

2-AG Continuous water softeners



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1. GENERAL

Filter is automatic parallel water softening system with electronic volumetric controller. For parallel systems tank 1 and 2 are normally both in service position. When set filters minimum capacity has been reached other filter continue in service mode and another starts regenerate. Water filtration system is delivered as programmed and ready filled up with resin. See table 1. for the technical details.

	2-AG-250	2-AG-330	2-AG-370	2-AG-410	2-AG-470	2-AG-550
Flow rate (l/min)	2 x 32,7	2 x 57	2 x 71,7	2 x 88	2 x 100	2 x 100
Flow rate (m ³ /h)	2 x 1,96	2 x 3,42	2 x 4,3	2 x 5,28	2 x 6,0	2 x 6,0
Capacity (m ³ /°dH)	2 x 120	2 x 240	2 x 336	2 x 400	2 x 528	2 x 640
Resin volume (l)	75	150	210	250	330	400
Tank D x H (mm)	257 x 1385	334 x 1370	369 x 1645	406 x 1630	469 x 1725	552 x 1625
Brine tank D x H (mm)	565 x 1123	565 x 1123	565 x 1123	723 x 1200	833 x 1196	833 x 1196
Brine tank volume (l)	190	190	190	340	460	460

Table 1. Technical details

Delivery includes:

- 2x Pressure vessels, 2 x diffusers with tube, TWIN valve, 2 x manifolds, resin
- Brine tank, salt suction tube, suction hose, regeneration salt
- PVC piping, rack
- 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.
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. Filters cut-off valves needs to be open while filter is in operation. Otherwise there's possibility for filter to get damaged due to pressure caused by possible temperature rise.
6. Please note that it's on customers duty to install non-return valve to line of filtrated water.
7. Filter may not be exposed to direct spray of water.

2.2 Water line connections

Ensure proper pipe installation before filter is connected to the line. Next, install drain line connections. Drain line fitting for 12,7 mm tube is pre-installed to valves drain line connection by supplier. Attach drain tube to fitting and run to drain so that siphon is avoided.

Brine tank should be installed to even platform. Connect brine tanks suction tubes to both valves brine line connections (see figure 1). Larger AG series filters do not have an air check in automatic valve but separate J-tube with air-check in brine tank (see figure 2). Both valves need own suction tube. Ensure proper installation before starting water softening system.

Drain tube must be installed between brine tank and drain. Attach tube to overflow fitting and run to drain (see figure 3).

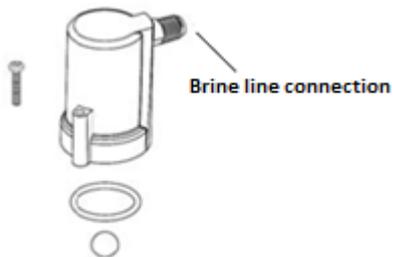


Figure 1. Air check valve



Figure 2. J-tube with air-check

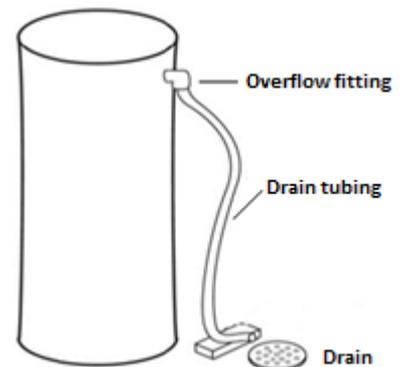


Figure 3. Overflow line connection

2.3 Changing the resin

Filter is supplied pre-filled with resin. Please see following instruction for changing the exhausted 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 back wash stage C1 - the filter is now unpressurized.
3. Remove the electric power plug from valve and open/remove the filter's water line connections and PVC piping.
4. Remove the automatic valves (twist the valve - right handed thread) and plug the diffuser upper end of tube.
5. Hose water inside the tank so the resin starts to flow out together with water. Remove the diffuser 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. Replace diffuser tube and fill pressure vessel with resin. Remove diffuser tube's cap and turn automatic valve in place.
7. Couple the PVC piping back to valves
8. Before re-starting the system, please make sure that all connections are securely tightened.

