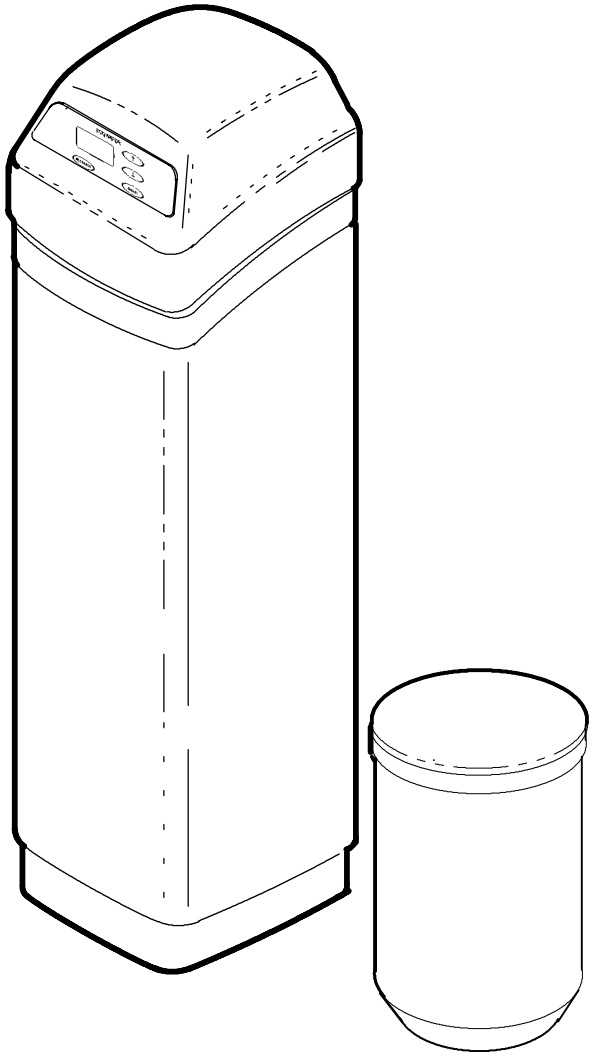
OWNERS MANUAL

How to maintain and operate your EcoWater automatic iron filter system

ECOWATER SYSTEMS®

SERIES
ETF2100 – IF10
with potassium permanganate feeder



PRINTED IN USA

EcoWater Systems
PO Box 64420, St. Paul MN 55164–9888

Part No. 7260033 (Rev. A 9/2/04)

UNPACKING

The EcoWater Automatic Iron Filter is shipped from the factory in two cartons, consisting of. . .

... mineral tank assembly & controller cover, timer and valve assembly & small parts skin-pack in one carton, and

... solution feeder tank, check valve assembly, nozzle assembly and connecting parts & 7 ft length of 5/16 in. O.D. tubing & 7 ft length of 3/8 in. O.D. tubing in the second carton.

NOTE: Gravel underbedding is included in the tank. **Filtering mineral and sand are not included.** See pages 24 and 25 for parts ordering information.

Thoroughly check the filter for possible shipping damage and parts loss. Also inspect and note any damage to the shipping cartons. Notify the transportation company if damage is present. EcoWater is not responsible for in-transit damages.

Remove and discard (RECYCLE) all packing materials. We suggest you do not remove the small parts on the skin-pack until you are ready to use them. Filter assembly instructions are on pages 6 thru 12.

Flow Washer Usage

	Tank Size
Media	10”
Birm	5 gpm
Greensand	7 gpm

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EcoWater Systems, Inc.
Advantage Warranty
Series ETF 2100 Water Systems

Congratulations! You have just purchased the highest quality water conditioning product on the market. To register your warranty, complete the enclosed Warranty Registration Card and mail it within 30 days of purchase.

To whom is this warranty extended?

EcoWater Systems, Inc. warrants its products to the original owner and guarantees that the products will be free from defects in materials and workmanship from the original date of installation.

How does my warranty work?

If, during the respective warranty period, a part proves, after inspection by EcoWater, to be defective, EcoWater will, at its sole option repair or replace that part at no charge, other than normal shipping, installation or service charges.

What is covered by the warranty?

EcoWater Systems, Inc. guarantees that,

for the LIFETIME of the original owner, the MINERAL TANK will not rust, corrode, leak, burst, or in any other manner fail to perform their proper functions and that,

for a period of FIVE (5) YEARS after installation, the VALVE BODY will be free of defects in materials and workmanship and will perform its proper function and that,

for a period of THREE (3) YEARS after installation, the ELECTRONIC FACEPLATE will be free of defects in materials and workmanship and will perform its normal functions and that,

for a period of ONE (1) YEAR after installation, ALL OTHER PARTS will be free of defects in materials and workmanship and will perform their normal functions.

How do I obtain warranty service?

Should you need service, your local, independent EcoWater Dealer is only a phone call away.

PHONE: _____

To obtain warranty service, notice must be given, within thirty (30) days of the discovery of the defect, to your local EcoWater Systems dealer.

If I need a part replaced after the factory warranty expires, is the replacement part warranted?

Yes, EcoWater Systems, Inc. warrants FACTORY REPAIRS as well as all REPLACEMENT PARTS for a period of 90 DAYS. This warranty does not include normal shipping, installation or service charges.

Are any additional warranties available?

We are pleased to say, YES! EcoWater Systems, Inc. sells an EXTENDED, PARTS ONLY WARRANTY for the ELECTRONICS portion of your product. This warranty is called the "Perfect Ten" and extends the three year warranty on the electronic FACEPLATE, WIRING HARNESS, DRIVE MOTOR, TRANSFORMER, POWER CORD, SENSOR HOUSING, and MICRO SWITCHES to a total of TEN YEARS from the date of original installation. Should your local dealer not offer this warranty, you may contact the factory for additional information.*

General Provisions

The above warranties are effective provided the water conditioner is operated at water pressures not exceeding 125 psi, and at water temperatures not exceeding 120°F; provided further that the water conditioner is not subject to abuse, misuse, alteration, neglect, freezing, accident or negligence; and provided further that the water conditioner is not damaged as the result of any unusual force of nature such as, but not limited to, flood, hurricane, tornado or earthquake. EcoWater Systems, Inc., is excused if failure to perform its warranty obligations is the result of strikes, government regulation, materials shortages, or other circumstances beyond its control.

*THERE ARE NO WARRANTIES ON THE WATER CONDITIONER BEYOND THOSE SPECIFICALLY DESCRIBED ABOVE. ALL IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, ARE DISCLAIMED TO THE EXTENT THEY MIGHT EXTEND BEYOND THE ABOVE PERIODS. THE SOLE OBLIGATION OF ECOWATER SYSTEMS, INC. UNDER THESE WARRANTIES IS TO REPLACE OR REPAIR THE COMPONENT OR PART WHICH PROVES TO BE DEFECTIVE WITHIN THE SPECIFIED TIME PERIOD, AND ECOWATER IS NOT LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES. NO ECOWATER DEALER, AGENT, REPRESENTATIVE, OR OTHER PERSON IS AUTHORIZED TO EXTEND OR EXPAND THE WARRANTIES EXPRESSLY DESCRIBED ABOVE.

