

541D19 SERIES

Technical Manual



Water Treatment Controls

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Introduction

The 541D19 is an electro-mechanical 3-cycle control valve for softening of drinking and feed water supplies. When the drain plunger is opened, the valve is automatically transferred to the regeneration position; with its few moving parts, this simple and reliable system guarantees years of trouble-free service. The mechanical 7 or 12 days timer offers an adjustable brine/slow rinse cycle time, for exact matching of water conditions and water usage, and is available in a "fast regeneration" version, for use in small systems. The valve is designed for hard water bypass during regeneration. A built in adjustable blending device for mixing hard and soft water to suit the particular needs of each installation is an optional feature. The valve requires a conventional float-controlled brine valve with aircheck to control the brine refill. The following sequence is followed:

1. SERVICE:

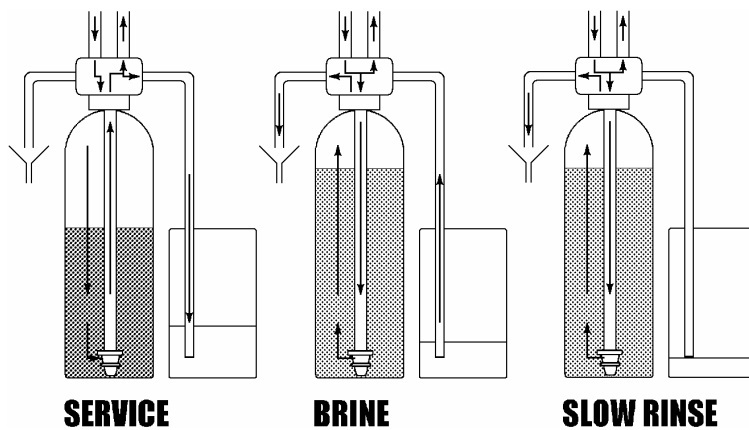
Untreated water flows down through the resin bed and up through the riser tube; the water is conditioned when passing through the resin. The throughput is dependent on the maximum permissible pressure drop for the complete water softener and the maximum permissible specific load of the resin (generally taken as 40 litres soft water per hour per litre resin).

2. BRINE:

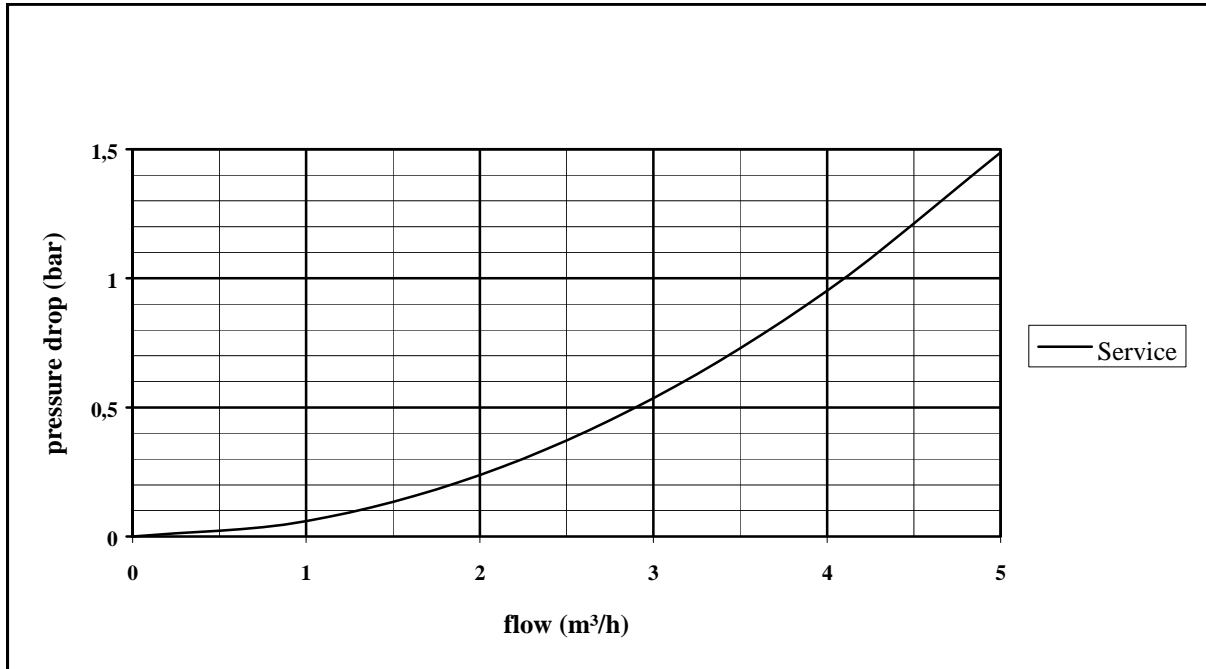
Salt brine, drawn from the brine tank by the injector, flows down through the riser tube and slowly up through the resin bed to drain; the resin is being regenerated when the salt brine passes through. The brine cycle is terminated when the air check is shut.

3. SLOW RINSE:

Slow rinse continues for the remainder of the brine cycle; the injectors motive water flows down through the riser tube and slowly up through the resin bed to drain, slowly washing the brine from the resin tank.

