

WS1 Series

Installation Operation Maintenance Manual



Cabinet Water Softeners With WS1 Series Valve

Models 20 ltr - 30 ltr

WS1 Series Watersoftener

Installation Operation Maintenance Manual

CONTENTS

NOS.		PAGE
1.0	UNPACKING AND PARTS IDENTIFICATION	4
1.1	Basic Parts List	4
1.2	Missing or Damaged Goods	4
2.0	TEMPORARY STORAGE	4
3.0	REGENERATION	5
3.1	The Regeneration Process	5
3.2	Meter Control of Regeneration	6
3.3	Time Clock Control of Regeneration	6
4.0	PRE-INSTALLATION CHECKS	7
4.1	Mechanical	7
4.1.1	Foundations/Drainage	7
4.1.2	Operating Space	7
4.1.3	Incoming Water	7
4.1.4	Pipework	8
4.1.5	Water Supply Company Requirements	8
4.2	Electrical	8
5.0	ASSEMBLY/INSTALLATION	9
5.1	Pipework	9
5.2	Assembly	10
6.0	PROGRAMMING	11
6.1	Introduction	
6.2	Controller Setting	11
6.2.1	Setting the Time of Day	11-12
6.3	Factory Programming	13-15

WS1 Series Watersoftener

Installation Operation Maintenance Manual

NOS.		PAGE
7.0	COMMISSIONING	16
7.1	Commissioning	16
8.0	ROUTINE MONITORING	17
9.0	FAULT FINDING AND RECTIFICATION	18
9.1	No Flow to Service	18
9.2	Poor Treated Water Quality	18
9.3	No Regeneration	19
9.4	Unsatisfactory Capacity between Regeneration's	19
10.0	WARRANTY AND SERVICE	19
10.1	After Sale Warranty	19
11.0	TECHNICAL DATA	20
11.1	Process and Operating (7-30ltr)	20
11.2	Engineering Data (7-30ltr)	21
12.0	SOFTENER OUTPUTS	22
13.0	INSTALLATION DRAWING	23
14.0	SPARES LIST	24
15.0	CE CERTIFICATE	25

WS1 Series Watersoftener

Installation Operation Maintenance Manual

1.0 PARTS LIST

1.1 BASIC PARTS LIST

The cabinet version of a WS1 valved softener is supplied fully assembled in a shipping carton.

1.2 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 within 2 days of receipt if a claim is to be made.

2.0 TEMPORARY STORAGE

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.

WS1 Series Watersoftener

Installation Operation Maintenance Manual

3.0 REGENERATION

3.1 The Regeneration Process

The regeneration process consists of six stages:-

1. 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.

2/3. Brine/Slow Rinse - During the first part of this stage, the concentrated salt -solution is drawn from the cabinet, blended with water to reduce the concentration to the correct level, and passed down 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 of the resin sees the right amount of regenerant.

4. Backwash (2nd) - This valve has the unique facility of performing a second backwash allowing for optimum regeneration, efficiency and cleaning of the resin bed. Water flows as in the first backwash cycle.

5. Fast Rinse - This follows the brine and slow rinse cycle, and entails rinsing away the residual brine and Calcium and Magnesium salts from the resin and re-packing the resin bed. This is carried out down flow with water flowing through the resin in the direction of service.

6. 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.

WS1 Series Watersoftener

Installation Operation Maintenance Manual

3.2 METER CONTROL OF REGENERATION

On meter controlled valves a water meter is installed in the outlet from the softener, to measure the volume of water which passes to service. The internal turbine rotates with the flow of water and reports its rate of rotation through Hall-effect circuitry to the printed circuit board. When the reading reaches zero the valve will automatically regenerate that night at 2 am for delayed regeneration softeners or immediately for immediate regeneration softeners.

3.3 TIME CLOCK CONTROL OF REGENERATION INITIATION

Time clock configuration valves initiate regeneration at a pre-set time after a pre-set number of days. The frequency of regenerations are adjustable on programming the timer (Regeneration control).

