

**IT IS UNSAFE TO START USING THIS DEVICE
WITHOUT FIRST READING AND UNDERSTANDING
THIS MANUAL IN ITS ENTIRETY**

OPERATOR'S INSTRUCTIONS

FOR

**CENTRAL BI-CARB MIXING
AND DELIVERY UNITS**

**Used For
HEMODIALYSIS**

**IMPORTANT DOCUMENT
PLEASE SAFEGUARD**

**Sept. 6, 2007
(BICBmanJ.doc)**



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Better Water, Inc.
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USER ASSISTANCE INFORMATION

Assistance is available: Monday through Friday (excluding holidays),
7:30 am to 4:00 pm Central Time.

Call: 615-355-6063

And follow the telephone prompts.

EMERGENCY assistance is available after normal operating hours
(including holidays). **BEFORE** calling for emergency assistance, please:

- Check** the operator's trouble-shooting guide.
- Check** the electrical power connections, fuses, and/or circuit breakers.
- Check** all valves to insure each is in the correct position.

If this fails to correct the problem **AND AN EMERGENCY
HEMODIALYSIS TREATMENT SITUATION EXISTS,**

Call: 615-355-6063

(You will enter the directory of on call cell phone numbers, please copy all
numbers, and then call the most appropriate number to handle your
emergency).



WARNINGS and CAUTIONS

WARNING: It is unsafe to operate the BI-CARB system without first reading and understanding the entire Operator's Instruction Manual.

WARNING: Misuse, improper operation, and/or improper monitoring of this system could result in serious injury, death, or other serious reactions to patients undergoing hemodialysis treatment.

CAUTION: When used as a medical device, Federal law restricts this device to sale by or on the order of a physician

NOTE: Where water is mentioned, it must be AAMI standard quality water.



INTRODUCTION

Your Better Water, Inc. Bi-Carb system is of the utmost quality. With proper care, preventative maintenance, and proper use, the Bi-Carb system will provide you with a very effective means of mixing the bicarbonate solution for your dialysis treatments.

Before you start using this Bi-Carb system, you **must** read and thoroughly understand this **entire** manual of Operator Instructions.

This manual describes in great detail all of the steps and procedures required to **safely** utilize the Bi-Carb system.

It is **unsafe** to use this system without a basic understanding of how this system operates, and a thorough understanding of this manual.

Once the Bi-Carb system has been delivered to you, it is the responsibility of the **Medical Director** to ensure that the system is used, monitored, and maintained in such a manner so as to satisfy all applicable standards.



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DESCRIPTION

The Bi-Carb system consists of two equally sized tanks. The two tanks are constructed entirely of polyethylene, and are not susceptible to corrosion. The units are plumbed together in a fashion which allows the system to be used in any number of combinations. Such as mixing in the #1 tank, while running off of the #2 tank. The user will fill the tanks with the appropriate amount of dialysis water (AAMI standard quality water) as indicated by the marks on the side of the tank for whatever amount of Bi-Carb they are going to mix. They will then turn the switch on the control panel to whatever mixer correlates to the particular tank they wish to mix first. After the solution is mixed and verified by whatever means the clinic has instituted as policy, it is now ready to re-circulate.

The solution is distributed through the loop with a magnetically driven pump and is flow switch protected to ensure it never runs dry or is deadheaded. After ensuring the valves are in the appropriate position, hold down on the red "**PUMP START**" button until the green light will stay on without having to hold in the button. The solution is now re-circulating.

When the solution is drawn down to approximately 10 gallons of solution left in the tank, an audible alarm will sound indicating that the tank is almost empty. Although not recommended the alarm can be muted by placing the switch in the "**OFF**" position. (It is important to remember to return the Mute Switch back in Alarm Position to properly monitor the fluid level in the tank)

The system is equipped with sample ports pre and post Bi-Carb distribution loop for easy sampling. It is also equipped with a water distribution hook-up for easy tank rinse-down and/or area clean-up.



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BI-CARB MIXERS

The mixers supplied with the Bi-Carb system are a 1/4 hp, 115VAC motor, equipped with a 316 stainless steel shaft and coupling, and three polypropylene propellers.

