AKURATE DYNAMICS

USER'S MANUAL

Delta CPS

Akurate Dynamics

2020 REV: AB

USER'S MANUAL

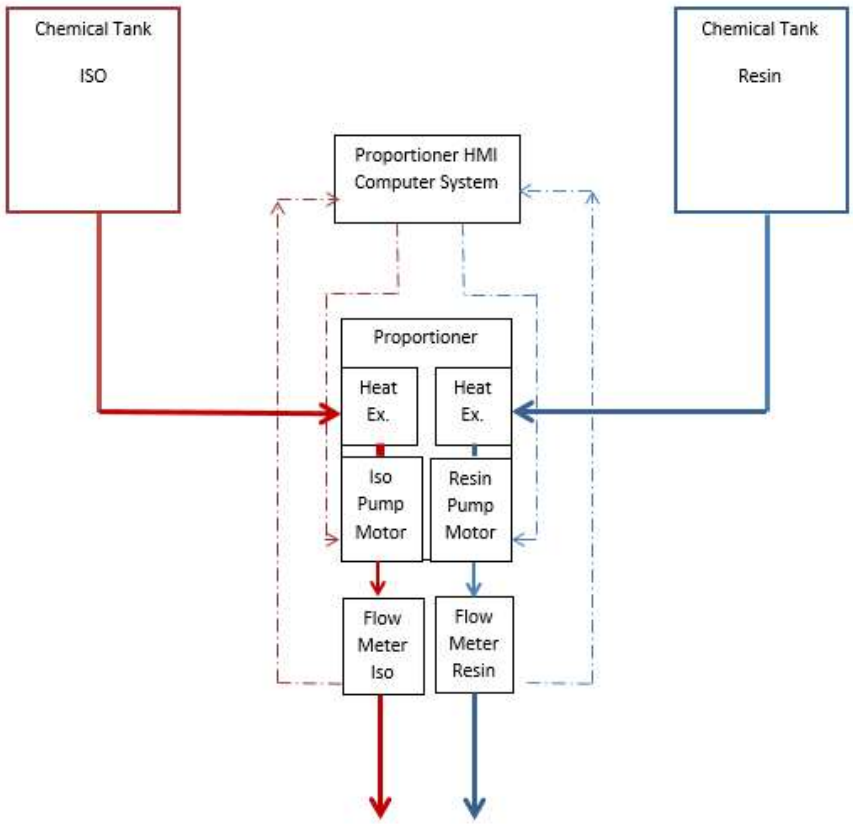
Contents

1.0 GENERAL INFORMATION

1.0 General Information

1.1 System Overview

The team at Akurate Dynamics specifically designed this system to address the most important aspects in the application of plural component polyureas. This intelligent system ensures that both the chemical and resulting foam are prepared and processed according to Chemical Manufacturer's specifications. Designing the system from the tip of the gun back to the tanks allowed for pressure and temperature to be maintained for optimal processing resulting in maximum reliable yields and on-ratio foam time-and-time again.



Process of Ratio Control:

- Iso Motor is set to a fixed Speed.
- Instantaneous flow is detected by the computer on both Iso and Resin Flow Meter. If Ratio is off, then the computer adjusts the speed of the Resin Pump to make the output flow match. This ratio is set by the computer and requires no interaction with the operator.

2.0 OPERATING THE PROPORTIONER

2.0 PROPORTIONER CONTROLS

2.1 Startup/Main Screen

Upon start up, the following screen will be displayed on the HMI (Human Machine Interface). From here you can cycle between the three different operation modes and control the main parameters: gun pressure (atomization pressure), pump speed, and operating temperature. Several key pieces of information can also be viewed here: pressure reading at the gun, motor speed, chemical temperature, volume of chemical, and ratio. From this screen, all other windows can be accessed using the buttons along the right side of the screen.

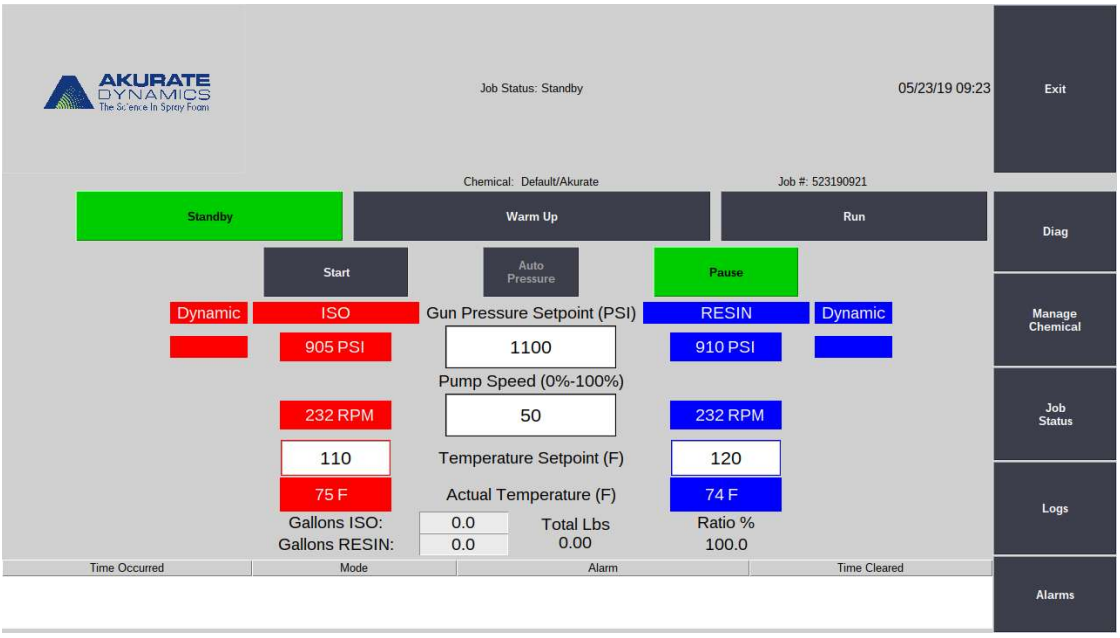


Figure 2.1 – Main Screen

2.2 Manage Chemical

To open the Manage Chemical screen, select the **"Manage Chemical"** box located on the main screen. Displayed in this window are the chemical settings being used, volume of chemical sprayed, ratio, tank

level and temps (if tank sensors are installed). Multiple chemicals may be added to the system to expedite set-up when using various chemicals between jobs. Whenever adding, editing, or deleting a chemical (outlined below) the user will be prompted to input a password. The password is 21 (Press 2 – 1 – Set).

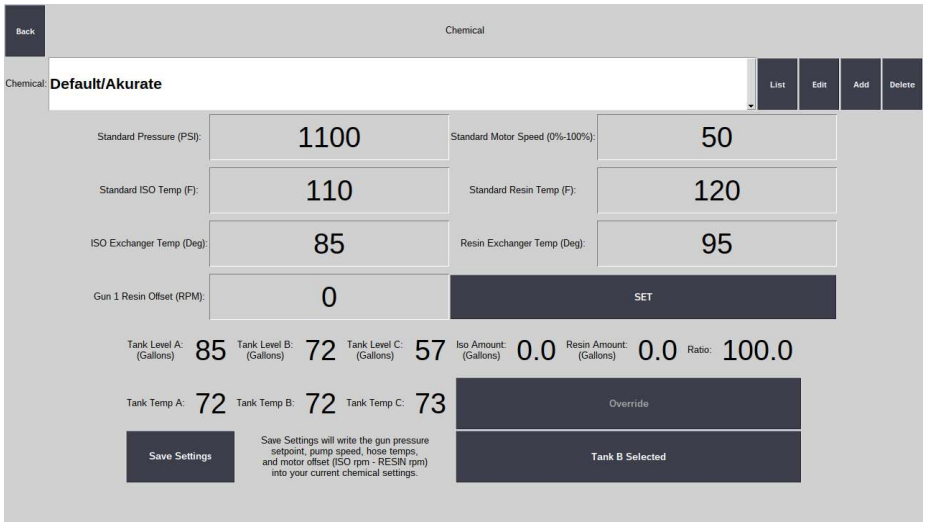


Figure 2.2 – Manage Chemical Screen

2.2.1 Add Chemical

Select the **"Add"** tab to add new chemical. Select each field to input the required information. Once all fields have been filled, press **"Save"** to add the new chemical to the system.

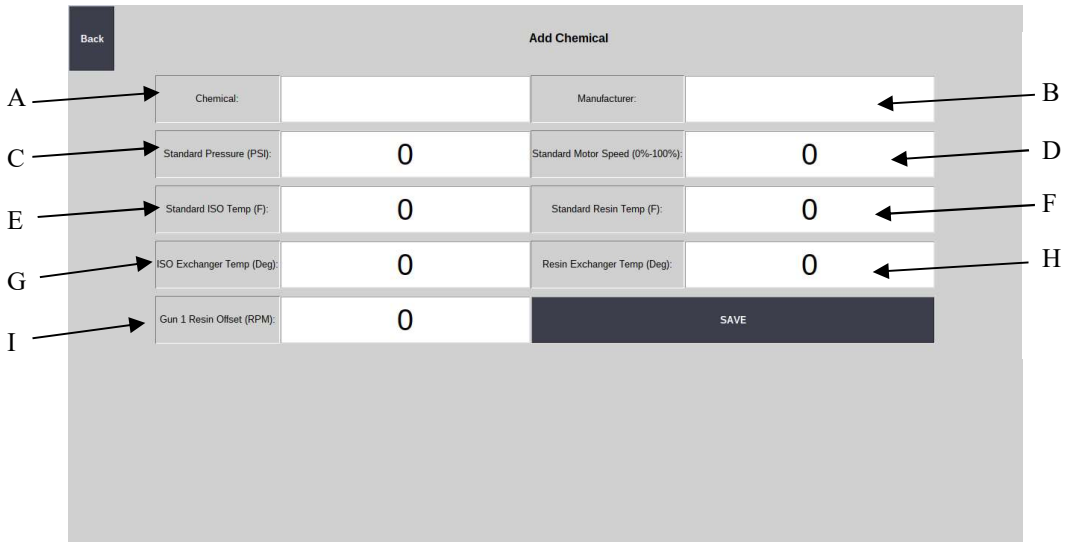


Figure 2.3 – Add Chemical Window

A. Chemical – Chemical Name
B. Manufacturer – Chemical Manufacturer
C. Standard Pressure (PSI) – Gun Pressure Setpoint
D. Standard Motor Speed (%)

E. Standard ISO Temp (°F) – Hose temperature for Iso
F. Standard Resin Temp (°F) – Hose temperature for Resin
G. ISO Exchanger Temp (°F) - Temperature setpoint for ISO preheater; ~10% below operating temperature. (Max Value = 120 °F)
H. Resin Exchanger Temp (°F) – Temperature setpoint for Resin preheater; ~10% below operating temperature. (Max Value = 120 °F)
I. Gun 1 Resin Offset – Motor speed offset from Iso Motor (Difference in motor speed)

2.2.2 Edit Chemical

To edit an existing chemical in the system:

1. From the Manage Chemical window, use the dropdown arrow or press **"List"** to view all saved chemicals.
2. Select the chemical you would like to display.
3. Select **"Edit"**.
4. Update the desired fields by selecting the appropriate box.
5. Once all desired changes are made, press **"Save"**.
6. Press **"Back"** to return to manage chemical window.

2.2.3 Selecting a Chemical

To update the systems settings for a particular chemical, follow the steps below:
Note: If the chemical being used has not been saved to the system, go to section 2.2.1 and follow the steps to add a new chemical.

1. From the Manage Chemical window, press the dropdown arrow or **"List"** to view saved chemicals.
2. Select the desired chemical from the menu.
3. Verify settings for each parameter.
    a. If an undesired value is in one of the fields, select **"Edit"** and follow steps in section 2.2.2.
4. Press **"Set"** to update system to the chemicals settings.

2.2.4 Deleting a Chemical

To remove a chemical from the system, follow the steps below:

1. From the Manage Chemical window, press the dropdown arrow or **"List"** to view saved chemicals.
2. Select the chemical to be removed.
3. Press **"Delete"**.
4. A new window will pop up to verify that the chemical is to be deleted. Select **"Yes"**.

2.3 Job Setup

The Job Setup window can be used to input important information relating to the day's job. It is crucial to fill out this window in order to generate Job Reports, Summaries and Logs that contain the correct information pertaining to that particular job.

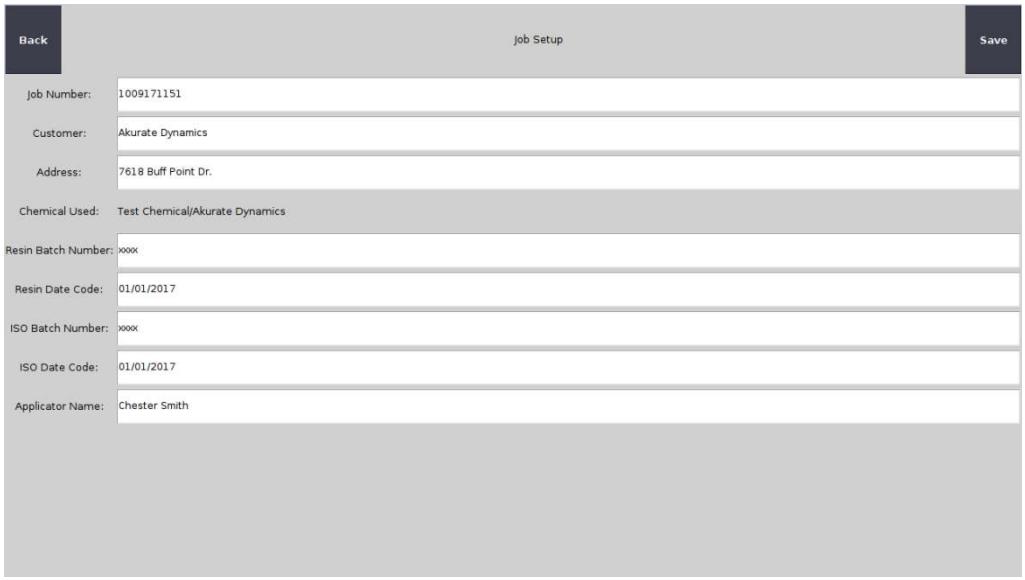


Figure 2.4 – Job Setup Screen

Job Setup should be completed each time a new job is started. Follow these steps:
Note: Verify that the correct chemical is selected in the Manage Chemical Window. If undesired chemical is displayed in the Manage Chemical window, follow steps in section 2.2.3 to update.

1. From the Main Screen press **"Job Setup"**.
2. In the Job Setup window select each field to update it with the correct information.
3. Once all fields are populated, press **"Save"**.

2.4 Operating Modes

There are three different modes for operation: **Standby**, **Warm-up**, and **Run**. The system defaults to **Standby** mode when initially turned on.

2.4.1 Standby Mode

Standby Mode is the default when first powering up the Proportioner. In **Standby** Mode, the system will not send power to any of the equipment within the system. This is the desired mode when making any changes in the system or whenever there is a brief break during operations that does not require a full shutdown.

2.4.2 Warm-up Mode

Warm-up mode is used to begin heating the chemical to operating temperatures and pressurize the system using auto-pressure or to recirculate the chemical through the hoses. In this mode, chemical will heat to a percentage of setpoint that can be defined in the configuration screen to prevent overheating.

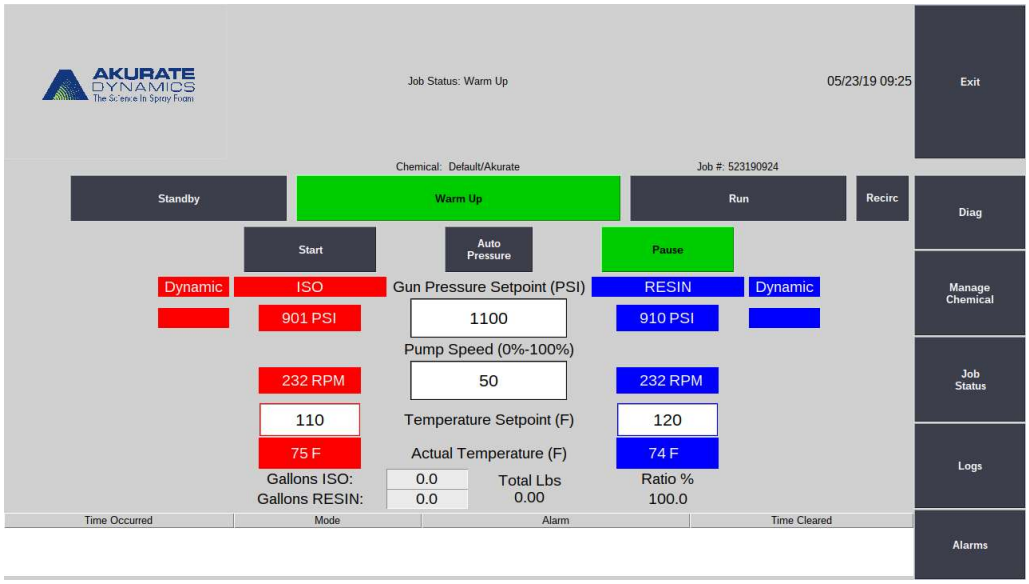


Figure 2.5 – Warm-up Mode

2.4.3 Run Mode

When ready to spray, select the **"Run"** button. Chemical temps will now reach 100% of set point. You will now have to select **"Start"** to pressure up and begin spraying.

