

## AG-250/330 Water softeners



1. GENERAL INFORMATION .....	3
2. INSTALLATION .....	4
2.1 Location selection .....	4
2.2 Filling resin to pressure vessel .....	5
2.3 Water line connections .....	5
2.4 Brine tank and tube connection .....	6
3 GENERAL CONTROLLER INSTRUCTION .....	7
3.1 Controller display .....	7
3.2 Controller buttons .....	8
4. PROGRAMMING CONTROLLER.....	9
4.1 Initial power-up/ Re-initialization (reset) .....	9
4.2 Default settings .....	10
4.3 Additional settings (P9-P19) .....	14
4.4 Cycle time programming.....	15
4.4.1 Regeneration modes .....	15
4.4.2 Manual regeneration .....	15
5. START-UP OF THE FILTER AND VALVE.....	16
6. MAINTENANCE AND TROUBLESHOOTING .....	17
6.1 Cleaning the automatic valve filter screen/net .....	17
6.2 Changing the resin .....	17
6.3 Possible problems and causes .....	18
7. ATTACHMENTS.....	19
Attachment 1: Automatic valve configuration .....	19
Attachment 2: Exploded view and spare part list.....	19

## 1. GENERAL INFORMATION

AG-CAB filter can be used for water softening and filtration of iron and manganese. Filters have fully automatic operation principle and only regular refill of salt is needed. More detailed technical information can be found from table 1.

AG		250	330
Connections (filter)	DN	20 / 10 (drain line)	
Flow rate	l/min	32,7	57
Capacity	m <sup>3</sup> /°dH	120	200
Resin	l	38	65
Rinse water	l/rinse	350	470
Pressure index	bar	10	
Working pressure, min/max.	bar	2 / 6	
Water temperature, min/max.	°C	2 / 38	
Ambient temperature, min/max.	°C	5 / 40	
Electrical connections	V/Hz	230 / 50	
Need for electric power	W	n. 4,8	
Height / diameter (filter)	mm	257 x 1385	334 x 1370
Width / depth / height (brine tank)	mm	380 x 380 x 790	
Brine tank volume	l	85	85

Table 1. Technical information

### The content of the delivery:

- Pressure vessel, diffusor with tube, automatic valve, drain tube, resin
- Brine tank, salt suction pipe, salt suction hose, regeneration salt
- Manual

## 2. INSTALLATION

### 2.1 Location selection

1. Install the filter to even surface and dry place that is equipped with large enough drainage to handle the backwash water. Please note that the filter creates 700-1300 litres of backwash water each time it regenerates.
2. For electrical connections there must be grounded power outlet 230V / 50Hz. Use only the power AC adapter that is supplied.
3. Make sure there is enough room around the filter for possible maintenance.
4. Do not use filter or piping at temperatures above 40 °C. Filter should be protected from freezing.
5. Please note that it's on customers duty to install non-return valve to line of filtrated water.
6. Filter may not be exposed to direct spray of water.

## 2.2 Filling resin to pressure vessel

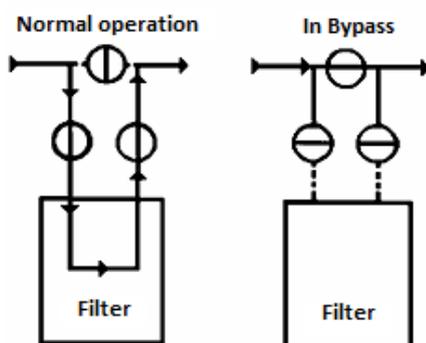
Pressure vessel is filled with resin so that the threaded automatic valve is turned open. Diffusor tube is detached from valve and left in its place inside the vessel. Upper end of diffusor tube is sealed with suitable cap or tape and after that resin can be poured into the vessel. Seal from diffusor tube is removed and automatic valve is turned in place. All pipe connections need to be checked before filter is started.

## 2.3 Water line connections

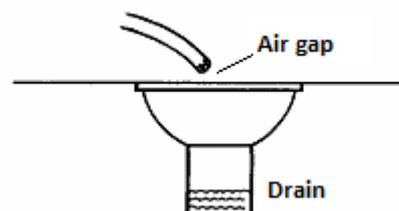
Filters inlet and outlet fittings are  $\frac{3}{4}$ " internal thread. Outlet fitting is marked with arrow. Drain line fitting for 12,7 mm tube is pre-installed to valves drain line connection by supplier.

