PENTAIR

Installer Manual

Siata V132-SFE-EV-VIRIDION

IMPORTANT SAFETY INSTRUCTIONS

Read and follow all instructions

Save these instructions

PENTAIR.EU

Table of contents

1. Generalities

1.1. Scope of the documentation

The documentation provides the necessary information for appropriate use of the product. It informs the user to ensure efficient execution of the installation, operation or maintenance procedures.
The content of this document is based on the information available at the time of publication. The original version of the document was written in English.
For safety and environmental protection reasons, the safety instructions given in this documentation must be strictly followed.
This manual is a reference and will not include every system installation situation. The person installing this equipment should have:

- training in the Siata series, SFE-EV-VIRIDION 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	21.12.2016	BRY/GPI	First edition.
B	22.02.2018	BRY/DSP	Revision of chapter 6 Programming.
C	13.07.2018	BRY/FIM	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-EV-VIRIDION

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
BV.....Brine Valve
DF.....Down Flow
DLFC .....Drain Line Flow Controller
Inj .....Injector
QC.....Quick Connect
Regen .....Regeneration
S&S .....Seals & Spacers
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 11 and 9.3. Recommendations, page 79);
→ Problem description of the device.

B Please refer to the "Troubleshooting" chapter, page 98. If the problem persists contact your supplier.

1.8. Copyright and Trademarks

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

1.9. Limitation of liability

Pentair Quality System EMEA products benefit, under specific conditions, from a manufacturer warranty that may be invoked by Pentair 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

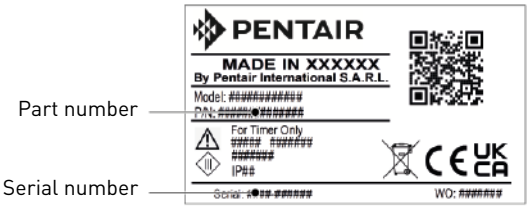
Pentair Scan mobile application is the ideal support for the maintenance person in his daily business. A simple scan of an identification (ID) label present on the valve with a smartphone gives an instantaneously access to all updated information related to the product, such as:

- 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 Available on the App Store or Available on the Google play in a smartphone.

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

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.

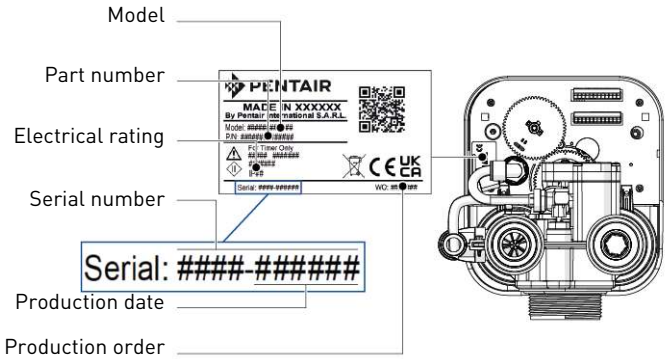
Danger
Warns against serious personal injury or death.

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

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 71;
- 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.

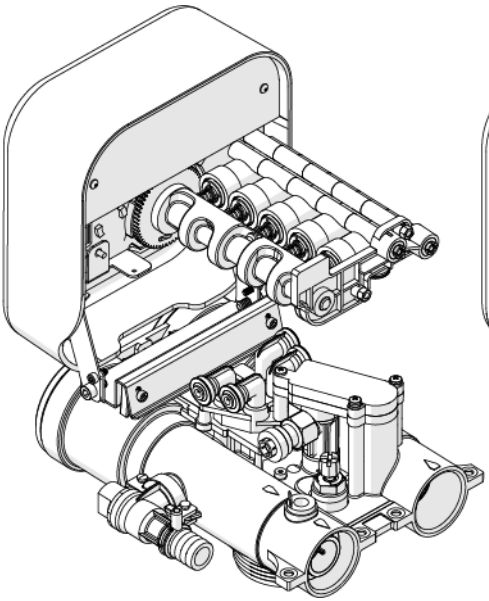
3.1.2. External connections

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.

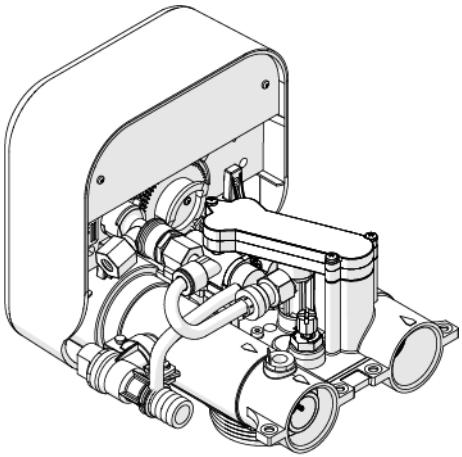
The remote camshaft can control up to 4 pilots hence more valves can be controlled with a single distributor. For this reason this configuration is generally used to:

- 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, 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
Ambient 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 (Δp = 1 bar)	7.0 m^3/h
Cv*	8.09 gpm
Kv*	7 m^3/h
Maximum backwash (Δp = 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 m^3/h across the valve at a pressure drop of 1 bar at 16°C.

Valve connections

Tank thread	2 ½" 8 NPSM
Inlet/outlet	Male 2" BSP or various QC fittings
Riser tube	32 mm
Drain line	20 mm
Brine line	⅜"

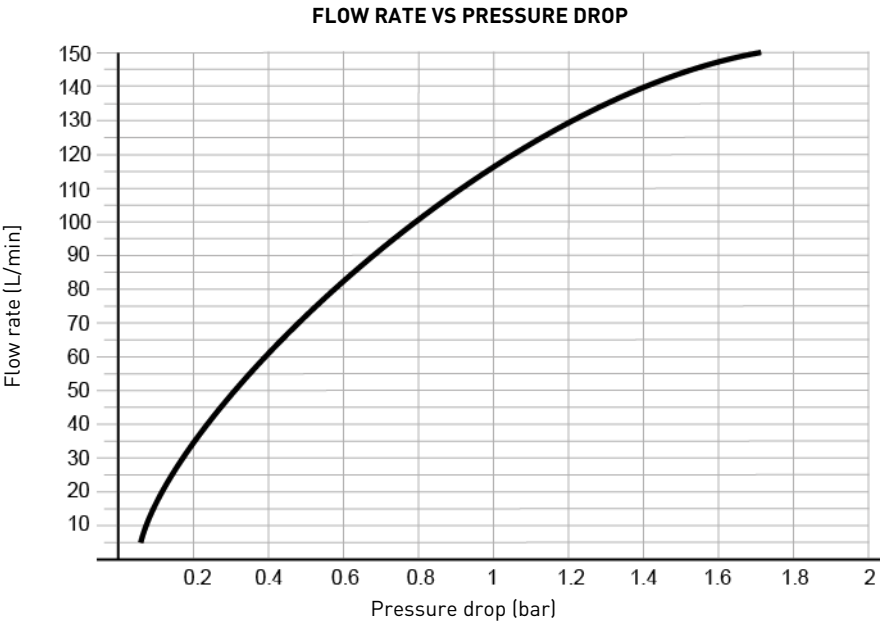
Electrical

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
Chlorine producer input	6 VDC, 800 mA
Protection rating	IP 40

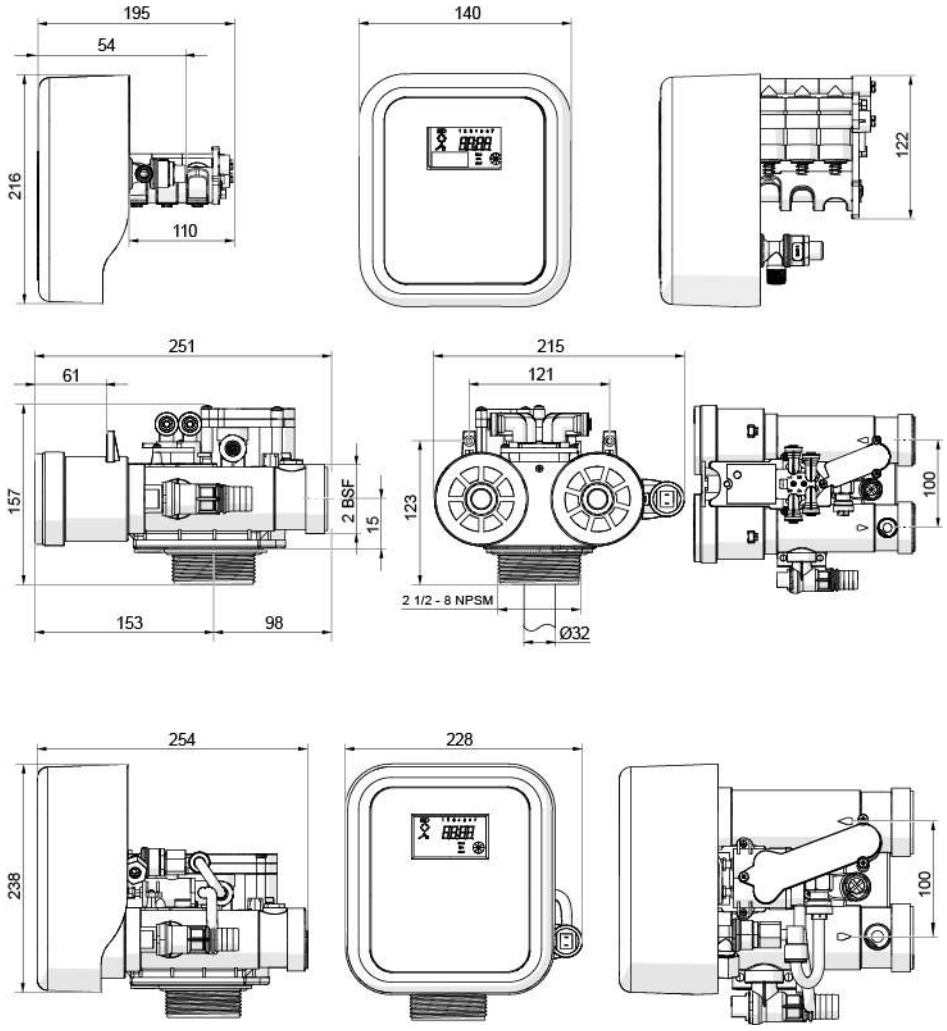
*: The device must only be used with the transformer provided in order to guarantee the safety voltage supply.

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.

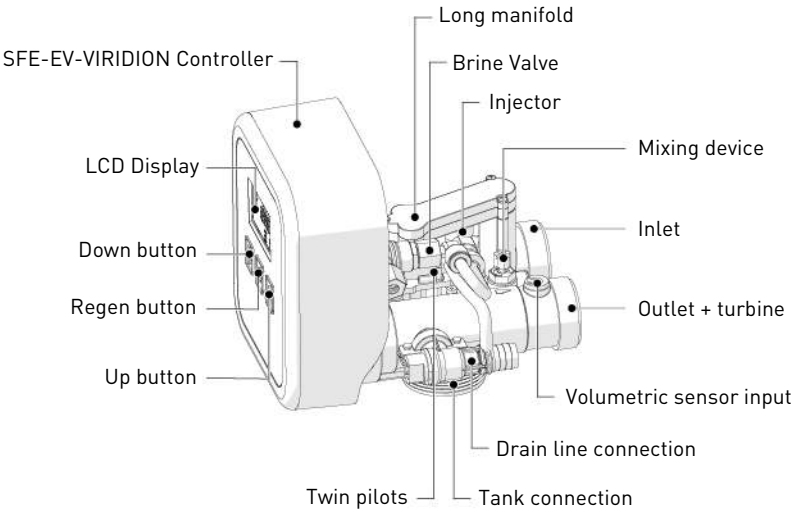


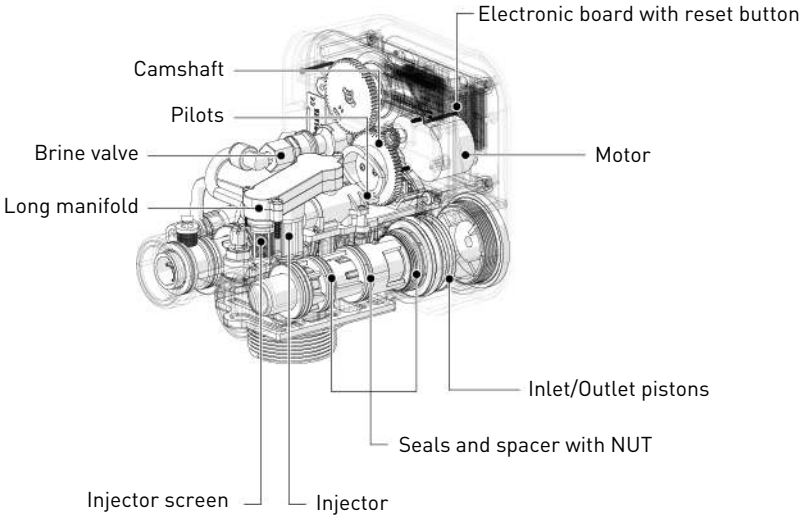
3.3. Outline drawing



3.4. Description and components location

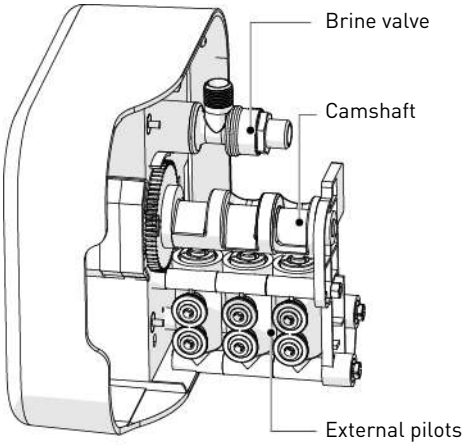
3.4.1. Valve with twin pilots

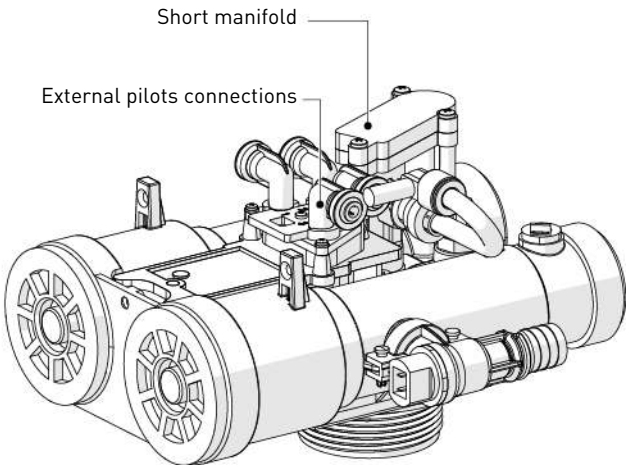




3.4.2. Valve with external pilots

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 18 for more information.





3.5. System regeneration cycle (5-cycle operation)

Service — normal use

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

Backwash — 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.

Rapid rinse — cycle C4

The 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 recompacted.

Tank refill — cycle C5

The SFE-EV-VIRIDION timer automatically calculate the refill cycle duration. Water is directed to the brine tank, though the BV, at a flow rate controlled by the refill controller [BLFC], to create brine for the next regeneration. During brine refill, treated water is already available at the valve outlet.

Note

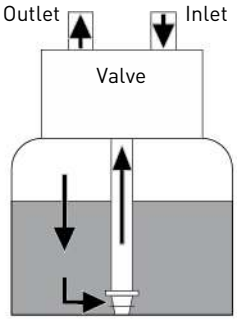
Depending on controller programming (see 6.8. Advanced programming, variables: Variable brining function & "BLFC size", page 64), the refill cycle is performed before the regeneration start, in this case refill is indicated as cycle 1B or after the cycle 4C, in this case is indicated as cycle 5C.

In case refill is performed before the regeneration, after the 1B cycle is completed, the controller & the valve will be still in service for a relative short time in order to wait the necessary time to dissolve the salt in the refilled water.

