



Atlantis Emulsion Polymer Makedown Systems
Part Numbers: A-1550-__ - __

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Atlantis Emulsion Polymer Systems Instruction Manual

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System Overview

The Atlantis **A-15500** line of polymer systems are built to order and can be configured with various tank sizes, polymer pumps, and solution pumps. Standard tank sizes are 20, 40, 90, and 185 gallons. All tanks come integrated with the system and are mounted on the back side of the welded HDPE skid. The EM-20 system can be configured with one on-skid solution pump while the larger systems can be configured with up to two on-skid solution pumps. A plugged drain port is included with every system and can be used as the inlet to a secondary solution pump skid.

Every system comes standard with a 4" color touchscreen control panel, an ultrasonic water flow meter, a submersible pressure sensor for tank level measurement, a solution tank mixer, a water solenoid valve, a high viscosity neat polymer pump, and the Atlantis exclusive polymer eductor / water flow control valve. The entire system comes pre-piped and pre-wired. The system also comes with a remote system enable, remote solution pump enable, and remote alarm status contacts for use with the customer DCS.

When in operation, the level control system will keep the made down polymer solution between two level set points using a submersible pressure level sensor that continuously monitors the tank level. Makedown is accomplished by turning on the neat polymer pump and the water solenoid when the level drops below the Low Tank Level Control set point. When the level reaches the High Tank Level Control set point, the polymer pump is turned off and the water solenoid valve remains on for the user programmed Wash-Out Time to allow the polymer solution to be rinsed from the makedown piping. After makedown completion the solution mixer will run for the user programmed Post-Makedown Mixer Time. The system is also equipped with an ultrasonic water flow sensor that allows the system to make down solution proportionately and ensures that there is water flow during the makedown process.

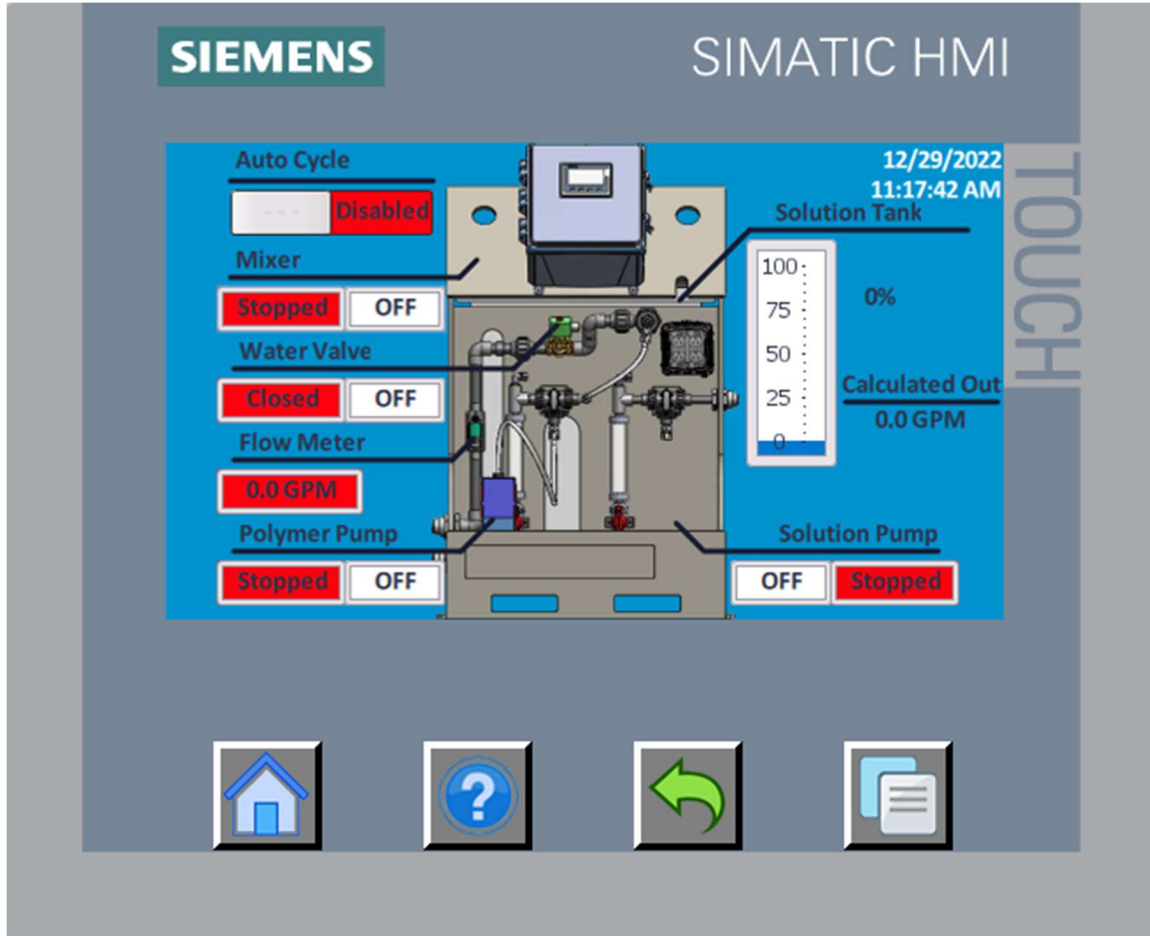
A diluted polymer solution ranging in concentration from approximately 0.1 to 2.0% may be aged in the solution tank. The system uses the water flow meter to accurately dose the neat polymer proportionately into the water stream. The solution can then be fed to the process using the solution feed pump. The polymer system can makedown polymers with viscosities up to 10,000 CPS.

Installation Requirements

The **A-15500** polymer system should be installed in a location where it will not be exposed to excessive heat or cold. Normal temperatures should be between 32°F and 110°F. Power can be provided by any 115VAC, 15-amp outlet.

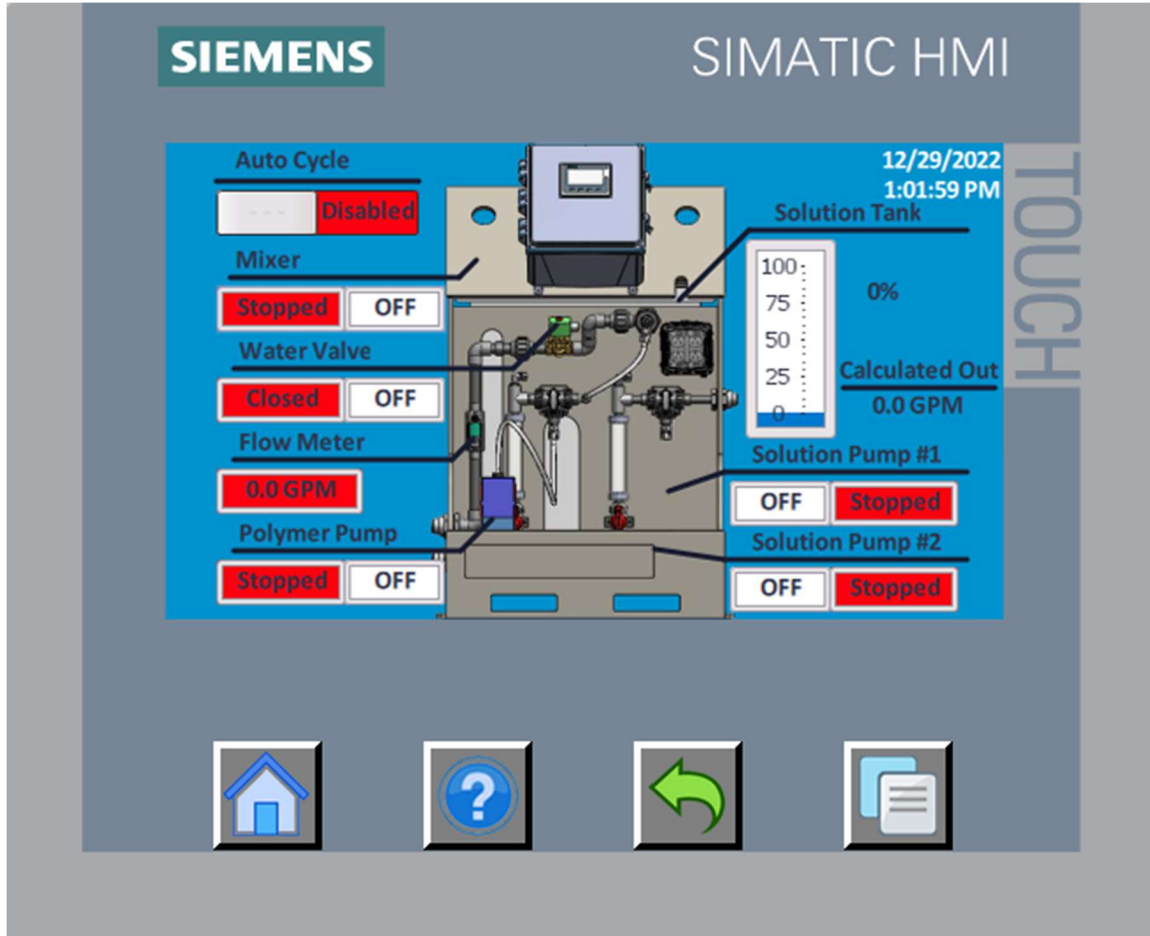
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System Overview Screen



The System Overview screen is the default screen on the EM system. This screen can be accessed by pressing the HOME button on the keypad at any time. The display provides an indication of the tank level, water flow rate, and the status of each of the system's components. The component's status is shown in RED when not running and GREEN when in use. The current operating mode of the component is shown in white. The mode of each component can be changed to HAND, OFF, or AUTO by pressing the white box and selecting the desired mode. The Auto Cycle Enable Switch allows for the Running of the Makedown process.

