Better Water LLC

Single Tank Bicarb
Central Mix and Delivery

Service Manual

rev. Dec 2016

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

Dec 2016 - REA 2327

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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 Adobe 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

This Service Manual has been developed for the purpose of ordering factory replacement parts and for Troubleshooting the Single Bicarb units. This Service Manual is not intended to replace the Operator Manual, but serve as a supplement to it. Current versions of this Service Manual and the Operator Manual as well as other helpful information can be found on our website at www.betterwater.com/support.

It is important to understand that the Better Water Bicarb Unit is a ***Class II Medical Device*** and that non-factory replacement parts could affect the safety, performance, and warranty of the unit.

This manual includes parts lists, photographs, schematics, and diagrams to assist you in servicing the 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 and Service Manuals. 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.

MODELS

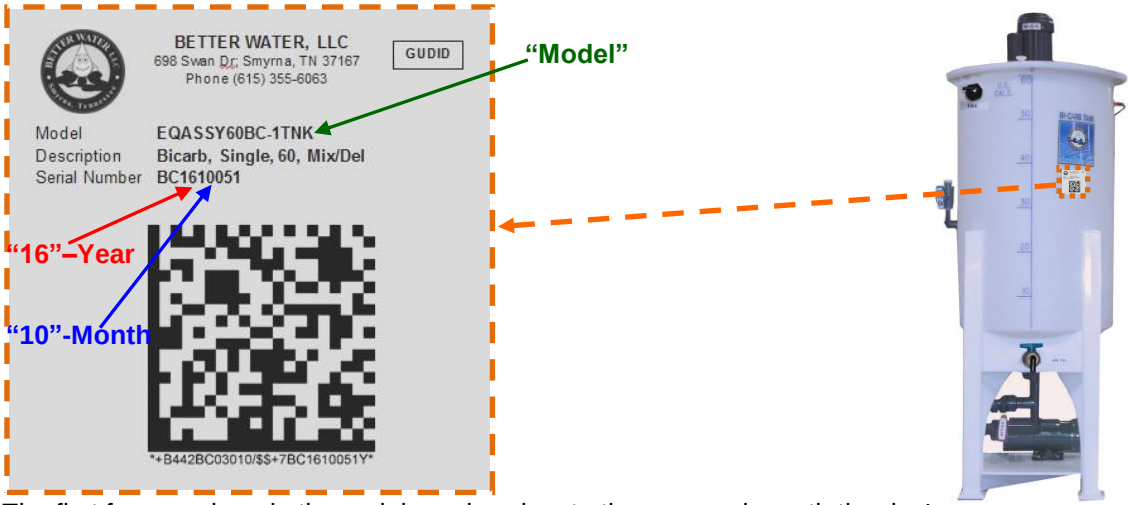
There are two models of the Single Bicarb unit; the 60 gallon and the 100 gallon. The operation, service, and replacement parts of these two units are the same with the only difference being the size of the tanks.

Single 60 Gallon Bicarb Unit
Part#
EQASSY60BC-1TNK

Single 100 Gallon Bicarb Unit
Part#
EQASSY100BC-1TNK

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**.*

MODEL CHANGES RELEVANT for SUPPORT and REPLACEMENT PARTS

The following is a summary of changes that were made and the time period they were made in that are relevant to support and determining the correct replacement part numbers. Refer to the section above concerning the serial number in determining the year and month the device was manufactured to determine the relevance of these changes to your device.

January 2005 – Control Box Change

The following changes were made to the Control Box:
- Changed from multiple standard relays to a single smart relay and expansion module
- Changed from a contactor/thermal overload to branch circuit protection

** These changes are detailed in the Control Box-Inside View section below*

January 2006 – Float Switch Change

A change was made in the float switches in January 2006. Prior to this a shorter, white float switch was used, and after a longer, black float switch. The shorter, white float switches are no longer available, so the float switches described below can be ordered as a replacement. If this is done, a new bulkhead, through which the float switch is installed, is required. This new bulkhead must have the inside enlarged to accommodate the area required for full motion of the longer, black float switches.

** See the Single Bicarb Unit-Front View as well as the Replacing Float Switches sections below.*

Prior to January 2006
Shorter, White Float Switch

After January 2006
Longer, Black Float Switch

June 2006 – Mixer Motor Mount Change

Prior to June 2006, the mixer motor was mounted on an elongated plastic mount which raised the motor a few inches above the lid. After June 2006 on, a flat plastic mount was used which lowered the height of the mixer motor. The mounting hardware also changed to accommodate the new mount.

** These changes are detailed in the Mixer Motor Mount section below.*

Prior to June 2006, Elongated Mount

After June 2006, Flat Mount

February 2010 – Change from Float Switches to Proximity Sensors

Prior to February 2010, High and Low Level Float Switches were used which are mechanical in nature. From February 2010 and beyond, electronic sensors were used, and ***they are not interchangeable***.

** These changes are detailed in the Single Bicarb Unit-Back View as well as the Replacing Float Switches sections below.*

Prior to February 2010

Description	*part#*
High Level Float Switch, Tank 1	**EQSUBBICBTNK1FL**
Low Level Float Switch, Tank 1	**EQSUBTNK1FL LOW**

From February 2010

Description	*part#*
High Level Sensor, Tank 1	**EQSUBTNK1HL**
Low Level Sensor, Tank 1	**EQSUBTNK1LL**

Mid-July 2013 – Ball Valve Change

Units manufactured before mid-July 2013 contained Plast-O-Matic ball valves which were changed to Asahi ball valves. ***These valves are not interchangeable***. Although their function is the same, their width and length are slightly different, and the handles are shaped differently.

** These changes are detailed in the Single Bicarb Unit-Front View and Plumbing sections below.*

Description	*Plast-O-Matic Valve*	*Asahi Valve*
1/2" Ball Valve, Red Handle	**PLVAS800167**	**PLVAS800167-A**
3/4" Ball Valve, Red Handle	**PLVAS800169**	**PLVAS800169-A**
3/4" Ball Valve, Blue Handle	**PLVAS800170**	**PLVAS800170-A**
1" Ball Valve, Blue Handle	**PLVAS800172**	**PLVAS800172-A**
1" Ball Valve, Red Handle	**PLVAS800174**	**PLVAS800174-A**

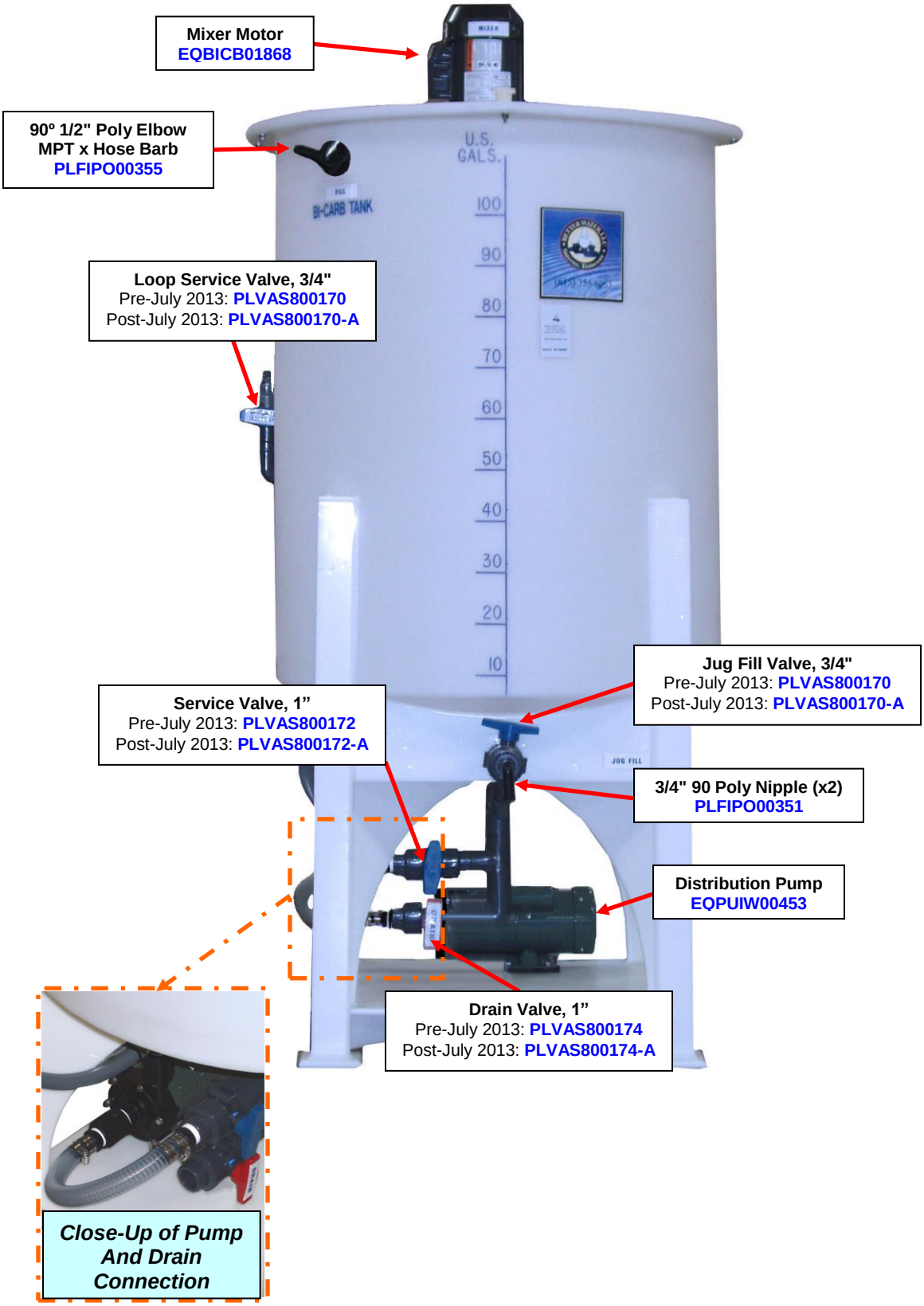
Mid-September 2013 – Fuse Change

The control box fuse was changed from a 3 amp to a 2 amp fuse, and moved from fusing the secondary side of the transformer to fusing the primary side of the transformer. If the fuse requires changing, it should be replaced with the same size fuse that the control box was built with which is specified on the face of the box.

