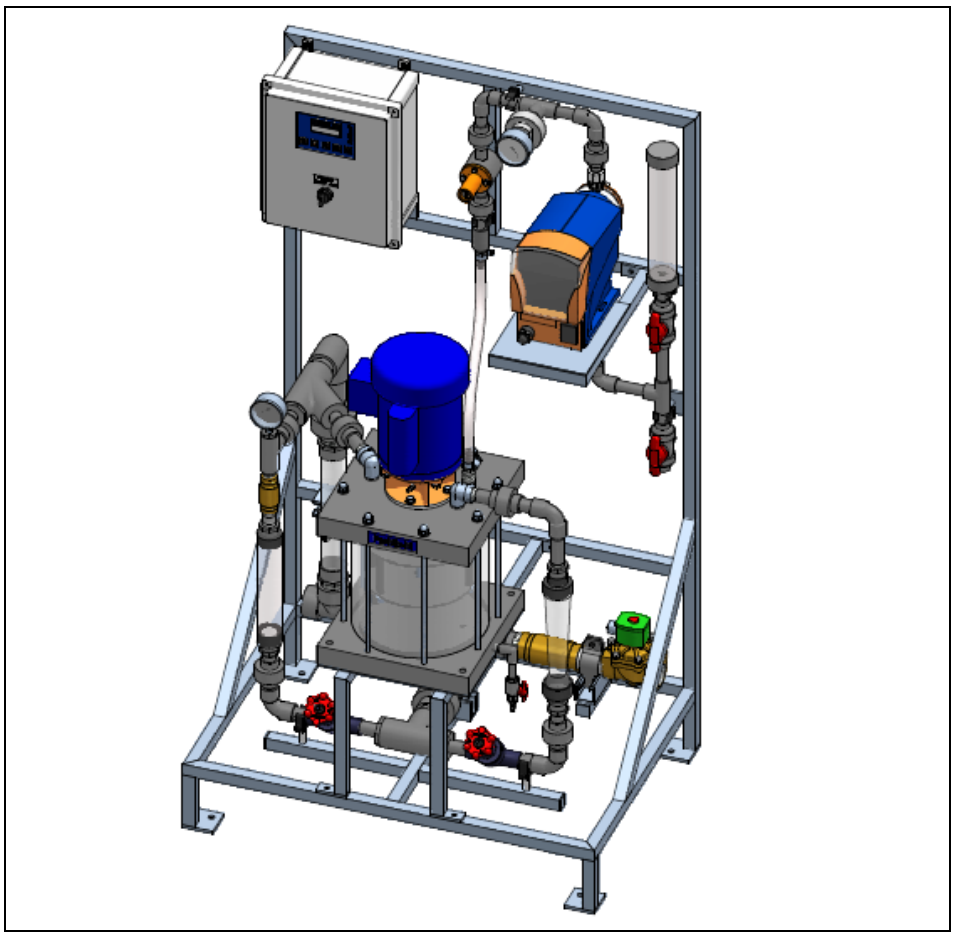
Operating Instructions ProMinent® ProMix-M (A Controls) Polymer Blending System

ProMix_DA/PA_OM.docx (01/31/11): – P/N: 7746717 (Revision 0)



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

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

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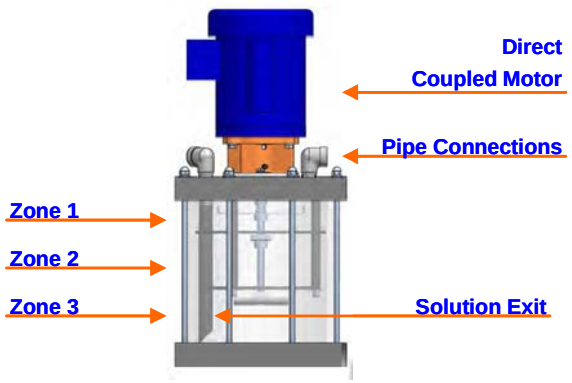
INTRODUCTION

i. Overview:

The ProMix M 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 of 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 and immediate dispersion before agglomeration takes place. The second zone mixing blade 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 zone 3. Finally, the third zone mixing blade gently agitates/blends the active polymer solution before it exits the chamber through the bottom of the discharge tube.



The ProMix M Polymer Feeder can be enabled in local mode (Simple On/Off operation) or remotely via a customer supplied dry contact which will Stop/Start the Polymer Feeder. A H-O-A manual switch on the door of the controller permits the user to select the Manual mode by turning the switch to 'H', the Auto mode by turning the switch to 'A' or Off by selecting 'O'. Either mode can be turned on or off remotely via a customer permissive contact.

In Manual mode the H-O-A switch is placed into the 'H' position on the controller door of the ProMix M Polymer Feeder. The neat polymer pump speed is then adjusted manually using the controller keypad to change the pump rate from 0 to 100% of the pump rated output. The user must calculate the required pump speed based upon the polymer concentration desired after manually adjusting the primary and secondary rotameters for the desired dilution water flow.

In Auto mode the H-O-A switch is placed into the 'A' position on the controller door of the ProMix M Polymer Feeder. This offers a remote control option. In this mode, 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. As in the Manual mode the user must calculate the required pump speed to attain the desired dosage.

The ProMix M 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, peristaltic neat polymer pumps, 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 Systems:

ProMix M Systems consist of the following skid models:

Diaphragm Pump Type DLTA (DA Series):

PART NUMBER	MODEL	PUMP TYPE	MAX CAPACITY
7746635	ProMix M 0-300 X2-2.4DA	Delta 1020-120	2.4 GPH
7746636	ProMix M 0-600 X2-4.0DA	Delta 1020-200	4.0 GPH
7746637	ProMix M 0-600X2-6.2DA	Delta 0730-200	6.2 GPH
7746638	ProMix M 0-600X2-10.0DA	Delta 0450-200	10.0 GPH
7746639	ProMix M 0-1200X2-6.2DA	Delta 0730-200	6.2 GPH
7746640	ProMix M 0-1200X2-10.0DA	Delta 0450-200	10.0 GPH
7746641	ProMix M 0-1500X2-6.2DA	Delta 0730-200	6.2 GPH
7746642	ProMix M 0-1500X2-10.0DA	Delta 0450-200	10.0 GPH

Progressive Cavity Pump Type (PA Series):

PART NUMBER	MODEL	PUMP TYPE	MAX CAPACITY
7746643	ProMix M 0-300 X2-5.0PA	Seepex MDP	5.0 GPH
7746644	ProMix M 0-600 X2-5.0PA	Seepex MDP	5.0 GPH
7746645	ProMix M 0-600X2-10.0PA	Seepex MDP	10.0 GPH
7746646	ProMix M 0-1200 X2-10.0PA	Seepex MDP	10.0 GPH
7746647	ProMix M 0-1200X2-24.0PA	Seepex MDP	24.0 GPH
7746648	ProMix M 0-1500 X2-10.0PA	Seepex MDP	10.0 GPH
7746649	ProMix M 0-1500X2-24.0PA	Seepex MDP	24.0 GPH

Refer to Appendix C for proper sizing

Overall Skid Dimensions (w/Delta) .....60"H x 34"W x 24"D
Overall Skid Dimensions (w/Seepex) .....60"H x 40"W x 24"D
Overall Weight of Skid .....220 lbs. w/Delta *(250 lbs. w/Seepex)*
Power Requirements .....120VAC, 60Hz, 1 Phase, 20 Amp
Volume of Mixing Chamber .....3.2 Gallons
Maximum Chamber Pressure .....150 PSIG
Normal Operating Pressure .....58 PSIG to 100 PSIG *(Depends on Pump Selected)*
Recommended Running Temperature .....+50°F to 100°F
Water Connection Size .....1-1/2" FNPT
Solution Discharge Connection Size .....1-1/2" FNPT

iii. Polymer Pumps used on M Models:

Series	Model	Identification Code	SPM Max	Flowrate (GPH) Min @ 25% Stroke	Max @ 100% Stroke	20% Derate of Max.	Pressure (PSIG)
DLTA	1020	DLTA1020PVT4600UD4031EN0	120	0.75	3.0	2.4	145
DLTA	1020	DLTA1020PVT4600UD4031EN0	200	1.25	5.0	4.0	145
DLTA	0730	DLTA0730PVT4600UD4031EN0	200	1.93	7.7	6.2	102
DLTA	0450	DLTA0450PVT2600UD4031EN0	200	3.23	12.9	10.3	58

Notes:

1 ProMinent - Delta Solenoid Driven Metering Pump
2 GPH Rating pumping Water not Polymer (Derate 20% for Polymer)
3 Control spm Modes Available: 80 HV3 Viscosity: 2000-4000 mPa *(Slow Discharge)*
(Maximum flowrates change with different settings) 120 HV2 Viscosity: 800-2000 mPa
160 HV1 Viscosity: 200-800 mPa
4 Standard spm Mode: 200 Viscosity: 0-200 mPa
5 Connections: ½" x 3/8" or DN10 Depending on Model Selected
6 Power Requirements: 115VAC, 60 Hz, Single Phase

Series	Model	Identification Code	SPM Max	Flowrate (GPH) Min.	Max.		Pressure (PSIG)
MDP	006-12	MDP 006-12/A6-P8-P8-H0-GA-X	121		5.0		100
MDP	006-12	MDP 006-12/A6-P8-P8-H0-GA-X	234		10.0		100
MDP	006-12	MDP 006-12/A6-P8-P8-H0-GA-X	552		24.0		100

Notes:

1 Seepex - Progressive Cavity Pumps
2 Flooded Suction Required
3 1" Suction Connection
4 1/2" Discharge Connection
5 Viscosity Range: 40,000 mPa (Flowrate Varies w/Viscosity)
6 Motor Specifications: ½ HP, 1750 RPM
7 Power Requirements: 120VAC, 60 Hz, Single Phase

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:

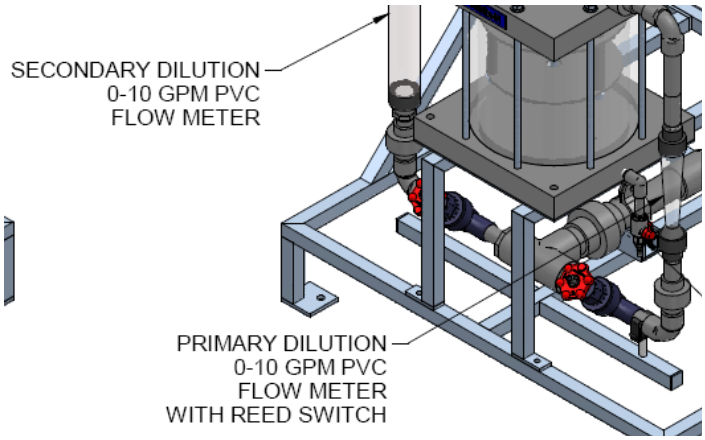
- Required Polymer System Voltage
- Available Water Pressure
- Injection Point Pressure
- Number of Injection Points
- Polymer Solution Discharge: For example (Length of Piping Run and Pipe Size)
- Neat Polymer Suction: Flooded or Lift
- Type of Application / Dewatering Device
- Type of Polymer: Emulsion, 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:
   - Inspect the piping for breakage. The system may have been jarred during shipping.
   - 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)*:
   - 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!
   - Piping should be at a minimum ¾" to and from the piping on the system. 1" or larger piping is recommended. Larger piping sizes would be required for runs over 100 feet in length if utilizing ¾" pipe.
   - 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.
   - Connect to outlet piping 1-1/2" FNPT from static mixer to associated customer application point.
   - Connect to make-up water inlet piping 1-1/2" FNPT (25 GPM maximum at 100 psig maximum).
   - Connect to Neat Polymer pump inlet piping ½" FNPT (DLTA Models) & 1" FNPT (Seepex Models).
   - Install 1-1/2" pressure regulator and 1-1/2" y-strainer / basket strainer on the clean make-up water line if equipment is currently not installed. (Recommended). Sizing depends on inlet/outlet piping.
   - 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:
   Note: Review local Electrical Code and follow accordingly.
   - Connect incoming power to skid mounted control panel *(120VAC, Single Phase, 20 Amp, 60 Hz).* Ensure panel is properly grounded.
   - Check electrical connections to be sure proper voltage is supplied to the system.
   - Power the unit using a dedicated, separate breaker in the local lighting distribution panel.
   - Do not route the AC power in common conduit with variable frequency pump drives.
   - 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. Set initial Chamber Mixer Motor Overload at approximately 2 Amps above the mixer FLA (Full Load Amps) rating and adjust as needed during startup to prevent nuisance tripping.
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 Delta or Seepex pump manual (Reference Document) for pump operation.

1.5 Quick Start Guide:

1. Review installation portion (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 DLTA pump press and hold the UP/DOWN Arrows on the keypad until chemical is visible in the suction line. The Seepex pump must have a flooded suction.
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 Secondary flow control valve and adjust the Primary flow control valve to obtain the flow range required. If additional dilution water is needed adjust the secondary accordingly.



7. Verify that the maximum polymer injection pump pressure is higher than 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. Check flows at 100% capacity.
10. In Manual "Hand" mode 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.
11. In Auto mode 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 also needed. If not available jumper these connections.
12. Confirm proper operation of all instrumentation. For example: Gauge, Rotometer switch, etc.
13. Input functions checked and simulated (remote start/stop, 4-20mA, etc.).
14. Output functions checked.
15. Test the operation of all remaining circuits.
16. Observe system to assure that nothing looks or sounds abnormal.

1.6 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.
- 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 M 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

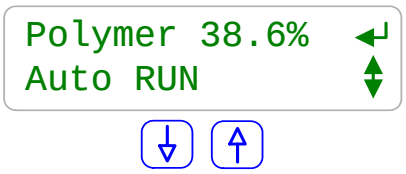
Move **RIGHT** to select next field when EDITing

ENTER to select an option & to execute EDITing

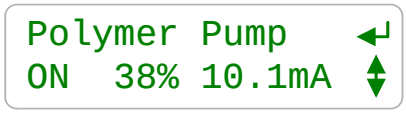
EXIT to escape option, info display or EDITing
EXIT goes to top of **Main Menu**

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.

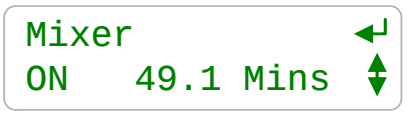


Displays the **Polymer Pump** feed rate 0-100% and the controlling 4-20mA current level,



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

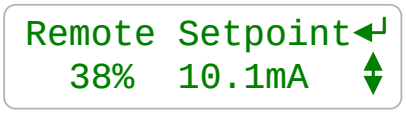
Mixer ON time resets to zero every time the **Mixer** turns OFF.



Alternates every second

Press **ENTER** during **Auto RUN** or **Manual RUN** to turn OFF the **Polymer Pump** and flush the mixer.

The **Remote Setpoint** 4-20mA current loop controls the **Polymer Pump** in **Auto 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 **4.2** for **Diagnostic** displays.

Press **ENTER** & **UP** at **Polymer Pump** to view-modify the pump maximum SPM. Applicable only for feeders NOT using a 4-20mA, current loop controlled pump.

2.3 Adjust Setpoint

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

Manual Setpoint may be adjusted at any time in Auto or Manual mode.

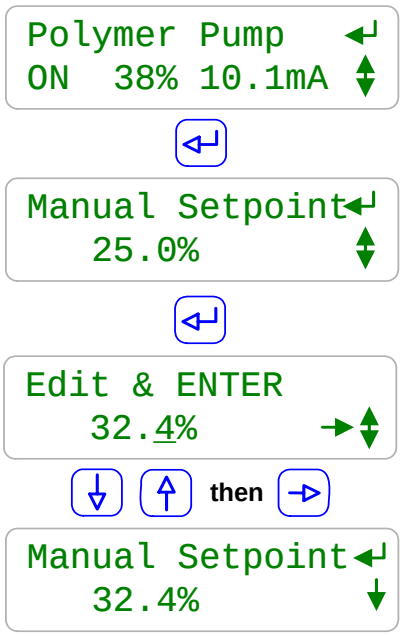
The present **Manual Setpoint** is **25.0%.** Press **ENTER** to adjust.

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

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

If the Auto-Manual switch is in the Manual position, any adjustment takes effect immediately, modifying both the 4-20mA output and the flashing green frequency output.

Adjust Manual Setpoint



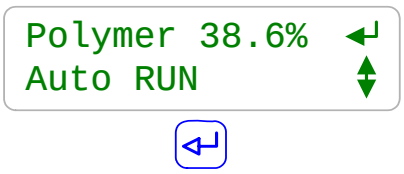
Sidebar:
Manual Setpoint only controls the polymer pump when the Auto-Manual switch is @ Manual.

If the **Manual Setpoint** is @ 25% and the Auto-Manual switch is @ Manual, the 4-20mA current output loop will be at 8mA (4mA + 0.25 x 16mA = 8mA).
The frequency control pulse output will be at 60 strokes per minute for a 240 SPM rated pump (0.25 x 240 = 60)

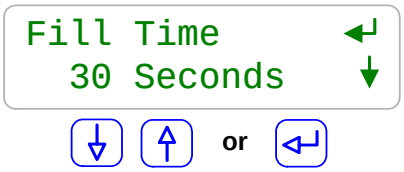
2.4 Modify Timing

View Timing

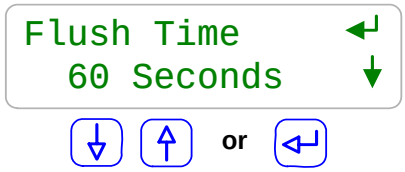
Press **ENTER** @ **Polymer** to view or adjust the feeder timing.



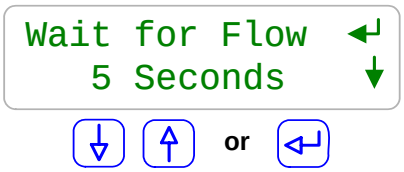
Fill Time may be adjusted to any time from 1 to 60 seconds. Press **ENTER** to adjust.



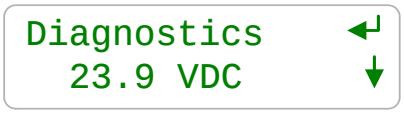
Flush Time may be adjusted to any time from 1 to 120 seconds. Press **ENTER** to adjust



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.



Sidebar:
Fill Time: Water inlet solenoid open, ON. Mixer and Polymer Pump both OFF.
Factory default = 30 seconds.

Flush Time: Water inlet solenoid open, ON and Mixer ON. Polymer Pump OFF.
Factory default = 60 seconds.

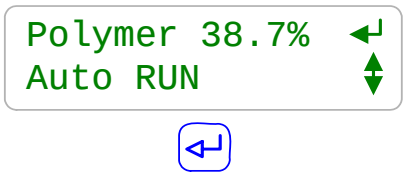
Wait for Flow: Water inlet solenoid open, ON. Mixer and Polymer Pump both OFF.
Factory default = 5 seconds.

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

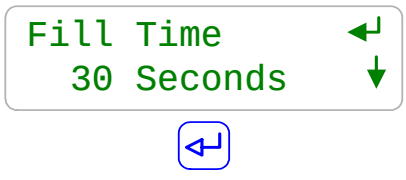
2.4 Modify Timing (continued)

Adjust Timing

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



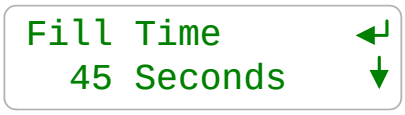
All three times are adjusted in the same way.
In this example we'll press **ENTER** @ **Fill Time**.



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

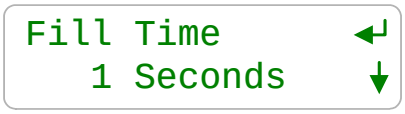
then

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



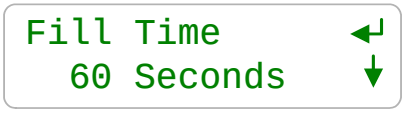
Low Limit response

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



High Limit response

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



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

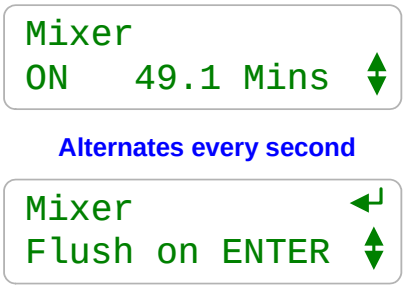
Flush Time: Minimum = 1 second, Maximum = 120 seconds.
Factory default = 60 seconds.

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

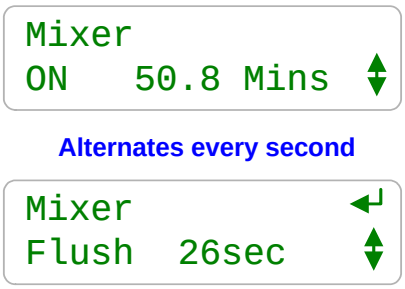
2.5 Flush Mixer

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 M 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.