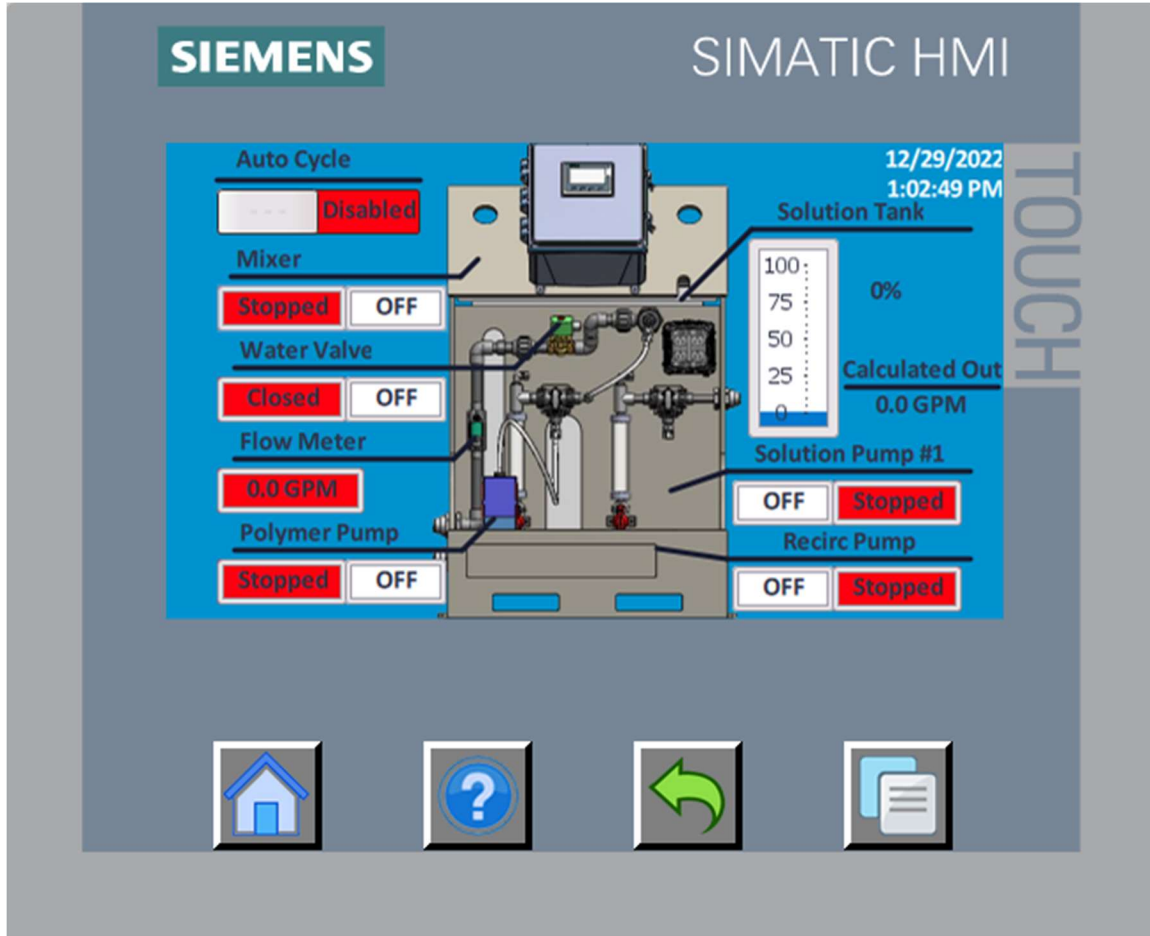
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System Overview Screen with Solution Pump #2 Selected



A second, Auxiliary Output, can be setup on the Parameters Screen. This System Overview Screen is changed to allow for control of a Second Solution Pump if this option has been selected on the Parameters Screen.

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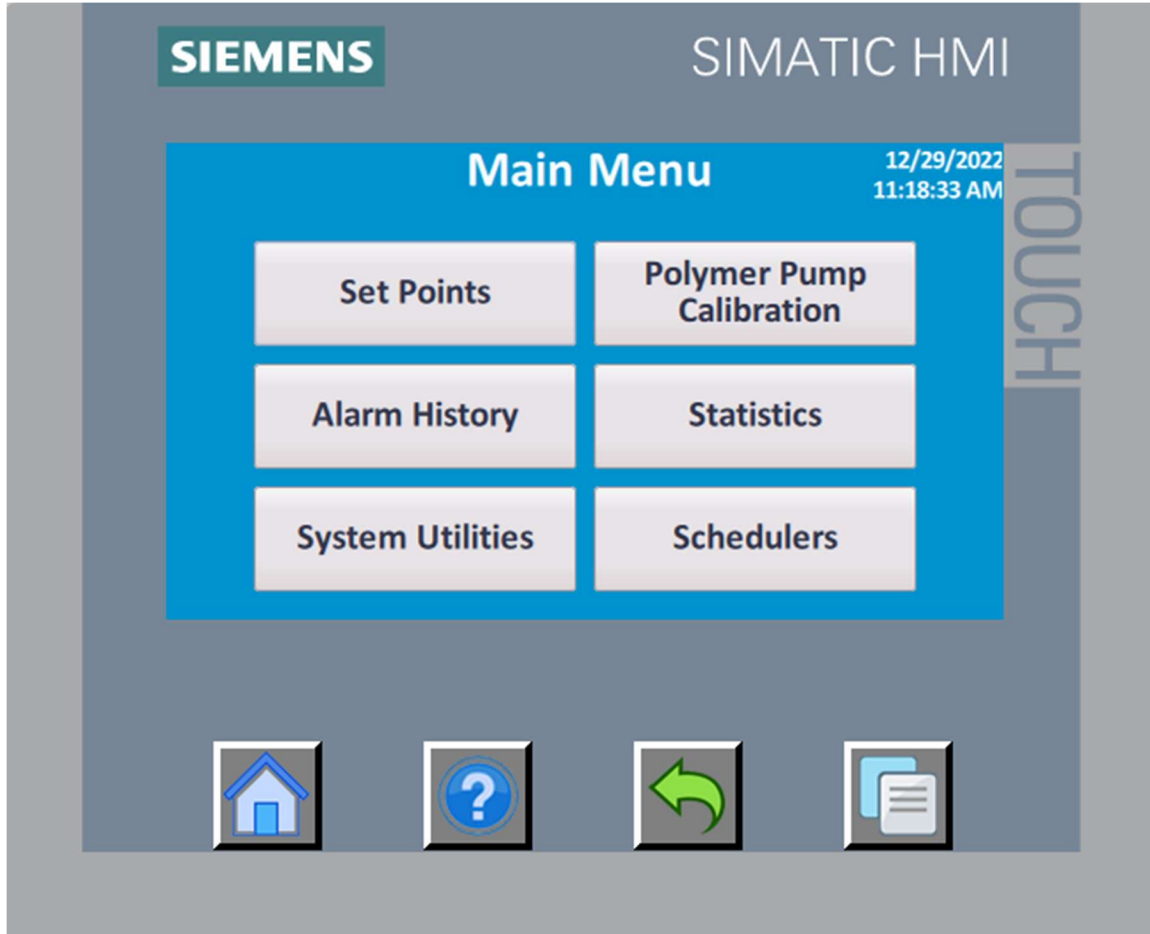
System Overview Screen with Recirc Pump Selected



A second, Auxiliary Output, can be setup on the Parameters Screen. This System Overview Screen is changed to allow for control of a Recirculation Pump if this option has been selected on the Parameters Screen.

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Main Menu



The Main Menu can be accessed by pressing the three-lined menu button on the keypad. This menu allows the user to access the various system screens.

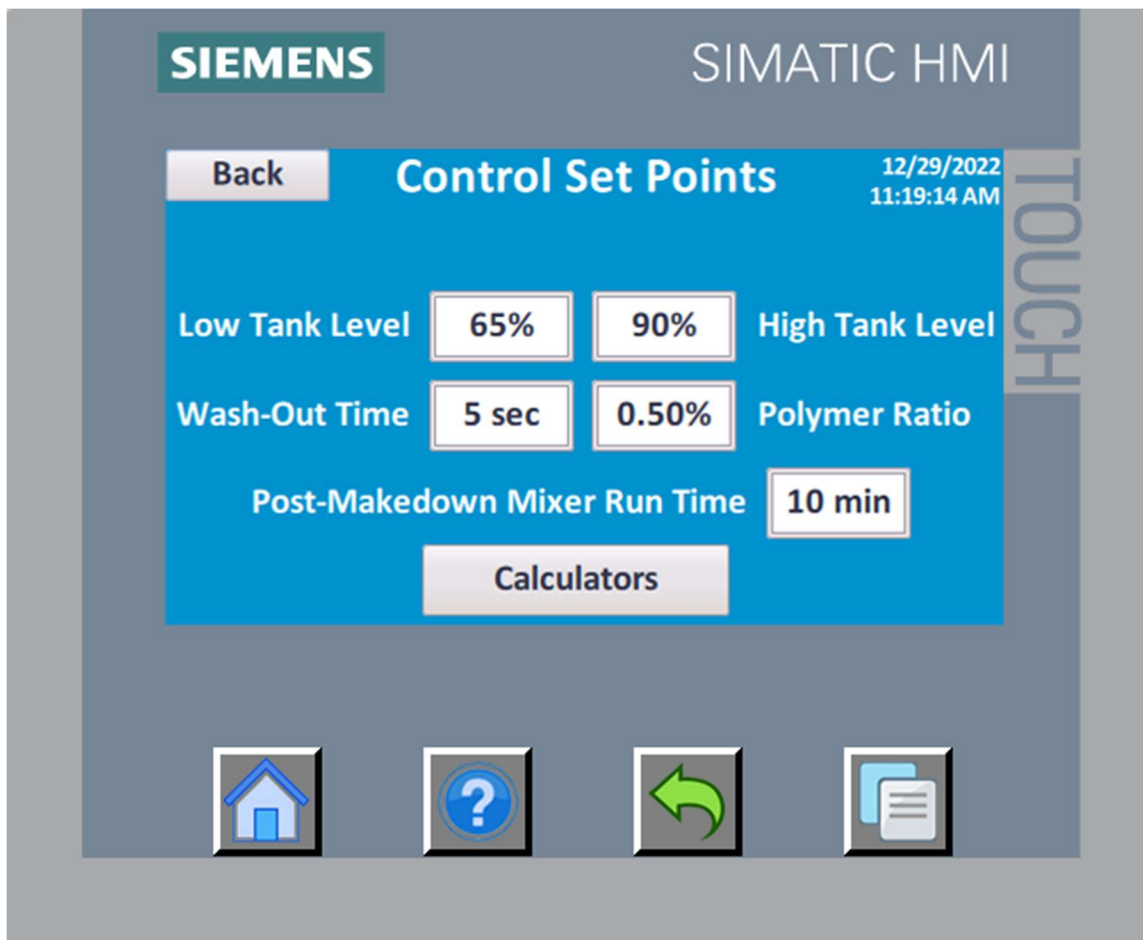
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Setpoints Menu



The Setpoints Menu Screen is a navigation screen that allows you to move to either the control or alarm setpoints screens.

