

Simplex Water Softener Installation, Operation and Maintenance Guide

Clack WS1, WS1.25, WS1.5, WS2



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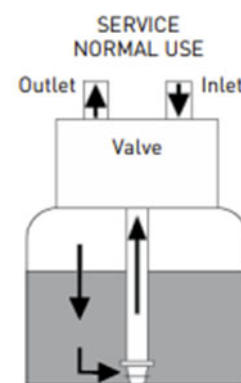
Introduction



Rainwater which falls on chalk and limestone dissolves and collects hardness minerals such as calcium and manganese. This water collects in underground aquifers before either naturally coming back to the surface as streams or being pumped via a borehole. The minerals naturally drop out of solution forming scale deposits, especially when the water is heated. In many applications this scale build up becomes unsightly or interferes with the efficiency of applications, and needs to be removed. Just 1.6mm of scale build up will cause a 12% loss in heating efficiency in boiler water. Softened water also reduces the excessive use of detergents and soaps.

How a water softener works

An automatic water softener is an ion exchange system consists of a pressure vessel filled with resin. Located on the top of the pressure vessel is the control valve. The water is passed through the control valve and down through the vessel. As the water passes across the resin bed, the colour compounds attach to the resin. Periodically, depending on how much water is used, the resin needs to be refreshed. This is done by flushing a small amount of salt (stored in an external brine tank), through the resin vessel. Once this process has been completed the resin is refreshed and ready to begin again.



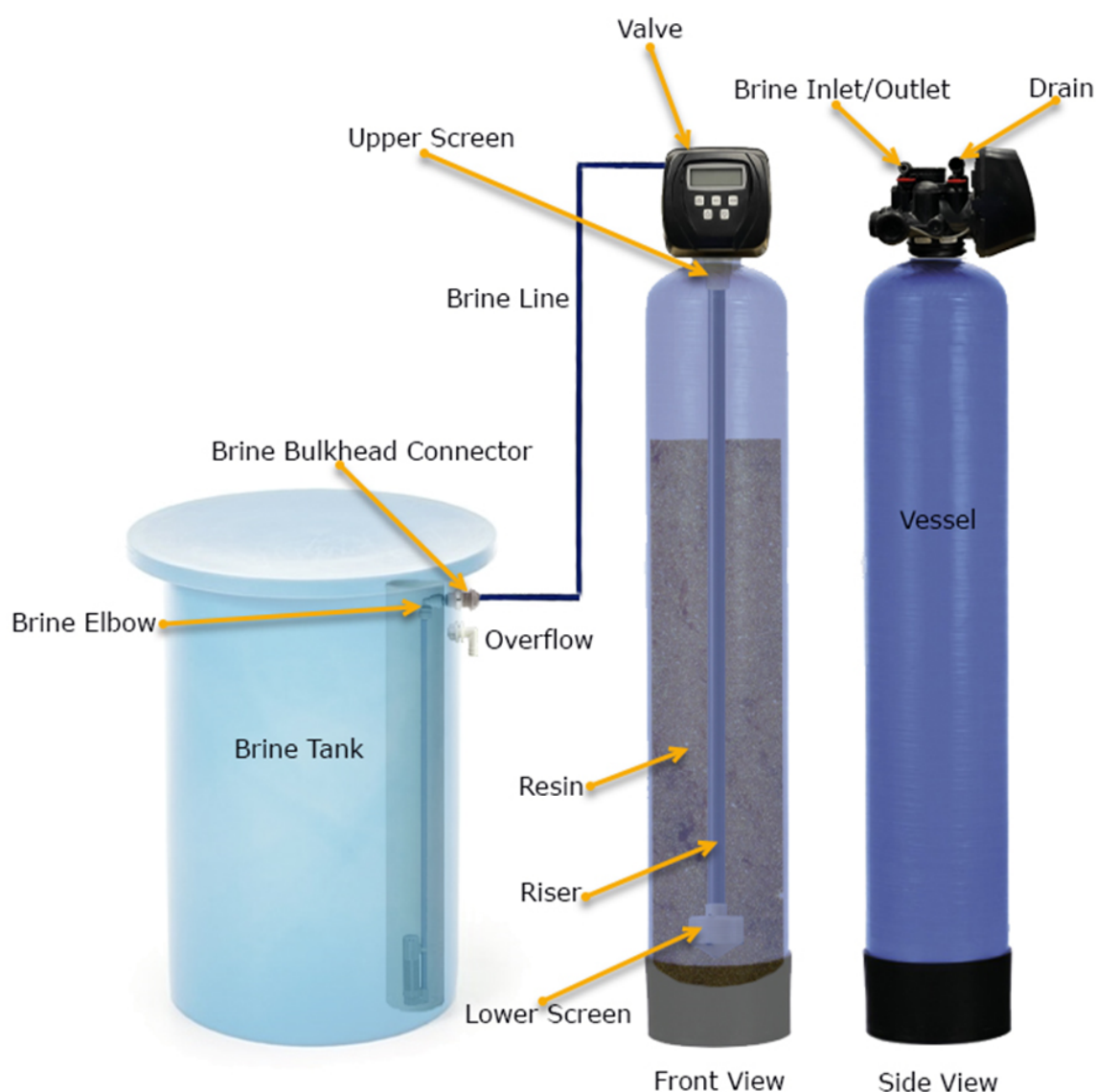
Unpacking

Pease Use the accompanying packing document to check that all items are present and correct.

If any item is missing or damaged your carrier and supplier must be notified within 2 days of receipt if a claim is to be made.

If installation is not to start immediately after delivery, the equipment should be stored in a clean dry area, where it will not be damaged, or be subjected to temperatures below freezing.

Parts included in your kit:



1. Installation

Please observe the local regulations concerning the installation of your system. Check that you have allowed space for access to the unit for possible future maintenance. This installation may require plumbing work and will require an electrical outlet to be fitted near the system.

This guide does not include plumbing directions.
Only attempt this if you have the necessary skills.

1.1 Pre-installation checks

- o The area needs to be level
- o Frost free
- o Access to electricity
- o Access to open drain.
- o Check the incoming water quality is within any parameters specified for that media (contact your supplier).
- o Incoming water pressure is between 2 and 8 bar (preferably approx. 4 bar)
- o Water temperature between 3°C and 45°C.

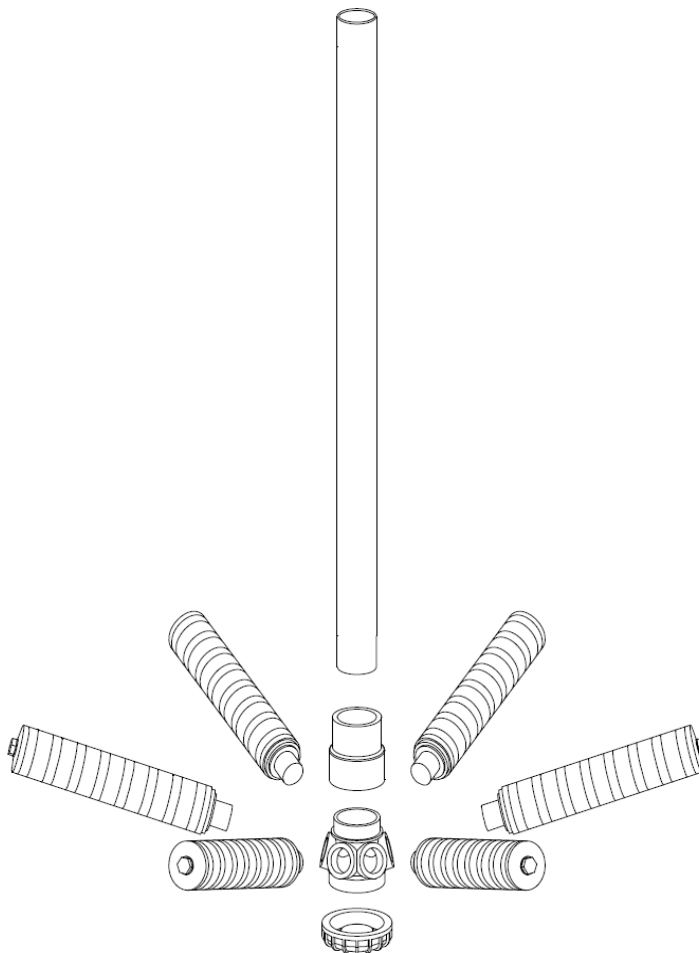
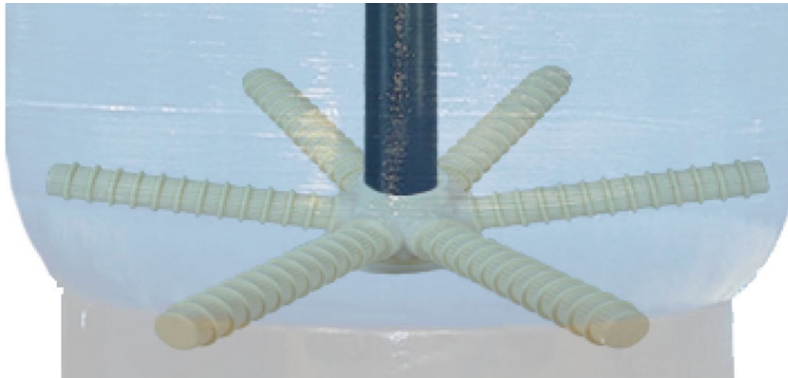
1.2 Fitting the Distribution System



Systems up to 13" x 54" (75 litres) have a simple riser tube and bottom screen. The bottom screen will be pre-glued so no further assembly is required. Simply place the riser tube with bottom screen into the vessel



For larger systems bottom laterals are used. These need to be assembled inside the vessel but will often be pre-installed before being shipped.