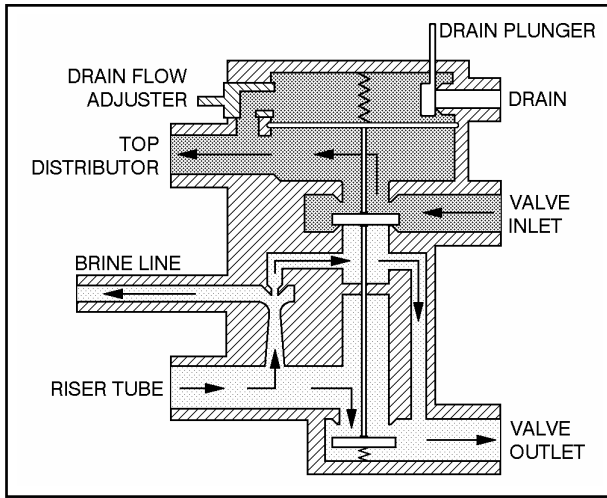


Technical Specifications

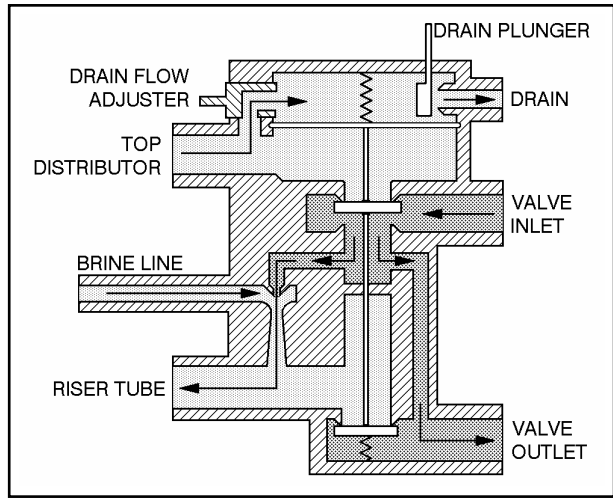


<ul style="list-style-type: none"> • Valve body material • Connections <ul style="list-style-type: none"> - inlet/outlet (optional) - drain line - brine line - tank • Riser tube • Mixing valve 	Glass filled Noryl® Brass adapters: 3/4" BSP male/female/male elbow 1/2" NPT, with connection 13 mm hose 3/8" tube 2 1/2" - 8 NPS 1,050" Optional
<ul style="list-style-type: none"> • Operating pressure • Hydrostatic test pressure • Electrical rating • Temperature 	Min. 1,4 - max. 8,3 bar 20 bar 24V – 50 Hz, 190 mA, transfo available Min. 2 °C - max. 48 °C
<ul style="list-style-type: none"> • Flow (m³/h) = $K_v \times \sqrt{\Delta p(bar)}$ - service: K_v 	4,1
<ul style="list-style-type: none"> • Softener applications 	Min. 6" (152 mm) - max. 12" (305 mm)
<ul style="list-style-type: none"> • Cycles • Controller <ul style="list-style-type: none"> - brine/slow rinse 	3 cycles, counter-current regeneration Electro-mechanical, 7 or 12 days, time clock Adjustable: 70-115 min 30-60 min (fast regeneration)

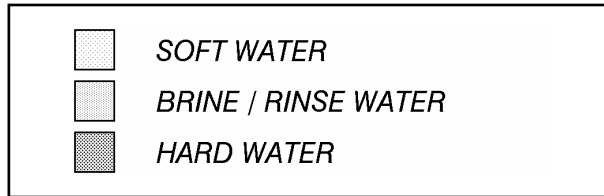
Flow Diagrams



SERVICE



BRINE / SLOW RINSE



Injector & Flow Control Selection

Injector

The injector determines the brine concentration (ratio between brine suction and rinse water) and the brine flow through the resin bed, thus the contact time between brine and resin. Injector performances vary significantly with inlet pressure.

Press. inlet bar	Inj. 5		Inj. 4		Inj. 3		Inj. 2		Inj. 1	
	Brine L/min	Rinse L/min	Brine L/min	Rinse L/min	Brine L/min	Rinse L/min	Brine L/min	Rinse L/min	Brine L/min	Rinse L/min
1,38	0,38	0,95	1,14	1,14	1,14	1,51	1,14	2,27	1,14	2,65
2,76	0,76	1,14	1,51	1,51	1,89	1,89	1,89	3,03	1,89	3,79
4,14	1,14	1,14	1,89	1,51	2,27	2,27	2,27	3,03	2,27	4,92
5,52	1,32	1,51	2,08	2,46	2,27	2,84	2,46	3,97	2,46	5,49
6,90	1,51	1,32	2,08	2,65	2,27	3,03	2,65	4,16	2,65	6,06

!!! The following table is only an indication and is valid for an inlet pressure of 3 bar and a bed height of 30".

Ø Tank		Injector
inch	mm	Nr.
6	152	5
7	178	4
8	203	3
9	229	2-3
10	254	1-2
12	305	1

!!! For very small units it might sometimes be advisable to use the injector selection table of the 541D18 valve; refer to Technical Manual 541D18.

Drain flow control (optional)

In case of the 541 valve, the drain flow control helps to keep the piston in the regeneration position when the operating pressure is extremely low (< 1,5 bar).

Ø Tank		Drain F.C.		
inch	mm	Nr.	Gal/min	(L/min)
6	152	U	1,2	(4,5)
7	178	U	1,2	(4,5)
8	203	E	1,6	(6,1)
9	229	G	2,0	(7,6)
10	254	J	2,6	(9,8)
12	305	K	3,5	(13,2)

Installation

Assembly

For proper assembly of valve and resin tank, proceed as follows:

1. Rinse the resin tank well before use.
2. Attach the lower distributor to the riser tube using PVC-glue or a stainless steel pin.
3. Lower the riser tube into the resin tank so that it touches the bottom.
4. Cut the riser tube 13 mm (= 1/2") below the top of the tank threads and chamfer the tube to prepare for insertion into the control valve.
5. Temporary plug the top of the riser tube to prevent resin from entering the tube and fill the tank with resin for max. 3/4.
6. Make sure the O-ring in the riser insert of the control valve is in the correct position; screw the upper distributor onto the control valve.
7. Lubricate the threads, the top of the riser tube and the tank O-ring of the control valve.
8. Lower the control valve straight down onto the riser tube and screw it onto the tank.

