



HL2 Controller  
Technical Manual  
Version 1.1 (Aug 2014)

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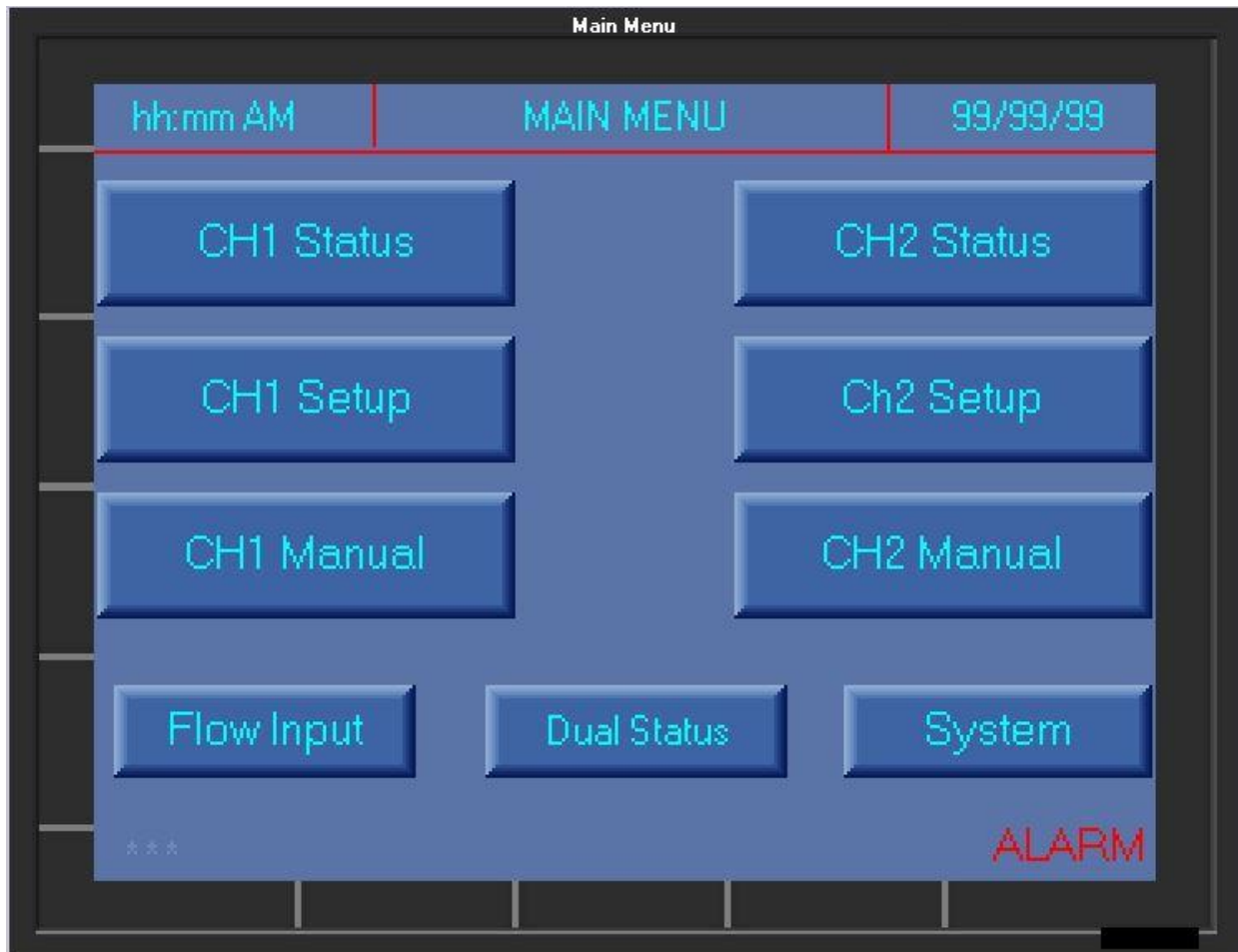
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## **1 Introduction**

## 2 Main Menu

Figure 1: Main Menu Screen



**CH1/CH2 Status:** View the Status Screen for the current Mode

**CH1/CH2 Setup:** Go to the Mode selection and configuration screens

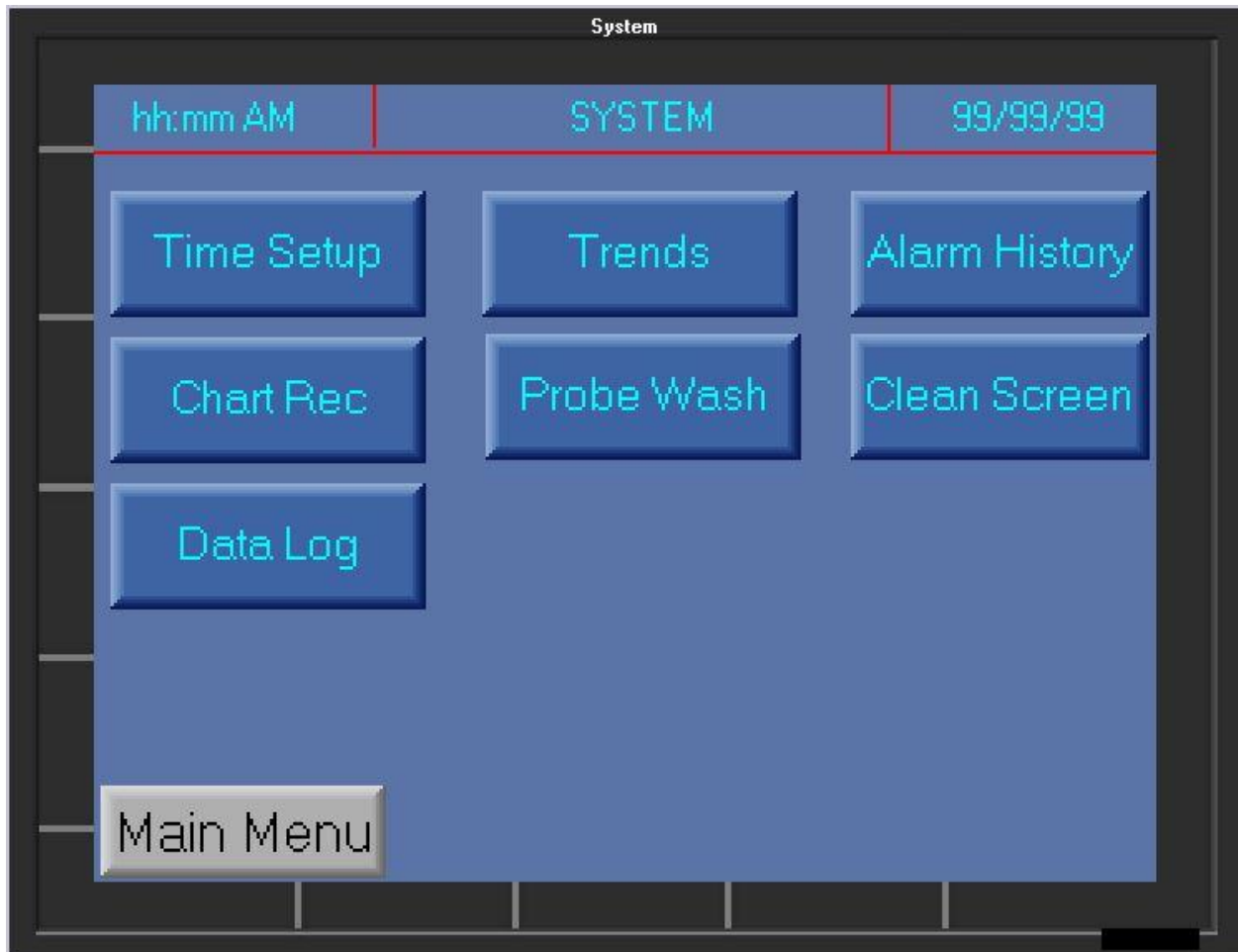
**CH1/CH2 Manual:** To place the controller into manual or auto

**Flow Input:** Go to the Flow Input setup screen

**Dual Status:** This button will be enabled when both channels are in NTL mode

**System:** Go to the Systems Menu screen.

### 3 System



**Time / IP:** Go to the Time and System setup screen

**Chart Rec:** Go to the Chart Recorder Setup screen

**Data Log:** Go to the Data Log setup and control screen

**Trends:** Will take you to the Trends menu screen

**Probe Wash:** Go to the Probe Wash set-up screens

**Alarm History:** Will show past alarms

**Clean Screen:** The screen will change to a blank screen with a countdown timer. Then screen can be cleaned while the timer is running. At the end of the timer the screen will revert back.

## 4 Time & System Setup

This screen is used to adjust the time/date and the network settings of the system.

Figure 2: Time System Setup Screen

The screenshot shows a 'Time Setup' screen with a blue background and a black border. At the top, there is a header bar with three sections: 'hh:mm AM', 'SETUP', and '99/99/99'. Below this, the main area contains four rows of input fields. The first row is labeled 'TIME & DATE:' and has a single large input field showing '01/01/04 00:00:00'. The second row is labeled 'IP ADDRESS:' and has four input fields, each showing '999.'. The third row is labeled 'SUBNET MASK:' and has four input fields, each showing '999.'. The fourth row is labeled 'GATEWAY:' and has four input fields, each showing '999.'. At the bottom left, there is a 'Main Menu' button.

