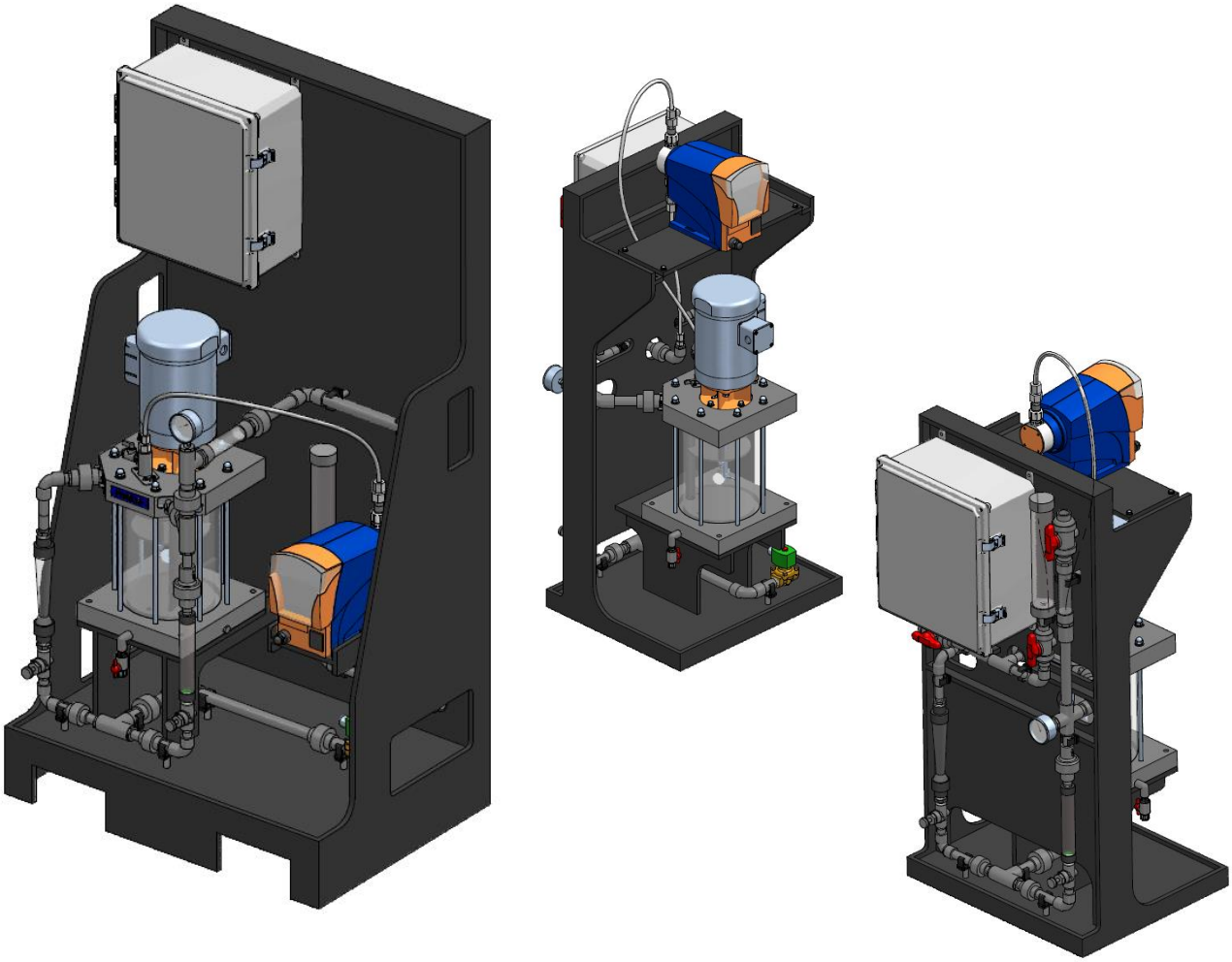
Operating Instructions ProMinent® ProMix-S & C Polymer Blending Systems



Please completely read through these operating instructions first! Do not discard!

The warranty shall be invalidated by damage caused by operating errors!

ProMix_S&C_IOM (01/17/17): – P/N: XXXXXX-(Rev-C)

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ProMinent ProMix 'S & C' Polymer Feeder

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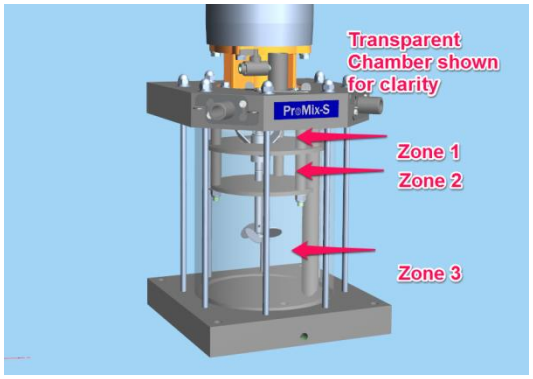
ProMinent ProMix ‘S & C’ Polymer Feeder

i. Overview:

The ProMix S & C “TA Series” Polymer Feeder is a skid system designed to control feed water and polymer and combine them to produce a high quality solution. The system is designed to receive liquid neat polymer while mixing it with feed water to produce and discharge a quality solution from the system.

Research in the science of polymer activation indicates that the activation energy must decrease as the polymeric chain is uncoiled to prevent rupture and hence decrease the performance of the product.

The mixing by the Polymer Feeder is accomplished mechanically with three distinct mixing zones separated by baffles. The first zone consists of a fast mixing blade that delivers high shear at the precise point of polymer injection, creating an immediate dispersion before agglomeration takes place. The second mixing zone induces a vortex and draws solution down through the center of the chamber from zone one and forces the solution outward to the sides and then down into the third zone. Finally, the third zone mixing blade gently agitates/blends the active polymer solution before it exits the chamber via the discharge tube.



The ProMix S & C Polymer Feeder controller offers several operating options. These options are selected using various combinations of the controller door switch positions and polymer type selections via the controller menu. The controller allows the polymer pump speed to be controlled either locally via the keypad or remotely via a customer supplied 4-20 mA signal over a 0 to 100% speed range. The polymer dosage rate must be calculated and the pump adjusted for the desired ratio concentration of polymer to dilution water leaving the feeder by volume. Different maximum concentrations are possible based upon the type of polymer. Emulsion polymers should be limited to a maximum of 1% concentration in the mixing chamber and Mannich polymers should not exceed 10% in the mixing chamber. The polymer type to be used is selectable from the keypad menu.

The System Start switch on the controller door has three positions, ON, OFF and REMOTE. ON enables the controller locally and REMOTE allows the controller to be enable via a customer supplied dry contact. The Polymer Pump switch has two positions, LOCAL and REMOTE. Placing the System Start switch in the OFF position after having first been in either of the other two positions will initiate a flush cycle for the system before shutting down.

The Polymer Pump switch on the controller front door has two positions to choose the source of the pump control signal. In the LOCAL position the controller uses the keypad entry for polymer pump speed. In the REMOTE position a user supplied 4-20 mA signal representing 0 – 100% pump speed controls the pump. The user must manually adjust the primary and post dilution valves for the desired dilution water flow rate and must calculate the required pump speed to attain the desired concentration. Rotameters are provided to monitor the dilution water flow rates.

The ProMix Polymer Feeder is equipped with all the necessary components for easy installation, reliable performance and safe operation. The design incorporates an electric solenoid valve (water inlet), flow meter/switch, manually adjustable rotameters for primary and secondary dilution flow, either a peristaltic or diaphragm type neat polymer pump (depending on model), microprocessor based controller, manual ball valves, pump calibration column, PVC piping and components, and polymer mixing chamber mounted on a skid to facilitate proper mixing and delivery.

ii. ProMix S Systems with Peristaltic Pumps:

Peristaltic Pump Type Blue-White (A-100NV Series):

PART NUMBER	MODEL	PUMP TYPE	MAX CAPACITY
1048346	60X1-0.22TA	Blue White A1N00V-1T	0.22 GPH
1048347	60X2-0.95TA	Blue White A1N30V-1T	0.95 GPH
1048348	120X2-0.95TA	Blue White A1N30V-1T	0.95 GPH
1048349	120X2-2.00TA	Blue White A1N30V-2T	2.00 GPH
1048351	300X2-2.00TA	Blue White A1N30V-2T	2.00 GPH
1048352	300X2-3.73TA	Blue White A1N20V-3T	3.73 GPH

Refer to Appendix C for proper sizing

Overall Skid Dimensions ..... 24" x 34" x 66" (L x W x H)
Overall Weight of Skid ..... Approx 170 lbs.
Power Requirements ..... 120 VAC, 60 Hz, 1 Phase, 15 Amp
Control panel FLA ..... 11.2 Amp
Volume of Mixing Chamber ..... 2.0 Gallons
Maximum Rated Chamber Pressure ..... 150 PSIG
Maximum Operating Chamber Pressure ..... 100 PSIG
Normal Operating Pressure ..... 50 PSIG or 65 PSIG (Depends on Pump Selected)
Recommended Running Temperature ..... +50°F to 100°F
Water Connection Size ..... ¾" FNPT
Solution Discharge Connection Size ..... ¾" FNPT
Neat Polymer Inlet Connection Size ..... ½" FNPT
Drain Connection ..... ¼" FNPT

ii. ProMix S Systems with Diaphragm Pumps:

Diaphragm Pump Type ProMinent Delta Series:

PART NUMBER	MODEL	PUMP TYPE	MAX CAPACITY
1048353	60X1-1.01DA	DLTA1608PVT4000UD4031EN0	1.01 GPH
1048354	60X2-1.01DA	DLTA1608PVT4000UD4031EN0	1.01 GPH
1048355	120X2-1.01DA	DLTA1608PVT4000UD4031EN0	1.01 GPH
1048356	120X2-2.30DA	DLTA1020PVT4000UD4031EN0	2.30 GPH
1048357	300X2-2.30DA	DLTA1020PVT4000UD4031EN0	2.30 GPH
1048358	300X2-3.70DA	DLTA0730PVT4000UD4031EN0	3.70 GPH

Refer to Appendix C for proper sizing

Overall Skid Dimensions ..... 24" x 34" x 66" (L x W x H)
Overall Weight of Skid ..... Approx 170 lbs.
Power Requirements ..... 120 VAC, 60 Hz, 1 Phase, 15 Amp
Control panel FLA ..... 11.5 Amp
Volume of Mixing Chamber ..... 2.0 Gallons
Maximum Rated Chamber Pressure ..... 150 PSIG
Maximum Operating Chamber Pressure ..... 100 PSIG
Normal Operating Pressure ..... 100 PSIG
Recommended Running Temperature ..... +50°F to 100°F
Water Connection Size ..... ¾" FNPT
Solution Discharge Connection Size ..... ¾" FNPT
Neat Polymer Inlet Connection Size ..... ½" FNPT
Drain Connection ..... ¼" FNPT

ii. ProMix C Systems with Peristaltic Pumps:

Peristaltic Pump Type Blue-White (A-100NV Series):

PART NUMBER	MODEL	PUMP TYPE	MAX CAPACITY
1048360	60X1-0.22TA	Blue White A1N00V-1T	0.22 GPH
1048361	60X2-0.95TA	Blue White A1N30V-1T	0.95 GPH
1048362	120X2-0.95TA	Blue White A1N30V-1T	0.95 GPH
1048363	120X2-2.00TA	Blue White A1N30V-2T	2.00 GPH
1048364	300X2-2.00TA	Blue White A1N30V-2T	2.00 GPH
1048365	300X2-3.73TA	Blue White A1N20V-3T	3.73 GPH

Refer to Appendix C for proper sizing

Overall Skid Dimensions ..... 26" x 24" x 50" (L x W x H)
Overall Weight of Skid ..... Approx 130 lbs.
Power Requirements ..... 120 VAC, 60 Hz, 1 Phase, 15 Amp
Control panel FLA ..... 11.2 Amp
Volume of Mixing Chamber ..... 2.0 Gallons
Maximum Rated Chamber Pressure ..... 150 PSIG
Maximum Operating Chamber Pressure ..... 100 PSIG
Normal Operating Pressure ..... 50 PSIG or 65 PSIG (Depends on Pump Selected)
Recommended Running Temperature ..... +50°F to 100°F
Water Connection Size ..... ¾" FNPT
Solution Discharge Connection Size ..... ¾" FNPT
Neat Polymer Inlet Connection Size ..... ½" FNPT
Drain Connection ..... ¼" FNPT

ii. ProMix C Systems with Diaphragm Pumps:

Diaphragm Pump Type ProMinent Delta Series:

PART NUMBER	MODEL	PUMP TYPE	MAX CAPACITY
1048460	60X1-1.01DA	DLTA1608PVT4000UD4031EN0	1.01 GPH
1048461	60X2-1.01DA	DLTA1608PVT4000UD4031EN0	1.01 GPH
1048462	120X2-1.01DA	DLTA1608PVT4000UD4031EN0	1.01 GPH
1048463	120X2-2.30DA	DLTA1020PVT4000UD4031EN0	2.30 GPH
1048474	300X2-2.30DA	DLTA1020PVT4000UD4031EN0	2.30 GPH
1048475	300X2-3.70DA	DLTA0730PVT4000UD4031EN0	3.70 GPH

Refer to Appendix C for proper sizing

Overall Skid Dimensions ..... 26" x 24" x 50" (L x W x H)
Overall Weight of Skid ..... Approx 170 lbs.
Power Requirements ..... 120 VAC, 60 Hz, 1 Phase, 15 Amp
Control panel FLA ..... 11.5 Amp
Volume of Mixing Chamber ..... 2.0 Gallons
Maximum Rated Chamber Pressure ..... 150 PSIG
Maximum Operating Chamber Pressure ..... 100 PSIG
Normal Operating Pressure ..... 100 PSIG
Recommended Running Temperature ..... +50°F to 100°F
Water Connection Size ..... ¾" FNPT
Solution Discharge Connection Size ..... ¾" FNPT
Neat Polymer Inlet Connection Size ..... ½" FNPT
Drain Connection ..... ¼" FNPT

iii. Peristaltic Polymer Pumps used on S & C Models:

Series	Part Number	Ident Code	RPM Max	Flowrate (GPH)		Pressure (PSIG)
				Min Rated	Max Rated	
A-100NV	1061489	A1N00V-1T	14	0.012	0.24	65
A-100NV	1061490	A1N30V-1T	60	0.053	1.06	65
A-100NV	1061491	A1N30V-2T	60	0.111	2.22	65
A-100NV	1061492	A1N20V-3T	45	0.207	4.14	50

Notes:

1. Blue White Peristaltic Pumps
2. GPH Rating above based upon pumping Water not Polymer
3. Power Requirements: 120VAC, 60Hz, Single Phase (0.35 Amp)
4. Suction Lift Capabilities: Approx 30ft. (based on water)
5. Tubing: Tygothane

iv. Diaphragm Polymer Pumps used on S & C Models:

Series	Identification Code	Factory Default Mode	SPM Max	Flowrate (GPH)		Pressure (PSIG)
				Min @ 100% Stroke	Max @ 100% Stroke	
DLTA	DLTA1020PVT4600UD4031EN0	HV2	120	0.008	1.01	145
DLTA	DLTA1020PVT4600UD4031EN0	HV2	120	0.019	2.30	145
DLTA	DLTA0730PVT4600UD4031EN0	HV2	120	0.031	3.70	102

Notes:

1. ProMinent - Delta Solenoid Driven Metering Pump
2. Original Pump GPH rating is derated 20% due to Polymer viscosity. The actual deration may vary depending on the polymer used
3. Control Modes Available *
    a. Standard – 200 spm: 0-50 cp
    b. HV1 (slightly reduced discharge speed) – 160 spm: 50-200 cp
    c. HV2 (moderately reduced discharge speed) – 120 spm: 200-500 cp
    d. HV3 (maximum reduced discharge speed)– 80 spm: 500-1000 cp
4. Connections: ½" x 3/8" or DN10 Depending on Model Selected
5. Power Requirements: 115VAC, 60 Hz, Single Phase

* Viscosity values are approximate and can vary widely per specific application. Use these values as a guideline only and consult the factory for specific application capabilities

1.0 INSTALLATION & QUICK START GUIDE

1.1 Safety:

Utilize appropriate protective safety gear when operating or maintaining this equipment. Recommended safety gear is as follows:

Personal Protective Equipment (PPE):

- Hard Hats (Where overhead hazards exist)
- Safety Glasses with side shields
- PVC Apron
- PVC Gloves
- Safety-Toed Work Boots

1.2 Delivery & Storage Checklist:

1. Check packing list for completeness and note any missing items immediately.
2. Inspect equipment and shipping container for damages before accepting delivery.

   Make note of the carrier's bill-of-lading the extent of the damage, if any, and notify the carrier.
3. Store the equipment on firm level surface in original packing container. Do not store the equipment where it may be exposed to extreme temperatures, precipitation, humidity, or dust. Avoid direct sunlight that could overheat and damage equipment.

