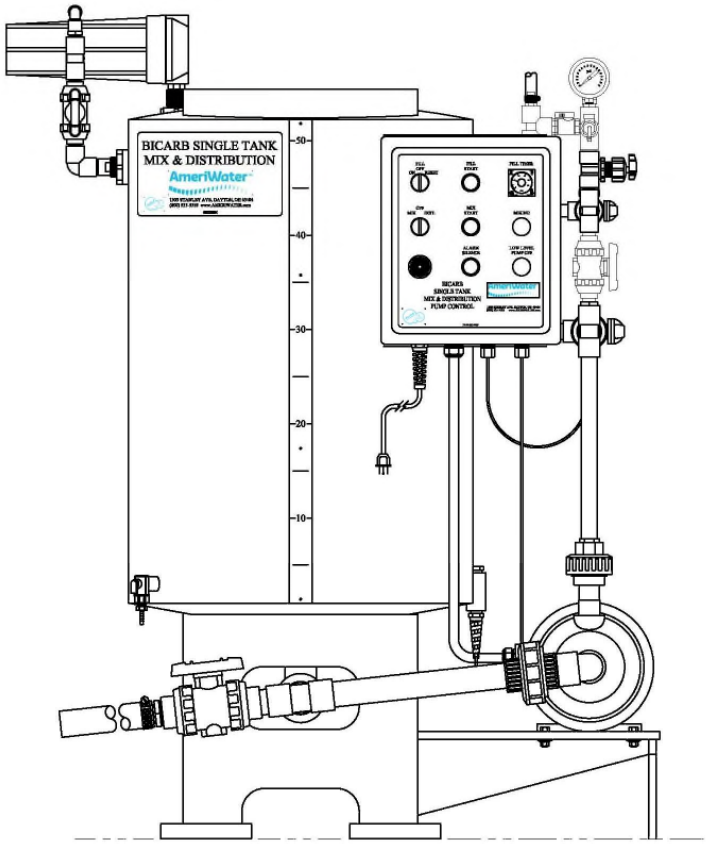
AmeriWater
The Water Purification Specialists

BICARB SINGLE TANK MIX & DISTRIBUTION SYSTEM

Installation/Operation Manual



Manufactured With Pride
In The USA

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AmeriWater • 3345 Stop 8 Rd. • Dayton, OH 45404

P/N 98-0114 REV F

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1.0 INTRODUCTION

CAUTION: Federal law restricts this device to sale by or on the order of a physician for use in hemodialysis applications!

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

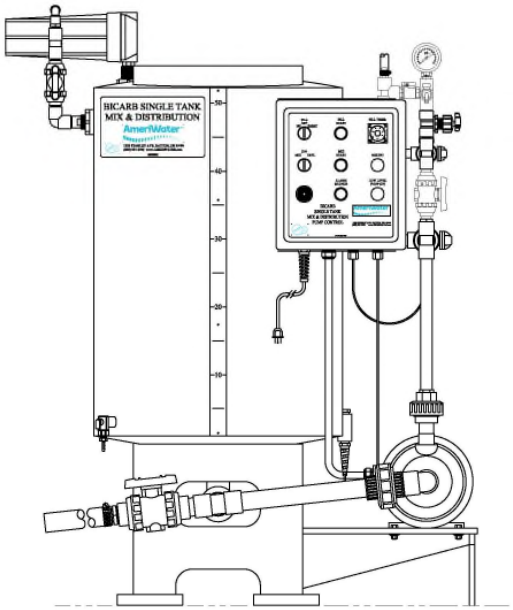
This manual has been provided for the installation, operation, and maintenance of the Bicarb Single Tank Mix and Distribution System. This AmeriWater Bicarb system is constructed of a virgin polyethylene tank with a sealed lid and cone bottom, complete drain fittings, and a 12-inch gasketed fill hole. Piping and true union valves are PVC schedule 80. The pump is a 120V, single-phase 8.2 amp motor, with all stainless steel design. The control is 120V with timed fill for purified water, and timed mixing for the Bicarb solution. The high vortex pumped mixing action provides complete mixing in minutes and keeps the bicarbonate powder in solution. The tank is equipped with a low level float switch (light and audible alarm) to protect the pump from running dry. The lightly pressurized distribution and recirculation design provides for a steady, consistent delivery process, and facilitates a complete and efficient disinfection.

The Bicarb System is designed to mix and distribute Bicarb solutions. The system is not equipped with monitoring systems such as conductivity, or pH. Therefore, the solution manufacture's procedures should be followed, and is the sole responsibility of the user.

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.

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

2.0 THEORY OF OPERATION



Tank Filling and Mixing
The tank is filled to a desired level with RO water. The filling rate is controlled with a 2GPM flow control. As the bicarbonate powder is added to the tank, the system utilizes the pump discharge to force the liquid through an eductor to mix and quickly dissolve the powder.

Distribution
After mixing is complete, the Bicarb solution is transferred from the tank to the distribution loop. The return loop is discharged to the bottom of the tank to prevent the loss of CO_2.

Low Level Protection
The tank is equipped with a low-level float switch, light and audible alarm. The pump will shut off, but the warning light remains illuminated and audible alarm stays on until the low level condition has been corrected. The audible alarm can be silenced by depressing the alarm silence button. The MIX cycle can be operated without interruption (for 10 minutes or whatever time is set on the TD2 timer inside the control box) when the tank level is above 15 gallons. Operating the mixing eductor at or below the 15 gallon level may require turning down the force of the mixing action with the #4 mix valve (see FIG 4-1).