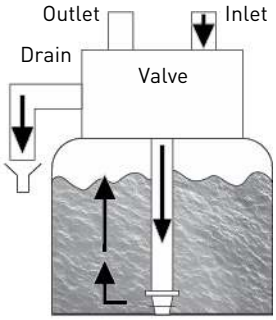
Note

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

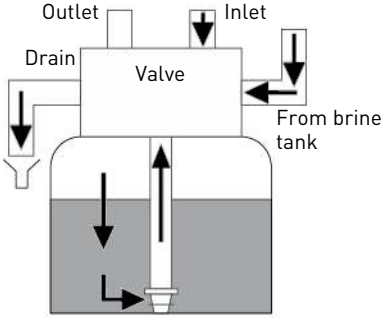
SERVICE
NORMAL USE



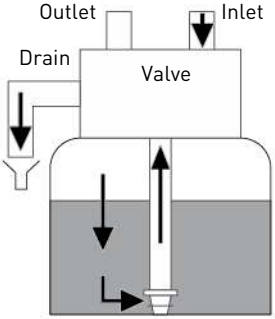
C1
BACKWASH



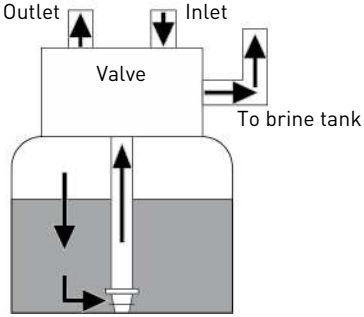
C2 + C3
BRINE DRAW & SLOW RINSE



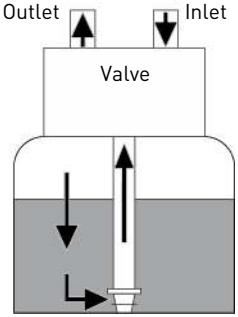
C4
RAPID RINSE



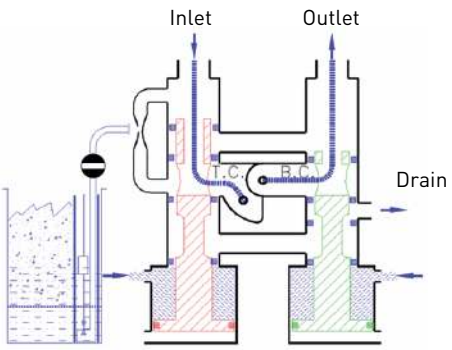
C5
BRINE REFILL



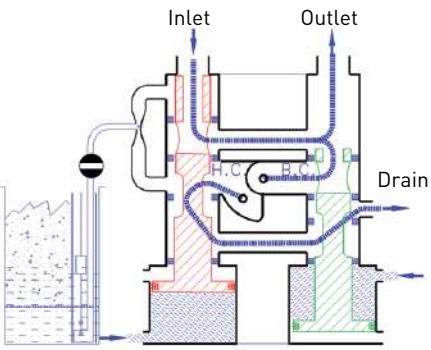
SERVICE
NORMAL USE



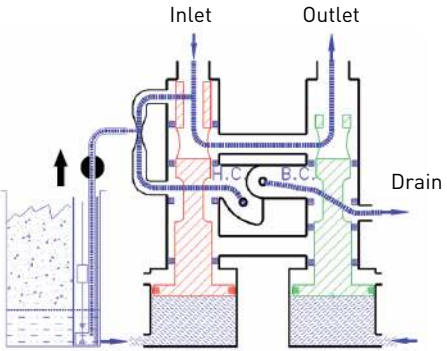
Service flow diagram



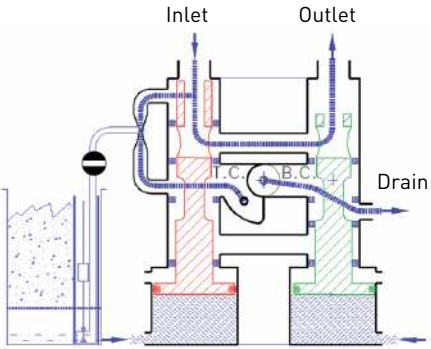
Backwash flow diagram



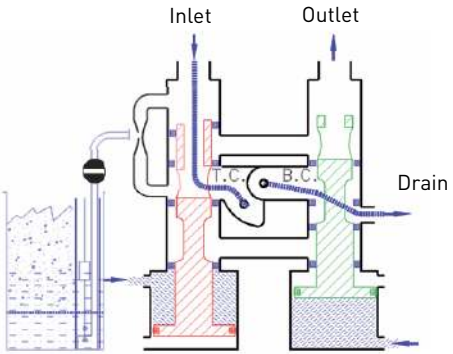
Brine draw diagram



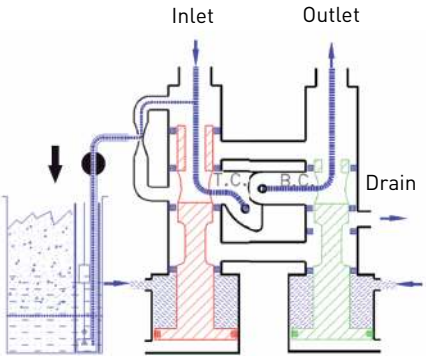
Slow rinse diagram



Fast rinse diagram



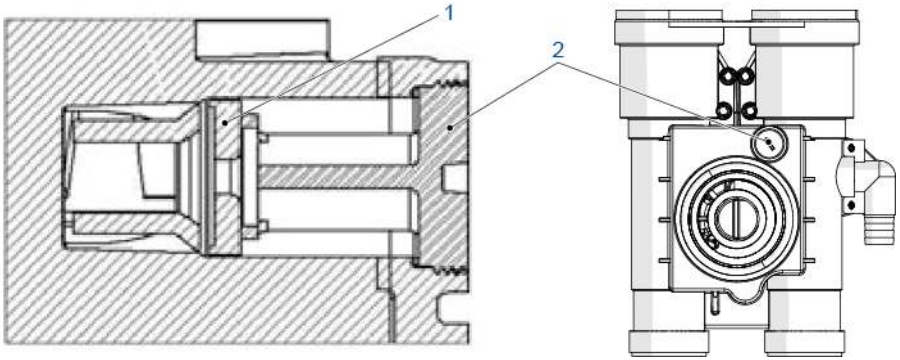
Refill diagram



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**).

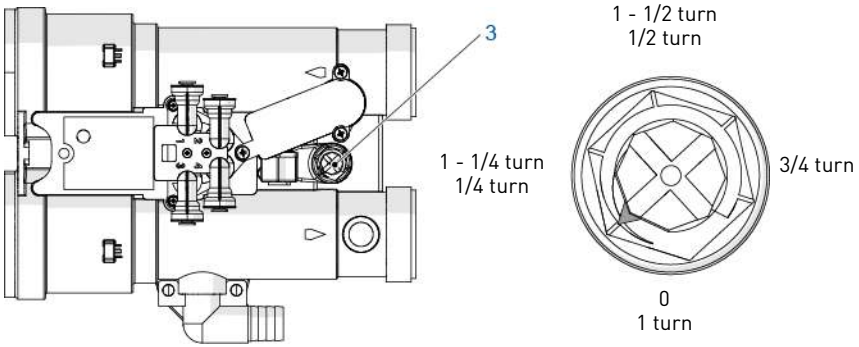


Valves equipped with this accessory are fitted with a flow control set offering the following maximum outputs:

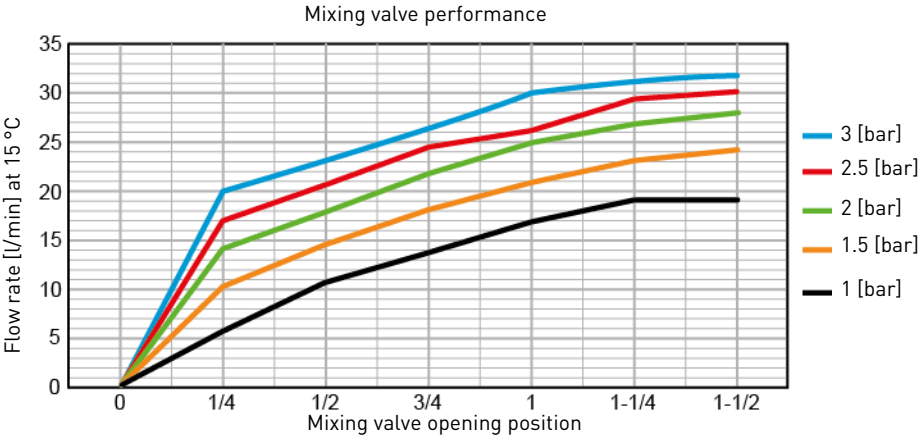
Code	Max output		
	[gpm]	[L/min]	[L/h]
12085	1.2	4.5	272.5
12086	1.5	5.7	340.6
12088	2.4	9.1	545.0
12090	3.5	13.2	794.8
12092	5	18.9	1135.5

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.

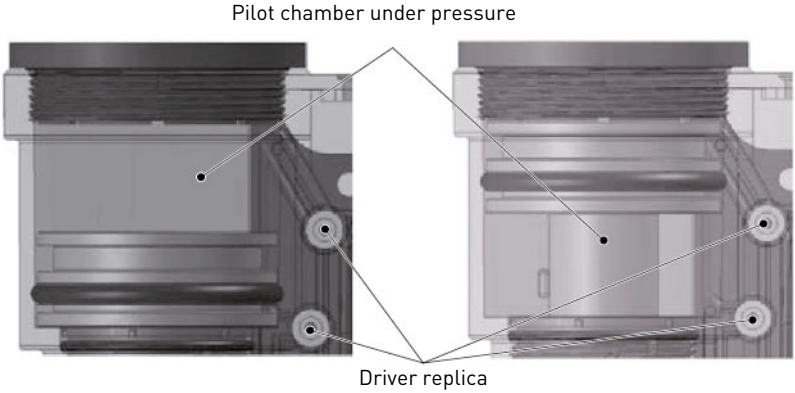


Note
There is no automatic bypass during a fast rinse cycle. But once the mixing device has been set, it connects the inlet and outlet of the valve.
So during the fast rinse phase with a mixing device, it is possible that a flow of untreated water flows into the outlet.



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.



Probe

The SFE-EV-VIRIDION controller can grant significatively water savings, with a probe, during slow rinse and fast rinse phases by comparing the instantaneous conductivity of the water (Ci) flowing through valve drain with the one previously recorded.

4. System sizing

4.1. Recommendations

4.1.1. Injector/DLFC/BLFC-Valve configuration

Tank diameter	Resin volume	Injector DF	DLFC		
[in]	L		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

Piping size (internal diameter)		Max. flow rate
[in]	[mm]	[m^3/h at 3 m/s]
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:

$$Q_{service\ max} = Fs_{service} \times BV$$

with:
$Q_{service\ max}$: service flow rate [m^3/h]
$Fs_{service}$: service velocity [BV/h]
BV: bed volume of resin [m^3]

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 Ca^{2+} and Mg^{2+} 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 $CaCO_3$ that can be fixed on the resin, expressed in kg as $CaCO_3$;
- 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 m^3 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.m^3 or °dH.m^3.

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
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

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}]
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:

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

with:
$M_{capacity}$: system mass capacity [g as $CaCO_3$]
V_{resin}: volume of resin [L]
$C_{resin\ ex}$: resin exchange capacity [g/L_{resin} as $CaCO_3$]

To calculate the system combined capacity:

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

with:
$C_{capacity}$: system combined capacity [$°f.m^3$ or $°dH.m^3$]
V_{resin}: volume of resin [L]
$C_{cor\ resin\ ex}$: corresponding resin exchange capacity [$°f.m^3/l$ or $°dH.m^3/l$]

To calculate the system volume capacity:

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

or

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

with:
$V_{capacity}$: system volume capacity [m^3]
$M_{capacity}$: system mass capacity [g as $CaCO_3$]
$C_{capacity}$: system combined capacity [$°f.m^3$ or $°dH.m^3$]
TH_{inlet}: inlet water hardness [mg/L as $CaCO_3$ or °f or °dH]

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

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:

$Q_{backwash} = Fs_{backwash} \times S$

with:
$Q_{backwash}$: backwash flow rate [m^3/h]
$Fs_{backwash}$: backwash velocity [m/h]
S: $Tank_{cross\ section\ area}$ [m^2]

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).

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

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 4.4. Injector flow rates (tables), page 34.

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:

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

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:

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

with:
$T_{brine\ draw}$: brine draw duration [min]
V_{brine}: brine volume to be drawn [L], see Refill calculation page 33
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.

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

with:
$T_{slow\ rinse}$: 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.

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

with:
$T_{fast\ rinse}$: 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

The SFE-EV-VIRIDION controller will automatically set the cycle time based on the program.

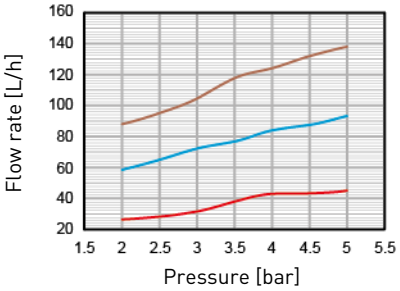
4.3. Salt amount definition

The salt settings is done through the controller programming.

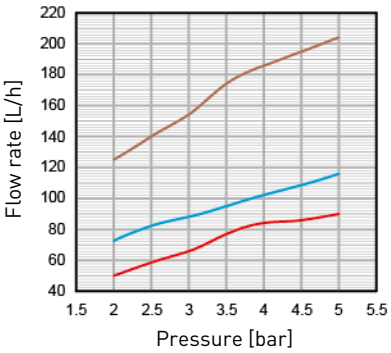
4.4. Injector flow rates (tables)

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

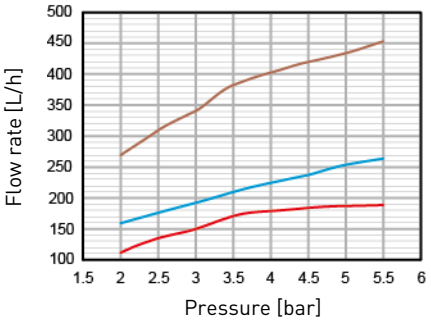
Brown injector performance



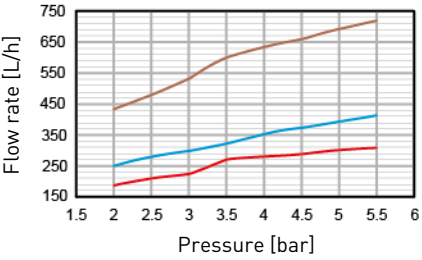
Blue injector performance



Red injector performance



Black injector performance



Regeneration
Slow rinse
Brine draw

5. Installation

Mandatory
It is strictly forbidden for not qualified personal, to accede to system's internal parts to perform any kind of technical action. Be sure to disconnect the electrical power, close the water inlet and depressurize the system before opening the front cover to access internal parts.

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 approved for a safe use with safety devices and the same technician must perform maintenance on the device.
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.

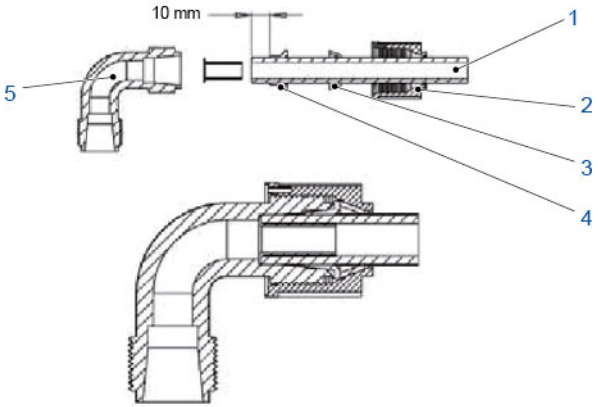
5.2. Safety notices for installation

- 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.

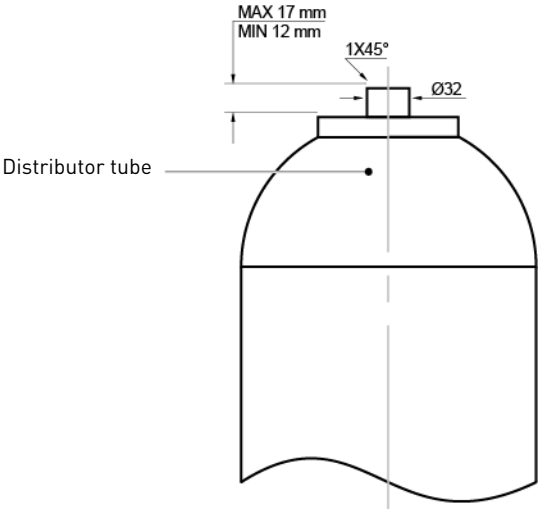


Length of connection pipes between valve and lower distribution system

The riser tube (distributor) 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 riser tube (distributor) must be ISO PN 10 or higher standard:
minimum height 12 mm;
maximum height 17 mm;
chamfer 1 mm x 45°;
ISO PN10 or higher 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 (dynamic pressure on injector) 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/DC transformer, motor, or controller. In the event of a failure, these should be replaced.

- All electrical connections must be completed according to local codes;
- 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 personnel;
- only use the AC/DC 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/DC transformer from its power source:
- an uninterrupted current supply is required. Please make sure that the voltage supply is compatible with the unit before installation;
- make sure the controller power source is plugged in;
- if the electrical cable is damaged, it must imperatively be replaced by qualified personnel.

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;
- the drain line may be elevated up to 1.8 m providing the run does not exceed 4.6 m and water pressure at the softener is not less than 2.76 bar. Elevation can increase by 61 cm for each additional 0.69 bar of water pressure at the drain connector;
- do not use lead-based solder for sweat solder connections;
- do not support the weight of the system on the 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;
- The installation of a prefilter is always recommended (100µ nominal).