Installation

!!! ATTENTION

- For proper functioning of the unit, incoming water pressure should be between a minimum of 1,4 bar during regeneration and a maximum of 8,3 bar in service; if necessary, a pressure reducer must be installed ahead of the system.
- Installation must only be undertaken by a person competent in plumbing.
- All plumbing and electrical connections must be done in accordance with local codes.
- Do not install the unit too close to a water heater (min. 3 m of piping between outlet of unit and inlet of heater); water heaters can sometimes transmit heat back down the cold pipe into the control valve; always install a check valve at the outlet of the unit.
- If the control valve is not equipped with a bypass, a three valve bypass system must be installed to enable bypassing during servicing.

For proper installation of the unit, proceed as follows:

1. **Inlet/outlet**: connect the inlet and outlet to the control valve; when facing the front of the valve, the inlet is at the right and the outlet at the left side.
2. **Drain line**: connect a hose to the drain line fitting on the valve and secure it; insert the drain hose into a standpipe, with siphon if required; make sure the drain hose is:
 - as short as possible,
 - not elevated too much,
 - free of kinks,as this will all create undesired counter-pressure.
3. **Brine line**: a conventional float-controlled brine valve system with aircheck is required for proper brining during regeneration; 3/8" polytube must be used to connect the brine system to the valve; do not overtighten the nut.
4. **Transformer**: make sure the power source carries the same rating as the transformer; plug transformer's output lead (with plug \varnothing 2,5 mm x 5,5 mm) into socket at the timer's power lead and plug transformer into socket; the connection can be secured by means of the wire clip.

Installation check-out

When installation has been completed, the unit is ready to be placed into service. Proceed as follows, while checking the unit for any leakages:

1. Place unit in bypass and turn on main water supply; open a cold water tap nearby and allow water to run for a few minutes until all foreign material that may have resulted from the installation is washed out; close the tap.
2. Slowly shift the bypass valve to the service position and secure it; allow water to completely fill the resin tank.
3. Carefully open a cold water tap and allow water to run for at least 2 minutes to set the resin bed and purge air from the system; close the tap.
4. Loosen the timer cover screw and pull away the front cover.
5. Program the control valve according to the specific installation (refer to "Programming" on pg. 8).
6. Fill the brine tank with water, higher than the air-check level.
7. Slowly turn the timer knob counter clockwise, until the brine/slow rinse section on the regeneration cam pushes down the actuator to open the drain plunger; depending on the pushed-in skipper tabs, this might take several revolutions; the valve is now transferred to the brine/slow rinse position.
8. Allow the valve to draw water from the brine tank until the aircheck closes.
9. Place unit in bypass.
10. Add the appropriate amount of water to the brine tank.
11. Add salt to the brine tank.
12. Set float of brine valve to the level of the water in the brine tank.
13. Shift bypass valve back to the service position.
14. Slowly turn the timer knob further counter clockwise, until the actuator is released and the drain plunger is closed; the valve is now transferred back to the service position.
15. Reset time of day.
16. Install the front cover.

Mixing valve (optional)

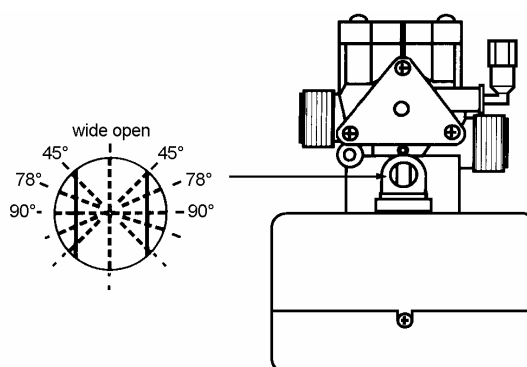
To adjust the residual hardness, the incorporated mixing valve must be regulated in function of the hardness of the incoming water and the desired residual hardness; the scale on the mixing valve has no absolute indication, but serves only as a reference point:

- To increase the residual hardness: turn screw counter clockwise.
- To decrease the residual hardness: turn screw clockwise.

Drain flow adjuster

!!! ATTENTION

When the valve is equipped with an incorporated drain flow control (optional), the drain flow adjuster is assembled and locked in the wide open position! By removing the locking plate, the drain flow adjuster can still be used, but note that the maximum flow to drain is limited by the incorporated drain flow control (optional).



With the drain flow adjuster it is possible to adjust the water flow to drain during regeneration. The so created counter pressure helps to keep the piston of the valve in the regeneration position when the operating pressure is extremely low (< 1,5 bar). To adjust:

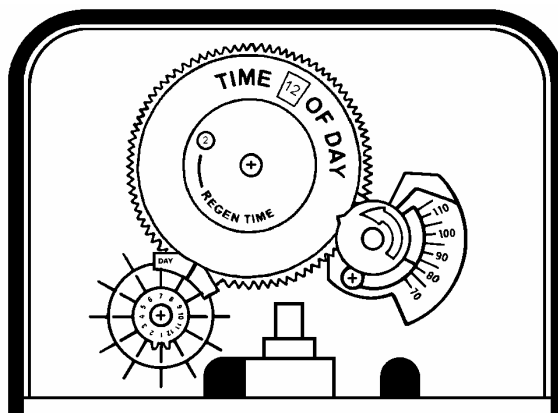
1. Place the unit in brine/slow rinse position.
2. Turn the drain flow adjuster either to the right or to the left until the piston remains stable in the regeneration position.