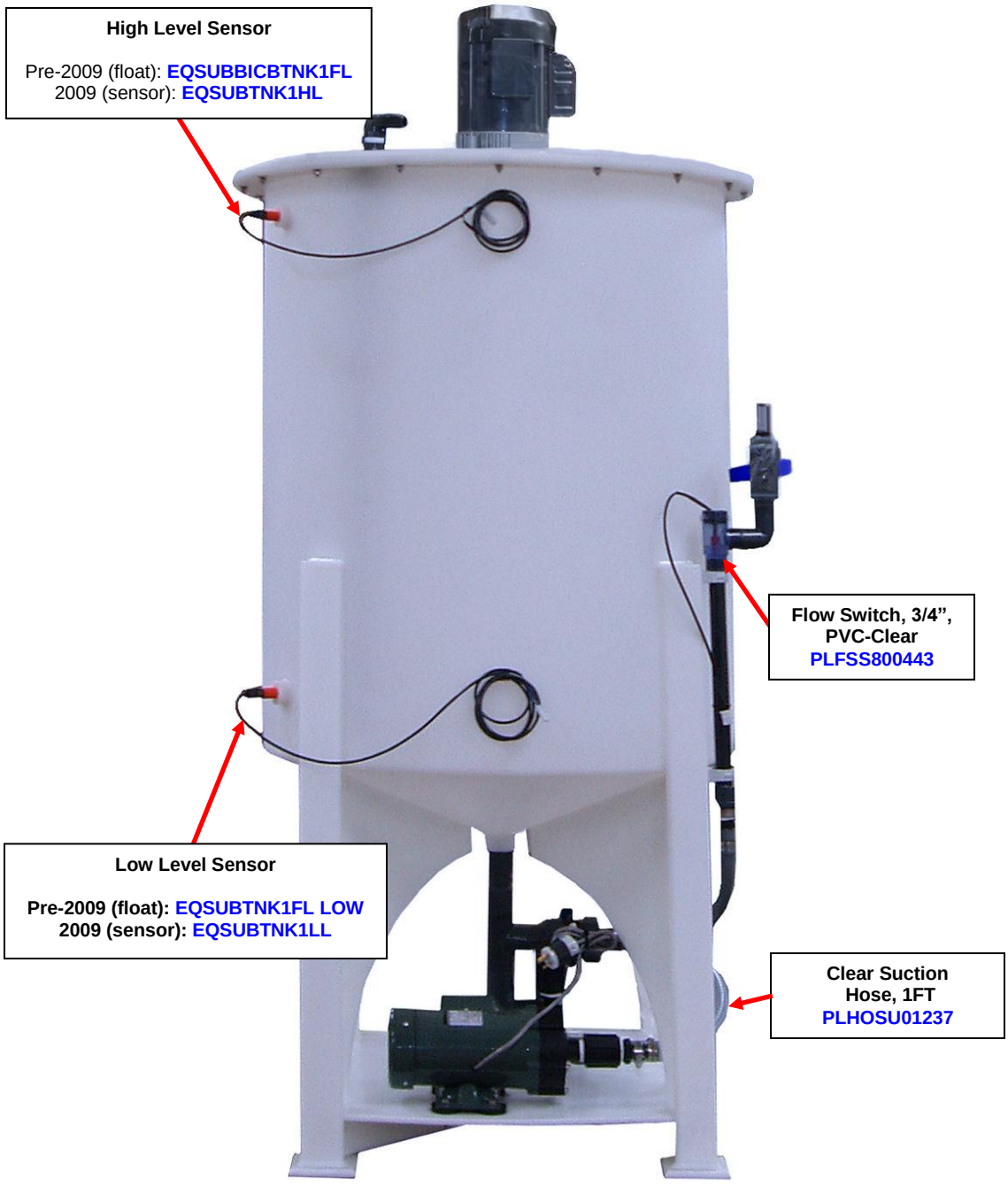
ELLFFS00834
Prior to Mid-September 2013
3 amp fuse

ELLFFS00832
After Mid-September 2013
2 amp fuse

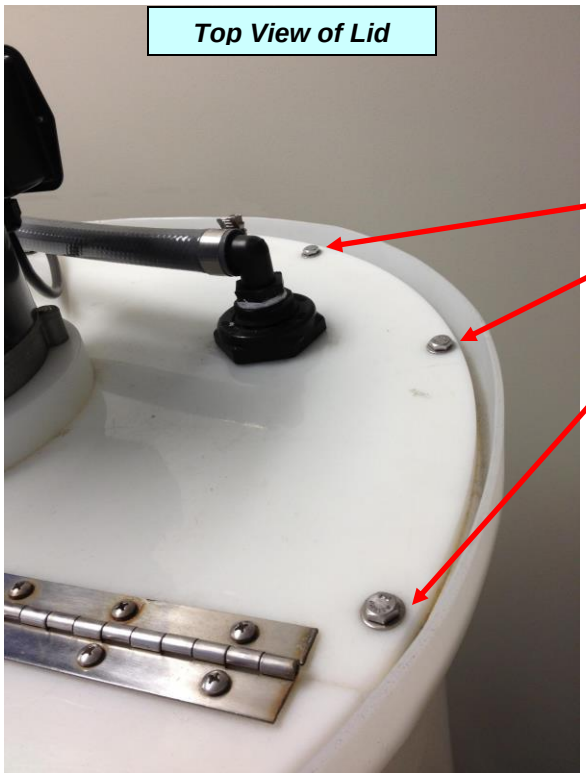
SINGLE BICARB UNIT (FRONT VIEW)



SINGLE BICARB UNIT (BACK VIEW)



LID & MOUNTING HARDWARE



Mounting Hardware Kit for 2 Bicarb Lids
<No Part Number>

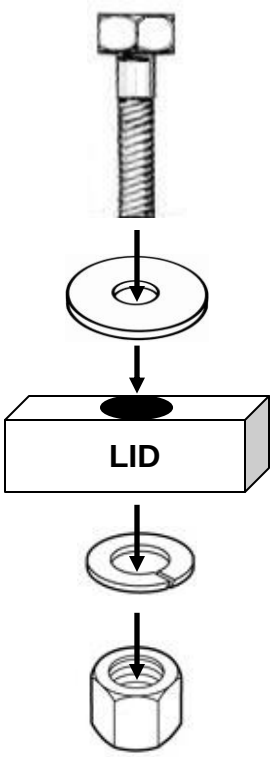
10 holes per lid, 10 of each

1 3/8" x 1/4" Bolt

1/4" Flat Washer

1/4" Locking Washer

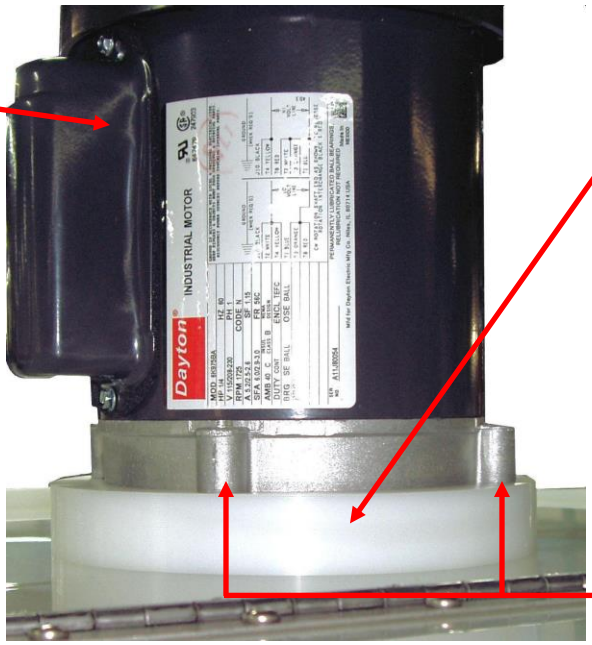
1/4" Nut



VOLARA FOAM for Tank Lid
If replacing the Volara Foam (.25" thick x 1.5" width) that helps seal the lid to the tank, refer to the following:
** 6 ft for 60 gallon Tanks*
** 10 ft for 100 gallon Tanks*

Volara Foam (.25 x 1.5)
EQBICB01600

MIXER MOTOR MOUNTS



Mixer Motor
EQBICB01868

Power Cord
(not shown)
ELPCOO00200

Mixer Mount / Spacer
EQBICBMXRMNT

Mounting Hardware
(*4 each, not shown*)

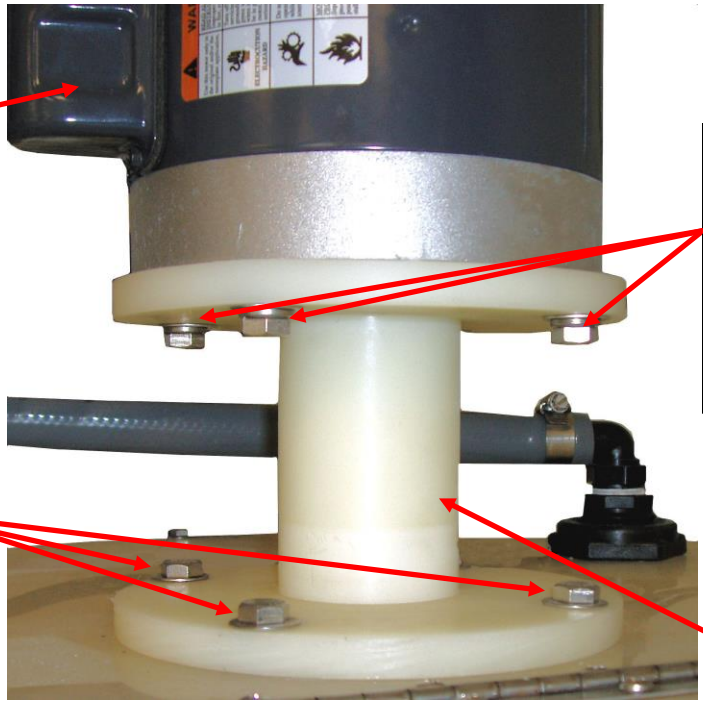
SS Bolts
HWBOSS01892

SS Lock Washers
HWWASS01913

SS Washers
HWWASS01889

The Mixer Mount / Spacer shown above is included on all Bicarb units produced from June 2006 to present.

Prior to June 2006, the Mixer Mount shown below was included, but is no longer available.



Mixer Motor
EQBICB01868

Power Cord
(not shown)
ELPCOO00200

Mounting Hardware
(*4 each*)

SS Bolts
HWBOSS01888

SS Washers
HWWASS01889

SS Nuts (*not shown*)
HWNUSS01888

Mounting Hardware
(*4 each*)