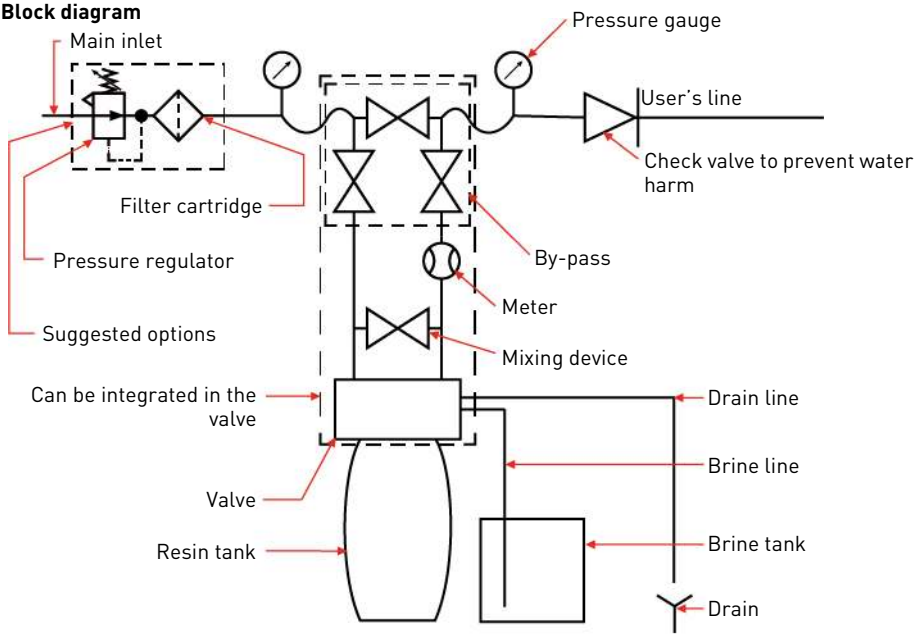
5.3.6. Integration constraints

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

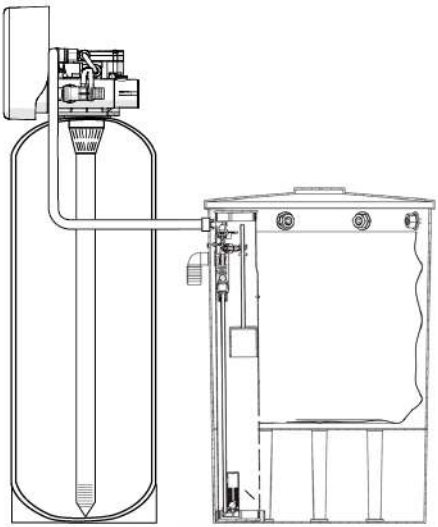
- level platform or floor;
- room to access equipment for maintenance and adding brine (salt) to tank;
- total minimum pipe run to water heater of 3 m to prevent backup of hot water into system;
- always install a check valve before water heater to protect the softener from hot water return;
- local 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

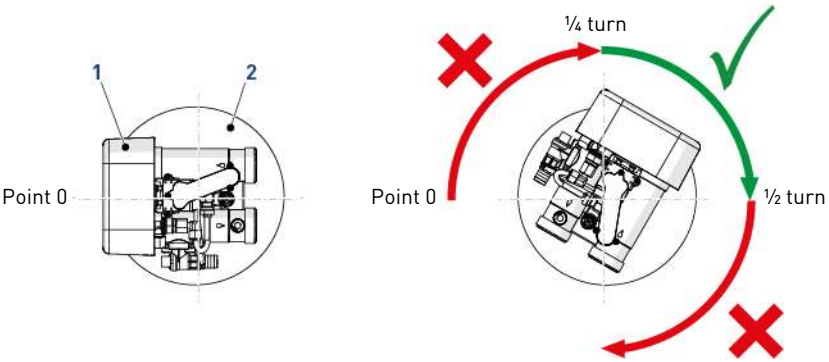


Configuration example



5.5. 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.
	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.



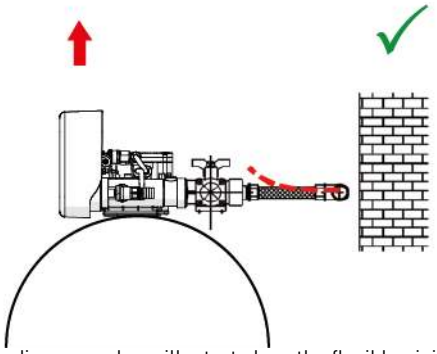
5.6. Valve connection to piping

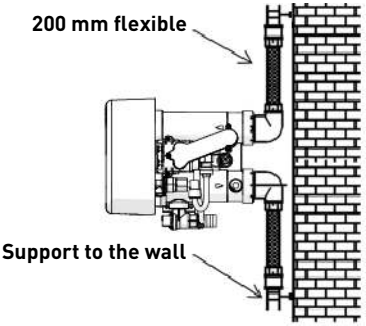
The connections should be hand tightened using PTFE (plumber's tape) on the threads if using the threaded connection type.
In case of heat welding (metal type connection), the connections should not be made to the valve when soldering.

Note
See chapter 3.4. Description and components location, page 18 to identify the connections.

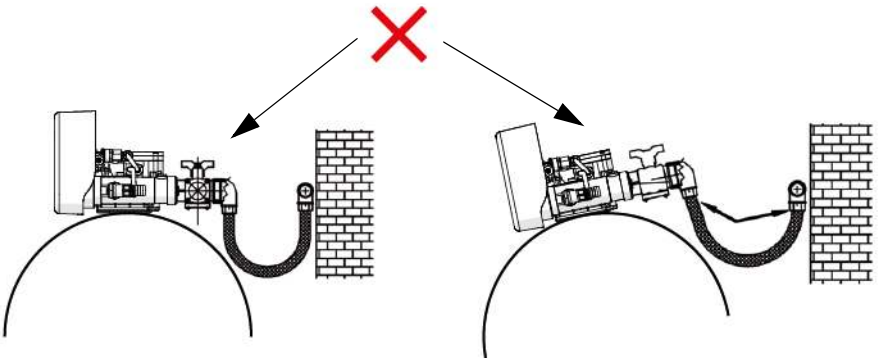
5.6.1. Top-mounted valve installation

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.





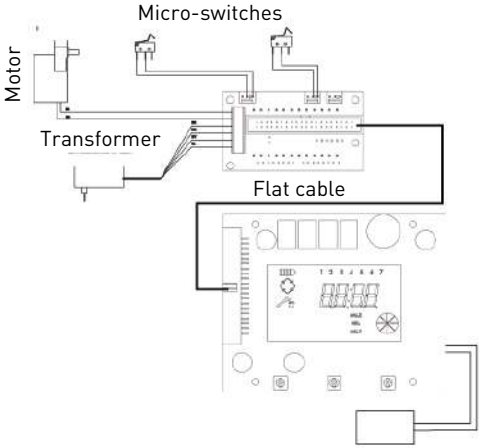
- The diagrams above illustrate how the flexible piping connection should be mounted;
- in order to adequately compensate the tank elongation the flexible tubes must be installed horizontally;
- should the flexible piping connection be installed in vertical position, instead of compensating the elongation, 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 installations 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.

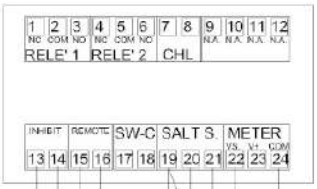
*Note: Use of petroleum-based grease and mineral based lubricant is totally forbidden, not only on the valve thread, since plastics (especially Noryl) will highly suffer from contact with this type of grease, leading into structural damage hence to potential failures.

5.7. Electrical connections



K-10058
Viridion conductivity probes

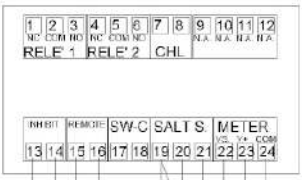
Terminal board



Salt sensor

Reed contact
Volumetric sensor

Terminal board



Salt sensor

Volumetric hall effect sensor

5.8. 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.

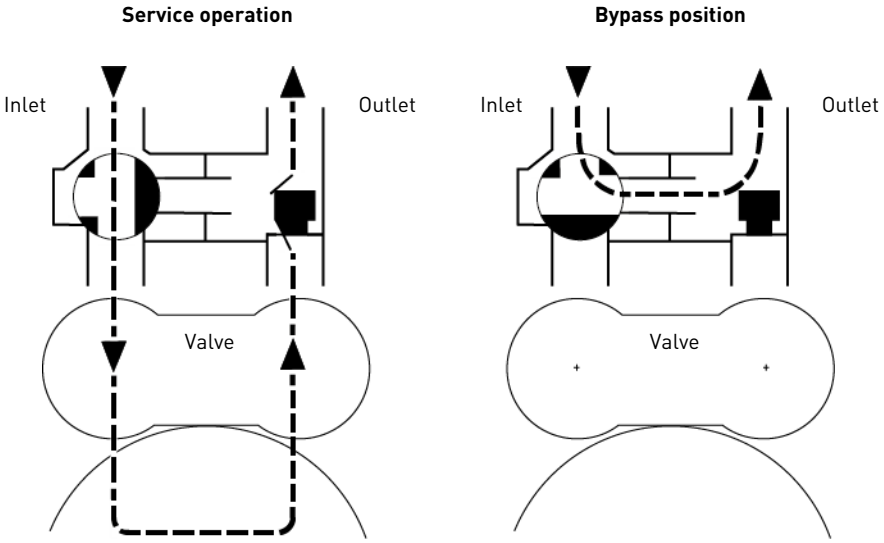
Caution
Do not use petroleum grease on gaskets when connecting bypass plumbing. Use only 100% silicone grease products when installing any plastic valves. Non-silicone grease may cause plastic components to fail over time.

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.

5.8.1. 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.

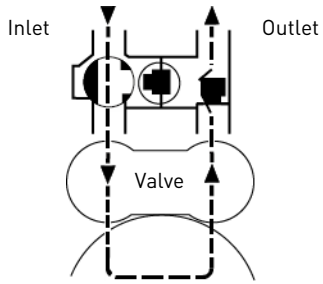


5.8.2. Automatic Bypass

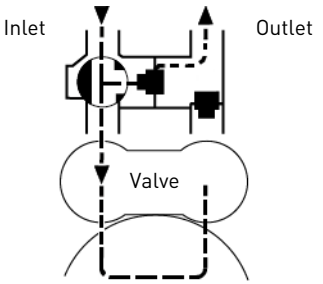
The automatic proportional bypass accessory enhances the system with following functions when fitted upstream of the water treatment system:

- 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.

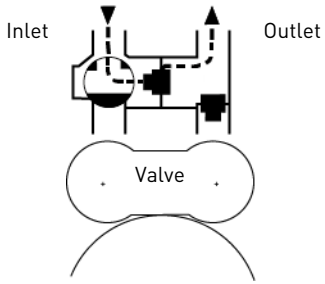
Service operation



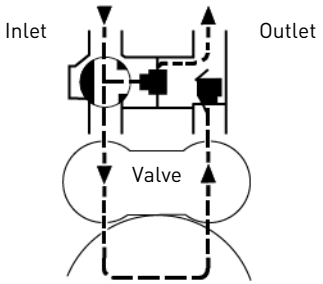
Regeneration. Automatic valve open for raw water bypass



Bypass position



Service operation with high pressure drop (automatic valve open)



5.9. Drain line connection

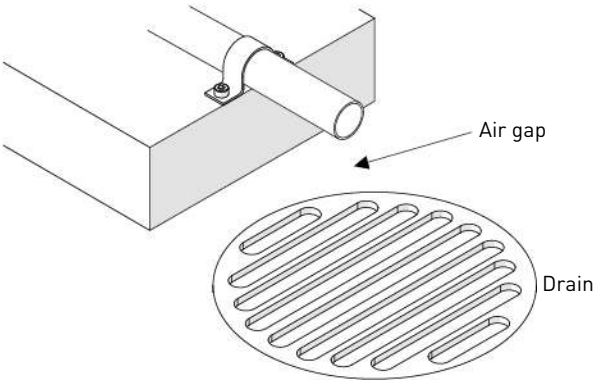
Note
Standard commercial practices are expressed here. Local codes may require changes to the following suggestions. Check with local authorities before installing a system.

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.



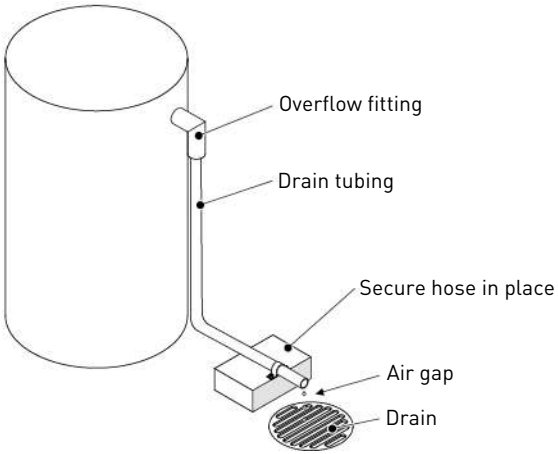
5.10. Overflow line connection

In the event of a malfunction, power failure, etc, 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.

5.11. Brine line connection

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

Most installations utilize a tank check valve.

5.12. 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

SFE-EV-VIRIDION can grant significantly water savings during slow rinse and fast rinse phases.

The Viridion functionality is totally transparent for the user, it is activated automatically plugging probe K-10058, no other settings are required.

At the beginning of the backwash phase, controller checks conductivity (C_m) in the water flowing through the drain of the valve and stores this information.

During the brine draw, the slow rinse and fast rinse controller compares the instantaneous conductivity in the water (C_i) flowing through valve drain with the one previously recorded. If the measured value (C_j) is in a range in between C_m value and C_m+10%, then all the brine drawn has passed by the resin bed.

When this condition happens, controller executes the following operations:

1. If the condition happens during a fast rinse, controller ends the rinse and returns in service status.
2. If the saving happens during a slow rinse, controller switch to a fast rinse. In this case fast rinse duration is 20% of the programmed time for a full fast rinse operation (minimum duration is 1 minute).

- In battery-operated mode, regeneration is not carried out and the parameters cannot be edited;
- the SFE-EV-VIRIDION controller allows you to manage your installation via time clock control, volumetric (immediate or delayed) control or external signal start. The controller will automatically initiate regenerations cycles based upon the programmed regeneration mode and the programmed parameters;
- the SFE-EV-VIRIDION 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-EV-VIRIDION controller can manage a chlorine production cell that will be activated during the brine draw cycle of the regeneration.

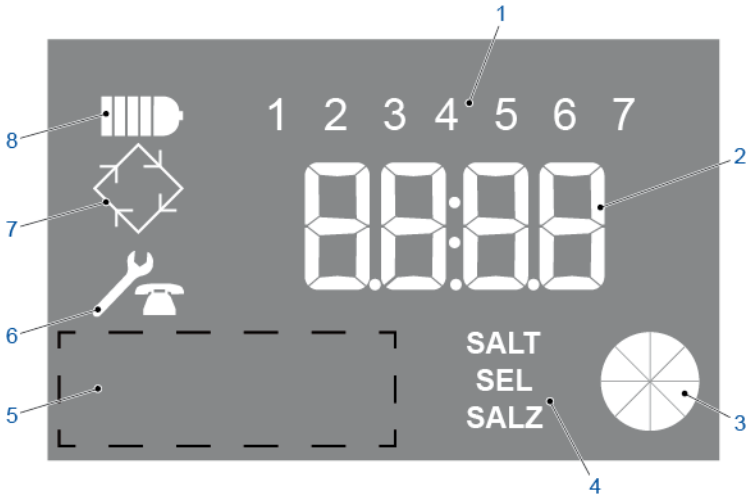
The variable brining function is designed to save water and salt by optimizing the brine to be used for resin regeneration when the controller is set up for a volumetric delayed mode (see chapter 5.3. Installation environment, page 35 for more information on programming of this option).This function requires that the brine for regeneration is prepared just before the regeneration cycle so that the controller takes into account the effective water volume that has been treated compared to the total volume capacity, and based on this value, it calculates the percentage of exhaustion of the resin bed before starting the regeneration.

As a result the regeneration will in that case always start by the refill cycle. The quantity of water to refill will be automatically calculated by the controller and adjusted by the percentage of exhaustion of the resin bed so that only the required volume of brine is prepared. As an example we can assume that if the controller registered 70% exhaustion of total resin bed capacity when starting a regeneration, in that case it calculates the theoretical amount of water needed to prepare brine for a complete regeneration and multiply this value by 0.7. Consequently the 30% of brine will be saved.

The percentage of brine saved for each regeneration can be displayed in the diagnostic mode of the controller. See chapter 6.9. Statistics, page 67 for more information.

Using this feature with volumetric immediate mode for regeneration will not allow to save water and salt since the regeneration will be done only when 100% of the resin is exhausted.

