Better Water LLC

Single Tank Bicarb
Mix-Only

Operator Manual

rev. Nov 2016

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Visit our website to see our complete product line of water purification products!

www.betterwater.com

Better Water LLC; 698 Swan Dr; Smyrna, TN 37167; www.betterwater.com

Our Company

Better Water LLC is a leading integrated manufacturer of water treatment equipment and components for the industrial, commercial, and institutional markets.

Located in Smyrna, Tennessee, Better Water LLC continues its history of manufacturing and distribution of equipment specifically designed for the renal dialysis market.

Founded in 1971, Better Water LLC has built a reputation for solving our customers' toughest problems with high quality products and unmatched service.

Contact Us

Better Water LLC
698 Swan Dr
Smyrna, TN 37167

Phone (615) 355-6063
Fax (615) 355-6065

Technical Support:
Phone (615) 355-6063, press "1"
Email support@betterwater.com

Customer Service:
Phone (615) 355-6063, press "3"
Email customerservice@betterwater.com

Technical Phone Support

Support is available regarding all Better Water LLC systems,
24 hours a day, 7 days a week.

- Normal business hours are Monday through Friday from 8:00 am until 3:30 pm, Central Standard Time (*excluding holidays*)

Call (615) 355-6063, press "1" for Technical Support

Emergency assistance is available after normal business hours *(including holidays)* by calling **(615) 708-8627.**

Technical Support Info Online

Our website, **www.betterwater.com**, which is updated frequently, contains a wealth of technical support information on the **SUPPORT** tab and includes:

- Operator and Service Manuals
- Interactive Frequently Asked Questions for Troubleshooting
- Consumables and Accessories Lists
- Technical Service Bulletins

For your convenience there are also online forms for placing **Orders** and requesting **Returned Goods Authorization**. These are PDF forms that can be downloaded and either faxed or emailed to us.

Specific Contacts

Technical Support	Phone	(615) 355-6063, option “1”
	Email	support@betterwater.com
To Place an Order (*purchase orders*)	Fax	(615) 355-6065
	Email	orders@betterwater.com
	Phone	(615) 355-6063
Customer Service (*returns*)	Phone	(615) 355-6063, option “2”
	Fax	(615) 355-6065
	Email	customerservice@betterwater.com

Website **www.betterwater.com**

Helpful information and forms that can be found on our website:

- Operator & Service Manuals
- Technical Service Bulletins
- Consumables and Replacement Parts List
- Brochures
- Order Form
- Return Goods Authorization Request Form

Introduction

The Better Water LLC Bicarb unit is manufactured to the utmost quality. With proper care, preventative maintenance, and proper use, it should provide you with a very effective means of mixing the bicarbonate solution for dialysis treatments.

Before starting you should first read and have a thorough understanding of this entire Operator Manual. It describes in detail the steps and procedures for safe usage of the Bicarb unit.

Once the this device has been delivered, it is the responsibility of the Medical Director to ensure that it is used, monitored, and maintained in such a manner so as to satisfy all applicable standards. Guidelines and other related information are available from:

- Food and Drug Administration (FDA)
- National Association of Nephrology Technicians/Technologists (NANT)
- Association for the Advancement of Medical Instrumentation (AAMI)

NOTE concerning pictures in this manual:
Pictures of devices and components may vary slightly due to product changes, and therefore should be for general reference only. Information concerning their use, functionality, or replacement will not differ unless noted.

WARNINGS

1. It is unsafe to operate or service this device without first reading and understanding the **entire** Operator's Manual. Keep this manual and other associated documentation for future reference.

2. 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.

3. Misuse, improper use, or handling of disinfectants and chemical cleaning solutions could result in serious injury or even death. You must comply with the information contained in the Material Safety Data Sheet (MSDS) for the chemical being used.

4. To avoid electrical shock hazard, do not operate this device when the covers or panels are removed.

5.  **ELECTROMAGNETIC INTERFERENCE: This device can create and radiate radio frequency energy and may cause harmful interference if not installed according to the manufacturer's instructions**.

