AQUA-DIAL
Quality Water

AUTOMATIC WATER SOFTENERS

INSTALLATION & PROGRAMMING INFORMATION

Your Model No is . . .

MICRO-SOFT
MICRO-SOFT HC
MICRO-SAVE
MICRO-SAVE HC

These instructions are designed to give you the customer a complete understanding of how to locate, install, programme and obtain trouble-free running of your AQUA-DIAL AUTOMATIC WATER SOFTENER.

Whether you intend to install the unit yourself or obtain the services of a tradesman, please spend a few minutes reading through this booklet and the other enclosed details. It will give you a complete understanding of the "SOFT WATER WORLD" that you are about to enter. **PLEASE RETAIN FOR FUTURE REFERENCE.**

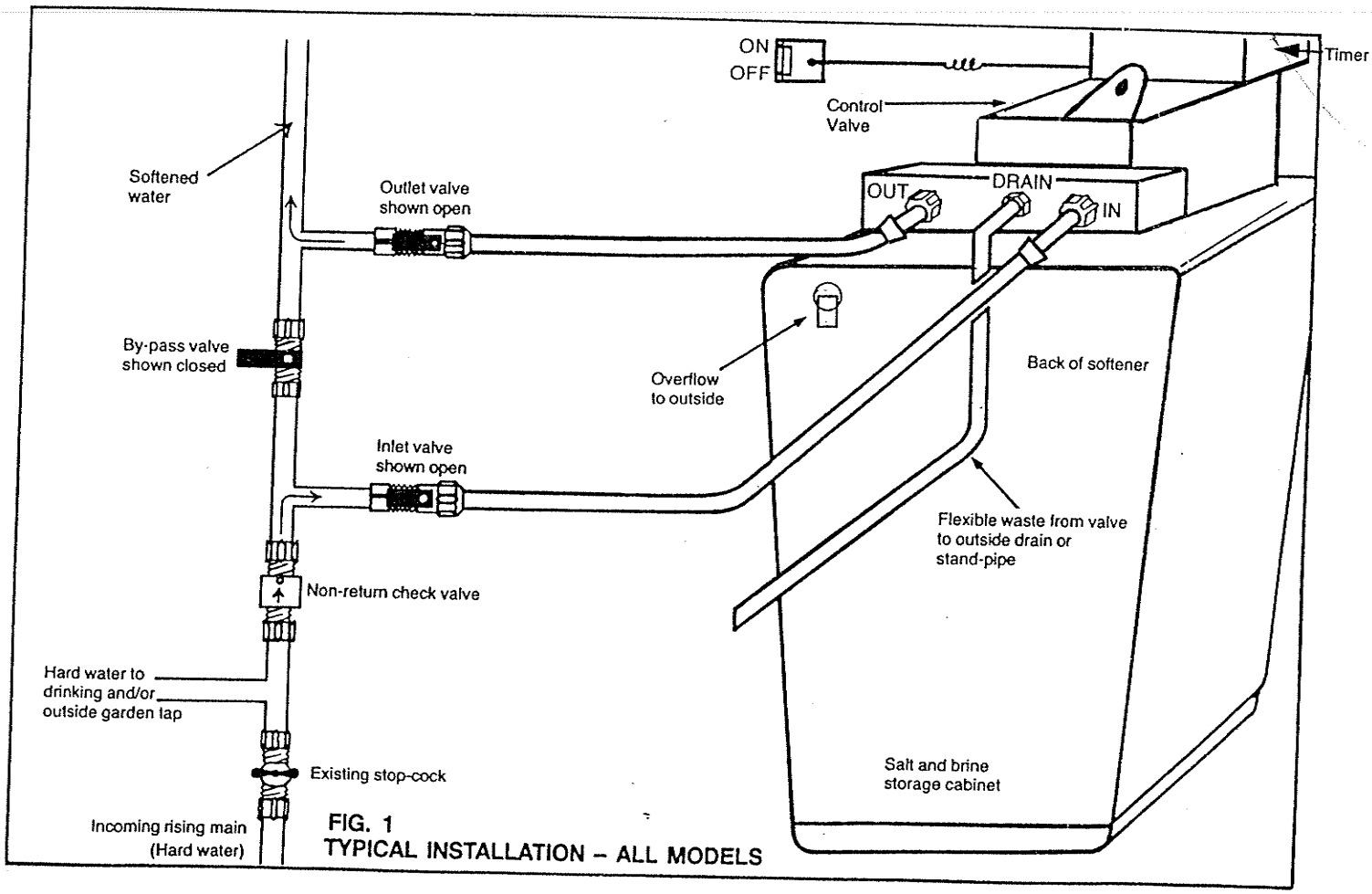


FIG. 1
TYPICAL INSTALLATION – ALL MODELS

LOCATION

The softener should be located as close as practicable to the incoming cold rising main supply. Very often (*but not always*) this main is in the kitchen or utility room. Sometimes the main rises in a downstairs cloakroom, under the stairs, *or* in the garage. In most cases the softener can be sited in any of these locations as well as outside (*with suitable frost protection cabinet*) or even in the loft space.

REQUIREMENTS

THE SOFTENER REQUIRES

Mains Water Supply 20-120 p.s.i. (1.36-8.16 Bar) pressure
A waste connection.
An electrical point.
Access for salt filling and service.