**Time & Date:** Input the current time and date of the system in the format mm/dd/yy hh:mm:ss

**IP Address:** Input the IP Address for the controller

**Subnet Mask:** Input the Subnet Mask of the network

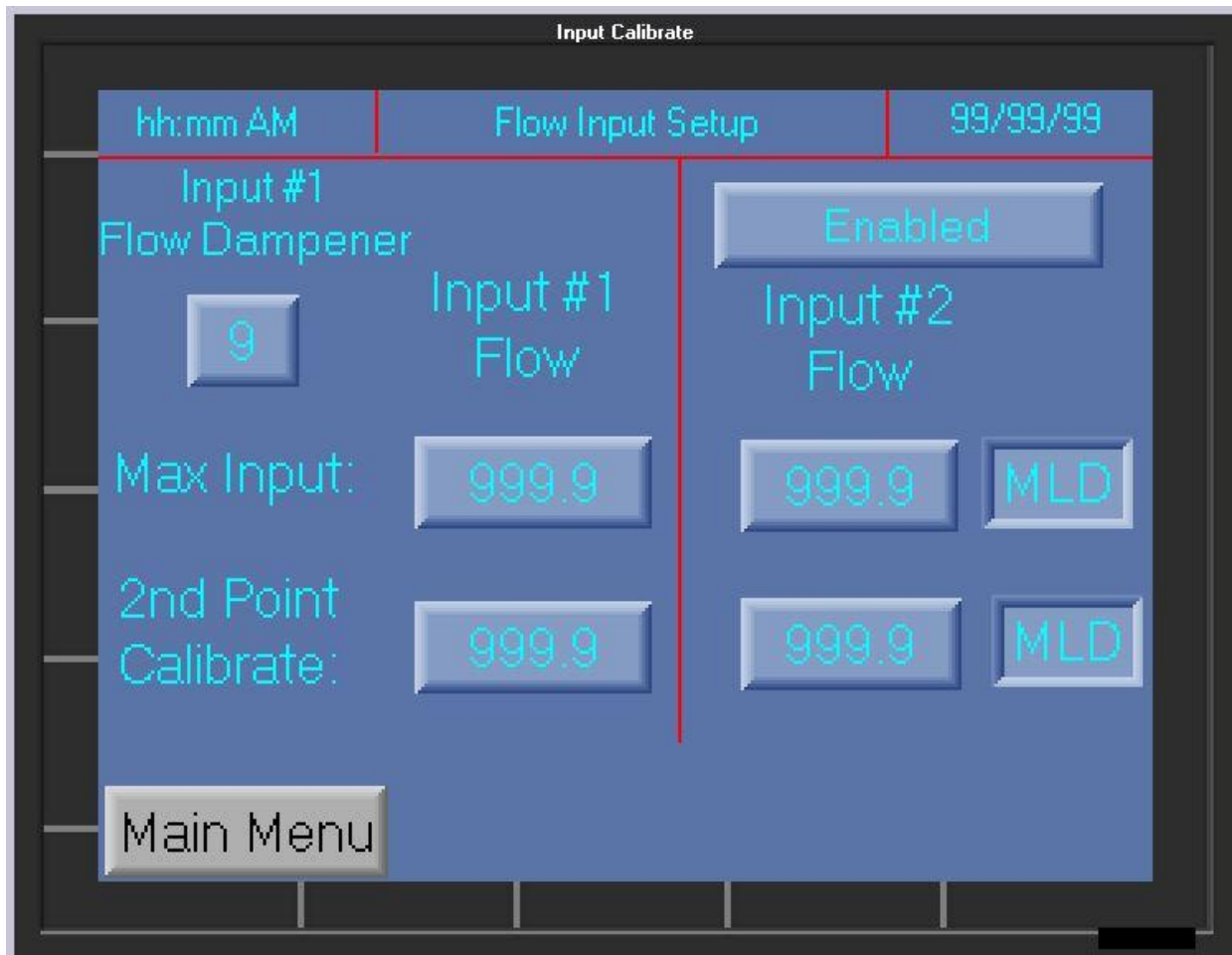
**Gateway:** Input the address of the network gateway



## 5 Flow Input Setup

This screen is used to calibrate how the Flow Input reading is measured.

Figure 3: Flow Input Setup Screen



**Flow Dampener:** If the analog signal on Input #1 is unstable, this setting will average it out over a sample range. The range can be set between 2 and 8.

The higher the range setting, the larger the dampening effect. For example, if range is set to 2, it will average the input reading out over the last 2 measurements. A range setting of 8 will use the last 8 measurements to calculate the average reading.

**Max Input:** Set the maximum flow that can be achieved in the application (i.e. what a 20mA reading equals.)

**2<sup>nd</sup> Point Calibrate:** If the flow meter reading is inaccurate, use this setting to input what current reading should be.

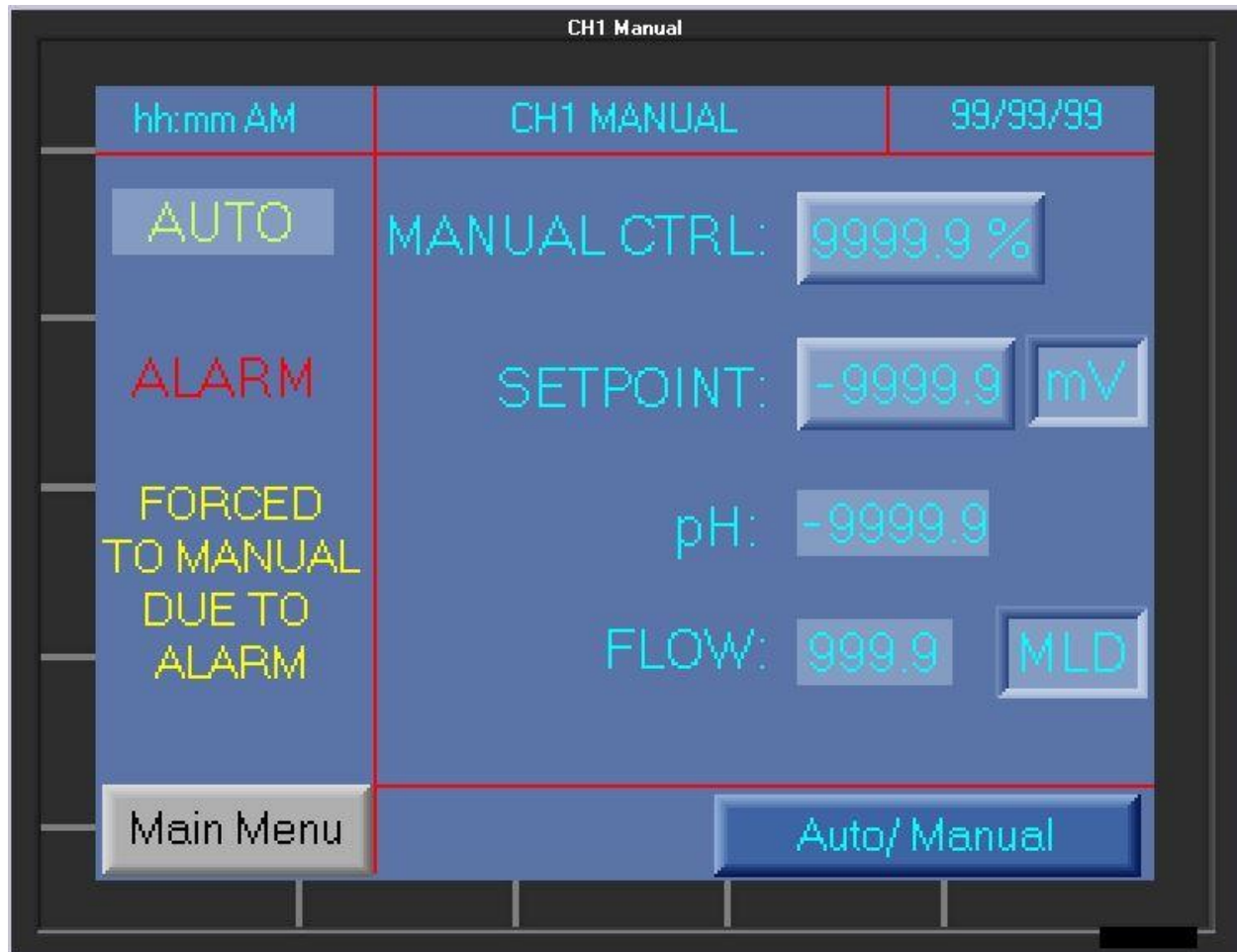
**Input #2 (Enabled/Disabled):** Toggles the second analog input on or off. Use Input #2 when there are two flow meters that join into one stream.

Use the “Main Menu” button to return to the Main Menu Screen.

## 6 Manual Control Mode CH1 / CH2

This screen controls whether the system is in Manual Mode or Auto Mode, and the control settings in each mode.

**Figure 4: Manual Control Mode Screen**



**Auto/Manual:** Toggles between Auto Mode and Manual Mode

**Manual CTRL:** Controls feeder speed in Manual Mode only. Enter the desired percent of feeder speed.

**Set Point:** Controls to the Input set point in Auto Mode only. Enter the desired Input control value.

**mV/pH:** Reading of current Input value.

**Flow:** Reading of current Flow value.

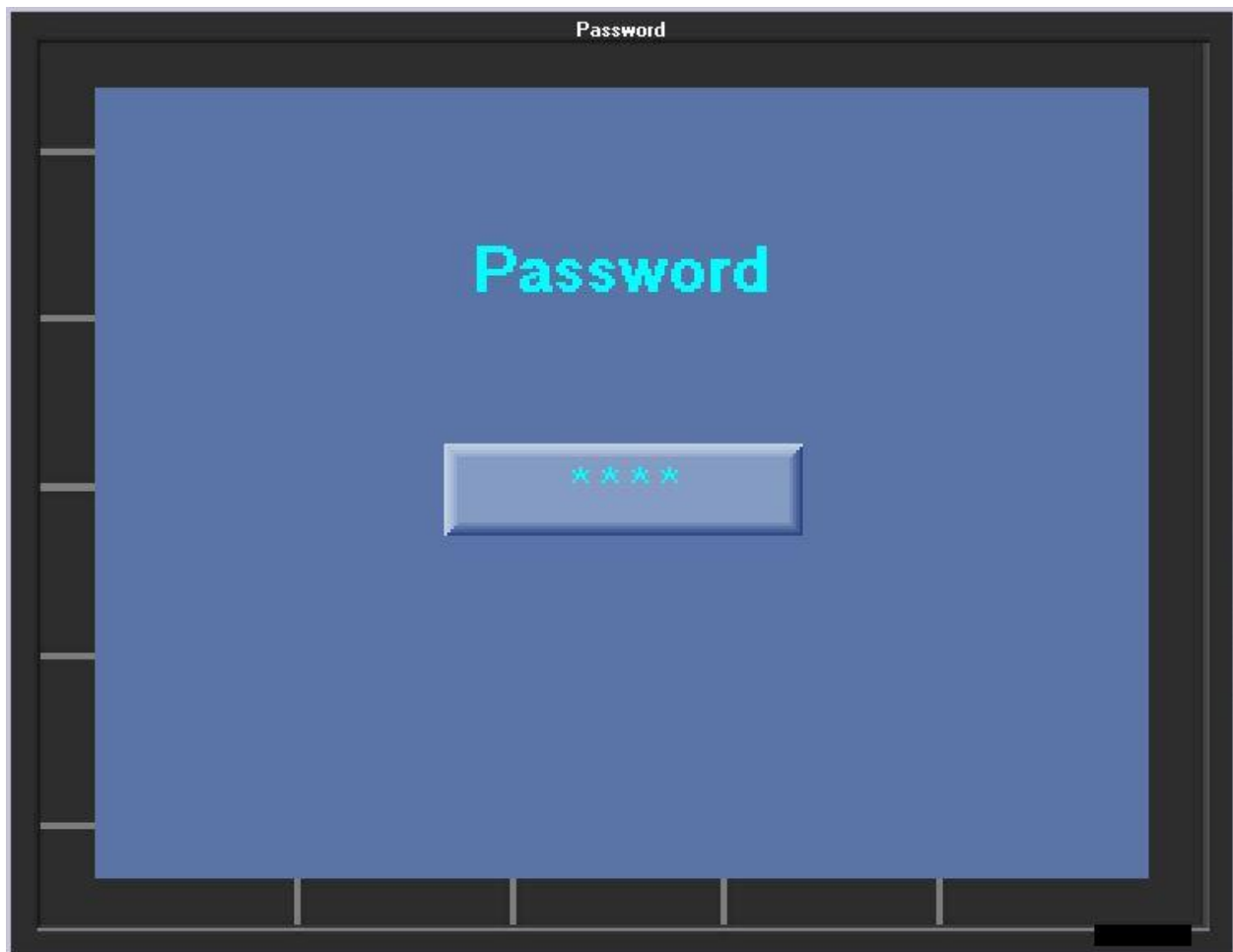
## 7 CH1/CH2 Setup Screens

These screens control the initial configuration of the controller. They are accessed via the “CH1 Setup” button on the Main Menu screen

