



MROZ

OPERATION & MAINTENANCE MANUAL



**Manufactured With Pride
In The USA**

www.amerewater.com • 800-535-5585

AmeriWater • 3345 Stop 8 Rd. • Dayton, OH 45414

98-0155 Rev. D

CAUTIONARY SYMBOLS

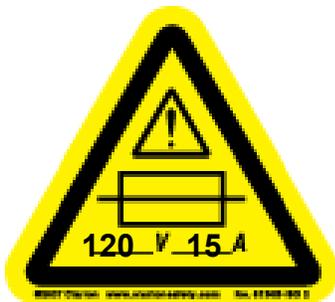


Caution, risk of electrical shock!
Attention, risque de choc électrique!

Open by qualified service personnel only!
Ouverture par le personnel qualifié seulement!

Refer to this Operation and Maintenance Manual for instructions and safety considerations.

Référez-vous au manuel des Opérations et Entretien pour instructions et mesures de sécurité.



Caution, risk of danger!
Attention, danger potential!

For service by qualified service personnel only!
Entretien par le personnel qualifié seulement!

Replace only with 120Vac, 15amp, time-delay fuse.
Remplacer avec 120Vac, 15 amp, fusible à retardement seulement.



Earth Ground terminal
Borne de mise à la terre

C This product has been tested to the requirements of CAN/CSA-C22.2 No. 61010-1, second edition, including Amendment 1, or a later version of the same standard incorporating the same level of testing requirements.

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1.0 GENERAL INFORMATION

1.1 INTRODUCTION

Congratulations on your decision to use the MROZ system! The MROZ is a water treatment system for use in hemodialysis applications. It is designed to pretreat and purify water resulting in product water that meets or exceeds ANSI/AAMI requirements for use in making dialysate for hemodialysis.

The model that you purchased was selected for the volume of water needed and the analysis of your input water. It is intended to be a component in a complete water purification system, and is not a complete water treatment system. It must be preceded by pre-treatment devices, and may need to be followed by post-treatment devices as well to meet current AAMI and Federal (U.S.) standards. This Operation Manual was written for the MRO3Z, MRO4Z, MRO5Z, MRO6Z, MRO7Z and MRO8Z models.

Your MROZ system was thoroughly tested and in excellent condition when it was shipped to you. However, because damage during shipment is possible, please unpack and carefully inspect the MROZ as soon as you receive it. Please notify AmeriWater® if any problems are encountered.

The initials “PAA” are used occasionally throughout this manual to generically represent the hydrogen peroxide/peroxyacetic acid solution that is to be used for disinfection. Peracidin® is an example of this solution. The caution on the front panel of the MROZ that states “Use only PAA/Use no substitutes” means that any of these products are acceptable. Do not attempt to use anything other than hydrogen peroxide/peroxyacetic acid disinfecting solution.

Please read the Operations Manual before using the system. Contact AmeriWater Customer Service with any questions at 1-800-535-5585 Monday through Friday 8:00 a.m. to 5:00 p.m. eastern standard time. For after-hours emergencies call 1-800-535-5585 and follow the instructions on the recorded message. Our on-call technician will return your call as soon as possible.

NOTE: This entire Operations Manual should be read before operating or servicing the system. This Operations Manual should then be kept near the system and used as a reference and troubleshooting guide.

WARNING: This Reverse Osmosis System (RO) contains a preservative solution to prevent microbiological growth and freezing. Discard all product water for at least two hours of operation before placing the RO in service.

CAUTION: No person should attempt to operate or service the AmeriWater MROZ without prior authorization, instruction, and training from AmeriWater and/or your medical facility director.

1.2 RESTRICTION ON USE

CAUTION: Federal law restricts this device for sale by or on the order of a physician (medical director) for use as a water treatment device for hemodialysis.

1.3 INDICATIONS FOR USE

The AmeriWater MROZ Reverse Osmosis System is a water treatment device intended for use in hemodialysis applications. It is intended to be used as a component in the AmeriWater Water Purification System (K991519), and is intended to purify potable water for use in making dialysate for hemodialysis and to meet current AAMI and Federal (U.S.) standards. The AmeriWater MROZ is intended for use in water rooms in a hospital, clinic, or dialysis center. The device is intended to be a component in a complete water purification system, and is not a complete water treatment system. It must be preceded by pre-treatment devices, and may need to be followed by post-treatment devices as well to meet current AAMI and Federal (U.S.) standards.

FLOW RATE TABLE

MROZ Model	Storage Tank Flow Rate (GPD - Gallon Per Day)	Direct Feed Flow Rate (GPD – Gallon Per Day)
MRO3Z	5513 TO 8,750 GPD	4788 TO 7,600 GPD
MRO4Z	7245 TO 11,500 GPD	6300 TO 10,000 GPD
MRO5Z	7560 TO 12,000 GPD	6577 TO 10,440 GPD
MRO6Z	9374 TO 14,880 GPD	8155 TO 12,945 GPD
MRO7Z	10773 TO 17,100 GPD	9373 TO 14,877 GPD
MRO8Z	12312 TO 19,543 GPD	10711 TO 17,002 GPD

Each model is available in a 208V, 230V, or 460V variant and includes a divert- to-drain feature to prevent patient exposure to unsafe product water. Each model includes temperature compensated online monitors that display conductivity and percent rejection.

The conductivity monitor activates an audible and visual alarm when the product water conductivity exceeds a preset alarm limit.

2.0 TECHNICAL INFORMATION

2.1 SPECIFICATIONS

Ideal, minimum, and maximum incoming water temperature	Min = 41° F (5° C) Max = 90° F (33° C) Ideal Temperature = 77° F (25° C)
Prefilter gauge pressure (when the MROZ is running) Minimum Maximum	20 PSI 90 PSI (Pounds per Square Inch)
MRO3Z Pump pressure – Minimum Maximum	100 PSI 140 PSI
MRO4Z Pump pressure – Minimum Maximum	100 PSI 160 PSI
MRO5Z Pump pressure – Minimum Maximum	100 PSI 160 PSI
MRO6Z Pump pressure – Minimum Maximum	100 PSI 160 PSI
MRO7Z Pump pressure – Minimum Maximum	100 PSI 180 PSI
MRO8Z Pump pressure – Minimum Maximum	100 PSI 200 PSI
Water pressure to dialysis machine	Controlled by Loop return relief valve.
Maximum output of product water @ 77°F (25°C), TDS<1000 ppm of NaCl, & pump pressure of 200 psi. These flows are based on storage tank flows and direct feed flows are 87% of the storage tank setup flows.	MRO3Z – 5513 TO 8,750 GPD (20,869 TO 33,122 LPD) MRO4Z – 7245 TO 11,500 GPD (27,425 TO 43,532 LPD) MRO5Z – 7560 TO 12,000 GPD (28,618 TO 45,425 LPD) MRO6Z – 9374 TO 14,880 GPD (35,484 TO 56,327 LPD) MRO7Z – 10773 TO 17,100 GPD (40,780 TO 64,730 LPD) MRO8Z – 12312 TO 19,543 GPD (46,606 TO 73,978 LPD) (Gallons Per Day / Liters Per Day)

Connections	Feed = 1" plain hose Product = 3/4" plain hose Drain = 1" plain hose			
Electrical Requirements	For the controller: 120V/60HZ UL Listed GFI (Ground Fault Interrupter), capable of 125VAC, 20AMP, 2.5kVA, -35C TO 66C, 60HZ, 4 TO 6mA leakage. For the pump: UL Listed, lockable, NEMA 4X rated 3 phase fused disconnect capable of 240VAC, 30AMP, 31.18kVA (For the 208/230V models) and 600VAC, 30AMP, 31.18kVA (For the 460V models)			
Pump Electrical Ratings				
Pump Model	Voltage	Frequency (Hz)	Phase Ø	Max Amp Draw
3Z402 Pump	208	60	3	5.5
3Z403 Pump	230	60	3	4.7
3Z404 Pump	460	60	3	2.5
4Z-5Z402 Pump	208	60	3	8.8
4Z-5Z403 Pump	230	60	3	7.6
4Z-5Z404 Pump	460	60	3	3.8
6Z402 Pump	208	60	3	12.0
6Z403 Pump	230	60	3	10.1
6Z404 Pump	460	60	3	5.3
7Z-8Z402 Pump	208	60	3	12.0
7Z-8Z403 Pump	230	60	3	10.1
7Z-8Z404 Pump	460	60	3	5.3
Dimensions Packaged Dimensions not Packaged	80" H x 32" W x 58" D 76"H x 30"W x 55"D			
Shipping Weight / Operation Weight	MRO3Z 360 - 410 lbs. / 285 lbs. MRO4Z 390 - 440 lbs. / 320 lbs. MRO5Z 420 - 470 lbs. / 355 lbs. MRO6Z 450 - 500 lbs. / 390 lbs. MRO7Z 470 - 530 lbs. / 410 lbs. MRO8Z 500 - 560 lbs. / 440 lbs.			

Materials that Contact Product Water:

ABS	Acrylic	Carbon	EPDM
Nylon	Polyester	Polyethylene	Polypropylene
PVC	Stainless Steel	TFCM* (Polyimide)	Tygon

*Thin Film Composite Membrane

All of the above listed materials meet FDA and/or NSF standards.

2.2 MROZ OUTPUT WATER QUALITY

The physician in charge of dialysis has the ultimate responsibility for selecting the maximum allowable levels of chemical contaminants in the water, and, also, is responsible for monitoring the water. The AmeriWater MROZ System is designed to produce water that meets or exceeds ANSI/AAMI requirements.

Polyamide Thin Film Composite Membrane

Contaminants	Percentage Removal
Calcium	99.5
Magnesium	99.5
Sodium	98.0
Potassium	97.0
Fluoride	87.0 - 93.0
Nitrate (NO ₃)	60.0 - 75.0
Sulfate	99.5
Copper	98.0 - 99.0
Barium	96.0 - 98.0
Zinc	98.0 - 99.0
Aluminum	98.0 - 99.0
Arsenic	94.0 - 96.0
Lead	96.0 - 98.0
Silver	93.0 - 96.0
Cadmium	96.0 - 98.0
Chromium	96.0 - 98.0
Selenium	94.0 - 96.0
Mercury	96.0 - 98.0
Antimony	96.0 - 98.0
Beryllium	96.0 - 98.0
Thallium	96.0 - 98.0

PT401 Antiscalant/Scale Inhibitor

Contaminants	Chemical Feed System
Membrane Scale Control	Not to exceed 40 ppm

2.3 ENVIRONMENTAL/TRANSPORT CONDITIONS EXPECTED

ENVIRONMENTAL CONDITIONS ANTICIPATED

This device is intended to be used under the following conditions:

Indoor use;

Altitude up to 2000 m; 6562 feet

Temperature between 5°C and 40°C; 41°F and 104°F

Maximum relative humidity 80% for temperatures up to 31°C (87.8°F) decreasing linearly to 50% relative humidity at 40°C (104°F)

MAINS supply voltage fluctuations up to $\pm 10\%$ of the nominal voltage;

Transient overvoltages present on MAINS supply = CATEGORY II;

Applicable RATED POLLUTION degree 2.

TRANSPORT CONDITIONS ANTICIPATED

Altitude up to 2000 m; 6562 feet

Temperature between 5°C and 40°C; 41°F and 104°F

Maximum relative humidity 80% for temperatures up to 31°C (87.8°F) decreasing linearly to 50% relative humidity at 40°C (104°F)

3.0 COMPONENTS AND SCHEMATICS

3.1 EXTERNAL FRONT VIEW

MRO3Z THRU MRO6Z CONFIGURATION SHOWN, MRO7Z & MRO8Z MODELS HAVE AN EXTERNALLY MOUNTED PRE-FILTER CARTRIDGE ASSEMBLY.

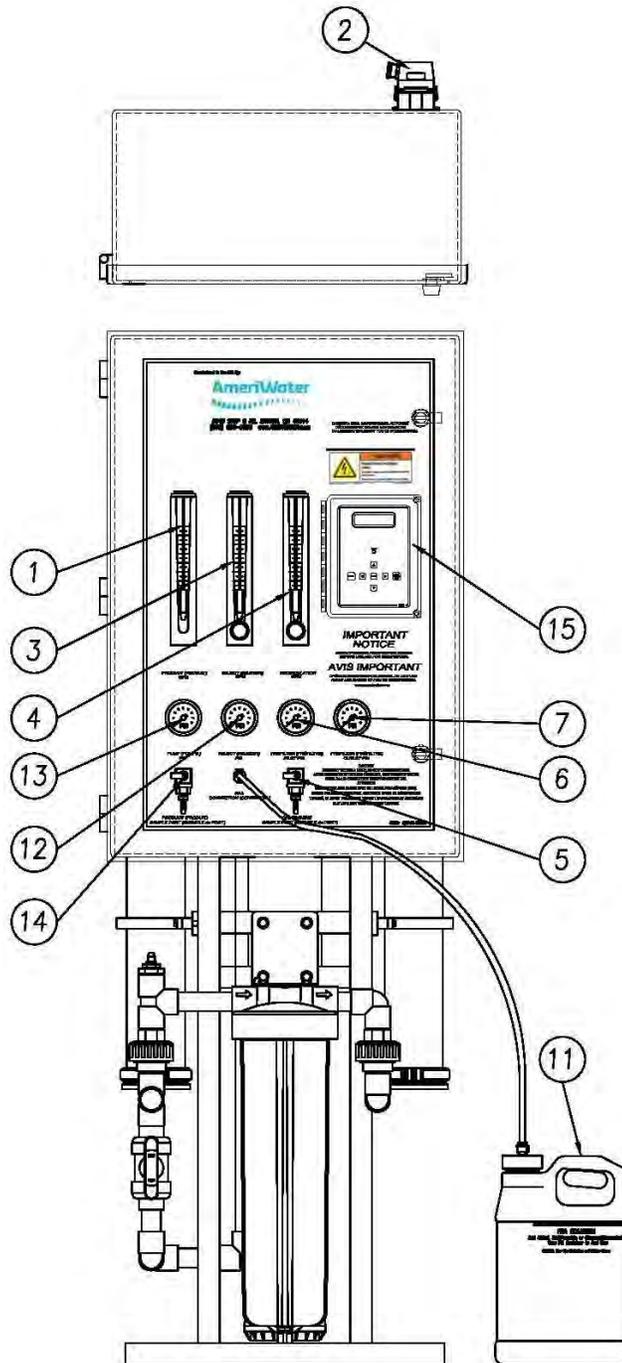


Figure 3.1

MRO7Z and MRO8Z CONFIGURATION SHOWN BELOW

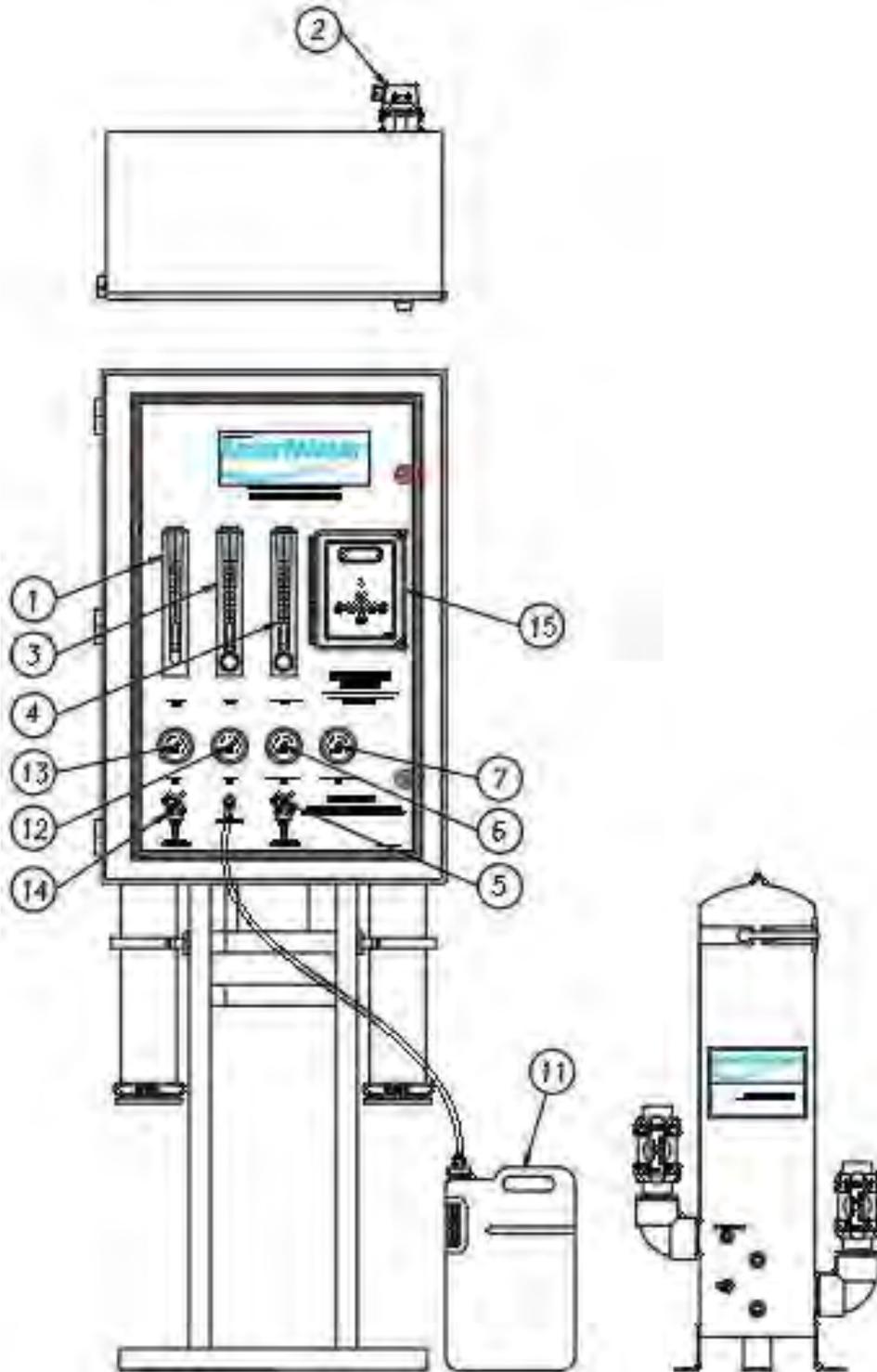


Figure 3.2

IDENTIFICATION OF COMPONENTS (EXTERNAL FRONT VIEW)

