INSTALLATION, OPERATING AND SERVICE MANUAL

LANCASTER WATER TREATMENT

Water Softener

Compact	Two Tank
LCT 24	LAT 16 LAT 24 LAT 32 LAT 45

Your new Lancaster Water Softener described in this booklet is designed to give you many years of trouble free service. When installed in accordance with the following instructions, and if given reasonable care, clear soft water will be the result. For servicing and future inspection purposes, file this booklet with your important papers.

LANCASTER WATER TREATMENT A DIVISION OF C-B TOOL CO.
1340 MANHEIM PIKE LANCASTER, PA 17601-3124 Area Code (717) 397-3521

INSTALLATION

All plumbing must conform to local codes

(Inspect unit carefully for carrier shortage or shipping damage.)

Location Selection

A. **The distance between the unit and a drain should be as short as possible.**

B. If it is likely that supplementary water treating equipment will be required, make certain adequate additional space is available.

C. Since salt must be added periodically to softener, the location should be easily accessible.

Do not install any unit closer to a hot water heater than a total run of 10 feet of piping between the outlet of the softener and the inlet to the heater. Water heaters can sometimes overheat to the extent they will transmit heat back down the cold pipe into the unit control valve. Hot water can severely damage the softener. A 10 foot total pipe run, including bends, elbows, etc., is a reasonable distance to help prevent this possibility. (A positive way to prevent hot water from flowing from the heat source to the softener, in the event of a negative pressure situation, is to install a check valve in the soft water piping from the softener. **If a check valve is installed, make certain the water heating unit is equipped with a properly rated temperature and pressure safety relief valve. Also be certain that local codes are not violated.)**

E. Do not locate unit where it or its connections (including the drain and overflow lines) will ever be subjected to room temperatures under 32°F (0°C) or over 120°F (49°C).

F. Do not install unit near acid or acid fumes.

Water Line Connection

A by-pass valve system must be installed since there will be occasions when the water softener must be by-passed for hard water or for servicing.

The most common by-pass systems are the Autotrol Series 156 By-pass Valve (Figure 1) and plumbed-in globe valves (Figure 2). Though both are similar in function, the 156 Autotrol By-pass offers simplicity and ease of operation.

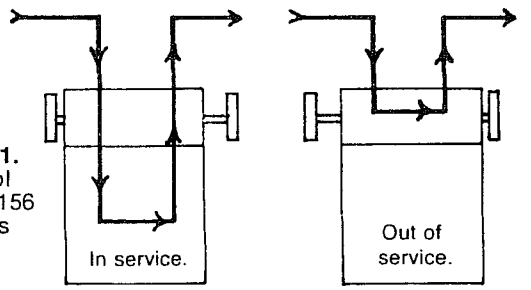


Figure 1. Autotrol Series 156 By-pass Valve.

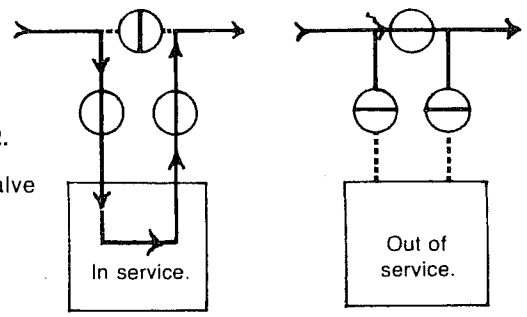


Figure 2. Typical globe valve by-pass system.

Drain Line Connection

A. If ideally located, the unit will be above and not more than 20 feet from drain. For such installations connect ½-inch I.D. plastic tubing to DRAIN LINE CONNECTION located on CONTROL.

B. If unit is located more than 20 feet from drain, use ¾-inch tubing for runs up to 40 feet. Also purchase adapter to bush tubing down to DRAIN LINE CONNECTION FITTING.

C. If unit is located where drain line must be elevated, you may elevate the line up to 6 feet providing the run does not exceed 15 feet and water pressure **at softener** is not less than 40 psi. You may elevate an additional 2 feet for each additional 10 psi.

D. Where drain line is elevated but empties into a drain below the level of the Control Valve, form a 7-inch loop at the far end of the line so that the bottom of the loop is level with the DRAIN LINE CONNECTION. This will provide an adequate siphon trap.

E. Where drain line empties into an overhead sewer line, a sink-type trap must be used.

PLACING SOFTENER INTO SERVICE

After all previous steps have been completed, the unit is ready to be placed into service. Follow these steps carefully.