Do mind that closing the drain flow adjuster too much, will result in bad suction of the injector.

The Electro-mechanical Timer

Programming

The electro-mechanical timer uses a 12 or 7 days skipper wheel to set the day(s) of regeneration. The brine/slow rinse cycle time can be set; a fast regeneration version with shorter regeneration time is available.



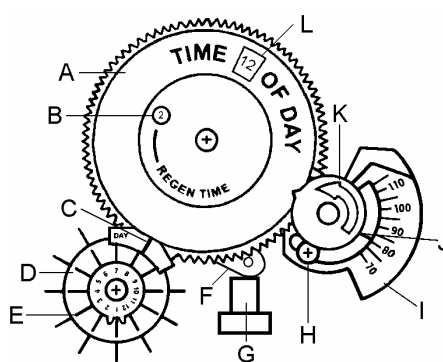
A: clock plate

B: time of regeneration window

C: day indicator

D: 12/7 days skipper wheel

E: skipper tabs



F: actuator

G: drain plunger

H: locking screw

L: time of day window

K: timer knob

J: brine/slow rinse cycle time indicator

I: brine/slow rinse section

- **time of regeneration:**

Turn the clock plate (A) until the desired time of regeneration appears in the time of regeneration window (B).

- **time of day:**

Turn the timer knob (K) counter clockwise until the correct time of day on the clock gear appears in the time of day window (L).

- **day(s) of regeneration:**

With all skipper tabs (E) pulled out, rotate the skipper wheel (D) until day "1" is aligned with the day indicator (C); push in skipper tabs (E) which correspond with the desired days of regeneration.

- **regeneration cycle:**

The length of the brine/slow rinse cycle is determined by the length of the brine/slow rinse section (I) on the regeneration cams; this can be adjusted between 70 and 115 min for the normal version, or 30 and 60 min for the fast regeneration version:

- Turn the timer knob (K) counter clockwise until the regeneration cams are accessible.
- Loosen the locking screw (H).
- Twist the upper cam until the desired brine/slow rinse cycle time is aligned with the cycle time indicator (J).
- Secure the locking screw (H).

Extra features

immediate regeneration: an immediate regeneration can manually be initiated by pushing in skipper tab (E) that is aligned with the day indicator (C) and turning the timer knob (K) counter clockwise, until the time of day in the time of day window (L) equals the time of regeneration (see time of regeneration window (B)); the time of day and the skipper tab (E) must be reset, when the regeneration is terminated.

Fast program check

When You want to check if the system is operating correctly, proceed as follows:

1. Plug unit into power supply.
2. Open water supply to valve.
3. Loosen the timer cover screw and pull away the front cover.
4. Slowly turn timer knob (K) counter clockwise until the brine/slow rinse section (I) on the regeneration cam pushes down the actuator (F) to open the drain plunger (G); depending on the pushed-in skipper tabs, this might take several revolutions; the valve is now transferred to the brine/slow rinse position.
5. Check brine draw by listening or feeling for suction.
6. Slowly turn timer knob (K) counter clockwise until the actuator (F) is released again and the drain plunger (G) is closed; the valve is now transferred back to the service position.
7. Reset time of day.
8. Install the front cover.

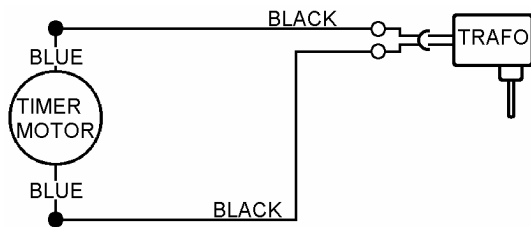
Parts Replacement

!!! BEFORE SERVICING:

- **MAKE SURE THE CONTROL VALVE IS IN SERVICE POSITION**
- **DISCONNECT ALL ELECTRICAL POWER TO THE UNIT**
- **BYPASS OR DISCONNECT THE WATER SUPPLY**
- **RELIEF THE WATER PRESSURE**

Timer motor

1. Remove the timer cover screw and lift off the timer and front cover.
2. Disconnect the wire nuts from the timer motor leads.
3. Remove the 2 screws holding the timer motor in place and lift away the motor.
4. Reverse the procedure for reassembly.

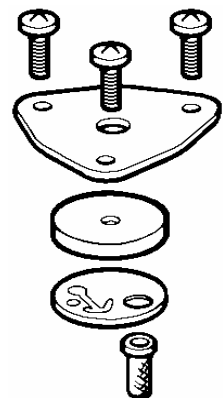


Timer head assembly

1. Remove the timer cover screw and lift off the timer and front cover.
2. Remove the drain hose from the drain line fitting.
3. Remove the 4 timer head screws and pull away the timer head assembly.
4. Reverse the procedure for reassembly; make sure the drain port O-ring is securely installed in the valve body groove.

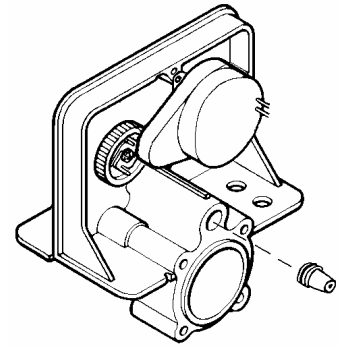
Injector

1. Remove the 3 screws holding the injector cover plate in place.
2. Lift off the injector cover plate.
3. Remove the injector and injector gasket.
4. Remove the injector filter and check for dirt or clogging.
5. Install the injector filter.
6. Install a new injector gasket; mind the alignment over the alignment post.
7. Install the injector; mind the alignment over the alignment post.
8. Install the injector cover plate.
9. Install the 3 injector cover plate screws and tighten them evenly.