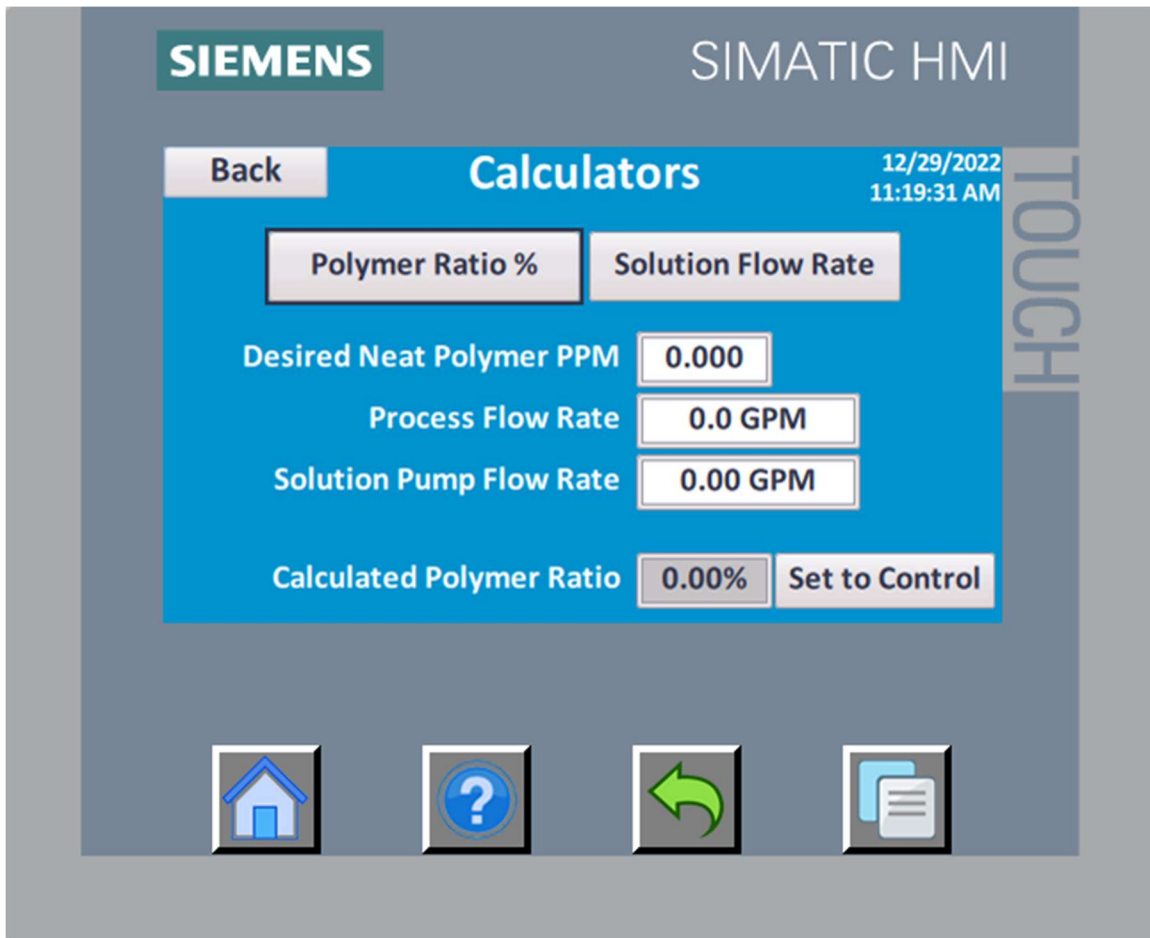
Control Set Points



The Control Set Points screen allows the user to modify the set points that control the makedown process. During automatic system operation the tank level is maintained between the Low Tank and High Tank Level Control Set Points. When the measured tank level falls below the Low Tank Level Control Set Point the water valve will open and the polymer pump will begin to run. Polymer will be proportionately fed into the water stream until the High Tank Level Control Set Point is reached. It is recommended that the Low Tank Level Control Set Point is kept at a value higher than 55%. This will make the aging more consistent. It will also ensure that the suction piping for the solution pump will always be flooded. The Wash-Out Time is the amount of time in seconds that the water solenoid valve will remain open after a Makedown cycle has completed. The wash-out is used to flush the piping clear of any polymer. The Polymer Ratio is the ratio of neat polymer to water. The Post-Makedown Mixer Time is the amount of time in minutes that the solution mixer will run after a Makedown cycle has completed. The mixer also runs during a Makedown cycle. On the Bottom of the Screen is a button to take you to the Automatic Calculators for the System.

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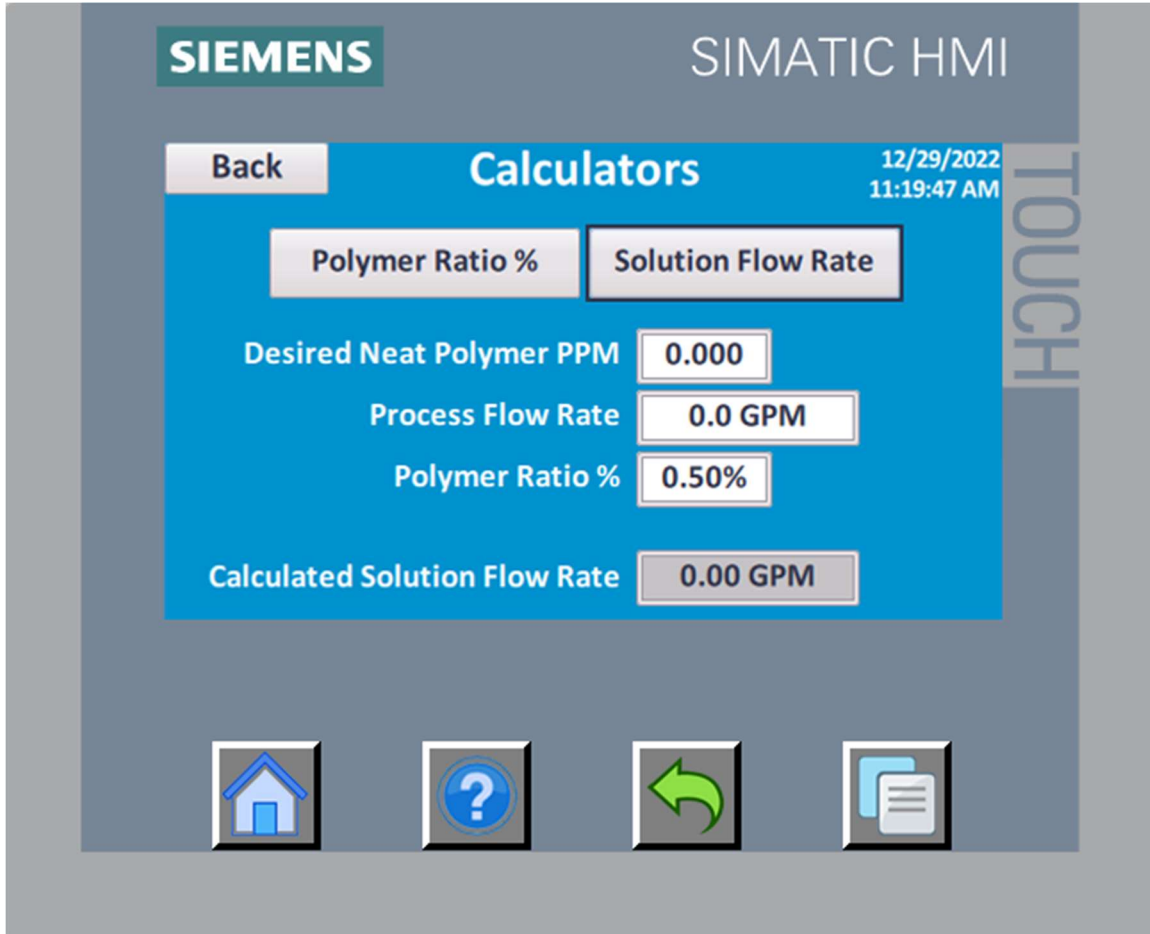
Calculators – Polymer Ratio %



The built-in system calculators can be used to calculate and set the desired polymer ratio. After entering the required variables the system will calculate the polymer ratio need to hit the Desired Neat Polymer PPM. The Set to Control button can then be pressed to store the calculated value to the control value.

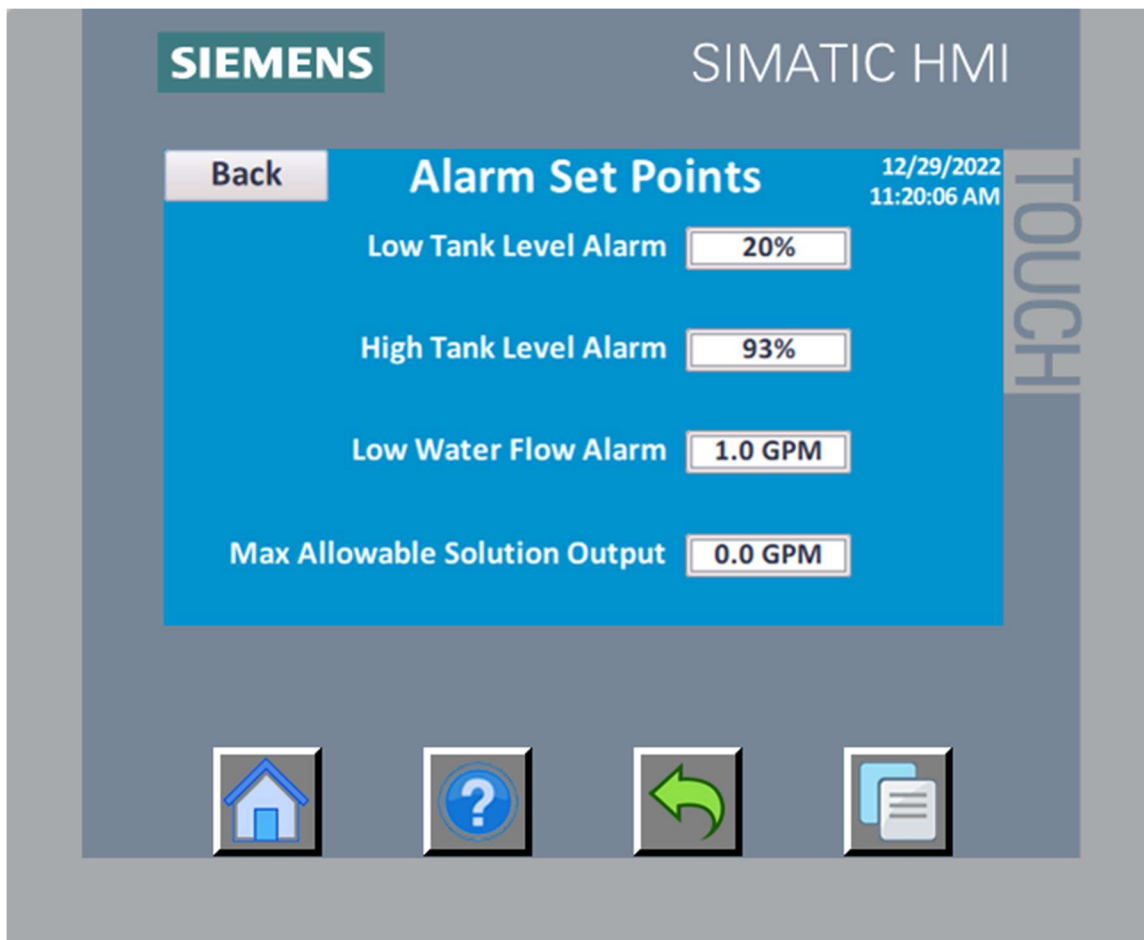
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Calculators – Solution Flow Rate



Inversely to the Polymer Ratio % calculator, the Solution Flow Rate calculator can be used to show the required solution flow rate to hit the Desired Neat Polymer PPM value based on a set Polymer Ratio %.

