

Installation Operation Maintenance Manual

Cabinet Softener With PISCES Downflow Brining Valve

Models

4 lit	7 lit
10 lit	14 lit
20 lit	25 lit
30 lit	

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1.0 GENERAL NOTES

These instructions cover the Pisces Range of cabinet Water Softeners, which includes models ranging in size from 4-30 litres resin volume.

It is recommended that these instructions are read throughout before commencing any work on the unit, particularly if you have no previous experience of installing and using a water softener.

The installation of a softener is very straight forward, and the only adjustments to be made to the controller program are setting the time of day and water hardness as detailed in Section 8.2.2. However we have tried to make these instructions as comprehensive as possible to answer any queries you may have about the functioning of your softener.

This softener will require salt for regeneration. We recommend the used of proprietary 'pellet' or 'tablet' salt.

Drinking softened water has not been shown to be harmful to normal healthy children and adults, but softened water contains a higher level of Sodium than a hard town mains supply. This is of concern to individuals on low Sodium diets or for babies fed with powder formula milk that already contains Sodium. It is therefore recommended that a separate un-softened drinking water supply is left in place or installed on a drinking water faucet. If a cartridge type water filter is installed on the drinking water line, this must be fed with un-softened water.

In the appendix to this manual is the original valve manufacturer's handbook. This is written for American customers and has a number of small differences in the setting up instructions from those used in Europe. In the event of confusion, refer to the data in this manual rather than in the valve manufacturer's handbook!

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2.0 THE SOFTENING PROCESS

Hardness in water is caused by the presence of dissolved salts of Calcium and Magnesium. In order to overcome the problems associated with the use of hard water, these salts must be removed. This process is called 'Softening'. One means of removing the salts is to exchange them for soluble Sodium salts. This technique is known as 'Ion Exchange Softening'.

2.1 IN SERVICE

In order to soften the water, it is passed through a bed of Ion Exchange resin beads which are contained inside a vertical cylindrical vessel. these beads are made of a synthetic material, and are usually amber or dark brown in colour and between 0.5 and 1.0 mm in diameter.

As the water flows down through the resin, the Calcium and Magnesium in the hard water are progressively exchanged for Sodium, with the result that the water which flows out of the unit contains only Sodium salts, which are not scale-forming. The Calcium and Magnesium remain, attached to the resin.

The Ion Exchange resin does not have an unlimited capacity for exchanging Calcium and Magnesium, so to keep the exit water soft it is necessary to periodically 'Regenerate' the resin to restore its capacity to soften the water.

2.2 REGENERATION

The softening process can be reversed if a strong solution of Sodium Chloride (i.e. Common salt dissolved in water -'brine') is passed through the resin.

The high concentration of Sodium allows it to exchange for the Calcium and Magnesium held on the resin, and these are then carried away to drain. The resin is left full of Sodium to enable it to soften water again.

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2.3 THE REGENERATION PROCESS

The regeneration process consists of four stages:-

Brine injection/Displacement Rinse - During the first part of this stage, the concentrated salt -solution is drawn from the salt storage tank, blended with water to reduce the concentration to the correct level, and passed up through the resin. When the required quantity of brine has been drawn in, the water flows alone to push the remaining brine through the resin at the correct rate, and ensure that all the resin sees the right amount of regenerant. The brine/slow rinse stage takes place before backwash in a high efficiency countercurrent regenerating water softener.

Backwash - Water flows upwards through the resin bed, and out to a drain. As it does so, it loosens the ion exchange beads, removes any resin 'fines' (i.e. small pieces of broken beads etc.) and cleans off any particles of dirt or pipework corrosion products which may have accumulated during the service cycle.

Fast Rinse - This follows the backwash, and entails rinsing away the residual brine and Calcium and Magnesium salts from the resin and re-packing the resin bed down. This is done down with water flowing through the resin in the direction of service.

Salt Tank Refill - Following the fast rinse, a quantity of water sufficient to dissolve the correct amount of salt for the next regeneration is returned to the salt tank. When this has finished, the unit automatically returns to service.