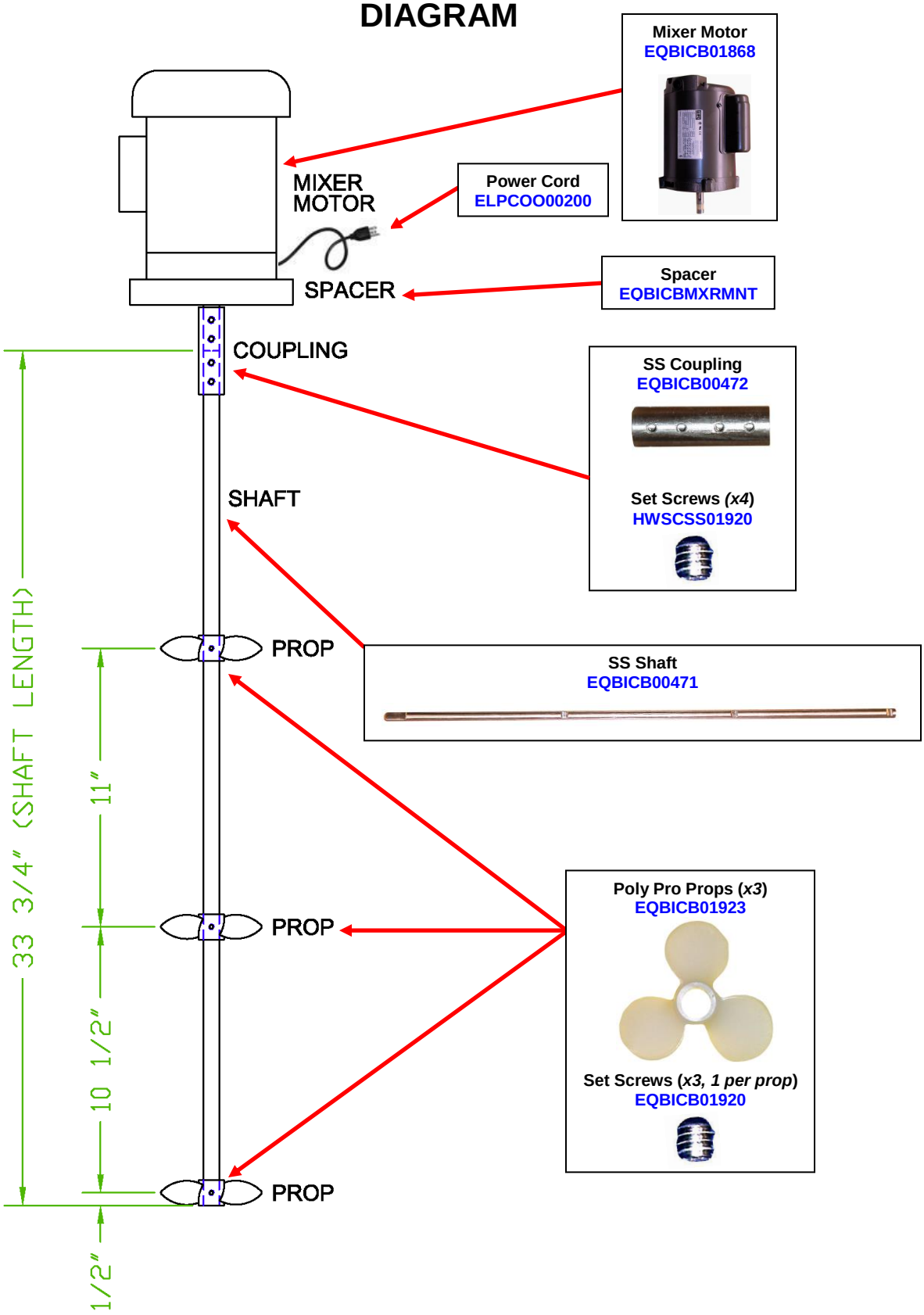
SS Bolts
HWBOSS01886

SS Lock Washers
HWWASS01913

SS Washers
HWWASS01889

Mixer Mount
This style no longer available

MIXER MOTOR, SHAFT, & PROPELLERS DIAGRAM



REPLACING PROPELLERS, SHAFT and/or COUPLING

1. Unplug the Bicarb unit's Main Power Cord.

2. Remove the Lid bolts and nuts so the lid can be lifted (*not removed*).

3. Lift the Lid and remove the bolts and nuts holding the Motor to the Motor Mount.

4. Lift the Motor straight up, to expose the Coupling and Shaft above the Lid, then take a pair of vice-grips and clamp them to the Shaft below the Coupling. This should allow enough support and access to proceed.

5. Remove the top two Set Screws in the Coupling, then remove the Motor, carefully laying it on top of the Tank (*sideways*).

6. The Coupling can remain attached to the Shaft if neither of these two pieces are being replaced. If replacing the Shaft or Coupling, then remove the bottom two Set Screws in the Coupling and set it aside.

7. Lift the Lid and take hold of the Shaft before removing the vice-grips, then remove the Shaft from the Tank.

8. Remove each Propeller from the Shaft by loosening its related Set Screw. It may be necessary to use a hammer to gently tap down the Propellers to remove them from the Shaft.

9. Replace each Propeller, aligning the Set Screw with the etched groove, then tighten carefully. ***NOTE:*** *Over-tightening can cause the threads on the propeller to strip.*

10. Lift the Lid, take hold of the Shaft, and reinsert it back into the Tank, and up through the Mixing Motor Mount. Hold in place with a pair of vice-grips, leaving enough room above the Shaft to reattach the Coupling.

11. Reattach the Shaft to the Coupling, then the Motor to the Coupling with the Set Screws. Use Lock-Tight on each of the Set-Screws before tightening because motor vibration will cause the set screws to back out which can cause damage to the motor and/or shaft assemblies.

12. Remove the vice-grips and allow the Coupling and Shaft to slip down through the Motor Mount, back into position.

13. Align and reattach the Motor to the Motor Mount using the previously removed bolts and nuts.

14. Realign the Lid and reattach to the Tank using the previously removed bolts and nuts.

15. Plug the Bicarb unit's Main Power Cord to an electrical receptacle.

REPLACING a MIXER MOTOR

1/4" HP Mixer Motor
EQBICB01868

Bicarb Power Cord
ELPCOO00200

1. Unplug the Bicarb unit's Main Power Cord

2. Unplug the Motor's Power Cord from the Control Box.

3. Remove the old Motor's Wiring Cover and un-wire the Power Cord.

4. Remove the new Motor's Wiring Cover and re-install/re-wire the Power Cord, consulting the wiring diagram on the new motor and wire for **low voltage**. Replace the Wiring Cover when finished.
**** NOTE:*** *Wire for* ***clock-wise rotation*** *to prevent upward water splash.*

5. Remove the Lid bolts and nuts so the lid can be lifted (*not removed*).

6. Lift the Lid and remove the bolts and nuts holding the Motor to the Motor Mount.

7. Lift the Motor straight up, to expose the Coupling and Shaft above the Lid, then take a pair of vice-grips and clamp them to the Shaft below the Coupling. This should allow enough support and access to proceed.

8. Remove the top two Set Screws in the Coupling, then remove the Motor, carefully laying it on top of the Tank (*sideways*).

9. Attach the new Motor to the Coupling, with the Set Screws. Use Lock-Tight on each of the Set-Screws before tightening because motor vibration will cause the set screws to back out which can cause damage to the motor and/or shaft assemblies.

10. Remove the vice-grips and allow the Coupling and Shaft to slip down through the Motor Mount, back into position.

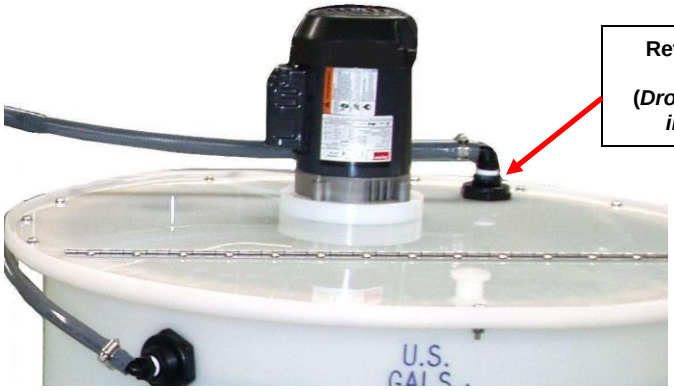
11. Align and reattach the Motor to the Motor Mount using the previously removed bolts and nuts.

12. Realign the Lid and reattach to the Tank using the previously removed bolts and nuts.

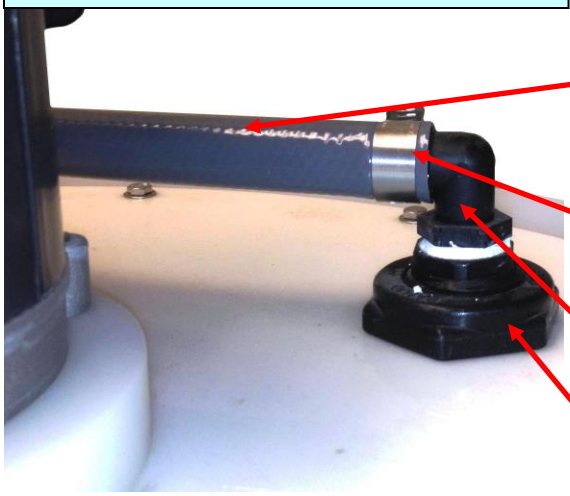
13. Plug the Motor's Power Cord into the Control Box.

14. Plug the Bicarb unit's Main Power Cord into an electrical receptacle.

RETURN-to-TANK FITTINGS / DROP-DOWN TUBE



Top View of Lid
Showing Hose, Clamp, & Bulkhead

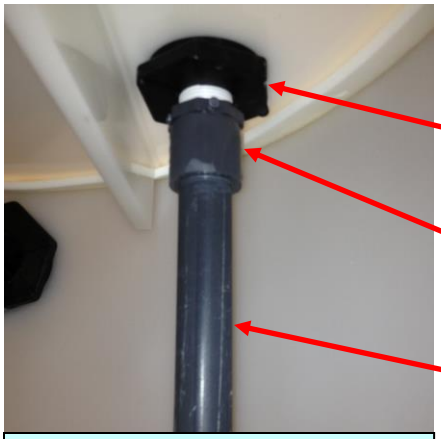


3/4" Hose Style 5000
Length from tank to header
PLHOST00315

Clamp Lined
Worm-Drive Hose
(x2, one for each end of hose)
PLHOCL002

90º 3/4" Poly Elbow
MPT x Hose Barb
PLFIPO00351

3/4" Poly Bulkhead
PLFIPO00308



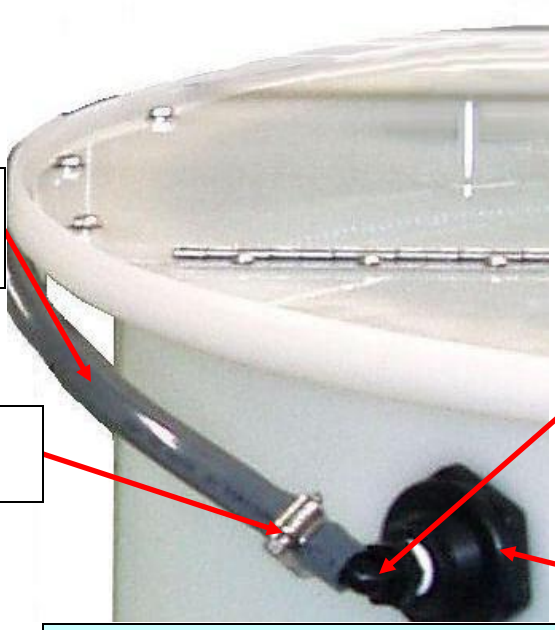
3/4" Poly Bulkhead
PLFIPO00308

S8 Male Adapter SxT
PLFIS800098

3/4" Sch 80 Pipe
(32" length)
PLPIS800044

Underside of Lid
Inside Tank View
Showing Bulkhead, Adapter,
and Drop-Down Tube

FILL INLET CONNECTIONS



Close-Up of Tank
Showing Hose, Clamp, & Bulkhead

Inside the Tank Connection to the Bulkhead can be one of two configurations both of which are shipped with the Bicarb unit in the Accessories Box

90º 1/2" Poly Elbow
MPT x Hose Barb
PLFIPO02070

+

Flow Control, 2.0 GPM
PVC Sch-80
PLFCS802001

- OR -

90º 1/2" Poly Elbow
MPT x Hose Barb
PLFIPO00355

VERIFYING FLOAT SWITCH FUNCTIONALITY

Float Switches were used on Bicarb units produced prior to February 2010. Bicarb units produced from February 2010 use the High and Low Level Sensors.

When a Float Switch is suspected of poor functionality or failure, this test should be performed. This is the same test performed at the Better Water manufacturing facility on returned Float Switches to verify warranty claims.