Some states do not allow limitations on how long an implied warranty lasts or exclusions or limitations of incidental or consequential damage, so the limitations and exclusions in this warranty may not apply to you. This warranty gives you specific legal rights, and you may have other rights which vary from state to state. This warranty applies to consumer-owned installations only.

GUARANTEE BOND

The Safeco Insurance Company of America has issued it's bond in the form shown below, guaranteeing full performance by EcoWater Systems, Inc.

SAFECO INSURANCE COMPANY OF AMERICA, hereinafter called "Surety," guarantees unto Bank of New York as Trustee holding said Guarantee Bond under the terms of a Trust Agreement dated April 9, 2003, for the use and benefit of original purchasers of residential EcoWater Systems Units within the Continental United States, as described herein, that EcoWater Systems, Inc., will discharge the obligations of the "EcoWater Bonded Parts and Service Guarantee Policy."

PROVIDED, HOWEVER, that:

1. Liability of Surety hereunder shall not exceed the sum of FIVE HUNDRED AND 00/100th DOLLARS ($500.00) as to any one installation, and shall not exceed the sum of FIVE HUNDRED THOUSAND AND 00/100th DOLLARS ($500,000.00) in the aggregate, and

2. There shall be no liability hereunder as to any purchaser to whom there has not been issued at the time of installation and purchase completed registration card which is enclosed with a facsimile of this bond, and who has not returned such card in accordance with this guarantee.

3. Claim must be made by such original purchaser in writing within 30 days from the expiration of these guarantees upon EcoWater Systems, Inc., PO Box 64420, St. Paul, MN 55164, to perform the terms of said guarantee, and notice of any default on such guarantee must be sent to Surety at its address by Registered Mail.

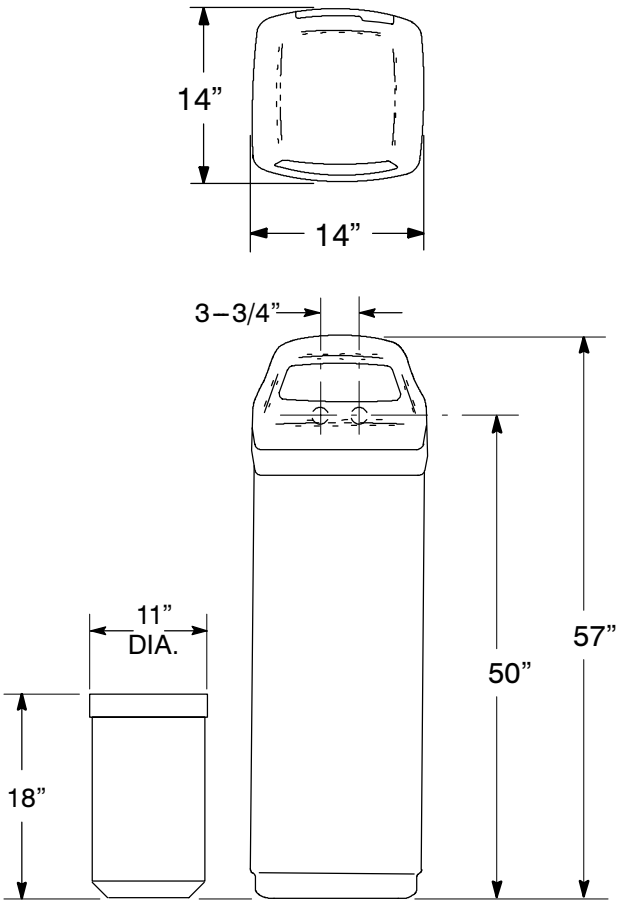
SAFECO INSURANCE COMPANY OF AMERICA

This is to certify that the original of the above guarantee and bond is on file with Bank of New York.

BANK OF NEW YORK
As Trustee

	ETF2100IF10 10" dia. x 47" Resin Tank
FILTER TYPE Iron Removal (Mineral ①)	Birm (Ferrite) or, Manganese Treated Greensand
Iron Removal Limits (parts per million) ②	20
Amount Mineral Recommended (cu ft)	1 to 1-1/4
Amount Gravel (lbs)	17
Amount Filter Sand Recommended (lbs) ①	10
Supply Water Pressure Limits (psi)	20 - 125
Supply Water Temperature Limits (°F)	35 - 120
Minimum Inlet Water Flow - Backwash and Fast Rinse Flow To Drain - (gal per min)	5
Mineral Regenerant	Potassium Permanganate
Amount Regenerant Used Each Recharge (oz)	2

① order mineral and sand separately (not included with filter)
② ferric iron, ferrous iron, or a combination of both



RECHARGE CYCLE TIMES
(default minutes)

Fill	1:30
Brine Draw	80
Backwash	20
Fast Rinse	5

FOR FUTURE REFERENCE, ENTER THE FOLLOWING INFORMATION

MODEL NO. [1] _____

DATE CODE [2] _____

SERIAL NO. [1] _____

INSTALLATION DATE _____

IRON CONTENT_____ PPM

[1] on rating decal
[2] on shipping carton

INLET - OUTLET PLUMBING OPTIONS

- ALWAYS INSTALL an EcoWater bypass valve, #7214383 or a 3 valve bypass system.
- Use 1"... or, 3/4" (minimum) pipe and fittings.
- Use sweat copper... or, threaded pipe*... or, CPVC plastic pipe.*

*Sweat soldering is required to adapt to the fittings (1" male) supplied with the filter, or obtain approved compression adaptors. PVC plastic adaptors, part #7104546, are available from EcoWater. **Be sure to comply with all local plumbing codes.**

OTHER REQUIREMENTS

- A drain is needed for regeneration discharge water. A floor drain is preferred, close to the filter. A laundry tub, sump, standpipe, etc., are other drain options.

CAUTION: Drain water exits the hose at a fast flow rate, and at water system pressure. **BE SURE the hose is fastened at the drain point** in some manner to prevent "whipping", and splashing is contained to prevent damage to the surrounding area.

- a 120V-60Hz, grounded electrical outlet (continuously "live") is needed within 10' of the filter.