2.4 METER CONTROL OF REGENERATION INITIATION

A water meter is installed in the outlet from the softener, to measure the volume of water which passes to service. This meter drives a turbine, the movement of which is measured by a magnetic sensor which sends signals to the regeneration controller. The controller microprocessor uses this information to calculate when the unit should be regenerated. Every night, at 2 am (for example), the volume of water used in the preceding days is compared to the capacity of the softener. The computer then assesses if the resin has enough capacity left to supply the next day's use, and if not, starts the regeneration.

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2.5 TIME CLOCK CONTROL OF REGENERATION INITIATION

Time clock configuration valves initiate regeneration at a pre-set time after a pre-set number of days. Both the time of day for regeneration and the frequency of regeneration are adjustable.

3.0 UNPACKING AND PARTS IDENTIFICATION

3.1 BASIC PACKAGES

The softener will be delivered in a number of packages which include a glassfibre reinforced pressure vessel, a control valve, a brine tanks, one or more 25 litre bags of resin with one additional part bag, and a funnel to fill the vessel

3.2 UNPACKING NOTES

The unpacking of the softener is quite straightforward, and there are no 'hidden' items. It is advisable to keep the packages sealed until such time as they are used, to prevent dust or water entry.

Care should be taken in lifting the softener or its parts out of their cartons. It is advisable to lay large cartons on their side and slide out the softener or parts prior to standing them up.

3.3 MISSING OR DAMAGED GOODS

Immediately on receipt of the goods, it is advisable to check that all items ordered have been received. If you have any doubt that goods have been supplied as requested, please contact your supplier immediately. If any items are missing or damaged, the carrier and your supplier must be notified in writing within 3 days of receipt if a claim is to be made.

4.0 TEMPORARY STORAGE

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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.

5.0 DESCRIPTION OF PLANT COMPONENTS

5.1 SOFTENER VESSEL AND INTERNALS

The pressure vessel which contains the ion exchange resin is made from a fibreglass/epoxy resin outer layer surrounding an inner, seamless shell made from Polyethylene. The vessel has a threaded hole at the top, of 2.5 inch nominal diameter, into which the control valve fits.

All vessels are equipped with a single filter distribution system. This is attached to a central riser tube, which is connected to the control valve, and passes water into and out of the resin bed.

5.2 CONTROL VALVE

The control valve is mounted on top of the vessel, and directs the water flow in and out of the resin bed during the service and regeneration cycles. The body of the control valve is made from glass reinforced Noryl.

The valve carries out its various functions by rotating a cam that drives a piston through a series of seals and ports. Depending on the position of the piston in the seal stack, the different functions of the valve will take place

5.3 REGENERATION CONTROLLER

The regeneration controller is attached to the valve, and is contained in a plastic housing.

The controller is powered by 12v AC electricity, and a separate, wall mounted transformer is connected to the valve to reduce normal mains voltage down from 240v so that all the electrical supply in and around the control valve runs at a safe 12v.

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5.4 BRINE SYSTEM

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.

5.5 BLENDING SYSTEM

In some applications, it is beneficial to retain a small proportion of the hardness, for instance, to increase the effectiveness of chemical treatments. Under these circumstances, a blending facility is provided in the valve, which allows a set proportion (depending on the raw water hardness) of the feed water to bypass the softening resin, before being blended with the softened water prior to the water meter. The blend valve is found on top of the valve and is adjusted with a screw driver by turning the white dial in the blue housing as required.

6.0 PRE-INSTALLATION

6.1 MECHANICAL

6.1.1 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. (See Engineering Data, Section 12.2)

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 (see Process and Operating Data, 12.1, for relevant flows). 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.

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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.

6.1.2 Operating Space

The space occupied by the softener can be found in the Engineering Data (Section 12.2).,

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.

6.1.3 Incoming Water

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

1. Available at all times at a flow equal to the required service flow or greater, and
2. At a pressure between 1.7 and 5.5 bar
3. Temperature between 0 and 50°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)

6.1.4 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 softener 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 softener should be installed (see Section 7.1.6).

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6.1.5 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 softener.

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.

6.2 *ELECTRICAL*

A continuous supply of 12v, 5 VA is required by the softener. A 240v transformer with an output of 9.6VA is provided, which should be connected to an uninterrupted mains supply, which is separately 1Amp 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.