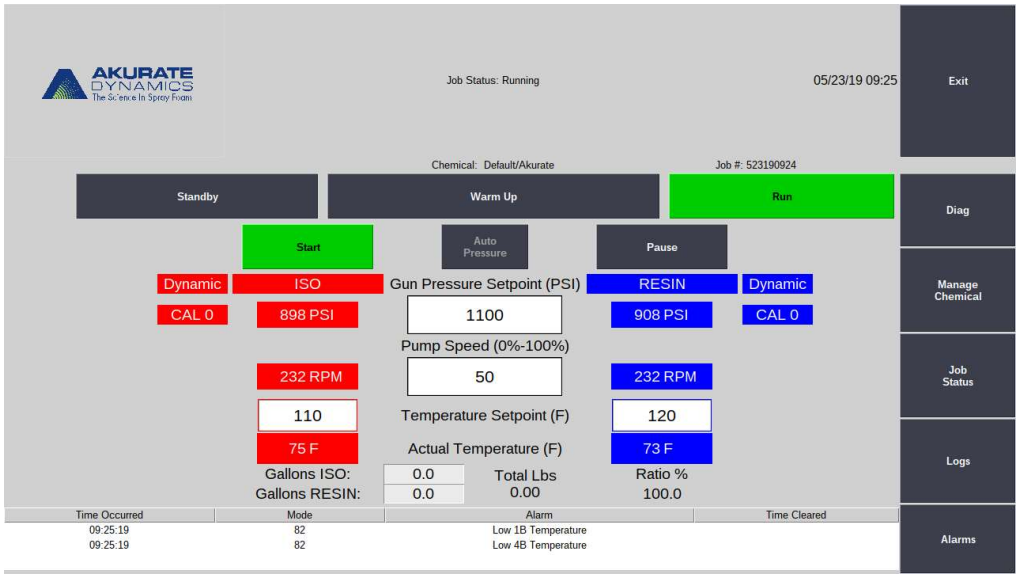


Figure 2.6 – Run Mode

2.5 Diagnostics Window

The Diagnostics Window contains several different measurements recorded throughout the system.

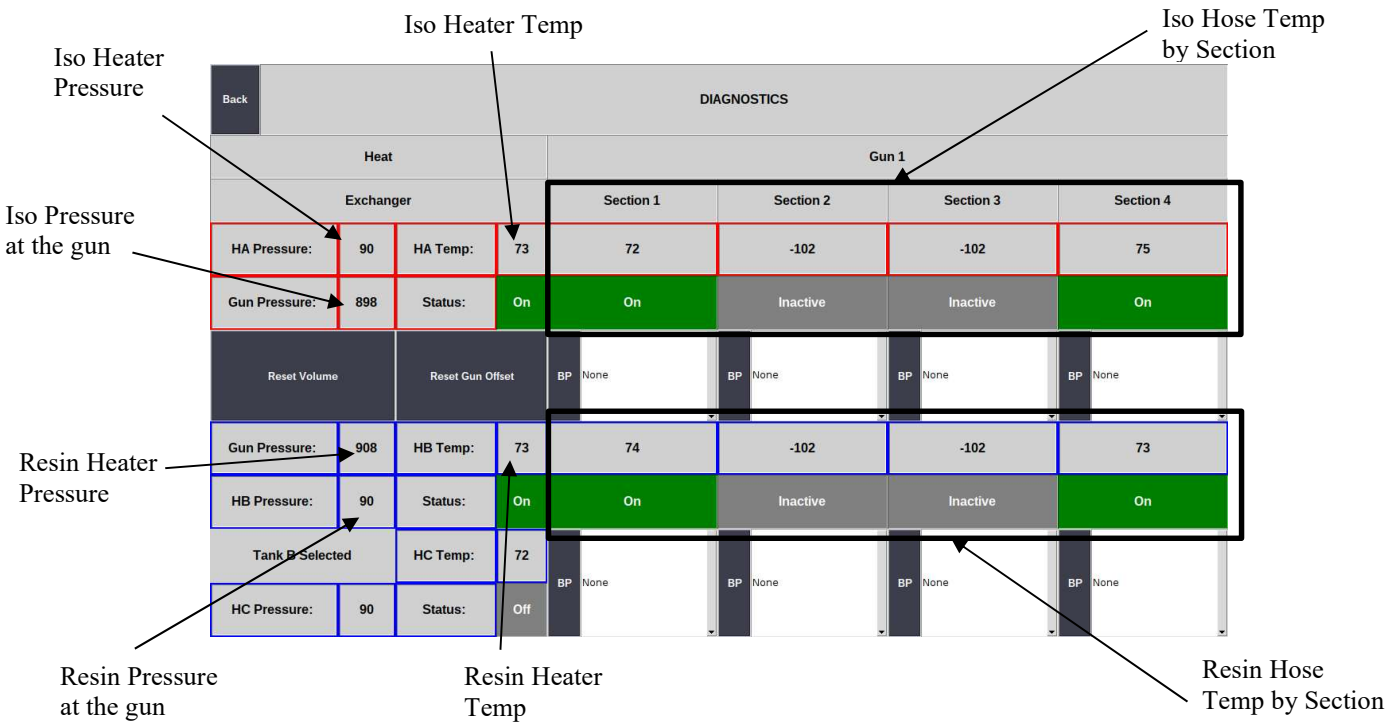


Figure 2.7 – Diagnostics Screen

2.5.1 Heater Sensors

Located on the left-hand side of the screen, heater temperature and pressures are displayed. If either of these sensors fail, they should be replaced immediately. Failing values would be values that are changing erratically, illogically, or a flat negative value less than -10 for any sensor.

2.5.2 Hose Temperature

Hose temperatures are displayed for each individual section. Sections 2 & 3 can be toggled as active or inactive in the configuration screen depending on the hose length as certain sections aren't present in shorter lengths of hose. The box underneath each hose temperature reading displays the status of the section. If the section is below setpoint for the given section and operational mode, the box will display **ON**. Once the section reaches the desired setpoint, the box will display **OFF**.

The **"BP"** button underneath each section stands for Bypass and can be used as a crutch to finish a job, given that a temp sensor was to fail in the middle of spraying. A value of -102 denotes either a disconnected sensor or that the sensor itself has failed. Also, if experiencing abnormal

values or erratically changing values, that can indicate a failing sensor. It is always best to replace the sensor when first discovered, however you can bypass the failing section to one adjacent. What this means is that if you were to bypass Section 3 to Section 4, Section 3 would be controlled using the Section 4 temp sensor. To do so press the **"BP"** button and a drop-down menu will appear displaying potential sections to bypass to. Simply select the desired section and continue operation until the job is complete and the sensor can be replaced.

2.5.3 Reset Volume

Reset volume is used to clear the volume count displayed at the bottom of the Main Screen and in the Manage Chemical window.

2.5.4 Reset Gun Offset

Gun offset is a term used to define the difference in motor speed between the Iso and Resin motors. For example, a gun offset of -10 would mean that if the Iso motor were reading 200RPM, the Resin motor would be set to 190RPM – the offset value can be both positive or negative. The gun offset (or difference in motor speed) is a critical component for maintaining ratio as the Resin motor speed either increases or decreases to output the same volume as Iso. The default offset is set to 0 unless changed in the Manage Chemical screen. Whenever the need arises to reset the offset after spraying you can do so by selecting the **"Reset Gun Offset"** button which will reset the offset to the value entered in the **Manage Chemical** screen.

2.6 Logs Window

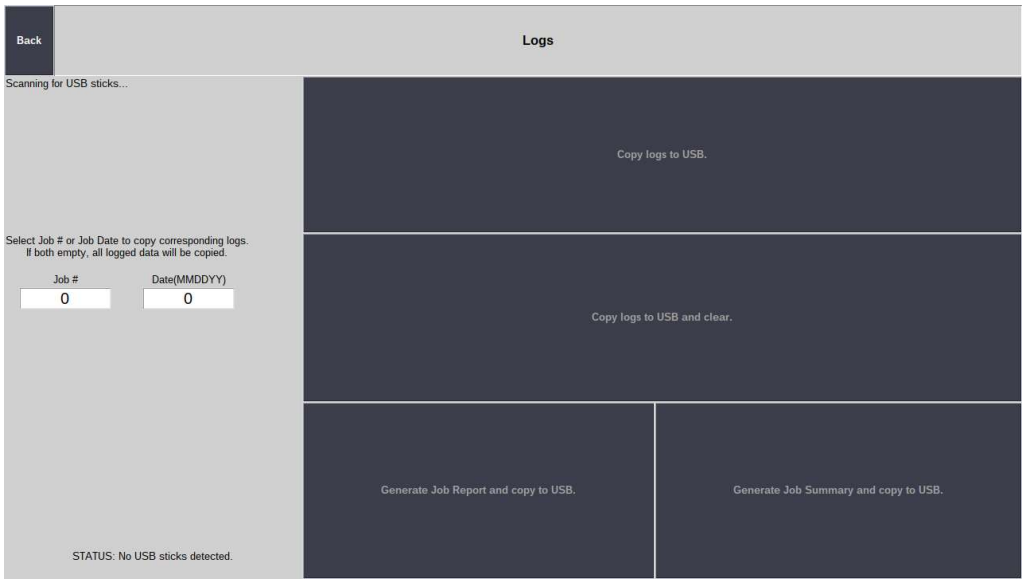


Figure 2.8 – Logs Screen

The Logs Window is where copies of any required documentation can be obtained. A USB key will be required in order to pull the files from the system. Copies of the data logs, Certificate of Conformance, and Job Summary are obtained here. Details for each can be found in Section 5.0.

2.8 Alarms Window

Alarms can be viewed from the Main Screen and the Alarms window. In order to view and/or address any alarms that occur, the **Alarms** window will need to be accessed.

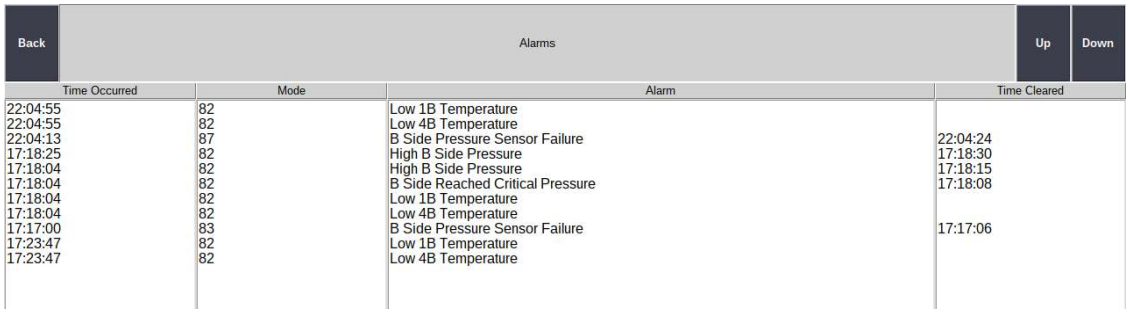


Figure 2.9 – Alarms Dashboard

2.10 Shutting Down

Before cutting power to the Proportioner with the master power switch, be sure to shut down the HMI first. To do so, go to **Standby**, press the **"Exit"** button in the upper right-hand corner of the Main Screen. Then press **"Shutdown"** in the pop-up window. Once the screen turns blue, the master power can be switched to **OFF**.

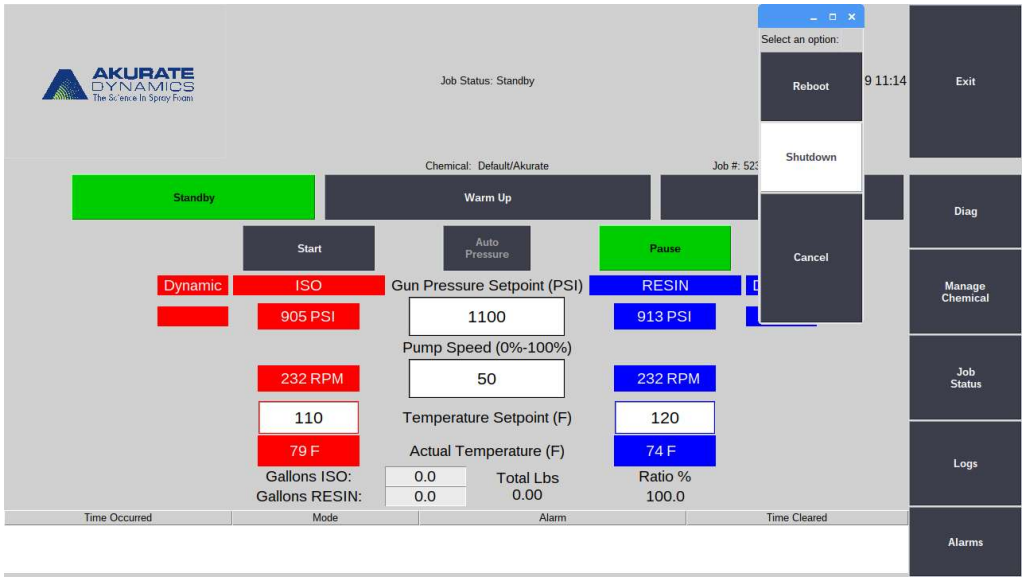
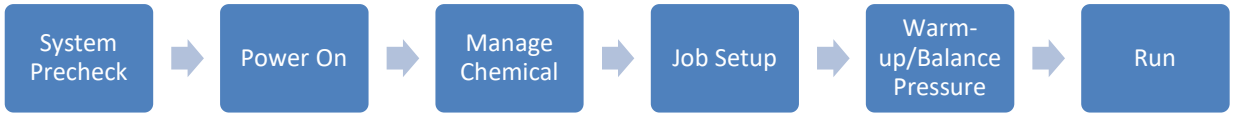


Figure 2.10 - Shutdown

3.0 SYSTEM OPERATION

3.0 SYSTEM OPERATION

The basic process to follow is outlined below. Follow the detailed steps beneath to ensure successful set-up each time. A breakdown of each step can be found subsequent sections.



1. Go through Precheck Procedures.
2. Power on the Proportioner.
3. Press the **"Manage Chemical"** button
4. Select Chemical to be used. (Details for adding and selecting chemical found in section 2.2)
   Note: Make sure to press **"Set"** before exiting the window.
5. Press **"Back"** to the Main Screen.

If not using Reporting feature, skip to step 9

6. Press the **"Job Setup"** button.
7. Fill out the required fields and press **"Save"**.
8. Press **"Back"** to the Main Screen.

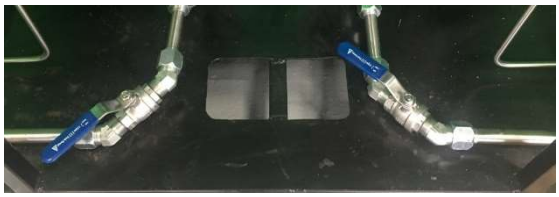
9. Press **"Warm Up"** to cycle into Warm-Up-mode.
   a. Note: In Warm-up Mode, hose temps will only go up to a percentage of setpoint as defined in the configuration screen. This is designed as a safety feature for the hoses to prevent overheating if the sprayer decides to leave the rig in Warm-up mode for an extended period of time.

**If using pneumatic or electric stick pumps to supply the Proportioner, be sure to set up and enable them before pressurizing the system.*

10. Press **"Auto Pressure"** to pressurize the system.
11. Press **"Run"** to switch into Run mode.
    a. Hose temps will remain at the "warm-up percentage" until flow is registered.
12. Once ready to spray, press **"Start"**.

3.1 Precheck

1. The generator has enough fuel for the job.
2. Valves at the bottom of each tank are in the OPEN position.
3. Valves inside or outside the Proportioner (if installed) are in the OPEN Position and set for the desired Resin tank (if more than one resin inlets/tanks).



*Picture for reference only, not all systems configured with the same valve location

3.2 Power On

In order to start the Proportioner, the generator must be running. The Proportioner will not power up using shore power. To power up the system:

1. Flip the switch on the Shore Power box to the **GEN POWER** position.
2. Start the generator.
3. Ensure breakers in the Main Control Panel are on.
4. Turn the power switch on the right side of the Proportioner to the **ON** position.

3.3 Chemical Setup

Upon startup of the Proportioner, the first step is to select the chemical being used. This is done in the **Manage Chemical** window. Select the chemical to be used from the dropdown list and press SET (Detailed description in section 2.2.3). If a new chemical is being used, it can be added to the list by following the steps outlined in section 2.2.1.

3.4 Job Setup

Key pieces of information regarding the current job can be input into the system via the Job Setup window. It is important that this information be put into the system for generating any desired documentation. To input the information, press the **"Job Setup"** tab on the right side of the screen. Input the required information and press **"Save"** (detailed description located in section 2.3).

3.5 Warm Up Mode

At startup, the system defaults to **Standby** mode. Once the chemical has been set, job information entered, and the sprayer is ready to begin, the system should be switched into Warm Up Mode. Switching to Warm Up mode signals the hose heat on and begins bringing the chemical to temperature. Simply press the **"Warm Up"** button to switch into Warm Up mode.

In Warm Up mode, you will notice a **Recirc** button added to the "modes menu". This can be used to recirculate chemical through the hoses (gallon count will not be recorded). If recirculation of the chemical is required, the steps outlined in section 3.5.2 should be followed.

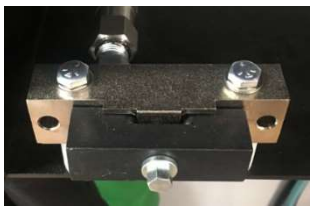
3.5.1 Auto Pressure

In **Warm Up** mode, the **Auto Pressure** button will appear underneath the **Warm Up** button. This is used to pressurize both sides of the system to the desired pressure setpoint before switching into Run mode. Once the button is selected, the Iso side will automatically pressurize until setpoint is reached followed by the Resin side. Be sure that the bleed-off valves (recirc valves) are closed to build pressure.

3.5.2 Recirculating Chemical Through Hoses

To recirculate chemical through the hoses:

1. Remove the gun from the gun manifold.
2. Attach gun manifold to Recirc Block located on the hose rack.
    a. If system is equipped with Open Cell/Closed Cell tanks, make sure the gun manifold is attached to the appropriate Recirc Block.



3. Open ports on gun manifold.
4. Press the **"Recirc"** button on the screen.
5. Set Motor speed between 15 and 30%.
6. Press **"Start"** – chemical is now recirculating through the hoses back into the tank
    a. Let system recirculate for length of time as mandated by chemical manufacturer.
7. Once the desired amount of time has passed, press **"Pause"**.
8. To exit Recirc mode, press the **"Warm Up"** button.
9. Close ports on Gun Manifold.
10. Reattach gun and proceed to normal operation.

