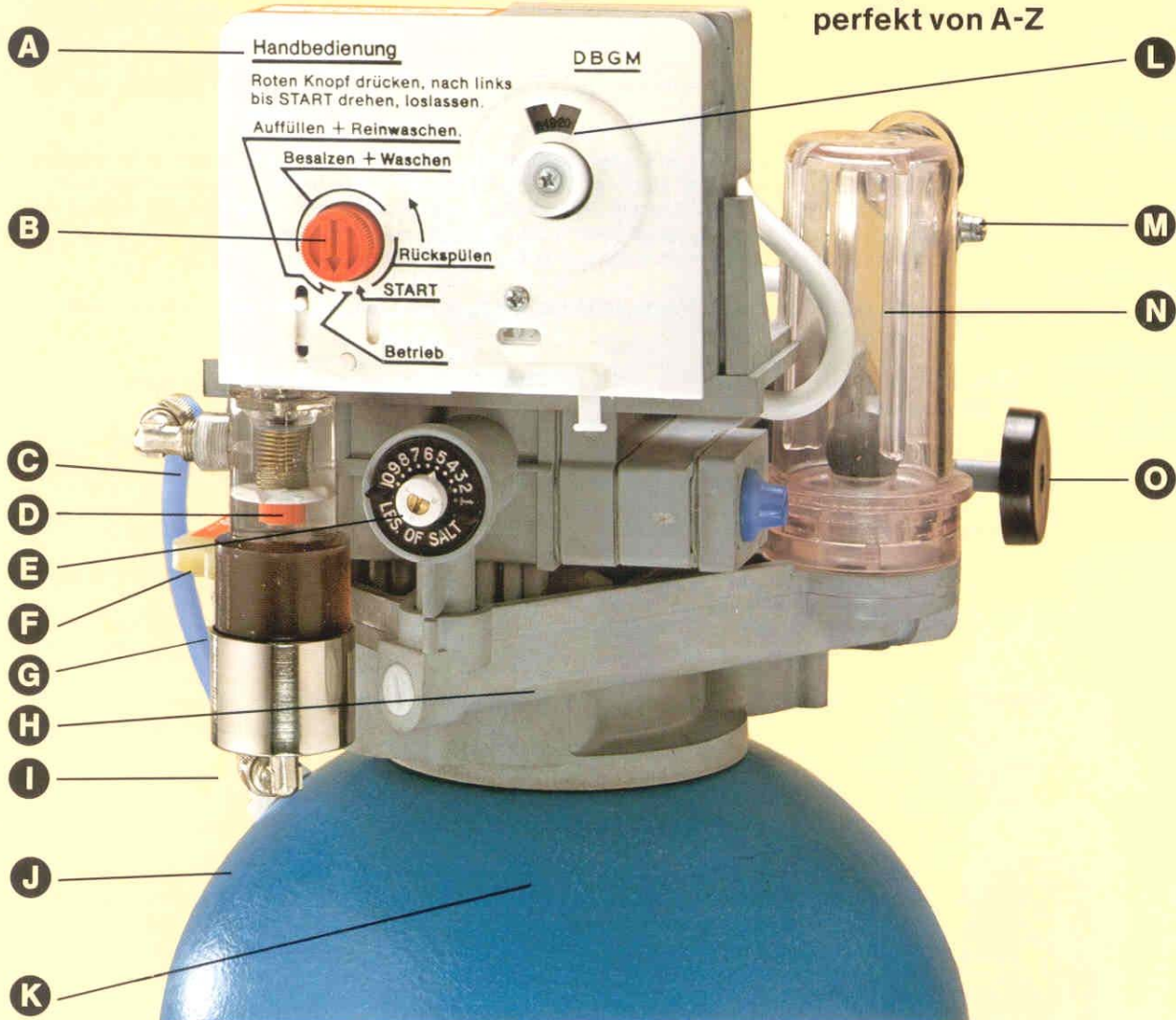


## Translation WAT/S-Compensor

- A Sensor Combi Timer. Here most of the movable parts as motor, gear and sensor are integrated and can easily be exchanged, that is to say, a maintenance without problems.
- B Indicator of the regeneration program with manual start for the immediate regeneration. The arrow shows in which part of the regeneration phase the program is.
- C The measure line brings the test water from the lower part of the resin filling into the measure cell and then into the soft water line.
- D The red signal shows sensor that the softener is exhausted to the measure point or completely.
- E The salt quantity regulator is adjustable according to the desired or most economic salt quantity.
- F Pulling the locking bar releases automatic valve. Therefore easy maintenance, even by the owner.
- G This is the new and unique measure cell which needs no test water and can be used with safe brining.
- H The valve casing consists of re-inforced fiberglass, therefore completely free of corrosion and it shows no electrolytic reaction in the connection line as for example in the case of red brass valves.
- I The measure line leads to the valve automatic and goes into the softwater line or during the regeneration into the mains.
- J The pressure tank is made of fiberglass in one piece and without a weld, that means an absolute elimination of corrosion.
- K High capacity resin
- L The 24 hours program clock, makes it possible to put off the regeneration to 2 o'clock in the night.
- M Salt solution suction pipe with sight control.
- N The transparent air check valve prevents the air from penetrating into the resin tank.
- O The bypass and needle valve makes it possible
  - a) to produce mixed water from 6-8 degrees (German hardness).
  - b) to change to hard water, for example to water the garden.
- P Test water pick-up

# Der neue WAT-S Compensator von **SOFT-STAR**<sup>®</sup> perfekt von A-Z



- A Sensor-Zeit-Combi-Programmwerk in dieser Einheit sind die meisten beweglichen Teile, wie Motor, Getriebe und Sensor zusammengefaßt und zu einer Steckeinheit ausgebildet, d.h. es ist sehr servicefreundlich.
- B Regenerationsprogramm-Anzeiger mit Handauslöser für die Sofortregeneration. Der Pfeil zeigt an, in welcher Regenerationsphase sich das Programm gerade befindet.
- C Die Meßleitung bringt das Testwasser aus dem unteren Teil der Harzfüllung in die Meßzelle und anschließend in die Weichwasserleitung.
- D Das rote Signal zeigt an, daß der Enthärter bis an den Meßpunkt oder ganz erschöpft ist.
- E Der Salzmenge­regler ist auf die gewünschte oder wirtschaftlichste Salzmenge einstellbar.
- F Haltebügel für abnehmbare Ventilautomatik, daher für Selbstservice geeignet.
- G Das ist die neue einzigartige Meßzelle, welche keinen Testwasserverbrauch hat und mit Sparbesalzung funktioniert.
- H Das Ventilgehäuse ist aus faserverstärktem Kunststoff, daher völlig korrosionsfrei, es bildet kein Korrosionspotenzial für die Anschlußleitung, wie dies bei Rotgußventilen der Fall ist.
- I Diese Meßleitung führt in den Ventilautomat und mündet in die Weichwasserleitung, bzw. beim Regenerieren in die Kanalleitung.
- J Der Druckbehälter ist aus Fiberglas in einem Stück ohne Naht gefertigt und völlig korrosionsfrei.
- K Hochleistungs-Ionen-Austauscherharz
- L Die 24-Stunden-Uhr verlegt die Regeneration in die Nacht auf ca. 2.00 Uhr.
- M Salzsole-Saug­schlauch mit Sichtkontrolle.
- N Das durchsichtige Luftverschlus­ventil verhindert das Eindringen von Luft in den Harztank.
- O Das Umschalt- und Verschneideventil erlaubt
  - a) Verschnittwasser von 6–8° dH herzustellen
  - b) auf hartes Wasser umzustellen, z. B. zum Garten gießen usw.
- P Testwasserentnahmesieb



## ... UND SO FUNKTIONIERT DER WAT-S COMPENSOR-WEICHWASSERAUTOMAT

Wie Sie wissen, benötigt jeder Wasserenthärter zur Wiederbelebung eine Spülung mit Kochsalzlösung. Das nennt man Regeneration.