Sidebar:
Flush Time: Minimum = 1 second, Maximum = 120 seconds.
Factory default = 60 seconds.

2.6 Status Message Summary

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

Sidebar:
Flow Check: The flowswitch measures dilution water flow into the mixer chamber.

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

2.7 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.

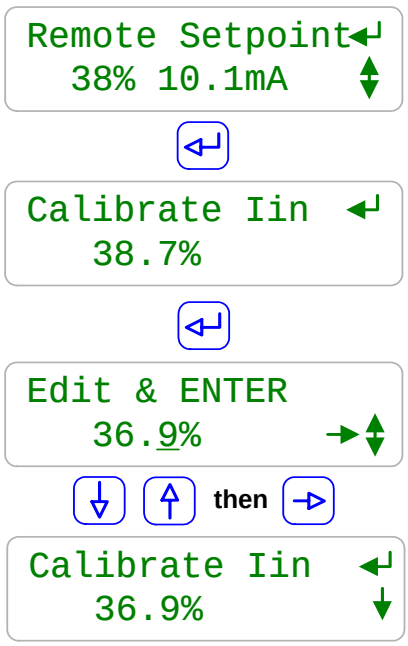
The present **4-20 mA Input** is **38.7%.** Press **ENTER** to calibrate.

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 Auto-Manual switch is in the Auto position, any adjustment takes effect immediately and modifies both the 4-20mA output and the flashing green frequency output.

Calibrate 4-20mA In



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%

2.8 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

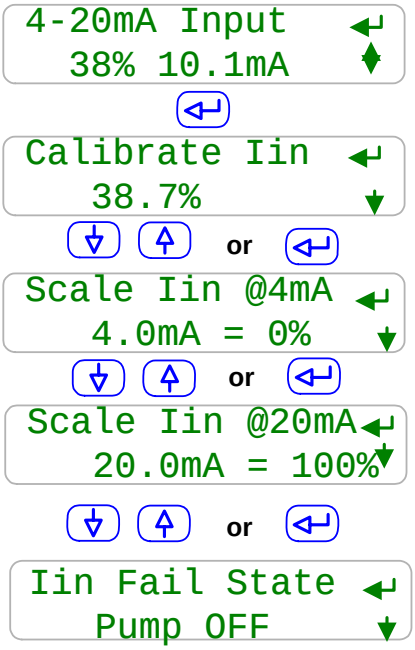
Press **DOWN** to view the present 4 mA pump feed percentage.
The factory default is as displayed. When the 4-20 mA input is at 4.0 mA the pump will be OFF.

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.

2.8 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**.

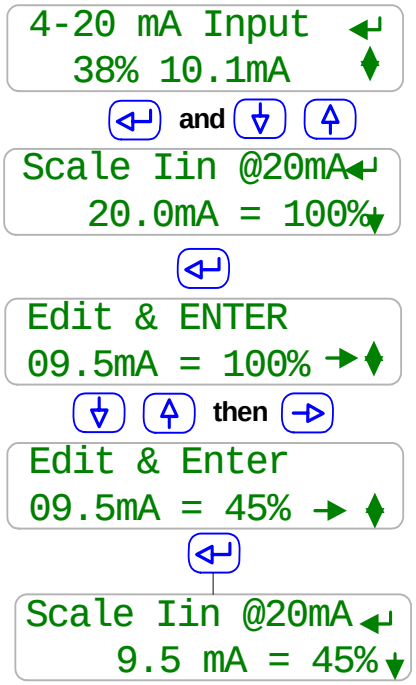
Press **RIGHT** to move the underline cursor & **UP** or **DOWN** to modify the value @ the cursor.
Press **EXIT** to leave the present setting unchanged.

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.

Modify mA @ 100% ON



Edit either or both mA & %

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

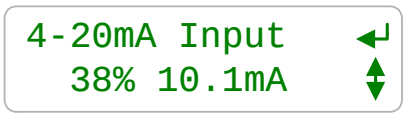
Setting the % above 100% will set the % to 100%. The % level cannot be set below 0%.
Refer to Appendix A for notes on 4-20mA Input scaling.

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 %.

2.9 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.

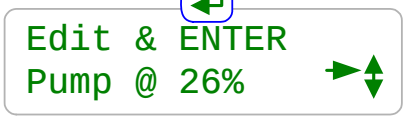
Press **DOWN** to select a user set pump speed on less than 4 mA.

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.

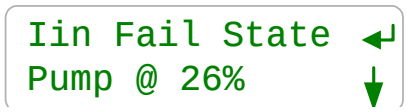
.
If you pressed **ENTER** @ **Pump @ 10%**
You will be able to modify the **10%** value.

ENTER @ Pump @ 10%



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

2.10 Calibrate 4-20mA Output

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

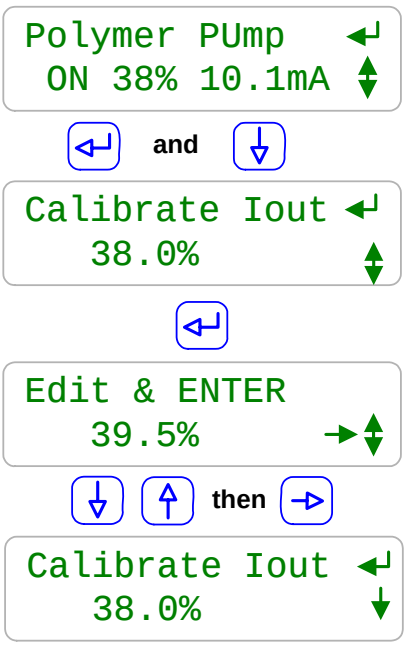
The present **Polymer Pump** control is 38.0%
But the on-pump display is @ 39.5%
Press **ENTER** to calibrate.

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

The ProMix M 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 and the flashing green frequency output.

Calibrate 4-20mA Out



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 M 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 M displays 50%

2.11 Adjust Pump

Press **ENTER** & **UP** @ **Polymer Pump**
to view or modify the maximum pump stroke rate.
Ignore this page if you are controlling the pump using the feeder 4-20mA current output.

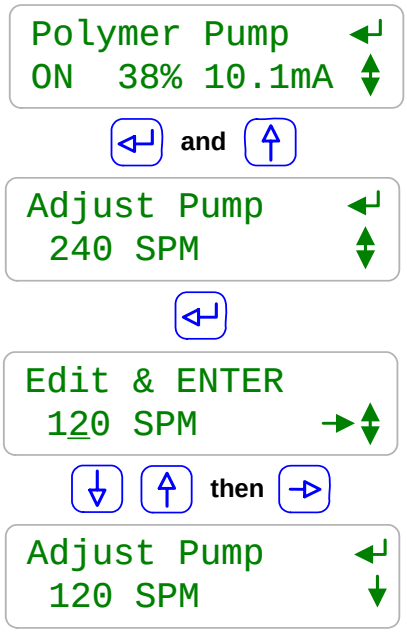
The present **Polymer Pump** is rated @ **240 SPM**
Press **ENTER** to modify.

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

Displays new, adjusted **Polymer Pump**
maximum strokes-per-minute.
Press **EXIT** to return to main menu.

Any pump speed adjustment takes effect immediately, modifying the flashing green frequency output rate.

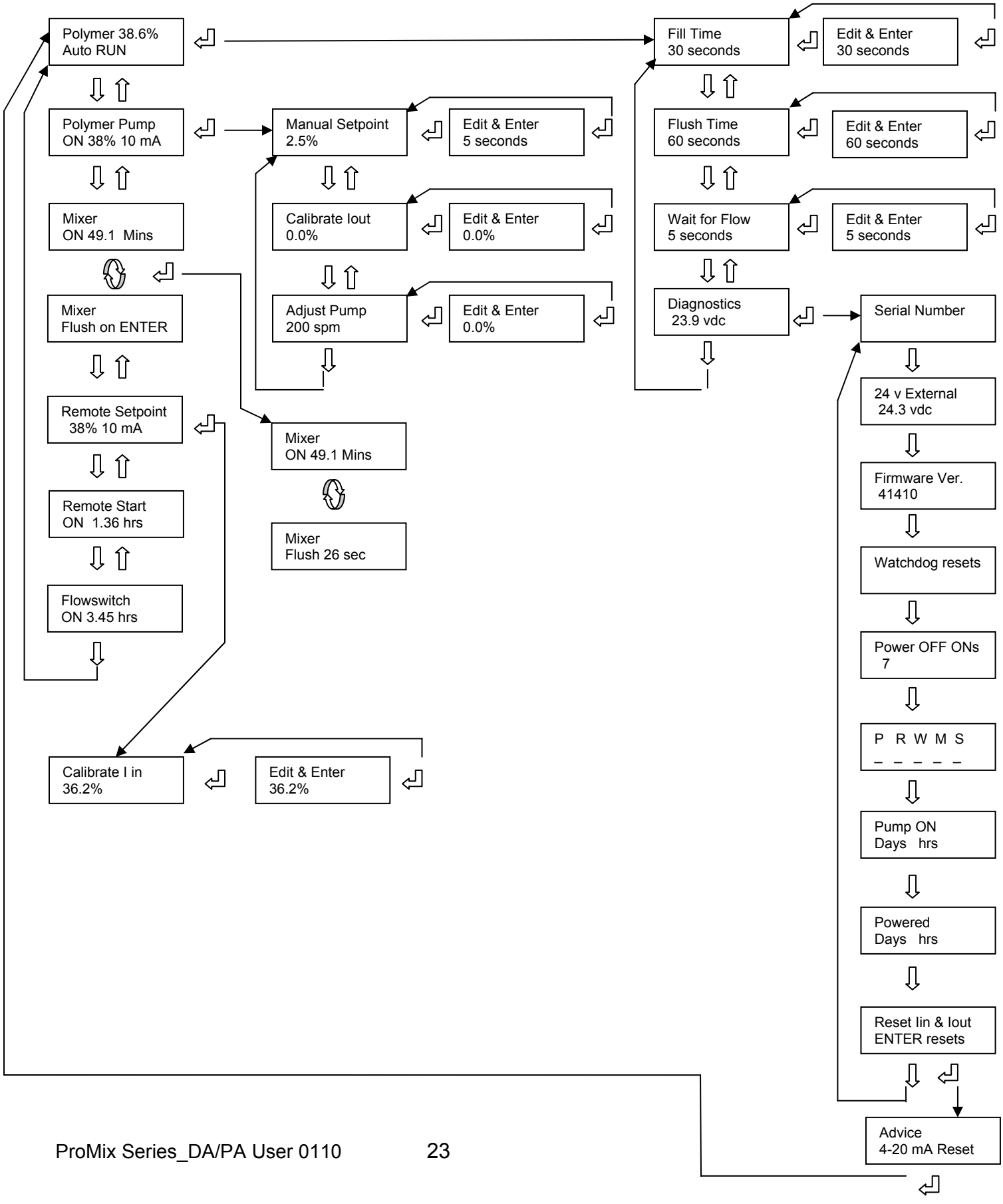
Adjust Pump



Sidebar:
Feeders using frequency controlled pumps can intentionally limit the pump polymer feedrate at the 100% manual and auto setpoints by reducing the pump maximum SPM.