1. **PRODUCT GPM:** Rotameter that measures the flow of the Product Water for Dialysis in gallons per minute (GPM).
2. **SIDE ENTRY HOOD:** External wire installation for float level switches, pretreat lockout and RO alarm relay connectors; (See Section 7).
3. **REJECT GPM WITH VALVE:** Rotameter with valve to control the flow of the Reject water to drain, in gallons per minute (GPM).
4. **RECIRCULATING GPM:** Rotameter with valve to control the flow of water being recirculated back before the pump, in gallons per minute (GPM).
5. **CHLORAMINE SAMPLE TEST PORT:** Valve for taking sample of feed water before the RO.
6. **PREFILTER INLET PSI:** Gauge that measures the pressure (in pounds per square inch) of the prefilter inlet.
7. **PREFILTER OUTLET PSI:** Gauge that measures the pressure (in pounds per square Inch) of the prefilter outlet.
8. **PRODUCT WATER FOR DIALYSIS:** Connection carrying Product Water for Dialysis.
9. **REJECT WATER TO DRAIN:** Connection carrying Reject to the drain.
10. **INCOMING TAP WATER:** Hose carrying Incoming Tap Water that is to be treated by the RO.
11. **PAA JUG:** Plastic jug to mix hydrogen peroxide/peroxyacetic acid (PAA) disinfecting solution and water for sanitizing the system; pre-marked with a red Fill Line to indicate how much water to add.
12. **REJECT PSI:** Gauge that measures the pressure (in pounds per square inch) of the water coming from reject side of the membranes.
13. **PUMP PSI:** Gauge that measures the pressure (in pounds per square inch) of the water coming from the pump feeding the membranes.
14. **PRODUCT WATER TEST PORT:** Valve for taking sample of Product Water.
15. **CONTROLLER:** Control mechanism for the RO. See Section 6.

3.2 INTERNAL CABINET, TOP AND SIDE VIEW

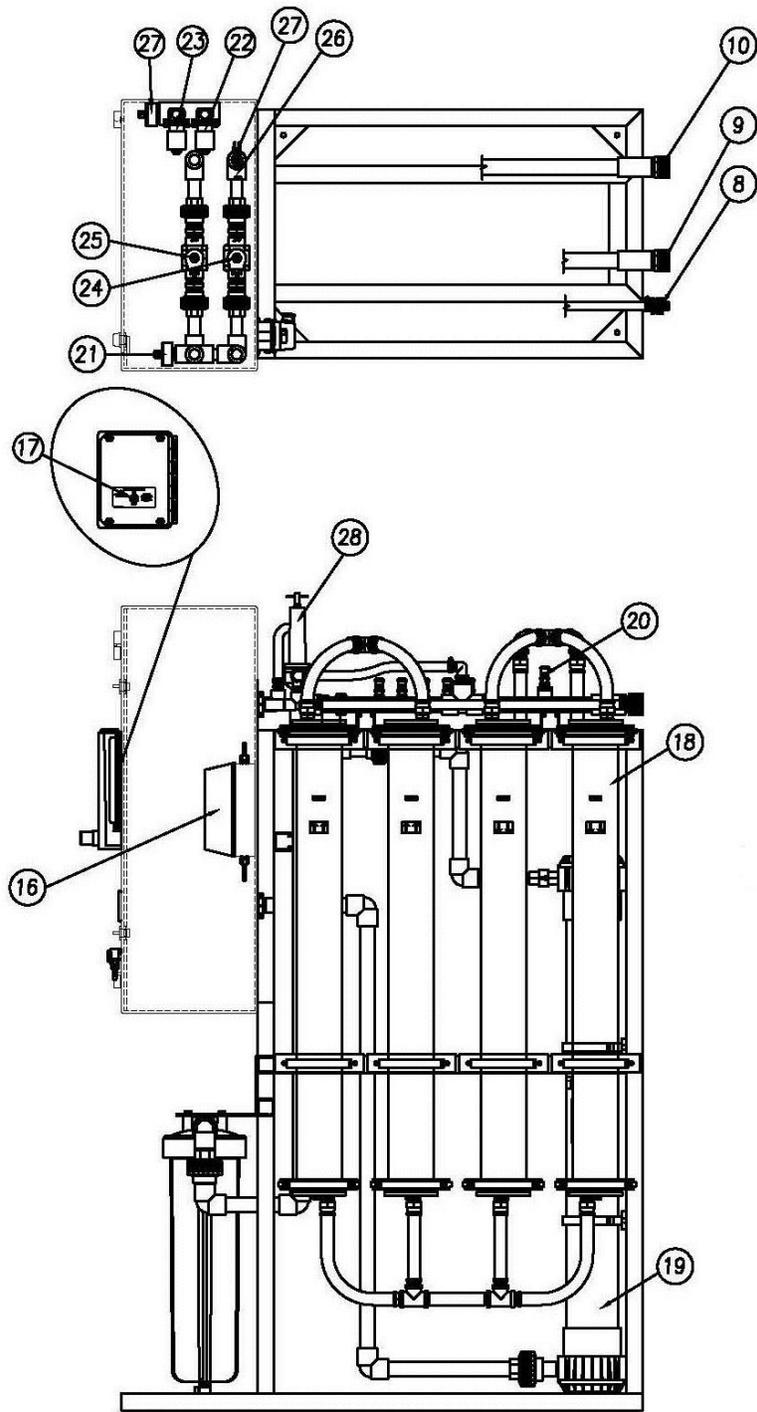


Figure 3.3

3.3 INTERNAL CABINET, TOP AND SIDE VIEW CONT.

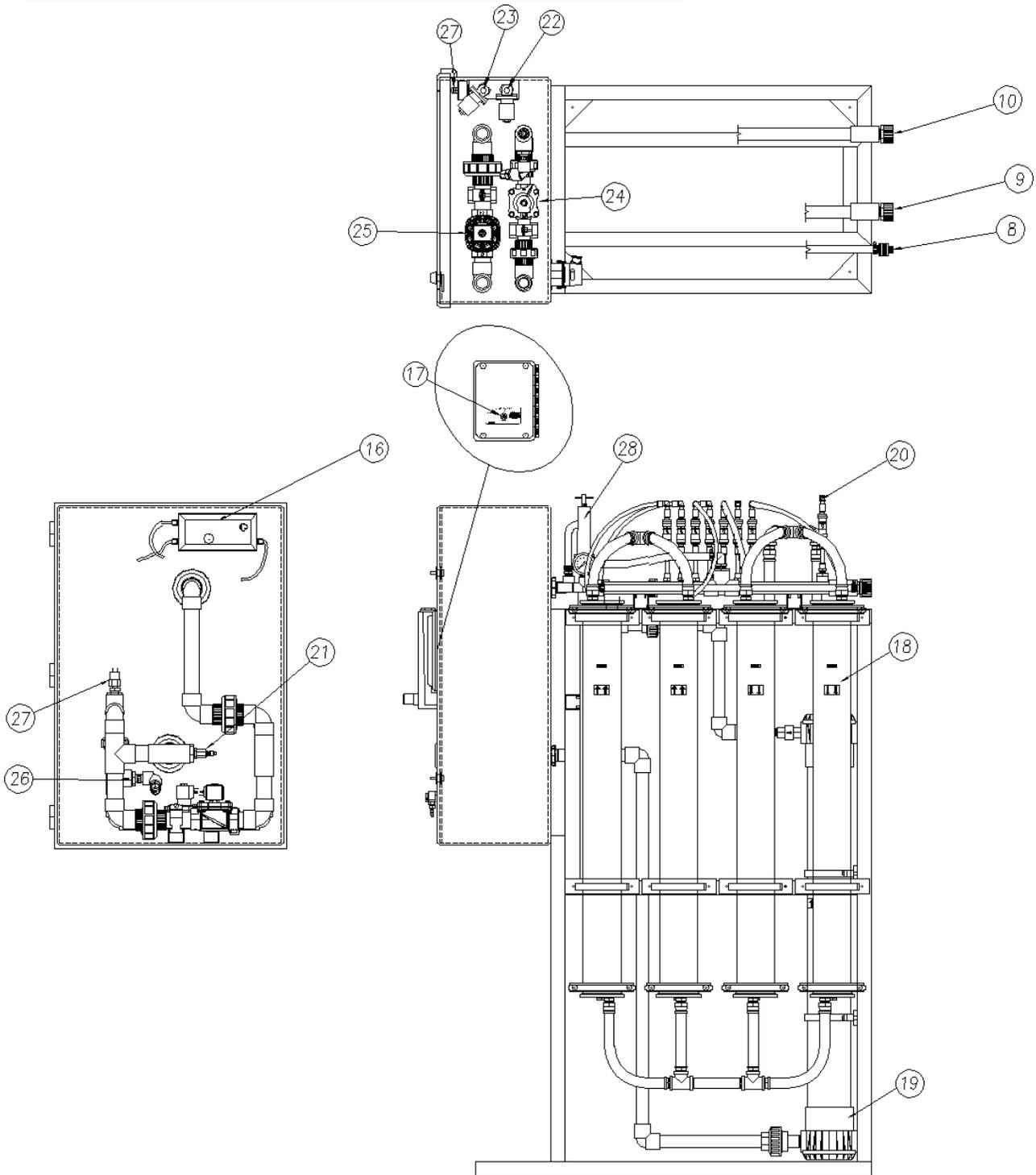
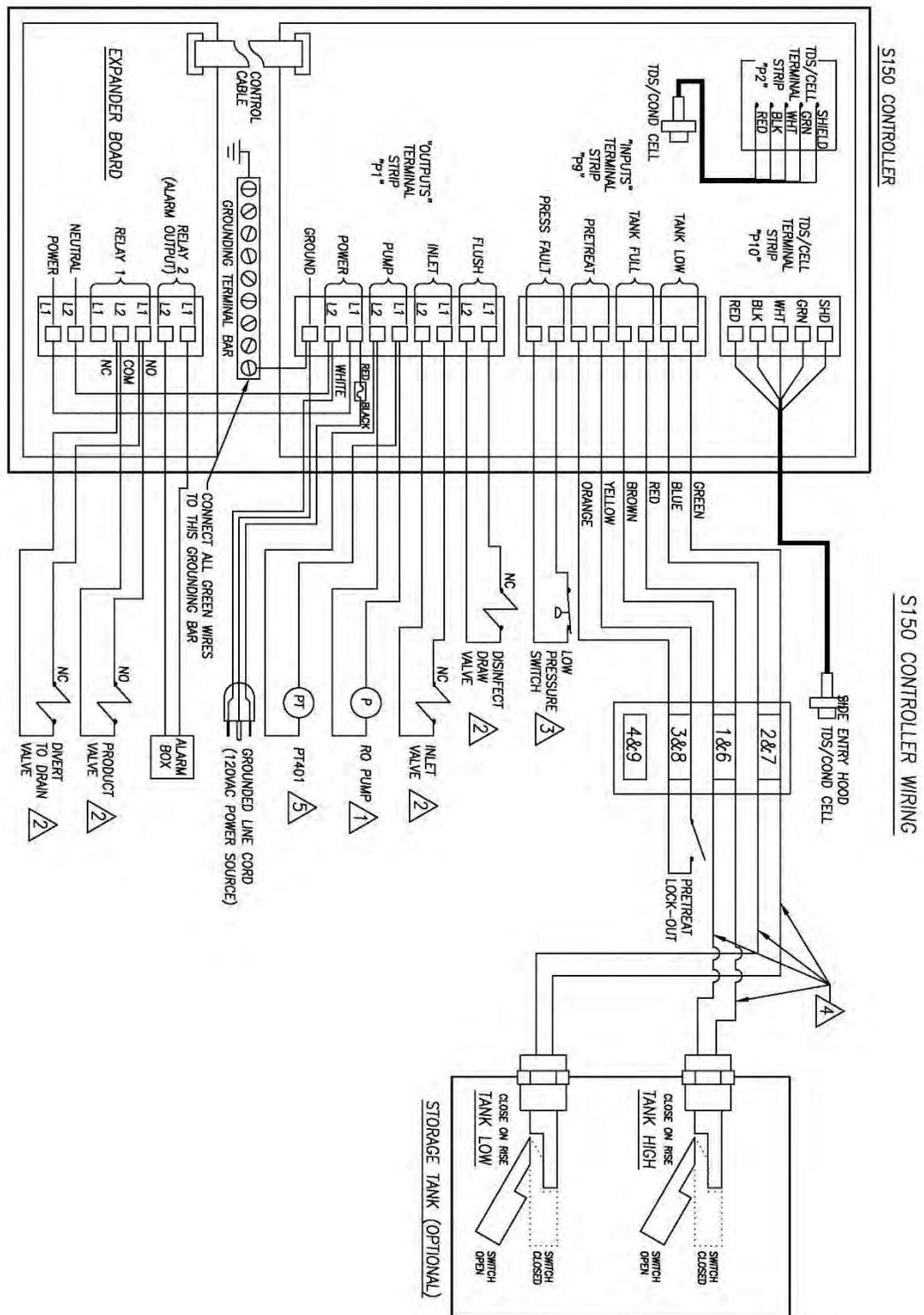


Figure 3.4

IDENTIFICATION OF COMPONENTS (INTERNAL CABINET AND SIDE VIEW)

16. **MOTOR CONTACTOR/OVERLOAD RELAY:** Starts and stops the pump motor and protects the motor from overload.
17. **CLEAN IN PLACE SWITCH (ALARM FAULT OVERRIDE):** When the Clean in Place (CIP) switch is placed to the ON position, all MROZ fail-safe modes are disabled for low-pressure membrane cleaning with the optional AmeriWater Clean In Place system (P/N 00CIP2). The controller will display a warning that the CIP mode is active.
18. **MEMBRANE:** Tape wrapped, spiral-wound, thin film composite membrane for reverse osmosis.
19. **PUMP:** Provides the driving pressure for the reverse osmosis system.
20. **PRODUCT HEADER ASSY:** This header directs all product water from the membranes to the flow meter.
21. **INCOMING CONDUCTIVITY SENSOR:** Cell that reads the quality of the feed water.
22. **PRODUCT TO DRAIN SOLENOID:** Opens when water quality is above set point.
23. **PRODUCT TO USE SOLENOID:** Closes when water quality is above set point.
24. **DISINFECT SOLENOID:** Opens to allow the hydrogen peroxide/ Peroxyacetic acid mixture to draw into the system to soak for the sanitize cycle.
25. **FEED SOLENOID:** Opens when the MROZ system is on to allow water to feed through the system, closes when the system is OFF.
26. **DISINFECT EJECTOR:** Causes suction to draw solution from PAA jug when the Disinfect Solenoid is opened.
27. **LOW PRESSURE SWITCH:** Switch to protect the pump in the event that the feed pressure drops below 5 PSI.
28. **PRODUCT CONDUCTIVITY SENSOR:** Cell that reads the quality of the product water.
29. **RELIEF VALVE:** Relieves product water to the drain in the event of excess back pressure on the product line.