7.0 ASSEMBLY/INSTALLATION

7.1 *MECHANICAL*

Check all the items against the parts list and shipping documents, and ensure you have them all before starting work. In addition to the softener you will require installation materials and basic tools, (i.e., spanners, screwdrivers etc., and PTFE tape)

7.1.1 Simplex Models

Assembling Vessel, Riser Tube and Internals

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Simplex units are shipped as pre-assembled components to reduce the risk of transit damage. These need to be assembled on site. Open the carton containing the pressure vessel and remove it. Check that the vessel has not been damaged in transit. Pay particular attention to the vessel top hole threads, as this is where the valve will seal. Check that there is no dirt or swarf inside.

Riser Tube/Bottom Filter

This comprises a length of pipe (the 'riser tube') to one end of which is glued a moulded screen. The other end is fitted into the bottom of the control valve. To make sure the riser fits properly, and there is no leakage, it will be supplied to the correct length prior to despatch.

7.1.2 Charging the Resin

The ion exchange resin is supplied in 25 litre bags plus a part bag if applicable. All models will be supplied with exactly the right quantity of resin. It is important that only the correct volume of resin is put into the vessel or the system will not function properly. (See **Section 12.1.2** for data)

Place the vessel in its final location - once filled with resin and water they should not be moved. Fill the vessel about 1/5 full with clean water. In order to keep the riser centrally located and prevent resin falling inside the riser, a cover is provided to be slipped over the end of the riser when filling with resin. This must be carefully removed without disturbing the riser prior to fitting the control valve. Carefully open the resin bags and pour the resin into the vessel, using the funnel provided, keeping the riser tube central and upright. Take great care not to spill resin on the floor. If any is spilt, make sure it is swept up immediately, as it is very easy to slip on it. Wash away any loose resin from the threads of the vessel or adapter collar. Remove the riser extender cover and check that the top of the riser is still correctly located

7.1.4 Assembling the Control Valve

Carefully remove the control valve from its packing, and check that all parts are present. Fit the top filter/distributor to the valve. This is a 'snap' bayonet fit.

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7.1.5 Attaching the Control Valve

Carefully fit the control valve on to the vessel, taking care to ensure that the riser tube locates correctly into the valve base through the top distributor, and that the threads are not crossed. Also take care to make sure that the 'O'rings are properly seated and not pinched.

7.1.6. Brine System

Move brine tank into position and connect the outer port of the bulk head union to the brine draw connection on the valve using the 3/8" tubing. Make sure that this connection is also tight to stop air leaking in.

If brine draw tubing is adjusted for length during installation, ensure that brass tubing inserts are refitted into tubing end prior to connecting into brine tank and control valve.

7.1.7 Pipework

Pipework should be assembled incorporating the features shown in the Installation Diagram, Section 14.1. It is essential that inlet and outlet isolating valves and a by-pass valve are provided, and that the water main is protected by a double check valve where appropriate (see Local Water Bye-laws).

In domestic premises it is recommended that a hard water supply is still used for drinking water (see General Notes Section 1.0).

Pipework can be constructed from any normally acceptable material (Copper, Galvanised, Plastic), provided it is properly supported and aligned. Ensure that the pipe is sufficiently large to accommodate the flow of water required, making due allowance for the pressure drop between the softener and the point of discharge of soft water.

NOTE: IF BRAZED OR SOLDERED FITTINGS ARE TO BE USED, THE PIPEWORK MUST BE DISCONNECTED FROM THE VALVE DURING HEATING AND COOLING. EXCESS HEAT CAN CAUSE PERMANENT DAMAGE TO SOME OF THE VALVE COMPONENTS.

The inlet and outlet pipework should be connected to the horizontal, rear facing connections on the rear of the valve manifold (3/4" BSP Male) (see Fig 1 in Section 14.1).

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7.1.8 Storage tank ball valve

Conventional ball float valves pass water at a slow trickle into storage tanks and cisterns when they are shutting off. Trickle flow is not recommended for satisfactory functioning of a water softener since channelling can occur through the resin bed and the meter may not accurately monitor very low flows. It is therefore recommended that main storage tanks for softened water should have the ball valve replaced with a servo type valve such as a Torbeck or Fluidmaster which permit full flow until they close off. These are inexpensive and are a direct replacement for the more common brass ball float valves.

