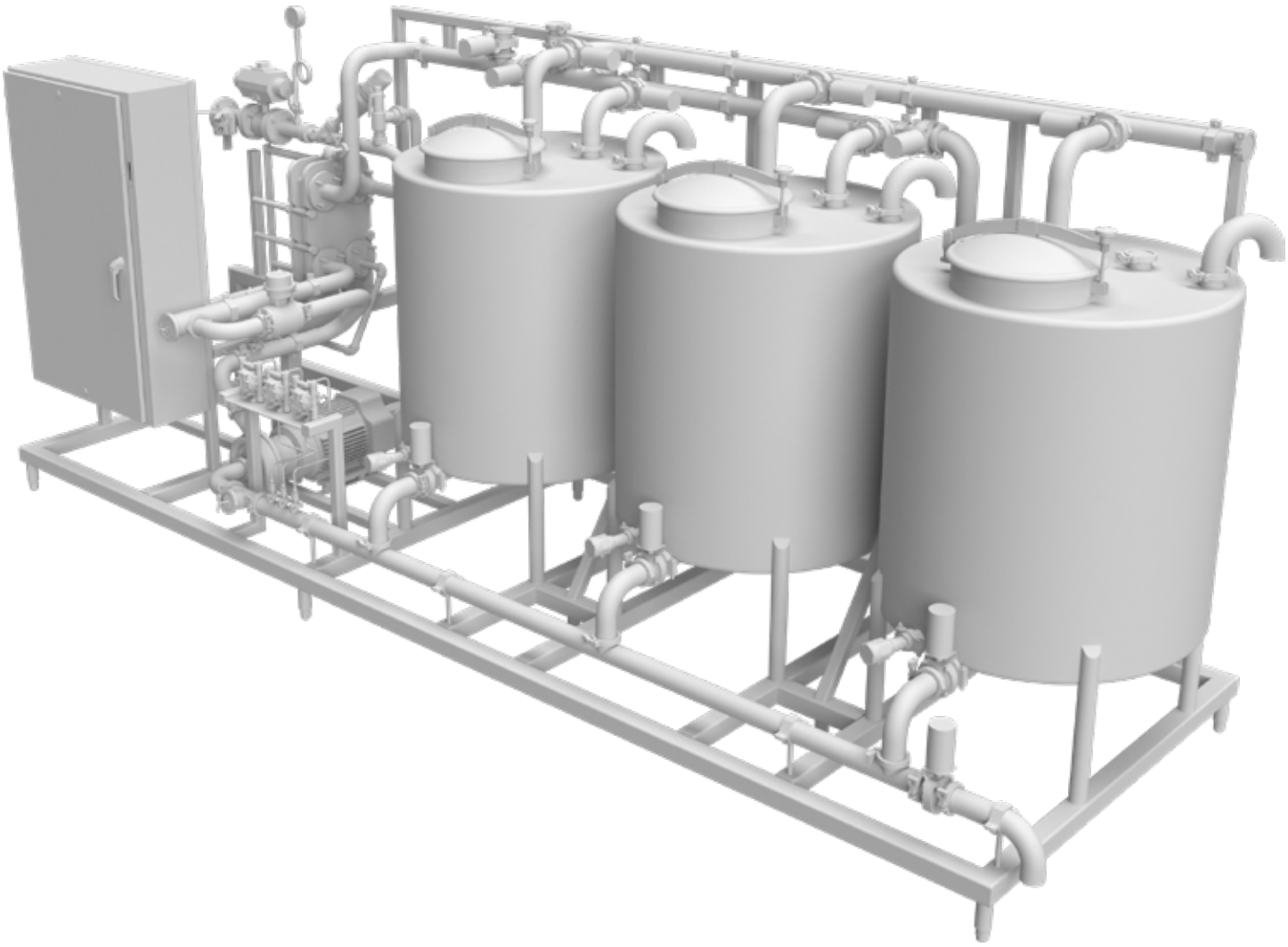
CIP 2.0
CONTROL SYSTEMS



CSI | INSTALLATION / OPERATION / MAINTENANCE

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IMPORTANT SAFETY INFORMATION

The CIP 2.0 Manual includes essential information for installing, operating, and maintaining equipment properly and in a safe manner. Failure to do so could result in personal injury and/or equipment damage.

DO NOT attempt to remove and/or modify CIP 2.0 products or programming. Doing so can create unsafe conditions for operator(s) and surrounding persons. Changes to CIP 2.0 products or programming void all warranties.

DO NOT place any CIP 2.0 product in an application where general product service ratings are exceeded. Doing so puts operator(s) and surrounding persons at risk of personal injury and may result in equipment damage.

THE MEANING OF DANGER, WARNING, AND CAUTION IN THESE INSTRUCTIONS

Danger: Indicates an imminently hazardous situation which, if not avoided, has a high likelihood of resulting in death or serious injury. The word Danger indicates the most extreme cases of risk that warrant immediate attention.

Warning: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. The word Warning is used for moderately at-risk cases that warrant immediate attention.

Caution: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. “Caution” may also indicate an unsafe operating or maintenance practice.

If at any point during operation, a Danger, Warning, or Caution indication is present, the operator should immediately take steps to resolve the problem and notify a supervisor.

Do not remove labeling on any CIP 2.0 product. Immediate replacement of missing labels is important to the safety of all users.

INTRODUCTION

Thank you for purchasing a CIP 2.0 Product!

This manual contains operation instructions for the CIP 2.0 Control System.

ABOUT THIS MANUAL

This manual covers the complete line of CIP 2.0 systems. All CIP 2.0 systems are available with optional equipment that can provide additional functionality.

Please contact **CSI at 417.831.1411** for assistance.

APPLICATION

CSI's CIP 2.0 regulates the operation of your Clean-in-Place system. CIP 2.0 takes the guesswork out of configuring and controlling the start, stop, flow, temperature, and chemical concentrations required for a successful clean-in-place cycle. If used properly, your CIP 2.0 system can be a source of savings and a vital step in ensuring product quality through rapid and effective cleaning.

TECHNICAL DATA

- Compressed air pressure: 90–100 psig (requires at least 90, no more than 100)
- Air inlet size: 1/2" FNPT
- Maximum product pressure: 145 psig
- Product Temperature range: 0°F–185°F
- Electrical Requirement: AC 480V, 60Hz +/- 6%
- Amperage requirement based on system configuration

AT A GLANCE

1. Emergency Stop (E-Stop)
2. Human Machine Interface (HMI)
3. Power Disconnect Switch
4. Air Pressure Regulator
5. Control Panel
6. Chemical Pumps
7. Chemical Tanks
8. Tank Level Transmitter

SAFETY

The CSI CIP 2.0 control package includes built-in safety features including air lockout and emergency stop capabilities. The control units can also incorporate system timeouts for added operator safety.

AIR LOCKOUT CAPABILITY

1 The photo on the left shows the air control in the Supply (SUP) position. To prevent accidental operation, turn the air control to the OFF position and lock it with a padlock (OSHA lockout/tagout standard for control of hazardous energy).

E-STOP CAPABILITY

Activate E-Stop to turn off all operations.

To release the E-Stop, twist clockwise until it pops up.

INSTALLATION

The CIP 2.0 control cabinet arrives mounted to the skid and pre-wired to instruments installed on the skid. Typical installation requires a dedicated 480V 3-Phase with Branch Circuit Protection with enough amperage for the configuration. Electrical schematics provided with the control panel indicate location, voltage, and amperage requirement for the panel.

WARNING

To avoid electrocution, ALL electrical work should be done by a registered electrician, following industrial safety standards and local codes. All power must be OFF and safely locked out during installation.

The CIP 2.0 system is designed to work as a standalone system or configured to connect to the plant network via Ethernet for permissions, data logging, and E-Stop connectivity. If the system is intended to communicate with the plant network, an Ethernet drop must be provided to the CIP 2.0 control system and the system uses 4-5 unique IP addresses depending on configuration.

DISCLAIMER OF LIABILITY

CSI does not assume responsibility and expressly disclaims liability for loss, damage, or expenses that arise in any way from the installation, operation, use, or maintenance performed in accordance with this manual. CSI assumes no responsibility for any infringement of patents or other rights of third parties that may result from use of the module. No license is granted by implication or otherwise under any patent or patent rights.

CSI reserves the right to make changes to the product, specifications, or this manual without prior notice.

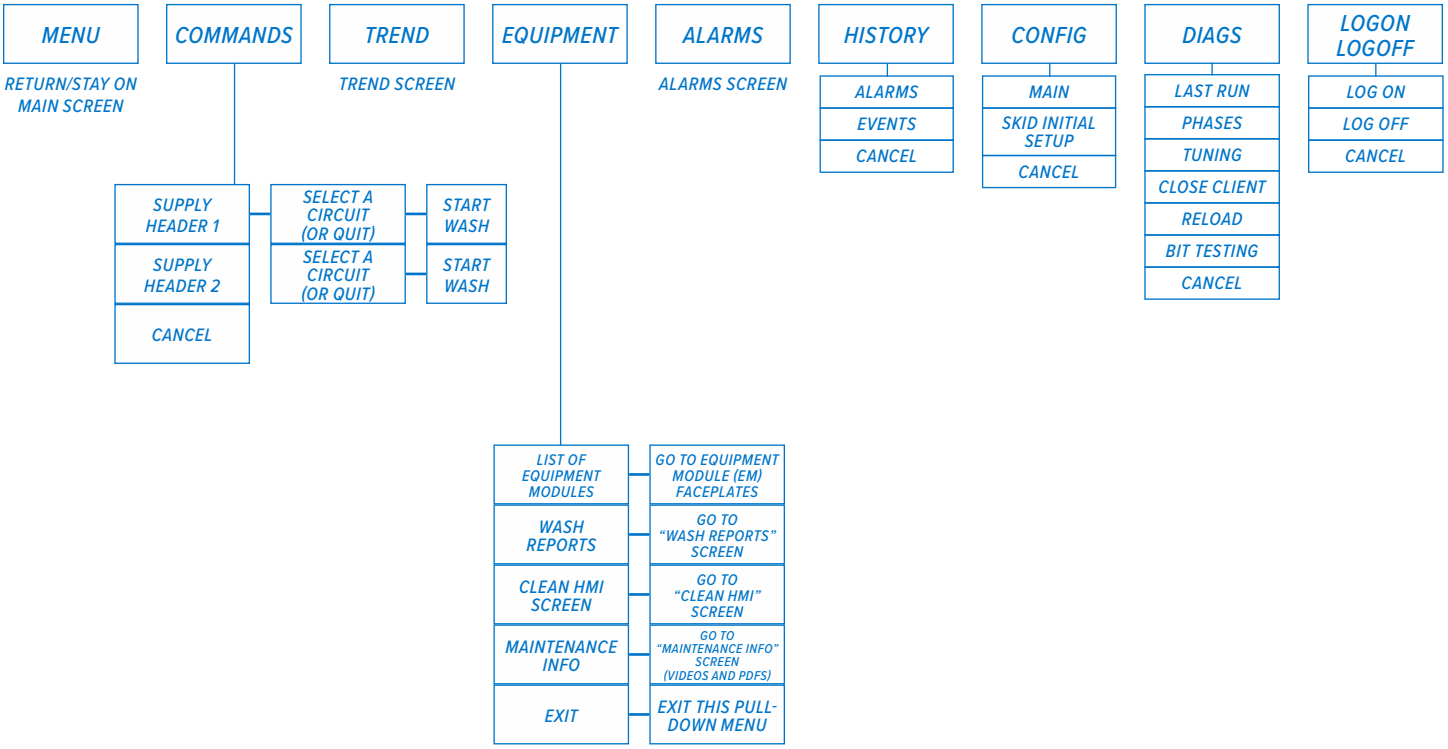
AIR CONNECTIONS

Note: CSI recommends that the air inlet be supplied with clean instrument air at the minimum pressure and flow rate for your application.