Move the vessel into its final position as it will be difficult to move once the media has been added.

1.3 Adding the Media



Block the top of the riser tube to stop media getting down the tube. This can be accomplished with tape or a small plastic bag over the end of the tube.

Fill the vessel with water until it is around a third full. This will prevent the bottom screen from getting damaged when you add the media. It will also allow enough movement of the riser tube when the media is added for you to re-centre.

Add the supplied media but ensure you leave around 30% free space above the media (there may be some media left over). This is so the media can expand into the space during regeneration allowing sediment and contaminants to be washed away. It also allows the water to pass more evenly through the media.

You may want to employ a funnel to make this process easier (this can be bought as an optional extra).



The media can be poured from the bag but we recommend using a smaller container to scoop out the media and pour into the vessel.

Once complete unblock the riser tube.

1.4 Fitting the valve

Add a small amount of silicone grease to the valve outer and inner o-rings



Fit the lower screen to the bottom of the valve. This is a bayonet fitting (twist to lock into place).



Slide the valve onto the riser tube ensuring the riser tube is fully inserted into the valve.

Gently place it onto the vessel threads and screw onto the thread in a clockwise direction until it squeezes tightly onto the main o-ring. Then finally give the valve a final tighten by tapping the rear side of the valve with the palm of your hand.





1.5 Brine Tank Connections

Attach the brine line to the brine connection on the brine tank and the brine inlet/outlet on the Clack valve



The brine system consists of a moulded polyethylene tank into which the brine well and brine pick up are assembled. The tank forms the salt storage container.

The brine pick-up tube is connected to the pipe from the control valve which sucks the brine from the tank. At the bottom of the brine pick-up tube is an air check valve. This serves to prevent air entering the valve when all the brine has been drawn in. Air in the system could cause spurting and 'hammering' at the taps or outlets.

1.6 Connecting your water supply

(Further notes on plumbing your system in can be found at the back of the manual).

Connect your pipe work to the inlet / outlet connections; use the supplied tails provide for 1" and 1.25" valves or direct BSP threaded connections on the 1.5" or 2" valves.



For the 1" and 1.25" valves an optional bypass valve is available which fits to the back of the valve and allows you to isolate the system when out of service (eg during routine maintenance)



Flexible hoses are available to make your installation easier (1" only)

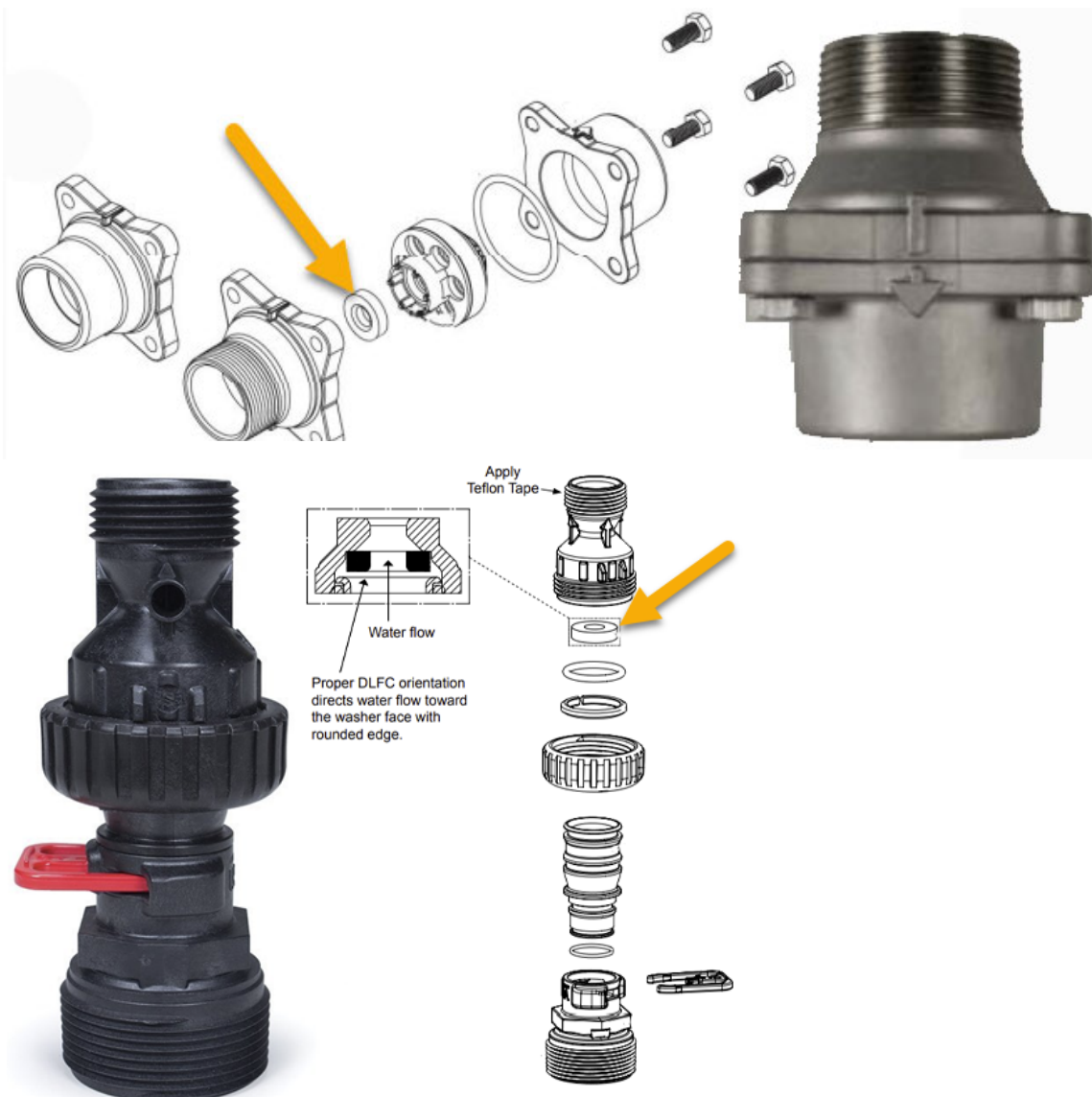
1.7 Drain Line Flow Control

This is possibly the most important component so it is important to check that it has been installed. The DLFC controls the backwash flow rate and without it the system will not function correctly.



On most of the valves the DLFC is internal but easy to check. Simply pull the red tag on the drain fitting and remove the complete fitting. The DLFC is a small rubber disk with a hole in the centre located on the bottom of the fitting.

Larger systems have an external DLFC which can be dismantled to check the DLFC is fitted.



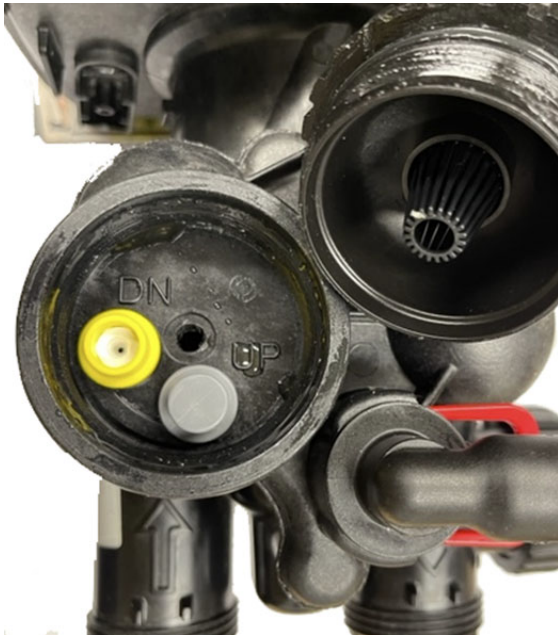
A hose barb fitting is included for the drain on the smaller systems allowing you to easily connect a braided hose which can be secured with a jubilee clip or similar should you choose. You can also utilise the male threaded fitting to customise the drain for your preferred pipework.



1.8 Injector

The injector is another important item in the functioning of the system.

Unscrew the cap indicated below.



Please check that the injector is fitted in the DN position and that the UP position has been plugged.

The injector colour will vary depending on the size of the system, this should be listed on the items list.

1.9 Electrical Connections

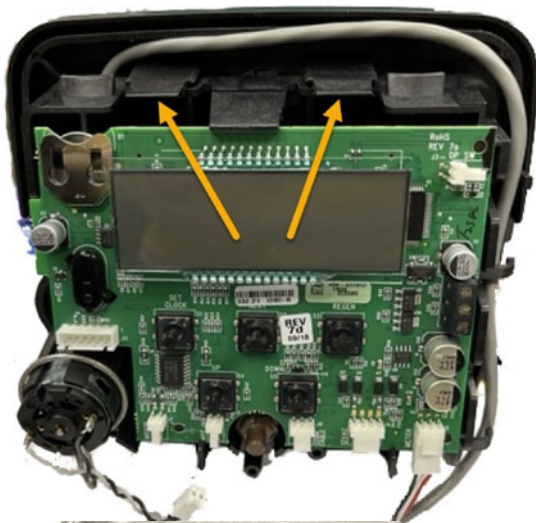
To connect the power cable you need to firstly remove the cover.