7.1.9 Drains and overflow connections

Connect the overflow fitting on the brine tank to a suitable drain, using flexible or rigid tubing. Make sure that there is a clear gap of approximately 50 mm between the end of the tube and the top of the drain tundish or gully edge.

The drain connection from the valve is a 1/2" hose spigot. Flexible tube should be run from this spigot to a drain capable of taking the maximum flow in regeneration (see Section 12.1), and leaving a similar gap above the drain edge. The drain must not be higher level than the 500mm above the control valve and preferably should have an air break at the same height as the control valve. A standard washing machine upstand is quite suitable for this.

7.1.10 Blending System

For those applications where it is advantageous to retain some hardness in the treated water, a blending system has been fitted. This is controlled by a rotating dial on top of the unit.

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7.2 ELECTRICAL

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

7.2.1 Mains Supply

The mains supply should be through a separate, switched supply, fused and earthed in accordance with Institute of Electrical Engineers Regulations. Current rating should be 1Amp.

7.2.2 Transformer

a safety transformer is provided to reduce the voltage to 12 volts to operate the controls.

This should be attached to a convenient wall, within 500mm of the softener. **DO NOT SWITCH ON THE ELECTRICAL SUPPLY AT THIS STAGE.**

8.0 COMMISSIONING

8.1 INTRODUCTION

It is recommended that the commissioning of the plant is undertaken by a trained service engineer, who will be able to put the plant into service quickly, and most efficiently. However, if the services of an experienced engineer are not available, following the steps outlined below will result in the system being properly commissioned.

8.2 CONTROLLER SETTING - Site programming mode

All controller settings will require the valve to have a mains supply switched on. The valve must not be regenerating when controller settings are adjusted.

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8.2.1 Setting the Time of Day

The time of Day is set in the programme. See 13.0 Factory Programming.

Meter and Time clock controlled valves: The display permanently shows the time day of the week at the top and the remaining calculated capacity in litres on the below.

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8.2.2 Site programming

The time of day set for regeneration to take place has been entered as 2:00 AM and this may need to be altered depending on site requirements.

On metered softeners, the regeneration override is used to freshen the resin if a regeneration has not taken place for a number of days. On time clock softeners the override is used to set the frequency of regeneration.

8.3 BRINE SYSTEM

8.3.1 Salt Tank Filling

Place approximately 100 mm depth of water in the bottom of the cabinet. Fill with pellet salt (recommended) until the cabinet is full or with granular salt until it is 3/4 full.

Overfilling the cabinet with granular salt can result in an overflow of brine. This cannot happen with pellet salt which is why it is recommended.

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.

8.4 PRE-SERVICE FLUSH AND REGENERATION

Set the manual isolating valves so that water will by-pass the softener. Turn on the main water supply. Open a soft water tap close by and let the water run for a few minutes to flush out any debris or foreign matter from the pipework system.

Press the SET/REGEN button for five seconds. The display will then indicate MAN. REG. and below whether it is time clock, meter delay or meter immediate. The controller will start a manual regen unless it is set to meter delay which it will wait until the delay time set. To override this press the SET/REGEN button again and press DOWN this will set it to immediate regen. You can then regen and set to delay after. Wait for the controller to advance the valve until the cycle and time in

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minutes stops flashing on the display and the dial on front reads backwash.

Slowly open the mains inlet isolating valve until water starts to flow slowly from the drain line. Air will escape initially through the drain line. When water begins to flow steadily, open the valve fully.

Press any button Three times more to set the valve to refill then leave the time to run down. This will allow the correct amount of water to be left in tank for brine. After each press, wait for the controller to stop in the next stage shown on the display. There will be loud 'click' as the brine valve closes while the valve advances from position 4 to the home position.

During regeneration the softener will pass hard water to service. The bypass can therefore be closed and the outlet valve opened. When the softener returns to service then soft water will be available.

8.5 Blending System

The valve has a built in blending adjustment on the top of the valve body behind and below the control valve powerhead. The blender is factory set to **fully closed**.

Blending is not normally required for domestic applications but is occasionally used for industrial processes where a small amount of hardness is used in conjunction with special chemicals.

The blender is not calibrated. The blend flow must also be set with the water flowing through the softener at its normal working flow rate.

