

MCB 205 DUAL TANK MIX & DELIVERY BICARB SYSTEM

OPERATION & MAINTENANCE MANUAL

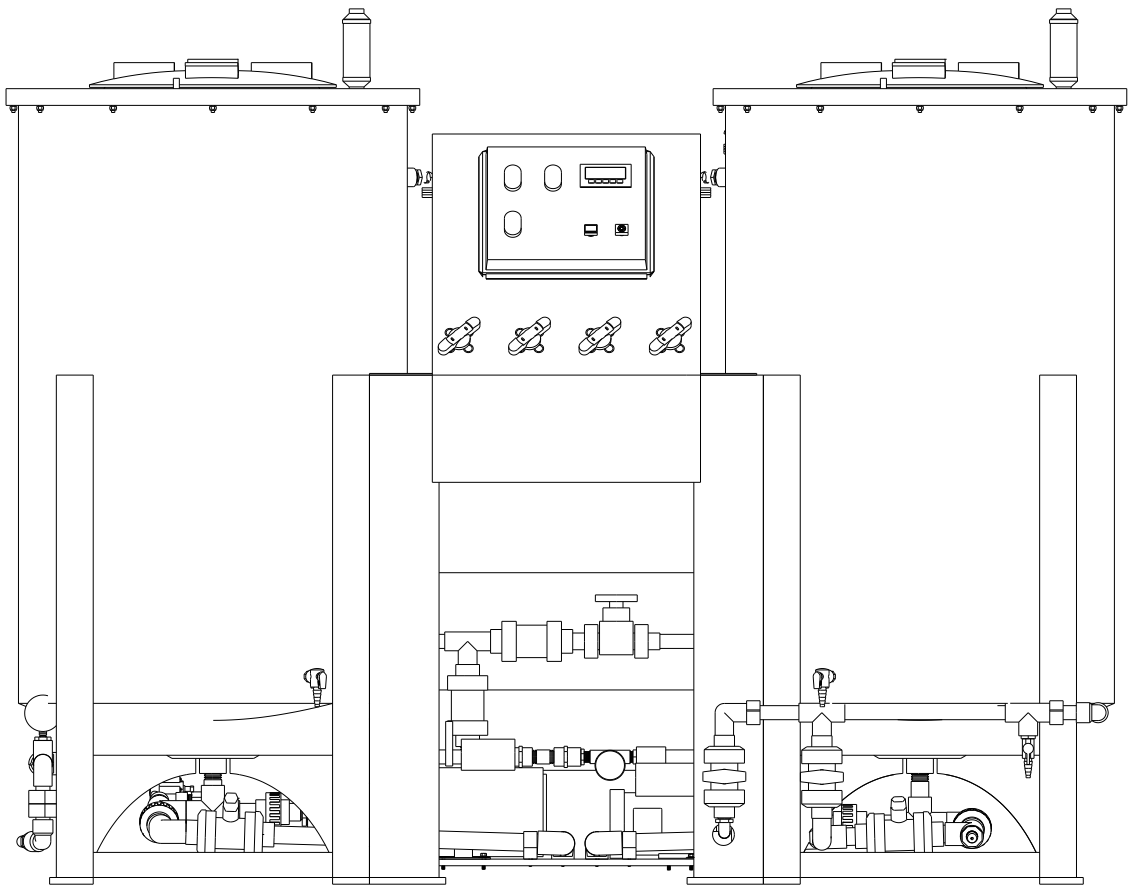


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CHAPTER ONE: GENERAL INFORMATION

1.1 General

This manual describes the installation and operation of a Mar Cor Purification MCB 205 Dual tank Mix & Delivery Bicarb System. The Bicarbonate Mixing and Distribution System (Bicarb System) designed and manufactured by Mar Cor Purification is safe, reliable and easy to use. This system will reduce staff time by providing consistent bicarb mixing, and thorough system cleaning and disinfection. The MCB 205 is intended to mix bicarbonate solution and distribute the solution to points of use.

Standard features of the Bicarb System include:

- All Polyethylene tanks and control units for easy cleaning.
- Mix & Distribution pump.
- Manual water fill for variable batch sizes.
- Large and easy to use valve handles and eye-level controls.
- Distribution tank allows a second batch to be mixed without interrupting distribution of first batch.
- (2) 50 Gallon or (2) 100 Gallon systems are available.

Model Number	Part Number	Description
MCB205-50	200-02-207	Bicarb Mix and Delivery (2) 50 Gallon Tanks
MCB205-100	200-02-208	Bicarb Mix and Delivery (2) 100 Gallon Tanks

1.2 Safety


This section does not contain all of the safety statements in the manual. Other safety statements are included within the manual text by the following denotations and are highlighted in bold print.

NOTE:	Statement that provides further clarification.
CAUTION:	Statement used to identify conditions that could result in equipment or property damage.
WARNING:	Statement used to identify conditions that could result in personal injury or loss of life.

Read This Manual:

This manual needs to be read and understood prior to operating or servicing this device. Use this manual for future reference or training.

Electrical:

- a. To avoid electrical shock, do not open control panel.
- b. Plug should be removed from wall outlet during servicing.
- c. Do not use an extension cord for operation.
- d. Use only with a grounded outlet and ensure that ground is in plug.
- e.  Symbol means, Caution risk of electrical shock.

Labeling:

Do not remove any system labels. All labels are important and necessary for understanding system operation.

Transporting

When lifting or carrying the MCB205 use at least 4 persons or properly rated lifting equipment. Ensure all proper safety equipment is used when moving the MCB205.

Use:

Do not use the MCB 205 in hazardous atmospheres or with material for which the equipment is not designed. If the MCB 205 is used in a manner not specified by the manufacturer the protective features of the unit might be impaired.

Electromagnetic Interference:

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with these instructions, may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference with other devices, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving device.
- Increase the separation between the equipment.
- Connect the equipment into an outlet on a circuit different from that to which the other device(s) is connected.
- Consult the field service technician or manufacturer for help.

CHAPTER TWO: SYSTEM INFORMATION

2.1 Utility Requirements

NOTE: Prior to installing the MCB 205 it is necessary to provide and create an environment suitable for the troublefree operation of the system.

2.1.1 Water

RO or DI water produced to AAMI standards for Hemodialysis. A minimum of 20 PSI is recommended for consistent filling and a maximum of 60 PSI. Must not exceed 30 LPM (8 GPM).

NOTE: Unit is equipped with 3 GPM flow restrictor for fill sensor accuracy.

2.1.2 Electrical

System must be supplied with a 115V, Single Phase, 20 Amp, 60 Hz power supply. An 8 ft. cord with US type plug connector is supplied with every unit. Histories of power failure, power surges, and low line voltages should be noted and reported to the manufacturer or their agent as they may create adverse conditions for the equipment's operation.

Fuse Tables

MCB205-50 Part Number 200-02-207			
Fuse Information			
Amp	Volt	Type	Number of Fuses
2	250	Time Delay	3
.5	250	Time Delay	1
10	600	Time Delay	1
7.5	600	Time Delay	1

MCB205-100 Part Number 200-02-208			
Fuse Information			
Amp	Volt	Type	Number of Fuses
2	250	Time Delay	3
.5	250	Time Delay	1
15	600	Time Delay	1
7.5	600	Time Delay	1

Machine Electrical Rating Table

Part Number	Voltage Rating	Amp Rating	Phase	HZ
200-02-207	115	10.5	1	60
200-02-208	115	12.8	1	60

2.1.3 Drain

A drain outlet is required for the Bicarb mixer. A floor drain is recommended for proper operation (minimum 1”).

2.1.4 Piping

Plumbing materials can significantly contribute to the contamination of the system. Schedule 40 or 80 PVC pipes, polypropylene, PVDF, and other FDA recommended materials are suitable for the system. Care must also be exercised in the choice of a thread sealant. Teflon tape is suitable for all threaded connections in this system.

WARNING: Ordinary pipe dope must be avoided since it may leach objectionable and potentially dangerous impurities into the water. For thread sealing, use a product that is compatible with pure water applications.

2.2 Dimensions/Operating Space

The following are the system dimensions:

Width: 7' 1"
Depth: 2' 8"
Height: 5' 1" (100 gallon) without vent filter
4' 9" (50 Gallon) without vent filter

For easy and safe operation, we recommend that there be a minimum of 2 feet on each side and 4 feet in the front of the system. Due to the wet environment, we recommend that the system be placed in a curbed area with a drain. This area should be at least 8 feet by 5 feet. The floor drain should be used as the system drain.

NOTE: Do not position the unit so it is difficult to disconnect the power cord from the outlet.

