

Model 500SE Customer Manual



MODEL 500SE

general installation check list

WATER PRESSURE: A minimum water pressure of 1,8 bar is required for the regeneration valve to operate effectively.

ELECTRICAL FACILITIES: A continuous 24 volt, 50 Hz. current supply is required. Make certain the current supply is always live and cannot be turned off with another switch.

EXISTING PLUMBING: Existing plumbing should be free from hardness scale and iron buildup. Piping that is built up heavily with hardness scale and/or iron should be replaced. If piping is clogged with iron, a separate iron filter unit should be installed ahead of the water softener.

LOCATION OF SOFTENER AND DRAIN: The softener should be located close to a drain.

BYPASS VALVES: Always provide for the installation of a bypass valve system.

CAUTION: Water pressure is not to exceed 8,5 bar. Water temperature is not to exceed 43°C. The unit must not be subjected to freezing conditions.

Physical installation

1. Place to water softener assembly in its final position, making sure that the assembly is on a firm and level base.
2. All plumbing connections should be made in accordance with the local Water Byelaws. The pipe size for the drain should not be less than 1/2" n.b. hose.
3. If the control valve is not already assembled to the pressure vessel then ensure that the centre distributor / riser tube is cut **FLUSH** with the top of the pressure vessel.
4. Lubricate the the outside of the distributor tube - the top 10mm is sufficient - and lubricate the large O-Ring that seals the valve to the pressure vessel. *NOTE: Use only silicone lubricant. Do not use petroleum grease or aerosol based lubricants.*
5. If soldering pipework close to the final valve connections, ensure that heat cannot be transmitted or conducted to the plastic components. Failure to observe this requirement may cause permanent damage.
6. All threaded connections to the control valve must only be sealed with PTFE tape.
7. Ensure that when finally positioning the system that the floor under the components is clean and flat.
8. When all plumbing connections are completed, place the bypass valve system into the bypass position. Turn on the water supply and open a nearby cold water tap to allow water to flush out the new pipework. When it is running clean and clear, turn off the cold water tap but leave the system in bypass.
9. Connect the system to the electrical supply via a suitable transformer. *NOTE: The control system is designed to operate at 24vac only. DO NOT CONNECT DIRECTLY TO THE MAINS ELECTRICAL SUPPLY.*

Now you must set-up the control system

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Control Start-Up Procedures

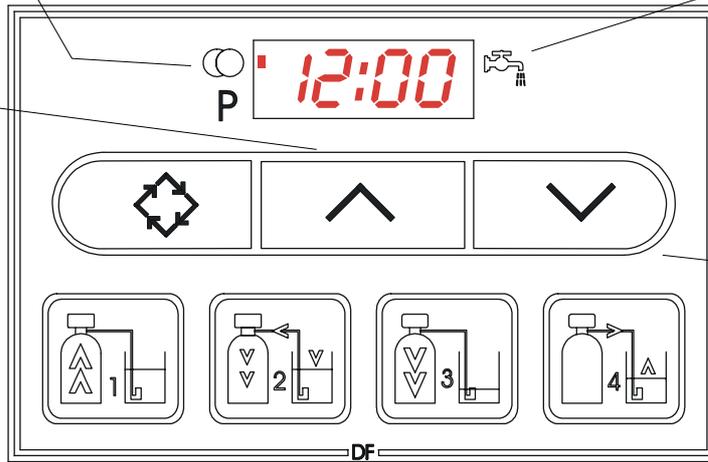
1. Set Time of Day

Whenever the valve is in Service the current time of day can be adjusted, the control programmed or an extra regeneration initiated

Service Indicator:
Valve in SERVICE - Dot ON
Extra Cycle Set - Dot flashing

Flow Indicator:
Flashing Dot when
water flows

Set UP
Button



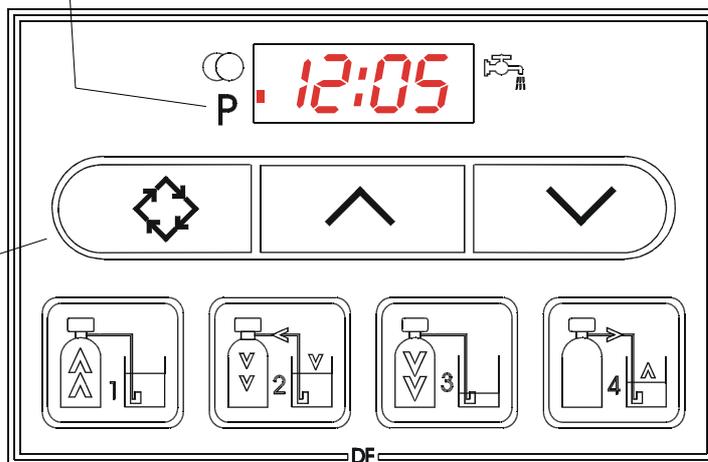
Set DOWN
Button

Push either the UP or DOWN set button once to adjust the Time of DAY display by one digit. Push and HOLD either the UP or DOWN set button to adjust the Time of Day display by multiple digits

2. Enter Control Programming Mode

Programme Mode Indicator:
Programme mode entered - Dot ON

Extra Cycle
Button



1. Push and HOLD both the UP or DOWN set button to enter Programming Mode.
2. Push the Extra Cycle Button once per display until all have been viewed and this mode is exited and normal operation is resumed.