### 7.1 Password Screen

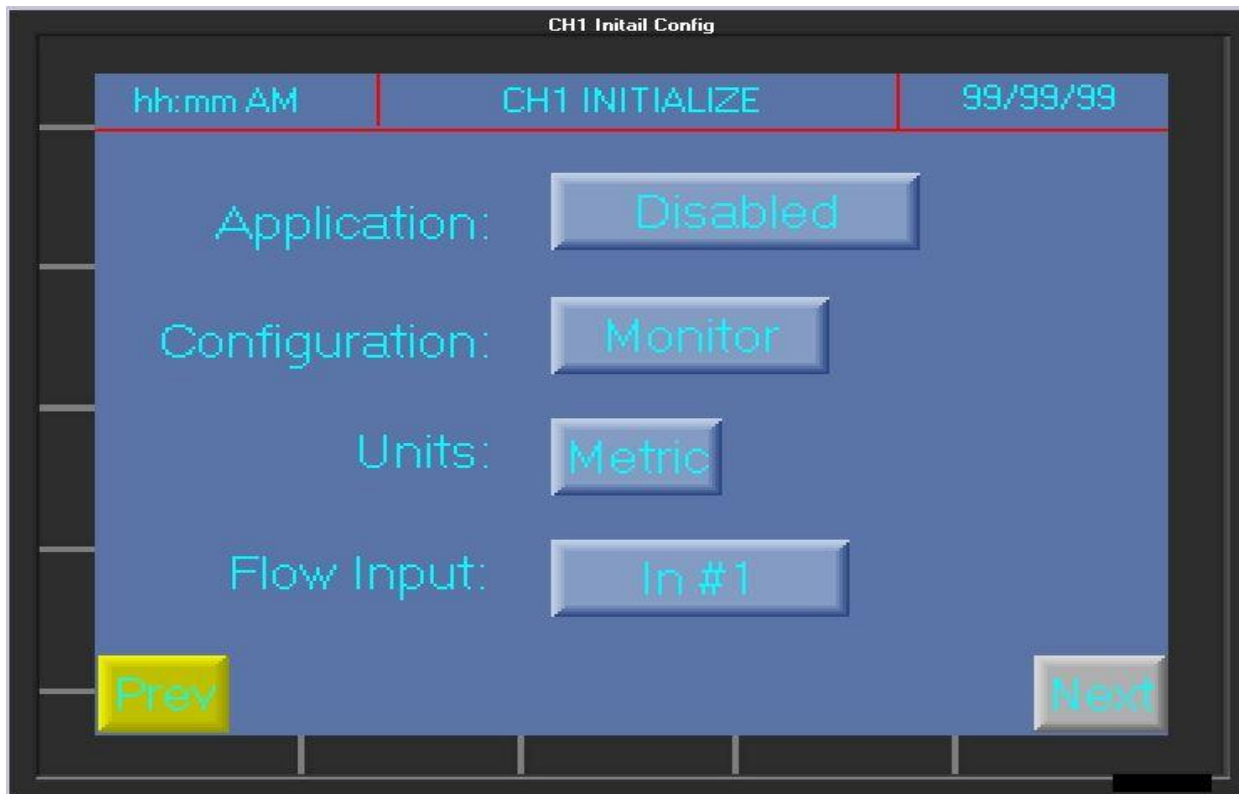
Users are required to input a password before accessing the Initialize Configuration screen. ***The password can be obtained from or changed by your Steltec representative.***

Figure 5: Password Screen



## 7.2 Initialize Configuration Screen

Figure 6: CH1 Setup/Initialize Configuration Screen



**Application:** Set to appropriate application.

- **Chlorination:** Also referred to as “Feed Up.” (E.g. When ORP is high, it will decrease the pump output.)
- **Dechlorination:** Also referred to as “Feed Down.” (E.g. When ORP is high, it will increase the pump output.)
- **pH:** Used for controlling pH control processes.
- **Disabled:** The controller is essentially off. All Alarms are disabled.

**Configuration:** Select the desired mode of control.

- **Monitor:** The controller will only display the input value (pH/ORP) and the flow.
- **Time Base:** This controller will enter Time Base Proportional (TBP) mode, an on/off type of control.
- **NTL:** This is Steltec’s proprietary control method. It uses an analog output to control the feeder, and will adjust the output as needed to keep the input value in the desired band.

**Units:** Sets the system of measurement to either Metric or U.S. units CH1 sets this for both channels

- **Metric:** Select to use metric values in the setup (e.g. liters, kilograms)
- **U.S.:** Select to use the statute values or US customary units (e.g. pounds, gallons)

**Flow Input:** Selects the value to use for the Flow Input. CH1 sets this for both channels

- **In#1:** Uses the value from the Flow Input #1
- **In#2:** Uses the value from Flow Input #2
- **In#1+In#2:** Uses the value of both inputs added together

To continue configuration of the selected mode, press NEXT. The user will be automatically directed to the appropriate mode configuration screen (Monitor, TBP or NTL.)

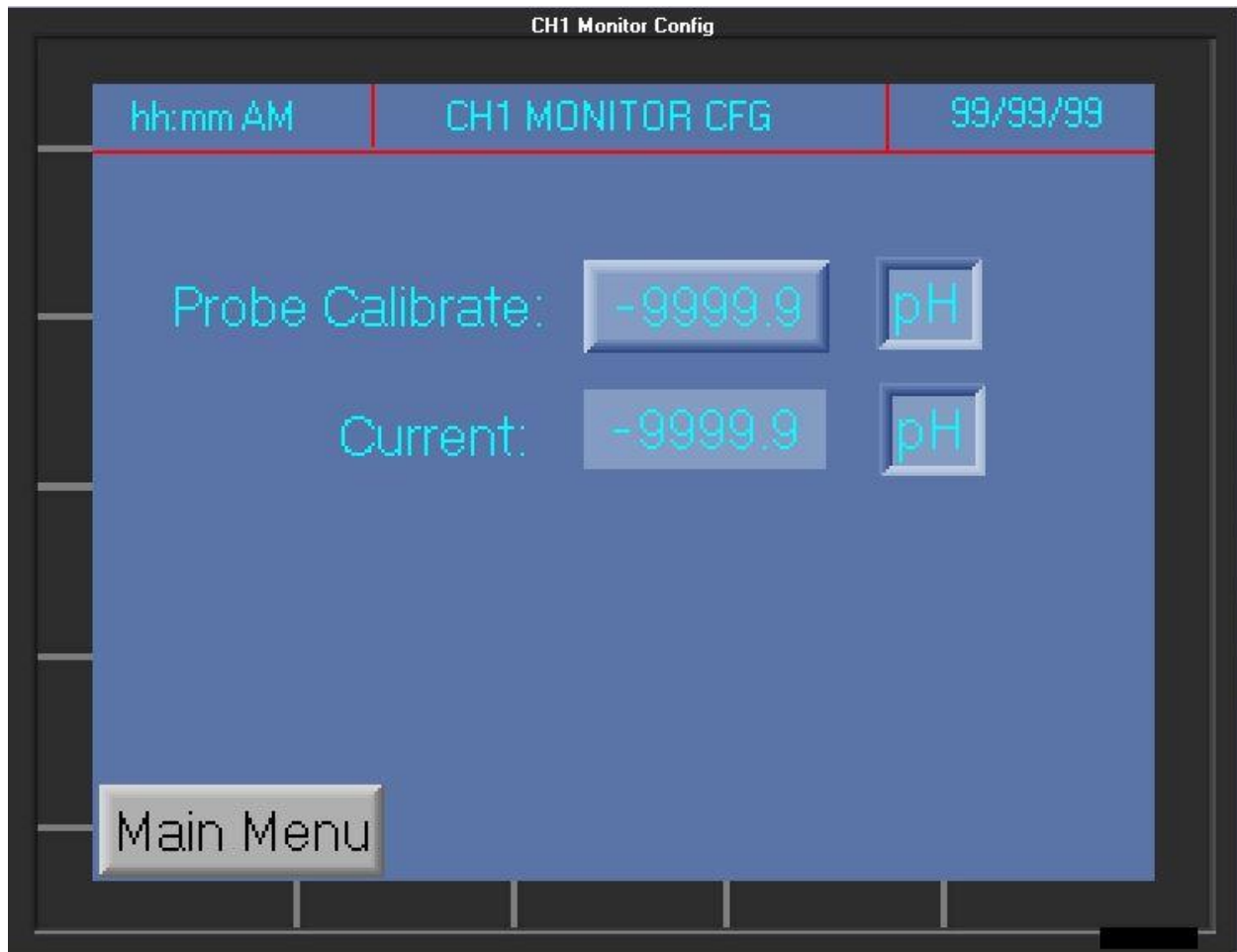
## 8 Monitor Mode CH1 / CH2

### 8.1 Monitor Configuration

Monitor Configuration is a continuation of the Initialize Configuration screen when the Monitor Mode is selected. (See “Initialize Configuration” section.)

This screen is used to calibrate the controller during Monitor Mode.

**Figure 7: Monitor Mode Configuration Screen**



**Probe Calibrate:** Change the current Input reading.

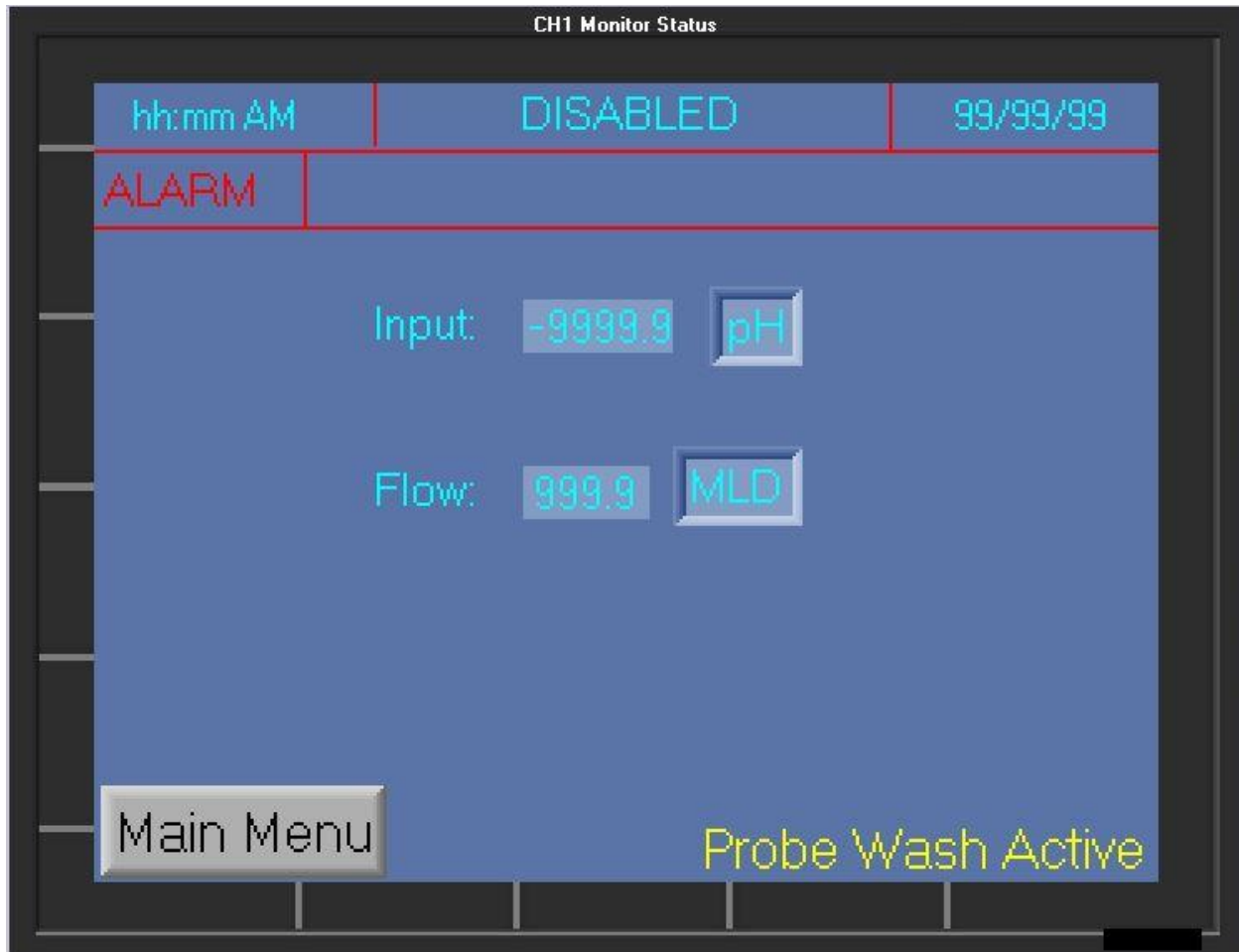
**Current:** Current Input reading.