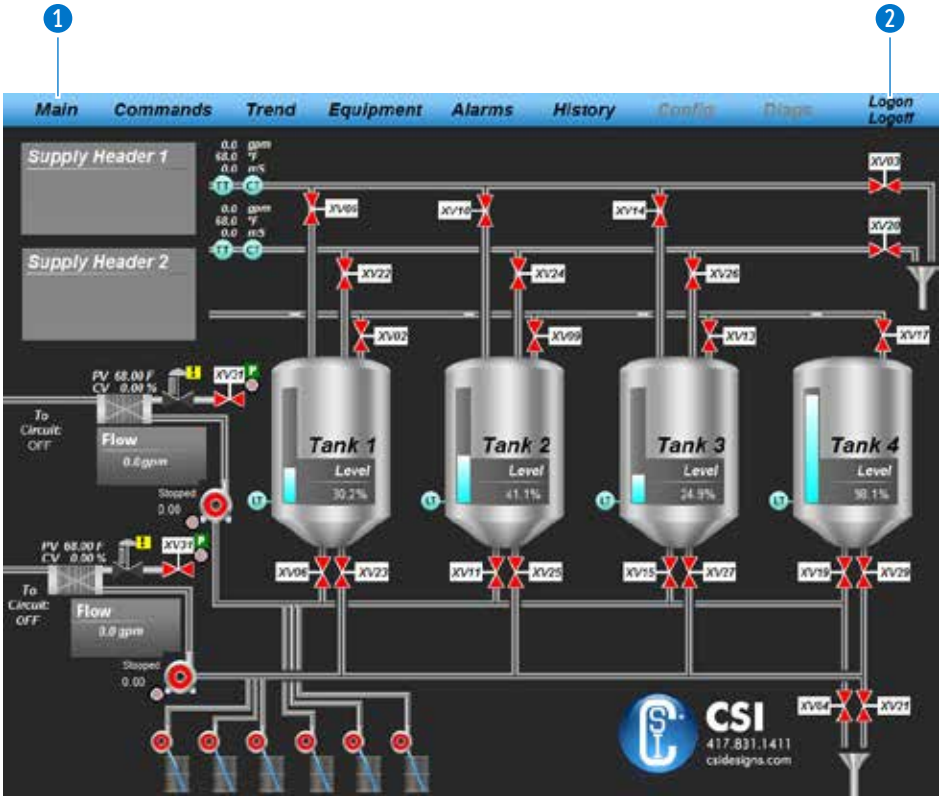
AIR INPUT TO SYSTEM

1. Air connection 1/2” NPT Female

HMI MENU: QUICK REFERENCE



OPERATION SCREENS: MAIN SCREEN



1 The main screen displays the equipment located on the skid, including tanks, valves, pumps, heat exchangers, and piping.

CIP 2.0 is a versatile program offering full programming capabilities for an assortment of systems ranging from small single-tank, single-supply systems to the four-tank, dual supply system (as shown above).

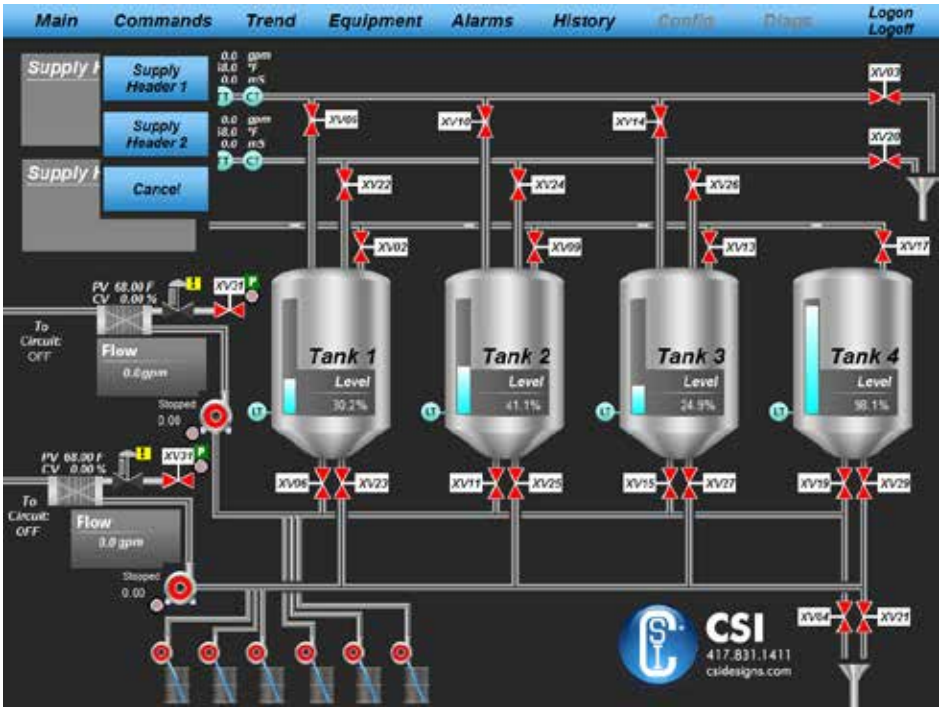
Dual supply means you can clean two independent processes simultaneously as there are two separate supply pumps, each having independent chemical dosing and heat exchange equipment.

Dual supply systems provide reduced cost and space requirements when compared to operating two separate clean in place systems.

2 Log in to start a wash or view screens. To log in, select the **Logon/Logoff** button on the far right, and select **LogOn**.

3 The Default Login is as follows:
4 User Name: DefaultOperator
5 Password: operator

OPERATION SCREENS (CONTINUED)



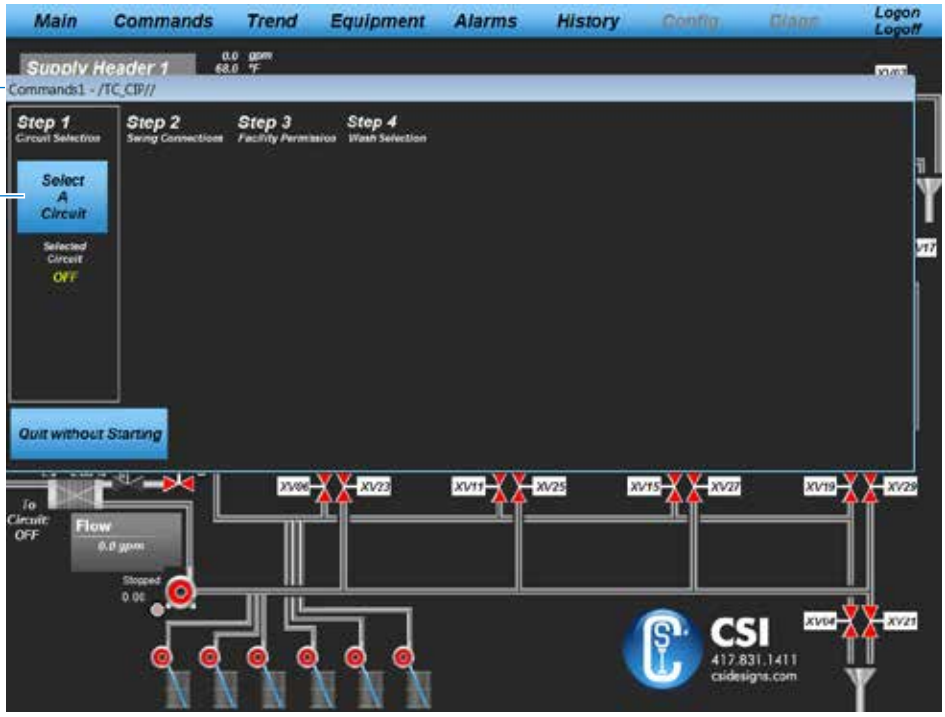
CONTROL PANEL

Use the touchscreen control panel to select wash parameters and cleaning cycle. Operators should take a moment to familiarize themselves with the items in bold below.

SYSTEM START

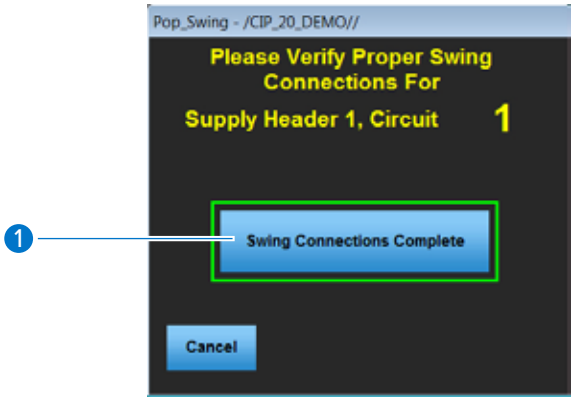
1. Verify all **Swing Connections** and piping connection.
2. Verify the **Air Relief Switch** is in the **On** position.
3. If not already completed, log on to the system by pressing the **Logon/Logoff** button.
4. Input your username and password (default user name: DefaultOperator; default password: operator)
5. To initiate a wash cycle, press the **Commands** button.
6. If the system has more than one supply, select the appropriate Supply Header. A prompt asks you to select a circuit.
7. Select the appropriate circuit. The system also indicates the last wash type and time stamp for each circuit.
8. If your system uses swing connections, it prompts you to verify that those connections have been made.
9. If your system requires plant permission, the system requests permission and holds until permission is granted.
10. Select the appropriate wash type to start the system. The process can be **Aborted** at any time from this screen.
11. Once the wash has started, press Close Window to return to Main screen.
12. The system runs the wash cycle in automatic mode until the circuit set-points have been completed, an error occurs, or an E-Stop condition occurs.