3. PROGRAMMING CONTROLLER

Controller is operated with four buttons (see figure 4).

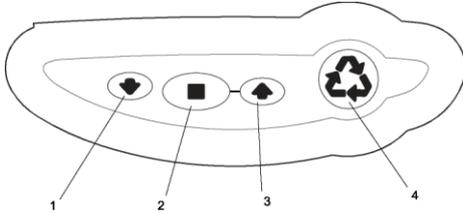


Figure 4. Keypad buttons

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.

3.1 Initial Power-up / Re-initialization (reset)

Connect AC adapter to power source.

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

- The display will show the valve type 255A (flashing). Select proper valve type (see table 2) with UP and DOWN buttons and accept selected valve type with SET button.
- Then input the system size (resin volume per one tank). Select the nearest volume to your actual system size.

Suodatin	Venttiilityyppi	Massamäärä
2-AG-250	255P	2 x 37
2-AG-330	255P	2 x 75
2-AG-370	278P	2 x 105
2-AG-410	278P	2 x 125
2-AG-470	278P	2 x 165
2-AG-550	278P	2 x 200

Table 2. Different valve types and resin volumes

3.2 Default settings (P1-P8)

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

The following table (table 3) show basic parameters of default settings.

- 1) Set time (P1).
- 2) Set day of week (P2).
- 3) Set time of regen (P3).
- 4) Set forced regen interval (P4).
- 5) Set salt amount (P6).
- 6) Set capacity (P7).
- 7) Set water hardness (P8).

P values	Parameter description	Range	Default	Units
P1	Time	00:00-23:59	-	HH:MM
P2	Day of week	-	-	Days
P3	Time of regen	00:00-23:59	2:00	HH:MM
P4	Forced regen interval	0-99	0	Days interval
P5	Not used with 764	-	-	-
P6	Salt amount	50-290	110	g/l (P9=1)
P7	Capacity			kg (P9=1)
P8	Hardness	30-2000	250	mg/l (P9=1)

Table 3. Default settings

After these setting programming the camshafts will synchronize themselves automatically. Tank 1 and tank 2 move to service. **ERR3** will be displayed when the tank 1 cam is moving. **ERR4** will be displayed when tank 2 cam is moving.

These cam movements may take up to 5 minutes.

NOTE: If no button is pushed for thirty seconds, the controller returns to normal operation mode. Pushing the REGEN button immediately returns the controller to normal operation.

3.3 Additional settings (P9-Pd)

Additional settings parameters will not need to be adjusted as the default settings. Contact your water treatment professional before attempting any programming.

Additional settings (see table 4) are accessible by pressing and holding the UP and DOWN buttons until the control displays a “P” value. Use arrow buttons to increment through the available selections. Press SET button to accept selected value.

P Values	Parameter description	Range	Default	Units	Notes
P9	Unit of measure	0-1	1	-	0=english, 1=metric
P10	Clockmode	0-3	1	-	0 = 12h, flowrate displayed 1 = 24h, flowrate displayed 2 = 12h, time of day displayed 3 = 24h, time of day displayed
P11	Service interval	0-250	0	months	Uses 30 days for reach months, 0=off
P12	Remote regen sw. Delay	3-250	60	s	-
P13	Chlorine generator	0-2	0	-	0 = none 1 = salt check only 2 = generate chlorine and check salt
P14	Refill rate	1-700		gpm x 100	-
P15	Brine drawrate	1-700		gpm x 100	-
P16	Reserve type	0-3	0	-	0 = Variable reserve, delayed regen 1 = Fixed reserve, delayed regen 2 = Variable reserve, delayed regen /Fixed reserve, immediate regen 3 = Fixed reserve, immediate regen
P17	Reserve percentage for fixed reserves	0-70	30	% of exchange capacity	(not used with alternating systems)
P18	Flow sensor select	0-7	0 (298 valves) 1 (255,263,268 273,278 valves)	-	0 = Internal turbine, magnum IT NHWB 1 = 1" Autotrol turbine, 2 turbines per system 2 = 2" Autotrol turbine, 2 turbines per system 3 = Users defined K factor 4 = Users defined pulse equivalent 5 = Magnum IT HWB 6 = 1" Autotrol turbine, 1 turbine per system (available with alternating systems only) 7 = 2" Autotrol turbine, 1 turbine per system (available with alternating systems only)
P19	K factor or pulse equivalent	1-99.99 0-9999	0,01 1	-	Pulses/liters (P18 = 3 ja P9 = 1) Liters/pulse (P18 = 4 ja P9 = 1)
Pr	refill first(not used with alternating systems)	0-1	0	-	0 = Refill first off 1 = Refill first on
Pd	Regeneration mode with initiated by a remote signal	0-1	0	-	0 = Immediate regeneration 1 = Delayed regeneration

