

Siata V132 - SFE



IMPORTANT SAFETY INSTRUCTIONS

Read and follow all instructions
Save these instructions

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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 Siata series, SFE 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 www.pentair.eu/product-finder/product-type/control-valves.

1.2. Release management

Revision	Date	Authors	Description
A	18.11.2016	STF/GPI	First edition.
B	19.04.2017	BRY/GPI	New chapter: Valve connection to piping.
C	28.05.2018	BRY/FLA	Address change, Bleam information and valve on tank assembly.
D	01.11.2019	STF	General corrections.
E	16.01.2023	BRY/FIM	Copyright, new cover, website and scan & service.

1.3. Manufacturer identifier, product

Manufacturer: Pentair International LLC
Avenue de Sevelin 20
1004 Lausanne
Switzerland

Product: Siata V132 - SFE

1.4. Intended use

The device is intended for residential, commercial or light industry environment (ref. EN 50081-1) use only and it is purpose-built for treatment and softening of water coming from supply network.

1.5. Abbreviations used

Assy.....	Assembly
BLFC	Brine Line Flow Controller
DF.....	Down Flow
DLFC	Drain Line Flow Controller
Inj	Injector
QC.....	Quick Connect
Regen.....	Regeneration
S&S	Seal & Spacer
SBV.....	Safety Brine Valve
TC	Time Clock

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;
- UNI EN ISO 9001.

Meets the following technical standards:

- EN 55014-1;
- EN 55014-2;
- EN 61000-3-2;
- EN 61000-3-3;
- EN 61000-6-1;
- EN 61000-6-2;
- EN 61000-6-3;
- EN 61000-6-4;
- EN 61010-1.

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:

- A** Collect the required information for a technical assistance request.
 - Product identification [see 2.2. Serial label location, page 10 and 9.3. Recommendations, page 65];
 - Problem description of the device.
- B** Please refer to the "Troubleshooting" chapter, page 81. If the problem persists contact your supplier.

1.8. Copyright

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.

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1.9. Limitation of liability

Pentair Quality System EMEA products benefit, under specific conditions, from a manufacturer warranty that may be invoked by Pentair 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 of profits, revenues, use, production, or contracts, or for any indirect, special or consequential loss or damage whatsoever. Please refer to the Pentair List Price to know more 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 an identification (ID) 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....

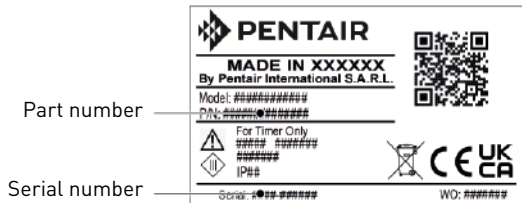
A Download the application Pentair Scan from  or  in a smartphone.



Mandatory

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

- B** Open the Pentair Scan application.
- C** 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.
- D** Navigate to find information.



2. Safety

2.1. Safety pictograms definition



Caution

Warns of a risk of minor injury or major material damage to the device or environment.



Warning

Warns against serious personal injury and damage to health.



Danger

Warns against serious personal injury or death.



Mandatory

Standard or measure to apply.



Note

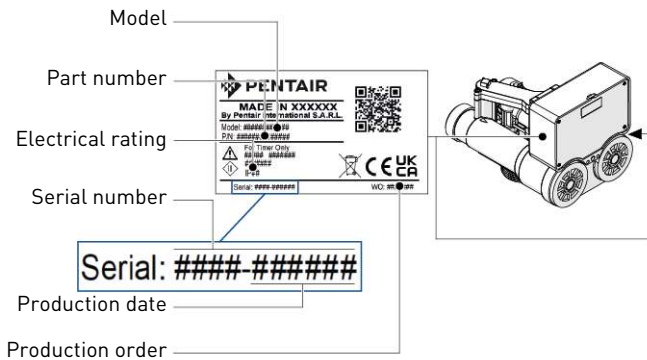
Comment



Prohibition

Restriction to be observed.

2.2. Serial label location



Note

Ensure that the serial label and the safety tags on the device are completely legible and clean. If necessary, replace them with new tags and put them in the same places.

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

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

The device must not be used by children aged under 8 years old or people with reduced physical, sensory or mental capabilities.

People with a lack of experience or without the necessary knowledge should not use the device.

Do not allow children to play with the device. Cleaning and maintenance intended to be performed by the user must not be performed by unsupervised children.

2.3.2. Material

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

- beware of high voltages present on the transformer (230V);
- 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 objects themselves.

Assembly

- Assemble only with components which are in accordance with water drinking 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.



Note

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.



Note

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 7.2. Sanitization, page 59;
- 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. Valve versions

3.1.1. Twin pilots

The pressure distributor pilot is mounted directly on top of the V132, in this case inlet water is the control fluid and feeds the pilot circuit from the top collector. A controller with a proper camshaft (called twin pilot camshaft) must be mounted on top of the valve and linked to the pilot stems. The rotation of the camshaft moves the stems of the pilots in/out the pilot circuit, deviating the control water inside the proper side of the V132 pressure chambers to move the pistons of the valve according to the various cycles/phases.

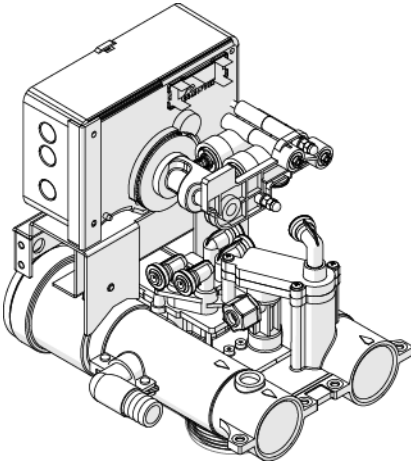
3.1.2. External connections

There are four quick connection ports on top of the valve, each port is linked to a pressure chamber inside the valve. The hydraulic distributor with pilots has to be mounted remotely from the valve, the pilot ports can be connected to valve ports with a diameter of 6 mm flexible tubing.

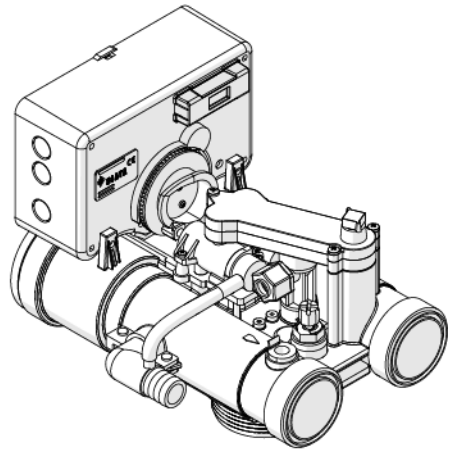
The remote camshaft can control up to 4 pilots hence more valves can be controlled with a single distributor. For this reason this configuration is generally used to:

- add outlet shut off pneumatic valve;
- add bypass during regeneration;
- control a valve in the suction line and make a timed brine draw.

External connections



Twin pilots



3.2. Technical specifications

Design specifications/ratings

Valve body	Glassfiber reinforced ABS
Rubber components	NBR
Valve material certification	DM174, ACS, KTW, W270
Weight (valve with controller)	2.5 kg (max.)
Recommended operating pressure	1.5 - 6 bar
Hydrostatic test pressure.....	22 bar
Water temperature.....	5 - 40°C
Maximum relative humidity.....	80% for temperatures up to 31 °C decreasing linearly to 50% relative humidity at 40°C;

Indoor use only

Flow rates (3.5 bar inlet - valve only)

Continuous ($\Delta p = 1$ bar)	7.0 m ³ /h
Cv*	8.09 gpm
Kv*	7 m ³ /h
Maximum backwash ($\Delta p = 1.8$ bar)	3.0 m ³ /h

*Cv: Flow rate in gpm across the valve at a pressure drop of 1 psi at 60°F.

*Kv: Flow rate in m³/h across the valve at a pressure drop of 1 bar at 16°C.

Valve connections

Tank Thread.....	2 1/2" 8 NPSM
Inlet/Outlet	Male 2" BSP or various QC fittings
Riser tube	32 mm
Drain line	20 mm
Brine line	3/8"

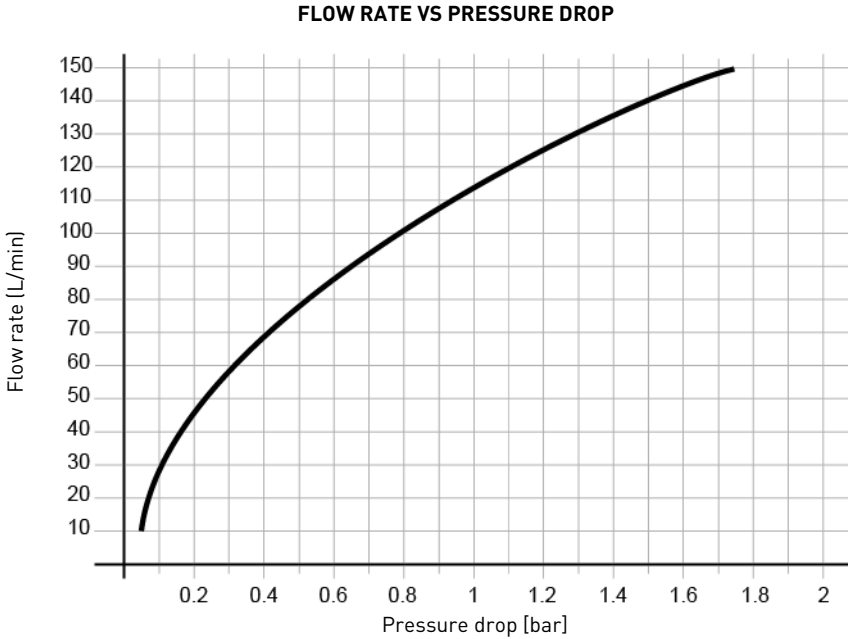
Electrical

Controller.....	12 VAC, 50/60 Hz, 4 W, Class III
Input supply frequency	50 or 60 Hz (controller configuration dependent)
Transformer*	230 VAC, 50/60 Hz, 11.5 VA, Class II
Motor input voltage.....	12 VAC
Protection rating.....	IP 30

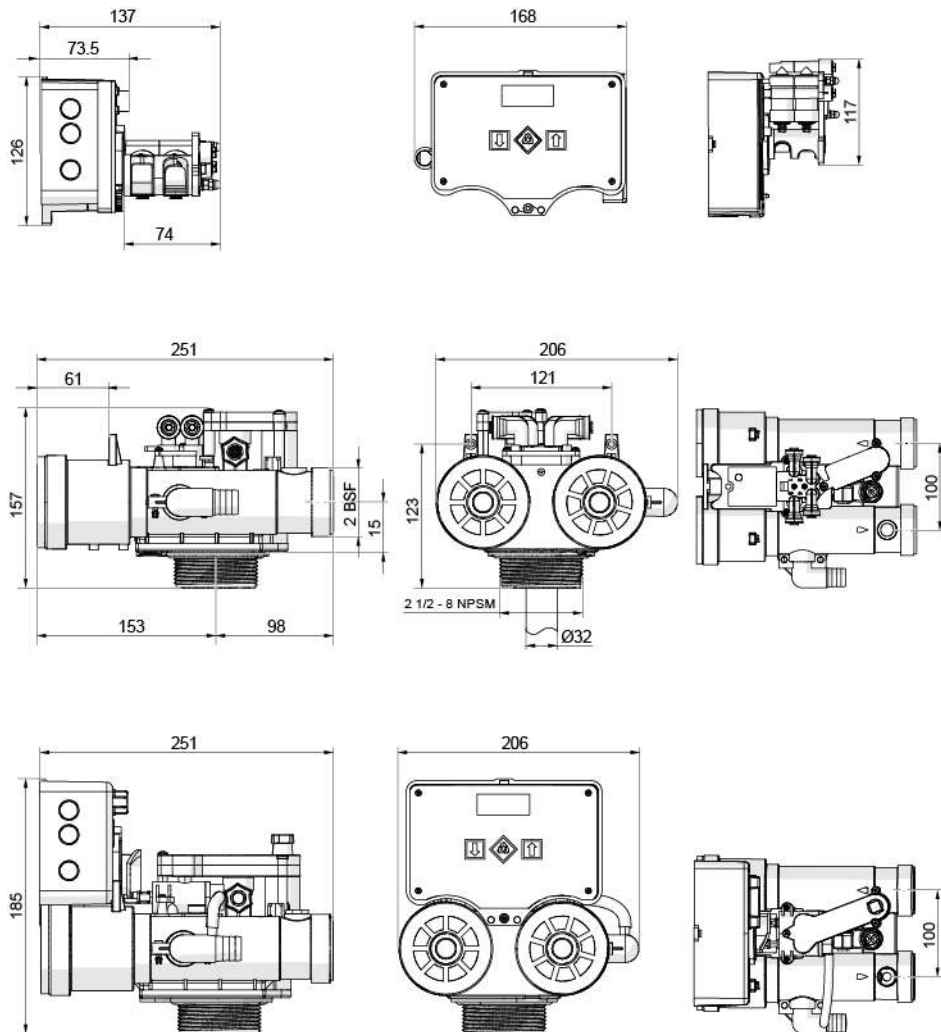
*: The device must only be used with the transformer provided in order to guarantee the safety voltage supply.

3.2.1. 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.

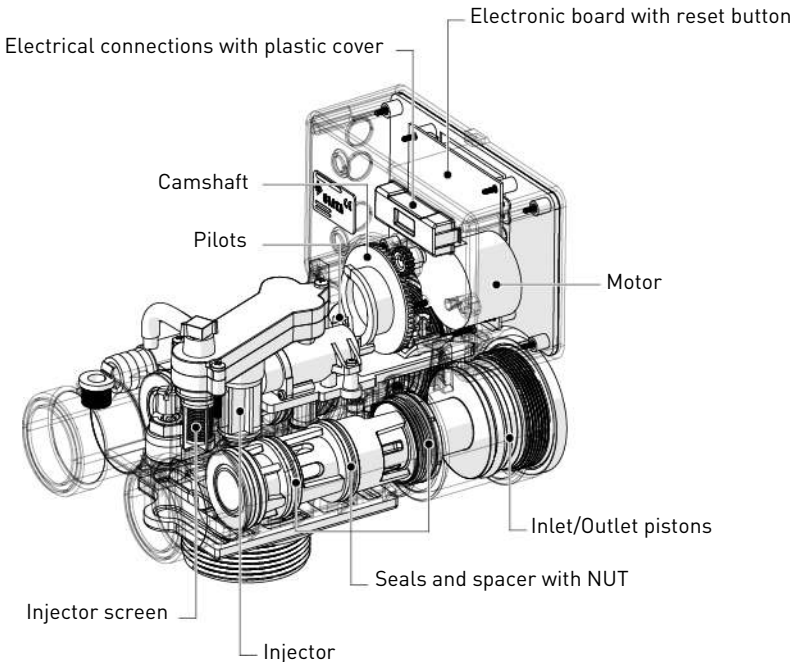
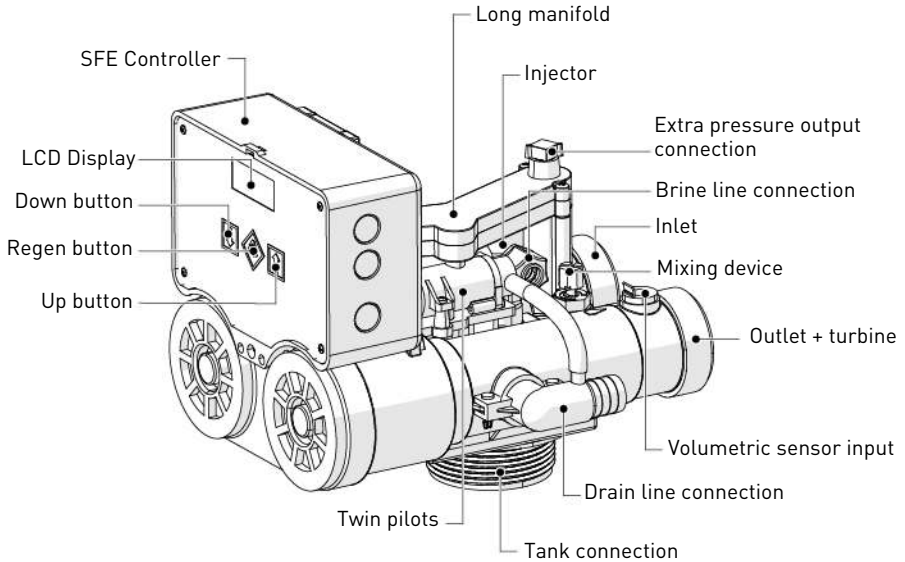


3.3. Outline drawing



3.4. Description and components location

3.4.1. Valve with twin pilots

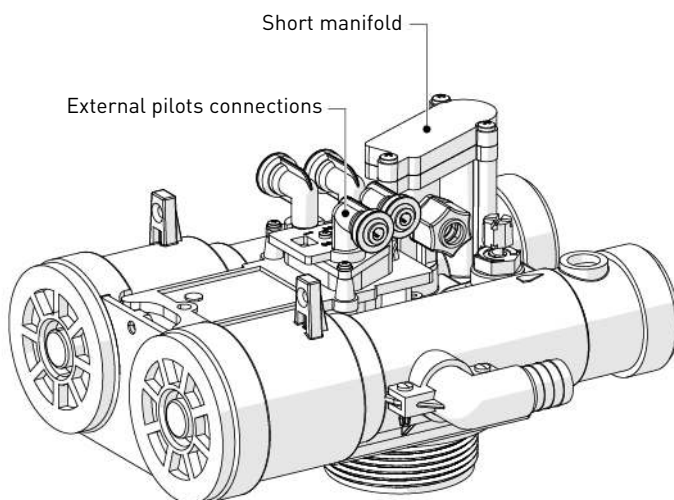
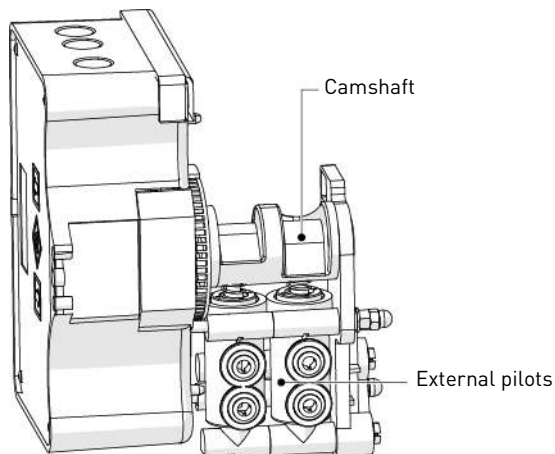


3.4.2. Valve with external pilots



Note

Only the components that differ from the twin pilots valve are described below. Refer to chapter 3.4.1. Valve with twin pilots, page 17 for more information.



