PENTAIR

INSTALLER MANUAL

FLECK 9100 SXT

COMMERCIAL

www.pentairaquaeurope.com

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 Fleck series, SXT controllers and water softener installation;
- knowledge of water conditioning and how to determine proper controller settings;
- basic plumbing skills.

This document is available in other languages on https://www.pentairaquaeurope.com/product-finder/product-type/control-valves.

1.2 Release management

Revision	Date	Authors	Description
A	27.10.2016	BRY/KVA	First edition.
B	01.06.2018	BRY/FIM	Address change, Bleam information and valve on tank assembly.
C	28.11.2019	BRY	Corrections.
D	12.05.2020	BRY/FIM	. Copyright and Trademarks.

1.3 Manufacturer identifier, product

Manufacturer: Pentair International LLC
Avenue de Sevelin 18
1004 Lausanne
Switzerland

Product: Fleck 9100 SXT

1.4 Intended use

The device is intended for commercial applications use only and it is purpose-built for water treatment.

1.5 Abbreviations used

Assy	Assembly
BLFC	Brine Line Flow Controller
BV	Brine Valve
CW	Cold Water
DF	Down Flow
Distr	Distribution
DLFC	Drain Line Flow Controller
HW	Hot Water
Inj	Injector
N/A	Not Available
NBP	No By Pass
PN	Part Number
QC	Quick connect
Regen	Regeneration
S&S	Seals & Spacers
SBV	Safety Brine Valve
STD	Standard
SM	Side Mounted
Sys	System
TC	Time Clock
TM	Top Mounted
UF	Up Flow
VB	Valve Body

1.6 Norms

1.6.1 Applicable norms

Comply with the following guidelines:

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

Meets the following technical standards:

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

1.6.2 Available certificates

- CE;
- DM174;
- ACS.

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

1.7 Procedure for technical support

Procedure to follow for any technical support request:

1. Collect the required information for a technical assistance request.
   - ⇨ Product identification (see Serial label location [→Page 13] and Recommendations [→Page 73]);
   - ⇨ Description of the device problem.
2. Please refer to the Troubleshooting [→Page 94]. If the problem persists contact your supplier.

1.8 Copyright and Trademarks

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1.9 Limitation of liability

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

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

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

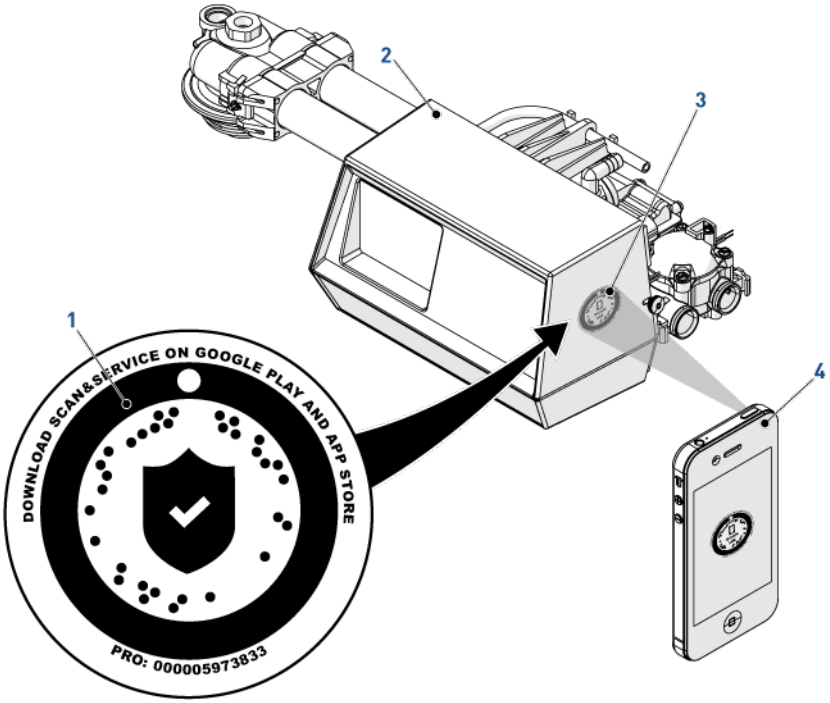
Pentair accepts no liability for equipment installed by the user upstream or downstream of Pentair products, as well as for process/production processes which are installed and connected around or even related to the installation. Disturbances, failures, direct or indirect damages that are caused by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

1.10 Scan & Service application

Scan & Service mobile application is the ideal support for the maintenance person in his daily business. A simple scan of an identification (ID) label (**1**) present on the valve with a smartphone gives an instantaneously access to all updated information related to the product, such as:

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

1. Download the application "Scan & Service" from Available on the App Store or Available on the Google play in a smartphone (**4**).
2. Open the application "Scan & Service".
3. Scan the bleam (**3**) stuck on the valve (**2**).
4. Navigate to find information.



2 Safety

2.1 Safety pictograms definition

DANGER

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

WARNING

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

CAUTION

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

Caution - material

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

Prohibition

Mandatory advice to follow.

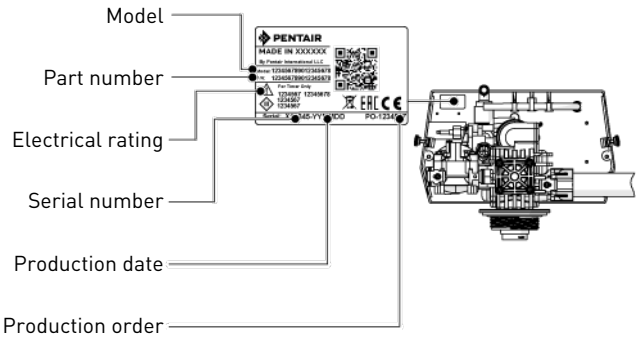
Mandatory

Applicable guideline, measure.

Info

Informative comment.

2.2 Serial label location



Mandatory

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

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

2.3 Hazards

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

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

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

2.3.1 Personnel

⚠ CAUTION

Risk of injury due to improper handling!

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

2.3.2 Material

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

- be careful of high voltages present on the transformer (100 – 240 V);
- do not put your fingers in the system (risk of injuries with moving parts and shock due to electric voltage).

2.4 Hygiene and sanitization

2.4.1 Sanitary issues

Preliminary checks and storage

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

Assembly

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

Info

This operation must be repeated in the case of ordinary and extraordinary maintenance. It should also be repeated whenever the system remains idle for a significant time.

Valid only for Italy

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

2.4.2 Hygiene measures

Disinfection

- The materials used for the construction of our products meet the standards for use with potable water; the manufacturing processes are also geared to preserving these criteria. However, the process of production, distribution, assembly and installation, may create conditions of bacterial proliferation, which may lead to odor problems and water contamination;
- it is therefore strongly recommended to sanitize the products. See Sanitization [→Page 64] ;
- maximum cleanliness is recommended during the assembly and installation;
- for disinfection, use Sodium or Calcium Hypochlorite and perform a manual regeneration.

3 Description

3.1 Technical specifications

Design specifications/ratings

Valve body	PPO (Polyphenylene oxide)
Rubber components	EP or EPDM
Valve material certification	DM174, ACS
Weight (valve with controller)	3 kg (max)
Recommended operating pressure	1.8 - 8.6 bar
Maximum inlet pressure	8.6 bar
Hydrostatic test pressure	20 bar
Water temperature	1 - 43°C
Ambient temperature	5 -40°C

Flow rates (3.5 bar inlet - valve only)

	¾"	1"
Continuous service flow (Δp = 1 bar)	4 m^3/h	4.5 m^3/h
Peak service flow (Δp = 1.8 bar)	5.4 m^3/h	5.9 m^3/h
Cv*	4.8 gpm	5.2 gpm
Kv*	4 m^3/h	4.5 m^3/h
Maximum backwash flow (Δp = 1.8 bar)	1.9 m^3/h	1.9 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	2½" - 8NPSM
Inlet/Outlet	¾" or 1" BSP, male
Riser tube	26.7 mm O.D., 1.05" tube
Drain line	½" O.D.
Brine line (1600/1610)	⅜"

Electrical

Transformer input voltage	230 VAC
Input supply frequency	50 or 60 Hz
Transformer output voltage	24 VAC
Motor input voltage	24 VAC
Controller input voltage	24 VAC
Controller max. power consumption	8 W

Protection rating.	IP 22
Power supply	100 to 240 VAC, 50/60 Hz, 0.5 A, Class II
Transient overvoltages	within the limits of category II
Pollution Degree	3

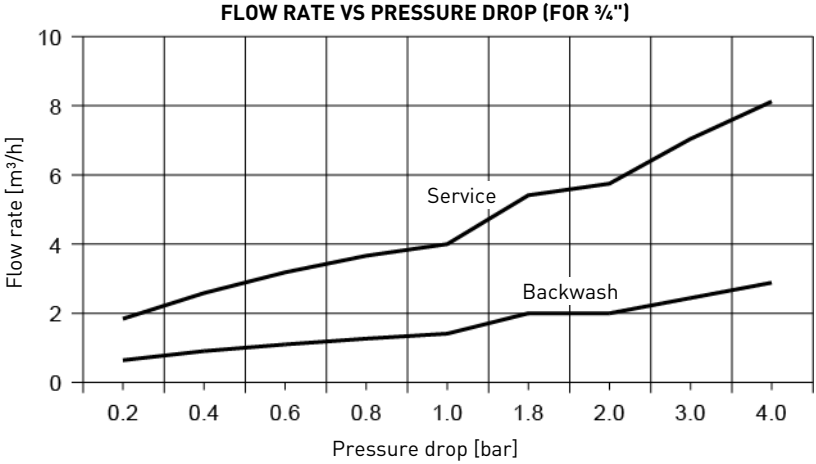
Temporary overvoltages must be limited in duration and in frequency.

Environmental conditions

- Indoor use only;
- temperature from 5°C to 40°C;
- maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C;
- mains supply voltage fluctuations up to ±10% of the nominal voltage.

3.2 Performance flow rate characteristics

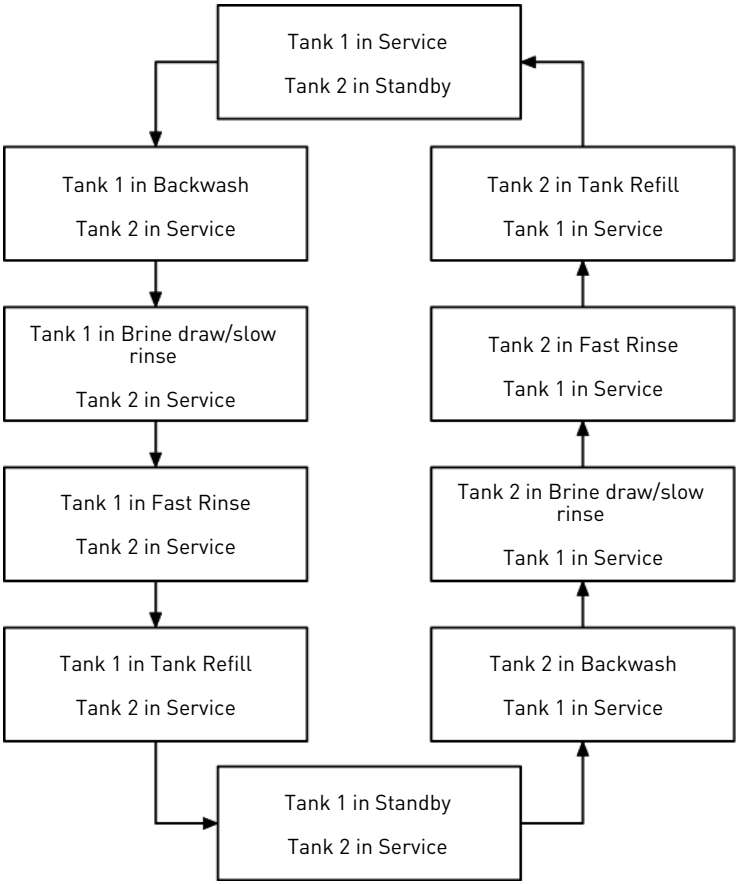
The graph shows the pressure drop created by the valve itself at different flow rates. It allows predetermining the maximum flow rate going through the valve depending on the system settings (inlet pressure etc). It also allows to determine the valve pressure drop at a given flow rate, and therefore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



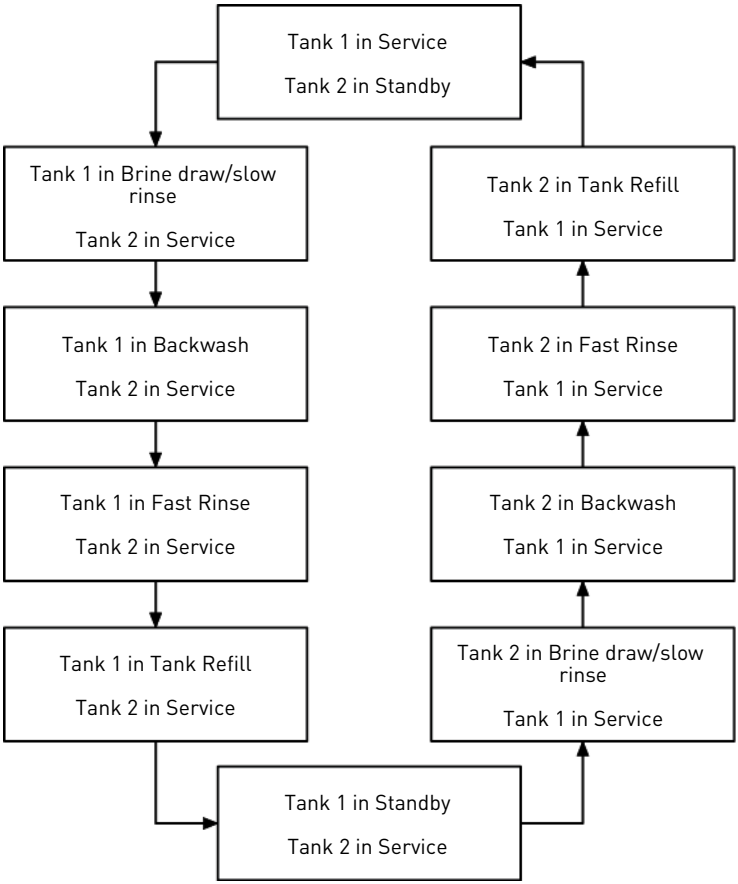
3.3 Way of operation

The 9100 valve is a twin alternating valve with immediate regeneration when a tank is exhausted. As soon as the programmed capacity (m^3) becomes zero, the controller switches tanks and begins regeneration in the exhausted tank as shown below.

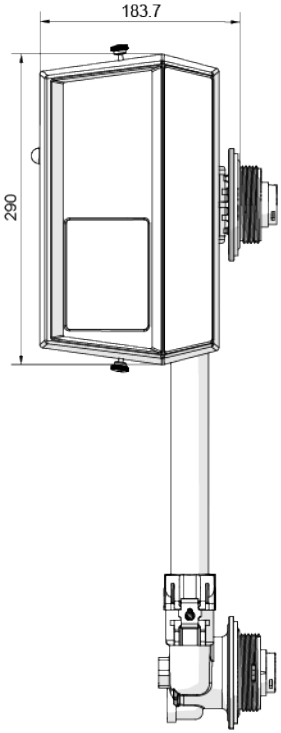
3.3.1 Downflow

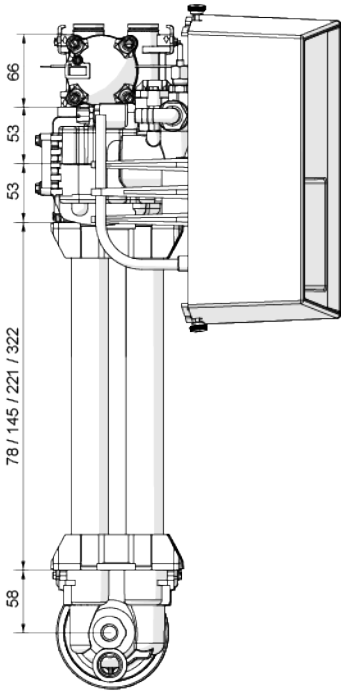


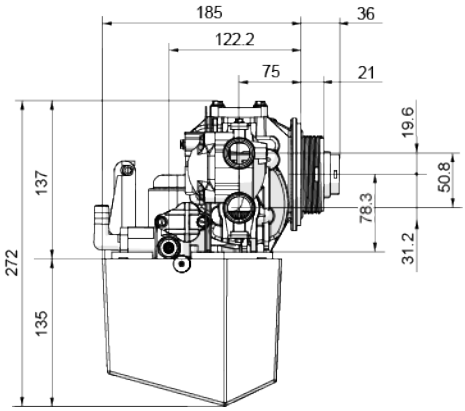
3.3.2 Upflow


Tank 1 in Service
Tank 2 in Standby
Tank 1 in Brine draw/slow rinse
Tank 2 in Service
Tank 2 in Tank Refill
Tank 1 in Service
Tank 1 in Backwash
Tank 2 in Service
Tank 2 in Fast Rinse
Tank 1 in Service
Tank 1 in Fast Rinse
Tank 2 in Service
Tank 2 in Backwash
Tank 1 in Service
Tank 1 in Tank Refill
Tank 2 in Service
Tank 2 in Brine draw/slow rinse
Tank 1 in Service
Tank 1 in Standby
Tank 2 in Service

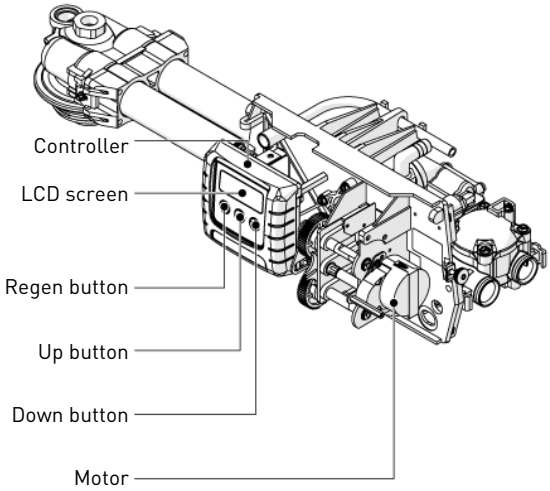
3.4 Outline drawing

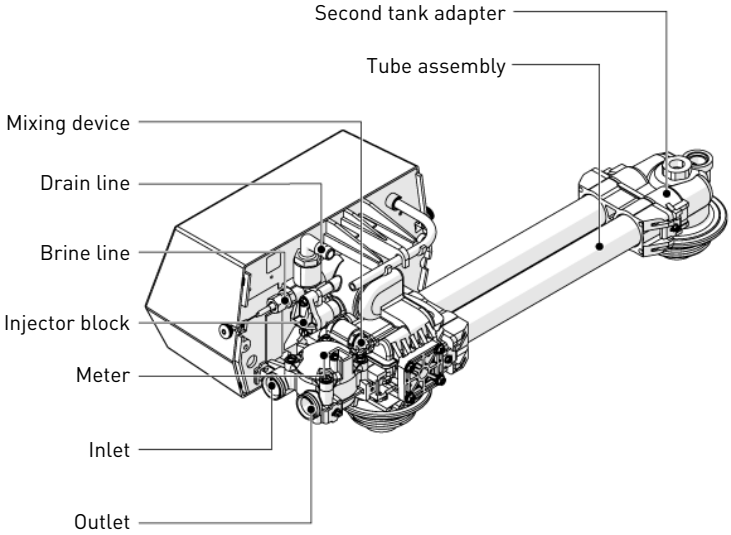






3.5 Components description and location





3.6 System regeneration cycle

Info

This valve allows to do down flow or up flow regenerations.

