

POLYMERPLUS

Advanced Activation System

PO Box 185100, Hamden, CT 06518
(203) 287-1985 BurtProcess.com



6PS *evo*

OPERATING MANUAL

1. Introduction	4
2. Unpacking	4
3. Pre-Installation	4–5
3.1 Protective Clothing	4
3.2 Location Requirements	4
3.3 Plumbing Guidelines	4
3.4 Electrical Considerations	5
4. Installation	5–6
4.1 Location & Mounting	5
4.2 Water Connection	5
4.3 Activated Solution Connection	5
4.4 Polymer Connection	6
4.5 Electrical Connection	6
4.6 Signal Connection	6
5. Operation	7–11
5.1 Home Page Overview	7
5.2 Settings Page	8
5.3 Tank Levels & Configurations	9
5.4 Outputs	10
5.5 Available Output Functions	10
5.6 Changing Output Functions	11

6. Start-Up	11
6.1 Water Feeder	11
6.2 Polymer Valves	11
6.3 Main Switch	11
6.4 Flow Requirement	11
7. Calibrate the Metering Pump	12
7.1 Change Pump Capacity	12
8. Cleaning the Sight Tube	13
9. Shutdown Over 48 Hours	13
10. Maintenance	13
10.1 Recommended Spare Parts	13
11. Troubleshooting	14
12. Help Page	15
13. Wiring Terminals	16
14. Wiring Diagram	17
15. System View 6PS evo-400	18
16. System View 6PS evo-1200	19

1. INTRODUCTION

This manual addresses the installation, operation, maintenance, and troubleshooting for the PolymerPlus 6PS-EVO. Please review the manual carefully. Pay special attention to warnings and precautions. Always follow good safety procedures, including the use of proper eye, face, and clothing protection.

2. UNPACKING

Your feeder includes the items listed on the packing slip. Notify the carrier immediately if there are any signs of damage to the feeder or its parts. Notify Burt Process Equipment if any of the parts are missing. Spare parts and accessories may be in a separate carton. They are shipped at the same time as the feeder.

3. PRE-INSTALLATION

3.1 PROTECTIVE CLOTHING

Refer to the MSDS precautions from the polymer supplier or the polymer to be mixed in the feeder. Pay special attention to warnings and precautions. Always follow good safety procedures, including the use of proper eye, face, and clothing protection.

3.2 LOCATION

This feeder is suitable for indoor locations where it might be subjected to spray or dripping water. The area is to be free of flammable vapors or dust. Ambient temperature is to be between 40 F and 120 F. (5 C and 50 C). Protect from freezing temperatures.

If the feeder is to be used in areas exposed to flammable vapors or dusts, the Explosion Proof option is required.

3.3 PLUMBING

Always adhere to your local plumbing codes and requirements. Be sure that installation does not constitute cross connection. Check local plumbing codes for guidelines. If using potable water, a backflow-preventer is required.

3.4 ELECTRICAL

All wiring must conform to local electrical codes. Connect the feeder to a grounded, GFCI protected, 120VAC supply.



WARNING

Risk of electric shock - Disconnect electricity before opening panel.

4. INSTALLATION

4.1 LOCATION

This feeder is suitable for locations. Protect from freezing temperatures. Install the feeder on a level concrete floor. Securely anchor the feeder to the floor. Provide spill containment as needed.

Reference 15.0 for System View on page 18

4.2 WATER CONNECTION

Provide a clean water supply to within 5' of the feeder. Hose is preferred over hard piping since it simplifies maintenance and reduces pipe support stresses.

- Water pressure should be at least 30 psig and must not exceed 60 psig or 100 °F (38 °C).
- Water pressure should be at least 30 psig higher than where the solution is being injected.
- Supply pipe size should be the same size or larger than the feeder inlet.
- Provide a local shutoff valve. Support the supply so that it does not stress the feeder connection.

4.3 ACTIVATED SOLUTION CONNECTION

Provide activated solution piping or hose to within 5' of the feeder. Hose is preferred since it simplifies maintenance and reduces pipe support stresses.

- Use only pipe or tubing that is designed to withstand up to 100 psig pressure.
- Discharge pipe size should be the same size or larger than the feeder outlet.
- Support the discharge so that it does not stress the feeder connection.



CAUTION

Do not use clear unreinforced vinyl tubing

4.4 POLYMER CONNECTION

Refer to the MSDS precautions from the supplier of the polymer to be mixed in the feeder. Always wear the recommended clothing, face shield, safety glasses, and gloves.

- The polymer can be gravity fed or suction lifted.
- Gravity Feed: To prevent over-pumping, the polymer level must be less than 5 feet above the feeder.
- Suction Lift: Install the feeder as close as possible to the polymer supply. Limit the suction lift to 4 feet.
- Supply pipe size should be the same size or larger than the feeder inlet.
- Provide a local shutoff valve. Support the supply so that it does not stress the feeder connection. Install a polymer strainer between the supply and the feeder.

