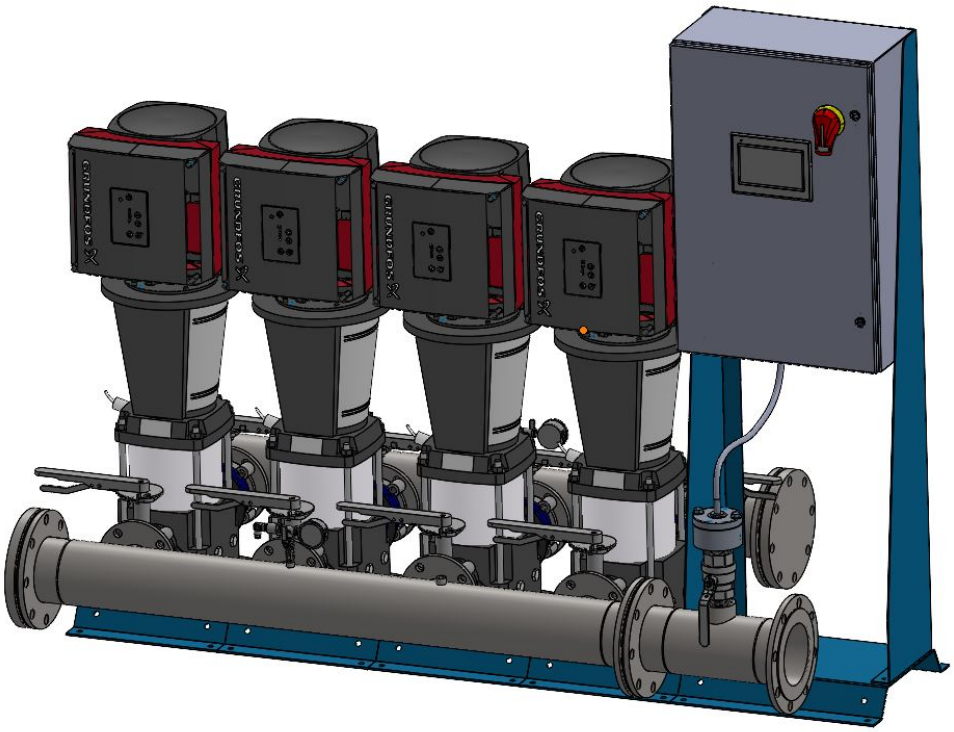
COMMERCIAL

OWNER'S MANUAL

BP SERIES BOOSTER PUMP SYSTEMS



CERTIFIED BY IAPMO R&T TO NSF/ANSI/CAN 61 FOR MATERIAL SAFETY REQUIREMENT ONLY.

CONFORMS TO UL STD 778
CERTIFIED TO CSA STD C22.2 NO. 108

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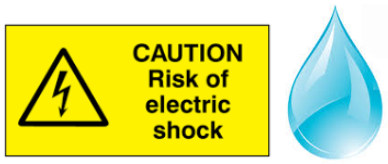
1 GENERAL INFORMATION

1.1 WARNINGS



1. CAUTION: RISK OF ELECTRICAL SHOCK AND ARC FLASH: System control panel, pumps, and other ancillary equipment may utilize HIGH VOLTAGE electricity. Exercise EXTREME CAUTION when servicing this equipment. High voltage connections must only by made by a licensed electrician and according to local regulations. System power supply must be DIS-ENGAGED (turned OFF) prior to any maintenance work on electrical components.

2. CAUTION: Wear proper hearing protection.

3. CAUTION: Designed for use with water.

4. CAUTION: For indoor use only.

5. Danger: When lifting the systems, do not use the eyebolts of the motors. Do not lift the system by the manifolds. Do not stand on manifolds.

6. Danger: Do not stand under or close to a lifted load. Comply with local regulations.

7. Warning: Death or serious personal injury. Before you lift, make sure the lifting equipment is capable of handling load.

8. NOTE: System must be installed in accordance with local plumbing and electrical codes and regulations.

   **Contact Water Control Corporation for more information.

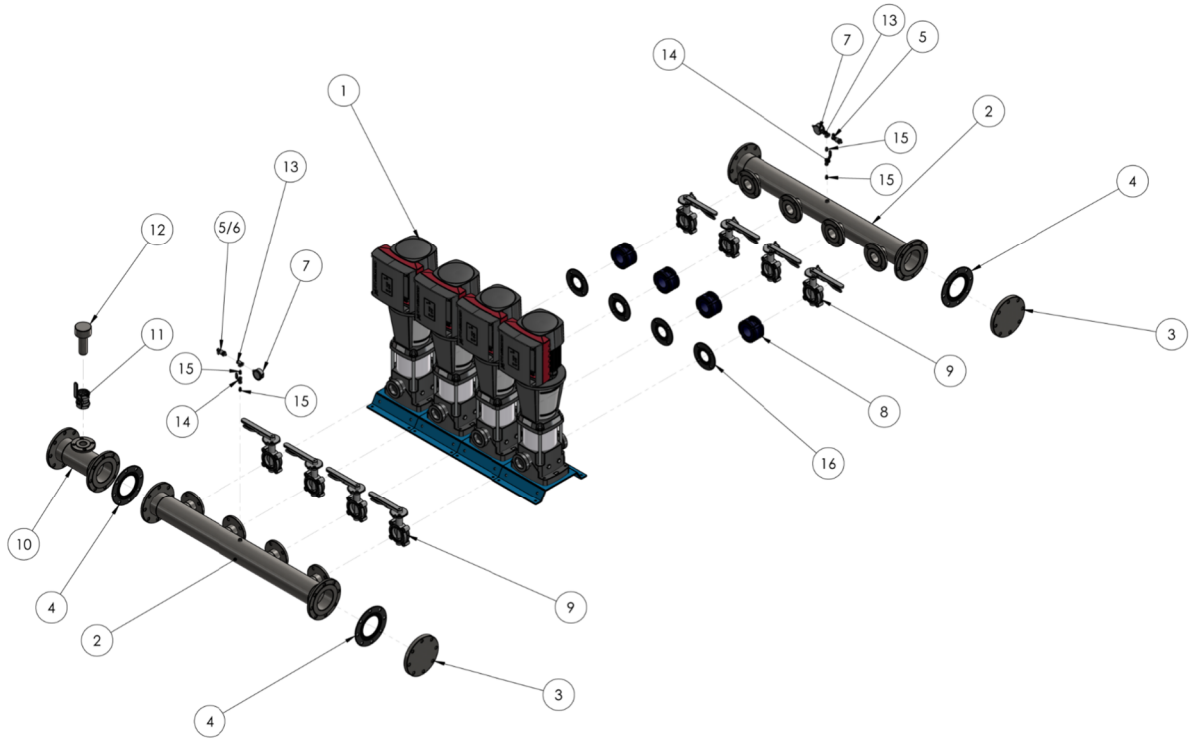
1.2 TARGET GROUP

These installation and operating instructions are intended for professional installers and for the operators of the system. WCC recommends that installation is carried out by skilled professionals with technical qualifications required by specific legislation or governing bodies.

2 SYSTEM INTRODUCTION

2.1 SYSTEM DESCRIPTION

BP series booster pump systems consist of 2 – 4 CRE pumps with integrated frequency-controlled single or three phase motors connected in parallel with stainless steel manifolds mounted on a base with a control cabinet. The system adjusts its performance to the demand by bringing pumps online/offline as required to maintain the desired setpoint for the application.



Number	Description	Number	Description
1	Booster Pumps	9	Isolation Valve
2	Inlet/Outlet Manifold, Stainless Steel	10	Manifold, LENS Sensor (optional)
3	Blind Flange	11	Ball Valve, 2" (optional)
4	Flange Gasket	12	LENS Sensor (optional)
5	Pressure Transmitter	13	Tee, Stainless Steel
6	Low Pressure Sensor/Switch (optional)	14	¼" Ball Valve
7	Pressure Gauge	15	Ball Valve, ¼"
8	Check Valve	16	Flange Gasket

The LENS water quality monitoring system (included with BPA series systems) includes a single, multi-parameter sensor probe which can be installed in a water main, a plumbing riser, a recirculation return line (up to 139°F), or a storage tank. The sensor probe provides continuous monitoring of free chlorine / monochloramine, pH, ORP, conductivity and temperature. It transmits data to an included PLC control panel which data logs 6 months worth of information and also has the ability to monitor up to 4 additional, external auxiliary analog sensors. The control panel also has 4 programmable relays which can be tied to any of the parameters that are being monitored.

The single, multi-parameter sensor installs into a pipe or water main via an included saddle or flanged tee kit (per specification). In-tank sensors are installed in a FNPT PVC or CPVC adaptor affixed to the end of a section of pipe which must be sized to ensure they remain submerged in water at all times. The sensor's integral recirculation pump provides a continuous flow of water across the sensor electrodes, with no water waste and no pipe flow required. Polymeric cleaning beads ensure the electrodes do not foul with debris or minerals. The sensor uses a Modbus data communication protocol to transmit free chlorine / monochloramine, pH, ORP, conductivity and temperature data to the PLC via a 10' (unless otherwise specified) shielded low-voltage cable.

The PLC control panel monitors, displays and data logs this information. Users are able to toggle between the different data parameters to view daily min/max values, program low/high level alarms and display graphical trending diagrams. The PLC control panel is also able to accept up to four (4) additional analog (4-20 mA) or digital (open/closed) signals from eternal sensors such as flow meters, temperature sensors, turbidimeters, pressure sensors, and more. These extra parameters are also displayed on the panel screen and allow for high/low alarms, data logging, trend graphing, etc.

The controller includes four (4) programmable relays, which can be linked via the PLC to the low/high value alarms for any of the parameters being monitored. These relays can be used to actuate external alarms as well as external equipment such as chlorinators, filters, solenoid valves, and more. SCADA output of all data to Building Automation Systems is available in native Modbus or BACnet protocols.

Recommended maintenance includes operation verification and calibration every 6 months, with a replacement of the sensor probe electrode tip every 12 months.

2.2 INTENDED USE

The system is a range of factory-assembled systems ready for installation and operation. The system maintains a constant pressure through continuous variable adjustment of the speed of the connected pumps.

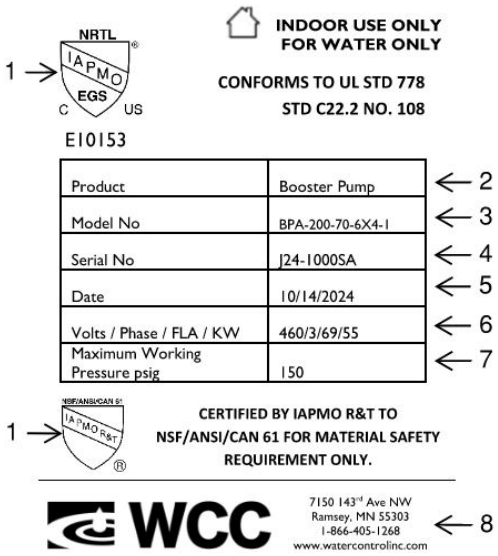
2.3 APPLICATIONS

The system is designed for pressure boosting of clean water for applications including but not limited to: hotels, hospitals, schools, office buildings, industrial, irrigation, car washes, apartment buildings, etc.

2.4 IDENTIFICATION

2.4.1 NAMEPLATE

The nameplate of the system is fitted on the side of the control panel.



NUMBER	DESCRIPTION
1	Marks of Approval
2	System Type
3	Model Number
4	Serial Number
5	Date of Manufacture
6	Electrical Information
7	Pressure Rating
8	Company Information

2.4.2 MODEL KEY

WCC Booster Pump Model Number Structure

Product Line	Controls Type	Flow Rate (gpm)	-	Pressure (psi)	-	Manifold Size	X	Number Pumps	-	Power
BP	A – Advanced (w/LENS)	50	-	35	-	3		2	-	1 - 440 - 480V/3PH
	S - Standard	100		70		4		3		2 - 200 - 240V/3PH (Only offered up to 7.5 HP)
	E - Basic	150				6		4		
		200								

Example: BPA-100-70-4x3-1 = Booster pump system, advanced controls, 100 gpm design flow at 70 psi, 4 inch manifold, 3 pumps, 440-480V/3 phase

2.4.3 AVAILABLE MODELS

440-480V/3 Phase Booster Pump Systems - *Actual model numbers will include (A, S or E) after BP indicating control type						
Booster Pump Models	**Pump Model**	**HP**	**Qty Pumps**	**Flow Rate (gpm)**	**Pressure (psi)**	**Amp Draw**
BP50-35-3X2-1	CRE 10-4	3	2	100	35	7.6
BP50-35-3X3-1	CRE 10-4	3	3	150	35	11.4
BP50-35-3X4-1	CRE 10-4	3	4	200	35	15.2
BP50-35-4X2-1	CRE 10-4	3	2	100	35	7.6
BP50-35-4X3-1	CRE 10-4	3	3	150	35	11.4
BP50-35-4X4-1	CRE 10-4	3	4	200	35	15.2
BP50-70-3X2-1	CRE 10-6	5	2	100	70	12
BP50-70-3X3-1	CRE 10-6	5	3	150	70	18
BP50-70-3X4-1	CRE 10-6	5	4	200	70	24
BP50-70-4X2-1	CRE 10-6	5	2	100	70	12
BP50-70-4X3-1	CRE 10-6	5	3	150	70	18
BP50-70-4X4-1	CRE 10-6	5	4	200	70	24
BP100-35-4X2-1	CRE 20-2	5	2	200	35	12
BP100-35-4X3-1	CRE 20-2	5	3	300	35	18
BP100-35-4X4-1	CRE 20-2	5	4	400	35	24
BP100-35-6X3-1	CRE 20-2	5	3	300	35	18
BP100-35-6X4-1	CRE 20-2	5	4	400	35	24
BP100-70-4X2-1	CRE 20-3	7.5	2	200	70	17.6
BP100-70-4X3-1	CRE 20-3	7.5	3	300	70	26.4
BP100-70-4X4-1	CRE 20-3	7.5	4	400	70	35.2
BP100-70-6X3-1	CRE 20-3	7.5	3	300	70	26.4
BP100-70-6X4-1	CRE 20-3	7.5	4	400	70	35.2
BP150-35-4X2-1	CRE 32-2-1	7.5	2	300	35	17.6
BP150-35-4X3-1	CRE 32-2-1	7.5	3	450	35	26.4
BP150-35-6X3-1	CRE 32-2-1	7.5	3	450	35	26.4
BP150-35-6X4-1	CRE 32-2-1	7.5	4	600	35	35.2
BP150-70-4X2-1	CRE 32-3-2	10	2	300	70	25.9
BP150-70-4X3-1	CRE 32-3-2	10	3	450	70	38.85
BP150-70-6X3-1	CRE 32-3-2	10	3	450	70	38.85
BP150-70-6X4-1	CRE 32-3-2	10	4	600	70	51.8
BP200-35-6X2-1	CRE 45-1-1	7.5	2	400	35	17.6
BP200-35-6X3-1	CRE 45-1-1	7.5	3	600	35	26.4
BP200-35-6X4-1	CRE 45-1-1	7.5	4	800	35	35.2
BP200-70-6X2-1	CRE 45-2 or CRE 32-4-2	15	2	400	70	34.5
BP200-70-6X3-1	CRE 45-2 or CRE 32-4-2	15	3	600	70	51.75
BP200-70-6X4-1	CRE 45-2 or CRE 32-4-2	15	4	800	70	69

200-240V/3 Phase Booster Pump Systems - *Actual model numbers will include (A, S or E) after BP indicating control type						
Booster Pump Models	**Pump Model**	**HP**	**Qty Pumps**	**Flow Rate (gpm)**	**Pressure (psi)**	**Amp Draw**
BP50-35-3X2-2	CRE 10-4	3	2	100	35	13.2
BP50-35-3X3-2	CRE 10-4	3	3	150	35	19.8
BP50-35-3X4-2	CRE 10-4	3	4	200	35	26.4
BP50-35-4X2-2	CRE 10-4	3	2	100	35	13.2
BP50-35-4X3-2	CRE 10-4	3	3	150	35	19.8
BP50-35-4X4-2	CRE 10-4	3	4	200	35	26.4
BP50-70-3X2-2	CRE 10-6	5	2	100	70	21.8
BP50-70-3X3-2	CRE 10-6	5	3	150	70	32.7
BP50-70-3X4-2	CRE 10-6	5	4	200	70	43.6
BP50-70-4X2-2	CRE 10-6	5	2	100	70	21.8
BP50-70-4X3-2	CRE 10-6	5	3	150	70	32.7
BP50-70-4X4-2	CRE 10-6	5	4	200	70	43.6
BP100-35-4X2-2	CRE 20-2	5	2	200	35	21.8
BP100-35-4X3-2	CRE 20-2	5	3	300	35	32.7
BP100-35-4X4-2	CRE 20-2	5	4	400	35	43.6
BP100-35-6X3-2	CRE 20-2	5	3	300	35	32.7
BP100-35-6X4-2	CRE 20-2	5	4	400	35	43.6
BP100-70-4X2-2	CRE 20-3	7.5	2	200	70	33.2
BP100-70-4X3-2	CRE 20-3	7.5	3	300	70	49.8
BP100-70-4X4-2	CRE 20-3	7.5	4	400	70	66.4
BP100-70-6X3-2	CRE 20-3	7.5	3	300	70	49.8
BP100-70-6X4-2	CRE 20-3	7.5	4	400	70	66.4
BP150-35-4X2-2	CRE 32-2-1	7.5	2	300	35	33.2
BP150-35-4X3-2	CRE 32-2-1	7.5	3	450	35	49.8
BP150-35-6X3-2	CRE 32-2-1	7.5	3	450	35	49.8
BP150-35-6X4-2	CRE 32-2-1	7.5	4	600	35	66.4
BP200-35-6X2-2	CRE 45-1-1	7.5	2	400	35	33.2
BP200-35-6X3-2	CRE 45-1-1	7.5	3	600	35	49.8
BP200-35-6X4-2	CRE 45-1-1	7.5	4	800	35	66.4

3 LENS WATER QUALITY MONITOR (BPA Series Only)

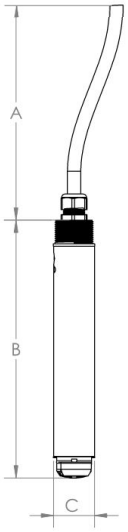
Overall	
Measurement method	Reagent less amperometric, three electrodes, no membrane or electrolyte
Chlorine measurement range - Limit of detection (LOD) - Limit of quantitation (LOQ) Monochloramine measurement range - Limit of detection (LOD)	0 to 20 ppm 10 ppb (0.01 ppm) 40 ppb (0.04 ppm) 0 to 10 ppm 30 ppb (0.03 ppm)
Resolution	0.001 ppm (1 ppb)
Chlorine accuracy	± 5% of the calibrated value 1 (DPD) at any pH between 6.5 and 8.75 ± 4% of the calibrated value 1 (DPD) at any temperature between 15˚C and 35°C ± 4% of the calibrated value 1 (DPD) at any conductivity between 200 and 10,000 µS ± 10% underflow changes between 0 to 4 meters/second velocity
Monochloramine accuracy	± 7% or ± 0.06 ppm, whichever is greater for 0 to 5 ppm NH_2Cl for 5 to 40°C ± 12% for >5 to 10 ppm NH_2Cl for 5 to 40°C ± 12% or 0.06 ppm, whichever is greater for 0 to 10 ppm NH_2Cl for >40 to 50°C
Turbidity interference	No effect up to 3,000 ppm (Arizona test dust fine, 50-micron size)
Calibration stability	6 months (typical)
Chlorine measurement interval	60 seconds
Monochloramine measurement interval	120 seconds
pH range (chlorine)	6.5 to 8.75
Conductivity	50 to 10,000 µS
Pressure limit	10 bar (145 psi)
Temperature	1 to 55°C (34 to 131°F)

Sample compensation	Automatic
Factory calibration	Yes
Ambient data	
Storage temperature	-20 to 60°C (-4 to 140°F)
Operating temperature	1 to 50°C (33 to 122°F)
Maximum flow velocity	0 to 5 meters/second velocity
Maximum immersion depth/pressure	30 feet, 145 psi
Cleaning method	Continuous mechanical cleaning, electrochemical cleaning
Cable length	10 feet standard, configurations up to 100 feet available
Electrical Information	
Power Requirements	120VAC / 1PH / 1.8A
Available Power for External Devices	1A @ 24VDC

3.1 COMPONENT DIMENSIONS

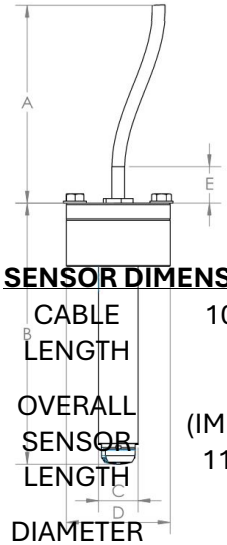
IMMERSION SENSOR

(TANK INSTALLATIONS)



WET TAP SENSOR

(PIPE INSTALLATIONS)



SENSOR DIMENSIONS		
A	CABLE LENGTH	10’, OR TO SPEC
B	OVERALL SENSOR LENGTH	11” (IMMERSION) 11.5” (WET TAP)
C	DIAMETER	1.72”
D	WET TAP REMOVAL TOOL DIAMETER	4.5” (WET TAP ONLY)
E	REQUIRED CLEARANCE FOR WET TAP REMOVAL TOOL	13” (WET TAP ONLY)

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4 RECEIVING THE SYSTEM

4.1 INSPECTION

- Do the following upon receipt of the system:
    - Inspect the shipment for damage
    - Make sure the system and accessories correspond to the order and no parts are missing

4.2 SCOPE OF DELIVERY

- All supplied systems are factory-tested
    - The packaging contains:
    - A booster pump system
    - Installation and operating instructions

5 INSTALLATION REQUIREMENTS

5.1 LOCATION

- The system is designed for indoor use only and must not be exposed to direct sunlight
    - Install the system in a well ventilated room to ensure sufficient cooling of the control cabinet and pumps
    - Install the system with 3 feet of clearance on all sides for inspection and removal

5.2 MOTOR COOLING

- Observe the following to ensure adequate cooling of the motor and electronics.
    - When installing the motor, make sure that the distance between the end of the fan cover and the wall or other fixed object is at least 2 inches.
    - Make sure the ambient temperature does not exceed 40°C.
    - Keep the cooling fins and fan blades clean.

6 INSTALLATION

6.1 MECHANICAL INSTALLATION

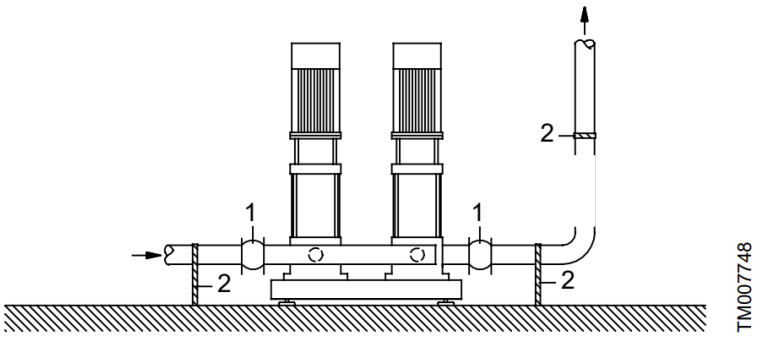
6.1.1 FOUNDATION

Position the system on a flat, level, solid surface, such as a concrete floor or foundation. If the system does not have vibration dampers, secure it directly to the floor or foundation using concrete anchors.

6.1.2 PIPEWORK

Arrows on the pump base show the direction of the water flow through the pump. The pipes connected to the system must be of adequate size. Utilize expansion joints on the inlet and outlet pipes to avoid resonance.

1. Connect the pipes to the manifolds of the system. The manifold has blind flanges on one side of each manifold. If this end is to be used, remove the blind flange assembly and install it on the desired side of the manifold.
2. Verify all bolts are tight before starting the pump. If systems are installed in blocks of flats or the first customer on the line is close to the system, it is recommended to install expansion joints on the system inlet/outlet to prevent vibration from being transmitted through the pipes.
3. Secure the pipes to the building structure to ensure that the pipes cannot move or be twisted.



Installation example with expansion joints and pipe supports

Pos.	Description
1	Expansion joint
2	Pipe support (and recommended location for isolating valve)

Note: The expansion joints and pipe supports shown in the above figure are not included in the standard system package.

6.1.3 DRAIN HOLES

The motor has a plugged drain hole in the flange on the drive side of the motor. You can turn the flange 90° to either side or 180°. With the drain hole open, the motor becomes self-venting, allowing water or humid air to escape the motor housing. With the drain hole open, the enclosure rating will be derated to a lower standard.

6.2 ELECTRICAL INSTALLATION

Verify that the supply voltage and frequency correspond to the values detailed on the system name plate. If the power supply cable is damaged, it must be replaced by the manufacturer, the manufacturer's service partner or a person with similar qualifications. The user or the installer is responsible for the installation of correct ground wire and protection according to local regulations. Secure and install the system in a place permanently. Connect the system permanently to the power source. Carry out the ground connection with duplicate conductors. The system must be installed according to the National Electrical Code (NEC) requirements.

6.3 LENS INSTALLATION (BPA Series Only)

6.3.1 SADDLE INSTALLATION

1. Prepare the pipe surface by thoroughly cleaning the surface of all rust, dirt, scale and debris. Verify that the fitting is the proper diameter for the main pipe on which the saddle is to be installed. Use a pipe outside diameter (OD) tape to confirm main pipe diameter. Installer shall confirm that pipe to be tapped has structural integrity sufficient for the tapping saddle. Please consult a piping engineer or the MFG if there is any doubt in this matter.
2. Inspect the pipe sealing surface for damage. Do not mount the fitting on any pipe surface that is damaged. Damage may include gauges, holes, cuts, pits, cracks or other surface imperfections that could impede gasket sealing performance.

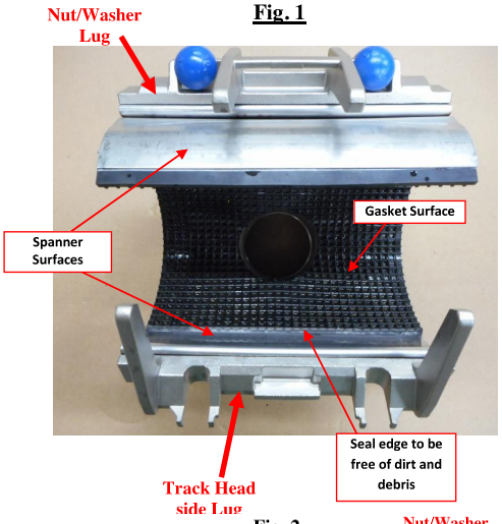


Fig. 1

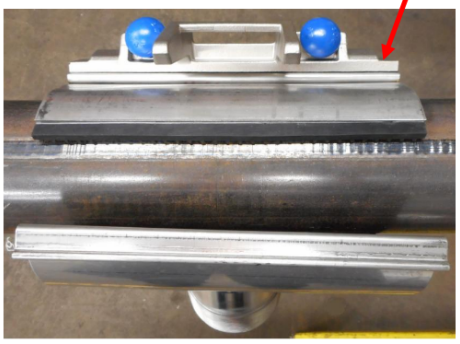
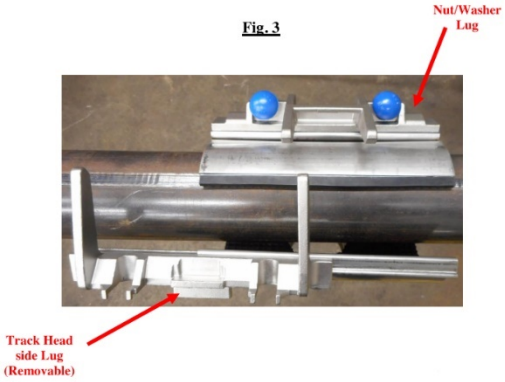


Fig. 2

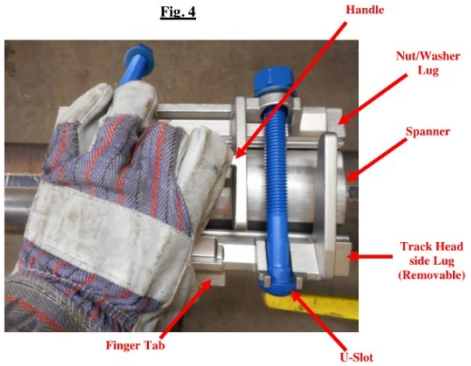
3. The saddle may be installed in a depressurized or pressurized pipe. If installing in a depressurized pipe, use a 1-7/8" holt saw to cut a hole in the pipe in the desired location. Remove any burrs or sharp edges that may have formed. If installing in a pressurized pipe (Hot tap), the hole will be cut in later steps. Special tools are required for a hot tap installation (not included).

Fig. 3



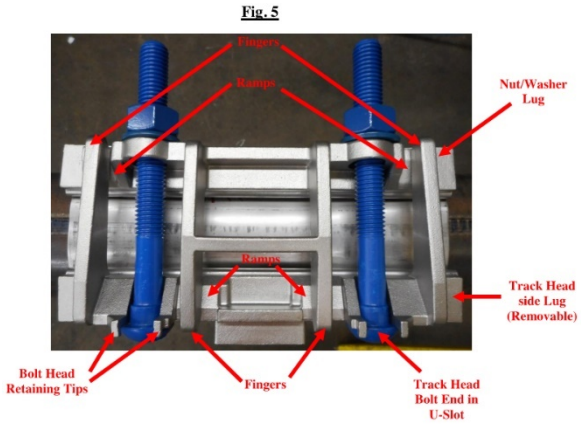
4. Lubricate the pipe surface, all fitting sealing and spanner surfaces (see Fig. 1), with a mixture of soapy water. Verify seal edge is free of debris and dirt prior to installation. Do not use grease or pipe lubricant except when otherwise specifically instructed to do so.
5. Mount the fitting to the pipe. If needed, remove the track head side lug from the bank to aid in installation (See Fig. 2). Light tapping with a non-metallic hammer may be utilized. Once the saddle is mounted, slide the track head lug (See Fig. 3) back onto the band (Light tapping with a non-metallic hammer may be utilized). Using the handle and finger tab (See Fig. 4), close the clamp together allowing one of the track head bolts to drop into the U-slot on the track head side lug. Verify the spanner slides under the band when closing the saddle.

Fig. 4



6. Insert the remaining bolt into the corresponding U-slot. Ensure nut sides of the bolts are secured through the closed holes on nut/washer side lug. The track head should nest securely behind the two-bolt head retaining tips on the track head U-slot (See Fig. 5). Once the bolts are secured in the bolt slots, but not yet tightened, rotate the saddle to the desired orientation.

Fig. 5



7. Tighten the nuts evenly (maintaining an even gap) to correct torque per the requirements below. As the fitting is tightened, verify that the lug fingers travel along their corresponding/mating ramps (See Fig. 5).
8. (Hot tap only) After the fitting is installed to the main conductor pipe, and the tapping valve is installed but prior to performing the line tap, hydrostatically test the assembly seals. Apply a hydraulic pressure test in accordance with the working line pressure plus an appropriate safety factor but not exceeding the pressure rating of the fitting. Do not use compressed gases to perform the pressure test.
9. (Hot tap only) Continue with the installation of the tapping equipment per the manufacturer's instructions.
10. Install the lens sensor into the pipe and pressurize the assembly.

11. Verify that no leaks are present. If leaks are present, retighten the nuts if required.

BOLT TORQUE REQUIREMENTS			
PVC OR STEEL (IPS) PIPE		**COPPER PIPE**	
NOM SIZE	**TORQUE (FT-LBS)**	**NOM SIZE**	**TORQUE (FT-LBS)**
2”	40	2”	40
3”	40-60	3”	40
4”	40-60	4”	40

6.3.2 SENSOR INSTALLATION – WET TAP

1. Locate the outlet port of the sensor. The outlet port is responsible for ejecting the process water back into the system. The orientation of the outlet port within a pipe must be carefully considered. Instructions for the alignment of the outlet port are detailed in subsequent steps. Figure 3 below displays how to identify the sensor outlet port. A sticker is also applied to the sensor with an arrow indicating the position of the sensor outlet port detailed in figure 4.

Figure 3

Figure 4

6.3.3 VERTICAL PIPE INSTALLATIONS

For vertical installations, ~~whare~~where a pipe is installed along a vertical wall, the sensor must not be inserted into a segment of pipe where the water flows down Figure 5. Water flow must always flow upwards, and the wet tap sensor must align with the direction of flow as shown below Figure 6

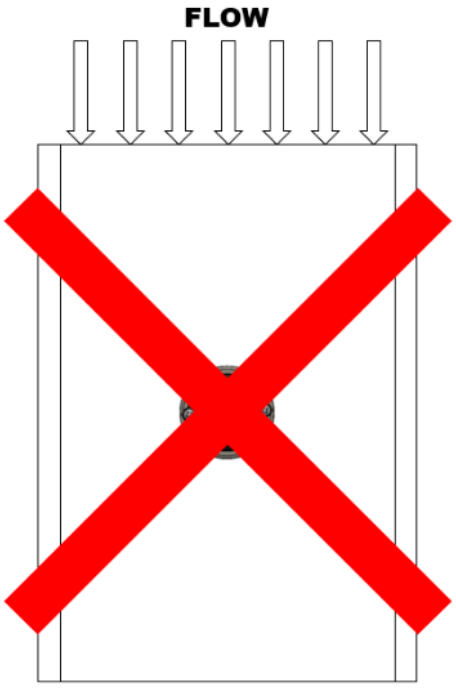


Figure 5

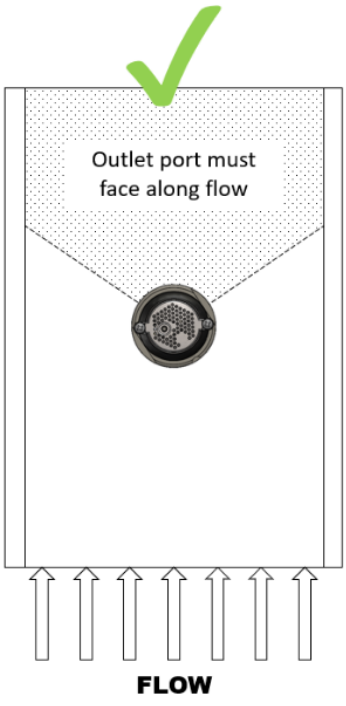
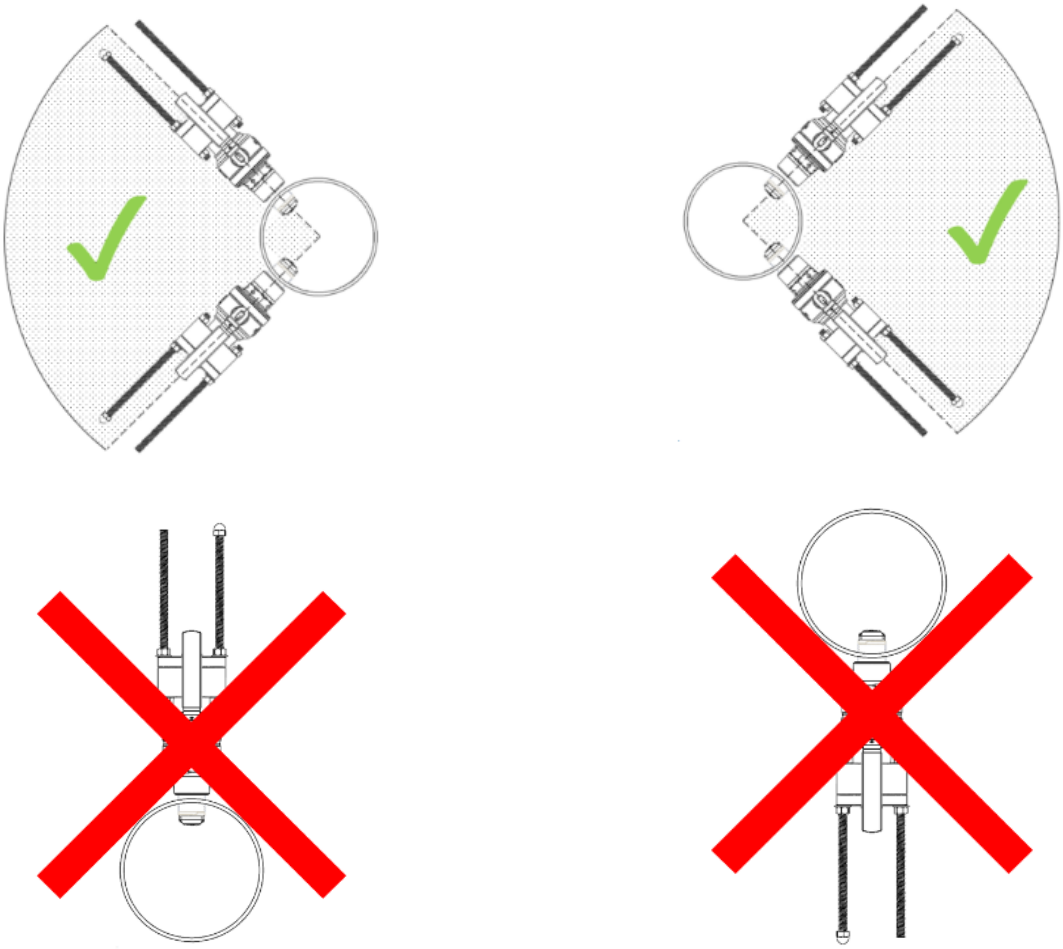


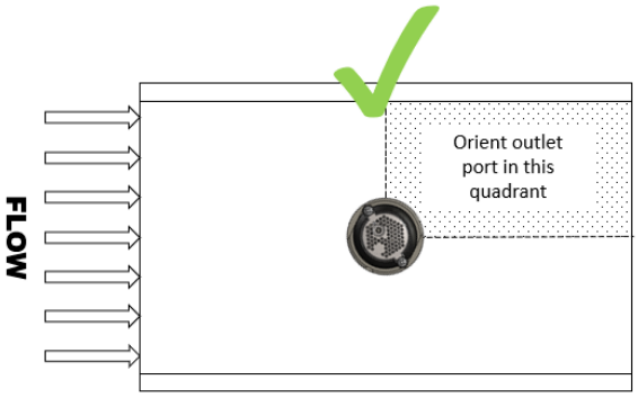
Figure 6

6.3.4 VERTICAL PIPE INSTALLATIONS

For horizontal installations, the wet tap sensor must not be installed vertically as shown in flow-facing views below. The sensor must be installed within ± 45˚ from horizontal as shown below.



Additionally, the outlet port must align with the direction of water flow and positioned upwards, given the direct of flow as detailed below. This will allow any air to be easily purged from the sensor.



6.3.5 INITIAL INSTALLATIONS

Figure 1

This installation assumes that a saddle or sensor installation fitting has been installed in the desired location in the pipe. Any 2 inch full port ball valve and appropriate saddle/installation fitting may be used. WCC offers various saddles or installation packages that may be purchased to aid in sensor installation.

Note: If the line is pressurized, ensure that the 2 inch valve remains closed until instructed to open the valve.

Figure 1

1. Remove the tape from the end cap (Figure 1).
2. Install the end cap onto the 2 inch valve.
    a. Note: Use an appropriate thread sealant to ensure a leak free joint.
3. Install the two all-threaded rods into the end cap until both rods are protruding from the end cap by approximately 1/2 inch. Thread hex nuts onto the protruding rod ends (Figure 2).
4. Lubricate the O-rings located in the end cap assembly with an appropriate lubricate rated for potable water.
5. Insert the sensor assembly into the end cap using the threaded rods as a guide.
    a. Note: Verify the sensor outlet port is orientated in the correct position based on the application.
6. Ensure that the sensor is slid far enough into the end cap so that the sensor sleeve is pushed past the two O-rings located inside the end cap (Figure 3).
7. Place washers and nuts onto the threaded rod protruding from the sensor cap (Figure 4) until they are touching the sensor cap. This will ensure that the sensor assembly does not push back once the valve is opened.

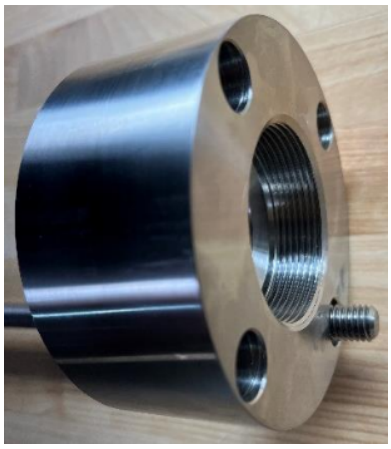


Figure 2

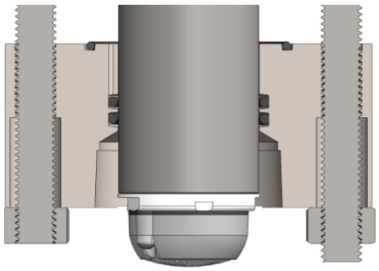


Figure 3

8. Slowly open the valve to allow the sensor to come into contact with the water. If the pipe is pressurized, verify there are no leaks. If a leak is present, close the valve and disassemble the sensor from the saddle and inspect any O-rings/sealing surfaces for damage or debris. Reassemble the sensor assembly in the same steps.

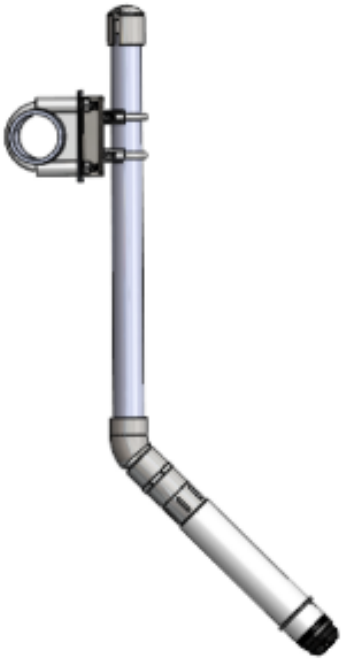
Figure 4

9. Insert the sensor assembly into the pipe/water. Tighten (clockwise rotation) the nuts evenly to push the sensor assembly into the pipe/water. The sensor cap should be flush with the end cap when fully inserted into the pipe.
10. Install a cap nut to one threaded rod to prevent the sensor from accidentally being removed too far when removing it from the pipe when maintenance is required.

6.3.6 SENSOR INSTALLATION – IMMERSION

The sensor may be installed in an immersion application such as installed in a tank. Piping, such as 1 inch PVC is recommended for these applications. Verify that the sensor cable is long enough for the application prior to beginning the installation process. It is recommended to use unions or other means to allow the installation piping to be easily removed for sensor maintenance

1. Apply an appropriate thread sealant to the male threads located on the sensor.
2. Install the sensor using a 45° elbow and thread x socket adapter to attach the sensor to the piping.
3. Position the sensor so that the outlet port is orientated vertically to purge air from the sensor.
4. Run the sensor cable through the pipe of sufficient length to immerse the sensor at the desired depth without allowing water to enter the pipe.
5. If using socket style fittings, ensure that all joints are glued with the appropriate solvent to ensure a leak free installation.
6. Mount/secure the sensor using a boom or rail mount installation as shown below. Alternative methods can be used to secure the sensor/pipe assembly in the desired location.
7. Route the cable and secure it outside the tank and away from any water.
8. Connect the sensor plug into the controller.