A. Remove Control Valve Cover by grasping finger holds on cover. Pull apart and lift off cover.

NOTE

The following steps will require your turning the red Pointer Knob (H), (Figure 4), to various positions. Insert a wide blade screwdriver into arrow slot in Pointer Knob (H) and press in firmly. With knob held in, rotate **COUNTERCLOCKWISE ONLY** until arrow or knob points to desired position. (Rotation is made much easier if you grasp the camshaft with your free hand and turn it at the same time.) Then permit knob to spring back out.

B. Insert screwdriver into slot in Pointer Knob (H), (Figure 4). Press in and rotate knob **COUNTERCLOCKWISE** until arrow points directly to the word **BACKWASH.**

C. Fill Mineral Tank with water.
1. With **water supply off,** place the by-pass valve(s) into the service position.
2. Open water supply valve **very slowly** to approximately the ¼ open position. **CAUTION** — if opened too rapidly or too far, mineral may be lost. In this position, you should hear air escaping **slowly** from the drain line.
3. When all of the air has been purged from the tank (water begins to flow steadily from the drain), open the main supply valve all the way.
4. Allow water to run to drain until clear.

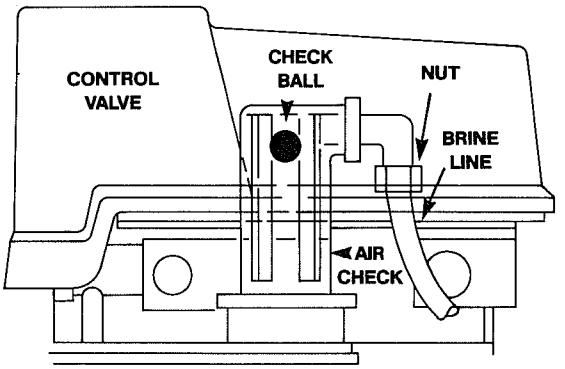
5. Turn off water supply and let the unit stand for about 5 minutes. This will allow all trapped air to escape from the tank.
6. Proceed to step D.

D. Add water to Brine Tank (initial fill).

With a bucket or hose, add approximately 4 gallons of water to regenerant tank.

E. Put into Service.

1. Open water supply valve slowly to full open position.
2. Carefully advance Pointer Knob **COUNTER-CLOCKWISE** to center of **BRINE REFILL** position and hold there until Air Check (Figure 3) fills with water and water starts to flow through brine line into brine tank. Do not run for more than 1 or 2 minutes.
3. Advance Pointer Knob **COUNTERCLOCKWISE** until arrow points to the center of the **BRINE AND RINSE** position.
4. With the softener in this position, check to see if water is being drawn from the brine tank. The water level in the brine tank will recede very slowly. Observe for at least 3 minutes. If the water level does not recede or goes up, or if air enters the transparent air check chamber and the ball falls and seats, see "Trouble Shooting" section, page 8.
5. Advance Pointer Knob **COUNTERCLOCKWISE** to **SERVICE.**
6. Run water from a nearby faucet until the water is clear and soft.



TIMER SETTING INSTRUCTIONS

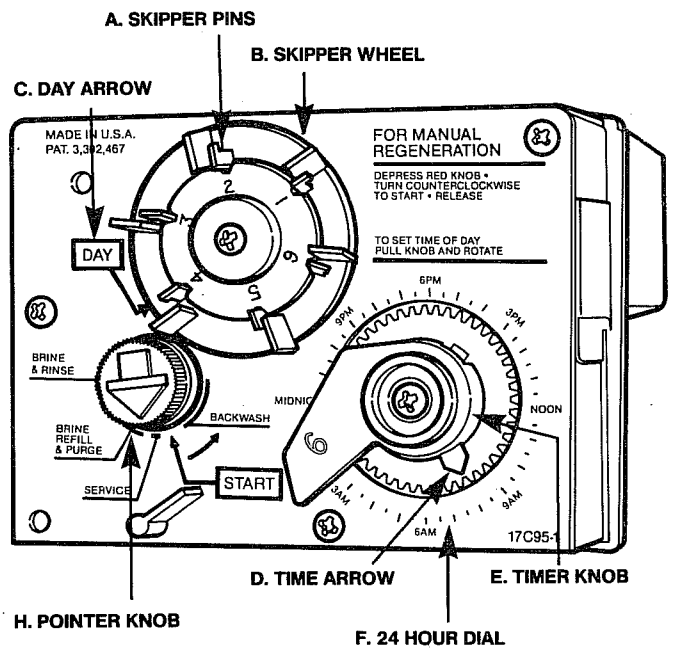


Figure 4

A. Set days of regeneration on skipper wheel (B) (Figure 4) Pull all skipper pins (A) outward (away from control). Rotate skipper wheel until day arrow (C) points to current day, or number 1. Depress skipper pin(s) (A) at day(s) for which regeneration is desired.