Table 4. Additional settings

NOTE: If no button is pushed for thirty seconds, the controller returns to normal operation mode. Pushing the REGEN button immediately returns the controller to normal operation.

3.4 Cycle time programming (C1-C8)

3.4.1 Regeneration sequences

Valve will select right regeneration cycle times automatically based on filters system size. Do not change any settings. Contact your water treatment professional before attempting any programming.

Pressing and holding the UP and SET keys for five seconds when the control is not in regeneration will enter cycle time programming. See below controller different cycles.

C1 = Backwash 1

C2 = Brine draw

C3 = Slow rinse

C4 = Re-pressurization/stand-by (only for 255 and 278 valves)

C5= Fast rinse 1

C6= Backwash 2 (only for 255 valves)

C7= Fast rinse 2 (only for 255 valves)

C8= Refill

After cycle C7 system will fill up brine tank automatically. Give a minimum time of two hours for brine to be saturated before next regeneration.

NOTE! There should be always salt tablets in brine tank.

3.4.2 Manual regeneration

There is two options for manual regeneration:

1. Press and release the REGEN button starts a manual regeneration. The regeneration icon on the display will flash indicating a regeneration will start when the time of day reaches the programmed time of regeneration.
2. Pressing and holding the REGEN button for three seconds starts an immediate manual regeneration on the tank in service. A solid regeneration icon will be displayed.

NOTE! If you want to cancel the regeneration push and hold SET and UP for five seconds.

3.5 Re-initialization (reset)

Press and hold the SET and DOWN button. H0 will be displayed. Press and hold the SET button for three seconds while H0 is displayed. All settings except for time of day and day of week will be reset. Control will now display the valve and system type. Refer to initial power-up (page 6).

4. TROUBLESHOOTING

4.1 Controller

Problem	Possible causes	Solution
ERR1	Program settings have been corrupted	Press any key and reprogram settings
ERR3	Controller on tank 1 not know the position of the camshaft. Camshaft should be rotating to find home position.	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 Check that motor is connected. Verify that motor wire harness is connected to motor and controller module.
	Camshaft on tank 1 is not turning during ERR 3 display	Verify that optical sensor is connected and in place. Verify that motor gear has engaged cam gear. If everything is connected, try replacing in this order: 1. Wire harness, motor, optical sensor assy 2. Controller
	Camshaft on tank 1 is turning more than five minutes to find home position	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: 1. Wire harness, motor, optical sensor assy 2. Controller
	Regeneration starts but control shows ERR3 before completing regeneration.	Verify that the correct valve is selected in the Logix controller.
ERR4	Controller on tank 2 does not know the position of the camshaft. Camshaft should be rotating to find home position.	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 Check that motor is connected. Verify that motor wire harness is connected to motor and controller module.
	Camshaft on tank 2 is not turning during ERR4 display	Verify that optical sensor is connected and in place. Verify that motor gear has engaged cam gear. If everything is connected, try replacing in this order: 1. Wire harness, motor, optical sensor assy 2. Controller
	Camshaft on tank 2 is turning more than five minutes to find home position	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: 1. Wire harness, motor, optical sensor assy 2. Controller
	Regeneration starts but control shows ERR before completing regeneration.	Verify that the correct valve is selected in the Logix controller.
Check salt light is displayed	No regeneration draw or insufficient regenerant detected during regeneration.	Ensure salt/regenerant is available. Check for regenerant draw. Inspect regenerant line for leaks.