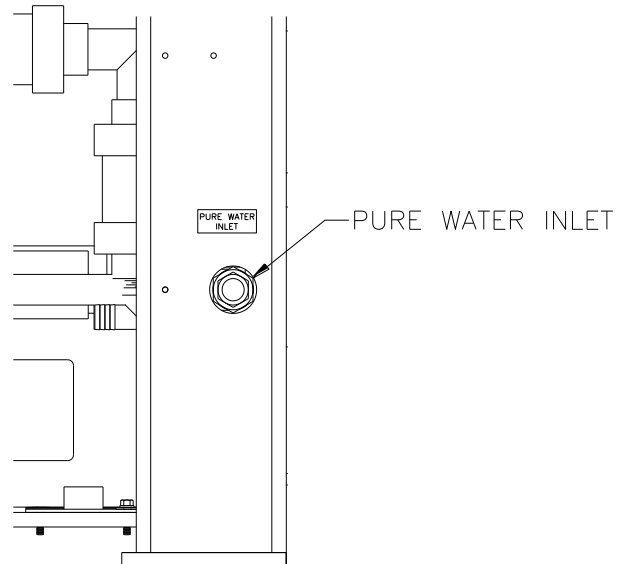
2.2.1 Operating Weight

<u>Part Number</u>	<u>Operating Weight</u>
200-02-207	1200 LBS
200-02-208	2065 LBS

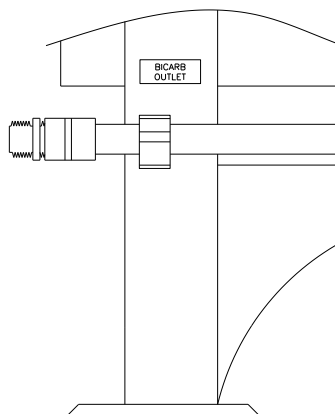
2.3 Installation

The bicarb system ships ready to operate. There are four system connections for operations:

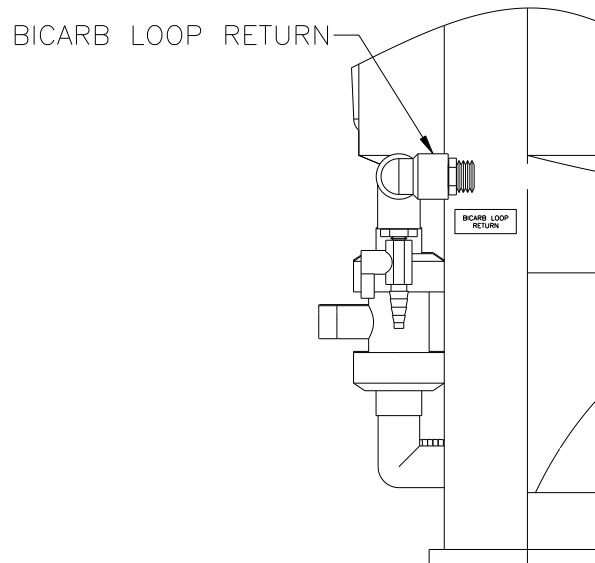
- Inlet (feed water): 3/4" schedule 80 PVC (installed with 3/4" GHMT)



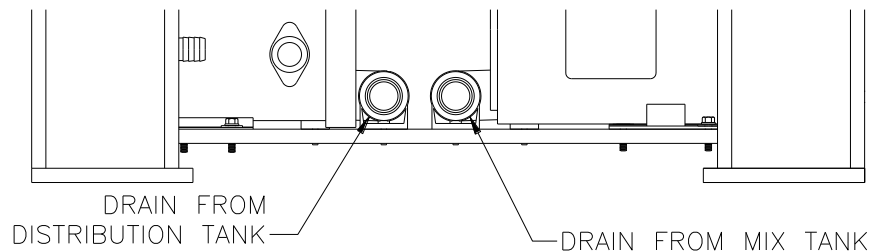
- Bicarb Outlet: 3/4" schedule 80 PVC (installed with 3/4" GHMT)



- Bicarb Loop Return: 3/4" schedule 80 PVC (installed with 3/4" GHMT)



- Drain: 1" schedule 80 PVC, socket (x2)



- Vent Filter Installation

Remove plug from tank cover vent filter opening. Remove dust plugs from vent filter housing ends. Apply thread tape to nipple. Install nipple into arrow end of vent filter. Install assembled parts into tank cover.

NOTE: For the feed water line, we recommend that a valve be placed prior to the system for emergency system shut-off. Unions or GHMT should be installed on all connections to allow the unit to be moved for servicing. Connections may be made with tubing.

2.4 Components of the Bicarb System

2.4.1 Valve and Test Port Labels

The following identifies and describes the function of each valve and test port. All valves are tagged or labeled.

- V1** Mix/Clean valve for mix tank
- V2** Mix tank transfer valve to distribution tank and feed valve for mix tank (V1)
- V3** Distribution tank clean and bicarb distribution loop return valve
- V4** RO water fast rinse of tank and bicarb loop rinse valve
- V5** Drain valve for the mix tank
- V6** Drain valve for the distribution tank
- V7** Bicarb loop drain valve on the purge system
- V8** Return loop isolation valve
- TP1** Bicarb loop purge test port
- TP2** Distribution tank test port
- TP3** Mix tank test port

2.4.2 Control Panel

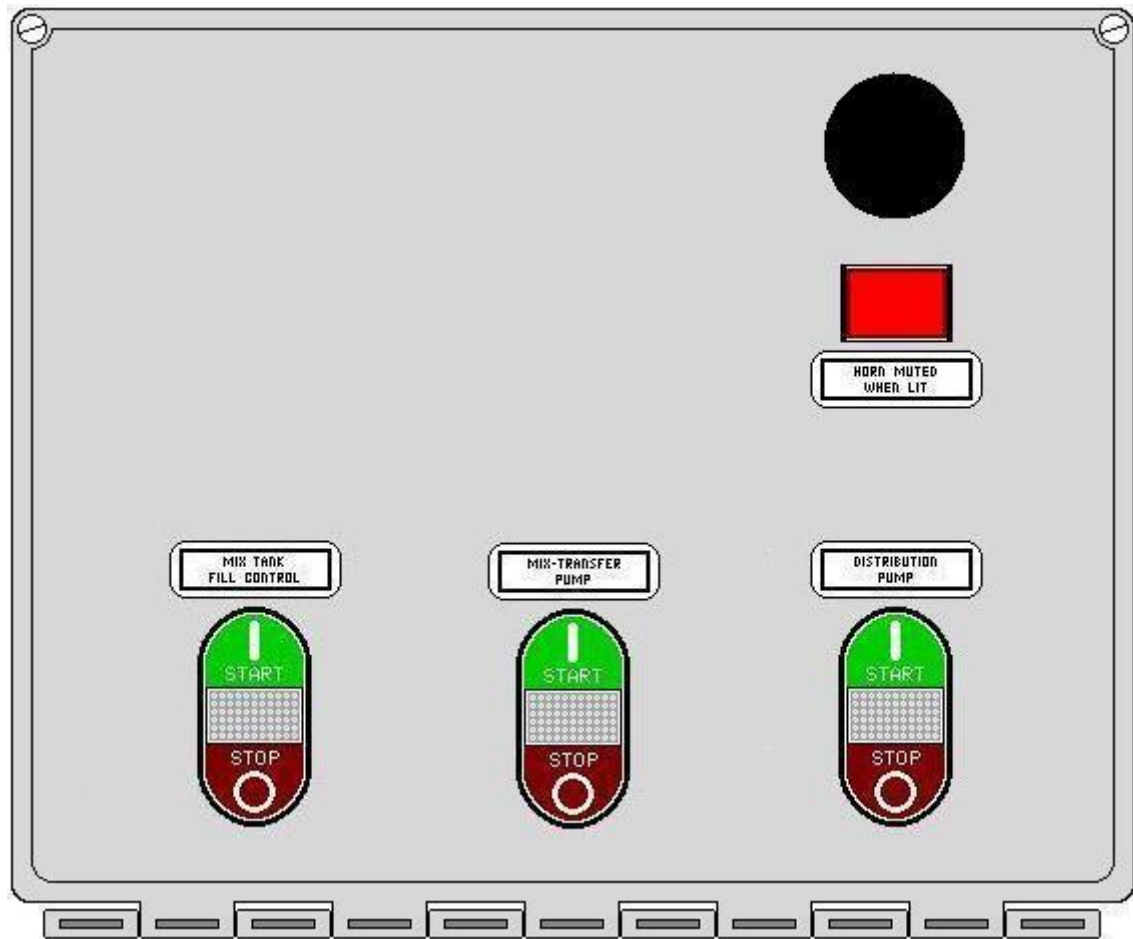


Figure 2.1 – Bicarb System Control Panel

1. **Mix Tank Fill Control:** Used to either start or stop the flow of pure water into the Mix Tank.
2. **Mix-Transfer Pump:** Used to either start or stop the Mix-Transfer Pump.
3. **Distribution Pump:** Used to either start or stop the distribution pump.
4. **Mute Button:** Used to mute audible alarms. Press button in to mute.
5. **Low Distribution Alarm:** Audible alarm.