ADJUSTING THE PROPELLERS

The propellers on the mixer shafts are pre-set at the factory to proper positions, and normally will not need to be adjusted. To move the propellers on the shaft, simply loosen the set screw located in the side of each propeller, and slide it (propeller) to the desired location on the shaft.

NOTE: The propellers will be hard to move on the shaft, as it is an extremely close tolerance fit.

MIXER OPERATION

To turn on a mixer, simply turn the “**MIXER CONTROL**” switch to whichever mixer you wish to operate, and the mixer will immediately start.

The mixers are wired through a time-delay relay that automatically turns the mixers off after a specific time, which is determined by the relay setting.

MIXER TIME ADJUSTMENT

The timers for the mixers are incorporated into the Smart Relay that controls all functions of the unit and are preset from the factory at 10 minutes (each mixer). These times are not user adjustable.

If you desire a mixing time other than 10 minutes, a different control chip needs to be installed in the Smart Relay.

These optional preprogrammed control chips (with other mixing times) are available and can be ordered from the factory.

Please call (615) 355-6063 for more information



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HIGH LEVEL SHUT-OFF

The High-Level Shut-Off is an option designed to prevent the overflowing of the tanks when filling. You can over-ride the operation of this switch during disinfect procedures.

The High Level Shut-Off consists of float switches, a 24vac solenoid valve, a “**TANK FILL**” switch, and a “**DISINFECT**” key switch.

FLOAT SWITCHES

The float switches are located on the back of the tanks and when activated will stop the filling of the tanks prior to overflowing.

24vac SOLENOID VALVE

The 24vac solenoid valve is located prior to the 3-way fill valve.

TANK FILL SWITCH

The Tank Fill Switch is located on the front of the main control box, and is labeled: “**TANK 1-OFF-TANK 2**”. This Switch will be turned to the appropriate tank to be filled. When not in use, it should be in the “**OFF**” position.

DISINFECT KEY SWITCH

The “**DISINFECT**” switch is a 2 position key switch, located on the front of the main control box and is labeled: “**OFF-ON**”. This switch will be left in the “**OFF**” position during normal operation.

When in the “**ON**” position, the floats will be over-ridden, so the operator can fill the tank to its capacity for disinfect and rinsing.



OPERATION OF THE HIGH LEVEL SHUT-OFF

TO FILL TANKS

With the “*DISINFECT*” key switch in “*OFF*” position, turn the “*TANK FILL*” switch to desired tank to be filled, turn the 3-way fill valve (valve **B4/B5**) to the desired tank to be filled and continue with normal filling procedures.

NOTE: You must still turn off the fill valve when tank is filled to desired amount. If water tank being filled exceeds desired amount of water, open the corresponding drain valve to that tank and drain until desired amount of water is achieved.

DISINFECT

During disinfect procedures, turn the “*DISINFECT*” key switch to “*ON*”, and continue with normal disinfect procedures. When disinfect is completed, turn the key switch back to “*OFF*”

NOTE: The float switches are over-ridden when in the “*ON*” position, so it is important to pay close attention to water level in the tanks to prevent overflowing.



MIXING BI-CARB SOLUTION IN THE #1 TANK

NOTE: Before mixing, make sure that the tank is empty and clean! (Low Level Tank Alarms should be turned to “**OFF**” position) Make sure to follow bicarbonate powder manufacturer’s instructions for mixing ratios. **DO NOT OPEN BAGS OVER THE OPEN TANK** (torn pieces of the bag and debris can fall into the tank and cause damage to the pump)

1. Close return valve **B6**.
2. Close tank #1 service valve **B11**.
3. Close tank #1 drain valve **B13**.
4. Slowly open the dialysis water (AAMI standard quality water) fill valve **B4**, and fill the tanks with the desired amount of water.

NOTE: When opening this valve, monitor the distribution water loop pressure gauge to ensure that the loop pressure **DOES NOT FALL BELOW 50 PSI** when dialyzing patients, due to the dialysis machines going into a low pressure alarm. Opening the valve without paying close attention to this pressure can cause an immediate loss in distribution water loop pressure.

