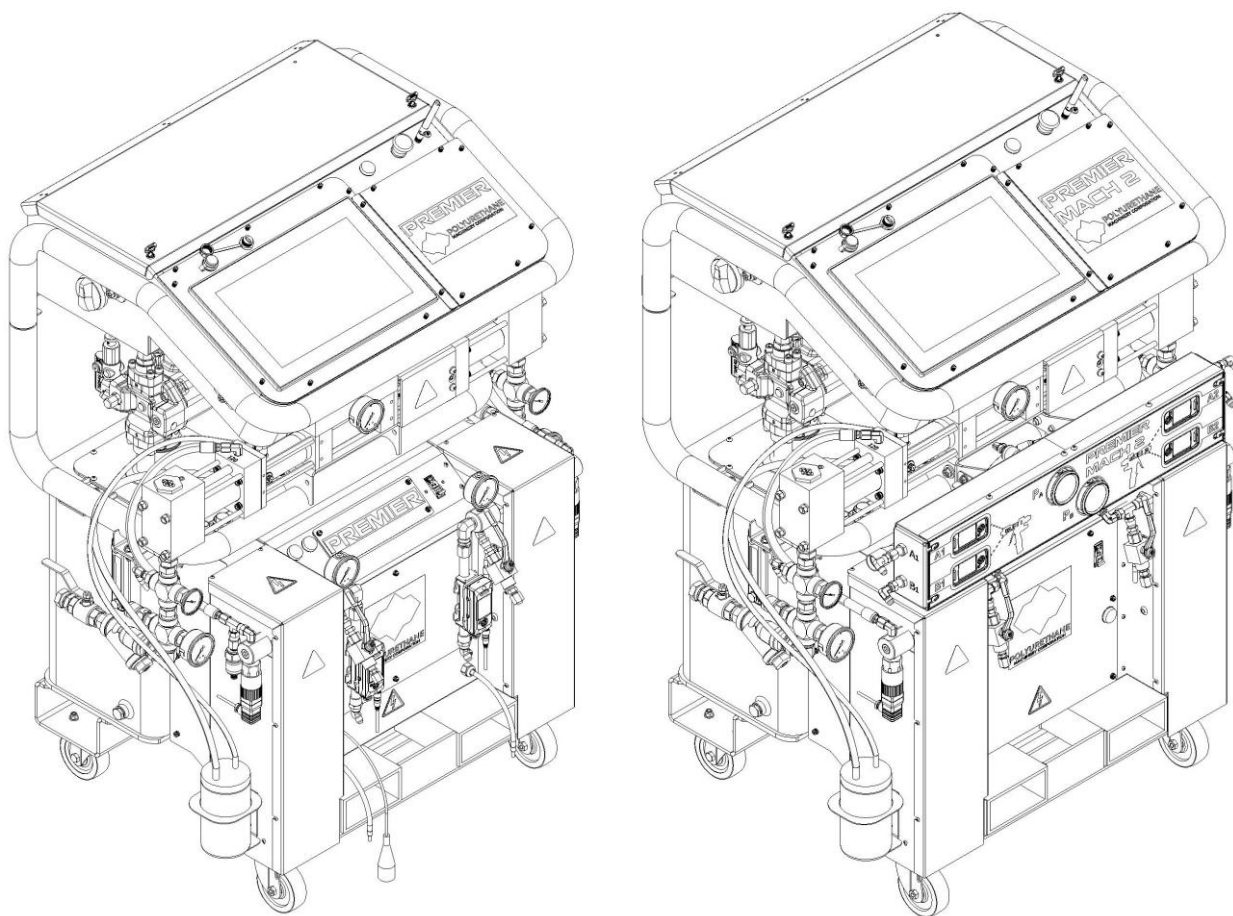




POLYURETHANE
MACHINERY CORPORATION

Premier Series Proportioner Service Manual

Ref. # 203878
Revision 1.1



FOR PROFESSIONAL USE ONLY
Not approved for use in European explosive atmosphere locations

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1 WARRANTY

Polyurethane Machinery Corporation (hereinafter “PMC”) provides this **LIMITED WARRANTY** (hereinafter “Warranty”) to the original purchaser (hereinafter “Customer”) covering this equipment and the original PMC manufactured accessories delivered with the equipment (hereinafter “Product”) against defects in material or workmanship of the Product (hereinafter “Defect” or “Defective”) for a period of one (1) year from the date of first purchase as shown on the original PMC invoice (hereinafter “Warranty Period”)

If during the Warranty Period under normal use, the Product is suspected by Customer to be Defective in material or workmanship, it is Customer’s responsibility to contact PMC and return the Product to PMC as directed by PMC, freight prepaid. If PMC determines that the Product is Defective and that such Defect is covered by this Warranty, PMC will credit Customer for the reasonable freight charges incurred by Customer in returning the Defective Product to PMC, and PMC (or its authorized agent) will, at PMC’s option, repair or replace the Product, subject to the following:


- A. **Original Invoice:** The original invoice must be kept as proof of the date of first sale and the Product serial number. The Warranty does not cover any Product if the Original Invoice appears to have been modified or altered, or when the serial number on the Product appears to have been altered or defaced.
- B. **Product Maintenance:** It is the Customer’s responsibility to maintain the Product properly. See your maintenance schedule and owner’s manual for details. The Warranty does not cover an improperly maintained Product.
- C. **Non-PMC Components and Accessories:** Non-PMC manufactured components and accessories that are used in the operation of the Product are not covered by this Warranty. Such components and accessories shall be subject to the warranty offered to the Customer, if any, by the original manufacturer of such component or accessory.
- D. **Other Warranty Exclusions:** The Warranty does not cover any Product that PMC determines has been damaged or fails to operate properly due to misuse, negligence, abuse, carelessness, neglect, or accident. By way of example only, this includes:
 - Normal wear and tear.
 - Improper or unauthorized installation, repair, alteration, adjustment, or modification of the product.
 - Use of heating devices, pumping equipment, dispensers, or other parts or accessories with the product that have not been approved or manufactured by PMC.
 - Failure to follow the operating instructions and recommendations provided by PMC.
 - Cosmetic damage.
 - Fire, flood, “acts of God”, or other contingencies beyond the control of PMC.

THE WARRANTY DESCRIBED HEREIN IS THE EXCLUSIVE REMEDY FOR THE CUSTOMER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, AND THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL OTHER WARRANTIES ARE HEREBY DISCLAIMED. TO THE FULLEST EXTENT PERMITTED BY LAW, PMC SHALL NOT BE RESPONSIBLE, WHETHER BASED IN CONTRACT, TORT (INCLUDING, WITHOUT LIMITATION, NEGLIGENCE), WARRANTY OR ANY OTHER LEGAL OR EQUITABLE GROUNDS, FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, LOST PROFITS, SPECIAL, PUNITIVE OR EXEMPLARY DAMAGES, WHETHER TO PERSON OR PROPERTY, ARISING FROM OR RELATING TO THE PRODUCT, EVEN IF PMC HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH LOSSES OR DAMAGES.

- Non-Warranty Service by PMC: If PMC determines that the suspected Defect of the Product is not covered by this Warranty, disposition of the Product will be made pursuant to the terms and conditions of PMC's written estimate on a time and materials basis.
- Continuing Warranty for Products Repaired or Replaced under Warranty: Following the repair or replacement of a Product covered by this Warranty, such Product will continue to be subject to the original Warranty for the remainder of original Warranty Period or for three (3) months from the repair or replacement date, whichever is longer.
- No Rights Implied: Nothing in the sale, lease or rental of any Product by PMC shall be construed to grant any right, interest, or license in or under any patent, trademark, copyright, trade secret or other proprietary right or material owned by anyone; nor does PMC encourage the infringement of same.
- Exclusive Warranty: This writing is the final, complete, and exclusive expression of the Warranty covering the Product. Any statements made by PMC, its employees or agents that differ from the terms of this Warranty shall have no effect. It is expressly understood that Customer's acceptance of this Warranty, by performance or otherwise, is upon and subject solely to the terms and conditions hereof, and any additional or different terms and conditions proposed or expressed by Customer or anyone, whether in writing or otherwise, are null and void unless specifically agreed to in writing by an Officer of PMC.

2 SAFETY AND HANDLING

This chapter contains important information on the safety, handling, and use of your Premier Series Proportioner.

	<p>Before installing the Premier Series Proportioner and startup, carefully read all the technical and safety documentation included in this manual. Pay special attention to the information in order to know and understand the operation and the conditions of use of the Premier Series Proportioner. All of the information is aimed at improving user safety and avoiding possible breakdowns from the incorrect use of the Premier Series Proportioner.</p>
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WARNING! Symbol is presented in front of information to alert of a situation that might cause serious injuries if the instructions are not followed.

CAUTION! Symbol is presented in front of information that indicates how to avoid damage to the proportioner or how to avoid a situation that could cause issues.

NOTE! Symbol is presented in front of relevant information of a procedure being carried out.

Careful study of this manual will enable the operator to know the characteristics of the Premier Series Proportioner and the operating procedures. By following the instructions and recommendations contained herein, you will reduce the potential risk of accidents in the installation, use, and maintenance of the Premier Series Proportioner. You will provide a better opportunity for greater output, incident-free operation for a longer time, and the possibility of detecting and resolving problems quickly and simply.






Keep this Operations Manual for future consultation of useful information. If you lose this manual, ask for a new copy from your PMC Service Center or go online at our web site (www.polymacusa.com).

The Premier Series Proportioner has been designed and built for the application of polyurethane foam chemical systems, and some two-component epoxy systems

WARNING! The design and configuration of the Premier Series Proportioner does not allow its use in potentially explosive atmospheres, or the pressure and temperature limits described in the technical specifications of this manual to be exceeded.

Always use liquids and solvents that are compatible with the unit. If in doubt, consult your authorized PMC distributor.

When working with the Premier Series Proportioner, it is recommended that the operator wear suitable clothing and elements of personal protection, including, without limitation, gloves, protective goggles, safety footwear and face masks. Use breathing equipment when working with the Premier Series Proportioner in enclosed spaces or in areas with insufficient ventilation. The introduction and follow-up of safety measures must not be limited to those described in this manual. Before starting up the Premier Series Proportioner, a comprehensive analysis must be made of the risks derived from the products to be dispensed, the type of application, and the working environment.

	<i>To prevent possible injury caused by incorrect handling of the raw materials and solvents used in the process, carefully read the Safety Data Sheet (SDS) provided by your supplier. Deal with the waste caused according to current regulations.</i>
	<i>To avoid damage caused by the impact of pressurized fluids, do not open any connection, or perform maintenance work on components subject to pressure until the pressure has been completely eliminated.</i>
	<i>Use suitable protection when operating, maintaining or being present in the area where the equipment is functioning. This includes, but is not limited to, the use of protective goggles, gloves, shoes, and safety clothing and breathing equipment.</i>
	<i>The equipment includes components that reach high temperatures and can cause burns. Hot parts of the equipment must not be handled or touched until they have cooled completely.</i>
	<i>To prevent serious injury through crushing or amputation, do not work with the equipment without the safety guards installed on the moving parts. Make sure that all the safety guards are correctly reinstalled at the end of the repair or maintenance work of the equipment.</i>

3 CHARACTERISTICS

The Premier Series Proportioner has been designed and built for the application of polyurea chemical systems, polyurethane foam chemical systems, and some specific two-component epoxy systems.

3.1 PRINCIPAL HEATING SYSTEM

The Proportioners consists of two (2) independent Material Heaters without internal seals. Each Heater six (6) Heating Elements rated at 1,500, or 1,750 Watts each, giving the Proportioner a total heat output of 18,000 or 21,000 Watts. The heating system provides the necessary control and safety components for their precise operation. The Material Heater design allows for a controlled and precise temperature differential (ΔT) of 90 ° F (32 ° C) and material application temperatures of up to 190° F (88 ° C) under ambient temperatures.

3.2 HOSE HEATING SYSTEM

The Premier (X) is designed with a 5 KVA (120 V) Isolation Transformer that enables effective heating of up to a total hose length of 410 feet (125 meters). The Premier MACH 2 is designed with a 6 KVA (70V) dual output multitap transformer that enables effective heating of two sets of hoses up to 260 feet (79 meters) each. The system includes an innovative hose heating concept in which the continuous braid tinned-copper jacket is distributed evenly around the circumference of the hose providing a uniform heating watt density and precise control of the material application temperature. This hose heating element design is extremely resistant to fatigue failure.

100% circumferential coverage produces the most uniform distribution of heat available.



Figure 1: Hose Heating Diagram

LOW PRESSURE (2250 PSI) HOSE WITHOUT SCUFF	
PART NUMBER	DESCRIPTION
MA-00014A	3/8" x 50' HOSEASY, LP, NO TC
MA-00014A-TC	3/8" x 50' HOSEASY, LP, W/TC
MA-00014A-25	3/8" x 25' HOSEASY, LP, NO TC
MA-00014A-TC-25	3/8" x 25' HOSEASY, LP, W/TC
200001	3/8" x 50' HOSEASY, LP, W/RTD
200010	1/2" x 50' HOSEASY, LP, NO TC
200011	1/2" x 50' HOSEASY, LP, W/TC
200012	1/2" x 50' HOSEASY, LP, W/RTD

LOW PRESSURE (2250 PSI) HOSE WITH SCUFF	
PART NUMBER	DESCRIPTION
200002	3/8" x 50' HOSEASY, LP, W/RTD, W/SCUFF
200005	3/8" x 50' HOSEASY, LP, NO TC, W/SCUFF
200006	3/8" x 50' HOSEASY, LP, W/TC, W/SCUFF
200016	1/2" x 50' HOSEASY, LP, NO TC, W/SCUFF
200017	1/2" x 50' HOSEASY, LP, W/TC, W/SCUFF
200018	1/2" x 50' HOSEASY, LP, W/RTD, W/SCUFF

HIGH PRESSURE (3500 PSI) HOSE WITHOUT SCUFF	
PART NUMBER	DESCRIPTION
MA-00039A	3/8" x 50' HOSE ASY, HP, NoTC
MA-00036-TC	3/8" x 50' HOSE ASY, HP, W/TC
MA-00039A-25	3/8" x 25' HOSE ASY, HP, NoTC

HIGH PRESSURE (3500 PSI) HOSE WITH SCUFF	
PART NUMBER	DESCRIPTION
200007	3/8" x 50' HOSE ASY, HP, NoTC, W/Scuff
200008	3/8" x 50' HOSE ASY, HP, W/TC, W/Scuff
200019	1/2" x 50' HOSE ASY, HP, NoTC, W/Scuff
200224	1/2" x 50' HOSE ASY, HP, W/TC, W/Scuff

3.3 DOUBLE ACTING OPPOSED PISTON METERING PUMPS

The double acting Pump Line is driven by a double ended Hydraulic Cylinder. The in-line pump system with opposed piston pumps provides a constant volume and guarantees uniform pressures in both directions of pump movement.

3.4 PRESSURE BALANCE CONTROL SYSTEM

The Pressure Balance Control (PBC) system performs an automatic shutdown when a chemical imbalance occurs. When the system is turned off, the Proportioner will perform as if there is no PBC system and will continue pumping material. When the system is turned on, it will continually monitor the pressure between the two chemicals (known as the **pressure differential**). If the pressure differential becomes equal to or greater than the **maximum allowable pressure differential**, the pumps will be shut off.

The Pressure Balance Control system can be simplified into a logic box diagram with inputs and outputs. There are five inputs: the power supply from the main console, the pressure readings from each chemical, the maximum pressure, and the maximum allowable pressure differential. Inside the logic box, the actual pressure differential of the chemicals is compared to the maximum allowable pressure differential. Depending on the circumstances of all five inputs, there are only two possible outputs: either the pumps will continue to pressurize and move material, or the pumps will shutoff and flow will be lost.

See Section 6.3.7 on Page 41 for the pressure balance control widget located in the HMI.

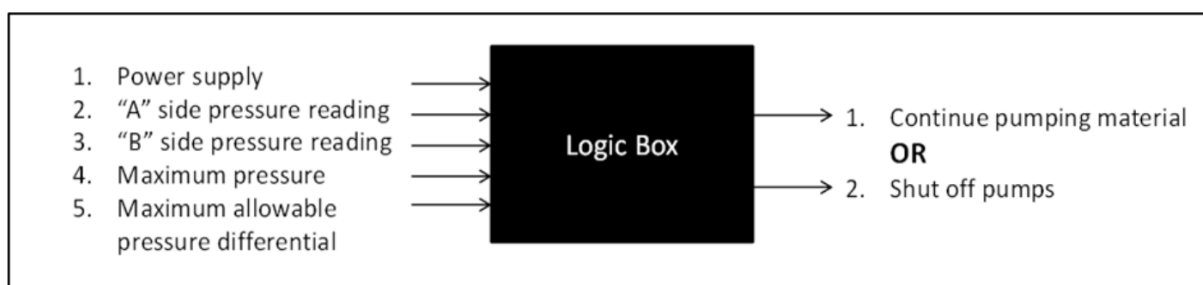


Figure 2: Pressure Balance Control Logic Diagram

4 TECHNICAL SPECIFICATIONS

4.1 ELECTRICAL



CAUTION! Inside the console is a Terminal Strip for connecting the main power (wire not supplied) to the Premier Series Proportioner. This electrical connection must be made only by a qualified electrician.

Premier Total Electrical Consumption

Heater Power	Transformer	Premier			
18kW	70V DT	75	A	27	kW

Heater Power	Transformer	Premier MACH 2			
18kW	120V	77	A	28	kW

Heater Power	Transformer	Premier X			
21kW	120V	83	A	30	kW

NOTES: Calculations for 200-240VAC specifications based off a 230VAC input.

4.2 MECHANICAL

	120 Pumps	
Maximum Working Pressure	2,000PSI (14MPa, 138bar)	
Maximum Production	40lb/min (14kg/min)	
Minimum Production	2lb/min (1kg/min)	
Volume per Cycle (Single Pump)	0.0312gal/cycle (0.1181L)	
Volume per Cycle (Both Pumps)	0.0624gal/cycle (0.2362L)	
Cycles per 50gal (190L) Drum	1603 cycles	
Maximum Hose Length		
5KVA Transformer	410ft (125m)	
6KVA Transformer	2 X 260ft (79m)	
Approximate Weight	Premier (X)	MACH 2
Hydraulic Tank Empty	670 lbs. (304 kg)	690 lbs. (313 kg)
Hydraulic Tank Full (20gal)	844 lbs. (383 kg)	864 lbs. (392 kg)
Overall Dimensions (W x D x H)		
Premier (X)	30.25in x 40in x 56in (77cm x 102cm x 142cm)	
MACH 2	28.5in x 40in x 56in (73cm x 102cm x 142cm)	

NOTES: MACH 2 Productions is 40lb/min between two guns (20lb/min each).

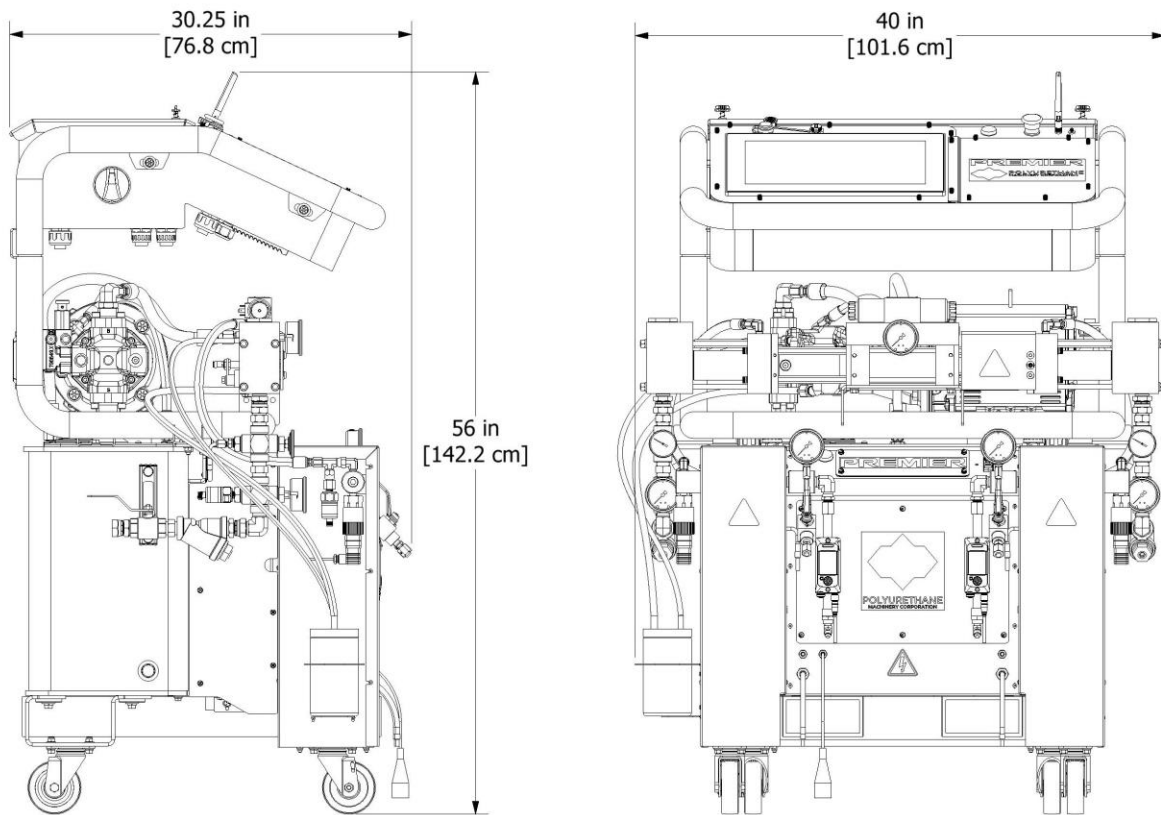


Figure 3: Premier (X) Proportioner Dimensions

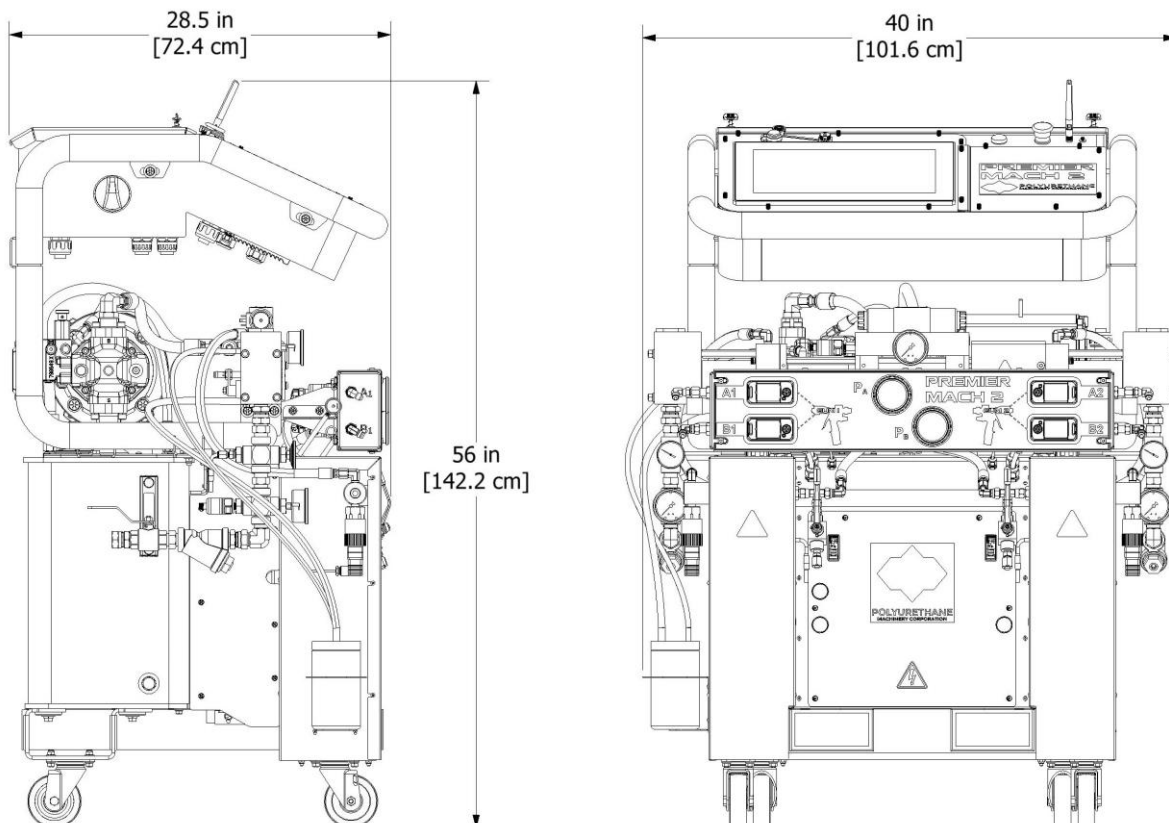


Figure 4: MACH 2 Proportioner Dimensions

5 DESCRIPTION

5.1 PREMIER (X) PROPORTIONER

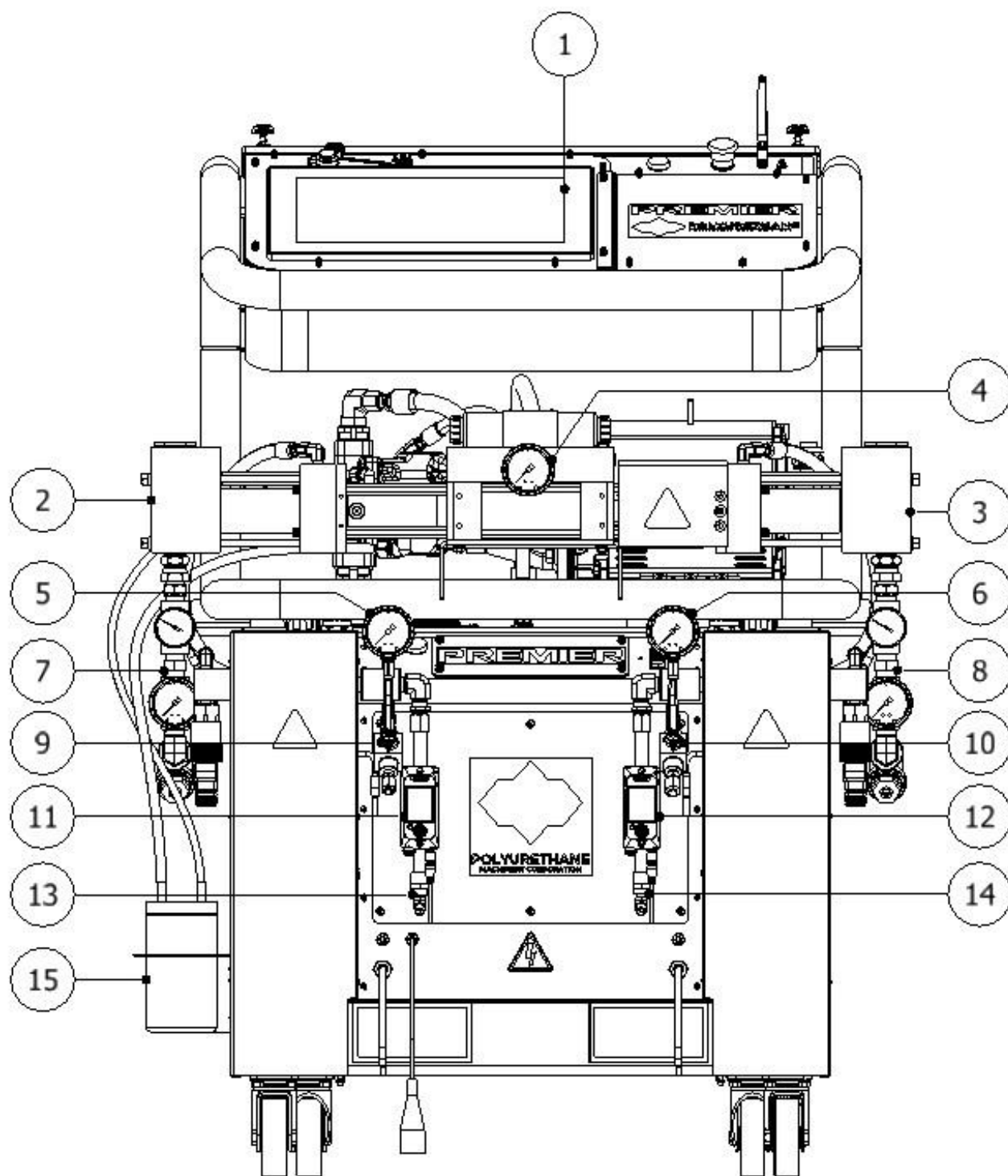


Figure 5: Premier (X) Component Identification - Front

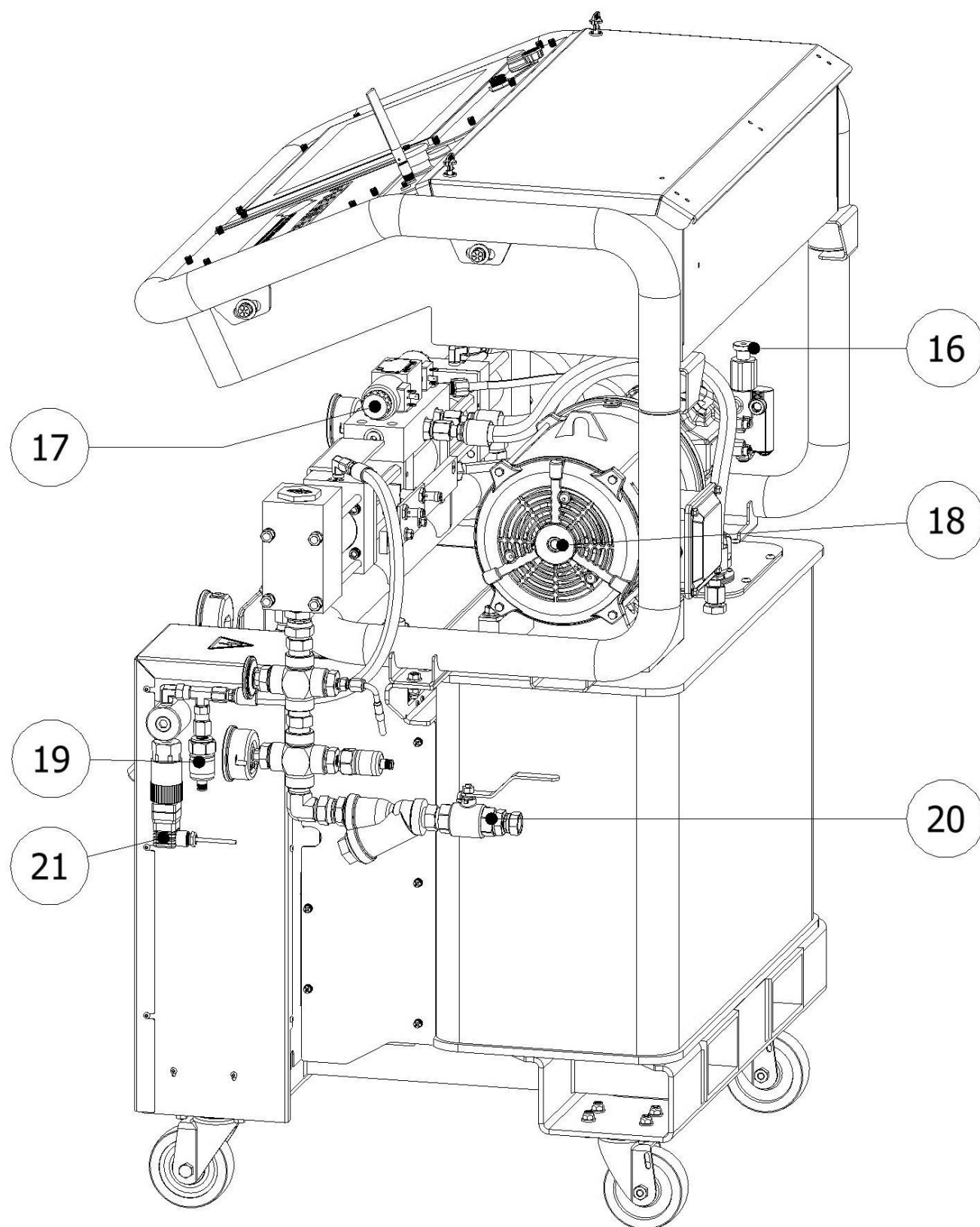


Figure 6: Premier (X) Component Identification - Back

- 1. Control Panel**
Controls and regulates the operation of the Premier Series Proportioner.
- 2. Isocyanate (Iso, A) Metering Pump**
Meters the Isocyanate material.
- 3. Polyol (Poly, B) Metering Pump**
Meters the Polyol material.
- 4. Hydraulic Cylinder Manifold**
Transfers power from hydraulic pump to material pumps.
- 5. Isocyanate (Iso, A) Outlet Pressure Gauge**
Provides pressure reading of Isocyanate after heating and pressurizing.
- 6. Polyol (Poly, B) Outlet Pressure Gauge**
Provides pressure reading of Polyol after heating and pressurizing.
- 7. Isocyanate (Iso, A) Inlet Manifold Assembly**
Provides Isocyanate temperature and pressure readings prior to heating and pressurizing.
- 8. Polyol (Poly, B) Inlet Manifold Assembly**
Provides Polyol temperature and pressure readings prior to heating and pressurizing.
- 9. Isocyanate (Iso, A) Recirculation Valve**
Separate ball valves allow the user to recirculate Isocyanate back into the barrel for reheating purposes or to purge the Proportioner of remaining Isocyanate.
- 10. Polyol (Poly, B) Recirculation Valve**
Separate ball valves allow the user to recirculate Polyol back into the barrel for reheating purposes or to purge the Proportioner of remaining Polyol.
- 11. Isocyanate (Iso, A) Flow Meter**
Provides flow reading of Isocyanate after heating and pressurizing.
- 12. Polyol (Poly, B) Flow Meter**
Provides flow reading of Polyol after heating and pressurizing.
- 13. Isocyanate (Iso, A) Outlet Hose Connection**
-05 JIC elbow fitting to connect A side of the hose set
- 14. Polyol (Poly, B) Outlet Hose connection**
-06 JIC elbow fitting to connect B side of the hose set
- 15. Lube Reservoir**
Provides PMC approved lube to the "A" Side Pump Shaft to avoid crystallization build-up.
- 16. Hydraulic Pressure Control**
Allows the pressure of the hydraulic system to be increased or decreased. Turn clockwise to increase pressure and counterclockwise to decrease. To regulate the pressure of the hydraulic system, the NORMAL or RETRACT pump switch position must be selected.
- 17. Hydraulic Manifold Assembly**
Provides pressure reading of hydraulic fluid and controls direction of flow.

18. Motor

Provides power to hydraulic pump.

19. Exit Pressure Transducer

Sends the exit pressure data to the computer

20. Safety Pressure Switch

Disables the pump circuit in the event of excess pressure in the system

21. Inlet Material Strainer

Screens (60 mesh) material from bulk supply.

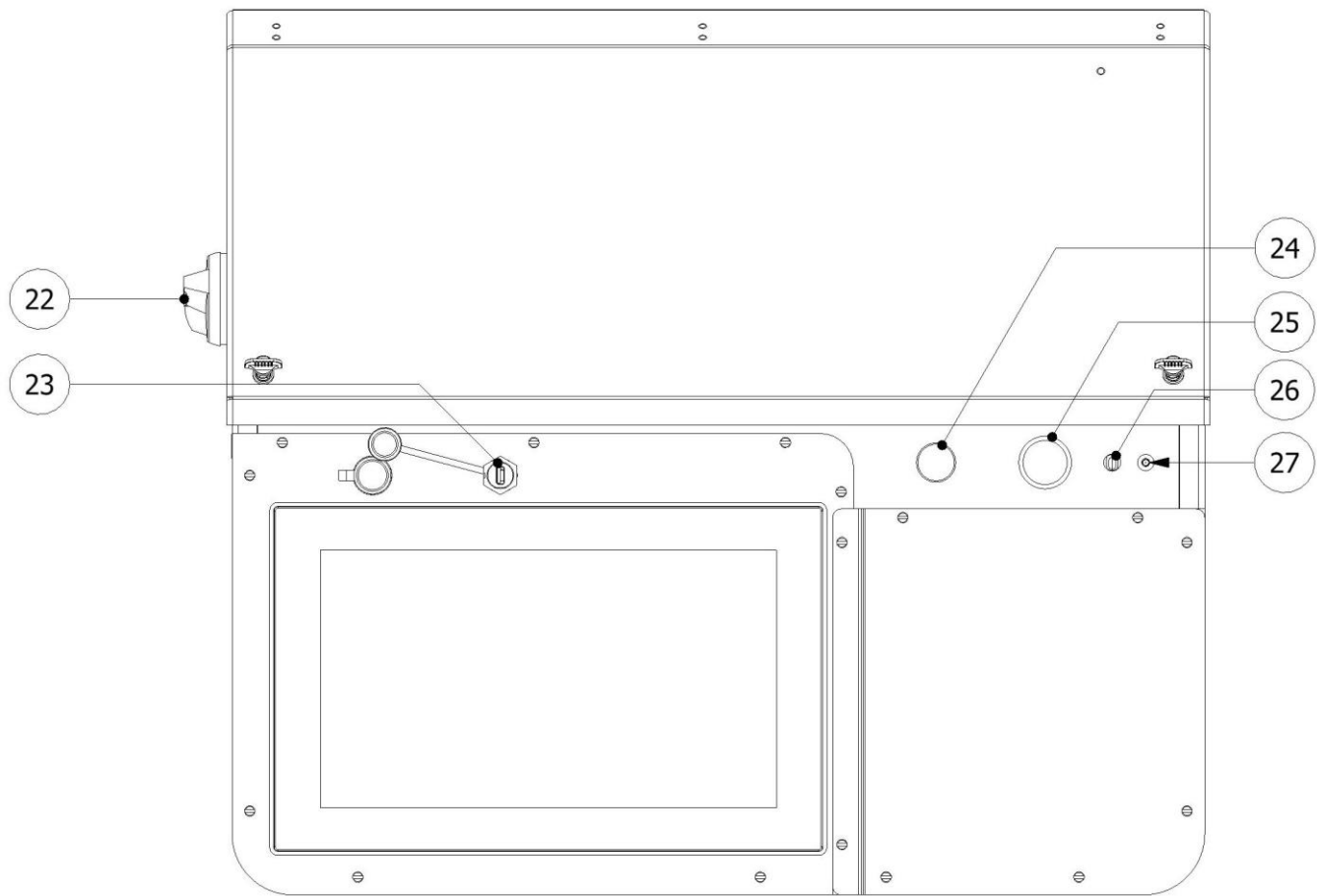


Figure 7: Premier (X) Front Panel Description

22. Main Power Switch

Turns ON and OFF main power to the control panel. It must be turned ON for any operation to be performed with the unit.

The Green indicator light (V) indicates that the main power switch is ON.

23. USB Port

Connects USB devices to the machine and give the user the ability to export job reports.

24. Power On Light

Green indicator light indicates whether the main power for the machine is turned ON or OFF.

25. Emergency Stop Button

Interrupts the Premier-Series control power circuit to stop all motion and heating.

Activate – Press the Emergency Stop Button down to stop all motion and heating.

Deactivate – Twist the Emergency Stop Button CLOCKWISE to release.

26. Primary Antenna port

Connects the machine to the internet service provider (ISP) and gives the user the ability to use the machines network capabilities. This Port must be used.

27. Secondary antenna port

Allows for a secondary antenna to be utilized for additional connection.

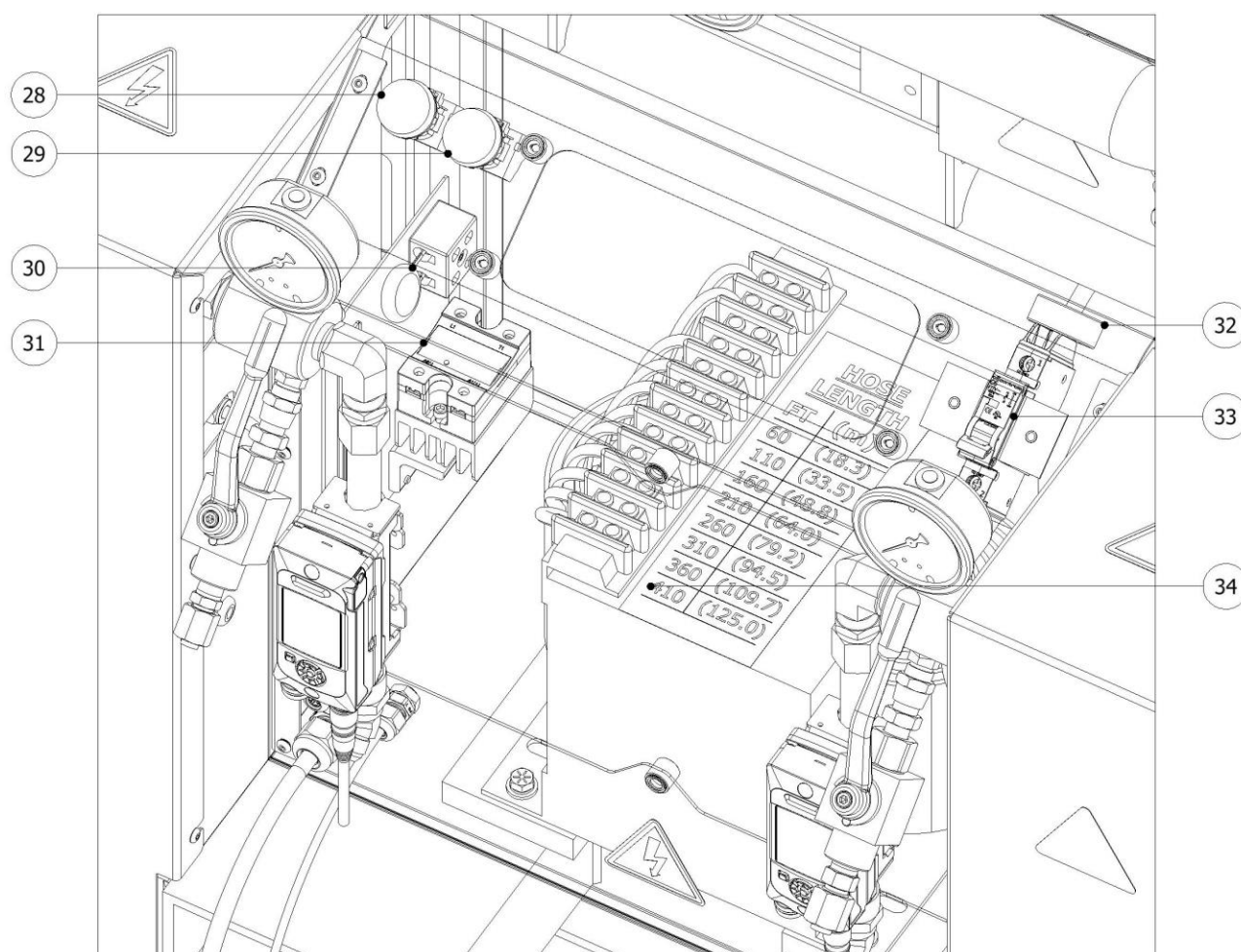


Figure 8: Premier (X) Transformer Enclosure

28. Voltage Indicator Light

Red Indicator Light that will light up when voltage is being supplied to the transformer.

29. Amps Indicator Light

White Indicator Light that will light up when the transformer is actively heating up the hose.

30. ICL (Inrush Current Limiter)

A safety fuse that will pop and keep the circuit open if there is too much voltage to the primary side of the hose transformer.

31. SSR (Solid State Relay)

Completes the hose heat circuit allowing amps to flow through the hose heat wires. The DC side is controlled by the Hose Heat Controller within the console.

32. CT (Current Transformer)

Senses amperage flow on the load side of the Hose Heat Breaker, which powers the Amps indicator Light.

33. Hose Heat Circuit Breaker

63A Single Pole circuit breaker that protects the Heated Hose from over-amping.

34. Hose Heat Transformer

Provides power to hose heat. The transformer provides different output voltages depending on hose length. See further information in section 13.2.

5.2 MACH 2 PROPORTIONER

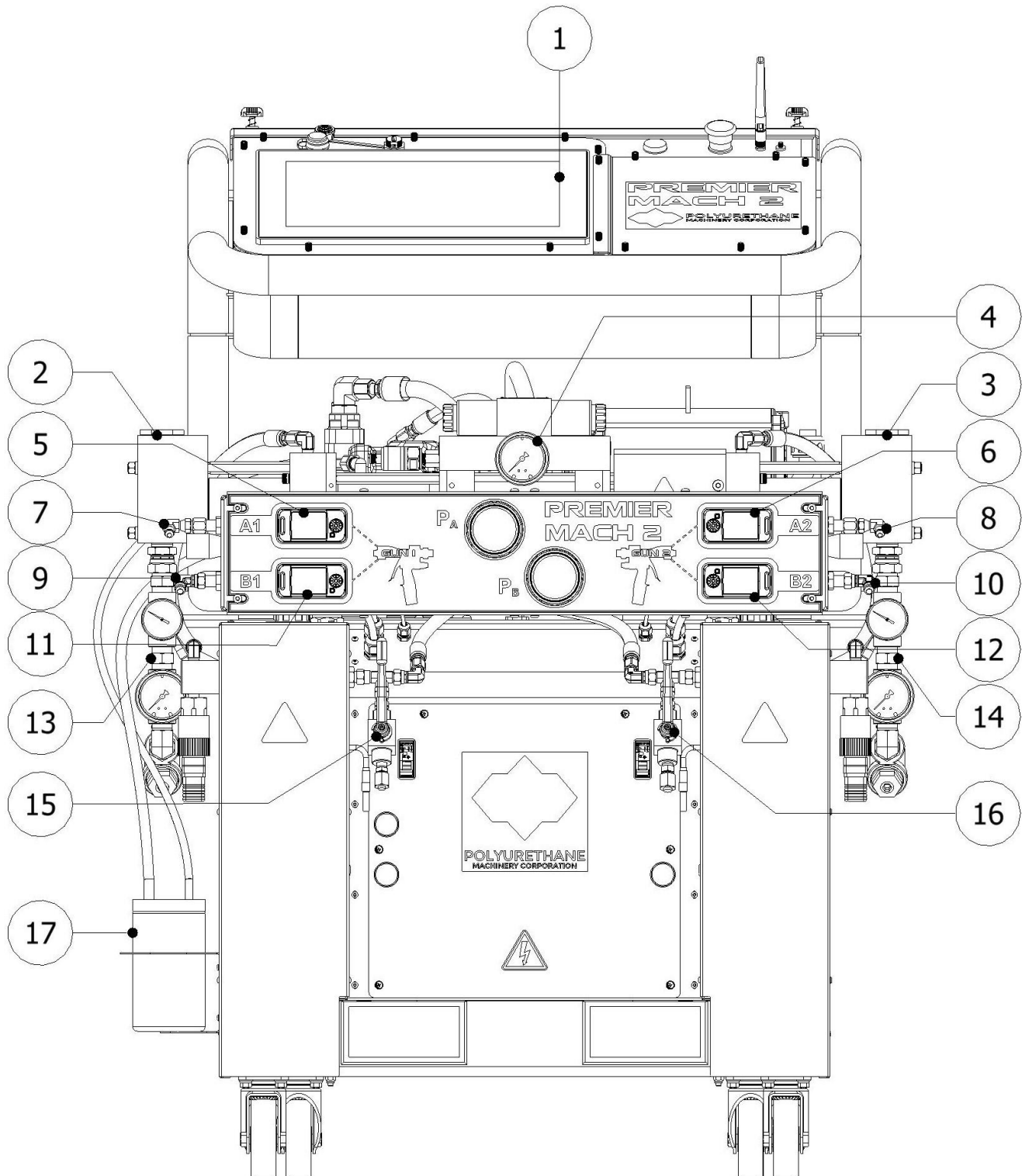


Figure 9: MACH 2 Component Identification - Front

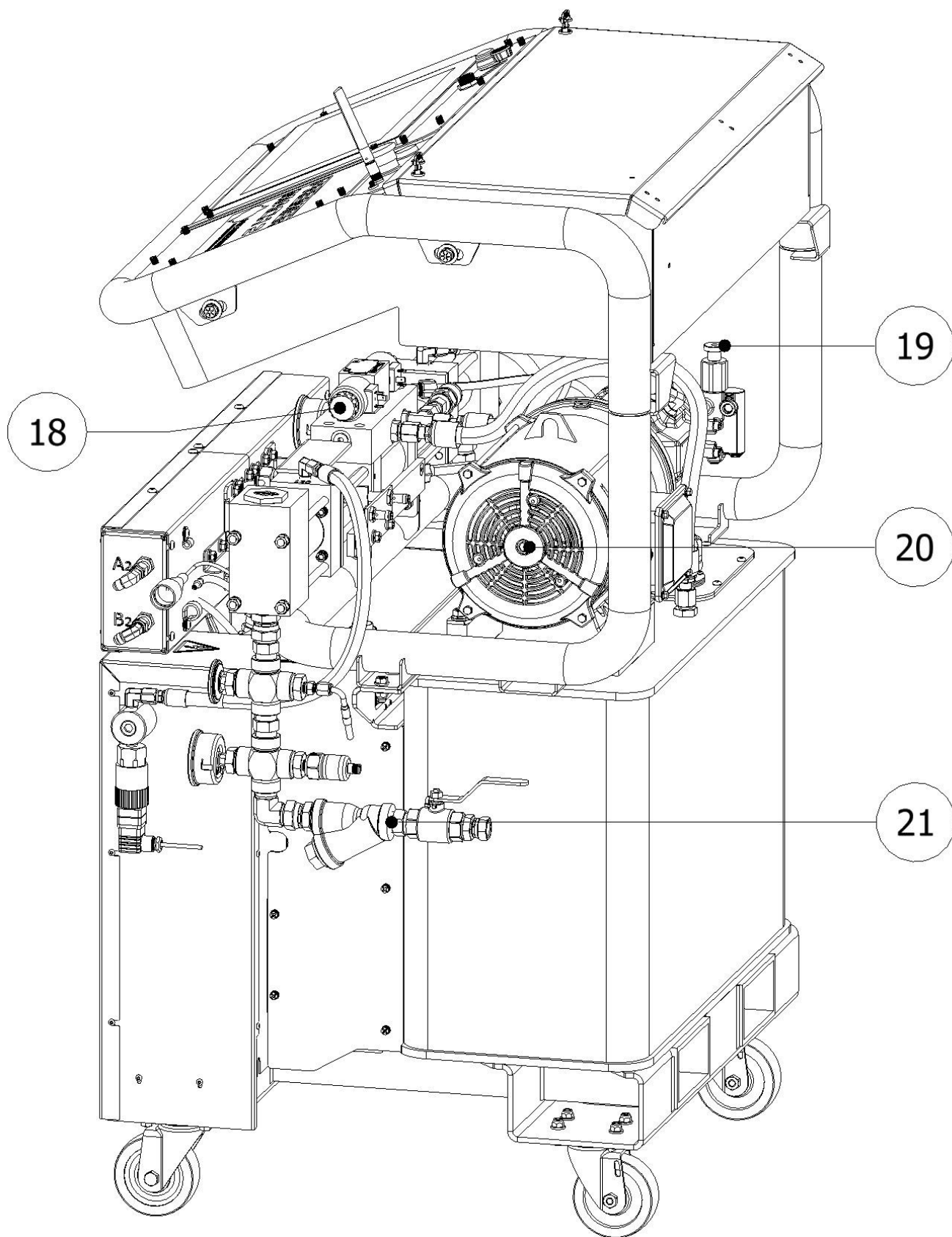


Figure 10: MACH 2 Component Identification - Back

- 1. Control Panel**
Controls and regulates the operation of the Premier Series Proportioner.
- 2. Isocyanate (Iso, A) Metering Pump**
Meters the Isocyanate material.
- 3. Polyol (Poly, B) Metering Pump**
Meters the Polyol material.
- 4. Hydraulic Cylinder Manifold**
Transfers power from hydraulic pump to material pumps.
- 5. Isocyanate (Iso, A1) Flow Meter**
Provides flow reading of Isocyanate after heating and pressurizing of Gun 1.
- 6. Isocyanate (Iso, A2) Flow Meter**
Provides flow reading of Isocyanate after heating and pressurizing of Gun 2.
- 7. Isocyanate (Iso, A1) Outlet Hose connection**
-05 JIC elbow fitting to connect A side of gun 1 hose set.
- 8. Isocyanate (Iso, A2) Outlet Hose connection**
-05 JIC elbow fitting to connect A side of gun 2 hose set.
- 9. Polyol (Poly, B1) Outlet Hose connection**
-06 JIC elbow fitting to connect B side of gun 1 hose set
- 10. Polyol (Poly, B2) Outlet Hose connection**
-06 JIC elbow fitting to connect B side of gun 2 hose set
- 11. Polyol (Poly, B1) Flow Meter**
Provides flow reading of Polyol after heating and pressurizing of Gun 1.
- 12. Polyol (Poly, B2) Flow Meter**
Provides flow reading of Polyol after heating and pressurizing of Gun 2.
- 13. Isocyanate (Iso, A) Inlet Manifold Assembly**
Provides Isocyanate temperature and pressure readings prior to heating and pressurizing.
- 14. Polyol (Poly, B) Inlet Manifold Assembly**
Provides Polyol temperature and pressure readings prior to heating and pressurizing.
- 15. Isocyanate (Iso, A) Recirculation Valve**
Separate ball valves allow the user to recirculate Polyol back into the barrel for reheating purposes or to purge the Proportioner of remaining Polyol.
- 16. Polyol (Poly, B) Recirculation Valve**
Allows the pressure of the hydraulic system to be increased or decreased. Turn clockwise to increase pressure and counterclockwise to decrease. To regulate the pressure of the hydraulic system, the NORMAL or RETRACT pump switch position must be selected.
- 17. Lube Reservoir**
Provides PMC approved lube to the "A" Side Pump Shaft to avoid crystallization build-up.

18. Hydraulic Manifold Assembly

Provides pressure reading of hydraulic fluid and controls direction of flow.

19. Hydraulic Pressure Control

Allows the pressure of the hydraulic system to be increased or decreased. Turn clockwise to increase pressure and counterclockwise to decrease. To regulate the pressure of the hydraulic system, the NORMAL or RETRACT pump switch position must be selected.

20. Motor

Provides power to hydraulic pump.

21. Inlet Material Strainer

Screens (60 mesh) material from bulk supply.

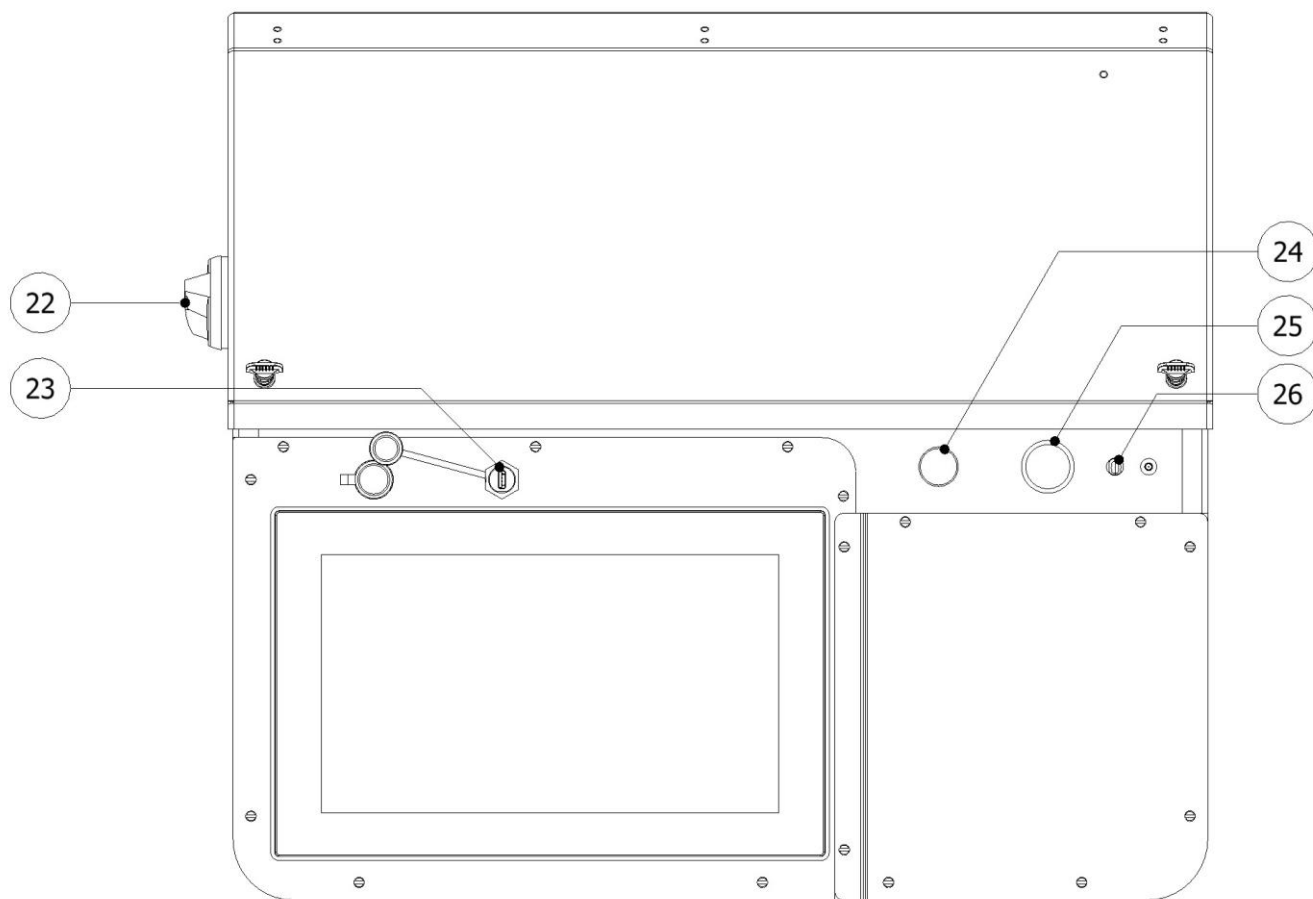


Figure 11: MACH 2 Front Panel Description

22. Main Power Switch

Turns ON and OFF main power to the control panel. It must be turned ON for any operation to be performed with the unit.

The Green indicator light (V) indicates that the main power switch is ON.

23. USB Port

Connects USB devices to the machine and give the user the ability to export job reports.

24. Power On Light

Green indicator light indicates whether the main power for the machine is turned ON or OFF.

25. Emergency Stop Button

Interrupts the Premier-Series control power circuit to stop all motion and heating.

Activate - Press the Emergency Stop Button down to stop all motion and heating.

Deactivate - Twist the Emergency Stop Button CLOCKWISE to release.

26. Antenna

Connects the machine to the internet service provider (ISP) and gives the user the ability to use the machines network capabilities.