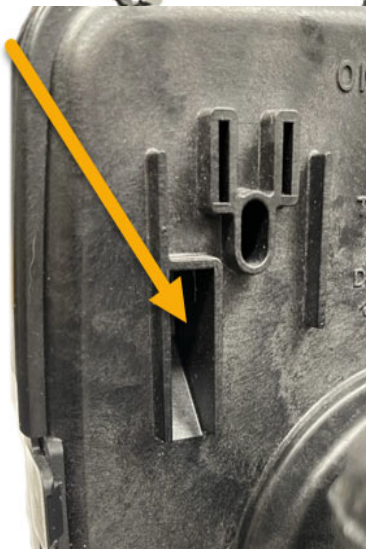
Gently push the release tabs on either side of the cover and pull the cover.



Now remove the drive bracket assembly by pressing up on the drive brackets release tabs and pulling towards you.



The drive bracket including PCB can now be lifted away to reveal the back plate. (Note the pictures show the meter cable which is not included with your head)



Thread the wire through the hole in the back plate



Thread the wire through the strain relief

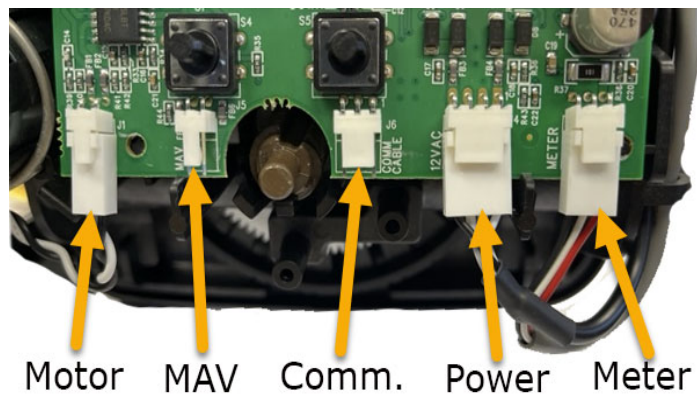
You can now re install the drive bracket into its original position.

Please make sure that this has been replaced correctly as this can cause problems at a later date.



Use the wire guides to hold the wire in position

Plug in the connectors



If fitting a MAV (Motorised Alternating Valve) or NHBP (No Hard water Bypass) locate the knock out plate and push through.



Remove the tabs at the bottom of the strain relief.



Thread the cables.



Fit the cover (supplied with your MAV or NHBP)

You can now plug your MAV or HHBP into the MAV connector.

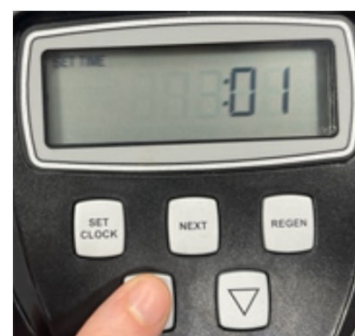
1.10 Quick Start

The valves are pre-programmed with the exception of the time and hardness setting. It is pre-set to regenerate every 2 days at 2:00 AM which you may want to adjust to suit your conditions. Do not extend it further than every 7 days to keep the resin in good condition.

Set Time of Day



Press **SET CLOCK**. Set time will appear in the top left hand corner. The hours will flash.



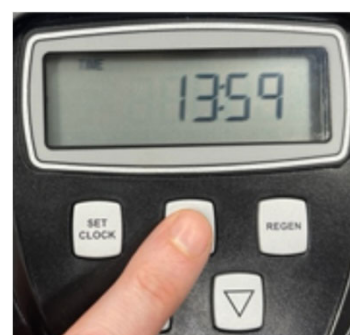
Use the **UP** and **DOWN** arrows to set the hour



Press **NEXT**. The minutes will now flash

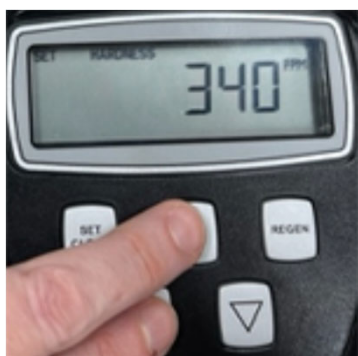


Use the **UP** and **DOWN** arrows to set the minutes



Press **NEXT**. You are now back in service mode.

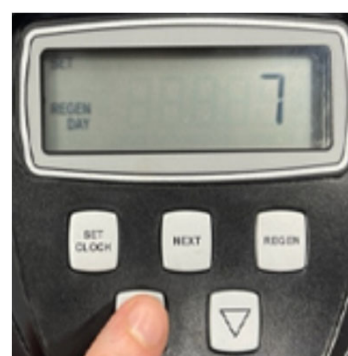
Set the Regeneration Interval



Press **NEXT** and **UP** for 3 seconds until "HARDNESS" and 340 appear. Use the **UP** and **DOWN** arrows to adjust to your hardness level* (see notes below)



Press **NEXT** Hardness and 2 will appear. Set to "0" using **UP** and **DOWN** arrows.



Press **NEXT**. Regen day will appear use the **UP** and **DOWN** arrows to set the days between regenerations if you don't have a meter or if you do you can use this to set the regeneration override day. Eg you can set the softener to regen. every 7 days even if capacity has not been



Press **NEXT**. The regen time will appear with the hours flashing. It is set to 2:00am. Use **UP** and **DOWN** arrows to adjust if necessary.



Press **NEXT**. The minutes will now flash. Use **UP** and **DOWN** to adjust if necessary



Programming is now complete.

* You can find out the hardness by purchasing a water hardness test kit or by contacting your local water authority. Hardness should be inputted in mg/l (PPM) calcium Carbonate.

mg/l as calcium carbonate equivalent	mg/l of calcium	Degrees Clark or English	Degrees German	Degrees French
100	40	7	5.6	10
200	80	14	11.2	20
300	120	21	16.8	30
325	130	23	18.2	32.5
400	160	28	22.4	40
435	174	30.5	24.4	43.5

** To keep the resin in good condition it is recommended to regenerate once a week even if capacity has not been met

How to calculate how often you need to regenerate.

You can calculate the capacity of the resin with the following equation.

$$\frac{\text{litres of resin} \times 50}{\text{ppm hardness}} = \text{m}^3 \text{ treated water}$$

Example: If you have a 75 litres water softener with a hardness of 300 ppm calcium carbonate and a daily usage of 2000 litres per day...

$$\frac{75 \times 50}{300} = 12.5 \text{ m}^3$$

12.5 m³ = 12000 litres

12000/2000 = 6

Therefore the softener should be regenerated every 6 days

Normal Service Display

During service the screen will show time, flow (if meter fitted) and days to next regeneration. Pressing the "Next" button will scroll through these 3 screens



2. Programming the Valves in case of memory loss

YOUR AUTOMATIC WATER SOFTENER IS SUPPLIED PRE-PROGRAMMED!

(excluding settings that need to be done on site)

THE SETTINGS BELOW ARE JUST IN CASE YOU NEED TO REPROGRAM THE UNIT

Should the programming have been lost the following instructions in conjunction with the relevant setting sheet will allow you to re-set them. When the power has been connected the valve will display the software number and initialise itself and then display TIME; you can then start to program the valve.



Press **NEXT** and **DOWN** simultaneously for 3 seconds



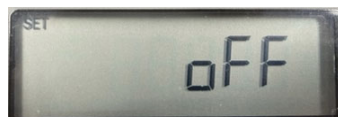
"SET" will appear in the corner with softener beneath flashing. If it instead reads "Filtering" use the **UP** or **DOWN** arrow to change to softening

Press **NEXT** and **DOWN** simultaneously for 3 seconds



"1.0" will flash. This denotes that it is a WS1 valve. If you have a different valve use the UP and DOWN arrows to adjust to your model (1.25, 1.5 or 2.0).

Press **NEXT**



The screen will alternate between "ALT" and "off".

Press **NEXT**



Press **NEXT**



The hardness units can be changed from ppm (shown) to French degrees or German degrees

Press **NEXT**

The following settings allow you to set the order of the stages of regeneration. Use the **UP** and **DOWN** arrows to adjust if necessary. Press **NEXT** to move to next screen.



Set 1 to "Backwash"



Set 2 to "dn Brine" (down draw flow brine)



Set 3 to "Rinse"



Set 4 to "Fill"



Set 5 to "End"

Press **NEXT**

You will come out of programming.

System Set UP



Press **NEXT** and **DOWN** simultaneously for 3 seconds



"SET" will appear in the corner with softener beneath flashing

Press **NEXT** to scroll through the following settings using the **UP** and **DOWN** arrows to make adjustments using the chart below as your guide...

Vessel Size	1044	1054	1248	1354	1465	1665	1865	2160	2160	2469	3072	3672
Resin Volume	40	50	60	75	100	125	175	225	225	300	500	700
Cycle 1 Backwash	5	5	5	5	5	5	5	5	5	5	5	5
Cycle 2 Brine Draw dn	60	70	62	64	86	71	84	61	68	66	81	72
Cycle 3 Fast Rinse	6	6	6	6	6	6	6	6	6	6	6	6
Cycle 4 Fill kg	6	7.5	9	11.25	15	18.5	27	33.5	33.5	45	75	105
Cycle 4 Fill (WS2 only)			3	4	6	7	10	12	12	16	27	35
Cycle 5	End											
Capacity kg	2	2.5	3	3.8	5	6.3	8.8	11.2	11.2	15	25	35
Regen	Auto											
Regen	Normal											
Relay1 rLY 1	off											
Relay 2 rLY 2	off											
Salt	off											



Refer to the chart above for your setting. Example, for a 10" x 54" Vessel (50 litres resin volume) **BRINE draw** should be set to **70** minutes.