3.5. System regeneration cycle (4-cycle operation)

Service — 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 towards sodium ions. The water is conditioned as it passes through the resin bed.

Backwash — 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 is flushed to the drain, while the media bed is remixed.

Brine draw— 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. Then the slow rinse phase starts.

Slow rinse — cycle C3

The slow rinse cycle allows the brine to be slowly pushed into the resin bed, enabling regeneration of the resin.

Fast rinse — cycle C4

The controller valve 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 recomacted.

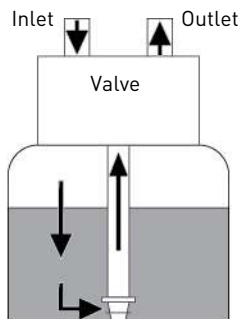
**Note**

After fast rinse cycle, water is directed to the brine tank to create brine for the next regeneration. But the brine refill cycle is not performed by the controller (this step is not included in the programmed cycles). See “Brine refill - cycle”, page 31.

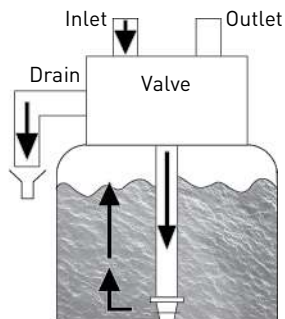
**Note**

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

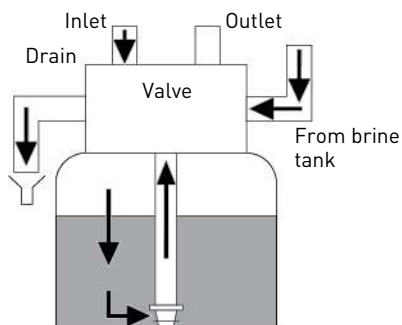
SERVICE
C0



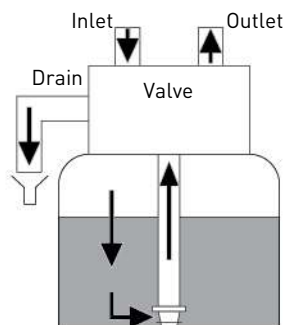
BACKWASH
C1



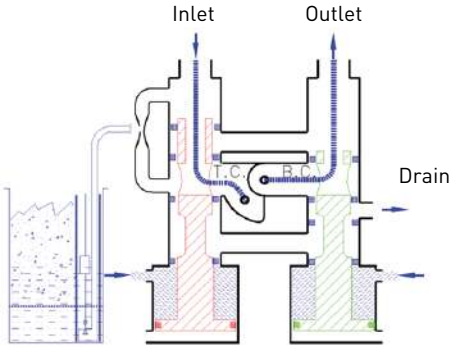
BRINE DRAW/SLOW RINSE
C2-C3



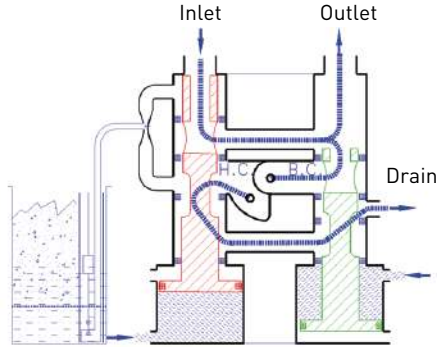
RAPID RINSE
C4



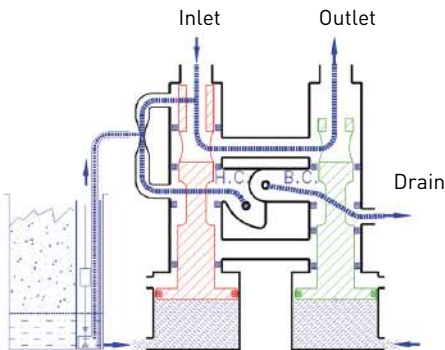
Service flow diagram



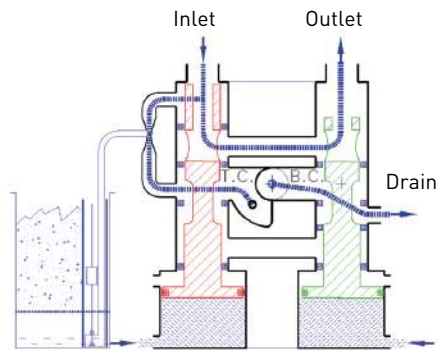
Backwash flow diagram



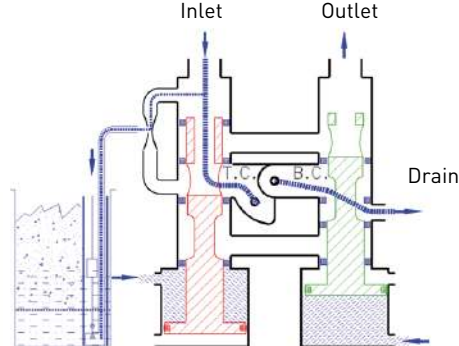
Brine draw diagram



Slow rinse diagram



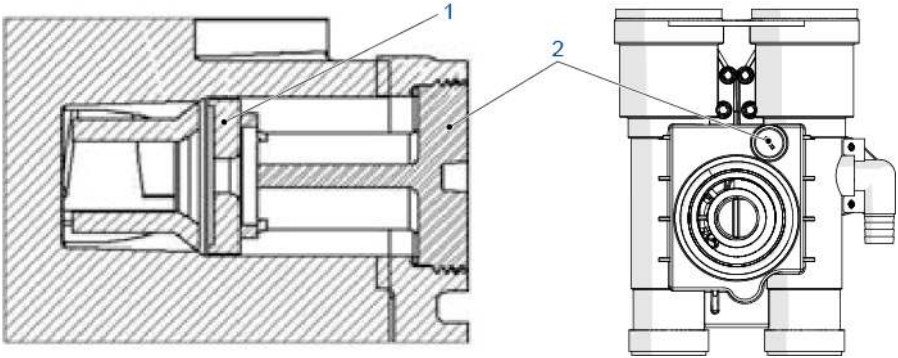
Fast rinse diagram



3.6. Options available on the valve

Backwash flow regulators

Backwash flow regulator (1) is positioned in the lower part of the valve. It is accessed by unscrewing protective cap (2).

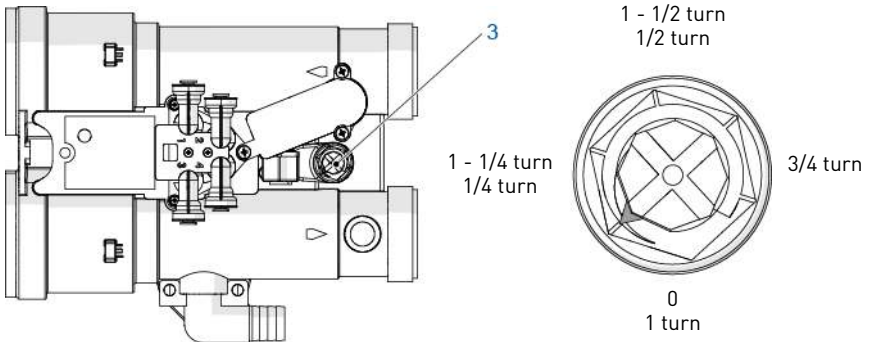


Valves equipped with this accessory are fitted with a flow control set offering the following maximum outputs:

Code	Max output		
	[gpm]	[L/min]	[L/h]
12085	1.2	4.5	272.5
12086	1.5	5.7	340.6
12088	2.4	9.1	545.0
12090	3.5	13.2	794.8
12092	5	18.9	1135.5

Mixing device

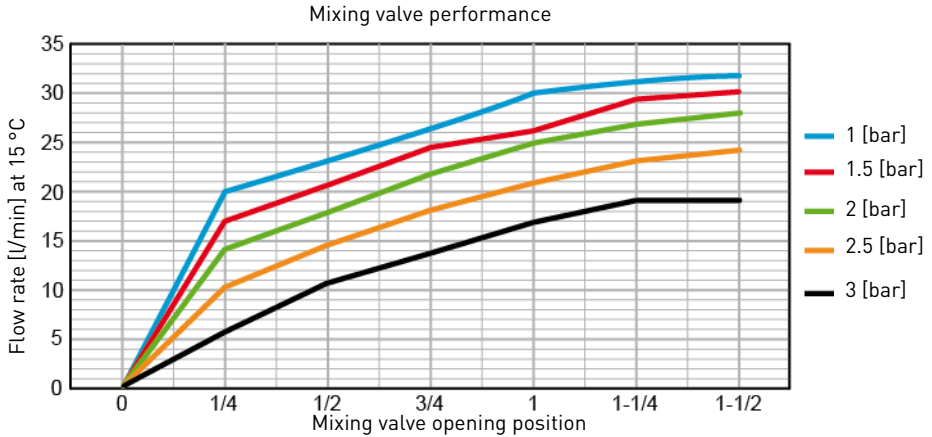
The valve can be equipped with a mixing device (3) whose function is to regulate the hardness of the water at the outlet.





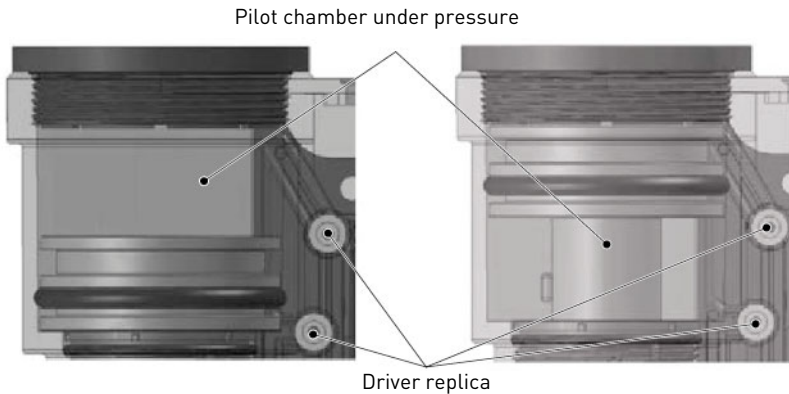
Note

There is no automatic bypass during a fast rinse cycle. But once the mixing device has been set, it connects the inlet and outlet of the valve.
So during the fast rinse phase with a mixing device, it is possible that a flow of untreated water flows into the outlet.



Additional hydraulic controls (driver replica)

The valve can be equipped with two pairs of connectors for duplicating the position of the hydraulic controls. In order to use the valve, which is delivered with this option, simply remove the blue plugs, at the bottom of the valve, to put a 6 mm flexible tube into the quick connections.



4. System sizing

4.1. Recommendations

4.1.1. Injector/DLFC/BLFC-Valve configuration

Tank diameter	Resin volume	Injector	DLFC		
[in]	L	DF	No. DLFC Washer	[l/h]	[gpm]
8	15	Brown	1	350	1.5
10	30	Blue	2	480	2.1
10	50	Blue	3	700	3.1
13	70	Red	4	950	4.2
14	100	Red	4	950	4.2
16	120	Black	5	1450	6.4
18	150	Black	5	1450	6.4

4.2. Sizing a softener (single unit)

4.2.1. Parameters to be considered

Whenever installing a softener, it is preferable to have full water analysis to ensure the inlet water content will not affect the resin bed.



Note

Please consult your resin manufacturer specifications to ensure that no additional pretreatment prior to softening is required.

The below sizing method can be applied for both residential and industrial softeners.

The sizing of a softener must be based upon certain parameters:

- inlet water hardness;
- peak flow rate and nominal flow rate;
- service velocity;
- salt dosage.

The softening and regeneration reactions are driven under certain conditions. To allow these reactions to take place, make sure that the velocity is convenient during the different phases for proper ion exchange. This velocity is given in the resin manufacturer specifications sheet.

Depending on the inlet water hardness, the service velocity for standard softening must be between:

Service velocity [bed volume per hour]	Inlet water hardness [mg/l as CaCO ₃]	°f °TH	°dH
8 - 40	<350	<35	<19.6
8 - 30	350 to 450	35 - 45	19.6 - 25.2
8 - 20	>450	>45	>25.2


Note

Failure to respect the service velocity will lead to hardness leakage or even total softener inefficiency.

Note that the water supply piping size may also be useful when estimating the nominal flow rate, since the size of the piping allows a maximum flow rate to pass. Assuming the maximum velocity of water in pipes is about 3 m/s, a good estimation for most common pressure [3 bar] and temperature [16°C] is:

Piping size (internal diameter)		Max. flow rate
[in]	[mm]	[m ³ /h at 3 m/s]
0.5	12	1.22
0.75	20	3.39
1	25	5.73
1.25	32	8.69
1.5	40	13.57
2.0	50	21.20
2.5	63	34.2
3.0	75	49.2

4.2.2. Determining the required volume of resin

When sizing a softener, make sure that the volume of resin in the tank (bed volume) will be sufficient so that even when the peak flow rate is reached, the velocity is still between the above values depending on the hardness. When sizing a softener, always choose the resin volume and tank size based on the peak flow rate but not on the nominal flow rate.


Note

Sizing on the nominal flow rate without taking the peak flow rate into account would result in choosing smaller tank size and resin volume, and may lead in severe hardness leakage during the service cycle when the peak flow is reached.

The maximum softened water flow rate that a softener can produce is given by the following formula:

$$Q_{\text{service max}} = F_{\text{service}} \times BV$$

with:
 $Q_{\text{service max}}$: service flow rate [m³/h]
 F_{service} : service velocity [BV/h]
 BV: bed volume of resin [m³]

Knowing this required volume of resin, it is possible now to determine the tank you need. Note that at least a third of the total volume of the tank must be kept as free space so that the bed expansion during backwash is sufficient to ensure correct cleaning of the resin.

4.2.3. Resin exchange capacity and capacity of the unit

The resin exchange capacity and capacity of the unit are two different things that should not be confused. The resin exchange capacity is the amount of Ca²⁺ and Mg²⁺ that can be retained by 1 litre of resin, which will depend on the resin type and salt dosage, whereas the capacity of the unit is the capacity of the system, which will depend on the volume of resin and resin exchange capacity.

Knowing the required volume of resin, you can determine the exchange capacity of the unit. The capacity of the unit can be expressed in different ways:

- the mass capacity, which corresponds to the weight in equivalent CaCO₃ that can be fixed on the resin, expressed in kg as CaCO₃;
- the volume capacity, which represents the maximum amount of water that can be treated between two regenerations. This last capacity takes into account the hardness of the water to be treated and is expressed in m³ or litres;
- the combined capacity, which represents the volume of water that could be treated between two regenerations if the inlet hardness is 1 °f or °dH. This capacity is expressed in °f.m³ or °dH.m³.

The resin exchange capacity will depend on the amount of salt to be injected into the resin bed during the regeneration. This amount of salt is given in grams per litre of resin. The next table is showing the resin exchange capacity in function of the amount of salt for a system with standard efficiency regeneration.

Resin exchange capacity as a function of the salt dosage:

Salt amount [g/L _{resin}]	Corresponding resin exchange capacity in [g/L _{resin}] as CaCO ₃	°f.m ³ [per L _{resin}]	°dH.m ³ [per L _{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

Salt amount [g/L _{resin}]	Corresponding resin exchange capacity in [g/L _{resin}] as CaCO ₃	°f.m ³ [per L _{resin}]	°dH.m ³ [per L _{resin}]
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

To calculate the system mass capacity:

$$M_{\text{capacity}} = V_{\text{resin}} \times C_{\text{resin ex}}$$

with:

 M_{capacity} : system mass capacity [g as CaCO₃]

 V_{resin} : volume of resin [L]

 $C_{\text{resin ex}}$: resin exchange capacity [g/L_{resin} as CaCO₃]

To calculate the system combined capacity:

$$C_{\text{capacity}} = V_{\text{resin}} \times C_{\text{cor resin ex}}$$

with:

 C_{capacity} : system combined capacity [°f.m³ or °dH.m³]

 V_{resin} : volume of resin [L]

 $C_{\text{cor resin ex}}$: corresponding resin exchange capacity
[°f.m³/l or °dH.m³/l]

To calculate the system volume capacity:

$$V_{\text{capacity}} = M_{\text{capacity}} / TH_{\text{inlet}}$$

or

$$V_{\text{capacity}} = C_{\text{capacity}} / TH_{\text{inlet}}$$

with:

 V_{capacity} : system volume capacity [m³]

 M_{capacity} : system mass capacity [g as CaCO₃]

 C_{capacity} : system combined capacity [°f.m³ or °dH.m³]

 TH_{inlet} : inlet water hardness [mg/L as CaCO₃ or °f or °dH]

Caution

 If a mixing device is set on the valve before meter, $TH = TH_{\text{inlet}} - TH_{\text{outlet}}$.

Having determined the previous capacity allows the operator to know the service cycle duration.

4.2.4. Valve configuration

Knowing the volume of resin, tank size and specifications of the resin, it is possible to determine the required valve configuration. The resin specification will give the backwash velocity, as well as the brine draw and slow rinse velocity that must be respected in order to ensure a proper regeneration of the unit. From this data, determine the required backwash flow rate as well as the brine draw and slow rinse flow rate. In most cases, the fast rinse flow rate will be the same as the backwash flow rate, however for certain valve types the fast rinse flow rate will be the same as the service flow rate.

To determine the backwash flow rate:

$$Q_{\text{backwash}} = F_{\text{Sbackwash}} \times S$$

with:
 Q_{backwash} : backwash flow rate [m³/h]
 $F_{\text{Sbackwash}}$: backwash velocity [m/h]
 S : Tank_{cross section area} [m²]

The DLFC installed on the valve has to limit the backwash flow rate to the above calculated flow rate.

To determine the injector size:

The velocities to be respected for brine draw and slow rinse are given on the resin manufacturer specifications. Generally speaking, the injector has to allow a flow rate of about 4 BV/h (corresponding to the flow rate of brine being drawn added to the flow rate of raw water passing through the injector nozzle to create the suction effect).

$$Q_{\text{Inj}} = 4 \times \text{BV} / \text{h}$$

with:
 Q_{inj} : total flow rate passing through the injector [L/h]
 BV: bed volume of resin [L]



Note

This value does not correspond to the brine draw flow rate but to the total flow rate passing through the injector. Then refer to the injector diagrams at the inlet pressure in order to check if the injector will give a correct flow rate. See chapter 4.3. Salt amount definition, page 31 and 4.4. Injector flow rates (tables), page 32.

4.2.5. Cycle time calculation

From this point, the volume of resin, the tank size, the capacity of the softener and the valve configuration are determined. Next step is to calculate the regeneration cycle duration, which depends on the valve configuration and once again on the resin specifications.



Note

Preprogrammed cycle times are only factory default programming that need to be adjusted to fit the system requirements.

For cycle time calculation the valve configuration must be known, which depends on:

- the tank size;
- the resin specifications for the velocity for backwashing the resin bed;
- the velocity of water for brine draw, slow rinse and fast rinse.