No effect on 4-20mA controlled Pumps
Changing the pump maximum SPM has no effect on the 4-20mA current loop output.

2.12 Keypad Menu Overview



2.13 4-20mA & Frequency Controls

The flashing green **Pump** LED on the lower, left top of the ProMix M circuit board flashes at the pulse feed rate.
The pulse feed rate is locked to the 4-20mA output level so any user activity that modifies or calibrates the 4-20mA output, alters the pulse feed rate.
0% defaults to 4.0mA and zero SPM.
100% defaults to 20mA and the maximum pump SPM.
The correspondence between 4-20mA input current & SPM may be changed by adjusting the 4-20mA input scaling.

2.14 Troubleshooting Guide

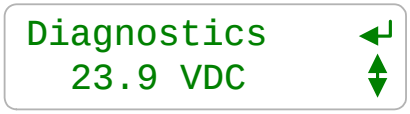
Adjustment and bypass fixes to operational problems.

LCD Display	Operational Problem
No Control STOP	Switch the Manual-Off-Auto to Manual while you figure out the problem with the 4-20mA current loop connected to **mA In** input terminals '**I+**' & Ground ⏚ terminal. If the ProMix M **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 120VAC 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 Auto-Manual-OFF 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.

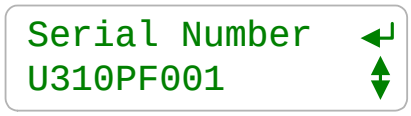
2.15 Diagnostic Display

Diagnostics

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



When initially programmed, the ProMix M 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.

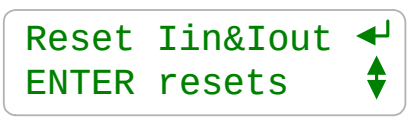
If the feeder runs continuously or the **RC** input is used to STOP the feeder, there should be a low number of **Power OFF-ONs**. An unexplained, high number usually indicates accidental shutdown or AC power wiring problems.

Relay ON/OFF display in the same order as wired and labeled on the ProMix M 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 M 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.



3.0 SPARE PARTS & PREVENTIVE MAINTENANCE

3.1 DELTA (DLTA) Pump Spare Parts

P/N:	*Description:*
1027082	DLTA1020 Spare Parts Kit**
1000249	DLTA1020 Diaphragm
1017393	DLTA1020 Liquid End
1027083	DLTA0730 Spare Parts Kit**
1000250	DLTA0730 Diaphragm
1017404	DLTA0730 Liquid End
1027084	DLTA0450 Spare Parts Kit**
1000251	DLTA0450 Diaphragm
1025138	DLTA0450 Liquid End

**Spare Parts Kit above includes the following:
(1) Diaphragm
(1) Suction Valve Set
(1) Discharge Valve Set
(2) Ball Valves (Check)
(1) Set of O-rings
(1) Connector Set

3.2 SEEPEX (MDP006-12) Pump Spare Parts

P/N:	*Description:*	*Manufacturer P/N:*
7746697	Lantern Flange, Seepex, ProMix-M	LATB2103M1200NXXAA
7746698	Shaft Pin, Seepex, ProMix-M	SBOL6062M1200XXXXX
7746699	Splash Ring, Seepex, ProMix-M	RSPF0062M1200XXXXX
7746700	Mech. Seal, Seepex, ProMix-M	GRDB15025U41H0A7A7
7746701	Mech. Seal Casing, Seepex, ProMix-M	GRGPP103M1200GB5MA
7746702	Support Ring, Seepex, ProMix-M	RSZPP00B5C80C00000
7746703	Suction Casing, Seepex, ProMix-M	SAGA6103M1200N02SP
7746704	O-Ring, Casing, FPM, Seepex	R-OH00250D80000000
7746705	Sealing Plug, Seepex, ProMix-M	SSVA7G018000000910
7746706	Sealing Ring, Seepex, ProMix-M	RDIP1G01800A007603
7746707	Rotating Units, Seepex, ProMix-M	RTEP8133M060CN00AY
7746708	Stator, Seepex, ProMix-M	STAH0103M060CENX00
7746709	Bolts, M6x100, Seepex, ProMix-M	SSKA7M060100000931
7746710	Pressure Branch, Seepex, ProMix-M	DRSA6103M1200R02SP

3.3 PVC Mixing Chamber Spare Parts

P/N:	Description:
7746474	Seal, Mech, Shaft, 1/2", ProMix-U
7746471	Injection Valve Assembly, ProMix-U
7746470	O-Ring, Injection Valve, Viton, ProMix-U
7746491	O-Ring, Chamber, Viton, ProMix-M
7500346	PVDF Insert - 1/16 NPT x 3/16 Hose Barb *(Seal Failure Fitting)*
7037004	Tubing PVC 3/16" x ¼" *(Seal Failure Tubing)*

3.4 Piping Components Spare Parts

P/N:	Description:
1019883	1/2" PVC Back Pressure/Pressure Relief Valve SOC pfc
1006813	Diaphragm BPV/PRV 1/4"-1/2"
7741084	0-100PSI, Gauge, SS, 2-1/2, Bottom MTD
7745788	0-160PSI, Gauge, SS, 2-1/2, Bottom MTD
7746151	0-100PSI 316SS Back gauge & CPVC/PTFE Isolator
7746152	0-160PSI 316SS Back gauge & CPVC/PTFE Isolator
7037009	Tubing PVC 3/8" X 1/2" *(Calibration Column)*
7744091	1/2" ID PVC Nylobraid Hose
7741354	1/2" SS Hose Clamp
7740541	1/2" PVC Hose Barb Adapter H x MNPT

3.5 Control Panel Spare Parts

P/N:	Description:
7746553	C3C Overload 8-12.5Amps Adjustable
7746403	C3C 3 POS NEMA Selector Switch
7746223	CBI UL 489 Circuit Breaker 20 Amp
7500413	Littlefuse 2.5A 250V for Circuit Board

3.6 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 or abnormal noises	Weekly
Check the electrical connections for integrity		Quarterly
Check tubing for wear or cuts		Weekly
Check Mixing Chamber Motor amperage. Check fan cover for obstruction or Dirt		Monthly
Check dosing diaphragm for damage (Delta Pump)		Every 3 Months (Approx 30% continuous operation.)
Check the liquid end for tightness (Delta Pump)	Torque Settings for screws 40 - 44 in/lb	Every 3 Months (Approx 30% continuous operation.)
Check leakage rate and tighten/loosen packing to allow 1-6 drops per minute (Seepex Pump)	Adjust tightening nuts only 1/2 turn per minute until stabilized	Weekly
Check flow pump rate at rated pressure (Seepex Pump)	Replace Rotor/stater as required	Weekly
Check Bearing End play and Temperature. Change Grease (Seepex Pump)	See Lubrication Chart	Monthly (3,000 Operation Hours)
Check Universal Joint Seal, Bushing and joint integrity. Replace Grease (Seepex Pump)	See Lubrication Chart	Upon rotor/stator replacement
Check Motor RPM/amperage. Drain. Check fan cover for obstruction or Dirt (Seepex Pump)		Monthly
Check Gear reducer temperature and oil level (Seepex Pump)	See Lubrication Chart	Monthly
Change Gear reducer oil (Seepex Pump)	See Lubrication Chart	3 Years
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 3/4 Hp (See Chart Below)	Ball Bearing Grease	5,000 Hours of Service per Year
Check Gear Reducer Oil Level (Seepex Pump)	210cSt @ 40°C (Gulf EP Lube-S 100 or equal)	Weekly
Change Gear Reducer Oil Level (Seepex Pump)	210cSt @ 40°C (Gulf EP Lube-S 100 or equal)	3 Years
Repack Motor Bearing w/Grease	Gulf EP No. 2 or equal	3 Years
Repack Pump Bearing	Shell Alvania EP 2 or equal	3,000 Operating Hours
Repack Pump Universal Joints	Seepex Grease Type 30321 "ONLY"	Rotor Replacement or 10,000 operating hours whichever is first

Mixing Chamber Motor Details:

Lubrication
This motor is supplied with pre-lubrication ball bearings. No lubrication required before start up.