1. Obtain a two-lead multi-meter and place in continuity mode.

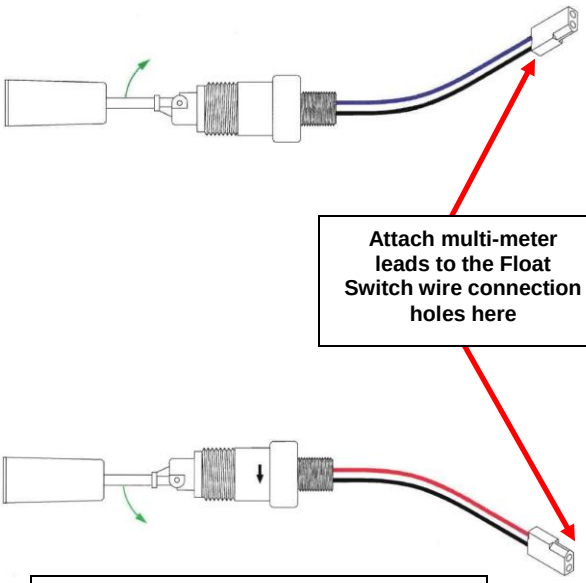
2. Attach the multi-meter leads to the contacts on the Float Switch wire.
* ***NOTE:*** *The wire colors are different between the High Level and Low Level Float Switches.*

3. Cycle the Float between open and close by raising and lowering the Float.

4. Take note as to whether the multi-meter alarms with the action of the Float reliably.
- The multi-meter should steady alarm when the Float is in the closed position.
    * HIGH LEVEL FLOAT SWITCH: alarms on the multi-meter when in the UP position
    * LOW LEVEL FLOAT SWITCH: alarms on the multi-meter when in the DOWN position

A failure to steady alarm in the closed position is the determination of a defective Float Switch.

HIGH LEVEL FLOAT SWITCH
EQSUBBICBTNK1FL
Alarms on the multi-meter when in the UP position



Attach multi-meter leads to the Float Switch wire connection holes here

LOW LEVEL FLOAT SWITCH
EQSUBTNK1FL LOW
Alarms on the multi-meter when in the DOWN position

REPLACING FLOAT SWITCHES

WHITE FLOAT SWITCHES vs. BLACK FLOAT SWITCHES

A change was made in the float switches in January 2006. Prior to this a shorter-white float switch was used, and after a longer-black float switch. The ***shorter-white float switches are no longer available***, so the float switches described below can be ordered as a replacement.

Prior to January 2006
Shorter-White Float Switch

After January 2006
Longer-Black Float Switch

Description	*part#*
High Level Float Switch	**EQSUBBICBTNK1FL**
Low Level Float Switch	**EQSUBTNK1FL LOW**

If this is done, a new bulkhead, through which the float switch is installed, is required. This new bulkhead must have the inside enlarged to accommodate the area required for full motion of the longer, black float switches. The part number for this bulkhead is **PLFIPO00321**. If placing an order for this bulkhead please note on the order "***Drill-Out/Enlarge for Old, White, Float Switch***".

REPLACEMENT INSTRUCTIONS

1. Disconnect the Float Switch's Wire Connection from the Control Box's Pigtail Connection.

2. Carefully unscrew the old Float Switch from the Bulkhead.

3. Place the new Float Switch into the bulkhead and carefully thread, taking care not to over-tighten it.

4. Correctly orient the Float Switch's Mechanical Float by turning the Float Switch either clock-wise or counter-clockwise.

- **HIGH LEVEL FLOAT SWITCH**:
The Mechanical Float should be oriented so that its normal position is sticking straight out, such that it will pivot at the joint to bend upward at a 90 degree angle when floating.

Normal Position

Floating Position

- **LOW LEVEL FLOAT SWITCH**:
The Mechanical Float should be oriented so that its normal position is bent at the pivot at a 90 degree angle hanging down, such that it will pivot to a straight-out position when floating.

Normal Position

Floating Position

5. Reconnect the Float Switch's Wire Connection to its corresponding Control Box's Pigtail Connection.

REPLACING PROXIMITY SENSORS

Proximity Sensors

Prior to January 2009, High and Low Level Float Switches were used which are mechanical in nature. From January 2009 and beyond, electronic, proximity sensors were used, and ***they are not interchangeable***.

** If Float Switches are required, see the section above on Replacing Float Switches.*

Description	*part#*
High Level Sensor, Tank 1	**EQSUBTNK1HL**
Low Level Sensor, Tank 1	**EQSUBTNK1LL**

REPLACEMENT INSTRUCTIONS

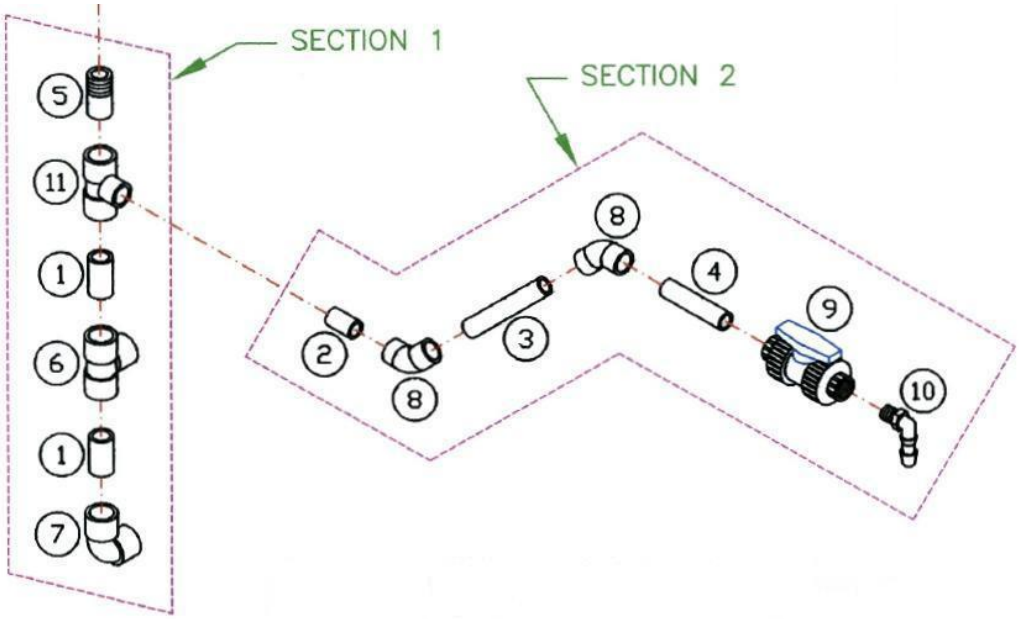
1. Disconnect the Proximity Sensor's Wire Connection from the Control Box's Pigtail Connection.

2. Carefully unscrew the old Proximity Sensor from the Bulkhead.

3. Place the new Proximity Sensor into the Bulkhead and carefully thread, taking care not to over-tighten it.

4. Reconnect the Proximity Sensor's Wire Connection to its corresponding Control Box's Pigtail Connection.

JUG FILL SUBASSEMBLY



Item#	Part#	Description	Qty
1	PLPIS800045	1” PVC Sch-80 Pipe, 2 3/16” length	2
2	PLPIS800044	3/4" PVC Sch-80 Pipe, 1 15/16” length	1
3	PLPIS800044	3/4" PVC Sch-80 Pipe, 4 7/16” length	1
4	PLPIS800044	3/4" PVC Sch-80 Pipe, cut to fit, approximately 8”	1
5	PLFIS800167	1” x 4” PVC Sch-80 Nipple, cut in half	1
6	PLFIS800050	1” PVC Sch-80 Tee SxSxS	1
7	PLFIS800062	1” PVC Sch-80 90º Elbow (SxS)	1
8	PLFIS800072	3/4" PVC Sch-80 45 Elbow (SxS)	2
9	PLVAS800170-A	3/4" Blue Ashai Valve	1
10	PLFIPO00351	3/4" MPT x 3/4" HN Polypro Elbow/Nipple	1
11	PLFIS801914	1” S x 1” S x 3/4" S Sch-80 Tee	1

** Reference DWG 3083*

REPLACEMENT INSTRUCTIONS IF BROKEN

In the event this assembly gets broken it can be replaced. The parts required will depend upon at which point the repair can be made, which should be at the pipes (item# 3 or 4), or at the connection to the bottom of the tank (item# 5).

* A 3/4" Coupling (2 1/8” length) may be required to connect if the pipe is broken (item# 1, 2, 2A, or 2B). This part number is **PLFIS800928**.

* Additionally two sections of 1” PVC Sch-80 Pipe may be required which connect to item# 6 Tee and item# 7 Elbow. This part number is **PLPIS800045**; 13” for 100-gallon, 9 3/16” for 60-gallon.

REPLACING the PUMP

1. Unplug the Bicarb unit's Main Power Cord.

2. Unplug the cord from the Pump to the Control Box.

3. Disconnect both the 3/4" Hose and the 1" Hose from the pump.

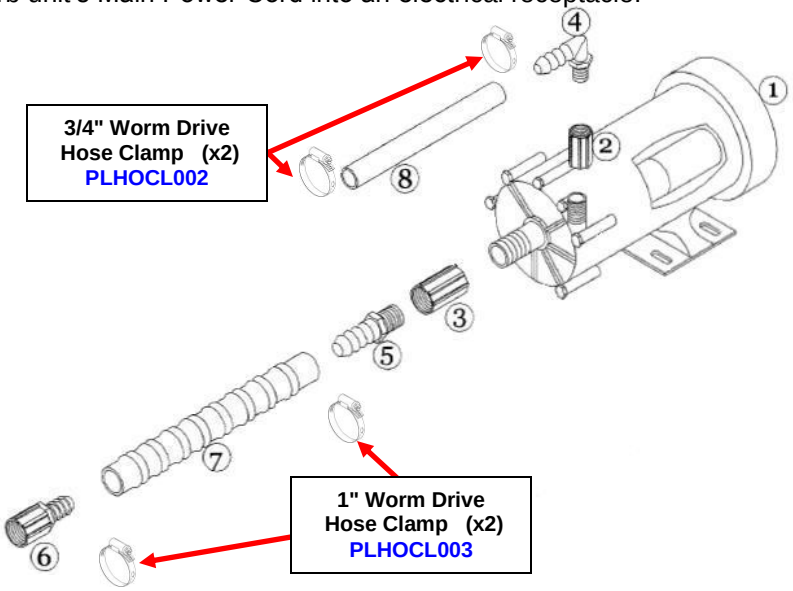
4. Remove the mounting hardware nuts from underneath the Tank Base from the four mounting holes.