3.4 ELECTRICAL DIAGRAM AND FIELD WIRING



Figure

3.5

Fig

R&D CONTROLLER ENCLOSURE

NOTES:

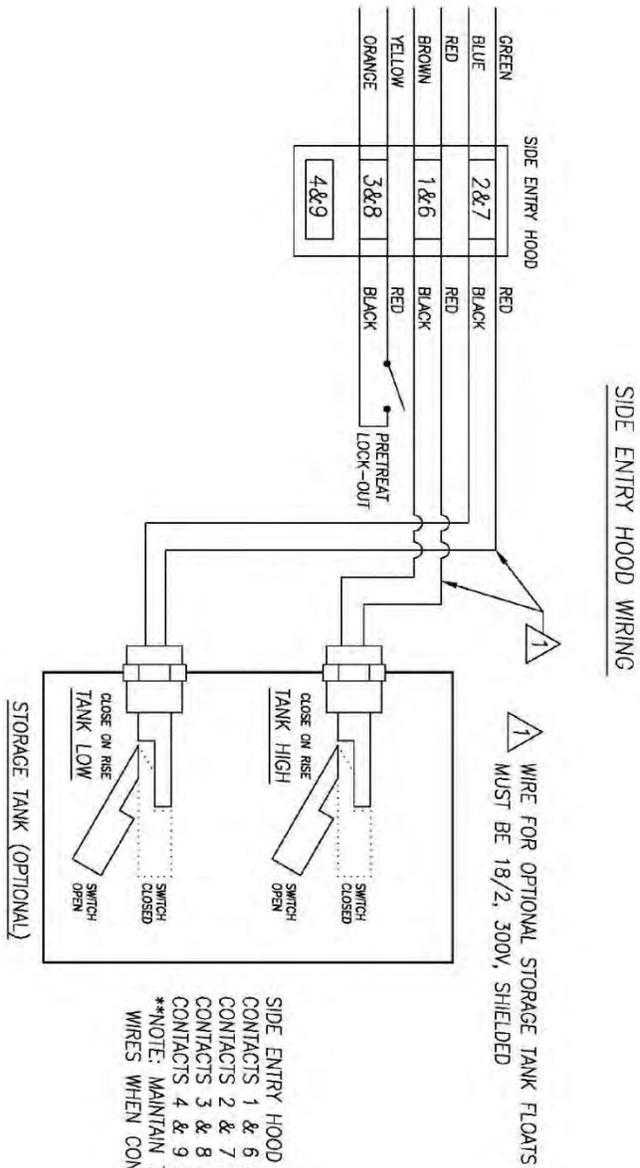
1. THE "CLEAN IN PLACE" SWITCH (WHICH IS ASSEMBLED TO THE BACK OF THE EXPANDER BOARD AND PROTRUDES THRU THE ENCLOSURE) DISABLES THE INPUTS AND THE ALARMS TO ALLOW MEMBRANE CLEANING.
2. WHITE WIRE OF COMPONENTS MUST ONLY BE CONNECTED TO THE NEUTRAL TERMINALS (L2 / T2) OR, IF DIN, CONNECT THE BROWN WIRES.
3. ALL GROUNDS WILL BE THE COLOR GREEN/YELLOW.
4. WHEN PLACING STRANDED WIRE INTO THE GROUNDING BAR, SLIP THE STRANDED WIRES INTO A FERRULE TO PREVENT DAMAGE BY THE SCREW. (GREENLEE #02986 G1173/8)

SIDE ENTRY HOOD CONNECTIONS FOR CUSTOMER USE:
CONTACTS 1 & 6 ARE FOR FLOAT LEVEL SWITCH, TANK HIGH.**
CONTACTS 2 & 7 ARE FOR FLOAT LEVEL SWITCH, TANK LOW. **
CONTACTS 3 & 8 ARE FOR PRETREATMENT LOCKOUT.
CONTACTS 4 & 9 ARE FOR RO ALARM RELAY.
NOTE: MAINTAIN THE POLARITY OF THE FLOAT SWITCH WIRES WHEN CONNECTING TO THE SIDE ENTRY HOOD.

S150 CONTROLLER WIRING:

- 1 PUMP WIRE MUST BE 16/4, 500W, 600V, 10AMPS, -40C TO 90C
- 2 SOLENOID VALVE WIRE HARNESSSES ARE 18/2, 300V, 10AMPS, -40C TO 90C
- 3 LOW PRESSURE SWITCH WIRE MUST BE 18/2, 500W, 300V, 10AMPS, -40C TO 90C
- 4 OPTIONAL STORAGE TANK FLOAT WIRE MUST BE 18/2, 300V, SHIELDED
- 5 PT401 PUMP WIRE CORD IS 18/3, SJ CORD, SJTW, 300V, 105C

Figure 3.6



SIDE ENTRY HOOD CONNECTIONS FOR CUSTOMER USE:
 CONTACTS 1 & 6 ARE FOR FLOAT LEVEL SWITCH, TANK HIGH.**
 CONTACTS 2 & 7 ARE FOR FLOAT LEVEL SWITCH, TANK LOW.**
 CONTACTS 3 & 8 ARE FOR PRETREATMENT LOCKOUT.
 CONTACTS 4 & 9 ARE FOR RO ALARM RELAY.
 **NOTE: MAINTAIN THE POLARITY OF THE FLOAT SWITCH
 WIRES WHEN CONNECTING TO THE SIDE ENTRY HOOD.**