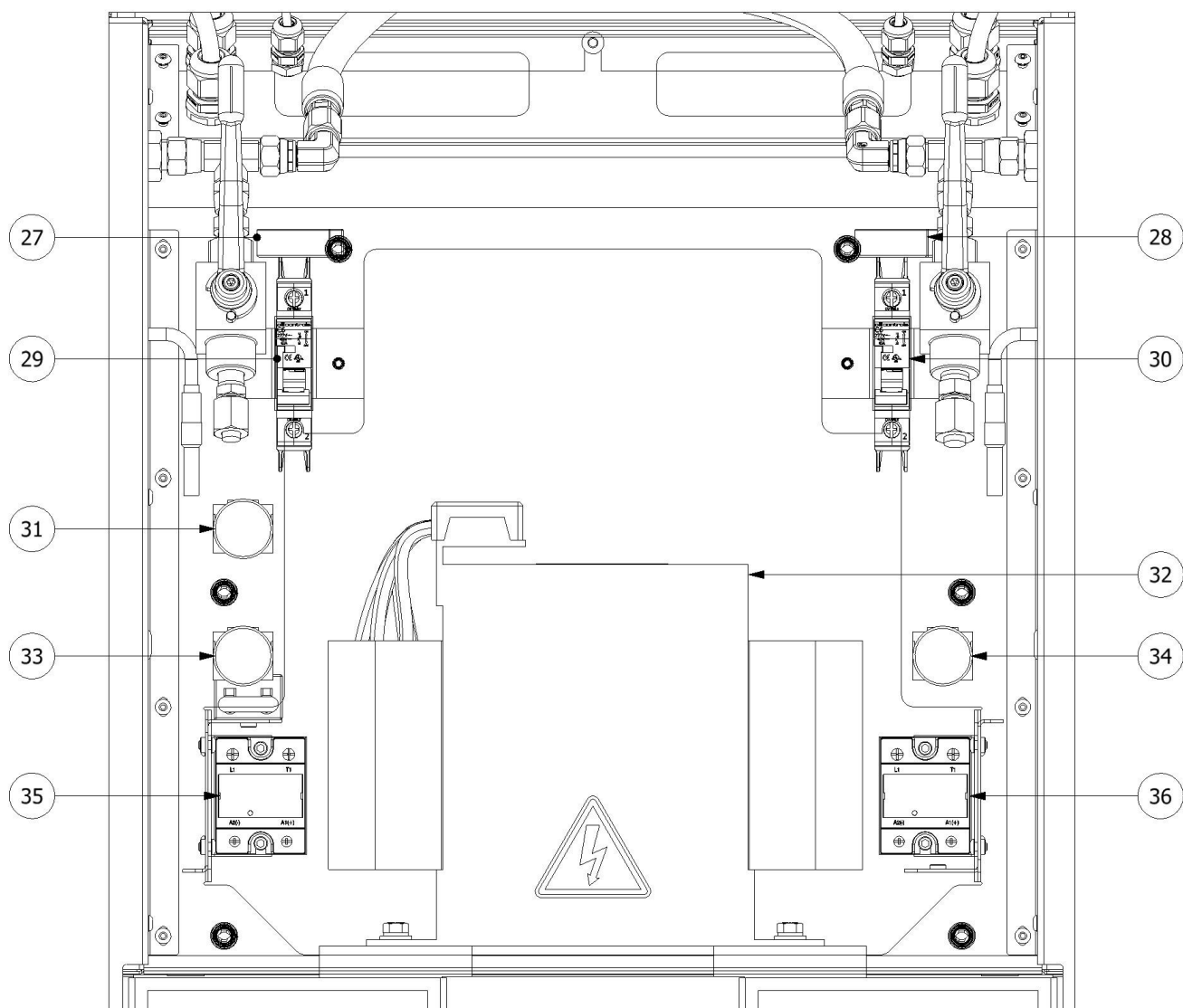


Figure 12: MACH 2 Transformer Enclosure

27. CT (Current Transformer, Gun 1)

Senses amperage flow on the load side of the Gun 1 Hose Heat Breaker, which powers the Gun 1 Amps indicator Light.

28. CT (Current Transformer, Gun 2)

Senses amperage flow on the load side of the Gun 2 Hose Heat Breaker, which powers the Gun 2 Amps indicator Light.

29. Gun 1 Hose Heat Circuit Breaker

63A Single Pole circuit breaker that protects the Gun 1 Heated Hose from over-amping.

30. Gun 2 Hose Heat Circuit Breaker

63A Single Pole circuit breaker that protects the Gun 2 Heated Hose from over-amping.

31. Voltage Indicator Light

Red Indicator Light that will light up when voltage is being supplied to the transformer.

32. Dual Multitap Transformer

Provides power to both Hose heat. The transformer provides two sets of different output voltages depending on the hose length. See further information in section 13.2.

33. Gun 1 Amps Indicator Light

White Indicator Light that will light up when the transformer is actively heating up the Gun 1 hose.

34. Gun 2 Amps Indicator Light

White Indicator Light that will light up when the transformer is actively heating up the Gun 2 hose.

35. SSR (Solid State Relay, Gun 1)

Completes the Gun 1 hose heat circuit allowing amps to flow through the hose heat wires. The DC side is controlled by the Hose Heat Controller within the console.

36. SSR (Solid State Relay, Gun 2)

Completes the Gun 2 hose heat circuit allowing amps to flow through the hose heat wires. The DC side is controlled by the Hose Heat Controller within the console.

6 COMMON HMI LAYOUT & USAGE

6.1 WIDGET SETPOINT VALUES

Premier Series HMI Widget Setpoint Values			
Widget Description	Allowable Data Ranges		Operating Maximums
	<u>Min.</u>	<u>Max</u>	
A/B Exit Pressure Gauge (PSI)	0	3000	2250/3250
A/B Temperature Control (°F)	0	200	200
Hose Temperature Control (°F)	0	200	200
Hose Temperature Control Manual Mode (%)	0	100	100
Countdown Counter	0	9999	9999
Pressure Balance Control (PSI)	0	3500	1000
Drum Counter Gauge (Gal)	0	55	Drum Dependent
Drum Counter Max Capacity (Gal)	0	55	Drum Dependent
Drum Counter Drum Level (Gal)	0	55	Drum Dependent
Drum Alarm Setpoints (Gal)	0	55	Drum Dependent
A/B Inlet Temperature Data (°F)	0	200	Rig Dependent
A/B Inlet Temperature High Setpoint (°F)	0	200	Rig Dependent
A/B Inlet Temperature Low Setpoint (°F)	0	200	Rig Dependent
A/B Inlet Pressure Data (PSI)	0	500	Rig Dependent
A/B Inlet Pressure High Setpoint (PSI)	0	500	Rig Dependent
A/B Inlet Pressure Low Setpoint (PSI)	0	500	Rig Dependent
Ratio Confirmation Data	nan.00 (zero)	25	Rig Dependent
Ratio Confirmation High Setpoint	1.01	1.20	Rig Dependent
Ratio Confirmation Low Setpoint	0.80	0.99	Rig Dependent

NOTE! The max Allowable Data Ranges are the software limits. Follow the actual values per the chemical manufacture's specifications.

Premier Security Levels		
Widget Description	User	Owner
Ratio Confirmation High setpoint	View Only	Full Access
Ratio Confirmation Low setpoint	View Only	Full Access
Manage Users	No Access	Full Access
Email Settings	No Access	Full Access
Time and Date setpoint	No Access	Full Access
Flow Meter Origin Reset	View Only	Full Access
Machine Setpoint Reset	No Access	Full Access

6.2 GENERAL SCREEN INFORMATION

The screen has particular patterns to look out for when using the machine. A single widget encompasses a single control function. Each widget is outlined with a border. The border is colored to the respective chemical and operation.

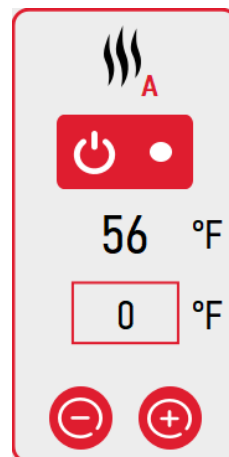


Figure 13: Controls Widget Reference

The E-Stop and Active Alarm symbols will appear at the top right of the screen if there is an alarm or the machines e-stop button is engaged. When there is an alarm active, a red “!” mark blinks above the bell. See Section 6.6, Page 56 for the events screen overview for further alarm information.



Figure 14: E-Stop



Figure 15: Active Alarm

6.2.1 COMMON WIDGET TRENDS

6.2.1.1 INPUT VALUES & VIEWING VALUES

Any value without a box around it is for viewing only. Any value with a box can be edited.

If the box is editable, there are two options to change the value. One is the +/- button option and the second is the keyboard option.

This pattern is followed throughout the entire machine.



Figure 16: +/- Buttons

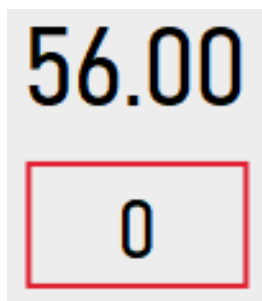


Figure 17: Actual Values vs. Setpoints

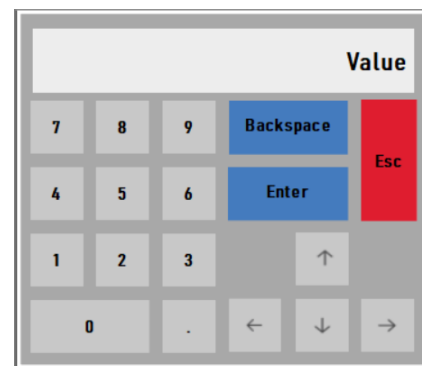


Figure 18: Input Keyboard

6.2.1.2 BUTTON FUNCTIONS & VISUALS

Pushbuttons come in the color of their respective widget. Colors include Red, Blue, Purple, and Grey. Some include a LED light that turns green when active and white when inactive.



Figure 19: Inactive Button



Figure 20: Active Button

6.2.1.3 GAUGE FUNCTIONS & VISUALS

Gauges are for visuals only and cannot be edited. Data is represented in real time.



Figure 21: Exit Pressure Gauge

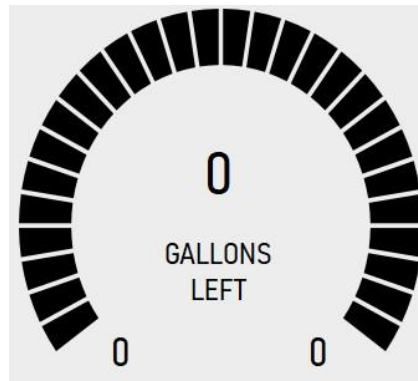


Figure 22: Drum Level Gauge

6.3 MACHINE SCREEN

This Machine Screen is where the user can control the pump, pressure balance, chemical temperatures, motor, and counters. You can also see exit pressure at a glance.

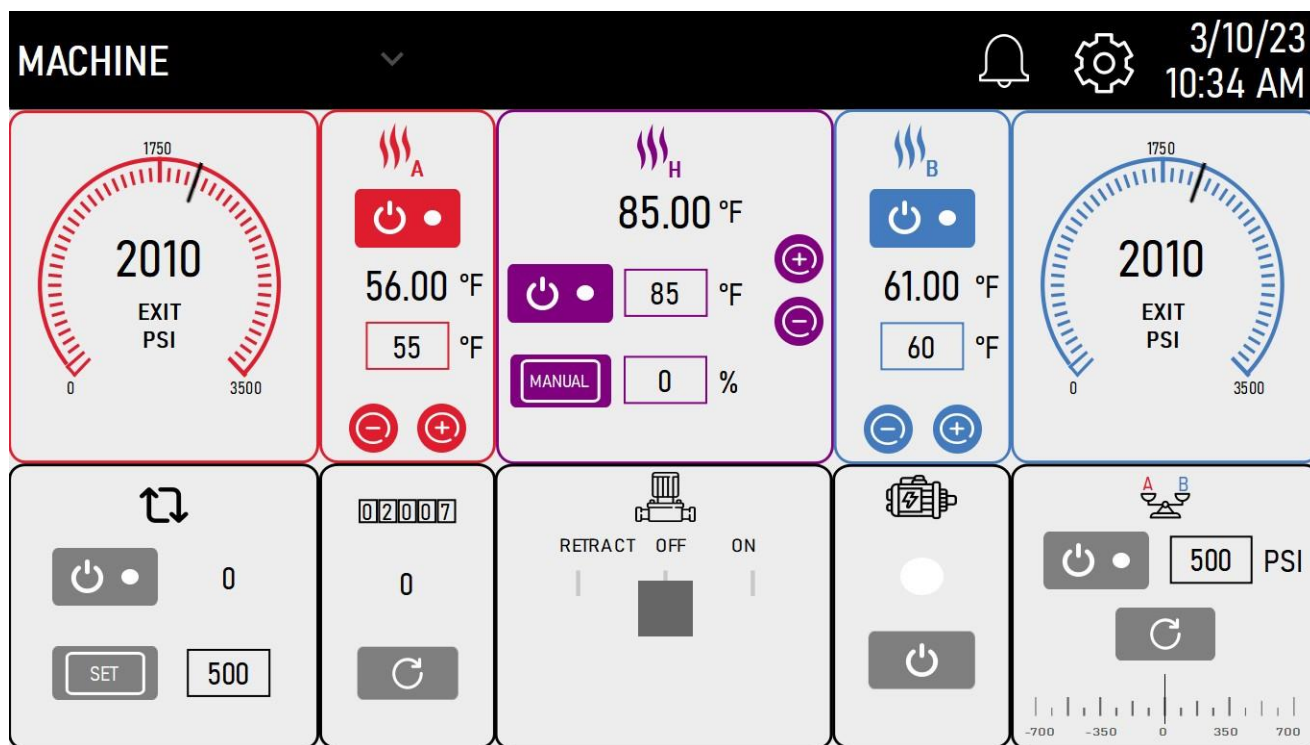


Figure 23: Premier (X) Machine screen

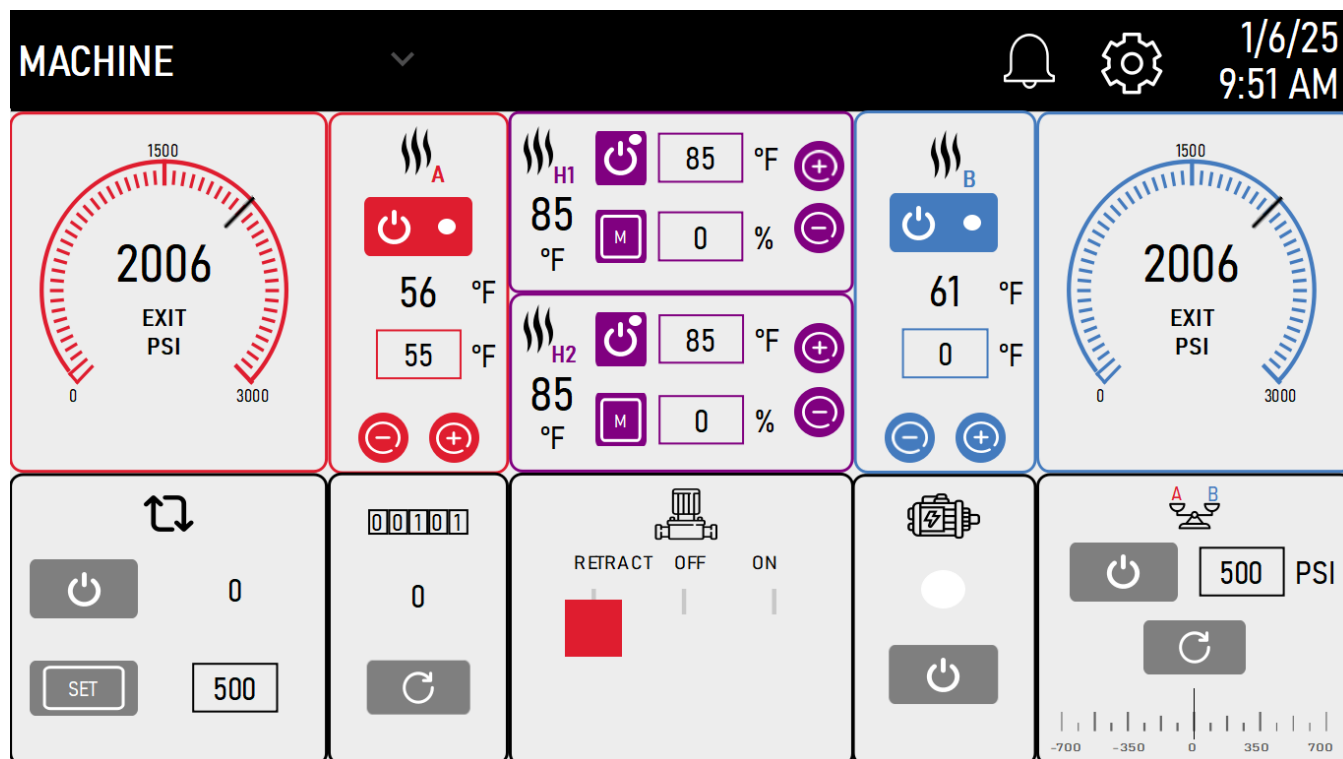


Figure 24: MACH 2 Machine Screen

6.3.1 A/B EXIT PRESSURE

This widget is a gauge that shows Exit pressure. Exit pressure can be monitored in real time. This is set by the pressure sensor on the side of the machine.



Figure 25: A Side Exit Pressure

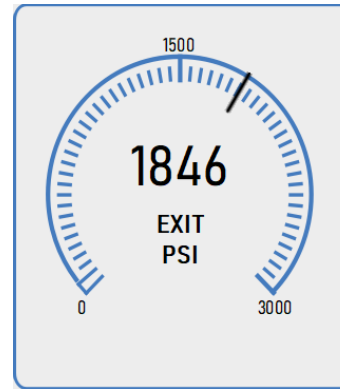


Figure 26: B Side Exit Pressure

6.3.2 COUNTDOWN COUNTER

This widget gives control of the machine pump countdown cycles. The user can input a number of counts to run for. Once set is hit, the number appears above and proceeds to count down. When the counter hits 0 the pump will stop until the counter is reset. To reset the value, press the "Set" button and continue operation.

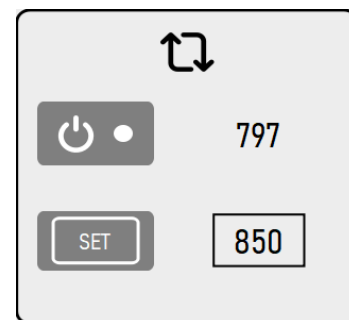


Figure 27: Countdown Counter

6.3.3 CYCLE COUNTER

This widget counts the number of cycles the pump has run. There is a reset button to reset the value in the cycle counter.

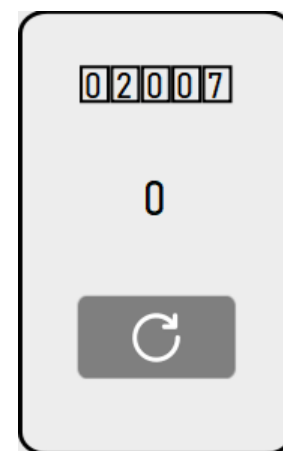


Figure 28: Cycle Counter

6.3.4 A/B SIDE HOSE HEATERS

This widget gives control of the Machines heaters. There's a real time temperature readout and a set point field. To use this, input the temperature desired for the heater to be at and then press the enable button. These widget setpoints are retained on shutdown or until changed. Manual hose heat activates the heater power with a duty cycle period of 1 second.

E.g., If you want the heater on in manual mode for 25%, the heater power will cycle on for 0.25 seconds and off for 0.75 seconds

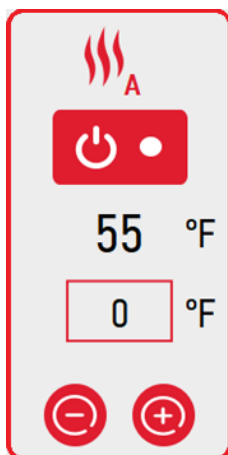


Figure 29: Premier (X) A Side Heater

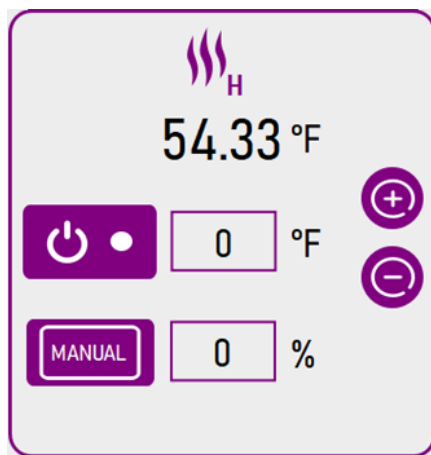


Figure 30: Premier (X) Hose Heater

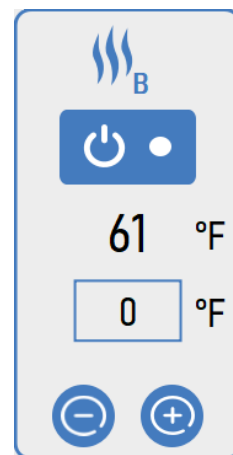


Figure 31: Premier (X) B Side Heater

The MACH2 heat symbols Change to their corresponding color when active.

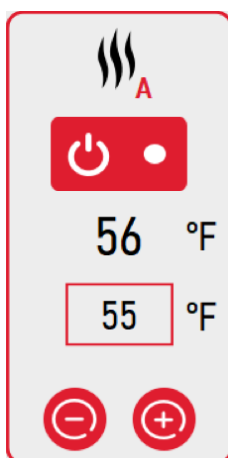


Figure 32: MACH2 A Side Heater

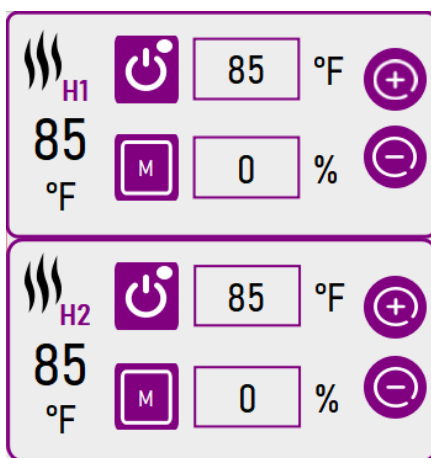


Figure 33: MACH 2 Hose Heaters

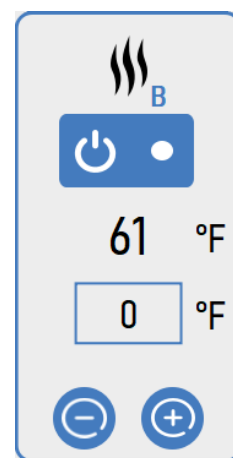


Figure 34: MACH 2 B Side Heater

6.3.5 PUMP CONTROL

This widget lets the user select the Pumps current mode. The Direction the pump is going is shown in neon green with an arrow in that direction. These widgets settings are retained on shutdown or until changed.

Retract: This lets the user “Park” the pump to the A-side

Normal: This runs the pump back and forth between A and B-sides.

Off: This will turn the pump off.

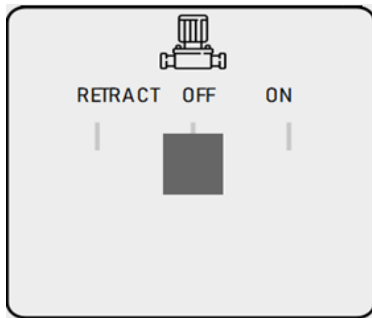


Figure 35: Pump Control Off

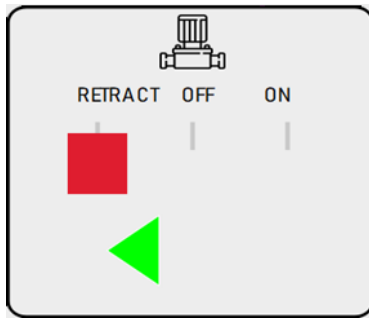


Figure 36: Pump Control Retract

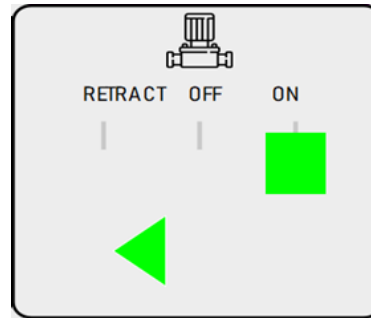


Figure 37: Pump Control On w/ Retract On

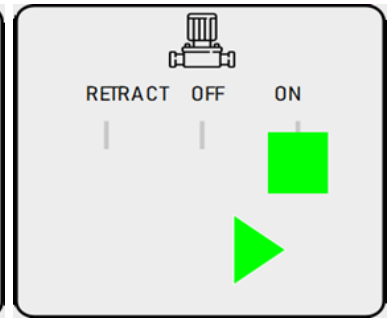


Figure 38: Pump Control On w/ Normal On

6.3.6 MOTOR ENABLE

This widget controls the motor. Pressing the power button turns the motor on. When the light is neon green, the motor is on.

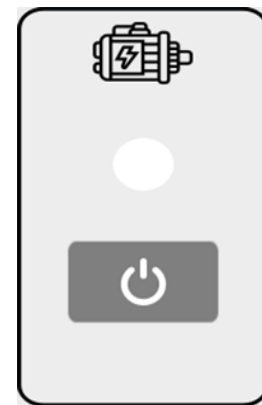


Figure 39: Motor Enable

6.3.7 PRESSURE BALANCE CONTROL

This widget allows the user to control the maximum difference between both sides based on what is input into the field. This widgets setpoints are retained on shutdown or until changed.

E.g., If you want the maximum difference between A side and B side to be 300PSI you would input 300 into the field. If the A side is 1400psi and B side is 1700psi. A Pressure Balance Alarm will trigger. Some scenarios may require the pressure balance alarm and the ratio alarm to be on to function properly.

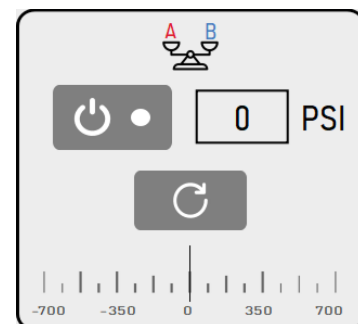


Figure 40: Pressure Balance Control

6.4 REPORT SCREENS

The Report Screen allow the user to record and send data from your machine to an email account for tracking of chemical and machine operation. See Section 12 on Page 74 for more information on report generating and saving.

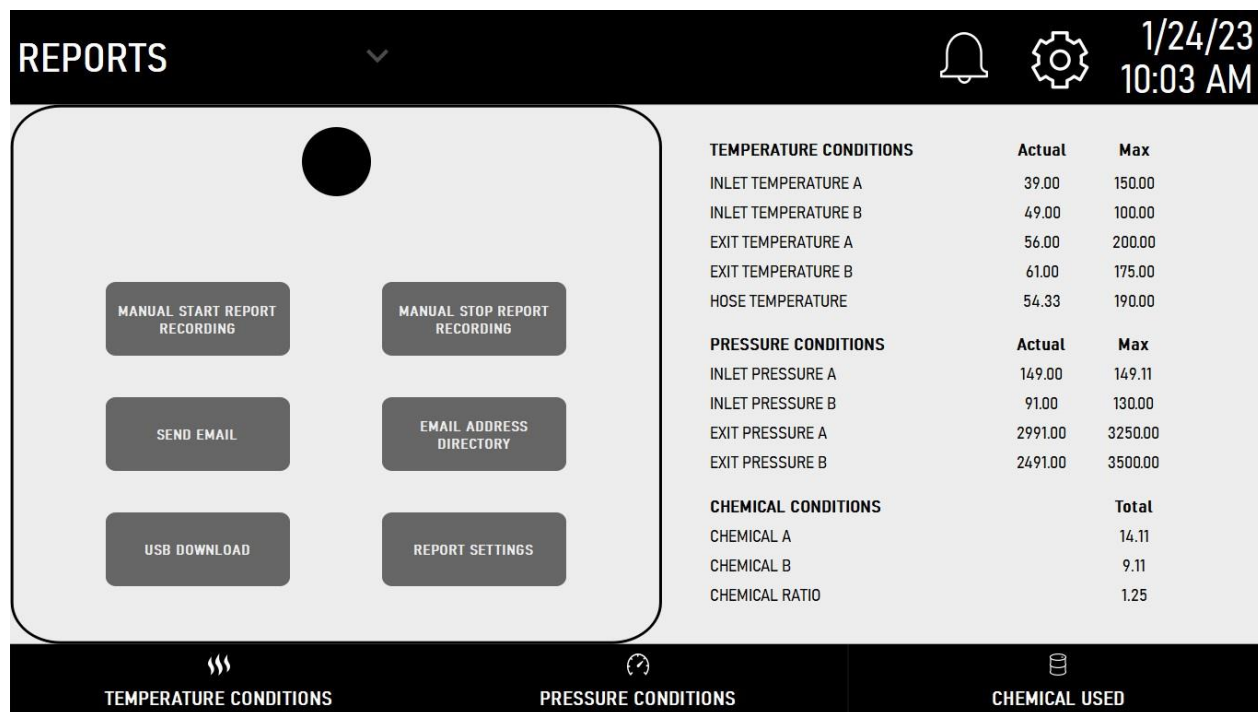


Figure 41: Premier (X) Report Screen

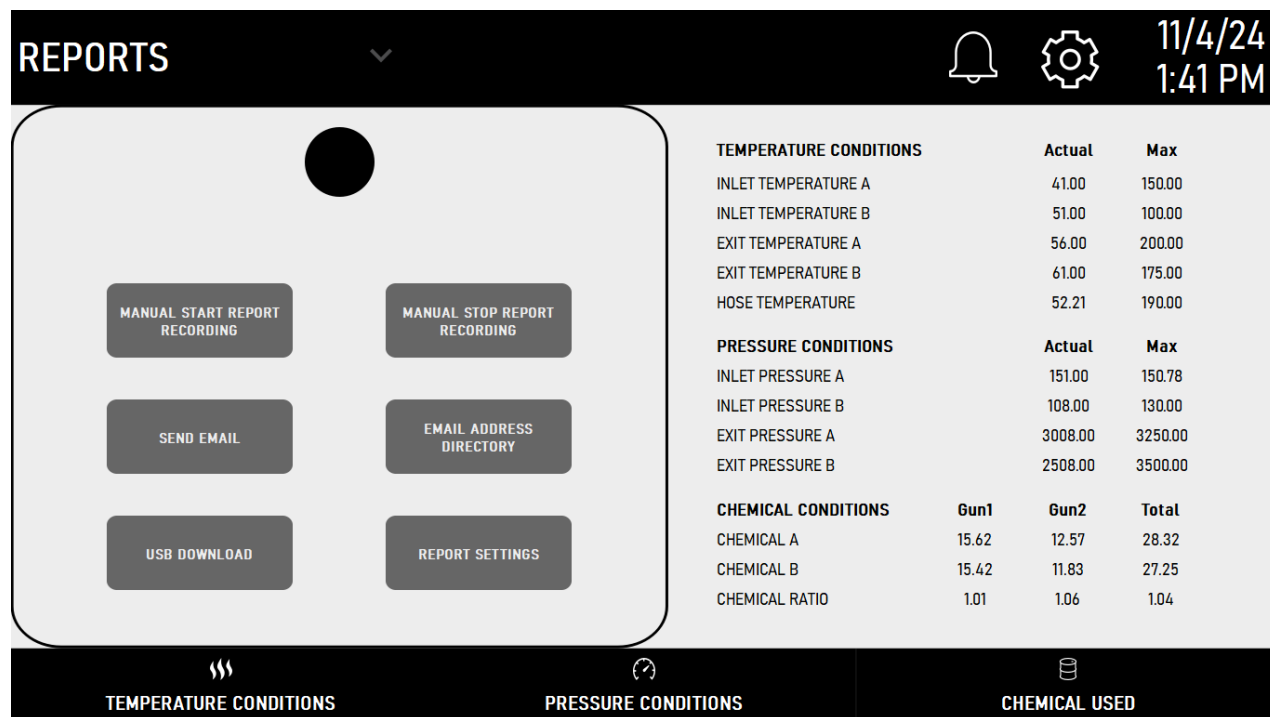


Figure 42: MACH 2 Report Screen

6.4.1 RECORD ON LIGHT

The record on light has two stages. The first is when it is inactive the light is solid black. The second stage is when a report is in progress the button turns Red with black rings.



Figure 43: Recording Active Light

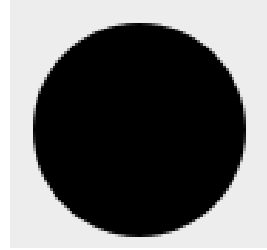


Figure 44: Recording Inactive Light

6.4.2 RECORD TIME

Recording time is displayed beneath the Record on Light and is displayed on the top bar on all screens. The time is updated every second and adds time accordingly.

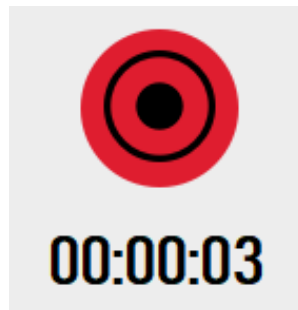


Figure 45: Recording Report Time

6.4.3 MANUAL START REPORT RECORDING

This widget starts the recording for a report. Selecting an interval only effects the detailed report. Pressing close after selecting an interval starts the recording process.

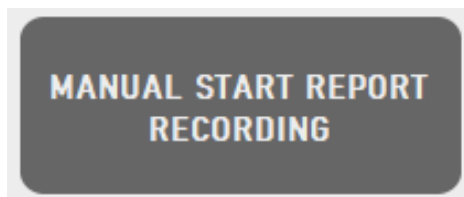


Figure 46: Start Recording Button

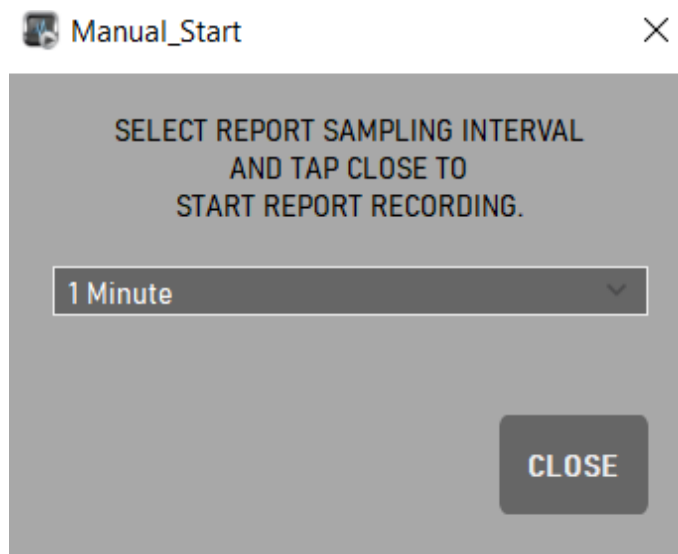


Figure 47: Start Report Recording Window

6.4.4 MANUAL STOP REPORT RECORDING

This widget stops the recording process. Make sure all fields are filled out based on the job's description. Once the fields are filled out, press which report you would like generated. Once the report is generated press the close button.

NOTE! If you use the same information in the fields for a detailed and express report, the data will over write one another and corrupt the file.

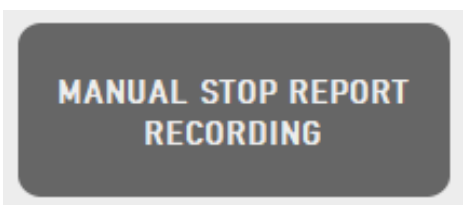


Figure 48: Stop Recording Button

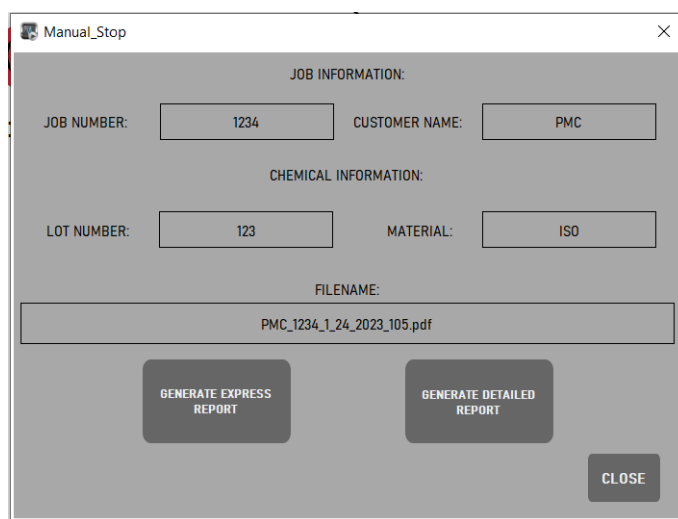


Figure 49: Stop Recording Window

6.4.5 EMAIL ADDRESS DIRECTORY

This widget lets the user store 20 email addresses at a time.

Click on one of the “empty” fields. Once inside, a keyboard will appear. Input an email address. Once complete, press enter on the keyboard and press close to close the window.

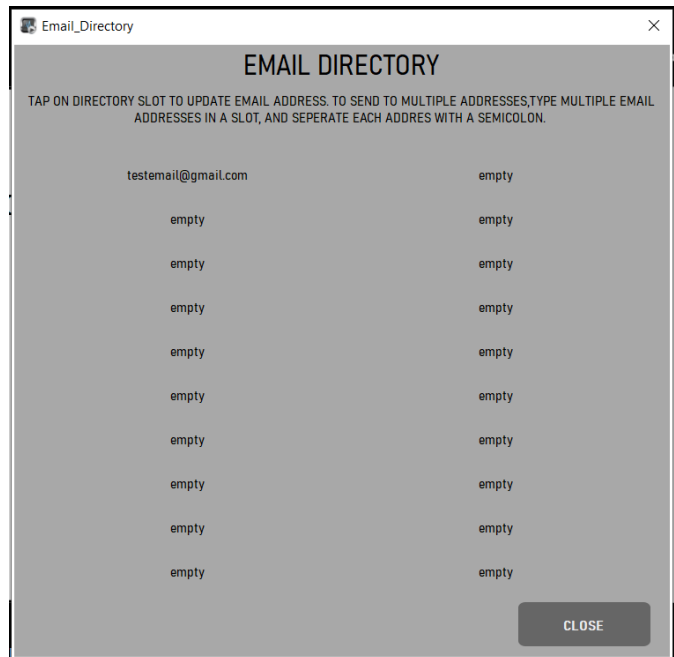


Figure 50: Email Directory

6.4.6 SEND EMAIL

This widget lets the user send an email of a report that was created. In the top left there is a light. If the light is a neon green color, the connection out of the machine is active. If it is white, there is no connection.

The select an email field uses the Email address Directory to pick an email. The select report field uses the log of reports that are in the machine to pick a report. The attach report button attaches the selected report to an email. This must be selected after both the email and report select dropdowns are chosen. The Send email button grabs the attached report and sends the report to the email selected.

To finish the process or exit at any time press the close button. See Section 12 on Page 74 for more information on report generating and saving.

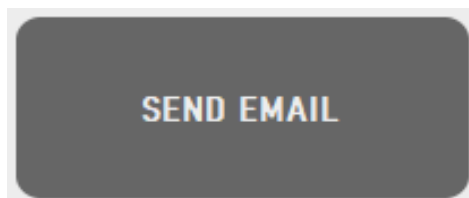


Figure 51: Send Email Button

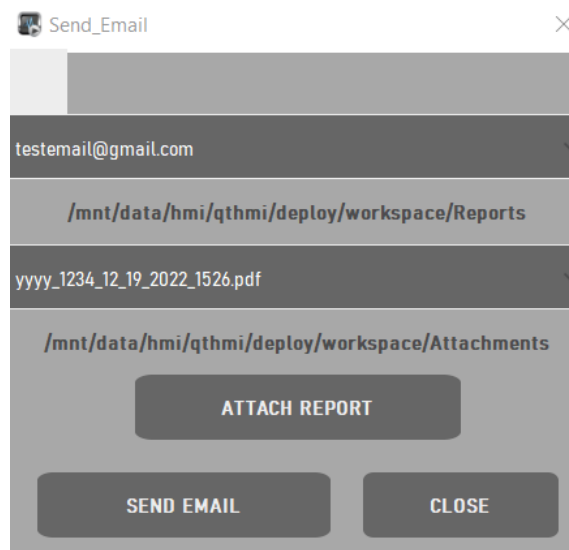


Figure 52: Send Email Window

6.4.7 REPORT SETTINGS

The Report Settings Widget lets the user select the amount of time to delete files up to 30 days. When the Report folder becomes full the files get deleted on a file in file out basis.

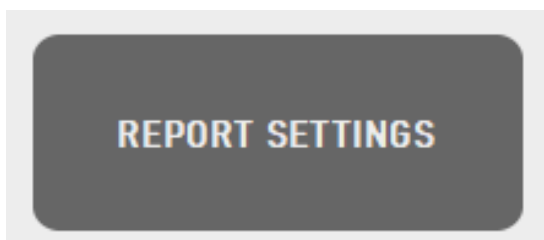


Figure 53: Report Settings Button

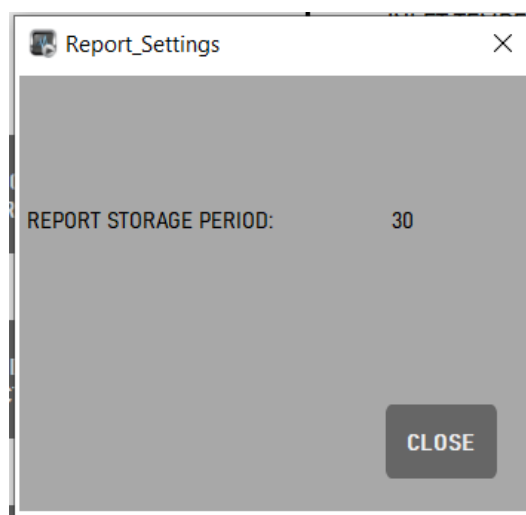


Figure 54: Report Storage Window

6.4.8 USB DOWNLOAD

This widget lets the user save any one of the reports or all of the reports to a USB stick. In the top left there is a light. If the light is a neon green color the USB is detected; if the light is white there is no USB detected.

The select report lets the user choose an individual report that has already been created. The download selection button lets the user download the individual file that was selected. The Download all button allows the user to copy all reports created on the machine to a USB.

When the file is successfully moved over to the USB, the top bar will say "DOWNLOAD COMPLETE". The remove USB button allows the user to safely remove the USB for ejection. The cancel button cancels any process and closes the window. See Section 12 on Page 74 for more information on report generating and saving.



Figure 55: USB Download Button

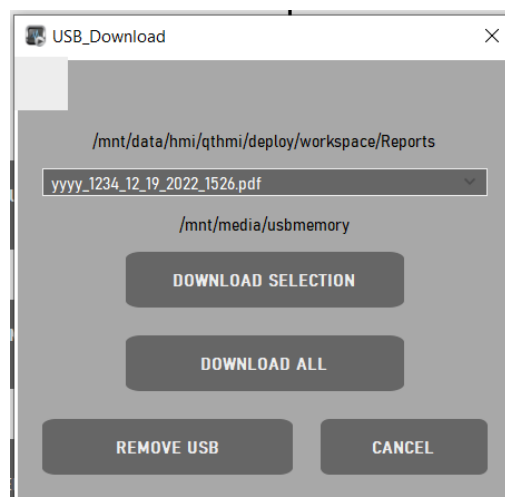


Figure 56: USB Download Window

6.4.9 TEMPERATURE CONDITIONS

The Temperature Conditions screen allows for an active look at current values of temperature. Both in a graphical and chart-based format. The colors in the chart match the colors on the graph. Additional values will be displayed for the MACH 2.

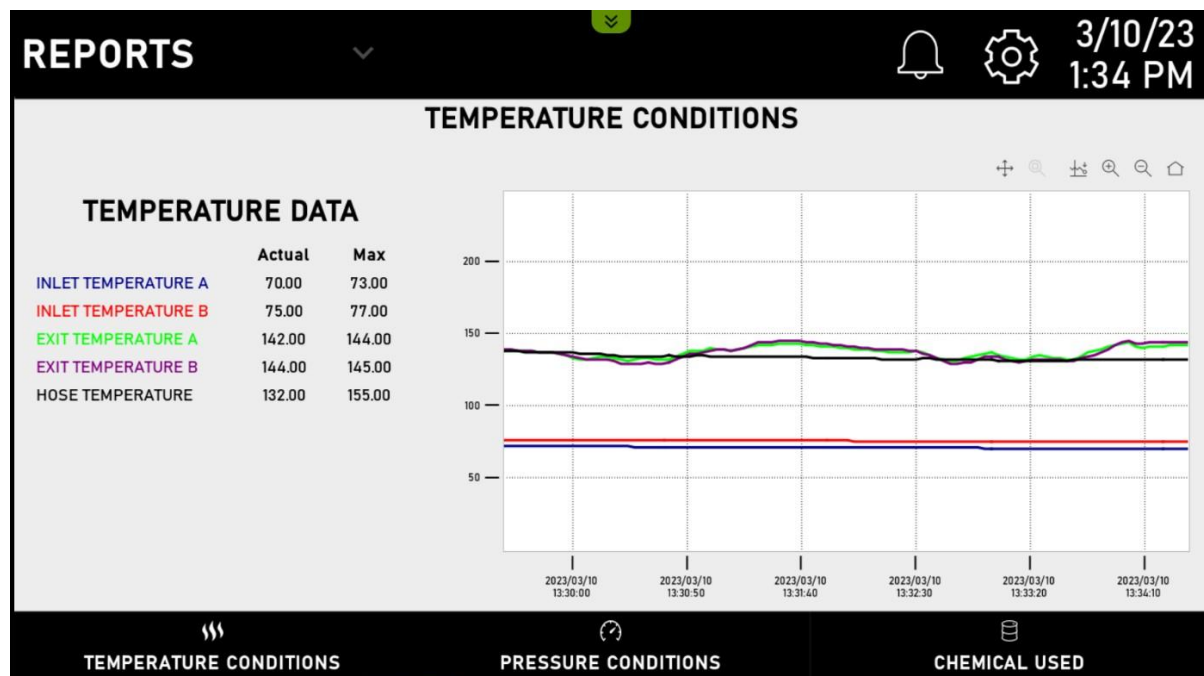


Figure 57: Reports Temperature Conditions

6.4.10 PRESSURE CONDITIONS

The Pressure Conditions screen allows for an active look at current values of Pressure. Both in a graphical and chart-based format. The colors in the chart match the colors on the graph. Additional values will be displayed for the MACH 2.

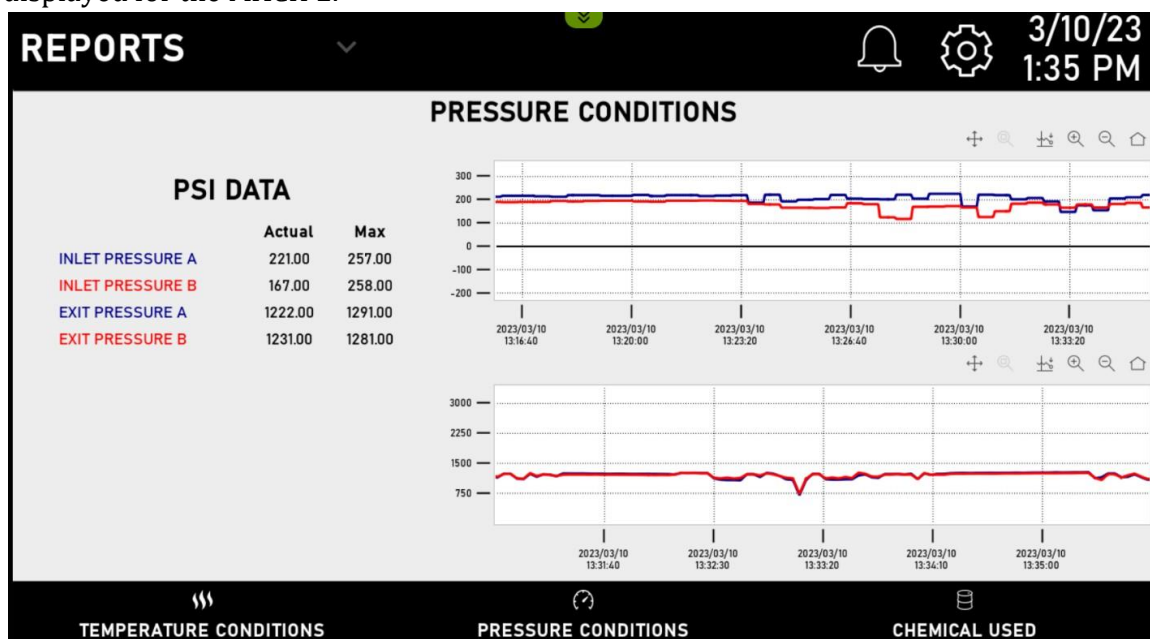


Figure 58: Reports Pressure Conditions

6.4.11 CHEMICAL USED

The Chemical Used screen allows for an active look at current values of Pressure. Both in a graphical and chart-based format. The colors in the chart match the colors on the graph. Additional values will be displayed for the MACH 2.

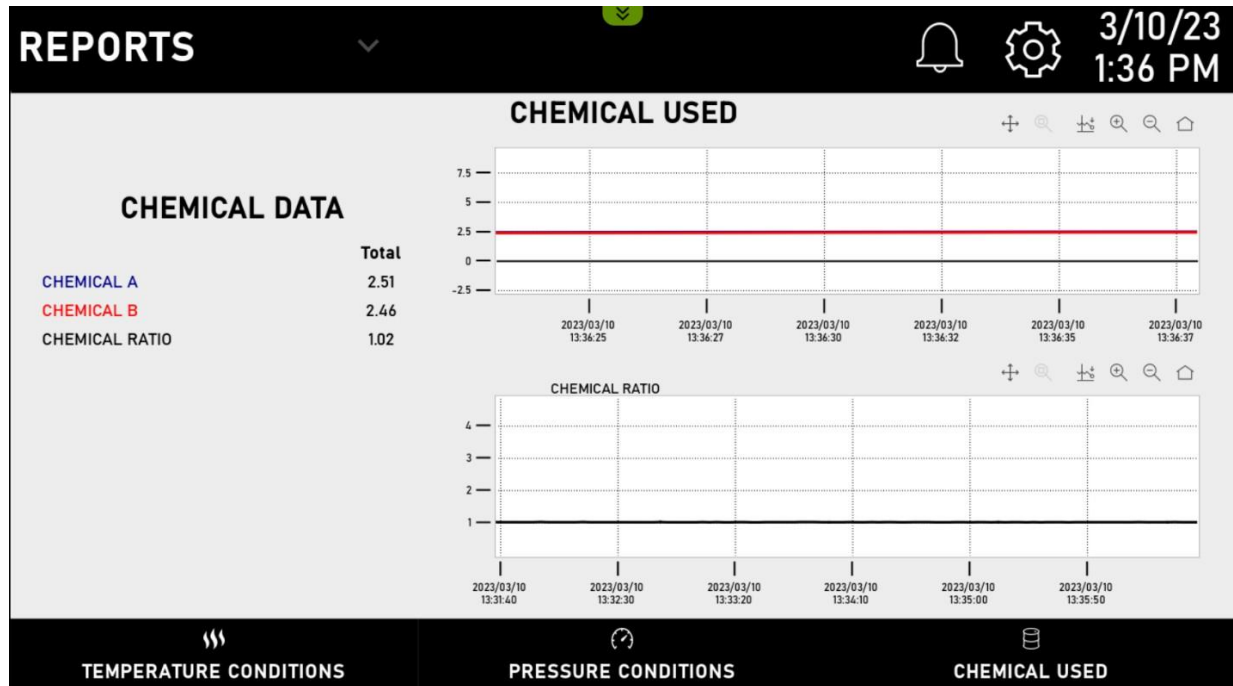


Figure 59: Reports Chemical Used

6.5 MAINTENANCE SCREEN.

The Maintenance Screen is used to aid in troubleshooting of the Premier. On this screen, the user will see all of the inputs and outputs for the machine.

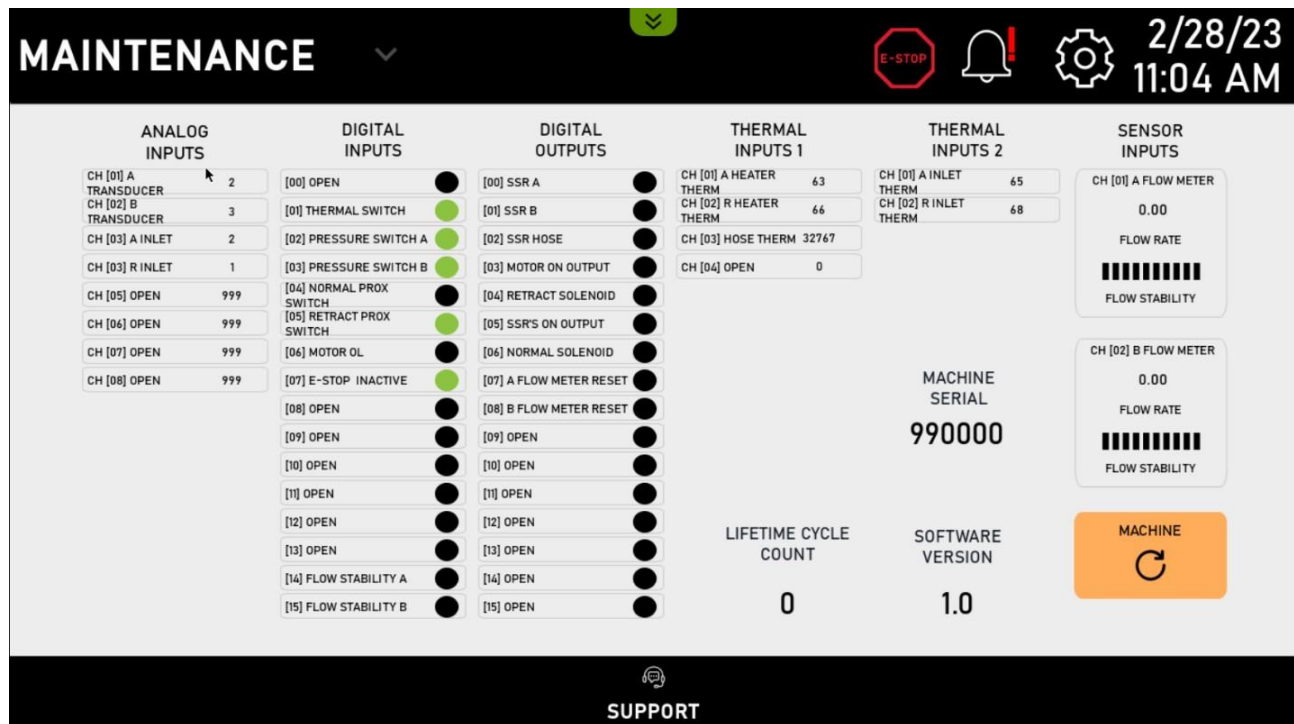


Figure 60: Premier (X) Report Maintenance Screen

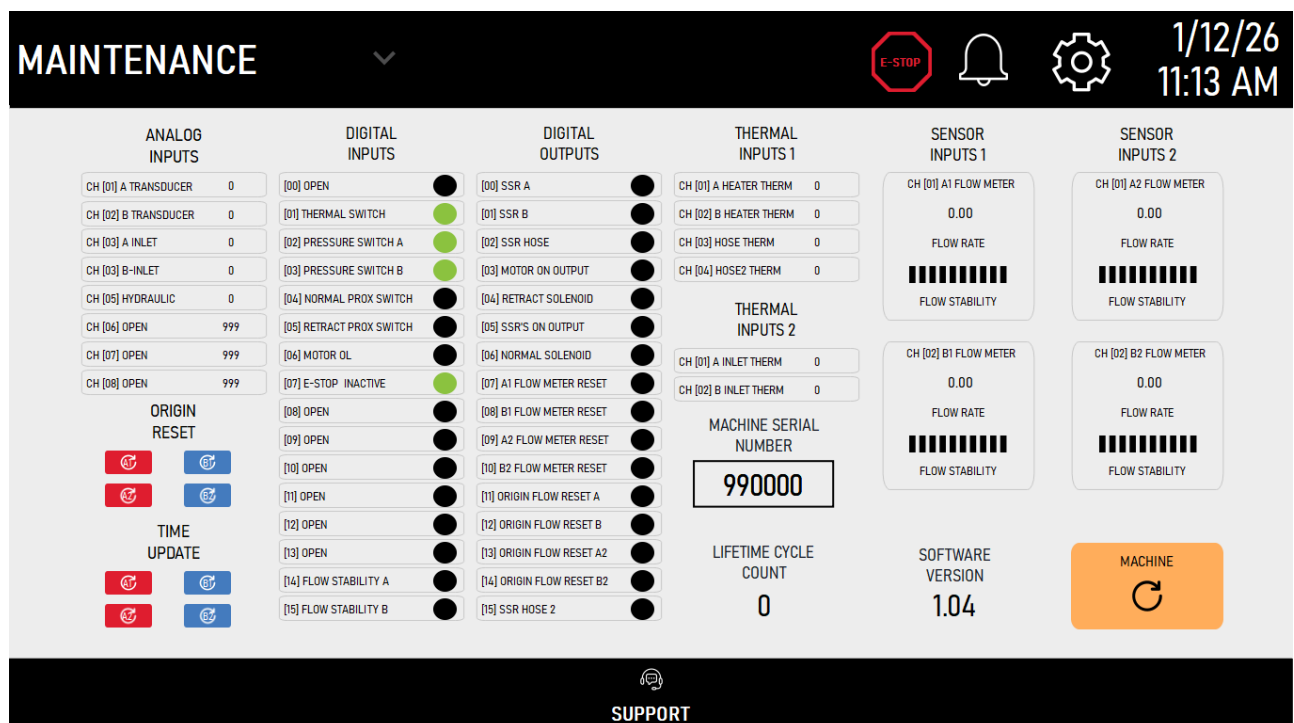


Figure 61: MACH 2 Report Maintenance Screen

6.5.1 ANALOG INPUTS

This widget shows the active raw data values of the Analog Inputs.

ANALOG INPUTS	
CH [01] A TRANSDUCER	0
CH [02] B TRANSDUCER	2
CH [03] A INLET	1
CH [03] R INLET	2
CH [05] OPEN	999
CH [06] OPEN	999
CH [07] OPEN	999
CH [08] OPEN	999

Figure 62: PLC Analog Inputs

6.5.2 DIGITAL INPUTS

This widget shows the active or inactive values of the Machines Inputs. If a light is on, the signal is coming back to the PLC. In Figure 63 the retract prox. sensor is active and the normal prox. sensor is inactive.

DIGITAL INPUTS	
[00] OPEN	<input type="radio"/>
[01] THERMAL SWITCH	<input checked="" type="radio"/>
[02] PRESSURE SWITCH A	<input checked="" type="radio"/>
[03] PRESSURE SWITCH B	<input checked="" type="radio"/>
[04] NORMAL PROX SWITCH	<input type="radio"/>
[05] RETRACT PROX SWITCH	<input checked="" type="radio"/>
[06] MOTOR OL	<input type="radio"/>
[07] E-STOP INACTIVE	<input checked="" type="radio"/>
[08] OPEN	<input type="radio"/>
[09] OPEN	<input type="radio"/>
[10] OPEN	<input type="radio"/>
[11] OPEN	<input type="radio"/>
[12] OPEN	<input type="radio"/>
[13] OPEN	<input type="radio"/>
[14] FLOW STABILITY A	<input type="radio"/>
[15] FLOW STABILITY B	<input type="radio"/>

Figure 63: PLC Digital Inputs

6.5.3 DIGITAL OUTPUTS

This widget shows the active or inactive values of the Machines outputs. If a light is on, the signal is being output from the PLC to the corresponding device listed. In **Error! Reference source not found.**, the E-stop is active so no outputs are turned on.

DIGITAL OUTPUTS	
[00] SSR A	<input type="checkbox"/>
[01] SSR B	<input type="checkbox"/>
[02] SSR HOSE	<input type="checkbox"/>
[03] MOTOR ON OUTPUT	<input type="checkbox"/>
[04] RETRACT SOLENOID	<input type="checkbox"/>
[05] SSR'S ON OUTPUT	<input type="checkbox"/>
[06] NORMAL SOLENOID	<input type="checkbox"/>
[07] A FLOW METER RESET	<input type="checkbox"/>
[08] B FLOW METER RESET	<input type="checkbox"/>
[09] OPEN	<input type="checkbox"/>
[10] OPEN	<input type="checkbox"/>
[11] OPEN	<input type="checkbox"/>
[12] OPEN	<input type="checkbox"/>
[13] OPEN	<input type="checkbox"/>
[14] OPEN	<input type="checkbox"/>
[15] OPEN	<input type="checkbox"/>

Figure 64: PLC Digital Outputs

6.5.4 THERMAL INPUTS

This widget shows the raw data for the heater and hose thermocouples.