Its recommended that bypass line is installed between inlet and outlet lines to allow detaching of filter for maintenance without interruptions in water supply (picture 1.).

Attach drain tube to fitting and run to drain so that siphon is avoided (picture 2). In ideal installation the drain tube sets all the way to drain. If this is not possible, drain tube can be lifted to maximum height of 1,8 meters if the tube length doesn't exceed 4,6 meters. In this case the inlet water pressure to filter needs to be over 2,8 bars.



Picture 1. Valve Bypass System

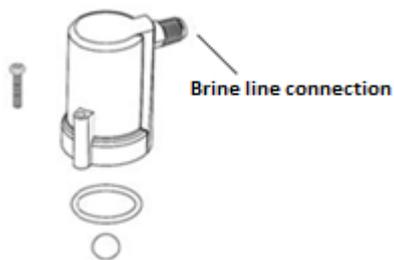


Picture 2. Drain line connection

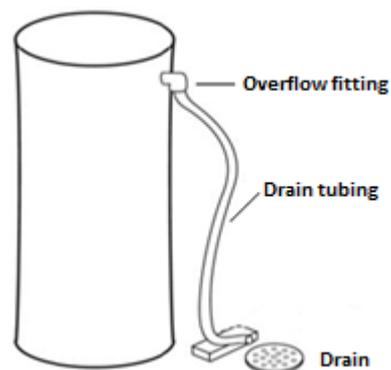
## 2.4 Brine tank and tube connection

Brine tank should be installed to even platform. Connect brine tanks suction tube (picture 3) to air checks regenerant line connection. Before starting the filter that all connections are well prepared, and tubes / piping have no places for leakage. Possible leakage in brine suction line can cause premature closure of floating ball valve and excess brine left to bottom of brine tank.

Drain tube must be installed between brine tank and drain to further damages in possible overflow situation of brine tank. Attach tube to overflow fitting and run to drain (picture 4).