Disinfection
The tank is designed for quick disinfection. The design utilizes a spray nozzle to completely spray the inside of the tank during disinfection. The pressurized distribution and recirculation process facilitates complete and efficient disinfection.

3.0 INSTALLATION

CAUTION: Local plumbing and electrical codes must be observed!

3.1 INSTALLATION REQUIREMENTS

The following requirements must be satisfied to insure proper installation and operation of the Bicarb Single Tank mix & Distribution System.

1. Locate the Bicarb System on a level floor.

2. Locate the system as close as possible to a floor drain (to facilitate draining of the Bicarb System).

3. Locate the Bicarb system as close as possible to the loop to minimize the length of the connecting hose.

4. Connect the purified water supply to the inlet hose located on top of the inlet header, using the 1/2" inside diameter (white) medical grade hose that is provided. Keep the run as short as possible.

5. Connect ½" outside diameter blue polyethylene tubing to the "Loop Feed" fitting, located on top of the cross above the pressure gauge. Run this tubing to the Bicarb distribution loop.

6. Connect the returning end of the Bicarb loop (½" outside diameter polyethylene tubing), to the "Loop Return" fitting on the top of the return header.

7. Connect the 1 ¼" drain hose to the drain valve, using one of the hose barb adaptors that are provided, and route the hose to the desired drain.

8. Connect the remote alarm if applicable (follow instructions provided with the **main** alarm panel).

9. Make sure that the switches on the Bicarb controller are turned off (see Fig. 4-1), and plug the controller into a dedicated 120 V, 20 AMP, single-phase, GFI electrical service outlet.

4.0 START-UP AND OPERATION

Please read and follow all the guidelines and recommendations of the solution manufacturer before proceeding with the start-up procedures. Refer to Fig. 4-1 to reference the control box and valve designations.

WARNING: The Bicarb System must be disinfected prior to placing the system in service! Failure to comply may result in injury, illness, or death to the patients

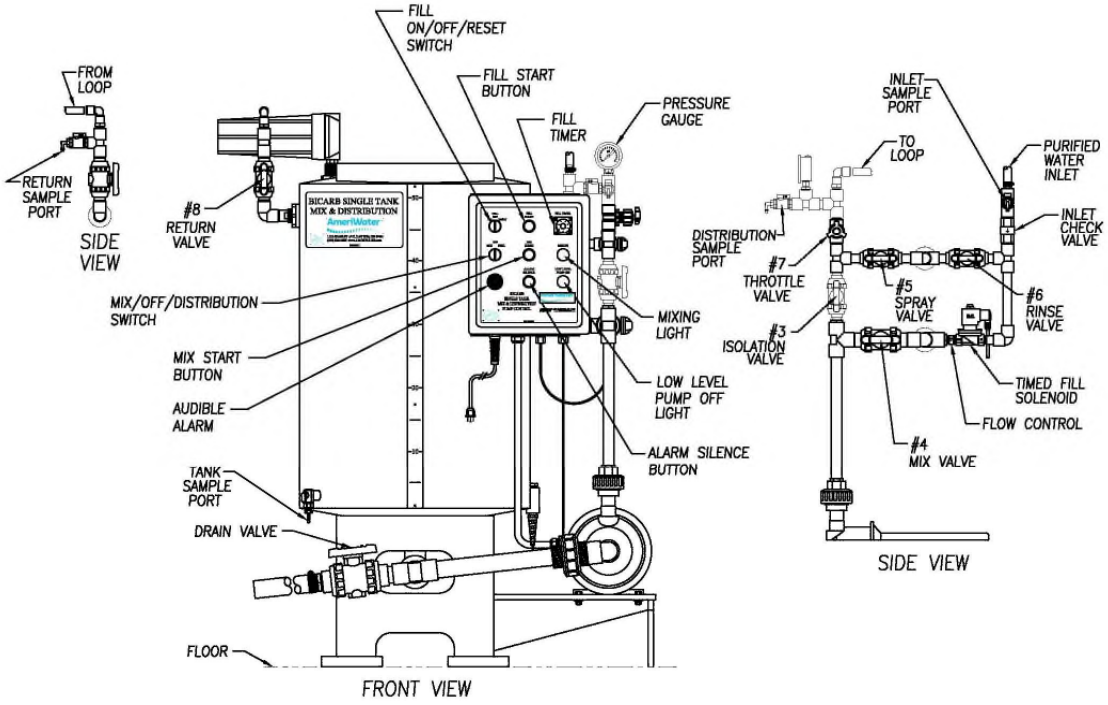


Fig. 4-1
FRONT AND SIDE VIEWS
BICARB CONTROL AND VALVE DESIGNATIONS

CAUTION: Always use a collection device to catch fluids from opening sample ports!

CAUTION: Always follow safety procedures when handling any chemicals!

CAUTION: Exposure to hydrogen peroxide/peroxyacetic acid concentrate or solution may cause severe chemical burns to skin or eyes. Additional information regarding hydrogen peroxide/peroxyacetic acid is found on your PAA bottle, and the Material Safety Data Sheet. Please read carefully before using these products.

4.1 DISINFECTION WITH CHLORINE OR PERACETIC ACID (PAA)

Perform the recommended disinfection and rinse procedures as established by your facility medical director before placing the Bicarb System into service. After disinfection, rinse with purified water until a negative residual disinfectant test is obtained.

WARNING: DO NOT use to treat patients until a negative residual disinfectant test is obtained! Verify that no patients are connected to the Bicarb loop during disinfection or serious injury, illness, or death may occur!