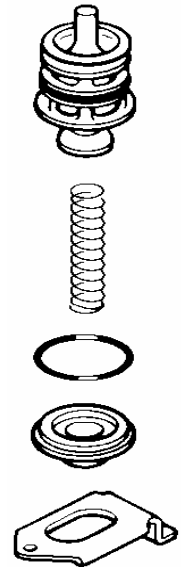
Incorporated drain flow control (option.)

1. Remove the timer cover screw and lift off the timer and front cover.
2. Remove the drain hose from the drain line fitting.
3. Remove the 4 timer head screws and pull away the timer head assembly.
4. Locate the drain flow control in the drain channel of the timer head.
5. Pull out the drain flow control.
6. Reverse the procedure for reassembly; make sure the drain port O-ring is securely installed in the valve body groove.



Drain plunger

1. Loosen the timer cover screw and pull away the front cover.
2. Loosen the retainer screw located below the timer gears on the front.
3. Pull the retainer down and away from the timer.
4. Place a hand under the plunger cap and press down on the drain plunger; the plunger cap, O-ring and spring will fall into Your hand.
5. Clean out the plunger orifice in the timer head; lubricate lightly.
6. Check the O-rings on the drain plunger; clean or replace if necessary; lubricate lightly.
7. Check the O-ring of the plunger cup; clean or replace if necessary; lubricate lightly.
8. Install drain plunger in the plunger orifice of the timer head.
9. Install the O-ring in the plunger cap groove and the spring in the centre whole of the plunger cap.
10. Install the plunger cap; press it in firmly.
11. Install the retainer.
12. Install the retainer screw.
13. Install the front cover.

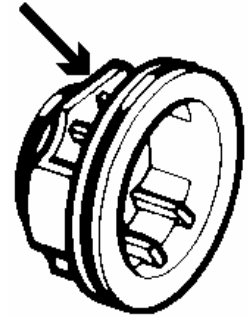


Main diaphragm

1. Remove the timer cover screw and lift off the timer and front cover.
2. Remove the drain hose from the drain line fitting.
3. Remove the 4 timer head screws and pull away the timer head assembly.
4. Remove the clip from the centre of the main diaphragm.
5. Lift away the main diaphragm from the body stem assembly.
6. Reverse the procedure for reassembly; make sure the drain port O-ring is securely installed in the valve body groove.

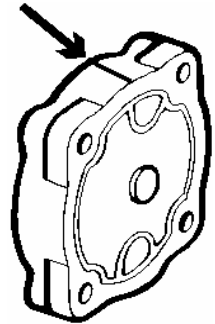
Body stem assembly

1. Remove the timer cover screw and lift off the timer and front cover.
2. Remove the drain hose from the drain line fitting.
3. Remove the 4 timer head screws and pull away the timer head assembly.
4. Remove the clip from the centre of the main diaphragm.
5. Lift away the diaphragm from the body stem assembly.
6. Remove the seat insert.
7. Pull out the body stem assembly.
8. Inspect the centre check disc rubber seal for wear; clean or replace if necessary.
9. Install the body stem assembly.
10. Lubricate the O-rings of the seat insert.
11. Install the seat insert with 1 of the 2 flats facing towards the top of the valve body.
12. Reverse the procedure for reassembly; make sure the drain port O-ring is securely installed in the valve body groove.
13. It is now necessary to verify the position of the rear check disc; refer to Parts Replacement "Check disc".



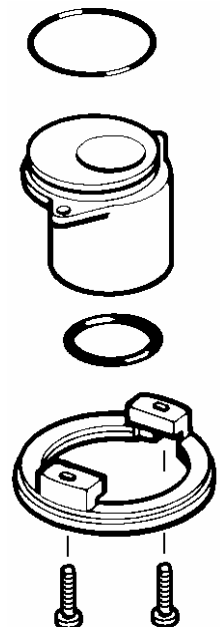
Check disc

1. Remove the 4 screws from the back cap.
2. Place a hand under the back cap and remove the back cap; the check disc spring might fall into Your hand.
3. Remove the check disc from the body stem assembly.
4. Inspect the check disc rubber seal for wear; clean or replace if necessary.
5. Install the check disc on the body stem assembly and the check disc spring onto the centre post of the check disc.
6. Make sure the back cap gasket is securely installed in the back cap grooves.
7. Align the mark on top of the back cap with the mark on the valve body and install the back cap with the open end of the check disc spring onto the centre post of the back cap.
8. Install the 4 screws and tighten them.



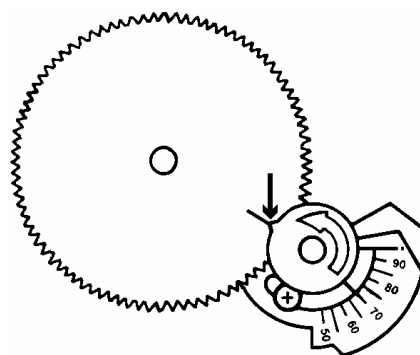
Riser insert

1. Remove the inlet and outlet from the control valve.
2. Remove the drain hose from the drain line fitting and the brine line from the brine line fitting.
3. Remove the control valve from the resin tank.
4. Unscrew the upper distributor from the control valve.
5. Remove the 2 screws holding the adapter ring and riser insert in place.
6. Lift away the adapter ring.
7. Pull the riser insert out of the valve body.
8. Check the O-ring on the riser insert; clean or replace if necessary; lubricate lightly.
9. Install the riser insert; press it in firmly.
10. Install the adapter ring and tighten the 2 screws.
11. Make sure the O-ring in the riser insert of the control valve is in the correct position; screw the upper distributor onto the control valve.
12. Lubricate the threads, the top of the riser tube and the tank O-ring of the control valve.
13. Lower the control valve straight down onto the riser tube and screw it onto the tank.
14. Install the drain hose to the drain line fitting and the brine line to the brine line fitting.
15. Install the inlet and outlet to the control valve.