Bei den meisten bekannten Anlagen wird diese Regeneration durch eine Zeituhr intervallweise ausgelöst, bzw. gesteuert.

Verständlicherweise weiß die Zeituhr nichts über den Wasserverbrauch, die Wasserhärte, sowie den Salzverbrauch bei der letzten Regeneration und kann diese soweit auch nicht berücksichtigen. Das heißt, es kann vorkommen, daß der Enthärter bereits zwei Tage erschöpft ist, aber die Zeituhr die Regeneration noch nicht freigibt. Genau der umgekehrte Fall tritt ein, wenn im Haus weniger Wasser gebraucht wird oder die Eingangshärte vom Stadtnetz geringer ist. Die Anlage regeneriert dann zu früh. Die unverbrauchte Kapazität geht verloren.

Dieses Verhalten tritt teilweise auch bei wasserzählergesteuerten Anlagen auf, unabhängig davon, ob ein elektronischer Rechner integriert ist oder nicht.

Um alle diese Nachteile zu vermeiden, haben wir den SOFT-STAR WAT-S Compensor entwickelt. In seiner Messung gehen alle wichtigen Faktoren ein.

Wie: – Wasserverbrauch – schwankende Wasserhärte aus dem Stadtnetz  
– unterschiedliche Besatzung – sowie Sparbesatzung mit verbessertem Wirkungsgrad

Das heißt, die Regeneration wird erst ausgelöst, wenn sie wirklich notwendig ist.

Somit werden mit dem WAT-S Compensor Betriebskosten eingespart. Trotzdem ist immer weiches Wasser vorhanden.

So funktioniert der WAT-S Compensor:

Der WAT-S Compensor testet die Weichwasserqualität den ganzen Tag über. Jedes mal, wenn im Haus Wasser entnommen wird, fließt eine kleine Menge Testwasser durch die Meßleitung C zur Meßzelle G.

In der Meßzelle wird das Wasser auf Härte untersucht und wird anschließend in die Weichwasserleitung zurückgeführt, so kann kein Tropfen verloren gehen.

Dieser Prozeß läuft über mehrere Tage, bis zu etwa einer Woche, dabei wird die Harzfüllung K Tag für Tag von oben nach unten schichtweise erschöpft. Wenn nach einigen Tagen so viel Wasser durch das Harz geflossen ist, daß die darin enthaltenen Härtebildner die Harzfüllung K bis zum Meßpunkt P erschöpft haben, fließt das erste Hartwasser durch die Meßleitung C in die Meßzelle.

Die im Meßwasser enthaltenen Härtebildner (alle Calcium- und Magnesiumionen) lassen die Meßsubstanz schrumpfen, dadurch wird das rote Signal sichtbar.

Die Anlage geht nun auf Reserve, das heißt, das Haus wird weiterhin aus der Harzfüllung, die sich unterhalb des Meßpunktes P befindet, mit Weichwasser versorgt.

Um 2.00 Uhr nachts, wenn niemand Wasser benötigt, bewegt die Mechanik in der Schaltuhr den Kolbenstengel D nach unten und tastet dabei den Schrumpfungsgang der Meßsubstanz ab. Bei einer Hartmeldung wird der Kolbenstengel um ca. 1 cm nach unten gedrückt und betätigt hierbei einen Starthebel, der die Regeneration sofort auslöst.

Die Regeneration läuft nun nach dem bewährten Programm ab: „Rückspülen, Salzsaugen, Salz auswaschen, Schnellwaschen, Salztank füllen und Betrieb“.

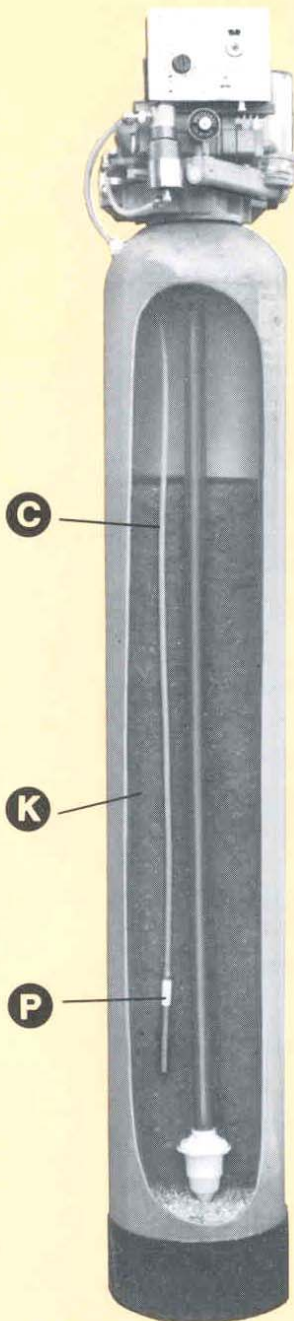
Die Meßzelle G ist an diesem Regenerationsprogramm voll beteiligt. Sie wird ebenfalls rückgespült, besalzt und vom Salz frei gewaschen. Dabei dehnt sich die Meßsubstanz wieder auf das Ausgangsvolumen aus und ist wieder betriebsbereit.

KURZ GESAGT:

Wir messen das zum Haus fließende Wasser ob es noch weich genug ist. Dabei berücksichtigen wir automatisch alle einwirkenden Größen wie Zeit, Rohwasserhärte, Aktivität der Harzfüllung unter unterschiedlicher Salzmenge beim Regenerieren.

Alles in Allem ist der WAT-S Compensor ein Fortschritt und einmalig in seiner Art.

**Der WAT-S Compensor ist eine SOFT-STAR Entwicklung mit international angemeldeten Patenten.**





**IMPORTANT:** Keep the softener free from frost. Water temperature must not exceed 30°C. Water pressure of 2 bar is necessary, but not more than 6 bar. The overflow fitting of the salt tank has to be connected with the drain by using a hose.

In rooms without a drain above the overflow fitting level, a safety floater, type 444, has to be installed in the salt tank.

### SERVICE

The softener has to be mounted according to the drawing ( see TD 8/1). Water entry and exit R 1", drain connection 1/2", (diameter is noch allowed to be reduced).

After the connection of the water-softener to the water pipe, plug in the electrical cord set (220V/50 Cycl.). The softener must be connected to the power supply all the time.

Afterwards the water pipe is opened and the softener slowly pressurized. To let the air flow off, the whole regeneration is done manually one single time.  
Therefore remove the grey top.