RINSE RESIDUAL BICARB OUT OF THE SYSTEM

1. Verify that all valves, sample ports, and tank lid are closed and power is on.

2. Open the DRAIN VALVE and allow the tank to drain completely.

3. Turn on purified water supply and open #6 RINSE VALVE, allow tank to rinse to drain until pH at drain is less than or equal to 8 (minimum continuous rinsing time of 5 min.). Use pH test strips (AmeriWater part number 97PH20901) to verify the pH at the drain.

4. When pH at drain is less than or equal to 8, close the DRAIN VALVE. Begin filling tank with purified water from the #6 RINSE VALVE. Monitor the tank while it fills to prevent tank from overflowing. Close the #6 RINSE VALVE when desired level is reached: 55-gallon Tank: Fill to 25 gallons, 100-gallon Tank: Fill to 50 gallons.

5. Open #4 MIX VALVE, wait 15 seconds for pump to prime, turn the switch on the control box to MIX (RED light and audible alarm will come on) and press the MIX START button. If no mixing action is observed, then the pump is not primed and should not be allowed to continue running without water. (Damage to pump could result from running without water.) When mixing action starts, allow system to run at this setting for 1 to 2 minutes and open #5 SPRAY VALVE for 1 minute, then close #5 SPRAY VALVE.

6. Open #8 RETURN VALVE, and #7 THROTTLE VALVE completely. Open RETURN SAMPLE PORT (full flow, with #8 RETURN VALVE at half flow) for 10 seconds then close RETURN SAMPLE PORT (fully open the #8 RETURN VALVE), and allow water to re-circulate through system until the timer stops the pump.

7. Close #4 MIX VALVE and open the DRAIN VALVE to allow water to flow to the drain for at least 5 seconds then close the DRAIN VALVE. (Do not operate pump while DRAIN VALVE is open or tank empty.) Open tank SAMPLE PORT for 10 seconds and close.

8. Open the DRAIN VALVE and allow the tank to drain completely then close.

9. Refill the tank with purified water and repeat steps 4-8. Do this until the pH is less than or equal to 8 at the tank SAMPLE PORT.

10. Run fresh purified water through each point of use and test with test strips until the pH at each point of use is less than or equal to 8.

11. Open the DRAIN VALVE to empty the tank (do not operate pump at this time).

ADD DISINFECTANT

1. Verify that all valves, sample ports, and tank lid on the Bicarb System are closed.

2. Begin filling tank with purified water by opening #6 RINSE VALVE. Monitor tank while it fills to prevent tank from overflowing. Close the #6 RINSE VALVE when desired level is reached: 55-gallon Tank: Fill to 25 gallons, 100-gallon Tank: Fill to 50 gallons.

3. Once filled, close the #6 RINSE VALVE. Open the #4 MIX VALVE and wait 15 seconds for the pump to prime, turn the switch on the control box to mix (RED light and audible alarm will come on) and press the MIX START button. If no mixing action is observed, then the pump is not primed and should not be allowed to continue running without water. (Damage to pump could result from running without water.) When mixing action starts, allow system to run at this setting for 1 to 2 minutes and open #5 SPRAY VALVE for 1 minute, then close #5 SPRAY VALVE (see CAUTION statement).

CAUTION: If SPRAY VALVE is open while pump is running, water will spray out when the tank lid is opened! USE SAFETY PRECAUTIONS FOR CHEMICALS!

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 hydrogen peroxide/peroxyacetic acid concentrate!

4. Open the tank lid and add the chlorine or peracetic acid (PAA) to the mixing water and then close the tank lid securely. AmeriWater recommends 32 ounces or 950 mL of chlorine or peracetic acid (PAA), for every 25 gallons of water to be used (a 1:100 ratio of disinfectant to water). CLOSE THE LID SECURELY TO THE TANK.

5. Open #5 SPRAY VALVE and close #4 MIX VALVE. Allow the water and disinfectant to mix in this configuration. Open the tank SAMPLE PORT for approximately 5 seconds while the system is mixing and verify with a test strip that the disinfectant concentration is at least 500 ppm. Add disinfectant to the tank if necessary to reach the required concentration, and mix until the Mix Timer (TD1) times out (10 minutes). Open the DRAIN VALVE for approximately 5 seconds, and then close. If a longer disinfection time is desired, allow the system to soak for 10 minutes and then press the MIX START button to allow the water and disinfectant in the tank to mix in this configuration until the Mix Timer (TD1) times out (10 minutes).

6. Open #8 RETURN VALVE, and the #7 THROTTLE VALVE.

7. Close the #5 SPRAY VALVE.

8. Turn the switch on the control box to DIST., and allow running at this setting. Allow the disinfectant to re-circulate through the bicarb loop for at least 30 minutes. Verify with test strips that the disinfectant concentration at each point of use is at least 500 ppm.

9. Open the DRAIN VALVE for at least 5 seconds then close.

10. Open RETURN SAMPLE PORT for at least 5 seconds, then close.

11. Turn the switch on the control box to OFF.

12. Open the TANK SAMPLE PORT for at least 5 seconds (full flow), then close.

13. Open the DRAIN VALVE, allow tank to drain completely then close the DRAIN VALVE.

14. Verify that all valves, sample ports, and tank lid are closed.

RINSE OUT DISINFECTANT

1. Begin filling tank with purified water by opening #6 RINSE VALVE. Monitor tank while it fills to prevent tank from overflowing. Close #6 RINSE VALVE when desired level is reached: 55-gallon Tank: Fill to 25 gallons, 100-gallon Tank: Fill to 50 gallons.

2. Open #4 MIX VALVE and wait 15 seconds for the pump to prime, turn the switch on the control box to mix (RED light and audible alarm will come on) and press the MIX START button. If no mixing action is observed, pump is not primed and should not be allowed to continue running without water. (Damage to pump could result from running without water.)