THERMAL INPUTS 1	
CH [01] A HEATER THERM	63
CH [02] R HEATER THERM	65
CH [03] HOSE THERM	32767
CH [04] OPEN	0

Figure 65: PLC Thermal Inputs 1

6.5.5 THERMAL INPUTS 2

This widget shows the raw data for the A and B side Inlet Temperatures.

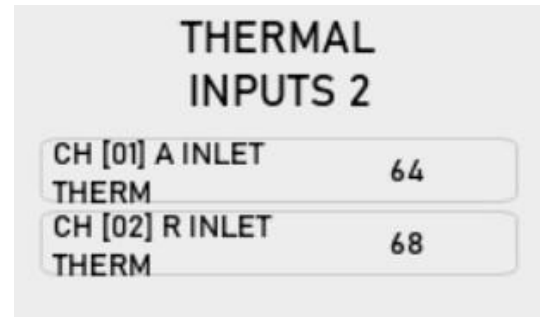


Figure 66: PLC Thermal Inputs 2

6.5.6 FLOW SENSOR INPUTS

This widget shows the raw data and current flow for the flow meters. The values being shown in Figure 67 (Currently 0.00), are measured in gallons/min. Flow stability is a confirmation that the sensors are functioning properly.

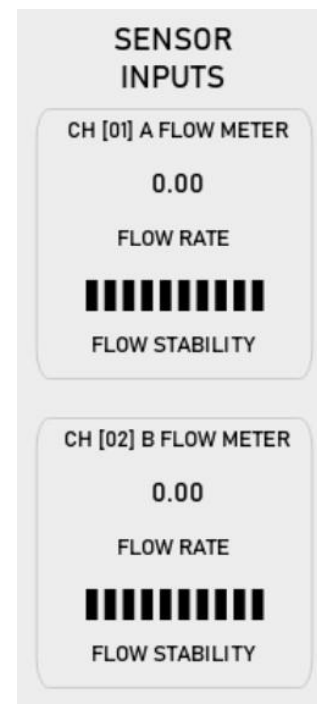


Figure 67: PLC Flow Sensor Inputs

6.5.7 MACHINE SETPOINT RESET

The machine setpoint reset allows the owner to set all machine setpoints to 0.



Figure 68: Machine Setpoint Reset Button

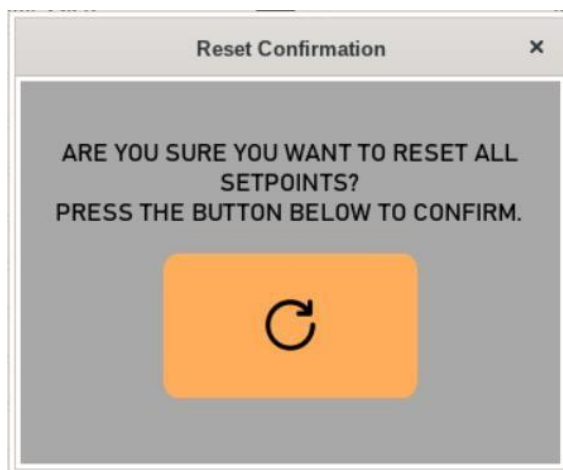


Figure 69: Machine Setpoint Reset Confirmation Window

6.5.8 ORIGIN RESET

The machine origin reset allows the owner to calibrate each of the flow meters individually from the HMI screen. Pressing each reset button will reset the corresponding flow meter. Calibration may take up to 60 seconds to complete. See section 11.1.2 page 73 for more information.



Figure 70: MACH 2 Origin Reset

6.5.9 TIME UPDATE

The time update allows the owner to synchronize each of the flow meters with the machine time. Pressing each reset button will reset the corresponding flow meter.

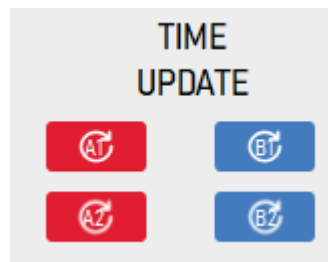


Figure 71: MACH 2 Time Update

6.5.10 MACHINE SERIAL NUMBER

The machine serial number widget shows the machines serial number. This number allows service to be able to keep track of each machine. This number cannot be hanged.

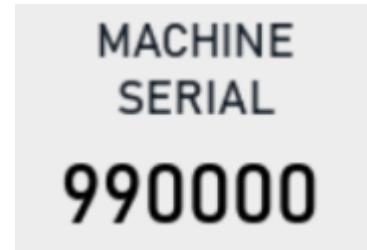


Figure 72: Machine Serial Number

6.5.11 MACHINE LIFETIME CYCLE COUNT

Machine lifetime cycle count allows you to see your machines lifetime cycle count. This cannot be changed.

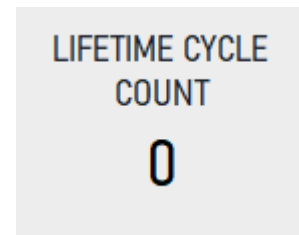


Figure 73: Lifetime Cycle Count

6.5.12 SOFTWARE VERSION

This widget allows for help troubleshooting the particular code version on the machine and certain functions.



Figure 74: PLC Software Version

6.5.13 SUPPORT

The Support screen is for direct hyperlinks to knowledge and tech support for Premier machine customers.

The QR code on the left is responsible for a direct link to the manual at any time.

This QR code on the right is responsible for a direct link to the authorized list of distributors

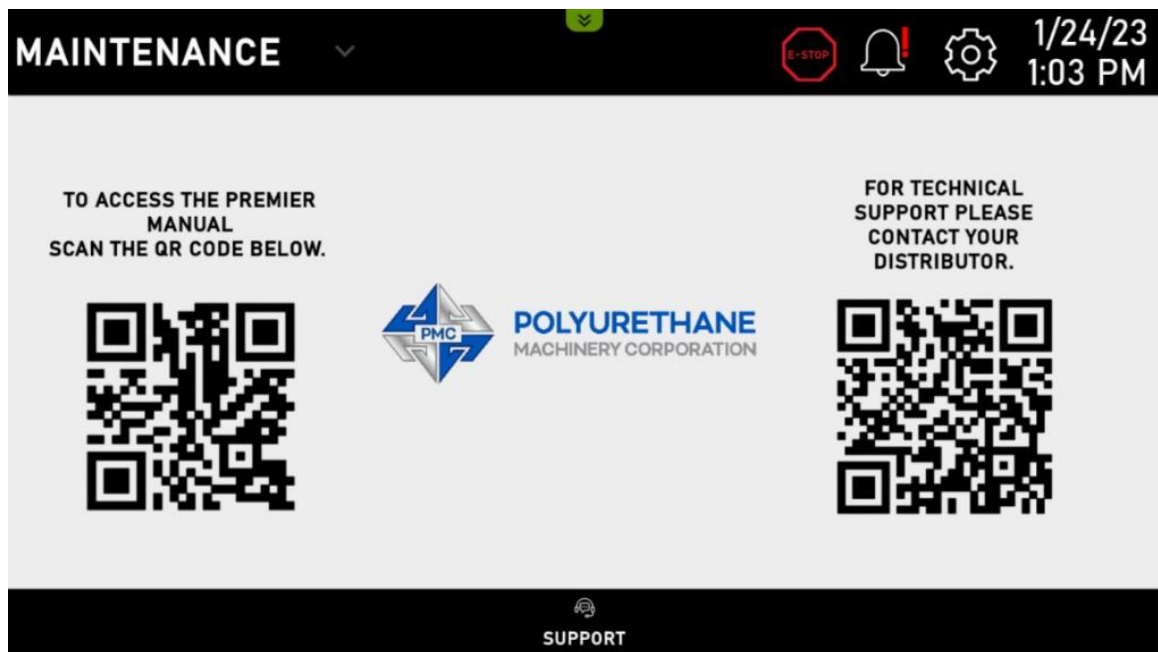


Figure 75: Support Screen

6.6 EVENTS SCREEN

The Events screen is the main tool to track alarms and machine events. This screen is available at the top bar or in the drop down at the top right.

The screenshot shows the 'EVENTS' screen with a top bar containing an 'E-STOP' button, a bell icon, a gear icon, and the date/time '1/24/23 10:45 AM'. Below the top bar, there are two main sections: 'Alarms History Table' and 'Audit View'.

Alarms History Table:

From: 01/24/23 - 10:13:55
To: 01/24/23 - 10:43:55
Duration: 30 Mins
Refresh

Column Filter: Name

Timestamp	Name	State	Value	Description
01/24/23 - 10:24:02	TSU ALARM	Triggered Not Acked	1	

Backward Forward

Audit View:

From: 01/24/23 - 10:13:55
To: 01/24/23 - 10:43:55
Duration: 30 Mins
Refresh

Column Filter: UserName

Record ID	Timestamp	UserName	Operation	Status	Information
245	01/24/23 - 10:26:53	User1	LOGIN	S_OK_NEED_PASWD_CHANGE	1
246	01/24/23 - 10:27:18	User1	CHANGE_PASSWORD	E_SIMILAR_PREV_PSWD	1
247	01/24/23 - 10:27:31	User1	CHANGE_PASSWORD	S_OK	1
248	01/24/23 - 10:27:53	User1	LOGOUT	S_OK	1

Backward Forward

Figure 76: Events Screen

6.6.1 EVENT LOG

The event log is used to track alarms. The Alarms can be tracked in time intervals of the following:

Duration Intervals:
1 Min
5 Mins
10 Mins
30 Mins
1 Hour
2 Hours
4 Hours
8 Hours
12 Hours
1 Day

The screenshot shows the 'Alarms History Table' section of the Events screen. It includes the same filters as Figure 76: From: 01/24/23 - 10:13:55, To: 01/24/23 - 10:43:55, Duration: 30 Mins, and a Refresh button. The Column Filter is set to 'Name'. The table displays one record with the following data:

Timestamp	Name	State	Value	Description
01/24/23 - 10:24:02	TSU ALARM	Triggered Not Acked	1	

Backward Forward

Figure 77: Alarms History Table

6.6.2 AUDIT VIEW

The audit view is used to track user-based information. This includes login, logout, user deletion, user addition and user password changes.

Audit View

From: 01/24/23 - 10:13:55
To: 01/24/23 - 10:43:55

Duration: 30 Mins

Refresh

Column Filter:

UserName

Record ID	Timestamp	UserName	Operation	Status	Information
245	01/24/23 - 10:26:53	User1	LOGIN	S_OK_NEED_PASWD_CHANGE	1
246	01/24/23 - 10:27:18	User1	CHANGE_PASSWORD	E_SIMILAR_PREV_PSWD	1
247	01/24/23 - 10:27:31	User1	CHANGE_PASSWORD	S_OK	1
248	01/24/23 - 10:27:53	User1	LOGOUT	S_OK	1

Backward

Forward

Figure 78: Audit View Table

6.7 SETTINGS

The settings screen allows the Owner to create/edit accounts, edit email/report settings and update the current time.

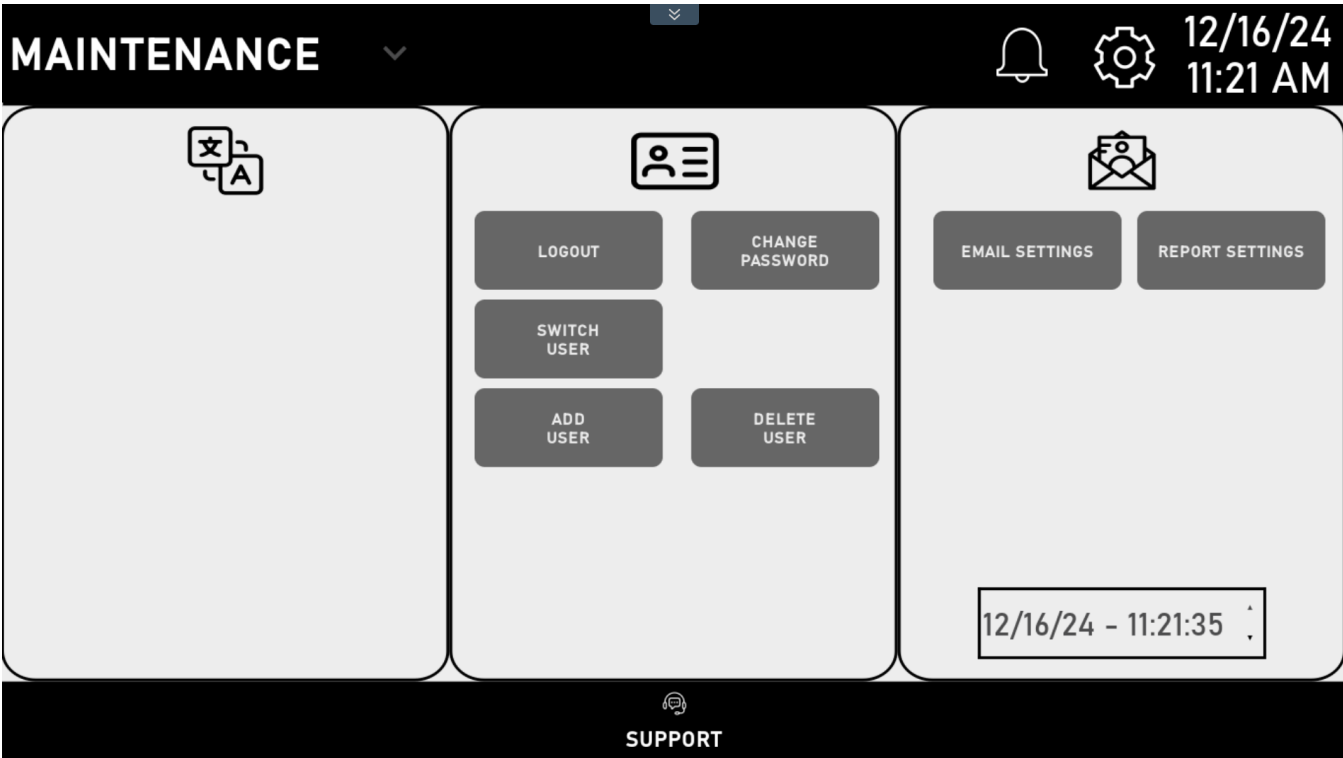


Figure 79: Settings Screen

6.7.1 MANAGE USERS

This section provides the ability for a user to logout or switch to another account. All other actions require an owner account.

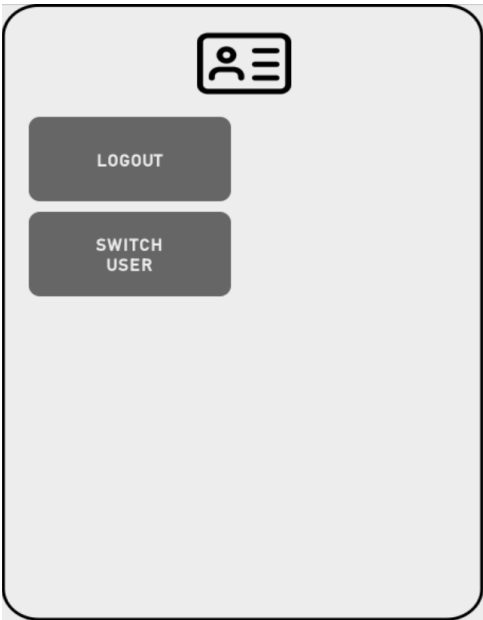


Figure 81: User Manage Settings

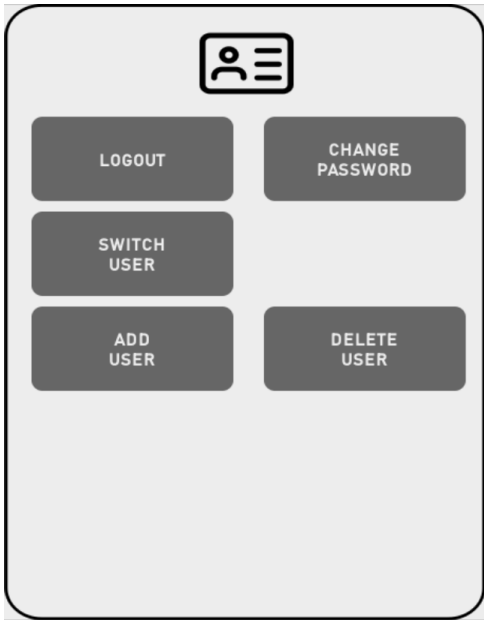


Figure 80: Owner Manage Settings

6.7.1.1 LOGOUT

allows the User Log Out of Their account.



Figure 82: Logout Button

6.7.1.2 SWITCH USER

allows the User Switch to another account.



Figure 83: Switch User Button

6.7.1.3 CHANGE PASSWORD

allows the Owner change the password of the current account.



Figure 84: Change Password Button

6.7.1.4 ADD USER

allows the Owner add user accounts. The accounts name, password and type (user or Owner) can be selected alongside if the password must be reset.



Figure 85: Add User Button

6.7.1.5 DELETE USER

allows the Owner delete user and other Owner accounts

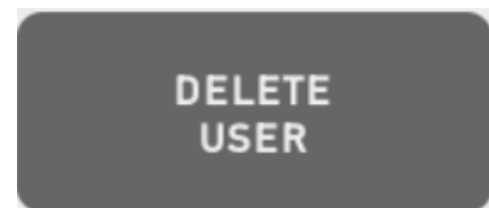


Figure 86: Delete User Button

EMAIL SETTINGS

6.7.1.6 EMAIL SETTINGS

Displays information about the machines email. Most information will not be displayed.



Figure 87: Email Settings Button

6.7.1.7 REPORT SETTINGS

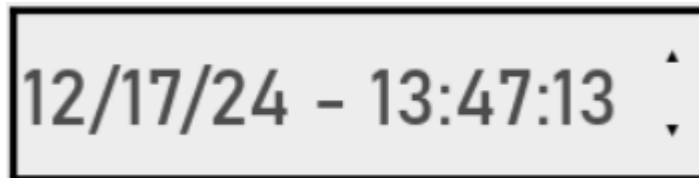
allows the user select the amount of time to delete files up to 30 days. More information can be found in section 6.4.7 page 46.



Figure 88: Report Settings Button

6.7.2 DATE AND TIME

The date and time can be adjusted by an Owner account in the bottom right of the Settings screen. This can be performed by selecting the time section (mm/dd/yy – hh:mm:ss) and using the up/down arrows.



7 Premier (X) HMI LAYOUT & USAGE

7.1 JOB SETUP SCREEN

The Job Setup screen is where the user can setup the high and low setpoints for the basic functions of the machine. Anything the user would need to setup when installing and turning on the machine you can find here. The user can set the drum levels and setpoints for inlet pressures and temperatures as well as ratio tolerances.

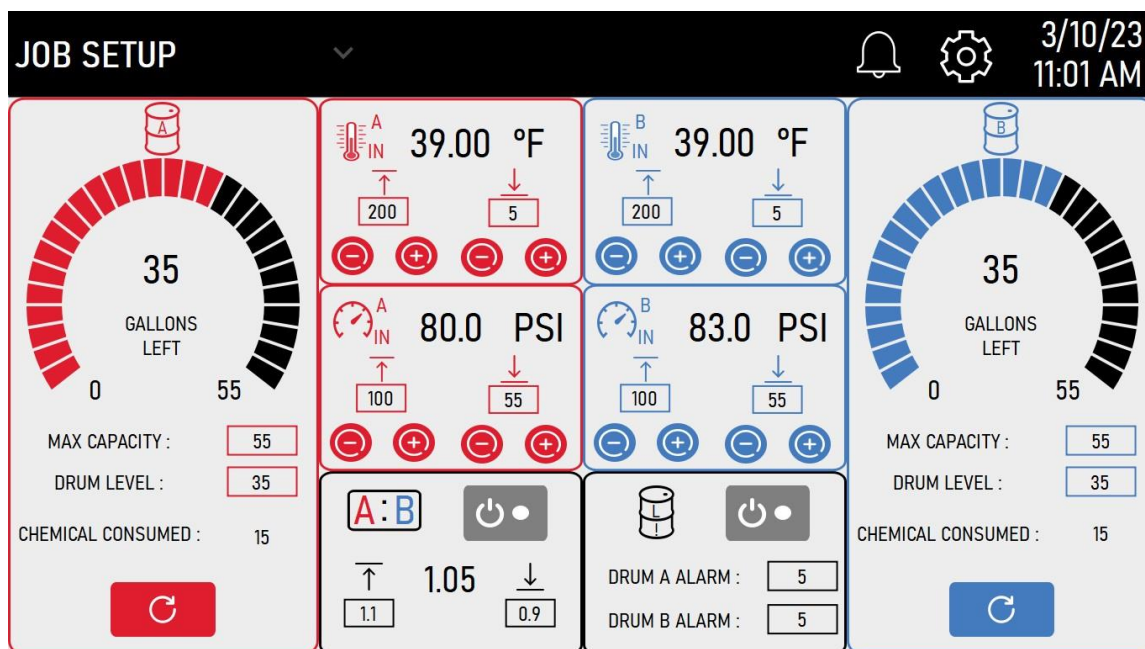


Figure 89: Job Setup Screen

7.1.1 A/B SIDE DRUM COUNTER

This widget shows how much chemical is left in the drums. The Drums Max Capacity can be and current level can be input by the user's measurement. The chemical consumed is based on the flow sensor readings. This widgets setpoints are retained on shutdown or until changed. The reset Button resets the chemical consumed to 0. All units are measured in Gallons.

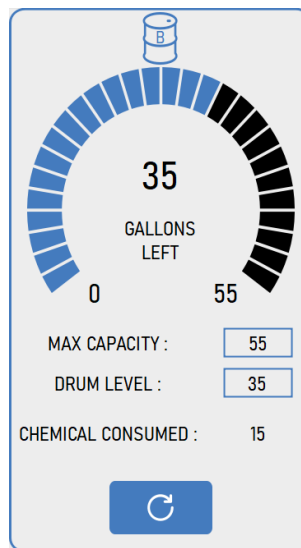
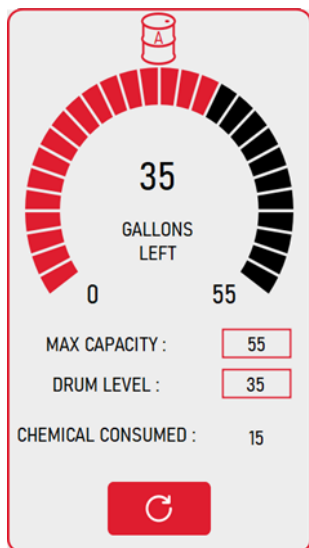


Figure 90: A Side Drum Counter Figure 91: B Side Drum Counter

7.1.2 A/B SIDE INLET TEMPERATURE

This widget allows the user to see the inlet temperature for A and B side. The up arrow is the upper limit for the alarm setting. The Down arrow is the lower limit for the alarm setting. This widgets setpoints are retained on shutdown or until changed.

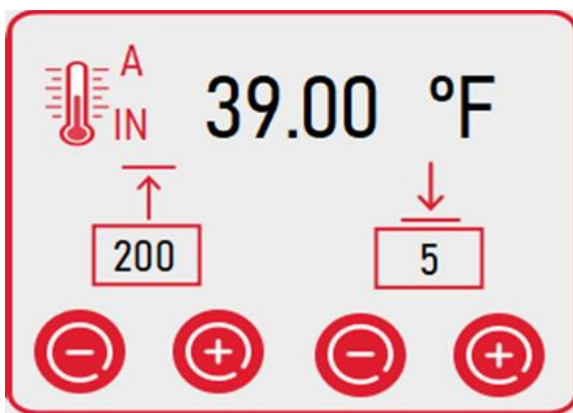


Figure 92: A Side Inlet Temperature

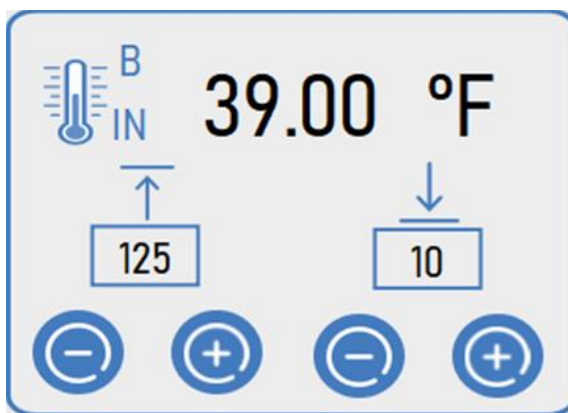


Figure 93: B Side Inlet Temperature

7.1.3 A/B SIDE INLET PRESSURE

This widget allows the user to see the inlet Pressure for A and B side. The up arrow is the upper limit for the alarm setting. The Down arrow is the lower limit for the alarm setting. This widgets setpoints are retained on shutdown or until changed.

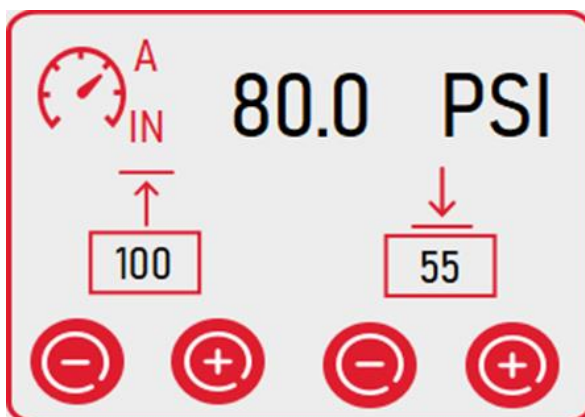


Figure 94: A Inlet Pressure

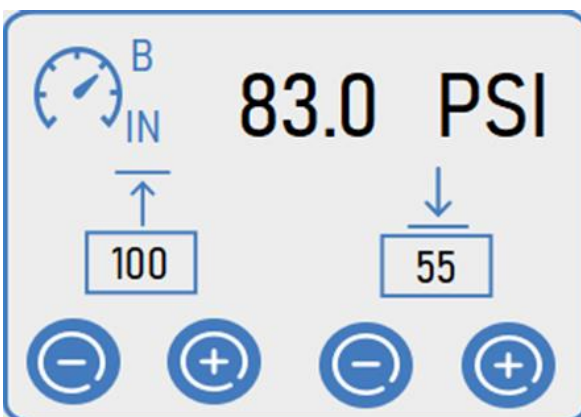


Figure 95: B Inlet Pressure

7.1.4 RATIO CONFIRMATION

This widget allows the user to see the current chemical ratio. The alarm is enabled when the power button is pressed. The high and low limit for the ratio alarm can be adjusted. This widgets setpoints are retained on shutdown or until changed.

This widget is locked out for the basic user. Ownership or above can change the high and low setpoints. Enable can be used by all permission levels.

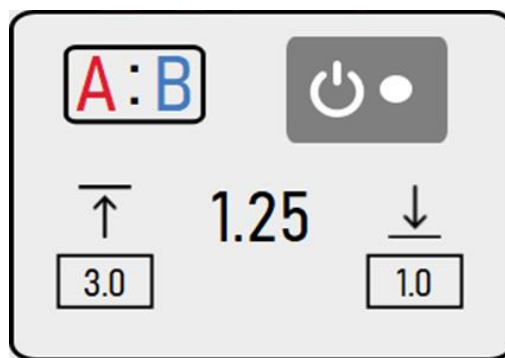


Figure 96: Ratio Confirmation

7.1.5 DRUM ALARM

This widget allows the user to set a lower limit on chemical usage for both A and B sides. Can be enabled by pressing the button after a value is set for both sides. Units are in Gallons. This widgets setpoints are retained on shutdown or until changed.

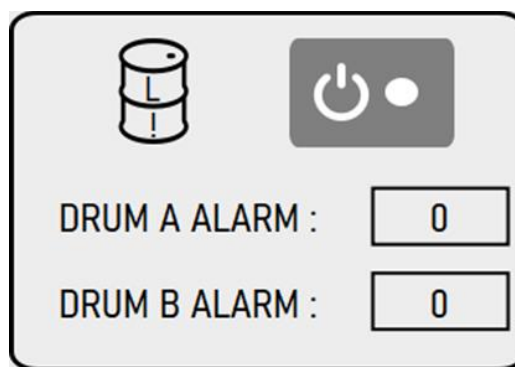


Figure 97: Low Drum Alarm

8 MACH 2 HMI LAYOUT & USAGE

8.1 CHEMICAL SCREEN

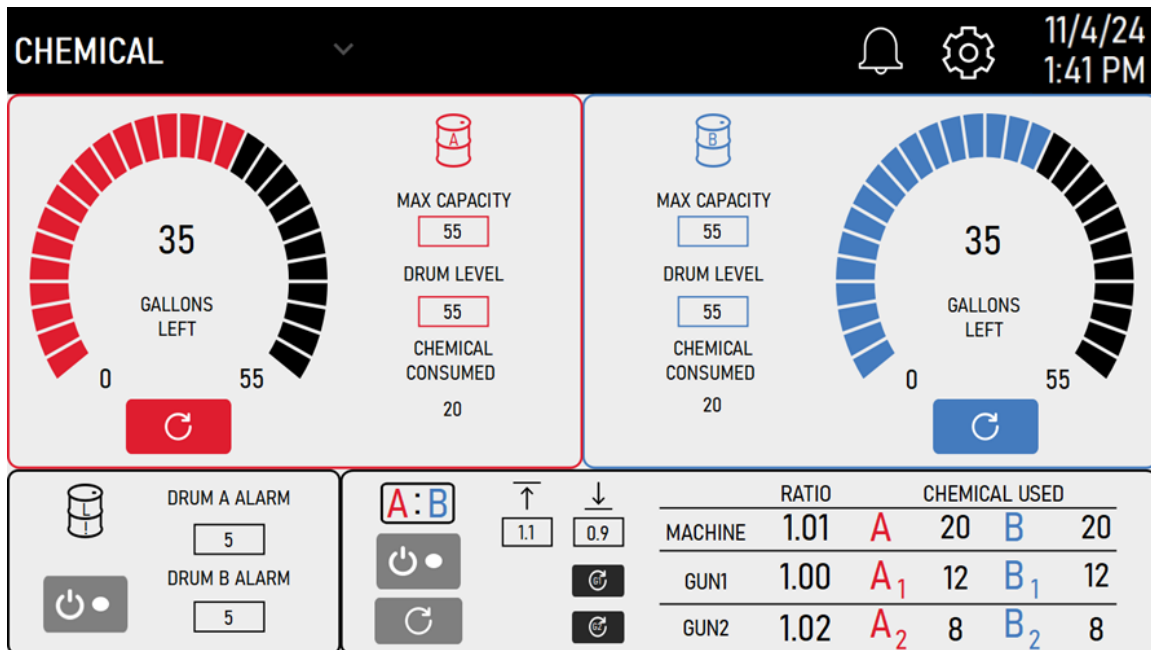


Figure 98: MACH 2 Chemical Screen

8.1.1 A/B SIDE DRUM COUNTER

This widget shows how much chemical is left in the drums. The Drums Max Capacity can be and current level can be input by the user's measurement. The chemical consumed is based on the flow sensor readings. This widgets setpoints are retained on shutdown or until changed. The reset Button resets the chemical consumed to 0. All units are measured in Gallons.

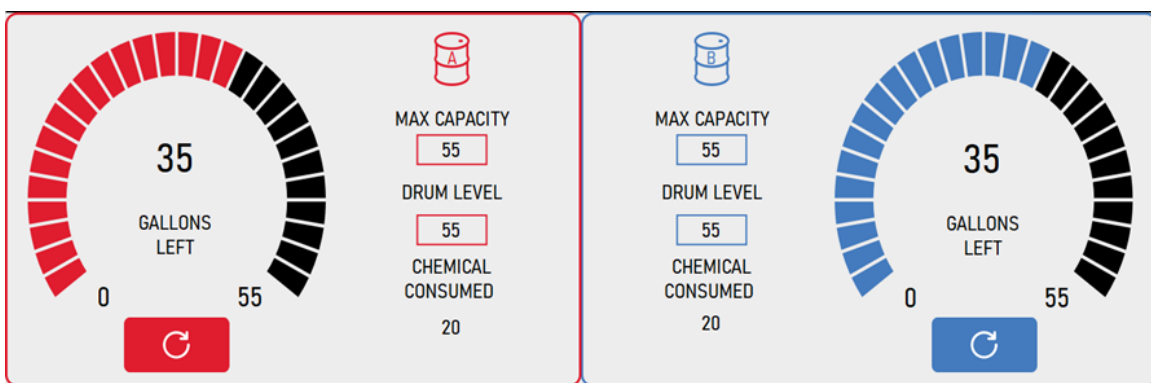


Figure 99: MACH 2 A/B Side Drum Counter

8.1.2 DRUM ALARM

This widget allows the user to set a lower limit on chemical usage for both A and B sides. Can be enabled by pressing the button after a value is set for both sides. Units are in Gallons. This widgets setpoints are retained on shutdown or until changed.

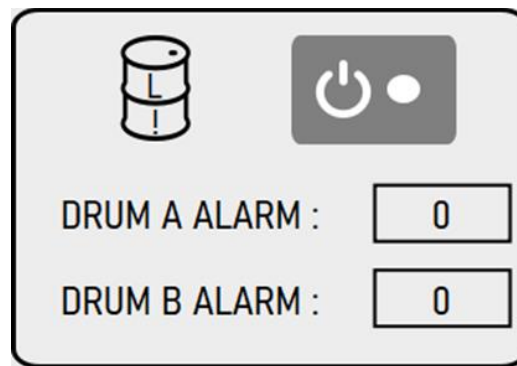


Figure 100: Low Drum Alarm

8.1.3 Ratio Confirmation

This widget allows the user to see the current chemical ratio. The alarm is enabled when the power button is pressed. The high and low limit for the ratio alarm can be Adjusted. The reset buttons labeled G1 and G2 will reset the Ratio and Chemical Used values for the respective gun. Reset will not affect the drum counter on the Chemical Screen. This widgets setpoints are retained on shutdown or until changed.

If either gun exceeds either the high or low setpoint, the ratio alarm will display the trip value and the chemical pumps will stop. The ratio is calculated using data from the flow meters taken over a set interval. Since the ratio alarm setpoints trigger the alarm condition, they must be set with the high limit greater than 1.00 and low limit less than 1.00.

This widget is locked out for the basic user. Ownership or above can change the high and low setpoints. Enable can be used by all permission levels.

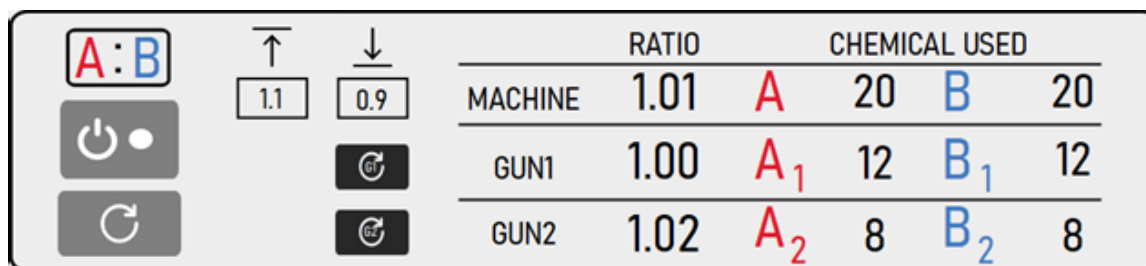


Figure 101: MACH 2 Ratio Confirmation

DISCLAIMER: The ratio alarm is sensitive to immediate changes for quick response to potential chemical blockages. It is normal to see the ratio oscillate near 1.00

8.2 SETUP SCREEN

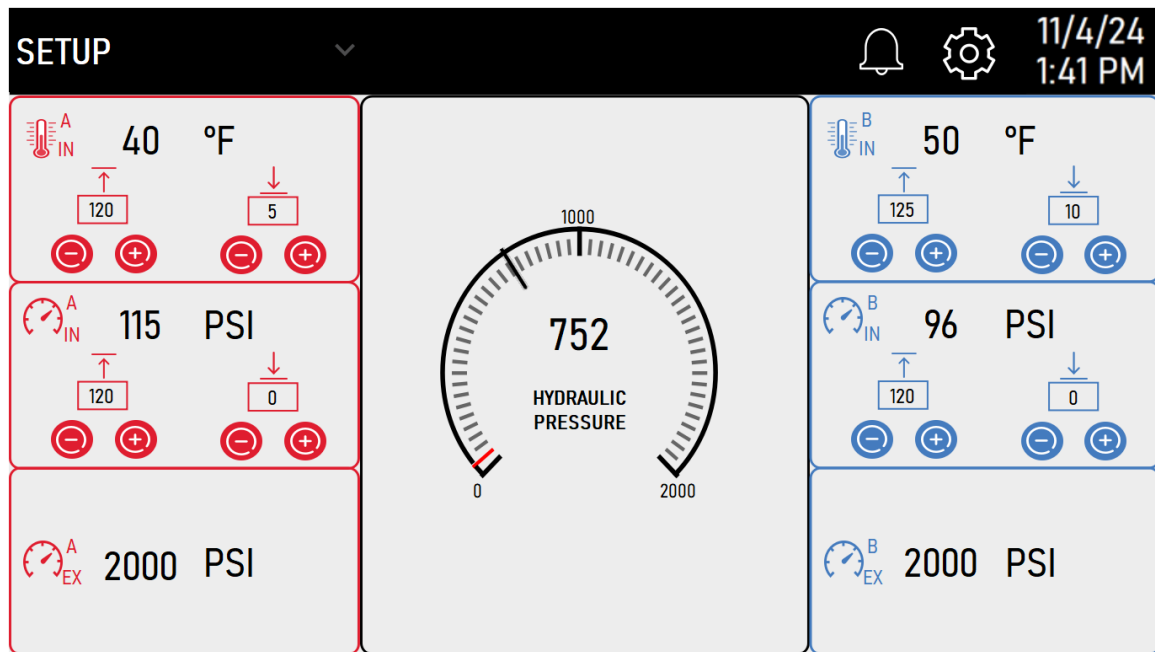


Figure 102: MACH 2 Setup Screen

8.2.1 A/B SIDE INLET TEMPERATURE

This widget allows the user to see the inlet temperature for A and B side. The up arrow is the upper limit for the alarm setting. The Down arrow is the lower limit for the alarm setting. This widgets setpoints are retained on shutdown or until changed.

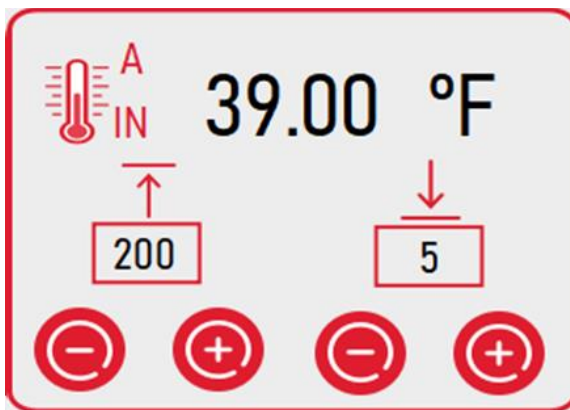


Figure 103: MACH 2 A Side Inlet Temperature

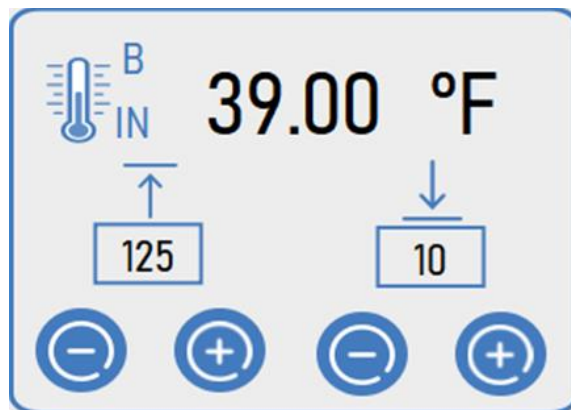


Figure 104: MACH 2 B Side Inlet Temperature

8.2.2 A/B SIDE INLET PRESSURE

This widget allows the user to see the inlet Pressure for A and B side. The up arrow is the upper limit for the alarm setting. The Down arrow is the lower limit for the alarm setting. This widgets setpoints are retained on shutdown or until changed.

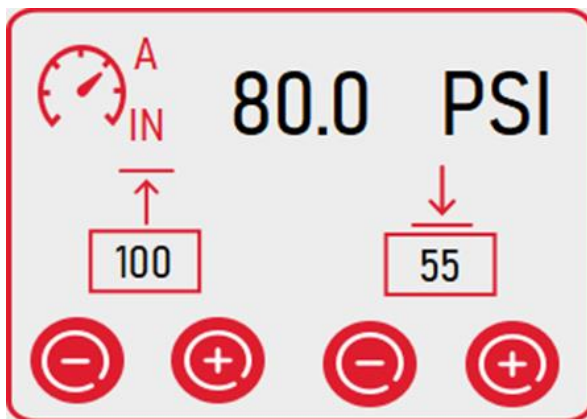


Figure 105: MACH 2 A Inlet Pressure

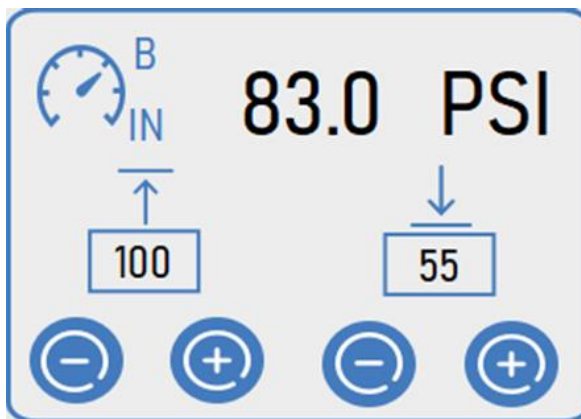


Figure 106: MACH 2 B Inlet Pressure

8.2.3 A/B EXIT PRESSURE

This widget shows the Exit pressure. Exit pressure can be monitored in real time. This is set by the pressure sensor on the side of the machine.



Figure 107: MACH 2 A exit Pressure

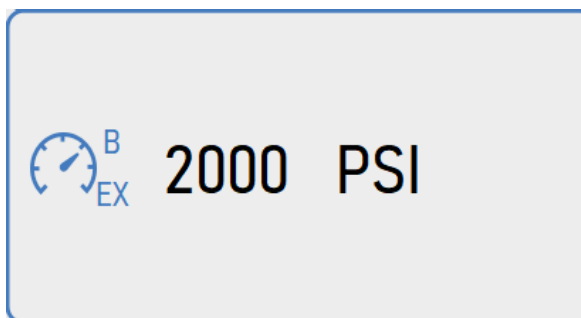


Figure 108: MACH 2 B exit Pressure

8.2.4 HYDRAULIC PRESSURE

This widget is a gauge that shows Hydraulic pressure. Hydraulic pressure can be monitored in real time. This is read by the pressure sensor on the rear of the hydraulic manifold.

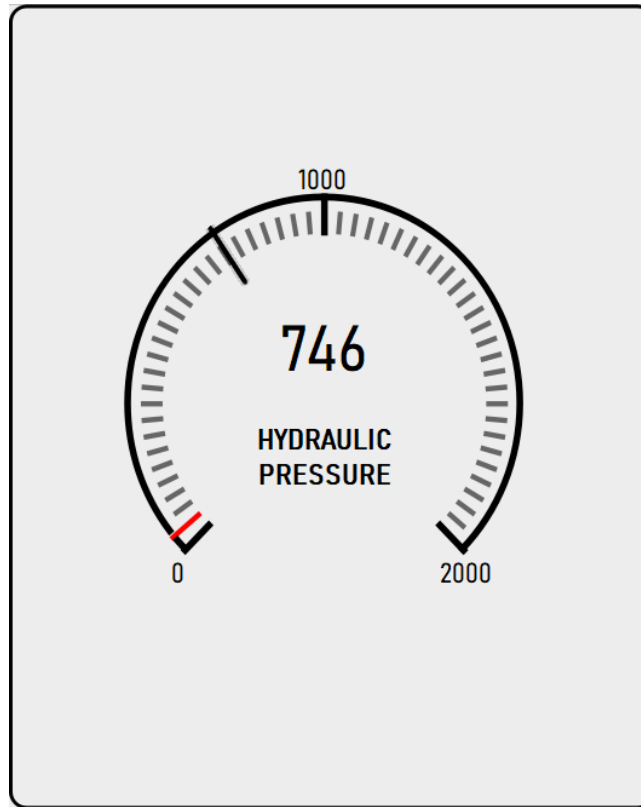


Figure 109: MACH 2 Hydraulic Pressure

9 NETWORK CONNECTION

The network connection to the machine is provided by a Verizon 4G LTE Modem, no other service provider can be used. Both 4G and 5G SIM cards from Verizon work for this device. The network connection is provided by a Verizon 4G LTE Modem, no other service provider can be used. For the first year of your machine PMC covers the cost of this Verizon Service. The start date is based on your machines shipping date.

After the first year of service, the user can take the SIM card that is in the machine and reactivate it with a Verizon representative. To do this the user will need the IMEI and the ICCID number that is on the SIM card itself. To find these two numbers open the top panel of the machine while it is off. The IMEI number will be located on the side of the router on a white label.



Figure 110: IMEI Number

To remove the SIM to get the number you need a paper clip/small pin to pop the tray out.

The ICCID can be seen on the front of the SIM card.

NOTE! PMC is not responsible for any lapses in coverage based on network availability.

10 REMOTE ACCESS

10.1 CORVINA LOGIN

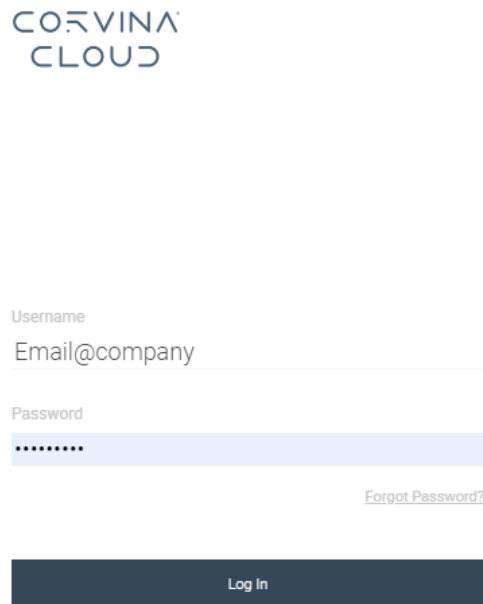
Go to the following website to log in to Corvina:

<https://app.corvina-us.io/> See below for the basic structure for the Username and Password:

Email: Email@company

Password: ExamplePassword

New User accounts will be activated by PMC. When activated, a confirmation email and a password reset email will be sent (check junk folder if not found). Contact your Distributor for more information.



CORVINA
CLOUD

Username
Email@company

Password
.....

[Forgot Password?](#)

Log In

Figure 111: Corvina Login Page

NOTE! Corvina requires monthly tokens to be used on each machine for remote access. Lifetime tokens are also available.

10.2 ACCESSING THE MACHINE

The user can see which machines are connected by looking at the indicators on the right of each machine. If there is a cellular icon that is blue, the machine is connected. If there is a cellular icon that is gray the machine is not connected.

Device	Serial No.	Description	Groups	Enabled	Renew	Status	
▼	99-0101	Premier Machine		✓	✓		⋮
▼	99-0102	Premier Machine		✓	✓		⋮

Figure 112: Corvina Active Machine Screen



Figure 113: Corvina Active Machine Icons

To access a machine, click the dropdown on the machine you want to connect to. A window will appear. In this window, click on the **VNC** option. This lets you view and control the machine remotely. Anything you do remotely will affect the operation of the machine in real time. More information can be found on the Corvina User Manual available on the Corvina website.

Device	Serial No.	Description	Groups	Enabled	Renew	Status
^	99-0101	Premier Machine				
Endpoint		Application	Status			
gateway Gateway		Jmobile4Web				
		SystemSettings				
		VNC				
PLC PLC						
∨	99-0102	Premier Machine				

Figure 114: Active Gateway VNC Connection

11 FLOW METERS

The flow meters are connected directly to the PLC. They will turn on once the machine is powered up. All information received from the meter goes to the PLC over I/O link. All units of measurement are in gallons/minute.

11.1 CALIBRATION

11.1.1 Premier (X) Calibration

NOTE! Follow the recommended procedure in the order shown.

CAUTION! For the best operation of the flow meter, ensure the pipes are filled with chemical by allowing the machine to run as normal for a few cycles. When calibrating, the machine should be static and at pressure.

37. On the flow sensor press the square button to get to the menu.
38. From the menu, navigate using the arrows to the settings menu and press the center select button to enter into the menu.
39. From the Settings menu, navigate to the “Useful Functions” menu.
40. Once in the “Useful Functions” menu, navigate to “[Flow] Origin Adj”
41. Press the center select button to use the function and select execute.
42. Your sensor should now be calibrated to the chemical you have in your system on that day.



Figure 115: Flow Meters
Step 2



Figure 116: Flow Meters
Step 3



Figure 117: Flow Meters
Step 4



Figure 118: Flow Meters
Step 5

NOTE! To get the most accurate measurements on your machine, it is recommended to do this at the beginning of each new job or material change.

11.1.2 Premier MACH 2 Calibration

NOTE! Follow the recommended procedure in the order shown.

CAUTION! For the best operation of the flow meter, ensure the pipes are filled with chemical by allowing the machine to run as normal for a few cycles. When calibrating, the machine should be static and at pressure.

NOTE! Must be signed into the owner account to access calibration options.

1. Navigate to the Maintenance screen.
2. Press the Origin Reset Buttons correlating to each desired Flow meter.
3. Wait 60 seconds for the calibration to complete. There is no completion notification.



Figure 119: MACH 2 Flow Meter Calibration

NOTE! Flow meters are locked on the MACH 2 and must be calibrated using this method.

12 JOB REPORTS

Job reports allow you to name and track job numbers and material usage across the entirety of a job. Machine set points and min./max. values will be displayed along with the option for time- based interval logging of these points. There are two types of reports; Express and Detailed.

12.1 EXPRESS REPORT

The express reports show only the essential information of the machine. This includes Job Number, Customer Name, Material Type, Lot Number, and corresponding data and graphs for Temperature, Pressure, and Chemical Conditions.

1. Each report has a header including Job Number, Material Type, Customer Name, and Lot Number.



Figure 120: Report Information Heading

2. The first part of the Temperature data section of the report is Temperature Condition Data. The charts will be in line graph form. This encompasses Inlet, Exit, and Hose Temperatures for the A and B sides.

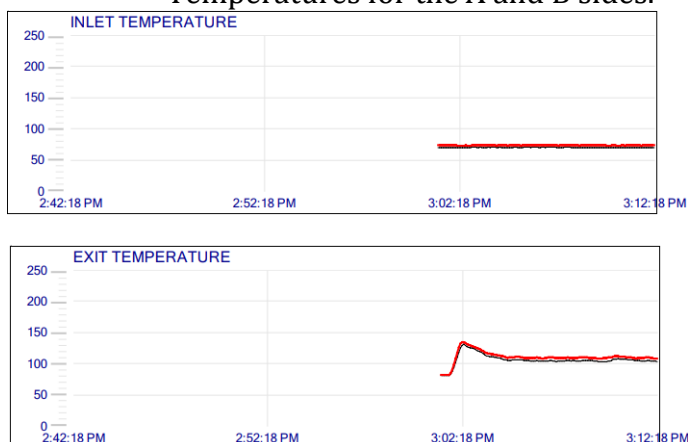


Figure 121: Temperature Conditions Chart - Inlet & Exit

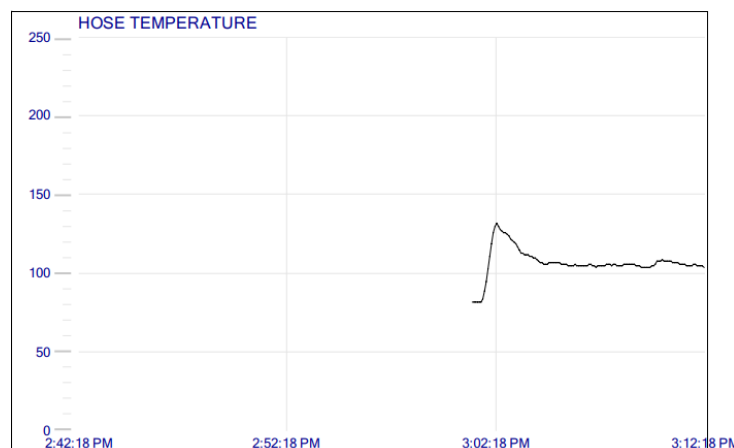


Figure 122: Temperature Conditions Chart – Hose

3. In the second part of the Temperature section of the report, you will see a chart filled with machine setpoints along with min./max. points of the recorded data. The length of the report is also shown.

	Inlet Temperature A (°F)	Inlet Temperature B (°F)	Exit Temperature A (°F)	Exit Temperature B (°F)	Hose Temperature (°F)
Upper Limit:	150.00	151.00			
Maximum:	72.00	75.00	122.00	126.00	108.00
Minimum:	71.00	71.00	79.00	81.00	77.00
Low Limit:	25.00	25.00			
Machine Time On:	11:11				

Figure 123: Temperature Condition Data

4. The first part of the Pressure data section in the report is the Pressure Condition Data. The charts will be in line graph form. This encompasses Inlet and Exit Pressure for the A and B sides.

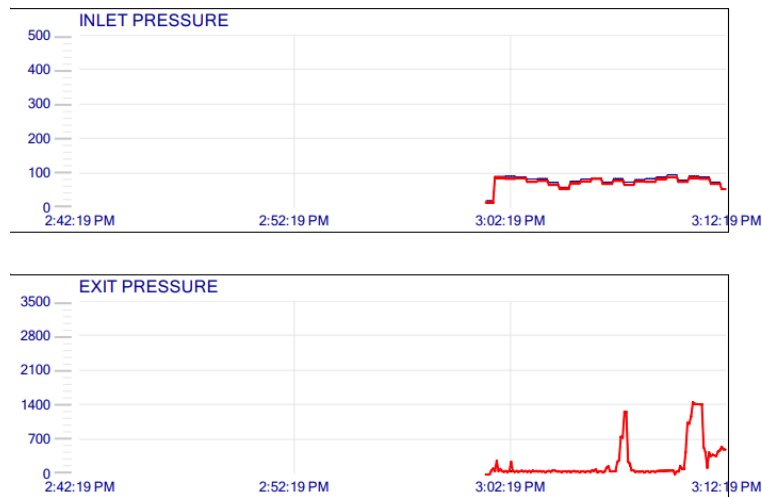


Figure 124: Pressure Condition Chart - Inlet & Exit

5. In the second part of the Pressure section of the report, you will see a chart filled with the max./min. inlet and exit pressure points of the recorded data.

	Inlet Pressure A (PSI)	Inlet Pressure B (PSI)	Exit Pressure A (PSI)	Exit Pressure B (PSI)
Maximum:	91.00	77.00	642.00	648.00
Minimum:	62.00	57.00	155.00	81.00

Figure 125: Pressure Condition Data

6. The first part of the Chemical Condition data section in the report is the Chemical Data. The charts will be in line graph form. This encompasses the machines chemical ratio and the total chemical used for the A and B sides.

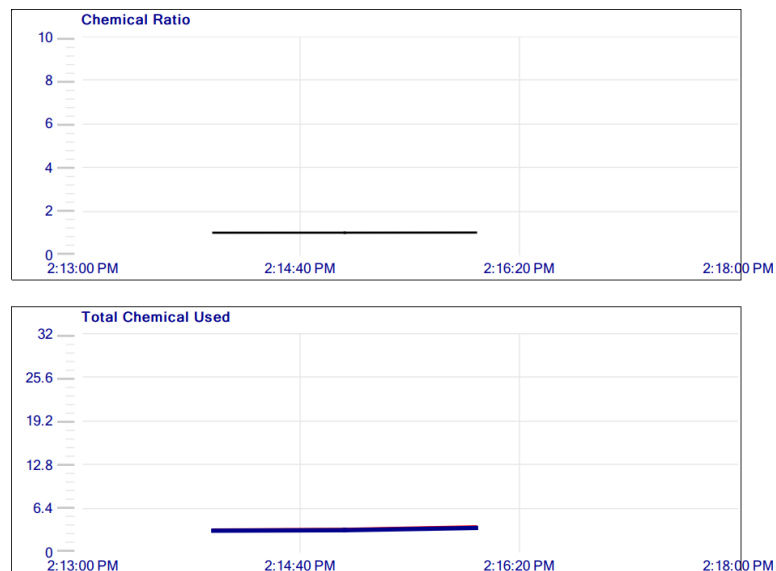


Figure 126: Chemical Condition Chart - Chemical Ratio & Chemical Used

7. In the second part of the Chemical section of the report, you will see a chart filled with the High setpoint, Low setpoint, and Ratio and Chemical Used points of the recorded data.

	Chemical Ratio:	Total Chemical Used A (Gal):
High Setpoint:	5.00	0.00
Setpoint:	1.07	Total Chemical Used B (Gal):
Low Setpoint:	1.00	0.00

Figure 127: Chemical Condition Data

12.2 DETAILED REPORT

The detailed report uses all the information in the express data and adds an interval-based log of all data points. After the Express data in the report is completed, the Detailed data is added to the end. You will see Temperature, Pressure, and Chemical data using the below data intervals.

Data Logging Intervals
3 Seconds
5 Seconds
10 Seconds
30 Seconds
1 Minutes
3 Minutes
5 Minutes

1. The Temperature Condition table logs Inlet and Exit temperature for the A and B sides as well as Hose temperature. This example uses a 10 second interval.

Temperature Condition Table

Timestamp	Inlet Temperature A (°F)	Inlet Temperature B (°F)	Exit Temperature A (°F)	Exit Temperature B	Hose Temperature
02/09/2023 - 01:57:50 PM	65.00	69.00	64.00	66.00	64.00
02/09/2023 - 01:58:00 PM	65.00	69.00	64.00	66.00	64.00
02/09/2023 - 01:58:10 PM	65.00	69.00	64.00	66.00	64.00
02/09/2023 - 01:58:20 PM	65.00	69.00	64.00	66.00	64.00
02/09/2023 - 01:58:30 PM	65.00	69.00	64.00	66.00	64.00
02/09/2023 - 01:58:40 PM	65.00	69.00	64.00	66.00	64.00
02/09/2023 - 01:58:50 PM	65.00	69.00	64.00	66.00	64.00
02/09/2023 - 01:59:00 PM	65.00	69.00	64.00	66.00	64.00
02/09/2023 - 02:07:50 PM	65.00	69.00	64.00	66.00	64.00
02/09/2023 - 02:08:00 PM	65.00	69.00	64.00	66.00	64.00
02/09/2023 - 02:08:10 PM	65.00	69.00	64.00	66.00	64.00
02/09/2023 - 02:08:20 PM	65.00	69.00	64.00	66.00	64.00

Figure 128: Temperature Condition Logged Data

2. The Pressure Condition table logs Inlet and Exit pressure for the A and B sides. Figure 129 uses a 10 second interval.

