INSTALLER MANUAL

Autotrol 255 Logix 742-762-764

IMPORTANT SAFETY INSTRUCTIONS

Read and follow all instructions

Save these instructions

WWW.PENTAIR.EU

Table of Contents

1 Generalities

1.1 Scope of the documentation

The documentation provides the necessary information for appropriate use of the product. It informs the user to ensure efficient execution of the installation, operation or maintenance procedures.

The content of this document is based on the information available at the time of publication. The original version of the document was written in English.

For safety and environmental protection reasons, the safety instructions given in this documentation must be strictly followed.

This manual is a reference and will not include every system installation situation. The person installing this equipment should have:

- training in the Autotrol series, Logix 742-762-764 controllers and water softener installation;
- knowledge of water conditioning and how to determine proper controller settings;
- basic plumbing skills.

This document is available in other languages on **https://www.pentair.eu/product-finder/product-type/control-valves**.

1.2 Release management

Revision	Date	Authors	Description
A	20.02.2019	STF/ARE	First edition.
B	09.10.2019	STF	General corrections.
C	16.01.2023	BRY/FIM	New design, copyright and trademarks, website, remove of scan & service.

1.3 Manufacturer identifier, product

Manufacturer:	Pentair International LLC
	Avenue de Sevelin 20
	1004 Lausanne
	Switzerland
Product:	Autotrol 255 Logix 742-762-764

1.4 Intended use

The device is intended to be used for residential/commercial applications only and it is purpose-built for water treatment.

1.5 Abbreviations used

Assy	Assembly
BLFC/Refill Flow Controller	Brine Line Flow Controller

DF	Down Flow
DLFC	Drain Line Flow Controller
Inj	Injector
PN	Part Number
QC	Quick Connect
Regen	Regeneration
SBV	Safety Brine Valve
S. Steel	Stainless Steel
TC	Time Clock
UF	Up Flow

1.6 Norms

1.6.1 Applicable norms

Comply with the following guidelines:

- 2006/42/EC: Machinery Directive;
- 2014/35/UE: Low Voltage Directive;
- 2014/30/UE: Electromagnetic compatibility;
- 2011/65/UE: Restriction of use of certain hazardous substances in electrical and electronic equipment (RoHS);
- UNI EN ISO9001.

Meets the following technical standards:

- IEC/EN 60335-1;
- IEC 61010-1;
- EN 55014-1;
- EN 55014-2;
- EN 61000-3-2: 2006 + A1: 2009 + A2: 2009;
- EN 61000-3-3: 2008;
- EN 61000-6-2: 2005;
- EN 61000-6-3: 2007 + A1: 2011;
- EN 61326-1.

1.6.2 Available certificates

- CE;
- DM174;
- ACS.

Please find beside the certifications for some of our product families. Please note that this list is not an exhaustive list of all our certifications. In case of need for more information please contact us.

1.7 Procedure for technical support

Procedure to follow for any technical support request:

1. Collect the required information for a technical assistance request.
   - ⇨ Product identification (see Serial label location [→Page 11] and Recommendations [→Page 69]);
   - ⇨ Description of the device problem.
2. Please refer to the Troubleshooting [→Page 80]. If the problem persists contact your supplier.

1.8 Copyright and Trademarks

All indicated Pentair trademarks and logos are property of Pentair. Third party registered and unregistered trademarks and logos are the property of their respective owners.

1.9 Limitation of liability

Pentair Quality System EMEA products benefit, under specific conditions, from a manufacturer warranty that may be invoked by Pentair's direct customers. Users should contact the vendor of this product for applicable conditions and in case of a potential warranty claim.

Any warranty provided by Pentair regarding the product will become invalid in case of:

- installation done by a non-water-professional;
- improper installation, improper programming, improper use, improper operation and/or maintenance leading to any kind of product damages;
- improper or unauthorized intervention on the controller or components;
- incorrect, improper or wrong connection/assembly of systems or products with this product and vice versa;
- use of a non-compatible lubricant, grease or chemicals of any type and not listed by the manufacturer as compatible for the product;
- failure due to wrong configuration and/or sizing.

Pentair accepts no liability for equipment installed by the user upstream or downstream of Pentair products, as well as for process/production processes which are installed and connected around or even related to the installation. Disturbances, failures, direct or indirect damages that are caused by such equipment or processes are also excluded from the warranty. Pentair shall not accept any liability for any loss or damage to profits, revenues, use, production, or contracts, or for any indirect, special or consequential loss or damage whatsoever. Please refer to the Pentair List Price for more information about terms and conditions applicable to this product.

1.10 Pentair Scan application

Pentair Scan mobile application is the ideal support for the maintenance person in his daily business. A simple scan of the serial label present on the valve with a smartphone gives an instantaneously access to all updated information related to the product, such as:

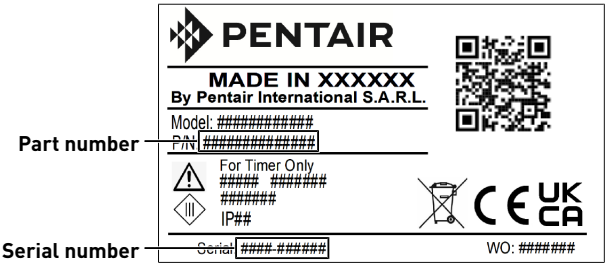
- valve's and tanks detailed configuration;
- manuals;
- spare parts lists;
- troubleshooting recommendations;
- multi-lingual videos, detailing how to best service a part;
- informations about new products, latest technologies, novelties about the Blue Network program, etc.

1. Download the application Pentair **Scan** from Available on the App Store or Available on the Google play in a smartphone.

Mandatory

The app must be open to scan and identify Pentair products!

2. Open the Pentair **Scan** application.
3. Either scan the serial number and part number from the product label or enter them manually.
   ⇨ For serial label location, refer to Serial label location [→Page 11].
4. Navigate to find information.



2 Safety

2.1 Safety pictograms definition

DANGER

This combination of symbol and keyword indicates an imminently hazardous situation that will result in serious or fatal injury if not avoided.

WARNING

This combination of symbol and keyword indicates a potentially hazardous situation that can result in serious or fatal injury if not avoided.

CAUTION

This combination of symbol and keyword indicates a potentially hazardous situation that can result in minimal or minor injury if not avoided.

Caution - material

This combination of symbol and keyword indicates a potentially hazardous situation that can result in material damage if not avoided.

Prohibition

Mandatory advice to follow.

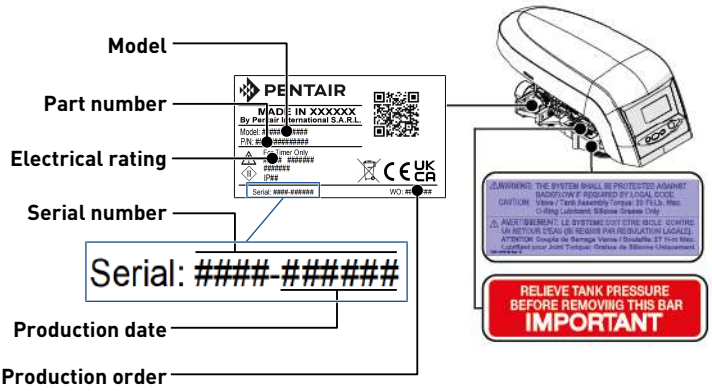
Mandatory

Applicable guideline, measure.

Info

Informative comment.

2.2 Serial label location



Mandatory

Ensure that the serial label and the safety labels on the device are completely legible and clean !

If necessary, replace them with new labels in the same positions.

2.3 Hazards

All the safety and protection instructions contained in this document must be observed in order to avoid temporary or permanent injury, damage to property or environmental pollution.

At the same time, any other legal regulations, accident prevention and environmental protection measures, as well as any recognized technical regulations relating to appropriate and risk-free methods of working which apply in the country and place of use of the device must be adhered to.

Any non-observation of the safety and protection rules, as well as any existing legal and technical regulations, will result in a risk of temporary or permanent injury, damage to property or environmental pollution.

2.3.1 Personnel

⚠ CAUTION

Risk of injury due to improper handling!

Only qualified and professional personnel, based on their training, experience and instruction as well as their knowledge of the regulations, safety rules and operations performed, are authorized to carry out necessary work.

2.3.2 Material

The following points must be observed to ensure proper operation of the system and the safety of user:

- do not remove the locking bar;
- be careful of high voltages present on the transformer (230 V, 50 Hz);

- do not put your fingers in the system (risk of injuries with moving parts and shock due to electric voltage).

2.4 Hygiene and sanitization

2.4.1 Sanitary issues

Preliminary checks and storage

- Check the integrity of the packaging. Check that there is no damage and no signs of contact with liquid to make sure that no external contamination occurred;
- the packaging has a protective function and must be removed just before installation. For transportation and storage, appropriate measures should be adopted to prevent the contamination of materials or the objects themselves.

Assembly

- Assemble only with components which are in accordance with drinking water standards;
- after installation and before use, perform one or more manual regenerations in order to clean the media bed. During such operations, do not use the water for human consumption. Perform a disinfection of the system in the case of installations for treatment of drinking water for human use.

Info

This operation must be repeated in the case of ordinary and extraordinary maintenance.

It should also be repeated whenever the system remains idle for a significant time.

Info

Valid only for Italy

In case of equipment used in accordance with the DM25, apply all the signs and obligations arising from the DM25.

2.4.2 Hygiene measures

Disinfection

- The materials used for the construction of our products meet the standards for use with potable water; the manufacturing processes are also geared to preserving these criteria. However, the process of production, distribution, assembly and installation, may create conditions of bacterial proliferation, which may lead to odor problems and water contamination;
- it is therefore strongly recommended to sanitize the products. See Sanitization [→Page 62];
- maximum cleanliness is recommended during the assembly and installation;
- for disinfection, use Sodium or Calcium Hypochlorite and perform a manual regeneration.

3 Description

3.1 Technical specifications

Design specifications/ratings

Valve body	Glass-filled Noryl® - NSF listed material
Rubber components	Compounded for cold water - NSF listed material
Valve material certification	WQA Gold Seal Certified to ORD 0902, NSF/ANSI 44, CE, ACS
Weight (valve with controller)	1.8 kg
Recommended operating pressure	1.38 - 8.27 bar
Hydrostatic test pressure	20.69 bar
Water temperature	1 - 38°C
Ambient temperature*	2 - 50°C

Flow rates (valve only)

	Single valve	Twin Alternating (2 valves)	Twin Parallel (2 valves)	Lockout "L" (n valves)*
Service at 1.03 bar (15 psi) drop (System)	3.52 m^3/h	3.52 m^3/h	7 m^3/h	n x 3.52 m^3/h
Backwash at 1.72 bar (25 psi) drop (per valve)	1.36 m^3/h	1.36 m^3/h	1.36 m^3/h	1.36 m^3/h
Service Kv (Cv) (per valve)	3.4 m^3/h (3.99 gpm)	3.4 m^3/h (3.99 gpm)	3.4 m^3/h (3.99 gpm)	3.4 m^3/h (3.99 gpm)
Backwash Kv (Cv) (per valve)	1 m^3/h (1.2 gpm)	1 m^3/h (1.2 gpm)	1 m^3/h (1.2 gpm)	1 m^3/h (1.2 gpm)

** n corresponds to the number of valves in the system.*

Valve connections

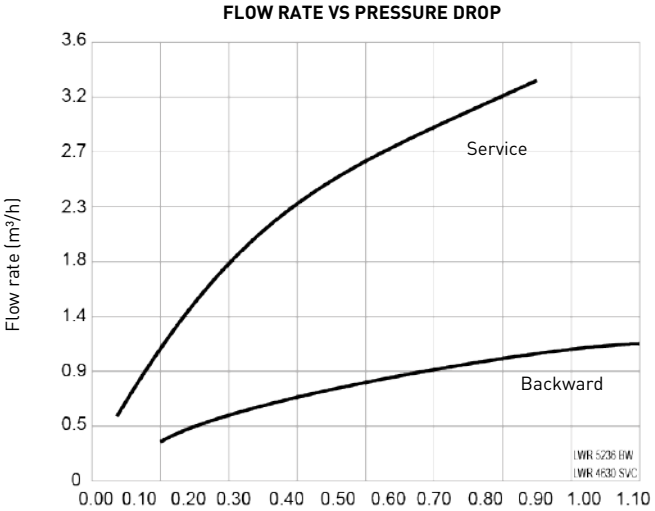
Tank AdapterThread	63.5 mm (2½") – 8 NPSM, male
Inlet/Outlet Maniflold	25.4 mm 1" BSP, female (s. steel) or male (thermoplastic).
	¾" BSP, female (thermoplastic or s. steel) or male (thermoplastic)
Drain line	½" or ⅜" (manifold dependent)
Brine line	9.5 mm (⅜") NPT as standard, 6.35 mm (¼") NPT optional; air check built onto valve
Riser tube [Ø]	27 mm (1.05") standard, or 20.6 mm (0.8125") optional with extra insert
Riser tube [length]	29 mm ± 3 mm (1⅛ ± ⅛") above top of tank

Electrical

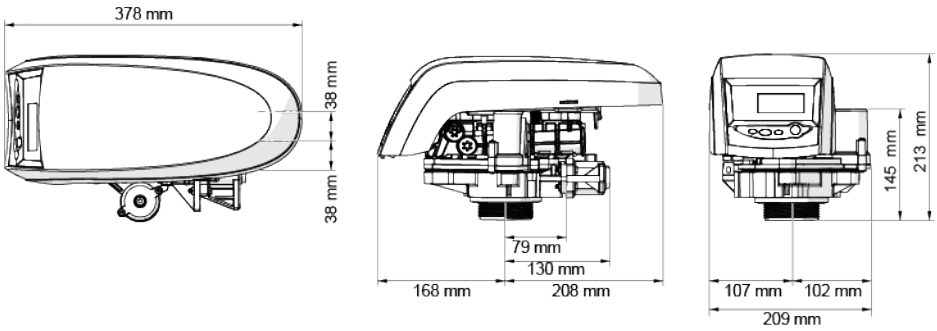
Controller Operating Voltage	12 VAC (requires use of Pentair Water supplied transformer)
Input Supply Frequency	50 or 60 Hz (controller configuration dependent)
Motor Input Voltage	12 VAC
Controller Power Consumption	8 W (max)
Protection rating	IP23

3.2 Performance flow rate characteristics

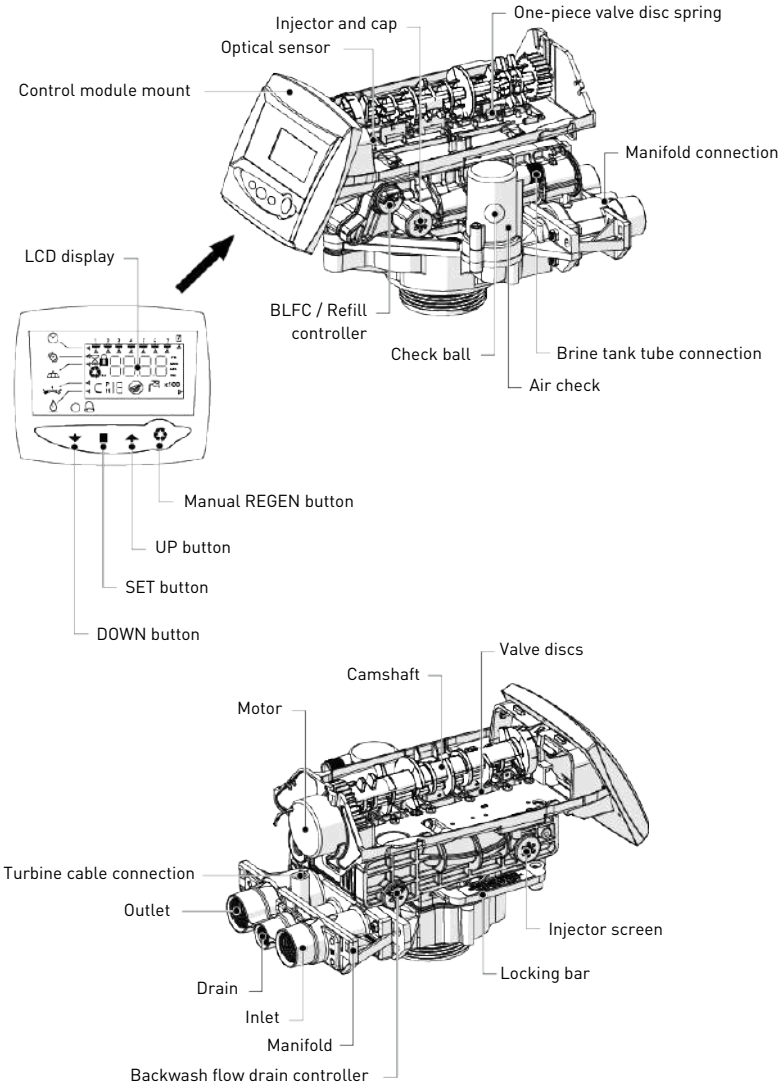
The graph shows the pressure drop created by the valve itself at different flow rates. It makes it possible to predetermine the maximum flow rate going through the valve depending on the system settings (inlet pressure etc). It also makes it possible to determine the valve pressure drop at a given flow rate, and therefore to evaluate the system pressure drop vs flow rate.



3.3 Outline drawing



3.4 Description and components location



3.5 Options available on the valve

3.5.1 Autotrol Logix residential/commercial series auxiliary microswitch kits

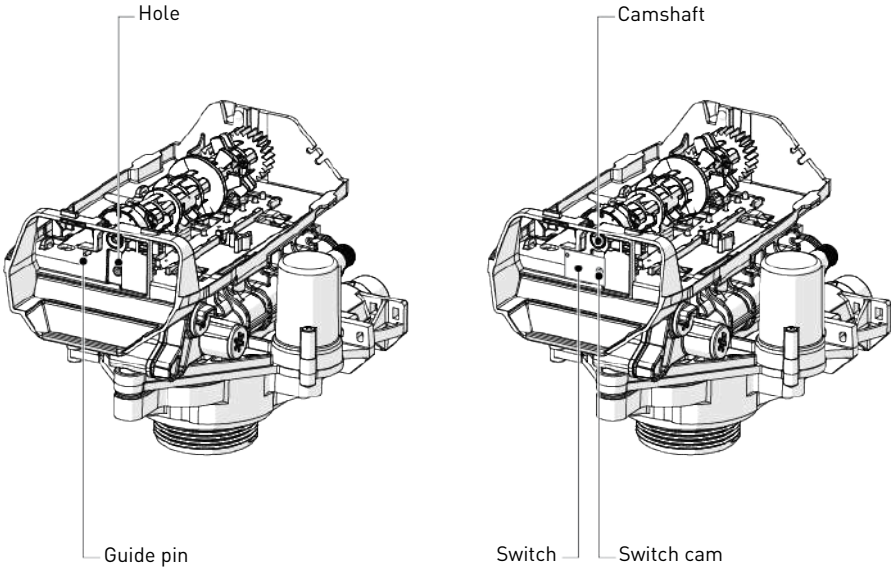
The Logix residential/commercial series switch kits allow you to provide an electrical signal during the valve operation. The switches can be wired independently in N.O or NC. The switches are available for 0.1 Amp or 5 Amp rating.