7 STARTUP

7.1 FLUSHING

WCC's systems are functionally tested and may contain a small volume of residual water left in the system. Contaminated drinking water can create health issues. Due to this, it is recommended to flush the system thoroughly. This also applies should the system sit idle for extended periods of time. Rinsing and flushing should be performed in accordance with any local regulations and practices.

Recommended flushing procedure:

1) Close all pump inlet/outlet valves.
2) Connect the outlet of the pump to an applicable drain. Additional hose, pipe, etc. may be required to reach the applicable drain near the system.
3) Connect the fresh water supply to the pump system inlet. If this is an existing installation, proceed to step 7.
4) Slowly allow water to enter the pump system manifold until fully pressurized.
5) Slowly open the inlet valves to each pump to allow water to enter the pumps until pressurized.
6) Crack the air bleed valve located at the top of each pump head to allow air to be purged from each pump. A steady stream of water will discharge from the air bleed port once all air has been purged form the pump head.
7) Flush water through each pump in the system. This process should be performed for each pump.
    a. Slow open the outlet isolation valve on the pump.
    b. Allow water to flow through the pump assembly for a minimum of 1 minute at a minimum flow rate of 10 gpm.
8) The system is now ready for the remaining startup procedure or be put back into service.

7.2 APPLICATIONS WITH POSITIVE INLET PRESSURE

1. Verify that the correct system has been installed for the application and there are no visibly damaged parts from shipping and/or installation processes.
2. Verify that the air pre-charge that is applied in the diaphragm tank is set to 70% of the system's pressure setpoint.
    a. E.g. The desired pressure setpoint for the application is 65 psi, the diaphragm tank air pre-charge should be set to 45 psi.
    b. Note: The pre-charge should only be measured or adjusted after any water pressure on the diaphragm tank has been relieved. The wetted side of the diaphragm tank must be open/equal to atmospheric pressure.
3. Connect the water and power supplies to the system.
4. Open all isolation valves located on the inlet and outlet of the system.
5. Purge any air that may be trapped inside the pumps by opening the vent screw until a solid stream of water exits the vent. The vent screw is identified as position 1 in Figure 1.
6. Turn on the main power to the system.
7. Verify or adjust the desired pressure setpoint for the application.
    a. Note: If the pressure setpoint is changed, the diaphragm tank air pre-charge will need to be adjusted as detailed in step 2.
8. Start pump 1 by pressing the "Auto" button on the controller.
9. Once the pump is running, vent pump 1 again using the vent screw.
10. Repeat steps 7 and 8 for the other pumps in the system.
11. Verify that the pumps are coming online/offline, adjusting the system performance per the demand of the system. The system is now running in automatic mode and ready for operation

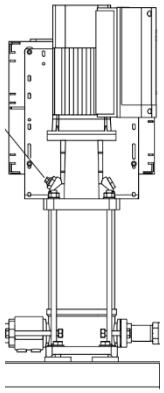


Figure 1

7.3 APPLICATIONS WITHOUT POSITIVE INLET PRESSRUE

1. Verify that the correct system has been installed for the application and there are no visibly damaged parts from shipping and/or installation processes.
2. Verify that the air pre-charge that is applied in the diaphragm tank is set to 70% of the system's pressure setpoint.
    a. E.g. The desired pressure setpoint for the application is 65 psi, the diaphragm tank air pre-charge should be set to 45 psi.
    b. Note: The pre-charge should only be measured or adjusted after any water pressure on the diaphragm tank has been relieved. The wetted side of the diaphragm tank must be open/equal to atmospheric pressure.
3. Connect the water and power supplies to the system.
4. Open all inlet isolation valves located on the inlet of the system.
5. Close all outlet isolation valves located on the outlet of the system.
6. Purge any air that may be trapped inside the pumps by opening the vent screw until a solid stream of water exits the vent. The vent screw is identified as position 1 and the fill screw is identified as position 2 in Figure 2.
7. Turn on the main power to the system.
8. Verify or adjust the desired pressure setpoint for the application.
9. Start pump 1 by pressing the "Auto" button on the controller.
10. Once the pump is running, vent pump 1 again using the vent screw.
11. Slowly open the outlet valve approximately halfway.
12. Repeat steps 9 to 11 for the other pumps in the system.
13. Verify that the pumps are coming online/offline, adjusting the system performance per the demand of the system. The system is now running in automatic mode and ready for operation.

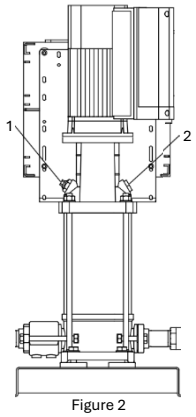
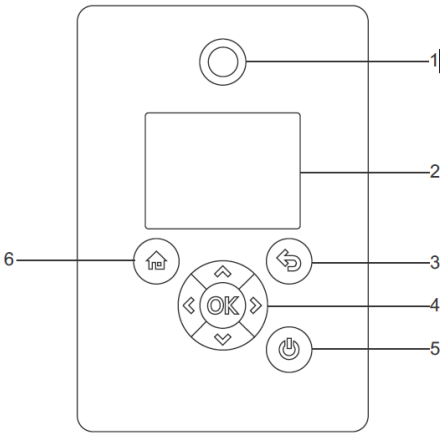
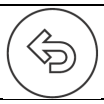


Figure 2

7.4 PUMP SCREEN OVERVIEW

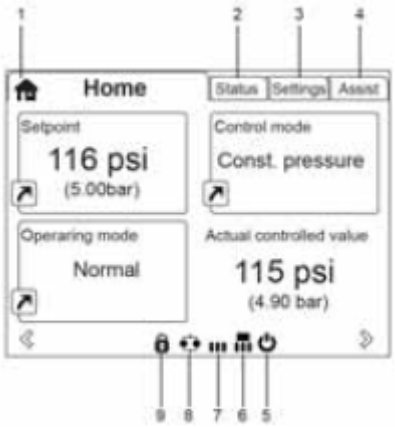
The pump overview screen allows the user to enter the advanced menu screens of the pump, change settings and view diagnostic information.

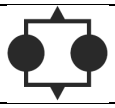


Pos	Symbol	Description
1		Pump Status Indicator This shows the operating status of the pump.
2	-	Graphical color display
3		This button goes one step back
4		With these buttons you can navigate between main menus, displays and digits. When you change the menu, the display always shows the top display of the new menu.
		With these buttons you can navigate between submenus. They also change value settings.
		It saves changed values, resets alarms and expands the value field.
5		This makes the pump ready for operation/starts and stops the pump. **Start:** If you press the button when the pump is stopped, the pump only starts if no other functions with higher priority have been enabled. **Stop:** If you press the button when the pump is running, the pump is always stopped. When ou stop the pump via this button, the iron appears in the bottom of the display.
6		This button goes to the “Home” menu.

7.5 PUMP SCREEN OVERVIEW

The pump overview screen provides process data for the pump. Parameters such as the current pressure setpoint, operating mode and actual system pressure may be viewed from the pump overview screen.

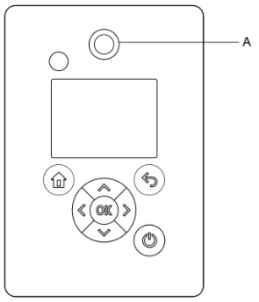


Pos	Symbol	Description
1		"Home" This menu shows up to four user-defined parameters. You can select parameters shown as shortcut icon, and when pressing "OK", you go directly to the "Settings" display for the selected parameter.
2	-	"Status" This menu shows the status of the pump and system as well as warnings and alarms.
3	-	"Settings" This menu gives access to all setting parameters. You can make detailed settings of the pump in this menu.
4	-	"Assist" This menu enables assisted pump setup, provides a short description of the control modes and offers fault advice.
5		This symbol indicates that the pump has been stopped via the button.
6		This symbol indicates that the pump is functioning as master pump in a multi-pump system.
7		This symbol indicates that the pump is functioning as a slave pump in a multi-pump system.
8		This symbol indicates that the pump is operating in a multi-pump system.
9		This symbol indicates that the possibility to make settings changes has been disabled for protective reasons.

7.5.1 PRESSURE SETPOINT ADJUSTMENT

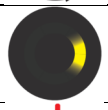
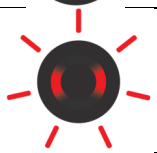
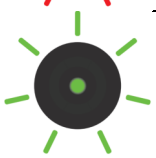
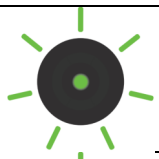
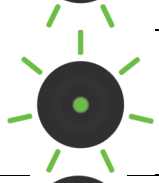
The pressure setpoint may be adjusted from the pump overview screen. To change the target pressure setpoint, use the arrow keys to navigate to the setpoint window, then press the "OK" button. Use the up/down arrows to change the value to the desired pressure setpoint. Once the desired target pressure is determined, press the "OK" button to save the value.

7.6 PUMP STATUS INDICATOR



The pump status indicator light, shown to the right as “A”, is located on the pump motor.

This light indicates the operating condition of the pump/motor.

INDICATOR LIGHT	INDICATION	DESCRIPTION
	No lights are on	**Power off** The motor is not running
	Two opposite green indicator lights are rotating in the same direction as the motor when seen from the non-drive end	**Power on** The motor is running
	Two opposite green indicator lights are permanently on	**Power on** The motor is not running
	One yellow indicator light is rotating in the same direction as the motor when seen from the non-drive end	**Warning** The motor is running with a warning
	One yellow indicator light is permanently on	**Warning** The motor has stopped
	Two opposite red indicator lights are flashing simultaneously	**Alarm** The motor has stopped
	The green indicator light in the middle flashes quickly four times	The eye flashes four times when you press the eye symbol next to the motor name in the Grundfos GO app
	The green indicator light in the middle is flashing continuously.	You have selected the motor in the Grundfos go app, and the motor is ready to be connected
	The green indicator light in the middle flashes quickly for a few seconds	The motor is controlled by the Grundfos Go app, or exchanging data with the app
	The green indicator light in the middle is permanently on	The motor is connected to the Grundfos go app

7.7 MULTI-PUMP FUNCTION

If two or more pumps in the system are configured with an outlet pressure sensor (standard), they can all function as master pumps. Normally, the pump with the lowest number is the master pump. At the factory, the master pump is marked with a number 1. If master pump 1 is switched off or stopped due to an alarm, one of the other master pumps will automatically take control of the system.

7.8 PROTECTIVE FUNCTIONS

Verify that any protective function, for example dry-running protection or external start/stop that is detected via a digital input is connected to and configured on all the pumps with an outlet pressure sensor. If an additional sensor is used, for example, a sensor with the limit-exceeded function or setpoint influence, this sensor must also be connected to all pumps with an outlet-pressure sensor. Alternatively, you can install an additional sensor for each pump with an outlet-pressure sensor.

7.8.1 DRY RUNNING PROTECTION

The pump system must include protection against a dry running condition. Types of dry running protection includes:

1. A pressure switch or an inlet pressure sensor is factory fitted to the inlet manifold.
2. A tank switch is factory fitted to the inlet manifold or fitted in a water tank after delivery.

8 TROUBLESHOOTING

PROBLEM	POTENTIAL CAUSE	CORRECTION
The system does not run when started	The actual pressure is higher than or equal to the setpoint	Wait until the pressure drops or decrease the pressure on the outlet side of the system and verify the system starts
	The power supply is disconnected	Connect the power supply
	The circuit breakers have tripped	Correct the fault and reset the breakers
	The circuit breaker is defective	Replace the circuit breaker
	The motor is defective	Repair or replace the motor
	The outlet pressure sensor is defective	Replace the outlet pressure sensor
	The outlet pressure sensor cable is broken or short circuited	Repair or replace the outlet pressure sensor sable
The system starts but stops	Dry running or no inlet pressure	Verify the water supply to the system is adequate. When the inlet pressure

immediately afterwards. The operating pressure is not reached.		is re-established, the pumps will restart after 15 seconds
The system stops and cannot restart	Outlet pressure sensor fault. The sensor is defective	Replace the outlet pressure sensor.
	The outlet pressure sensor cable is broken or short circuited	Repair or replace the outlet pressure sensor sable
	The power supply is disconnected on pump 1	Connect the power supply
Unstable water supply from the system	The inlet pressure is too low	Check the inlet pipe and possible inlet strainer
	The inlet pipe or pumps are partially blocked by impurities	Clean the inlet pipe or pumps
	The pumps suck air	Check the inlet pipe for leaks
	The outlet pressure sensor is defective	Replace the outlet pressure sensor
The pumps are running but deliver no water	The inlet pipe or pumps are blocked by impurities	Clean the inlet pipe or pumps
	The check valve is stuck in the closed position	Clean the check valve. The check valve must move freely
	The inlet pipe is leaking	Check the inlet pipe for leaks
	Air in the inlet pipe or pumps	Vent any air from the pumps. Check the inlet pipe for leaks
The system cannot reach the desired setpoint	The communication cable is broken or short circuited between pumps	Repair or replace the cable
	Pump 2 or 3 does not operate	Connect the power supply to the pump and verify the pump condition
The shaft seal is leaking	The shaft seal is defective	Replace the shaft seal
	The height adjustment of the pump shaft is incorrect	Readjust the shaft height
There is noise when the pumps are operating	The pumps are cavitating	Clean the inlet pipe or pumps, and if installed, the inlet strainer
	The pumps do not rotate freely (frictional resistance) due to inaccurate height of the pump shaft	Readjust the shaft height
Very frequent starts and stops	Wrong diaphragm tank pre-charge pressure setting	Verify and/or adjust the pre-charge pressure setting
	The difference between start and stop pressure is to small	Increase the differential pressure setting on each pressure switch.

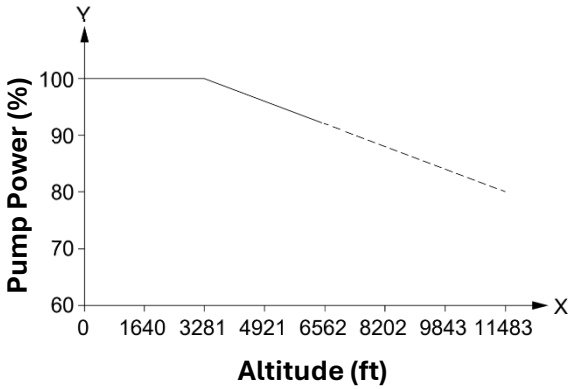
9 TECHNICAL DATA

9.1 OPERATING CONDITIONGS

9.1.1 INSTALLATION ALTITUDE

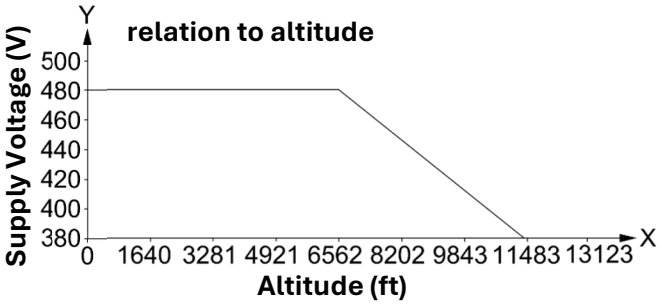
The installation altitude is the height above sea level of the installation site. Motors installed up to 3,281 ft above sea level can be loaded 100%. The motors can be installed up to 11,483 ft above sea level. Motors installed more than 3,281 ft must not be fully loaded due to the low density and consequent low cooling effect of the air at that level.

Motor output power in relation to altitude



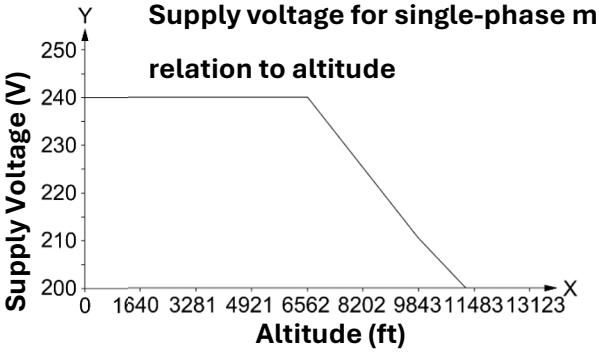
In order to maintain the galvanic isolation and ensure correct clearance according to IEC 60664-1:2007, you must adapt the supply voltage to the altitude.

Supply voltage for three-phase motor in relation to altitude



Supply voltage for three-phase motor in relation to altitude

Supply voltage for single-phase motor in relation to altitude



Supply voltage for single-phase motor in relation to altitude

9.1.2 AMBIENT TEMPERATURE

	During storage and transporation	During operation
Minimum	-22°F (-30°C)	32°F (0°C)
Maximum	140°F (60°C)	104°F (40°C)

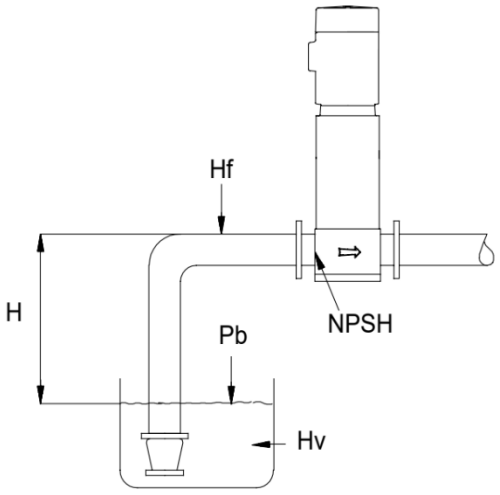
9.1.3 LIQUID TEMPERATURE

System type	Liquid temperature (water)
Minimum	41°F (5°C)
Maximum	158°F (60°C)

9.1.4 MINIMUM INLET PRESSURE

The minimum inlet pressure "H" in meters of head required to avoid cavitation in the pumps can be calculated using the below formula.

$H = p_b \times 10.2 - NPSH - Hf - Hv - Hs$	
p_b	Barometric pressure in bar. Barometric pressure can be st to 1 bar. In closed systems, p_b indicates the system pressure in bar.
NPSH	Net Positive Suction Head in meters of head. The NPSH value can be read from the NPSH curve at the highest flow which the individual pump delivers.
Hf	Friction loss in the inlet manifold in meters of head at the highest flow which the individual pump delivers. Note: If a check valve is installed on the inlet side of the pump, the friction loss in the valve must be added. Consult the manufacturer's data for what this value would be.
Hv	Vapor pressure in meters of head
Hs	Safety margin of minimum 0.5 meters of head



Example: H = 1 x 10.2 – 1.2 – 3.0 – 2.1 – 0.5 = 3.4 meters of head. This means that each pump can operate with a maximum suction lift of 3.4 meters of head.

9.1.5 MAXIMUM INLET PRESSURE

The total of the actual inlet pressure and the pressure at which the pump is operating against a closed valve must not exceed the maximum system pressure.

9.1.6 MINIMUM FLOW RATE

Due to the risk of overheating, do not use the pumps at flow rates below 10% of the rated flow rate of one pump. The pumps must not run against a closed outlet valve.

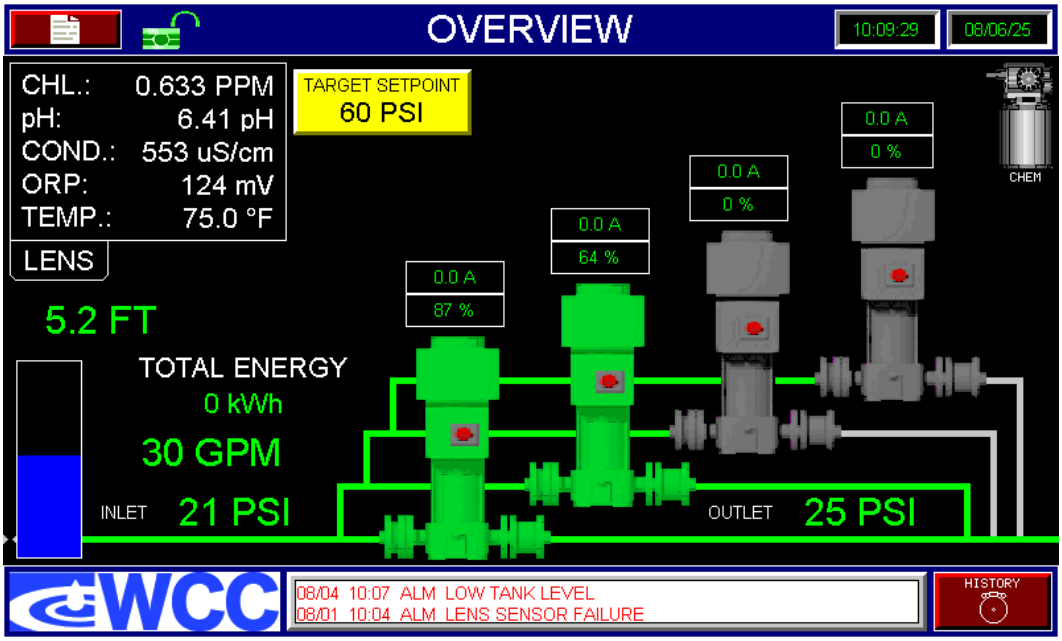
9.1.7 MAXIMUM STARTS AND STOPS

Limit the system starts and stops via the power supply to a maximum of 4 times per hour. When the system is switched on via the power supply, it will start running after approximately 5 seconds. For more frequent starts and stops, use the external start/stop input of the system. When the system is started via an external on/off switch, the system starts running immediately.

10 PROGRAMMING (BPA/BPS Systems Only)

10.1 OVERVIEW

The main overview screen provides the process information at a quick glance. This screen will show which pumps are online or offline, current inlet and outlet pressure, target set point, LENS parameter readings (on BPA systems), total energy consumption and estimated system flow rate. Touching each parameter icon or window will navigate to the detail screen. Note that the overview screen icons may change based on what system features are enabled.



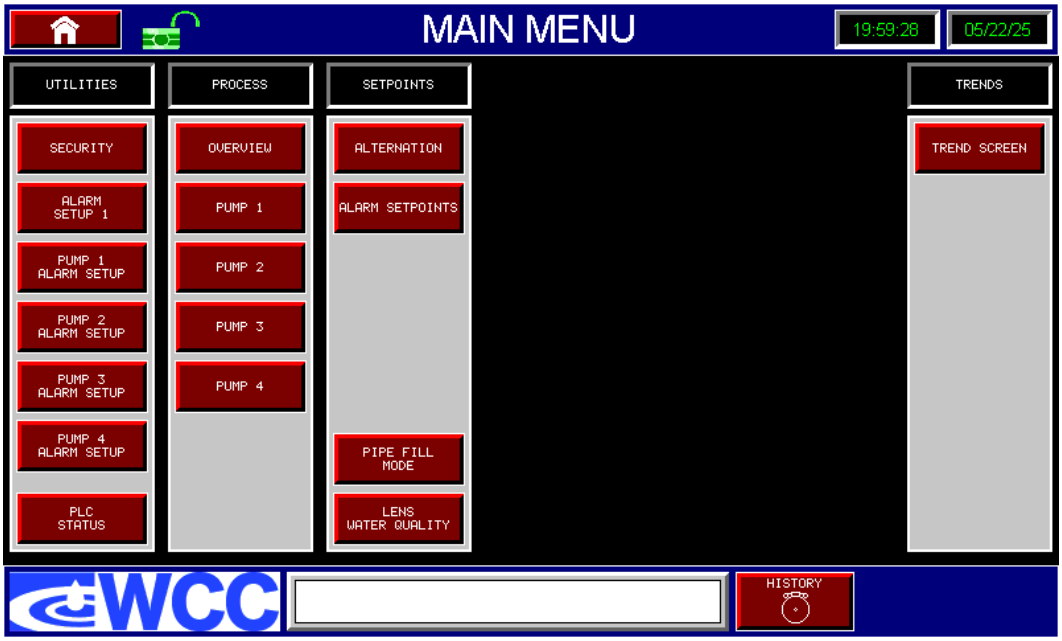
Pressing this button will bring the user to the alarm history overview. Any active or previously acknowledged alarms will be displayed.

Pressing this button will allow the user to change the target discharge pressure setpoint.

Pressing this button will bring the user to the main menu.

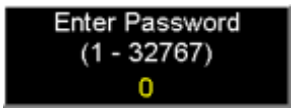
10.2 MAIN MENU

The main menu screen provides navigation to all sub screens within the program. Selecting one of the buttons will bring you to the corresponding screen.



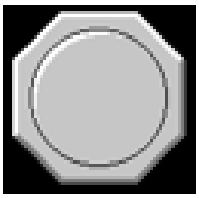
10.3 SECURITY

Log into the system to change setpoints. There are (2) configured users with differing security clearances. OPER (operator) has access to limited features such as alarm setpoints. SUPER (supervisor) has access to all system settings. The default password for OPER is 1234 and SUPER is 5555. These can be changed on the security configuration page. Contact WCC for assistance if you forget or lose your password.

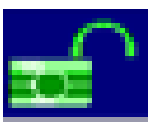


Pressing this button will allow the user to enter either the OPER or SUPER password to log into the system.

Pressing this button will bring the user to the security configuration page. Only the SUPER level may change the default passwords.

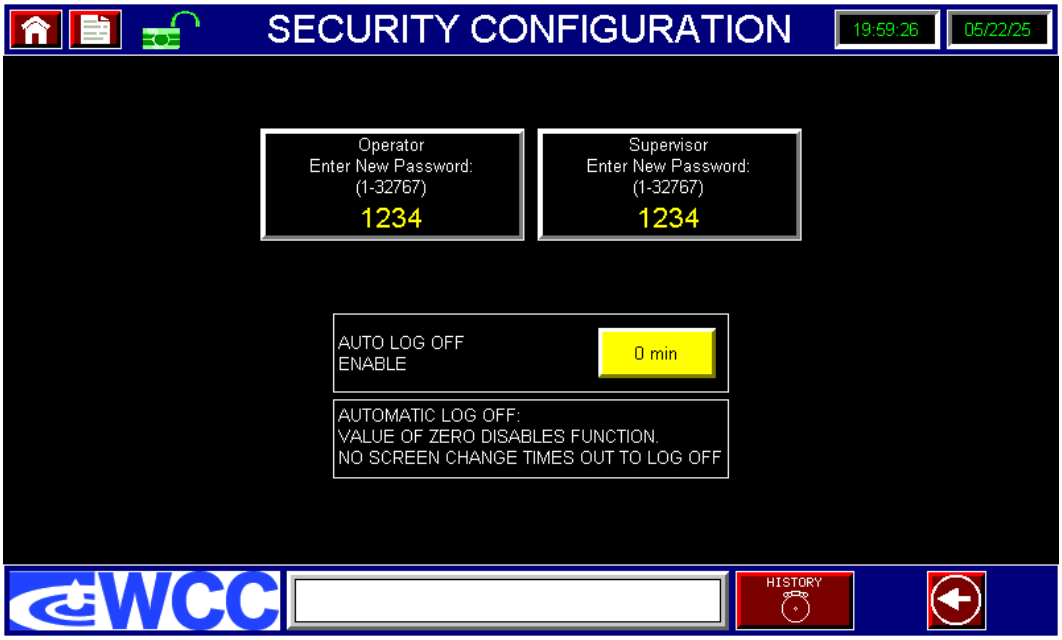


Pressing this button will manually log the user out of the system.

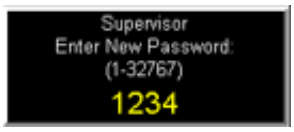


This icon indicates if a user is currently logged in. The icon will illuminate green when logged in and gray when logged out.

The security configuration page allows the default Operator/Supervisor passwords to be changed from the default values. The passwords may only be changed from the supervisor level. Note that once the default values are changed, they will no longer work. Contact WCC for assistance if you forget or lose your password.



This icon is used to set the password for the operator security level. The default password is 1234, but can be changed to any 4 digit code that is desired.

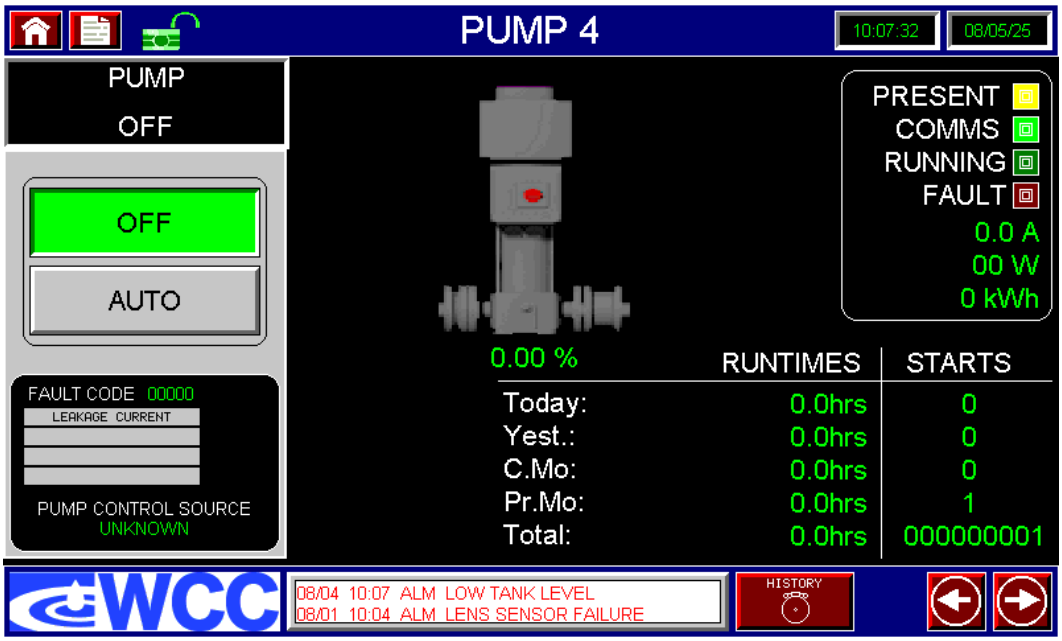


This icon is used to set the password for the supervisor security level. The default password is 5555, but can be changed to any 4 digit code that is desired.

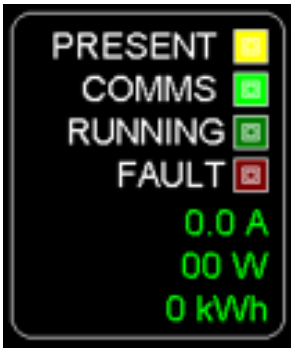
This icon is used to set the auto log off feature. After the user defined/adjustable time period has passed with no interaction from the user, the system will automatically be logged off. If a value of 0 is used, the auto log off feature will be disabled.

10.4 PUMP SCREEN

The pump screen provides information regarding the system pump. The pump may be enabled/disabled from this screen. The current status of the pump will be displayed on this screen as well as run time information. There will be a specific pump detail screen for each pump in the system.



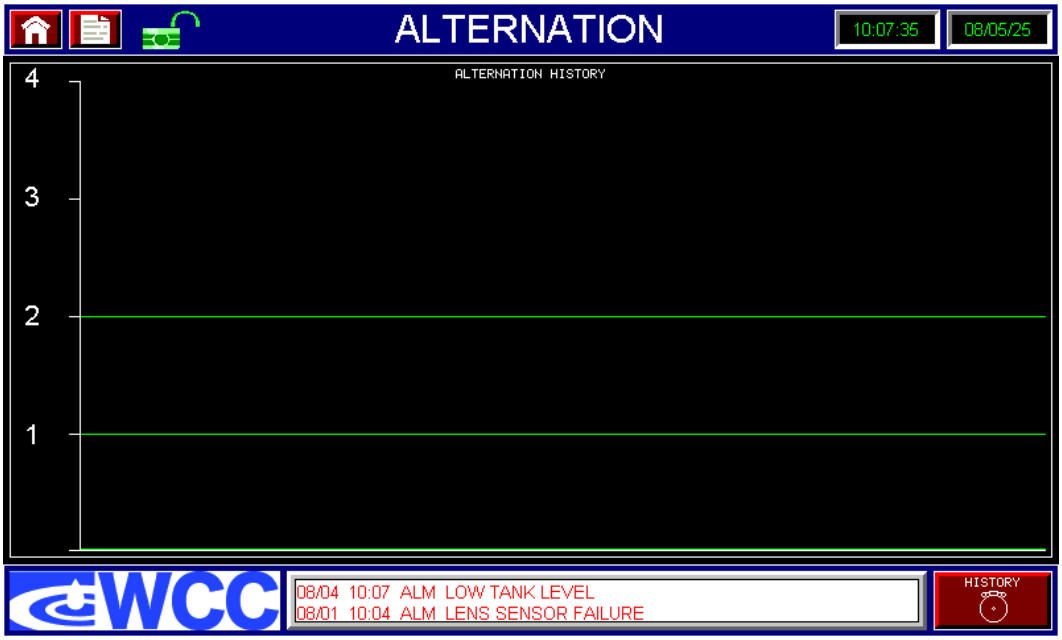
Pressing this button will enable or disable the pump from running. Press the “OFF” button to turn the pump off. Press the “AUTO” button to turn the pump on.



This box details the current status of the pump. Present illuminates indicating that the pumps can communicate between each other, Comms illuminates when communication is active between the pump and control panel, Running illuminates when the pump is currently running and Fault illuminates if an alarm is active. The current power consumption is also displayed for the pump.

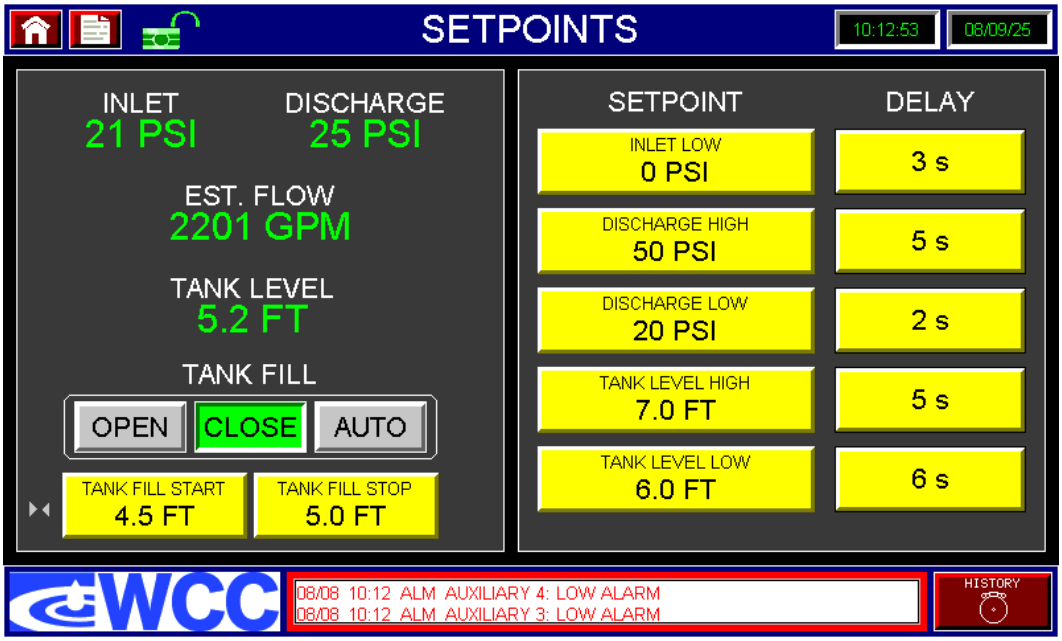
10.5 PUMP ALTERNATION

Pump alternation is controlled by the pumps themselves and cannot be adjusted. The alternation sequence is dependent on energy consumed to equalize pump run time across the total number of pumps in the system. The pumps will stage and additional pumps will be brought online/offline to maintain the desired pressure setpoint. The below screen provides information for the pump alternation/staging in relation to the complete system.



10.6 ALARM AND TANK FILL SETPOINTS

This screen provides access to the alarm configuration which is used to set parameters to trigger a system alarm and turn off the pumps.



DISCHARGE LOW
20 PSI

Pressing this button will allow the user defined/adjustable minimum system discharge pressure to be set. If the setpoint is met for the specified delay time, an alarm will be triggered, and the system will shut down.

DISCHARGE HIGH
50 PSI

Pressing this button will allow the user defined/adjustable maximum discharge pressure to be set. If the setpoint is met for the specified delay time, an alarm will be triggered, and the system will shut down.

INLET LOW
0 PSI

Pressing this button will allow the user defined/adjustable minimum system feed pressure to be set. If this setpoint is met for the specified delay time, an alarm will be triggered, and the system will shut down.

TANK LEVEL LOW
6.0 FT

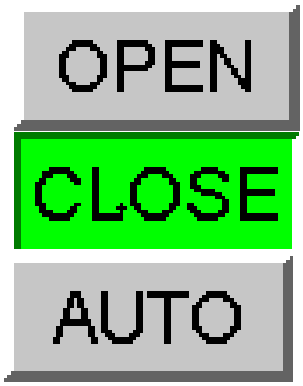
Pressing this button will allow the user defined/adjustable low tank level to be set. If the setpoint is met for the specified delay time, an alarm will be triggered and the system will shut down.

TANK LEVEL HIGH
7.0 FT

Pressing this button will allow the user defined/adjustable high tank level to be set. If the setpoint is met for the specified delay time, an alarm will be triggered.

Pressing this button will allow the user defined/adjustable tank fill start level to be set. Once the specified tank level has been met, the tank fill valve will be actuated to start filling the tank.

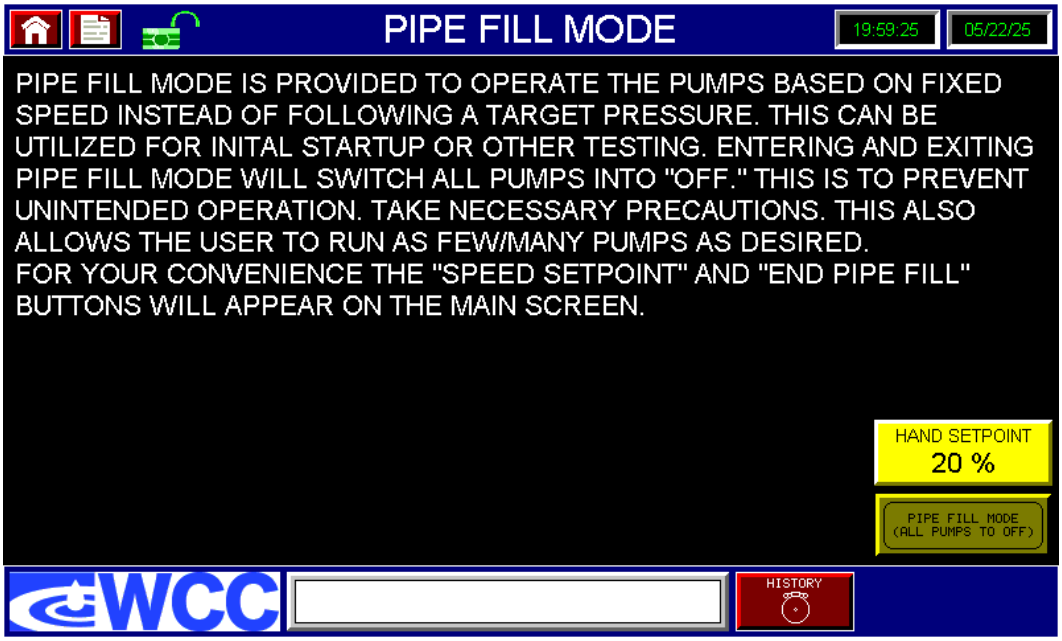
Pressing this button will allow the user defined/adjustable tank fill stop level to be set. Once the specified tank level has been met, the tank fill valve will be actuated closed to stop filling the tank.

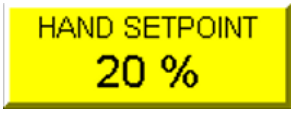


Pressing this button will allow the user to manually open/close the tank fill valve or place the fill valve into auto mode. When in open mode, the valve will be open and remain open regardless of any external inputs. When in close mode, the valve will closed and remain closed regardless of any external inputs. When in auto mode, the valve will open/close based on user defined/adjustable setpoints.

10.7 PIPE FILL MODE

The pipe fill mode can be used for new installations where the building's plumbing is not filled with water. This mode allows the pump speed to be set to a user defined/adjustable level to fill the building's plumbing slowly.



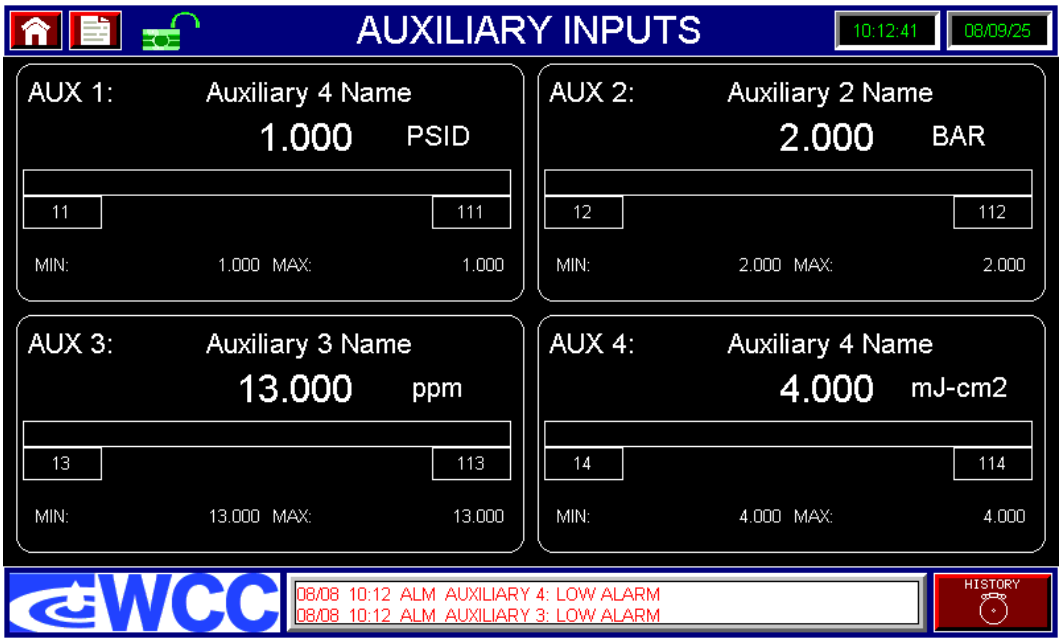


Pressing this button will allow the user to manually set the pump speed.

Pressing this button will allow the user to enter the pipr fill mode. After depressing the button, all pumps status will be changed to disabled/off line. To allow the pumps to run at the specified speed, the "AUTO" button will need to be depressed on what pumps are desired to be online/running.