3.6.1 Downflow regeneration cycle (5-cycles 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 by 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 & slow rinse — cycles C2

The valve 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 on the resin beads are replaced by sodium ions and are sent to the drain. The resin is regenerated during the brine cycle. When the air check valve closes brine drawing finishes, and then the slow rinse phase starts.

Rapid rinse — cycle C3

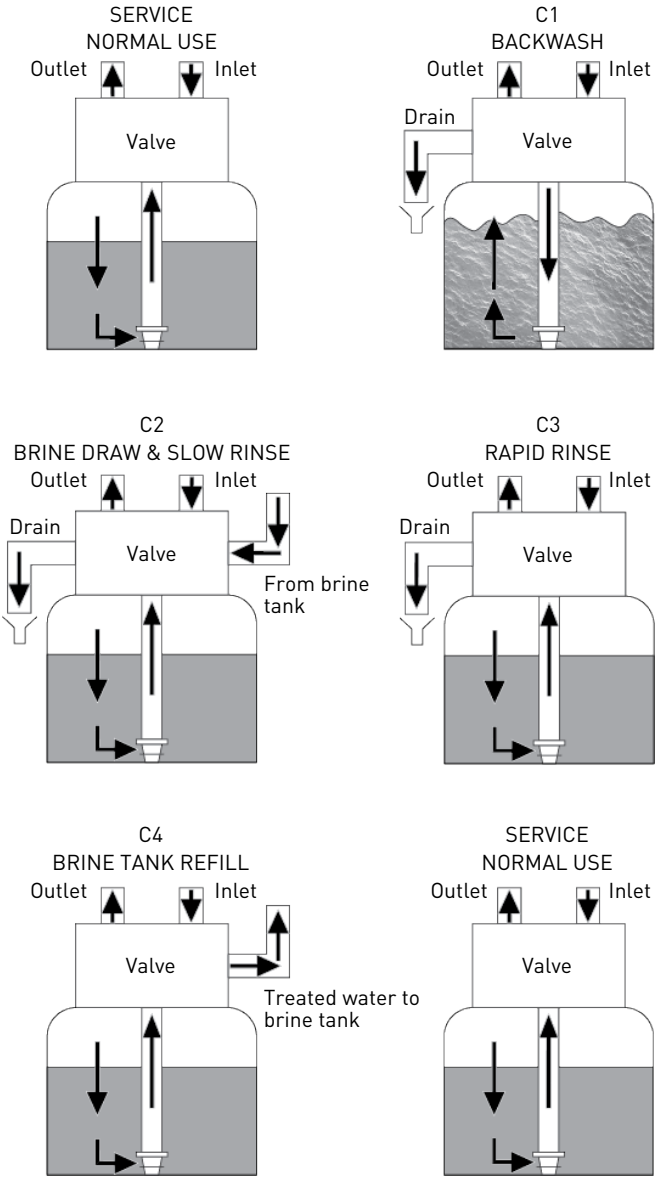
The valve directs water down through the resin bed and up through the riser tube to the drain. Any residual brine is rinsed from the resin bed, while the media bed is re-compacted.

Brine tank refill — cycle C4

Water is directed to the brine tank, at a 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.

Info

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


SERVICE
NORMAL USE
Outlet
Inlet
Valve
C1
BACKWASH
Outlet
Inlet
Drain
Valve
C2
BRINE DRAW & SLOW RINSE
Outlet
Inlet
Drain
Valve
From brine tank
C3
RAPID RINSE
Outlet
Inlet
Drain
Valve
C4
BRINE TANK REFILL
Outlet
Inlet
Valve
Treated water to brine tank
SERVICE
NORMAL USE
Outlet
Inlet
Valve

3.6.2 Upflow regeneration cycle (5-cycles 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.

Brine draw & slow rinse — cycle C1

The controller directs water through the brine injector and brine is drawn from the brine tank. The brine is then directed down through the riser tube and up through the resin bed to the drain. The hardness ions are replaced by sodium ions and are sent to the drain. The resin is regenerated during the brine cycle. Then the slow rinse phase starts.

Backwash — cycle C2

The flow of water is reversed by the valve and directed down through 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.

Rapid rinse — cycle C3

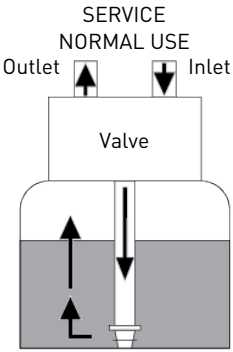
The controller valve directs water down through the resin bed and up through the riser tube to the drain. Any residual brine is rinsed from the resin bed, while the media bed is recompacted.

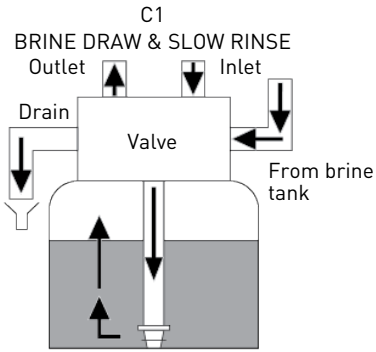
Brine tank refill — cycle C4

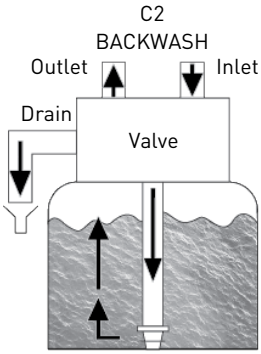
Water is directed to the brine tank, at a rate controlled by the refill controller [BLFC], to create brine for the next regeneration. During brine refill, treated water is already available at the valve outlet.

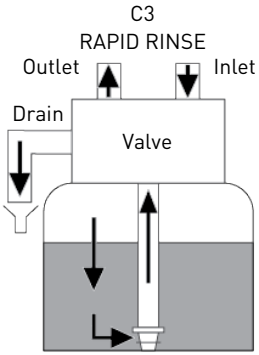
Info

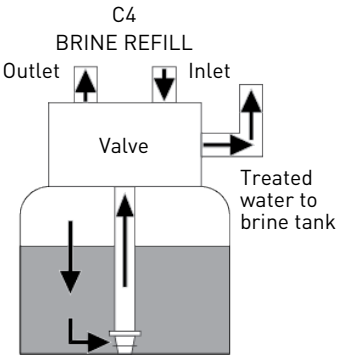
For illustration purpose only. Always verify inlet and outlet marking on the valve.

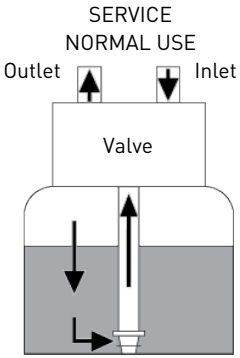

SERVICE
NORMAL USE
Outlet
Inlet
Valve


C1
BRINE DRAW & SLOW RINSE
Outlet
Inlet
Drain
Valve
From brine tank


C2
BACKWASH
Outlet
Inlet
Drain
Valve


C3
RAPID RINSE
Outlet
Inlet
Drain
Valve


C4
BRINE REFILL
Outlet
Inlet
Valve
Treated water to brine tank


SERVICE
NORMAL USE
Outlet
Inlet
Valve

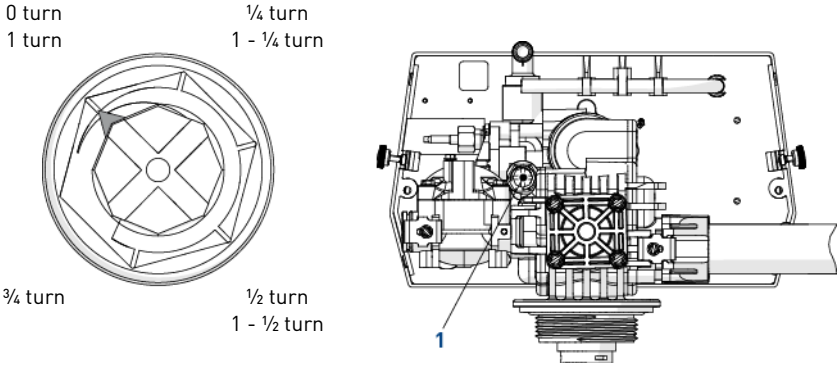
3.7 Options available on the valve

Mixing device

The valve can be equipped with a mixing device (**1**) whose function is to regulate the hardness of the water at the outlet. The mixing can be set from 0% to 25% of hard water (e.i. 0 turn = 0% of hard wate r with 100% of treated water and 1-½ turn = 25% of hard water with 75% of treated water).

Info

To set the mixing up to 50%, a yoke with integrated mixing must be used.



4 System sizing

4.1 Recommended Injector/DLFC/BLFC-Valve configuration

Brine syst.	Tank Diameter	Connect. flexible	Resin volume	Injector				DLFC	BLFC	
	[in]	[mm]	L	DF	Color	UF	Color	[gpm]	DF [gpm]	UF [gpm]
9100 / 1650	6	78.3	5 - 7	0	Red	0	Red	1.2	0.125	0.125
	7		8 - 14							
	8	144.5	9 - 21	1	White	1	White	1.5	0.25	0.25
	9		22 - 28					2	0.50	0.50
	10	221.0	29 - 42					2.4		
	12		43 - 56	2	Blue	2	Blue	3.5	1.00	1.00
	13	322.3	57 - 70					4		
	14		71- 85	3	Yellow	3	Yellow	5		
	16		86 - 113					7		

Info

In upflow configuration, the injector cap is fitted with a pressure regulator set to 2 bar.

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.

Tip

Please consult your resin manufacturer specification !

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

Caution - material

Risk of leakage due to unrespected service velocity !

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

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

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

4.2.2 Determining the required volume of resin

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

Caution - material

Risk of leakage due to wrong sizing !

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 needed tank. 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, it is possible to 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 2 regenerations. This last capacity takes into account the hardness of the water to be treated and is expressed in m^3 or litre;
- the combined capacity, which represents the volume of water that could be treated between 2 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 [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

Salt amount [g/L_{resin}]	Corresponding resin exchange capacity [g/L_{resin}] as $CaCO_3$	°f.m^3 [per L_{resin}]	°dH.m^3 [per L_{resin}]
140	53.8	5.38	3.01
150	55.5	5.55	3.1
170	58.5	5.85	3.27
200	62.7	6.27	3.5
230	66.9	6.69	3.74
260	71	7.1	3.97
290	75.3	7.53	4.21

To calculate the system mass capacity:

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

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]

Mandatory

If a mixing device is set on the valve before meter, use 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 4BV / 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]

Info

This value does not correspond to the brine draw flow rate but to the total flow rate passing through the injector.

Refer to the injector diagrams at the inlet pressure in order to check if the injector will give a correct flow rate.

See chapters Salt amount definition [→Page 33] and Injector flow rates [→Page 33].

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.

Info

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:

$Tb_{ackwash} = (N_{BVbw} \times BV) / Q_{DLFC}$

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]

Info

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]

Tip

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]

To calculate the refill duration:

The refill flow rate is controlled by the refill controller (BLFC). The relation between the BLFC size, the tank size and the resin volume is given in the valve specifications.

To calculate the refill duration:

$T_{refill} = V_{WB} / Q_{BLFC}$

with:

T_{refill}: refill duration [min]

V_{WB}: Volume of water to be refill to prepare the brine [L]

Q_{BLFC}: BLFC size [L/min]

$V_{WB} = D_{Salt} \times BV / S_{sol}$

with:

V_{WB}: Volume of water to be refill to prepare the brine [L]

D_{Salt}: Salt dosage per litre of resin [g/L]

BV: Bed volume [L]

S_{sol}: 360g/L - Solubility of salt per litre of water

Tip

When calculating the time required to draw the brine, take into account that the volume of brine [Vbrine] will be 1.125 bigger than the volume of water refilled !

4.3 Salt amount definition

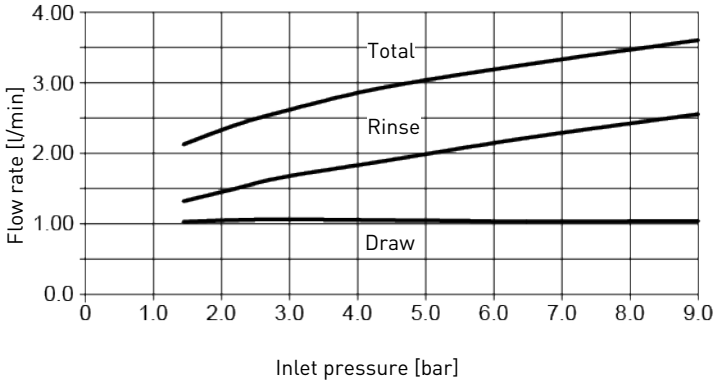
The salt settings are controlled through the controller programming. See Resin exchange capacity and capacity of the unit [→Page 29].

4.4 Injector flow rates

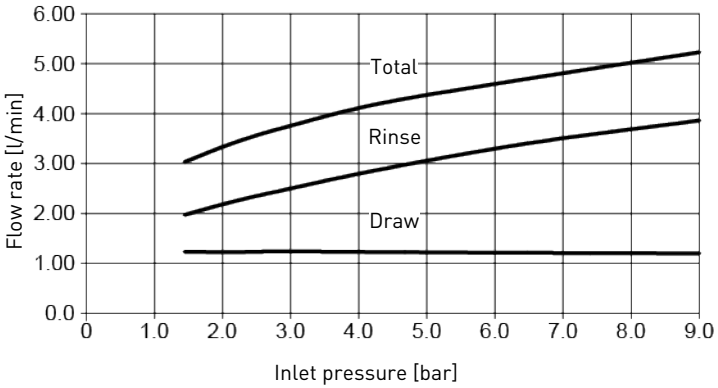
The following graphics represent the injectors flow rate as a function of the inlet pressure for the different injector sizes.

4.4.1 1650 injectors

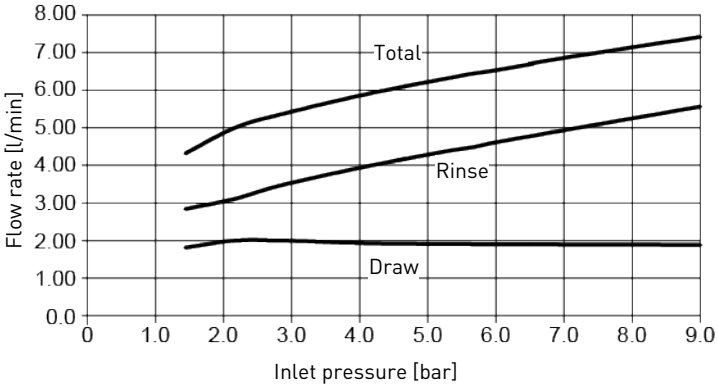
INJECTOR 0



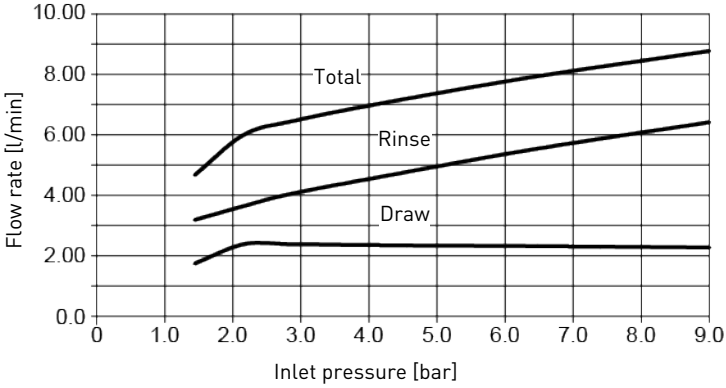
INJECTOR 1



INJECTOR 2



INJECTOR 3


10.00
8.00
6.00
4.00
2.00
0.0
Flow rate [l/min]
Total
Rinse
Draw
0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
Inlet pressure [bar]

5 Installation

⚠ CAUTION

Risk of injury due to electrical shock or pressurized elements !

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 damages to people or properties resulting from an improper use of the device not compliant with the following instructions.

Whenever this guide doesn't clarify all doubts about installation, service or maintenance, please contact the technical support of the company that has installed the device.

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

In case of out of order or malfunction, before performing any kind of action on the device, please ensure to have disconnected the transformer from the power source, to shut off inlet water supply to the valve and to drain water pressure opening a tap down-line of the valve.

1. Be careful when removing the valve from the box and during subsequent handling, weight is liable to cause damage to property and persons in case of accidental impact.
2. Before sending the water on the valve, make sure that all plumbing connections are tight and properly implemented in order to avoid dangerous leaks of pressurized water.
3. Use caution when installing welded metal piping near the valve, the heat may damage the plastic body of the valve and the bypass.
4. Be careful not to let the full weight of the valve on fittings, pipes or bypass.
5. Make sure that the environment in which the valve is installed does not reach freezing temperatures of the water, the valve may be damaged.
6. Make sure that the tank containing the resin is vertical; otherwise the resin could enter in the valve and damage it.

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 environement

5.3.1 General

- Use only brine salts designed for water softening. Do not use ice melt, block, or rock salts;

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

5.3.2 Water

- Water temperature must not exceed 43°C;
- a minimum of 1.4 bar (dynamic pressure on injector) of water pressure is required for the valve to operate effectively.

Mandatory

Do not exceed a maximum of 8.6 bar inlet pressure. In such cases, it is necessary to install a pressure regulator upstream the system.

5.3.3 Electrical

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

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

Mandatory

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

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

5.3.4 Mechanical

Caution - material

Risk of damage due to wrong lubricant use !

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

Use only approved silicone grease or soapy water !

- All plastic connections should be hand-tightened. PTFE (plumber's tape) may be used on connections that do not use an O-ring seal. Do not use pliers or pipe wrenches;
- existing plumbing should be in a good shape and free from limescale. In case of doubt, it is preferable to replace it;
- all plumbing must be completed according to local codes and installed without tension or bending stresses;
- soldering near the drain line should be done before connecting the drain line to the valve. Excessive heat will cause interior damage to the valve;
- do not use lead-based solder for sweat solder connections;
- the riser tube should be cut flush with the top of the tank. Slightly bevel the ridge in order to avoid deterioration of the seal whilst fitting the valve;
- the drain line must be a minimum of 12.7 mm (½") in diameter. Use 19 mm (¾") pipe if the backwash flow rate is greater than 26.5 lpm or the pipe length is greater than 6 m;
- 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 drain elbow, and other NPT/BSP threads;
- the installation of a pre-filter is always recommended (100µ nominal);
- valve inlet/outlet must be connected to main piping via flexible.