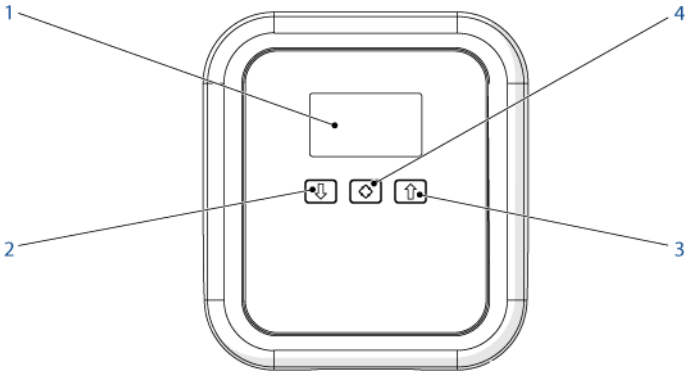
6.2. Display



1.	Days of the week	→ 1: Monday; → 2: Tuesday; → 3: Wednesday; → 4: Thursday; → 5: Friday; → 6: Saturday; → 7: Sunday; → Flashing if regeneration is enabled for that day.
2.	Parameter display	→ Clock; → Remaining volume capacity.
3.	Animated graphic gauge	→ Current water consumption; → Remaining treatable volume.
4.	Low salt alarm	→ Appears when low salt level is detected.
5.	Customer's area(*)	→ For customer's logo.
6.	Maintenance request icon	→ Appears when softener needs technical maintenance.
7.	Regeneration icon	→ Flashes in programming mode; → Flashes during brining; → Appears during regeneration.
8.	Battery operation icon	→ Appears when the controller is operating on battery.

(*): The customer's logo may be included on the display if requested by the customer. Contact Pentair for further information.

6.3. Commands



1. Display → Used to show informations, see 6.2. Display, page 48.
2. ⇩ - Down arrow
   → Pass to the next digit during programming steps;
   → Reset the statistics;
   → Reset salt alarm count down;
   → Cancel a manual regeneration.
3. ⇧ - Up arrow
   → Edit the displayed value during programming steps;
   → Enter statistics menu.
4. ◇ - Regenerate
   → Enter in basic programming;
   → Validate a parameter and switch to the next one if available;
   → Start an immediate regeneration.

6.4. Password

Mandatory
The access to the controller operating parameters requires the input of a 4-digit code.

Note
The default passwords are 0000 for the basic menu and 1111 for the intermediate and advanced menu.

6.4.1. Access password

A Enter the menu.
B Use ⇧ to modify the digit.
C Press ⇩ to pass to the next digit.
D Press ◇ to validate the password.

6.4.2. Changing the password

A Enter the menu.
B Press ⇩ and ⇧ for 5 seconds.
C Change the password using ⇧ to modify the digit and ⇩ to pass to the next digit.
D Press ◇ to validate the new password.

6.5. Controller setting

Note
Menus are displayed in a defined and incremental order.

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

Mandatory
In order to store the new settings in the programming mode, it is necessary to go through all the parameters.

6.6. Basic programming

6.6.1. Basic programming mode chart

Parameter description	Range of values	Default value	Units of measure	Notes
Current time	0:00 - 23:59	10:00	hour: minute	-
Day of week	1 - 7	1	N/A	The day is shown in the upper part of the display. 1: Monday 2: Tuesday 3: Wednesday 4: Thursday 5: Friday 6: Saturday 7: Sunday
Regeneration start time	0:00 - 23:59	2:00	hour: minute	-

6.6.2. Entering the basic menu

A Press and release ◇ to access the basic menu.
B Enter the password.
→ See "Access password", page 50.

6.6.3. Current time

Set the current time displayed.

A Use ⇧ to modify the digit.
B Press ⇩ to pass to the next digit.
C Press ◇ to validate and switch to the next parameter.

6.6.4. Day of week

Set the current day of the week.

A Use ⇧ and ⇩ to change the selection.

B Press ◇ to validate and switch to the next parameter.

6.6.5. Regeneration start time

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

A Use ⇧ to modify the digit.

B Press ⇩ to pass to the next digit.

C Press ◇ to validate.

6.6.6. End of programming

Note
The controller saves the modifications and return automatically to service mode.

End of programming and modifications saving:

6.7. Intermediate programming

6.7.1. Entering the intermediate menu

A Press [⇩] and [⇧] for 5 seconds to access the intermediate menu.
B Enter the password.
→ See "Access password", page 50.

6.7.2. Regeneration mode

SH0: Time clock regeneration on predefined days;
SH1: Volumetric delayed regeneration;
SH2: Volumetric immediate regeneration;
SH3: Regenerations are initiated based upon a programmed time interval (every 2, 3, 4, 6, 8 or 12 hours). The first generation starts at the regeneration time set in the basic menu and following regeneration will be carried out depending on the programmed interval;
SH4: Time clock regeneration.

Set the regeneration mode.

A Use [⇧] and [⇩] to change the selection.
B Press [◇] to validate and switch to the next parameter.

6.7.3. Display units type

Note
The display shows the unit use for remaining volume.

Note
The volume unit can be set in liters (Lt), in cubic meters (MC) or in gallons (GL).

Note
This parameter can be modified only in the advance programming menu.

Unit used for remaining volume:

A Press [◇] to switch to the next parameter.

6.7.4. Interval between regenerations

Note
This option is displayed only if **SH** (regeneration mode) is set to 3.

Set the interval between regenerations: 2, 3, 4, 6, 8 or 12 hours:

A Use [⇧] and [⇩] to set the interval.
B Press [◇] to switch to the next parameter.

6.7.5. Variable brining function

Note
If the variable brining function is enable, the brine tank will be filled for brine preparation before regeneration.

Note
After each 10 regeneration cycles, the controller will perform the next regeneration with no optimization of the salt usage. This to preserve resin bed efficiency.

A Use ⇧ and ⇩ to enable or disable the brining function.
B Press ◇ to validate and switch to the next parameter.

6.7.6. Refill option

Note
This option is displayed only if **Vb** (brining function) is set to OFF.

Note
This option defines if the brine tank refill cycle is done before (0) or after (1) each regeneration.

A Use ⇧ and ⇩ to set the brine tank refill.
B Press ◇ to validate and switch to the next parameter.

6.7.7. Inlet water hardness

Note
This option is displayed only if **SH** (regeneration mode) is set to 1 or to 2.

Set the inlet water hardness in °f (French degrees), °d (German degrees) or mg/L of $CaCO_3$.
A Use ⇧ and ⇩ to set the hardness.
B Press ◇ to validate and switch to the next parameter.

6.7.8. Outlet water hardness

Note
This option is displayed only if **SH** (regeneration mode) is set to 1 or to 2.

Mandatory
Make sure the mixing device is correctly set up to match with the programmed value.

Mandatory
Use the same unit as the one used for the inlet hardness.

Set the outlet water hardness in °f (French degrees), °d (German degrees) or mg/L of $CaCO_3$.

A Use ⇧ and ⇩ to set the hardness.
B Press ◇ to validate and switch to the next parameter.

6.7.9. Resin exchange capacity

Note
This option is displayed only if **SH** (regeneration mode) is set to 1 or to 2.

Mandatory
Use the same unit as the one used for the hardness.

Mandatory
In case the mixing device is installed downstream the meter, set up this parameter to 0.

Note
The resin exchange capacity can be set from 1 to 10 in °f·m^3/L, °d·m^3/L or g of $CaCO_3/L_{Resin}$.

Set the resin exchange capacity.

A Use ⇧ and ⇩ to set the exchange capacity.
B Press ◇ to validate and switch to the next parameter.

6.7.10. Salt dosage

Note
The salt dosage can be set from 80 to 200 g/L.

Set the quantity of salt in gram per liter of resin to be used for each regeneration.

A Use ⇧ and ⇩ to set the dosage.
B Press ◇ to validate and switch to the next parameter.

6.7.11. Resin volume

Note
The resin volume can be set from 1 to 999 liters.

Set the resin volume.

A Use ⇧ and ⇩ to set the volume.
B Press ◇ to validate and switch to the next parameter.

6.7.12. Reserve capacity management

Note
This option is displayed only if **SH** (regeneration mode) is set to 1 or to 2.

Note
The value can be set from 0 to 1.

Set the kind of reserve capacity management.

A Use ⇧ and ⇩ to set the value.
B Press ◇ to validate and switch to the next parameter.

6.7.13. Reserve volume in %

Note
This option is displayed only if **SH** (regeneration mode) is set to 1 and **rM** (reserve capacity management) is set to 0.

Note
The percentage value can be set from OFF (0%) to 50%.

Set the value of reserve volume expressed in %.

A Use ⇧ and ⇩ to set the reserve volume.
B Press ◇ to validate and switch to the next parameter.

6.7.14. Opening time of brine valve

Note
The display shows the time (in hour) of the brine valve opening to prepare the total volume of brine.

Note
The opening time can be set from 0h to 24h.

Note
This option is displayed only if **vB** (variable brining) is set to ON and **Pr** (refill first) is set to 1.

Set the opening time of brine valve:

A Use ⇧ and ⇩ to set the opening time.

B Press ◇ to validate and switch to the next parameter.

6.7.15. First regeneration cycle duration

Note
The duration of the regeneration cycle can be set from 0 (OFF) to 99 minutes.

Set the first regeneration cycle duration.

A Use ⇧ and ⇩ to set the duration.

B Press ◇ to validate and switch to the next parameter.

6.7.16. Second regeneration cycle duration

Note
The duration of the regeneration cycle can be set from 0 (OFF) to 99 minutes.

Set the second regeneration cycle duration.

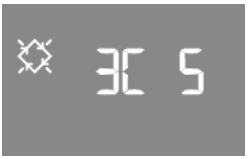
A Use ⇧ and ⇩ to set the duration.

B Press ◇ to validate and switch to the next parameter.

6.7.17. Third regeneration cycle duration

Note
The duration of the regeneration cycle can be set from 0 (OFF) to 99 minutes.

Set the third regeneration cycle duration.

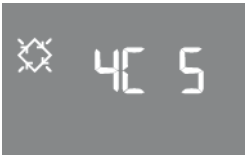


A Use ⇧ and ⇩ to set the duration.
B Press ◇ to validate and switch to the next parameter.

6.7.18. Fourth regeneration cycle duration

Note
The duration of the regeneration cycle can be set from 0 (OFF) to 99 minutes.

Set the fourth regeneration cycle duration.



A Use ⇧ and ⇩ to set the duration.
B Press ◇ to validate and switch to the next parameter.

6.7.19. Chlorine cell control

Note
This option activate the chlorine producer control cell.

Note
For the boards without chlorine cell management hardware, even if the chlorine control is activated, there will not be power in the back terminal ports 7-8. So it is not possible to produce Cl.

Set the chlorine cell control.

A Use ⇧ and ⇩ to set the control cell.
B Press ◇ to validate and switch to the next parameter.

6.7.20. Chlorine cell control duration

Note
The duration of the chlorine cell control duration can be set from 1 minute to 2C (second regeneration cycle duration).

Note
This option is displayed only if **Cl** (chlorine cell control) is set to ON.

Set the chlorine cell control duration.

A Use ⇧ and ⇩ to set the control cell duration.
B Press ◇ to validate and switch to the next parameter.

6.7.21. Holiday function

Note
The holiday function permit to put the system in a hibernation state after a predetermined number of days without any water consumption.

Note
The interval, before the holiday mode is activated, can be set from 0 (OFF) to 99 days.

Note
This option is displayed only if **SH** (regeneration mode) is set to 1 or to 2.

Set the interval before the holiday.

A Use ⇧ and ⇩ to set the interval.
B Press ◇ to validate and switch to the next parameter.

6.7.22. Prescaler flag

Note
Set the prescaler to 1 (pre-set) to use it with programmed values. To let it free, set it to 0.

Note
This option is displayed only if **SH** (regeneration mode) is set to 1 or to 2.

Set the prescaler flag.

A Use ⇧ and ⇩ to set the prescaler flag.
B Press ◇ to validate and switch to the next parameter.

6.7.23. Prescaler free for volumetric sensor

Note
The prescaler free can be set from 0.1 to 99,9.

Note
The prescaler free is set by default to 14 (applies to SIATA turbine with only one magnet).

Note
This option is displayed only if **FP** (pre-scaled flag) is set to 0.

Set the prescaler free.

A Use ⇧ and ⇩ to set the prescaler free.
B Press ◇ to validate and switch to the next parameter.

6.7.24. Number of regenerations before salt alarm

Note
The number of regenerations before salt alarm can be set from 0 - CO - 99.

Note
CO is a salt alarm generated by resistivity check of the drained water during the brine draw phase.

Set the number of regenerations before salt alarm light up on the controller's display.

A Use ⇧ and ⇩ to set the number of regenerations.
B Press ◇ to validate and switch to the next parameter.

6.7.25. Days enabled for regeneration

Note
This option is displayed only if **SH** (regeneration mode) is set to 0.

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 parameter.

6.7.26. Calendar override

Note
The calendar override can be set from 0 (OFF) to 99 days.

Note
In case no regeneration occurred during this programmed interval of day (calendar override), the controller will automatically start a regeneration.

Note
This type of regeneration is carried out at the regeneration time even on non-enabled days.

Note
This option is displayed only if **SH** (regeneration mode) is set to 1, to 2 or to 4.

Set the calendar override.

A Use [⇧] and [⇩] to set the calendar override.
B Press [◇] to validate and switch to the next parameter.

6.7.27. Main electrical frequency

Set the main electrical frequency to 50 or 60 Hz.

A Use [⇧] and [⇩] to set the frequency.
B Press [◇] to validate and switch to the next parameter.

6.7.28. Manual opening of brine valve

Note
During the opening and the closure of the brine valve, a mechanical movement appears on the display. When the valve is completely open, the display shows bMON and when the valve is completely closed, the display shows bMOF.

Caution
When this command is operated, the brine valve is under full control of the user/installer.

Warning
Pentair is not responsible for any damage caused by the incorrect use of this command by the user/installer.

A Press [⇧] to open the brine valve.
B Press [⇩] to close the brine valve.
C Press [◇] to validate and switch to the next parameter.

6.7.29. When recalculate the treatable water volume

Note
The value can be set to IMM (immediate) or dIF (at the end of next regeneration).

Note
This option is displayed only if **SH** (regeneration mode) is set to 1 or to 2.

Set when you want the treatable water volume to be recalculated.

A Use ⇧ and ⇩ to set the value.

B Press ◇ to end the intermediate menu programming

6.7.30. End of programming

Note
The controller saves the modifications and return automatically to service mode.

End of programming and modifications saving:

6.8. Advanced programming

Entering the advanced menu

A Press ◇ and ⇧ simultaneously for 5 seconds to access to the advanced menu.
B Enter the password.
→ See6.4.1. Access password, page 50.

6.8.1. Relays activation mode

Note
The number lit on the upper part of the display identifies the relay to set.

Select the relay.

A Set the relay 1 or 2 using ⇩ or ⇧.
B Press ◇ to go through the parameter showed in the bellow table.
C For each parameter use ⇩ or ⇧ to change the value and ◇ to confirm.

Parameter	Description	Characterisation
C1	1st regeneration cycle.	OFF to duration of 1st cycle.
C2	2nd regeneration cycle.	OFF to duration of 2nd cycle.
C3	3dr regeneration cycle.	OFF to duration of 3rd cycle.
C4	4th regeneration cycle.	OFF to duration of 4th cycle.
ri	Active during whole regeneration.	ON - OFF.
EC	Active from the end of regeneration until the programmed time (minutes).	0 to 99 min.
SA	Salt alarm.	OFF - ON.
Fr	Active if the alarm FR01 is present.	OFF - ON.
AL	Active in case of generic alarm active.	OFF - ON.
B	Active during refill.	OFF or rF (during refill) or rFd (during refill & brine draw).

6.8.2. BLFC size

Note
The value can be set to 00 (gpm), 01 (L/min) or 02 (Custom).

Set the BLFC size.

A Use ⇧ and ⇩ to set the size.
B Press ◇ to validate and switch to the next parameter.

6.8.3. BLFC range in gpm

Note
The value can be set from 0.01 gpm and 9.99 gpm.

Note
The option is displayed only if **rF** (BLFC size) is set to 02.

Set the BLFC range in gpm.

A Use ⇧ and ⇩ to set the BLFC range.
B Press ◇ to validate and switch to the next parameter.

6.8.4. Remote regeneration start mode

Note
This mode is used in case a remote regeneration is initiated.

Note
If this mode is deactivated (i), the regeneration will be immediate.
If this mode is activated (d), the regeneration will be delayed to the programmed start regeneration time.

Set the remote regeneration start mode.

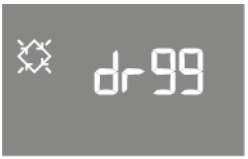
A Use ⇧ and ⇩ to set the start mode.
B Press ◇ to validate and switch to the next parameter.

6.8.5. Remote regeneration start delay

Note
Duration in minute of the external signal on port 15/16 of terminal strip to start a regeneration.

Set the remote regeneration start delay time.

A Use ⇧ and ⇩ to set the delay time in minute.
B Press ◇ to validate and switch to the next parameter.



6.8.6. Interval between maintenance

Note
The interval between maintenance can be set from 0 (OFF) to 52 weeks.

Set the interval between maintenance.

A Use ⇧ and ⇩ to set the interval.
B Press ◇ to validate and switch to the next parameter.

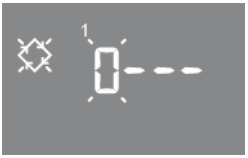
6.8.7. Technical service phone number

Note
The phone number may be set to a maximum of 7 fields, each consisting of 4 digits.

Note
The number lit on the upper part of the display identifies the current field.

Set the technical service phone number.