4.5 ELECTRICAL CONNECTION

All wiring must conform to local electrical codes.

Disconnect power to the feeder before opening the Electrical Enclosure. Connect the feeder to a grounded, GFCI protected, 120 VAC supply.



WARNING

Risk of electric shock - Disconnect electricity before opening panel.

4.6 SIGNAL CONNECTION

Disconnect power to the feeder before opening the Electrical Enclosure. Refer to the wiring diagram for signal connections.

1. Local or Remote Start / Stop Control.
2. Remote 4-20 mA control of the polymer pump.
3. Solution Tank Level, 4-20 mA input.
4. General Alarm Output.
5. Feeder Running Output.



WARNING

Risk of electric shock - Disconnect electricity before opening panel.

5. OPERATION

5.1 HOME PAGE. Typical page is shown below.

Dilution water flow rate in GPH.

A bar graph indicates the flow range of the dilution water flow meter. A status indication of the water valve is provided as “OPEN” or “CLOSED”.

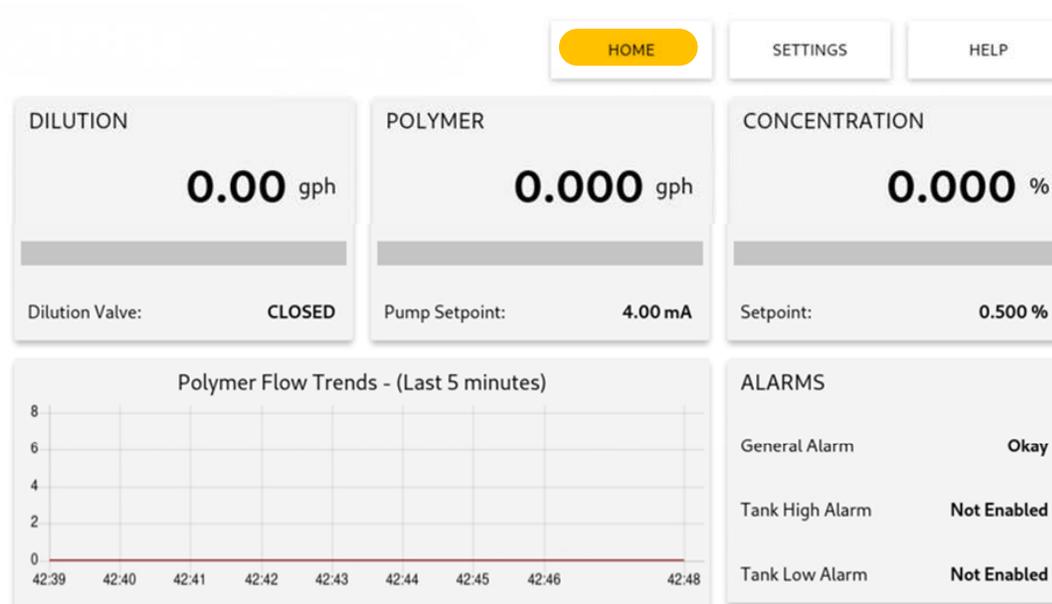
Polymer flow rate in GPH. This is based on pump speed.

A bar graph indicates the flow range of the polymer metering pump. A status indication of the pump set point is provided in 0.XX mA.

Current solution concentration in percentage.

A bar graph indicates the concentration range of the feeder. A status indication of the solution concentration set-point.

Current active alarms are shown on this page.



5.2 SETTINGS PAGE. Typical page is shown below.

The settings screen allows configuring the main system modes and set-points.

Start/Stop Mode Selection.

LOCAL Mode - The feeder turns on/off depending only on the state of the physical switch on the front of the control panel.

REMOTE Mode - The feeder turns on/off depending on the state of the physical switch on the front of the control panel and a remote switch input. The remote switch is to be a dry contact.

ANALOG Mode - The feeder turns on/off depending on the level of the tank being monitored. The trip points are input on the TANK-LEVELS part of this page.

Pump Speed Mode Selection

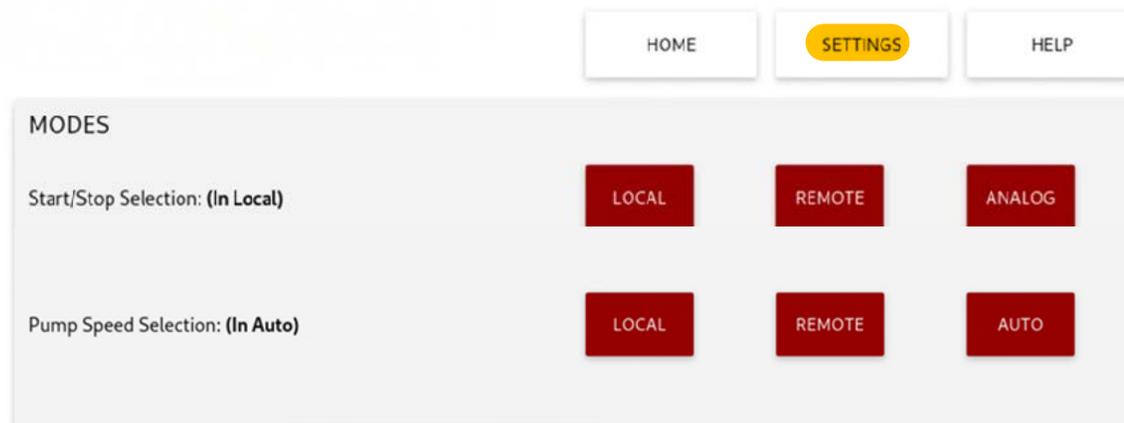
The pump is factory set in Analog 4-20mA Mode. Do not change the pump to a different mode. Pump speed is to be controlled only at the feeder HMI Settings Screen, as noted below.

