diag” pressing the “Up” or “Down” arrow will call up the PLC Diagnostic screen.

No Configuration Display



- When the Booster has not been setup, this display and the Main Menu display will be the only operation displays to appear.

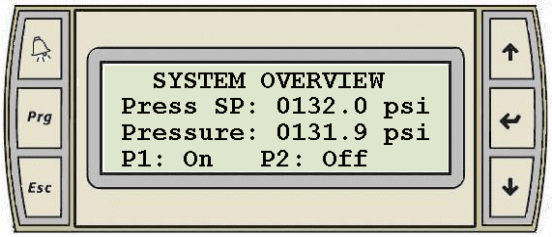
Diagnostic Display



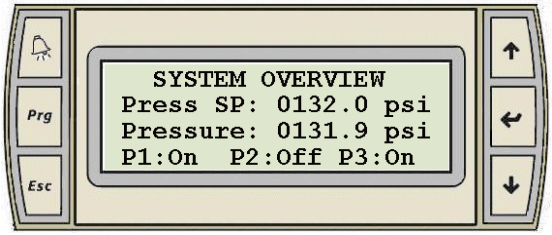
- Line 2 and 3 indicates the PLC, Memory, Network, and Communication status.
- Pressing the “Esc” key will call up the main menu.

System Overview Displays

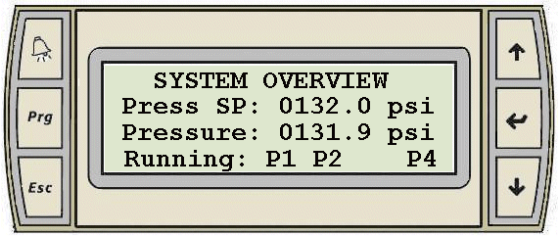
Two Pumps



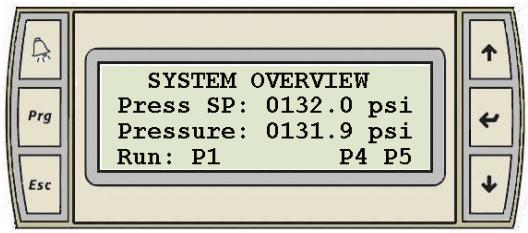
Three Pumps



Four Pumps

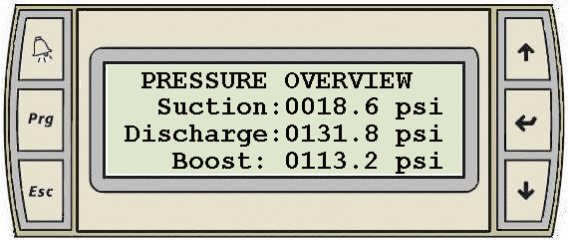


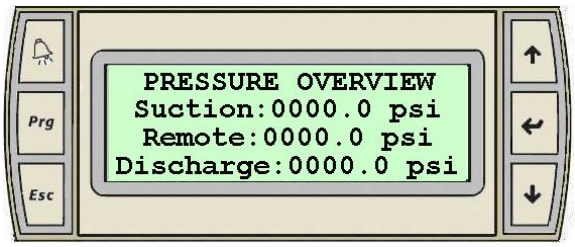
Five Pumps



- The System Overview screen for the selected amount of pumps will be the only one to be active and displayed.
- This display is for viewing only.
- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active Operation displays.
- The first line displays the System Pressure Set Point.
- The second line displays the actual system pressure value.
- The third line shows which pump is On or Off (in the case of 4 or 5 pumps “P#” indicates that pump number # is running).

Pressure Overview Display

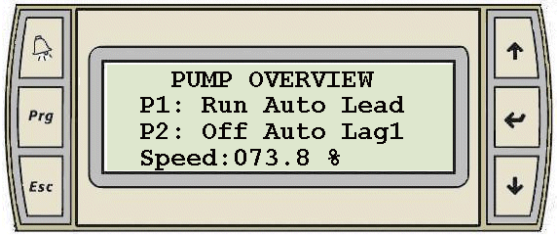




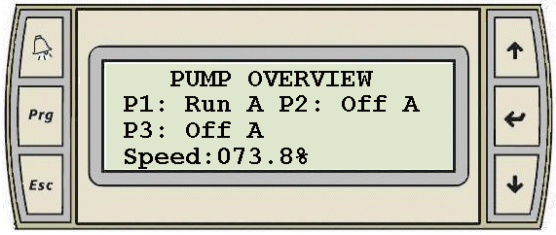
- This screen will only be active and displayed when the suction pressure sensor is enabled.
- This display is for viewing only.
- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active Operation displays.
- This screen displays the actual value of the suction, discharge and remote pressure is enabled. It also calculates the pump boost.

Variable Speed Pump Overview Displays

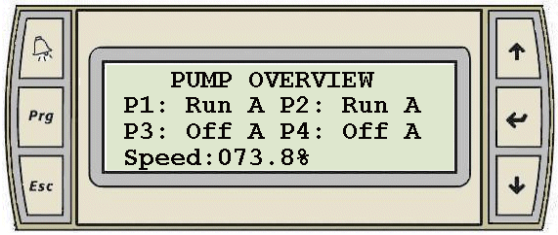
Two Pumps



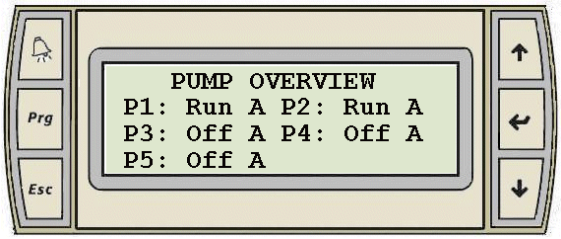
Three Pumps



Four Pumps

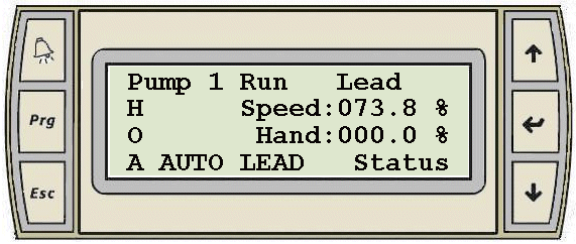


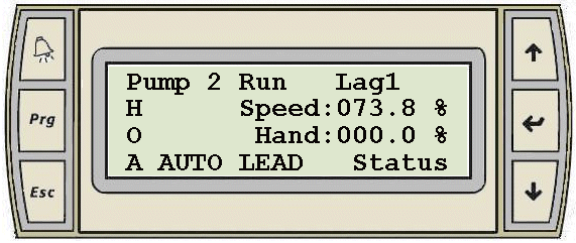
Five Pumps



- The Pump Overview screen for the selected amount of pumps will be the only one to be active and displayed.
- This display is for viewing only.
- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active Operation displays.
- This screen will display for each pump: the run feedback “Off or Run”, and the mode “Hand-Off-Auto” or “H-O-A”.
- This screen will also display the speed of the pumps and which pump is the Lead pump.

Variable Speed Pump Control Display

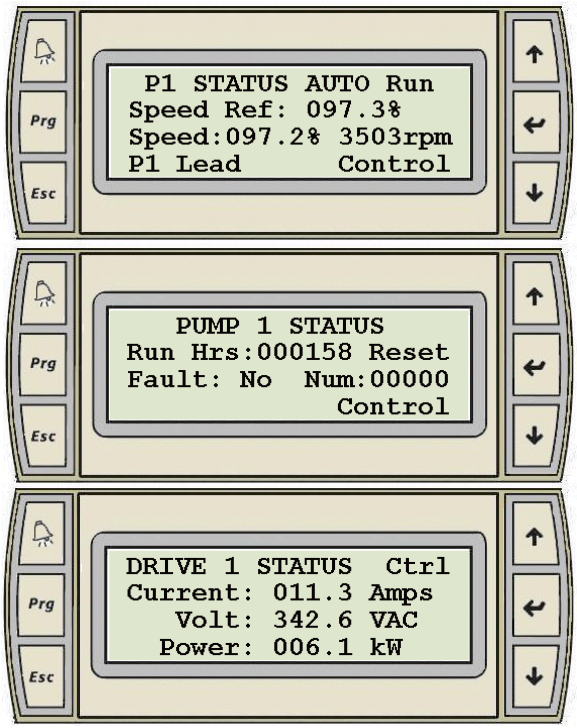




- There are similar displays for Pump 1 to 5.
- Only the displays corresponding to the number of pumps selected will be active and displayed. For example if the number of pumps is set to two on the pump setup display, only the control display for pump 1 and 2 will be active.
- When the cursor is at the top left corner of the screen pressing the “Up” or “Down” arrow will navigate between all active operation displays.
- The following information is displayed for the corresponding pump:
- The top line indicates the Pump number, the pump running status (Run, Stop), and the pump parallel status (Lead, Lag 1, Lag 2, Lag 3, or Lag 4).
- Line 2, 3, and 4 at the left of the screen is used to select the Pump Mode: Hand (H), Off (O), or Auto (A).
- The Pump Mode is indicated on line 2, 3, and 4 beside the H-O-A selector. The picture above indicates the pump is in Auto mode.
- Line 2 at the right of the screen indicates the pump speed.
- Line 3 at the right of the screen is used to set the pump speed in Hand mode.
- Pressing the “Enter” key will move the cursor as follow: H, O, Hand, A, Lead, Status, and back to the top left corner.
- When the cursor is over “H”, “O”, or “A” pressing the “Up” or “Down” key will change the pump mode to Hand, Off, Auto correspondingly.
- When the cursor is over Hand, pressing the “Up” or “Down” arrow will increase or decrease the pump speed when the pump is in Hand mode. When the value for the Hand speed is set to the desired value you must press the “Enter” key for the controller to use the new Hand Speed value.
- When the cursor is over Lead, pressing the “Up” or “Down” arrow will set the pump as lead pump. A pump can only be set as Lead pump if it is in Auto mode and it is not in alarm.