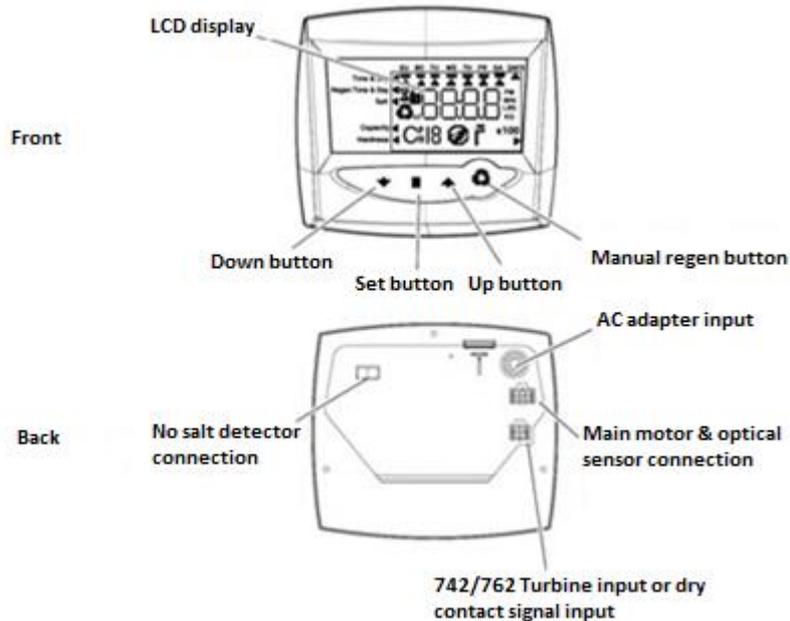
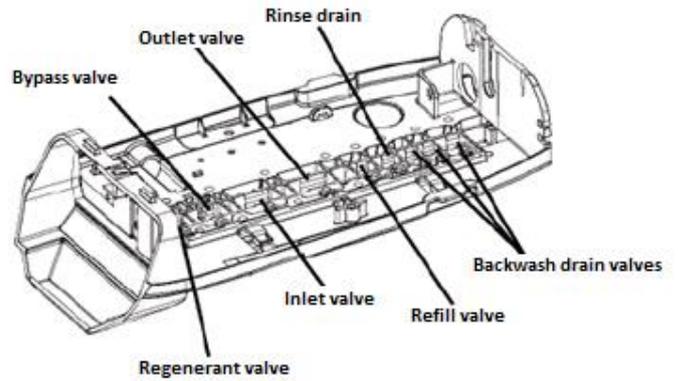
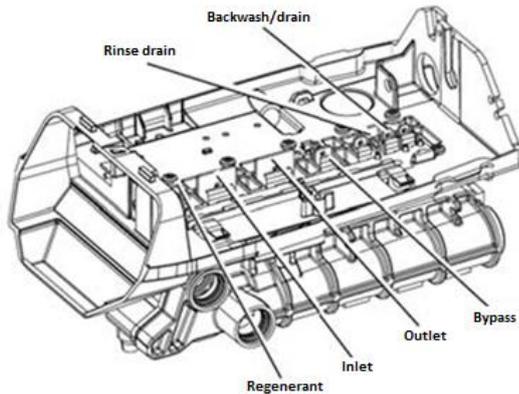
4.2 Water filtration system