Aligning timer knob and clock gear

1. Loosen the timer cover screw and pull away the front cover.
2. Place a hand under the timer and remove the clock gear screw; the clock plate and spring washer will fall into Your hand.
3. Remove the locating dial.
4. Turn the timer knob until the pointer on the timer knob is pointing to the centre of the clock gear.
5. Install the clock gear so that the black mark (a line) on the clock gear is pointing to the centre of the timer knob (= aligned with the pointer on the timer knob).
6. Reverse the procedure for reassembly.



Troubleshooting

Hard (untreated) water to service

Cause	Solution
1. Open or defective bypass	1. Close or verify bypass
2. Excessive water usage	2. Verify regeneration frequency
3. Valve in regeneration	3. /
4. Loss of resin	4. Refer to problem "Loss of resin"
5. Mixing valve open	5. Reduce mixing valve opening
6. Change in raw water hardness	6. Adjust regeneration frequency accordingly
7. Unit fails to regenerate	7. Refer to problem "Unit fails to regenerate"
8. Valve fails to draw brine	8. Refer to problem "Valve fails to draw brine"
9. Decreasing exchange capacity of resin	9. Clean or replace resin bed
10. No salt in brine tank	10. Add salt
11. Leak at riser tube	11. Verify that riser tube is seated correctly and is not cracked

Unit fails to regenerate

Cause	Solution
1. Faulty electrical supply	1. Verify electrical service (fuse, transfo,...)
2. Defective timer motor	2. Replace timer motor
3. Regeneration frequency not programmed	3. Verify days of regeneration on skipper wheel
4. Timer knob out of alignment with clock gear	4. Refer to Parts Replacement "Aligning timer knob and clock gear"
5. Body stem assembly switches continuously	5. Check minimum operating pressure; refer to Installation "Drain flow adjuster"

Valve fails to draw brine

Cause	Solution
1. Low inlet pressure	1. Verify operating pressure; must exceed 1,4 bar
2. Drain flow adjuster too much closed	2. Open drain flow adjuster slowly until unit draws brine
3. Plugged injector	3. Clean injector
4. Plugged injector filter	4. Clean injector filter
5. Restricted drain line	5. Verify drain line for kinks or restrictions
6. Restricted brine line	6. Verify brine line for kinks or restrictions
7. Leak in brine line	7. Verify brine line and connections for air leakage
8. Not enough water in brine tank	8. Verify functioning and float setting of brine valve

Excessive water in brine tank

Cause	Solution
1. Improper setting of float	1. Verify float setting of brine valve
2. Defective brine valve	2. Verify or replace brine valve

Unit uses too much salt

Cause	Solution
1. Excessive water in brine tank	1. Refer to problem "Excessive water in brine tank"
2. Unit regenerates too frequently	2. Verify days of regeneration on skipper wheel

Salt water to service

Cause	Solution
1. Excessive water in brine tank	1. Refer to problem "Excessive water in brine tank"
2. Injector undersized	2. Verify injector selection
3. Improper brine/slow rinse time setting	3. Verify that brine/slow rinse time corresponds to the proper salt level and amount of resin

Loss of resin through drain line

Cause	Solution
1. Lower and/or upper distributor damaged	1. Replace distributor(s)
2. Leak between riser tube and upper distributor	2. Verify that riser tube is seated correctly and is not cracked

Loss of water pressure

Cause	Solution
1. Mineral or iron build-up in resin tank	1. Clean resin bed and control valve; increase regeneration frequency
2. Plugged outlet manifold	2. Remove and clean outlet
3. Plugged lower and/or upper distributor	3. Verify that distributors are free of debris
4. Crushed lower and/or upper distributor	4. Replace distributor(s)

Drain flows continuously

Cause	Solution
1. Drain plunger stuck in open position	1. Clean or replace drain plunger
2. Defective timer motor	2. Replace timer motor