Figure 3.7

3.5 FLOW DIAGRAMS

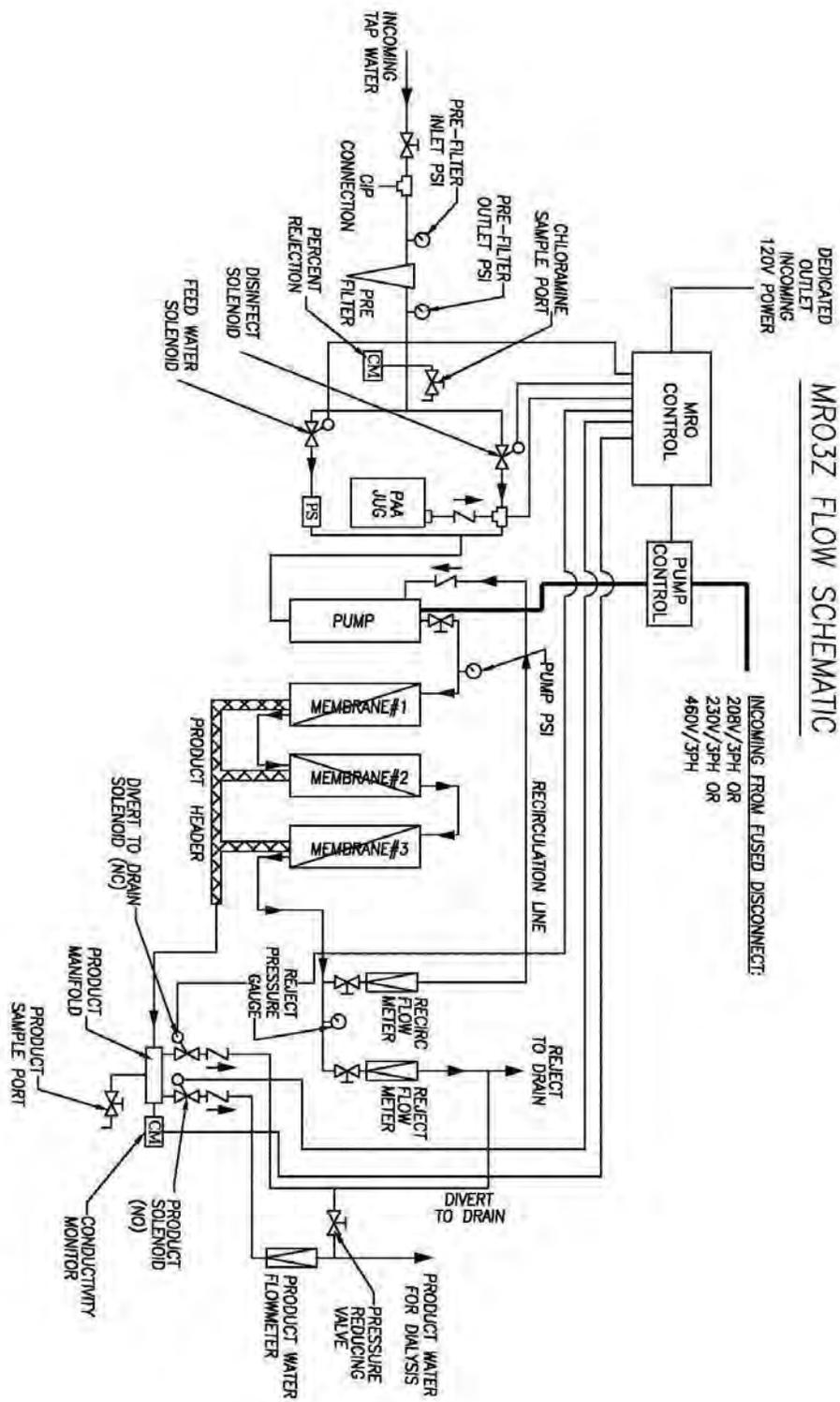


Figure 3.8

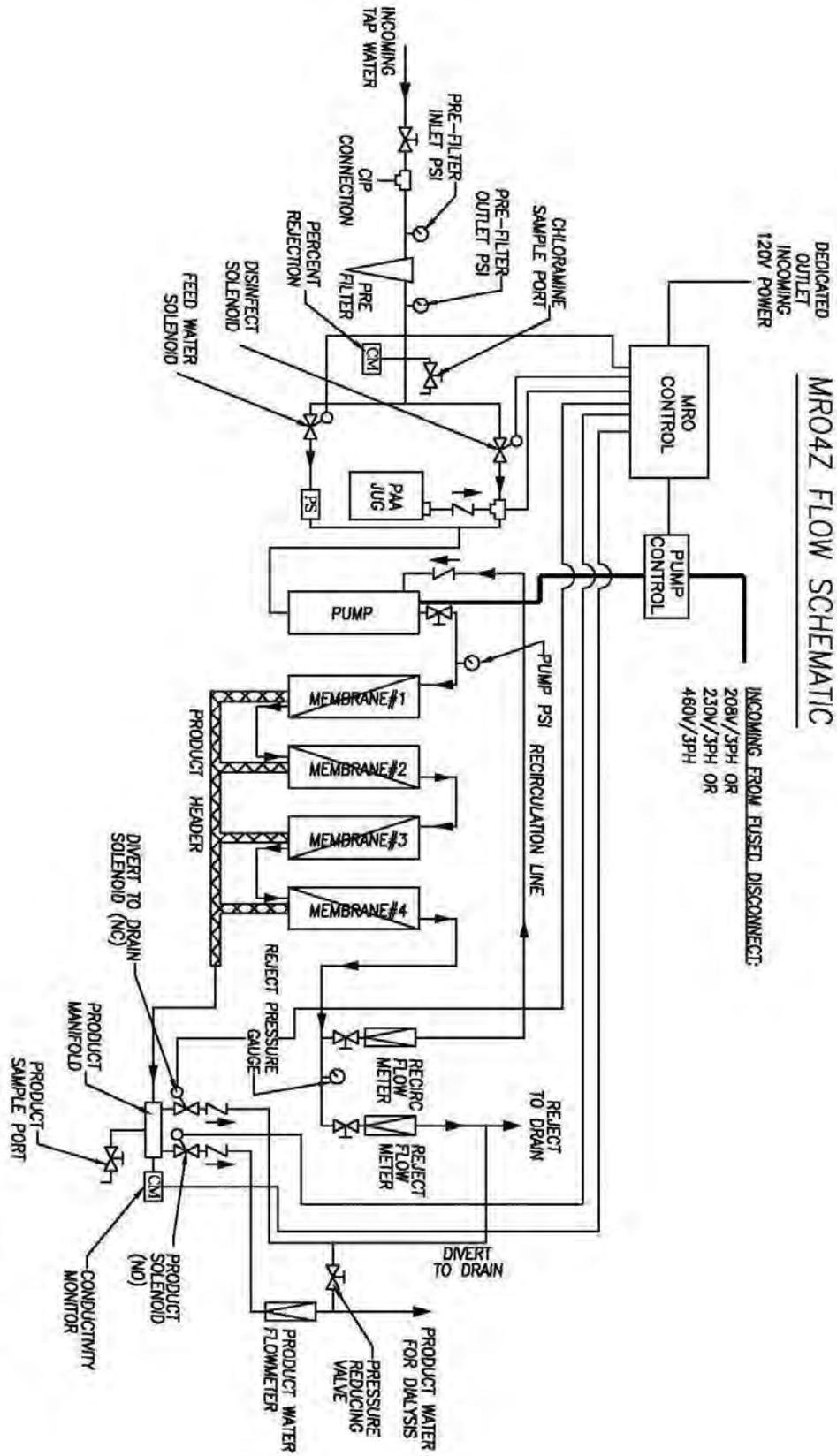


Figure 3.9

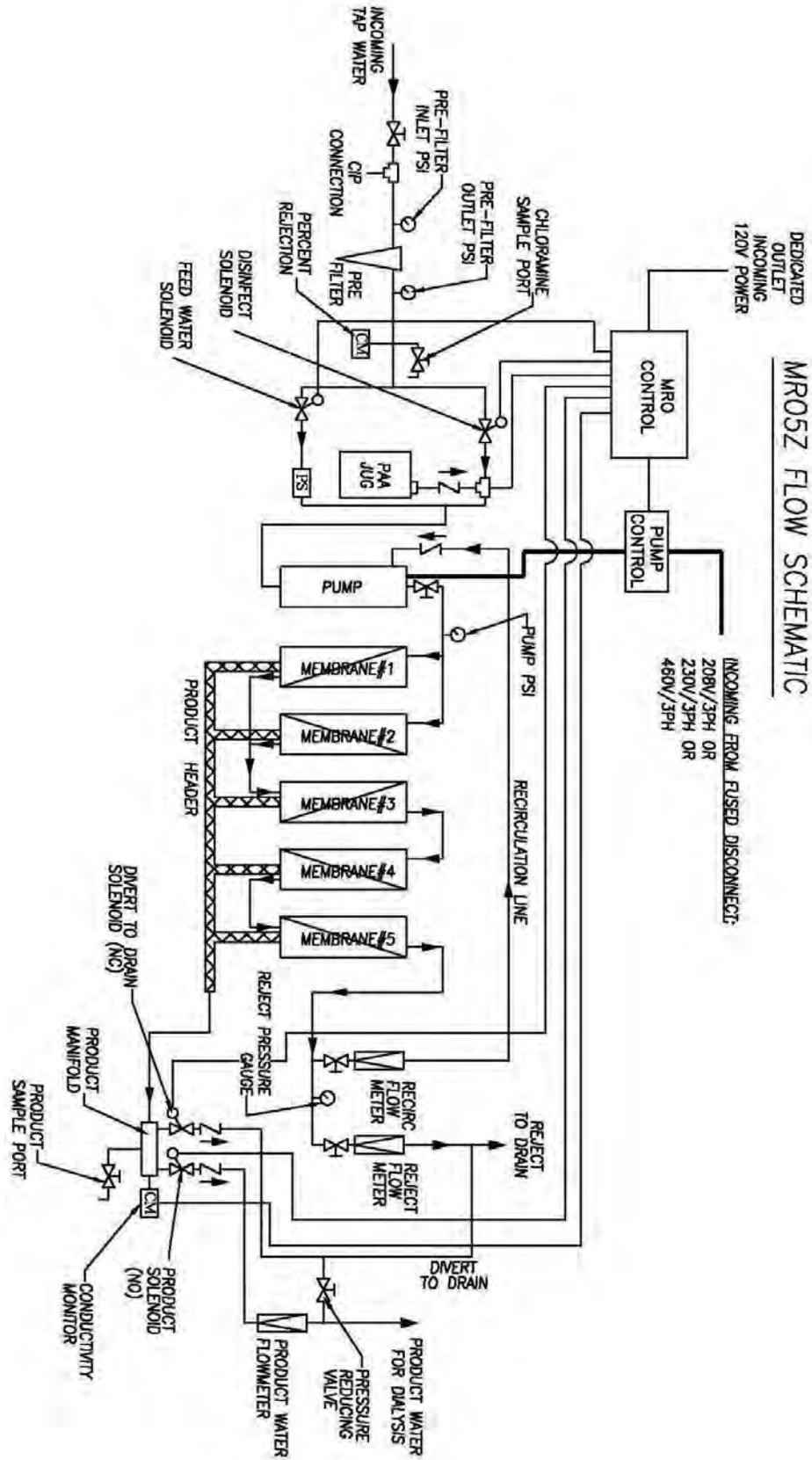


Figure 3.10

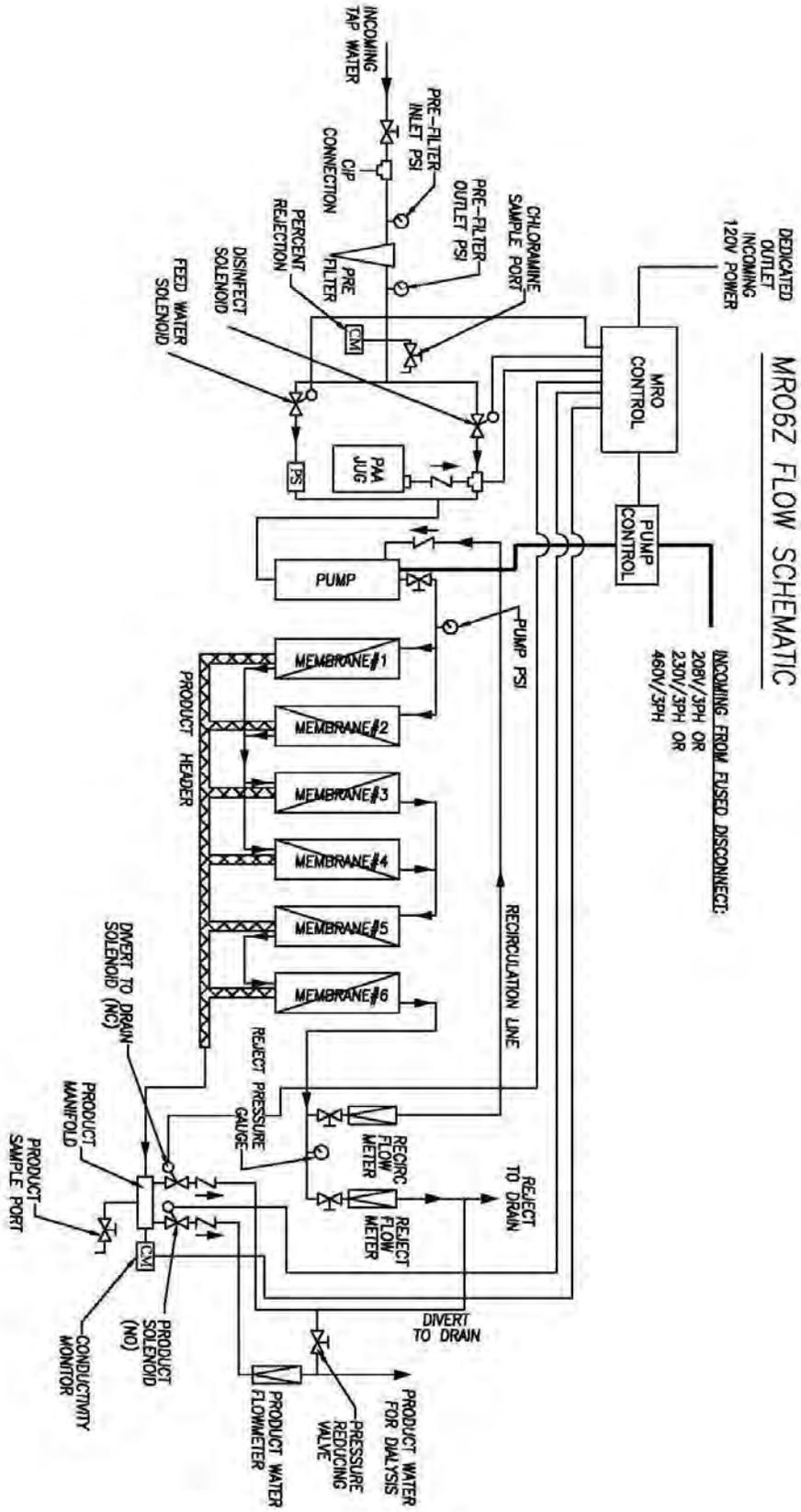


Figure 3.11

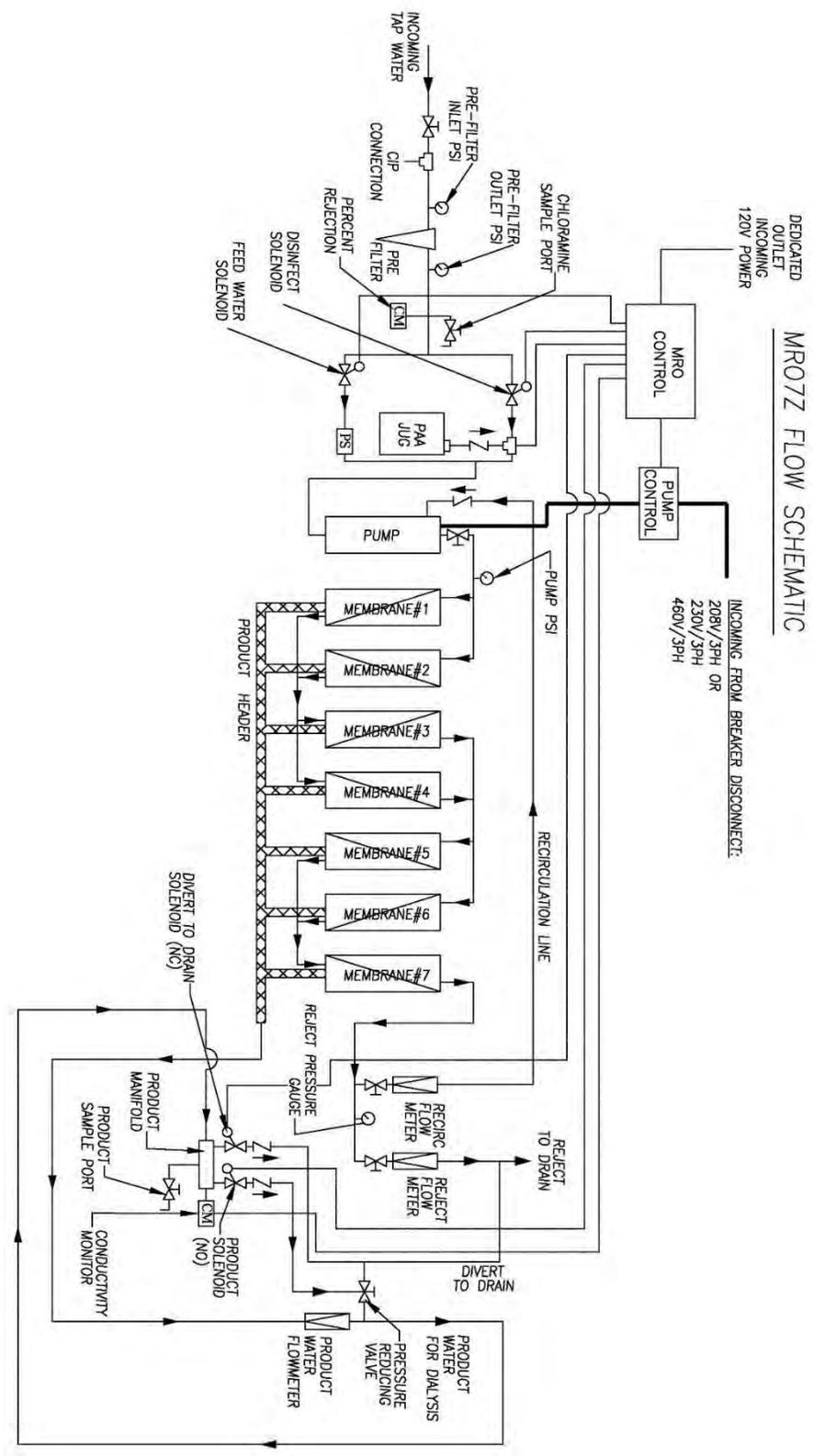


Figure 3.12

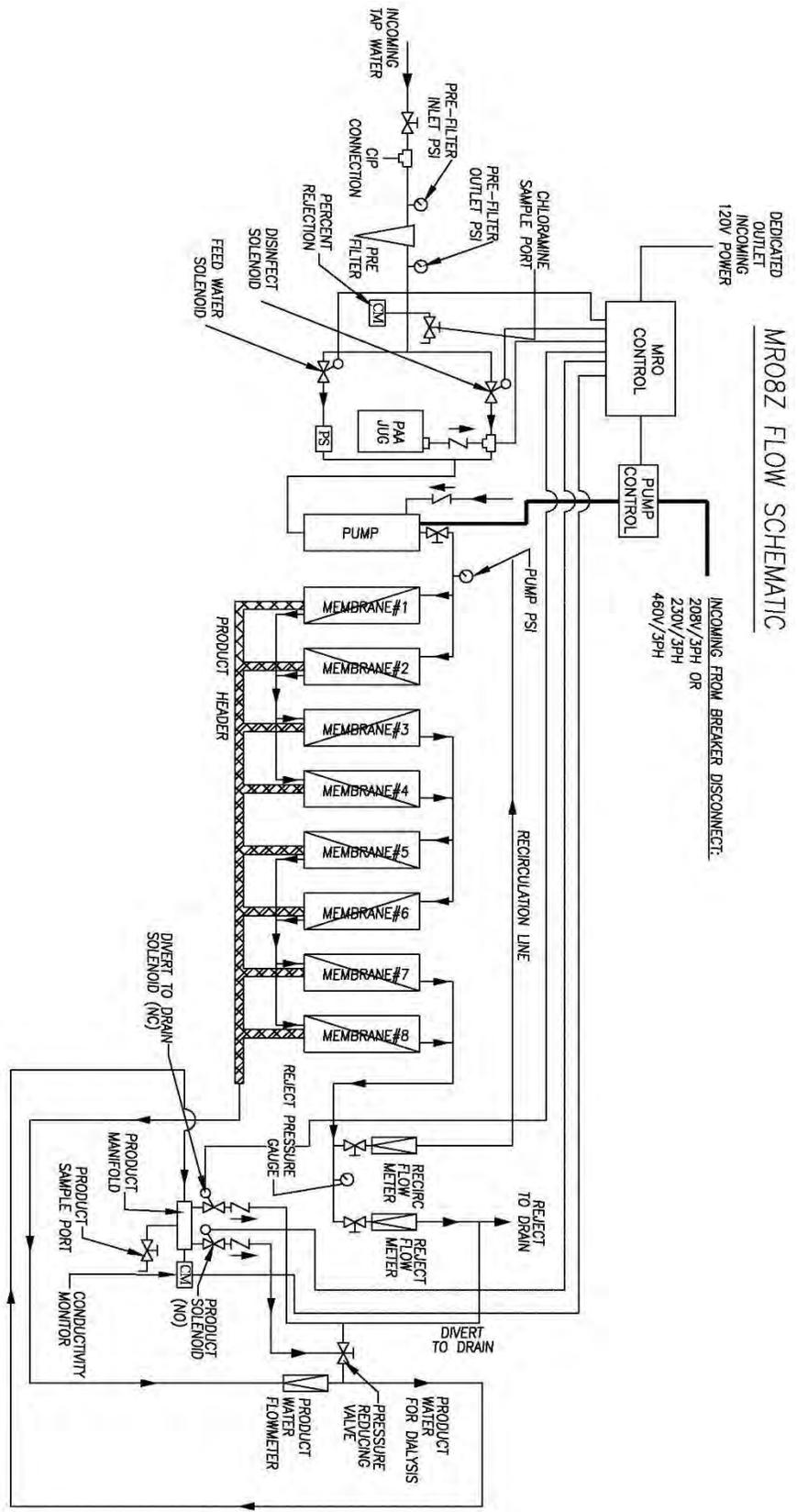


Figure 3.13

4.0 MROZ STARTUP & OPERATION

4.1 CAUTION

The Operations Manual should then be kept near the system and used as a reference and troubleshooting guide.

Follow all safety procedures for the facility and company for which all work is being performed.



CAUTION: No person should attempt to operate or service the MROZ without Prior authorization or instruction from your medical facility director.

WARNING: This Reverse Osmosis System (RO) contains a preservative solution to prevent microbiological growth and freezing. Discard all product water for at least two hours of operation before placing the RO in service.

1. The MROZ unit needs to be provided with 2 electrical sources with the following requirements:
 - a. Electrical source for the controller
 - i. Single Phase, UL Listed, 3 Conductor type, Hospital grade receptacle with Ground Fault Indicator (GFI)
 - ii. Rated for 125VAC, 20 AMP, 2.5KVA, 60 Hz
 - b. 208/230VAC Models
 - i. Electrical source for the pump
 1. UL listed, Lockable, NEMA 4X, 3 Phase Disconnect
 2. Rated for 240VAC, 30 AMP, 31.18 KVA, 60 Hz
 - c. 460VAC Models
 - i. Electrical source for the pump
 1. UL listed, Lockable, NEMA 4X, 3 Phase Disconnect
 2. Rated for 600VAC, 30 AMP, 31.18 KVA, 60 Hz

The proper polarity and ground integrity must be initially checked and thereafter maintained. Failure to do so may result in electrical shock to the operator. It is suggested that the MROZ be placed on an electrical supply with emergency backup.

2. Only a dedicated, direct wired, hospital grade, UL Listed, 120-volt GFI receptacle capable of 125VAC, 20AMP, 2.5kVA is approved for use with the MROZ. It must not be plugged into an extension cord or power strip that could cause high amperage.
3. Always maintain a 3 foot perimeter around the fused disconnect. This is to keep the disconnect accessible in case of an emergency or the need to shut down system.
4. All local plumbing and electrical requirements should be met.



To avoid electrical shock, always unplug and lockout the MROZ system before opening the face of the electrical controller.

5. Incoming water should be between 41° F and 90° F (5° C and 33° C). It is not recommended to use water at temperatures below 41° F (5° C) as it will reduce membrane performance significantly. Never use water warmer than 90° F (33° C). Use only the cold water supply unless using an automatic blending valve to get 77° F (25° C) water.
6. Water with silt density index (SDI) above 5 SDI will foul the membrane.
7. It is important to test for chlorine and chloramines at the CHLORIMINE SAMPLE PORT every four hours when using the system. Chlorine will deteriorate the membrane and cause system failure. It is recommended to use a Total Chlorine test kit, such as Water Check 2 Low Level Chlorine/Chloramines Test Strips (P/N 97CM20201).
8. Incoming tap water pH should be within EPA National Secondary Drinking Water Regulations of 6.5 - 8.5. Incoming tap water with pH higher or lower than the regulation may cause higher conductivity in the product water. If the water changes drastically, the membrane will be harder to clean. Periodically check the pH of the incoming tap water to verify that it is within the specified range (pH Water/Bicarbonate/Dialysate Test Strips P/N 97PH20901).



CAUTION: Mixing chlorine and hydrogen peroxide/peroxyacetic acid causes a toxic chemical reaction. Never allow them to mix! Do not use chlorine to disinfect the system!

9. Use only the exact amount of hydrogen peroxide/peroxyacetic acid disinfectant solution (PAA) and in proper dilution during disinfection of the system.
10. It is important to test for PAA in the Product Water after rinsing during disinfection of the system. Do not use the system until all traces of the disinfecting solution in the Product Water are gone.



CAUTION: Never operate the MROZ connected to dialysis machines if the water conductivity exceeds the set point, indicating Poor Quality!

11. Always maintain water flow and pressure to avoid damage to the pump.
12. Minimum feed pressure is 20 PSI (while the MROZ is in operation, with flow). Maximum feed pressure is 90 PSI.
13. If the system is operated without a micron prefilter, the membranes will foul.

14. With the RO Operating, adjust the valve on the **Reject** flowmeter until the flow rate is equal to the product flow rate of the RO. This will be 50% recovery. Operating the RO at higher recovery percentage may reduce the life span of the RO membranes. Recovery is calculated via the following equation:

$$\frac{\text{Product Flow (GPM)}}{\text{Feed Flow (GPM)}} \times 100\% = \text{RO Recovery}$$

15. With the RO Operating, adjust the valve on the **Recirculation** flow meter until the recirculation flow rate is approximately 1/3rd of the reject flow rate.
16. Starting the RO the first time, the user can verify that the RO is operating correctly by checking the flow meters, the controller and the inlet and outlet pressure gauges. The flow meters will show movement on the flow bobbers in the flow meters. The flow meters should be reading 50% product / 50% reject and 33.3% recirc. The controller will show on the screen operating parameters, such as quality of water, Temp of water. The incoming and outlet gauges will show pressure reading on the gauge. There will be a differential of pressure between the two gauges.
17. When operating an MROZ with a direct feed loop, the feed water pressure should be adjusted to approximately 25-30 PSI on the regulator found on the product recovery kit. Setting the pressure above this may result in reduced RO permeate flow in the direct feed loop.

WARNING: The Clean in Place Switch, located inside the cabinet on the back of the controller, must be in the OFF position during normal operation. If the Clean in Place Switch is left in the ON position during normal operation, all MROZ fail-safe modes will be disabled, and damage to the MROZ or injury to the patient may occur.

18. Minimize the opportunities for bacterial growth between uses!

Whenever the MROZ is not used for a period of several hours, and connected to a Direct Feed Loop, the “Membrane Flush Feature” of the MROZ should be programmed to be active when in the STANDBY mode (See section 5 for activating this feature).

Whenever the MROZ is not used for a period of several hours, and connected to a Storage Tank of a Central System, the “Membrane Flush Feature” of the MROZ should be programmed to be active when in the OPERATE mode (See section 5 for activating this feature). This feature will flush the MROZ when the Storage Tank is full and the water level is maintained at the Tank Full High float switch by diverting the Product Water to drain.

Before determining a bacteria count, the MROZ should be PLACED in FLUSH for 5 minutes (fully opened reject flow control knob), and then placed in OPERATE for 5 – 10 additional minutes after a period of non-use, but before taking a sample of the PRODUCT WATER. Bacteria are known to increase in population when water is not moving.

4.2 SAFETY FEATURES

The MROZ is equipped with several safety features for the benefit of both the user and the patient. They consist of the following:

1. Disinfection using (PAA) disinfecting solution instead of formaldehyde increases safety and avoids health risks associated with formaldehyde. PAA produces no harmful by-products or side effects, thus it is safer for patients. Using PAA does not require additional ventilation, and disposal is safe and easy. Important information regarding the usage and handling of PAA is listed in Section 5.3, A WORD ABOUT HYDROGEN PEROXIDE/PEROXYACETIC ACID, and in PAA Materials Safety Data Sheet. Please read them carefully.
2. INCOMING TAP WATER, PRODUCT WATER and REJECT WATER TO DRAIN hoses are labeled to prevent incorrect connections.
3. Low pressure shutdown protects the pump if the feed pressure drops below 5 PSI.
4. An audible alarm sounds whenever water quality climbs to an unacceptable level or when feed pressure is too low.
5. Product Water Divert-to-Drain: When the unit goes above the quality set point, product water is diverted to the drain, preventing poor quality water from reaching the patient.

4.3 INITIAL STARTUP

WARNING: This Reverse Osmosis System (RO) contains a preservative solution to prevent microbiological growth and freezing. Discard all product water for at least two hours of operation before placing the RO in service.

1. Secure the RO to the floor.
2. Remove the protective covers from the PRODUCT WATER, REJECT WATER TO DRAIN and INCOMING TAP WATER threaded fittings on the back of the MROZ, and connect them to the respective threaded fittings in the installation kit.
3. Slide the hose clamps over the hoses that were provided in the installation kit for holding the 3 hoses in place on the MROZ.
4. Slip the INCOMING TAP WATER, PRODUCT WATER and REJECT WATER TO DRAIN hoses over the appropriately sized barbed fitting, then secure each with a hose clamp.



CAUTION: All hoses **MUST** be fully inserted over the barbed area and completely seated over fitting for full clamp engagement.