Relubrication Intervals
The following intervals are suggested as a guide:

SUGGESTED RELUBRICATION INTERVALS		
HOURS OF SERVICE PER YEAR	H.P. RANGE	RELUBE INTERVAL
5,000	Sub Fractional to 7 1/2 10 to 40 50-200	5 Years 3 Years 1 Year
Continuous Normal Applications	Sub Fractional to 7 1/2 10 to 40 50 to 200	2 Years 1 Year 9 Months
Season Service Motor Idle 6 Months or More	All	1 Year (Beginning of Season)
Continuous High Ambients Dirty or Moist Locations High Vibrations Where Shaft End is Hot (Pumps-Fans)	Sub Fractional to 40 50 to 200	6 Months 3 Months

Lubrication

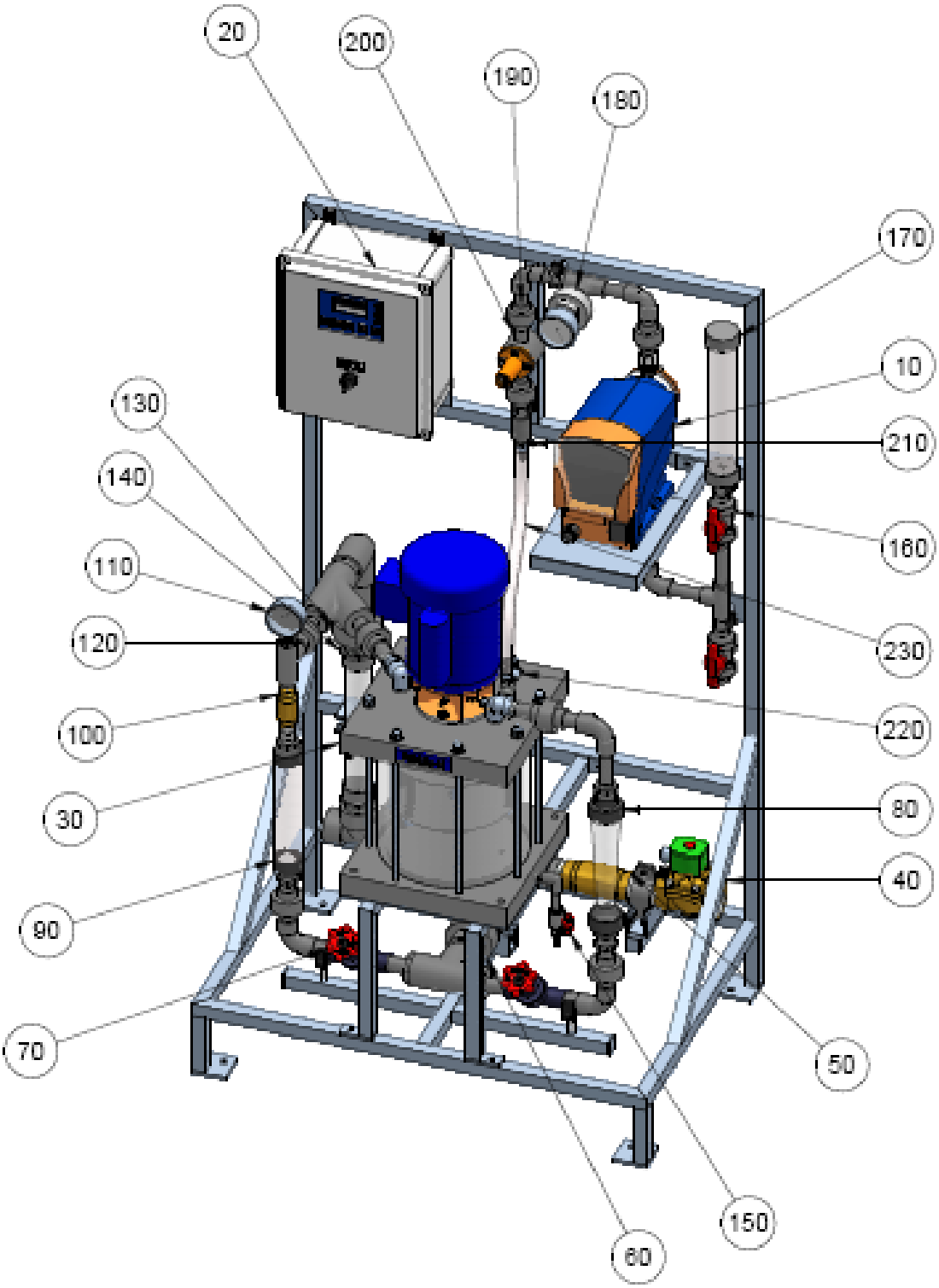
Use high quality ball bearing lubricant. Use consistency of lubricant suitable for class of insulation stamped on nameplate as follows:

LUBRICATION CONSISTENCY				
INSULATION CLASS	CONSISTENCY	TYPE	TYPICAL LUBRICATION	FRAME TYPE
B & F F & H	Medium	Polyurea	Shell Dolium R and/or Chevron SR1 2	Sub Fractional to 447T All

APPENDIX A – DA & PA Series Bill of Material

Mechanical & Electrical List

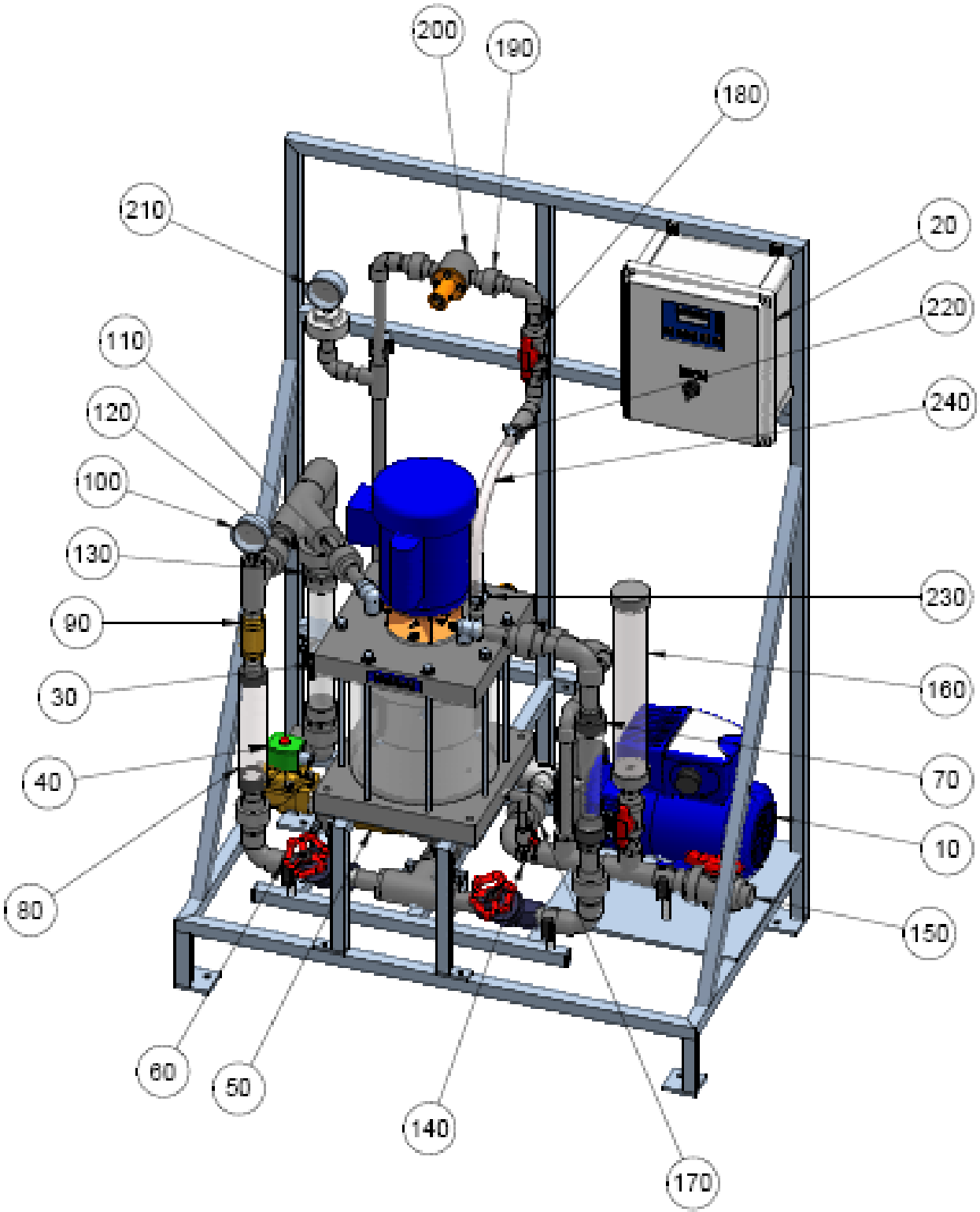
General Mechanical Layout



PROMIX M CONTROL DA

PROMIX M (DA SERIES)
BILL OF MATERIAL

ITEM	PART DESCRIPTION	PART NO.	7746635	7746636	7746637	7746638	7746639	7746640	7746641	7746642
10	DELTA 1020 SERIES PUMP ON HV2 SETTING	DLTA1020PVT4600UD4031EN0	X							
	DELTA 1020 SERIES PUMP	DLTA1020PVT4600UD4031EN0		X						
	DELTA 0730 SERIES PUMP	DLTA0730PVT4600UD4031EN0			X		X		X	
	DELTA 0450 SERIES PUMP	DLTA0450PVT2600UD4031EN0				X		X		X
20	CONTROL PANEL	7746569	X	X	X	X	X	X	X	X
30	PROMIX M MIXING CHAMBER	7746503	X	X	X	X	X	X	X	X
40	SOLENOID VALVE, 1-1/2", FNPT, BRASS	7746526	X	X	X	X	X	X	X	X
50	CHECK VALVE, 1-1/2", FNPT, BRASS	7746625	X	X	X	X	X	X	X	X
60	UNION, 1-1/2", SOCKET, PVC/VITON, SCH. 80	7744564	X	X	X	X	X	X	X	X
70	GLOBE VALVE, 3/4", SOCKET, PVC/EPDM	7741479	X	X	X	X	X	X	X	X
80	FLOW METER, 5 GPM, 3/4", FNPT, PVC, W\SWITCH	7746674	X							
	FLOW METER, 10 GPM, 3/4", FNPT, PVC, W\SWITCH	7746675		X	X	X				
	FLOW METER, 20 GPM, 1", FNPT, PVC, W\SWITCH	7746676					X	X		
	FLOW METER, 25 GPM, 1", FNPT, PVC, W\SWITCH	7746677							X	X
90	FLOW METER, 5 GPM, 1/2", FNPT, PVC	7746343	X							
	FLOW METER, 10 GPM, 1", FNPT, PVC	7746652		X	X	X				
	FLOW METER, 21 GPM, 1", FNPT, PVC	7746653					X	X		
	FLOW METER, 30.5 GPM, 1", FNPT, PVC	7746654							X	X
100	CHECK VALVE, 3/4", FNPT, BRASS	7746527	X	X	X	X	X	X	X	X
110	PRESSURE GAUGE, 316 SST, 0-100PSI	7741084				X		X		X
	PRESSURE GAUGE, 316 SST, 0-160PSI	7745788	X	X	X		X		X	
120	UNION, 3/4", SOCKET, PVC/VITON, SCH. 80	7744555	X	X	X	X	X	X	X	X
130	UNION, 1-1/2", FNPT, PVC/VITON, SCH. 80	7744559	X	X	X	X	X	X	X	X
140	STATIC MIXER, 1-1/2", MNPT, CLEAR PVC, SCH. 40, 6 ELE	7746529	X	X	X	X	X	X	X	X
150	LAB COCK, 1/4", FNPT, PVC/VITON	7746331	X	X	X	X	X	X	X	X
160	BALL VALVE, 1/2", PVC/VITON, SCH. 80, TYPE 21	7000309	X	X	X	X	X	X	X	X
170	CALIBRATION COLUMN, PVC, 500mL	7500139	X	X	X	X	X	X	X	X
180	PRESSURE GAUGE, 316SST, CPVC/PTFE ISOLATOR, 0-100PSI	7746151				X		X		X
	PRESSURE GAUGE, 316SST, CPVC/PTFE ISOLATOR, 0-160PSI	7746152	X	X	X		X		X	
190	UNION, 1/2", SOCKET, PVC/VITON, SCH. 80	7744562	X	X	X	X	X	X	X	X
200	BACK PRESSURE VALVE, 1/2", SOCKET, PVC, 0-150 PSI	1019883	X	X	X	X	X	X	X	X
210	HOSE BARB ADAPTER, 1/2" ID TUBING X MNPT, PVC	7740541	X	X	X	X	X	X	X	X
220	HOSE CLAMP, 1/2", SST	7741354	X	X	X	X	X	X	X	X
230	TUBING, 1/2" ID, PVC, NYLOBRAID	7744091	X	X	X	X	X	X	X	X