INSTALLATION KIT

Your Softener comes complete with a basic 10mm flexible trade installation kit (*see detail sheet with kit*). The same kit is also available with 12.5mm inlet and outlet hoses. The larger size kit should be used when all supplies are run direct from the mains or in areas of low pressure. Alternatively you can disregard the hoses and "hard plumb" the connections in 15mm copper tube.

Unvented plumbing and hot water systems: Disregard the inlet and outlet hoses, valves and non-return check valve. "Hard plumb" using 22mm copper tube and fittings. A 22mm (¾") non-return check valve will also be required.

The following are available from Aqua-Dial or your supplier:

1. 22mm (¾") non-return check valve.
2. Pressure limiting valve 50 P.S.I. for high pressure areas.
3. Hardness test kit: For accurate testing.
4. Drinking water tap: For hard water drinking point.
5. Drinking water filter kits.

1 STARTING THE INSTALLATION

Before commencing the installation, ascertain that the water pressure is not too low or high. Optimum operating pressure is 20 to 70 p.s.i. If daytime pressure exceeds 70 p.s.i., then a pressure limiting valve should be installed. These are available from your supplier and should be located as shown in Fig. 2. Pressure can be determined by applying a gauge to an outside tap or single pillar tap or by contacting your local Water Board. If water splashes out over the sink when the cold tap is turned fully on, it is a good indication of high pressure.

2 DRAIN THE RISING MAIN

Turn off the existing cold mains supply stopcock and drain down any water in the pipe via the "drain off cock" or kitchen cold tap. To allow air to enter the main via the ballvalve in the loft tank, run a small amount of water from the cold tap in the bathroom. If all your cold supply connections are off the rising main, open a tap at the highest point.

3 INSTALLING THE BY-PASS SET

Cut the rising main and install the inlet, outlet and by-pass valves as shown in Fig. 2. Install the non return check valve and connect hard water supply to kitchen drinking tap and outside garden supply (if required). Re-site or install a "drain off cock" as indicated. Fit the pressure limiting valve (if applicable) prior to the hard water inlet to the softener.

Turn the inlet and outlet valves to closed (handle pointing across water flow). Turn the by-pass valve to open (handle pointing with the water flow).

Ensure the "drain off cock" is closed and turn back on the existing stopcock. This will allow hard water to again enter the system.

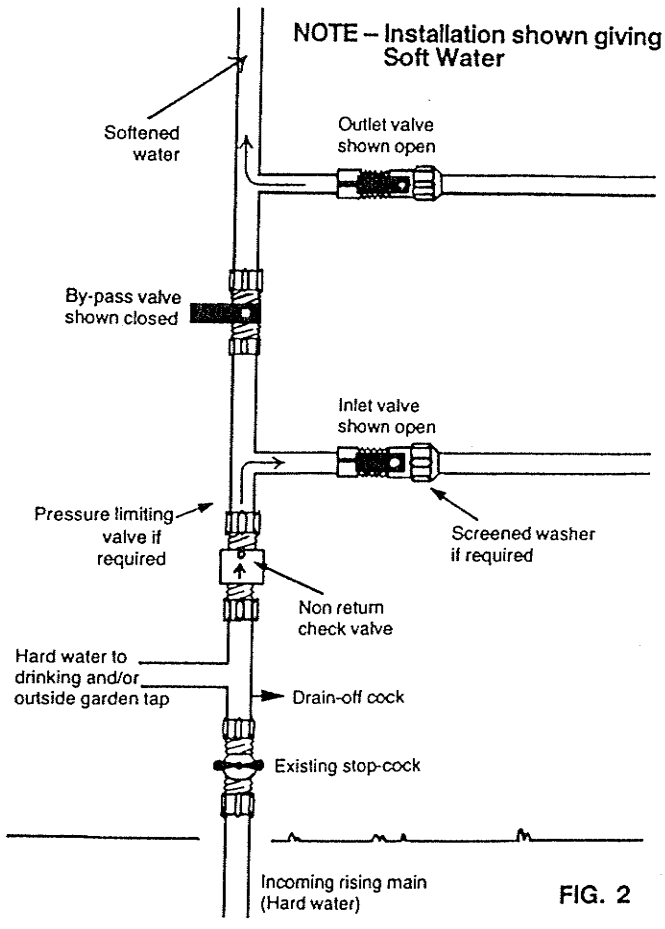


FIG. 2

NOTE – IMPORTANT!

Softening water increases the sodium content of raw water. Anybody on a sodium free or low sodium diet should not drink softened water. Do not use softened water in artificial baby feeds. Where practicable install a separate hard water drinking tap (*see Section 5*).

4 CONNECTING INLET/OUTLET HOSES

From the inlet valve connect a hose to the "PORT" marked "IN" on the softener control valve (Fig. 1). Ensure that the rubber washers (Fig. 3) are in place and hand tighten nut plus half turn with a spanner. Connect outlet hose from outlet valve to softener in the same manner.