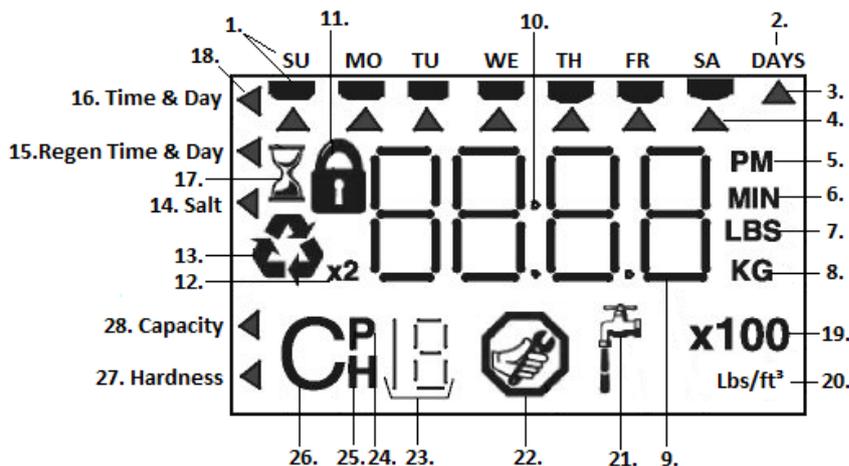
Picture 3. Air check



Picture 4. Overflow line connection

## 3 GENERAL CONTROLLER INSTRUCTION

### 3.1 Controller display



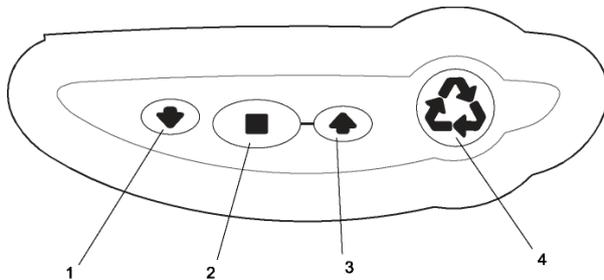
Picture 5. Display icons

#### Description of Symbols

- |  |   |
|--|---|
| 1. Day of week when regeneration takes place   | 15. Time and date for regeneration when controller is in normal mode and under programming. |
| 2. Check (see chapter 3.2).  | 16. Current time and date when controller is in normal mode and under programming.          |
| 3. Shows interval for regeneration in days   | 17. Shown when cam-axel is turning into new position and new stage begins.                  |
| 4. Shows the days for regeneration   | 18. Status of the screen  |
| 5. Not in use  | 19. Not in use.   |
| 6. Not in use  | 20. Not in use.   |
| 7. Shows how many grams of salt is used for each litre of brine.                       | 21. Not in use.   |
| 8. Not is use.   | 22. Not in use.   |
| 9. Shows the set values (e.g. current time, time for regeneration etc.)                | 23. Regeneration stage status   |
| 10. Separator for hours and minutes.   | 24. Not in use  |
| 11. Shows if value is locked. When shown its not possible to change the value in case. | 25. Programming mode on.  |
| 12. Filter makes two regenerations in a row.   | 26. Regeneration stage (together with 23.)  |
| 13. Regeneration process is running.   | 27. Not in use.   |
| 14. Not in use.  | 28. Capacity.   |

### 3.2 Controller buttons

Controller is operated with following buttons (picture 6).



Picture 6. Controller buttons

1. **DOWN arrow.** Generally used to scroll down or increment through a group of choices.
2. **SET.** Used to accept a setting that normally becomes stored in memory. Also used together with the arrow buttons.
3. **UP arrow.** Generally used to scroll up or increment through a group of choices.
4. **REGENERATE.** Used to command the controller to regenerate. Also used to change the lock mode.

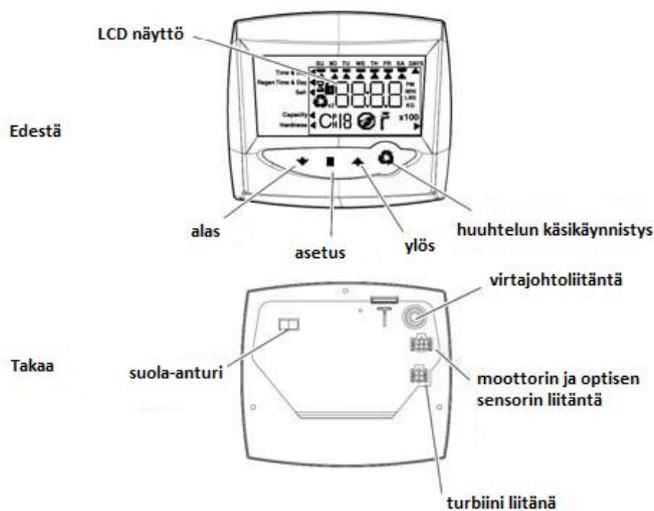
Controller will return to initial/home mode in 30 seconds if none of the buttons are pushed.

## 4. PROGRAMMING CONTROLLER

### 4.1 Initial power-up/ Re-initialization (reset)

When filter is installed to water supply the start-up can begin. However, do not open the inlet water valve yet.

1) Connect AC adapter to power source (picture 7). Make sure that the electric cord doesn't tangle around the camshaft.



Picture 7. Controller identification

2) Select right valve type from table 2.

- Select your valve type using UP and DOWN buttons. Accept selected valve type with SET button.

3) Select system size (resin volume in tank) from table 2.

- Select the nearest volume to your actual system size by using UP and DOWN buttons. Accepted selected resin volume with SET button.

Filter	Valve type	Resin volume
AG-250	255	40
AG-330	255	65
AG-370	278	90
AG-410	278	105
AG-470	278	160

Table 2. Filters valve types and resin volumes

#### 4.2 Default settings

Use UP (  ) and DOWN (  ) buttons to increment through the available selections. Press SET (  ) button to accept selected value or type.