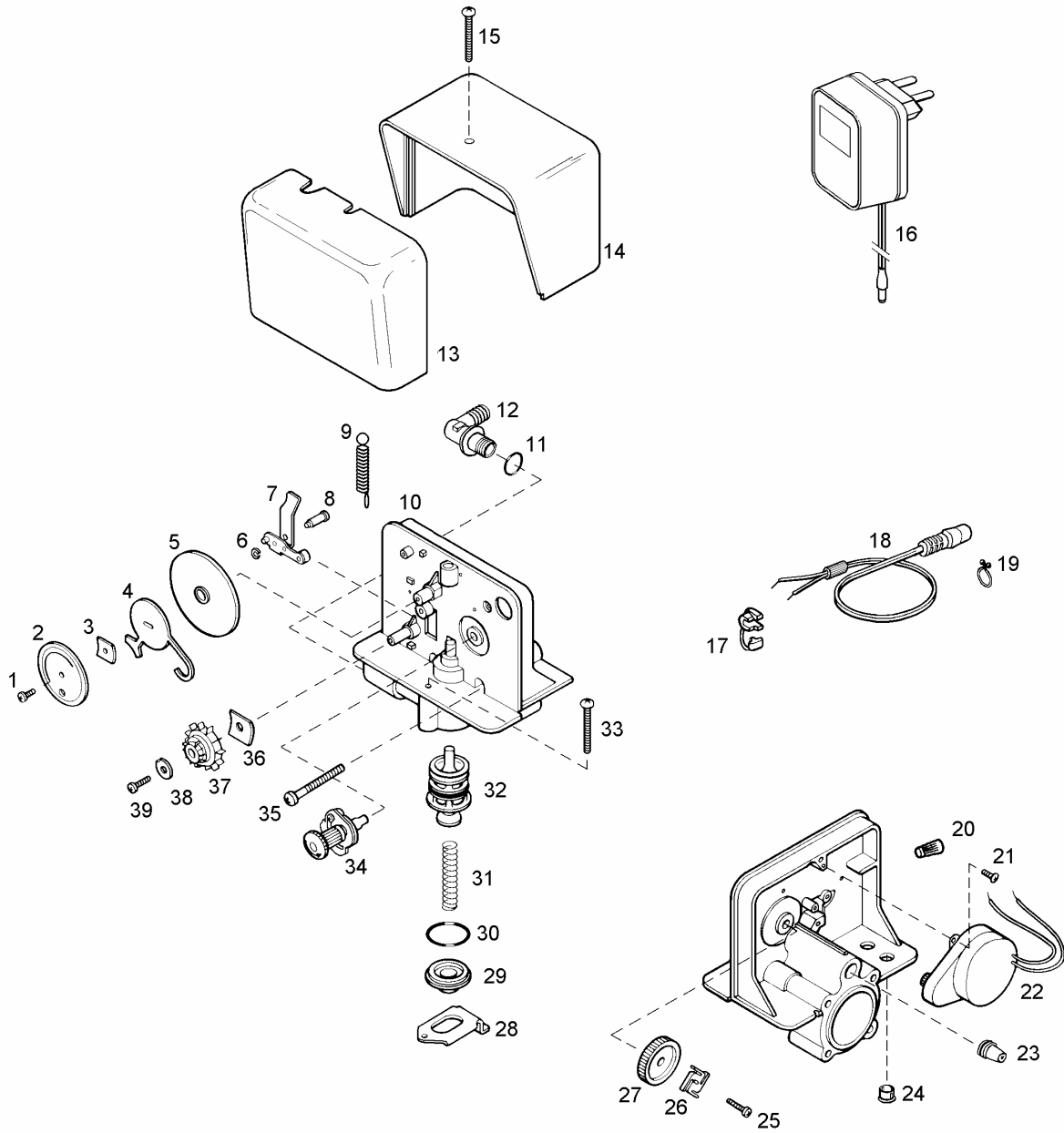
Annual Maintenance

To assure the correct functioning of the control valve, the following items must be checked annually:

1. Clean out injector and injector filter.
2. Verify programming of timer; re-program timer if necessary.
3. Verify correct execution of program (refer to “Fast program check” on pg. 9).
4. Measure the residual hardness; adjust mixing valve if necessary.
5. Verify min. and max. pressure; install pressure reducer if necessary.