3. Open the TANK SAMPLE PORT for at least 5 seconds (at full flow).

4. Open the DRAIN VALVE and allow the tank to drain completely. Close the DRAIN VALVE, and repeat the steps above, 2 to 3 times or until a negative residual for disinfectant is achieved when using test strips. When a negative residual disinfectant is achieved, fill tank with purified water to the level specified above.

5. Run fresh purified water through each point of use and test with test strips until a negative residual is achieved at each point of use.

6. AmeriWater recommends filling the tank with RO purified water and allowing it to re-circulate through the loop with the #7 THROTTLE VALVE fully opened while the system is not in normal use.

7. Log disinfection completion in your facility's system daily checklist or journal.

4.2 MIXING BICARBONATE SOLUTION (BICARB)

1. Before connecting the system to electric, determine and set the time on the mix timer (TD1) as needed. (The factory setting is 10 minutes on the timer, which is located inside the control box.

WARNING: Electric shock may occur if the power is not disconnected prior to opening and/or closing any electrical device!

2. Plug the power cord of the unit into a 120-volt, 20 AMP, dedicated, single-phase GFI receptacle.

3. Verify that the tank is empty and clean by visual inspection and performing a residual disinfectant test before filling with purified water.

4. Verify that all valves, sample ports, and tank lid on the Bicarb System are closed.

5. Determine the desired batch size (so that the Tank fill level can be determined).

   a. To fill the tank, (Check the Bicarb manufacturer's recommendation on amount of water to use) set the fill timer on the front of the control panel to 1 minute for every 2 gallons of water desired. Turn the fill switch ON and push the FILL START button.

   b. For best results partially fill the mix tank to a level 3-4 gallons (1.5-2 minutes) less than what is needed before adding in the Bicarb. Additional water can be added by temporarily opening the #6 RINSE VALVE.

6. When the tank is filled to the desired level, open the #4 MIX VALVE, (wait for pump to prime) turn the switch for MIX/OFF/DIST. to MIX (RED light will come on) and press the MIX START button.

7. Open tank lid and **slowly** add the dry chemical to the mixing water, then close lid.

WARNING: Follow all of the bicarbonate powder manufacturer's recommendations for use of personal protective equipment in order to prevent injury, illness, or inadvertent contamination of the bicarbonate solution!

8. When the Mix Timer (TD2) times out and the Pump has stopped, remove the cover and inspect the contents of the mix tank to verify that all of the powder has dissolved. If there is any powder in the tank that has not dissolved, close the tank lid and press the MIX START button to continue mixing until all of the powder has dissolved.

9. Perform the powder manufacturer's recommended test procedures on the solution to check the ratio.

   a. If the solution concentration is too high, add purified water to adjust the solution to a lower concentration.

10. Log test results in your facility's daily checklist or journal.

4.3 DISTRIBUTION OF BICARBONATE SOLUTION (BICARB)

1. Open the #7 THROTTLE VALVE.

2. Turn the MIX/OFF/DIST. switch to DIST. Set loop pressure to between 4 and 6 psi by adjusting the #7 THROTTLE valve and #4 MIX VALVE. (It is recommended to partially open the # 4 MIX VALVE to allow the pump to run fully without being choked down.)

3. Open the RETURN SAMPLE PORT to verify that the loop water is flowing through the #8 RETURN VALVE back into the tank (adjust the #8 RETURN VALVE if necessary).

   a. You may have to temporarily close the #8 RETURN VALVE in order to pass solution through the RETURN SAMPLE PORT.

4.4 END OF DAY PROCEDURES

1. The Bicarb Mix and Distribution System should be cleared of bicarbonate solution at the end of the treatment day.

2. Follow the steps in section 4.1.3 to rinse out the system, clearing it of bicarbonate solution.

CAUTION: Bicarbonate mixing and distribution systems must always be cleared of the bicarbonate solution and rinsed clear at the end of the treatment day, as well as prior to preparing new batches of solution!

4.5 PUMP PROTECTION

The Tank is equipped with a low-level float switch.

When the tank level is low and the switch is in DIST. mode, a RED light will illuminate, and an audible horn will sound. Depressing the Alarm Silence Button will silence the audible horn or alarm.

The RED light will remain illuminated and the pump will not operate until the condition has been corrected.

The pump should not be operated or the switch placed in the MIX or DIST. positions unless the tank has fluid above the float switch. The Mix cycle can be operated without interruption when the tank level is above 15 gallons.

5.0 MAINTENANCE

Maintenance is the responsibility of the operator. Scheduled disinfection and bacterial monitoring is to be established by your facility medical director. The medical director should decide if disinfection should be performed weekly or more often.

Daily Maintenance

Check the system plumbing for leaks or precipitation build up that may cause reduced flow or function of the system.

Weekly Maintenance

AmeriWater recommends disinfecting the Bicarb System weekly (based on ANSI/AAMI recommendations for weekly disinfection) or as directed by your facility's protocol.

Monthly Maintenance

When possible, coordinate the Bicarb system disinfection with the disinfection of the water purification system. Conduct a manual fill (open the #6 RINSE VALVE) during the water purification system disinfection in order to disinfect the pure water inlet to the Bicarb system.

Quarterly Maintenance

AmeriWater recommends that the Bicarb System be decalcified quarterly. Vinegar is an acceptable solution for decalcifying the system. The system may have to be decalcified more often depending on the amount of calcium build up. Mix 1 gallon of vinegar per 25 gallons of water and re-circulate through the loop. If the loop is re-circulating with RO purified water when not in use, the decalcification process may not be necessary.