5.4 Integration constraints

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

- flat and firm level platform or floor;
- room to access equipment for maintenance and adding brine (salt) to tank;
- constant electrical supply to operate the controller;
- total minimum pipe run to water heater of 3 m (10 ft) to prevent backup of HW into system;
- always install check valve before water heater to protect the softener from HW return;
- local drain for discharge as close as possible;
- water line connections with shut off or bypass valves;
- must meet any local and state codes for site of installation;
- valve is designed for minor plumbing misalignments. Do not support weight of system on the plumbing;
- be sure all soldered pipes are fully cooled before attaching plastic valve to the plumbing.

5.5 Valve connection to piping

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

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

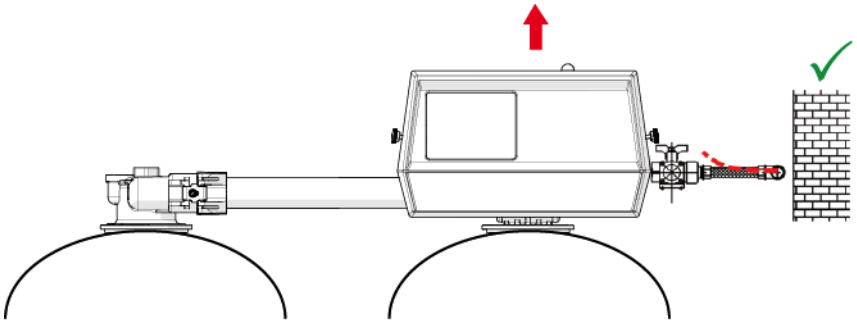
Tip

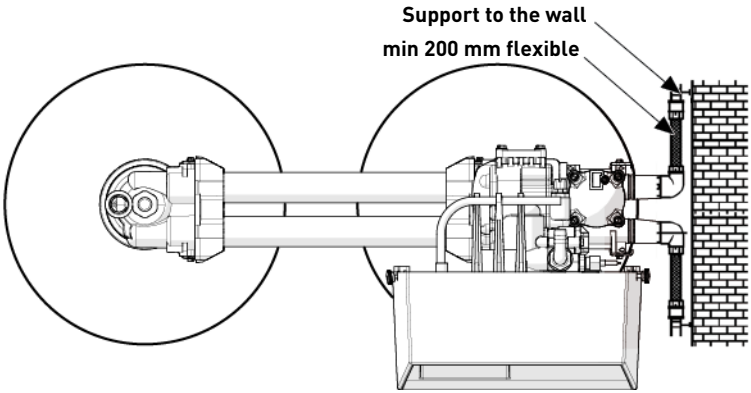
See chapter Components description and location [→Page 21] to identify the connections.

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

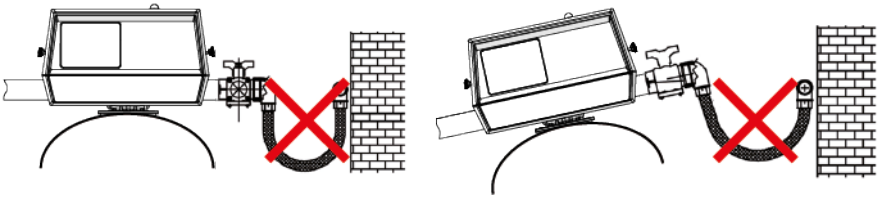
5.5.1 Top-mounted valve installation

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





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

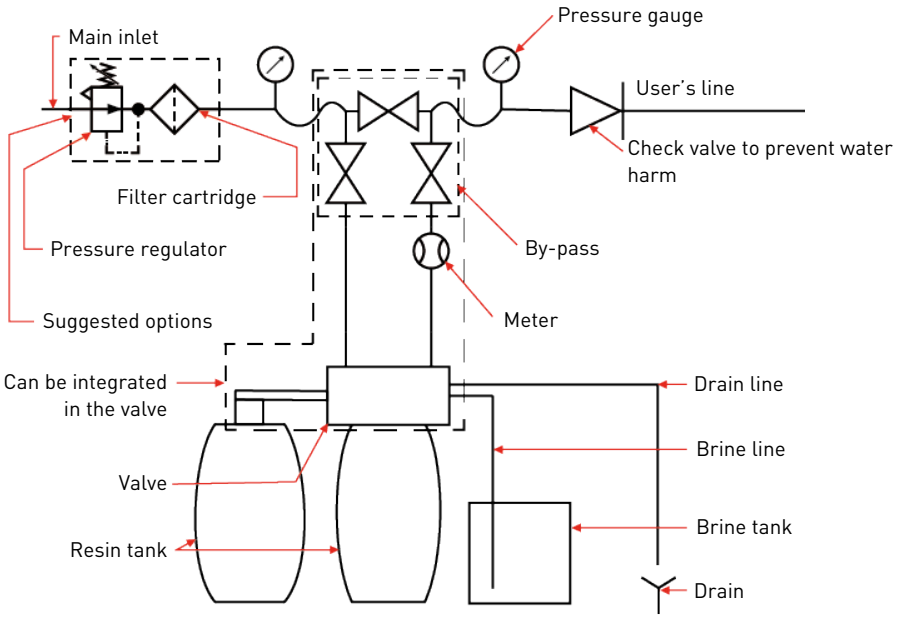


- in any case, any failure caused by improper installations and/or piping connections may void the warranty of Pentair products;
- in the same way, using lubricant* [→Page 40] on the valve thread is not allowed and will void the warranty for the valve and tank. Indeed using lubricant there will cause the valve to be over-torqued, which may lead to valve thread or tank thread damage even if the connection to piping has been done following the above procedure.

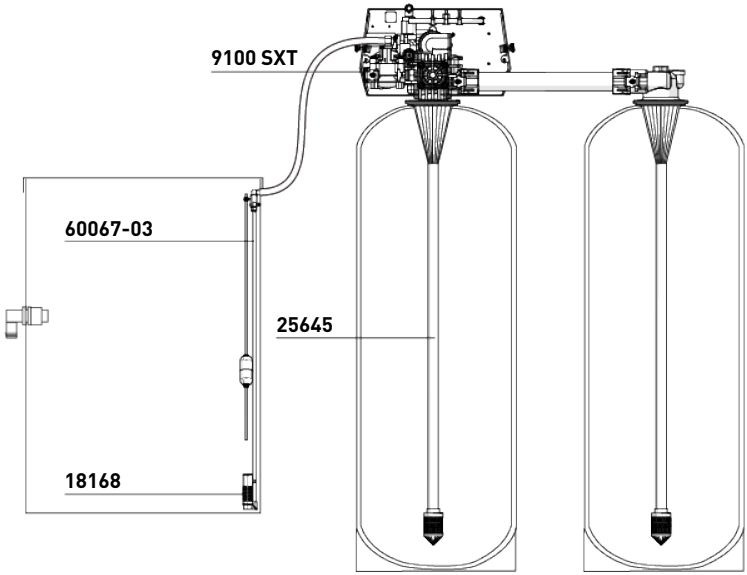
*Note: Use of petroleum-based grease and mineral based lubricant is totally forbidden, not only on the valve thread, since plastics used (especially Noryl) will highly suffer from contact with this type of grease, leading into structural damage hence to potential failures.

5.6 Block diagram and configuration example

Block diagram



Top mounted configuration example



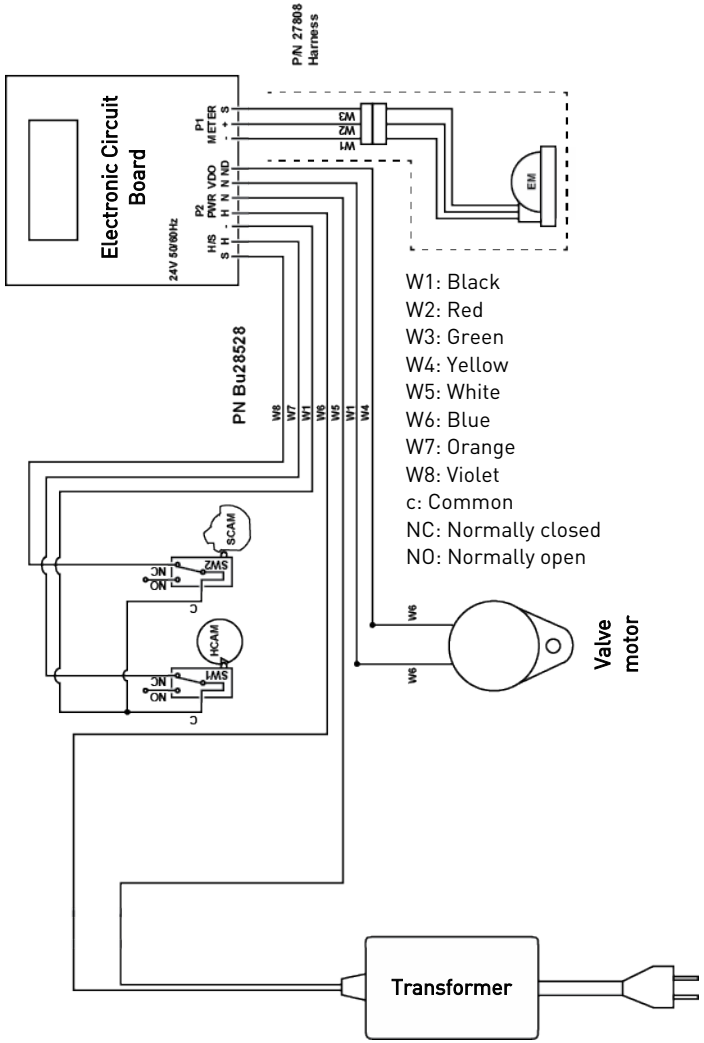
5.7 Regeneration flows

Metered

The controller monitors the volume of water used. Once it calculates that there is not enough capacity for the next operation day, a regeneration cycle will be initiated immediately or at a pre-set time:

- **immediate control:** the controller measures water usage and regenerates the system as soon as the system capacity is reached;
- **delayed control:** the controller measures water usage and if the capacity is not reached until the number of days override, it regenerates the system, at the specified regeneration time.

5.8 Electrical connections

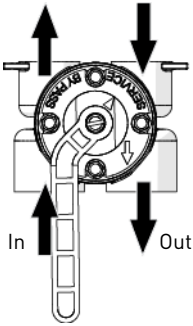


5.9 Bypassing

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

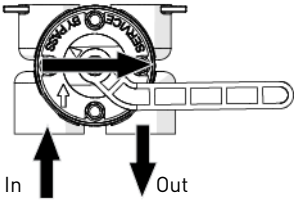
Normal operation

Softening System



In Bypass

Softening System



Caution - material

Risk of damage due to bad mounting !

Do not solder pipes with lead-based solder.

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

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

5.10 Drain line connection

Info

Standard commercial practices are expressed here.

Local codes may require changes to the following suggestions.

Check with local authorities before installing a system.

Mandatory

The drain line must be build with ½" semi rigid or rigid piping ! An air gap must be present at the drain!

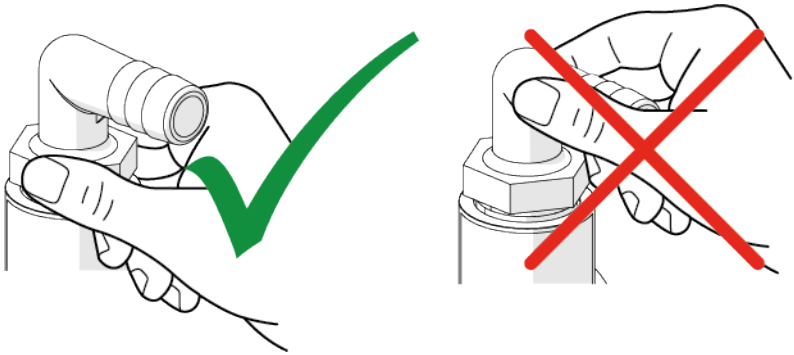
Caution - material

Risk of damage due to over-force !

The drain line plastic elbow must always be hand-tighten without using the elbow as a lever.

The drain plastic elbow is not designed to support the weight of the tube. The tube has to have its own support.

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



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

If the backwash flow rate exceeds 91 Lpm or if the unit is located 6.1-12.2 m from the drain, use 31.75 mm (1¼") tubing. Use appropriate fittings to connect the 31.75 mm (1¼") tubing to the 25.4 mm (1") NPT drain connection on 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.

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

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

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

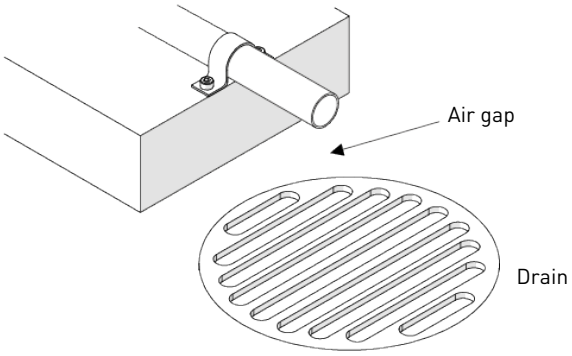
Mandatory

Waste connections or the drain outlet shall be designed and constructed to provide connection to the sanitary waste system through an air-gap of 2 pipe diameters or 50.8 mm (2"), whichever is larger.

Caution - material

Risk of damage due to lack of gap !

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



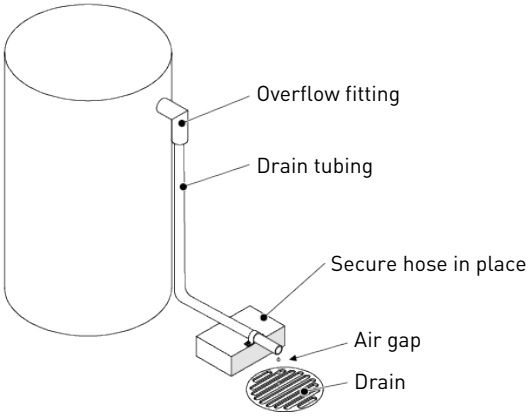
5.11 Overflow line connection

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

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

Do not elevate overflow higher than overflow fitting.

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



Caution - material

Risk of flooding due to lack of floor drain !

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

5.12 Brine line connection

Mandatory

The brine line must be built with 3/8'' semi rigid piping !

Caution - material

Risk of malfunction due to the use of wrong equipment !

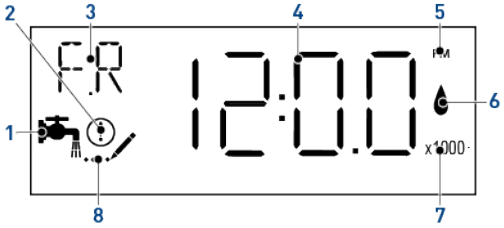
Flexible and semi-flexible hoses may shrink because of the vacuum during brine draw.

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.

Brine line must be equipped with brine tank air check in the brine tank.

6 Programming

6.1 Display



1. Service icon
- Appears in service mode;
- Flashes if a regeneration cycle has been queued.

2. Error / Information icon
- Appears in case of error, see Troubleshooting [→Page 94], or in diagnostic mode, see.Diagnostic [→Page 60]

3. Parameter display

Master programming and diagnostic modes:
- C: Unit capacity;
- CD: Current day;
- CT: Regeneration control type;
- DF: Display format;
- Dn, n=1 to 7: Day of week;
- DO: Days override;
- FM: Flow meter;
- FR: Current flow rate;
- H: Feedwater hardness;
- HR: Hours in service;
- K: Meter pulse;
- NT: Number of tanks;
- PF: Peak flow rate;
- RC: Reserve capacity;
- RF: Regeneration flow;
- RS: Reserve selection;
- RT: Regeneration time;
- SF: Safety factor;
- SV: Software version;
- TD: Time of day;
- TS: Tank in service;
- VU: Volume used.

Regeneration cycles:

- B1: First backwash (for dF2b regeneration flow);
- B2: Second backwash (for dF2b regeneration flow);
- BD: Brine draw;
- BF: Brine fill;
- BW: Backwash;
- RR: Rapid rinse.

4. Data display	.
5. PM indicator	• Appears if controller set in US unit.
6. Flow indicator	• Flashes when outlet flow is detected.
7. x1000 indicator	• Appears when the displayed number is bigger than 9999.
8. Programming icon	• Appears in programming modes.

6.2 Commands

Info

Menus are displayed in a defined and incremental order.

If none of the buttons are pushed for 5 minutes in the Programming mode, or if there is a power failure, the controller returns to Service mode without saving.

Mandatory

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

1. Press to pass to the next step.
2. Use ▼ and ▲ to adjust the values.

6.3 Setting the time of the day (TD)

Set the time in the system.

1. Press and hold ▼ or ▲ until the programming icon replaces the service icon and the parameter display reads TD.
2. Set the time with ▼ or ▲.
3. Press to validate the selection and return to the service mode, or wait for 10 seconds.

6.4 Basic programming

6.4.1 Basic programming mode chart

Parameter		Options	Definition	Note
DO	Days override	0 to 99	Day	-
RT	Regeneration time	00:00:00 to 23:59:59	Hour	Regeneration time will not appear unless regeneration day override is on.
H	Feedwater hardness	1 to 1990	°TH, ppm or grains	Only displayed for volumetric regenerations.
RC	Fixed reserve capacity	0 to 50	%	Only displayed for volumetric regenerations and if set in reserve selection.
SF	Safety factor	0 to 50	%	Only available if set in reserve selection.
CD	Current day	1 to 7	Day of the week	-

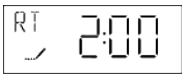
6.4.2 Day of override (DO)

1. Press ▼ and ▲ simultaneously for 5 seconds to enter the menus sequence.
2. Select the number of days of override with ▼ and ▲.
3. Press ⟲ to validate the selection and advance to the next parameter.

6.4.3 Regeneration time (RT)

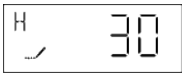
Determine the time of regeneration.

1. Adjust the regeneration time with ▼ and ▲.
2. Press ⟲ to validate the selection and advance to the next parameter.



6.4.4 Feed water hardness (H)

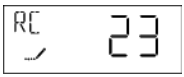
1. Adjust the water hardness with ▼ and ▲.
2. Press ⟲ to validate the selection and advance to the next parameter.



6.4.5 Reserve capacity (RC) or (SF)

Determine the reserve capacity in litre or in percentage.

1. Adjust the reserve capacity with ▼ and ▲.
2. Press ⟲ to validate the selection and advance to the next parameter.



6.4.6 Current day of the week (CD)

Determine the day of regeneration.

Info

Appears only if the softener is set to "weekly time clock".

1 for Monday, 2 for Tuesday, 3 for Wednesday, 4 for Thursday, 5 for Friday, 6 for Saturday and 7 for Sunday.

1. Adjust the day of the week with ▼ and ▲.
2. Press ⟲ to validate the selection and exit the basic programming mode.

6.5 Master programming mode

Info

As soon as programming mode is entered, all parameters can be displayed or set to suit the needs.

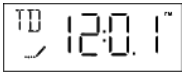
Depending on the current programming, some functions will not be displayed or will not be selectable.