Further information needed for cycle time calculation are:

- the resin volume previously determined;
- the salt amount used per regeneration;
- the volume of water to use for backwash, brine draw, slow rinse and fast rinse.

To calculate the backwash duration:

$$T_{\text{backwash}} = (N_{\text{BVbw}} \times \text{BV}) / Q_{\text{DLFC}}$$

with:

T_{backwash} : backwash duration [min]

N_{BVbw} : number of bed volume for backwash

BV: bed volume [L]

Q_{DLFC} : drain line flow controller size [L/min]



Note

The typical value of the volume of water to be used for backwash is between 1.5 and 4 times the bed volume, depending on the inlet water quality.

To calculate the brine draw duration:

Knowing the injector draw flow rate at the working pressure:

$$T_{\text{brine draw}} = V_{\text{brine}} / Q_{\text{draw}}$$

with:
 $T_{\text{brine draw}}$: brine draw duration [min]
 V_{brine} : brine volume to be drawn [L], see Refill calculation page 31
 Q_{draw} : injection draw flow rate [L/min]



Note

Multiply the amount of salt in kg by 3 to get a approximation of the brine volume to draw.

To calculate slow rinse duration:

The volume of water to be used for slow rinse is given in the resin manufacturers specifications. Generally speaking, it is advised that between 2 and 4 BV of water is used to perform the slow rinse after brine draw. The slow rinse cycle allows brine to be pushed slowly through the resin bed, allowing the resin to be in contact with brine for sufficient time and therefore to be regenerated.

Refer to the injector curve at the common working pressure to determine the slow rinse duration.

$$T_{\text{slow rinse}} = (N_{\text{BVsr}} \times \text{BV}) / Q_{\text{SR}}$$

with:
 $T_{\text{slow rinse}}$: slow rinse duration [min]
 N_{BVsr} : number of bed volume for slow rinse
 BV: bed volume [L]
 Q_{SR} : injector slow rinse flow rate [L/min]

To calculate fast rinse duration:

The fast rinse is aimed at eliminating an excess of salt in the resin bed and also recompacting the resin in the tank.

Depending on the valve type, the fast rinse flow rate is controlled by the DLFC or it has about the same flow rate as in service. The fast rinse velocity can be the same as the service velocity, and the volume of water to be used for the fast rinse is generally between 1 and 10 BV depending on the salt dosage.

$$T_{\text{fast rinse}} = (N_{\text{BVfr}} \times \text{BV}) / Q_{\text{DLFC}}$$

with:
 $T_{\text{fast rinse}}$: fast rinse duration [min]
 N_{BVfr} : number of bed volume for fast rinse
 BV: bed volume [L]
 Q_{DLFC} : drain line flow controller size [L/min]

4.2.6. Brine refill - cycle

After fast rinse cycle, water is directed to the brine tank at the rate of the safety brine valve to create brine for the next regeneration. But the brine refill cycle is not performed by the controller (this step is not included in the programmed cycles).

Example of configuration:

- Safety brine valve rate: 1l/min;
- with a 50L softening;
- with a salt setting of 150 g/L for regeneration.

Calculate the amount of water and salt required:

$(150 \times 100)/1000 = 15\text{kg}$ of salt;

$15/0.375 = 40\text{L}$ of water.

Fill the brine tank to the AC level.

Put 40 liters of water and at least 15 kg of salt in the brine tank.

Use a pencil to mark the level of mixed water and salt in the brine tank and set the floater to that level. See "Block diagram and configuration example", page 37.

**Note**

Please also refer to chapter "Start up procedure", page 58 for additional information.

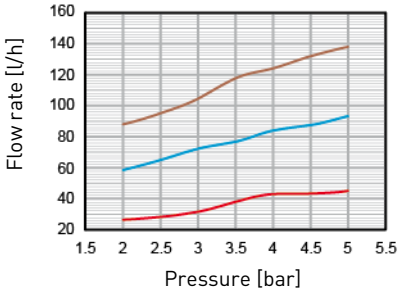
4.3. Salt amount definition

The salt setting is done through the controller programming.

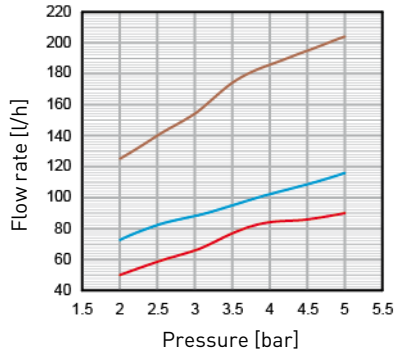
4.4. Injector flow rates (tables)

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

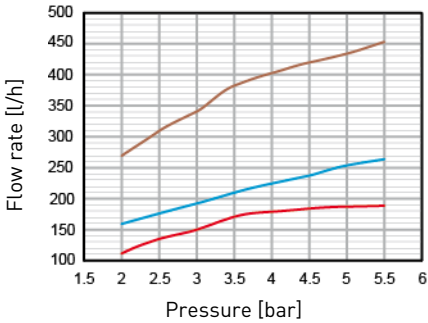
Brown injector performance



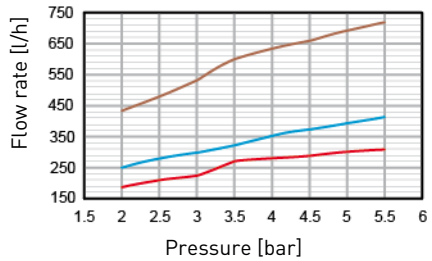
Blue injector performance



Red injector performance



Black injector performance



- Brine draw
- Slow rinse
- Regeneration

5. Installation



Caution

It is strictly forbidden for non-qualified persons to access the system's internal components in order to perform any kind of technical operation.

5.1. Warnings

The manufacturer will not be held liable for any damage or injury to persons or property resulting from improper use of the device, or use not in line with the following instructions.

Should this guide leave any doubt concerning installation, service or maintenance, please contact the technical support of the company that installed the device.

Device installation must be done by a qualified technician according to the current standards and regulations, using tools compliant with the device for a safe use and referring to that technician also for device maintenance.

In the event of breakdowns or malfunctions, before performing any kind of action on the device, make sure the transformer is disconnected from the power source, the water supply to the valve inlet shut off and the water pressure drained by opening a tap downstream of the valve.

5.2. Safety notices for installation

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

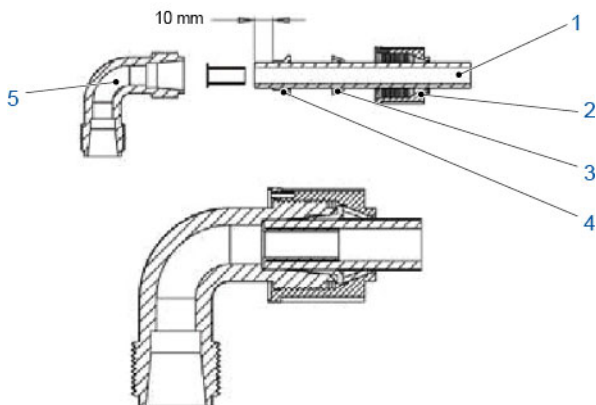
5.3. Installation environment

5.3.1. Tips and suggestions

Connection of pipes and fittings

Where 3/8" GAS rigid pipes or hoses are used in connections between pipes and fittings (diameter of approximately 9.7 mm), take care to respect the pipe dimensions. Pipes of a smaller diameter do not guarantee a pressure/vacuum seal. Pipes of a larger diameter, conversely, must be forced into their housing and this adversely affects the installation of retaining rings **(3)** and **(4)** resulting in a poor seal.

When working on fittings that are already installed, always replace retaining rings **(3)** and **(4)** 65-AC and 65-AA with equivalent new parts. When installing, ensure that the end of pipe **(1)** fully enters the housing of fitting **(5)** to ensure maximum grip. If a flexible tube is used, tighten pipe collar **(2)** thoroughly by hand. If a rigid pipe is used, tighten ring **(2)** using a wrench.



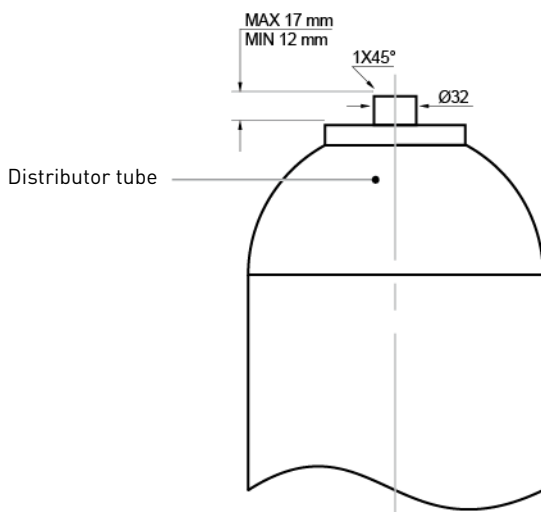
Length of connection pipes between valve and lower distribution system

The connection pipe must be cut between 12 to 17 mm, measured from the upper edge of the tank. Remove the sharp edges (1 mm x 45°) to avoid damage to the seal during installation. See drawing below.



Note

The connection pipe between the valve and the lower distribution system is ISO PN 6 standard : Minimum height 12 mm;
 Maximum height 17 mm;
 Chamfer 1 mm x 45°;
 ISO PN6 pipe.



5.3.2. General

- Use only brine salts designed for water softening. Do not use ice melt salt, block, or rock salts;
- keep the media tank in the upright position. Do not turn on its side, upside down, or drop. Turning the tank upside down may cause media to enter the valve or might plug 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 media tank, first place the control valve in backwash position, then do not open water valve completely. Fill tank slowly to prevent media from exiting the tank;
- when installing the water connection (bypass or manifold) connect to the plumbing system first. 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.

5.3.3. Water

- A minimum of 1.5 bar of water pressure is required for the regeneration valve to operate effectively. Do not exceed 6 bar; if this is the case, you should install a pressure regulator upstream of the system;
- the water temperature must not exceed 40 °C;
- the unit must not be subjected to freezing conditions.

5.3.4. Electrical

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

- All electrical connections must be completed according to local codes;
- an uninterrupted current supply is required. Please make sure that your voltage supply is compatible with your unit before installation. If the electrical cable is damaged, it must be replaced by a qualified personal;
- only use the AC power transformer supplied;



Mandatory

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

- the power outlet must be grounded;
- to disconnect the power, unplug the AC transformer from its power source.

5.3.5. Mechanical

- Do not use PTFE (plumber's tape) lubricants such as vaseline, oils, or hydrocarbon-based lubricants. Use only 100% silicone lubricants;
- 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;
- all plumbing must be completed according to local codes;
- 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;
- observe the drain line requirements:
maximum 1 m high at 2 bars inlet pressure. Add 50 cm for each additional 1 bar inlet pressure;
- do not use lead-based solder for sweat solder connections;
- the drain line must be a minimum of 12.7 mm (1/2") in diameter. Use 19 mm (3/4") pipe if the backwash flow rate is greater than 26.5 lpm or the pipe length is greater than 6 m;
- 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 2" BSP or in any other threaded connection in the valve.

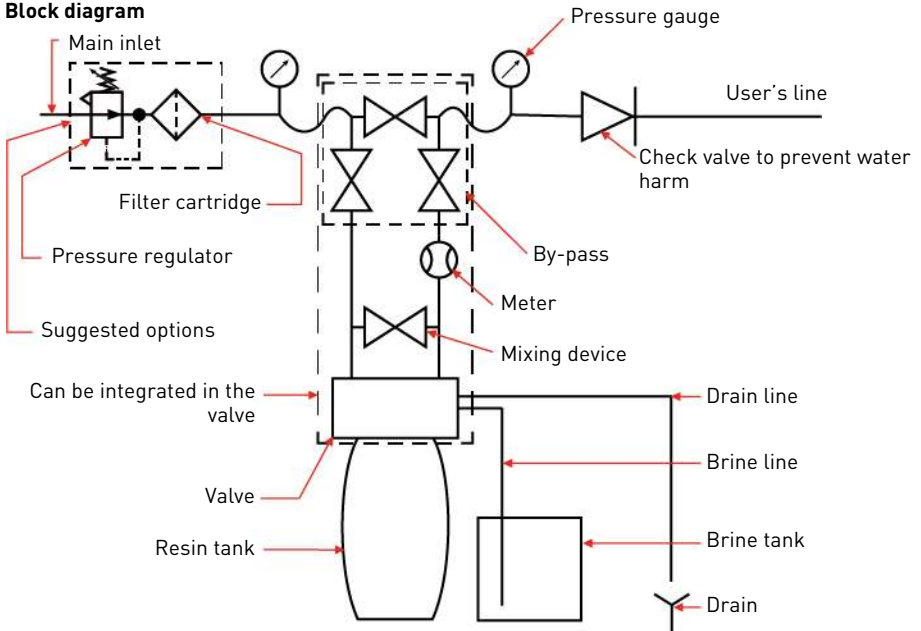
5.3.6. Integration constraints

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

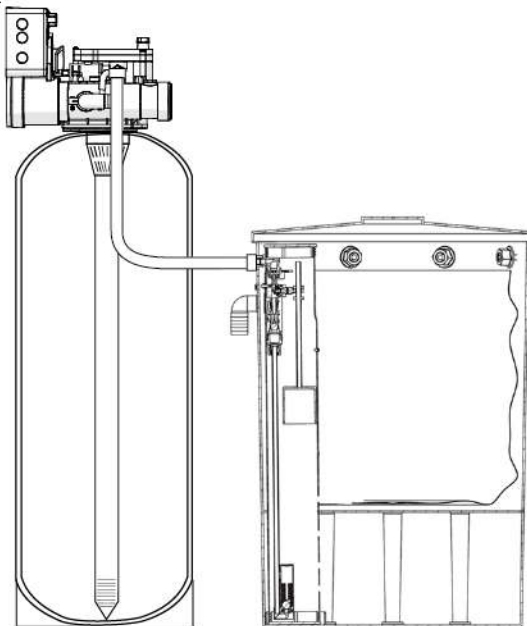
- level platform or floor;
- room to access equipment for maintenance and adding brine (salt) to tank;
- total minimum pipe run to water heater of 3 m to prevent backup of hot water into system;
- always install a check valve to protect the softener from hot water return;
- local drain for discharge as close as possible;
- water line connections with shut off or bypass valves;
- must meet any local and state codes for the installation site;
- the valve is designed for minor plumbing misalignments. Do not support the weight of the system on the plumbing;
- make sure all soldered pipes are fully cooled before attaching plastic valves to the plumbing;
- the existing plumbing should be in a good condition and free from limescale. If in doubt, replace it. The installation of a pre-filter is always advised.

5.4. Block diagram and configuration example

Block diagram

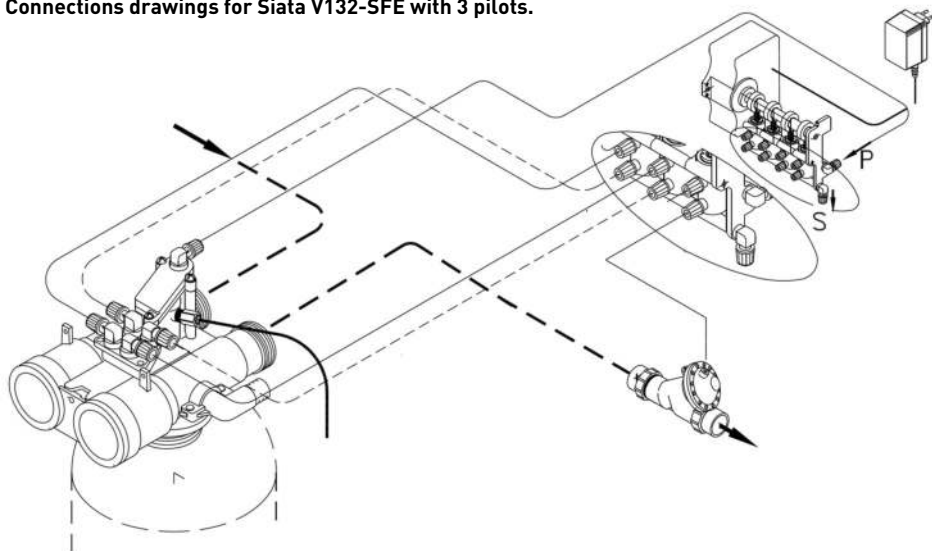


Configuration example

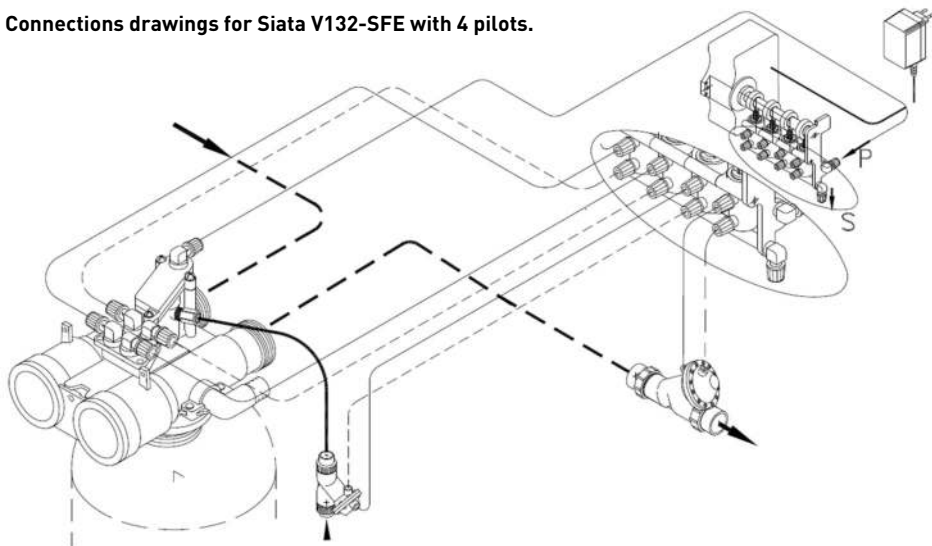


5.5. Diagrams of softening systems and connections

Connections drawings for Siata V132-SFE with 3 pilots.

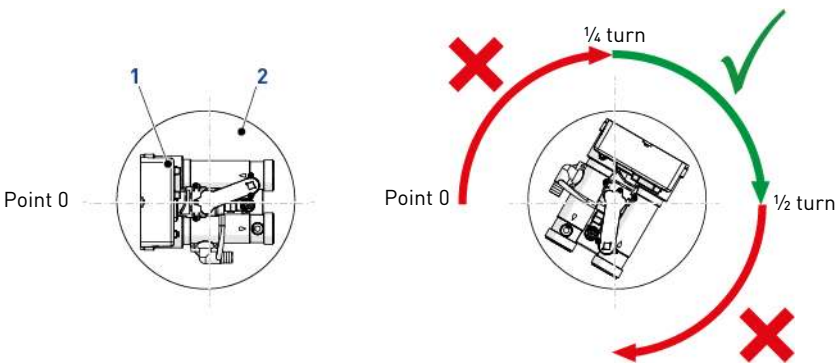


Connections drawings for Siata V132-SFE with 4 pilots.