Pressure Condition Table

Timestamp	Inlet Pressure A (PSI)	Inlet Pressure B (PSI)	Exit Pressure A (PSI)	Exit Pressure B (PSI)
02/09/2023 - 01:57:50 PM	1.00	2.00	0.00	1.00
02/09/2023 - 01:58:00 PM	1.00	2.00	0.00	2.00
02/09/2023 - 01:58:10 PM	1.00	2.00	1.00	2.00
02/09/2023 - 01:58:20 PM	1.00	1.00	0.00	1.00
02/09/2023 - 01:58:30 PM	1.00	1.00	0.00	3.00
02/09/2023 - 01:58:40 PM	1.00	1.00	1.00	3.00
02/09/2023 - 01:58:50 PM	1.00	1.00	1.00	2.00
02/09/2023 - 01:59:00 PM	1.00	1.00	0.00	2.00
02/09/2023 - 02:07:50 PM	1.00	1.00	0.00	1.00
02/09/2023 - 02:08:00 PM	1.00	1.00	0.00	2.00
02/09/2023 - 02:08:10 PM	1.00	1.00	0.00	2.00
02/09/2023 - 02:08:20 PM	1.00	2.00	0.00	2.00

Figure 129: Pressure Condition Logged Data

3. The Chemical Condition table logs Chemical Ratio and Chemical Used for the A and B sides. Figure 130 uses a 1-minute interval.

Chemical Condition Table

Timestamp	Chemical Ratio	Total Chemical Used A	Total Chemical Used B
01/11/2023 - 02:14:00 PM	1.06	3.43	3.25
01/11/2023 - 02:15:00 PM	1.06	3.52	3.32
01/11/2023 - 02:16:00 PM	1.07	3.89	3.65

Figure 130: Chemical Conditions Logged Data

12.3 CAPTURING REPORTS

NOTE! When starting a new job or changing out materials, restart/start report recording.

1. To capture a report, press the “Manual Start Report Recording” button.
2. Select a report interval and press “Close”. Data is now being recorded.
3. When you are done recording press the “Manual stop Report Recording” button. When this opens up fill in all available information for your current job.
4. Once all information is filled generate a report of your choosing. You do this by pressing the “Generate Express Report” button or the “Generate Detailed Report” button.

NOTE! If you would like each type of report, you need to change the customer's name to something different. If both reports have the same name, it will corrupt both files. Once the reports are created, you can send or move these files.

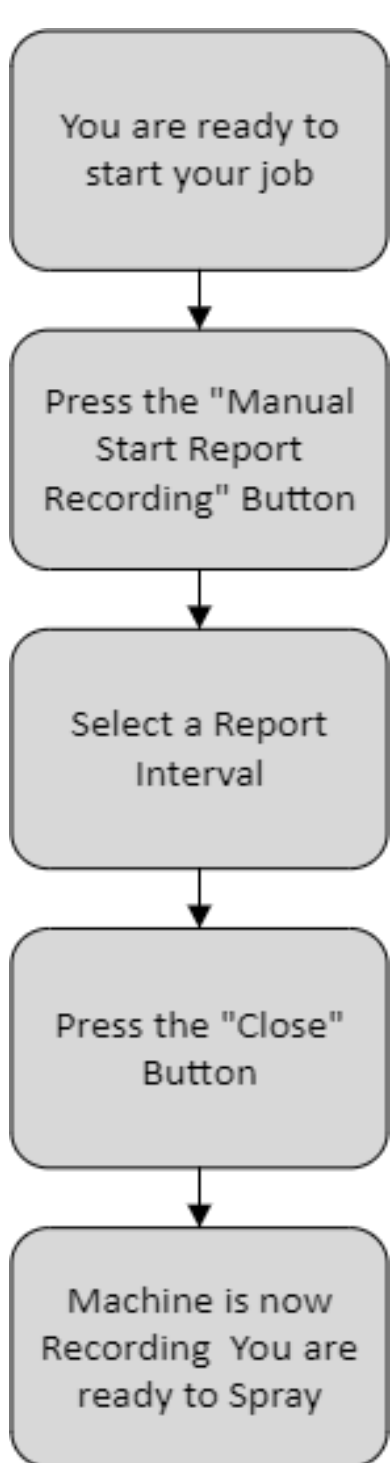


Figure 131: Start Report Flow Chart

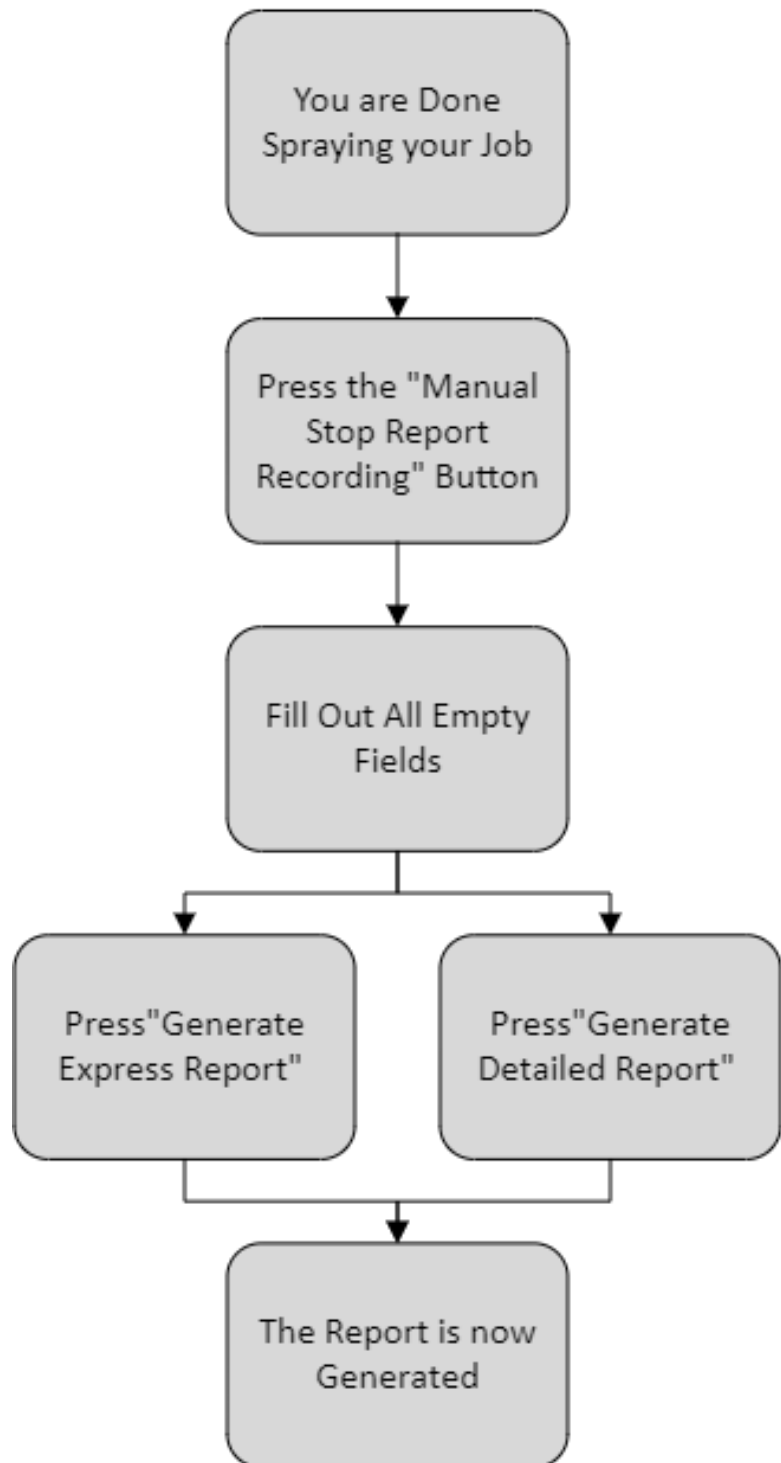


Figure 132: Generate Report Flow Chart

12.4 SENDING REPORTS

NOTE! When emailing your report, you can only send one at a time. When saving to a USB device, you can save multiple at once.

12.4.1 EMAILING REPORTS

1. To send an email press the “Send Email” button.
2. Select an email address (See Section 6.4.5 Page 45) using the drop down and select the report you have selected.
3. Once both drop downs have the correct selection press the “Attach Report” button and press “Send Email”. A window will come up saying the email has been sent.

12.4.2 USB SAVING

1. To save files to a USB press the “USB Download” button. Select the report you would like to save to the USB.
2. Press “Download Selection” for a single report or “Download All” for all reports on the machine.
3. To remove the USB, press the “Remove USB” button next press the “Yes” button on the smaller window. Press OK to finish the process. It is now safe to remove your USB.

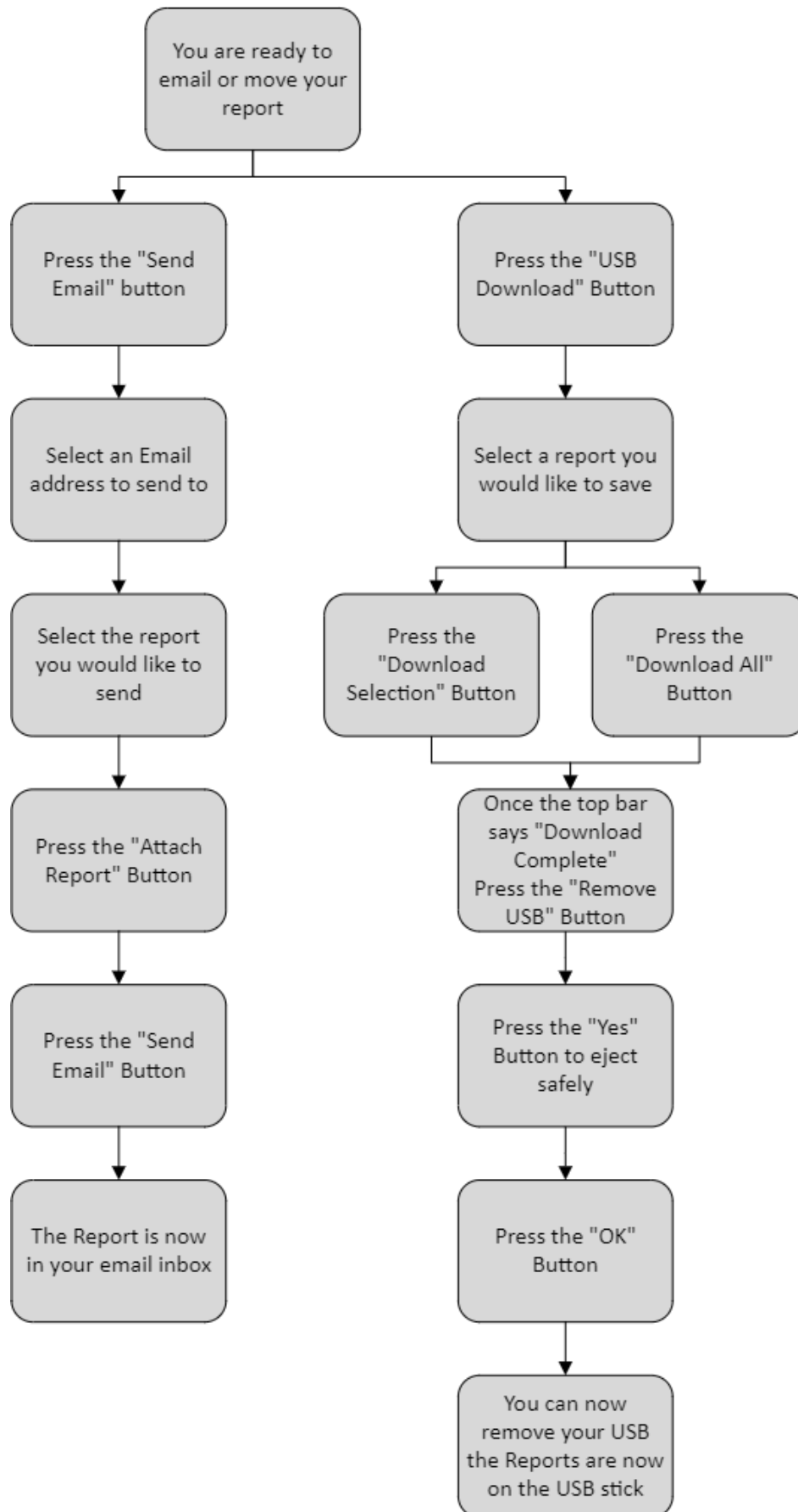


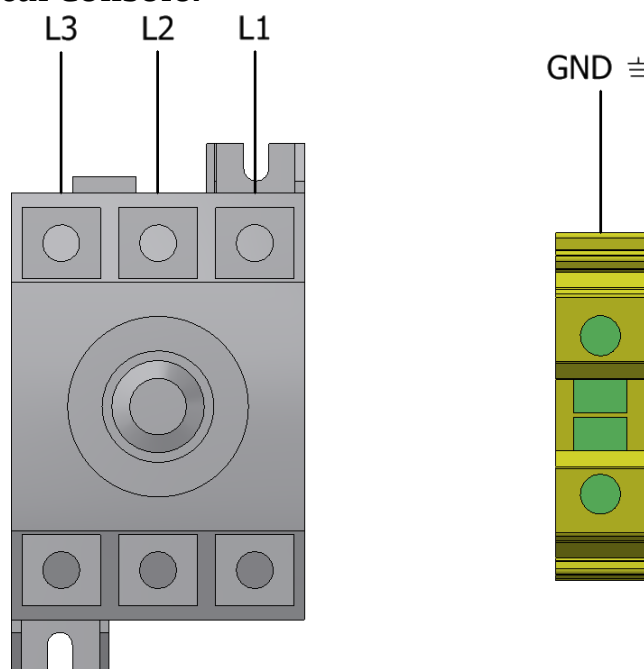
Figure 133: Emailing & Saving Report Flow Chart

13 INSTALLATION

WARNING! Use suitable protection and follow the recommendations in the Safety Information enclosed and provided by material suppliers when installing or working with the Proportioner.

CAUTION! Make sure the power cable is disconnected from the main power source before connecting to the Terminal Strip in the Console.

NOTE! To ensure the Premier Series Proportioner works correctly, the electrical supply must meet the specifications indicated on the Serial Number Placard affixed to the Electrical Console.



3 PHASE X 230 VOLT

Figure 134: Incoming Electrical Power Connection

1. Insert the main power cable by passing it through the wire stop at the bottom of the electrical console and connect as shown in the diagram above.
2. Fill the Hydraulic Reservoir with 16 gallons (61 Liters) of approved hydraulic fluid. See page 88 for hydraulic oil specifications.

NOTE! Do not fill the tank to maximum capacity; use the Visual Level Indicator on the tank to make sure the amount of hydraulic fluid is not more than 16 gal (61 L) or 80% of the tank's maximum capacity.

3. To check the level of the hydraulic fluid in the Hydraulic Pump Case, disconnect the Hydraulic Hose from the 90-degree fitting and remove Fitting from Hydraulic Case. Add fluid as required. Reattach Fitting and Hydraulic Hose. Turn the hydraulic pressure control knob counterclockwise until it stops, that is the lowest hydraulic pressure setting.

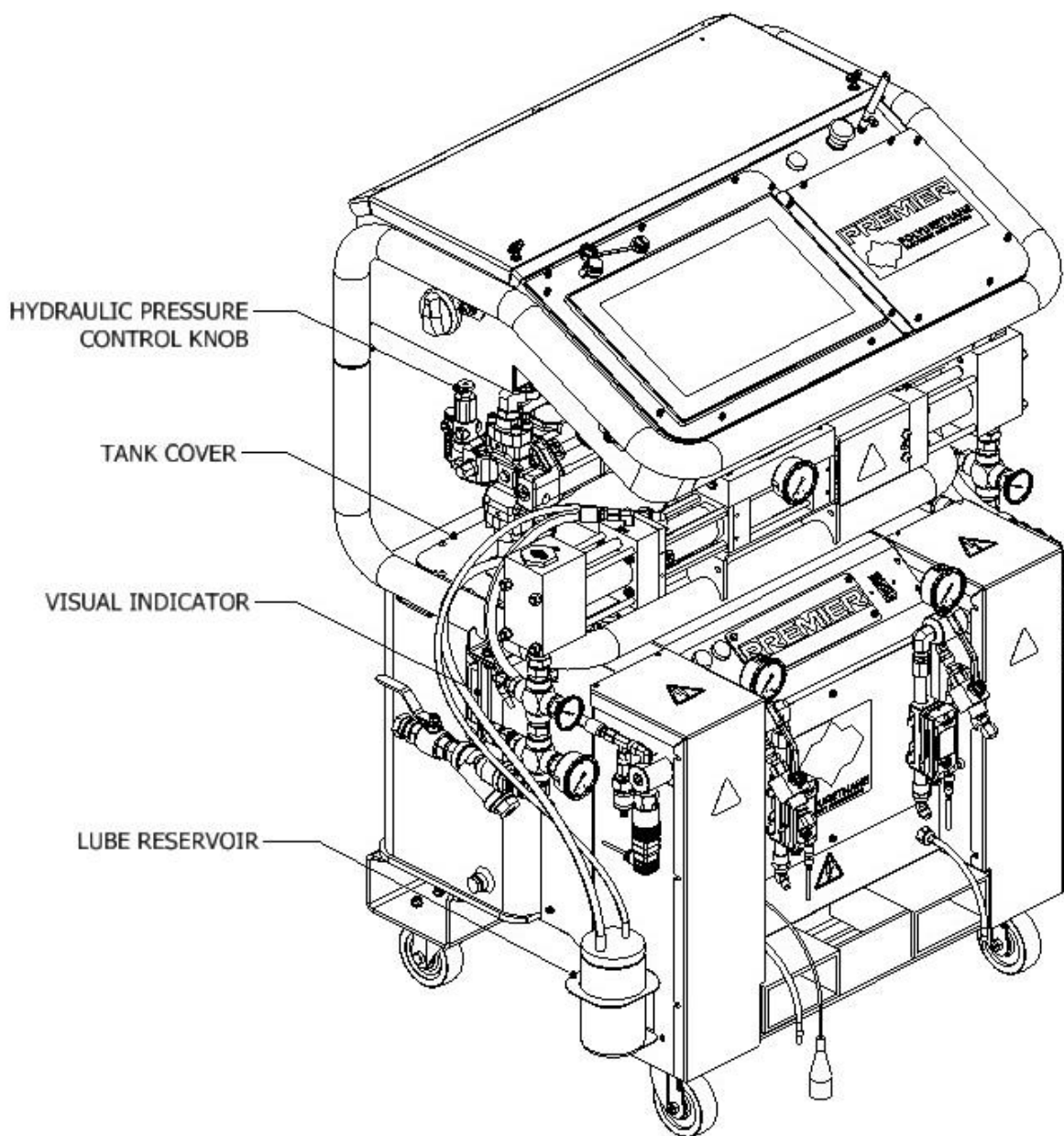


Figure 135: Installation

CAUTION! Ensure that the emergency stop is not engaged.

4. **Three Phase Proportioner Only:** Check the Electric Motor to ensure rotation is clockwise when viewing the end of the Electric Motor. A counterclockwise rotation indicates two of the incoming power leads need to be reversed.

CAUTION! Ensure Main Power Switch is OFF and incoming power/main disconnect is locked OFF before reversing power leads.

5. Recheck rotation before proceeding with Installation.
6. Fill the Lube Reservoir with PMC Pump Lube or suitable dilutants. It is not necessary to prime the system.

13.1 HEATED HOSE INSTALLATION

CAUTION! The material delivery Heated Hoses are color coded Red and Blue, allowing the user to recognize them. The Red corresponds to the Isocyanate (Iso, A) and the Blue to the Polyol (Poly, B). To avoid connection errors, the Coupling Connections of the Iso (A) and Poly (B) Heated Hoses are different sizes to ensure correct orientation.

NOTE! The material delivery Heated Hoses are capped at the ends to prevent absorbing moisture. Do not remove caps until the Heated Hoses are going to be installed on the Proportioner.

1. Lay out all the Heated Hose assemblies end to end aligning the Iso “A” (red) and Poly “B” (blue) and connect the respective Coupling Connections using the appropriately sized open-end wrench after ensuring Heated Hose assemblies lay flat.

CAUTION! Take care to not cross-thread or over-tighten the Coupling Connections. Thread seal tape or compound is not recommended for this tapered seat Coupling Connections.

2. Connect the material Heated Hoses to the outlets of the respective Heaters i.e., Iso (A) Heated Hose to the Iso (A) Heater and the Poly (B) Heated Hose to the Poly (B) Heater ensuring Heated Hose assemblies lay flat.
3. Connect Air Hose Coupling Connections.
4. Connect the Heated Hose power wires to the “Fast-Lock” Connector (Part# KT-00029A) coming from the Hose Heat Transformer as follows:
Loosen the Socket Head Set Screw to allow insertion of the Heated Hose electrical wire Terminal.
Insert the Terminal into the “Fast-Lock” Connector Body.
Securely tighten the Socket Head Set Screw.
Install electrical tape around Connector Body.

NOTE! A good practice is to add some dielectric grease (Permatex 67VR or equivalent) to the outside of the Terminal, where the electrical connection is made, prior to insertion.

5. Repeat the above steps to connect the “Fast-Lock” Connectors that you will find on all Heated Hose power wire.

CAUTION! Ensure the proper mechanical and electrical connections of the Heated Hoses are made to avoid possible material leakage and Hose heat problems.

6. It is recommended the TSU (Temperature Sensing Unit) be installed between the last section of Heated Hose and the Gun Whip. Carefully straighten the sensing wire, inserting it in the Iso (A) Heated Hose and tighten fluid fittings with appropriately sized open-end wrenches.

CAUTION! To protect the TSU sensor, you must pay special attention not to kink or excessively bend the Heated Hoses. Do not coil the Heated Hoses with a diameter of less than 4 feet (1.22 Meters).

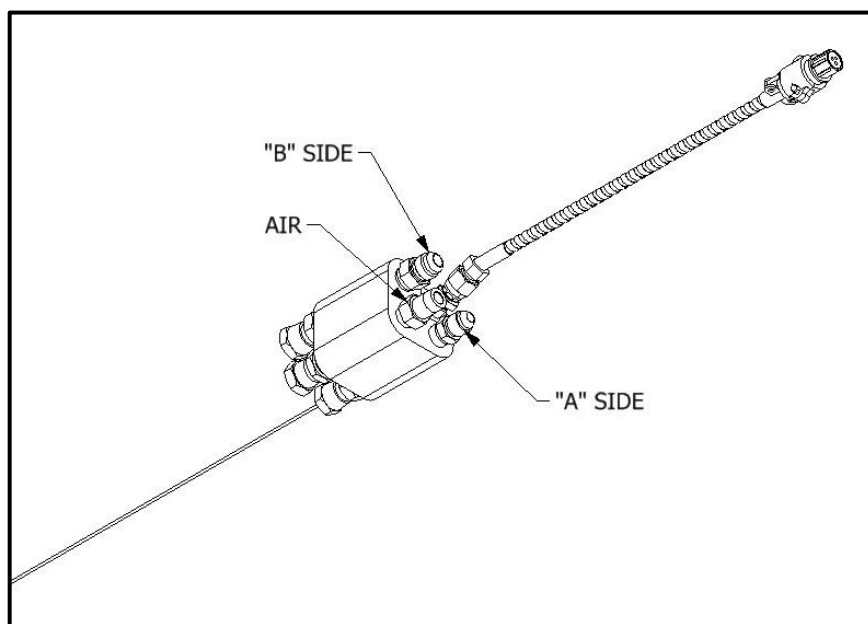


Figure 136: Temperature Sensing Unit

Part# EL-51A-4

Replacement Sensor Part# EL-51A-2

CAUTION! Connecting the TSU between the first and second section of Heated Hose results in the TSU sensing the material temperature exiting the Heater and not the inside of the Heated Hose near the Spray Gun.

7. Ensure the Manual Valves are CLOSED and connect the Coupling Block to the Heated Gun Whip.

CAUTION! Excessive force closing or opening the Manual Valves may result in damage to the Manual Valves and/or Coupling Block.

8. Connect the Transfer Pump/ Heated Hose Assemblies/Air Supply and Air Dryer systems as required. Review the Installation Instructions for each to ensure proper set-up and operation.
9. Install the Material Transfer Pumps as follows:

WARNING! If Transfer Pumps have been previously used, pay special attention to connect each Pump to its specific material. Inadvertently changing the Transfer Pumps will cause a chemical reaction rendering them useless.

NOTE! Placing a tape of the same color as of the Material Delivery Hoses (red for the Iso (A), blue for the Poly (B)) on each Transfer Pump would be a good method for minimizing errors in connection.

- A. Make sure that the Inlet Valves on the Proportioner are closed.
- B. Connect one end of the Polyol (B) Material Delivery Hose (3/4" thread) to the Proportioner Polyol (B) Inlet Valve and the other end to the Polyol (B) Transfer Pump.
- C. Connect one end of the Iso (A) Material Delivery Hose (1/2" thread) to the Proportioner Iso (A) Inlet Valve and the other end to the Iso Transfer Pump.
- D. Connect the air hose to the Transfer Pumps after ensuring each Transfer Pump Shut-Off Valve is CLOSED.

NOTE! To avoid errors in connection, the Coupling connections of the Iso (A) and Poly (B) Material Delivery Hoses are different sizes, making it difficult to swap connections.

- 10. Ground the Transfer Pump as recommend by the material supplier. The movement of product inside the Hoses can cause static electricity and produce electrical discharges.
 - a. Connect air to the airline coming off the first section of hose (90-110 psi, 6-8 bar)

13.2 HOSE HEAT TRANSFORMER

CAUTION! The Hose Heat circuit breaker needs to be off before working with the Hose Heat Transformer.

The Hose Heat Transformer offers the ability of connecting to different output voltages depending on the total length of the Heated Hose in use, maximizing the heating ability of the Heated Hose. The factory setting is 18 volts for use with 60 feet of Heated Hose. Before starting the Proportioner, ensure the setting matches the Heated Hose length installed. If Heated Hose sections are added or removed, the Tap setting should be changed to a setting which will limit the maximum amperage in the Heated Hose to 52 amps. The suggested settings are listed in the table below.

RECOMMENDED TAP SETTINGS		
Tap	Feet	Meters
120V	410	125
105V	360	109.7
90V	310	94.5
75V	260	79.2
60V	210	64
45V	160	48.8
30V	110	33.5
18V	60	18.3

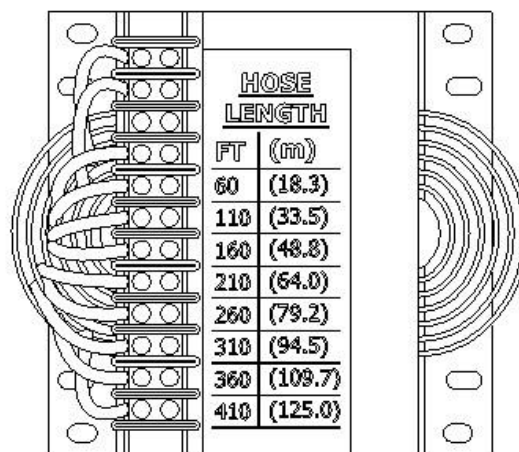
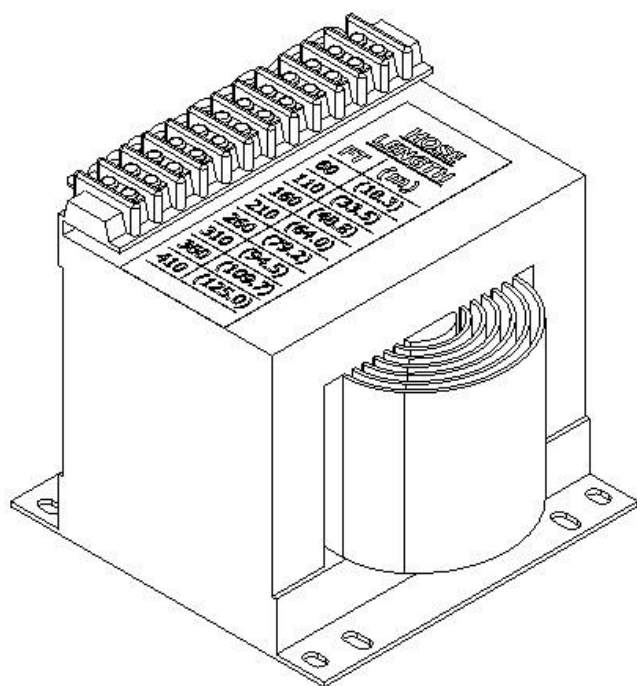


Figure 137: Premier (X) Transformer Tap Settings

*120V transformers (shown above) allow for a maximum hose length of 410 ft (125 m) and minimum length of 60 ft (18 m).

RECOMMENDED TAP SETTINGS		
Tap	Feet	Meters
72V	260	79.2
54V	210	64.0
36V	160	48.7

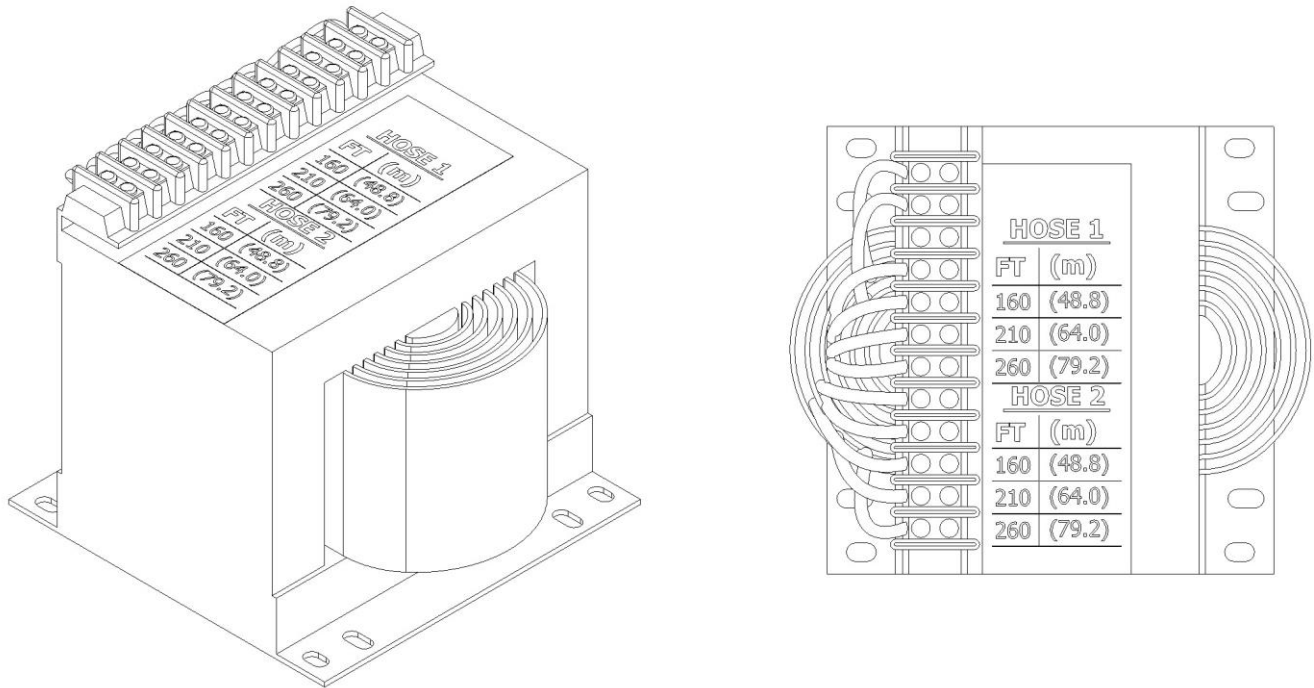


Figure 138: MACH 2 Transformer Tap Settings

*70V Dual Multitap transformers (shown above) allow for a maximum hose length of 260 ft (79 m) and minimum length of 160 ft (49 m).

14 START-UP

NOTE! Follow the recommended procedure in the order shown.

1. Check the lube fluid level and service as required.
2. Make sure the materials have been stored at the manufacturer's recommended temperature. Ask your material supplier for information (Safety Data Sheet) on the minimum storage temperature.
3. Y-Strainer screens should be checked routinely.
4. Connect air supply to the two Transfer Pumps and ensure Air Valves are in the fully OPEN position. OPEN both Proportioner Material Inlet Ball Valves.

CAUTION! Remove all Heated Hose sections from coiled storage and lay flat to eliminate heat build-up and possible Heated Hose failure.

5. Turn ON Main Power (See 22 on Page 26).
6. Turn ON Hose Heater (See 6.3.4 on Page 40) and confirm material set-point temperature as recommended by the material supplier or application conditions.

CAUTION! To avoid excessive pressure in the Proportioner, wait for the Hose Heater to reach its set-point temperature before continuing.

7. Turn ON each Primary Heater and confirm material set-point temperature as required by the material supplier or application conditions has been reached.
8. Turn ON Motor Power (See 6.3.6 on Page 41).
9. Set Pump Switch (See 6.3.5 on Page 41) to NORMAL. One of the Directional Indicator Lights will illuminate, indicating the Metering Pump direction, and the Metering Pump Shafts will begin to move.
10. Proceed with installation and start-up of the Spray Gun as per the gun manual.
11. Proceed to proportioner purging (Section 15 Page 90) before moving forward.

NOTE! The Material Pressure Gauges should be approximately equal and remain constant throughout the Metering Pump cycle. If not, refer to Trouble Shooting section.

15 PROPORTIONER PURGING

WARNING! Use suitable Personal Protection Equipment (PPE) and follow the recommendations in the Safety Information provided by product suppliers when installing or working with the unit.

WARNING! Do not turn the Temperature Controllers ON until the Proportioner purging procedure is complete and the Primary Heaters and Heated Hoses are filled with material.

NOTE! Before using the Proportioner it is necessary to purge the entire system, including Heated Hoses, of mineral oil left over from Quality Control testing and air. The following procedure is also followed to purge air entrapped by running out of material in the supply Drum/Reservoirs resulting in a significant indicated material pressure imbalance as indicated by the Pressure Gauges and sprayed material.

1. Ensure the following before proceeding:
 - a. Air supply to Transfer Pumps is 90 - 110 psi (6 - 8 bar).
 - b. Proportioner inlet ball valves are CLOSED.
 - c. All connections are tight.
 - d. Material should be stored to the material suppliers recommended temperatures.
 - e. Spray gun coupling block is installed and manual valves are closed.
2. Slowly OPEN the Poly (B) Transfer Pump Air Shut-Off Valve allowing Pump to cycle slowly as it fills the Material Delivery Hose to the Proportioner. Check for leaks.
3. OPEN Poly (B) Coupling Block Manual Valve over a waste container.
4. Slowly OPEN Proportioner Poly (B) Inlet Valve allowing Transfer Pump to move material through the system. When all spitting of air stops and all traces of mineral oil have disappeared, CLOSE Poly (B) Coupling Block Manual Valve. Clean Coupling Block.
5. Repeat steps 2 to 4 for Iso (A) side.

CAUTION! Properly dispose of all waste chemicals in accordance with all applicable local, state, and federal codes. DO NOT turn on the Auto Countdown Widget (6.3.2 Page 39) or the Pressure Balance Control Widget (Section 6.3.7 Page 41) until after full setup is complete.

- 6.** Turn Hydraulic Pressure Control (See 16 on Page 24) fully COUNTERCLOCKWISE.
- 7.** Turn ON Main Power (See 22 on Page 26). Green pilot will light.
- 8.** Turn ON Motor Power (See 6.3.6 on Page 41). Widget will light.
- 9.** Set Pump switch (See 6.3.5 on Page 41) to NORMAL. Turn Hydraulic Pressure Control CLOCKWISE increasing material pressure to 400 psi (28 bar). Both Material Pressure Gauges (See 5 and 6 on Page 24) should approximately read the same. Check all Heated Hose Coupling connections for leakage.
- 10.** Check all TSU connections for leaks.
- 11.** Bundle all Heated Hose Connections ensuring that there are NO kinks in the TSU Cable or Air Hose. Wrap with Electrical Tape to securely hold all components in place and minimize places for bundle to snag onto job site protrusions.

16 MACHINE STOP

16.1 IDLE

Follow the procedure below for temporary shutdowns, such as lunch breaks:

1. Set Pump Switch (See 6.3.5 on Page 41) to the OFF position.
2. Turn both "A" and "B" Heaters OFF. Hose Heater should remain ON. Never leave Proportioner ON if unattended.
3. CLOSE Spray Gun Manual Valves.

CAUTION! Excessive force opening or closing the Manual Valves may result in damage to the Manual Valves and/or Coupling Block.

16.2 SHUT DOWN

Follow the procedure below for shutdowns when work is **stopped for the day**:

4. Set Pump Switch (See 6.3.5 on Page 41) to the RETRACT position.
5. Spray off the application surface until Material Pressure Gauges (See Items 5 & 6 on page 24) read approximately 400psi.

CAUTION! To avoid possible Proportioning Pump Seal weepage, and moisture vapor drive into the Heated Hoses, the system pressure should not be reduced to zero. It is recommended to lower the system pressure to a minimum of 400 psi (28 bar).






6. CLOSE the Spray Gun Coupling Block Manual Valves.
7. Turn OFF Motor Power (See 6.3.6 on Page 41).
8. Turn OFF the A and B Heaters and Hose Heater (See 6.3.4 on Page 40).
9. If recording data, stop recording and save report (See 12.4 On Page 80).
10. Turn OFF the Main Power (See 22 on Page 26).
11. Disconnect the air supply to the two Transfer Pumps and CLOSE the Proportioner Material Inlet Valves.

CAUTION! Excessive force opening or closing the Manual Valves may result in damage to the Manual Valves and/or Coupling Block.

17 TROUBLESHOOTING

This Premier Series Proportioner has been designed and built to withstand severe working conditions with a high degree of reliability, provided that it is used in a suitable application by a properly trained operator. This chapter contains information on possible faults that may interrupt the operation of the Premier Series Proportioner. The information provided will serve as a guideline to detect and resolve problems. In any case, feel free to contact your authorized PMC distributor, where a qualified technician will advise you.

WARNING! Only qualified personnel should perform troubleshooting; unqualified personnel may cause damage to the unit and put the operator at risk.

	<i>To prevent possible injury caused by incorrect handling of the raw materials and solvents used in the process, carefully read the Safety Data Sheet (SDS) provided by your supplier. Deal with the waste caused according to current regulations.</i>
	<i>To avoid damage caused by the impact of pressurized fluids, do not open any connection, or perform maintenance work on components subject to pressure until the pressure has been completely eliminated.</i>
	<i>Use suitable protection when operating, maintaining or being present in the area where the equipment is functioning. This includes, but is not limited to, the use of protective goggles, gloves, shoes, and safety clothing and breathing equipment.</i>
	<i>The equipment includes components that reach high temperatures and can cause burns. Hot parts of the equipment must not be handled or touched until they have cooled completely.</i>
	<i>To prevent serious injury through crushing or amputation, do not work with the equipment without the safety guards installed on the moving parts. Make sure that all the safety guards are correctly reinstalled at the end of the repair or maintenance work of the equipment.</i>

WARNING! Before correcting any kind of defect, make sure the Main Power Switch is OFF and incoming power is locked OFF. NEVER access the inside of the Control Panel with the Proportioner power supply ON.

17.1 HEATERS

WARNING! Only qualified personnel should perform troubleshooting; unqualified personnel may cause damage to the unit, personnel, or property and put the operator at risk. The Heaters are components that reach high temperatures; you must wait until they cool before handling.

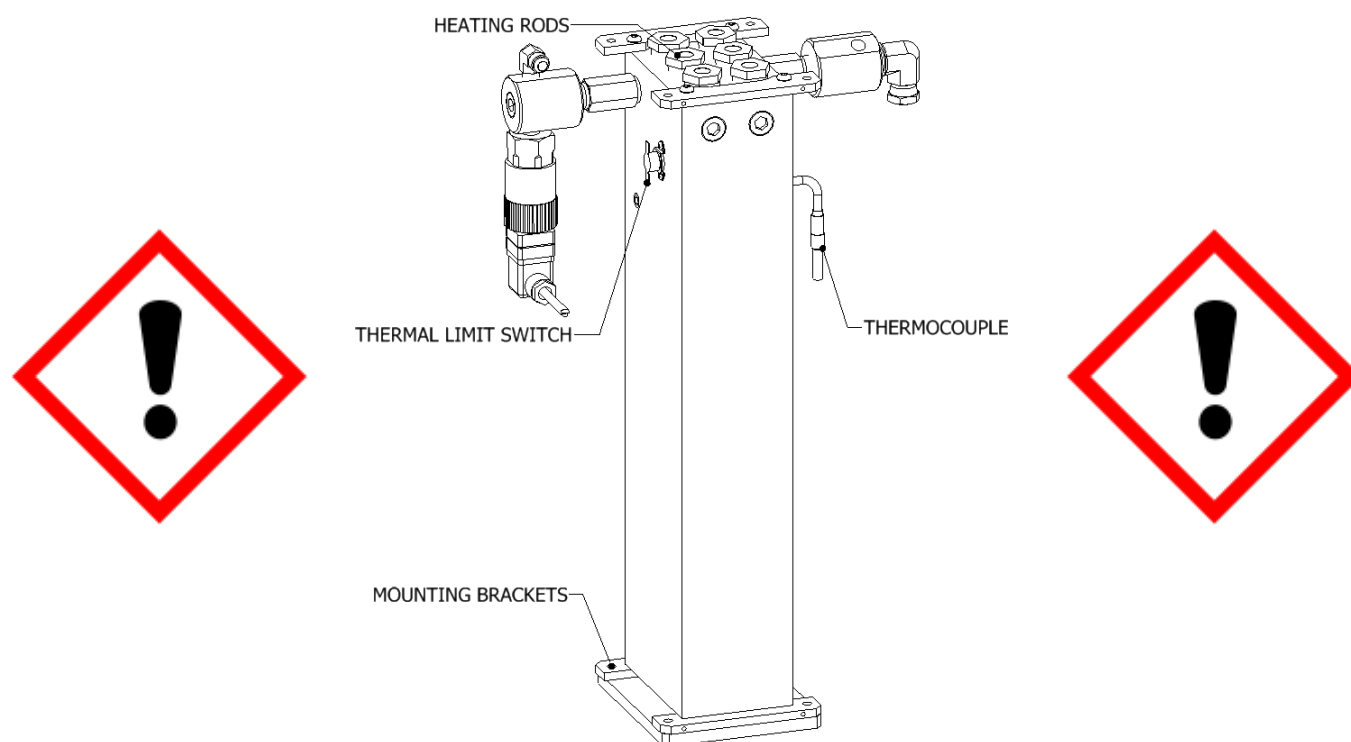


Figure 139: Heater

NOTE! The Thermal Limit Switch is a safety switch in contact with the Heater Body. If the surface temperature exceeds 220°F (109°C) the Limit Switch will shut off the Heater power. The Limit Switch will not reset until the temperature in the Heater is below 190°F (88°C). The system is designed that in case of an over temperature, a contactor located in the console will open and disable power to both Heaters and the Hose.

Frequent Heater Problems

Primary heater does not heat and the display on the PLC shows ambient temperature.	Page 95
Primary heater does not heat and the display on the PLC shows an error message.	Page 96
Primary heater controller shows excessive temperature, and the circuit has turned off.	Page 96
Primary heater Temperature drops excessively while spraying.	Page 96

Follow the recommended procedure in the indicated order to solve the problem and avoid unnecessary repairs. Make sure all Switches are in the correct position and Indicator Lights ON before determining the existence of a fault.

- **Problem:** Primary heater does not heat and the display on the PLC shows ambient temperature.

Solutions:

1. Check that the light on the heater widget is lit.

If the light is on, move to the next step.

2. Check the heater breaker in the main console. If tripped, reset the breaker. If it continues to trip, wrap a Clamp style multimeter around one of the wires coming off the breaker. If the Amperage reading does not exceed the rating of the breaker, the breaker needs to be replaced. If the breaker draws more than it is rated for (32A), the most likely cause is that one or more of the fire rods located in the heater are shorted.

If the breaker is not tripped, move on to the next step.

3. Open the console top and locate the solid-state relays for the heaters, looking over the console top from the front of the machine. There are two relays to the left bottom of the console, the one to the far left is for the “A” heater and the one to the right is for the “B” heater. With the heater on, look to see if an LED light is lit on the relay and heater widget (Section 7.1.2 Page 62).

If there is no LED light on the solid-state relay, move to the next step.

4. With a DC voltmeter read across position A1 and A2 on the solid-state relay (smaller wires) if you have a reading of 23-24 volts DC and the AC reading across L1 and L2 (Heavy wires) reads 208-230 volts AC replace the solid-state relay. With 23-24 volts DC at A1 and A2 the proper reading should be 1 volt AC across L1 and L2. A defective over temperature switch will open a contactor disabling both Heaters and the Hose.

If there is no DC voltage to the relay, move to the next step.

5. Check the M1 contactor to ensure it is activated. If not, inspect the contactor for failure.

If the M1 contactor is activated, move to the next step.

- **Problem:** Primary heater does not heat and the display on the HMI shows an error message.
Solutions:

1. Remove the heater cover and check that the thermocouple wires are secure to the harness going up to the controller.

If there are no loose connections replace the heater thermocouple.

- **Problem:** Primary heater widget shows excessive temperature, and the circuit has turned off.

CAUTION! The heater must be allowed to cool down before continuing.

Solutions:

2. Set the widget set point at least 20 degrees lower than the temperature shown. Briefly turn on the heater and look for the LED light on the solid-state relay and the heater widget to be on.

If the light is on the widget and not on the relay, replace the relay

If the light is on the relay but not the screen, contact your authorized PMC distributor for further assistance

- **Problem:** Primary heater Temperature drops excessively while spraying.

Solutions:

3. Temperature of the chemical in the containers is too cold.
4. Exceeding the flow rate specification of the machine. Use a smaller mixing chamber to reduce flow.
5. Disconnect power to the machine. One or more of the fire rods in the heater have malfunctioned. Remove the heater cover and disconnect the wires to measure the resistance across each rod. Installing a smaller mixing chamber in the gun may allow you to spray until a new rod(s) is installed.

CAUTION! If the rod that is used in conjunction with the thermocouple is defective, do not operate the heater until the rod is replaced.

Individual Ohm Measurement	
1500 WATT	31 OHMS
1750 WATT	27 OHMS

17.2 HYDRAULIC DRIVE SYSTEM

Frequent Hydraulic Drive System Problems

Hydraulic Pump does not develop pressure and the electric motor is not running.	Page 97
Hydraulic Pump does not develop pressure.	Page 98
Low or zero hydraulic pressure with unusual Hydraulic Pump noises.	Page 98

Follow the recommended procedure in the indicated order to solve the problem and avoid unnecessary repairs. Make sure all Switches are in the correct position and Indicator Lights ON before determining the existence of a fault.

WARNING! Only qualified personnel should perform troubleshooting; unqualified personnel may cause damage to the unit, personnel, or property and put the operator at risk. The Heaters are components that reach high temperatures; you must wait until they cool before handling.

CAUTION! Excessive force opening or closing the Manual Valves may result in damage to the Manual Valves and/or Coupling Block.

- **Problem:** Hydraulic Pump does not develop pressure and the electric motor is not running.

Solutions:

Motor Contactor Overload – The Electric Motor is protected from excessive current by an Overload Switch. After allowing the Motor to cool, open the Control Panel and reset Motor Contactor Overload.

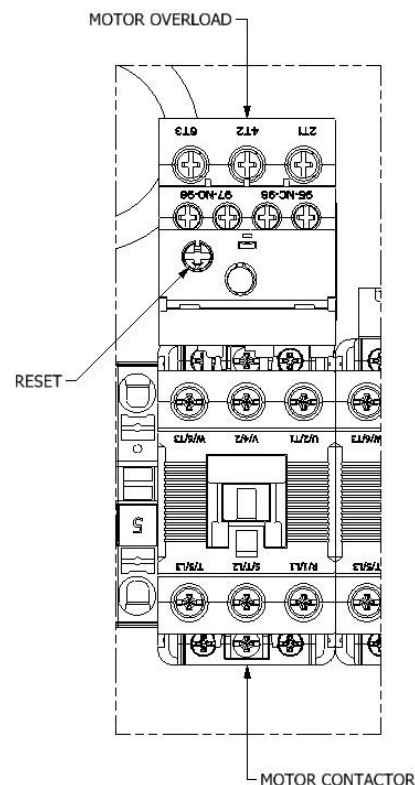


Figure 140 Motor
Overload & Contactor

- **Problem:** Hydraulic Pump does not develop pressure.

Solutions:

NOTE! Hydraulic pressure is not generated if the Motor Power Switch (See 6.3.6 on Page 41) is OFF or the Pump Switch (See 6.3.5 on Page 41) is in the OFF position.

Hydraulic Power Package - With the Pump Switch in the NORMAL position, the failure of the Hydraulic Pump to develop pressure is loss of pump suction (prime). To ensure positive prime, check the following:

Motor Rotation.

Hydraulic Reservoir is filled to the correct level.

Hydraulic Pump Case is filled with the proper hydraulic fluid.

Loose Inlet Plumbing: Check that all inlet plumbing to Hydraulic Pump is tight ensuring no air leakage into the hydraulic system.

-
- **Problem:** Low or zero hydraulic pressure with unusual Hydraulic Pump noises.

Solutions:

6. The use of an incorrect hydraulic fluid can result in unusual noises from the pump, excessive wear, and moisture absorption. Ensure the hydraulic oil used is from the list on page 53. In addition, continuous excessive hydraulic oil temperature as well as failure to change the hydraulic oil on a yearly basis will cause the oil to fail and result in excessive Hydraulic Pump wear and unusual noises.
7. Loose Inlet Plumbing: Check that all inlet plumbing to Hydraulic Pump is tight, ensuring no air leakage into the hydraulic system.

17.3 METERING PUMP LINE

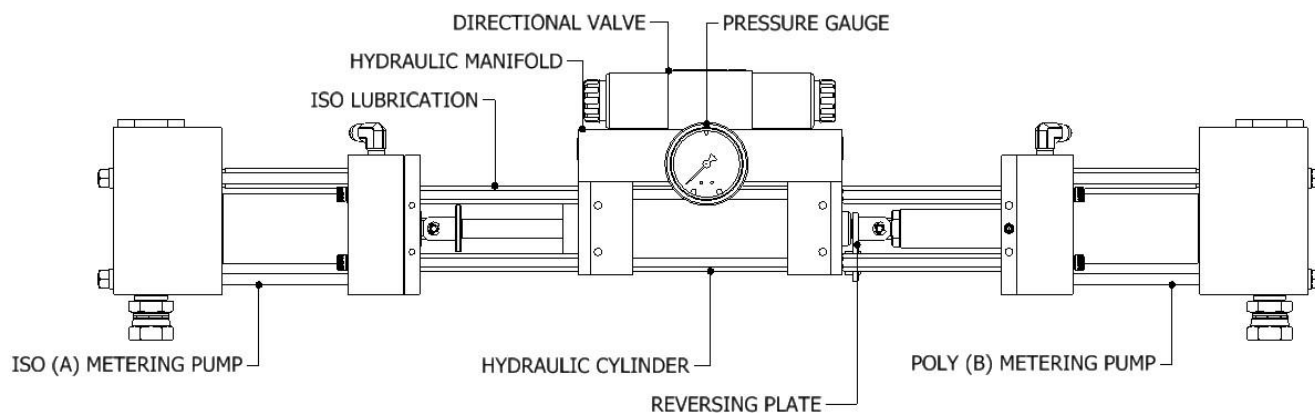


Figure 102: Metering Pump-Line

Frequent Pump-Line Problems

Metering pumps do not change direction and the pressures on both of chemical gauges are lower than normal.	Page 99
Cavitation.	Page 103
Pressure Loss: Discharge/Inlet Ball.	Page 103

Follow the recommended procedure in the indicated order to solve the problem and avoid unnecessary repairs. Make sure all Switches are in the correct position and Indicator Lights ON before determining the existence of a fault.

- **Problem:** Metering pumps do not change direction and the pressures on both of chemical gauges are lower than normal.

Solutions:

1. The Metering Pump Line has a Reversing Plate which actuates two Proximity Switches (EL-153), one at each end of the stroke. The Prox. Switches in turn actuate the appropriate Directional Valve Solenoid (HI-05003). Failure to make contact with either Prox. Switch may be caused by:
 - Deformation of the Reversing Plate.
 - Foreign material preventing the Reversing Plate from contacting the Prox. Switches.
2. Passing of the Reversing Plate beyond the Prox. Switch may be caused by:
 - Failure of the Prox. Switch and related components on the side of the over-run.
 - Failure of a component of the Directional Valve.
 - Mounting Plate (PU-07006) and/or Prox. Switch is out of adjustment.

NOTE! IF THE DIRECTIONAL INDICATOR ARROW (See 6.3.5 on Page 41) IS ON CHECK THE REVERSING VALVE COIL ON THE SIDE THAT THE ARROW IS ON. IF YOU HAVE 24 VOLTS DC AT THE PLUG, CHECK THE OHM'S RESISTANCE OF THE COIL, IT SHOULD READ APPROXIMATELY 19 OHMs, IF NOT REPLACE THE DIRECTIONAL VALVE. IF THE DIRECTIONAL LIGHT IS OFF PROCEED BELOW.

NOTE! BEFORE TROUBLESHOOTING, THE REVERSING PLATE MUST BE MOVED AWAY FROM THE SWITCH.

Bleed down the chemical pressures.

Ensure Pump Switch (See 6.3.5 on Page 41) is OFF.











Turn on the Motor Power (See 6.3.6 on Page 41).

Go to the Directional Valve and locate the Actuation Coils. Located in the middle of each coil is a small round tab that can be pushed in to manually shift the spool to move the pumps. If the Reversing plate is all the way to the left push in on the right- side coil. If it is all the way to the right side, push in on the left side coil.

WARNING! THE MOTOR MUST BE OFF AND THE PUMP SWITCH IN THE NORMAL POSITION.

- a. Take a small screwdriver or a thin piece of metal and move it across the front of each Prox. switch. A red light on the back of the switch should illuminate. If not, replace the switch that does not light.
- b. If the Prox. switches light up, turn off all power and check for continuity on both over pressure switches, pin 1 and 2.

3. Safety Pressure Switch - Each Metering Pump has a Safety Pressure Switch set to 2,250 psi. for # 120 pumps. When the material system reaches this pressure, the PLC will remove power from the Directional Valve and Directional Indicators (See 6.3.5 on Page 41). Lack of Directional Indicators along with high pressure indicated on one or both of the material Pressure Gauges (5, 6 , Section 5) is an indication of an over-pressure condition. The Safety Pressure Switches are a momentary design; when the pressure bleeds off the Metering Pump Line will resume normal operation. However, the cause of the over-pressure should be determined and corrected. The most common causes are:
- Cavitations of the Metering Pump on the **low-** pressure side causing high pressure on the opposite side.
 - A restriction in the Spray Gun on the **high-**pressure side.
4. Pressure/Material Imbalance - Troubleshooting this problem requires the applicator to:
- Know what the NORMAL spray pressures are for the application in progress.
 - Determine what material is NOT exiting the Mixing Chamber.
 - Read the Pressure Gauge on the problem side and interpret the reading.
 - Read the Ratio

Material Condition	"A" GAUGE	"B" GAUGE
NORMAL		
LACK OF ISO (A)		
LACK OF POLY (B)		
RESTRICTION OF ISO (A)		
RESTRICTION OF POLY (B)		

Material Condition MACH 2	GUN Ratio
NORMAL	Ratio Within Range
RESTRICTION OF ISO	Ratio Below Range
RESTRICTION OF POLY	Ratio Above Range

- **Problem:** Cavitation.

- Solutions:**

1. Cavitations occur when the Metering Pump (2 or 3, Section 5) requires a larger volume of material than the supply system (Transfer Pump) can furnish. This creates a “void” of material in the Metering Pump. The most common causes of cavitations are:
 - a. Material temperature too low causing increased material viscosity resulting in the inability of the Transfer Pump to maintain sufficient supply to the Metering Pump. This is most common with today’s blowing agents. Ensure the material temperature in the drums is no lower than the material suppliers’ recommendation.
 - b. Failure to vent the material drum while drawing material out with the Transfer Pump causes a vacuum and cavitations in the Transfer Pump. Ensure the drum is vented to the atmosphere or a Desiccated Air Dyer Kit is installed as recommended by the material supplier.
 - c. Insufficient air volume for Transfer Pump or a partially closed Transfer Pump Air Valve will limit the ability of the Transfer Pump to operate at its maximum capability.
 - d. Inlet Material Screen (21, Section 5) obstructed (See Section 18.2 Page 109).
 - e. Metering Pump Inlet Ball does not seat properly allowing material to flow back into the Material Delivery Hose when the Metering Pump is on the “Discharge” stroke. This causes the volume of material on that Metering Pump to be less on the discharge stroke resulting in intermittent off-ratio material and Pressure Gauge fluctuation.
-

- **Problem:** Pressure Loss: Discharge/Inlet Ball.

- Solutions:**

1. Simultaneous observation of the material Pressure Gauge (5 and 6, Page 24, Section 5) and Directional Indicator Arrow (Page 41, Section 6.3.5) is necessary to determine which direction the Metering Pump fails to maintain pressure. Refer to the chart to determine problem:

	Left Arrow ON	Right Arrow ON
Iso Pressure Gauge FALLS	Iso Inlet Ball does not seat properly	Iso Discharge Ball does not seat properly
Poly Pressure Gauge FALLS	Poly Discharge Ball does not seat properly	Poly Inlet Ball does not seat properly

In most cases the cause of a leaking Inlet/Discharge Ball is foreign material preventing the Ball from seating properly. If the above steps do not resolve the problem, replace the appropriate Ball. For service see section 18.5 METERING PUMP-LINE (Page 112).

17.4 HOSE HEATING

WARNING! Before correcting any kind of defect, make sure the Main Power Switch is OFF and incoming power is locked OFF. NEVER access the inside of the Control Panel with the Proportioner power supply ON. The Heated Hose are components which reach high temperatures; you must wait until they have cooled before handling.

CAUTION! Excessive force opening or closing the Manual Valves may result in damage to the Manual Valves and/or Coupling Block.

Hose Heating Problems

Heated Hose does not heat and the display on the screen shows ambient temperature.	Page 104
Hose does not heat and the display on the screen shows an error message.	Page 105
Hose will heat but does not come up to set temperature.	Page 106

Follow the recommended procedure in the indicated order to solve the problem and avoid unnecessary repairs. Make sure all Switches are in the correct position and Indicator Lights ON before determining the existence of a fault.

- **Problem:** Heated Hose does not heat and the display on the screen shows ambient temperature.
Solutions:

1. Check that the button is lit when the heater is turned on.
If the light is on, move on to the next step.
If the light is off, contact your authorized PMC distributor for further assistance.
2. Check the Hose Heat breaker in the main console and reset the breaker. If it continues to trip, wrap a clamp style multimeter around one of the wires coming off the breaker. If it does not draw more than the rated value of the breaker, the breaker needs to be replaced. **If the breaker is not tripped, move on to the next step.**
3. Check the circuit breaker mounted on the transformer and reset the breaker. If it continues to trip, wrap a clamp style multimeter around one of the wires from the transformer going to the heated hose. If it does not draw more than the rated value of the breaker, the tap setting on the hose transformer needs to be lowered.
If the Amp Draw is less than the rated value, move on to the next step.
4. Check that the tap setting on the transformer is set for the proper hose length.
If it is set correctly, move to the next step.