CAUTIONS

1. When used as a medical device, federal law restricts this device to sale by or on the authority of a physician. Per CFR 801.109 (b)(1).

2. Improper operation of this device could result in a low or no-flow alarm on the dialysis machines.

3. Misuse or improper operation of this device will void any warranty.

4. Where water is mentioned, unless otherwise noted, it must be AAMI standard quality water.

5. Electrical and plumbing connections must adhere to local statutes and any facility codes. Connect this device to a proper ground connection in accordance with the National Electrical Code. Do not remove the ground wire or ground plug. Do not use an extension cord with this device.

6. Do not remove any Caution, Warning, or any other descriptive labels from the device.

7. Do not operate this device in an explosive environment or in the presence of flammable materials. Do not use this device to store, mix, or transfer flammable liquids.

8. Movement or vibrations during shipment may cause connections to loosen.

9. Do not operate this unit in an environment where temperatures may be below 50^{o} F or above 90^{o} F.

10. This device should not be used for purposes outside the device's stated applications, specifications, or limitations.

GENERAL REQUIREMENTS & SPECIFICATIONS

Water Connection:

- RO Water Inlet Connection:	Hose barb connection for 3/4” hose

Electrical Requirements:

- All Models:	115 VAC, 20 AMP, Dedicated GFCI Outlet
- Location:	5’ 6” to 6’ above finished floor, on the wall, within 5’ of the Bicarb unit

Drain Requirement:

- 12” x 12” floor sink preferred	In close proximity to the Bicarb unit
- Drain Connection:	1” Schedule 80 PVC pipe, female socket, solvent weld

Floor Space:

- 60 Gallon Single Tank:	2’ 6” deep x 3’ 6” wide x 6’ 0” high
- 100 Gallon Single Tank:	3’ 3” deep x 4’ 0” wide x 6’ 2” high

Operating Weight:

- 60 Gallon Single Tank:	790 lbs
- 100 Gallon Single Tank:	1220 lbs

MODELS

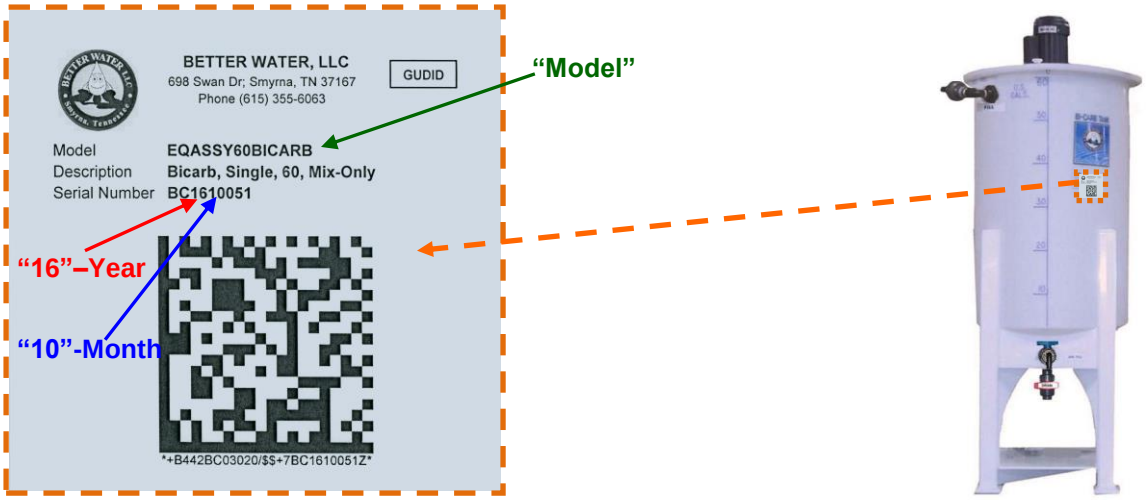
There are two models of the Single Bicarb unit; the 60 gallon and the 100 gallon. The operation, service, and replacement parts of these two units are the same with the only difference being the size of the tanks.