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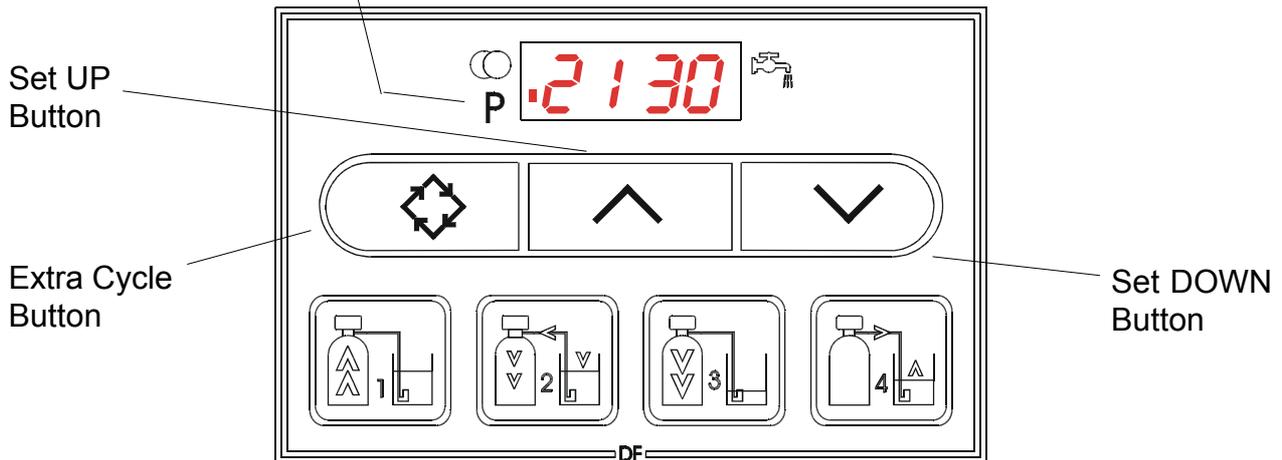
Control Start-Up Procedures

3. Set Control Programming

Depending on current control programming, option setting displays that are not required to be set will not be viewed.

Programme Mode Indicator:

Programme mode entered - Dot ON



1. The first option setting display that appears in the Programme Mode is Treated Water Capacity. using the Set UP or DOWN button, set the display to the capacity of the system in LITRES OR CUBIC METERS. For example:

2130 litres treated water capacity



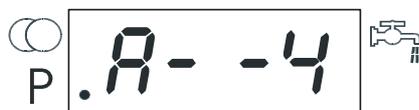
2. Push the Extra Cycle button. The second option setting display that appears is Regeneration Time. using the set UP or DOWN buttons, adjust the display to the time of day when you want a regeneration cycle to start. For example:

2:00 AM regeneration start



3. Push the Extra Cycle button. The third option setting that appears is the Regeneration Day Override. using the set UP or DOWN button, adjust the maximum number of days before a regeneration MUST occur (4 days is the recommended setting). For example:

Regenerate at least every 4 days



4. Control programming is now complete. Push the Extra Cycle button again to exit the programming mode and return to normal service.

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Control Start-Up Procedures

4. Start an Immediate Regeneration

When starting an extra regeneration cycle you will have one or two options, depending on how your control is set up:

Extra Cycle
Button

- 1. Press and Release to Extra Cycle button:**
 - With **Immediate Regeneration** controls the control will go into regeneration immediately.
 - With **Delayed Regeneration** controls the service arrow will begin to flash immediately and a regeneration will occur at the preset regeneration time.
- 2. Press and HOLD for the Extra Cycle button for 5 seconds:**
 - With **Delayed Regeneration** controls this will force an immediate regeneration.

5. Regeneration Cycle Displays

The following series of displays appear when the control enters a regeneration cycle (*times indicated are examples only*):

Valve driving to regen step #1  P   Then  P   Less than 9 min. remains in regen step #1

Valve driving to regen step #2  P   Then  P   Less than 59 min. remains in regen step #2

Valve driving to regen step #3  P   Then  P   Less than 9 min. remains in regen step #3

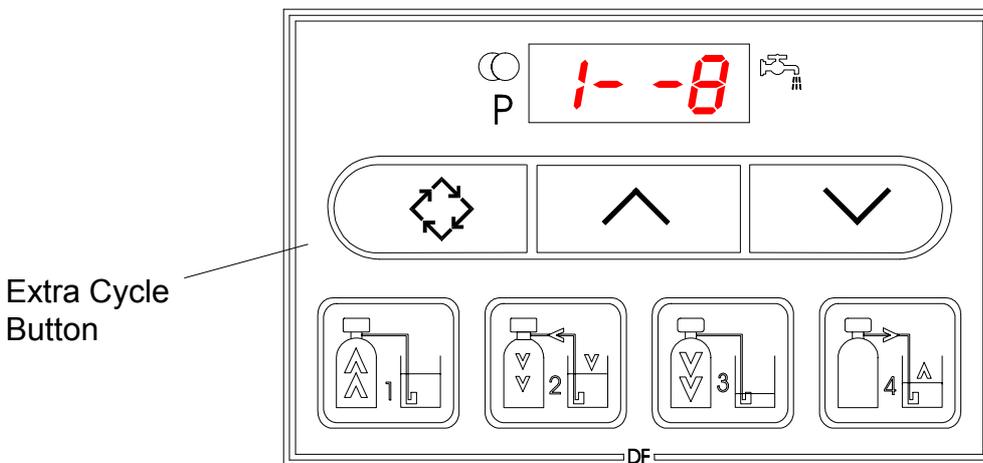
Valve driving to regen step #4  P   Then  P   Less than 12 min. remains in regen step #4

Regen complete.    Then  P   Valve has returned to service

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Control Start-Up Procedures

6. Fast Cycling the Valve through a Regeneration



- A. Initiate a regeneration - see step 4. Once the valve reaches Regen step #1 let water flow to drain for approx. 5 minutes.