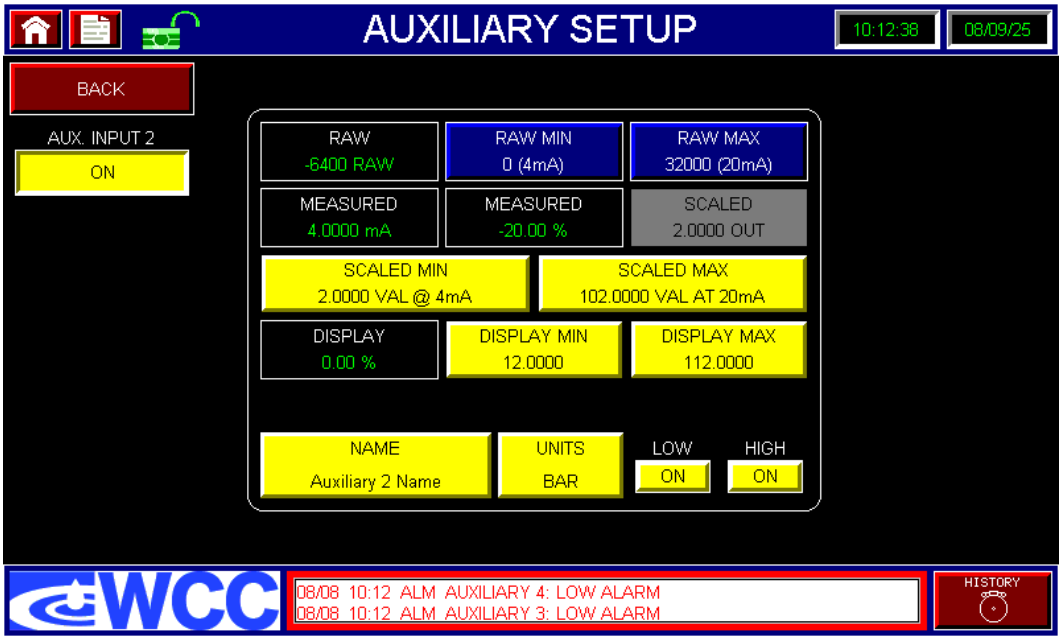
10.8 EXTERNAL AUXILIARY ANALOG INPUT OVERVIEW

The external auxiliary analog overview screen provides process information at a quick glance. If configured, channel variable and percentage bar will flash red with an unacknowledged alarm, and solid red with acknowledged alarm. Touching each parameter window will navigate to the detail screen. Each parameter name, units, etc. may be configured as part of the channel configuration process.



10.8.1 EXTERNAL AUXILIARY ANALOG INPUT SETUP

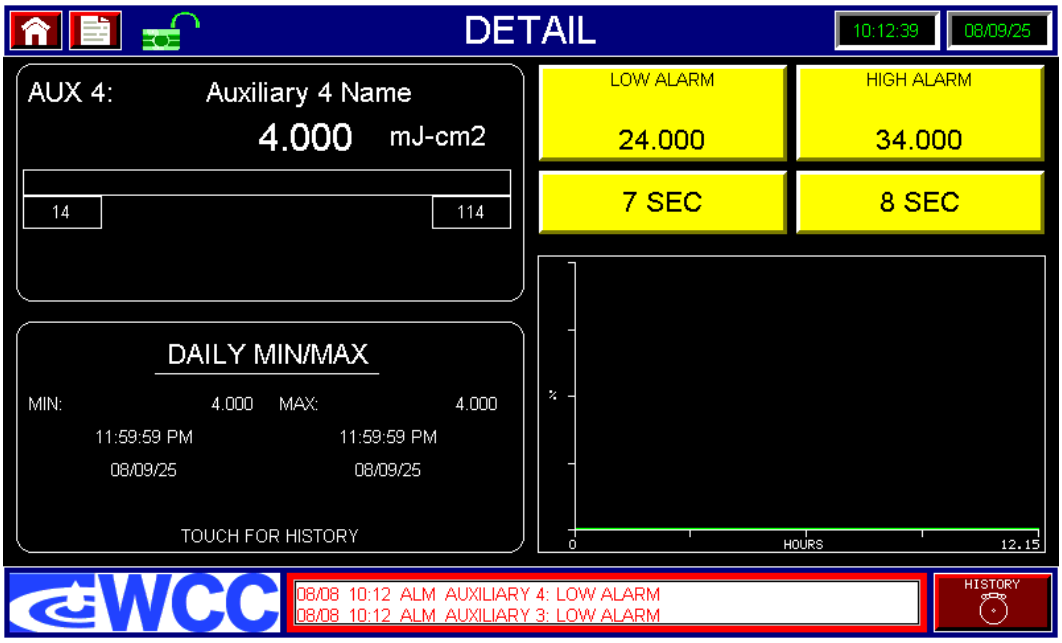
The external auxiliary analog input setup screen provides access to the channel input configuration. From this screen, the input may be enabled/disabled, input name can be modified/changed, the input units can be changed, low/high alarms may be enabled/disabled, and the input scaling may be adjusted.

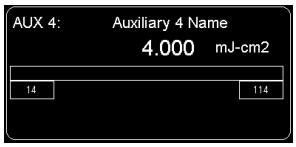


ON	Pressing this button will allow the user to enable or disable the input.	DISPLAY MIN 12.0000	Pressing this button will allow the user to change the minimum display value.
NAME Auxiliary 2 Name	Pressing this button will allow the user to change the input name.	DISPLAY MAX 112.0000	Pressing this button will allow the user to change the maximum display value.
UNITS BAR	Pressing this button will allow the user to change the input units.	SCALED MIN 2.0000 VAL @ 4mA	Pressing this button will allow the user to change the scaled minimum value.
LOW ON HIGH ON	Pressing this button will allow the user to enable or disable the low/high setpoint and alarm.	SCALED MAX 102.0000 VAL AT 20mA	Pressing this button will allow the user to change the scaled maximum value.

10.8.2 EXTERNAL AUXILIARY ANALOG INPUT DETAIL SCREEN

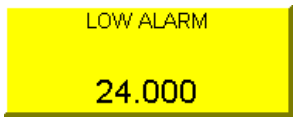
The external auxiliary analog input detail screen provides an instantaneous value, low/high setpoints (if configured) and the current day's min/max values.



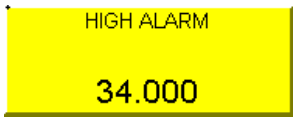


This window displays the current, instantaneous parameter value. The trend bar is displayed below the value to show where the current value falls within the low/high setpoints.

This window displays the daily min/max parameter value for the current day. The min and max value at the end of each day will be recorded with a time stamp for when the value occurred.



If configured, the low alarm setpoint button will be displayed. The low alarm value may be adjusted from this screen by touching the button.

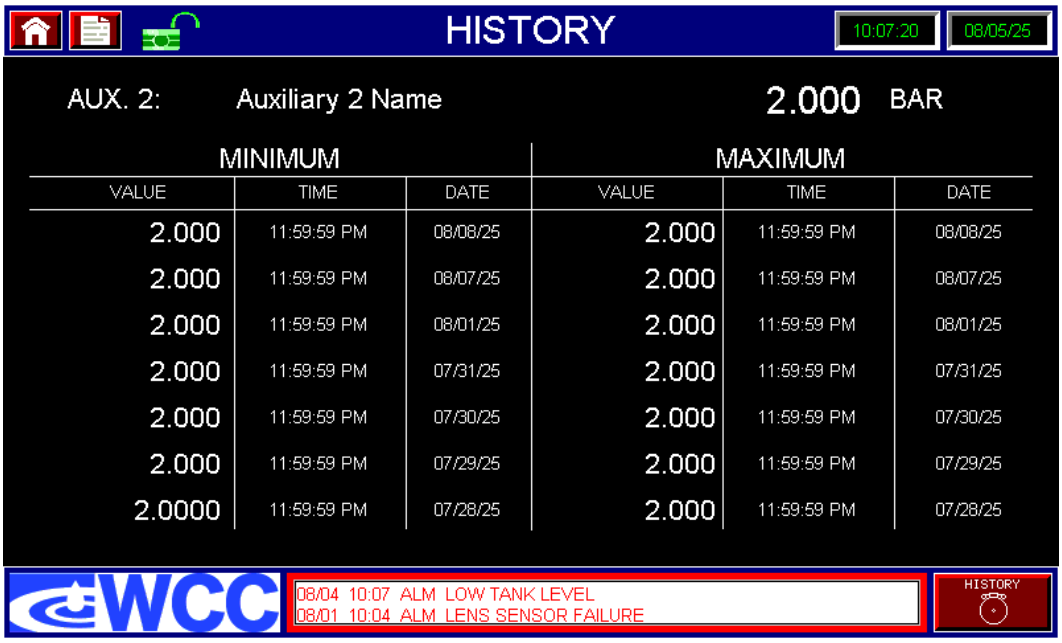


If configured, the high alarm setpoint button will be displayed. The low alarm value may be adjusted from this screen by touching the button.

If configured, this value is also used to determine when the high or low alarm setpoint alarm will be activated.

10.8.3 EXTERNAL AUXILIARY ANALOG INPUT HISTORY SCREEN

This screen shows record of the previous seven days minimum/maximum values with corresponding time and date stamp. These values are also logged to the micro SD card at the end of each day.

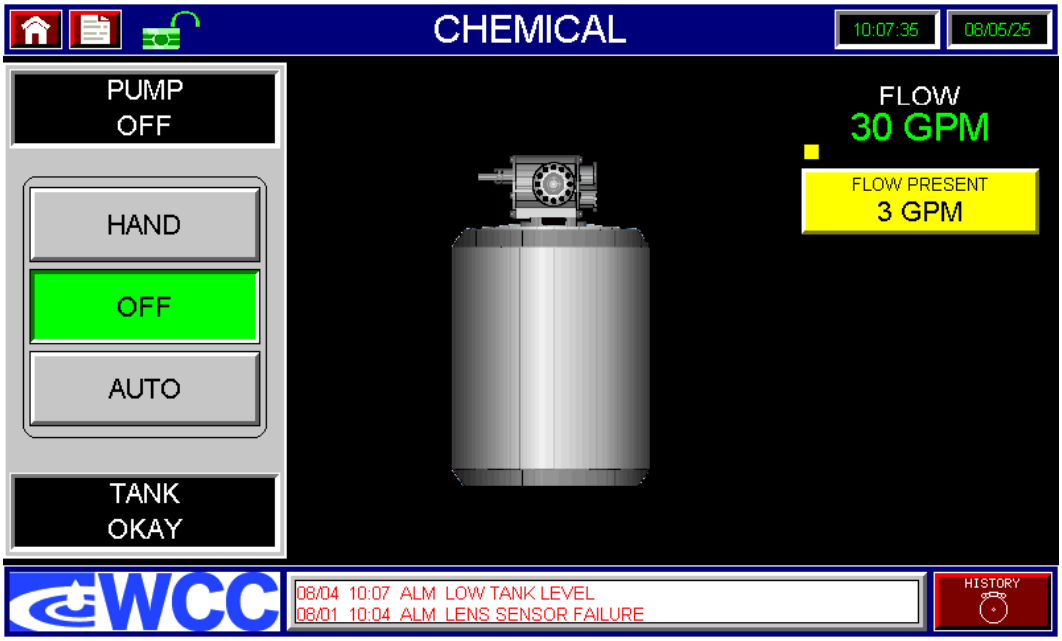


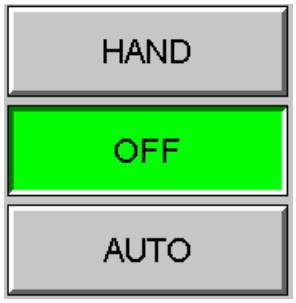
10.9 TRENDING

Trend screens are available for key parameters such as inlet/suction pressure, discharge pressure, etc. The window displays the trend graph(s) for the displayed parameter for the last 12 hours.

10.10 CHEMICAL INJECTION SETUP

This screen allows the use of a chemical injection system to be incorporated into the system control panel. This could be used to inject chlorine or adjust the pH level of water as a few examples. The use of an external flow meter is required for proper system operation.





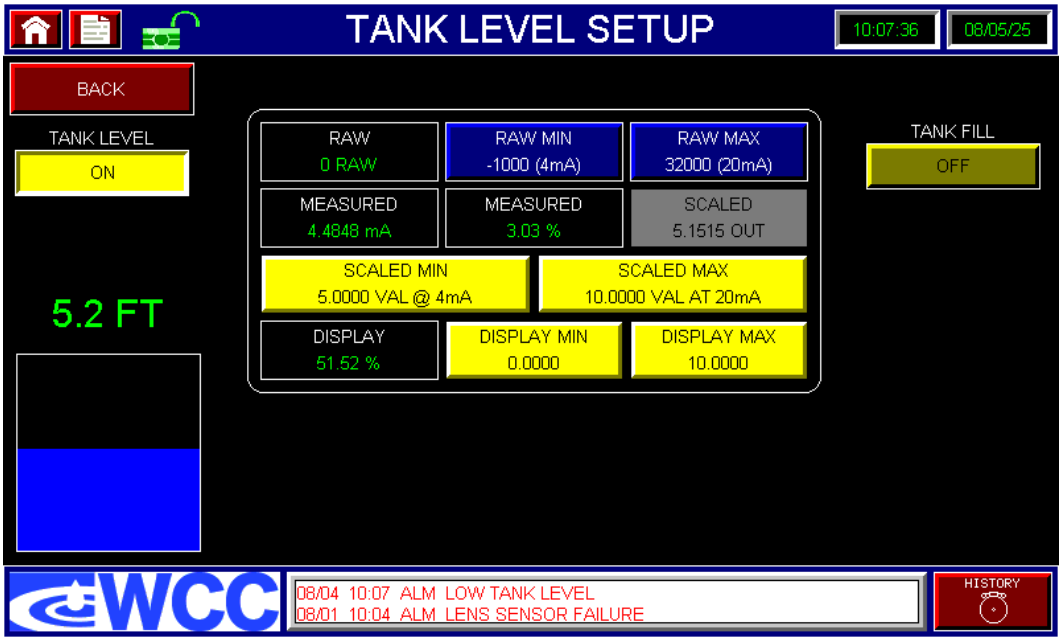
Pressing this button will allow the user to toggle the chemical pump between hand, off and auto mode. When in "hand" mode, the chemical pump will be called to run regardless of any external inputs. When in "off" mode, the chemical pump will be offline regardless of any external inputs. When in "auto" mode, the chemical pump will be brough online/offline based on external inputs.

Pressing this button will allow the user to set a user defined/adjustable flow rate setpoint for when the chemical pump will be brought online/offline. This value can be set to 0 if desired to always have the chemical pump online.

The current instantaneous flow rate provided by the external analog flow meter is displayed here.

10.11 TANK LEVEL SETUP

The tank level setup screen provides access to the tank level sensor input configuration (if enabled). From this screen, the input may be enabled/disabled, and the input scaling may be adjusted.



ON

Pressing this button will allow the user to enable or disable the input.

SCALED MIN
5.0000 VAL @ 4mA

Pressing this button will allow the user to change the scaled minimum value.

DISPLAY MIN
0.0000

Pressing this button will allow th user to change the minimum display value.

SCALED MAX
10.0000 VAL AT 20mA

Pressing this button will allow the user to change the scaled maximum value.

DISPLAY MAX
10.0000

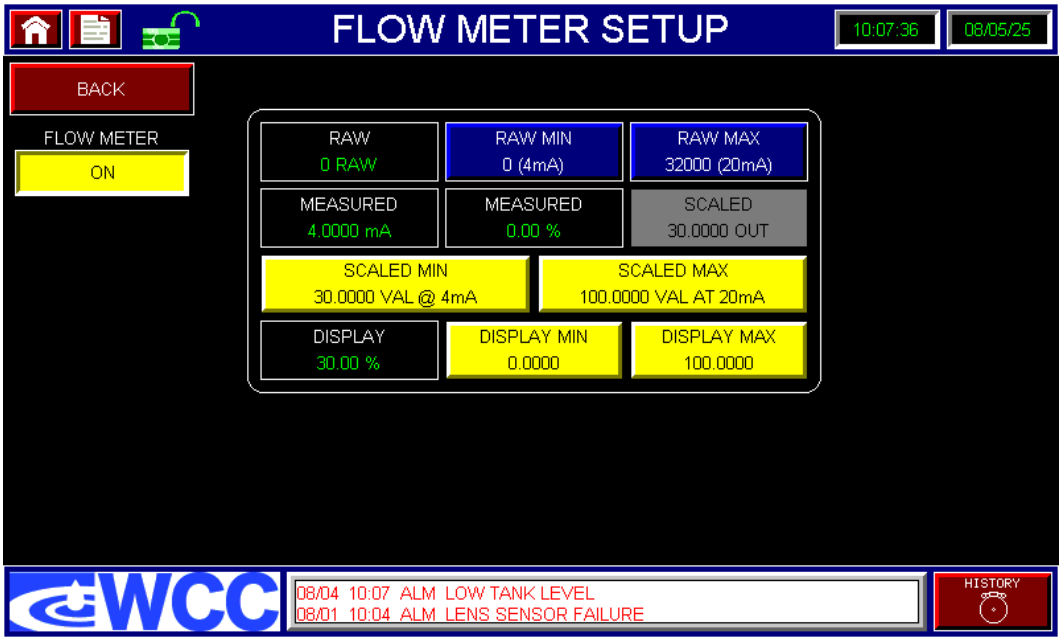
Pressing this button will allow th user to change the maximum display value.

OFF

Pressing this button will allow the user to open/close the tank fill valve. When “on” the valve is open and when “off” the valve is closed

10.12 FLOW METER SETUP

The flow meter setup screen provides access to the flow meter sensor input configuration (if enabled). From this screen, the input may be enabled/disabled, and the input scaling may be adjusted.



ON

Pressing this button will allow the user to enable or disable the input.

SCALED MIN
30.0000 VAL @ 4mA

Pressing this button will allow the user to change the scaled minimum value.

DISPLAY MIN
0.0000

Pressing this button will allow th user to change the minimum display value.

SCALED MAX
100.0000 VAL AT 20mA

Pressing this button will allow the user to change the scaled maximum value.

DISPLAY MAX
100.0000

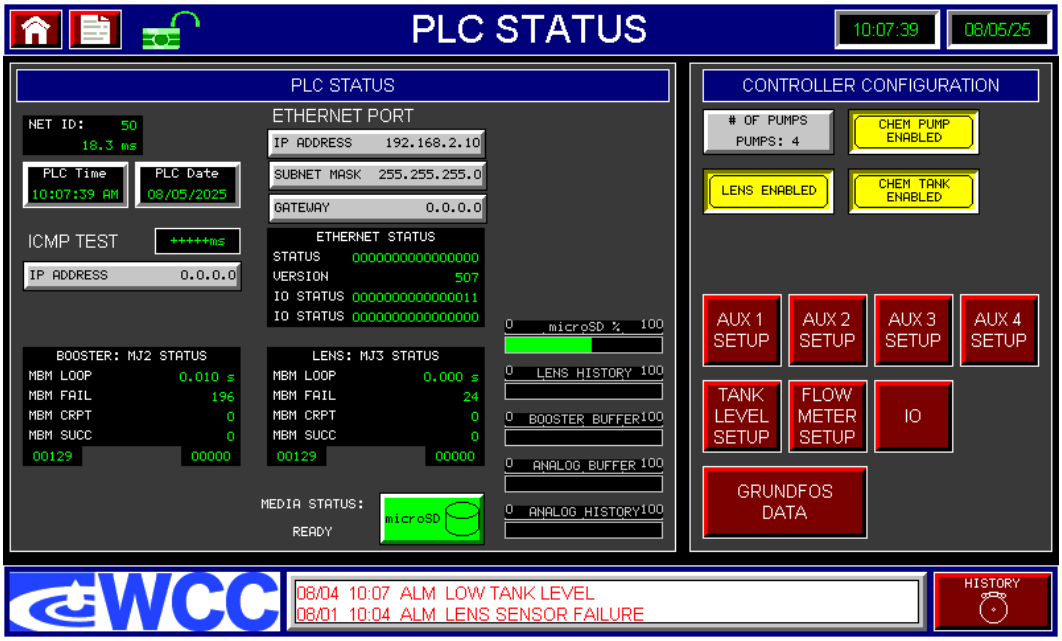
Pressing this button will allow the user to change the maximum display value.

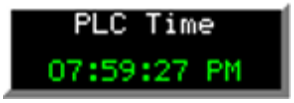
10.13 CONTACT PAGE

This screen provides the user with WCC contact information as well as program information. The model and firmware version may be requested for troubleshooting assistance. The page may be displayed by touching the WCC logo located on the bottom bar of any screen.

10.14 ADVANCED SETTINGS/INFORMATION

The PLC status screen allows the user to adjust settings such as the PLC time, PLC date, network settings and access to sensor scaling.

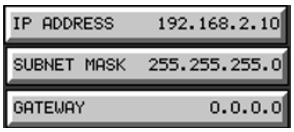




Pressing this button will allow the user to manually set the PLC time. The clock format is a 12 hour clock.

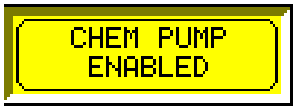
Pressing this button will allow the user to manually set the PLC date. The date format is MM/DD/YYYY.

Pressing this button will enable or disable the snap to alarm feature. If enabled, the alarm screen will be displayed when an alarm is triggered. If disabled, the alarm will only show in the alarm bar at the bottom of the screen.

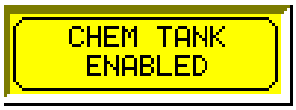


Pressing these buttons will allow the user to adjust the PLC network settings.

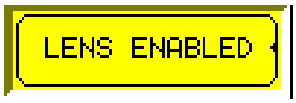
Pressing this button will allow the user to access the analog scaling and digital input/output status.



Pressing this button will allow the chemical injection pump feature to be enabled.



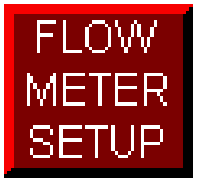
Pressing this button will allow the chemical tank feature to be enabled.



Pressing this button will allow the LENS monitoring feature to be enabled (if equipped).

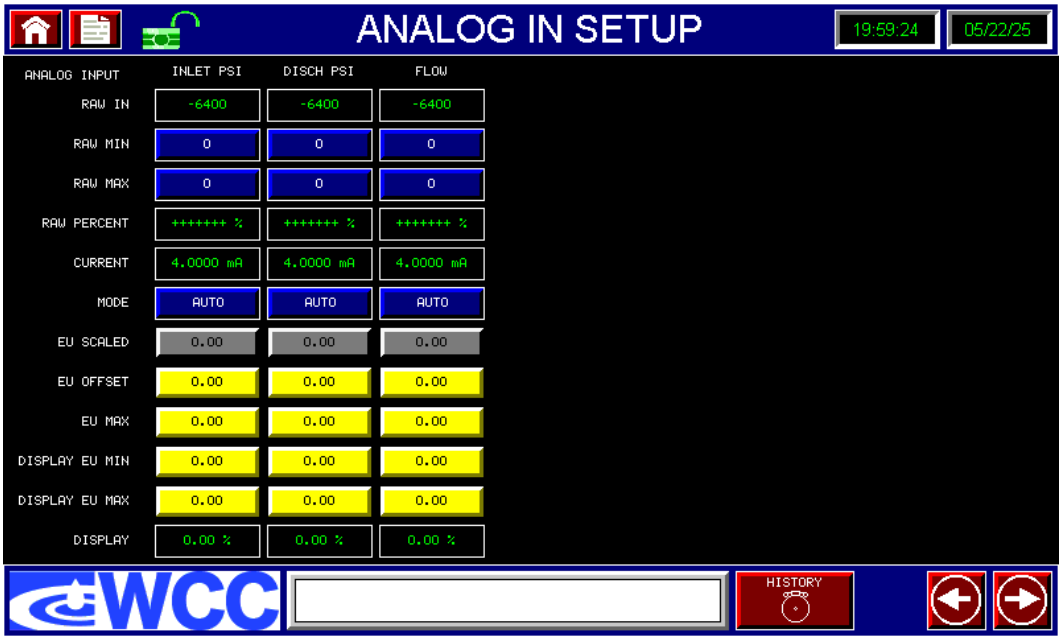
Pressing any of the (4) auxiliary setup buttons will bring the user to the auxiliary input setup screen.

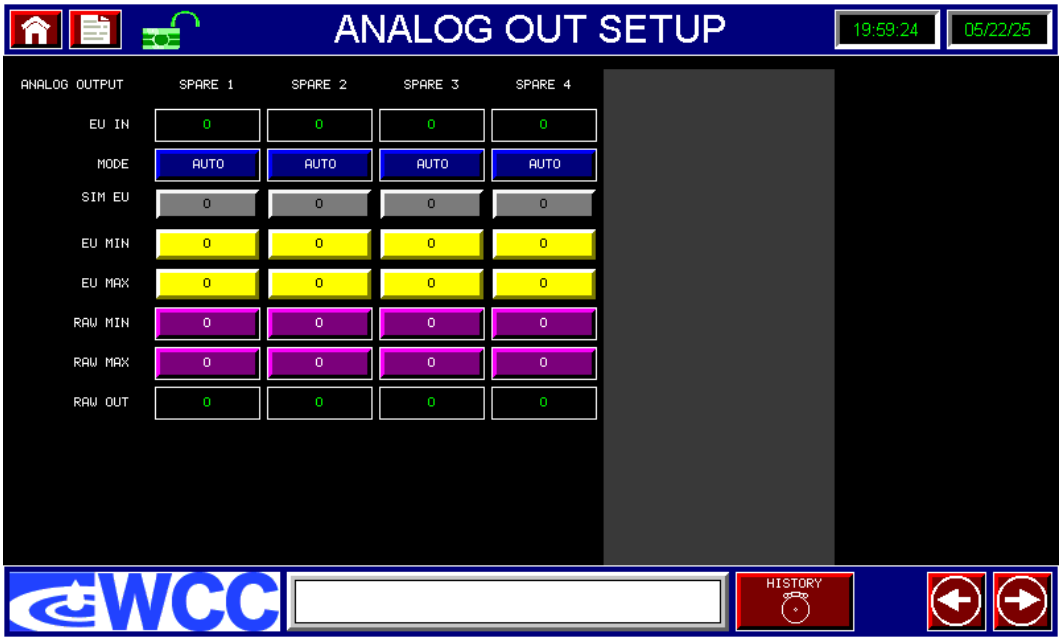
Pressing the tank level setup button will bring the user to the tank level setup screen.



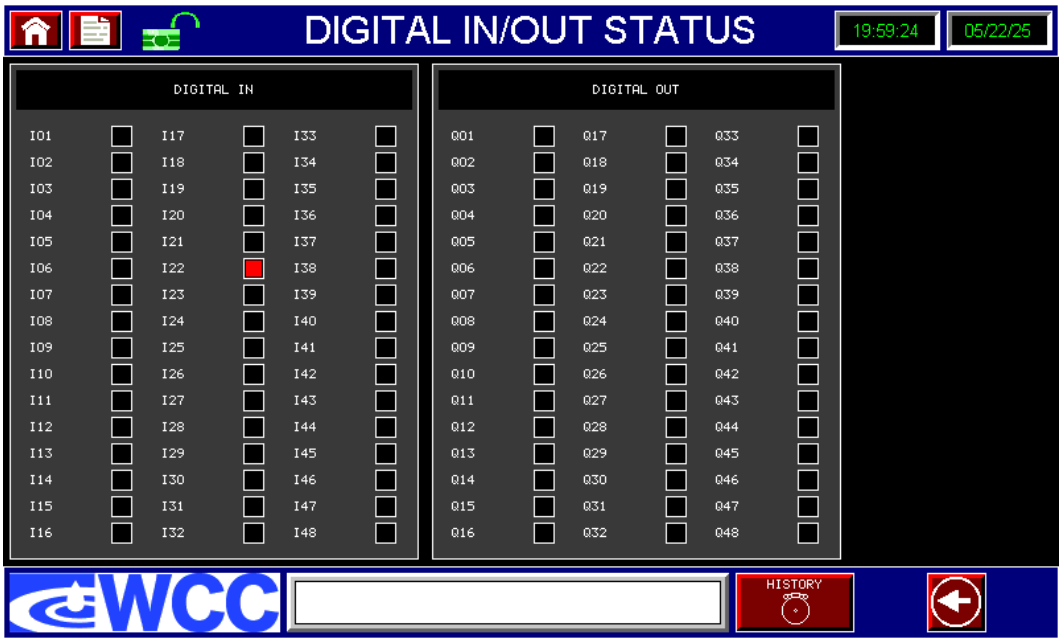
Pressing the flow meter setup button will bring the user to the flow meter setup screen.

The analog input and output screen allows the user to adjust the sensor scaling and trend window. The display EU min/max allow the user to adjust the trend window to display a specific portion of the value's range. The EU offset and EU max are used to set the range for the sensor.



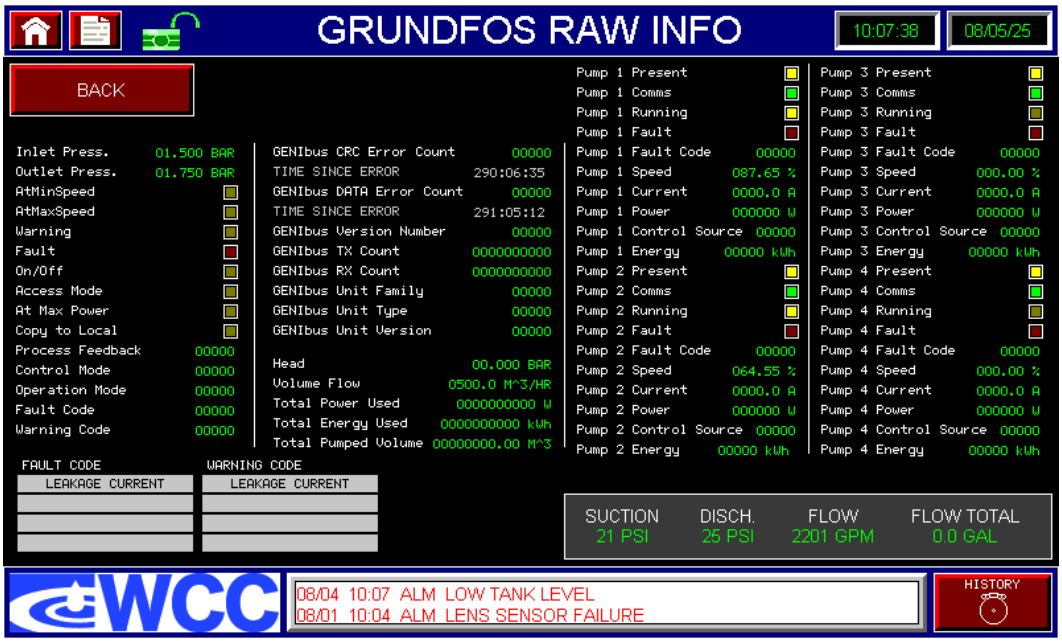


The digital input/output status screen shows the physical status of each input. If the box next to the input is illuminated in red, the input is currently active. If the next to the input is black, the input is currently inactive.



Pressing this button will allow the user to access the raw pump data.

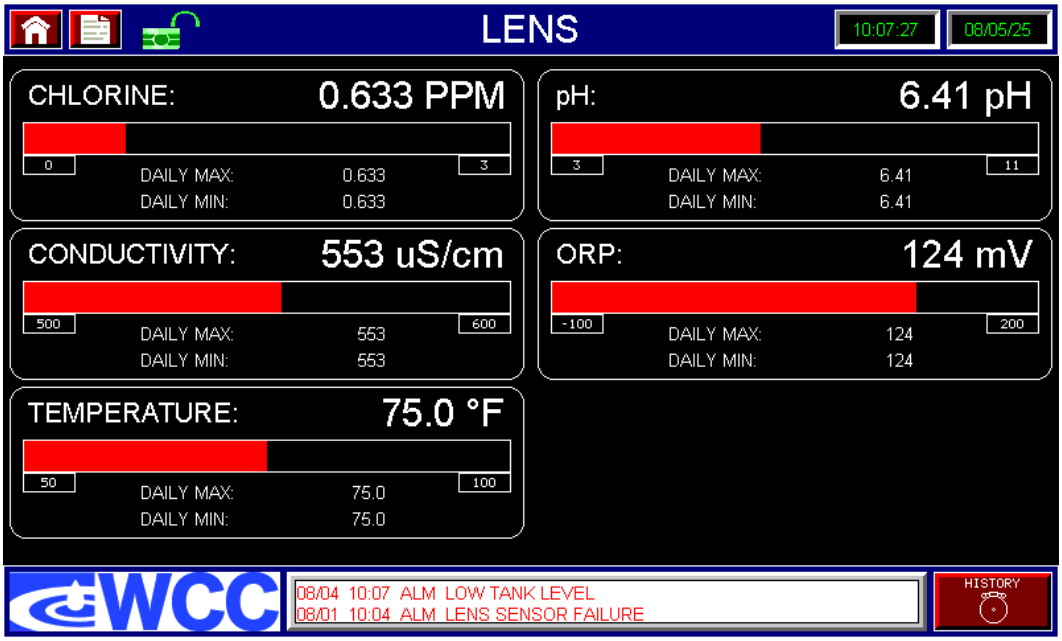
The Grundfos pump raw info screen details the raw data used for communication



11 LENS PROGRAMMING (BPA Systems Only)

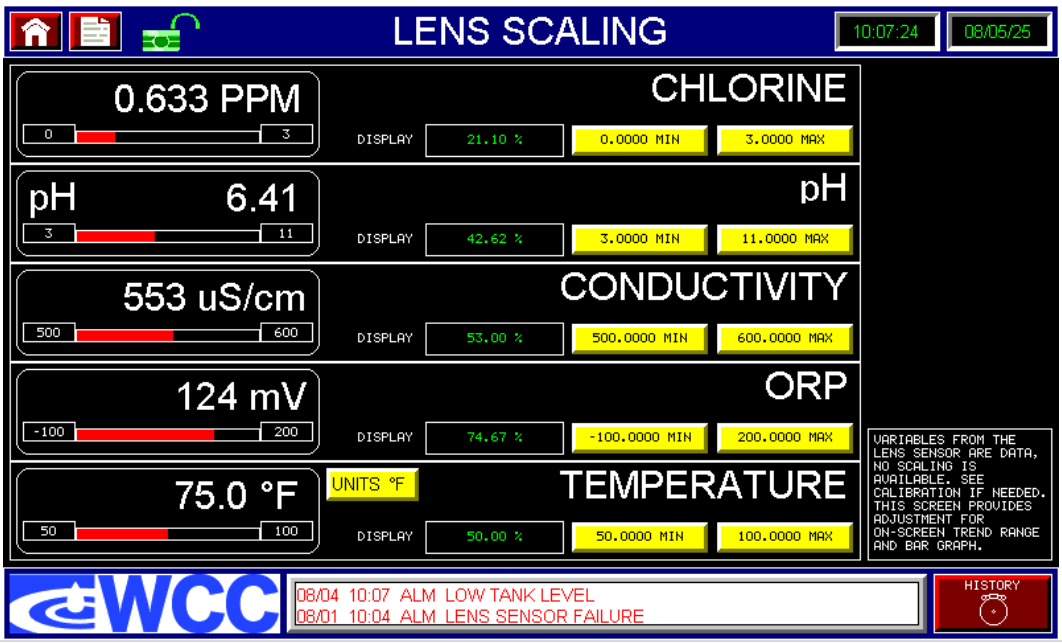
11.1 OVERVIEW

The LENS overview screen provides the process information at a quick glance. If configured, external auxiliary Channel 1 will also be displayed in the bottom right corner of this screen. Touching each parameter window will navigate to the detail screen.



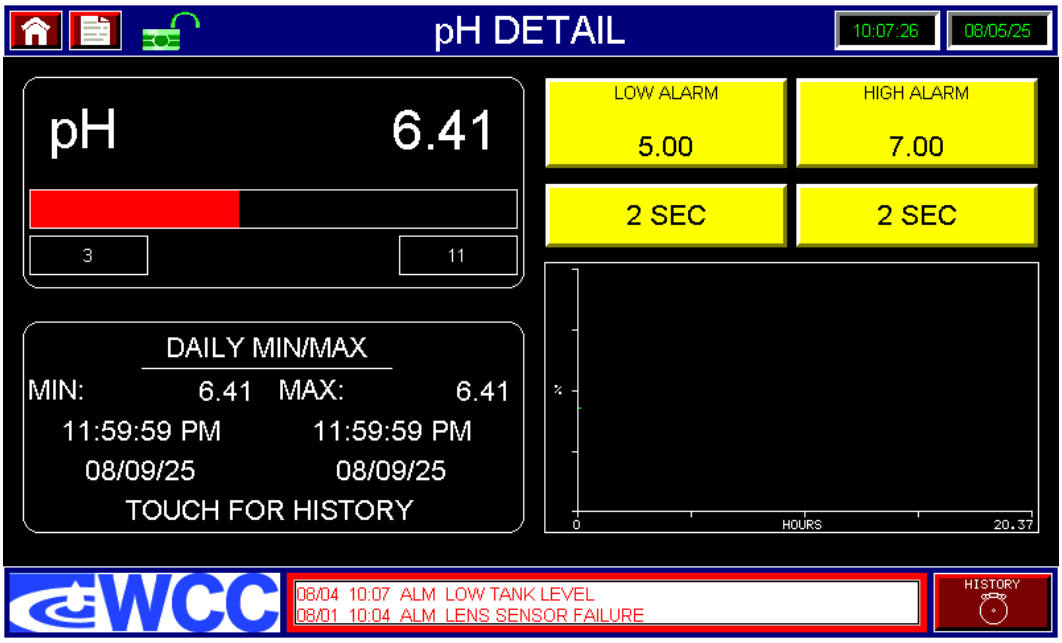
11.2 LENS SCALING

The LENS sensor scaling cannot be adjusted. The display value for each parameter may be adjusted by using the min/max buttons. The units for temperate may also be adjusted from this screen.



11.3 LENS PARAMETER CHANNEL DETAIL

The LENS detail screens (accessed by touching any of the channels on the overview screen) provides an instantaneous value for the measured parameter. Each individual LENS parameter has a channel detail screen. Low/high setpoints can be set/adjusted from this screen. The current day's minimum and maximum values are displayed, touching this area will navigate to the parameter's min/max history screen.



This window displays the current, instantaneous parameter value. The trend bar is displayed below the value to show where the current value falls within the low/high setpoints.

This window displays the daily min/max parameter value for the current day. The min and max value at the end of each day will be recorded with a time stamp for when the value occurred.

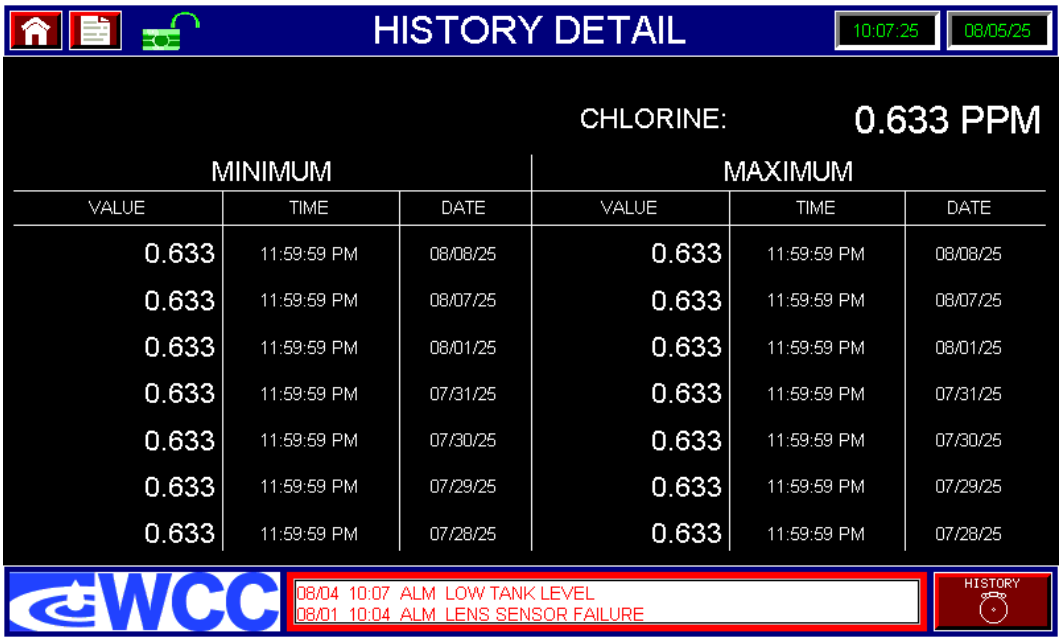
The low alarm value may be adjusted from this screen by touching the button.

The low alarm value may be adjusted from this screen by touching the button.

This value is also used to determine when the high or low alarm setpoint alarm will be activated. The setpoint alarm will be activated once the delay time has been met.

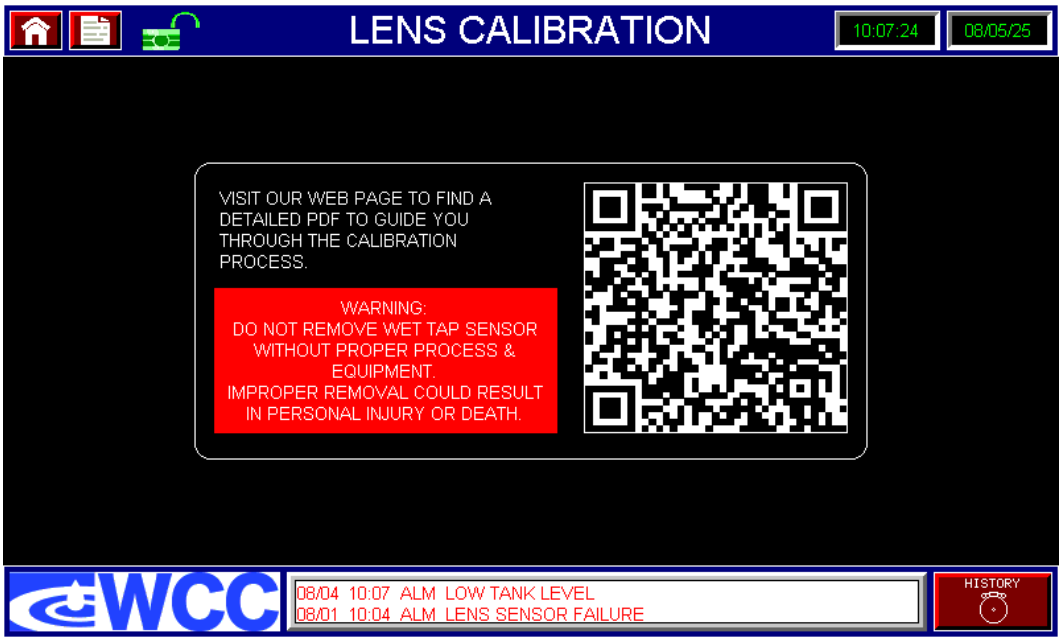
11.4 LENS PARAMETER CHANNEL DETAIL

This screen shows record of the previous seven days minimum/maximum values with corresponding time and date stamp. These values are also logged to the micro SD card at the end of the day. Each LENS parameter will have its own history detail screen.



