



**EG**  
**Controls**  
JACKSONVILLE, FLORIDA

# **LSC - Micro**

## **Operational Screen Guide**

# 1 Introduction

The **LSC - Micro** series controller is designed to handle 2 constant speed pumps in a wastewater pump station application. There are 15 color touch screens that graphically display operational status, station data and allow entry of system setup information.

The system is designed to operate with an analog level transmitter, an analog level transmitter with backup floats, or floats only. The three operating modes are selectable and require no additional programming.

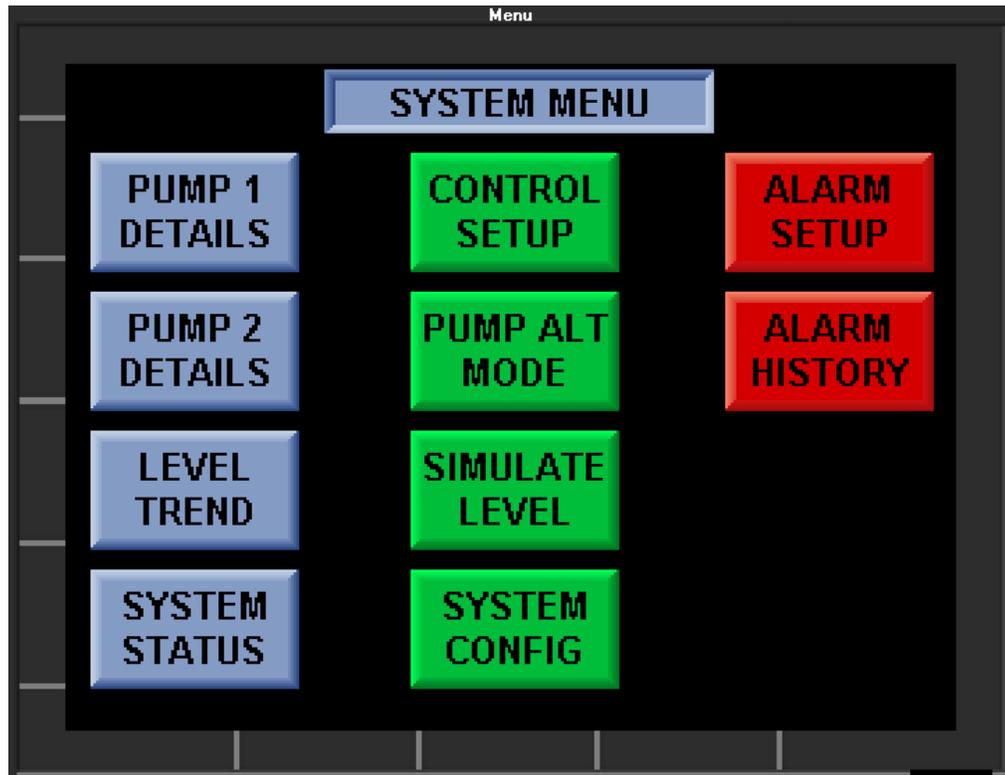
The **LSC - Micro** is an economical control solution with abundance of user friendly features.

- ◆ Calculated Station Inflow and Outflow
- ◆ Pump Run Time
- ◆ Pump Number of Starts and Starts Per Hour
- ◆ Failed Pump Replacement
- ◆ Multiple Alternation Modes
- ◆ Alarm History
- ◆ Level Trending
- ◆ Password Protection
- ◆ System Simulation
- ◆ Micro SD Card Slot for Program Memory Retention and Data Logging
- ◆ Industry Standard MODBUS Communications (Optional Ethernet or Profibus)

**The following guide will explain the functions of each screen.**

## 2 Screens

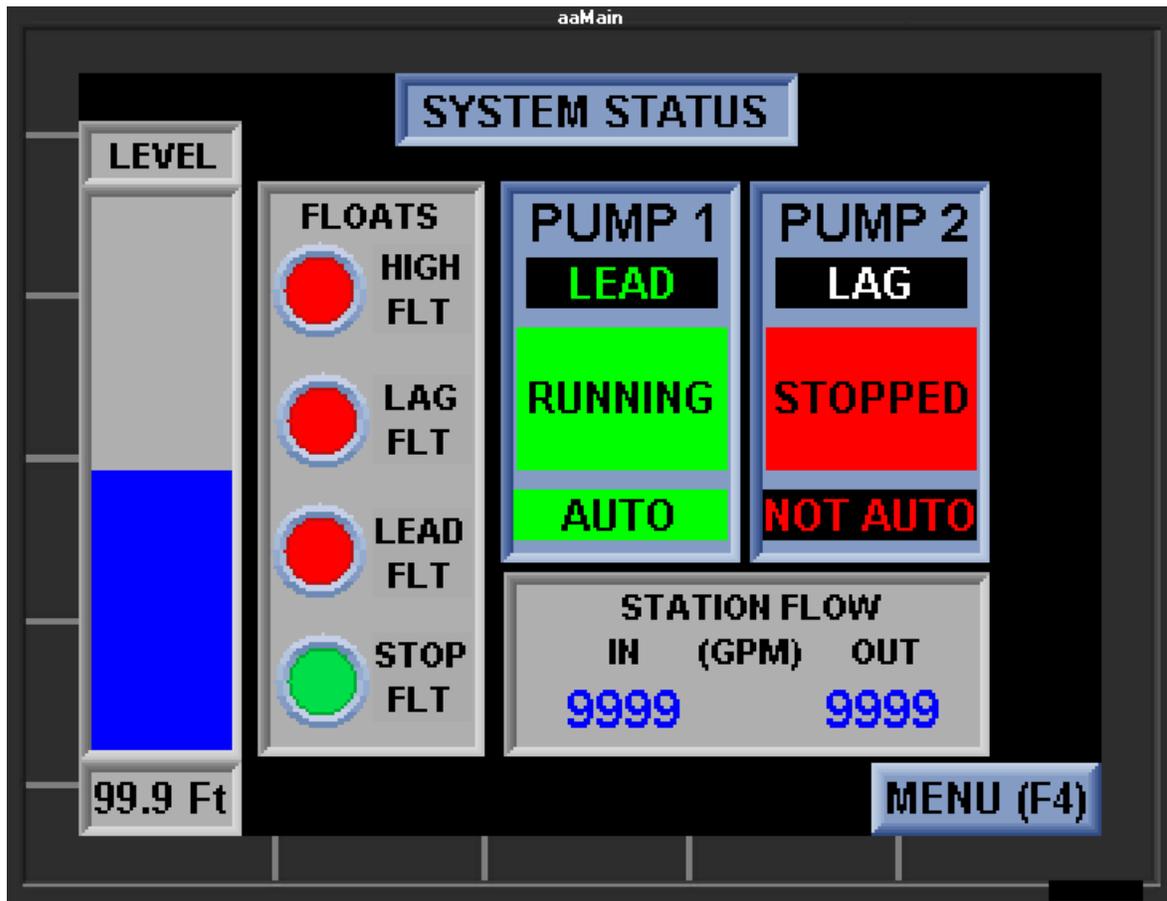
### Menu Screen



The Menu Screen allows direct access to any screen listed below. Pressing any of the buttons will carry the operator to the selected screen.