3.5.1.1 Front mount

The microswitch is mounted behind the controller at the front end of the camshaft. The cam for this switch is screwed to the front of the camshaft. This cam can be adjusted to activate the microswitch on any position upon your needs.

To install this front mount microswitch:

1. Place the valve into the position during which you need the signal.
2. Remove the cover and the controller.
   ⇨ See First steps [→Page 71], Valve from tank disassembly [→Page 75] and Optical sensor and controller replacement [→Page 77].
3. Screw switch base to top plate using the switch guide pin over screw boss.
4. Install the cam so that the microswitch pin is released and screw the cam using a self-tapping screw.
5. Connect wires.

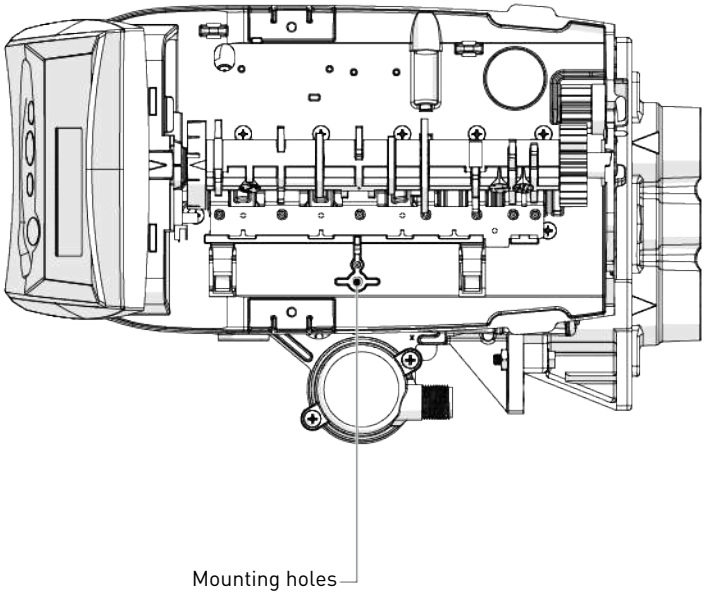


3.5.1.2 Top plate mount

The microswitch is located under the cover and is screwed to the top plate. The switch is turned on/ off by a cam lobe on the camshaft. Its function is to signal that the unit is in-service or out-of-service (regenerating). Actually, the microswitch is actuated during service position. As a result, depending on the wiring N.O or N.C, the signal will be given either during the complete service period or during the complete regeneration time.

To install this top plate microswitch:

1. Remove the cover.
   ⇨ See First steps [→Page 71] and Valve from tank disassembly [→Page 75].
2. Connect wires.
3. Use self-tapping screws to secure the switch base to the blind boss top plate.
4. Adjust microswitch distance to the camshaft.



3.6 System regeneration cycle (8-cycles operation)

Service (downflow) — cycle C0

Untreated water is directed down through the resin bed and up through the riser tube. The hardness ions attach themselves to the resin and are removed from the raw water being exchanged on the resin beads against sodium ions. The water is conditioned as it passes through the resin bed.

Backwash (upflow) — cycle C1

The flow of water is reversed by the valve and directed down the riser tube and up through the resin bed. During the backwash cycle, the bed is expanded and debris are flushed to the drain, while the media bed is remixed.

Brine (downflow) — cycle C2

The controller directs water through the brine injector and brine is drawn from the brine tank. The brine is then directed down through the resin bed and up through the riser tube to the drain. The hardness ions are displaced by sodium ions and are sent to the drain. The resin is regenerated during the brine cycle. When the air check valve closes brine drawing finishes, and then the slow rinse phase starts.

Slow rinse (downflow) — cycle C3

Repressurize cycle (hard water bypass flapper open) — cycle C4

This cycle allows the air and water to hydraulically balance in the valve before continuing the regeneration.

Fast rinse (downflow) — cycle C5

The controller value directs water down through the resin bed and up through the riser tube to the drain. Any residual brine is rinsed from the resin bed, while the media bed is re-compacted.

2nd Backwash (upflow) — cycle C6

2nd Fast rinse (downflow) — cycle C7

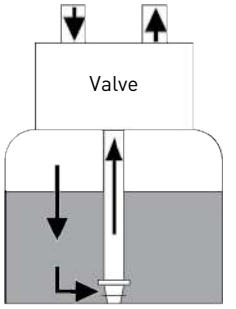
Brine refill — cycle C8

Water is directed to the brine tank at a rate controlled by the refill controller, to create brine for the next regeneration. During brine refill, treated water is already available at the valve outlet.

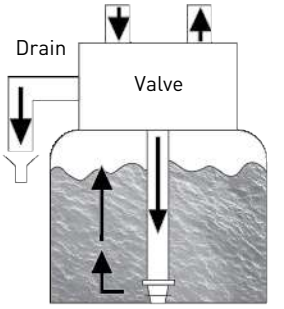
Info

For illustration purpose only. Always verify inlet and outlet marking on the valve.

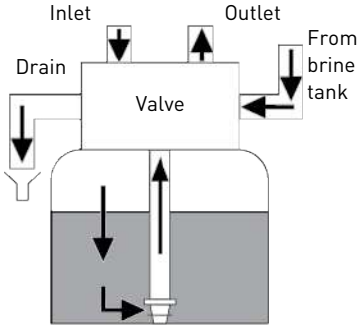
SERVICE
C0



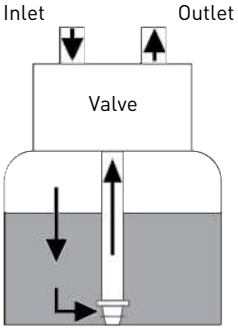
BACKWASH
C1 and C6



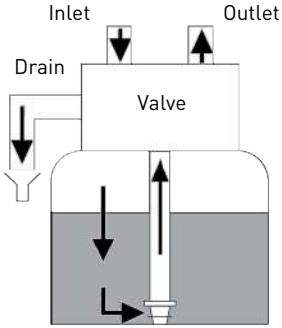
BRINE/SLOW RINSE
C2 and C3



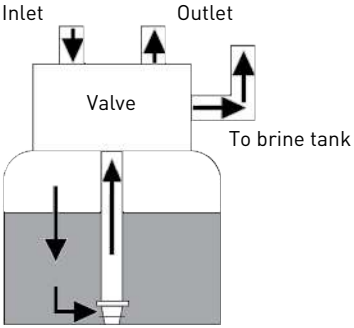
REPRESSURIZE
C4



FAST RINSE
C5 and C7



BRINE REFILL
C8



3.7 Regeneration Sequence for Twin and Lockout Systems

Info

Note

Perform a first regeneration for each tank, it will synchronize the camshafts if not already synchronized.

When you fill water in the system, repeat operations described on chapter Water filling, draining and waterproofness inspection.

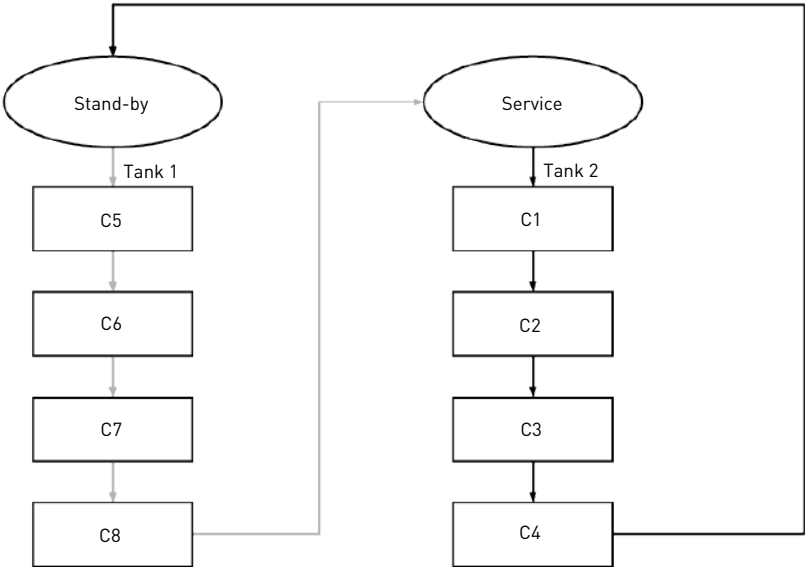
3.7.1 Twin alternating systems

In this example, tank 1 is in stand-by position whereas tank 2 is in service position.

When an immediate regeneration is initiated, tank 2 stay in service whereas tank 1 moves to C5, C6, C7, C8 and to the service position.

Once tank 1 reaches the service position, tank 2 moves to C1, C2, C3, C4 and to stand-by position.

Cycles repeat themselves so on.



When an immediate regeneration is initiated, Tank 2 stay in service whereas tank 1 moves to:

Once Tank 1 has reached the service position, Tank 2 moves to:

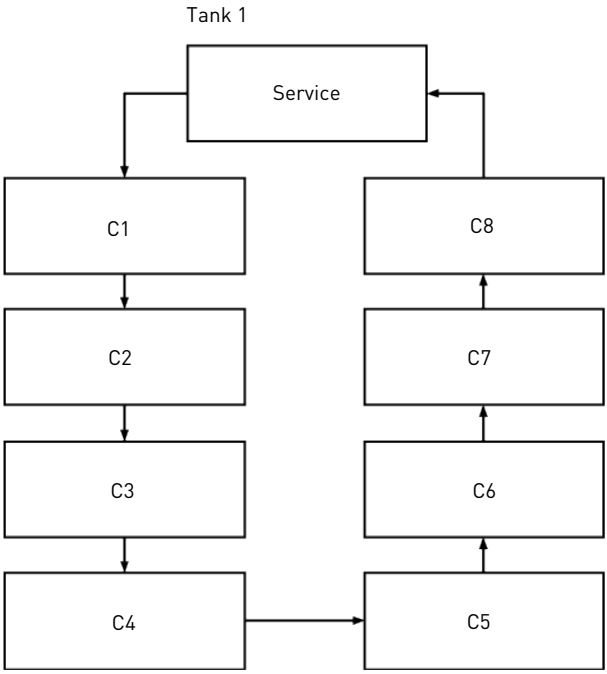
3.7.2 Twin parallel systems

Refill first option: off, Pr=0

Tank 1 and tank 2 are both in service position. Depending on the residual capacity, tank 1 or tank 2 will initiate first a regeneration.

In this example tank 1 moves from service position to C1, then to C2, ... until C8 and comes back in the service position. Tank 2 will not initiate a regeneration while tank 1 is not back in service.

Initiate again a regeneration, this time tank 2 will move through the cycles whereas tank 1 stay in service.



Tank 2

Service

Tank 2 will not initiate a regeneration while tank 1 is not back in service

Refill first option: on, Pr=1

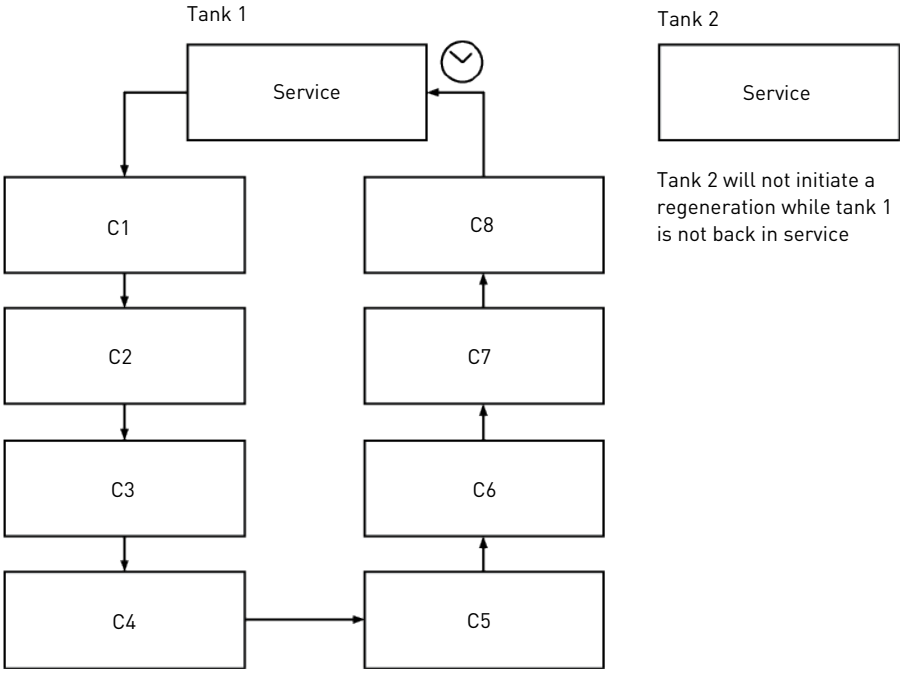
The refill first option has been designed mainly for twin parallel systems using only one brine tank. It allows a minimum time of 2 hours for brine to be saturated.

Tank 1 and tank 2 are both in service position. Depending on the residual capacity, tank 1 or tank 2 will initiate first a regeneration.

In this example tank 1 moves from service position to C8 and then comes back in the service position for 2 hours. "C0" will then be displayed. After this delay the valve will then regenerate normally but skipping the C8 cycle since the refill will be done first at the next regeneration.

Tank 2 will not initiate a regeneration while tank 1 is not back in service.

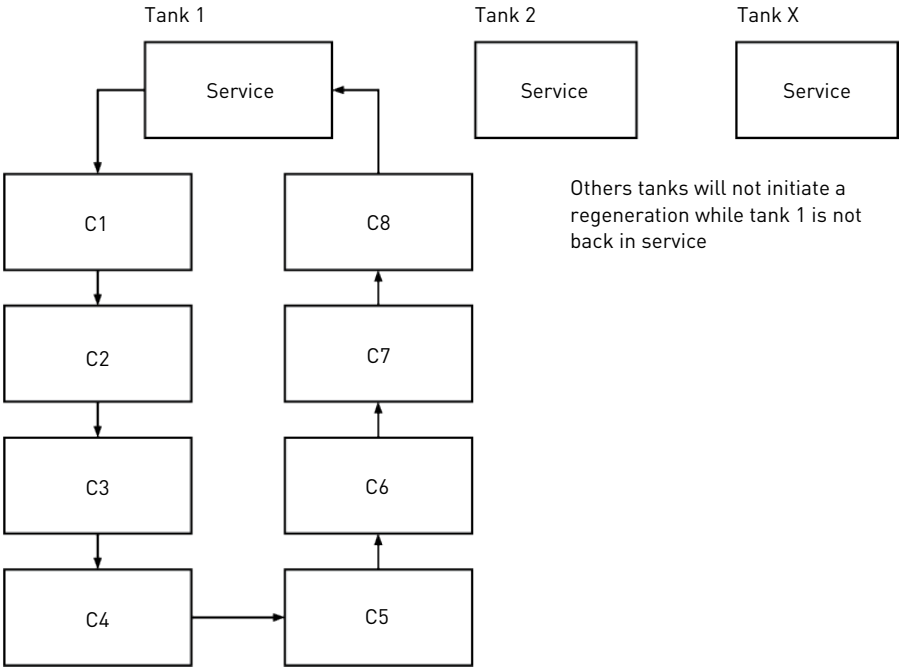
Initiate again a regeneration, this time tank 2 will move through the cycles whereas tank 1 stay in service.



3.7.3 Lockout "L" systems

The first tank of the system whose capacity is exhausted will be regenerated first. The tank controller will send a signal to all others controllers in the system that will not be able to start a regeneration until it is finished.

The others tanks will then regenerate in order of priority according to the remaining capacity.



When you order a 255 - 764L valve, it will be shipped with a standard 255 Logix camshaft. This camshaft does not close the bypass flapper during regeneration, so there will be hard water available at the outlet during all the regeneration. If you are building a multi-simplex system with 255 - 764L valves and you do not want hard water to be bypassed during the regeneration, use one of the following options :

- Use the 255 Logix duplex camshaft on each valve in the system. This camshaft ensures that the bypass flapper is closed during all the regeneration process. The backwash is then done with treated water of another tank entering through the valve outlet (same principle as for a duplex mode A or P). If you choose this option, do not forget to take into account this additional flow to be produced in service when sizing your installation.

Use a solenoid valve on the valve output and a microswitch kit. The microswitch is mounted on the camshaft and it closes the solenoid valve for the duration of the regeneration. Therefore the valve will not use water coming from the others tanks.

4 System sizing

4.1 Recommendations

4.1.1 Injector/DLFC/Refill flow controller - Valve configuration

Vessel diameter [In]	Media volume [L]	Injector Flow control	Refill flow control [gpm]	Backwash flow control [gpm]
6	5/10	E [yellow]	0.33	0.9
7	15	F [peach]	0.33	1.2
8	20	G [tan]	0.33	1.6
9	30	H [lt purple]	0.33	2.0
10	35	J [lt blue]	0.33	2.5
12	40	K [pink]	0.33	3.5
13	50	L [orange]	0.33	4.1
14	80	L [orange]	0.33	4.8

4.2 Cycle time calculation

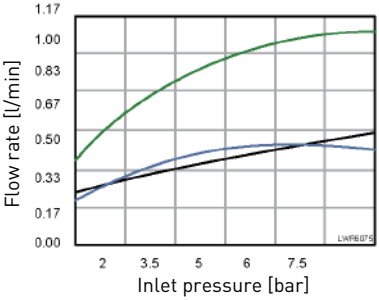
All the Logix controller range automatically calculates the unit capacity as well as the cycle time. No calculations are therefore required.

4.3 Injector flow rates

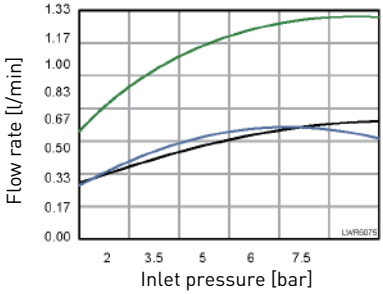
The following graphs represent the injectors flow rate as a function of the inlet pressure for the different injector sizes.