WS1 Series Watersoftener

Installation Operation Maintenance Manual

4.0 PRE-INSTALLATION CHECKS

4.1 MECHANICAL

4.1.1 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 11.2)

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, 11.1, for relevant flows). The total flow of water to drain depends on site conditions, but will be approximately 6 times the resin volume. Preferably the drain should be level with or no higher than 500mm above the softener valve.

A second drain is required for the cabinet 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.

4.1.2 Operating Space

The space occupied by the softener can be found in the Engineering Data (Section 11.2).

Access will be required to refill the cabinet with salt, 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.

4.1.3 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 or greater than the required service flow
2. At a pressure between 1.7 and 7.0 bar
3. Temperature between 4 and 38°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)

4.1.4 Pipework

WS1 Series Watersoftener

Installation Operation Maintenance Manual

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.

4.1.5 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.

4.2 ELECTRICAL

A continuous supply of 240v, 5 VA is required. The softener itself is 12 volt but a plug in 240v/12v transformer is supplied and should be connected to an uninterrupted mains supply, which is separately 1 Amp fused, and does not have any additional switch.

WS1 Series Watersoftener

Installation Operation Maintenance Manual

5.0 ASSEMBLY/INSTALLATION

5.1 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)

5.1.1 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).

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.

WS1 Series Watersoftener

Installation Operation Maintenance Manual

5.1.2 Assembly

Position the cabinet in its working location.

Connect inlet and outlet pipework to the valve (1" NPT 90 deg male threaded elbows at rear of valve) using flexibles where possible or rigid high pressure pipe and socket unions. Some flexible pipework is advisable to prevent stress on the vessel as it cycles during service, since it will expand and contract longitudinally.

Connect drain line to the drain outlet (3/4" male threaded elbow on top of valve). Ensure that there is an air break in the drain line at the same height as the valves to prevent negative pressure on the vessel.

Connect power supply to valve and commission.

WS1 Series Watersoftener

Installation Operation Maintenance Manual

6.0 PROGRAMMING

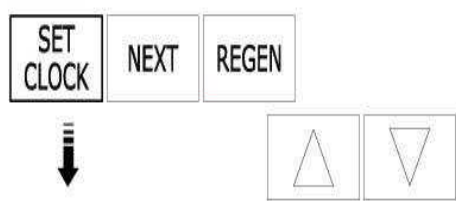
6.1 INTRODUCTION

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.

6.2 CONTROLLER SETTING - Site programming mode

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

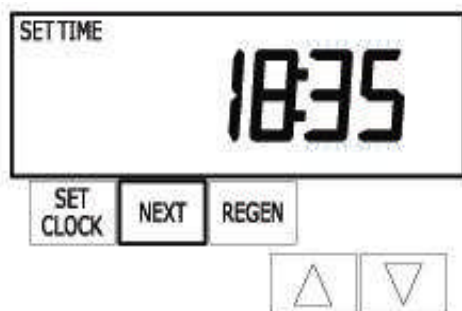
6.2.1 Setting the Time of Day



1. Press SET CLOCK

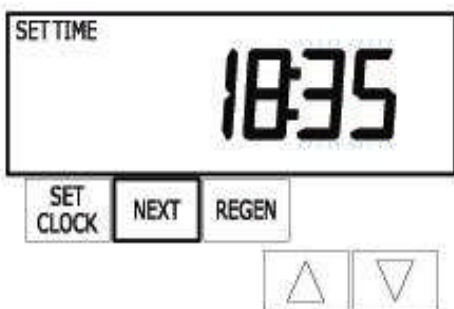
WS1 Series Watersoftener

Installation Operation Maintenance Manual



2. Adjust hours with UP and DOWN arrows

3. Press NEXT



4. Adjust minutes with UP and DOWN arrows.

5. Press NEXT to return to normal operation

The softener regeneration cycles have been factory programmed. On metered softeners the volume capacity of the resin in litres has also been entered on a default hardness of 300ppm and a reserve capacity of 33%. This may need to be altered based on local water hardness and reserve required for the site (see section 13.1)

The time of day for regeneration to take place has been entered as 2.00 AM and this can be altered depending on site requirements.