Pump 1 Details	Information for Pump 1
Pump 2 Details	Information for Pump 2
Level Trend	Real time trend data of station level
System Status	Current system status and overview
Control Setup	System control setpoints
Alarm Setup	System alarm setpoints
Pump Alt Mode	Alternation mode selection
System Configuration	Set system operation mode and well dimensions
Alarm History	Historical alarm information
Simulate Level	Level simulation and system testing

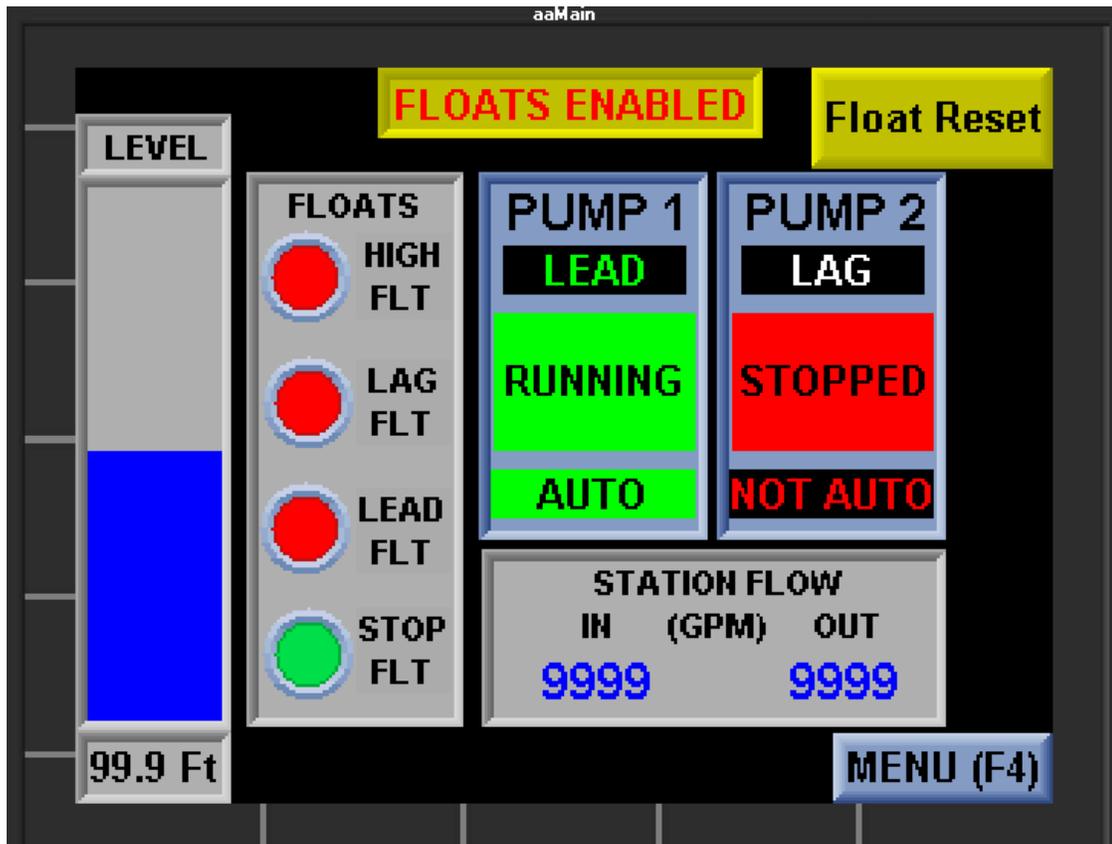
## System Status Screen (Normal Operation)



The System Status Screen is an informational screen designed to give the operator an overview of the pump station operations.

- ◆ Wet Well Level      Depth in feet displayed with a vertical bar-graph
- ◆ Floats              Floats are green when tipped and red when hanging vertical and not actuated
- ◆ Pump Line Up      Displayed as Lead or Lag above each pump
- ◆ Pump Run Status    Each pump graphic is red for Stopped, green for Running, and yellow if Faulted
- ◆ Pump Status        Text below each pump for Running, Stopped, or Failed status
- ◆ Pump Mode          Text below each pump for HOA switch status (Auto or Not in Auto)
- ◆ Station Inflow      Wet well Inflow in GPM (calculated).
- ◆ Station Outflow     Station Outflow in GPM (calculated)
- ◆ Menu Button        Returns operator to the Menu screen

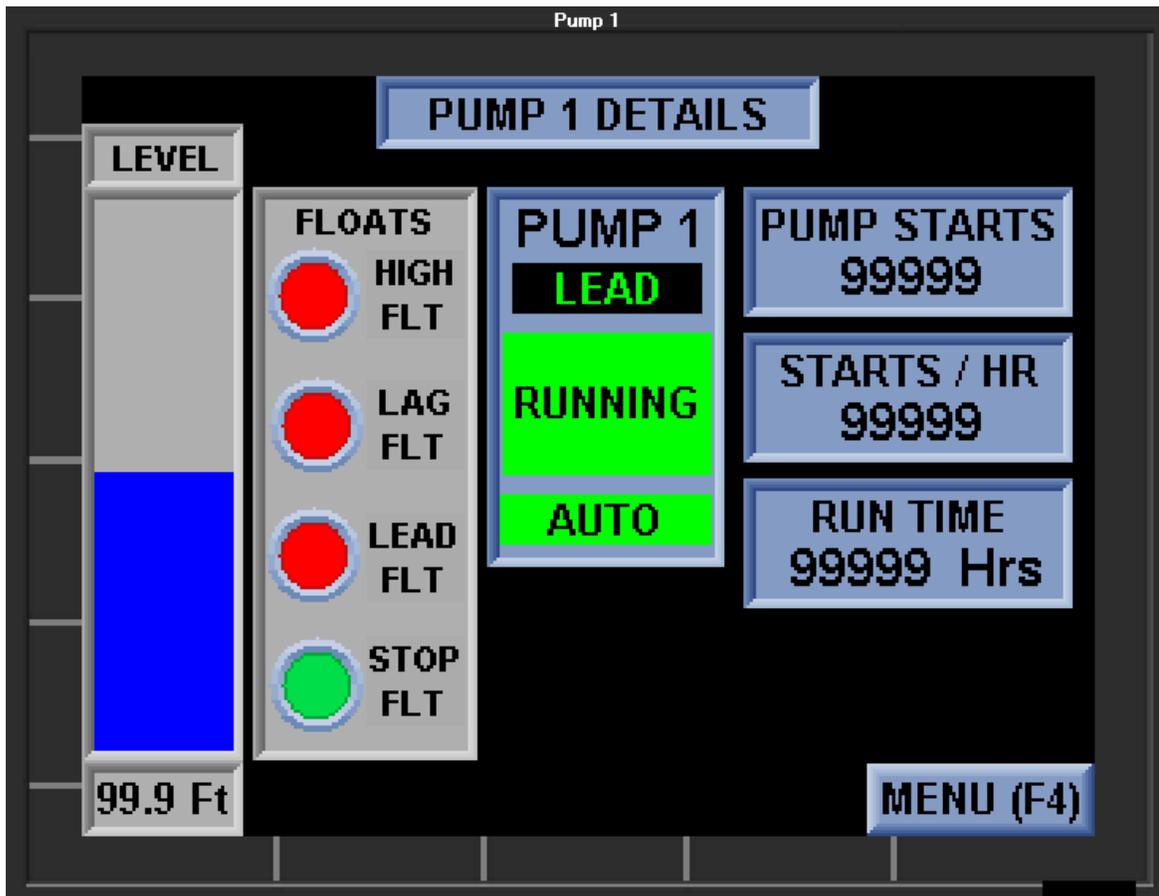
## System Status Screen (Backup Enabled)



