



Atlantis Emulsion Polymer Makedown Systems
Part Numbers: A-15500-___-___

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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 150 gallons. With the exception of the 150-gallon model all tanks come integrated with the system and are mounted on the back side of the welded polypropylene 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.

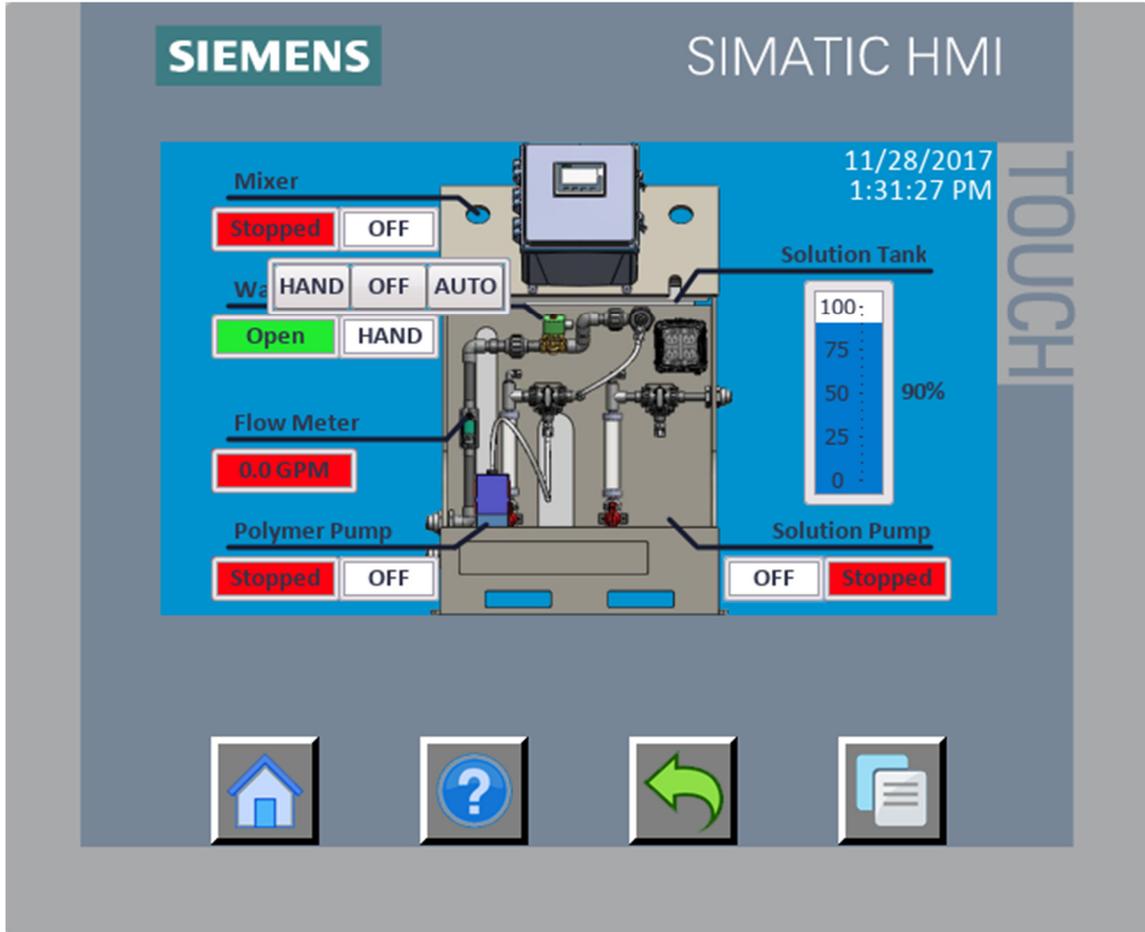
When in operation, the level control system will keep the made down polymer solution between two level set points using a submersible pressure level sensor that continuously monitors the tank level. Makedown is accomplished by turning on the neat polymer pump and the water solenoid when the level drops 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

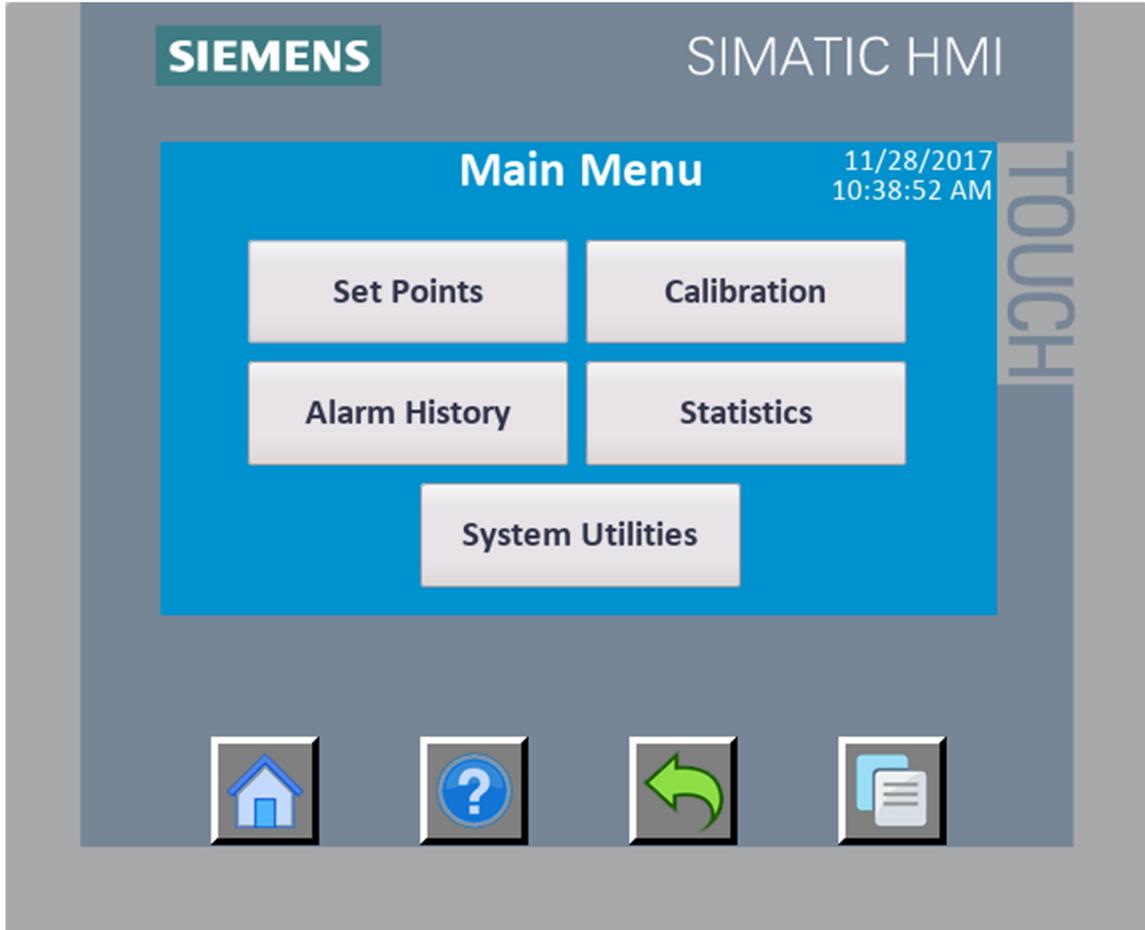
The **A-15500** polymer system should be installed in a location where it will not be exposed to excessive heat or cold. Normal temperatures should be between 32°F and 110°F. Power can be provided by any 115VAC, 15-amp outlet.