Next, manually step the valve through a regeneration cycle, check valve function in each step:

- B. Push the **Extra Cycle** button once to advance the valve to Regen. step # 2
C. Push the **Extra Cycle** button once to advance the valve to Regen. step # 3
D. Push the **Extra Cycle** button once to advance the valve to Regen. step # 4
E. Push the **Extra Cycle** button a last time to advance the valve back to SERVICE

7. Final Set-Up

With proper valve operation verified:

- A. Add water to the salt container until the top of the air check is covered. Manually step the valve into the **BRINE DRAW** position (step #2) and allow the valve to draw water out of the salt container until the water level reduces no further. The water level should be at the midpoint of the screen section of the screen intake area,
- B. Manually step the valve to the **BRINE REFILL** position and then allow the valve to return to the **SERVICE** position automatically.
- C. With the valve in the **SERVICE** position, place salt into the salt container to the recommended level. Use the type of salt recommended by your supplier.

Set-Up is now completed and the control can be left to run automatically.

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Control Operation

Time Initiation Valves

In normal operation the Time of Day display will be viewed at all times. The control will operate normally until the number of days since the last regeneration reaches the Day Override setting. At this point a regeneration will be initiated at the Preset regeneration time.

Volume Initiated Valves

In normal operation the Time of day display will alternate with a Volume Remaining display. This volume displayed will be in LITRES. As treated water is produced, the Volume remaining display will count down towards zero (displayed as [- - - -]). On reaching zero, a regeneration will be initiated either immediately or delayed until the pre-set regeneration time, depending on how the control is configured. Water flow through the valve is indicated by the Flow Dot flashing in direct relationship to the flow rate.

Immediate Regeneration set-up with Day Override programmed.

If the the valve reaches the Day Override value before the zero volume point is reached then the valve will regenerate at the same time as the previous regeneration. On completion of the regeneration cycle the system capacity will be reset to the pre-set maximum system capacity.

Delayed Regeneration set-up with Day Override programmed.

If the the valve reaches the Day Override value before the zero volume point is reached then the valve will set to regenerate at the pre-set regeneration time. On completion of the regeneration cycle the system capacity will be reset to the pre-set maximum system capacity.

Control Operation during regeneration.

During regeneration the control will display the system status. The display window will indicate the regeneration step that the valve is advancing to, or has reached, and the time remaining in that step. The step number displayed will flash until the valve has completed driving to its next step position. Once all regeneration steps have been completed the valve will return automatically to the SERVICE position and resume normal operation. NOTE: Pushing the Extra Cycle button during a regeneration cycle will immediately advance the valve to the next cycle step position. Avoid doing this unless you understand the consequences of your actions.

Control Operation during programming.

The control will only enter the Programming Mode with the valve in the SERVICE position. While in the Programme Mode the control will continue to operate normally, monitoring water flow and maintaining time etc. NOTE: Control programming is stored in permanent memory so battery backup is not required.

Control Operation during power failure.

During a power failure all displays and programming will be retained. Water will continue to flow but the volume will not be monitored. When power is restored the control will resume operation from the point when power was lost. An indication of power loss is an innacurate Time of Day display.

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Timer setting

To determine the appropriate frequency of regeneration for Time Based systems:

The following data is for general guidance only. Many factors influence water consumption and water softener capacity. Your water softener supplier/installer should be consulted for expert guidance.

- a). Establish the total likely 24 hour water consumption in cubic meters (m³).
- b). *Determine the hardness of the incoming water supply in mole/m³ (mg/l as CaCO₃).
- c). *Determine the quantity of resin contained in your pressure vessel in cubic meters (m³).
- d). *Determine the optimum regeneration level for your requirements in kg NaCl /m³ resin
* see page 1 for original setting data

From the following table, determine the approximate softening capacity of your installation:

kg NaCl /m ³ resin	Softening capacity kg. CaCO ₃ / m ³ resin
100	48
130	55
160	60

$$\text{Softening capacity (m}^3\text{)} = \frac{\text{resin capacity (kg. CaCO}_3\text{ / m}^3\text{)} \times \text{resin volume (m}^3\text{)} \times 1000}{\text{water hardness (mg/l CaCO}_3\text{)}}$$

$$\text{Regeneration frequency} = \frac{\text{softening capacity (m}^3\text{)}}{\text{24 hour consumption (m}^3\text{)}} \quad \text{rounded down to a whole number}$$

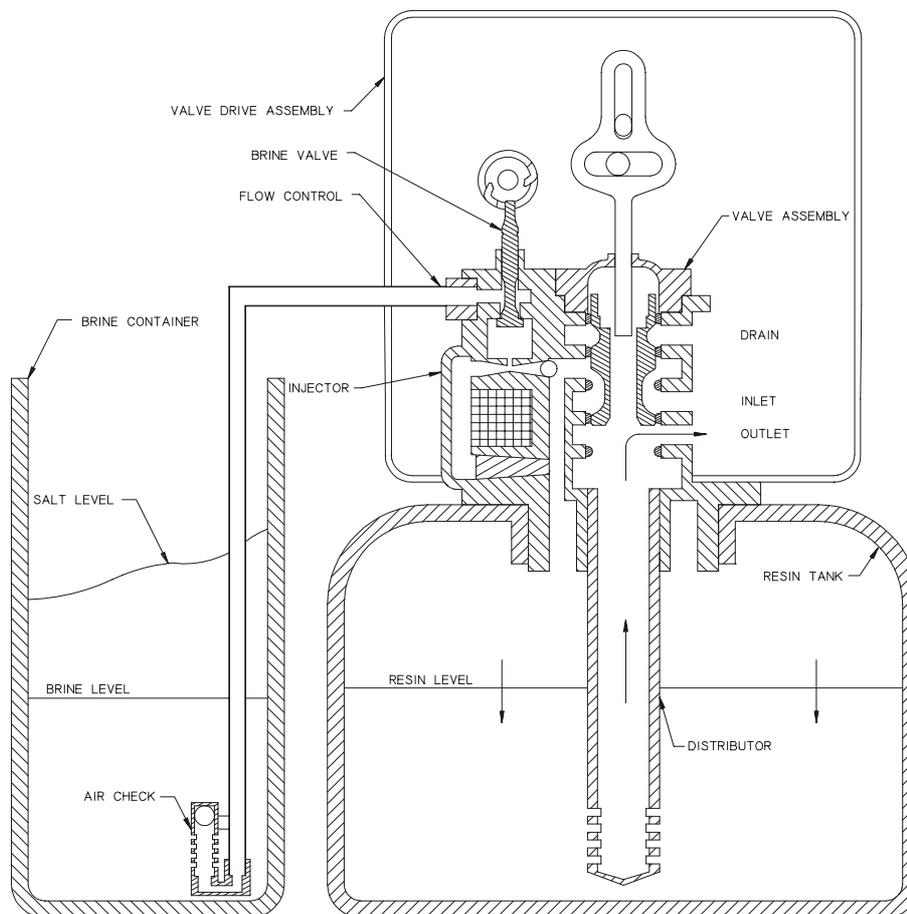
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flow diagrams