OPERATION SCREENS (CONTINUED)



1. A prompt screen appears: **Select A Circuit** or **Quit without Starting**.
2. Press **Select A Circuit** to continue the starting process. The screen prompts you to select the desired circuit or Cancel.
3. Select the desired circuit number.

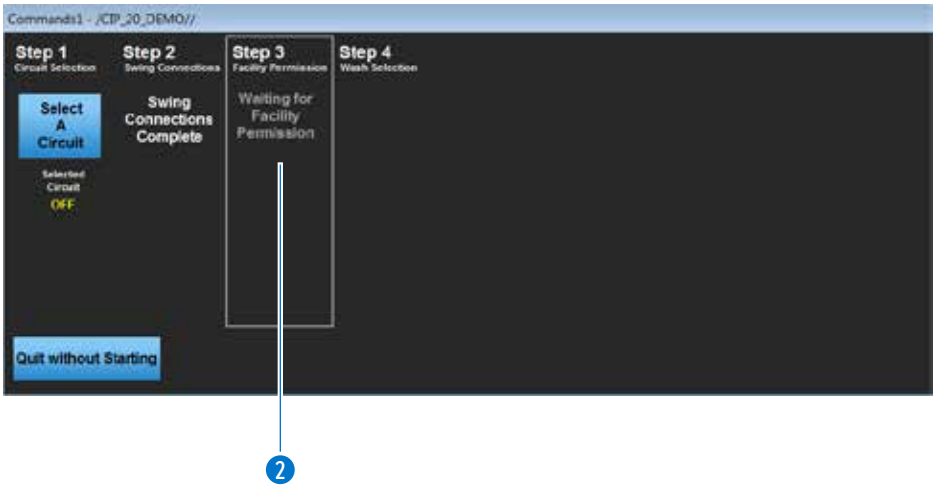
OPERATION SCREENS (CONTINUED)



1 If the system is configured with swing connections, they must first be verified. If the connections are in place press **Swing Connections Complete**.

If the system is configured to request permission from a plant PLC before beginning operation, it does so now.

2 If the system stalls at this point, it may be waiting to receive facility permission from the plant PLC, or it might not be getting the signal from the plant PLC entirely.



OPERATION SCREENS (CONTINUED)

Once permission is granted, the operator is presented with available wash types.

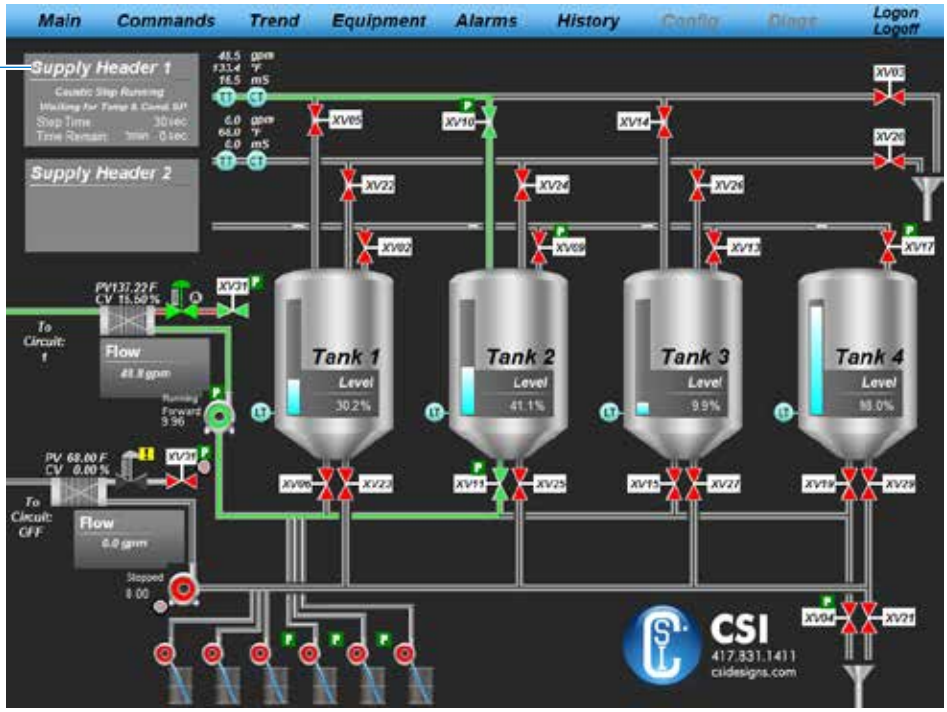
1 From this screen the operator can: **Start**, **Hold**, **Restart**, & **Abort** a wash.

Select **Start** on the desired wash type. Then press **Close Window**.

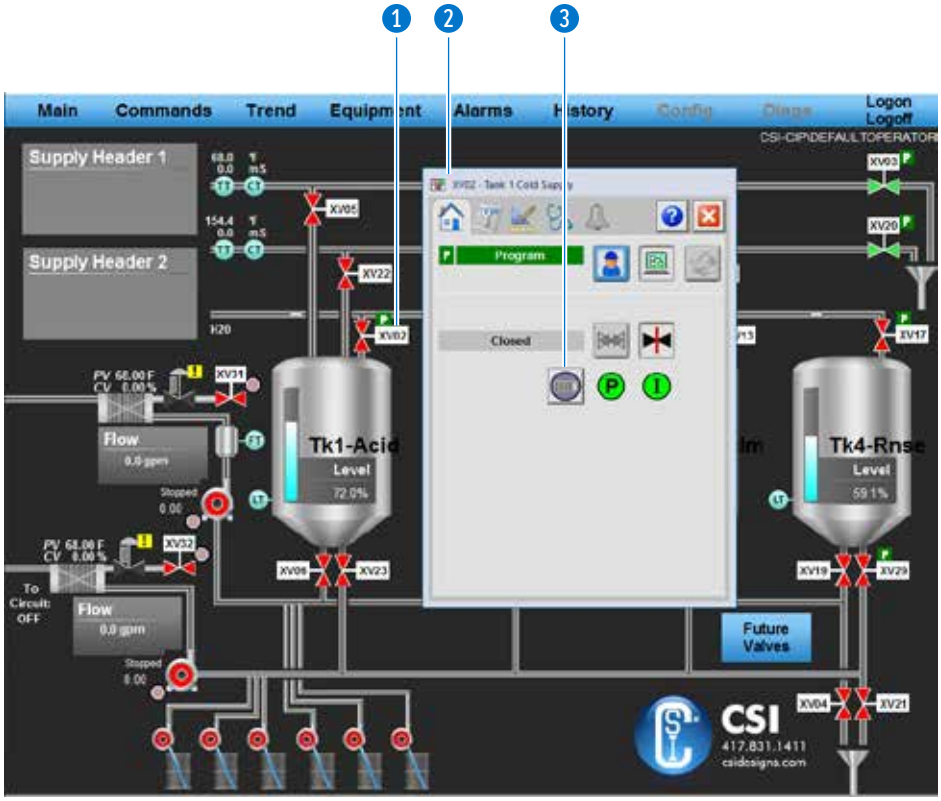
The system should now run the selected wash in automatic mode until the wash set-points have been met or there is an error or E-stop command.

Once completed, the system automatically returns to an idle state.

2 **PLEASE NOTE:** While running, the wash step and information about the current step is displayed in the top left corner of the Main screen.



OPERATION SCREENS: DEVICE FACEPLATES

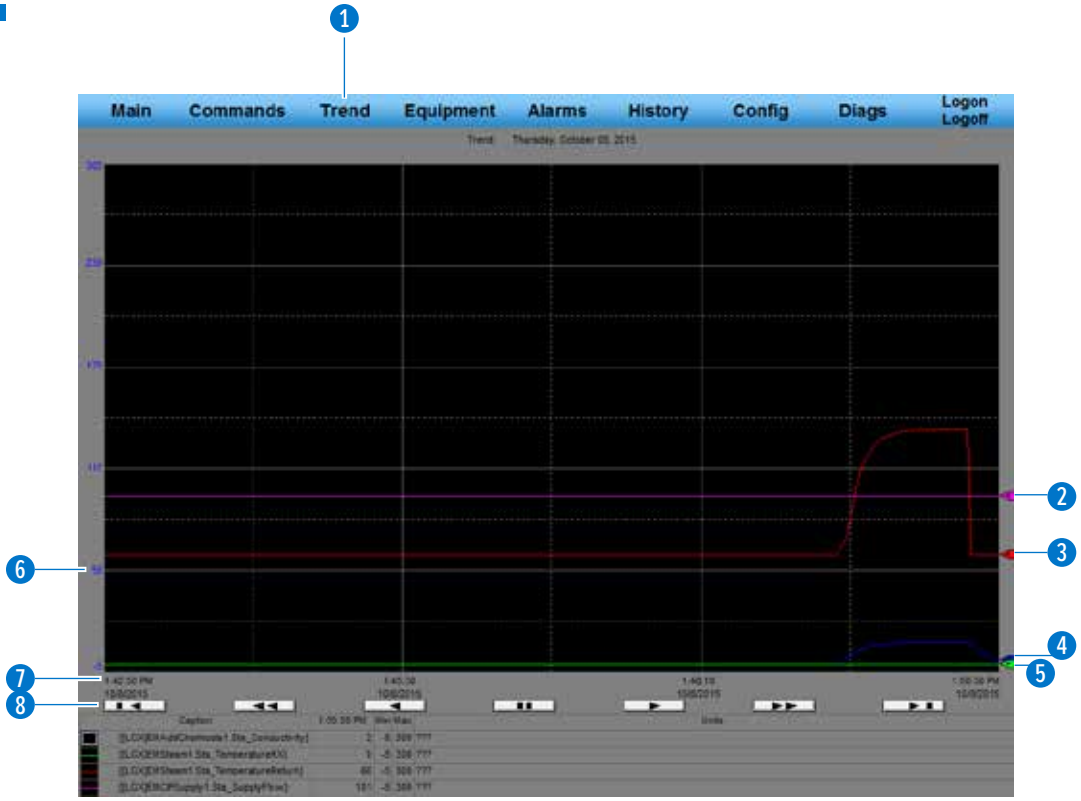


1 To access allowable actions, touch/click on a device (e.g., XV02) which will open the screen for that device.

2 From this screen the operator can see allowable actions for this device on the each tab. (Home tab is pictured above.)

3 Click this button to see the Valve Statistics screen (pictured below).

TREND SCREEN



1 The trend screen displays process parameters over the course of the cycle. To display parameters, press **Trend** from the main navigation window.