Press F1 to return to the Main Menu.

## 8.2 Monitor Status Screen

Once the Monitor mode is selected and configured via the CH1 Setup screens, the Monitor Status screen can be viewed by selecting “CH1 Status” in the Main Menu.

Figure 8: Monitor Mode Status Screen



## 9 Time Base Proportional (TBP) Mode Ch1 / CH2

### 9.1 TBP Configuration

TBP Configuration is a continuation of the Initialize Configuration screen when the Time Base Mode is selected. (See “Initialize Configuration” section.)

TBP Mode is configured via a series of three configuration screens and one alarm setup screen. Use the “PREV” and “NEXT” buttons to navigate between the screens.

Figure 9: TBP Configuration Screen 1 (of 3)



**Set Point:** Enter the desired pH control value

**Dead Band:** Enter the area around the Set Point where no adjustments will be made to the output (i.e. Area = Set Point Value  $\pm$  Dead Band Value)



Figure 10: TBP Configuration Screen 2 (of 3)

The screenshot shows a configuration screen titled "CH1 TBP Config2". At the top, there is a header bar with three sections: "hh:mm AM", "CH1 TBP CFG 2/3", and "99/99/99". Below this, the main area contains three configuration items: "Probe Calibrate:" with a value of "-9999.9" and a unit of "pH"; "Current:" with a value of "-9999.9" and a unit of "pH"; and "Feed Direction:" with a value of "Down". At the bottom left is a yellow "Prev" button, and at the bottom right is a grey "Next" button.

**Probe Calibrate:** If probe has a known value and it differs from current reading, enter the correct value here

**Current:** Current input reading

**Feed Direction:**

- **UP:** When input Value is high on time is decreased
- **DOWN:** When input value is high on time is increased

Figure 11: TBP Configuration Screen 3 (of 3)

The screenshot shows a screen titled "CH1 TBP Config3". At the top, there is a header bar with three sections: "hh:mm AM", "CH1 TBP CFG 1/3", and "99/99/99". The main area of the screen is blue and contains the following elements:

- Flow:** A label followed by a button labeled "Live".
- Live Flow Maximum:** A label followed by a button showing "999.99" and another button labeled "LPM".
- Cycle Time:** A label followed by a button showing "999 sec".
- Navigation:** A yellow "Prev" button at the bottom left and a grey "Next" button at the bottom right.

**Flow: Live**-This uses an analog input #1 to determine the cycle time.

**Live Flow Maximum:** Enter the value of the highest flow (i.e. what 20mA is equal to)

**Cycle Time:** Total turnover time. Only used when Flow is in Cycle mode.

Press NEXT to continue onto the TBP Alarm Setup screen.

## 9.2 TBP Alarm Setup

TBP mode has two alarms:

- High or low pH/ORP input readings
- Exceeding the maximum feeder pump on-time

Settings for these alarms are configured on this screen. This screen is a continuation of the TBP Mode configuration screens (see previous section.)

Figure 12: TBP Alarm Setup Screen

CH1 TBP Alarm

hh:mm AM CH1 TBP ALARM 99/99/99

High Alarm: 999.9 pH

Low Alarm: -999.9 pH

Max On Time Hours: 99:99

Prev Main Menu

**High Alarm:** Set the maximum input reading value which will trigger the high pH/ORP alarm

**Low Alarm:** Set the minimum input reading value which will trigger the low pH/ORP alarm

**Max On Time Hours:** Set the maximum number of hours that the pump can run consecutively. If this maximum time is reached, the pump will turn off and the alarm will have to be manually cleared.

### 9.3 TBP Status Screen

Once the TBP mode is selected and configured via the CH1 Setup screens, the TBP Status screen can be viewed by selecting “CH1 Status” in the Main Menu.

This screen will display the TBP status of the live values as well as notification of any alarms.

To jump to Alarms, press the word Alarm.

Figure 13: TBP Status Screen



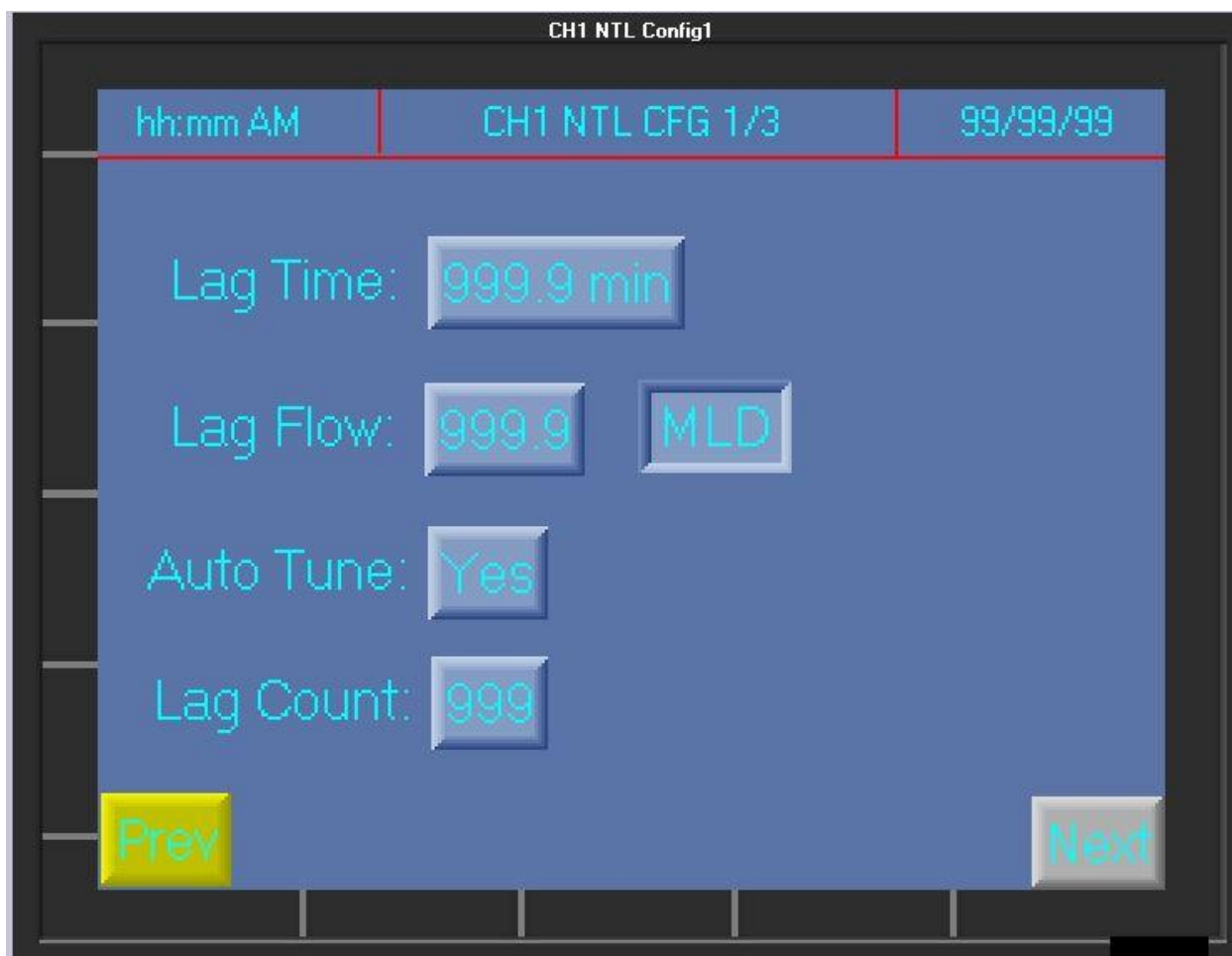
## 10 NTL Mode CH1 / Ch2

### 10.1 NTL Configuration

NTL Configuration is a continuation of the Initialize Configuration screen when the NTL Mode is selected. (See “Initialize Configuration” section.)

NTL Mode is configured via a series of 6 screens: three mode configuration screens and three alarm setup screens. Use the “PREV” and “NEXT” buttons to navigate between the screens.

Figure 14: NTL Mode Configuration Screen 1 (of 3)



**Lag Time:** Input time (in minutes) from chemical injection point to input probe

**Lag Flow:** Flow at the time that Lag Time was measured

**Auto Tune:** This is a Steltec proprietary process. When turned on, this process will self-adjust the sensitivity to make larger or smaller gains depend on the how erratically the input changes.

**Lag Count:** Set how many Lag Time cycles need to pass before Auto Tune makes adjustments.

Figure 15: NTL Mode Configuration Screen 2 (of 3)

The screenshot shows a configuration screen titled "CH1 NTL Config2". At the top, there is a header bar with three sections: "hh:mm AM", "CH1 NTL CFG 2/3", and "99/99/99". Below this, the main area is divided into four rows, each with a label and a value field:

- Deviation Sensitivity:** 999.9 %
- Rate Sensitivity:** 999.9 %
- Min Output Change:** 99.9 %
- Set Point:** -9999.9 pH

At the bottom left, there is a yellow "Prev" button, and at the bottom right, there is a grey "Next" button.

**Deviation Sensitivity:** Adjusts the sensitivity of the reaction to deviations from the set point. (Default setting is 0.1%) This Value is affected by AutoTune.

**Rate Sensitivity:** Reaction to Input curve (Default setting is 0.1%) This Value is affected by Auto Tune

**Min Output Change:** Sets how large of a deviation from set point is allowed before the controller changes the output. (i.e. the "Dead Band")

**Set Point:** Enter the desired Input control value.

Figure 16: NTL Mode Configuration Screen 3 (of 3)

The screenshot shows the 'CH1 NTL Config3' screen with a blue background and white text. At the top, there is a header bar with three sections: 'hh:mm AM', 'CH1 NTL CFG 3/3', and '99/99/99'. Below this, the screen is divided into several rows of configuration parameters. Each row has a label, a numerical input field, and a unit selection button. The parameters are: 'Probe Calibrate' with value '-9999.9' and unit 'pH'; 'Current' with value '-9999.9' and unit 'pH'; 'Feed Type' with value 'Volume' and unit '999.9 %'; 'Max Output' with value '9999.9' and unit 'lph'; and '2nd Point Cal' with value '9999.9' and unit 'lph'. At the bottom left is a yellow 'Prev' button, and at the bottom right is a grey 'Next' button.