3.6 Run Mode

Operational mode for the system. You must press **"Start"** to enable the pumps before spraying chemical.

3.7 Changeover (If Equipped)

Purge Process:

1. If a job has just been completed, edit the entries in the **"Job Setup"** screen for the new job details and save.
2. Bleed out the Resin side so that pressure drops around or below 100 PSI.
3. Ensure that the system is in **"Warm up"** mode.
4. Reset Volume in the **"Diagnostic"** screen if the total sprayed does not equal 0.0 gallons.
5. On the switch box, set the switch to the chemical intended to be used.
6. On the main screen, click on the Akurate Dynamics logo in the top left corner.
7. Click the **"List Hose Length"** button and select the corresponding hose length from the dropdown box. The selected value should show up in the white box under the **"List Hose Length"** button after selecting it.
8. Click the **"Begin Hose Purge"** button. A pop-up box will come up and ask if the user is ready to begin purging the hoses.
9. Click **"Yes"** on this pop up to begin.
10. When the process has been completed, a pop-up box will come up and let the user know that the purging process is done. Click **"Ok"**.
11. Another pop up will come up to instruct the operator to use air to purge the recirculation line. Click **"Ok"** when done.
12. A final pop up box will come up to let the user know to move the recirculate valve to the other position. Click **"Ok"** when done.
13. Reset Volume in the **"Diagnostic"** screen.

4.0 DOCUMENTATION

4.0 DOCUMENTATION

One of the key components of the Akurate Dynamics system is the ability to log data during operations. This creates the ability to present customers with a deliverable report to validate the quality of the job. There are three different files that can be downloaded from the Proportioner: Logs, Job Report, and Job Summary. Only one file can be downloaded at a time, therefore the USB must be removed and reinserted when pulling multiple documents (See section 2.6).

4.1 Logs

While the system is in **Run** mode, specific pieces of information are logged and can be accessed if need be for documentation and troubleshooting purposes. The Logs file contains all recorded data since the last time the logs were cleared. In order to obtain a copy of the Logs stored in the system, a USB key will be needed. To obtain the logs:

1. Insert USB Key into the USB slot mounted next to the HMI
    a. Once USB is inserted, a window will pop up, simply press somewhere on the screen outside of the box to close this window.
2. Navigate to the Logs window by pressing the **"Logs"** button on the Main Screen
3. If the USB key is not damaged, there should be a message displayed on the left-hand side of the screen "USB Detected: [USB Name]"
    a. If the screen continues to read "Scanning for USB", there may be a problem with the USB Key. Try a new USB and if problem persists, contact Technical Support.
    b. Make sure USB cable is properly connected to board.
4. Logs are ready to be copied and there are two options:
    a. **Copy Logs to USB** – Select this option if you want to copy the existing logs and leave them in the system's memory.
    b. **Copy Logs to USB and Clear** – Select this option if you want a copy of the logs and to clear the memory in the system.
        ****Memory should be cleared approximately every 2 months depending on frequency of use.*
5. Once complete, **"Logs and Alarms file copied"** will be displayed at the bottom of the screen
6. Disconnect USB key – Files can then be accessed from a computer

4.2 Job Report - Certificate of Conformance

The Job Report, or Certificate of Conformance, details the date, customer, address, applicator, and ratio for chemical applied on site. *The Job Setup screen must be filled out prior to spraying for the Job Report to be generated correctly* (See section 2.3).

4.3 Job Summary

The Job Summary provides information pertaining to a given job, whether it be a single or multi-day job. This information includes: Date, Customer, Address, Applicator, Ratio, Pressures, Temperatures, Total Volumes, and Chemical Batch Numbers (if specified). *The Job Setup screen must be filled out prior to spraying for Job Summary to be generated correctly.*

5.0 ALARMS

5.0 ALARMS

Alarm	Trigger	Value	Flag #	Action
Low A Pressure	Below Setpoint	400	1	Alert
Low B Pressure	Below Setpoint	400	4	Alert
High A Pressure	Above Setpoint	400	5	Alert
High B Pressure	Above Setpoint	400	6	Alert
Low A1 Temp	Below Setpoint	40	12	Alert
Low A2 Temp	Below Setpoint	40	13	Alert
Low A3 Temp	Below Setpoint	40	14	Alert
Low A4 Temp	Below Setpoint	40	3	Alert
Low B1 Temp	Below Setpoint	40	15	Alert
Low B2 Temp	Below Setpoint	40	16	Alert
Low B3 Temp	Below Setpoint	40	17	Alert
Low B4 Temp	Below Setpoint	40	2	Alert
High A1 Temp	Above Setpoint	40	18	Alert
High A2 Temp	Above Setpoint	40	19	Alert
High A3 Temp	Above Setpoint	40	20	Alert
High A4 Temp	Above Setpoint	40	7	Alert
High B1 Temp	Above Setpoint	40	21	Alert
High B2 Temp	Above Setpoint	40	22	Alert
High B3 Temp	Above Setpoint	40	23	Alert
High B4 Temp	Above Setpoint	40	8	Alert
Low Tank A Level	Below Setpoint	7	9	Alert, standby, enable override
Low Tank B Level	Below Setpoint	7	10	Alert, standby, enable override
Low Tank C Level	Below Setpoint	7	11	Alert, standby, enable override
A Pressure Fail	Below Value	-25	24	Alert, standby
B Pressure Fail	Below Value	-25	25	Alert, standby
A1 Temp Fail	Below Value	-25	26	Alert, standby
A2 Temp Fail	Below Value	-25	27	Alert, standby
A3 Temp Fail	Below Value	-25	28	Alert, standby
A4 Temp Fail	Below Value	-25	29	Alert, standby
B1 Temp Fail	Below Value	-25	30	Alert, standby
B2 Temp Fail	Below Value	-25	31	Alert, standby
B3 Temp Fail	Below Value	-25	32	Alert, standby
B4 Temp Fail	Below Value	-25	33	Alert, standby
Critical A Pressure	Above Value	2000	34	Alert, standby
Critical B Pressure	Above Value	2000	35	Alert, standby
Critical A1 Temp	Above Value	170	36	Alert, standby
Critical A2 Temp	Above Value	170	37	Alert, standby
Critical A3 Temp	Above Value	170	38	Alert, standby

Critical A4 Temp	Above Value	170	39	Alert, standby
Critical B1 Temp	Above Value	170	40	Alert, standby
Critical B2 Temp	Above Value	170	41	Alert, standby
Critical B3 Temp	Above Value	170	42	Alert, standby
Critical B4 Temp	Above Value	170	43	Alert, standby
Off Ratio	Above/Below	3%	44	Alert after 3 Gal, Standby
Tank A Fail	Below	0	45	Alert, standby
Tank B Fail	Below	0	46	Alert, standby
Tank C Fail	Below	0	47	Alert, standby
Low Tank A Temp	Below	60	48	Alert, Run disabled
Low Tank B Temp	Below	60	49	Alert, Run disabled
Low Tank C Temp	Below	60	50	Alert, Run disabled
GP differential	Above	600	51	Alert, Pause
Timed Low ISO Pressure	Below Setpoint	600	52	Alert & Standby if error holds for 5 seconds
Timed Low RESIN Pressure	Below Setpoint	600	53	Alert & Standby if error holds for 5 seconds
High A Heater Outlet Temp	Above Setpoint	40	54	Alert
Low A Heater Outlet Temp	Below Setpoint	40	55	Alert
Critical High A Heater Outlet Temp	Above	170	56	Alert, Standby, Disable Heaters Until Fixed
A Outlet Heater Temp Fail	Below	0	57	Alert, Standby, Disable Heaters Until Fixed
High B Heater Outlet Temp	Above Setpoint	40	58	Alert
Low B Heater Outlet Temp	Below Setpoint	40	59	Alert
Critical High B Heater Outlet Temp	Above	170	60	Alert, Standby, Disable Heaters Until Fixed
B Heater Outlet Temp Fail	Below	0	61	Alert, Standby, Disable Heaters Until Fixed
High Purge Process Hose Pressure	Above	950	62	Alert, Pauses purge process until under 950 PSI
Purge Process Pump Pressure (B)	Above	140	63	Alert, ends purge process above 140 PSI Heater Pressure
High C Heater Outlet Temp	Above	40	64	Alert
Low C Heater Outlet Temp	Below	40	65	Alert
Critical High C Outlet Temp	Above	170	66	Alert, Standby
C Heater Outlet Temp Fail	Below	0	67	Alert, Standby, Disable Heaters Until Fixed
Purge Process Pump Pressure (C)	Above	140	68	Alert, ends purge process above 140 PSI Heater Pressure
Auto Pressure Error	(Timed)	20 s	69	Alert, Standby if hose pressure doesn't reach setpoint in time
Heater A under 5 PSI	Below	5	70	Alert, Standby after 10 seconds under 5 PSI
Heater B under 5 PSI	Below	5	71	Alert, Standby after 10 seconds

Heater C under 5 PSI	Below	5	72	Alert, Standby after 10 seconds under 5 PSI
Heater A Inlet Temp Fail	Below	0	73	Alert, Heater off unless flowing chemical
Heater B Inlet Temp Fail	Below	0	74	Alert, Heater off unless flowing chemical
Heater C Inlet Temp Fail	Below	0	75	Alert, Heater off unless flowing chemical

6.0 FEED SYSTEM

6.0 FEED SYSTEM

6.1 Tanks

6.1.1 Main Tank Components

Located on each tank is a fill port, breathing cap, air valve, recirc line, ground wire, pressure gauge, supply valve located at the bottom.

- Fill Port – strictly used for loading chemical into tanks. Different mating configuration between iso and resin tank to prevent cross contaminating diaphragm pumps
- Breathing Cap – located on top of tank to prevent tank from drawing a vacuum or over pressurizing from nitrogen.
- Air Valve – Two-way ball valve on top of the tank with air valve. To be used to relieve pressure from tank when filling tanks or to be left open when spraying (if tank does not have nitrogen hooked up) to prevent from drawing a vacuum.
- Recirc Line – Located at rear of tank, this line is to allow chemical to recirculate back into the tank through either the proportioner or the hoses.
- Pressure Gauge – Installed on Iso and Closed Cell tanks to monitor Nitrogen pressure
- Ground Wire – Attached to the wall on a metal stud.
- Master Supply Valve – Located at bottom of tank. Shut off or open to supply from tank to system

6.1.2 Tank Sensors (If installed)

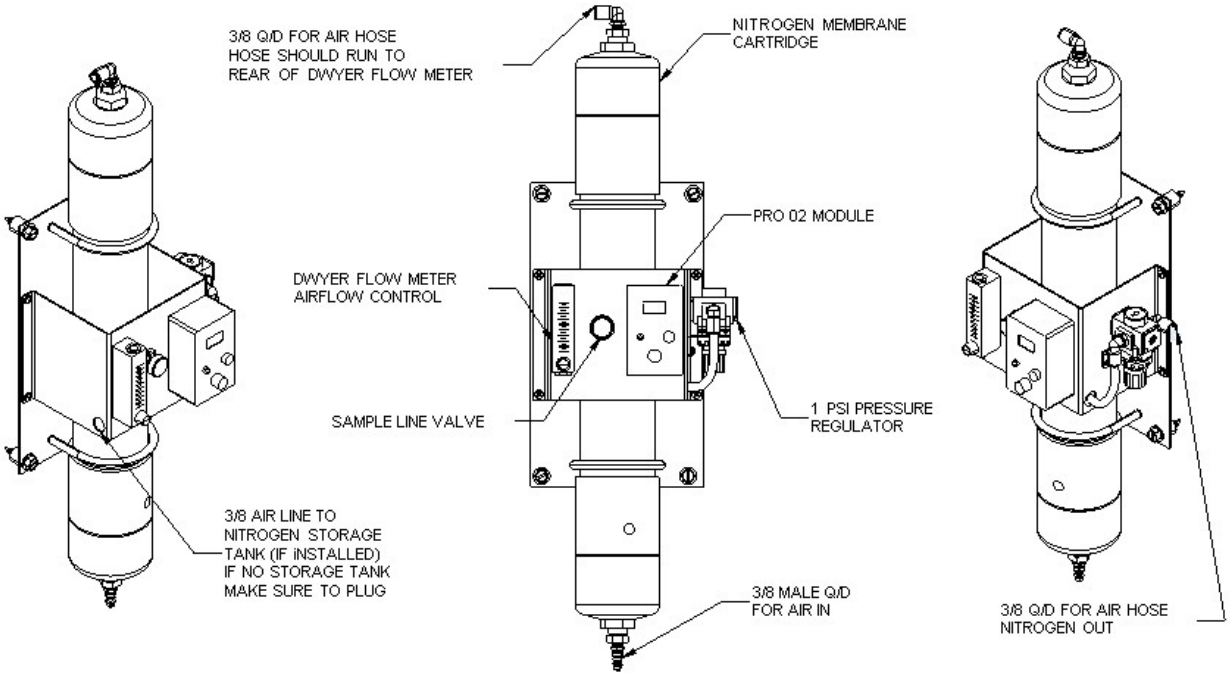
As an option to the customer, tank sensors may be installed to monitor tank level and temperature. Sensor data is displayed on the **Manage Chemical** Screen in the bottom left-hand corner. The sensors can be used as a tool to shut off the unit when chemical is too cold or running low via the Tank Alarms. Tank alarms are by default turned on but can be toggled off via the hidden configuration screen.

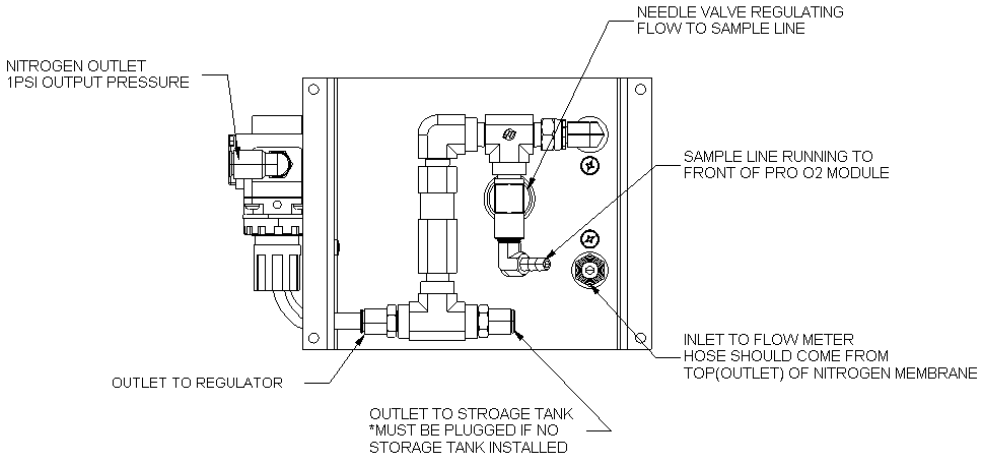
**See appendix for wiring schematic.*

6.1.3 Nitrogen System (If installed)

The nitrogen system consists of a nitrogen membrane cartridge, flow meter, Pro O2 Module, pressure regulator, and storage tank (if installed). Air should be supplied to the membrane cartridge at ~120 psi. The pressure regulator mounted to the nitrogen assembly regulates the flow of nitrogen to 1 psi. The system should be calibrated upon start up and checked once every 6 months. See calibration instructions on next page.

NOTE: Power does not need to be on to the Pro O2 Module for the system to work; it is purely for calibration purposes.