5. Remove the pump, replacing with the new one.

6. Remount the pump to the Tank Base using the mounting hardware. (*See Pump Mounting Hardware diagram below*)

7. Reconnect the 3/4" Hose and the 1" Hose to the pump.

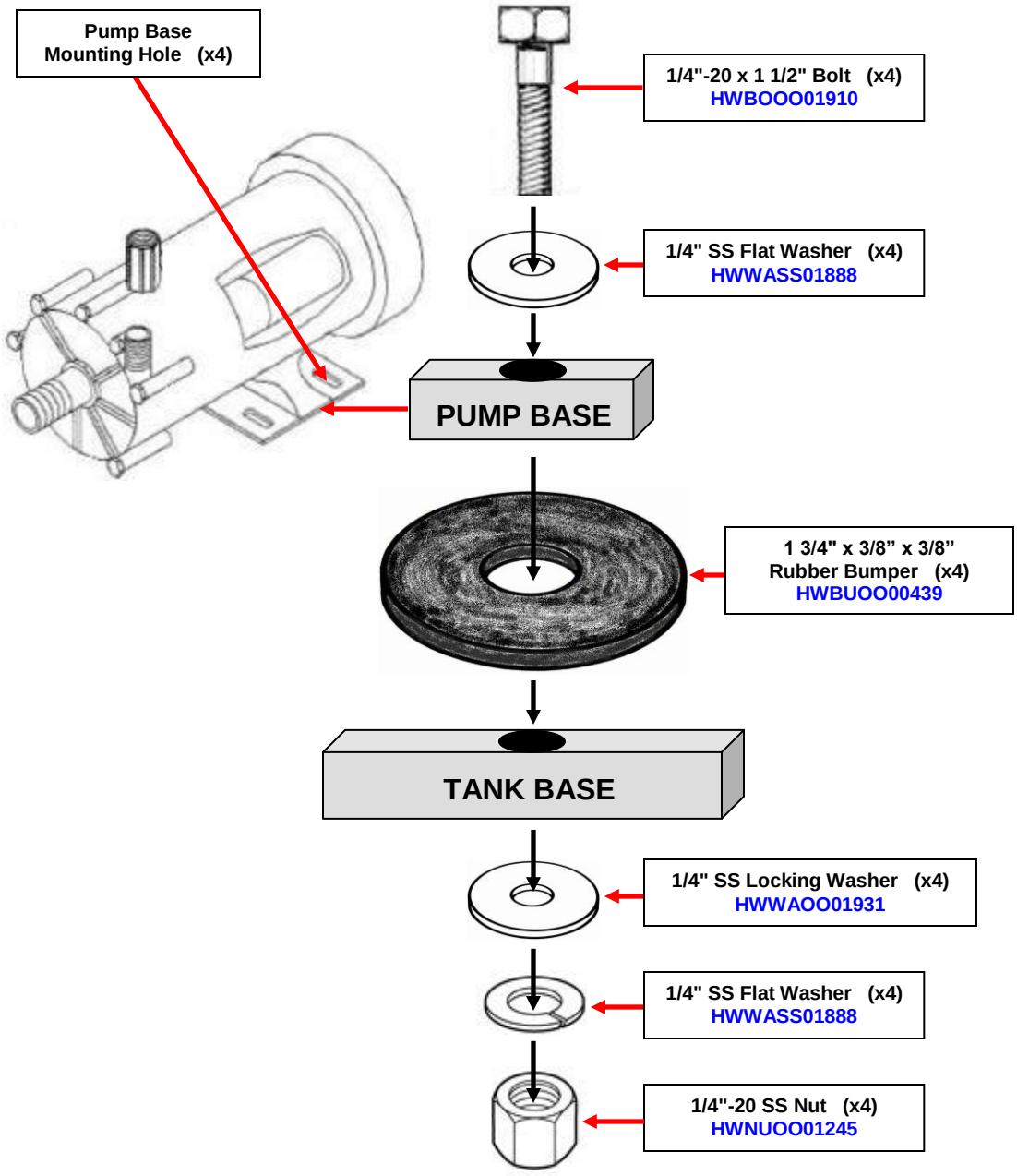
8. Plug the Bicarb unit's Main Power Cord into an electrical receptacle.



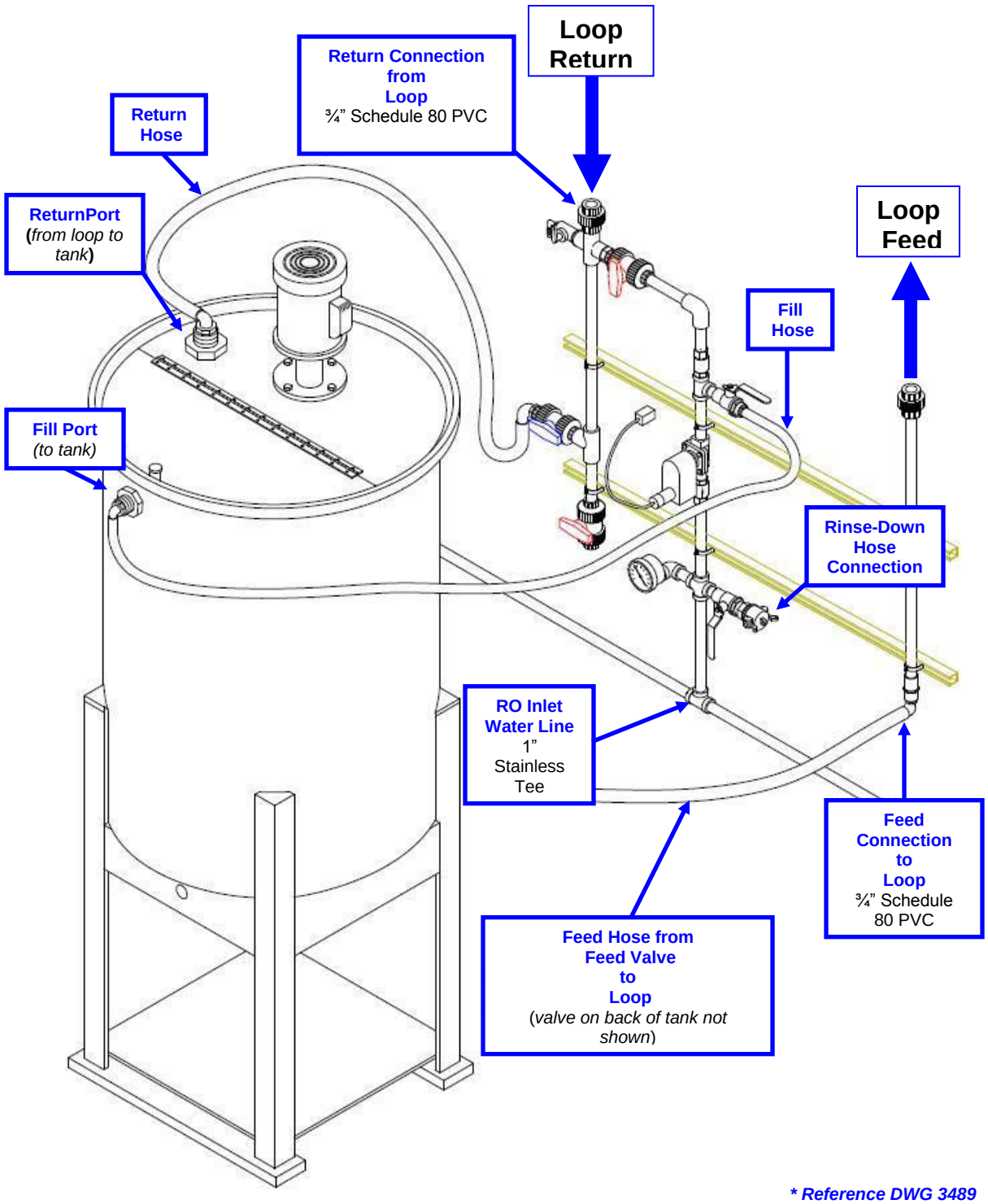
Item#	*Part#*	*Description*	*Qty*
1	EQPUIW00453	**MD-100 1/3 HP, 1PH, 115V Pump**	1
2	PLFIPO01230	**1" x 3/4" Pg Reducer**	1
3	PLFIPO00302	**1" TxT Coupling**	1
4	PLFIPO00351	**3/4" Poly 90° Hose Nipple**	1
5	PLFIPO00306	**1" Poly Hose Nipple**	1
6	EQTAFI01860	**1" Hose Barb x Union**	1
7	PLHOSU01237	**1" Suction Hose** *(100 gal: 20", 60 gal: 12")*	1
8	PLHOST00315	**3/4" Style 5000 Hose** *(100 gal: 36", 60 gal: 30")*	1
9	ELHBPL00765	**Hubble 2 Pole 3 Wire 15A, 125V, NY PL**	1

**** Reference DWG 3303***

PUMP MOUNTING HARDWARE

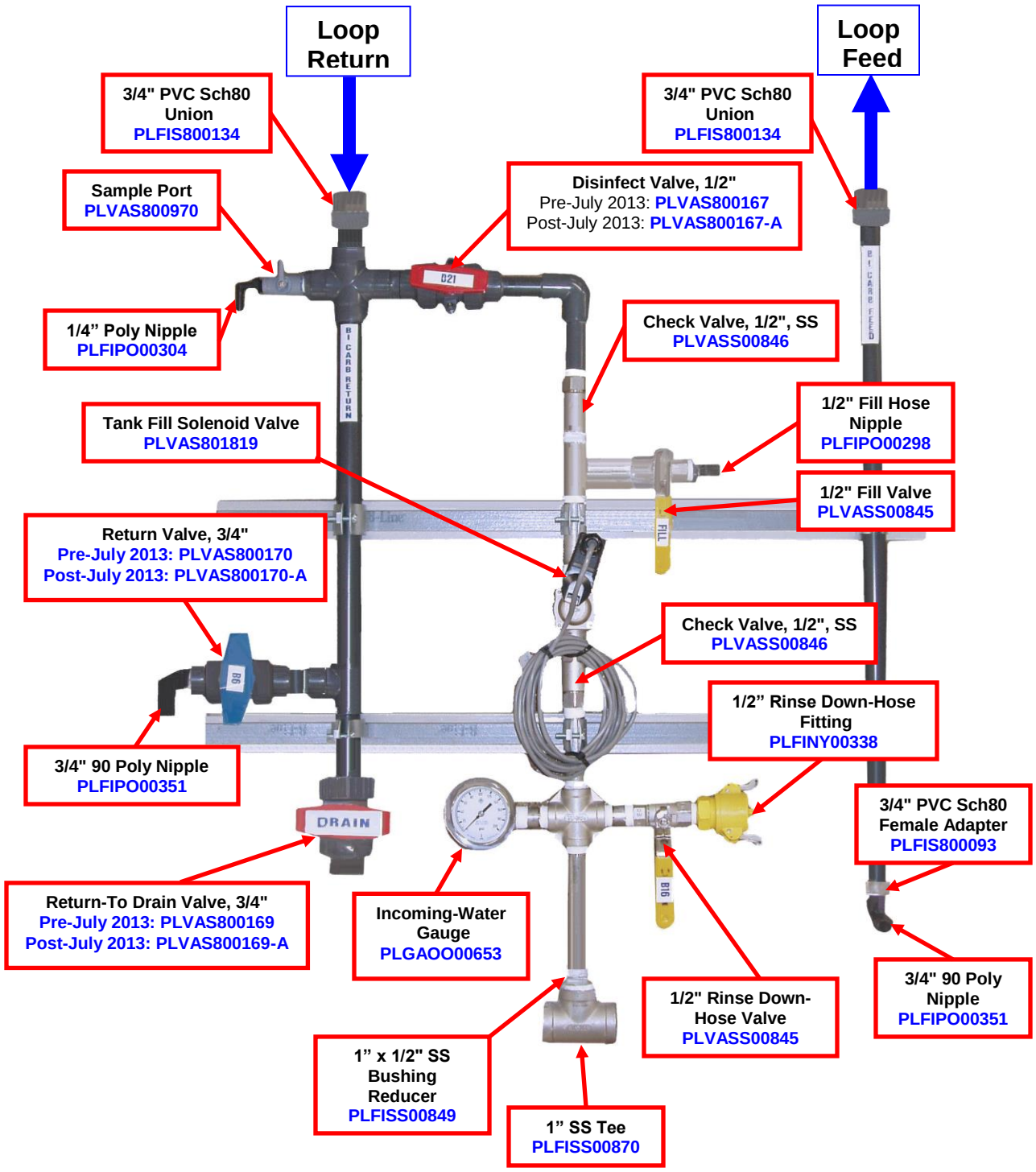


PLUMBING HEADER and TANK DIAGRAM



** Reference DWG 3489*

PLUMBING HEADER
Part# EQASSYBCB01859



BICARB UNIT VALVES LEGEND & DESCRIPTIONS

Fill Valve
This is the main valve used to fill the Tank.
* ***NOTE:*** Tank Fill Switch on Control Panel must be in the Tank# 1 position to fill. Once the level in the tank reaches the High Level Sensor, the Solenoid Valve will close and water flow will cease.