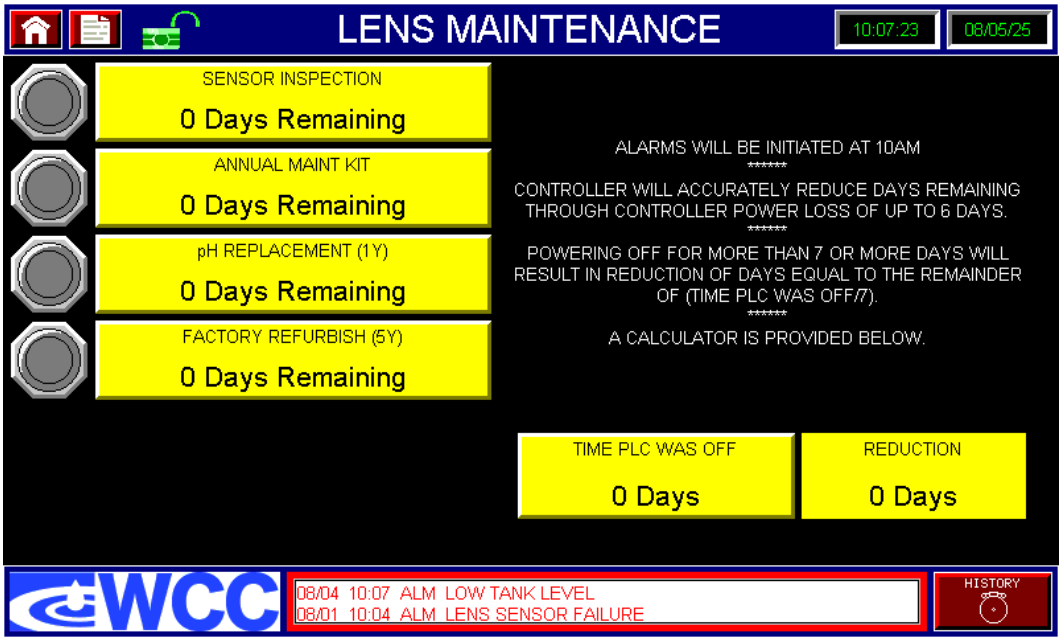
11.5 LENS CALIBRATION

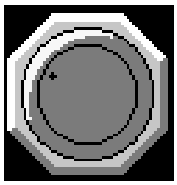
LENS parameter calibration is performed by using a third party app. The QR code may be scanned to navigate to WCC's web page where the app can be downloaded.



11.6 LENS MAINTENANCE REMINDER

This screen allows LENS maintenance reminders to be configured to assist with proper system maintenance. Individual reminders may be activated.





Pressing this button allows the user to independently active or deactivate each available maintenance reminder. When the color of the button is gray, the maintenance reminder is deactivated. When the color of the button is green, the maintenance reminder is activated.

Pressing this button allows the user to adjust the days remaining for the maintenance reminder. The recommended interval is detailed in the LENS maintenance section but may also be adjusted based on actual site conditions.

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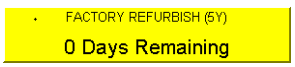
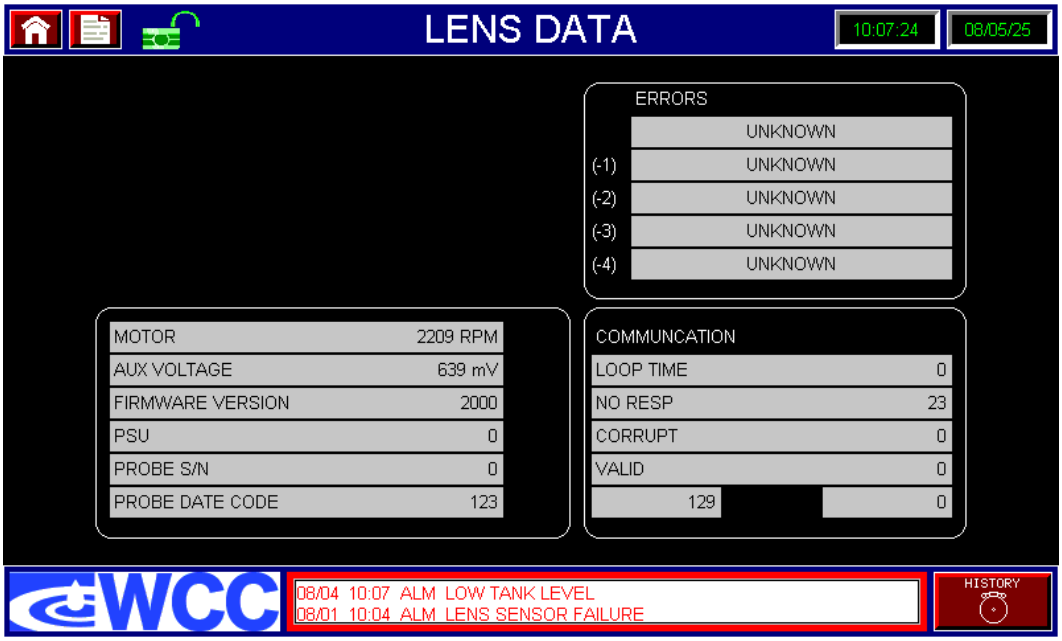
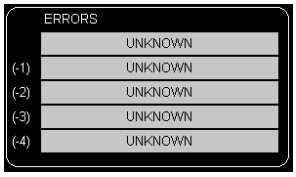


Pressing this button allows the user to adjust the days remaining for the maintenance reminder. The recommended interval is detailed in the LENS maintenance section but may also be adjusted based on actual site conditions.

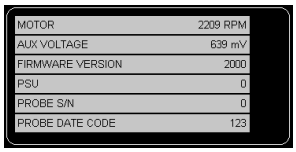
11.7 ADVANCED LENS INFORMATION

This screen provides additional information regarding the LENS sensor and PLC. This information may be requested by WCC for advanced troubleshooting assistance.

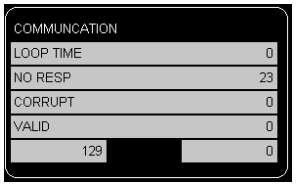




This table shows the current alarm (if active) and up to four previous alarms generated by the LENS sensor.



This table shows additional information pertaining to communications between the PLC and LENS sensor.



This table shows real time data pertaining to the LENS sensor.

12 MAINTENANCE

12.1 BOOSTER PUMP SYSTEM

The booster pump system does not typically require any regular maintenance when installed on clean, city water supplies. Pump bearings and shaft seals are maintenance free. It is recommended to inspect the system regularly for leaks or changes in operation performance. The cooling fans of the motor must be kept clean and free of debris to ensure proper motor cooling. It is recommended to replace the pump seal every 2 years as a preventative maintenance item. Site conditions and actual water quality may result in a more frequent service interval.

The system must be protected against freezing temperatures in cold climates. If the system is not used during freezing temperatures, the system must be drained to prevent damage. This can be accomplished by turning power off to the system, relieving pressure from the system, loosening the vent screw located on the pump heads, removing the drain plugs from the base of the pumps and allowing water to drain from the system. Do not tighten vent screws and reinstall drain plugs until the system is to be used again.

12.1.1 REPLACEMENT PARTS

SERIES	PART NUMBER	DESCRIPTION	QUANTITY REQUIRED
BP15	3-150-99011	PUMP SHAFT SEAL	1 PER PUMP
BP30			
BP50	3-150-99012		
BP100			
BP150	3-150-99013		
BP200			

12.2 LENS SYSTEM (BPA Systems Only)

12.2.1 SENSOR REMOVAL – WET TAP INSTALLATION

1. Ensure that the cap nut is installed on at least one of the threaded rods on the wet tap assembly. This will ensure that the sensor is not removed too far when being backed out of the pipe.
2. Loosen (counter-clockwise rotation) the nuts evenly to allow the sensor to be backed out from the pipe. Note if the pipe is still pressurized, the sensor will be pushed out from the pipe as the nuts are loosened.
3. Once the sensor has been backed out from the pipe, but not removed from the sensor end cap, slowly close the ball valve. Note that if there is resistance when attempting to close the ball valve, the sensor may

not have been backed out far enough to allow the ball valve to close. Continue to evenly loosen the nuts to allow the sensor to be backed out further in small increments. Attempt to slowly close the ball valve again.

4. With the ball valve closed, the nuts can continue to loosen further. Note that if the sensor is being removed from a pressurized pipe, there will be residual pressure trapped between the ball valve and sensor. This can be relieved by continuing to slowly remove the sensor.
5. Once any residual pressure is relieved, the nuts may be removed from the threaded rod. This will allow the sensor to be removed from the wet tap assembly.
6. Reference sensor installation section to reinstall the sensor.

12.2.2 SENSOR REMOVAL – IMMERSION INSTALLATION

1. Disconnect the piping securing the sensor assembly in the tank and remove it from the tank.
2. Disconnect the LENS sensor cable from the LENS controller.
3. Unthread the LENS sensor from the installation piping.
4. Reference sensor installation section to reinstall the sensor

12.2.3 SENSOR CLEANING

When sensors are installed in applications with high iron or high biofouling concentrations, a buildup can occur on the end of the sensor (strainer) that may restrict flow through the sensor. In these applications, the sensor should be inspected every two weeks. If build up is present, the following cleaning procedure should be followed:

Cleaning Method: White Vinegar

To acid clean the sensor, remove the sensor from the process, and rinse the sensor to remove any residual disinfectant that may be present in the water.

1. Select a small container and fill with 2 inches of tap water and immerse the sensor in the water.
2. Power the sensor on and tap lightly to remove any air that may be trapped in the sensor and rinse the sensor in the tap water. After completed, power down the sensor.
3. Drain the water from the container and refill the container with white vinegar.
4. Place the sensor in the container, power the sensor and clear air in the same method as defined in step 2.
5. Power the sensor while in the vinegar for 5 - 10 minutes.
6. Rinse the sensor as defined in step 2.
7. Return the sensor to the process and verify sensor readings are correct.

For a sensor that is underreporting even after performing the above mentioned cleaning method, a further cleaning step may be required. This will involve cleaning the measurement probe surfaces with either Isopropyl Alcohol or Dawn Dish soap.

1. Remove the sensor cover
2. Clean the measurement surfaces with a clean, microfiber cloth saturated with either Isopropyl Alcohol or Dawn Dish soap.
3. Reinstall the sensor cover.
4. Verify that the sensor has adequate water ejection from the ejection port before reinstalling the sensor into the process.

12.2.4 SENSOR ANNUAL MAINTENANCE

The annual maintenance is dedicated to the vital practice of replacing wear components internal to the sensor. Wear parts such as gaskets, bearings, impellers and wear rings experience natural wear/tear during normal operation. By understanding when and how to replace these components, users can ensure the accuracy of their measurements, prolong the sensor's service life and ensure the efficiency of water treatment processes/readings.

Tools Required:

1. #1 Philips Screwdriver
2. Isopropyl Alcohol
3. Lint free, clean cloth

Wear Part Removal: Remove the cover screws (quantity 2) from the sensor cover. Maintain pressure on the sensor cover and rotate the sensor vertically. Remove the sensor cover and screws from the sensor end while keeping the sensor orientated vertically. Remove the impeller from the impeller well. Impellers are magnetically coupled and should be easily removed. Remove the wear ring. All removed parts can be discarded. If fouling is present, it is recommended to clean the sensor end with Isopropyl Alcohol and a lint-free cloth. Care should be taken not to scratch the electrode surface.

New Wear Part Installation: Remove parts from the replacement wear kit. Install new wear ring into wear ring groove. Install new impeller into impeller well. Place 15 cleaning beads into the sensor end cover. Beads must only be present in the electrode compartment. Align the temperature sensor and impeller with their respective holes in the sensor cover. Lower sensor into sensor cover. Twist the cover gently until the sensor guide pins drop into the sensor end. Holding the sensor cover in place, insert and tighten both cover screws until there is no gap between the sensor cover gasket and the sensor end. To prevent motor biding, do not over-tighten the screws.

Function Testing: Power on the sensor and verify that the impeller spins freely. If the impeller does not spin freely, loosen the cover screws 1/4 turn at a time until the impeller can be heard spinning. The sensor can also be run in a bucket with water to verify the water stream is coming out of the sensor outlet port.

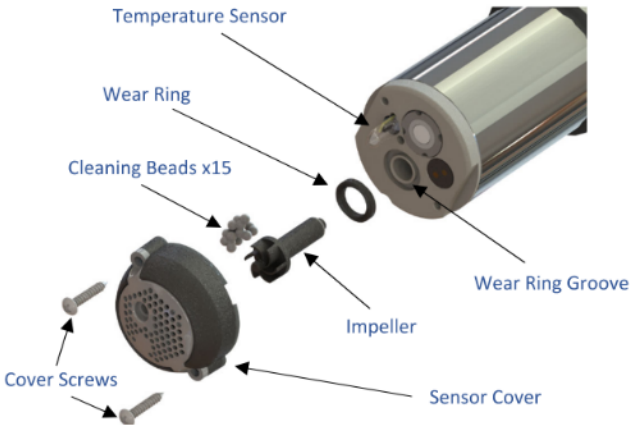


Figure 1: Exploded assembly - bottom view.

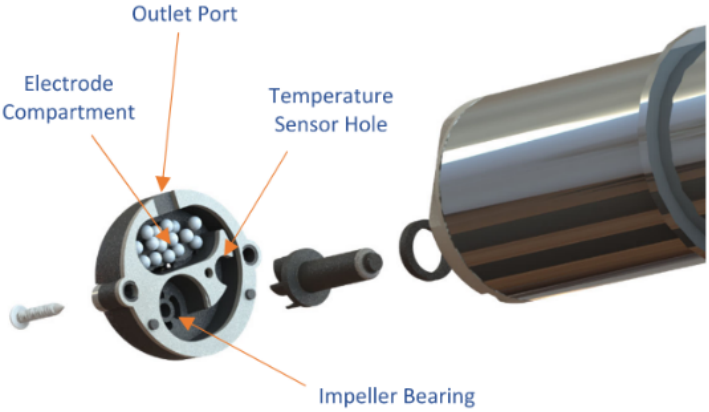


Figure 2: Exploded assembly - correct cleaning bead location.

12.2.5 pH SENSOR REPLACEMENT

The pH sensor should be replaced every year for the best accuracy. Other than calibration, there is no maintenance required for this sensor. It does not require wet storage when removed from service.

1. Use the LENS repair tool (included in the kit) and insert the prongs into the recess in the pH sensor (Figure 7 & 8).
2. Rotate the sensor counterclockwise (CCW) to unthread the probe from the sensor body (Figure 9).
3. Remove the old pH sensor and replace it with the new pH sensor (Figure 10).
4. Upon startup, reset the pH default value.

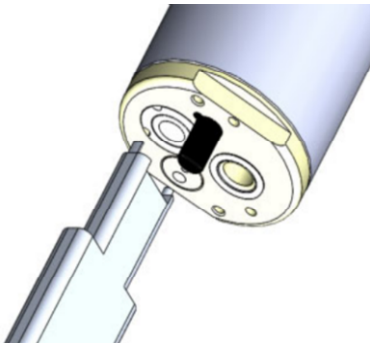


Figure 7

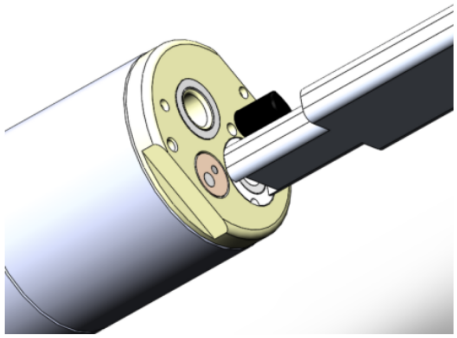


Figure 8

Figure 9

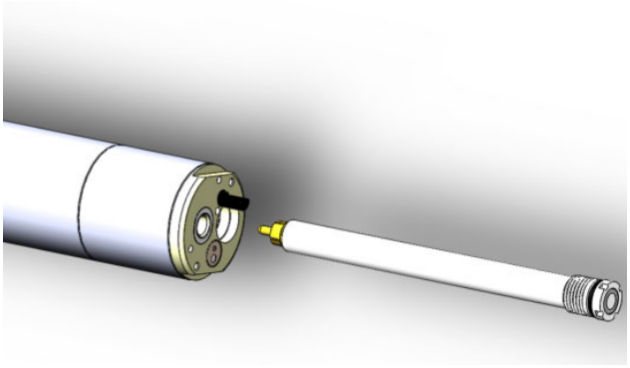


Figure 10

12.2.6 FIVE YEAR MAINTENANCE

It is recommended to return the sensor to the factory to perform a five year rebuild of the sensor to replace the internal motor assembly, worn parts and perform any factory calibrations required.

12.2.7 REPLACEMENT PARTS

PART NUMBER	DESCRIPTION	USED ON
3-210-02042	PH SENSOR REPLACEMENT KIT	WET TAP OR IMMERSION
3-210-02043	WEAR PART REPLACEMENT KIT	WET TAP OR IMMERSION
2-210-15018	LENS WET TAP REPLACEMENT O-RING KIT	WET TAP ONLY

12.3 LENS TROUBLESHOOTING (BPA Systems Only)

PROBLEM	POSSIBLE ISSUE	HOW TO CORRECT
PANEL NOT POWERED	NO POWER IS BEING SUPPLIED TO THE PANEL	CORRECT POWER BEING SUPPLIED TO PANEL
	WRONG VOTLAGE BRING SUPPLIED TO PANEL	
	POWER FEED BREAKER IS TRIPPED	RESET BREAKER
AUXILIARY ANALOG SENSOR NOT REGISTERING ON PLC	INCORRECT SENSOR WIRING	CORRECT SENSOR WIRING
	INCORRECT SENSOR TYPE	REPLACE WITH CORRECT SENSOR TYPE, CORRECT WIRING FOR SENSOR TYPE
	INCORRECT VOLTAGE FOR SENSOR	REPLACE WITH CORRECT SENSOR TYPE, CORRECT WIRING FOR SENSOR TYPE
	SENSOR WIRED TO INCORRECT CHANNEL INPUT	CORRECT SENSOR WIRING
	LOW VOLTAGE POWER NOT BEING SUPPLIED FROM PANEL	RESET BREAKER, REPLACE POWER SUPPLY
DISCRETE SENSOR NOT REGISTERING ON PLC	INCORRECT SENSOR WIRING	CORRECT SENSOR WIRING
	INCORRECT SENSOR TYPE	REPLACE SENSOR WITH CORRECT TYPE (NO/NC), CORRECT SENSOR WIRING
	SENSOR WIRED TO INCORRECT CHANNEL INPUT	CORRECT SENSOR WIRING
	LOW VOLTAGE POWER NOT BEING SUPPLIED FROM PANEL	RESET BREAKER, REPLACE POWER SUPPLY
OUTPUT NOT ACTIVATED	BAD OR FAILED RELAY	REPLACE RELAY

		RELAY USED FOR INCORRECT APPLICATION (INDUCTIVE LOAD)
	OUTPUT NOT CONFIGURED IN PLC	CONFIGURE OUTPUT SETTINGS IN PLC
PANEL NOT COMMUNICATING OVER BUILDING NETWORK	INCORRECT PORT USED FOR COMMUNICATION	CORRECT PORT BEING USED FOR COMMUNICATION
	INCORRECT PROTOCOL USED FOR COMMUNICATION	CORRECT PROTOCOL BEING USED FOR COMMUNICATION, ORDER PROTOCOL CONVERTER
	INCORRECT ADDRESS DATA ENTERED INTO PLC	CORRECT NETWORK ADDRESS DATA ENTERED INTO PLC
	INCORRECT POINTS BEING REFERENCED	CORRECT POINTS BEING REFERENCED, CONSULT INCLUDED POINTS MAP

13 BACNET AND MODBUS MAP (BPA/BPS Systems Only)

BP-A/S BACnet POINTS MAPPING - V1.0					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
MI	2	PUMP 1 FAULT	1=NOT FAULTED; 2=FAULTED	95	No-units
MI	3	PUMP 1 PERMISSIVE	1=NOT CALLED; 2=CALLED	95	No-units
MI	4	PUMP 1 RUNNING	1=NOT RUNNING; 2=RUNNING	95	No-units
MI	5	PUMP 2 FAULT	1=NOT FAULTED; 2=FAULTED	95	No-units
MI	6	PUMP 2 PERMISSIVE	1=NOT CALLED; 2=CALLED	95	No-units
MI	7	PUMP 2 RUNNING	1=NOT RUNNING; 2=RUNNING	95	No-units
MI	8	PUMP 3 FAULT	1=NOT FAULTED; 2=FAULTED	95	No-units
MI	9	PUMP 3 PERMISSIVE	1=NOT CALLED; 2=CALLED	95	No-units
MI	10	PUMP 3 RUNNING	1=NOT RUNNING; 2=RUNNING	95	No-units
MI	11	PUMP 4 FAULT	1=NOT FAULTED; 2=FAULTED	95	No-units
MI	12	PUMP 4 PERMISSIVE	1=NOT CALLED; 2=CALLED	95	No-units
MI	13	PUMP 4 RUNNING	1=NOT RUNNING; 2=RUNNING	95	No-units
MI	14	PUMP 1 PRESENT	1= Not present; 2= Present	95	No-units
MI	15	PUMP 2 PRESENT	1= Not present; 2= Present	95	No-units
MI	16	PUMP 3 PRESENT	1= Not present; 2= Present	95	No-units
MI	17	PUMP 4 PRESENT	1= Not present; 2= Present	95	No-units
MI	18	PUMP 1 COMM FAULT	1= Comms OK (not present); 2= Comms fault	95	No-units
MI	19	PUMP 2 COMM FAULT	1= Comms OK (not present); 2= Comms fault	95	No-units
MI	20	PUMP 3 COMM FAULT	1= Comms OK (not present); 2= Comms fault	95	No-units
MI	21	PUMP 4 COMM FAULT	1= Comms OK (not present); 2= Comms fault	95	No-units
MI	22	TANK FILL CALL	1=NOT CALLED; 2=CALLED	95	No-units
MI	23	CHEMICAL PUMP REQUIRED	1=NOT REQ.; 2=REQ.	95	No-units
MI	24	PUMP 1 STATUS	1=OFF; 2=READY; 3=LOST;4=RUN; 5=FAIL	95	No-units
MI	25	PUMP 2 STATUS	1=OFF; 2=READY; 3=LOST;4=RUN; 5=FAIL	95	No-units
MI	26	PUMP 3 STATUS	1=OFF; 2=READY; 3=LOST;4=RUN; 5=FAIL	95	No-units
MI	27	PUMP 4 STATUS	1=OFF; 2=READY; 3=LOST;4=RUN; 5=FAIL	95	No-units
MI	28	PUMP 1 OFF-AUTO SWITCH	1=OFF; 2=AUTO	95	No-units
MI	29	PUMP 2 OFF-AUTO SWITCH	1=OFF; 2=AUTO	95	No-units
MI	30	PUMP 3 OFF-AUTO SWITCH	1=OFF; 2=AUTO	95	No-units
MI	31	PUMP 4 OFF-AUTO SWITCH	1=OFF; 2=AUTO	95	No-units
MI	32	AUX 1 UNITS	1=UNITS, 2=FT, 3=INCHES, 4=METERS, 5=CM 6=GPM, 7=LPM, 8=PSI, 9=°F, 10=°C, 11=pH 12=mV13=mS, 14=mJ/cm2, 15=GAL 16=%, 17=ppm, 18=BAR, 19=PSID	95	No-units

BP-A/S BACnet POINTS MAPPING - V1.0					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
MI	33	AUX 2 UNITS	1=UNITS, 2=FT, 3=INCHES, 4=METERS, 5=CM 6=GPM, 7=LPM, 8=PSI, 9=°F, 10=°C, 11=pH 12=mV13=mS, 14=mJ/cm2, 15=GAL 16=%, 17=ppm, 18=BAR, 19=PSID	95	No-units
MI	34	AUX 3 UNITS	1=UNITS, 2=FT, 3=INCHES, 4=METERS, 5=CM 6=GPM, 7=LPM, 8=PSI, 9=°F, 10=°C, 11=pH 12=mV13=mS, 14=mJ/cm2, 15=GAL 16=%, 17=ppm, 18=BAR, 19=PSID	95	No-units
MI	35	AUX 4 UNITS	1=UNITS, 2=FT, 3=INCHES, 4=METERS, 5=CM 6=GPM, 7=LPM, 8=PSI, 9=°F, 10=°C, 11=pH 12=mV13=mS, 14=mJ/cm2, 15=GAL 16=%, 17=ppm, 18=BAR, 19=PSID	95	No-units
MI	36	TANK FILL VALVE OCA	1=OPEN; 2=CLOSE; 3=AUTO	95	No-units
MI	37	CHEM PUMP HOA	1=HAND; 2=OFF; 3=AUTO	95	No-units
MI	38	CHEM TANK STATUS	1=OKAY; 2=LOW;3=EMPTY	95	No-units
MI	39	CHEM PUMP STATUS	1=OFF; 2=INHIBITTED;3=RUNNING; 4=FAIL	95	No-units
MI	40	PUMP 1 CONTROL SOURCE	1=Unknown; 2=Setpoint buttons on pump 3=GENIbus (controller); 4=GENIlink (IR)/GENIair (radio) 5=External control; 6=Start/Stop button	95	No-units
MI	41	PUMP 2 CONTROL SOURCE	1=Unknown; 2=Setpoint buttons on pump 3=GENIbus (controller); 4=GENIlink (IR)/GENIair (radio) 5=External control; 6=Start/Stop button	95	No-units
MI	42	PUMP 3 CONTROL SOURCE	1=Unknown; 2=Setpoint buttons on pump 3=GENIbus (controller); 4=GENIlink (IR)/GENIair (radio) 5=External control; 6=Start/Stop button	95	No-units
MI	43	PUMP 4 CONTROL SOURCE	1=Unknown; 2=Setpoint buttons on pump 3=GENIbus (controller); 4=GENIlink (IR)/GENIair (radio) 5=External control; 6=Start/Stop button	95	No-units
MI	44	COMMUNCAITION FAIL TO PUMP(S)	1=CLEAR; 2=ALARM	95	No-units
MI	45	LOW INLET PRESSURE	1=CLEAR; 2=ALARM	95	No-units
MI	46	HIGH DISCHARGE PRESSURE	1=CLEAR; 2=ALARM	95	No-units
MI	47	LOW DISCHARGE PRESSURE	1=CLEAR; 2=ALARM	95	No-units
MI	48	HIGH TANK LEVEL	1=CLEAR; 2=ALARM	95	No-units
MI	49	LOW TANK LEVEL	1=CLEAR; 2=ALARM	95	No-units
MI	50	SPARE ALARM 07	1=CLEAR; 2=ALARM	95	No-units
MI	51	CHEMICAL TANK LOW (WARN)	1=CLEAR; 2=ALARM	95	No-units

BP-A/S BACnet POINTS MAPPING - V1.0					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
MI	52	CHEMICAL TANK EMPTY	1=CLEAR; 2=ALARM	95	No-units
MI	53	microSD CARD 90% FULL	1=CLEAR; 2=ALARM	95	No-units
MI	54	BOOSTER FAULT - GENERIC (SEE STATUS PAGE FOR DETAILS)	1=CLEAR; 2=ALARM	95	No-units
MI	55	BOOSTER WARN - GENERIC (SEE STATUS PAGE FOR DETAILS)	1=CLEAR; 2=ALARM	95	No-units
MI	56	SPARE ALARM 13	1=CLEAR; 2=ALARM	95	No-units
MI	57	SPARE ALARM 14	1=CLEAR; 2=ALARM	95	No-units
MI	58	SPARE ALARM 15	1=CLEAR; 2=ALARM	95	No-units
MI	59	SPARE ALARM 16	1=CLEAR; 2=ALARM	95	No-units
MI	60	SPARE ALARM 17	1=CLEAR; 2=ALARM	95	No-units
MI	89	SPARE ALARM 46	1=CLEAR; 2=ALARM	95	No-units
MI	90	SPARE ALARM 47	1=CLEAR; 2=ALARM	95	No-units
MI	91	SPARE ALARM 48	1=CLEAR; 2=ALARM	95	No-units
MI	92	AUXILIARY 1: SENSOR FAILURE	1=CLEAR; 2=ALARM	95	No-units
MI	93	AUXILIARY 1: HIGH ALARM	1=CLEAR; 2=ALARM	95	No-units
MI	94	AUXILIARY 1: LOW ALARM	1=CLEAR; 2=ALARM	95	No-units
MI	95	AUXILIARY 2: SENSOR FAILURE	1=CLEAR; 2=ALARM	95	No-units
MI	96	AUXILIARY 2: HIGH ALARM	1=CLEAR; 2=ALARM	95	No-units
MI	97	AUXILIARY 2: LOW ALARM	1=CLEAR; 2=ALARM	95	No-units
MI	98	AUXILIARY 3: SENSOR FAILURE	1=CLEAR; 2=ALARM	95	No-units
MI	99	AUXILIARY 3: HIGH ALARM	1=CLEAR; 2=ALARM	95	No-units
MI	100	AUXILIARY 3: LOW ALARM	1=CLEAR; 2=ALARM	95	No-units
MI	101	AUXILIARY 4: SENSOR FAILURE	1=CLEAR; 2=ALARM	95	No-units
MI	102	AUXILIARY 4: HIGH ALARM	1=CLEAR; 2=ALARM	95	No-units
MI	103	AUXILIARY 4: LOW ALARM	1=CLEAR; 2=ALARM	95	No-units
MI	104	SPARE ALARM 61	1=CLEAR; 2=ALARM	95	No-units
MI	105	SPARE ALARM 62	1=CLEAR; 2=ALARM	95	No-units
MI	106	SPARE ALARM 63	1=CLEAR; 2=ALARM	95	No-units
MI	107	SPARE ALARM 64	1=CLEAR; 2=ALARM	95	No-units
MI	108	PUMP 1 - EXTERNAL FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	109	PUMP 1 - TOO MANY RESTARTS	1=CLEAR; 2=ALARM	95	No-units
MI	110	PUMP 1 - COMMUNICATION FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	111	PUMP 1 - FORCED PUMPING	1=CLEAR; 2=ALARM	95	No-units
MI	112	PUMP 1 - REPLACE MOTOR BEARINGS	1=CLEAR; 2=ALARM	95	No-units
MI	113	PUMP 1 - OVERVOLTAGE	1=CLEAR; 2=ALARM	95	No-units
MI	114	PUMP 1 - UNDERVOLTAGE	1=CLEAR; 2=ALARM	95	No-units
MI	115	PUMP 1 - UNDERVOLTAGE TRANSIENT FROM MAINS SUPPLY	1=CLEAR; 2=ALARM	95	No-units

BP-A/S BACnet POINTS MAPPING - V1.0					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
MI	116	PUMP 1 - OVERLOAD	1=CLEAR; 2=ALARM	95	No-units
MI	117	PUMP 1 - BLOCKED PUMP	1=CLEAR; 2=ALARM	95	No-units
MI	118	PUMP 1 - DRY RUNNING	1=CLEAR; 2=ALARM	95	No-units
MI	119	PUMP 1 - STO ACTIVE INDICATION	1=CLEAR; 2=ALARM	95	No-units
MI	120	PUMP 1 - HIGH MOTOR TEMPERATURE	1=CLEAR; 2=ALARM	95	No-units
MI	121	PUMP 1 - INTERNAL FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	122	PUMP 1 - INTERNAL COMMUNCATION FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	123	PUMP 1 - INTERNAL SENSOR FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	124	PUMP 1 - PT100/1000 SENSOR 1 FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	125	PUMP 1 - SUPPLY FAULT, 5V	1=CLEAR; 2=ALARM	95	No-units
MI	126	PUMP 1 - SUPPLY FAULT, 24V	1=CLEAR; 2=ALARM	95	No-units
MI	127	PUMP 1 - SIGNAL FAULT, LIQTEC-SENSOR	1=CLEAR; 2=ALARM	95	No-units
MI	128	PUMP 1 - SIGNAL FAULT, SENSOR 1	1=CLEAR; 2=ALARM	95	No-units
MI	129	PUMP 1 - SIGNAL FAULT, SENSOR 2	1=CLEAR; 2=ALARM	95	No-units
MI	130	PUMP 1 - SIGNAL FAULT, SENSOR 3	1=CLEAR; 2=ALARM	95	No-units
MI	131	PUMP 1 - PT100/1000 SENSOR 2 FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	132	PUMP 1 - LIMIT 1 EXCEEDED	1=CLEAR; 2=ALARM	95	No-units
MI	133	PUMP 1 - LIMIT 2 EXCEEDED	1=CLEAR; 2=ALARM	95	No-units
MI	134	PUMP 1 - SOFT PRESSURE BUILDUP, TIMEOUT	1=CLEAR; 2=ALARM	95	No-units
MI	135	SPARE ALARM 92	1=CLEAR; 2=ALARM	95	No-units
MI	136	SPARE ALARM 93	1=CLEAR; 2=ALARM	95	No-units
MI	137	SPARE ALARM 94	1=CLEAR; 2=ALARM	95	No-units
MI	138	SPARE ALARM 95	1=CLEAR; 2=ALARM	95	No-units
MI	139	PUMP 1 FAULT - GENERIC	1=CLEAR; 2=ALARM	95	No-units
MI	140	PUMP 2 - EXTERNAL FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	141	PUMP 2 - TOO MANY RESTARTS	1=CLEAR; 2=ALARM	95	No-units
MI	142	PUMP 2 - COMMUNICATION FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	143	PUMP 2 - FORCED PUMPING	1=CLEAR; 2=ALARM	95	No-units
MI	144	PUMP 2 - REPLACE MOTOR BEARINGS	1=CLEAR; 2=ALARM	95	No-units
MI	145	PUMP 2 - OVERVOLTAGE	1=CLEAR; 2=ALARM	95	No-units
MI	146	PUMP 2 - UNDERVOLTAGE	1=CLEAR; 2=ALARM	95	No-units
MI	147	PUMP 2 - UNDERVOLTAGE TRANSIENT FROM MAINS SUPPLY	1=CLEAR; 2=ALARM	95	No-units
MI	148	PUMP 2 - OVERLOAD	1=CLEAR; 2=ALARM	95	No-units
MI	149	PUMP 2 - BLOCKED PUMP	1=CLEAR; 2=ALARM	95	No-units
MI	150	PUMP 2 - DRY RUNNING	1=CLEAR; 2=ALARM	95	No-units
MI	151	PUMP 2 - STO ACTIVE INDICATION	1=CLEAR; 2=ALARM	95	No-units

BP-A/S BACnet POINTS MAPPING - V1.0					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
MI	152	PUMP 2 - HIGH MOTOR TEMPERATURE	1=CLEAR; 2=ALARM	95	No-units
MI	153	PUMP 2 - INTERNAL FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	154	PUMP 2 - INTERNAL COMMUNCATION FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	155	PUMP 2 - INTERNAL SENSOR FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	156	PUMP 2 - PT100/1000 SENSOR 1 FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	157	PUMP 2 - SUPPLY FAULT, 5V	1=CLEAR; 2=ALARM	95	No-units
MI	158	PUMP 2 - SUPPLY FAULT, 24V	1=CLEAR; 2=ALARM	95	No-units
MI	159	PUMP 2 - SIGNAL FAULT, LIQTEC-SENSOR	1=CLEAR; 2=ALARM	95	No-units
MI	160	PUMP 2 - SIGNAL FAULT, SENSOR 1	1=CLEAR; 2=ALARM	95	No-units
MI	161	PUMP 2 - SIGNAL FAULT, SENSOR 2	1=CLEAR; 2=ALARM	95	No-units
MI	162	PUMP 2 - SIGNAL FAULT, SENSOR 3	1=CLEAR; 2=ALARM	95	No-units
MI	163	PUMP 2 - PT100/1000 SENSOR 2 FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	164	PUMP 2 - LIMIT 1 EXCEEDED	1=CLEAR; 2=ALARM	95	No-units
MI	165	PUMP 2 - LIMIT 2 EXCEEDED	1=CLEAR; 2=ALARM	95	No-units
MI	166	PUMP 2 - SOFT PRESSURE BUILDUP, TIMEOUT	1=CLEAR; 2=ALARM	95	No-units
MI	167	SPARE ALARM 124	1=CLEAR; 2=ALARM	95	No-units
MI	168	SPARE ALARM 125	1=CLEAR; 2=ALARM	95	No-units
MI	169	SPARE ALARM 126	1=CLEAR; 2=ALARM	95	No-units
MI	170	SPARE ALARM 127	1=CLEAR; 2=ALARM	95	No-units
MI	171	PUMP 2 FAULT - GENERIC	1=CLEAR; 2=ALARM	95	No-units
MI	172	PUMP 3 - EXTERNAL FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	173	PUMP 3 - TOO MANY RESTARTS	1=CLEAR; 2=ALARM	95	No-units
MI	174	PUMP 3 - COMMUNICATION FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	175	PUMP 3 - FORCED PUMPING	1=CLEAR; 2=ALARM	95	No-units
MI	176	PUMP 3 - REPLACE MOTOR BEARINGS	1=CLEAR; 2=ALARM	95	No-units
MI	177	PUMP 3 - OVERVOLTAGE	1=CLEAR; 2=ALARM	95	No-units
MI	178	PUMP 3 - UNDERVOLTAGE	1=CLEAR; 2=ALARM	95	No-units
MI	179	PUMP 3 - UNDERVOLTAGE TRANSIENT FROM MAINS SUPPLY	1=CLEAR; 2=ALARM	95	No-units
MI	180	PUMP 3 - OVERLOAD	1=CLEAR; 2=ALARM	95	No-units
MI	181	PUMP 3 - BLOCKED PUMP	1=CLEAR; 2=ALARM	95	No-units
MI	182	PUMP 3 - DRY RUNNING	1=CLEAR; 2=ALARM	95	No-units
MI	183	PUMP 3 - STO ACTIVE INDICATION	1=CLEAR; 2=ALARM	95	No-units
MI	184	PUMP 3 - HIGH MOTOR TEMPERATURE	1=CLEAR; 2=ALARM	95	No-units
MI	185	PUMP 3 - INTERNAL FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	186	PUMP 3 - INTERNAL COMMUNCATION FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	187	PUMP 3 - INTERNAL SENSOR FAULT	1=CLEAR; 2=ALARM	95	No-units

BP-A/S BACnet POINTS MAPPING - V1.0					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
MI	188	PUMP 3 - PT100/1000 SENSOR 1 FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	189	PUMP 3 - SUPPLY FAULT, 5V	1=CLEAR; 2=ALARM	95	No-units
MI	190	PUMP 3 - SUPPLY FAULT, 24V	1=CLEAR; 2=ALARM	95	No-units
MI	191	PUMP 3 - SIGNAL FAULT, LIQTEC-SENSOR	1=CLEAR; 2=ALARM	95	No-units
MI	192	PUMP 3 - SIGNAL FAULT, SENSOR 1	1=CLEAR; 2=ALARM	95	No-units
MI	193	PUMP 3 - SIGNAL FAULT, SENSOR 2	1=CLEAR; 2=ALARM	95	No-units
MI	194	PUMP 3 - SIGNAL FAULT, SENSOR 3	1=CLEAR; 2=ALARM	95	No-units
MI	195	PUMP 3 - PT100/1000 SENSOR 2 FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	196	PUMP 3 - LIMIT 1 EXCEEDED	1=CLEAR; 2=ALARM	95	No-units
MI	197	PUMP 3 - LIMIT 2 EXCEEDED	1=CLEAR; 2=ALARM	95	No-units
MI	198	PUMP 3 - SOFT PRESSURE BUILDUP, TIMEOUT	1=CLEAR; 2=ALARM	95	No-units
MI	199	SPARE ALARM 156	1=CLEAR; 2=ALARM	95	No-units
MI	200	SPARE ALARM 157	1=CLEAR; 2=ALARM	95	No-units
MI	201	SPARE ALARM 158	1=CLEAR; 2=ALARM	95	No-units
MI	202	SPARE ALARM 159	1=CLEAR; 2=ALARM	95	No-units
MI	203	PUMP 3 FAULT - GENERIC	1=CLEAR; 2=ALARM	95	No-units
MI	204	PUMP 4 - EXTERNAL FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	205	PUMP 4 - TOO MANY RESTARTS	1=CLEAR; 2=ALARM	95	No-units
MI	206	PUMP 4 - COMMUNICATION FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	207	PUMP 4 - FORCED PUMPING	1=CLEAR; 2=ALARM	95	No-units
MI	208	PUMP 4 - REPLACE MOTOR BEARINGS	1=CLEAR; 2=ALARM	95	No-units
MI	209	PUMP 4 - OVERVOLTAGE	1=CLEAR; 2=ALARM	95	No-units
MI	210	PUMP 4 - UNDERVOLTAGE	1=CLEAR; 2=ALARM	95	No-units
MI	211	PUMP 4 - UNDERVOLTAGE TRANSIENT FROM MAINS SUPPLY	1=CLEAR; 2=ALARM	95	No-units
MI	212	PUMP 4 - OVERLOAD	1=CLEAR; 2=ALARM	95	No-units
MI	213	PUMP 4 - BLOCKED PUMP	1=CLEAR; 2=ALARM	95	No-units
MI	214	PUMP 4 - DRY RUNNING	1=CLEAR; 2=ALARM	95	No-units
MI	215	PUMP 4 - STO ACTIVE INDICATION	1=CLEAR; 2=ALARM	95	No-units
MI	216	PUMP 4 - HIGH MOTOR TEMPERATURE	1=CLEAR; 2=ALARM	95	No-units
MI	217	PUMP 4 - INTERNAL FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	218	PUMP 4 - INTERNAL COMMUNCATION FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	219	PUMP 4 - INTERNAL SENSOR FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	220	PUMP 4 - PT100/1000 SENSOR 1 FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	221	PUMP 4 - SUPPLY FAULT, 5V	1=CLEAR; 2=ALARM	95	No-units
MI	222	PUMP 4 - SUPPLY FAULT, 24V	1=CLEAR; 2=ALARM	95	No-units
MI	223	PUMP 4 - SIGNAL FAULT, LIQTEC-SENSOR	1=CLEAR; 2=ALARM	95	No-units

BP-A/S BACnet POINTS MAPPING - V1.0					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
MI	224	PUMP 4 - SIGNAL FAULT, SENSOR 1	1=CLEAR; 2=ALARM	95	No-units
MI	225	PUMP 4 - SIGNAL FAULT, SENSOR 2	1=CLEAR; 2=ALARM	95	No-units
MI	226	PUMP 4 - SIGNAL FAULT, SENSOR 3	1=CLEAR; 2=ALARM	95	No-units
MI	227	PUMP 4 - PT100/1000 SENSOR 2 FAULT	1=CLEAR; 2=ALARM	95	No-units
MI	228	PUMP 4 - LIMIT 1 EXCEEDED	1=CLEAR; 2=ALARM	95	No-units
MI	229	PUMP 4 - LIMIT 2 EXCEEDED	1=CLEAR; 2=ALARM	95	No-units
MI	230	PUMP 4 - SOFT PRESSURE BUILDUP, TIMEOUT	1=CLEAR; 2=ALARM	95	No-units
MI	231	SPARE ALARM 188	1=CLEAR; 2=ALARM	95	No-units
MI	232	SPARE ALARM 189	1=CLEAR; 2=ALARM	95	No-units
MI	233	SPARE ALARM 190	1=CLEAR; 2=ALARM	95	No-units
MI	234	SPARE ALARM 191	1=CLEAR; 2=ALARM	95	No-units
MI	235	PUMP 4 FAULT - GENERIC	1=CLEAR; 2=ALARM	95	No-units
AI	1	PUMP 1 RUN TIME TDY	Hours	71	Hours
AI	2	PUMP 1 RUN TIME YDY	Hours	71	Hours
AI	3	PUMP 1 RUN TIME CM	Hours	71	Hours
AI	4	PUMP 1 RUN TIME PM	Hours	71	Hours
AI	5	PUMP 1 STARTS TDY	Starts	95	No-units
AI	6	PUMP 1 STARTS YDY	Starts	95	No-units
AI	7	PUMP 1 STARTS CM	Starts	95	No-units
AI	8	PUMP 1 STARTS PM	Starts	95	No-units
AI	9	PUMP 2 RUN TIME TDY	Hours	71	Hours
AI	10	PUMP 2 RUN TIME YDY	Hours	71	Hours
AI	11	PUMP 2 RUN TIME CM	Hours	71	Hours
AI	12	PUMP 2 RUN TIME PM	Hours	71	Hours
AI	13	PUMP 2 STARTS TDY	Starts	95	No-units
AI	14	PUMP 2 STARTS YDY	Starts	95	No-units
AI	15	PUMP 2 STARTS CM	Starts	95	No-units
AI	16	PUMP 2 STARTS PM	Starts	95	No-units
AI	17	PUMP 3 RUN TIME TDY	Hours	71	Hours
AI	18	PUMP 3 RUN TIME YDY	Hours	71	Hours
AI	19	PUMP 3 RUN TIME CM	Hours	71	Hours
AI	20	PUMP 3 RUN TIME PM	Hours	71	Hours
AI	21	PUMP 3 STARTS TDY	Starts	95	No-units
AI	22	PUMP 3 STARTS YDY	Starts	95	No-units
AI	23	PUMP 3 STARTS CM	Starts	95	No-units
AI	24	PUMP 3 STARTS PM	Starts	95	No-units