5.6. Valve on tank assembly

No.	Operation
A	Lubricate the seals with approved silicone grease.
B	Spin the valve (1) onto the tank (2), ensuring the threads are not cross-threaded.
C	Rotate the valve (1) clockwise and freely, without using force until it comes to a stop.
i	Note This stop position is considered point zero.
D	Rotate the valve (1) clockwise from point zero to between ¼ turn and ½ turn.
!	Caution Do NOT exceed 27 Nm of torque when installing the valve. Exceeding this limit may damage the threads and cause failure.



5.7. 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.



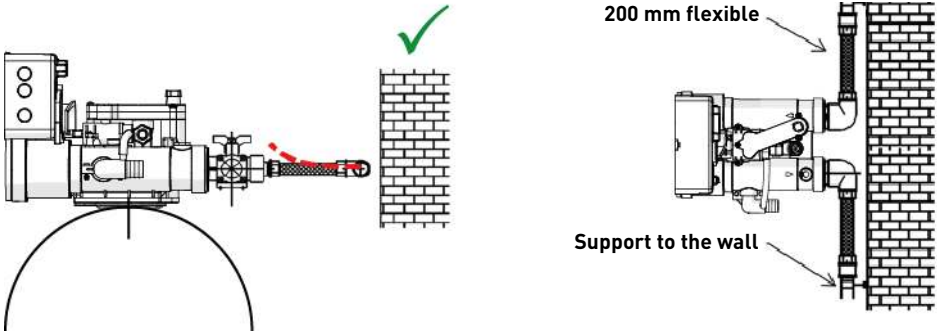
Note

See chapter 3.4. Description and components location, page 17 to identify the connections.

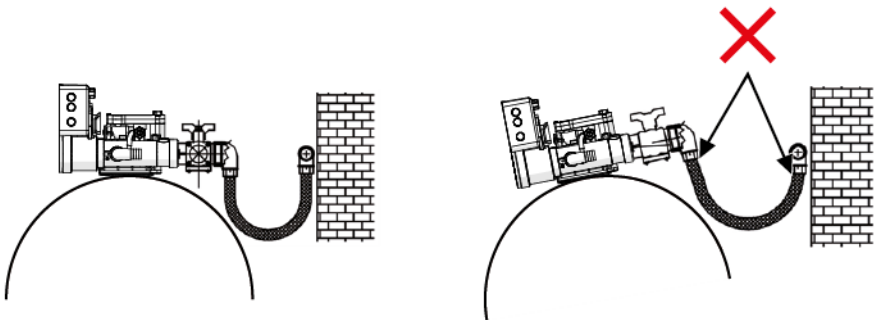
5.7.1. Top-mounted valve installation

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.

In addition, 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.



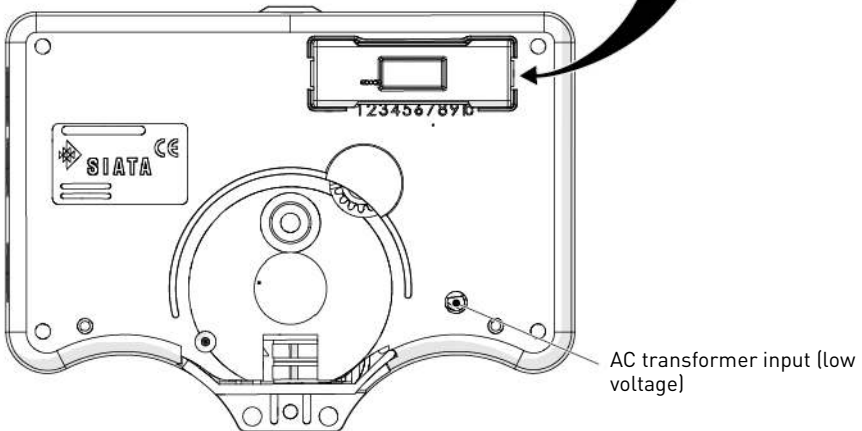
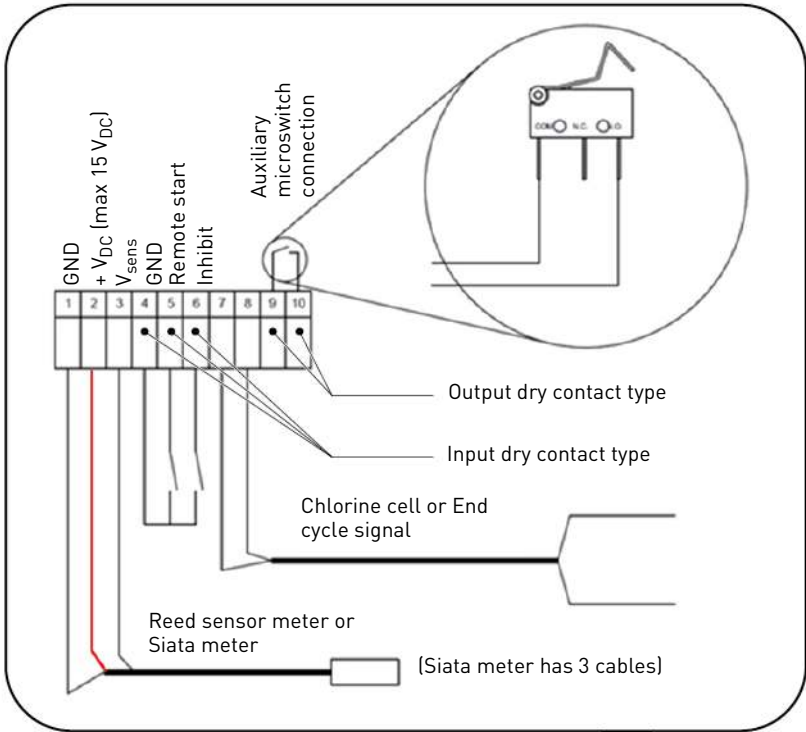
- The diagrams above illustrate how the flexible piping connection should be mounted;
- in order to adequately compensate the tank elongation the flexible tubes must be installed horizontally;
- should the flexible piping connection be installed in vertical position, instead of compensating the elongation, it will create additional stresses on the valve & tank assembly. Therefore this is to be avoided;
- the flexible piping connection must be 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 connects to the tank, or on the female thread connection of the tank that connects to the valve. In some cases, damage may also be seen on the valve inlet and outlet connections;



- in any case, any failure caused by improper installation and/or piping connections may void the warranty of Pentair products;
- in the same way, using lubricant* 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 (especially Noryl) will highly suffer from contact with this type of grease, leading into structural damage hence to potential failures.

5.8. Connections (electrical)



5.9. Bypassing

A bypass valve system has to 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 the system to be bypassed.



Caution

Do not solder pipes with lead-based solder.



Caution

Do not use tools to tighten plastic fittings. Over time, stress may break the connections.



Caution

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



Note

Always provide a bypass valve for the installation, if the unit is not equipped with one.

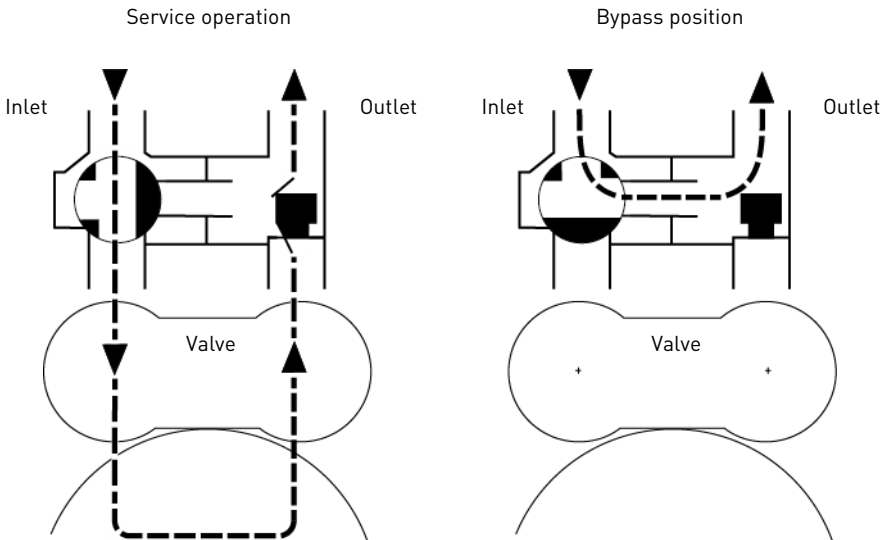


Note

Depending on the system configuration, several types of bypass are possible.

5.9.1. Manual Bypass

The manual bypass is used simply to disconnect valve or the entire water treatment system without causing a break in the supply of water. During service it provides a perfect seal between inlet and outlet to prevent mixing between raw water and treated water.

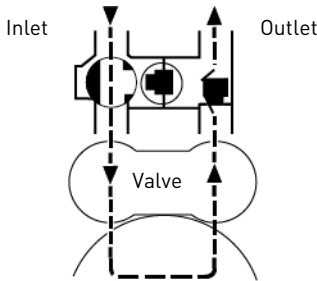


5.9.2. Automatic Bypass

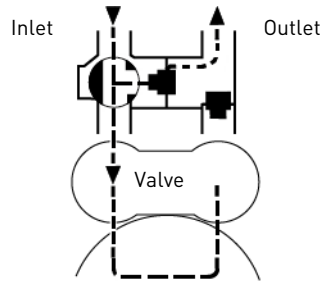
The automatic proportional bypass accessory enhances the system with following functions when fitted upstream of the water treatment system:

- supply of untreated water during regeneration cycle 4C. In this cycle the valve does not provide hard water bypass during the regeneration;
- if there is a temporary increase of the water consumption the pressure drop inside the valve and through the resin bed increases substantially. In this situation, due to the differential pressure that has been created from inlet and outlet sides of the bypass, the automatic bypass valve opens to balance the outlet pressure with the inlet pressure ensuring a higher flow rate at the outlet. But of course in that case an intermediate hardness is obtained during part of the service cycle;
- disconnection of the valve or the entire water treatment system without causing a break in the supply of water. In that case only raw water is available for the user.

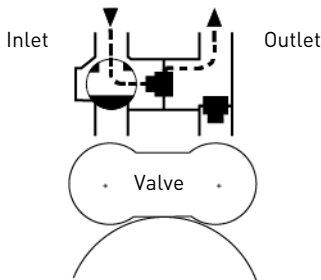
Service operation



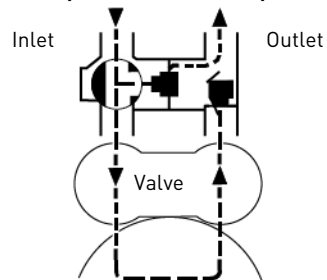
Regeneration. Automatic valve open for raw water bypass



Bypass position



Service operation with high pressure drop (automatic valve open)



5.10. Drain line connection



Note

Standard commercial practices are expressed here. Local codes may require changes to the following suggestions. Check with local authorities before installing a system.



Caution

Do not over tighten the hose tightening ring on its plastic support.

The unit should not be more than 6.1 m from the drain. Use a 22 mm hose tube.

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.

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.



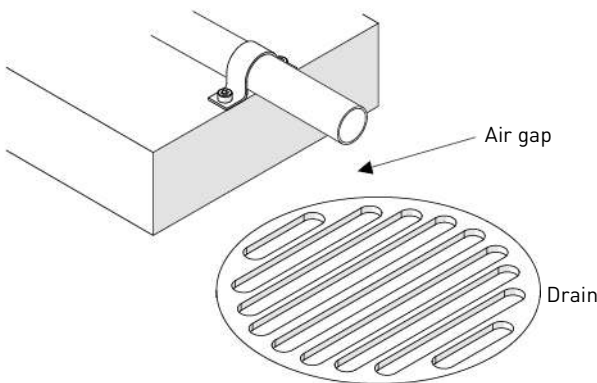
Note

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

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



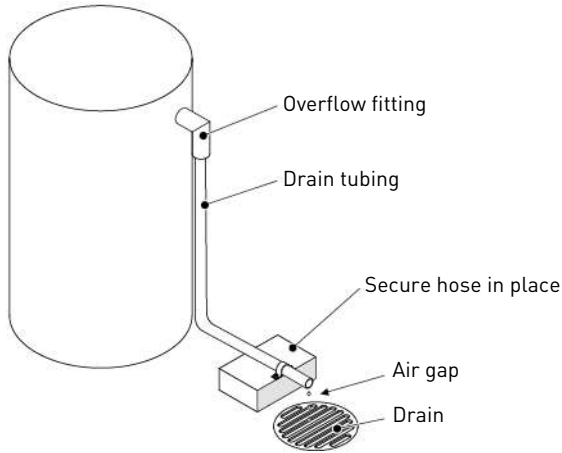
5.11. Overflow line connection

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 cabinet or brine tank. Most tank manufacturers include a post for the tank overflow connector.

To connect the overflow line, locate the hole on side of tank. Insert overflow fitting into tank and tighten with plastic thumb nut and gasket as shown below. Attach a length of 12.7 mm (1/2") I.D. tubing (not supplied) to fitting and run to drain.

Do not elevate overflow higher than overflow fitting.

Do not tie into drain line of controller unit. 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

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

5.12. 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 utilize a tank check valve.

5.13. Chlorinator

The chlorinator is able to carry out automatic sterilisation of the resin during regeneration. To perform this function, the valve must naturally be equipped with a controller able to manage the SIATA range of chlorinators. The controller supplies power to the electrolytic cell during the regeneration cycle to produce an appropriate quantity of chlorine by electrolysis of the brine, which is necessary for the sterilisation of the resins.

6. Programming

6.1. General information

- In battery-operated mode, regeneration is not carried out and the parameters cannot be edited;
- the SFE controller allows you to manage your installation via clock control or volumetric control. The controller will automatically initiate regenerations cycles based upon the programmed regeneration mode and the programmed parameters;
- the SFE controller offers the possibility to manually start regeneration simply by pressing the regeneration button, as well as initiate a regeneration from an external signal;
- the controller is able to receive an external signal for inhibition of regeneration cycles, that will block any regeneration start as long as the inhibit signal is received by the controller;
- the SFE controller can manage a chlorine production cell that will be activated during the brine draw cycle of the regeneration.



Note

- The SFE controller is available with 2 different electronic boards:
- Standard 7930-23: this board allows to program a dry contact relay.
 - Chlorine cell control 7930-24: this board allows to drive a chlorine producer.
- Both electronic boards are delivered with the same software.

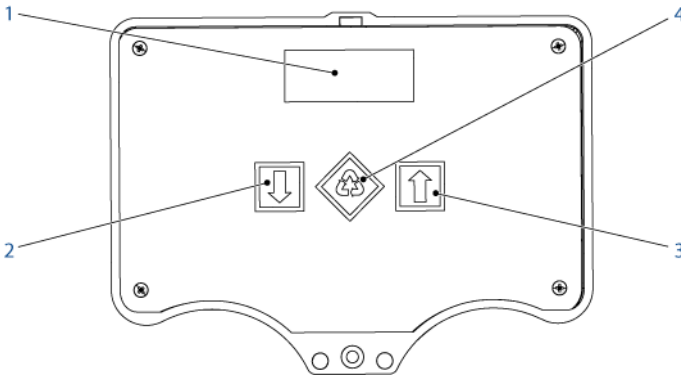
6.2. Display






- | | |
|-----------------------------|--|
| 1. Power supply status icon | → Enabled: lack of mains supply and storage of the programming data to the memory;
→ Disabled: power supply and storage of the programming data to the memory are OK. |
| 2. Regeneration icon | → Flashes in programming mode;
→ Flashes during brining;
→ Appears during regeneration. |
| 3. Service status icon | → Appears when valve in service. |

- 4. Days of the week
 - M0: Monday;
 - TU: Tuesday;
 - WE: Wednesday;
 - TH: Thursday;
 - FR: Friday;
 - SA: Saturday;
 - SU: Sunday;
 - Flashing if regeneration is enabled for that day.
- 5. AM/PM indicator
 - AM: 0h01 to 12h00;
 - PM: 12h01 to 24h00.
- 6. Parameter display
 - Clock;
 - Remaining volume capacity.

6.3. Commands




- 1. Display
 - Used to show informations, see 6.2. Display, page 46.
- 2.  - Down arrow
 - Edit the displayed value during programming steps;
 - Reset salt alarm count down.
- 3.  - Up arrow
 - Edit the displayed value during programming steps;
 - Enter diagnostic mode.
- 4.  - Regenerate
 - Start an immediate regeneration;
 - Cancel a manual regeneration;
 - Enter in basic programming;
 - Validate a parameter and switch to the next one if available.

6.4. Basic programming



Note

To access the basic menu, press and release the  button.



Note

Menus are displayed in a defined and incremental order.



Note




While the parameters are being edited, the regeneration icon is on and flashing.

6.4.1. Basic programming mode chart

Parameter description	Range of values	Default value	Units of measure	Notes
Hour format setting	12:H or 24:H	24:H	hour	24:H for PM. 12:H for AM.
Current time	0:00 - 23:59 PM	10:00	hour: minute	Dependent of hour format setting.
Day of week	MO-TU-WE-TH-FR-SA-SU	MO	N/A	The day is shown in the upper part of the display.
Days enabled for regeneration	d1 to d7	None	N/A	d1: Monday. d2: Tuesday. d3: Wednesday. d4: Thursday. d5: Friday. d6: Saturday. d7: Sunday. Enable/Disable the regeneration on each day (1=enabled, 0=disabled). Days set to "1" are blinking, days set to "0" are fix.
Regeneration time	0:00 - 23:59PM	2:00	hour: minute	Dependent of hour format setting.

6.4.2. Hour format setting




Set your format settings as 12 or 24 hours.

- A Use  and  to edit this parameter.
- B Press  to validate and switch to the next parameters.



6.4.3. Current time




Set the current time displayed.

- A Use  and  to edit this parameter.
- B Press  to validate and switch to the next parameters.



6.4.4. Day of week

Set the current day of the week.

- A Use  and  to edit this parameter.
- B Press  to validate and switch to the next parameters.



6.4.5. Days enabled for regeneration

Set the days enabled for regeneration. The display shows "dx y" where "x" is the day of the week (1 - 7) and "y" shows whether the selected day is enabled for regeneration "1" or not "0".

For each enabled day, the top of the display shows the relevant flashing icon.



- A Use to edit the setting of the selected day "x".
- B Use to enable or disable the selected day "y".
- C Press to validate and switch to the next parameters.

6.4.6. Regeneration time

Set the regeneration time. Regeneration will start when a delayed time or cubic meter start is enabled.



- A Use and to edit this parameter.
- B Press to validate.
"End" is displayed on the screen. Programming is now complete.