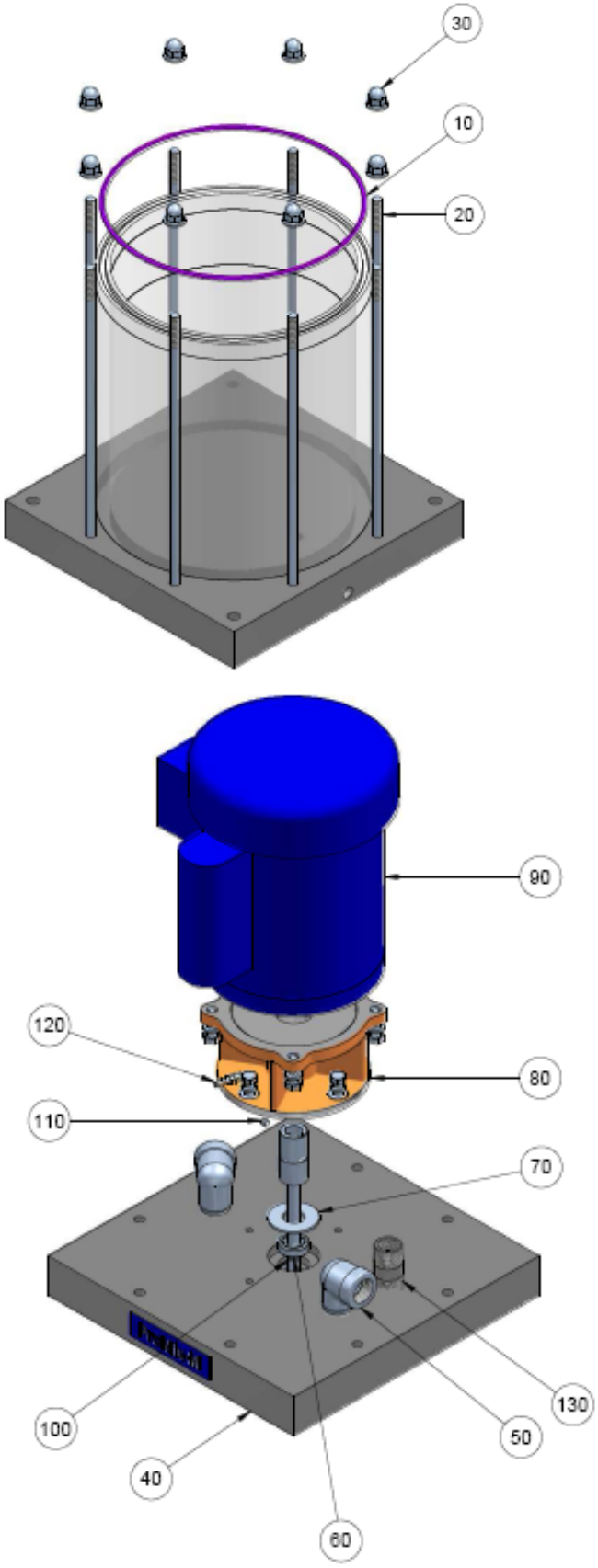


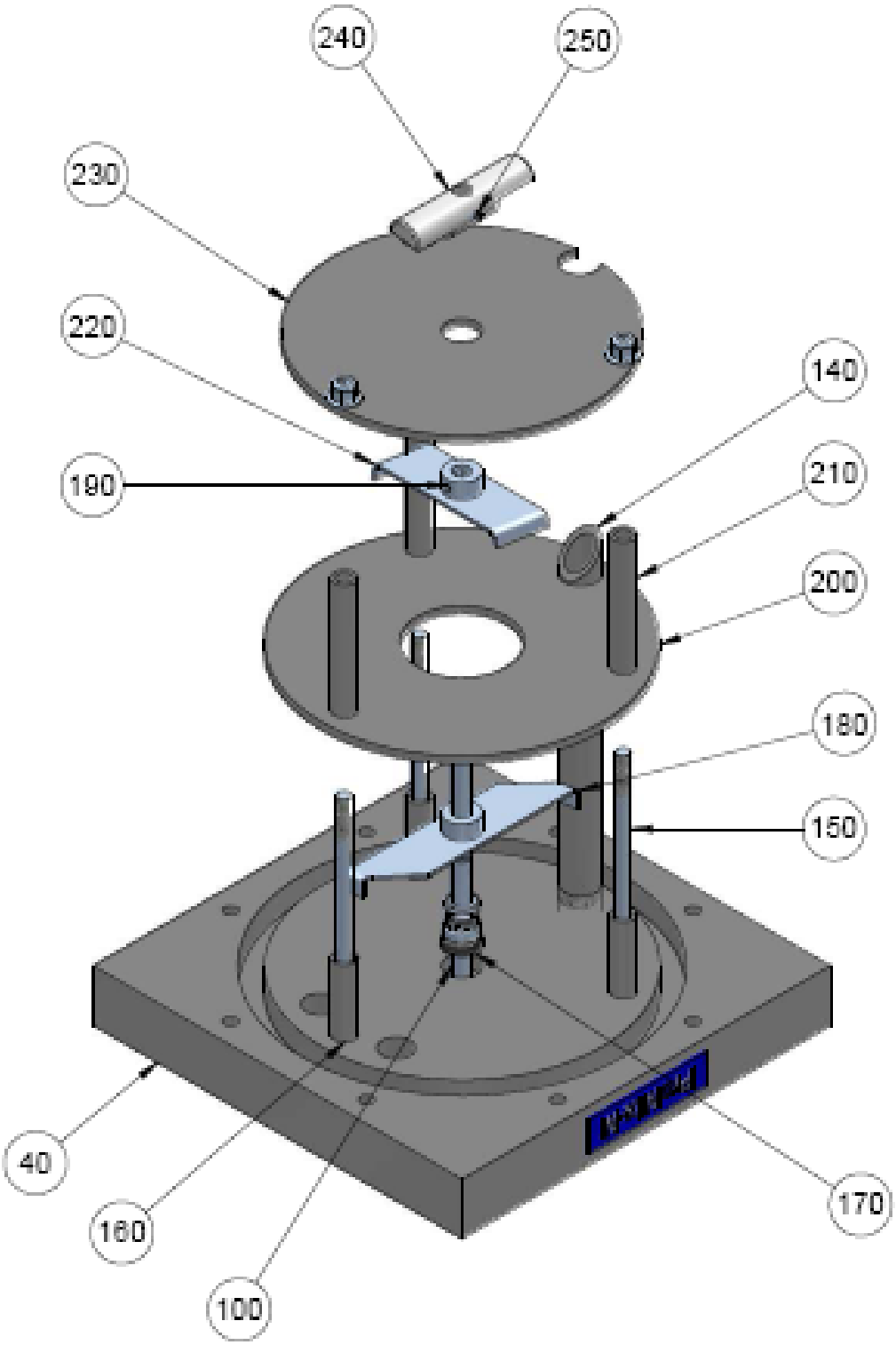
PROMIX M CONTROL PA

PROMIX M (PA SERIES) BILL OF MATERIAL

ITEM	PART DESCRIPTION	PART NO.	7746643	7746644	7746645	7746646	7746647	7746648	7746649
10	SEEPEX MODEL MDP PUMP SET AT 121 RPM	7746577	X	X					
	SEEPEX MODEL MDP PUMP SET AT 234 RPM	7746577			X	X		X	
	SEEPEX MODEL MDP PUMP SET AT 552 RPM	7746577					X		X
20	CONTROL PANEL	7746569	X	X	X	X	X	X	X
30	PROMIX M MIXING CHAMBER	7746503	X	X	X	X	X	X	X
40	SOLENOID VALVE, 1-1/2", FNPT, BRASS	7746526	X	X	X	X	X	X	X
50	CHECK VALVE, 1-1/2", FNPT, BRASS	7746625	X	X	X	X	X	X	X
60	GLOBE VALVE, 1", FNPT, PVC/EPDM	7744262	X	X	X	X	X	X	X
70	FLOW METER, 5 GPM, 3/4", FNPT, PVC, W\SWITCH	7746677	X						
	FLOW METER, 10 GPM, 3/4", FNPT, PVC, W\SWITCH	7746676		X	X				
	FLOW METER, 20 GPM, 1", FNPT, PVC, W\SWITCH	7746675				X	X		
	FLOW METER, 25 GPM, 1", FNPT, PVC, W\SWITCH	7746674						X	X
80	FLOW METER, 5 GPM, 1/2", FNPT, PVC	7746343	X						
	FLOW METER, 10 GPM, 1", FNPT, PVC	7746652		X	X				
	FLOW METER, 21 GPM, 1", FNPT, PVC	7746653				X	X		
	FLOW METER, 30.5 GPM, 1", FNPT, PVC	7746654						X	X
90	CHECK VALVE, 1", FNPT, BRASS	7746687	X	X	X	X	X	X	X
100	PRESSURE GAUGE, 316 SST, 0-160PSI	7745788	X	X	X	X	X	X	X
110	UNION, 3/4", SOCKET, PVC/VITON, SCH. 80	7744555	X	X	X	X	X	X	X
120	UNION, 1-1/2", FNPT, PVC/VITON, SCH. 80	7744559	X	X	X	X	X	X	X
130	STATIC MIXER, 1-1/2", MNPT, CLEAR PVC, SCH. 40, 6 ELE	7746529	X	X	X	X	X	X	X
140	LAB COCK, 1/4", FNPT, PVC/VITON	7746331	X	X	X	X	X	X	X
150	BALL VALVE, 1", PVC/VITON, SCH. 80, TYPE 21	7741335	X	X	X	X	X	X	X
160	CALIBRATION COLUMN, PVC, 500mL	7500139	X	X	X	X		X	
	CALIBRATION COLUMN, PVC, 1000mL	7500130					X		X
170	UNION, 1", SOCKET, PVC/VITON, SCH. 80	7744563	X	X	X	X	X	X	X
180	BALL VALVE, 1/2", PVC/VITON, SCH. 80, TYPE 21	7000309	X	X	X	X	X	X	X
190	UNION, 1/2", SOCKET, PVC/VITON, SCH. 80	7746151	X	X	X	X	X	X	X
200	BACK PRESSURE VALVE, 1/2", SOCKET, PVC, 0-150 PSI	1019883	X	X	X	X	X	X	X
210	PRESSURE GAUGE, 316SST, CPVC/PTFE ISOLATOR, 0-160PSI	7745318	X	X	X	X	X	X	X
220	HOSE BARB ADAPTER, 1/2" ID TUBING X MNPT, PVC	7740541	X	X	X	X	X	X	X
230	HOSE CLAMP, 1/2", SST	7741354	X	X	X	X	X	X	X
240	TUBING, 1/2" ID, PVC, NYLOBRAID	7744091	X	X	X	X	X	X	X