5. Using the hose supplied for the INCOMING TAP WATER, connect the MROZ INCOMING TAP WATER hose to the potable blended water supply. If blending both warm and cold water to improve product flow rate, do not exceed 90° F (33° C).
6. Using the hose supplied for the REJECT WATER TO DRAIN, connect the MROZ REJECT WATER to a drain location. Leave at least a 2" air gap between the hose and the drain to prevent contamination or siphoning.
7. Using the hose supplied for the PRODUCT WATER, connect the MROZ PRODUCT WATER to a drain until the start-up flush and initial disinfection cycle are completed, and the water quality meets standards below the conductivity set point, and not in alarm.
8. Open the cabinet door, and ensure that the "CIP" switch on the back of the controller is in the "OFF" position.



CAUTION: All the main power wiring for system must be done by a qualified electrician. None of the 3 phase wiring can be done by any unauthorized personal.

9. Wire main power from a UL Listed, lockable, NEMA 4X rated 3 phase fused disconnect capable of 240VAC, 30AMP, 31.18kVA (For the 208/230V models) and 600VAC, 30AMP, 31.18kVA (For the 460V models) to connection box inside of MROZ cabinet. See wiring diagram in section 3.3.

10. Plug the controller power cord into a dedicated hospital grade UL Listed 120-volt GFI receptacle that is capable of 125VAC, 20AMP, 2.5kVA, -35C TO 66C, 60HZ, 4 TO 6mA leakage.
11. Connection to a wall disconnect must be done by a qualified electrician. The wall disconnect must be of a UL Listed, lockable, 4X NEMA rated fusible box, capable of 240VAC, 30AMP, 31.18kVA (For the 208/230V models) and 600VAC, 30AMP, 31.18kVA (For the 460V models).

Note: Specified pressure cannot be obtained, and the pump will quickly overheat if 3-wire connections are not correct. Verify the 3-wire connections to give the correct rotation on the MROZ pump for 3 phase applications.

12. Place the pump disconnect switch in the “Off” position. Turn on the MROZ by pressing the POWER key.
13. Perform a soft start on the RO by running it with the pump off (the pump power should be disconnected from step 12) until all air has bled out of the unit and the membranes are fully wetted. Once this has occurred, place the pump disconnect switch in the “On” position.
14. Turn the REJECT FLOW CONTROL KNOB located at the bottom of the Reject Flow meter counter-clockwise to allow the MROZ to run in full-flow Reject flush for about 15 minutes.
15. After 15 minutes, turn the REJECT FLOW CONTROL KNOB clockwise so that the Reject flow is approximately equal to the Product water flow. Allow the product water to flow to drain for 2 hours to ensure that all preservative is rinsed out of the system. Check for leaks during this time.

NOTE: The MROZ conductivity alarm may sound, which is normal when the MROZ is in FLUSH. Press the ALARM SILENCE key on the MROZ controller to silence the alarm. The alarm will restart after a 3 minute delay.

16. The conductivity value, after flushing and being put back into the service mode, must be within the acceptable limit.
17. After a thorough flushing of the preservative, the MROZ must be disinfected prior to being put into service for dialysis use. **(See Disinfecting The System, Section 5).**
18. When all disinfection procedures have been completed, turn on the feed water supply.
19. Press the POWER key (the display will show OPERATING after a 10 second delay).

NOTE: The conductivity may alarm for a few seconds before dropping into the desired range.

20. Refer to your facilities Start-Up Log. Complete the entire MROZ Performance section; making sure that the system is operating within all the required ranges.

WARNING: Do not use the MROZ to feed a dialysis machine until all specifications are met.

When the log shows that all start-up conditions are met, the system is now ready for use. Press the POWER key (the display will show STANDBY). Connect the PRODUCT WATER hose to the Direct Feed Loop or Storage Tank inlet. (Be sure to connect the Product Water hose aseptically).



CAUTION: Although the water treatment system may produce water of sufficient quality to meet the requirements of AAMI standards, distribution of the water may degrade its quality to the point where it no longer meets the requirements of this standard. AmeriWater offers information about ultra-pure water piping to prevent the degradation of product water in a water loop or central system.

21. Before returning the MROZ to service, samples for Microbiological, LAL and AAMI need to be taken. The samples need to pass before MROZ being used for patients.

4.4 SYSTEM SHUTDOWN

Ordinarily, an MROZ is connected to a water use system that is used continually or very frequently. Therefore, frequent shut down is not necessary. Most usually, the MROZ is connected to a Direct Feed Loop or Storage Tank of a Central System. If so, the MROZ should be cycled using the “Flush” feature in the controller of the MROZ. This will allow an MROZ connected to a Direct Feed Loop while in STANDBY to start and circulate Product Water through the loop at some predetermined frequency for a predetermined amount of time (every 2 to 3 hours for 45 minutes, for example). This allows the water to be “freshened” in the MROZ and loop. When the MROZ is connected to the storage tank of a central system, the MROZ shall remain in OPERATION. When the “Flush” feature is active, the MROZ will cycle on some predetermine frequency to send the Product Water through the “Divert to Drain” feature of the MROZ to the drain.

If the MROZ must be shut down for an extended period, contact Ameriwater for instructions.

5.0 DISINFECTING THE SYSTEM

5.1 DISINFECTION PROCEDURE

The MROZ system should be disinfected according to specifications of your medical facility director. As a general guideline, AmeriWater recommends that the system should be disinfected at least monthly.

Be sure to refer to your facilities Start-Up Log. This will help you verify that all steps are performed and recorded to disinfect the system properly.

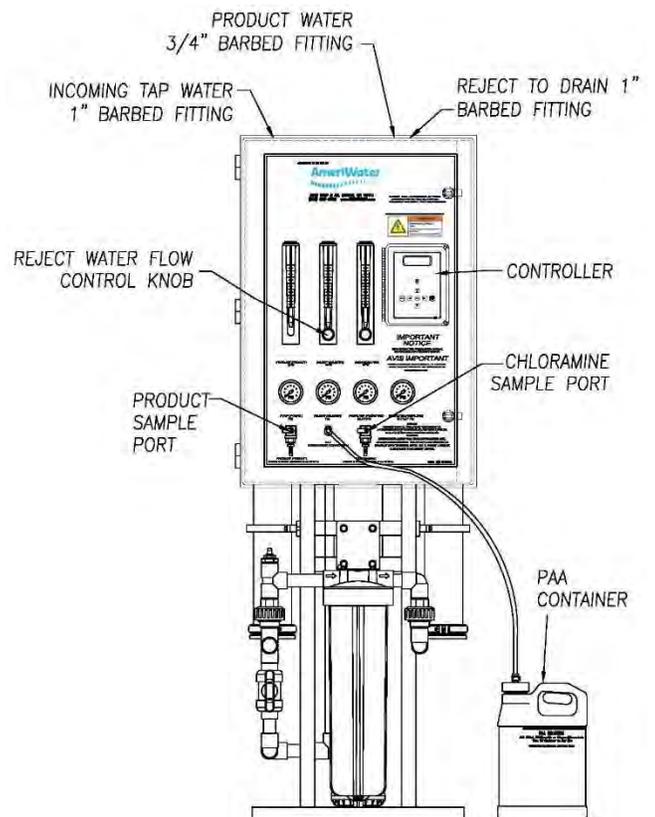
5.1a. DISINFECTING THE MROZ ONLY FIGURE 5.1

1. Switch off the MROZ by pressing the POWER key (the display will show STANDBY).
2. To disinfect the MROZ and direct-feed water loop, allow the PRODUCT WATER hose to remain connected to the loop during the disinfection procedure, **but be sure all dialysis machines are disconnected during the disinfection procedure.**

WARNING: The disinfection mode will allow PAA to flow through the PRODUCT WATER hose. This is to allow disinfection of the hoses and the connected direct-feed water loop.

3. To disinfect only the MROZ that is connected to a Storage Tank, disconnect the PRODUCT WATER hose from the tank and place along with the REJECT WATER TO DRAIN hose in a drain.
4. Put on rubber gloves, apron, and goggles.
5. Unscrew the cap assembly of the PAA container (plastic 2 ½ gallon container).

CAUTION: Exposure to hydrogen peroxide/ peroxyacetic acid concentrate or solution may cause severe chemical burns to the skin or eyes. Additional information regarding the safe handling of PAA is found in this section, on the Peracidin container, and in the material safety data sheet. Please read carefully before using.



6. Add 800 ml of 100% PAA disinfecting solution to the PAA Container, and fill with water to the red line (tap water or treated water may be used).
7. Screw the cap assembly securely back onto the PAA container.
8. Agitate the container in a circular motion for approximately 10 seconds.
9. Connect the PAA tubing male fitting into the quick disconnect fitting that is mounted on the front of the cabinet of the MROZ (Figure 5.1).
10. Press and hold the LEFT ARROW key and then, press the RIGHT ARROW key. This will access the DISINFECT MODE. The controller display will show DISINFECT ENABLED and the keys can be released.
11. When in DISINFECT ENABLED, the signal from the conductivity cell is disabled. The Product Water for Dialysis will pass through and out the PRODUCT WATER hose laden with PAA disinfectant. If connected to a small direct feed loop, PAA disinfectant solution will also pass into the loop.
12. Pressing and holding the ENTER key will activate the disinfect function, draw PAA from the container and pump PAA solution through the MROZ.
13. Adjust the REJECT flow control knob so that the PAA will be drawn into the MROZ in approximately 2 minutes. (Figure 5.1) The REJECT flow amount will have to be determined the first time the PAA is drawn in, and noted the flow that will empty the container in approximately 2 minutes.
14. Continue holding the ENTER key until the PAA container is empty, then immediately release the ENTER key.

NOTE: The ENTER key must be held until all the PAA is drawn into the MROZ.

- a. Avoid stopping and starting the disinfect function which may cause a thermal overload of the MROZ pump.
 - b. Releasing the ENTER key may cause the system to lose its prime preventing all of the disinfectant from being drawn into the MROZ.
 - c. Approximately ¼” of the solution will remain in the bottom of the PAA container. This is normal and may be emptied down the drain after the entire process is complete.
15. Record on the Start-Up Log that this step was performed.
 16. The MROZ should be filled with PAA disinfecting solution. To ensure that PAA solution has been pumped through the MROZ, use Peracid test strips (P/N 97hp20401):
 - a. Using a test strip, test the water the REJECT WATER TO DRAIN hose, the result must be at least 1% (500 ppm).

- b. Use another test strip at the PRODUCT WATER hose, the result must be at least 0.5% (250 ppm).
 - c. If the desired levels are not reached, press and hold "ENTER" button to force disinfectant thru the hoses.
17. Label the MROZ with appropriate WARNING signs (Example: "DO NOT USE / CONTAINS DISINFECTANT").
18. Leave the MROZ in the DISINFECT ENABLED mode, and allow the PAA solution to soak for 60 minutes within the MROZ.

WARNING: Soaking longer than twelve hours may cause damage to the membrane.

19. Record the Start and Stop times on the Log to have a record of how long the membrane soaked in PAA disinfecting solution.
20. After the required soak time is achieved in the DISINFECT mode, flush the residual PAA from the disinfectant draw plumbing by:
 - a. Rinse and fill the PAA Container to the red line with dechlorinated water from the Chloramine Sample Port and connect the PAA tubing to the PAA connection on the front of the MROZ.
 - b. Press and hold the ENTER key to turn on the Disinfect Draw function and THE DISPLAY WILL READ **DISINFECT ENABLED DRAW**. Continue to hold the ENTER key, until all of the water is drawn in and you begin to see air bubbles in the draw tube. This will flush out any residual PAA left in the injection plumbing.
 - c. Disconnect the PAA Container and PAA tubing from the PAA connection on the front of the MROZ.
21. Press the ALARM SILENCE/RESET key to exit the DISINFECT Mode and verify that the MROZ is off (STANDBY).
22. DO NOT reconnect the PRODUCT WATER hose at this time!
23. Turn on the MROZ by pressing the POWER key. Open the REJECT VALVE to allow full flow of REJECT WATER. Record the Start time on the Startup Log. Allow the machine to run at this setting for at least 15 minutes.

WARNING: Do not connect to any dialysis machine at this time. The water quality may register good, but it is possible that some residual PAA disinfecting solution is still in the system. All of the disinfecting solution MUST be completely flushed out before the system is reconnected to any dialysis machine.

24. After rinsing with the REJECT VALVE allowing full flow for at least 15 minutes, turn the REJECT VALVE clockwise until the REJECT flow is approximately equal to the PRODUCT flow (normal operation reject flow). Allow the MROZ to run for 15 more minutes.
25. After the first 30 minutes, repeat 15 more minutes of full flow through the REJECT VALVE + 15 minutes of operation a normal operation reject flow. This will give a total of 60 minutes of running time to remove the disinfectant. Begin to test for the presence of PAA with residual test strips (**Renal Check PX Test Strips (P/N 97PX20501)**) at product and reject hoses.
26. If the MROZ is connected to a loop that is being recirculated back through a Product Recovery valve and then, back into the MROZ, periodically test for the presence of residual PAA at each water use outlet AND at the CHLORAMINE SAMPLE PORT (at the front of the MROZ) until no trace of PAA is detected by the residual test strips.

WARNING: Continue rinsing and testing with test strips until all test strips show a negative residual result (no color change) to ensure that there are NO traces of PAA disinfecting solution remaining in the entire water system. AmeriWater recommends using Renal Check PX Test Strips (P/N 97PX20501)

26. Record the Stop time on the Startup Log to have a record of how long it takes for the disinfecting solution to completely rinse out. Place a checkmark on the log to verify that residual PAA tested negative.
27. Disinfection is complete. Pull an AAMI sample.
28. If the MROZ was disconnected during disinfection from the loop or storage tank, it can be reconnected for use once it is producing water within the acceptable conductivity range.

WARNING: The PAA Container PAA and tubing must remain disconnected from the PAA connection on the front of the MROZ during patient treatment!

WARNING: Although it is a necessity to use a carbon filter to remove chlorine and chloramines from the incoming water, the carbon filter that is up-stream of the MROZ, is a potential source of bacteria. It is very important that backwashing carbons be frequently backwashed and that the MROZ is put into fast flush for 5 minutes, minimum, before every use to minimize the bacteria growth. An MROZ that seems to be quickly re-infected after a thorough disinfection procedure may be getting re-infected from an insufficiently flushed carbon filter.

5.2 A WORD ABOUT HYDROGEN PEROXIDE/PEROXYACETIC ACID

Do not use hydrogen peroxide/ peroxyacetic acid concentrate (PAA) after the expiration date. Using outdated PAA may cause incomplete disinfection. PAA loses effectiveness if not kept out of direct sunlight and/or the cap is not tightly sealed. Using ineffective disinfecting solution will cause incomplete disinfection. Using less than the required volume of PAA concentrate will result in incomplete disinfection.

Disposal of Outdated Hydrogen Peroxide/Peroxyacetic Acid:

Supplies Needed - a sink with a supply of tap water
 - rubber gloves, lab apron, and goggles
 - a supply of paper towels

1. Put on rubber gloves, apron and goggles.



CAUTION: Exposure to PAA concentrate or solution may cause severe chemical burns to skin or eyes.

2. Start a flow of cold tap water to dilute the PAA as it flows down the sink drain.
3. Slowly and carefully pour the disinfecting solution down the drain, taking care to avoid spills, splashes, or breathing the vapors.



CAUTION: Splashing PAA concentrate may cause severe chemical burns.

4. Rinse the emptied PAA container with tap water to remove all traces of the chemical. **Rinsing emptied containers is needed to protect waste handlers from accidental exposure to the chemical.**
5. Rinse the drain with tap water to remove residual disinfecting solution from the surfaces and flush the chemical from the drains.
6. Discard the emptied and rinsed container in a waste receptacle or set aside for recycling.
7. Inspect the area for spilled or dripped disinfecting solution. Wipe up small spills with a damp paper towel. Larger spills should be either flushed to drain with water or removed with a water bucket and floor mop.

WARNING: Verify that there is no chlorine (bleach) in the water bucket or floor mop. Chlorine (bleach) will cause a severe chemical reaction when it comes in contact with PAA concentrate!

8. Rinse rubber gloves with tap water to remove any residues due to handling.
9. Return rubber gloves, apron, and goggles to their storage area.

5.3 MEMBRANE FLUSH FEATURE (AUTO FLUSH)

The MRO3Z-MRO8Z sizes are connected to a loop or storage tank only having 1-2 days of non-use when dialysis procedures are not being carried out. The MEMBRANE FLUSH FEATURE is the preferred means for minimizing bacterial growth for the MRO3Z-MRO8Z during periods when dialysis procedures are not being carried out. The MRO3Z-MRO8Z can be set up to discourage microbiological growth by “flushing” periodically.

The Membrane Flush feature is disabled as a default from the factory for MRO3Z-MRO8Z models. Refer to the default set points in Section 6.4. If these default settings do not meet your particular need, then they can be changed. See Section 6.5 on how to change from the default settings.

FLUSH MODE	RO PUMP	INLET VALVE	DIVERT VALVE
3 (FOR STORAGE TANK APPLICATIONS)	ON	OPEN	ENABLED
4 (FOR LOOP APPLICATIONS)	ON	OPEN	DISABLED

FLUSH MODE #3 assumes that the **MROZ is connected to a storage tank** and, therefore, will divert the PRODUCT WATER to the drain. This minimizes bacterial growth and directs all the water to the drain, rather than refill the storage tank. **FLUSH MODE #3** will cause all the water to be diverted to drain for each MEMBRANE AUTO FLUSH cycle.