Annual Maintenance

AmeriWater recommends that you change the tank vent filter cartridge at least annually, or anytime the filter cartridge gets wet.

IMPORTANT: Log all maintenance in your facilities operation and maintenance journal.

6.0 SYSTEM DRAWINGS

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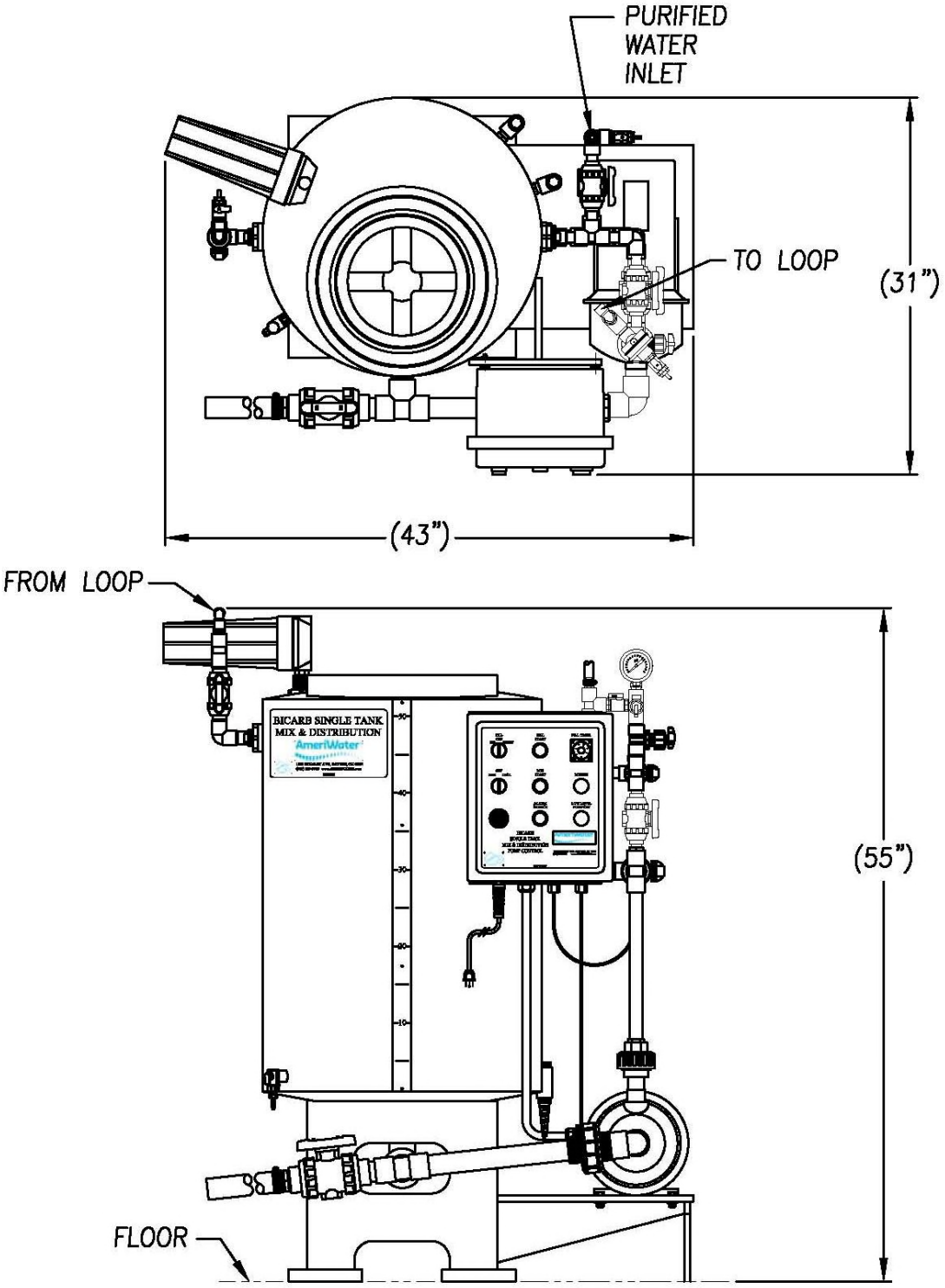