The System Status Screen is an informational screen designed to give the operator an overview of the pump station operations.

- ◆ Wet Well Level      Depth in feet displayed at bottom and also as a vertical bar-graph
- ◆ Floats              Floats are green when tipped and red when hanging vertical and not actuated
- ◆ Pump Line Up      Displayed as Lead or Lag above each pump
- ◆ Pump Run Status    Each pump graphic is red for Stopped, green for Running, and yellow if Faulted
- ◆ Pump Status        Text below each pump for Running, Stopped, or Failed status
- ◆ Pump Mode         Text below each pump for HOA switch status (Auto or Not in Auto)
- ◆ Station Inflow      Wet well Inflow in GPM (calculated).
- ◆ Station Outflow    Station Outflow in GPM (calculated)
- ◆ Menu Button        Returns operator to the Menu screen
- ◆ Floats Enabled     Alarm pop-up that Float Backup system is enabled
- ◆ Float Reset         Resets the latched Float Backup system

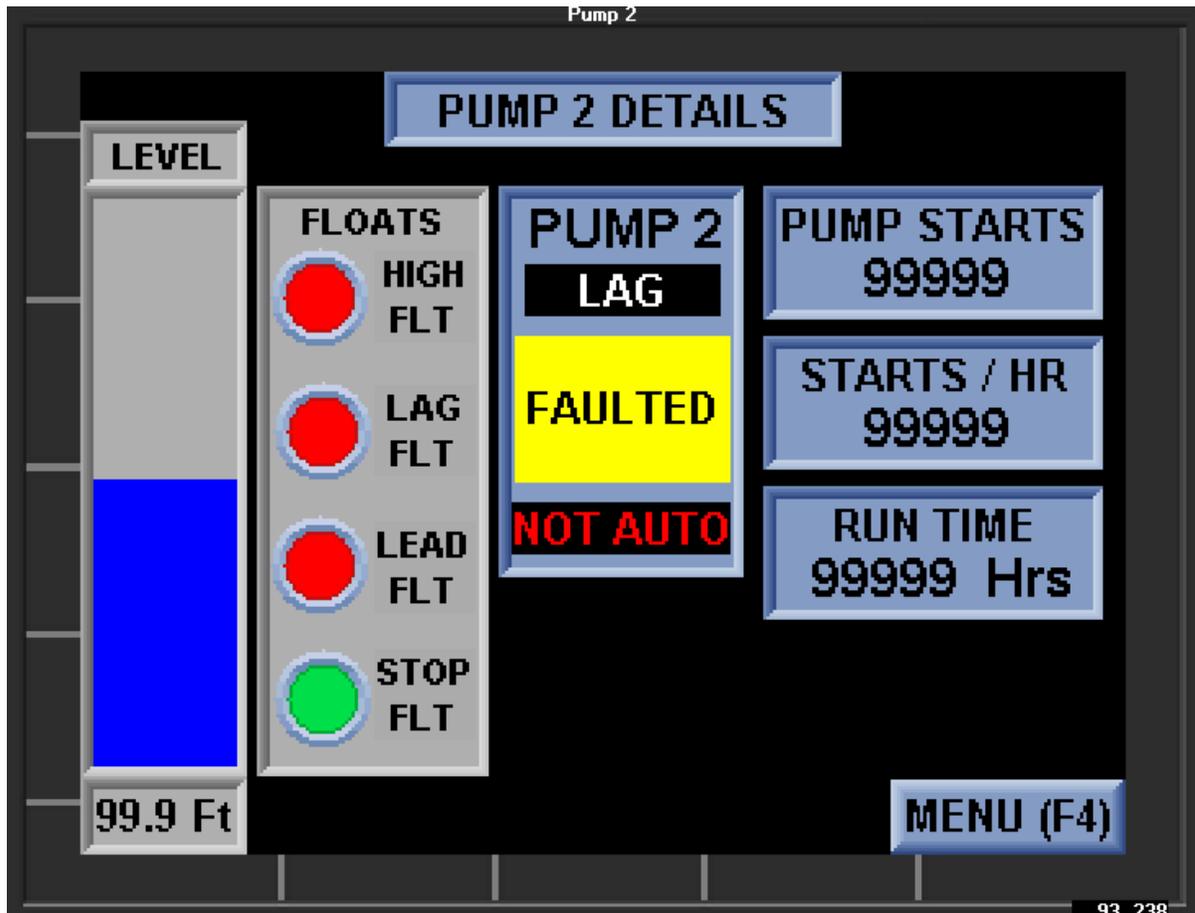
## Pump 1 Details Screen



The Pump 1 Details Screen is status information relative to Pump 1. The following information is displayed:

- ◆ Level – Floats      Allows the operator a view of the level and float status while viewing the Pump 1 Status screen
- ◆ Pump Line Up      Indicates Lead or Lag mode for the pump
- ◆ Pump Run Status      The pump graphic is red for Stopped, green for Running, and yellow for Faulted
- ◆ Pump Status      Text below each pump for Running, Stopped, or Failed status
- ◆ Switch Status      Text below each pump for HOA switch status (Auto or Not in Auto)
- ◆ Run Time      Logged run hours (resettable)
- ◆ Number of Starts      Total number of pump starts (resettable)
- ◆ Starts per Hour      Total number of pump starts per hour
- ◆ Menu Button      Returns operator to the Menu screen