TOOLS YOU MAY NEED

- common screwdriver
- cross-point screwdriver
- pliers
- tape measure

SOLDERED COPPER	THREADED	CPVC PLASTIC
• tubing cutter	• hacksaw or pipe cutter	• hacksaw
• propane torch	• threading tool	• adjustable wrench
• LEAD-FREE solder and flux	• pipe joint compound*	• solvent cement*
• emery cloth, sandpaper or steel wool		• primer

* approved for use on potable water

MATERIALS YOU MAY NEED

- bypass valve, or 3 valves
- pipe and fittings as required
- 5/8" I. D. minimum drain hose, either standard garden hose, or hose onto a barb fitting①

① VALVE DRAIN OPTIONS: Flexible drain hose is not allowed in all localities (check your codes). For a rigid valve drain run, plumb in following codes. To adapt to the valve drain fitting, purchase a garden hose thread x 5/8" tube (minimum) adaptor.

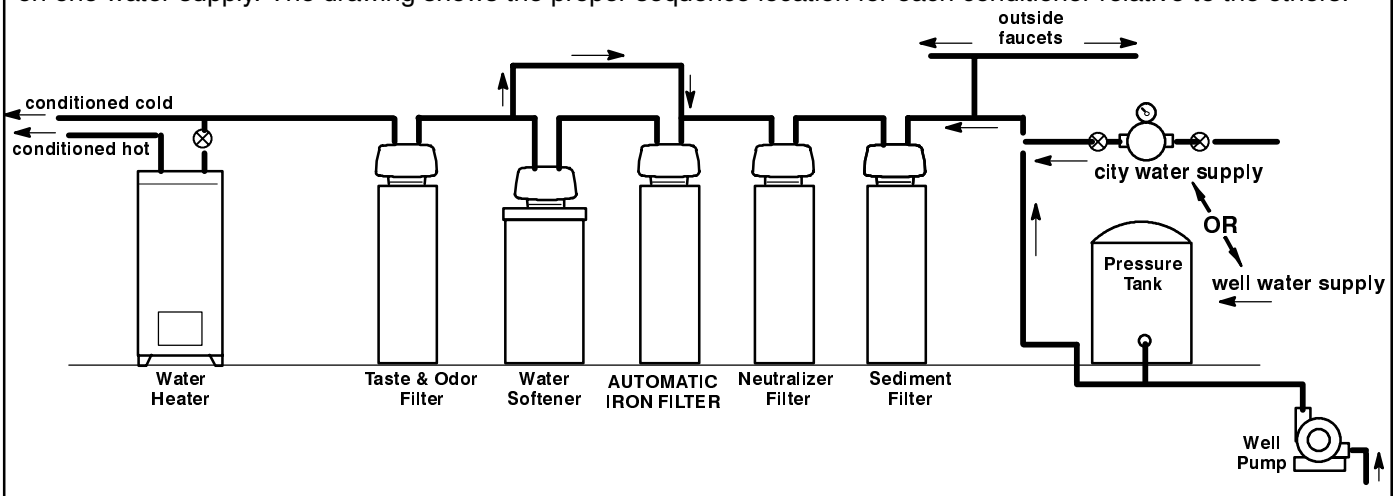
SELECT INSTALLATION LOCATION

Consider all of the following as an installation location for the filter is selected.

- To filter all water in the home, install the filter close to the water supply inlet, and before all other plumbing connections, EXCEPT outside water pipes. Outside faucets should remain on raw supply water.
- Always install a water softener along with the iron filter. Locate the filter ahead of the softener, and both ahead of the water heater as shown in Figure 1, page 6.
- If other water conditioning equipment is needed, locate as shown in Figure 1, page 6.
- A nearby drain is needed to carry away regeneration discharge water. A floor drain is preferred, with a laundry tub, sump, standpipe, etc., other options (check your local codes).
- **The filter works on 24 VAC volts only**. A transformer is included to reduce 120-60 Hz house electrical power. Provide an approved, grounded outlet within 10' of the filter. The transformer has an attached 10' power cable for connection between the outlet and the timer.
- Position the filter at least 6" from surrounding walls, or other appliances, to allow access for adding potassium permanganate powder, and other service.
- Install the filter in a place water damage is least likely to occur if it develops a leak.
- If installing the filter in an outside location, be sure to provide protection from the elements, contamination, vandalism, and sunlight heat. The sun's heat can melt plastic parts.

FIGURE 1

COMPLETE WATER CONDITIONING SYSTEM – Seldom would all of the water conditioners shown below be needed on one water supply. The drawing shows the proper sequence location for each conditioner relative to the others.



Note: For clarity, not all EcoWater conditioners are illustrated (reverse osmosis, distillers, other drinking water).

ECOWATER SYSTEMS

1. FILL MINERAL TANK, INSTALL VALVE

a. Remove the tank clamps (Figure 2, page 7), valve assembly, o–ring seals (3), and the top distributor.

b. Shake the tank to level the factory loaded gravel. Temporarily plug the bottom distributor standpipe with a rag to prevent sand and mineral from entering.

c. Move the tank to the installation location. Using a funnel, add the specified amount of filter sand. Then, add the mineral.

NOTE: Filter sand and the desired mineral type are not included with the filter (see specifications).

d. Thoroughly clean all sand and mineral from the tank top opening. Fill the tank with water, 1" to 2" from the top.

e. Pour about 1 oz (2 tablespoons) of disinfectant into the iron filter. Add through the tank top opening.

f. Install the top distributor and three o-ring seals in the tank exactly as shown in Figure 2, page 7.

g. Lower the valve assembly onto the tank, centering over the standpipe. Push downward, to squeeze the o-ring seals, while installing the clamp sections and retainers. Be sure the clamp sections and retainers are fastened securely in place.

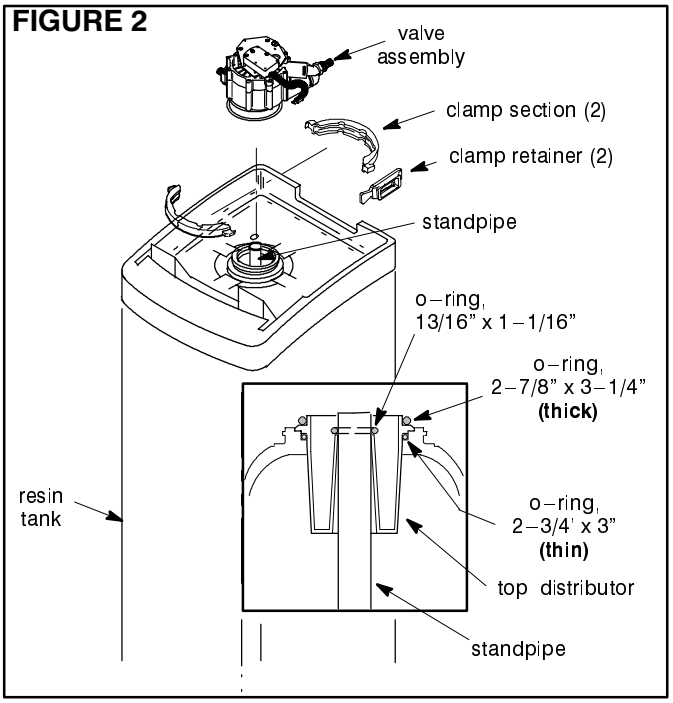
SANITIZING THE FILTER

Care is taken at the factory to keep your water filter clean and sanitary. Materials used to make the filter will not infect or contaminate your water supply, and will not cause bacteria to form or grow. However, during shipping, storage, adding mineral, installing and operating, bacteria could get into the filter. For this reason, sanitizing as follows is suggested [1] when installing.