The trend screen maps the analog values associated with your system.

All CIP 2.0 programs include:

2 Supply Flow,

3 Return Temperature,

4 Conductivity, and

5 HX or Supply Temperature trends.

More complicated systems, such as a dual supply system, display two trends for Conductivity, Temperature, and Supply Flow, each referencing their corresponding system.

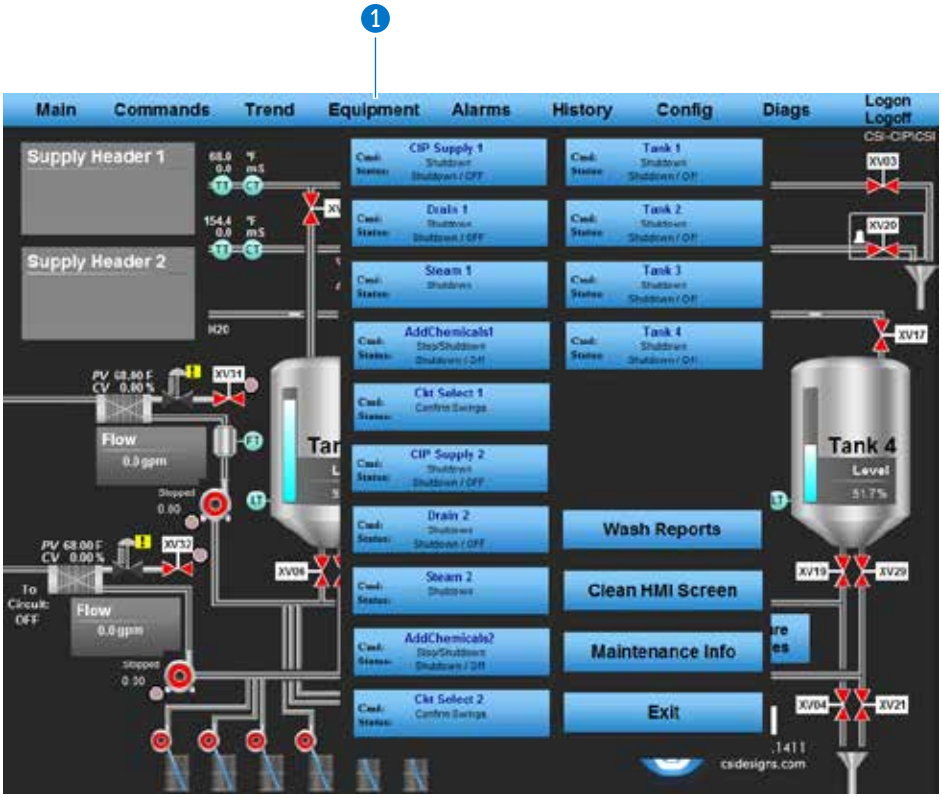
Additional process parameters can be recorded and observed on an individual skid basis.

6 Units scale can be accessed to the left of the Y axis.

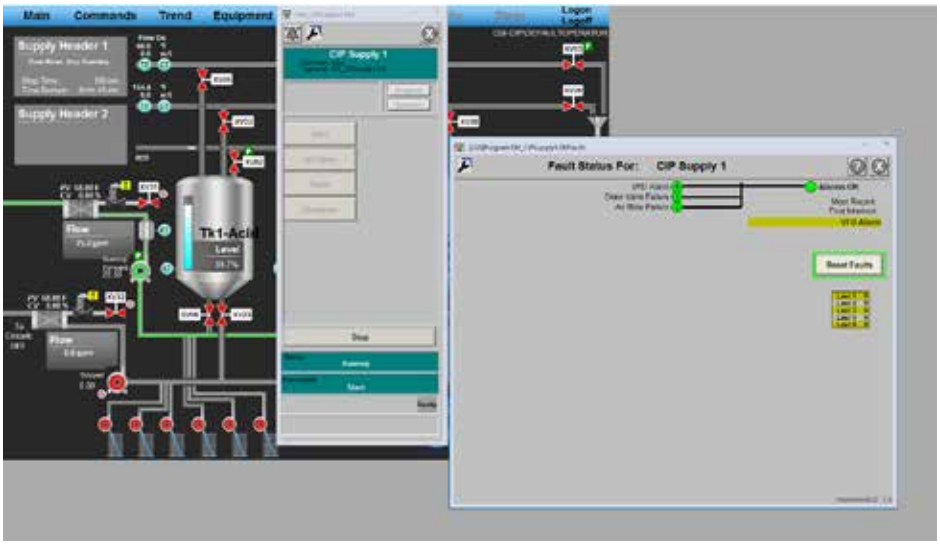
7 Time scale can also be accessed below the X axis.

8 Trend data can go forward or backward by pressing the arrow buttons at the bottom.

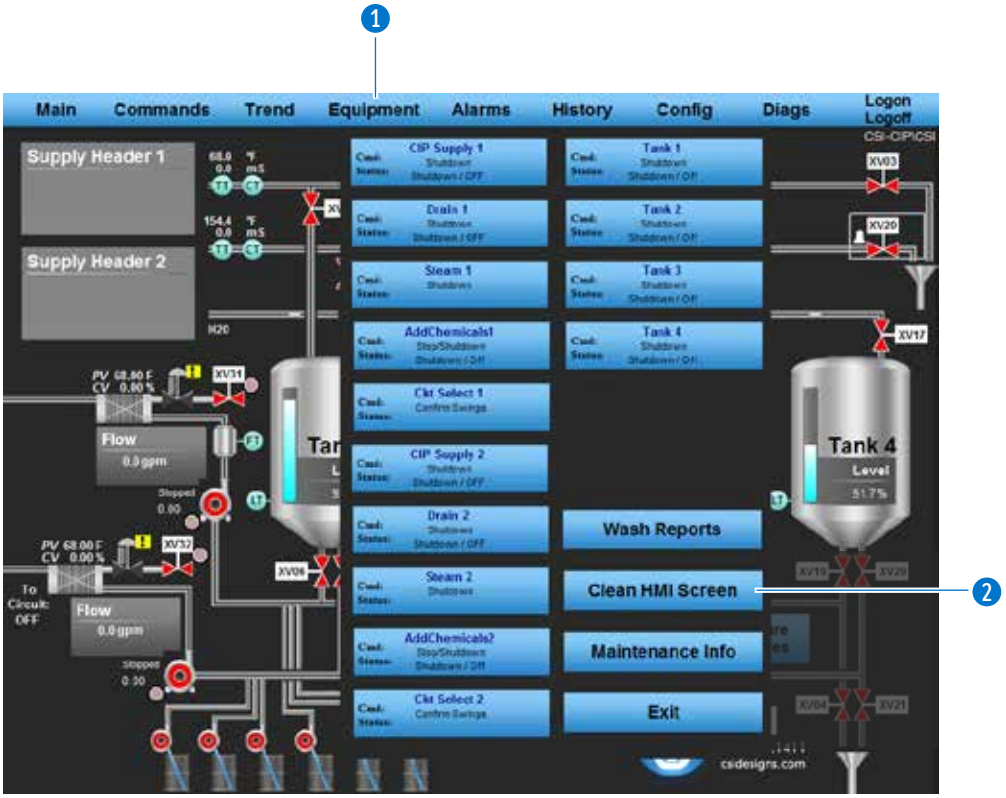
EQUIPMENT SCREEN



1 Select **Equipment** from the main navigation to display the status, manually command, or access alarms or faults (pictured below) for a piece of equipment. This screen above displays the equipment available with the system.



EQUIPMENT SCREEN: CLEAN HMI SCREEN

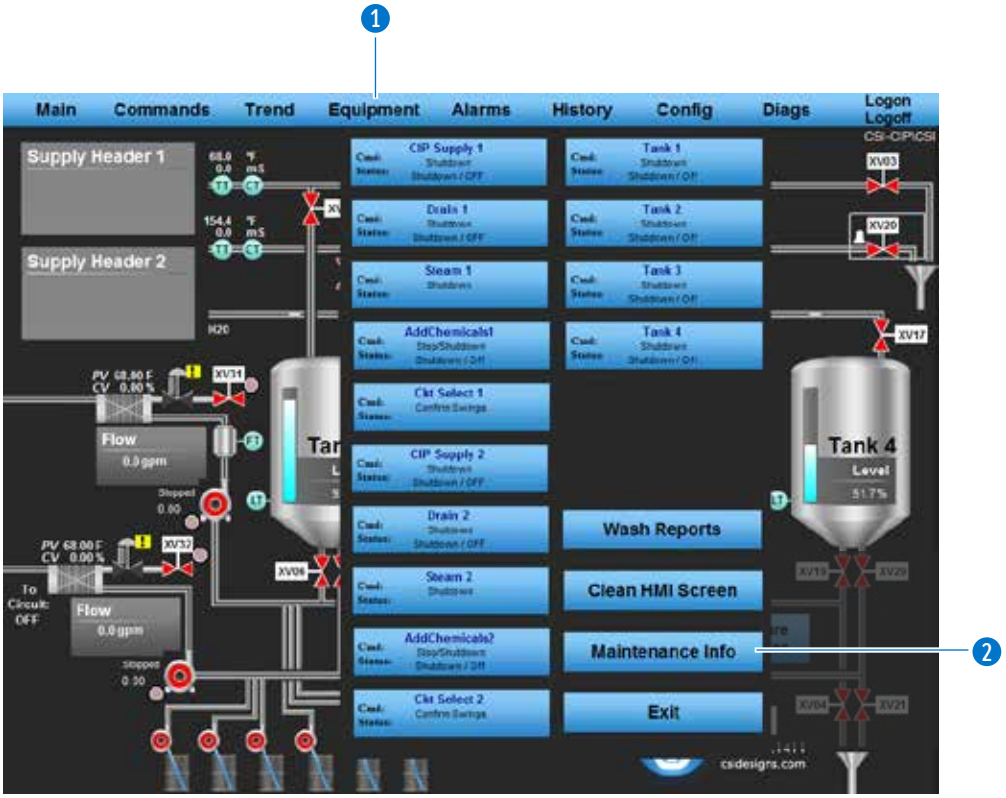


1 Select **Equipment** from the main navigation.

2 Press **Clean HMI Screen** to display a popup which hides the CIP skid objects so the screen can be wiped down with a damp microfiber cloth.