For all sizes set **Rinse** to **5** minutes



Refer to the chart above for your setting. Example, for a 10" x 54" Vessel (50 litres resin volume) **FILL** should be set to 7.5 Kg



Refer to the chart above for your setting. Example, for a 10" x 54" Vessel (50 litres resin volume) **CAPACITY** should be set to 2.5 Kg



For all sizes set to "AUTO"



For all sizes set to "NORMAL"



Unless you're using the relay 1 this should be set to "off"



Unless you're using the relay 2 this should be set to "off"



For all sizes set to "off"

Press **NEXT**

You will come out of programming.

QUICK REFERENCE SETTINGS SHEET

Please apply the settings in the following sequence.

Selections are made using the **UP** and **DOWN** buttons until the required setting is displayed.

After each setting press **NEXT** to continue.

Vessel Size	1044	1054	1248	1354	1465	1665	1865	2160	2160	2469	3072	3672
Resin Volume	40	50	60	75	100	125	175	225	225	300	500	700
Valve	WS1CI	WS1CI	WS1CI	WS1CI	WS1CI	WS1CI	WS1CI	WS1CI	WS1CI			
	WS125CI	WS1.25CI	WS1.25CI	WS1.25CI	WS1.25CI	WS1.25CI	WS1.25CI	WS1.25CI	WS1.25CI			
			WS1.5CI	WS1.5CI	WS1.5CI	WS1.5CI	WS1.5CI	WS1.5CI	WS1.5CI			
			WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI	WS2CI
			WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI	WS2LCI

Step 1, Cycle Sequence

Press **NEXT** and **DOWN** simultaneously for 3 seconds and release.

Screen will display SOFTENING flashing.

Press **NEXT** and **DOWN** simultaneously for 3 seconds, the screen will display SET 1.0 (set to the correct valve - WS1 - 1.0, WS1.25 - 1.25

WS1.5 - 1.5, WS2 - 2.0)

Vessel Size	1044	1054	1248	1354	1465	1665	1865	2160	2160	2469	3072	3672
Resin Volume	40	50	60	75	100	125	175	225	225	300	500	700
Alternating (ALT)	off											
DP	off											
Hardness	PPM											
Set Cycle 1	Backwash											
Set Cycle 2	Brine Draw dr											
Set Cycle 3	Fast Rinse											
Set Cycle 4	Fill											
Set Cycle 5	End											

Step 2, System Setup

Press **NEXT** and **DOWN** simultaneously for 3 seconds and release.

SET with SOFTENING flashing should appear on screen.

Vessel Size	1044	1054	1248	1354	1465	1665	1865	2160	2160	2469	3072	3672
Resin Volume	40	50	60	75	100	125	175	225	225	300	500	700
Cycle 1 Backwash	5	5	5	5	5	5	5	5	5	5	5	5
Cycle 2 Brine Draw dn	60	70	62	64	86	71	84	61	68	66	81	72
Cycle 3 Fast Rinse	6	6	6	6	6	6	6	6	6	6	6	6
Cycle 4 Fill kg	6	7.5	9	11.25	15	18.5	27	33.5	33.5	45	75	105
Cycle 4 Fill (WS2 only)			3	4	6	7	10	12	12	16	27	35
Cycle 5	End											
Capacity kg	2	2.5	3	3.8	5	6.3	8.8	11.2	11.2	15	25	35
Regen	Auto											
Regen	Normal											
Relay1 rLY1	off											
Relay2 rLY2	off											
Salt	off											

Step 3, Display Settings

Press **NEXT** and **UP** simultaneously for 3 seconds and release.

HARDNESS with 340 flashing should appear on screen.

Hardness	Set on Site											
Hardness 2	N/A set to "0"											
Regen Day	Off or set the day											
Regen Time	Preset to 2:00 AM Adjust if you prefer a different time											

Notes

TOTAL RESET: Press and hold **REGEN** and **NEXT** for three seconds

1. NHWB: WS1 & 1.25 If required set as nhwb (Alternating setting) connect NHWB or MAV to port B to outlet. Port A of MAV needs blocking.

1a. SEPS: (Separate Source) If required set as seps (Alternating setting) connect MAV port C port to Inlet & A port to separate source.

3. Commissioning the System

With the system fully plumbed in and the valve programmed commissioning can start

3.1 Regeneration

When the system is fully functional the regeneration will happen at the pre-set time (see programming the valve section). However, running a manual regeneration during commissioning is the best way of removing air from the system, bedding in the resin and flushing the system through.



Fill the brine tank with approximately 100mm of water and fill the brine tank with tablet salt or 3/4 full if using granular salt (SALT IS NOT SUPPLIED WITH YOUR KIT BUT CAN BE PURCHASED AS AN EXTRA).

Under no circumstances use cooking salt or Pure Vacuum Dried (PVD) salt to fill the cabinet as either of these will damage the resin and the internal components of the regeneration valve and brine draw system.

Make sure the water inlet and outlet are closed.

Press and hold the **REGEN** button for 3 seconds.

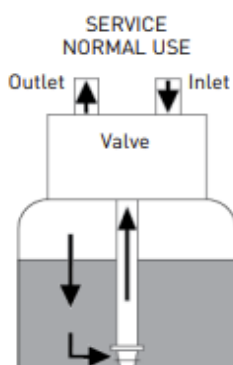
The piston will move to the backwash position.

Slowly half open the water inlet to the system, and then slowly open the outlet to allow the air to be purged from the system.

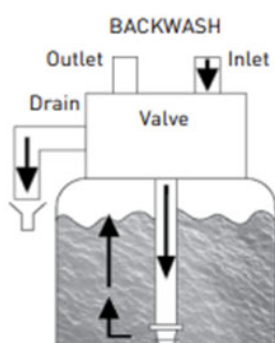
Once this has been done you can fully open the inlet and outlet and allow the system to continue through the regeneration cycle, this will allow you to check for leaks and also purge any remaining air from the system.

After a backwash the system will move through a brine draw routine, rinse and fill before stopping in the service position....

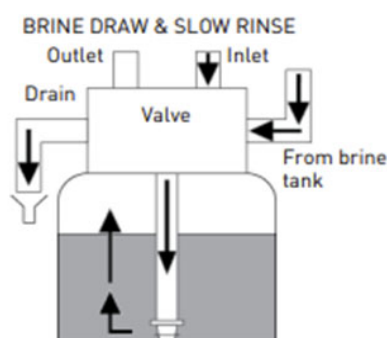
Stages of Regeneration....



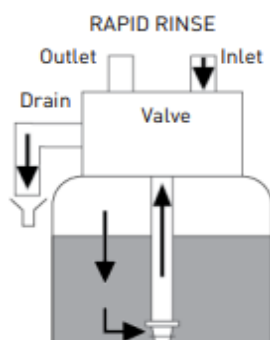
In normal service the water passes through the inlet, down through the resin, up the riser tube to the outlet



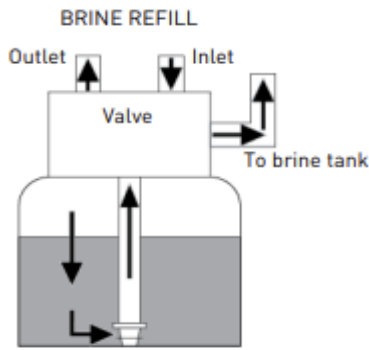
The first stage of regeneration is the backwash. The valve reverses the flow of water so that water now travels down the riser and up through the resin which lifts the bed and loosens any debris that may be trapped in the resin. The water then goes to waste.



During this stage water is sucked from the brine tank. The concentrated brine is mixed with water from the inlet to reduce the concentration to the correct level. It travels down the riser and up through the resin, when the correct amount of brine has been drawn water from the inlet continues to be drawn up through the resin to push the remaining brine through the resin. This process exchanges the organic molecules attached to the resin for sodium ions in the brine thus refreshing the resin and making it ready to attract organics again. During commissioning it is important to observe that water is being sucked from the brine tank and going to drain



During Rapid rinse water is passed down through the resin and up the riser (same as in service) then to drain. This stage flushes out any residual salt and organics that might be present and re-beds the resin ready for use.



During brine refill a quantity of water sufficient to dissolve the correct amount of salt for the next regeneration is passed through the resin into the brine tank to ensure treated water is used to make the brine for the next regeneration.

The unit will automatically go back into service after regeneration is complete.

For new systems or after a media change it may be necessary to run two regenerations to fully charge the media (check the water at the end of the backwash is running clear).

To initiate a delayed regeneration press the regeneration button once quickly this will start flashing Regen Today in the bottom left corner of the screen and the system will regenerate at the pre-set regeneration time. If you wish to cancel this just press the regeneration button again and the display will disappear.

To initiate an immediate regeneration press and hold the regeneration button until the valve motor starts to turn.