LOCAL Mode. The pump speed is set by the “Local Polymer Flow Setpoint”. To change the setpoint, tap on the indicated setpoint.

Increase or decrease the set-point as desired.

REMOTE Mode. The pump speed is set by a remote 4-20 mA signal. The speed is preset for 4-20 mA = 0 to 7.67 GPH.

AUTO Mode. The pump speed is set by the processor; based on dilution water flow and desired solution concentration. To change the solution concentration, tap on the indicated setpoint. Increase or decrease the set-point as desired.



5.3 SETTINGS PAGE.

Tank-Level and other Configurations.
 Scroll down on the settings screen to view:

AGE TANK LEVEL SETPOINTS

WATER FLOWMETER RANGE. Min and Max are not adjustable. They are based on the water flowmeter. The flush time is adjustable as desired.

METERING PUMP RANGE. Min and Max are adjustable.

See Section 7.1 for details on page 12

LEVEL TRANSMITTER RANGE. Min and Max are not adjustable. They are based on the installed transmitter.

SETPOINTS

Local Polymer Flow Setpoint (%): ▼ 0.0 ▲

Desired Solution Concentration Setpoint (%): ▼ 0.50 ▲

TANKLEVELS

Current Scaled Tank Level: 0.00 in

Tank Low Alarm Setpoint (in): ▼ 12 ▲

Tank Fill Start Setpoint (in): ▼ 30 ▲

Tank Fill Stop Setpoint (in): ▼ 42 ▲

Tank High Alarm Setpoint (in): ▼ 44 ▲

CONFIGURATIONS

Dilution Flowmeter Scaling SM6621 - 0 to 396.3 gph ▼

Flowmeter Scaling Custom Min Setpoint (gph): ▼ 0 ▲

Flowmeter Scaling Custom Max Setpoint (gph): ▼ 0 ▲

Dilution Flush Setpoint (sec): ▼ 15 ▲

Metering Pump Scaling QDos 20 PU - 0 to 7.672 gph ▼

Polymer Scaling Custom Min Setpoint (gph): ▼ 0.0 ▲

Polymer Scaling Custom Max Setpoint (gph): ▼ 0.0 ▲

Level Sensor Scaling PM1708 - 0 to 100.466 inH2O ▼

Level Sensor Position Setpoint (in): ▼ 0.0 ▲

Level Scaling Custom Min Setpoint (in): ▼ 0.0 ▲

Level Scaling Custom Max Setpoint (in): ▼ 0.0 ▲

Motor Connector Function Disabled ▼

5.4 OUTPUTS: Each Cortex Controller output can be configured to activate for desired commands or conditions. This allows the controller to integrate seamlessly with your alarms, indication lights, valves, and pumps.

There are four MOSFET outputs (DIO3-DIO6). They are low voltage DC outputs typically used to drive relays, pilot lights, or interlocks. Power is limited to 24 VDC, 12 watts.

There are six relay outputs (DO1-DO6). They are isolated dry-contact outputs typically used to drive contactors or system indicators. Each relay can be configured as NO or NC. Power is limited to 277VAC / 30VDC, 10 Amps.

5.5 AVAILABLE OUTPUT FUNCTIONS: Each output can be assigned to one of these functions:

- Disabled (Output is off and not used)
- Dilution Command (Water Valve)
- Polymer Command (Pump)
- Agitator Command
- Solution Pump Command
- General Alarm
- Tank Low Alarm
- Tank High Alarm
- Dilution Water Low Flow Alarm
- Polymer Low Flow Alarm
- In Local Start Mode
- In Remote Start Mode
- In Analog Start Mode
- In Local Speed Mode
- In Remote Speed Mode
- In Auto Speed Mode
- Running Indication

OUTPUTS		
DIO3 - Mosfet Output	Disabled	▼
DIO4 - Mosfet Output	Disabled	▼
DIO5 - Mosfet Output	Dilution Command	▼
DIO6 - Mosfet Output	Disabled	▼
DO1 - Relay Output	Dilution Command	▼
DO2 - Relay Output	Disabled	▼
DO3 - Relay Output	General Alarm	▼
DO4 - Relay Output	Running Indication	▼
DO5 - Relay Output	Tank Low Alarm	▼
DO6 - Relay Output	Tank High Alarm	▼

5.6 CHANGING THE OUTPUT FUNCTION:

1. Access the “SETTINGS” page. Scroll down to the “OUTPUTS” section.
2. Select the output you want to reconfigure, for example “DO5-Relay Output”.
3. Tap the down arrow on the right of the output. A menu will appear. Select the desired function.