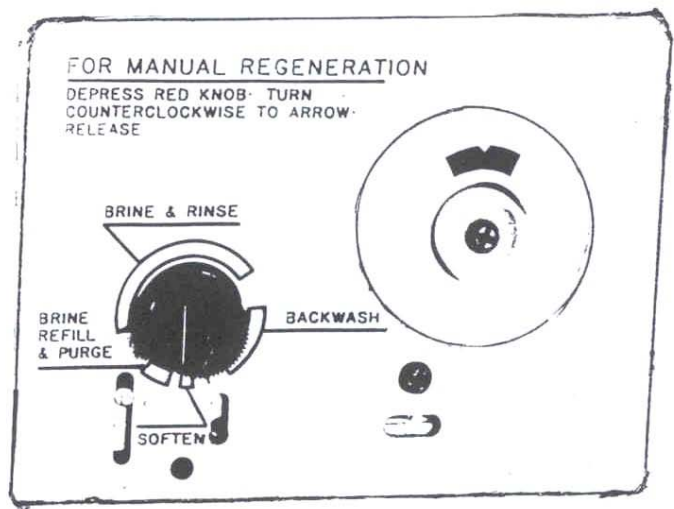
1. Press the red button with one hand and turn with the other hand the camshaft counterclockwise to the beginning of point 'Rückspülen' (backwash).  
Keep in this position for about 3 - 5 minutes. Air and water can now flow off.
2. Fill the salt tank about 10 cm with water using a bucket. (only for initial setting). Press the red button again and continue to turn it counterclockwise close to the position 'Auffüllen und Reinwaschen' ( salt tank refill and rapid rinse ). After a few minutes the valve starts refilling water into the salt tank, this takes about 9 minutes.  
The water level is alright if the water is 5 - 25 cm over the screen-plate (depends on the size of the softener). The softener is ready for service now.
3. To set the timer, pull out 24-hour clock knob and rotate until correct time of the day is shown.
4. Test (if you have a by-pass): close the by-pass valve. Test the hardness of the water. With one drop of the chemical the water must become green. With the open by-pass the water must have 6 - 8° hardness ( German hardness).
5. Fill the salt tank with at least 25 kg or more special salt. (pellets or block salt).

### MAINTENANCE:

About every 4 weeks test the soft water.  
Take care that there is a regular salt consumption.

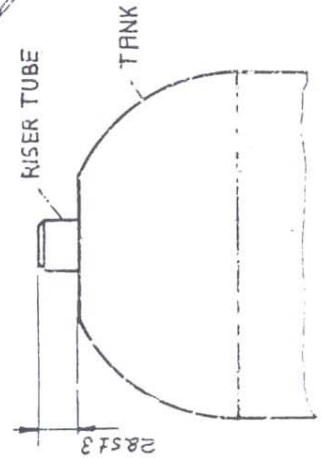
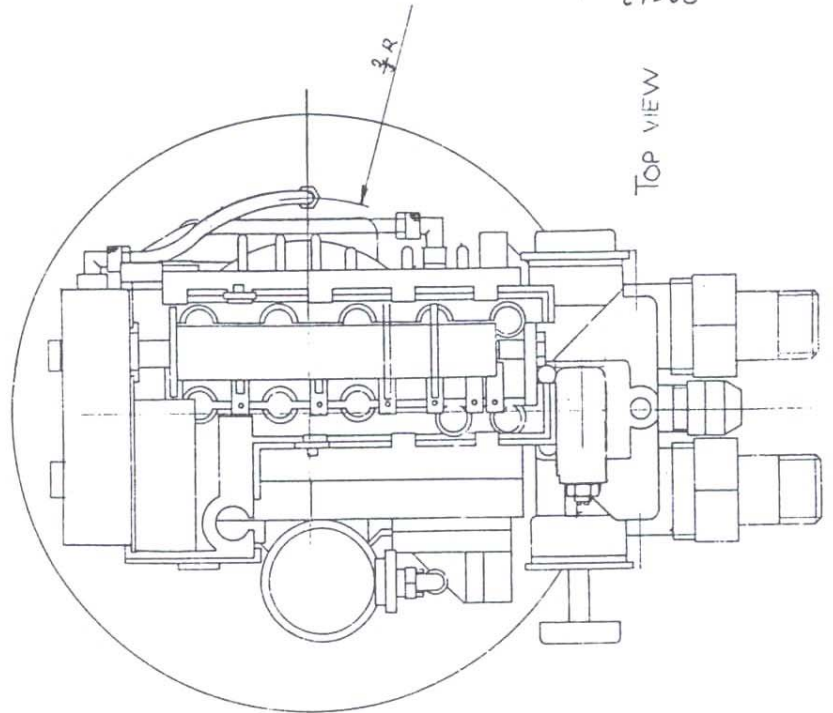
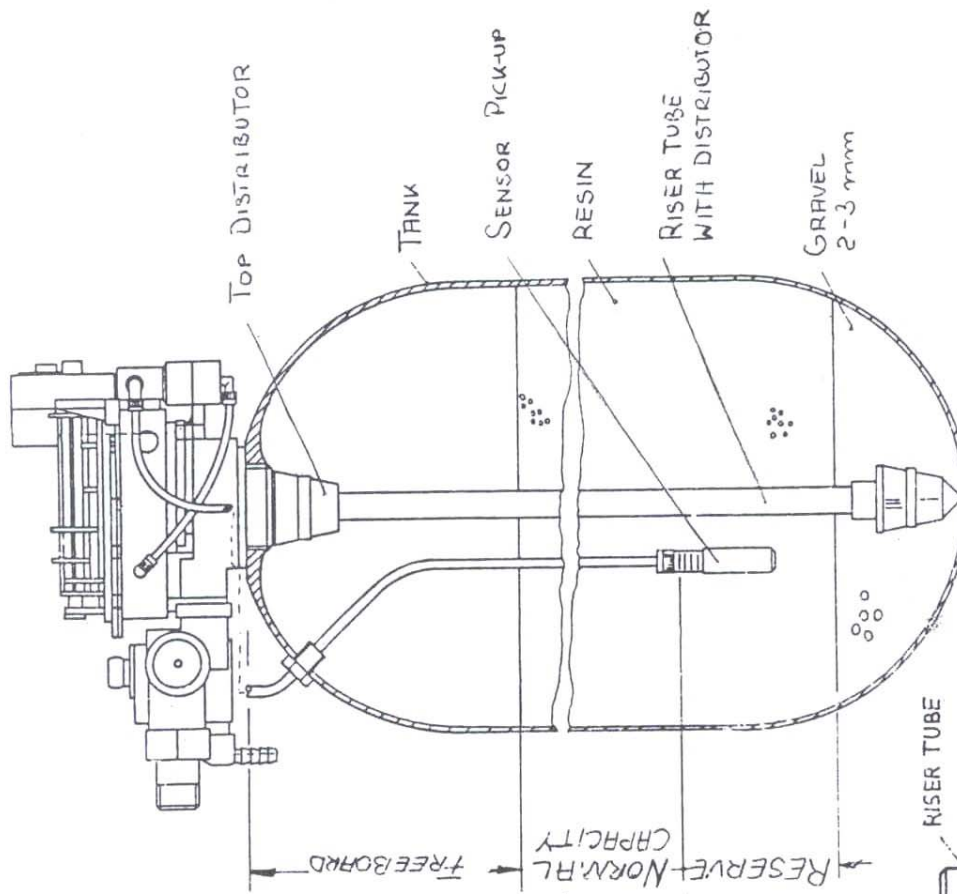
Refill salt if the salt level is below the water level. Clean the salt tank if there is a layer of sand and dirt.