Alarm Set Points



There are four alarm set points that can be adjusted by the user. The High and Low Tank Level Control Set Points are used to indicate to the user that the tank is not within the normal limits of operation. A Low Water Flow Alarm activates when the water flow rate during makedown falls below the Low Water Flow Alarm Set Point. The Max Allowable Solution Output Setpoint allows for you to enter the Maximum expected GPM output of the system. If the Maximum expected output is detected for a set amount of time, the system will stop the Makedown process and Alarm.

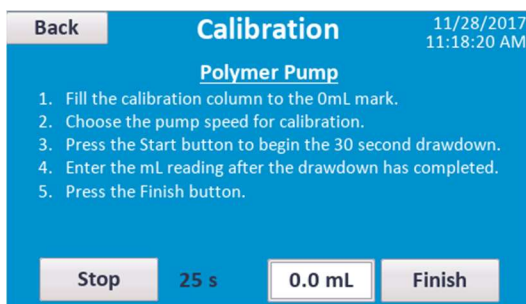
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Calibration – Polymer Pump

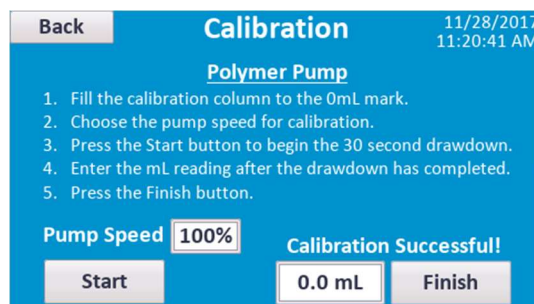


A 30-second drawdown is used to calibrate the neat polymer pump. There is a calibration column installed on the suction side of the neat polymer pump. Before calibrating the polymer pump the calibration column must be filled to the 0mL top line. Once filled the user selects the drawdown pump speed and then presses the 'Start' button. The pump will turn on at the set rate and run for 30 seconds. After the 30 second timer finishes the user can either cancel the calibration or enter the mL volume pumped and press the finish button.

Calibration Timer in Progress



Calibration Successful



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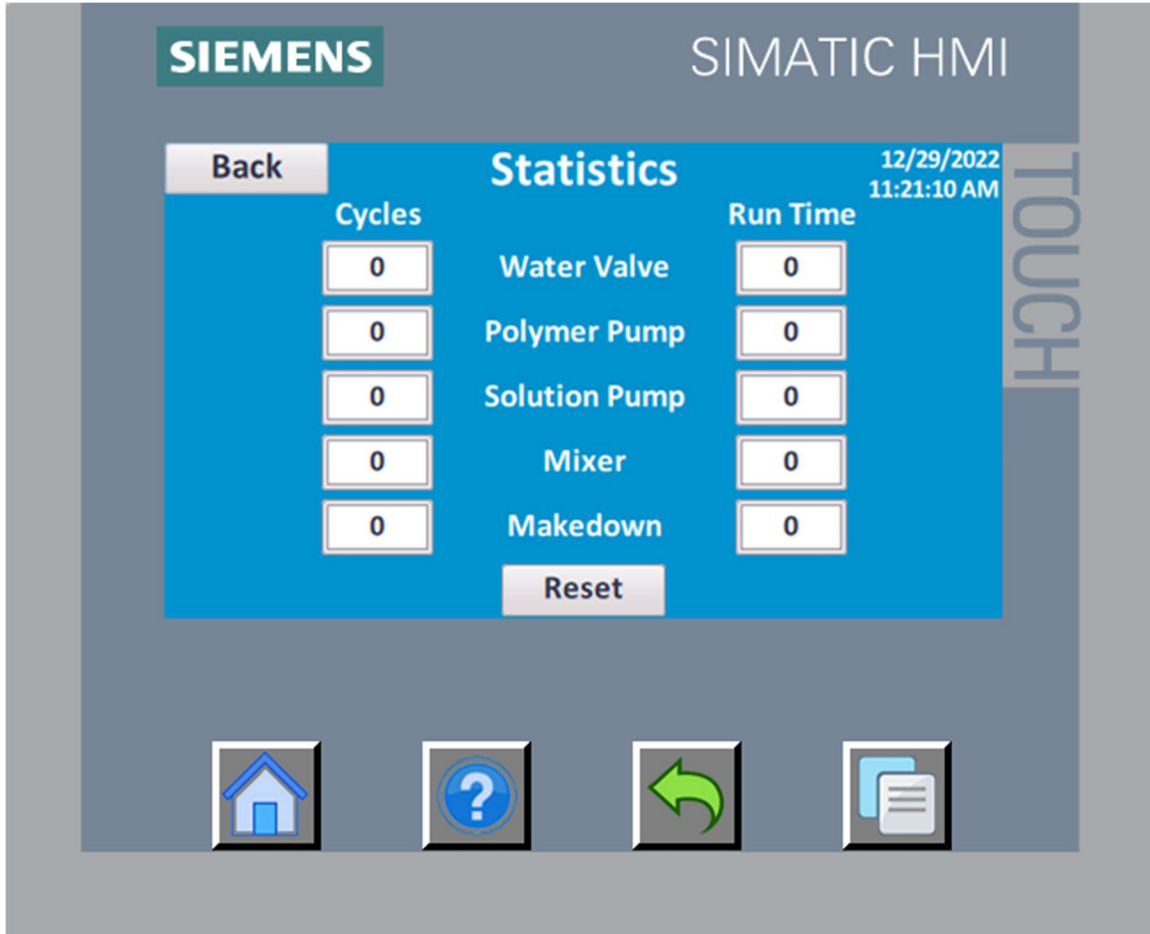
Alarm History



The Alarm History screen can then be selected from the Main Menu screen. This screen shows the time and date that each alarm became active.

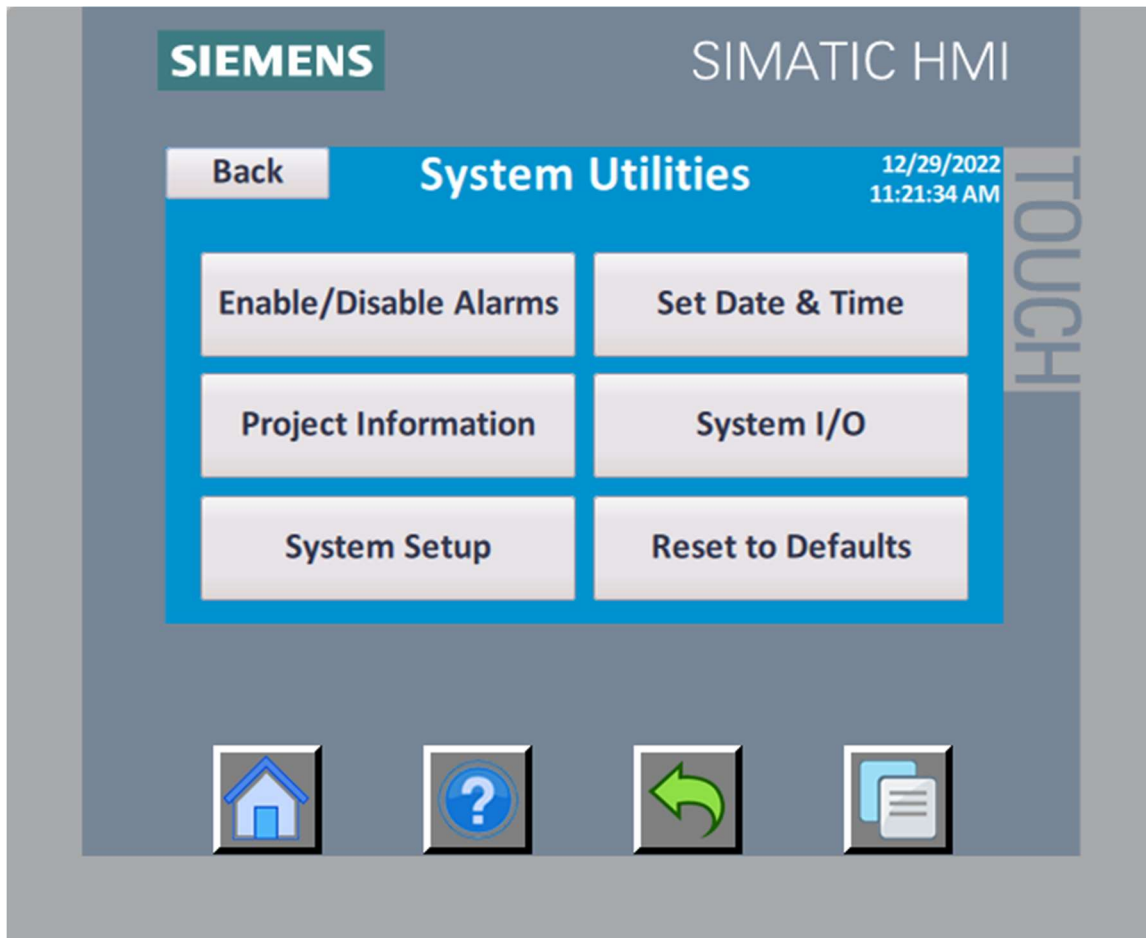
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Statistics



The statistics screen shows the cycles (left) and run time (right) in hours that each component has run. The statistics can be reset by pressing the reset button and confirming the reset prompt.

System Utilities



The system utilities screen allows the user access to various system functions. The rest of the system utility screens are shown on the following pages.

