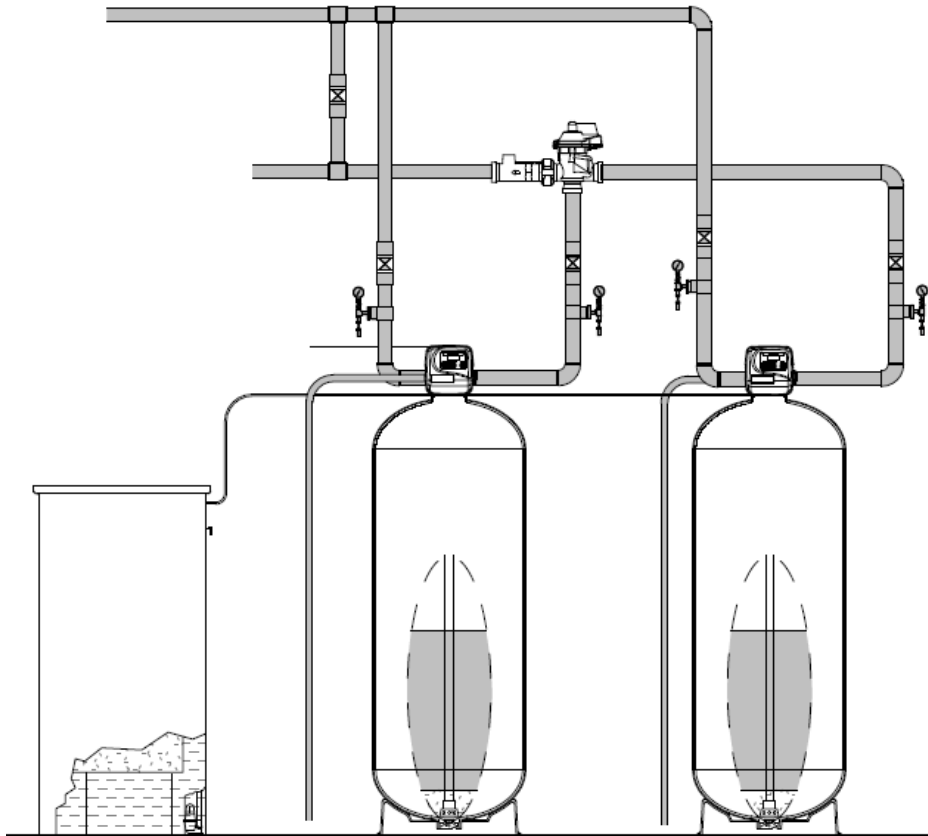




## 1.5" HIGH CAPACITY DUPLEX WATER SOFTENER INSTALLATION AND OPERATIONS MANUAL



[www.excaliburwater.com](http://www.excaliburwater.com)

Barrie, ON L4N 4Y8

## **Water Softener Introduction:**

Please read Excalibur Water Systems Water Softener manual carefully before starting the Water Softener installation. The Water Softener manual contains detailed information about your new Water Softener, including the Water Softener Installation, Settings, Start up and Operation. The Excalibur Water Softener has been designed and engineered to provide soft conditioned water for many years, when the Water Softener is properly installed and operated. Throughout your Excalibur Water Softener manual you will find special headings to highlight special Water Softener procedures that provide additional explanations.

## **Caution:**

The Excalibur Water Softener high inlet water pressure or low water temperature may cause excessive Water Softener media bed expansion during the Water Softener backwash, resulting in loss of Water Softener media to drain.

## **Warning! Shock Hazard!**

Disconnect the Water Softener power before removing control valve cover.

The Excalibur Water Softener caution and warning paragraphs are not meant to cover all possible conditions and situations that may occur with the Water Softener. It must be understood that common sense, caution and careful attention are factors which cannot be built into the Water Softener. These factors must be supplied by the personnel installing, operating or servicing the Water Softener.

## **Water Softener Components:**

### **Media Tank;**

The Water Softener media tank features Excalibur fiberglass wound high impact Water Softener media tank. The media Water Softener tank contains quartz underbedding, single point distributor, Excalibur high capacity durable synthetic Water Softener resin which meets Excalibur Water System's rigid specifications.

### **Brine Tank;**

The Water Softener salt storage tank has a capacity of 800 lbs of water softening salt. The brine well and safety float are installed in the brine to eliminate the Water Softener brine from overflowing. These durable Water Softener brine tanks are made of tough polyethylene and are complete with a polyethylene cover.

### **Double Safe Brine Refill System;**

The Excalibur high capacity Water Softener combined brine refill Water Softener feature has a positive float safety shut off device to prevent the Water Softener brine tank from overflowing.