WS1 Series Watersoftener

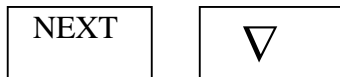
Installation Operation Maintenance Manual

6.3 Factory Programming

Regeneration Programming

(All programming below is Factory set)

To alter settings – Press “∇” and “Δ” keys
To back up at any stage – Press “REGEN”
To save any changes – Press “SET
CLOCK”



Press and hold together for 5 seconds



“Softening” will be flashing in top right corner



Set 1st cycle time in minutes - BACKWASH



Set 2nd cycle time in minutes – BRINE &
SLOW RINSE



Set 3rd cycle time in minutes –
BACKWASH 2



Set 4th cycle time in minutes – FAST
RINSE



Set 5th cycle time in kilos of salt required
per regeneration – BRINE REFILL

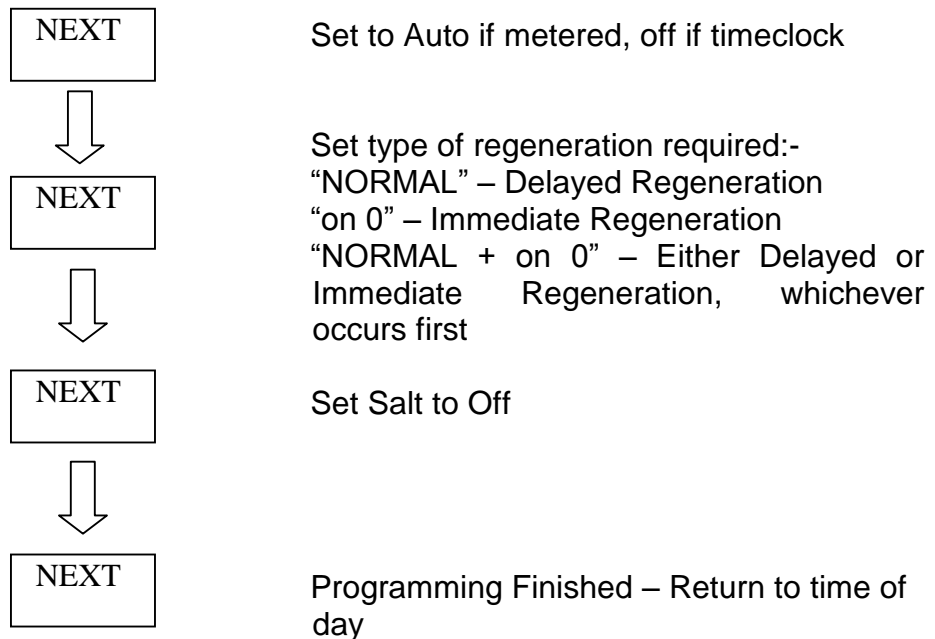


Capacity in Kilograms – set according to
softener size in technical data if metered,
ignore if timeclock.