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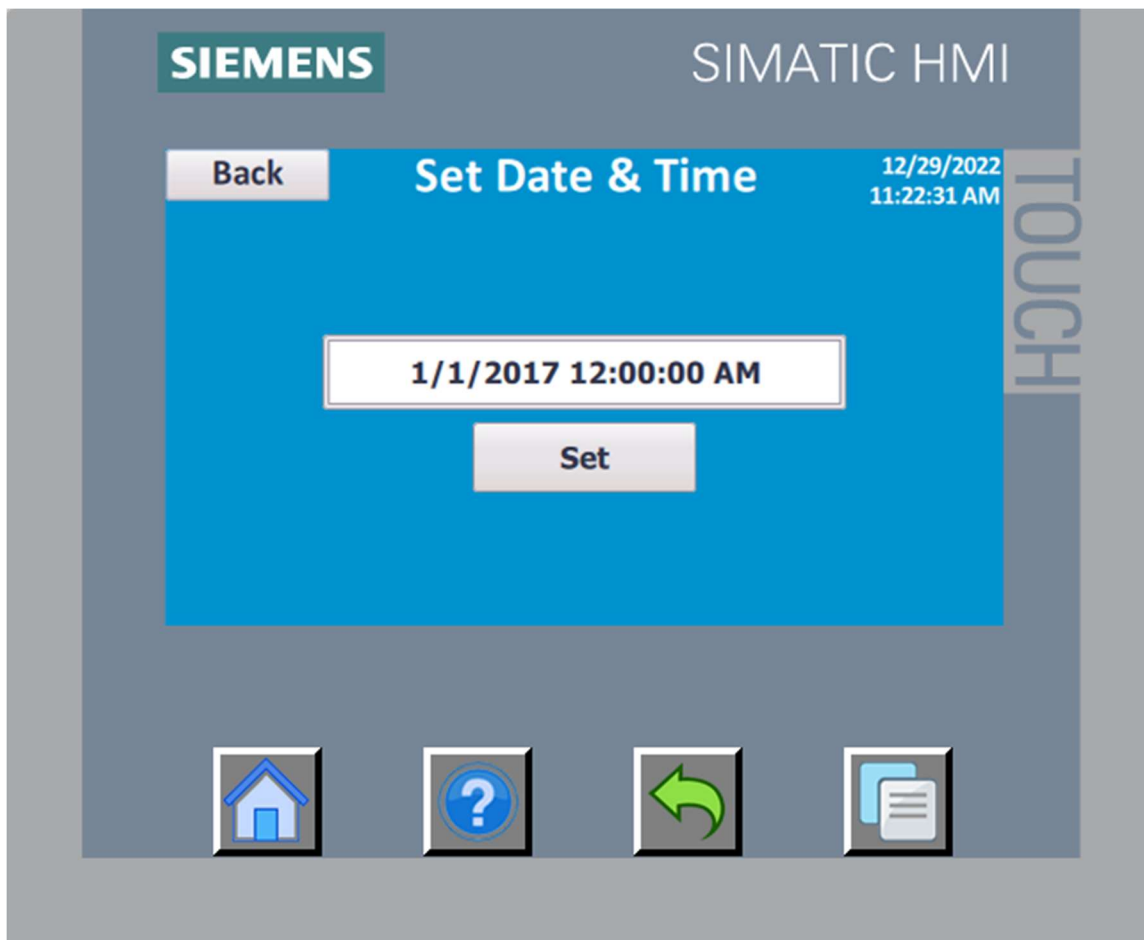
Enable/Disable Alarms



Each of the system alarms is able to be deactivated by the user. All alarms are activated by default. Press the On/Off switch to toggle the status of the alarm activation.

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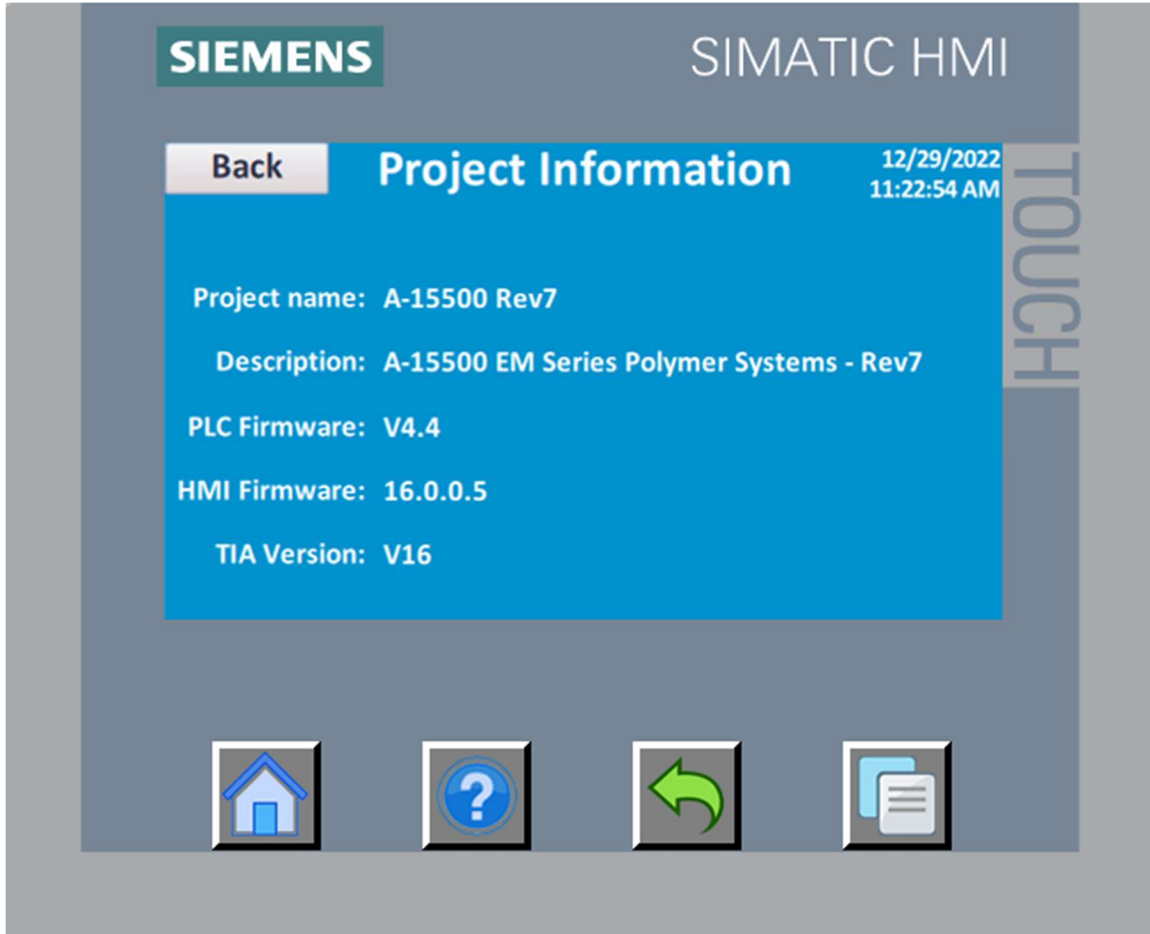
Set Date & Time



Press the date/time entry box to enter the current date and time. The data and time must be entered in the exact format shown on the screen above. The best way to do this is to use the arrow keys on the numerical entry screen to navigate to the numbers that need to be changed. Then use the backspace to delete the number.

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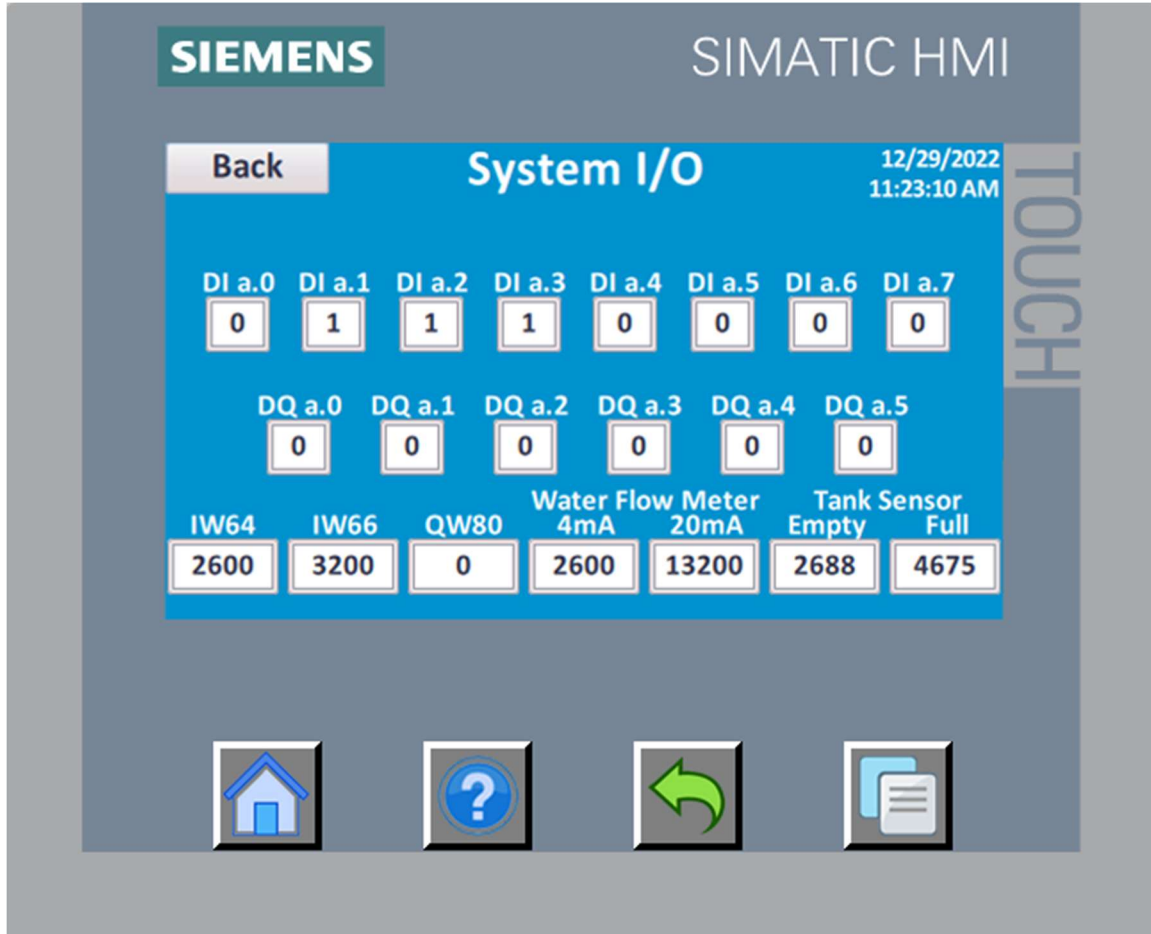
Project Information



The project information screen shows the current revision number and firmware version of the PLC. This is helpful to know if there is a new revision to the software and during troubleshooting.