Problem	Possible causes	Solution
Brine tank overflow	a. Uncontrolled refill flow rate b. Air leak in regenerant line to air check c. Drain control clogged with resin or other debris. d. Aircheck ball prematurely seating due to air check.	a. Remove refill flow control to clean ball and seat b. Check all connections in regenerant line for leaks. c. Clean drain control d. Check all connections in regenerant line for leaks.
Flowing or dripping water at drain or regenerant line after regeneration	a. Valve stem return spring weak. b. Debris is preventing valve disc from closing.	a. replace spring. (contact dealer) b. Remove debris
Hard water leakage after regeneration	a. Improper regeneration b. Leaking of external bypass valve. c. O-ring around riser pipe damaged d. System capacity too low due to incorrect resin volume settings.	a. Repeat regeneration after making certain correct regenerant dosage was set. b. Replace bypass valve. (contact dealer) c. Replace O-ring d. Reset control and program resin volume to correct settings
Control will not draw regenerant or intermittent or irregular regenerant draw	a. Low water pressure b. Restricted drain line c. Injector plugged d. Injector defective e. Valve disc 2 and/or 3 not closed f. Air check valve prematurely closed	a. Make correct setting according to instructions. b. Remove restriction. c. Clean injector and screen d. Replace injector and cap (contact dealer) e. Remove foreign matter from disc and check disc for closing by pushing in on stem. Replace if needed. (contact dealer) Put control momentarily into brine refill. Replace or repair air check if needed. (Contact dealer)
Control will not regenerate automatically	a. AC adapter or motor not connected b. Defective motor	a. Connect power b. Replace motor (contact dealer)
Control regenerates at wrong time of day	a. Controller set incorrectly	a. Correct the time settings according to instructions.
No conditioned water after regeneration	a. No salt in brine tank b. Injector plugged c. Air check valve closes prematurely	a. Add salt to brine tank b. Clean injector and screen c. Quick cycle control into regenerant draw/slow rinse. Replace or repair air check if needed. (contact dealer.)
Backwash or purges at excessively low or high rate	a. Incorrect drain controller used. b. Foreign matter affecting valve operation.	a. Replace with correct size controller (contact dealer) b. Remove drain controller and clean ball and seat
Control display 1-x (1 thru 4)	a. Control is in test mode	a. Press control keys in order from left to right.