Loop Return Valve to Tank (B-6)
When the pump is operating and when this valve is in the OPEN position, liquid will return to Tank.

Return to Drain Valve
When the pump is operating and when this valve is in the OPEN position, liquid will return to Drain.

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 Tank. After bicarbonate solution is verified, this valve is used to fill jugs from Tank if needed. During the disinfect/cleaning procedure, this valve can also be used to verify the presence of disinfectant/cleaner.

Service Pump Valve
This valve is used to allow liquid to be pumped from Tank through the pump and to the distribution Loop. When this valve is closed, Tank will be isolated from the pump and distribution loop.

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

Loop Service Valve
This valve must be open to pump any liquid from Tank to the distribution loop. In an emergency situation, this valve can be closed and all flow to the distribution loop will cease.

Rinse-Down Valve (B-16)
This valve, when open, will allow water to flow through a connected hose to rinse down the inside of the tanks.

Disinfect Valve (B-21)
This valve is used to rinse the Bicarb distribution loop. When opened, dialysis water will enter the Bicarb distribution loop. The Return to Drain Valve should be open and this will flush the distribution loop of all bicarbonate solution or disinfect/cleaning solution.

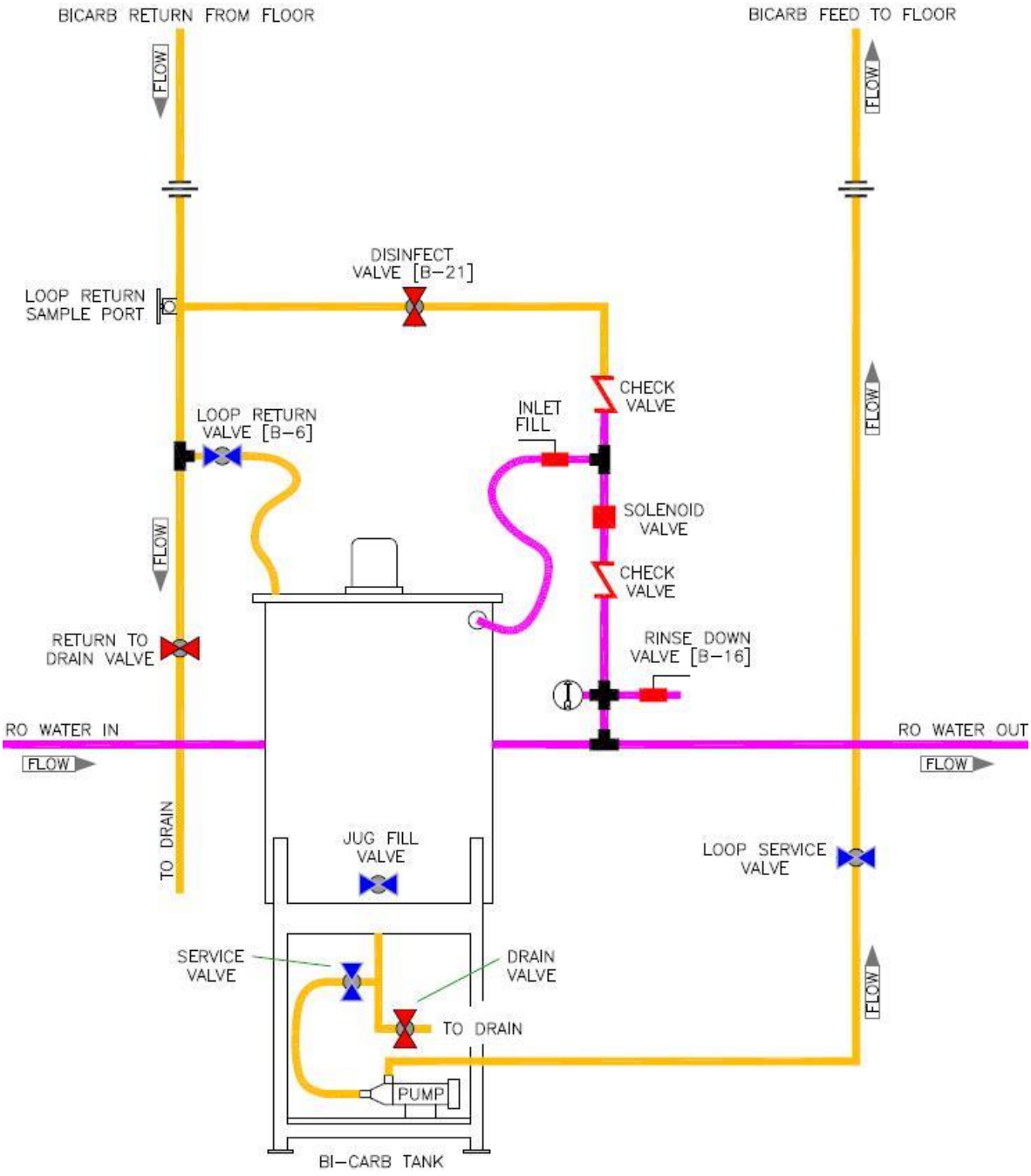
Loop Return Sample Port
This valve will allow the user to take a sample of the liquid flowing from the distribution loop. This can be used to verify a bicarbonate solution or to verify the presence or absence of disinfectant/cleaning solution.

Tank Fill Solenoid Valve
This valve receives a signal from the High Level Sensors (in Tank) and the Tank Selector Switch (on the front of the Control Box). If the level of liquid is above the High Level Sensor, this Solenoid Valve will not open. This Solenoid Valve and the High Level Sensors are deactivated when the Keyed Disinfect Switch is in the ON position.

Flow Restrictor

When installed, the Flow Restrictors are installed to only allow 2gpm to flow though the fill lines. This will prevent the filling process from using too much water from the distribution loop and possibly causing the dialysis machines to go into a “Low Pressure” alarm condition.

BICARB UNIT FLOW DIAGRAM

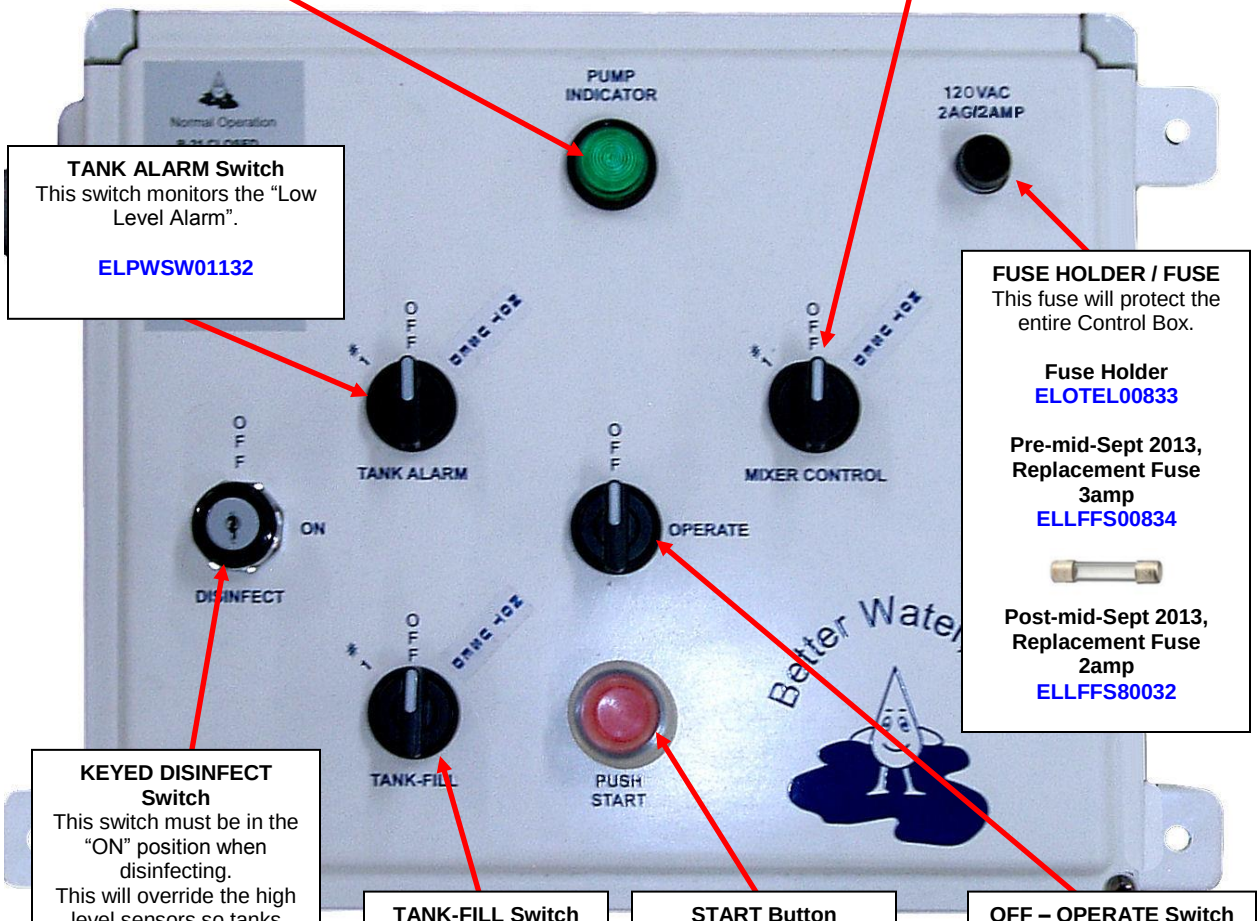


** Reference DWG 3742*

CONTROL BOX (Front View)

Part# EQASSYBCB01854

Functions & Part Numbers



Pump Indicator Light
This Light will be illuminated when the distribution Pump is running.

Indicator Light (complete)
ELLPS01894

Replacement Bulb
ELLPLS01896

Mixer Control Switch
This switch turns the mixer motor ON and OFF.
ELPWSW01132

TANK ALARM Switch
This switch monitors the "Low Level Alarm".

ELPWSW01132

FUSE HOLDER / FUSE
This fuse will protect the entire Control Box.

Fuse Holder
ELOTEL00833

Pre-mid-Sept 2013, Replacement Fuse 3amp
ELLFFS00834

Post-mid-Sept 2013, Replacement Fuse 2amp
ELLFFS80032

KEYED DISINFECT Switch
This switch must be in the "ON" position when disinfecting.
This will override the high level sensors so tanks can be filled to capacity for disinfection and rinsing.

Keyed Disinfect Switch
ELPWSW01135

Replacement Key
ELIDRL01130

TANK-FILL Switch
This switch opens the inlet solenoid valve to fill the tank.

ELPWSW01132

START Button
After turning Off – Operate Switch to OPERATE, Push and Hold Start Button until Green Indicator light stays on.

Start Button
ELPWSW01133

Replacement Clear Rubber Boot
ELPWSW01134

OFF – OPERATE Switch
Main Power Switch

ELPWSW01132

CONTROL BOX (Inside-Box View)

Part# EQASSYBCB01854

Functions & Part Numbers

For Models Produced from January 2005

Mixer Contactor, 5.5 - 8 amp
Provides overload protection.

ELSICN015

Pump Contactor, 2.8 - 4 amp
Provides overload protection.

ELSICN013

Smart Relay, 24V
The main controller that controls all of the functions of the Bicarb Unit.