This is done by trial and error. When the unit is in service, open the blend controller, by turning the knob **clockwise** half a turn. Check the downstream water hardness with a test kit and then turn the knob open or closed to adjust the harness to the required level.

A change will then need to be made to the valve programming on metered softeners. See section 13.4 'Custom settings' for information on adjusting the valve program to work correctly with the blender.

9.0 OPERATION

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9.1 NORMAL OPERATION

Operation is completely automatic, with regeneration being initiated whenever required by the meter controller.

9.2 REFILLING WITH SALT

Since salt is used in the regeneration process, the level of salt in the brine tank will fall after each regeneration. It should not be allowed to fall below 75 mm above the bottom of the cabinet. When the low level is approached (or more often, as a routine) the cabinet should be refilled to the top with pellet salt or 3/4 filled with granular salt.

The approximate capacity of the cabinet for salt is shown in Section 12.1.

9.3 MANUAL REGENERATION

There can be occasions during the life of equipment such as softeners when the original design basis is not applicable. For example, after a shutdown period, the demand for soft water may far exceed the design flow rate for a short period. Another possibility is that the Water Service Plc finds it necessary to change to a supply which is much harder than that normally received. It will then be necessary to give the unit an additional regeneration to ensure that soft water continues to be available to service.

This additional regeneration is initiated manually.

To do so hold down SET/REGEN button until regeneration begins (see section 8.4) but do not forward any cycles on.

Note: if screen is locked hold down the menu button for five seconds or until it reads unlocked.

9.4 BY-PASSING THE SOFTENER

There may be occasions when it is desirable to by-pass the softener, to allow hard water to go to service, or if the softener is for some reason not performing properly.

To do this, open the by-pass isolating valve and close the softener outlet isolating valve (see Installation Diagram, Fig 3 in Section 14.2).

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The softener can still be safely regenerated with the valves in this position. If for any reason, it is desired to completely isolate the softener, it will be necessary to close the inlet isolating valve as well.

9.5 TEMPORARY SHUT-DOWN

The softener can be left indefinitely without use. During periods of low or minimal water use, for example during vacation absences, the valve controller will automatically regenerate the resin at the frequency set in the regeneration override.

If the softener needs to be taken out of service for some time for any other reason, it is recommended that one or two simple procedures be undertaken to ensure the return to operation is as smooth as possible.

1. The unit should be left regenerated.
2. The electrical supply should be turned off
3. The inlet and outlet manual isolating valves should be closed.
4. The valve should be drained of water if there is the possibility of the system freezing.

On restart, it will be necessary to reset the 'time of day. It is also recommended that the unit be regenerated again before being put into service.

9.6 CHANGES IN INCOMING WATER

There is a much greater tendency these days for the Water supply Plc to use water from more than one source. It is unlikely that two sources will have similar chemical composition, and so when this happens the raw water being fed to the unit may also change. It is suggested that routine monitoring be undertaken to check whether this is the case (see 9.9). If variation greater than 5% is found, it will be necessary to check whether the settings for regeneration need changing. Resetting is the same as setting.

9.7 ROUTINE MONITORING

The following recommendations are made to help the user of the softener confirm that it is performing as required, and to give early warning of possible problems. The operation of the softener is completely automatic, and should not require adjustment (except as above).

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Weekly

Check the treated water hardness with a hardness test kit.
Inspect the level of salt in the salt tank and refill if necessary.

Monthly

Check raw water hardness, and record. Compare with original hardness and adjust volume capacity setting if required (see Section 13.1).

Annually

Inspect and clean/replace as necessary the brine injector, piston and the internal seals. This should be performed by a competent engineer familiar with Fleck valves.

10.0 FAULT FINDING AND RECTIFICATION

Modern water softeners are extremely reliable and unlikely to give any problems if they are installed and operated correctly.

10.1 NO FLOW TO SERVICE

Check mains pressure is above 1.7 bar.

Check inlet and outlet isolating valves are open.

Check service outlet valve is open.

Check pressure drop across resin. If excessive, resin may be fouled, or internals blocked. Initiate a regeneration. If this does not free up the resin the softener will need to be inspected and serviced by a competent engineer.

10.2 POOR TREATED WATER QUALITY

Check manual by-pass closed.