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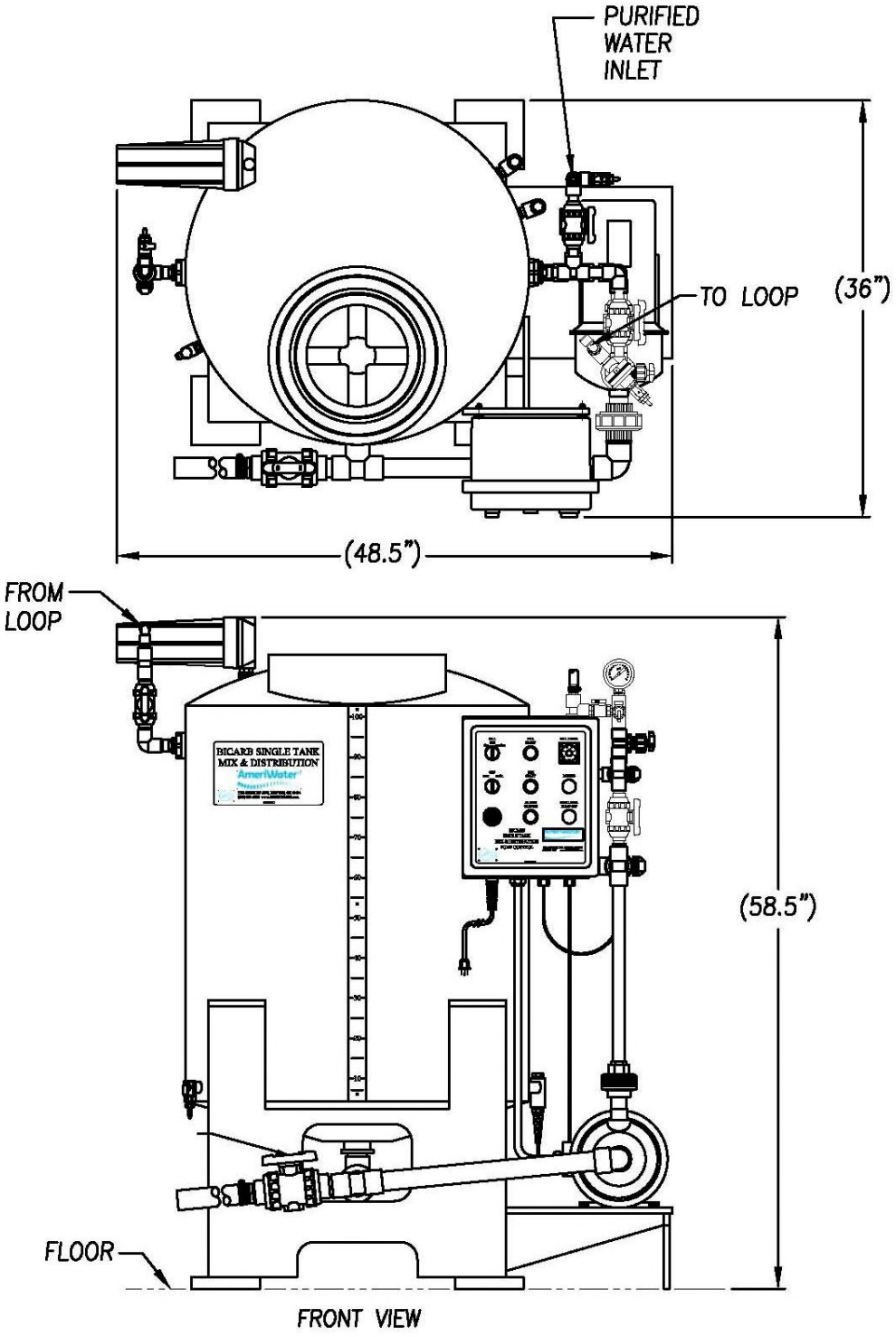
