Diamond LINQ Softener

Single Tank Product Manual

920-757-5440 - www.diamondh2o.com - N1022 Quality Drive, Greenville, WI 54942

Set Up Instructions for DLS-Series Single Tank

Inspect the packaging of the equipment to confirm that nothing was damaged during shipping. (Figure 1)

Figure 1: Original Packaging of DLS Single Tank System
This is how the packages will generally arrive

Remove the resin tank(s) and valve(s) from the packaging. Make sure everything is included and without damage. Notice that the valve(s), Brine Line 'T', brine line hose, and MAV valve will be found in the brine tank. Below is a checklist with everything you should have received.

_____ 1) Control Valve
(Figure 2)

Figure 2: Control Valve

_____ 2) Brine Tank (Figure 3)
_____ 3) Brine Line Hose (Figure 5)
_____ 4) Softener Tank (Figure 4)

Figure 3: Brine Tank

Figure 4: Softener Tank

Figure 5: Brine Line Hose, Control valve packaging, Brine Line 'T' (in bag)

_____ 5) Correct Amount of Gravel (from Model and Media Requirements Table on page 2)
_____ 6) Correct Amount of Resin (from Model and Media Requirements Table on page 2)

Call Diamond H2O right away if anything is missing. Contact the freight company **immediately** if anything is damaged. Diamond H2O will not be liable for any damage received after shipping.

Packaged By: _____ Date: _____

Received By: _____ Date: _____

Table 1: Media Requirements.

Example: A DLS-120-100 would require 4 cubic feet of resin and 50 pounds of gravel per tank.

Model Number	Amount of Resin per Tank (cu. ft.)	Amount of Gravel per Tank (pounds)
DLS-30-100	1	
DLS-45-100	1.5	
DLS-60-100	2	
DLS-75-100	2.5	20
DLS-90-100	3	30
DLS-120-100	4	50

NOTE: Bags of gravel should be marked with a tag showing whether they belong to the brine tank or the softener tank.

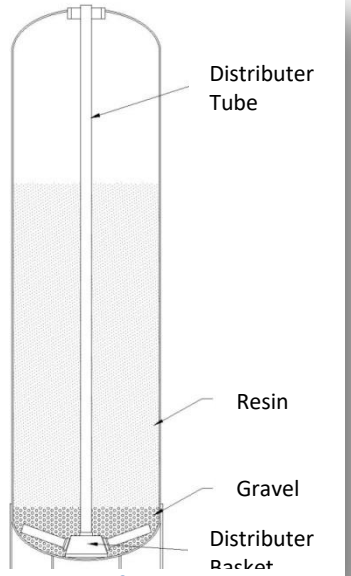


Figure 6: Softener Diagram

Table 2: Softener Specifications

MODEL	CAPACITY & SALT per REGENERATION				FLOW RATE (GPM)			SOFTENER TANK(S)		BRINE TANK (With Grid)		Plumbing	
	MAXIMUM		MINIMUM		CONT.	PEAK	BACKWASH	SIZE	CAPACITY	SIZE	CAPACITY	SERVICE	DRAIN
	Capacity	Salt/ Regen	Capacity	Salt/ Regen	@15psi Drop	@25psi Drop	n/a	Dia x Ht (in)	Cu Ft	Dia x Ht (in)	Lbs.	Inches	Inches
DLS-30-100	30,000	15 lb	24,000	10lb	12	16	2.4	9 x 48	1	18 x 33	300	1	¾
DLS-45-100	45,000	22.5 lb	36,000	15lb	12	16	3.0	10 x 54	1.5	18 x 40	400	1	¾
DLS-60-100	60,000	30 lb	48,000	20lb	14	18	4.0	12 x 52	2	18 x 40	400	1	¾
DLS-75-100	75,000	37.5 lb	60,000	25lb	14	18	5.0	13 x 54	2.5	18 x 40	400	1	¾
DLS-90-100	90,000	45 lb	72,000	30lb	15	19	5.0	14 x 65	3	24 x 50	900	1	¾
DLS-120-100	120,000	60 lb	96,000	40lb	15	19	7.0	16 x 65	4	24 x 50	900	1	¾

Table 3: Injector Specifications

Model Number	Injector
DLS-30-100	Red
DLS-45-100	Red
DLS-60-100	White
DLS-75-100	White
DLS-90-100	Blue
DLS-120-100	Blue

Please read the entire Owner's Manual and Instruction before installation.
This Owner's Manual must stay with the unit.

How A Water Softener Works

Water hardness is derived from Calcium and Magnesium minerals that have been dissolved into the water under the earth's surface. These minerals are found in limestone deposits and are the source of hard water. The amount of hardness in a given water supply is dependent upon the quantity of Calcium and Magnesium present and the length of time water has been in contact with them. This can vary dramatically from well-to-well and, for this reason, water analysis is imperative in order to determine the proper treatment method. The degree of hardness increases as the concentration of Calcium and Magnesium "ions" increase and is measured in Grains Per Gallon (gpg). Diamond H2O's state certified lab is capable of performing all of these tests in house as well as lead, copper, arsenic, nitrate, nitrite, coliform bacteria, and many other essential tests to help determine the best possible treatment of your water. Contact TGA Laboratories for details on testing (www.tgalabs.com).