NOTE: If there is an interruption or a fault to the system the pumps will be off, filling action stops, alarms are inactive, and the control panel is live. Manual action is required to restart the unit.

2.4.3 Tanks and Control Stand

There are two polyethylene tanks. One is designed for mixing the Bicarb powder (Mix Tank) and the other is designed for distributing the Bicarb solution (Distribution Tank). The Mix Tank, also known as the Make-up Tank, includes an eductor, which creates a swirling motion in order to properly dissolve the powder into solution. Each tank contains a spray ball. The spray ball is used for cleaning and disinfecting the tanks conveniently and effectively. Both tanks include a hinge-top lid with a vent filter.

The control stand is constructed of polyethylene. It is designed to hold the control panel and, main operating valves. There is an access panel in the front of the unit that can be removed to conduct repairs easily.

2.4.4 Pump Operation and Flow Sensors

There are two pumps on the Bicarb System. The Mix Pump is designed to mix bicarb powder and transfer the mixed solution to the Distribution Tank. The mix pump is on a timer that stops the mix pump after operating for 10 minutes. The Distribution Pump is designed to distribute the mixed solution to all points and return the solution back to the Distribution Tank.

The mix and distribution pumps are equipped with a separate flow sensor. The flow sensors are designed to sense liquid flowing through the pump. When liquid is not flowing, a signal is sent to turn the pump off. This is designed to reduce pump damage. The pumps may also turn on automatically without pressing the START button for the pump if a valve is open and liquid is present at the sensor.

2.4.5 Vent Filter

A vent filter is installed on the mix tank and distribution tank covers. The cartridge style vent filter inhibits dust or other debris from entering the tank.

2.4.6 System Floats

The system is equipped with three floats, one in the mix tank and two in the distribution tank. They operate as follows:

Mix Tank Float: The mix tank is equipped with a high level float that closes the fill valve if the water in the tank exceeds the maximum fill level. The fill valve controller will not reactivate unless the water level is below this float level. Open valve **V5** to drain excess water from the tank.

Distribution Tank Low Float: The distribution tank is equipped with a low level float that sounds a warning if the bicarb in the tank drops below 38 liters (10 gallons). The alarm is equipped with a mute (red button mounted on the main panel) that will silence the alarm or disengage it during cleaning operations. When the red light is lit, the alarm is muted. The distribution tank alarm can be muted during cleaning operations.

Distribution Tank High Float: The distribution tank is equipped with a high level float that stops any liquid transferring from the mix tank into the distribution tank if the level exceeds the maximum fill capacity.

2.5 Service Assistance

If service assistance is required, take the following steps:

1. Consult the “Trouble Shooting” section of this manual (Chapter 7.0). If the problem cannot be identified and corrected by any of the procedures found in that section, then . . .
2. Contact your Facility Equipment Technician. If the technician is unable to help, then . . .
3. Call Mar Cor Purification Technical Support Department at (800) 633-3080. Technicians are available for all calls between 7:00am and 7:00pm CST, Monday through Friday. Technicians are also available at other time for emergency calls only. Technicians will be on hand to discuss the problem with you and endeavor to rectify it over the phone. If the problem appears to be of a more serious nature, you will be given instructions regarding the action to be taken. Prior to making the phone call, you must be prepared to answer two questions.
 1. What model do you have?
 2. What is the serial number? (located on the front of the system)
4. In addition, for non-Emergency issues you may email techserv@mcpur.com and a technician will respond generally within one working day.

2.6 Symbols and Abbreviations

cc	Cubic centimeters
cfu/ml.	Colony Forming Units per Milliliter
E U	Endotoxin Units
ft	Foot (feet)
GHMT	Garden Hose Male Thread
GPM	Gallons Per Minute
lbs	Pounds
LPM	Liters Per Minute
NA	Not Applicable
NPT	National Pipe Thread
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
RO	Reverse Osmosis
VAC	Volts Alternating Current

2.7 Environmental and Storage Considerations

- 2.7.1 Operating Temperature Range: 35 to 100° F.
- 2.7.2 Operating Relative Humidity: 5% to 85%, no condensing.
- 2.7.3 Storage Temperature Range: 35 to 100° F.
- 2.7.4 Storage Relative Humidity: 5% to 85%, no condensing.

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CHAPTER THREE: INITIAL SYSTEM START-UP

WARNING: The Bicarb System and Bicarb Distribution Loop needs to be disinfected prior to being ready for patient use.

3.1 Bicarb System Set-Up

1. Place the Bicarb system into position and install the Inlet (product water), Drain, Bicarb Loop Return, and Bicarb Outlet (Refer to Section 2.3).
2. All valves should be in the **OFF** or closed position.
3. Plug in the system per the specifications (Refer to Section 2.1).
4. Confirm product water is available and flowing through the product water distribution piping system.
5. Proceed to Chapter 5.0 and follow instructions through Section 5.4.
6. After system disinfection, proceed to Chapter 4.0 for System Operation.

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CHAPTER FOUR: SYSTEM OPERATION

WARNING: If the Disinfecting Procedure was used prior to a new batch of bicarb being made, a residual test should be performed prior to the initiation of the mixing cycle (see the Rinse Procedure, Section 5.4, if necessary).

4.1 Bicarb Mixing

1. All valves should be in the **Off** or “closed” position.
2. Open the product water valve that feeds the bicarb system.
3. Determine the batch size that is required up to the maximum the tank will hold.
4. Press the **Mix-Tank Fill Control** START button to fill the tank to ½ the batch size or a minimum of 38 liters (10 gallons), then press the STOP button.

NOTE: Operator must watch tank level and must stop the filling process when the level is achieved.

5. Turn **V1** to **Mix** and **V2** to **Mix/Clean**. Make sure **V2** is not placed in the **Transfer** position.
6. Press the **Mix-Transfer Pump** START button (hold down until the light on the button illuminates and then release). The pump will begin circulating the water inside the Mix Tank. This activates the 10-minute mix timer so as to prevent over-mixing.
7. Open the Mix Tank lid and add a bag of powder slowly through the top of the Mix Tank.

CAUTION: If bicarb powder is added too fast, the pump may clog and could result in irreversible damage to the pump.

CAUTION: Be careful not to drop anything into the Mix Tank during this process.

8. Press the **Mix Tank Fill Control** START button again to add the balance of the water. Press the **Mix Tank Fill Control** STOP button when desired level is attained. The Mix-Transfer pump is still operating during this time.
9. While the Mix Tank is in fill and mix mode, slowly add any additional powder through the top of the Mix Tank to achieve the desired batch. Once completed, close and seal the tank lid.
10. Allow the contents to mix for at least 10 minutes. If additional time is required, press the **Mix Transfer Pump** START button, press the **Mix-Transfer Pump** STOP button at any time to halt the mixing action.
11. Once the mixing is complete, test the bicarbonate mixture per the manufacturers’ specifications through **TP3 (Mix Tank Test Valve)** as it should be clear and without sediment. If the mixture is too strong or too weak, dump the contents (Open **V5**) and remix another batch.

12. Once the mixture has been verified, press the **Mix-Transfer Pump** STOP button and turn **V1** and **V2** to the **OFF** position. Proceed to Section 4.2, Bicarb Transfer.

4.2 Bicarb Transfer

1. Turn **V2** to **Transfer**. **V1**, **V3**, and **V4** should be in the **Off** positions.
2. Press the **Mix-Transfer Pump** START button.
3. After the bicarb is fully transferred or if the amount of liquid exceeds the distribution tank's maximum fill capacity, the Mix-Transfer pump will shut down automatically.
4. Turn **V2** to the **Off** position.
5. The transfer is complete. Proceed to Section 4.3 or 4.6.

NOTE: This system is designed to allow solution to be transferred and distributed simultaneously. If this is required, **V3** must remain in the **Dist. Return** position when **V2** is set to **Transfer** (in step 1).

WARNING: Never disinfect the unit while dialyzing patients or possible harm could occur.

4.3 Bicarb Mix Tank Rinse

1. Empty any residue that is left in the Mix Tank after transfer by opening **V5**, then close.
2. Press the **Mix Tank Fill Control** START button and fill to a minimum of 38 liters (10 gallons). Press the **Mix Tank Fill Control** STOP button when level is achieved.
3. Turn **V1** to **Clean** and **V2** to **Mix/Clean**.
4. Press the **Mix-Transfer Pump** START button and rinse for 1 minute.
5. Turn **V1** to **Mix** and rinse for 1 minute.
6. Press the **Mix-Transfer Pump** STOP button and turn **V1** and **V2** to the **OFF** position.
7. Open **V5** to drain the bicarb Mix Tank.
8. Close **V5** when the tank is empty.