TOTAL BRINE DRAW RINSE

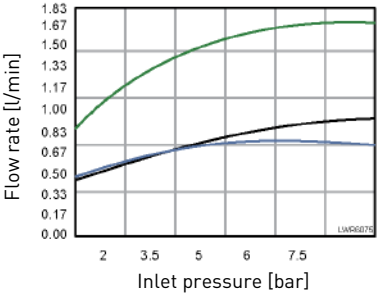
Injector "E" (Yellow)
For 6" Tanks



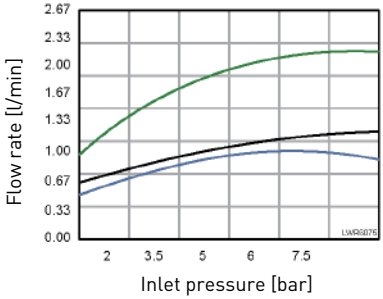
Injector "F" (Peach)
For 7" Tanks



Injector "G" (Tan)
For 8" Tanks

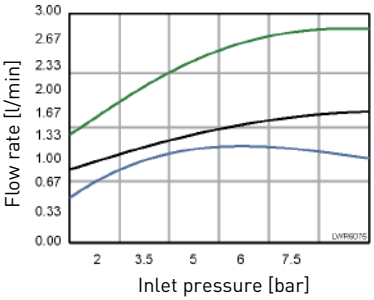


Injector "H" (Light Purple)
For 9" Tanks

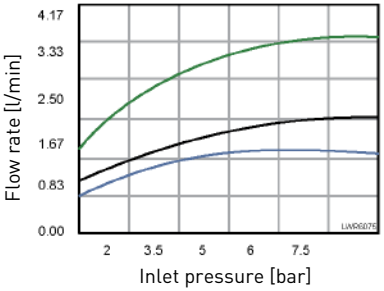


TOTAL BRINE DRAW RINSE

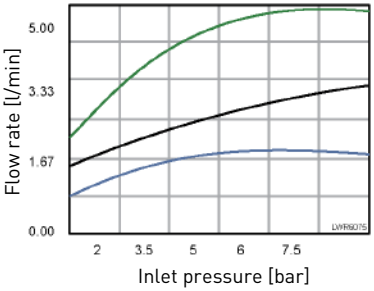
Injector "J" (Light Blue)
For 10" Tanks



Injector "K" (Pink)
For 12" Tanks



Injector "L" (Orange)
For 13 " and 14" Tanks



4.4 Resin exchange capacity upon salt dosage for standard efficiency

Salt amount	Corresponding resin exchange capacity		
grams / liter of resin	grams / liter of resin as $CaCO_3$	°f.m^3 / liter of resin	°d.m^3 / liter of resin
50	29.9	2.99	1.67
60	34	3.4	1.9
70	37.5	3.75	2.09
80	40.6	4.06	2.27
90	43.4	4.34	2.42
100	45.9	4.59	2.56
110	48.2	4.82	2.69
120	50.2	5.02	2.8
130	52.1	5.21	2.91
140	53.8	5.38	3.01
150	55.5	5.55	3.1
170	58.5	5.85	3.27
200	62.7	6.27	3.5
230	66.9	6.69	3.74
260	71	7.1	3.97
290	75.3	7.53	4.21

4.5 Resin exchange capacity upon salt dosage for high efficiency

Salt amount	Corresponding resin exchange capacity		
grams / liter of resin	grams / liter of resin as $CaCO_3$	°f.m^3 / liter of resin	°d.m^3 / liter of resin
50	33.6	3.36	1.88
60	40	4	2.23
70	44.5	4.45	2.49
80	48.4	4.84	2.7
90	51.8	5.18	2.89
100	54.9	5.49	3.07
110	57.7	5.77	3.22
120	60.2	6.02	3.36
130	62.6	6.26	3.5
140	64.8	6.48	3.62
150	66.8	6.68	3.73
170	70.4	7.04	3.93
200	75.2	7.52	4.2

Salt amount	Corresponding resin exchange capacity		
grams / liter of resin	grams / liter of resin as $CaCO_3$	°f.m^3 / liter of resin	°d.m^3 / liter of resin
230	79.3	7.93	4.43
260	82.9	8.29	4.63
290	86.1	8.61	4.81

5 Installation

5.1 Safety notices for installation

- Observe all warnings that appear in this manual;
- only qualified and professional personnel are authorized to carry out installation work.

5.2 Installation environement

5.2.1 General

- Use only brine salts designed for water softening. Do not use ice melt, block, or rock salts;
- keep the media tank in an upright position. Do not turn on its side, upside down, or drop it. Turning the tank upside down may cause media to enter the valve or might clog the upper screen;
- follow State and local codes for water testing. Do not use water that is micro-biologically unsafe or of unknown quality;
- when filling the media tank with water, first place the valve in the backwash position, then partly open the valve. Fill the tank slowly to prevent media from exiting the tank;
- when installing the water connection (bypass or manifold), first connect to the plumbing system. Allow heated parts to cool and cemented parts to set before installing any plastic parts. Do not get primer or solvent on O-rings, nuts, or the valve.

5.2.2 Electrical

There are no user-serviceable parts in the AC/AC or AC/DC transformer, motor, or controller. In the event of a failure, these should be replaced.

- All electrical connections must be completed according to local codes;
- use only the power AC/AC or AC/DC transformer that is supplied;

Mandatory

The use of any other power transformer than the one supplied void the warranty of all electronic parts of the valve!

- the power outlet must be grounded;
- to disconnect power, unplug the AC/AC or AC/DC transformer from its power source;
- an uninterrupted current supply is required. Please make sure that the voltage supply is compatible with the unit before installation;
- make sure the controller power source is plugged in;
- if the electrical cable is damaged, it is imperative that it is replaced by qualified personnel.

5.2.3 Mechanical

Prohibition

Do not use petroleum-based lubricants such as vaseline, oils, or hydrocarbon-based lubricants.

Use only 100% silicone lubricants.

Caution - material

Risk of damage due to wrong lubricant use !

Do not use petroleum-based lubricants such as Vaseline, oils, or hydrocarbon-basedlubricants.

Do not use silicon grease.

Use only P-80® Emulsion lubricant (water based lubricant) !

- All plastic connections should be hand-tightened. PTFE (plumber's tape) may be used on connections that do not use an O-ring seal. Do not use pliers or pipe wrenches;
- existing plumbing should be in a good shape and free from limescale. In case of doubt, it is preferable to replace it;
- all plumbing must be completed according to local codes and installed without tension or bending stresses;
- soldering near the drain line should be done before connecting the drain line to the valve. Excessive heat will cause interior damage to the valve;
- do not use lead-based solder for sweat solder connections;
- the drain line may be elevated up to 1.8 m providing the run does not exceed 4.6 m and water pressure at the softener is not less than 2.76 bar. Elevation can increase by 61 cm for each additional 0.69 bar of water pressure at the drain connector; do not use lead-based solder for sweat solder connections;
- the drain line must be a minimum of 12.7 mm (½") in diameter. Use 19 mm (¾") pipe if the backwash flow rate is greater than 26.5 lpm or the pipe length is greater than 6 m;
- the drain line must be a minimum of 12.7 mm (½") in diameter. Use 19 mm (¾") pipe if the backwash flow rate is greater than 26.5 lpm (5.83 gpm) or the pipe length is greater than 6 m (19 ft 8 in);
- do not support the weight of the system on the control valve fittings, plumbing, or the bypass;
- it is not recommended to use sealants on the threads. Use PTFE (plumber's tape) on the threads of the 25.4 mm (1") NPT elbow, the drain line connections, and other NPT/BSP threads.

5.2.4 Outdoor Locations

When the water softening system is installed outdoors, several points must be considered:

- moisture — The valve and Logix 742-762-764 controller are rated for NEMA 3 locations. Falling water should not affect performance. The system is not designed to withstand extreme humidity or water spray from below. Examples are: constant heavy mist, near corrosive environment, upwards spray from sprinkler;

- direct Sunlight — The materials used will fade or discolour over time in direct sunlight. The integrity of the materials will not degrade to cause system failures. If it is necessary to locate the softener in direct sunlight, a protective outdoor cover (P/N 1267811) over the valve and controller is necessary;
- temperature — Extreme hot or cold temperatures may cause damage to the valve or controller. Freezing temperatures will freeze the water in the valve. This will cause physical damage to the internal parts as well as the plumbing. High temperatures will affect the controller. The display may become unreadable but the controller should continue to function. When the temperature drops back into normal operating limits the display will return to normal. A protective cover (P/ N 1267811) should assist with high temperature applications;
- insects — The controller and valve have been designed to keep all but the smallest insects out of the critical areas. Any holes in the top plate can be covered with a metal foil ductwork tape. The top cover should be installed securely in place;
- wind — The Logix cover is designed to withstand a 48 km/h wind when properly installed on the valve.

5.3 Integration constraints

Location of a water treatment system is important. The following conditions are required:

⚠ CAUTION

The surface for installation (platform or floor) must be solid, flat and level.

Mandatory

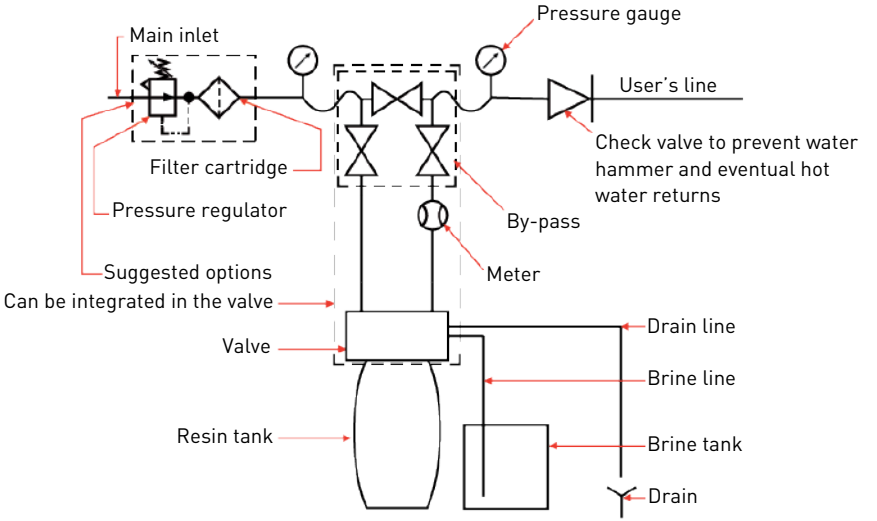
Drain must be capable of handing a maximum backwash flow rate of 19 L/min.

- locate the softener as close as possible from drain discharge point and within 12.2 m maximum of drain discharge point, respecting minimum drain line diameter advises given at chapter Drain line connection [→Page 39];
- room to access equipment for maintenance and adding brine (salt) to tank;
- constant electrical supply to operate the controller;
- total minimum pipe run to water heater of 3 m to prevent backup of HW into system;
- always install check valve before water heater to protect the softener from HW return;
- local drain for discharge as close as possible;
- water line connections with shut off or bypass valves;
- must meet any local and state codes for site of installation;
- valve is designed for minor plumbing misalignments. Do not support weight of system on the plumbing;
- use flexible piping to connect main piping to softener;
- be sure all soldered pipes are fully cooled before attaching plastic valve to the plumbing.

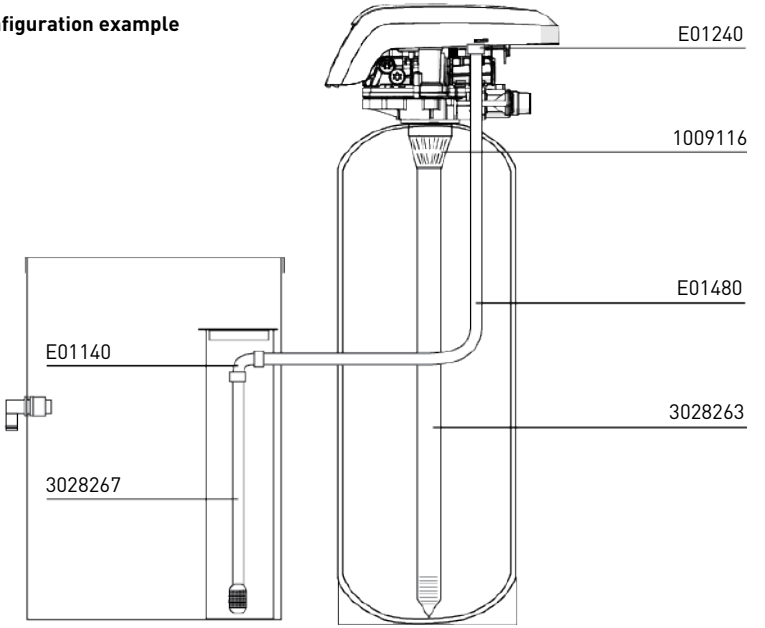
5.4 Block diagram and configuration example

5.4.1 Simplex systems

Block diagram



Configuration example

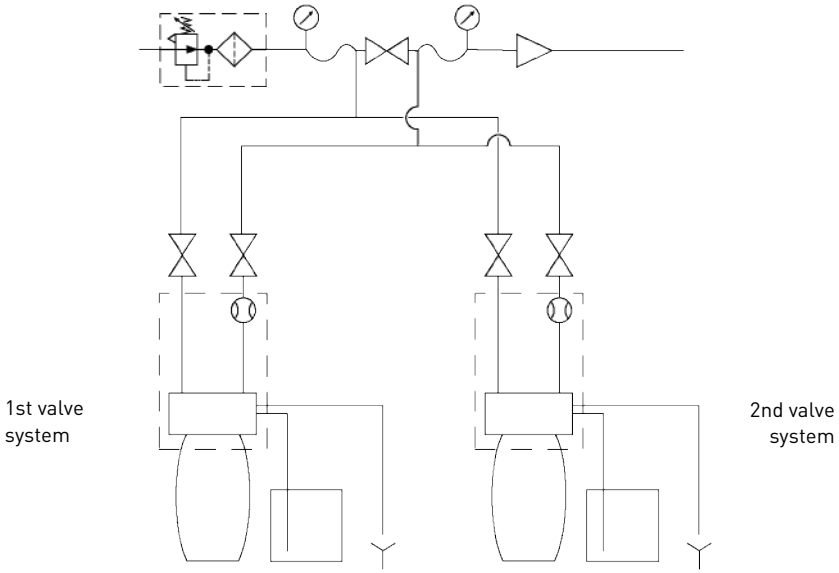


5.4.2 Twin parallel / alternating systems

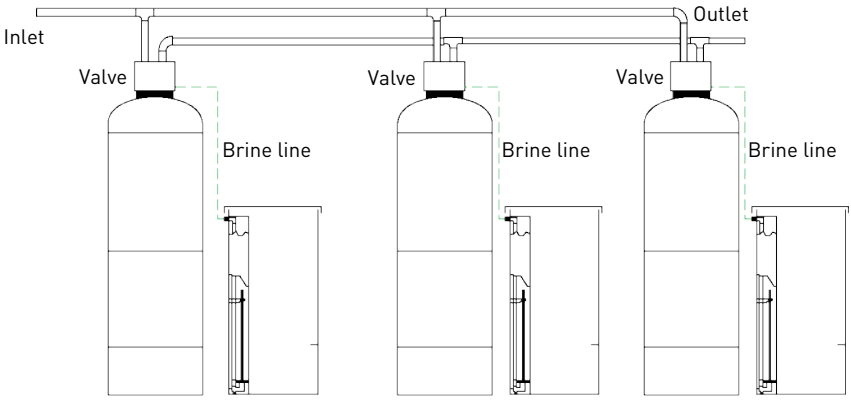
Info

For the description of the elements below, please refer to Simplex systems [→Page 32].

Block diagram



Example of triplex parallel system installation



5.5 Valve on tank assembly

1. Lubricate the seals with approved silicone grease.
2. Spin the valve (**1**) onto the tank (**2**), ensuring the threads are not cross-threaded.
3. Rotate the valve (**1**) clockwise and freely, without using force until it comes to a stop.

Info

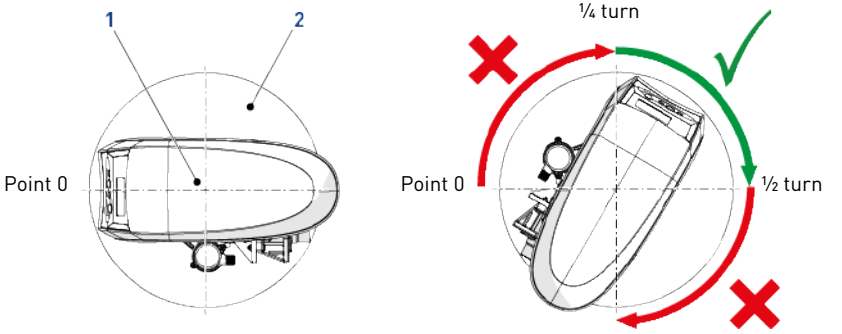
This stop position is considered point zero.

4. Rotate the valve (**1**) clockwise from point zero to between ¼ turn and ½ turn.

Caution - material

Risk of damage due to excessive force !

Do NOT exceed 27 Nm of torque when installing the valve. Exceeding this limit may damage the threads and cause failure.



5.6 Valve connection to piping

The connections should be hand tightened using PTFE (plumber's tape) on the threads if using the threaded connection type.

In case of heat welding (metal type connection), the connections should not be made to the valve when soldering.

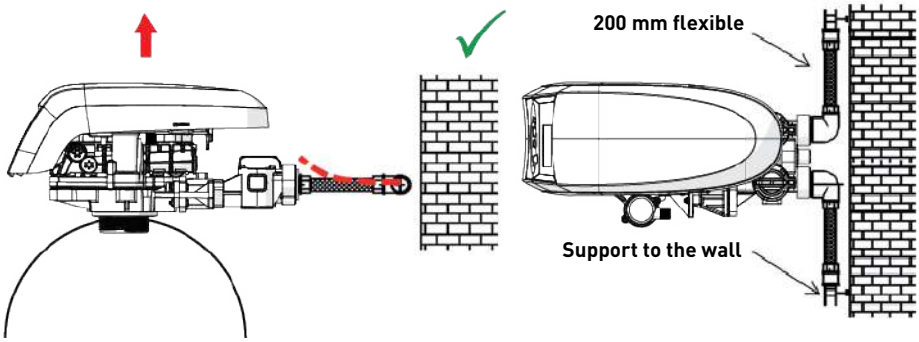
Tip

See chapter Description and components location [→Page 15] to identify the connections.

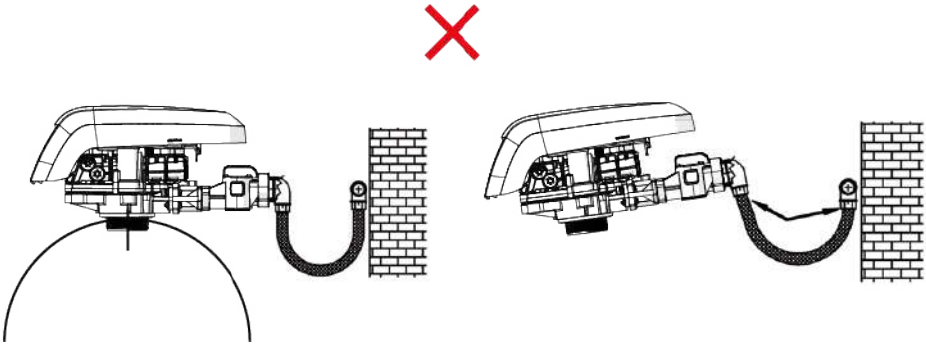
When pressurized, any composite tank will expand both vertically and circumferential. In order to compensate the vertical expansion, the piping connections to the valve must be flexible enough to avoid overstress on the valve and tank.

5.6.1 Top-mounted valve installation

The valve and tank should not be supporting any part of the piping weight. This is hence compulsory to have the piping fixed to a rigid structure (e.g. frame, skid, wall...) so that the weight of it is not applying any stress on the valve and tank.