A Use ⇧ to modify the digit.
B Press ⇩ to pass to the next digit.
C Press ◇ for 3 seconds to pass to the next field of 4 digits.
D Press ◇ to validate the phone number and switch to the next parameter.



6.8.8. End of programming

Note
The controller saves the modifications and return automatically to service mode.

End of programming and modifications saving:

6.9. Statistics

The statistics menu displays some of the module's historical data.

A To access to this menu, press and hold [⇧] for 5 seconds.

B Use [◇] to switch to the next parameter in the statistics menu.

Note
The display of treated water is scrolling to allow display of more than 9999 litres.

Note
When the brining variable function **Vb** (brining option) is disabled (i.e. with OFF status) optimisation values E:xx are all set to E:00.

Note
Data on the time and date of the latest regenerations are present only if regenerations have been carried out.

Note
While the statistics are displayed, the regeneration icon is on, if not otherwise indicated.

	Data		Description
1	xxxx		Number of regenerations carried out.
2	SAxx		Number of regenerations remaining before triggering the salt alarm.
3	FFxx		Number of days elapsed since the last regeneration.
4	M3xxxxxx.xx		Water treated in m^3.
5	Hxxxxx		Number of hours elapsed since first installation.
6	LMxxxx		Average consumption since first installation in L/h.
7	P OFF/ON		Sensor presence: OFF or ON.
8*	Xx:xx		Time and date of past regenerations.
9*	M xx	01	Regeneration was launched in instantaneous manual mode.
		02	Regeneration was launched in delayed manual mode at the programmed time.
	A xx	01	Automatic regeneration launched in timed mode (SH:00).
		02	Automatic regeneration launched in combined mode (SH:01) because volume exhausted.
		03	Automatic regeneration launched in combined mode (SH:01) because maximum number of days for obligatory regeneration has been reached.
		04	-

	Data		Description
9*	A xx	05	Automatic regeneration launched in volume mode (SH:02).
		06	Automatic regeneration launched in volume mode (SH:02) because maximum number of days for obligatory regeneration has been reached.
		07	-
		08	Automatic regeneration launched in interval mode (SH:03).
		09	Automatic regeneration launched in time clock mode (SH:04).
	S xx	01	Regeneration started instantaneously by remote start.
		02	Regeneration started at programmed time by remote delayed start.
	xx		Number of days elapsed since the previous regeneration.
	Dnxx		Elapsed days since last signal from the meter was received.
	Exxx		Percentage of water saving performed.
	Xxxx		Conductivity during phase 1.
	Xxxx		Conductivity during phase 2.
	T2xx		Elapsed time to read conductivity in phase 2.
	Xxxx		Phase and time in which regeneration was skipped.
	Xxxx		Conductivity level for what washing phase was ended.
	Alxx	NOAL	No alarm.
		AL01	Salt quantity too low during phase 2.
		AL02	Sensor disconnected during the regeneration.
		AL03	Sensor presence alarm.
		AL04	Conductivity not properly restored after regeneration.
		AL05	Hardware reset occurred during the regeneration.
		AL06	Regeneration stopped manually.
10	U 1-7		Water consumption average (m^3 or L) for each day (evaluated considering the last 4 weeks).
11	rExxxxxx		Reserve for the current day in m^3 or L.
12	AAA.Y		Software version and revision.

* Parameters repeated for the last 3 recorded regenerations, each of those is indicated by progressive sectors of the circle icon.

6.9.1. Resetting the statistics

The statistic may be deleted in the statistics menu.

A Open the Statistics menu.
→ See 6.9. Statistics, page 67.

B Press and hold [⇩] for 5 seconds.

Note
The statistical data are reset to 0 and the message **CLS** flashes on the display for a few seconds.

6.10. Resetting the controller

6.10.1. Resetting the EEPROM

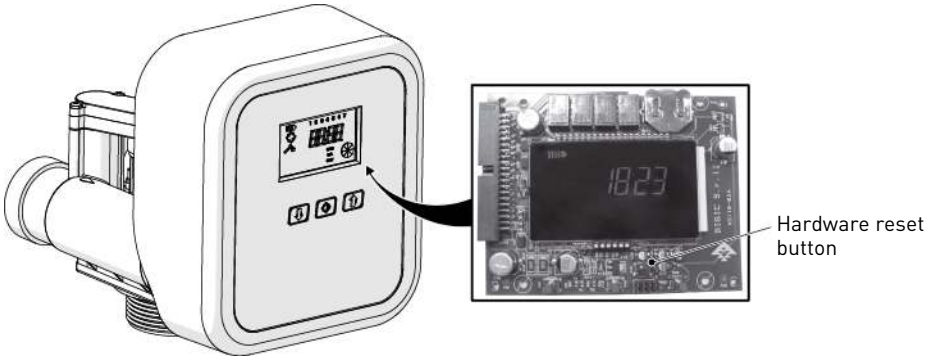
To reset the EEPROM to the default values, the controller must be in the service condition (no regeneration cycle running and clock displayed).

A Open the Statistics menu.
→ See 6.9. Statistics, page 67.
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.

6.10.2. Resetting the hardware

The SFE-EV-VIRIDION 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 plug in the SFE-EV-VIRIDION controller to the power source.
2. Proceed to programming according to your system specification if not done yet.
3. Start a manual regeneration by pressing ◇ for 5 seconds, and select immediate start. The motor will move. The first stop will either refill, either backwash (see 6.8. Advanced programming, "Variable brining function", page 54 and "BLFC size", page 64) If, 1B cycle (refill) is displayed, press and release ◇ to move forward to 1C cycle (blackwash). Once in this position, unplug the SFE-EV-VIRIDION controller from the power source.
4. With the outlet manual valve still closed, slowly open the inlet manual valve and the bypass.
5. If in the installation are not present manual inlet/outlet valve but only a bypass, open the nearest faucet close to the system, then slowly open the bypass valve. The valve and tank will slowly get filled with raw water, allowing air to be purged by the drain and/or by the open faucet next to the system. Open the inlet manual valve progressively until fully open position.
6. Once the drain runs clear and the inlet manual valve fully open, plug in again the SFE-EV-VIRIDION controller to the power source. Press ⇩ for 5 seconds to drive the valve in service position again.
7. After the controller is back in service position, enter advanced programming and go to the parameter that controls manual opening of the brine valve (see 6.8. Advanced programming, "Manual opening of brine valve", page 61).
8. Keep the brine valve open and check if the water flow in the brine tank. Refill until the water reach the air check level, then close the brine valve.
9. Start again manual regeneration by pressing ◇ for 5 seconds. If controller is programmed for refill first or variable brining let it perform a full refill (1B cycle). Otherwise skip to step 12.
10. In case there is a salt platform in the brine tank, after 1B cycle (refill) is finish, unplug the controller and close the inlet manual valve to perform the following operations: check if the water level has overcome the platform level for at least 5 cm or at least 10 cm if variable brining function is activated. If not cut the salt platform feet in order to create this condition. Mark the level reached by water with a pen. Put salt in the brine tank, and check the level reached by after salt refill, mark this level also. 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 any irregularity during regeneration that may lead to softener inefficiency.
11. Set the safety brine valve Floater in-between the higher marked level and the overflow elbow.
12. Plug the controller to power. It is now in backwash position. Press ◇ to move to 2C cycle (brine draw).

13. Once in 2C cycle (brine draw) check if the brine is effectively drawn by the valve, and advance to the next cycle. In case controller is programmed for refill after the regeneration, move it to 5C cycle (refill) and perform operations described on steps 9 to 11.
14. Press ◇ to move the controller is service position. Open a faucet and run the water for a couple of minutes, then check the hardness and eventually adjust the residual hardness if valve have a mixing device.

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.

8. Operation

8.1. Display examples

- In service in time clock control mode:

- In service in volumetric control mode:
  this display alternate with the display of time clock control mode:

- During regeneration:

- Holiday mode:

- AL02, conductivity reading error:
  the controller couldn't register conductivity values during all or part of the regeneration cycle:

- AL04, conductivity too high:
  the value of the conductivity at the end of the regeneration is too high:

8.2. 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.

8.3. Manual regeneration

To initiate a manual regeneration:

A Press and hold ◇ for 5 seconds.
→ The SFE-EV-VIRIDION controller can be used to either start regeneration immediately or delay it until the programmed time.

B Use ⇧ and ⇩ to scroll between immediate regeneration (AI) or delayed regeneration (Ad) 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.

8.4. 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.

8.5. Regeneration with remote start signal and regeneration inhibit signal

With the SFE-EV-VIRIDION controller, the regenerations can be remotely started by an external signal (dry contact) by short-circuiting the terminal block 15 and 16 at the back of the controller. The duration of contact closure must be at least 60 seconds. The controller allows two different methods of launching regeneration with remote start: immediate or delayed, see "Remote regeneration start mode", page 64 for more information on how to program it.

In the same way, any regeneration may be inhibited by short-circuiting pins 13 and 14 of the terminal block at the back of the controller. As long as the contact between these 2 pins is closed, no regeneration of any type can start.

8.6. Holiday function

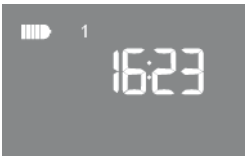
When programming the SFE-EV-VIRIDION for a volumetric control mode, you can also activate the "Holiday function". This feature will place the system in a hibernation state after a predetermined number of day without any water consumption that you program in the advanced menu (See 6.7.21. Holiday function, page 59). This means that no regeneration based upon calendar override or external signal can be started.

When the feature is activated in the advance programming menu, and when there is no water consumption during the programmed number of day, the controller will perform a complete regeneration cycle and will place the system in stand by. The controller will then alternatively display "HOL" and the treatable volume of water.

As soon as water consumption is detected by the controller (pulses from the meter), then the SFE-EV-VIRIDION will perform a fast rinse of the resin bed and will schedule a complete regeneration cycle at the next regeneration time. If the variable brining option is activated, the brine tank will be filled 3 hours before the usual regeneration.

8.7. Battery operation

Note
During battery operation, regeneration is not carried out and it is not possible to modify parameters.



Note
If the programmed regeneration mode is volumetric (delayed or immediate), the time of day and remaining available volume are displayed alternatively.

Caution
The volume is not counted down, only displayed.

8.8. Service position search

When powered on, the module may sometimes display F1-I or F2-I, where the number indicates the first or second attempt to position the controller in service position. A rotating bar is also shown to indicate that the motor is on. If both searches fail, the message FR01 is displayed see 9.4.8. Twin pilots replacement, page 89.

8.9. Salt Alarm function

The controller generates a salt alarm using two different methods.

Method 1

The presence of salt is detected by a ON-OFF salt sensor (ON when the tank contains salt, OFF when the tank does not contain salt). As soon as the sensor is set to OFF, the salt alarm icon is activated on the display (in three languages: French, German and English). As soon as the sensor is restored to ON status (i.e. the brine tank has been filled with salt), the salt alarm icon disappears from the display and the controller enables regeneration.

Method 2

The controller incorporates a counter that is decreased by one unit at each regeneration. As soon as the counter reaches zero, the salt alarm icon is activated on the display (in three languages: French, German and English) and any regeneration is postponed until the alarm has been manually deactivated. Once the alarm is removed, the controller will start any postponed regeneration. Press any key to exit alarm. See "Number of regenerations before salt alarm", page 60. If during the service the ⇩ button is pressed for 5 seconds, the salt alarm count down will be restored, display will show **SAL** to confirm that.

8.10. Operation during a power failure

The following conditions may arise when there is a power failure.

During stand-by, during parameter restore or during statistical analysis

In all these cases, the module returns to stand-by and displays the clock with battery icon on to indicate there is no mains power. If there is a power outage during parameter restore, the system exits restore status without saving any changes made. When power is restored, it will be necessary to go back to parameter restore and carry out the changes again.

During regeneration cycle movement or end of cycle search

In this case, the controller continues to display the current stage, the battery icon is turned on to indicate that mains power is off, the revolving bar is locked to indicate that the motor is off. When mains power is restored, the motor starts again and will complete the movement.

During regeneration cycle pause

In this case, the controller continues to display the current stage, the battery icon is turned on to indicate that mains power is off, the pause timer is stopped. When mains power is restored, the pause timer will resume and the system will move onto the next stage.

During an alarm

In this case, the module continues to display the alarm and the battery icon is turned on to indicate that mains power is off. The controller will remain in alarm status when mains power is restored.

8.11. Other Key Functions

- Press and hold the ⇧ and ⇩ buttons for 5 seconds to display the programmed maintenance phone number;
- in standby press and hold ⇩ button for 5 seconds to reset the salt alarm countdown;
- during the regeneration press and hold ⇩ button for 5 seconds to reset the salt alarm countdown.

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 in respecting 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 silicone lub / replace****	Check / lubricate with approved silicone lub / replace****	Check / lubricate with approved silicone lub / replace****	Check / lubricate with approved silicone lub / replace****	Clean / replace if necessary
Pistons ***	Check / lubricate with approved silicone lub / replace****	Check / lubricate with approved silicone lub / replace****	Check / lubricate with approved silicone lub / replace****	Check / lubricate with approved silicone lub / replace****	Replace
Seals & Spacers ***	Check / lubricate with approved silicone lub / replace****	Check / lubricate with approved silicone lub / replace****	Check / lubricate with approved silicone lub / replace****	Check / lubricate with approved silicone 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

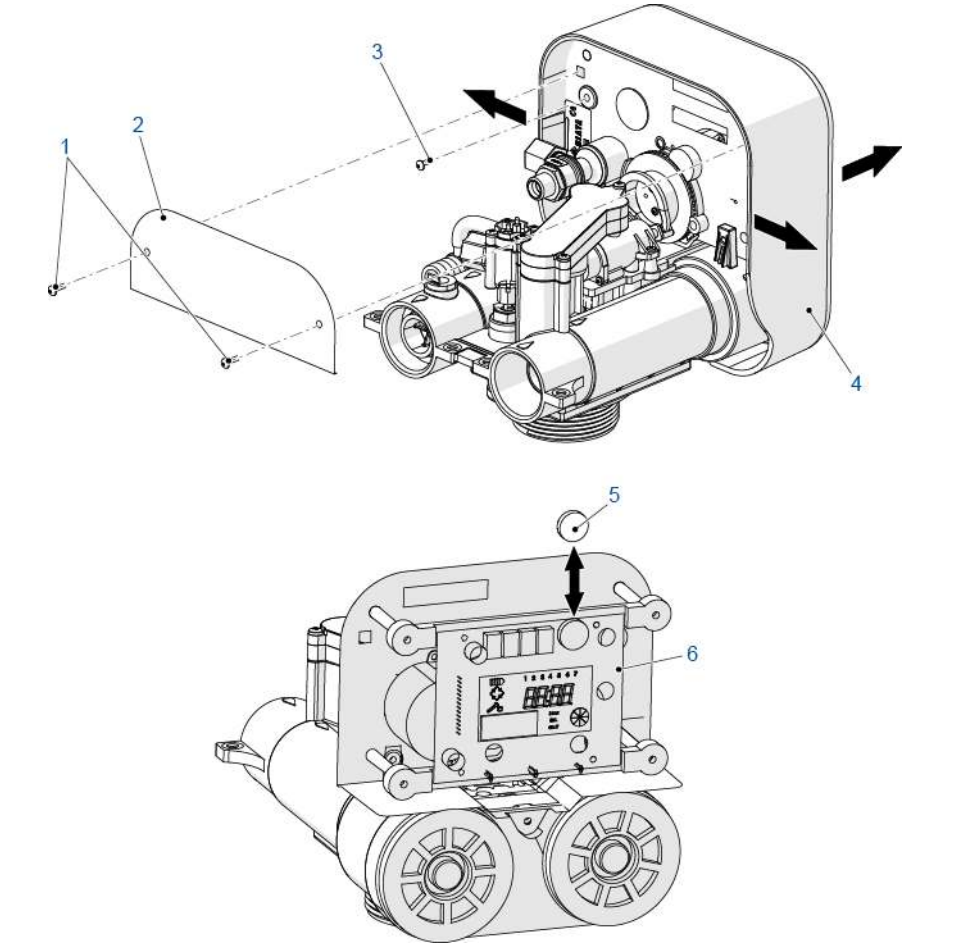
9.4.1. First steps

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.