For example, you can select “In Remote Start Mode” for DO-5. The relay will activate when the Start-Stop switch is in Remote mode.

Notes:

- Output will activate when the assigned function is true.
- Only one function can be assigned per output. The function can be changed as desired.
- Ensure that outputs are wired appropriately to the external devices that match the output type.
- Ensure that the external devices are within the voltage and power ratings of the outputs.
- Use the configurable outputs to efficiently integrate with plant control and monitoring systems.

6. START-UP:

6.1 Turn on the water to the feeder. Fully open the water flow control valve.

6.2 Open the polymer valves to the metering pump.

6.3 Turn the main physical switch to “ON

Set the Settings Screen “START / STOP” to LOCAL or REMOTE. These are described above.

Set the Settings Screen “PUMP SPEED MODE” to LOCAL, REMOTE or AUTO. These are described above. Adjust the set points as desired.

6.4 When the feeder is turned on, water will start to flow; and the polymer pump will run per the speed set-point. Before the metering pump turns on, water flow must be higher than the minimum.

7. CALIBRATE THE METERING PUMP:

1. Fill the calibration column with polymer.
2. Set the Settings Screen “START / STOP” to LOCAL.
3. Operate the pump at a desired rate.
4. Measure the time needed to drain 50 to 100 ml of polymer.
5. Measure the time needed to pump out a desired amount of polymer.

The pump flow in Gallons Per Hour equals:

$$0.95 \times \frac{(\# \text{ of ml})}{(\# \text{ of seconds})} = \# \text{ of GPH} \quad \text{EXAMPLE: } 0.95 \times \frac{(100 \text{ ml})}{30 \text{ sec}} = 3.17 \text{ GPH}$$

6. The flow on the pump speed display should agree with the measured flow. If it does not agree, update the pump maximum scaling value on the settings page for the metering pump. Update as needed until the measured flow matches the displayed flow.

7.1 CHANGE THE METERING PUMP CAPACITY:

The pump will not operate if the input signal is below 4.1 mA.

If you anticipate operating near the pump flow that a 4.1mA signal will generate, then you should reduce the pump maximum setpoint.

For example, the QDos-20PU factory range is 0 to 7.67 GPH. A signal of 4.1 mA will yield a flow of 0.05 GPH (1.2 GPD).

If you plan to operate near 0.05 GPH, you will need to change the pump range as follows.

1. On the Feeder HMI Settings Page CONFIGURATIONS, Metering Pump Scaling, select CUSTOM PUMP.
2. Keep the Minimum Setpoint to 0.0 GPH
3. Change Maximum Setpoint to 0.38 GPH (9.1 GPD), which is 5% of the factory setting. This allows a feed rate down to 0.003 GPH (0.07 GPD).
4. On the QDos-20PU Pump; see the Manual, Part 22.1.
5. Press MODE. “Analog 4-20 mA” will be highlighted.
6. Press the CALIBRATE button.
7. Press the MANUAL button. The 19.99 mA signal will appear.
8. Press the ACCEPT button.
9. Press + or – button to change the flow to 5%.
10. Press SET FLOW.
11. The 4.09 mA signal will appear next. Press ACCEPT and SET FLOW without making any changes.
12. Press the ANALOG button to return to 4-20 mA Mode. Maximum setpoints can be modified as desired. Make sure that the maximum flow on the pump agrees with the maximum setpoint on the HMI.

8. CLEANING THE SIGHT TUBE:

1. Turn the “START / STOP” switch to “OFF”.
NOTE: The water flushes the feeder for 15 seconds when the switch is turned off.
2. Close the main water supply valve.
3. Drain the sight tube chamber using the drain valve.
4. Remove the top cap by removing the four wing nuts and opening the union on the discharge pipe.
5. Rinse the sight tube cleaning assembly. Wipe the sight tube with a clean cloth.
6. Reinstall the top cap O-Ring, cap, and the wing nuts. Tighten the pipe union.
7. Reset the switches to the desired positions, open the main water supply valve.
8. Check for leaks and proper flow rates.

9. SHUTDOWN FOR OVER 48 HOURS:

1. Fill the calibration column with oil that is compatible with the process and the polymer.
Pump the oil until all the polymer is displaced out of the feeder.
2. Turn the system switch to “OFF”.
3. Close the water supply and discharge valves.
4. If needed, drain the feeder using the drain valve. Note that some feeder components will not fully drain and will be damaged if exposed to freezing temperatures.