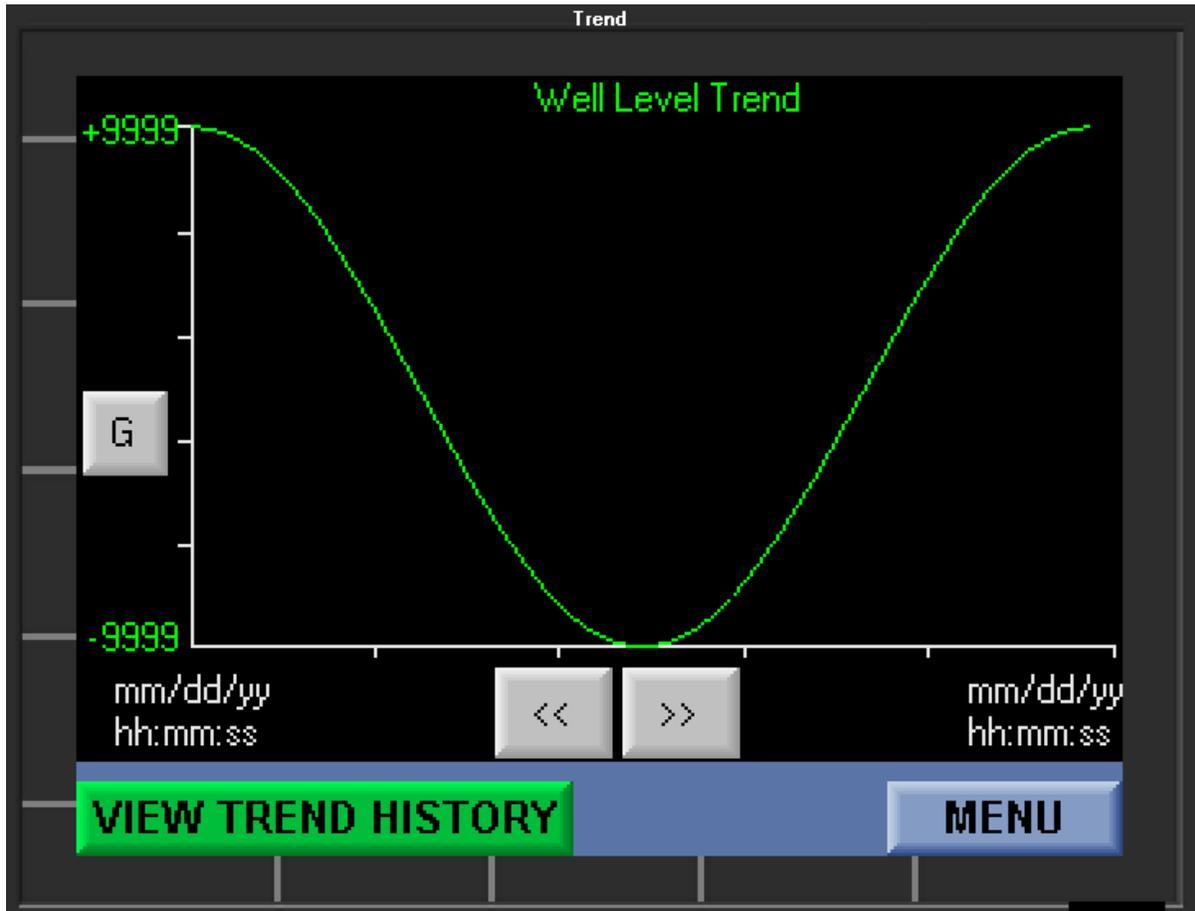
## Pump 2 Details Screen



The Pump 2 Details Screen is status information relative to Pump 2. The following information is displayed:

- ◆ Level – Floats      Allows the operator a view of the level and float status while viewing the Pump 2 Status screen
- ◆ Pump Line Up      Indicates Lead or Lag mode for the pump
- ◆ Pump Run Status      The pump graphic is red for Stopped, green for Running, and yellow for Faulted
- ◆ Pump Status      Text below each pump for Running, Stopped, or Failed status
- ◆ Switch Status      Text below each pump for HOA switch status (Auto or Not in Auto)
- ◆ Run Time      Logged run hours (resettable)
- ◆ Number of Starts      Total number of pump starts (resettable)
- ◆ Starts per Hour      Total number of pump starts per hour
- ◆ Menu Button      Returns operator to the Menu screen

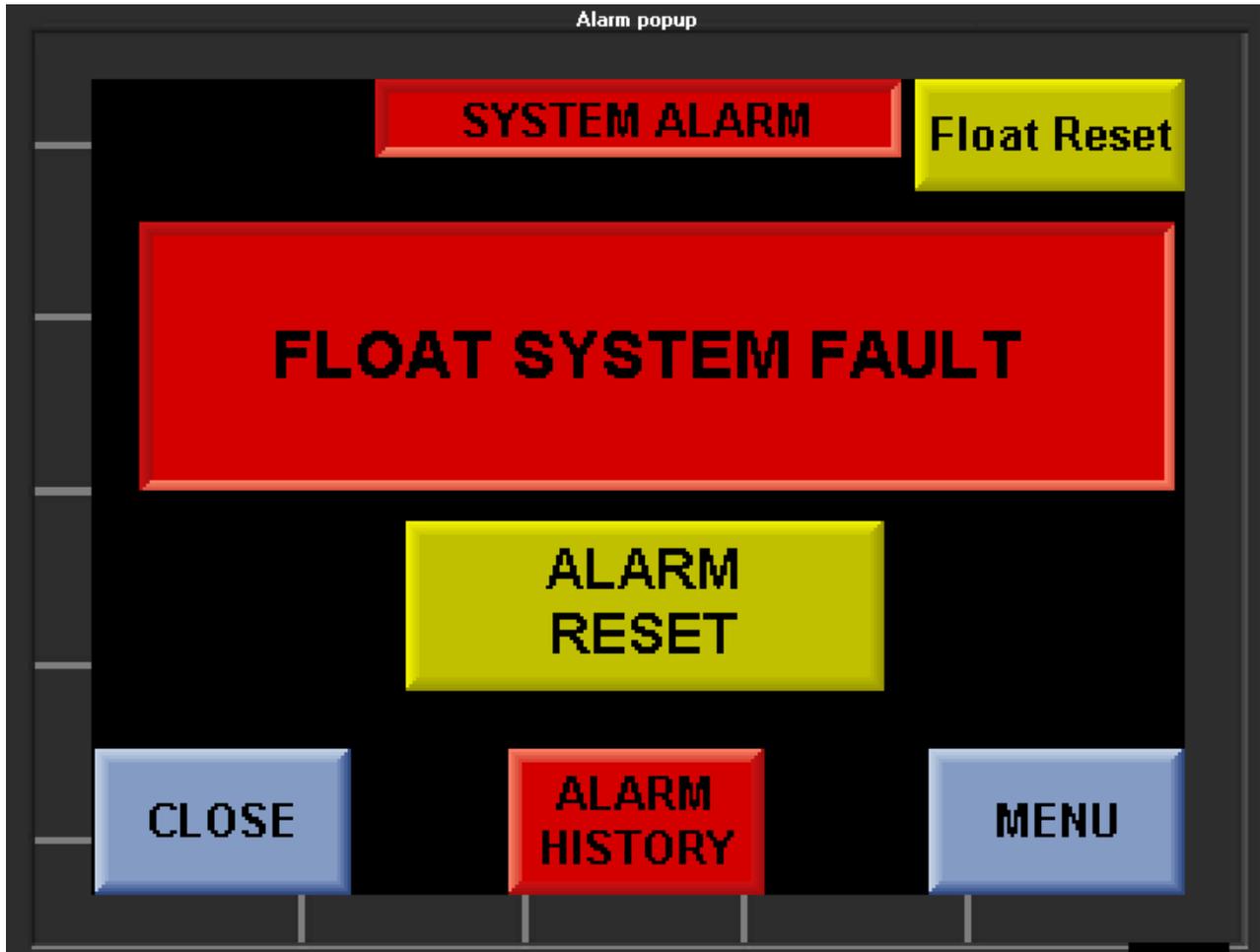
## Level Trend Screen



The Level Trend Screen displays real time trending of the wet well level. The Y axis (vertical) is the depth and the X axis (horizontal) is the time. The time/ date shown below the trend (left to right) is the total elapsed time that has been recorded in EEPROM memory.