   Ambient Conditions for storage and transport:

Temperature:	14°F to 120°F
Air Humidity:	≤ 92% relative humidity, non-condensing

1.3 Installation Considerations:

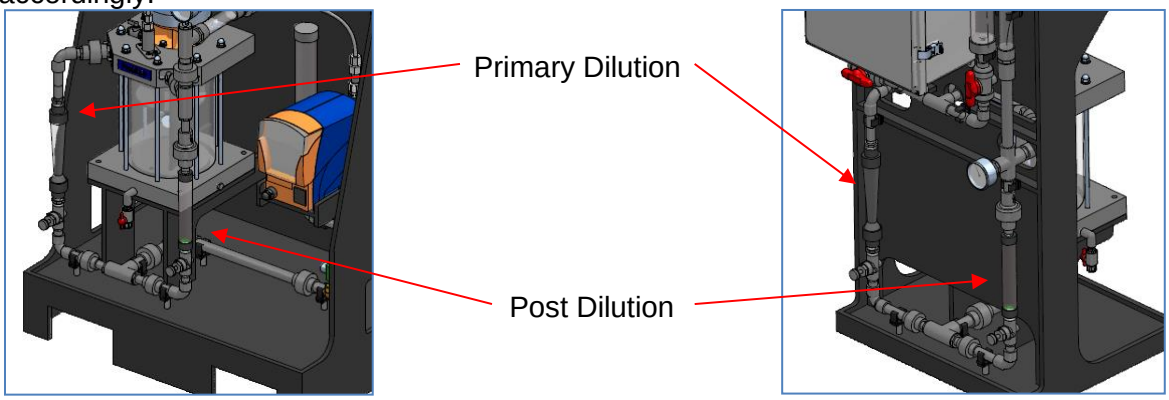
- Required Polymer System Voltage
- Available Water Pressure
- Injection Point Pressure
- Number of Injection Points
- Polymer Solution Discharge: For example (Length of Piping Run and Pipe Size)
- Neat Polymer Suction: Flooded or Lift
- Type of Application / Dewatering Device
- Type of Polymer: Emulsion, Dispersion, Solution

1.4 Installation:

1. Unpack and position equipment on sturdy level surface. Fasten to prevent movement.
2. Do not install equipment in areas of extreme heat, cold, dust or humidity. Avoid areas where objects or fluids can drop from overhead.
3. Units are to be installed as close to the point of application as possible.
4. Inlet pressure is not to exceed 100 psig working pressure.
5. System pressure at the discharge is not to exceed 80% of inlet pressure.
6. Piping Internal to the System:
    a. Inspect the piping for breakage. The system may have been jarred during shipping.
    b. Check the tightness on all unions. Hand tighten only – no tools. Unions incorporate an o- ring seal. Ensure that the o-ring is seated properly prior to tightening.
7. Piping External to the System *(Reference Appendix A for connection location)*:
    a. Install piping so that connections properly meet system termination points. Do not "stretch" field installed piping to meet system termination points. Stressed piping will fail!
    b. Piping should be at a minimum ¾" to and from the piping on the system.
    c. Avoid getting dirt and debris inside the piping during installation. Plug ends of piping with rags if construction activities are underway. All debris must be flushed from piping before system start-up.
    d. Connect to outlet piping ¾" FNPT from static mixer to associated customer application point.
    e. Connect to make-up water inlet piping ¾" FNPT (5 GPM maximum at 100 psig maximum).
    f. Connect to Neat Polymer pump inlet piping ½" FNPT.
    g. Install ¾" pressure regulator and ¾" y-strainer / basket strainer on the clean make-up water line if equipment is currently not installed. (Recommended)
    h. Allow provisions for draining the system piping. Skid components will require maintenance. Ensure that chemicals can be evacuated from the skid piping and components for servicing.
8. Electrical Supply Needed for the System:
    a. Note: Review local Electrical Code and follow accordingly.
    b. Connect incoming power to skid mounted control panel *(120VAC, Single Phase, 15 Amp, 60 Hz).* Ensure panel is properly grounded.
    c. Check electrical connections to be sure proper voltage is supplied to the system.
    d. Power the unit using a dedicated, separate breaker in the local lighting distribution panel.
    e. Do not route the AC power in common conduit with variable frequency pump drives.
    f. Do not put conduit entries in the top of the control panel. Resulting conduit condensation and failure to seal may damage controller circuit boards.
9. The Overload relay should be set to the Motor Nameplate Full Load Amps. Setting this to a higher value will result in possible damage to the motor and associated wiring. Overload conditions should be investigated and possible process changes may need to be made to prevent overload conditions.
10. Connect Digital Remote Start Functions (note wiring termination points in Appendix B) for polymer tank level and remote start permissive. Default jumpers should remain in place for any input not available.
11. Refer to the Blue White A-100NV Installation & Maintenance Manual regarding pump information.

1.5 Quick Start Guide:

1. After the installation guidelines (Section 1.4) of the manual.
2. Open ball valve on the suction of the pump to allow chemical to flow into the system by gravity. If the application is suction lift then ensure liquid is present in pump suction.
3. Start up pumps at 100% stroke length and frequency to purge all air and prime the system. To prime the pump press and hold the PRIME button on the keypad until chemical is visible in the suction line.
4. Verify motor rotation on Mixing Chamber motor. Normal rotation is CCW.
5. Do not run the mixing chamber motor dry. Damage to the mechanical seal could occur.
6. Close the Post Dilution flow control valve and adjust the Primary Dilution flow control valve to obtain the flow range required. If additional dilution water is needed adjust the secondary accordingly.



ProMix S ProMix C

7. Verify that the maximum polymer injection pump pressure is higher then the system pressure.
8. Perform pump calibration using drawdown calibration cylinder.
9. Check flow calibration and be sure pump meets or exceeds the rated flow capacity.
10. Check flows at 100% capacity.
11. In System Start ON and Polymer Pump LOCAL switch positions the neat polymer pump speed is adjusted manually using the controller keypad to change the pump rate from 0 to 100% of the pump rated output.
12. In System Start ON and Polymer Pump REMOTE switch positions the controller receives a remote customer supplied analog 4-20 mA signal to adjust the desired pump speed from 0 to 100% of the pump rated output. This remote 4-20 mA signal can be scaled at the controller to enhance the resolution of the pump output control and bias the pump response to the remote signal. A remote start permissive is optional – if used then System Start switch should be in the REMOTE position.
13. Confirm proper operation of all instrumentation. For example: Gauge, Rotometer switch, etc.
14. Input functions checked and simulated (remote start/stop, 4-20mA, etc.).
15. Output functions checked.
16. Test the operation of all remaining circuits.
17. Observe system to assure that nothing looks or sounds abnormal.

1.6 ProMix Controller Door Switches

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Manually adjust the two door switches, 'System Start' and 'Polymer Pump' for the desired operating conditions:

System Start door switch

Permits use of remote contact to enable system operation in REMOTE position.

Polymer Pump door switch

Determines the set point for pump control action which can be from the keypad entry in LOCAL or from a 4-20 mA signal in REMOTE.

door switch options

System Start **ON-OFF-REMOTE** controller door switch	**Polymer Pump** **LOCAL-REMOTE** controller door switch	**PROMIX OPERATION**
ON	LOCAL	Remote Start Contact: N/A Keypad Local Setpoint: 0 – 100% pump speed Remote Setpoint: N/A Max. chamber concentration: 1.0%
ON	REMOTE	Remote Start Contact: N/A Keypad Local Setpoint: N/A Remote Setpoint: 4-20 mA = 0 –100% pump speed Max. chamber concentration: 1.0%
REMOTE	LOCAL	Remote Start Contact: Close=start, open=stop Keypad Local Setpoint: 0 – 100% pump speed Remote Setpoint: N/A Max. chamber concentration: 1.0%
REMOTE	REMOTE	Remote Start Contact: Close=start, open=stop Keypad Local Setpoint: N/A Remote Setpoint: 4-20 mA = 0–100% pump speed Max. chamber concentration: 1.0%

1.7 Servicing Guidelines:

- Disconnect electrical power to the equipment prior to servicing.
- Relieve all pressure from the unit prior to servicing.
- Close all suction and discharge valves.
- Verify dilution water is closed.

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- Drain chemical/water from unit prior to disassembly.
- Maintain protective covers over all moving parts.
- Keep body parts, hair and foreign objects from contact with moving parts.
- Do not allow grease or oil to be used or stored around the feed equipment or chemicals.
- Review the Material Safety Data Sheets of the Polymer utilized and observe appropriate safety measures.
- Mineral Oil can be utilized to aid in the polymer cleaning process.

Ensure all operating & maintenance personnel are instructed regarding the contents of this manual

2.0 CONTROLLER

2.1 Keypad Navigation

The ProMinent ProMix S Polymer Feeder uses a fixed configuration to deliver the operation required to operate the feeder. The main board is not interchangeable with other ProMinent controller hardware.

The top line of the main menu displays the current feeder state on power ON

Press **EXIT** during any main menu display & you'll return to the top of the menu & the current feeder state.

The other main menu displays show information you'll need to set & adjust feed rate and to verify flowswitch, 4-20mA in & out…

UP & **DOWN** to view options or to EDIT numbers

Move **RIGHT** to select next field when EDITing

ENTER to select an option & to execute EDITing

EXIT to escape option, info display or EDITing
EXIT goes to top of **Main Menu**

2.2 Main Menu

This is the power ON, top of the menu display.
Press **EXIT** at any display to return here.
Displays the **Polymer** feed rate 0-100% and the current state of the feeder. See 1.6 for complete state table.

Displays the **Polymer Pump** feed rate 0-100% and the controlling 4-20mA current level,

Press **ENTER** @ **Polymer Pump** to view-adjust the Manual Setpoint & Calibrate the 4-20mA controlling the pump.

Mixer ON time resets to zero every time the **Mixer** turns OFF.

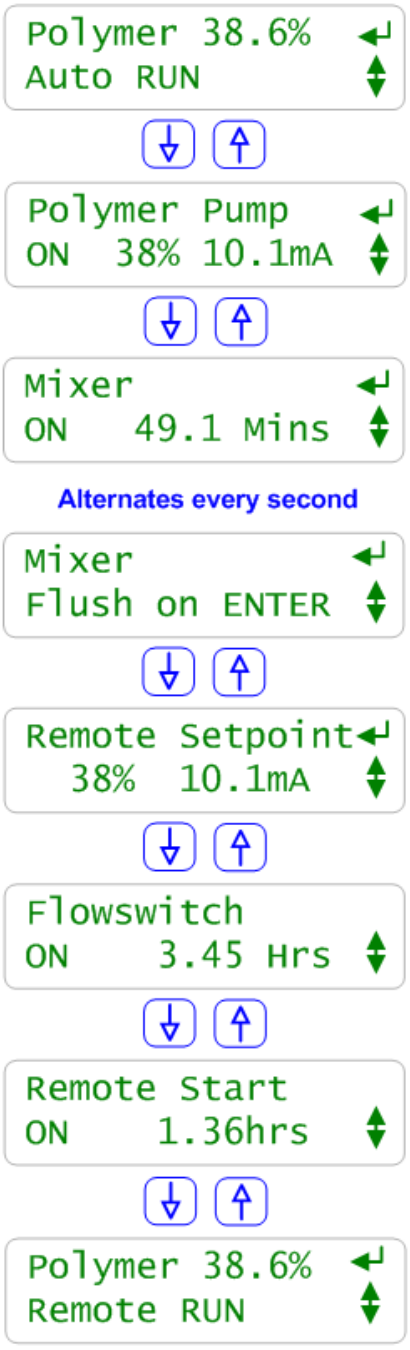
Press **ENTER** during **Remote RUN** or **Local RUN** to turn OFF the **Polymer pump** and flush the mixer.

The **Remote Setpoint** 4-20mA current loop controls the **Polymer Pump** in **Remote RUN** mode.
Press **ENTER** to calibrate.

Flowswitch ON time resets to zero every time the **Flowswitch** turns OFF.
After 24 hours displays **>1Day**.

The **Remote Start** contacts must be closed for the polymer feeder to run.
Remote Start time resets to zero every time the contact set opens.

We're now back at the top of the main menu.



Sidebar:
Press **ENTER** at **Polymer** to view and adjust feeder **Fill**, **Flush** & **Wait-for-Flow** timing.

Press **ENTER** & **UP** at **Polymer** to view feeder **Diagnostics**. Refer to **2.17** for **Diagnostic** displays.

2.3 Adjust Setpoint

Press **ENTER** @ **Polymer Pump** to view or adjust the **Local Setpoint**.

Local Setpoint may be adjusted at any time if Polymer Pump switch is set to Local mode.

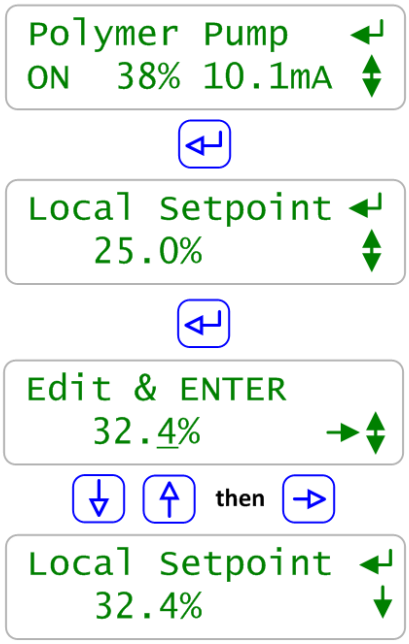
The present **Local Setpoint** is **25.0%.** Press **ENTER** to adjust.

Key **RIGHT** to move the cursor & **UP** or **DOWN** to change the digit. Key **EXIT** to abandon or **ENTER** to execute.

Displays new, adjusted **Local Setpoint**. Press **EXIT** to return to main menu.

If the Polymer Pump switch is in the **Local** position, any adjustment takes effect immediately, modifying the 4-20mA output to the pump.

Adjust Local Setpoint



Sidebar:
Local Setpoint only controls the polymer pump when the Auto-Manual switch is @ Local.

If the **Local Setpoint** is @ 25% the 4-20 mA current output loop will be at 8mA (4mA + 0.25 x 16mA = 8mA).

Remote Setpoint only controls the polymer pump when the Polymer Pump switch is @ Remote. The polymer pump speed is then controlled by the remote 4-20 mA signal.

2.4 Modify Timing

View Timing

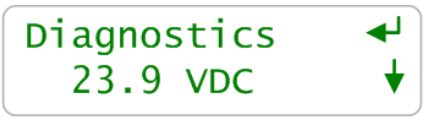
Press **ENTER** @ **Polymer** to view or adjust the feeder timing.

Fill Time is the time that the feeder waits to fill the feeder prior to turning on the **Polymer Feed** pump. This protects the mechanical seal of the mixer motor shaft by keeping it wet. Minimum time is 30 seconds for the first fill only. Thereafter this step is skipped if operation pauses unless electrical power to the controller is cycled. Key **ENTER** to modify.

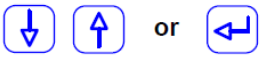
Flush Time is the time water flows after initiation of a Flush Cycle. This is a maintenance feature and can be manually initiated by (1) placing the controller door System Start Switch in the OFF position for more than 2 seconds or (2) by opening the remote start contact for longer than 2 seconds or (3) by using the keypad menu. Key **ENTER** to modify time.

Wait for Flow may be adjusted to any time from 1 to 30 seconds. Press **ENTER** to adjust.

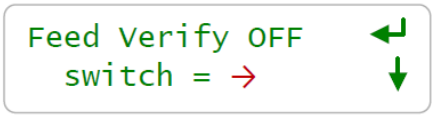
Diagnostics displays the input current loop power voltage. Press **ENTER** to view diagnostic data set. Refer to 4.2 for detail.

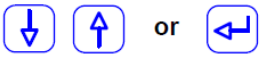


Interlock (CI) could be set to NO/NC using → key



Feed Verify ON/OFF could be set to ON using → for pulse feedback from Metering pump (metering pump must have pulse (dry contact output)





Feed Verify may be adjusted to any time from 1 to 300 seconds. Press **ENTER** to adjust

Sidebar:

Wait for Flow: Water inlet solenoid open, ON. Mixer and Polymer Pump both OFF.
Factory default = 5 seconds.

The 4-20mA current loop control input may be powered by the site control system or by the ProMix S 24VDC power supply.

Press **ENTER** @ **Polymer**
to view or adjust the **Fill Time**, **Flush time**
or **Wait for Flow** time.

All three times are adjusted in the same way.
In this example we'll press **ENTER** @ **Fill Time**.

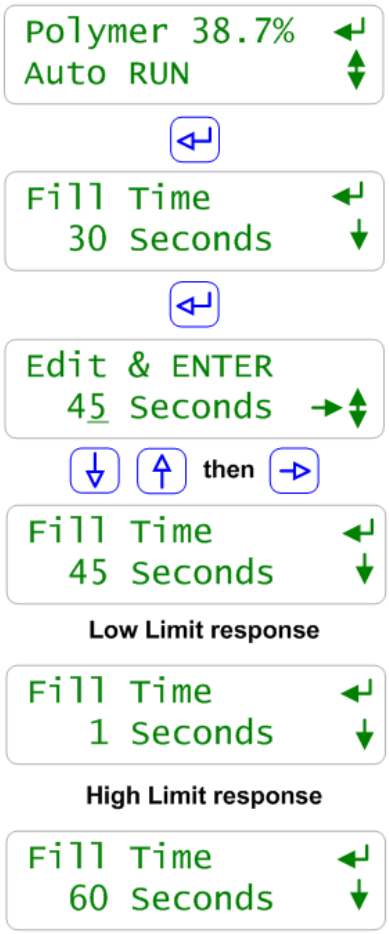
Key **RIGHT** to move the cursor &
UP or **DOWN** to change the digit.
Key **EXIT** to abandon or **ENTER** to execute.