If during a regeneration cycle you need to skip through the cycle this can be done in the following way. To skip to the next stage quickly press the regeneration button and this will take it to the next stage of the regeneration, this can be repeated to get to the end of the regeneration cycle.

4. Routine Maintenance

Your system is designed to run with the minimum of maintenance and does not normally require much adjustment.

Weekly

Check the salt level (this may need to be done more regularly dependant on consumption) The salt level should always be above the water level. Check there is no sign of damage or leaks, Check the quality of the treated water.

Monthly

Check the quality of the incoming water to see if it has changed significantly.

Yearly

Check for leaks or damage.

5. Troubleshooting

On the following pages you will find a guide as to the most common problems that may arise; please consult this section before contacting your supplying dealer as most problems are easily cured using the troubleshooting information.

Troubleshooting

TC control valves do not have meters so shaded areas are not applicable for TC control valves

Problem	Possible Cause	Solution
1. No Display on PC Board	a. No power at electric outlet	a. Repair outlet or use working outlet
	b. Control valve Power Adapter not plugged into outlet or power cord end not connected to PC board connection	b. Plug Power Adapter into outlet or connect power cord end to PC Board connection
	c. Improper power supply	c. Verify proper voltage is being delivered to PC Board
	d. Defective Power Adapter	d. Replace Power Adapter
	e. Defective PC Board	e. Replace PC Board
2. PC Board does not display correct time of day	a. Power Adapter plugged into electric outlet controlled by light switch	a. Use uninterrupted outlet
	b. Tripped breaker switch and/or tripped GFI	b. Reset breaker switch and/or GFI switch
	c. Power outage	c. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	d. Defective PC Board	d. Replace PC Board
3. Display does not indicate that water is flowing. Refer to user instructions for how the display indicates water is flowing	a. Bypass valve in bypass position	a. Turn bypass handles to place bypass in service position
	b. Meter is not connected to meter connection on PC Board	b. Connect meter to three pin connection labeled METER on PC Board
	c. Restricted/ stalled meter turbine	c. Remove meter and check for rotation or foreign material
	d. Meter wire not installed securely into three pin connector	d. Verify meter cable wires are installed securely into three pin connector labeled METER
	e. Defective meter	e. Replace meter
	f. Defective PC Board	f. Replace PC Board
4. Control valve regenerates at wrong time of day	a. Power outage	a. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	b. Time of day not set correctly	b. Reset to correct time of day
	c. Time of regeneration set incorrectly	c. Reset regeneration time
	d. Control valve set at "on 0" (immediate regeneration)	d. Check programming setting and reset to NORMAL (for a delayed regen time)
	e. Control valve set at "NORMAL + on 0" (delayed and/ or immediate)	e. Check programming setting and reset to NORMAL (for a delayed regen time)
5. Time of day flashes on and off	a. Power outage	a. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
6. Control valve does not regenerate automatically when the correct button(s) is depressed and held. For TC valves the buttons are ▲&▼. For all other valves the button is REGEN	a. Broken drive gear or drive cap assembly	a. Replace drive gear or drive cap assembly
	b. Broken Piston Rod	b. Replace piston rod
	c. Defective PC Board	c. Defective PC Board
7. Control valve does not regenerate automatically but does when the correct button(s) is depressed and held. For TC valves the buttons are ▲&▼. For all other valves the button is REGEN	a. Bypass valve in bypass position	a. Turn bypass handles to place bypass in service position
	b. Meter is not connected to meter connection on PC Board	b. Connect meter to three pin connection labeled METER on PC Board
	c. Restricted/ stalled meter turbine	c. Remove meter and check for rotation or foreign material
	d. Incorrect programming	d. Check for programming error
	e. Meter wire not installed securely into three pin connector	e. Verify meter cable wires are installed securely into three pin connector labeled METER
	f. Defective meter	f. Replace meter
	g. Defective PC Board	g. Replace PC Board

Simplex Water Softener Installation, Operation and Maintenance Guide

Problem	Possible Cause	Solution
8. Hard or untreated water is being delivered	a. Bypass valve is open or faulty	a. Fully close bypass valve or replace
	b. Media is exhausted due to high water usage	b. Check program settings or diagnostics for abnormal water usage
	c. Meter not registering	c. Remove meter and check for rotation or foreign material
	d. Water quality fluctuation	d. Test water and adjust program values accordingly
	e. No regenerant or low level of regenerant in regenerant tank	e. Add proper regenerant to tank
	f. Control fails to draw in regenerant	f. Refer to Trouble Shooting Guide number 12
	g. Insufficient regenerant level in regenerant tank	g. Check refill setting in programming. Check refill flow control for restrictions or debris and clean or replace
	h. Damaged seal/stack assembly	h. Replace seal/stack assembly
	i. Control valve body type and piston type mix matched	i. Verify proper control valve body type and piston type match
	j. Fouled media bed	j. Replace media bed
9. Control valve uses too much regenerant	a. Improper refill setting	a. Check refill setting
	b. Improper program settings	b. Check program setting to make sure they are specific to the water quality and application needs
	c. Control valve regenerates frequently	c. Check for leaking fixtures that may be exhausting capacity or system is undersized
10. Residual regenerant being delivered to service	a. Low water pressure	a. Check incoming water pressure – water pressure must remain at minimum of 25 psi
	b. Incorrect injector size	b. Replace injector with correct size for the application
	c. Restricted drain line	c. Check drain line for restrictions or debris and clean
11. Excessive water in regenerant tank	a. Improper program settings	a. Check refill setting
	b. Plugged injector	b. Remove injector and clean or replace
	c. Drive cap assembly not tightened in properly	c. Re-tighten the drive cap assembly
	d. Damaged seal/ stack assembly	d. Replace seal/ stack
	e. Restricted or kinked drain line	e. Check drain line for restrictions or debris and or un-kink drain line
	f. Plugged backwash flow controller	f. Remove backwash flow controller and clean or replace
	g. Missing refill flow controller	g. Replace refill flow controller
12. Control valve fails to draw in regenerant	a. Injector is plugged	a. Remove injector and clean or replace
	b. Faulty regenerant piston	b. Replace regenerant piston
	c. Regenerant line connection leak	c. Inspect regenerant line for air leak
	d. Drain line restriction or debris cause excess back pressure	d. Inspect drain line and clean to correct restriction
	e. Drain line too long or too high	e. Shorten length and or height
	f. Low water pressure	f. Check incoming water pressure – water pressure must remain at minimum of 25 psi

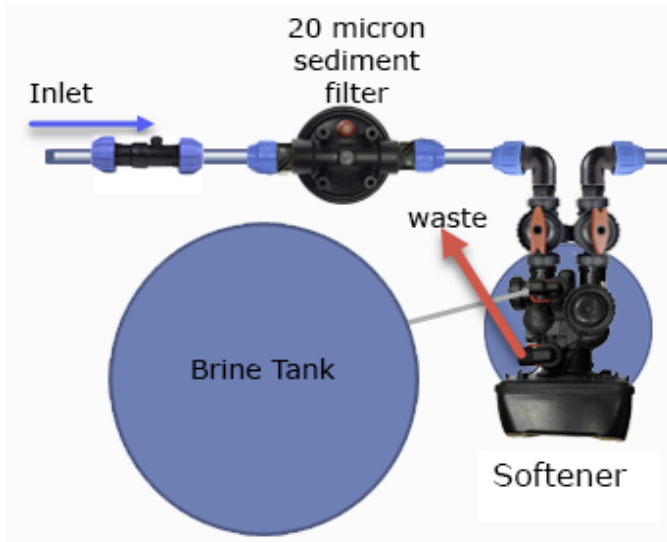
Simplex Water Softener Installation, Operation and Maintenance Guide

Problem	Possible Cause	Solution
13. Water running to drain	a. Power outage during regeneration	a. Upon power being restored control will finish the remaining regeneration time. Reset time of day.
	b. Damaged seal/ stack assembly	b. Replace seal/ stack assembly
	c. Piston assembly failure	c. Replace piston assembly
	d. Drive cap assembly not tightened in properly	d. Re-tighten the drive cap assembly
14. E1, Err – 1001, Err – 101 = Control unable to sense motor movement	a. Motor not inserted full to engage pinion, motor wires broken or disconnected	a. Disconnect power, make sure motor is fully engaged, check for broken wires, make sure two pin connector on motor is connected to the two pin connection on the PC Board labeled MOTOR. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. PC Board not properly snapped into drive bracket	b. Properly snap PC Board into drive bracket and then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Missing reduction gears	c. Replace missing gears
15. E2, Err – 1002, Err – 102 = Control valve motor ran too short and was unable to find the next cycle position and stalled	a. Foreign material is lodged in control valve	a. Open up control valve and pull out piston assembly and seal/ stack assembly for inspection. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. Mechanical binding	b. Check piston and seal/ stack assembly, check reduction gears, check drive bracket and main drive gear interface. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Main drive gear too tight	c. Loosen main drive gear. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	d. Improper voltage being delivered to PC Board	d. Verify that proper voltage is being supplied. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.