For immediate regeneration outside the normal program, press the red button and turn to the position 'Start'.



1. Mount valve on tank, and mark location of adapter as shown in the top view
2. Drill hole at marked location and tap 3/8" NPT thread.
3. Cement adapter using a two component epoxy resin.
4. Install sensor tube with screen and weight at desired height. The height of the screen determines the amount of reserve.
5. Place riser tube in tank. Length of riser tube 25-30 mm more than tank height (see sketch).
6. Fill tank with gravel first, followed by resin.
7. Mount valve to the tank. Connect sensortube to top of sensor. Connect bottom of sensor to valve.

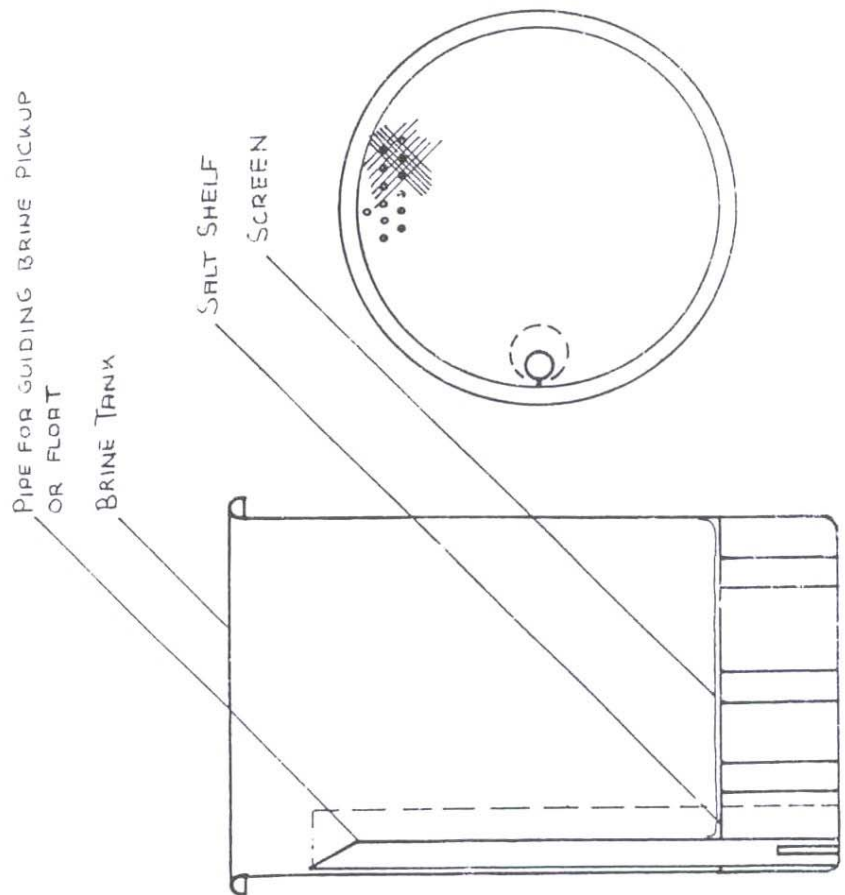
Tank drawn 90° turned to valve



TOP VIEW

**Brine tank for model WATS**

1. Softener can be used with small pipe for guiding the brine pick up. **This requires use of salt pellets.**
2. Even when using salt pellets it is recommended to use a brine shelf with a height of 10 cm for better operation.
3. When using finely grained salt, a salt shelf with screen on it must be used. The height of the shelf depends up on the volume of brine required. **In all cases when using salt shelves make sure water level reaches salt.**
4. In all cases the float can be used additionally. But it has only safety function and must not restrict refill of valve.