NORMAL SERVICE POSITION

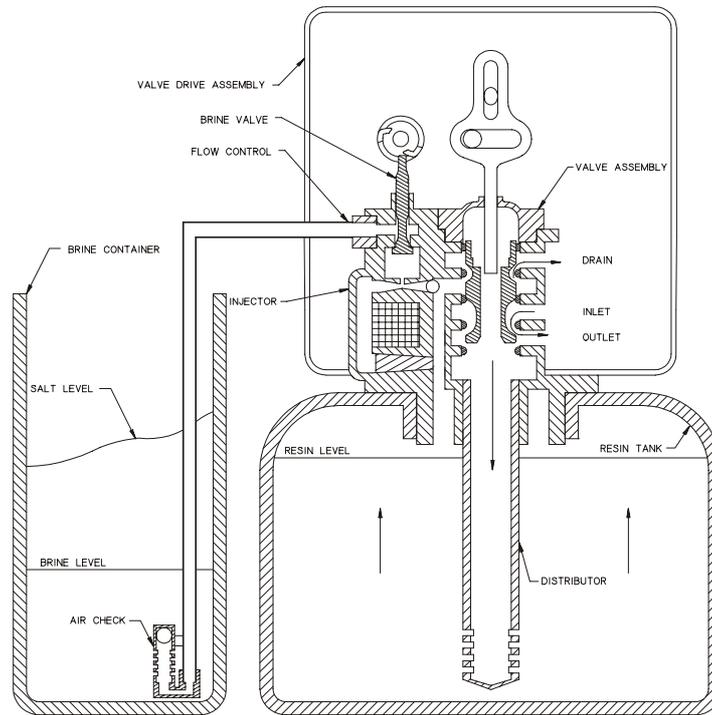


Hard water enters the unit at the valve inlet and flows around the valve piston and down through the resin vessel. Softened water enters the centre tube through the bottom screen, then flows up through the centre tube, and exits from the valve outlet.

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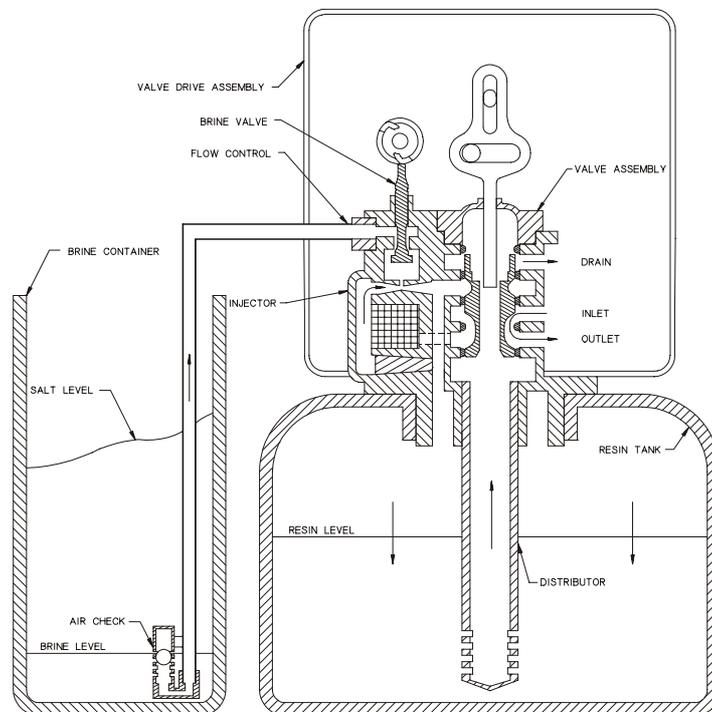
Flow diagrams

BACKWASH



Hard water enters the unit at the valve inlet, flows around the valve piston, down the centre tube, through the bottom screen and up through the resin, around the piston and exits via the valve drain port.

BRINE / SLOW RINSE

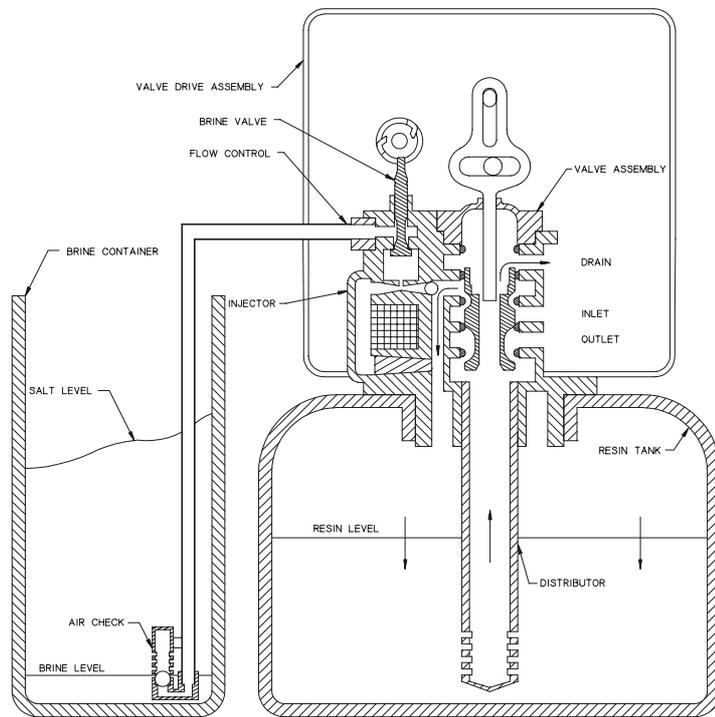


Hard water enters the unit at the valve inlet, flows up into the injector housing and through the injector nozzle and throat, drawing brine from the brine tank. Brine flows down through the resin exits via the bottom screen, up through the centre tube and exits via the valve drain port. When the Air Check seats, a water flow continues to provide a slow contact rinse phase.