B. Set the time-of-day of REGENERATION. Grasp timer knob (E) and pull outward. Rotate in either direction until actual time-of-day on time dial (F) is in line with time-of-day arrow "D" Release timer knob (E).

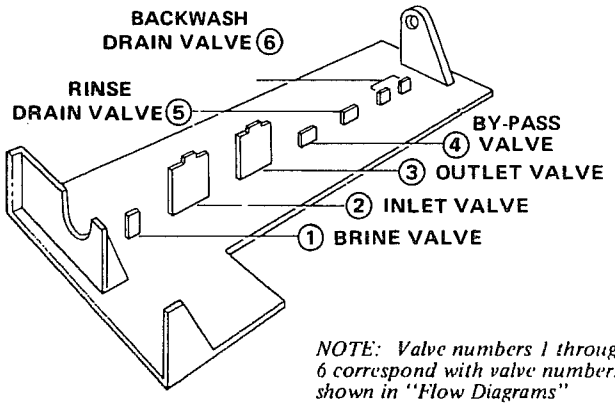
NOTE: The unit is factory set to REGENERATE/BACKWASH at 2:30 a.m. If you prefer to have the unit regenerate at an earlier or later time, simply set the current time-of-day accordingly. (e.g., To have the unit REGENERATE/BACKWASH at 4:30 a.m. — 2 hours later — set the clock 2 hours earlier than the actual current time.)

SPECIAL FEATURES OF TIMER

A. **Guest Cycle.** When abnormally high water usage exhausts your water conditioner's capacity ahead of schedule, an extra tegeneration can be achieved by depressing the pointer knob (H) with fingers or wide bladed screwdriver and turning **COUNTER-CLOCKWISE** to **START**. It will take a few minutes for regeneration to start. Normal regeneration schedule will not be disrupted.

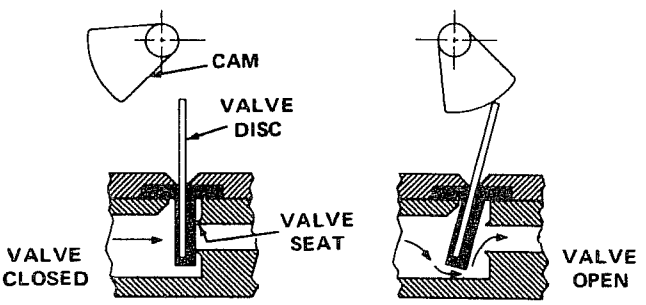
B. **Manual Regeneration.** Electricity is used only to run the timer and to rotate the camshaft. All other functions are operated by water pressure. Therefore, in the event of a power outage, all the various regeneration positions may be dialed manually be depressing the pointer knob (H) and turning **COUNTER-CLOCKWISE**. Manual time cycle: BACKWASH — 14 minutes; BRINE AND RINSE — 52 minutes; BRINE REFILL — 10 minutes; PURGE — 6 minutes. **Do not exceed 10 minutes** for the BRINE REFILL cycle as this will cause excessive salt usage during the next regeneration and possibly a salt residue in the softened water.

IDENTIFICATION OF CONTROL VALVING



NOTE: Valve numbers 1 through 6 correspond with valve numbers shown in "Flow Diagrams"

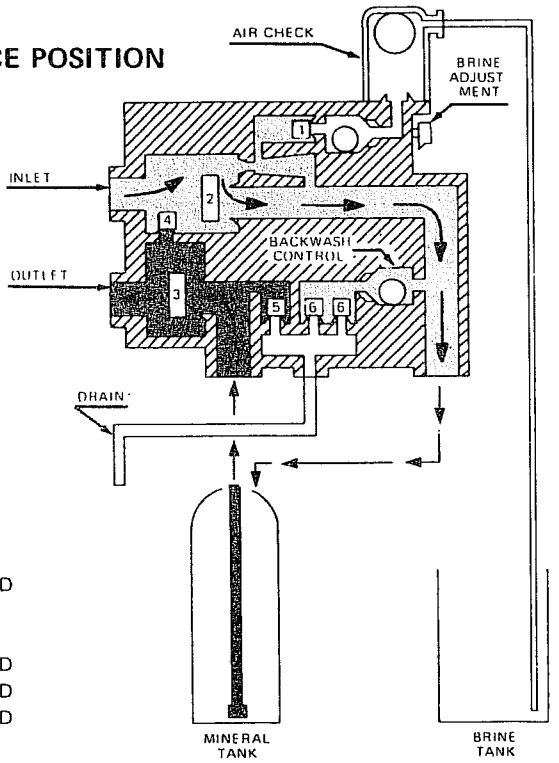
VALVE DISC (PRINCIPLE OF OPERATION)