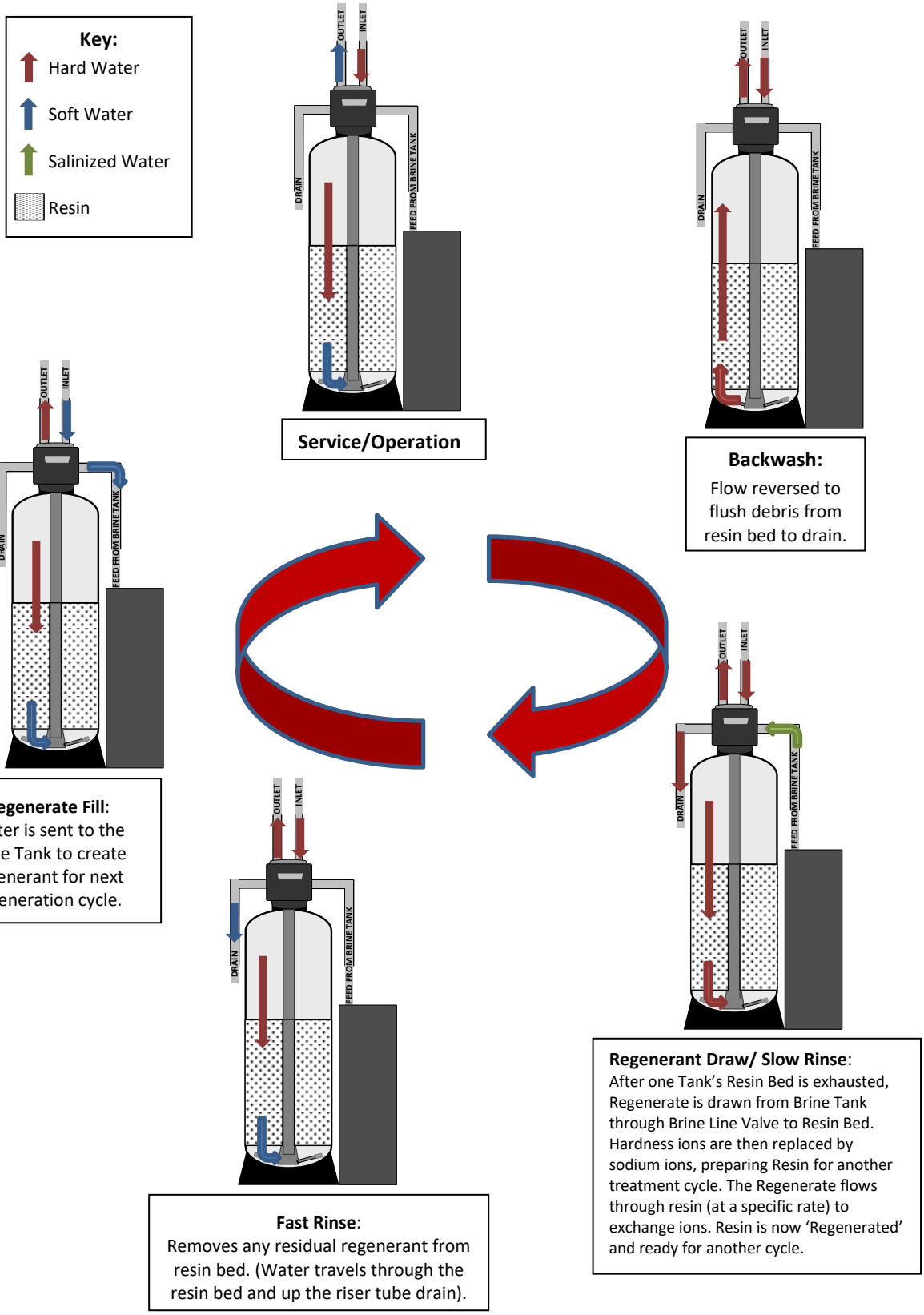
The problem of hard water in the home / business comes to light in many facets of daily use. Water spots and scum left behind on bathtubs, fixtures and showers; wear and tear on appliances; calcium build-up in hot water heaters and piping; and, greater amounts of soap and detergents being used are just a few examples.

The modern water softener is designed to reduce hardness ions and their unpleasant side effects. Special resin beads in the softener are used to change hard water into soft water. The surfaces of these beads are covered with sodium ions. As hard water enters the softener and comes into contact with the resin, an exchange of ions takes place. As dissolved Calcium and Magnesium ions cling to the resin surface, sodium ions take their place, thus softening the water. This process is called Ion Exchange. Over time, the sodium ions used for the exchange process become depleted and must be replenished.

The water softener provides a Regeneration process (**see page 4 for diagrams**) whereby brine solution enters the softener, driving-off the collected hardness ions and replenishes the surface of the resin beads with more sodium ions. This process is automatically initiated by the control valve on the softener. The regeneration process has five basic cycles as follows:

1. Backwash - The control valve directs the water flow in a reverse direction through the softener, separating the resin beads and flushing any accumulated particles to a waste drain.
2. Brine & Rinse - In the first part of this cycle, the control valve directs brine solution downward through the softener, driving-off collected hardness ions and replenishing the resin beads with sodium ions. The second part of the cycle rinses hardness ions and excess brine from the softener to the waste drain.
3. Rapid Rinse - The control valve directs the water flow downward, settling and recompacting the resin bed.
4. Brine Refill - The control valve directs fresh water into the salt compartment to create new brine solution for the next scheduled regeneration.
5. Service - This is the normal "operating" cycle where hard water enters the softener, comes into contact with the resin beads and exchanges hardness ions for sodium ions - the water then becomes "soft" and ready for use.

Figure 7: General Softener Operations



Installation Requirements

- A level floor position ahead of piping into water heater.
- Unit must be installed at least 10’ ahead of the inlet to a water heater to prevent damage due to back-up of hot water.
- DO NOT install the unit in an area of direct sunlight or where freezing temperatures may occur!
- (See Installation Diagrams for proper placement and plumbing connections.)

-Major System Components-

1. Brine Tank - This tank holds the salt that is added to the softener. This salt is dissolved with water to form a brine solution used in the softener regeneration process.
2. Softener - This tank contains the ion exchange resin media. Water flows through the softener under pressure to come into contact with the resin for water softening.
3. Control Valve - The valve directs water through the softener for water softening and controls the flow of water / brine for the regeneration process.