6.5. Advanced programming



Note

Press and hold for 5 seconds to access advanced programming.



Caution

The SFE controller 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.

6.5.1. Master programming mode chart

Parameter	Options	Definition	Note
SH:xx	00	Regeneration start at the time set on the enabled days.	-
	01	Regeneration start at the time set after the volume treatment on the enabled days.	-
	02	Immediate start at the end of the volume treatment on the enabled days.	-
	03	Start at intervals. Regeneration starts every 1, 2, 3, 4, 8 or 12 hours.	Regeneration starts when the hour strikes, so if regeneration is enabled every two hours, it will be carried out at 0:00, 2:00, 4:00 and so on.

Parameter	Options	Definition	Note
S:xx	1 to 12	Interval time between regenerations	This parameter is displayed after the regeneration start mode only if an interval start has been selected (SH:03).
F:xx	14.0	Prescale of the volumetric meter.	This parameter is displayed after the start up mode only if a volume start has been selected (SH:01 or SH:02). It must be set at 14.0.
xxxx	1000 to 9999	Volume to be treated before starting regeneration in [L].	This parameter is displayed after the prescaler only if a volume start has been selected (SH-01 or SH-02).
1C:xx	OFF to 99	Duration of the regeneration cycle in [min].	If the parameter is set to OFF, the cycle will be skipped and the system will directly go to the next cycle.
2C:xx			
3C:xx			
4C:xx			
SA:xx	0 to 99	Number of regenerations before a salt alarm is generated.	Only displayed for meter delayed and immediate regenerations.
A:xx	OFF to 14	Days of interval for the mandatory regeneration.	This type of regeneration is carried out at the regeneration time even on non enabled days.
FR:xx	50 or 60	Frequency of the power supply.	-
FC:xx	1 to 99	Duration of the cycle end pulse in [min].	-
FCCL	N/A	Chlorine driver activated.	Only with 7930-24 board.
UdIF		Volume not restored.	The volume remaining will be kept in memory or restored to the programmed value, after exiting the programming and only if a volume start has been selected (SH 1 or SH 2).
UIMM		Volume restored.	
END			End of programming.

6.5.2. Regeneration start mode




Set the regeneration start mode:

- SH:00 - Regeneration start at the time set on the enabled days.
- SH:01 - Regeneration start at the time set after the volume treatment on the enabled days.
- SH:02 - Immediate start at the end of the volume treatment on the enabled days;
- SH:03 - Start at intervals. Regeneration starts every 1, 2, 3, 4, 8 or 12 hours. Regeneration starts when the hour strikes, so if regeneration is enabled every two hours, it will be carried out at 0:00, 2:00, 4:00 and so on.



Note

The first regeneration is carried out at the time set in the basic menu. This function is available on the enabled days.

- A** Use  and  to edit this parameter.
- B** Press  to validate and switch to the next parameters.




6.5.3. Interval time between regenerations

Set the interval time (hours) between regenerations.



Note

This parameter is displayed after the regeneration start mode only if an interval start has been selected (SH:03).

- A** Use  and  to edit this parameter.
- B** Press  to validate and switch to the next parameters.




6.5.4. Volumetric meter K factor

Set the volumetric meter K factor. The parameter is composed of the integer part and of the decimal part, separated by the decimal point. Set this parameter to 14.0 for Siata V132.




Note

This parameter is displayed after the regeneration start mode only if a volume start has been selected (SH:01 or SH:02).

- A** Use  and  to edit this parameter.
- B** Press  to validate and switch to the next parameters.

6.5.5. Volume to be treated before starting regeneration

Set the volume (liters) to be treated before starting the regeneration. Thousands and hundreds are modified first; once they are correctly set, press  to switch to the tenths and units setting.



Note

This parameter is displayed after the regeneration start mode only if a volume start has been selected (SH:01 or SH:02).



Note

The SFE display allow to program 4 digits volume capacity, hence max programmable volume in liters is 9999. Should be necessary to program a volume capacity > 9999 L it is possible to use a user defined corrective factor C_f to multiply the meter K factor and divide the real volume capacity in order to get a capacity to set < 9999.




$$\begin{aligned} \text{Volume to be set} &= \text{Volume capacity} / C_f \\ \text{K factor to be set} &= \text{Meter K factor} \times C_f \end{aligned}$$

Example:

Volume capacity of the unit is 20000 L, to be set on V132 SFE. In order set on 4 digit display, use $C_f=4$.

$$\text{Volume to be set} = 20000 / 4 = 5000$$

$$\text{K factor to be set} = 14 \times 4 = 56$$

- A Use  and  to edit this parameter.
- B Press  to validate and switch to the next parameters.

The following formula is used to calculate the volume of treatable water (in liters) between two subsequent regenerations:

$$V_{\text{treatable water}} = [(L.xxx) \times (C.xx) \times 1000] / [(d.xxx) - (do.xx)]$$

where:

- d.xxx: incoming water hardness, in French degrees [°f] or [ppm];
- do.xx: desired outgoing water hardness, in French degrees [°f];
- C:xx: exchange capacity of the regenerating resin used, expressed in [°f x m³/L] or in [g/L_{resin}] of CaCO₃;
- L.xxx: volume of resin, expressed in liters [L].

The result must be typed, rounded down to the closest integer.






Note

The desired outgoing water hardness value must be compatible with the provisions of the regulations in force where the controller is used.

6.5.6. Duration of the first regeneration cycle stop




Set the duration of the first regeneration cycle stop (minutes). If the parameter is set to off, the stop will be skipped and the system will go directly to the next stop.

- A Use  and  to edit this parameter.
- B Press  to validate and switch to the next parameters.



6.5.7. Duration of the second regeneration cycle stop




Set the duration of the second regeneration cycle stop (minutes). If the parameter is set to off, the stop will be skipped and the system will go directly to the next stop.

- A Use  and  to edit this parameter.
- B Press  to validate and switch to the next parameters.



6.5.8. Duration of the third regeneration cycle stop




Set the duration of the third regeneration cycle stop (minutes). If the parameter is set to off, the stop will be skipped and the system will go directly to the next stop.

- A Use  and  to edit this parameter.
- B Press  to validate and switch to the next parameters.



6.5.9. Duration of the fourth regeneration cycle stop




Set the duration of the fourth regeneration cycle stop (minutes). If the parameter is set to off, the stop will be skipped and the system will go directly to the next stop.

- A Use  and  to edit this parameter.
- B Press  to validate and switch to the next parameters.



6.5.10. Number of regenerations before a salt alarm is generated

Set the number of regenerations before a salt alarm is generated.

- A Use  and  to edit this parameter.
- B Press  to validate and switch to the next parameters.



The following formula is used to calculate the number of regenerations before a salt alarm is generated:

$$SA = [(M.xxx) \times 1000] / [(L.xxx) \times (G.xx)]$$




where:

- M.xxx: amount of salt found in the brine tank [kg];
- L.xxx: volume of resin [l];
- G.xxx: amount of salt required to regenerate 1 liter of resin [g/l].

The result must be typed, rounded down to the closest integer.

6.5.11. Days of interval for the mandatory regeneration

Set the number of days of interval for the mandatory regeneration. If this parameter is set to Off, the function is disabled.

- A Use  and  to edit this parameter.
- B Press  to validate and switch to the next parameters.






Note

Regeneration will take place at the regeneration time even if the day is disabled.

6.5.12. Frequency




Set the frequency of the mains to 50 or 60 Hz.

- A Use  and  to edit this parameter.
- B Press  to validate and switch to the next parameters.



6.5.13. Duration of the cycle end pulse

Set the duration of the cycle end pulse.

- A Use  and  to edit this parameter.
- B Press  to validate and switch to the next parameters.






Note

This functionality only works if the controller has cycle end pulse.

6.5.14. Chlorine driver activated

Set the chlorine driver on or off.

- A Use  and  to edit this parameter.
- B Press  to validate and switch to the next parameters.



Note

This functionality only works if the controller has chlorine driver.

6.5.15. Volume restored/not restored

Set to determine whether the volume is restored (UdMM) or not restored (UdIF). The volume remaining will be kept in memory or restored to the programmed value, after exiting the programming (SH:01 or SH:02).

- A Use and to edit this parameter.
- B Press to validate.
"End" is displayed on the screen. Programming is now complete.



6.5.16. Statistics





The statistics menu displays some of the module's historical data.. To access to this menu, press and hold for 5 seconds.

Data	Description
Xxxx	Number of regenerations carried out.
SAxx	Number of residual regenerations before the salt alarm is generated.
FFxx	Number of days elapsed since the last regeneration.
Lxxxxxx	Overall volume treated [l].
Xx:xx	Day and time of the last regeneration carried out, the regeneration icon is on.
Xx:xx	Day and time of the second last regeneration carried out, the service icon is on.
Xx:xx	Day and time of the third last regeneration carried out, the service and regeneration icons are on simultaneously.
End	End of the statistics.
189x	Software release and revision.

- The treated volume is displayed on a running string to allow a number greater than 9999 to be read;
- use to switch to the next parameters in the statistics menu;
- the date and time information for the last regenerations is only available if they have been carried out;
- while the statistics are displayed, the regeneration icon is on, if not otherwise indicated.

6.5.17. Resetting the EEPROM

To reset the EEPROM to the default values, the controller must be in the service condition (no regeneration cycle running and clock displayed).

- A** Open the Statistics menu.
→ See 6.5.16. Statistics, page 56.
- B** Press and release .
- C** Press and release .
- D** Press and release .
- E** Press and hold  for 5 seconds.
→ The display shows "rSt" for a few seconds. The EEPROM has been reset.



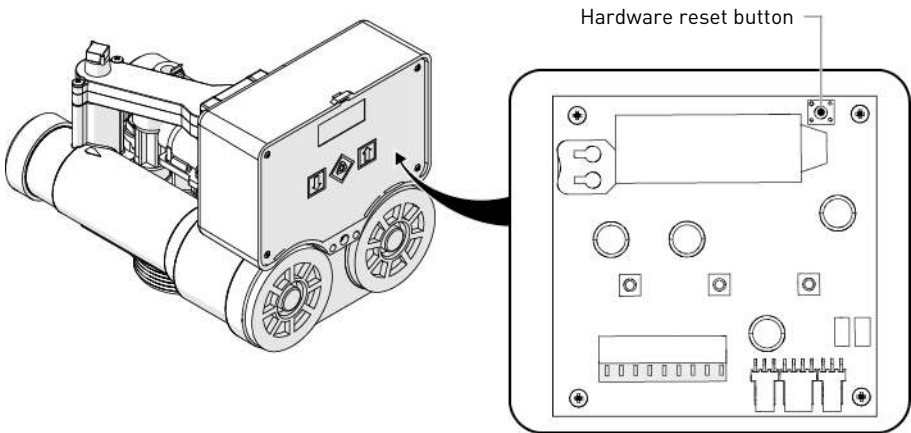
Note

This procedure does not reset the statistical data.

6.5.18. Resetting the hardware

The SFE controller is fitted with a hardware reset button located on the board itself close to the display and not directly accessible by the user.

After a hardware reset, the time on the display flashes until any button is pressed.






7. Commissioning



Note



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

7.1. Start up procedure

1. With the bypass still in bypass position (inlet and outlet of the valve closed), plug in the SFE controller to the power source.
2. If not done yet proceed to programming according to the system specification. See "Programming", page 46.
3. Start a manual regeneration by pressing  for 5 seconds (see "Manual regeneration", page 61). The controller is going to move in backwash position (C1). Once in this position, unplug the SFE controller from the power source.
4. Make sure the brine line is connected to the safety brine valve. Set the floater of the brine valve to the lowest level possible and make sure the brine tank is yet not filled with salt.
5. With the outlet manual valve still closed, slowly open the inlet manual valve. The system is going to pressurize and the V132 pistons is moving effectively in backwash position. The valve and tank is going to slowly get filled with raw water, allowing air to be purged out by the drain. Open the inlet valve progressively until fully open position. Because of the particular design of the V132, during this cycle the brine tank is going to be refilled as well. As soon as the brine valve floater level is reached and the floater lifted by the water, the refill of the brine tank should stop. Check that the floater tightly close the brine line to ensure the safety brine valve is working properly. Mark with a pen the level that the water reached on the floater.
6. As soon as the drain runs clear, plug in again the SFE controller to the power source.
7. Press on  once to move the valve pistons to the next regeneration cycle position (brine draw (C2)). Check if the draw is performed and let the water in the brine tank decrease to the air check level.
8. Press on  to move to slow rinse cycle (C3), this is not creating changes in the pistons position. Place the brine valve float to the highest possible position to allow proper refill during the next cycle.
9. The Siata brine valve BR1-100 is equipped with a brine line flow control (BLFC) which set the refill flow rate at 1 L/min. Knowing it, determine the refill time to get the brine tank filled with the required amount of water to prepare the brine according to your system settings:

$$T_{\text{refill}} = V_{\text{brine}} / Q_{\text{BLFC}}$$

In case your softener is equipped with a non Siata safety brine valve, and the BLFC size is unknown/BLFC is not present, close the inlet manual valve and fill brine tank with the amount of water needed using buckets filled with a known amount of water. Mark the level then skip step #10 and move to step #11.

10. Press on  to move the valve pistons to the next regeneration cycle position (fast rinse [C4]). As soon as the flow at the drain increases, the valve is going to also start the refill of the brine tank.
Start to time with your wrist-lock from this moment. As soon as cycle C4 is reached press on  to move the valve back in service position, this operation is not going to stop the refill of the brine tank. Once the time for refill, calculated in step #9, is passed by, close the inlet manual valve to stop the refill.
 11. Fill the brine tank with salt. It is possible to mark the level of water in the brine tank when it is completely refilled with water and full of salt. In the future, after each regeneration, you can visually control that the quantity of water refilled should be between the 2 marks done. Marking are optional, but may allow to visually detect an irregularity during regeneration that may lead to softener inefficiency.
 12. With the brine tank completely refilled and full of salt, adjust the safety brine float in the brine well to the water level, use the mark done on step #5 as a reference. Make sure the overflow elbow is installed above the float level.
 13. Open the inlet manual valve and check there is no refill anymore and the safety brine valve floater has successfully closed the brine line.
 14. Open the outlet manual valve. And a faucet downstream the softener. Softener is now in service and fully operating.
 15. After the softener has been running a few minutes in service cycle, proceed to hardness test on the outlet water to make sure the water is treated.
-


Note

This procedure is intended for system using a salt platform in the brine tank. Not using a salt platform may result in salt consumption discrepancies and softener loss of efficiency.

7.2. Sanitization

7.2.1. Disinfection of water softeners

The construction materials used in modern water softeners do not support bacterial growth, nor will these materials contaminate a water supply. During normal use, a softener may become fouled 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, your softener may need to be disinfected after installation. Some softeners will require periodic disinfection during their normal lifetime. Consult your installing dealer for more information on disinfecting your softener.

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

Dosage

Measure two grains ~ 0.11 mL 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 from being carried into the softener.

Proceed with the normal regeneration.

7.2.3. Electro chlorination

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





8. Operation

8.1. Recommendations


- Use only regeneration salts designed for water softening EN973;
- for optimal system operation, the use of clean salt free from impurities 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 lifetime of the ion exchange resins. Refer to media manufacturer specs sheets for more information.

8.2. Manual regeneration

To initiate a manual regeneration:

- A** Press and hold  for 5 seconds.
→ The SFE controller can be used to either start regeneration immediately or delay it until the programmed time.
- B** Use   to scroll between immediate regeneration or delayed regeneration at the programmed time.
- C** Confirm with .
→ When Delayed manual regeneration is chosen, the current day of the week and the service icon will blink until regeneration starts.


8.3. Cancelling a regeneration

- A** If a regeneration has started, the regeneration can be cancelled by pressing  for 5 seconds.
→ The controller will then place the valve back in the service position.

8.4. Microswitch search

When powered on, the module may sometimes display F1-| or F2-|, where the number indicates the first or second microswitch attempt. A rotating bar is also shown to indicate that the motor is on. If both searches fail, the message FR01 is displayed.

8.5. Salt recharge

The controller has a counter that decreases by one at each regeneration. When the counter reaches 0, a salt alarm is generated. To recharge the counter to the initial value of the parameter SA, press and hold  when the module is in service, "SAL" will flash on the display for 5 seconds and the counter will be reset to the setup value.

9. Maintenance



Mandatory

Cleaning and maintenance shall take place at regular intervals in order to guarantee the proper functioning of the complete system.



Mandatory

The maintenance and service operation must be done by qualified personnel only. Failure inspecting this may void the warranty.



Caution

Any valve maintenance operation must be carried out in the absence of hydraulic pressure. For this reason, disconnect the water delivery line to the valve.

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 correspond 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 water treatment system, verify and record static and dynamic pressure, reporting pressure drop. Verify that inlet pressure respects valve and system limits.
7. If pressure gauges are not present, but suitable points exist, install temporary pressure gauge(s) to perform point 6.
8. If controller has a twin pilot circuit verify piston movement and lubrication.
9. If controller have external pilots, check for leakages from the QC of each pilot, and from pilot circuit exhaust.
10. If different pressure, source is used to pressurize an external pilots controller, verify that inlet pressure & pilot circuit pressure respects valve and water treatment system limits, and that pilot circuit static pressure is not superior than inlet water static pressure.

9.1.3. Regeneration test

1. Check condition of brine tank and any associated equipment.
2. Check brine level in brine tank.
3. Initiate regeneration test.
 - Check brine draw during brine draw stage.
 - Check brine tank refill.
 - Check operation of safety brine valve.
 - 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.
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
DLFC **	Clean	Clean	Clean	Clean	Clean / replace if necessary
Safety brine valve ***	Check	Check	Check	Check	Clean / replace if necessary
Bypass (contains O-rings **)	Check / lubricate with approved silicon lub / replace****	Check / lubricate with approved silicon lub / replace****	Check / lubricate with approved silicon lub / replace****	Check / lubricate with approved silicon lub / replace****	Clean / replace if necessary
Pistons ***	Check / lubricate with approved silicon lub / replace****	Check / lubricate with approved silicon lub / replace****	Check / lubricate with approved silicon lub / replace****	Check / lubricate with approved silicon lub / replace****	Replace
Seals & Spacers ***	Check / lubricate with approved silicon lub / replace****	Check / lubricate with approved silicon lub / replace****	Check / lubricate with approved silicon lub / replace****	Check / lubricate with approved silicon lub / replace****	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 & Spring*	Check	Check	Check	Check	Replace

Items	1 year	2 year	3 year	4 year	5 year
Micro-switches	Check	Check	Check	Check	Check
Inlet Hardness	Check	Check	Check	Check	Check
Residual hardness	Check / adapt mixing if necessary	Check / adapt mixing if necessary	Check / adapt mixing if necessary	Check / adapt mixing if necessary	Check / adapt mixing if necessary
Electronic / settings*	Check	Check	Check	Check	Check / replace if necessary
Timer battery	Check / replace if necessary	Check / replace if necessary	Check / replace if necessary	Check / replace if necessary	Check / replace if necessary
Transformer*	Check	Check	Check	Check	Check / replace if necessary
Chlorine generator (if present)	Check	Check	Check	Check	Check / replace if necessary
Turbine ***	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.