Check blending valve has not been opened or adjusted.

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Check salt level in salt tank. Refill if necessary.

Trickle flow through conventional ball valve in storage tank. Replace with Torbeck or Fluidmaster servo valve.

Check raw water pressure above minimum. If flow is less than minimum, channelling of water can occur in resin, which results in inadequate treatment.

Check injector strainer and injector not blocked (see Appendix for drawings). Clean if necessary.

Check brine pick-up screen not blocked. Clean if necessary.

Check brine line not split. Replace if necessary.

Check raw water hardness, and then check if controller setting is correct for this hardness (see Section 8)

10.3 NO REGENERATION

Check electrical supply, fuses etc. satisfactory.

Check control head motor runs, by initiating a manual regeneration, and listening for drive motor gently 'ticking' as it advances between cycles. Replace if necessary.

Check meter running freely (if fitted) indicated by running a treated water outlet and watching the flow indicator and 'volume remaining' reading on the display count down at the same rate as the water flow.

10.4 UNSATISFACTORY CAPACITY BETWEEN REGENERATIONS

See Section 10.2.

Check condition of resin. It may have become fouled, inhibiting the regeneration process. If fouled, it should be cleaned or replaced.

Check incoming water for presence of Chlorine. If high, the resin may have been degraded.

Check raw water pressure. Too high pressure may mean the brine draw stage of regeneration is not effective

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11.0 WARRANTY AND SERVICE

11.1 AFTER SALE WARRANTY

Your softener is covered by a parts warranty for a period of one year from installation.

Should you have any problems with your softener or require routine service, please contact your supplier.

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12.0 ENGINEERING DATA

12.1 PROCESS AND OPERATING DATA

MODEL		4L	7L	10L	14L	20L	25L	30L
PARAMETER	UNITS							
Max. Service Flow	M3/hr	0.16	0.28	0.4	0.56	0.8	1.0	1.2
Min Service Flow	M3/hr	0.2	0.035	0.05	0.07	0.10	0.13	0.15
Volume treated between regens (300 ppm CaCO ₃ , 21° Clarke)	M3	0.67	1.1	1.67	2.34	3.34	4.17	5.01
Salt used per regeneration	kg	0.56	0.98	1.4	1.96	2.8	3.5	4.2
Regeneration Time	mins	38	41	42	43	56	58	58
Resin Volume	litres	4	7	10	14	20	25	30
Salt Storage Capacity	kg	20	25	25	25	75	75	75
Maximum Flow to drain	Lit/min	4.6	4.6	4.6	4.6	4.6	5.7	7.6

IMPORTANT NOTES

Much of the data quoted in the above table is affected by the inlet pressure, and so should be regarded as nominal only.

Total flow to drain will be similarly affected and is therefore not quoted, but will be about 6 times the resin volume.

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12.2 ENGINEERING DATA

MODEL		7L	10 L	14 L	20 L	25L	30L
PARAMETER	UNITS						
Diameter of vessel/valve	mm	220	220	220	220	250	270
Height to top of valve	mm	640	640	800	1105	1105	1105
Diameter of brine tank	mm	203	203	203	225	225	250
Height of brine tank	mm	630 all					
Inlet Conn.	ins BSPM	¾" all					
Outlet Conn.	ins BSPM	¾" all					
Drain Conn.	ins	½" all					
Brine Tank Overflow Conn.	ins	¾" all					
Breech fitted		1	1	3	3	5	5
Delivered Wt.	Kg.	16	16	22	34	39	44
Working Wt. (approx)	Kg	43	46	57	94	99	104
Maximum Flow to drain	Lit/min	4.5	4.5	5.2	5.2	5.7	5.7
Electrical Power	v	240	240	240	240	240	
	Hz	50	50	50	50	50	
	V/A	1.2	1.2	1.2	1.2	1.2	

MAXIMUM OPERATING PRESSURE 5.5 Bar MINIMUM OPERATING
 PRESSURE 1.7 Bar MAXIMUM OPERATING TEMPERATURE 50.0C
 HEADROOM - Allow 100 mm greater than overall height.