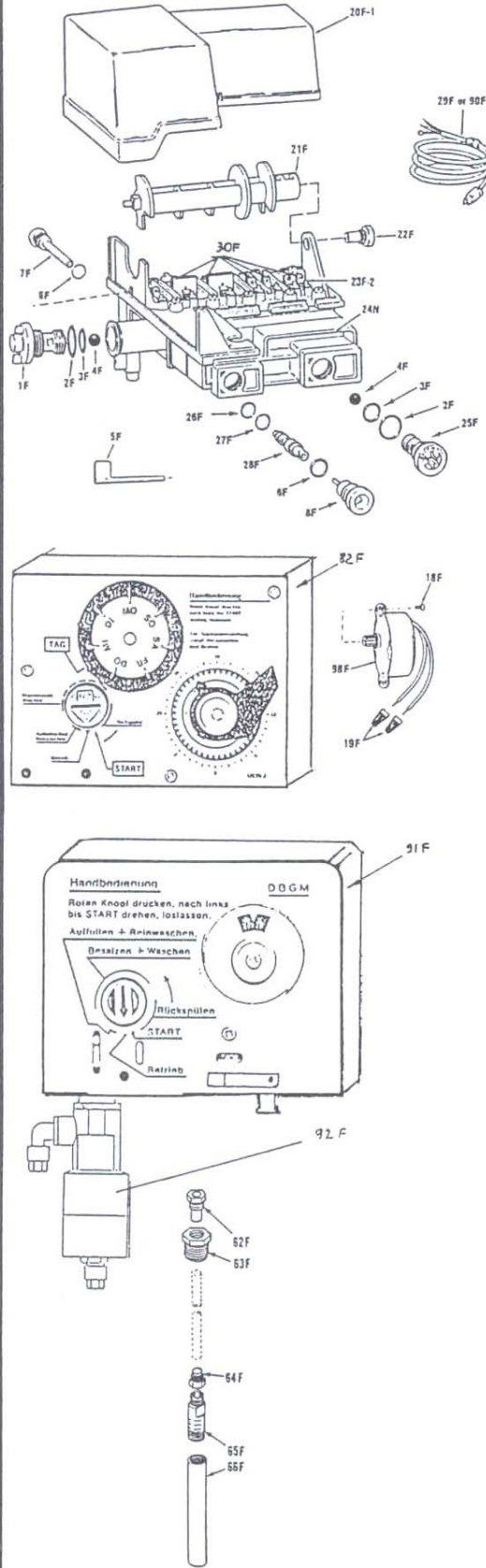


Bild Nr.	Best.-Nr.	Bezeichnung	Description
	1F	Salzregler	Brine control assy
	2F	O-Ring	O-ring
	3F	O-Ring	O-ring
	4F	Kugel	Ball
	5F	Haltestift	Timer locking pin
	6F	O-Ring	O-ring
	7F	Sieb+Kappe+O-Ring	Injector cap + Screen assy
	8F	Kappe A = 50-100	Injector cap A = 50-100
		Kappe B =125-300	Injector cap B =125-300
	18F	Schrauben,2 Stck	Mounting screw
	19F	Kabelkupplung	wire nut
	20F	Deckel	cover
	21F	Nockenwelle	cam shaft assy
	22F	"lagerschr.	cam shaft bearing
	23F	U-Feder	Valve spring
	24N	Ventilgehäuse	Control body
	25F	Rückspülblende	Backwash assy
		Nr. 6,7,8,10,12	Nb.6,7,8,10,12
		bitte Größe angeben	please specify size
	26F	O-Ring	O-ring
	27F	O-Ring	O-ring
	28F	Injektor +O-Ring	size injector
		weiss oder blau	white or blue
	29F	Netzkabel	cord set
	30F	Klappensatz	Kit the clapper
	62F	Klemmschraube	Compression fitting
	63F	Tankdurchführ.	adapter bushingim Satz
	64F	Überwurfmutter	Compression nut
	65F	Spaltfilter	sreen
	66F	Gewicht	weight
	67F	Sensorschlauch	pick up tube
	82F	Zeitschaltwerk	6- or 7-day timer
	98F2	Timer-Motor	timer motor
	91F	WAT/S-Timer	Timer WAT/S
	91F	WAT-Timer	Timer WAT
	92F	Meßzelle WAT/S	measure cell WAT/S
		Steuerkopf WAE	valve WAE
		mit Flansche	with piping
		Steuerkopf WAT/S	valve WAT/S
		mit Flansche	with piping
	1148	Verschneidev.U.+V.	by-pass-valve
	410A563094	Sensordurchführung	Sensor-kit
		u. Gewicht	62F,63F,64F,65F,66F,67F

TD 156

Ersatzteilliste für die Enthärter  
Typen WAE - WATS (Kunststoffventil)  
Repair-part-list for water softeners  
type WAE - WAT/S

**SOFT-STAR**

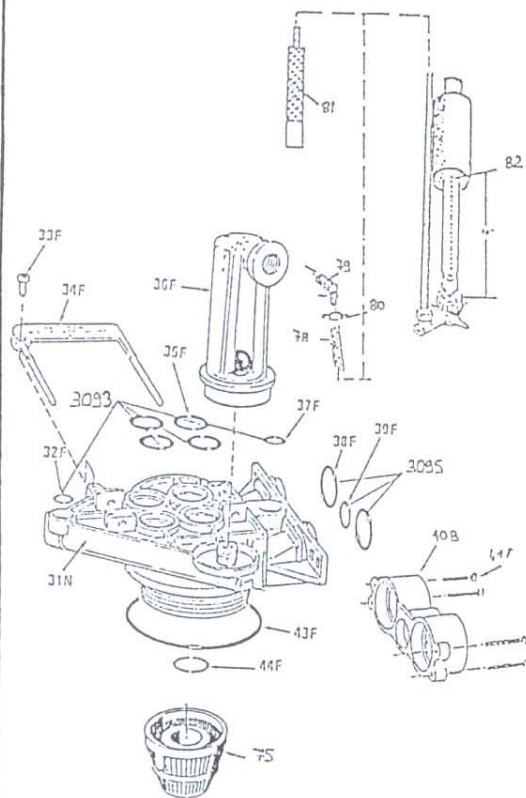
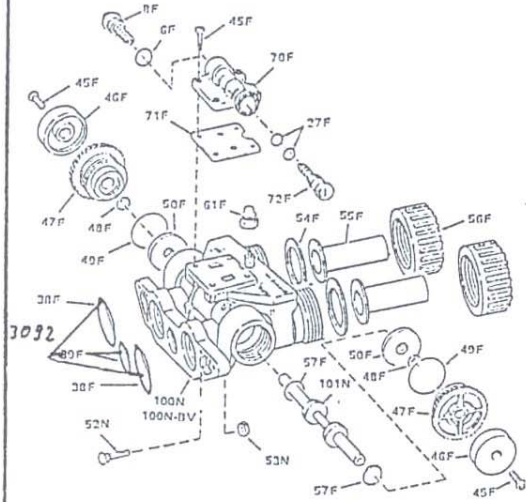


Bild-Nr.	Best.-Nr.	Bezeichnung Nr.	Description
	6F	0-Ring	0-ring
	8F	Sieb+Kappe+O-Ring	injector cap + screen assy
	27F	2 O-Ringe	2 0-ring
	45F	4 Schrauben	4 screw
	70F	Verschneideventil	blending valve
	71F	Flachdichtung	gasket
	72F	Ventilnadel	screw, adjusting
	75	Spaltfilter	top distributor
	78	Saugschlauch	suction tube
	79	Schlauchwinkel	tube elbow
	80	Schlauchschele	tube fixture
	81	Saugsieb	screen
	82	Sicherheitsschw.	safety float
	31N	Tankadapter	tank adapter body
	32F	O-Ring	im Satz s. unten
	33F	Sicherungsschraube	positioning screw
	34F	Zugbügel	locking bar
	35F	4 O-Ringe	im Satz s. unten
	36F	Luftverschlußventil	air check assembly
	37F	O-Ring	im Satz s.unten
	38F	2 O-Ringe	im Satz s.unten
	39F	O-Ring	im Satz s.unten
	40B	Anschlußflansche	pipng boss
	41F	4 Schrauben	4 screw
	42F	4 Muttern	4 nut
	43F	O-Ring	0-ring
	44F	O-Ring	0-ring
	45F	Schraube 2 Stck.	2 screw
	46F	Knopf	knob
	47F	Endkappe	end cap
	48F	O-Ring	0-ring
	49F	O-Ring	0-ring
	50F	Beilagscheibe	washer
	52N	4 Schloßschrauben	4 bolt
	53N	4 Muttern	4 nut
	54F	2 Dichtungen	2 gasket
	55F	2 Anschlußstutzen	pipe adapter
	56F	2 Überwurfmuttern	2 nut for adapter
	57F	O-Ring	0-ring
	101N	Ventilstange	shaft valve stem
	156A12	O-Ringsatz für Bypass-Ventil 2x38F,1x39F	0-ring-kit for by pass-valve 2x38F,1x39F
	150A2393093	O-Ringsatz für Oberteil 4x35F,1x32F,1x37F	0-ring-kit for tank adapter 4x35F,1x32F,1x37F
	3095	O-Ringsatz für Flansche 2x38F,1x39F	0-ring-kit for piping 2x38F,1x39F

Stand: 1. April 2000



TD  
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Ersatzteile: Gruppe: Druck- u. Salztanks, Sieb-  
boden, Schwimmer, Harz, Silberharz für die  
Typen WAE, WAT, WATS, WAT/B, WAE/B  
WAV/T, WAV/E, WA