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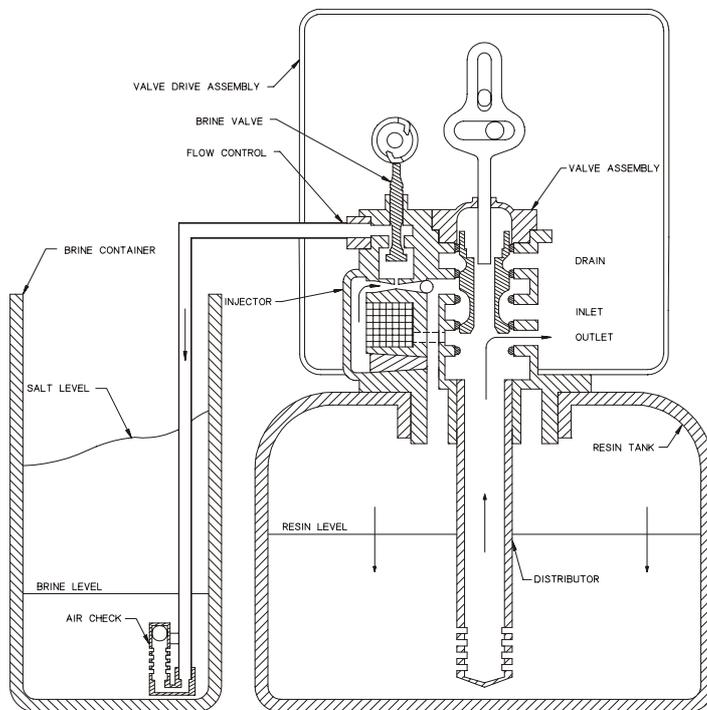
Flow diagrams

RAPID RINSE



Hard water enters the unit at the valve inlet, flows around the valve piston and down through the resin, into the bottom screen and up through the centre tube, through the piston and exits via the valve drain port.