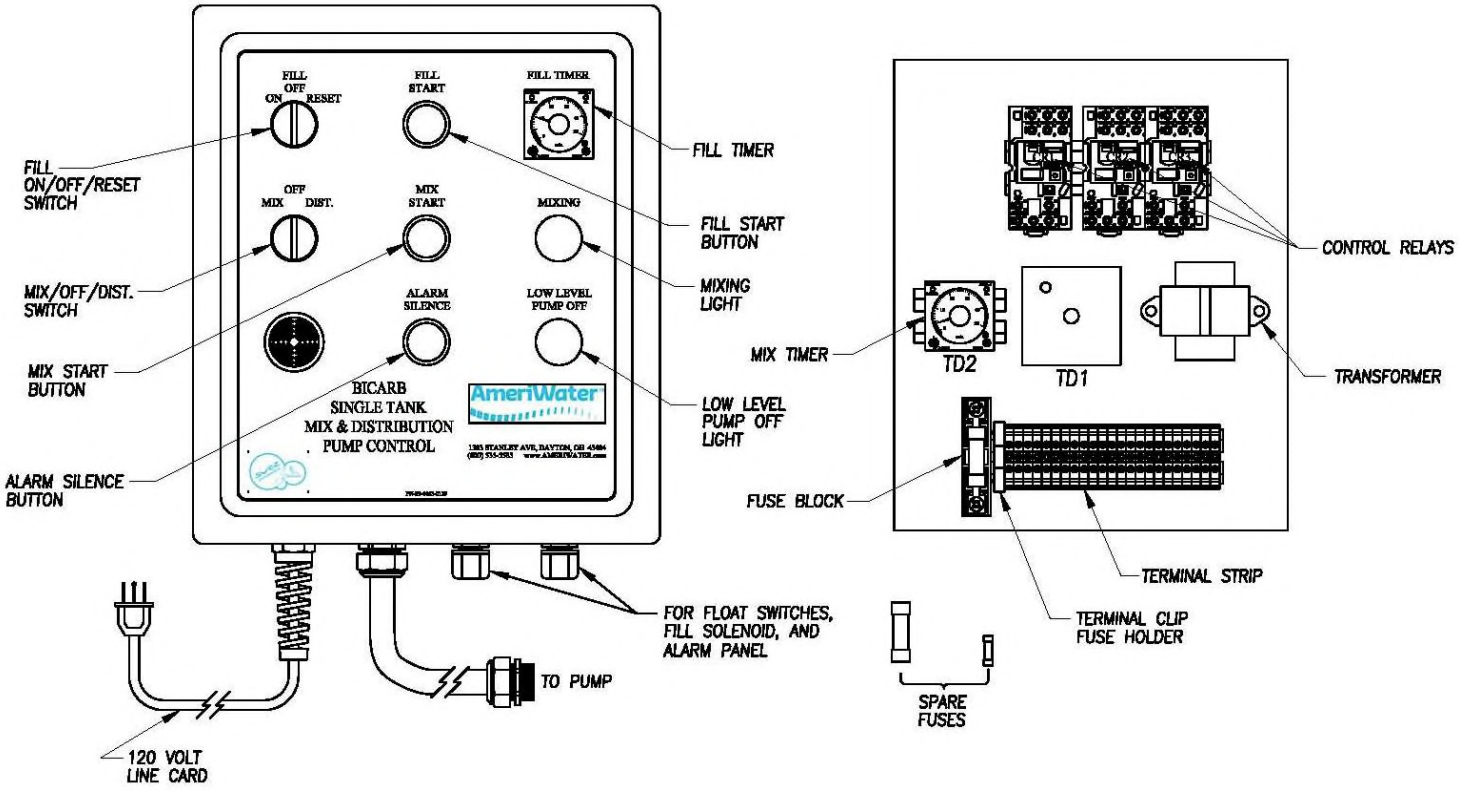
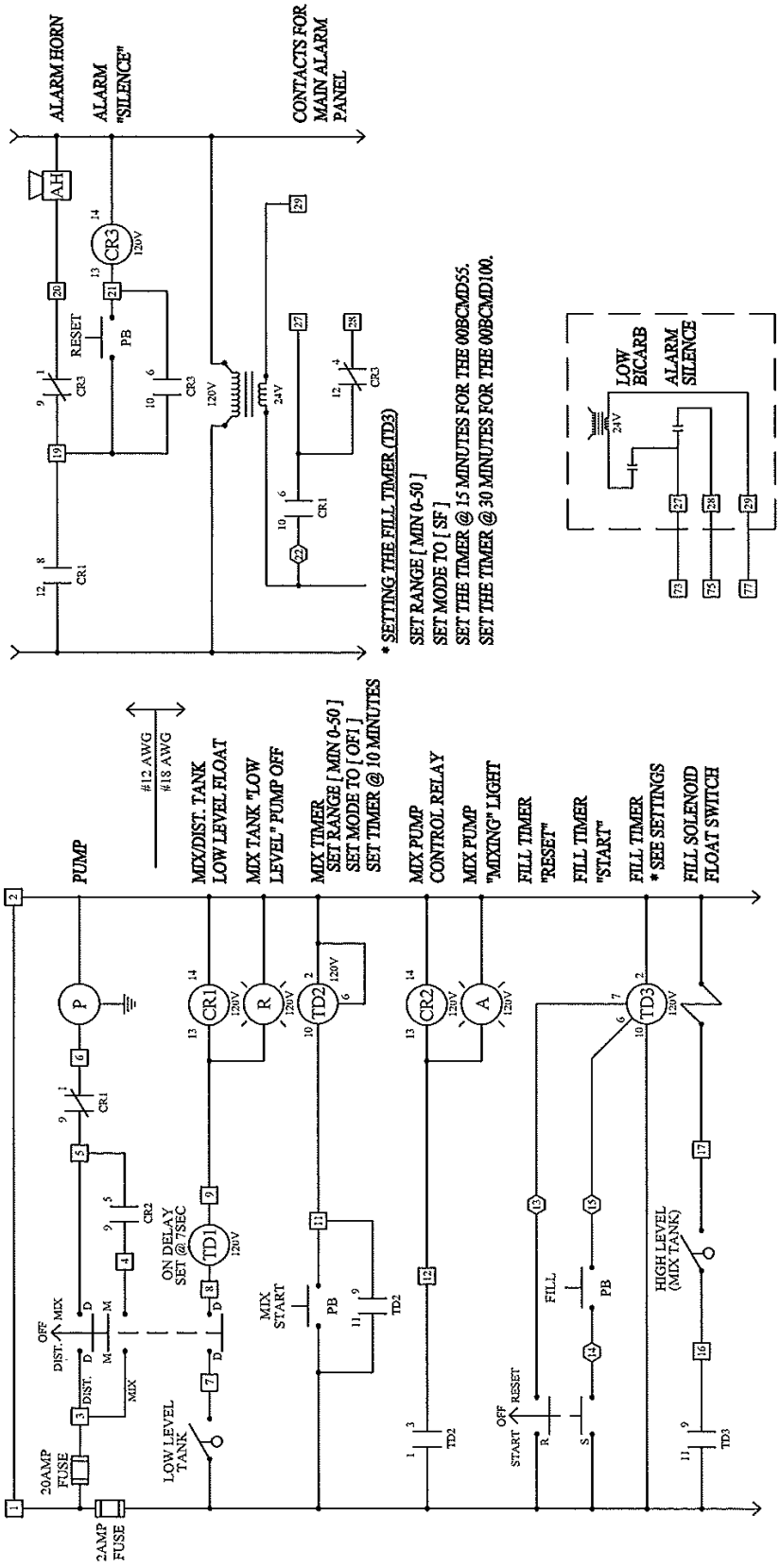