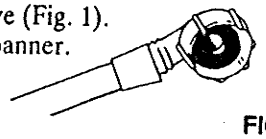
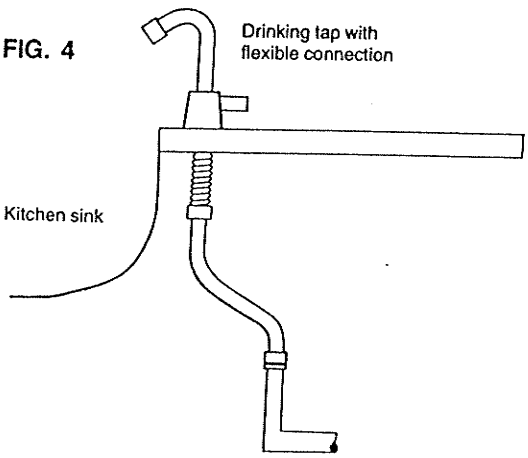


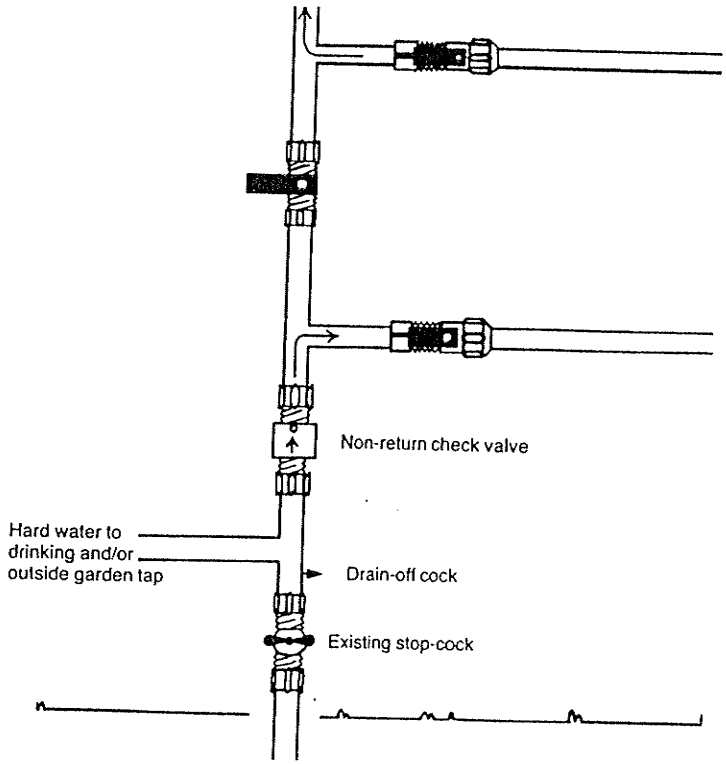
FIG. 3

5 CONNECTING THE HARD WATER DRINKING TAP

The cold supply to the kitchen sink can be left on hard water or alternatively a separate hard water tap can be installed as Fig. 4. Aqua-Dial can supply a hard water drinking tap kit or filter kit.

FIG. 4





NOTE – If an outside tap is installed a "double check valve" must be fitted to the outside tap.

6 PLUMBING THE DRAIN CONNECTION

The drain outlet for the softener is located between the inlet and outlet port. It has a 12mm hose barb outlet. The drain operates under mains pressuring during regeneration and jubilee clips must be used to secure the lightweight 12mm drain hose. The drain hose may be run into an existing or new "stand-pipe" (as in a washing machine installation) or directly into an external gully. If the drain hose is exposed to the outside, the part outside should be insulated to prevent freezing.

The drain can be connected to a soil stack via a deep-seal trapped connection and "stand-pipe".

As the drain is under pressure, it may be elevated as in cellar or under stair type installations.

Always leave an air gap between water level and hose outlet when discharging into a stand-pipe. Clip or secure the hose at stand-pipe to prevent "kinking" and accidental removal or "blow out" of the hose.

7 OVERFLOW CONNECTION

The overflow connection is located at the rear of the softener. It is *not* under pressure and **cannot be elevated. The overflow pipe must run downhill** and terminate either outside the building or into an internal stand-pipe. Use 22mm rigid plastic overflow pipe in conjunction with the elbow supplied.

The 22mm rigid plastic overflow pipe can be obtained from your supplier. It is also suitable for long runs.

8 ELECTRICAL CONNECTION

The softener must be connected to an electrical supply. The consumption is only seven watts, which is used to drive the clock. All other cycles on the valve are operated by water pressure.

Connect the lead to a 13 amp socket and fuse to 3 amps. A switched fused spur outlet is preferred. The supply must be continuous.

9 COMMISSIONING SOFTENER – ALL MODELS

1. Remove control valve cover. The salt setting knob (Fig. 5) is set in the factory. Do not alter without contacting technical services. Remove the cardboard packing piece from the brine storage cabinet.
2. Depress and turn red pointer knob 'H' (Fig. 6 or Fig. 7) on the control, anticlockwise using broad headed screwdriver, to the backwash position. Assist this movement by simultaneously turning the camshaft with your other hand.
3. Close the by-pass valve as Fig. 2. Open inlet valve partially by turning. The resin vessel should now be heard to fill with water. Air in the resin vessel and valve will be evacuated out of the drain pipe.
4. When water starts running from the drain, open the inlet valve fully and allow to run for three minutes.
5. Turn red pointer knob 'H' anticlockwise to a point just before the brine re-fill and purge position. (FAST RINSE REFILL, MICRO-SAVE MODELS.)
6. Switch on power supply. Check that clock motor can be heard running.
7. Allow clock to run red pointer knob anticlockwise to service position (CONDITIONED WATER MICROSAVE MODELS). Allow approximately 15 to 25 minutes. Ensure that brine storage cabinet stops filling.
8. Fill brine storage cabinet with salt to a level not exceeding 3 inches (75mm) below the bottom of the salt lid opening. Granular or tablet salt is suitable. The salt will be dissolved and gradually used by the machine. A visual check should be carried out on a 3 to 6 weekly interval (depending on usage). Re-fill as necessary. Always ensure a minimum salt level of 5" (125mm) above the base of cabinet.
9. Fully open outlet valve as Fig. 2. You now have softened water.
10. Set clock and regeneration days required.
    See Section 10 (below) for Micro-Soft range. See Section 11 (page 6) for Micro-Save range.