6.5.1 Master programming mode chart

Parameter		Options	Definition	Note
DF	Display format	GAL	US units	-
		Ltr	Metric units	-
RF	Regeneration flow	dF1b	Std DF single backwash	Standard for 9000 Twin valve
		dF2b	Std DF double backwash	-
		FLtr	Filter	To be used with standard piston only.
		UFbd	UF brine first	-
		UFlt	UF filter	To be used with UF piston only.
		Othr	Other	-
CT	Regeneration control type	Fd	Metered delayed	-
		FI	Metered immediate	Standard for 9000 Twin valve
		tc	Time clock	-
		dAY	Day of the week	-
NT	Number of tanks	1	Single tank system	-
		2	Double tanks system	-
TS	Tank in service	U1	Tank 1 in service	Only displayed for double tanks system.
		U2	Tank 2 in service	
C	Unit capacity	0.1 to 9'999'000	°TH*m^3	Only displayed for volumetric regenerations.
V	Filter capacity	1 to 999'900	L	Only displayed for filter.
H	Feedwater hardness	1 to 1990	°TH, ppm or grains	Only displayed for volumetric regenerations.
RS	Reserve selection	SF	Safety factor	-
		rc	Fixed reserve capacity	-
SF	Safety factor	0 to 50	%	Only available if set in reserve selection.
RC	Fixed reserve capacity	0 to 50	%	Only displayed for volumetric regenerations and if set in reserve selection.
DO	Days override	0 to 99	Day	-
RT	Regeneration time	00:00:00 to 23:59:59	Hour	Regeneration time will not appear unless regeneration day override is on.

Parameter		Options	Definition	Note
B1	First backwash	0 to 199	Minute	Only displayed for dF2b regeneration flow. In case of dF1b regeneration flow, the screen shows BW.
BD	Brine draw			BD consist of time for brine draw and slow rinse.
B2	Second backwash			Only shown in dF2b regeneration flow.
RR	Rapid rinse			-
BF	Brine fill	0 to 199	Minute	-
BW	Backwash			-
Rn	Cycle number n=1 to 6			Only if "Othr" is chosen under **VT**. R1, R2, R3, etc... will be displayed instead.
Dn	Day of week, n=1 to 7	ON - OFF	-	Regeneration setting for each day of the week. OFF by default. Not available for 9000 serie valves.
CD	Current day	1 to 7	Day of the week	Not available for 9000 serie valves
FM	Flow meter type	P0.7	¾" paddle wheel	-
		t0.7	¾" turbine	-
		P1.0	1" paddle wheel	-
		t1.0	1" turbine	-
		P1.5	1½" paddle wheel	-
		t1.5	1½" turbine	-
		P2.0	2" paddle wheel	-
		Gen	Generic or non-Fleck	-
K	Meter pulse	0.1 to 999.9	Litre	Only displayed for generic flow meter type.

6.5.2 Entering master programming mode



1. Press and hold ▼ or ▲ until the programming icon replaces the service icon and the parameter display reads TD.
2. Set the time to 12:01 PM with ▼ or ▲.
3. Press ◈ to validate the selection and return to the service mode, or wait for 10 seconds.
4. Press and hold ▼ and ▲ for 5 seconds until the programming icon replaces the service icon and the display format screen appears.

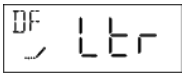
6.5.3 Display format mode (DF)

Select the unit of measure.

Options:

- GAL: U.S. gallons and 12-Hour AM/PM;
- Ltr: litres and 24-Hour.

1. Press ▼ or ▲ to select the unit.
2. Press ◇ to validate the selection and move to the next parameter.



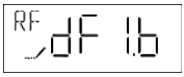
6.5.4 Regeneration flow (RF)

Select the regeneration flow.

Options:

- dF1b: standard downflow single backwash (standard);
- Othr: other;
- UFtr: upflow filter (for 5000 filter);
- UFbd: upflow brine first;
- FLtr: filter, to be used with standard piston only (except 5000);
- dF2b: standard downflow double backwash.

1. Press ▼ or ▲ to select t the regeneration flow.
2. Press ◇ to validate the selection and move to the next parameter.



6.5.5 Regeneration control type (CT)

Select the regeneration controller type.

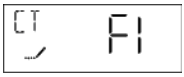
Options:

- Fd: meter delayed;
- FI: meter immediate;
- tc: time clock;
- dAY: day of the week.

Mandatory

Due to the usage of twin tanks, set regeneration control type to meter immediate.

1. Press ▼ or ▲ to select **FI**.
2. Press ◇ to validate the selection and move to the next parameter.



6.5.6 Number of tanks (NT)

Select the number of tanks.

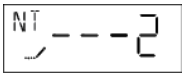
Options:

- NT 1: single tank system;
- NT 2: double tanks system.

Mandatory

Due to the 9100 valve being designed for double tanks system only, set valve type to 2.

1. Press ▼ or ▲ until "---2" is displayed.
2. Press ⟲ to validate the selection and move to the next parameter.



6.5.7 Tank in service (TS)

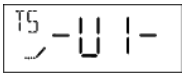
Info

This parameter appears only if number of tanks (NT) is set to 2.

If it does not appears, the 9100 valve being a double tanks system, go back to number of tanks (**NT**) and set it to 2.

Select which of the two tanks is in service.

1. Press ▼ or ▲ to select which tank is in service.
2. Press ⟲ to validate the selection and move to the next parameter.



6.5.8 Unit capacity (C)

Set the unit capacity.

Mandatory

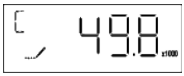
Enter the capacity of the media bed in m^3 x °TH or g as $CaCO_3$ for softener system (C is displayed in the upper left corner) or in litres for filter (V is displayed in the upper left corner) !

Info

The unit capacity parameter is only available if the controller type has been programmed for volumetric regeneration.

The unit capacity can be set from 0.1 to 9999 x 1000 °TH*m^3, g as $CaCO_3$ equivalent or in grains if DF=GAL.

1. Press ▼ or ▲ to select the unit capacity.
2. Press ⟲ to validate the selection and to move the next parameter.



6.5.9 Feedwater hardness (H)

Set the feedwater hardness.

Mandatory

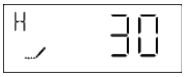
Enter the feedwater hardness in °TH, ppm or grains of hardness for softener system.

Info

The feedwater hardness parameter is only available if the controller type has been programmed for volumetric regeneration.

The feedwater hardness can be set from 1 to 1990 °TH, ppm, or grains.

1. Press ▼ or ▲ to set the feedwater hardness in accordance with display format (DF), see Display format mode (DF) [→Page 54].
2. Press ◈ to validate the selection and to move the next parameter.



6.5.10 Reserve selection (RS)

Info

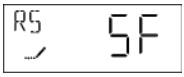
This parameter is not useful when regeneration control type (CT) is set to FI.

Set the reserve type.

Options:

- SF: safety factor;
- rc: fixed reserve capacity.

1. Press ▼ or ▲ to set the reserve type.
2. Press ◈ to validate the selection and move to the next parameter.



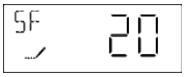
6.5.10.1 Safety factor (SF)

Info

This parameter is not shown if RS is set to RC.

The safety factor can be set from 0 to 50% of the initial volumetric capacity.

1. Press ▼ or ▲ to set the reserve type.
2. Press ◈ to validate the selection and move to the next parameter.



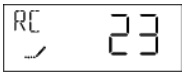
6.5.10.2 Reserve capacity (RC)

Info

This parameter is not shown if RS is set to SF.

The fixed reserve capacity can be set up to a volume equivalent to 50% of the initial volumetric capacity.

1. Press ▼ or ▲ to set the reserve type.
2. Press ⟲ to validate the selection and move to the next parameter.



6.5.11 Days override (DO)

Set the maximum number of days between regeneration cycles.

Info

This parameter allows setting the maximum amount of days that the system can stay in service mode without regeneration.

Mandatory

In time clock mode, this parameter must be set and the controller will need at least one regeneration day activated.

Setting the parameter to "OFF" disables this function.

The number of days can be set from OFF, or 1 to 99 days.

1. Press ▼ or ▲ to set the days override.
2. Press ⟲ to validate the selection and move to the next parameter.

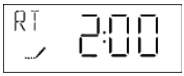
6.5.12 Regeneration time (RT)

Set the regeneration time.

Info

Regeneration time is the time of the day when regenerations occur for delayed regeneration of any type and calendar override regeneration.

1. Press ▼ or ▲ to set the regeneration time.
2. Press ⟲ to validate the selection and move to the next parameter.



6.5.13 Regeneration cycle step duration

Set the duration in minutes of each regeneration cycle.

Info

Setting a cycle step to 0 will cause the controller to skip that step during regeneration, but keeps the following steps available.

The different regeneration cycles are listed in sequence based on the regeneration flow selected for the system.

All cycles can be set from 0 to 199 minutes.

6.5.13.1 Regeneration abbreviations

B1	First backwash	BF	Brine fill
B2	Second backwash	BW	Backwash
BD	Brine draw	RR	Rapid rinse

6.5.13.2 For pre-set regeneration cycles

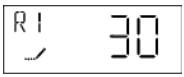
1. Press ▼ or ▲ to set the regeneration cycle time.
2. Press ◇ to validate the selection and move to the next parameter.
3. Repeat the two previous steps for each cycle.

6.5.13.3 For regeneration flow Other

Info

The regeneration cycles are identified as R1 to R6.

1. Press ▲ or ▼ or to set the regeneration time of this cycle.
2. Press ◇ to validate the selection and move to the next regeneration cycle.
3. Repeat the two previous steps for each cycle.



6.5.14 Day of week (Dn, n = 1 to 7)

Set the day of week for regeneration.

Info

The day of week parameter is only available if "day" mode has been set in controller type selection.

1. Press ▼ or ▲ to set "ON" or "OFF" to set the day as a regeneration day.
2. Press ⟲ to validate the selection.
3. Repeat the two previous steps until **D7** is set.
4. Press ⟲ to validate the selection and move to the next parameter.

6.5.15 Current day (CD)

Set the current day.

Info

The current day is defined from D1 (Monday) to D7 (Sunday).

1. Press ▼ or ▲ to set the current day.
2. Press ⟲ to validate the selection and move to the next parameter.

6.5.16 Flow meter type (FM)

Select the flow meter type.

Options:

- P0.7: ¾" paddle wheel meter (Standard setting for 4600, 5600 and 9100);
- t0.7: ¾" turbine meter;
- P1.0: 1" paddle wheel meter (Standard setting for 2750 and 9000);
- t1.0: 1" turbine meter;
- P1.5: 1½" paddle wheel meter (Standard setting for 2850);
- t1.5: 1½" turbine meter;
- P2.0: 2" paddle wheel meter;
- Gen: generic or other non-Fleck meter.

1. Press ▼ or ▲ to set the flow meter type.
2. Press ⟲ to validate the selection and move to the next parameter or exit master programming mode and save modifications done.

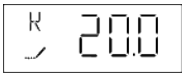
6.5.17 Meter pulse (K)

Set the meter pulse for a non-standard flow meter.

Info

The meter pulse parameter is only available if the Gen option has been set in flow meter type selection.

1. Press ▼ or ▲ to set the meter constant in pulses per unit of volume.
2. Press ⟲ to validate the selection and to exit the master programming mode.



6.6 Diagnostic

Info

Depending on current settings, some displays cannot be viewed.

If none of the buttons are pushed for 1 minute in the diagnostic mode the controller returns to Service mode.

6.6.1 Commands

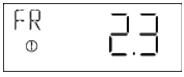
1. Press and hold ⟲ and ▲ for five seconds to enter the diagnostic mode.
2. Press ▼ or ▲ to navigate in the diagnostic mode.
3. Press ⟲ to exit the Diagnostic mode at any time.

6.6.2 Current flow rate (FR)

Info

The display is updated every second.

1. Current flow rate display (L/min or gpm depending on display format programmed):

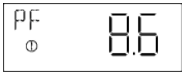


6.6.3 Peak flow rate (PF)

Info

The controller registers the highest flow rate (L/min) since the last regeneration.

1. Peak flow rate display:



6.6.4 Hours since last regeneration (HR)

Info

Shows the number of hours since the last regeneration, indicating the length of the current service cycle.

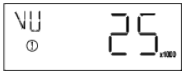
1. Hours since last regeneration display:

6.6.5 Volume since last regeneration (VU)

Info

Shows the volume used since the last regeneration (L).

1. Volume since last regeneration display (L or Gal depending on display format programmed):

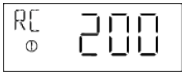


6.6.6 Reserve capacity (RC)

Info

Shows the remaining reserve volume until next regeneration (L).

1. Volume until next regeneration display (L or Gal depending on display format programmed):

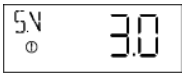


6.6.7 Software version (SV)

Info

Shows the version of the software used by the controller.

1. Software version display:



6.7 Resetting the controller

Mandatory

Once you have completed this operation, check all programming steps !

Info

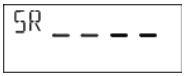
There are two options to reset: partial and hard reset.

Partial reset will set all the parameters to default values, except volume remaining in volumetric systems and days since last regeneration in time clock systems.

Hard reset will set all the parameters to default values.

6.7.1 Soft reset (SR)

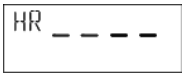
1. Press and hold and ▼ for 25 seconds while in normal service mode until **SR** is displayed.



2. Reprogram all parameters in Master programming mode.

6.7.2 Hard reset (HR)

1. Hold while powering up the unit.
2. The display shows **HR**.



3. Reprogram all parameters in Master programming mode.

7 Commissioning

Info

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

7.1 Water filling, draining and waterproofness inspection

1. With the bypass still in bypass position (inlet and outlet of the valve closed), plug in the SXT 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 the regen button for 5 seconds. The piston will move into backwash position. If the first cycle is not backwash, quick cycle the valve until the piston is in backwash position. Once in this position, unplug the SXT controller from the power source.
4. With the bypass still in bypass position, put the bypass slowly in service position.
5. Open the nearest faucet close to the system.
   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 progressively until fully open position.
6. Once the drain runs clear and the bypass valve is fully in service position, plug in again the SXT controller to the power source.
7. Push on the regen button once to move the piston to the next regeneration cycle position. Leave the valve 1 minute in each positions and move to the next one, until RF (brine refill cycle) is displayed. When RF is displayed, let the valve run the entire cycle and check the level of water in the brine tank or cabinet. The level of water in the brine tank should be about 5 cm above the salt platform. You may want to mark the level on the brine tank as this can be used as an indicator for the future lifetime of the softener.
8. Once RF is completed, the valve will automatically go back into service position (unless non-standard regen sequence is programmed). Start again a manual regeneration by pressing for 5 seconds on the regen button. The valve will move to backwash position.
9. Press the regen button once to move to brine draw position. Check to see in the brine tank is the water level decrease.
10. Once the draw function is observed and confirmed (level of water in the brine tank or cabinet has decreased), you may go through each cycle pushing on the regen button until RF, leave the water come back to the 'full' level, and then push on the regen button so that the valve returns into service position.
11. Repeat above procedure, from its second step, for the second tank.
12. Slowly open the outlet manual valve, and close the bypass manual valve. The system is now in service.
13. Close the faucet.

14. Fill the brine tank or cabinet with salt. You may want to mark the level of water in the brine tank/cabinet when completely refilled with water and full of salt. In the future, after each regeneration, you can visually control that the quantity of water refilled should be between the 2 marks done. Marking are optional, but may allow to visually detect any irregularity during regeneration that may lead to softener inefficiency.
15. With the brine tank completely refilled and full of salt, adjust the safety brine valve in the brine well. Make sure the overflow elbow is installed above the float level.
16. After the softener has been running a few minutes in service, proceed to hardness test on outlet water to make sure the water is treated as per requirements.

The system is ready and in service.

7.2 Sanitization

7.2.1 Disinfection of water softeners

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

Thus, 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 among the following methods.

7.2.2 Sodium or calcium hypochlorite

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

5.25% Sodium hypochlorite

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

Dosage

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

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

Brine tank softeners

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

Proceed with the normal regeneration.

Calcium hypochlorite

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

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

Dosage

Measure two grains ~ 0.11 mL for 1 L.

Brine tank softeners

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

Proceed with the normal regeneration.

7.2.3 Electro chlorination

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

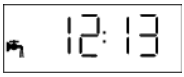
8 Operation

8.1 Display

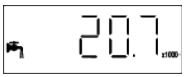
8.1.1 Display during operation

Examples:

- Valve in service with day time:

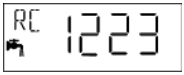


- Valve in service with volume remaining before regeneration:



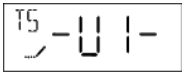
- Remaining days before next regeneration:

- In volumetric regeneration flow, reserve 1223 litres remaining:



- In volumetric regeneration flow, exhausted reserve, immediate or delayed start in regeneration depending on the adjustment:

- Tank in service:



Info

In delayed volumetric mode, the icon flashes as soon as the reserve begins to be used.

8.1.2 Display during regeneration

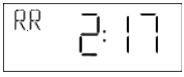
During a regeneration the display shows the current cycle step and the time remaining for that cycle. The countdown for the time remaining starts only when the valve is in the cycle displayed.

Examples:

- Valve going to rapid rinse. **RR** are flashing:

- Refill cycle, 12 min 38 sec. left:

- Rapid rinse cycle, 2 min 17 sec. left:



8.2 Recommendations

- Use only regeneration salts designed for water softening in accordance with EN973;
- for optimal system operation, the use of clean salt, free from impurities, is recommended (for example salt pellets);
- do not use ice melt, 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 the technical guides for resins in common use, providing necessary checks on the system.

8.3 Manual regeneration

Mandatory

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

8.3.1 Manual delayed regeneration

Info

This option is not available in mode FI.

8.3.2 Immediate regeneration

1. Press and hold for 5 seconds to initiate immediate manual regeneration regardless from the programmed regeneration control type.

8.3.3 To advance regeneration cycles

1. Press to pass to the next regeneration cycle.

8.4 Operation during a power failure

- Current valve position, cycle step time elapsed, and time of day is stored 24 hours during a power failure, and will be restored upon power restoration;
- in regeneration, when power is shutting down, the controller saves the current regeneration data. When power is restored, the controller resume the regeneration cycle at the point where power failed;

Caution - material

Risk of damage due to power failure !

Without power, the valve stays in its current position until power is restored.

The system should include all required safety components to prevent overflows resulting from a power failure during regeneration.

- all the program settings are stored in a permanent memory;
- time is kept during a power failure and the time of day is adjusted upon restoration of the power (as long as the power is restored within 24 hours);
- the time of day on the main display screen will flash when there has been a power failure;
- the flashing of the time of day can be stopped by pressing any button on the display.

9 Maintenance

Mandatory

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

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

Failure in respecting above instructions may void the warranty!

9.1 General system inspection

Mandatory

Must be done, at minimum, once a year !