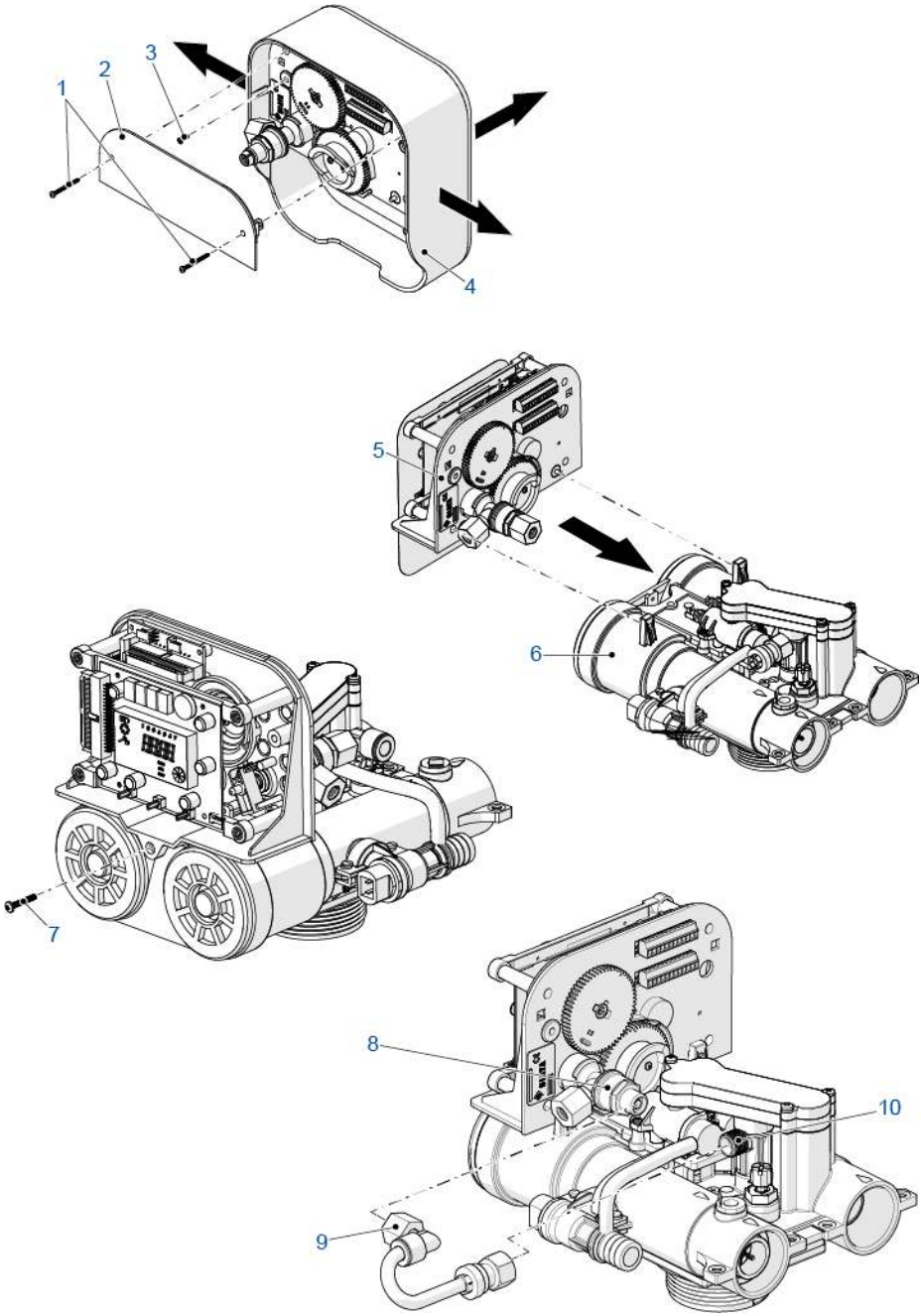
9.4.2. Controller battery replacement

No.	Operation
	Note The battery should be changed every year.
A	Using a screwdriver, unscrew (**1**).
B	Remove the back panel (**2**).
C	Using a screwdriver, unscrew (**3**).
D	Remove the cover (**4**) by pushing its sides as shown.
E	Change the battery (**5**) on the electronic board (**6**).
	Note Battery: FDK lithium battery CR2032U 3V.
F	Reverse above procedure steps to rebuild.



9.4.3. Controller on valve installation

No.	Operation
A	Using a screwdriver, unscrew (**1**).
B	Remove the back panel (**2**).
C	Using a screwdriver, unscrew (**3**).
D	Remove the cover (**4**) by pushing its sides as shown.
E	Install the controller (**5**) on the valve (**6**).
F	Using a screwdriver, screw (**7**) to fix the controller (**5**) on the valve (**6**).
G	Using the tube (**9**), connect the brine valve (**8**) to the injector (**10**).
H	Reverse step **A** to **D** to reassemble the controller cover.

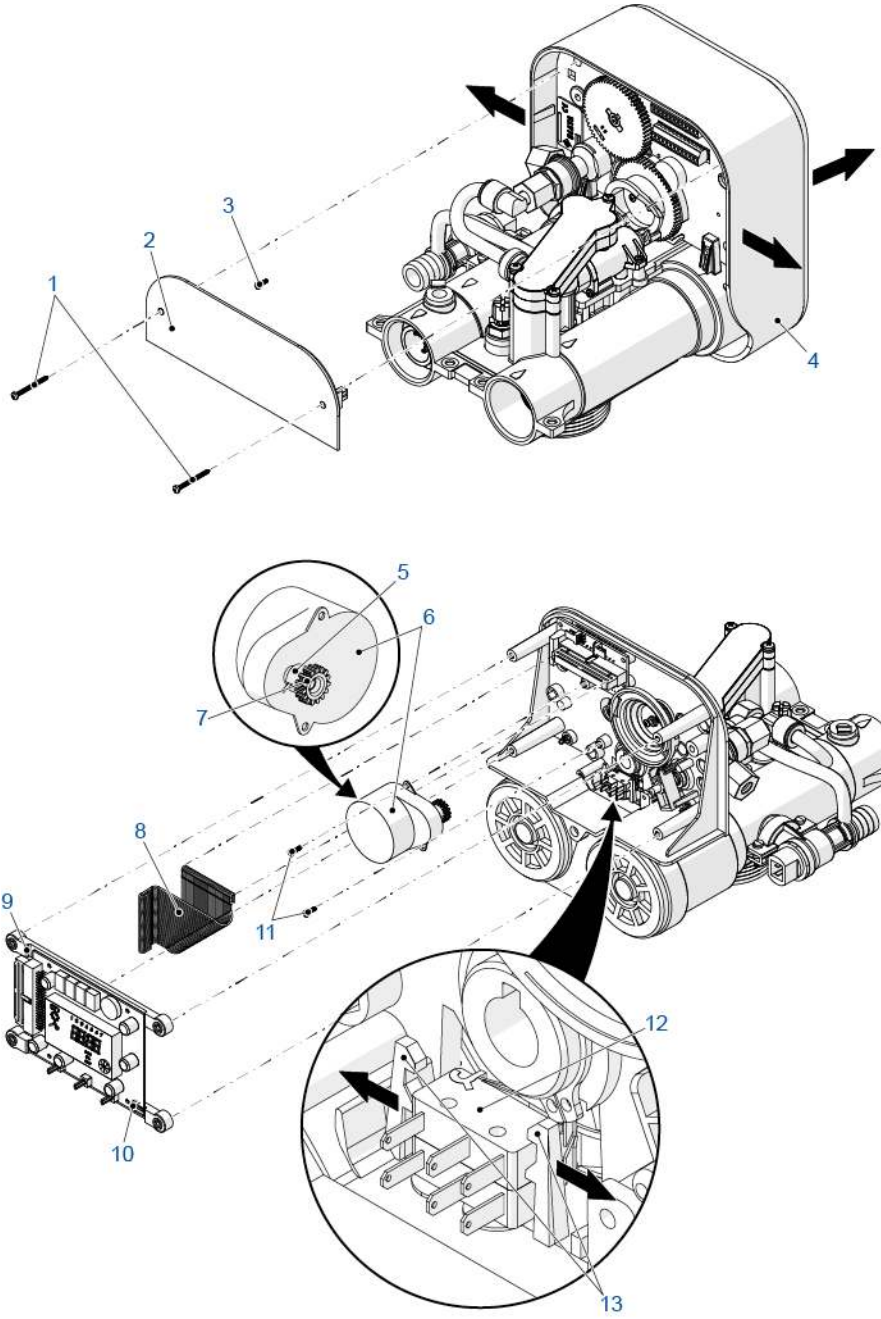

1
2
3
4
5
6
7
8
9
10

9.4.4. Motor replacement

No.	Operation
A	Using a screwdriver, unscrew (**1**).
B	Remove the back panel (**2**).
C	Using a screwdriver, unscrew (**3**).
D	Remove the cover (**4**) by pushing its sides as shown.
E	Disconnect the conductivity probe (**10**).
F	Pull the electronic board (**9**).
G	Disconnect the flat cable (**8**) and guard the electronic board (**9**).
H	Using a screwdriver, unscrew the two screws (**11**).
I	Remove the motor (**6**).
J	Remove the pinion (**7**) and check the condition of the spring (**5**).
K	If necessary, unscrew and change the spring (**5**) using pliers.
L	Replace the motor (**6**).
M	Reverse above procedure steps to rebuild.

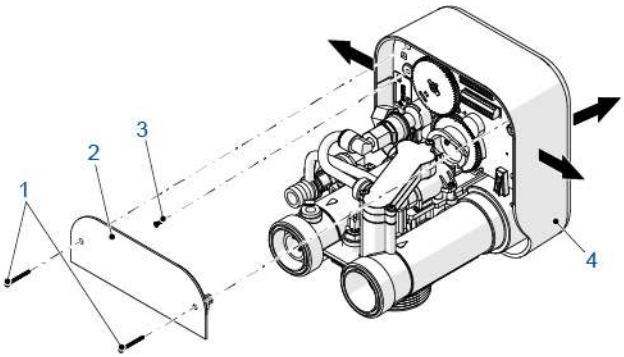
9.4.5. Micro-switch replacement

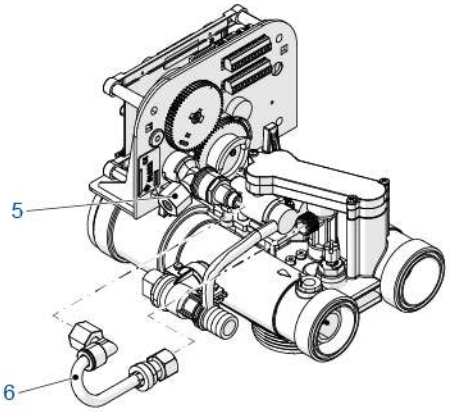
No.	Operation
A	Using a screwdriver, unscrew (**1**).
B	Remove the back panel (**2**).
C	Using a screwdriver, unscrew (**3**).
D	Remove the cover (**4**) by pushing its sides as shown.
E	Disconnect the conductivity probe (**10**).
F	Pull the electronic board (**9**).
G	Disconnect the flat cable (**8**) and guard the electronic board (**9**).
H	Disconnect the micro-switches (**12**).
	Note Pay attention to the connector order.
I	Remove the micro-switches (**12**) by pulling the clips (**13**) as shown.
J	Replace the micro-switches (**12**).
K	Reverse above procedure steps to rebuild.

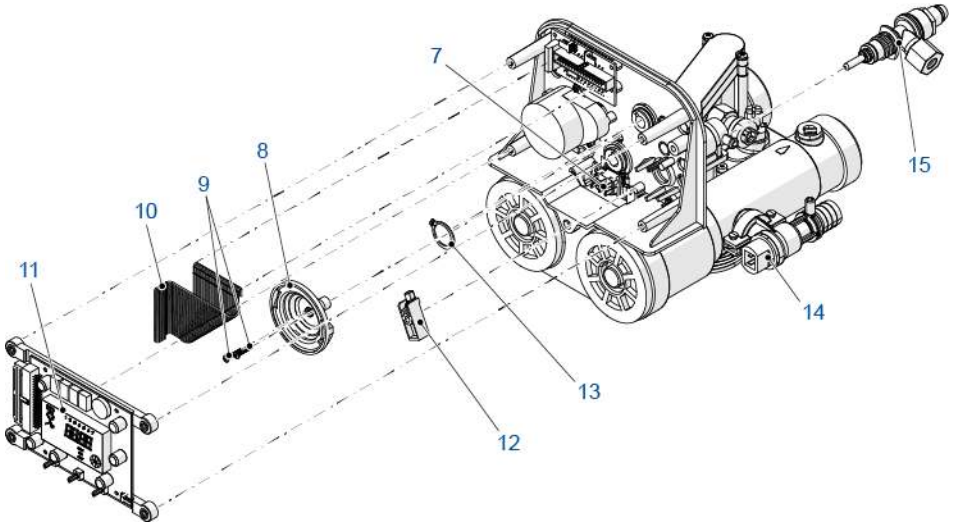

1
2
3
4
5
6
7
8
9
10
11
12
13

9.4.6. Brine valve replacement

No.	Operation
A	Using a screwdriver, unscrew (**1**).
B	Remove the back panel (**2**).
C	Using a screwdriver, unscrew (**3**).
D	Remove the cover (**4**) by pushing its sides as shown.
E	Using a wrench, disconnect the brine lines (**5** and **6**).
F	Disconnect the conductivity probe (**14**).
G	Pull the electronic board (**11**).
H	Disconnect the flat cable (**10**) and guard the electronic board (**11**).
I	Disconnect the micro-switches (**7**).
	Note Pay attention to the connector order.
J	Using a screwdriver, unscrew (**9**) and remove the brine cam (**8**).
K	Remove the pusher (**12**).
L	Using pliers, remove the circlip (**13**) and the brine valve (**15**).
M	Replace the brine valve (**15**).
N	Reverse above procedure steps to rebuild.

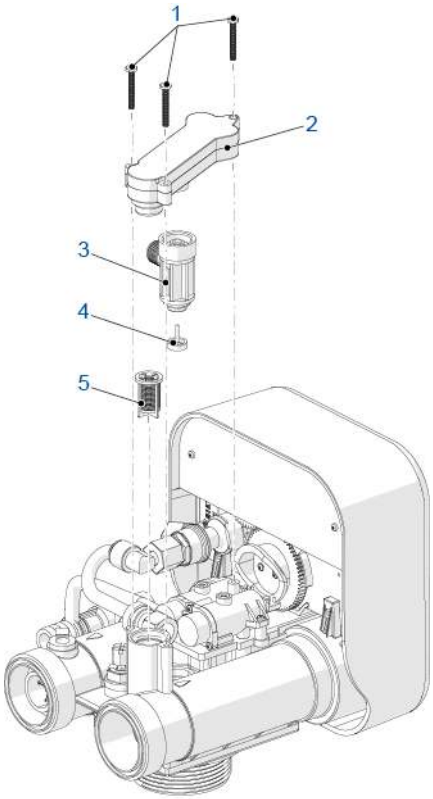

1
2
3
4


5
6


7
8
9
10
11
12
13
14
15

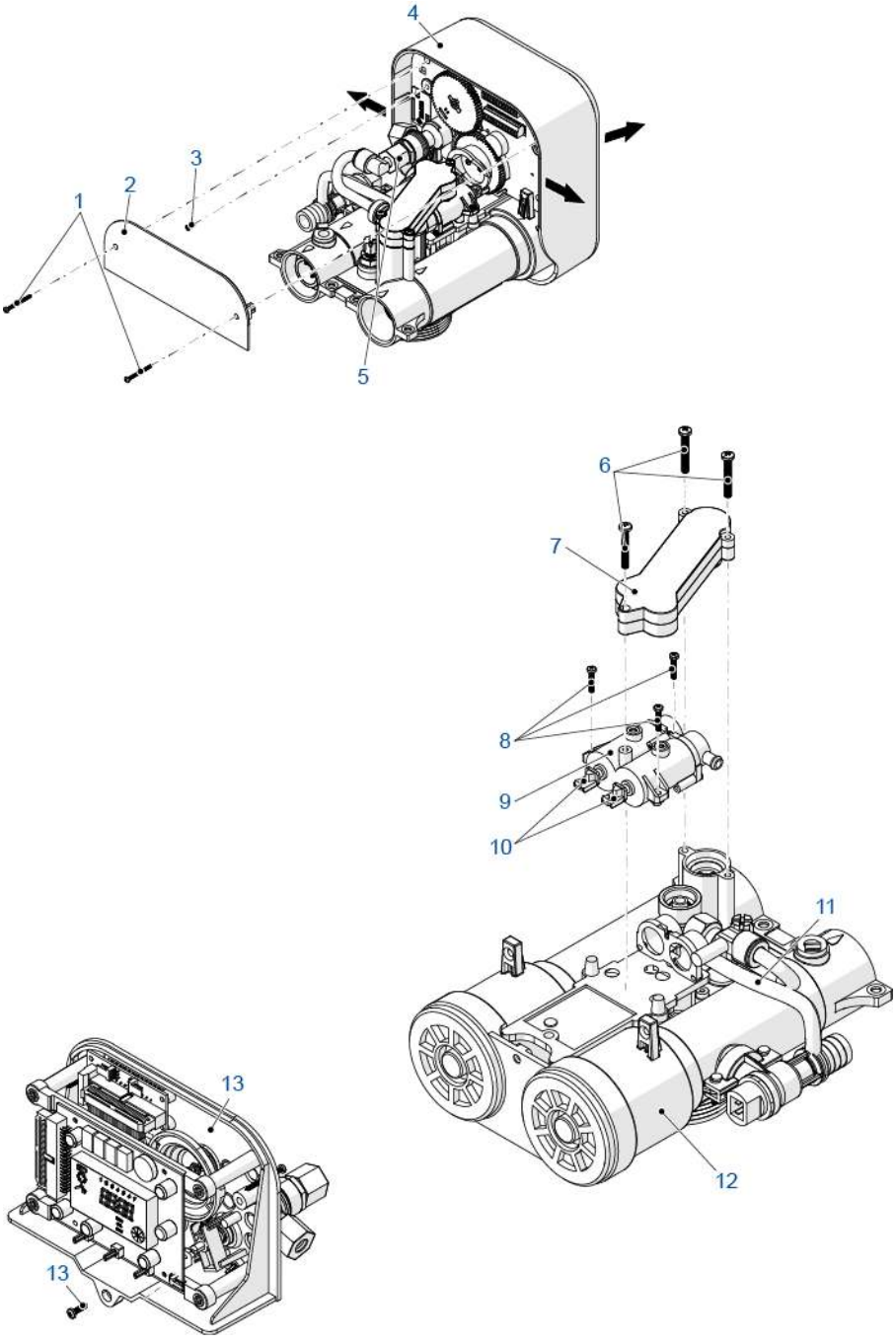
9.4.7. Injector and injector screen cleaning

No.	Operation
A	Using a screwdriver, unscrew (**1**).
⚠	**Caution** Unscrew the screws slowly to prevent gripping between the material and the screws.
B	Remove the collector (**2**).
C	Remove and clean the injector (**4**) and the flow breaker (**5**).
D	Using pliers, remove and clean the injector screen (**3**).
ℹ	**Note** Use water or compressed air to clean the injector, flow breaker and injector screen.
E	Replace and grease all the o-rings with silicone grease (cod. 8500).
F	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.