On the other hand, when an **MROZ is connected to a Direct Feed Loop**, the PRODUCT water should be directed into the loop during the MEMBRANE AUTO FLUSH cycle to keep the water in the loop “fresh”. Setting the **FLUSH MODE for #4** will disable the DIVERT TO DRAIN feature, and the PRODUCT WATER will be circulated through the loop during each MEMBRANE AUTO FLUSH cycle. The MEMBRANE AUTO FLUSH will operate while the MROZ is in the STANDBY mode, while connected to the loop even though no water is being used for dialysis.

SETPOINT SETTING

Flush Type	6 (Off hours)
Flush Time	30 to 60 (minutes)
Flush Mode	3 (Inlet valve open, pump on)
Flush Interval	4 to 12 (hours)

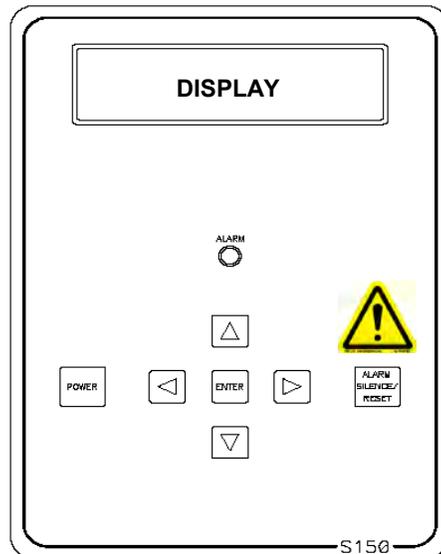
The MROZ must be connected to the electric power source, incoming water supply, and drain at all times for this feature to be operable.

The Flush Time and Flush Interval settings are recommended settings, but may be adjusted to fit your specific needs. Contact your AmeriWater representative for guidance.

6.0 MROZ CONTROLLER

6.1 FRONT PANEL CONTROLS AND INDICATORS

FIGURE 6.1



- | | |
|---|--|
| DISPLAY | - Shows status of system. |
| ALARM LAMP | - Flashes when fault causes an RO system shut down. On steady when a Set point is exceeded that does not cause an RO system shut down. |
| POWER KEY | - Places controller in operating or standby mode. |
| LEFT ARROW KEY | - Scrolls through Set points starting with first Set point. |
| RIGHT ARROW KEY | - Scrolls through Set points starting with last Set point. |
| UP ARROW KEY | - Increases value of Set point. |
| DOWN ARROW KEY | - Decreases value of Set point |
| ENTER KEY | - Confirms entry of new Set point value |
| ALARM SILENCE/RESET KEY | - Push once for alarm silence and twice to reset system after a shutdown has occurred. |
| ACCESSING DISINFECT MODE | - Push and hold the left arrow key, and then push the right arrow key. |
| (NOTE: The J2 jumper must already be installed to make this an active mode.)
(Refer to Figure 6.2) | |
| DISINFECT | - Push the ENTER key and hold until all of the solution is drawn into the MROZ. |

6.2 CONTROLLER OPERATION

GENERAL OPERATION

The unit has 2 modes of operation, a standby mode and an operating mode that are controlled by the POWER key. In the standby mode, the unit is effectively off. All outputs are turned off and the display shows STANDBY. In the operating mode, the unit operates automatically. All inputs are monitored and the outputs are controlled accordingly. Pressing the POWER key will toggle the unit from STANDBY to OPERATE or from OPERATE to STANDBY. If power is removed from the unit, when power is reapplied, the unit will restart in the mode it was in when power was removed.

DISPLAY

The display is a 2 line x 20-character backlit liquid crystal display. System operating status and sensor readings are shown on this display. Set point information can, also, be shown on this display.

OPERATING STATUS MESSAGES

The operating status of the unit is shown on the top line of the display. The following list describes the items shown for the operating status.

STANDBY - The unit is in the STANDBY mode.

DELAY 99 - The unit is in the RO start delay. The number is the seconds remaining before the RO pump starts.

OPERATING - The RO unit is operating.

TANK FULL - The unit is shut down due to a tank full condition.

TANK FULL 99 - The unit is shut down due to a tank full condition. If the number is blinking, the tank full high switch has cleared, but the tank full low switch is still active. If the number is on steady, both tank level switches have cleared and the delay is counting down.

PRETREAT - The unit is shut down due to a pretreat lockout condition.

PRESS FAULT - The unit is shut down due to a pressure fault condition.

MEMB FLUSH 99 – Membrane Flush is active. The number is the minutes remaining in the flush cycle.

CONDUCTIVITY

The Conductivity is shown on the top line after the unit operating status. When the unit is in STANDBY, because of a shutdown condition, the reading is replaced with '----'. If the reading is over range, the reading is shown as '^^^' when in the OPERATE mode.

OPERATING HOURS

The current operating hours are shown on the bottom line.

TEMPERATURE

The current water temperature is shown on the bottom line to the right of operating hours. When the unit is in STANDBY due to a shutdown condition, the reading is replaced with '---'.

WARNING MESSAGES

Warning messages are also shown on the second line. If any warnings are active, the active warnings will alternate with the normal displays for the bottom line. The following lists the warning messages.

HI COND - The Conductivity reading has exceeded the programmed limit.

TANK FULL OPERATION

The unit can be operated with 1 or 2 level switches. With 1 level switch, the switch is connected to the tank full high input. When this switch has been active for 5 seconds, the unit will shut down on tank full. TANK FULL will show on the display. When the tank full condition clears, the display will show TANK FULL 99. The number is the tank full restart time and the unit will restart when this delay times out.

For 2 level switch operation, the upper switch is connected to the tank full high input and the lower switch is connected to the tank full low input. When both switches are "open", the MROZ unit will start. The MROZ unit will continue to run when the water level rises, and while the lower switch becomes active (closed). When the upper switch becomes active (closes), after the 5 second delay, the MROZ unit will shut down. TANK FULL will show on the display. When the tank level drops and the upper level switch clears, the display will show TANK FULL 99 and the MROZ unit will remain off. The number is the tank full restart time and the number will blink until the lower level switch clears (opens). When the lower level switch clears (opens), the number will remain steady and the MROZ will restart when the delay times out.

TANK FULL (TF) RESTART

The tank full restart is the delay before the MROZ unit starts when a tank full condition clears. This delay can be in minutes or in seconds. The tank full restart set point selects seconds or minutes.

TANK FULL OVERRIDE

A timed tank full override can be initiated when the MROZ unit is shut down due to a tank full condition. Pressing the Alarm Silence/Reset key for 3 seconds during a tank full condition will enable the tank full override. The RO will start and TF OVERRIDE 9 will show on the display. The number is the minutes remaining in the override timer. When the override times out, the unit will return to the tank full shut down condition. The TANK FULL OVERRIDE will divert all water to the drain, whether the water quality is good or bad coming into the RO.

PRESSURE FAULT

If the pressure fault input becomes active (closes) and stays active for the delay programmed in the PF Delay Set point, the unit will shut down for a pressure fault. The display will show PRESS FAULT, the alarm lamp will flash and the audible alarm will sound. The pressure fault can be cleared by pressing the Alarm Silence/Reset key twice.

AUTO RESET

If a pressure fault shut down occurs and the Auto Reset Set point is programmed to 0, the unit will remain shut down until manually reset. If the Auto Reset Set point is programmed to a value greater than 0, the unit will automatically clear the pressure fault and attempt to restart after this delay times out.

ALARM SILENCE

When a shutdown occurs that causes the audible alarm to sound, the alarm can be silenced by pressing the Alarm Silence/Reset key once. The alarm will remain silenced for 3 minutes [180 seconds (AAMI RD62 standard)] when the Alarm Silence Set point is programmed to the factory default 3. If the Alarm Silence Set point is programmed to a value other than 3, the alarm will resound after this delay times out. Pressing the Alarm Silence/Reset key will silence the alarm and reset this delay.

PRETREAT

If the pretreat input becomes active (closes) and stays active for 2 seconds, the unit will shut down in a pretreat lockout condition. PRETREAT will show on the display and the unit will remain shut down as long as the pretreat input is active.

HIGH CONDUCTIVITY

If the Conductivity reading exceeds the limit programmed the Cond Limit Set point for the delay programmed in the Cond Delay Set point, the alarm lamp will light and the HI COND warning message will show on the display. This warning will clear when the Conductivity drops below the Set point.

When the High Conductivity warning message is active, the MROZ will divert the PRODUCT WATER to drain (through the Reject hose), until the Product water conductivity goes back into the acceptable quality range.

ALARM OUTPUT

The Expansion I/O relay 2 has been programmed to operate as an alarm relay. The relay will energize whenever a warning or alarm condition occurs. The relay will remain energized as long as the warning/alarm condition is active.

6.3 CONTROLLER ADJUSTMENTS

Your controller has been calibrated prior to shipment and the conductivity set point has been preset based on an analysis of your water provided at the time of sale. It may be necessary to periodically calibrate the Conductivity. If the controller should require calibration, follow the instructions below. Please contact AmeriWater at 800/535-5585 or 937/461-8833 if you have any questions regarding the procedure.

CONDUCTIVITY CALIBRATION

The accuracy of both the feed and the product conductivity displays should be verified with a calibrated, hand-held meter. If the either the feed or the product conductivity display is not within 5% of the hand-held meter reading, the controller should be adjusted by turning the appropriate potentiometer screw (Figure 6.2, below) until the conductivity value displayed matches the calibrated meter.

DISPLAY ADJUSTMENT

The display contrast can be adjusted for best viewing by adjusting control R3. This control is located toward the upper right corner of the board, just to the left of the cell connector.

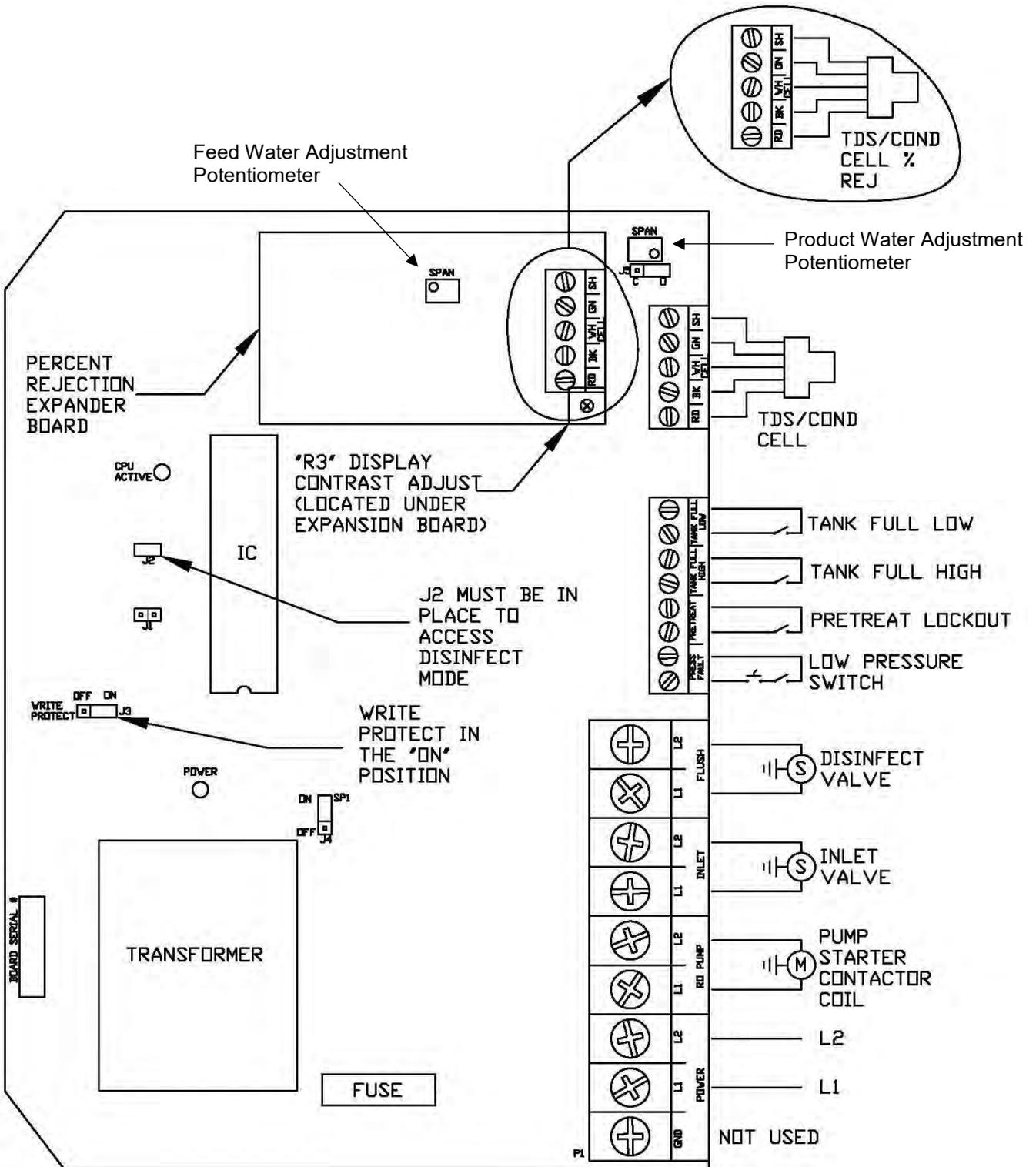


FIGURE 6.2

6.4 STANDARD SETPOINTS

SETPOINT	DESCRIPTION	RANGE	FACTORY SETTING
TDS/Cond Limit	When this value is met or exceeded, the alarm lamp will light and high TDS/Cond will show on the display. To disable, set to 0.	0-999 μS or PPM*	Based on water analysis.
TDS/Cond Delay	When the limit Set point is exceeded, no alarm will be given until this time has expired.	0-999 seconds	10
RO Start Delay	The amount of time between the inlet valve opening and the RO pump start.	0-99 seconds	10
Press Fault Delay	The time a pressure fault must be active before a pressure fault shut down occurs.	0-99 seconds	10
Auto Reset	When a pressure fault shut down is active, the system will attempt to restart after this delay. If set to 0, system must be manually reset.	0-99 minutes	0
Alarm Silence	If the audible alarm is silenced, after this delay, the alarm will resound. If set to 0, the alarm will remain silenced.	0-99 minutes	3
TF Restart Delay	When a tank full condition clears, the system will restart after this delay.	0-99 sec/min	3
TF Restart	Selects whether the tank full restart delay is in seconds or minutes. 0=seconds, 1=minutes.	0-1	0
TFO Time	The amount of time that a tank full override lasts.	0-15 minutes	3
Tank Lo Restart	Not Used		
Flush Type	Selects the type of flush. Set to 0 to disable.	0-8	0
Flush Time	The length of time a membrane flush cycle will last when flush is active.	0-99	0

* μS = microsiemens; PPM = Parts Per Million

SETPOINT	DESCRIPTION	RANGE	FACTORY SETTING
Flush Interval	The interval between flush cycles. Only valid with operation hour, elapsed time or off flush types.	0-99 minutes	0
Flush Mode	Selects if the inlet and RO pump relays operate during flush.	1-4	0
Maximum Hours	If the current operating hours exceed this limit, the operating hours warning will occur. To disable, set to 0.	0-65000 hours	0
Current Hours	Current number of hours of RO system operation.	0-65000 hours	0
Expander Mode	Not Used		
Temp Offset	Allows adjustment of temperature reading by ± 5 °F.	± 5	0
Temp UOM	Selects display of temperature in °F or °C	0-1	0
Switch Select	Selects if switch inputs are normally open or normally closed.	0-32	0
TDS/Cond UOM	Selects display of water quality in μS or PPM NOTE: If this Set point is changed, the unit must be recalibrated.	0-1	0
TDS/Cond Range	Selects range of TDS/Conductivity monitor 0-50, 1-100, 2-250, 3-500, 4-1000, 5-2500, 6-5000. NOTE: If this Set point is changed, the unit must be recalibrated.	0-6	1
C2 Range	Selects range of TDS/Conductivity monitor 0-50, 1-100, 2-250, 3-500, 4-1000, 5-2500, 6-5000. NOTE: If this Set point is changed, the unit must be recalibrated and range components may need to be changed.	0-6	4
C2 Limit	When this value is met or exceeded, the alarm lamp will light and high TDS/Cond will show on the display. To disable, set to 0.		
<p>NOTE: If the incoming feed water is greater than 1000 μS (i.e. C2 Range is set to 5 or 6), first turn the Write Protect off by moving the Write Protect chip in the controller to the off position. Then change the value of C2 Range to either 5 or 6. Next, remove the resistor in the controller in the R10 position (note that it has not been soldered in place) and place the resistor in the R9 position (also not soldered in place) into the now vacant R10 position. Finally, recalibrate the unit using a conductivity meter.</p>			
<p>NOTE: If this Setpoint is changed, the unit must be recalibrated and range components may need to be changed.</p>			
%Rej	The 2 nd TDS/Conductivity is used to monitor 0-1 feed water, programming this set point to 1 allows the % rejection to be displayed.		

6.5 TO DISPLAY OR CHANGE SETPOINTS

NOTE: Please contact your AmeriWater representative prior to changing set points.

1. Refer to Figure 6.1 for the location of the keys used to display or change the Setpoints and Figure 6.2 for the location of the write protect jumper, J3. For the unit to be able to accept a change in a Setpoint, the shorting jumper must be in the WRITE PROTECT OFF position (center and left pins).