3 The Close button takes you back to the Main HMI screen.

EQUIPMENT SCREEN: MAINTENANCE INFO

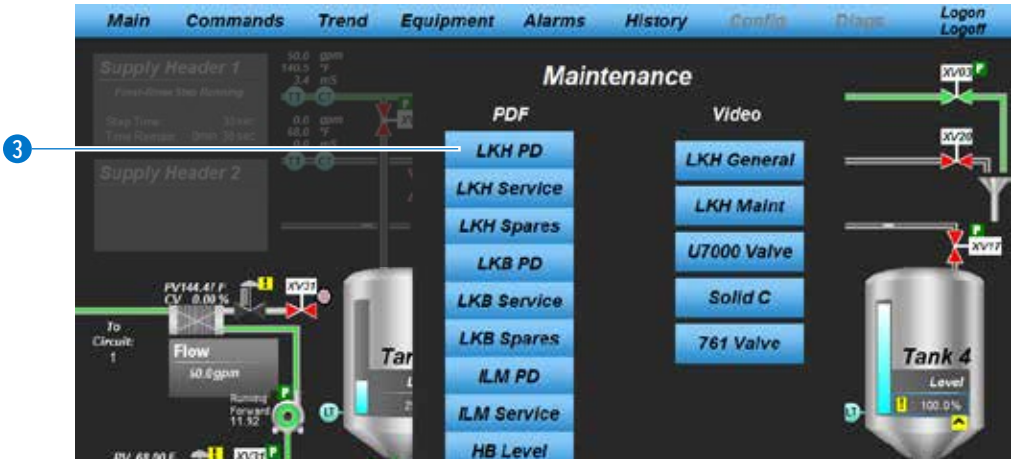


1 Select **Equipment** in the navigation bar.

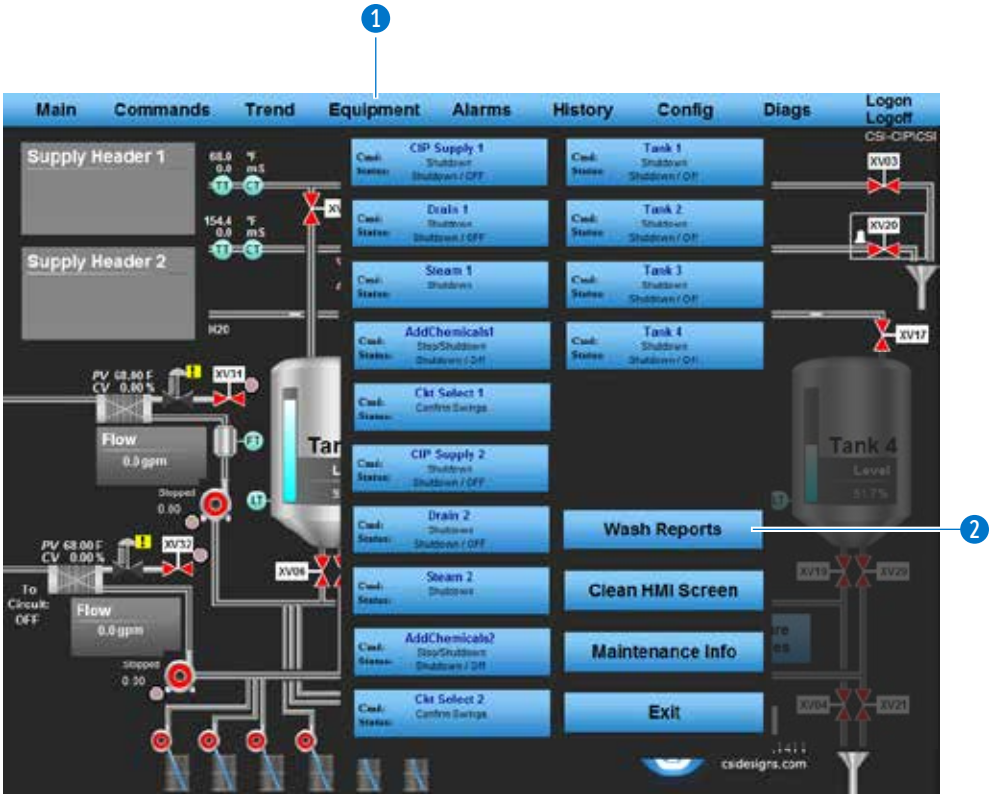
2 Press **Maintenance Info** to display a list of maintenance videos or manuals for a piece of equipment.

3 Press any PDF or Video button to view information on screen for a piece of equipment.

NOTE: Because of Windows-10 processing, the first PDF or video selected will load slowly and will go to the background. Press the same button for the PDF or video again to view it. Leave the viewer open to select additional PDFs and/or videos for viewing without delay.



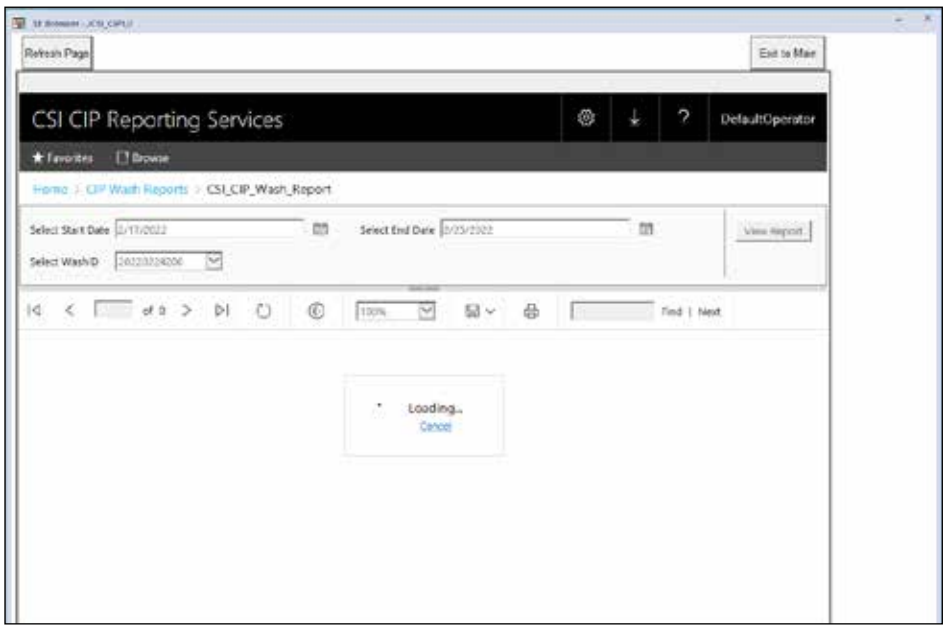
EQUIPMENT SCREEN: WASH REPORTS



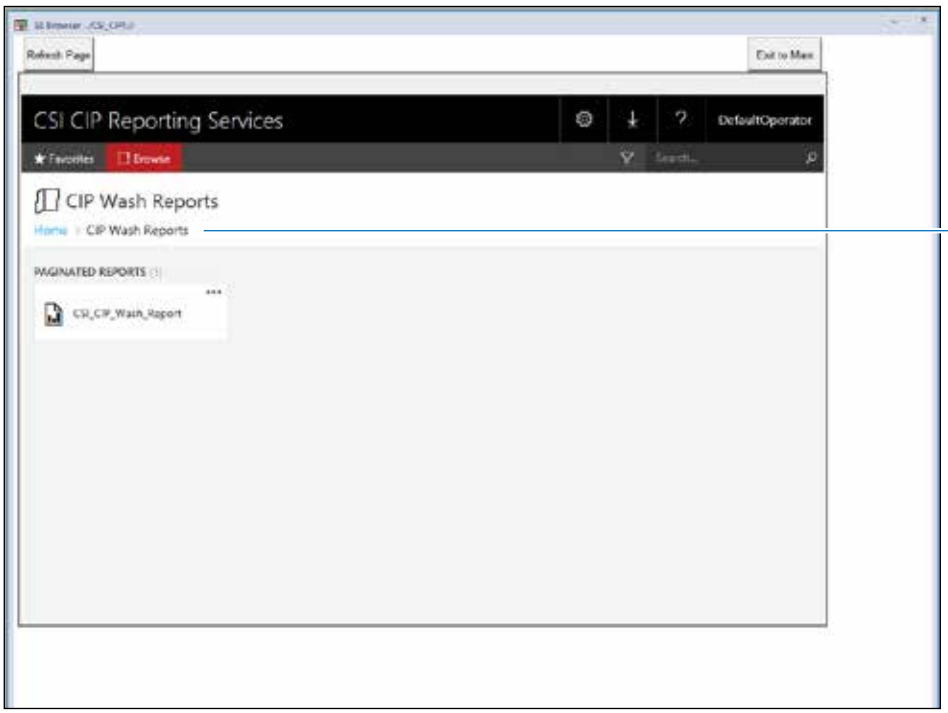
1 Select **Equipment** in the navigation bar.

2 Press **Wash Reports** to display the "Wash Reports" historical database reporting page. Please be patient while page loads slowly, as pictured below.

NOTE: Wash Reports can only be viewed when logged in as DefaultOperator. If you are logged in at a higher level, the wash reports will not be visible.