P/N: 7746503 Mixing Chamber (Utilized on both models)




240
250
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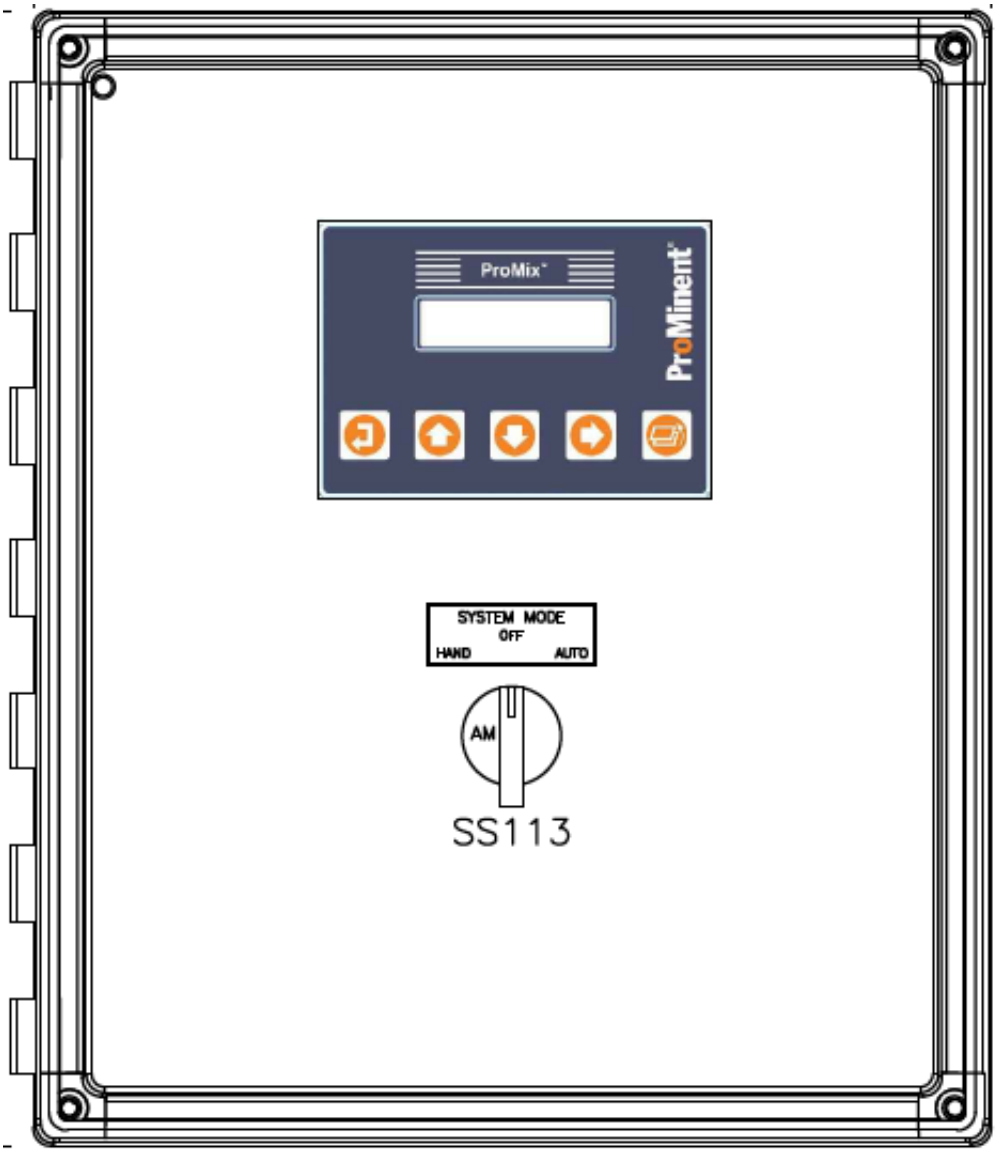
100
170

PROMIX M - MIXING CHAMBER BILL OF MATERIALS			
ITEM	**QTY.**	**PART DESCRIPTION**	**PART NO.**
10	1	O-RING, CHAMBER, VITON, PROMIX-M	7746491
20	8	ROD, 316SS, 3/8-16 X 14.5, PROMIX-U	7746494
30	8	NUT, ACORN, 3/8-16, 18-8 SST	7746492
40	1	PLATE, TOP, PVC, 1.75, PROMIX-M	7746485
50	2	ELBOW, STREET, 3/4", FNPT X MNPT, 316 SST, 150#	7746520
60	1	BEARING, 440SS, 1.125X.5X.31, PROMIX-M	7746472
70	1	WASHER, 316SS, 1.88X.81X.09, PROMIX-M	7746473
80	1	FLANGE, MOTOR, C56/135, PROMIX-M	7746478
90	1	MOTOR, 3/4 HP, TEFC, 56C, 115/230VAC, LEESON, 110057	7951060
100	1	SHAFT, MIXER, 303SS, PROMIX-M	7746484
110	1	SCREW, SET, 316SS, 1/4-28 PROMIX-U	851405
120	1	HOSE BARB, 1/16" MNPT X 3/16" ID, PVDF	7500346
130	1	INJECTION VALVE ASSEMBLY, PROMIX-U	7746471
140	1	PIPE, DISCHARGE, PVC, 3/4", PROMIX-U	7746490
150	3	ROD, 316SS, 3/8-16X8, PROMIX-M	7746497
160	3	SPACER, TOP BAFFLE, PROMIX-M	7746495
170	1	SEAL, MECH, SHAFT, 304SS, 1/2", PROMIX-M	7746474
180	1	BLADE, PRIMARY, 316SS, PROMIX-M	7746482
190	4	SCREW, SET, 316SS, 1/4-28 PROMIX-U	7746476
200	1	BAFFLE, TOP, PVC, .25, PROMIX-M	7746487
210	3	SPACER, BOTTOM BAFFLE, PROMIX-M	7746496
220	1	BLADE, SECONDARY, 316SS, PROMIX-M	7746483
230	1	BAFFLE, BOTTOM, PVC, .25, PROMIX-M	7746488
240	1	PROP, AGITATOR, CPVC, PROMIX-M	7746481
250	1	PIN, SPRING, 18-8SS, .187X1.25, PROMIX-M	7746475

P/N: 7746569 Control Panel “A Controls” (Utilized on both models)



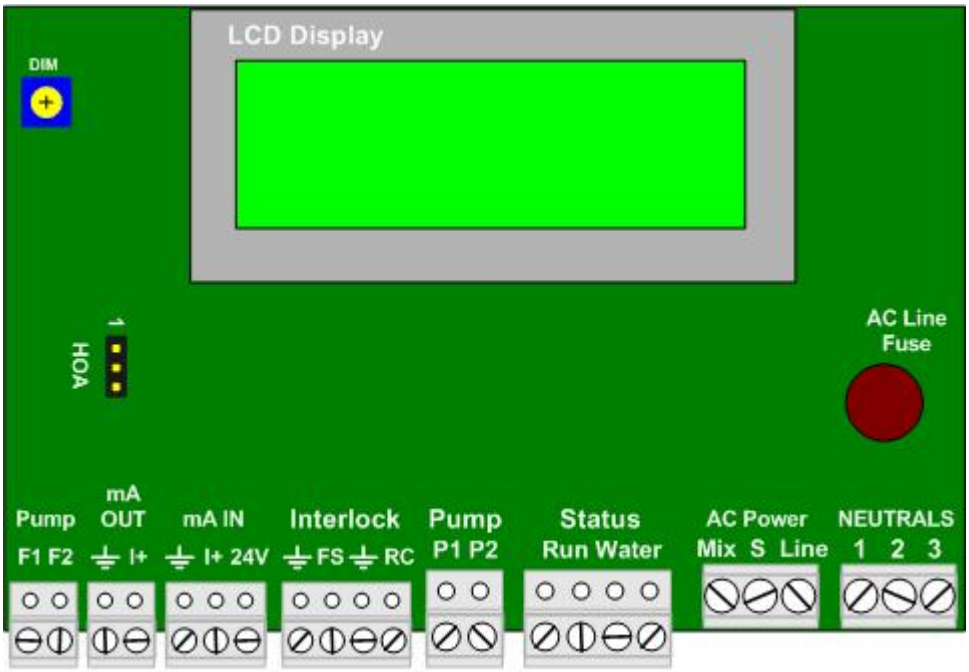
PROMIX M - "A" Controls Bill of Material P/N: 7746569		
QTY.	**PART DESCRIPTION**	**PART NO.**
1	FIBOX PN 501336 PROMIX TA ENCLOSURE	7746679
1	FIBOX 12X10 PAINTED STEEL SUB PANEL	7746226
1	CBI UL 489 Circuit Breaker 20 Amp	7746223
1	C3C 300-S25N30D10 120V, 1NO AUX CONT	7746346
1	C3C 320-B2U12 OVLD 8-12.5AMPS ADJUSTABLE	7746553
1	C3C 3 POS NEMA SELECTOR SWITCH	7746403
2	C3C 22CB2NO CONTACT BLOCK	7746464
1	MOV ZA SERIES V180ZA1P NEWARK 58K7343	7745305
3	WEID WPE4 YEL/GRN GROUND TERMINAL	7745704
13	WEID WDU4 SINGLE FEED THRU TERMINAL	7745700
7	WEID WDK4N DUAL FEED THRU TERMINAL	7745702
2	WEID WAP/WDK4N END PLATE	7745703
4	WEID WEW35/2 END BARRIER	7745699
1	WEID WS16/2 1X1 1/4 INCH FUSE TERMINAL	7745711
1	FS FUSE 2A GLASS BODY TIME DELAY GDL2	7746094
1	PHOENIX 0819330 UC-EMLP DEVICE LABEL	7500386
1	POWER CORD 12' 14/3 SOW BLK W/PLUG	7740819
2	PG13 SKINTOP FITTING - BLACK SL13 W/NUT	7744824
2	SKINTOP FITTING PG11 BLACK SL11 W/NUT	7744823
3	CONNECTOR PG9 BLACK (7735074.2)	703885
3	PG-9 Nut	7500067
1	PROMIX-S "A" CONTROL BOARD	7746655
1	PROMIX KEYPAD DISPLAY CONTROL A_	7746682
1	TYCO 3-640440-3 PC BOARD RECEPTICLE	7746684
1	CAROL 4062 CABLE 3 COND 22AWG UNSHIELDED	7746685
1	BELDEN 8466 18AWG 12COND CABLE	7500201
1	RR150PV-0250 ROUND ROD .250" PVC	7746532
1	1/2" SWIVEL FITTING FOR POLYTUFF II	7745763
1	1/2" CORD GRIP 2 HOLE X 0.24"	7744578