-Softener Location / Other Requirements-

- If household plumbing is galvanized and you intend to make the installation with copper (or vice versa), obtain di-electric unions to prevent dissimilar metal corrosion.
- Where the drain line is elevated above the control valve or exceeds 20 feet in length to reach the drain, use 3/4" I.D. drain line tubing instead of 1/2" I.D. Drain line tubing is not included.
- All plumbing lines not requiring “soft” water should be connected “upstream” of the softener.
- The brine tank drain line is gravity flow and must discharge below the overflow fitting.
- The brine overflow is provided as a back-up in the event the safety float shut-off should fail, allowing the brine tank to overfill. This drain connection would then carry the excess water to the drain and prevent flooding of the floor. Therefore, no liability will or can be assumed by the manufacturer of the softener should this occur.

Caution

- If sweat soldering copper pipe (remember to always use lead free solder and flux), cover bypass valve with wet rags to prevent heat damage to connections and control valve
- If using PVC or plastic pipe primers and solvent cements specifically recommended for use with potable water are required.
- Do not “TEE” to the main drain line from control valve.

1. **Obtain the required tools listed below:**
   A. Utility Knife
   B. Pliers
   C. Phillips Screwdriver
   D. Hammer
   E. Level
   F. Softener filling funnel

2. **Place the tanks near a water source.**
   A. Select a position near a floor drain that has adequate carrying capacity to handle the backwash flow rate.
   B. Place the softener(s) and brine tank on a level, firm foundation, like concrete.
   C. **Determine the "front" of each tank** received. For each tank:
      a. Make sure that the distributer riser is flush with the top of the resin tank (Figure 10 on page 6).

      b. Before placing any water, gravel, or resin in the resin tank, screw in the control valve to the point where it is secure. The valve does not need to be forced on, but should be snug.

      c. Mark the "front" of each resin tank (shown in Figure 8) with either a marker or tape. The front of the resin tank is determined by the location of the face of the control valve once it has been secured to the face of the control valve. Make sure that the system is positioned in a way that the plumbing can be installed.

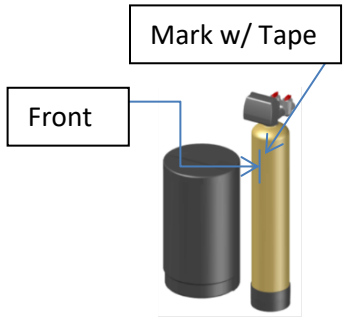


Figure 8: Softener Front

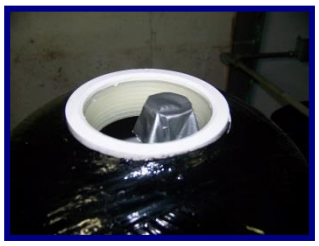


Figure 9: How to Block Distributer Tube

   D. ***Before Filling the Tanks***:
      a. Remove the valve(s)
      b. Ensure that the front(s) of the tank(s) is/are positioned correctly. Once filled, the resin tanks will be very difficult to move.
      c. Cover the exposed end of the distributor riser(s) to make sure no resin gets inside. Covering up the riser(s) with duct tape is one option, shown in Figure 8.
      d. Obtain a funnel to assist placing the resin in the resin tanks. (A funnel designed specifically for our resin tanks can be ordered from Diamond H2O Conditioning.)

3. Setting up the tank:

A. Fill the tank up to 30% full of water.

B. Check the system specifications on page 2 to determine the correct amount of gravel and resin needed for your system.

C. Position the distributor tube so it is in the center of the tank, shown in Figure 10.

Figure 10: Centered Distributer Tube

D. **SLOWLY**, pour the correct amount of support gravel into the tank without getting any gravel into the distributer tube.

E. Visually confirm that the gravel is level and covering the distributor basket and radials, if it is not, contact Diamond H2O Conditioning.

F. **SLOWLY**, pour the correct amount of resin into the tank. Try to keep the media level by carefully rocking the tank back and forth.

G. Fill the rest of the tank with water to prevent air from getting in the tanks and potentially losing media.

H. Verify that there is a large O-ring on the control valve(s) adapter base. (Figure 12)

I. Place the control valve on the tank, making sure that the distributor tube fits into the bottom of the control valve.

J. Tighten the control valve onto the tank to the point that it is snug. Double check that the valve is in a correct position to be able to install the plumbing.

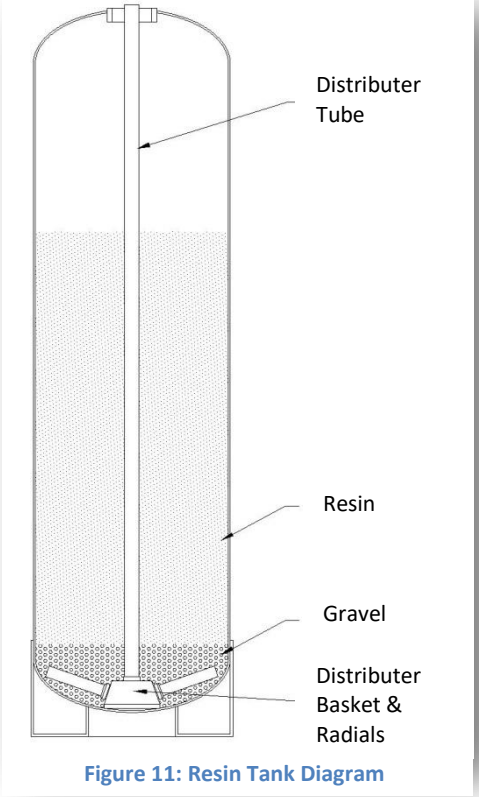


Figure 11: Resin Tank Diagram

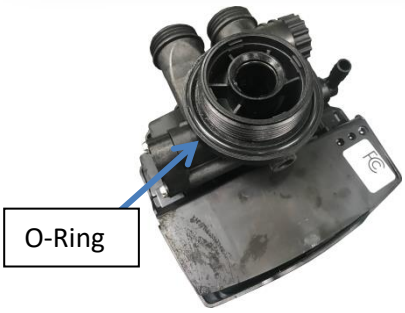


Figure 12: Valve Underside

4. Connect the brine tank.

A. Remove the ties on the brine line hose (included in the brine tank).

B. Remove the well cap and connect one end of the brine line hose to the brine line connection (Shown in Figure 14) of the brine tank. Tighten the brine line hose to the brine line connection by turning the cap of the brine line connection clockwise by hand. Make sure that no air can get into the line, or the softener will not regenerate properly.