System Overview Screen



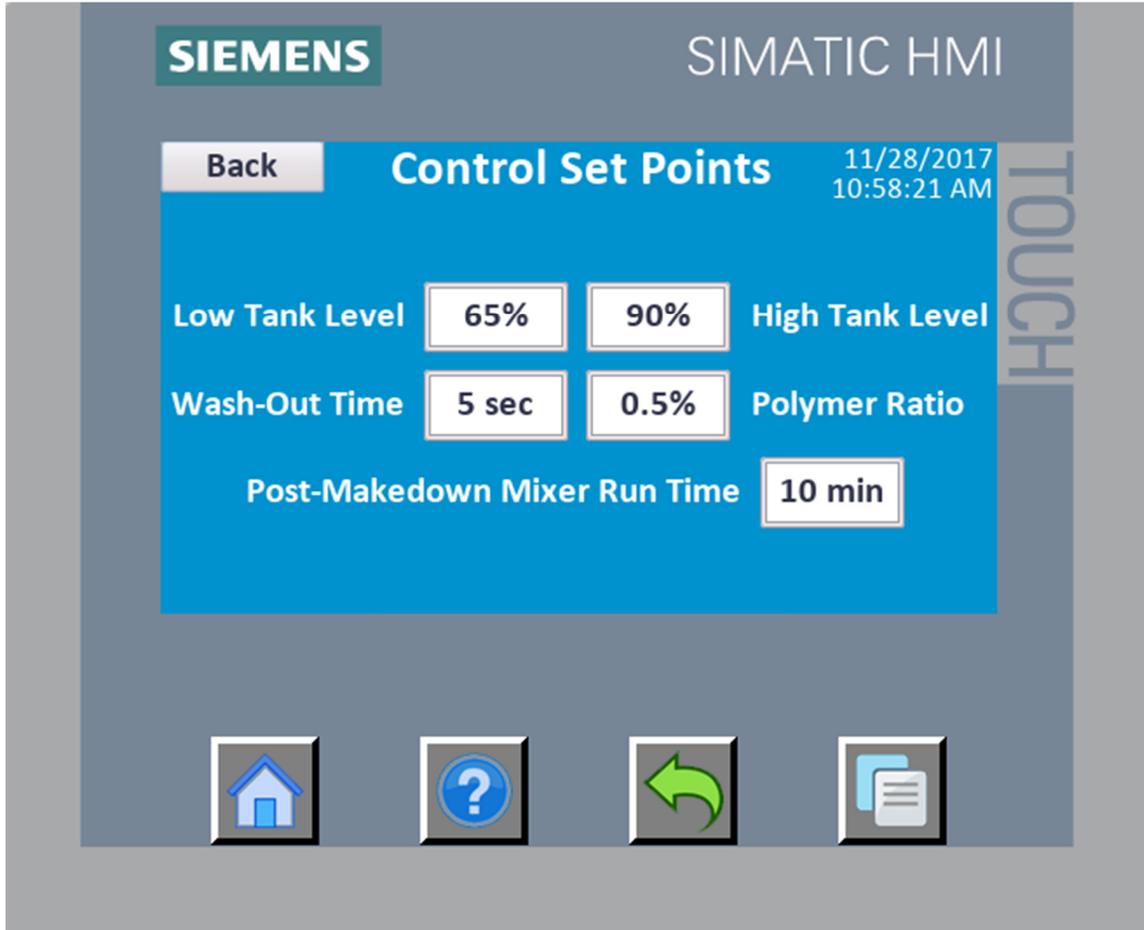
The System Overview screen is the default screen on the EM system. This screen can be accessed by pressing the HOME button on the keypad at any time. The display provides an indication of the tank level, water flow rate, and the status of each of the system's components. The component's status is shown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