Parameter	Value	Unit
Probe Calibrate:	-9999.9	pH
Current:	-9999.9	pH
Feed Type:	Volume	999.9 %
Max Output:	9999.9	lph
2nd Point Cal:	9999.9	lph

**Probe Calibrate:** If the input is a known value and differs from Current, enter the Calibrate value.

**Current:** Current input reading.

**Feed Type (Volume/Weight):** Select the appropriate feeder type

**Volume:** Use this for a liquid feeder.

**Active:** Enter The percent active chemical for feeding liquid.

**Weight:** Use this for a Powder feeder

**Max Output:** Set the Maximum output from the feeder.

**2<sup>nd</sup> Point Cal:** Use this setting if the feeder is running at a known value to calibrate. (Feeder must be running off of the controller's analog output signal.)

Press "NEXT" to continue onto the NTL Alarm Setup screens.

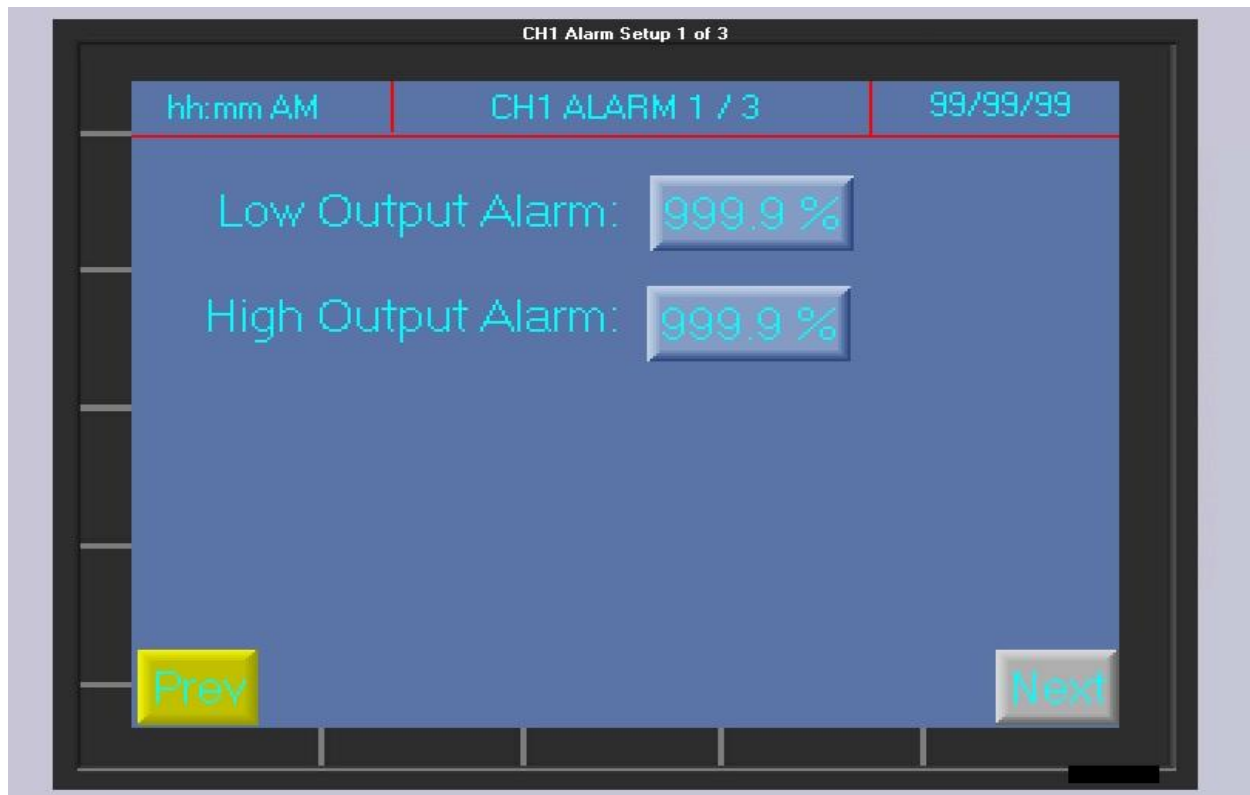
## 10.2 NTL Alarm Setup

There are three alarms for NTL Mode:

- High or Low Feeder Output
- High or Low pH/ORP Reading
- Minimum or Maximum Dosage

Settings for these alarms, including alarm overrides, are configured on the following three screens. These screens are a continuation of the NTL Mode configuration screens (see previous section.) Use the PREV and NEXT buttons to navigate the screens.

**Figure 17: NTL Alarm Setup Screen 1 (of 3) – Feeder Output Alarm Settings**



**Low Output Alarm:** Set the minimum feeder output percentage which will trigger the low output alarm.

**High Output Alarm:** Set the maximum feeder output percentage which will trigger the high output alarm.



Figure 18: NTL Alarm Setup Screen 2 (of 3) – pH/ORP Reading Alarm Settings

CH1 Alarm Setup 2 of 3

hh:mm AM CH1 ALARM 2 / 3 99/99/99

High Alarm: 999.9 pH

Low Alarm: -999.9 pH

Alarm Override: cPPM

High Override: -999.9 % Override

Low Override: -999.9 % Override

Prev Next

120

**High Alarm:** Set the maximum pH/ORP level which will trigger the high pH/ORP alarm.

**Low Alarm:** Set the minimum pH/ORP level which will trigger the low pH/ORP alarm.

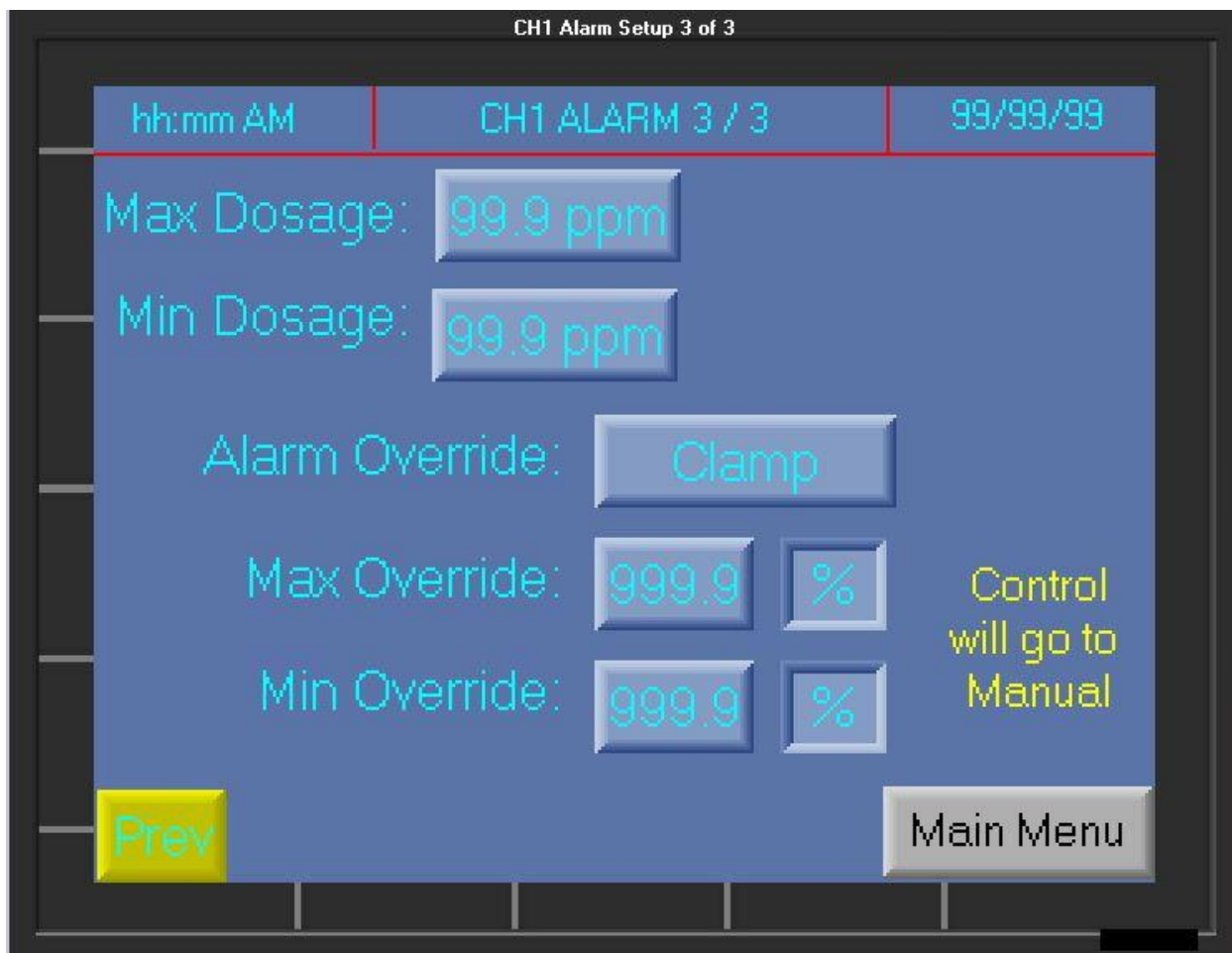
**Alarm Override:** Select whether the controller activates an alarm override mode when a pH/ORP alarm is triggered.

- **Fixed Out %:** When triggered, the controller will set feeder output to a fixed percentage and place controller into Manual. Enter the desired output below percentages below.
- **Alt SP:** Alternate Setpoint. When triggered, the controller will control to a different value until alarm clears. Enter the desired high and low alternate setpoints below.
- **cPPM:** This will control to a cPPm . Will only control to one High or low alarm. Press Override button to chose
- **Disabled:** Alarm will turn on but no override will activate.

**Override Settings:** These fields will change between fixed feeder output percentage (%) or alternate setpoint (pH/mV) depending on the override mode selected.

- **High Override:** Set the override for high alarm.
- **Low Override:** Set the override for low alarm.

Figure 19: NTL Alarm Setup Screen 3 (of 3) – Dosage Alarm Settings



**MAX Dosage:** Set the maximum level dosage the **cPPM** can reach before an alarm is triggered

**MIN Dosage:** Set the minimum level dosage the **cPPM** can reach before an alarm is triggered

**Alarm Override:**

- **Fixed Out %:** When triggered, controller will set feeder output to a fixed percentage until alarm clears. Enter the desired output below percentages below.
- **Clamp:** When triggered, the controller will lock at the minimum or maximum dosage level. The system will come out of clamp once the input value has entered the dead band by the end of Lag time.
- **Disabled:** Alarm will turn on but no override will activate.

**High Override:** Set the fixed percentage override for high alarm.

**Low Override:** Set the fixed percentage override for low alarm.

### 10.3 NTL Status Screen

Once the NTL mode is selected and configured via the CH1 Setup screens, the NTL Status screen can be viewed by selecting “CH1 Status” in the Main Menu.

This screen will display the status of the live values as well as notification of any alarms.

To jump to Alarms, the word ALARM.