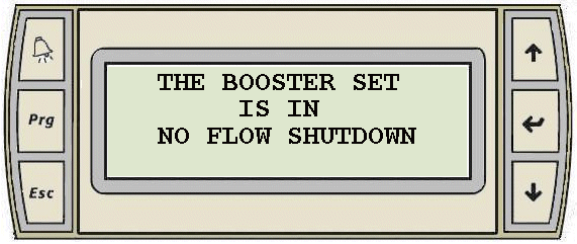
- When the cursor is over Status pressing the “Up” or “Down” arrow will call up the Pump Status Display.

Variable Speed Pump Status Displays



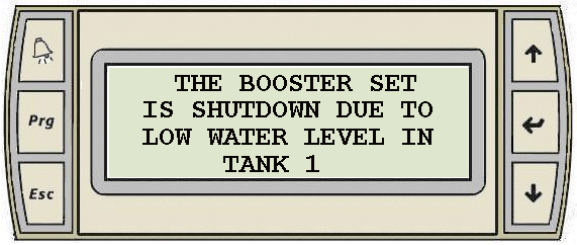
- There are similar displays for Pump 1 to 5.
- Only the displays corresponding to the number of pumps selected will be active and displayed.
- When the cursor is at the top left corner of the screen pressing the “Up” or “Down” arrow will navigate between all active pump status displays.
- Display 1 Line 1 indicates the pump mode “Hand-Off-Auto”, and the run feedback “Off or Run”.
- Display 1 Line 2 indicates the speed reference.
- Display 1 Line 3 indicates the drive actual speed in percent and RPM.
- Display 1 Line 4 indicates the pump parallel status “Lead, Lag1, Lag2, Lag3, or Lag4”.
- Display 2 Line 2 indicates the total number of running hours since the last reset.
- Display 2 Line 3 indicates if the drive is faulted and the fault number.
- Display 3 Line 1 to 3 indicates the drive current, voltage, and power.
- Pressing the “Enter” key on display 1 and 3 will move the cursor as follow: Control, and back to the top left corner.
- Pressing the “Enter” key on display 2 will move the cursor as follow: Reset, Control, and back to the top left corner
- When the cursor is over Reset pressing the “Up” or “Down” arrow will reset the number of run hours to zero.
- When the cursor is over Control pressing the “Up” or “Down” arrow will call up the Pump Control Display.
- Pressing the “Esc” button at anytime will call up the Pump Overview display.

No Flow Shutdown Display



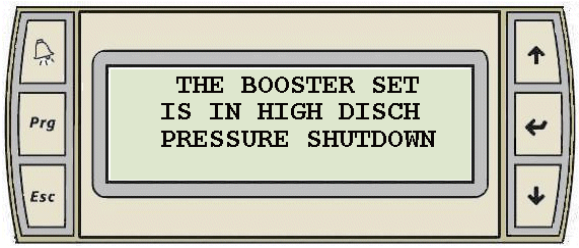
- When the booster set stops because of No Flow Shutdown this display appears.
- When the booster set start up again the system overview display appears.
- When the cursor is at the top left corner of the screen pressing the “Up” or “Down” arrow will navigate between all actives operation displays.

Low Tank Level Shutdown Displays



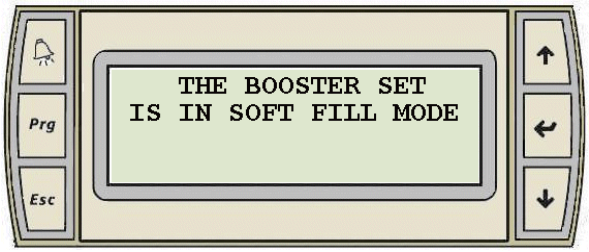
- When the booster set stops due to low water level in the tank the corresponding display appears.
- When the booster set starts up again the system overview display appears.
- When the cursor is at the top left corner of the screen pressing the “Up” or “Down” arrow will navigate between all actives operation displays.

High Discharge Pressure Shutdown



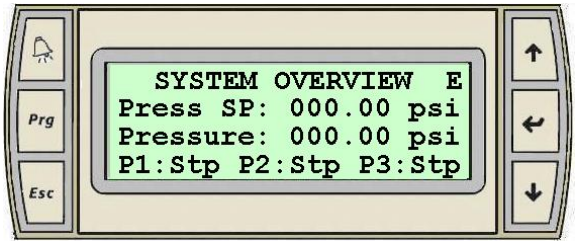
- When the booster set stops due to the discharge pressure over the maximum value, the corresponding display appears.
- When the booster set start up again the system overview display appears.
- When the cursor is at the top left corner of the screen pressing the “Up” or “Down” arrow will navigate between all actives operation displays.

Soft Fill Mode Display



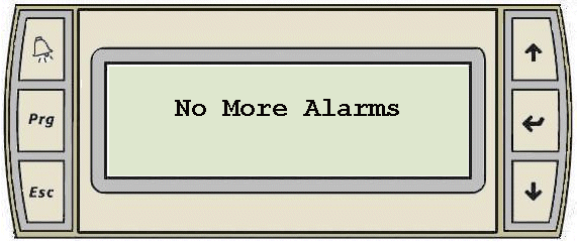
- When the booster set is first started, or after a power cycle and if the Soft Fill Mode is enabled, the following display will appear

End of Curve Protection Display

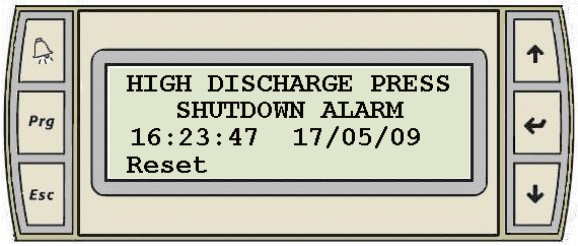


- When the booster set is in EOC protection mode, the next lag pump will be staged On and a letter “E” will be displayed on the top right corner of the System Overview screen

Alarm Management Displays



- Pressing the “Alarm” button  at any time will call up the alarm display.
- If there is no active alarm the “No More Alarms” display will appear.
- This display will also appear when navigating through a number of Active Alarm displays to indicate when you reach the end of the list of active alarm.

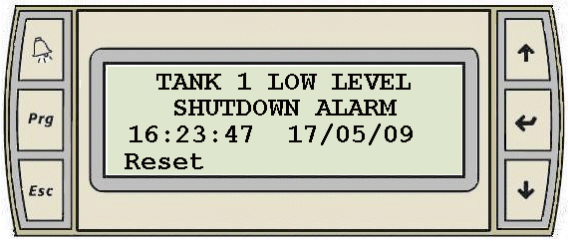


- If there is one or more active alarms an alarm display similar to the one at right will appear.
  - When the cursor is at the top left corner of the screen pressing the “Up” or “Down” arrow will navigate between the active alarm displays.
  - When you reach the end of the alarm list the “No More Alarms” display will appear.
  - All alarm displays are setup as the one above.
- The top two lines give a brief alarm description.
- The third line shows the time and date (HH:MM:SS DD:MM:YY) when the alarm occurred.
- When the cursor is above “Reset”, pressing the “Up” or “Down” arrow will reset all non active alarm. It will also silence the alarm horn and stop the “Alarm” button from flashing red. If there are no more active alarms the “Alarm” button will turn white.

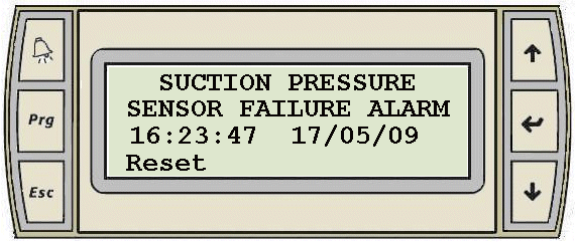
Alarm Displays

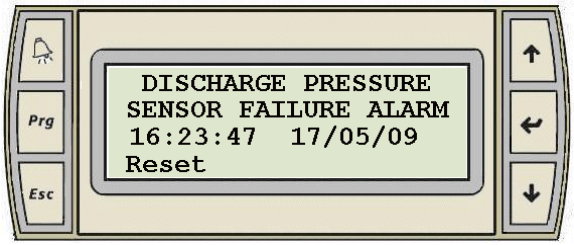
These are all the different Alarm Display in order they will appear when navigating through the active alarms. Only the displays associated with an active alarm will appear.

