4600 & 5600 Series

Installation
Operation
Maintenance
Manual

Cabinet Water Softener
With Brass 4600 & Noryl 5600
Series Valves

Models
04 lit
07 lit
10 lit
14 lit
20 lit
25 lit
30 lit

Rev 1.0 29/07/08

CONTENTS

1.0 UNPACKING AND PARTS LIST

1.1 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 out of the carton. It is advisable to lay the carton on its side and slide out the softener prior to standing it up.

1.2 BASIC PARTS LIST

1. SOFTENER

2. FLECK MANUAL

3. INSTRUCTIONS

4. HOOD (if specified)

5. SALT LID

1.3 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 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.

3.0 GENERAL NOTES

These instructions cover the 5600 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 thoroughly before commencing any work on the unit, particularly if you have no previous experience of installing and using a water 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.

4.0 REGENERATION

4.1 The Regeneration Process

The regeneration process consists of four stages:-

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.

Brine/Slow 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 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 the resin sees the right amount of regenerant.

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. This is completed with water flowing up through the resin opposite to 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.

4.2 METER CONTROL OF REGENERATION

On meter controlled valves a turbine is installed in the outlet from the softener, to measure the volume of water which passes to service. As water flows over the turbine a cable is rotated which counts down the meter dial on the front of the valve. When the dial reaches zero the valve will automatically regenerate that night at 2 am.

If an IMMEDIATE regeneration valve has been specified the above still applies, however regeneration will take place as soon as the meter reaches zero.

4.3 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 fully adjustable.

Softeners built with brass 4600 Hot Water valves are only available with time clock regeneration control.

5.0 PRE-INSTALLATION CHECKS

5.1 MECHANICAL

5.1.1 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 but 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.

5.1.2 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 salt 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.

5.1.3 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 5.5 bar
3. Temperature between 0 and 50^{o}C
   (65^{o}C for Hot Water softeners)
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^{o}C, less than 0.3 ppm if temperature higher (up to 30^{o}C)

5.1.4 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.

5.1.5 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.

5.2 ELECTRICAL

A continuous supply of 240v, 5 VA is required by the softener. This should be provided by an uninterrupted mains supply, which is separately 1 Amp fused, and does not have any additional switch.

A plug is not provided with this softener since the cable should be connected to fused spur outlet. However if that is not possible then a plug should be fitted to the cable with a 1 amp fuse. The socket used should be un-switched to prevent the softener from being inadvertently turned off.

6.0 ASSEMBLY/INSTALLATION

6.1 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)

6.1.1 Pipework

Pipework should be assembled incorporating the features shown in the Installation Diagram, Section 13.1. 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 Female) (see Fig 1 in Section 13.1).

6.1.2 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 tun dish 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 11.2), and leaving a similar gap above the drain edge. The drain must not be higher than 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.

6.1.3 Blending System

For those applications where it is advantageous to retain some hardness in the treated water, a blending system has been. This is controlled by a rotating knob on the left side of the control valve.

7.0 COMMISSIONING

7.1 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.

7.2 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.

7.2.1 Add water to the brine tank until it is filled approximately 6" (150mm) from the bottom of the tank. Fill the cabinet with the correct grade of salt (tablet or granular)

7.2.2 After 10 minutes turn on the power supply and inlet water supply. Turn the main control knob approximately 45° clockwise to initiate a regeneration. The full cycle driven by the timer motor will take 180 minutes on softeners 20 litres and above, or 90 minutes on softeners 14 litres and below. During regeneration check that the brine is drawn in from the brine tank during 'Brine & Rinse and that the water returns to the cabinet during 'Brine Refill'. The level the water will reach depends on the type of salt used and the resin volume of the softener

7.2.3 When regeneration is completed, open the outlet hose connection tap and ensure that the bypass is closed in the plumbing system.

7.2.4 Set the time of day by pressing the red time set button and rotating the 24 hour gear until the present time is visible above "time of day" arrow.

To determine whether the time is set in AM or PM mode on Fast Regeneration valves (14 Litre softeners and below) check the window in the "time of day" inner wheel immediately after 4.30. If the window is black the timer is set in AM, if the window is white the timer is set in PM.

7.2.5 Set the capacity of the system on metered units (see table 13.3 for softener outputs calculation) or frequency of regeneration on time clock units.

Regeneration of either unit will take place at 2.00 am on the relevant morning. If another regeneration time is required then offset the current time.

7.2.6 The softener will now be commissioned - Open the outlet from the softener to run to service.

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, piston and the internal seals. This should be performed by a competent engineer familiar with Fleck valves.

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 blending valve has not been opened or adjusted.