9.1.1 Water quality

9.1.1.1 Valve used for softening

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

9.1.2 Mechanical Checks

1. Inspect general condition of softener/filter 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 timer, verify regeneration frequency, and make sure the valve configuration is appropriate for media and tank size.
4. Check water meter, if present, report water meter settings and compare with previous inspection.
5. If water meter is present, verify total water consumption compared to previous visit.
6. If pressure gauges are installed before and after softening/filtering system, verify and record static and dynamic pressure, reporting pressure drop. Verify that inlet pressure respects valve and softening/filtering system limits. Verify that pressure drop stay stable year on year, adapt backwash duration if required.
7. If pressure gauges are not present, but suitable points exist, install temporary pressure gauge(s) to perform precedent point.

9.1.3 Regeneration test

9.1.3.1 Valve used for softening

1. Check condition of brine tank and any associated equipment.
2. Check salt level in brine tank.

3. Initiate regeneration test.
   - ⇨ Check brine draw during brine draw stage.
   - ⇨ Check brine tank refill.
   - ⇨ Check operation of safety brine valve, where fitted.
   - ⇨ Check for brine draw off levels.
   - ⇨ Check for resin loss at the drain during regeneration.
   - ⇨ Where fitted, check for satisfactory operation of solenoid, i.e. outlet shut off during regeneration and/or brine line shut off valve(s).
4. Test and record Total Hardness of outlet water from softener vessel(s).

9.1.3.2 Valve used for filtration

1. Initiate manual regeneration and observe flow to drain.
2. Make sure flow rate correspond to DLFC configuration.
3. Check for media loss at the drain during backwash.
4. Check to see if water runs clear at the end of the backwash cycle.
5. Observe flow fast rinse cycle and measure pressure drop thought the filter system. Pressure drop after fast rinse should return equal or very close to pressure drop recorded after system start-up.
6. Where fitted, check for satisfactory operation of solenoid valve(s) i.e. outlet shut off during regeneration.

9.2 Recommended maintenance plan

9.2.1 Valve used for softening

Items	1 year	2 year	3 year	4 year	5 year
Injector & filter	Clean	Clean	Clean	Clean	Clean/ replace if necessary
BLFC***	Clean	Clean	Clean	Clean	Clean/ replace if necessary
DLFC***	Clean	Clean	Clean	Clean	Clean/ replace if necessary
Bypass (if present, contains Orings***)	Clean	Clean	Clean	Clean	Clean/replace if necessary
Piston*	Check/clean/ replace if necessary	Replace	Check/clean/ replace if necessary	Replace	Check/clean/ replace if necessary
Seals & spacers*	Check/clean/ replace if necessary	Replace	Check/clean/ replace if necessary	Replace	Check/clean/ replace if necessary
Brine valve	Check/clean/ replace if necessary	Check/clean/ replace if necessary	Check/clean/ replace if necessary	Check/clean/ replace if necessary	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
Motors	Check	Check	Check	Check	Replace
Gearing	Check	Check	Check	Check	Check/ replace if necessary
Inlet hardness	Check	Check	Check	Check	Check
Residual hardness	Check/adapt mixing screw if necessary	Check/adapt mixing screw if necessary	Check/adapt mixing screw if necessary	Check/adapt mixing screw if necessary	Check/adapt mixing screw if necessary
Electronic/ settings**	Check	Check	Check	Check	Check/ replace if necessary
Transformer**	Check	Check	Check	Check	Check/ replace if necessary
Microswitches	Check	Check	Check	Check	Replace
Meter(s)* (if present)	Check and Clean	Check and Clean	Check and Clean	Check and Clean	Replace
Meter cable(s)* (if present)	Check	Check	Check	Check	Replace

Items	1 year	2 year	3 year	4 year	5 year
Valve watertightness	Check	Check	Check	Check	Check
Valve to piping watertightness	Check	Check	Check	Check	Check

* Wear parts - durability strongly affected by raw water quality and regeneration frequency.

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

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

9.3 Recommendations

9.3.1 Use original spare parts

Caution - material

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

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

Usage of non-genuine spare parts voids all warranties.

Parts to keep in stock for potential replacements are the pistons, S&S kit, injectors, micro-switches and motors. Refer to maintenance sheet.

9.3.2 Use original approved lubricants

- Dow Corning #7 Release Agent.

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 of both inlet and treated water.

9.4 Cleaning and maintenance

9.4.1 First steps

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

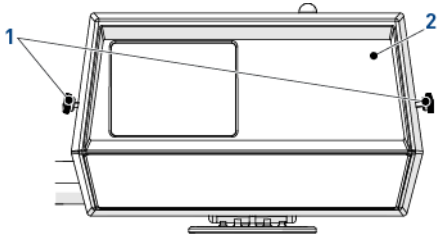
Mandatory

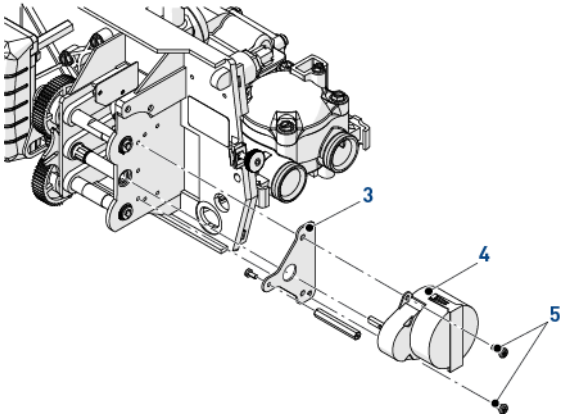
These operations must be performed before any cleaning or maintenance procedure !

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

9.4.2 Controller motor replacement

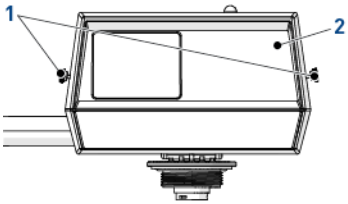
1. Loosen the wheels (**1**) and open the valve cover (**2**).
2. Disconnect the motor (**4**).
3. Unscrew (**5**) and pull out the old motor (**4**) and the plate (**3**).
4. Change the motor (**4**).
5. Reverse above procedure steps to rebuild.

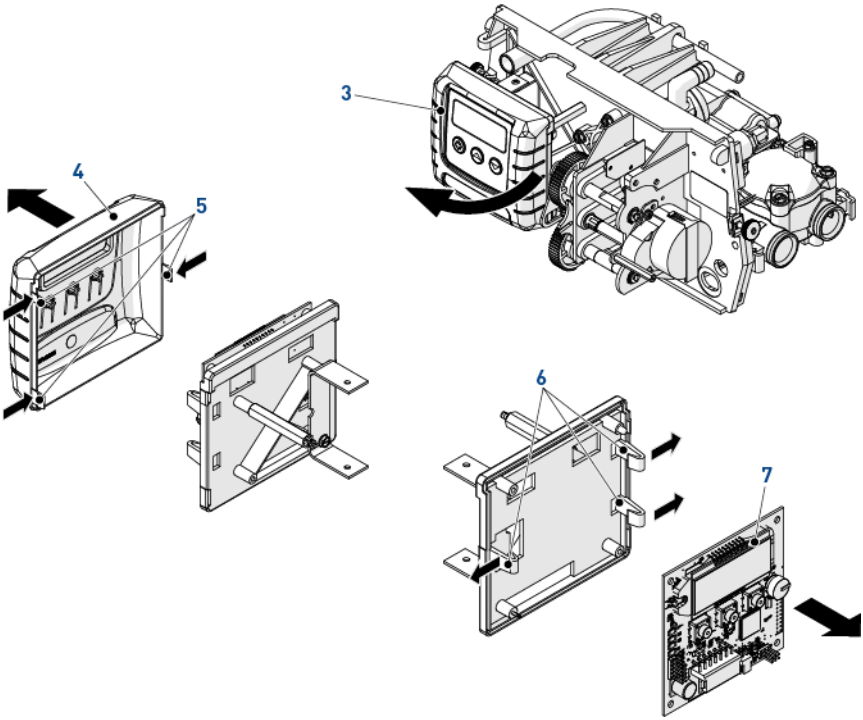




9.4.3 Controller replacement

1. Loosen the wheels (**1**) and open the valve cover (**2**).
2. Push the controller (**3**).
3. Press the controller clips (**5**) and open the controller cover (**4**).
4. Disconnect the old controller (**7**) and remove it opening the card clips (**6**).
5. Connect the new controller, see Electrical connections [→Page 43]
6. Reverse above procedure steps to rebuild..



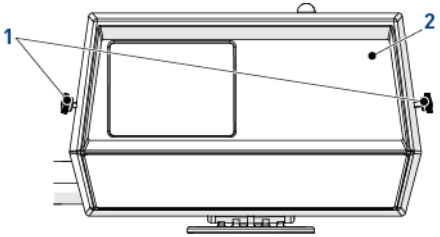


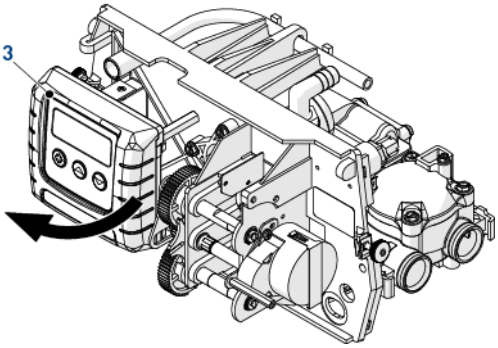
9.4.4 Power head disassembly/replacement

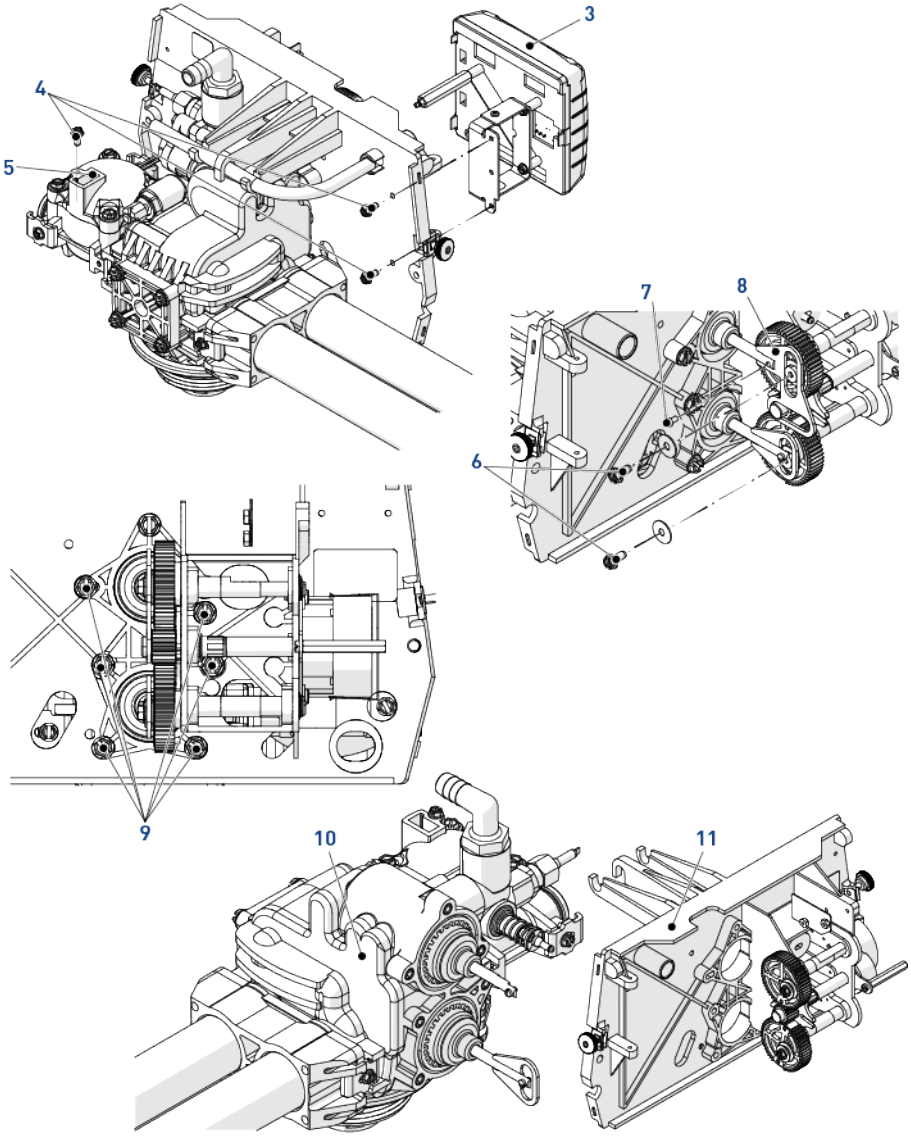
1. Loosen the wheels (**1**) and open the valve cover (**2**).
2. Push the controller (**3**).
3. Using a 7 mm wrench or flat screwdriver, unscrew (**4**) to free the meter cable (**5**) and the controller (**3**).
4. Using a 7 mm wrench or flat screwdriver, unlock the pistons from the screws (**6**).
5. Using a flat screwdriver, remove (**7**) and free the upper piston plate (**8**).
6. Using a 8 m wrench or flat screwdriver, unscrew (**9**).
7. Separate the backplate (**11**) from the valve body (**10**).
8. Change the backplate (**11**).
9. Reverse above procedure steps to rebuild.

Tip

These operations need to be performed before any cleaning or maintenance procedure.






3
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8
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9
10
11

9.4.5 Upper piston and/or seal and spacer kit replacement

Caution - material

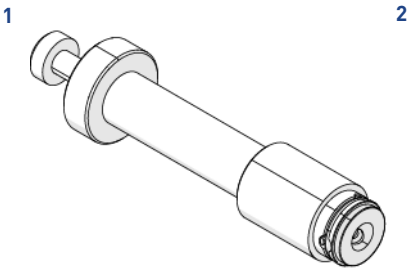
Risk of damage due to wrong lubricant use !

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

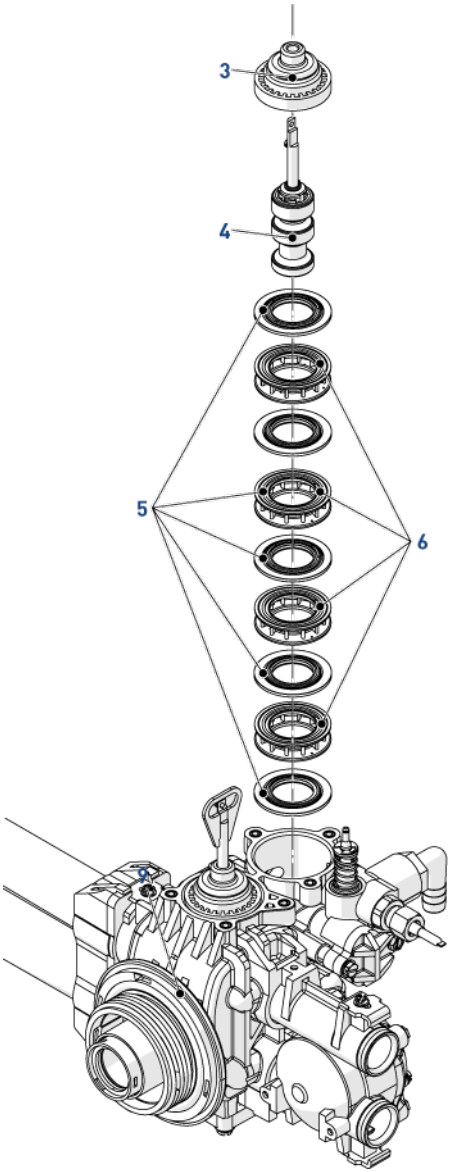
Use only approved silicone grease or soapy water !

1. Remove the power head, see Power head disassembly/replacement [→Page 76].
2. Using pliers, remove the piston (**4**).
3. Remove the cover cup (**3**) from the piston (**4**).
4. Using a small hook, remove a seal (**5**).
5. Using the puller (**1**), remove a spacer (**6**).
6. Repeat the two previous steps for all the seals and spacers.
7. Lubricate all seals (**5**) with approved lubricant only.
8. Put back a new seal (**5**) using the stuffer (**2**).
9. Put back a spacer (**6**) using the stuffer (**2**).
10. Repeat the two previous steps for all the seals and spacers.
11. Lubricate the piston (**4**) with approved lubricant only.
12. Put back the piston (**4**).
13. Put back the cover cup (**3**).
14. Rebuild the power head, see Power head disassembly/replacement [→Page 76].

9.4.5.1 Special tools needed



Item	Part number	Description	Packaging quantity
1	13061	Puller	1
2	12763	Stuffer	1


3
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6
9

9.4.6 Lower piston and/or front side seal and spacer kit replacement

Caution - material

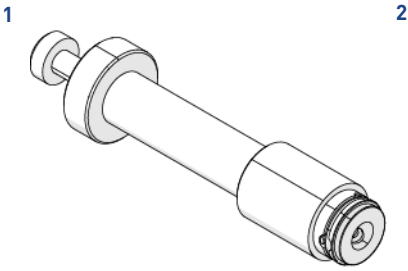
Risk of damage due to wrong lubricant use !

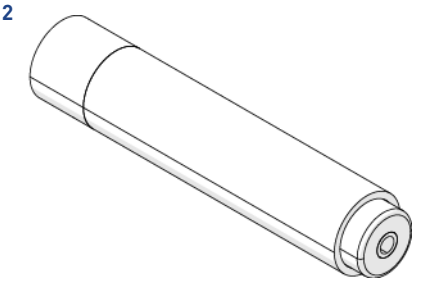
Do not use petroleum-based lubricants such as vaseline, oils, or hydrocarbon-based lubricants.

Use only approved silicone grease or soapy water !

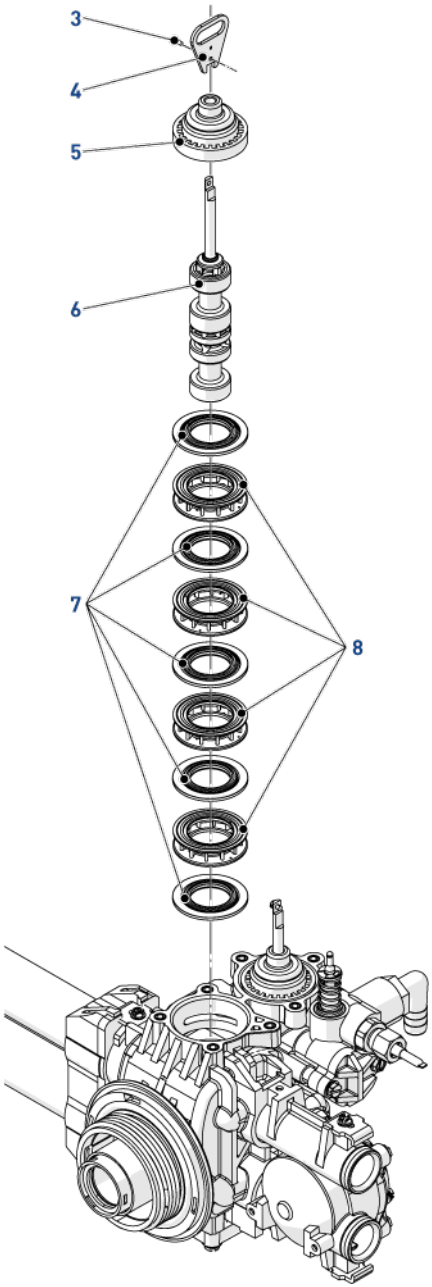
1. Remove the power head, see Power head disassembly/replacement [→Page 76].
2. Using pliers, remove the piston (**6**).
3. Remove the screw (**3**) and the piston plate (**4**).
4. Remove the cover cup (**5**) from the piston (**6**).
5. Using a small hook, remove a seal (**7**).
6. Using the puller (**1**), remove a spacer (**8**).
7. Repeat the two previous steps for all the seals and spacers.
8. Lubricate all seals (**7**) with approved lubricant only.
9. Put back a new seal (**7**) using the stuffer (**2**).
10. Put back a spacer (**8**) using the stuffer (**2**).
11. Repeat the two previous steps for all the seals and spacers.
12. Lubricate the piston (**6**) with approved lubricant only.
13. Put back the piston (**6**).
14. Put back the cover cup (**5**).
15. Put back the piston plate (**4**) and the screw (**3**).
16. Rebuild the power head, see Power head disassembly/replacement [→Page 76].