5. To check the secondary side of the transformer, you must take an AC volt reading across the two leads coming out of the transformer that are connected to the “A” and “B” hose leads. If you are reading voltage (your volt reading will vary depending on what tap setting is used), most likely the problem is in the heated hose. Either a connector has come loose or there is a broken wire.
6. Because the gun whip takes the most abuse, it is most likely the whip that has failed. Disconnect the crossover wires on the machine end of the whip hose and connect the two wires together coming off the 50' section. Turn on the hose heat and see if the hose heat circuit is operating; if so, replace the whip. To take a continuity reading through the heated hose, one of the leads from the transformer to the “A” or “B” heated hose must be disconnected.
If no voltage is coming out of the transformer to the heated hose, move onto the next step.
7. Open the front side of the transformer cabin (where the transformer is located) and locate the solid-state relay for the hose circuit (EL-35). With the hose turned on and the LED light illuminated on the relay, take a voltmeter (set on DC) and measure across position A1 and A2; your reading should be 24 volts. Then take an AC volts measurement across position L1 and L2 (heavy wires). With the relay functioning properly you should have a 1-volt Reading. If the Reading is 18 to 90 volts AC, the relay has malfunctioned and needs to be replaced. If the AC Reading across L1 and L2 is .025 volts check the over temperature switches in the heaters. A defective over temperature switch will open a contactor disabling both Heaters and the Hose. **If there is no light on the solid-state relay, move to the next step.**
8. Using a DC voltmeter, measure across pin OD5121-A2(-) on the PLC of the 107(+) terminal block. This is the output of the controller and sends power to the solid-state relay. Your reading will be **23-24 VDC**. If there is no voltage, check to make sure that the set temperature of the controller is above ambient temperature. **If there is no DC voltage to the relay, Contact your authorized PMC distributor for further assistance.**

-
- **Problem:** Hose does not heat and the display on the screen shows an error message “0”.
Solutions:

9. Check position TS3101-C7 (Purple Wire) and TS3101-D7 (Red Wire) on the PLC's temperature card for loose wires.
If the wires are tight, move to the next step.

WARNING! Make sure to turn the machine off before moving forward.

1. Remove the transformer cover and check that the thermocouple wires are secure to the harness going up to the controller. If there are no loose connections, disconnect the wire from the TSU and connect it directly to the thermocouple harness coming out of the hose transformer. **If the machine still shows the error, replace the hose thermocouple. If the error goes away and temperature is now shown on the screen, then all the TSU harnesses from the TSU to the transformer need to be checked for loose connectors or one or more of the harnesses defective.**

- **Problem:** Hose will heat but does not come up to set temperature.

Solutions:

1. Check the tap setting on the transformer to ensure that the correct position has been selected for the length of hose being used. Depending on the machines incoming voltage, you may have to move the tap setting higher (up one).

CAUTION! Do not exceed the amperage rating (63A) of the transformer hose breaker.






WARNING! Before correcting any kind of defect, make sure the Main Power Switch is OFF and incoming power is locked OFF. NEVER access the inside of the Control Panel with the Proportioner power supply ON.

17.5 PRESSURE BALANCE CONTROL

If the Pressure Balance Control is not working properly, Contact your authorized PMC distributor for further assistance.

18 MAINTENANCE

To achieve maximum output from the Premier Series Proportioner, a daily or regular maintenance schedule is required.

	<i>To prevent possible injury caused by incorrect handling of the raw materials and solvents used in the process, carefully read the Safety Data Sheet (SDS) provided by your supplier. Deal with the waste caused according to current regulations.</i>
	<i>To avoid damage caused by the impact of pressurized fluids, do not open any connection, or perform maintenance work on components subject to pressure until the pressure has been completely eliminated.</i>
	<i>Use suitable protection when operating, maintaining or being present in the area where the equipment is functioning. This includes, but is not limited to, the use of protective goggles, gloves, shoes, and safety clothing and breathing equipment.</i>
	<i>The equipment includes components that reach high temperatures and can cause burns. Hot parts of the equipment must not be handled or touched until they have cooled completely.</i>
	<i>To prevent serious injury through crushing or amputation, do not work with the equipment without the safety guards installed on the moving parts. Make sure that all the safety guards are correctly reinstalled at the end of the repair or maintenance work of the equipment.</i>

CAUTION! All repairs performed by unqualified personnel or the use of parts other than supplied by PMC may cause damage to the unit and put the operator at risk.



Hydraulic Proportioner

Rebuild Chemical Pumps

Check Hose Insulation

18.2 INLET MATERIAL SCREENS

Inspection of the Inlet Material Screens on a daily basis is no longer necessary as long as the following conditions are met.

1. Material drums are stored within the recommended material storage temperature range and drums are not opened prior to installing the Proportioner Material Transfer Pumps.
2. Desiccant air dryers are used to dry replacement air as material is removed from the drums to the Proportioner.
3. Consolidation of old material into a common drum for use is minimized, especially the Iso (A).

If the above conditions are met, inspection of the Inlet Material Screens may be done on a **bi-weekly** basis.

NOTE! Inspect and clean Inlet Material Screens before Proportioner start-up. They should not be cleaned after the days' operation as the Proportioner should be purged (see page 90) immediately after inspection and cleaning. This is to reduce the risk of moisture contamination, contamination through the reaction with the solvent used in the cleaning operation, and cross-over at the Spray Gun due to air entrapment.

CAUTION! Make sure the Main Power Switch is OFF and incoming power is locked OFF.

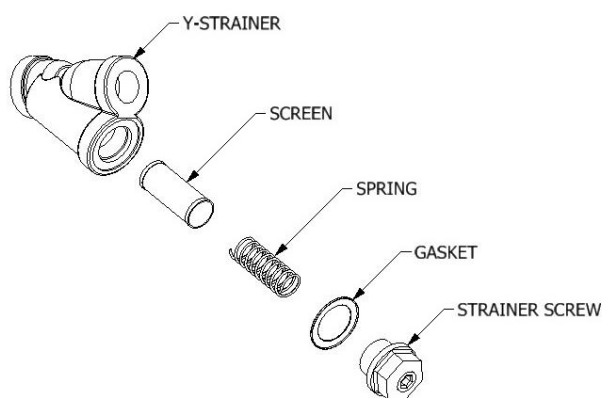


Figure 141: Inlet Strainer Components

1. CLOSE the Poly (B) Proportioner Inlet Valve.
2. Place a suitable container under the Material Inlet Strainer to collect the residual material. Carefully loosen the Strainer Nut to drain material into the container.
3. Completely unscrew the Strainer Nut.
4. Remove the Seal, Spring and Screen and clean them with a suitable solvent. Dry the parts and ensure the Screen is not obstructed. Replace the Screen if more than 20% of the Screen surface is obstructed by residue.
5. Reinstall the Screen, Spring and Seal. Grease the threads and screw on the Strainer Nut.

6. OPEN the Poly (B) Proportioner Inlet Valve, pressurize the Material Transfer Pump, check for leaks, and wipe Y-strainer clean.
7. Repeat above for the Iso (A) side.
8. Proceed with Proportioner Purging operation (See page 90).

18.3 ISO LUBRICATION SYSTEM

DAILY: Check the condition of the PMC Lube Oil in the Iso Lube Reservoir. Replace the PMC Lube Oil if you see significant changes in the color or signs of solidification. Ensure inside of Reservoir is wiped clean.

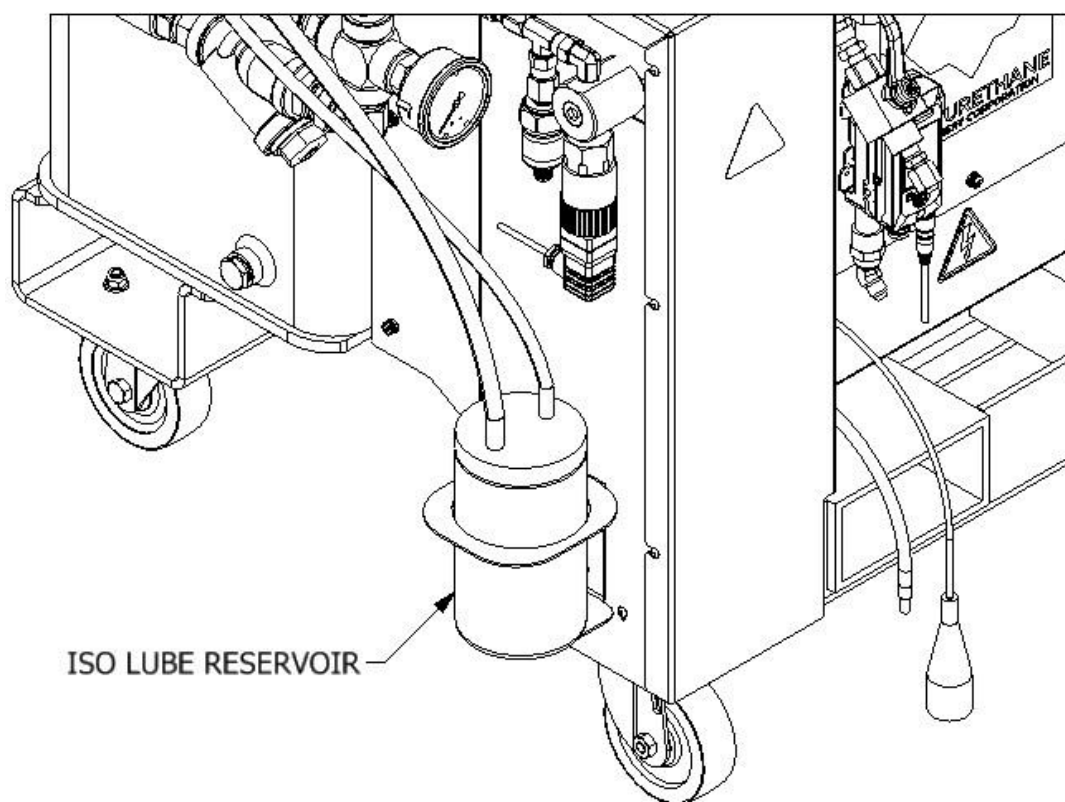


Figure 142: ISO Lubrication System

To replace the Lube Oil, proceed as follows:

1. Remove the Lube Reservoir from its support, unscrew the Lid and remove the Check Valve from the Suction Hose.
2. Empty the contaminated Lube Oil in a waste container and refit the Check Valve in the Suction Hose.

NOTE! Valve is directional.

4. Clean the Reservoir, refill with Lube Oil, and screw on the Lid and place the Reservoir in its support.

NOTE! The system is auto-suction and does not need priming.

18.4 HYDRAULIC DRIVE SYSTEM

WARNING! Before performing any maintenance, make sure the Main Power Switch is OFF and incoming power is locked OFF. The Hydraulic Unit is a component that works under pressure. Do not open any connection or carry out maintenance on components subject to pressure until all pressure has been bled to zero.

The hydraulic unit should be serviced yearly:

3. Completely drain the Tank of hydraulic fluid.
4. Clean the Tank Top to prevent foreign material from falling into the Tank when the Cover is removed.
5. Unscrew the Suction Pipe from its connection with the Hydraulic Pump.
6. Remove the Cover and Suction Pipe from the Hydraulic Tank. Take care not to damage Tank Cover Gasket.
7. Inspect the bottom of the Tank for sediment and clean as required. Clean the Suction Pipe and its connections.
8. Fill the Tank with 16 gal (61 L) of approved hydraulic fluid (See page 116 for recommendations).
9. Insert the Suction Pipe into the Tank Cover and install the Cover. Again, take care not to damage Tank Cover Gasket. Connect the Suction Pipe securely to the Hydraulic Pump.
10. Ensure the Hydraulic Pump Case is full of fluid and proceed with the normal operation.

18.5 METERING PUMP-LINE

WARNING! Before performing any maintenance, make sure the Main Power Switch is OFF and incoming power is locked OFF. Allow material temperature to cool below 80°F and bleed all material pressure to zero.

Weekly: When the Proportioning Pumps are functioning properly it is not unusual for a small amount of Poly (B) material to appear on the Pump Shaft. This material should be wiped away, so dirt does not accumulate on the Pump Shaft and the Pump Shaft Packings are not damaged.

Yearly or as required: It is not unusual for those who use the Premier Series Proportioner on a regular basis to rebuild the Proportioning Pumps on a yearly basis and service the Hydraulic Drive System (See page 111) at the same time, while the Proportioner is out of service.

18.6 PUMP BASE SERVICE

1. The Metering Pump Line has a Reversing Plate which actuates two Proximity Switches (EL-153), one at each end of the stroke. The Prox. Switches in turn actuate the appropriate Directional Valve Solenoid (HI-05003). Failure to make contact with either Prox. Switch may be caused by:
Deformation of the Reversing Plate.
2. CLOSE appropriate proportioner inlet material supply valve and remove airline from transfer pump.
3. Ensure all material pressure in the Proportioner system is zero and remove appropriate Retainer Nut.
4. For Inlet Ball
Remove Inlet Ball with a magnet (DO NOT use any sharp object), clean Ball and Ball Seat, and inspect for foreign material and any damage on the Inlet Ball.
Using supplied Ball Seat Tool (TL-02), check for proper Ball Seat Gasket compression. Snug Seat up to 1/4 turn maximum 110ft-lbs (149Nm).
5. For Discharge Ball:
Remove Cage and Spring.
Remove Discharge Ball with a magnet (DO NOT use any sharp object), clean Ball and Ball Seat, and inspect for foreign material and any damage on the Discharge Ball.
Using supplied Ball Seat Tool (TL-02), check for proper Ball Seat Gasket compression. Snug Seat up to 1/4 turn maximum 30ft-lbs (41Nm).

18.7 PUMP SEAL REPLACEMENT

NOTE! Refer to Parts Identification for reference.

1. When the Iso (A) Proportioning Pump Cylinder is disassembled for service, all parts included in the Pump Rebuild Kit (KT-07000, KT-07002, KT-07004, KT-07006) should be replaced.
2. When the Poly (B) Proportioning Pump Cylinder is disassembled for service, all parts included in the Pump Rebuild Kit (KT-07001, KT-07003, KT-07005, KT-07007) should be replaced.
3. When assembling Proportioning Pump lubricate all Seals, Piston Rod and Pump Cylinder with #1 Lithium Grease to assist in assembly and minimize Seal damage during re-assembly.
4. When the Pump Base is disassembled for service, all O-rings included in the O-ring Kit (KT- 05009) should be replaced.
5. After reassembly of the Proportioning Pumps torque the Assembly Bolts to 30ft-lbs (41Nm).

CAUTION! Use wooden or plastic tools or a brass brush for cleaning. Do not use metal or abrasive tools that can scratch the contact surfaces.

18.8 METERING PUMP REMOVAL

NOTE! When removing the Poly side pump, skip steps 3 and 4.

1. Put machine in retract position.
2. Turn off main power and discharge all pressure gauges to zero.
3. Disconnect the bottom elbow on the Iso lube cylinder and drain all Iso lube.
4. Disconnect the top hose going to Iso lube cylinder then uninstall red plug.
5. Remove clevis pin.
6. Disconnect the hose on the pump flange.
7. Disconnect the Y-strainer from elbow.
8. Carefully remove the four bolts and washers while holding the pump in place.

18.9 MATERIAL HEATER

WARNING! Before performing any maintenance, make sure the Main Power Switch is OFF and incoming power is locked OFF. NEVER access the inside of the Control Panel with the Proportioner power supply ON. The Heaters are components that reach high temperatures; you must wait until they have cooled before handling and bleed all material pressure to zero.

18.10 THERMOCOUPLE REPLACEMENT

NOTE! The Thermocouple is assembled into the Connector Body with a Ferrule and Nut. Once inserted into the Body and the Nut is tightened, the Ferrule locks to the Thermocouple and does not allow it to be relocated or moved. The location of the Thermocouple is very important and must be done correctly before tightening the Nut.

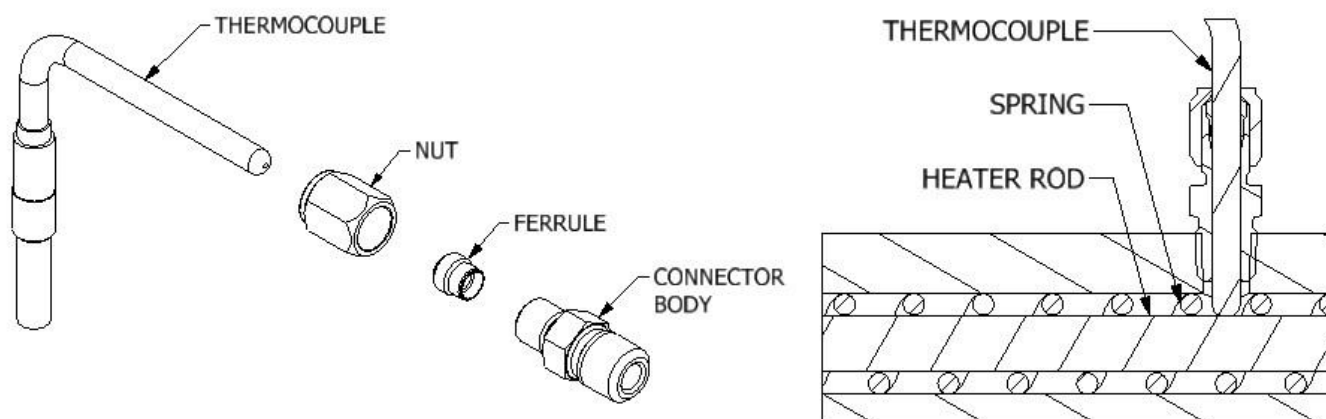


Figure 143: Thermocouple Identification

1. Unscrew the Nut that holds the defective Thermocouple and remove from the Body. Disconnect Thermocouple wiring located under the Top Cover of the Heater. Remove Body and discard.
2. Install Heating Element and Spring if also removed.
3. Install Connector Body into Heater using an open-end wrench and tighten to prevent leakage. Teflon Tape or appropriate Thread Sealant should be used.
4. Slide the Nut and the Ferrule over the Thermocouple and insert this assembly into the Connector Body until it comes **into positive physical contact** with the Heating Rod. Make sure the Spring does not prevent the Thermocouple from making contact with the Heating Rod.
5. Slowly tighten the Nut using an open-end wrench, ensuring the Thermocouple maintains positive physical contact with the Heating Rod.
6. Reinstall the Thermocouple wires.

WARNING! Before performing any maintenance, make sure the Main Power Switch is OFF and incoming power is locked OFF. NEVER access the inside of the Control Panel with the Proportioner power supply ON. The Heaters are components that reach high temperatures; you must wait until they have cooled before handling and bleed all material pressure to zero.

To replace a defect Heating Rod, proceed as follows:

1. Ensure Main Power Switch is OFF and incoming power is locked OFF. Depressurize proportioner and remove the Cover on Heater.

WARNING! If the Heating Rod to be replaced is the one in contact with the Thermocouple, it is necessary to remove the Thermocouple first. Do not loosen or tighten Thermocouple Body.

2. Disconnect the suspect Heating Rod from the wire connections and test the Heating Rod again for proper electrical resistance.

Heating Rod	Ohm Measurement per Rod	Total Ohm Measurement per Fluid Side
1500 WATT	32.4 Ω	10.8 Ω
1750 WATT	27.5 Ω	9.2 Ω

3. Unscrew the Heating Rod and remove from the Heater Block along with its Spring and inspect; it must be smooth and shiny in appearance. If it is blackened or has material adhered to it replace the Heating Rod, even if ohm reading is acceptable.
4. Apply Teflon Tape or appropriate Thread Sealant to the Heating Rod thread and assemble Heating Rod and Spring into the Heater Block. Tighten securely to 110 ft/lbs. (150 Nm)
5. If necessary, carefully re-install Thermocouple ensuring positive physical contact with the Heating Rod. Make sure the Spring does not prevent the Thermocouple from making contact with the Heating Rod. Tighten Nut with open-end wrench.
6. Reconnect wire connections and replace Cover.
7. Ensure Heater is full of material prior to electrical testing.

19 HYDRAULIC OIL SPECIFICATIONS

Recommended Hydraulic Oil Specification:

ISO/ASTM Viscosity Grade 32

Viscosity:

28.8 – 35.2 SSU at 104°F Rust and Oxidation Inhibited

19.1 MANUFACTURERS

Recommended	
Company	Oil
Mobil	DTE24

Alternative	
Company	Oil
Cook's	Albavis 8
Ashland	Valvoline AW15
Shell	Tellus 32(25)
Sun Oil	SunVis 706
Chevron	ISO32
American Oil & Supply	PQ Iso 32
Gulf Oil	Harmony 32AW (43AW)
Atlantic Richfield	Duro AWS-150
BP Oil	Energol HLP-C32
Exxon	Nuto H-32(44)
Margolis	T.I.P.100-15-7
Fiske Bros.	Lubriplate Hyd. #0
SW	Alemite Hydraulic HD #0
Texaco	Rando HD32 (HD A0)
White & Bagley	EP Hyd. 150

20 PARTS IDENTIFICATION

NOTE! ASSEMBLIES THAT DO NOT STATE PREMIER (X) OR MACH 2 ARE USED FOR BOTH

20.1 FRAME ASSEMBLY

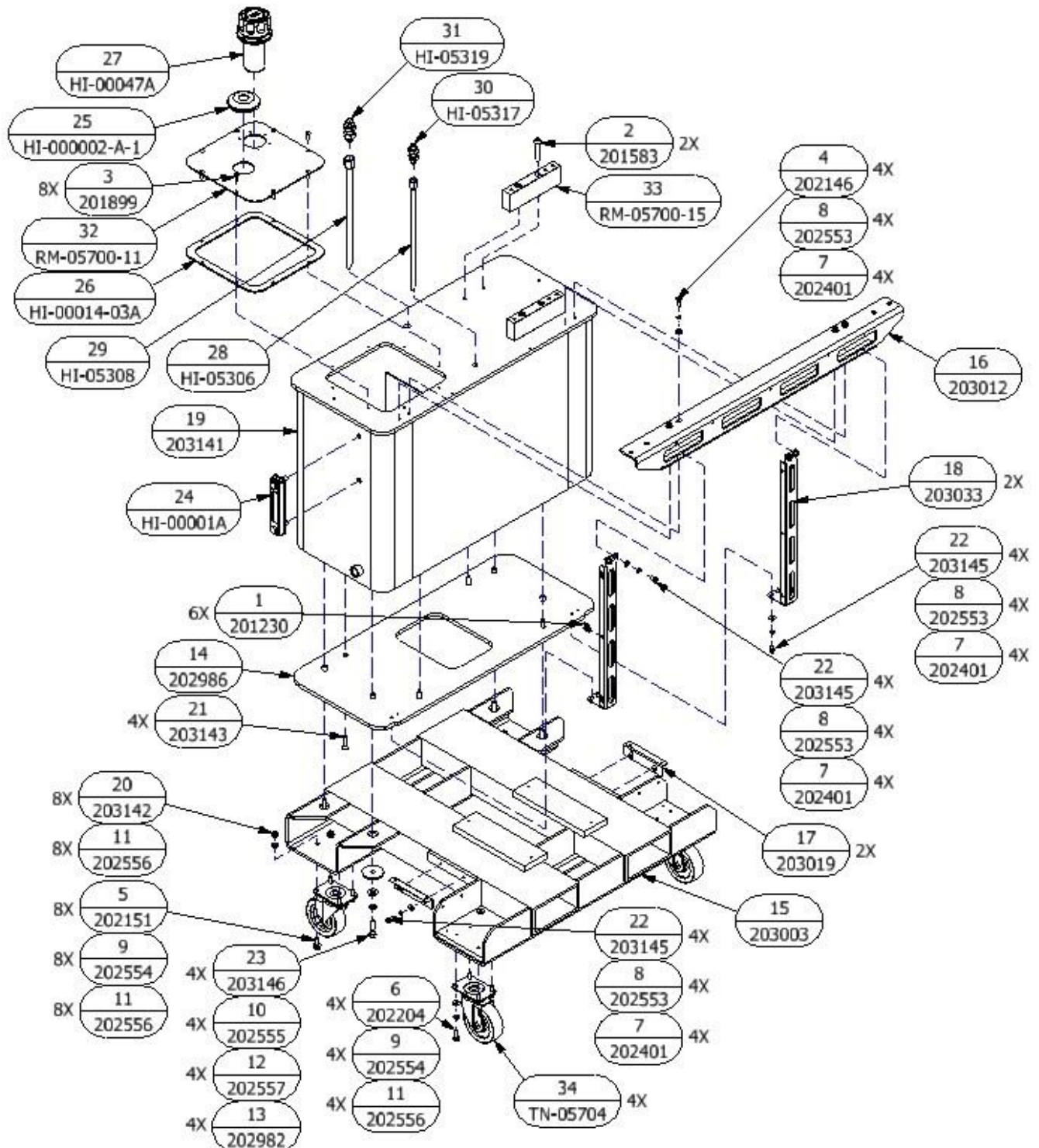


Figure 144: Frame Assembly (203097)

A SINGLE PUMP ASSEMBLY (PU-05001-120)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	201230	RECEPTACLE, 82 QUARTER TURN	6
2	201583	SHCS, 3/8-16 x 2, 18-8 SS	4
3	201899	BHCS, 1/4-20 x 0.75, 18-8 SS	8
4	202146	HHCS, 1/4-20 x 0.750, ZP8	4
5	202151	HHCS, 5/16-18 x 1.000, ZP8	8
6	202204	HHCS, 5/16-18 x 0.875, ZP8	8
7	202401	WASHER, FLAT, SAE, 1/4, ZP	16
8	202553	WASHER, LOCK, 1/4, ZP	16
9	202554	WASHER, LOCK, 5/16, ZP	16
10	202555	WASHER, LOCK, 3/8, ZP	4
11	202556	WASHER, FLAT, SAE, 5/16, ZP	24
12	202557	WASHER, FLAT, USS, 3/8, ZP	4
13	202982	WASHER, TANK MOUNT, PREMIER	4
14	202986	TANK MOUNT ASSY, PREMIER	1
15	203003	WELDMENT, BASE FRAME, PREMIER	1
16	203012	SUPPORT, PUMP FRAME, PREMIER	1
17	203019	SUPPORT, BASE COVER, PREMIER	2
18	203033	SIDE COVER SUPPORT, PREMIER	2
19	203141	WELDMENT, TANK, PREMIER	1
20	203142	NUT, NYLOC, 5/16-18, ZP	8
21	203143	FHCS, 3/8-16 x 1.250, ZP	4
22	203145	HHCS, 1/4-20 x 0.500, ZP5	12
23	203146	HHCS, 3/8-16 x 1.500, ZP8	4
24	HI-00001A	SIGHT GAUGE, TANK	1
25	HI-000002-A-1	GROMMET MODIFIED 1"	1
26	HI-00014-03A	TANK TOP GASKET	1
27	HI-00047A	HYDRAULIC FILL STRAINER, CAP M	1
28	HI-05306	TANK PUMP DRAIN TUBE	1
29	HI-05308	TANK DISCHARGE TUBE	1
30	HI-05317	BULKHEAD UNION, STRT, -06 JIC, STL	1
31	HI-05319	BULKHEAD UNION, STRT, -08 JIC, STL	1
32	RM-05700-11	LID, TANK	1
33	RM-05700-15	MOTOR MOUNT BARS	2
34	TN-05704	4" SWIVEL CASTER	4

20.2 PROX SENSOR ASSEMBLY

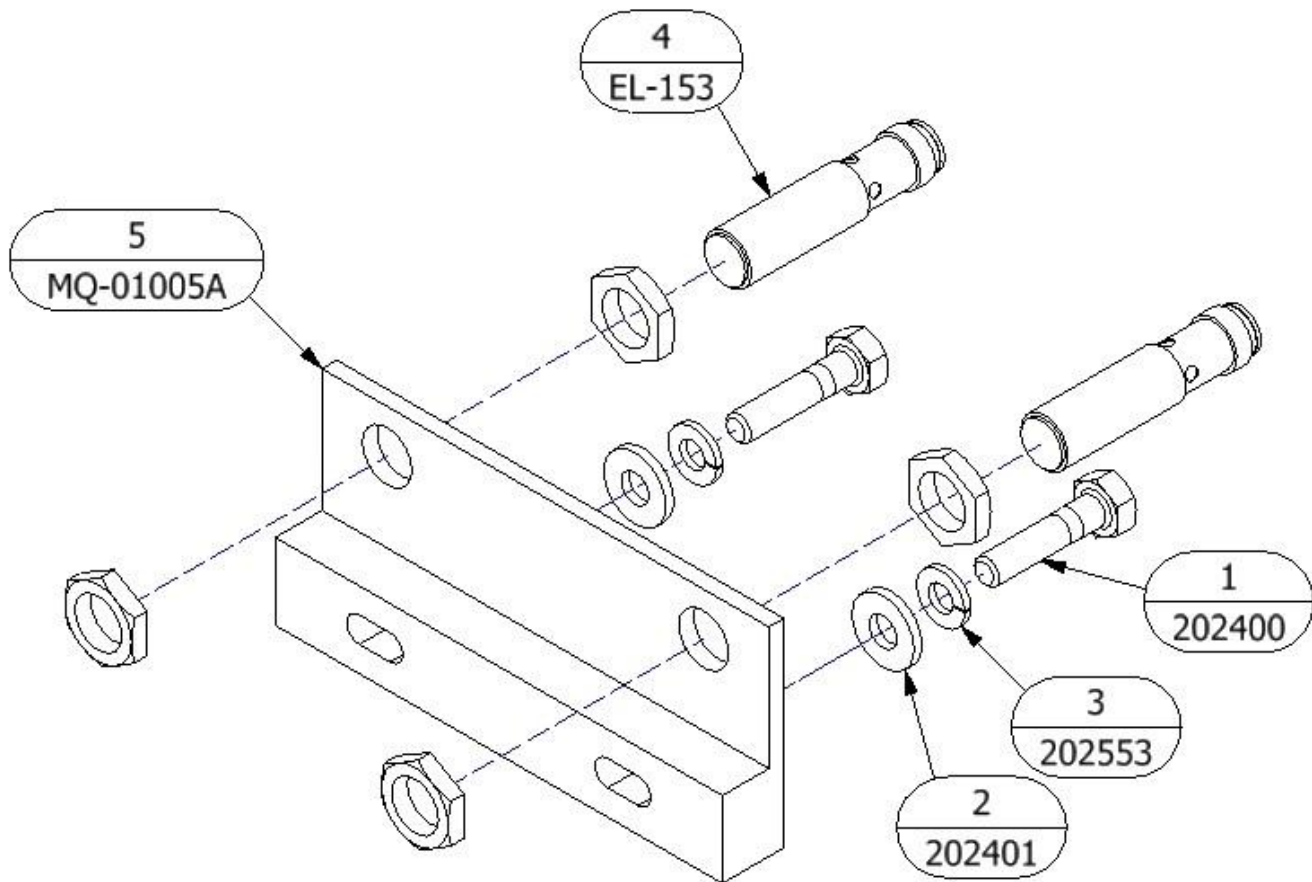


Figure 145: Prox. Sensor Assembly (RM-230)

PROX SENSOR ASSEMBLY (RM-230)			
ITEM	QTY	PART NUMBER	DESCRIPTION
1*	2	202400	HHCS, 1/4-20 X 1.25, ZP GRD 5
2*	2	202401	WASHER, FLAT, SAE, 1/4, ZP
3*	2	202553	WASHER, LOCK, 1/4, ZP
4	2	EL-153	12MM PROX SWITCH
	4		M12 X 1.75 JAM NUT
5	1	MQ-01005A	REVERSING SWITCH, MTG PLATE

* Indicates parts not included in RM-230 assembly, hardware located in final assembly.

20.3 PUMP-LINE ASSEMBLY

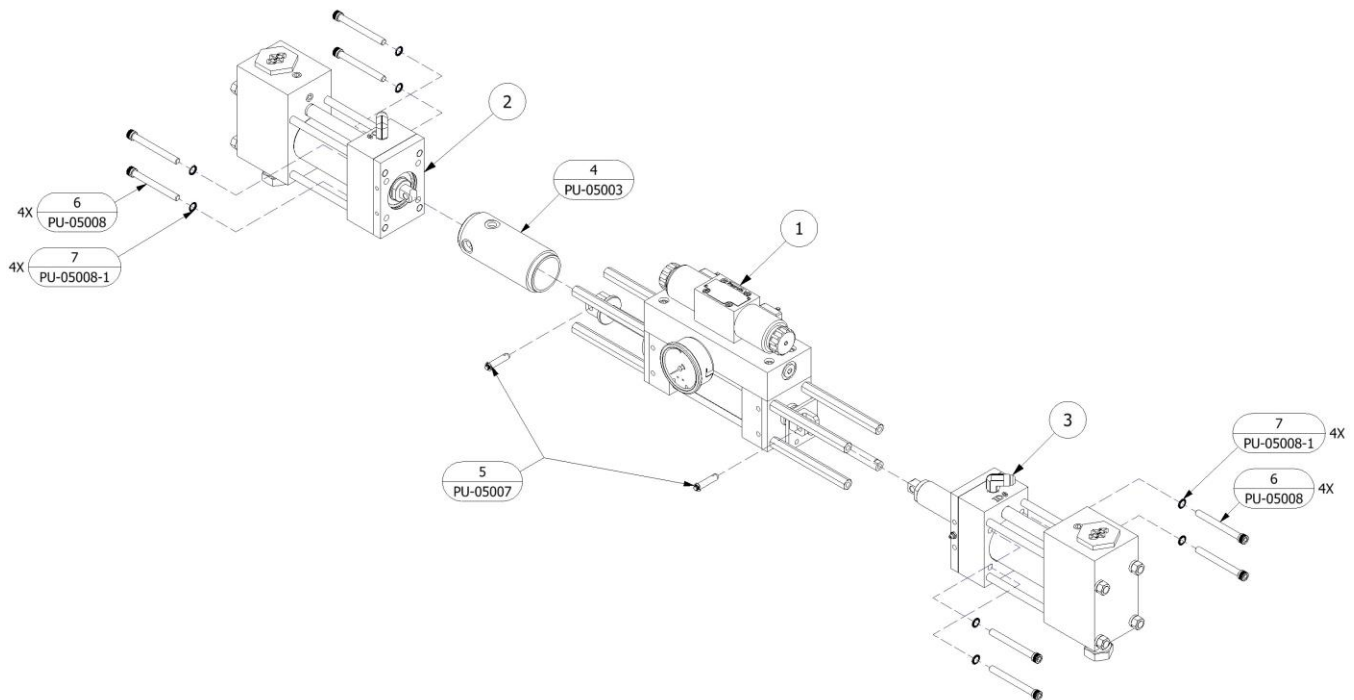


Figure 146: Pump-Line Assembly (PL-1A)

PUMP LINE ASSEMBLY - LOW PRESSURE (PL-1A)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	HI-01	HYD CYL ASSY, PH(X)-25/40	1
2	PU-05001-XXX	"A" PUMP ASSEMBLY, SIZE XXX	1
3	PU-05002-XXX	"B" PUMP ASSY, SIZE XXX	1
4	PU-05003	LUBE CYLINDER	1
5	PU-05007	PIN, CLEVIS W/ CLIP	2
6	PU-05008	SHCS, 5/16-24 x 3.000, BO	8
7	PU-05008-1	WASHER, SERRATED, 5/16, BO	8

20.3.1 PUMP BASE REBUILD KITS

PUMP BASE REPAIR KIT, SPLIT SLEEVE (202355)		
QTY	PART NUMBER	DESCRIPTION
1	200706	CHECK VALVE REMOVAL TOOL, PUMP
1	202228	PIPE PLUG 1/4-18, 7/8 TAPER
1	HI-05067	O-RING, -028, VITON, 90D
1	OR-00045A	O-RING, -218, TEFLON, 55D
1	OR-00051B	GASKET, INLET BALL SEAT
1	PU-01003-DG	GASKET, DISCHARGE BALL SEAT
1	PU-01003-IG	SEAT, INLET
1	PU-05019	BALL, INLET
1	PU-05020	SPRING
1	PU-05021	GASKET, PUMP RETAINER NUT
1	PU-05023-1	SEAT, DISCHARGE
1	PU-05024	BALL, DISCHARGE
1	PU-05025	TOOL, BALL SEAT REMOVAL
1	TL-02	O-RING -218, AFLAS 80D

PUMPLINE, O-RING KIT (KT-05009)		
QTY	PART NUMBER	DESCRIPTION
4	OR-00011A	O-RING, 12 X 12MM ID
4	OR-00020A	O-RING, -133, VITON, 90D
2	OR-00044A	O-RING, -218, AFLAS, 80D
2	OR-00046A	GASKET, CYLINDER FLANGE
1	OR-00051B	O-RING -024
2	PU-01013A	O-RING -136, VITON

20.4 HYDRAULIC CYLINDER ASSEMBLY

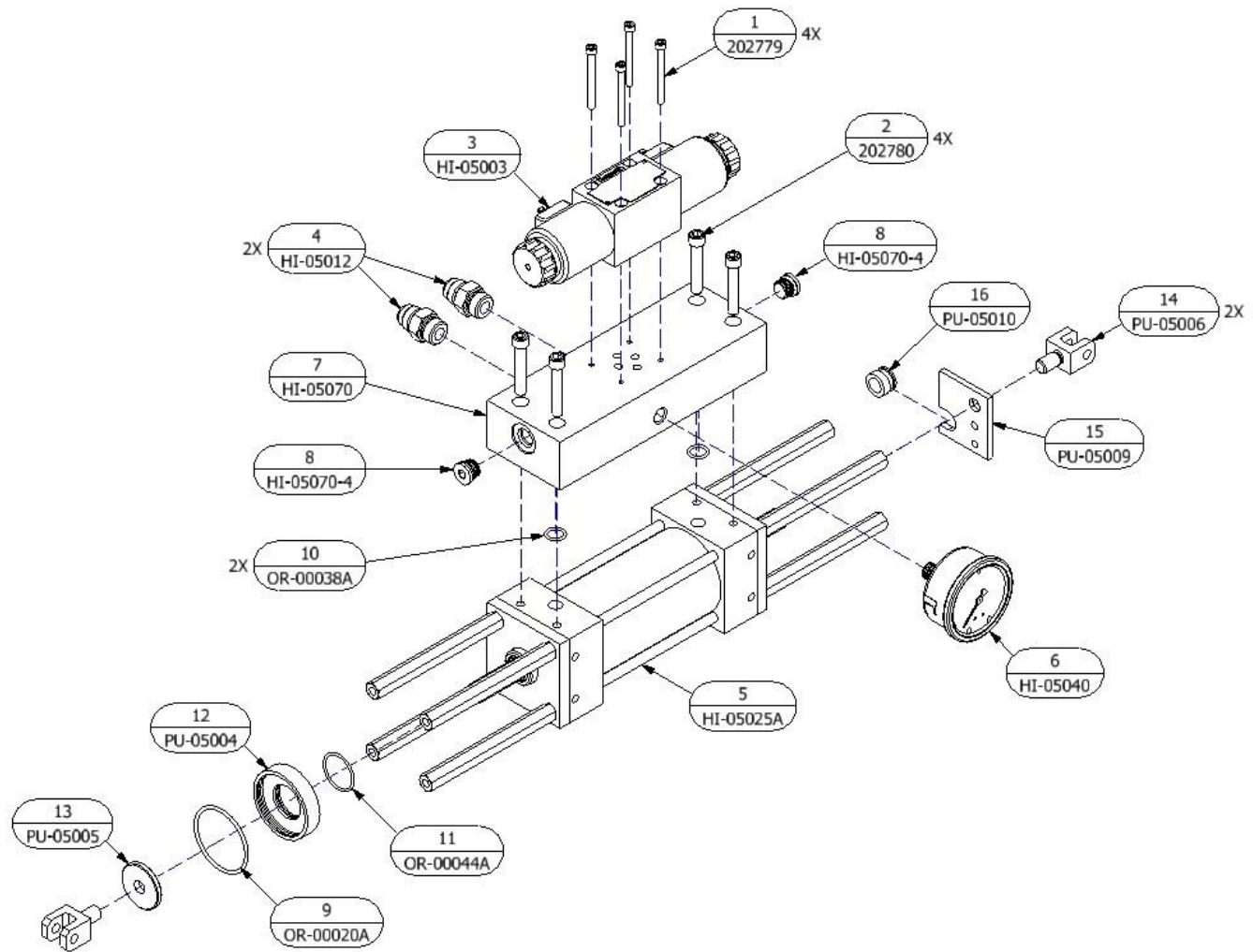


Figure 147: Hydraulic Cylinder Assembly (HI-01)

HYDRAULIC CYLINDER ASSEMBLY (HI-01)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	202779	SHCS, #10-24 x 2, ZP	4
2	202780	SHCS, 5/16-18 x 1.75, ZP	4
3	HI-05003	DIRECTIONAL VALVE	1
4	HI-05012	FTG, -08 ORB X -08 JIC, STL	2
5	HI-05025A	HYD CYL ASSY, BASE, CLASSICS	1
6	HI-05040	GAUGE, PRESSURE, 0-2000psi	1
7	HI-05070	HYDRAULIC MANIFOLD, CLASSIC	1
8	HI-05070-4	PLUG, -06 ORB, STL	2
9	OR-00020A	O-RING, -136, Viton	1
10	OR-00038A	O-RING, 2.00mm x 12.50mm, Viton, BRN	2
11	OR-00044A	O-RING, -024, Viton	1
12	PU-05004	END CAP; CYLINDER	1
13	PU-05005	BAFFLE	1
14	PU-05006	CLEVIS, HYDRAULIC	2
15	PU-05009	PLATE; REVERSING SWITCH	1
16	PU-05010	BUSHING	1

20.4.1 HYDRAULIC CYLINDER REBUILD KIT

HYDRAULIC CYLINDER REBUILD KIT (KT-05025)			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	HI-05025-1	U CUP
2	2	HI-05025-2	BACK-UP RING, PISTON
3	1	HI-05025-3	WEAR RING
4	2	HI-05025-4	WIPER, ROD
5	2	HI-05025-5	SHAFT SEAL
6	2	HI-05025-6	BACK-UP RING, BUSHING
7	2	OR-00038A	2MM X 12.5MM, 75 VITON BROWN
8	2	OR-00039A	O-RING -218 HYD CYLINDER ROD
9	2	OR-00040A	O-RING -036 HYD CYLINDER

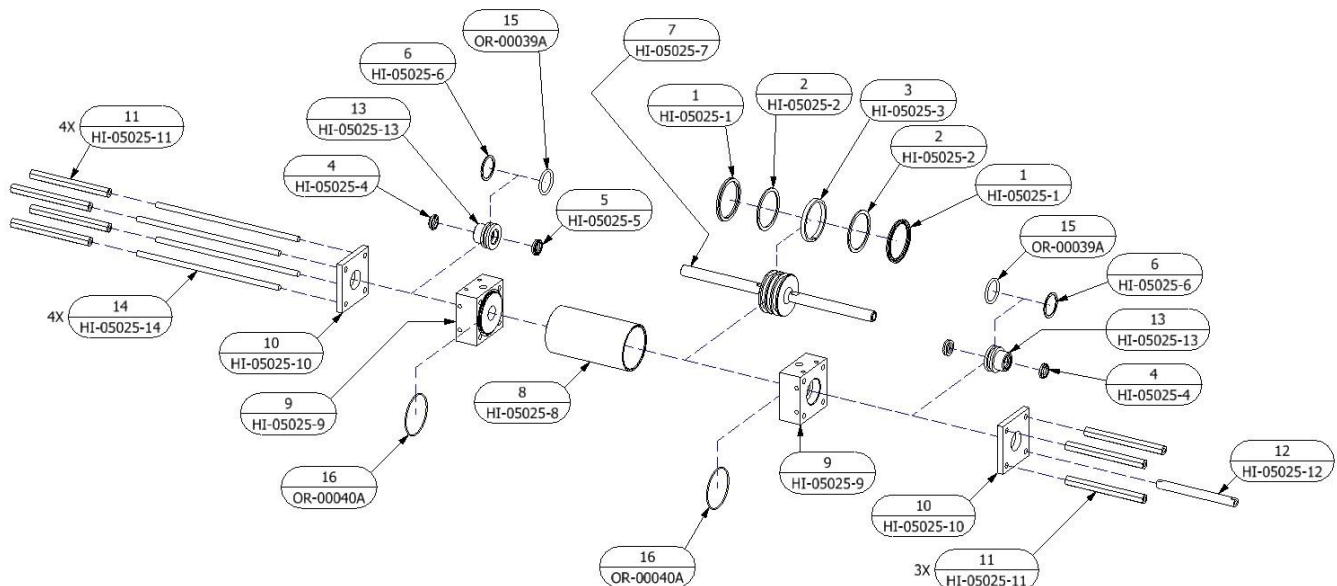
20.4.2 HYDRAULIC CYLINDER ASSEMBLY BASE

Figure 148: Hydraulic Cylinder Assembly Base (HI-05025A)

HYDRAULIC CYLINDER ASSEMBLY BASE (HI-05025A)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	HI-05025-1	U CUP	2
2	HI-05025-2	BACK-UP RING, HYD PISTON	2
3	HI-05025-3	WEAR RING, HYD PISTON	1
4	HI-05025-4	ROD WIPER, BUSHING, HYD CYL	2
5	HI-05025-5	SHAFT SEAL	2
6	HI-05025-6	BACK-UP RING, BUSHING, HYD CYL	2
7	HI-05025-7	PISTON, HYDRAULIC, CLSC	1
8	HI-05025-8	CYLINDER, HYDRAULIC, CLSC	1
9	HI-05025-9	PORT BLOCK, HYDRAULIC, CLSC	2
10	HI-05025-10	RETAINER FLANGE, HYD CYL, CLSC	2
11	HI-05025-11	STANDOFF, HEX, HYD CYL, CLSC	7
12	HI-05025-12	STANDOFF; REVERSING SWITCH	1
13	HI-05025-13	BUSHING, HYD CYL	2
14	HI-05025-14	TIE ROD; 5/16-24 x 9.375"	4
15	OR-00039A	O-RING, -218, Viton	2
16	OR-00040A	O-RING, -036, Viton	2

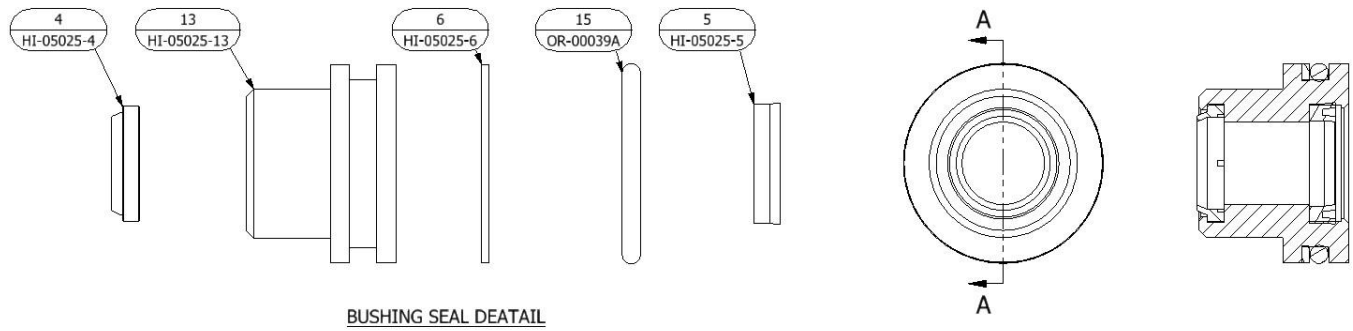


Figure 149: Hydraulic Seal Detail View

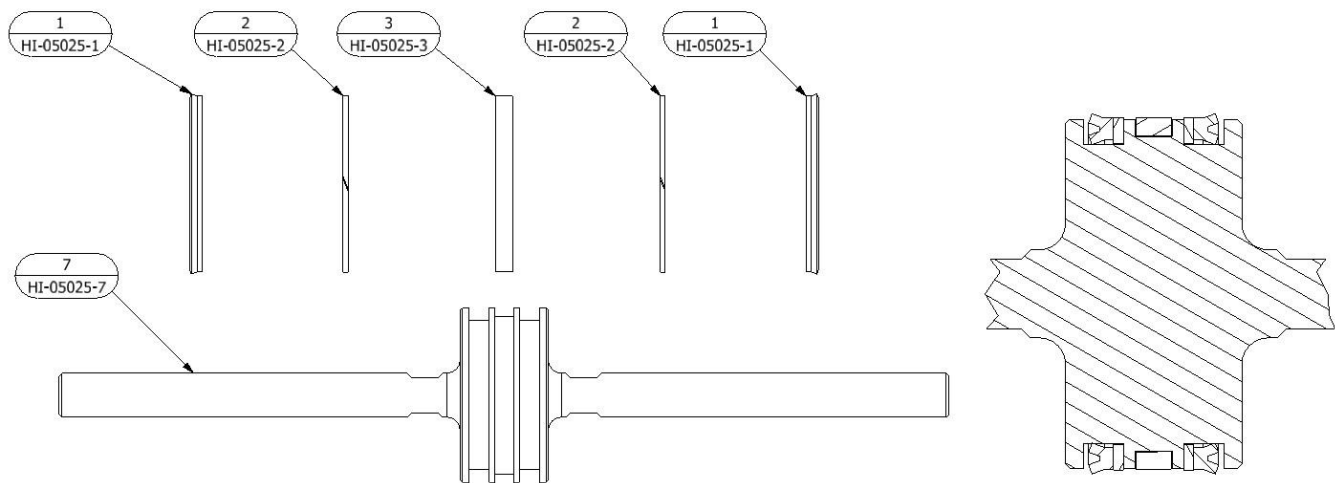


Figure 150: Hydraulic Piston Detail View

20.5 A SINGLE PUMP ASSEMBLY

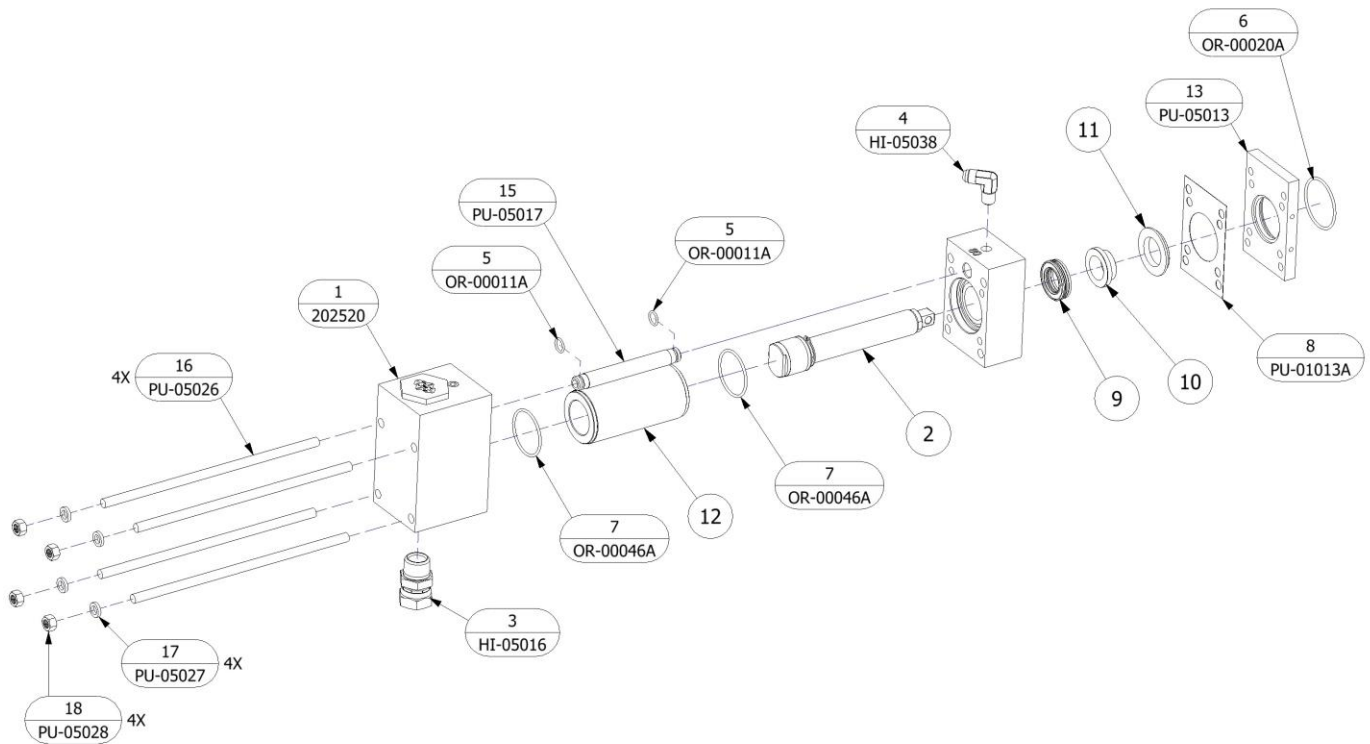


Figure 151: A Single Pump Assembly (PU-05001-120)

A SINGLE PUMP ASSEMBLY (PU-05001-120)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	202520	PUMP BASE ASSEMBLY, CLASSICS	1
2	202668	PISTON ASSEMBLY, -120	1
3	HI-05016	3/4 MPT X 3/4 FPT SW	1
4	HI-05038	FTG, 90° ELB, 1/4MPT X -06 JIC, STL	1
5	OR-00011A	O-RING, 2.00mm x 12.00mm, Viton	2
6	OR-00020A	O-RING, -136, Viton	1
7	OR-00046A	O-RING, -133, Viton	2
8	PU-01013A	CYLINDER FLANGE GASKET	1
9	PU-03000	TRIPLE LIP SEAL, 120	1
10	PU-03005	SHAFT BEARING, 120, A	1
11	PU-05012	PUMP CYLINDER, 120	1
12	PU-05013	"A" PACKING RETAINER FLANGE	1
13	PU-05014	PUMP FLANGE, 120	1
14	PU-05017	CROSSOVER TUBE	1
15	PU-05026	TIE ROD; 3/8-24 X 10-3/8	4
16	PU-05027	WASHER, CLASSIC PUMP	4
17	PU-05028	NUT, CLASSIC PUMP	4

20.5.1 A SINGLE REBUILD KIT

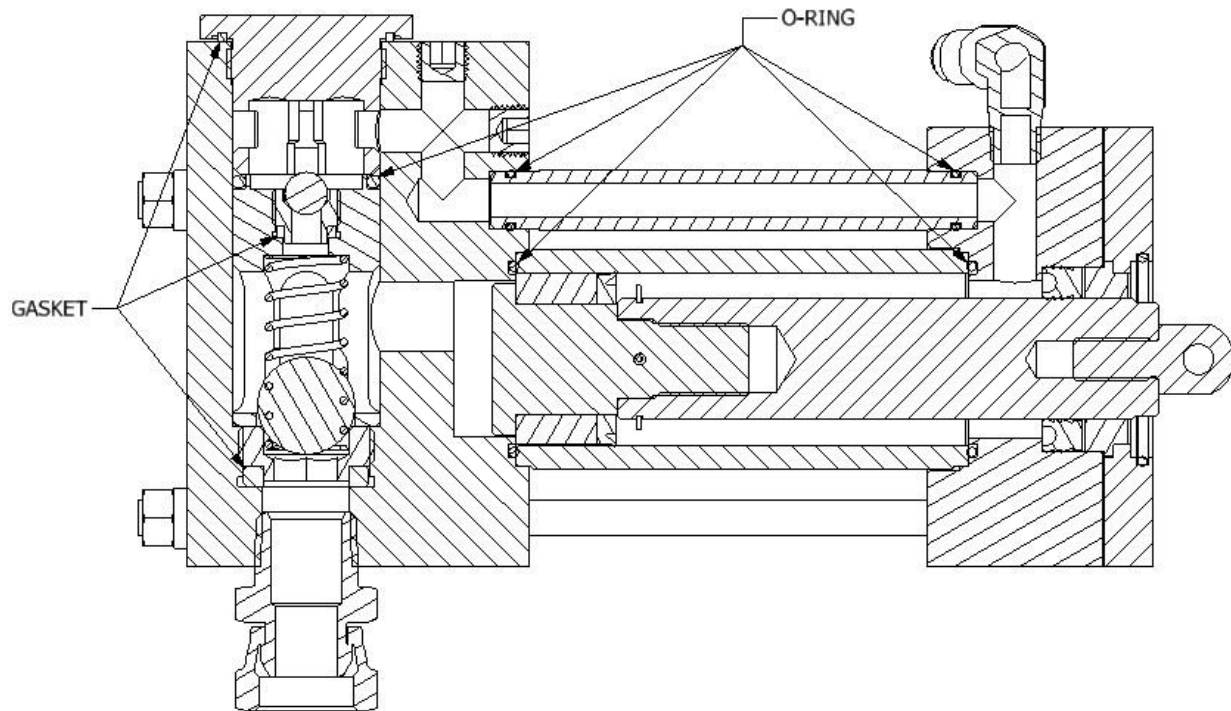


Figure 152: A Single Pump Cross Section

A PUMP REBUILD KIT (KT-07000)		
QTY	PART NUMBER	DESCRIPTION
1	KT-01016A-012	PISTON SEAL, 120 PUMP
2	OR-00011A	O-RING, 12 X 12MM ID
2	OR-00020A	O-RING -136, VITON, 90D
1	OR-00044A	O-RING -024
2	OR-00045A	O-RING -028, VITON, 90D
2	OR-00046A	O-RING -133, VITON, 90D
1	OR-00051B	O-RING -133, AFLAS 80D
1	PU-01013A	GASKET, CYLINDER FLANGE
1	PU-01003-DG	GASKET, INLET BALL SEAT
1	PU-01003-IG	GASKET, DISCHARGE BALL SEAT
1	PU-03000	TRIPLE LIP SEAL, 120 PUMP
1	PU-03005	SHAFT BEARING, 120 PUMP
1	PU-03017	RETAINING RING, 40 PUMP, A SIDE
1	PU-03019	BULLET, 120 PUMP
1	PU-03021	SEAL TOOL, A SIDE
1	PU-05023-1	GASKET, PUMP RETAINER NUT
1	PU-05029	PIN, 120 PUMP
1	PU-05030	SNAP RING, 120 PUMP
1	PU-05041	PISTON BEARING, 120 PUMP
1	RA-00065A	PLUG, PUMP CYLINDER
2	TN-04199	SHCS, 6/8-24 X 2.50

20.6 B SINGLE PUMP ASSEMBLY

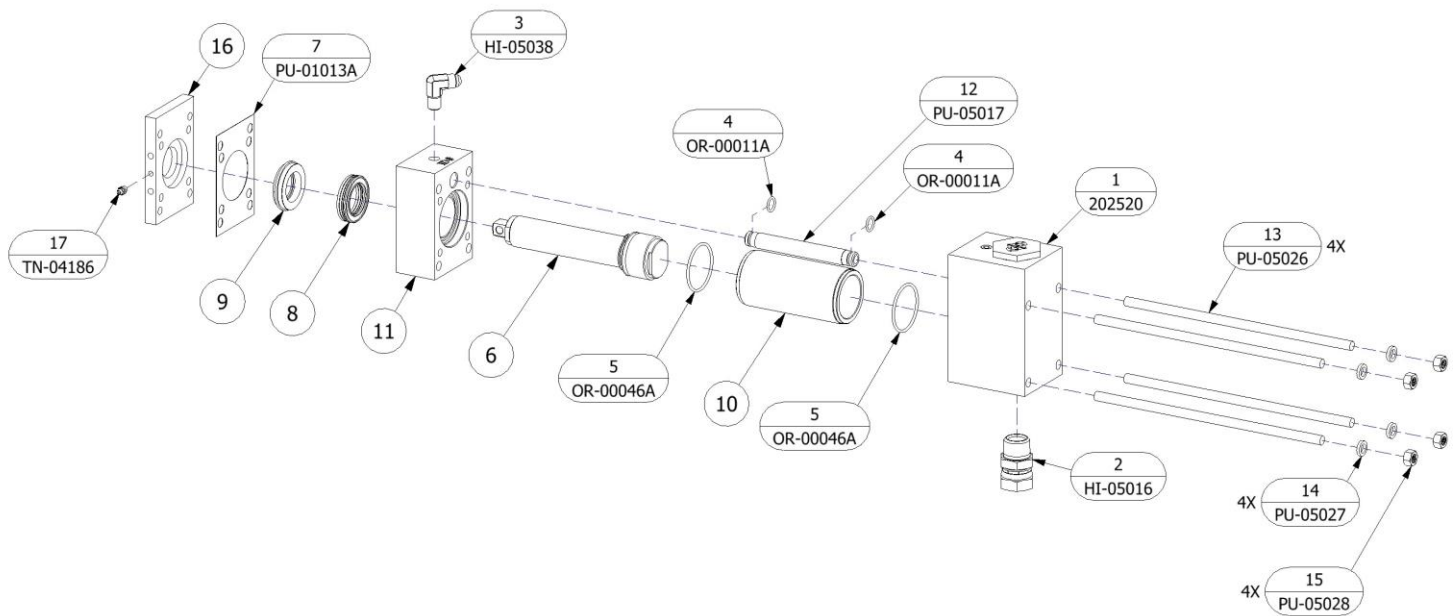


Figure 153: B Single Pump Assembly (PU-05002-120)