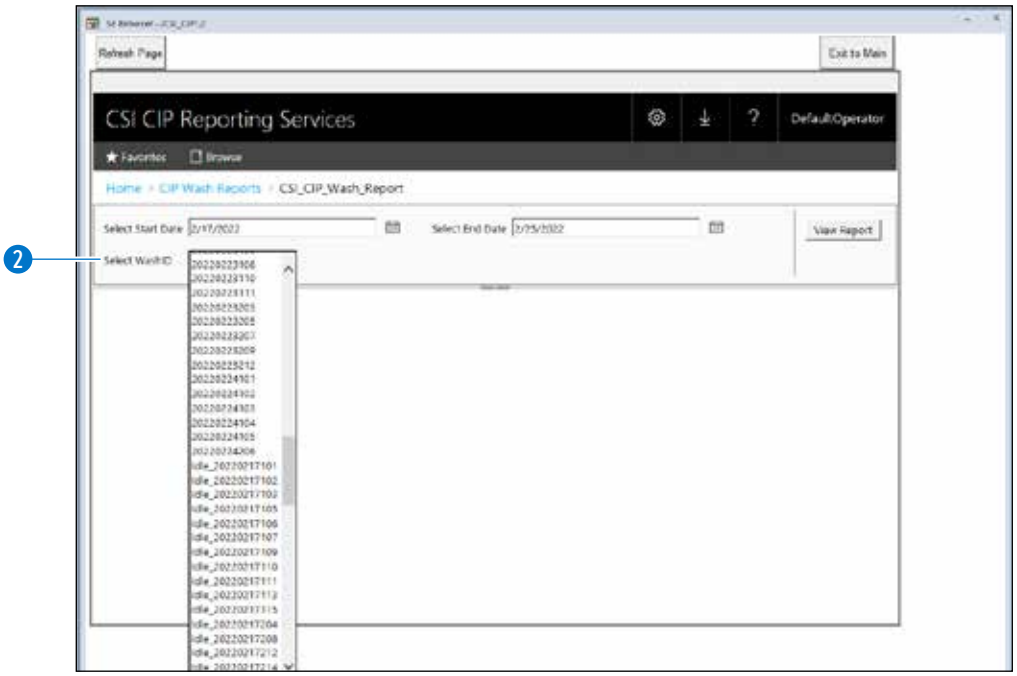


EQUIPMENT SCREEN: WASH REPORTS (CONTINUED)

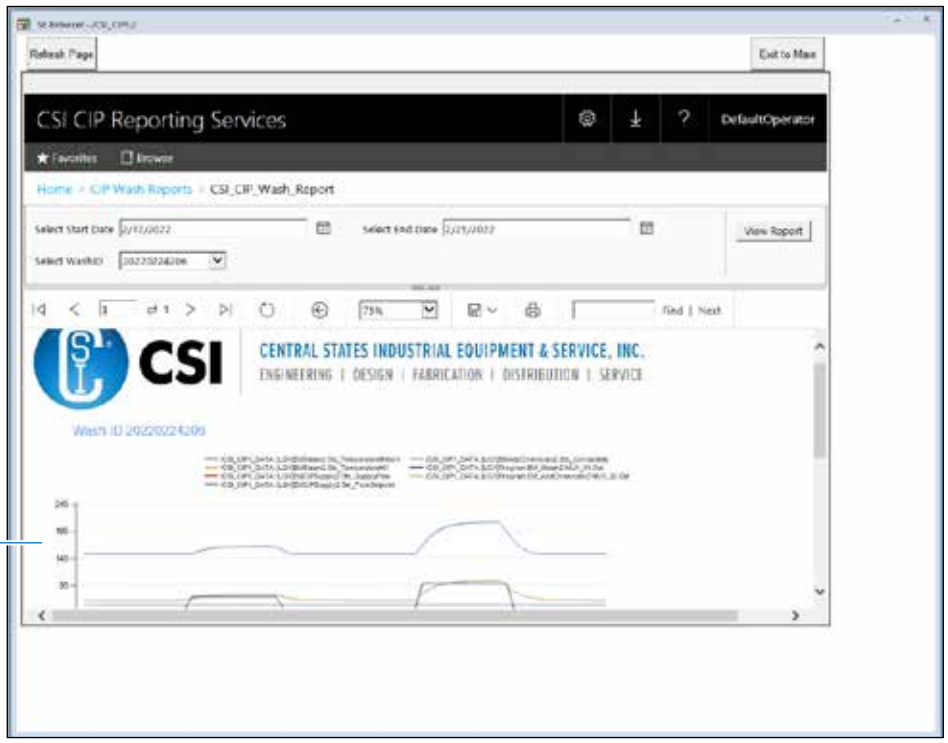


1 If Wash Reports screen does not load, click **CIP Wash Reports** in the file path to access the Report file selection or press “Exit to Main” and load the reports again.

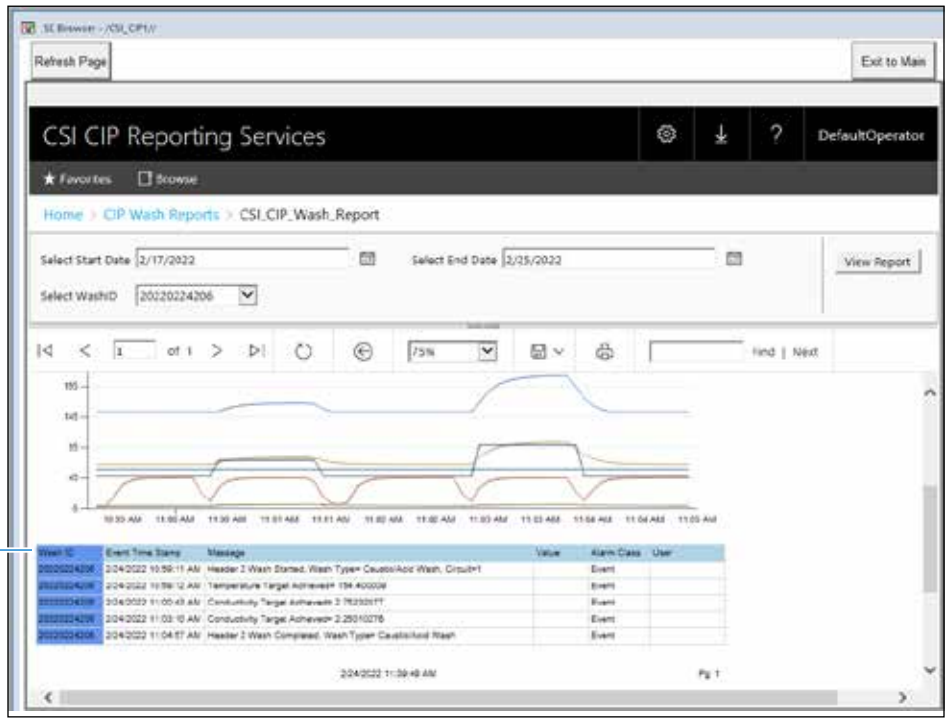
2 Select a Wash ID, then View Report. Wash IDs that end with 1xx are from Supply 1; those ending with 2xx are from Supply 2.



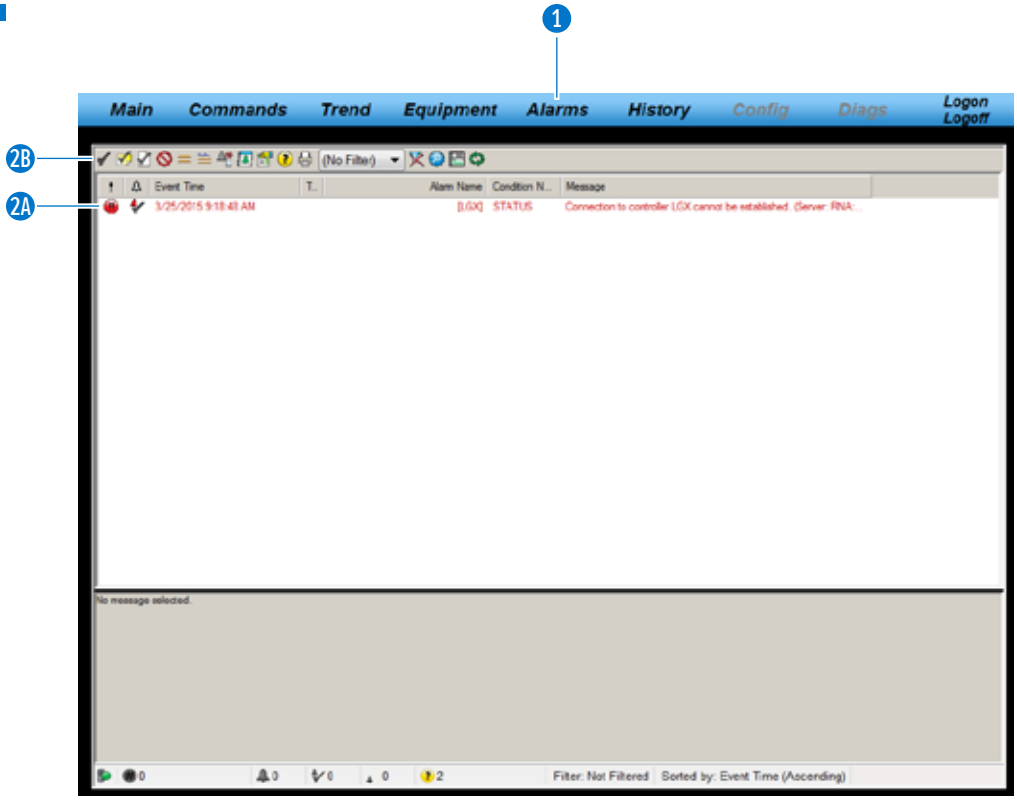
EQUIPMENT SCREEN: WASH REPORTS (CONTINUED)



1. Example of Wash Report with Trend Data is pictured above.
2. Example of Wash Report with Events is pictured below.



ALARMS SCREEN

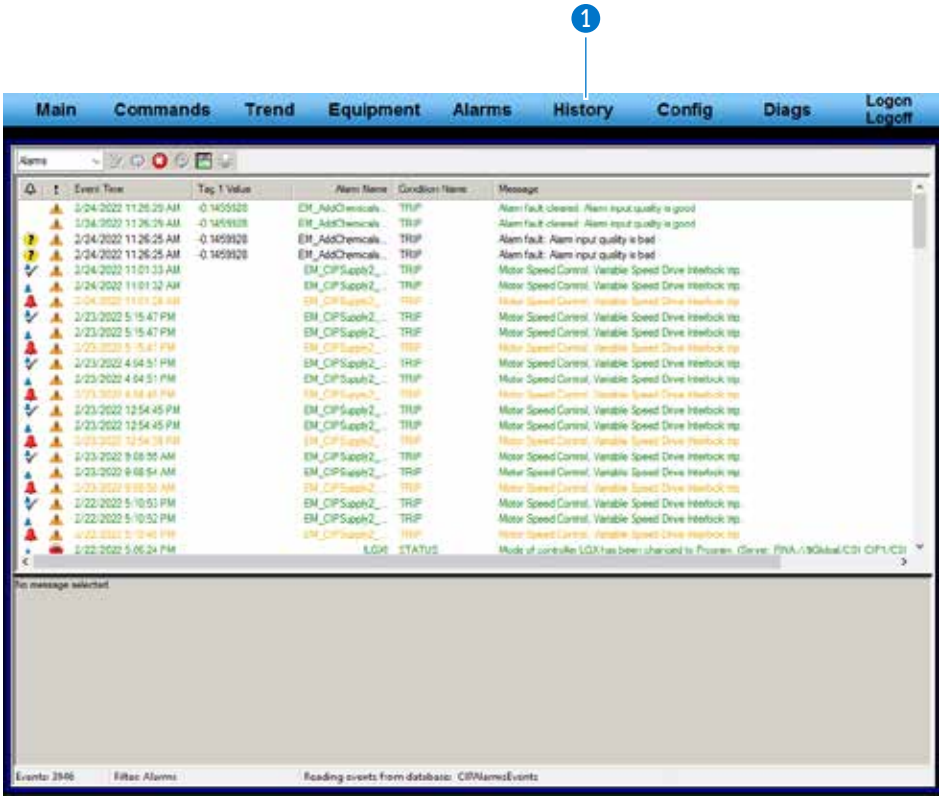


1 The **Alarms** button in the main navigation blinks red to indicate a situation that should be investigated immediately. To see the cause of the alarm(s) select **Alarms** from the main navigation.