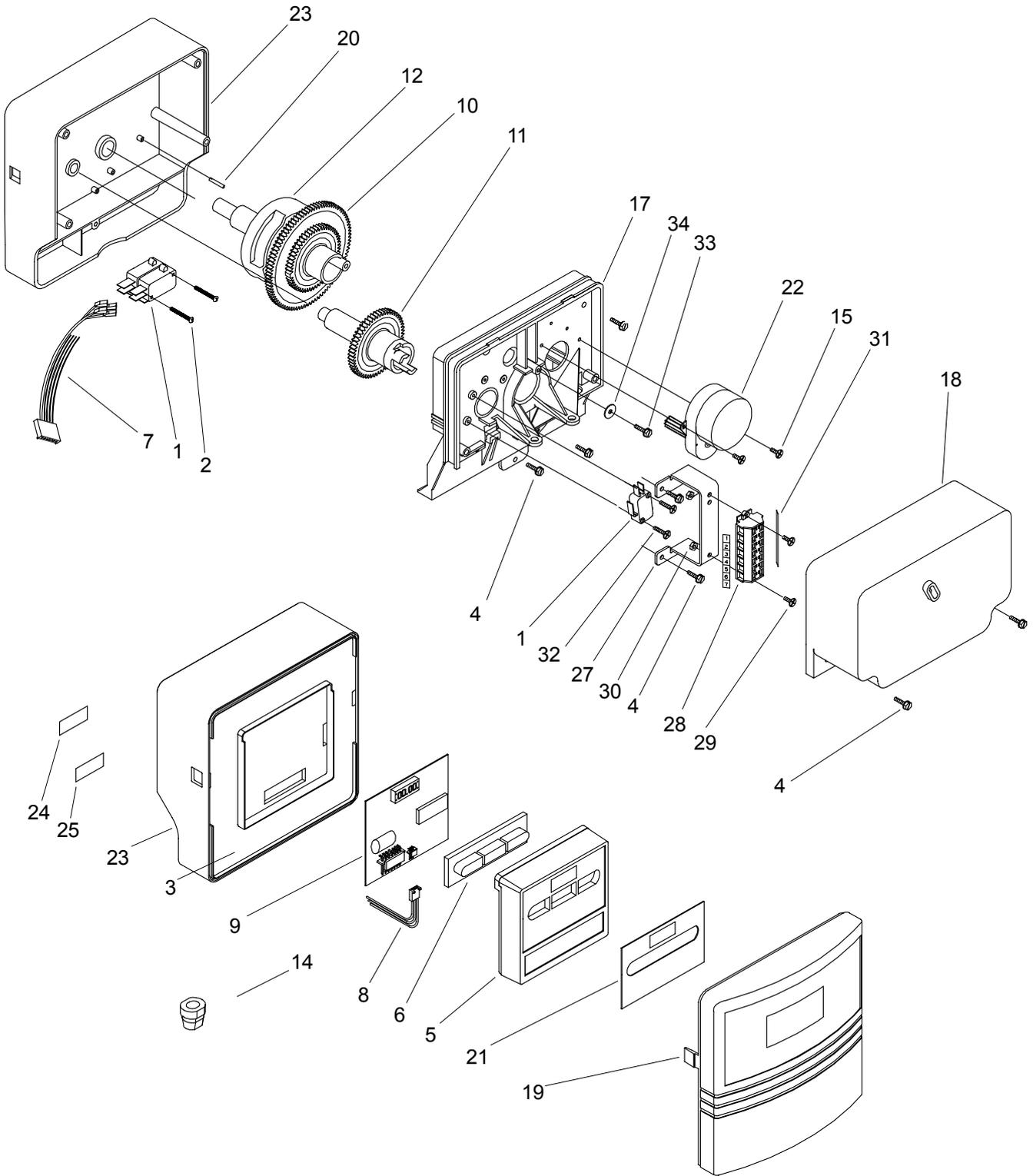
BRINE REFILL



Hard water enters the unit at the valve inlet, flows around the valve piston and down through the resin. Softened water flows up through the centre tube, into the ejector housing and then to the brine tank at a regulated flow.

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Control drive assembly



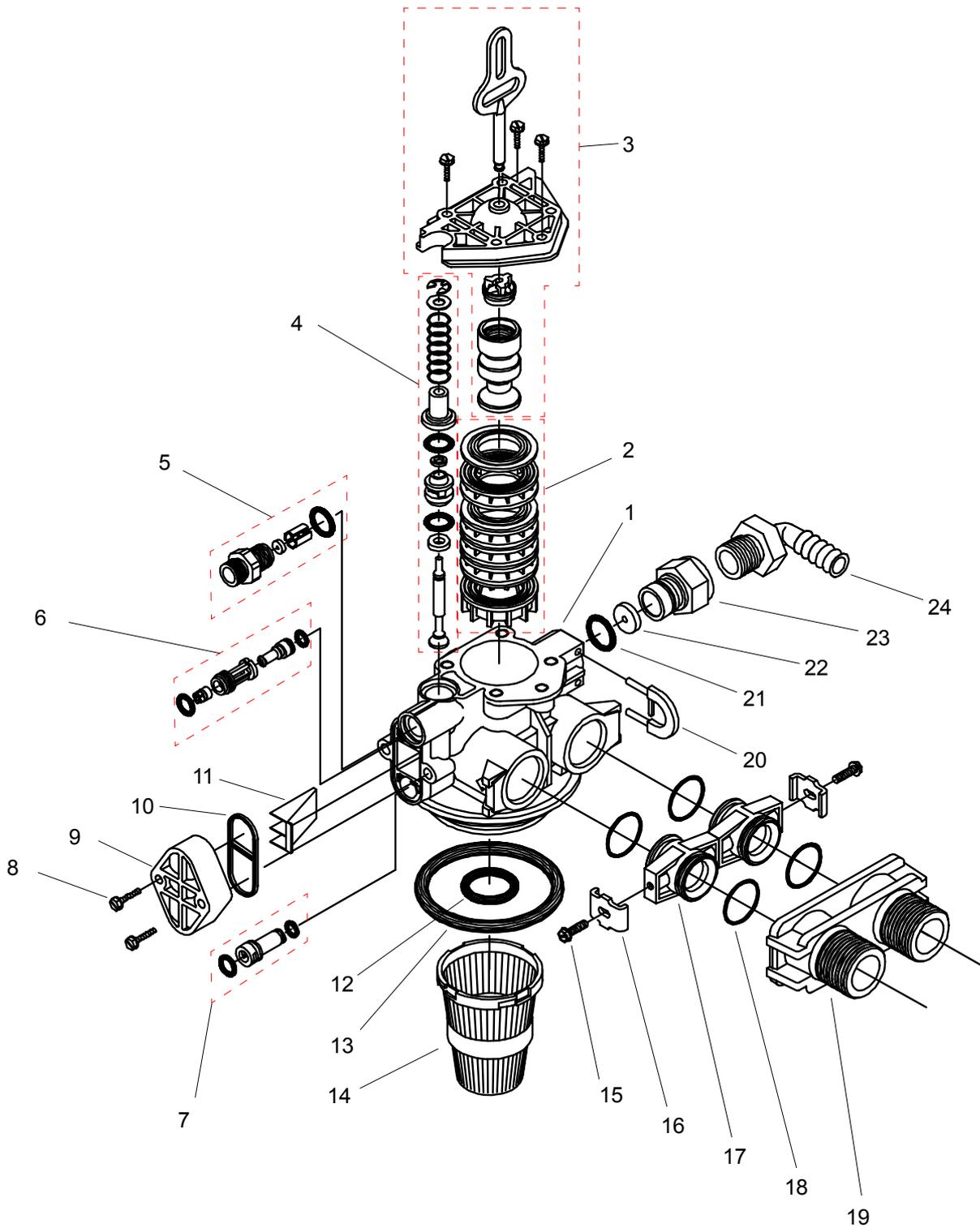
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Control drive assembly

Item	Qty	Part No.	Description
1	3	10218-01	Microswitch
2	2	40081	Screw
3	1	40326	Front cover label
4	6	13296	Screw
5	1	19471-02	Front panel cover
6	1	19473	Button assy
7	1	19474	Power harness
8	1	19791-01	Harness assy
9	1	40283	SE timer PCB
10	1	18211-01	Main gear - DOWNFLOW
11	1	18228	Brine valve cam - DOWNFLOW
12	1	19927	Programme cam - DOWNFLOW
13	2	12681	Wire nut - not shown
14	1	13547	Strain relief
15	2	13602	Screw
16	1	14044	Cable tie - not shown
17	1	18202-03	Backplate
18	1	18259-02	Rear cover
19	1	18260-00	Front cover
20	1	18655	Roll pin
21	1	19697-02	Display label - UPFLOW
22	1	40251	Motor assy - 24 Vac
23	1	40269-02	Front plate
24	1	23474	Assy Label
25	1	21271	Serial label
26	1	14044	Cable tie - not shown
27	1	19282	Mounting bracket
28	1	23653	Terminal strip
29	2	11085	Screw
30	2	11086	Nut
31	2	24046	Label terminal strip 7 pos.
32	2	18158	Screw
33	1	18261	Screw
34	1	13363	Washer