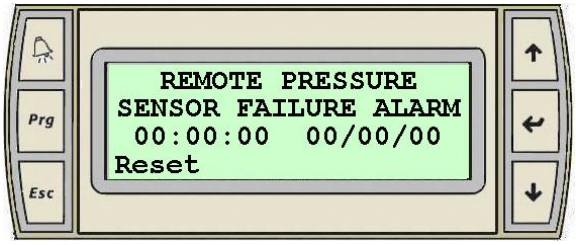
1. Low Water Level Shutdown Alarm



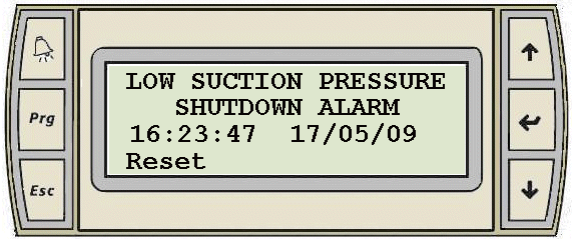
2. Pressure Sensors Failure Alarms

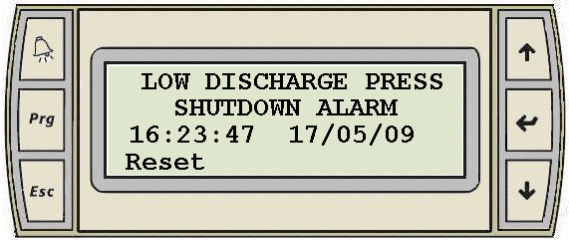


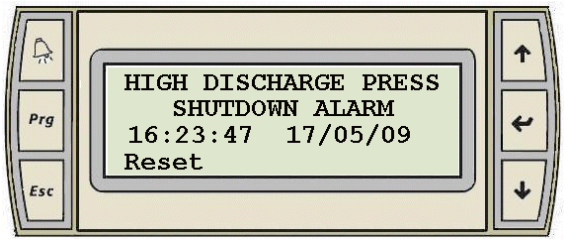




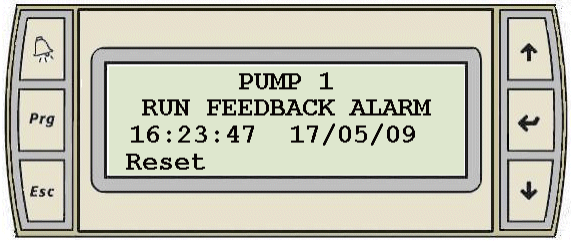
3. Pressure Limit Alarms

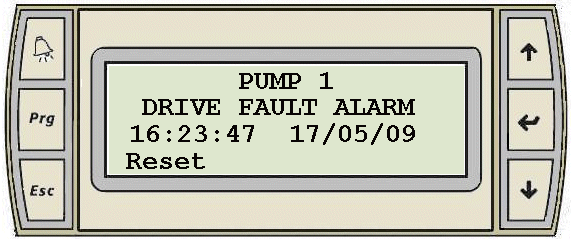


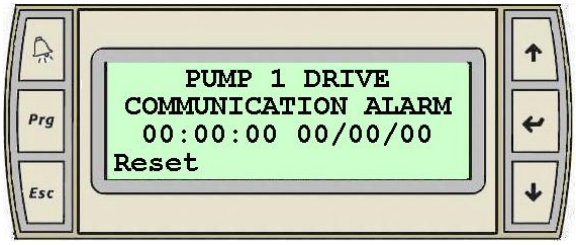




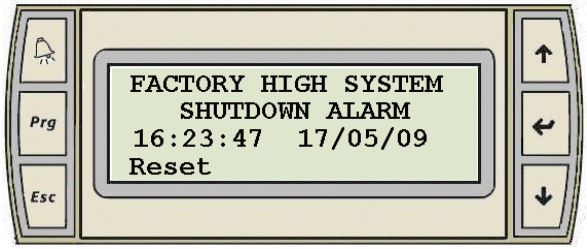
4. Variable Speed Booster Pump Alarms (Similar for pump 1 to 5)





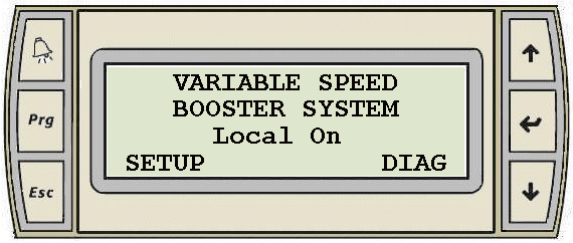


5. Factory High System Shutdown Alarm



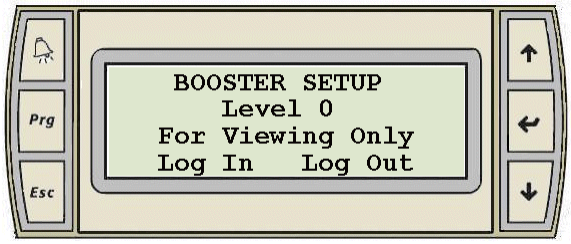
System Setup Displays

To go to the “Main Setup Screen” first go to the “Main Menu” by pressing the “Prg” button.

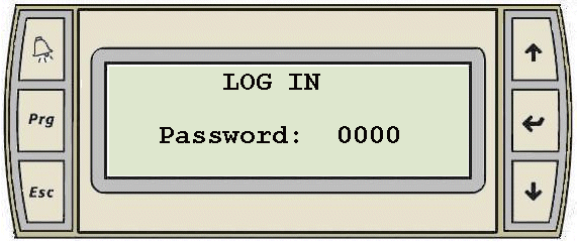


- Press the “Enter” key to move the cursor over “Setup”.
- When the cursor is over “Setup” pressing the “Up” or “Down” arrow will call up the Main Setup Screen.

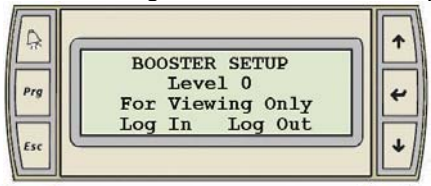
Main Setup Display (Level 0)

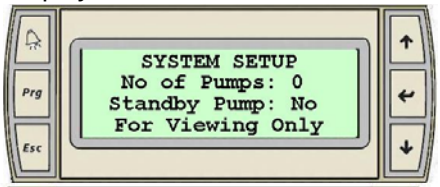


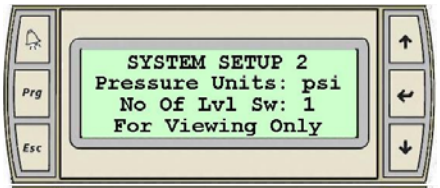
- This display is for viewing only. Level 0 setup display.
- The Setup Displays are divided in three levels with each level having the same number of displays with different level of access. Level 0 setup displays are for viewing only and no adjustment can be made. Level 1 setup displays can be used for changing the system setup and restoring the system factory defaults. Level 2 setup displays can be used for changing the system setup, and saving and restoring the system defaults.
- To access Level 1 and 2 an operator need to enter the proper password: Level 1 password is 9393, Level 2 password is 2323.
- Pressing the “Enter” key will move the cursor over “Log In” and “Log Out”.
- When the cursor is over “Log In” pressing the “Up” or “Down” arrow will call up the “Log In” display.

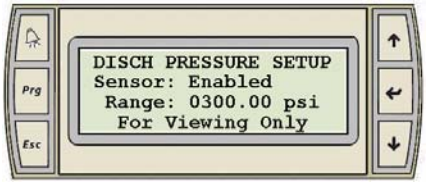


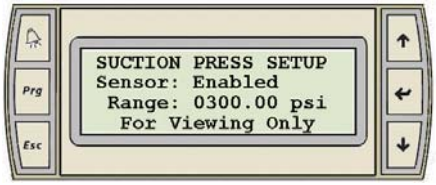
- Pressing the “Enter” key will move the cursor above the number area.
- When the cursor is over the number area, pressing the “Up” or “Down” arrow will increase or decrease the password number.
- When you reach the value you want “9393” for level 1, or “2323” for level 2, press the “Enter” key. This will call up the Main Setup Display for the password you selected.
- If you enter a wrong password value nothing will happen.
- After a password is entered, it will log out automatically after 5 minutes.
- When the cursor is over “Log Out” pressing the “Up” or “Down” arrow will clear the password and take away the access to Level 1 and 2 setup screen.
- When the cursor is at the top left corner of the screen pressing the “Up” or “Down” arrow will navigate between the Level 0 Setup Displays.
- These displays will give anybody a quick look at all the system setup.
- The following are all the level 0 setup displays:

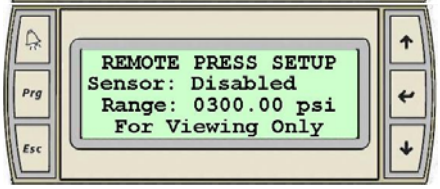


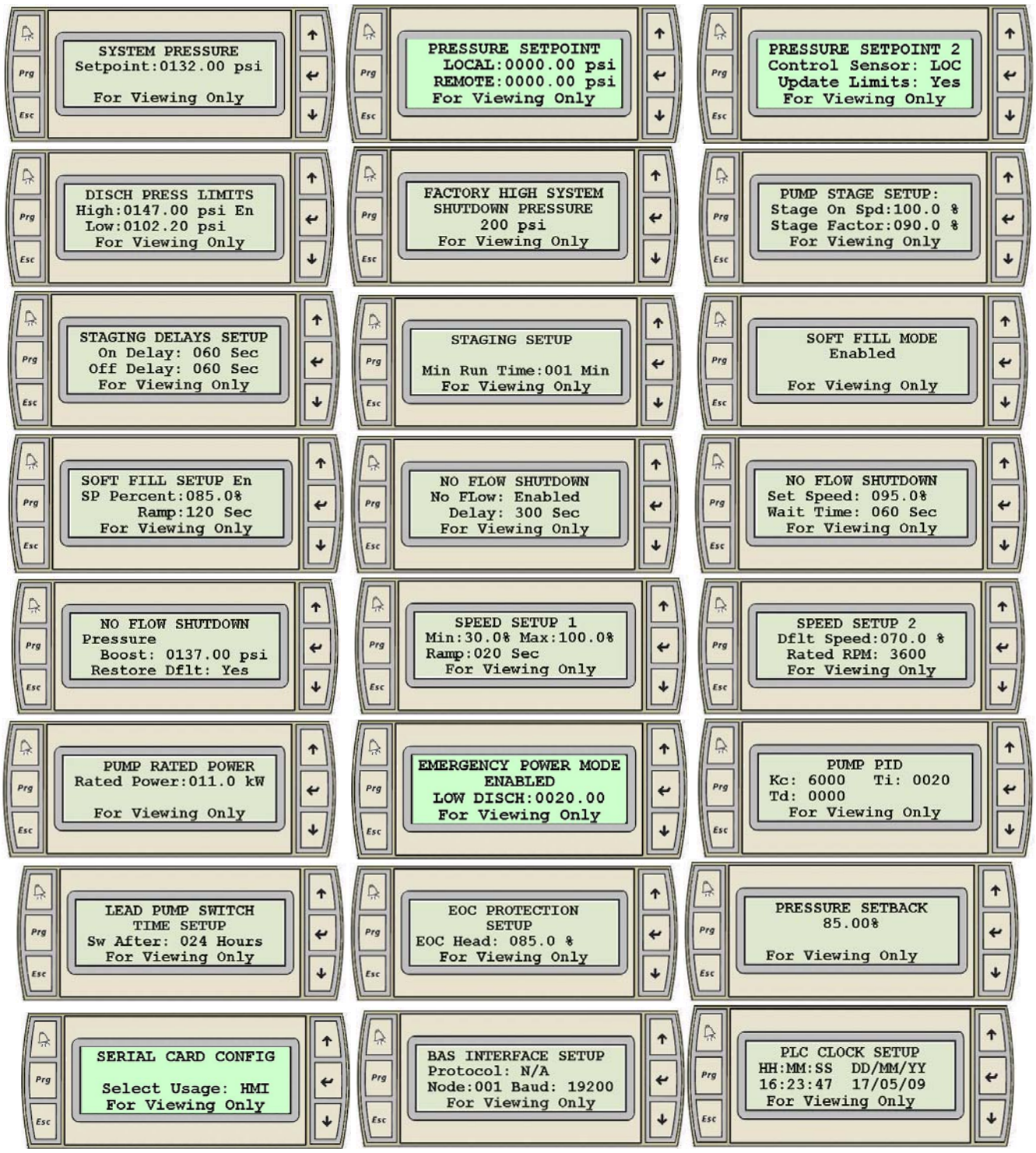








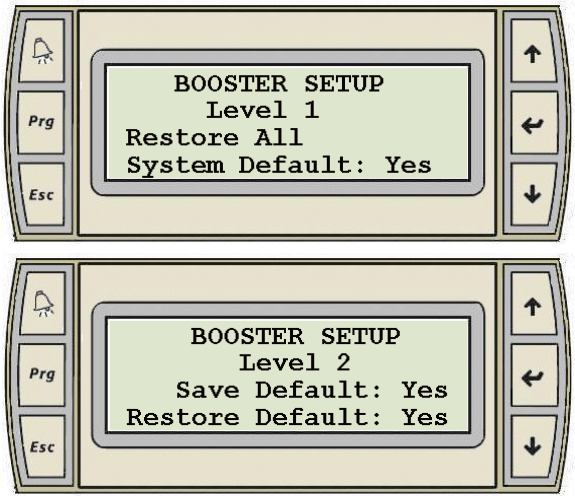




- Only the displays relevant to the system setup will be active and visible.

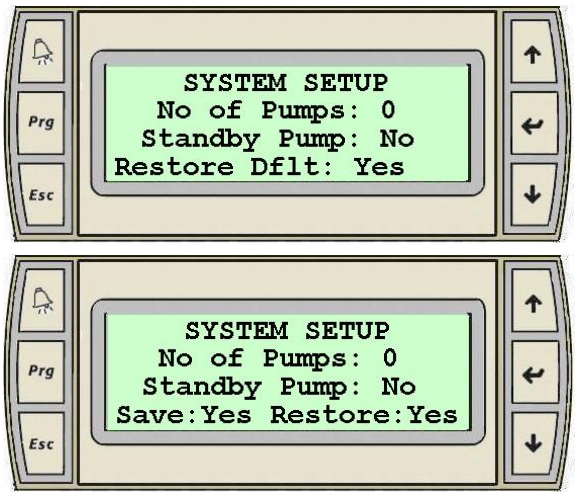
Setup Displays – Level 1 And Level 2

Main Setup Displays



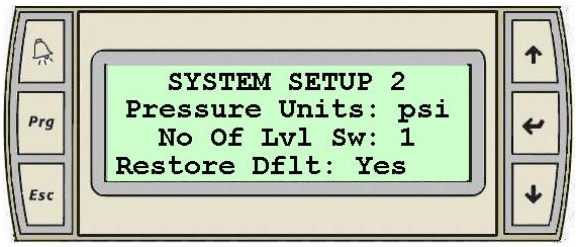
- These are the first displays to appear when entering the Log In password for Level 1 and 2 respectively.
- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- On the Level 1 display pressing the “Enter” key will move the cursor over “Yes”.
- When the cursor is over “Yes” pressing the “Up” or “Down” arrow will **Restore the default settings for all the values in all the setup displays**. This is indicated by the text changing from “Yes” to “Done” for a few seconds.
- On the Level 2 display pressing the “Enter” key will move the cursor over “Yes” beside “Save Default”, and “Restore Default”.
- When the cursor is over “Yes” beside “Save Default” pressing the “Up” or “Down” arrow will **Save the Setup Values in all Setup Displays as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Default” pressing the “Up” or “Down” arrow will **Restore the Default Settings for all the Values in all the Setup Displays**. The text will change between “Yes” to “Ok” for a few seconds.

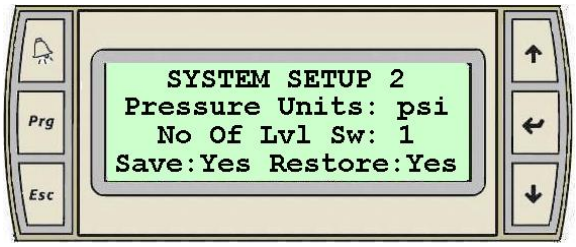
System Setup Displays



- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over both values, over “Yes” beside Save and Restore and back at the top left corner.
- When the cursor is over the value beside “No of Pumps”, press the “Up” or “Down” key to select the number of pumps.
- When the cursor is over the value beside “Standby Pump”, press the “Up” or “Down” key to select “Yes” or “No”.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

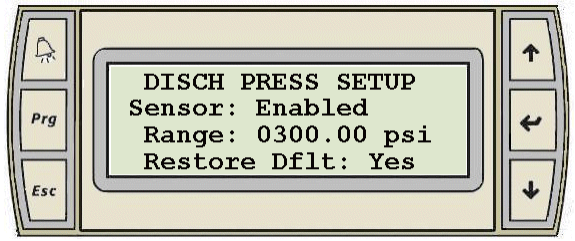
Pressure Units Setup Displays

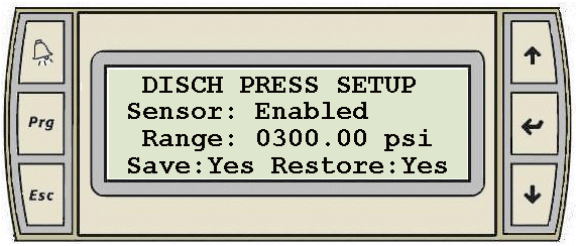




- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- When the cursor is over the Engineering Unit, pressing the “Up” or “Down” key will select between: psi, ft, Kpa, m, and bar.
- When the cursor is over the value beside “No of Lvl Sw”, press the “Up” or “Down” key to select the number of level switches connected to the booster set.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