Exploded Views & Part Numbers

Electro-mechanical timer

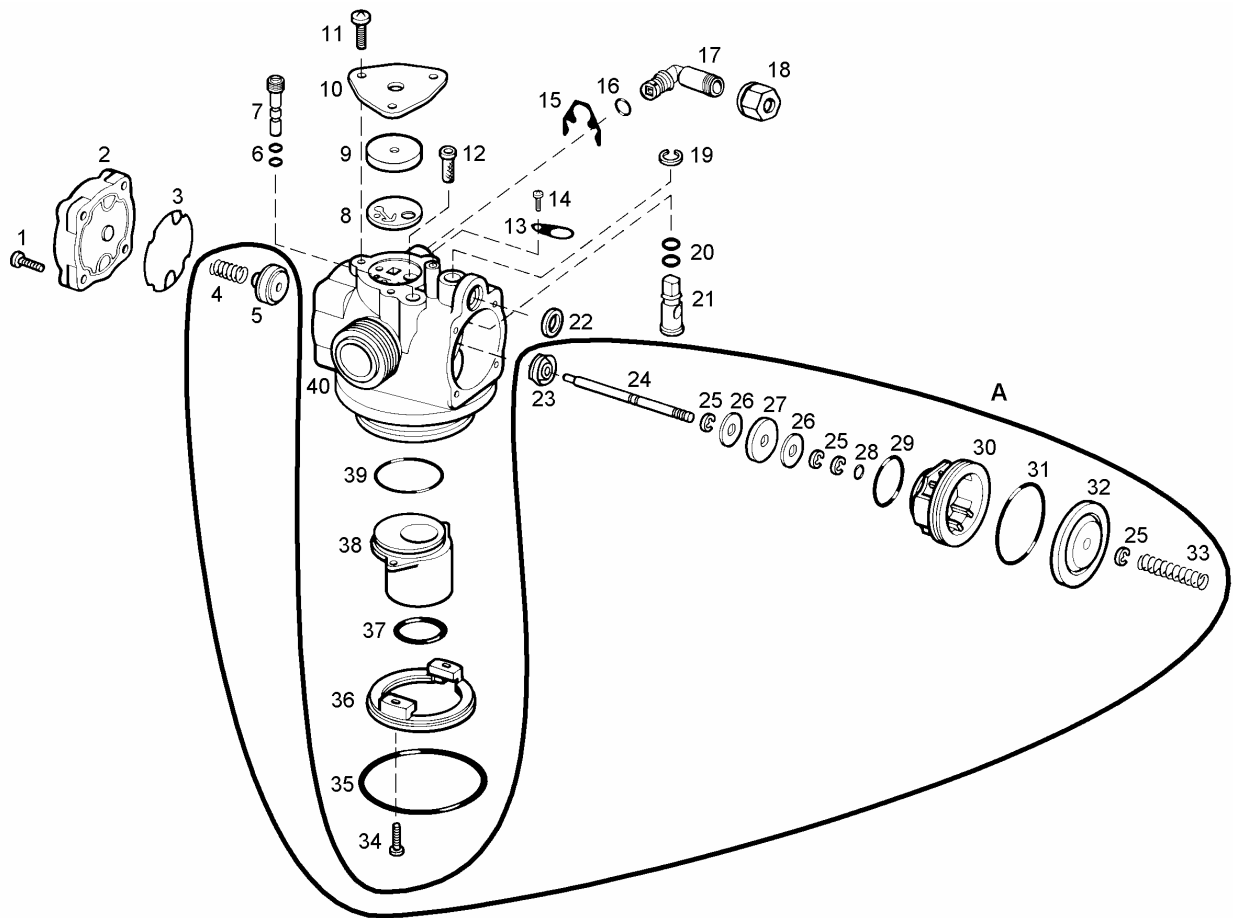


541D19 SERIES

ITEM	PART NUMBER	DESCRIPTION
1	15/76	Screw, clock gear
2	529/309/2	Clock plate
3	525/303	Spring washer, clock plate
4	529/308/3	Locating dial
5	529/232/9 529/232/4	24 hr clock gear (12-days) AM/PM clock gear (7-days)
6	19/23	Clip, actuator
7	529/218	Actuator
8	529/212	Spindle, actuator
9	541/802	Spring, actuator
10	529/202/2	Housing, timer head
11	185/115/1	O-ring, drain elbow
12	H1026/1	Drain elbow
13	72373	Front cover
14	72431	Timer cover (black)
15	15/207/12	Screw, timer cover
16	28/296/11 28/296/18	Transfo 230/24V - 50 Hz, 4VA, EuroT plug Transfo 230/24V - 50 Hz, 4VA, UK plug
17	28/8/28	Strain relief, power lead
18	28/300/3	Power lead with plug
19	72263	Wire clip
20	28/26	Wire nut (2x)
21	15/76	Screw, timer motor (2x)
22	30/77/J	Timer motor
23	541/300/*	Drain flow control (optional)
24	28/85	Plug
25	15/185/10	Screw, ratchet
26	525/260	Ratchet
27	525/254/2	Gear, ratchet
28	529/280	Retainer, drain plunger
29	529/286	Plunger cap
30	185/022/1	O-ring, plunger cap
31	401/7	Spring, drain plunger
32	529/219/3/15	Drain plunger
33	15/92/24	Screw, retainer
34	529/239/2 529/239/3	Timer knob/cams Timer knob/cams fast regeneration
35	15/87	Screw, timer head (4x)
36	525/205	Spring washer, skipper wheel
37	525/241/12 525/241/07	Skipper wheel (12-days) Skipper wheel (7-days)
38	525/274/1 525/274/2	Washer, day indicator (12-days) Washer, day indicator (7-days)
39	15/185/10	Screw, skipper wheel

* Size: refer to "Sizing Table"

Valve body



541D19 SERIES

ITEM	PART NUMBER	DESCRIPTION
1	15/222	Screw, back cap (4x)
2	541/207	Back cap
3	541/206	Gasket, back cap
4	541/239	Spring, check disc
5	541/246	Check disc
6	185/005/1	O-ring, mixing valve (2x)
7	541/940/6/1	Mixing valve (optional)
8	541/325	Gasket, injector
9	428/*	Injector
10	541/221	Cover plate, injector
11	15/89	Screw, cover plate (3x)
12	413/13	Filter, injector
13	541/293	Locking plate, drain flow adjuster
14	15/76	Screw, locking plate
15	541/254	Spring clip
16	186/118	O-ring, brine elbow
17	568/336/0	Brine elbow
18	21/90	Nut, brine elbow
19	19/19	Clip, drain flow adjuster
20	186/134	O-ring, drain flow adjuster (2x)
21	541/238	Drain flow adjuster
22	529/244	O-ring, drain port
23	467/216	Seal, body stem
24	541/210	Body stem
25	19/3	Clip, body stem (4x)
26	541/217	Disc washer (2x)
27	541/216	Valve disc
28	185/005/1	O-ring, body stem
29	185/024/1	O-ring, seat insert (small)
30	541/204	Seat insert
31	185/029/1	O-ring, seat insert (large)
32	541/256	Main diaphragm
33	516/221	Spring, main diaphragm
34	15/90	Screw, adapter ring (2x)
35	185/67/4	O-ring, tank
36	541/232	Adapter ring
37	185/214/1	O-ring, riser tube
38	541/218	Riser insert 1,050"
39	185/029/1	O-ring, riser insert
40	541/257/1	Valve body (incl. 467/216)
	541/257/1/R	Valve body (incl. 467/216) for mixing valve
A	RK/541/244	Repair kit body stem

* Size: refer to "Sizing Table"

541D19/TVID(/R)

T = Timer: **A** = 12-days
 B = 7-days
 C = 12-days, fast regen.
 D = 7-days, fast regen.

V = Voltage: **L** = transfo 230/24VAC, 4VA, EuroT plug
 R = transfo 230/24VAC, 4VA, UK plug
 J = no transfo

I = Injector: **7, 5, 4, 3, 2, 1**

D = Incorporated drain flow control:

0 = no flow control, only drain flow adjuster

Nr.	Gal/min	(L/min)
U	1,2	(4,5)
E	1,6	(6,1)
F	1,8	(6,8)
G	2,0	(7,6)
H	2,2	(8,3)
J	2,6	(9,8)
T	3,0	(11,4)
K	3,5	(13,2)

/R = Incorporated mixing valve