Displays new, adjusted **Fill Time**.
Press **EXIT** to return to main menu.

If you **ENTER** a time less than 1 second,
the **Fill Time** will be set to 1 second.

If you **ENTER** a time greater than 60 seconds,
the **Fill Time** will be set to 60 seconds.

Adjust Timing



Sidebar:
Fill Time: Minimum = 1 second, Maximum = 60 seconds.
Factory default = 30 seconds.

Flush Time: Minimum = 1 second, Maximum = 300 seconds.
Factory default = 60 seconds.

Wait for Flow: Minimum = 1 second, Maximum = 30 seconds.
Factory default = 5 seconds.

2.5 Manually Flush Mixer

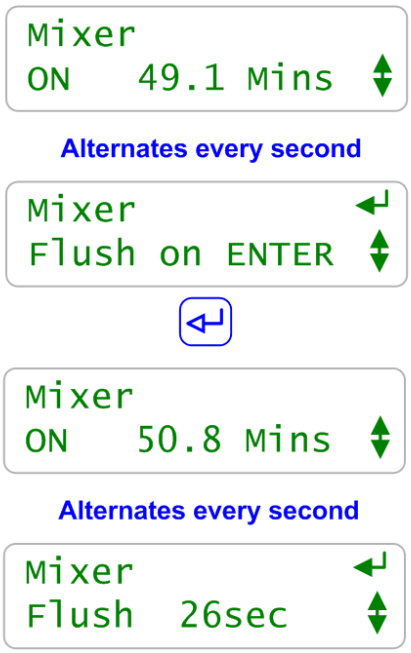
Press **ENTER** @ **Mixer**
When the **Mixer ON** time display is alternating with the **Flush on ENTER** display.

The polymer feed pump will turn OFF.
The Mixer & water inlet solenoid will remain ON while the alternating **Mixer** display counts down the flush period.

At the end of the Flush period the ProMix S will return to the Auto RUN or Manual RUN state unless the user:

1. Sets the Auto-Manual-OFF switch to OFF.
2. Shuts off the feeder inlet water.
3. Opens the Remote Start contacts.

Flush Mixer



Sidebar:
Flush Time: Minimum = 1 second, Maximum = 300 seconds.
Factory default = 60 seconds

2.6 Automatic Flush Mixer

In Local Mode

After setting the System start selector switch to OFF position the unit will go through Automatic flush cycle and will stop after defined flush Time, the system will run again if the selector switch is back to ON position

In Remote Mode

After opening the remote contact the unit will go through Automatic flush cycle and will stop after defined flush Time, the system will run again if the remote contact is closed

2.7 Status Message Summary

LCD Displays	Feeder State
Offline STOP	Feeder powered. On-Off-Remote switch at Off.
Lin<4mA, Fault	On-Off-Remote switch at Auto and 4-20mA input less than 4 mA. Exits on 4-20mA >= 4 mA or On-Off-Remote= Off or Manual
Flow Check	Waits user set seconds for Flow switch contact set closed after Filling Mixer. Exits on flow switch closed or On-Off-Remote= Off
No Water STOP	Exits on flow switch closed or On-Off-Remote= Off
Filling Mixer	Inlet Solenoid ON & Mixer OFF. Waits user set seconds to fill mixer. Exits on On-Off-Remote= Off
No Ext.Run STOP	Polymer Pump, Mixer and Solenoid OFF Exits on Remote Start contacts closed or On-Off-Remote = Off
Flushing Mixer	Solenoid & Mixer ON. Polymer pump OFF. Exits on flush time expired or No flow or On-Off-Remote = Off
Flush Fail STOP	No Flow measured while flushing. Exits on flush time expired or flow measured or On-Off-Remote = Off
Remote RUN	Polymer pump @ 4-20mA input controlled setpoint. Exits on no flow, control<0%, flush, Remote Start open, or On-Off-Remote = Off or Manual.
Local RUN	Polymer pump @ user setpoint. Exits on no flow, flush, Remote Start open or On-Off-Remote = Auto or Off.
Flushed, Stopped **Press the ENTER key to Run**	Flush ends. Polymer Pump, Mixer and Solenoid OFF Any key press restarts.

Sidebar:
Flow Check: The flow switch monitors dilution water flow into the mixer chamber.

Filling Mixer: The mixer chamber is filled once after every power ON cycle.
If you drain the mixer, switch the power OFF then ON to re-fill the mixer chamber.

2.8 Calibrate 4-20mA Input

Press **ENTER** @ **4-20 mA Input**
to calibrate the 4-20mA current loop input
from the site's control system

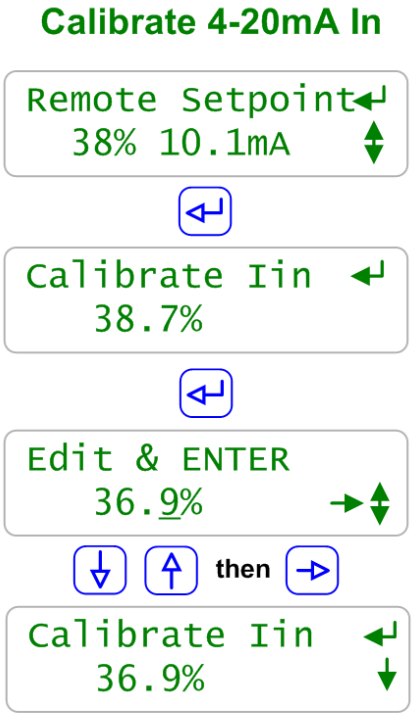
4-20 mA Input may be calibrated at any time
in Auto or Manual mode.

The present **4-20 mA Input** is **38.7%.**
Press **ENTER** to calibrate.

Key **RIGHT** to move the cursor &
UP or **DOWN** to change the digit.
Key **EXIT** to abandon or **ENTER** to execute.

Displays new, adjusted **Remote Setpoint**.
Press **EXIT** to return to main menu.

If the Local-Remote switch is in the Remote position,
any adjustment takes effect immediately and modifies
the 4-20mA output to the polymer pump.



Sidebar:
'Calibrate Iin' matches the % display on the polymer feeder with the remote operator's % display.

The underlying 4-20mA level is of less importance than having both of the % displays (the feeder's & the remote operator's) match because the Polymer feed pump operates from OFF at 0% to maximum ON at 100%.

It's simpler to calibrate on a % instead of calibrating on a current and making a non-intuitive 4-20mA loop to 0-100% conversion.
So you don't need to know that a 32.4% feed corresponds to a current loop @ 9.18 mA.

The factory default scales the 4-20 mA input for 4mA = 0% Pump to 20 mA = 100% Pump.
See Section 2.2 if your site's 4-20 mA input is not scaled 4-20 mA = 0 to 100%

2.9 Scale the 4-20mA Input

Press **ENTER** @ **4-20 mA Input**
to navigate the input current loop sub-menu

See the previous page for calibrating the 4-20 mA input loop

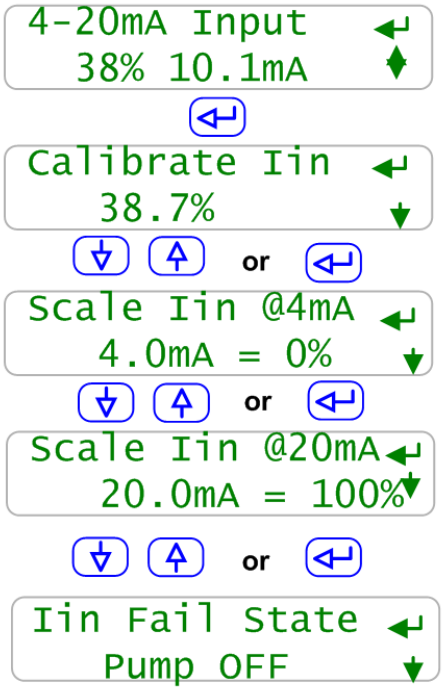
Press **DOWN** to view the present 4 mA pump feed percentage.
The factory default is as displayed. When the 4-20 mA input is at 4.0 mA the pump will be OFF.

Press **DOWN** to view the present 20 mA pump feed percentage.
The factory default is as displayed. When the 4-20 mA input is at 20.0 mA the pump will be 100%.

Press **DOWN** to view the response when the input current loop is less than 4.0 mA.
The factory default is as displayed. When the 4-20 mA input is less than 4.0 mA the pump will be OFF.

Press **ENTER** at any of the four sub-menu displays to modify the present setting.
Press **EXIT** to leave unchanged.

4-20mA input sub Menu



Sidebar:

Calibration of the 4-20 mA input ensures that the measured value of the 4-20 mA Input is displayed as the correct mA level.

Scaling the 4-20 mA input is required when you do not want 4-20 mA to correspond to a 0-100% polymer feed rate.

Selecting a different response than Pump OFF on loss of the 4-20 mA input allows for a wider range of site operational configurations & control loop reliability.

2.9 Scale the 4-20mA Input (continued)

Press **ENTER** @ **4-20mA Input** to calibrate the 4-20mA current loop input from the site's control system.

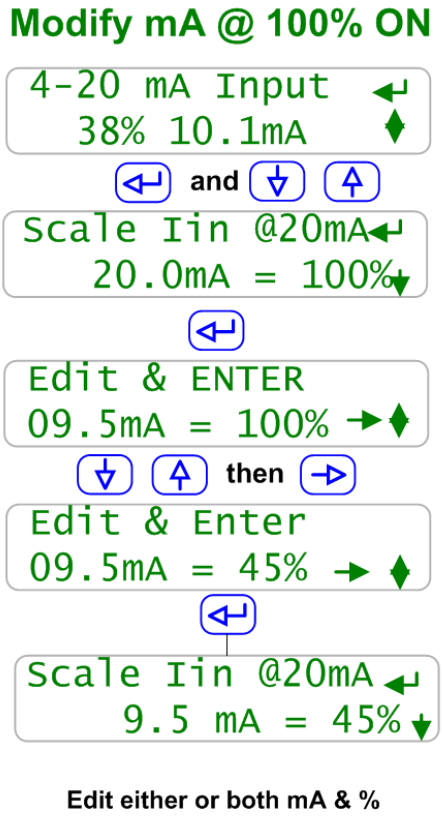
Press **UP** or **DOWN** to the **Scale Iin @20mA** display & then press **ENTER**.

Press **RIGHT** to move the underline cursor & **UP** or **DOWN** to modify the value @ the cursor. Press **EXIT** to leave the present setting unchanged.

You can modify either or both of the mA level and the resulting pump feed %. Press **ENTER** when finished editing.

Displays new, adjusted **Scale Iin @20mA** Press **EXIT** to return to main menu.

Scale Iin @4mA is modified in the same way.



Sidebar:
There's a lot of flexibility in the 4-20 mA input scaling & the corresponding pump speed but most users will leave 4mA=0% and adjust the mA @ 100% to allow 0-100% pump operation over a narrower range of 4-20 mA input.

For example, if you wish 0-15% of the 4-20 mA input to control the pump from 0-100%
Edit **Scale Iin @20mA** for **6.4mA = 100%**
& leave **Scale Iin @ 4 mA** unchanged at **4.0mA = 0%**

Setting the mA level below 4.0mA will set the mA level to 4.0mA
Setting the mA level above 21.0mA will set the mA level to 21mA

Setting the % above 100% will set the % to 100%. The % level cannot be set below 0%.
Refer to Appendix B for notes on 4-20mA Input scaling.

If you set % span to zero in error, the pump will turn OFF.
Note that you could make the current loop response reverse acting so that an increasing loop current will cause a decreasing pump %.

2.10 Response on Loss of 4-20 mA Input

View-Modify response On 4-20mA Input fail

Press **ENTER** at 4-20mA input.

Press **UP** or **DOWN** to **Iin Fail State**.

Displays the factory default.
Pump OFF when **4-20mA Input** less than 4mA.
Press **ENTER** to select a different response.

Press **DOWN** to select a user set pump speed on less than 4 mA.

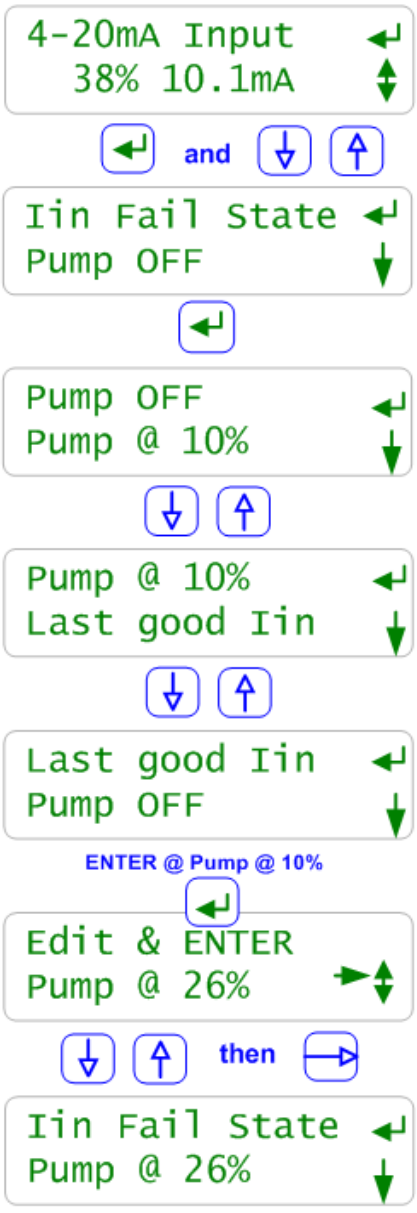
Displays the factory default of 10%.
Press **ENTER** to select response & modify value.

Press **DOWN and ENTER** to run the pump at the last input Value greater than 4.0mA when the measured current loop value falls below 4.0mA.

.
If you pressed **ENTER** @ **Pump @ 10%**
You will be able to modify the **10%** value.

Press **RIGHT** to move the underline cursor & **UP** or **DOWN** to modify the value at the cursor.

Press **EXIT** to leave unchanged or **ENTER** To set the new value.



Sidebar:
The feeder defines a failed 4-20mA input @ -1% which is nominally 3.85mA.
(4.0mA – 0.01 x 16.0mA = 3.84mA)

3.85mA allows 4.0mA, a valid pump control signal some headroom prior to a fault response

2.11 Calibrate 4-20mA Output

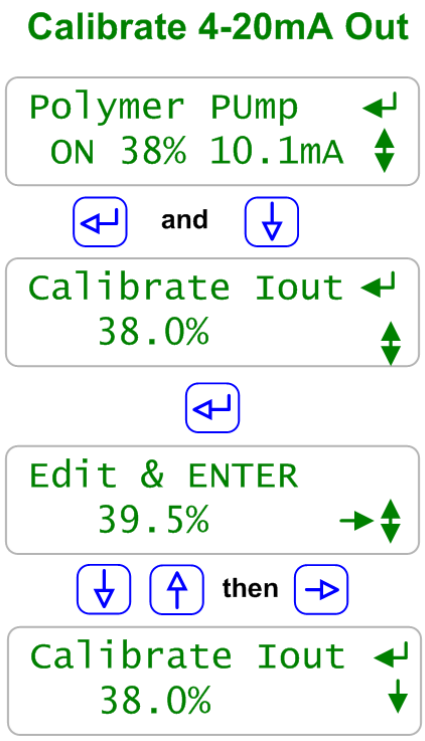
Press **ENTER** & **DOWN** @ **Polymer Pump**
to calibrate the 4-20mA current loop output
that controls the pump feed rate

The present **Polymer Pump** control is 38.0%
But the on-pump display is @ 39.5%
Press **ENTER** to calibrate.

Key **RIGHT** to move the cursor &
UP or **DOWN** to change the digit.
Key **EXIT** to abandon or **ENTER** to execute.

The ProMix S reduces the pump 4-20mA current
So that the on-pump display will measure 38.0%.
Press **EXIT** to return to main menu.

Any adjustment takes effect immediately and modifies both
the 4-20mA output.



Sidebar:
'Calibrate Iout' matches the % display on the polymer feeder with the polymer feed pump's % display (not all pump types display %, some display mA)
Note: 50% will not display 12mA after calibration. It will display the mA required for the pump to display 50% which could be 11mA to 13mA Refer to 4.3 for 4-20mA reset.
Correction >10% blocked, displays "**Advice >10% Adj.Error**". Press **EXIT** to clear.

Modifying Zero, <4%
At less than 4% the 4-20mA zero is modified to correct loop offset.
Example: Pump shows 0% and the ProMix S displays 1.5%.

Modifying Span, >6%
At more than 6% the 4-20mA span is modified to correct loop gain.
Example: Pump shows 52% and the ProMix S displays 50%

2.12 Operation Configuration

Set points

Control of the neat polymer feed pump is set by the **System Start** and **Polymer Pump** switches located on the ProMix control panel door. The type of polymer, either **emulsion** or **Mannich**, and the operation, either **Local** or **Remote,** are selected via the controller keypad or browser interface. Refer to the ProMix Mode and Polymer charts in section 1.6.