4.4 Jug Filling

NOTE: Bicarb distribution tank should have at least 38 liters (10 gallons) of bicarb in it as the jug fill works with gravity.

1. Turn **V3** to the **Off** position.
2. Using the jug fill hose, insert hose end into jug to be filled.
3. Insert quick connect end of jug filling hose assembly into the **JUG PORT** quick connect at the base of the distribution tank and bicarb solution will begin flowing.
4. Disconnect quick connect when jug is full.

NOTE: A valve may be installed on the end of the jug filling hose to stop the flow of bicarb.

4.5 Adding Water to Mix Tank

1. To add additional volume of water into the mix tank, press the **Mix Tank Fill Control** START button.
2. Press the **Mix Tank Fill Control** STOP button when desired amount is achieved.

4.6 Bicarb Distribution

CAUTION: If this is the first time the system has been used after a rinsing, the pure water from the bicarb loop must be purged out of the system to prevent the bicarb in the distribution tank from being diluted. If the bicarb solution is already present in the loop, proceed to step 7 in this section.

1. Close **V8** and open **V7** and place **V3** in the **Dist. Return** position. (This diverts the pure water in the pipe to drain).
2. Pump may start automatically. If not, press the **Distribution Pump** START button and allow to run for approximately 1-2 minutes and then test for the presence of bicarb at **TP1** (Test Port 1).
3. Once positive for bicarb, press the **Distribution Pump** STOP button to shut the pump off. If the pump doesn't stop, hold the STOP button for 5-10 seconds or turn **V3** to **Off**.
4. Repeat above steps 1 and 3 until bicarb is present at **TP1**. Purge each point-of-use to remove water from the piping connection. Place **V3** in the **OFF** position.
5. At this time, all pure water has been purged from the loop.
6. Close valve **V7** and open valve **V8**.
7. To begin distributing bicarb solution through the loop, be sure that **V8** is open and all other valves are closed.
8. Place valve **V3** in the **Dist. Return** position for loop distribution of the bicarb solution.
9. Pump may start automatically. If not, press the **Distribution Pump** START button to start the pump.
10. Bicarb is now circulating in the system and returning to the distribution tank. The bicarb system is ready to use at all points-of-use.
11. To stop distributing the bicarb solution, press the **Distribution Pump** STOP button and place valve **V3** in the **OFF** position.

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CHAPTER FIVE: SYSTEM CLEANING AND DISINFECTION

5.1 Introduction

NOTE: Disinfecting should be done every night after system operation unless proven documented results in accordance with customer's policies and procedures demonstrate otherwise so as to maintain bacteria and endotoxin levels that are in accordance with AAMI standards. It is recommended that the system be disinfected on a weekly basis.

For disinfecting, the recommended total contact time for the bicarb system is one (1) hour. This includes introducing the approved disinfecting agents (1% peracetic acid or household bleach 1% mixture by volume), recirculating the solution through the system, testing for positive presence at each point, dwell time, and rinsing. If less time (for example 30-45 minutes) is practiced and still maintains acceptable culture results than that can be used as an approved maintenance practice. However, if higher culture counts are noted than a change in the practice is required.

Mar Cor Purification recommends that the system be rinsed every night following normal system operation.

1. There are 3 basic steps to disinfecting the bicarb system:
 - a. STEP 1: System Pre-Rinse (Section 5.2) – designed to rinse bicarb from the system. This procedure should be done nightly after normal operation.
 - b. STEP 2: System Disinfecting (Section 5.3) – procedures for cleaning/disinfecting the bicarb system and distribution piping loop.
 - c. STEP 3: System Rinsing (Section 5.4) – procedures for rinsing out the cleaning/disinfecting solution in order to return the system to normal operation.

WARNING: System disinfecting should NOT be done while the bicarb system is in use for patients or possible harm could occur.

5.2 Bicarb System Pre-Rinse

1. Open valves **V5**, **V6**, and **V7** to drain to make sure that bicarb solution is drained from both tanks and loop. Valves **V1**, **V2**, **V3**, and **V4** should be in the **Off** position.
2. **System Pre-Rinse:** The bicarb system is equipped with a mix and distribution tank and loop RO water fast rinse. To rinse bicarb from the system:
 - a. Make sure valves **V5** and **V6**, the drain valves for both tanks, are open.
 - b. After the tanks are empty, close **V6**, **V7**, and make sure **V8** is open.

- c. Turn **V4** to **Mix Tank Rinse**.
- d. Rinse the Mix tank for approximately 5 minutes or until a negative result is achieved at **TP3**. To aid in the rinse process, turn **V4** to **Off** after 3 minutes and allow the solution that has accumulated inside the tank to completely drain. Once drained, turn **V4** to **Mix Tank Rinse** to continue rinse process.
- e. Once a negative result is achieved, close **V5** and **TP3** to allow 95 liters (25 gallons) to fill in the Mix tank.
- f. Turn **V4** to **Off**.
- g. Turn **V1** to **Mix** position and **V2** to **Mix/Clean** position.
- h. Press the **Mix-Transfer Pump** START button (hold until light on the button illuminates then release).
- i. Circulate the solution for approximately 3-5 minutes then press the **Mix-Transfer Pump** STOP button.
- j. Turn **V1** and **V2** to the **Off** position and open **V5** and **TP3** to drain the tank.
- k. Once drained, close **V5** and **TP3**.
- l. Turn **V4** to **Mix Tank Rinse** to add 95 liters (25 gallons) of water into the mix tank. While filling test for the absence of the bicarb solution at **TP3**.
- m. To verify that the bicarb solution has been rinsed through **V1 Mix** and **V2 Mix/Clean**, press the **Mix-Transfer Pump** START button and circulate for approximately 2 minutes. Press the **Mix-Transfer Pump** STOP button to turn off the pump. Test for the absence of bicarb or cleaning solution at **TP3**. If positive, drain tank and repeat steps "l-m". If clear, proceed to next step.
- n. Turn **V1** to **Clean** and turn **V2** to mix/clean. Press the **Mix-Transfer Pump** START button to circulate water through the spray nozzle for approximately 3-5 minutes.
- o. Open **TP3** to test the **Mix Tank Test Valve**. If positive, drain the tank and repeat steps "l-o". If clear, proceed to the next step.
- p. Press the **Mix-Transfer Pump** STOP button.
- q. Once the solution in the tank test negative, close **V5** and turn **V1** to **Off**.
- r. Turn **V4** to **Mix Tank Rinse** to add a total of 133 liters (35 gallons) of water into the Mix tank.
- s. Turn **V2** to **Transfer** and open **V6** to transfer and drain clean water through the transfer piping.
- t. Press the **Mix-Transfer Pump** START button to transfer 133 liters (35 gallons) to the distribution tank (the pump will shut-off automatically when transfer is complete). Once transfer is complete, close **V2**.
- u. Turn **V4** to **Loop Rinse** and **V3** to **Dist. Return** to rinse the loop back through the Distribution tank until no bicarb solution is at **TP1** and **TP2**. This step is time proportional to bicarb loop distance.

NOTE: The operator may have to slightly close **V8** to obtain flow through test port **TP1** and **TP2**.

- v. Turn **V3** to **Dist .Clean** and rinse for approximately 5 minutes.
- w. After that time and the tank is completely empty, close **V6** to allow 95 liters (25 gallons) to fill in the Distribution tank.
- x. Turn **V3** and **V4** to **Off**. Close **V8** and open **V7**. Connect the quick disconnect fitting at the **Jug Fill** port and run to drain. After 19 liters (5 gallons) have drained, test for the absence of bicarb solution. If positive, drain the tank and repeat steps “v-x”. If clear, proceed to the next step.
- y. Turn **V3** to **Dist. Return** and press the **Distribution Pump** START button to distribute the water in the Distribution tank to drain through **V7**. Test at **TP1** and **TP2** to verify the absence of the bicarb or cleaning solution. If positive after the tank is empty, repeat steps “v-y”. If clear, open **V6** to aid in the rinse process then proceed to the next step.

NOTE: The low-level tank alarm will sound when the level drains down. Press the mute button to silence the alarm. When the tank is empty, the distribution pump will automatically shut off. Press the mute button again to restore the low-level alarm.

- z. Open valve **V8**. Close **V7**.
- aa. Turn **V4** to **Loop Rinse** and **V3** to **Dist. Return** to rinse the loop until RO water is present at **TP1** and **TP2**. While rinsing, test all stations to determine that bicarb solution is negative in the bicarb distribution loop.
- bb. Once negative results are confirmed, turn **V4** and **V3** to **Off** and close **V6**. If any tests are positive, repeat steps “aa” until **all points** on the bicarb distribution loop test for the **absence** of bicarb or cleaning solution.
- cc. The system has now been thoroughly rinsed. The unit is now ready for normal operation.