BP-A/S BACnet POINTS MAPPING - V1.0					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
AI	25	PUMP 4 RUN TIME TDY	Hours	71	Hours
AI	26	PUMP 4 RUN TIME YDY	Hours	71	Hours
AI	27	PUMP 4 RUN TIME CM	Hours	71	Hours
AI	28	PUMP 4 RUN TIME PM	Hours	71	Hours
AI	29	PUMP 4 STARTS TDY	Starts	95	No-units
AI	30	PUMP 4 STARTS YDY	Starts	95	No-units
AI	31	PUMP 4 STARTS CM	Starts	95	No-units
AI	32	PUMP 4 STARTS PM	Starts	95	No-units
AI	33	AUX 1 HIGH ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	34	AUX 1 LOW ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	35	AUX 2 HIGH ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	36	AUX 2 LOW ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	37	AUX 3 HIGH ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	38	AUX 3 LOW ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	39	AUX 4 HIGH ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	40	AUX 4 LOW ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	41	AUX 1 COMMON NAME 00	ASCII	95	No-units
AI	42	AUX 1 COMMON NAME 01	ASCII	95	No-units
AI	43	AUX 1 COMMON NAME 02	ASCII	95	No-units
AI	44	AUX 1 COMMON NAME 03	ASCII	95	No-units
AI	45	AUX 1 COMMON NAME 04	ASCII	95	No-units
AI	46	AUX 1 COMMON NAME 05	ASCII	95	No-units
AI	47	AUX 1 COMMON NAME 06	ASCII	95	No-units
AI	48	AUX 1 COMMON NAME 07	ASCII	95	No-units
AI	49	AUX 1 COMMON NAME 08	ASCII	95	No-units
AI	50	AUX 1 COMMON NAME 09	ASCII	95	No-units
AI	51	AUX 2 COMMON NAME 00	ASCII	95	No-units
AI	52	AUX 2 COMMON NAME 01	ASCII	95	No-units
AI	53	AUX 2 COMMON NAME 02	ASCII	95	No-units
AI	54	AUX 2 COMMON NAME 03	ASCII	95	No-units
AI	55	AUX 2 COMMON NAME 04	ASCII	95	No-units
AI	56	AUX 2 COMMON NAME 05	ASCII	95	No-units
AI	57	AUX 2 COMMON NAME 06	ASCII	95	No-units
AI	58	AUX 2 COMMON NAME 07	ASCII	95	No-units
AI	59	AUX 2 COMMON NAME 08	ASCII	95	No-units
AI	60	AUX 2 COMMON NAME 09	ASCII	95	No-units

BP-A/S BACnet POINTS MAPPING - V1.0					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
AI	61	AUX 3 COMMON NAME 00	ASCII	95	No-units
AI	62	AUX 3 COMMON NAME 01	ASCII	95	No-units
AI	63	AUX 3 COMMON NAME 02	ASCII	95	No-units
AI	64	AUX 3 COMMON NAME 03	ASCII	95	No-units
AI	65	AUX 3 COMMON NAME 04	ASCII	95	No-units
AI	66	AUX 3 COMMON NAME 05	ASCII	95	No-units
AI	67	AUX 3 COMMON NAME 06	ASCII	95	No-units
AI	68	AUX 3 COMMON NAME 07	ASCII	95	No-units
AI	69	AUX 3 COMMON NAME 08	ASCII	95	No-units
AI	70	AUX 3 COMMON NAME 09	ASCII	95	No-units
AI	71	AUX 4 COMMON NAME 00	ASCII	95	No-units
AI	72	AUX 4 COMMON NAME 01	ASCII	95	No-units
AI	73	AUX 4 COMMON NAME 02	ASCII	95	No-units
AI	74	AUX 4 COMMON NAME 03	ASCII	95	No-units
AI	75	AUX 4 COMMON NAME 04	ASCII	95	No-units
AI	76	AUX 4 COMMON NAME 05	ASCII	95	No-units
AI	77	AUX 4 COMMON NAME 06	ASCII	95	No-units
AI	78	AUX 4 COMMON NAME 07	ASCII	95	No-units
AI	79	AUX 4 COMMON NAME 08	ASCII	95	No-units
AI	80	AUX 4 COMMON NAME 09	ASCII	95	No-units
AI	81	TANK LEVEL LOW ALARM SETPOINT	FT	33	Feet
AI	82	TANK LEVEL HIGH ALARM SETPOINT	FT	33	Feet
AI	83	TANK LEVEL FILL START SETPOINT	FT	33	Feet
AI	84	TANK LEVEL FILL STOP SETPOINT	FT	33	Feet
AI	85	CHEM TANK FLOW SETPOINT	GPM	89	Us-gallons-per-minute
AI	86	TANK LEVEL	FT	33	Feet
AI	87	TANK LEVEL PERCENT	% (DISPLAY)	98	Percent
AI	88	FLOW	GPM	89	Us-gallons-per-minute
AI	89	FLOW PERCENT	% (DISPLAY)	98	Percent
AI	226	AUX 1 LOW SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	227	AUX 1 LOW MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	228	AUX 1 LOW HOURS - 0 DAYS AGO	Hours	71	Hours
AI	229	AUX 1 LOW DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	230	AUX 1 LOW MONTH - 0 DAYS AGO	Month	68	Months
AI	231	AUX 1 LOW YEAR - 0 DAYS AGO	Year	67	Years
AI	232	AUX 1 HIGH SECONDS - 0 DAYS AGO	Seconds	73	Seconds

BP-A/S BACnet POINTS MAPPING - V1.0					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
AI	233	AUX 1 HIGH MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	234	AUX 1 HIGH HOURS - 0 DAYS AGO	Hours	71	Hours
AI	235	AUX 1 HIGH DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	236	AUX 1 HIGH MONTH - 0 DAYS AGO	Month	68	Months
AI	237	AUX 1 HIGH YEAR - 0 DAYS AGO	Year	67	Years
AI	238	AUX 2 LOW SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	239	AUX 2 LOW MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	240	AUX 2 LOW HOURS - 0 DAYS AGO	Hours	71	Hours
AI	241	AUX 2 LOW DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	242	AUX 2 LOW MONTH - 0 DAYS AGO	Month	68	Months
AI	243	AUX 2 LOW YEAR - 0 DAYS AGO	Year	67	Years
AI	244	AUX 2 HIGH SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	245	AUX 2 HIGH MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	246	AUX 2 HIGH HOURS - 0 DAYS AGO	Hours	71	Hours
AI	247	AUX 2 HIGH DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	248	AUX 2 HIGH MONTH - 0 DAYS AGO	Month	68	Months
AI	249	AUX 2 HIGH YEAR - 0 DAYS AGO	Year	67	Years
AI	250	AUX 3 LOW SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	251	AUX 3 LOW MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	252	AUX 3 LOW HOURS - 0 DAYS AGO	Hours	71	Hours
AI	253	AUX 3 LOW DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	254	AUX 3 LOW MONTH - 0 DAYS AGO	Month	68	Months
AI	255	AUX 3 LOW YEAR - 0 DAYS AGO	Year	67	Years
AI	256	AUX 3 HIGH SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	257	AUX 3 HIGH MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	258	AUX 3 HIGH HOURS - 0 DAYS AGO	Hours	71	Hours
AI	259	AUX 3 HIGH DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	260	AUX 3 HIGH MONTH - 0 DAYS AGO	Month	68	Months
AI	261	AUX 3 HIGH YEAR - 0 DAYS AGO	Year	67	Years
AI	262	AUX 4 LOW SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	263	AUX 4 LOW MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	264	AUX 4 LOW HOURS - 0 DAYS AGO	Hours	71	Hours
AI	265	AUX 4 LOW DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	266	AUX 4 LOW MONTH - 0 DAYS AGO	Month	68	Months
AI	267	AUX 4 LOW YEAR - 0 DAYS AGO	Year	67	Years
AI	268	AUX 4 HIGH SECONDS - 0 DAYS AGO	Seconds	73	Seconds

BP-A/S BACnet POINTS MAPPING - V1.0					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
AI	269	AUX 4 HIGH MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	270	AUX 4 HIGH HOURS - 0 DAYS AGO	Hours	71	Hours
AI	271	AUX 4 HIGH DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	272	AUX 4 HIGH MONTH - 0 DAYS AGO	Month	68	Months
AI	273	AUX 4 HIGH YEAR - 0 DAYS AGO	Year	67	Years
AI	274	AUX 1 LOW SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	275	AUX 1 LOW MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	276	AUX 1 LOW HOURS - 1 DAY AGO	Hours	71	Hours
AI	277	AUX 1 LOW DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	278	AUX 1 LOW MONTH - 1 DAY AGO	Month	68	Months
AI	279	AUX 1 LOW YEAR - 1 DAY AGO	Year	67	Years
AI	280	AUX 1 HIGH SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	281	AUX 1 HIGH MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	282	AUX 1 HIGH HOURS - 1 DAY AGO	Hours	71	Hours
AI	283	AUX 1 HIGH DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	284	AUX 1 HIGH MONTH - 1 DAY AGO	Month	68	Months
AI	285	AUX 1 HIGH YEAR - 1 DAY AGO	Year	67	Years
AI	286	AUX 2 LOW SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	287	AUX 2 LOW MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	288	AUX 2 LOW HOURS - 1 DAY AGO	Hours	71	Hours
AI	289	AUX 2 LOW DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	290	AUX 2 LOW MONTH - 1 DAY AGO	Month	68	Months
AI	291	AUX 2 LOW YEAR - 1 DAY AGO	Year	67	Years
AI	292	AUX 2 HIGH SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	293	AUX 2 HIGH MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	294	AUX 2 HIGH HOURS - 1 DAY AGO	Hours	71	Hours
AI	295	AUX 2 HIGH DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	296	AUX 2 HIGH MONTH - 1 DAY AGO	Month	68	Months
AI	297	AUX 2 HIGH YEAR - 1 DAY AGO	Year	67	Years
AI	298	AUX 3 LOW SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	299	AUX 3 LOW MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	300	AUX 3 LOW HOURS - 1 DAY AGO	Hours	71	Hours
AI	301	AUX 3 LOW DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	302	AUX 3 LOW MONTH - 1 DAY AGO	Month	68	Months
AI	303	AUX 3 LOW YEAR - 1 DAY AGO	Year	67	Years
AI	304	AUX 3 HIGH SECONDS - 1 DAY AGO	Seconds	73	Seconds

BP-A/S BACnet POINTS MAPPING - V1.0					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
AI	305	AUX 3 HIGH MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	306	AUX 3 HIGH HOURS - 1 DAY AGO	Hours	71	Hours
AI	307	AUX 3 HIGH DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	308	AUX 3 HIGH MONTH - 1 DAY AGO	Month	68	Months
AI	309	AUX 3 HIGH YEAR - 1 DAY AGO	Year	67	Years
AI	310	AUX 4 LOW SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	311	AUX 4 LOW MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	312	AUX 4 LOW HOURS - 1 DAY AGO	Hours	71	Hours
AI	313	AUX 4 LOW DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	314	AUX 4 LOW MONTH - 1 DAY AGO	Month	68	Months
AI	315	AUX 4 LOW YEAR - 1 DAY AGO	Year	67	Years
AI	316	AUX 4 HIGH SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	317	AUX 4 HIGH MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	318	AUX 4 HIGH HOURS - 1 DAY AGO	Hours	71	Hours
AI	319	AUX 4 HIGH DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	320	AUX 4 HIGH MONTH - 1 DAY AGO	Month	68	Months
AI	321	AUX 4 HIGH YEAR - 1 DAY AGO	Year	67	Years
AI	327	PUMP 1 FAULT CODE	SEE BOOSTER MANUAL	95	No-units
AI	328	PUMP 1 SPEED	#	95	No-units
AI	329	PUMP 1 CURRENT	Amps	3	Amperes
AI	330	PUMP 1 POWER	Watts	47	Watts
AI	331	PUMP 2 FAULT CODE	SEE BOOSTER MANUAL	95	No-units
AI	332	PUMP 2 SPEED	#	95	No-units
AI	333	PUMP 2 CURRENT	Amps	3	Amperes
AI	334	PUMP 2 POWER	Watts	47	Watts
AI	335	PUMP 3 FAULT CODE	SEE BOOSTER MANUAL	95	No-units
AI	336	PUMP 3 SPEED	#	95	No-units
AI	337	PUMP 3 CURRENT	Amps	3	Amperes
AI	338	PUMP 3 POWER	Watts	47	Watts
AI	339	PUMP 4 FAULT CODE	SEE BOOSTER MANUAL	95	No-units
AI	340	PUMP 4 SPEED	#	95	No-units
AI	341	PUMP 4 CURRENT	Amps	3	Amperes
AI	342	PUMP 4 POWER	Watts	47	Watts
AI	343	PUMP 1 ENERGY	kW/h	19	Kilowatt-hours
AI	344	PUMP 2 ENERGY	kW/h	19	Kilowatt-hours
AI	345	PUMP 3 ENERGY	kW/h	19	Kilowatt-hours

BP-A/S BACnet POINTS MAPPING - V1.0					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
AI	346	PUMP 4 ENERGY	kW/h	19	Kilowatt-hours
AI	347	INLET PRESSURE	PSI	56	Pounds-force-per-square-inch
AI	348	OUTLET PRESSURE	PSI	56	Pounds-force-per-square-inch
AI	359	DISCHARGE PRESSURE LOW SETPOINT	PSI	56	Pounds-force-per-square-inch
AI	360	DISCHARGE PRESSURE HIGH SETPOINT	PSI	56	Pounds-force-per-square-inch
AI	361	INLET PRESSURE LOW SETPOINT	PSI	56	Pounds-force-per-square-inch
AI	362	INLET PRESSURE LOW DELAY SETPOINT	Seconds	73	Seconds
AI	363	DISCHARGE PRESSURE HIGH DELAY SETPOINT	Seconds	73	Seconds
AI	364	DISCHARGE PRESSURE LOW DELAY SETPOINT	Seconds	73	Seconds
AI	365	TANK LEVEL HIGH ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	366	TANK LEVEL LOW ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	367	COMM PUMP DEVICE STATUS WORD 1	0	95	No-units
AI	368	COMM PUMP DEVICE STATUS WORD 2	0	95	No-units
AI	369	PUMP 1 RUN TIME TOTAL	Hours	71	Hours
AI	370	PUMP 1 STARTS TOTAL	Starts	95	No-units
AI	371	PUMP 2 RUN TIME TOTAL	Hours	71	Hours
AI	372	PUMP 2 STARTS TOTAL	Starts	95	No-units
AI	373	PUMP 3 RUN TIME TOTAL	Hours	71	Hours
AI	374	PUMP 3 STARTS TOTAL	Starts	95	No-units
AI	375	PUMP 4 RUN TIME TOTAL	Hours	71	Hours
AI	376	PUMP 4 STARTS TOTAL	Starts	95	No-units
AI	377	AUX 1 HIGH ALARM SETPOINT	Units	95	No-units
AI	378	AUX 1 LOW ALARM SETPOINT	Units	95	No-units
AI	379	AUX 2 HIGH ALARM SETPOINT	Units	95	No-units
AI	380	AUX 2 LOW ALARM SETPOINT	Units	95	No-units
AI	381	AUX 3 HIGH ALARM SETPOINT	Units	95	No-units
AI	382	AUX 3 LOW ALARM SETPOINT	Units	95	No-units
AI	383	AUX 4 HIGH ALARM SETPOINT	Units	95	No-units
AI	384	AUX 4 LOW ALARM SETPOINT	Units	95	No-units
AI	405	AUX 1 LOW VALUE - 0 DAYS AGO	Units	95	No-units
AI	406	AUX 2 LOW VALUE - 0 DAYS AGO	Units	95	No-units
AI	407	AUX 3 LOW VALUE - 0 DAYS AGO	Units	95	No-units
AI	408	AUX 4 LOW VALUE - 0 DAYS AGO	Units	95	No-units
AI	409	AUX 1 LOW VALUE - 1 DAY AGO	Units	95	No-units
AI	410	AUX 1 HIGH VALUE - 1 DAY AGO	Units	95	No-units
AI	411	AUX 2 LOW VALUE - 1 DAY AGO	Units	95	No-units

BP-A/S BACnet POINTS MAPPING - V1.0					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
AI	412	AUX 2 HIGH VALUE - 1 DAY AGO	Units	95	No-units
AI	413	AUX 3 LOW VALUE - 1 DAY AGO	Units	95	No-units
AI	414	AUX 3 HIGH VALUE - 1 DAY AGO	Units	95	No-units
AI	415	AUX 4 LOW VALUE - 1 DAY AGO	Units	95	No-units
AI	416	AUX 4 HIGH VALUE - 1 DAY AGO	Units	95	No-units
AI	417	AUX1 DISPLAY MIN	Units	95	No-units
AI	418	AUX1 DISPLAY MAX	Units	95	No-units
AI	419	AUX2 DISPLAY MIN	Units	95	No-units
AI	420	AUX2 DISPLAY MAX	Units	95	No-units
AI	421	AUX3 DISPLAY MIN	Units	95	No-units
AI	422	AUX3 DISPLAY MAX	Units	95	No-units
AI	423	AUX4 DISPLAY MIN	Units	95	No-units
AI	424	AUX4 DISPLAY MAX	Units	95	No-units
AI	435	FLOW TDY	kGal	95	No-units
AI	436	FLOW YDY	kGal	95	No-units
AI	437	FLOW CM	kGal	95	No-units
AI	438	FLOW PM	kGal	95	No-units
AI	439	FLOW TOTAL	kGal	95	No-units
AI	440	COMM TO PUMP STATUS WORD 1	0	95	No-units
AI	441	COMM TO PUMP STATUS WORD 2	0	95	No-units
AI	442	COMM TO PUMP STATUS WORD 3	0	95	No-units
AI	443	COMM TO PUMP STATUS WORD 4	0	95	No-units

BP-A BACnet POINTS MAPPING - V1.0					
BP-A SYSTEMS ONLY - LENS SENSOR					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
MI	1	LENS TEMP MODE F C	1=°F; 2=°C	95	No-units
MI	61	LENS SENSOR FAILURE	1=CLEAR; 2=ALARM	95	No-units
MI	62	CHLORINE HIGH	1=CLEAR; 2=ALARM	95	No-units
MI	63	CHLORINE LOW	1=CLEAR; 2=ALARM	95	No-units
MI	64	pH HIGH	1=CLEAR; 2=ALARM	95	No-units
MI	65	pH LOW	1=CLEAR; 2=ALARM	95	No-units
MI	66	CONDUCTIVITY HIGH	1=CLEAR; 2=ALARM	95	No-units
MI	67	CONDUCTIVITY LOW	1=CLEAR; 2=ALARM	95	No-units
MI	68	ORP HIGH	1=CLEAR; 2=ALARM	95	No-units
MI	69	ORP LOW	1=CLEAR; 2=ALARM	95	No-units
MI	70	TEMPERATURE HIGH	1=CLEAR; 2=ALARM	95	No-units
MI	71	TEMPERATURE LOW	1=CLEAR; 2=ALARM	95	No-units
MI	72	MAINT. REQUIRED - SENSOR INSPECTION	1=CLEAR; 2=ALARM	95	No-units
MI	73	MAINT. REQUIRED - ANNUAL MAINTENACE KIT	1=CLEAR; 2=ALARM	95	No-units
MI	74	MAINT. REQUIRED - pH SENSOR REPLACEMENT	1=CLEAR; 2=ALARM	95	No-units
MI	75	MAINT. REQUIRED - SENSOR FACTORY REFURBISH	1=CLEAR; 2=ALARM	95	No-units
MI	76	LENS SENSOR - AIR IN SENSOR 10 CYC	1=CLEAR; 2=ALARM	95	No-units
MI	77	LENS SENSOR - SENSOR COMM PROBLEM	1=CLEAR; 2=ALARM	95	No-units
MI	78	LENS SENSOR - ZERO CAL OOR	1=CLEAR; 2=ALARM	95	No-units
MI	79	LENS SENSOR - BAD pH OFFSET	1=CLEAR; 2=ALARM	95	No-units
MI	80	LENS SENSOR - BAD pH SLOPE	1=CLEAR; 2=ALARM	95	No-units
MI	81	LENS SENSOR - AIR IN SENSOR	1=CLEAR; 2=ALARM	95	No-units
MI	82	LENS SENSOR - MOTOR STALLED	1=CLEAR; 2=ALARM	95	No-units
MI	83	LENS SENSOR - MOTOR RPM VERY LOW	1=CLEAR; 2=ALARM	95	No-units
MI	84	LENS SENSOR - CL LEVEL OOR >30PPM	1=CLEAR; 2=ALARM	95	No-units
MI	85	LENS SENSOR - pH LOW <5	1=CLEAR; 2=ALARM	95	No-units
MI	86	LENS SENSOR - pH HIGH >10	1=CLEAR; 2=ALARM	95	No-units
MI	87	LENS SENSOR - COND. HIGH >65000uS	1=CLEAR; 2=ALARM	95	No-units
MI	88	LENS SENSOR - TEMP. HIGH >42C	1=CLEAR; 2=ALARM	95	No-units
AI	90	CHLORINE	PPM	96	Parts-per-million
AI	91	pH	pH	95	No-units
AI	92	CONDUCTIVITY	uS/cm	95	No-units
AI	93	ORP	mV	124	Millivolts
AI	94	TEMPERATURE	°F/°C	64	Degrees-Fahrenheit
AI	95	RPM	RPM	95	No-units

BP-A BACnet POINTS MAPPING - V1.0					
BP-A SYSTEMS ONLY - LENS SENSOR					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
AI	96	VOLTAGE	mV	124	Millivolts
AI	97	LENS ERROR 0	SEE LENS MANUAL	95	No-units
AI	98	LENS ERROR 1	SEE LENS MANUAL	95	No-units
AI	99	LENS ERROR 2	SEE LENS MANUAL	95	No-units
AI	100	LENS ERROR 3	SEE LENS MANUAL	95	No-units
AI	101	LENS ERROR 4	SEE LENS MANUAL	95	No-units
AI	102	MAINT_MP_SENSOR_CLEANING	DAYS REMAINING	70	Days
AI	103	MAINT_MP_SENSOR_1Y_KIT	DAYS REMAINING	70	Days
AI	104	MAINT_MP_SENSOR_ANNUAL_PH_REP	DAYS REMAINING	70	Days
AI	105	MAINT_MP_SENSOR_5Y_FACTORY	DAYS REMAINING	70	Days
AI	106	CHLORINE LOW SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	107	CHLORINE LOW MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	108	CHLORINE LOW HOURS - 0 DAYS AGO	Hours	71	Hours
AI	109	CHLORINE LOW DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	110	CHLORINE LOW MONTH - 0 DAYS AGO	Month	68	Months
AI	111	CHLORINE LOW YEAR - 0 DAYS AGO	Year	67	Years
AI	112	CHLORINE HIGH SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	113	CHLORINE HIGH MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	114	CHLORINE HIGH HOURS - 0 DAYS AGO	Hours	71	Hours
AI	115	CHLORINE HIGH DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	116	CHLORINE HIGH MONTH - 0 DAYS AGO	Month	68	Months
AI	117	CHLORINE HIGH YEAR - 0 DAYS AGO	Year	67	Years
AI	118	pH LOW SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	119	pH LOW MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	120	pH LOW HOURS - 0 DAYS AGO	Hours	71	Hours
AI	121	pH LOW DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	122	pH LOW MONTH - 0 DAYS AGO	Month	68	Months
AI	123	pH LOW YEAR - 0 DAYS AGO	Year	67	Years
AI	124	pH HIGH SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	125	pH HIGH MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	126	pH HIGH HOURS - 0 DAYS AGO	Hours	71	Hours
AI	127	pH HIGH DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	128	pH HIGH MONTH - 0 DAYS AGO	Month	68	Months
AI	129	pH HIGH YEAR - 0 DAYS AGO	Year	67	Years
AI	130	CONDUCTIVITY LOW SECONDS - 0 DAYS AGO	Seconds	73	Seconds

BP-A BACnet POINTS MAPPING - V1.0					
BP-A SYSTEMS ONLY - LENS SENSOR					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
AI	131	CONDUCTIVITY LOW MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	132	CONDUCTIVITY LOW HOURS - 0 DAYS AGO	Hours	71	Hours
AI	133	CONDUCTIVITY LOW DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	134	CONDUCTIVITY LOW MONTH - 0 DAYS AGO	Month	68	Months
AI	135	CONDUCTIVITY LOW YEAR - 0 DAYS AGO	Year	67	Years
AI	136	CONDUCTIVITY HIGH SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	137	CONDUCTIVITY HIGH MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	138	CONDUCTIVITY HIGH HOURS - 0 DAYS AGO	Hours	71	Hours
AI	139	CONDUCTIVITY HIGH DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	140	CONDUCTIVITY HIGH MONTH - 0 DAYS AGO	Month	68	Months
AI	141	CONDUCTIVITY HIGH YEAR - 0 DAYS AGO	Year	67	Years
AI	142	ORP LOW SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	143	ORP LOW MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	144	ORP LOW HOURS - 0 DAYS AGO	Hours	71	Hours
AI	145	ORP LOW DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	146	ORP LOW MONTH - 0 DAYS AGO	Month	68	Months
AI	147	ORP LOW YEAR - 0 DAYS AGO	Year	67	Years
AI	148	ORP HIGH SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	149	ORP HIGH MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	150	ORP HIGH HOURS - 0 DAYS AGO	Hours	71	Hours
AI	151	ORP HIGH DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	152	ORP HIGH MONTH - 0 DAYS AGO	Month	68	Months
AI	153	ORP HIGH YEAR - 0 DAYS AGO	Year	67	Years
AI	154	TEMPERATURE LOW SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	155	TEMPERATURE LOW MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	156	TEMPERATURE LOW HOURS - 0 DAYS AGO	Hours	71	Hours
AI	157	TEMPERATURE LOW DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	158	TEMPERATURE LOW MONTH - 0 DAYS AGO	Month	68	Months
AI	159	TEMPERATURE LOW YEAR - 0 DAYS AGO	Year	67	Years
AI	160	TEMPERATURE HIGH SECONDS - 0 DAYS AGO	Seconds	73	Seconds
AI	161	TEMPERATURE HIGH MINUTES - 0 DAYS AGO	Minutes	72	Minutes
AI	162	TEMPERATURE HIGH HOURS - 0 DAYS AGO	Hours	71	Hours
AI	163	TEMPERATURE HIGH DAY - 0 DAYS AGO	Day (of Month)	70	Days
AI	164	TEMPERATURE HIGH MONTH - 0 DAYS AGO	Month	68	Months
AI	165	TEMPERATURE HIGH YEAR - 0 DAYS AGO	Year	67	Years

BP-A BACnet POINTS MAPPING - V1.0					
BP-A SYSTEMS ONLY - LENS SENSOR					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
AI	166	CHLORINE LOW SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	167	CHLORINE LOW MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	168	CHLORINE LOW HOURS - 1 DAY AGO	Hours	71	Hours
AI	169	CHLORINE LOW DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	170	CHLORINE LOW MONTH - 1 DAY AGO	Month	68	Months
AI	171	CHLORINE LOW YEAR - 1 DAY AGO	Year	67	Years
AI	172	CHLORINE HIGH SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	173	CHLORINE HIGH MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	174	CHLORINE HIGH HOURS - 1 DAY AGO	Hours	71	Hours
AI	175	CHLORINE HIGH DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	176	CHLORINE HIGH MONTH - 1 DAY AGO	Month	68	Months
AI	177	CHLORINE HIGH YEAR - 1 DAY AGO	Year	67	Years
AI	178	pH LOW SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	179	pH LOW MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	180	pH LOW HOURS - 1 DAY AGO	Hours	71	Hours
AI	181	pH LOW DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	182	pH LOW MONTH - 1 DAY AGO	Month	68	Months
AI	183	pH LOW YEAR - 1 DAY AGO	Year	67	Years
AI	184	pH HIGH SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	185	pH HIGH MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	186	pH HIGH HOURS - 1 DAY AGO	Hours	71	Hours
AI	187	pH HIGH DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	188	pH HIGH MONTH - 1 DAY AGO	Month	68	Months
AI	189	pH HIGH YEAR - 1 DAY AGO	Year	67	Years
AI	190	CONDUCTIVITY LOW SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	191	CONDUCTIVITY LOW MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	192	CONDUCTIVITY LOW HOURS - 1 DAY AGO	Hours	71	Hours
AI	193	CONDUCTIVITY LOW DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	194	CONDUCTIVITY LOW MONTH - 1 DAY AGO	Month	68	Months
AI	195	CONDUCTIVITY LOW YEAR - 1 DAY AGO	Year	67	Years
AI	196	CONDUCTIVITY HIGH SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	197	CONDUCTIVITY HIGH MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	198	CONDUCTIVITY HIGH HOURS - 1 DAY AGO	Hours	71	Hours
AI	199	CONDUCTIVITY HIGH DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	200	CONDUCTIVITY HIGH MONTH - 1 DAY AGO	Month	68	Months

BP-A BACnet POINTS MAPPING - V1.0					
BP-A SYSTEMS ONLY - LENS SENSOR					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
AI	201	CONDUCTIVITY HIGH YEAR - 1 DAY AGO	Year	67	Years
AI	202	ORP LOW SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	203	ORP LOW MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	204	ORP LOW HOURS - 1 DAY AGO	Hours	71	Hours
AI	205	ORP LOW DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	206	ORP LOW MONTH - 1 DAY AGO	Month	68	Months
AI	207	ORP LOW YEAR - 1 DAY AGO	Year	67	Years
AI	208	ORP HIGH SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	209	ORP HIGH MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	210	ORP HIGH HOURS - 1 DAY AGO	Hours	71	Hours
AI	211	ORP HIGH DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	212	ORP HIGH MONTH - 1 DAY AGO	Month	68	Months
AI	213	ORP HIGH YEAR - 1 DAY AGO	Year	67	Years
AI	214	TEMPERATURE LOW SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	215	TEMPERATURE LOW MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	216	TEMPERATURE LOW HOURS - 1 DAY AGO	Hours	71	Hours
AI	217	TEMPERATURE LOW DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	218	TEMPERATURE LOW MONTH - 1 DAY AGO	Month	68	Months
AI	219	TEMPERATURE LOW YEAR - 1 DAY AGO	Year	67	Years
AI	220	TEMPERATURE HIGH SECONDS - 1 DAY AGO	Seconds	73	Seconds
AI	221	TEMPERATURE HIGH MINUTES - 1 DAY AGO	Minutes	72	Minutes
AI	222	TEMPERATURE HIGH HOURS - 1 DAY AGO	Hours	71	Hours
AI	223	TEMPERATURE HIGH DAY - 1 DAY AGO	Day (of Month)	70	Days
AI	224	TEMPERATURE HIGH MONTH - 1 DAY AGO	Month	68	Months
AI	225	TEMPERATURE HIGH YEAR - 1 DAY AGO	Year	67	Years
AI	322	CHLORINE DISPLAY PERCENT	% (DISPLAY)	71	Hours
AI	323	pH DISPLAY PERCENT	% (DISPLAY)	71	Hours
AI	324	CONDUCTIVITY DISPLAY PERCENT	% (DISPLAY)	71	Hours
AI	325	ORP DISPLAY PERCENT	% (DISPLAY)	71	Hours
AI	326	TEMPERATURE DISPLAY PERCENT	% (DISPLAY)	71	Hours
AI	349	CHLORINE HIGH ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	350	CHLORINE LOW ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	351	pH HIGH ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	352	pH LOW ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	353	CONDUCTIVITY HIGH ALARM DELAY SETPOINT	Seconds	73	Seconds

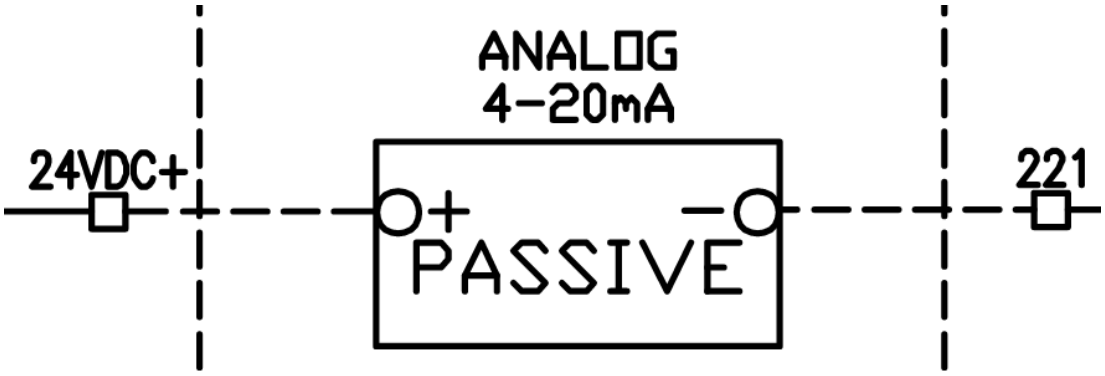
BP-A BACnet POINTS MAPPING - V1.0					
BP-A SYSTEMS ONLY - LENS SENSOR					
OBJ TYPE	OBJ NUM	NAME	DESCRIPTION	BACNET UNITS	ENGINEERING UNITS
AI	354	CONDUCTIVITY LOW ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	355	ORP HIGH ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	356	ORP LOW ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	357	TEMPERATURE HIGH ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	358	TEMPERATURE LOW ALARM DELAY SETPOINT	Seconds	73	Seconds
AI	385	CHLORINE HIGH ALARM SETPOINT	PPM	96	Parts-per-million
AI	386	CHLORINE LOW ALARM SETPOINT	PPM	96	Parts-per-million
AI	387	pH HIGH ALARM SETPOINT	pH	95	No-units
AI	388	pH LOW ALARM SETPOINT	pH	95	No-units
AI	389	CONDUCTIVITY HIGH ALARM SETPOINT	uS/cm	95	No-units
AI	390	CONDUCTIVITY LOW ALARM SETPOINT	uS/cm	95	No-units
AI	391	ORP HIGH ALARM SETPOINT	mV	124	Millivolts
AI	392	ORP LOW ALARM SETPOINT	mV	124	Millivolts
AI	393	TEMPERATURE HIGH ALARM SETPOINT	°F/°C	64	Degrees-Fahrenheit
AI	394	TEMPERATURE LOW ALARM SETPOINT	°F/°C	64	Degrees-Fahrenheit
AI	395	CHLORINE LOW VALUE - 1 DAY AGO	PPM	96	Parts-per-million
AI	396	CHLORINE HIGH VALUE - 1 DAY AGO	PPM	96	Parts-per-million
AI	397	pH LOW VALUE - 1 DAY AGO	pH	95	No-units
AI	398	pH HIGH VALUE - 1 DAY AGO	pH	95	No-units
AI	399	CONDUCTIVITY LOW VALUE - 1 DAY AGO	uS/cm	95	No-units
AI	400	CONDUCTIVITY HIGH VALUE - 1 DAY AGO	uS/cm	95	No-units
AI	401	ORP LOW VALUE - 1 DAY AGO	mV	124	Millivolts
AI	402	ORP HIGH VALUE - 1 DAY AGO	mV	124	Millivolts
AI	403	TEMPERATURE LOW VALUE - 1 DAY AGO	°F/°C	64	Degrees-Fahrenheit
AI	404	TEMPERATURE HIGH VALUE - 1 DAY AGO	°F/°C	64	Degrees-Fahrenheit
AI	425	CHLORINE DISPLAY MIN	PPM	96	Parts-per-million
AI	426	CHLORINE DISPLAY MAX	PPM	96	Parts-per-million
AI	427	pH DISPLAY MIN	pH	95	No-units
AI	428	pH DISPLAY MAX	pH	95	No-units
AI	429	CONDUCTIVITY DISPLAY MIN	uS/cm	95	No-units
AI	430	CONDUCTIVITY DISPLAY MAX	uS/cm	95	No-units
AI	431	ORP DISPLAY MIN	mV	124	Millivolts
AI	432	ORP DISPLAY MAX	mV	124	Millivolts
AI	433	TEMPERATURE DISPLAY MIN	°F/°C	64	Degrees-Fahrenheit
AI	434	TEMPERATURE DISPLAY MAX	°F/°C	64	Degrees-Fahrenheit

14 CONNECTING EXTERNAL SENSORS (BPA/BPS Systems Only)

Up to (4) auxiliary analog sensors and (4) dry contact sensors, switches, etc. may be wired directly to the BPA/BPS system control panel for additional monitoring. This is accomplished by utilizing the integral 24VDC power supply. The power would be supplied by the system control panel to the external device and returned to the panel, completing the circuit.

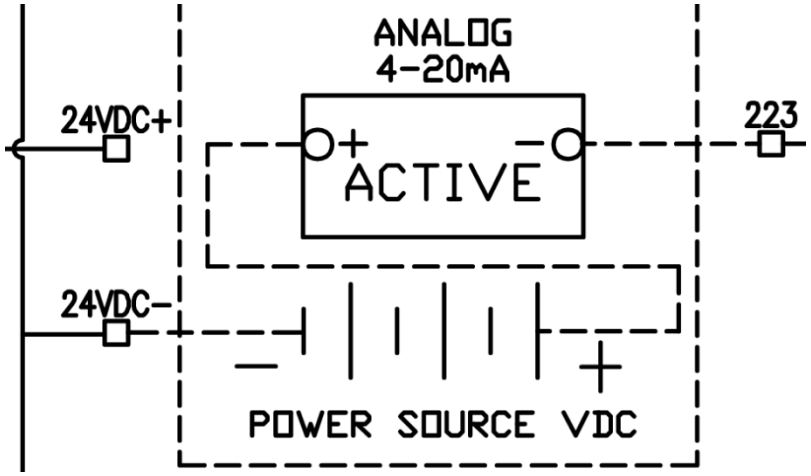
14.1 AUXILIARY ANALOG SENSOR (PASSIVE)

1) Verify the desired sensor is compatible with the 24VDC power being supplied by the control panel and that the analog type is a 4-20mA type sensor.
2) It is recommended to de-energize the panel prior to opening the panel door to perform the subsequent sensor installation.
3) Connect the (+) wire from the sensor to one of the (4) terminals labeled 24VDC+ to supply power to the auxiliary analog sensor.
4) Connect the (-) wire from the sensor to one of the (4) terminals labeled as an analog input. Each analog input has a specific terminal associated with it. If the sensor is landed on the incorrect terminal, the auxiliary analog setup process will not be able to be completed correctly. Consult the included wiring diagram for analog input terminal listing.



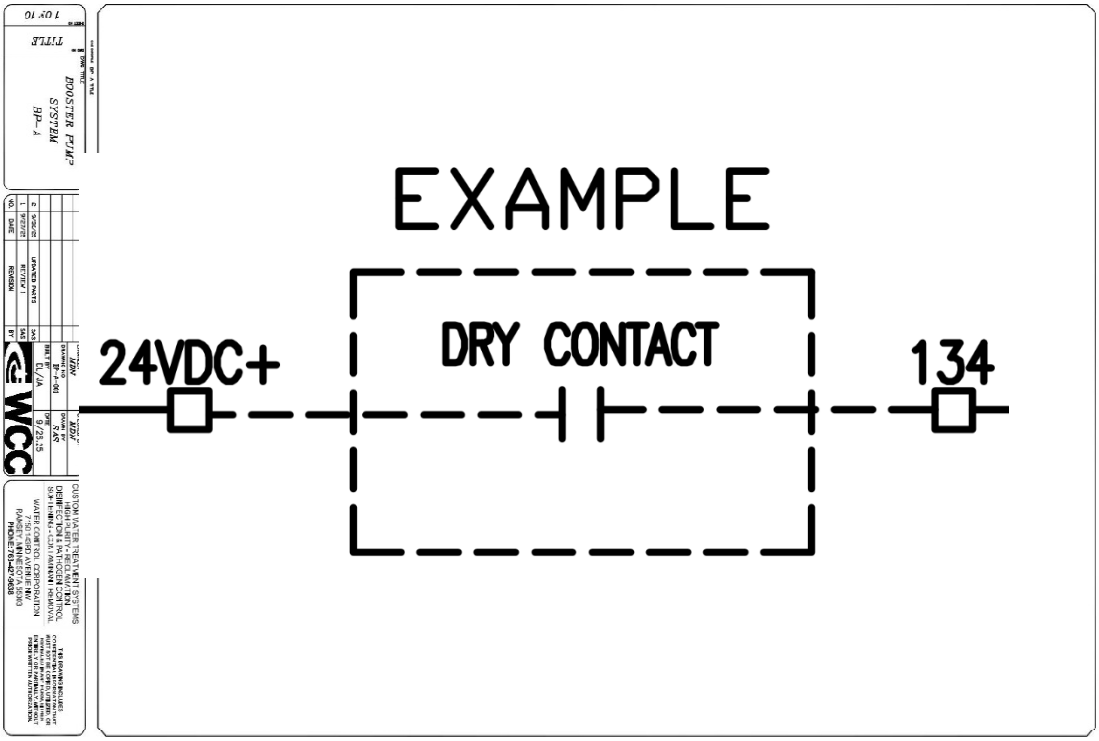
14.2 AUXILIARY ANALOG SENSOR (ACTIVE)

1) Verify the desired sensor is compatible with the control panel and that the analog type is a 4-20mA type sensor.
2) It is recommended to de-energize the panel prior to opening the panel door to perform the subsequent sensor installation.
3) Connect the (+) wire from the sensor to the external or LENS panel power supply (24VDC+). Connect the analog signal wire from the sensor to one of (4) terminals labeled as analog input. Each analog input has a specific terminal associated with it. If the sensor is landed on the incorrect terminal, the auxiliary analog setup process will not be able to be completed correctly. Consult the included wiring diagram for analog input terminal listing.
4) Connect the (-) wire from the sensor to the external or LENS panel power supply (24VDC-). If using an external power supply, the negative side of the power supply must be tied together with one of the negative terminals located in the LENS panel labeled 24VDC-.