Simplex Water Softener Installation, Operation and Maintenance Guide

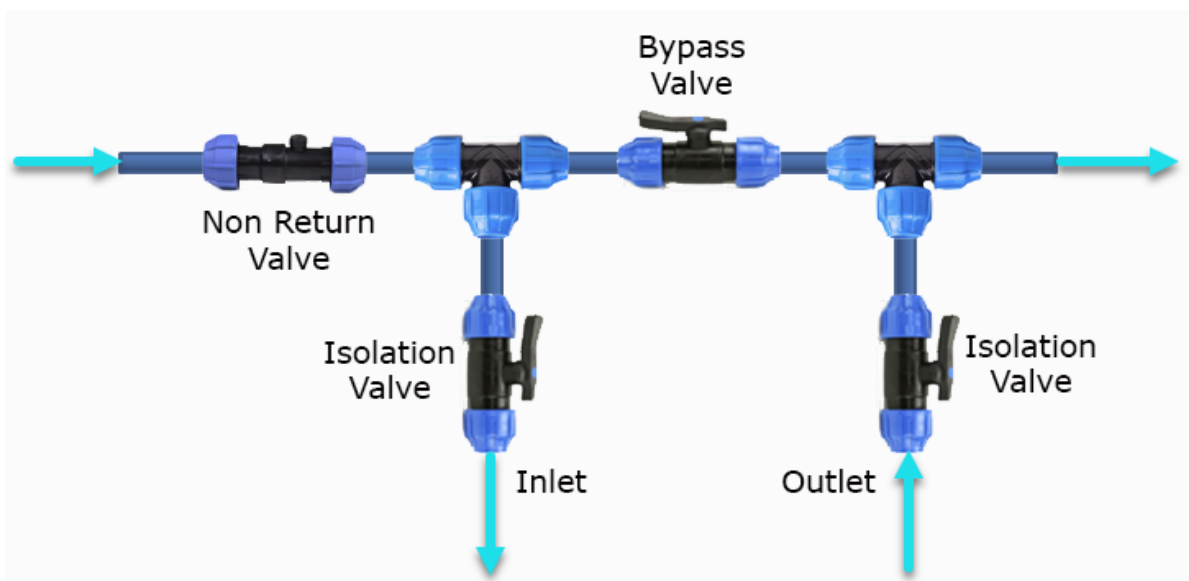
Problem	Possible Cause	Solution
16. E3, Err – 1003, Err – 103 = Control valve motor ran too long and was unable to find the next cycle position	a. Motor failure during a regeneration	a. Check motor connections then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	b. Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	c. Snap drive bracket in properly then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
17. Err – 1004, Err – 104 = Control valve motor ran too long and timed out trying to reach home position	a. Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	a. Snap drive bracket in properly then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
18. Err -1006, Err – 106, Err - 116 = MAV/ SEPS/ NHBP/ AUX MAV valve motor ran too long and unable to find the proper park position Motorized Alternating Valve = MAV Separate Source = SEPS No Hard Water Bypass = NHBP Auxiliary MAV = AUX MAV	a. Control valve programmed for ALT A or b, nHbP, SEPS, or AUX MAV with out having a MAV or NHBP valve attached to operate that function	a. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect. Then re-program valve to proper setting
	b. MAV/ NHBP motor wire not connected to PC Board	b. Connect MAV/ NHBP motor to PC Board two pin connection labeled DRIVE. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. MAV/ NHBP motor not fully engaged with reduction gears	c. Properly insert motor into casing, do not force into casing Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	d. Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	d. Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
19. Err – 1007, Err – 107, Err - 117 = MAV/ SEPS/ NHBP/ AUX MAV valve motor ran too short (stalled) while looking for proper park position Motorized Alternating Valve = MAV Separate Source = SEPS No Hard Water Bypass = NHBP Auxiliary MAV = AUX MAV	a. Foreign material is lodged in MAV/ NHBP valve	a. Open up MAV/ NHBP valve and check piston and seal/ stack assembly for foreign material. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. Mechanical binding	b. Check piston and seal/ stack assembly, check reduction gears, drive gear interface, and check MAV/ NHBP black drive pinion on motor for being jammed into motor body. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.

6. Typical Installation Layouts



In this example a 20 micron sediment pre-filter has been added. The automatic water softener is fitted with a bypass valve so that the system can easily be isolated and the inlet water will bypass the system so there is no loss of water.

Without the bypass valve we recommend that you use your pipework to create a bypass as shown in the diagram below.



7.0 Further Installation Notes

7.1 MECHANICAL

7.1.1 Foundation/Drainage

The softener will not require any special foundations, provided that a firm, level area which is capable of supporting the working weight is available.

Unwanted water from the regeneration process must flow to drain, and so an open drain or gully, capable of passing the necessary flow is required. The total flow of water to drain depends on site conditions, but will be approximately 6 times the resin volume. The drain may be at a level no higher than 500mm above the softener valve.

A second drain is required for the brine tank overflow. This is a safety drain which will only discharge water if there is a malfunction in the control valve. Where possible this should be installed through an outside wall like a cistern overflow, where it will give a visual indication of any failure.

7.1.2 Operating Space

Access will be required to refill the brine tank, and to carry out adjustments or maintenance on the equipment. It is therefore recommended that a minimum of 500mm clearance be allowed in front of the unit for this purpose.

7.1.3 Incoming Water

The raw water to be fed to the organic scavenger must comply with the following:-

1. Available at all times at a flow equal to the required service flow or greater
2. At a pressure between 1.7 and 5.5 bar
3. Temperature between 1 and 40°C
4. Suspended solids less than 1 ppm
5. Iron less than 0.2 ppm, Manganese less than 0.1 ppm, Free Chlorine less than 1 ppm if temperature is less than 15°C, less than 0.3 ppm if temperature higher (up to 30°C)

7.1.4 Pipework

Pipework to be connected to the softener should not have an excessive amount of hardness scale deposit. Piping that is heavily built up with scale (or Iron deposits) should be replaced.

Make sure that the pipework can be connected to the scavenger in such a way as to impose no stresses on the control valve, and that it is properly aligned and supported.

A system for the complete by-passing and isolation of the scavenger should be installed

7.1.5 Water Supply Company Requirements

It is essential that if the equipment is to be connected directly to a mains water supply, the local bylaws must be adhered to. These cover both plumbing and the prevention of backflow into the mains. If there is any doubt, the local water inspector should be consulted, but in general, the installation of a 'Double check valve assembly' conforming to BS6282 part 2 will be required in the feed pipework to the scavenger.

If the pressure available from the mains is not adequate it will be necessary to install a booster pump arrangement. Such a system would be covered by additional bylaws, and the water storage tank needed must comply with these.

7.2 ELECTRICAL

A continuous supply is required by the scavenger. A transformer is provided, which should be connected to an uninterrupted mains supply, which is separately 1 Amp fused, and does not have any additional switch.

It is recommended that the transformer be attached to a nearby wall, within 500 mm of the softener in an area free from water spray or excessive heat or condensation.

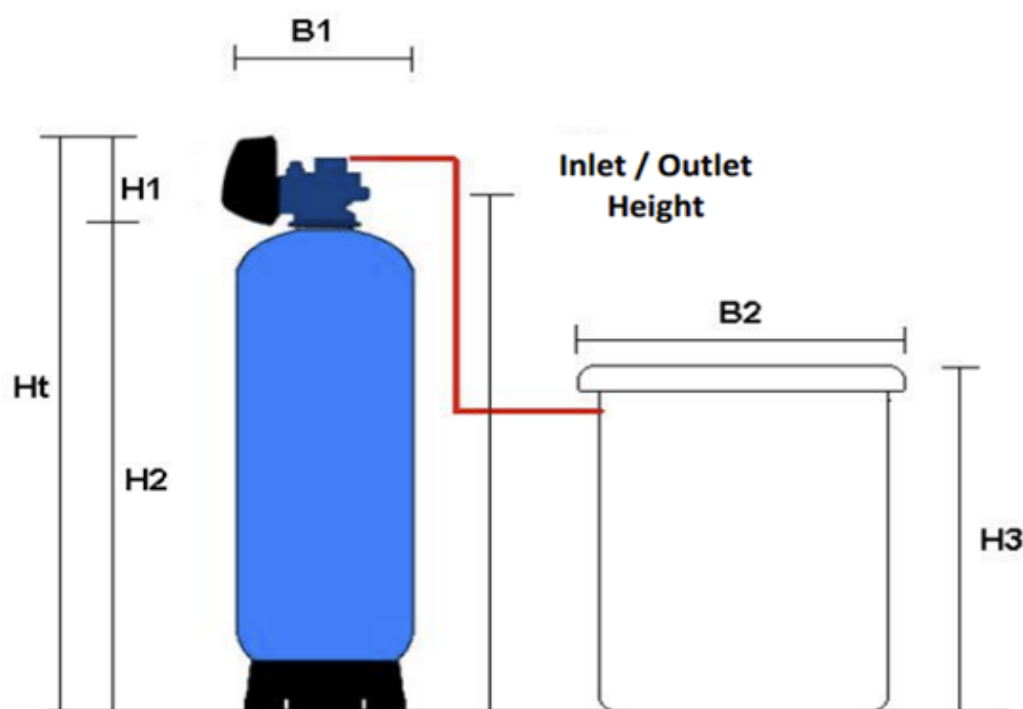
Electrical installation is very straightforward, but should still be carried out by a competent electrician, and must conform to the appropriate standards of safety.