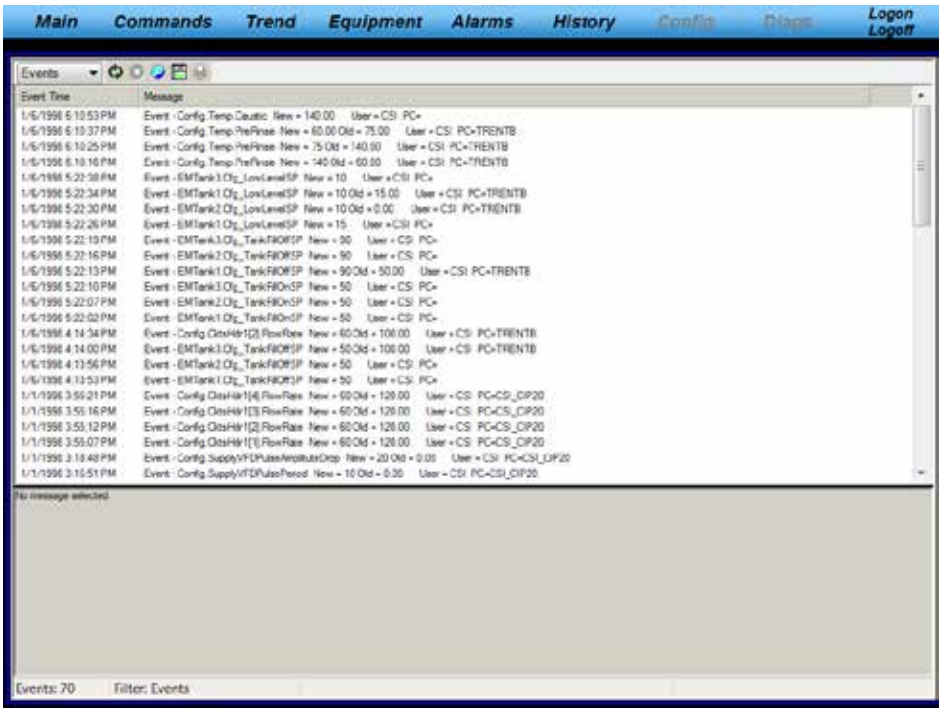
The Alarms button blinks until the alarm(s) are acknowledged.

2 To acknowledge alarm(s), **highlight the alarm** by clicking it, then **press the check mark** at the upper-left corner. Once acknowledged, the alarm occurrence is recorded in the event log — as shown on page 18.

HISTORY SCREENS: ALARMS AND EVENTS

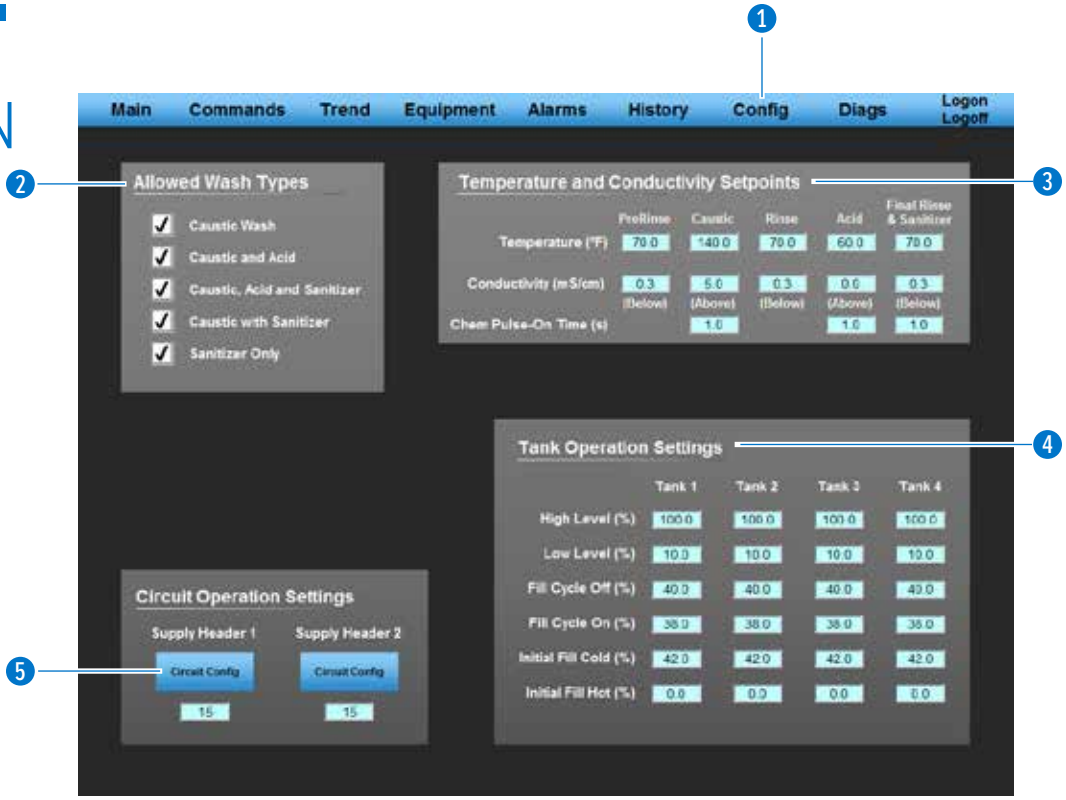


1 Select the **History** button from the main navigation. To access the alarm log, press **Alarms** from the drop-down menu. (Alarms screen is pictured above.) To access the event log, press **Events** from the drop-down menu. (Events screen is pictured below.)



CONFIGURATION SCREENS

ELEVATED LOGIN ACCESS ONLY



To change the system set points from the factory settings, log in at an elevated level. (Call our engineering team at 417-831-1411 to get username and password.)

1 Press the **Config** button from the main navigation menu. Then press **Main** from the drop-down menu to get to the main configuration screen.

2 On this screen, you can change the allowed wash types.

3 You can also change the set points for temperature, conductivity, and chemical pulse-on times. After changing the set points, the tanks should cycle on and off between their respective percentage values to maintain fluid level.

4 Fill levels and initial fills can be adjusted in the **Tank Operation Settings** box.

5 To change flow rates and times for a selected circuit, press **Circuit Config**.

CONFIGURATION SCREENS (CONTINUED)

ELEVATED LOGIN ACCESS ONLY

1 On the circuit settings page the number of circuits available can be configured based on your piping configuration, up to **15 total circuits** per supply.

2 Select whether the circuit needs to verify swing connection (**Has Swing Conn**) or needs to wait for facility permission (**Wait For Facility Perm**) before starting.

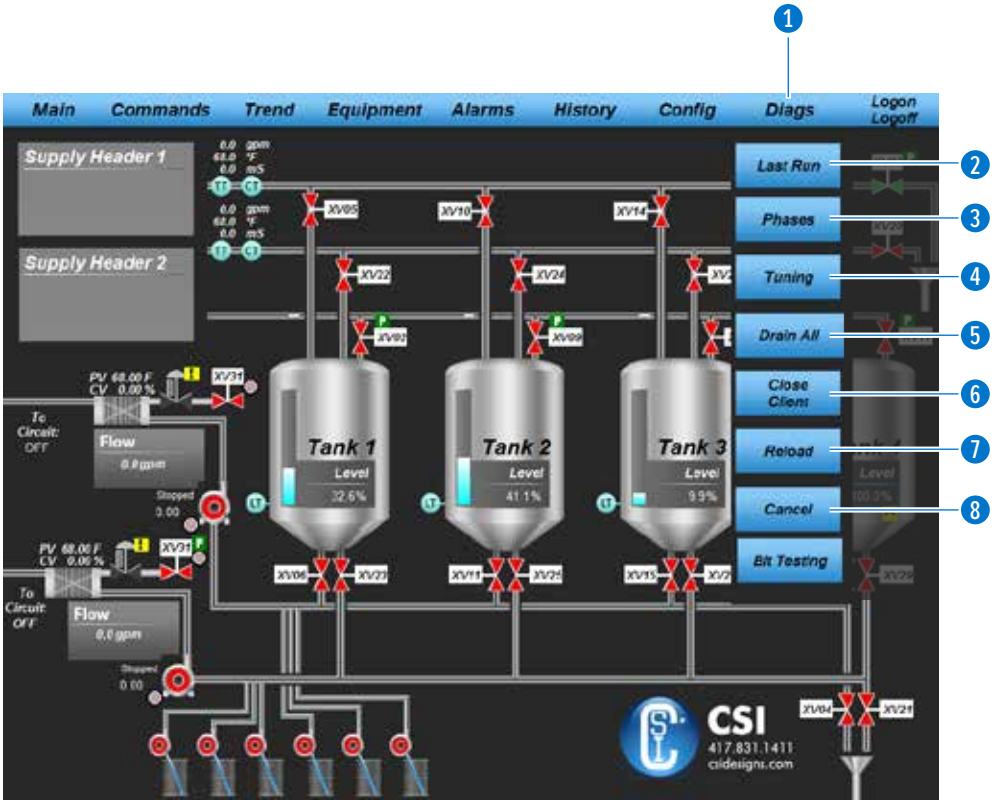
3 Input the flow rate set-point for the circuit.

4 Input the required time. The wash must maintain the designated flow rate, temperature, and conductivity, before moving to the next phase.

5 **Pulse Rinsing** is only visible on this screen if the VFD drop percentage is greater than 0 on the Skid Initial Setup screen (see page 21). If there is no pulse amount set, then it is disabled by default.