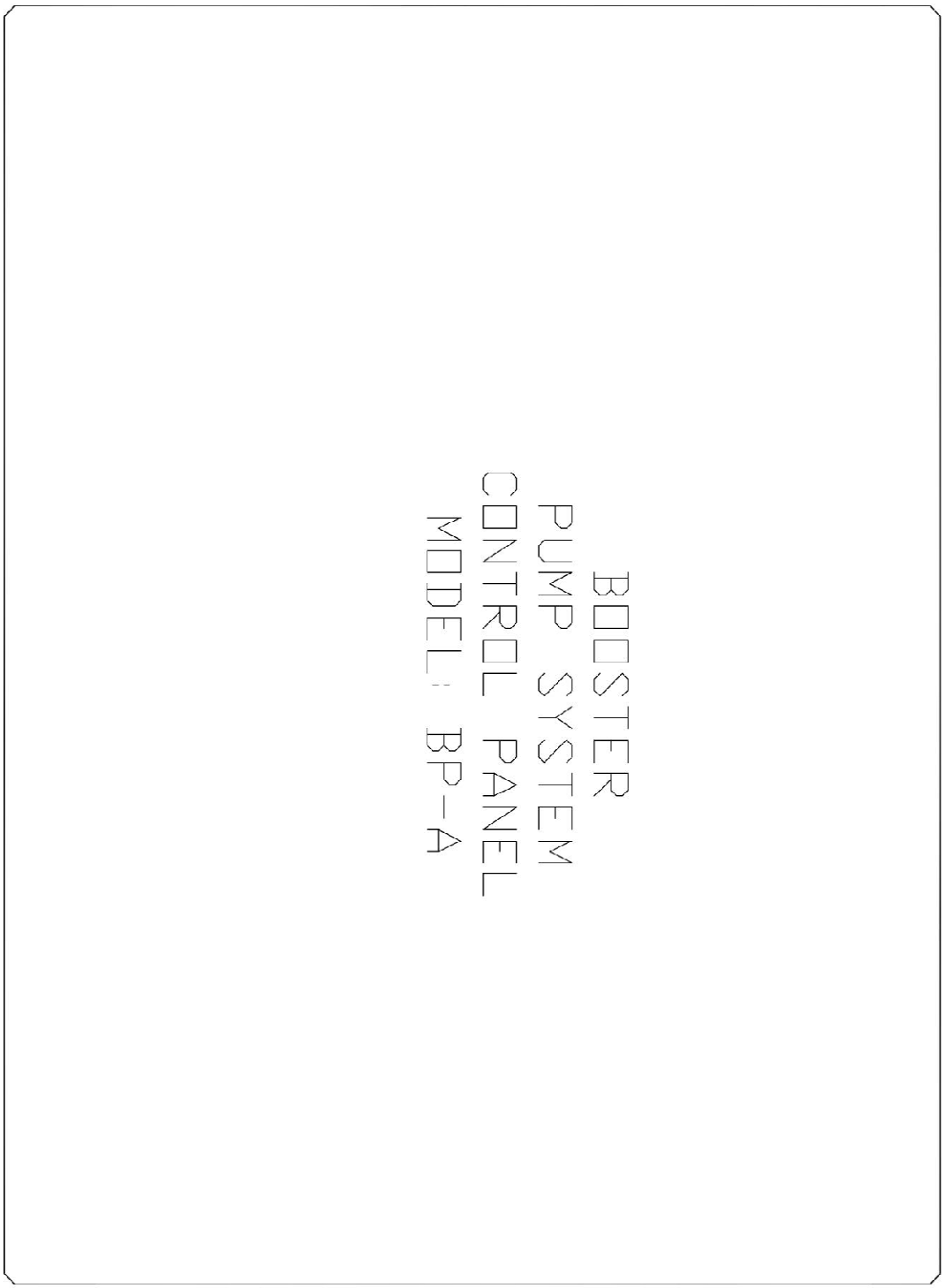
14.3 DIGITAL INPUT SENSOR/SWITCH

1) Verify the desired sensor/switch is compatible with the 24VDC power being supplied by the control panel. The sensor/switch needs to either activate based on 24VDC power or be dry contact type sensor/switch.
2) It is recommended to de-energize the panel prior to opening the panel door to perform the subsequent sensor installation.
3) Connect the (+) wire from the sensor/switch to one of (4) terminals labeled 24VDC+ to supply power to the auxiliary sensor/switch.
4) Connect the (-) wire from the sensor/switch to one of the (4) terminals labeled as digital input. Each digital input has a specific terminal associated with it. If the sensor is landed on the incorrect terminal, the digital input setup process will not be able to be completed correctly. Consult the included wiring diagram for digital input terminal listing.



15 WIRING DIAGRAMS

15.1 BPA SERIES



TAG NAMING	
TAG	DESCRIPTION
AI	ANALOG INPUT
AO	ANALOG OUTPUT
CB	CIRCUIT BREAKER
CON	CONTACTOR
CR	CONTROL RELAY
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
DIV	DIVERT VALVES
DIS	DISCONNECT
FLT	FLOAT LEVEL SWITCH
FM	FLOW METER
FS	FLOW SENSOR
GND	GROUND
LS	LIMIT SWITCH
LT	PILOT LIGHT
MS	MOTOR STARTER
MTR	MOTOR
NS	NETWORK SWITCH
PBLT	PUSH BUTTON PILOT LIGHT
PDB	POWER DISTRIBUTION BLOCK
PLC	PROGRAMABLE LOGIC CONTROLLER
PS	PRESSURE SWITCH
PT	PRESSURE TRANSDUCER
PWS	POWER SUPPLY
RO	REVERSE OSMOSIS
SI	SIGNAL ISOLATOR
SOL	SOLENOID
SP	SIGNAL SPLITTER
SS	SELECTOR SWITCH
SU	SURGE PROTECTOR
TAS	TEMPERATURE SWITCH
TB	TERMINAL BLOCK
TD	TIMER
TMP	TEMPERATURE SWITCH
UV	ULTRAVIOLET
VFD	VARIABLE FREQ. DRIVE
WS	WATER SOFTENER
XF	TRANSFORMER

AMPACITIES OF INSULATED CONDUCTORS-UL508A TABLE 28.1, 38.1 COPPER WIRE		
WIRE SIZE-AWG	AMPS-60° C	AMPS 75° C
24	2	
22	3	
20	5	
18	7	
16	10	
14	15	15
12	20	20
10	30	30
8	40	50
6	55	65
4	70	85
3	85	100
2	95	115
1	110	130
1 / 0		150
2 / 0		175
3 / 0		200
4 / 0		230

WIRE COLOR ABBREVIATIONS	
BLK	BLACK
RED	RED
WHT	WHITE
GRN	GREEN
BLU	BLUE
WHT/BLU	WHITE W/BLUE STRIPE
YEL	YELLOW
ORG	ORANGE
BRN	BROWN
CLR	CLEAR

WIRE COLOR CODES	
BLACK	120 VAC HOT FROM LIGHTING PANEL AND HIGH VOLTALGE CIRCUITS
RED	INTERNAL 120 VAC CONTROL WIRING
WHITE	GROUNDED 120 VAC NEUTRAL
GREEN	GROUND
BLUE	24 VDC, 15 VDC AND 12 VIC POSITIVE
WHITE W/BLUE STRIPE	24 VDC, 15 VDC AND 12 VIC COMMON
YELLOW	EXTERNAL VOLTAGE SOURCE
ORANGE	EXTERNAL VOLTAGE SOURCE (UL508A UPDATE)
ANALOG	WHITE OR CLEAR POSITIVE (+), BLACK NEGATIVE (-)

MINIMUM WIRE GAUGES	
18 AWG	PLC I/O AAND ANALOG (SHIELDED TWISTED PAIR)
16 AWG	AC AND DC CONTROL CIRCUITS AND POWER TO PLC
14 AWG	POWER CIRCUITS, CIRCUIT BREAKERS AND GROUND CONDUCTORS
14 AWG	VOLTAGES GREATER THAN 120 VOLTS

STANDARD, STRAIGHT-THROUGH WIRING DIAGRAM
(BOTH ENDS ARE THE SAME):

ETHERNET

T568A CABLE		
RJ-45 TO RJ-45		
PIN	WIRE COLOR	10Base-T Signal 100Base-TX Signal
1	WHT/GRN	TRANSMIT +
2	GRN	TRANSMIT -
3	WHT/ORG	RECEIVE +
4	BLU	UNUSED
5	WHT/BLU	UNUSED
6	ORG	RECEIVE -
7	WHT/BRN	UNUSED
8	BRN	UNUSED

ETHERNET

T568B CABLE		
RJ-45 TO RJ-45		
PIN	WIRE COLOR	10Base-T Signal 100Base-TX Signal
1	WHT/ORG	TRANSMIT +
2	ORG	TRANSMIT -
3	WHT/GRN	RECEIVE +
4	BLU	UNUSED
5	WHT/BLU	UNUSED
6	GRN	RECEIVE -
7	WHT/BRN	UNUSED
8	BRN	UNUSED

CROSSOVER CABLE WIRING DIAGRAM (T568B):

ETHERNET

CROSS-OVER CABLE		
RJ-45 (T568B) TO RJ-45 (T568A)		
PIN	WIRE COLOR	PIN
1	WHT/ORG	3
2	ORG	6
3	WHT/GRN	1
4	BLU	7
5	WHT/BLU	8
6	GRN	2
7	WHT/BRN	4
8	BRN	5

CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL
WATER CONTROL CORPORATION
7756 145RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-4838

ENGINEER MDN | CHECKED BY MDN
DRAWING NO BP-A-001 | DRAWN BY SAS
BUILT BY DL/JA | DATE 9/26/25

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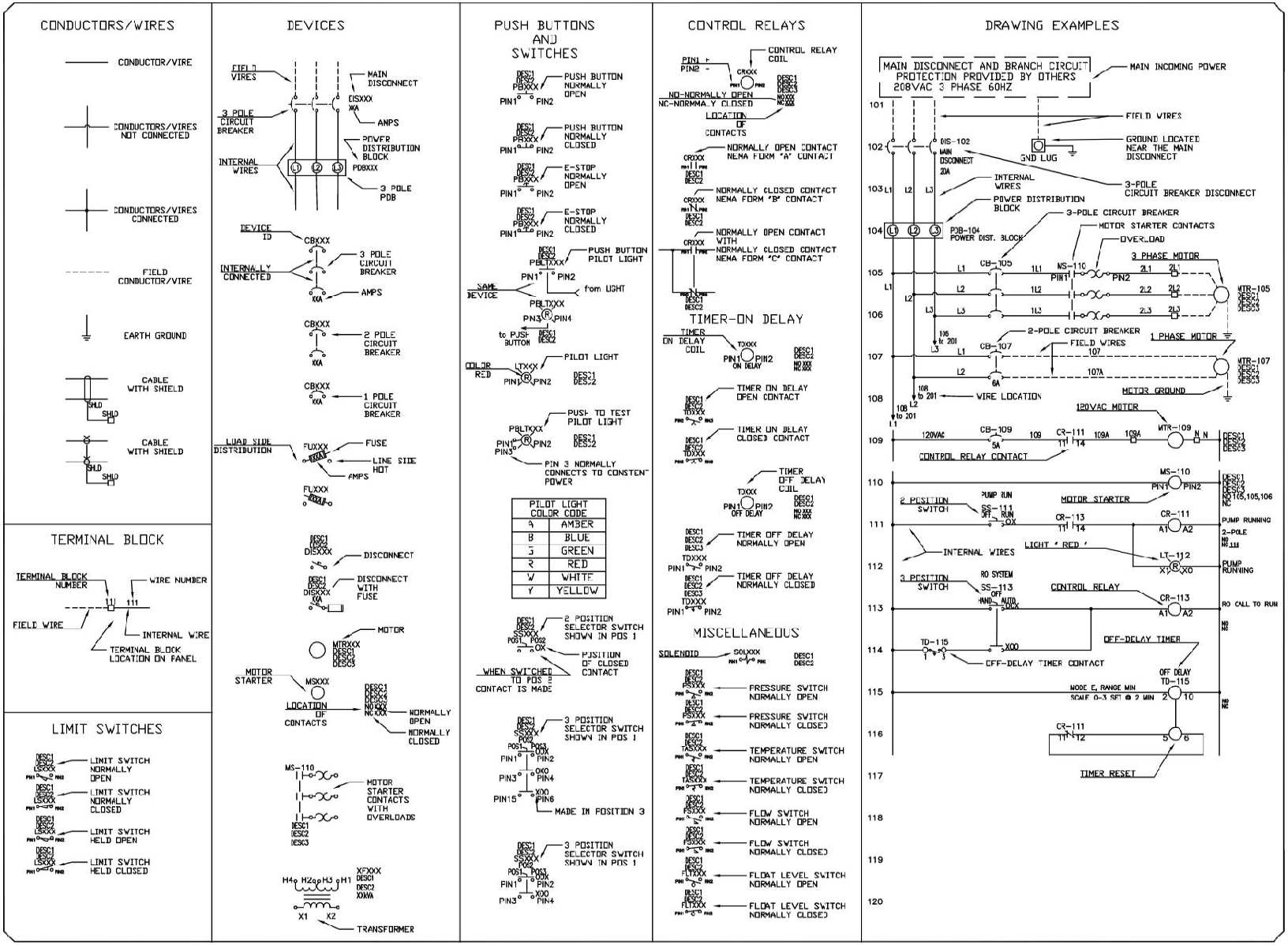
2	9/30/25	UPDATED PARTS	SAS
1	9/27/25	REVIEW 1	SAS

DWG TITLE: BOOSTER PUMP SYSTEM BP-A
DWG NO: STANDARDS
SHEET NO: 2 OF 10


CONDUCTORS/WIRES
CONDUCTOR/VIRE
CONDUCTORS/VIRES NOT CONNECTED
CONDUCTORS/VIRES CONNECTED
FIELD CONDUCTOR/VIRE
EARTH GROUND
CABLE WITH SHIELD
CABLE WITH SHIELD
TERMINAL BLOCK
TERMINAL BLOCK NUMBER
WIRE NUMBER
FIELD WIRE
INTERNAL WIRE
TERMINAL BLOCK LOCATION ON PANEL
LIMIT SWITCHES
LIMIT SWITCH NORMALLY OPEN
LIMIT SWITCH NORMALLY CLOSED
LIMIT SWITCH HELD OPEN
LIMIT SWITCH HELD CLOSED
DEVICES
FIELD WIRES
MAIN DISCONNECT
3 POLE CIRCUIT BREAKER
AMPS
POWER DISTRIBUTION BLOCK
INTERNAL WIRES
3 POLE PDB
DEVICE ID
INTERNALLY CONNECTED
2 POLE CIRCUIT BREAKER
1 POLE CIRCUIT BREAKER
LOAD SIDE DISTRIBUTION
FUSE
LINE SIDE HOT
DISCONNECT
DISCONNECT WITH FUSE
MOTOR
MOTOR STARTER
LOCATION OF CONTACTS
NORMALLY OPEN
NORMALLY CLOSED
MOTOR STARTER CONTACTS WITH OVERLOADS
TRANSFORMER
PUSH BUTTONS AND SWITCHES
PUSH BUTTON NORMALLY OPEN
PUSH BUTTON NORMALLY CLOSED
E-STOP NORMALLY OPEN
E-STOP NORMALLY CLOSED
PUSH BUTTON PILOT LIGHT
SAME DEVICE
from LIGHT
to PUSH BUTTON
PILOT LIGHT
PUSH TO TEST PILOT LIGHT
PIN 3 NORMALLY CONNECTS TO CONSTENT POWER
PILOT LIGHT COLOR CODE
A AMBER
B BLUE
G GREEN
R RED
W WHITE
Y YELLOW
2 POSITION SELECTOR SWITCH SHOWN IN POS 1
POSITION OF CLOSED CONTACT
WHEN SWITCHED TO POS 2 CONTACT IS MADE
3 POSITION SELECTOR SWITCH SHOWN IN POS 1
MADE IN POSITION 3
CONTROL RELAYS
CONTROL RELAY COIL
NO-NORMALLY OPEN
NC-NORMALLY CLOSED
LOCATION OF CONTACTS
NORMALLY OPEN CONTACT NEMA FORM "A" CONTACT
NORMALLY CLOSED CONTACT NEMA FORM "B" CONTACT
NORMALLY OPEN CONTACT WITH NORMALLY CLOSED CONTACT NEMA FORM "C" CONTACT
TIMER-ON DELAY
TIMER ON DELAY COIL
TIMER ON DELAY OPEN CONTACT
TIMER ON DELAY CLOSED CONTACT
TIMER OFF DELAY COIL
TIMER OFF DELAY NORMALLY OPEN
TIMER OFF DELAY NORMALLY CLOSED
MISCELLANEOUS
SOLENOID
PRESSURE SWITCH NORMALLY OPEN
PRESSURE SWITCH NORMALLY CLOSED
TEMPERATURE SWITCH NORMALLY OPEN
TEMPERATURE SWITCH NORMALLY CLOSED
FLOW SWITCH NORMALLY OPEN
FLOW SWITCH NORMALLY CLOSED
FLOAT LEVEL SWITCH NORMALLY OPEN
FLOAT LEVEL SWITCH NORMALLY CLOSED
DRAWING EXAMPLES
MAIN DISCONNECT AND BRANCH CIRCUIT PROTECTION PROVIDED BY OTHERS 208VAC 3 PHASE 60HZ
MAIN INCOMING POWER
FIELD WIRES
GROUND LOCATED NEAR THE MAIN DISCONNECT
GND LUG
DIS-102 MAIN DISCONNECT 20A
INTERNAL WIRES
3-POLE CIRCUIT BREAKER DISCONNECT
POWER DISTRIBUTION BLOCK
3-POLE CIRCUIT BREAKER
MOTOR STARTER CONTACTS
OVERLOAD
PDB-104 POWER DIST. BLOCK
3 PHASE MOTOR
MTR-105
2-POLE CIRCUIT BREAKER
FIELD WIRES
1 PHASE MOTOR
MTR-107
WIRE LOCATION
MOTOR GROUND
120VAC MOTOR
MTR-109
120VAC
CONTROL RELAY CONTACT
2 POSITION SWITCH
PUMP RUN
MOTOR STARTER
PUMP RUNNING 2-POLE
INTERNAL WIRES
LIGHT " RED "
PUMP RUNNING
3 POSITION SWITCH
RO SYSTEM
CONTROL RELAY
RO CALL TO RUN
OFF-DELAY TIMER
OFF-DELAY TIMER CONTACT
MODE E, RANGE MIN SCALE 0-3 SET @ 2 MIN
OFF DELAY TD-115
TIMER RESET
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HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL
WATER CONTROL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9638
ENGINEER JDW
CHECKED BY JDW
DRAWING NO 001
DRAWN BY SAS
SHEET BY DL/JA
DATE 9/26/25
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2 9/30/25 UPDATED PARTS SAS
1 9/27/25 REVIEW 1 SAS
NO. DATE REVISION BY
DWG TITLE BOOSTER PUMP SYSTEM BP-A
DWG NO SYMBOLS
SHEET NO 3 OF 10
CAD DWG FILE: BP-A SYMBOL STANDARDS

BOOSTER PUMP SYSTEM PUMP TABLE

Pumps																		
Part Number	Description	HP	Voltage	Ph.	Amp	Circuit Breaker		Pumps	FLA	DISC.		Pumps	FLA	DISC.		Pumps	FLA	DISC.
99340970	CRE 10-4, 460V/3PH, NO SENSOR, 2 FLG, 460V/3PH	3	460	3	3.8	SU203M-K6		2	7.6	SU203M-K15		3	11.4	SU203M-K20		4	15.2	SU203M-K20
99391956	CRE 10-4, 240V/3PH, NO SENSOR, 2 FLG, 240V/3PH	3	200-240	3	5.6	SU203M-K15		2	13.2*	SU203M-K20		3	19.8*	SU203M-K32		4	26.4*	XT1NU3060AFF 000XXX
99076140	CRE 10-6, 460V/3PH, NO SENSOR, 2 FLG, 460V/3PH	5	460	3	6	SU203M-K15		2	12	SU203M-K20		3	18	SU203M-K32		4	24	XT1NU3060AFF 000XXX
99391957	CRE 10-6, 240V/3PH, NO SENSOR, 2 FLG, 240V/3PH	5	200-240	3	10.9	SU203M-K32		2	21.8*	SU203M-K40		3	32.7*	XT1NU3060AFF 000XXX		4	43.6*	XT1NU3100AFF 000XXX
99076264	CRE 20-2, 460V/3PH, NO SENSOR, 2 FLG, 460V/3PH	5	460	3	6	SU203M-K15		2	12	SU203M-K20		3	18	SU203M-K32		4	24	XT1NU3060AFF 000XXX
99392158	CRE 20-2, 240V/3PH, NO SENSOR, 2 FLG, 240V/3PH	5	200-240	3	10.9	SU203M-K32		2	21.8*	SU203M-K40		3	32.7*	XT1NU3060AFF 000XXX		4	43.6*	XT1NU3100AFF 000XXX
99076265	CRE 20-3, 460V/3PH, NO SENSOR, 2 FLG, 460V/3PH	7.5	460	3	8.8	SU203M-K20		2	17.6	SU203M-K32		3	26.4	XT1NU3060AFF 000XXX		4	35.2	XT1NU3060AFF 000XXX
99392159	CRE 20-3, 240V/3PH, NO SENSOR, 2 FLG, 240V/3PH	7.5	200-240	3	16.6	SU203M-K32		2	33.2*	XT1NU3060AFF 000XXX		3	49.8*	XT1NU3100AFF 000XXX		4	66.4*	XT1NU3100AFF 000XXX
99076523	CRE 32-2-1, 460V/3PH, NO SENSOR, 2.5 FLG, 460V/3PH	7.5	460	3	8.8	SU203M-K20		2	17.6	SU203M-K32		3	26.4	XT1NU3060AFF 000XXX		4	35.2	XT1NU3060AFF 000XXX
99392744	CRE 32-2-1, 240V/3PH, NO SENSOR, 2.5 FLG, 240V/3PH	7.5	200-240	3	16.6	SU203M-K32		2	33.2*	XT1NU3060AFF 000XXX		3	49.8*	XT1NU3100AFF 000XXX		4	66.4*	XT1NU3100AFF 000XXX
99076524	CRE 32-3-2, 460V/3PH, NO SENSOR, 2.5 FLG, 460V/3PH	10	460	3	12.95	SU203M-K32		2	25.9	XT1NU3060AFF 000XXX		3	38.85	XT1NU3100AFF 000XXX		4	51.8	XT1NU3100AFF 000XXX
99076534	CRE 45-1-1, 460V/3PH, NO SENSOR, 3 FLG, 460V/3PH	7.5	460	3	8.8	SU203M-K20		2	17.6	SU203M-K32		3	26.4	XT1NU3060AFF 000XXX		4	35.2	XT1NU3060AFF 000XXX
99392751	CRE 45-1-1, 240V/3PH, NO SENSOR, 3 FLG, 240V/3PH	7.5	200-240	3	16.6	SU203M-K32		2	33.2*	XT1NU3060AFF 000XXX		3	49.8*	XT1NU3100AFF 000XXX		4	66.4*	XT1NU3100AFF 000XXX
99249174	CRE 45-2, 460V/3PH, NO SENSOR, 3 FLG, 460V/3PH	15	460	3	17.25	SU203M-K32		2	34.5	XT1NU3060AFF 000XXX		3	51.75	XT1NU3100AFF 000XXX		4	69	XT1NU3100AFF 000XXX
*	FLA CALCULATED AT MAX VOLTAGE																	

MAIN CIRCUIT BREAKER ACCESSORIES (REQUIRED, QTY. 1)										
MAIN CIRCUIT BREAKER TYPE	MFG	HANDLE		MFG	SHAFT		MFG	BASE	MFG	LUGS
X-1	ABB	□HB65J10		ABB	□XP10X500		ABB	KXTBRHEBFP	ABB	KXTICUALI-3PC (2)
SU200	ABB	CHB65L6		ABB	□XP6X290		ABB	S2C-DH		

CUSTOM WATER TREATMENT SYSTEMS
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WATER CONTROL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-4638

ENGINEER MDW | CHECKED BY MDW
DRAWING NO | DRAWN BY SAS
BUILT BY # 001 | DATE 9/26/25
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1	9/27/25	REVIEW 1	SAS

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USING BOM: BP-A PUMP TABLE

BOOSTER PUMP SYSTEM BP-A

PUMP TABLE

SHEET NO 4 OF 10

REFERENCE PUMP TABLE	REC	QTY	SUB	CATALOG	TAGS	INST	MFG
REFERENCE PUMP TABLE		1	*1		DISCONNECT HANDLE	HANDLE/ADAPTER/SHAFT	ABB
			*1	ADAPTER			ABB
			*1	SHAFT			ABB
REFERENCE PUMP TABLE		1			DIS102		ABB
		1		SU201M-K3	CB140		ABB
		1		SU201M-K4	CB139		ABB
		1		SU202M-K6	CB137		ABB
REFERENCE PUMP TABLE REFERENCE PUMP TABLE REFERENCE PUMP TABLE REFERENCE PUMP TABLE		4		SU203M-KXX	CB105 CB114 CB122 CB130		ABB
		1		3B3-7301	BN234	BACNET	CONTROL SOLUTIONS
		3		569010	PDB103	POWER DIST. BLOCK	ERIFLEX
		1		3T-SB-E	BP214	BLUETOOTH BOX	HALOGEN
		1		CP3020	PANEL		HOFFMAN
		1		CSD302010	ENCLOSURE		HOFFMAN
		1		CWHPTO	DOOR HANDLE		HOFFMAN
		1		HE-XPLWE6	PLC204	PLC	HORNER
		1		WDR-120-24	PWS137	24VDC POWER SUPPLY	MEANWELL
		2		NA-409-1		GND BAR	PENN UNION
		1		LA-2-1		GND LUG	PENN UNION
		1		1085254	NS201	NETWORK SWITCH	PHOENIX CONTACT
		1	*1	2320254	UPS137	UPS/BATTERY	PHOENIX CONTACT
			*1	2938235			PHOENIX CONTACT
		8		2966171	CR301 CR302 CR303 CR306 CR307 CR308 CR309 CR310	24VDC RELAY 24VDC RELAY 24VDC RELAY 24VDC RELAY 24VDC RELAY 24VDC RELAY 24VDC RELAY 24VDC RELAY	PHOENIX CONTACT
		23		3022276		END STOP	PHOENIX CONTACT
		43		3044636	TB1 TB2 TB3 TB4	UTTB 2.5 UTTB 2.5 UTTB 2.5 UTTB 2.5	PHOENIX CONTACT
		4		3044665	TB1	UTTB 2.5-PE	PHOENIX CONTACT
		1	*1	3046032	FU137		PHOENIX CONTACT
			*1	GGM5			MERSEN
		4	*1	3047293		END COVER/SPACER	PHOENIX CONTACT
			*1	3047303			PHOENIX CONTACT
		1		FS 4.4-0.5	M12 MALE BULKHEAD		TURCK

CAD DWG FILE BP-A BOM

DWG TITLE: BOOSTER PUMP SYSTEM BP-A

DWG NO: BOM

SHEET NO: 5 OF 10

NO.	DATE	REVISION	BY
2	9/30/25	UPDATED PARTS	SAS
1	9/27/25	REVIEW 1	SAS

ENGINEER: MDN
CHECKED BY: MDN
DRAWING NO: BP-A-001
DRAWN BY: SAS
BUILT BY: DL/JA
DATE: 9/26.25

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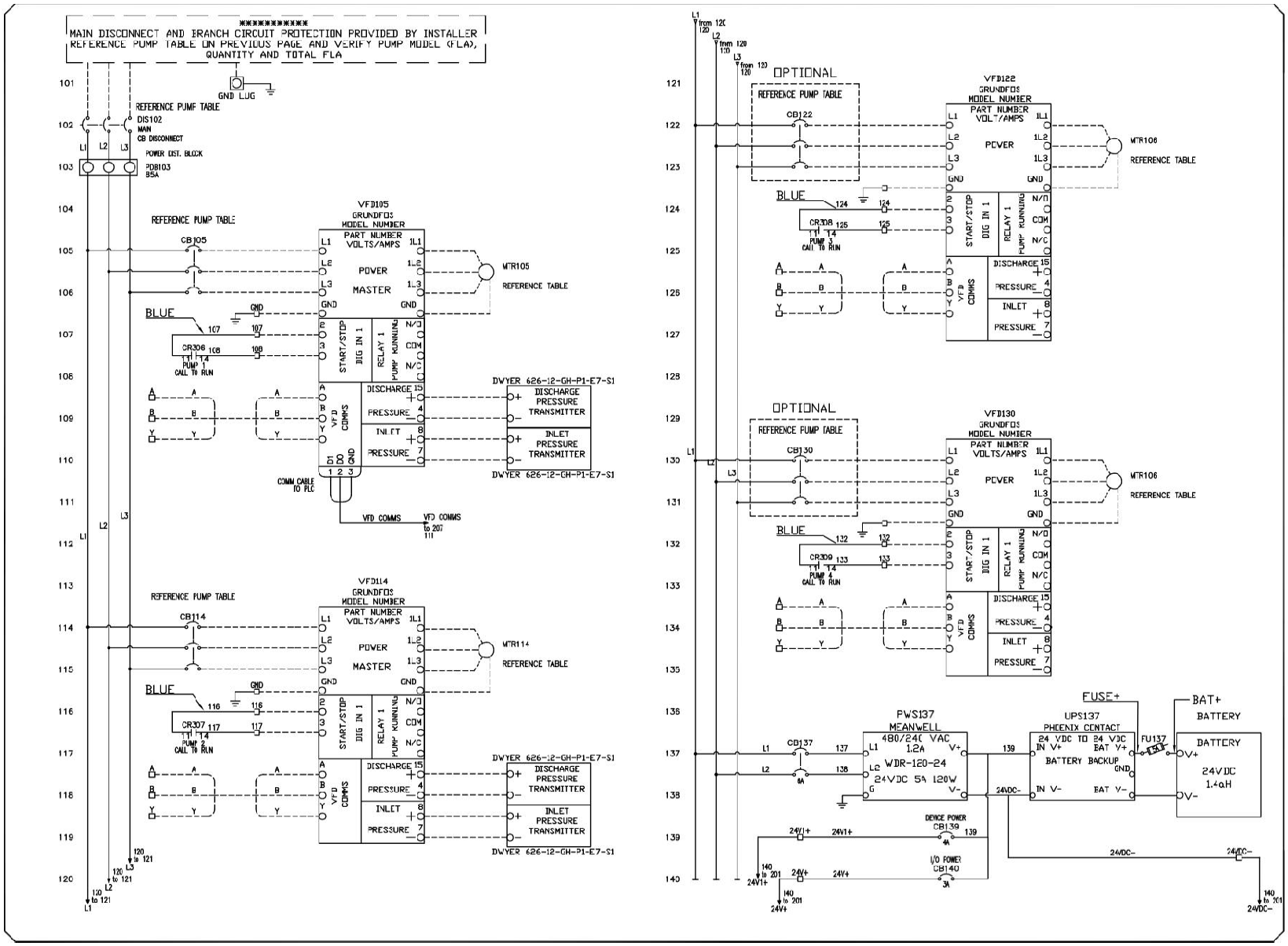
CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL

WATER CONTROL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9638



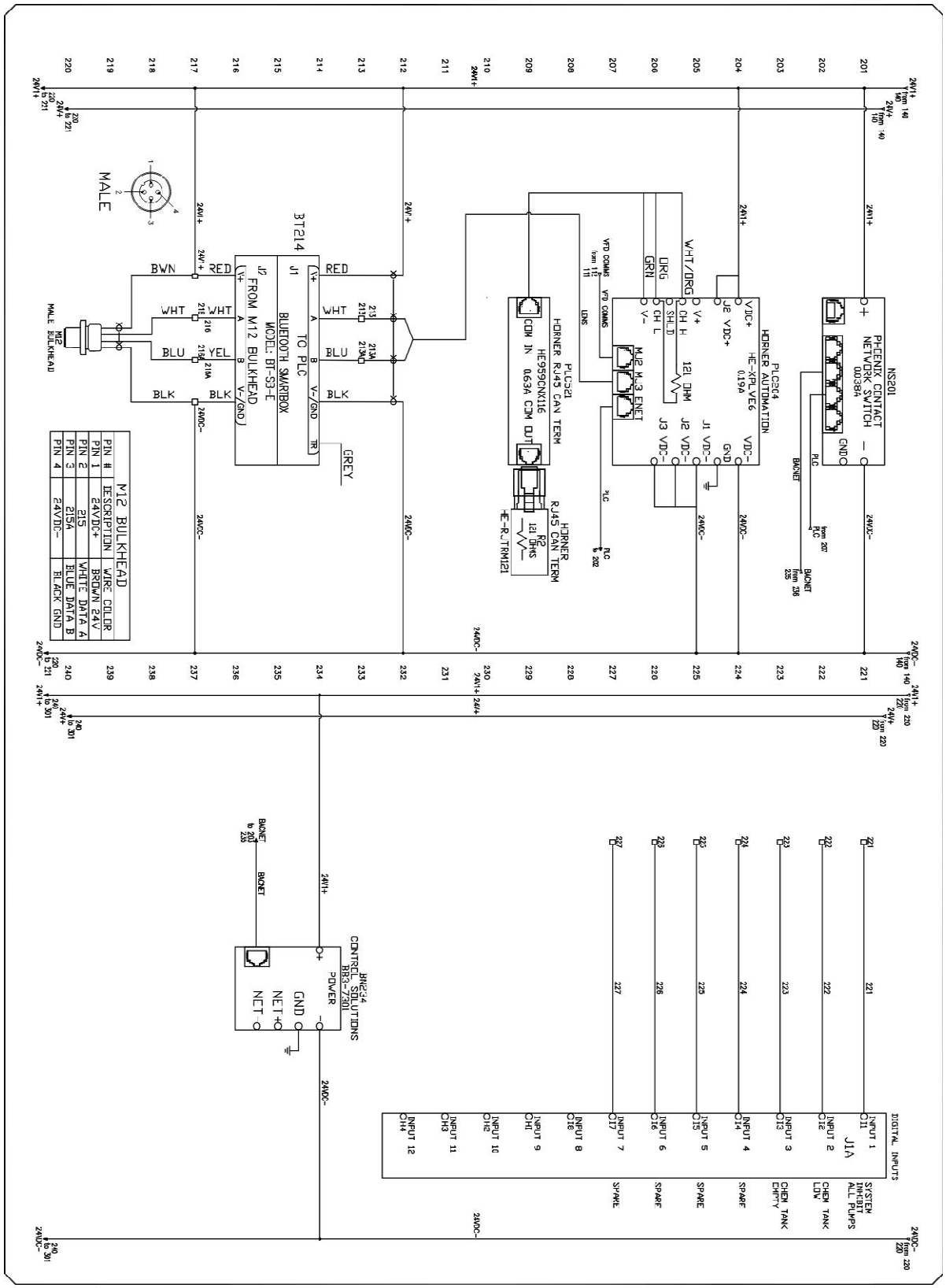
CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY • RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING • CONTAMINANT REMOVAL

WATER CONTROL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9633

NO.	DATE	REVISION	BY
2	9/26/25	UPDATED PARTS	SAS
1	9/27/25	REVIEW 1	SAS

ENGINEER: MDN
DRAWING NO: BP-A-001
BUILT BY: DL/JA
CHECKED BY: MDN
DRAWN BY: SAS
DATE: 9/26.25

DWG TITLE: BOOSTER PUMP SYSTEM BP-A
DWG NO: 100
SHEET NO: 6 OF 10



DWG FILE: BP-A ELECT-02

DWG TITLE
BOOSTER PUMP SYSTEM
BP-A

SHEET NO. 7 OF 10

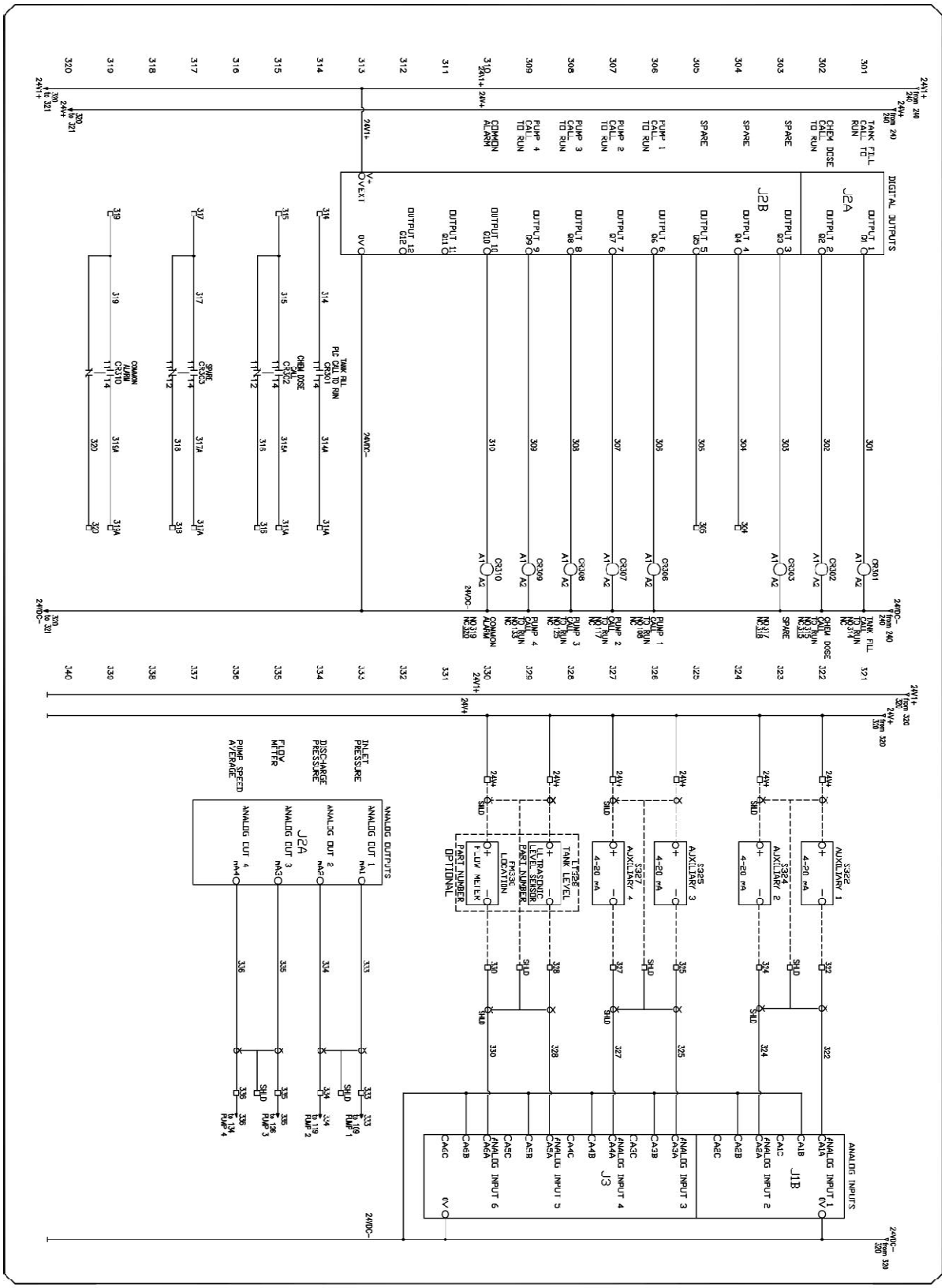
DWG NO. 200

NO.	DATE	REVISION	BY
2	9/30/25	UPDATED PARTS	SAS
1	9/27/25	REVIEW 1	SAS

ENGINEER	CHECKED BY
MDN	MDN
DRAWING NO	DRAWN BY
BP-A-001	SAS
BUILT BY	DATE
DL/JA	9/26.25

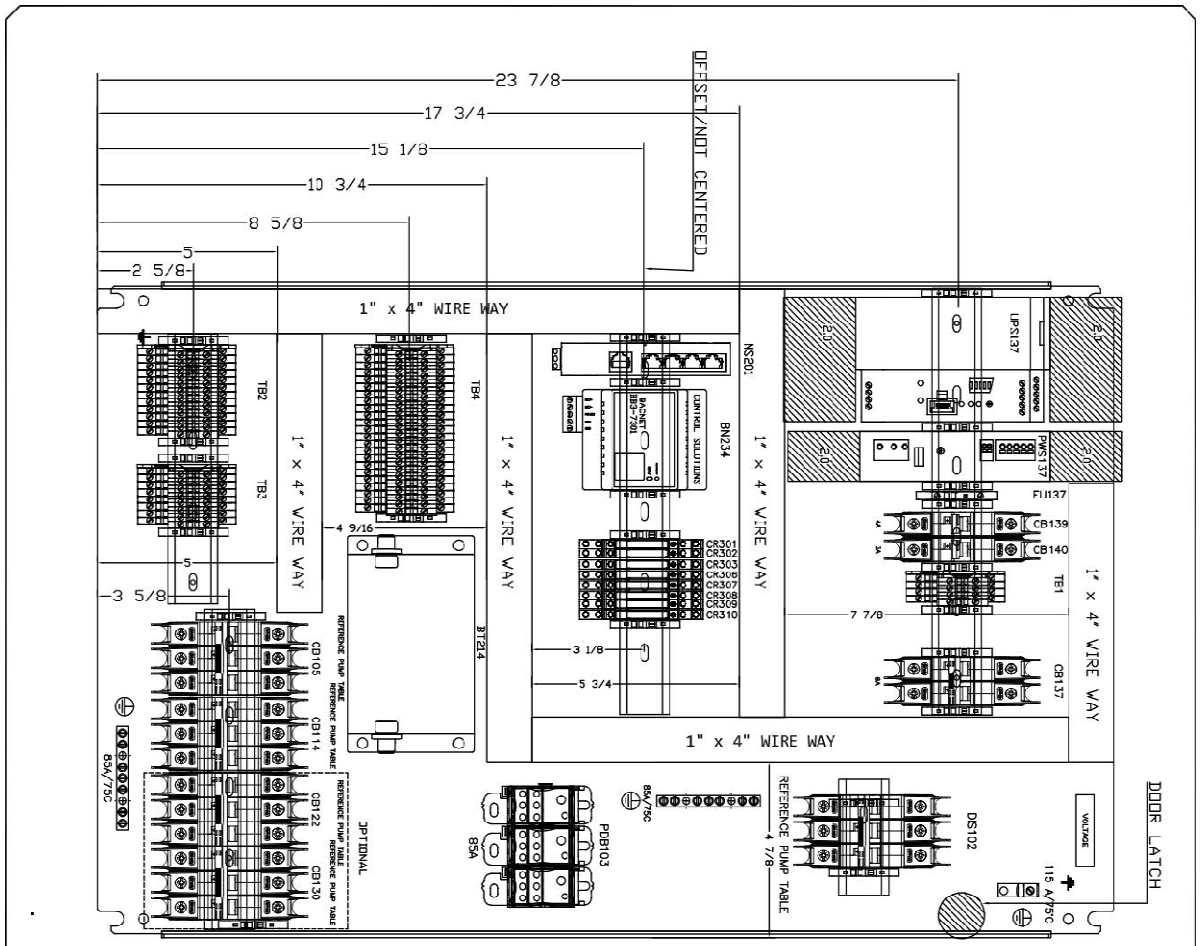
CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL

WATER CONTROL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9638



DWG TITLE: BOOSTER PUMP SYSTEM BP-A		ENGINEER: MDN	CHECKED BY: MDN	CUSTOM WATER TREATMENT SYSTEMS HIGH PURITY - RECLAMATION DISINFECTION & PATHOGEN CONTROL SOFTENING - CONTAMINANT REMOVAL
SHEET NO: 8 OF 10	DRAWING NO: 300	DRAWING NO: BP-A-001	DRAWN BY: SAS	WATER CONTROL CORPORATION 7150 143RD AVENUE NW RAMSEY, MINNESOTA 55303 PHONE: 763-427-9633
		BUILT BY: DL/JA	DATE: 9/26.25	THIS DRAWING INCLUDES CONFIDENTIAL INFORMATION THAT MUST NOT BE COPIED, UTILIZED, OR REVEALED IN ANY FORM, EITHER ENTIRELY OR PARTIALLY, WITHOUT PRIOR WRITTEN AUTHORIZATION.