Attachment 1: Automatic valve and controller identifications

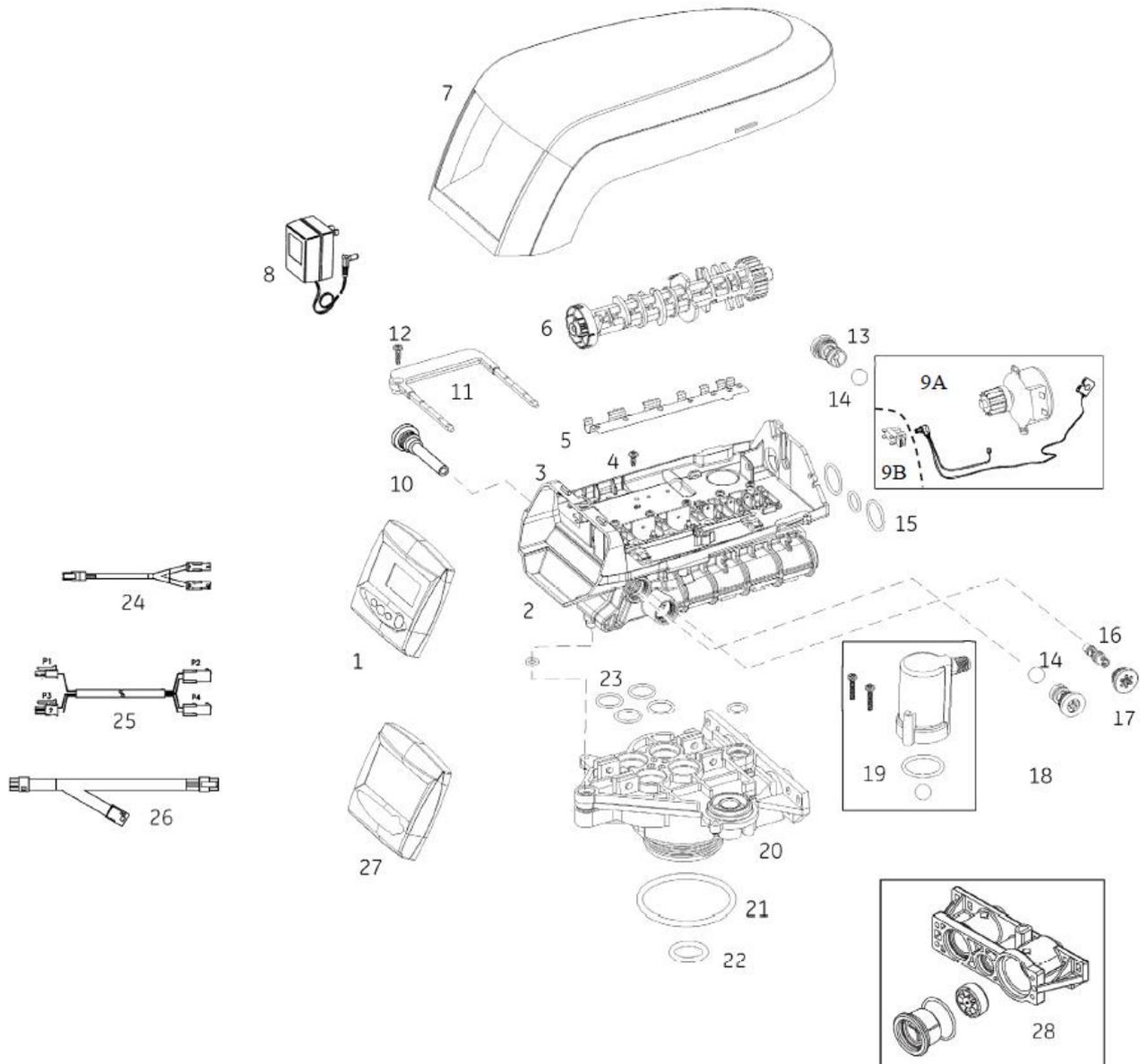
VALVE 255/764

VALVE 278/764



Attachment 2: Exploded view and spare parts

VALVE 255/764



Number	Ref.	P.N.	Description
1	AW505E		764C Timer w/check salt 12V 50Hz w/Symbol Label
2+3+4+5	AW168	1244650	255/700 Valve Assembly w/o Flow Controls
3	AW162	1235340	Top plate, 255 Valve, 700/860 Series Controller
4 -12	AW174	3030450	Top Plate Screw No 8 x 9/16"
5	AW163	1235341	Spring One Piece, 255 Valve
6	AW149	1235353	Cam 255/700-860 Series Valve, STD, Black, L mode

<i>Number</i>	<i>Ref.</i>	<i>P.N.</i>	<i>Description</i>
6	AW177	1236251	Cam 255/700-860 Series valve, TWIN, Tan, A-P mode
7	AW148	1236246	Standard Cover 255-268 Valve, 700/860 Series
8	AW500	1000814	European Transformer 230/12V
8	AW501	1000813	British Transformer
8	AW502	1000811	American transformer 120/12V
9A	AW126	1238861	Motor w/Spacer& Pinion & Cable 700 Series Controller
9B	AW129	1235373	Optic Sensor
10	AW125	1000226	Screen/Cap Assembly with O-ring
11	AW173	1031405	Locking Bar
13	AW100	1000209	Drain Control Assembly No 7 for 7" tank
13	AW101	1000210	Drain Control Assembly No 8 for 8" tank
13	AW102	1000211	Drain Control Assembly No 9 for 9" tank
13	AW103	1000212	Drain Control Assembly No 10 for 10" tank
13	AW104	1000213	Drain Control Assembly No 12 for 12" tank
13	AW105	1000214	Drain Control Assembly No 13 for 13" tank
13	AW106	1000215	Drain Control Assembly No 14 for 14" tank
14	AW139	1030502	Flow Control Ball (if used)
15	AW196	1040459	O-ring Set
16	AW133	1035730	E injector – Yellow
16	AW134	1035731	F injector – Peach
16	AW135	1035732	G injector – Tan
16	AW136	1035733	H injector – Light Purple
16	AW137	1035734	J injector – Light Blue
16	AW138	1035735	K injector – Pink
16	AW348	1035736	L injector – Orange
16	AW349	1035737	M injector – Brown
16	AW350	1035738	N injector – Green
16	AW351	1035739	Q injector – Purple
16	AW352	1035884	R injector – Dark grey
17	AW107	1000269	Injector / Backwash 00-open Cap with o-ring
18	AW118	1243511	Brine Refill Control 0.33 gpm (requires ball)
19	AW190	1032417	Air-check Kit ¼" male
20	AW170	1033784	255 Tank Adapter New Style
21	AW172	3029969	O-ring tank
22	AW169	3030918	O-ring 1,05"
23	AW195	1001404	O-ring set
24	AW365	3016715	Y sensor cable connector TWIN
25	AW366	3016775	Interconnecting cable twin
26	AW367	3020228	Remote Start / Lockout (only L mode)
27	AW504	1254886	Blank secondary controller
28	AW201	1032350	Meter Adapter Kit
*	AW124	3029962	Motor Locking Pin
*	AW128	1035446	Turbine cable 255-268-278/700