### **Electronic Control Valve;**

The Water Softener time and frequency of regeneration are controlled by the electronic control valve and meter. The Water Softener control valve can be adjusted to suit a wide range of water types and usages. The Water Softener has a manual regeneration button that permits an extra supply of soft water for temporary increases in water usages.

## **6 Cycle Control Valve;**

The reliable Excalibur Water Softener control valve provides direct flow of water during regeneration. The Water Softener control valve is constructed with durable corrosion resistant materials, epoxy coated, the piston operated design assures positive, accurate positioning even in turbidity water problem water supplies. The six cycle Water Softener control valve sequence of operation is as follows:

1. 1<sup>st</sup> backwash,
2. Draw/slow rinse
3. 2<sup>nd</sup> backwash
4. Fast rinse
5. Refill
6. Service.

## **Service;**

The Water Softener service cycle is a down flow operation. The hard water flows down through the Water Softener resin and is softened by hard water ions such as calcium and magnesium attaching to the Water Softener resin beads. Then the Water Softener must be put into regeneration at which time the calcium and magnesium ions are then exchanged for sodium ions and flushed to drain.

## **Regeneration:**

The Water Softener first step of regeneration is the back wash cycle. Water flow from the bottom to the top of the tank then out to drain, washing out turbidity or iron and reclassifying the Water Softener resin bed. The Water Softener has an automatic flow control in the drain line that limits flow of back wash water to avoid possible loss of resin.

The Water Softener second step or regeneration is brine draw and slow rinse. The Water Softener control valve directs water through the Water Softener brine injector mixing it with concentrated brine from the brine tank and discharges into the top of the Water Softener tank. The Water Softener brine flows from the top of the Water Softener tank through the Water Softener resin bed and out to drain,

replacing and carrying out the calcium and magnesium. This restores the Water Softener capacity. Then the Water Softener goes into slow rinse cycle which is when all the brine has been drawn from the Water Softener brine tank. An eliminator built into the brine safety valve, prevents air from being drawn into the water softener tank. Fresh water continues to flow through the Water Softener brine injector into the Water Softener tank in a down flow direction, slowly displacing the brine and rinsing it out to drain.

The third step is the second back wash cycle. The Water Softener has the water flow from the bottom to the top of the tank then out to drain, washing out turbidity or iron and reclassifying the Water Softener resin bed. The Water Softener has an automatic flow control in the drain line that limits flow of back wash to avoid possible loss of Water Softener resin.

The fourth step is the fast rinse cycle. The Water Softener received a fast rinse down flow to insure a salt free preconditioned Water Softener resin bed before returning the Water Softener to service.

The fifth step is refill cycle. The Water Softener refills the Water Softener media tank until water ready to go into service.

The sixth step is the service cycle. The Water Softener goes into service making soft water until capacity utilized.

### **Water Softener Preparation;**

The success of the Water Softener installation will depend to a great extent on advance planning and preparation. Careful attention to the Water Softener location, accessibility to electrical and drain facilities and the availability of the proper tools will ensure a proper Water Softener installation. Of utmost importance is the assurance that the Water Softener has been properly applied and meets all specifications.

### **Application:**

Essential to correct application is a complete water analysis of water to be treated. Excalibur extends to all customers, through its dealers or our factory, a water analysis service.

### **Hardness:**

Water hardness is a term which describes the materials dissolved in the water which forms scale in pipes and water heaters and causes graying of laundry, just to name a few. The Water Softener will perform and will remove all water hardness to zero.

### **Iron:**

Iron through not always visible when water is drawn can cause reddish staining of fixtures and clothing and even a dry metallic taste in drinking water. It also causes hot beverages, such as coffee and tea, to turn murky, black colour. Excessive amounts of iron and iron in different forms will require additional filtration equipment.

### **Pressure:**

The Water Softener is designed to operate within a pressure range of 30 to 100psi (210 – 690kpa). Water pressure below 30psi (210kpa) may cause the Water Softener to perform and recharge inefficiently, while pressure above 100psi (690kpa) can cause damage and noisy operation of the Water Softener control valve. Low pressure is generally not a problem with municipal water supplies, although some adjustment of well pump system may be required on private supplies. Although uncommon, some municipal water supplies may exceed the high limit. A pressure reducing valve should be installed before the Water Softener is such pressures are encountered. Also, some municipal water supplies have high pressures during nighttime hours.

### **Pressure Drop;**

Whenever water is flowing a certain amount is lost due to the resistance from pipe, fittings and appliances connected to the water supply. The amount of pressure drop encountered depends on how fast the water is flowing and how much resistance it meets. The amount of pressure available at a tap is also determined by its height above the source supply. For example, if water pressure in the

basement is 50psi (345kpa) it will be about 40psi (276kpa) on the second floor or a reduction of about 5psi (34kpa) for every 10 feet of elevation.