Figure 20: NTL Status Screen



## 11 Alarms Status Screens

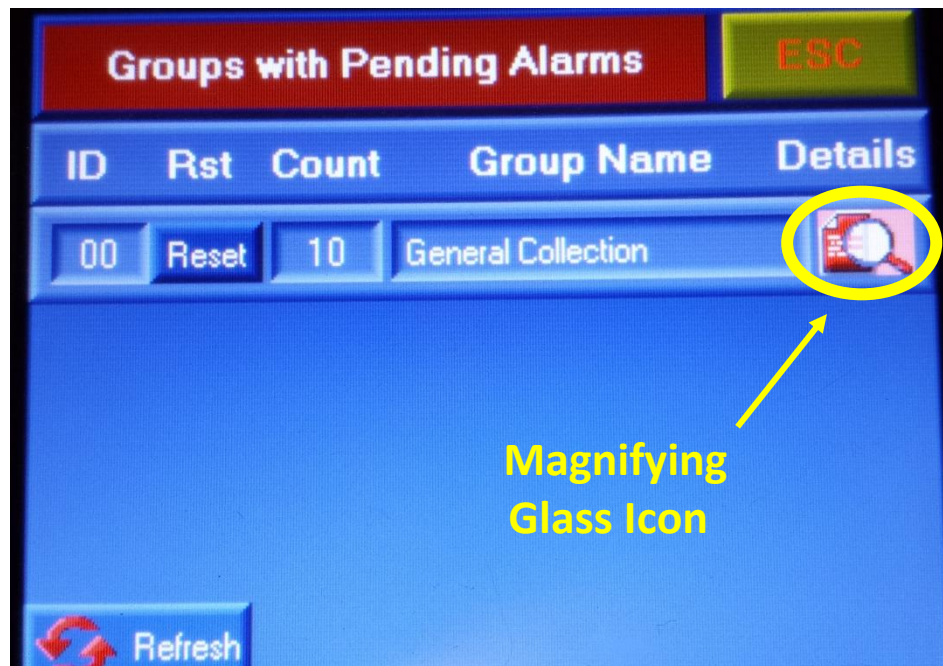
The Alarm Status screens can be accessed by pressing F4 from any screen.

### 11.1 Alarm Status Main Screen

Alarms are indicated by the flashing “ALARM” notice at the top of the Main Menu and Status screens. To check the source of an alarm, go to the Alarm Status Main Screen by pressing F4.

If there are no active alarms, this screen will be blank.

Figure 21: Alarm Status Main Screen



**Count:** Displays the number of active alarms.

**Reset:** Resets the count of active alarms. {Not currently in use}

**Group Name:** Will always display as “General Collection”

**[Red magnifying glass icon]:** Displays details on any active alarms – opens the Alarms in Group Status screen.

**ESC:** Return to Main Menu

**Refresh:** Refreshes the Alarm Status Main screen {Not currently in use}

## 11.2 Alarms in Group Status Screen

The Alarms in Group Status screen displays any active alarms. This screen is used to view any ongoing alarm notices and access the Alarm Details screen (if an alarm needs to be acknowledged.)

Figure 22: Alarms in Group Status Screen



**ID:** The identification code for the alarm

**Time On:** Indicates the time the alarm started. Alarms are sorted from earliest to latest Time On.

**Ack:** Displays the acknowledgement status of the alarm. ***Alarms are acknowledged by going to the Alarm Details screen via the Magnifying glass icon.***

- **[Blank]:** Alarm does not need to be acknowledged. The alarm notice will disappear automatically once the condition has cleared.
- **N:** Alarm needs to be acknowledged, but has not been yet. The alarm notice will not disappear until acknowledged, even if the condition has cleared.
- **Y:** Alarm has been acknowledged, but is ongoing. The alarm notice will disappear once the condition clears.

**Alarm Name:** Displays the name of the alarm. See next section for alarm descriptions.

**[Red Magnifying Glass Icon]:** Press to go to the Details screen of the individual alarm to acknowledge it.

**ESC:** Returns to the Alarm Status Main Screen

**Refresh:** Manually refreshes the Alarm notices. [Note: screen will automatically refresh when an alarm condition clears.]

### 11.3 Alarm Details Screen

{NEED SCREENSHOT}

### 11.4 Alarm Descriptions

The following is a list of possible alarms. Note that some alarms need to be manually acknowledged on the Alarm Details Screen before the alarm notice will clear.

#### Alarms requiring manual acknowledgement

- **Loss of Flow IN#1:** Indicates that the analog signal from the flow meter #1 has fallen below the 4 mA threshold. If the signal was lost abruptly, the controller will go into override mode using the last good reading.\*
- **Loss of Flow IN#2:** Indicates that the analog signal from the flow meter #2 has fallen below the 4 mA threshold. If the signal was lost abruptly, the controller will use the last good reading. \*
- **LOSS OF INPUT #1:** Input pH/ORP Probe signal has been lost. \*
- **Data Write Fail:** Error writing to SD Card.

*\* Override will hold the last value for 30 minutes then switch to Manual Mode. If the condition clears within 30 minutes, while in Override, the system will return to Auto Mode. If the condition clears after 30 minutes, while in Manual Mode, the operator will need to manually switch the system back to Auto Mode (see Section 6: Manual Mode).*

#### Alarms that will clear automatically (no acknowledgement needed)

- **CH1 / CH2 High pH/ORP (INPUT):** Input Value on pH/ORP is too high
- **CH1 / CH2 Low pH/ORP (INPUT):** Input Value on pH/ORP is too low
- **CH1 / CH2 High Dosage:** Feeder output exceeded High limit
- **Ch1 / CH2 Low Dosage:** Feeder output fell below minimum output