5. Turn the “**MIXER CONTROL**” knob on the control panel to the “**#1**” position.
6. Open the lid to the #1 tank and pour in the appropriate amount of bicarbonate powder into the tank. Ensure that the mixer is operating before pouring in the powder.
7. After the mixer automatically turns off, turn the switch back to the “**OFF**” position.
8. Once the solution is mixed and the distribution pump has been started, always verify that the solution is properly mixed by testing at sample port valve **B17** located at the front of the Bi-Carb unit. Since this valve is located on the loop return, this is what the patient is actually receiving.

CAUTION: The MAXIMUM storage time for the Bi-carbonate solution is 24 hours! (Circulating)



MIXING BI-CARB SOLUTION IN THE #2 TANK

NOTE: Before mixing, make sure that the tank is empty and clean! (Low Level Tank Alarms should be turned to “**OFF**” position) Make sure to follow bicarbonate powder manufacturer’s instructions for mixing ratios. **DO NOT OPEN BAGS OVER THE OPEN TANK** (torn pieces of the bag and debris can fall into the tank and cause damage to the pump)

1. Close return valve **B7**.
2. Close tank #2 service valve **B12**.
3. Close tank #2 drain valve **B14**.
4. Slowly open the dialysis water (AAMI standard quality water) fill valve **B5**, and fill the tanks with the desired amount of water.

NOTE: When opening this valve, monitor the distribution water loop pressure gauge to ensure that the loop pressure **DOES NOT FALL BELOW 50 PSI** when dialyzing patients, due to the dialysis machines going into a low pressure alarm. Opening the valve without paying close attention to this pressure can cause an immediate loss in distribution water loop pressure.

5. Turn the “**MIXER CONTROL**” knob on the control panel to the “**#2**” position.
6. Open the lid to the #2 tank and pour in the appropriate amount of bicarbonate powder into the tank. Ensure that the mixer is operating before pouring in the powder.
7. After the mixer automatically turns off, turn the switch back to the “**OFF**” position.
8. Once the solution is mixed and the distribution pump has been started, always verify that the solution is properly mixed by testing at sample port valve **B17** located at the front of the Bi-Carb unit. Since this valve is located on the loop return, this is what the patient is actually receiving.

CAUTION: The MAXIMUM storage time for the Bi-carbonate solution is 24 hours! (Circulating)



VALVE POSITIONS FOR ONE-TANK OPERATION #1 TANK

THESE VALVE POSITIONS ARE APPLICABLE IF #1 BI-CARB TANK IS FEEDING THE DISTRIBUTION LOOP, AND THE RETURN COMES BACK TO #1 BI-CARB TANK.

1. #1 Bi-Carb tank drain valve **B13** must be closed.
2. #1 Bi-Carb tank service valve **B11** must be open and #2 Bi-Carb tank service valve **B12** closed.
3. Loop distribution pump outlet valve **B15** open.
4. #1 & #2 dialysis water (AAMI standard quality water) inlet valves **B4** & **B5** must be closed.
5. #1 Bi-Carb tank loop return valve **B6** must be open, and #2 Bi-Carb tank loop return valve **B7** must be closed.
6. Loop return to drain valve **B8** should be closed.
7. Dialysis water (AAMI standard quality water) rinse valve **B16** must be closed.
8. Both sample valves **B17** & **B18** must be closed.
9. Both jug fill valves **B9** & **B10** must be closed.
10. Tank Alarm Switch will be in the #1 position.



VALVE POSITIONS FOR ONE-TANK OPERATION #2 TANK

THESE VALVE POSITIONS ARE APPLICABLE IF #2 BI-CARB TANK IS FEEDING THE DISTRIBUTION LOOP, AND THE RETURN COMES BACK TO #2 BI-CARB TANK.