Single 60 Gallon Bicarb Unit
Part#
EQASSY60BICARB

Single 100 Gallon Bicarb Unit
Part#
EQASSY100BICARB

IMPORTANT INFORMATION FOR SUPPORT

Adhered to the front of each Bicarb unit is a label containing important information relating to the specific Bicarb unit, and details both the **Model** and **Serial Number**. Both of these pieces of information are very important in obtaining support, determining warranty, and properly servicing the Bicarb unit. Please have this information available if you contact Technical Support.



The first four numbers in the serial number denote the year and month the device was manufactured. *In the example above the Single 60 Gallon Bicarb unit was produced in **2016**, in the month of **October**.*

PRODUCT DESCRIPTION

The Single Tank Bicarb (Mix-Only) unit consists of a single tank that is constructed entirely of polyethelene and is not susceptible to corrosion. The front half of the lid is hinged for easy access when adding the bicarbonate powder-mix.

The unit is equipped with a 1" Drain Valve (*red handle*), and will be plumbed to a suitable drain.

It has a 3/4" Inlet Port on the upper side. A 3/4" valve and water supply (*not supplied with unit*) will be plumbed from your AAMI Standard Quality Water supply.

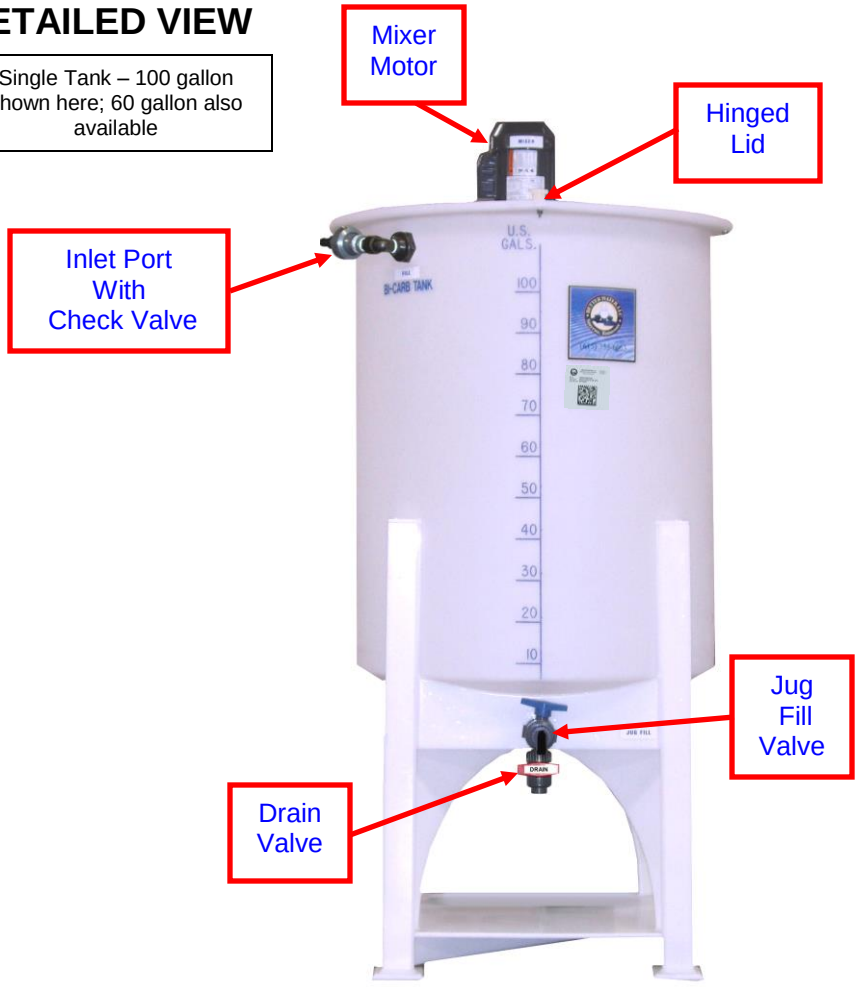
The unit is equipped with a mixer with propellers for mixing the bicarbonate solution. The switch for the mixer is located on the power cord, which should be plugged into a GFI protected, 110 VAC, 20 AMP circuit.