### **Location:**

The location of the Water Softener should be selected on the basis of the following factors. If at all possible, piping normally requiring unconditioned water should be bypasses. This many not be practical, however is all cases.

### **Temperature:**

The Water Softener should be installed in an area protected from extreme heat. Do not allow Water Softener to freeze. Also, the Water Softener must not be located directly adjacent to a furnace or water heater or in an area where it may be exposed to direct sunlight. An outdoor location is not recommended unless the Water Softener is protected from rain, blowing sand or dust and extreme cold or heat.

### **Caution:**

If the Water Softener is installed on the water line, hot water may back up into the Water Softener and damage the Water Softener. Install a check valve after the Water Softener. For additional protection, install a “Y” strainer to prevent Water Softener media from entering the Water Softener service line.

### **Electrical Requirements and Power Consumption;**

The Water Softener should be located near an electrical outlet, preferably a designated electrical outlet. The Water Softener control valve c/w a 15 foot power cord.

### **Warning;**

Always connect a ground wire; an improperly grounded Water Softener could cause injury from electrical shock.

### **Drain Requirements;**

The Water Softener has an open free flowing drain capable of carrying the maximum drain flow rate may be used. This may take the form of a floor drain, utility sink or stand pipe. The Water Softener requires a back flow preventor, required by code and should be provided to prevent back-siphoning of drain line.

### **Space Requirements;**

Along with the availability of draining and electrical connections, the physical location of the Water Softener must be considered. Two feet clearance above the Water Softener is recommended for service access and for filling the Water Softener brine tank. The floor must be level and smooth and free of foreign object to prevent uneven stresses which might cause puncturing or cracking of the Water Softener brine tank. If necessary, the brine tank should be placed on a separate platform to compensate for a rough floor surface.

### **Water Softening Salt;**

The Water Softener is equipped with a brine tank for dissolving rock salt. Any good grade of Water Softener sale including pellets or solar Water Softener salt may be used.

## Water Softener Button Operation and Function:



Scrolls to the Water Softener next display



Pressing Water Softener regen button once and releasing will schedule a Water Softener regeneration at the preset Water Softener delayed regeneration time.

Pressing again and releasing will cancel the Water Softener regeneration.

Pressing and holding for 3 seconds will initiate an immediate Water Softener regeneration.

Pressing while the Water Softener is in regeneration will advance the Water Softener to the next cycle.

Pressing in the Water Softener program levels will go backwards to the previous Water Softener screen.



Changes to the Water Softener variable being displayed.

▼, NEXT, ▲, and SET CLOCK

Key sequence to lock and unlock Water Softener program settings.



Holding for 3 seconds initiates a Water Softener control reset. The Water Softener software version is displayed and the Water Softener piston returns to the Water Softener home/service position, re-synchronizing the Water Softener control valve.

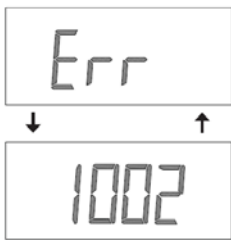
## Water Softener Regeneration and Error Screens;

### Water Softener Regeneration Screen:



Water Softener control valve displays the time remaining in the current cycle. Pressing the Water Softener regen button advances to the next Water Softener cycle.

### Water Softener Error Screen;



The Water Softener alternated Err and error code every 3 seconds. Clear the Water Softener error screen by disconnecting the power at the Water Softener PC board and reconnecting or press the Water Softener next and regen Water Softener buttons simultaneously for 3 seconds.



## Water Softener User Displays

When the water softener is operating, one of the five water softener displays may be shown. Pressing the water softener next button will alternate between the displays shown below.

### Water Softener User 1

Typical water softener user display. If water softener volume is selected in configuration settings step 3cs. Shows water softener volume remaining to regeneration. If water softener volume is not selected in configuration settings step 3cs, this water softener screen will not be shown. If a meter is not used on the water softener this display will not change.

### Water Softener User 2

Water softener displays number of days to next water softener regeneration.

### Water Softener User 3

The water softener displays flow rate in gallons per minute. If a water softener meter is not used this water softener display will be show but 0 will be displayed on the water softener screen. This water softener screen will not be shown if 7 day or 28 days is selected in the water softener display configuration settings step 3cs.