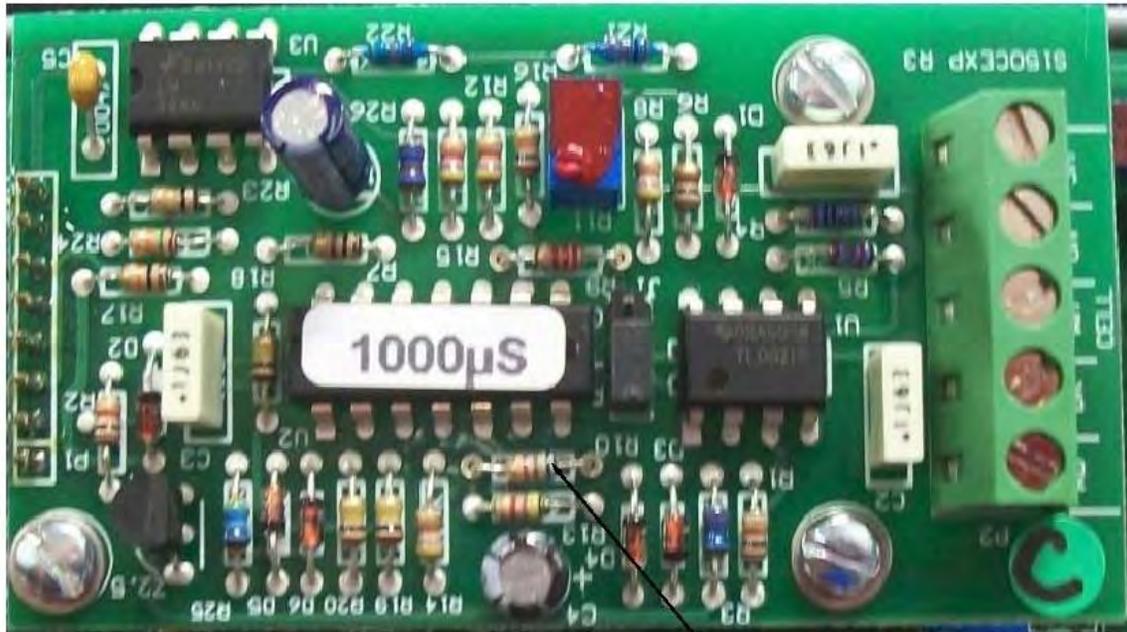
NOTE: Setpoints cannot be changed if the write protect jumper is in the ON position.

2. Use the LEFT and RIGHT ARROW keys to display the Setpoints. Each press of an arrow key will advance the display to the next Setpoint. The Left arrow key starts with the beginning Setpoint and the Right arrow key starts with the last Setpoint.
3. The Up and Down arrow keys are used to increase or decrease the Setpoint value. The value will change by 1 count each time a key is pressed. If the key is pressed and held for >1 second, the Setpoint value will change at a fast rate. When the key is released, the fast rate will be reset. Pressing both the UP and DOWN ARROW keys together will reset the set point value to 0.
4. Pressing the ALARM SILENCE/RESET key at any time will cancel the operation and return the display to the main screen.
5. To accept the new set point value, press the ENTER key.
6. The unit will beep twice if the change is accepted. If the write protect jumper is on, the unit will show WRITE PROTECTED on the display and one long beep will sound.
7. When finished changing Setpoints, the write protect jumper should be placed in the ON position (center and right pins).

6.6 CHANGING RESISTORS ON THE RO CONTROL BOARD FOR C2 RANGE

If your incoming feed conductivity is above the Factory setting C2 range of 0-1000 micro-seimens, then you'll have to swap the resistors on the conductivity board.

1. Switch off the RO by pressing the POWER key (the display will show STANDBY).
2. Turn off all power to RO.
3. Open door on RO controller. Conductivity board you need to get to is on the back of the door.



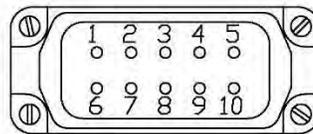
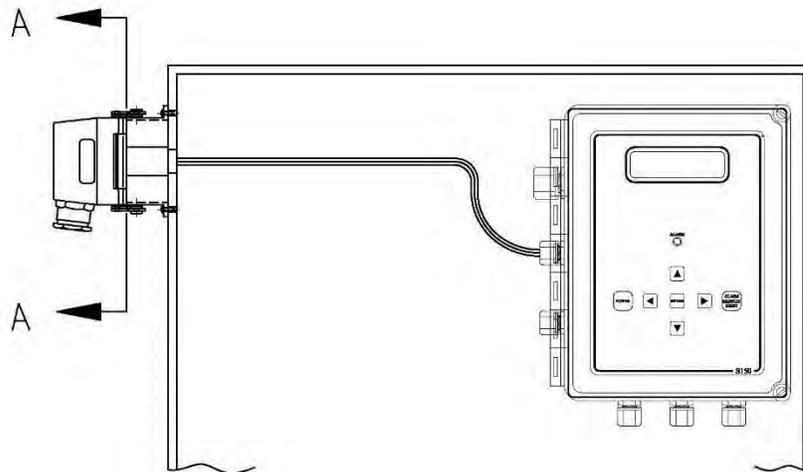
R10 RESISTOR

4. The control system for the RO3X ships with resistor R10 (see above) that can be identified by its color bands (Red-Violet-Red-Gold). If your feed water conductivity exceeds 1,000 $\mu\text{S}/\text{cm}$, you may want to change out the resistor in the R10 position with a replacement resistor, provided by AmeriWater. This replacement resistor can be identified by its color bands (Blue-Grey-Red-Gold). Alternatively, if you have an ohm-meter, the original resistor can be identified by its resistance value of 2.7 k Ω ; the replacement resistor's resistance value is 6.8 k Ω .
5. Remove the R10 resistor with needle nose pliers.
6. Move the replacement resistor to the R10 position.
7. Save the R10 resistor somewhere safe.
8. Close RO controller door.
9. Re-apply power to RO.
10. Go into setpoints in the controller (Ref. Section 10.1).
11. Change the C2 Range setpoint to meet your needs. C2 Range setpoint 5 is 0-2500, 6 is 0-5000.
12. Once the setpoint has been changed, then you need to calibrate the units by taking a sample of the permeate water and testing it with a calibrated conductivity meter.

7.0 EXTERNAL WIRE INSTALLATION

FLOAT LEVEL SWITCHES, PRETREAT LOCKOUT & RO ALARM RELAY CONNECTORS

1. Remove the side entry hood by disengaging the lock and pulling down.
2. Loosen 4 retaining screws from outer shroud and remove inner terminals.
3. Loosen the nut and run the float switch wires through the outer housing.
4. Connect the High Tank float wires to contacts 1 & 6, Low Tank wires to contacts 2 & 7, Pretreatment Lockout wires to contacts 3 & 8 and RO Alarm Relay wires to contacts 4 & 9.
5. Replace the inner terminals into the outer shroud.
6. Tighten the nut, replace the retaining screws and re-install the side entry and engage the lock.



SECTION A-A

4 X SIZE

CONTACTS 1 & 6 ARE FOR FLOAT LEVEL SWITCH, TANK HIGH.
CONTACTS 2 & 7 ARE FOR FLOAT LEVEL SWITCH, TANK LOW.
CONTACTS 3 & 8 ARE FOR PRETREATMENT LOCKOUT.
CONTACTS 4 & 9 ARE FOR RO ALARM RELAY.

8.0 MAINTENANCE

WARNING: If any component of the water treatment system is changed or replaced, the user should conduct appropriate tests to ensure that the revised system meets all standards to which it was initially tested.

WARNING: Maintenance shall be performed by qualified personnel only.

8.1 MAINTAINING THE SYSTEM

Use the following maintenance schedule:

Daily	Complete daily log. Ensure unit is operating within parameters (see below).
Monthly	Perform a disinfection of the unit (see Section 5.0).
	Perform product water bacteria and endotoxin testing.
Yearly	Perform feed and product water AAMI analysis.
	Check feed and product water quality calibration (see Section 6.3).
As Needed	Replace MROZ pre-filter cartridge (based on daily log).
	Membrane cleaning, if > 10% loss of product flow / > 10% rise in product conductivity.

Notes:

Your facility needs to provide a Startup Log for the MROZ system. This must be filled out completely each time the system is used. The MROZ must operate within the given parameters. The recorded information may be useful in troubleshooting problems.

8.2 MEMBRANE MAINTENANCE INSTRUCTIONS

MEMBRANE REPLACEMENT PROCEDURE MRO3Z-MRO8Z:

Turn off the incoming tap water supply to the MRO3Z-MRO8Z and unplug the MRO3Z-MRO8Z from the GFI receptacle. (The following procedure will cause water to leak and spill – This could occur at different times during the procedure - You may get wet.) Follow all safety procedures for the facility and company for which all work is being performed.

1. Place a container under the CHLORAMINE SAMPLE (TEST) PORT and slowly open the port to relieve the pressure on the MROZ system.
2. Press release button on Product Water Manifold (Manifold located near top of frame) to disconnect product water hose from all membranes being removed.
3. Remove the fittings for the water inlet, reject water and product water from the membrane to be exchanged. This will allow the water to drain from the membrane housing.

NOTE: The plastic compression fitting will remain with the tubing on which it was connected.

4. Loosen the clamps that hold the membrane assembly to the RO frame.
5. Remove the end caps from each end of the membrane by loosening the bolts that hold these in place.
6. Pull the membrane out of the housing.
7. Load the replacement membrane(s) into the housing ensuring that the brine seal is towards the water inlet side.

NOTE: You must insert membranes into the inlet end of the housing. Inserting a membrane from the discharge end will damage the membrane's brine seal.

8. Replace the end caps and secure with the clamps.
9. Re-install the membrane onto the skid and secure with the clamps.
10. Connect all fittings back to their original positions.
11. Replace any additional membranes at this time by following steps 2-10.
12. With RO pump deactivated, turn RO on to begin wetting the RO membranes. Allow membranes to wet until all air is purged, before applying pump pressure. Applying high pressure to membranes before they are wetted will cause damage to the membranes.

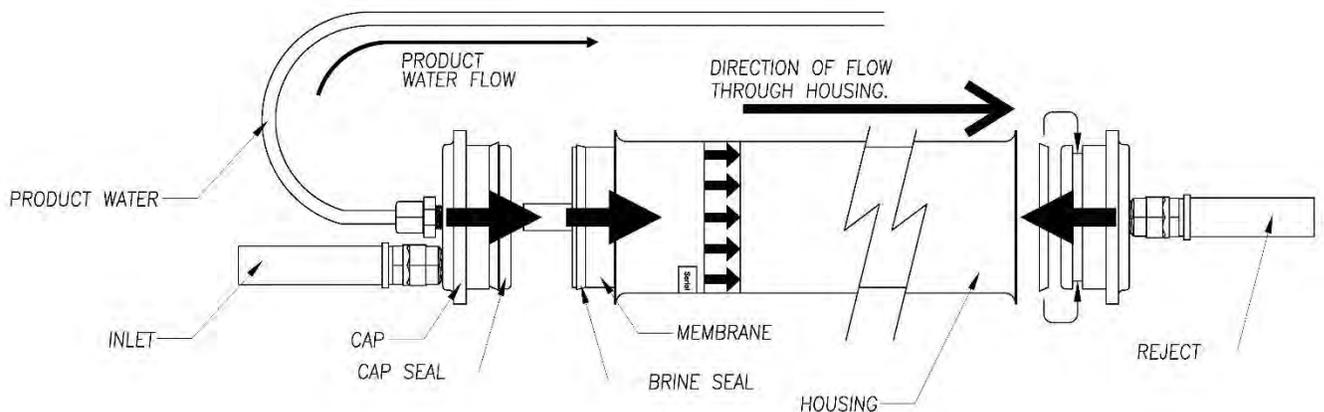


FIGURE 8.6

Rinse Out Cycle

After the exchange is complete, it is important to put the MROZ through a rinsing out cycle to flush the preservative out of the new membrane.

1. Put the PRODUCT WATER hose at a drain.
2. Turn the Reject Flow Control Knob counterclockwise to give full reject flow. The Pump pressure will be lower than normal during this rinse out cycle.
3. Turn on the MROZ and allow water to run through the system per section 4.0 – see warning, below:

WARNING: Replacement membranes come shipped from the manufacturer containing a preservative solution to prevent microbiological growth and freezing. Discard all product water for at least two hours of operation before placing the RO back into service, again.

4. Turn the knob on the Reject Flow Control Knob clockwise so that the Product Water flow and Reject Water flow are approximately equal. Verify that the MROZ product conductivity is below the conductivity alarm setpoint.
5. Disinfect the system per the instructions in section 5.1.
6. Pull an AAMI analysis. The MROZ can be used after disinfection when it begins producing water to the specifications.
7. Reconnect the PRODUCT WATER hose to the dialysis machine.
8. Turn on the MROZ. The rinse out cycle is now complete, and the MROZ is ready for use.

WARNING: If the product water conductivity does not come out of alarm, do not use the system! Continue rinsing, or call AmeriWater for guidance.

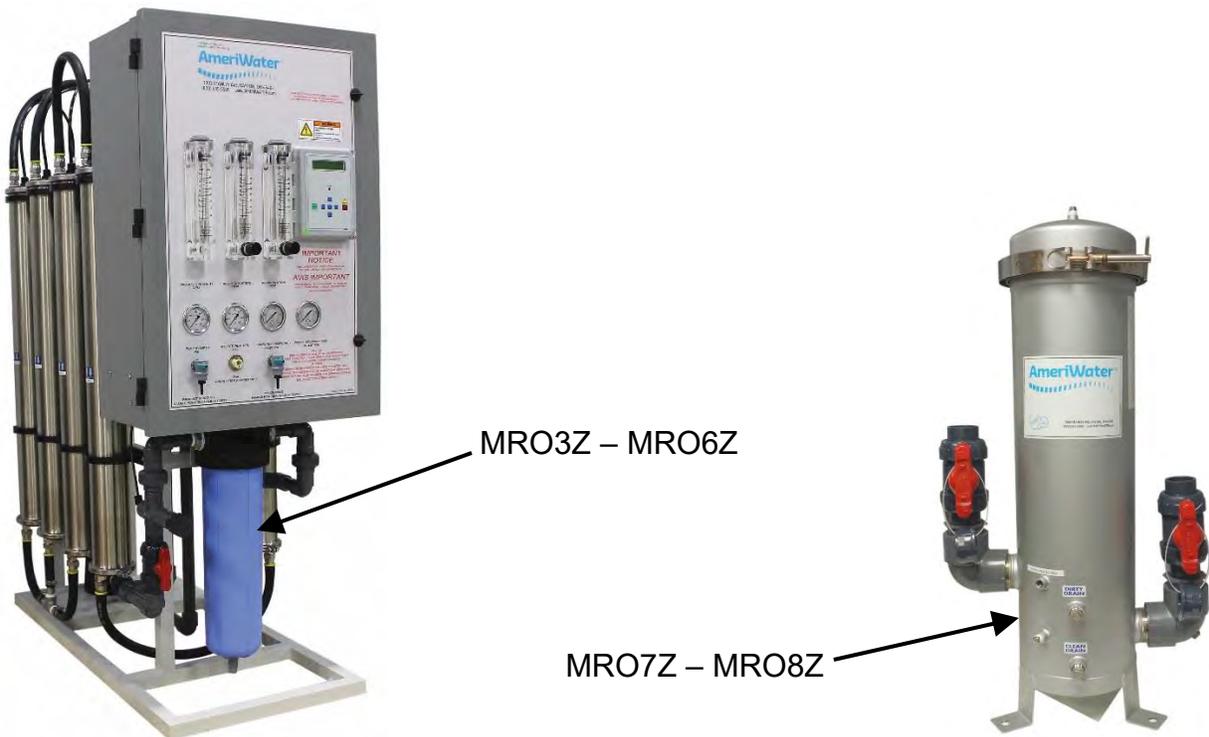
8.3 PREFILTER REPLACEMENT INSTRUCTIONS

The following steps need to be followed to successfully replace the Prefilter on the MROZ:

1. Turn off the MROZ and relieve pressure on the system by placing a container under the CHLORAMINE SAMPLE (TEST) PORT and slowly opening the sample port.

CAUTION: Even after relieving the pressure from the system and filter assembly, the filter housings could be full of water. Use care to prevent spillage.

2. For models MRO3Z, MRO4Z, MRO5Z and MRO6Z; use the filter wrench to unscrew the filter housing.
3. For models MRO7Z and MRO8Z, remove the band clamp and then remove the top cover, then remove top plate to access filters.
4. Remove and discard the used filter(s).
5. Partially unwrap the plastic from the new filter. Holding the end covered with plastic, place the new filter in the housing. Discard the remaining plastic after installation.
6. Screw the filter housing back on making sure the O-ring is in the groove, and not pinched. Hand tighten only. On MRO7Z and 8Z, after filters have been replaced, put top plate back on, and fit top of housing and secure it with band clamp



9.0 TROUBLESHOOTING AND REPAIR

9.1 TROUBLESHOOTING CHART

WARNING: Only those persons who have read the complete operations manual or who have received authorization from the medical facility director should attempt to troubleshoot and/or repair the MROZ system. Follow all safety procedures for the facility and company for which all work is being performed.