The Jug-Fill is located on the front of the unit, and is designed to allow ample space for the average jug to be placed under the spout for filling.

The mixer supplied with the Bicarb unit is a 1/4 HP, 110 VAC motor, equipped with a 316 stainless steel shaft and coupling, and three polypropylene propellers.

DETAILED VIEW

Single Tank – 100 gallon shown here; 60 gallon also available



OPERATION

Before you start using this device, operators must read and understand this manual in its entirety. This manual of Operator's Instructions describes in considerable detail all of the steps and procedures required to **safely** operate this device. With proper operation, maintenance, and care, this device should give you years of reliable service.

It is **unsafe** to operate this device without a basic understanding of water treatment and a thorough understanding of the contents of this manual. Inadequately treated water for hemodialysis poses a severe threat to the health and safety of hemodialysis patients. Education and training of the staff in these facilities is critical given the technically complex subject of water treatment. Guidelines and other related information are available from:
- Food and Drug Administration (FDA)
- National Association of Nephrology Technicians/Technologists (NANT)
- Association for the Advancement of Medical Instrumentation (AAMI)

Incoming tap water contaminants, temperature, pH, pressure, and flow-rates have a direct impact on the quality and quantity of the RO output. The operator must be aware of changing tap water conditions. This can be easily accomplished with good, two-way communications with the local municipal water supplier and with routine testing of the tap water.

BICARB UNIT VALVES LEGEND and DESCRIPTIONS

Jug Fill Valve
After bicarbonate solution is mixed, this valve is used to take a sample to verify the bicarbonate solution is mixed properly from the Tank. After bicarbonate solution is verified, this valve is used to fill jugs from the Tank if needed. During disinfect/cleaning procedure, this valve can also be used to verify the presence of disinfectant/cleaner.

Drain Valve
This valve is used to drain all liquid from the Tank.

MIXING BICARBONATE SOLUTION

- NOTE: Before mixing, make sure that the tank is empty and clean! Follow the bicarbonate powder manufacturer's instructions for mixing ratios. This device does not control or verify the quality of the bicarbonate solution. The operator is responsible for mixture ratios and verification.

1. Close the **TANK DRAIN VALVE**.

2. Slowly open the **FILL VALVE**, and fill the tank 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 20 PSI(*)** when dialyzing patients. This will prevent the dialysis machines from 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.*
***(*)** 20 PSI is an estimate; exact operating pressures may vary.*
- When water level is at the desired level, close the **FILL VALVE**.

3. Locate the **MIXER MOTOR POWER Switch** on the Power Cord and turn the Mixer to **ON**.

4. Open the Lid to the Tank and slowly pour in the appropriate amount of bicarbonate powder into the Tank. Ensure that the Mixer is operating before pouring the powder in.

5. After mixing for the desired amount of time, turn the **MIXER MOTOR POWER Switch** to **OFF**.
- NOTE: Mixing time is normally 10 minutes but this is determined by the Medical Director.

6. Verify that the solution is properly mixed by testing a sample from the Jug Fill Valve, located on the front of the Bicarb unit.
- NOTE: Verification of solution should be done according to company policies and procedures.

7. Bicarbonate solution is ready for use.

CAUTION
Mixed bicarbonate solution has a limited storage time. Consult the bicarbonate powder manufacture's recommendations for storage time limits.

GENERAL DISINFECTING INFORMATION

To perform at peak efficiency the Bicarb unit must periodically be disinfected.

The **Disinfecting Process** is designed to significantly reduce bacteria and endotoxins that may build-up in the water and on the internal surfaces in the form of bio-film. The importance of regular and frequent disinfection cannot be minimized due to the risk associated with bacteria proliferation. It is recommended to disinfect the unit **Weekly** with bleach or an approved cold-sterilant disinfectant.

Bicarb units may require more disinfecting, which is ultimately the responsibility of the Medical Director, and is typically based on water testing.