Softener
Main Components

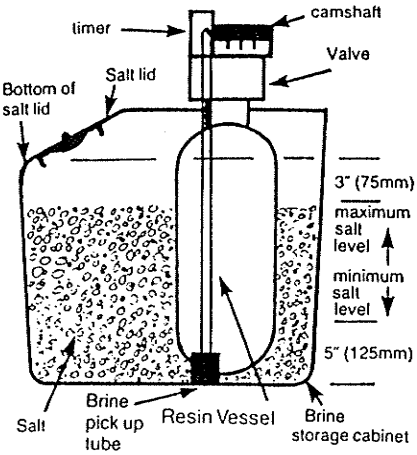


FIG. 5

Salt Setting Knob

10 ADJUSTMENT OF TIMER MICRO-SOFT RANGE

1. Set time arrow 'D' (Fig. 6) to correct time of day by grasping timer knob 'E', pulling outwards and rotating in either direction until the actual time of day on the 24hr. time dial. Release timer knob 'E' and ensure that cogs relocate.
2. Slide out skipper pins 'A' and rotate skipper wheel 'B' until the day of the week faces the day arrow 'C'.
3. From the **"regeneration chart"** (page 5) decide how often you wish to regenerate. Every 1, 2, 3/4 or 7 days. Your local water board will give you the hardness of your water in p.p.m. (parts per million as $CaCO_3$). Example: Micro-Soft 10 Harness 300 p.p.m. (or mg/l) 3 people. Regenerate every 3 days, on skipper wheel 'B' slide all skippper pins 'A' out and push in Friday pin and Monday pin. This will allow a 3 and 4 day regeneration at 3 a.m.

   If regeneration is required every two days push in Friday pin, Sunday pin, Tuesday pin. This always leaves Tuesday, Wednesday and Thursday (low usage days).

   For regeneration 1 day per week, push in Friday pin.
4. If you need an extra amount of softened water at any time, an extra regeneration can be started by:

   Pushing in pointer knob 'H' and turning anticlockwise to start.

NOTE: There will be a delay of up to 10 minutes before any apparent reaction from the softener occurs.