Note: To view the historical trending, press the **View Trend History** button (Micro SD card required). Press the left or right green arrow buttons to scroll thru the saved trending files. Select file to view. Press the blue arrow scroll buttons or drag center blue button to move back and forth within the trending period.

## Alarm Pop-Up Screen



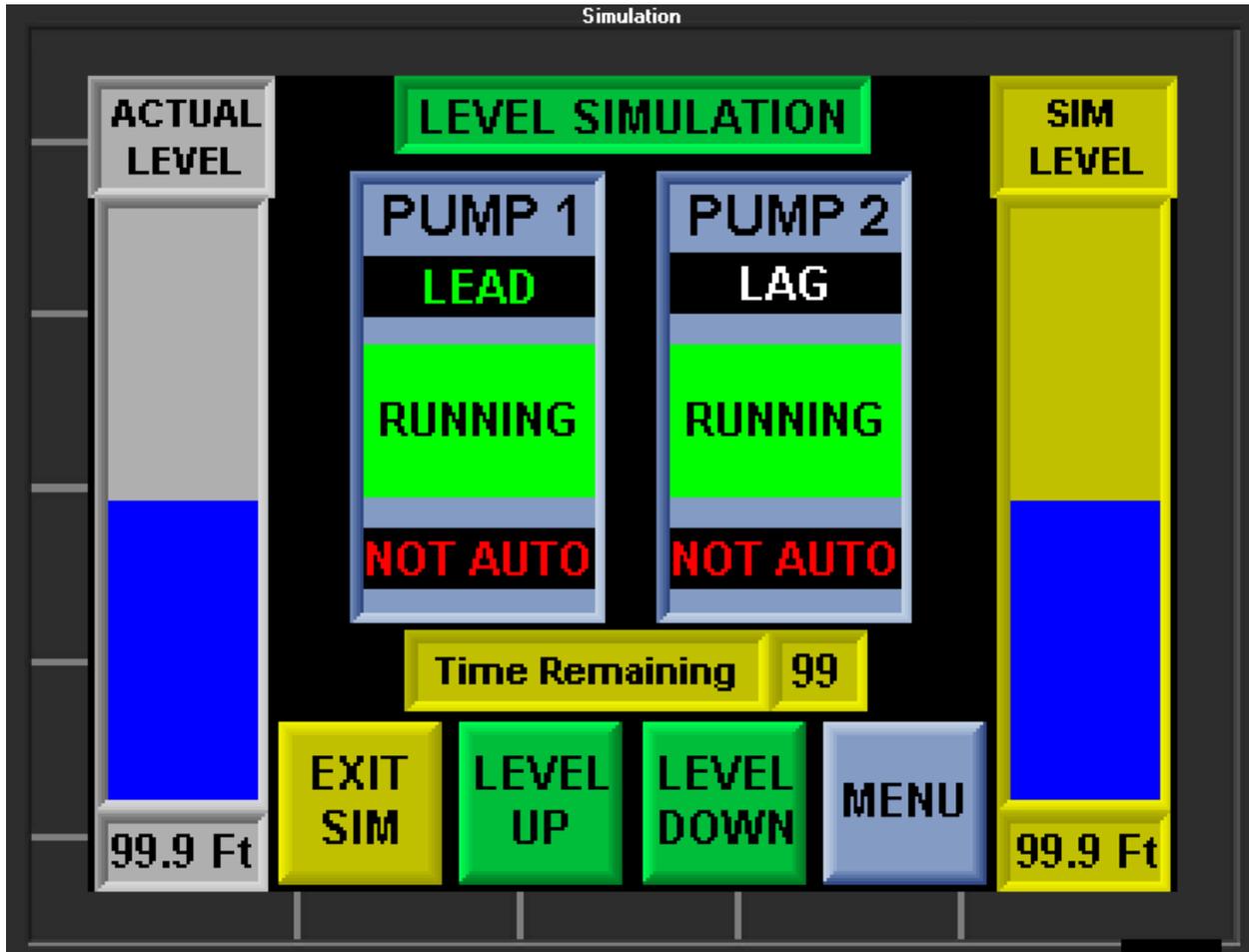
The Alarm Pop-Up Screen is displayed when a new alarm is triggered. The operator can then go to the Alarm History screen to see more detailed information. Pressing the alarm reset button will reset "Pump Failed to Start" alarms. All other alarms will automatically reset once the alarm condition has been corrected.

### Alarm History Screen

Priority	Low	<b>Alarm History</b>	ESC
Group	00	General Collection	
ID	004	General Alarm	
Trigger Rise Time	30/01/06 02:45	<b>Duration</b>	
Trigger Fall Time	30/01/06 02:50	00:05:00	
Ack. Time	30/01/06 03:39	00:52:18	
Reset Time	00/00/00 00:00		
		<<	>>

The Alarm History Screen displays historical alarm information. An alarm is added to this screen when the alarm becomes inactive and all pending actions (acknowledge, etc.) have taken place.