<i>Number</i>	<i>Ref.</i>	<i>P.N.</i>	<i>Description</i>
6	AW364	1237406	Twin cam 278/700, Tan
7	AW148	1236246	Cover 255-268 700/860 Valve
8	AW500	1000814	European Transformer 230/12V
8	AW501	1000813	British Transformer
8	AW502	1000811	American transformer 120/12V
9A	AW126	1238861	Motor w/Spacer & Pinion & Cable 700 Series Controller
9B	AW129	1235373	Optic Sensor
10	AW125	1000226	Screen/Cap Assembly with O-ring
11	AW100	1000209	Drain Control Assembly No 7 for 7" tank
11	AW101	1000210	Drain Control Assembly No 8 for 8" tank
11	AW102	1000211	Drain Control Assembly No 9 for 9" tank
11	AW103	1000212	Drain Control Assembly No 10 for 10" tank
11	AW104	1000213	Drain Control Assembly No 12 for 12" tank
11	AW105	1000214	Drain Control Assembly No 13 for 13" tank
11	AW106	1000215	Drain Control Assembly No 14 for 14" tank
12	AW139	1030502	Flow Control Ball
13	AV031		1" BSPT Brass Pipe Adapter Kit
13	AV032	1001615	32 mm PVC Tube Adapter Kit
13	AV038		1 ¼" BSPT Brass Pipe Adapter Kit
13	AW183		32 mm PVC Tube Adapter Kit
14	AW133	1035730	E injector – Yellow
14	AW134	1035731	F injector – Peach
14	AW135	1035732	G injector – Tan
14	AW136	1035733	H injector – Light Purple
14	AW137	1035734	J injector – Light Blue
14	AW138	1035735	K injector – Pink
14	AW348	1035736	L injector – Orange
14	AW349	1035737	M injector – Brown
14	AW350	1035738	N injector – Green
14	AW351	1035739	Q injector – Purple
14	AW352	1035884	R injector – Dark grey
15	AW107	1000269	Injector / Backwash 00-open Cap with o-ring
16	AW118	1243511	Brine Refill Control 0.33 gpm (requires ball)
16	AW327	1000519	Brine Refill Control 1.30 gpm (requires ball)
17	AW319	1035622	Tank Ring
18	AW172	3029969	O-ring tank
19	AW169	3030918	O-ring 1,05"
21	AW365	3016715	Y sensor cable connector TWIN
22	AW366	3016775	Interconnecting cable twin
23	AW367	3020228	Remote Start / Lockout (only L mode)
24	AW504	1254886	Blank secondary controller
*	AW124	3029962	Motor Locking Pin
*	AW128	1235446	Turbine cable 255-268-278/700
25	AW328	1033444	Turbine Assembly