- The diagrams above illustrate how the flexible piping connection should be mounted;
- in order to adequately compensate the tank elongation the flexible tubes must be installed **horizontally**;
- should the flexible piping connection be installed in vertical position, instead of compensating the elongation, it will create additional stresses on the valve & tank assembly. Therefore this is to be avoided;
- the flexible piping connection must also be installed stretched, avoiding excessive length. For instance 20 – 40 cm is enough;
- excessively long and non-stretched flexible piping connection will create stresses on the valve and tank assembly when the system is pressurized, as illustrated in the below picture: on the left the assembly when the system is unpressurised, on the right the flexible piping connection when put under pressure tends to lift up the valve when stretching up. This configuration is even more dramatic when using semi-flexible piping;
- failure to provide enough vertical compensation may lead to different kinds of damage, either on the valve thread which is connected to the tank, or on the female thread connection of the tank. In some cases, damage may also be seen on the valve inlet and outlet connections;

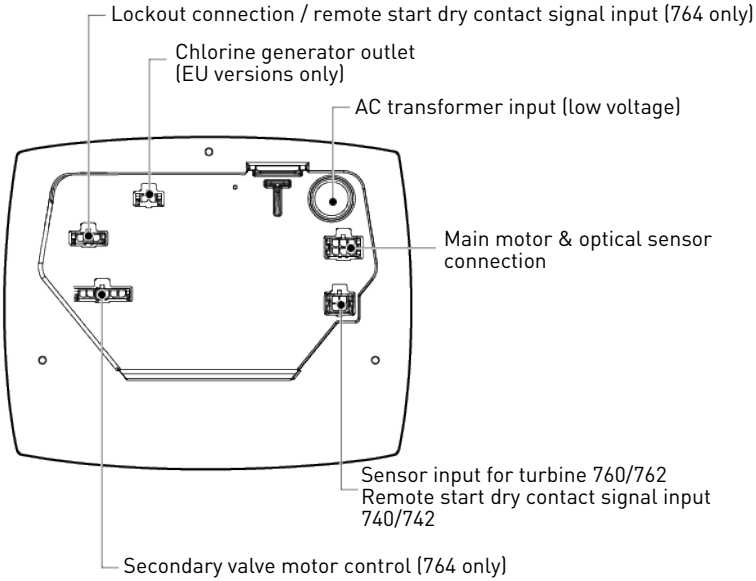


- in any case, any failure caused by improper installations and/or piping connections may void the warranty of Pentair products;
- in the same way, using lubricant* [→Page 36] on the valve thread is not allowed and will void the warranty for the valve and tank. Indeed using lubricant there will cause the valve to be over-torqued, which may lead to valve thread or tank thread damage even if the connection to piping has been done following the above procedure.

*Note: Use of petroleum-based grease and mineral based lubricant is totally forbidden, not only on the valve thread, since plastics used (especially Noryl) will highly suffer from contact with this type of grease, leading into structural damage hence to potential failures.

5.7 Connections (electrical)

Controller connections:

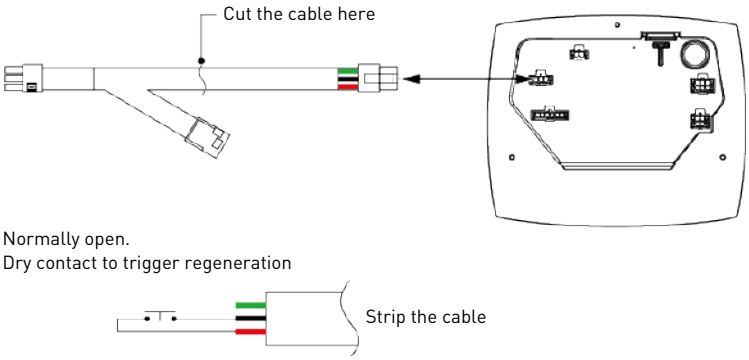


Simplex system with the possibility of triggering regeneration by external signal:

For this system type, there are only 3 standard connections to make:

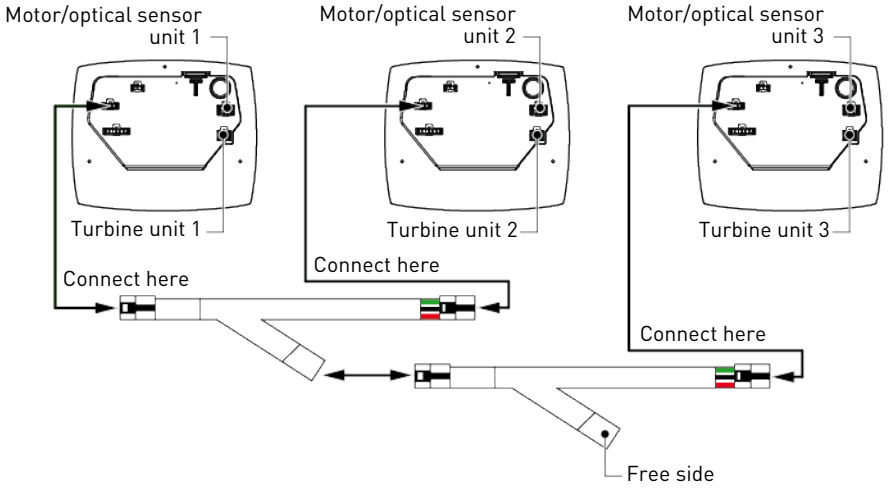
- the controller connection to an electrical outlet;
- the motor and optical sensor connections to the controller;
- the relay connection (dry contact) to the turbine connection or to the remote start connection depending on the controller (742 or 764) which will trigger regeneration via an external signal.

Example for 764 with 3020228: remote start/lockout cable



Interconnected multi-simplex systems Lockout "L" (764L only):

For each valve of the system the following connections must be made: the controller connection to an electrical outlet, the motor and optical sensor connections to the valve controller and the controller connections between each others via an interconnecting cable (3020228: remote start/ lockout cable) (for a N valves system, it will require N-1 cables).

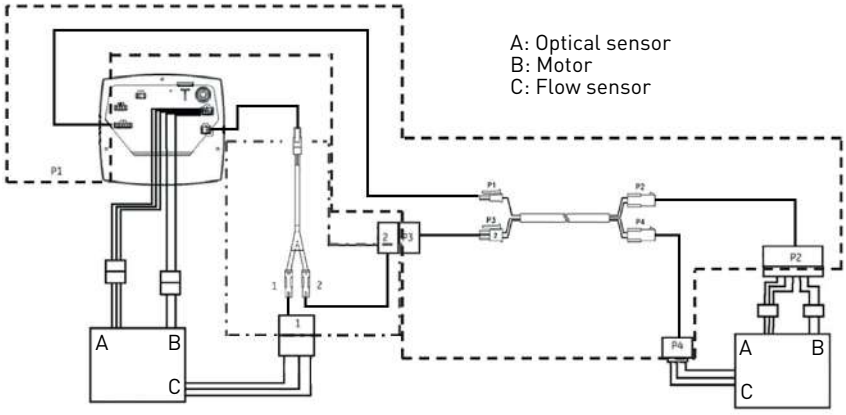


Twin parallel and alternating systems:

The twin sensor and extension cables are used for twin parallel and alternating systems.

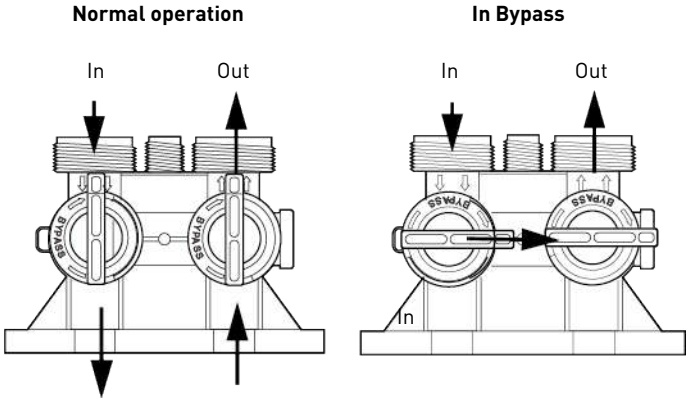
Four standard connections are required for operation:

- Controller connection to an electrical outlet;
- Flow sensor connection to the controller;
- Motor and optical sensor connections to the controller;
- Connection between tank 1 and tank 2.



5.8 Bypassing

A bypass valve system should be installed on all water conditioning systems. Bypass valves isolate the softener from the water system and allow unconditioned water to be used. Service or routine maintenance procedures may also require that the system is bypassed.



Caution - material

Risk of damage due to bad mounting!

Do not solder pipes with lead-based solder.

Do not use tools to tighten plastic fittings. Over time, stress may break the connections. When the bypass valve is used, only hand tighten the plastic nuts.

Do not use petroleum grease on gaskets when connecting bypass plumbing. Use only 100% silicone grease products when installing any plastic valve. Non-silicone grease may cause plastic components to fail over time.

5.9 Drain line connection

Info

Standard commercial practices are expressed here.

Local codes may require changes to the following suggestions.

Check with local authorities before installing a system.

The unit should not be more than 6.1 m from the drain. Use an appropriate adapter fitting to connect 12.7 mm plastic tubing to the drain line connection of the control valve.

If the backwash flow rate exceeds 22.7 lpm or if the unit is located 6.1-12.2 m from the drain, use 19 mm (3/4") tubing. Use appropriate fittings to connect the 19 mm (3/4") tubing to the 19 mm (3/4") NPT drain connection on the valve.

The drain line may be elevated up to 1.8 m (6 ft) providing the run does not exceed 4.6 m and water pressure at the softener is not less than 2.76 bar. Elevation can increase by 61 cm for each additional 0.69 bar of water pressure at the drain connector.

Where the drain line is elevated but empties into a drain below the level of the valve, form a 18 cm loop at the far end of the line so that the bottom of the loop is level with the drain line connection. This will provide an adequate siphon trap.

Where the drain empties into an overhead sewer line, a sink-type trap must be used.

Secure the end of the drain line to prevent it from moving.

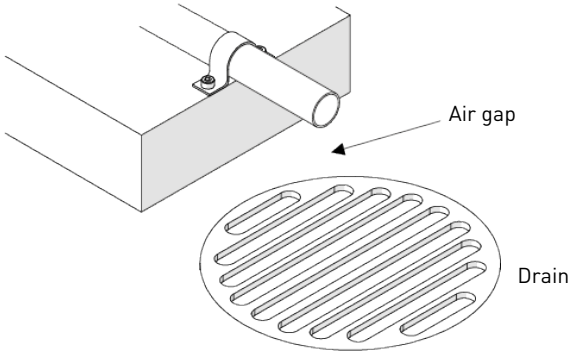
Mandatory

Waste connections or the drain outlet shall be designed and constructed to provide connection to the sanitary waste system through an air-gap of 2 pipe diameters or 25.4 mm (1"), whichever is larger.

Caution - material

Risk of damage due to lack of gap !

Never insert the drain line directly into a drain, sewer line or trap. Always allow an air gap between the drain line and the waste water to prevent the possibility of sewage being back-siphoned into the softener.



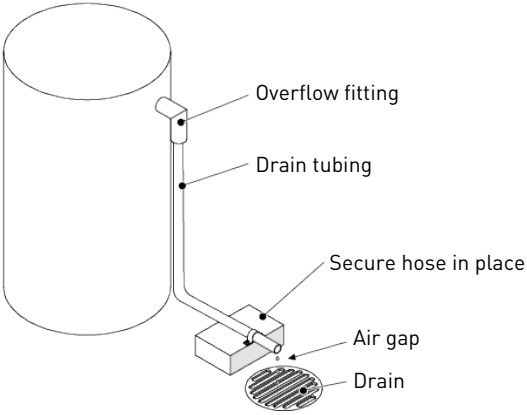
5.10 Overflow line connection

In the event of a malfunction, the brine tank overflow fitting will direct "overflow" to the drain instead of spilling on the floor. This fitting should be on the side of the brine tank. Most brine tank manufacturers feature a pre-drilled hole for the tank overflow connector.

To connect the overflow line, locate the hole on the side of the tank. Insert the overflow fitting into the tank and tighten with plastic thumb nut and gasket as shown below. Attach a 12.7 mm (½") I.D. tubing (not supplied) to fitting and run to drain.

Do not elevate overflow higher than overflow fitting.

Do not tie into the drain line of the controller unit. The overflow line must be a direct, separate line from overflow fitting to drain, sewer or tub. Allow an air gap as per drain line instructions.



Caution - material

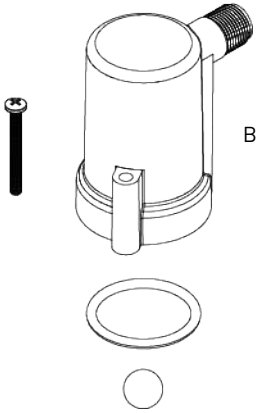
Risk of flooding due to lack of floor drain !

Floor drain is always recommended to avoid flooding in case of overflow.

5.11 Brine line connection

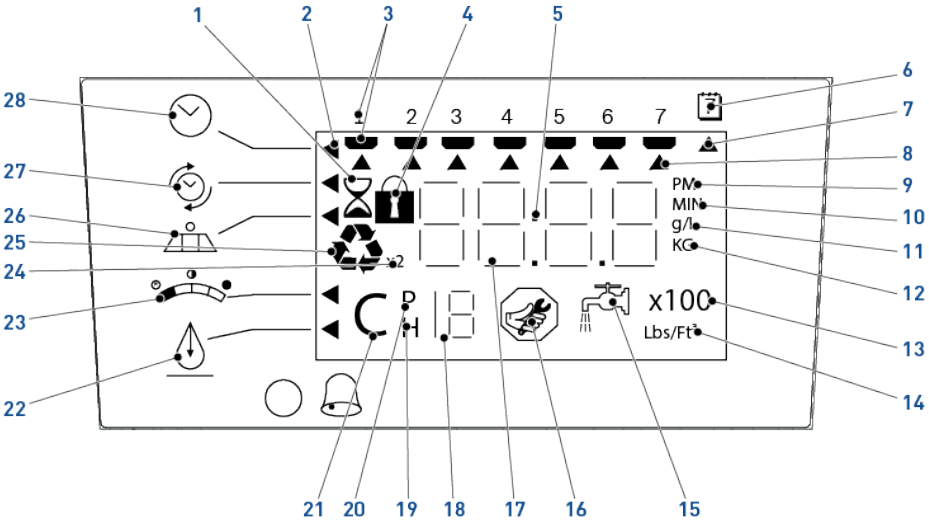
The brine line from the tank connects to the valve. Make the connections and hand tighten. Be sure that the brine line is secure and free from air leaks. Even a small leak may cause the brine line to drain out, and the softener will not draw brine from the tank. This may also introduce air into the valve, causing problems with the valve operation.

Most installations utilise a tank check valve. This is not necessary when using the 255 valve with the built-in aircheck. Using a tank check valve with the 255 valve with aircheck will result in premature checking of the aircheck valve, before the tank is empty.



6 Programming

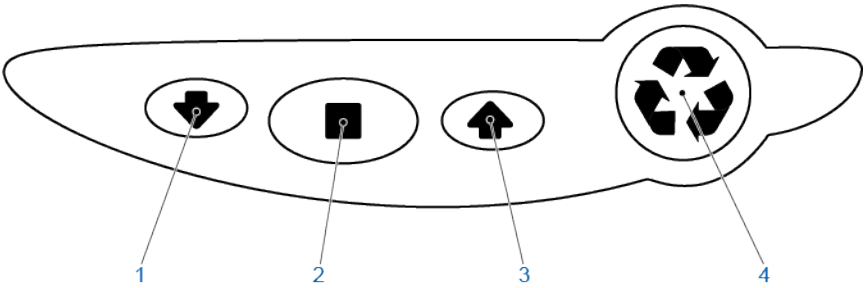
6.1 Display



1.	Hourglass	Displayed when the motor is running. The camshaft should be turning.
2.	Cursor	These cursors appear next to the item that is currently displayed.
3.	Days of the week	Displayed days of the week. The flag below the day appears when that day has been programmed as a day the system should regenerate (used with 7-day timer programming, 742 only)
4.	Locked/unlocked indicator	This symbol is display in basic programming when the current parameter is locked-out. It is also used in advanced programming to indicate if the displayed parameter is locked when the controller is in basic programming (the icon flashes).
5.	Colon	Colon flashes as part of the time display. It also indicates normal operation (742 only).
6.	Days between regenerations	Days between regeneration programming / day override setting.
7.	Cursor	This cursor is displayed when the days between regeneration are being programmed (used with 0.5 to 99 day regeneration programming).
8.	Cursor	One of these cursors is displayed to indicate which day is programmed into the controller.

9.	"PM"	Indicates that the time displayed is between 12:00 noon and 12:00 midnight. "PM" indicator is not used if the clock mode is set to 24-hour (there is no AM indicator).
10.	"MIN"	Indicates that the value entered/displayed is in minute increments.
11.	"g/L"	Indicates that the value entered/displayed is in grams/Liter.
12.	"KG"	Indicates that the value entered/displayed is in kilograms or kilograins.
13.	"x100"	x100 multiplier for large values.
14.	"Lbs/ft3"	Indicates that the value entered/displayed for regenerant amount is in pounds per cubic foot.
15.	Faucet	Appears when the current flow rate is displayed. The controller may show the faucet and "0", indicating no flow.
16.	Maintenance interval	Displayed when the month in service exceed the value programmed in parameter P11.
17.	Digits	Four digits used to display the time, program value or error codes.
18.	Number	Used with #19, #20 and #21. Displays a sequence number or value.
19.	History values (H)	The number displayed by #18 identifies which history value is currently displayed.
20.	Parameter (P)	Displayed only in advanced programming. The number displayed by #18 identifies which parameter is currently displayed.
21.	Cycle (C)	The number displayed by #18 is the current cycle in the regeneration sequence.
22.	Hardness	Hardness setting - only used with 760 and 762 controllers.
23.	Capacity	Shows estimated system capacity.
24.	"x2"	Indicates a second regeneration has been called for.
25.	Recycle sign	Flashes when a regeneration at the next time of regeneration has been called for. Also displayed (continuously) when in regeneration.
26.	Salt	Programming the amount of regenerant. If the controller is on a 3-cycle filter then the backwash time is displayed.
27.	Regeneration time	Time of regeneration and days of regeneration setting. Days of regeneration setting is only available on 742 controller.
28.	Time and day	Programming the current time and day.

6.2 Commands



1. ▼ - Down arrow	Used to scroll down or decrement through a group of choices.
2. ■ - Set	Used to accept a setting that normally becomes stored in memory. Also used together with the arrow buttons to access special features.
3. ▲ - Up arrow	Used to scroll up or increment through a group of choices.
4. ♻ - Regenerate	Used to command the controller to regenerate. Also used to change the lock mode.

6.3 Basic programming

Info

Menus are displayed in a defined and incremental order.

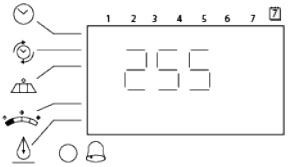
6.3.1 Basic programming mode chart

Parameter description	Range of values	Default value	Units of measure	Notes
Program valve type	255, 263, 268, 278 and Magnum series	None	N/A	-
Program system size	5 - 100 / F	None	liters	-
Time setting	1:00 - 12:59 AM 0:00 - 23:59 PM	12:00 PM	hour: minute	-
Day of week	N/A	None	N/A	-
Regeneration time	1:00 - 12:59 AM 0:00 - 23:59 PM	2:00 AM	hour: minute	-
Days override (762-764 controllers only)	0.5 - 99	0	day	0 = no days override. 0.5 = regeneration twice a day at time of regeneration and 12 hours later.
Days between regeneration (742 controller only)	0.5 - 99	0	day	0 = no days between regeneration. 0.5 = regeneration twice a day at time of regeneration and 12 hours later.
Day of week regeneration (742 controller only)	N/A	None	N/A	Available only if days between regeneration is set to "0".
Amount of brine used per regeneration	50-290	110	g/l	-
Estimated system capacity	N/A	None	kg equivalent $CACO_3$	For information purpose only on the 742 controller.
Hardness (762 controller only)	30 - 2000	250	Mg/l equivalent $CACO_3$	-

6.3.2 Basic programming 742 - 762 controller

6.3.2.1 Program valve type

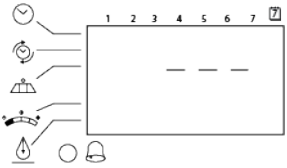
Set your valve type through the options.