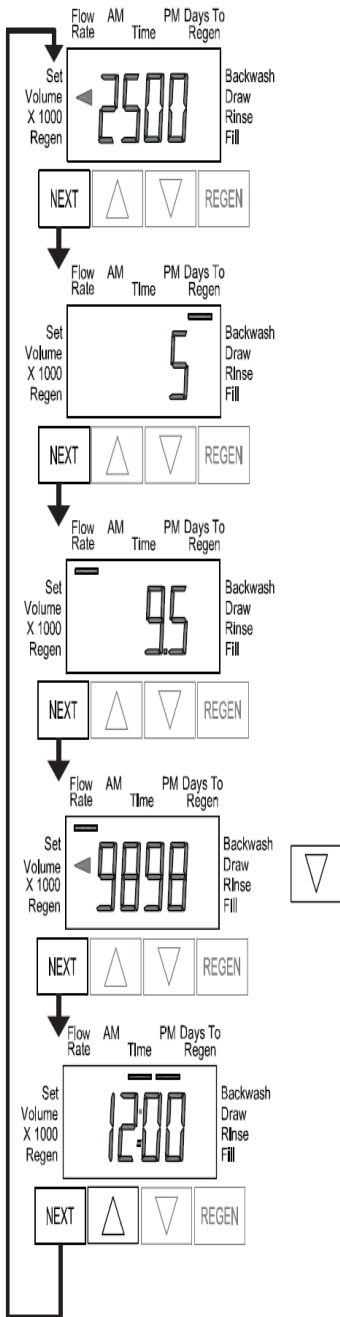
### Water Softener User 4

The water softener displays total flow in gallons since last reset. If a water softener meter is not used this water softener display will be shown but 0 will be displayed. This water softener screen will not be shown if 7 days or 28 days is selected in configuration settings step 3cs.

Press the water softener down arrow for 3 seconds to reset water softener to 0.

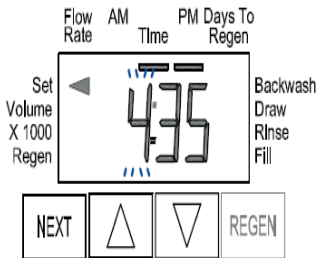
### Water Softener User 5

Water softener shows current time.

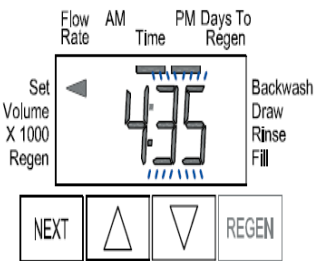


## Setting Water Softener Time of Day

Push the water softener next button until Time of Day screen is displayed. Press the water softener up arrow and hold until the water softener set indicator is displayed and the hour flashes. Press the water softener up and down arrows until the water softener displays the correct hour.



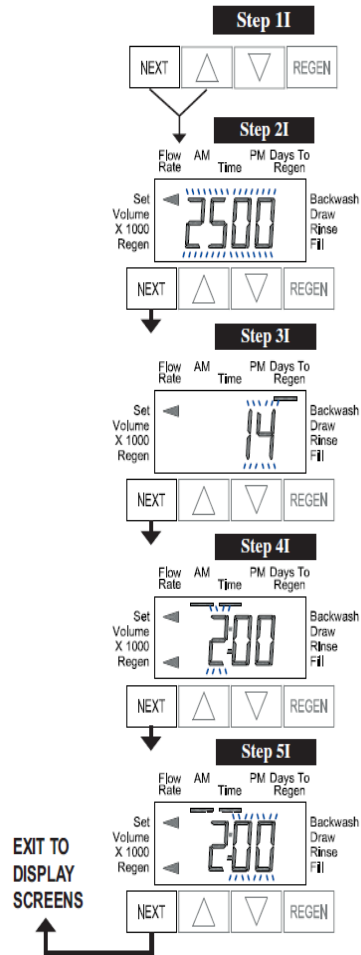
Then press the water softener next button. The water softener minutes will flash. Press the water softener up and down arrows until the correct minute is displayed.



Press the water softener next button to return to the display screens. The water softener Time of Day should only need to be set after power outages lasting more than 8 hours, if the water softener battery has been depleted and a power outage occurs, or when Daylight Savings Time begins or ends. If a power outage lasting more than 8 hours occurs the water softener Time of Day will flash on and off which indicates the water softener Time of Day should be reset. If a power outage lasts less than 8 hours and the water softener Time of Day flashes on and off the water softener Time of Day should be reset and the battery replaced.

## Water softener installer display settings

The water softener has one of three settings on what was selected in configuration settings step 3cs. Volume (gallons) selected in configuration settings step 3cs.



Step 1I – To enter water softener display press the water softener next and up buttons on the water softener simultaneously for 5 seconds and release.

Step 2I – The water softener volumetric capacity in gallons to regenerate the water softener. Press the water softener next button to go to step 3I. Press the water softener regeneration button to exit installer display.

Step 3I – Adjust the water softener day override from 1 – 28 or off. Press the water softener next button to step 4I. Press the water softener regeneration button to return to previous step.

Step 4I – Use the water softener up or down buttons to set the regeneration hour. Press the water softener next button to go to Step 5I. Press the water softener regeneration button to return the previous step.

Step 5I – Use the water softener up or down buttons to set The regeneration minutes. Press the next to exit installer Display. Press the regen button to return to previous step.