1. #2 Bi-Carb tank drain valve **B14** must be closed.
2. #2 Bi-Carb tank service valve **B12** must be open and #1 Bi-Carb tank service valve **B11** closed.
3. Loop distribution pump outlet valve **B15** open.
4. #1 & #2 dialysis water (AAMI standard quality water) inlet valves **B4** & **B5** must be closed.
5. #2 Bi-Carb tank loop return valve **B7** must be open, and #1 Bi-Carb tank loop return valve **B6** must be closed.
6. Loop return to drain valve **B8** should be closed.
7. Dialysis water (AAMI standard quality water) rinse valve **B16** must be closed.
8. Both sample valves **B17** & **B18** must be closed.
9. Both jug fill valves **B9** & **B10** must be closed.
10. Tank Alarm Switch will be in the #2 position.



VALVE POSITIONS FOR TWO-TANK OPERATION

THESE VALVE POSITIONS ARE APPLICABLE IF BOTH BI-CARB TANKS ARE FEEDING THE DISTRIBUTION LOOP, AND THE RETURN COMES BACK TO BOTH BI-CARB TANKS.

1. #1 & #2 Bi-Carb tank drains must be closed. Valves **B13** & **B14**.
2. #1 & #2 Bi-Carb tank service valves must be open. Valves **B11** & **B12**.
3. Loop distribution pump outlet valve **B15** open.
4. #1 & #2 dialysis water (AAMI standard quality water) inlet valves must be closed. Valves **B4** & **B5**.
5. #1 & #2 Bi-Carb tank loop return valves must be open. Valves **B6** & **B7**.
6. Loop return to drain valve **B8** should be closed.
7. Dialysis water (AAMI standard quality water) rinse valve **B16** must be closed.
8. Both sample valves **B17** & **B18** must be closed.
9. Both jug fill valves **B9** & **B10** must be closed.
10. Tank Alarm Switch can be in either #1 or #2 position.



BI-CARB LOOP DISTRIBUTION PUMP OPERATION

BEFORE ATTEMPTING TO START THE PUMP, ENSURE THE FOLLOWING:

1. There is bicarbonate solution, dialysis water (AAMI standard quality water, or disinfect solution in the tank, according to whichever operation is being performed.
2. The appropriate valves are opened or closed, according to what tanks and operation is being performed.
3. There is power to the pump.

NOTE: This pump is equipped with a flow switch which will not allow the pump to run if there is no liquid (empty tank), or if the pump is dead-headed (valve downstream of the pump discharge closed).

TO START PUMP

1. Turn “**OPERATE/OFF**” switch to the “**OPERATE**” position.
2. Depress the red push-button switch until the green “**PUMP INDICATOR**” light stays on.

TO TURN OFF PUMP

1. Turn “**OPERATE/OFF**” switch to the “**OFF**” position.



BI-CARB TANK LOW-LEVEL ALARM

Each tank has its own “**LOW LEVEL**” audible alarm located at the back of each tank, pointing towards the control box. These alarms are operated on 24VAC supplied from a transformer inside the control box. However, only one tank alarm can be utilized at a time. Therefore, it is important to make sure that the appropriate tank alarm is selected.

If the **#1** Bi-Carb tank is the one being used to re-circulate the solution through the loop, then the “**TANK ALARM**” switch must be in the “**#1**” position.

If the **#2** Bi-Carb tank is the one being used to re-circulate the solution through the loop, then the “**TANK ALARM**” switch must be in the “**#2**” position.

If both the **#1** & **#2** Bi-Carb tanks are being used at the same time to re-circulate the solution through the loop, then the “**TANK ALARM**” switch can be in either the “**#2**” or “**#1**” position.

The alarm is activated when the level in the tank reaches approximately 10 gallons.

To mute the alarm, simply place the “**TANK ALARM**” switch in the “**OFF**” position.

The Tank Alarm Switch can give erroneous alarms if left on in the tank being mixed. It is therefore recommended that the Tank Alarm be in the “**OFF**” position when mixing.