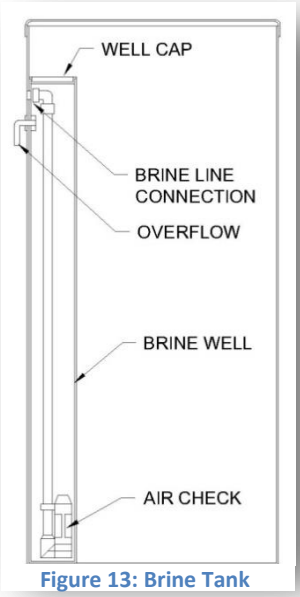


Figure 13: Brine Tank

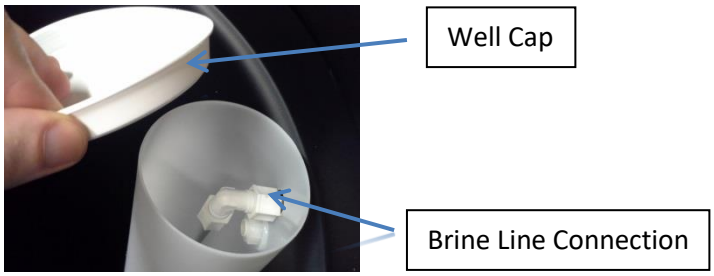


Figure 14: Brine Well Picture

C. Attach the brine line to the valve's brine inlet shown in figure 15.

D. Safely dispose of any leftover tubing.

E. Fill the brine tank with salt.

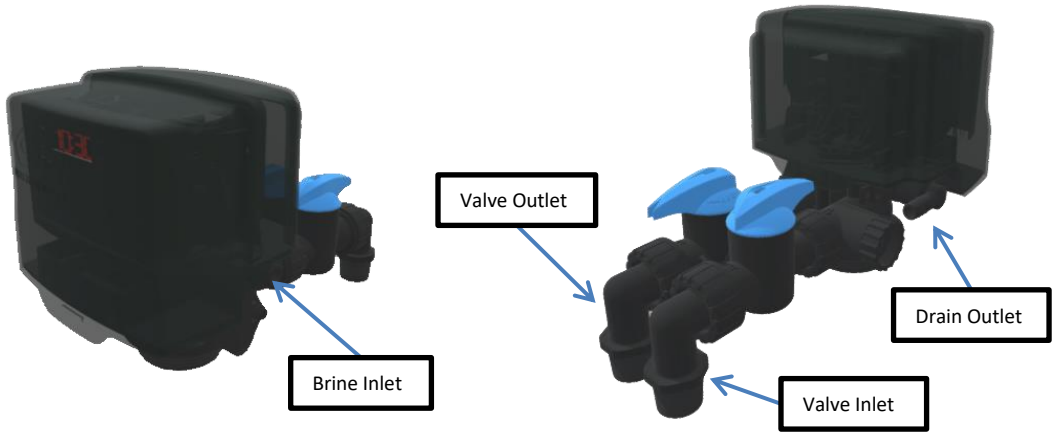


Figure 15: Control Valve Diagram

5. Connect the Valves to the Water Source

A. Pipe or tube a line from the Control Valve Drain (Figure 15) to the drain.

B.

DO NOT

- install a valve in this line
- use a pipe smaller than the unit's inlet or outlet
- make a direct connection to the drain
  - Provide an air gap at least four times the diameter of the drain pipe to conform to sanitation codes and be able to observe the drain flow.
- use an excessive amount of elbows in the plumbing

C. Turn off the main water supply and open nearest faucet to relieve pressure. Connect the facility plumbing to the control valve inlet and outlet following all local codes.

Note: Make sure all piping is free of thread chips and other foreign matter.

D. Turn the bypass valve to the "bypass" position (shown below).

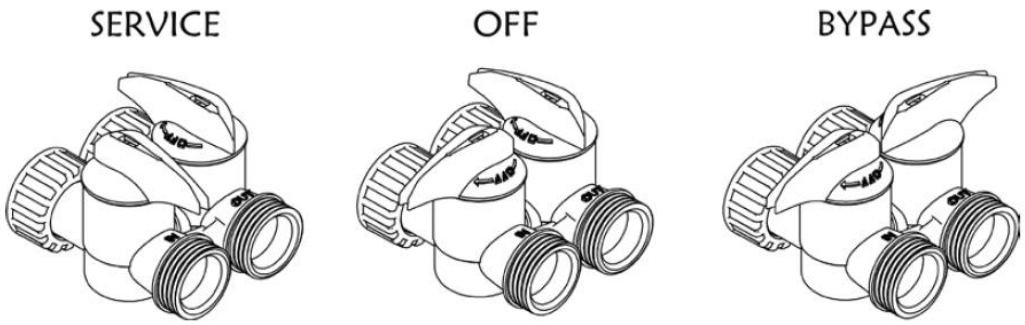


Figure 16: Bypass Valve Positions

E. Turn the main supply on to restore water service to the home.

F. Open the nearest faucet to evacuate air and re pressurize plumbing lines.

G. Check for leaks.

6. Connect the power supply

A. 1. Connect the power cord and plug power supply into a 115 volt / 60 Hz receptacle.

Electronic Connections

P = Power Supply
B = Powered in Backwash Step Only (Cycle #1)
S = Powered for Entire Regen. Cycle

Figure 17: Power Supply

7. Start up the system for the first time.

A. Add about three gallons of water to the brine tank.

B. Double check that the tanks are filled with water.

a. Manually put the control valve into regeneration (Hold the SET/CHANGE button or press the “regen now” button in the Diamond Linq app)

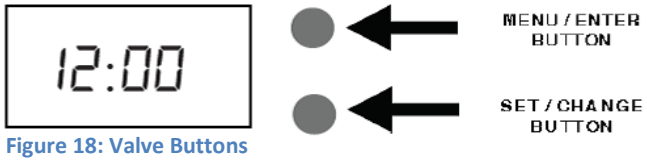


Figure 18: Valve Buttons

b. While the system is in backwash (cycle 1), slowly change the adjust the bypass valve to the “service” position.

c. A mixture of air and water will flow from the drain line.

d. Once the tank is filled, only water will be coming out of the drain line. Put the system back into bypass operation. Run each step of the regen cycle (Figure 7) for a few minutes each. You can advance to the next step by holding the SET/CHANGE button.