Main Menu



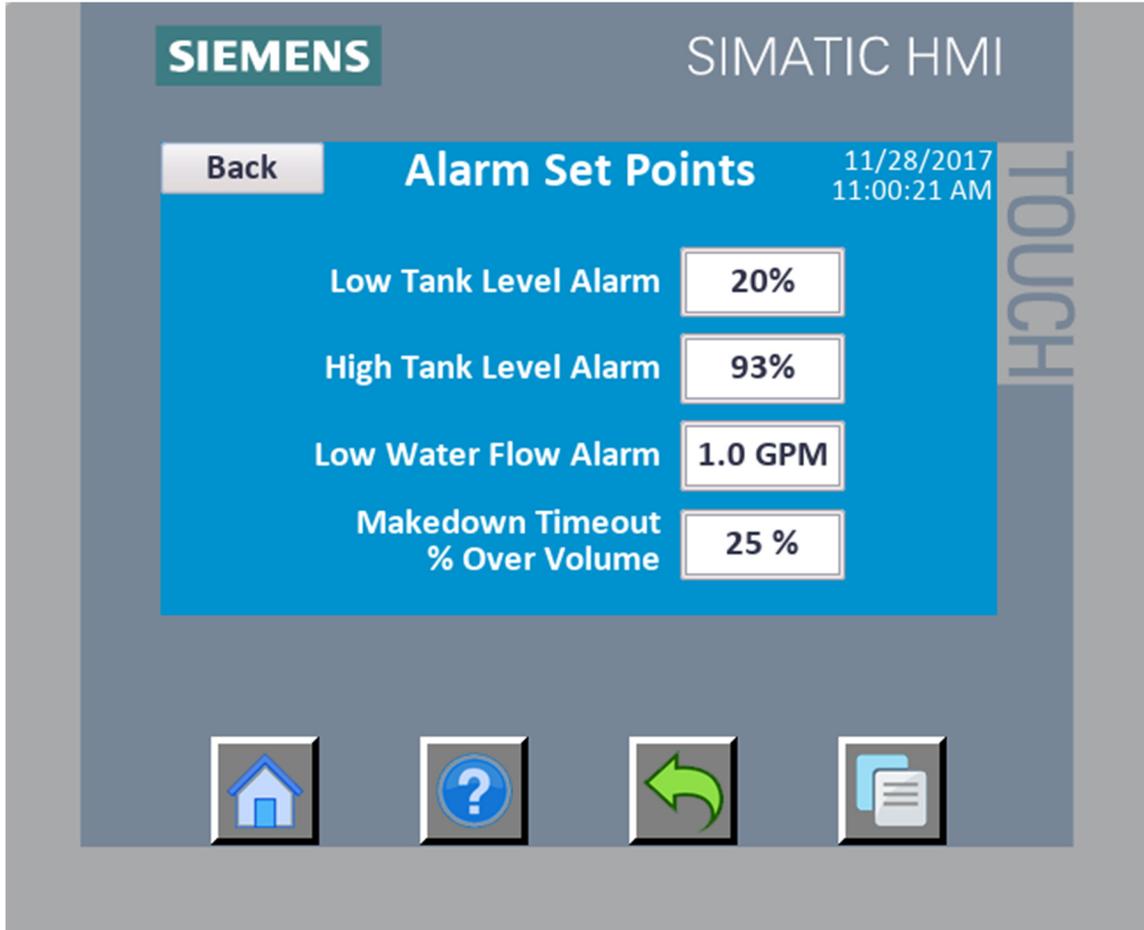
The Main Menu can be accessed by pressing the three-lined menu button on the keypad. This menu allows the user to access the various system screens.

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.

Alarm Set Points



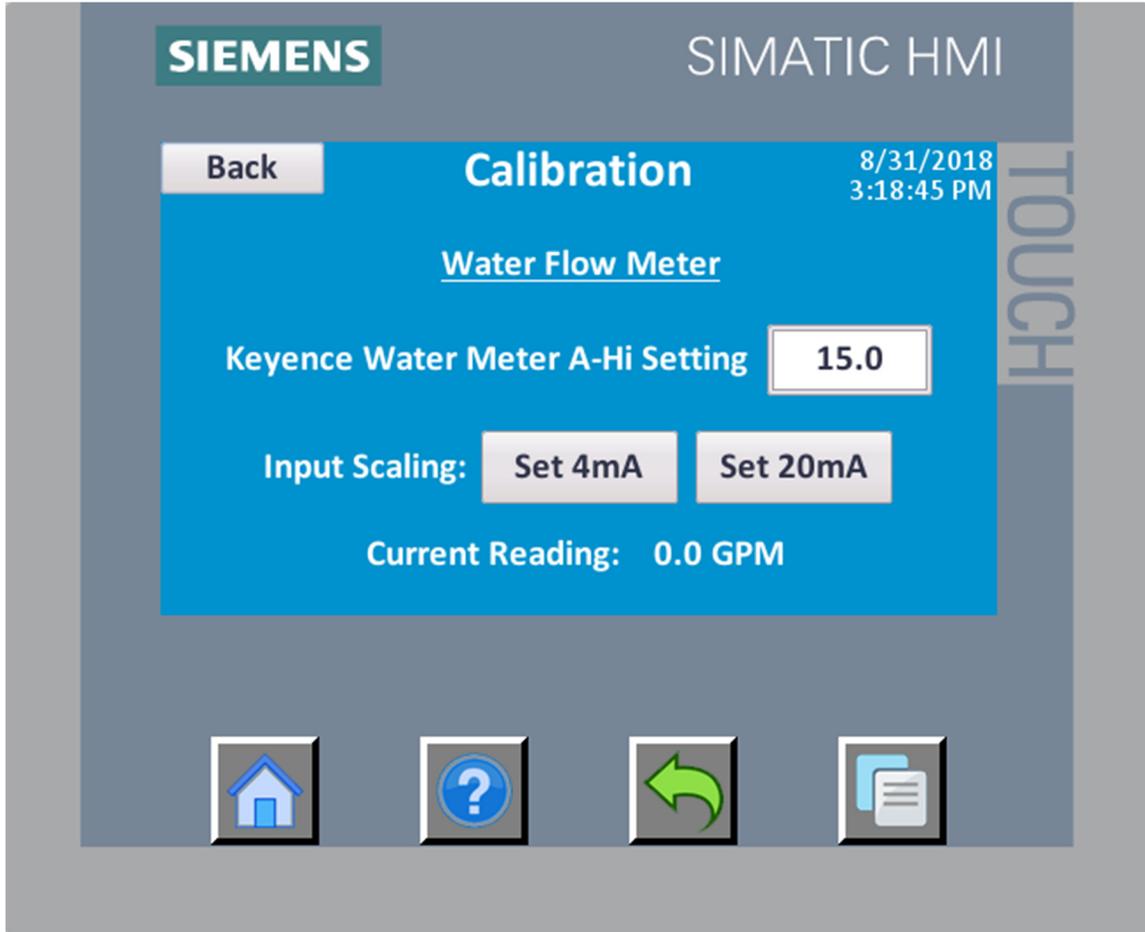
There are four alarm set points that can be adjusted by the user. The High and Low Tank Level Control Set Points are used to indicate to the user that the tank is not within the normal limits of operation. A Low Water Flow Alarm activates when the water flow rate during makedown falls below the Low Water Flow Alarm Set Point. The Makedown Timeout % Over Volume alarm is used to detect a leak in the solution tank. The specifics of all of these alarms plus more are explained in the System Alarms section of this manual.