NOTE: In Batch mode the ProMix feeder adjusts the pump speed as the measured Primary & Post dilution flow rates vary to maintain the setpoint polymer concentration.

Feed Verification

Feed verification ensures that the polymer pump is actually delivering polymer by monitoring the output of the pump. Sometimes a thermal flow switch is employed for this purpose as an optional feature for 'other' type pumps selection. The Delta pump utilizes an integral relay for feed verification. See section 2.13 for further details.

Pump Calibration

Before placing the ProMix system in operation the polymer pump should be calibrated at maximum dosing and the resultant gph rate entered into the configuration menu for pump size. A calibration cylinder is provided on most ProMix systems to assist in the calibration of the polymer pump. The following procedure should be followed to calibrate a Delta type pump, assuming all installation requirements are met:

1. Configure pump for manual operation, set desired suction viscosity spm, and set stroke length to 100%.
2. Fill calibration cylinder to top mark by manipulating valves & pump to allow neat polymer into the cylinder. Manually fill the calibration cylinder if it is not possible to use the pump output.
3. Keep ProMix feeder connected to the actual system so that maximum application back pressure is realized.
4. Open primary dilution water valve so that the mix chamber fills when system is started.
5. Manipulate pump valves so that pump suction is connected to the calibration cylinder only.
6. Manually run pump at maximum rated strokes per minute and time the calibration column drawdown for at least 30 seconds taking note of beginning and end marks. Calculate the gph pump rate from the volume and time.
7. Using the controller keypad, enter the calculated pump rate in gph
8. Place the pump back into the analog mode.

2.13 Feed Verification

Press **ENTER** and **DOWN** @ **Polymer Pump** to navigate to the polymer pump feed verification option.

Feed Verify when switched **ON** is used to monitor the relay pulse output from the polymer feed pump verifying that the 4-20 mA signal from the controller is driving the pump. If this **Feed Verify** pulse signal is not active when the controller is sending the 4-20 mA control signal to the polymer pump then a pump failure alarm is actuated.

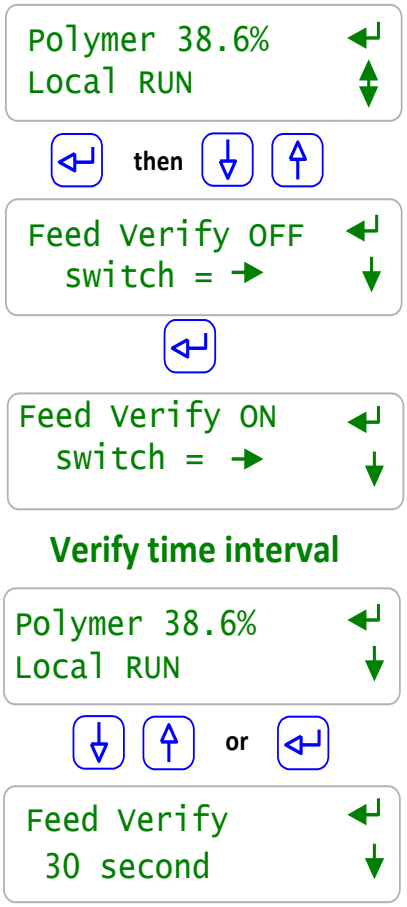
Feed Verify can also be turned **OFF** in the case where the polymer pump does not have the pulse feedback option. Press the **RIGHT** key to alternate between **ON and OFF** and press **ENTER** to modify. Press **EXIT** to return to main menu.

Press **ENTER** and **DOWN** @ **Polymer Pump** to navigate to the polymer pump feed verification option pulse timing interval.

Feed Verify is the time delay between pulse signals and may be adjusted to any time from 1 to 300 seconds. If a pulse is not received within this time period and **Feed Verify** is **ON** then a pump failure alarm is actuated. Press **ENTER** to modify and press the **RIGHT** key to change values.

Press **EXIT** to return to main menu

Verify on/off



Verify time interval

Sidebar:

The **Feed Verify** pulse signal from the pump is wired to the **FV** terminals on the Digital Input accessory board.

2.15 4-20mA Controls

0% defaults to 4.0mA and zero SPM.
100% defaults to 20mA and the maximum pump SPM.
The 4-20mA input current may be changed by adjusting the 4-20mA input scaling.

2.16 Troubleshooting Guide

Adjustment and bypass fixes to operational problems.

LCD Display	Operational Problem
No Control STOP	Switch the On-Off-Remote to On while you figure out the problem with the 4-20mA current loop connected to **mA In** input terminals '**I+**' & Ground ⏚ terminal. If the ProMix S **mA In 24V** is powering the loop, view **Polymer / Diagnostic** to ensure >23VDC
No Water STOP	**Flowswitch OK?** If a flowswitch – differential pressure switch problem, jumper controller **Interlock** input terminal '**FS**' to the adjacent Ground symbol ⏚ terminal while you resolve. **Solenoid OK?** Verify that the solenoid has been actuated during the **Filling Mixer** and **Flow Check** states by cracking a downstream union. Verify 120 VAC between **AC Power** terminal '**S'**olenoid & **Neutrals** terminals during the **Filling Mixer** and **Flow Check** states. **Fuse Fails?** If no AC solenoid power, verify solenoid wiring & coil not shorted & replace the solenoid fuse. It's the brown 2.5A fuse in the white socket above the **Neutrals** terminals. www.digikey.com Part# 7500413 Note that power to the mixer motor start relay coil shares the 2.5A solenoid fuse.
No Ext.Run STOP	If a Remote Start contact set problem, jumper controller **Interlock** input terminal '**RC**' to the adjacent Ground symbol terminal.
Flush Fail STOP	This state occurs if flow lost during flushing. After flush time expires, goes to **No Water STOP** ⏚
Offline STOP	It the On-Off-Remote switch is not in the OFF position then there is either a lose connection @ the door mounted switch terminals or the red 3 wire connector below the keypad ribbon connector has been disconnected.

2.17 Diagnostic Display

Press **ENTER** & **UP** @ **Polymer** for **Diagnostics**.

When initially programmed, the ProMix S serial number 1st letter is set to '**U**'. Manufacturing sets the 1st letter to '**P**'

Firmware Ver: is the software issue date. In this example 4/06/10.

An increasing number of **Watchdog Resets** indicates that the software is halting, typically as a result of an external electrical fault. Disconnect the **Interlock** **RC** inputs first, followed by the **mA In** **I+** & common inputs next.

If the feeder runs continuously or the **RC** input is used to STOP the feeder, there should be a low number of **Power OFF-ONs**. An unexplained, high number usually indicates accidental shutdown or AC power wiring problems.

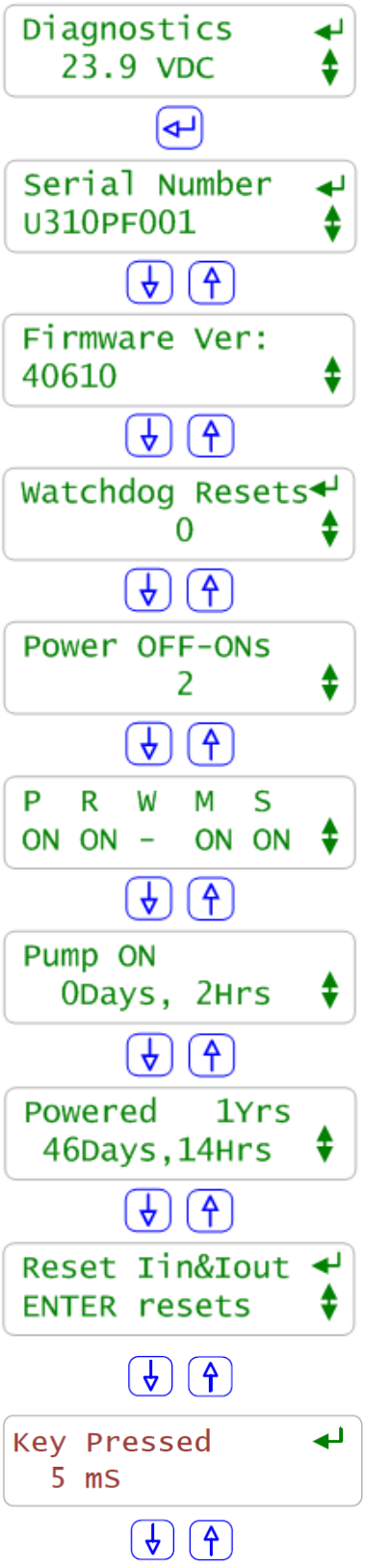
Relay ON/OFF display in the same order as wired and labeled on the ProMix S circuit board. **P**olymer enable, **R**unning, **W**ater Loss, **M**ixer, **S**olenoid. **P**,**R** & **W** are dry NO contacts, **M** & **S** are NO hot, 120VAC.

This is the elapsed time on the **P**olymer enable contact set & therefore tracks the time spent in the **Auto RUN** & **Manual RUN** states. It's saved to flash every hour so if powered OFF before an hour of ON time, ON time is lost.

This is the elapsed ProMix S AC powered time & meant to be compared to the previous **Pump ON** time. It's saved to flash every hour so if powered OFF before an hour of ON time, ON time is lost.

The 4-20mA current input is locked to the 4-20mA current output when Auto selected. Both can be calibrated & occasionally mis-calibrated. Press **ENTER** to return to the factory defaults & a known state.

Diagnostics



Key Pressed: the Debounce time for keypad and it is set to 10ms factory default, it is not adjustable

2.18 Blue White A-100NV Pump

Cabling 4-20mA Input

BLUE to **mA IN**, **I+**
BLACK to **mA IN**, Ground

Blue White 4-20mA has a 250 ohm loop resistance.

4mA is nominally 600mV & 12mA nominally 1750mV at ProMix S terminals. (Noted for users with mA measuring problems)

3.0 SPARE PARTS & PREVENTIVE MAINTENANCE

3.1 BLUE WHITE A-100NV Pump Spare Parts

P/N	***Description***
1079474	Tygothane Tube Assy (A1N00V-1T; A1N30V-1T)
1079475	Tygothane Tube Assy (A1N30V-2T)
1079476	Tygothane Tube Assy (A1N20V-3T)
7747083	Roller Assembly
7747084	Tube Nuts

3.2 PVC Mixing Chamber Spare Parts

P/N:	*Description:*
7746474	Seal, Mech, Shaft, 1/2", ProMix-U
7747244	Injection Valve, SG ProMix
7747241	O-Ring, Chamber Insert, Viton, ProMix-U
7746516	O-Ring, Chamber, Viton, ProMix-S

3.3 Piping Components Spare Parts

P/N:	*Description:*
7741084	0-100PSI, Gauge, SS, 2-1/2, Bottom MTD
7741089	0-60PSI, Gauge, SS, 2-1/2, Bottom MTD
7741514	3/8" OD Natural PE Tubing

3.4 Control Panel Spare Parts

P/N:	*Description:*
1078793	SQD Motor Circuit Protector 6-10 Amp Adjustable
1078795	SQD Contactor
1077610	ABB Circuit Breaker 15 Amp
1077609	ABB Circuit Breaker 10 Amp
7500413	Littlefuse 2.5A 250V for Circuit Board

3.5 Maintenance and Lubrication Schedule

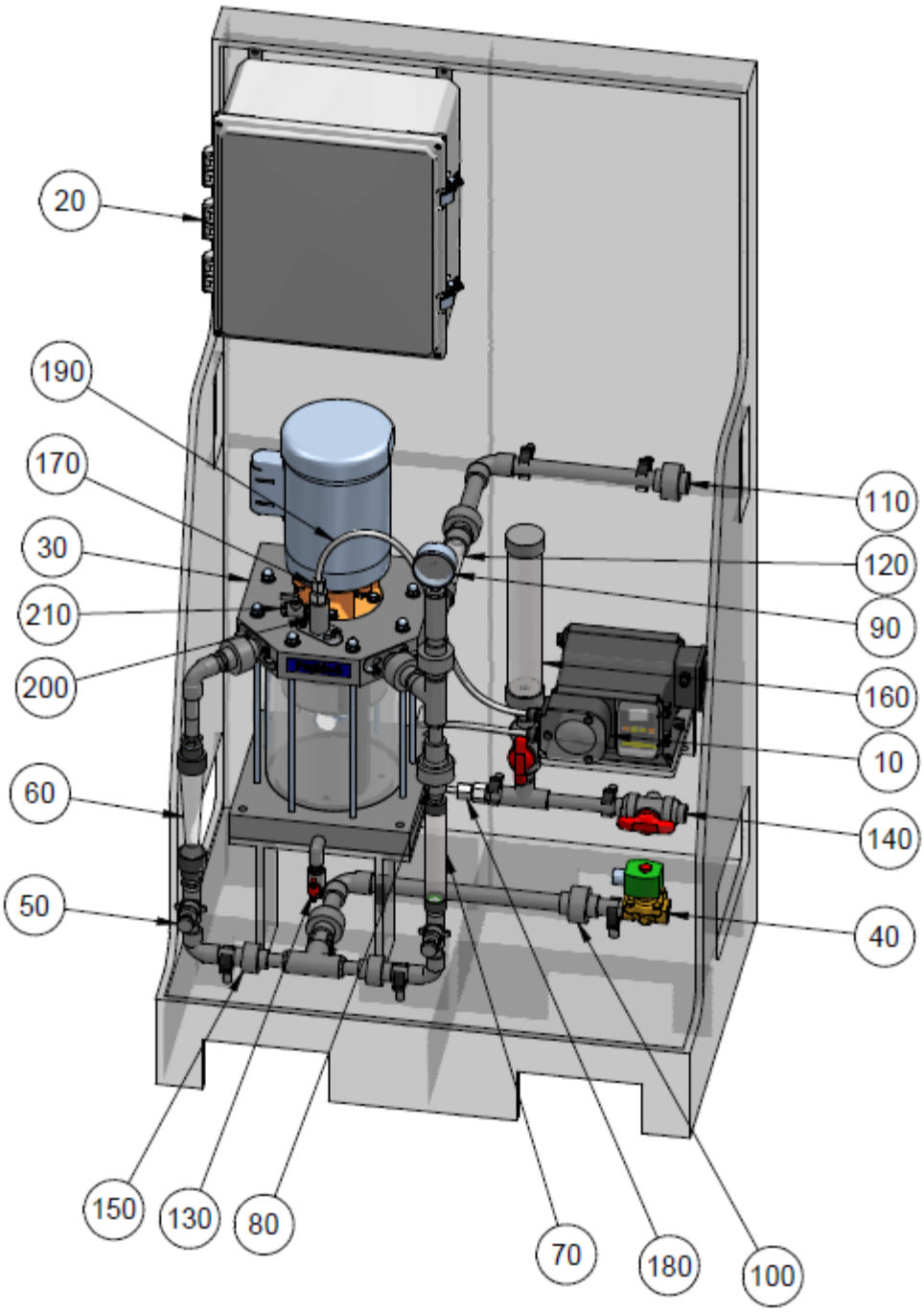
MAINTENANCE		
Description / Task	**Remarks**	**Frequency**
Visual inspection of unit		Weekly
Check dosing line fittings and valves for tightness		Every 3 Months (Approx 30% continuous operation.)
Verify equipment is operating properly	No leaks in the piping or at the "weep hole" or abnormal noises	Weekly
Check the electrical connections for integrity		Quarterly
Check process tubing for wear or cuts		Weekly
Check Mixing Chamber Motor amperage. Check fan cover for obstruction or Dirt		Monthly
Check pump tubing for wear or cuts		Weekly
Short Term - Flushing of Piping & Chamber	24 Hour Shut Down	Run 60 Second Flush
Long Term – Flushing of Piping & Chamber	24 Hour + or if large amount of polymer is dosed into chamber w/o water running	Run Water until piping is visibly clear in static mixer

LUBRICATION		
Description / Task	**Lubrication**	**Frequency**
Mixing Chamber Motor 1/2 Hp - Standard Bearings	Ball Bearing Grease	5,000 Hours of Service per Year or every three years