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13.0 Factory Programming

13.1 Master Program Settings

Master Program set up summary

Details applicable to each valve or programming type are in the columns 'T/C' (Timeclock) and 'DEL' (Delayed regeneration). Regeneration cycle data applicable to each resin volume is shown in the resin volume columns. The treated water capacity is entered as 66% of the resin capacity at 300 ppm giving a 33% reserve.

To adjust any of these settings see the following section, 13.3

To enter press the menu button.

Parameter description	Disp	Value	Res Vol	4	7	10	14	20	25	30
Regional	US									
Regen. mode	METER	MTR/CLOCK								
Time	TIME	Set time								
Regen time	REG. TIME	02:00 AM								
**Day override	REG. DAYS	07								
*Unit capacity @300ppm	REG. CAP. ???G	see across	⇒	117	206	294	412	588	736	883
BackWash	BACKWASH	See across	⇒	4	4	4	4	4	4	4
Brine Draw/Slow Rinse	BRINE	See across	⇒	30	30	30	30	40	40	40
Fast Rinse	RINSE	See across	⇒	4	4	4	4	4	4	4
Brine Refill	REFILL	See across	⇒	2	3	4	5	8	10	12
Load default	DEFAULT	IGNORE								
Exit to time of day										

- only if volumetric
- Day override will only be displayed if calendar clock or meter override is set on regen. Mode.

To enter the programme press the menu button, valve will then show the 1st setting.

To change setting press set/regen button, this will make the display flash and allow setting to be changed by pressing up or down.

Once option chosen press set/regen again to stop flashing, then press arrow down to move to next setting and repeat steps until all settings complete.

Press menu button to exit programming.

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13.2 Master Programming

This section is for information only. The valve is pre-programmed and will not need adjustments made to the Master Level Program unless custom settings are required.

Unlock the screen by holding down menu button and enter program by pressing menu button again once screen unlocked.

Refer to previous table in 13.1 for factory settings or 13.3 for capacity settings using different water hardness.

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13.3 Softener output (capacity) at differing hardness levels

Outputs detailed in litres

Lit resin Harness (ppm)	7	10	14	20	25	30	40	50	60	75
150	1600	2200	3200	4600	5600	6800	9200	11200	12800	16800
175	1371	1886	2743	3943	4800	5829	7886	9600	10971	14400
200	1200	1650	2400	3450	4200	5100	6900	8400	9600	12600
225	1067	1467	2133	3067	3733	4533	6133	7467	8533	11200
250	960	1320	1920	2760	3360	4080	5520	6720	7680	10080
275	873	1200	1745	2509	3055	3709	5018	6109	6982	9164
300	800	1100	1600	2300	2800	3400	4600	5600	6400	8400
325	738	1015	1477	2123	2585	3138	4246	5169	5908	7754
350	686	943	1371	1971	2400	2914	3943	4800	5486	7200
375	640	880	1280	1840	2240	2720	3680	4480	5120	6720
400	600	825	1200	1725	2100	2550	3450	4200	4800	6300
425	565	776	1129	1624	1976	2400	3247	3953	4518	5929
450	533	733	1067	1533	1867	2267	3067	3733	4267	5600
475	505	695	1011	1453	1768	2147	2905	3537	4042	5305
500	480	660	960	1380	1680	2040	2760	3360	3840	5040

When setting the capacity of the softener, allowance must be made for a 24 hour reserve on metered units. On domestic supplies this should be calculated at 150 litres per person per day unless meter reading data is available that is substantially different.

eg 1: A 30 litre softener at 400 ppm supplying a four person household should be set to a capacity of:

$$2550 - (4 \times 150) = 1950 \text{ litres}$$

eg 1: A 10 litre softener at 225 ppm supplying a two person household should be set to a capacity of:

$$1467 - (2 \times 150) = 1167 \text{ litres}$$

The PISCES valves capacity is calculated in USGallons so all calculations in litres should be divided by 3.8 before being entered. The factory default setting is 66% of the capacity at 300 ppm.

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13.4 Custom Programming

There are two variations on the settings that may be required. Both need adjustments to be made through the Master Programming Mode.

13.4.1 Using blender. If the blender fitted to the valve is to be used, the valve capacity needs to be adjusted. This means that the valve will still be able to calculate when the resin should be regenerated without wasting salt.

You will first need to adjust the blender and check the hardness of the blended water on site during normal service flow.