5.3 Bicarb System Disinfecting

1. Determine the Disinfecting batch size that is required up to the maximum the tank will hold. **Batch size** is based on the following parameters:
 - a. The disinfecting agent solution strength. See Chapter 6.0 for specifications on disinfecting agents.
 - b. Enough water to disinfect both tanks at one time. Minimum recommended is 95 liters (25 gallons).
2. Press the **Mix Tank Fill Control** START button to fill the tank to the desired level.
3. After the tank fills to the desired level, turn **V1** to **Mix** and **V2** to **Mix/Clean**.
4. Press the **Mix-Transfer Pump** START button (hold button for 5-10 seconds).

WARNING: Wear gloves, eye protection and protective clothing as required.

WARNING: Place a label on the Bicarb system stating "WARNING DO NOT USE".

5. The water in the mix tank will begin to circulate. Add the disinfecting solution slowly through the top of the bicarb mix tank.
6. Mix for approximately 2 minutes and then test solution per manufacturer's specifications through **TP3**. Note: If the pump shuts off, restart accordingly.
7. If mixture is correct, turn **V1** to **Clean** and press the **Mix Transfer Pump** START button to circulate the solution through the spray nozzle for approximately 5 minutes. If the mixture is not correct, add more water or disinfectant accordingly.
8. Open valve **TP3** to disinfect the **Mix Tank Test Valve**, draining approximately 4 liters (1 gallon) into a bucket or drain.
9. Once completed, press the **Mix-Transfer Pump** STOP button (hold for 5-10 seconds).
10. Turn **V1** to **Off** and **V2** to **Transfer**.
11. Pump may start automatically. If not, press the **Mix-Transfer Pump** START button (hold for 5-10 seconds) and transfer approximately 57 liters (15 gallons) of the solution to the Distribution Tank. Watching the level, press the **Mix-Transfer Pump** STOP button when approximately 57 liters (15 gallons) of the solution has been transferred (hold button for 5-10 seconds).
12. **Loop Purging:** To prevent diluting the disinfecting solution in the distribution tank, the RO rinse water must be purged out of the system.
 - a. Open **V7** and close **V8** (This diverts the RO water in the loop to drain).

- b. Turn **V3** to the **Dist. Return** position (pump may start automatically). If not, press the **Distribution Pump** START button (hold for 5-10 seconds) and allow it to run for approximately 30-60 seconds to test for the presence of the solution at **TP1** and **TP2**. This step is time proportional to the bicarb loop length.

NOTE: Operator may have to slightly close **V7** to obtain a steady flow through test port **TP1**.

- c. Continue steps “b-c” above until disinfecting solution is present at **TP1** and **TP2**.
 - d. Press the **Distribution Pump** STOP button (hold for 5-10 seconds) and turn valve **V3** to **OFF**.
 - e. Close valve **V7** and open valve **V8**.
13. Turn **V3** to **Dist. Return** and press the **Distribution Pump** START button (hold for 5-10 seconds).
 14. Circulate the disinfecting solution for approximately 5 minutes.
 15. Insert quick disconnect end of jug filling hose into the **Jug Port** at the base of the Distribution tank and drain approximately 4 liters (1 gallon) of solution into a bucket or drain and test for the presence of the solution.
 16. Test **ALL** points-of-use for the presence of the disinfecting solution. (Note: At this time if more disinfecting solution is required, transfer the remaining solution in the Mix tank over to the Distribution tank.)
 17. Once each point-of-use has tested positive for the solution, turn **V3** to **Dist. Clean** and circulate solution through spray nozzle in the Distribution tank.
 18. Circulate the disinfecting solution for approximately 10 minutes.
 19. Press the **Distribution Pump** STOP button to turn off the pump.
 20. Turn valves **V1**, **V2**, **V3**, and **V4** to the **Off** position.
 21. system is now dwelling in a disinfectant solution. **The recommended total contact time is one (1) hour.** Contact time begins at the time the disinfecting solution was introduced into the system. After the recommended time proceed to Section 5.4.

5.4 Bicarb System Disinfectant Rinsing

WARNING: Keep all warning labels in place until final rinse steps are completed. Use appropriate residual test to verify absence of disinfectant. Wear all necessary protective gear.

1. Open valves **V5**, **V6** and **V7** to make sure that the disinfecting solution is drained from both tanks and the loop. Valves **V1**, **V2**, **V3** and **V4** should be in the **Off** position.

2. **System Rinse:** The bicarb system is equipped with a mix tank and loop RO water fast rinse. To rinse disinfectant solution from the system:
- a. Make sure valves **V5** and **V6**, the drain valves for both tanks, are open.
 - b. After the tanks are empty, close **V6**, **V7** and make sure **V8** is open.
 - c. Turn **V4** to **Mix Tank Rinse**.
 - d. Rinse the Mix tank for approximately 5 minutes or until a negative result is achieved at **TP3**. To aid in the rinse process, turn **V4** to **Off** after 3 minutes and allow the solution that has accumulated inside the tank to completely drain. Once drained, turn **V4** to **Mix Tank Rinse** to continue rinse process.
 - e. Once a negative result is achieved, close **V5** and **TP3** to allow 95 liters (25 gallons) to fill in the Mix tank.
 - f. Turn **V4** to **Off**.
 - g. Turn **V1** to **Mix** position and **V2** to **Mix/Clean** position.
 - h. Press **Mix-Transfer Pump** START button (hold until light lights up) circulate for 3-5 minutes.
 - i. Press the mix transfer pump STOP button. Open **V5** and **TP3** to drain tank.
 - j. Turn **V4** to **Mix Tank Rinse** to add 95 liters (25 gallons) of water into the Mix tank. While filling test for the absence of the disinfecting solution at **TP3**. Once negative, close V5.
 - k. To verify that the disinfecting solution has been rinsed through **V1 Mix** and **V2 Mix/Clean**, press the **Mix-Transfer Pump** START button and circulate for approximately 2 minutes. Press the **Mix-Transfer Pump** STOP button to turn off the pump. Test for the absence of disinfecting solution at **TP3**. If positive, drain the tank and repeat steps “j-k”. If clear, proceed to the next step.
 - l. Turn **V1** to **Clean** and V2 to mix/clean. Press the **Mix-Transfer Pump** START button to circulate water through the spray nozzle for approximately 3-5 minutes
 - m. Open **TP3** to test the **Mix Tank Test Valve**. If positive, drain the tank and repeat steps “j-l”. If clear, proceed to the next step.
 - n. Press the **Mix-Transfer Pump** STOP button.
 - o. Once the solution in tank tests negative, close **V5** and turn **V1** to **Off**.
 - p. Turn **V4** to **Mix Tank Rinse** to add 133 liters (35 gallons) of water into the Mix tank.
 - q. Turn **V2** to **Transfer** and open **V6** to transfer and drain clean water through the transfer piping.
 - r. Press the **Mix-Transfer Pump** START button to transfer 133 liters (35 gallons) to the distribution tank (the pump will shut-off automatically when transfer is complete). Once transfer is complete, close **V2**.
 - s. Turn **V4** to **Loop Rinse** and **V3** to **Dist. Return** to rinse the loop back through the Distribution tank until a negative result is achieved at **TP1** and **TP2**. This step is time proportional to bicarb loop distance.

NOTE: Operator may have to slightly close **V8** to obtain flow through test port **TP1**.

- t. Turn **V3** to **Dist .Clean** and rinse for approximately 5 minutes. Test at **TP2** to verify a negative result.
- u. After that time and the tank is completely empty, close **V6** to allow 95 liters (25 gallons) to fill in the Distribution tank.
- v. Turn **V3** and **V4** to **Off**. Close **V8** and open **V7**. Connect the quick disconnect fitting at the **Jug Fill** port and run to drain. After 19 liters (5 gallons) have drained, test for a negative result. If positive, drain the tank and repeat steps “t-v”. If clear, proceed to the next step.
- w. Turn **V3** to **Dist. Return** and press the **Distribution Pump** START button to distribute the water in the Distribution tank to drain through **V7**. Test at **TP1** and **TP2** to verify the absence of the cleaning solution. If positive after the tank is empty, repeat steps “t-w”. If clear, open **V6** to aid in the rinse process then proceed to the next step.

NOTE: The low-level tank alarm will sound when the level drains down. Press the mute button to silence the alarm. When the tank is empty, the distribution pump will automatically shut off. Press the mute button again to restore the low-level alarm.

- x. Open **V8**. Close **V7**.
- y. Turn **V4** to **Loop Rinse** and **V3** to **Dist. Return** to rinse the loop until RO water is present at **TP1**. While rinsing, test all points-of-use to determine that disinfecting solution is negative in the bicarb distribution loop.
- z. Once negative results are confirmed, turn **V4** and **V3** to **Off** and close **V6**. If any tests are positive, repeat steps “y” until **all points** on the bicarb distribution loop test for the **absence** of disinfecting solution.
- aa. Record date, time, and initials of operator on the log sheet.
- bb. The system has now been disinfected and rinsed thoroughly. Remove all warning labels. The unit is now ready for normal operation.