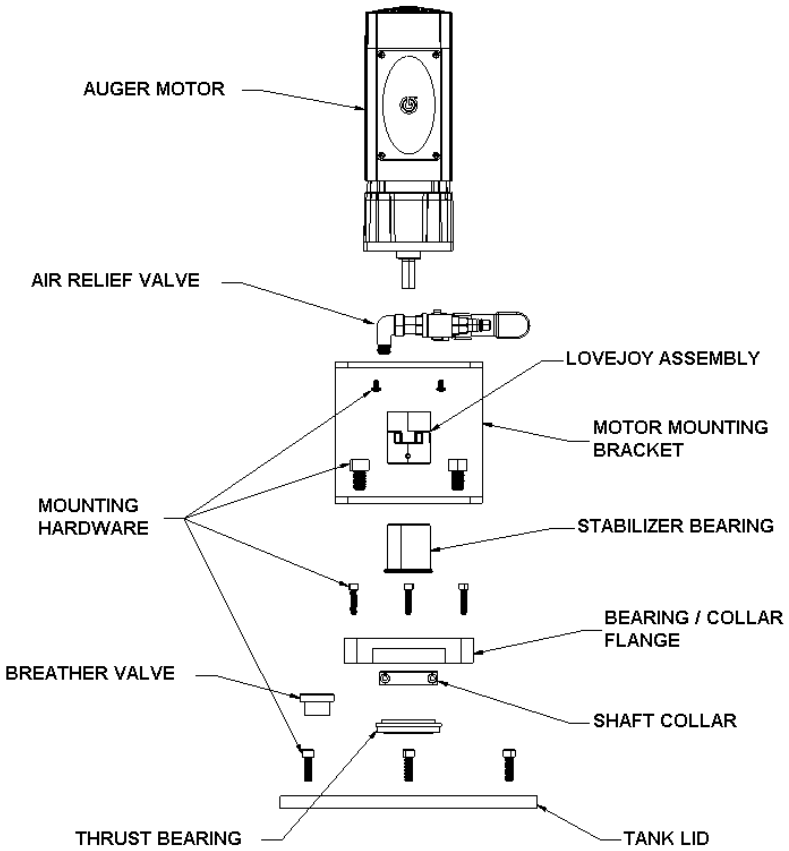


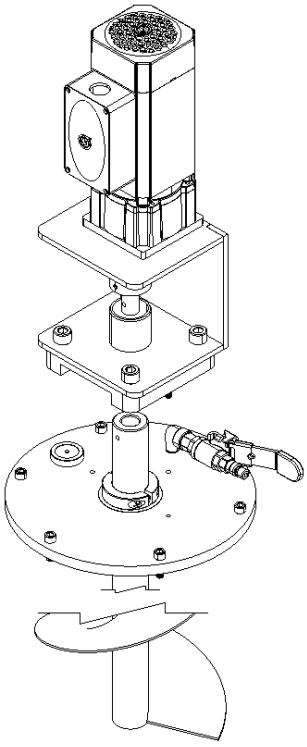


Calibration & Set-up

1. Turn Power on to Pro O2 Module
2. Remove Sample Line from Module
3. Turn the Calibration Knob until the display shows 20.9
4. Reattach Sample Line to Pro O2 Module
5. Open Sample Line Valve
6. Using the Flow Control Knob, adjust flow until the display reads desired oxygen composition.
    a. If 95% Nitrogen is desired, then display should read 5% Oxygen
7. Close Sample Line Valve
8. Set-up is complete

6.1.4 Mixer (If installed)





**See appendix for wiring schematic.*

6.2 Transfer Pumps

6.2.1 Tanks

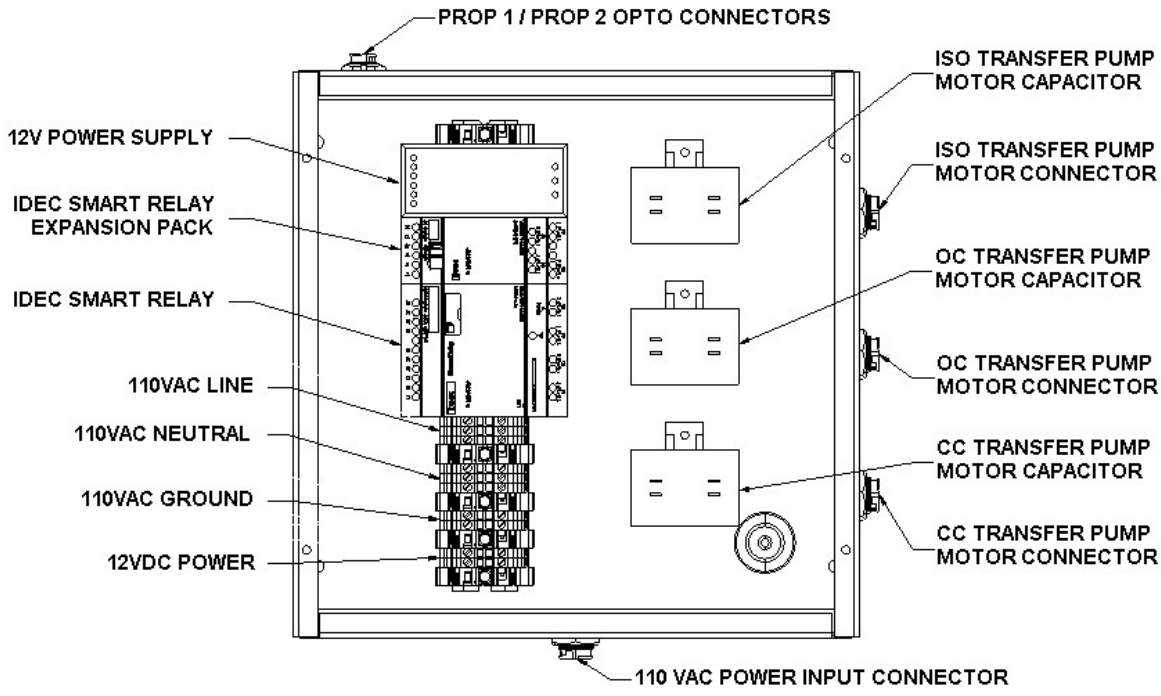
Chemical is supplied to the proportioner via the transfer pumps located underneath the tank. They are designed to turn on when in Warm-up or Run Mode and heater pressure reads below 47psi.

Configurations	
Single Proportioner | Single Resin Tank	Direct Wiring to Proportioner
Single Proportioner | Dual Resin Tanks	Switchbox / Smart Relay
Dual Proportioner | Single Resin Tank	
Dual Proportioner | Dual Resin Tanks	

6.2.1a Direct Wiring to Proportioner

**See appendix for wiring schematic.*

6.2.1b Switchbox/Smart Relay



Not all versions will have capacitors

**See appendix for wiring schematic.*

6.2.2 Electric Stick Pump – FSP Pump

**Refer to FSP Manual for user instruction.*

6.2.3 Pneumatic Stick Pumps

Inlet pressure at heater set below 100 psi

6.3 Check Valve

Located after the transfer pump is an inline check valve to hold pressure downstream of the transfer pump. It is possible for the check valve to be stuck open or closed due to dirty or contaminated chemical. If stuck open, heater pressure will fluctuate up and down from 20-60 psi and the transfer pump will turn on and off constantly while not spraying. If stuck closed, the heater pressure will not build while in Warm-Up or Run Mode and the transfer pump can be observed constantly spinning. To correct the issue first try tapping on the check valve a few times while the transfer pump is running. If the issue continues, remove and clean the check valve with TSL or carburetor cleaner or simply replace the check valve.

Inline Check Valve Specs:

- ¾ NPT Female Connection on both ends
- 10-15 psi cracking pressure

6.4 Wye Strainer

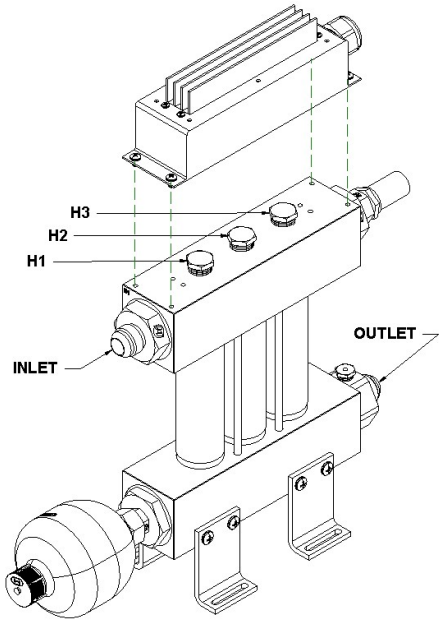
A wye strainer should be installed somewhere in the feed lines past the check valves in order to filter the material going through the system. A 40-mesh screen size is recommended. These should be monitored **weekly**.

7.0 PROPORTIONER

7.0 PROPORITONER

7.1 Heaters

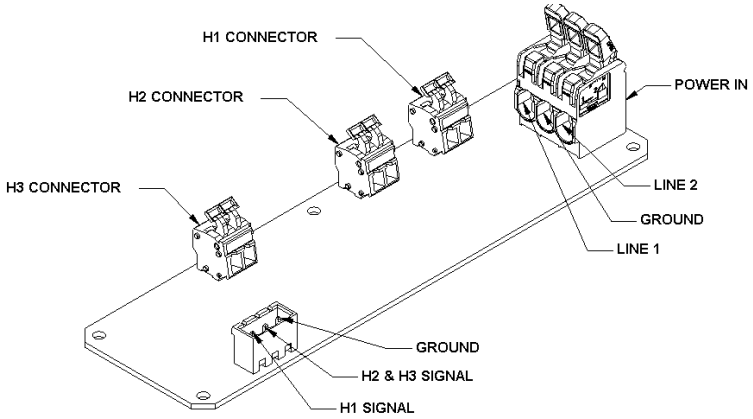
The heaters are the first components along the flow path inside the proportioner and are used to monitor inlet pressure and preheat the chemical as it enters the pumps and hoses. The system is designed to maintain ~50 psi inlet pressure, therefore the pressure sensor located on the heater controls the transfer system. Heater pressure should be maintain between 50-75 psi for.

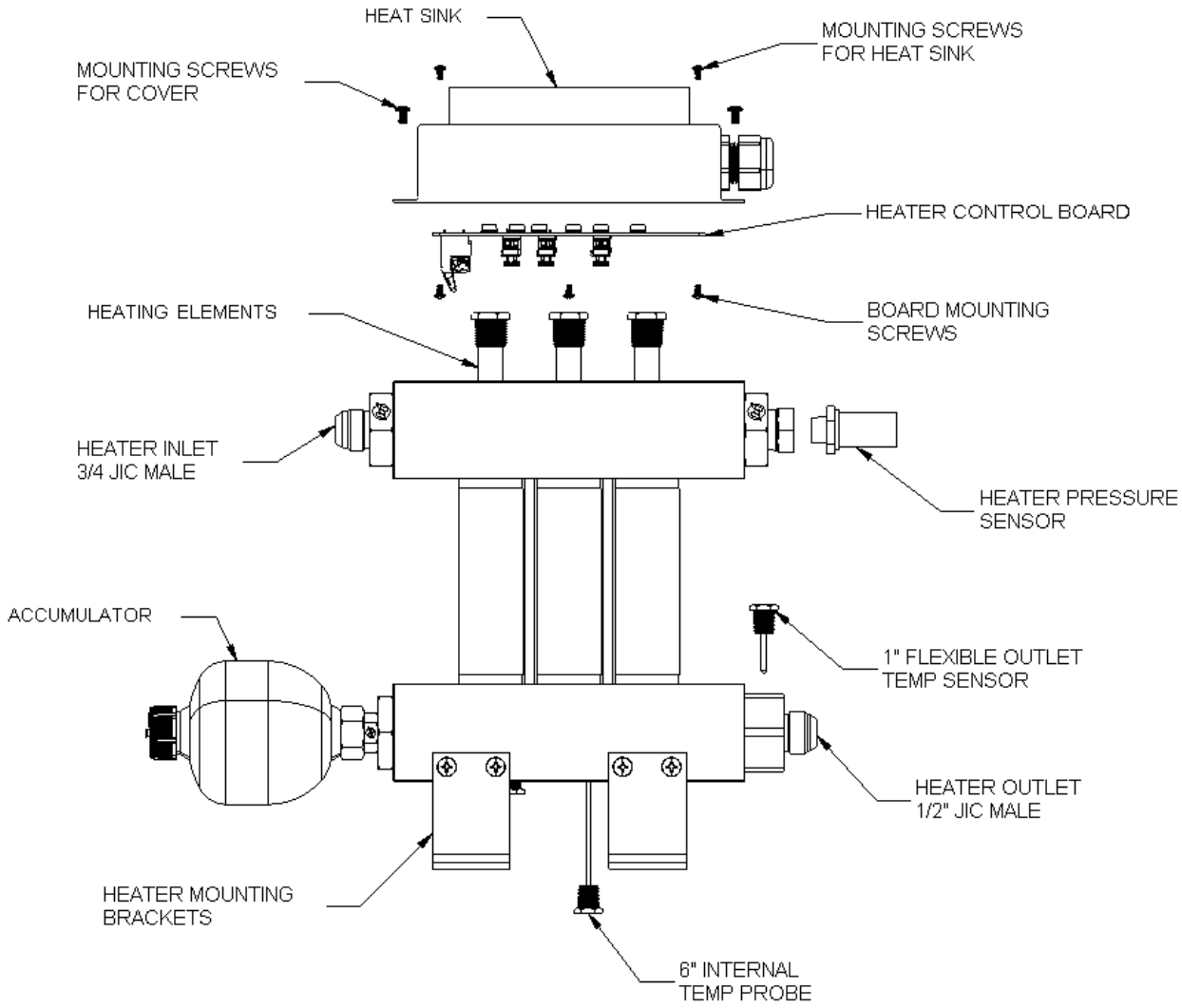


Also located in the heater assembly is an accumulator. This is used to absorb pressure spikes as the transfers system supplies chemical to the heaters. If observing abnormal pressure spikes in heater pressure (50-150psi jumps in pressure) it is likely that the internal bladder of the accumulator has failed and should be replaced.

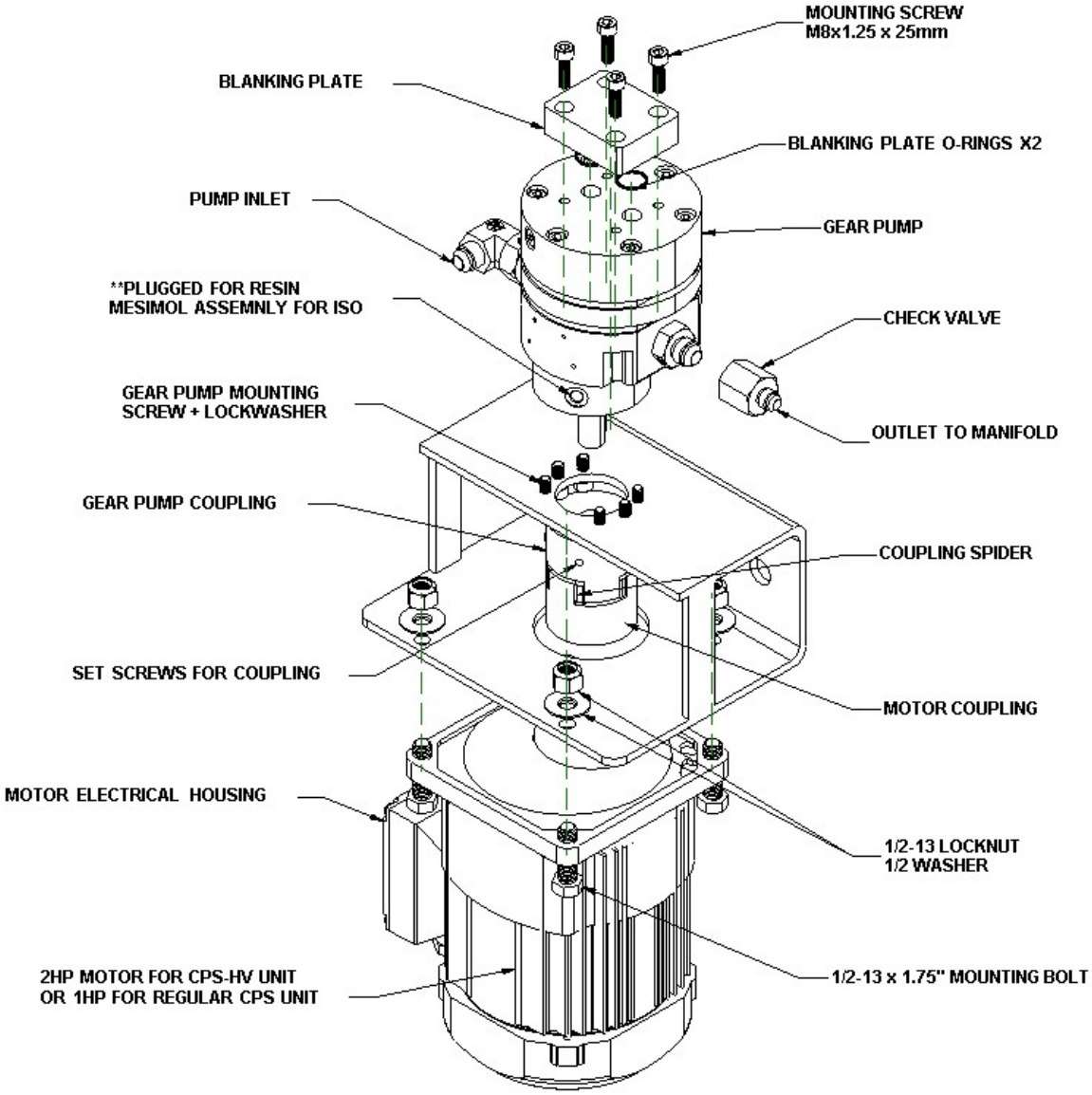
There are three individual heating elements inside the heater referred to as H1, H2, and H3 as depicted in the figure below. H2 and H3 are controlled together (Turn on and off at the same time) and H1 is controlled independently.

**See appendix for wiring schematic.*




HEAT SINK
MOUNTING SCREWS FOR HEAT SINK
MOUNTING SCREWS FOR COVER
HEATER CONTROL BOARD
HEATING ELEMENTS
BOARD MOUNTING SCREWS
HEATER INLET 3/4 JIC MALE
HEATER PRESSURE SENSOR
ACCUMULATOR
1" FLEXIBLE OUTLET TEMP SENSOR
HEATER OUTLET 1/2" JIC MALE
HEATER MOUNTING BRACKETS
6" INTERNAL TEMP PROBE

7.2 Gear Pump/Motor

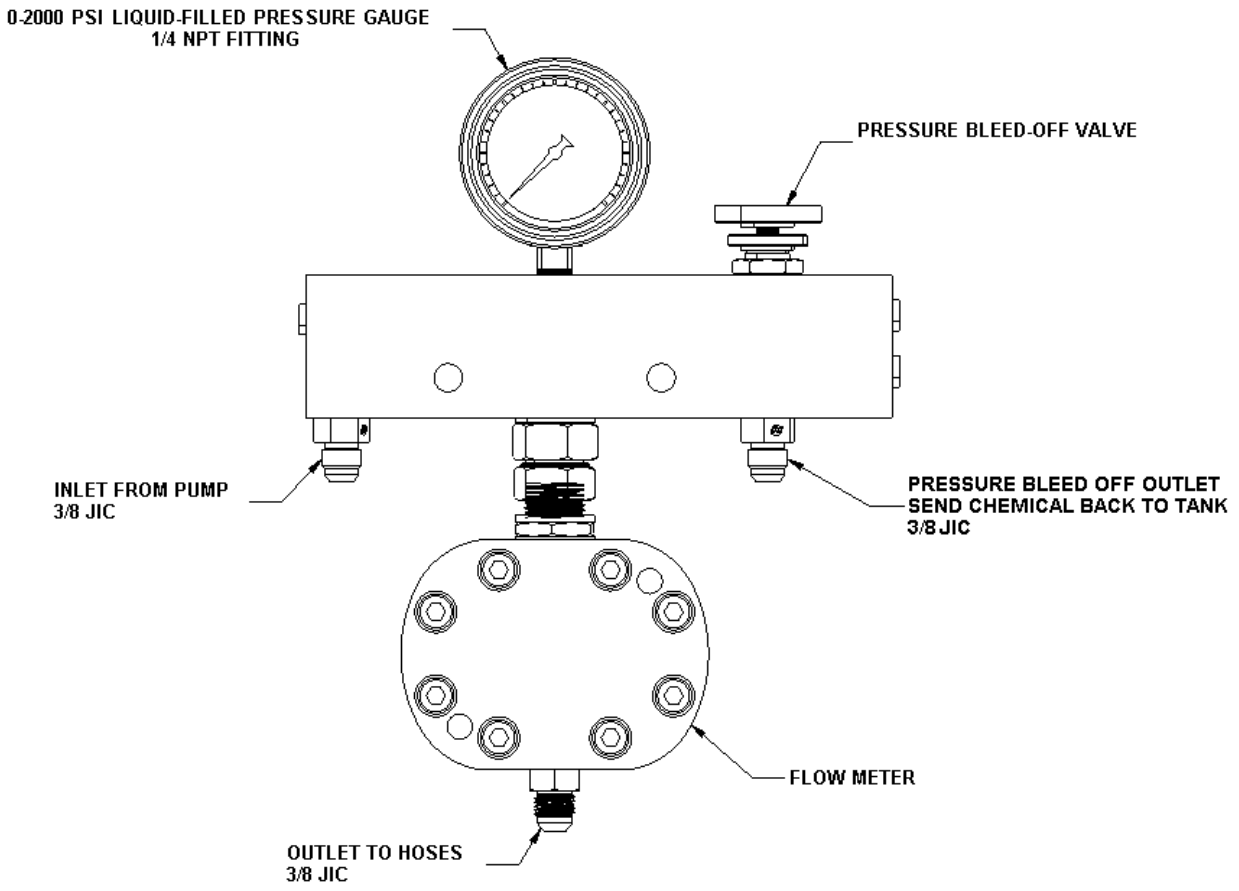


Note: Iso pump/motor has a mesamoll reservoir bottle that must be kept ¾ of the way full and replace when cloudly.