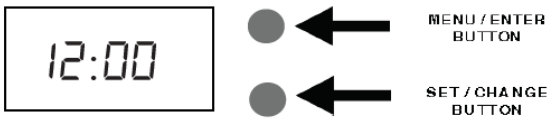
C. Program the Valve. Most of the settings were programed to Diamond H2O’s default values. The rest of the site-specific settings should be set by an installer after the water quality (pH, TDS, total hardness, and iron) have been determined. These settings can be changed with the valve’s two buttons (page 11) or by using the Diamond LINQ app (page 14).

8. Programming

1. Set time of day.
2. Set a.m. or p.m.
3. Set number of days between regeneration. (Refer to Regeneration Charts below.)
4. Follow along the line indicating the number of persons in the family to the column that corresponds with the hardness range. This will indicate how many days between regeneration should be programmed. (Refer to Figure 1.)

Note: Salt settings are pre-set at the factory for the maximum shown on the capacity charts.
Warning: Do not reduce salt settings below 9 lbs. as the water level in the brine tank will not reach the grid plate.

Main Menu



1. To enter Main Menu, press the **Menu/Enter** button.
   (Time of Day will flash)

2. To set the **Time of Day**, press the **Set/Change** button.
   (First digit will flash) Example [12-00]
   - To change digit value, press the **Set/Change** button.
   - To accept the digit value, press the **Menu/Enter** button.
   - Next digit will flash to begin setting.
   - Once the last digit display is accepted, all digits will flash.

3. To set **A.M.** or **P.M.**, press the **Menu/Enter** button.
   - To change digit value, press the **Set/Change** button. Example [A]
   - To accept the digit value, press the **Menu/Enter** button.
   - Once A.M. or P.M. is accepted, the next menu item will flash.

4. a. To set the **Number of Days between Regeneration** (A), press the **Set/Change** button. (**Time Clock Softeners**)
   - Repeat instructions from step (2). Example [A - 07]

   Notes: 1) Maximum value is 29.
   2) If value set to 0, Regeneration will never occur.
   3) Default setting is 4 days for softeners.

   b. To set **Hardness** (**Metered Softeners Only**) an "H" will appear to enter Compensated Hardness in grains per gallon (gpg) Default setting is 25 gpg. Example [H - 25]

5. To Exit Main Menu, press the **Menu/Enter** button.
   Note: If no buttons are pressed for 60 seconds, the Main Menu will be exited automatically.

Normal Operation

1. **Home Display**
   a. **Time Clock Softeners -**Alternates between the display of Time of Day and Number of Days until the Next Regeneration.
      - Days Remaining until the Next Regeneration will count down from the entered value until it reaches 1 day remaining.
      - A Regeneration Cycle will then be initiated at the next designated regeneration time.
   b. **Metered** models alternate the Time of Day and Gallons left until the next regeneration. The meter will count down to zero (0000) and then regenerate at the scheduled time set.

2. **Battery Back-Up** (Uses a standard 9-volt alkaline battery.)

Features of Battery Back-Up:

- During power failures, the battery will maintain the time of day as long as the battery has power. The display is turned off to conserve battery power during this time. To confirm that the battery is working, press either button and the display will turn on for five (5) seconds.

- If power failure occurs while system is regenerating, the Signature 2 will motor to a shut off position to prevent constant flow to drain. Depending upon system pressure and other factors, it is possible to observe a reduced flow to drain during this step. After power is restored, the Signature 2 will return and finish the cycle where it left off prior to the power interruption.

- When used without battery back-up, during a power failure, the unit stops at its current point in the regeneration position and then restarts at that point when the power is restored. The time will be offset by the increment of time the unit was without power, so it is necessary to reset the time of day on the unit. No other system will be affected.

Starting Extra Regeneration Cycle

1. To Start **Delayed Extra Cycle** Example [1]
   - If Days Remaining Until Next Regeneration does not read '1', press and hold the **Set/Change** button for 3 seconds until the display reads '1', or '0000' on metered models.
   - Regeneration cycle will initiate at the next designated regeneration time.

2. To start **Immediate Extra Cycle** ➡ First complete above step.
   - With Days Remaining Until Next Regeneration at '1' or '0000',
   - Press and hold the **Set/Change** button.
   - After 3 seconds, the regeneration cycle will begin.

3. To **Fast Cycle** thru regeneration ➡ First complete above 2 steps.
   Note: Press and hold the **Set/Change** button for 3 seconds to advance to the next cycle step. Fast Cycle is not necessary unless desired to manually step through each cycle step. (Repeat until valve returns to the home display)

Softeners		Default (Min)
Step 1	Backwash	10
Step 2	Brine & Rinse	60
Step 3	Rapid Rinse	10
Step 4	Brine Refill	15 lbs/ cu ft

Master Programming Mode

To enter Master Programming Mode, press and hold both buttons for 5 seconds.

Note: All Master Programming functions have been preset at the factory. Unless a change is desired, it is **NOT** necessary to enter Master Programming Mode.

1. Regeneration Time (r) Example [r 2A]

- The time of day at which regeneration may take place is designated by the letter "r".
- Default regeneration time setting for **SOFTENERS is 2a**
- The first display digit indicates A.M. or P.M. To change the value, press the **Set/Change** button.
- Press **Menu/Enter** button to accept the value and move to the next digit.
- The second and third display digits indicate the hour at which the regeneration will occur.
- Change the digits with the **Set/Change** button and accept with the **Menu/Enter** button.
- After the entire display flashes, press the **Menu/Enter** button to move to the next menu item.