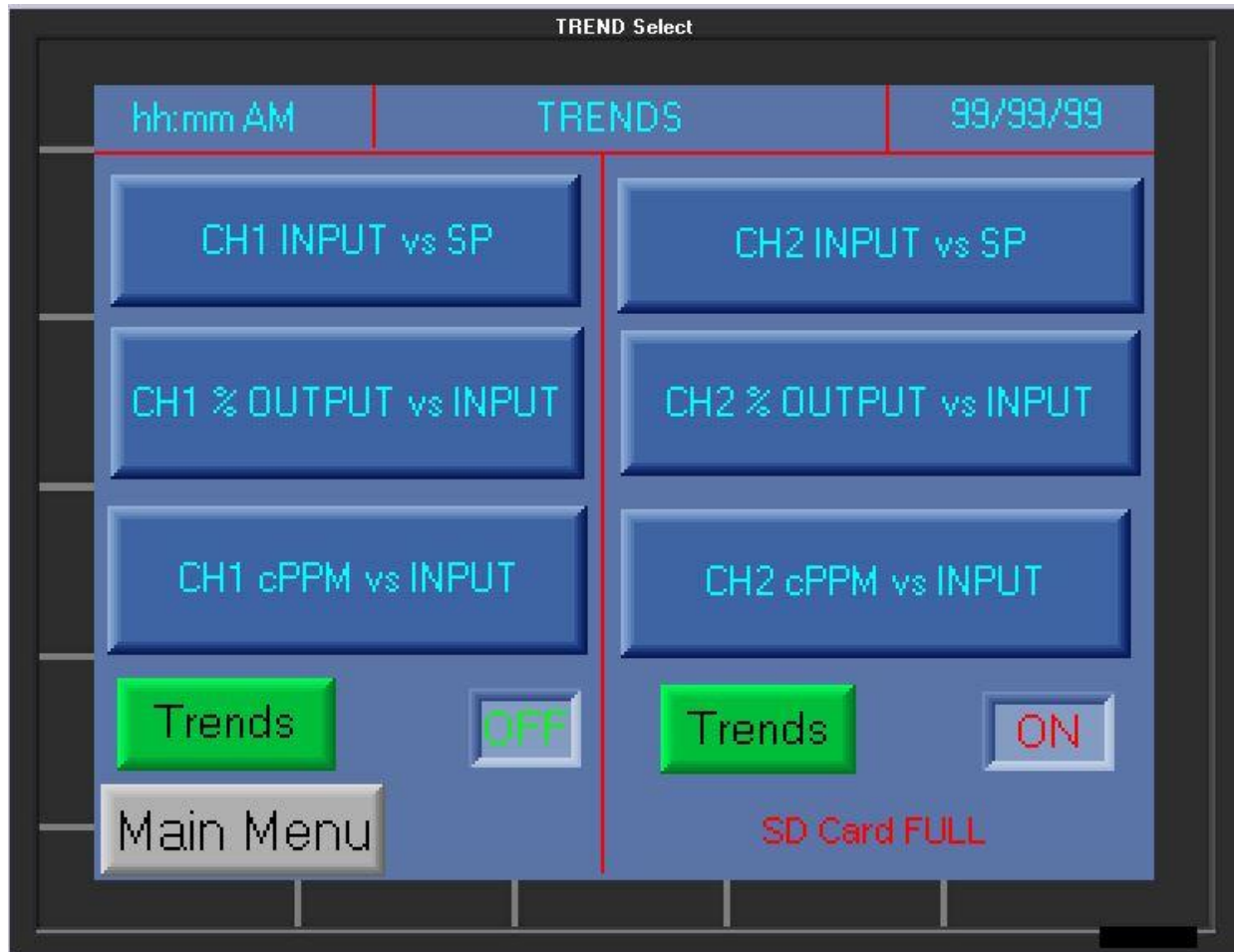




## 12 Trends Function

### 12.1 Trends Menu Screen

Figure 23: Trends Menu Screen

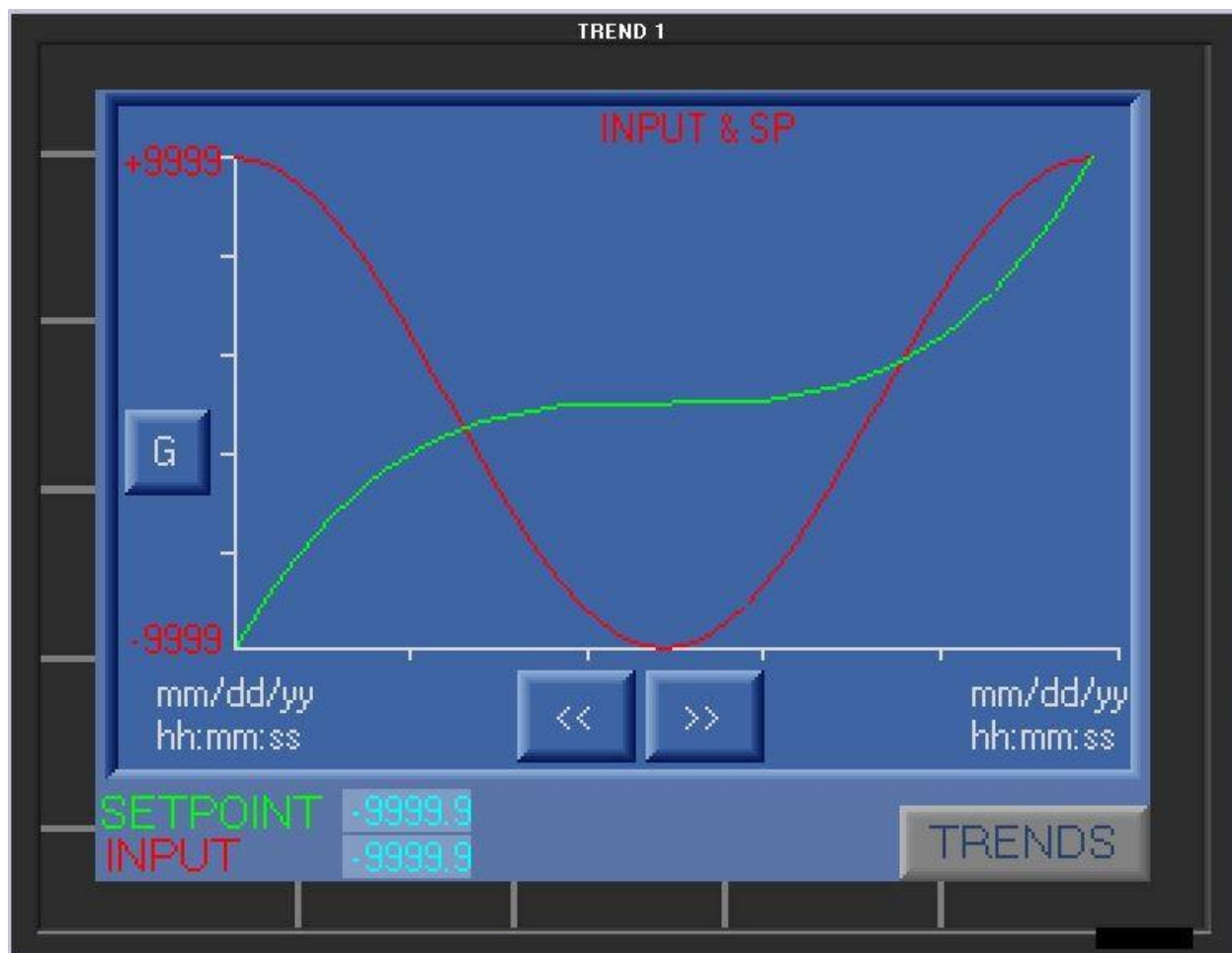


**F1:** Will turn the trending features on and off. IF turned off no trending data will be stored



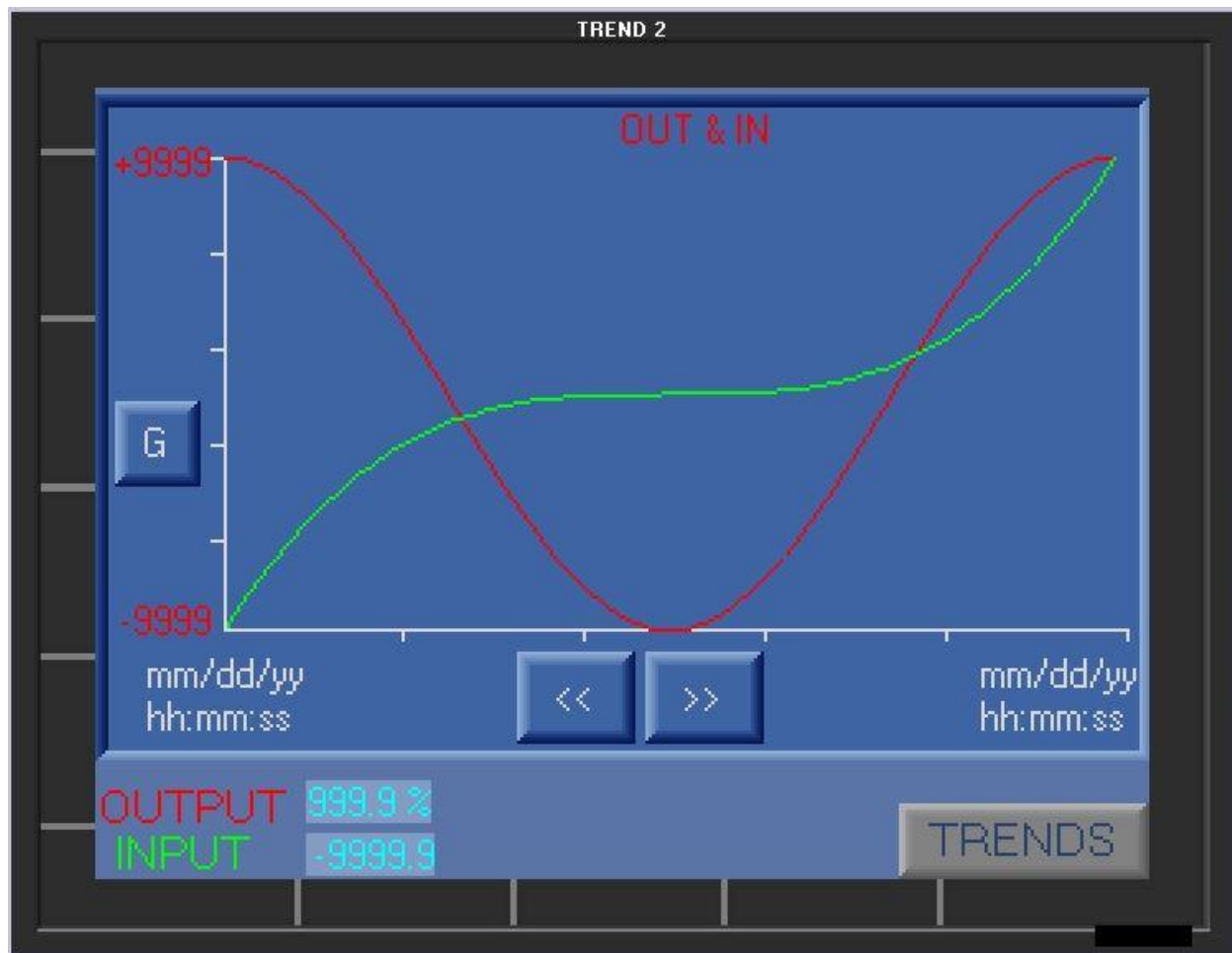
## 12.2 Trends – Input vs. Setpoint Screen

Figure 24: Trends - Input vs. Setpoint Screen



## 12.3 Trends – Output vs. Input

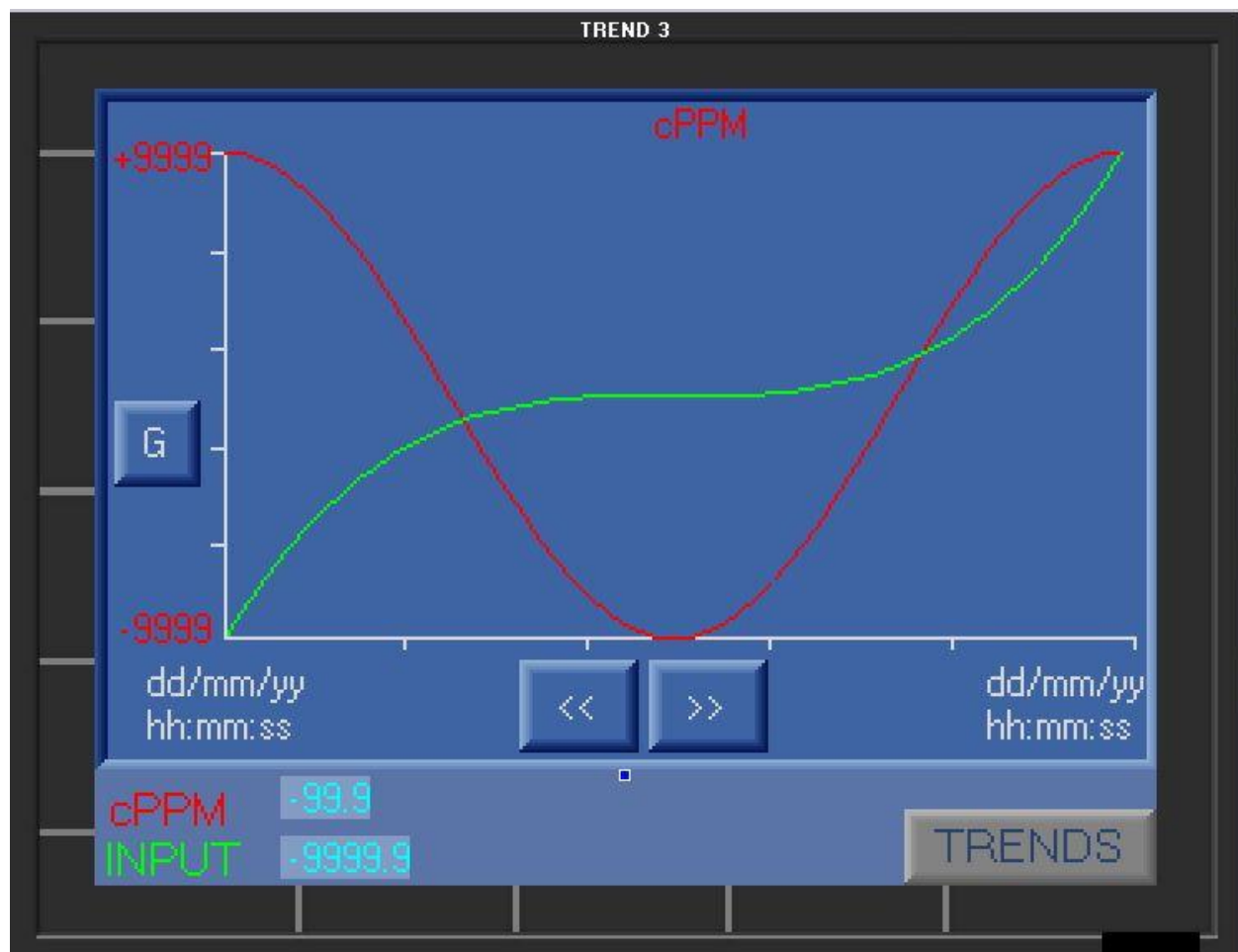
Figure 25: Trends - Output vs. Input Screen



Touch the Y axis to change the scaling value.