Calibration Menu



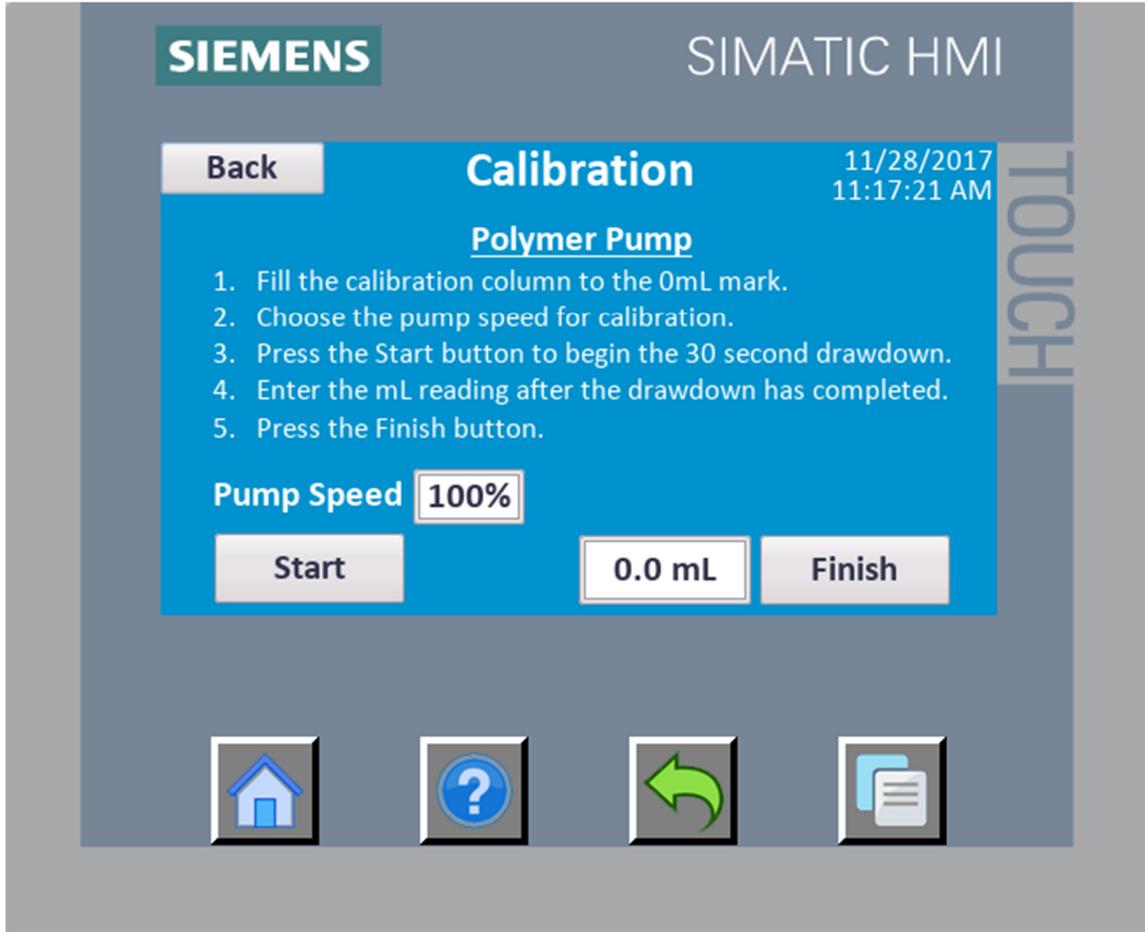
The water flow meter, polymer pump, and solution tank all have available calibration settings. Each calibration screen can be accessed by pressing their respective button.

Calibration – Water Flow Meter



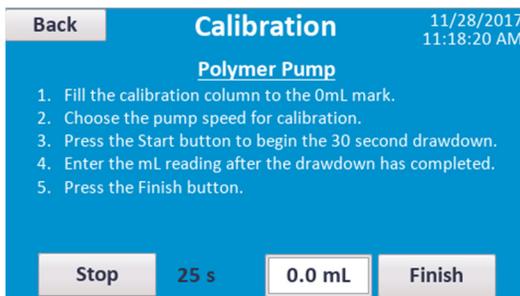
To measure the incoming water flow rate the system uses a Keyence brand ultrasonic flow meter. The flow meter has its own settings that control its 4-20mA output. The Keyence Water Meter A-Hi Setting should be set to match the A-Hi setting that is programmed into the Keyence Water Meter. This is set to 15.0GPM by default. If the reading on the screen does not match the reading on the Keyence meter, then the Set 4mA and Set 20mA buttons can be used to scale the input.

Calibration – Polymer Pump

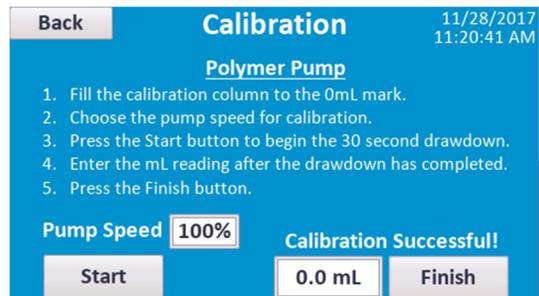


A 30-second drawdown is used to calibrate the neat polymer pump. There is a calibration column installed on the suction side of the neat polymer pump. Before calibrating the polymer pump the calibration column must be filled to the 0mL top line. Once filled the user selects the drawdown pump speed and 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



Calibration – Solution Tank



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.