**SOFT-STAR**

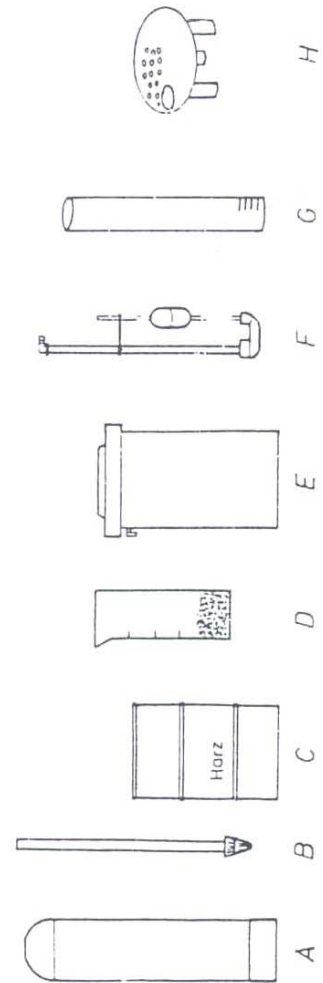
Anlage Größe softener typ	A Druckbehälter pressertank Best.-No.	B Steigrohr risertube Best.-No.	C Harzfällung resin filling Best.-No.	D Silberharz silver resin Best.-No.	E Salztank salttank Best.-No.	F Schwimmer floater Best.-No.	G Schwimmersch. floaterwell Best.-No.	H Siebboden plattform Best.-No.
50	4020	4070	4100	4151	4201	4251	4226	4276
75	4021	4071	4101	4152	4202	4252	4227	4277
100	4022	4071	4102	4153	4203	4253	4228	4278
125	4023	4072	4103	4154	4204	4254	4229	4279
150	4024	4073	4104	4155	4205	4255	4230	4280
175	4025	4074	4105	4156	4206	4256	4231	4281
200	4026	4075	4106	4157	4207	4257	4232	4282
250	4027	4076	4107	4158	4208	4258	4233	4283
300	402	4076	4108	4159	4209	4259	4234	4284

Bei Cabinet Geräten ist das Gehäuse der Salztank

Bei Ersatzteilbestellung unbedingt Größe und  
Typ der Anlage angeben.

Bei Siebboden  $\emptyset$  des Salztanks und Höhe der  
Stützen angeben.

When ordering spareparts it is necessary to  
quote size and type of the water softener.  
Incase of an order of saltplatforms please  
quote diameter of the salttanks and height  
of the brackets.



WAT-S Compensor SOFT-STAR  
VEIT 3307



# TROUBLE SHOOTING

Automatic water conditioner control  
with micro processor (MP)  
demand system timer.

Problem	Possible Cause	Solution
1. Clock does not display time of day.	<ul style="list-style-type: none"> <li>a. Electric cord unplugged.</li> <li>b. No electric power at outlet.</li> <li>c. Defective transformer.</li> <li>d. Defective circuit board.</li> </ul>	<ul style="list-style-type: none"> <li>a. Connect power.</li> <li>b. Repair outlet or use working outlet</li> <li>c. Replace transformer.</li> <li>d. Replace timer.</li> </ul>
2. Clock does not display correct time of day.	<ul style="list-style-type: none"> <li>a. Outlet operated by switch.</li> <li>b. Incorrect voltage or frequency (Hz).</li> <li>c. Power outages.</li> </ul>	<ul style="list-style-type: none"> <li>a. Use outlet not controlled by switch.</li> <li>b. Replace timer with one of correct voltage and frequency (Hertz).</li> <li>c. Reset clock.</li> </ul>
3. Time display continues to advance.	<ul style="list-style-type: none"> <li>a. Defective time set switch.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace timer.</li> </ul>
4. Flashing time display.	<ul style="list-style-type: none"> <li>a. Power outage with weak or dead battery.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace with a fresh 9 volt alkaline battery. Reset clock.</li> </ul>
5. Lower case letter "c" displayed.	<ul style="list-style-type: none"> <li>a. Hardness or capacity settings not connected.</li> <li>b. Electrical interference.</li> <li>c. Defective circuit board connection to hardness and capacity settings.</li> </ul>	<ul style="list-style-type: none"> <li>a. Disconnect electrical power and battery to unit. Replace jumper to proper pin pair. Restore power and advance the time display past 2 A.M. Set to the correct time of day and reconnect battery.</li> <li>b. Disconnect electrical power and battery. Restore power and reset time of day display. Reconnect battery after electrical power has been restored.</li> <li>c. Replace timer.</li> </ul>
6. Time display shows something other than time of day or lower case letter "c".	<ul style="list-style-type: none"> <li>a. Electrical interference.</li> <li>b. Defective circuit board.</li> </ul>	<ul style="list-style-type: none"> <li>a. Disconnect power and battery to unit. Restore power and reset time of day display. Reconnect battery only after electrical power is restored.</li> <li>b. Replace timer.</li> </ul>
7. No water flow display when water is flowing.	<ul style="list-style-type: none"> <li>a. Bypass valve in bypass.</li> <li>b. Meter probe disconnected or not fully connected to meter housing.</li> <li>c. Restricted meter turbine rotation due to foreign material in meter housing.</li> <li>d. Defective meter probe.</li> <li>e. Defective circuit board.</li> </ul>	<ul style="list-style-type: none"> <li>a. Shift bypass valve into service position.</li> <li>b. Fully insert probe into meter housing.</li> <li>c. Remove meter housing, free up turbine and flush with clean water. (Do not disassemble turbine from meter housing.) Turbine should spin freely. If not, replace meter.</li> <li>d. Replace timer.</li> <li>e. Replace timer.</li> </ul>
8. Control regenerates at wrong time of day.	<ul style="list-style-type: none"> <li>a. Power outages.</li> <li>b. Clock set incorrectly.</li> </ul>	<ul style="list-style-type: none"> <li>a. Reset clock to correct time of day.</li> <li>b. Reset clock to correct time of day.</li> </ul>
9. Timer stalled in regeneration cycle.	<ul style="list-style-type: none"> <li>a. Motor dead.</li> <li>b. Motor runs backward.</li> <li>c. No electric power at outlet.</li> <li>d. Incorrect voltage or frequency (Hz).</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace motor.</li> <li>b. Replace motor.</li> <li>c. Repair outlet or use working outlet.</li> <li>d. Replace timer with one of correct voltage and frequency (Hertz).</li> </ul>