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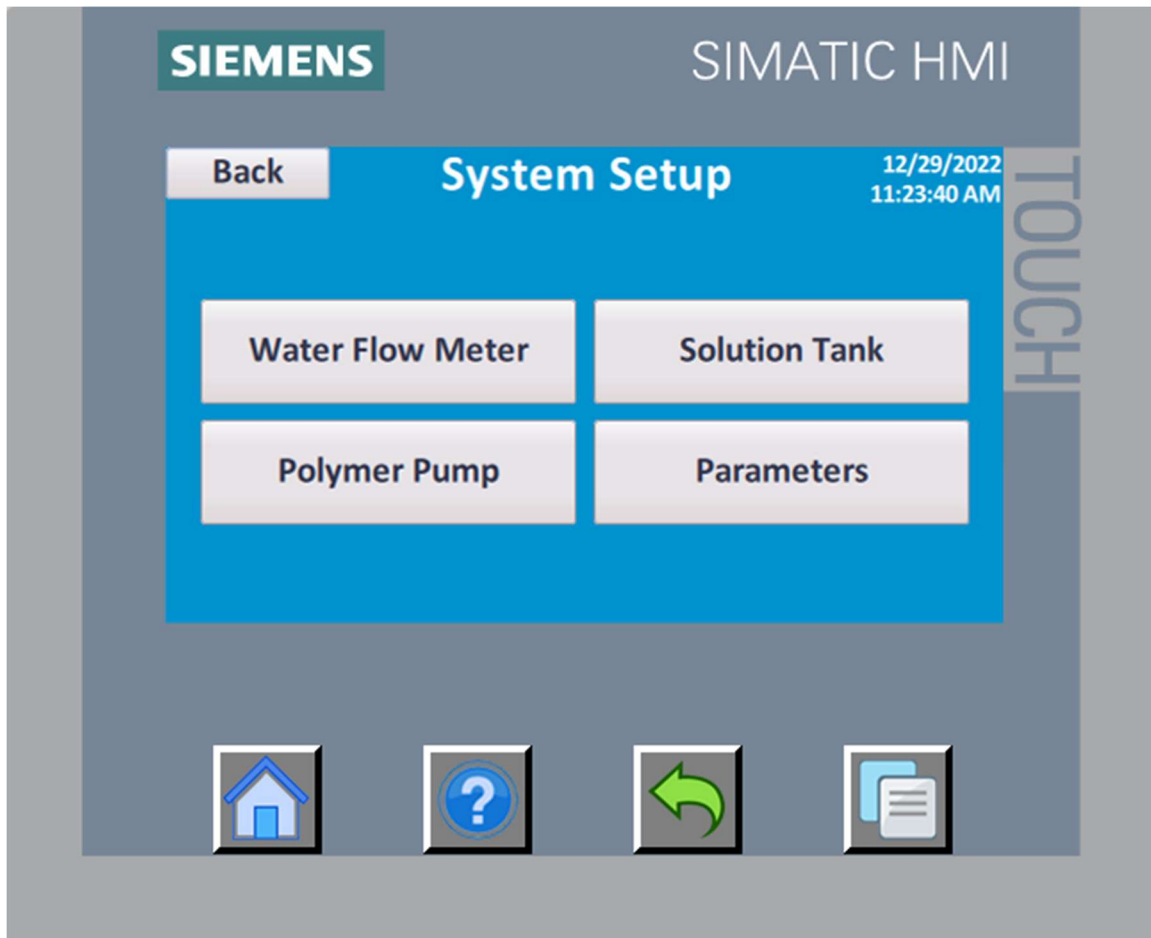
System I/O



The raw system inputs and outputs are shown on the System I/O screen. This screen is helpful when troubleshooting the system.

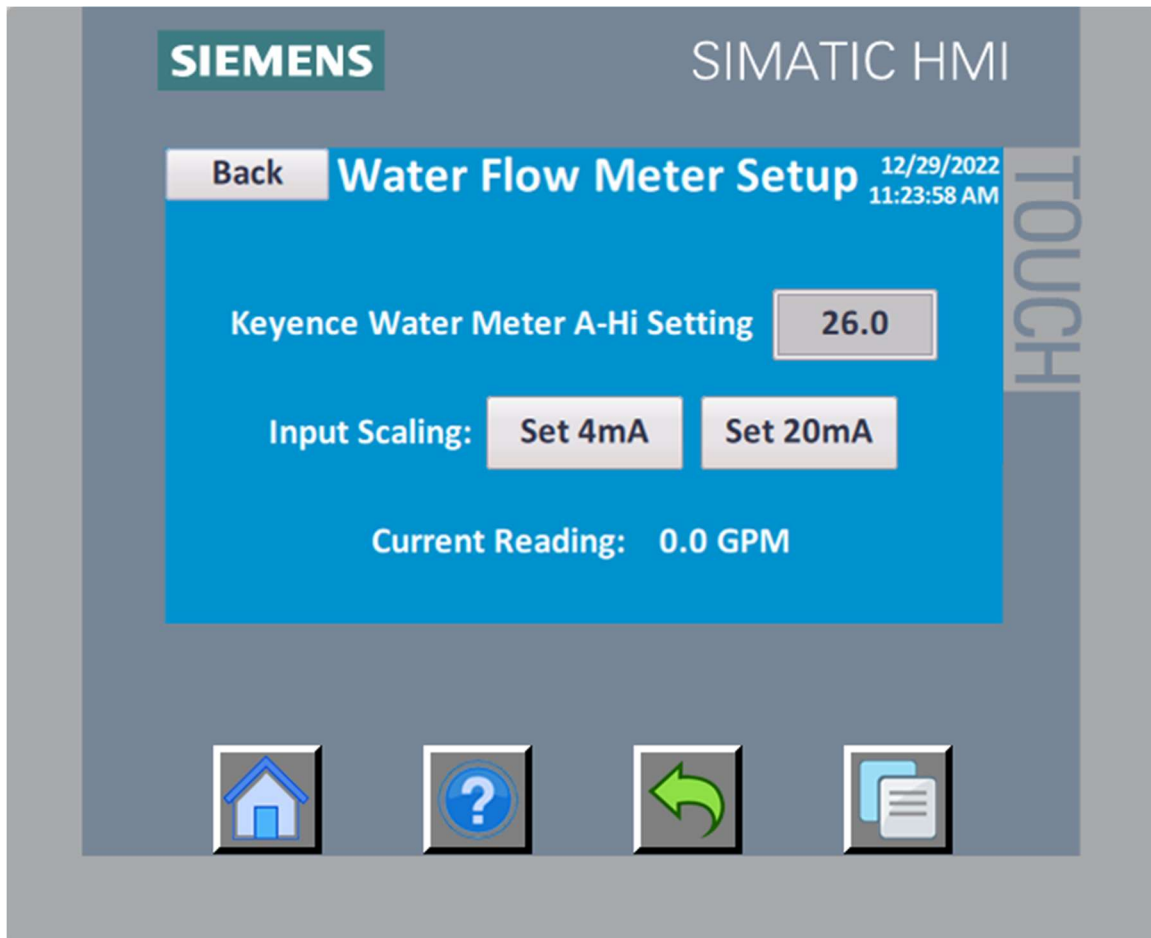
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System Setup Menu



The System Setup Screen is a navigation screen that allows you to move to either the Water Flow Meter Setup Screen, the Solution Tank Setup Screen, the Polymer Pump Setup Screen, or the Parameters Screen.

Water Flow Meter Setup



The Water Flow Meter's 20mA (A-Hi) value can be setup here. If the water flow meter value on screen does not match the value shown on the meter, then the Set 4mA and Set 20mA buttons can be used to scale the input.

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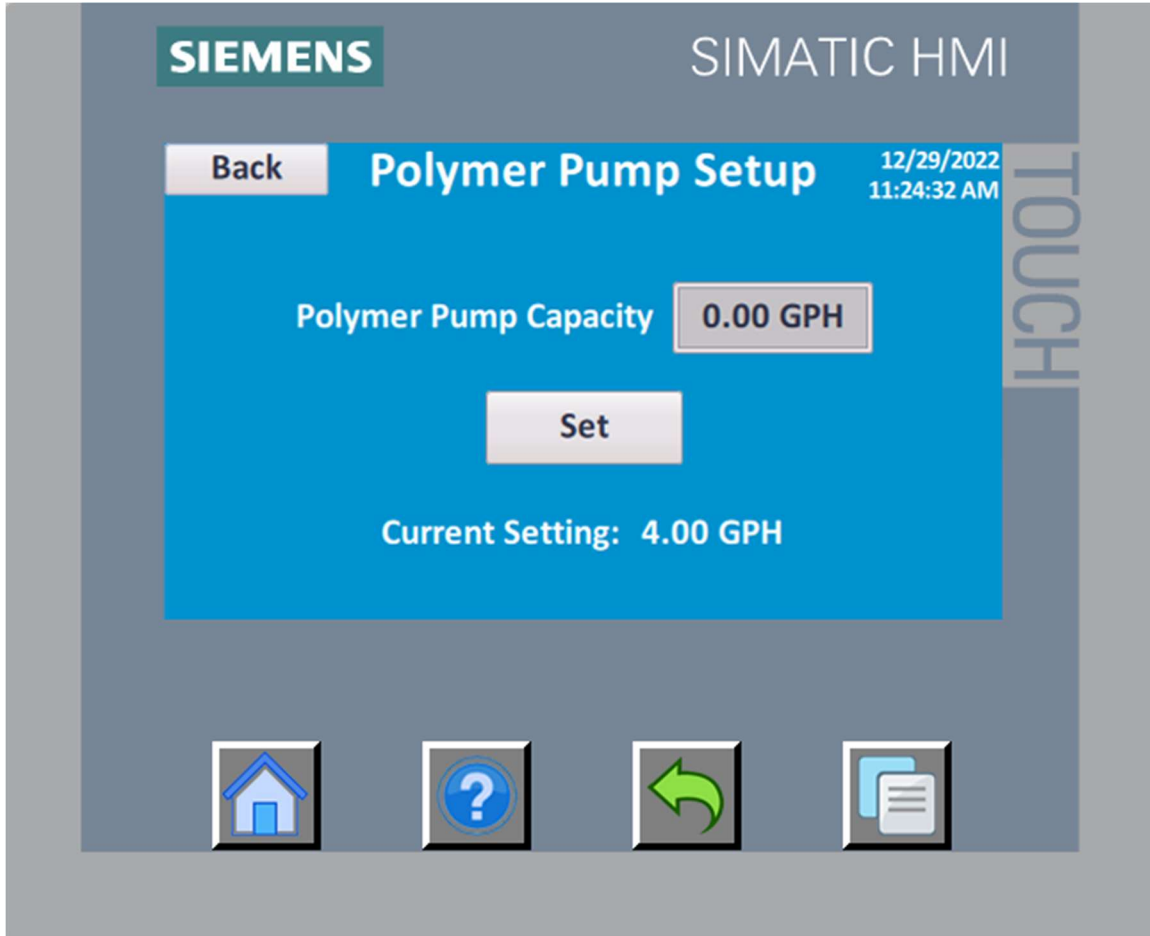
Solution Tank Setup



The solution tank uses a submersible pressure sensor to measure the height of liquid in the tank. If the tank level value on screen does not match the level in the tank then, then the Set 4mA and Set 20mA buttons can be used to scale the input. The correct volume at the 100% fill height must also be entered. The volume is used to calculate how much liquid it should take to fill the tank during each makedown cycle.