FIG. 6

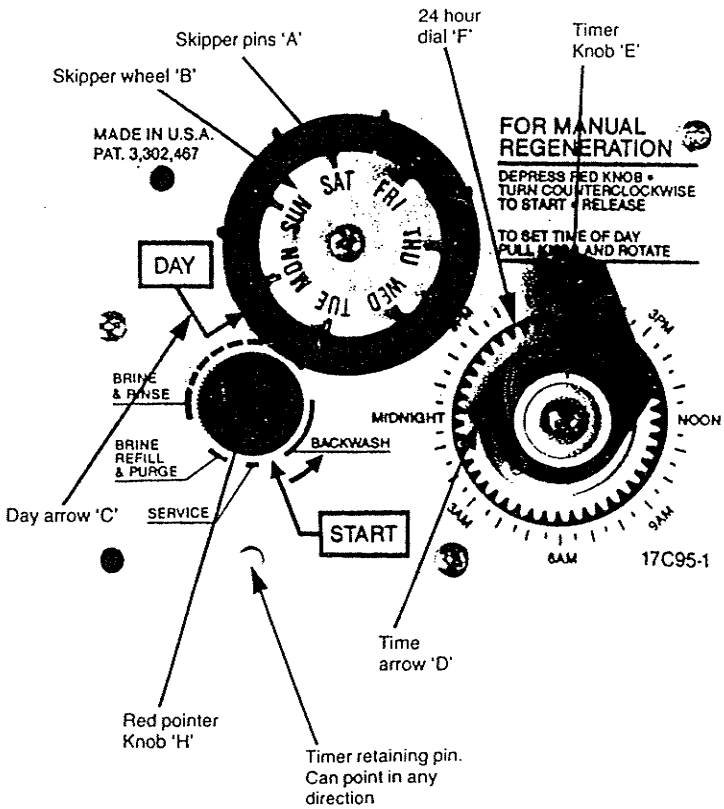


CHART SHOWING REGENERATION INTERVALS IN DAYS
MICRO-SOFT H-C RANGE

10 LTR. H-C								14 LTR. H-C								20 LTR. H-C							
Hardness in °	Hardness in ppm	Gallons per regeneration	Persons in household					Hardness in ppm	Gallons per regeneration	Persons in household						Hardness in ppm	Gallons per regeneration	Persons in household					
			2	3	4	5	6			5	6	7	8	9	10			9	10	11	12	13
10°	150	1140	14	9	7	5	4	150	1560	7	6	5	4	4	3	150	2200	6	5	5	4	4
14°	200	855	10	7	5	4	3	200	1170	5	4	4	3	3	2	200	1650	4	4	3	3	3
17°	250	684	8	5	4	3	2	250	936	4	3	3	2	2	2	250	1320	3	3	3	2	2
20°	286	597	7	4	3	2	2	286	818	4	3	2	2	2	2	286	1154	3	2	2	2	2
21°	300	570	7	4	3	2	2	300	780	3	3	2	2	2	1	300	1100	3	2	2	2	2
24°	350	488	6	4	3	2	2	350	668	3	2	2	2	1	1	350	942	2	2	2	1	1
28°	400	428	5	3	2	2	1	400	585	2	2	2	1	1	1	400	825	2	2	1	1	1
30°	430	397	4	3	2	1	1	430	544	2	2	1	1	1	1	430	767	2	1	1	1	1
			DAYS BETWEEN REGENERATION							DAYS BETWEEN REGENERATION								DAYS BETWEEN REGENERATION					

CHART SHOWING REGENERATION INTERVALS IN DAYS
MICRO-SOFT RANGE

10 LTR.								14 LTR.								20 LTR.							
Hardness in °	Hardness in ppm	Gallons per regeneration	Persons in household					Hardness in ppm	Gallons per regeneration	Persons in household						Hardness in ppm	Gallons per regeneration	Persons in household					
			1	2	3	4	5			2	3	4	5	6	7			6	7	8	9	10
10°	150	760	19	9	6	4	3	150	1120	14	9	7	5	4	4	150	1660	6	5	5	4	4
14°	200	570	14	7	4	3	2	200	840	10	7	5	4	3	3	200	1214	5	4	3	3	3
17°	250	460	11	5	3	2	2	250	674	8	5	4	3	3	2	250	970	4	3	3	3	2
20°	286	400	10	5	3	2	2	286	580	7	5	3	3	2	2	286	850	3	3	2	2	2
21°	300	380	9	5	3	2	2	300	562	7	4	3	3	2	2	300	830	3	3	2	2	2
24°	350	327	8	4	2	2	1	350	480	6	4	3	2	2	1	350	712	3	2	2	2	1
28°	400	285	7	3	2	1	1	400	420	5	3	2	2	1	1	400	623	2	2	2	1	1
30°	430	265	6	3	2	1	1	430	392	5	3	2	2	1	1	430	580	2	2	1	1	1
			DAYS BETWEEN REGENERATION							DAYS BETWEEN REGENERATION								DAYS BETWEEN REGENERATION					

The above chart is a guide to capacities and usage based on the assumption of 40 gallons of water per person per day. Naturally everyone's usage will vary and regeneration can be altered to suit. If towards the end of the interval between regenerations the water starts to get hard, re-programme the softener to regenerate more frequently. Capacities are shown in p.p.m. (parts per milllion) as $CaCO_3$ equivalent. One degree (Clark or English) = 14.29 p.p.m.

EXAMPLE: 21° (300 p.p.m.) hardness, 4 people in family with 10 ltr. H-C machine regeneration every 3 days.

11 ADJUSTMENT OF TIMER MICRO-SAVE MODELS

1. **Caution**: Be sure the electric outlet for the softener is properly earthed to protect the user from injury or possibly fatal shock.
2. Open the access door 'D' by inserting a small screwdriver into the small opening at the bottom of the door and gently pry up (see Figure 7).

   Important note: The hardness and capacity have been set at the factory. Unless you need to alter the hardness for your area (it is set to 17 GPG or 290 ppm), no further adjustment should be made.

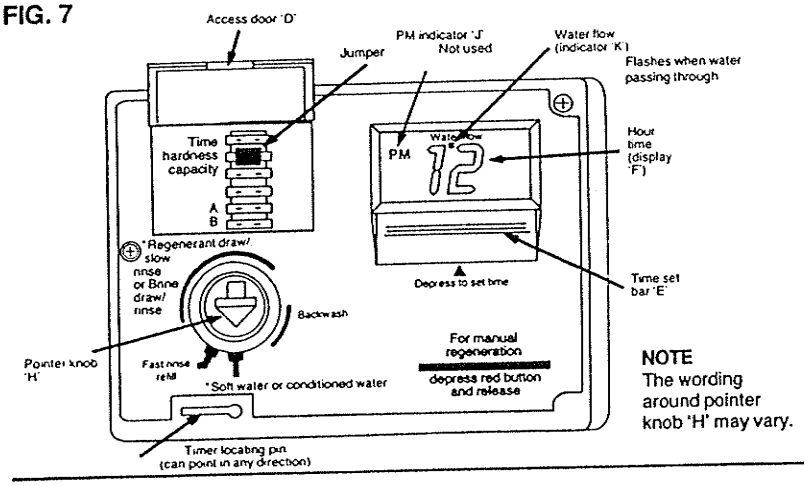
   If for any reason you should wish to alter the time or hardness proceed as follows.
3. With the "jumper" on the top 2 pins next to the word "TIME" (Figure 7/2), set the time-of-day to the closest hour by depressing the black TIME SET BAR 'E'.
4. Pull the jumper off the top 2 pins and place it on the next set of pins next to the word HARDNESS (Figure 7/1). Depress the black TIME SET BAR 'E' until the correct hardness is displayed. The hardness range is from 1 to 99 grains per gallon.

   To change the water hardness from parts per million to grains per gallon as displayed use this formula:
   p.p.m. ÷ 17.1 = G.P.G.
5. Capacity is pre-set – do not alter.