<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
9. (Cont'd.)	<ul style="list-style-type: none"> <li>e. Broken gear.</li> <li>f. Defective switch.</li> <li>g. Air leak in brine connections.</li>   <li>h. Binding of camshaft.</li> <li>i. Water pressure greater than 125 psi during regeneration.</li> </ul>	<ul style="list-style-type: none"> <li>e. Replace gear.</li> <li>f. Replace timer.</li> <li>g. Check all junction points and make appropriate corrections.</li> <li>h. Remove foreign object obstruction from valve discs or camshaft.</li> <li>i. Install pressure regulator.</li> </ul>
10. Continuous regeneration. Camshaft does not stop at the end of regeneration.	<ul style="list-style-type: none"> <li>a. Broken projection on red gear.</li> <li>b. Defective switch.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace red gear.</li> <li>b. Replace timer.</li> </ul>
11. Control will not regenerate automatically or when red button is depressed.	<ul style="list-style-type: none"> <li>a. Electric cord unplugged.</li> <li>b. No electric power at outlet.</li> <li>c. Defective motor.</li> <li>d. Broken gear.</li> <li>e. Binding in gear train.</li> <li>f. Defective switch.</li> </ul>	<ul style="list-style-type: none"> <li>a. Connect power.</li> <li>b. Repair outlet or use working outlet.</li> <li>c. Replace motor.</li> <li>d. Replace gear.</li> <li>e. Replace timer.</li> <li>f. Replace switch.</li> </ul>
12. Control will not regenerate automatically but will regenerate when red button is depressed.	<ul style="list-style-type: none"> <li>a. If water flow display is not operative, refer to Item 7.</li> <li>b. Defective circuit board.</li> <li>c. Incorrect hardness and capacity settings.</li> </ul>	<ul style="list-style-type: none"> <li>a. Same as Item 7.</li> <li>b. Replace circuit board.</li> <li>c. Set to correct values. (See Timer Adjustment Procedure.)</li> </ul>
13. Run out of soft water between regenerations.	<ul style="list-style-type: none"> <li>a. Improper regeneration.</li> <li>b. Fouled softener resin.</li> <li>c. Incorrect salt setting.</li>   <li>d. Incorrect hardness or capacity settings.</li> <li>e. Water hardness has increased.</li> <li>f. Restricted meter turbine rotation due to foreign material in meter housing.</li>   <li>g. Excessive flow below 1/5 gallon per minute.</li> </ul>	<ul style="list-style-type: none"> <li>a. Repeat regeneration making certain that correct salt dosage is used. (Also, see Items 14, 16, 17.)</li> <li>b. Use resin cleaner. (Also, see Item 19.)</li> <li>c. Set salt control to proper level. (See salt setting chart.)</li> <li>d. Set to correct values. (See Timer Adjustment Procedure.)</li> <li>e. Set hardness to new value. (See Timer Adjustment Procedure.)</li> <li>f. Remove meter housing, free up turbine and flush with clean water. (DO NOT DISASSEMBLE TURBINE FROM METER HOUSING.) Turbine should spin freely, if not, replace meter.</li> <li>g. Repair leaky plumbing and/or fixtures.</li> </ul>
14. 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. Inlet or outlet valve disc not closed.</li> <li>f. Air check valve prematurely closed.</li> </ul>	<ul style="list-style-type: none"> <li>a. Set pump to maintain 20 psi at softener.</li> <li>b. Change drain to remove restriction.</li> <li>c. Remove injector and flush it and injector screen (item 7F or 7S and 28F).</li> <li>d. Replace both injector and injector cap (item 28F and 8F).</li> <li>e. Flush out foreign matter by manually operating valve stem.</li> <li>f. Put control momentarily into brine refill. Replace or repair air check if needed.</li> </ul>

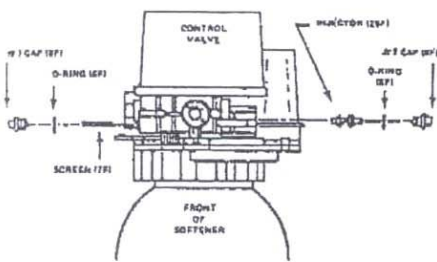
<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
15. Brine tank overflow.	<ul style="list-style-type: none"> <li>a. Brine valve disc 1 being held open.</li> <li>b. Uncontrolled brine refill flow rate.</li> <li>c. Inlet and/or outlet valve disc not closed during brine draw causing brine refill.</li> <li>d. Air leak in brine line to air check.</li> </ul>	<ul style="list-style-type: none"> <li>a. Manually operate valve stem to flush away obstruction.</li> <li>b. Remove variable salt controller to clean it and ball (Item 1F and 4F).</li> <li>c. Flush out foreign matter holding disc open by manually operating valve stem.</li> <li>d. Check all connections in brine line for leaks. Refer to instructions.</li> </ul>
16. System using more or less salt than salt control (Item 21F) is set for.	<ul style="list-style-type: none"> <li>a. Inaccurate setting.</li> <li>b. Foreign matter in controller causing incorrect flow rates.</li> <li>c. Defective controller.</li> </ul>	<ul style="list-style-type: none"> <li>a. Make correct setting.</li> <li>b. Remove variable salt controller and flush out foreign matter (Items 1F and 4F). Manually position control to brine draw to clean controller (after so doing position control to "purge" to remove brine from tank).</li> <li>c. Replace defective part.</li> </ul>
17. Intermittent or irregular brine draw.	<ul style="list-style-type: none"> <li>a. Low water pressure.</li> <li>b. Defective injector.</li> <li>c. Plugged injector screen.</li> </ul>	<ul style="list-style-type: none"> <li>a. Set pump to maintain 20 psi at softener.</li> <li>b. Replace both injector and injector cap (items 28F and 8F).</li> <li>c. Clean or replace screen (Item 7F or 7S).</li> </ul>
18. No soft water after regeneration.	<ul style="list-style-type: none"> <li>a. Unit did not regenerate.</li> <li>b. No salt in brine tank.</li> <li>c. Plugged injector.</li> <li>d. Air check valve closed prematurely.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check for power.</li> <li>b. Add salt to brine tank.</li> <li>c. Remove injector and flush it and injector screen (items 28F and 7F or 7S).</li> <li>d. Put control momentarily into brine refill to free air check. Replace or repair air check if needed. Refer to instructions.</li> </ul>
19. Control backwashes at excessively low or high rate.	<ul style="list-style-type: none"> <li>a. Incorrect backwash controller used (Item 25F).</li> <li>b. Foreign matter affecting controller operation.</li> <li>c. Ball missing.</li> <li>d. Defective ball and/or controller.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace with correct size controller.</li> <li>b. Remove controller and clean it and ball.</li> <li>c. Replace ball.</li> <li>d. Replace ball and/or controller.</li> </ul>
20. Flowing or dripping water at drain or brine line after regeneration.	<ul style="list-style-type: none"> <li>a. Drain valve (5 or 6) or brine valve (1) held open by foreign matter or particle.</li> <li>b. Valve stem return spring on top plate (item 23F-2) weak.</li> </ul>	<ul style="list-style-type: none"> <li>a. Manually operate valve stem to flush away obstruction.</li> <li>b. Replace spring.</li> </ul>
21. Hard water leakage during service.	<ul style="list-style-type: none"> <li>a. Improper regeneration.</li> <li>b. Leaking of bypass valve.</li> <li>c. "O" seal around riser tube damaged.</li> <li>d. Bypass valve disc leaking.</li> </ul>	<ul style="list-style-type: none"> <li>a. Repeat regeneration making certain correct salt dosage used.</li> <li>b. Replace "O" Ring (item 57F).</li> <li>c. Replace "O" Ring (item 44F or 44S).</li> <li>d. Flush out foreign matter by manually operating valve stem or replace valve disc if defective.</li> </ul>



**INSTALLATION INSTRUCTIONS FOR  
WATER SOFTENERS TYPES WAE 50 - 300  
TROUBLE SHOOTING FOR SOFTENER**

**Preventive Maintenance**

1. Inspect and clean Brine Tank and Screen Filter on end of brine pick-up tube **once a year**, or when sediment appears in the bottom of the Brine Tank.
2. Clean Injector Screen (7F) and Injector (28F) **once a year**, (Figure 16):
  - a. Unplug electric cord.
  - b. Shut-off water supply or put by-pass valve(s) into by-pass position.
  - c. Relieve tank pressure by opening valve No. 6 (at rear) with a screwdriver or finger pressure, (Figure 15-B, page 8).
  - d. Using screwdriver, unscrew #1 Cap (8F).
  - e. Remove Cap and Screen (7F), or assembly (depending on model).
  - f. Clean Screen (7F) using fine brush. Flush until clean.
  - g. Lubricate O-ring (6F) with silicone lubricant and reassemble.
  - h. Using screwdriver, unscrew #2 Cap (8F).
  - i. Using needlenose pliers, pull Injector (28F) straight out.
  - j. Clean and flush Injector.
  - k. Lubricate all Injector O-rings with silicone lubricant.
  - l. Reinstall Injector and push all the way in. Tighten Cap.
  - m. Plug electric cord into outlet; **reset Timer** (page 7).
  - n. Open water supply valve or return by-pass valve(s) to service position.