1
2
3
4
5

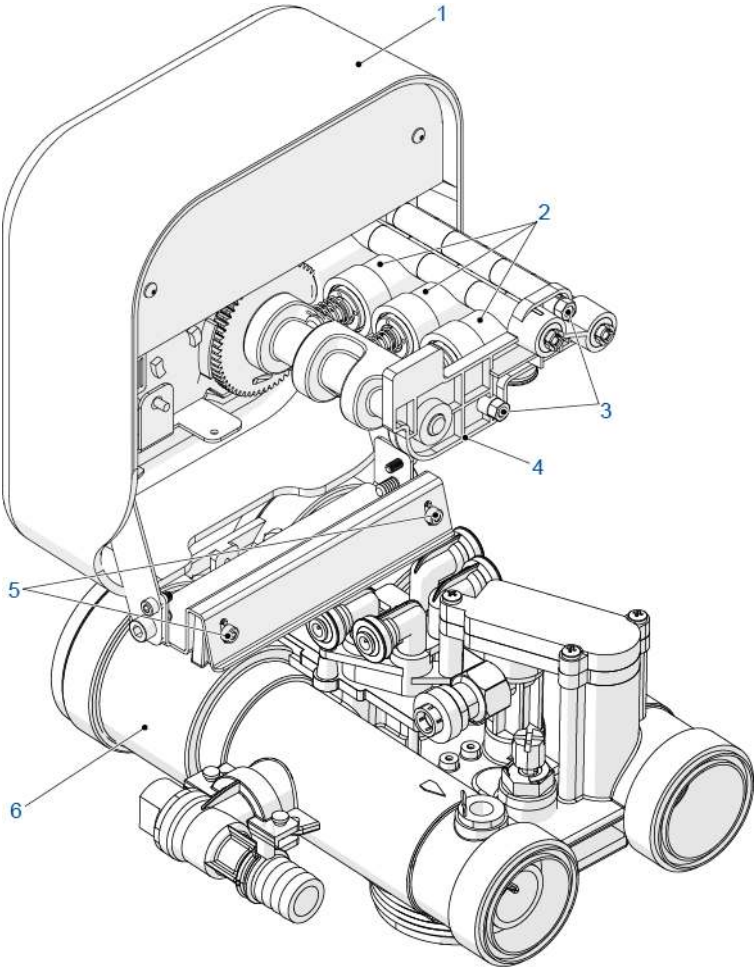
9.4.8. Twin pilots replacement

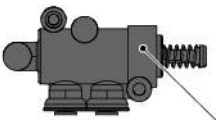
No.	Operation
A	Using a screwdriver, unscrew (**1**).
B	Remove the back panel (**2**).
C	Using a screwdriver, unscrew (**3**).
D	Remove the cover (**4**) by pushing its sides as shown.
E	Using a wrench, disconnect the brine valve (**5**).
F	Using a screwdriver, unscrew (**14**).
G	Remove the controller (**13**) from the valve (**12**).
H	Manually actuate the pistons (**10**) to drain out the water inside the valve to the drain.
I	Using a screwdriver, unscrew (**6**).
⚠	**Caution** Unscrew the screws slowly to prevent gripping between the material and the screws.
J	Remove the collector (**7**).
K	Using a screwdriver, unscrew (**8**).
L	Unplug the pilots to drain tube (**11**).
M	Remove and change the twin pilot (**9**).
ℹ	**Note** Replace all of the twin pilots (**9**) in case of damage. Only the pistons (**10**) can be changed separately.
N	Replace and grease all the o-rings and pistons (**10**) with silicone grease (cod. 8500).
O	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.

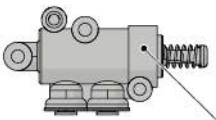

4
3
2
1
5
6
7
8
9
10
11
12
13
13

9.4.9. Pilots (external drivers connections) replacement

No.	Operation
A	Using a screwdriver, unscrew (**5**).
B	Remove the controller with the pilots (**1**) from the valve body (**6**).
C	Unscrew and remove the screws, the nuts and the washers (**3**).
D	Remove the clamping plate (**4**).
E	Remove and change the pilots (**2**).
	Note Replace the entire pilot (**2**) 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 (**7**) is placed next to the controller, the others pilots with four holes (**8**) 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.


1
2
3
4
5
6


7

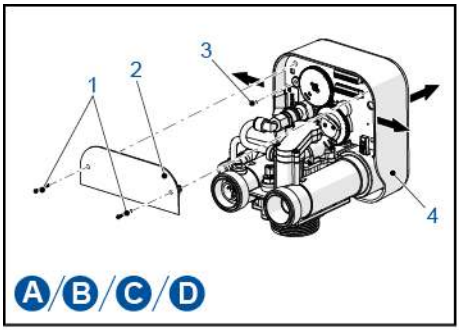

8

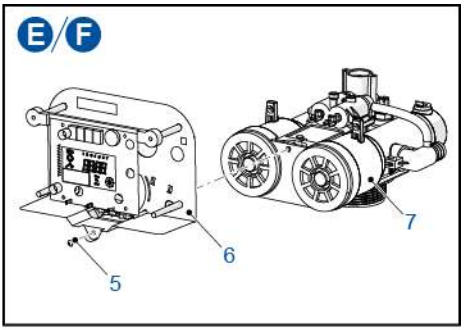
9.4.10. Internal pistons & seals and spacers replacement

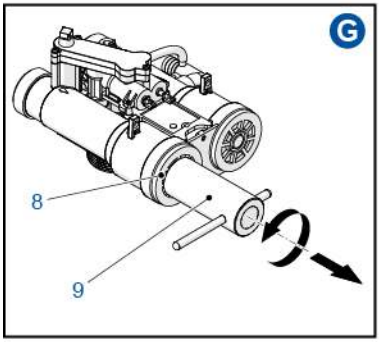
9.4.10.1 Disassembly

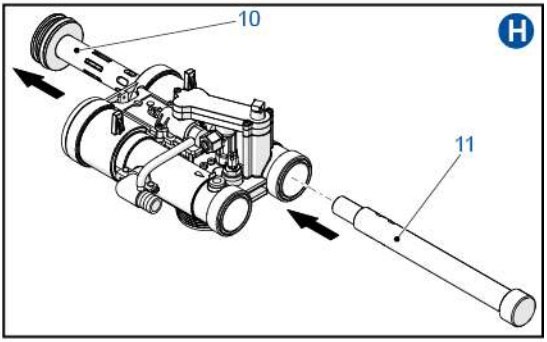
Note
The procedure to disassemble the inlet and outlet pistons is the same.

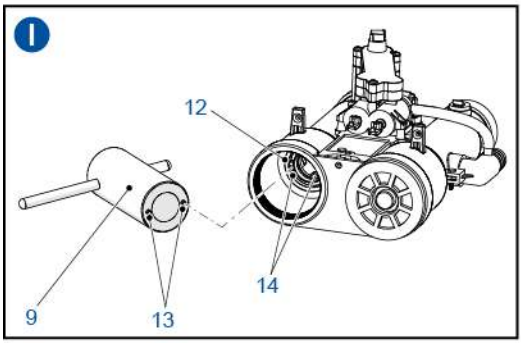
No.	Operation
	Note Use special tools from the 2238/05 kit to disassemble the valve internal parts.
	Caution Disconnect the inlet/outlet fitting before proceeding.
A	Using a screwdriver, unscrew (**1**).
B	Remove the back panel (**2**).
C	Using a screwdriver, unscrew (**3**).
D	Remove the cover (**4**) by pushing its sides as shown.
E	Using a screwdriver, unscrew (**5**).
F	Remove the controller (**6**) from the valve (**7**).
G	Using tool (**9**), unscrew the valve cap (**8**).
H	Match the tool (**11**) with the piston hole and push to slip off the piston (**10**).
I	Using tool (**9**), try to match the pins (**13**) of the tool in the ring nut's holes (**14**).
J	Using tool (**9**), unscrew and remove the ring nut (**12**).
K	Place tool (**11**) inside the valve and pull until you slip off the seals and spacers pack (**15**).
	Caution Do not forget the correct sequence of the seals and spacers pack (**15**). 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.
L	If necessary, change the piston (**10**) and the seals and spacers pack (**15**).
M	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 longer than the outlet piston).

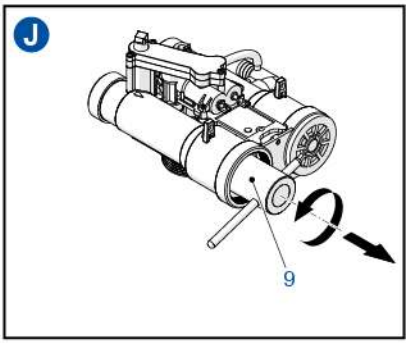

1
2
3
4
A/B/C/D

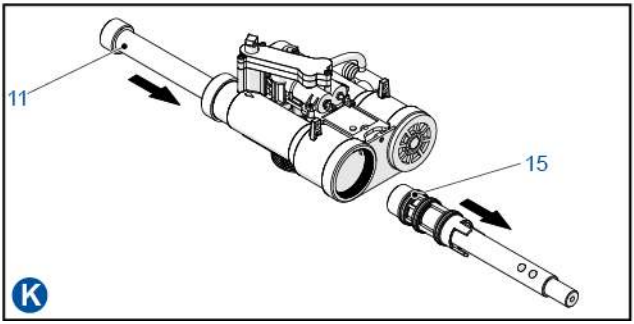

E/F
5
6
7


G
8
9


H
10
11


I
9
12
13
14

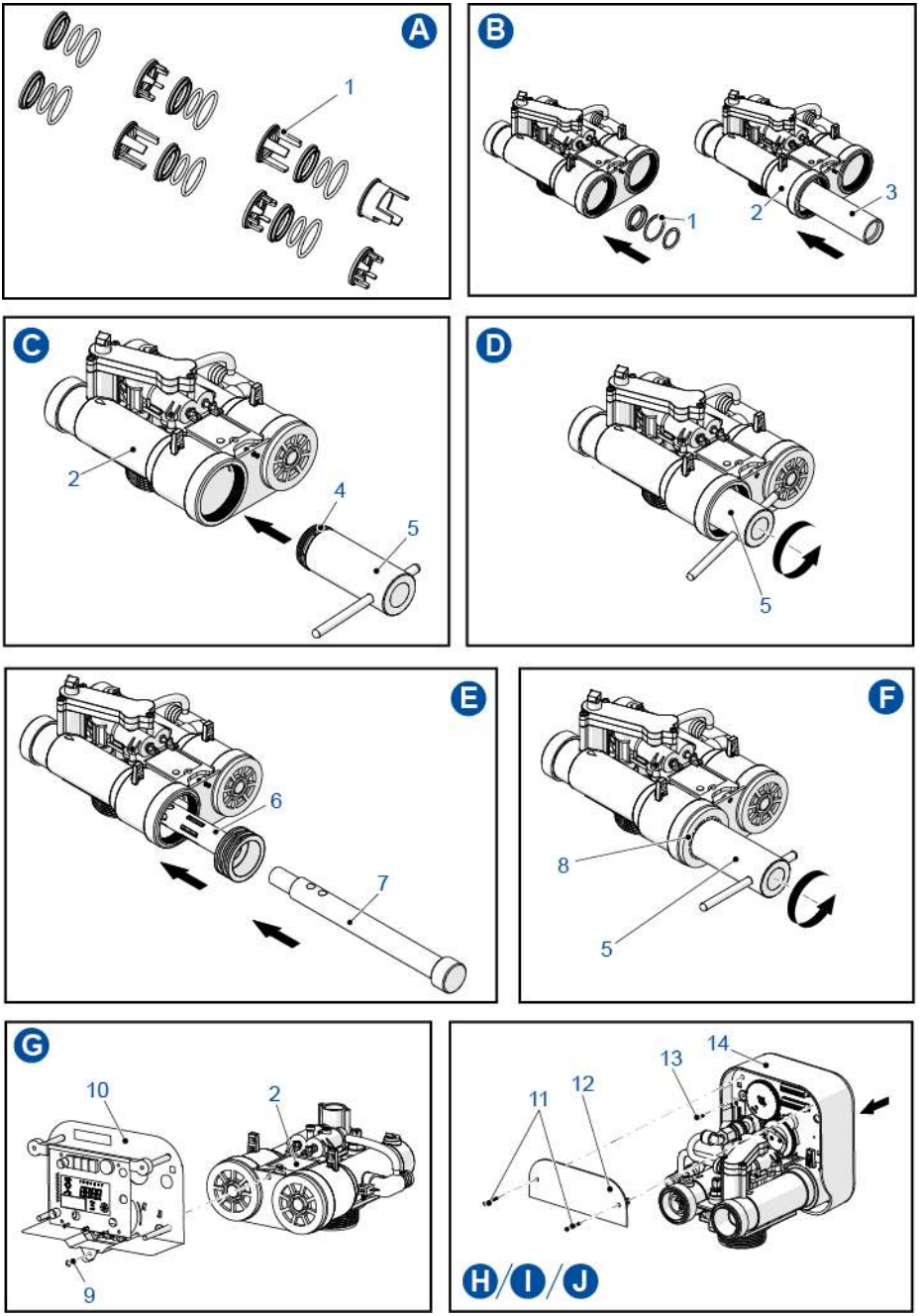

J
9


11
15
K

9.4.10.2 Assembly

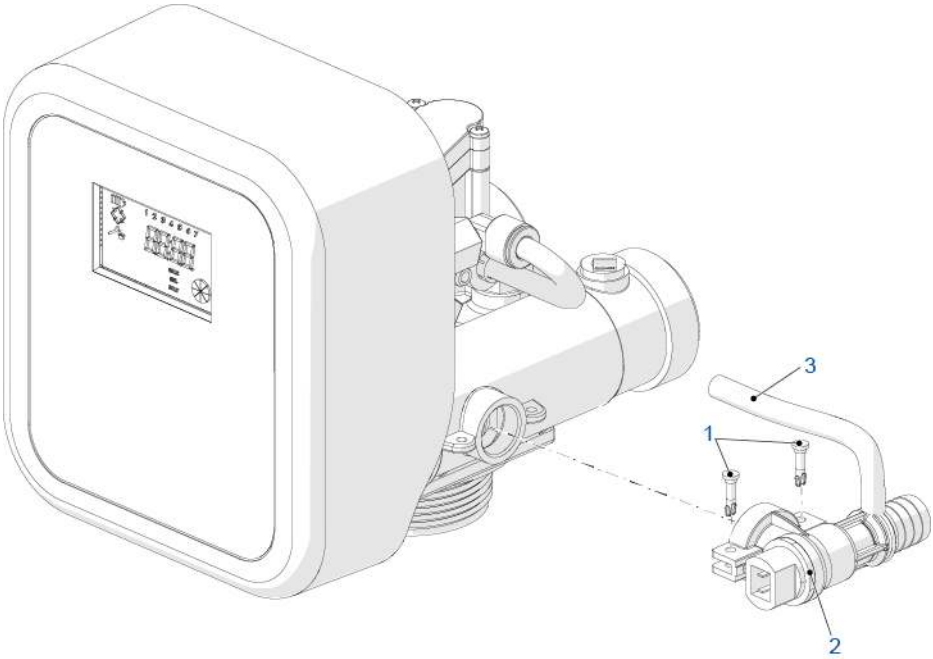
Note
The procedure to assemble the inlet and outlet pistons is the same.

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**).
H	Install the controller's cover (**14**) by pushing it as shown.
I	Fix the controller's cover with the screw (**13**).
J	Install the back panel (**12**) with the two screws (**11**).