Notes:

CHAPTER SIX: SYSTEM MAINTENANCE

6.1 Bicarb Components

1. Pumps - The pumps are 1/5 hp, 1/2 hp, or 3/4 hp, Totally Enclosed Fan Cooled (TEFC) motors and require no maintenance.

<p>CAUTION: The mix and distribution pumps must be kept clean to assure long life with minimal interruptions. We recommend the use of vinegar or citric acid in both pumps on a quarterly basis to keep bicarb from calcifying in the pump heads and flow switches.</p>
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2. Inspect the unit's hoses, fittings, and PVC pipes every week for leaks or damage. Replace as needed. The spare part numbers for the hoses and fittings can be found in Section 8 of this manual. Contact Mar Cor's Technical Service Department for assistance.
3. System Disinfecting - Disinfection should be done with agents that meet the following criteria:
 - a. Peracetic Acid - Per manufacture's specifications (1% Minncare is standard and recommended).
 - b. Bleach, Household - 1% mixture (By Volume).
4. Check the Bicarb Vent Filter monthly for the presence of moisture. Remove the filter and shake it with a downward motion causing any water to be expelled. Replace the vent filter if any water is expelled.
5. Check the Bicarb tank manway lid for cracks or degradation. Replace if necessary.

Chemical Mix Table

Disinfectant	QTY	%		Decalcifier	QTY	%
Bleach (Household)	0.95 Liters or 32 ounces	1%		Acetic Acid	4.73 Liters or 1.25 Gallons	5%
Peracetic Acid (Minnicare)	0.95 Liters or 32 ounces	1%		Citric Acid	4.73 liters or 1.25 Gallons	5%
<p>(NOTE:) Add quantities listed to 95 liters (25 gallons) of water.</p> <p>WARNING: DO NOT MIX CHEMICALS TOGETHER</p>						

6.2 Schedule

1. Daily Maintenance. The Bicarb System should be rinsed every evening after the final patient shift. See Section 5.1.
2. Weekly Maintenance. The Bicarb System should be rinsed and disinfected after the final patient shift, see Section 5.1. The unit must then be rinsed of the disinfectant and have a negative result. Inspect the system for leaks or damage. Repair as necessary.
3. Monthly Maintenance. Bacterial monitoring should be performed on a monthly basis once the initial cultures have been performed on the system. After disinfection and rinse, the bacteria samples should be retaken and tested accordingly. Follow clinics procedures as required.
4. Quarterly Maintenance. The Bicarb system should be decalcified. Acetic acid (e.g. vinegar) or citric acid is an acceptable solution. This may need to be performed more often depending upon precipitation formation.
5. Yearly Maintenance. The vent filters should be replaced once a year.

CHAPTER SEVEN: SYSTEM TROUBLESHOOTING**7.1 Mix Pump or Distribution Pump**

1. Pump Noisy
 - a. Verify fluid availability.
 - b. Verify the flow switch is working properly.
 - c. Ensure proper ball valve orientation. Pump will not run without flow.
 - d. Replace pump.
2. Pump Does Not Run
 - a. Verify fluid availability.
 - b. Make sure the unit is plugged in with power to the outlet.
 - c. Verify the flow switch is working properly.
 - d. Blown fuse, replace fuse
 - e. Faulty pump, replace pump
3. Pump Does Not Shut-Off or Re-Starts After Off Button Is Pressed
 - a. Hold down STOP button longer, pump is still sensing flow through the unit.
 - b. Turn Off the appropriate ball valve (V1 or V2 for the Mix pump, V3 for the Distribution Pump).
 - c. Verify the flow switch is working properly.
 - d. Clean or replace flow switch.

7.2 System Flow

1. No Flow to Stations
 - a. Verify proper valve orientation.
 - b. Verify actual supply fluid level.
 - c. Adjust the diaphragm valve as necessary.
 - d. Verify the flow switch is working properly.
 - e. Refer to Section 7.1.
2. System Transfer Does Not Occur
 - a. Verify proper valve orientation.
 - b. Verify transfer check valve works properly.
 - c. Refer to Section 7.1.
3. Pumps Start Automatically
 - a. This will occur if V1, V2 and V3 are not in the OFF position, pump is sensing flow from gravity.
 - b. Hold down STOP button for the corresponding pump until flow stops.
 - c. Verify proper valve orientation.
 - d. Refer to Section 7.1.3.

4. No Bicarb Flow From Jug Port
 - a. The jug fill works with gravity pressure. There needs to be a minimum of 38 liters (10 gallons) in the distribution tank.
 - b. Verify proper connection of fittings.

7.3 Flow Switch

1. No Pump Operation
 - a. Verify actual fluid level.
 - b. Verify valve positions.
 - c. Check wiring connections.
 - d. Remove switch, clean and reinstall.
 - e. Replace switch.

7.4 Fill Solenoid Valve

1. Valve Fails to Close
 - a. Check wiring connections.
 - b. Disassemble and clean.
 - c. Replace valve.
2. Valve Fails to Open
 - a. Check to make sure purified water is turned on to the unit.
 - b. Check wiring connections.
 - c. Replace valve.

CHAPTER EIGHT: SPARE PARTS & SUPPLIES

Supplies and replacement parts are available from Mar Cor Purification by calling 1-800-633-3080. Replacement parts can be ordered by referring to the system diagram. Suggested spare parts are highlighted with an asterisk.

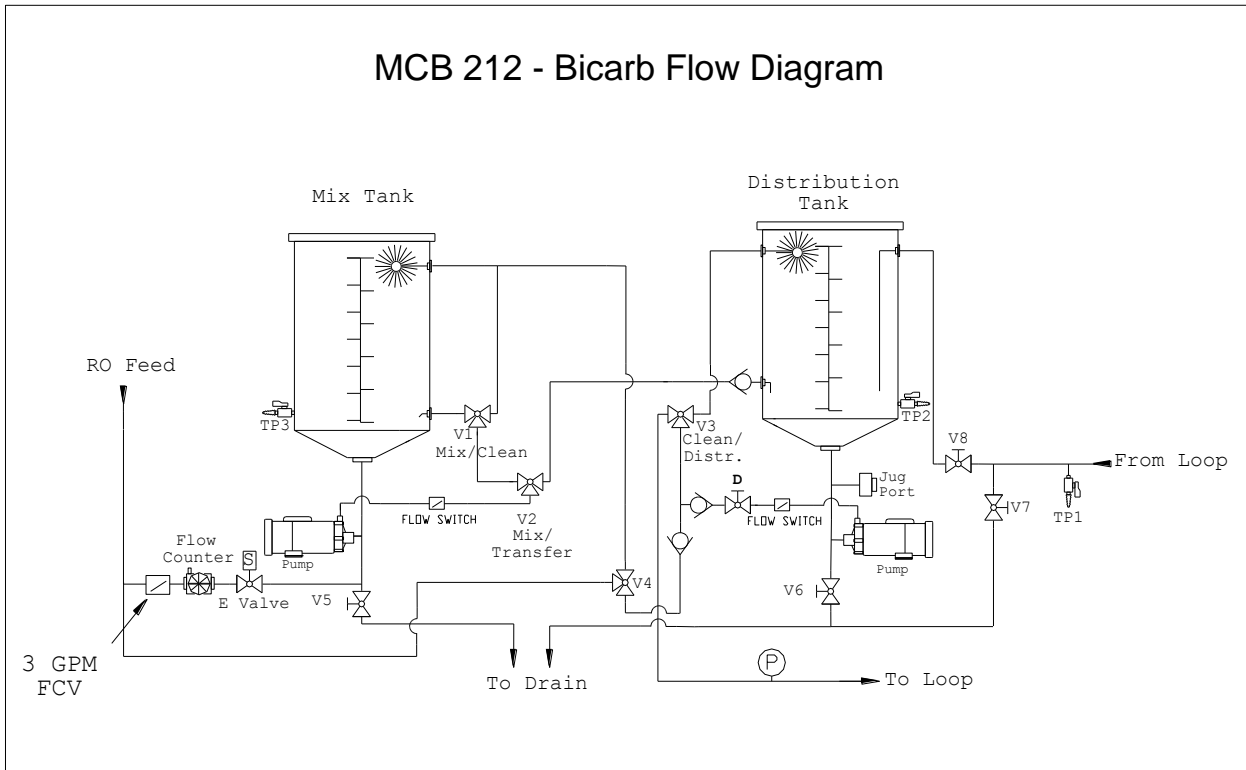
Spare Parts List:

Description	Part Number
3/4" 3 way true union valve, PVC (type 23)	425-05-162
Mix tank flow sensor, 2 gpm*	313-05-002
Distribution tank flow sensor, 0.1 gpm	313-08-162
Flow control nipple, PVC, 3 gpm	425-27-239
Tank mount level switch	314-01-003
Distribution pump/motor, 1/5 HP	028-05-002
Mix pump/motor, 3/4 HP (100 gallon tank)	028-07-001
Mix pump/motor, 1/2 HP (50 gallon tank)	028-06-002
Distribution pump only, less motor*	028-83-172
Mix pump only, less motor* (100 gallon tank)	028-83-176
Mix pump only, less motor* (50 gallon tank)	028-83-174
3/4" NPT x 3/4 MGH Dixon	350-11-004
1" hose clamp	348-10-016
3/4" Hose, Grey, High Purity	1228208
Labcock test port valve, PVC	425-06-103
0-30 SS pressure gauge	300-04-101
3/4" Diaphragm Valve	425-18-102
3/4" Click, support bracket	345-76-032
QDC In-Line Hose Barb Body, 1/2", w/shutoff	347-41-105
QDC Male Pipe Thread Insert, 1/2" w/shutoff	347-43-005
1/2" braided hose, clear	355-02-008
3/4" Inlet Solenoid Valve, 24V	ME41164
Fuse, pump*	250-13-537
Fuse, pump*	250-13-539
Fuse, pump*	250-13-534
Minnicare 400 Cold Sterilant, 4 x1 gal., case	176-01-001
Minnicare 1% test strips	185-40-005
Minnicare residual test strips	185-40-004
90° PVC Test Port	3027001
Filter, 5 Micron, Tank Cover*	ME41383
O-Ring, 16" Dia. EPDM	1236603

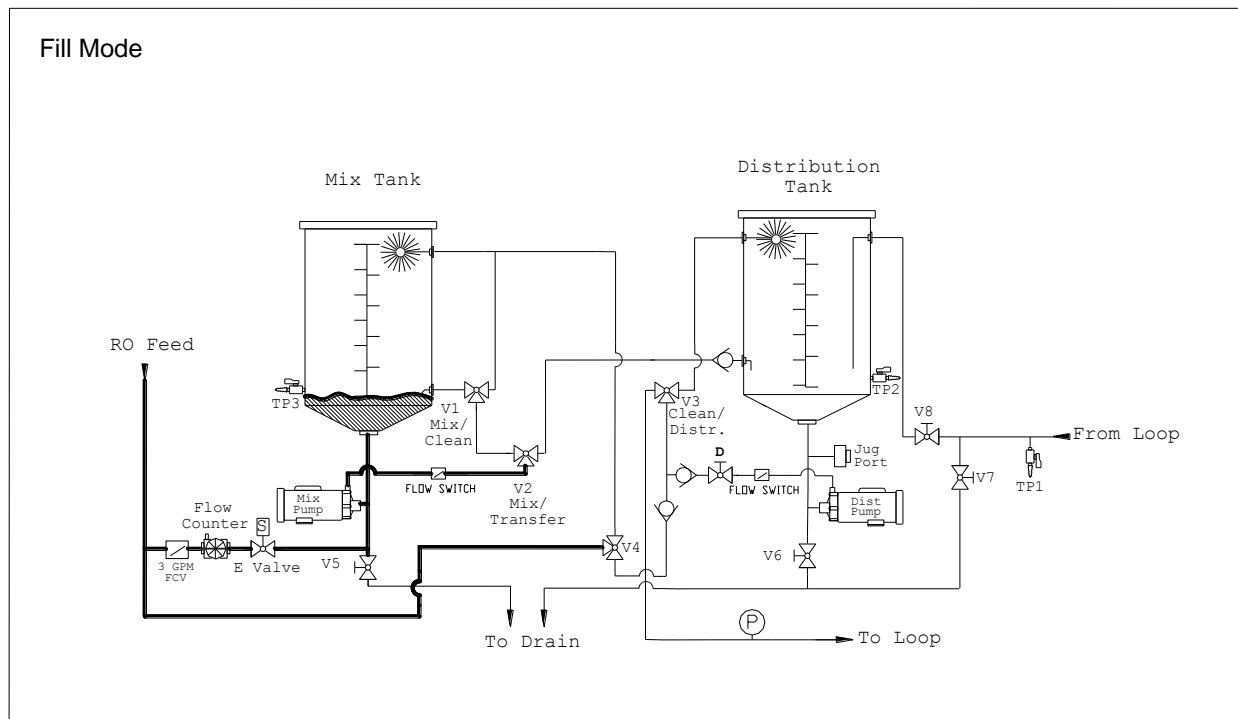
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CHAPTER NINE: DRAWINGS