*** Wear part.

**** For severe duty application.

9.3. Recommendations

9.3.1. Use original spare parts



Caution

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

Parts to keep in stock for potential replacements are the motor, controller, transformer, injectors, o-ring kit and DLFC.

9.3.2. Use original approved lubricants

- Silicone grease (cod. 8500).


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 for softeners.



9.4. Cleaning and maintenance

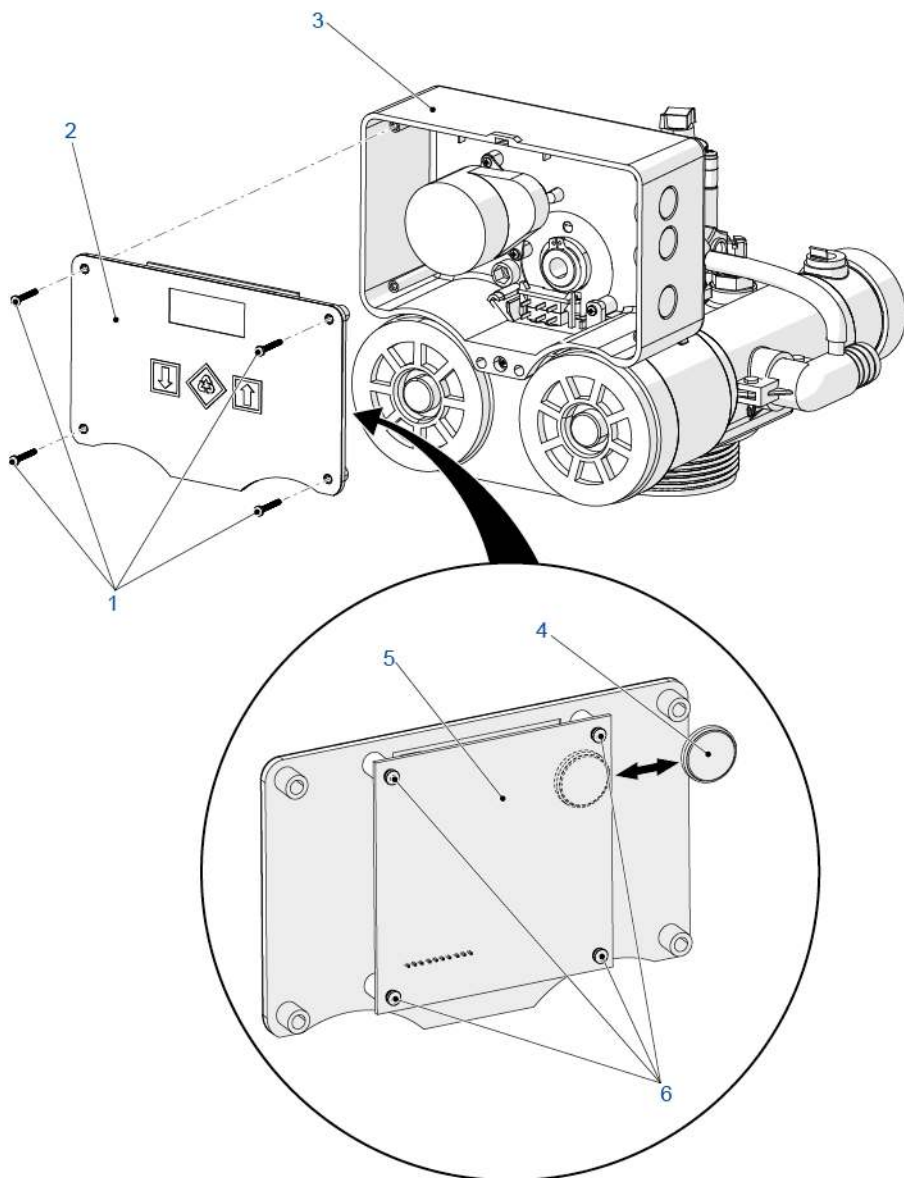
9.4.1. First steps

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


No.	Operation
	Caution These operations need to be performed before any cleaning or maintenance procedure.
A	Unplug the wall-mounted transformer.
B	Shut off water supply or put bypass valve(s) into bypass position.
C	Relieve system pressure before performing any operations.

9.4.2. Controller battery replacement

No.	Operation
	Note The battery should be changed every year.
A	Using a screwdriver, unscrew the four screws (1) .
B	Remove the front panel (2) from the controller (3) .
C	Using a plastic screwdriver, unscrew the four screws (6) .
D	Change the battery (4) on the electronic board (5) .
	Note Battery: FDK Lithium battery CR2032u 3V.
E	Reverse above procedure steps to rebuild.

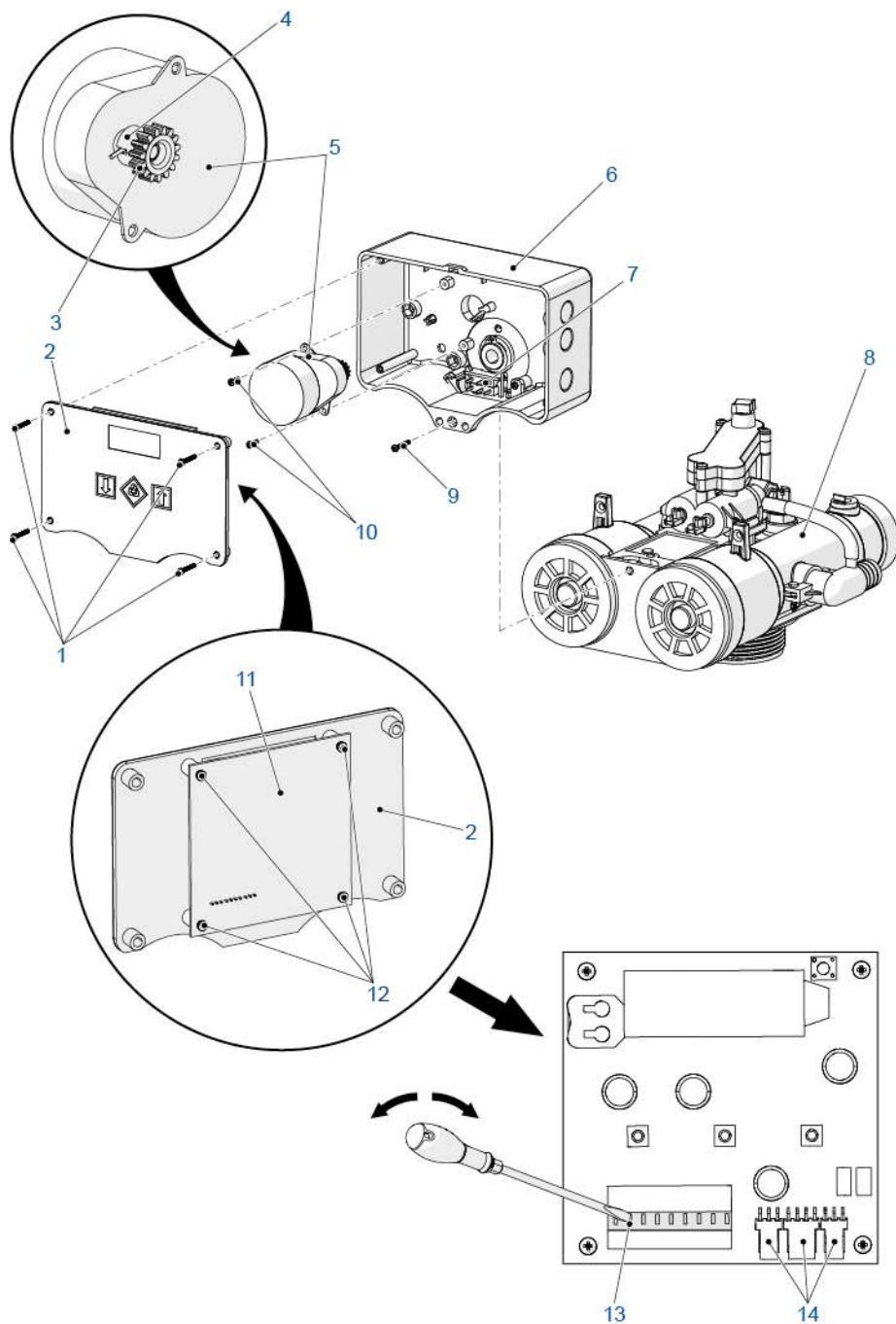


9.4.3. Motor replacement




No.	Operation
A	Using a screwdriver, unscrew the screw (9) .
B	Remove the controller (6) from the valve (8) .
C	Using a screwdriver, unscrew the four screws (1) .
D	Remove the front panel (2) from the controller (6) .
E	Using a screwdriver, unscrew the two screws (10) .
F	Remove the motor (5) .
G	Remove the pinion (3) and check the condition of the spring (4) .
H	If necessary, unscrew and change the spring (4) using pliers.
I	Using a plastic screwdriver, unscrew the four screws (12) to access the electronic board (11) .
J	If necessary, disconnect the three connectors (14) and replace the motor (5) .
 Note	Pay attention to the connector order.
K	Reverse above procedure steps to rebuild.

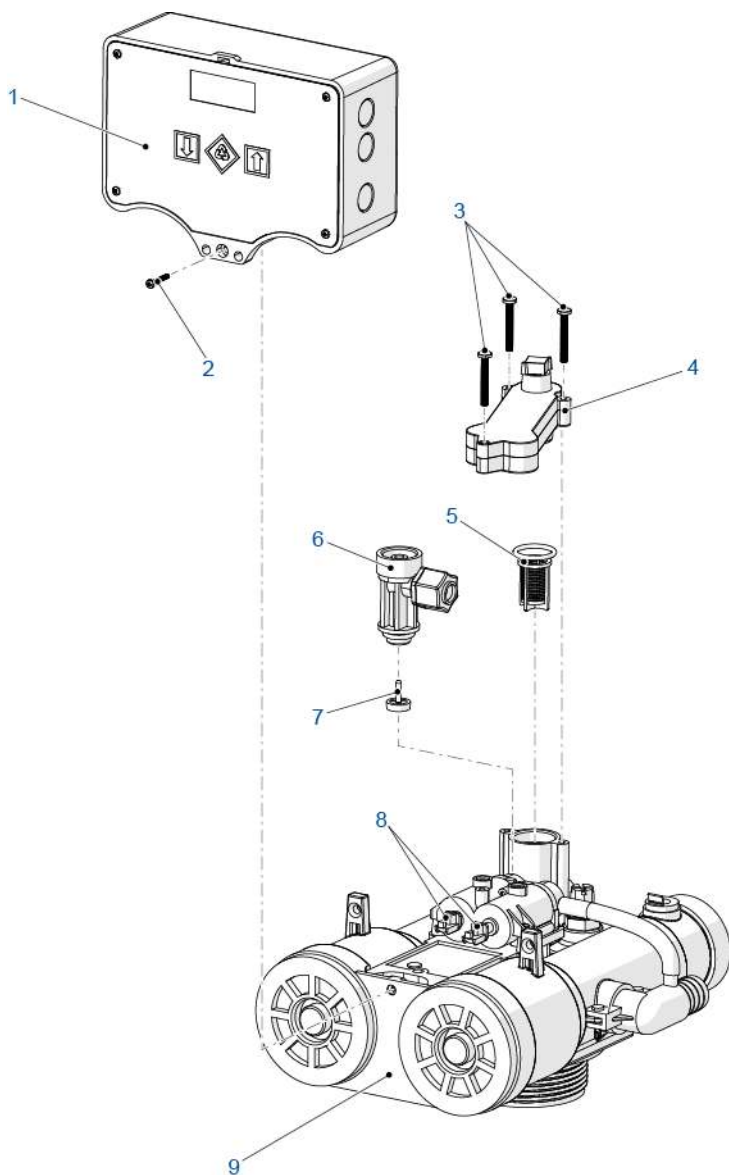
9.4.4. Microswitch replacement

No.	Operation
A	Using a screwdriver, unscrew the screw (9) .
B	Remove the controller (6) from the valve (8) .
C	Using a screwdriver, unscrew the four screws (1) .
D	Remove the front panel (2) from the controller (6) .
E	Using a plastic screwdriver, unscrew the four screws (12) to access to the electronic board (11) .
F	Using a plastic flat screwdriver, disconnect the microswitch cable (13) .
G	Disconnect the connectors (7) and change the microswitch.
H	Reverse above procedure steps to rebuild.



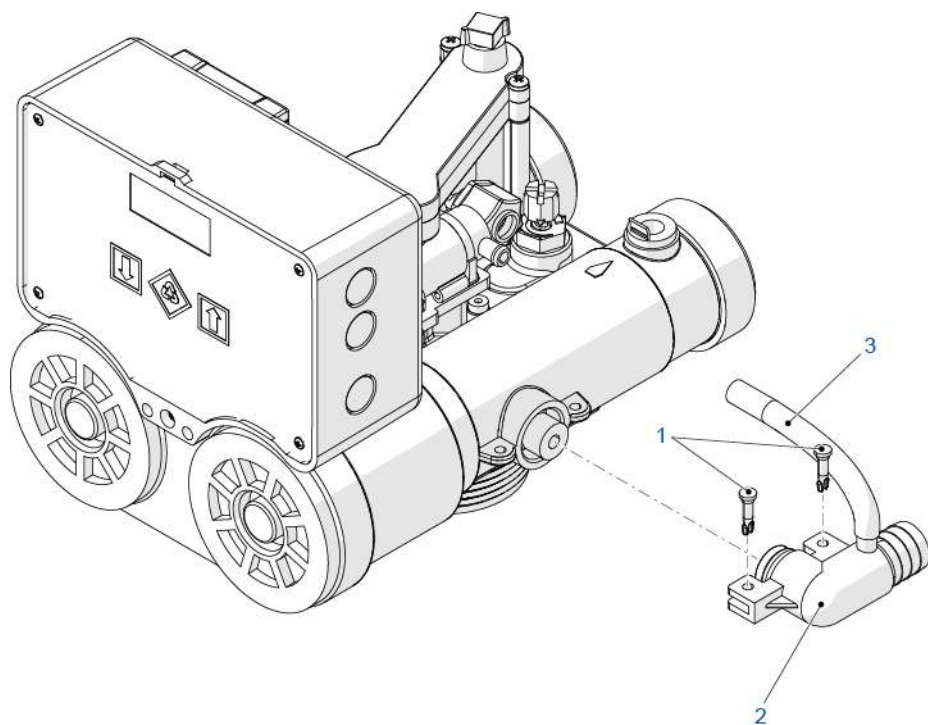
9.4.5. Injector and the injector screen cleaning

No.	Operation
A	Using a screwdriver, unscrew the screw (2) .
B	Remove the controller (1) from the valve (9) .
C	Manually actuate the pistons (8) to drain the water from inside the valve.
D	Using a screwdriver, unscrew the three screws (3) .
	Caution Unscrew the screws slowly to prevent gripping between the material and the screws.
E	Remove the collector (4) .
F	Remove and clean the injector (6) and the flow breaker (7) .
G	Using pliers, remove and clean the injector screen (5) .
	Note Use water or compressed air to clean the injector, flow breaker and injector screen.
H	Replace and grease all the o-rings with silicone grease (cod. 8500).
I	Reverse above procedure steps to rebuild.
	Caution When reassembling the collector: - try to match the self tapping screws with the original thread; - slowly screw by hand without forcing then tighten using a screwdriver; - always carry out these operations using normal screwdrivers; do not use automatic screwdrivers.






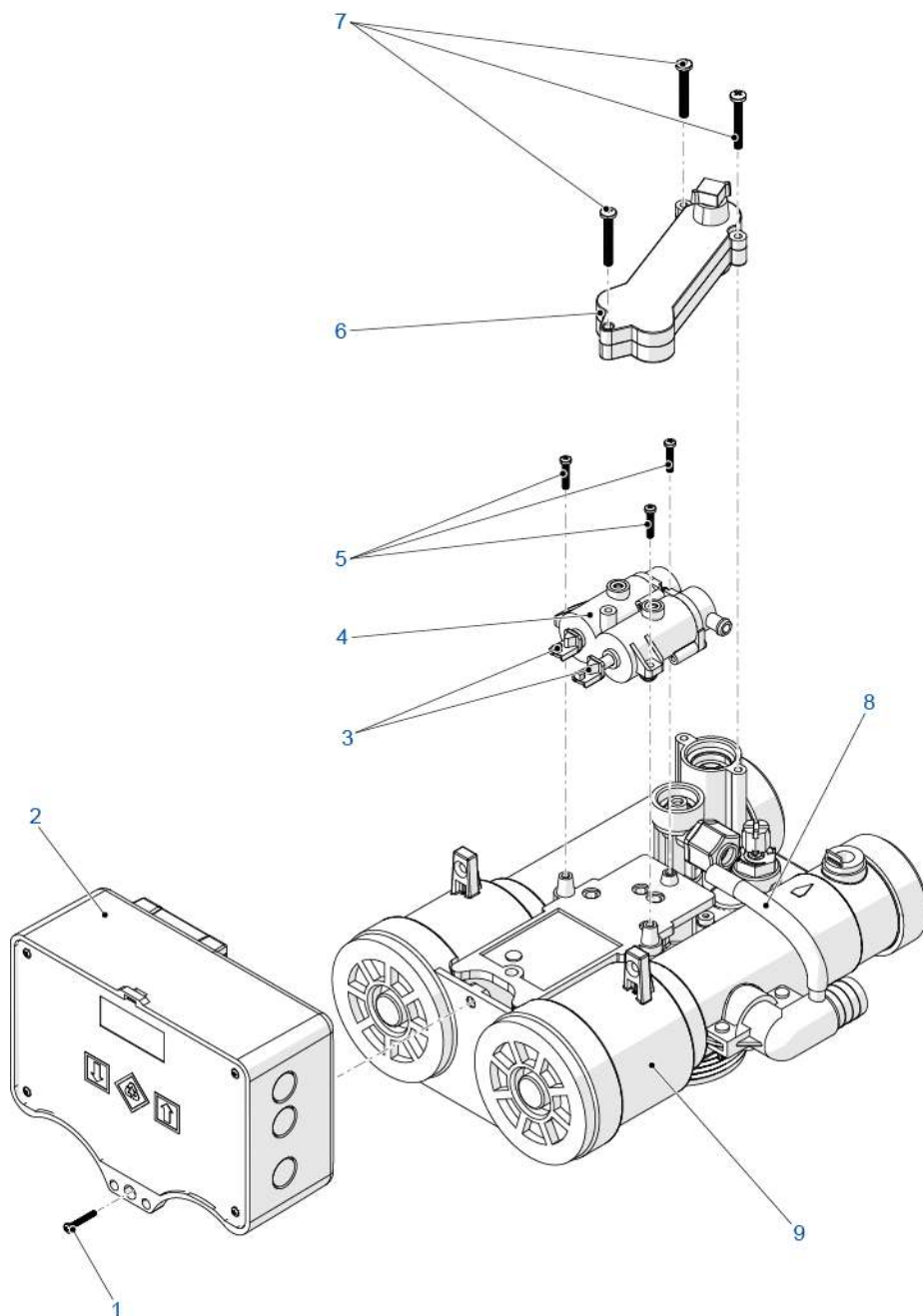
9.4.6. Drain connection replacement

No.	Operation
A	Unplug the pilots to drain tube (3).
B	Push out the two locking pins (1).
C	Slip off and change the drain manifold (2).
D	Replace and grease all the o-rings with silicone grease (cod. 8500).
E	Reverse above procedure steps to rebuild.