Appendix A - TA Series Bill of Material

Mechanical & Electrical List

General Mechanical Layout – ProMix S TA

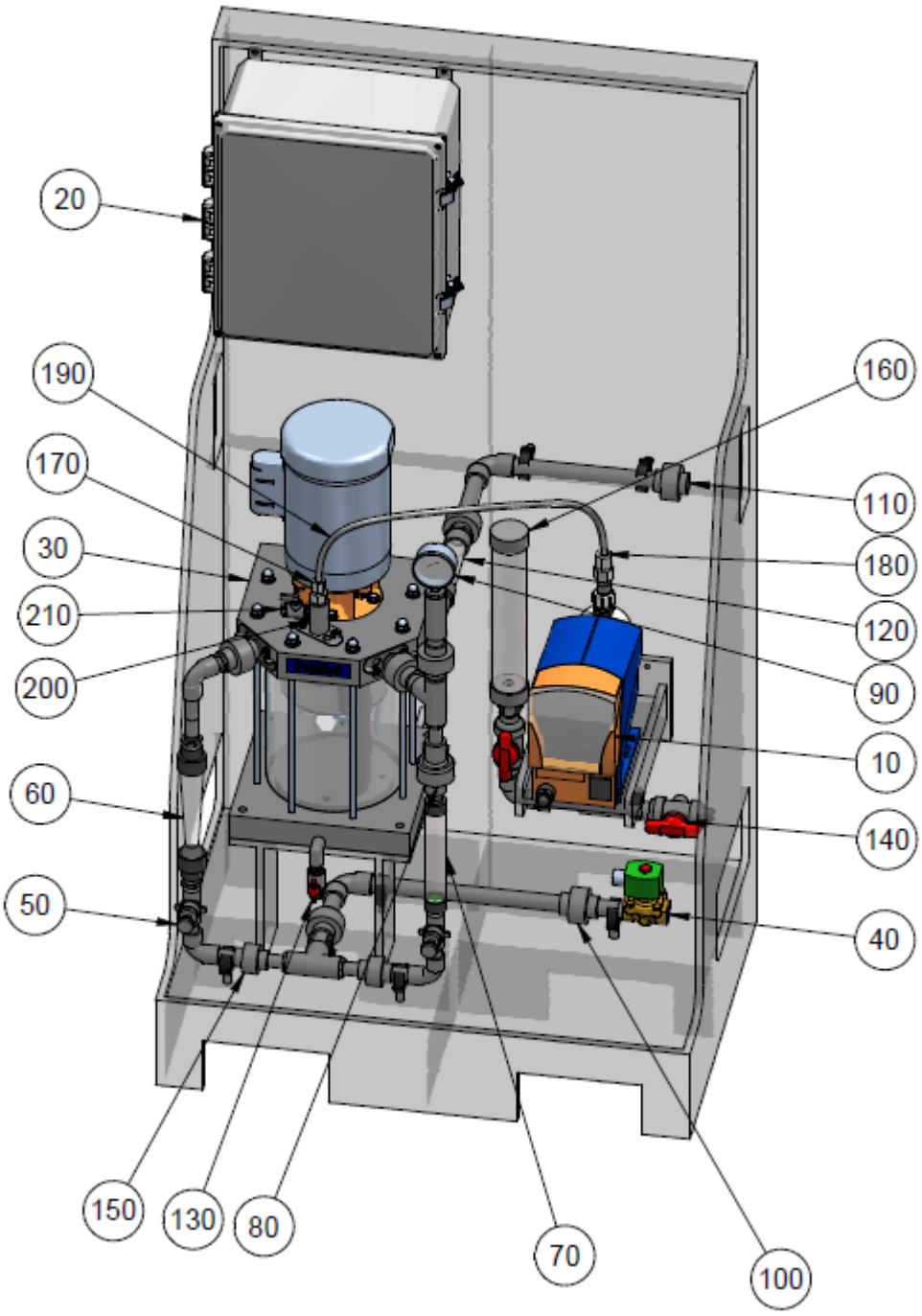


ProMix S TA with Peristaltic Tubing Pump

PROMIX S (TA SERIES) BILL OF MATERIAL

ITEM	PART DESCRIPTION	PART NO.	1048346	1048347	1048348	1048349	1048351	1048352
10	PUMP, 3/8" OD, 0.24 GPH, BLUE-WHITE A1N00V-1T	7747012	X					
	PUMP, 3/8" OD, 1.06 GPH, BLUE-WHITE A1N30V-1T	7747013		X	X			
	PUMP, 3/8" OD, 2.22 GPH, BLUE-WHITE A1N30V-2T	7747014				X	X	
	PUMP, 3/8" OD, 4.14 GPH, BLUE-WHITE A1N30V-3T	7747015						X
20	CONTROL PANEL	7747279	X	X	X	X	X	X
30	PROMIX S MIXING CHAMBER	7747255	X	X	X	X	X	X
40	SOLENOID VALVE, 3/4", FNPT, BRASS	7746305	X	X	X	X	X	X
50	NEEDLE VALVE, 1/2", FNPT, PVC	7746303	X	X	X	X	X	X
60	FLOW METER, 1 GPM, 1/2", FNPT, PVC, W\SWITCH	7746672	X	X				
	FLOW METER, 3 GPM, 1/2", FNPT, PVC, W\SWITCH	7746673			X	X		
	FLOW METER, 5 GPM, 3/4", FNPT, PVC, W\SWITCH	7746674					X	X
70	FLOW METER, 1 GPM, 1/2", FNPT, PVC	7746342		X				
	FLOW METER, 2 GPM, 1/2", FNPT, PVC	7746304			X	X		
	FLOW METER, 5 GPM, 1/2", FNPT, PVC	7746343					X	X
80	CHECK VALVE, 1/2", SKT, PVC	1048404	X	X	X	X	X	X
90	PRESSURE GAUGE, 316 SST, 0-100PSI	7741084	X	X	X	X	X	X
100	UNION, 3/4", SOCKET, PVC/VITON, SCH. 80	7744555	X	X	X	X	X	X
110	UNION, 3/4", FNPT, PVC/VITON, SCH. 80	7744556	X	X	X	X	X	X
120	STATIC MIXER, 3/4", MNPT, CLEAR PVC, SCH. 40, 6 ELE	7746301	X	X	X	X	X	X
130	LAB COCK, 1/4", FNPT, PVC/VITON	7746331	X	X	X	X	X	X
140	BALL VALVE, 1/2", PVC/VITON, SCH. 80	7000309	X	X	X	X	X	X
150	UNION, 1/2", SOCKET, PVC/VITON, SCH. 80	7744562	X	X	X	X	X	X
160	CALIBRATION COLUMN, PVC, 250mL	7500138	X	X	X	X		
	CALIBRATION COLUMN, PVC, 500mL	7500139					X	X
170	MALE CONNECTOR, 3/8" O.D. TUBING X 1/2" MNPT, PVDF	7744813	X	X	X	X	X	X
180	FEMALE CONNECTOR, 3/8" O.D. TUBE X 1/2" FNPT, PVDF	7800709	X	X	X	X	X	X
190	TUBING, 3/8" OD, HDPE	7741514	X	X	X	X	X	X
200	INJECTION VALVE	7747244	X	X	X	X	X	X
210	BLEED VALVE, 1/8", PVC/VITON	7747237	X	X	X	X	X	X

General Mechanical Layout – ProMix S DA

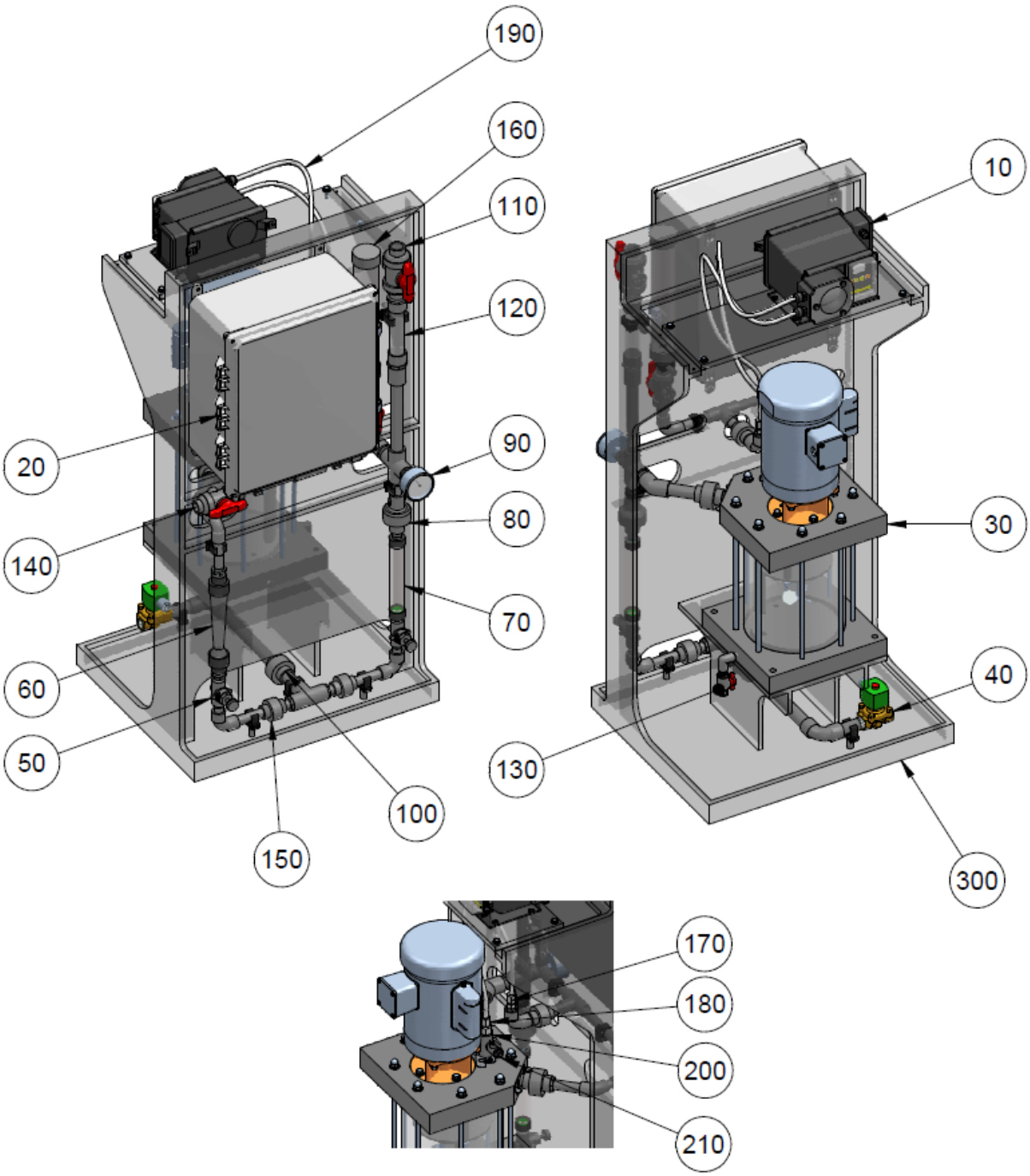


ProMix S DA with Diaphragm Pump

PROMIX S (DA SERIES) BILL OF MATERIAL

ITEM	PART DESCRIPTION	PART NO.	1048353	1048354	1048355	1048356	1048357	1048358
10	DELTA 1608 SERIES PUMP	DLTA1608PVT4000UD4031EN0	X	X	X			
	DELTA 1020 SERIES PUMP	DLTA1020PVT4000UD4031EN0				X	X	
	DELTA 0730 SERIES PUMP	DLTA0730PVT4000UD4031EN0						X
20	CONTROL PANEL	7747280	X	X	X	X	X	X
30	PROMIX S MIXING CHAMBER	7747255	X	X	X	X	X	X
40	SOLENOID VALVE, 3/4", FNPT, BRASS	7746305	X	X	X	X	X	X
50	NEEDLE VALVE, 1/2", FNPT, PVC	7746303	X	X	X	X	X	X
60	FLOW METER, 1 GPM, 1/2", FNPT, PVC, W\SWITCH	7746672	X	X				
	FLOW METER, 3 GPM, 1/2", FNPT, PVC, W\SWITCH	7746673			X	X		
	FLOW METER, 5 GPM, 3/4", FNPT, PVC, W\SWITCH	7746674					X	X
70	FLOW METER, 1 GPM, 1/2", FNPT, PVC	7746342		X				
	FLOW METER, 2 GPM, 1/2", FNPT, PVC	7746304			X	X		
	FLOW METER, 5 GPM, 1/2", FNPT, PVC	7746343					X	X
80	CHECK VALVE, 1/2", SKT, PVC	1048404	X	X	X	X	X	X
90	PRESSURE GAUGE, 316 SST, 0-100PSI	7741084				X	X	X
	PRESSURE GAUGE, 316 SST, 0-160PSI	7745788	X	X	X			
100	UNION, 3/4", SOCKET, PVC/VITON, SCH. 80	7744555	X	X	X	X	X	X
110	UNION, 3/4", FNPT, PVC/VITON, SCH. 80	7744556	X	X	X	X	X	X
120	STATIC MIXER, 3/4", MNPT, CLEAR PVC, SCH. 40, 6 ELE	7746301	X	X	X	X	X	X
130	LAB COCK, 1/4", FNPT, PVC/VITON	7746331	X	X	X	X	X	X
140	BALL VALVE, 1/2", PVC/VITON, SCH. 80	7000309	X	X	X	X	X	X
150	UNION, 1/2", SOCKET, PVC/VITON, SCH. 80	7744562	X	X	X	X	X	X
160	CALIBRATION COLUMN, PVC, 250mL	7500138	X	X	X	X		
	CALIBRATION COLUMN, PVC, 500mL	7500139					X	X
170	MALE CONNECTOR, 3/8" O.D. TUBING X 1/2" MNPT, PVDF	7744813	X	X	X	X	X	X
180	FEMALE CONNECTOR, 3/8" O.D. TUBE X 1/2" FNPT, PVDF	7800709	X	X	X	X	X	X
190	TUBING, 3/8" OD, HDPE	7741514	X	X	X	X	X	X
200	INJECTION VALVE	7747244	X	X	X	X	X	X
210	BLEED VALVE, 1/8", PVC/VITON	7747237	X	X	X	X	X	X