1. Use ▲ and ▼ to scroll though valve type choices.
   ⇨ Valve type flashes.
2. Choose the 255 valve type.
3. Press ■ to validate the valve type selected and advance to the next parameter using ▼ or ▲.
4. If an incorrect setting is programmed, see Resetting the controller [→Page 59].

6.3.2.2 Program system size

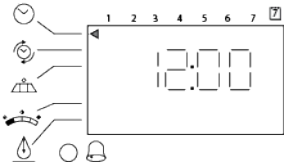
Set your input system size and your resin volume in litres.



1. Use ▲ and ▼ to scroll though resin volume choices.
   ⇨ Three dashes than resin volume flashes.
2. Choose the nearest volume to your actual system size.
3. Press ■ to validate the system size selected and advance to the next parameter using ▼ or ▲.
4. If an incorrect setting is programmed, see Resetting the controller [→Page 59].

6.3.2.3 Time setting

Set the current time.

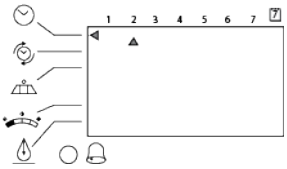


1. Press ■ when the time of the day is displayed.
   ⇨ Time flashes.
2. Adjust displayed time with ▲ and ▼.
3. Press ■ to validate the selection and advance to the next parameter using ▼ or ▲.

6.3.2.4 Day of week

Set the current day of the week.

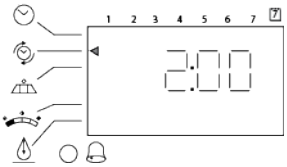
1. Press ■.
   ⇨ Arrow flashes.
2. Select displayed day with ▲ and ▼.
3. Press ■ to validate the selection and advance to the next parameter using ▼ or ▲.



6.3.2.5 Regeneration time

Set the time when regeneration will take place.

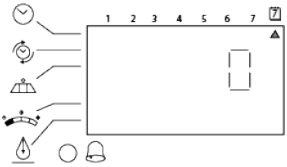
1. Press ■.
   ⇨ Regeneration time flashes.
2. Adjust displayed time with ▲ and ▼.
   ⇨ Default setting: 2:00am.
3. Press ■ to validate the selection and advance to the next parameter using ▼ or ▲.



6.3.2.6 Days override (762 controller only)

Set the number of days for calendar override.

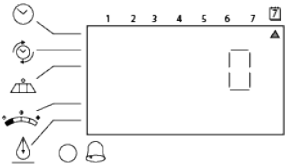
1. Press ■.
   ⇨ Number of days flashes.
2. Adjust displayed number with ▲ and ▼.
   ⇨ Default time for days override: 0 day (disabled).
   ⇨ Days can be adjusted from ½ (0.5) to 99 days.
3. Press ■ to validate the selection and advance to the next parameter using ▼ or ▲.



6.3.2.7 Days between regeneration (742 controller only)

Set the number of days between regeneration.

1. Press ■.
   ⇨ Number of days flashes.
2. Adjust displayed number with ▲ and ▼.
   ⇨ Set to 0 to program as a 7-day timer.
   ⇨ Days can be adjusted from ½ (.5) to 99 days.
3. Press ■ to validate the selection and advance to the next parameter using ▼ or ▲.



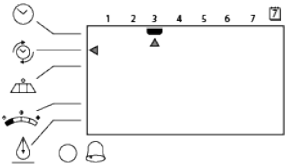
6.3.2.8 Day of week regeneration (742 controller only)

Info

This parameter is available only if days between regeneration is set to "0".

Select the days when regeneration will take place.

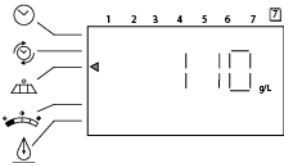
1. Press ■.
   ⇨ Arrow flashes.
2. Activate/deactivate the day indicated by the flashing arrow with ▲ and ▼.
   ⇨ A flag appears below the day when this is activated.
3. Press ■ to validate and repeat for each day.



6.3.2.9 Amount of salt used per regeneration

Set desired salt amount in g/L.

1. Press ■.
   ⇨ Salt amount flashes.
2. Adjust displayed salt amount with ▲ and ▼.
3. Press ■ to validate the selection and advance to the next parameter using ▼ or ▲.



6.3.2.10 Estimated capacity

Info

Note

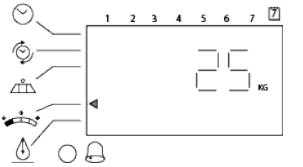
The system capacity is displayed in kilograms equivalent $CaCO_3$ of hardness removed before a regeneration is necessary.

The system capacity is calculated by the Logix software, using the resin volume, brine dosage and hardness settings.

This parameter can be override for 762 controller and is view only for 742 controller.

Set the estimated capacity on the controller.

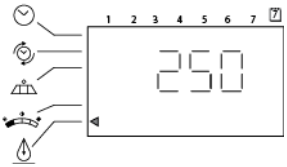
1. Press ■.
   ⇨ The amount number flashes.
2. Adjust displayed capacity with ▲ and ▼.
3. Press ■ to validate the selection and advance to the next parameter using ▼ or ▲.



6.3.2.11 Hardness (762 controller only)

Set inlet water hardness at installation site.

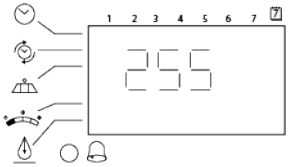
1. Press ■.
   ⇨ The hardness number flashes.
2. Adjust displayed hardness number with ▲ and ▼.
3. Press ■ to validate the selection.
   ⇨ Initial programming is now complete. The controller will return you to the normal operation mode.



6.3.3 Basic programming 764 controller

6.3.3.1 Program valve and system types

Set your valve type through the options.



1. Use ▲ and ▼ to scroll though valve type choices.
   ⇨ Valve type flashes
2. Choose the 255 valve type.
3. Press ■ to validate the system size selected and advance to the next parameter using ▼ or ▲.
4. If an incorrect setting is programmed, see Resetting the controller [→Page 59].

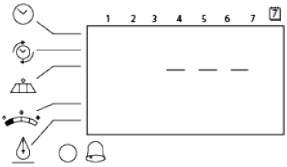
Preprogrammed configurations:

Type	Valve		Application
255A	255	Twin Alternating	8-cycles softener
273A	273		3-cycles filter
278A	278		5-cycles softener
293A	293		3-cycles filter
298A	298		5-cycles softener
255P	255	Twin Parallel	8-cycles softener
273P	273		3-cycles filter
278P	278		5-cycles softener
293P	293		3-cycles filter
298P	298		5-cycles softener
255L	255	Single tank or multi-simplex system (Lockout). Regeneration mode: metered, time clock or remote regeneration	8-cycles softener
263L	263		3-cycles filter
268L	268		8-cycles softener
273L	273		3-cycles filter
278L	278		5-cycles softener
293L	293		3-cycles filter
298L	298		5-cycles softener

6.3.3.2 Program system size

Set your system in filter configuration.

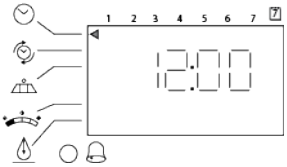
1. Use ▲ and ▼ to scroll though resin volume choices.
   ⇨ Three dashes than resin volume flashes.
2. Choose the nearest volume to your actual system size.
3. Press ■ to validate the system size selected and advance to the next parameter using ▼ or ▲.
4. If an incorrect setting is programmed, see Resetting the controller [→Page 59].



6.3.3.3 Time setting

Set the current time.

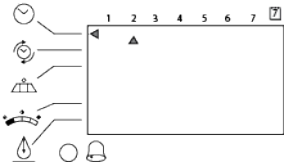
1. Press ■ when the time of the day is displayed.
   ⇨ Time flashes.
2. Adjust displayed time with ▲ and ▼.
3. Press ■ to validate the selection and advance to the next parameter using ▼ or ▲.



6.3.3.4 Day of week

Set the current day of the week.

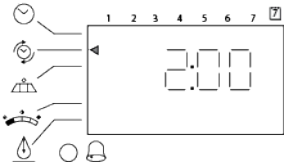
1. Press ■.
   ⇨ Arrow flashes.
2. Select displayed day with ▲ and ▼.
3. Press ■ to validate the selection and advance to the next parameter using ▼ or ▲.



6.3.3.5 Regeneration time

Set the time when regeneration will take place.

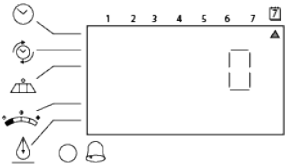
1. Press ■.
   ⇨ Regeneration time flashes.
2. Adjust displayed time with ▲ and ▼.
   ⇨ Default setting: 2:00am.
3. Press ■ to validate the selection and advance to the next parameter using ▼ or ▲.



6.3.3.6 Days override

Set the number of days for calendar override.

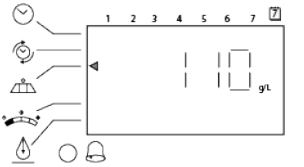
1. Press ■.
   ⇨ Number of days flashes.
2. Adjust displayed number with ▲ and ▼.
   ⇨ Default time for days override: 0 day (disabled).
   ⇨ Days can be adjusted from ½ (0.5) to 99 days.
3. Press ■ to validate the selection and advance to the next parameter using ▼ or ▲.



6.3.3.7 Amount of salt used per regeneration

Set desired salt amount in g/L:

1. Press ■.
   ⇨ Salt amount flashes.
2. Adjust displayed settings with ▲ and ▼.
3. Press ■ to validate the selection and advance to the next parameter using ▼ or ▲.



6.3.3.8 Estimated capacity

Info

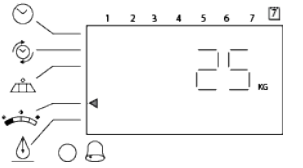
Note

The system capacity is displayed in kilograms equivalent $CaCO_3$ of hardness re-moved before a regeneration is necessary.

The system capacity is calculated by the Logix software, using the resin volume and salt dosage.

Set the estimated system capacity on the controller.

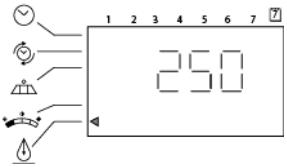
1. Press ■.
   ⇨ The amount number flashes.
2. Adjust displayed capacity with ▲ and ▼.
3. Press ■ to validate the selection and advance to the next parameter using ▼ or ▲.



6.3.3.9 Hardness

Set inlet water hardness at installation site.

1. Press ■.
   ⇨ The hardness number flashes.
2. Adjust displayed hardness number with ▲ and ▼.
3. Press ■ to validate the selection.
   ⇨ Initial programming is now complete. The controller will return you to the normal operation mode.



6.4 Advanced programming (8-cycles softener system)

Info

Info

Menus are displayed in a defined and incremental order.

Press and hold ▲ + ▼ for 5 seconds to access advance programming. A "P" symbol is displayed on the bottom left of screen.

The 742/762/764 features an advanced programming level that allows the installing dealer to make changes to the controller for more demanding applications. The homeowner/end user should never have to access this level.

The advanced programming menu includes:

Parameter description		Range of values	Default value	Units of measure	Notes
P1	Time of day	1:00 - 12:59 AM/PM 0:00 - 23:59	12:00 PM	Hour : minute	Range depends on value selected for P10.
P2	Day of week	-	None	N/A	-
P3	Time of regeneration	1:00 - 12:59 AM/PM 0:00 - 23:59	2:00 AM	Hour: minute	Range depends on value selected for P10.
P4	Days override (Days between regeneration on 742 controller)	0 - 99	0	Days	0 = no calendar override. 0.5 = regeneration twice a day at time of regeneration and 12 hours later.
P5	Day of week regeneration	N/A	None	N/A	Day of week regeneration is skipped if calendar override is more than 0 (742 controller only).
P6	Salt amount	50 - 290	110	g/l	Unit of measure depends on value selected for P9.
P7	System capacity	0.1 - 90	*	kg	Unit of measure depends on value selected for P9.
P8	Water hardness	30 - 2000	250	mg/l	Unit of measure depends on value selected for P9 (762 – 764 controllers only).

*Calculated depending on salt setting and resin volume. The capacity may be manually adjusted.

Parameter description		Range of values	Default value	Units of measure	Notes
P9	Units of measure	0 - 1	1**	N/A	0 = US unit. 1= Metric unit.

Parameter description		Range of values	Default value	Units of measure	Notes
P10	Clock mode	0 - 3	1**	N/A	0 = 12 hour clock, flow rate displayed. 1 = 24 hour clock, flow rate displayed. 2 = 12 hour clock, time of day displayed. 3 = 24 hour clock, time of day displayed.
P11	Service interval	0 - 250	0	Months	Uses 30 days for each month.
P12	Remote regeneration switch delay	3 - 250	60	Seconds	Time remote switch must be active to start regeneration on 742 - 764 controllers.
P13	Chlorine generator options	0 - 2	0	N/A	0 = no chlorine generator. 1= salt check only. 2 = generate chlorine and salt check.
P14	Refill rate	1 - 700	*	gpm x 100	-
P15	Draw rate	1 - 700	*	gpm x 100	-
P16	Reserve type	0 - 3	0	N/A	762/764 controllers only: 0 = variable reserve delayed regeneration. 1 = fixed reserve delayed regeneration. 2 = variable reserve delayed regeneration/fixed reserve immediate regeneration. 3 = fixed reserve immediate regeneration. (Not used with Alternating systems)
P17	Initial average or fixed reserve	0 - 70	30	%	762/764 controllers only: Depends on value selected for P16. (Not used with Alternating systems)

Parameter description		Range of values	Default value	Units of measure	Notes
P18	Flow sensor select	0 - 7	*	N/A	762/764 controllers only: 0 = internal turbine, Magnum IT NHWB. 1 = 1" Autotrol turbine, 2 turbines per system. 2 = 2" Autotrol turbine, 2 turbines per system. 3 = User defined K-factor. 4 = User defined pulse equivalent. 5 = Magnum IT HWB. 764 controller only: 6 = 1" Autotrol turbine, 1 turbine per system, available with Alternating systems only. 7 = 2" Autotrol turbine, 1 turbine per system, available with Alternating systems only.
P19	K-factor or pulse equivalent	1.00 -99.99 0 - 9999	0.01 1	N/A	762/764 controllers only: K-factor P18 = 3. Pulse equivalent P18 = 4.
Pr	Refill first	0 - 1	0	N/A	0 = Refill first off 1 = Refill first on (not used with Alternating system)
Pd	Regeneration mode when initiated by a remote signal	0 - 1	0	N/A	742/764 controllers only: 0 = Immediate regeneration 1 = Delayed regeneration

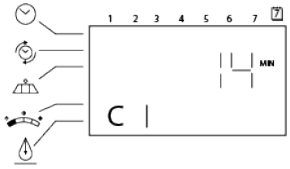
* Default value selected with valve type and resin volume.

** Factory default value is "0" for North America and "1" for World units.

6.4.1 Cycle time programming

Set the cycle time programming.

1. Press and hold the and for 5 seconds when the controller is not in regeneration to enter cycle time programming.
   - ⇨ A small "C#" with a number will be displayed indicating the controller is in cycle time programming.
   - ⇨ The number indicates the cycle being viewed or changed.
   - ⇨ Cycle times are programmable from 0 to 200 minutes.
2. Press ■.
   - ⇨ Cycle time flashes.
3. Adjust displayed time with ▲ and ▼.
4. Press ■ to validate the selection
   - ⇨ The next cycle time is displayed.



Info

The draw and refill cycle times (C2 & C8) can not be changed in cycle time programming for 8 - cycles softener system.

They are calculated using the draw and refill rates and the salt amounts.

255 Valves		
Description	Default value [min]	**C# displayed**
Backwash	14	1
Draw [1]	(3)	2 [2]
Slow rinse	(4)	3 [2]
Repressurize (hard water bypass flapper open)	3	4
Fast rinse	6	5
2nd Backwash	1	6
2nd Fast rinse	1	7
Brine refill [1]	(5)	8

[1] Can only be programmed in 3 - cycle filter configuration.

[2] Separate draw and rinse positions are present on cam. The controller stays in the brine draw position for both draw and rinse times then it proceeds through the rinse position with no dwell time.

[3] Depends on valve type and resin volume. Time is calculated from total salt amount and draw rate.

[4] Depends on valve type, resin volume and rinse rate.

[5] Depends on valve type and resin volume. Time is calculated from total salt amount and refill rate.

6.4.2 Diagnostic

To access diagnostic values, press and hold ■ and ▼ for 5 seconds, diagnostic H symbol is displayed on the bottom left of the screen.

Diagnostic Code	Description	Unit	Range	742	762	764
H0	Initial setting value	Litre	Resin Volume	Yes	Yes	Yes
H1	Day since last regeneration	N/A	0 - 255			
H2	Current flow rate	Depends on turbine used		No		
H3	Water used today since time of regeneration	m^3	0 - 1310.70			
H4	Water used since last regeneration	m^3	0 - 1310.70			
H5	Total water used since reset in 100 s	m^3	0-9999			
H6	Total water used since reset in 1000000 s	m^3	4264 x 10^4			
H7	Average usage for Sunday	m^3	0 - 1310.70			
H8	Average usage for Monday	m^3	0 - 1310.70			
H9	Average usage for Tuesday	m^3	0 - 1310.70			
H10	Average usage for Wednesday	m^3	0 - 1310.70			
H11	Average usage for Thursday	m^3	0 - 1310.70			
H12	Average usage for Friday	m^3	0 - 1310.70			
H13	Average usage for Saturday	m^3	0 - 1310.70			
H14	Average service cycle	Day	0 - 255			
H15	Peak flow rate	l/min	0 - 1000			
H16	Day and time of peak flow rate	Time and day that peak flow occurred				
H17	Months since service	Month	0 - 2184	Yes		
H18	Water used since last regeneration - tank 1	m^3	0 - 1310.70	No	No	
H19	Water used since last regeneration - tank 2	m^3	0 - 1310.70			
Hr	Number of regenerations since last service	N/A	0 - 65536	Yes	Yes	

6.4.3 Resetting the controller

Info

Resetting the controller will delete all information stored in its memory, except the time and day.

This will require you to reprogram the controller completely from the initial power-up mode.

Resetting the controller:

1. Press and hold the ■ and ▼ for 5 seconds.
   ⇨ H0 and the system's set resin volume (or "F" mode) will be displayed.
2. If a history value other the "H0" is displayed, use ▲ to scroll through the settings until "H0" is displayed.
3. To reset the controller, press and hold ■ for 5 seconds.
   ⇨ The controller will be reset to an unprogrammed state.
4. Go to Programming [→Page 42], to reprogram the controller.