B SINGLE PUMP ASSEMBLY (PU-05002-120)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	202520	PUMP BASE ASSEMBLY, CLASSICS	1
2	202668	PISTON ASSEMBLY, -120	1
3	HI-05016	3/4 MPT X 3/4 FPT SW	1
4	HI-05038	FTG, 90° ELB, 1/4MPT X -06 JIC, STL	1
5	OR-00011A	O-RING, 2.00mm x 12.00mm, Viton	2
6	OR-00046A	O-RING, -133, Viton	2
7	PU-01013A	CYLINDER FLANGE GASKET	1
8	PU-03000	TRIPLE LIP SEAL, 120	1
9	PU-03010	SHAFT BEARING, 120, R	1
10	PU-05012	PUMP CYLINDER, 120	1
11	PU-05014	PUMP FLANGE, 120	1
12	PU-05017	CROSSOVER TUBE	1
13	PU-05026	TIE ROD; 3/8-24 X 10-3/8	4
14	PU-05027	WASHER, CLASSIC PUMP	4
15	PU-05028	NUT, CLASSIC PUMP	4
16	PU-05032	FLANGE "R" PACKING RETAINER, 120	1
17	TN-04186	GREASE FITTING, 1/4-28	1

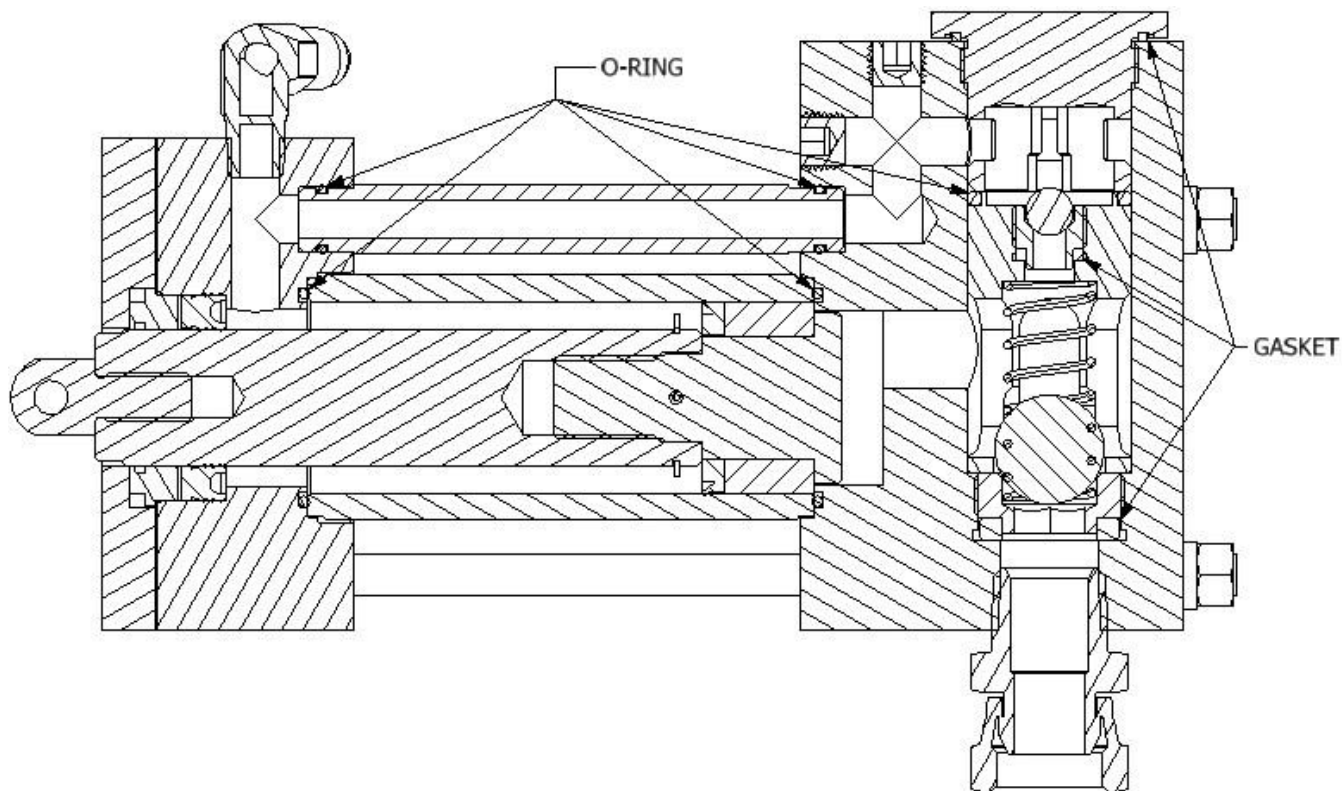
20.6.1 B SINGLE PUMP SEALS

Figure 154: B Single Pump Cross Section

B PUMP REBUILD KIT (KT-07001)		
QTY	PART NUMBER	DESCRIPTION
1	KT-01016A-012	PISTON SEAL, 120 PUMP
2	OR-00011A	O-RING, 12 X 12MM ID
2	OR-00045A	O-RING -028, VITON, 90D
2	OR-00046A	O-RING -133, VITON, 90D
1	OR-00051B	O-RING -133, AFLAS 80D
1	PU-01013A	GASKET, CYLINDER FLANGE
1	PU-01003-DG	GASKET, INLET BALL SEAT
1	PU-01003-IG	GASKET, DISCHARGE BALL SEAT
1	PU-03000	TRIPLE LIP SEAL, 120 PUMP
1	PU-03010	SHAFT BEARING, 120 PUMP
1	PU-03019	BULLET, 120 PUMP
1	PU-05023-1	GASKET, PUMP RETAINER NUT
1	PU-05029	PIN, 120 PUMP
1	PU-05030	SNAP RING, 120 PUMP
1	PU-05041	PISTON BEARING, 120 PUMP
2	TN-04199	SHCS, 6/8-24 X 2.50

20.7 A & B PUMP BASE ASSEMBLY

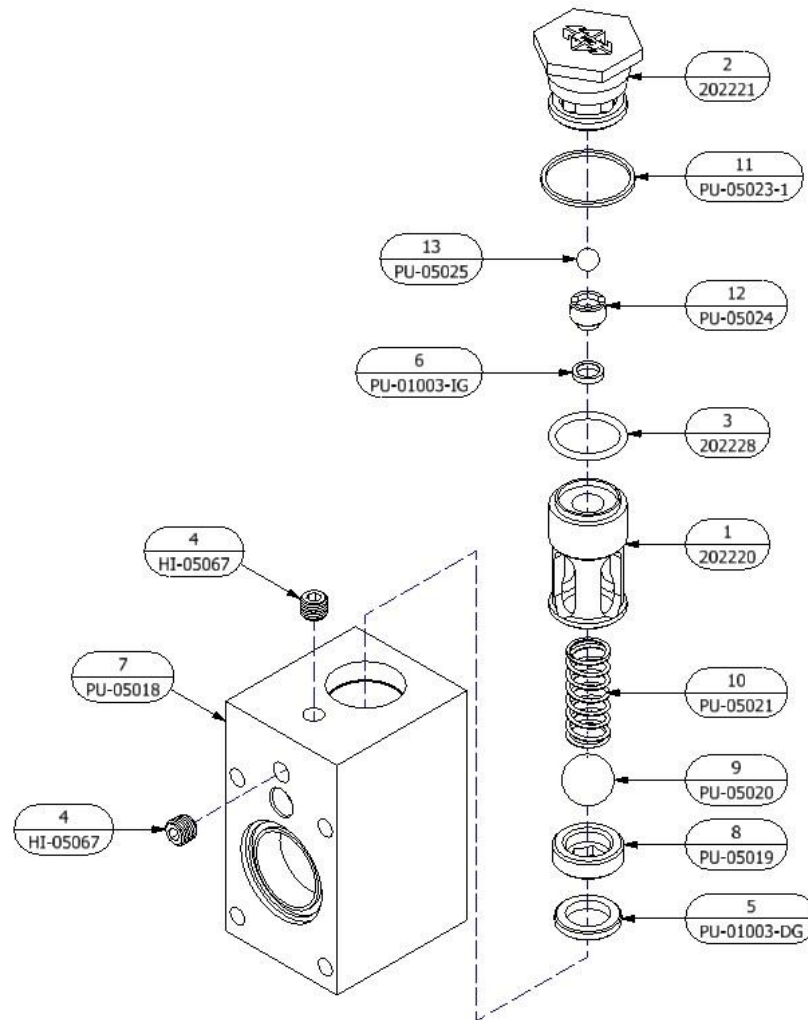


Figure 155: A & B Pump Base Assembly (202520)

A & B PUMP BASE ASSEMBLY (202520)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	202220	SLEEVE, PUMP BASE, CLSC	1
2	202221	RETAINING NUT, PUMP BASE, CLSC	1
3	202228	O-RING, -218, PTFE	1
4	HI-05067	PIPE PLUG 1/4"-18; 7/8 TAPER S	2
5	PU-01003-DG	INLET BALL SEAT GASKET	1
6	PU-01003-IG	GASKET, DISCHARGE BALL SEAT, CLSC	1
7	PU-05018	PUMP BASE	1
8	PU-05019	SEAT, INLET	1
9	PU-05020	BALL, INLET	1
10	PU-05021	SPRING, PUMP BASE	1
11	PU-05023-1	GASKET, PUMP RETAINER NUT, CLSC	1
12	PU-05024	SEAT, DISCHARGE, CLSC	1
13	PU-05025	BALL, DISCHARGE, CLSC	1

20.8 INLET MONITORING ASSEMBLY

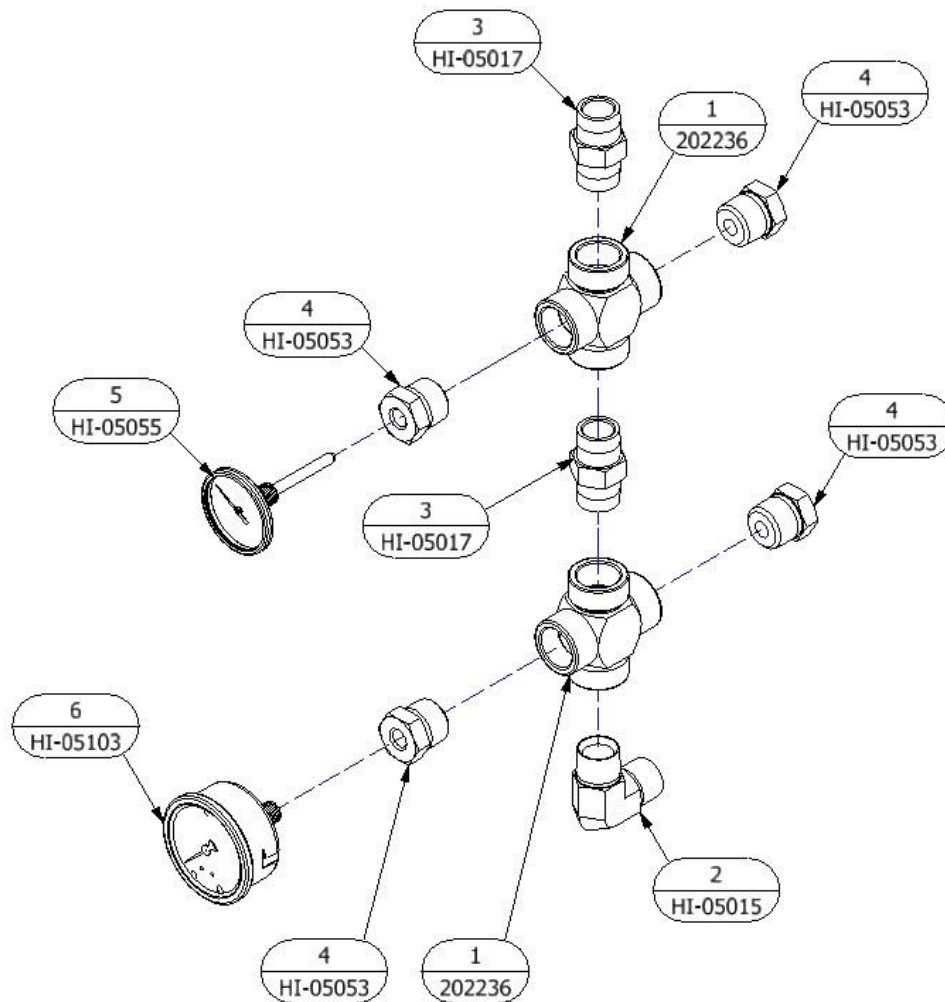


Figure 156: Inlet Monitoring Assembly (202237)

INLET MONITORING ASSEMBLY (202237)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	202236	FTG, CROSS, 3/4 NPTF, STL	2
2	HI-05015	FTG, 90° ELB, 3/4 MPT, STL	1
3	HI-05017	NIPPLE, HEX, 3/4 NPT, STL	2
4	HI-05053	FTG, PTR, 3/4 MPT X 1/4 FPT, STL	4
5	HI-05055	TEMP GAUGE 0-200 DEG F/C	1
6	HI-05103	PRESSURE GAUGE, CM 0-600 psi	1

20.9 Y-STRAINER ASSEMBLY "A" SIDE

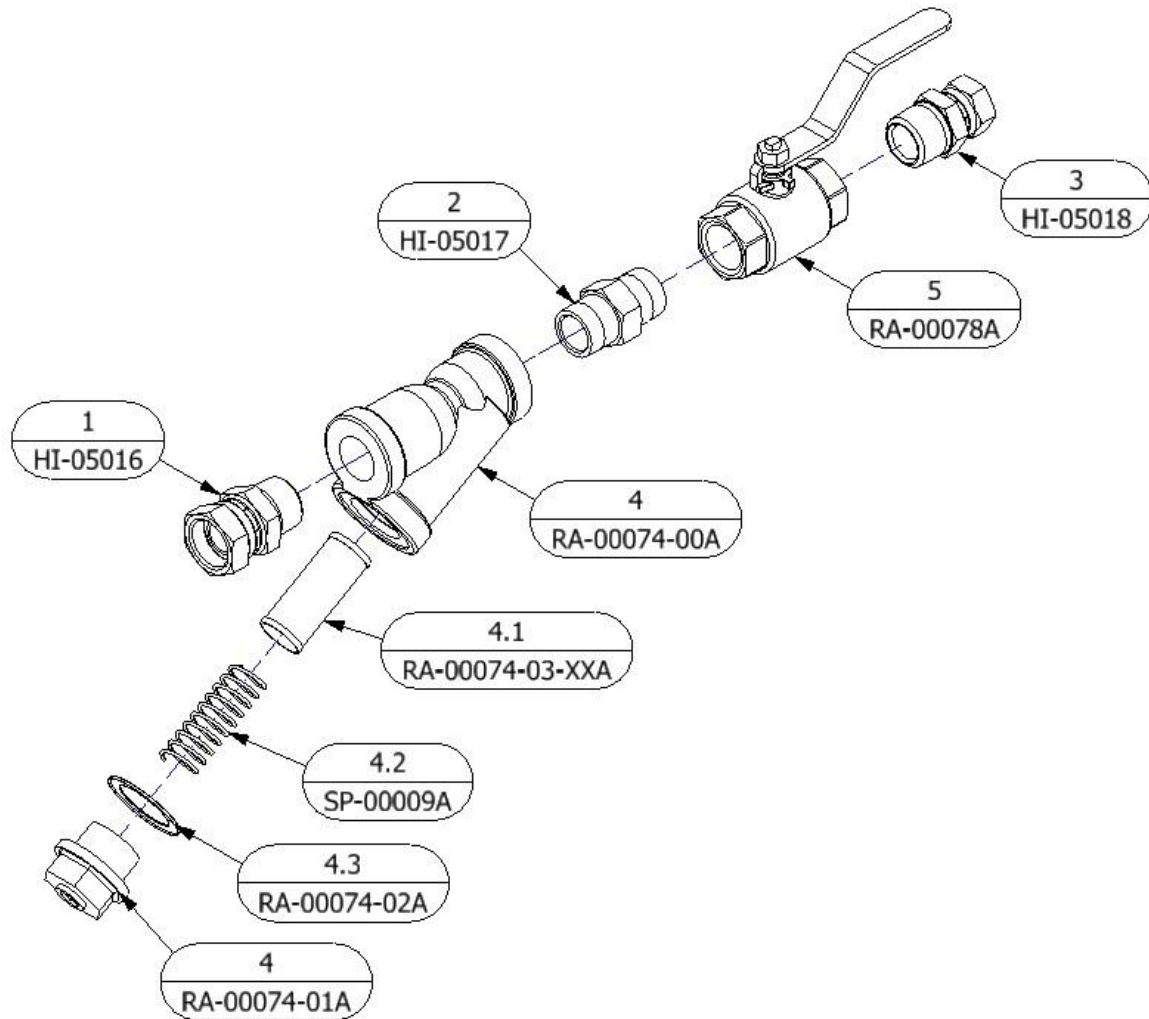


Figure 157: Y-Strainer Assembly "A" Side (YS-1)

Y-STRAINER ASSEMBLY "A" SIDE (YS-1)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	HI-05016	3/4 MPT X 3/4 FPT SW	1
2	HI-05017	NIPPLE, HEX, 3/4 NPT, STL	1
3	HI-05018	3/4 NPT x 1/2 NPT SW	1
4	RA-00074-00A	Y-STRAINER ASSY	1
4.1	RA-00074-00	Y-STRAINER BODY	1
4.2	RA-00074-03-XXA	FILTER SCREEN 30/60/80	1
4.3	SP-00009A	FILTER SCREEN SPRING	1
4.4	RA-00074-02A	Y-STRAINER GASKET	1
4.5	RA-00074-01A	DRAIN PLUG ASSEMBLY, Y-STRAINER	1
5	RA-00078A	3/4 NPT BALL VALVE, SS;1000psi	1

Note: Items 4.1-4.3 can be ordered separately but are all included in purchase of Item 4 (RA-00074-00A).

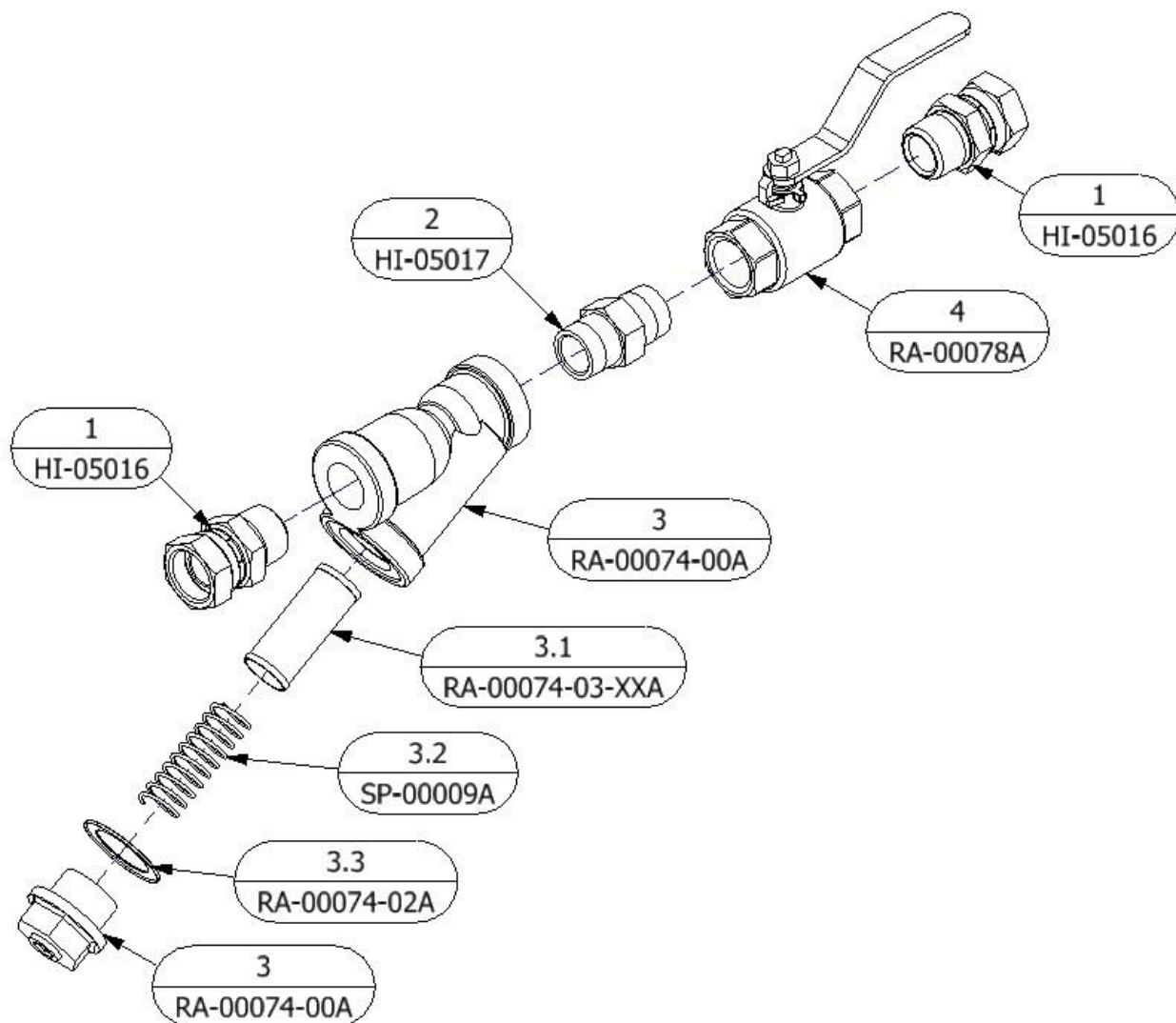
20.10 Y-STRAINER ASSEMBLY "B" SIDE

Figure 158: Y-Strainer Assembly "B" Side (YS-2)

Y-STRAINER ASSEMBLY "B" SIDE (YS-2)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	HI-05016	3/4 MPT X 3/4 FPT SW	2
2	HI-05017	NIPPLE, HEX, 3/4 NPT, STL	1
3	RA-00074-00A	Y-STRAINER ASSY	1
3.1	RA-00074-00	Y-STRAINER BODY	1
3.2	RA-00074-03-XXA	FILTER SCREEN 30/60/80	1
3.3	SP-00009A	FILTER SCREEN SPRING	1
3.4	RA-00074-02A	Y-STRAINER GASKET	1
3.5	RA-00074-01A	DRAIN PLUG ASSEMBLY, Y-STRAINER	1
4	RA-00078A	3/4 NPT BALL VALVE, SS;1000psi	1

Note: Items 3.1-3.3 can be ordered separately but are all included in purchase of Item 3 (RA-00074-00A).

20.11 PREMIER (X) HEATER ASSEMBLY

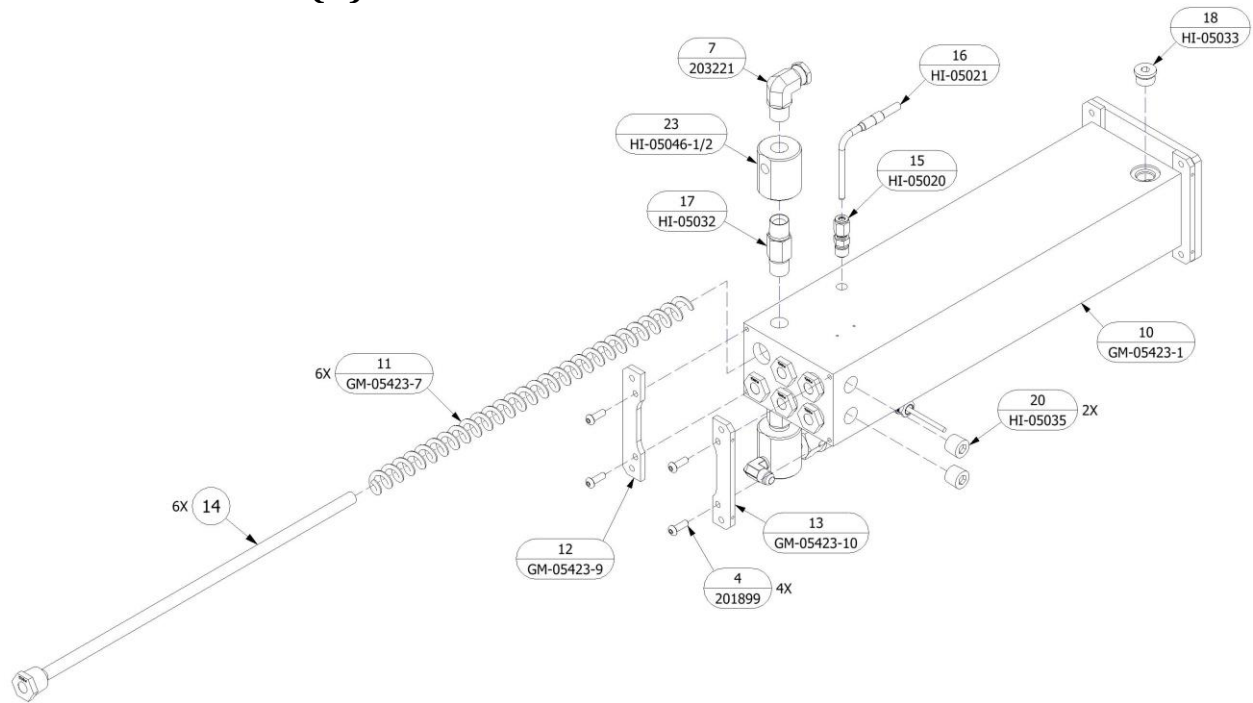


Figure 159: Premier (X) Heater Assembly, 6 Rod - A

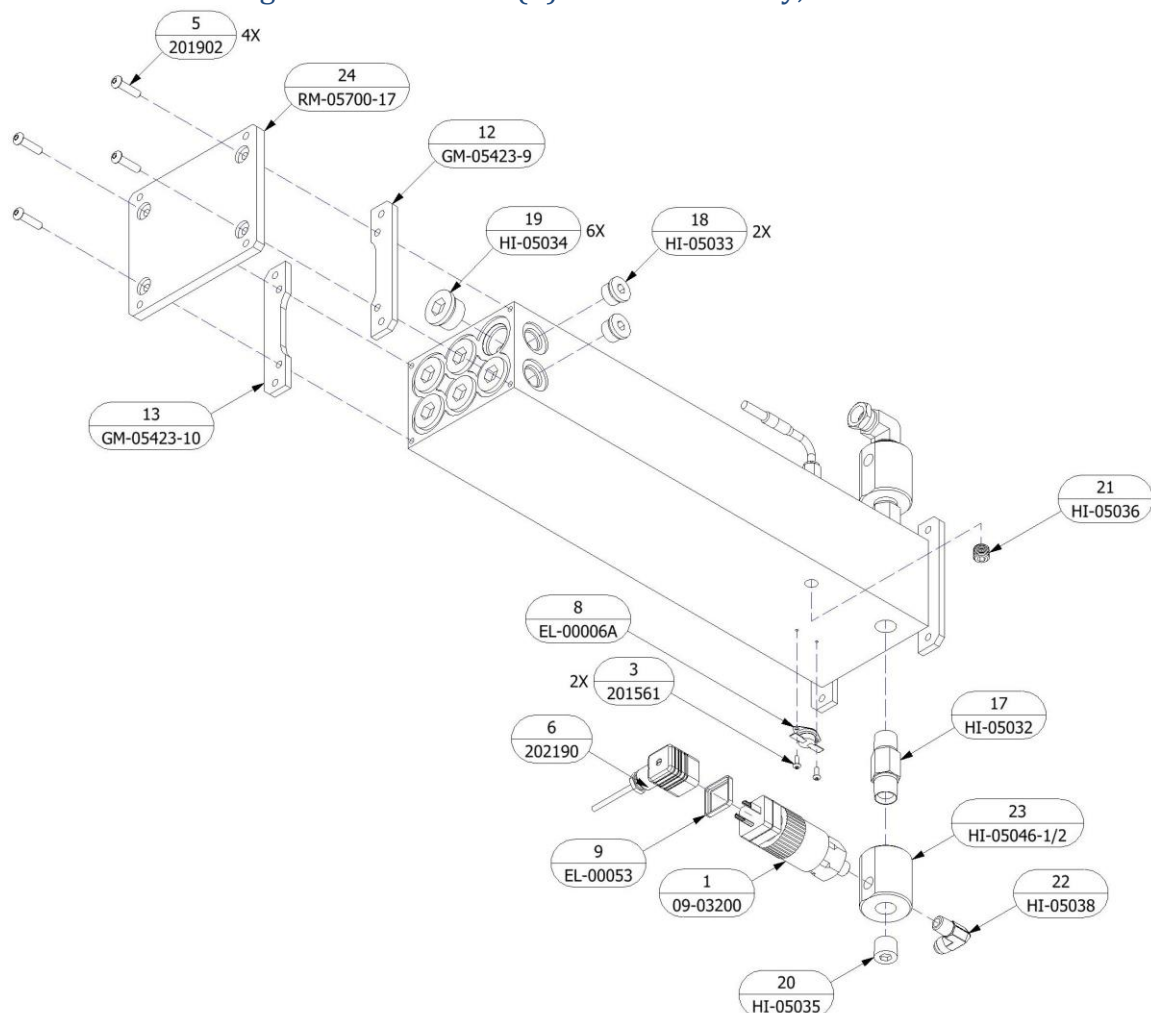


Figure 160: Premier (X) Heater Assembly, 6 Rod - B

PREMIER (X) PREHEATER ASSEMBLY, 6-ROD, (9kW/10.5kW)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	09-03200	PRESSURE SWITCH	1
2	200977	FERRULE, 8AWG, RED	2
3	201561	BHCS, #6-32 x 0.375, 18-8 SS	2
4	201899	BHCS, 1/4-20 x 0.75, 18-8 SS	4
5	201902	BHCS, 1/4-20 x 1.000, 18-8 SS	4
6	202190	CABLE, OP, PH25/40	1
7	203221	FTG, 90° EL, 1/2 MPTF x 3/8 NPSM, STL	1
8	EL-00006A	SWITCH, THERMAL LIMIT OVERTEMP	1
9	EL-00053	SOLENOID VALVE GASKET	1
10	GM-05423-1	HEATER, BODY, 6-ROD, CLASSIC, Al	1
11	GM-05423-7	HTR, SPRING, 18", CBN STL	6
12	GM-05423-9	PHENOLIC STANDOFF; BOTTOM FRONT	2
13	GM-05423-10	PHENOLIC STANDOFF, BOTTOM BACK	2
14	GM-05423-1500	FIRE ROD; 1500W, 3/4 NPT, 17.5"	6
	GM-05423-1750	FIRE ROD; 1750W, 3/4 NPT, 17.5"	6
*15	HI-05020	THERMOCOUPLE NUT, FERRULE, & BODY	1
*16	HI-05021	E TYPE THERMOCOUPLE	1
17	HI-05032	1/2 MPT LONG HEX NIPPLE	2
18	HI-05033	PLUG, -08 ORB, STL	3
19	HI-05034	PLUG, -12 ORB, STL	6
20	HI-05035	PLUG, FLUSH SEAL, 1/2 NPT, STL	3
21	HI-05036	PLUG, FLUSH SEAL, 1/4 NPT, STL	1
22	HI-05038	FTG, 90° ELB, 1/4MPT X -06 JIC, STL	1
23	HI-05046-1/2	MANIFOLD, 1/2 OUTLET	2
24	RM-05700-17	HEATER BOTTOM; MOUNTING PLATE	1

* Indicates part included in KT-05021: Heater Thermocouple Kit.

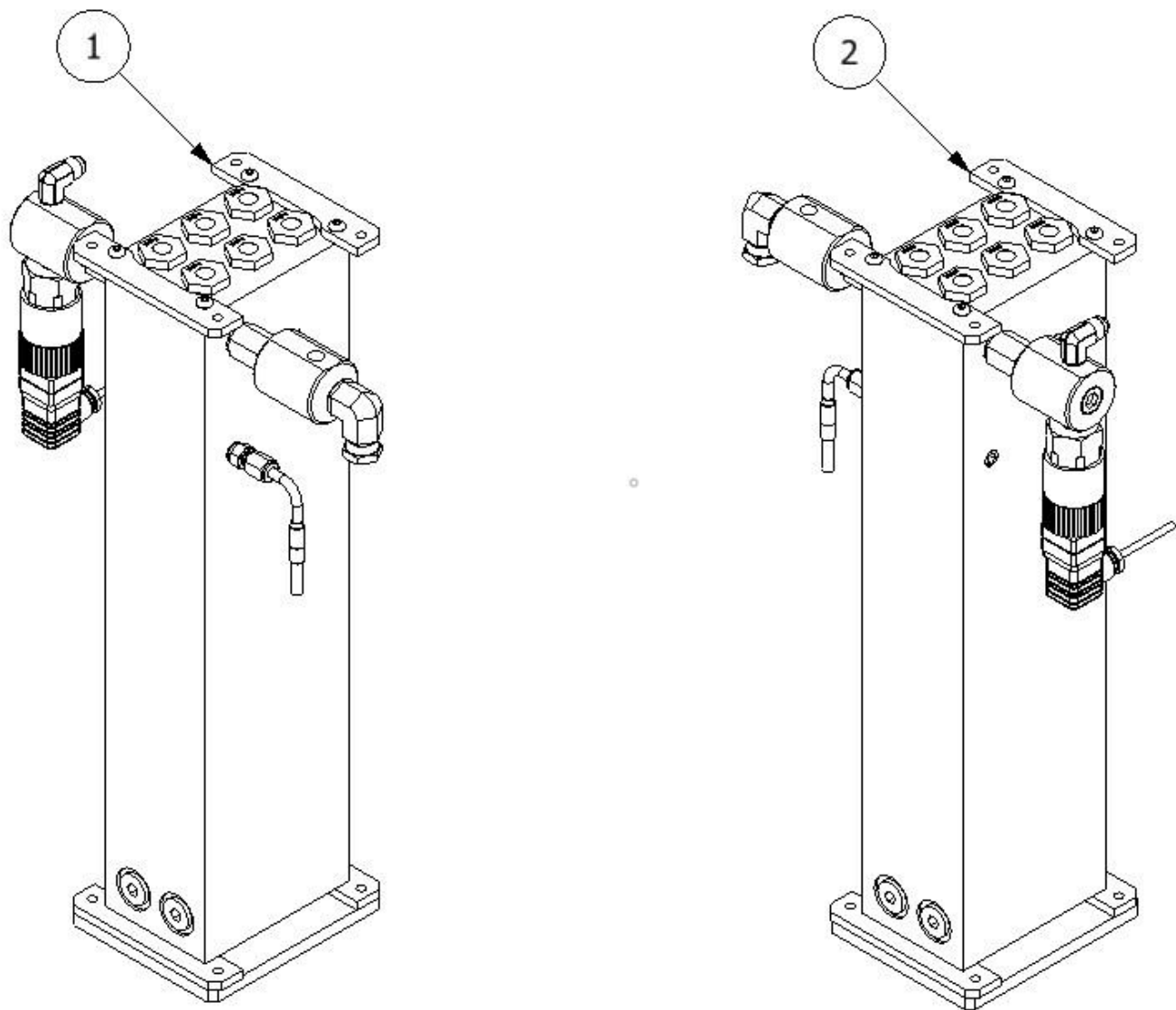


Figure 161: Premier (X) 6 Rod Heater Assembly, A and B Side

PREMIER (X) HEATER ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	203122	PREHEATER, A, 9.0kW PREMIER
	1	203717	PREHEATER, A, 10.5kW PREMIER
2	1	203125	PREHEATER, B, 9.0kW PREMIER
	1	203718	PREHEATER, B, 10.5kW PREMIER

20.12 MACH 2 HEATER ASSEMBLY

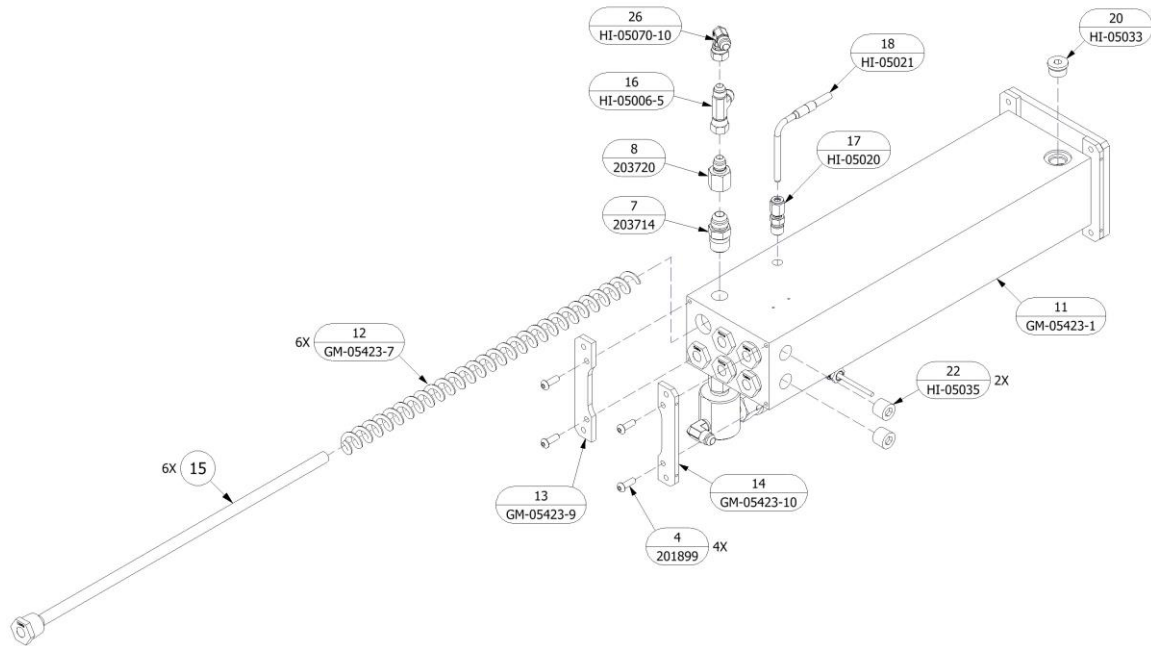


Figure 162: MACH 2 Heater Assembly, 6 Rod - A

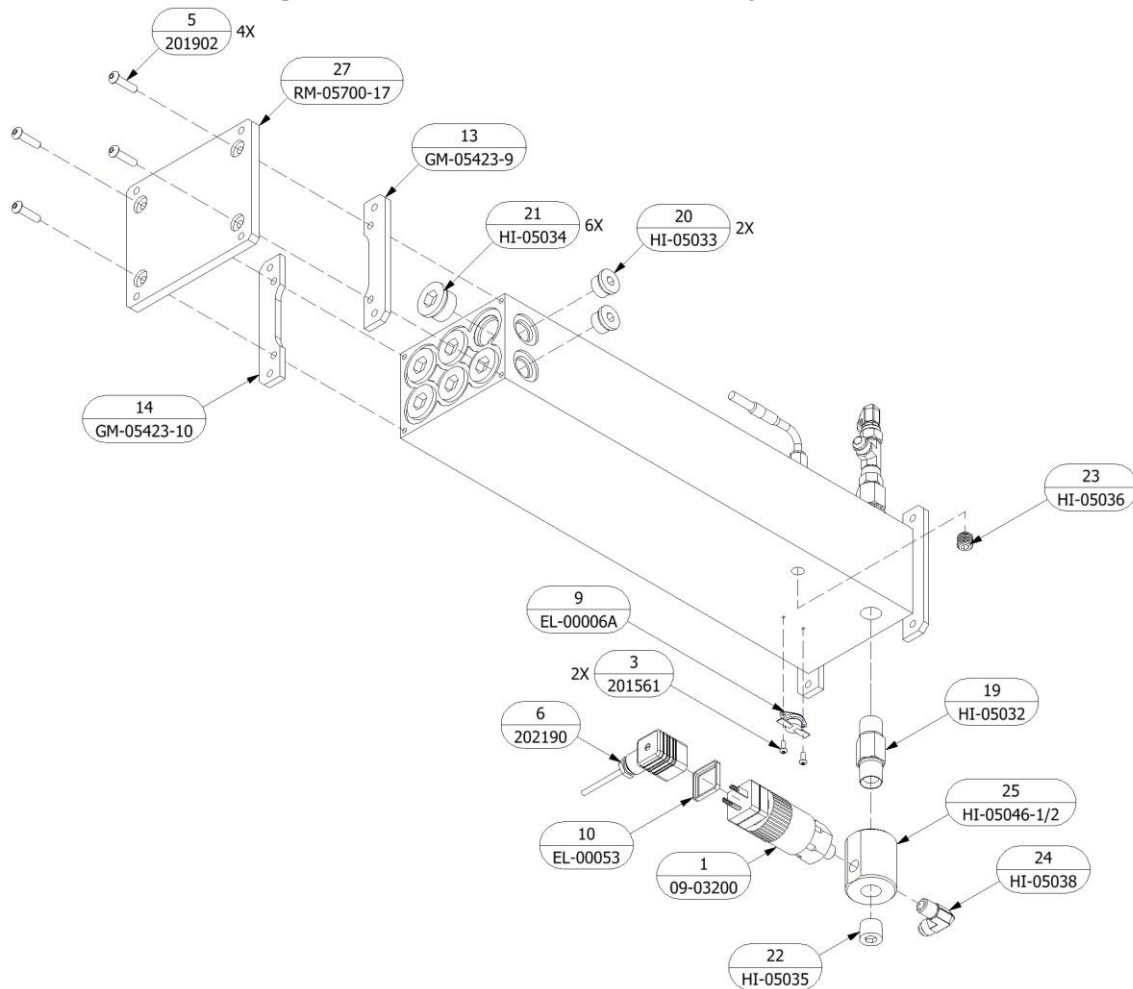


Figure 163: MACH 2 Heater Assembly, 6 Rod - B

MACH 2 PREHEATER ASSEMBLY, 6-ROD, (9kW)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	09-03200	PRESSURE SWITCH	1
2	200977	FERRULE, 8AWG, RED	2
3	201561	BHCS, #6-32 x 0.375, 18-8 SS	2
4	201899	BHCS, 1/4-20 x 0.75, 18-8 SS	4
5	201902	BHCS, 1/4-20 x 1.000, 18-8 SS	4
6	202190	CABLE, OP, PH25/40	1
7	203714	FTG, STR, -10 JIC M X 1/2 MPT	1
8	203720	FTG, STR -8 JIC F X -6 JIC M	1
9	EL-00006A	SWITCH, THERMAL LIMIT OVERTEMP	1
10	EL-00053	SOLENOID VALVE GASKET	1
11	GM-05423-1	HEATER, BODY, 6-ROD, CLASSIC, AI	1
12	GM-05423-7	HTR, SPRING, 18", CBN STL	6
13	GM-05423-9	PHENOLIC STANDOFF; BOTTOM FRONT	2
14	GM-05423-10	PHENOLIC STANDOFF, BOTTOM BACK	2
15	GM-05423-1500	FIRE ROD; 1500W, 3/4 NPT, 17.5"	6
16	HI-05006-5	FTG, RUN TEE, -06 JIC, STL	1
17	*HI-05020	THERMOCOUPLE NUT, FERRULE, & BODY	1
18	*HI-05021	E TYPE THERMOCOUPLE	1
19	HI-05032	1/2 MPT LONG HEX NIPPLE	1
20	HI-05033	PLUG, -08 ORB, STL	3
21	HI-05034	PLUG, -12 ORB, STL	6
22	HI-05035	PLUG, FLUSH SEAL, 1/2 NPT, STL	3
23	HI-05036	PLUG, FLUSH SEAL, 1/4 NPT, STL	1
24	HI-05038	FTG, 90° ELB, 1/4MPT X -06 JIC, STL	1
25	HI-05046-1/2	MANIFOLD, 1/2 OUTLET	1
26	HI-05070-10	FTG, 90 EL -6 JIC SWVL F X M	1
27	RM-05700-17	HEATER BOTTOM; MOUNTING PLATE	1

* Indicates part included in KT-05021: Heater Thermocouple Kit.

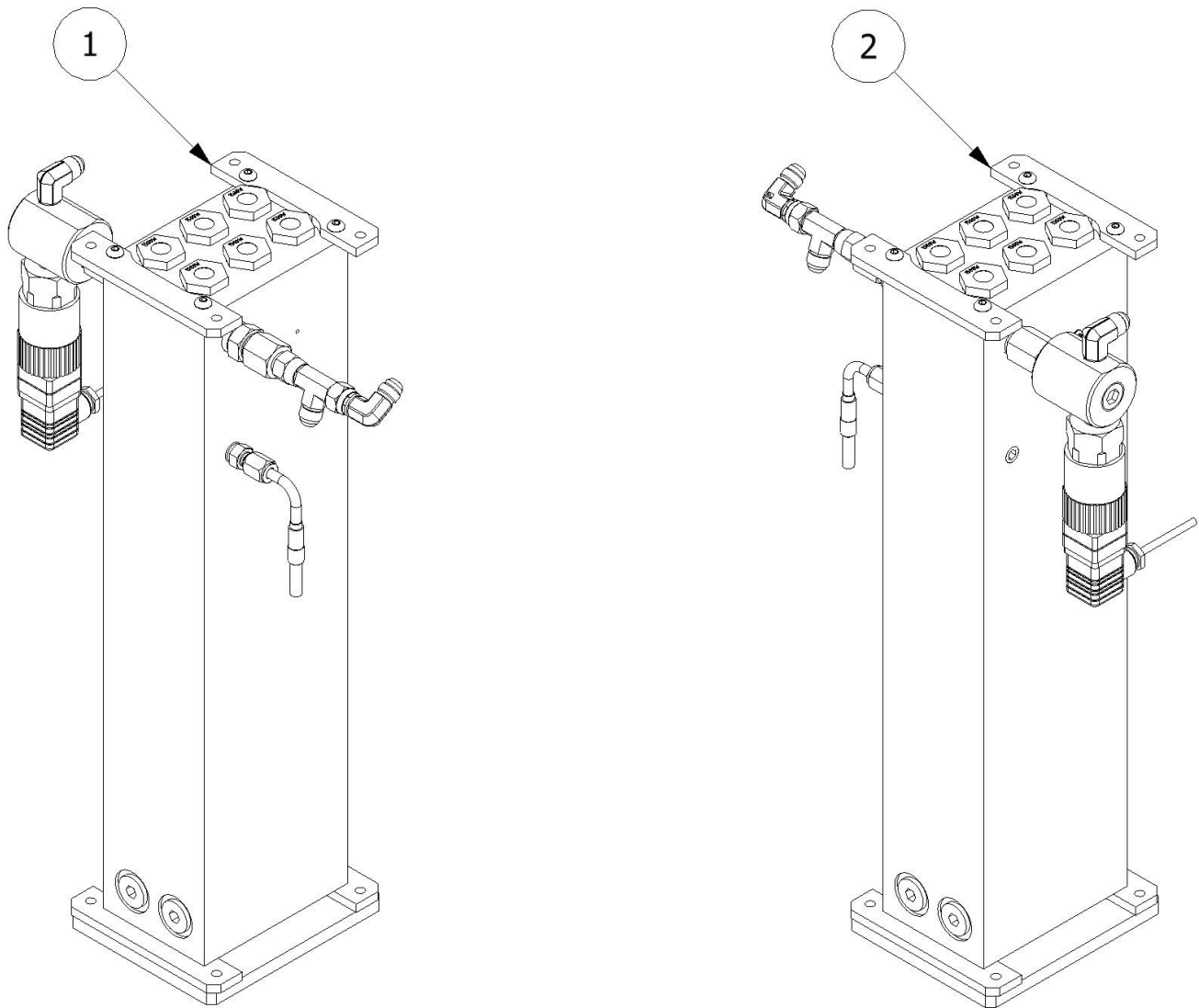


Figure 164: MACH 2 6 Rod Heater Assembly, A and B Side

MACH 2 HEATER ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	203760	PREHEATER, A, 9.0kW, MACH 2
2	1	203761	PREHEATER, B, 9.0kW, MACH 2

20.13 PRESSURE TRANSDUCER ASSEMBLY

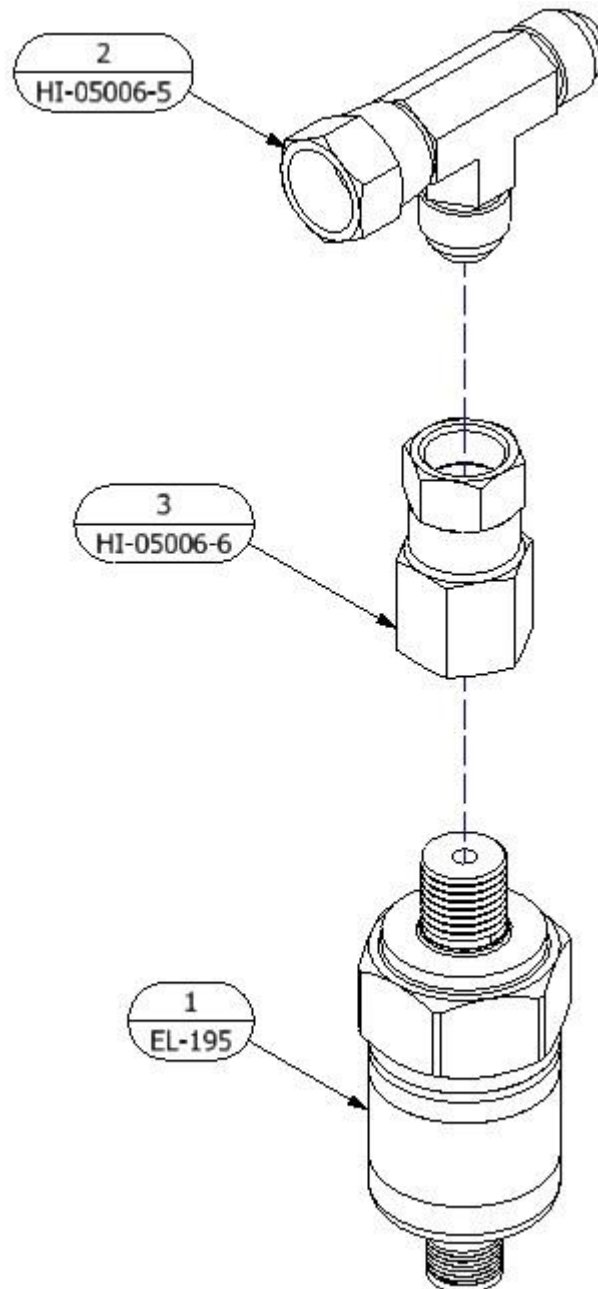


Figure 165: Pressure Transducer Assembly (EL-200)

PRESSURE TRANSDUCER ASSEMBLY (EL-200)			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	EL-195	0-500 PRESS TRANSDUCER
2	1	HI-05006-5	FTG, RUN TEE, -06 JIC, STL
3	1	HI-05006-6	1/4 NPT X 6 JIC GAUGE FITTING

20.14 MOTOR-LINE ASSEMBLY

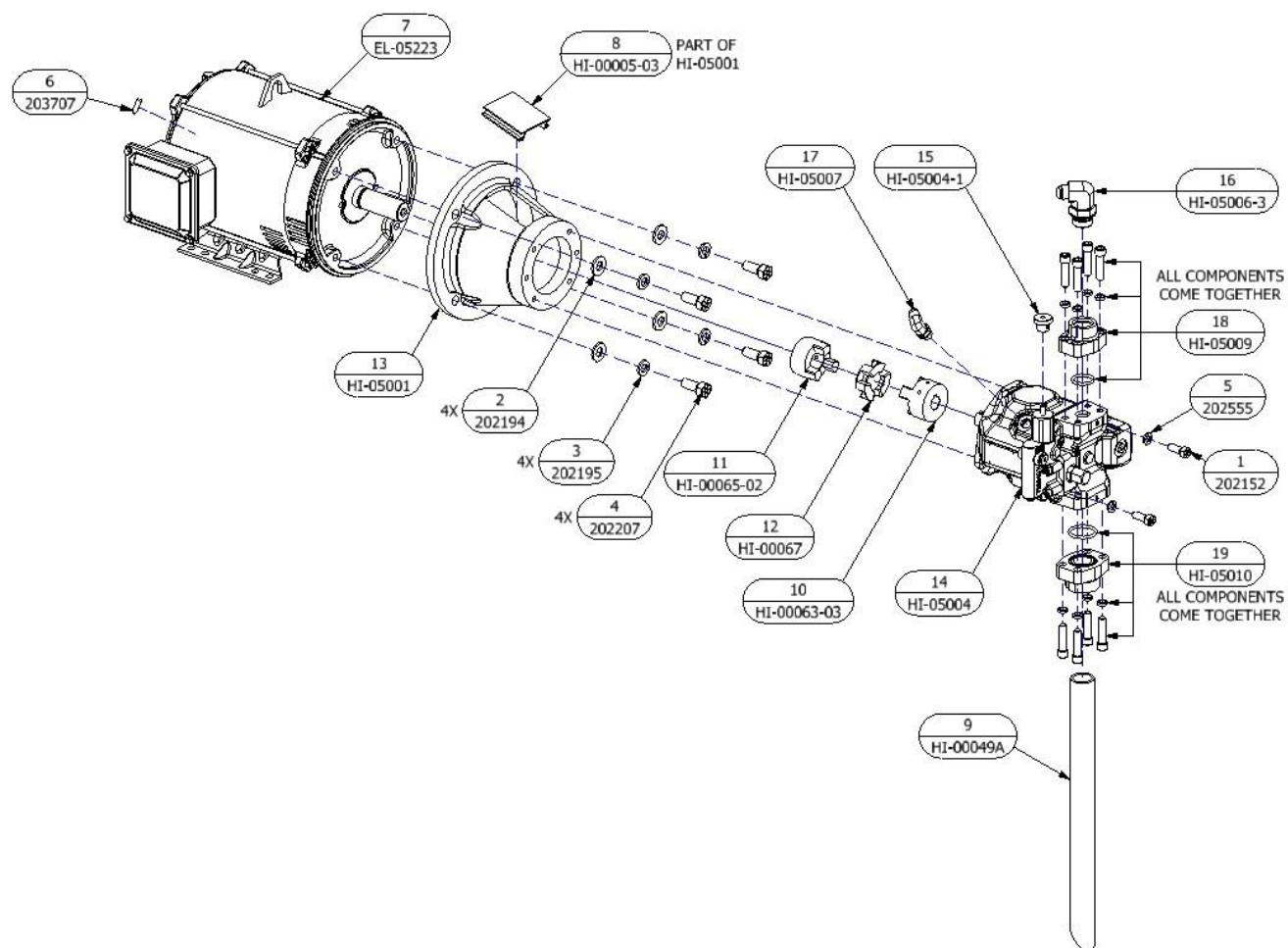


Figure 166: Motor-Line Assembly (ML-4)

MOTOR-LINE ASSEMBLY (ML-4)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	202152	HHCS, 3/8-16 x 1.000, ZP8	2
2	202194	WASHER, FLAT, SAE, 1/2, ZP	4
3	202195	WASHER, LOCK, 1/2, ZP	4
4	202207	HHCS, 1/2-13 x 1.250, ZP8	4
5	202555	WASHER, LOCK, 3/8, ZP	2
6	203707	LABEL, ARROW RED 3/4"	1
7	EL-05223	ELECTRIC MOTOR, 5HP, 3PH, 60HZ	1
8	HI-00005-03	ACCESS COVER	1
9	HI-00049A	1" X 16" BLACK PIPE FOR HYDRAULIC	1
10	HI-00063-03	COUPLER HUB, 3/4	1
11	HI-00065-02	COUPLER HUB, 1 1/8	1
12	HI-00067	MAGNALOY INSERT, 9.45HP	1
13	HI-05001	BELL HOUSING	1
14	HI-05004	HYDRAULIC PUMP	1
15	HI-05004-1	Control Knob, Hydraulic Pump	1
16	HI-05006-3	FTG, 90° ELB, -08 JIC X -12ORB, STL	1
17	HI-05007	FTG, 90° ELB, -06JIC X -06ORB, STL	1
18	HI-05009	1-1/16-12 OUTLET FLANGE	1
19	HI-05010	1" NPT INLET FLANGE	1

20.15 A FLOW METER PIPES

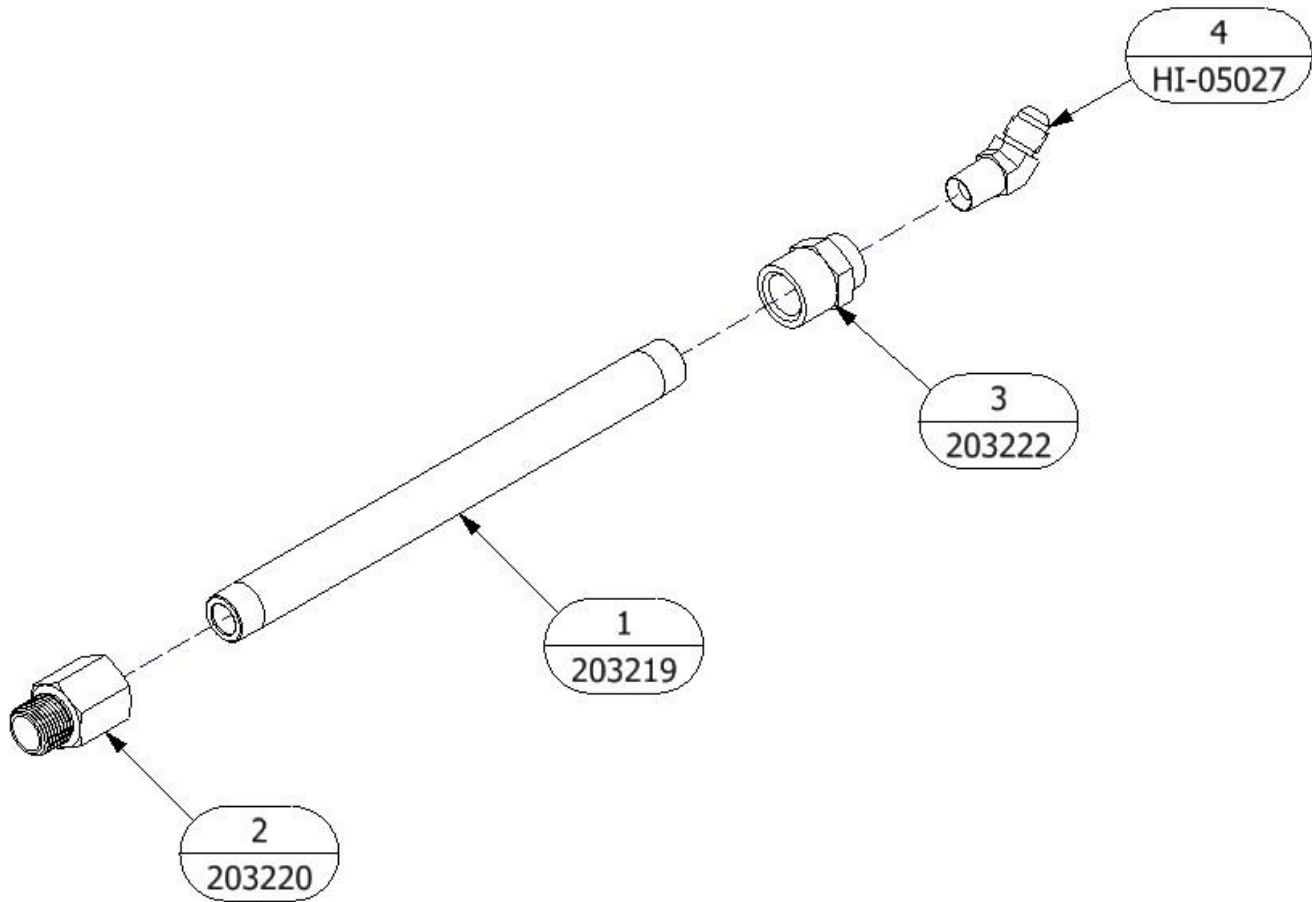


Figure 167: Flow Meter Pipe - A-Side (203232)