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.

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.

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.

Makedown Timeout Alarm

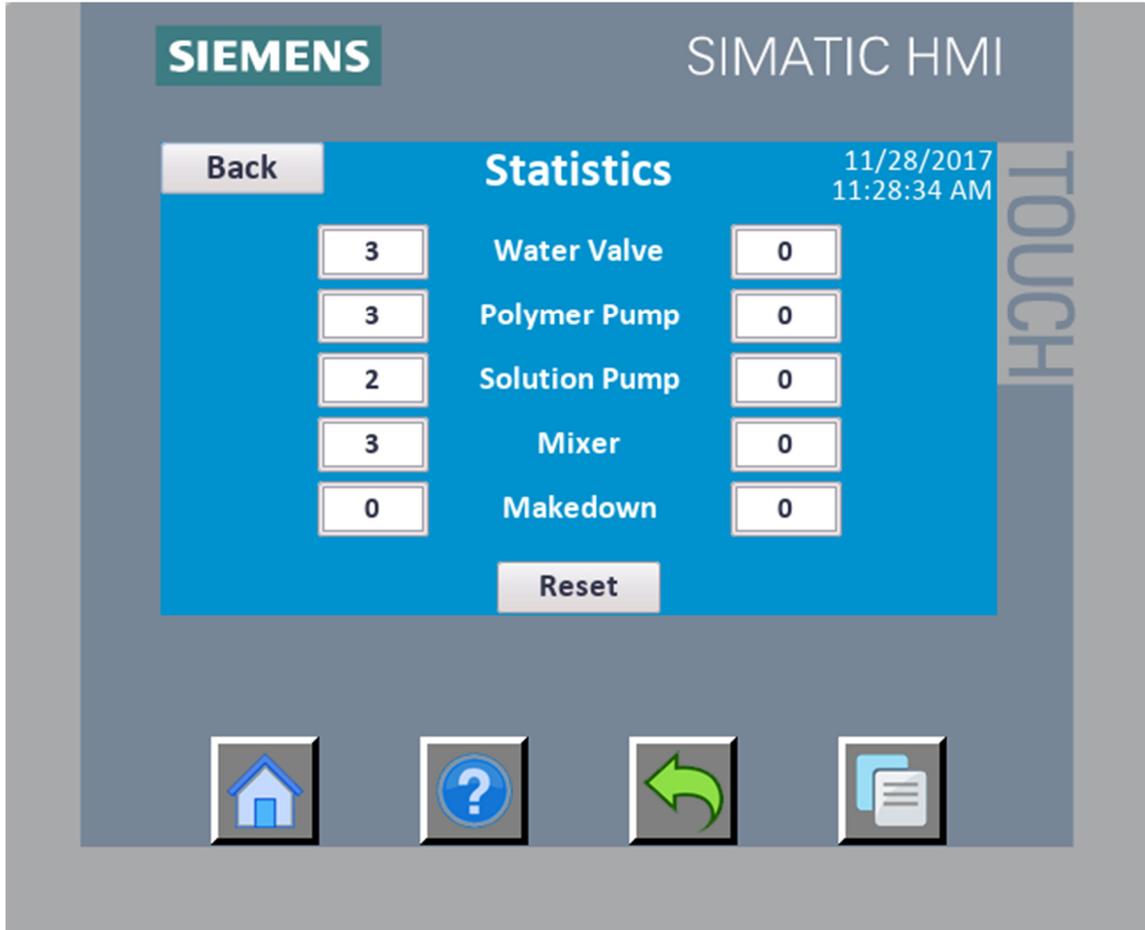
- At the start of each makedown cycle the system calculates the expected volume needed to reach the high tank level control set point. The system totals the water flow using the water flow meter and will activate this alarm if the makedown cycle uses more water than expected. The Makedown Timeout % Over Volume can be set by the user to adjust the alarm point. The volume used in the makedown cycle must be greater than the expected volume plus the percentage of expected value set by the user. This alarm will shut off the Makedown process and must be acknowledged in the Pending Alarms screen in order for the system to return to normal operation.

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.