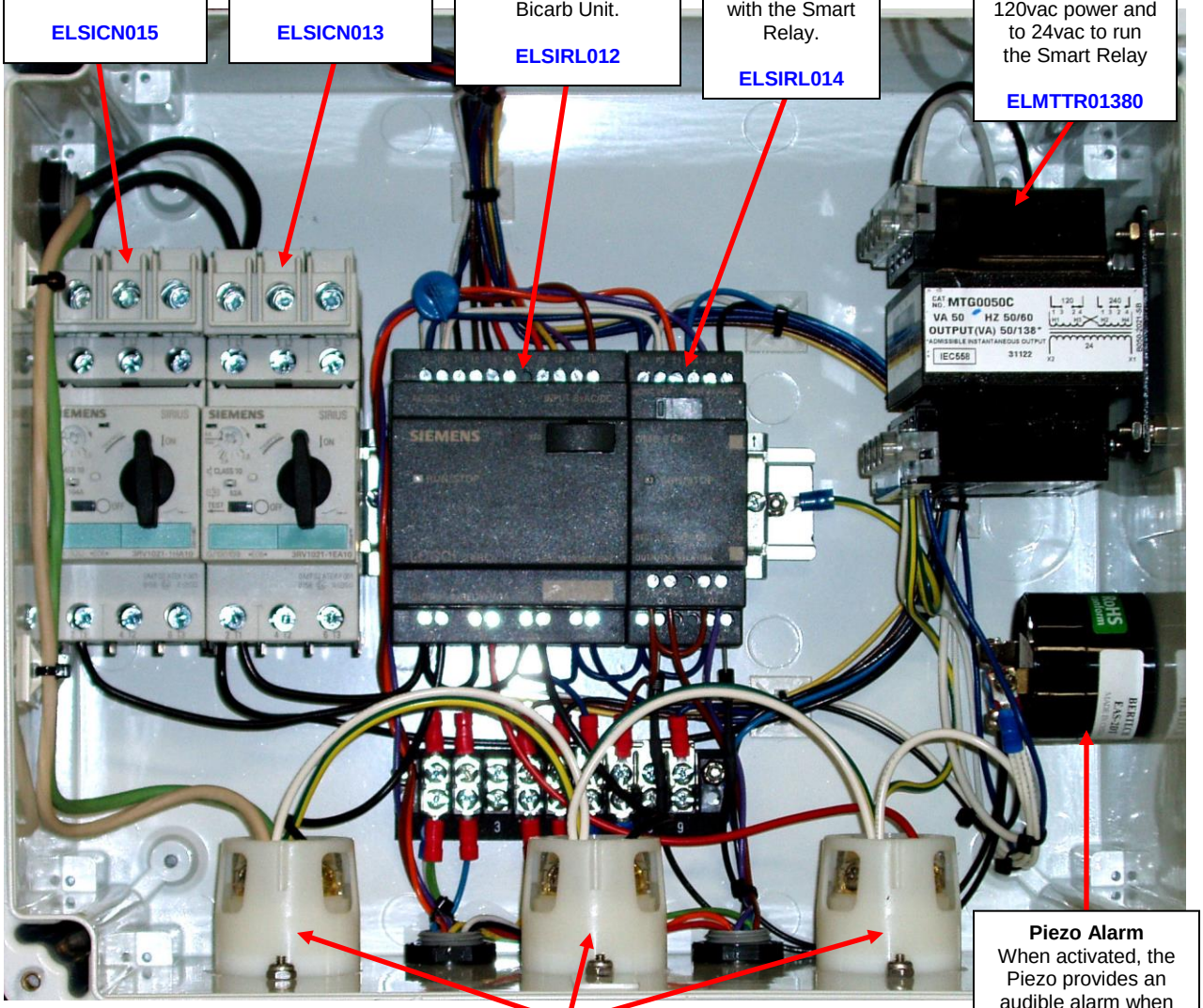
ELSIRL012

Expansion Module, 24V
Works in conjunction with the Smart Relay.

ELSIRL014

Transformer
This will convert the incoming 120vac power and to 24vac to run the Smart Relay

ELMTTR01380



Piezo Alarm
When activated, the Piezo provides an audible alarm when the level in the tank reaches the Low Level Sensor

ELSAPZ01097

Receptacles (x3)
These provide a place to plug in (*from the back*) the Distribution Pump and both Mixers

ELHBRE01852

CONTROL BOX (Inside-Box View)

Part# EQASSYBCB01854

Functions & Part Numbers

For Models Produced before January 2005

Timer
Controls the length of time that the Mixers will run.

Timer Base
ELIDRL01839

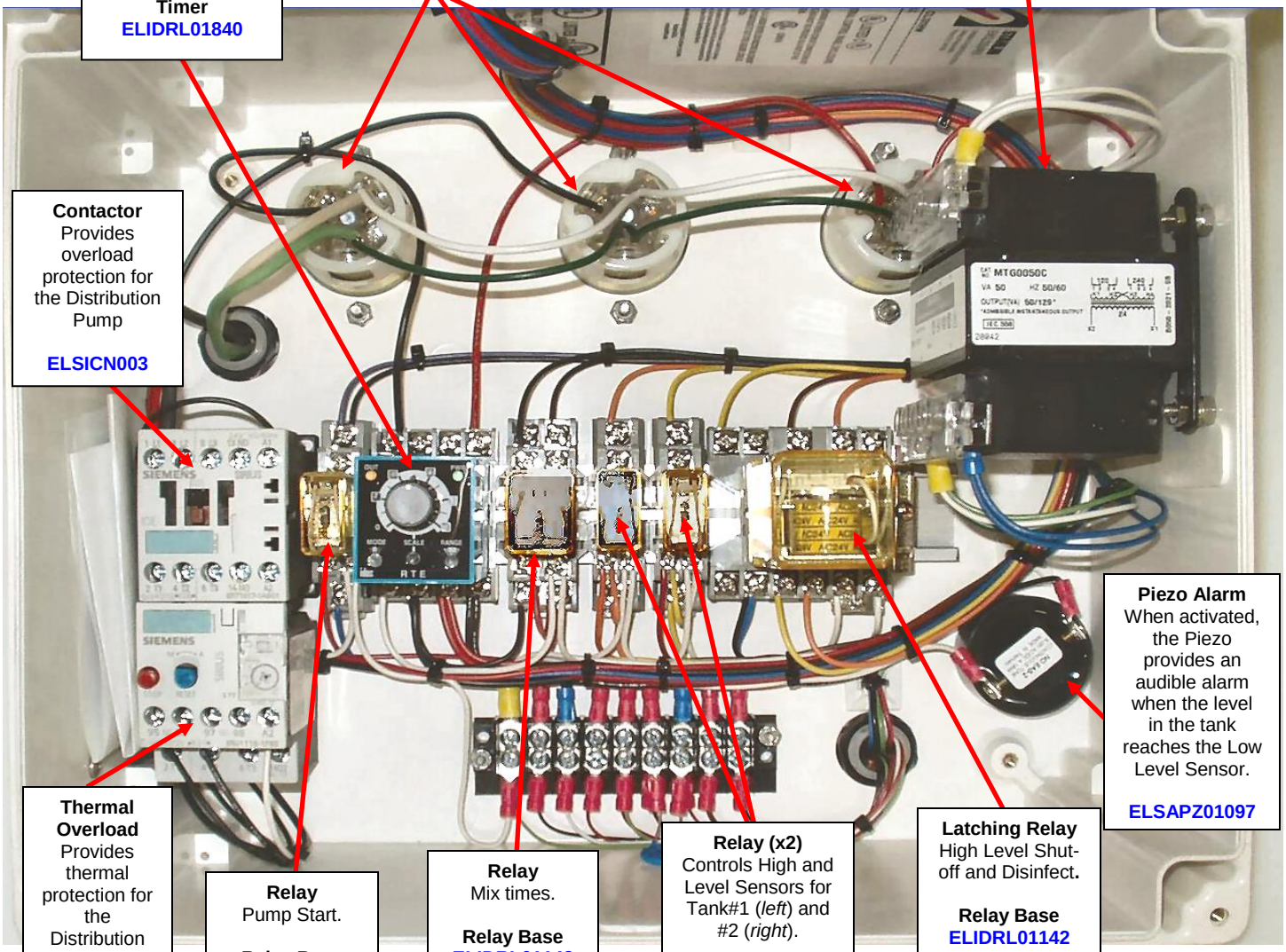
Timer
ELIDRL01840

Receptacles (x3)
These provide a place to plug in (from the back) the Distribution Pump and both Mixers.

ELHBRE01852

Transformer
This will convert the incoming 120 vac power to 24 vac to operate the timers and relays that control all operations of the unit.

ELMTTR01380



Contactor
Provides overload protection for the Distribution Pump

ELSICN003

Piezo Alarm
When activated, the Piezo provides an audible alarm when the level in the tank reaches the Low Level Sensor.

ELSAPZ01097

Thermal Overload
Provides thermal protection for the Distribution Pump

ELSICN001

Relay
Pump Start.

Relay Base
ELIDRL01142

Relay
ELIDRL01146

Relay
Mix times.

Relay Base
ELIDRL01143

Relay
ELIDRL01145

Relay (x2)
Controls High and Level Sensors for Tank#1 (*left*) and #2 (*right*).

Relay Base
ELIDRL01142

Relay
ELIDRL01146

Latching Relay
High Level Shut-off and Disinfect.

Relay Base
ELIDRL01142

Relay
ELIDRL01146

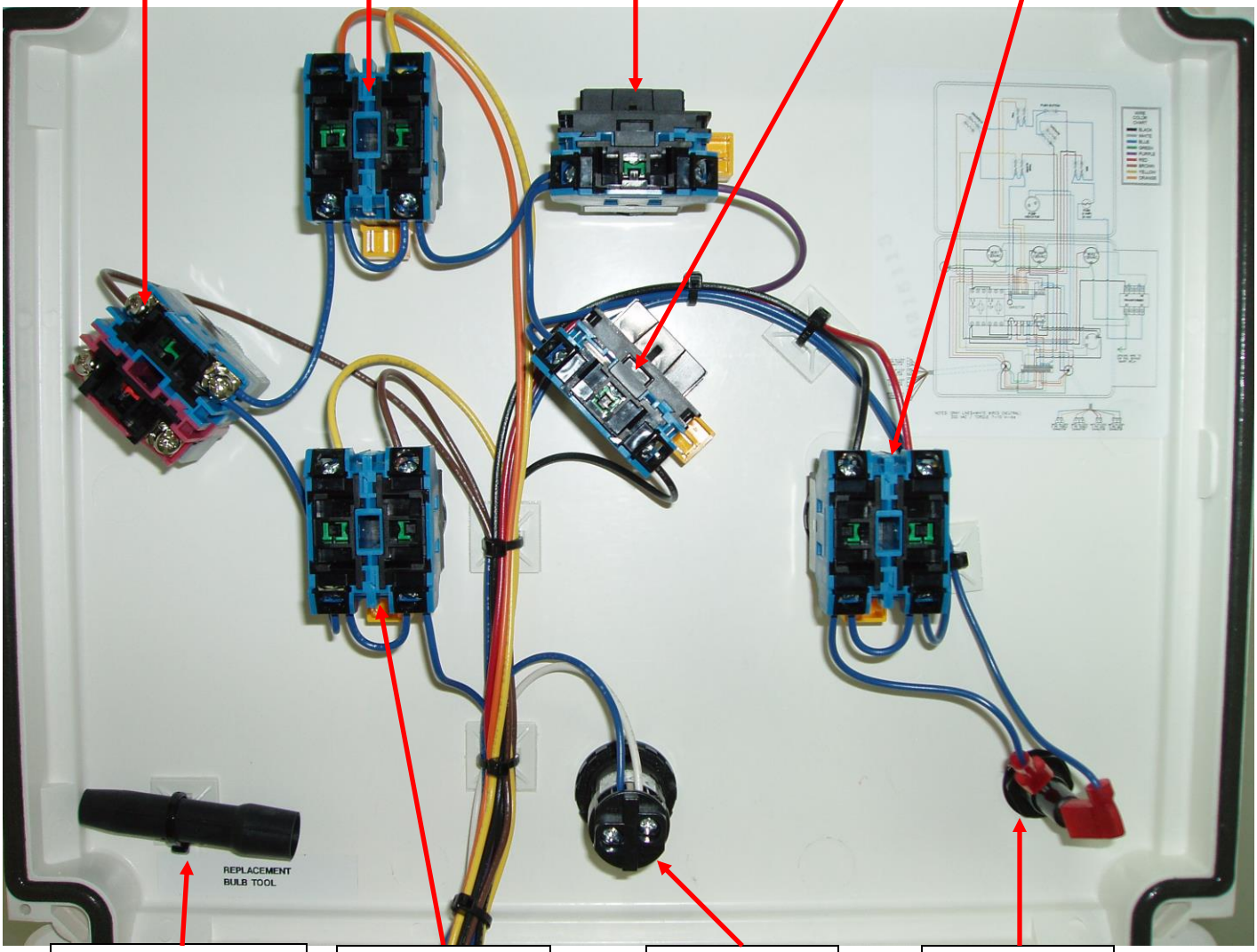
NOTE: *No picture was available of the inside of the Single Bicarb Control Box built prior to January 2005. The picture shown is that of a Dual Bicarb Control Box built prior to January 2005. The only difference is the three Receptacles are on the bottom of the box rather than the back.*