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DISINFECTING THE DISTRIBUTION SYSTEM

The use of household bleach (5.25%) is common for use in disinfecting water treatment systems and Bi-Carb delivery systems for hemodialysis. Bleach is a cost effective disinfectant and generally produces satisfactory results. Varying concentrations of Sodium Hypochlorite (bleach) are used among dialysis facilities for disinfection. A 50-PPM to 1,000-PPM concentration is often used; however, most of the dialysis industry seems to use a 500-PPM solution with a dwell time of 30 to 60 minutes. To calculate the desired concentration of Sodium Hypochlorite in a given volume of water use the following calculation.

$$\frac{\text{Storage Tank (L)} + \text{Loop Volume (L)} \times \text{Desired Concentration (MG/L)}}{(50,000 \text{ MG/L})}$$

Loop Volume: 3/4" Sch80 pipe = .0214 gal/ft
1" Sch80 pipe = .0357 gal/ft
1-1/4" Sch80 pipe = .0644 gal/ft

Example of Dilutions:

1. Household bleach contains 52,500-PPM of Sodium Hypochlorite
2. 1:1,000 dilution of household bleach provides about 50PPM Sodium Hypochlorite.
3. 1:100 dilution provides about 500-PPM Sodium Hypochlorite
4. 1:50 dilution provides about 1,000-PPM of Sodium Hypochlorite

Generally speaking the greater the concentration of bleach the shorter the dwell time.

In a study published by the C.D.C. the following results were documented:

1. Concentrations of 1,000-PPM will kill 99.9% of Bacillus Subtillis spores with a 5 minute dwell time and will also destroy fungal agents in less than an hour.
2. A 200-PPM solution will inactivate 25 different viruses within 10 minutes. Typically Better Water, Inc. will recommend a 500-PPM Sodium Hypochlorite solution with a dwell time of 30 to 60 minutes.



DISINFECTING BI-CARB SYSTEM

As the manufacturer, we recommend that the Bi-Carb system be disinfected and cleaned once every week (usually on different days). The clinics may require more or less frequent disinfecting. It is ultimately the medical director's responsibility to determine the frequency of disinfection, and is typically based on bacteria testing.

NOTE: The wash-down hose provided with your system needs to be disinfected prior to the following disinfection procedures. This can be accomplished by pouring bleach through the hose, or by running disinfect solution through the hose from the jug-fills (to drain or a bucket) during step 17

NOTE: DO NOT ATTEMPT TO DISINFECT OR CLEAN THE DISTRIBUTION LOOP WHILE PATIENTS ARE DIALYZING!

FOR DISINFECTING, USE 500-PPM SOLUTION OF 5% SODIUM HYPOCHLORITE.

1. Empty both Bi-Carb tanks of un-used bicarbonate solution by opening tank drain valves **B13** and **B14**. (Turn Tank Alarm Switch to "**OFF**" position)
2. When tanks are empty, close valves **B13** and **B14**, and make sure that valves **B11** and **B12** are open.
3. Fill tanks with proper amount of dialysis water (AAMI standard quality water) by opening valve **B4** and then **B5**.

For 60 gallon tanks, fill to 50 gallon mark.

For 100 gallon tanks, fill to 90 gallon mark.

Close valve **B5**.

4. Open valve **B8**, close valves **B6** & **B7** turn on pump, and flush 1/2 of the fresh dialysis water (AAMI standard quality water) down the drain. Then close valve **B8**, and turn off pump.

5. Fill tanks with proper amount of dialysis water (AAMI standard quality water) by opening valve **B4** and then **B5**.

For 60 gallon tanks, fill to 50 gallon mark.

For 100 gallon tanks, fill to 90 gallon mark.

Close valve **B5**.



6. Turn on mixer to Bi-Carb tank #1.
7. Lift lid and add the appropriate amount of disinfectant to Bi-Carb tank #1.
For 60 gallon tanks, add 2750 cc's of bleach to tank #1.
For 100 gallon tanks, add 4000 cc's of bleach to tank #1.

Turn off mixer after approximately one minute.

8. Turn on mixer to Bi-Carb tank #2.
9. Lift lid and add the appropriate amount of disinfectant to Bi-Carb tank #2.
For 60 gallon tanks, add 2750 cc's of bleach to tank #2.
For 100 gallon tanks, add 4000 cc's of bleach to tank #2.

Turn off mixer after approximately one minute.