9.4.6.1 Special tools needed





Item	Part number	Description	Packaging quantity
1	13601	Puller	1
2	12763	Stuffer	1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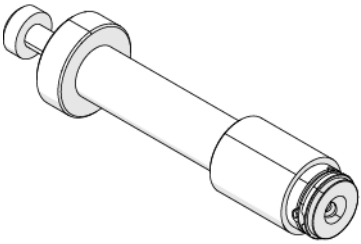
8

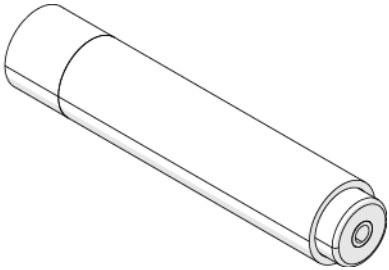
9.4.7 Back side seal and spacer cartridge replacement

9.4.7.1 Special tools needed

1



2



Item	Part number	Description	Packaging quantity
1	13601	Puller	1
2	12763	Stuffer	1

9.4.7.2 Valve produced before November 2009

Info

The seal & spacer cartridge for downflow and upflow are different.

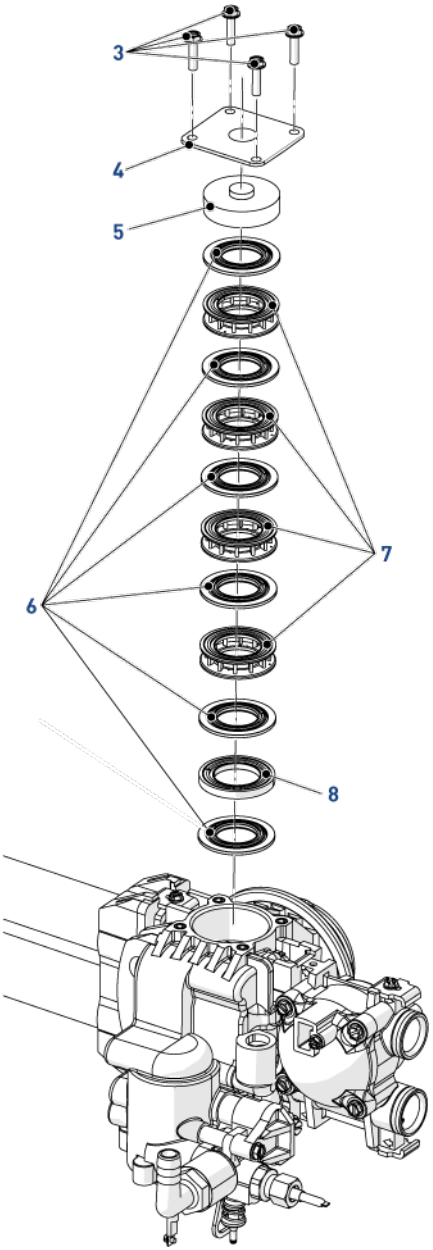
Caution - material

Risk of damage due to wrong lubricant use !

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

Use only approved silicone grease or soapy water !

1. Remove the lower piston, see Lower piston and/or front side seal and spacer kit replacement [→Page 80].
2. Using a 8 mm wrench or flat screwdriver, unscrew (**3**) and remove the end cap (**4**).
3. Remove the sub end plug (**5**).
4. Using a small hook, remove a seal (**6**).
5. Using the puller (**1**), remove a spacer (**7**).
6. Repeat the two previous steps for all the seals and spacers.
7. Lubricate all seals (**6**) with approved lubricant only.
8. Put back a new seal (**6**) using the stuffer (**2**).
9. Put back the new plain spacer (**8**) using the stuffer (**2**).
10. Put back a new seal (**6**) using the stuffer (**2**).
11. Put back a new spacer (**7**) using the stuffer (**2**).
12. Repeat the two previous steps for all the seals and spacers.
13. Put back the sub end plug (**5**).
14. Put back the end cap (**4**) and screw (**3**) using an 8 mm wrench or flat screwdriver.
15. Put back the lower piston, see Lower piston and/or front side seal and spacer kit replacement [→Page 80].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9.4.7.3 Valve produced from November 2009 until April 2015

Info

The seal & spacer cartridge for downflow and upflow are different. Upflow valves still have the two pieces end cap and requires all the seals.

Caution - material

Risk of damage due to bad component or wrong lubricant use !

One of the seals contained in the cartridge will not be used for downflow.

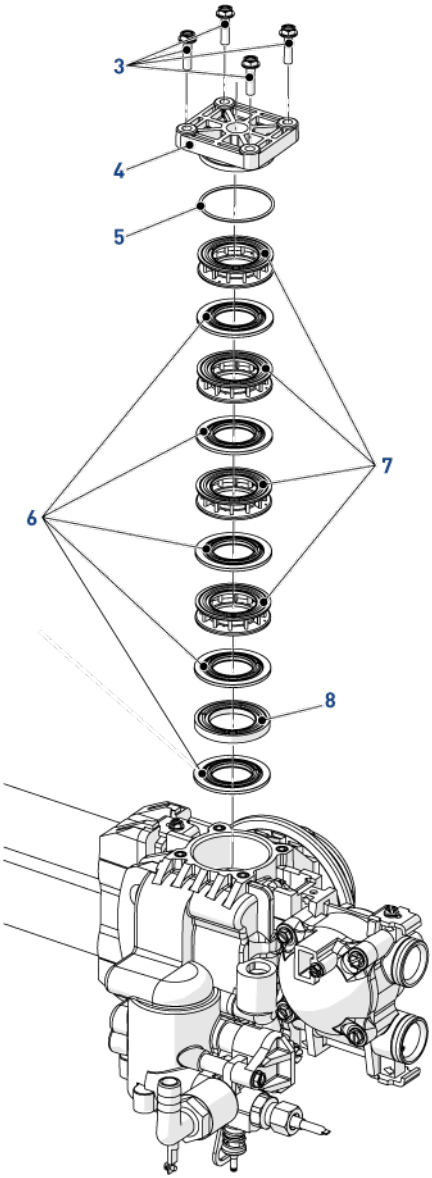
For downflow, using this extra seal may damage the valve and its components.

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

Do not use silicon grease.

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

1. Remove the lower piston, see Lower piston and/or front side seal and spacer kit replacement [→Page 80].
2. Using a 8 mm wrench or flat screwdriver, unscrew (**3**) and remove the end cap (**4**) (PN BR42278).
3. Using the puller (**1**), remove a spacer (**7**).
4. Using a small hook, remove a seal (**6**).
5. Repeat the two previous steps for all the seals and spacers.
6. Lubricate all seals (**6**) with approved lubricant only.
7. Put back a new seal (**6**) using the stuffer (**2**).
8. Put back the new plain spacer (**8**) using the stuffer (**2**).
9. Put back a new seal (**6**) using the stuffer (**2**).
10. Put back a new spacer (**7**) using the stuffer (**2**).
11. Repeat the two previous steps for all the seals and spacers.
12. Lubricate the end cap o-ring (**3**).
13. Put back the end cap (**4**) and screw (**3**) using an 8 mm wrench or flat screwdriver.
14. Put back the lower piston, see Lower piston and/or front side seal and spacer kit replacement [→Page 80].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9.4.7.4 Valve produced after April 2015

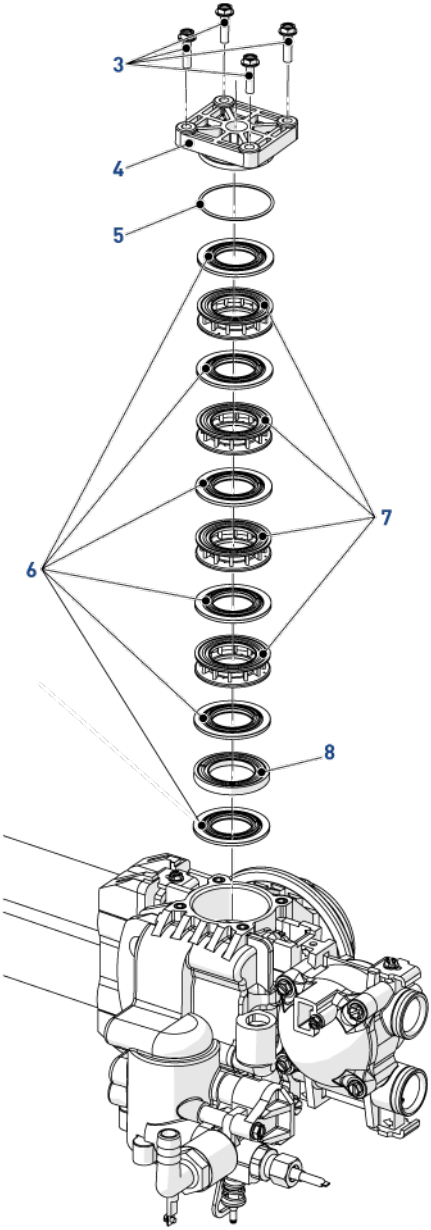
Caution - material

Risk of damage due to wrong lubricant use !

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

Use only approved silicone grease or soapy water !

1. Remove the lower piston, see Lower piston and/or front side seal and spacer kit replacement [→Page 80].
2. Using a 8 mm wrench or flat screwdriver, unscrew (**3**) and remove the end cap (**4**) (PN BR43458).
3. Using a small hook, remove a seal (**6**).
4. Using the puller (**1**), remove a spacer (**7**).
5. Repeat the two previous steps for all the seals and spacers.
6. Lubricate all seals (**6**) with approved lubricant only.
7. Put back a new seal (**6**) using the stuffer (**2**).
8. Put back the new plain spacer (**8**) using the stuffer (**2**).
9. Put back a new seal (**6**) using the stuffer (**2**).
10. Put back a new spacer (**7**) using the stuffer (**2**).
11. Repeat the two previous steps for all the seals and spacers.
12. Lubricate the end cap o-ring (**5**).
13. Put back the end cap (**4**) and screw (**3**) using an 8 mm wrench or flat screwdriver.
14. Put back the lower piston, see Lower piston and/or front side seal and spacer kit replacement [→Page 80].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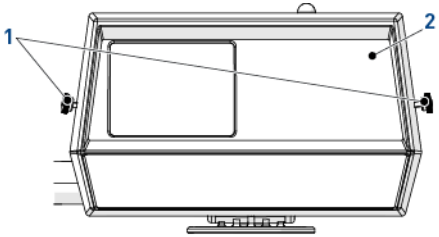
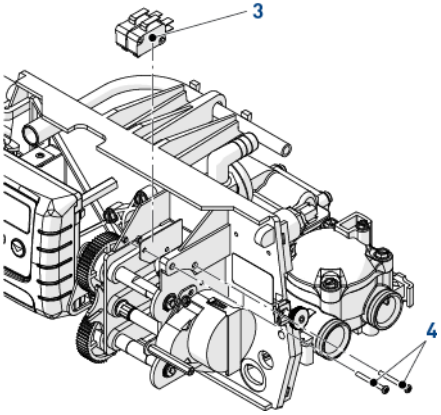
9.4.8 Micro-switches replacement

1. Loosen the wheels (**1**) and open the valve cover (**2**).
2. Unscrew (**4**) and pull out the old micro-switches (**3**).
3. Disconnect the micro-switches (**3**).
4. Change the micro-switches (**3**).
5. Reverse above procedure steps to rebuild.





9.4.9 Injector cleaning

1. Remove the screws (**1**).
2. Remove the injector block (**2**) and the spacer (**3**).
3. Remove the o-rings (**4**) and (**5**).
4. Remove the cap (**6**).
5. Remove the injector filter (**10**) and clean it immersing it in limescale.
6. Unscrew the nozzle (**8**) and the injector (**9**) and clean them blowing inside and immersing them in limescale.
7. Screw the injector (**9**) back.
8. Screw the nozzle (**8**) back.
9. Put the injector filter (**10**) back.
10. Lubricate the o-ring (**7**) with approved lubricant only.

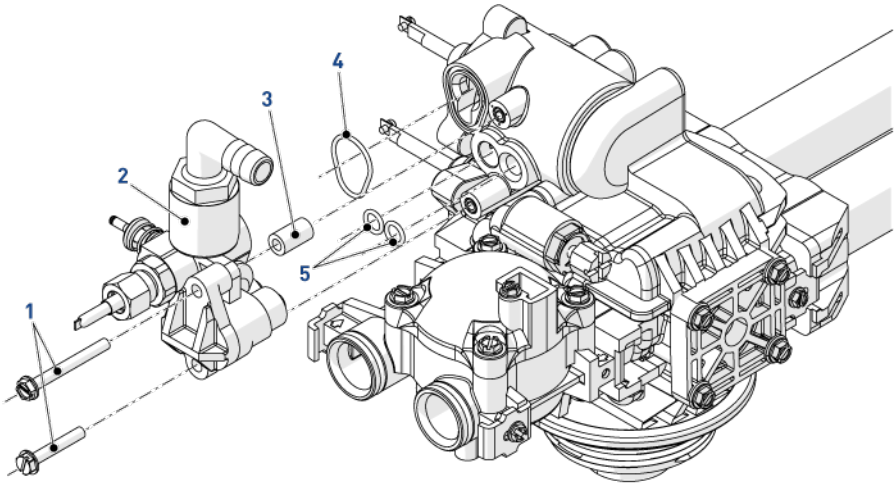
Caution - material

Risk of damage due to wrong lubricant use !

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

Use only approved silicone grease or soapy water !

11. Put back the o-ring (**7**) on the cap (**6**).
12. Put back the cap (**6**).
13. Lubricate the o-rings (**4**) and (**5**) with approved lubricant only.
14. Put back the o-rings (**4**) and (**5**).
15. Put back the injector block (**2**) with the spacer (**3**).
16. Put back the screws (**1**).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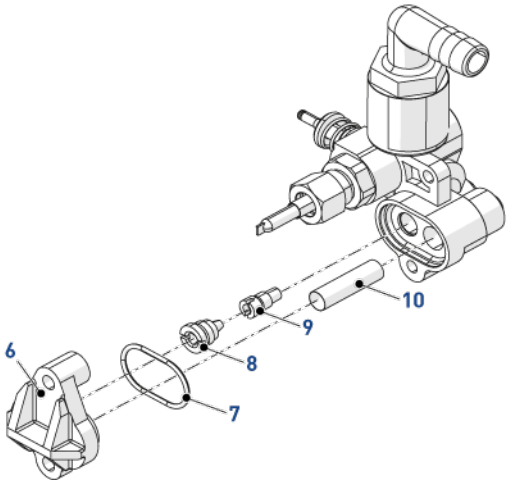
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9.4.10 BLFC cleaning

1. Using a wrench, remove the BLFC holder (**1**).
2. Using pliers, remove the grid (**4**) from BLFC holder (**1**).
3. Remove the BLFC washer (**3**) from the grid (**4**).
4. Clean with a terry cloth or change the BLFC washer (**3**) and the seal (**2**).
5. Clean the grid (**4**).
6. Lubricate the seal (**2**) with approved lubricant only.

Caution - material

Risk of damage due to wrong lubricant use !

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

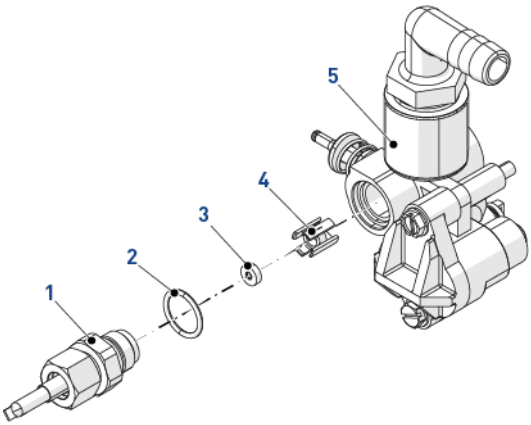
Use only approved silicone grease or soapy water !

7. Reverse above procedure steps to rebuild.

Mandatory

The washers (3) have to be installed with their chamfered side upfront the water stream flow.

Flow indication must be visible after the washer (**3**) is placed on the holder (**1**).



9.4.11 Valve on tank assembly

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

Info

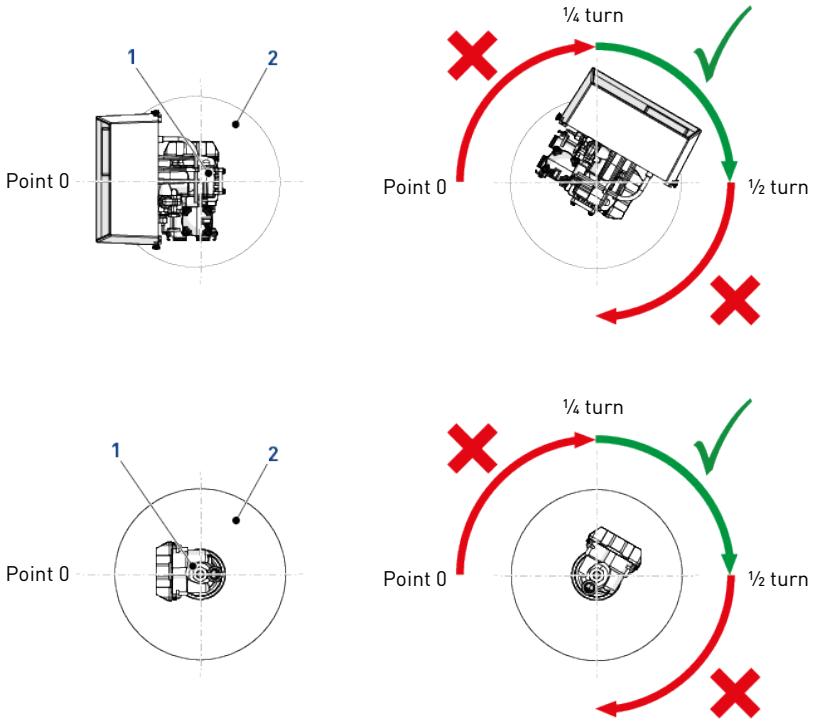
This stop position is considered point zero.

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

Caution - material

Risk of damage due to excessive force !