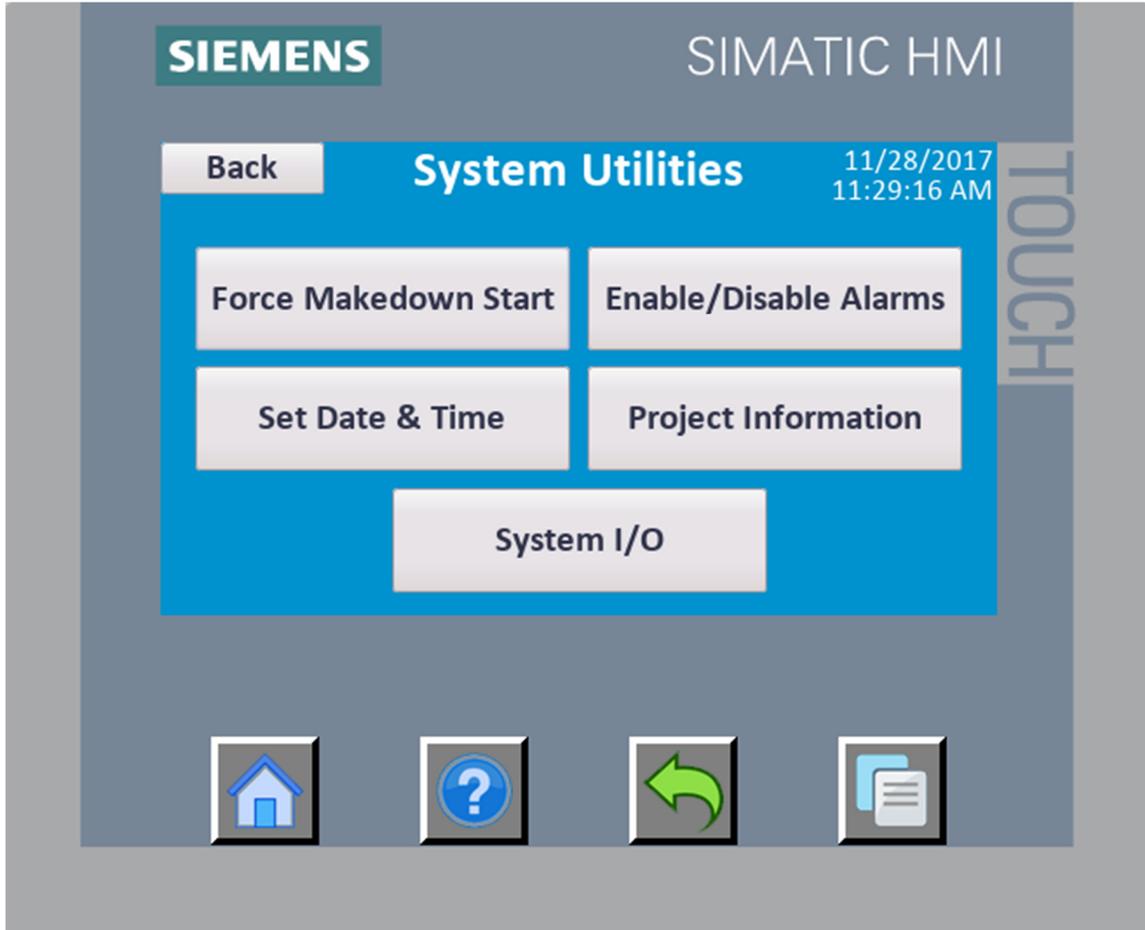
This system also comes with a remote alarm contact that is active any time there is an active system alarm. This is so that the user can view alarm status remotely via a DCS.

Statistics



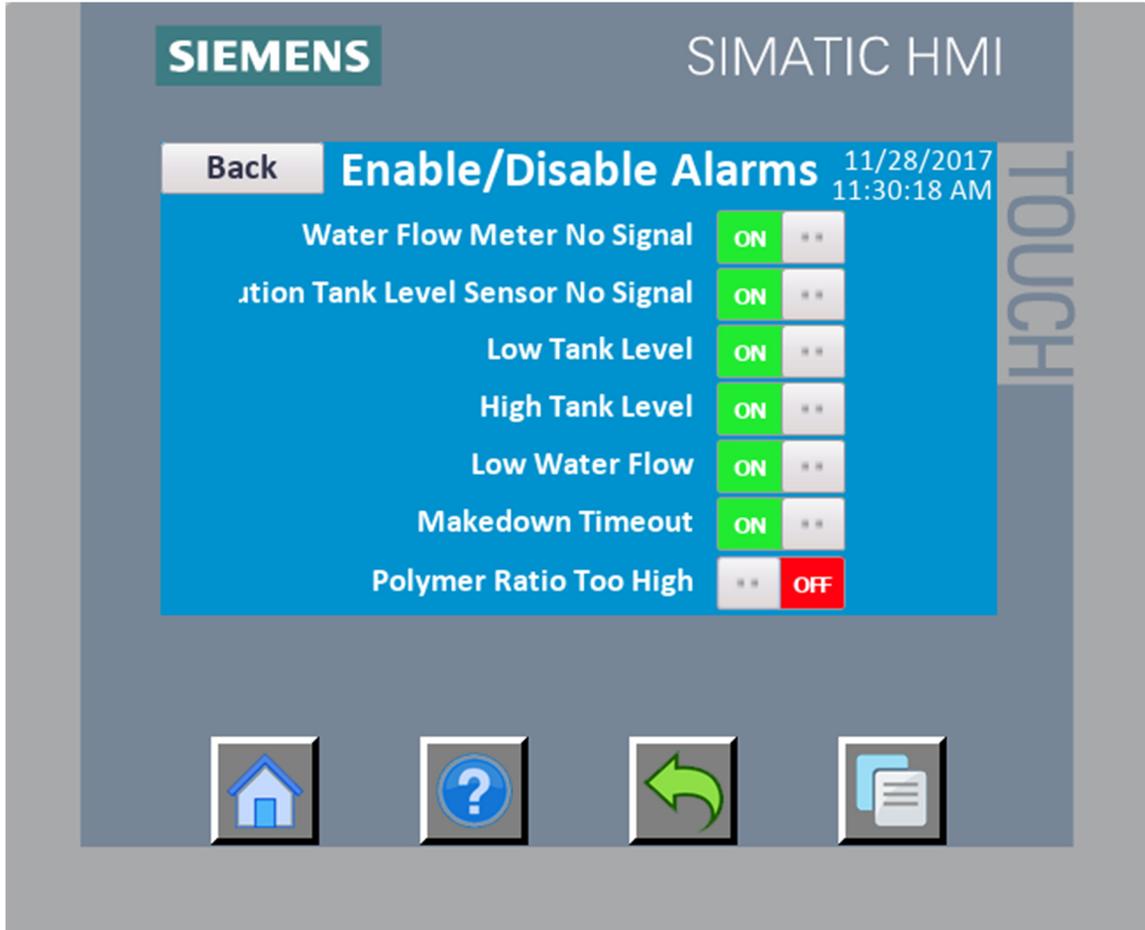
The statistics screen shows the cycles (left) and run time (right) in hours that each component has run. The statistics can be reset by pressing the reset button and confirming the reset prompt.