##### 1) Set time of day

- Press DOWN
- Set the correct time of day and press SET



##### 2) Set Day of week

- Press DOWN
- Set the correct day of week. (1=Sunday, 2=Monday, 3=Tuesday etc.)
- Press SET



### 3) Set time of regeneration

- Press DOWN
- Choose time of regeneration
- Press SET



### 4) Set days to regenerate

#### OPTION 1

- Press DOWN
- Set number of days between time-clock regeneration (regen frequency)
- Default value is "3"
- Press SET



**OPTION 2:**

Specific day of week regeneration:

- Press DOWN
- To change the controller to regenerate on specific days, set the number of days between regeneration to zero "0".
- Press the SET button and the display will show a flashing cursor at the top under Sunday. The day of week can be selected when the cursor is below it.
- To toggle the day on/off, the triangular cursor must be below that day and flashing.
- Press SET

**5) Set salt amount**

- Press DOWN
- Recommended salt amount is 110-150 mg/l
- Set salt amount and press SET



## 6) Set capacity

- Press DOWN
- Automatic valve will count filter capacity automatically by systems resin volume and salt amount. Don't change settings
- Press SET



### 4.3 Additional settings (P9-P19)

Additional settings (see table 3) are accessible by pressing and holding the UP and DOWN buttons until the control displays a “P” value.

P-value	Parameter description	Units	Notes
P9	Unit of measure	-	0=english, 1 =metric
P10	Clock mode	-	0 = 12h 1 = 24h
P11	Service interval	months	
P12	Remote regen sw. Delay	s	-
P13	Chlorine generator	-	0 = none 1 = salt check only 2 = generate chlorine and check salt
P14	Refill rate	gpm x 100	-
P15	Brine type	gpm x 100	-
P16	Reserve type	-	0 = variable reserve, delay regen 1 = fixed reserve, delay regen 2 = variable reserve, immediate regeneration 3 = fixed reserve, immediate regeneration
P17	Reserve percentage for fixed reserves	%	
P18	Flow sensor select	-	0 = internal turbine, Magnum IT NHWB 1 = 1" autotrol turbine 2 = 2" autotrol turbine 3 = user defined K factor 4 = user defined pulse equivalent 5 = Magnum IT HWB
P19	K factor or pulse equivalent	-	pulses/liter (P18 = 3 ja P9 = 1) liters/pulse (P18 = 4 ja P9 = 1)

Table 3. Additional settings

Use UP (  ) and DOWN (  ) buttons to increment through the available selections. Press SET (  ) button to accept selected value or type.

#### Recommended settings:

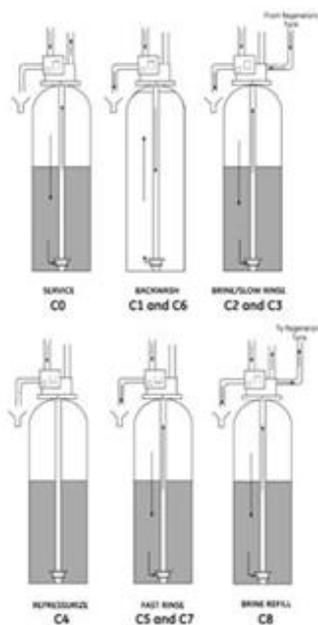
P9	1
P10	1
P13	0
P16	Not used
P17	Not used
P18	Not used

#### 4.4 Cycle time programming

Automatic valve will select right regeneration cycle times automatically based on filters system size. Do not change any settings.

##### 4.4.1 Regeneration modes

Below is described the regeneration cycles of automatic valve that is used in AG-CAB filters.



- C0 = Normal filtering stage (not shown)
- C1 = Regeneration back wash
- C2 = Suction of the brine
- C3 = Slow flushing
- C4 = Pressurizing / prepared
- C5 = Quick flushing
- C6 = Backwash 2 (only in valve 255)
- C7= Quick flush 2 (only in valve 255)
- C8= Fill of brine tank with water

Picture 8. regeneration cycles

##### 4.4.2 Manual regeneration

Manual regeneration can be done with two ways:

Option 1. Press the REGENERATE button shortly. Regeneration symbol starts blinking on the screen. Valve executes additional regeneration cycle on the pre-set time (2:00 as standard).

Option 2. Press the REGENERATE button for five seconds and the regeneration cycle starts immediately.