10. Even taking into account the volume of water in the distribution loop, this will provide the system with the appropriate amount of disinfectant for the Bi-Carb system.
11. Turn "**DISINFECT**" key switch to "**ON**".
12. Now, without overflowing the tanks, fill them all the way to the top by opening valve **B4 (Tank 1)** and then **B5 (Tank 2)**.

CAUTION: This WILL result in an overflow condition if tanks are not monitored. The "ON" position overrides the high level shut off switches. Refer back to pages 11 and 12 for details on High level shut off operation. Turn switch back to "**OFF**" to re-activate the float control.

13. Close valve **B5**.

14. Ensure that the following valves are in the appropriate positions:

B1	open	B7	closed	B13	closed
B2	open	B8	open	B14	closed
B3	closed	B9	closed	B15	open
B4	closed	B10	closed	B16	closed
B5	closed	B11	open	B17	closed
B6	closed	B12	open	B18	closed

15. Start pump by depressing the red "**PUSH START**" switch until the green "**PUMP INDICATOR**" light stays illuminated.

16. Let the solution go to drain until the tanks are approximately half empty, then open valves **B6** and **B7**; and then close valve **B8**.



17. Obtain a container to hold under the jug fills of the Bi-Carb tanks. Slowly open the jug fill valves **B9** and **B10** one at a time for approximately 5-10 seconds to let the solution pull through that part of the system.

NOTE: It is acceptable to disinfect the wash-down hose during this step. Hold the hose up to the jug-fill and let the water (containing the bleach solution) run through the hose to a drain or a container.

18. Obtain a smaller container to hold under the sample ports at the valve box on the front of the Bi-Carb unit. Slowly open the sample port valves **B17** and **B18** one at a time for approximately 20-30 seconds to let the solution pull through that part of the system.
19. Take a chlorine test kit and test the solution at sample valve **B17** to ensure there is a positive reading at that location.
20. Let the solution re-circulate for approximately 20 minutes.
21. Verify that there is positive readings at all use points in the loop.
22. Open valve **B8**, and then close valves **B6** and **B7**.
23. Let the solution run to drain until the pump turns itself off by the flow switch.
24. Connect the wash-down hose (provided with the system) to valve **B16**, and rinse down the entire inside of each Bi-Carb tank with fresh dialysis water (AAMI standard quality water.) Pay special attention to the inside of the lid.
25. Fill both tanks with fresh dialysis water (AAMI standard quality water) by opening valves **B4** or **B5**. Re-start pump by depressing red push button switch. Let the water continue running down the drain at the Bi-Carb loop return. (**B8** is open)
26. Open **B9** and **B10** to rinse with AAMI standard quality water. Close **B9** and **B10** when done.
27. Obtain a smaller container to hold under the sample ports at the valve box on the front of the Bi-Carb unit. Slowly open the sample port valves **B17** and **B18** one at a time for approximately 20-30 seconds to rinse that part of the system. After the 20-30 seconds have passed, close **B17** and **B18**.
28. Repeat steps 24 thru 27 until **NO** chlorine (bleach) is present at any of the use points through-out the Bi-Carb distribution system



29. After the tanks have emptied, close valve **B12**, open valve **B14** and **B4** and fill Tank #1 to approx. 20 gallons. Close valve **B4**. Close Valve **B8** and open valves **B7**. Start pump and run pump until pump shuts off. (Water will be returning to tank #2 and going straight to drain.)
 30. Close valves **B7**, **B11** & **B14** and open valves **B6**, **B12** & **B13**. Open Valve **B5** and fill Tank #2 to approx. 20 gallons. Close valve **B5**. Start pump and run until pump shuts off. (Water will be returning to tank #1 and going straight to drain)
 31. Both return hoses should now be clear of all disinfectant.
- NOTE:** Be sure to check for trace amounts of chlorine (bleach) at the jug fill valves **B9** and **B10**, and the sample port valves **B17** and **B18**.
32. Verify that there are **NO** positive readings at all use points in the loop.
 33. Once there are no trace amounts of chlorine (bleach) left at any of the use points in the system, it is now ready to mix a new batch of Bi-Carb



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CLEANING BI-CARB SYSTEM

As the manufacturer, we recommend that the Bi-Carb System be disinfected and cleaned once every week (usually on different days). The clinics may require more or less frequent disinfecting. It is ultimately the medical director's responsibility to determine the frequency of disinfection, and is typically based on bacteria testing.