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



10 Troubleshooting

Problem	Cause	Solution
Softener fails to regenerate automatically	Interrupted power or switched off power source.	Restore the controller and connect to constant power source.
	Disconnected/faulty meter cable.	Check connections in the power head and on the meter cover. Change the cable.
	Defective power cord.	Replace cord.
	Defective motor.	Change motor.
	Defective controller.	Change controller.
	Blocked meter.	Clean or change meter.
	Bad programming.	Program correctly.
Softener delivers hard water	By-pass valve is open.	Close by-pass valve.
	No salt in the brine tank.	Add salt in the brine tank and keep salt level above water level.
	Plugged injector and/or filter.	Clean or replace injector and/or filter.
	Insufficient water flowing into brine tank.	Check brine tank filling time and clean flow regulator.
	Hot water tank hardness.	Repeated flushing of the hot water tank.
	Leak at the distributor hose.	Ensure the distributor tube has no cracks. Check the o-ring.
	Internal valve leak.	Change seals & spacers and/or piston assembly.
	Blocked meter.	Clean or change meter.
	Disconnected/faulty meter cable.	Check connections in the power head and on the meter cover. Change the cable.
	Bad programming.	Program correctly.
Excessive salt consumption	Improper brine refill setting.	Check use of salt and setting of brine refill.
	Too much water in the brine tank.	See problem below: Too much water in the brine tank.
	Bad programming.	Program correctly.
Water pressure drop	Iron deposit in the valve inlet.	Clean the inlet.
	Iron deposit in the valve.	Clean the valve and resin.
	Valve inlet obstructed by foreign elements.	Remove piston and clean the valve.

Problem	Cause	Solution
Resin loss through drain line	Top distributor missing or broken.	Add or replace the top distributor.
	Air in water system.	Ensure the presence of air check system in the brine tank.
	Improperly sized drain line flow control.	Size the drain line flow control correctly.
Iron presence in the valve/treated water	The resin bed is dirty.	Check backwash, brine draw, and brine refill. Regenerate more often and increase backwash cycle time.
	Iron concentration exceeds recommended parameters.	Contact your local dealer.
Too much water in the brine tank.	Plugged drain line flow control.	Clean drain line flow control.
	Plugged injector system.	Clean injector and screen, change if necessary.
	Faulty brine valve.	Change brine valve.
	Bad programming.	Program correctly.
	Controller is not cycling.	Change controller.
	Foreign material in the brine valve.	Replace brine valve seat and clean the valve.
	Foreign material in the brine line flow control.	Clean brine line flow control.
Salted water in service line	Plugged injector and/or filter.	Clean or replace injector and/or filter.
	Power head not operating properly.	Change power head.
	Foreign material in the brine valve.	Replace brine valve seat and clean the valve.
	Foreign material in the brine line flow control.	Clean brine line flow control.
	Low water pressure.	Raise inlet pressure to 1.8 bar minimum.
	Bad programming.	Program correctly.

Problem	Cause	Solution
Softener fails to draw brine	Plugged drain line flow control.	Clean drain line flow control.
	Plugged injector and/or filter.	Clean or replace injector and/or filter.
	Low water pressure.	Raise inlet pressure to 1.8 bar minimum.
	Internal valve leak.	Change seals & spacers and/or piston assembly.
	Bad programming.	Program correctly.
	Power head not operating properly.	Change power head.
Controller cycles continuously	Power head not operating properly.	Change power head.
	Faulty microswitch or wiring loom.	Change microswitch or wiring loom.
	Defective or badly set cycle cam.	Reposition or change cycle cam.
Drain flows continuously	Foreign elements in the valve.	Clean valve and check it in the different regeneration positions.
	Internal valve leak.	Change seals & spacers and/or piston assembly.
	Valve blocked in brine refill or backwash.	
	Defective or blocked motor.	Change motor and check gear teeth.
	Power head not operating properly.	Change power head.
Upper drive synchronization	Power failure while the electronic was compiling data.	System will recover automatically within a few minutes.
	The board doesn't receive the signal from the homing microswicth (motor runs for the 6 first minutes of UD display then shows ER0).	Check microswicthes and associated wiring.
	Er 0 was shown, power switch off and on: UD---- is displayed at power restoration and motor runs for 6 minutes looking for its position, finally shows Er0 again if expected signals from microswicthes aren't received.	

10.1 Error detection

Errors codes appear on the service display.

Info

It can take up to 1 minute before an error can be detected and displayed.

10.1.1 Motor stall/cam sense error

Info

The valve drive takes more than 6 minutes to go to the next regeneration cycle and the board hasn't received expected signals from microswitches.

1. Unplug the unit and plug back in. Allow the controller to attempt to find position again.
2. Unplug the unit and examine the power head, especially look at homing/step microswitches and motor.
3. Verify all circuit board connections.
4. Verify the motor and gearing components are in good condition and assembled properly.
5. Check the valve and verify that the piston travels freely.
6. Replace/reassemble the various components as necessary.
7. Plug the unit back in and observe its behaviour.
8. If the error reoccurs, unplug the unit.
9. Put it into bypass.
10. Contact dealer.

10.1.2 Motor run-ON error/cycle sense error

Info

The valve performed an unforeseen cycle.

This error message is only valid until controller version 2.6.

1. Unplug the unit and plug back in. Allow the controller to attempt to find position again.
2. Unplug the unit and examine the power head.
3. Verify all circuit board connections.
4. Enter master programming mode.
5. Verify that the valve type and system type are set correctly with regard to the unit itself.
6. Step the unit to a manual regeneration.
7. Verify that it functions correctly.
8. If the error reoccurs, unplug the unit.
9. Put it into bypass.
10. Contact dealer.

10.1.3 Regeneration failure

Info

The system has not regenerated for more than 99 days or 7 days if the controller type has been set to day of week.

1. Perform a manual regeneration to reset the error code.
2. If the system is metered, verify that it is measuring flow by running service water and watching for the flow indicator on the display.
3. If the unit doesn't measure flow, verify that the meter is working properly and its cable is well connected.
4. Enter master programming mode.
5. Verify that the unit is configured properly.
6. Check that system capacity has been selected.
7. Check that day override is set properly.
8. Check that meter is identified correctly.
9. If the unit is configured as a day of week system, verify that at least one day is set ON.
10. Correct the setting as necessary.

10.1.4 Memory error

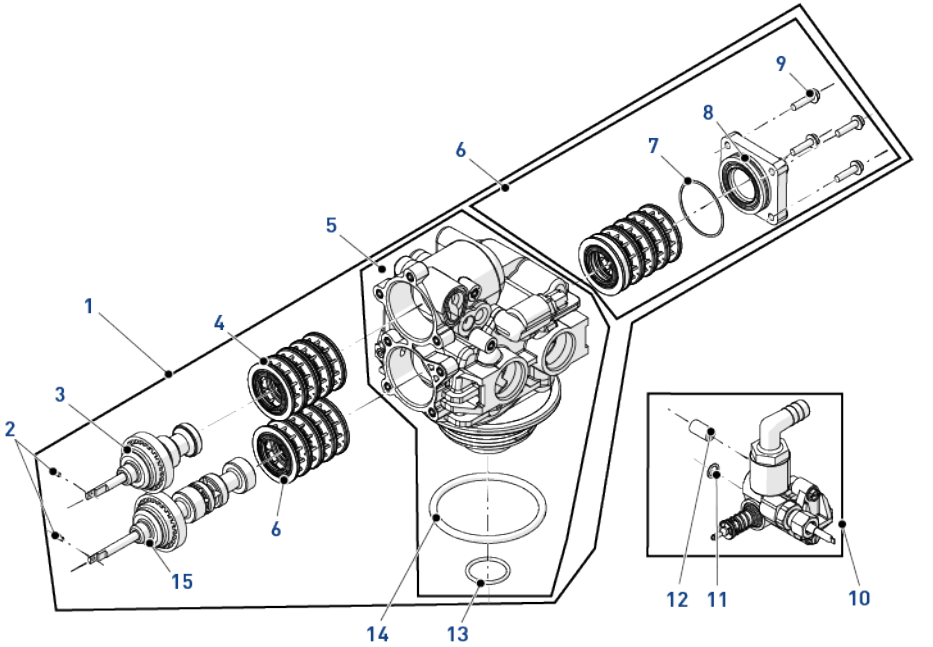
Info

The controller board has a memory failure.

1. Perform a master reset.
2. Reconfigure the system via master programming mode.
3. Step the valve through a manual regeneration.
4. If the error reoccurs, unplug the unit.
5. Put it into bypass.
6. Contact dealer.

11 Spare parts and options

11.1 Valve parts list



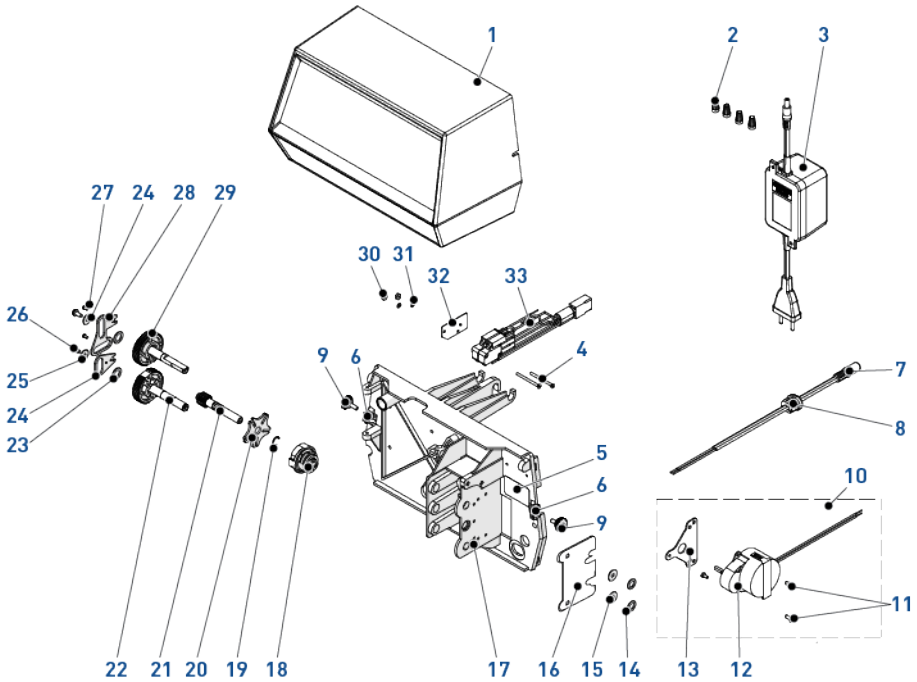
Info

The sizes for injector, drain line flow control and brine line flow control have to be specified.

Item	Part number	Description	Packaging quantity
1	BU28524-01	VB assy 9100 DF without mixing	1
-	BU28524-02	VB assy 9100 UF without mixing	1
2	11335SP	Piston rod screw	50
3	24234	Piston assy 9000/9100 upper	1
4	24115	Upper S&S kit residential	1
5	BU28241	VB & distributor adapter 9100 without mixing	1
6	BU28664	S&S kit 9000/9100 lower	1
4 + 6	25642	S&S kit 9000/9100 upper & lower	1
7	14928	Sub end plug for valve produced before Nov. 2009	1
-	40952SP	O-ring for valve produced from Nov. 2009	5
8	14906	O-ring End Plug 7700	1

Item	Part number	Description	Packaging quantity
-	BR42278	End cap for valve produced from Nov. 2009 until Apr. 2015	1
-	BR43458	End cap for valve produced after Apr. 2015	1
9	24874SP	Screw THM 5 x 8	50
-	15331SP	Screw hex head 10-24 9000	50
10	VCINJ1	Injector residential	1
11	13497SP	Air dispenser	50
12	13361SP	Spacer injector	5
13	13304-01SP	O-ring 560 CD	10
14	18303-01SP	O-ring top of tank	10
15	24235	Piston assy 9000/9100 lower DF	1
-	28173	Piston assy 9000/9100 lower UF	1

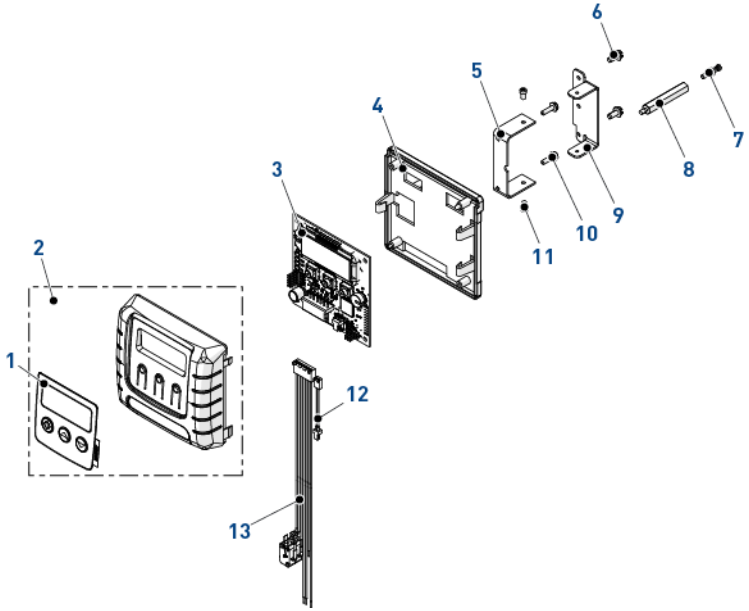
11.2 Power head parts list



Item	Part number	Description	Packaging quantity
-	VCPHTWIN1	Twin power head assy 9000 – 9100 - 9500	1
1	19291-020	Cover 9000/9100/9500 black	1
2	40422SP	Wire nut tan	50

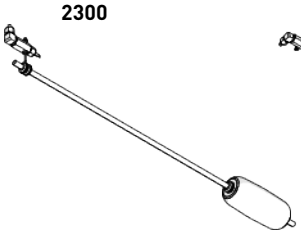
Item	Part number	Description	Packaging quantity
3	BU28597	Kit transformer 10VA 400 mA residential	1
4	15172SP	Screw flat head	50
5	21271	Serial number label	1
6	18728SP	Clip 9000/9500	50
7	BU28552	Transformer wire harness	1
8	13547SP	Strain relief 24V	50
9	19367SP	Cover designer screw 12.7 mm	10
10	26503-24	Drive motor assy 24V 50/60 Hz twin	1
11	19160	Screw, #6-32 x 3/8 pan head	50
12	BR18737	Drive motor 24V 50/60 Hz 1 rpm	1
13	15199	Ground plate 9000/9100/9500	1
14	14917SP	Crescent retaining ring 9000/9100/9500	10
15	15692SP	Washer brass 9000/9500	50
16	27002SP	Label shaft pos picto 9000/9500	10
17	15131	Back plate 9000/9100/9500	1
18	BR15132	Triple cam 9000/9100 DF	1
19	15810SP	Retaining ring 9000/9500	10
20	14896SP	Wheel, Geneva	10
21	15135SP	Drive gear 9000/9100/9500	10
22	25870	Drive gear lower 9000 assy	1
23	15372SP	Washer 9000/9500	10
24	15019	Link, piston rod	1
25	23250SP	Washer LN 4	50
26	17798	Screw, hex washer head, #8-16 x .38	10
27	BR11335	Screw, fillister head, #4-40 x .19	10
28	14921SP	Link, piston rod	10
29	25868	Drive gear up assy	1
30	10339SP	Nut switch mount	50
31	11663SP	Lock washer	50
32	10302SP	Insulator limit switch	50
33	BU27746	Harness 9000	1

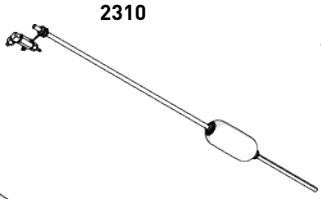
11.3 Controller parts list

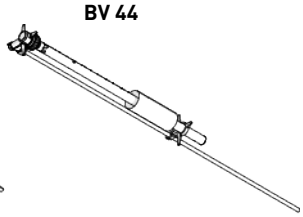


Item	Part number	Description	Packaging quantity
-	BU28712-02	Complete SXT controller without meter cable	1
1	BR42637	SXT front panel	1
2	BU28714	Cover front panel & label SXT	1
3	BR43346-E0	Circuit board SXT programmed Eco	1
4	19889	Circuit board housing	1
5	26982	Mounting bracket controller	1
6	13296SP	Screw	50
7	14265SP	Clip spring timer	10
8	26983	Stand off	1
9	13881SP	Timer hinge bracket	10
10	10300SP	Timer screw	50
11	11384SP	Screw PH 6-32x¼ zinc	50
12	BU27808	Meter cable adapted SE 60 mm	1
13	BU28528	Wire harness with switches	1

11.4 Safety brine valves list



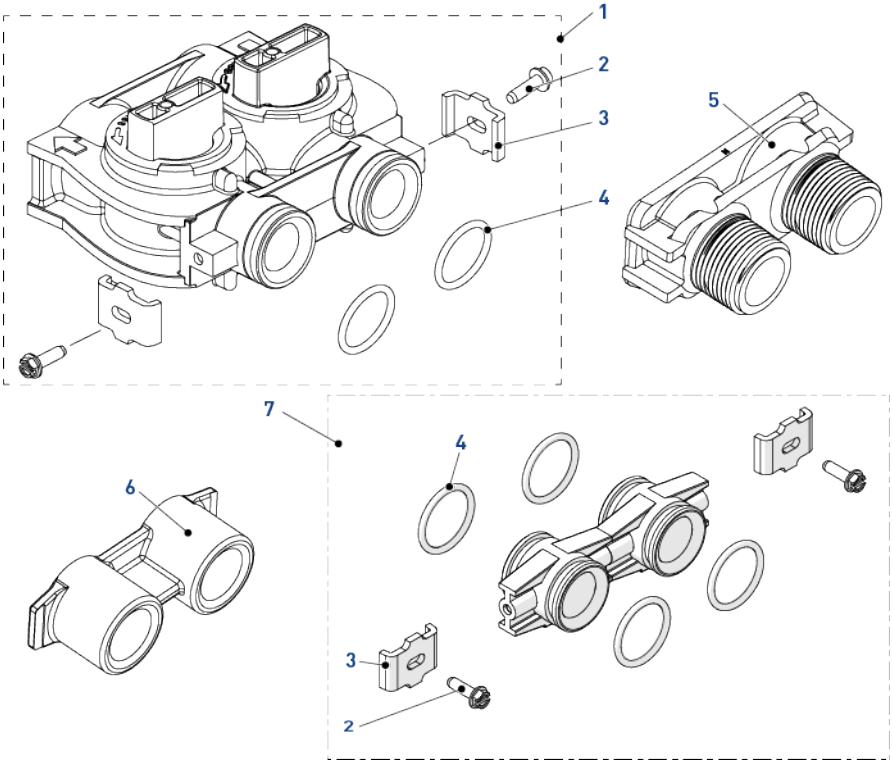




Item	Brine system	Part number	Description	Packaging quantity
-	1600	27833	Safety Brine Valve 2300 - Without Air-Check	24
-		27834	Safety Brine Valve 2300 - HW - Without Air-Check	24
-		60067-03	Safety Brine Valve 2310 - Without Air-Check	24
-		25687	Brine Valve 44 - 914mm	10
-		18961	Brine Valve 44 - 1250mm	10