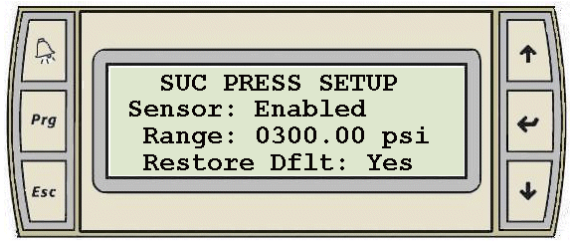
Discharge Pressure Sensor Setup Displays

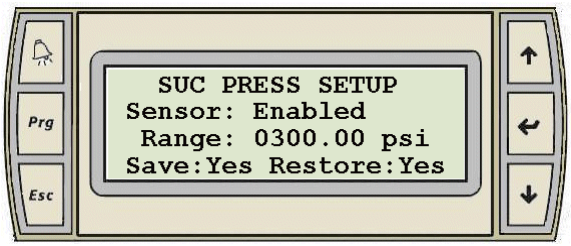




- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the text beside “Sensor”, the value beside “Range”, over the engineering unit, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the text beside “Sensor” pressing the “Up” or “Down” key will select between disabling (Disabled), and enabling (Enabled) the discharge pressure sensor.
- When the cursor is over the value beside “Range”, pressing the “Up” or “Down” key will set the range for the discharge pressure sensor to the desired value.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

Suction Pressure Sensor Setup Displays

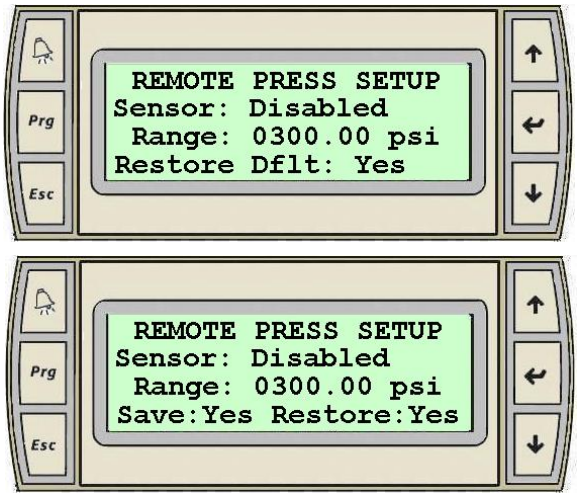




- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the text beside “Sensor”, the value beside “Range”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the text beside “Sensor” pressing the “Up” or “Down” key will select between disabling (Disabled), and enabling (Enabled) the suction pressure sensor.
- When the cursor is over the value beside “Range”, pressing the “Up” or “Down” key will set the range for the suction pressure sensor to the desired value.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.

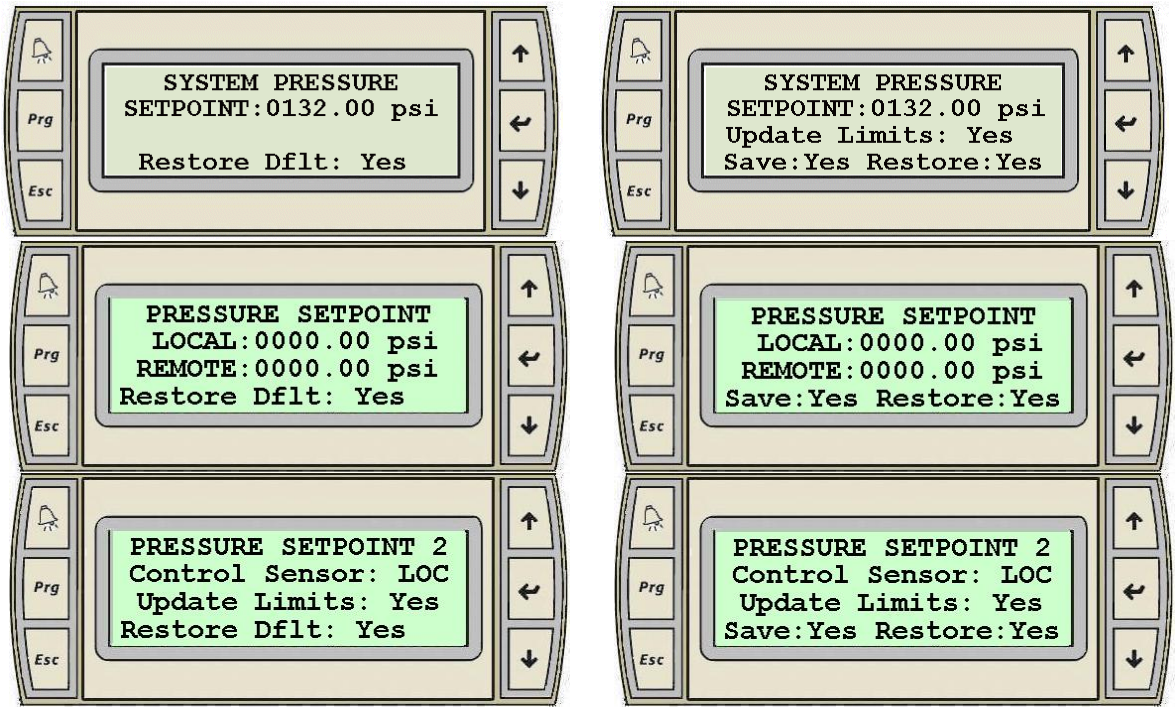
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

Remote Pressure Sensor Setup Displays



- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the text beside “Sensor”, the value beside “Range”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the text beside “Sensor” pressing the “Up” or “Down” key will select between disabling (Disabled), and enabling (Enabled) the suction pressure sensor.
- When the cursor is over the value beside “Range”, pressing the “Up” or “Down” key will set the range for the suction pressure sensor to the desired value.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

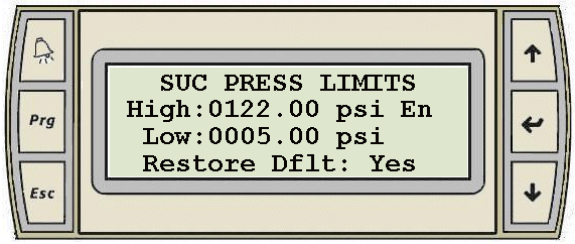
System Pressure Setpoint Setup Displays

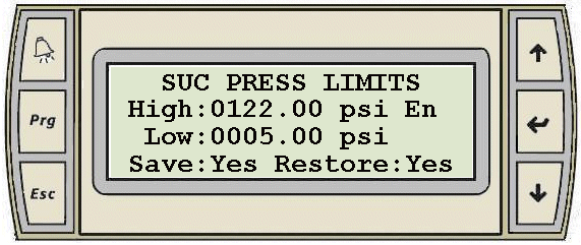


- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “Setpoint” or “Local” or “Remote” if the Remote Sensor is enabled, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “Setpoint” or “Local” or “Remote” if the Remote Sensor is enabled, pressing the “Up” or “Down” key will set the System pressure Setpoint to the desired value.

- When the cursor is over the “Yes” beside “Update Limits”, pressing the “Up” or “Down” key will automatically update the High and Low pressure limits for the discharge and suction pressure according to the System Set point entered.
- When the cursor is over the “LOC” beside “Control Sensor”, pressing the “Up” or “Down” key will select whether to use the “LOCAL” or “REMOTE” sensor.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

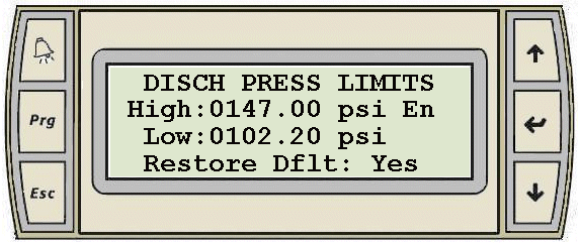
Suction Pressure Alarm Setpoints Displays

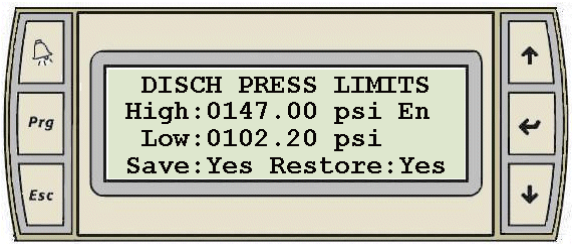




- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- This display is only active when the suction pressure sensor is enabled.
- Pressing the “Enter” key will move the cursor over the value beside “High”, the value beside “Low”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “High”, pressing the “Up” or “Down” key will set the High Suction Pressure Shutdown Setpoint to the desired value.
- When the cursor is over the value beside “Low”, pressing the “Up” or “Down” key will set the Low Suction Pressure Shutdown Setpoint to the desired value.
- It is possible to Enable or Disable the High Limit alarm.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

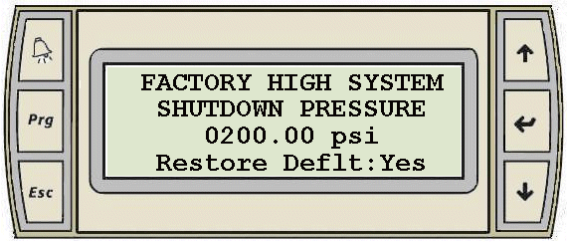
Discharge Pressure Alarm Setpoints Displays