DISINFECTING with BLEACH

The use of typical household bleach (5.25%) is common for use in disinfecting water treatment 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. Generally speaking, the greater the concentration the shorter the dwell time.

a. 5.25% household bleach is 52,500 ppm Sodium Hypochlorite
b. 6.25% household bleach is 62,500 ppm Sodium Hypochlorite
c. 8.25% household bleach is 82,500 ppm Sodium Hypochlorite

Better Water LLC recommends using IRON FREE bleach. Care should be taken to select iron free bleach because many discount or generic brands will have high iron content. Iron will be harmful to the equipment and shorten its lifespan.

**** WARNING: DO NOT USE "SPLASH-LESS" BLEACH. The content of "splash-less" bleach may damage the equipment, and will create foam.***

BLEACH SOLUTION FOR BICARB UNITS

a. Better Water LLC recommends a minimum 525 ppm solution of sodium hypochlorite (*bleach*) This is 1 gallon (128 ounces) of bleach per 100 gallons of water or a **1:100 dilution.** Currently there are 3 major bleach concentrations readily available on the market. Below are the dilution formulas required for each concentration percentage:

5.25% = 525 ppm dilution	Water Gallons x 1.28 = ounces of bleach 5.25%
6.25% = 625 ppm dilution	Water Gallons x 0.96 = ounces of bleach 6.25%
8.25% = 825 ppm dilution	Water Gallons x 0.73 = ounces of bleach 8.25%

b. Recommended dwell time is **30-60 minutes**

**** See Appendix A for other bleach dilution ratios and pipe volume calculations, and 3 feet per second flow velocity rates if needed.***

DISINFECTING PROCEDURE

See **GENERAL CLEANING and DISINFECTING INFORMATION** section for recommendations and details for this procedure.

WARNING

Chemical cleaners and disinfectants can cause serious injury or death.

Proper protective equipment must be used.

The preparation of these chemical solutions must be done in accordance with the specifications established for the particular chemical.

These chemical solutions must be handled in accordance with their Material Safety Data Sheet (MSDS).

These procedures should be performed by trained and qualified technicians.

FOR DISINFECTING, Use a proper dilution of sodium hypochlorite *(bleach)* based on strength as previously detailed.
- Other approved cold-sterilant disinfectants can be used following the manufacturer's instructions for dilution ratios and use.

1. Empty the Bicarb Tank of unused bicarbonate solution by opening **TANK DRAIN VALVE**.

2. When the Tank is empty, close the **TANK DRAIN VALVE**.

3. Rinse the Tank by filling to its capacity with dialysis water by opening the **FILL VALVE**.

4. Once full, close the **FILL VALVE**.

5. Open the **TANK DRAIN VALVE** and drain the Tank.

6. Once empty, close the **TANK DRAIN VALVE**.

PREPARE DISINFECTANT PROCEDURE

7. Fill tank with proper amount of dialysis water by opening the **FILL VALVE**.
- For 60 gallon tanks, fill to 50 gallon mark.
- For 100 gallon tanks, fill to 90 gallon mark.
- Once full, close the **FILL VALVE**.

8. Turn the Bicarb Tank Mixer Motor on by turning the **MIXER MOTOR POWER Switch** to **ON**.

9. Lift the Lid and add the appropriate amount of disinfectant to the Bicarb tank.

10. Let the solution mix for approximately one minute, and then turn the **MIXER MOTOR POWER Switch** to **OFF**.

11. Open the **FILL VALVE** and fill the Tank to its capacity, without overflowing the tank
- When at capacity, close the **FILL VALVE**.

DISINFECT BICARB UNIT

12. Disinfect the Jug Fill Valve by…
- Obtain a container to hold under the Jug Fill of the Bicarb Tank.
- Slowly open the **JUG FILL VALVE** for approximately 5-10 seconds to let the disinfectant solution pull through the valve.
- After several seconds, close the **JUG FILL VALVE**.

13. Take a disinfectant test kit and test the solution at the Jug Fill Valve to ensure there is a positive reading at that location.