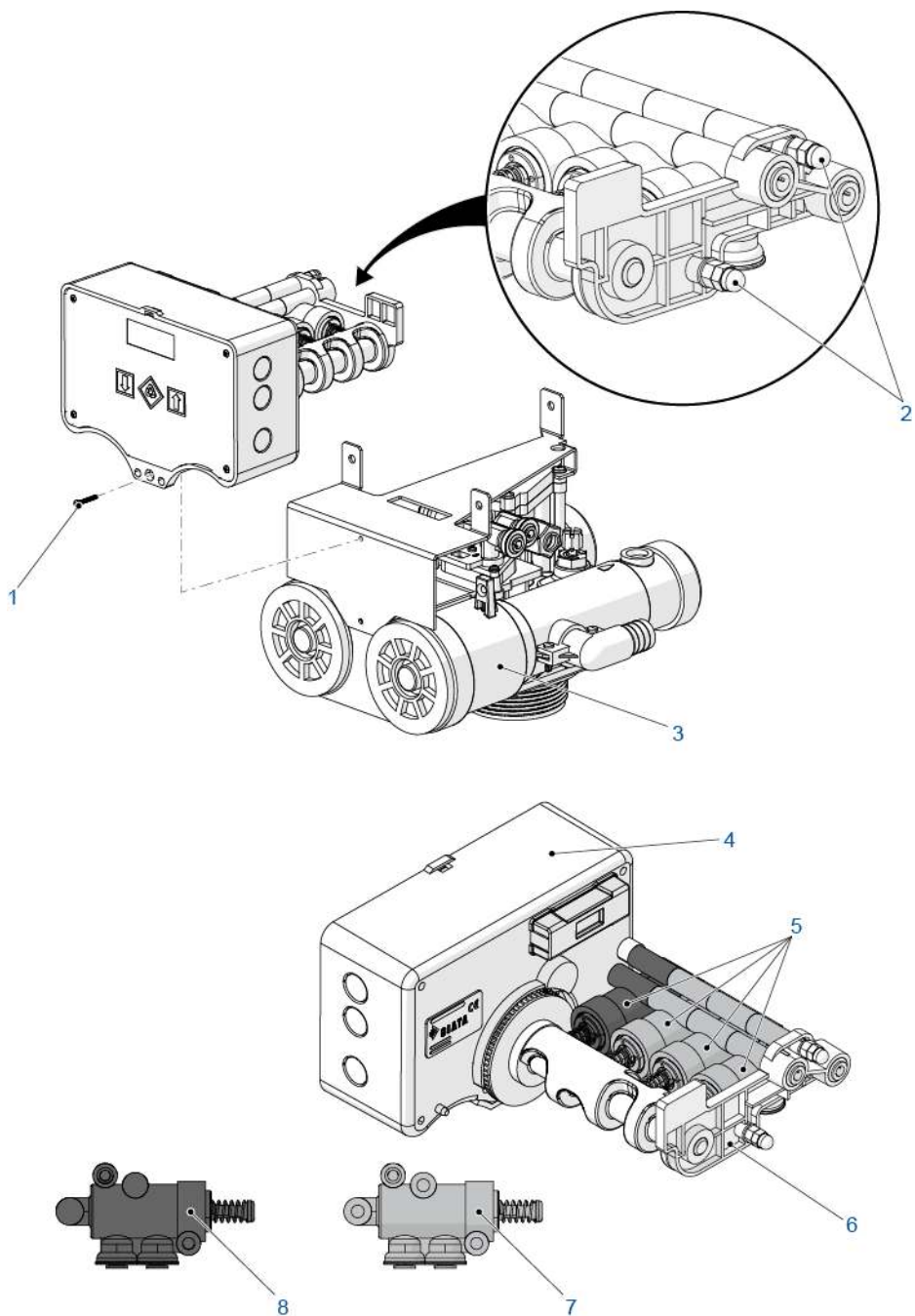
9.4.7. Twin pilots replacement

No.	Operation
A	Using a screwdriver, unscrew the screw (1).
B	Remove the controller (2) from the valve (9).
C	Manually actuate the pistons (3) to drain out the water inside the valve to the drain.
D	Using a screwdriver, unscrew the three screws (7).
 Caution	Unscrew the screws slowly to prevent gripping between the material and the screws.
E	Remove the collector (6).
F	Using a screwdriver, unscrew the three screws (5).
G	Unplug the pilots to drain tube (8).
H	Remove and change the twin pilot (4).
 Note	Replace all of the twin pilots (4) in case of damage. Only the pistons (3) can be changed separately.
I	Replace and grease all the o-rings with silicone grease (cod. 8500).
J	Reverse above procedure steps to rebuild.
 Caution	When reassembling the collector: <ul style="list-style-type: none"> - try to match the self tapping screws with the original thread; - slowly screw by hand without forcing then tighten using a screwdriver; - always carry out these operations using normal screwdrivers; do not use automatic screwdrivers.



9.4.8. Pilots replacement (external drivers connections)

No.	Operation
A	Using a screwdriver, unscrew the screw (1).
B	Remove the controller with the pilots (4) from the valve body (3).
C	Unscrew and remove the screws, the nuts and the washers (2).
D	Remove the clamping plate (6).
E	Remove and change the pilots (5).
 Note	Replace the entire pilot (5) in case of damage.
F	Replace and grease all the o-rings with silicone grease (cod. 8500).
G	Reverse above procedure steps to rebuild.
 Note	Pay attention to the pilot order. The pilot with two holes (8) is placed next to the controller, the others pilots with four holes (7) follow.
 Note	The number of pilots can vary according to the valve configuration.
 Caution	When reassembling, be sure to place the o-rings between each pilot.








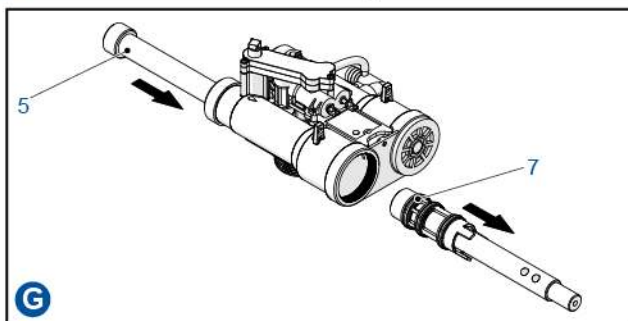
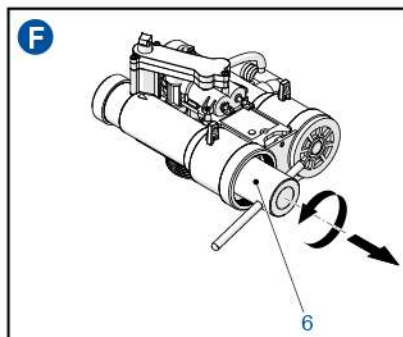
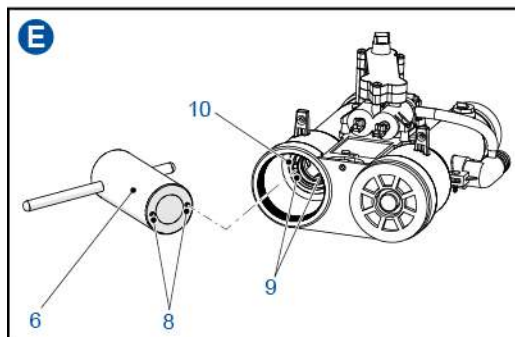
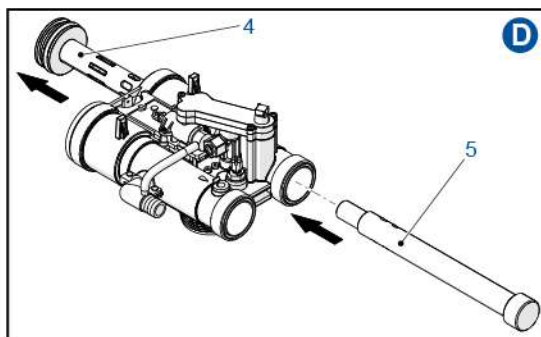
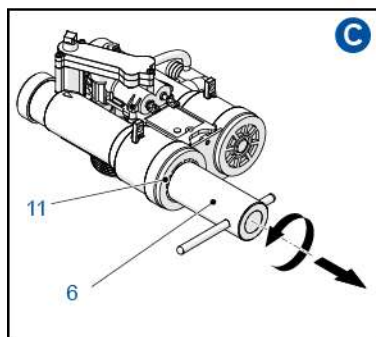
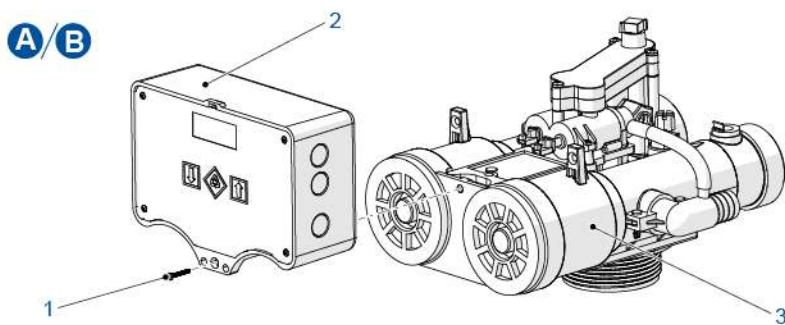
9.4.9. Internal pistons and seals & spacers replacement

9.4.9.1 Disassembly


Note

The procedure to disassemble the inlet and outlet pistons is the same.





No.	Operation
 Note	Use special tools from the 2238/05 kit to disassemble the valve internal parts.
 Caution	Disconnect the inlet/outlet fitting before proceeding.
A	Using a screwdriver, unscrew the screw (1).
B	Remove the controller (2) from the valve (3).
C	Using tool (6), unscrew the valve cap (11).
D	Match the tool (5) with the piston hole and push to slip off the piston (4).
E	Using tool (6), try to match the pins (8) of the tool in the ring nut's holes (9).
F	Using tool (6), unscrew and remove the ring nut (10).
G	Place tool (5) inside the valve and pull until you slip off the seals and spacers pack (7).
 Caution	Do not forget the correct sequence of the seals and spacers pack (7). If you reassemble the pack incorrectly, the valve will not work properly.
 Note	The sequence of the seals and spacers is different for the valve inlet and outlet.
H	If necessary, change the piston (4) and the seals and spacers pack (7).
I	Replace and grease all the o-rings with silicone grease (cod. 8500).
 Note	Take care not to mix up the inlet and outlet pistons (the inlet piston is bigger than the outlet piston).

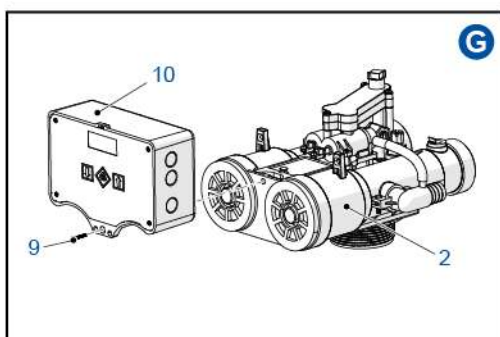
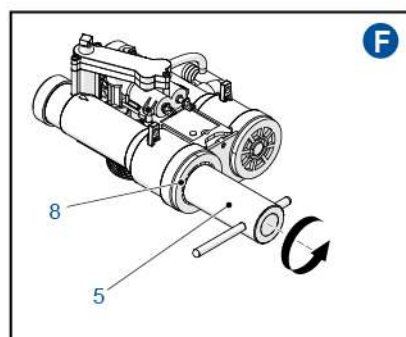
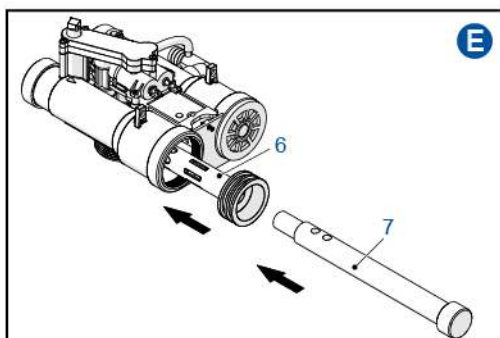
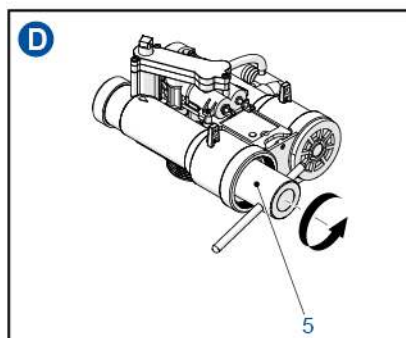
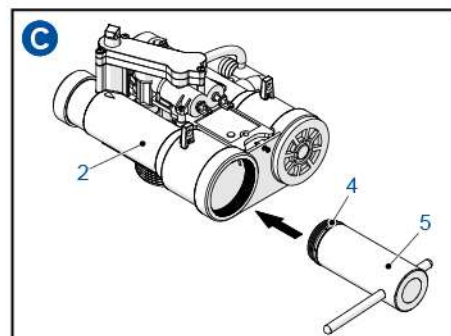
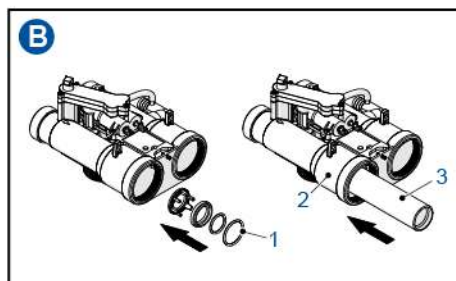
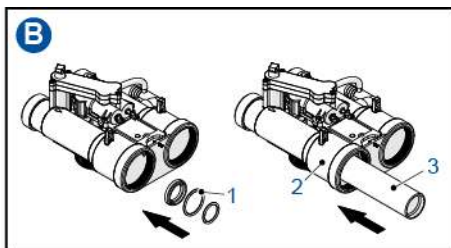
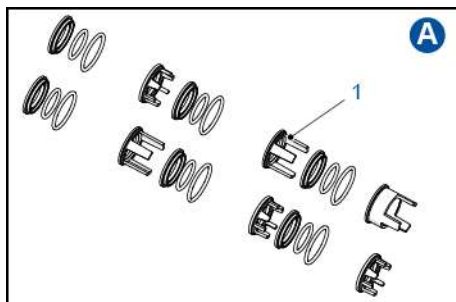


9.4.9.2 Assembly

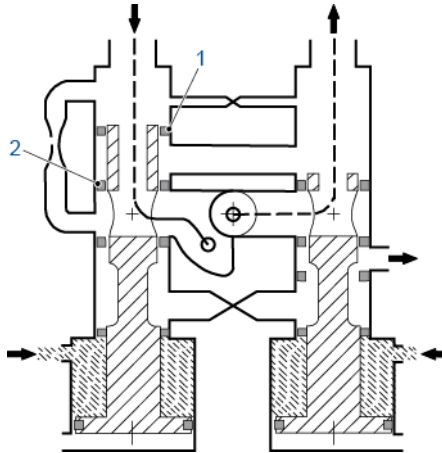

Note

The procedure to assemble the inlet and outlet pistons is the same.

No.	Operation
 Note	Use special tools from the 2238/05 kit to assemble the valve internal parts.
 Note	Before reassembling, grease with silicone grease (cod. 8500): - The inlet and outlet pistons; - The seals and spacers pack and the ring nut.
 Note	The sequence of the seals and spacers is different for the valve inlet and outlet.
A	Reassemble the seals and spacers (1).
 Caution	Do not forget the correct sequence of the seals and spacers pack (1). If you reassemble the pack incorrectly, the valve will not work properly.
B	Using tool (3), place the seals and spacers (1) in the valve (2).
C	Using tool (5), try to match the pins of the tool in the ring nut's holes and place the ring nut (4) in the valve (2).
D	Using tool (5), screw the ring nut.
E	Match the tool (7) with the piston hole and push to slip in the piston (6).
F	Using tool (5), screw the valve cap (8).
G	Place the controller (10) on the valve (2) and using a screwdriver, screw the screw (9).