## 5. START-UP OF THE FILTER AND VALVE

The actual start-up of filter can be made after filter is in place and controller is programmed. Please see the following instructions.

1. Remove the cover of valve.
2. Make sure that water inlet and outlet valves (and by-pass valve if exists) are closed
3. Press the Regenerate-button for five seconds to start the regeneration manually – camshaft now turns to regeneration position C1.
4. Remove the air from filter. When filter is in stage C1 open the inlet valve partially. Do not open the inlet valve fully to prevent that filtering resin goes to automatic valve.
5. When the filter is full of water the water starts to flow slowly to drain. Inlet valve can now be fully opened. Let the water flow to drain until it becomes clear.
6. Fill the brine tank (start-up fill). First the brine tank is filled with water about 10 cm from the bottom of the brine tank. Then insert about 50-75 kg of clean regeneration salt to brine tank. There needs to be enough salt that the brine becomes saturated (salt is filled at least 30 cm from bottom of the tank). Then fill some 15 l of additional water to brine tank.
7. Make sure that the water inlet valve is now fully open.
8. Press the SET and arrow UP buttons at the same time to set the valve to next stage C2. Press the SET and arrow UP buttons again at the same time to set the valve to next stage C3. Repeat this until valve is in stage C8.
9. Let the water to flow to brine tank.
10. Press once more SET and UP arrow buttons at the same time to set the system to C0 stage (C0 not shown in the controller screen).

## 6. MAINTENANCE AND TROUBLESHOOTING

### *6.1 Cleaning the automatic valve filter screen/net*

Within normal use it is enough if automatic valves filter screen/net is cleaned once or twice a year. Screen/net is located on the left side of the valve.

### *6.2 Changing the resin*

Please see following instruction for changing the filtering resin.

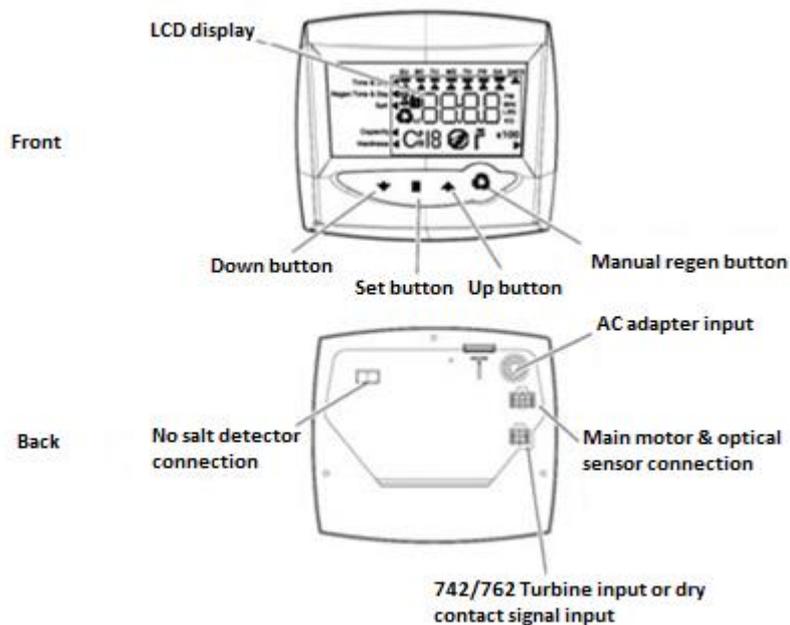
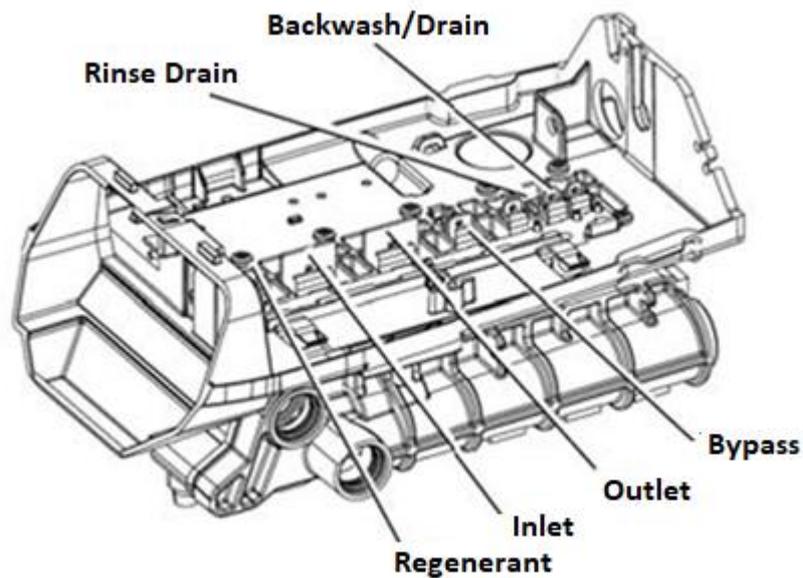
1. Close the inlet and outlet valves.
2. Start the regeneration cycle manually (see chapter 4.4.2, page 15) and wait until valve is in backwash stage C1 - the filter is now unpressurized.
3. Remove the electric power plug from valve and open/remove the filters water line connections.
4. Remove the automatic valve (twist the valve - right handed thread) and plug the diffusor upper end of tube.
5. Hose water inside the tank so the resin starts to flow out together with water. Remove the diffusor tube and continue until all resin is removed from the tank. Take care of the disposal of used resin according to your local instructions (e.g. polymer-based can be treated like other plastic waste).
6. Fill the tank with new resin as instructed in chapter 2.2 (page 5).