Common 5.25% household bleach such as Clorox, Linco, Bo Peep, White Sail, Eagle, etc., is a suggested disinfectant. Another is tablet or granular form calcium hypochlorite, under trade names such as Perchloron and HTH.

[1] Recommended by the Water Quality Association. On some water supplies, the filter may need periodic disinfecting.

FIGURE 2



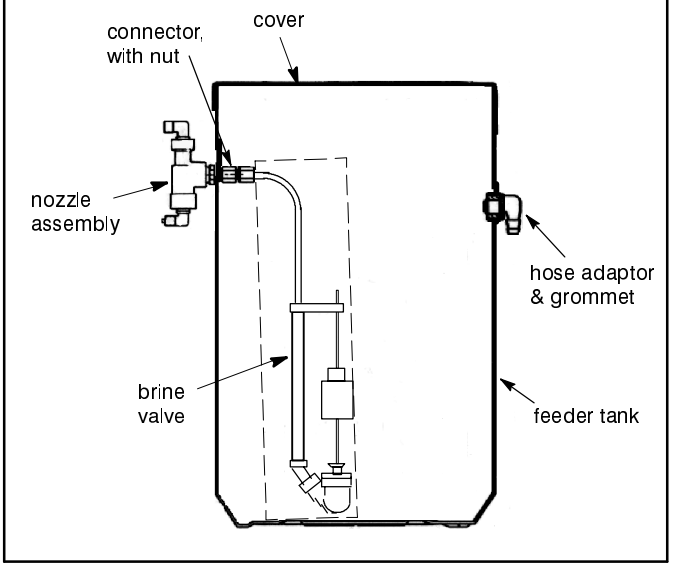
2. NOZZLE ASM., FEEDER VALVE & TANK

a. Push the rubber grommet into the 3/4" dia. hole in the feeder tank sidewall. Then, insert the hose adaptor elbow into the grommet.

b. Using Figure 3 as a guide, connect the nozzle & venturi assembly to the feeder brine valve assembly using the connector.

c. Check to be sure all compression nuts are tightened and the brine valve is vertical.

FIGURE 3



3. INSTALL INLET AND OUTLET FITTINGS

NOTE: All fittings are on the small parts skin–pack.

a. Insert the support into the valve outlet port (push in firmly), up to the shoulder.

NOTE: If installing the EcoWater bypass valve, see Figure 4, or the separate instructions included with it.

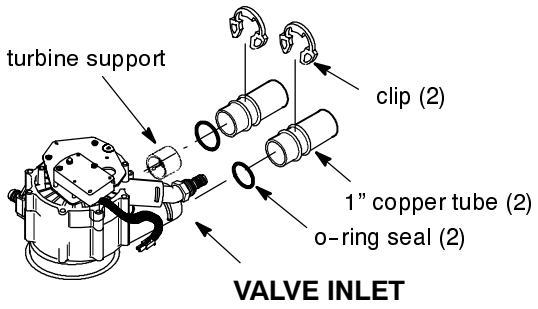
b. Slide a lubricated o–ring seal onto one of the copper tubes. Carefully insert the copper tube into the outlet port (see Figure 4) and secure in place with a plastic "C" clip.

NOTE: For lubrication, use silicone grease approved for use on potable water supplies.

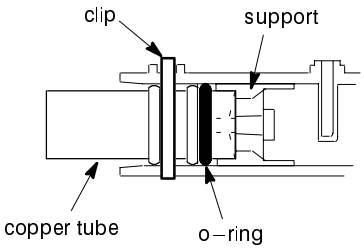
c. Repeat step b on the INLET port side.

IMPORTANT: Be sure copper tubes are firmly held in place by the plastic "C" clips.

FIGURE 4



VALVE INLET



4. TURN OFF WATER SUPPLY

a. Close the main water supply valve, near the well pump or water meter.

b. Shut off the electric or fuel supply to the water heater.

c. Open high and low faucets to drain all water from the house pipes.

5. INSTALLING THREE VALVE BYPASS

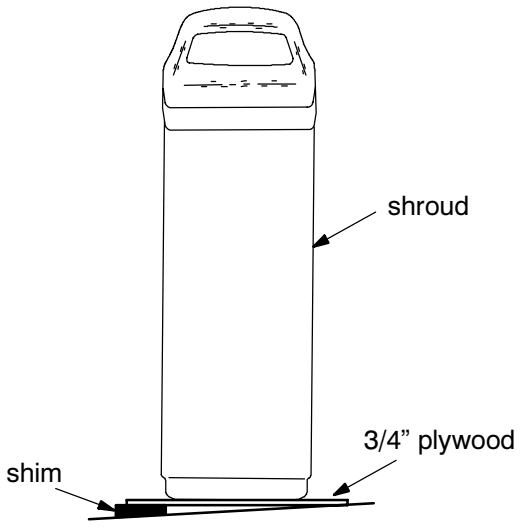
If installing a 3-valve bypass system, plumb as needed using Figure 7 on page 10 as a guide. When installing sweat copper, **be sure to use lead-free solder and flux**, as required by federal and state codes. Use pipe joint compound on outside pipe threads.

6. MOVE THE FILTER INTO PLACE

Move the filter into installation position. Set it on a solid, smooth and level surface. If needed, place the filter on a section of 3/4" thick (minimum) plywood. Then, shim under the plywood to level the filter, Figure 5.

CAUTION: Do not place shims directly under the shroud. The weight of the tank may cause the tank to fracture at the shim.

FIGURE 5



7. ASSEMBLE INLET & OUTLET PLUMBING

Measure, cut, and loosely assemble pipe and fittings from the main water pipe (or from the bypass valves installed in step 5), to the inlet and outlet copper tubes, on the filter.

Be sure the **HARD WATER** supply pipe **GOES TO** the filter **INLET SIDE**. Trace the water flow direction to be sure.