## Simulation Screen

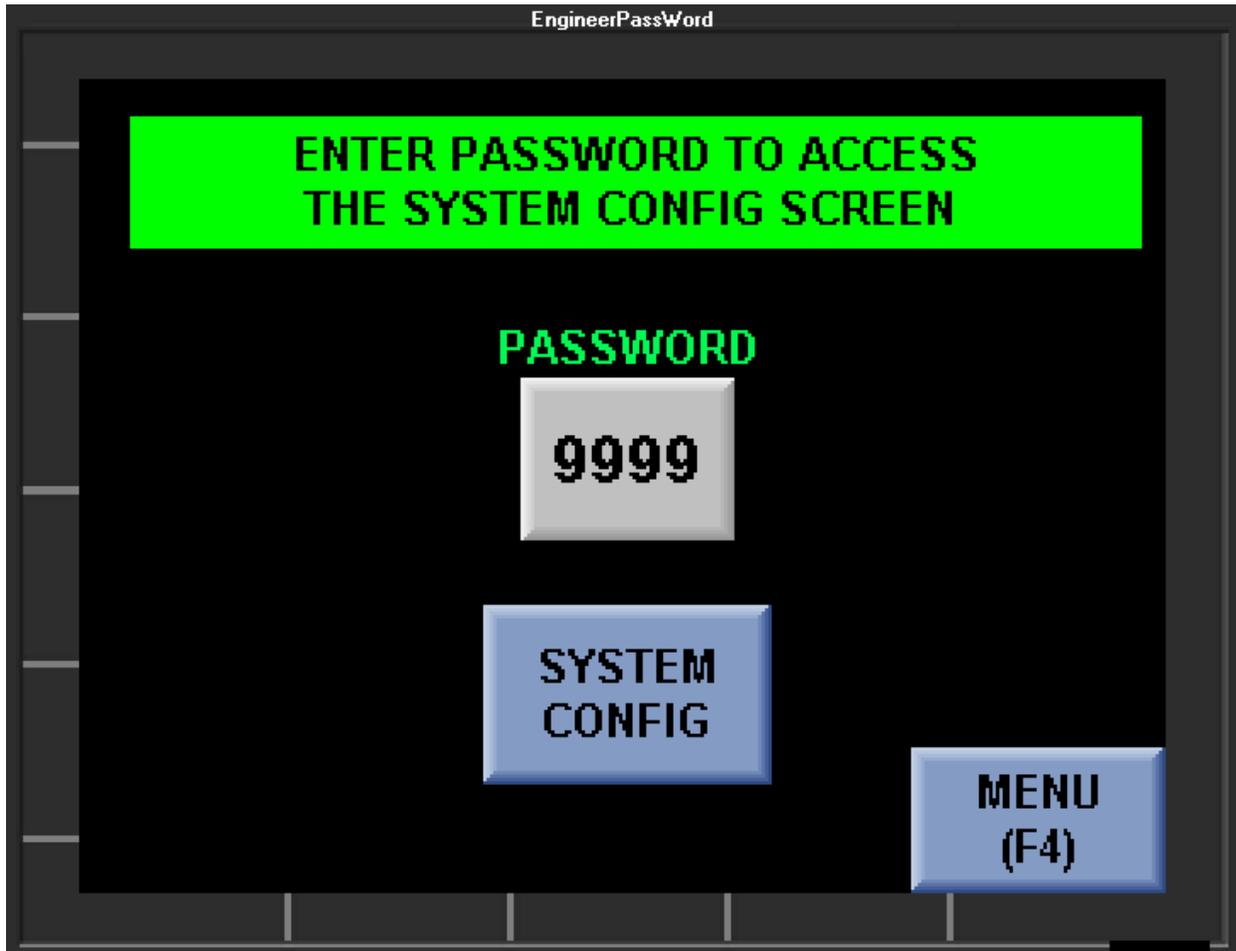


The Simulation Screen allows the operator to test the operation of the system. The pumps will actually start and level alarms will occur if conditions are met. The **Actual Level** is shown on the left bar graph. The **Simulated Level** is shown on the right bar graph.

Operating the system: Press **UP** to simulate rising level (simulated level bar graph moves upward from the initial actual level). Press **DOWN** and simulated level moves downward. At any time, you can press the **Exit** button to discontinue simulation and return to normal system operation.

In the center of the screen, the **Time Remaining** of simulation is displayed. This is a timer that will return the system to normal operation if no operator input is received for 60 seconds.

## System Password Screen



The System Password Screen allows authorized personnel to access the system configuration screens.

Once the correct password is entered, the **System Config** button will appear.

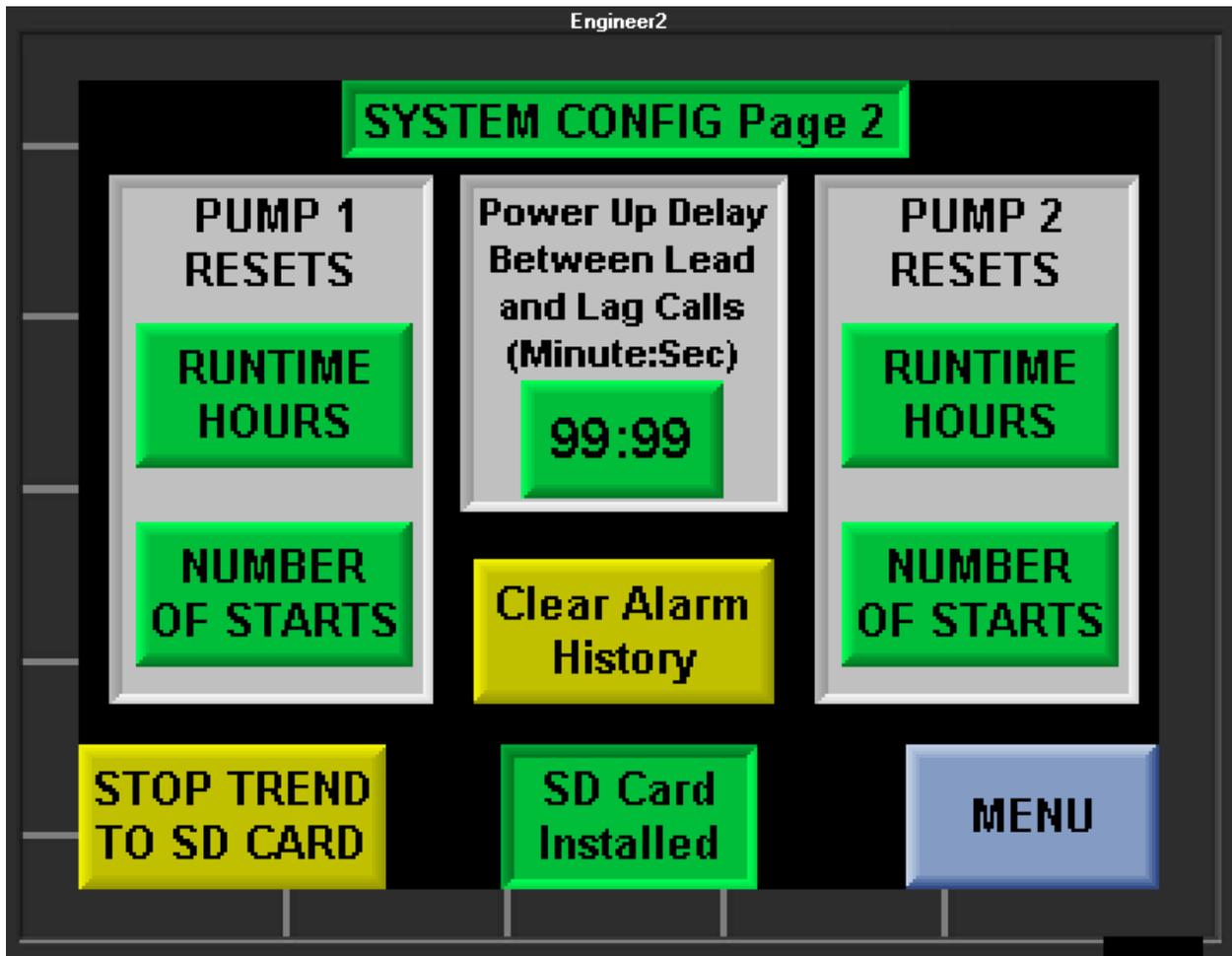
## System Configuration Screen (1 of 2)

The screenshot displays a user interface for system configuration. At the top, the user role is identified as 'Engineer'. The main title is 'SYSTEM CONFIG', highlighted in green, with a 'NEXT' button to its right. Below this, there are two main sections:

- Select Method of Level Control** (yellow background):
  - Level Xmtr Only
  - Xmtr With Floats
  - Floats Only
- Select Well Shape and Enter Dimensions** (grey background):
  - Rectangle Well**: Well Diameter or Length: 99.99 FT
  - Circular Well**: Well Width if Rectangular: 99.99 FT

The System Configuration Screen 1 is password protected. Information entered on this screen is typically completed during the initial system start up. The well shape/dimensions are utilized for the station inflow and outflow calculations. The operating mode selected will determine which level sensor graphic is displayed (vertical level bargraph, float symbols or both).