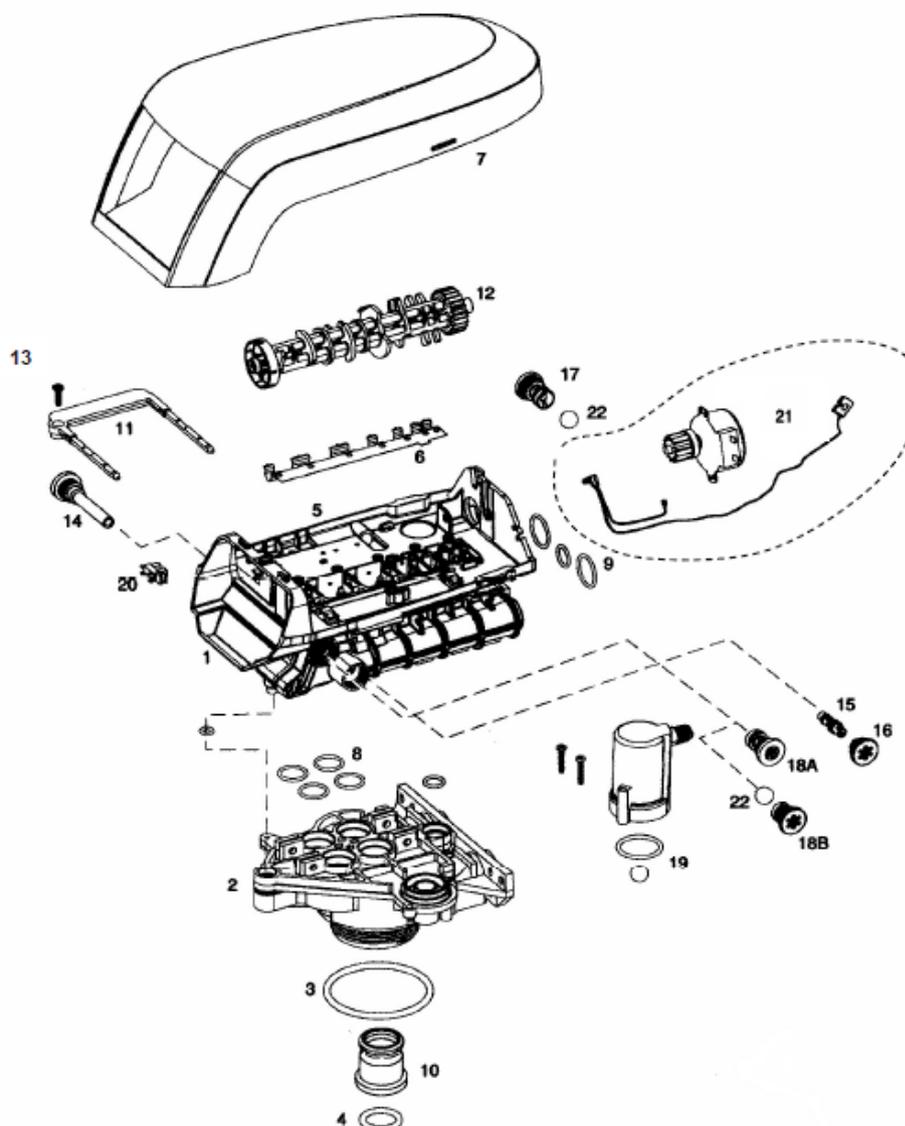
### 6.3 Possible problems and causes

Problem	Possible cause	Solution
Brine tank overflow	<ul style="list-style-type: none"> <li>a. Uncontrolled brine refill flow rate</li> <li>b. Air leak in brine to air check</li> <li>c. Drain control clogged with resin or other debris</li> </ul>	<ul style="list-style-type: none"> <li>a. Remove brine control to clean ball and seat</li> <li>b. Check all connections in brine line for leaks. Refer to instructions.</li> <li>c. Clean drain control</li> </ul>
Flowing or dripping water at drain or brine line after regeneration	<ul style="list-style-type: none"> <li>a. Valve stem return spring weak</li> <li>b. Debris preventing valve disc from closing</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace spring. (Contact dealer)</li> <li>b. Remove debris</li> </ul>
Control will not draw brine	<ul style="list-style-type: none"> <li>a. Low water pressure</li> <li>b. Restricted drain line</li> <li>c. Injector plugged</li> <li>d. Injector defective</li> <li>e. Valve disc 2 and/or 3 not closed.</li> <li>f. Air check valve prematurely closed</li> </ul>	<ul style="list-style-type: none"> <li>a. Make correct setting according to instructions.</li> <li>b. Remove restriction.</li> <li>c. Clean injector and screen.</li> <li>d. Replace injector and cap. (Contact dealer)</li> <li>e. Remove foreign matter from disc and check disc for closing by pushing in on stem. Replace if needed. (Contact dealer)</li> <li>f. Put control momentarily into brine refill, C8. Replace or repair air check if needed</li> </ul>
Control will not regenerate automatically	<ul style="list-style-type: none"> <li>a. AC adapter or motor not connected</li> <li>b. Defective adapter or motor</li> </ul>	<ul style="list-style-type: none"> <li>a. Connect power</li> <li>b. Replace adapter/motor. (Contact dealer.)</li> </ul>