System Utilities



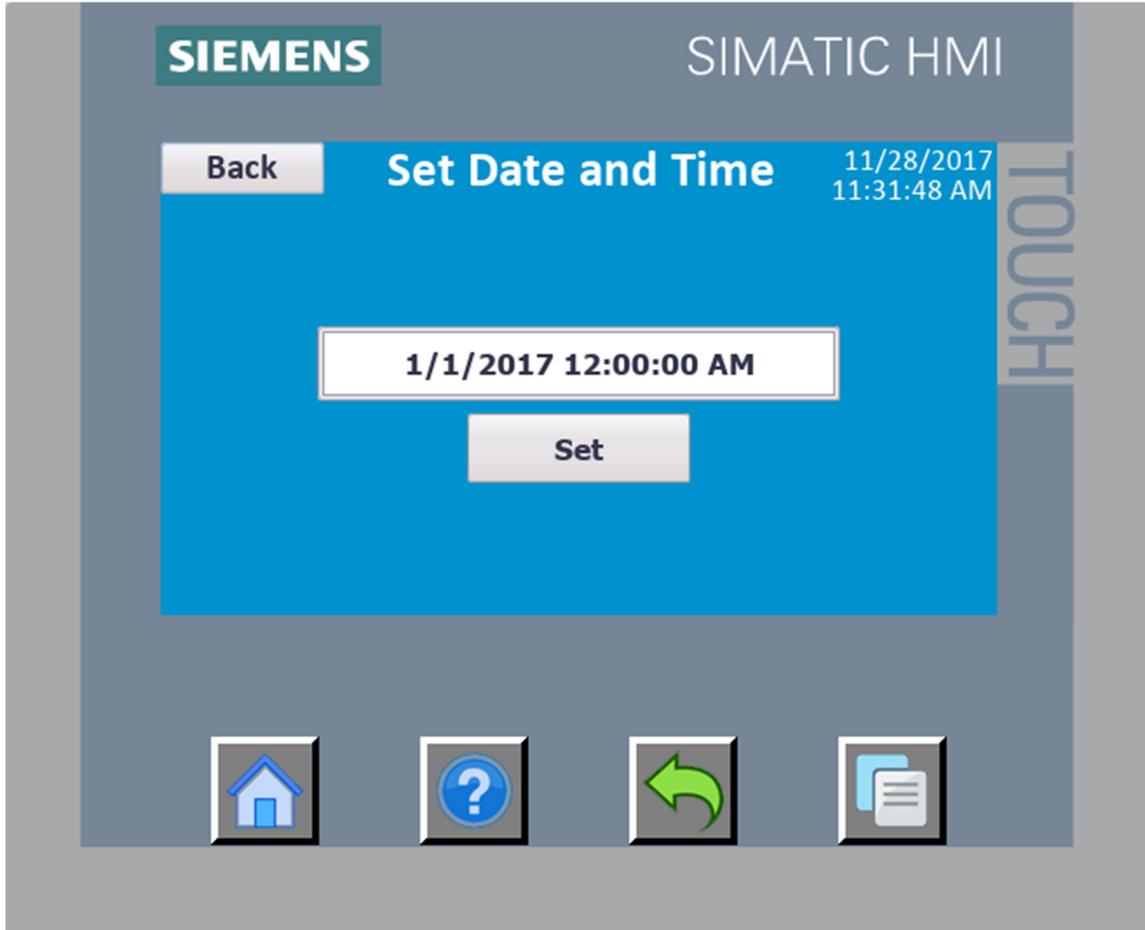
The system utilities screen allows the user access to various system functions. Firstly, the 'Force Makedown Start' button can be pressed to start a makedown if the system has been locked out of starting due to a system alarm. Note that the polymer pump and water valves have to be in automatic mode and the tank level must be below the high tank level control set point in order to force a makedown. The rest of the system utility screens are shown on the following pages.

Enable/Disable Alarms



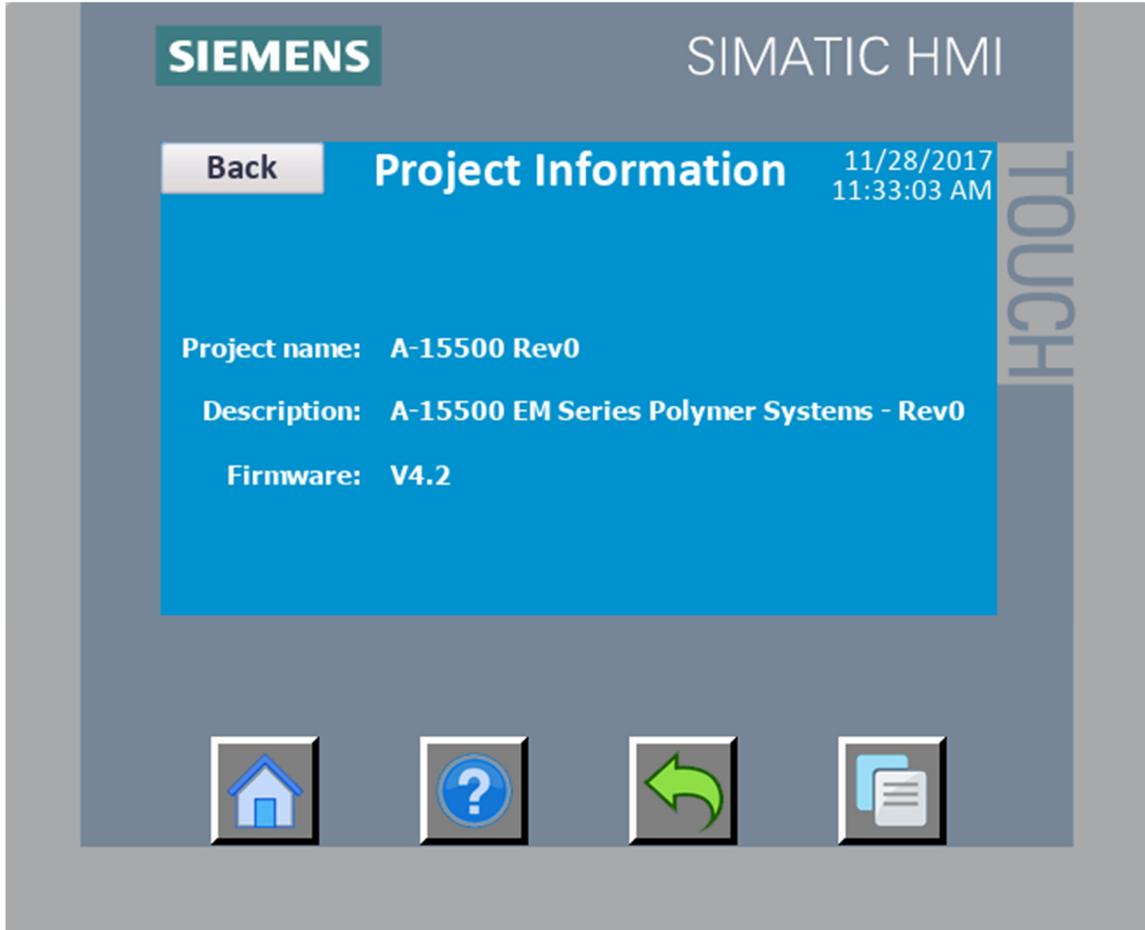
Each of the system alarms is able to be deactivated by the user. All alarms are activated by default. Press the On/Off switch to toggle the status of the alarm activation.