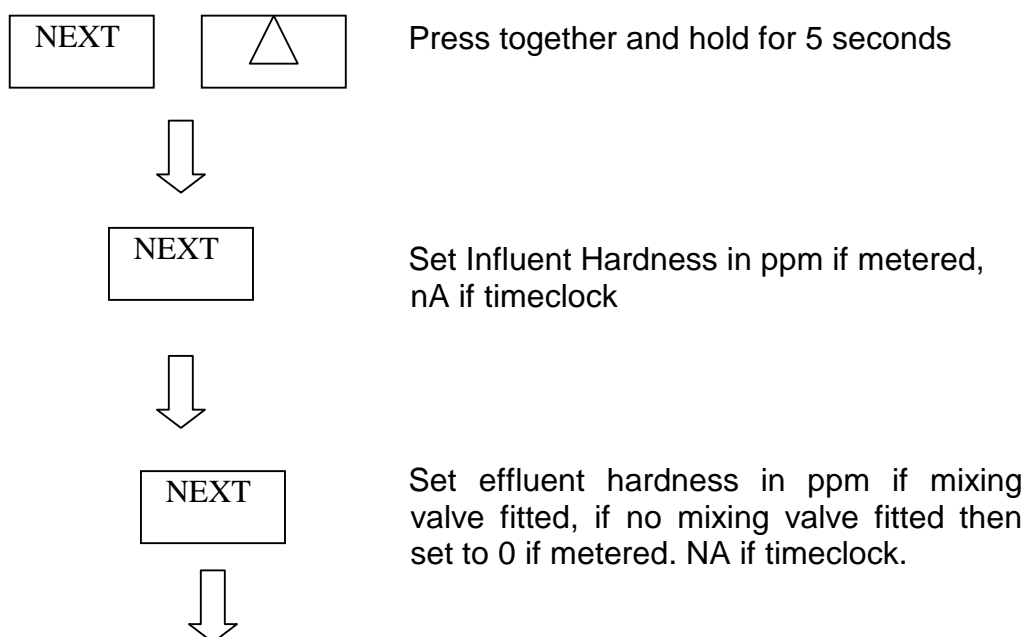
WS1 Series Watersoftener

Installation Operation Maintenance Manual



User Programming

To alter settings – Press “∇” and “Δ” keys
To back up at any stage – Press “REGEN”
To save any changes – Press “SET CLOCK”



WS1 Series Watersoftener

Installation Operation Maintenance Manual

NEXT

Set day regeneration override for metered softeners OR set frequency of regenerations for time clock valves. (1-28 days)



NEXT

Set time for regeneration hours.
Time for Immediate regeneration valves cannot be altered and will show "on 0"



NEXT

Set time for regeneration minutes.

Returns to time of day

WS1 Series Watersoftener

Installation Operation Maintenance Manual

7.0 COMMISSIONING

The objective of commissioning is to fill the softener and cabinet with water, check for leaks and prepare it for service. The simplest way to commission the unit is to initiate a regeneration. This will eliminate the air from the system and flush the resin prior to use.

- 7.1.1 Manually add water to the cabinet until it is filled approximately 6" (100mm) from the bottom of the tank.
- 7.1.2 Before opening the inlet water supply, ensure that the outlet is shut and switch on the power supply and press the "REGEN" button on the valve. "Regen today" will appear at the bottom left of the timer, by continuing to press the "REGEN" button the motor will power up and move the valve into the backwash position. Slowly open the inlet valve. At first, air will be expelled from the drain line, followed by water once the vessel is full. The first quantity of water will have a tan colouration which is perfectly normal. Allow water to run to drain until the water is clear.
- 7.1.3 Next, press the "Regen" button and the motor will move the valve into the brine and slow rinse position. Ensure that the water level in the cabinet drops as water is drawn in. During brine and slow rinse water will slowly run to drain.
- 7.1.4 Press the "Regen" button 3 more times (after pressing the button once, wait for the motor to stop before pressing it again) until the valve reaches the refill stage. Ensure that water is now refilling the cabinet. Leave to fill for full duration of the cycle and add salt to the cabinet. The level the water will reach depends on the type of salt used and the resin volume of the softener
- 7.1.5 At the end of the refill cycle the motor will automatically move the valve back into the service position. The softener is now commissioned. Open the outlet from the softener to run water to service.
- 7.1.6 Add salt to the cabinet. If tablet salt is used (recommended) then the cabinet can be filled to the top. If granular salt is used then the cabinet must only be 3/4 full.

WS1 Series Watersoftener

Installation Operation Maintenance Manual

8.0 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.

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 12.0).

Annually

Inspect and clean/replace as necessary the brine injector, brine screen and the internal disc/flapper set. This should be performed by a competent engineer familiar with the WS1 valve.

WS1 Series Watersoftener

Installation Operation Maintenance Manual

9.0 FAULT FINDING AND RECTIFICATION

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

9.1 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.