No conditioned water after regeneration	<ul style="list-style-type: none"> <li>a. Improper regeneration</li> <li>b. No salt in regenerant tank</li> <li>c. Injector or screen plugged</li> <li>d. Air check valve closes prematurely</li> </ul>	<ul style="list-style-type: none"> <li>a. Repeat regeneration after making certain correct salt dosage was set.</li> <li>b. Add salt</li> <li>c. Clean injector and screen.</li> <li>d. Put control momentarily in brine/slow rinse, C2. Replace or repair air check if needed (Contact dealer.)</li> </ul>
Water taste salty	Regeneration does not work normally	Check brine draw and time of regeneration.
ERR 1 is displayed	Control power has been connected and the control is not sure of the status of the operation.	Press the UP arrow and the control should reset.
ERR 2 is displayed	Control power does not match 50 or 60 Hz	Disconnect and reconnect the power. If problem persists, obtain the appropriate controller or AC adapter for either 50 or 60 Hz power.
ERR 3 is displayed	<ul style="list-style-type: none"> <li>a. Controller does not know the position of the camshaft. Camshaft should be rotating to find home position.</li> <li>b. Camshaft is not turning during ERR3 display.</li> <li>c. Camshaft is turning for more than five minutes to find position</li> </ul>	<ul style="list-style-type: none"> <li>a. Wait for two minutes for the controller to return to home position. The hourglass should be flashing on the display indicating the motor is running.</li> <li>b. Check that motor and optical sensor is connected. Verify that motor wire harness is connected to motor and controller module. Verify that motor gear has engaged can gear. If everything is connected try replacing in this order: wire harness, motor, optical sensor, controller.</li> <li>c. Verify that optical sensor is in place and connected to wire. Verify that camshaft is connected appropriately. Verify that no dirt or rubbish is clogging any of the cam slots. If motor continues to rotate indefinitely, replace the following components in this order: wire harness, motor, optical sensor, controller.</li> </ul>