## System Configuration Screen (2 of 2)



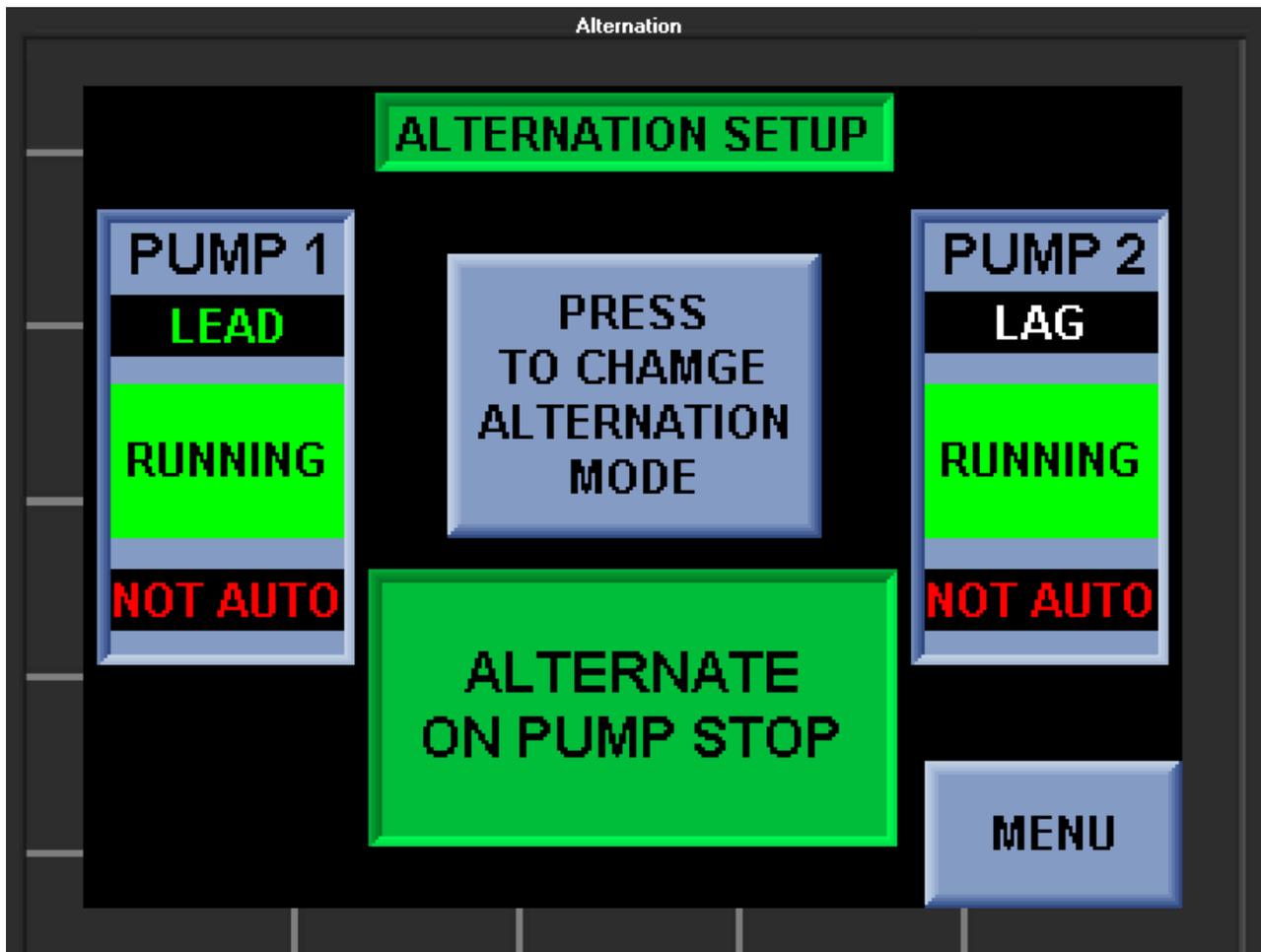
The System Configuration Screen 2 is password protected. This screen allows the total pump run time and number of starts to be reset. This is useful when a new pump has been installed.

The lag pump start can be delayed to prevent simultaneous pump starting. Enter delay period in (minutes:Seconds).

If a Micro SD card is installed, the green indicator will light and station level trending can be started. Press the **Stop Trend** button to halt trending if the Micro SD needs to be changed.

The **Clear Alarm History** button will clear all the alarm history files from memory.

## Alternation Setup Screen



The Alternation Setup Screen allows the system operator to change the pump alternation sequence. The **Alternation** mode will change each time the button is pressed. Selections include alternate on pump stop, pump run time balancing, Pump 1 in Lead or Pump 2 in Lead.

## Alarm Setup Screen

The screenshot shows the 'Alarm Setup' screen with a title bar 'Alarm Setup' and a red header 'ALARM SETUP'. Below the header are four rows of yellow buttons for setting alarm points, and a blue 'MENU' button at the bottom right.

Alarm Type	Set Point Value
High Level Alarm Set Point (Ft)	99.9
Low Level Alarm Set Point (Ft)	99.9
P1 Starts/Hr Alarm Set Point	999
P2 Starts/Hr Alarm Set Point	999

The Alarm Setup Screen allows set points to be entered for High and Low level alarms. Values can be entered for the maximum pump starts per hour. If this set point is exceeded, a corresponding alarm will be posted and added to the **Alarm History Screen**.