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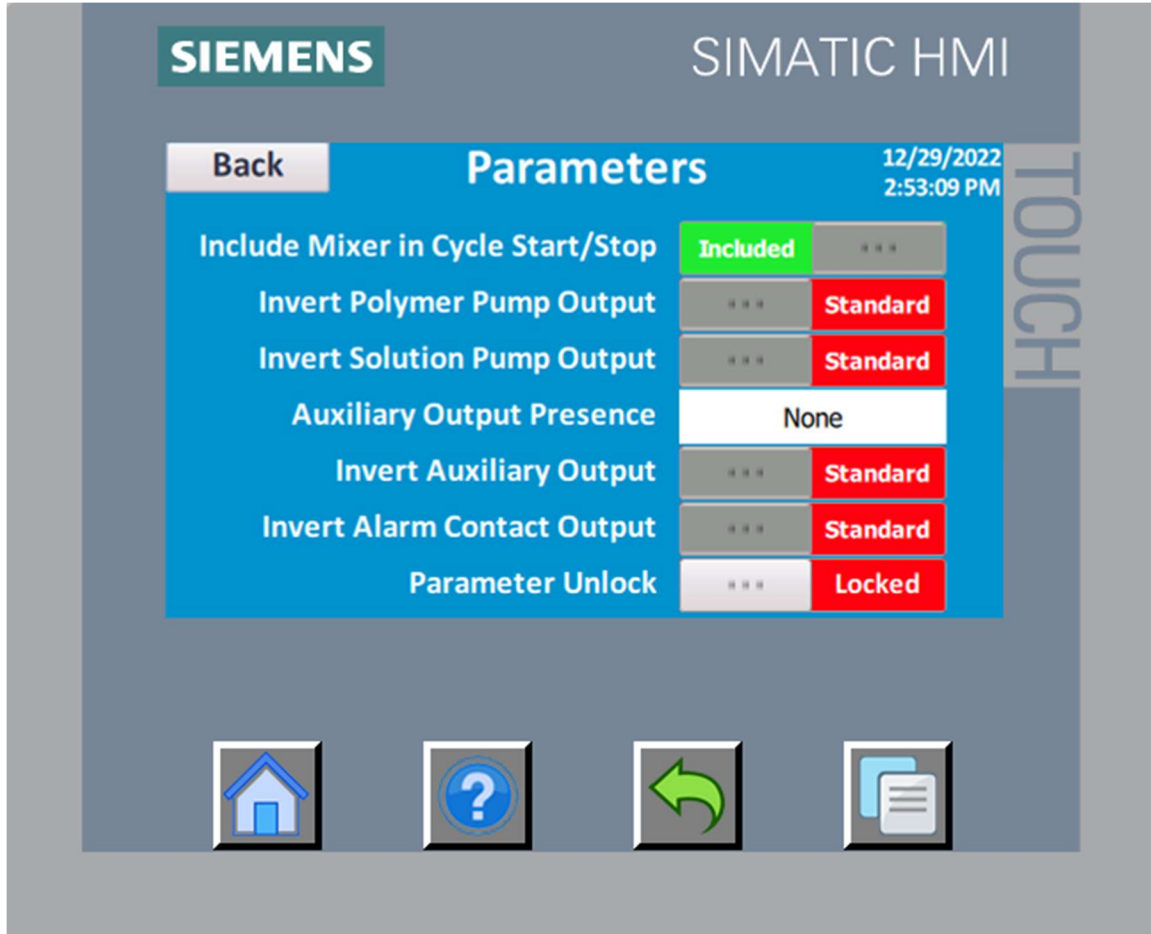
Polymer Pump Setup



The 20mA, maximum output of the neat polymer pump is set here. This allows the system to properly dose the neat polymer to the water stream based on the set Polymer Ratio %

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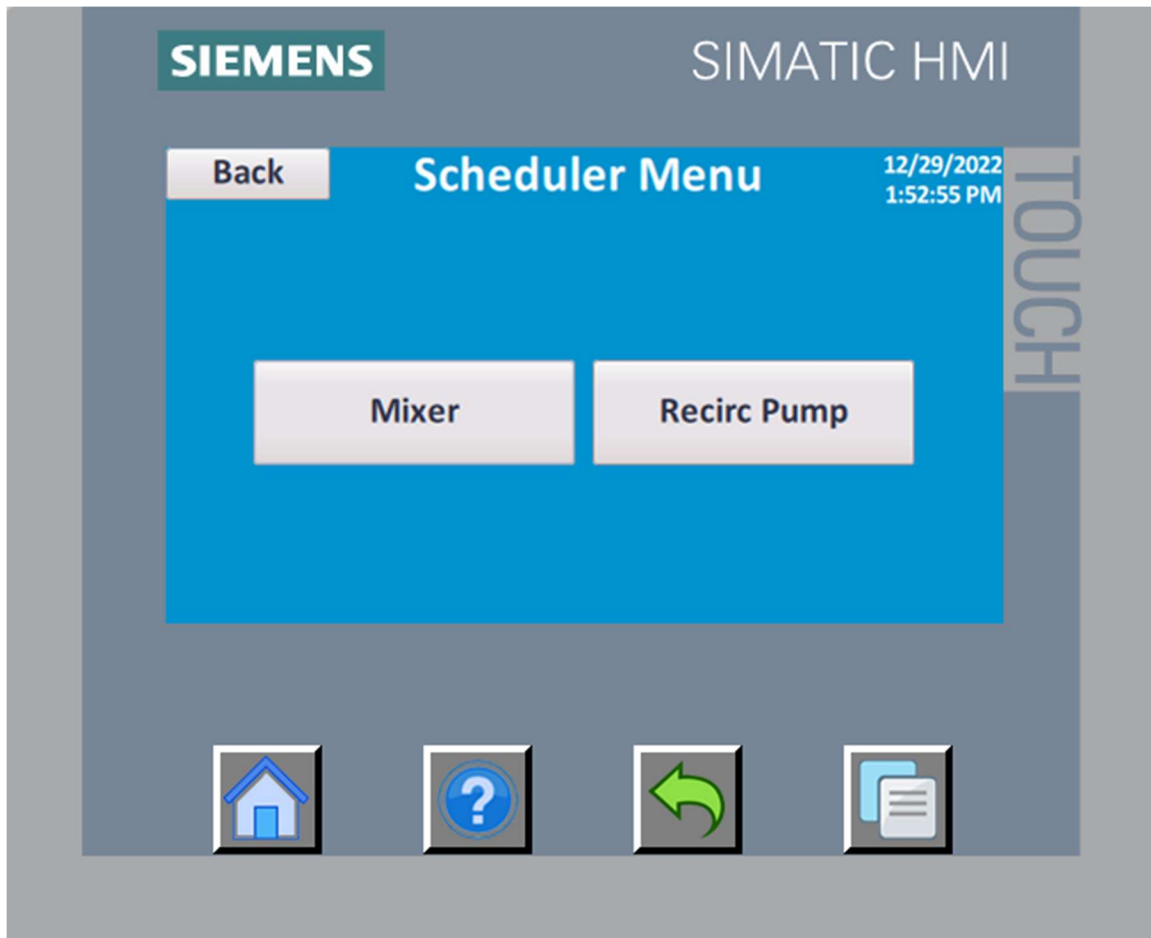
Parameters



The Parameters Screen holds some general settings of the device. The settings include having the mixer in the Auto Cycle Start/Stop Sequence. Inverting Outputs to and from the Polymer Pump, Solution Pump, Auxiliary Output Selection, and Alarm Contact. The Screens also allows for selection of the Auxiliary Output to be defined as either None, which is disabled, a Recirculation Pump, or a Second Solution Pump. There is a parameter Unlock switch on the bottom of the screen that allows for the prevention of accidental changing of these settings.

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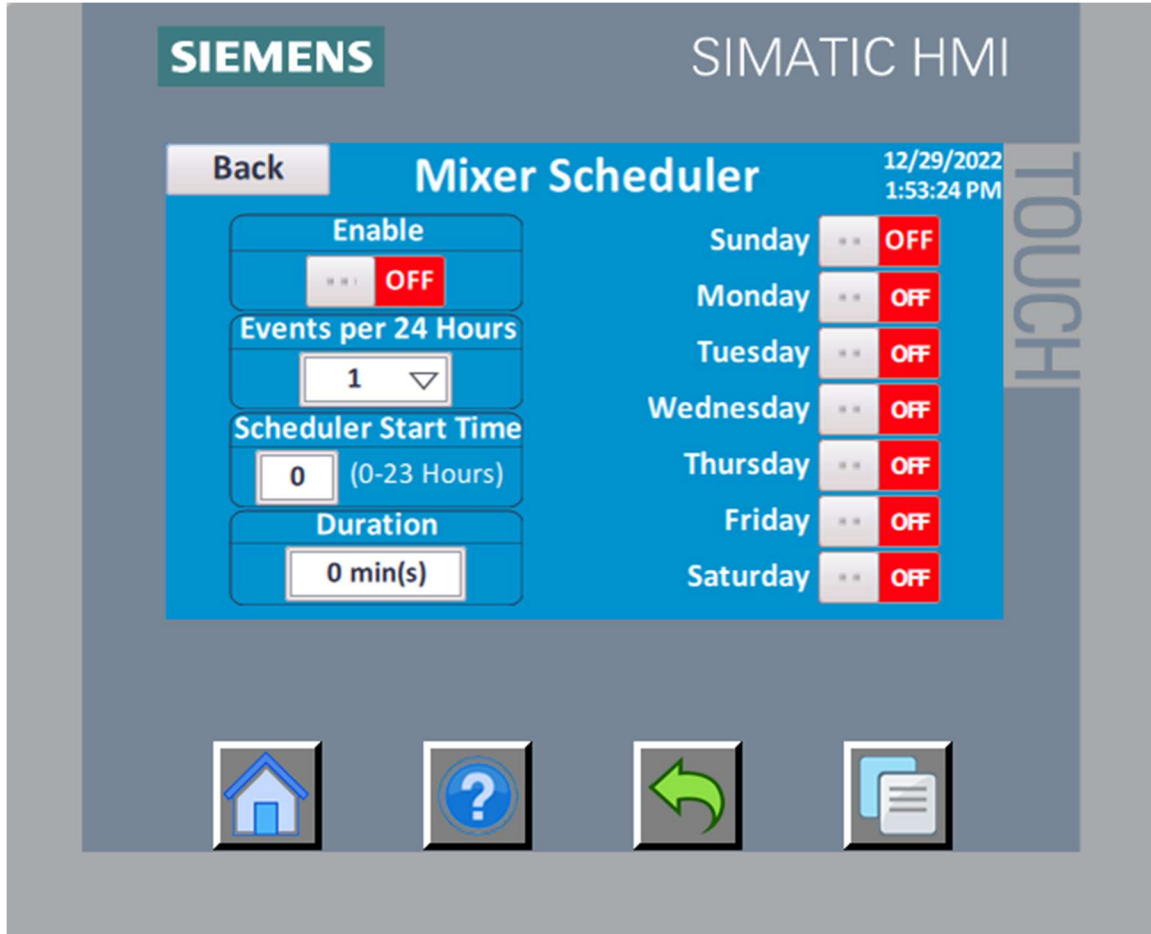
Scheduler Menu



The Scheduler Menu Screen is a navigation screen that allows you to move to either the Mixer Scheduler Screen, or the Recirculation Pump Scheduler Screen. The Recirculation Pump Selection Screen will only be present if the Auxiliary Output is selected as Recirc Pump on the Parameters Screen.