DIAGS SCREEN

ELEVATED LOGIN ACCESS ONLY



1 By selecting **Diags**, a number of useful tools for diagnosis are available. These are only available at an elevated level such as engineer. (Call our engineering team at 417-831-1411 to get username and password.)

2 The **Last Run** button displays the last wash type and timestamp for each circuit.

3 The **Phases** button displays the current status for each phase of the wash cycle

4 The **Tuning** button displays the current status, configuration and tuning faceplate for each loop in the system

5 The **Drain All** button automatically opens valves to drain the system

6 The **Close Client** button closes the HMI and takes you to a windows environment.

7 The **Reload** button closes the client and reopens it.

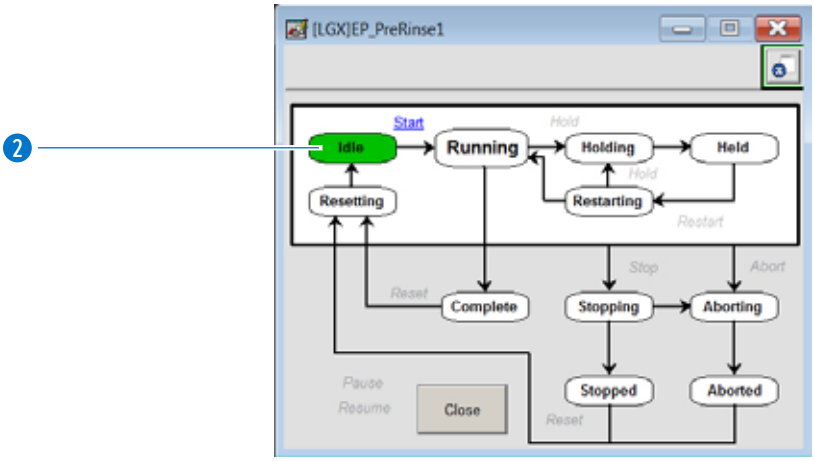
8 The **Cancel** button closes the drop-down menu entirely.

DIAGS SCREEN: PHASE SCREEN

ELEVATED LOGIN ACCESS ONLY

The **Phase** screen available under the **Diags** menu provides information about phases of a wash cycle. You can **Stop**, **Abort** and **Reset** from this screen.

1. Select the **Popup** button for a visual representation of the phase.
2. The **Popup** screen shows the current status of a phase and can be commanded from this screen.



MAINTENANCE

Warning: Ensure a safe working environment before performing maintenance on the CIP 2.0 control system. Ensure a safe work environment includes but is not limited to verifying the following precautions:

- Power to the control panel should be OFF and Locked Out
- Remove or Lock Out the inbound air supply from the pressure regulator

General cleanliness extends the life of your control panels and components. The area should be kept free of spills and loose debris. Under NO circumstance should the panel be sprayed down or cleaned with wet fluids. Doing so could damage the electrical and pneumatic equipment.

If any hardware issues exist, cease all use of the CIP 2.0 Control Panel until all issues are resolved.

MAINTENANCE CHECKLIST

- Check air lines for cracks and leaks.
- Check pressure drop across filter, if pressure drop exceeds maximum allowable the filter needs to be cleaned or replaced.

Note: The pressure drop should not exceed 14psig, if the pressure drop exceeds the maximum allowable the filter needs to be cleaned or replaced.

- Check for loose connections or connectivity concerns regarding the solenoid valves.

Note: A solenoid valve does not give advanced warning before failing.

REPLACING "POLY" TUBING

1. Disconnect the inbound airline at the pressure regulator and ensure that the Control Panel is powered down
2. Press the outer ring of the pneumatic fitting in, and then gently pull the cracked or leaking airline from the fitting
3. Repeat the same procedure for the other end of the airline
4. Use the cracked or leaking airline as a guide for the length of the new airline
5. Trim the new section of airline to the appropriate length.
6. Install airline by pressing each end into pneumatic fittings

Note: Make certain the outer rings on the pneumatic fittings extend after the new line is pressed in. If they are not fully extended outward the hose could be blown out from its seated position when subjected to sufficient pressure.

MAINTENANCE

REPLACING PRESSURE REGULATOR FILTER ELEMENT

SMC, the manufacturer of the supplied filter regulator, recommends the filter element be changed every two years or when the pressure drop across the element exceeds 14 psig.

1. Locate the spring-loaded release on the front of the pressure regulator.
2. Press the release down and hold.
3. Turn the portion of the pressure regulator body below the spring-loaded release by holding the release with the thumb of the hand with which you intend to turn the body.
4. The pressure regulator body should only have to turn approximately half a revolution before you can gently pull it free.

   Note: If you only turn the body a quarter of a turn, the release may try to extend back into place.
5. Once the body of the regulator is removed, the element can be easily removed and replaced.
6. Put the body back on and turn it back into position in the opposite direction you removed it to seat the body in its original position.

REPLACING SOLENOID VALVE

Although solenoid valves used by CSI are rated for one million cycles, there are no performance guarantees for these items. While we do not guarantee a particular number of cycles, we are confident the valves are free from manufacturing defects.

1. Remove retaining screws from the existing solenoid valve

   Note: Keep them until you are certain new screws have been provided
2. Gently remove the solenoid valve from the mounting pad.
   - Take note of how the solenoid valve is oriented
   - Take note of any and all O-rings, as there may be small O-rings on sealing surfaces
   - In some cases the top or bottom of the solenoid valve may need to come out first
3. Verify the O-rings are properly placed on the new solenoid valve. You might have to insert or seat one end of the solenoid valve before the other end seats properly.

   Note: It should never be necessary to force the new solenoid valve into place
4. Install the retaining screws that you removed in step 1. If new retaining screws were provided, use them and discard the screws from step 1.

TROUBLE-SHOOTING

Q. WHAT SHOULD I DO WHEN THE CIP 2.0 SYSTEM HANGS ON "WAITING FOR FACILITY PERMISSION?

Verify whether the circuit needs permission from the plant before starting.

If the circuit does not need permission before starting, have an elevated user change the configuration type for the circuit under Circuit Configuration.

If the circuit does need permission, verify that you are getting a signal back from the plant PLC, as the system may be requesting permission and not getting a response.

Q. WHAT SHOULD I DO IF I ACCIDENTALLY CLOSE THE HMI CLIENT?

A. Locate the shortcut on the Windows Desktop called **CSI-CIP.cli**, double click this file to re-launch the HMI client.

Q. WHAT SHOULD I DO IF I CANNOT MANUALLY RUN THE CIP PUMP?

Verify that there is at least one tank discharge valve open to supply the pump with liquid.

Verify that there is a tank level over 5% in the tank that is supplying the liquid.

If either of the above is not true there should be a stop sign symbol next to the pump indicating it cannot run. This is done by design to protect the pump from running dry.

Q. WHAT SHOULD I DO IF I CANNOT MANUALLY RUN THE HEATER OR STEAM VALVE?

Verify that there is a recirculation loop established and that the flow is over 10 GPM.

Ensure the steam supply valve status shows in the open position.

If the valve is not in open position, a yellow exclamation point indicates that the equipment cannot run, to protect the heat exchanger from heating without flow.

Q. WHY DO I NOT SEE WASH REPORTS WHEN I FIRST ACCESS THEM?

Select Wash ID and date range, then view report.

Q. WHY DO I NOT SEE WASH REPORTS WHEN I'M LOGGED IN AS "ENGINEER"?

The equipment is set up to allow only "operator" (or additional administrator set up by customer's IT department) to access Wash Reports. Log out of elevated access, and log in as a default operator or administrator.

Q. HOW DO I LOG IN AND LOG OUT?

See login instructions on the bottom of page 9. Also, the startup engineer at CSI will provide your company point-of-contact with a spreadsheet of elevated-access usernames and passwords.

WARRANTY

A. **GENERAL PROVISIONS**: Central States Industrial Equipment & Service Inc. (hereinafter referred to as the Company) warrants to the original purchaser-used (hereinafter referred to as the Customer) that equipment or parts thereof manufactured by it are free from defects in material and workmanship only, under normal use and service, for a period of one (1) year from the original shipment date. The Company shall not be liable for any loss of profit, loss by reason of plant shutdown, non-operation or increased cost of operation, loss product or materials, or other special or consequential loss or damages. This warranty does not apply to any equipment (or parts thereof) which has been subjected to accident, alteration, abuse or misuse. This warranty is in lieu of all other warranties, expressed or implied (including the implied warranty of merchantability and fitness) and of all other obligations or liabilities on the part of the Company, and the Company neither assumes nor authorizes any other person to assume for it any other obligation or liability in connection with this equipment. In the event of a breach of warranty our liability shall be limited to the purchase price of the part(s)that failed.

B. **RETURN OF PARTS OR EQUIPMENT TO COMPANY PLANT**: Permission to return any parts or equipment must be obtained, in writing, and must be returned with transportation cost prepaid. In the event that equipment (or parts thereof) manufactured by the Company is returned to the plant, the Company's obligation is limited to repairing or replacing parts which upon examination are found (to the satisfaction of the Company) to be defective in either material or workmanship. No transportation will be paid by the Company unless written approval for transportation charges is given by the Company.

C. **COMPONENTS NOT MANUFACTURED BY THE COMPANY**: Components not manufactured by the Company, but furnished as part of its equipment (for example: Valves, controls, gauges, electrical switches or instruments) are warranted by the Company only to the extent of the Component manufacturer's warranty.

D. **REPAIR OF EQUIPMENT INSTALLED IN THE CONTINENTAL UNITED STATES**: Should an in-warranty failure occur, and it is, in the judgment of the Company, impractical to return the equipment for repairs, the Company will arrange for the repairs to be made by its personnel or, at its option, sublet to a qualified company. The Customer is expected to cooperate by making the equipment available and accessible when the work is scheduled and is expected to provide the necessary utilities. If local labor conditions prohibit such work being done by Company personnel under the conditions and at the rates payable by its contracts with its employees, the Company obligation shall be limited to supervision of the work, replacement of defective parts, and labor costs in an amount equal to the amount which would be payable for a reasonable number of hours required to make the repairs at the rates payable under the terms of Company contracts with its employees. In such event, all labor costs shall be paid by the Customer and the Company will reimburse to the extent set forth above.

E. **REPAIR OF EQUIPMENT INSTALLED OUTSIDE THE CONTINENTAL UNITED STATES**: Should an in-warranty failure occur, and it is, in the judgment of the Company, impractical to return the equipment for repairs, the Company obligation shall be limited, and the Company shall have the options of either sending a service representative to repair (or supervise the repairs) or granting a reasonable allowance for having the repairs made locally.