2. **Regeneration Day Override (A)** – Meter (Demand) Mode Only

- Press **Menu/Enter** button. This display is used to set the maximum amount of time (in days) the unit can be in service without regeneration. This setting is identified by the letter "A" in the left digit. Regeneration will begin at the scheduled time. A setting of zero will cancel this feature.
- Example: Override every 7 days (A-07), default setting, or cancel setting (A-00). Maximum is 29.

3. **Regeneration Cycle Step Times (Steps 1, 2, 3, 4)**

Example [3 - 10]

- The next 4 displays set the duration of time in minutes for each regeneration cycle step.
- The step number which is currently modifiable is indicated on the far left of the display screen.
- The number of minutes allotted for the selected backwash step is displayed on the far right.
- Change the digit values using the **Set/Change** and **Menu/Enter** buttons as described above.

4. **System Capacity in Grains** (c) – Meter (Demand Mode Only)

- Press the **Menu/Enter** button. This display is used to set the system capacity in grains and is used in conjunction with the hardness setting to calculate total gallons of treated water available between regenerations. This option is identified by the letter "c" in the left digit. The maximum value for this item is 399. Example: 32,000 grain capacity (c 032).

5. **Reserve Capacity Setting** % Example (P - 25)

6. **Bluetooth Enabled** bE - 1 (ON)
bE - 0 (OFF)

7. **Bluetooth Password** bbPP is displayed for one second, then password is displayed.

8. To Exit the Master Programming Mode, press the **Menu/Enter** button until time of day returns.

Note: If no buttons are pressed for 60 seconds, the Master Programming Mode will be exited automatically.

9. Diamond LINQ Application

For simplified set up and control, please install the Diamond LINQ on a compatible Bluetooth 4.0+ enabled smart phone or tablet.

A. Depending on your device, download and install the Diamond LINQ app from:
   - Google Play Store
   - Apple App Store

Figure 19: LINQ App Icon

B. Open the Diamond LINQ app
   a. Ensure your Bluetooth connectivity is turned on.
   b. Choose a valve device at any time from the list of available devices to connect to by clicking on it.
   c. If the valve you want to connect to doesn't show up, or there is a problem connecting to a device you can press the "Scan for Devices" button or the Diamond LINQ logo at any time to refresh the list and start the process over.
   d. If the valve device is a BTLE valve and it has a password other than the default password, the first time you connect to it the app will ask you to enter the password. After entering it the first time you should not need to enter it again unless it changes.

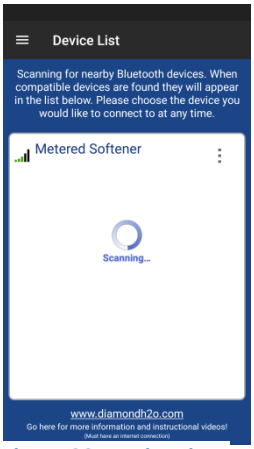


Figure 20: Device List

C. BTLE Valve devices can be updated by the App. When the app is updated from the Google Play Store or the Apple App Store, it may contain an updated firmware program for the valve devices. These updates could contain new features or operational improvements. It is up to the user to allow these updates to be sent to the valve device.

D. Navigation and Regeneration

The navigation menu can be accessed by pressing the meu key  or swiping from the left in portrait mode. The menu is shown at all times in landscape mode.

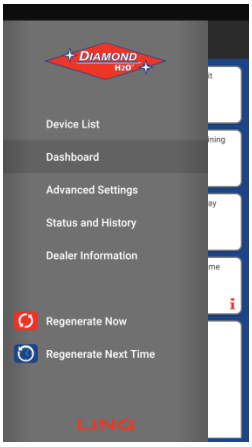


Figure 21: Navigation

You can manually start a regeneration by pressing:

During regeneration, you can skip to the next cycle by pressing:

You can manually regenerate at the next programmed regeneration time by pressing:

Diamond H2O contact information and app version information can be found by pressing the Diamond H2O Logo: 

E. Dashboard

The dashboard will contain general information for monitoring your softener which is contained in blocks.

Blocks with a red "**Set**" can be changed or updated. Other blocks are read only.

NOTE: Consult your dealer before making any changes from the Dashboard. Dealer contact information can be found in the navigation menu.

Press the ℹ button in the bottom right corner of a block for more information.

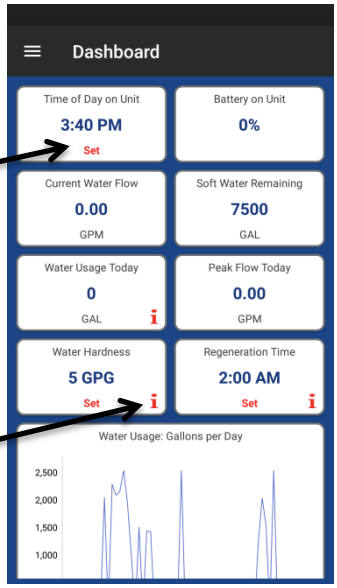
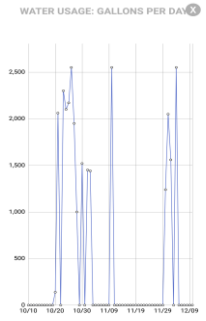


Figure 22: Dashboard

Table 4: Dashboard Block Information Table

Time of Day Time of Day on Unit 3:40 PM Set Displays Unit Time. Press "set" to set time based on device time	**Battery on Unit** Battery on Unit 0% Displays the battery backup charge if available	**Current Water Flow** Current Water Flow 0.00 GPM Displays the current flow rate passing through the unit in GPM (gallons per minute)
Soft Water Remaining Soft Water Remaining 7500 GAL Displays the remaining capacity before regeneration in GAL (gallons)	**Water Usage Today** Water Usage Today 0 GAL ℹ Displays the gallons used today in GAL (gallons)	**Peak Flow Today** Peak Flow Today 0.00 GPM Displays the peak flow rate used today in GPM (gallons per minute)
Water Hardness Water Hardness 5 GPG Set ℹ Displays the incoming water hardness setting in grains per gallon (GPG) which is used to calculate capacity. This should be determined by a water quality test and should be set by the dealer (gallons)	**Regeneration Time** Regeneration Time 2:00 AM Set ℹ Displays the time the unit will regenerate. This should be set to a time when water won't be in use	**Water Usage Graph** Click the graph to for detailed info. Pinch in/out to change graph and view history 