**CAUTION**

Some components will not fully drain and can be damaged if exposed to freezing temperatures.

10. MAINTENANCE:

The feeder was designed to require minimum maintenance, with all components easily accessible.

Contact Burt Process Equipment via email at techsupport@burtprocess.com, or via phone at **(203) 287-1985** for assistance or parts.

10.1 RECOMMENDED SPARE PARTS:

Recommended Spare Parts	6psEVO-400	6psEVO-1200
1. Feeder O-Ring Set	EXL-ORING-06	EXL-ORING-01
2. Polymer Injection Valve	EXL-0027-H	EXL-0027-H
3. Metering Pump Head Assembly	WMP-0M3.1500.PFP	WMP-0M3.1500.PFP

11. TROUBLESHOOTING:**A. SYMPTOM: METERING PUMP DOES NOT PUMP TO CAPACITY.**

- | | | |
|---|---------------|--|
| 1 | LIKELY CAUSE: | Polymer inlet hose leak. |
| | SOLUTION: | Tighten all connections. Minimize number of inlet hose connections.
Check for cuts. |
| 2 | LIKELY CAUSE: | Pump suction lift is too high. |
| | SOLUTION: | Relocate the feeder or polymer supply. |
| 3 | LIKELY CAUSE: | Polymer too viscous. |
| | SOLUTION: | Increase the suction line size. |

B. SYMPTOM: METERING PUMP DOES NOT PUMP TO CAPACITY.

- | | | |
|---|---------------|---|
| 1 | LIKELY CAUSE: | Worn pump tube. |
| | SOLUTION: | Replace worn pump head assembly. |
| 2 | LIKELY CAUSE: | Feeder injection valve is plugged. |
| | SOLUTION: | Replace or clean the valve.
Note: The injection valve is located outside the activation apparatus. |

C. SYMPTOM: FEEDER INJECTION VALVE IS LEAKING.

- | | | |
|---|---------------|-----------------------------|
| 1 | LIKELY CAUSE: | Debris in the valve. |
| | SOLUTION: | Replace or clean the valve. |

D. SYMPTOM: SIGHT TUBE WIPER IS NOT SPINNING (The wiper keeps the sight tube clean.)

- | | | |
|---|---------------|---|
| 1 | LIKELY CAUSE: | Solution flow is too low to operate the wiper. |
| | SOLUTION: | Temporarily increase dilution water flow until the sight tube is cleaned. |

E. SYMPTOM: HMI SCREEN DOES NOT TURN ON

- | | | |
|---|---------------|--|
| 1 | LIKELY CAUSE: | Screen cables were loose or unplugged while power up, causing the controller to disable the output to the screen. |
| | SOLUTION: | Unplug the unit from the power source (120vac plug).
Unplug both cables (USB and HDMI) from behind the screen and on the backboard.
Plug the cables back into the screen and the backboard.
Plug the unit back to the power source.
Wait 1-2 minutes for the HMI to have fully powered up. |