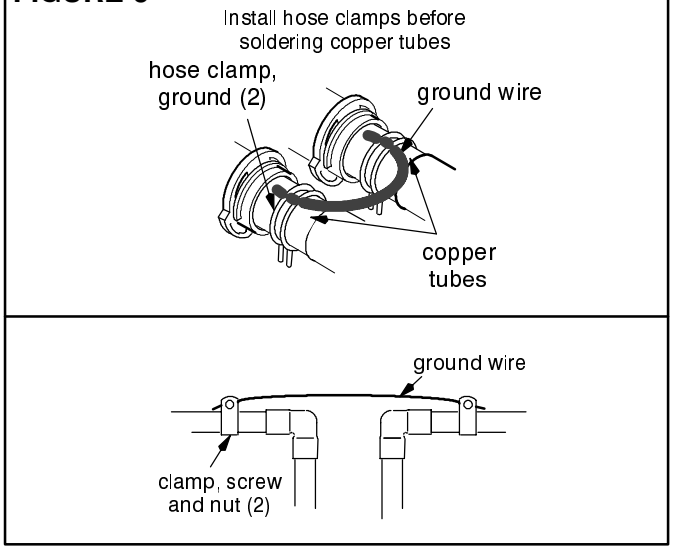
8. COLD WATER PIPE GROUNDING

The house cold water pipe (metal only) is often used as a ground for the house electrical system. The 3-valve bypass type of installation, shown in Figure 7 on page 10, will maintain ground continuity. If you use the plastic bypass valve at the filter, continuity is broken. To restore the ground, do either step **a** or **b** following (see Figure 6).

a. Use the included hose clamps and wire, to make a jumper across the inlet and outlet copper tubes.

b. Install a #4 copper wire across the removed section of main water pipe, securely clamping at both ends.

FIGURE 6



9. CONNECT INLET & OUTLET PLUMBING

Complete the inlet and outlet plumbing as applicable below.

a. SOLDERED COPPER

(1) Thoroughly clean and flux all joints.

(2) Pull the plastic "C" clips and remove the inlet and outlet tubes from the valve, and the o-rings from the tubes. **DO NOT solder with tubes in the valve.** Soldering heat will damage the valve.

NOTE: If installing ground as shown in Figure 6, place hose clamps on copper tubes (see step 8a).

(3) Make all solder connections. Be sure to keep fittings fully together, and pipes square and straight.

(4) **After plumbing has cooled,** repeat steps 3b and 3c, page 7.

IMPORTANT: Be sure copper tubes are firmly held in place by the plastic "C" clips.

b. THREADED PIPE

(1) Apply pipe joint compound to all outside pipe threads.

(2) Tighten all threaded joints.

(3) If soldering to the inlet and outlet tubes, observe step **a** above.

c. CPVC PLASTIC PIPE

(1) Clean, prime and cement all joints, following the manufactures instructions supplied with the plastic pipe and fittings.

(2) If soldering to the inlet and outlet tubes, observe preceding step **a**.

10. INSTALL VALVE DRAIN HOSE

a. Connect a length of 5/8" minimum I.D. hose (check codes) to the valve drain elbow, on the controller, Figure 8. The elbow accepts either hose onto a barb fitting, or standard garden hose. To use the threads, cut off the barbs with a hacksaw.

b. Run the hose to the floor drain, and as typically shown in Figure 8, tie or wire the end to a brick or other heavy object. This will prevent "whipping" during regenerations. Be sure to provide a 1-1/2" minimum air gap, to prevent possible sewer water backup.

NOTE: In addition to the floor drain, you can use a laundry tub, sump, or standpipe as a drain point (see "Other Requirements" on page 5). Be sure to avoid long drain runs, or elevating the hose, which restrict drain flow.

FIGURE 7

TYPICAL VALVE INSTALLATIONS

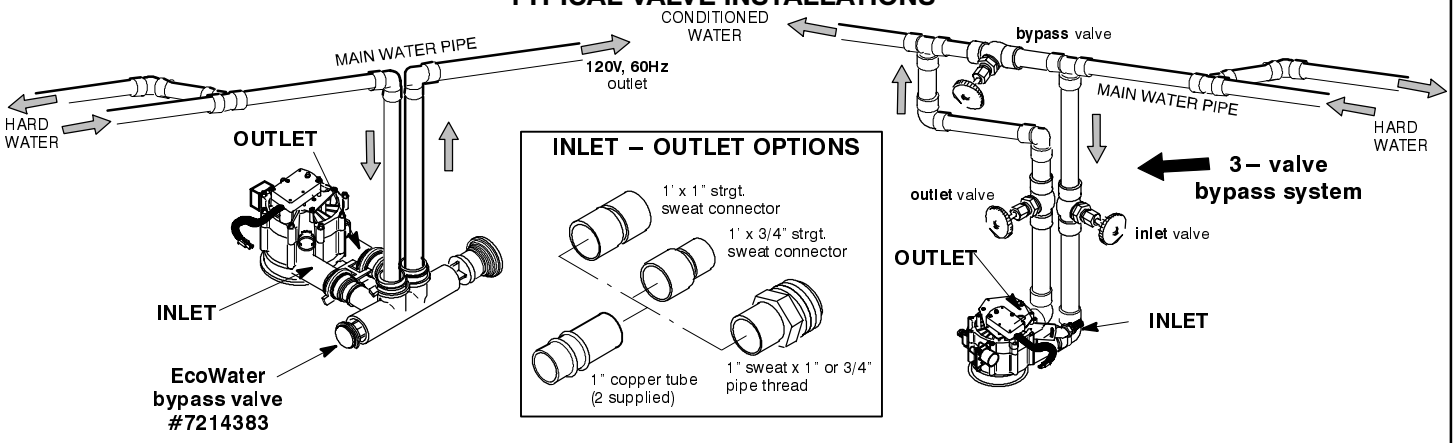
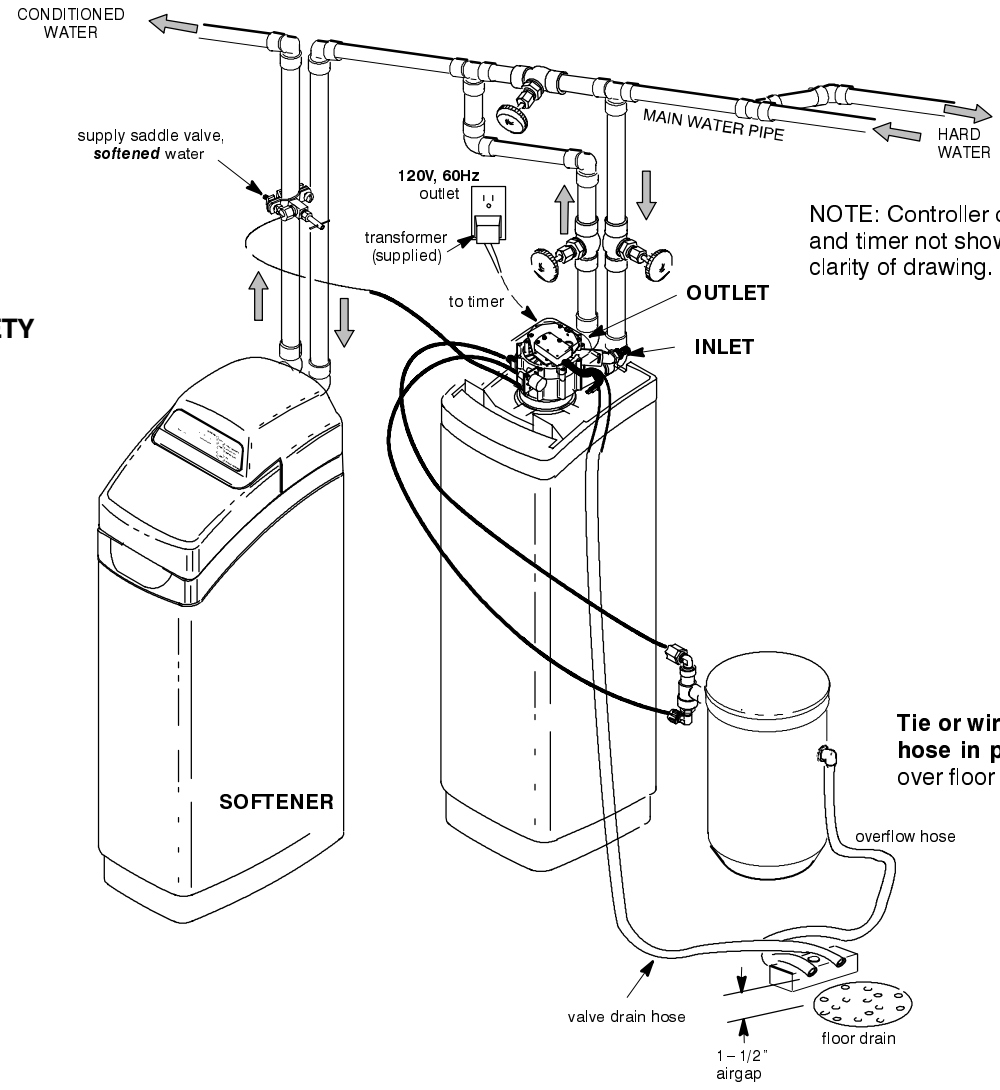