8. Data Sheets

TECHNICAL DATA SHEET SIMPLEX SOFTENERS

CLACK WS1 CI

Dimensions (cm)



Resin litres	Valve H1	Vessel H2	Vessel H3	Brine Tank Ht	Inlet/Outlet Height	Vessel B1	Brine Tank B2	Weight Kg*
20 835	19	89	44	108	74	22	32sq	27
30 1035	19	89	89	108	94	27	32sq	40
40 1044	19	112	84	131	117	27	44sq	50
50 1054	19	139	84	158	144	27	44sq	65
60 1248	19	123	84	142	128	32	44sq	75
75 1354	19	140	83	159	145	34	67	90
100 1465	19	168	83	187	173	37	67	118
125 1465	19	168	83	187	173	37	67	140

All measurements can vary due to the cooling process during manufacture of the vessels and brine tanks.

*Estimated weight of the system without water or salt

General conditions for installation

Connection IN & OUT:	1"
Option side mount:	n/a
Drain connection(*):	3/4" or 1" fro DLFC flows over 10 GPM
Electrical rating:	230V 50 Hz 12V Transformer
max power rating:	6W
IP protection class:	Double Isolated Transformer
Minimum inlet pressure :	200 kPa (2 bar)
Maximum inlet pressure:	600 kPa (6 bar)
Vacuum:	no allowance
Average pressure loss (**):	100 kPa (1 bar)
Min-max water temperature:	5-35°C

Notes (*) Dependant on Drain line flow control.

(**) Under normal circumstances.

It is always recommended to install a 25µ cartridge filter before a softener.

Resin

Type: Strong acid cation resin - softening ,food grade quality

Life span: 15 years under normal circumstances

Ion Exchange (for average salt consumption of 150 g/l)

Resin volume (Litres)	20	30	40	50	60	75	100	125
Capacity CaCO ₃ (Kg)	1	1.5	2	2.5	3	3.8	5	6.3
Capacity at 300ppm CaCO ₃ (m ³)	3.3	5	6.6	8.3	10	13	17	21
Salt usage / regeneration (Kg)	3	4.5	6	7.5	9	11	15	19

Regeneration

Default start time is 2:00 AM, set on the timer as "Delayed Regeneration"

Options: TIME - VOLUME - IMMEDIATE - DELAYED - DAYS OVERRIDE - MANUAL REGNERATION

Resin volume (Litres)	20	30	40	50	60	75	100	125
Total Time (mins)	67	79	71	81	73	75	97	97

The interval between regenerations should not be more than 4 days, to prevent bacteria growth.

At least 8 hours between regenerations is required for the brine solution to form.

Flow Rate

Resin volume (Litres)	20	30	40	50	60	75	100	125
Nominal (m ³ /hr)	0.8	1.2	1.6	2	2.4	3	4	5
Minimum (LPH)	60							

Consumption of Rinse Water

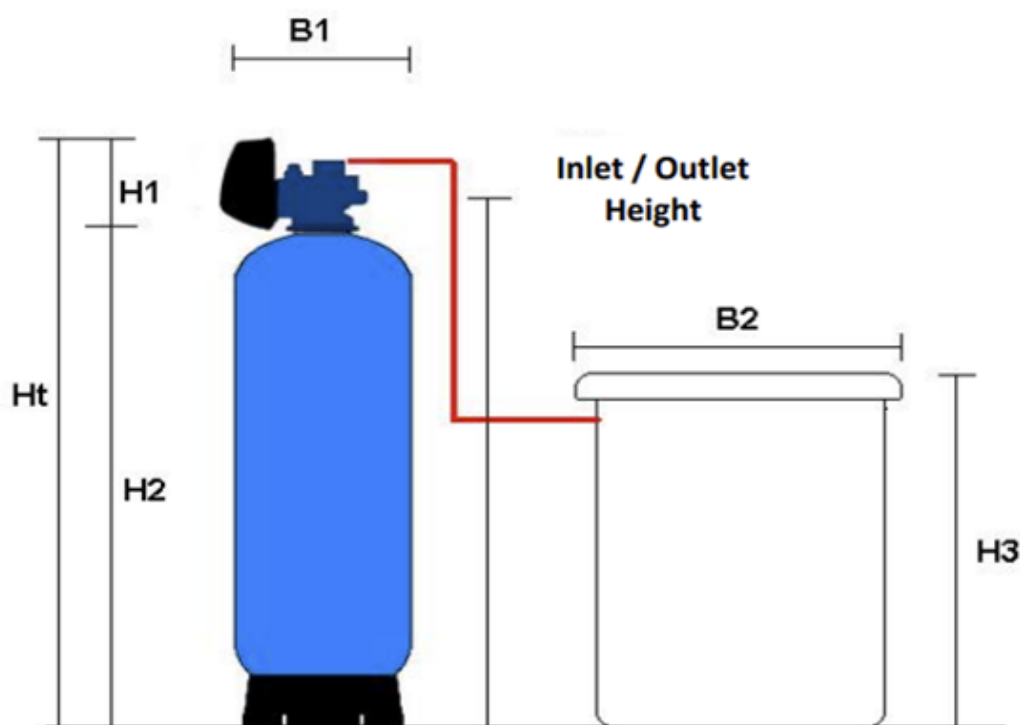
Resin volume (Litres)	20	30	40	50	60	75	100	125
1.Backwash (litres)	32	52	52	52	74	95	95	95
2.Brining + Slow rinse (litres)	67	124	102	110	153	188	263	246
4. Fast Rinse (litres)	39	62	62	62	89	114	114	114
Total (litres)	138	238	216	224	316	397	472	455

Figures based on 60PSI pressure.

TECHNICAL DATA SHEET SIMPLEX SOFTENERS

CLACK WS1.25 CI

Dimensions (cm)



Resin litres	Valve H1	Vessel H2	Vessel H3	Brine Tank Ht	Inlet/Outlet Height	Vessel B1	Brine Tank B2	Weight Kg*
75 1354	19	140	83	159	145	34	67Ø	90
100 1475	19	168	83	187	173	37	67Ø	118
125 1475	19	168	83	187	173	37	67Ø	140
150 1655	19	167	101	186	173	41	76Ø	175
200 1865	19	179	93	198	184	51	87Ø	230

All measurements can vary due to the cooling process during manufacture of the vessels and brine tanks.

*Estimated weight of the system without water or salt

General conditions for installation

Connection IN & OUT:	1 1/4"
Option side mount:	n/a
Drain connection(*):	3/4" or 1" fro DLFC flows over 10 GPM
Electrical rating:	230V 50 Hz 12V Transformer
max power rating:	6W
IP protection class:	Double Isolated Transformer
Minimum inlet pressure :	200 kPa (2 bar)
Maximum inlet pressure:	600 kPa (6 bar)
Vacuum:	no allowance
Average pressure loss (**):	100 kPa (1 bar)
Min-max water temperature:	5-35°C

Notes (*) Dependant on Drain line flow control.

(**) Under normal circumstances.

It is always recommended to install a 25µ cartridge filter before a softener.

Resin

Type: Strong acid cation resin - softening ,food grade quality

Life span: 15 years under normal circumstances

Ion Exchange (for average salt consumption of 150 g/l)

Resin volume (litres)	75	100	125	150	200
Capacity CaCO ₃ (kg)	3.8	5	6.3	7.5	10
Capacity at 300 ppm CaCO ₃ (m ³)	13	17	21	25	33
Salt usage / regeneration (kg)	11	15	19	22.5	30

Regeneration

Default start time is 2:00 AM, set on the timer as "Delayed Regeneration"

Options: TIME - VOLUME - IMMEDIATE - DELAYED - DAYS OVERRIDE - MANUAL REGNERATION

Resin volume (litres)	75	100	125	150	200
Total time (mins)	75	97	97	82	95

The interval between regenerations should not be more than 4 days, to prevent bacteria growth.

At least 8 hours between regenerations is required for the brine solution to form.

Flow Rate

Resin volume (litres)	75	100	125	150	200
Nominal (m ³ /hr)	3	4	5	6	8
Minimum (LPH)	60				

Consumption of Rinse Water

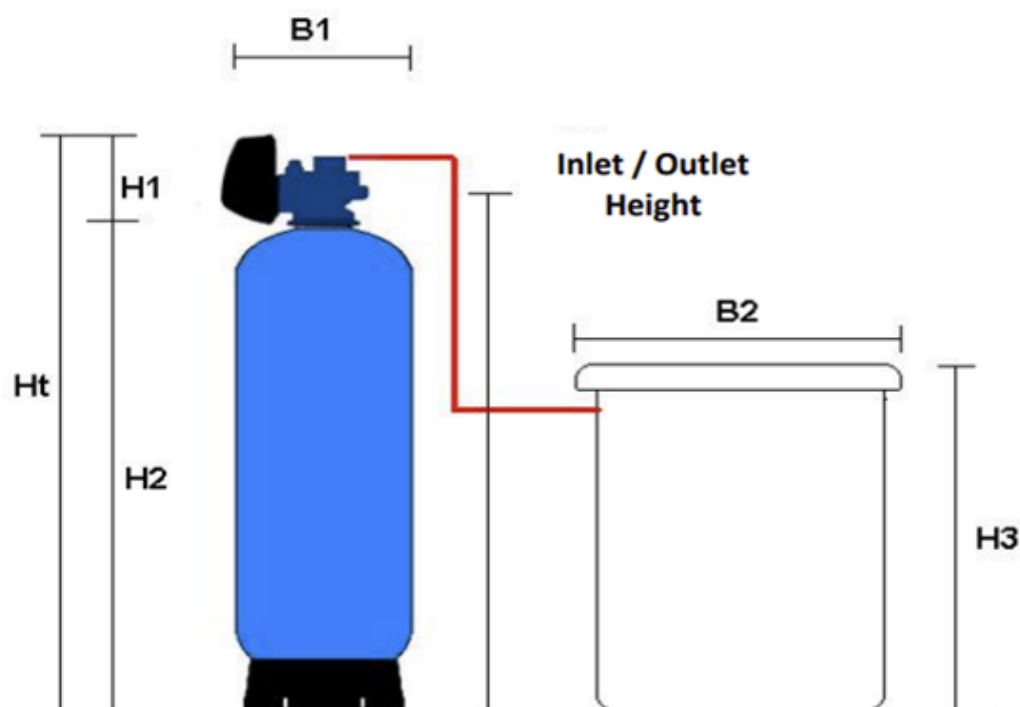
Resin volume (litres)	75	100	125	150	200
1. Backwash (litres)	95	95	95	132	170
2. Brining + slow rinse (litres)	188	263	246	282	440
4. Fast rinse (litres)	114	114	114	159	204
Total (litres)	397	472	455	573	814

Figures based on 60PSI pressure.