12. HELP PAGE: Aides in troubleshooting

HOME

SETTINGS

HELP

SUPPORTINFORMATION

Model Number: **6PS evo**

Support Phone Number: **203-287-1985**

Support Email Address: **techsupport@burtprocess.com**

DIGITALINS

DI1: 0
 DI2: 0
 DI3: 0
 DI4: 0
 DI5: 0
 DI6: 0
 DI8: 0
 DI8: 0

DIGITALOUTS

DO1: 0
 DO2: 0
 DO3: 0
 DO4: 0
 DO5: 0
 DO6: 0

ANALOGINS

AI1: 3.814 mA
 AI2: 0.005 mA
 AI3: 0.006 mA
 AI4: 0.005 mA

ANALOGOUTS

AO1: 4.000 mA
 AO2: 0.000 mA

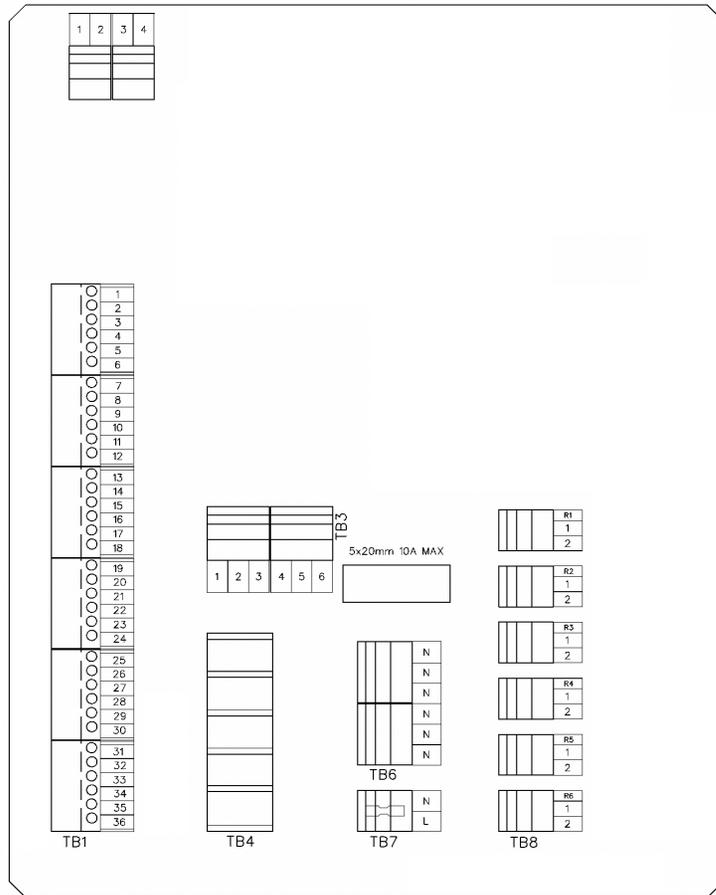
RESOURCES

Load Average: [0.46,0.44,0.36]

Memory Usage: 55.32 %

Uptime: 163265.33

13. Wiring Terminals



Function	Terminal	Pin(s)	Typical Wiring
120VAC Line (In)	TB7	L	-
120VAC Neutral (In)	TB7	N	-

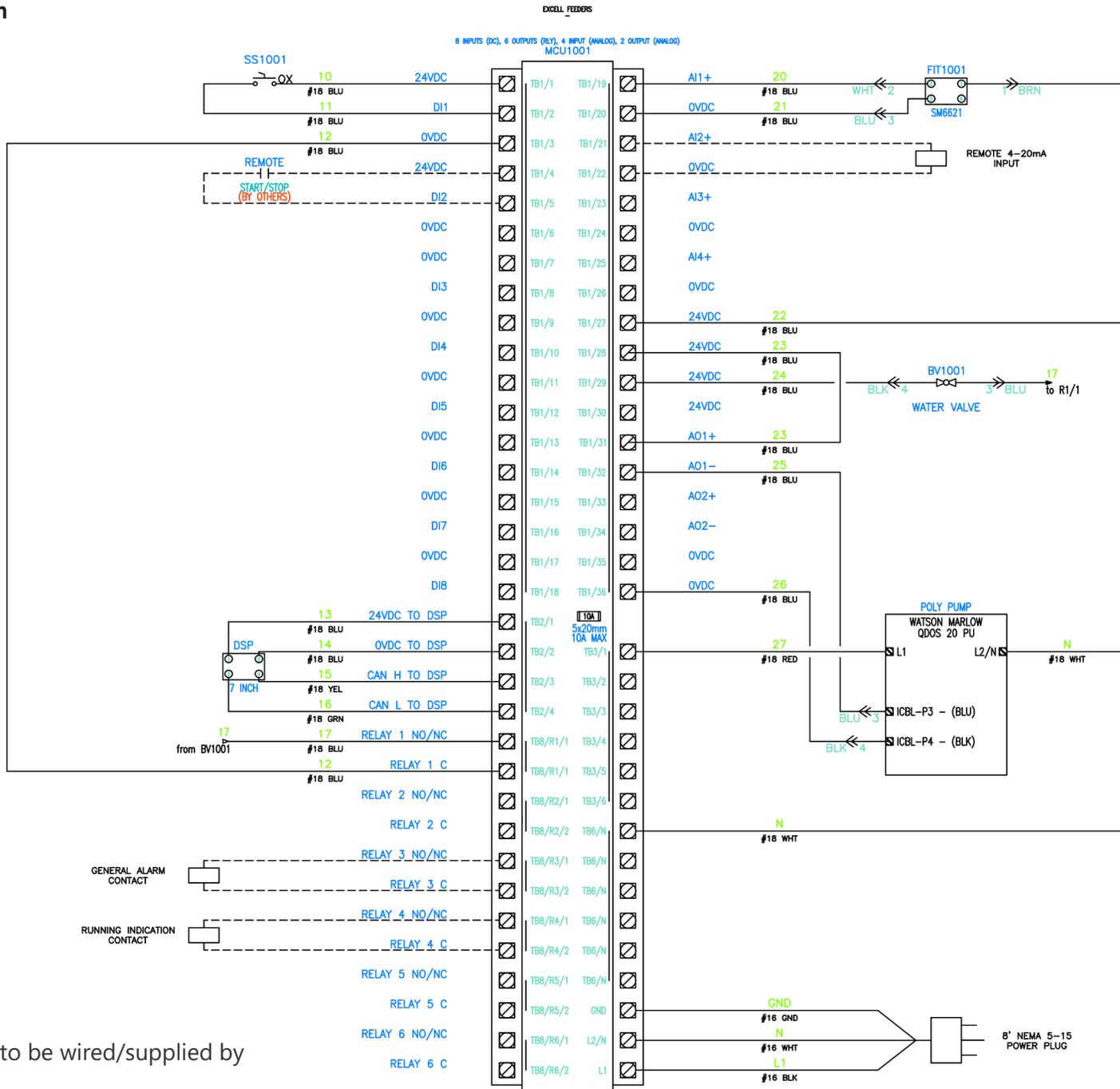
Function	Terminal	Pin(s)	Typical Wiring
120VAC Neutral	TB6	N, N, N, N, N, N	-