General Mechanical Layout – ProMix C TA

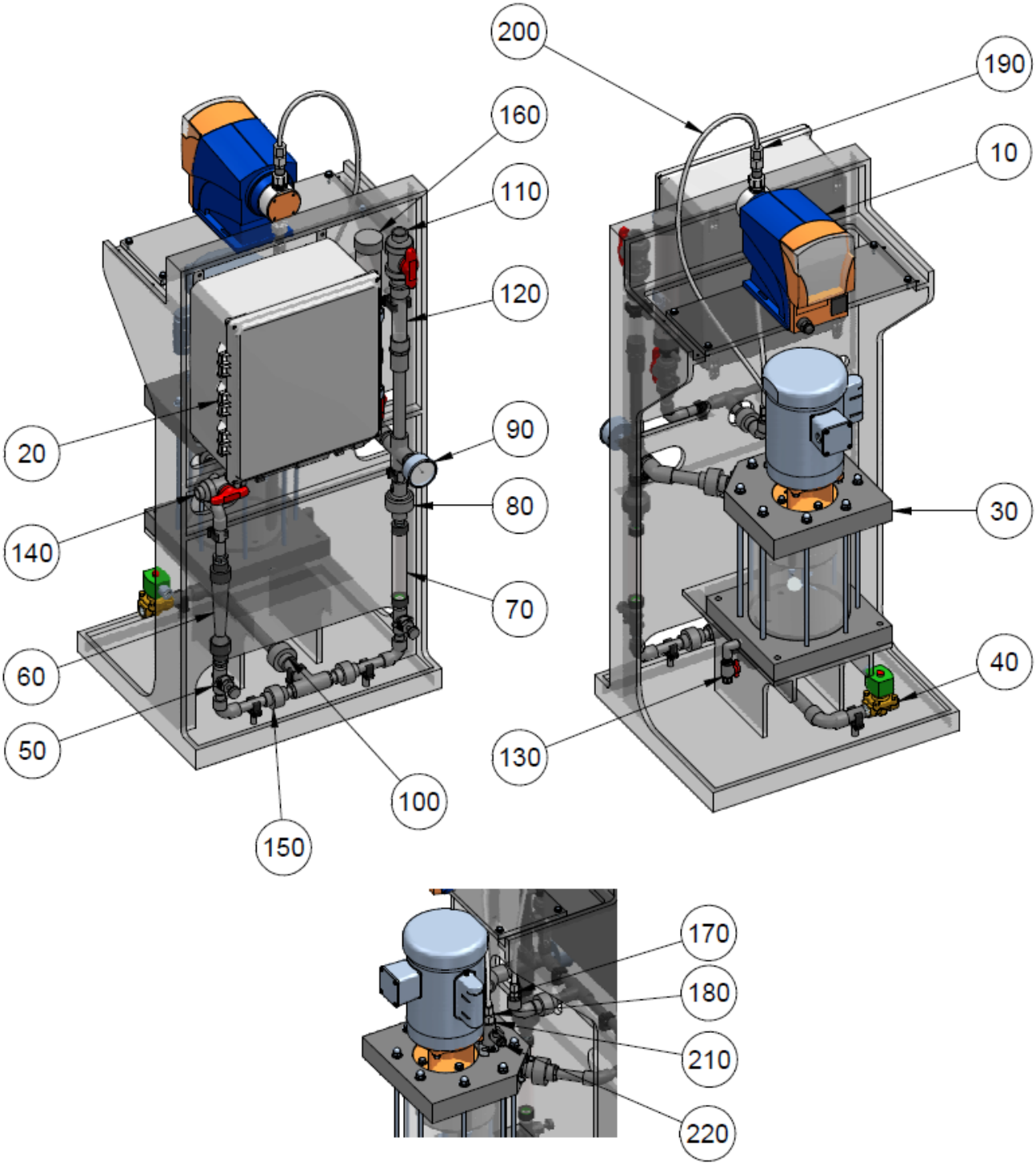


PROMIX C CONTROL A

PROMIX C (TA SERIES) BILL OF MATERIAL

ITEM	PART DESCRIPTION	PART NO.	1048360	1048361	1048362	1048463	1048364	1048365
10	PUMP, 3/8" OD, 0.24 GPH, BLUE-WHITE A1N00V-1T	7747012	X					
	PUMP, 3/8" OD, 1.06 GPH, BLUE-WHITE A1N30V-1T	7747013		X	X			
	PUMP, 3/8" OD, 2.22 GPH, BLUE-WHITE A1N30V-2T	7747014				X	X	
	PUMP, 3/8" OD, 4.14 GPH, BLUE-WHITE A1N30V-3T	7747015						X
20	CONTROL PANEL	7747279	X	X	X	X	X	X
30	PROMIX S MIXING CHAMBER	7747255	X	X	X	X	X	X
40	SOLENOID VALVE, 3/4", FNPT, BRASS	7746305	X	X	X	X	X	X
50	NEEDLE VALVE, 1/2", FNPT, PVC	7746303	X	X	X	X	X	X
60	FLOW METER, 1 GPM, 1/2", FNPT, PVC, W\SWITCH	7746672	X	X				
	FLOW METER, 3 GPM, 1/2", FNPT, PVC, W\SWITCH	7746673			X	X		
	FLOW METER, 5 GPM, 3/4", FNPT, PVC, W\SWITCH	7746674					X	X
70	FLOW METER, 1 GPM, 1/2", FNPT, PVC	7746342		X				
	FLOW METER, 2 GPM, 1/2", FNPT, PVC	7746304			X	X		
	FLOW METER, 5 GPM, 1/2", FNPT, PVC	7746343					X	X
80	CHECK VALVE, 1/2", SKT, PVC	1048404	X	X	X	X	X	X
90	PRESSURE GAUGE, 316 SST, 0-60PSI	7746129	X	X	X	X	X	X
100	UNION, 3/4", SOCKET, PVC/VITON, SCH. 80	7744555	X	X	X	X	X	X
110	BALL VALVE, 3/4", PVC/VITON, SCH. 80	7741668	X	X	X	X	X	X
120	STATIC MIXER, 3/4", MNPT, CLEAR PVC, SCH. 40, 6 ELE	7746301	X	X	X	X	X	X
130	LAB COCK, 1/4", FNPT, PVC/VITON	7746331	X	X	X	X	X	X
140	BALL VALVE, 1/2", PVC/VITON, SCH. 80	7000309	X	X	X	X	X	X
150	UNION, 1/2", SOCKET, PVC/VITON, SCH. 80	7744562	X	X	X	X	X	X
160	CALIBRATION COLUMN, PVC, 250mL	7500138	X	X	X	X		
	CALIBRATION COLUMN, PVC, 500mL	7500139					X	X
170	MALE CONNECTOR, 3/8" O.D. TUBING X 1/4" MNPT, PVDF	7744577	X	X	X	X	X	X
180	MALE CONNECTOR, 3/8" O.D. TUBING X 1/2" MNPT, PVDF	7744813	X	X	X	X	X	X
190	TUBING, 3/8" OD, HDPE	7741514	X	X	X	X	X	X
200	INJECTION VALVE	7747244	X	X	X	X	X	X
210	BLEED VALVE, 1/8", PVC/VITON	7747237	X	X	X	X	X	X

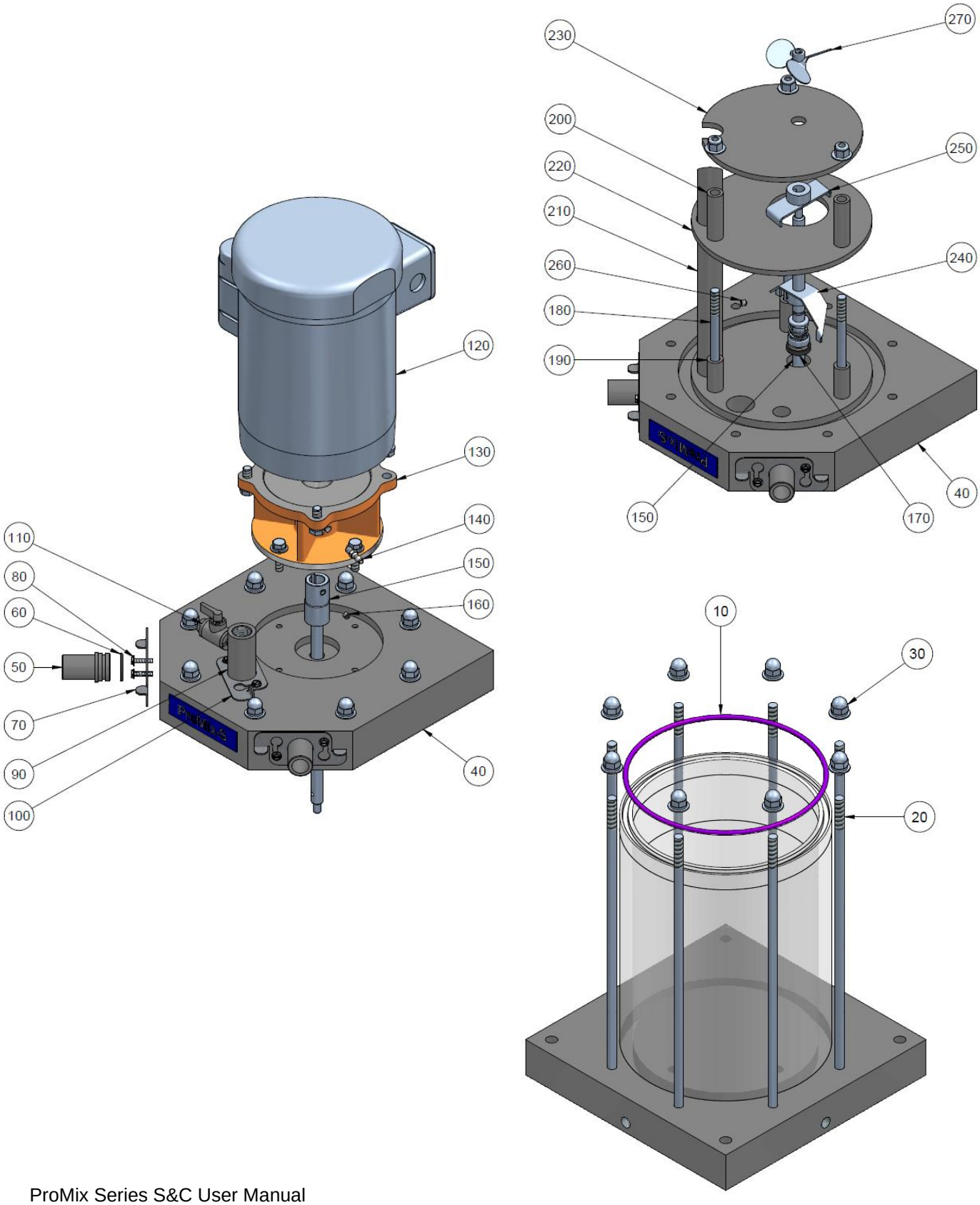
General Mechanical Layout – ProMix C DA



PROMIX C (DA SERIES) BILL OF MATERIAL

ITEM	PART DESCRIPTION	PART NO.	1048460	1048461	1048462	1048463	1048474	1048475
10	DELTA 1608 SERIES PUMP	DLTA1608PVT4000UD4031EN0	X	X	X			
	DELTA 1020 SERIES PUMP	DLTA1020PVT4000UD4031EN0				X	X	
	DELTA 0730 SERIES PUMP	DLTA0730PVT4000UD4031EN0						X
20	CONTROL PANEL	7747280	X	X	X	X	X	X
30	PROMIX S MIXING CHAMBER	7747255	X	X	X	X	X	X
40	SOLENOID VALVE, 3/4", FNPT, BRASS	7746305	X	X	X	X	X	X
50	NEEDLE VALVE, 1/2", FNPT, PVC	7746303	X	X	X	X	X	X
60	FLOW METER, 1 GPM, 1/2", FNPT, PVC, W\SWITCH	7746672	X	X				
	FLOW METER, 3 GPM, 1/2", FNPT, PVC, W\SWITCH	7746673			X	X		
	FLOW METER, 5 GPM, 3/4", FNPT, PVC, W\SWITCH	7746674					X	X
70	FLOW METER, 1 GPM, 1/2", FNPT, PVC	7746342		X				
	FLOW METER, 2 GPM, 1/2", FNPT, PVC	7746304			X	X		
	FLOW METER, 5 GPM, 1/2", FNPT, PVC	7746343					X	X
80	CHECK VALVE, 1/2", SKT, PVC	1048404	X	X	X	X	X	X
90	PRESSURE GAUGE, 316 SST, 0-100PSI	7746130				X	X	X
	PRESSURE GAUGE, 316 SST, 0-160PSI	7746131	X	X	X			
100	UNION, 3/4", SOCKET, PVC/VITON, SCH. 80	7744555	X	X	X	X	X	X
110	BALL VALVE, 3/4", PVC/VITON, SCH. 80	7741668	X	X	X	X	X	X
120	STATIC MIXER, 3/4", MNPT, CLEAR PVC, SCH. 40, 6 ELE	7746301	X	X	X	X	X	X
130	LAB COCK, 1/4", FNPT, PVC/VITON	7746331	X	X	X	X	X	X
140	BALL VALVE, 1/2", PVC/VITON, SCH. 80	7000309	X	X	X	X	X	X
150	UNION, 1/2", SOCKET, PVC/VITON, SCH. 80	7744562	X	X	X	X	X	X
160	CALIBRATION COLUMN, PVC, 250mL	7500138	X	X	X	X		
	CALIBRATION COLUMN, PVC, 500mL	7500139					X	X
170	MALE CONNECTOR, 3/8" O.D. TUBING X 1/4" MNPT, PVDF	7744577	X	X	X	X	X	X
180	MALE CONNECTOR, 3/8" O.D. TUBING X 1/2" MNPT, PVDF	7744813	X	X	X	X	X	X
190	FEMALE CONNECTOR, 3/8" O.D. TUBE X 1/2" FNPT, PVDF	7800709	X	X	X	X	X	X
200	TUBING, 3/8" OD, HDPE	7741514	X	X	X	X	X	X
210	INJECTION VALVE	7747244	X	X	X	X	X	X
220	BLEED VALVE, 1/8", PVC/VITON	7747237	X	X	X	X	X	X

P/N: 7747255 Mixing Chamber Components



PROMIX S - MIXING CHAMBER BILL OF MATERIALS P/N: 7747255

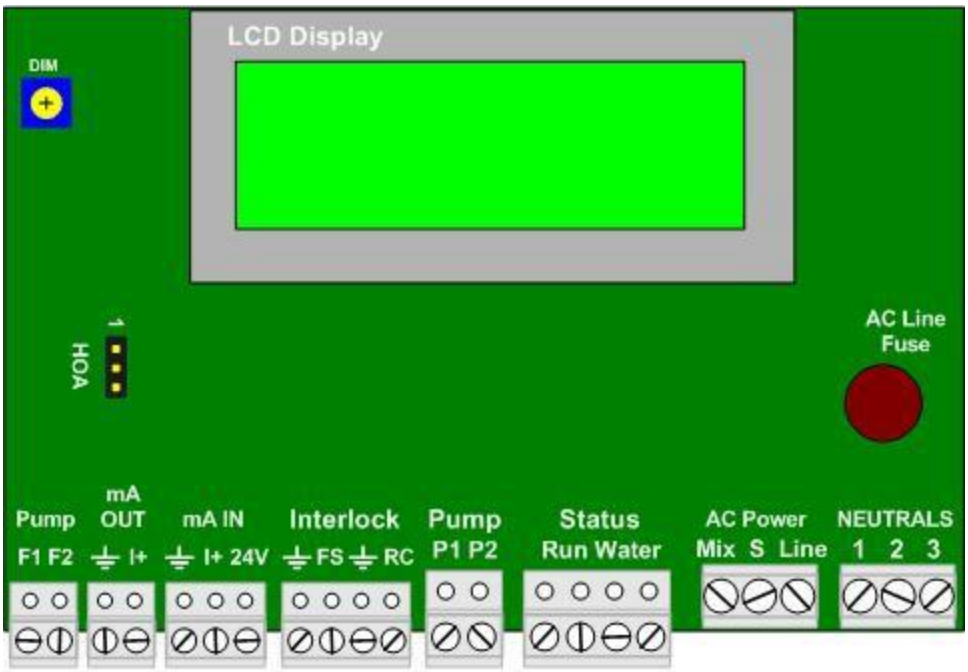
ITEM #	QTY.	DESCRIPTION	USA P\N
10	1	O-RING, CHAMBER, VITON, PROMIX-S	7746516
20	8	ROD, 316SS, 3/8-16 X 14.75, PROMIX-U	7747246
30	8	NUT, ACORN, 3/8-16, 18-8 SST	7746492
40	1	PLATE, TOP, PVC, 1.75, SG, PROMIX-S	7747254
50	2	INSERT, MALE, 3/4", PVC, PROMIX-S	7747269
60	2	O-RING, VITON, .987 ID X .103 CS, AS568B-120	7747241
70	2	RETAINER, MALE INSERT, 3/4", 316 SST, PROMIX-S	7747271
80	6	SCREW, 10-24X3/4", 18-8, HEX HEAD WITH WASHER	7747238
90	1	INJECTION VALVE, SG, PROMIX	7747244
100	1	RETAINER, INJECTION VALVE, 316 SST	7747239
110	1	VALVE, BALL, 1/8", MNPT X FNPT, PVC, VITON	7747237
120	1	MOTOR, 1/2 HP, TEFC, 115\230 VAC, 1 PH, 56C, BALDOR VWDL3504	7747212
130	1	FLANGE, MOTOR, C56/135, PROMIX-M	7746478
140	1	HOSE BARB, 1/16" MNPT X 3/16" ID, PVDF	7500346
150	1	SHAFT, MIXER, 303SS, PROMIX-M	7746484
160	1	SCREW, SET, 316SS, 1/4-28 PROMIX-U	851405
170	1	SEAL, MECH, SHAFT, 304SS, 1/2", PROMIX-U	7746474
180	3	ROD, 316SS, 3/8-16 X 6, PROMIX-S	7746588
190	3	SPACER, TOP BAFFLE, PROMIX-S	7746586
200	3	SPACER, BOTTOM BAFFLE, PROMIX-S	7746587
210	1	PIPE, DISCHARGE, PVC, 3/4" , SG, PROMIX-U	7747257
220	1	BAFFLE, TOP, PVC, .25, PROMIX-S	7747259
230	1	BAFFLE, BOTTOM, PVC, .25, PROMIX-S	7747258
240	1	BLADE, PRIMARY, 316SS, PROMIX-S	7746508
250	1	BLADE, SECONDARY, 316SS, PROMIX-S	7746509
260	4	SCREW, SET, 316SS, 1/4-28 PROMIX-U	7746476
270	1	PROP, AGITATOR, 316SST, PROMIX-S	7746507

Appendix B – Control Panel “A Controls”

B.1 Controller Board Layout

The controller consists of one circuit board.

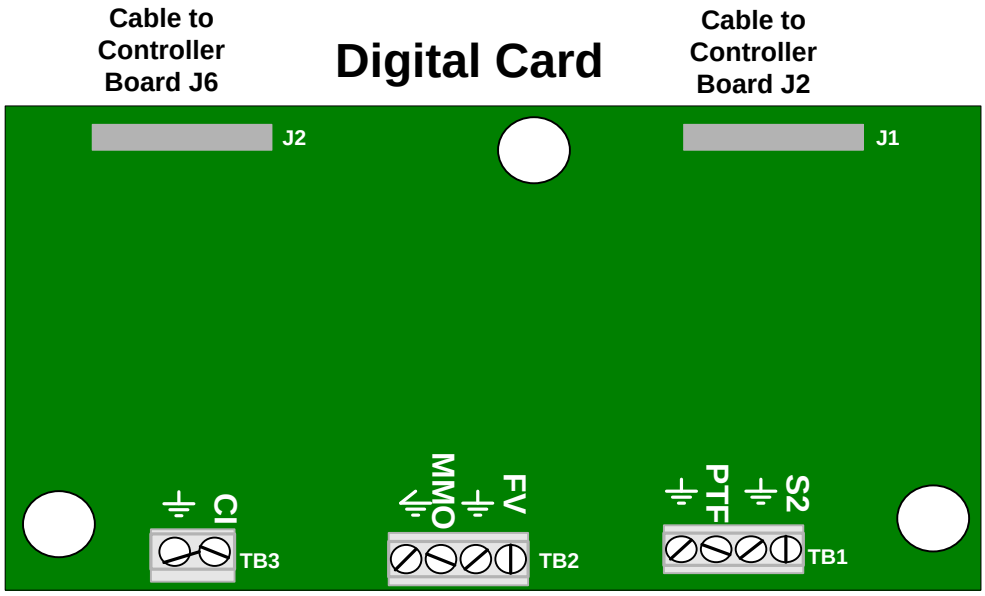
It includes a 2 line x 16 character LCD display and a microcontroller module.



All field terminations are to be landed on terminals as per Appendix Section B.2.