## 12.4 Trends – cPPM vs. Input

Figure 26: Trends - PPM vs. Input Screen

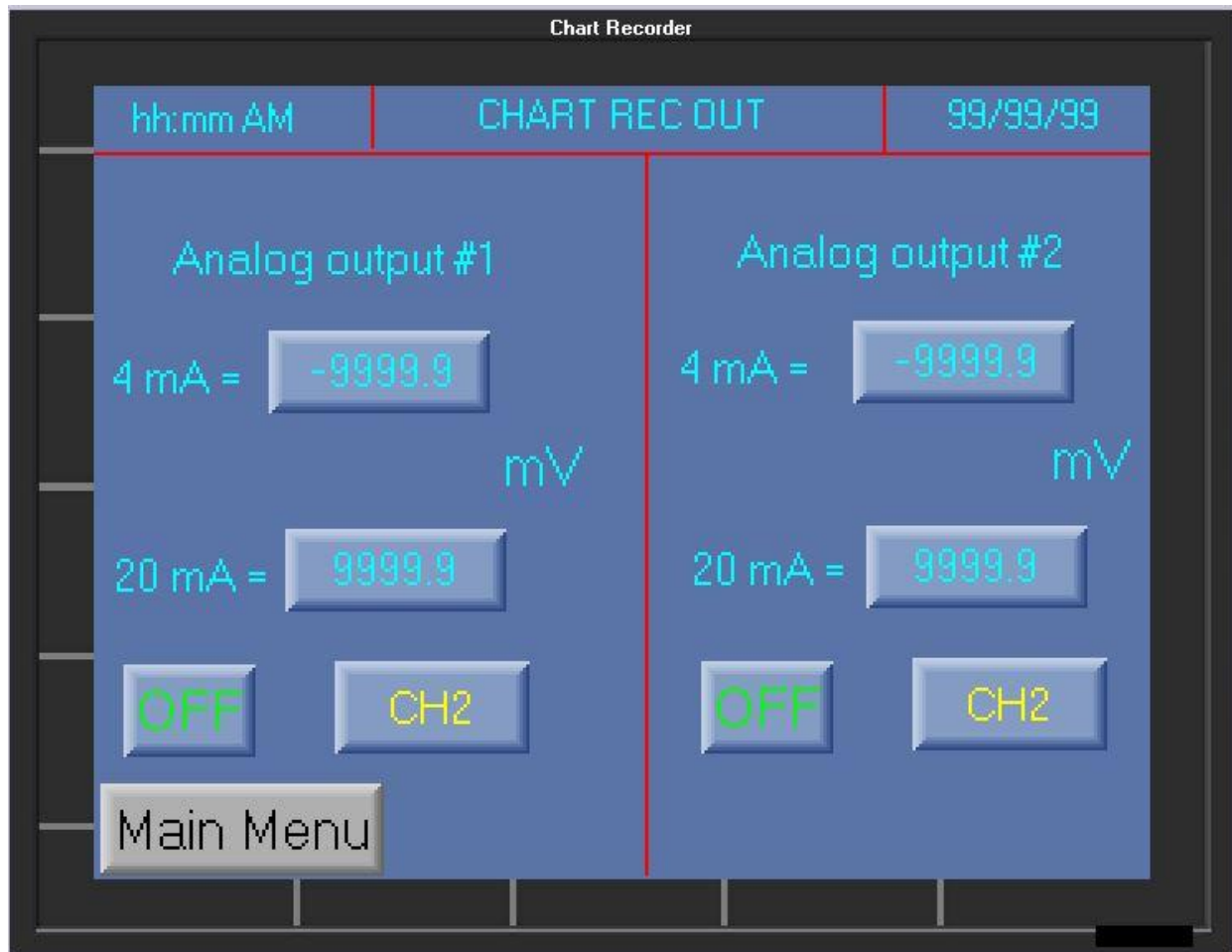


Touch the Y axis to change the scaling value.

## 13 Chart Recorder

The Chart Recorder feature records the sensor input values over time. Analog output #2 can be used to feed into a Chart Recorder or Remote PLC.

Figure 27: Chart Recorder Screen



**ON/OFF:** Turns this feature on or off

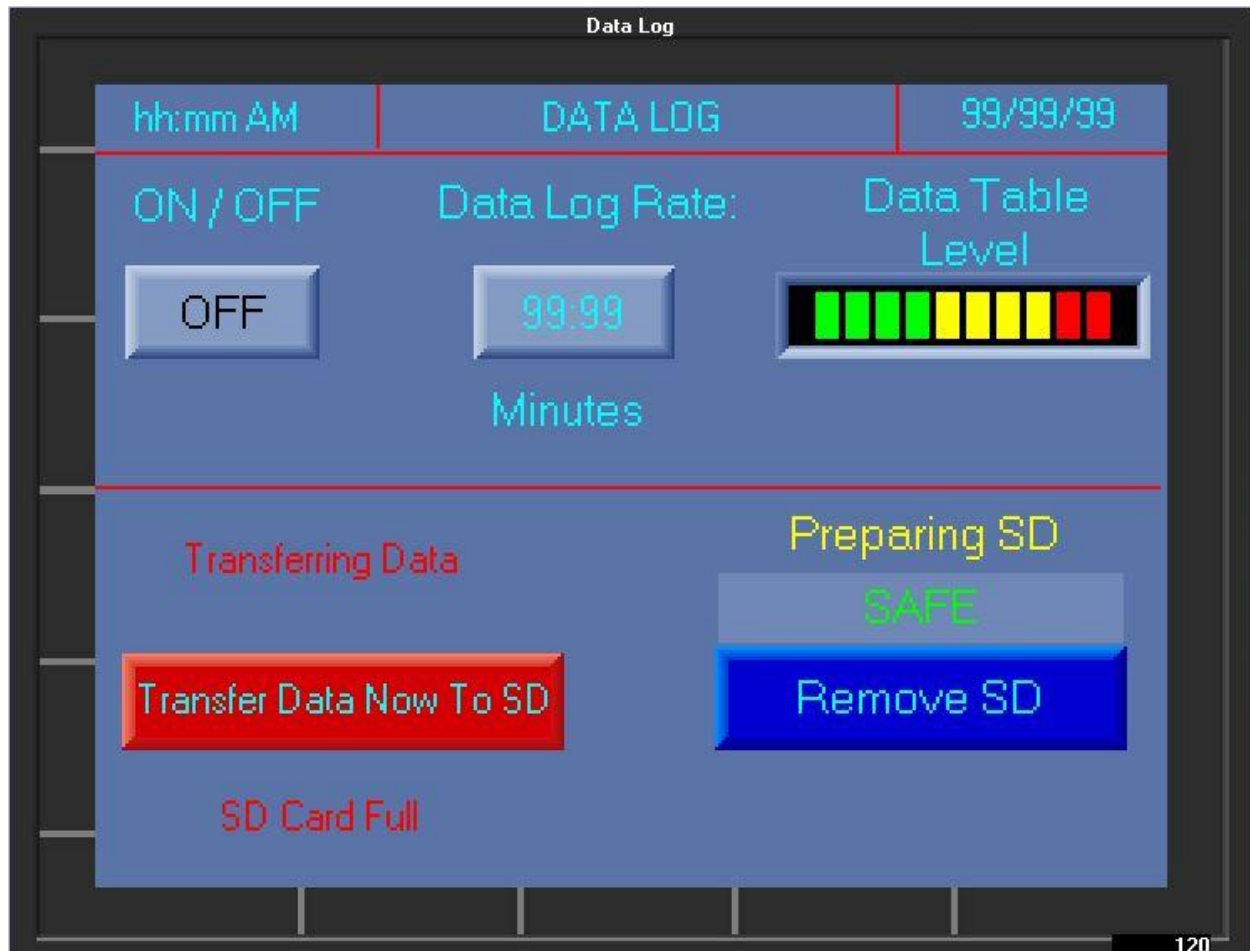
**Chart Calibration:** Customizes the minimum and maximum values of the Chart Recorder (4 mA and 20 mA) to the usual mV range of your application

- **4mA:** Set to the minimum value that 4mA will equal
- **20mA:** Set to the maximum value that 20mA will equal.
- **CH:** Picks which channel IS outputted on that analog.

## 14 Data Log

The Data Log feature records a wide range of readings over time, and stores them internally. Data is then transferred to the SD card for further use. This transfer is done automatically at midnight each day, or can be done manually at any time.

Figure 28: Data Log Screen



**ON/OFF:** Enables or disables the data logging feature as well as SD card back up.

**Data Log Rate:** Set how often data will be logged in minutes. Minimum is one minute.

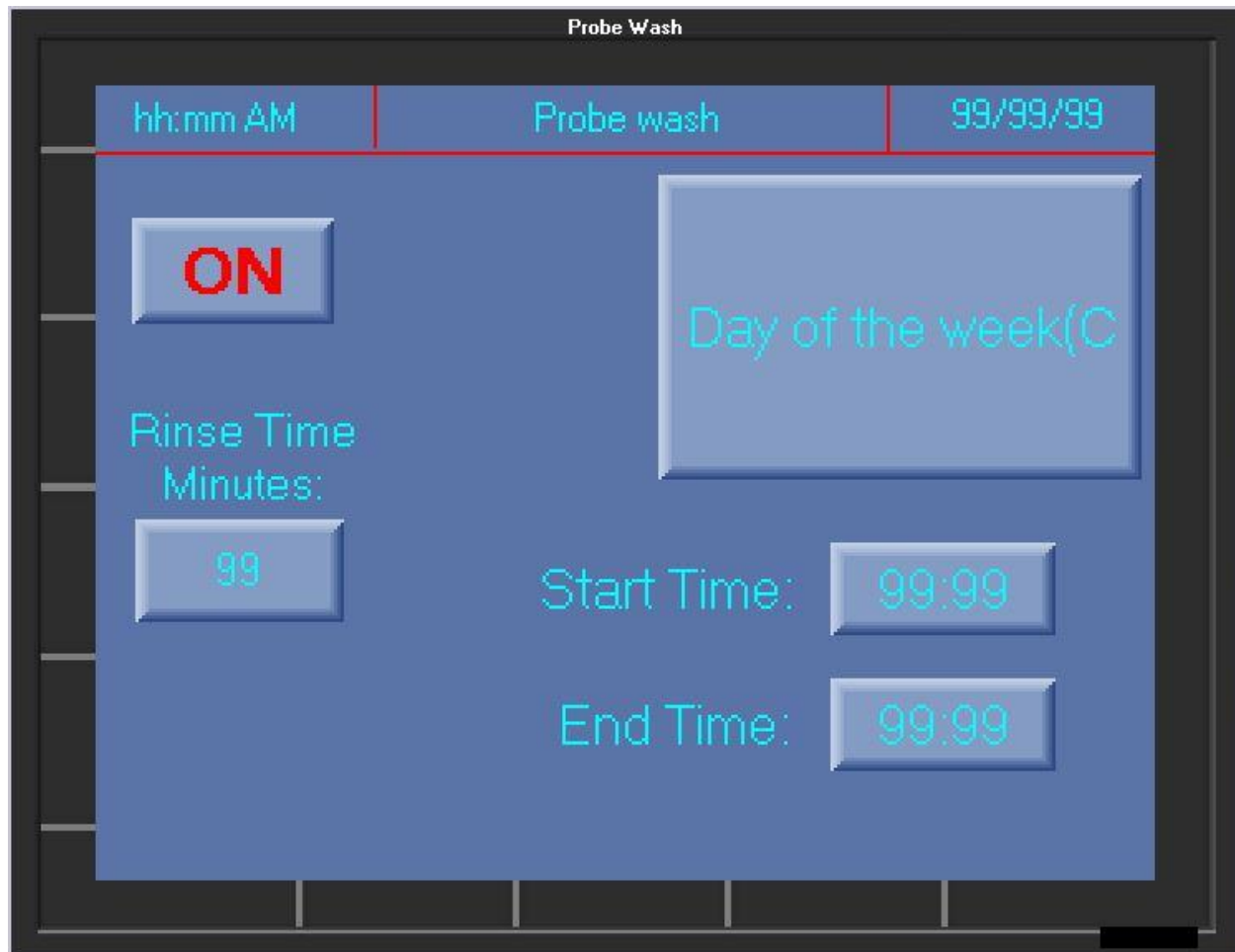
**Data Table Level:** Indicates how full the data table is. Once the data table is full, the Data Log will stop recording.

**Transfer Data Now to SD:** Begins a manual transfer of the data to the SD card.

**Remove SD:** Use this function to remove the SD Card. It will stop the Data Log from trying to write to the SD Card. **DO NOT REMOVE THE SD CARD UNTIL THE WORD “SAFE” IS DISPLAYED.** This function will reset when a formatted SD card is re-inserted.

## 15 Automated Probe Wash Settings

Figure 29: Probe Wash Settings Screen



**ON / OFF:** Turns the automated probe wash feature on or off

**Rinse Time:** Set how long the cleaning agent pump will run

**Day of the week:** Select the day or days the Probe Wash will run

**Start Time:** Set the start time for the Probe Wash

**End Time:** Set the end time for the Probe Wash. Allow time for probe to re-stabilize.

When Probe wash is running the Input value will be locked at the last reading prior to the Start time.