To assist you in quickly restoring your system into service, AmeriWater will send your replacement part out immediately and check your bad part when it comes in to verify if it is covered under your equipment warranty.

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
MROZ will not start	MROZ not plugged in	Plug into electrical outlet.
	Circuit breaker blown	Reset the breaker.
	MROZ in a FAULT condition	Check MROZ controller display for FAULT condition and correct the FAULT.
System has power but no water flow	Feed source not open	Open Incoming Tap Water valve.
	Feed pressure < 20 PSI	Increase pressure to \geq 20 PSI.
	Incoming hose kinked	Straighten kinks from the INCOMING TAP WATER hose.
	Prefilter clogged	Check the prefilter gauges for pressure drop; replace the prefilter if the pressure drop is 10 PSI or greater than initially recorded.
	Circuit board relay is not operating	Replace the controller circuit board (Section 9.2)
System has power but no water flow (continued)	Feed solenoid is not operating	Test the solenoid (Section 9.5). Replace the valve if it is defective (see Section 9.6).

<u>PROBLEM</u>	<u>POSSIBLE CAUSE</u>	<u>CORRECTIVE ACTION</u>
Disinfect cycle will not operate when holding the ENTER key	DISINFECT MODE has not been accessed correctly.	Access DISINFECT MODE (see 5.1).
	Circuit board relay not operating in DISINFECT MODE.	Replace the controller circuit board (see 9.2).
	Disinfect Solenoid Valve not operating.	Test solenoid valve (Section 9.5). Replace the valve if it fails (see 9.6).
Pump making excessive noise	Low pressure or flow rate feeding the MROZ.	Check the prefilter outlet gauge PSI (must be ≥ 20 PSI), and verify that the product flow (flowmeter) > 1 GPM.
	Feed solenoid is not operating.	Test the solenoid (see 9.5). Replace the valve if it is defective (see 9.6).
	Pump motor or impeller failing.	Check PUMP PSI GAUGE to verify within operating parameters. Replace the pump assembly if necessary (see 9.3 and 9.4).
Poor quality product water	High Chlorine levels	Backwash the carbon filter or rebed carbon filter.
	MROZ not rinsed thoroughly	Rinse membrane (see 8.4).
	Reject Flow Meter not properly adjusted.	Turn the Reject Flow Meter knob so that the Reject Water flow is equal or slightly greater than the Product Water flow.
	Fouled membrane	Exchange membrane. (see 8.3). Verify that the conductivity cell accuracy with a known good meter. Follow the calibration procedures in Section 6.5 or replace cell if necessary.

<u>PROBLEM</u>	<u>POSSIBLE CAUSE</u>	<u>CORRECTIVE ACTION</u>
Low product flow rate	Low pressure feeding membrane	Verify that the incoming tap water supply is fully open. The pressure on the prefilter gauges should be ≥ 20 PSI when the MROZ is operating.
	Low pump PSI.	Pump should be operating at: MRO3Z 100-140 PSI MRO4Z 100-160 PSI MRO5Z 100-160 PSI MRO6Z 100-160 PSI MRO7Z 100-180 PSI MRO8Z 100-200 PSI
	Reject GPM flow rate too high.	Adjust Reject Water flow rate.
	Excessive PRODUCT line backpressure.	Check for restrictions in the PRODUCT WATER FOR DIALYSIS hose. Check the feed pressure gauge on the dialysis machine. If the dialysis machine does not have a pressure gauge, install one inline.
	Low temperature incoming tap water.	RO+ membrane performance is affected by water temperature. The Product Water Flow Rate and Output decreases as the temperature of the Incoming Tap Water decreases.
	Prefilter clogged.	Check the prefilter gauges for pressure drop. Replace the prefilter cartridge if the pressure drop is ≥ 10 PSI.
	Membrane needs replaced.	Replace the membrane.
High Bacteria Count	Too long since the last disinfection or the procedure was not performed correctly	Disinfect the MROZ following the procedures in Section 5.

9.2 CONTROLLER TROUBLESHOOTING MATRIX

CAUTION: Hazardous voltages are present when power is applied to the unit. Care should be taken when troubleshooting any of the input power or output circuits. When disconnecting or connecting any board or accessory, be sure power is unplugged. Follow all safety procedures for the facility and company for which all work is being performed.

Before contacting AmeriWater for technical help, verify the programming of all Setpoints, check the display and check the status of all lights and indicators. The more information available when you contact us, the easier it will be to determine the source of the problem. Standard set points, and drawings of the controller and pc boards can be found in Section 6.

<u>PROBLEM</u>	<u>INVESTIGATION</u>	<u>CORRECTIVE ACTION</u>
System Inoperative	<p>Is the yellow CPU active LED blinking?</p> <p>If no, is the green power LED, DS1 Lit?</p> <p>If no, is the fuse OK?</p> <p>If no, replace the fuse.</p> <p>If yes, with a voltmeter, verify power is applied to the power terminals L1 and L2.</p>	<p>If power is applied to the power terminals and the other checks are OK, the pc board is defective and should be replaced.</p> <p>If no power is applied to the board, check the power wiring to the system.</p>
Display Blank	<p>Is the green power LED, DS1 lit?</p> <p>If yes, is the CPU active LED, DS9 blinking?</p> <p>If yes, adjust the display contrast adjustment, R3. Is the display still blank?</p>	<p>If no, refer to the system inoperative section.</p> <p>If no, replace the board.</p> <p>If yes, replace the board.</p>
Inlet Valve Will Not Operate	<p>Is the system in standby?</p> <p>If no, are any shut down conditions active?</p> <p>If no, is the inlet LED, DS8 lit?</p>	<p>If no, replace the board.</p> <p>If no, replace the board.</p>

<u>PROBLEM</u>	<u>INVESTIGATION</u>	<u>CORRECTIVE ACTION</u>
Inlet Valve Will Not Operate (Cont'd.)	If yes, with a voltmeter, verify if there is power on the inlet terminals. Is there power?	If yes, check the valve and wiring.
RO Pump Will Not Operate	Is the system in standby? If no, are any shut down conditions active? If no, is the RO LED, DS6 lit? If yes, with a voltmeter, verify if there is power on the RO pump terminals. Is there power?	If no, replace the board. If no, replace the board. If yes, check the pump and wiring.
No or incorrect conductivity reading	Is sensor wired correctly? If yes, is sensor installed inline as shown in the tubing diagram on page 14? If yes, verify correct Conductivity range. Range correct? Does unit calibrate OK? If no, disconnect green and white wires of sensor. Does reading show 0? If yes, reconnect wires and remove sensor from piping and dry. Does reading show 0? If yes, short terminals of cell together. Does reading show '^^^'?	If no, correct wiring. If no, install correctly. If no, correct range. If yes, calibrate unit. If no, replace board. If no, replace cell. If no, replace board.

<u>PROBLEM</u>	<u>INVESTIGATION</u>	<u>CORRECTIVE ACTION</u>
Incoming Conductivity Reads "^^^"	Indicates incoming conductivity is greater than 1000 μ S.	Turn the Write Protect off by moving the Write Protect chip in the controller to the off position. Then change the value of C2 Range to either 5 or 6. Next, remove the resistor in the controller in the R10 position (note that it has not been soldered in place) and place the resistor in the R9 position (also not soldered in place) into the now vacant R10 position. Finally, recalibrate the unit using a conductivity meter.

9.3 PUMP REPAIR

The following procedures are instructions for removing the pump from the unit.

The MRO3Z-MRO6Z Series has a pump with a ¾ NPT throttle valve.

The MRO7Z-MRO8Z Series has a pump with a 1 NPT throttle valve.

Before replacing the pump, be sure the pump's thermal overload has not tripped.

Allow the pump to sit at least 5 minutes to allow it to reset, then try to re-start the pump.

1. Turn off the water supply and the power supply to the MROZ. Unplug the power cord from the electrical outlet and turn off the wall disconnect for the high voltage. Make sure there is a "lockout" placed on the handle of the wall disconnect.
2. Open the front panel of the cabinet. Disconnect the pump from the control box by disconnecting the wires from the connectors located in the control box (See controller drawings in Section 6).
3. Remove the 1/2 black plastic conduit from the wires. Cut the wire harness half way to the pump. Keep the half of the wire harness that way connected to the motor starter in the RO3X cabinet for future use.
4. Disconnect the suction and recirculation headers from pump by loosening the unions coming out of the suction and discharge of the pump. Remove hose and fittings from top of pump going to first membrane inlet.
5. Remove the clamps securing the pump assembly and remove the assembly from the frame.
6. Pull locking ring on top of housing, slide pump out of the housing and remove pump cap and fittings from pump.
7. Package pump for shipping to Ameriwater (If still under warranty).

9.4 INSTALLING A REPLACEMENT PUMP ASSEMBLY

The following procedures are instructions to install the replacement pump assembly.

1. Compare the new pump to the existing to ensure that the voltage is correct.
2. Slide together pump end and pump motor, tightening nuts in a cross pattern
3. Tighten nuts to between 90-120 in.-lbs.
4. Run wires through sealcon fitting on pump cap.
5. Mount wire shroud with care as to not scuff, crimp or cut wires.
6. Tighten sealcon around wires.
7. Slide the new pump assembly into the housing taking care that the o-ring does not roll.

8. Secure the cap to the housing with the plastic locking ring previously removed.
9. Clean the threads from the fittings that were previously removed. Apply a suitable thread sealant and install into the cap.
10. Insert the pump assembly and reconnect the pump to the frame using the unistrut clamps.
11. Connect the membrane feed tubing and pump pressure gauge tubing to the pump housing outlet port (at the top), and tighten the ferrule nut. Connect the feed tube from the inlet header to the hose barb tee by tightening the hose clamp on the hose barb tee.
12. Connect the pump feed hose to the inlet of the pump by tightening the hose clamp.
13. Take the saved half of the pump wire harness that was previously cut and butt-splice it together with the wires from the replacement pump. Slide supplied heatshrink over the butt-splice location of the harness. Using a heat gun heat the heatshrink around the wire harness.
14. Connect the pump wires to the motor starter box by inserting the wires through the Sealcon fitting on the bottom of the enclosure, and connecting them to the terminal block. Connect the green (ground) wire to the threaded lug in the control box.
15. Reapply power to RO and RO pump. Check that RO Pump builds specified pump pressure (Section 2.1). If it does not build, check rotation of motor.

9.5 SOLENOID TEST PROCEDURE

Feed Solenoid

1. With the MROZ Off, turn the Incoming Tap Water supply on. **If there is water flowing to the drain, the solenoid has failed open.**
2. Turn on the MROZ, with the Incoming Tap Water supply still on. **If there is no flow to the drain, the solenoid has failed closed.**
3. Use a voltmeter to verify that power is not being supplied to the INLET SOLENOID VALVE terminal when the MROZ is off, and that power is being supplied to the terminal when the MROZ is on. If the power supply is normal, the solenoid valve is bad. If the power supply is not correct, see Section 9, Controller Troubleshooting.

Disinfect Solenoid

1. Turn off the MROZ.
2. Turn the knob on the Reject Water flow meter counterclockwise about 2 – 3 revolutions.
3. Press and hold the LEFT ARROW KEY and press the RIGHT ARROW KEY to access the DISINFECT MODE.
4. Hold in the ENTER KEY until water flows to the drain. **If there is no water flow to the drain, the solenoid has failed closed.**

9.6 SOLENOID VALVE REPLACEMENT

For all valves, Feed, Disinfect, or Product Divert Solenoid Valves

1. Turn off the MROZ by pressing the POWER key (the display will show STANDBY), unplug the 120 VAC power cord from the electrical outlet, turn off the wall disconnect, and place a lockout in the disconnect handle of the disconnect switch.
2. Turn off the incoming tap water supply to the MROZ.
3. Open the front panel of the cabinet.
4. Disconnect the solenoid wiring harness plug from the solenoid valve.
5. Disconnect the hoses/tubing from the solenoid valve.
6. For the Product Divert solenoid valves, remove the valve from the MROZ cabinet by unbolting it from the cabinet, for the Feed and Disinfect solenoid valves, loosen the union and remove valve.

7. Remove the hose/tube fittings or pvc fittings from the defective valve.
8. Make sure that the flow direction arrow located on the side of the valve is pointing in the correct direction (same as one being replaced).
9. Install per the kit instructions.
10. Reattach the hose/tubing to the corresponding fittings on the valve.
11. Reconnect the wire harness to the valve.
12. To verify that the solenoid valve is installed correctly, follow the Solenoid Test Procedures in Section 9.5.

10.0 WARRANTY POLICY

This product is covered under the standard AmeriWater warranty policy. For specific terms and conditions, please contact your AmeriWater Sales Representative.

11.0 SPARE PARTS LISTING

ROUTINE REPLACEMENT ITEMS (NON-DURABLE COMPONENTS)

PART #	DESCRIPTION
0013-0002	O-Ring Kit for 24-0007 Membrane Housing
21530238	O-RING,FLTR HSG,BB,SQ THDS,ROUND
20-1016	FILTER CARTRIDGE POLY SPUN, 1 MICRON, 4.5" X 20",DOE
R22-4041	MROZ Membrane
95-0006	PERACIDIN DISINFECTANT, 2 QUARTS
95-0007	PERACIDIN DISINFECTANT, 4 QUARTS
97WS20301	Test Strips Water Soft, Water Hardness (6 bottles of 100 strips each)
97HP20401	Test Strips Peracid Test (6 Bottles of 100 Strips each) For Measuring High Range Paracetic Acid
97PX20501	Test Strips Renal Check (6 Bottles of 100 Strips each) For Measuring Residual Peroxide
97PH20901	Test Strips pH (6 Bottles of 100 Strips each) For Measuring pH/Water/Acid, Base/Bicarbonate/Dialysate
97RC22101	WaterCheck RC (6 Bottles of 100 Strips each) For Measuring Residual Chlorine
97CM20201	WaterCheck 2 (6 Bottles of 100 Strips each) For Measuring Low Level Chlorine/Chloramine
LAL	LAL Endotoxin Testing, Exact results in just a few days
AAMI	AAMI Chemical Analysis, Results within one week

*Call AmeriWater or your AmeriWater distributor for pricing.

SPARE PARTS ITEMS

PART #	DESCRIPTION
21675175	FLTR,HOUS,4.5X20,1,I/O,DOE
21675187	FLTR,WRENCH,4.5"X10"-20"
69932109	Wire Harness for Solenoid Valves
0185-0153	PAA BOTTLE ASSY
0167-0014	SIDE ENTRY HOOD
04-7001	Q-CON,.25MPTxCOUP,W/SHUTOFF,PP
16-0074	CPC,INSERT,0.38TXCOUP,NO SHUTOFF
R65-0014	SWITCH,PRESSURE,.25MPT,3-40PSI,SET AT 8
R69446010	CONTROLLER W/ COND SENSORS,ASSY, % REJECTION,2.15 CHIP
R59-0015	0.75,FPT,120V,N.C. SOLENOID
59-0019	VAL,SOL,.75,FPT,120V,N.O.,DIN
59-0027	VAL,SOL,1,120V,NC,3-WIRE,DIN,SS316
059-0001	VAL,SOL,1.25,120V,NC,3-WIRE,DIN,SS316
41-0032	FLOW METER,PANEL MOUNT,2-20 GPM,1"MPT,NO VALVE
41-0025	FLOW METER,PANEL MOUNT,2-20 GPM,1"MPT,WITH VALVE
60760445	MOTOR STARTER/OL ASSY,3PH,120V COIL
60-0042	MOTOR STARTER/OL ASSY,3HP,3PH,120V COIL
R188-0048	KIT,REPLACEMENT,PUMP,1HP,208V/3PH,10GPM,FOR MRO3Z402
R188-0049	KIT,REPLACEMENT,PUMP,1HP,230V/3PH,10GPM,FOR MRO3Z403
R188-0050	KIT,REPLACEMENT,PUMP,1HP,460V/3PH,10GPM,FOR MRO3Z404
R188-0051	KIT,REPLACEMENT,PUMP,2HP,208V/3PH,15GPM,FOR MRO4Z402
R188-0052	KIT,REPLACEMENT,PUMP,2HP,230V/3PH,15GPM,FOR MRO4Z403
R188-0053	KIT,REPLACEMENT,PUMP,2HP,460V/3PH,15GPM,FOR MRO4Z404
R188-0054	KIT,REPLACEMENT,PUMP,2HP,208V/3PH,15GPM,FOR MRO5Z402
R188-0055	KIT,REPLACEMENT,PUMP,2HP,230V/3PH,15GPM,FOR MRO5Z403
R188-0056	KIT,REPLACEMENT,PUMP,2HP,460V/3PH,15GPM,FOR MRO5Z404
R188-0057	KIT,REPLACEMENT,PUMP,3HP,208V/3PH,20GPM,FOR MRO6Z402
R188-0058	KIT,REPLACEMENT,PUMP,3HP,230V/3PH,20GPM,FOR MRO6Z403
R188-0059	KIT,REPLACEMENT,PUMP,3HP,460V/3PH,20GPM,FOR MRO6Z404
R188-0065	KIT,REPLACEMENT,PUMP,3HP,208V/3PH,30GPM, FOR MRO7Z402 & MRO8Z402
R188-0066	KIT,REPLACEMENT,PUMP,3HP,230V/3PH,30GPM, FOR MRO7Z403 & MRO8Z403
R188-0067	KIT,REPLACEMENT,PUMP,3HP,460V/3PH,30GPM, FOR MRO7Z404 & MRO8Z404

*Call AmeriWater or your AmeriWater distributor for pricing.