**See appendix for motor wiring schematic.*

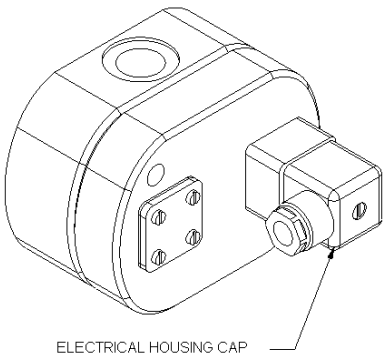
7.3 Manifold

Once chemical leaves the proportioning pump, it enters the manifold assembly. Flow is directed out to the hoses or back into the tank via the pressure bleed-off valves. See figure below for components. The figure below is a depiction of the Iso manifold, the Resin assembly is a mirror image.



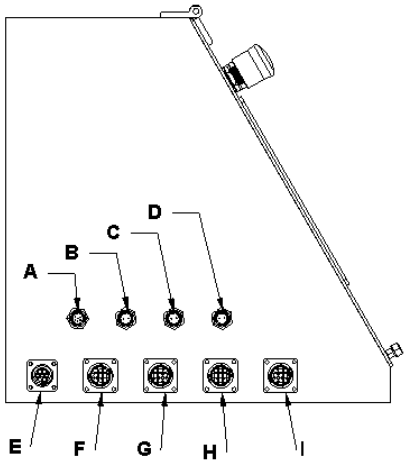
7.4 Flow Meter

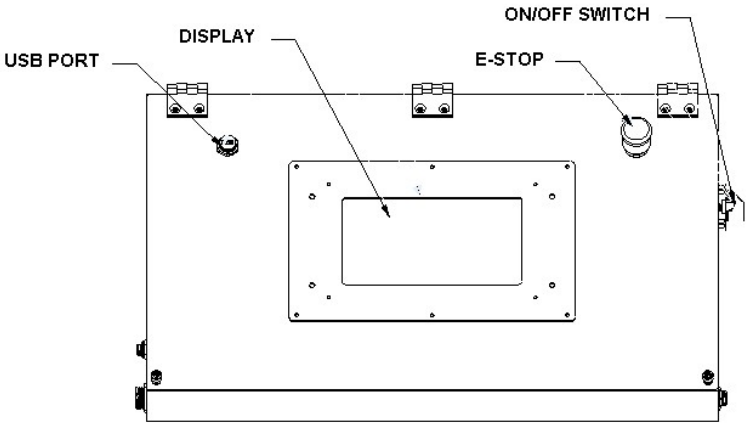
The flow meters have an internal gear that counts revolutions to accurately measure the amount of chemical leaving the system. These measurements are used to adjust resin motor speed to accurately maintain the desired ratio. Orientation of the flow meter is not critical. If a flow meter is not recording flow (monitored at the bottom of the main screen) there could be a physical blockage in the body of the flow meter or an electrical issue with the wiring.

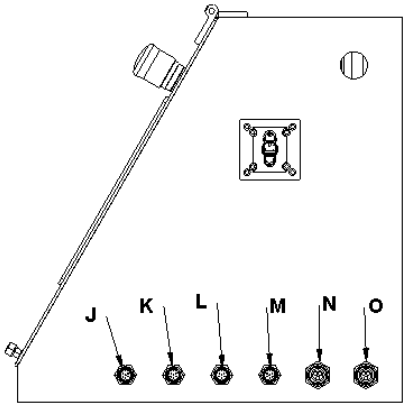


**See appendix for wiring schematic.*

7.5 Electrical Enclosure

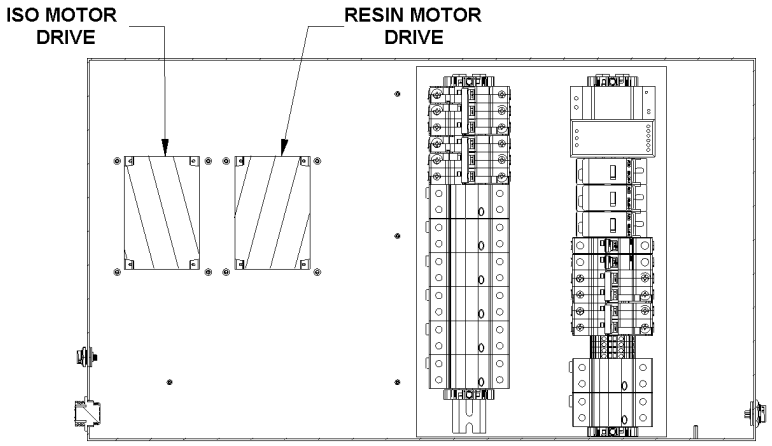


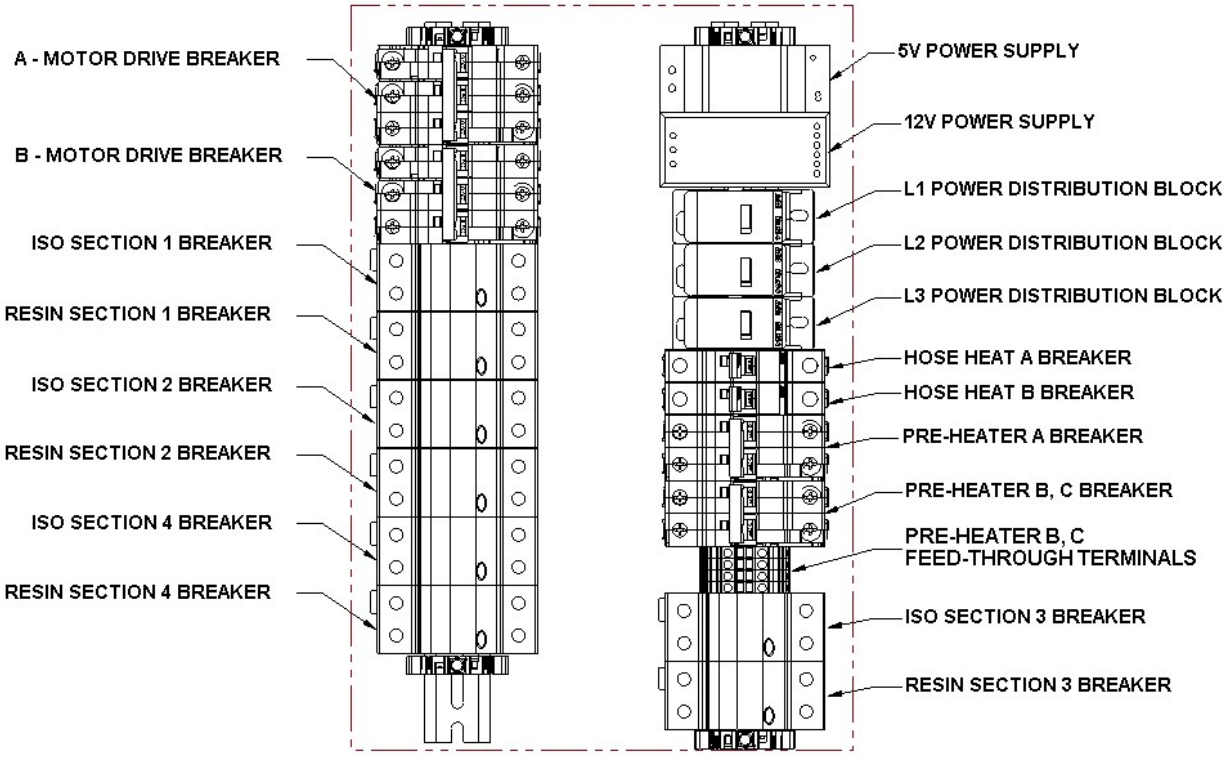




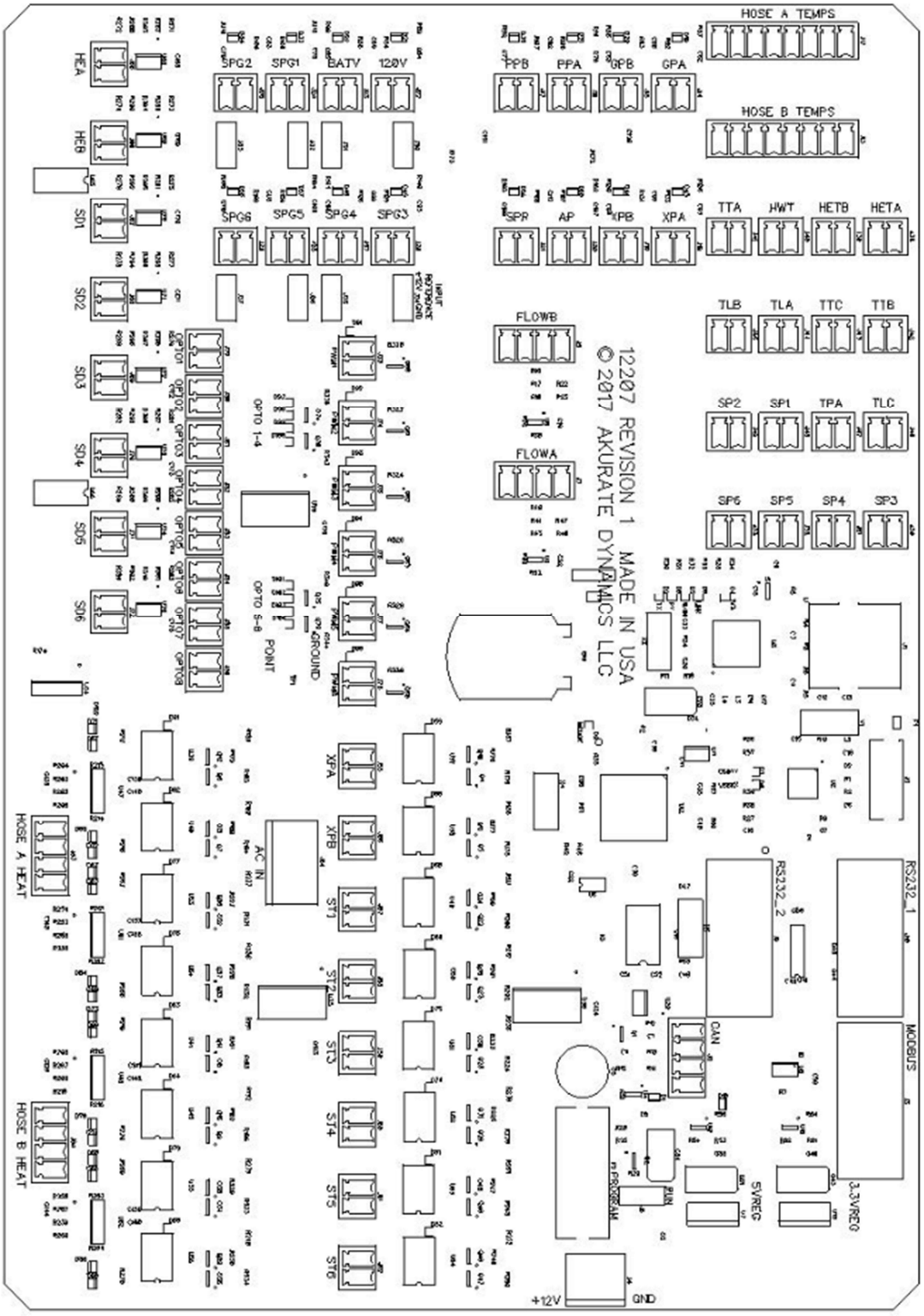
A	Tank Level A
B	Tank Temp A
C	Tank Temp B
D	Tank Temp C
E	Gun Pressure (GPA/GPB)
F	Hose Section 1
G	Hose Section 2
H	Hose Section 3

I	Hose Section 4
J	Spare
K	Tank Level C
L	Opto Out
M	Tank Level B
N	Transfer Pump A
O	Transfer Pump B


ISO MOTOR DRIVE
RESIN MOTOR DRIVE


A - MOTOR DRIVE BREAKER
B - MOTOR DRIVE BREAKER
ISO SECTION 1 BREAKER
RESIN SECTION 1 BREAKER
ISO SECTION 2 BREAKER
RESIN SECTION 2 BREAKER
ISO SECTION 4 BREAKER
RESIN SECTION 4 BREAKER
5V POWER SUPPLY
12V POWER SUPPLY
L1 POWER DISTRIBUTION BLOCK
L2 POWER DISTRIBUTION BLOCK
L3 POWER DISTRIBUTION BLOCK
HOSE HEAT A BREAKER
HOSE HEAT B BREAKER
PRE-HEATER A BREAKER
PRE-HEATER B, C BREAKER
PRE-HEATER B, C FEED-THROUGH TERMINALS
ISO SECTION 3 BREAKER
RESIN SECTION 3 BREAKER

7.6 Control Board

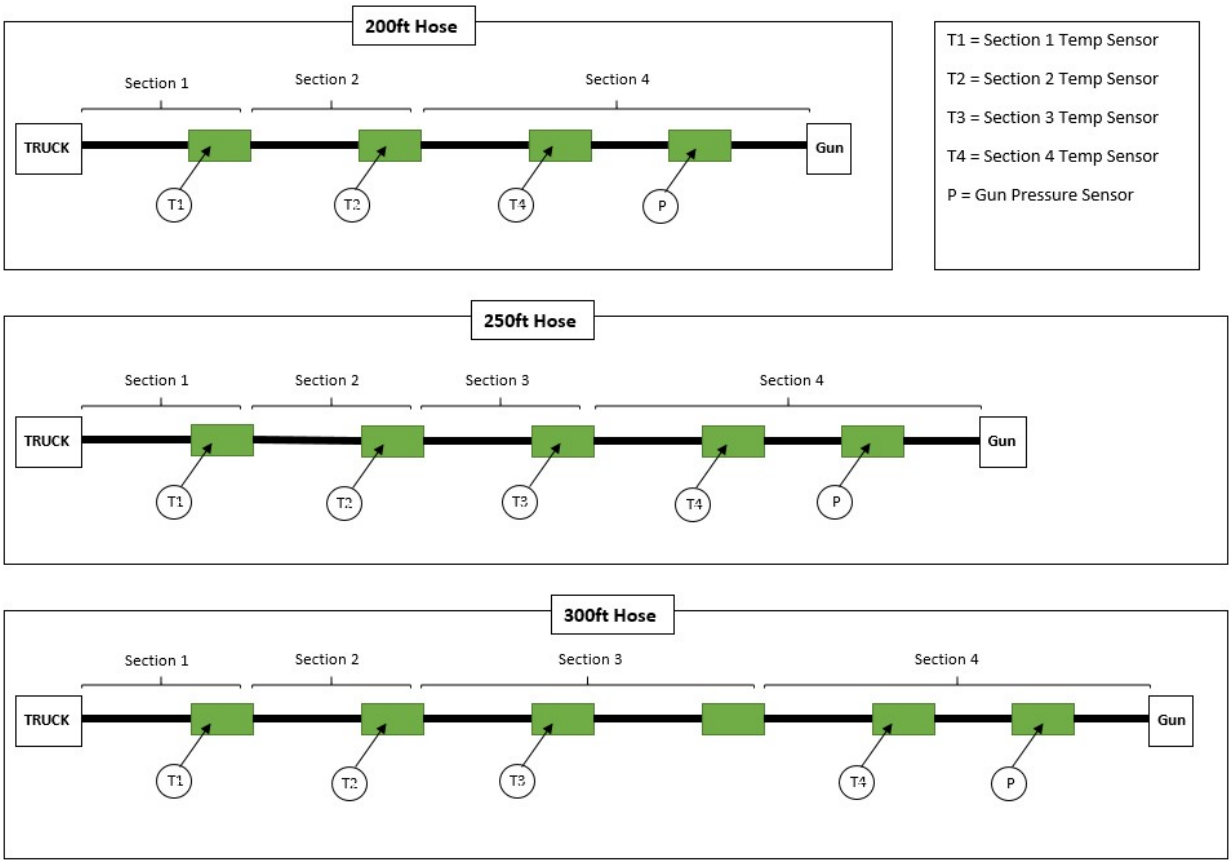


8.0 HOSES

8.0 Hoses

8.1 Hose Configurations

Akurate Dynamics offers 3 standard hose configurations. Use the figure below to help with identifying hose configurations and sensor locations.