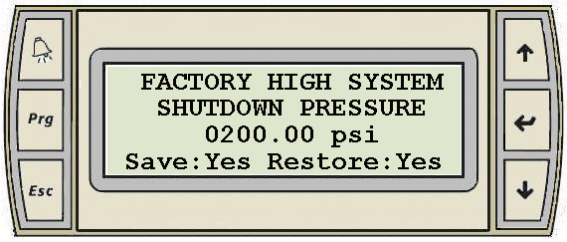




- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “High”, the value beside “Low”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “High”, pressing the “Up” or “Down” key will set the High Discharge Pressure Shutdown Setpoint to the desired value.
- When the cursor is over the value beside “Low”, pressing the “Up” or “Down” key will set the Low Discharge Pressure Shutdown Setpoint to the desired value.
- It is possible to Enable or Disable the High Limit alarm.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

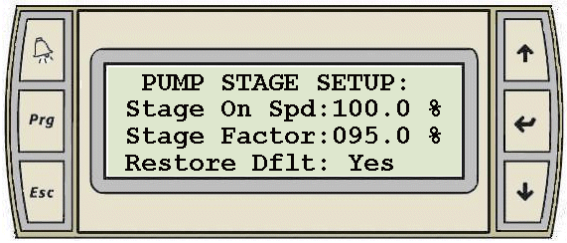
Factory High System Shutdown Pressure Setup Displays

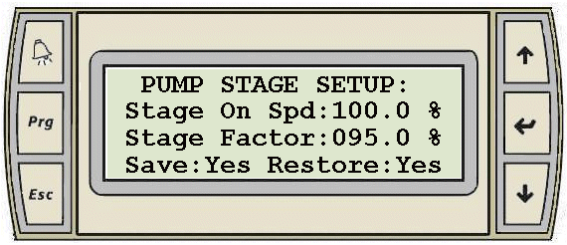




- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor to select the Factory High System Shutdown Pressure. If the pressure units are psi, the choices are: 200, 232, 370 and 400. The equivalents are available for different pressure units.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

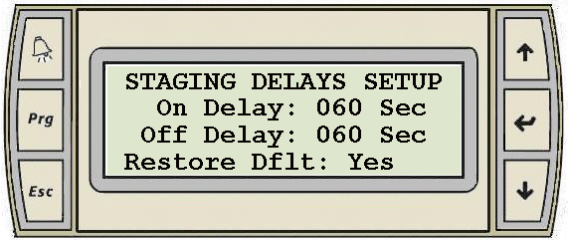
Variable Speed Booster Speed Staging Setpoints Displays

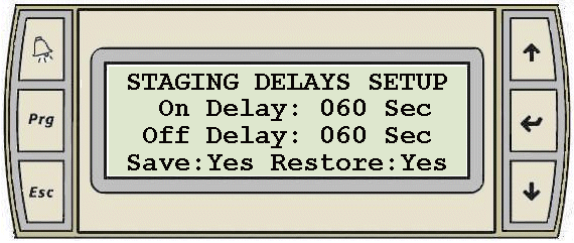




- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “Stage On Spd”, the value beside “Stage Factor”, over “ Save: Yes” and “Restore: Yes”, and back at the top left corner.
- The value beside “Stage On Spd” is the pump speed (in percentage) at which the booster set will stage On the next lag pump.
- The value beside “Stage Factor” is the percentage of maximum pump speed at which the booster set will stage Off a pump if the running pumps are drawing 10% below maximum power.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

Staging Delay Setpoint Setup Displays

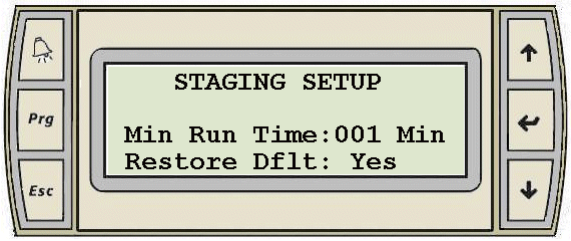


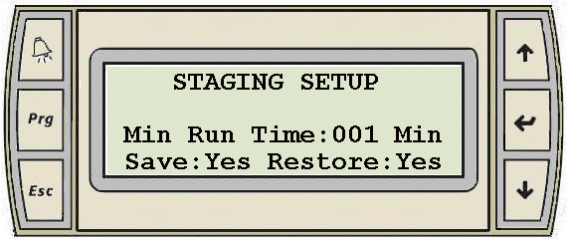


- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “On Delay”, the value beside “Off Delay”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “On Delay”, pressing the “Up” or “Down” key will set the Stage On Delay Setpoint to the desired value.
- When the cursor is over the value beside “Off Delay”, pressing the “Up” or “Down” key will set the Stage Off Delay Setpoint to the desired value.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.

- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

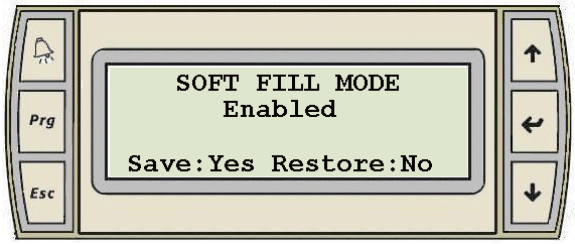
Minimum Runtime Setup Displays





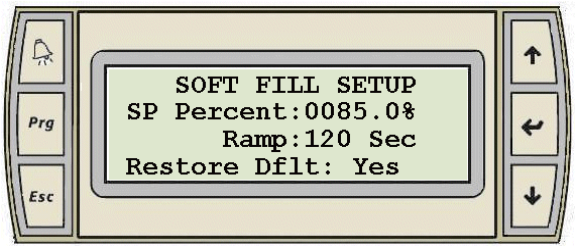
- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “Min Run Time”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “Min Run Time”, pressing the “Up” or “Down” key will set the Pump Minimum Run Time Setpoint to the desired value. This is the minimum run time the lag pump will run before shutting down.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

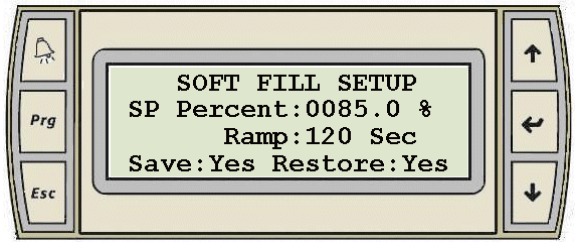
Soft Fill Mode Setup Displays



- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the “Enabled/Disabled” modes, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value “Enabled/Disabled”, pressing the “Up” or “Down” key will toggle the selection for the Soft Fill Mode.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

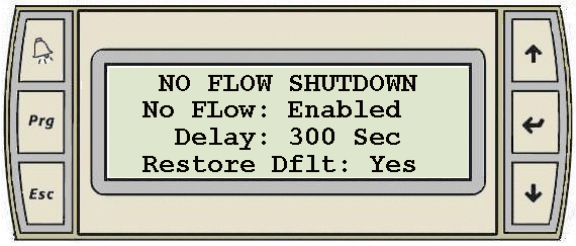
Soft Fill Setup Displays

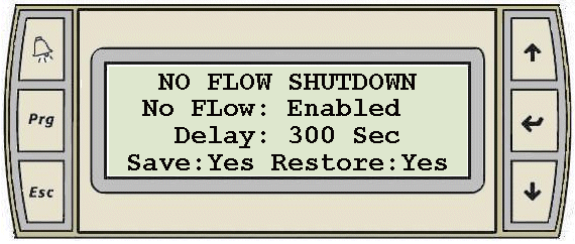




- This display is only active when the No Flow Shutdown is enabled.
- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “SP Percent”, the value beside “Ramp”, over “Yes” beside “Save” and “Restore”, and back at the top left corner.
- When the cursor is over the value beside “SP Percent”, pressing the “Up” or “Down” key will set the Soft Fill Setpoint percent to the desired value. This is percent of the system flow.
- When the cursor is over the value beside “Ramp”, pressing the “Up” or “Down” key will set the Ramp time Setpoint to the desired value. This is the pump speed ramp during Soft Fill Mode.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

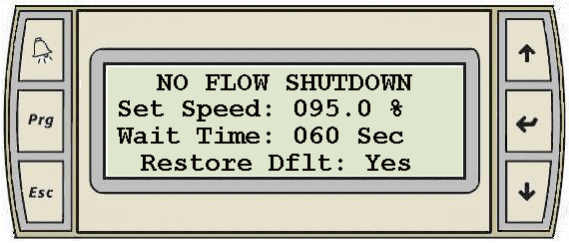
No Flow Shutdown Setup Displays

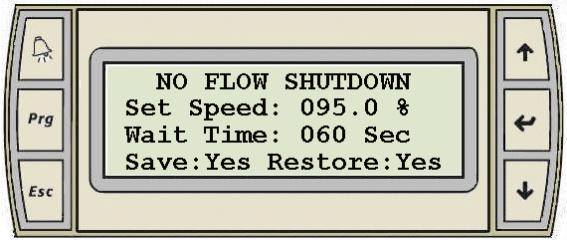




- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the text beside “No Flow”, the value beside “Delay”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the text beside “No Flow”, pressing the “Up” or “Down” key will toggle the text between “Disabled”, and “Enabled”
- When the cursor is over the value beside “Delay”, pressing the “Up” or “Down” key will set the No Flow Shutdown Delay Setpoint to the desired value. This is the maximum time to run with one pump only under 95% speed before checking the No Flow condition.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