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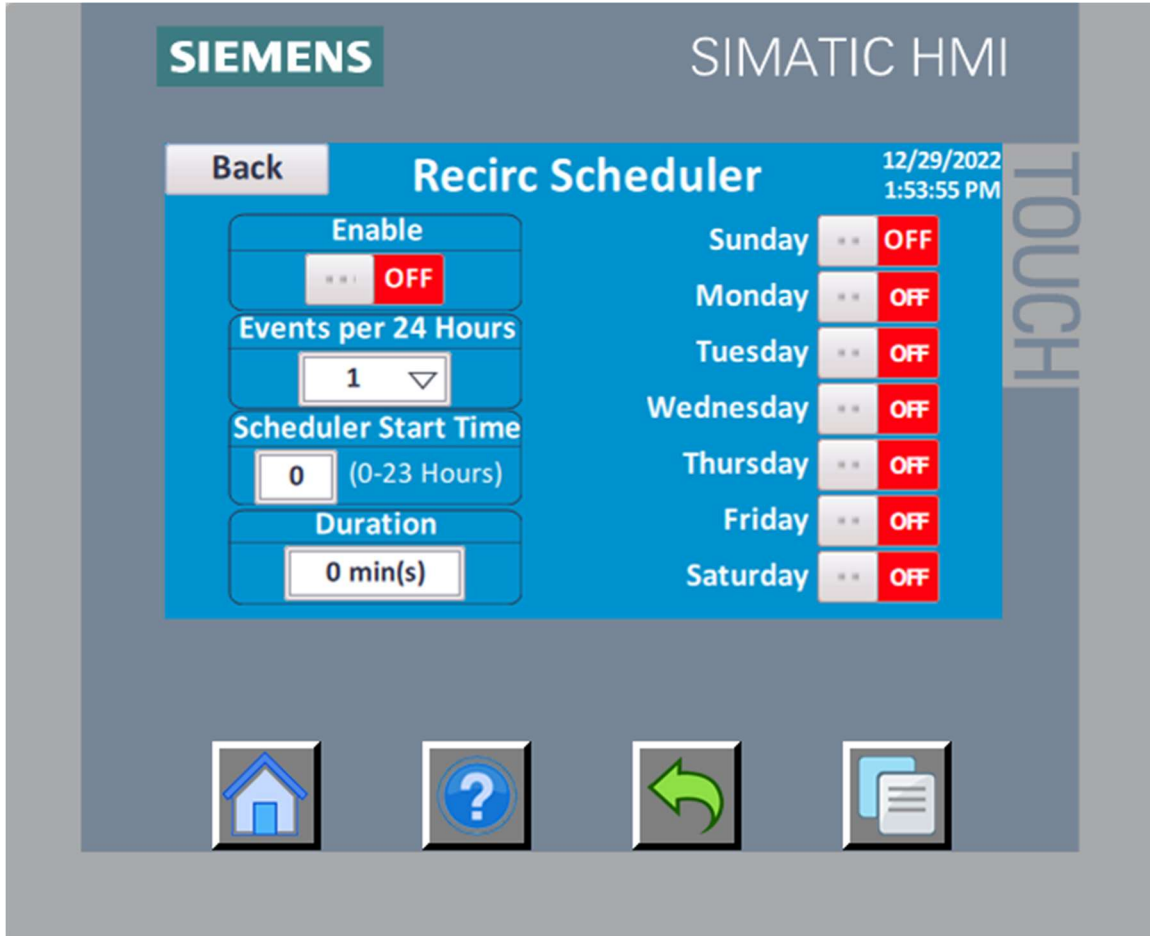
Mixer Scheduler



The Mixer Scheduler Screens allows for Scheduling the Mixer to come on at preset times. In order for the scheduler to control the device, the mixer must be in Auto Mode on the Overview Screen. The Enable Switch allows for the enabling and disabling of the scheduler. The events per 24 hours selects how many times the scheduler will turn on per 24 hours. The scheduler Start Time is the Hour that the scheduler should start. The duration is the amount of time in minutes that the scheduler will keep the device on.

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Recirculation Pump Scheduler



The Recirculation Pump Scheduler Screens allows for Scheduling the neat tank recirculation pump to come on at preset times. In order for the scheduler to control the device, the recirculation pump must be in Auto Mode on the Overview Screen. The Enable Switch allows for the enabling and disabling of the scheduler. The events per 24 hours selects how many times the scheduler will turn on per 24 hours. The scheduler Start Time is the Hour that the scheduler should start. The duration is the amount of time in minutes that the scheduler will keep the device on. The recirculation pump scheduler will be inhibited when in the active makedown process.

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View Active Alarms



When an alarm is active the Pending Alarms window will pop-up on the screen. A small alarm indication box will also appear in the top left corner of the screen. The indication box shows the number of pending alarms and can be pressed to toggle the visibility of the Pending Alarms window. Some alarms require acknowledgement before the system will resume normal operation. To acknowledge an alarm press the alarm to highlight it and then press the check mark button in the bottom right of the Pending Alarms window.

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System Alarms List

Emergency Stop

- If the Emergency Stop button is pressed all pumps, the water solenoid, the mixer, and the Makedown process will be stopped until the button is disengaged.

Solution Tank Level Sensor No Signal Alarm

- If the system does not see an incoming signal from the solution tank level sensor this alarm will activate and shut off the Makedown process if active.

Water Flow Meter No Signal Alarm

- If the system does not see an incoming signal from the water flow meter this alarm will activate and shut off the Makedown process if active.

Low Tank Level Alarm

- If the level of the tank drops below the Low Tank Level Alarm set point the Low Tank Level Alarm will be activated and the solution pump will be turned off.

High Tank Level Alarm

- If the level of the tank rises above the High Tank Level Alarm set point the High Tank Level Alarm will be activated and the Makedown process will be deactivated.

Low Water Flow Alarm

- If a makedown cycle is in progress and the water flow meter is reading a flow of less than the Low Water Flow Alarm set point the Low Water Flow Alarm will activate and shut off the Makedown process. This alarm must be acknowledged in the Pending Alarms screen in order for the system to return to normal operation.

GPM Out Mismatch Alarm

- The system calculates the amount of flow out of the tank, if this flow exceeds the amount input on the Alarm Setpoint screen for a certain amount of time, the system will exit the makedown process. The value on the alarm setpoint screen should be the sum of all the flows exiting the tank at any given time.

Polymer Ratio Too High Alarm

- During makedown the system reads in the incoming water flow rate and attempts to proportionately control the neat polymer pump flow rate. If the water flow rate is too high for the polymer pump to keep up this alarm will activate and shut off the Makedown process. To remedy this the user can either lower the Polymer Ratio control set point or adjust the water flow control valve to lower the incoming water flow rate.

This system also comes with a remote alarm contact that is active any time there is an active system alarm. This is so that the user can view alarm status remotely via a DCS.

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Setting the Polymer Makedown System

- The inlet water flow is regulated by the Atlantis SP-1000 polymer eductor/flow control valve. The flow rate can be adjusted by turning the flow control valve knob in or out. The current water flow can be seen in GPM from the system summary screen. Inlet flow should not be lower than 2 GPM in order to ensure adequate breaking of the polymer.
- A hand held vacuum pump has been provided with the unit to assist in priming the polymer pump. If hand priming is needed, perform the following actions:
 - a. Turn off the pump.
 - b. Attach the vacuum pump to the priming port on top of the calibration tube to the left of the neat polymer pump.
 - c. Open the polymer inlet valve and rotate the 3-way valve on the top of the neat polymer pump so that it would feed polymer to the calibration tube.
 - d. Close the valve on the bottom of the neat polymer pump's calibration tube.
 - e. Using the vacuum pump, pull polymer up through the head of the Walchem pump head and into the calibration tube.
 - f. Rotate the 3-way valve so that it will feed polymer into the water network when the pump is turned on.
 - g. Turn on the pump.
- ***NOTE: Do not pull polymer into the vacuum pump.***

Running the System

1. Ensure that the water and polymer supply line valves are on and turn the Polymer Pump and Water Valve selector switches to the AUTO position. The tank should fill with solution until it reaches the programmed High Tank Level Set Point.
2. Turn the Solution Feed Pump selector switch to the AUTO position when you wish to feed diluted product to the process. The pump will run only when the level is above the Low Level Alarm Set Point in the tank to prevent it from running dry. When in AUTO mode the pump will feed continuously if the Solution Pump Timers are Disabled and only when instructed to by the user set Solution Pump Timers if they are Enabled.

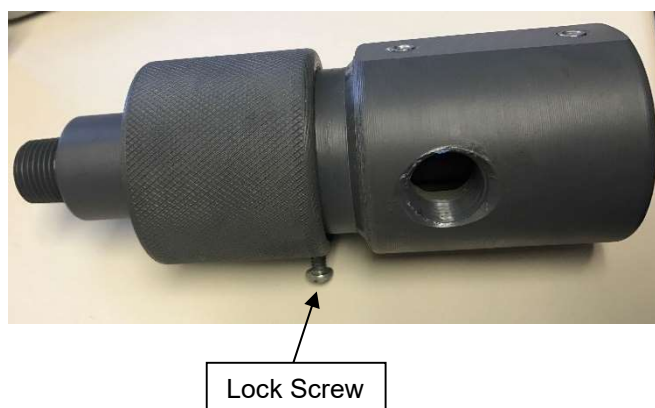
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Atlantis SP-1000 Polymer Eductor

The polymer eductor has an integrated spring-loaded check valve. If you believe that this valve needs to be cleaned, please do the following:

1. Remove power from the system and turn off the water supply at its source.
2. Remove all water pressure from the skid.
3. Remove the Philipps “lock” screw from the bottom of the water adjustment knob.

CAUTION: Never operate the system with water pressure when the Phillips “lock” screw is removed from the water adjustment knob. This screw prevents the knob from being unthreaded to a point where water pressure can push the polymer injector from the mixing eductor with excessive force.



4. Unscrew the water adjustment valve all the way and pull the knob and the polymer injector from the mixing body.
5. Remove the ½” PVC cap from the top of the polymer injector.
6. You can push down on the nut under the PVC cap to open the check valve on the bottom of the polymer injector.
7. Use a small screwdriver to remove any debris at the check valve. **Do not damage the surface of the check valve face or the seat face.**
8. You can turn on the polymer pump in Hand to force polymer through the check valve to test its operation.
9. After you feel the valve has been cleaned and seals, reassemble the valve.
10. Reinstall the Philipps “Lock” screw in the know to prevent unthreading it too far during operation and causing the valve to come apart under pressure.