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)

9.3 NO REGENERATION

Check electrical supply, fuses etc. satisfactory.

Check control head motor runs, by initiating a manual regeneration and observing the movement of the program wheel - which is very slow!,

Check meter cable is fitted correctly in meter assemblt and in the back of the valve.

9.4 UNSATISFACTORY CAPACITY BETWEEN REGENERATIONS

See Section 12.0

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 routine service, please contact your supplier.

11.0 TECHNICAL DATA

11.1 PROCESS AND OPERATING DATA

4600 & 5600 Series Water Softeners

MODEL		4L	7L	10 L	14 L	20 L	25 L	30 L
PARAMETER	**UNITS**							
Max. Service Flow	m3/hr	0.16	0.30	0.40	0.56	0.80	1.00	1.20
Min Service Flow	m3/hr	0.02	0.03	0.05	0.07	0.10	0.13	0.15
Volume treated between regens (300 ppm CaCO3, 21° Clarke)	m3	0.64	1.1	1.6	2.3	3.3	4.1	5.0
Max Salt used per regeneration	kg	0.56	0.98	1.4	1.96	2.8	3.5	4.2
Regeneration Time	mins	90	90	90	90	180	180	180
Salt Storage Capacity	kg	10	20	20	25	50	50	50
Max operating Temperature (5600)	°C -	50	50	50	50	50	50	50
Max operating Temperature (4600)	°C -	65	65	65	65	65	65	65
Maximum Flow to drain	lit/min	4.6	4.6	4.6	4.6	5.7	9.08	

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.

11.2 ENGINEERING DATA

4600 & 5600 Series Water Softeners

11.2.1 Trojan, Trident & Caribbean (4L Trojan only)

MODEL		4L	7L	10 L	14 L	20 L	25 L	30 L
PARAMETER	UNITS							
Width	mm	230	230	230	230	340	340	340
Depth	mm	450	450	450	450	520	520	520
Height to valve	mm	535	620	620	760	1120	1120	1120
Height to hood	mm	550	660	660	805	1120	1120	1120
Rear clearance required	mm	50	50	50	50	50	50	50
Inlet Conn (Cold)	ins BSPM	3/4	3/4	3/4	3/4	1	1	1
Outlet Conn.(Cold)	ins BSPM	3/4	3/4	3/4	3/4	1	1	1
Inlet Conn (Hot)	ins BSPF	1	1	1	1	1	1	1
Outlet Conn.(Hot)	ins BSPF	1	1	1	1	1	1	1
Drain Conn.	ins	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Cabinet/Salt Tank Overflow Conn.	ins	½	1/2	1/2	1/2	1/2	1/2	1/2
Delivered Wt.	Kg.	10	14	16	22	34	39	44
Working Wt. (approx.)	Kg.	25	42	46	57	94	99	104
Electrical Power	v	240	240	240	240	240	240	240
	Hz	50	50	50	50	50	50	50
	V/A	1.2	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.

11.2.2 Titan

MODEL		7L	10 L	14 L	20 L
PARAMETER	UNITS				
Width	mm	270	270	270	270
Depth	mm	490	490	490	490
Height to valve	mm	650	650	765	790
Rear clearance required	mm	50	50	50	50
Inlet Conn.	ins BSPM	3/4	3/4	3/4	3/4
Outlet Conn.	ins BSPM	3/4	3/4	3/4	3/4
Drain Conn.	ins	1/2	1/2	1/2	1/2
Cabinet/Salt Tank overflow Conn.	ins	3/4	3/4	3/4	3/4
Delivered Wt.	Kg.	14	16	22	30
Working Wt. (approx.)	Kg.	42	46	57	90
Electrical Power	v	240	240	240	240
	Hz	50	50	50	50
V/A	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.

12.0 SOFTENER OUTPUTS

Outputs detailed in litres

Lit resin	**4**	**7**	**10**	**14**	**20**	**25**	**30**
Hardness (ppm)							
100	2000	3500	5000	7000	10000	12500	15000
150	1340	2345	3350	4690	6700	8375	10050
200	1000	1750	2500	3500	5000	6250	7500
250	800	1400	2000	2800	4000	5000	6000
300	668	1169	1670	2338	3340	4175	5010
350	572	1001	1430	2002	2860	3575	4290
400	500	875	1250	1750	2500	3125	3750

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.