APPENDIX B – Control Panel "A Controls"

B.1 Controller Board Layout

The controller consists of one circuit board.

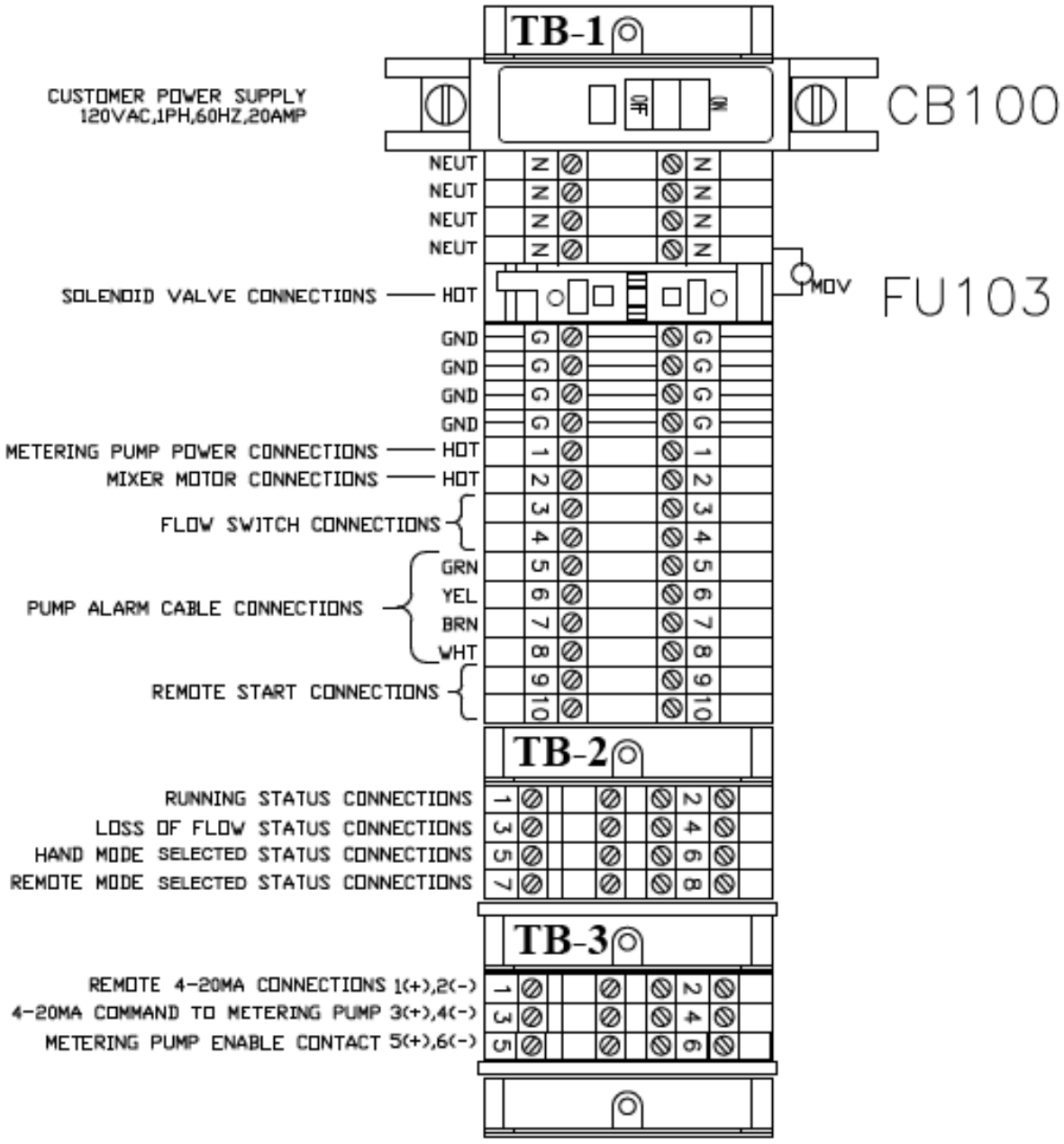
It includes a 2 line x 16 character LCD display and a microcontroller module.



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

B.2 Controller Wiring (DA/PB Series) P/N: 7746569 w/DLTA or Seepex Pump

Reference Supplement Drawing: 7746569-300 for further wiring details



B.3 4-20 mA Input Scaling

- **Feeding More Polymer when the 4-20mA Input Current Decreases:**
  If you set **Scale Iin @ 4mA** to **4mA = 100%** and **Scale Iin @20mA** to **20mA = 0%**, the feeder will accommodate a logically inverted controlling 4-20mA current loop.
  However the default **Iin 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 **Iin Fail State** to **Pump @ 100%.**

- **Non-Zero % at 4.0mA & 100% @ <20mA:**
  To verify a non-standard 4-20mA input scaling, Set **Scale Iin @4mA** to **4mA = 20%** and **Scale Iin @ 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

- **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 Iin @4mA** to **6mA = 100%** and **Scale Iin @ 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.

- **Dual Logical Inversion:**
  Be careful how you set the scaling currents and percentages. The effect is not always obvious.
  If you set **Scale Iin @4mA** to **20mA = 100%** and **Scale Iin @ 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

- **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 Iin @ 4mA** to **10mA = 100%** and
  Scale Iin @ 20mA to **10mA= 0%**, the feeder forces a 0.1mA difference
  If you set **Scale Iin @4mA** to **4mA = 50%** and **Scale Iin @ 20mA** to **20mA= 50%**, the feeder forces a 1% difference.

Correct any keying error prior to operating the ProMix M

APPENDIX C – Polymer Sizing / Dosage

The ProMix M H-O-A switch on the controller door enables the user to select either Manual or Auto operation. In 'H' or Manual, the polymer pump speed is selectable from 0 -100% by using the controller keypad. In 'A' or Auto, the polymer pump speed is controlled proportionally by a remote 4-20 mA signal representing 0-100% pump speed. It is assumed the pump stroke length is maintained at 100%.

The desired polymer dosage must be considered prior to selecting the ProMix M 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 M 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.

ProMinent ProMix 'DA' & 'PA' Polymer Feeder

APPENDIX D – Reference Documents

Mechanical General Arrangement Drawings:

7746635-200	PROMIX-M_0-300X2-2.4DA Skid System
7746636-200	PROMIX-M_0-600X2-4.0DA Skid System
7746637-200	PROMIX-M_0-600X2-6.2DA Skid System
7746638-200	PROMIX-M_0-600X2-10.0DA Skid System
7746639-200	PROMIX-M_0-1200X2-6.2DA Skid System
7746640-200	PROMIX-M_0-1200X2-10.0DA Skid System
7746641-200	PROMIX-M_0-1500X2-6.2DA Skid System
7746642-200	PROMIX-M_0-1500X2-10.0DA Skid System
7746643-200	PROMIX-M_0-300X2-5.0PA Skid System
7746644-200	PROMIX-M_0-600X2-5.0PA Skid System
7746645-200	PROMIX-M_0-600X2-10.0PA Skid System
7746646-200	PROMIX-M_0-1200X2-10.0PA Skid System
7746647-200	PROMIX-M_0-1200X2-24.0PA Skid System
7746648-200	PROMIX-M_0-1500X2-10.0PA Skid System
7746649-200	PROMIX-M_0-1500X2-24.0PA Skid System

Electrical Schematic Drawings:

7746569-300	PROMIX-M Delta/Seepex "A" Control Panel

Pump Manuals:

DLTA QSG	Delta Pump Quick Start Guide
986691	Delta Pump Operating Manual
MDP006-12	Seepex Pump Operating Manual

Instructional Manuals:

7746471-400	Injection Valve Cleaning Instructions
7746503-400	Mixing Chamber Mechanical Seal Replacement

Catalog Component Cut Sheets:

7746635-701	PROMIX-M_0-300X2-2.4DA Skid System
7746636-701	PROMIX-M_0-600X2-4.0DA Skid System
7746637-701	PROMIX-M_0-600X2-6.2DA Skid System
7746638-701	PROMIX-M_0-600X2-10.0DA Skid System
7746639-701	PROMIX-M_0-1200X2-6.2DA Skid System
7746640-701	PROMIX-M_0-1200X2-10.0DA Skid System
7746641-701	PROMIX-M_0-1500X2-6.2DA Skid System
7746642-701	PROMIX-M_0-1500X2-10.0DA Skid System
7746643-701	PROMIX-M_0-300X2-5.0PA Skid System
7746644-701	PROMIX-M_0-600X2-5.0PA Skid System
7746645-701	PROMIX-M_0-600X2-10.0PA Skid System
7746646-701	PROMIX-M_0-1200X2-10.0PA Skid System
7746647-701	PROMIX-M_0-1200X2-24.0PA Skid System
7746648-701	PROMIX-M_0-1500X2-10.0PA Skid System
7746649-701	PROMIX-M_0-1500X2-24.0PA Skid System

(Provided upon request)

Documents noted in this section are not in this manual