NO.	DATE	REVISION	BY
2	9/30/25	UPDATED PARTS	SAS
1	9/27/25	REVIEW 1	SAS



TORQUE RATINGS

DESCRIPTION	TORQUE RATING	NOTES
PHOENIX CONTACT UTTB 2.5	0.5 ... 0.6 Nm 5.31-7.08 inch lbs	
PHOENIX CONTACT UTTB 2.5-PE	0.5 ... 0.6 Nm 5.31-7.08 inch lbs	
GROUND LUG LA-2-1	4 Nm 35 inch lbs	
GROUND BAR NA-409-1	14-8AWG 21 inch-lbs	
ERIFLEX PDB103	SMALL SCREW 1.2Nm LARGE SCREW 3.5Nm	
ABB SU20XM-KXX CIRCUIT BREAKERS	2.8 Nm 24.78 inch lbs	
ABB XT1 CIRCUIT BREAKERS	10AWG-8AWG 4.5Nm 24.78 in-lbs 6AWG-2/0AWG 9Nm 80 in-lbs	

TB1 UTB 2.5		TB1 UTB 2.5	
TOP	Jumper	BOTTOM	Jumper
24V1+	0 0 0	24VDC-	0 0 0
24V1+	0 0 0	24VDC-	0 0 0
24V1+	0 0 0	24VDC-	0 0 0
24V1+	0 0 0	24VDC-	0 0 0

TB2 UTTB 2.5 UTT3 2.5-PE		TB2 UTTB 2.5 UTTB 2.5-PE	
TOP	Jumper	BOTTOM	Jumper
24V+	0 0 0	24V+	0 0 0
SHLD	0 0 0	SHLD	0 0 0
322	0 0 0	324	0 0 0
SHLD	0 0 0	SHLD	0 0 0
24V+	0 0 0	24V+	0 0 0
325	0 0 0	327	0 0 0
SHLD	0 0 0	SHLD	0 0 0
24V+	0 0 0	24V+	0 0 0
328	0 0 0	330	0 0 0
SHLD	0 0 0	SHLD	0 0 0
333	0 0 0	335	0 0 0
334	0 0 0	336	0 0 0
SHLD	0 0 0	SHLD	0 0 0

TB3 VFD COMMS UTTB 2.5		TB3 VFD COMMS UTTB 2.5	
TOP	Jumper	BOTTOM	Jumper
A	0 0 0	B	0 0 0
A	0 0 0	B	0 0 0
A	0 0 0	B	0 0 0
A	0 0 0	B	0 0 0
Y	0 0 0		0 0 0
Y	0 0 0		0 0 0
Y	0 0 0		0 0 0
Y	0 0 0		0 0 0

TB4 UTTB 2.5		TB4 UTTB 2.5	
TOP	Jumper	BOTTOM	Jumper
24V1+	0 0 0	24VDC-	0 0 0
24V1+	0 0 0	24VDC-	0 0 0
24V1+	0 0 0	24VDC-	0 0 0
24V1+	0 0 0	24VDC-	0 0 0
107	0 0 0	108	0 0 0
116	0 0 0	117	0 0 0
124	0 0 0	125	0 0 0
132	0 0 0	133	0 0 0
213	0 0 0	216	0 0 0
213A	0 0 0	2:6A	0 0 0
221	0 0 0	222	0 0 0
24V+	0 0 0	24V+	0 0 0
223	0 0 0	224	0 0 0
225	0 0 0	226	0 0 0
24V+	0 0 0	24V+	0 0 0
227	0 0 0		
314	0 0 0	305	0 0 0
24V+	0 0 0	314	0 0 0
315	0 0 0	3:5A	0 0 0
316	0 0 0	317	0 0 0
317A	0 0 0	318	0 0 0
319	0 0 0	3:9A	0 0 0
320	0 0 0		

DXD DWG FILE BP-A PANEL

DWG TITLE
BOOSTER PUMP SYSTEM BP-A

SHEET NO. *9 OF 10*
DWG NO. *PANEL*

NO.	DATE	REVISION	BY
2	9/30/25	UPDATED PARTS	SAS
1	9/27/25	REVIEW 1	SAS

ENGINEER *MDN*	CHECKED BY *MDN*
DRAWING NO BP-A-001	DRAWN BY *SAS*
BUILT BY DL/JA	DATE 9/20.25

WCC

CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL

WATER CONTROL CORPORATION
7150 143RD AVENUE NW
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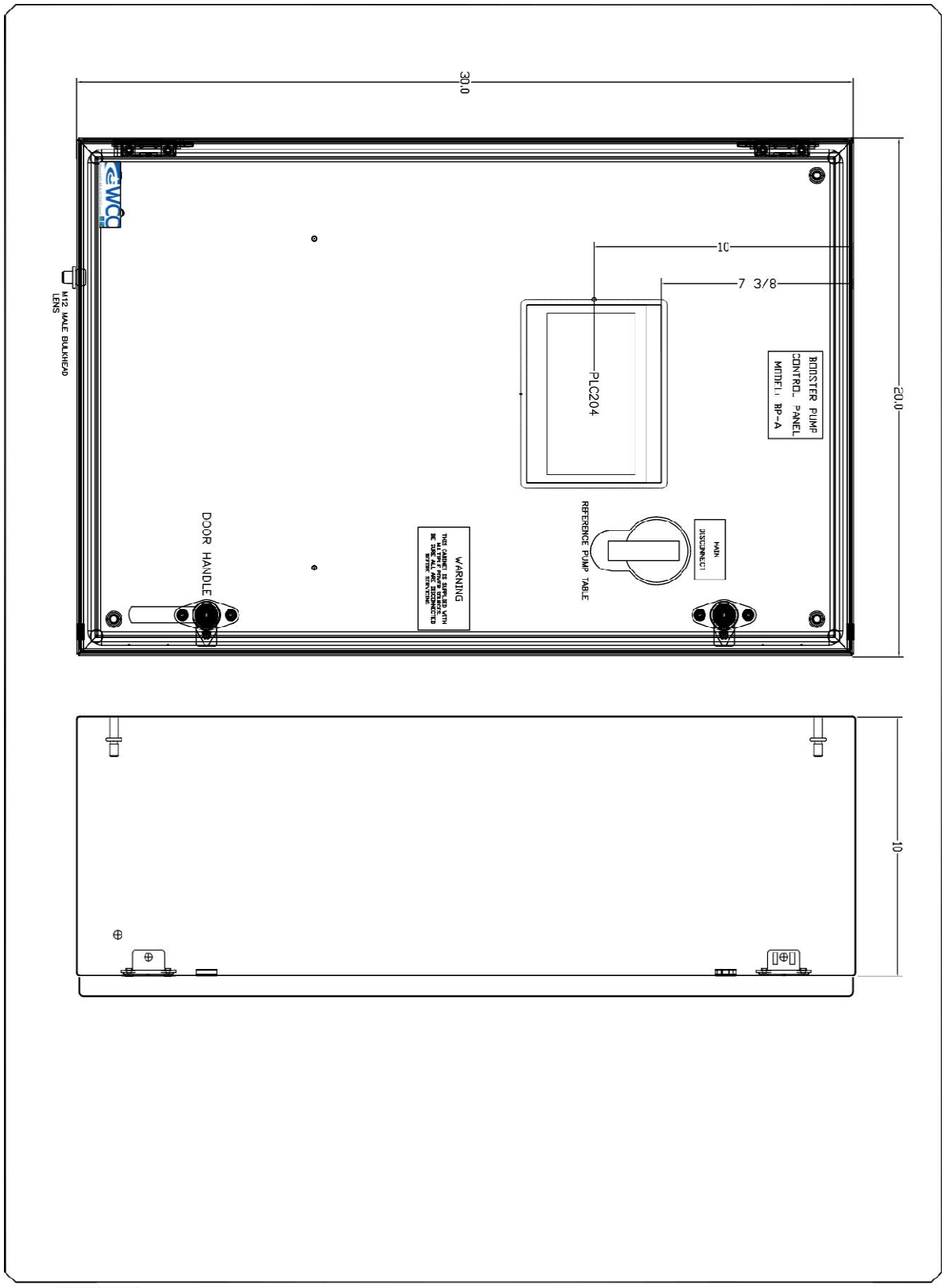
PHONE: 763-427-9638



DWG FILE: BP-A ENCLOSURE

DWG TITLE

BOOSTER PUMP SYSTEM BP-A

SHEET NO: 10 OF 10

SIZE: ENCLOSURE

NO	DATE	REVISION	BY
2	9/30/25	UPDATED PARTS	SAS
1	9/27/25	REVIEW 1	SAS

ENGINEER: MDN	CHECKED BY: MDN
DRAWING NO: BP-A-001	DRAWN BY: SAS
BUILT BY: DL/JA	DATE: 9/26.25

WCC

CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
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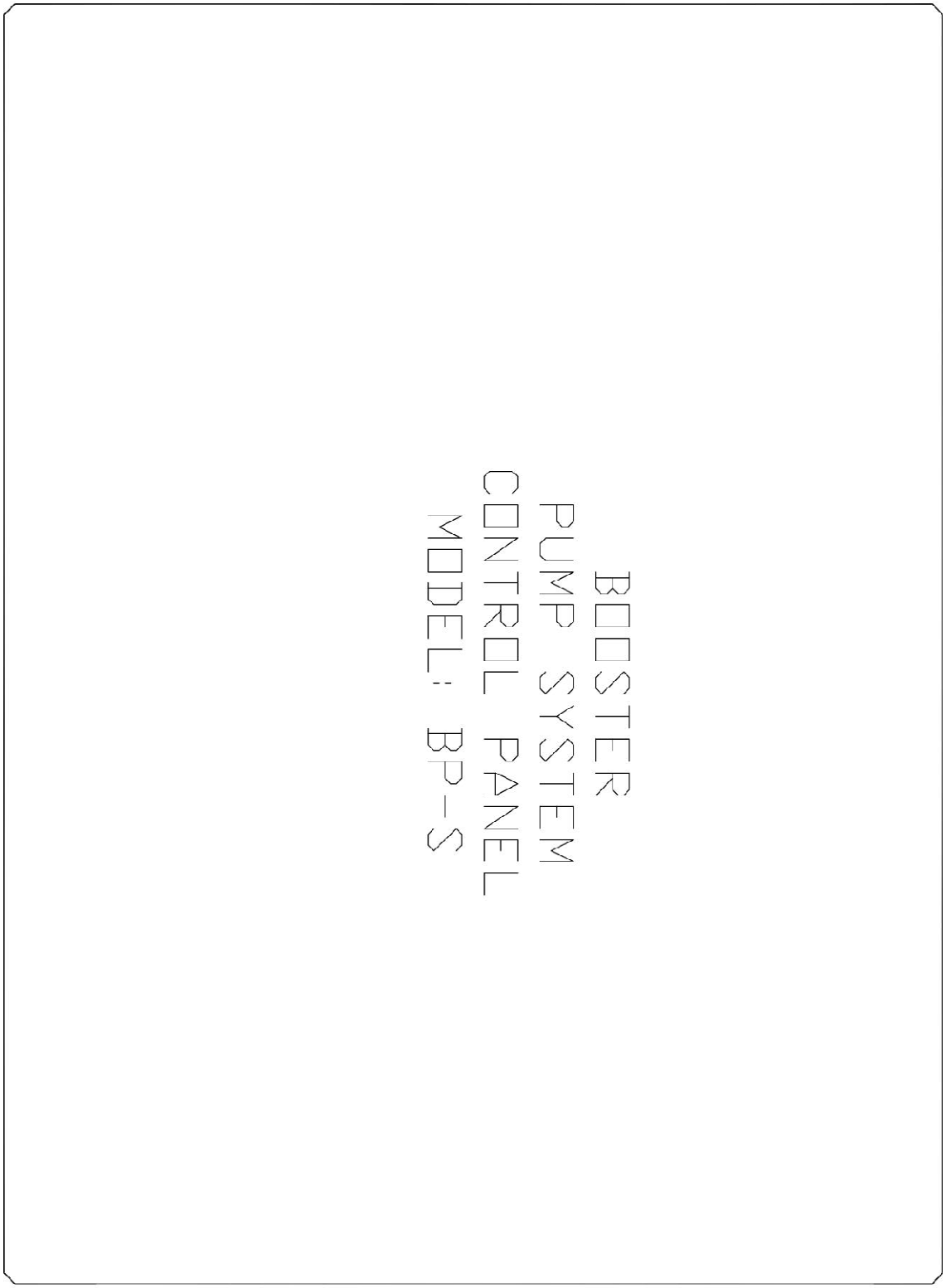
15.2 BPS SERIES



TAG NAMING	
TAG	DESCRIPTION
AI	ANALOG INPUT
AO	ANALOG OUTPUT
CB	CIRCUIT BREAKER
CON	CONTACTOR
CR	CONTROL RELAY
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
DIV	DIVERT VALVES
DIS	DISCONNECT
FLT	FLOAT LEVEL SWITCH
FM	FLOW METER
FS	FLOW SENSOR
GND	GROUND
LS	LIMIT SWITCH
LT	PILOT LIGHT
MS	MOTOR STARTER
MTR	MOTOR
NS	NETWORK SWITCH
PBLT	PUSH BUTTON PILOT LIGHT
PDB	POWER DISTRIBUTION BLOCK
PLC	PROGRAMABLE LOGIC CONTROLLER
PS	PRESSURE SWITCH
PT	PRESSURE TRANSDUCER
PWS	POWER SUPPLY
RO	REVERSE OSMOSIS
SI	SIGNAL ISOLATOR
SOL	SOLENOID
SP	SIGNAL SPLITTER
SS	SELECTOR SWITCH
SU	SURGE PROTECTOR
TAS	TEMPERATURE SWITCH
TB	TERMINAL BLOCK
TD	TIMER
TMP	TEMPERATURE SWITCH
UV	ULTRAVIOLET
VFD	VARIABLE FREQ. DRIVE
WS	WATER SOFTENER
XF	TRANSFORMER

AMPACITIES OF INSULATED CONDUCTORS-UL508A TABLE 28.1, 38.1 COPPER WIRE		
WIRE SIZE-AWG	AMPS-60° C	AMPS 75° C
24	2	
22	3	
20	5	
18	7	
16	10	
14	15	15
12	20	20
10	30	30
8	40	50
6	55	65
4	70	85
3	85	100
2	95	115
1	110	130
1 / 0		150
2 / 0		175
3 / 0		200
4 / 0		230

WIRE COLOR ABBREVIATIONS	
BLK	BLACK
RED	RED
WHT	WHITE
GRN	GREEN
BLU	BLUE
WHT/BLU	WHITE W/BLUE STRIPE
YEL	YELLOW
ORG	ORANGE
BRN	BROWN
CLR	CLEAR

WIRE COLOR CODES	
BLACK	120 VAC HOT FROM LIGHTING PANEL AND HIGH VOLTALGE CIRCUITS
RED	INTERNAL 120 VAC CONTROL WIRING
WHITE	GROUNDED 120 VAC NEUTRAL
GREEN	GROUND
BLUE	24 VDC, 15 VDC AND 12 VDC POSITIVE
WHITE W/BLUE STRIPE	24 VDC, 15 VDC AND 12 VDC COMMON
YELLOW	EXTERNAL VOLTAGE SOURCE
ORANGE	EXTERNAL VOLTAGE SOURCE (UL508A UPDATE)
ANALOG	WHITE OR CLEAR POSITIVE (+), BLACK NEGATIVE (-)

MINIMUM WIRE GAUGES	
18 AWG	PLC I/O AAND ANALOG (SHIELDED TWISTED PAIR)
16 AWG	AC AND DC CONTROL CIRCUITS AND POWER TO PLC
14 AWG	POWER CIRCUITS, CIRCUIT BREAKERS AND GROUND CONDUCTORS
14 AWG	VOLTAGES GREATER THAN 120 VOLTS

STANDARD, STRAIGHT THROUGH WIRING DIAGRAM (BOTH ENDS ARE THE SAME):

ETHERNET

T568A CABLE		
RJ-45 TO RJ-45		
PIN	WIRE COLOR	10Base-T Signal 100Base-TX Signa
1	WHT/GRN	TRANSMIT +
2	GRN	TRANSMIT -
3	WHT/ORG	RECEIVE +
4	BLU	UNUSED
5	WHT/BLU	UNUSED
6	ORG	RECEIVE -
7	WHT/BRN	UNUSED
8	BRN	UNUSED

ETHERNET

T568B CABLE		
RJ-45 TO RJ-45		
PIN	WIRE COLOR	10Base-T Signal 100Base-TX Signa
1	WHT/ORG	TRANSMIT +
2	ORG	TRANSMIT -
3	WHT/GRN	RECEIVE +
4	BLU	UNUSED
5	WHT/BLU	UNUSED
6	GRN	RECEIVE -
7	WHT/BRN	UNUSED
8	BRN	UNUSED

CROSSOVER CABLE WIRING DIAGRAM (T568B):

ETHERNET

CROSS-OVER CABLE		
RJ-45 (T568B) TO RJ-45 (T568A)		
PIN	WIRE COLOR	PIN
1	WHT/ORG	3
2	ORG	6
3	WHT/GRN	1
4	BLU	7
5	WHT/BLU	8
6	GRN	2
7	WHT/BRN	4
8	BRN	5

CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - REGLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL

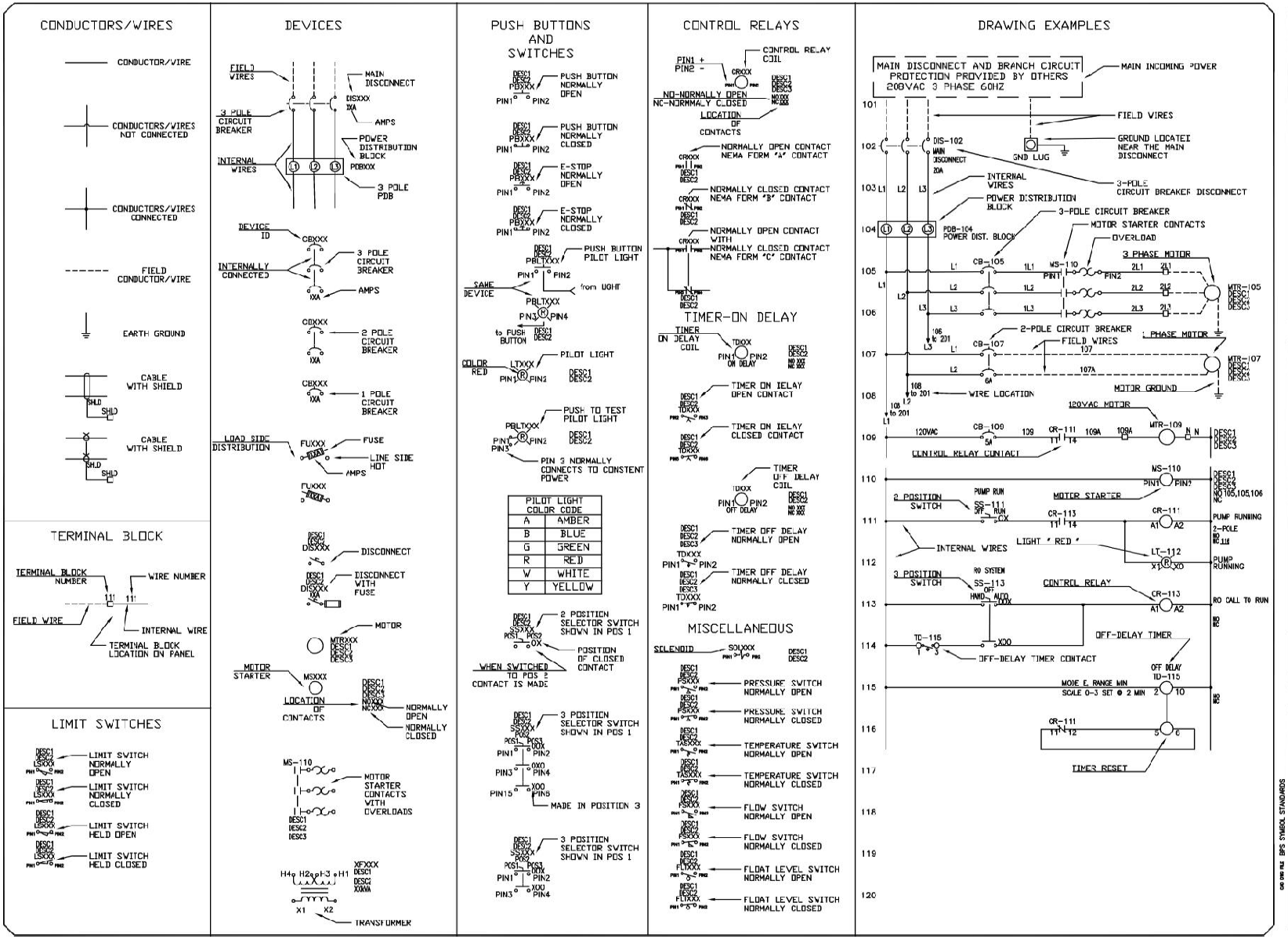
WATER CONTROL CORPORATION
7750 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9638

ENGINEER	CHECKED BY
MEDOW	MDM
DRAWN BY	DATE
SAS	10/15/24
DRAWING NO	
BP-S-001	
BUILT BY	
DL/JA	

NO.	DATE	REVISION	BY
5	10/29/25	RELEASE UPDATED	SAS
4	10/2/25	RELEASE FOR BUILD	SAS
3	9/26/25	REVIEW 3	SAS
2	8/1/25	REVIEW 2	SAS
1	1/24/25	REVIEW 1	SAS

DWG TITLE
BOOSTER PUMP SYSTEM BP-S
STANDARDS

SHEET NO
2 OF 10



CUSTOM WATER TREATMENT SYSTEMS
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SOFTENING - CONTAMINANT REMOVAL
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ENGINEER	CHECKED BY
DL/JA	SAS
DRAWING NO	DRAWN BY
BP-S 001	SAS
BUILT BY	DATE
SAS	10/15/24

NO.	DATE	REVISION	BY
5	10/25/25	RELEASE UPDATED	SAS
4	10/2/25	RELEASE FOR BUILD	SAS
3	9/26/25	REVIEW 3	SAS
2	9/11/25	REVIEW 2	SAS
1	1/29/25	REVIEW 1	SAS

DWG TITLE: BOOSTER PUMP SYSTEM BP-S

DWG NO: SYMBOLS

SHEET NO: 3 OF 10

ON THIS PAGE: BPS SYMBOL STANDARDS

BOOSTER PUMP SYSTEM PUMP TABLE

Pumps																	
Part Number	Description	HP	Voltage	Ph.	Amp	Circuit Breaker	Pumps	FLA	DISC.	Pumps	FLA	DISC.	Pumps	FLA	DISC.
99340970	CRE 10-4, 460V/3PH, NO SENSOR, 2 FLG, 460V/3PH	3	460	3	3.8	SU203M-K6	2	7.6	SU203M-K15	3	11.4	SU203M-K20	4	15.2	SU203M-K20
99351956	CRE 10-4, 240V/3PH, NO SENSOR, 2 FLG, 240V/3PH	3	200-240	3	6.6	SU203M-K15	2	13.2*	SU203M-K20	3	19.8*	SU203M-K32	4	26.4*	XT1NU3060AFF 000XXX
99076140	CRE 10-6, 460V/3PH, NO SENSOR, 2 FLG, 460V/3PH	5	460	3	6	SU203M-K15	2	12	SU203M-K20	3	18	SU203M-K32	4	24	XT1NU3060AFF 000XXX
99351957	CRE 10-6, 240V/3PH, NO SENSOR, 2 FLG, 240V/3PH	5	200-240	3	10.9	SU203M-K32	2	21.8*	SU203M-K40	3	32.7*	XT1NU3060AFF 000XXX	4	43.6*	XT1NU3100AFF 000XXX
99076264	CRE 20-2, 460V/3PH, NO SENSOR, 2 FLG, 460V/3PH	5	460	3	6	SU203M-K15	2	12	SU203M-K20	3	18	SU203M-K32	4	24	XT1NU3060AFF 000XXX
99352158	CRE 20-2, 240V/3PH, NO SENSOR, 2 FLG, 240V/3PH	5	200-240	3	10.9	SU203M-K32	2	21.8*	SU203M-K40	3	32.7*	XT1NU3060AFF 000XXX	4	43.6*	XT1NU3100AFF 000XXX
99076265	CRE 20-3, 460V/3PH, NO SENSOR, 2 FLG, 460V/3PH	7.5	460	3	8.8	SU203M-K20	2	17.6	SU203M-K32	3	26.4	XT1NU3060AFF 000XXX	4	35.2	XT1NU3060AFF 000XXX
99352159	CRE 20-3, 240V/3PH, NO SENSOR, 2 FLG, 240V/3PH	7.5	200-240	3	16.6	SU203M-K32	2	33.2*	XT1NU3060AFF 000XXX	3	49.8*	XT1NU3100AFF 000XXX	4	66.4*	XT1NU3100AFF 000XXX
99076523	CRE 32-2-1, 460V/3PH, NO SENSOR, 2.5 FLG, 460V/3PH	7.5	460	3	8.8	SU203M-K20	2	17.6	SU203M-K32	3	26.4	XT1NU3060AFF 000XXX	4	35.2	XT1NU3060AFF 000XXX
99392744	CRE 32-2-1, 240V/3PH, NO SENSOR, 2.5 FLG, 240V/3PH	7.5	200-240	3	16.6	SU203M-K32	2	33.2*	XT1NU3060AFF 000XXX	3	49.8*	XT1NU3100AFF 000XXX	4	66.4*	XT1NU3100AFF 000XXX
99076524	CRE 32-3-2, 460V/3PH, NO SENSOR, 2.5 FLG, 460V/3PH	10	460	3	12.95	SU203M-K32	2	25.9	XT1NU3060AFF 000XXX	3	38.85	XT1NU3100AFF 000XXX	4	51.8	XT1NU3100AFF 000XXX
99076534	CRE 45-1-1, 460V/3PH, NO SENSOR, 3 FLG, 460V/3PH	7.5	460	3	8.8	SU203M-K20	2	17.6	SU203M-K32	3	26.4	XT1NU3060AFF 000XXX	4	35.2	XT1NU3060AFF 000XXX
99352751	CRE 45-1-1, 240V/3PH, NO SENSOR, 3 FLG, 240V/3PH	7.5	200-240	3	16.6	SU203M-K32	2	33.2*	XT1NU3060AFF 000XXX	3	49.8*	XT1NU3100AFF 000XXX	4	66.4*	XT1NU3100AFF 000XXX
99249174	CRE 45-2, 460V/3PH, NO SENSOR, 3 FLG, 460V/3PH	15	460	3	17.25	SU203M-K32	2	34.5	XT1NU3060AFF 000XXX	3	51.75	XT1NU3100AFF 000XXX	4	69	XT1NU3100AFF 000XXX
*	FLA CALCULATED AT MAX VOLTAGE														

MAIN CIRCUIT BREAKER ACCESSORIES (REQUIRED, QTY. 1)								
MAIN CIRCUIT BREAKER TYPE	MFG	HANDLE	MFG	SHAFT	MFG	BASE	MFG	LUGS
XT1	ABB	OHB65J10	ABB	OXP10X500	ABB	KXTBRHEBFP	ABB	KXTICUAL1-3PC (2)
SU200	ABB	OHB65L6	ABB	OXP6X290	ABB	S2C-DH		

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PHONE: 763-427-9633

NO.	DATE	REVISION	BY
5	10/29/25	RELEASE UPDATED	SAS
4	10/2/25	REVIEW & REVISE PER RUN D	SAS
3	9/26/25	REVIEW 3	SAS
2	8/11/25	REVIEW 2	SAS
1	1/29/25	REVIEW 1	SAS

ENGINEER: MDN | CHECKED BY: MDN
DRAWING NO: BP_S-001 | DRAWN BY: SAS
BUILT BY: DL/JA | DATE: 10/15/24

DWG TITLE: BOOSTER PUMP SYSTEM BP_S
PUMP TABLE
SHEET #0: 4 OF 10

REFERENCE PUMP TABLE	REC	QTY	SUB	CATALOG	TAGS	INST	MFG
REFERENCE PUMP TABLE		1	*1		DISCONNECT HANDLE	HANDLE/ADAPTER/SHAFT	AB3
		1	*1	ADAPTER/REFERENCE HANDLE			AB3
		1	*1	SHAFT/REFERENCE HANDLE			AB3
REFERENCE PUMP TABLE		1			DIS102		AB3
		1		SU201M-K3	CB140		AB3
		1		SU201M-K4	CB139		AB3
		1		SU202M-K6	CB137		AB3
REFERENCE PUMP TABLE REFERENCE PUMP TABLE REFERENCE PUMP TABLE REFERENCE PUMP TABLE		4		SU203M-KXX	CB105 CB114 CB122 CB130		AB3
		1		BB3-7301	BN234	BACNET	CONTROL SOLUTIONS
		3		569020	PDB103	POWER DIST. BLOCK	ERFLEX
		1		CP3020	PANEL		HOFFMAN
		1		CSD302010	ENCLOSURE		HOFFMAN
		1		CWHPTD	DOOR HANDLE		HOFFMAN
		1		HE-XPLWE6	PLC204	PLC	HORNER
		1		WDR-120-24	PWS137	24VDC POWER SUPPLY	MEANWELL
		2		NA-409-1	85A/75C	GND BAR	PENN UNION
		1		LA-2-1	115 A/75°C	GND LUG	PENN UNION
		1		1085254	NS201	NETWORK SWITCH	PHOENIX CONTACT
		8		2966171	CR301 CR302 CR303 CR306 CR307 CR308 CR309 CR310	24VDC RELAY 24VDC RELAY 24VDC RELAY 24VDC RELAY 24VDC RELAY 24VDC RELAY 24VDC RELAY 24VDC RELAY	PHOENIX CONTACT
		21		3022276	END STOP		PHOENIX CONTACT
		43		3044636	TB1 TB2 TB3 TB4	UTTB 2.5 UTTB 2.5 UTTB 2.5 UTTB 2.5	PHOENIX CONTACT
		4		3044665	TB1	UTTB 2.5-PE	PHOENIX CONTACT
		4	*1	3047293			PHOENIX CONTACT
		4	*1	3047303			PHOENIX CONTACT

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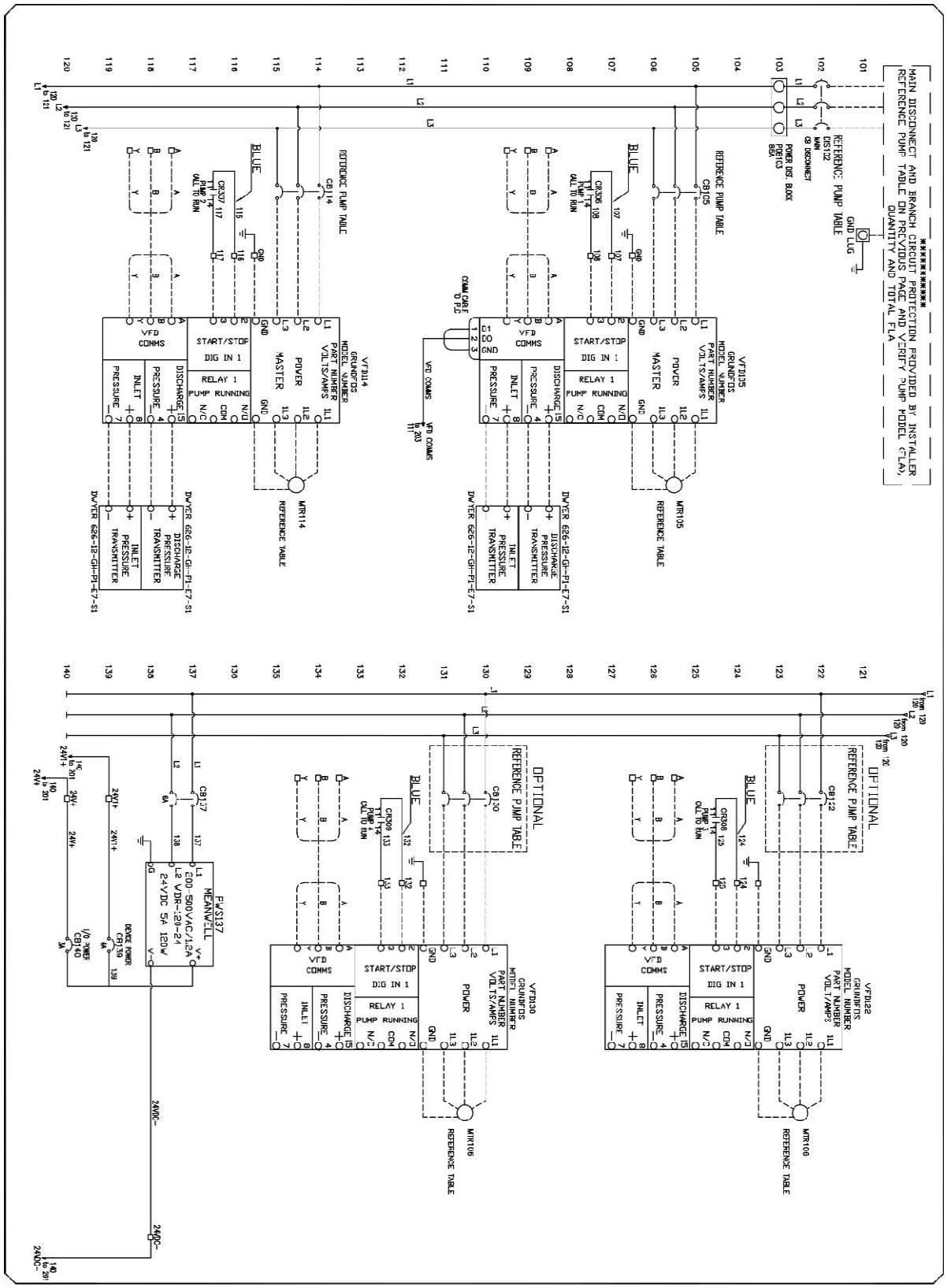
3	9/26/25	REVIEW 3	SAS
2	8/11/25	REVIEW 2	SAS
1	1/29/25	REVIEW 1	SAS

ENGINEER MDN | CHECKED BY MDN
SERIAL NO BP-S-001 | DRAWN BY SAS
SCALE DL/A | DATE 10/15/24

DWG TITLE: BOOSTER PUMP SYSTEM BP-S

BOM

SHEET NO 5 OF 10



DWG TITLE	BOOSTER PUMP SYSTEM BP-S		
SHEET #	6 OF 10		
DRW No	100		

NO.	DATE	REVISION	BY
5	10/29/25	RELEASE UPDATED	SAS
4	10/2/25	RELEASE FOR BUILD	SAS
3	9/26/25	REVIEW 3	SAS
2	8/11/25	REVIEW 2	SAS
1	1/29/25	REVIEW 1	SAS

ENGINEER: MDN	CHECKED BY: MDN
DRAWING NO: BP-S-001	DRAWN BY: SAS
BUILT BY: DL/JA	DATE: 10/15/24

WCC

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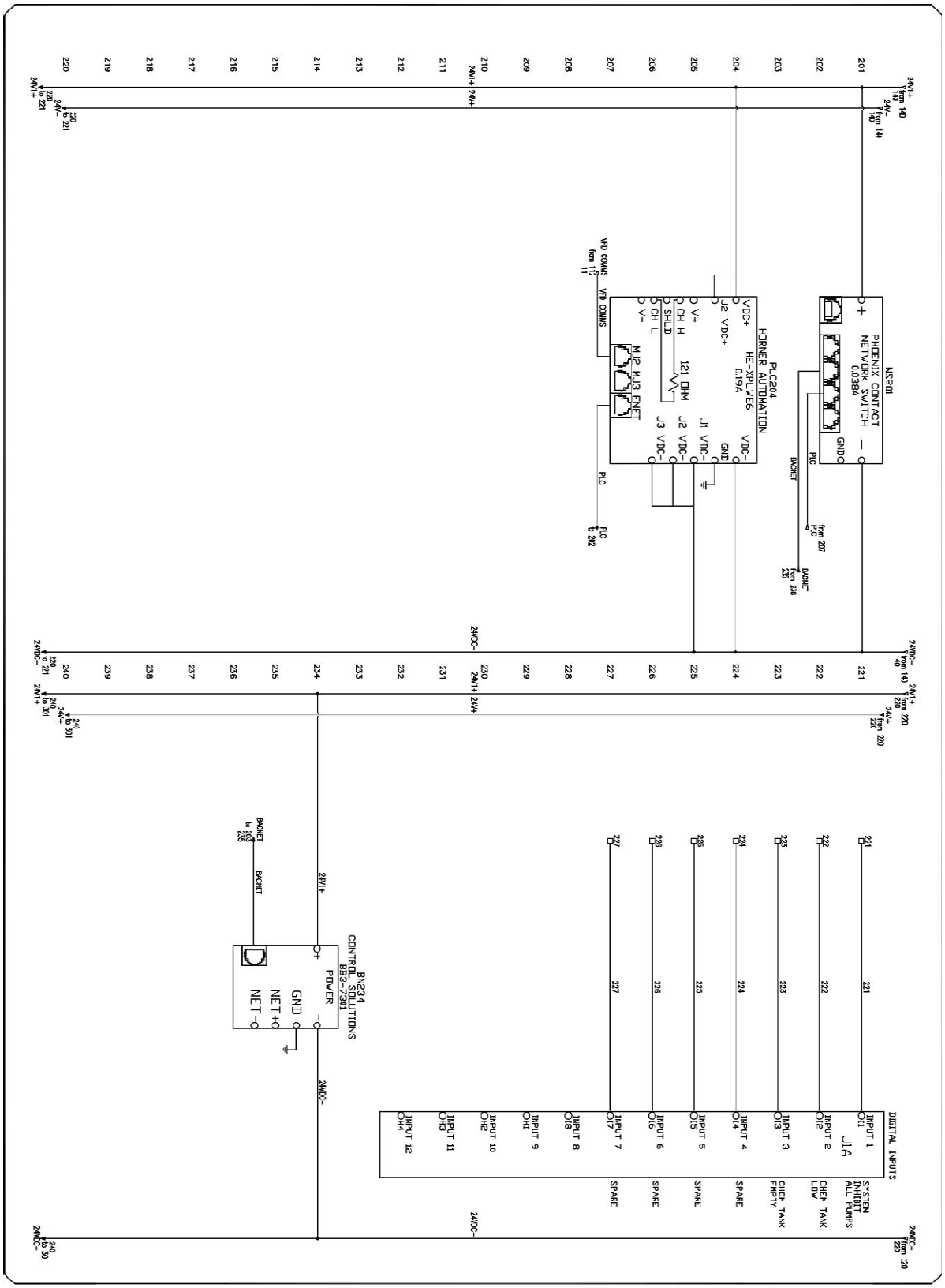
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9633



				ENGINEER MDN	CHECKED BY MDN
5	10/29/25	RELEASE UPDATED	SAS	DRAWING NO BP-S-001	DRAWN BY SAS
4	10/2/25	RELEASE FOR BUILD	SAS	BUILT BY DL/JA	DATE 10/15/24
3	9/26/25	REVIEW 3	SAS		
2	8/11/25	REVIEW 2	SAS		
1	1/29/25	REVIEW 1	SAS		
NO.	DATE	REVISION	BY		