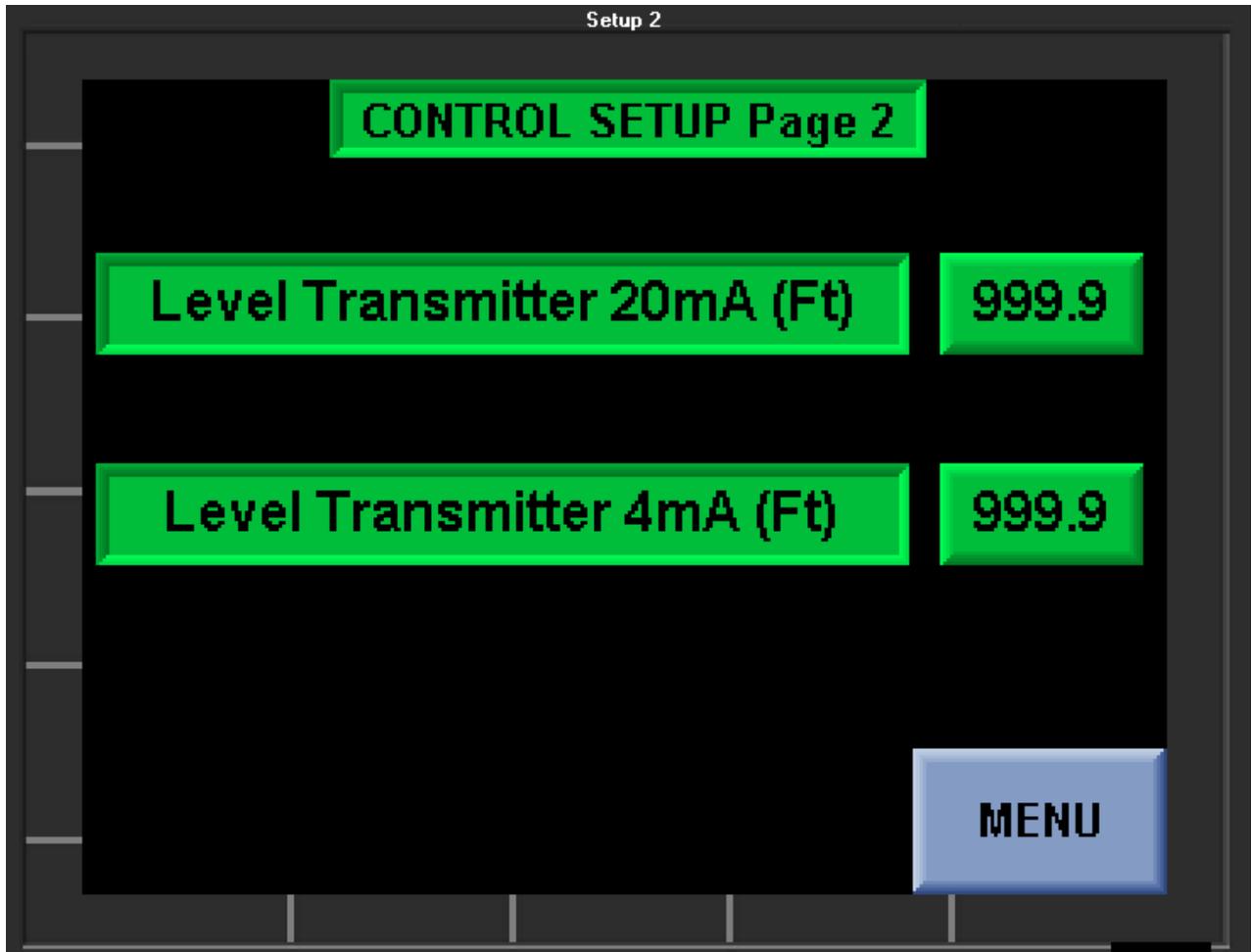
**Control Setup Screen (1 of 2)**

Setup

<b>CONTROL SETUP</b>	<b>NEXT</b>
<b>Lead Start Level Set Point (Ft)</b>	<b>999.9</b>
<b>Lag Start Level Set Point (Ft)</b>	<b>999.9</b>
<b>Lead Stop Level Set Point (Ft)</b>	<b>999.9</b>
<b>Lag Stop Level Set Point (Ft)</b>	<b>999.9</b>

The Control Setup Screen 1 allows set points to be entered for the Lead and Lag pump start/ stop levels. These set points are required if an analog level transmitter is used.

### Control Setup Screen (2 of 2)



The Control Setup Screen 2 allows values to be entered for the analog level transmitter scaling.

Note: Values entered are in feet of water column.

A 10psi transducer for example would be  $(10 / .433 = 23.09 \text{ feet})$

### **3 Hardware Specifications**

#### **1. Hardware Ratings**

The hardware ratings shall be as follows

A. Operating Temperature	0 to +50°C (32 to 122°F)
B. Storage Temperature	-20 to +60°C (-4 to 140°F)
C. Relative humidity (RH)	10% to 95% (non-condensing)
D. Voltage range	20.4 to 28.8VDC <10% ripple
E. Power consumption	npn inputs 280mA @ 24VDC pnp inputs 190mA @ 24VDC Backlight 20mA @ 24VDC Ethernet card 35mA @ 24VDC Relay Outputs (ea.) 8mA @ 24VDC

#### **1. System Configuration:**

The Programmable Logic Controller shall include an integrated processor, embedded I/O, color touchscreen panel and 5 sealed membrane function keys. The PLC shall allow for expansion input/output modules and communication modules.

A. System Ratings shall be as follows:

1. Input / Output Capacity capable of supporting up to 256 I/O points (8 I/O modules maximum)
2. Scan Rate of 15µs per 1kb ladder logic
3. Adjustable white LED backlight TFT LCD display
4. Up to 1024 displays
5. 480x272 pixel resolution
6. 4.3" viewing area resistive, analog touchscreen
7. 5 programmable function keys, metal dome, sealed membrane switch

B. Programming shall be ladder logic format

C. Programming software shall be downloadable from the manufacturers website at no cost and shall support the following features:

1. Remote access
2. Micro SD Card backup/ upload/ logging
3. Data logging
4. OPC Server compliant
5. DDE format read/ write

## 1. System Processor

Processor shall be as follows:

- a. Memory: 1MB Application, 512k Fonts, 3MB Images.
- b. Removable memory: Standard SD or SDHC (32GB max)
- c. Real Time Clock
- d. Battery backup (7 years typical at 25°C)
- e. Replaceable, coin type, Lithium battery (CR2450)

## 1. Base Features

Base Features shall be as follows:

- a. Input voltage 24VDC
- b. (12) digital inputs rated 24VDC (2 configurable as analog current/ voltage)
- c. 6 Relay Outputs rated 5 amp at 250VAC/ 30VDC
- d. Comm Port 1: RS232/ RS485 (up to 32 nodes)
- e. Comm Port 2: Optional RS232/RS485, Ethernet or CANbus

## 2. Communication Interfaces

### 1. Comm Port 1

- a. RS232 baud rates between 300 to 115200 bps
- b. RS485 up to 32 nodes/ 1200m (4000') maximum
- c. USB 2.0 compliant; full speed

### 2. Comm Port 2 (Optional)

- d. Ethernet
- e. RS232/485
- f. CANbus



**Contact EG Controls or an authorized representative  
in your area for more information on the  
LSC – Micro Level Control System**

**Mailing Address:**

**EG Controls, Inc.  
11790 Philips Hwy  
Jacksonville, FL 32256**

**904-292-0110 (Direct Line) or [Sales@EGControls.com](mailto:Sales@EGControls.com)**