9.2 POOR TREATED WATER QUALITY

Check manual by-pass closed.

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 capacity setting is correct for this hardness (see Section 12.0)

WS1 Series Watersoftener

Installation Operation Maintenance Manual

9.3 NO REGENERATION

Check electrical supply, fuses etc. satisfactory.

Check control head motor runs by initiating a manual regeneration (Press "REGEN" button for 5s and then again for a further 5s), listening for drive motor 'whirring' as it advances between cycles. Replace if necessary.

Check internal meter running freely (if fitted) indicated by small black dot in center of display flashing.

9.4 UNSATISFACTORY CAPACITY BETWEEN REGENERATIONS

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

10.0 WARRANTY AND SERVICE

10.1 AFTER SALE WARRANTY

Your softener is covered by a parts warranty for a period of one year from installation or 14 months from purchase.

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

WS1 Series Watersoftener

Installation Operation Maintenance Manual

11.0 TECHNICAL DATA

11.1 PROCESS AND OPERATING DATA

WS1 Series Water Softeners (20-30L)

MODEL		7L	10 L	14 L	20 L	25 L	30 L
PARAMETER	UNITS						
Max. Service Flow	m ³ /hr	0.30	0.40	0.56	0.80	1.00	1.20
Min Service Flow	m ³ /hr	0.03	0.05	0.07	0.10	0.13	0.15
Volume treated between regens (300 ppm CaCO ₃ , 21° Clarke)	m ³	1.1	1.6	2.3	3.3	4.1	5.0
Max Salt used per regeneration	kg	0.98	1.4	1.96	2.8	3.5	4.2
Regeneration Time	mins	45	45	45	48	58	68
Salt Storage Capacity	kg	20	20	25	50	50	50
Max operating Temperature	°C -	50	50	50	50	50	50
Maximum Flow to drain	lit/min	4.6	4.6	4.6	4.6	5.7	9.1

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.

WS1 Series Watersoftener

Installation Operation Maintenance Manual

11.2 ENGINEERING DATA

WS1 Series Water Softeners (20-30L)

MODEL		7L	10L	14L	20L	25 L	30L
PARAMETER	UNITS						
Vessel		717	817	822	835	935	1035
Width	mm	230	230	230	340	340	340
Depth	mm	450	450	450	520	520	520
Height	mm	620	620	760	1120	1120	1120
Rear clearance required	mm	50	50	50	50	50	50
Inlet Conn.	ins NPT	1	1	1	1	1	1
Outlet Conn.	ins NPT	1	1	1	1	1	1
Drain Conn.	ins NPT	3/4	3/4	3/4	3/4	3/4	3/4
Cabinet Overflow Conn.	ins	1/2	1/2	1/2	1/2	1/2	1/2
Delivered Wt.	Kg.	14	16	22	35	40	45
Electrical Power	v	240	240	240	240	240	240
	Hz	50	50	50	50	50	50
	V/A	1.2	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.

WS1 Series Watersoftener

Installation Operation Maintenance Manual

12.0 SOFTENER OUTPUTS

Outputs detailed in litres

Lit resin	7	10	14	20	25	30
Hardness(ppm)						
100	3500	5000	7000	10000	12500	15000
150	2345	3350	4690	6700	8375	10050
200	1750	2500	3500	5000	6250	7500
250	1400	2000	2800	4000	5000	6000
300	1169	1670	2338	3340	4175	5010
350	1001	1430	2002	2860	3575	4290
400	875	1250	1750	2500	3125	3750