TECHNICAL DATA SHEET SIMPLEX SOFTENERS

CLACK WS1.5 CI

Dimensions (cm)



Resin litres	Valve H1	Vessel H2	Vessel H3	Brine Tank Ht	Inlet/Outlet Height	Vessel B1	Brine Tank B2	Weight Kg*
75 1354	20	167	83	187	172	37	67Ø	190
100 1475	20	167	83	187	172	37	67Ø	210
150 1655	20	168	101	188	172	41	76Ø	230
200 1865	20	179	101	199	187	51	76Ø	230
250 2160	20	163	101	183	171	56	76Ø	275
350 2469	20	188	111	208	196	61	100Ø	734
500 3072	20	188	129	208	196	61	107Ø	734

All measurements can vary due to the cooling process during manufacture of the vessels and brine tanks.

*Estimated weight of the system without water or salt

General conditions for installation

Connection IN & OUT:	1.5"
Option side mount:	n/a
Drain connection(*):	3/4" or 1" or 1.25" dependant on flow
Electrical rating:	230V 50 Hz 12V Transformer
max power rating:	6W
IP protection class:	Double Isolated Transformer
Minimum inlet pressure :	200 kPa (2 bar)
Maximum inlet pressure:	600 kPa (6 bar)
Vacuum:	no allowance
Average pressure loss (**):	100 kPa (1 bar)
Min-max water temperature:	5-35°C

Notes (*) Dependant on Drain line flow control.

(**) Under normal circumstances.

It is always recommended to install a 25µm cartridge filter before a softener.

Resin

Type: Strong acid cation resin - softening , food grade quality

Life span: 15 years under normal circumstances

Ion Exchange (for average salt consumption of 150 g/l)

Resin volume (Litres)	75	100	150	200	250	350	500
Capacity CaCO ₃ (Kg)	3.8	5	7.5	10	12.5	17.5	25
Capacity at 300ppm CaCO ₃ (m ³)	12.5	16.7	25	33	41.6	58.3	83.3
Salt usage / regeneration (Kg)	11.3	15	22.5	30	37.5	52.5	75

Regeneration

Default start time is 2:00 AM, set on the timer as "Delayed Regeneration"

Options: TIME - VOLUME - IMMEDIATE - DELAYED - DAYS OVERRIDE - MANUAL REGNERATION

Resin volume (Litres)	75	100	150	200	250	350	500
Total Time (mins)	77	94	82	95	72	94	85

The interval between regenerations should not be more than 4 days, to prevent bacteria growth.

At least 8 hours between regenerations is required for the brine solution to form.

Flow Rate

Resin volume (Litres)	75	100	150	200	250	350	500
Nominal (m ³ /hr)	3	4	6	8	10	14	20
Minimum (LPH)	120						

Consumption of Rinse Water

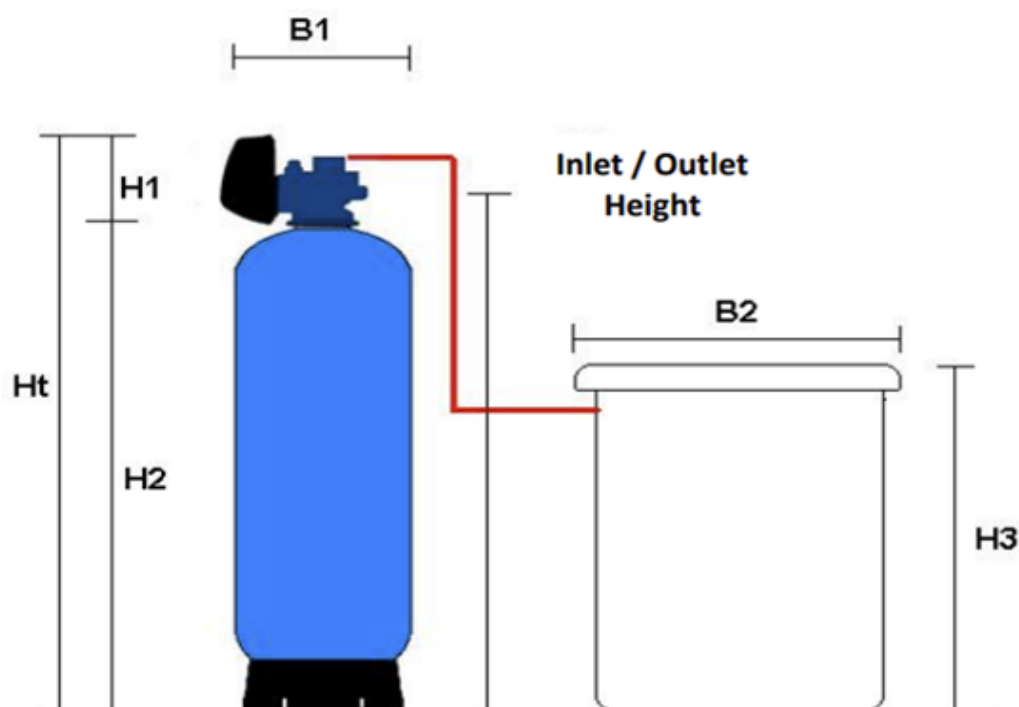
Resin volume (Litres)	75	100	150	200	250	350	500
1.Backwash (litres)	80	95	132	170	246	310	470
2.Brining + Slow rinse (litres)	238	258	282	528	972	752	1197
4. Fast Rinse (litres)	60	80	159	204	295	450	950
Total (litres)	378	433	573	902	1513	1512	2617

Figures based on 60PSI pressure.

TECHNICAL DATA SHEET SIMPLEX SOFTENERS

CLACK WS2 CI

Dimensions (cm)



Resin litres	Valve H1	Vessel H2	Vessel H3	Brine Tank Ht	Inlet/Outlet Height	Vessel B1	Brine Tank B2	Weight Kg*
200 1865	22	179	101	201	187	51	76Ø	240
250 2160	22	163	101	185	171	56	76Ø	285
350 2469	22	188	124	210	200	61	87Ø	400
500 3072	22	205	124	227	217	77	87Ø	555
700 3672	22	215	111	237	227	93	100Ø	747

All measurements can vary due to the cooling process during manufacture of the vessels and brine tanks.

*Estimated weight of the system without water or salt

General conditions for installation

Connection IN & OUT:	2"
Option side mount:	n/a
Drain connection(*):	1" for DLFC 10 - 25gpm 1.25" Over 25gpm
Electrical rating:	230V 50 Hz 12V Transformer
max power rating:	6W
IP protection class:	Double Isolated Transformer
Minimum inlet pressure :	200 kPa (2 bar)
Maximum inlet pressure:	600 kPa (6 bar)
Vacuum:	no allowance
Average pressure loss (**):	100 kPa (1 bar)
Min-max water temperature:	5-35°C

Notes (*) Dependant on Drain line flow control.

(**) Under normal circumstances.

It is always recommended to install a 25µm cartridge filter before a softener.

Resin

Type: Strong acid cation resin - softening ,food grade quality

Life span: 15 years under normal circumstances

Ion Exchange (for average salt consumption of 150 g/l)

Resin volume (litres)	200	250	350	500	700
Capacity CaCO ₃ (kg)	10	12.5	17.5	25	35
Capacity at 300 ppm CaCO ₃ (m ³)	33	41.6	58.3	83.3	117
Salt usage / regeneration (kg)	30	37.5	52.5	75	105

Regeneration

Default start time is 2:00 AM, set on the timer as "Delayed Regeneration"

Options: TIME - VOLUME - IMMEDIATE - DELAYED - DAYS OVERRIDE - MANUAL REGNERATION

Resin volume (litres)	200	250	350	500	700
Total time (mins)	82	95	77	92	83

The interval between regenerations should not be more than 4 days, to prevent bacteria growth.

At least 8 hours between regenerations is required for the brine solution to form.

Flow Rate

Resin volume (litres)	200	250	350	500	700
Nominal (m ³ /hr)	8	10	14	20	28
Minimum (LPH)	342				

Consumption of Rinse Water

Resin volume (litres)	200	250	350	500	700
1. Backwash (litres)	170	246	247	378	660
2. Brining + slow rinse (litres)	528	972	803	1488	1638
4. Fast rinse (litres)	204	295	295	454	795
Total (litres)	902	1513	1345	2320	3093

Figures based on 60PSI pressure.