   NOTE: The use of a small needle nose pliers or tweezers will aid in moving the jumper.
6. Return the jumper to the top set of pins next to the word "Time" and close the access door. The bottom 3 sets of pins are used for factory testing and are not used in normal operation. The jumper must NOT be left on any pins other than the top pair next to the word "TIME". Failure to do this will cause the unit not to operate.

In the event that the hardness or capacity setting must be changed, simply follow Steps 1 through 6. The new information will be entered when the jumper is returned to "TIME".

FIG. 7



NOTE
The wording around pointer knob 'H' may vary.

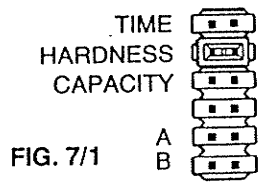


FIG. 7/1

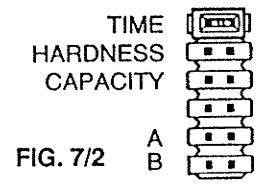


FIG. 7/2

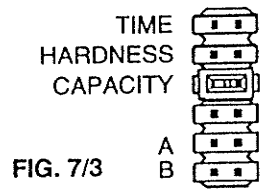


FIG. 7/3

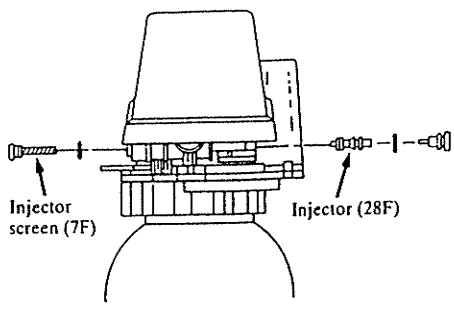
12 PREVENTIVE MAINTENANCE – ALL MODELS

A. Inspect and clean brine cabinet and screen filter on end of brine pick-up tube **once a year**, or when sediment appears in the bottom of the brine cabinet.

B. Clean injector screen (7F) and injector (28F) **once a year**:

1. Unplug electric cord.
2. Shut-off water supply or put bypass valve(s) into bypass position.
3. Relieve tank pressure by opening valve No. 6 (at rear) with a screwdriver or finger pressure (Figure 11).
4. Using screwdriver, unscrew cap (7F) (Figure 9).
5. Remove cap and screen (7F), or assembly (depending on model).
6. Clean screen (7F) using fine brush. Flush until clean.
7. Lubricate O-ring (6F) with silicone lubricant and reassemble.
8. Using screwdriver, unscrew cap (8F).
9. Using needle nose pliers, pull injector (28F) straight out.
10. Clean and flush injector.
11. Lubricate all injector O-rings with silicone lubricant.
12. Reinstall injector and push all the way in. Tighten cap.
13. Plug electric cord into outlet; **reset timer**.
14. Open water supply valve or return bypass valve(s) to service position.

FIG. 8



REPLACEMENT PARTS LIST

VALVE BODY

Item	Description	No. Required	Item	Description	No. Required
IF-10	Brine Control Assy., 10lb capacity	1	21F-3	Camshaft – 1 Piece	1
2F	O-Ring	2	22F	Camshaft Bearing	1
3F	O-Ring	2	23F-2	Valve Spring	7
4F	Ball	2	24N	Control Body	1
5F	Timer Locking Pin	1	25F-8	Backwash Assy., 8" dia.	1
6F	O-Ring	2	26F	O-Ring	1
7F	Injector Cap & Screen Assy.	1	27F	O-Ring	1
8F-AA	"A" Size Injector Cap, or	1	*28F-AA	"A" Size Injector – White, or	1
8F-HC	"HC" Size Injector Cap	1	*28F-HC	"HC" Size Injector – Brown	1
20F-1	Cover (New Style)	1	29F	Cord Set, Round, or	1
			90F	Cord Set, Flat	1