FLOW METER PIPE ASSEMBLY, A-SIDE (203232)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	203219	PIPE, 3/8 NPT, 8.000", SS	1
2	203220	FTG, STRT, 3/8 MPTF x 3/8 FPTF, STL	1
3	203222	FTG, STRT, 3/8 FPTF x 1/4 FPTF, STL	1
4	HI-05027	1/4 MPT x 1/2-20 JIC 45 DEG ELBOW	1

20.16 B FLOW METER PIPES

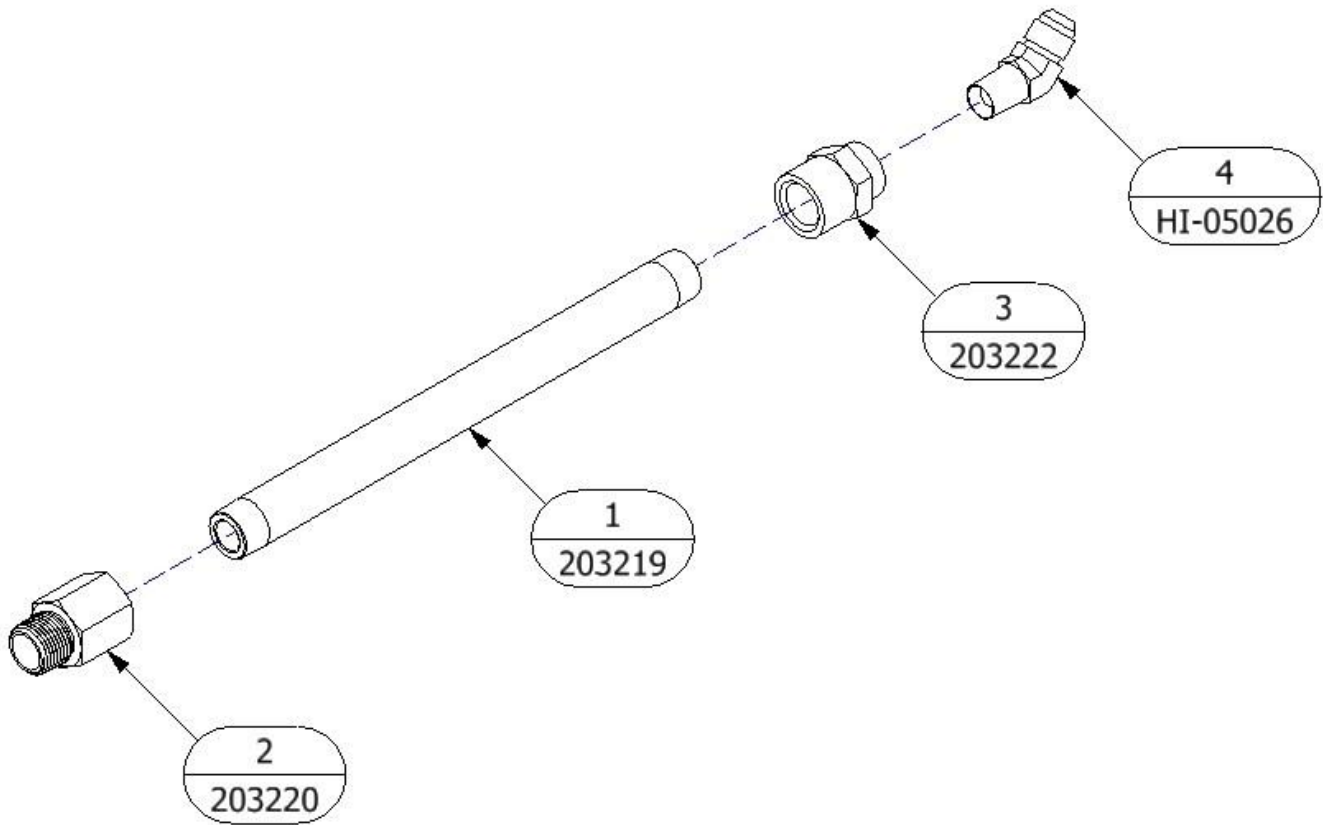


Figure 168: Flow Meter Pipe - B-Side (203233)

FLOW METER PIPE ASSEMBLY, B-SIDE (203233)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	203219	PIPE, 3/8 NPT, 8.000", SS	1
2	203220	FTG, STRT, 3/8 MPTF x 3/8 FPTF, STL	1
3	203222	FTG, STRT, 3/8 FPTF x 1/4 FPTF, STL	1
4	HI-05026	1/4 MPT x 9/16-18 JIC 45 DEG ELBOW	1

20.17 CONSOLE ASSEMBLY

20.17.1 PREMIER (X) CONSOLE ASSEMBLY

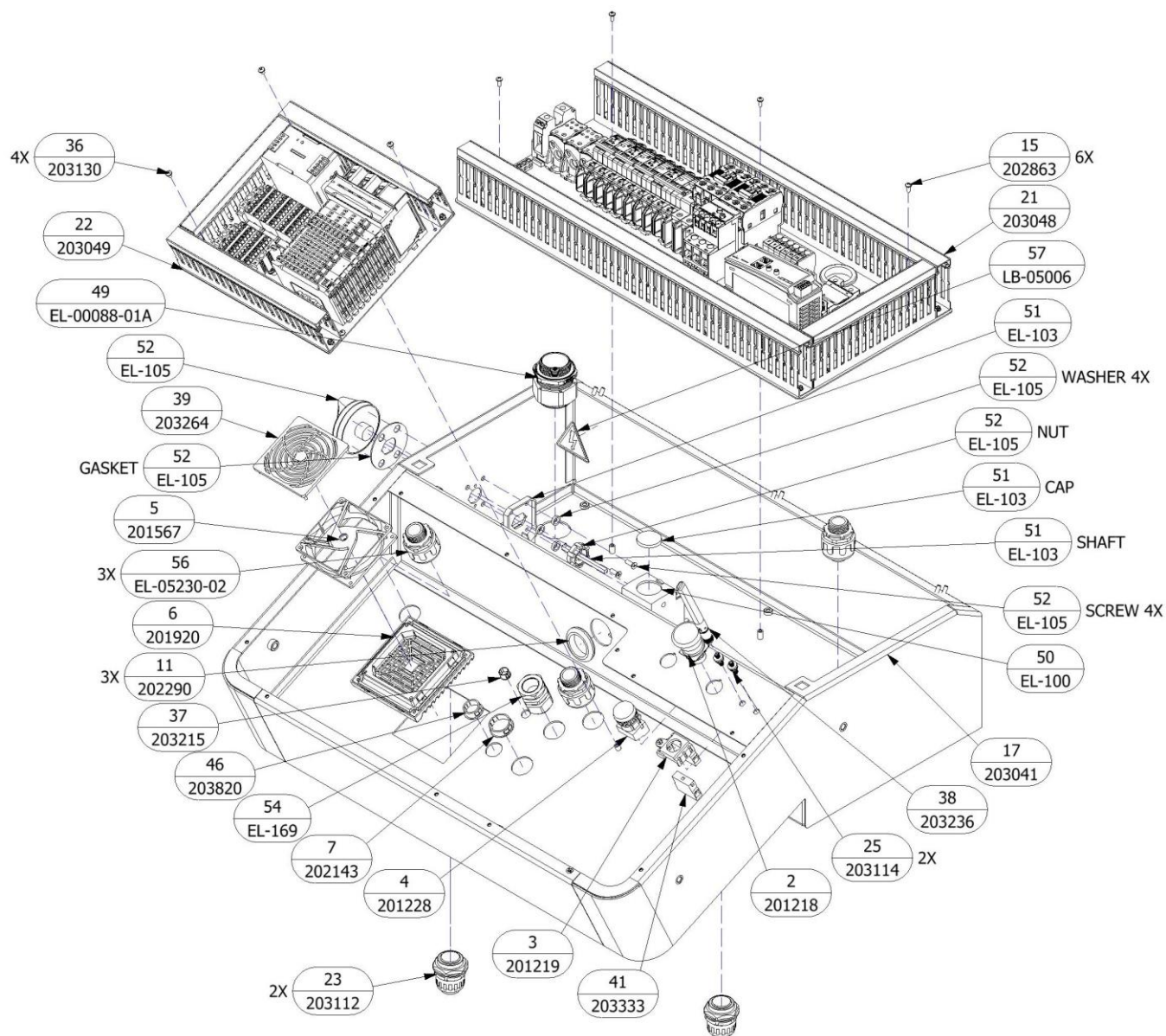


Figure 169: Premier (X) Console Assembly - A

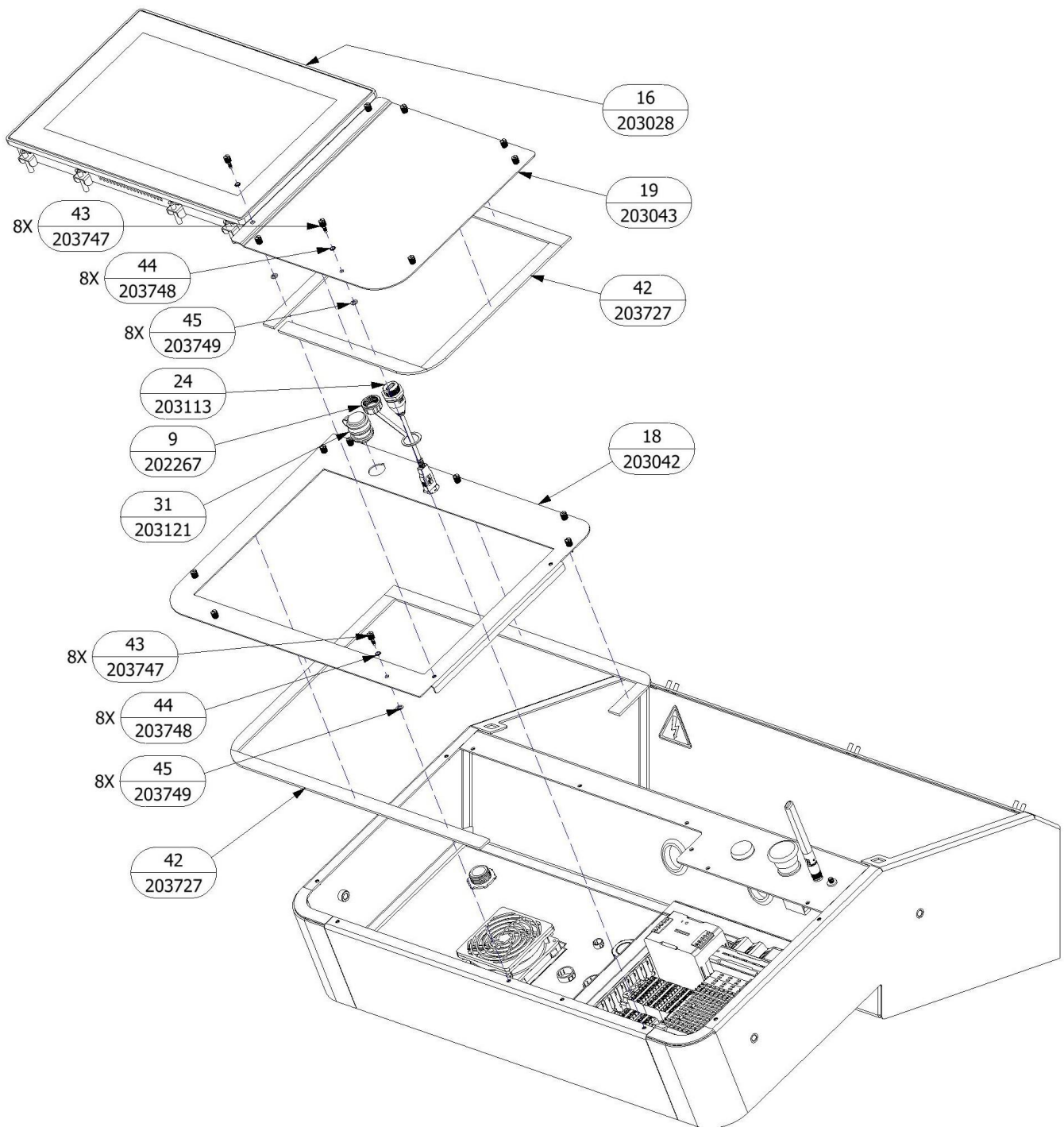


Figure 170: Premier (X) Console Assembly - B

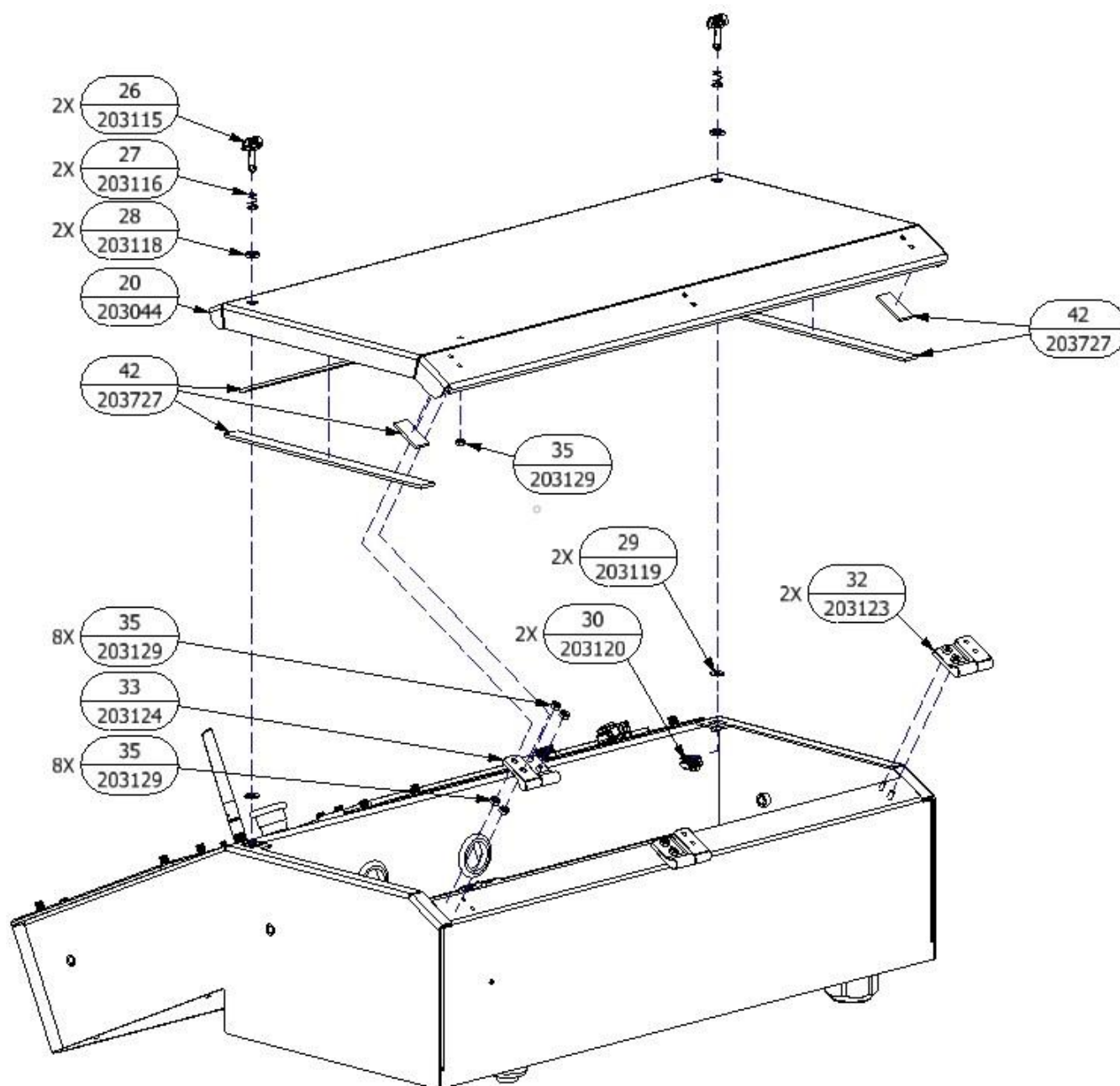


Figure 171: Premier (X) Console Assembly - C

PREMIER (X) CONSOLE ASSEMBLY (203052)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	201011	CABLE, GY, 3 X 22 AWG UNSHIELDED	300 in
2	201218	E-STOP PUSH-TWIST	1
3	201219	CONTACT BLOCK, NON-LIGHTED SPST, NC	1
4	201228	LIGHT UNIT, GREEN, 240VAC	1
5	201567	FAN, DC BRUSHLESS, 24 VDC	1
6	201920	COVER, FAN, 92mm	1
7	202143	PLUG, LOCKING, Ø1.125, NYLON	1
8	202148	BOTTOM PLATE WIRES	1
9	202267	CAP, USB, PHD(X)-2	1
10	202269	CABLE, CAT5E, 24.000	2
11	202290	GRMT,1.500GW,1.250ID,0.093GD,SBR	3
12	202342	USB STICK, 8 GB	1
13	202343	MEMORY CARD, SDHD, 32GB	1
14	202503	WIRES, CONSOLE, 3HP, 3PH, 220V, PHD	1
15	202863	PHCS, #8-32 x 0.375, ZP	6
16	203028	TOUCHSCREEN, CAPACITIVE, 15 in	1
17	203041	WELDMENT, ENCLOSURE, PRMR	1
18	203042	COVER, HMI, PREMIER	1
19	203043	COVER, PLC ACCESS, PREMIER	1
20	203044	COVER, HINGED, PREMIER	1
21	203048	BTM PLT ASSY, 3Ø, 220V, PRMR	1
22	203049	ASSY, BTM PLT, PLC, PRMR	1
23	203112	STRAIGHT CONDUIT CONNECTOR, 1"	2
24	203113	CABLE, USB, WP, M-F, 0.5m	1
25	203114	BULKHEAD, SMA, WP, F-F	2
26	203115	WING STUD, 1/4 TURN, 075	2
27	203116	SPRING, 045 - 070, 1/4 TURN,SS	2
28	203118	SELF-EJECTING CUP, 1/4 TURN	2
29	203119	RETAINER, SPLIT, 1/4 TURN	2
30	203120	RCPT, 1/4 TURN, MINI SNAP-IN	2
31	203121	BULKHEAD, RJ45, SOCKET	1
32	203123	HINGE, CONSTANT TORQUE, TYPE A	2
33	203124	HINGE, CONSTANT TORQUE, TYPE B	1
34	203127	CABLE, SMA, M-M, 12"	1
35	203129	NUT, K-LOCK, #10-32, ZP	15
36	203130	PHCS, #8-32 x 0.250, ZP	4
37	203215	PLUG, SHORTY, .500	1
38	203236	ANTENNA, 90, SMA	1
39	203264	FAN GAURD, PUSH ON, 92 mm	1

ITEM	PART NUMBER	DESCRIPTION	QTY
40	203278	CABLE, CAT5E, 36.000"	1
41	203333	SECONDARY ESTOP CONTACT N/C	1
42	203727	FOAM TAPE, 1/8" X 3/4", PVC	147 in
43	203747	SCREW CAPTIVE 8-32 X 1/2"	16
44	203748	SPRING, TAPERED 1/4"	16
45	203749	PUSH NUT #8	16
46	203820	PLUG, LOCKING, Ø.875, NYLON	1
47	EL-00052	SOLENOID VALVE CONNECTOR	2
48	EL-00053	SOLENOID VALVE CONN GASKET	2
49	EL-00088-01A	HEYCO SR INCOMING POWER	1
50	EL-100	ROTARY DISCONNECT, 80A, 3 POLE	1
51	EL-103	DOOR MOUNTING KIT	1
52	EL-105	SELECTOR HANDLE, RED	1
53	EL-158	MIRCO CORDSET 90 DEGREE CONNECT	6
54	EL-169	4 WIRE CORD GRIP	1
55	EL-170	TVS, 1500W, 22V, BI-DIRECTIONAL	2
56	EL-05230-02	STRAIGHT CONDUIT CONNECTOR, 3/4	3
57	LB-05006	LABEL, HIGH VOLTAGE	1
58	RM-E20-7-510	THERMOCOUPLE WIRE, 20GA	1 ft

20.17.2 PREMIER (X) PLC PLATE ASSEMBLY

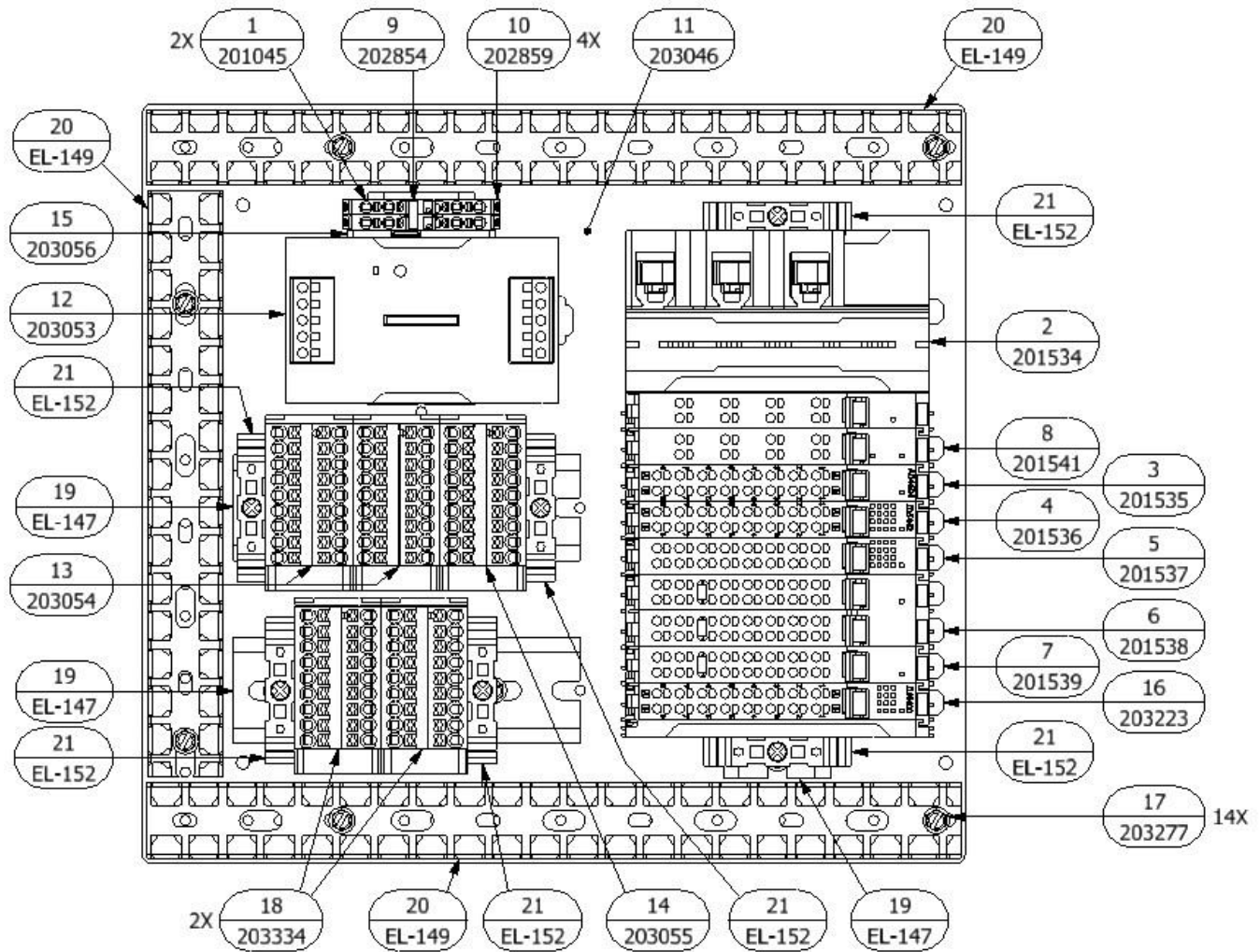


Figure 172: Premier (X) PLC Plate Assembly (203049)

PREMIER (X) PLC PLATE ASSEMBLY (203049)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	201045	TERM BLOCK GROUND PUSH TO CONN	2
2	201534	PLC, NO SQL, PHD MACHINES	1
3	201535	SLICE, ANALOG INPUT, 8 CHANNEL	1
4	201536	SLICE, DIGITAL INPUT, 16 CHANN	1
5	201537	SLICE, DIGITAL OUTPUT, 16 CHANN	1
6	201538	SLICE, THERMOCOUPLE INPUT, 4 C	1
7	201539	SLICE THERMOCOUPLE INPUT, 2 C	1
8	201541	SLICE, I/O POWER FEED, 5-24VDC	1
9	202854	BRIDGE, PLUG-IN, 2 POS, 5.2mm	1
10	202859	MARKER, TERMINAL BLOCK, 5.2mm	4
11	203046	BOTTOM PLATE, LV, PREMIER	1
12	203053	POWER SUPPLY, 5A, 230VAC/24VDC	1
13	203054	DISTR BLOCK, 18 x 2.5mm, BLK	2
14	203055	DISTR BLOCK, 18 x 2.5mm, RED	1
15	203056	END COVER, PUSH-IN, 5.2mm	1
16	203223	SLICE, I/O LINK MASTER	1
17	203277	HHCS, ST, #8-32 x 0.250, ZP	14
18	203334	DISTR BLOCK 18 x 2.5mm, GRY	2
19	EL-147	DIN RAIL, 35mm x 7.5mm	20 in
20	EL-149	WIRE DUCT, 25mm x 60mm	30 in
21	EL-152	END STOP, 35mm	6

20.17.3 MACH 2 CONSOLE ASSEMBLY

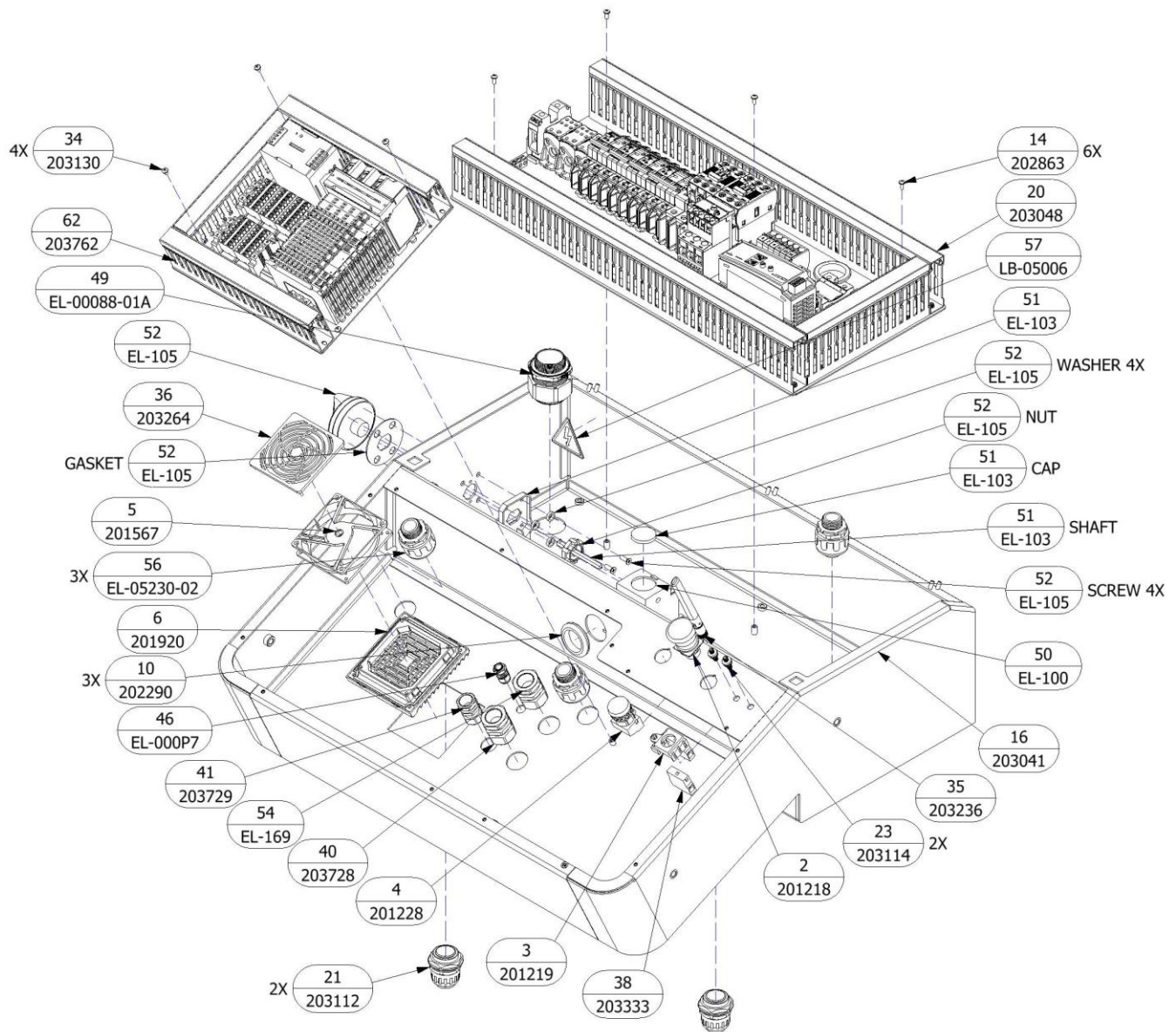


Figure 173: MACH 2 Console Assembly - A

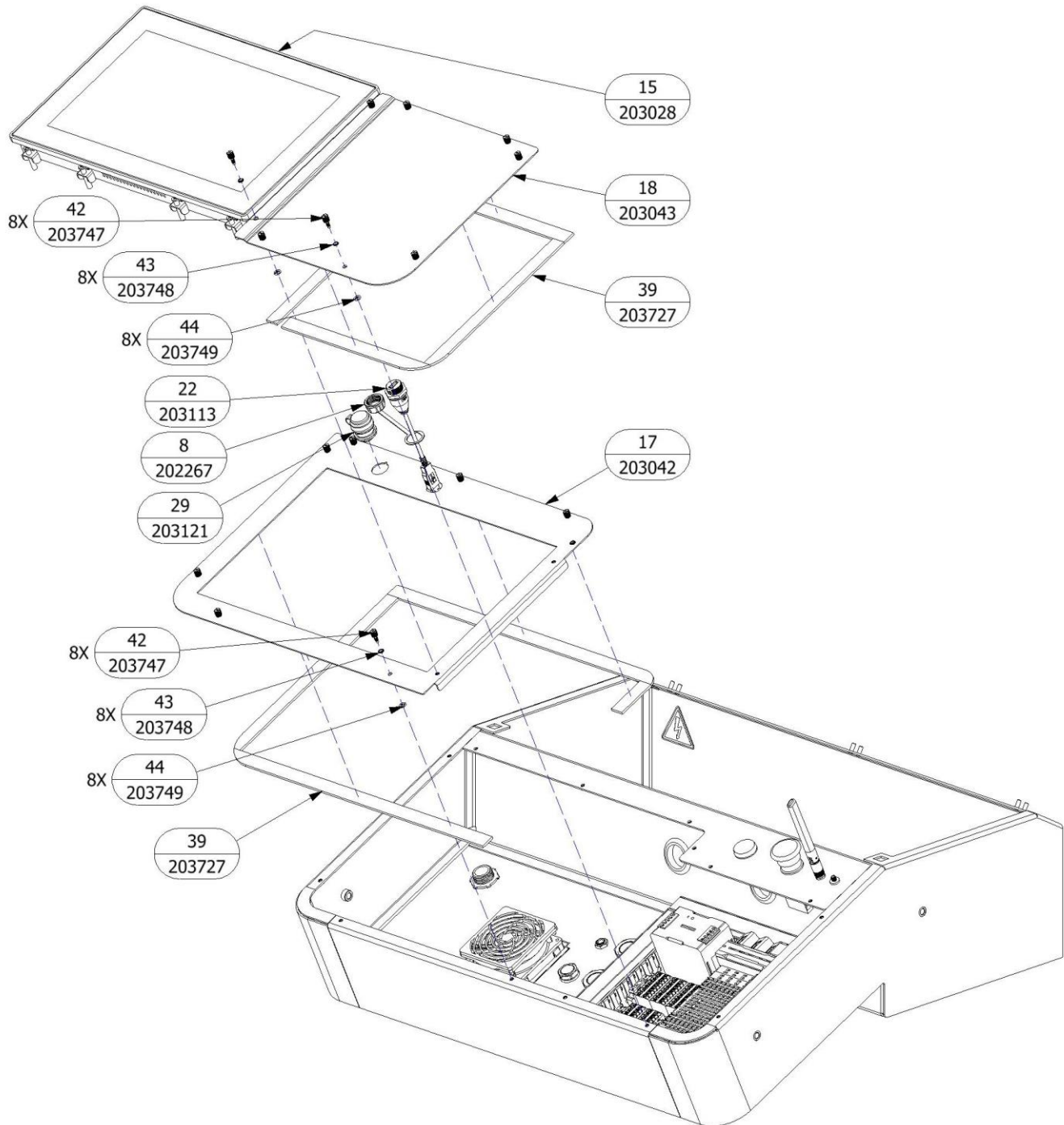


Figure 174: MACH 2 Console Assembly - B

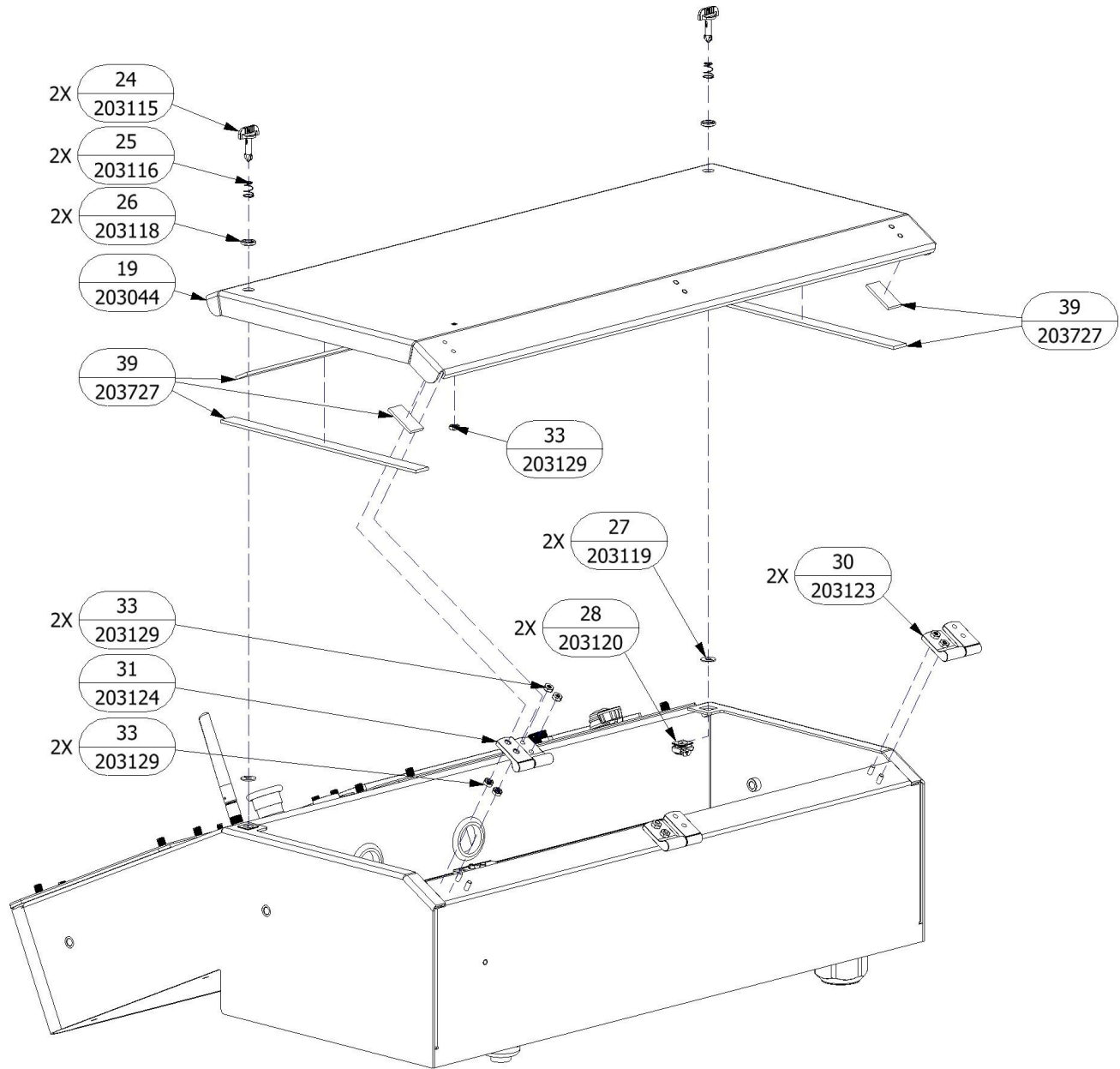


Figure 175: MACH 2 Console Assembly - C

MACH 2 CONSOLE ASSEMBLY (203763)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	201011	CABLE, GY, 3 X 22 AWG UNSHIELDED	300 in
2	201218	E-STOP PUSH-TWIST	1
3	201219	CONTACT BLOCK, NON-LIGHTED SPST, NC	1
4	201228	LIGHT UNIT, GREEN, 240VAC	1
5	201567	FAN, DC BRUSHLESS, 24 VDC	1
6	201920	COVER, FAN, 92mm	1
8	202148	BOTTOM PLATE WIRES	1
9	202267	CAP, USB, PHD(X)-2	1
10	202269	CABLE, CAT5E, 24.000	2
11	202290	GRMT,1.500GW,1.250ID,0.093GD,SBR	3
12	202342	USB STICK, 8 GB	1
13	202343	MEMORY CARD, SDHD, 32GB	1
14	202503	WIRES, CONSOLE, 3HP, 3PH, 220V, PHD	1
15	202863	PHCS, #8-32 x 0.375, ZP	6
16	203028	TOUCHSCREEN, CAPACITIVE, 15 in	1
17	203041	WELDMENT, ENCLOSURE, PRMR	1
18	203042	COVER, HMI, PREMIER	1
19	203043	COVER, PLC ACCESS, PREMIER	1
20	203044	COVER, HINGED, PREMIER	1
21	203048	BTM PLT ASSY, 3Ø, 220V, PRMR	1
23	203112	STRAIGHT CONDUIT CONNECTOR, 1"	2
24	203113	CABLE, USB, WP, M-F, 0.5m	1
25	203114	BULKHEAD, SMA, WP, F-F	2
26	203115	WING STUD, 1/4 TURN, 075	2
27	203116	SPRING, 045 - 070, 1/4 TURN,SS	2
28	203118	SELF-EJECTING CUP, 1/4 TURN	2
29	203119	RETAINER, SPLIT, 1/4 TURN	2
30	203120	RCPT, 1/4 TURN, MINI SNAP-IN	2
31	203121	BULKHEAD, RJ45, SOCKET	1
32	203123	HINGE, CONSTANT TORQUE, TYPE A	2
33	203124	HINGE, CONSTANT TORQUE, TYPE B	1
34	203127	CABLE, SMA, M-M, 12"	1
35	203129	NUT, K-LOCK, #10-32, ZP	15
36	203130	PHCS, #8-32 x 0.250, ZP	4
38	203236	ANTENNA, 90, SMA	1
39	203264	FAN GAURD, PUSH ON, 92 mm	1
40	203278	CABLE, CAT5E, 36.000"	1
41	203333	SECONDARY ESTOP CONTACT N/C	1

ITEM	PART NUMBER	DESCRIPTION	QTY
42	203727	FOAM TAPE, 1/8" X 3/4", PVC	147 in
43	203728	CORD GRIP, 3/4NPT, 4 WIRE .24	1
44	203729	CORD GRIP, 1/2NPT, 2 WIRE .20	1
45	203747	SCREW CAPTIVE 8-32 X 1/2"	16
46	203748	SPRING, TAPERED 1/4"	16
47	203749	PUSH NUT #8	16
49	EL-000P7	HEYCO SR THERMOCOUPLE	1
50	EL-00052	SOLENOID VALVE CONNECTOR	2
51	EL-00053	SOLENOID VALVE CONN GASKET	2
52	EL-00088-01A	HEYCO SR INCOMING POWER	1
53	EL-100	ROTARY DISCONNECT, 80A, 3 POLE	1
54	EL-103	DOOR MOUNTING KIT	1
55	EL-105	SELECTOR HANDLE, RED	1
56	EL-158	MIRCO CORDSET 90 DEGREE CONNECT	6
57	EL-169	4 WIRE CORD GRIP	1
58	EL-170	TVS, 1500W, 22V, BI-DIRECTIONAL	2
59	EL-05230-02	STRAIGHT CONDUIT CONNECTOR, 3/4	3
60	LB-05006	LABEL, HIGH VOLTAGE	1
61	RM-E20-7-510	THERMOCOUPLE WIRE, 20GA	1 ft
62	203762	ASSY, BTM PLT, PLC, PRMR M2	1

20.17.4 MACH 2 PLC PLATE ASSEMBLY

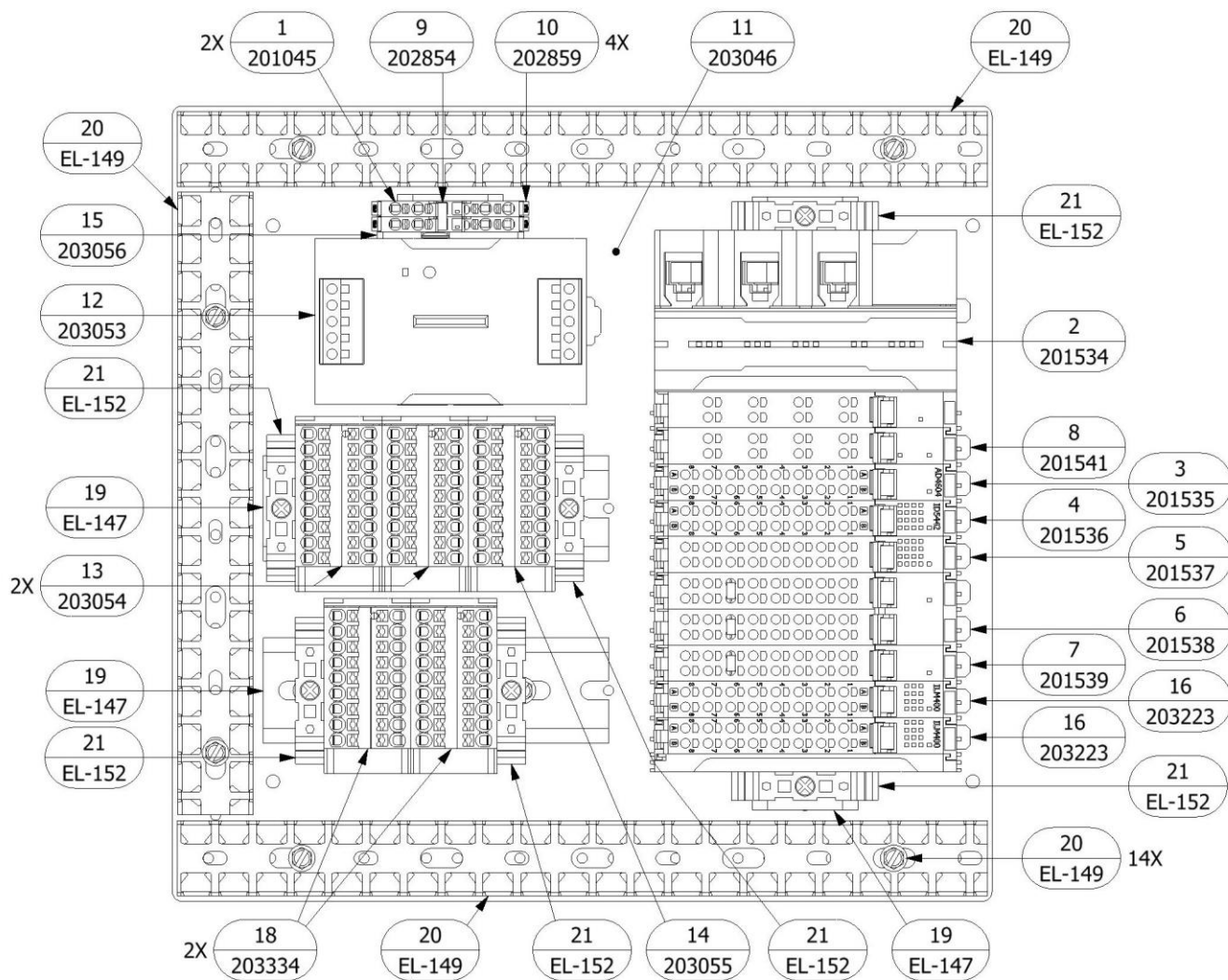


Figure 176: MACH 2 PLC Plate Assembly (203762)

MACH 2 PLC PLATE ASSEMBLY (203762)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	201045	TERM BLOCK GROUND PUSH TO CONN	2
2	201534	PLC, NO SQL, PHD MACHINES	1
3	201535	SLICE, ANALOG INPUT, 8 CHANNEL	1
4	201536	SLICE, DIGITAL INPUT, 16 CHANN	1
5	201537	SLICE, DIGITAL OUTPUT, 16 CHANN	1
6	201538	SLICE, THERMOCOUPLE INPUT, 4 C	1
7	201539	SLICE THERMOCOUPLE INPUT, 2 C	1
8	201541	SLICE, I/O POWER FEED, 5-24VDC	1
9	202854	BRIDGE, PLUG-IN, 2 POS, 5.2mm	1
10	202859	MARKER, TERMINAL BLOCK, 5.2mm	4
11	203046	BOTTOM PLATE, LV, PREMIER	1
12	203053	POWER SUPPLY, 5A, 230VAC/24VDC	1
13	203054	DISTR BLOCK, 18 x 2.5mm, BLK	2
14	203055	DISTR BLOCK, 18 x 2.5mm, RED	1
15	203056	END COVER, PUSH-IN, 5.2mm	1
16	203223	SLICE, I/O LINK MASTER	2
17	203277	HHCS, ST, #8-32 x 0.250, ZP	14
18	203334	DISTR BLOCK 18 x 2.5mm, GRY	2
19	EL-147	DIN RAIL, 35mm x 7.5mm	20 in
20	EL-149	WIRE DUCT, 25mm x 60mm	30 in
21	EL-152	END STOP, 35mm	6

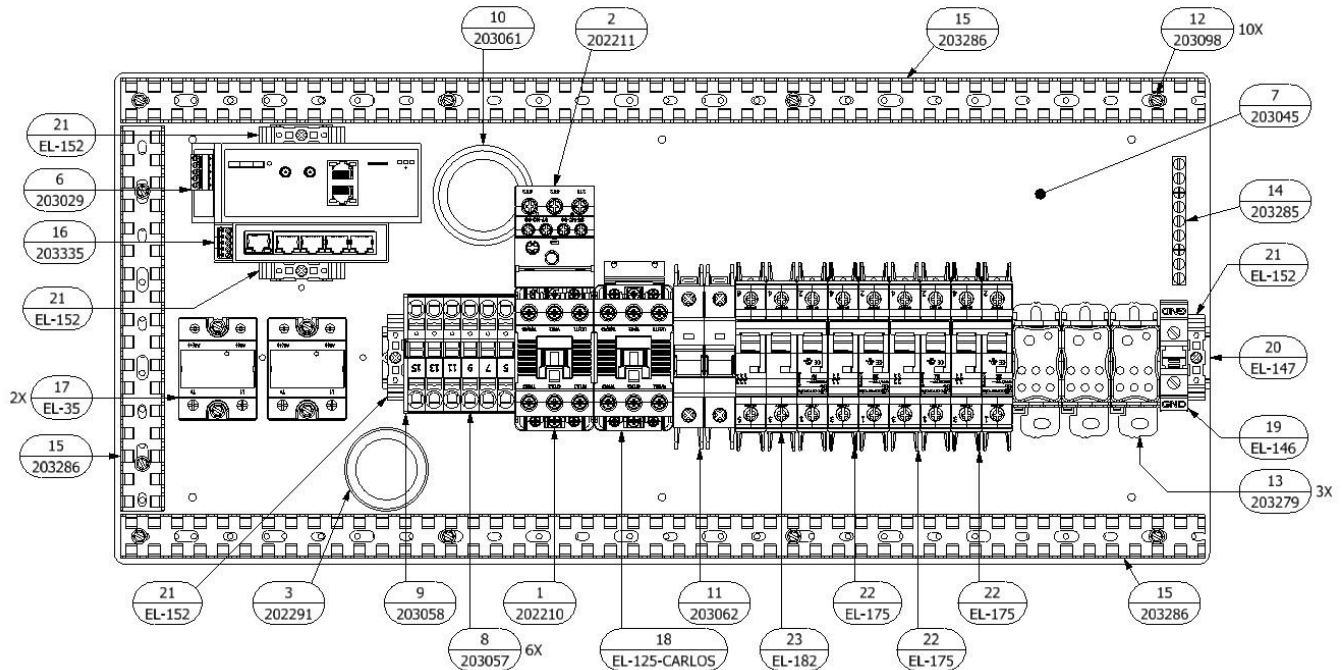
20.17.1 HIGH VOLTAGE PLATE ASSEMBLY

Figure 177: High Voltage Plate Assembly (203048)

HIGH VOLTAGE PLATE ASSEMBLY (203048)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	202210	CONTACTOR, 32A, 24VDC COIL, CG	1
2	202211	MOTOR OVERLOAD	1
3	202291	GRMT, 1.625GW, 1.375ID, 0.125GD, SBR	1
4	202860	MARKER, TERMINAL BLOCK, 10.2mm	6
5	202862	MARKER, TERMINAL BLOCK, 16 mm	2
6	203029	ROUTER, CELLULAR, VZW	1
7	203045	BOTTOM PLATE, HV, PREMIER	1
8	203057	TB, PUSH-IN, 10.2mm	6
9	203058	END COVER, 10.2mm	1
10	203061	GRMT,2.000GW,1.625ID,0.063GD,S	1
11	203062	CIRCUIT BREAKER, 7A, 2 POLE	1
12	203098	HHCS, ST, #8-32 x 0.375, ZP	20
13	203279	DIST BLK, 125A, 7 TERM	3
14	203285	GROUND BAR, 7 TERMINAL	1
15	203286	WIRE DUCT, 1.000 x 3.150, PVC	57 in
16	203335	ETHERNET SWITCH 5 PORT	1
17	EL-35	RELAY, 100 AMP, 480V	2
18	EL-125-CARLOS	CONTACTOR, 40A, 24V, W/SURGE	1
19	EL-146	TERMINAL BLOCK, 16mm, GRND	1
20	EL-147	DIN RAIL, 35mm x 7.5mm	22 in
21	EL-152	END STOP, 35mm	4
22	EL-175	CIRCUIT BREAKER, 50A, 2 POLE	3
23	EL-182	CIRCUIT BREAKER, 32A, 3 POLE	1

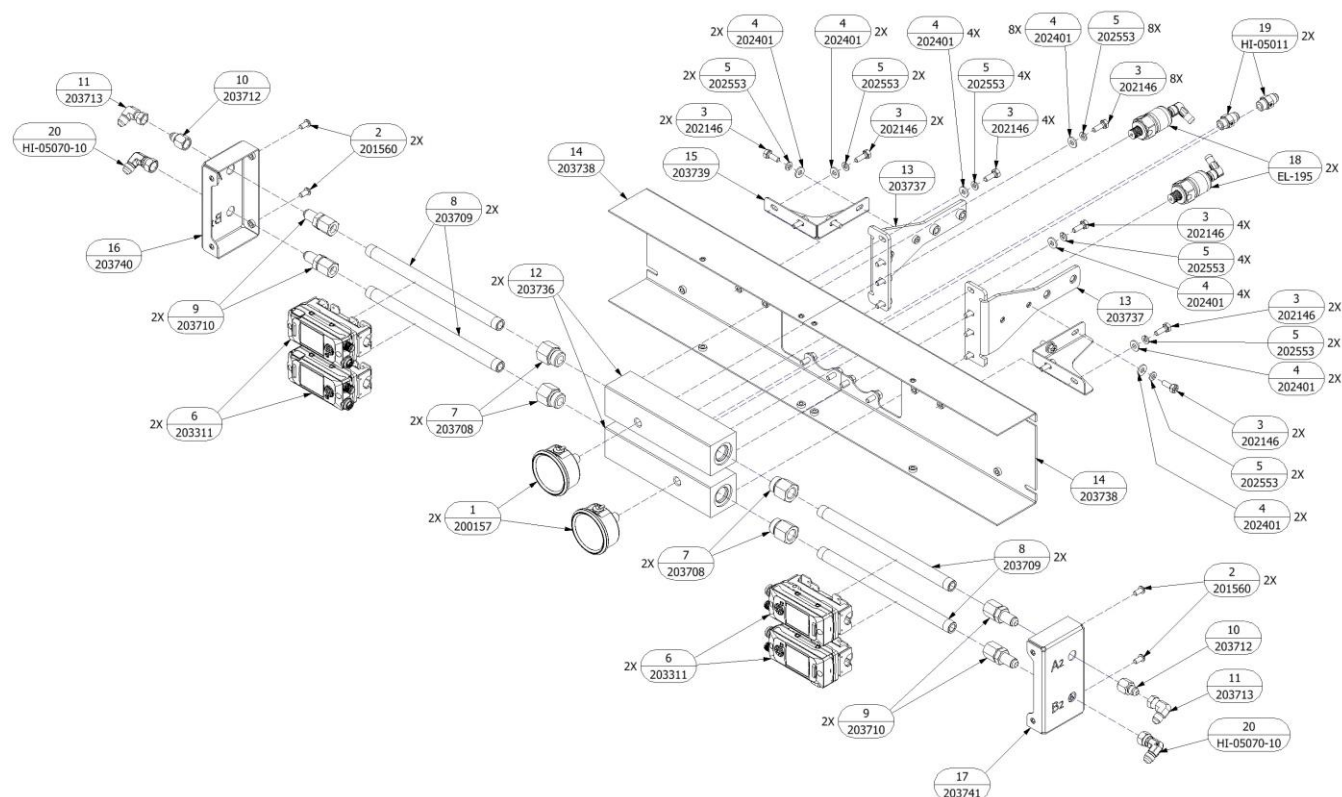
20.18 MACH 2 MANIFOLD

Figure 178: Mach 2 Manifold (203746)

MACH 2 MANIFOLD (203746)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	200157	GAUGE, BACK MOUNT, 0-3000 PSI	2
2	201560	BHCS, 1/4-20 x 0.500, 18-8 SS	4
3	202146	HHCS, 1/4-20 x 0.750, ZP8	24
4	202401	WASHER, FLAT, SAE, 1/4, ZP	24
5	202553	WASHER, LOCK, 1/4, ZP	24
6	203311	FLOW METER, CLAMP-ON, UT, PRG	4
7	203708	FTG, STR -10 ORB X 3/8 FNPT	4
8	203709	PIPE, 3/8 NPT, 10.00", SS	4
9	203710	FTG, 3/8 FNPT X -6 JIC BLKHD	4
10	203712	FTG, STR -6 JIC F X -5 JIC M	2
11	203713	FTG, 90 EL -5 JIC SWVL F X M	2
12	203736	MANIFOLD, OUTLET, PRMR M2	2
13	203737	BRACKET, MANIFOLD, PRMR M2	2
14	203738	CHANNEL, PIPE SPRT, PRMR M2	2
15	203739	BRACE, MANIFOLD BRKT, PRMR M2	2
16	203740	SUPPORT, PIPES LEFT, PRMR M2	1
17	203741	SUPPORT, PIPES RIGHT, PRMR M2	1
18	EL-195	TRANSDUCER 0-5000psi	2
19	HI-05011	FTG, STR -6 ORB X -6 JIC M	2
20	HI-05070-10	FTG, 90 EL -6 JIC SWVL F X M	2