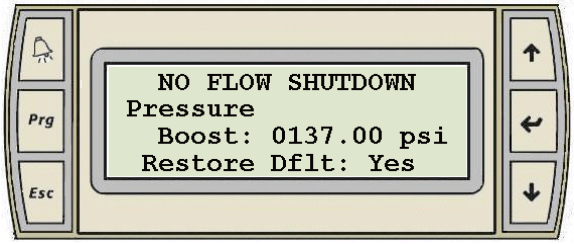
Variable Speed Booster No Flow Shutdown Setup Displays 1

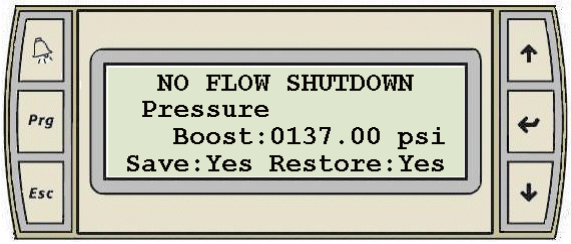




- This display is only active when the No Flow Shutdown is enabled.
- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “Set Speed”, over the value beside “Reset”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “Set Speed”, pressing the “Up” or “Down” key will set the No Flow Shutdown Speed Setpoint to the desired value. The pump will slow down to this percentage of current speed to test the No Flow condition.
- When the cursor is over the value beside “Wait Time”, pressing the “Up” or “Down” key will set the Wait Time Setpoint to the desired value. This is the time to wait before checking for a pressure drop after the pump was slowed down.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

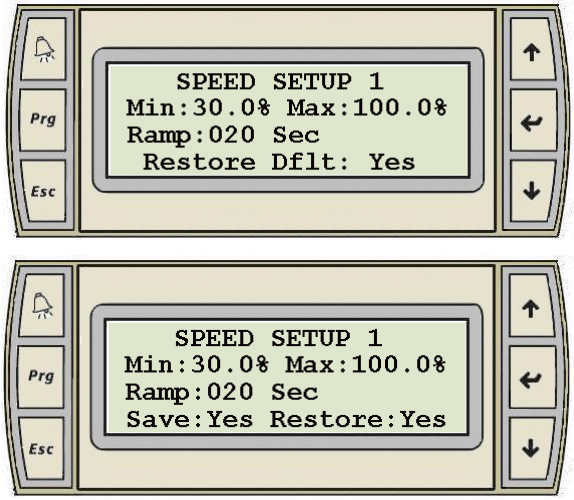
Variable Speed Booster No Flow Shutdown Setup Displays 2





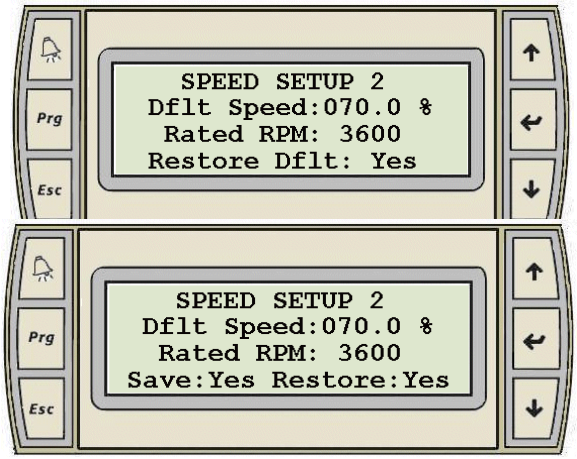
- This display is only active when the No Flow Shutdown is enabled.
- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “Boost”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “Boost”, pressing the “Up” or “Down” key will set the No Flow Shutdown Pressure Boost Setpoint to the desired value. When in no flow shutdown, the booster will increase the system pressure to the No Flow Boost pressure setpoint before shutting down the lead pump.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

Variable Speed Booster Speed Setpoints Displays 1



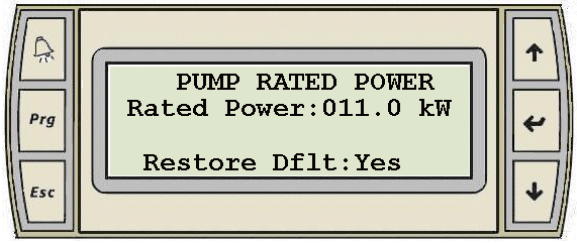
- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “Min”, over the value beside “Max”, over the value beside “Ramp”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “Min”, pressing the “Up” or “Down” key will set the Minimum Pump Speed setpoint to the desired value.
- When the cursor is over the value beside “Max”, pressing the “Up” or “Down” key will set the Maximum Pump Speed setpoint to the desired value.
- When the cursor is over the value beside “Ramp”, pressing the “Up” or “Down” key will set the Pump Ramping Speed setpoint to the desired value. This is the minimum time the pump will take to go from 0% to 100% speed.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

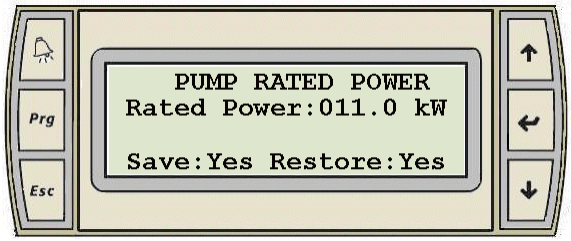
Variable Speed Booster Speed Setpoints Displays 2



- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “Dflt Speed”, over the value beside “Rated RPM”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “Dflt Speed”, pressing the “Up” or “Down” key will set the Default Pump Speed setpoint to the desired value. This is the speed the pumps will default to when the discharge pressure sensor fails.
- When the cursor is over the value beside “Rated RPM”, pressing the “Up” or “Down” key will set the Drive Rated RPM to the desired value. This is to display the pump speed in RPM.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

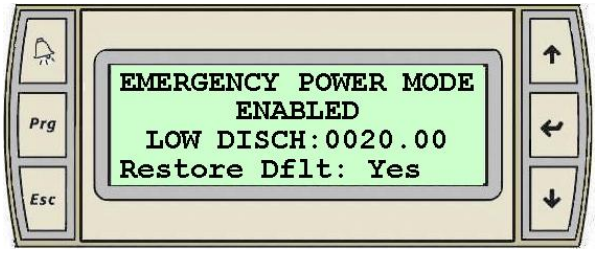
Pump Rated Power Setup Displays

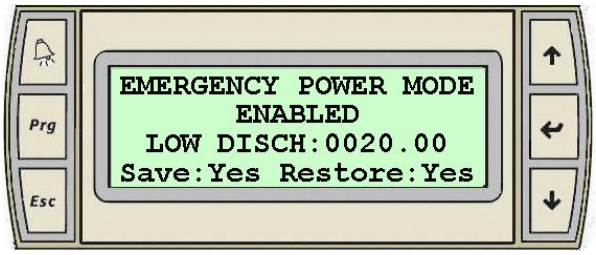




- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “Rated Power”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “Rated Power”, pressing the “Up” or “Down” key will set the Pump Rated Power (in kW) to the desired value.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

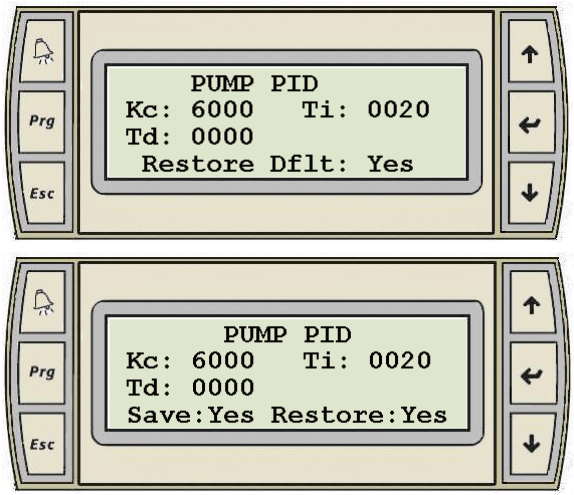
Emergency Power Mode





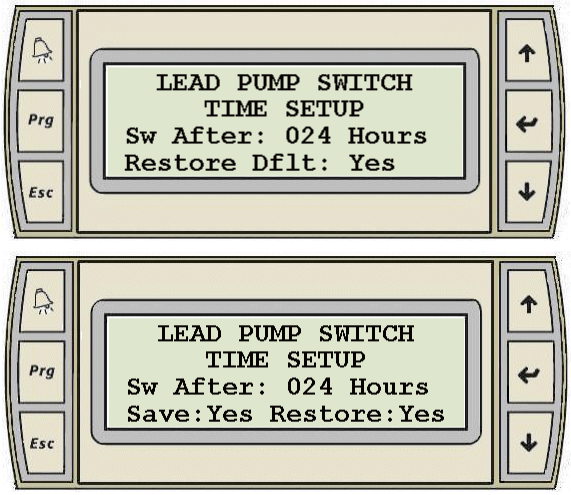
- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the “Disabled” text, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over “Disabled” pressing the “Up” or “Down” arrow will toggle the text between “Disabled”, and “Enabled”
- When the cursor is over the value beside “LOW DISCH”, pressing the “Up” or “Down” key will set the Low Discharge Pressure Alarm Setpoint when in Emergency Mode to the desired value.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will Save the settings on this screen as Default Values. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will Restore the Default Settings for the settings on this screen. The text will change between “Yes” to “Ok” for a few seconds.