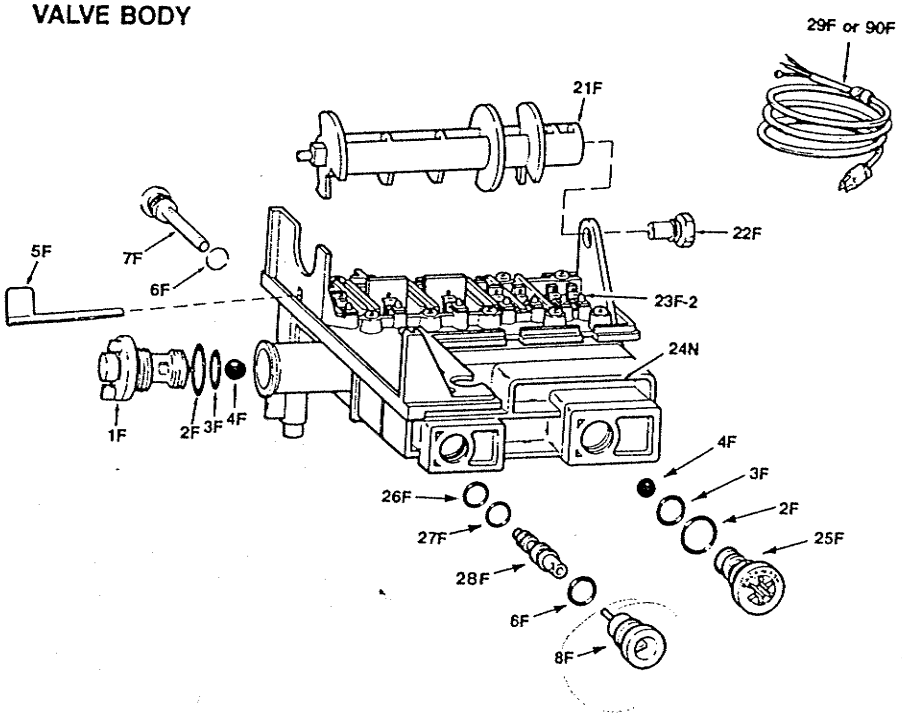
TANK ADAPTER MODULE

31N	Tank Adapter Body	1	37F	O-Ring	1
32F	O-Ring	1	38F	O-Ring	2
33F	Positioning Screw	1	39F	O-Ring	1
34F-1	Locking Bar – English	1	43F	O-Ring	1
35F	O-Ring	4	44F	O-Ring	1
36F	Air Check Assembly	1			

*Pull out w/needle nose pliers. Small end goes in first.

VALVE BODY

FIG. 9



TANK ADAPTER MODULE

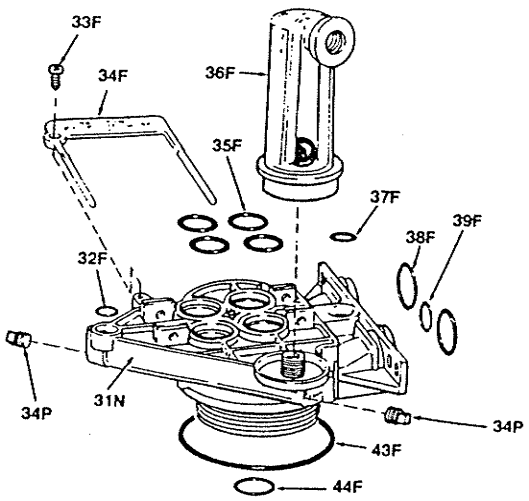
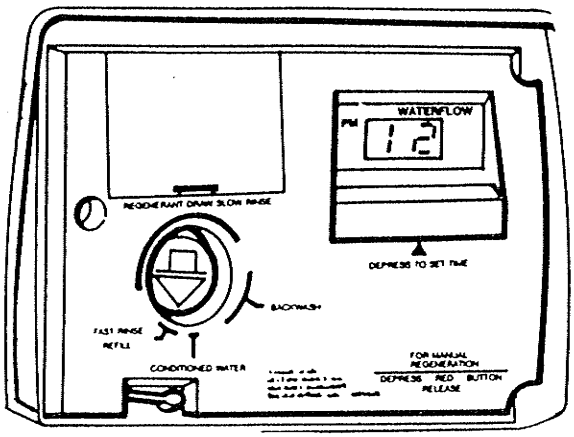