FIGURE 8

TUBING INSTALLATION



NOTE: Controller cover and timer not shown for clarity of drawing.

READ THE SAFETY GUIDES, PAGE 3

Tie or wire valve drain hose in place, to keep over floor drain.

11. INSTALL CONDITIONED WATER SUPPLY SADDLE VALVE

NOTE: If plumbing codes do not allow saddle valves, provide fittings for connection as typically shown in Figure 9B.

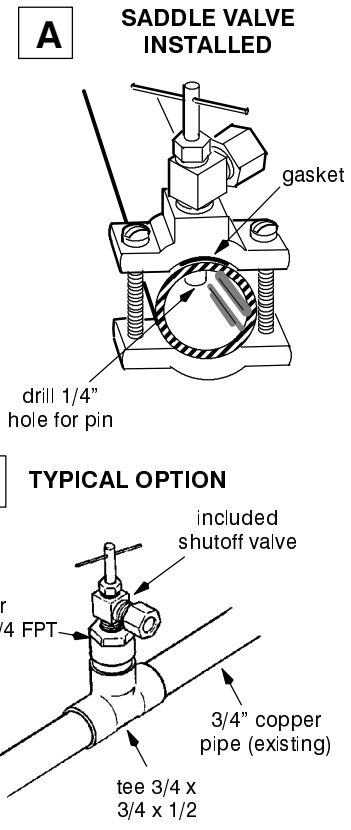
DANGER

To protect yourself from serious injury or fatal shock, use a hand or battery powered drill only to do the following step. Do not use an electric drill.

a. In a nearby, convenient location, drill a 1/4" dia. hole into a ***conditioned, cold*** **water pipe.**

b. Install the included saddle valve as shown in Figure 9A. Tighten screws evenly, but do not overtighten. Be sure to use the rubber gasket. **Fully open the valve.**

FIGURE 9



12. MAKE ALL TUBING CONNECTIONS

Move the feeder assembly into place nearby the filter, keeping accessible for adding potassium permanganate powder and other service.

Make all tubing connections as shown in Figure 10. Be sure to allow enough tubing length to permit cover installation. Tighten all compression nuts. Do not kink or bend the tubing.

a. 5/16" O.D. – from conditioned water saddle valve (installed in step 9), to the bottom of solenoid valve.

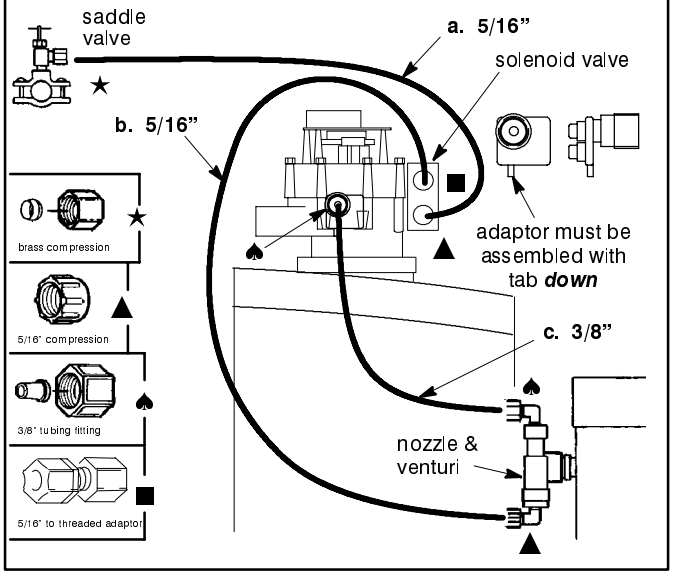
b. 5/16" O.D. – from bottom of the nozzle/venturi, to top of solenoid valve.

c. 3/8" O.D. – from top of the nozzle/venturi, to 3/8" tube adaptor. Make sure adaptor is in proper position, see Figure 10.

d. 3/8" I.D. high quality hose – from hose adaptor on the feeder tank to a floor drain – Be sure to **provide an air gap** between the end of the hose and floor drain (Figure 8, page 10).

CAUTION: Do not omit this hose. It will carry excess potassium permanganate solution to the floor drain if the tank should over fill. **Permanganate solution will deeply stain.**

FIGURE 10



13. PRESSURE TESTING FOR LEAKS

NOTE: To prevent excessive air pressure in the filter and plumbing system, do the following steps in exact order.

a. Open two or more *filtered* water faucets, both hot and cold.

b. Referring to Figure 11, place the bypass valve(s) in "service" position.

c. *Slowly* open the main water supply valve.

d. Close the filtered water faucets **after** both of the following occur.