Variable Speed Booster PID Setup Displays



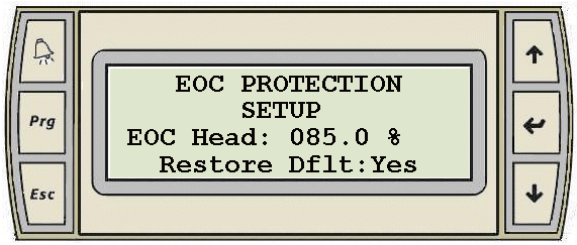
- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “Kc”, over the value beside “Ti”, over the value beside “Td”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “Kc”, pressing the “Up” or “Down” key will set the PID Proportional Constant Kc to the desired value.
- When the cursor is over the value beside “Ti”, pressing the “Up” or “Down” key will set the PID Integral Time Constant Ti to the desired value.
- When the cursor is over the value beside “Td”, pressing the “Up” or “Down” key will set the PID Derivative Time Constant Td to the desired value.
- The actual system pressure is displayed on the screen to help when adjusting the PID constant.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

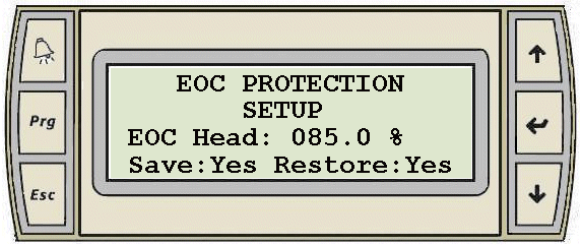
Lead Pump Switch Time Setup Displays



- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “Sw After”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “Sw After”, pressing the “Up” or “Down” key will set the Lead Pump Run Hours Setpoint to the desired value. The Lag 1 pump will become the Lead pump after the Lead pump runs for the set amount of time.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

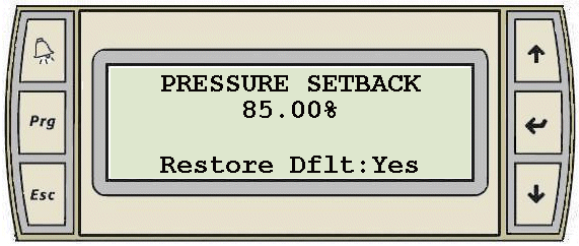
End of Curve (EOC) Protection Setup Displays

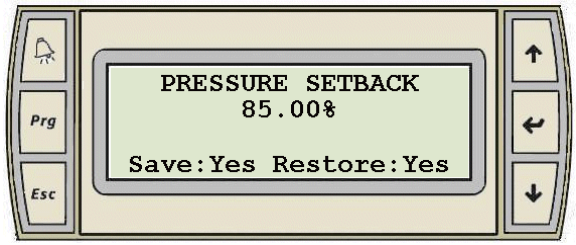




- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “EOC Head”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “EOC Head”, pressing the “Up” or “Down” key will set the Setpoint to the desired value. This is the Full Speed EOC Head in percent of design head.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

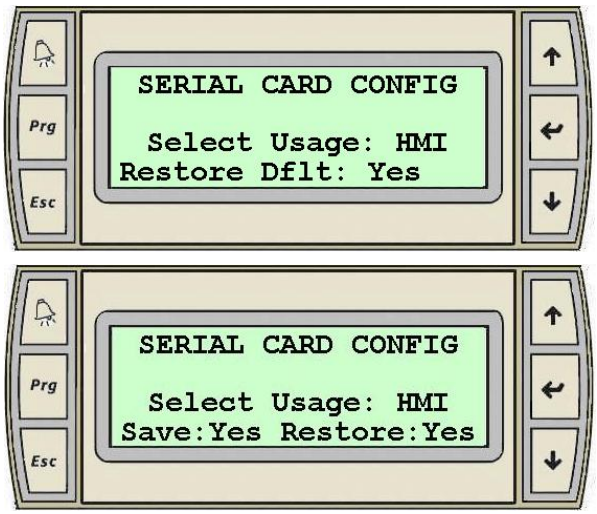
Pressure Setback Setup Displays





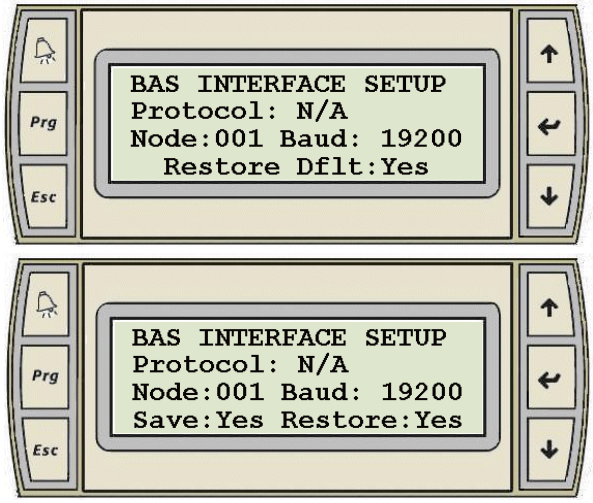
- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value below “PRESSURE SETBACK”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “PRESSURE SETBACK”, pressing the “Up” or “Down” key will set the Setpoint to the desired value. This is percentage of system setpoint.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

Serial Card Configuration



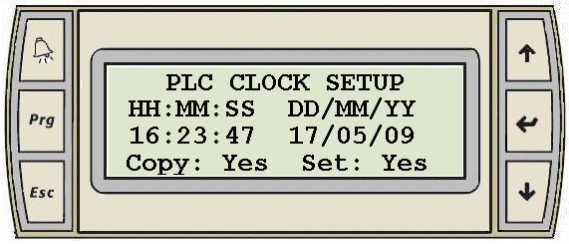
- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the value beside “Select Usage”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “Select Usage”, pressing the “Up” or “Down” key will toggle the text between “HMI”, and “BAS”. By Default the program utilizes the serial card to communicate with the HMI touch panel. When there is no HMI select “BAS” to enable the BAS communication.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

Building Automation System (BAS) Interface Setup Displays



- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor over the text beside “Protocol”, the value beside “Node”, the value beside “Baud”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the value beside “Protocol”, pressing the “Up” or “Down” key will set the Protocol to the desired type. The choices are: Modbus, BACnet and Lonworks.
- When the cursor is over the value beside “Node”, pressing the “Up” or “Down” key will set the Node address to the desired value.
- When the cursor is over the value beside “Baud”, pressing the “Up” or “Down” key will set the Baud rate to the desired value.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.
- When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

PLC Clock Setup Display



- When the cursor is at the top left corner of the screen, pressing the “Up” or “Down” arrow will navigate between the active setup screens of the respective Level.
- Pressing the “Enter” key will move the cursor below the Time expressed in Hours (HH), Minutes (MM) and Seconds (SS), “HH:MM:SS”, below the Date expressed in Day (DD), Month (MM) and YEAR (YY), “DD/MM/YY”, over “Yes” beside Save and Restore, and back at the top left corner.
- When the cursor is over the number below “HH:MM:SS”, pressing the “Up” or “Down” keys will set the Hour (HH), the Minute (MM) and the Second (SS) to the desired values.
- When the cursor is over the number below “DD/MM/YY”, pressing the “Up” or “Down” keys will set the Day (DD), the Month (MM) and the Year (YY) to the desired values.
- When the cursor is over “Copy”, pressing the “Up” or “Down” keys will copy the current time and date from the PLC to the display. This will overwrite any values previously entered.
- When the cursor is over “Set”, pressing the “Up” or “Down” keys will set the entered time and date to the PLC.
- When the cursor is over “Yes” beside “Save” pressing the “Up” or “Down” arrow will **Save the settings on this screen as Default Values**. The text will change between “Yes” to “Ok” for a few seconds.

When the cursor is over “Yes” beside “Restore Dflt” or “Restore” pressing the “Up” or “Down” arrow will **Restore the Default Settings for the settings on this screen**. The text will change between “Yes” to “Ok” for a few seconds.

S. A. Armstrong Limited
23 Bertrand Avenue
Toronto, Ontario
Canada, M1L 2P3
T: 416-755-2291
F: 416-759-9101

Armstrong Pumps Inc.
93 East Avenue
North Tonawanda, New York
U.S.A. 14120-6594
T: 716-693-8813
F: 716-693-8970

Armstrong Integrated Limited
Wenlock Way
Manchester
United Kingdom, M12 5JL
T: +44 (0) 8444 145 145
F: +44 (0) 8444 145 146