14. Let the solution dwell in Tank for 30-60 minutes.

15. Drain the Tank by opening the **TANK DRAIN VALVE**.

RINSE PROCEDURE

16. Connect a hose to a dialysis water source and rinse down the entire inside of the Bicarb Tank with fresh dialysis water. Pay special attention to the inside of the lid.

17. Close the **TANK DRAIN VALVE**.

18. Open the **FILL VALVE** and fill the Tank to its capacity, without overflowing the Tank.
- When filled to capacity, then close the **FILL VALVE**.

19. Open the **TANK DRAIN VALVE**.
- Using a disinfectant test kit test the solution at the Jug Fill Valve while it is draining, to ensure there is a clear reading at that location. Once there are no trace amounts of disinfectant left at the Jug Fill, the system is disinfected and ready to mix a new batch of bicarbonate.

20. Repeat steps 17 and 19 until **NO** disinfectant is present at the Jug Fill Valve.

WARNING

Disinfectants can cause serious injury or death to patients undergoing hemodialysis treatment.

SYSTEM MAINTENANCE, General

Maintenance Task	Frequency (more often if needed)	Notes
Check the system for leaks	Daily	Visual Inspection
Monitor the system for unusual sounds	Daily	Auditory Inspection
Clean external surfaces	Weekly	Use a soft, damp towel or sponge. (***DO NOT USE BLEACH***)
Disinfect	Weekly	See Disinfecting Procedure section

LONG TERM STORAGE of the BICARB UNIT

PUTTING BICARB UNIT INTO STORAGE

1. Drain and rinse all bicarbonate solution from the unit.

2. Disinfect the unit.

3. Disconnect power, then coil and secure the power cord.

4. Disconnect from water source and drain completely.

5. Open and leave open the Drain Valve and the Jug Fill Valve.

6. Allow unit to completely air dry.
- NOTE: Under no circumstances should the unit be stored in a "wet" condition (any liquids). Storing "wet" can cause damage to the components, and contamination of the Bicarb unit.

7. Store with the lid closed to prevent foreign objects from entering the tank.

8. Secure plastic bags over all openings to prevent contamination:
- Fill Valve
- Jug Fill Valve
- Tank Drain Valve

BRINGING BICARB UNIT BACK FROM STORAGE

1. Remove protective plastic bags from openings.

2. Reconnect to water source.

3. Reconnect to power.

4. Disinfect the unit.

RELATED REPLACEMENT PARTS

DESCRIPTION	PART#	PICTURE
Propeller Shaft - 316 Stainless Steel	EQBICB00471	
Propeller - Polypropylene	EQBICB01923	
Propeller Set Screw - Stainless Steel; one screw per propeller	EQBICB01920	
Shaft Coupling - Stainless Steel	EQBICB00472	
Coupling Set Screw - Stainless Steel; 4 screws per coupling	HWSCSS01920	
Mixer Motor - 1/4 HP, 115 VAC	EQBICB01868	
Mixer-Motor Power Cord, Central System	EQSUB120BMPC001	

Pictures do not reflect the size of the item in relation to the other pictures

RELATED REPLACEMENT PARTS

DESCRIPTION	PART#	PICTURE
3/4” Blue Handle Valve, Plast-O-Matic ** For models manufactured before August 2013*	**PLVAS800170**	
3/4” Blue Handle Valve, Asahi ** For models manufactured from August 2013*	**PLVAS800170-A**	
1” Red Handle Valve, Plast-O-Matic ** For models manufactured before August 2013*	**PLVAS800174**	
1” Red Handle Valve, Asahi ** For models manufactured from August 2013*	**PLVAS800174-A**	
Concentrate Regulator Calibration Kit ** For calibrating regulators in Floor-Valve-Boxes and Panels* ** Blue wand is for bicarbonate; Red wand is for acid*	**EQASSYCC01**	
Flow Control, 2.0 GPM PVC Sch-80	**PLFCS802001**	
Volara Foam for Tank Lid, .25” TK x 1.5” W ** 6 ft for 60 gallon Tanks* ** 10 ft for 100 gallon Tanks*	**EQBICB01600**	

Pictures do not reflect the size of the item in relation to the other pictures

TROUBLE-SHOOTING GUIDE

The information in this document is intended to serve as a guide only for qualified operators. It is not all inclusive of the problems that may be encountered. This guide should aid operators with reminders and routine trouble-shooting tasks.