## 7. ATTACHMENTS

### *Attachment 1: Automatic valve configuration*



**Attachment 2: Exploded view and spare part list**


Number	Ref.	P.N.	Description
1+5+6	AW168	1244650	255/700 Valve Assembly w/o Flow Controls
2	AW170	1033784	255 Tank Adapter New Style
3	AW172	3029969	O-ring BN
4	AW169	3030918	O-ring 1,05"
5	AW162	1235340	Top plate, 255 Valve, 700/860 Series Controller
6	AW163	1235341	Spring One Piece, 255 Valve
7	AW148	1236246	Standard Cover 255-268 Valve, 700/860 Series
*	AW145	1242234	255 Slim Cover
8	AW195	1001404	O-ring set
9	AW196	1040459	O-ring set

<i>Number</i>	<i>Ref.</i>	<i>P.N.</i>	<i>Description</i>
10	AW171	1001986	13/16 Rubber Insert (Optional)
*	AW180	1000250	Valve Disk Kit
*	AV037	1239760	Blending Kit for 255 and 268 valves
11	AW173	1031405	Locking Bar
12	AW149	1235353	Cam 255/700-860 Series Valve, STD, Black
13	AW174	3030450	Top Plate Screw No 8 x 9/16"
14	AW125	1000226	Screen/Cap Assembly with O-ring
15	AW133	1035730	E injector – Yellow
15	AW134	1035731	F injector – Peach
15	AW135	1035732	G injector – Tan
15	AW136	1035733	H injector – Light Purple
15	AW137	1035734	J injector – Light Blue
15	AW138	1035735	K injector – Pink
15	AW348	1035736	L injector – Orange
15	AW349	1035737	M injector – Brown
15	AW350	1035738	N injector – Green
15	AW351	1035739	Q injector – Purple
15	AW352	1035884	R injector – Dark grey
16	AW107	1000269	Injector / Backwash 00-open Cap with o-ring
17	AW100	1000209	Drain Control Assembly No 7 for 7" tank
17	AW101	1000210	Drain Control Assembly No 8 for 8" tank
17	AW102	1000211	Drain Control Assembly No 9 for 9" tank
17	AW103	1000212	Drain Control Assembly No 10 for 10" tank
17	AW104	1000213	Drain Control Assembly No 12 for 12" tank
17	AW105	1000214	Drain Control Assembly No 13 for 13" tank
17	AW106	1000215	Drain Control Assembly No 14 for 14" tank
18A	AW116	1000222	Brine Refill Control 0.33 gpm old style
18B	AW118	1243511	Brine Refill Control 0.33 gpm (requires ball)
19	AW190	1032417	Air-check Kit ¼" male
20	AW129	1235373	Optic Sensor
21	AW126	1238861	Motor w/Spacer & Pinion & Cable 700 Series Controller
22	AW139	1030502	Flow Control Ball
*	AW191	1033066	New to Old Style Air-check Adapter
*	AW140	1030528	Air-check Ball
*	AW128	1035446	Turbine cable 255-268-278/700
*	AX040	1244336	Kit Chlorine Generator 255/268 Logix
*	AW124	3029962	Motor Locking Pin

*	AV057	1239711	Front Mount Switch Kit 0.1 A
*	AV058	1239752	Front Mount Switch Kit 5 A
*	AV059	1239753	Top Plate Mount Switch Kit 0.1 A
*	AV069	1239754	Top Plate Mount Switch Kit 5 A
*	AV036	1263718	Kit remote Logix control with 3 m cable
*	AV036A	1256257	Kit remote Logix control with terminal blocks
*	AV023	1242411	Extension cord for cabinets
*	AV023A	1239979	Logix impulse Kit
*	AW500	1000814	European Transformer 230/12V
*	AW501	1000813	British Transformer
*	AW502	1000811	American transformer 120/12V