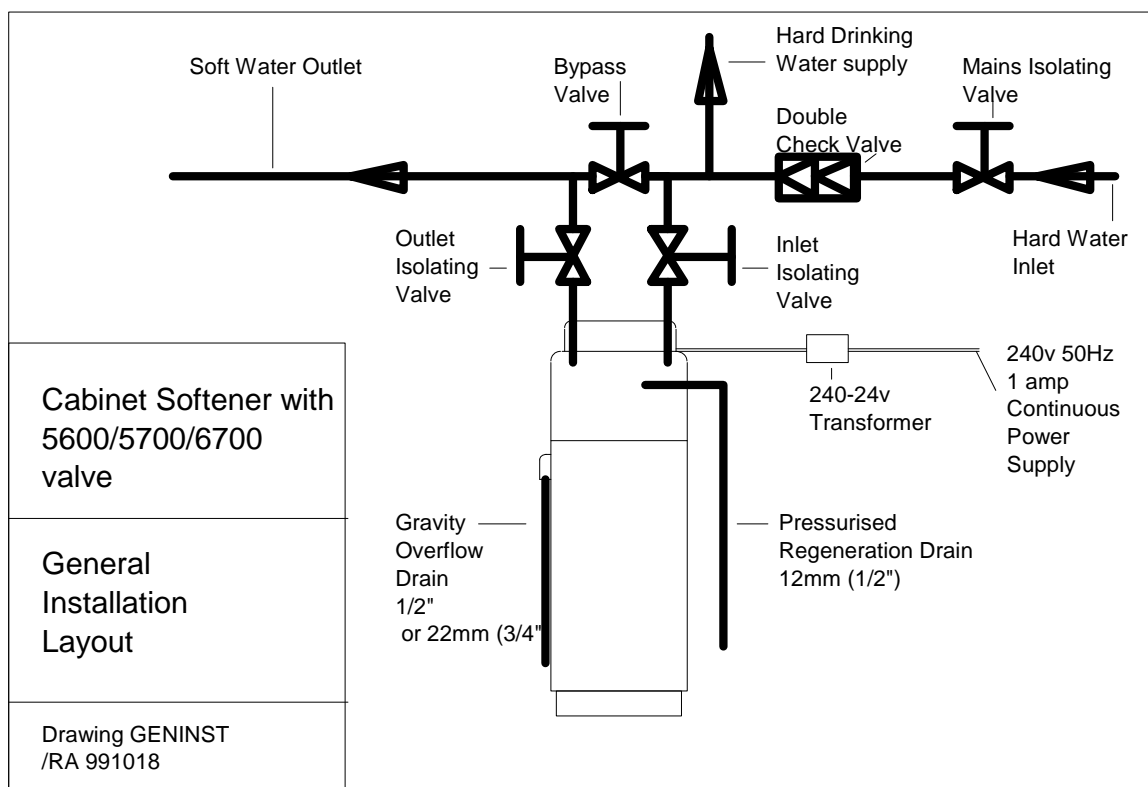
WS1 Series Watersoftener

Installation Operation Maintenance Manual

13.0 Drawings

13.1 Installation Layout

Fig 1 General Installation Layout Cabinet Softeners



WS1 Series Watersoftener

Installation Operation Maintenance Manual

14.0 SPARES LIST

PART NO.	DESCRIPTION
XC3107-01	Motor Assy
XC3108	PC Board
XC3011	Piston Assy - Downflow
XC3011-01	Piston Assy - Upflow
XC3174	Piston - Regneration
XC3003	Meter Assy
XC3003-01	Meter Assy Plug
XC3118-01	Turbine Assy
XC3005	Seal & Spacer Stack Assy
XC3180	Tank O Ring
XC3135	Drive Cap O ring
XC3152	Injector Cap O ring
XC3177	Injector Screen

WS1 Series Watersoftener

Installation Operation Maintenance Manual

15.0 CE Certificate

Manufacturer's Declaration of Conformity

We the undersigned
EURAQUA UK, HITCHIN, ENGLAND

Certify that the product

Type: CABINET WATER SOFTENER WITH CLACK WS1 12 VOLT AC VALVE

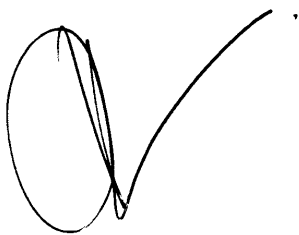
has been designed and manufactured in accordance with the specifications of the following:

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 01/01/07

Issue place & date