– water runs smoothly, with no air bubbles
– you can smell the sanitizing bleach (page 6) odor at the opened faucets

e. Check your installation work for leaks. If rework is needed, be sure to take the same precautions as in step 9.

f. Add 10 lbs of potassium permanganate powder and about 1/2 gallon of water (soft water preferred) into the feeder tank. Install the tank cover.

14. CONNECT ALL LEADWIRES

a. Connect the wire harness to the valve switch, Figure 12. The switch is located on the outlet valve cover, behind the motor.

b. Connect the solenoid switch.

c. Attach the valve motor leadwire connector to the matching female connector on the faceplate timer.

CAUTION: Be sure all wiring is away from the valve cam, which rotates during operation.

15. CONNECT TO ELECTRICAL POWER

Plug the transformer into a continuously "live" 120V–60Hz house electrical outlet, approved by local codes.

16. To complete the installation, do the programming steps on the following page.

Be sure to restart the water heater, page 14.

FIGURE 11

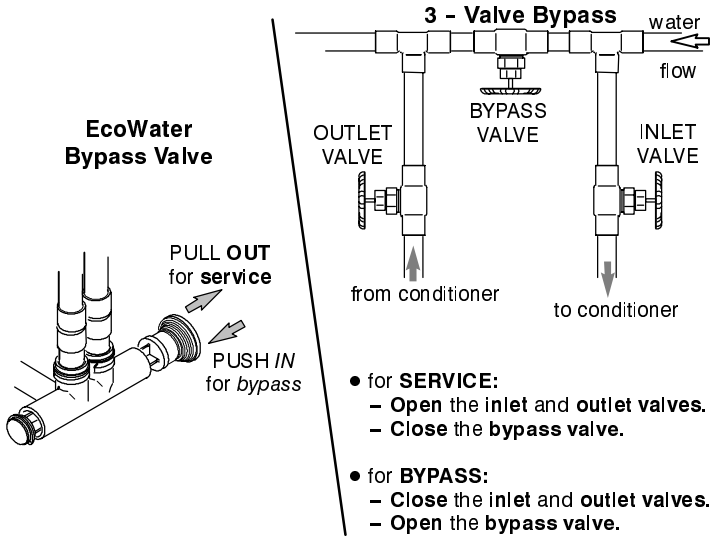


FIGURE 12

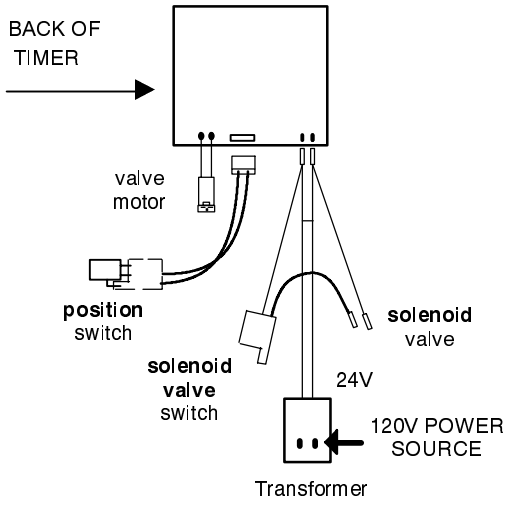
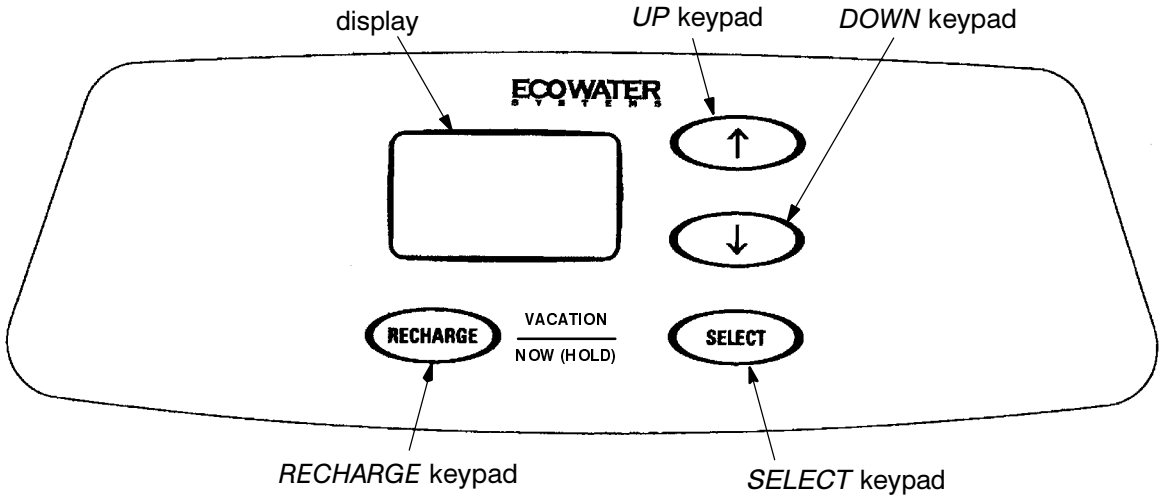
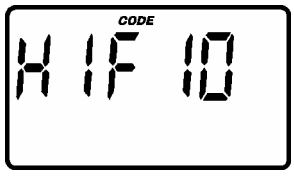
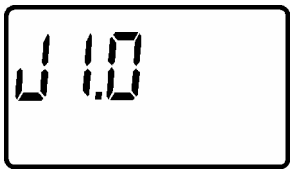


FIGURE 13



I. When the transformer is plugged in, the model code HIF10 shows in the face plate display for the first few seconds. The model code is followed by a test number (example: J1.0). Then the display will flash "12:00 PM" and the words "PRESENT TIME". Set the present time of day as follows:





A. Set Time of Day

1. Press the UP or DOWN keypads until the correct time of day shows, being sure AM or PM shows in the display.

NOTE: Press and quickly release the keypads to slowly advance the display. Hold the kaypads down for fast advance. This procedure applies for all following settings.

2. Press the SELECT keypad once to set the present time and advance to the next set up screen.

B. Set Days to Recharge

1. This setting is the number of days the filter will go between recharges. The default setting is 3 days, with a maximum setting of 99.

2. Press the UP or DOWN keypads until the correct number of days between recharges is shown in the display.

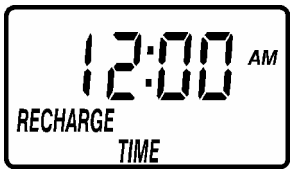
3. Press the SELECT keypad once to set the days to recharge and advance to the next set up screen.