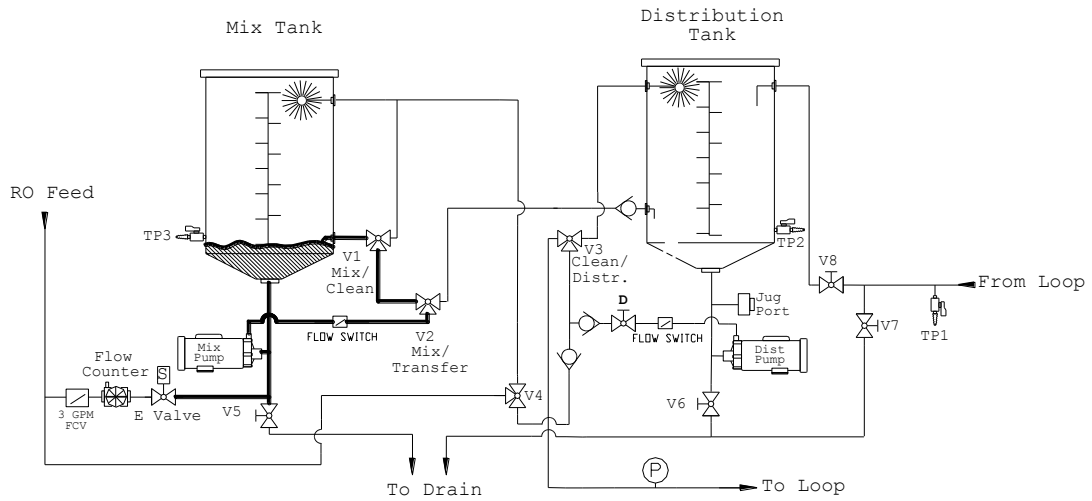
MCB 212 - Bicarb Flow Diagram



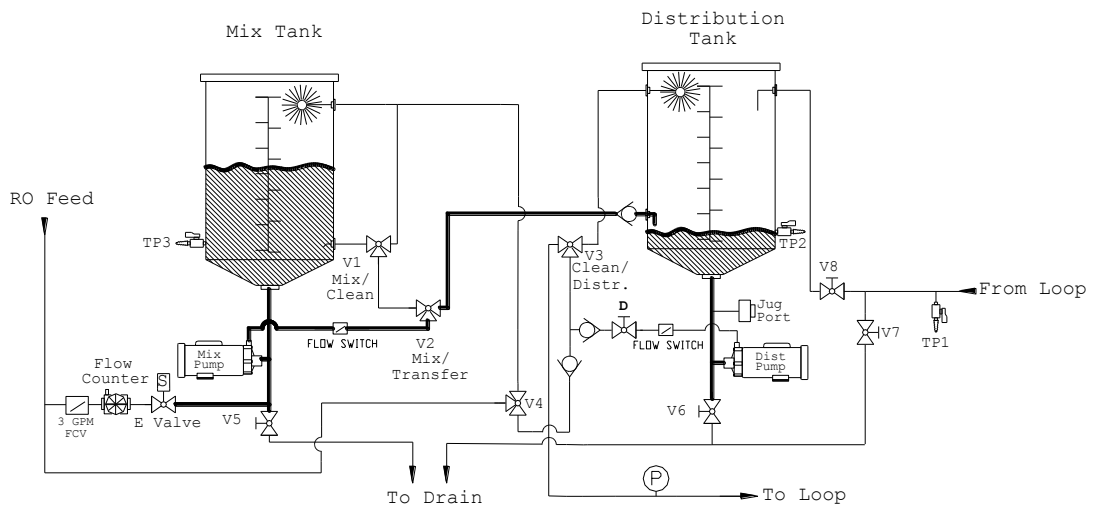
Fill Mode



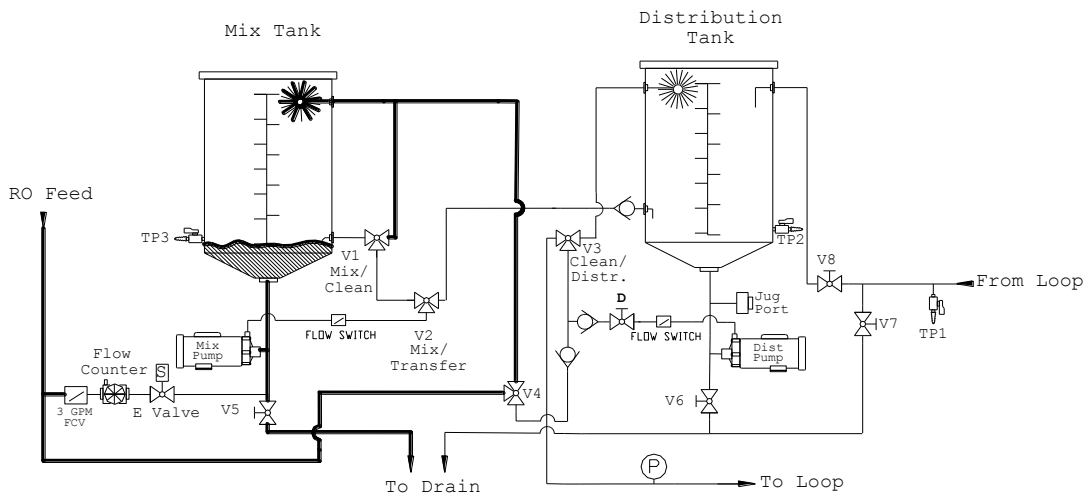
Mix Mode



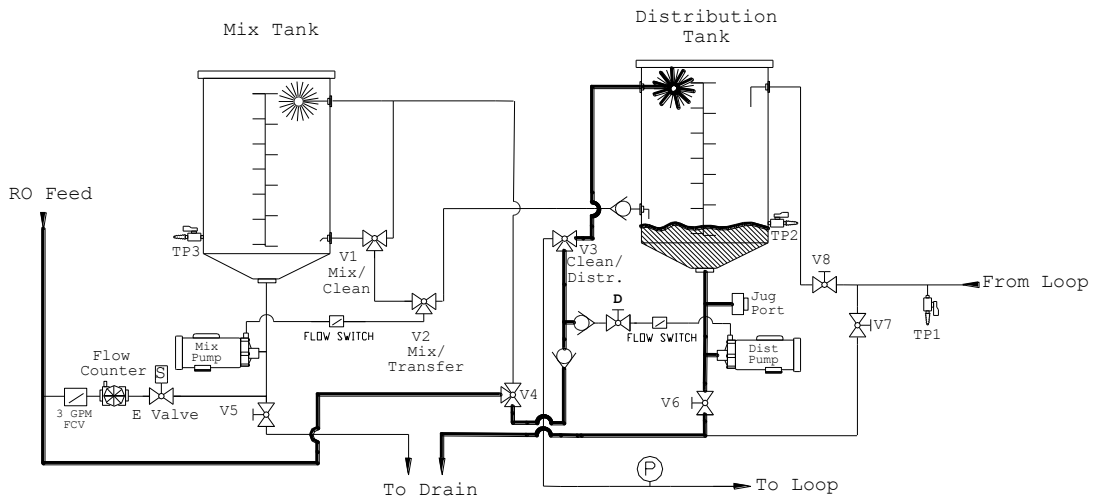
Transfer Mode



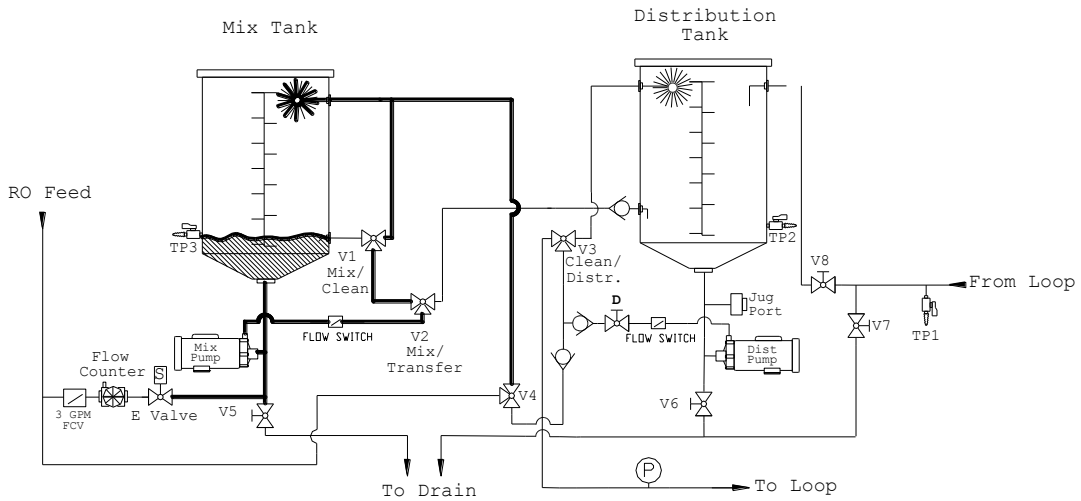
Mix Tank Rinse Mode



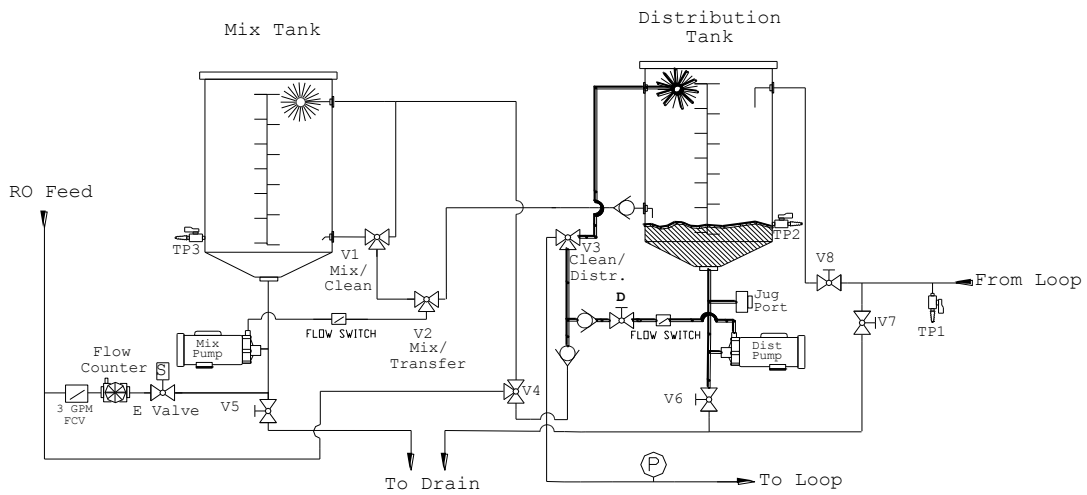
Distribution Tank Rinse Mode



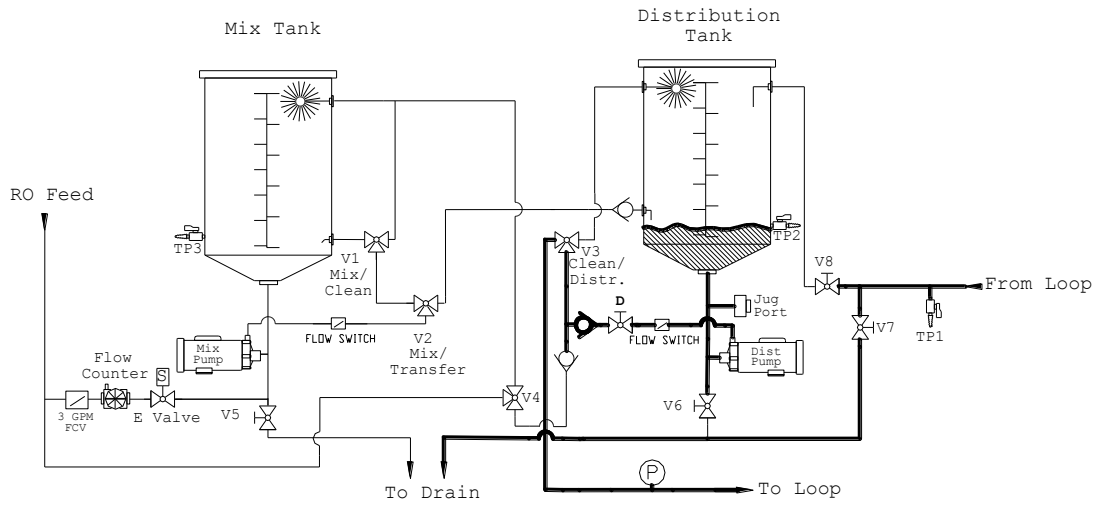
Mix Tank Disinfect Mode



Distribution Tank Disinfect Mode



Loop Rinse Mode



Notes:

Call **(800) 633-3080** for additional information or visit www.mcpur.com.



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