20.19 PREMIER (X) FINAL ASSEMBLY

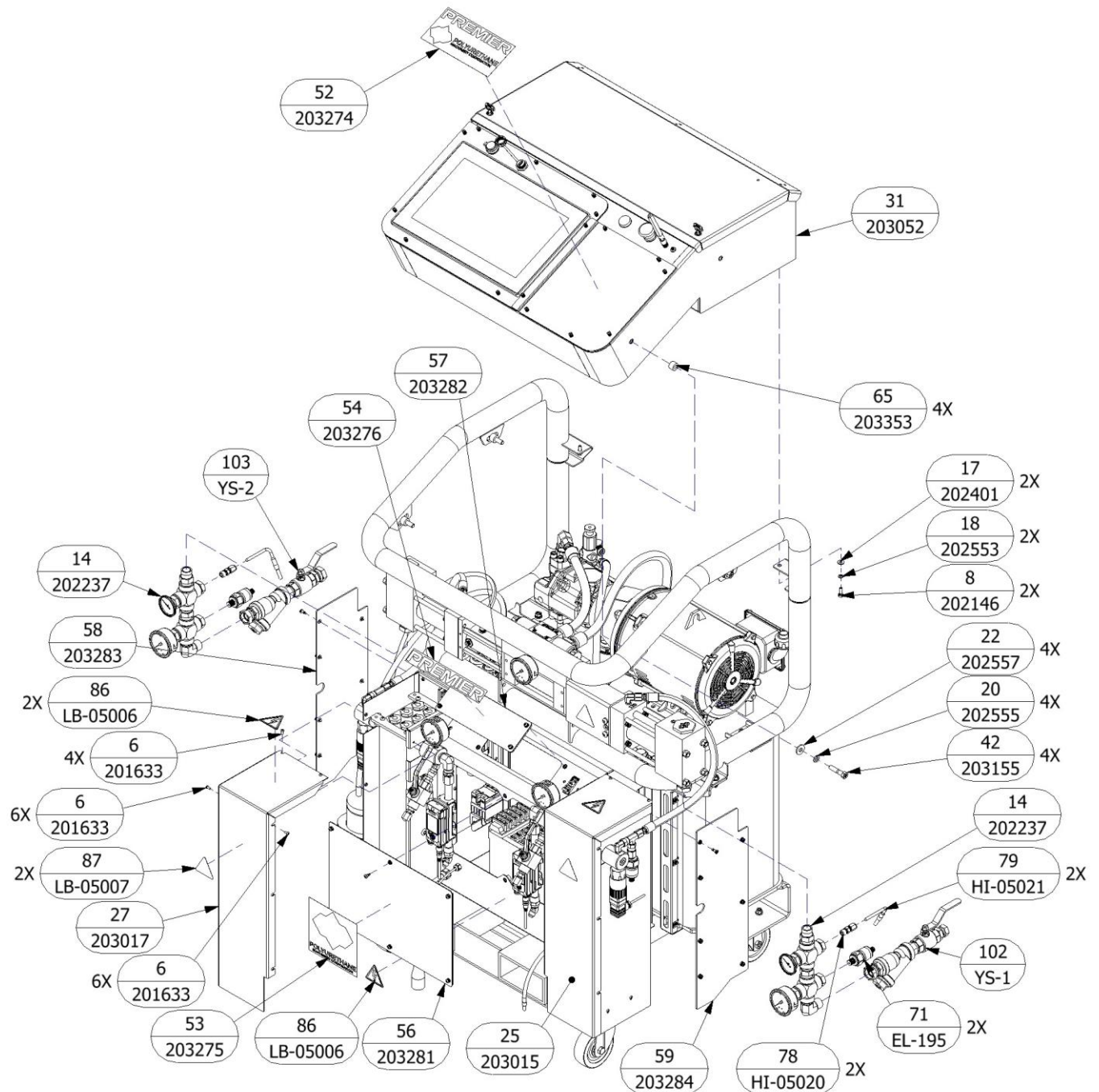


Figure 179: Premier (X) Final Assembly – A

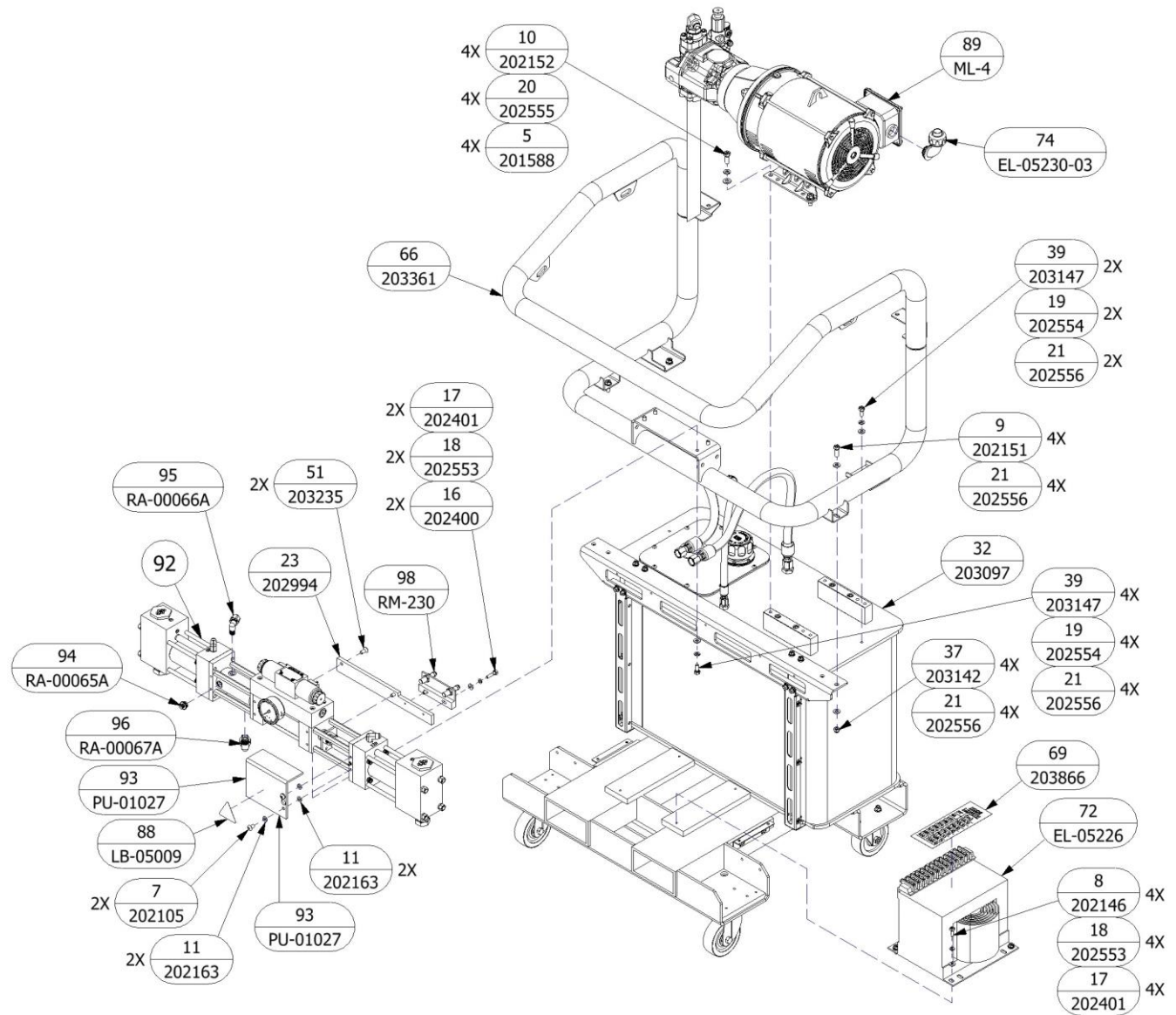


Figure 180: Premier (X) Final Assembly - B

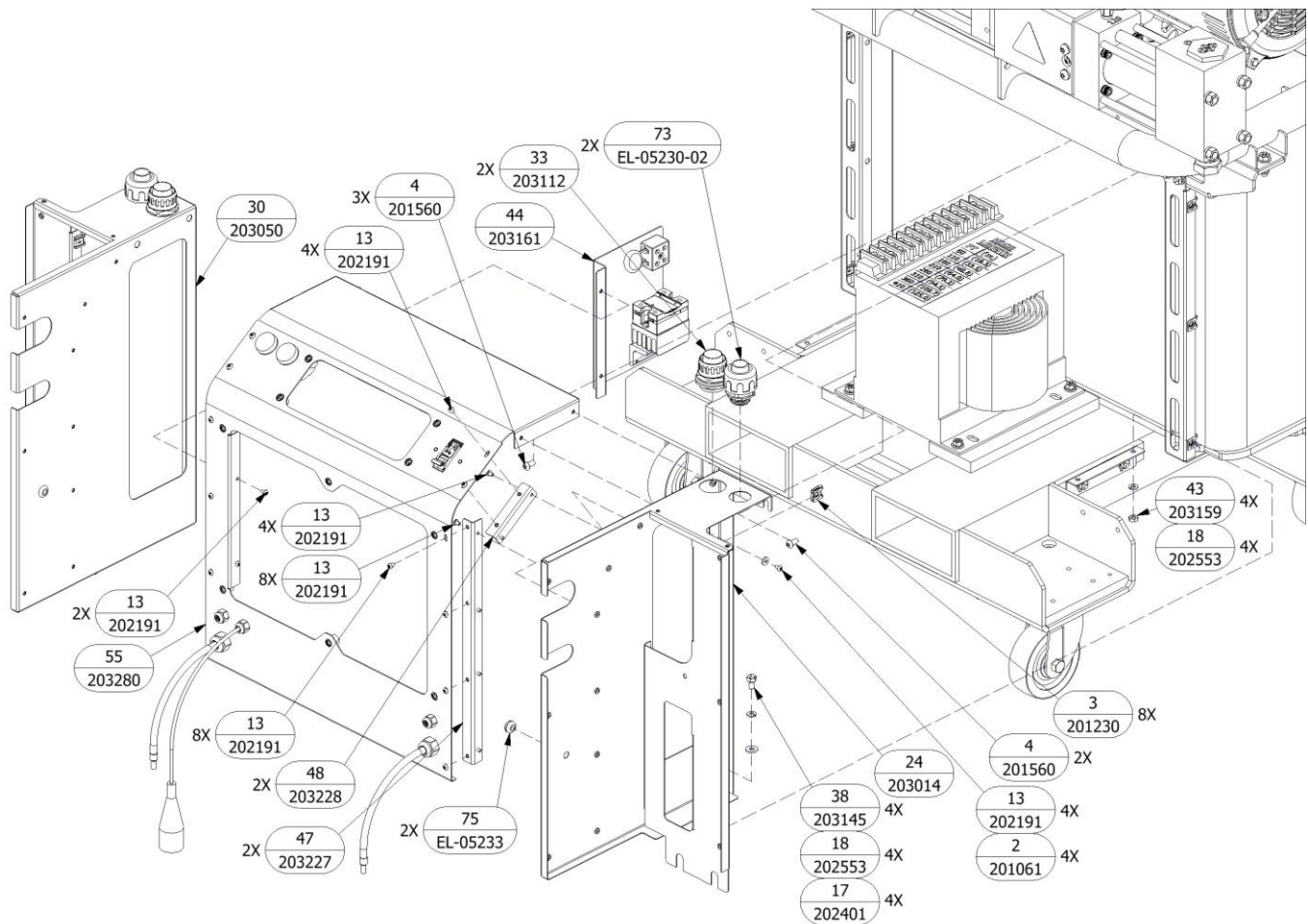


Figure 181: Premier (X) Final Assembly - C

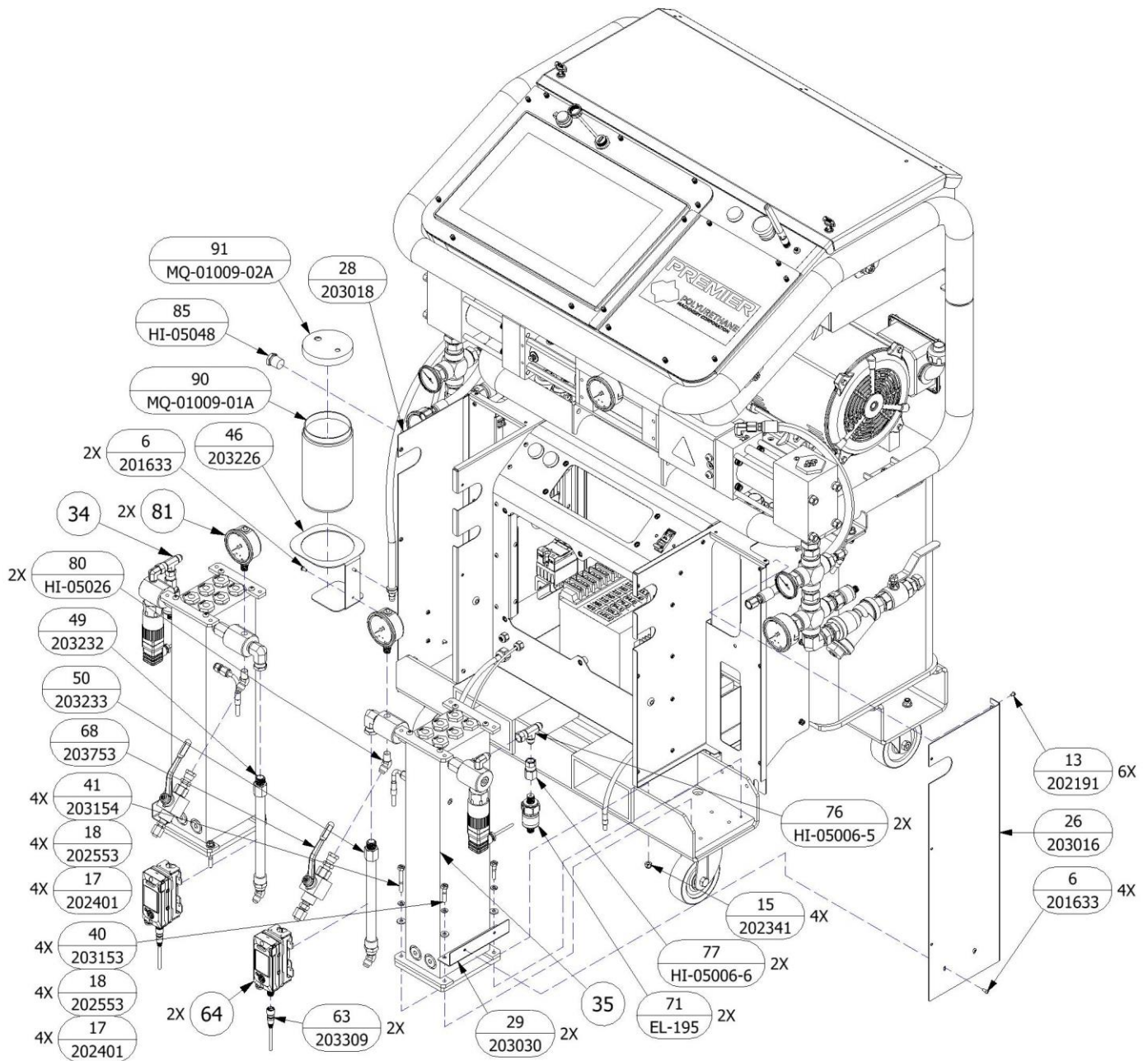


Figure 182: Premier (X) Final Assembly - D

PREMIER (X)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	200936	FERRULE, QD FEMALE, 18AWG, RD	4
2	201061	WASHER, FLAT, SAE, #8, 18-8 SS	4
3	201230	RECEPTACLE, 82 QUARTER TURN	8
4	201560	BHCS, 1/4-20 x 0.500, 18-8 SS	5
5	201588	WASHER, FLAT, SAE, 3/8, 18-8 SS	4
6	201633	BHCS, #8-32 x 0.375, 18-8 SS	22
7	202105	BHCS, 5/16-18 x 0.500, 18-8 SS	2
8	202146	HHCS, 1/4-20 x 0.750, ZP8	6
9	202151	HHCS, 5/16-18 x 1.000, ZP8	4
10	202152	HHCS, 3/8-16 x 1.000, ZP8	4
11	202163	WASHER, .562 OD x .290 ID, NEOPRENE	4
12	202174	WIRE NUT, #18-14AWG, PROCELAIN	10 in
13	202191	BHCS, #8-32 x 0.250, 18-8 SS	36
14	202237	INLET ASSY, A/B, BASE, PREMIER	2
15	202341	NUT, NYLOC, 1/4-20, ZP	4
16	202400	HHCS, 1/4-20 x 1.125, ZP5	2
17	202401	WASHER, FLAT, SAE, 1/4, ZP	20
18	202553	WASHER, LOCK, 1/4, ZP	24
19	202554	WASHER, LOCK, 5/16, ZP	6
20	202555	WASHER, LOCK, 3/8, ZP	8
21	202556	WASHER, FLAT, SAE, 5/16, ZP	14
22	202557	WASHER, FLAT, USS, 3/8, ZP	4
23	202994	SUPPORT, PROX SW, PREMIER	1
24	203014	RH BASE, HEAT COVER, PREMIER	1
25	203015	RH HEATER COVER, PREMEIR	1
26	203016	RH HEATER COVER, SIDE, PREMIER	1
27	203017	LH HEATER COVER, PREMIER	1
28	203018	LH HEATER COVER, SIDE, PREMIER	1
29	203030	SUPPORT, LOWER COVER, PREMIER	2
30	203050	LH BASE, HEAT COVER, PREMIER	1
31	203052	CONSOLE, 3PH, 220V, PREMIER	1
32	203097	FRAME ASSEMBLY, PREMIER	1
33	203112	STRAIGHT CONDUIT CONNECTOR, 1"	2
34	203122	PREHEATER, A, 9.0kW, PREMIER	1
	203717	PREHEATER, A, 10.5kW, PREMIER	1
35	203125	PREHEATER, B, 9.0kW, PREMIER	1
	203718	PREHEATER, B, 10.5kW, PREMIER	1
36	203126	CONDUIT, FLEX, 1"	3 ft
37	203142	NUT, NYLOC, 5/16-18, ZP	4
38	203145	HHCS, 1/4-20 x 0.500, ZP5	4

ITEM	PART NUMBER	DESCRIPTION	QTY
39	203147	HHCS, 5/16-18 x 0.750, ZP8	6
40	203153	HHCS, 1/4-20 x 1.250, ZP8	4
41	203154	HHCS, 1/4-20 x 2.000, ZP8	4
42	203155	HHCS, 3/8-16 x 1.750, ZP8	4
43	203159	NUT, JAM, 1/4-20, ZP5	4
44	203161	ASSEMBLY, UTILITY PLATE, PREMIER	1
45	203181	HOSE, HYDRAULIC, 1/2" X 10"	1
46	203226	BRACKET, LUBE BOTTLE, PREMIER	1
47	203227	BRACKET, XFMR COVER, VERT, PREMIER	2
48	203228	BRACKET, XFMR COVER, ANG, PREMIER	2
49	203232	FM FTGS, A-SIDE, PREMIER	1
50	203233	FM FTGS, B SIDE, PREMIER	1
51	203235	FHCS, 5/16-18 x 0.750, ZP	2
52	203274	DECAL, PLC COVER, PREMIER	1
53	203275	DECAL, XFMR, FRONT, PREMIER	1
54	203276	DETAIL, XFMR, TOP, PREMIER	1
55	203280	COVER ASSY, XFMR BASE, PRMR	1
56	203281	COVER, QT, XFMR, FRONT, PRMR	1
57	203282	COVER, QT, XFMR, TOP, PRMR	1
58	203283	COVER, QT, LEFT SIDE, PRMR	1
59	203284	COVER, QT, RIGHT SIDE, PRMR	1
60	203288	WIRE NUT, #14-12AWG, NYLON	3 in
61	203289	WIRE NUT, #10-22AWG, NYLON	1
62	203308	CABLE, FLOW METER, A, PRMR	1
63	203309	CABLE, FLOW METER, B, PRMR	1
64	203311	FLOW METER, CLAMP-ON, UT, PRG	2
	203824	FLOW METER, UT, HI-TEMP, PRG	2
65	203353	SPACER, 3/8 x .625", LDPE	4
66	203361	WELDMENT, UPPER FRAME, PREMIER	1
67	203528	PRMR XFMR WIRES 6AWG	1
68	203753	BLEED VALVE KIT, PREMIER	2
69	203866	DECAL, XFMR WIRING, PREMIER	1
70	EL-63	PREHEATER ELECTRICAL CONNECTOR	2
71	EL-195	TRANSDUCER 0-5000psi	4
72	EL-05226	120V TRANSFORMER, 5kVA, 1PH, 6	1
73	EL-05230-02	STRAIGHT CONDUIT CONNECTOR, 3/4	2
74	EL-05230-03	RT ANGLE CONDUIT CONNECTOR	1
75	EL-05233	GROMMET, REVERSING SWITCH	2
76	HI-05006-5	FTG, RUN TEE, -06 JIC, STL	2

ITEM	PART NUMBER	DESCRIPTION	QTY
77	HI-05006-6	FTG, STRT, -06 JIC SW X 1/4 FPT, STL	2
78	HI-05020	THERMOCOUPLE NUT, FERRULE, & BODY	2
79	HI-05021	E TYPE THERMOCOUPLE	2
80	HI-05026	1/4 MPT x 9/16-18 JIC 45 DEG ELBOW	2
81	HI-05028	GAUGE, PRESSURE, 0-3000 psi	2
	HI-00035	GAUGE, PRESSURE, 0-5000 psi	2
82	HI-05047	HOSE, PUMP TO HEATER	2
83	HI-05047-1	HOSE, 16.25" HYD PUMP TO TANK	1
84	HI-05047-8	HOSE ASSY	1
85	HI-05048	DRAIN PLUG	1
86	LB-05006	LABEL, HIGH VOLTAGE	3
87	LB-05007	LABEL, HOT SURFACE	2
88	LB-05009	LABEL, PINCH POINT	1
89	ML-4	MOTOR LINE ASSEMBLY; 5HP, 3PH, 60Hz	1
90	MQ-01009-01A	LUBE BOTTLE	1
91	MQ-01009-02A	LUBE BOTTLE LID	1
92	PL-1A	PUMPLINE ASSY, 120A/120B	1
93	PU-01027	ACTIVATOR PLATE COVER	1
94	RA-00065A	PLUG, PUMP CYLINDER	1
95	RA-00066A	CBMB 90 DEG MALE ELBOW NPT	1
96	RA-00067A	CBMB 90 DEG MALE ELBOW NPT	1
97	RA-00068A	CHECK VALVE, 1/4 TUBE	1
98	RM-230	MOUNTED PROXIMITY SWITCH ASSY	1
99	RM-E-64-0100	POLYFLO TUBING, 3/8"	3 ft
100	RM-E-86-0100	POLYFLOW TUBING, 1/2"	3 ft
101	RM-EL-05230-01	CONDUIT, FLEX, 3/4"	5 ft
102	YS-1	Y STRAINER ASSEMBLY, A SIDE	1
103	YS-2	Y STRAINER ASSEMBLY, B SIDE	1

20.20 MACH 2 FINAL ASSEMBLY

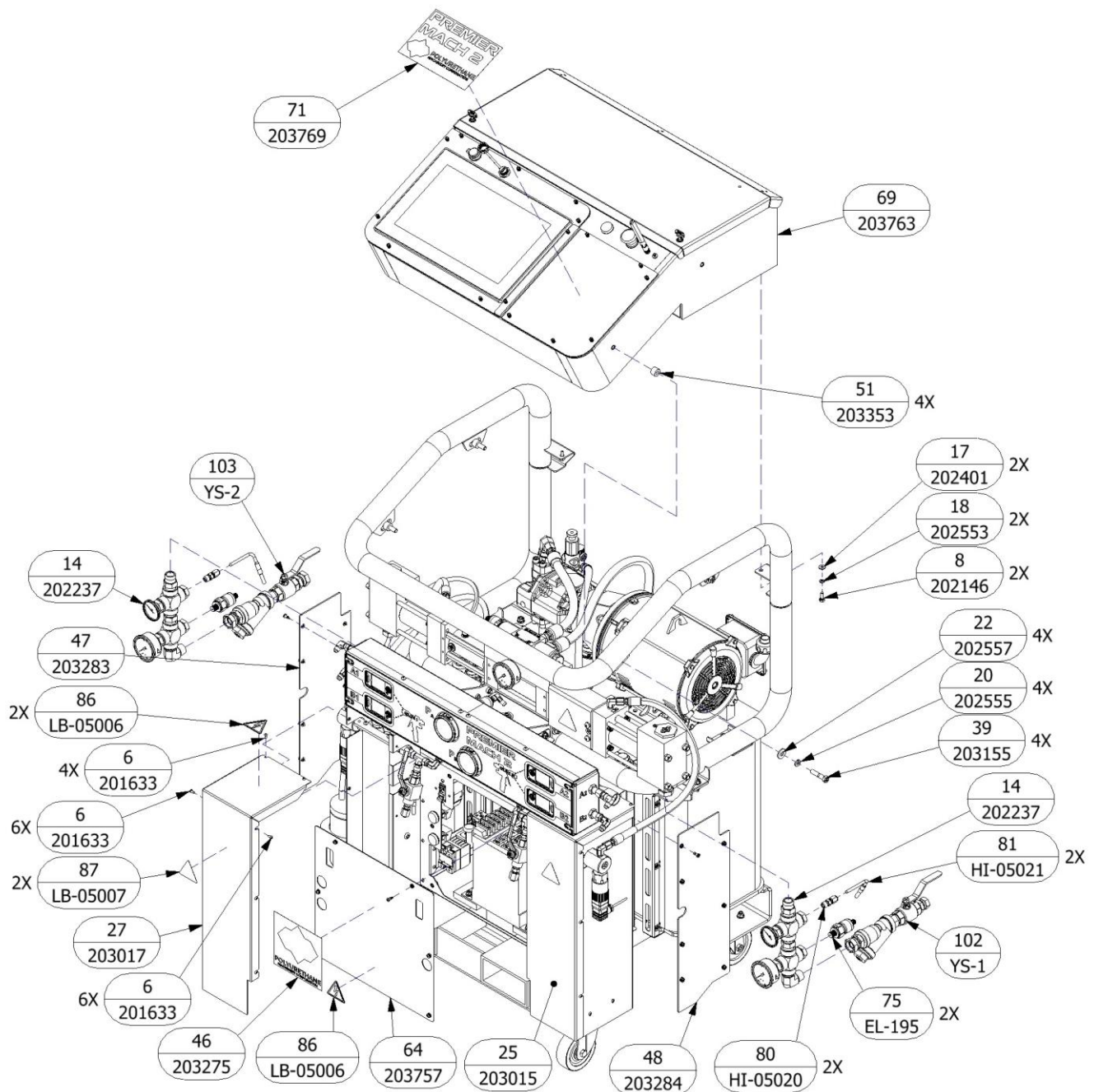


Figure 183: MACH 2 Final Assembly – A

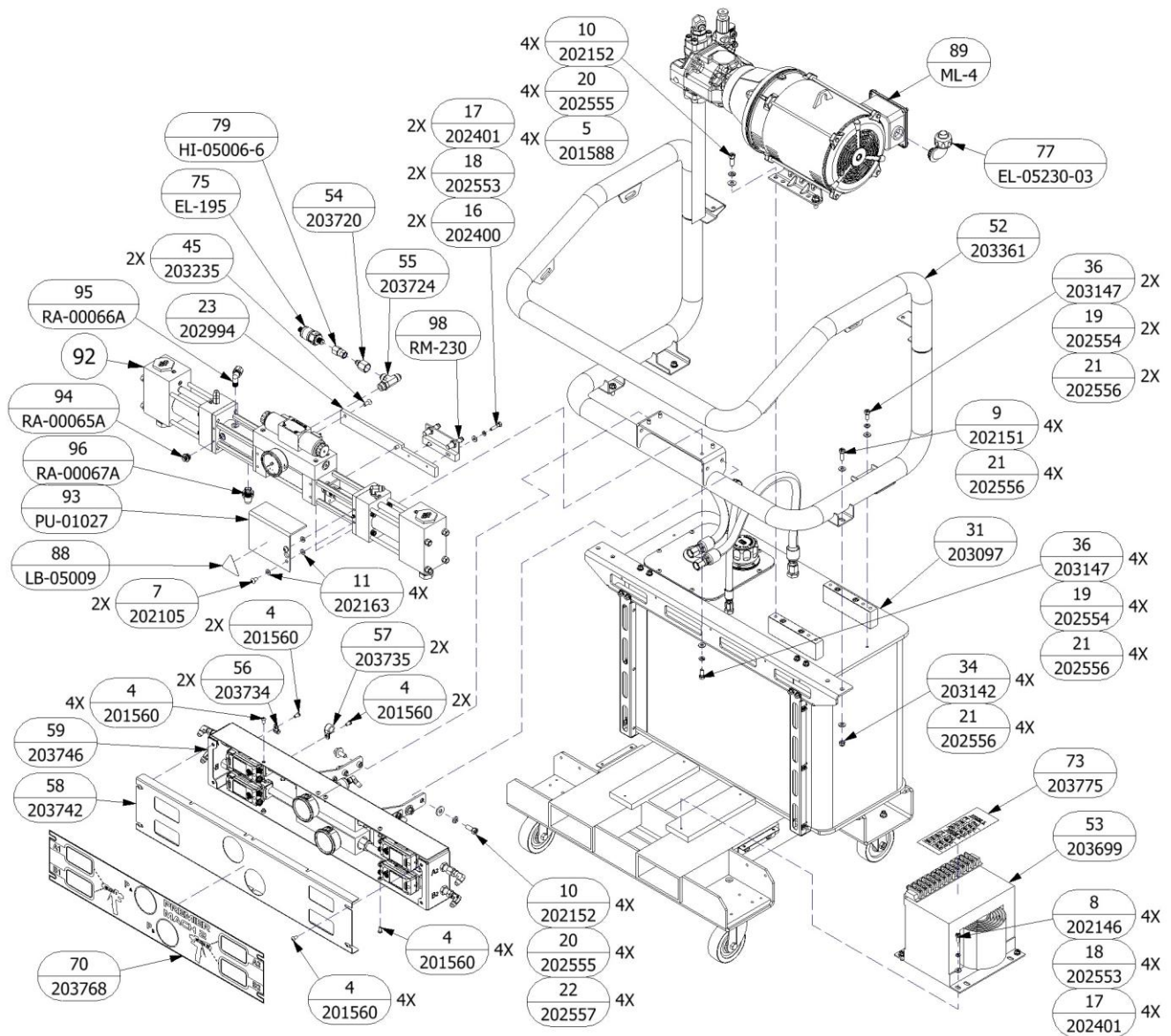


Figure 184: MACH 2 Final Assembly - B

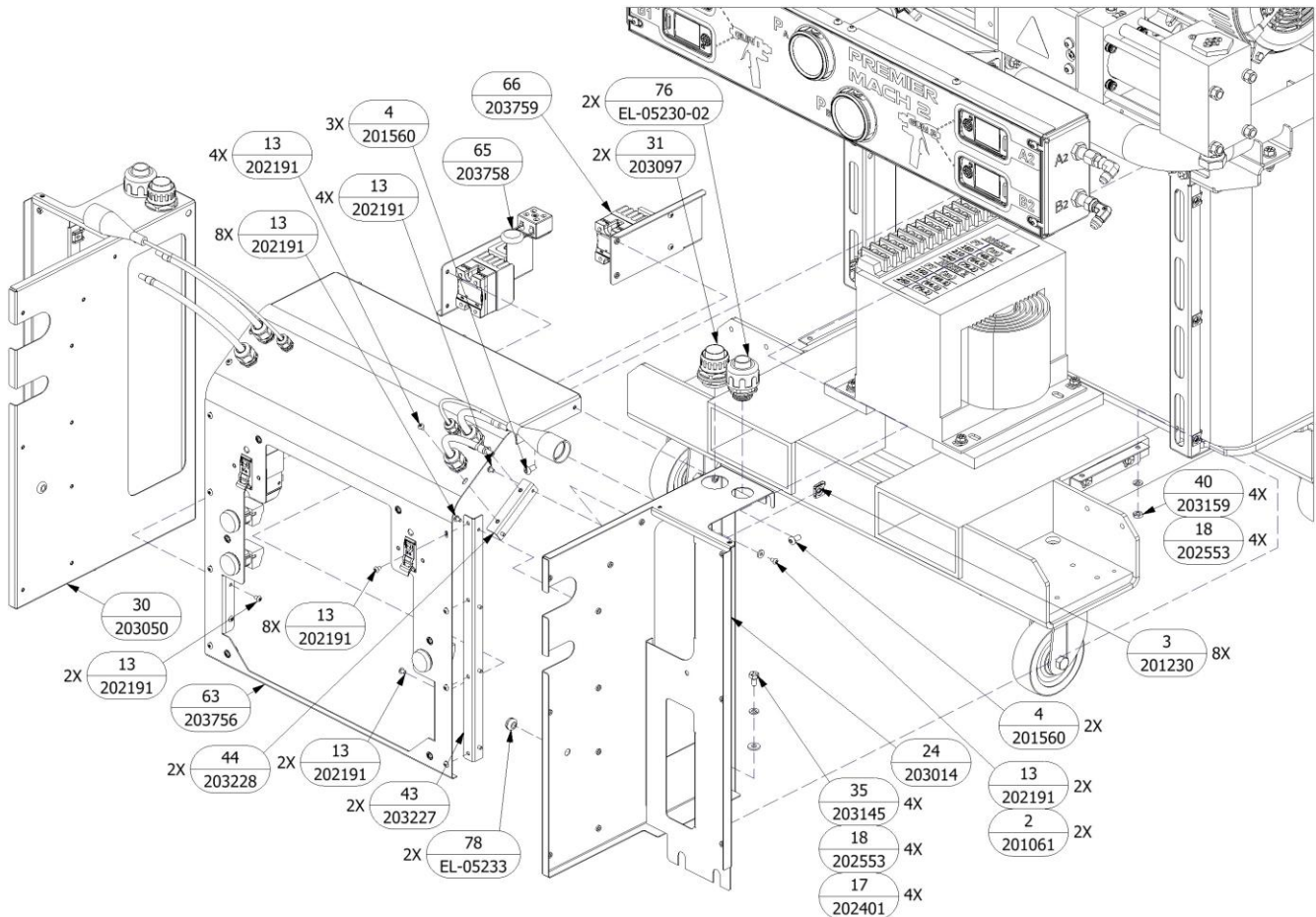


Figure 185: MACH 2 Final Assembly – C

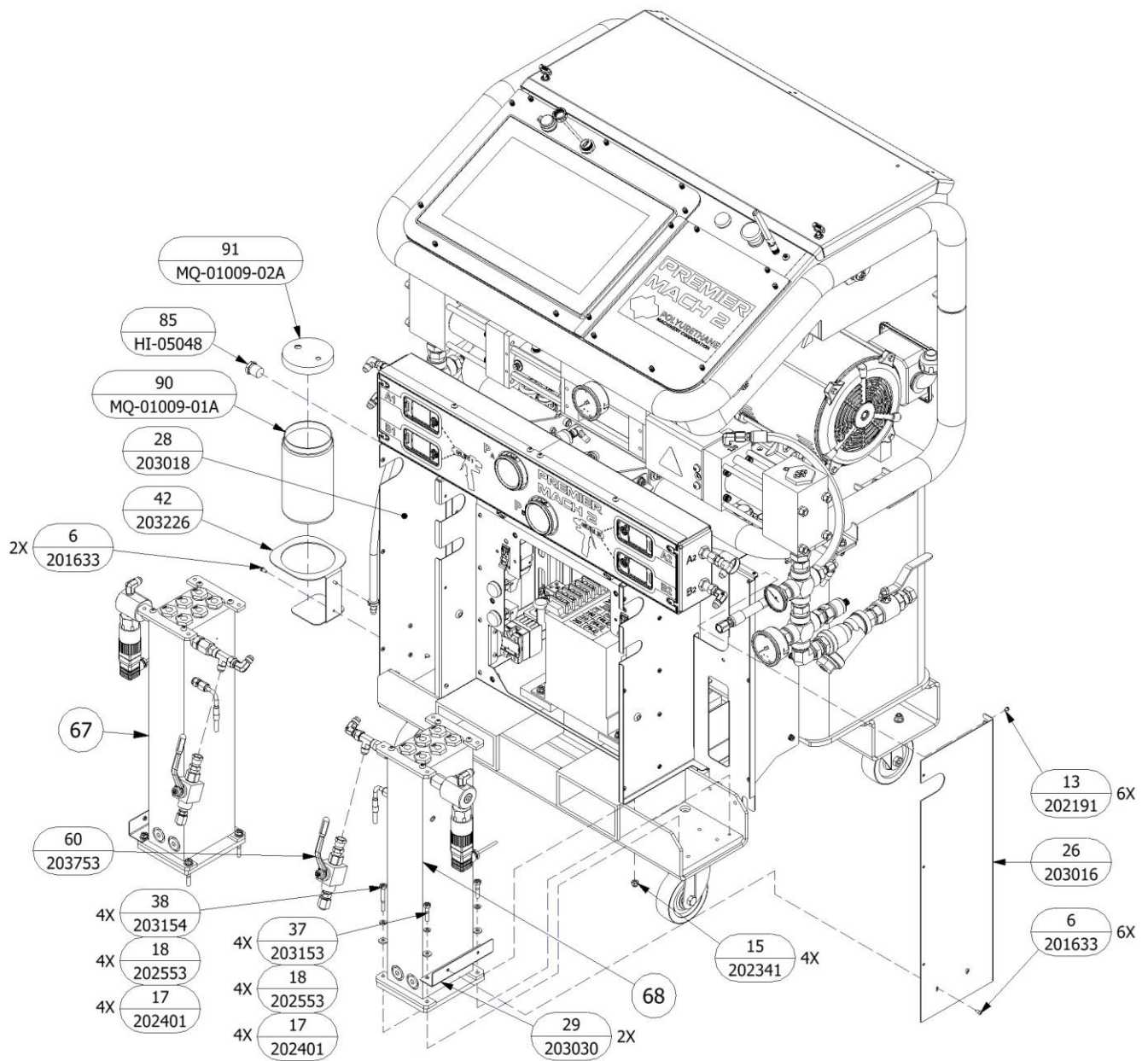


Figure 186: MACH 2 Final Assembly - D

MACH 2			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	200936	FERRULE, QD FEMALE, 18AWG, RD	4
2	201061	WASHER, FLAT, SAE, #8, 18-8 SS	4
3	201230	RECEPTACLE, 82 QUARTER TURN	8
4	201560	BHCS, 1/4-20 x 0.500, 18-8 SS	21
5	201588	WASHER, FLAT, SAE, 3/8, 18-8 SS	4
6	201633	BHCS, #8-32 x 0.375, 18-8 SS	22
7	202105	BHCS, 5/16-18 x 0.500, 18-8 SS	2
8	202146	HHCS, 1/4-20 x 0.750, ZP8	6
9	202151	HHCS, 5/16-18 x 1.000, ZP8	4
10	202152	HHCS, 3/8-16 x 1.000, ZP8	8
11	202163	WASHER, .562 OD x .290 ID, NEOPRENE	4
12	202174	WIRE NUT, #18-14AWG, PROCELAIN	12 in
13	202191	BHCS, #8-32 x 0.250, 18-8 SS	38
14	202237	INLET ASSY, A/B, BASE, PREMIER	2
15	202341	NUT, NYLOC, 1/4-20, ZP	4
16	202400	HHCS, 1/4-20 x 1.125, ZP5	2
17	202401	WASHER, FLAT, SAE, 1/4, ZP	20
18	202553	WASHER, LOCK, 1/4, ZP	24
19	202554	WASHER, LOCK, 5/16, ZP	6
20	202555	WASHER, LOCK, 3/8, ZP	12
21	202556	WASHER, FLAT, SAE, 5/16, ZP	14
22	202557	WASHER, FLAT, USS, 3/8, ZP	8
23	202994	SUPPORT, PROX SW, PREMIER	1
24	203014	RH BASE, HEAT COVER, PREMIER	1
25	203015	RH HEATER COVER, PREMEIR	1
26	203016	RH HEATER COVER, SIDE, PREMIER	1
27	203017	LH HEATER COVER, PREMIER	1
28	203018	LH HEATER COVER, SIDE, PREMIER	1
29	203030	SUPPORT, LOWER COVER, PREMIER	2
30	203050	LH BASE, HEAT COVER, PREMIER	1
31	203097	FRAME ASSEMBLY, PREMIER	1
32	203112	STRAIGHT CONDUIT CONNECTOR, 1"	2
33	203126	CONDUIT, FLEX, 1"	3.5 ft
34	203142	NUT, NYLOC, 5/16-18, ZP	4
35	203145	HHCS, 1/4-20 x 0.500, ZP5	4
36	203147	HHCS, 5/16-18 x 0.750, ZP8	6
37	203153	HHCS, 1/4-20 x 1.250, ZP8	4
38	203154	HHCS, 1/4-20 x 2.000, ZP8	4
39	203155	HHCS, 3/8-16 x 1.750, ZP8	4
40	203159	NUT, JAM, 1/4-20, ZP5	4

ITEM	PART NUMBER	DESCRIPTION	QTY
41	203181	HOSE, HYDRAULIC, 1/2" X 10"	1
42	203226	BRACKET, LUBE BOTTLE, PREMIER	1
43	203227	BRACKET, XFMR COVER, VERT, PREMIER	2
44	203228	BRACKET, XFMR COVER, ANG, PREMIER	2
45	203235	FHCS, 5/16-18 x 0.750, ZP	2
46	203275	DECAL, XFMR, FRONT, PREMIER	1
47	203283	COVER, QT, LEFT SIDE, PRMR	1
48	203284	COVER, QT, RIGHT SIDE, PRMR	1
49	203288	WIRE NUT, #14-12AWG, NYLON	3 in
50	203289	WIRE NUT, #10-22AWG, NYLON	1
51	203353	SPACER, 3/8 x .625", LDPE	4
52	203361	WELDMENT, UPPER FRAME, PREMIER	1
53	203699	DUAL MULTI TAP XFMR 6KVA	1
54	203720	FTG, STR -8 JIC F X -6 JIC M	1
55	203724	FTG, RUN TEE -8 ORB X -8 JIC M	1
56	203734	LOOP CLAMP, 1/4" ID, CUSHND	2
57	203735	LOOP CLAMP, 5/8" ID, CUSHND	2
58	203742	COVER, MANIFOLD, PRMR M2	1
59	203746	ASSY, MANIFOLD, PRMR M2	1
60	203753	BLEED VALVE KIT, PREMIER	2
61	203754	HOSE, A HTR TO A M2 MNFLD	1
62	203755	HOSE, B HTR TO B M2 MNFLD	1
63	203756	ASSY, XFMR COVER, PRMR M2	1
64	203757	ASSY, XFMR ACCESS QT, PRMR M2	1
65	203758	ASSY, SSR PLT LEFT, PRMR M2	1
66	203759	ASSY, SSR PLT RIGHT, PRMR M2	1
67	203760	PREHEATER, A, 9.0kW, MACH 2	1
68	203761	PREHEATER, B, 9.0kW, MACH 2	1
69	203763	CONSOLE, 3PH, 220V, PREMIER M2	1
70	203768	DECAL, MANIFOLD, M2	1
71	203769	DECAL, PLC COVER, PREMIER	1
72	203774	M2 XFMR WIRES 6AWG	1
73	203775	LABEL, DUAL XFMR TAPS	1
74	EL-63	PREHEATER ELECTRICAL CONNECTOR	2
75	EL-195	TRANSDUCER 0-5000psi	3
76	EL-05230-02	STRAIGHT CONDUIT CONNECTOR, 3/4	2
77	EL-05230-03	RT ANGLE CONDUIT CONNECTOR	1
78	EL-05233	GROMMET, REVERSING SWITCH	2
79	HI-05006-6	FTG, STRT, -06 JIC SW X 1/4 FPT, STL	1

ITEM	PART NUMBER	DESCRIPTION	QTY
80	HI-05020	THERMOCOUPLE NUT, FERRULE, & BODY	2
81	HI-05021	E TYPE THERMOCOUPLE	2
82	HI-05047	HOSE, 3/8" X 20.00", STRT	2
83	HI-05047-1	HOSE, 3/8" X 16.25", STRT	1
84	HI-05047-8	HOSE, 1/2" X 20.00", STRT	1
85	HI-05048	DRAIN PLUG	1
86	LB-05006	LABEL, HIGH VOLTAGE	3
87	LB-05007	LABEL, HOT SURFACE	2
88	LB-05009	LABEL, PINCH POINT	1
89	ML-4	MOTOR LINE ASSEMBLY; 5HP, 3PH, 60Hz	1
90	MQ-01009-01A	LUBE BOTTLE	1
91	MQ-01009-02A	LUBE BOTTLE LID	1
92	PL-1A	PUMPLINE ASSY, 120A/120B	1
93	PU-01027	ACTIVATOR PLATE COVER	1
94	RA-00065A	PLUG, PUMP CYLINDER	1
95	RA-00066A	CBMB 90 DEG MALE ELBOW NPT	1
96	RA-00067A	CBMB 90 DEG MALE ELBOW NPT	1
97	RA-00068A	CHECK VALVE, 1/4 TUBE	1
98	RM-230	MOUNTED PROXIMITY SWITCH ASSY	1
99	RM-E-64-0100	POLYFLO TUBING, 3/8"	3.6 ft
100	RM-E-86-0100	POLYFLOW TUBING, 1/2"	3.6 ft
101	RM-EL-05230-01	CONDUIT, FLEX, 3/4"	5 ft
102	YS-1	Y STRAINER ASSEMBLY, A SIDE	1
103	YS-2	Y STRAINER ASSEMBLY, R SIDE	1

20.21 PREMIER (X) HOSES

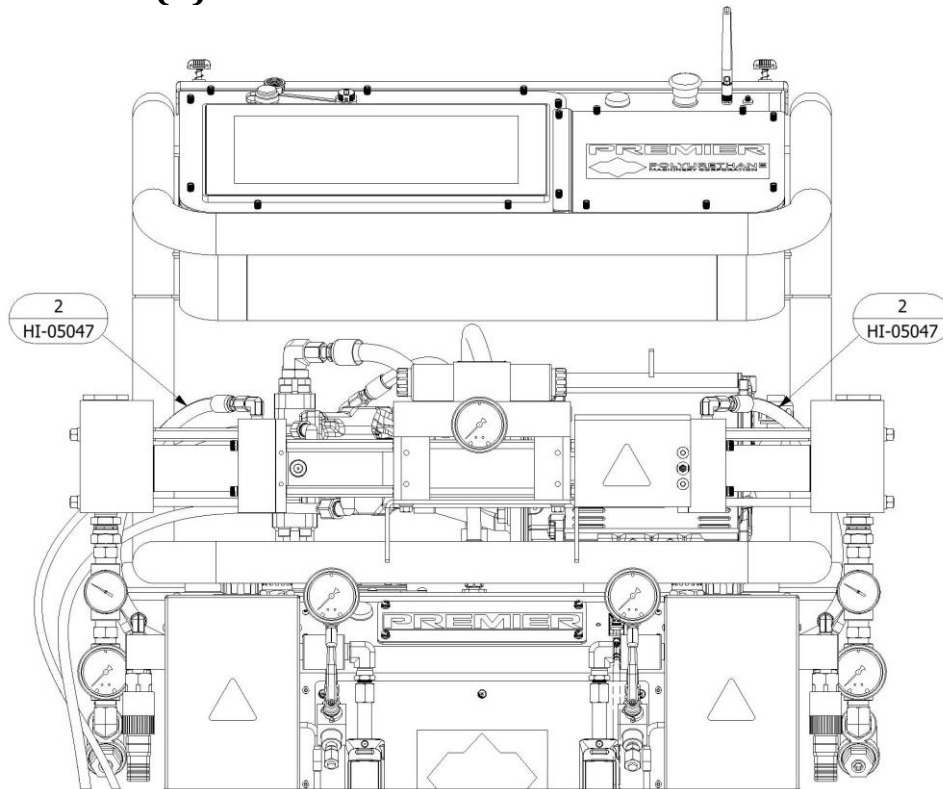


Figure 187: Premier (X) Proportioner Hoses – Front

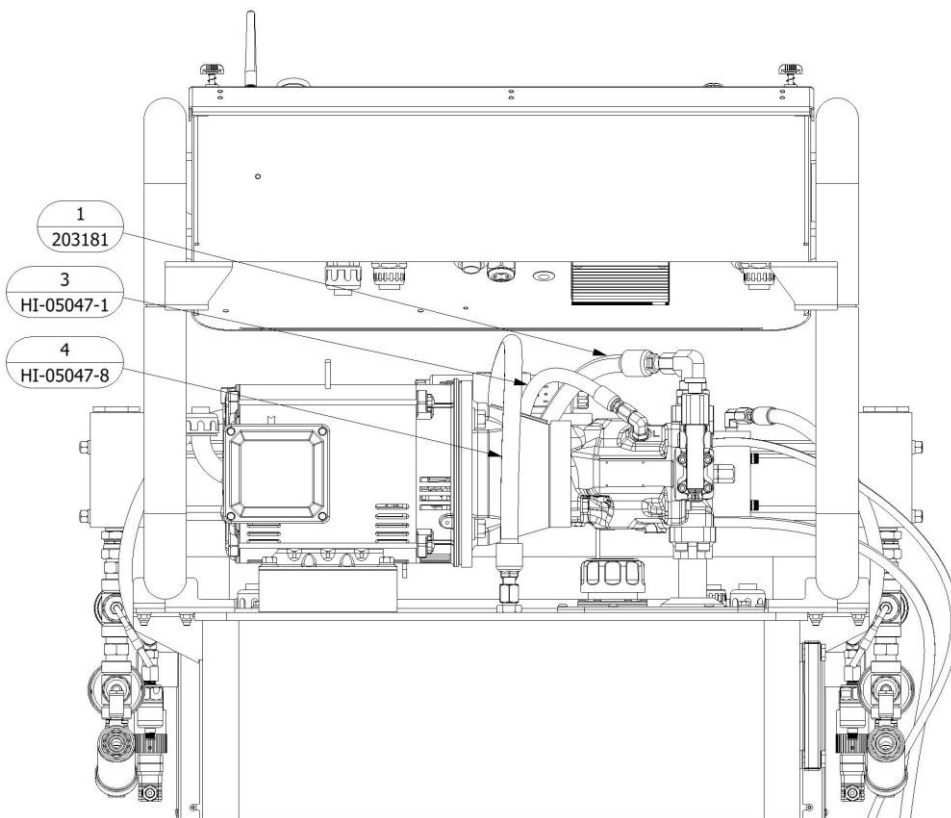


Figure 188: Premier (X) Proportioner Hoses - Back

PREMIER (X) PROPORTIONER HOSES			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	203181	HOSE, HYDRAULIC, 1/2" X 10"
2	2	HI-05047	HOSE, 3/8" X 20.00", STRT
3	1	HI-05047-1	HOSE, 3/8" X 16.25", STRT
4	1	HI-05047-8	HOSE, 1/2" X 20.00", STRT

20.21.1 HALF INCH HOSE KIT

HALF INCH HOSE KIT (200212)		
QTY	PART NUMBER	DESCRIPTION
1	RA-00010	ISO MALE MANIFOLD SETTINGS
1	RA-00011	POLY MALE MANIFOLD FITTING
1	RA-00019	JIC REDUCER 7/8-14 X 9/16-18
1	RA-00020	JIC REDUCER 3/4-16 X 1/2-20

20.22 MACH 2 HOSES

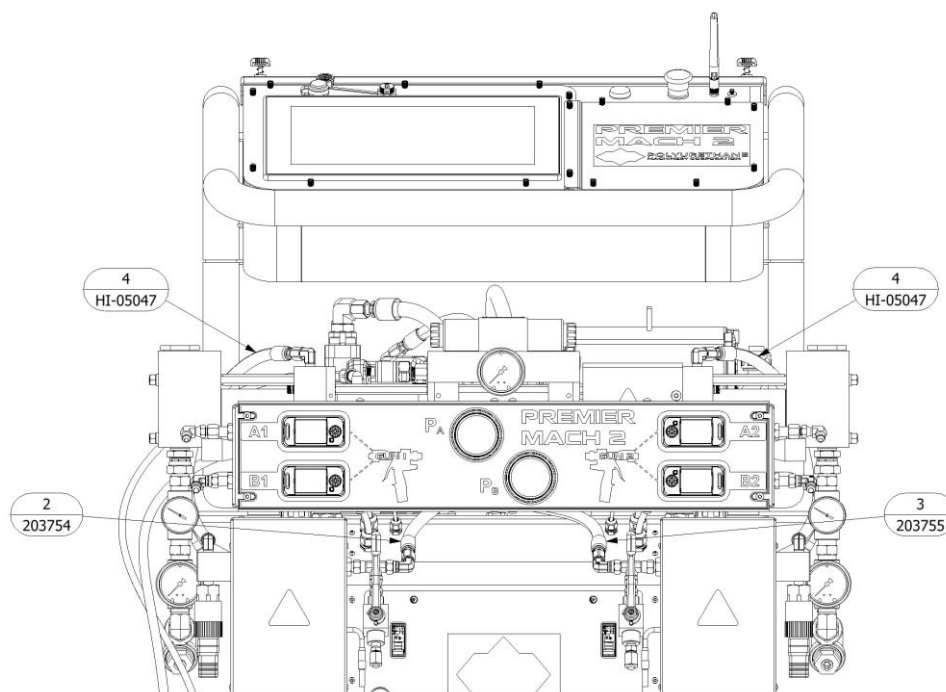


Figure 189: MACH 2 Proportioner Hoses – Front

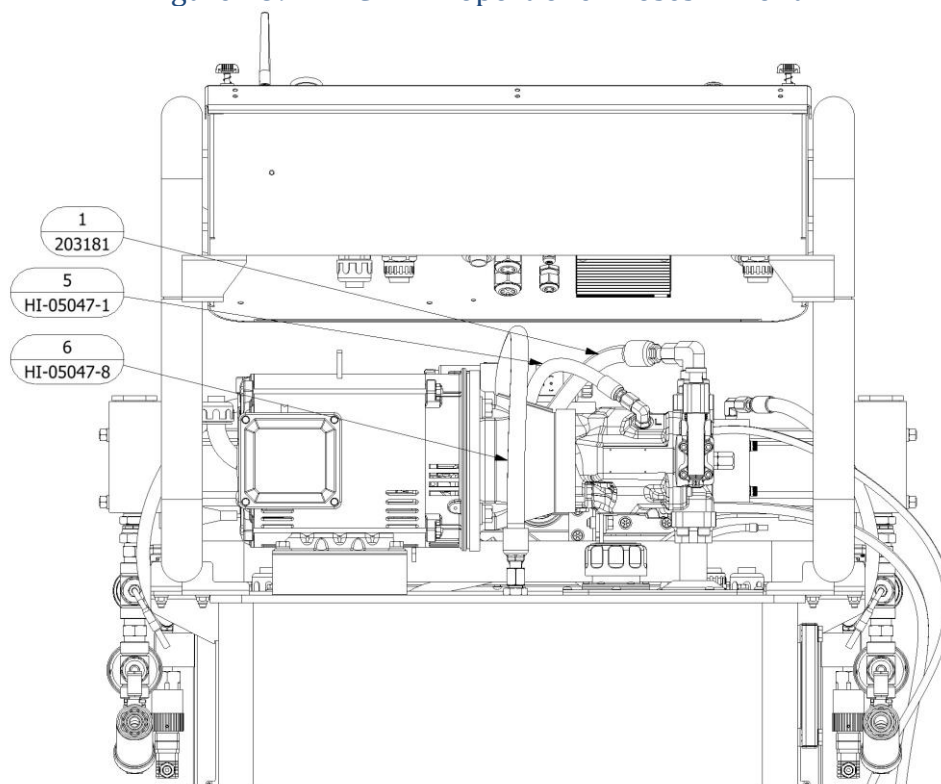


Figure 190: MACH 2 Proportioner Hoses - Back

MACH 2 PROPORTIONER HOSES			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	203181	HOSE, HYDRAULIC, 1/2" X 10"
2	1	203754	HOSE, A HTR TO A M2 MNFLD
3	1	203755	HOSE, B HTR TO B M2 MNFLD
4	2	HI-05047	HOSE, 3/8" X 20.00", STRT
5	1	HI-05047-1	HOSE, 3/8" X 16.25", STRT
6	1	HI-05047-8	HOSE, 1/2" X 20.00", STRT

20.22.1 HALF INCH HOSE KIT

HALF INCH HOSE KIT (200212)		
QTY	PART NUMBER	DESCRIPTION
1	RA-00010	ISO MALE MANIFOLD SETTINGS
1	RA-00011	POLY MALE MANIFOLD FITTING
1	RA-00019	JIC REDUCER 7/8-14 X 9/16-18
1	RA-00020	JIC REDUCER 3/4-16 X 1/2-20

20.23 LUBE BOTTLE COMPONENTS

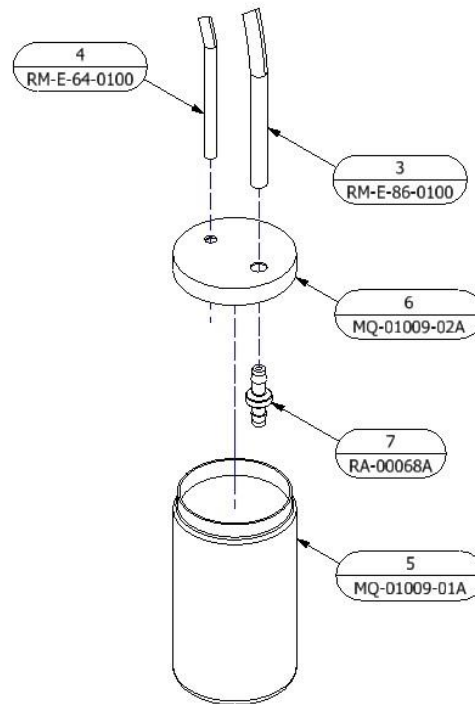
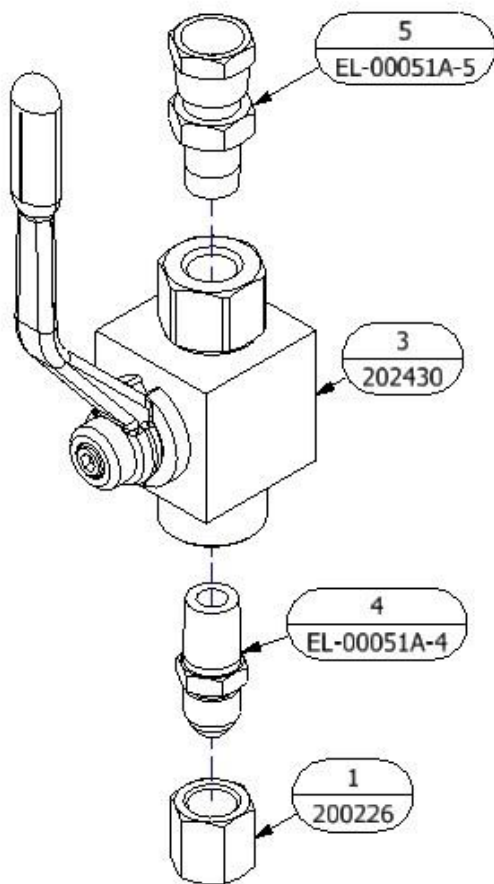


Figure 191: Lube Bottle Components

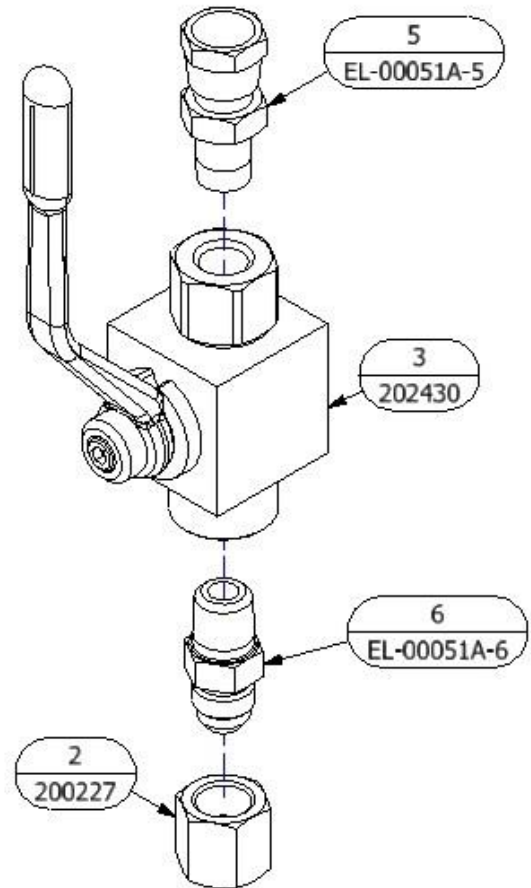
LUBE BOTTLE COMPONENTS			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	GP-00960-1-GAL	PUMP LUBE GALLON
2	1	GP-00960-1-QRT	PUMP LUBE QUART
3	1	MA-00024A	1/2" X 43' PLASTIC TUBING, RETURN
4	1	MA-00025A	3/8" X 43' PLASTIC TUBING
5	1	MQ-01009-01A	LUBE BOTTLE
6	1	MQ-01009-02A	LUBE BOTTLE LID
7	1	RA-00068A	CHECK VALVE
8	1	RA-06008	CHECK VALVE, POLYTUBE, 3/8

LUBE ASSY KIT, PREMIER (202640)		
QTY	PART NUMBER	DESCRIPTION
1	MA-00024A-1	1/2" X 43' PLASTIC TUBING, RETURN
1	MA-00025A-1	3/8" X 43' PLASTIC TUBING
1	MQ-01009-01A	LUBE BOTTLE
1	MQ-01009-02A	LUBE BOTTLE LID
1	RA-00066A	MALE ELBOW, 3/8 TUBE X 1/4 NPT
1	RA-00067A	MALE ELBOW, 1/2 TUBE X 3/8 NPT
1	RA-00068A	CHECK VALVE
1	RA-06008	CHECK VALVE, POLYTUBE, 3/8

20.24 BLEED VALVES



"A" SIDE VALVE ASSEMBLY



"B" SIDE VALVE ASSEMBLY

Figure 192: Bleed Valves (203753)

BLEED VALVES (203753)			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	200226	5 JIC CAP	1
2	200227	6 JIC CAP	1
3	202430	BALL VALVE, 1/4 NPT, 5000 PSI	2
4	EL-00051A-4	1/4 NPT X 5 JIC	1
5	EL-00051A-5	1/4 NPT X 6 SWIVIL	2
6	EL-00051A-6	1/4 NPT X 6 JIC	1