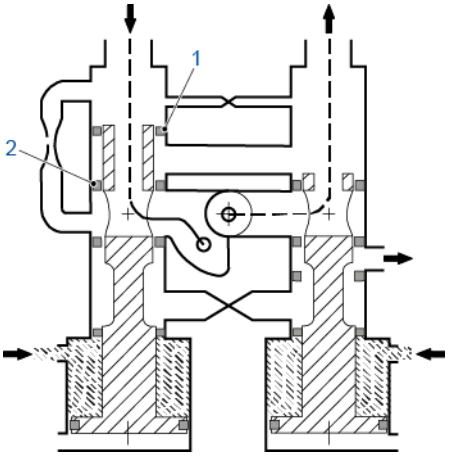

A
1
B
1
2
3
C
2
4
5
D
5
E
6
7
F
8
5
G
10
2
9
H/I/J
11
12
13
14

9.4.11. 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.



10. Troubleshooting



Issue	Cause	Reset and recovery
Leaks to the drain during service or when in stand-by.	Leak from pilot.	**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. **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. 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.

Issue	Cause	Reset and recovery
Hard water detected in the outlet.	Probable leakage between inlet and outlet or between the valve and tank seal.	**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. **B** The rise pipe o-ring may be damaged, disconnect the valve from the tank and check the o-ring status.
	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.
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 bar. 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.	Thoroughly check the connection assembly to the brine tank: **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.

Issue	Cause	Reset and recovery
Leaks to the drain during service or when in stand-by.	Leak through the piston/seals and spacer system.	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. 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.
The controller is not turned on.	Controller not plugged or no power is coming from the supply.	Connect the controller to the supply.
	Transformer faulty or wiring problem.	Using a DMM, check if the transformer is working properly. If it is working properly, check for a wiring problem, otherwise just change the transformer.
	Wiring problem.	Open the box and check if the harnesses are properly wired like showed in the wiring diagrams. Check if the harnesses are damaged.

Issue	Cause	Reset and recovery
FR01 end cycle alarm.	Micro-switch support damaged.	Open the controller box and check the integrity of the plastic parts holding the micro-switch.
	Cam not fixed.	Check if the cam is properly fixed by the circlip.
	Micro-switch stick damaged.	Check if the metal stick which closes the micro-switch is damaged.
	Micro-switch damaged.	Dismount the micro-switch and try to actuate it manually. If the controller goes back in service the micro-switch is working, if this is the case check for mechanical problems. If the controller does not go back in service, the micro-switch is damaged or there is a wiring problem.
	Wiring problem.	Using the electrical diagrams check if the wiring of the micro-switch is properly done. Check the integrity of the harness.
	Motor problem.	Check if the motor is running. Check motor wiring and the harnesses integrity.
		Check if motor shaft is linked to pinion gear and torque transfer to pinion during motor rotation.
The controller displays wrong parameters.	The controller is out of program.	Dismount the box and press the reset hardware button. If this does not solve the problem change the electronic board.
The controller is blocked, whatever button is pressed it does not gives feedback on the display.		
Controller displays ErEE or ErES.	EEprom parameters reading error/ EEprom statistics reading error.	If these parameters are displayed continuously, the board is damaged.
The controller does not start regeneration.	Inhibit signal active.	Check if there is a shortcut between the inhibit terminal ports.
	Bad programming.	Check if the controller is well programmed based on the system configuration.

10.1. Alarm messages

Inhibit signal

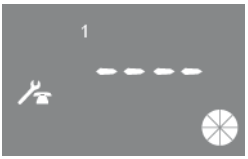
There is an inhibit signal input. The following screen alternates with the service screen in the display. Any incoming regeneration is blocked.

Salt alarm

No more salt in the brine tank. Fill the brine tank with salt if a sensor is present. Filling the tank instantly activates the salt sensor and turns off the salt alarm icon. If there is no salt sensor, fill the brine tank with salt and press any of the controller buttons. During the salt alarm, regenerations are not carried out.

Technical service request

Active at regular intervals (in weeks) that may be set by after-sales service. The alarm is deactivated by pressing any of the controller buttons.



FR01

End of cycle alarm. The module cannot find the end of cycle. During the end of cycle alarm, regenerations are not carried out.

AL02

Conductivity reading error. The controller couldn't register conductivity values during all or part of the regeneration cycle.

AL04

Conductivity too high. The value of the conductivity at the end of the regeneration is too high.

ErEE

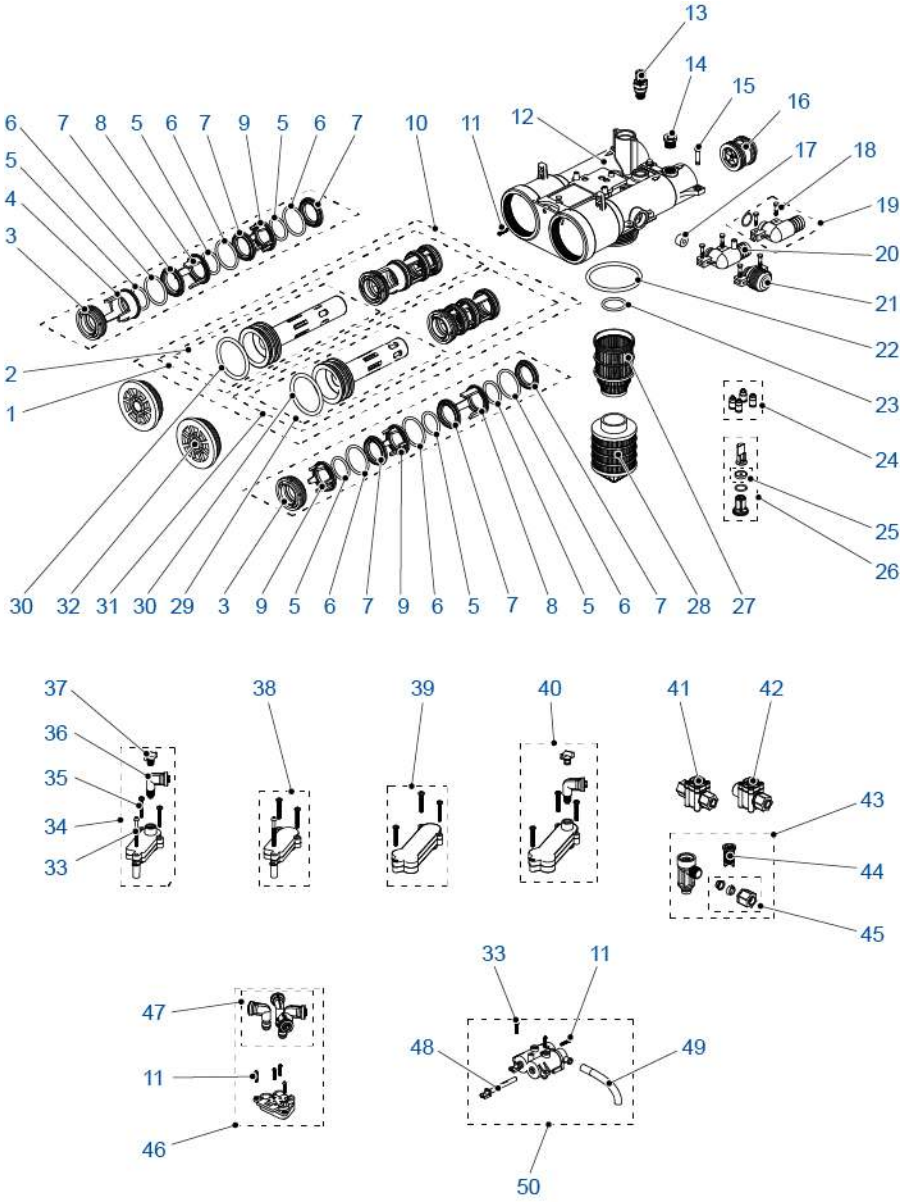
Error reading parameters from EEPROM. This may appear directly on start-up or after a hardware reset for a few seconds. In this error mode, the controller cannot read the preset parameters. These are reset.

ErES

Error reading statistics from EEPROM. This may appear directly after a hardware reset for a few seconds. In this error mode, the controller is unable to write/read summary information in the statistics menu.

11. Spare parts

11.1. Valve parts list



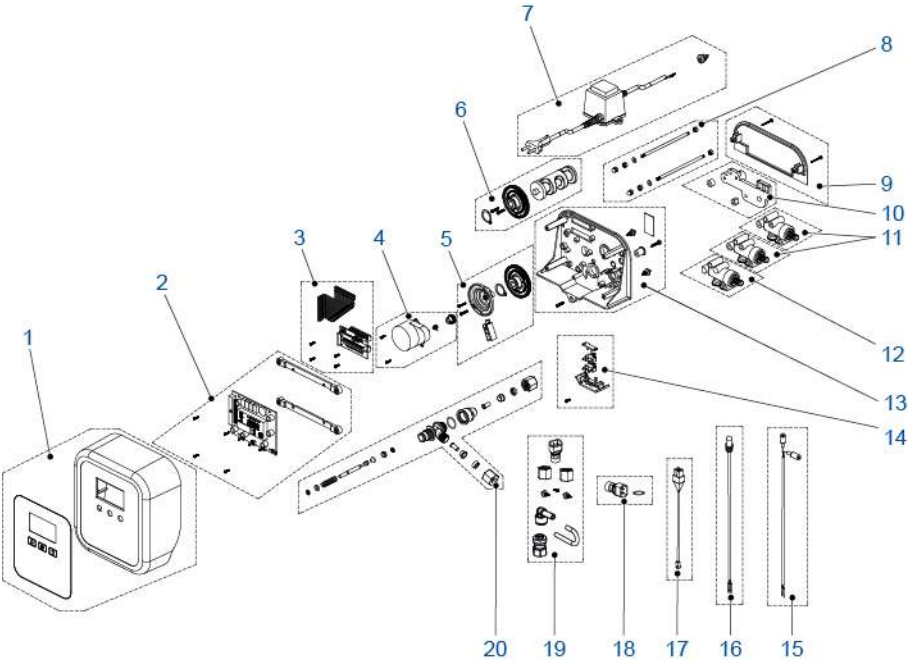
Item	Part number	Description	Assembly quantity
1	2230-IN/05	Inlet piston with S&S assy	1
*	2230-DIN/05	Inlet piston with S&S assy for demineralization cationic	1
2	1918/05	Inlet piston assy	1
3	K1-1518/05	S&S pack closure nut	1
4	K1-16	Longer spacer	1
5	K1-44	Internal o-rings	6
6	K1-45	External o-rings	6
7	K1-13	Seals holder ring	6
8	K1-15	Medium length spacer	2
9	K1-14	Short spacer	3
10	2230/05	Pistons with S&S assy	1
*	2230-D/05	Pistons with S&S assy for demineralization cationic	1
11	K1-104	Controller fixing screws	6
12+14 +32	2256-K01/05	Valve body blue service kit	1
*	2256-K02/05	Valve body blue service kit volumetric	1
13	24509-01	Mixing assy	1
14	K-2224-A/05	Turbine sensor holder nut	1
15	K-9/05	Inlet/outlet connection lock pin	1
16	2222/05	Internal turbine assy	1
17	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
18	K-9-S/05	Drain connection lock pin	1
19	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
*	K1-2249- CNVIR/05	Drain hose elbow for external connection valves with conductivity probe	1

Item	Part number	Description	Assembly quantity
20	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
*	K1-2249-NVIR/05	Drain hose elbow for twin pilot valves with conductivity probe	1
21	K1-2249-A/05	Drain connection 1" BSP male	1
*	K1-2249-AN/05	Drain connection 1" BSP male - black version	1
22	K1-6300-62	Tank adapter o-ring	1
23	K-46-1/05	Rise pipe o-ring	1
24	K-10028	Driver replica connection	1
25	K-10027	Backwash flow control BLFC washers kit	1
26	K-10026	Backwash flow control kit without backwash flow control BLFC washer kit	1
27	1001-32I	Upper strainer	1
28	1002-D32	Bottom strainer (Ø 32.mm)	1
29	1918-C/05	Outlet piston assy	1
30	K-41/05	Piston o-rings	1
31	2230-OUT/05	Outlet piston with S&S assy	1
*	2230-DOUT/05	Outlet piston with S&S assy for demineralization cationic	1
32	1915/05	Valve cap assy	2
*	1915-N/05	Valve cap assy - black version	2
33	K-102-L1/05	Short manifold screws	1
34	22-DK/05	Short manifold with 1/8" connection	1
*	22-DNK/05	Short manifold with 1/8" connection	1
35	106-K/05	Manifold screws	3
36	105-AS1/05	Quick connection elbow 1/8" threaded	1
37	K-23/05	1/8" cap with o-ring	1
*	K-23-N/05	1/8" cap with o-ring - black version	1

Item	Part number	Description	Assembly quantity
38	22-CK/05	Short manifold	1
*	22-CNK/05	Short manifold - black version	1
39	22-AK/05	Twin pilot manifold assy	1
*	22-ANK/05	Twin pilot manifold assy - black version	1
40	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
41	590-A/05	Chlorine cell remote mount	1
42	590-B/05	Chlorine cell direct mount	1
43	2231-B/05	Inj assy - blue	1
*	2231-F/05	Inj for filter valves	1
*	2231-G/05	Inj assy - grey	1
*	2231-M/05	Inj assy - brown	1
*	2231-N/05	Inj assy - black	1
*	2231-R/05	Inj assy - red	1
44	18-K/05	Inj screen	1
45	66/05	Nut + tube sleeve	1
*	66-K/05	Nut + tube sleeve	1
46	2252-1/05	External pilots connections assy	1
*	2252-1N/05	External pilots connections assy - black version	1
47	105-PORL/05	Quick connection elbow	4
48	32-GR/05	Small piston for twin pilot assy	1
49	K1-31	Twin pilot drain tubing kit	1
50	2250/05	Twin pilot assy	1
*	2250-N/05	Twin pilot assy - black version	1

* Not shown

11.2. SFE-EV-VIRIDION spare parts



Item	Part number	Description	Assembly quantity
1	K-10002/01	Black box with cover SFE-EV VIRIDION	1
2	K-10025/01	Kit electronic board SFE-EV with frame & screws	1
3	K-10164	Interface SFE-EV SPX/VIR with flat cable	1
4	94-R7K/05	Kit motor. 1 G/1" 12V 50 Hz	1
5	K-10001	Assy drive cam	1
6	2221-328/05	Cam 3 pilots with gear	1
*	2221-215/05	Cam 2 pilots with gear	1
*	2229-1/05	Cam asymmetric SFE-EV Viridion twin pilot assy	1
7	95-STD1	Transformer 230/115 VAC 0,6	1
8	468-K2	Coupling bar 2 external drivers assy	1
*	468-K3	Coupling bar 3 external drivers assy	1
9	K-10008	SFE-EV Viridion back cover assy	1
10	433-KNM/05	Camshaft black backplate assy	1
11	2253-BMN/05	Pilot black 6mm Siata assy	1
12	2253-AMN/05	Terminal pilot black 6mm Siata assy	1
13	K-10003	SFE-EV Viridion black bracket assy	1
14	K88-BKL2/05	Kit auxiliary & homing micro-switch black	1
15	K-10110	Kit meter cable 50cm for back connector	1
16	K-10111	Chloride cell cable for back connector	1
17	K-10129	Kit conductivity probe harness L=750mm	1
*	K-10130	Kit conductivity probe harness L=1500mm	1
18	K-10058	Kit sensor with electrode chlorine GE	1
19	K-10151	Kit for SFE-V TP + conductivity probe	1
20	K-10004	BV assy 1 gpm	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)	1
*	2265-B/05	Kit fitting 1" BSP female threaded (nylon)	1
*	2265-C/05	Kit fitting 1 ¼" BSP female threaded (nylon)	1
*	2265-D/05	Kit fitting Ø 32 mm for DN 25 pipe to glue (ABS)	1
*	2265-GB/05	Kit fitting Ø 33,5 mm 1" pipe (ASTM) to glue (ABS)	1
*	2265-K/05	Kit fitting 1 ½" BSP female threaded (nylon)	1
*	2265-H/05	Kit fitting 1" BSP female - 1 ½" BSP male threaded (nylon)	1
*	2265-I/05	Kit fitting 1 ¼" BSP female - 2" BSP male threaded (nylon)	1

* 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)	1
*	494-C/05	Kit fitting Ø 40 mm for DN 32 pipe to glue (PVC)	1
*	494-F/05	Kit fitting 1 ½" BSP male threaded (BRASS)	1
*	494-S/05	Kit fitting 1 ¼" NPT female threaded (PVC)	1
*	494-T/05	Kit fitting Ø 42.4 mm for 1 1/4"pipe (ASTM) to glue (PVC)	1

* Not shown

11.4. Accessories

Brine valve

Item	Code	Description	Assembly quantity
*	60067-03	SBV 2310 - without air check	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.nixing + 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 ½" female - ¾" male	2
*	K-491/05	Reduction 1 ½" female - 1" male	2

* Not shown

Meters

Item	Code	Description	Assembly quantity
*	2296/05	Turbine meter G 1 ½"	1
*	2297-2M/05	Turbine meter G ¾" (2 magnets)	1
*	2297/05	Turbine meter G ¾"	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 disposed 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.

www.pentair.eu