FLOW DIAGRAMS

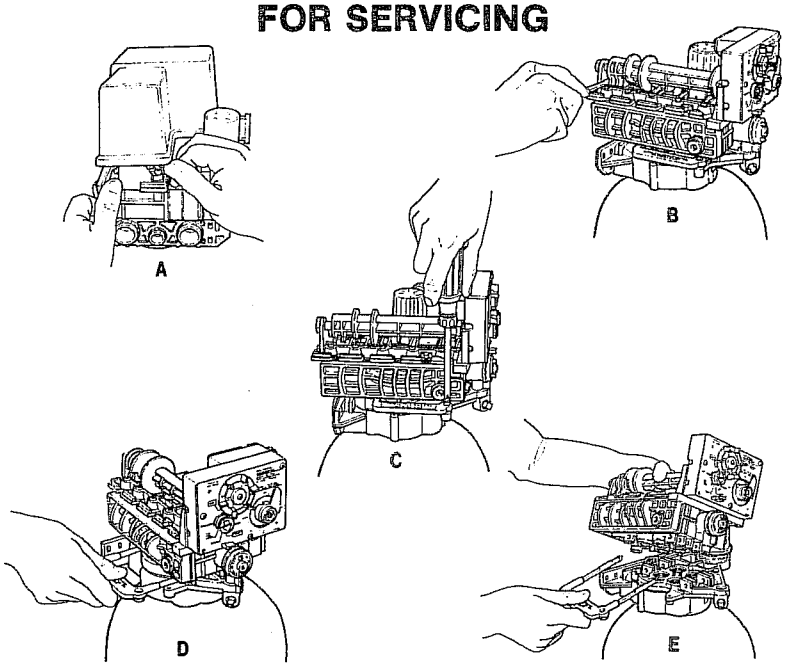
1 SERVICE POSITION

☐ HARD WATER
▩ SOFT WATER



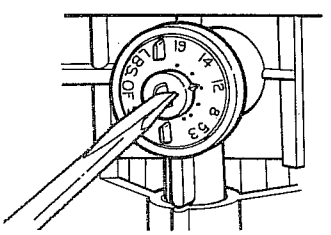
Valve No.
1 – CLOSED
2 – OPEN
3 – OPEN
4 – CLOSED
5 – CLOSED
6 – CLOSED

FOR SERVICING



1. Unplug electric cord.
2. Shut-off water supply or put bypass valve(s) into bypass position.
3. Remove cover (Figure A), and with screwdriver, relieve tank pressure by pushing open all valves on control as shown (Figure B).
4. Remove screw in locking bar (Figure C).
5. Apply downward hand pressure on control and pull locking bar out (Figure D).
6. Using a rocking motion, lift control from the tank adapter (Figure E). If O-ring seals come off with control, put them back into tank adapter sockets. Lubricate O-rings with silicone lubricant.
7. To replace control module, reverse above procedure.

ADJUSTMENT OF BRINE CONTROL

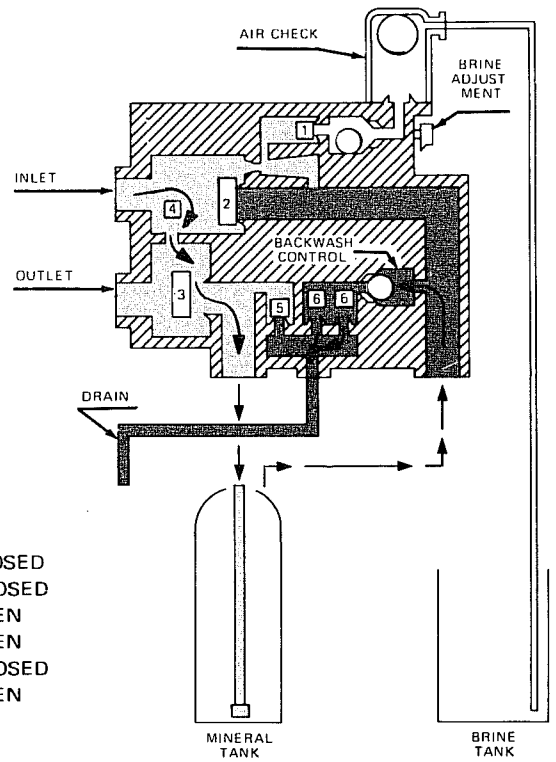


All models may be adjusted to produce Maximum to minimum softening capacities by setting the Salt Dial which controls the amount of salt used per regeneration. When desired, the Minimum setting may be used on installations if the frequency of regeneration is increased to compensate for the lower regenerated softening capacity. Your installing dealer will set your unit for proper salt usage. Further adjustments are needed only if water supply changes or if water use changes dramatically.