NOTE: DO NOT ATTEMPT TO DISINFECT OR CLEAN THE DISTRIBUTION LOOP WHILE PATIENTS ARE DIALYZING!

FOR CLEANING, USE VINEGAR THAT CONTAINS 5% ACETIC ACID.

1. Empty both Bi-Carb tanks of un-used bicarbonate solution by opening tank drain valves **B13** and **B14**.
2. When tanks are empty, close valves **B13** and **B14**, and make sure that valves **B11** and **B12** are open.
3. Fill tanks with proper amount of dialysis water (AAMI standard quality water) by opening valve **B4** or **B5**.

For 60 gallon tanks, fill to 50 gallon mark.

For 100 gallon tanks, fill to 90 gallon mark.

NOTE: This step rinses residual bi-carb solution from tanks.

Close valve **B4** or **B5**.

4. Open valve **B8**, turn on pump, and flush all of the fresh dialysis water (AAMI standard quality water) down the drain. Then close valve **B8**, and turn off pump.
5. Fill tanks with proper amount of dialysis water (AAMI standard quality water) by opening valve **B4** or **B5**.

For 60 gallon tanks, fill to 15 gallon mark.

For 100 gallon tanks, fill to 20 gallon mark.

Close valve **B4** or **B5**.



6. Turn on mixer to Bi-Carb tank #1.
7. Lift lid and add the appropriate amount of cleaner to Bi-Carb tank #1.
For 60 gallon tanks, add 1.5 GAL. of vinegar to TANK #1.
For 100 gallon tanks, add 2 GAL. of vinegar to TANK #1.
Turn off mixer after approximately one minute.
8. Turn on mixer to Bi-Carb tank #2.
9. Lift lid and add the appropriate amount of cleaner to Bi-Carb tank #2.
For 60 gallon tanks, add 1.5 GAL. of vinegar to TANK #2.
For 100 gallon tanks, add 2 GAL. of vinegar to TANK #2.
Turn off mixer after approximately one minute.
10. Even taking into account the volume of water in the distribution loop, this will provide the system with the appropriate amount of cleaner for the Bi-Carb system.
11. Turn “*DISINFECT*” key switch to “*ON*”.
12. Now, without overflowing the tanks, fill them all the way to the top by opening valve **B4 (Tank 1)** or **B5 (Tank 2)**.

CAUTION: This WILL result in an overflow condition if tanks are not monitored. The “ON” position overrides the high level shut off switches. Refer back to pages 11 and 12 for details on High level shut off operation. Turn switch back to “OFF” to re-activate the float control.

13. Close valve **B4** or **B5**.
14. Ensure that the following valves are in the appropriate positions:

B1	open	B7	closed	B13	closed
B2	open	B8	open	B14	closed
B3	closed	B9	closed	B15	open
B4	closed	B10	closed	B16	closed
B5	closed	B11	open	B17	closed
B6	closed	B12	open	B18	closed
15. Start pump by depressing the red “*PUSH START*” switch until the green “*PUMP INDICATOR*” light stays illuminated.
16. Let the solution go to drain until the tanks are approximately half empty, then open valves **B6** and **B7**; and then close valve **B8**.