7 Commissioning

Info

This chapter is available for standard regeneration flows. Contact your supplier if the actual regeneration is not standard and if you need assistance.

7.1 Water filling, draining and watertightness inspection

7.1.1 System started

Once you have performed the previous initial programming steps, you will need to activate the softener.

Caution - material

Do not rotate the camshaft by hand or damage to the unit may occur.

Use the controller to take the camshaft electronically through the cycles

Follow these steps carefully:

1. Remove the cover from the valve. Removing the cover will allow you to see that the camshaft is turning, and in which cycle the camshaft is currently positioned.
2. With the supply water for the system still turned off, position the bypass valve to the "nonbypass" (normal operation) position.
3. Press ♻ on the controller for 5 seconds. This will initiate a manual regeneration.
   ⇨ The controller will indicate that the motor is turning the camshaft to cycle C1 (Backwash) position by flashing an hourglass. The controller will display the total regen time remaining. If you press and hold the ■ button, the controller will indicate the time remaining in the current cycle.
4. Fill the media tank with water.
   ⇨ While the controller is in cycle C1 (Backwash), open the water supply valve very slowly to approximately the ¼ open position.

⚠ CAUTION

If opened too rapidly or too far, media may be lost out of the tank into the valve or the plumbing.

In the ¼ open position, you should hear air slowly escaping from the valve drain line.

   ⇨ When all of the air has been purged from the media tank (water begins to flow steadily from the drain line), open the main supply valve all of the way. This will purge the final air from the tank.
   ⇨ Allow water to drain out until the water runs clear from the drain line. This purges any refuse from the media bed.
   ⇨ Turn off the water supply and let the system stand for about 5 minutes. This will allow any trapped air to escape from the tank.
5. Add water to the brine tank (initial fill) (softener only).

⇨ With a bucket or hose, add approximately 15 liters (4 gallons) of water to the brine tank. If the tank has a salt platform in the bottom of the tank, add water until the water level is approximately 25 mm (1") above the platform.

Info

Note

We recommend that you do not put salt into the tank before the control valve has been started up. With no salt in the tank, it is much easier to view water flow and motion.

6. Engage the refill cycle to prime the line between the brine tank and the valve (softener only).

⇨ Slowly open the main water supply valve again, to the fully open position. Be sure not to open too rapidly as that would push the media out of the media tank.

⇨ Advance the controller to the Refill (C8) position. From cycle C1 (Backwash), press and hold ■. This will display the current cycle.
While pressing ■, press ▲ to advance to the next cycle. Continue to advance through each cycle until you have reached cycle C8 (Refill).

Info

Note

As you advance through each cycle there will be a slight delay before you can advance to the next cycle. The hourglass icon will be lit while the camshaft is indexing. There may be a pause at cycle C4 (System Pause). This cycle allows the water/air pressure to equalize on each side of the valve discs before moving on. The hourglass will not be visible indicating that the system is paused.

⇨ With the water supply completely open, when the valve reaches C8 (Refill), the controller will direct water down through the line to the brine tank. Let the water flow through the line until all air bubbles have been purged from the line.

⇨ Do not let the water flow down the line to the tank for more than 1 to 2 minutes, or the tank may overfill.

Info

Note

Proceed as previously mentioned taking into account the regeneration sequence described in chapter Regeneration Sequence for Twin and Lockout Systems [→Page 20].

⇨ Once the air is purged from the line, press ■ and ▲ simultaneously to advance to cycle C0 (Treated Water) position.

7. Draw water from the brine tank.

⇨ From the treated water position (cycle C0), advance the valve to the draw brine position. Press ♻ for 5 seconds.

⇨ The controller will begin a manual regen, and advance the control valve to the cycle C1 (Backwash). Press ■ and ▲ to advance to cycle C2 (Draw).

⇨ With the controller in this position, check to see that the water in the brine tank is being drawn out of the tank. The water level in the tank should recede very slowly.

⇨ Observe the water being drawn from the brine tank for at least 3 minutes. If the water level does not recede, or goes up, check all hose connections. C2 should be displayed.

8. If the water level is receding from the brine tank you can then advance the controller back to the treated water (C0) position by pressing ■ and ▲ simultaneously to advance the controller to the C0 position.
9. Finally, turn on a faucet plumbed after the water softener. Run the faucet until the water runs clear. Add salt to the brine tank.

7.1.2 Additional tips

- When the controller is first plugged in, it may display a flashing hourglass and the message "Err 3", this means that the controller is looking for home position. If the "Err 2" is displayed, check that the incoming power frequency matches the controller;
- with 764 controller programmed in A or P mode "Err.4" may also be displayed on the screen when the controller is looking for secondary valve's home position;
- the preset default time of regeneration is 2:00 AM;
- power supply? The World controller senses the electrical input and decides which is needed;
- the 700 Series controller can be programmed to regenerate on specific days of the week;
- if electrical power is not available, the camshaft can be rotated counter-clockwise by hand if the motor is removed;
- the 700 Series controllers send commands to the motor for camshaft movement. However, water pressure/flow are required during the regeneration cycle for backwash, purge and refill, and brine draw to actually take place;
- make sure the control power source is plugged in. The transformer should be connected to a non-switched power source;
- you can start programming from the beginning by resetting the amount of media, see chapter Resetting the controller [→Page 59].

7.2 Sanitization

7.2.1 Disinfection of water softeners

The materials of construction of the modern water softener will not support bacterial growth, nor will these materials contaminate a water supply. In addition, during normal use, a softener may become polluted with organic matter, or in some cases with bacteria from the water supply. This may result in an off-taste or odour in the water.

Thus, the softener may need to be disinfected after installation. Some softeners will require periodic disinfection during their normal lifetime. Consult the installing dealer for more information on softener disinfection.

Depending on the conditions of use, the softener type, the type of ion exchanger and the disinfectant available, a choice can be made among the following methods.

7.2.2 Sodium or calcium hypochlorite

These materials are satisfactory for use with polystyrene resins, synthetic gel zeolite, greensand and bentonites.

5.25% Sodium hypochlorite

If stronger solutions are used, such as those sold for commercial laundries, adjust the dosage accordingly.

Dosage

Polystyrene resin: set 1.25 mL fluid per 1 L of resin.

Non-resinous exchangers: set 0.85 mL fluid per 1 L.

Brine tank softeners

Backwash the softener and add the required amount of hypochlorite solution to the well of the brine tank. The brine tank should have water in it to permit the solution to be carried into the softener.

Proceed with the normal regeneration.

Calcium hypochlorite

Calcium hypochlorite, 70% available chlorine, is available in several forms including tablets and granules. These solid materials may be used directly without dissolving before use.

Do not let the disinfectant stand for more than 3 hours in the brine tank before the regeneration start.

Dosage

Measure two grains ~ 0.11 mL for 1 L.

Brine tank softeners

Backwash the softener and add the required amount of hypochlorite to the well of the brine tank. The brine tank should have water in it to permit the chlorine solution to be carried into the softener.

Proceed with the normal regeneration.

7.2.3 Electro chlorination (if present)

Valves or systems already equipped with an electrochlorinator device or system will be sanitized during the brine draw phase.

8 Operation

During a regeneration:

- A "C#" is displayed to show the current cycle;
- total regen time remaining is displayed on screen;
- you can press and hold ■ to show current cycle time remaining.

8.1 Recommendations

- Use only regeneration salts designed for water softening EN973;
- for optimal system operation, the use of clean salt and impurities free is recommended (for example salt pellets);
- do not use ice melt salt, block, or rock salts;
- the sanitizing process (both with liquid and electrochlorination) may introduce chlorine compounds which may reduce the life of the ion exchange resins. Refer to media manufacturer specifications sheet for more information.

8.2 Manual regeneration

Mandatory

The controller must be in service in order to enable this procedure.

Info

Note

The unit returns to normal operation if no buttons are pressed within 30 seconds.

Info

Note

To cancel: press ♻ again. The regen symbol disappears.

Immediate regeneration

1. Press and hold ♻ for 5 seconds to initiate immediate manual regeneration.
   ⇨ A solid regeneration icon will be displayed.
   ⇨ Camshaft starts rotating to cycle C1.

Double regeneration

1. After an immediate regeneration has begun, press ♻ again to plan a second manual regeneration.
   ⇨ A flashing "x2" symbol indicates the second regeneration will start at the programmed delayed regeneration time.

Immediate double regeneration

1. Press and hold ♻ to start the second regeneration immediately following the current regeneration.

⇨ A solid "x2" symbol will be displayed.

Manual delayed regeneration

1. Press ♻ once to program a delayed regeneration.
   ⇨ The regeneration will start on the scheduled time. See Basic programming [→Page 45].
   ⇨ A flashing regen symbol will be displayed.

8.3 To advance regeneration cycles

1. Simultaneously press ■ and ▲ to advance to the next cycle.
   ⇨ An hourglass will display while the camshaft is moving.
   ⇨ When the camshaft reaches next cycle, "C2" will be displayed.
2. Repeat ■ and ▲ to advance through each cycle.

8.4 To cancel a regeneration

1. Press and hold ■ and ▲ for 5 seconds to cancel the regen.
   ⇨ Hourglass will flash once cancelled.
   ⇨ Camshaft will move to service position – may take 1 to 2 minutes.

8.5 Automatic regeneration modes with twin system (764 only)

Info

Info

Refer to Advanced programming (8-cycles softener system) [→Page 54] for the Px parameters description.

8.5.1 Alternating systems

Parameters P16 and P17 are not accessible with alternating systems. The regeneration mode is an immediate regeneration without reserve, since a tank will be regenerated as soon as its resin is exhausted (the other becomes the tank in service).

8.5.2 Parallel systems

Parameter P16 is used to determine the method for demanded initiated regeneration. Four regeneration modes are possible:

- P16 = 0, delayed regeneration with a variable reserve:

Regenerations will start only at the time of regeneration entered in P3. A tank is regenerated if the remaining capacity in that tank is below the minimum required capacity needed to meet the next days calculated water usage requirement. The next days water usage number is based on the daily average water usage held in memory plus a 20% reserve. If necessary both tanks will be regenerated sequentially beginning with the most exhausted tank. This option allows the controller to vary the reserve, and therefore the decision to regenerate, based on the actual daily water usage pattern for the location at which it is installed (see table below);

Priority	Flow rate	Continuous soft water	Efficiency
High	x		
Average		x	x
Low			

Table with P16 = 0

- P16 = 1, delayed regeneration with a fixed reserve:

Regenerations will start only at the time of regeneration entered in P3. A tank is regenerated if the remaining capacity in that tank is below the percentage entered in P17. If either tank's capacity is overrun by 50% a regeneration will take place. The controller will also cause both tanks to be regenerated sequentially the next time of regeneration regardless of how much water is used during that 24 hours period. This feature helps to recover a severely exhausted bed (see table below);

Priority	Flow rate	Continuous soft water	Efficiency
High	x		
Average		x	
Low			x

Table with P16 = 1

- P16 = 2, immediate regeneration - fixed reserve/delayed regeneration - variable reserve:

This option uses the features of both options P16 = 0 and P16 = 3. This is the most versatile of regeneration options. Option P16 = 2 provides all the advantages of variable reserve based on the actual amount of water that is used each day plus the capacity to react to the excessive water usage days that occur occasionally (see table below);

Priority	Flow rate	Continuous soft water	Efficiency
High		x	
Average	x		x
Low			

Table with P16 = 2

- P16 = 3, immediate regeneration - fixed reserve:

Regenerations are started immediately when a tank reaches zero or when the system remaining capacity in both tanks drops below the reserve capacity programmed in P17. To prevent hard water this reserve should be set large enough to provide conditioned water during the regeneration of the most exhausted tank (see table below).

Priority	Flow rate	Continuous soft water	Efficiency
High		x	x
Average			
Low	x		

Table with P16 = 3

9 Maintenance

Mandatory

Cleaning, maintenance and service operation shall take place at regular intervals and must be done by qualified personnel only in order to guarantee the proper functioning of the complete system.

Report maintenance done in the Maintenance chapter of the User Guide document.

Failure in respecting above instructions may void the warranty!

9.1 General system inspection

Mandatory

Has to be done once a year at minimum.

9.1.1 Water quality

1. Raw water total hardness.
2. Treated water hardness.

9.1.2 Mechanical Checks

1. Inspect general condition of valve and associated ancillaries and check for any leaks, ensure valve connection to piping is made with adequate flexibility as per manufacturer instruction.
2. Inspection of electrical connections, verify wiring connections and search for evidence of overloading.
3. Verify settings of electronic or electromechanical timer, verify regeneration frequency, make sure the valve configuration corresponds to the settings.
4. Check water meter, if present, report water meter settings, compare with previous inspection.
5. Verify total water consumption compared to previous visit.
6. If pressure gauges are installed before and after softening system, verify and record static and dynamic pressure, reporting pressure drop. Verify that inlet pressure respects valve and softening system limits.
7. If pressure gauges are not present, but suitable points exist, install temporary pressure gauge(s) to perform precedent point.

9.1.3 Regeneration test

1. Check condition of brine tank and any associated equipment.
2. Check salt level in brine tank.
3. Initiate regeneration test.
   - ⇨ Check brine draw during brine draw stage, observe aircheck ball and make sure of proper function.
   - ⇨ Check brine tank refill, observe aircheck ball and make sure of proper function.

- ⇨ Check operation of safety brine valve, where fitted ***.
- ⇨ Check for brine draw off levels.
- ⇨ Check for resin loss at the drain during regeneration.
- ⇨ Where fitted, check for satisfactory operation of solenoid, i.e. outlet shut off during regeneration and/or brine line shut off valve(s).

4. Test and record Total Hardness of outlet water from softener vessel(s).

9.2 Recommended maintenance plan

Items	1 year	2 year	3 year	4 year	5 year
Injector & filter	Clean	Clean	Clean	Clean	Clean/ replace if necessary
Refill controller & ball**	Clean	Clean	Clean	Clean	Clean/ replace if necessary
DLFC & ball**	Clean	Clean	Clean	Clean	Clean/ replace if necessary
Aircheck & ball**	-	-	-	-	Clean / replace if necessary
256 Bypass (if present, contains O-rings**)	-	-	-	-	Clean/ replace if necessary
Flappers**	-	-	-	-	Replace
Flappers spring	-	-	-	-	Replace
O-Rings**	Check for watertightness / clean or replace in case of leakage	Check for watertightness / clean or replace in case of leakage	Check for watertightness / clean or replace in case of leakage	Check for watertightness / clean or replace in case of leakage	Check for watertightness / clean or replace in case of leakage
Motor, motor cable and optical sensor harness	Check	Check	Check	Check	Replace
Optical sensor	Check	Check	Check	Check	Replace
Inlet Hardness	Check	Check	Check	Check	Check
Residual hardness	Check / adapt mixing screw if necessary	Check / adapt mixing screw if necessary	Check / adapt mixing screw if necessary	Check / adapt mixing screw if necessary	Check / adapt mixing screw if necessary
Electronic / settings*	Check	Check	Check	Check	Check / replace if necessary

Items	1 year	2 year	3 year	4 year	5 year
Transformer*	Check	Check	Check	Check	Check / replace if necessary
Chlorine generator (if present)	Check / clean	Check / clean	Check / clean	Check / clean	Check / clean / replace if necessary
Turbine manifold****	Check / clean	Check / clean	Check / clean	Check / clean	Replace
Turbine cable (if turbine manifold present)	Check	Check	Check	Check	Replace
Valve watertightness	Check	Check	Check	Check	Check
Valve to piping watertightness	Check	Check	Check	Check	Check

* Electronical parts – durability strongly affected by power source quality and stability

** Elastomer durability is strongly affected by raw water concentration in chlorine and its derivate

*** 255 being already equipped with an aircheck, the safety brine valve should not be equipped with an aircheck too otherwise this may create hydraulic interferences and cause brine draw malfunction due to safety brine valve aircheck not opening.

**** Wear part.

9.3 Recommendations

9.3.1 Use original spare parts

Caution - material

Risk of damage due to use of non-genuine spare parts !

To ensure correct operation and safety of the device, only use original spare parts and accessories recommended by the manufacturer.

Usage of non-genuine spare parts voids all warranties.

Parts to keep in stock for potential replacements are motor and optical sensor, controller, transformer, injectors, flapper kit, O-ring kit, refill flow controller and DLFC.

9.3.2 Use original approved lubricants

- Production:
  p/n 1014082 (NFO "Chemplex" 862 Silicone Comp.);
- spare part:
  p/n 42561 (SILICONE LUBRICANT PACK).

9.3.3 Maintenance instructions

- Disinfect and clean the system at least once a year or if the treated water has an off-taste or an unusual odor;
- perform a hardness test every year at both inlet and treated water.

9.4 Cleaning and maintenance

9.4.1 First steps

Before any cleaning or maintenance procedure, complete the following steps:

Mandatory

These operations must be performed before any cleaning or maintenance procedure !

1. Unplug the wall-mounted transformer.
2. Shut off water supply or put bypass valve(s) into bypass position.
3. Relieve system pressure before performing any operations.

9.4.2 Injector cleaning

1. Using a Torx key, unscrew and remove the injector cap (**4**).

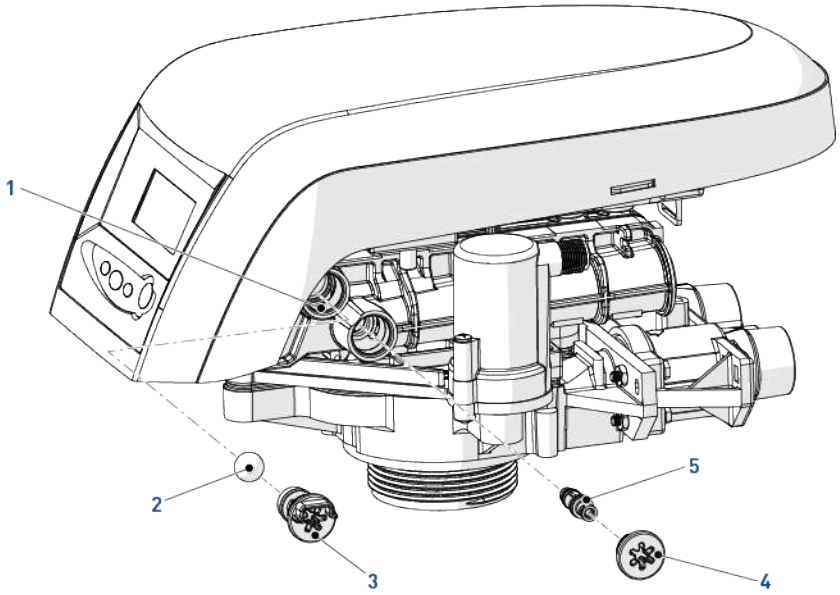
Caution - material

Take care not to damage the injector (5).

2. Using pliers, gently extract the injector (**5**) from valve body.
3. Clean the injector (**5**) using compressed air, a soft brush or possibly a pin.
4. Reverse above procedure steps to rebuild.