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valve body assembly



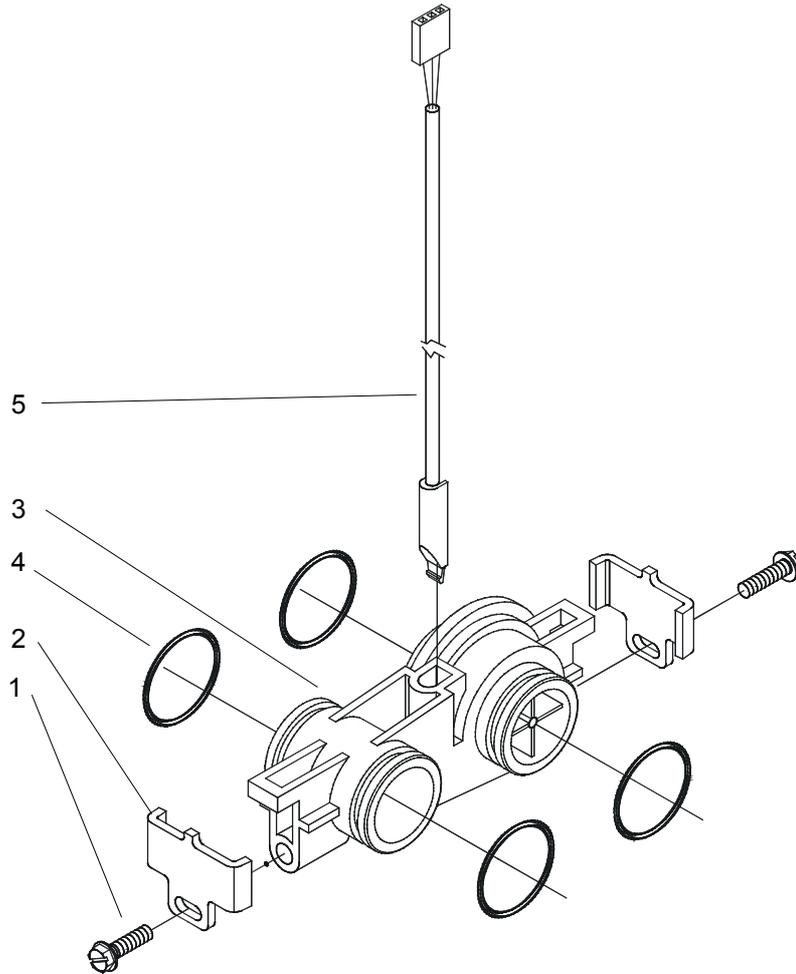
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valve body assembly

Item	Qty	Part Number	Description
1	1	18815	Valve body
2	1	26045	Seal and spacer kit
3	1	26079	Piston assembly - Downflow
4	1	26046	Brine valve assembly
5	1	18272-?	BLFC assembly- specify size
6	1	18272-?	Injector assembly - specify size
7	1	18276-01	Injector plug assembly
8	2	18262	Screw
9	1	18277	Injector cap, softener
10	1	18301	Injector seal, downflow
11	1	18271	Injector screen
12	1	13304	O-Ring
13	1	18303	O-Ring
14	1	18280	Top screen
15	2	13314	Screw
16	2	13255	Clip
17	2	13709	Adaptor coupling
18	2	13305	O-Ring
19	1	18706-10	1in BSP male yoke
20	1	18312	Drain retainer
21	1	11183	O-Ring
22	1	12***	DLFC washer - specify size
23	1	11385-01	Flow control housing
24	1	12338	Drain elbow

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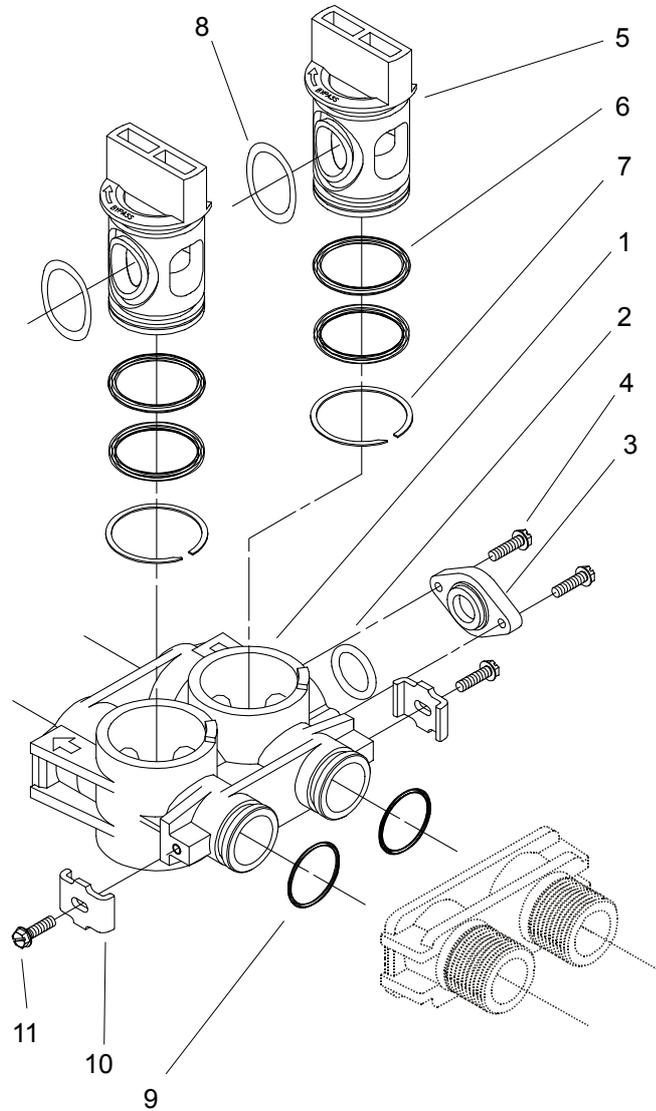
meter assembly (option)