Function	Terminal	Pin(s)	Typical Wiring
120VAC Fused Line	TB3	1, 2, 3, 4, 5, 6	-

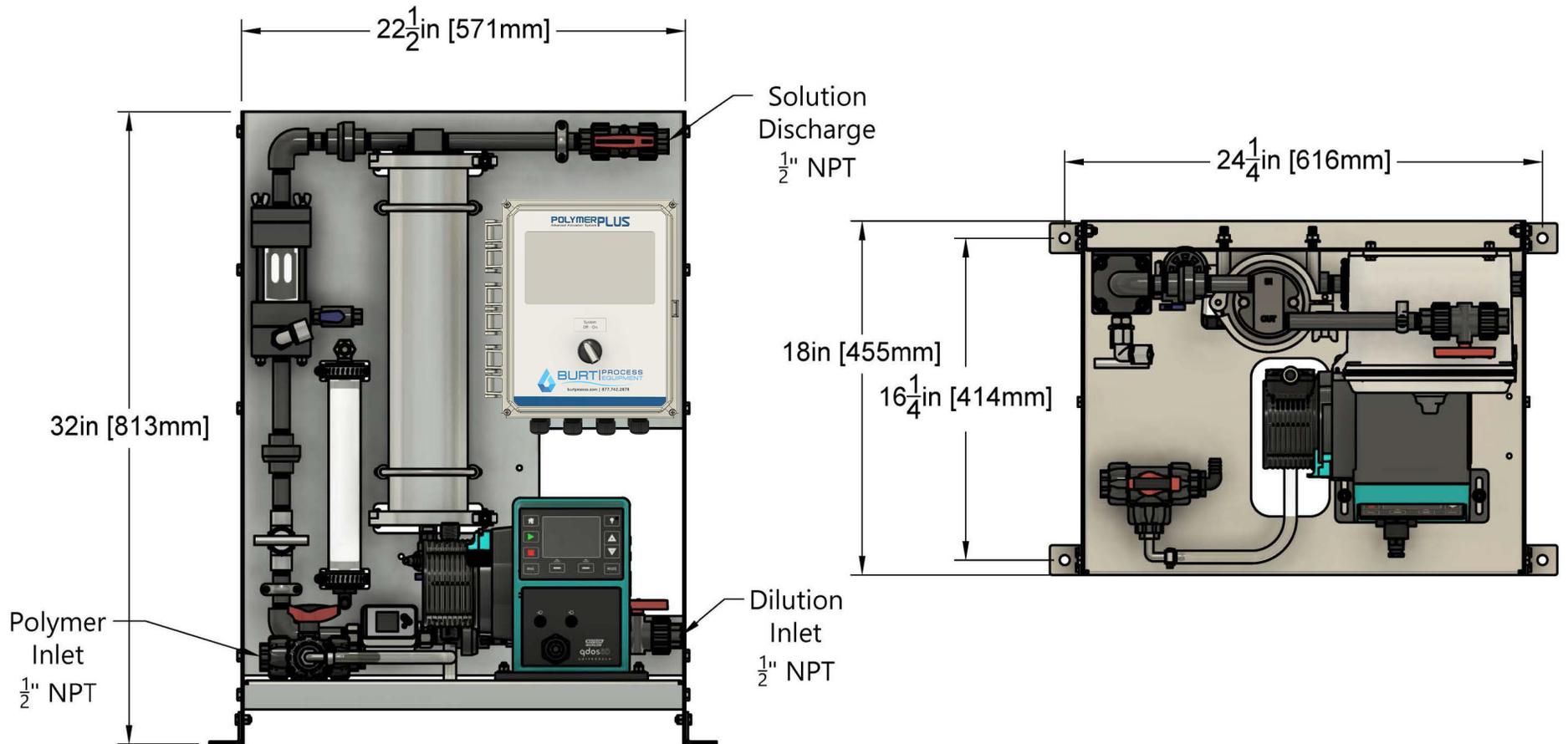
Function	Terminal	Pin(s)	Typical Wiring
Relay Output 1 NO/NC	TB8	R1-1	
Relay Output 1 C	TB8	R1-2	
Relay Output 2 NO/NC	TB8	R2-1	
Relay Output 2 C	TB8	R2-2	
Relay Output 3 NO/NC	TB8	R3-1	
Relay Output 3 C	TB8	R3-2	
Relay Output 4 NO/NC	TB8	R4-1	
Relay Output 4 C	TB8	R4-2	
Relay Output 5 NO/NC	TB8	R5-1	
Relay Output 5 C	TB8	R5-2	
Relay Output 6 NO/NC	TB8	R6-1	
Relay Output 6 C	TB8	R6-2	