9.4.3 Refill controller cleaning

1. Using a Torx key, unscrew and extract the refill controller (**3**).
2. Clean the refill controller (**3**) with a soft brush.
   ⇨ Make sure the refill controller groove is perfectly clean.
3. Check for O-rings integrity.
4. Check for ball (**2**) integrity (if present).
5. Clean the refill controller chamber (**1**) before reinserting the refill controller (**3**).
6. Reverse above procedure steps to rebuild.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9.4.4 Injector screen cleaning

1. Using a Torx key, unscrew and extract the injector screen cap (**4**).
2. Unclip the white plastic basket (**5**) and clean it with a soft brush.
   ⇨ Use of descaling agent such as white vinegar might be required in case of impurities on the plastic basket (**5**).
3. Check for O-rings integrity before reinserting the injector screen cap (**4**).
4. Reverse above procedure steps to rebuild.

9.4.5 Backwash controller cleaning

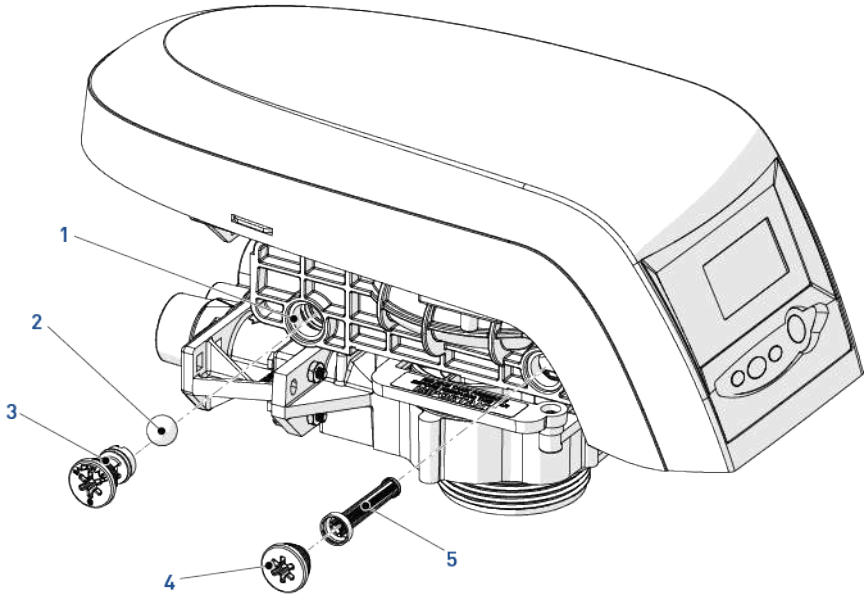
1. Using a Torx key, unscrew and extract the backwash flow controller (**3**).
2. Clean the backwash controller (**3**) using a soft brush or compressed air.
3. Check for O-rings integrity before reinserting the backwash controller (**3**).

Info

Note

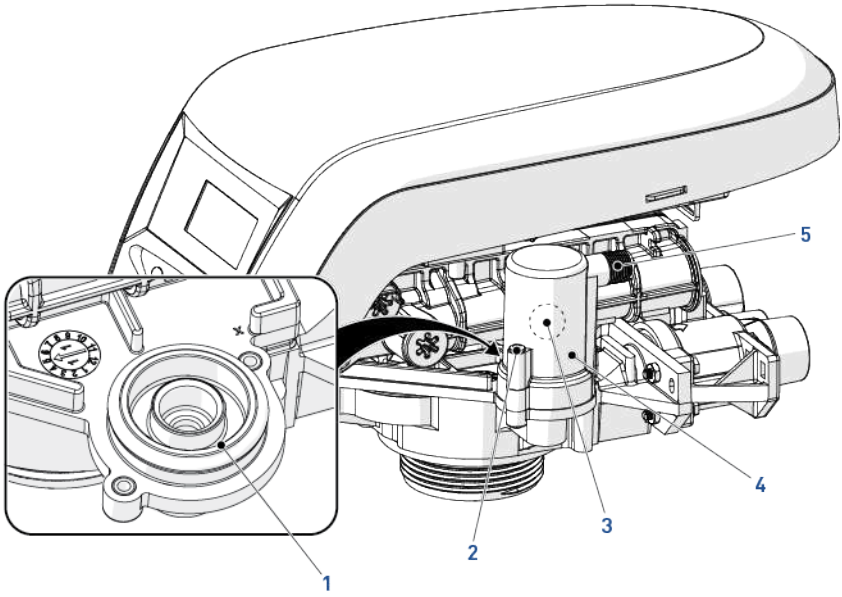
Depending on the backwash controller size, it may be of a different type to that shown below. If the model fitting the valve is with the ball (**2**), make sure to clean the backwash controller grooves and backwash controller chamber (**1**). Also check for ball (**2**) integrity before reinserting.

4. Reverse above procedure steps to rebuild.



9.4.6 Air check valve cleaning

1. Unscrew brine pipe (**5**).
2. Using a Phillips screwdriver, loosen air check cap screw (**2**) (2x).
   Let the 2 screws (**2**) on the cap (**4**).
3. Remove the cap (**4**).
4. Clean the air check ball (**3**) and groove (**1**) using a soft cloth or a soft brush.



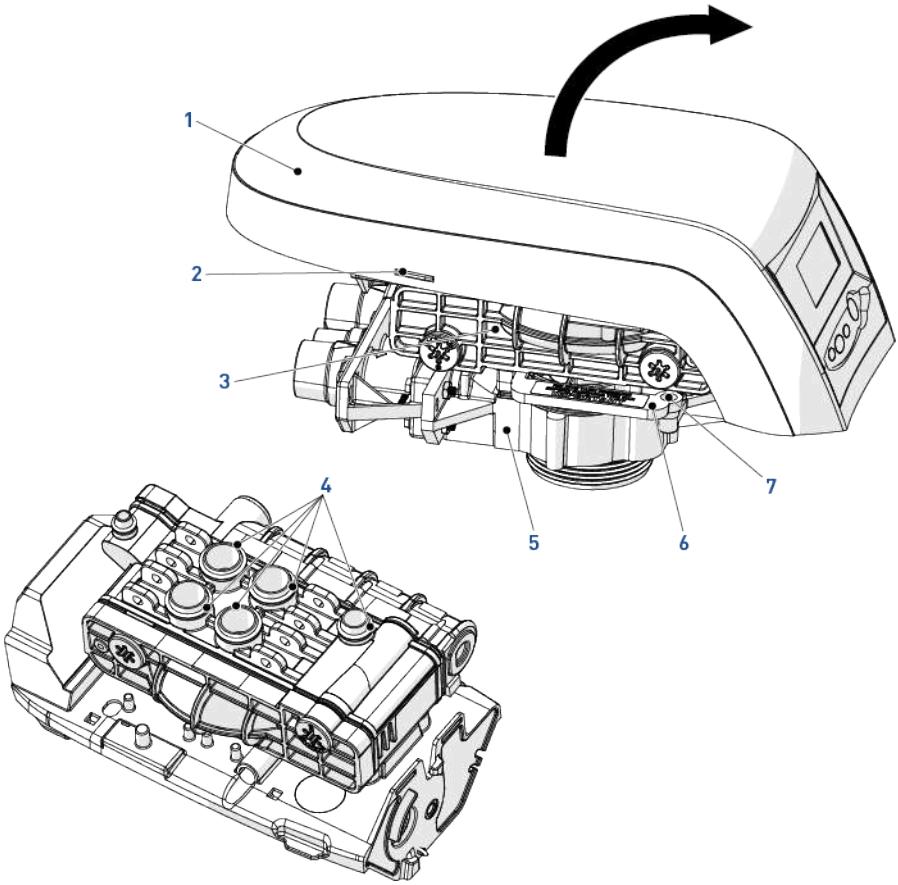
9.4.7 Valve from tank disassembly

Tip

Type et source du danger

Depending on the maintenance required, it may be useful to disassemble the valve from the tank in order to have easier access

1. Unlock the cover (**1**) from the slide clips (**2**) (one on each side of the valve).
2. Lift the cover (**1**).
3. Using a Phillips screwdriver unscrew the screw (**7**) from the locking bar (**6**), so that the locking bar (**6**) can be slid out of its position.
4. You can now lift the top of the valve body (**3**) from the tank adapter (**5**), so as to perform all required maintenance operations with the upper valve body (**3**) part on a workbench. Take care with the seals (**4**) on the valve body bosses.



9.4.8 Motor and camshaft replacement

1. Remove the white locking pin (**2**) securing the motor (**3**).
2. Turn the motor (**3**) counter clockwise and slide it out of its position.
3. Slide the camshaft (**1**) backwards until it is released from its mounting boss, then lift it up.

Info

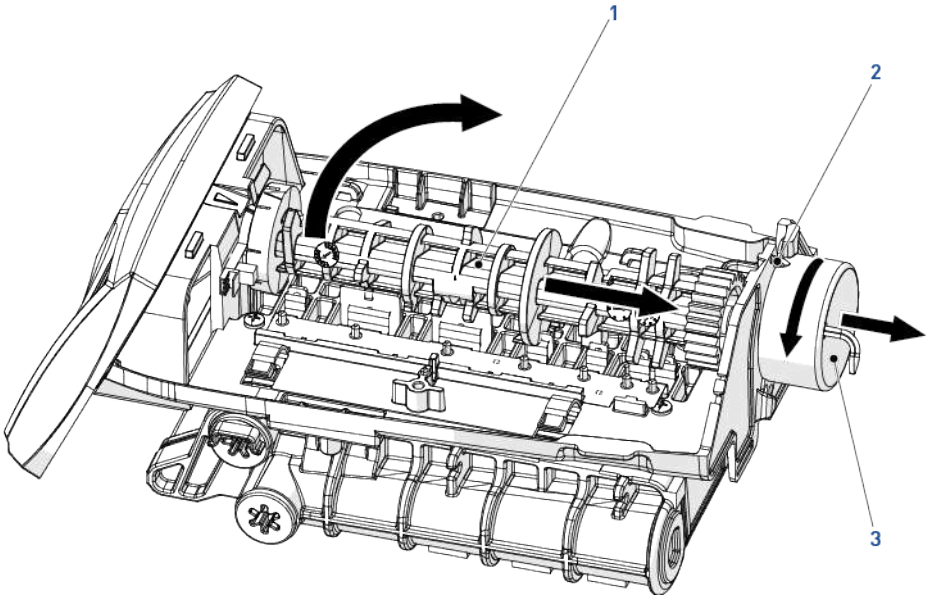
Note

To replace the motor, you also have to disconnect the optical sensor cable. See Optical sensor and controller replacement [→Page 77].

4. Reverse above procedure steps to rebuild.

Caution - material

When reassembling the camshaft (1), place it in the centering hole and use the arrows on the top plate and the camshaft to align the camshaft.



9.4.9 Optical sensor and controller replacement

Info

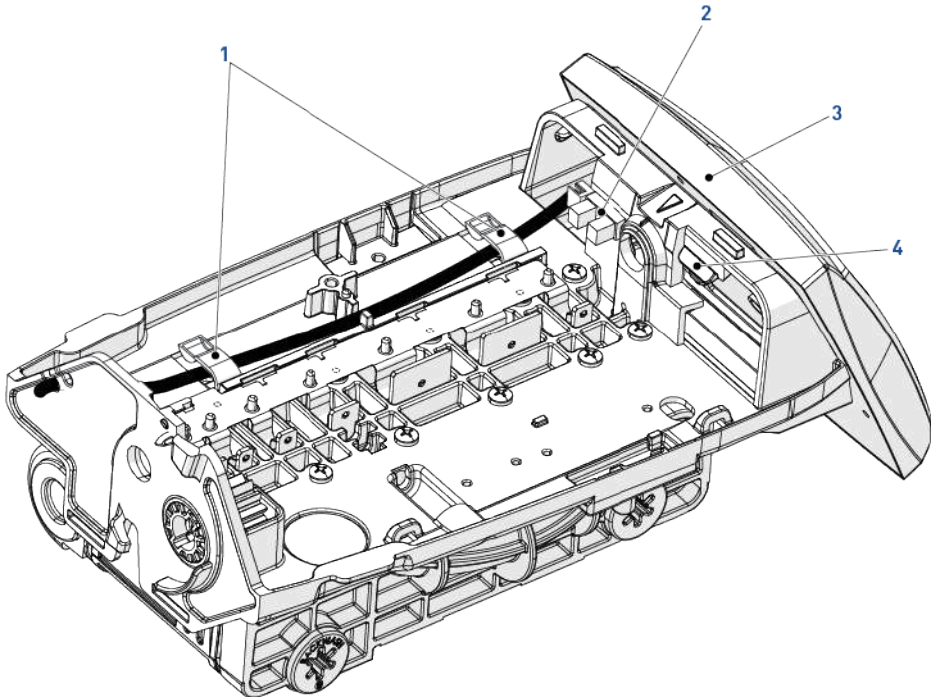
Note

To remove the optical sensor, you first have to disassemble the camshaft. See Motor and camshaft replacement [→Page 76].

1. The optical sensor (**2**) is clipped on the front edge, gently press on the clips to release the optical sensor (**2**) from its location.
2. Press the controller locking pad (**4**) and slide the controller (**3**) out of its position.
3. Disconnect the cables from the controller by pressing on the clip and pulling them.
4. Remove the motor, cables and optical sensor assembly to change them.
5. Reverse above procedure steps to rebuild.

Caution - material

When refitting, always use the cables guide (1) to secure the cables. This will prevent the cables from being crushed or cut when closing the cover or by the camshaft during regeneration cycles.



9.4.10 Top plate, flapper spring and flappers replacement

⚠ WARNING

Take care with sharp edges.

Use of protective glove is highly recommended to remove the spring (**4**).

1. Using a flat screwdriver, release the flapper springs (**2**) one by one and then remove the spring (**3**).
2. Loosen all top plate screws (**1**).
3. Remove the top plate (**4**) from the valve.
4. Clean or replace the flappers (**5**) if needed.

Caution - material

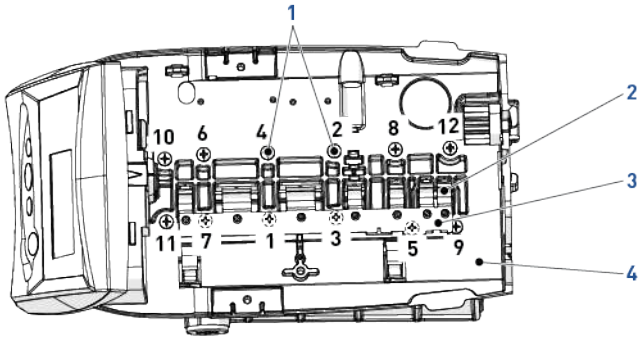
The outline of the flapper seat can be seen on the flapper side.

If the outline is irregular, this may indicate that debris is or has been preventing the flapper (**1**) from closing, and potential damage.

5. Reverse above procedure steps to rebuild.

Caution - material

When refitting the top plate (4), always follow the screwing order below.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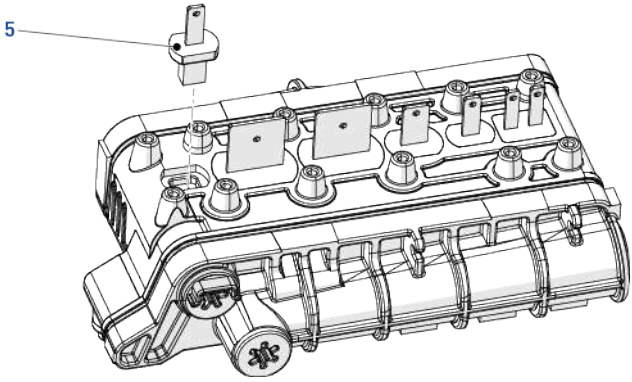
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10 Troubleshooting

10.1 Logix controller

Err. code	Cause	Solution
ERR 1	Controller power has been connected and the controller is not sure of the operating status.	Reset controller. See Resetting the controller [→Page 59].
ERR 2	Controller power does not match 50 or 60 Hz.	Disconnect and reconnect the power. If problem is not solved, obtain an appropriate controller or AC transformer.
ERR3	Controller lost the position of camshaft. Camshaft should be rotating to find Home position.	Wait for 2 minutes: the controller returns to Home position. An hourglass icon flashes to indicate that the motor is running.
	Camshaft does not rotate.	Check: • Motor connections. • If motor wire harness is connected to the motor. • If motor wire harness is connected to the controller. • Optical sensor connection and position. • If motor and camshaft gears are engaged.
		If everything is connected, try replacing in this order: • Wire harness. • Motor. • Optical sensor. • Controller. • See Cleaning and maintenance [→Page 71].
	Camshaft rotates for more than 5 minutes to find Home position.	Check: • Optical sensor connection and position. • Camshaft connection. • Camshaft slots cleanness.

Err. code	Cause	Solution
ERR3	Camshaft rotates for more than 5 minutes to find Home position.	If motor keeps rotating indefinitely, replace the following components in this order: • Wire harness. • Motor. • Optical sensor. • Controller. • See Cleaning and maintenance [→Page 71].
ERR4	Controller on tank 2 does not know the position of the camshaft. Camshaft should be rotating to find Home position.	Wait for two minutes, the controller will return to home position. The hourglass should be flashing on the display indicating the motor is running.
	Camshaft on tank 2 is not turning when ERR 4 is displayed.	Check that motor is connected. Verify that motor wire harness is connected to the motor and controller module. Verify that optical sensor is connected and in place. Verify that motor gear has engaged cam gear. If everything is connected, try replacing in this order: • wire harness, motor, optical sensor assembly; • controller.
	Camshaft on tank 2 is turning for more than five minutes to find Home position.	Verify that optical sensor is in place and connected to wire. Verify that camshaft is connected. Verify that no dirt or rubbish is clogging any of the cam slots. If motor continues to rotate indefinitely, replace the following components in this order: • wire harness, motor, optical sensor assembly; • controller.
	Regeneration starts but controller shows ERR 4 before completing the regeneration.	Verify that the correct valve is selected in the Logix controller.