Item	Qty	Part Number	Description
1	2	13314	Screw
2	2	19569	Clip
3	1	19797	Meter body assembly
4	4	13505	O-Ring
5	1	19791-01	Harness assembly
6	1	146135	Flow straightener (not shownn)

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bypass assembly (option)

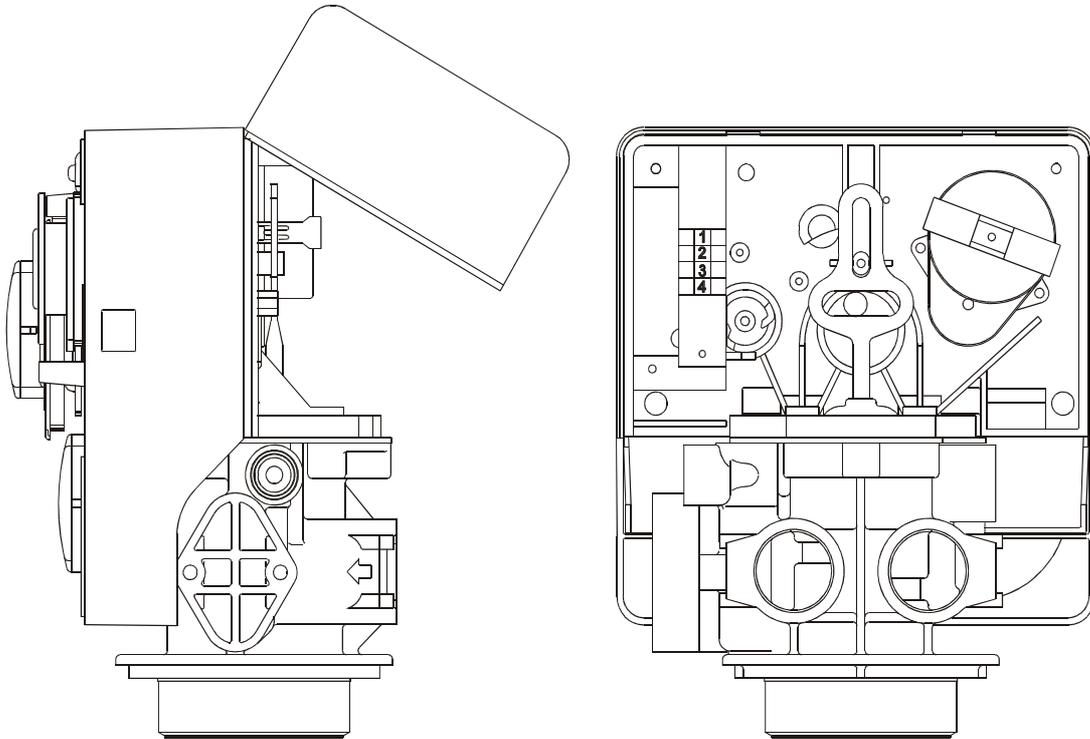


Item	Qty	Part Number	Description
1	1	17819	Bypass valve body
2	1	11183	O-Ring
3	1	18582	Bypass cap
4	2	175121	Screw
5	2	17820	Bypass plug
6	4	18661	O-Ring
7	2	18662	Retaining ring
8	2	18660	O-Ring
9	2	13305	O-Ring
10	2	13255	Mounting clip
11	2	13314	Screw

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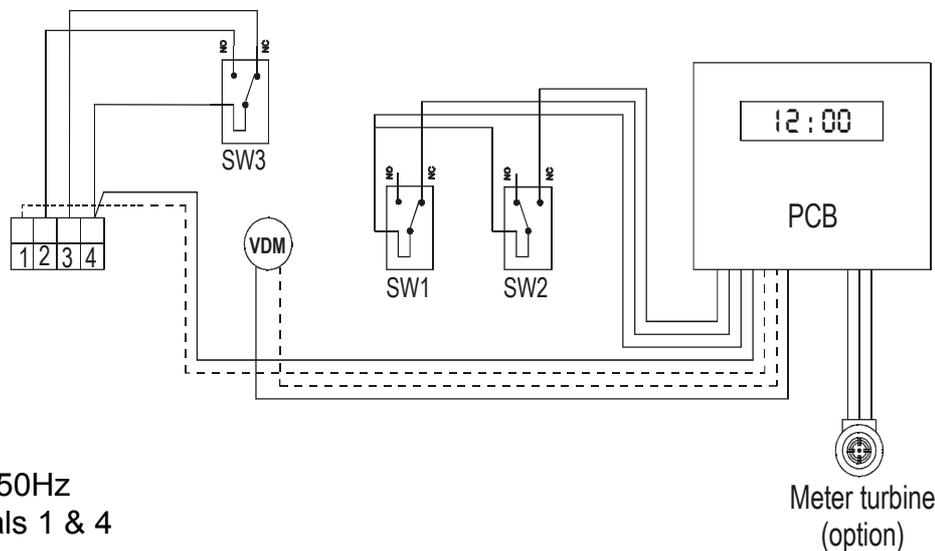
electrical wiring access

To gain access to the electrical connections, remove the two screws (*item 4 - see page 14*) and swing the rear cover upwards.



electrical wiring schematic

SW1 = Homing switch
SW2 = Step switch
SW3 = Auxiliary switch



Connect 24 Vac 50Hz
supply to terminals 1 & 4

Meter turbine
(option)