Function	Terminal	Pin(s)	Typical Wiring
24VDC	TB1	1, 4, 27, 28, 29, 30	-
0VDC	TB1	3, 6, 7, 9, 11, 13, 15, 17, 20, 22, 24, 26, 35, 36	-
DI1	TB1	2	
DI2	TB1	5	
DI3	TB1	8	
DI4	TB1	10	
DI5	TB1	12	
DI6	TB1	14	
DI7	TB1	16	
DI8	TB1	18	
AI1+	TB1	19	
AI2+	TB1	21	
AI3+	TB1	23	
AI4+	TB1	25	
AO1+	TB1	31	
AO1-	TB1	32	
AO2+	TB1	33	
AO2-	TB1	34	

14. Wiring Diagram



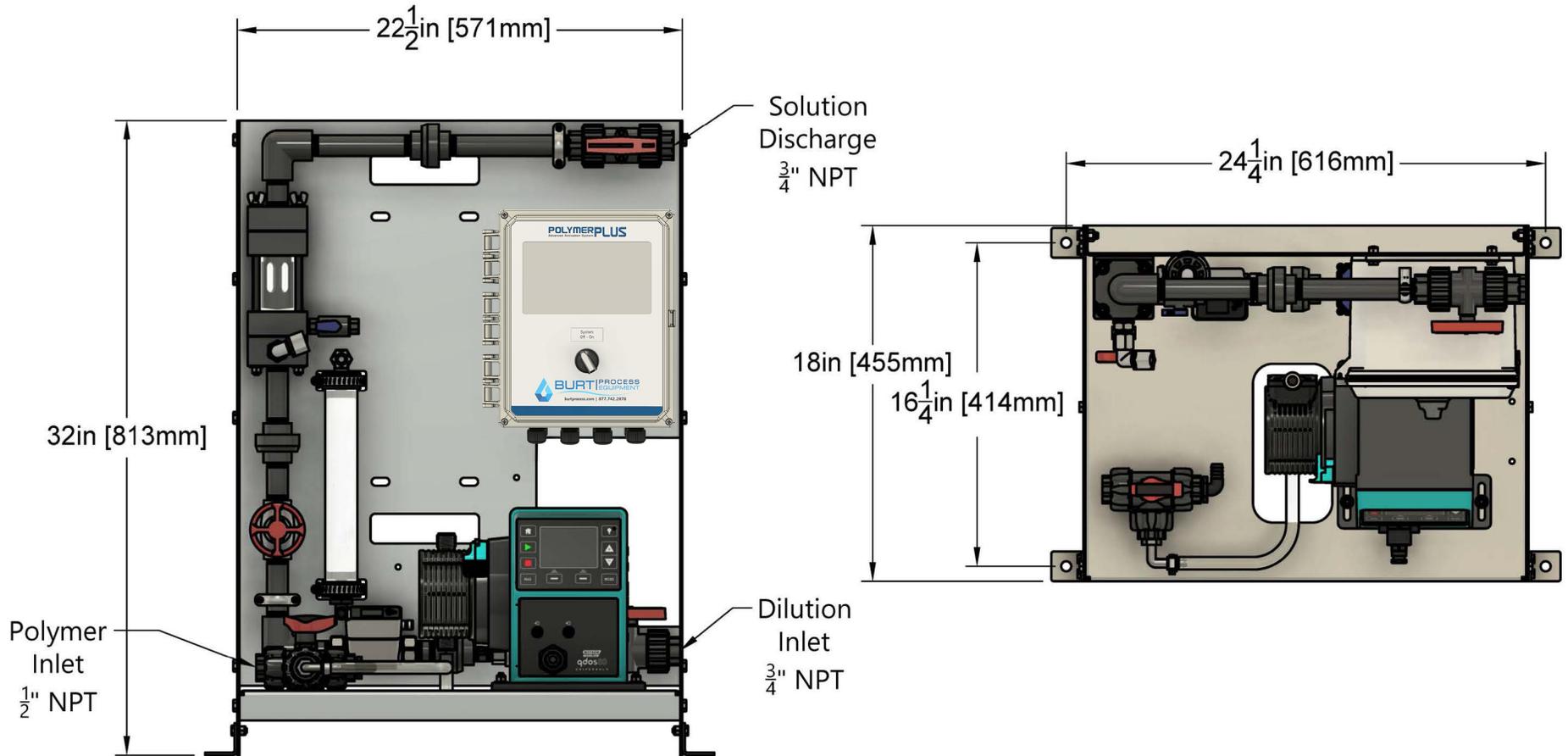
15. System View: 6PS evo-400



Front View

Top View

16. System View: 6PS evo-1200



Front View

Top View



BURT | PROCESS
EQUIPMENT

Partners In Global Water Quality

www.BurtProcess.com | 203-287-1985
100 Overlook Drive, Hamden, CT 06514