17. Obtain a container to hold under the jug fills of the Bi-Carb tanks. Slowly open the jug fill valves **B9** and **B10** one at a time for approximately 5-10 seconds to let the solution pull through that part of the system.
 18. Obtain a smaller container to hold under the sample ports at the valve box on the front of the Bi-Carb unit. Slowly open the sample port valves **B17** and **B18** one at a time for approximately 20-30 seconds to let the solution pull through that part of the system. After the 20-30 seconds have passed, close **B17** and **B18**.
 19. Let the solution re-circulate for approximately 20 minutes.
 20. Open valve **B8**, and then close valves **B6** and **B7**.
 21. Let the solution run to drain until the pump turns itself off by the flow switch.
 22. Connect a hose to valve **B16**, and rinse down the entire inside of each Bi-Carb tank with fresh dialysis water (AAMI standard quality water.) Pay special attention to the inside of the lid.
 23. Fill both tanks with fresh dialysis water (AAMI standard quality water) by opening valves **B4** or **B5**. Re-start pump by depressing red push button switch. Let the water continue running down the drain at the Bi-Carb loop return.
 24. Open **B9**, **B10** to rinse with AAMI standard quality water. Close **B9** and **B10** when done.
 25. Obtain a smaller container to hold under the sample ports at the valve box on the front of the Bi-Carb unit. Slowly open the sample port valves **B17** and **B18** one at a time for approximately 20-30 seconds to rinse that part of the system. After the 20-30 seconds have passed, close **B17** and **B18**.
 26. Repeat steps 22 thru 25 until **NO** cleaning solution is present at any of the use points through-out the Bi-Carb distribution system.
- NOTE:** When cleaning with vinegar, verify that the solution is completely rinsed out by comparing the pH of the dialysis water (AAMI standard quality water) to the pH of the Bi-Carb loop return at sample ports **B17** and **B18**. When the pH's are equal, all the vinegar is rinsed out.
27. Once there are no trace amounts of cleaning solution left at any of the use points in the system, it is now ready to mix a new batch of Bi-Carb.



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TROUBLE SHOOTING GUIDE

PROBLEM: Green “*PUMP INDICATOR*” light will not illuminate.

CORRECTIVE ACTION:

1. Check to see if the distribution pump is running. This can be easily done by visually looking at the end of the pump under the #2 Bi-Carb tank to see if the fan is turning. If fan is not turning, then go to next problem.
2. If the pump is running, the light bulb is bad.

PROBLEM: Distribution pump is not running. This can be verified by looking at the fan located at the end of the pump under Bi-Carb tank #2. If the fan is not turning, the pump is not running.

CORRECTIVE ACTION:

1. Make sure “*OPERATE / OFF*” switch is in the “*OPERATE*” position.
2. Make sure there is Bi-Carb solution, dialysis water (AAMI standard quality water), or Disinfect solution in the tank. Pump will not run if the tanks are empty.
3. Make sure that valve **B11** and/or **B12** is open.
4. Make sure that valve **B15** is open.
5. Make sure that at least one of the following valves are open. **B6**, **B7**, or **B8**
6. Check fuses on the front of the control box cover.

CAUTION: Inside of control box has 120VAC.

7. Make sure that the Bi-Carb unit and pump has not come unplugged. Also, check flow-switch wiring.
8. Check circuit breaker that provides power to the Bi-Carb unit.



PROBLEM: Tank mixers will not operate.

CORRECTIVE ACTION:

1. Turn the “**MIXER CONTROL**” switch to “**OFF**”, then back to “**#1**” or “**#2**” position.
2. Check fuses in the top corners of the control box.
3. Make sure that the Bi-Carb unit and/or mixer cords have not come un-plugged.
4. Check circuit breaker that provides power to the Bi-Carb unit.

PROBLEM: Low level alarms not working.

CORRECTIVE ACTION:

1. Make sure the “**TANK ALARM**” switch is in “**#1**” or “**#2**” position.
2. Make sure the level in the tank chosen to alarm “**#1**” is below the level of the switch.
3. Check fuses in the top corners of the control box.
4. Take a spray bottle with vinegar and thoroughly clean the switches on the inside of the tank.

NOTE: Do this step when it can be guaranteed that the vinegar will not be distributed to the patients!

5. Check all wiring associated with the switches for loose connections.



SUMMARY

The Bi-Carb system will provide years of trouble-free service provided it is properly maintained.

Any Bi-Carb system is inherently prone for bacteria growth, due to the rich environment that this solution provides. Therefore, it is extremely important to disinfect the unit on a regular basis.

The operator must follow each and every step in each procedure and read and heed each **WARNING** and **CAUTION** found throughout this manual.