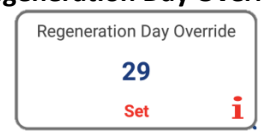
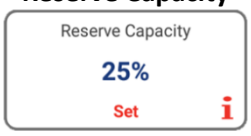
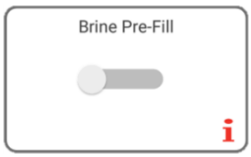
F. Advanced Settings

The advanced settings section of the app should only be programmed by a dealer. These settings contain values that will affect the performance of the water softener and the quality of the treated water. These settings will vary from system to system.

Most advanced settings will be set by the manufacturer.

Figure 23: Advanced Settings

Table 5: Advanced Settings Block Information Table

Days Until Regeneration  Displays the days remaining until regeneration override occurs	**Regeneration Day Override**  Displays the maximun number of days between regenerations	**Reserve Capacity**  The softener uses a meter to determine when regeneration is needed. When the system is set to regenerate at a certain time, the reserve capacity is used to treat water until the regeneration occurs
Resin Grains Capacity  Displays softener's capacity in grains of hardness	**Brine Pre-Fill**  Enable Pre-fill to fill the Brine Tank prior to the scheduled regeneration time	**Back Wash Cycle**  Displays the amount of time(in minutes) for the back wash cycle
Brine Draw/ Slow Rinse  Displays the amount of time (minutes) of brine draw/ slow rinse. The calcium and magnesium captured by the softener is removed by the brine solution and rinsed to drain	**Rapid Rinse**  Displays the amount of time (minutes) for a rapid rinse. This runs a rinse at a high rate in the same direction as normal water flow	**Brine Refill**  Displays the amount of time (minutes) it takes to refill the brine tank. Careful when editing this setting, it can greatly affect efficiencies and the softeners ability to make soft water

G. Status and History

The status and history screen displays statistics which can be used to increase system efficiency and diagnose certain issues. The system includes a totalizer which keeps track of total water usage and regeneration data. Water usage between regenerations and peak flow per day graphs are available by scrolling down on this screen.

Graphs can be expanded and viewed in full screen by pressing the desired graph.

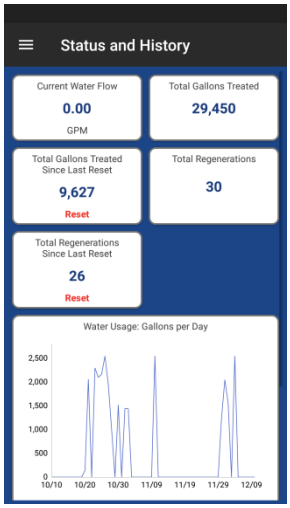
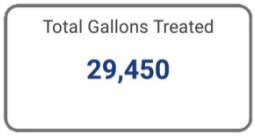
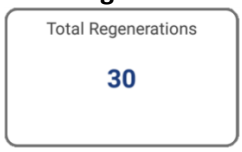
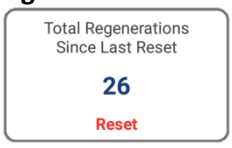
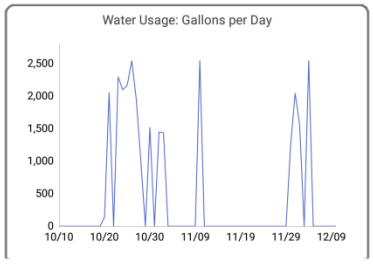
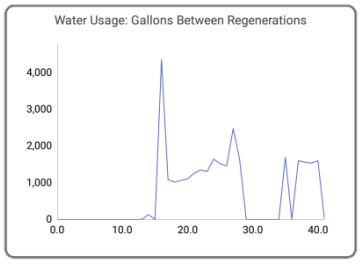
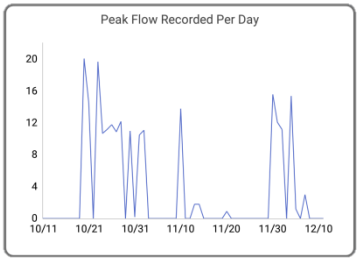


Figure 24: Status and History

Table 6: Status and History Block Information Table

Current Water Flow  Displays the current flow rate passing through the unit in GPM (gallons per minute)	**Total Gallons Treated**  Displays the number of gallons the unit has treated since start up	**Total Gallons Since Reset**  Displays the number of gallons treated since last reset. Press reset to restart the totalizer
Total Regenerations  Displays the number of regenerations since start up	**Total Regenerations Since Reset**  Displays the number of regenerations since last reset. Press reset to restart the counter	 This chart displays the total number of gallons used per day
 This chart displays gallons used between regenerations	 The chart displays the peak flow rates in gpm per day	