10. Troubleshooting



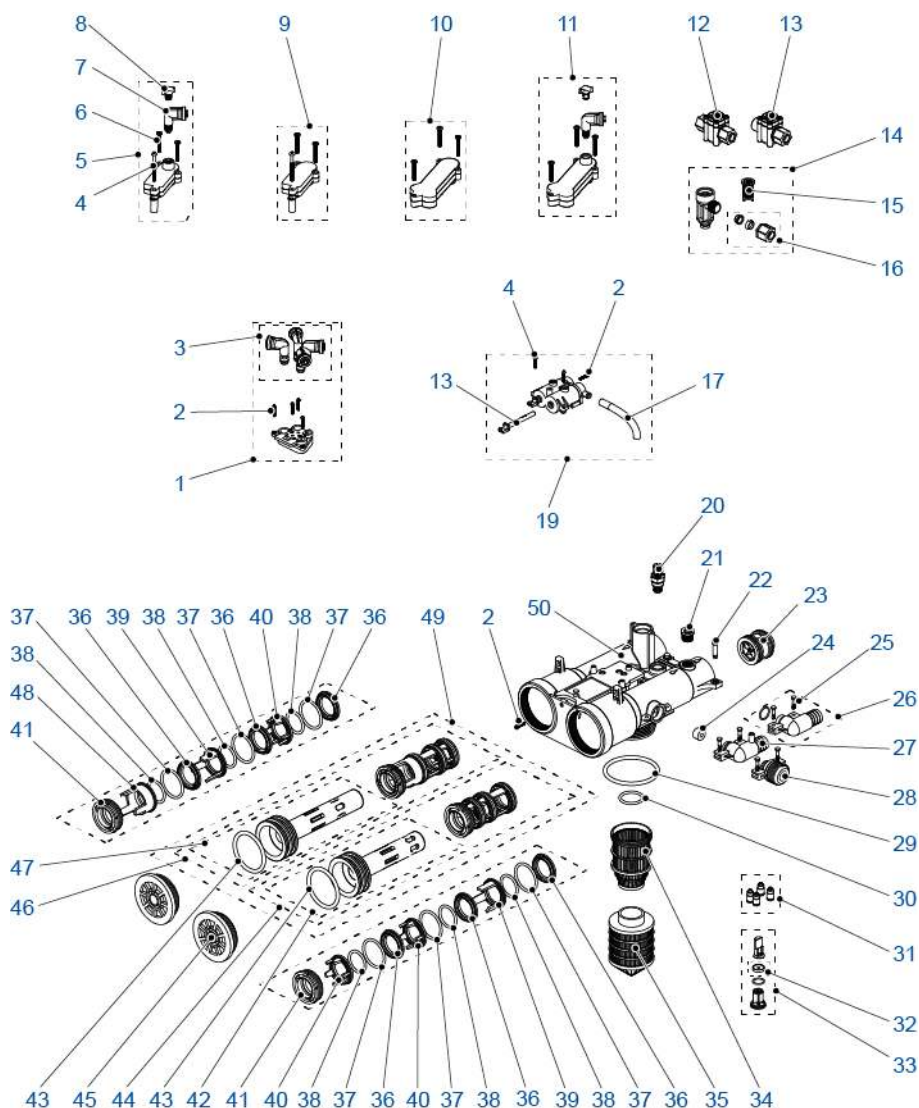
Issue	Cause	Reset and recovery
<p>Leaks to the drain during service or when in stand-by.</p>	<p>Leak from pilot.</p>	<p>A Twin pilot valve: Before closing the inlet water supply, disconnect the drain rubber tube and check if there is a leakage from that tube. In case there is one, close inlet water pressure and change the twin pilot assembly.</p> <p>B External distributor valve: Before closing the inlet water supply, disconnect the drain plastic tube from the pilot distributor system and check if there is a leakage from the drain port. In case there is one, one or more pilots must be replaced.</p> <p>A pilot circuit leakage can also cause malfunctions of the valve because the pressure can not be maintained in the pressure chambers and hence the piston of the valve can be badly positioned. After solving the pilot leakage problem, restore inlet water supply and put the controller in service position to check if leakage has stopped. If the leakage remains, contact your supplier for maintenance on the valve.</p>

Issue	Cause	Reset and recovery
Leaks to the drain during service or when in stand-by.	Leak through the piston/seals and spacer system.	<p>If the water leaking from the drain is softened check for damages on the outlet part of the valve, in particular outlet piston or seals and spacers. Otherwise check for damages on the inlet part of the valve.</p> <p>Dismount the pistons and the seals and spacer pack. Visually check every items inside the valve and replace the damaged part. If more that a third of the total o-rings needs to be replaced, change the complete piston and seals and spacers sub-assembly.</p>
Hard water detected in the outlet.	Probable leakage between inlet and outlet or between the valve and tank seal.	<p>A Damage on the inlet internals o-ring (1) and (2) or on the inlet piston. Dismount the valve and visually check these items. Replace them if they are damaged.</p> <p>B The rise pipe o-ring may be damaged, disconnect the valve from the tank and check the o-ring status.</p>
	High pressure drop is causing the opening of the automatic bypass.	If mixing is not desired replace the automatic bypass with a manual bypass model.
	Inlet piston is out of position causing bypass between inlet and outlet.	In that case a leakage on the drain should also be observed. Check for problems on the pilot circuit otherwise check if the pilot pressure is in compliance with the valve specifications. For twin pilot valves, the screen inside the manifold may be plugged by dirt causing pressure drop on the pilot circuit. Remove and clean it.
	Bypass valve not closed.	Ensure that the bypass valve is closed.

Issue	Cause	Reset and recovery
No brine draw.	Low water pressure at the inlet.	Close the outlet of the valve, check that the pressure gauge shows a pressure of at least 2 bars. If it is lower, the pressure is insufficient. If the pressure is higher than 2 bar, check the mechanical filter which is installed before the injector is plugged by dirt. Remove it and clean.
	Screen on the manifold is plugged by dirt.	Remove manifold and screen and clean thoroughly.
	Plugged injector.	Remove injector, thoroughly clean the holes in the injector and remount it.
	Problems in salt/brine tank.	<p>Thoroughly check the connection assembly to the brine tank:</p> <ul style="list-style-type: none"> A Check that there are no obstructions in the connection system. B Check that there is a flow when the float is in lower position. C Check that there is no formation of a salt bridge in the brine tank. D Check that all components of the brine valve operate efficiently.

11. Spare parts

11.1. Valve parts list



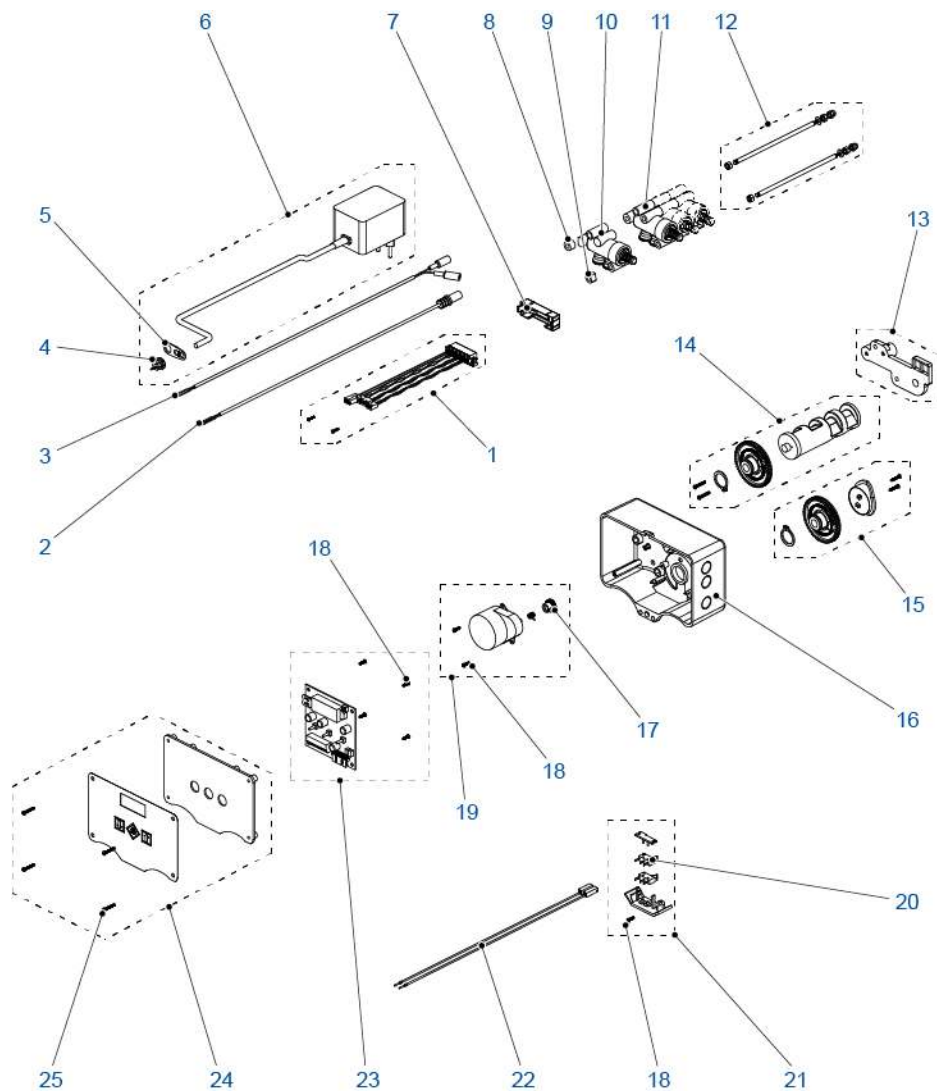
Item	Part number	Description	Assembly quantity
1	2252-1/05	External pilots connections assy	1
*	2252-1N/05	External pilots connections assy - black version	1
2	K1-104	Controller fixing screws	2
3	105-PORL/05	Quick connection elbow	1
4	K-102-L1/05	Short manifold screws	6
5	22-DK/05	Short manifold with 1/8" connection	1
*	22-DNK/05	Short manifold with 1/8" connection	1
6	106-K/05	Manifold screws	3
7	105-AS1/05	Quick connection elbow 1/8" threaded	1
8	K-23/05	1/8" cap with o-ring	1
*	K-23-N/05	1/8" cap with o-ring - black version	1
9	22-CK/05	Short manifold	1
*	22-CNK/05	Short manifold - black version	1
10	22-AK/05	Twin pilot manifold assy	1
*	22-ANK/05	Twin pilot manifold assy - black version	1
11	22-BK/05	Twin pilot manifold assy with 1/8" connection	1
*	22-BNK/05	Twin pilot manifold assy with 1/8" connection - black version	1
12	590-A/05	Chlorine cell remote mount	1
13	590-B/05	Chlorine cell direct mount	1
14	2231-B/05	Injector assy - blue	1
*	2231-F/05	Injector for filter valves	1
*	2231-G/05	Injector assy - grey	1
*	2231-M/05	Injector assy - brown	1
*	2231-N/05	Injector assy - black	1
*	2231-R/05	Injector assy - red	1
15	18-K/05	Injector screen	1
16	66/05	Nut + tube sleeve	1
*	66-K/05	Nut + tube sleeve	1
17	K1-31	Twin pilot drain tubing kit	1
18	32-GR/05	Small piston for twin pilot assy	1
19	2250/05	Twin pilot assy	1
*	2250-N/05	Twin pilot assy - black version	1

Item	Part number	Description	Assembly quantity
20	24509-01	Mixing assy	1
21	K-2224-A/05	Turbine sensor holder nut	1
22	K-9/05	Inlet/outlet connection lock pin	1
23	2222/05	Internal turbine assy	1
24	K-70-1	Flow control Ø3-mm. & 320 L/h (#70-1)	1
*	K-70-2	Flow control Ø3.5-mm. & 480 L/h (#70-2)	1
*	K-70-3	Flow control Ø4-mm. & 700 L/h (#70-3)	1
*	K-70-4	Flow control Ø5-mm. & 950 L/h (#70-4)	1
*	K-70-5	Flow control Ø6-mm. & 1450 L/h (#70-5)	1
25	K-9-S/05	Drain connection lock pin	1
26	K1-2249-C/05	Drain hose elbow for external connection valves	1
*	K1-2249-CN/05	Drain hose elbow for external connection valves - black version	1
27	K1-2249/05	Drain hose elbow for twin pilot valves	1
*	K1-2249-N/05	Drain hose elbow for twin pilot valves - black version	1
28	K1-2249-A/05	Drain connection 1" BSP male	1
*	K1-2249-AN/05	Drain connection 1" BSP male - black version	1
29	K1-6300-62	Tank adapter o-ring	1
30	K-46-1/05	Rise pipe o-ring	1
31	K-10028	Driver replica connection	1
32	K-10027	Backwash flow control BLFC washers kit	1
33	K-10026	Backwash flow control kit without backwash flow control BLFC washer kit	1
34	1001-32I	Upper strainer	1
35	1002-D32	Bottom strainer (Ø 32.mm)	1
36	K1-13	Seals holder ring	6
37	K1-45	External o-rings	6
38	K1-44	Internal o-rings	6
39	K1-15	Medium length spacer	2
40	K1-14	Short spacer	3

Item	Part number	Description	Assembly quantity
41	K1-1518/05	Seals & spacers pack closure nut	2
42	1918-C/05	Outlet piston assy	1
43	K-41/05	Piston o-rings	2
44	2230-OUT/05	Outlet piston w/ seals & spacers assy	1
*	2230-DOU/05	Outlet piston w/ seals & spacers assy for demineralization cationic	1
45	1915/05	Valve cap assy	2
*	1915-N/05	Valve cap assy - black version	2
46	2230-IN/05	Inlet piston w/ seals & spacers assy	1
*	2230-DIN/05	Inlet piston w/ seals & spacers assy for demineralization cationic	1
47	1918/05	Inlet piston assy	1
48	K1-16	Longer spacer	1
49	2230/05	Pistons w/ seals & spacers assy	1
*	2230-D/05	Pistons w/ seals & spacers assy for demineralization cationic	1
50+21 +45	2256-K01/05	Valve body service kit	1
*	2256-K02/05	Valve body service kit volumetric	1

* Not shown

11.2. SFE spare parts



Item	Part number	Description	Assembly quantity
1	K-10117	SFE back connector kit w/ internal wiring	1
2	K-10110	Kit meter cable for back connector	1
3	K-10111	Chloride cell cable for back connector	1
4	K-90-XP	Kit cable holder #90-XP	1
5	K-90	Cable lock clip	1
6	K-10009	Transformer standard 230/12 VAC 600mA	1
7	K-10113	SFE back connector cover cap	1
8	K-10147	Kit blue spacer	1
*	K-10145	Kit black spacer	1
9	K-10148	Kit blue spacer w/ chamfer	1
*	K-10146	Kit black spacer w/ chamfer	1
10	2253-AM/05	Kit external pilot with blind holes (1th pilot) - blue version	1
*	2253-AMN/05	Kit external pilot with blind holes (1th pilot) - black version	1
11	2253-BM/05	Kit external pilot with clearance holes - blue version	1
*	2253-BMN/05	Kit external pilot with clearance holes - black version	1
12	468-K2	Tie rods & nuts kit for 2 pilot camshaft	1
*	468-K3	Tie rods & nuts kit for 3 pilot camshaft	1
*	468-K4	Tie rods & nuts kit for 4 pilot camshaft	1
13	433-KBM/05	Camshaft backplate kit - blue version	1
*	433-KNM/05	Camshaft backplate kit - black version	1
14	2221-2/05	Kit Cam 201 - 2 pilots standard	1
*	2221-2FBW/05	Kit Cam 210 - 2 pilots for profiler	1
*	2221-3CU/05	Kit Cam 301 - 3 pilots outlet shut-off	1
*	2221-3CA/05	Kit Cam 303 - 3 pilots suction shut-off no refill	1
*	2221-4AU/05	Kit Cam 409 - 4 pilots outlet + suction shut-off	1
*	2221-4FBW/05	Kit cam 410 - 4 pilots for 2 filters sequential regeneration	1
15	2229/05	Twin pilot cam kit	1
16	K-10114	Kit SFE standard box - blue version	1
*	K-10115	Kit SFE standard box - black version	1

Item	Part number	Description	Assembly quantity
17	K-114-DX	Spring for standard motor	1
18	K-118	Screw #118	7
19	94-R7K/05	Standard 12V motor kit	1
20	K-92-F	Kit microswitch	1
21	K88-L2/05	Kit aux and homing for microswitch with blue support	1
*	K88-BKL2/05	Kit aux and homing for microswitch with black support	1
22	K-10118	Microswitch red harness kit	1
23	K-7930-24	Electronic board SFE standard w/ chloride driver	1
*	K-7930-23	Electronic board SFE standard	1
24	856-SFE-K1	SFE controller front plate kit with standard label	1
25	K1-120	Screw #120	1

* Not shown

11.3. Fittings

For V132 with quick inlet and outlet ports

Item	Part number	Description	Assembly quantity
*	2265-A/05	Kit fitting ¾" BSP female threaded (NYLON)	2
*	2265-B/05	Kit fitting 1" BSP female threaded (NYLON)	2
*	2265-C/05	Kit fitting 1 ¼" BSP female threaded (NYLON)	2
*	2265-D/05	Kit fitting Ø 32 mm for DN 25 pipe to glue (ABS)	2
*	2265-GB/05	Kit fitting Ø 33,5 mm 1" pipe (ASTM) to glue (ABS)	2
*	2265-K/05	Kit fitting 1 ½" BSP female threaded (NYLON)	2
*	2265-H/05	Kit fitting 1" BSP female - 1 ½" BSP male threaded (NYLON)	2
*	2265-I/05	Kit fitting 1 ¼" BSP female - 2" BSP male threaded (NYLON)	2

* Not shown

For V132 threaded inlet and outlet ports

Item	Part number	Description	Assembly quantity
*	494-B/05	Kit fitting 1 ¼" BSP female threaded (PVC)	2
*	494-C/05	Kit fitting Ø 40 mm for DN 32 pipe to glue (PVC)	2
*	494-F/05	Kit fitting 1 ½" BSP male threaded (BRASS)	2

* Not shown

11.4. Accessories

Brine valve

Item	Code	Description	Assembly quantity
*	BR1-100/05	Brine valve BR with flexible pole	1

* Not shown

Bypass valve

Item	Code	Description	Assembly quantity
*	BP-D/06	Direct bypass with prop. mixing + check valve	1
*	BP-D1/06	Direct bypass no mixing + check valve	1
*	BP-DN1/06	Direct bypass black no mixing + check valve	1
*	BP-D/08	Direct bypass with mixing	1
*	BP-DP/06	Direct bypass with prop.mixing + check valve + sample taps	1
*	BP-DP1/06	Direct bypass no mixing + check valve + sample taps	1
*	BP-DPN1/06	Direct bypass black no mixing + check valve + sample taps	1
*	BP-DP/08	Direct bypass with mixing + sample taps	1
*	BP-DPN/06	Direct bypass black with prop.mixing + check valve	1
*	BP-FD/05	Direct bypass for filter	1
*	BP-FDP/05	Direct bypass for filter + sample taps	1
*	BP-FR/05	Remote bypass for filter	1
*	BP-R/06	Remote bypass with prop. mixing + check valve	1
*	BP-R1/06	Remote bypass no mixing + check valve	1
*	BP-RN1/06	Remote bypass black no mixing + check valve	1
*	BP-RP/06	Remote bypass with prop.mixing + check valve + sample taps	1
*	BP-RP1/06	Remote bypass no mixing + check valve + sample taps	1
*	BP-RPN1/06	Remote bypass black no mixing + check valve + sample taps	1

* Not shown

Fittings for bypass

Item	Code	Description	Assembly quantity
*	K-490/05	Reduction 1 1/2" female - 3/4" male	2
*	K-491/05	Reduction 1 1/2" female - 1" male	2

* Not shown

Meters

Item	Code	Description	Assembly quantity
*	2296/05	Turbine meter G 1 1/2"	1
*	2297-2M/05	Turbine meter G 3/4" (2 magnet)	1
*	2297/05	Turbine meter G 3/4"	1

* Not shown

Maintenance parts

Item	Code	Description	Assembly quantity
*	2238/05	Kit maintenance tools	1
*	8500	Silicone grease package 1 Kg	1

* Not shown

Piping (tubes & connectors)

Item	Code	Description	Assembly quantity
*	E01480	Brine line tube 3/8"	1
*	2220	Polyethylene tube (4 X 6) transparent	1
*	2220-A	Polyethylene tube (4 X 6) azure	1
*	2220-G	Polyethylene tube (4 X 6) yellow	1
*	2220-N	Polyethylene tube (4 X 6) black	1
*	2220-R	Polyethylene tube (4 X 6) red	1
*	2220-V	Polyethylene tube (4 X 6) green	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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