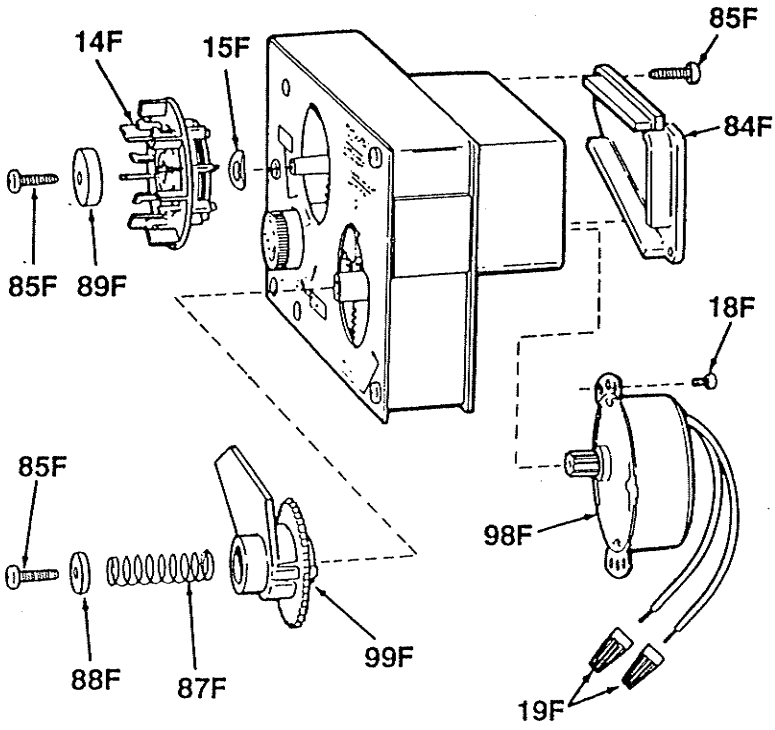
FIG. 10

460 MICRO-SAVE RANGE



Due to Modular Design no User Serviceable Parts

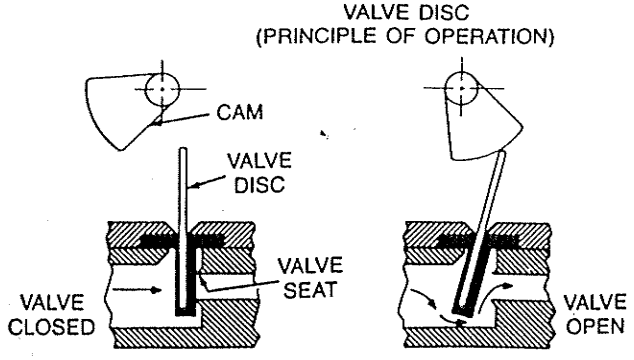
440 MICRO-SOFT RANGE



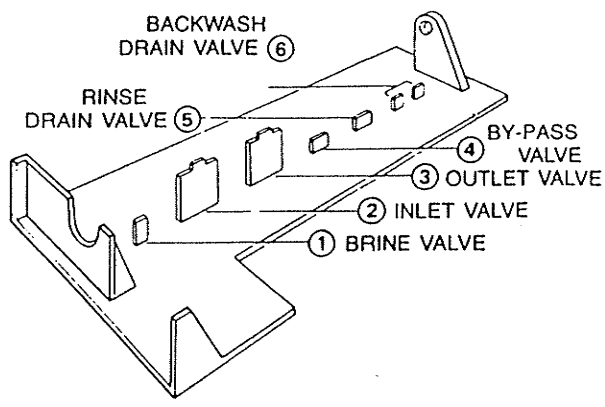
Item	Description	No. Required	Item	Description	No. Required
460 TIMER					
460 Timer	Complete Module	1			
440 TIMER					
14F-7	Skipper Wheel, 7-Day	1	99F	Gear Retainer	1
15F	Friction Washer	1	89F	Day Dial Washer	1
18F	Mounting Screw	2	97F	Timer Assembly – 440 Timer	1
19F	Wire Nut	2	98F-2	Motor, 240V 50HZ	1
84F	Cover Plate- Timer	1	99F-2	7-Day Tripper Arm	1
85F	Screw	3	99F-4	7-Day Tripper Assy.	1
87F	Compression Spring	1			

FIG. 11

VALVE DISCS



IDENTIFICATION OF CONTROL VALVING



Before contacting your supplier or our service department, always run a complete check on this page. History shows that the major percentage of service call-outs are due to owner misuse. Service visits can very often be avoided by studying the information below or alternatively discussing the problem over the phone. Always check your salt level at a monthly interval and top up as necessary.

The technology upon which the 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.

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 Micro-Soft models) 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 and/or 3 not closed f. Air check valve prematurely closed	a. Set pump to maintain 20 psi. b. Change drain to remove restriction. c. Clean injector and screen. d. Replace injector and cap. e. Remove foreign matter from disc and check disc for closing by pushing in on stem. Replace if needed. 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 e. Salt overfill	a. Manually operate valve stem to flush. away obstruction. b. Remove variable salt controller to clean it and ball (items 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 "purge" 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 softened 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 on 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 102N). c. Replace O-Ring (item 44F).

15 TROUBLE SHOOTING – ADDITIONAL INFORMATION ON MICRO-SAVE MODELS

Problem	Possible Cause	Solution
1. Clock does not display time of day	a. Electric cord unplugged b. No electric power at outlet c. Defective transformer d. Defective circuit board	a. Connect power. b. Repair outlet or use working outlet. c. Replace transformer. d. Replace timer.
2. Clock does not display correct time of day	a. Outlet operated by switch b. Incorrect voltage or frequency (Hz) c. Power outages	a. Use outlet not controlled by switch. b. Replace timer with one of correct voltage and frequency (Hertz). c. Reset clock.
3. Time display continues to advance	a. Defective time set switch	a. Replace timer.
4. Flashing time display	a. Power outage	a. Check power failure, switch on and reset clock.
5. Lower case letter "c" displayed	a. Hardness or capacity settings not connected b. Electrical interference c. Defective circuit board connection to hardness and capacity settings	a. Disconnect electrical power 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. b. Disconnect electrical power and battery. Restore power and reset time of day display. c. Replace timer.
6. Time display shows something other than time of day or lower case letter "c"	a. Electrical interference b. Defective circuit board	a. Disconnect power to unit. Restore power and reset time of day display. Reconnect battery only after electrical power is restored. b. Replace timer.
7. No water flow display when water is flowing	a. Bypass valve open b. Meter probe disconnected or not fully connected to meter housing c. Restricted meter turbine rotation due to foreign material in meter housing d. Defective meter probe e. Defective circuit board	a. Shift bypass valve into service (closed) position. b. Fully insert probe into meter housing. 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. d. Replace timer. e. Replace timer.
8. Control regenerates at wrong time of day	a. Power outages b. Clock set incorrectly	a. Reset clock to correct time of day. b. Reset clock to correct time of day.

SALT

Your water softener has been designed to run on granular, tablet or block salt. Aqua-Dial can supply salt delivered to your home. Please complete and return separate salt card or telephone Aqua-Dial on 081-549 7812.

16 GUARANTEE (UK ONLY)

All Aqua-Dial automatic domestic water softeners are covered by a full one year parts and labour guarantee against faulty materials or workmanship.

Aqua-Dial have full service back-up covering the United Kingdom. For help, advice or service phone their technical services department.

17 SERVICE CONTRACT (UK ONLY)

Aqua-Dial offer a "Peace of Mind" service contract covering all parts, labour and call-out charges, available for a small yearly premium.

Please complete and return the section on the reverse side of the guarantee card.