For any problem outside the confines of this guide, call for technical assistance.

Problem	Possible Causes	Possible Solutions
Mixer will not operate	**1. Bicarb unit not plugged into electrical receptacle** **2. Tripped breaker**	**1.** Verify that the Bicarb unit is plugged into an electrical receptacle. **2.** Reset breaker if necessary.
“”	**1. Faulty Power Switch** **2. Faulty Power Cord**	**1.** Replace power cord/power switch
Tank will not hold water or bicarbonate solution	**1. Drain is open**	**1.** Verify Drain Valve is closed.
Replacement motor won’t work	**1. Incorrectly wired**	**1.** Verify voltage setup for 110 vac **2.** If wrong, consult wiring diagram on mixer motor.

LIMITED WARRANTY TERMS and CONDITIONS

a. This limited warranty is given only to the original buyer and covers the equipment delivered with this limited warranty.
b. The buyer shall be barred from any recovery on this limited warranty or otherwise for damages due in whole or in part to…

… unreasonable use
… improper operation
… use beyond normal fashion
… failure to follow instructions
… failure to maintain the product in good condition and repair
… or the like.

c. If the buyer discovers or should have discovered a defect in which it is reasonable to conclude that damage, either personal, property, or economic, may result, the buyer's continued use of the product shall constitute any assumption of risk by the buyer and a bar to any recovery for breach of this limited warranty or otherwise.
d. No oral or written representation, information, or advice given by Better Water LLC or any of its representatives shall create a warranty or in any way increase the scope of this express limited warranty and shall not form a part of the basis for bargain.

WHAT IS WARRANTED AND FOR HOW LONG?

a. All equipment, excluding ion exchange and filtration media and cartridges, are warranted to be free from factory defects in materials, and workmanship under normal use for a period of one (1) year from the date of shipment.
b. It is a condition precedent to recovery on this limited warranty that the buyer strictly comply with all operating and maintenance guidelines established by Better Water LLC and that the serial number (*if applicable*) is intact and legible on the equipment.
c. It is a condition precedent to recovery on this limited warranty for damage to the external finish of the equipment that the buyer notifies Better Water LLC at the time of the installation that the finish is damaged.

WHAT IS REMEDY FOR BREACH OF THIS LIMITED WARRANTY or NEGLIGENCE BY BETTER WATER LLC

a. Buyer's sole and exclusive remedy for any breach of this limited warranty or negligence by Better Water LLC shall be repair or replacement of the defective part, at the option of Better Water LLC, provided such defective part is returned to Better Water LLC for inspection.
b. Better Water LLC shall not be obligated to supply an exact replacement of the defective part and reserves the right to substitute new and improved parts.
c. Better Water LLC shall provide at no cost to buyer, labor to remove and/or replace defective parts covered by this limited warranty for a period of ninety (90) days from the date of installation by Better Water LLC of the equipment.
d. After such ninety (90) day period, buyer shall be responsible for any labor or service charge for the removal and/or replacement of any defective parts.
e. Buyer shall be responsible for all travel expenses and freight charges at all times.
f. Better Water LLC shall have no obligation to repair or replace any defective part if buyer fails to follow the procedure set forth in “HOW TO OBTAIN A REPLACEMENT PART UNDER LIMITED WARRANTY”.

IN NO EVENT SHALL THIS LIMITED WARRANTY BE CONSTRUED TO COVER, NOR SHALL BETTER WATER LLC BE LIABLE TO BUYER AS ANY OTHER PERSON FOR, ANY CONSEQUENTIAL, INCIDENTIAL, ECONOMIC, DIRECT, INDIRECT, GENERAL OR SPECIAL DAMAGES, WHICH ARE HEREBY EXPRESSLY DISCLAIMED.