Next, calculate the percentage or proportion of the blended water when compared with the raw water. If, for example, the hardness of the blended water is 60 ppm, and the raw water is 300 ppm, the proportion of blended water is $60/300 = 1/5$, or 20%. The 'capacity' of the softener can then be increased by 20%, saving salt.

13.4.2 Immediate regeneration. The valve is factory programmed for meter override regeneration which means that it will check whether it has zeroed out at the pre-programmed regeneration time (factory set to 2:00 AM).

However the valve can also be set for 'immediate' regeneration when it will regenerate as soon as the water meter zeroes out at any time of the day. The setting is made in second step of the Master Programming mode when the setting should be changed to METER IMMEDIATE. (see section 13.1)

No reserve needs to be allows for the system capacity when the softener is programmed for immediate regeneration.

Please note, that there will then be no 'regeneration time of day' option presented during the Master or Site Programming modes when immediate regeneration is selected.

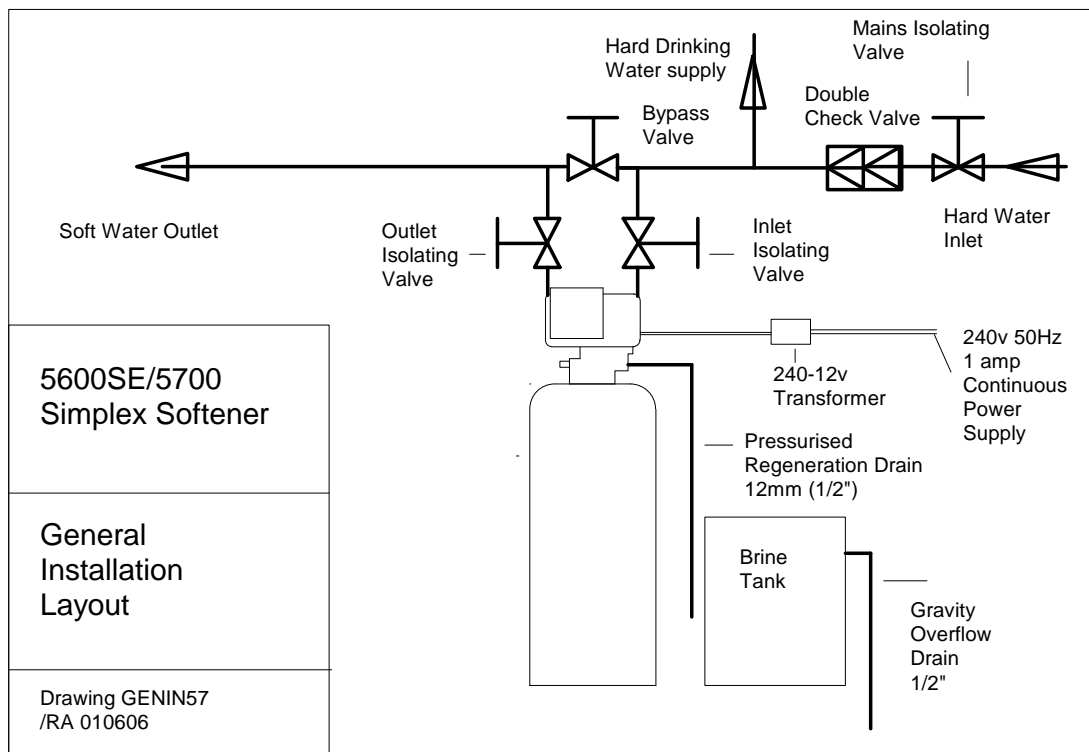
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14.0 Drawings

14.1 Installation Layout

Fig 1 General Installation Layout Pisces cabinet Softeners



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Manufacturer's Declaration of Conformity

We the undersigned

EURAQUA UK, HITCHIN, ENGLAND

Certify that the product

type: CABINET WATER SOFTENER WITH Pisces


has been designed and manufactured in accordance with the specifications of the following:

Directive

Machinery Directive 89/392/EEC
Low Voltage Directive 73/23/EEC
EMC-Directive 89/336/EEC

Standard

EN 292-1, EN 292-2
EN 60 335-1
EN 55 014



RT Adam
Director

Hitchin, England 01/01/01
Issue place & date