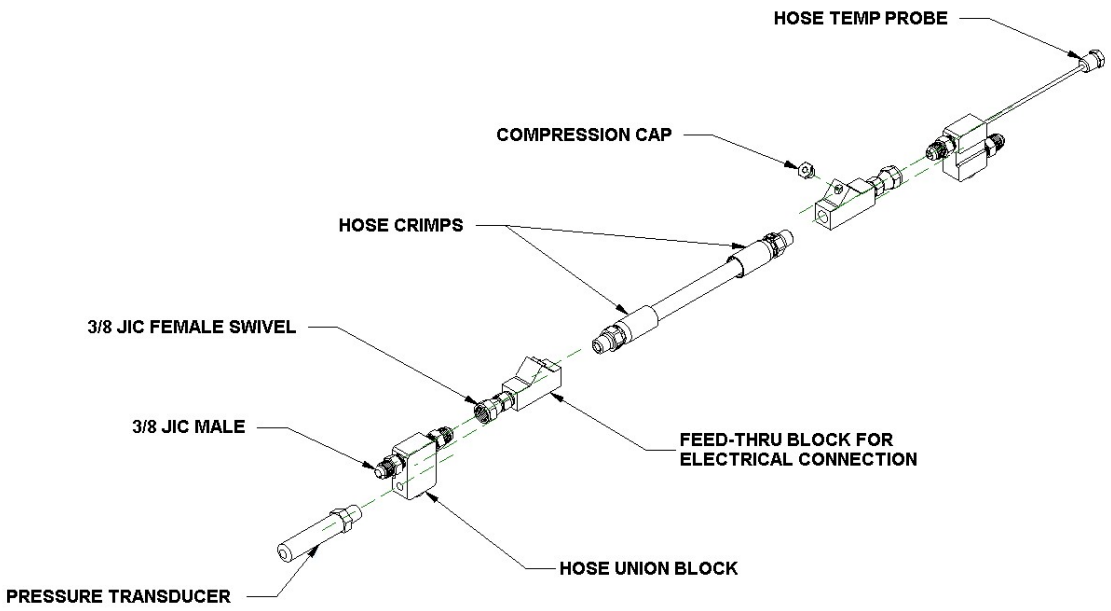


There are three different hose designs that make up a full hose:

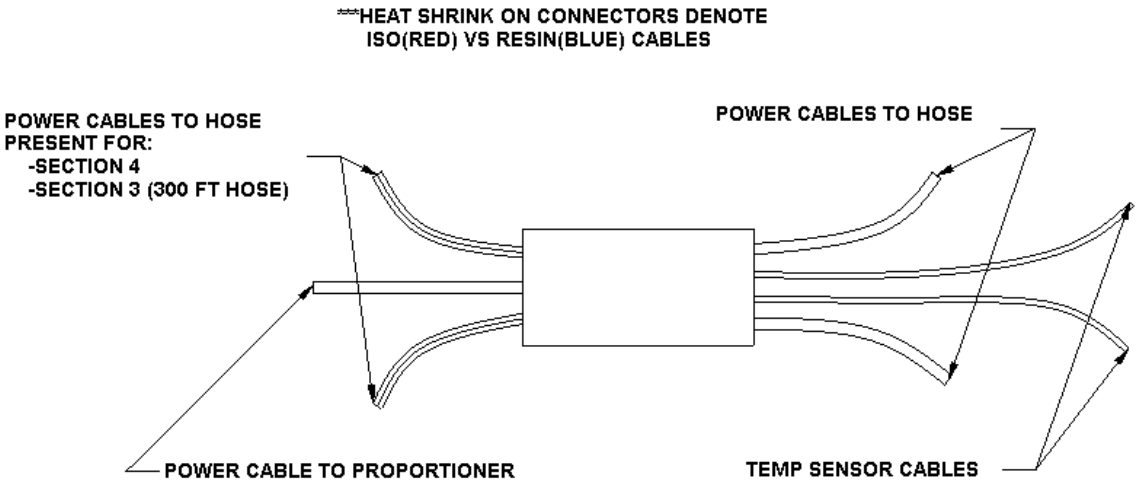
- 50 ft Section
- Pressure Jumper
- Whip

Sections 1, 2, and 3 are made with only 50 ft. sections. Section 4 is comprised of a 50ft section, pressure jumper, and whip.

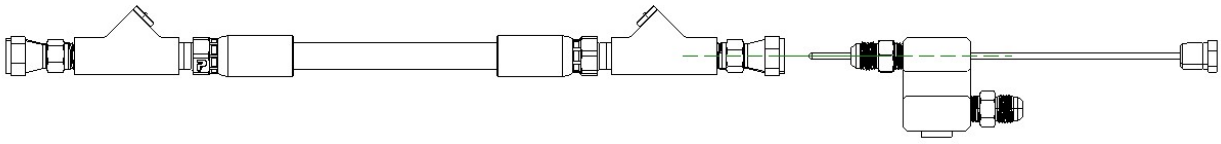
Hose sections are joined together using a Hose Union Block. The blocks are also used for housing temperature and pressure sensors depending on their locations in the hose assembly. The figure above can be used to help locate these sensors.



8.2 Power Cables



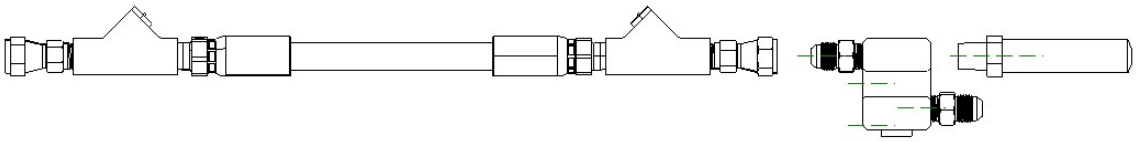
8.3 50 ft Section



8.3.1 How to Test

- Measure for 120V AC on board for corresponding hose section
- Measure for 120V AC at power cable block power connector when in run mode
- Measure for 32-38 Ω on hose connector

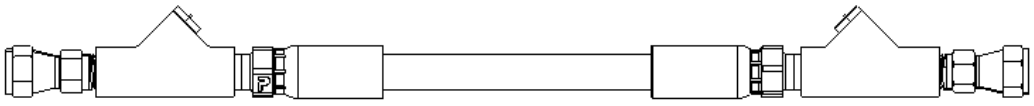
8.4 Pressure Jumper



8.4.1 How to Test

- With whip attached – Measure ~ 50 Ω
- Without whip attached, use jumper to close one end of section and measure ~ 26Ω

8.5 Whip



8.5.1 How to Test

- Measure for 20-22 Ω at hose connector to jumper

9.0 NEW PROPORTIONER STARTUP PROCEDURES

9.0 NEW PROPORTIONER STARTUP PROCEDURES

When bringing up a new proportioner, the general process is as follows:

1. Initial Configuration
2. Sensor Check
3. Transfer Pump Check
4. Fill Heaters
5. Fill Lines
6. Hose Diagnostics
7. Test Spray

9.1 Initial Configuration

First step is to setup the software for the Rig Configuration. Press the Akurate Logo in the top left corner of the Main Screen (Figure 1), this will take you to raw value screen (Figure 2).

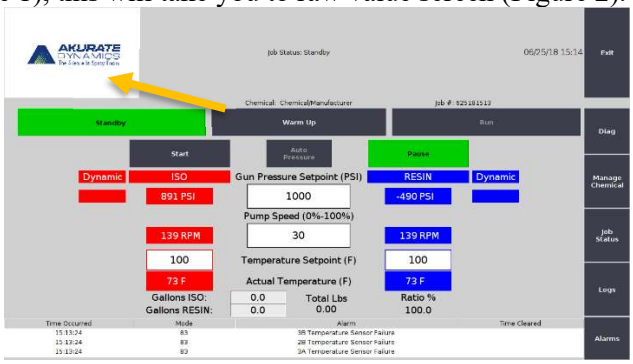


Figure 1

From the raw value screen, you can activate or deactivate Section 2 and 3, if installed. If both sections are present in the hose, make sure the buttons read **"Active"** (Press the button to toggle inactive/active). If a Section is not present in the hose, make sure that section reads **"Inactive"**. Next, from this screen, press the button **"Control Board Version"** in the bottom right corner.

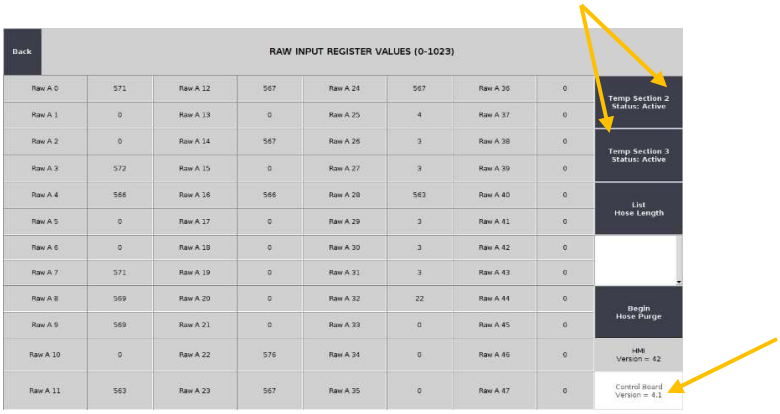


Figure 2

On the left side of this screen are several questions that pertain to the equipment and proportioner components. Select the option for each question in the list, seen in Figure 3. If you don't have tank temp and level sensors, make sure **"Tank Alarms"** are set to off.

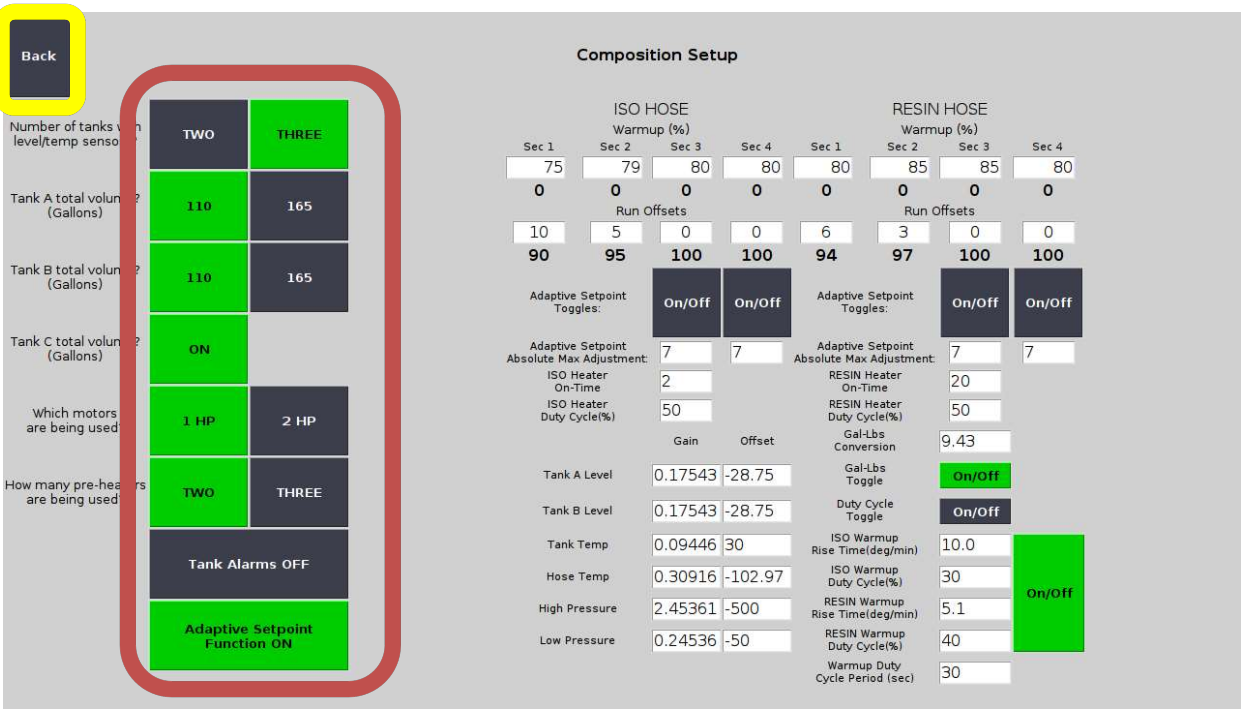


Figure 3

Once you have completed the configuration, press the **"Back"** button on this screen and the Raw Value Screen and that will take you back to the Main Screen. Then move on to sensor check.

9.2 Sensor Check

The first thing to look for with a new proportioner is that the system is receiving logical values from all sensors. Any largely negative, extremely high, or illogical number (60˚F when it's 90˚F outside) is a likely indication that there is an issue with the sensor or there is a bad connection somewhere along the way. Specific examples of known error values are: -102" for temp sensors which is an indication that the sensor is not plugged in or there is not a sensor there at all, and "-495" for pressure sensors. All sensor data can be found between the Diagnostics (Figure 5) and Manage Chemical (Figure 7) screens.

Diagnostics Screen:

- Heater Pressures
- Heater Temperature
- Section Hose Heat

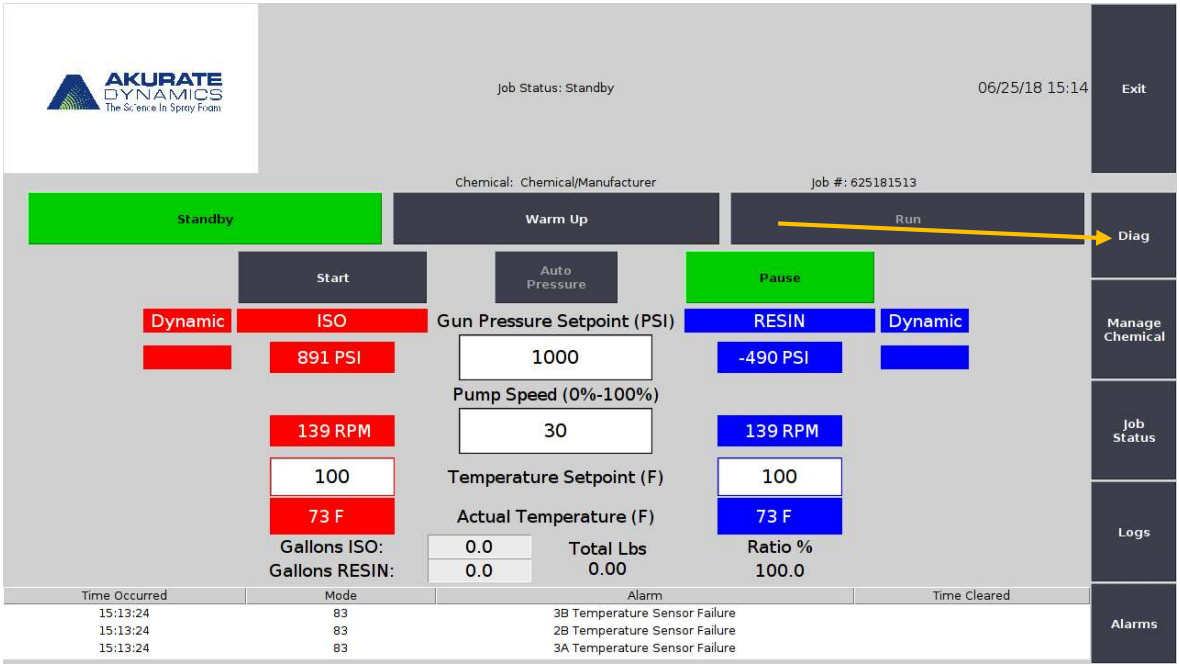


Figure 4

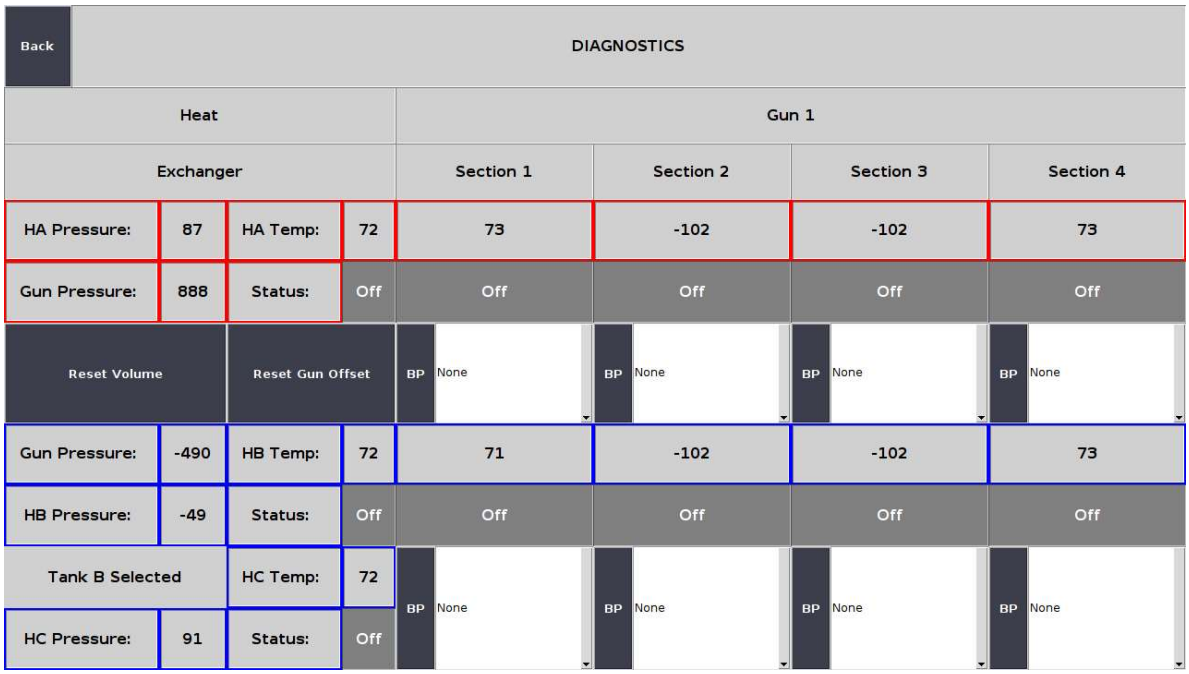


Figure 5

Manage Chemical Screen:

- Tank Levels
- Tank Temperatures

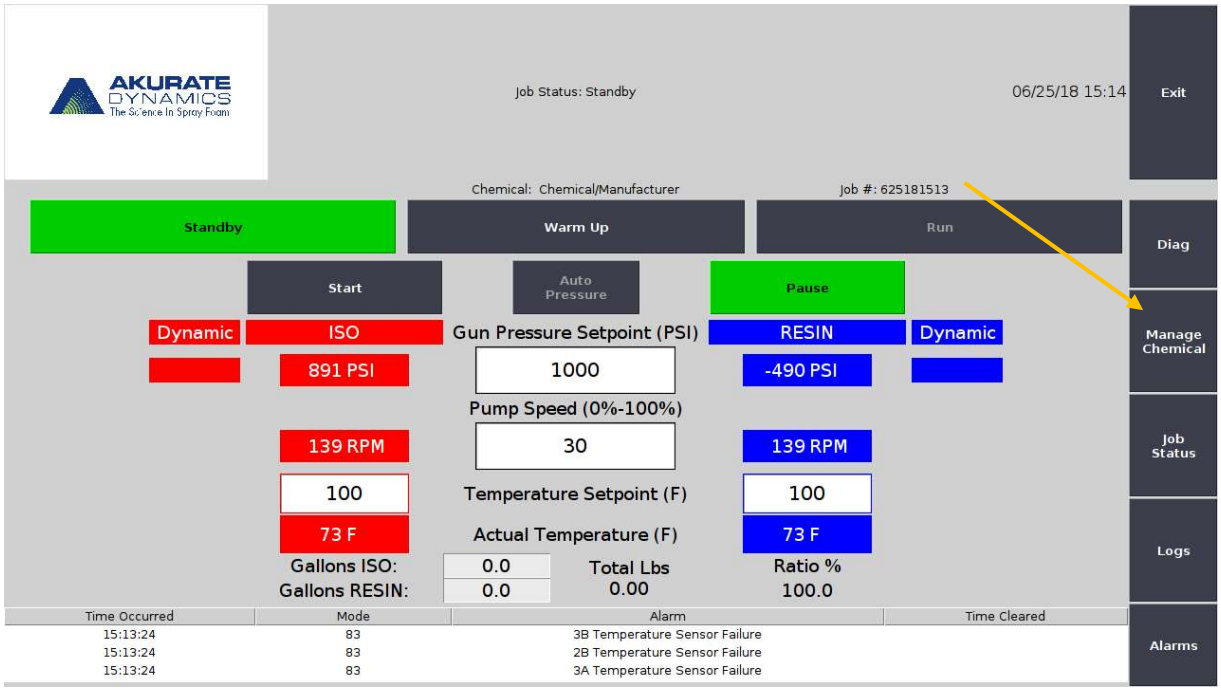


Figure 6

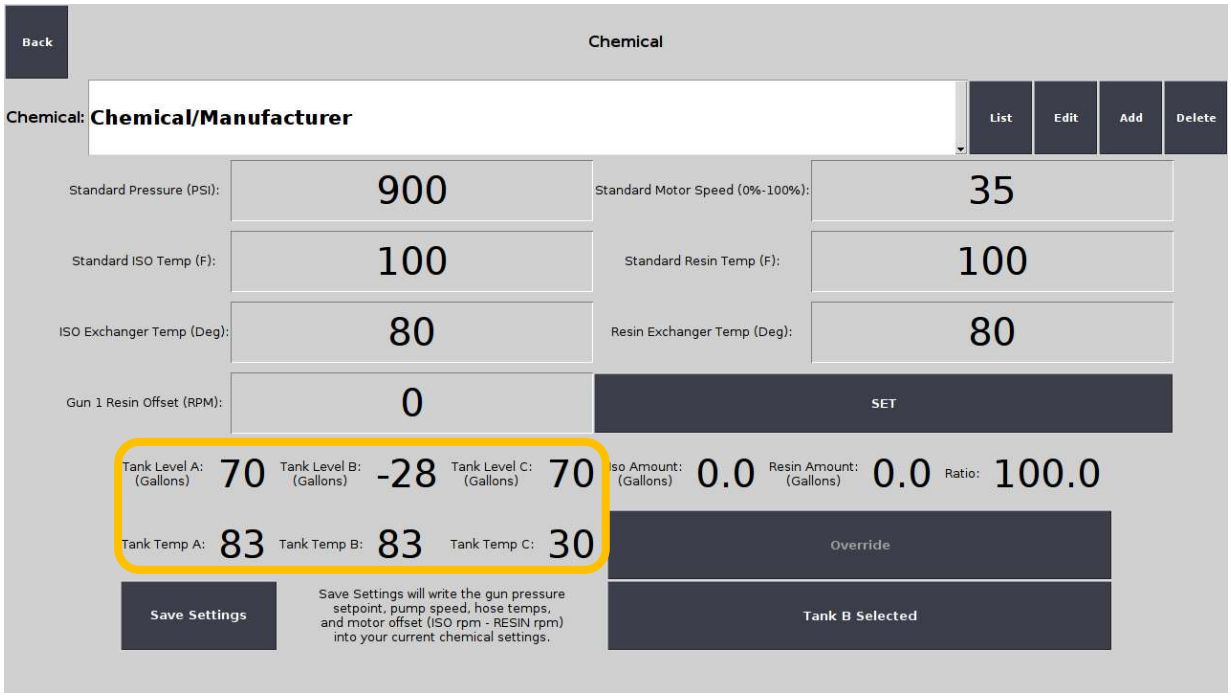


Figure 7

9.3 Transfer Pump Check

To start this process, turn all breakers off in the control box. The exception to this is if you have a Single Proportioner / Single Tank rig, if that is the case then turn ON the number 12 breaker shown in Figure 8

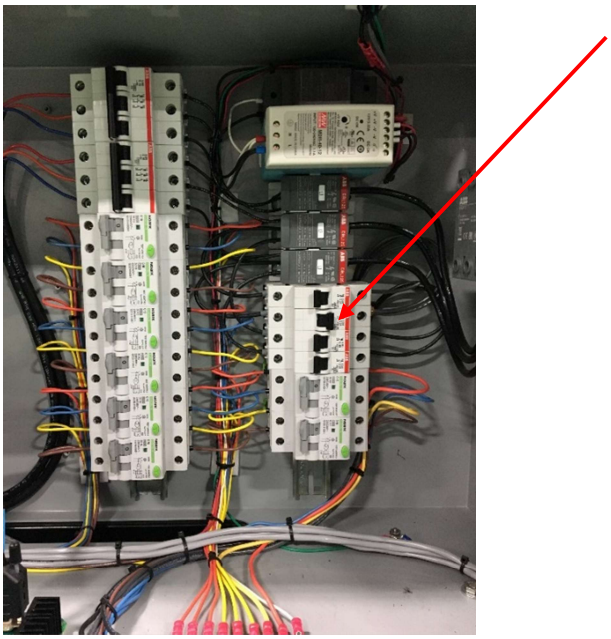


Figure 8

At this point, there is a distinction between a single and dual proportioners in a rig as well as the number of tanks that you have. The transfer pumps are to be controlled either by the proportioner itself or by a switch box located on the wall (depending on where your integrator/builder placed the box, see Figure 9). It is best to test one side at a time in order to diagnose problems should they arise. Also, complete the testing of both pumps on one proportioner then repeat the process on the other should you have 2 proportioners in your rig.

The first step is to set the Gun Pressure Setpoint below 600psi, this is to avoid an alarm that disables the proportioner. To test the Iso side, unplug the "Transfer Pump B" or "Tank B" connector depending on if you have a switch box or not. See Figure 9, it shows the switch box set up to test an Iso transfer pump.

Figure 9

Before testing, double check all the valves are open between your tanks and proportioner. If one of the valves is closed, you could build pressure and cause a hose failure. Next, you will put the proportioner in **"Run"** mode. At this point, the transfer pump should be continuously spinning clockwise at the pump face. If this is the case, put the proportioner back in **"Standby"** mode. There is no need to run this test very long because pressure does not need to be built up yet. After the Iso transfer pump has been successfully tested, move on to the Resin transfer pump.

The same process applies, unplug the "Transfer Pump A" or "Tank A" connector depending on you have a switch box or not. Before testing, double check all the valves are open between your tanks and proportioner. Put the proportioner in **"Run"** mode and make sure the correct transfer pump is spinning clockwise at the pump face. If you have a third tank, the process is the same but make sure the switch on the switch box is indicating the correct tank.

When going to test Tank C transfer pump, be sure that the toggle switch on the switch box is oriented correctly. The next step is to go to the "Manage Chemical" screen. On this screen, in the bottom right corner you will see a toggle box labeled **"Tank B Selected"**; touch this button once and it will say **"Tank C Selected"**. At this point you can proceed with testing Tank C Transfer pump in the same manner as the other two. IF YOU HAVE TANKS A, B AND C, ALWAYS BE MINDFUL OF WHICH TANK YOU HAVE SELECTED/INDICATED BOTH ON THE PROPORTIONER AND ON THE SWITCH BOX.

***If you have stick pumps refer to operations manual for set up and testing.

9.4 Fill Heaters

After transfer pumps have been cleared, the system now needs to be primed by filling the heaters. As mentioned in the previous section, the transfer pumps will kick on while in Run Mode and heater pressure is below 47psi. This process is best done by completing one side at a time, therefore disconnect the transfer pumps that aren't being used by unplugging the connector from the side of the proportioner (If Single Proportioner, Single Resin Tank) or from the Switch Box (If Dual Proportioner, or Dual Resin Tanks). Then go into Run Mode (no need to press start) and let the pump fill the heater. Monitor the heater pressure and observe that the transfer pump stops once pressure reaches 47psi. If pressure continues to climb and or/reaches 200 psi, begin troubleshooting this issue (could be bad sensor, crossed connection, or incorrect tank selection).

Repeat this process for the other side by plugging in the cable corresponding to the next transfer pump.

9.5 Fill the Lines

Filling the lines should also be done one side at a time and **all hose heat and preheater breakers should be off. See Figure 8.**
Turn off the breaker to the proportioner motor that isn't being used (breaker 1 and 2). For example, if filling the Iso line, turn off the Resin Motor breaker (2).

1. Set pressure setpoint to 300 psi

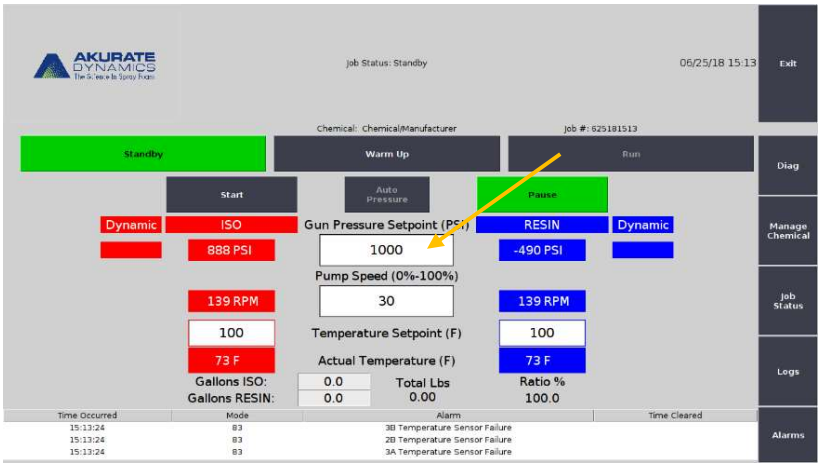


Figure 10

2. Set Motor Speed to 20%

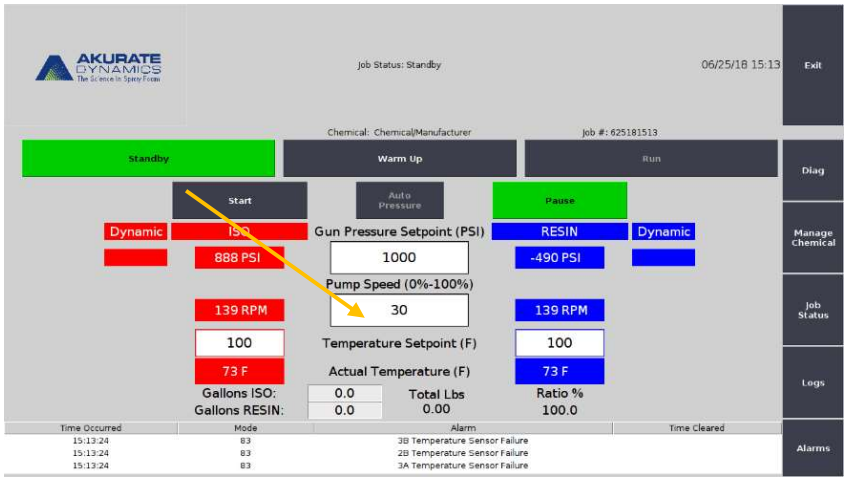


Figure 11

3. Select **Run Mode** and press **"Start"**
4. Let the proportioner run until you no longer see air coming out of the gun manifold.
5. Once confident air is out of the hoses, go into Standby Mode and close the gun manifold.

Repeat this process for the next side.

9.6 Hose Diagnostics

Now that the lines are filled, the hose heat breakers (3-12) and preheater breakers (13-15) should all be flipped to the on positions. Input temperature settings on the Main Screen (as seen in Figure 12) and test the hose heat by going into warm-up or run mode and monitor that hoses heat properly.

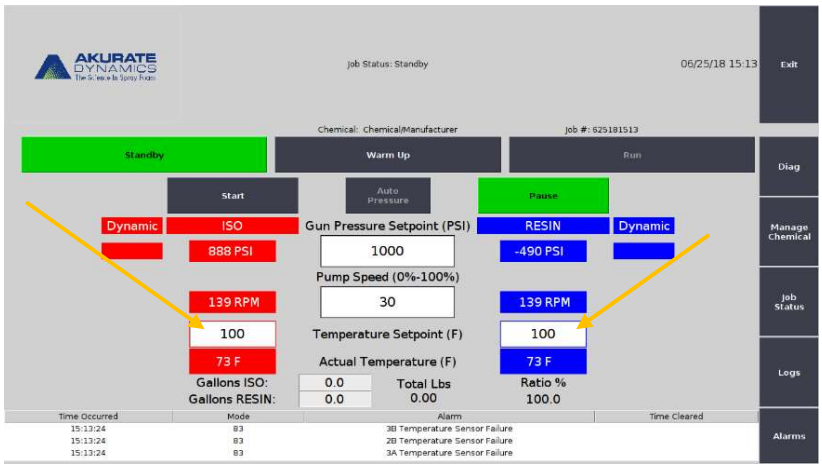


Figure 12

9.7 Test Spray

Now that hoses have reached temperature and have passed the diagnostics testing, input operational settings and perform a test spray. Monitor for proper operation of the system.

10.0 TROUBLESHOOTING

10.0 TROUBLESHOOTING

Troubleshooting the Akurate System

First, it is important to understand that the system has been designed to prevent the user from spraying when an issue begins to arise. There are several alarms in place to monitor for bad spraying conditions like pressure imbalances, temperature issues, and ratio. While alarms can be a good indication of where to start, it doesn't always give you the answer. It is often easier to spot an issue by trying to spray again after an alarm trips and then watching how the system reacts. Below is an outline of how to go about trouble shooting the system. Keep in mind that the steps may be interchangeable based on the issue you're experiencing but can be used as a rough guide.

1. Define the symptoms
    - Many times, customers will call and just begin rambling about one or more issues and come up with their own diagnosis of the problem. It is important to break up the issues and get a clear story of what the problem is. If there appears to be more than one issue, troubleshoot one at a time.

2. What to check first
    - Make sure system is configured correctly for the task at hand
        - Interface, switchbox (if installed), breakers, and ball valves (Is the operator in Run Mode? Warm up? Correct Tank Selection? Recirc valve closed/open?)
    - Motor speeds
    - Alarms
    - Heater Pressure
    - Gun
    - Test spray – it is typically easier to diagnose an issue while watching the system attempt to spray; monitor pressures in hoses and heater, see if a motor is spinning when it should, or watching how the resin motor speed is changing.

3. Isolate which section of the system is likely the culprit: Feed, Proportioner, or Hose
    - As all troubleshooting goes, it is best to start at one end and work towards the other.
        - If there is a hose section not heating, either start from that hose section and work towards the board, or work from the board out to the hose section.
        - If troubleshooting a pressure issue at the gun, work from the gun back to the feed system or from the feed system out to the gun.

4. Isolate to Mechanical or Electrical issue

5. Determine most likely issue and establish corrective action

Troubleshooting Guide

Losing pressure while spraying (Iso, Resin)

If losing pressure while spraying resulting in the system going into stand-by, it is often due to one of the issues listed below. The three most common issues are listed first and should always be checked before considering something else. Also, it is many times the result of one of the other issues outlined in this guide. It is hard to tell which one while spraying if no one is watching the proportioner, therefor when pressure is lost, it is best to go back to the system and try pressuring up normally and monitoring for some other issue during this process.