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

3750 - (4x150) = 3150 litres

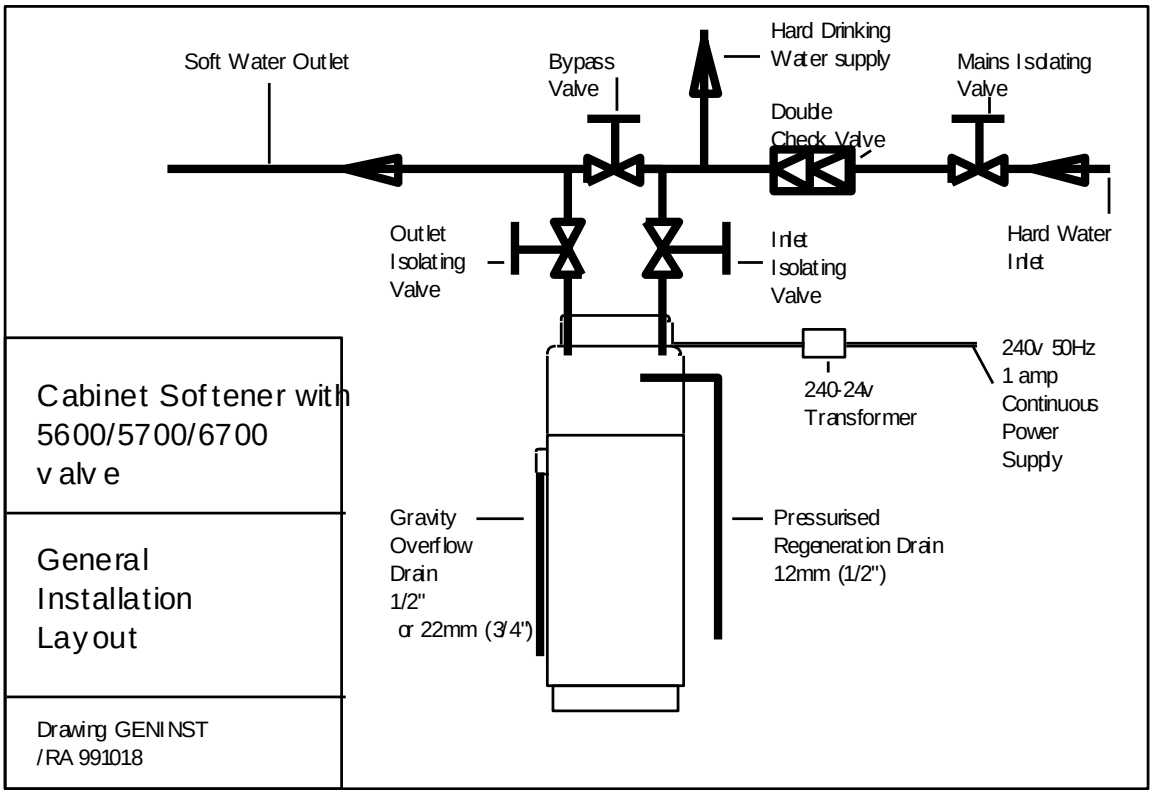
e.g. 1: A 10 litre softener at 250 ppm supplying a two person household should be set to a capacity of:

2000 - (2x150) = 1700 litres

13.0 Drawings

13.1 Installation Layout

Fig 1 General Installation Layout Cabinet Softeners



NB - As standard the softener is **240v**
However if softener has been requested as 24v the 240v/24v transformer will be required.

14.0 SPARES LIST

PART NO.	DESCRIPTION
XF24073	Blender Assembly
XF24121	Brine Cam Assembly
XF25736	Brine Cam Assembly (Fast Regen)
XFAC	Brine Pick-up
XF24114	Brine Valve
XF24118	Injector Assembly c/w BLFC/DLFC (please specify)
XF13302	O-Ring (Brine Spacer)
XF12638	O-Ring (Drain)
XF13301	O-Ring (Injector)
XF13303	O-Ring (Injector Cover)
XF24107	Meter Assy (8m3) Econominder
XF25871	Meter Assy (40m3) Econominder
XF24102	Meter Body Assy
XF14038	Meter Cover Standard
XF15659	Meter Cover Extended
XF24116	Piston Assembly (Std)
XF24117	Piston Assembly (LWU)
XF18089	Piston Assembly (Fast Regen)
XF18323	Power Head Time Clock (Fast Regen)
XF18085	Power Head Econominder (Fast Regen)
XF24127	Power Head Time Clock
XF24124	Power Head Econominder
XFR1	Riser Tube c/w 1” Dist
XF12767	Brine Screen
XF24115	Seal & Spacer kit
XF18825	Timer Motor 240v (Fast Regen)
XF18824	Timer Motor 240v Std
XF19168	Timer Motor 24v (Fast Regen)
XF18826	Timer Motor 24v Std