The **amount of salt** placed into the Regenerant Storage Tank has nothing to do with the amount of salt used during the REGENERATE/BACKWASH program. Water will dissolve and absorb salt only until it becomes saturated. A given amount of Brine (salt saturated water) contains a specific amount of salt. The Salt Dial on the Control controls the amount of Brine used during the REGENERATE/BACKWASH program (e.g., when set at 15 lbs.) the amount of Brine the softener will use for each program will contain 15 lbs. of salt, etc.). Never let the amount of salt in the Regenerant Storage Tank be less than the amount required for the next regeneration.

2 BACKWASH POSITION

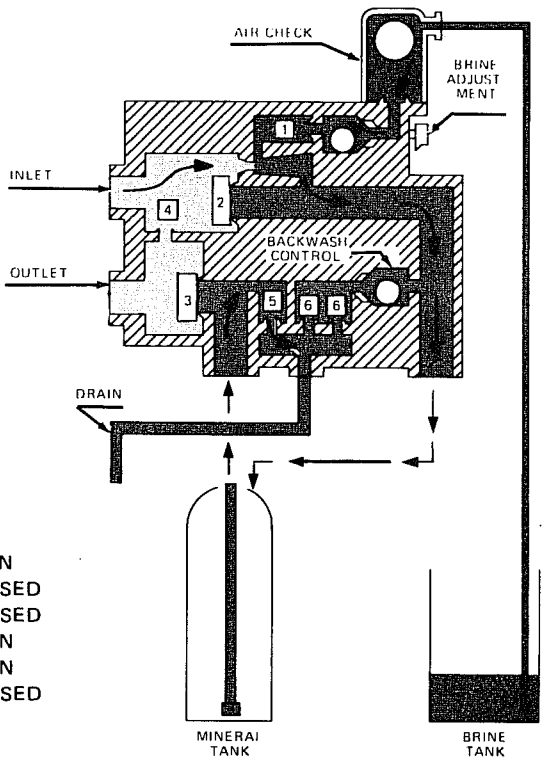