- Gun Blockage
- Check Valve issue
- Clogged Wye Strainer
- Chemical overheating inside heaters
- Transfer pump issue
- Air trapped on inlet side of pump
- Motor binding
- Pump seal failure

Pressure starts to build but can't reach pressure setpoint (Iso, Resin)

- Recirc valve stuck open
  - Ensure recirc valve has not been left open. May need to tighten set screw on valve handle if knob seems loose.
- Wye strainer clogged
  - Bleed pressure off the side in struggling to build pressure. Begin trying to build pressure again. Go directly to Diagnostics screen and monitor the heater pressure value, if struggling to reach/maintain 50 psi, or failing to reach 50 psi, the wye strainer is likely clogged.
    - Corrective Action: Close valve on bottom of tank and chemical inlet valve inside proportioner. Remove screen from wye strainer. Clean and replace. Open tank valve and chemical inlet valve.
- Chemical heaters are too hot
  - Indicators:
    - Motors constantly turning but stays between 500-700 psi
    - Actual temps significantly greater than the setpoint
    - Setpoint higher than _ on Iso Heater and _ on Resin Heater
  - Resolution:
    - Bring heaters down and wait a few minutes before trying to pressure back up and resume normal operation
- Air trapped on inlet side of pump - Iso
  - Indicator:
    - Pressure started to build but immediately fell off
    - Clicking sound coming from pump (cavitation)
    - Resin Motor Speed rapidly slows down
    - Iso gallon count not increasing when motor is turning

        - Corrective Action
            - Turn off Resin Motor Breaker, open Recirc Valve completely on Iso side. In Warm-up Recirc Mode, set motor speed to 55% and run the motors for approximately 10 sec. Go to Standby, turn the Resin Motor Breaker back on, and try to build pressure normally. If problem repeats itself, repeat the steps outlined above.
                - Alternate method to bleed air: Loosen the fitting on the inlet side of the pump, have a funnel or pan underneath the fitting as you will bleed out a decent amount of chemical. Go into run mode, this will allow the transfer pump to push any air out of the inlet side through the fitting. Once confident all air is out, tighten fitting and go into Standby Mode.
    - Significant leak
        - Start looking around and inside the proportioner and if leak not found, begin looking at hoses
    - Valve shut on tank or chemical inlet to proportioner
        - Check that valve is open at bottom of chemical tanks

- **<u>Iso side can't hold pressure at pressure setpoint</u>**
    - Check valve stuck open
        - Indicator:
            - Both motors rapidly turning off and on for short intervals
            - Resin Pressure continues to climb, and Iso Pressure hangs around setpoint
            - Once close to setpoint, pause the system and monitor heat exchanger pressure in diagnostics screen. If this number slowly rises as gun pressure slowly falls, you can confirm that it is the check valve.
        - Corrective Action: (If Equipped)
            - Remove Check Valve with 7/8" wrench. Blow out and remove anything caught in the check valve. Replace. If same symptoms repeat, replace with a new check valve.
    - Hose leak
        - Indicator:
            - Slow decrease in pressure
            - Pooling of chemical in hoses
        - Corrective Action:
            - Start looking at each hose connection for any leaks
    - Recirc valve slightly cracked
        - Ensure Recirc Valve is firmly tightened. May require tightening of set screw on valve knob
    - Air trapped in the hose
        - Indicator:
            - Pressure bounces around versus steadily declining
        - Corrective Action:
            - Spray through it

- **Resin side can't hold pressure at pressure setpoint**
  - Resin check valve stuck open
    - Indicator:
      - Iso Pressure holds at setpoint, and resin pressure steadily falls below setpoint
      - Once close to setpoint, pause the system and monitor Resin Heat Exchanger Pressure in Diagnostics screen. If this number slowly rises as Resin gun pressure slowly falls, you can confirm that it is the check valve.
    - Corrective Action: (If Equipped)
      - Remove Check Valve with 7/8" wrench. Blow out and remove anything caught in the check valve. Replace. If same symptoms repeat, replace with a new check valve.
  - Hose leak
    - Indicator:
      - Slow decrease in pressure
      - Pooling of chemical in hoses
    - Corrective Action:
      - Start looking at each hose connection for any leaks and fix if possible. If leak or puncture in hose lining, replace section.
  - Recirc valve slightly cracked
    - Ensure Recirc Valve is firmly tightened. May require tightening of set screw on valve knob.
  - Air trapped in the hose
    - Indicator:
      - Pressure bounces around versus steadily declining
    - Corrective Action:
      - Spray through it.

- **Resin Pressure won't build at all**
  - Motor breaker off
    - Ensure Motor Breaker is in the On Position
  - Large negative offset stored
    - Indicator
      - Resin Motor Speed (RPM) at Zero
    - Corrective Action:
      - Go to Manage Chemical screen. You will notice a large negative value stored in Gun Offset. Press Edit, change the value to zero. Press Save then Set. Go to Diagnostics screen and Reset Volume and Reset Gun Offset. Motor speeds should now match on the main screen.
  - Drive Error
    - Indicator:
      - Resin motor not spinning while trying to build pressure.

- Resin drive inside electrical enclosure displays error code (something other than just a number)

- Corrective Action:
  - Reset drive by holding down the two buttons on the left side of the drive until it resets.
  - If error message occurs again when trying to pressure back up, Reboot the system
  - If issue continues, contact technical support.

- Wye strainer clogged
  - Indicator
    - While motors are on in Run mode, Resin Motor speed steadily climbs
    - While motors are on, Resin Heater pressure in Diagnostics screen struggles to build to 50psi if at all.
  - Corrective Action:
    - Close valve on bottom of tank and chemical inlet valve inside proportioner. Remove screen from wye strainer. Clean and replace. Open tank valve and chemical inlet valve.
- Air trapped on inlet side of pump
  - Indicator:
    - Cavitation – Clicking noise coming from Resin Pump.
    - Resin Motor Speed rapidly increase.
    - Resin gallon count not increasing when motors are spinning.
    - Resin heater pressure not decreasing below 47 PSI while motor is spinning.
  - Corrective Action:
    - Turn off Iso Motor Breaker, open Recirc Valve completely on Resin side. In Warm-up Recirc Mode, Set motor speed to 50% for 2HP Motors and 75% for 1HP Motors and run the motors for approximately 10 sec or until pressure starts to rapidly build. Go to Standby, turn the Iso Motor Breaker back on, and try to build pressure normally. If problem repeats itself, repeat the steps outlined above.
      - Alternate method to bleed air: Loosen the fitting on the inlet side of the pump, have a funnel or pan underneath the fitting as you will bleed out a decent amount of chemical. Go into run mode, this will allow the transfer pump to push any air out of the inlet side through the fitting. Once confident all air is out, tighten fitting and go into Standby Mode.
    - Once resolved, Reset Gun offset and Reset Volume
- Transfer pump not turning
  - See Section "**Resin Transfer Pump not Turning**"
- Blockage in hose before pressure sensor
  - Indicator:
    - While pumps are on, pressure on the analog gauge increases with no increase in pressure at the gun.
- Tank valve shut

- Ensure Valves are open

- **Iso pressure won't build at all**
  - Breakers off
    - Ensure motor breaker is in the on position
  - Drive error
    - Indicator:
      - Iso motor not spinning while trying to build pressure
      - Iso drive inside electrical enclosure displays error code (something other than just a number)
    - Corrective Action:
      - Reset drive by holding down the two buttons on the left side of the drive until it resets.
      - If error message occurs again when trying to pressure back up, Reboot the system
      - If issue continues, contact technical support.
  - Wye strainer clogged
    - Indicator
      - While motors are on in Run mode, Resin Motor speed steadily falls
      - While motors are on, Iso Heater pressure in Diagnostics screen struggles or won't build to 50psi if at all.
    - Corrective Action:
      - Turn off system. Close valve on bottom of tank and chemical inlet valve inside proportioner. Remove screen from wye strainer. Clean and replace. Open tank valve and chemical inlet valve.
  - Air trapped on inlet side of pump
    - Indicator:
      - Cavitation – Clicking noise coming from Iso Pump
      - Iso heater pressure not decreasing below 47 PSI while motor is spinning
      - Resin Motor Speed rapidly decreases
      - Iso gallon count not increasing while motors are spinning
    - Corrective Action:
      - Turn off Resin Motor Breaker, open Recirc Valve completely on Iso side. In Warm-up Recirc Mode, set motor speed to 50% for 2HP Motors and 75% for 1 HP Motors and run the motors for approximately 10 sec or until pressure starts to rapidly build. Go to Standby, turn the Resin Motor Breaker back on, and try to build pressure normally. If problem repeats itself, repeat the steps outlined above.
        - If repeating the steps above doesn't work you will have to relieve the pressure manually: Loosen the fitting on the inlet side of the pump, have a funnel or pan underneath the fitting as you will bleed out a decent amount of chemical. Go into run mode, this will allow the transfer pump to push any air out of the inlet side through the fitting. Once confident all air is out, tighten fitting and go into Standby Mode.
      - Once resolved, Reset Gun offset and Reset Volume

- Recirc valve stuck open
  - Ensure Recirc valve is closed when trying to build pressure
- Transfer pump not turning
  - See section for **Iso Transfer Pump not Turning**
- Tank or Inlet Valves shut
  - Ensure all valves are open leading from the tank to the proportioner

Iso Motor won't turn

- Breaker off
  - Make sure Iso Motor Breaker is on
- Drive error
  - Indicator:
    - Iso motor not spinning while trying to build pressure
    - Iso drive inside electrical enclosure displays error code (something other than just a number)
  - Corrective Action:
    - Reset drive by holding down the two buttons on the left side of the drive until it resets.
    - If error message occurs again when trying to pressure back up, Reboot the system
    - If issue continues, contact technical support.
- Lost communication

Resin Motor won't turn

- Breaker off
  - Make sure Resin Motor Breaker is on
- Drive error
  - Indicator:
    - Iso motor not spinning while trying to build pressure
    - Iso drive inside electrical enclosure displays error code (something other than just a number)
  - Corrective Action:
    - Reset drive by holding down the two buttons on the left side of the drive until it resets.
    - If error message occurs again when trying to pressure back up, Reboot the system
    - If issue continues, contact technical support.
- Negative offset stored
  - Indicator
    - Resin Motor Speed (RPM) at Zero
  - Corrective Action:
    - Go to Manage Chemical screen. You will notice a large negative value stored in Gun Offset. Press Edit, change the value to zero. Press Save

then Set. Go to Diagnostics screen and Reset Volume and Reset Gun Offset. Motor speeds should now match on the main screen.

- Lost communication

➢ Resin Transfer pump won't turn

The transfer pumps are designed to maintain 50psi while recirculating in Warm-up Mode or while in Run Mode. If heater displays 48psi or greater the transfer pump will not turn. If while in Run mode or trying to recirculate chemical in Warm-up mode the pressure inside the heater (value displayed in the Diagnostics Screen) falls below 48 psi and the motor doesn't turn on, then the following possible issues could be occurring.

- Wrong Tank selected (Dual Resin Tanks)
  - Ensure the correct Tank is selected in the Manage Chemical screen as well as the Control Switch box for the chemical tanks.
- Electrical connection loose
  - Ensure transfer pump cables are plugged in completely
    - For Single Proportioner units:
      - locate the connection labeled "Transfer Pump B" on the right side of the proportioner
    - For Dual Proportioner units:
      - Check the connection labeled "Opto Out" on the right side of the proportioner.
      - Locate the electrical housing box on the wall that has labeled connections for each transfer pump. Check the transfer pump cable which corresponds to the tank you are using.
- Vapor Locked
- Lost communication (Electrical)

➢ Iso Transfer pump won't turn

The transfer pumps are designed to maintain 50psi while recirculating in Warm-up Mode or while in Run Mode. If heater displays 48psi or greater the transfer pump will not turn. If while in Run mode or trying to recirculate chemical in Warm-up mode the pressure inside the heater (value displayed in the Diagnostics Screen) falls below 48 psi and the motor doesn't turn on, then the following possible issues could be occurring.

- Electrical connection loose
  - Ensure transfer pump cables are plugged in completely
    - For Single Proportioner System, look for the plugins labeled "Transfer Pump A" for Iso Transfer pump
- Heater pressure sensor cables are crossed at the sensor connections
  - Check that pressure sensors are plugged in to the correct cables
- Lost communication (Electrical)
- Vapor locked

➢ Transfer pump constantly spinning

- Heater pressure sensor cables are crossed at the sensor connections
  - Check that pressure sensors are plugged in to the correct cables

- Tank valve or inlet valves shut
  - Make sure all valves leading from the tank to the proportioner are open
- Wye strainer clogged
  - Indicator:
    - Pressure not building in the corresponding heater
  - Corrective Action:
    - Turn off system. Close valve on bottom of tank and chemical inlet valve inside proportioner. Remove screen from wye strainer. Clean and replace. Open tank valve and chemical inlet valve.
- Lost communication

➢ **Transfer pump turning on and off constantly while in Run Mode and not spraying**

- Check Valve stuck open
  - Indicator
    - Pump constantly turning on and off
    - In Diagnostics screen, heater pressure is building up and falling off while the proportioner is not on.
  - Corrective Action:
    - Take a mallet and beat on the black check valve a few times to see if the problem stops
    - If problem persists, remove check valve to either clean or replace.
- Major leak
  - Make sure no major leakage is occurring inside the Proportioner or on the chemical feed lines to the system

➢ **I have a -102 temp value**

- Bad temp sensor
- Sensor/Cable Disconnected
  - Corrective Action:
    - Identify section that the "bad" temp sensor is located. *If having trouble identifying the correct section and temp sensor location, see* ***Identifying Hose Sections and Sensors****.* First check to see if disconnected or making bad contact. If plugging the temp sensor back in or securing the connector doesn't fix the problem, replace the temp sensor and plug back in. See **Changing a Temp Sensor**.
    - If problem continues, check the connection on the side of the proportioner for the corresponding section. If securing this connection doesn't work, contact technical support.

➢ **Hose section reading 212°**

- Bad Sensor
  - If in the middle of the job you can bypass the section to the next section in front of it to finish the job before replacing the sensor. This can be done in the Diagnostics Screen using the dropdown menu underneath the corresponding hose section labeled Bypass. Once back at the shop, replace the temp sensor. See

Changing a Temp Sensor.

- **I have a -492 gun pressure value**
  - Bad Sensor
  - Sensor/Cable Disconnected
    - Corrective Action:
      - Open the pressure section of the cable (25 feet back from the gun) and check to see if pressure sensor has become disconnected or if the connection is loose. If plugging the pressure sensor back in or securing the connector doesn't fix the problem, replace the pressure sensor and plug back in.
      - If problem continues, check that the pressure cable on the left side of the proportioner is secured. If securing the section doesn't fix the problem, contact technical support.

- **Heater Pressure Sensor Failure**
  - Pressure sensor disconnected or gone bad
    - Corrective Action:
      - Identify heater with the pressure sensor issue. Open the door on the proportioner and identify the pressure sensor on corresponding heater. Check if the connection has come loose on the pressure sensor. If cable is secured and problem persists, replace the pressure sensor. See **Replacing a Heater Pressure Sensor.**
      - If problem continues contact technical support

- **My analog gauge won't bleed all the way to zero**
  - Bad Gauge
    - Ensure that the pressure on the hose is able to bleed all the way down to zero. If hose pressure does bleed to zero, the gauge is bad and needs to be replaced.
  - Blockage in Recirc Line to tank or in pressure manifold
    - If the hose pressure stops somewhere close to the analog gauge reading when bleeding pressure, there is likely a blockage somewhere in the recirc line or pressure manifold

- **My heaters are overheating significantly (>30F above setpoint)**
  - Relay stuck closed

- **My heaters aren't heating up**
  - Chemical settings aren't correct
    - Check that the correct chemical is selected and that the settings assigned to that chemical are correctly entered in the Manage Chemical Screen.
  - Bad Relay
  - Breakers off
    - Ensure that the heater breakers are in the on position
  - Poor electrical connection

- For Proportioners with heat exchangers:
  - Heaters do not turn on until motors are spinning.

➢ A section or sections of hose aren't heating up

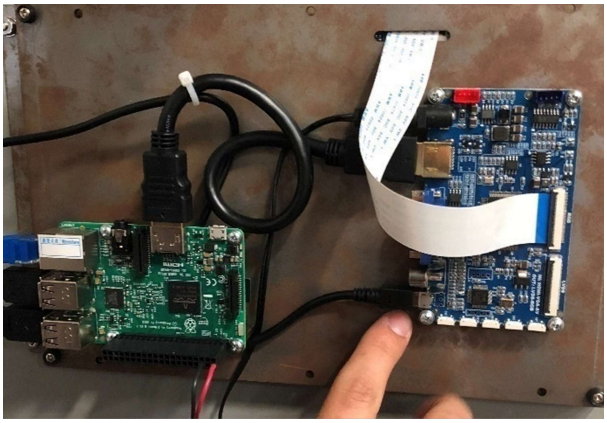
- Bad connection
- Breakers off
- Wire sheared off on hose

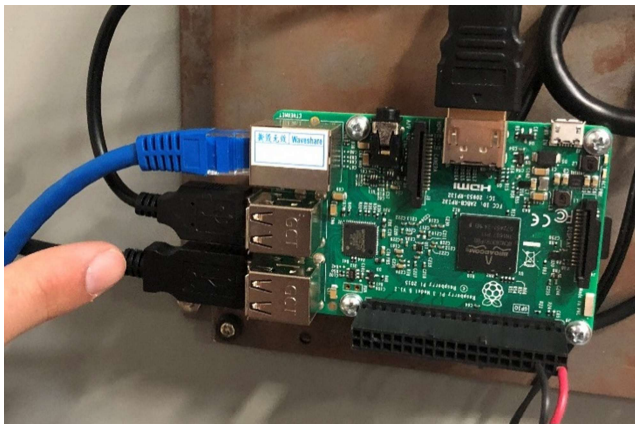
➢ My resin pressure comes up extremely slow

- Check that the resin motor speed is equal to the Iso motor speed. If value is much lower, reset the Gun Offset in the Diagnostics Screen. If this doesn't make them equal, there is a negative offset stored in the Manage Chemical Screen. Edit the chemical, change the gun offset to 0, press Save, then Back, then Set, and reset the Gun Offset in the Diagnostics Screen.

➢ Touch screen isn't responding

- Lost communication with control board
  - Corrective Action:
    - Watch the main screen for a few seconds. Are any of the values changing on the main screen?
      - If yes, communication is good. And proceed to next possible issue.
      - If no, communication has been lost, see section **Reestablishing Communication between Raspberry Pi and Control Board.**
- Poor cable connection on LVDS board
  - Corrective Action:
    - Unplug the connection shown in the picture below and make sure the cable and plug are clean of any debris. Plug the connection back in. If this doesn't work, try moving the cable around and see if the touch screen begins responding again. If this doesn't work, contact technical support





➢ Main screen doesn't open upon system startup

- First make sure all breakers are on in the main breaker box. Then check if the E-stop is engaged. If breakers are on and E-stop is not engaged, power off and power on the system again. If the unit still doesn't turn on, contact technical support.

- **A section or sections of hose are overheating significantly**
  - Electrical