Auxiliary digital input card – Internal Connections:

1. Connect cable from Digital card J1 to Controller Board J2
2. Connect cable from Digital card J2 to Controller Board J6

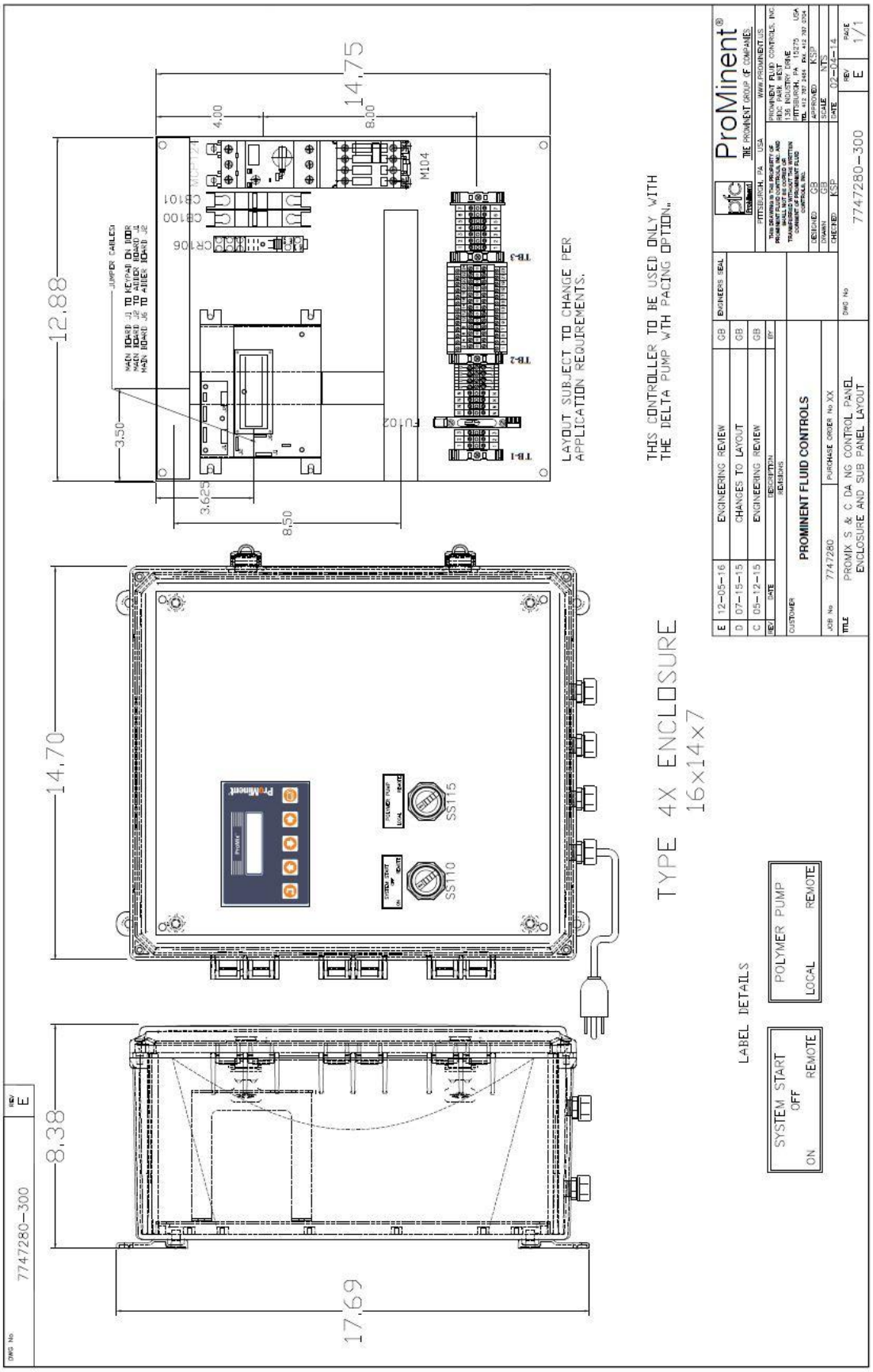


CI - configurable input (sometimes used for tank level)

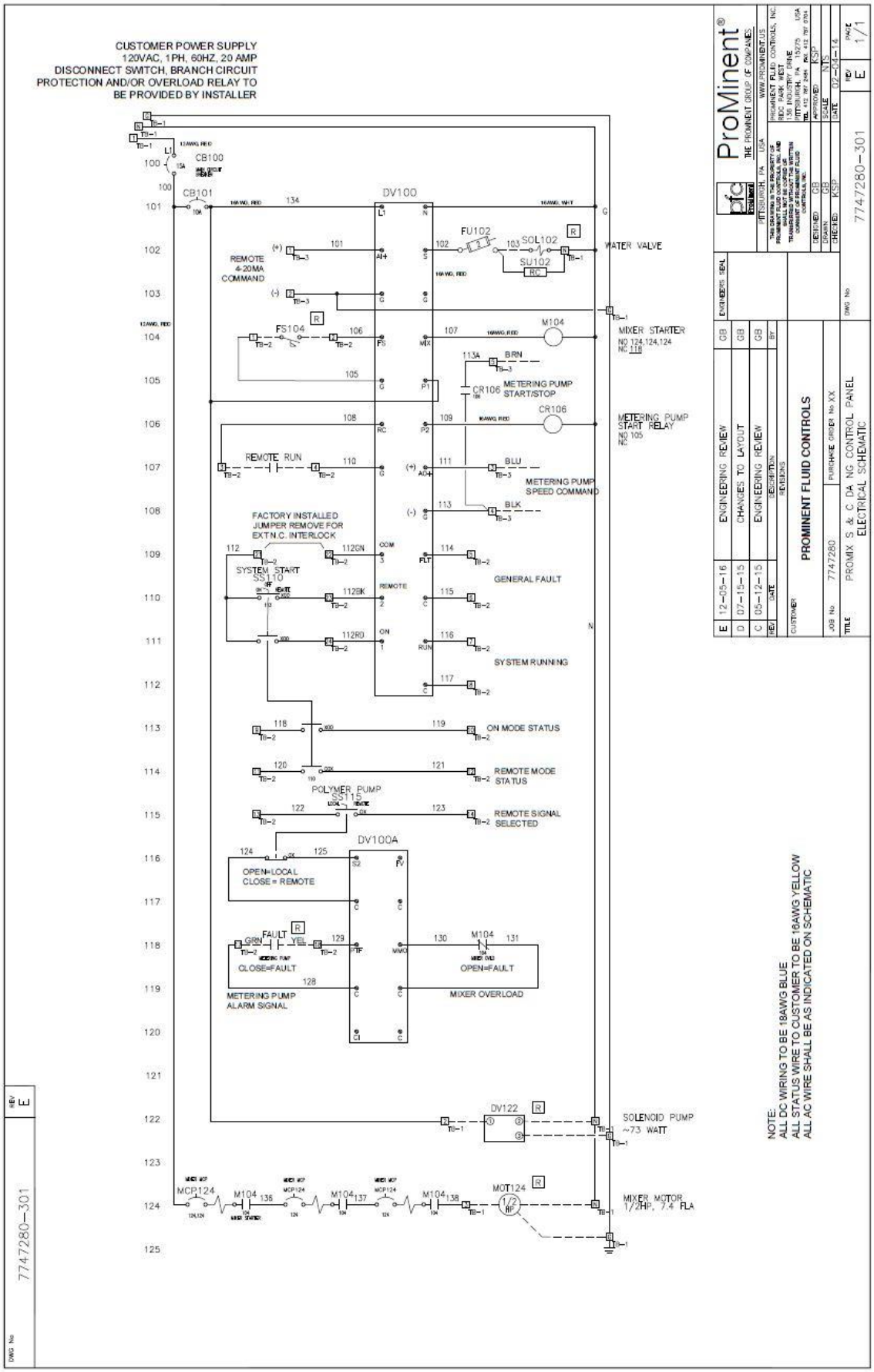
MMO – mixer motor overload
FV – feed verification

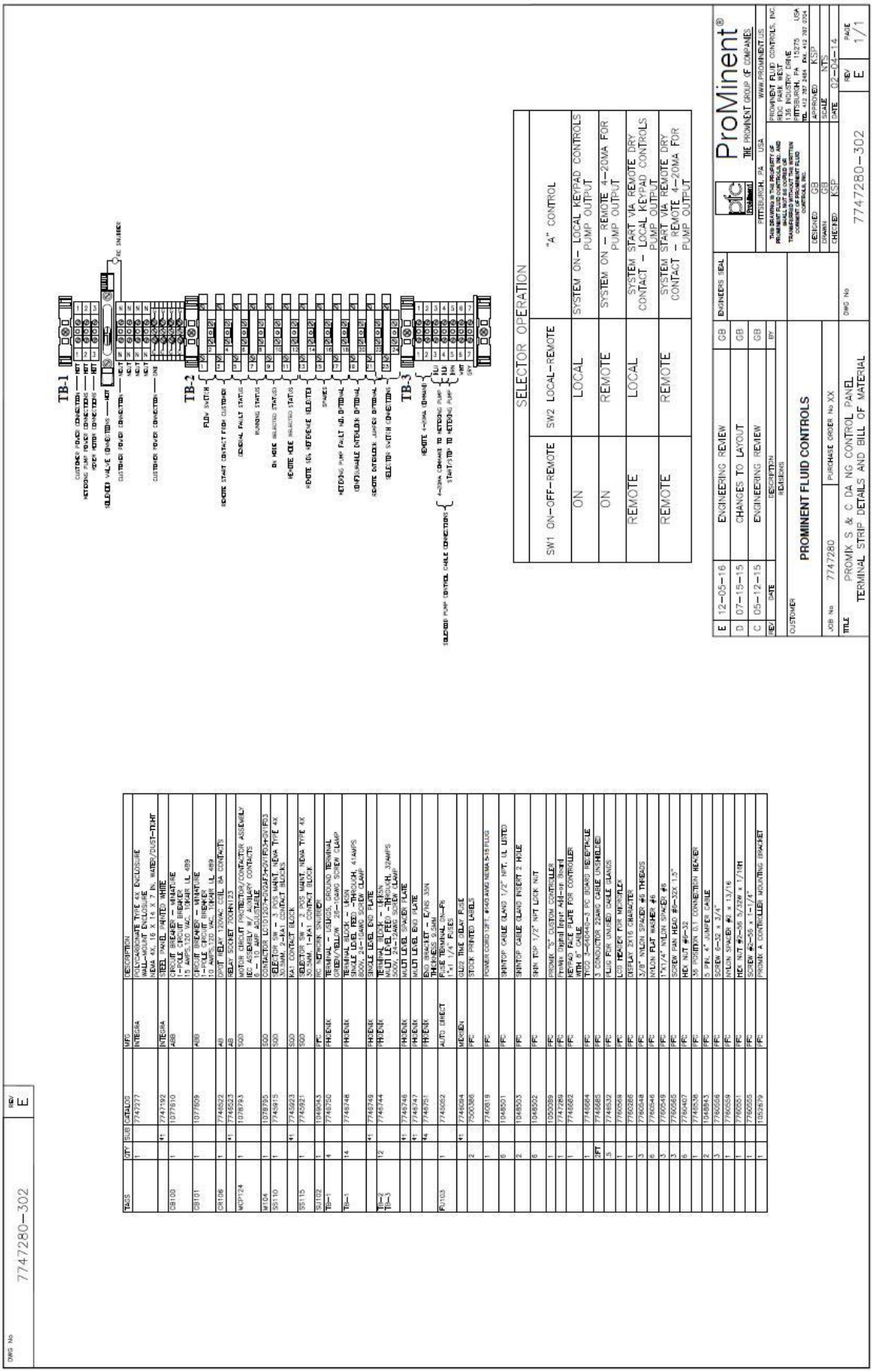
PTF - pump failure
S2 - interface to Polymer Pump door switch