PURIFIED
WATER
INLET
TO LOOP
(36")
(48.5")
FROM
LOOP
BICARB SINGLE TANK
MIX & DISTRIBUTION
(58.5")
FLOOR
FRONT VIEW

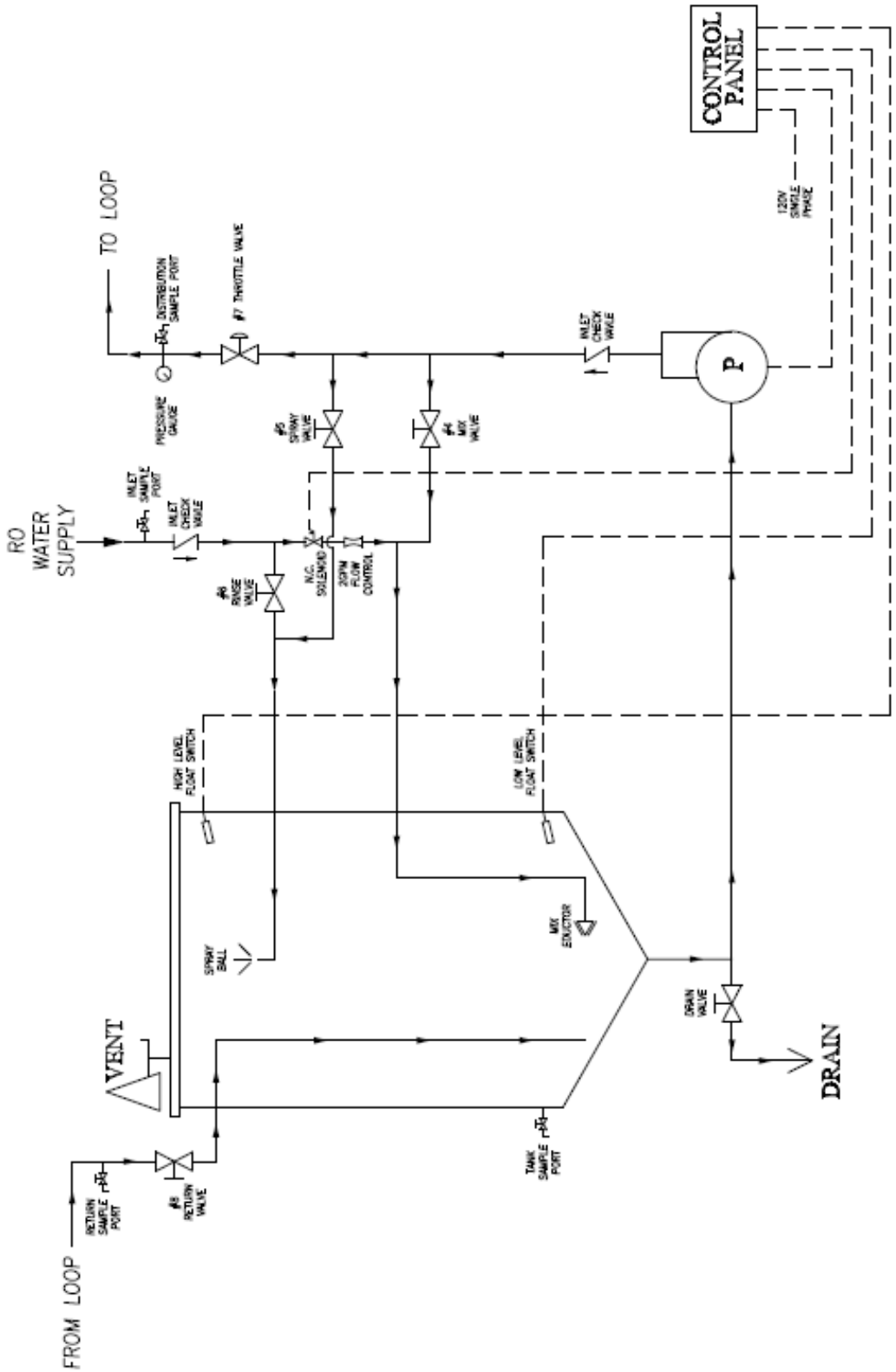
BICARB SINGLE TANK MIX & DISTRIBUTION CONTROL



BICARB SINGLE TANK MIX & DISTRIBUTION SCHEMATIC



BICARB SINGLE TANK MIX & DISTRIBUTION FLOW CHART



7.0 PARTS LIST

Description	Part Number
FILTER CARTRIDGE SUBMICRON, 0.2 MICRON, 2.5" X 10", DOE	20-3021
FLOATSWITCH,ASSY	0167-0010
FUSE 2A	63760133
FUSE 15A	63760186
GAUGE,0-30,.25,CBM	43-0006
LIGHT AMBER PILOT 120V	65511227
HORN PIEZO 120 VAC, 80-95 DB	65760204
LIGHT RED PILOT 120V	65511223
LINE CORD 120V 12/3 HOSPITAL GRADE STRIPPED ENDS	66932113
MIX & DISTRIBUTION PUMP	80-0102
PERACIDIN DISINFECTANT, 2 QUARTS	95-0006
PERACIDIN DISINFECTANT, 4 QUARTS	95-0007
RELAY,120V,15AMP,3PDT,11TERM-LED&TEST BUTTON	64-0017
SWITCH 3-POSITION MAINTAIN	65511222
SWITCH 3-POSITION RETURN RIGHT	65511229
SWITCH PUSH BUTTON	65511220
TEST STRIPS PERACETIC ACID TEST	97HP20401
TEST STRIPS RENAL CHECK, RESIDUAL PEROXIDE	97PX20501
TEST STRIPS WATER CHECK RESIDUAL CHLORINE/CHLORAMINE	97RC22101
TEST STRIPS WATER CHECK 2 LOW LEVEL CHLORINE/CHLORAMINE	97CM20201
TIMER RAIL MOUNT 11 PIN	64760235
TRANSFORMER 120/208/240-24V 40VA	62760177
VAL,CHECK,.5FPT,WHITE,PP	55-0003
VAL,SOL,.5FPT,NC,120V,DIN	59-0002
VALVE BALL 1.25” TRUE UNION PVC80	041732001
VALVE BALL 1/2" TRUE UNION PVC80	041531812
VALVE BALL 3/4" TRUE UNION PVC80	041530841
VALVE BALL 3/8" M X F (SAMPLE PORT/DRAIN)	041001
VALVE,NEEDLE,.5,FPT,PVC80 (THROTTLE VALVE)	04100002
WIRE HARNESS,DIN,STD ISO,6FT,STRIPPED ENDS	66932109
WRENCH,FILTER,10" OR 20" WHITE	21675184