**Figure 16**

**Trouble Shooting**

**Series 155 automatic water softener control with automatic timer. For item numbers mentioned refer to exploded view.**

The technology upon which the Series 155 control is based is well established and proven in service over many years. However, should a problem or question arise regarding the operation of the system, the control can be very easily serviced. The control module can be quickly replaced or adjustments can be made at the installation.

Problem	Possible Cause	Solution
1. Control will not regenerate automatically	a. Electric cord unplugged b. Defective timer motor c. Skipper pins not down on timer skipper wheel (Item 14F) d. Binding in gear train of timer	a. Connect power. b. Replace motor. c. Depress pins for days regeneration required. d. Replace timer.
2. Control regenerates at wrong time of day	a. Timer set incorrectly	a. Make correct setting according to instructions.
3. Control will not draw brine	a. Low water pressure b. Restricted drain line c. Injector plugged d. Injector defective e. Valve disc 2 not closed f. Air check valve prematurely closed	a. Set pump to maintain 20 psi at softener. b. Change drain to remove restriction. c. Remove injector and flush it and injector screen (Item 7F and 28F). d. Replace both injector and injector cap (Item 28F and 8F). e. Flush out foreign matter by manually operating valve stem. f. Put control momentarily into brine refill. Replace or repair air check if needed.
4. Brine tank overflow	a. Brine valve disc 1 being held open b. Uncontrolled brine refill flow rate c. Valve disc 2 not closed during brine draw causing brine refill d. Air leak in brine line to air check	a. Manually operate valve stem to flush away obstruction. b. Remove variable salt controller to clean it and ball (Item 1F and 4F). c. Flush out foreign matter holding disc open by manually operating valve stem. d. Check all connections in brine line for leaks. Refer to instructions.
5. System using more or less salt than salt control (Item 1F) is set for	a. Inaccurate setting b. Foreign matter in controller causing incorrect flow rates c. Defective controller	a. Make correct setting. b. Remove variable salt controller and flush out foreign matter (Items 1F and 4F). Manually position control to brine draw to clean controller (after so doing position control to "prime" to remove brine from tank). c. Replace defective part.
6. Intermittent or irregular brine draw	a. Low water pressure b. Defective injector	a. Set pump to maintain 20 psi at softener. b. Replace both injector and injector cap (Items 28F and 8F).
7. No soft water after regeneration	a. Unit did not regenerate b. No salt in brine tank c. Plugged injector d. Air check valve closed prematurely	a. Check for power. b. Add salt to brine tank. c. Remove injector and flush it and injector screen (Items 28F and 7F). d. Put control momentarily into brine refill to free air check. Replace or repair air check if needed. Refer to instructions.
8. Control backwashes at excessively low or high rate	a. Incorrect backwash controller used (Item 25F). b. Foreign matter affecting controller operation c. Valve disc 1 held open	a. Replace with correct size controller. b. Remove controller and clean it and ball. c. Flush out foreign matter by manually operating valve stem.
9. Flowing or dripping water at drain or brine line after regeneration	a. Drain valve (5 or 6) or brine valve (1) held open by foreign matter or particle. b. Valve stem return spring off top plate (Item 23F) weak	a. Manually operate valve stem to flush away obstruction. b. Replace spring.
10. Hard water leakage during service	a. Improper regeneration b. Leaking of by-pass valve c. O-seal around riser tube damaged	a. Repeat regeneration making certain correct salt dosage used. b. Replace O-Ring (Item 57F). c. Replace O-Ring (Item 44F).



# Model 156-GB Bypass and Blending Valve

## Features and Installation Instructions

### Application

The 156-GB is a combination bypass and blending valve which allows the blending of a proportional amount of hard and soft water. The 156-GB will blend as much as 75% raw water at a service flow of 8 gpm (1.8 m<sup>3</sup>/hr). It will maintain the blend to within 15 % of the set point, in the range of 20 to 100% of the softener's rated flow.

### Features

The 156-GB valve mounts to the 255 valve and connects to the service lines exactly as does the 156 bypass, serving as a conventional bypass valve when required.

When the bypass operation has been used, the blending set point is maintained when the valve is returned to the service position. No readjustment is required.

The initial setting and any readjustment is easily accomplished by turning the blender knob to a position on a scale.

The set position may be locked to prevent tampering and to maintain its position during bypass operation.

The valve may also be set so that no blending occurs. This allows blending to be discontinued if requirements change, or to provide future blending capability.

### Construction

The valve is made of glass reinforced engineered plastic to provide years of reliable operation.

Union type service line connectors provide for a simple, economical and reliable installation.

### Operation, Set-Up and Adjustment

The adjustable blender knob positions the valve's spool to allow a specific amount of untreated water to bypass the softener and blend with the treated water. The amount of blend is described as a percentage of the amount of hardness in the blended water compared to the raw water.

The initial step is to determine the blend percentage based on the desired residual hardness and the hardness of the water supply. For example: If the blended water is to have a

hardness of 8 and the supply has a hardness of 20, the blend required is:  $8/20 = 0.40$  or, 40%.

The scale on the indicator knob establishes an initial setting. A sample of the blended water should then be tested and the setting adjusted if necessary. An adjustment will probably be required because the amount of blend is dependent on the relative pressure loss between the blending valve and the remainder of the softener during service flow. The pressure loss of the blending valve is constant but the pressure loss of the softener depends on the size of its resin tank, the amount of ion exchange resin it contains, its riser tube size and the type of resin screen employed.

The numbers on the scale, multiplied by 10, approximate the percent blend and provide an initial setting. To continue the example to obtain 40% blend use the following procedure:

1. Set the valve for no blend as explained below.
2. Draw a water sample from a nearby tap that is supplied by the softener and test it for hardness. If the water is not soft, the softener must be regenerated before the blending valve can be set.
3. Set the valve to the full bypass position by pushing the black knob towards the valve body as far as it will go.
4. Loosen the set screw on the blender knob so that the indicator knob turns freely.
5. Hold the blender knob and turn the indicator knob to the position where the edge of the blender knob is aligned with the number 4 line on the scale.
6. Retighten the set screw lightly to maintain the setting.
7. Push the blender knob towards the valve body as far as it will go.
8. Draw another water sample after a sufficient amount of flow has occurred to insure that the sample is blended. Test the water hardness. If the hardness is less than 8, increase the setting; if too high, decrease the setting.

To set the valve for no blend, turn the indicator knob all the way into the blender knob, then push the blender knob towards the valve body as far as it will go.