HARD WATER
BACKWASH WATER



Valve No.
1 – CLOSED
2 – CLOSED
3 – OPEN
4 – OPEN
5 – CLOSED
6 – OPEN

3 BRINING POSITION

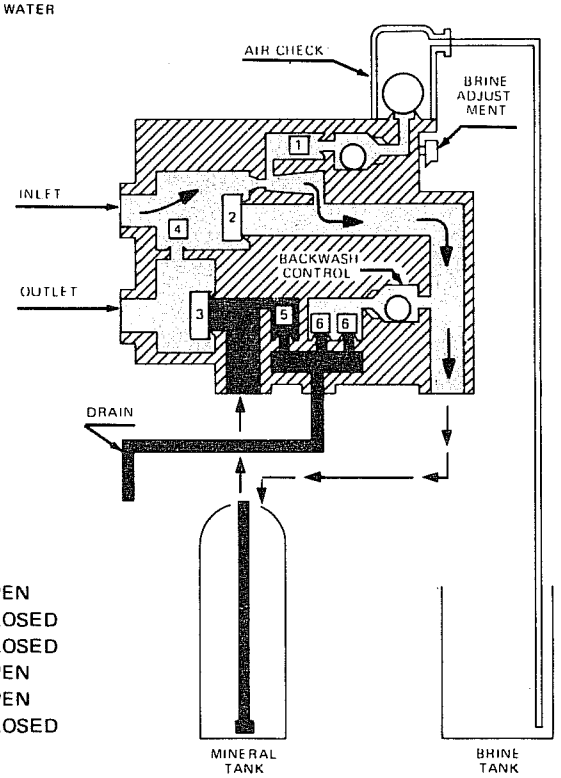
HARD WATER
BRINE



Valve No.
1 – OPEN
2 – CLOSED
3 – CLOSED
4 – OPEN
5 – OPEN
6 – CLOSED

4 SLOW RINSE POSITION

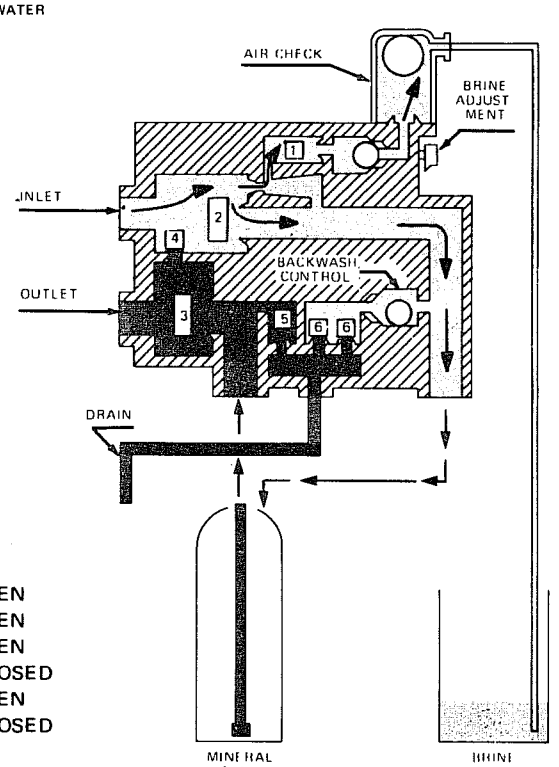
HARD WATER
RINSE WATER



Valve No.
1 – OPEN
2 – CLOSED
3 – CLOSED
4 – OPEN
5 – OPEN
6 – CLOSED

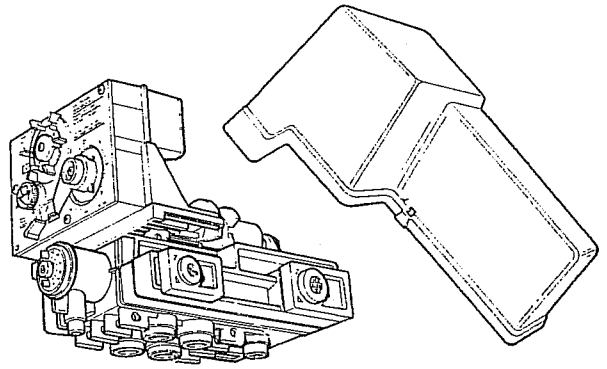
5 BRINE REFILL & PURGE POSITION

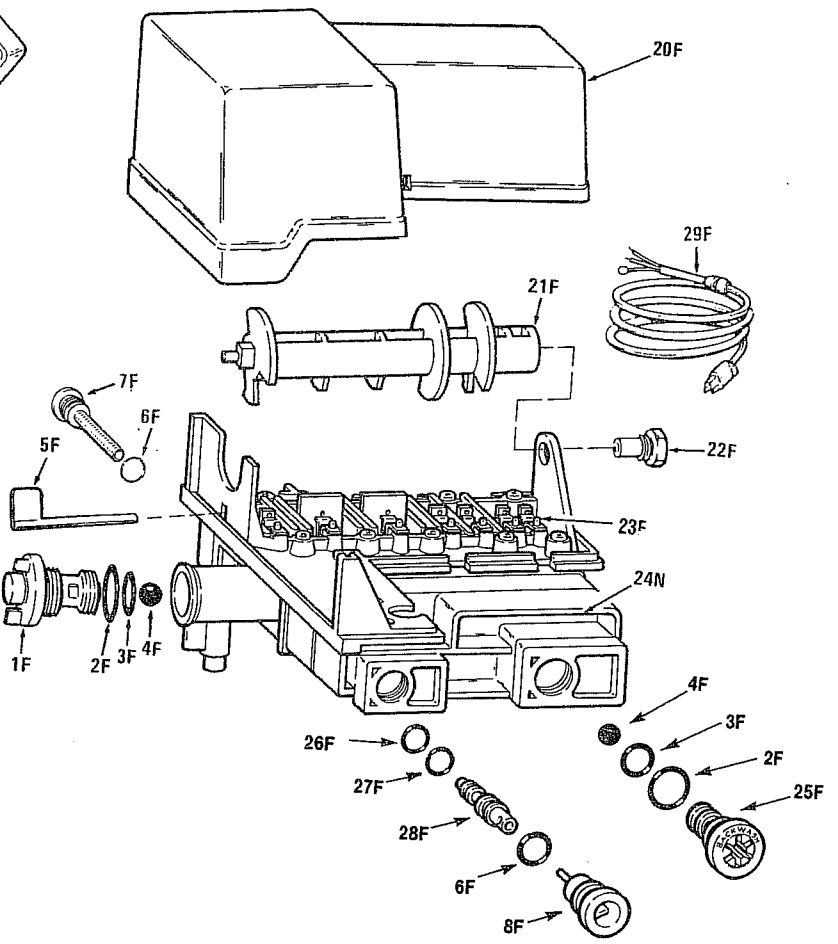
HARD WATER
PURGE WATER



Valve No.
1 – OPEN
2 – OPEN
3 – OPEN
4 – CLOSED
5 – OPEN
6 – CLOSED

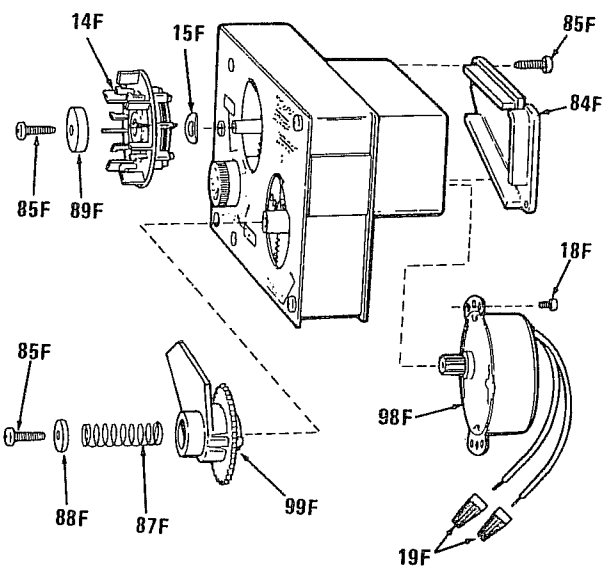
K-7 CONTROL MODULE