Set Date & Time



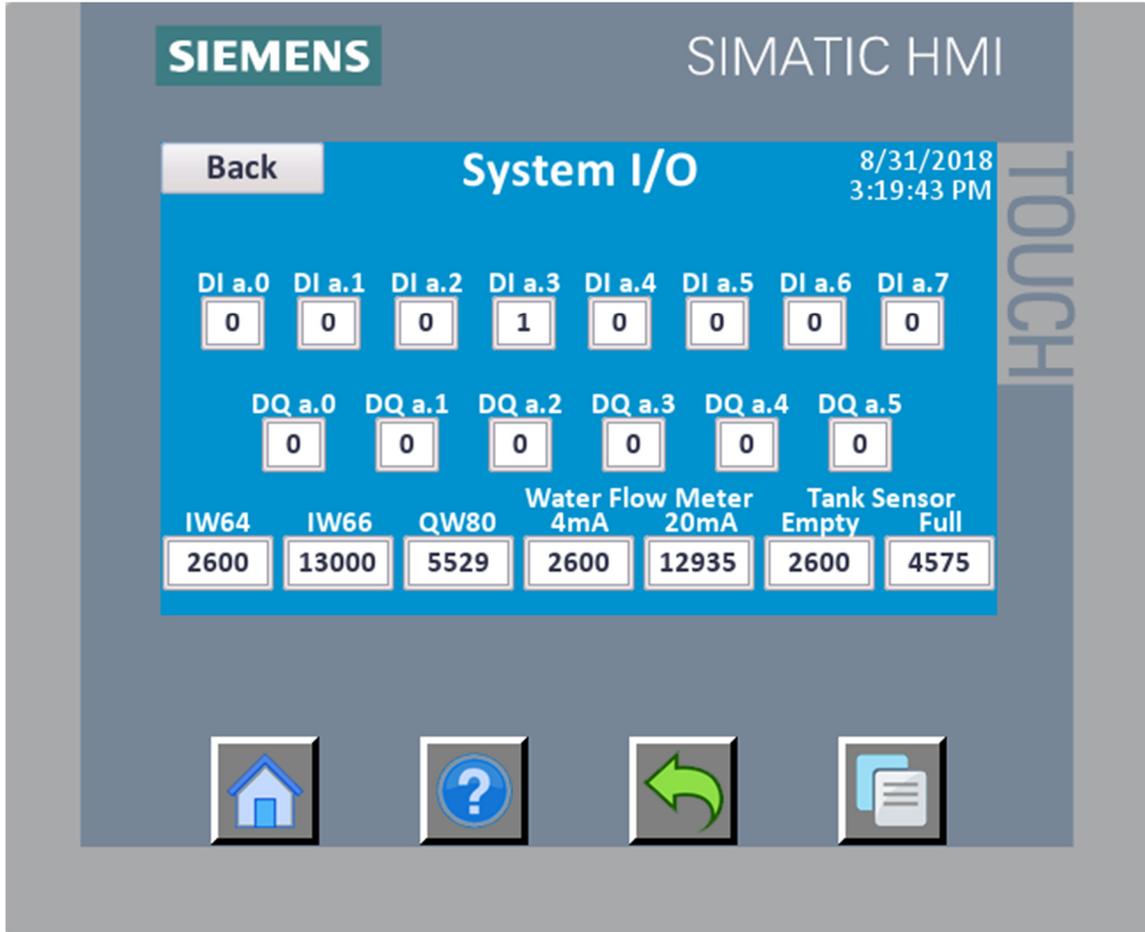
Press the date/time entry box to enter the current date and time. The data and time must be entered in the exact format shown on the screen above. The best way to do this is to use the arrow keys on the numerical entry screen to navigate to the numbers that need to be changed. Then use the backspace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

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.

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.

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

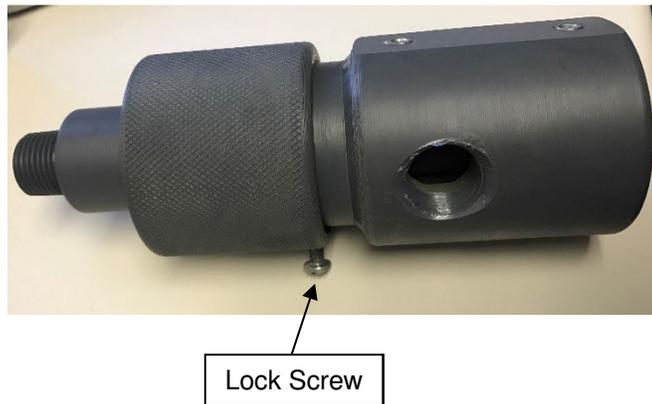
1. Ensure that the water and polymer supply line valves are on and turn the Polymer Pump and Water Valve selector switches to the AUTO position. The tank should fill with solution until it reaches the programmed High Tank Level Set Point.
2. Turn the Solution Feed Pump selector switch to the AUTO position 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.

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 knob to prevent unthreading it too far during operation and causing the valve to come apart under pressure.