CONTROL BOX (Inside of Lid View)

Part# EQASSYBCB01854

Part Numbers

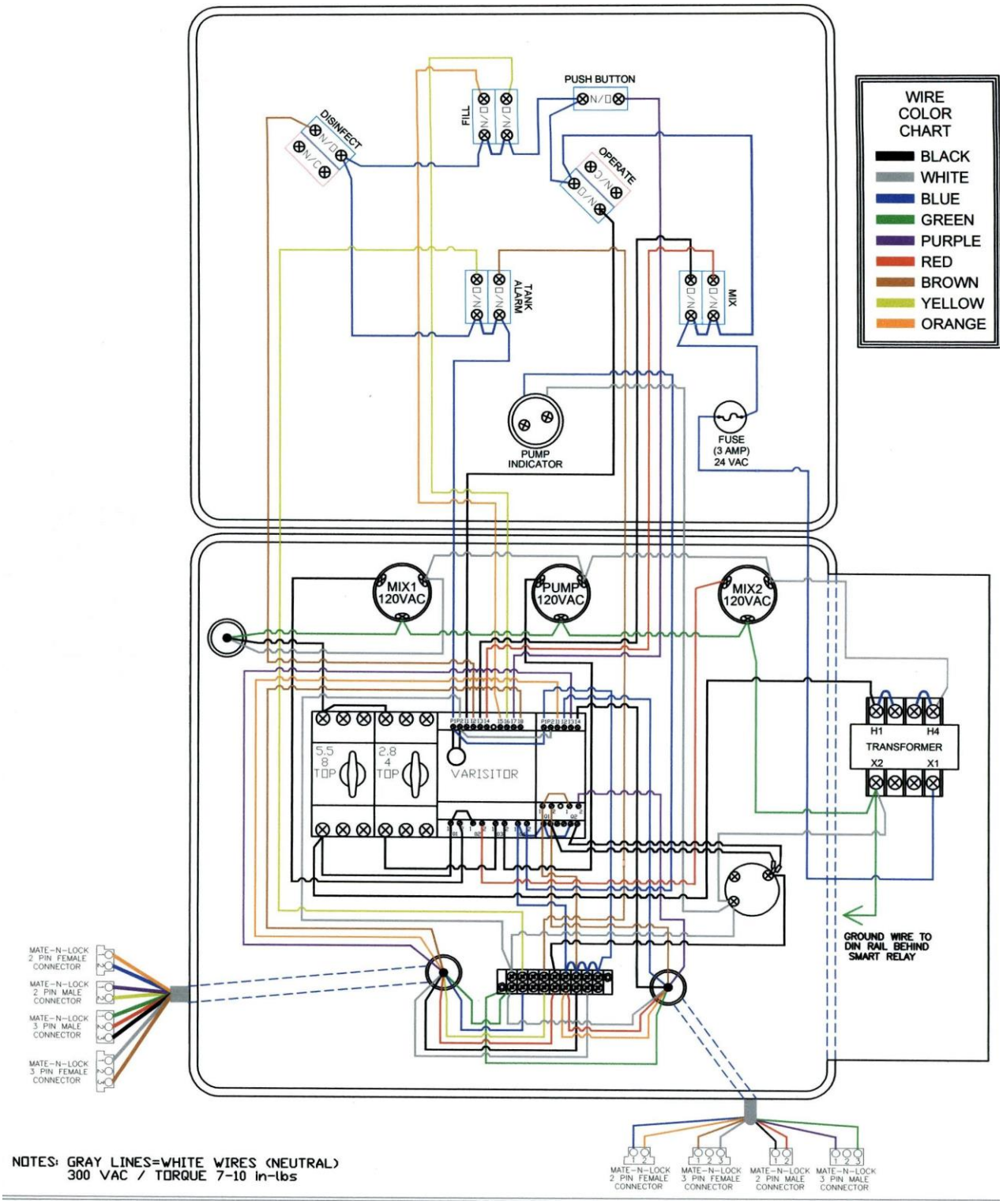
For All Models



CONTROL BOX WIRING SCHEMATIC

Part# EQASSYBCB01854

(printed on inside of Control Box Lid)



RELATED REPLACEMENT PARTS

DESCRIPTION	PART#	PICTURE
Propeller Shaft - 316 Stainless Steel	EQBICB00471	
Propeller - Polypropylene	EQBICB01923	
Propeller Set Screw - Stainless Steel	EQBICB01920	
Shaft Coupling - Stainless Steel	EQBICB00472	
Coupling Set Screw - Stainless Steel	HWSCSS01920	
Mixer Motor - 1/4 HP, 115 VAC	EQBICB01868	
Mixer-Motor Power Cord - For Mix/Delivery Bicarb units	EQPCOO00200	
MD 100RLT Pump - 1/3 HP, 1 Phase, 115 VAC	EQPUIW00453	

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

RELATED REPLACEMENT PARTS

DESCRIPTION	PART#	PICTURE
3/4" Red Handle Valve, Plast-O-Matic * *For models manufactured before mid-July 2013*	**PLVAS800169**	
3/4" Red Handle Valve, Asahi * *For models manufactured from mid-July 2013*	**PLVAS800169-A**	
3/4” Blue Handle Valve, Plast-O-Matic * *For models manufactured before mid-July 2013*	**PLVAS800170**	
3/4” Blue Handle Valve, Asahi * *For models manufactured from mid-July 2013*	**PLVAS800170-A**	
1” Blue Handle Valve, Plast-O-Matic * *For models manufactured before mid-July 2013*	**PLVAS800172**	
1” Blue Handle Valve, Asahi * *For models manufactured from mid-July 2013*	**PLVAS800172-A**	
1” Red Handle Valve, Plast-O-Matic * *For models manufactured before mid-July 2013*	**PLVAS800174**	
1” Red Handle Valve, Asahi * *For models manufactured from mid-July 2013*	**PLVAS800174-A**	

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

RELATED REPLACEMENT PARTS

DESCRIPTION	PART#	PICTURE
High Level Proximity Sensor Subassembly ** For models manufactured from January 2009*	**EQSUBTNK1HL**	
Low Level Proximity Sensor Subassembly ** For models manufactured from January 2009*	**EQSUBTNK1LL**	
High Level Float Switch: ** For models manufactured before January 2009*	**EQSUBBICBTNK1FL**	
Low Level Float Switch ** For models manufactured before January 2009*	**EQSUBTNK1FL LOW**	
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**	
Check Valve, 1/2", 316 Stainless-Steel	**PLVASS00846**	
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

RELATED REPLACEMENT PARTS

DESCRIPTION	PART#	PICTURE
Bicarb Remote Alarm Box	**EQASSYBICB01709**	
Bicarb Control Box	**EQASSYBCB01854**	
Fuse, 3 Amp, Little-Fuse ** For models manufactured before mid-September 2013*	**ELLFFS00834**	
Fuse, 2 Amp, Little-Fuse ** For models manufactured after mid-September 2013*	**ELLFFS00832**	
Fuse Holder	**ELOTEL00833**	
Flow-Switch, 1”, PVC-Clear	**PLFSS800443**	

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

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 B

TECHNICAL SERVICE BULLETINS

TECHNICAL SERVICE BULLETIN

Frequency for Cleaning Bicarbonate Mixing Units

TSB# **TSB2016001**	Date **02/18/16**	Page 1 of 1

OVERVIEW:

Bicarbonate mixing units require periodic cleaning to remove bicarbonate and mineral deposit build-up on internal surfaces, as well as the flow-switch, and pump. The frequency at which this cleaning is performed is dependent upon the type of tank level sensors used and how often the bicarb tanks are rinsed.

If **float sensors** are used, which are mechanical in nature, then cleaning must be performed **weekly** for optimum performance. Since these have moving parts that come in contact with the bicarbonate solution, their proper operation can be affected by bicarbonate and mineral build-up which could hinder movement in the hinged area. Float sensors were used in bicarbs prior to February 2010.

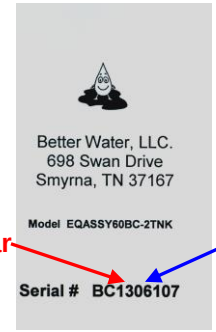
Float Sensors
Different models utilized: short white or long black

If **proximity sensors** are used, which are not mechanical but use electronic signals to sense water levels, then cleaning must be performed **monthly** if adequate tank rinsing procedures are employed. This type of sensor is less sensitive to bicarbonate and mineral build-up since they don't have moving parts. Proximity sensors have been in use since February 2010.

Proximity Sensor

SENSOR DETERMINATION BASED ON SERIAL NUMBER

Besides physically looking inside a bicarb's tanks to determine which sensor it has, the serial number can be used to determine this as well since proximity sensors have been in use since February 2010. Adhered to each bicarb is a label which contains the bicarb's serial number. The first four numbers in the serial number denote the year and month the device was manufactured. So for example a bicarb whose serial number is 1306107 was manufactured in 2013 in the month of June.



"13" - Year "06" - Month

RECOMMENDATIONS:

1. Rinsing procedures…
… At minimum at the end of the dialysis day if the bicarb has been used to mix bicarbonate solution, the tanks should be rinsed. If the bicarbonate solution was distributed via the distribution loop, then it should be rinsed as well.
… Optimally tanks should be rinsed after each batch of bicarbonate is mixed and emptied, especially if many batches are mixed within a single day.

2. Recommended cleaning solutions:
- Vinegar containing 5% acetic acid, with a dilution ratio of 1 gallon of vinegar for every 10 gallons of water.
- Citric Acid, following its manufacturer's instructions for dilution ratios and use.
- 1% Peracetic Acid solution, following its manufacturer's instructions for use.

Bicarbs may require more cleaning which is ultimately the responsibility of the Medical Director.

NOTES


BETTER WATER LLC
Smyrna, Tennessee