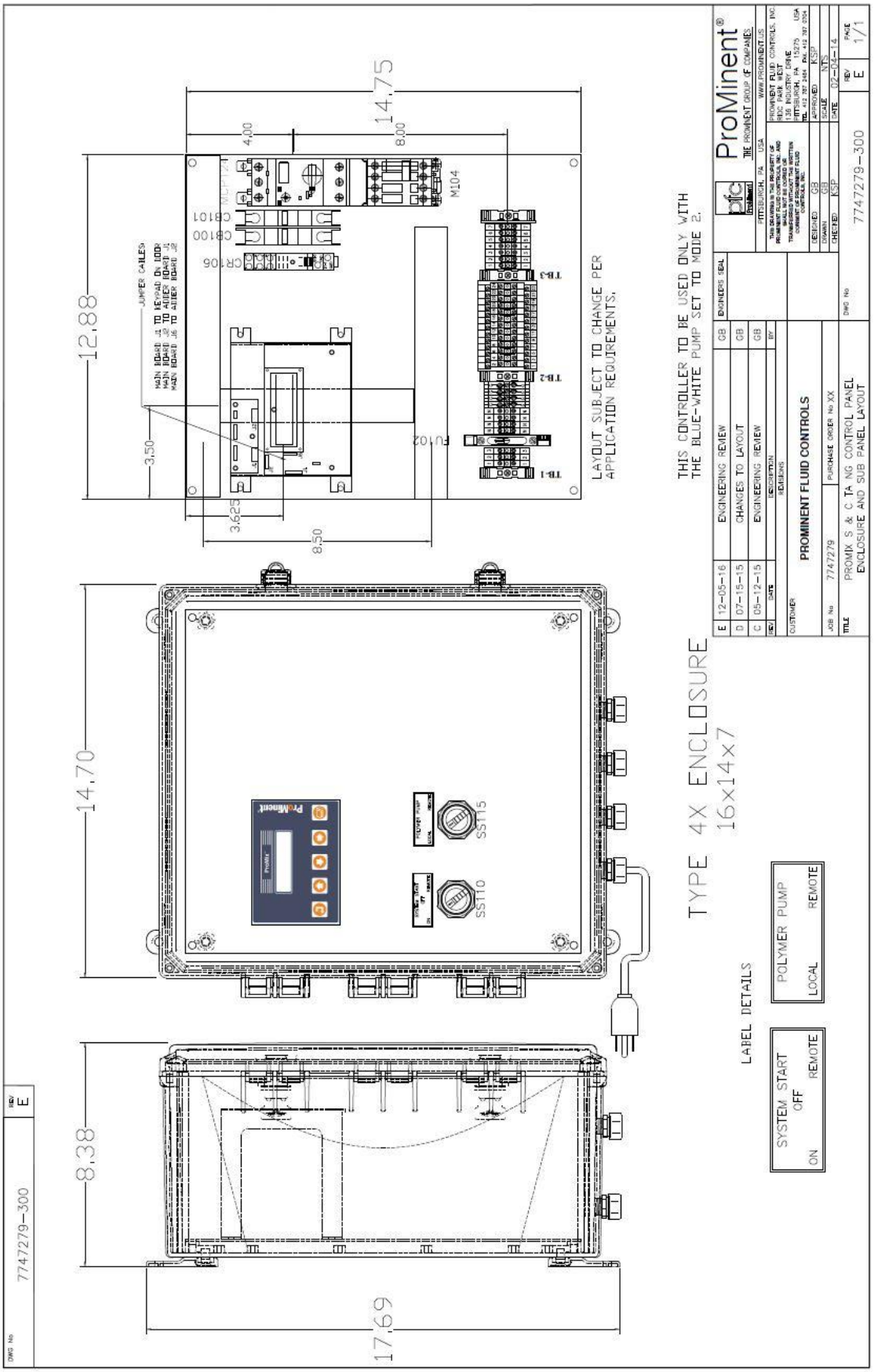
B.2 Control Panel Drawings

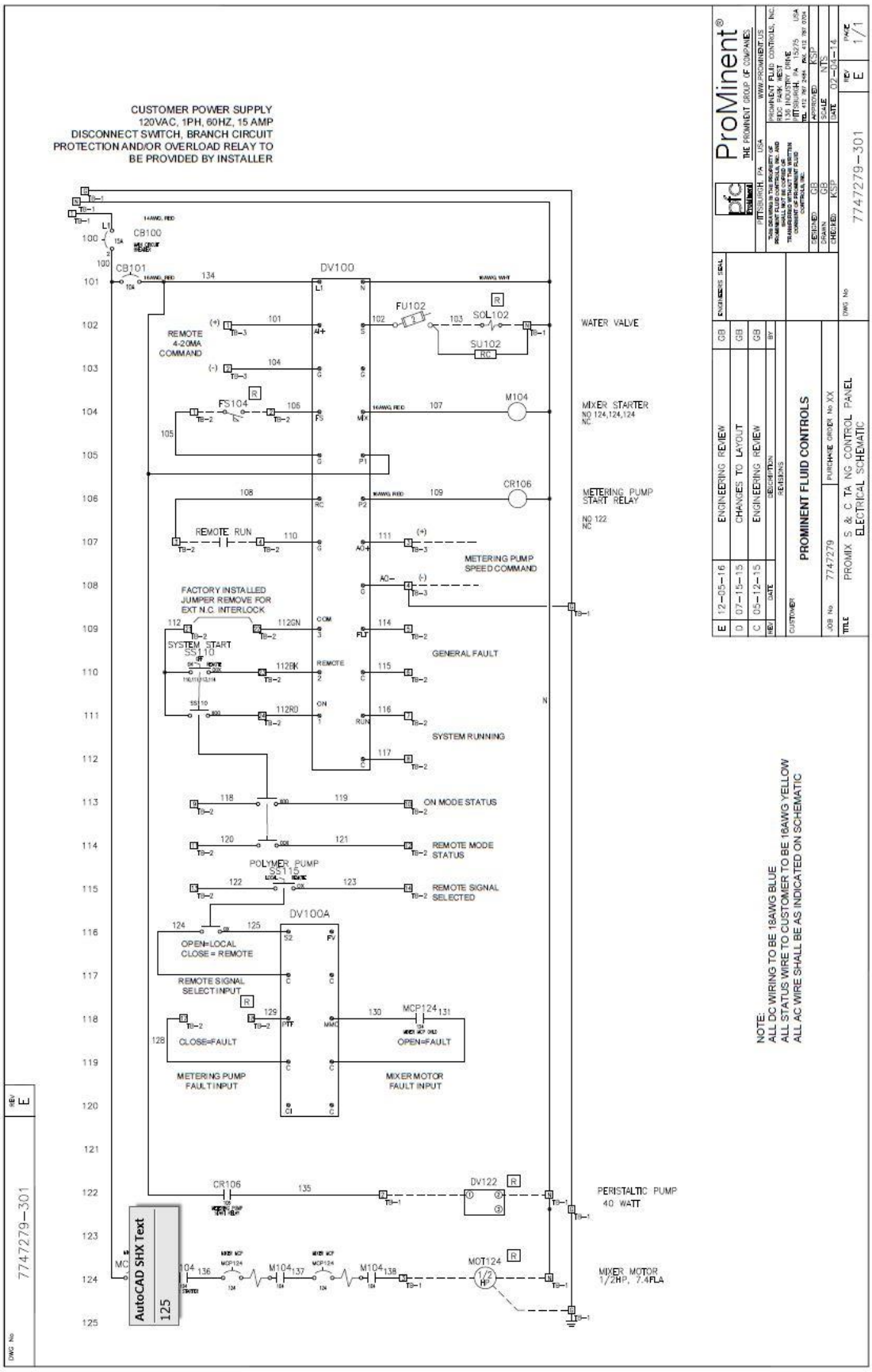


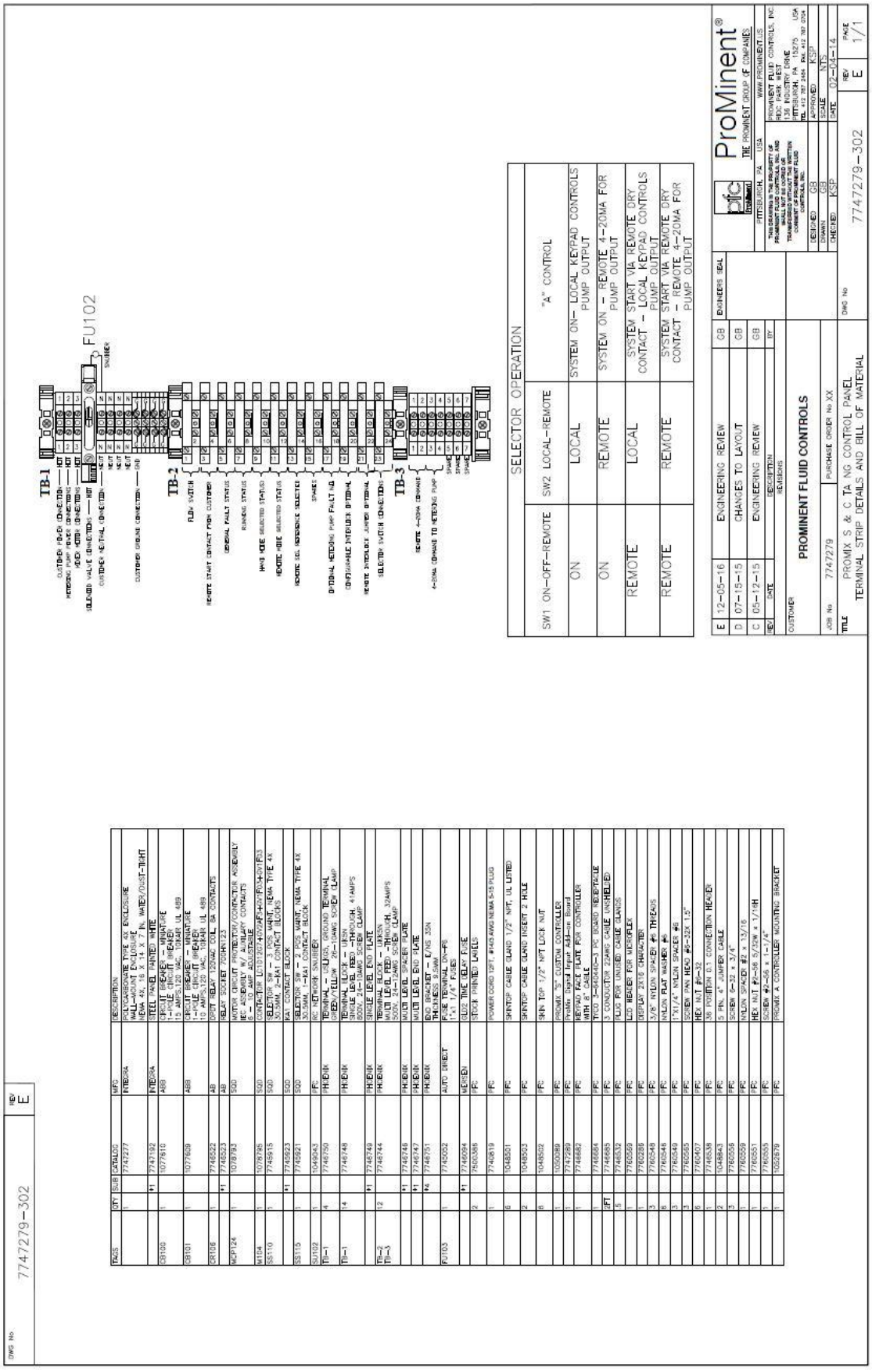
ProMinent ProMix ‘S & C’ Polymer Feeder




DWG No 7747280-302 REV E
TB-1
TB-2
TB-3
SELECTOR OPERATION
SW1 ON-OFF-REMOTE
SW2 LOCAL-REMOTE
"A" CONTROL
ON LOCAL SYSTEM ON- LOCAL KEYPAD CONTROLS PUMP OUTPUT
ON REMOTE SYSTEM ON - REMOTE 4-20MA FOR PUMP OUTPUT
REMOTE LOCAL SYSTEM START VIA REMOTE DRY CONTACT - LOCAL KEYPAD CONTROLS PUMP OUTPUT
REMOTE REMOTE SYSTEM START VIA REMOTE DRY CONTACT - REMOTE 4-20MA FOR PUMP OUTPUT
E 12-05-16 ENGINEERING REVIEW GB
D 07-15-15 CHANGES TO LAYOUT GB
C 05-12-15 ENGINEERING REVIEW GB
REV DATE DESCRIPTION BY
REVISIONS
ENGINEERS SEAL
ProMinent
THE PROMINENT GROUP OF COMPANIES
PITTSBURGH, PA USA
WWW.PROMINENT.US
CUSTOMER
PROMINENT FLUID CONTROLS
JOB No 7747280 PURCHASE ORDER No XX
TITLE PROMIX S & C DA NG CONTROL PANEL
TERMINAL STRIP DETAILS AND BILL OF MATERIAL
DWG No 7747280-302
REV E
PAGE 1/1


14.75
12.88
14.70
8.38
17.69
8.50
3.625
3.50
4.00
8.00
LAYOUT SUBJECT TO CHANGE PER APPLICATION REQUIREMENTS.
THIS CONTROLLER TO BE USED ONLY WITH THE BLUE-WHITE PUMP SET TO MODE 2.
TYPE 4X ENCLOSURE
16x14x7
LABEL DETAILS
SYSTEM START
OFF
ON
REMOTE
POLYMER PUMP
LOCAL
REMOTE
SS115
SS116
PROMINENT FLUID CONTROLS
PROMIX S & C TA NG CONTROL PANEL
ENCLOSURE AND SUB PANEL LAYOUT
7747279-300
ProMinent


CUSTOMER POWER SUPPLY
120VAC, 1PH, 60HZ, 15 AMP
DISCONNECT SWITCH, BRANCH CIRCUIT
PROTECTION AND/OR OVERLOAD RELAY TO
BE PROVIDED BY INSTALLER
CB100
CB101
DV100
FU102
SOL102
SU102
WATER VALVE
REMOTE
4-20MA
COMMAND
FS104
M104
MIXER STARTER
NO 124,124,124
NC
CR106
METERING PUMP
START RELAY
NO 122
NC
REMOTE RUN
METERING PUMP
SPEED COMMAND
FACTORY INSTALLED
JUMPER REMOVE FOR
EXT N.C. INTERLOCK
SYSTEM START
SS110
GENERAL FAULT
SYSTEM RUNNING
ON MODE STATUS
REMOTE MODE
STATUS
POLYMER PUMP
SS115
REMOTE SIGNAL
SELECTED
DV100A
OPEN=LOCAL
CLOSE = REMOTE
REMOTE SIGNAL
SELECT INPUT
CLOSE=FAULT
OPEN=FAULT
METERING PUMP
FAULT INPUT
MIXER MOTOR
FAULT INPUT
CR106
DV122
PERISTALTIC PUMP
40 WATT
MOT124
MIXER MOTOR
1/2HP, 7.4FLA
NOTE:
ALL DC WIRING TO BE 18AWG BLUE
ALL STATUS WIRE TO CUSTOMER TO BE 18AWG YELLOW
ALL AC WIRE SHALL BE AS INDICATED ON SCHEMATIC
ProMinent
PROMINENT FLUID CONTROLS
PROMIX S & C TA NG CONTROL PANEL
ELECTRICAL SCHEMATIC
7747279-301
AutoCAD SHX Text
125


DWG No 7747279-302 REV E
TB-1
TB-2
TB-3
FU102
SELECTOR OPERATION
SW1 ON-OFF-REMOTE
SW2 LOCAL-REMOTE
"A" CONTROL
ON LOCAL SYSTEM ON- LOCAL KEYPAD CONTROLS PUMP OUTPUT
ON REMOTE SYSTEM ON - REMOTE 4-20MA FOR PUMP OUTPUT
REMOTE LOCAL SYSTEM START VIA REMOTE DRY CONTACT - LOCAL KEYPAD CONTROLS PUMP OUTPUT
REMOTE REMOTE SYSTEM START VIA REMOTE DRY CONTACT - REMOTE 4-20MA FOR PUMP OUTPUT
ProMinent
THE PROMINENT GROUP OF COMPANIES
PROMINENT FLUID CONTROLS
PROMIX S & C TA NG CONTROL PANEL
TERMINAL STRIP DETAILS AND BILL OF MATERIAL
7747279-302
E 12-05-16 ENGINEERING REVIEW GB
D 07-15-15 CHANGES TO LAYOUT GB
C 05-12-15 ENGINEERING REVIEW GB
REV DATE DESCRIPTION BY
ENGINEERS SEAL
DESIGNED GB
DRAWN GB
CHECKED KSP
SCALE NTS
DATE 02-04-14
REV E
PAGE 1/1

B.3 4-20 mA Input Scaling

1. **Feeding More Polymer when the 4-20mA Input Current Decreases:**
If you set Scale lin @ 4mA to 4mA = 100% and Scale lin @20mA to 20mA = 0%, the feeder will accommodate a logically inverted controlling 4-20mA current loop.
However the default lin Fail State is polymer pump OFF at 3.85mA.
If a current signal <4.0mA does not represent a control loop fault at your site, you may wish to set the lin Fail State to Pump @ 100%.

2. **Non-Zero % at 4.0mA & 100% @ <20mA:**
To verify a non-standard 4-20mA input scaling, Set Scale lin @4mA to 4mA = 20% and Scale lin @ 20mA to 12mA= 100%.
For a controlling current loop is at each of the following values:
Greater than 12mA = 100% pump speed
4.0mA =20% pump speed
12 to 4mA = (100%-20%) x (mA-4)/(12-4)) + 20%
Example: At 10.4mA control current: (80% x (10.5-4)/8) + 20% = 85% pump speed

3. **Correct Pump Response buy more Complex than needed:**
If you also logically invert the 4-20mA pump response it may get confusing for you to verify the pump response to the 4-20mA input.
If you set Scale lin @4mA to 6mA = 100% and Scale lin @ 20mA to 16mA= 10%
16 to 6mA = (10%-100%) x (mA – 16)/6-16)) + 10%
Example: At 13.6mA control current: (-90% x (10.5 - 4)/8) + 20% = 31% pump speed

Few users will need to re-scale more than one of the current or percentage parameters. Many users will not have to re-scale the 4-20mA input; 4-20mA will be 0-100% pump speed.

4. **Dual Logical Inversion:**
Be careful how you set the scaling currents and percentages. The effect is not always obvious.
If you set Scale lin @4mA to 20mA = 100% and Scale lin @ 20mA to 4mA= 0% You've logically inverted both the control current and the pump response – you are then back to factory default span & control response
This is not a fault but could be confusing to other users

5. **Keying Error Response:**
Be aware not to accidentally set both the 4mA and 20mA scaling to the same values!
For example if you set Scale lin @ 4mA to 10mA = 100% and
Scale lin @ 20mA to 10mA= 0%, the feeder forces a 0.1mA difference
If you set Scale lin @4mA to 4mA = 50% and Scale lin @ 20mA to 20mA= 50%, the feeder forces a 1% difference.

Correct any keying error prior to operating the ProMix S&C Systems

Appendix C – Polymer Sizing / Dosage

The ProMix S & C Polymer Pump switch on the controller door enables the user to select either LOCAL or REMOTE operation. In 'LOCAL', the polymer pump speed is selectable from 0 - 100% using the controller keypad. In 'REMOTE', the polymer pump speed is controlled by a remote 4-20 mA signal representing 0 – 100%.

The desired polymer dosage must be considered prior to selecting the ProMix S/C model and pump speed. Typically the user will know how much polymer is required. This information is from jar tests or from prior experience. Otherwise the dosage can be derived from an initial manual calculation which must be adjusted based upon actual operation.

Below are typical guidelines to estimate polymer feed dosage:

1. For a Clarifier / Filter application:

    A = MGD Plant Flow
    B = ppm active polymer
    C = desired solution concentration (%)

    (A*B)/24 = GPH active polymer

    GPH active polymer/C = Required dilution range

2. For a Sludge Dewatering application:
    User must have the following information to estimate GPH neat polymer:

    A = GPM sludge
    B = % solids (concentration)
    C = lbs polymer per dry ton
    D = percent active polymer
    E = desired solution concentration (%)

    (((A*8.34)*B)*60)/2000 = Tons/Hr dry sludge

    (((Tons/Hr dry sludge*C)/8.34)/D)/E = Required dilution range

The polymer concentration from the ProMix S/C Polymer feeder is based upon the neat polymer pump rate divided by the total water flow through the primary and secondary rotameters. For example, if the neat polymer feed rate is 1.5 gph and the flow through the primary rotameter is 15 gpm and the flow through the secondary rotameter is 10 gpm then the polymer concentration is:

((1.5 gph / 60) / (15 gpm + 10 gpm)) = 0.001 = 0.1%

Further post dilution is possible with equipment by others.

Appendix D – Reference Documents

Mechanical General Arrangement Drawings – ProMix C:

1048360 -200	ProMix C SG 60X1-0.22TA System
1048361 -200	ProMix C SG 60X2-0.95TA System
1048362 -200	ProMix C SG 120X2-0.95TA System
1048363 -200	ProMix C SG 120X2-2.00TA System
1048364 -200	ProMix C SG 300X2-2.00TA System
1048365 -200	ProMix C SG 300X2-3.73TA System
1048460 -200	ProMix C SG 60X1-1.01DA System
1048461 -200	ProMix C SG 60X2-1.01DA System
1048462 -200	ProMix C SG 120X2-1.01DA System
1048463 -200	ProMix C SG 120X2-2.30DA System
1048474 -200	ProMix C SG 300X2-2.30DA System
1048475 -200	ProMix C SG 300X2-3.70DA System

Mechanical General Arrangement Drawings – ProMix S:

1048346 -200	ProMix S SG 60X1-0.22TA System
1048347 -200	ProMix S SG 60X2-0.95TA System
1048348 -200	ProMix S SG 120X2-0.95TA System
1048349 -200	ProMix S SG 120X2-2.00TA System
1048351 -200	ProMix S SG 300X2-2.00TA System
1048352 -200	ProMix S SG 300X2-3.73TA System
1048353 -200	ProMix S SG 60X1-1.01DA System
1048354 -200	ProMix S SG 60X2-1.01DA System
1048355 -200	ProMix S SG 120X2-1.01DA System
1048356 -200	ProMix S SG 120X2-2.30DA System
1048357 -200	ProMix S SG 300X2-2.30DA System
1048358 -200	ProMix S SG 300X2-3.70DA System

Electrical Schematic Drawings:

7747279-300	PROMIX-S&C TA NG Control Panel
7747280-300	PROMIX-S&C DA NG Control Panel

Pump Manuals:

80000-381_A100NV	Blue White Pump - Operating Manual

Instructional Manuals:

7746471-400	Injection Valve Cleaning Instructions
7746589-400	Mixing Chamber Mechanical Seal Replacement

(Provided upon request)

Documents noted in this section are not in this manual

Appendix E - Keypad Menu Overview