10.2 Valve

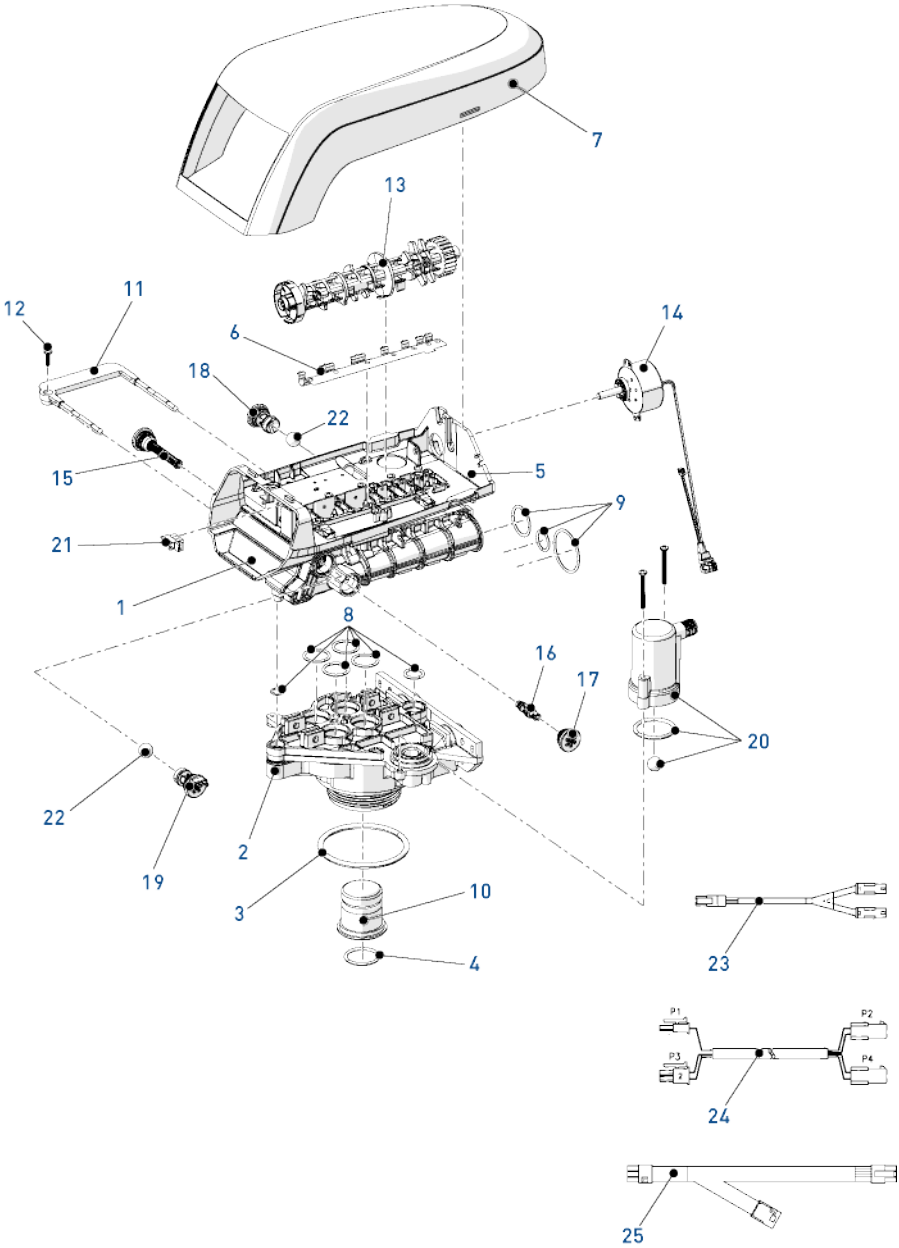
Issue	Cause	Solution
- - : - -	Power failure occurred.	Press ■ to reset the time.
Brine tank overflow.	Uncontrolled brine refill flow rate.	Remove brine controller to clean ball and seat.
	Air leak in brine line to air check.	Check all connections in brine line for any leaks.
	Drain control clogged with resin or other debris.	Clean drain control.
Flowing or dripping water at drain or brine line after regeneration.	Valve stem return spring is weak.	Replace the spring.
	Valve disc cannot close because of debris.	Remove debris.
Hard water leakage after regeneration.	Improper regeneration.	Control brine dosage setting and repeat regeneration.
	Leaking of external bypass valve.	Replace bypass valve.
	O-ring around riser pipe damaged.	Replace O-ring.
	Incorrect capacity.	Verify appropriate brine amount and system capacity.
Controller will not draw brine.	Low water pressure.	Control and adjust setting according to instructions.
	Restricted drain line.	Remove restriction.
	Injector plugged.	Clean injector and screen.
	Injector defective.	Replace injector and cap.
	Valve disc 2 and/or 3 not closed.	Remove foreign matter from the disc. Check if the disc can close by pushing on stem. Replace the disc if needed.
	Air check valve prematurely closed.	Put controller momentarily into brine refill (C8 - cycle). Replace or repair air check if needed.
Controller will not regenerate automatically.	AC transformer or motor are not connected.	Connect the power.
	Defective motor.	Replace motor.
Controller regenerates at wrong time of day.	Controller set incorrectly.	Correct time setting according to instructions. See Regeneration time [→Page 47].

Issue	Cause	Solution
Valve will not draw brine.	Low water pressure.	Set pump to maintain 1.38 bar (20 psi) at softener.
	Restricted drain line.	Change drain to remove restriction.
	Injector plugged.	Clean injector and screen.
	Injector defective.	Replace injector.
	Air check valve closes prematurely on 255 valve or brine pickup tube.	Put controller momentarily into brine cycle (C2). Replace or repair air check if needed.
System using more or less salt than brine setting.	Foreign matter in valve causing incorrect flow rates.	Remove brine controller and flush out foreign matter. Then advance controller to brine cycle (C2) to clean valve (after so doing controller goes to "2nd fast rinse" cycle (C7) to remove any brine from tank).
Intermittent or irregular brine draw.	Low water pressure.	Set pump to maintain 1.38 bar (20 psi) at softener.
	Defective injector.	Replace injector.
No conditioned water after regeneration.	No brine in brine tank.	Add brine to brine tank.
	Injector plugged.	Clean injector and screen.
	Air check valve closes prematurely.	Put controller momentarily into brine cycle (C2). Replace or repair air check if needed.
Backwashes or purges at excessively low or high rate.	Incorrect drain control used.	Replace with correct size controller.
	Foreign matter affecting valve operation.	Remove drain control and clean ball and seat.
No water flow display when water is flowing on 760 controller.	Bypass valve in bypass.	Shift bypass valve to non-bypass position.
	Meter probe disconnected or not fully connected to meter housing.	Fully insert probe into meter housing.
	Restricted meter turbine rotation due to foreign matter in meter.	Remove meter housing, free up turbine and flush with clean water. Turbine should spin freely. If not, replace meter.

Issue	Cause	Solution
Run out of conditioned water between regenerations.	Improper regeneration.	Control brine dosage set and repeat regeneration.
	Incorrect brine setting.	Set P6 to proper level. See Amount of salt used per regeneration [→Page 48]
	Incorrect hardness or capacity settings.	Set to correct values. See Basic programming 742 - 762 controller [→Page 46]
	Water hardness has increased.	Set hardness to new value. See Hardness (762 controller only) [→Page 49]
	Restricted meter turbine rotation due to foreign matter in meter.	Remove meter housing, free up turbine and flush with clean water. Turbine should spin freely. If not, replace meter.
Brine tank overflow.	Brine valve disc 1 being held open by foreign matter.	Manually operate valve stem to flush away obstruction.
	Valve disc 2 not closed during brine draw causing brine refill.	Flush out foreign matter holding disc open by manually operating valve stem.
	Air leak in brine line to air check.	Check all connections in brine line for any leaks.
	Improper drain control for injector.	Use of small drain control with larger injector will reduce draw rates.
	Drain control clogged with resin or other debris.	Clean drain control.

11 Spare parts

11.1 Valve parts list

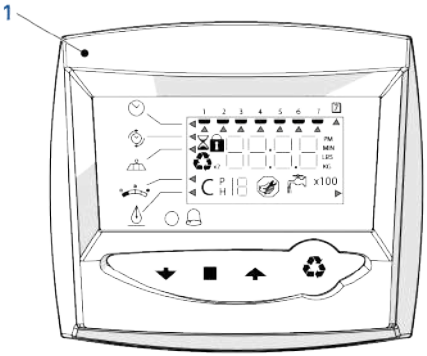


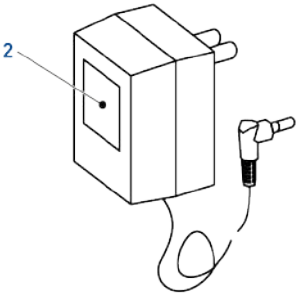
Item	Part number	Description	Assembly quantity
1	1244650	255 valve assembly, without flow controls	1
2	1033784	255 tank adapter new style	1
3	1010154	O-ring EP	1
4	1232370	O-ring EP	1
5	1235340	Top plate, 255 valve, 700/860 series controller	1
6	1235341	Spring, one-piece, 255 valve	1
7	1236246	Cover, valve, 255/Performa 700/860 series	1
*	1267672	Slim line cover 255 700/800	1
8	1001404	O-ring group: tank adapter	1
9	1040459	O-ring group: piping boss	1
10	1001986	13/16" rubber insert (optional)	1
*	1000250	Valve disk kit - standard/sev	1
*	1239760	Blending valve kit 400 & 700 series	1
11	1031402	Multilingual locking bar	1
12	1234170	Locking bar screw no. 8-9/16"	1
13	1235353	Camshaft 255/700-860 series std black for single systems L mode	1
	1236251	Camshaft 255/700-860 series twin tan for twin versions A + P mode	1
14	1238861	Motor + cable 700 series controller	1
*	3029962	Motor locking pin (white)	1
15	1000226	Screen/cap assembly with o-ring	1
16	1035730	"E" Inj (high efficiency) - yellow (6" diameter vessels)	1
	1035731	"F" Injector (high efficiency) - peach (7" diameter vessels)	1
	1035732	"G" Inj (high efficiency) - tan (8" diameter vessels)	1
	1035733	"H" Inj (high efficiency) - lt purple (9" diameter vessels)	1
	1035734	"J" Inj (high efficiency) - lt blue (10" diameter vessels)	1
	1035735	"K" Inj (high efficiency) - pink (12" diameter vessels)	1
	1035736	"L" Inj (high efficiency) - orange (13-14" diameter vessels)	1
17	1000269	Injector cap with o-ring	1

Item	Part number	Description	Assembly quantity
18	1000208	Drain control assy with o-ring No.6	1
	1000209	Drain control assy with o-ring No.7 (1.2 gpm; 4.5 Lpm)	1
	1000210	Drain control assy with o-ring No.8 (1.6 gpm; 6.1 Lpm)	1
	1000211	Drain control assy with o-ring No.9 (2.0 gpm; 7.6 Lpm)	1
	1000212	Drain control assy with o-ring No.10 (2.5 gpm; 9.5 Lpm)	1
	1000213	Drain control assy with o-ring No.12 (3.5 gpm; 13.2 Lpm)	1
	1000214	Drain control assy with o-ring No.13 (4.1 gpm; 15.5 Lpm) no ball	1
	1000215	Drain control assy with o-ring No.14 (4.8 gpm; 18.2 Lpm) no ball	1
19	1243510	Brine refill controller,.33 gpm, no ball	1
20	1032416	Air check kit 3/8" male	1
	1032417	Air check kit 1/4" male (Std)	1
21	1235373	Module, sensor, photo interrupter	1
22	1030502	Ball, flow control internal up to no.12 inclusive	1
23	3016715	Y sensor cable connector twin	1
24	3016775	Interconnecting cable twin	1
25	3020228	Remote start/lockout cable L versions	1
*	1033066	New to old style air check adapter	1
*	1244336	Chlorine generator kit, 0.33 gpm (use only in L versions)	1
*	1235446	Turbine cable, Logix, short	1
*	1239711	Switch kit, front mount, 0.1 amp	1
*	1239752	Switch kit, front mount, 5 amp	1
*	1239753	Switch kit, top plate mount, 0.1 amp	1
*	1239754	Switch kit, top plate mount, 5 amp	1

** Not shown*

11.2 742/762/764 Controllers

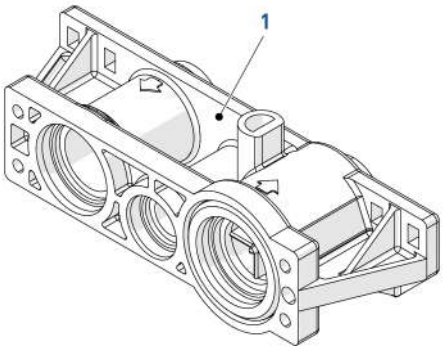




Item	Part number	Description	Assembly quantity
1	1242159	Logix 742 controller – picto Softening check salt diode visible	1
	1242151	Logix 742 controller – Picto Softening, check salt diode not visible	1
	1265830	Logix 762 controller - Picto Softening, check salt diode visible	1
	1265827	Logix 762 controller - Picto Softening, check salt diode not visible	1
	3022346	Logix 764 controller - Picto Softening, check salt diode not visible	1
*	1254886	Secondary faceplate	1
2	1000813	Transformer British plug	1
	1000814	Transformer European plug	1
*	3031845	Overlay picto, softening, metered, diode visible	1
*	3031844	Overlay picto, softening, metered, diode not visible	1
*	3031379	Overlay picto, softening, time clock, diode visible	1
*	3031378	Overlay picto, softening, time clock, diode not visible	1

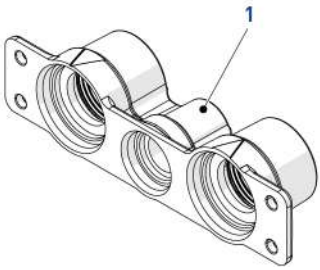
** Not shown*

11.3 Meter adapter



Item	Part number	Description	Package quantity
1	1032350	Meter adapter kit	1
2	1040524	Piping boss/meter install kit	1

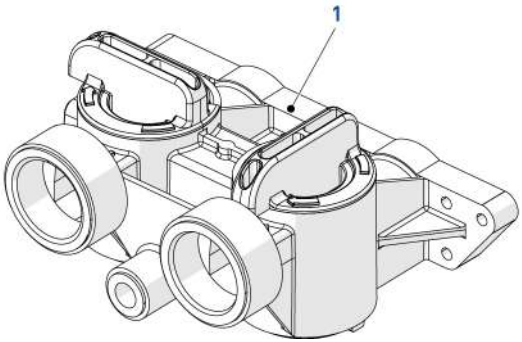
11.4 Piping boss (manifold)

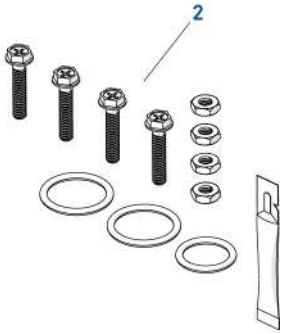


Item	Part number	Description	Assembly quantity
1	3023761	Piping boss 3/4" BSPT stainless steel 3/8" BSPT drain	1
*	3023747	Piping boss 1" BSPT stainless steel 1/2" BSPT drain	1
*	1040283	Piping boss 3/4" BSPT Noryl 1/2" BSPT drain	1
2	1040524	Piping boss/meter install kit	1
*	3028275	3/8" drain elbow for manifold	1
*	3028272	1/2" drain elbow for manifold	1
*	1036988	1/2" drain connector for manifold	1
*	1234255	Male plastic piping boss 1" BSP	1
*	1234256	Male plastic piping boss 3/4" BSP	1

** Not shown*

11.5 Bypass & connections

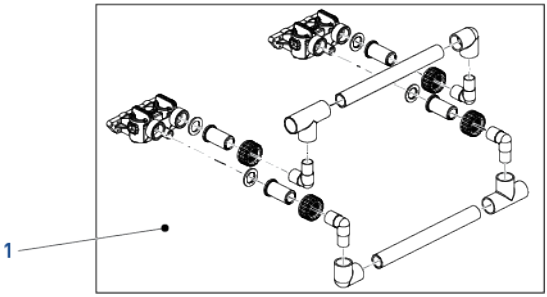


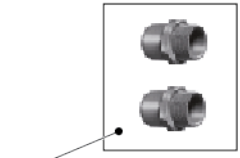


Item	Part number	Description	Package quantity
1	1040769	Bypass body assy (includes bypass installation kit)	1
2	1040524	Bypass installation kit	1
*	1034302	Bypass repair kit (rotor seals & clips)	1
*	3028264	Drain elbow for bypass 256	1
*	3023824	3/4" BSPT stainless steel pipe adapter kit	1
*	3023807	1" BSPT stainless steel pipe adapter kit	1
*	1001608	22 mm copper tube adapter kit	1
*	1001615	32 mm PVC tube adapter kit	1
*	1001614	1" PVC tube adapter kit	1
*	1001613	3/4" PVC tube adapter kit	
*	1030541	Gasket for 1" pipe or tube	2
*	1034385	Adapter nut 1 - 1 1/4" bakelite	2
*	1030540	Plumbing adapter 3/4" copper tube	2
*	1030545	Plumbing adapter 1" copper tube	2
*	3014557	Plumbing adapter for 1" NPT stainless steel	2
*	3013737	Plumbing adapter for 3/4" BSPT stainless steel (replaces 1030576)	2
*	1030574	Plumbing adapter for 22 mm copper tube	2
*	1030578	Plumbing adapter for 3/4" CPVC pipe	2
*	1030579	Plumbing adapter for 1" CPVC pipe	2
*	1000982	Plumbing adapter for 3/4" BSPT plastic male thread	2
*	1001422	Plumbing adapter for 1" BSPT plastic male thread	2

*Not shown

11.6 Interconnecting kit & connections

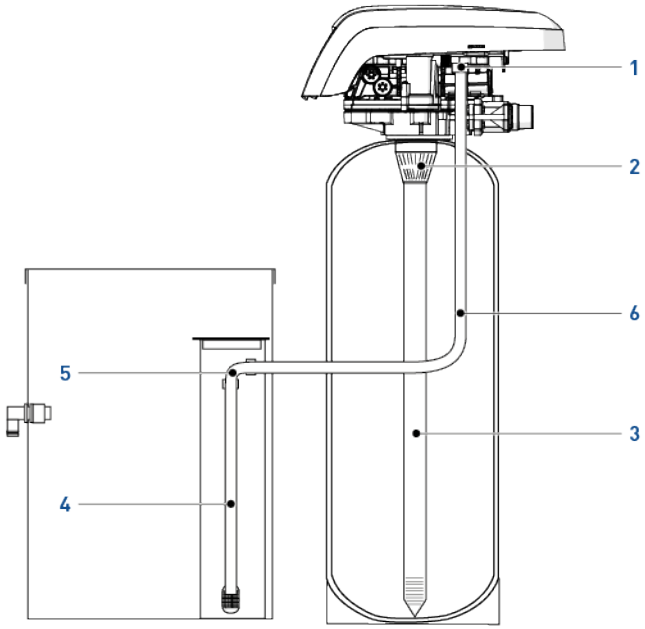




Item	Part number	Description	Package quantity
1	3019931-2532	Deluxe interconnecting kit 255 twin DN25 mm female 32 mm. Includes: - 2x bypass 256 (1040769); - 1x interconnecting piping elements; - 2x 32 mm PVC tube adapter kit (1001615)	1
*	1040769	Bypass body assembly (includes bypass installation kit)	1
*	1034302	Bypass repair kit (rotor seals & clips)	1
*	1001615	32 mm PVC tube adapter kit	1
*	3028264	Drain elbow for bypass 256	1
2	Kit-P10	Mounting kit (2 connections) DN 25/32 mm ext x 1" BSP	1

** Not shown*

11.7 Valve installation kits



Item	Part number	Description	Assembly quantity
*	3029815	Installation kit-255. Consists of E01240; 1009116; 3028263; 3020267; CC-D1203; MS-RI3460; AV090	1
1	E01240	Air check elbow (CA40) 1/4" FNPT- 3/8" T	1
2	1009116	Upper screen	1
3	3028263	Riser tube 1.050"	1
4	3028267	Brine tube 3/8" with screen	1
5	E01140	Union elbow 3/8" T - 3/8" T	1
6	E01480	Tubing 3/8" roll of 30 m	1

** Not shown*

12 Disposal

The device must be scrapped in accordance with directive 2012/19/EU or the environmental standards in force in the country of installation. The components included in the system must be separated and recycled in a waste recycling center that conforms with the legislation in force in the country of installation. This will help to reduce the impact on the environment, health, safety and help to promote recycling. Pentair does not collect used product for recycling. Contact your local recycling center for more information.

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