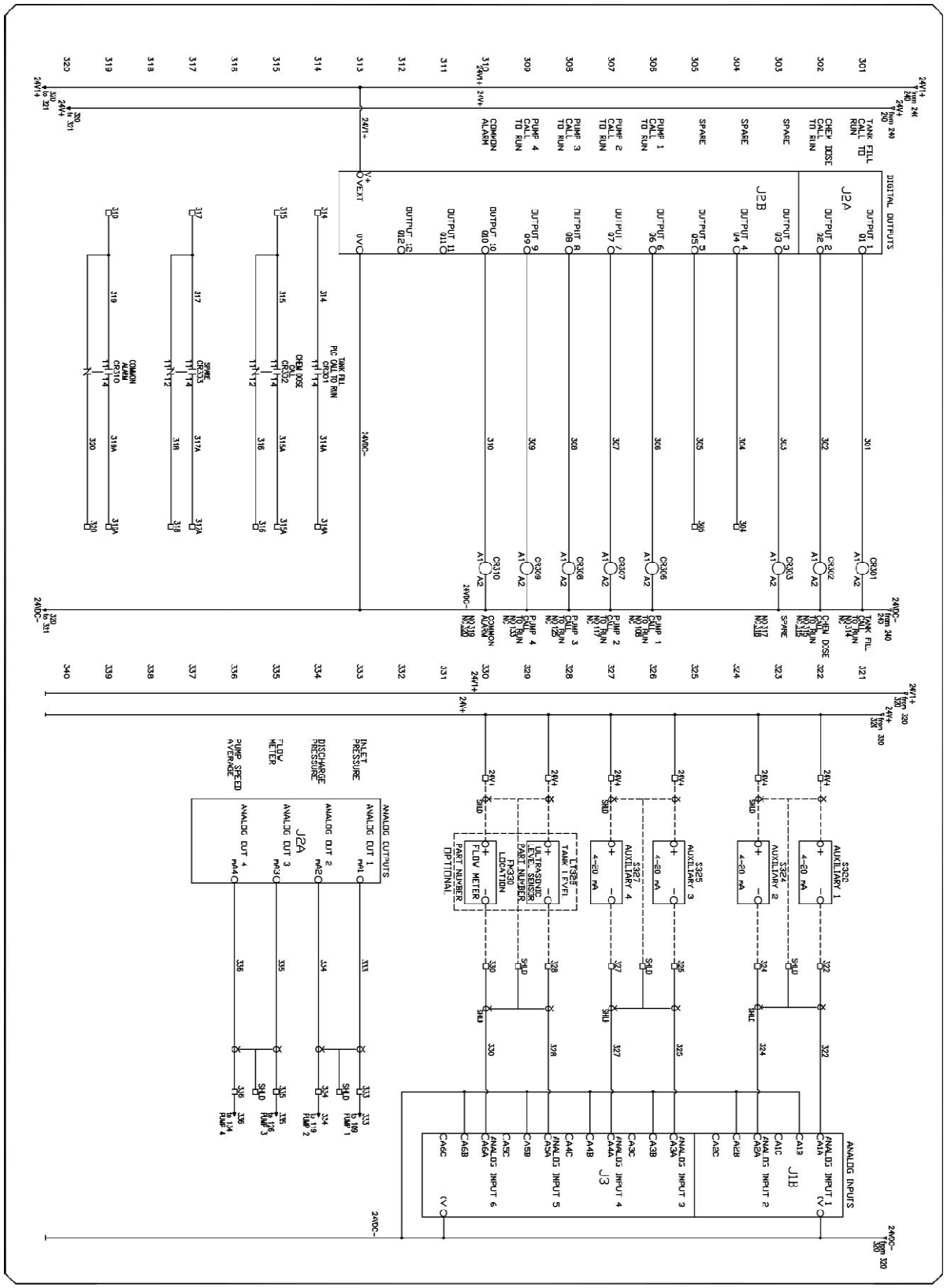
DWG TITLE
BOOSTER PUMP SYSTEM BP-S

SHEET NO 7 OF 10

DWG NO 200

CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL

WATER CONTROL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9638



DWG TITLE

BOOSTER PUMP SYSTEM BP-S

SHEET NO: 8 OF 10

DWG NO: 300

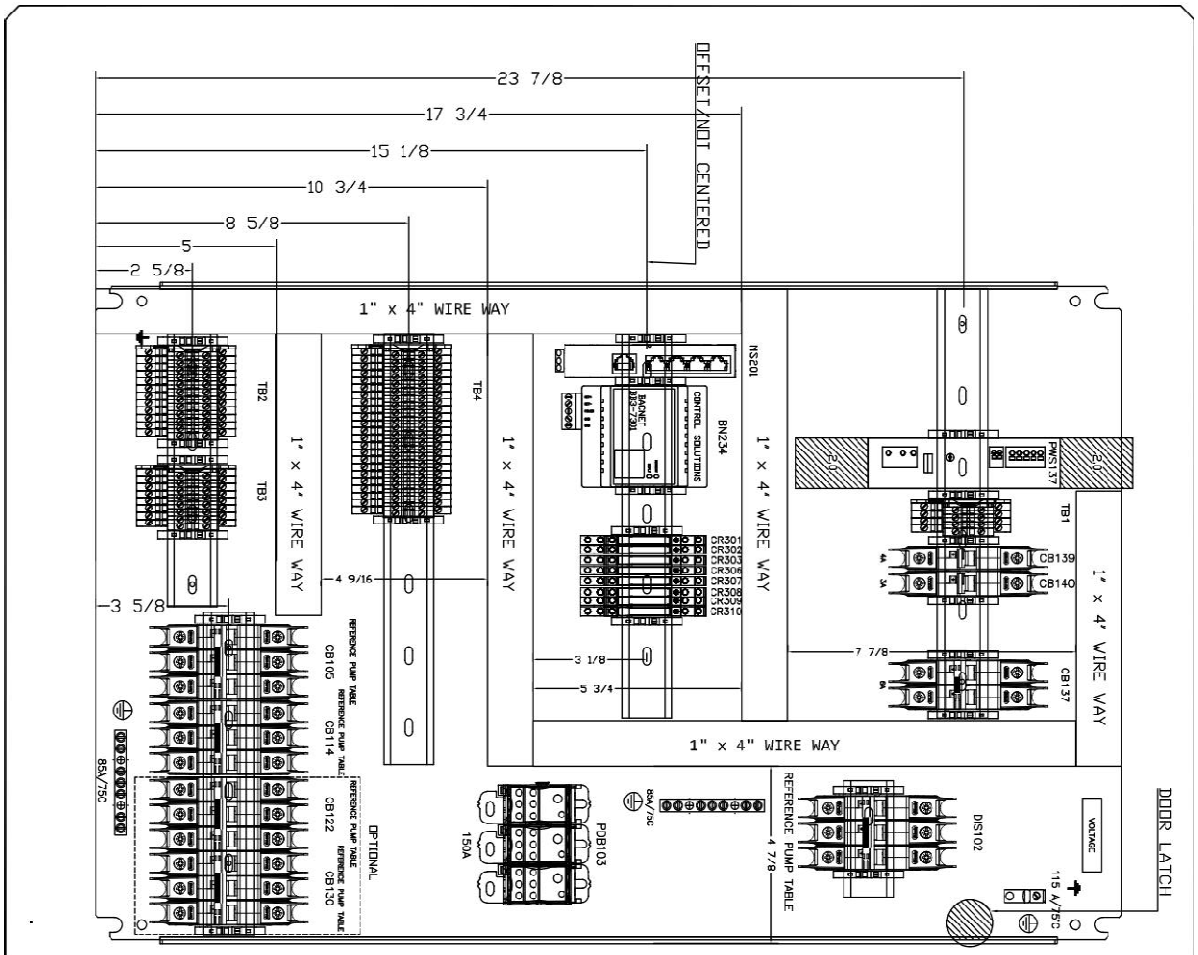
NO.	DATE	REVISION	BY
5	10/29/25	RELEASE UPDATED	SAS
4	10/2/25	RELEASE FOR BUILD	SAS
3	9/26/25	REVIEW 3	SAS
2	8/11/25	REVIEW 2	SAS
1	1/29/25	REVIEW 1	SAS

ENGINEER: MDN	CHECKED BY: MDN
DRAWING NO: BP-S-001	DRAWN BY: SAS
BUILT BY: DL/JA	DATE: 10/15/24

WCC

CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL

WATER CONTROL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9638



TORQUE RATINGS

DESCRIPTION	TORQUE RATING	NOTES
PHOENIX CONTACT UTTB 2.5	0.5 ... 0.6 Nm 5.31-7.08 inch lbs	
PHOENIX CONTACT UTTB 2.5-PE	0.5 ... 0.6 Nm 5.31-7.08 inch lbs	
GROUND LUG LA-2-1	4 Nm 35 inch lbs	
GROUND BAR NA-409-1	14-8AWG 21 inch-lbs	
ERIFLEX PDB103	SMALL SCREW 1.2Nm LARGE SCREW 3.5Nm	
ABB SU20XM-KXX CIRCUIT BREAKERS	2.8 Nm 24.78 inch lbs	
ABB XT: CIRCUIT BREAKERS	10AWG-8AWG 4.5Nm 24.78 in-lbs 6AWG-2/0AWG 9Nm 80 in-lbs	

TB3 VFD COMMS UTTB 2.5		TB3 VFD COMMS UTTB 2.5	
TOP	Jumper	BOTTOM	Jumper
A		B	
A		B	
A		B	
A		B	
Y			
Y			
Y			
Y			

TB2 UTTB 2.5-PE		TB2 UTTB 2.5-PE	
TOP	Jumper	BOTTOM	Jumper
24V+		24V+	
322		324	
SHLD		SHLD	
24V+		24V+	
325		327	
SHLD		SHLD	
24V+		24V+	
328		330	
SHLD		SHLD	
333		335	
334		336	
SHLD		SHLD	

TB1 UTTB 2.5		TB1 UTTB 2.5	
TOP	Jumper	BOTTOM	Jumper
24V1+		24VDC-	
24V1+		24VDC-	
24V1+		24VDC-	
24V1+		24VDC-	

TB4 UTTB 2.5		TB4 UTTB 2.5	
TOP	Jumper	BOTTOM	Jumper
24V1+		24VDC-	
24V1+		24VDC-	
24V1+		24VDC-	
24V1+		24VDC-	
107		108	
116		117	
124		125	
132		133	
221		222	
223		224	
225		226	
227		24V+	
304		305	
24V+		314	
315		315A	
316		317	
317A		318	
319		319A	
320			

DWG TITLE

BOOSTER PUMP SYSTEM BP-S

PANEL

9 OF 10

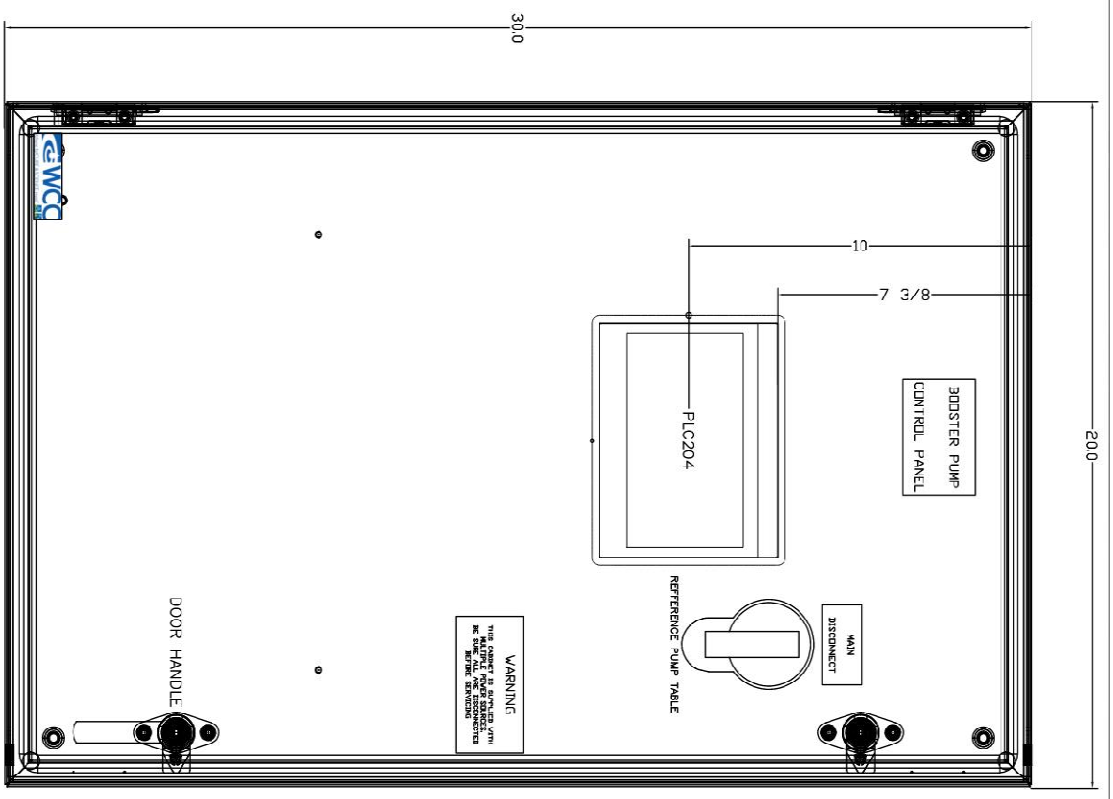
NO.	DATE	REVISION	BY
5	10/29/25	RELEASE UPDATED	SAS
4	10/2/25	RELEASE FOR BUILD	SAS
3	9/26/25	REVIEW 3	SAS
2	8/11/25	REVIEW 2	SAS
1	1/29/25	REVIEW 1	SAS

ENGINEER: MDN	CHECKED BY: MDN
DRAWING NO: BP-S-001	DRAWN BY: SAS
BUILT BY: DL/JA	DATE: 10/15/24

WCC

CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL

WATER CONTROL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9638



CAD DWG FILE: BPS ENCLOSURE

DWG TITLE

BOOSTER PUMP SYSTEM BP-S

SHEET NO: *10 OF 10*

DWG NO: *ENCLOSURE*

NO.	DATE	REVISION	BY
5	10/29/25	RELEASE UPDATED	SAS
4	10/2/25	RELEASE FOR BUILD	SAS
3	9/26/25	REVIEW 3	SAS
2	8/11/25	REVIEW 2	SAS
1	1/29/25	REVIEW 1	SAS

ENGINEER: *MDN*	CHECKED BY: *MDN*
DRAWING NO: BP-S-001	DRAWN BY: *SAS*
BUILT BY: DL/JA	DATE: 10/15/24

WCC

CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL

WATER CONTROL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9638

15.3 BPE SERIES

TAG NAMING	
TAG	DESCRIPTION
AI	ANALOG INPUT
AO	ANALOG OUTPUT
CB	CIRCUIT BREAKER
CON	CONTACTOR
CR	CONTROL RELAY
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
DIV	DIVERT VALVES
DIS	DISCONNECT
FLT	FLOAT LEVEL SWITCH
FM	FLOW METER
FS	FLOW SENSOR
GND	GROUND
LS	LIMIT SWITCH
LT	PILOT LIGHT
MS	MOTOR STARTER
MTR	MOTOR
NS	NETWORK SWITCH
PBLT	PUSH BUTTON PILOT LIGHT
PDB	POWER DISTRIBUTION BLOCK
PLC	PROGRAMABLE LOGIC CONTROLLER
PS	PRESSURE SWITCH
PT	PRESSURE TRANSDUCER
PWS	POWER SUPPLY
RO	REVERSE OSMOSIS
SI	SIGNAL ISOLATOR
SOL	SOLENOID
SP	SIGNAL SPLITTER
SS	SELECTOR SWITCH
SU	SURGE PROTECTOR
TAS	TEMPERATURE SWITCH
TB	TERMINAL BLOCK
TD	TIMER
TMP	TEMPERATURE SWITCH
UV	ULTRAVIOLET
VFD	VARIABLE FREQ. DRIVE
WS	WATER SOFTENER
XF	TRANSFORMER

AMPACITIES OF INSULATED CONDUCTORS-UL508A TABLE 28.1, 38.1 COPPER WIRE		
WIRE SIZE-AWG	AMPS-60° C	AMPS 75° C
24	2	
22	3	
20	5	
18	7	
16	10	
14	15	15
12	20	20
10	30	30
8	40	50
6	55	65
4	70	85
3	85	100
2	95	115
1	110	130
1 / 0		150
2 / 0		175
3 / 0		200
4 / 0		230

WIRE COLOR ABBREVIATIONS	
BLK	BLACK
RED	RED
WHT	WHITE
GRN	GREEN
BLU	BLUE
WHT/BLU	WHITE W/BLUE STRIPE
YEL	YELLOW
ORG	ORANGE
BRN	BROWN
CLR	CLEAR

WIRE COLOR CODES	
BLACK	120 VAC HOT FROM LIGHTING PANEL AND HIGH VOLTALGE CIRCUITS
RED	INTERNAL 120 VAC CONTROL WIRING
WHITE	GROUNDED 120 VAC NEUTRAL
GREEN	GROUND
BLUE	24 VDC, 15 VDC AND 12 VDC POSITIVE
WHITE W/BLUE STRIPE	24 VDC, 15 VDC AND 12 VDC COMMON
YELLOW	EXTERNAL VOLTAGE SOURCE
ORANGE	EXTERNAL VOLTAGE SOURCE (UL508A UPDATE)
ANALOG	WHITE OR CLEAR POSITIVE (+), BLACK NEGATIVE (-)

MINIMUM WIRE GAUGES	
18 AWG	PLC I/O AAND ANALOG (SHIELDED TWISTED PAIR)
16 AWG	AC AND DC CONTROL CIRCUITS AND POWER TO PLC
14 AWG	POWER CIRCUITS, CIRCUIT BREAKERS AND GROUND CONDUCTORS
14 AWG	VOLTAGES GREATER THAN 120 VOLTS

STANDARD, STRAIGHT-THROUGH WIRING DIAGRAM
(BOTH ENDS ARE THE SAME)

ETHERNET

T568A CABLE		
RJ-45 TO RJ-45		
PIN	WIRE COLOR	10Base-T Signal 100Base-TX Signal
1	WHT/GRN	TRANSMIT +
2	GRN	TRANSMIT -
3	WHT/ORG	RECEIVE +
4	BLU	UNUSED
5	WHT/BLU	UNUSED
6	ORG	RECEIVE -
7	WHT/BRN	UNUSED
8	BRN	UNUSED

ETHERNET

T568B CABLE		
RJ-45 TO RJ-45		
PIN	WIRE COLOR	10Base-T Signal 100Base-TX Signal
1	WHT/ORG	TRANSMIT +
2	ORG	TRANSMIT -
3	WHT/GRN	RECEIVE +
4	BLU	UNUSED
5	WHT/BLU	UNUSED
6	GRN	RECEIVE -
7	WHT/BRN	UNUSED
8	BRN	UNUSED

CROSSOVER CABLE WIRING DIAGRAM (T568B):

ETHERNET

CROSS-OVER CABLE		
RJ-45 (T568B) TO RJ-45 (T568A)		
PIN	WIRE COLOR	PIN
1	WHT/ORG	3
2	ORG	6
3	WHT/GRN	1
4	BLU	7
5	WHT/BLU	8
6	GRN	2
7	WHT/BRN	4
8	BRN	5

CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL
WATER CONTROL CORPORATION
7756 149RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-2833

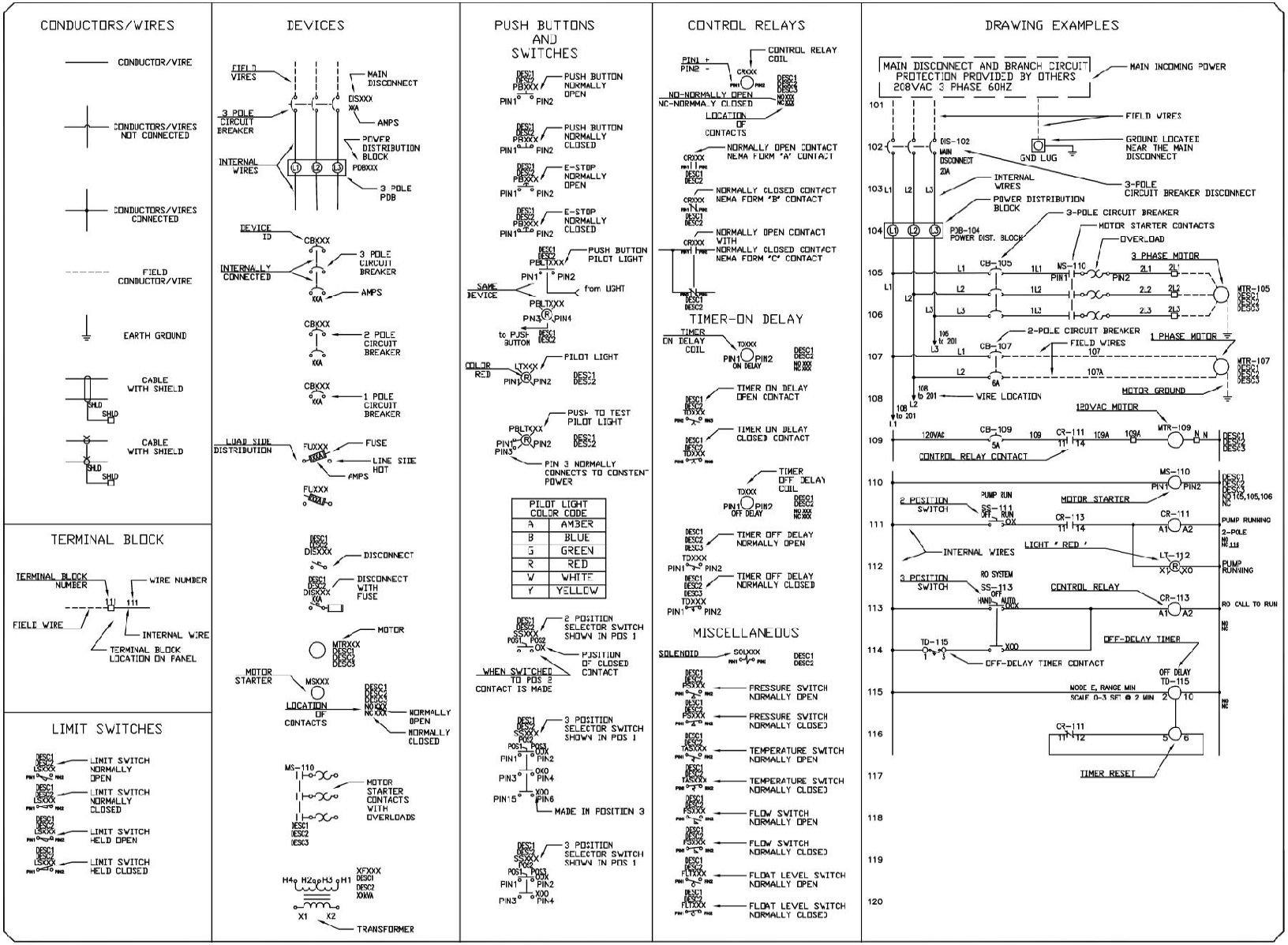
ENGINEER MDN | CHECKED BY MDN
DRAWING NO BP-E-001 | DRAWN BY SAS
BUILT BY DL/JA | DATE 1/29/25

NO.	DATE	REVISION	BY
3	1/29/26	RELEASE FOR BUILD	SAS
2	9/27/25	REVIEW 2	SAS
1	1/28/25	REVIEW 1	SAS

DWG TITLE
BOOSTER PUMP CONTROL PANEL MODEL: BP-E

DWG NO
STANDARDS

SHEET NO
2 OF 8



CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL

WATER CONTROL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9638

ENGINEER	CHECKED BY
JDW	JDW
DRAWING NO	DRAWN BY
E 001	SAS

NO.	DATE	REVISION	BY
3	1/9/26	RELEASE FOR BUILD	SAS
2	9/27/25	REVIEW 2	SAS
1	1/30/25	REVIEW 1	SAS

DWG TITLE: BOOSTER PUMP CONTROL PANEL MODEL: BP-E

DWG NO: SYMBOLS

SHEET NO: 3 OF 8

CAD DWG FILE: BP E-SYS SYMBOL STANDARDS

Pumps	BOOSTER PUMP SYSTEM PUMP TABLE														
Part Number	Description	HP	Voltage	Ph.	Amp	Circuit Breaker		Pumps	FLA		Pumps	FLA		Pumps	FLA
99340970	CRE 10-4, 460V/3PH, NO SENSOR, 2 FLG, 460V/3PH	3	460	3	3.8	SU203M-K6		2	7.6		3	11.4		4	15.2
99391956	CRE 10-4, 240V/3PH, NO SENSOR, 2 FLG, 240V/3PH	3	200-240	3	6.6	SU203M-K15		2	13.2*		3	19.8*		4	26.4*
99076140	CRE 10-6, 460V/3PH, NO SENSOR, 2 FLG, 460V/3PH	5	460	3	6	SU203M-K15		2	12		3	18		4	24
99391957	CRE 10-6, 240V/3PH, NO SENSOR, 2 FLG, 240V/3PH	5	200-240	3	10.9	SL203M-K32		2	21.8*		3	32.7*		4	43.6*
99076264	CRE 20-2, 460V/3PH, NO SENSOR, 2 FLG, 460V/3PH	5	460	3	6	SU203M-K15		2	12		3	18		4	24
99392158	CRE 20-2, 240V/3PH, NO SENSOR, 2 FLG, 240V/3PH	5	200-240	3	10.9	SL203M-K32		2	21.8*		3	32.7*		4	43.6*
99076265	CRE 20-3, 460V/3PH, NO SENSOR, 2 FLG, 460V/3PH	7.5	460	3	8.8	SU203M-K20		2	17.6		3	26.4		4	35.2
99392159	CRE 20-3, 240V/3PH, NO SENSOR, 2 FLG, 240V/3PH	7.5	200-240	3	16.6	SL203M-K32		2	33.2*		3	49.8*		4	66.4*
99076523	CRE 32-2-1, 460V/3PH, NO SENSOR, 2.5 FLG, 460V/3PH	7.5	460	3	8.8	SU203M-K20		2	17.6		3	26.4		4	35.2
99392744	CRE 32-2-1, 240V/3PH, NO SENSOR, 2.5 FLG, 240V/3PH	7.5	200-240	3	16.6	SL203M-K32		2	33.2*		3	49.8*		4	66.4*
99076524	CRE 32-3-2, 460V/3PH, NO SENSOR, 2.5 FLG, 460V/3PH	10	460	3	12.95	SL203M-K32		2	25.9		3	38.85		4	51.8
99076534	CRE 45-1-1, 460V/3PH, NO SENSOR, 3 FLG, 460V/3PH	7.5	460	3	8.8	SU203M-K20		2	17.6		3	26.4		4	35.2
99392751	CRE 45-1-1, 240V/3PH, NO SENSOR, 3 FLG, 240V/3PH	7.5	200-240	3	16.6	SL203M-K32		2	33.2*		3	49.8*		4	66.4*
99249174	CRE 45-2, 460V/3PH, NO SENSOR, 3 FLG, 460V/3PH	15	460	3	17.25	SL203M-K32		2	34.5		3	51.75		4	69
*	FLA CALCULATED AT MAX VOLTAGE														

CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL

WATER CONTROL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-0638

ENGINEER: MDN | CHECKED BY: MDN
DRAWING NO: BP E-001 | DRAWN BY: SAS
BUILT BY: DL/JA | DATE: 1/29/25

NO.	DATE	REVISION	BY
3	1/9/26	RELEASE FOR BUILD	SAS
2	9/27/25	REVIEW 2	SAS
1	1/30/25	REVIEW 1	SAS

DWG TITLE: BOOSTER PUMP CONTROL PANEL MODEL: BP-E
DWG NO: PUMP TABLE
SHEET NO: 4 OF 8

REC	QTY	SUB	CATALOG	TAGS	INST	MFG
	4		SU203M-KXX	CB105 CB114 CB122 CB130		ABB
	3		569020	PDB102		ERIFLEX
	1		CP1612	PANEL	PANEL	HOFFMAN
	1		CSD16128	ENCLOSURE	ENCLOSURE	HOFFMAN
	1		CWHPTO	DOOR HANDLE		HOFFMAN
	1		NA-409-1	GROUND BAR		PENN UNION
	1		LA-2-1	GND LUG	GND	PENN UNION
	4		3022276	END STOP		PHOENIX CONTACT

CAD DWG FILE BP E-SYS BOM

DWG TITLE: BOOSTER PUMP CONTROL PANEL MODEL: BP-E

DWG NO: BOM

SHEET NO: 5 OF 8

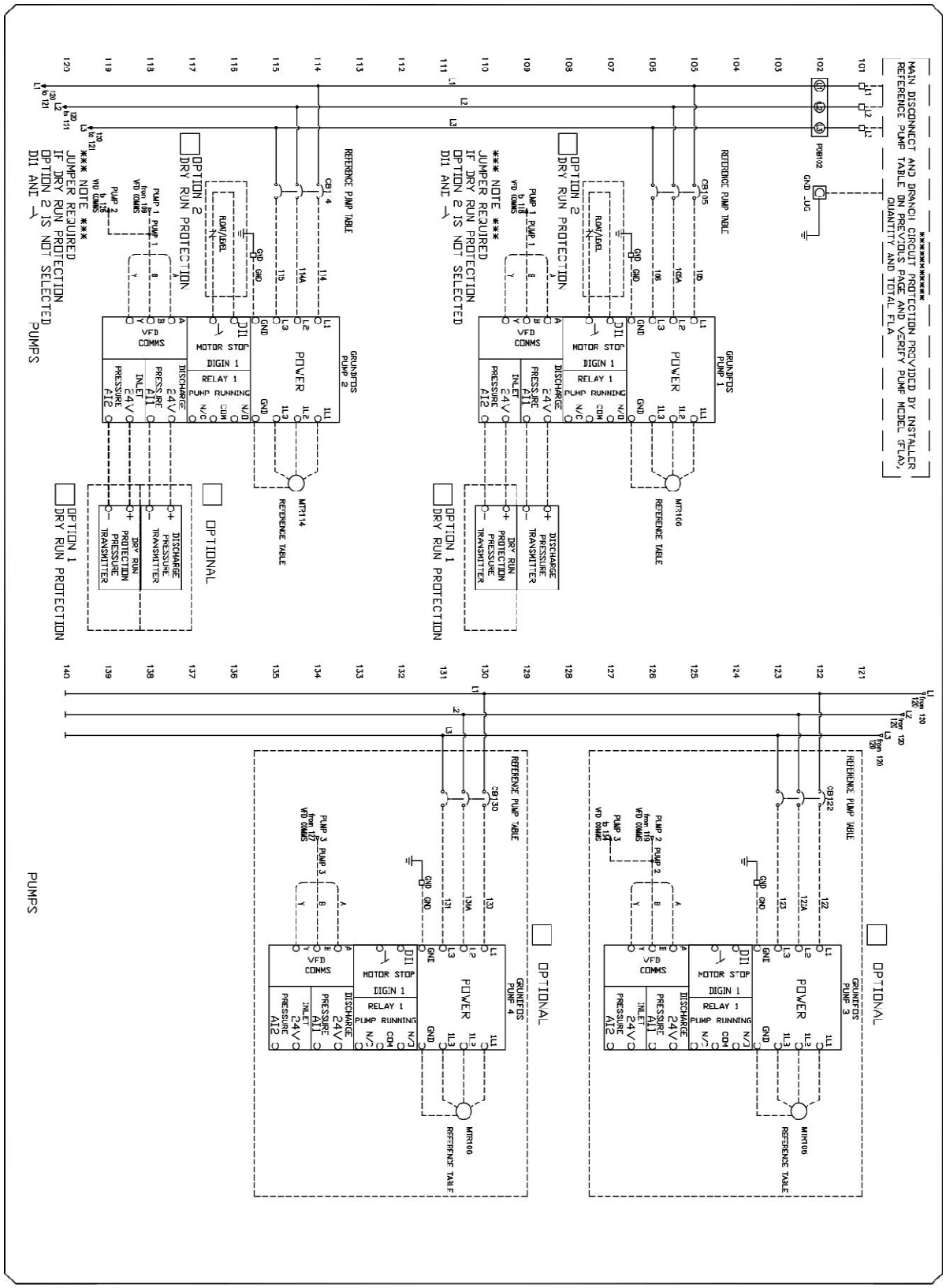
NO.	DATE	REVISION	BY
3	1/9/26	RELEASE FOR BUILD	SAS
2	9/27/25	REVIEW 2	SAS
1	1/30/25	REVIEW 1	SAS

ENGINEER: MDN
CHECKED BY: MDN
DRAWING NO: BP-E-001
DRAWN BY: SAS
BUILT BY: DL/JA
DATE: 1/29/25

WCC

CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL

WATER CONTROL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9638



DWG DWG FILE BP E-SYS ELECT-01

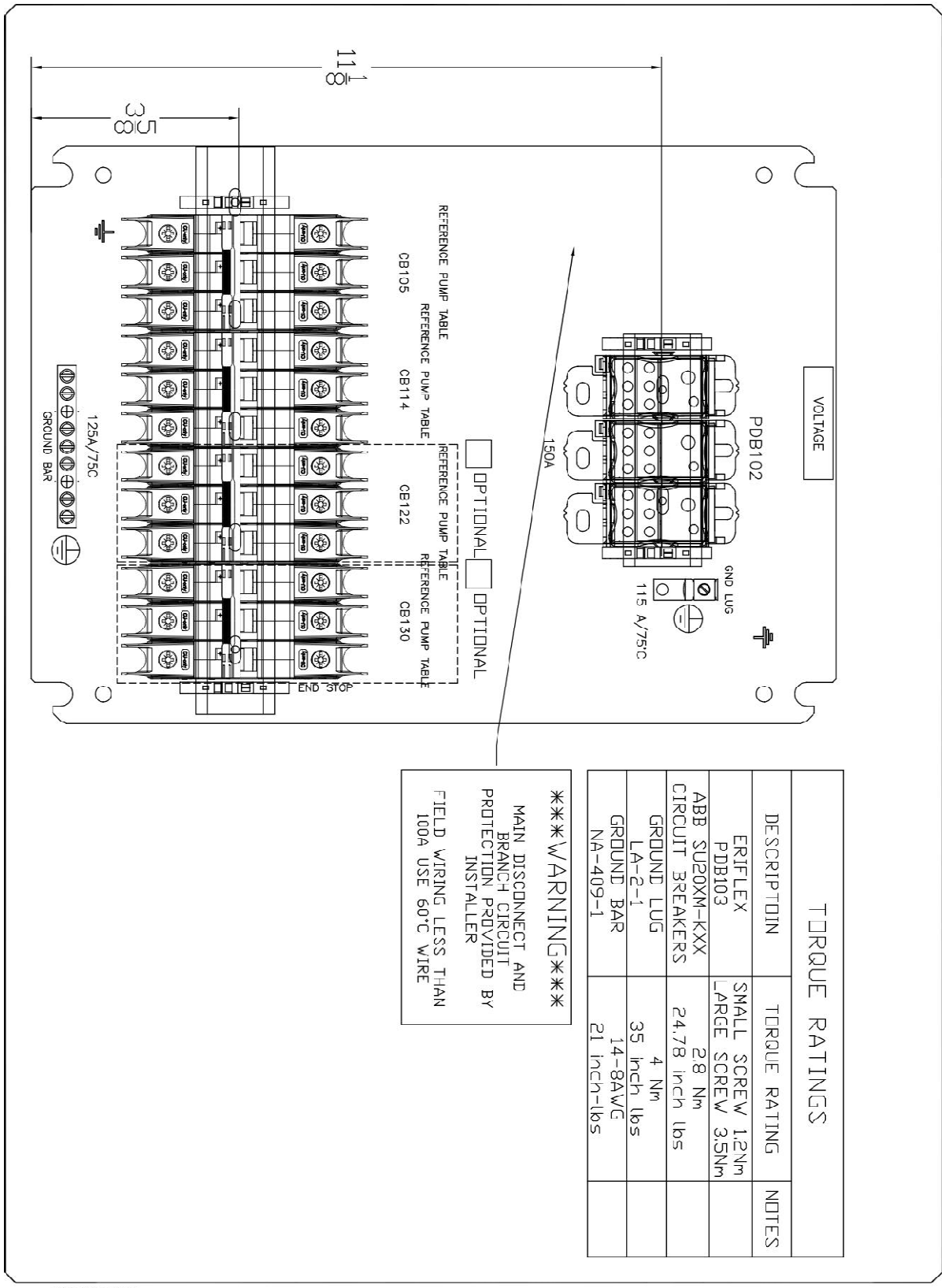
DWG TITLE	SHEET NO	DWG NO
BOOSTER PUMP CONTROL PANEL MODEL: BP-E	6 OF 8	100

NO.	DATE	REVISION	BY
3	1/9/26	RELEASE FOR BUILD	SAS
2	9/27/25	REVIEW 2	SAS
1	1/30/25	REVIEW 1	SAS

ENGINEER	CHECKED BY
MDN	MDN
DRAWING NO	DRAWN BY
BP-E-001	SAS
BUILT BY	DATE
DL/JA	1/29/25

CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL

WATER CONTRCL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9638



TORQUE RATINGS		
DESCRIPTOIN	TORQUE RATING	NOTES
ERIFLEX PDB103	SMALL SCREW 1.2Nm LARGE SCREW 3.5Nm	
ABB SU20XM-KXX CIRCUIT BREAKERS	2.8 Nm 24.78 inch lbs	
GROUND LUG LA-2-1	4 Nm 35 inch lbs	
GROUND BAR NA-409-1	14-8AWG 21 inch-lbs	

WARNING

MAIN DISCONNECT AND BRANCH CIRCUIT PROTECTION PROVIDED BY INSTALLER

FIELD WIRING LESS THAN 100A USE 60°C WIRE

GD DWG FILE BP E-SYS PANEL

DWG TITLE
BOOSTER PUMP CONTROL PANEL
MODEL: BP-E

DWG NO PANEL

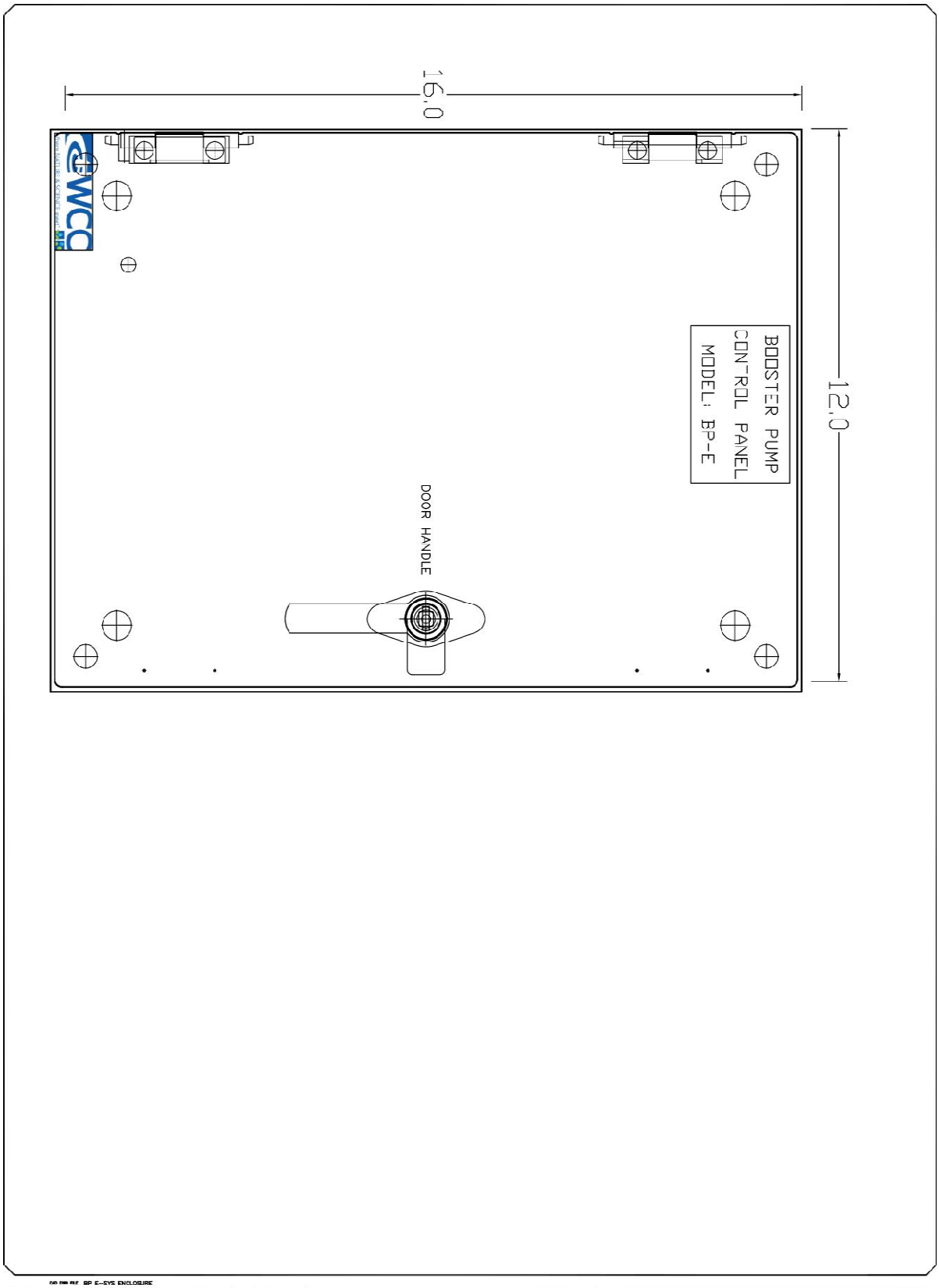
SHEET # 7 OF 8

NO.	DATE	REVISION	BY
3	1/9/26	RELEASE FOR BUILD	SAS
2	9/27/25	REVIEW 2	SAS
1	1/30/25	REVIEW 1	SAS

ENGINEER MDN | CHECKED BY MDN
DRAWING NO BP_E_001 | DRAWN BY SAS
BUILT BY DL/JA | DATE 1/29/25

WCC

CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL
WATER CONTROL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9638



DWG NAME BP E-SYS ENCLOSURE

DWG NO	8 OF 8
DWG TITLE	ENCLOSURE

BOOSTER PUMP
CONTROL PANEL
MODEL: BP-E

NO.	DATE	REVISION	BY
3	1/9/26	RELEASE FOR BUILD	SAS
2	9/27/25	REVIEW 2	SAS
1	1/30/25	REVIEW 1	SAS

ENGINEER: MDN	CHECKED BY: MDN
DRAWING NO: BP-E-001	DRAWN BY: SAS
BUILT BY: DL/JA	DATE: 1/29/25

WCC

CUSTOM WATER TREATMENT SYSTEMS
HIGH PURITY - RECLAMATION
DISINFECTION & PATHOGEN CONTROL
SOFTENING - CONTAMINANT REMOVAL

WATER CONTROL CORPORATION
7150 143RD AVENUE NW
RAMSEY, MINNESOTA 55303
PHONE: 763-427-9638

16 WARRANTY

Official Warranty

Water Control Corporation

Booster Pump System

Limited Warranty

Water Control Corporation warrants the high purity system to be free of manufacturers defects for the lesser of 18 months from the date of delivery or 12 months from the date of startup. We will, at our discretion, repair or replace defective products. This warranty does not include any costs associated with removal of defective products, or installation of replacement products. All replacement parts will be provided FOB Ramsey, MN. This warranty is transferable.

DISCLAIMER OF IMPLIED WARRANTIES

Water Control Corporation makes no warranties except those expressly stated in this document. To the extent permitted by the laws of the applicable state, **ALL WARRANTIES CONTAINED IN THIS DOCUMENT ARE EXPRESSLY IN LIEU OF, AND WATER CONTROL CORPORATION EXPRESSLY DISCLAIMS, ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

WHAT IS NOT COVERED BY THESE WARRANTIES

1. Replaceable or "sacrificial" parts, including (but not limited to) filter modules, membranes, carbon media, DI media, calcite media, pump seals, or UV bulbs.

2. Conditions and damages resulting from any of the following:

   - Wear caused by unfavorable water conditions
   - Improper installation, delivery, or maintenance
   - Any repair, modification, alteration, or adjustment not authorized by the manufacturer or an authorized servicer
   - Misuse, abuse, accidents, or unreasonable use
   - Improper setting of any control
   - Incorrect electric current, voltage, or supply
   - Improper system storage

3. Warranties are void if the original serial numbers have been removed, altered, or cannot be readily determined

4. System startup must be performed by an authorized factory representative. Failure to do so will void warranty.

5. The cost of service or service call to:

   - Correct installation errors
   - Instruct the user on proper use of the product
   - Transport the product to the servicer

6. Any costs associated with removal of defective products, or installation of replacement products.

7. Consequential, special, or incidental damages sustained by any person as a result of the breach of these warranties. Some states do not allow the exclusion or limitation of consequential or incidental damages, so the above exclusion may not apply to you.

Official Warranty

Water Control Corporation

LENS System

Limited Warranty

Water Control Corporation warrants the monitoring system to be free of manufacturers defects for the lesser of 18 months from the date of delivery or 12 months from the date of startup. We will, at our discretion, repair or replace defective products. This warranty does not include any costs associated with removal of defective products, or installation of replacement products. All replacement parts will be provided FOB Ramsey, MN. This warranty is transferable.

DISCLAIMER OF IMPLIED WARRANTIES

Water Control Corporation makes no warranties except those expressly stated in this document. To the extent permitted by the laws of the applicable state, **ALL WARRANTIES CONTAINED IN THIS DOCUMENT ARE EXPRESSLY IN LIEU OF, AND WATER CONTROL CORPORATION EXPRESSLY DISCLAIMS, ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

WHAT IS NOT COVERED BY THESE WARRANTIES

1. Replaceable or "sacrificial" parts, including (but not limited to) wear ring, cleaning beads, impellers, impeller bearings, temperature sensor, or pH probe.

2. Conditions and damages resulting from any of the following:

   - Wear caused by unfavorable water conditions
   - Improper installation, delivery, or maintenance
   - Any repair, modification, alteration, or adjustment not authorized by the manufacturer or an authorized servicer
   - Misuse, abuse, accidents, or unreasonable use
   - Improper setting of any control
   - Incorrect electric current, voltage, or supply
   - Improper system storage

3. Warranties are void if the original serial numbers have been removed, altered, or cannot be readily determined

4. The cost of service or service call to:

   - Correct installation errors
   - Instruct the user on proper use of the product
   - Transport the product to the servicer

5. Any costs associated with removal of defective products, or installation of replacement products.

6. Consequential, special, or incidental damages sustained by any person as a result of the breach of these warranties. Some states do not allow the exclusion or limitation of consequential or incidental damages, so the above exclusion may not apply to you.