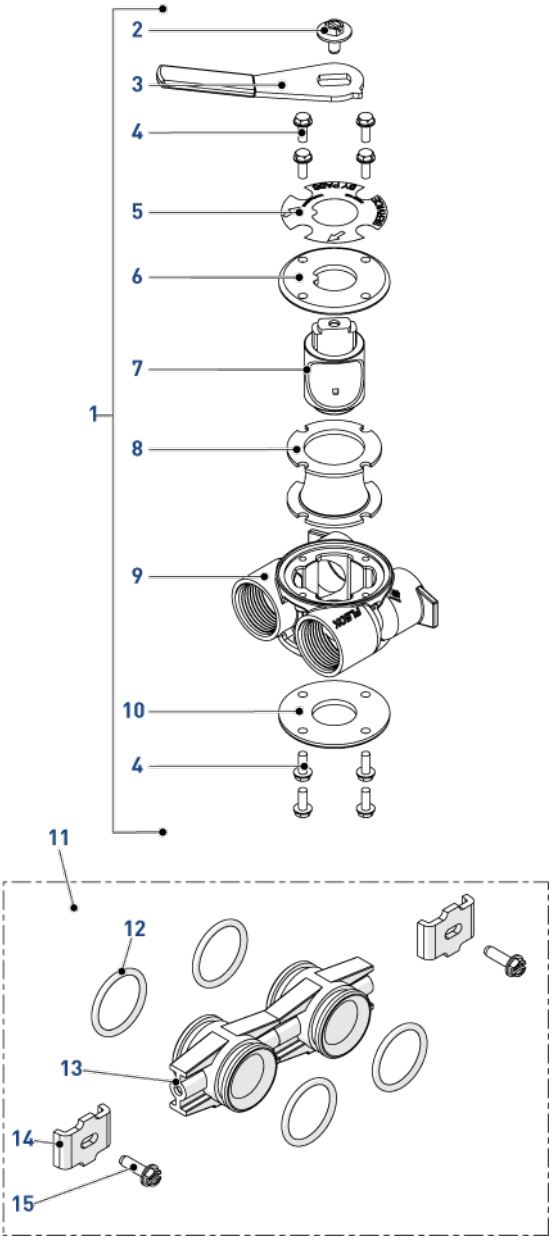
11.5 Bypass valve assembly list

11.5.1 Plastic bypass (no yoke)



Item	Part number	Description	Packaging quantity
1	BU26054	Bypass plastic	1
2	13314SP	Screw, slot ind, hex, 8-18 x 0.60"	50
3	13255SP	Clip mounting	12
4	13305-01SP	O-ring	10
5	18706-10	Yoke, 1", BSP, male, plastic	1
-	18706-12	Yoke, ¾", BSP, male, plastic	1
-	24689	Yoke, ¾", BSP, male, brass	1
6	13398-10	Yoke 1", BSP, female, brass	1
7	Kit 256	Adapter assembly, kit coupling, with o-rings	1

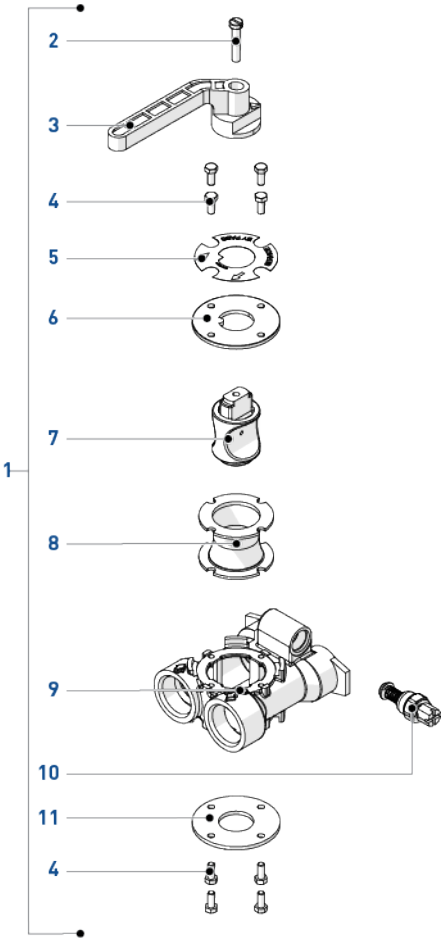
11.5.2 1" BSP female stainless steel bypass



Item	Part number	Description	Packaging quantity
1	BU28502	Bypass Stainless Steel 1" BSP	1

Item	Part number	Description	Packaging quantity
2	13386SP	Screw Hex Hd Mach 1/4-20 X 1 Or Slot Hex	10
3	24419-10SP	Bypass handle red	10
4	15727	Screw, Hex washer head 10-24 x 0.5"	8
5	13604-01	Label bypass standard	1
6	BU11978	Cover bypass, Top	1
7	BU11972	Plug, bypass	1
8	14105SP	Seal, bypass, 560CD	5
9	40634-10	Bypass body, 1" BSP, stainless steel	1
10	11986	Cover bypass, Bottom	1
11	Kit 256	Adapter assembly, kit coupling, with o-rings	1
12	13305-01SP	O-ring	10
13	13255SP	Clip mounting	12
14	13314SP	Screw, slot ind, hex, 8-18 x 0.60"	50

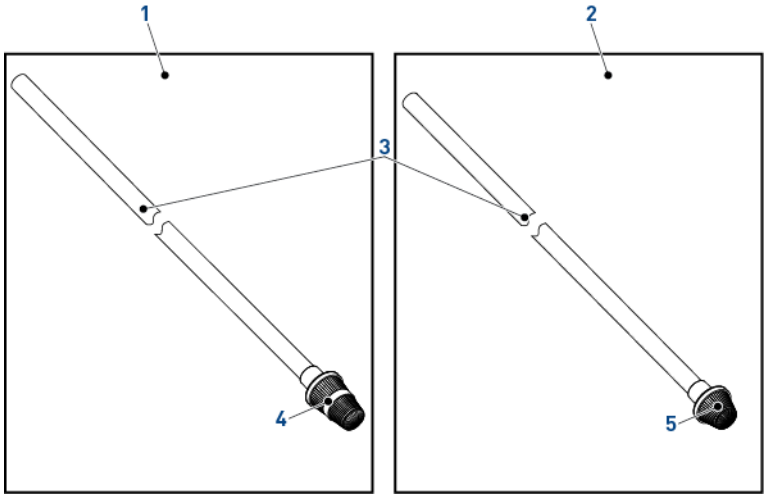
11.5.3 1" BSP female brass bypass with mixing



Item	Part number	Description	Packaging quantity
1	24734-10	Bypass 1" BSP female brass with mixing	1
2	BU28642	Screw TC, slotted, M6x30	10
3	24419-10SP	Bypass handle red	10
4	11737SP	Screw TH M5x12	8
5	21134	Bypass label	1
6	BU11978	Cover bypass, Top	1
7	BU11972	Plug, bypass	1
8	14105SP	Seal, bypass, 560CD	5
9	24155	Bypass body, 1" BSP, brass	1

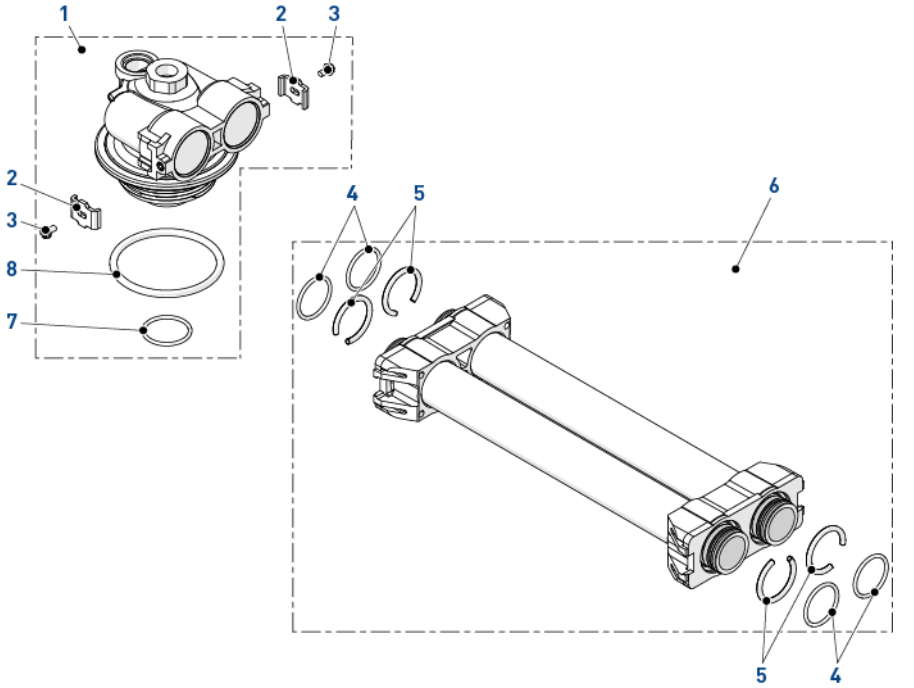
Item	Part number	Description	Packaging quantity
10	24509-02	Mixing assy HW	1
11	BU11986	Cover bypass, bottom	1

11.6 Distribution systems parts list



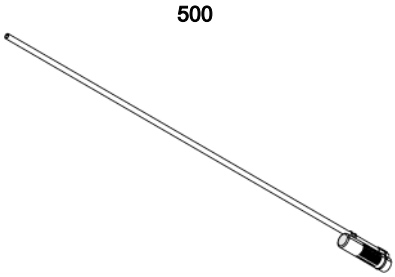
Item	Part number	Description	Packaging quantity
1	27827	Distributor assy, 1" high flow 1 m 10	24
-	25645	Distributor assy, 1" high flow 1 m 95	24
-	BU28508	Distributor assy, 1" high flow HW 1m10	24
-	21675	Distributor assy, 1" high flow HW 1m88	12
2	27828	Distributor assy, 1" UF & high capacity 1 m 10	24
-	BU28509	Distributor assy, 1" UF & high capacity HW 1 m 10	24
-	25639	Distributor assy, 1" high capacity HW 1m88	24
3	BU28648	Distributor tube, 1" - 1 m 85 (ACS)	1
-	BU28650	Distributor tube, 1" - 1 m 06 (ACS)	1
-	BU28507	Distributor tube, 1" - 1m06 HW	1
-	12165-01	Distributor tube, 1" - 1m78 HW	1
4	25360	Bottom distributor, 1" high flow	1
-	27106	Bottom distributor, 1" high flow HW	1
5	25797	Bottom distributor, 1" UF & high capacity	1
-	27109	Bottom distributor, 1" UF & high capacity HW	1

11.7 Second tank adapter parts list



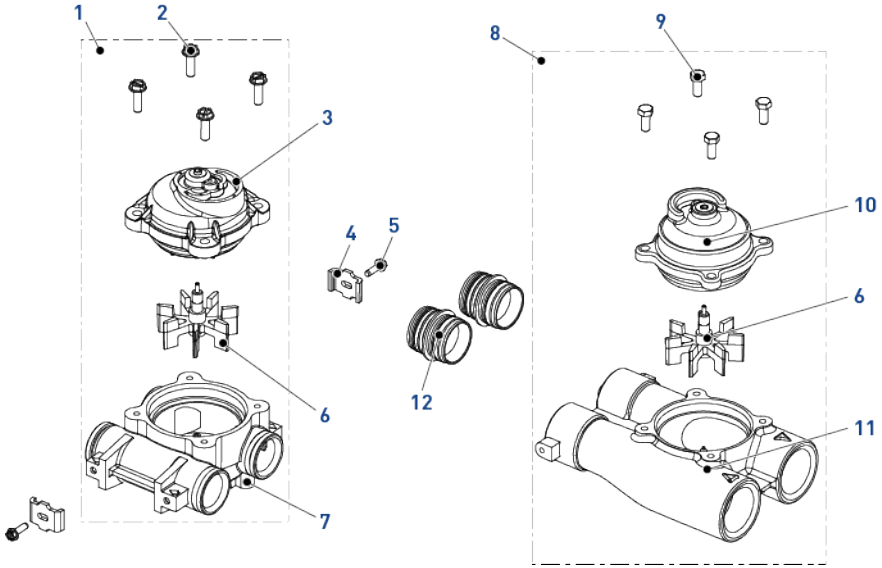
Item	Part number	Description	Packaging quantity
1	28242	2nd tank adapter assembly	1
2	13255SP	Mounting clip	12
3	14202-01SP	Screw adapter clip	50
4	13287-01SP	O-ring 560 CD QC	10
5	40678SP	Ring yoke retainer	12
6	28243-07	Tube assy for 7" tank	1
-	28243-09	Tube assy for 9" tank	1
-	28243-12	Tube assy for 12" tank	1
-	28243-16	Tube assy for 16" tank	1
7	13304-01SP	O-ring 560 CD	10
8	18303-01SP	O-ring top of tank	10

11.8 Air checks list



Item	Brine system	Part number	Description	Packaging quantity
-	1600	18168	Air checks 500A, 915mm (36")	48
-		26773	Air checks 500A, 1m25	48
-		23473	Air checks 500 HW	48

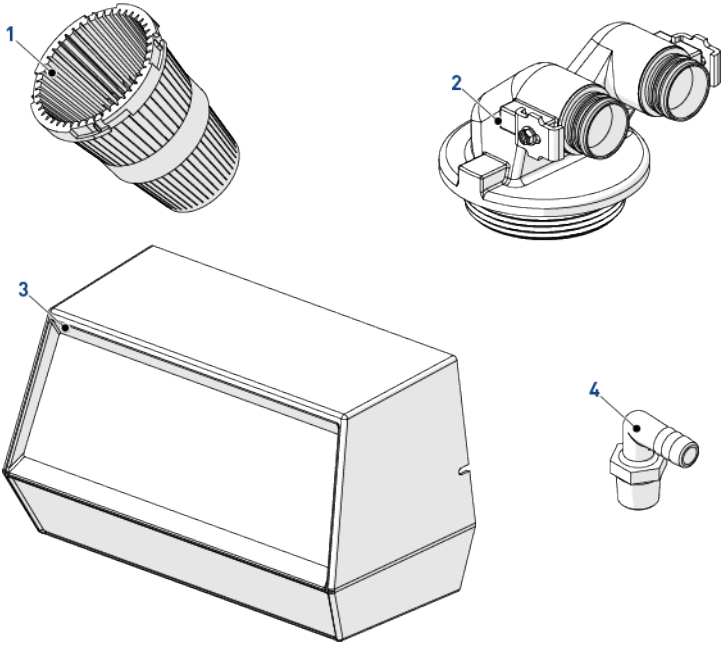
11.9 Plastic turbine meter assembly



Item	Part number	Description	Packaging quantity
1	26702	Meter assembly, ¾", electronic plastic	1
2	12473SP	Screw hex washer 10-24 x 5/8 18-8SS	50
3	18330	Cover meter assembly, ¾", electronic plastic	1
4	13255SP	Mounting clip	12

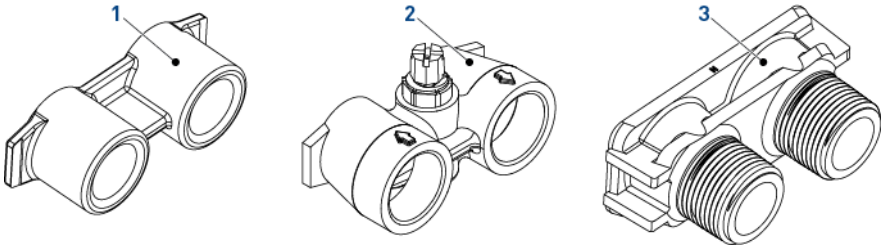
Item	Part number	Description	Packaging quantity
5	14202-01SP	Screw adapter clip	50
6	13509SP	Impeller meter except 2" & 3"	10
7	24102	Meter body assembly, ¾", plastic with o-ring	1
8	27130	Meter assembly, 1", electronic brass	1
9	11737SP	Screw TH M5 x 12	50
10	14716-02	Cover meter assembly, 1", electronic brass	1
11	15043-20	Meter body assembly, 1", brass	1
12	15078-01	Coupling assembly, 1"	4

11.10 CE compliance parts list



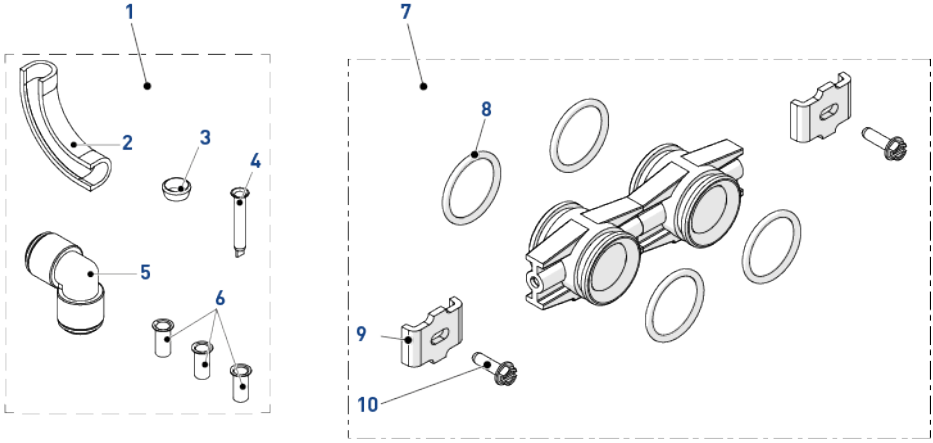
Item	Part number	Description	Packaging quantity
1	18280SP	Collector top 1" x 0.011 grey bayonet	10
2	28242	2nd tank adapt assy 9100	1
3	19291-020	Cover 9000/9100/9500 black	1
2	21511SP	Hose barb 90° ½" x ½", black or grey	10

11.11 Yokes



Item	Part number	Description	Packaging quantity
1	13398-10	Yoke, 1", BSP, female, brass	1
2	24735	Yoke, 1", BSP, female, brass, mixing	1
3	24689	Yoke, ¾", BSP, male, brass	1
-	18706-12	Yoke, ¾", BSP, male, plastic	1
-	18706-10	Yoke, 1", BSP, male, plastic	1

11.12 Other components list



Item	Part number	Description	Packaging quantity
1	Kit accessories 1600		1
2	24575SP	Tube holder	10
3	10330SP	Sleeve 3/8"	50
4	12767SP	Screen brine line	10
5	12794-01SP	Elbow $^{3}/_{8}$"x $^{3}/_{8}$"	10
6	10332SP	Insert sleeve $^{3}/_{8}$"	50

Item	Part number	Description	Packaging quantity
7	Kit 256	Adapter assembly, kit coupling, with o-rings	1
8	13305-01SP	O-ring 560 CD adapt coupling	10
9	13255SP	Mounting clip	12
10	13314SP	Screw adapt clip	50
Not shown	BU28319	Kit 9000	1

12 Disposal

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

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