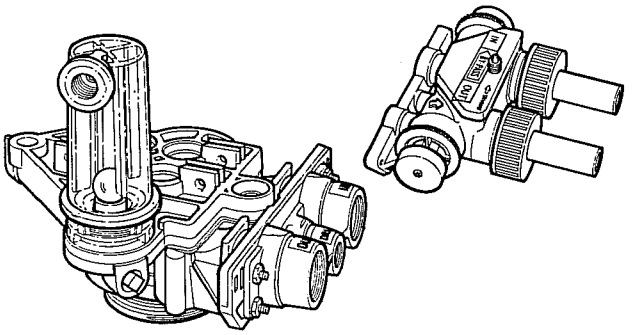
Part No.	Quantity	Description
1F	1	Brine Controller w/2F & 3F
2F	2	O-Ring
3F	2	O-Ring
4F	2	Ball
5F	1	Timer Locking Pin
6F	2	O-Ring
7F	1	Injector Screen-Cap Assembly
8F	1	Injector Cap (Blue) w/6F
20F	1	Cover
21F	1	Camshaft Assembly for LAT-16, 24, 32
21F-1	1	Camshaft Assy., XS for LAT-45
22F	1	Camshaft Bearing
23F	7	Valve Springs
24N	1	Control Body
25F-7	1	Backwash Assy. for LAT-16
25F-8	1	Backwash Assy. for LAT-24
25F-10	1	Backwash Assy. for LAT-32, 45
26F	1	O-Ring
27F	1	O-Ring
28F	1	Injector (Blue) w/26F & 27F
29F	1	Cord Set
KITS		
155A152	1	Set of Valve Discs

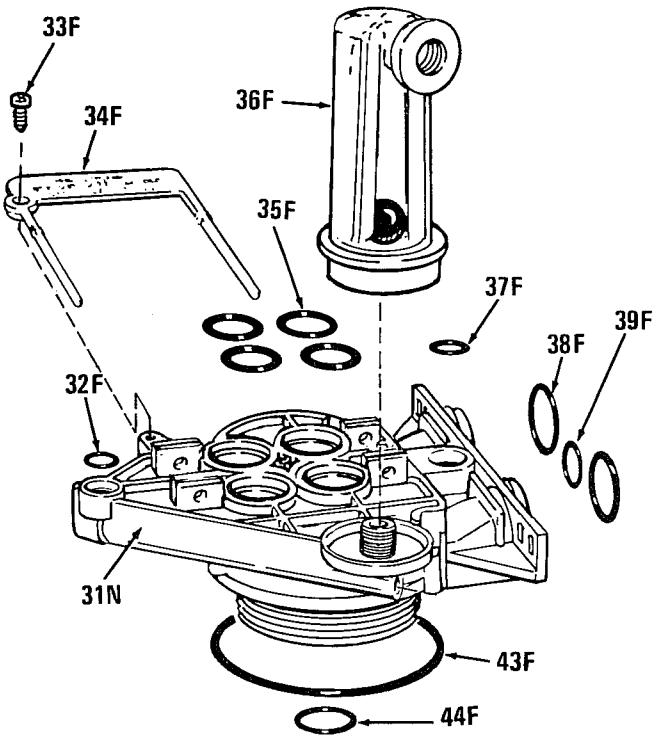
NO. 440 TIMER ASSEMBLY (97F)