HOW TO OBTAIN A REPLACEMENT PART UNDER LIMITED WARRANTY

a. Buyer should contact the Customer Service or Technical Support Departments and request a Return Goods Authorization.
b. Described part(s) will be sent with a purchase order.
c. The returned part(s) will be returned to the factory for limited warranty consideration. If part(s) are not covered under the limited warranty, part(s) will be considered billable against the purchase order supplied.

WHAT IS NOT COVERED BY THIS LIMITED WARRANTY:

By way of example and not limitation, this limited warranty does not cover:

- Damage to or replacement of any ion exchange resin of filter media
- Labor or service charges for the removal and/or replacement of any defective parts after the ninety (90) day period from the date of installation or sale by Better Water LLC
- Freight charges and travel expenses
- Damage from inadequate or defective wiring, improper voltage, improper connections or electrical service, inadequate or defective plumbing, water supply, or water pressure, or in violation of applicable building, plumbing or electrical codes, laws, ordinances or regulations.
- Damage from improper installation or operation, including but not limited to, abuse, accident, neglect, improper maintenance, freezing and fires, or abnormal use.
- Damage caused by contaminants in Buyer's water supply, including hardness, chlorine, chloramines, sulfur, bacterial iron, tannin, algae, oil, organic matter or other unusual substances, if special equipment has not been installed by Better Water LLC to remove such contaminants
- Damage to or caused by filters/membranes or other replacement parts not purchased from Better Water LLC or damage caused by modification, alteration, repair or service of the equipment or any of its parts by anyone other than Better Water LLC or its expressly authorized representatives.

APPENDIX A

CALCULATIONS & CONVERSIONS

BLEACH DISINFECTING DILUTIONS

a. 5.25% household bleach is 52,500 ppm Sodium Hypochlorite
b. 6.25% household bleach is 62,500 ppm Sodium Hypochlorite
c. 8.25% household bleach is 82,500 ppm Sodium Hypochlorite

1:50 Dilution

5.25% = 1050 ppm	Tank Gallons x 2.56 = ounces of bleach 5.25%
6.25% = 1250 ppm	Tank Gallons x 1.92 = ounces of bleach 6.25%
8.25% = 1650 ppm	Tank Gallons x 1.46 = ounces of bleach 8.25%

1:100 Dilution

5.25% = 525 ppm	Tank Gallons x 1.28 = ounces of bleach 5.25%
6.25% = 625 ppm	Tank Gallons x 0.96 = ounces of bleach 6.25%
8.25% = 825 ppm	Tank Gallons x 0.73 = ounces of bleach 8.25%

1:500 Dilution

5.25% = 105 ppm	Tank Gallons x 0.256 = ounces of bleach 5.25%
6.25% = 125 ppm	Tank Gallons x 0.192 = ounces of bleach 6.25%
8.25% = 165 ppm	Tank Gallons x 0.146 = ounces of bleach 8.25%

1:1000 Dilution

5.25% = 52.5 ppm	Tank Gallons x 0.128 = ounces of bleach 5.25%
6.25% = 62.5 ppm	Tank Gallons x 0.096 = ounces of bleach 6.25%
8.25% = 82.5 ppm	Tank Gallons x 0.074 = ounces of bleach 8.25%

CONVERSION FORMULAS

OUNCES to MILLILITERS
Formula: **Fluid Ounces x 29.6 = Milliliters**
Example: 128 oz x 29.6 = 3790 milliliters

MILLILITERS to OUNCES
Formula: **Milliliters / 29.6 = Ounces**
Example: 750 ml / 29.6 = 25.34 ounces

GALLONS to OUNCES
Formula: **Gallon * 128 = Ounces**
*Example: 1 gal * 128 = 128 ounces*

OUNCES to GALLONS
Formula: **Ounces / 128 = Gallons**
Example: 128 ounces / 128 = 1 Gallon

APPENDIX B

PRE-SHIP TEST DATA

NOTES


BETTER WATER LLC
Smyrna, Tennessee