10. Troubleshooting

SYMPTOM	PROBABLE CAUSE	CORRECTION
1.Softener Fails to Regenerate Automatically	Power supply plugged into intermittentent or dead power source	Connect to constant power source
	Disconnected meter cable	Reconnect cable
	Improper control valve programming	Reset program settings
	Defective power supply	Replace power supply
	Meter is dirty or defective	Clean or replace meter assembly
	Defective Drive motor	Replace motor
2. Regeneration at Wrong Time	Time of day improperly set, due to power failure	Reset time of day programming and install 9-volt battery.
	Regeneration time set improperly	Reset regeneration time programming
3. Loss of Capacity	Increased raw water hardness	Increase hardness setting or decrease days between regeneration
	Brine concentration and or / quantity	Keep brine tank full of salt at all times. Clean it yearly. Salt may be bridged. If using a salt grid plate, ensure refill water is over it.
	Resin fouling	Call dealer. Find out how to confirm it. Clean the resin and prevent future fouling.
	Poor distribution, channeling (uneven bed surface)	Call dealer. Check backwash flow. Regenerate more frequently
	Internal valve leak	Call dealer. Replace spacers, seals and / or piston
	Resin age	Call dealer. Check for resin oxidation caused by chlorine. Mushy resin.
	Resin loss	Call dealer. Check for correct bed depth. Broken distributor tube. Air or gas in bed: well gas eliminator. Loose brine line.
4. Poor Water Quality	Check items listed in #1, #2, and #3	
	Bypass valve open	Close bypass valve.
	Channeling	Check for too slow or high service flow. Check for media fouling.
5. High Salt Usage	High salt setting	Lower brine tank refill time
	Excessive water in brine tank	See symptom #7
	Constant flow through the unit	Indicates plumbing leak (e.g. toilet tank)
	Regenerating too frequently	Lower hardness setting or increase days between regeneration.
6. Loss of Water Pressure	Scaling / fouling of inlet pipe	Clean or replace pipline. Pretreat to prevent.
	Fouled resin	Clean resin. Pretreat to prevent.
	Improper backwash setting	Backwash more frequently

10. Troubleshooting (2)

SYMPTOM	PROBABLE CAUSE	CORRECTION
7. Excessive Water in Brine Tank and / or Salty Water to Service	Plugged drain line or drain line control	Check flow to drain. Clean drainline flow control button
	Dirty or damaged brine valve	Clean or replace brine valve.
	Plugged injector or screen	Clean or replace injector screen.
	Low inlet pressure	Increase pressure to allow injector to perform properly. (20 psig minimum)
	Excessive brine refill cycle time	Lower brine refill time.
8. Softener Fails to Use Salt	Check items listed in #1	
	Improper control valve programming	Check and reset programming
	Plugged / restrict drain line	Clean drain line and / or flow control button
	Injector and / or screen is plugged	Clean or replace injector and screen
	No water in brine tank	Check for restriction in BLFC. Ensure safety float is not stuck. Check brine tank for leaks.
	Water pressure is too low	Line pressure must be at least 20 psi.
	Brine line injects air during brine draw	Check brine line connectionsfor air leaks
	Internal control leak	Call dealer. Check piston, seals and spacers for scratches and dents.
9. Continuous Flow to Drain	Foreign material in control piston and seals	Call dealer. Clean valve and replace piston and seals.
	Internal control leak	Same as above.
	Valve jammed in backwash, brine or rapid rinse position	Same as above.
	Motor stopped or jammed	Check for jammed piston. Replace piston and seals. Replace motor if motor is unresponsive.

Control Valve Error Code Diagnosis

Under normal operating conditions, when your control valve is in the "in service" position, the display should alternate between the current time of day and the number of days remaining (for filters and time clock softeners) or gallons remaining (for metered softeners) until the next regeneration. This is the "home display." If the valve is currently going through a regeneration cycle, the display will show the cycle step on the left side of the display and the number of minutes remaining in that step on the right side of the display. If any other information is being displayed, then the valve is informing you of an issue. There are five error codes which could indicate an issue with the control valve. When an error is being displayed, the valve will be in a stopped position, and the buttons will not respond to being pressed. Even if the cause of the error code is corrected, the error code will not clear until the power supply has been disconnected and reconnected (this will be referred to as "cycling" the power). All error codes are displayed as the letters "Err" followed by a flashing number 2-6:

Error 2 - Valve is searching for homing slot.
Allow valve to continue running. If the homing slot is found, the valve will return to the home display, otherwise, another error code will appear.

Error 3 - No encoder slots are being seen.
This occurs when the motor is running, but the encoder is not seeing any of the slots in the encoder wheel. This can happen if the encoder has been disconnected, but most commonly occurs when debris in the valve body has stopped the piston, causing the encoder wheel to be unable to turn.

1. Check encoder connection. If the encoder is plugged in and snapped into place, skip to step #2 below. If encoder is disconnected, reconnect it and cycle power to clear the error.
2. Disconnect powerhead from valve body, cycle power to clear the error code. Manually cycle the powerhead through the regeneration cycle steps to verify that the motor can cycle properly while the powerhead is disconnected from the valve body. If the error 3 does not reappear, skip to step #3 below. If the error 3 does reappear, order a board & motor kit to replace the circuit board & motor.
3. Remove piston and seals from the valve body and inspect valve body for debris. Replace the seal & spacer kit. Inspect piston and replace piston if Teflon coating is worn

Error 4 - Unable to find homing slot.

1. Check encoder wheel for debris.
2. Cycle power. Valve should either find home or go to a different error code. If error 4 returns, replace powerhead assembly.

Error 5 - Motor overload.
This occurs when the motor current is too high. This could be caused by an issue with the motor itself, but is typically caused by friction in the valve body

1. Disconnect powerhead from valve body and cycle power to clear the error code.
2. If the error 5 returns, replace the motor. Otherwise, manually cycle the powerhead through the regeneration cycle steps to verify that the motor can cycle properly while the powerhead is disconnected from the valve body. Either way, proceed to the next step.
3. Remove piston and seals from the valve body and inspect valve body for debris. Replace the seal & spacer kit. Inspect piston and replace piston if Teflon coating is worn.

Error 6 - No motor current.
This typically occurs if the motor cable has come unplugged from the circuit board. Check that the motor cable is plugged into the circuit board and attached to the motor. If this is not the issue, the motor or circuit board may need to be re-placed.

No Display
If your display is blank, there is no power going to the circuit board due to one of the following factors:

- The electrical outlet is not powered or is switched off
- The power cable has come unplugged from the circuit board
- The power supply has come unplugged from your electrical outlet
- The power supply has come unplugged from the control valve
- The power supply is not working