Part No.	Quantity	Description
14F	1	Skipper Wheel (6 day)
15F	1	Friction Washer
18F	2	Motor Mounting Screws
19F	2	Wire Nuts
84F	1	Cover Plate
85F	3	Screw
87F	1	Spring
88F	1	Retainer Washer
89F	1	Retainer Washer
97F	1	440 Timer Assy. (6 days) complete with motor
98F	1	Timer Motor 115 volt
99F	1	Tripper Assembly (6 day)

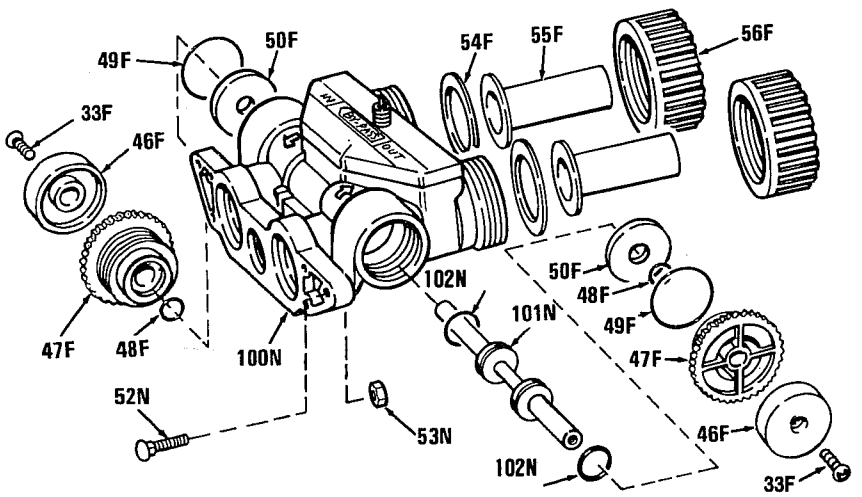
K-6 TANK ADAPTER MODULE





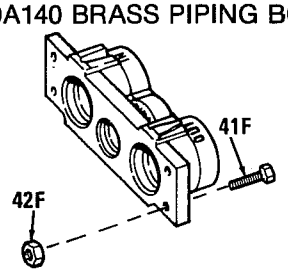
Part No.	Quantity	Description
31N	1	Tank Adapter Body
32F	1	O-Ring
33F	1	Positioning Screw
34F	1	Locking Bar
35F	4	O-Ring
36F	1	Air Check Assembly
37F	1	O-Ring
38F	2	O-Ring
39F	1	O-Ring
43F	1	O-Ring
44F	1	O-Ring
KITS		
150A129	1	For Items 32F, 35F & 37F
150A144	1	For Items 38F & 39F

NO. 156 BY-PASS VALVE ASSEMBLY



Part No.	Quantity	Description
33F	2	Screw
46F	1	Knob
47F	2	End Cap
48F	2	O-Ring
49F	2	O-Ring
50F	4	Washer
52N	4	Bolt
53N	2	Nut
54F	2	Gasket
55F	2	Tube Adapter, ¾" Copper
56F	2	Nut for ¾" Tube Adapter
100N	1	Bypass Body
101N	1	Shaft Valve Stem
102N	2	O-Ring

NO. 157A140 NORYL PIPING BOSS ¾"
NO. 150A140 BRASS PIPING BOSS ¾"



Part No.	Quantity	Description
41F	4	Screw
42F	4	Nut

MAINTENANCE GUIDE

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 Cap (7F).
   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 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.

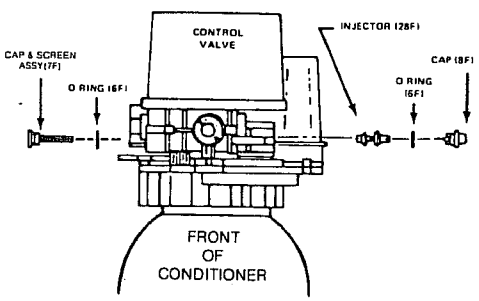


Figure 16

Trouble Shooting

Series 155 automatic water conditioner 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.

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 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	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 "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 conditioned 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).