NOTE: See the chart on the following page to determine the frequency of recharges. Find the number of people living in the household, and then going across the chart, find the amount of iron (in parts per million) that is in the water supply. The number of days that shows is the number of days the filter should be set for recharges.

Number of People	Iron (parts per million)						
	2	4	6	8	10	15	20
1	7 days	6 days	5 days	4 days	3 days	3 days	2 days
2	6 days	5 days	3 days	3 days	2 days	1 day	1 day
3	5 days	3 days	2 days	2 days	1 day	1 day	1 day
4	4 days	3 days	2 days	1 day	1 day	1 day	1 day
5	4 days	2 days	1 day	1 day	1 day	1 day	1 day
6	3 days	2 days	1 day	1 day	1 day	1 day	1 day
7	3 days	1 day	1 day	1 day	1 day	1 day	1 day
8	2 days	1 day	1 day	1 day	1 day	1 day	1 day
NOTE: If there is an iron bleed or the water supply has high turbidity (sand, silt, sediments, etc.) set the filter to regenerate more often than the table above shows.							

C. Set Recharge Time

1. Press the UP or DOWN keypads until the correct recharge time shows, being sure AM or PM shows in the display. Default for this display is 12:00 AM.



2. Press the SELECT keypad once to set the days to recharge and advance to the next set up screen.

II. Press and hold the RECHARGE keypad for three seconds until RECHARGE NOW begins to flash in the display, starting a recharge. This recharge flushes “fines” from the new mineral, and purges air and bleach remaining from the sanitizing procedure. The filter returns to service in approximately 107 minutes.

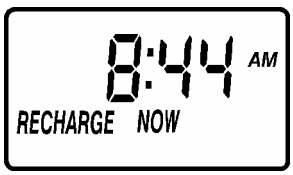
III. RESTART THE WATER HEATER: Turn on the electric or fuel supply to the water heater, and light the pilot, if applies.

NOTE: The water heater is filled with unfiltered water and as hot water is used, it refills with filtered water. In a few days, hot water will be fully filtered. To have fully filtered water immediately, wait until the recharge (step II) is over. Then, drain the water heater until water runs cold.

IV. THE TIMER IS NOW PROGRAMMED AND INSTALLATION IS COMPLETE.

FEATURES / OPTIONS

RECHARGE NOW – For an immediate extra recharge at any time, use this feature. Press and **hold** in the RECHARGE keypad for three seconds until RECHARGE NOW begins to flash in the display.



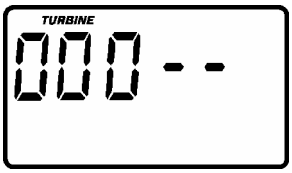
VACATION – The day you leave on vacation, or other long absence, press (DO NOT HOLD IN) the RECHARGE keypad. **VAC** begins to flash in the display. The timer will keep time, but the filter will not recharge and waste water.

NOTE: While in the VACATION setting, the filter **will** go through a recharge if the RECHARGE NOW feature is used.

WHEN YOU RETURN, press the RECHARGE keypad again to return the filter to service, and the correct time of day will show in the display. **Remember to to this or the filter will not recharge and you will soon have unfiltered water.**

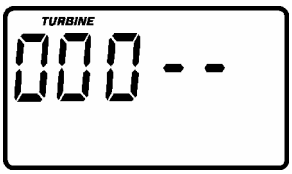
The default settings for fill (1:30 minutes), brine draw (80 minutes), backwash (20 minutes) and fast rinse (5 minutes) cycles of regeneration are factory set for maximum performance of the filter. Use the following procedures to check for correct cycle times, or to change if desired. However, only trained technicians should change the time settings.

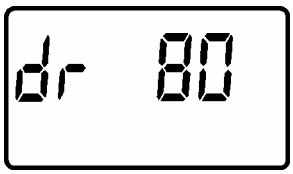
ADJUSTABLE FILL – Press and hold the SELECT button until the display shows "000––", then press the SELECT button once to advance to the Fill time adjust screen.



Using the UP or DOWN buttons, adjust the fill time from 0 minutes to 3 minutes.

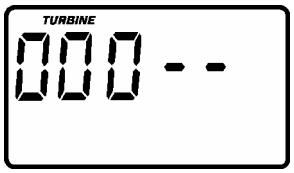
ADJUSTABLE BRINE DRAW – Press and hold the SELECT button until the display shows "000––", then press the SELECT button twice to advance to the Brine Draw time adjust screen.





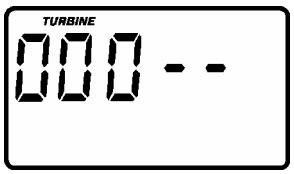
Using the UP or DOWN buttons, adjust the brine draw time from 0 minutes to 255 minutes.

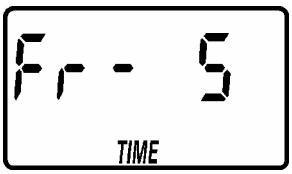
ADJUSTABLE BACKWASH – Press and hold the SELECT button until the display shows "000––", then press the SELECT button three times to advance to the Backwash time adjust screen.



Using the UP or DOWN buttons, adjust the backwash time from 0 minutes to 60 minutes.

ADJUSTABLE FAST RINSE – Press and hold the SELECT button until the display shows "000––", then press the SELECT button four times to advance to the Fast Rinse time adjust screen.





Using the UP or DOWN buttons, adjust the fast rinse time from 0 minutes to 60 minutes.

TIMER "POWER-OUTAGE MEMORY" – If electrical power to the timer is interrupted, the "memory" built into timer circuitry keeps time for 6 hours (minimum) or more. The display is blank and the filter will not regenerate. When electrical power comes on, one of two things will happen.

1. The present time of day will show steady, meaning the timer has not lost time.

2. The display will show a time, but it will be flashing. The timer memory did **not** keep the time setting and must be reset (page 13). If you do not reset the time, regenerations will most likely be at the wrong time of day.

NOTE: The flashing display is to remind you to reset the timer.

NOTE: If the filter was in a recharge when power was lost, it will now finish the cycle.

During "service", the filter is providing filtered water to the household. Iron is removed from the water by the birm or manganese greensand mineral. The mineral oxidizes* the iron, and mechanically filters it from the water. At regular intervals, the mineral needs cleaning to remove iron deposits, and to restore oxygen content. This is done during regeneration with a potassium permanganate solution. *Fill*, *solution draw*, *backwash*, and *fast rinse* are stages of the regeneration sequence.

* The mineral bed releases oxygen into the water, to change the iron from a soluble to a solid form.

SERVICE (Figure 14, page 17): Unfiltered water enters the filter valve inlet, passes through the valve, into the resin tank and mineral bed. Water is filtered as it passes through the bed, then exits through the bottom distributor. Flow continues up the internal standpipe, into the valve, and out to the house pipes.

FILL (Figure 15, page 17): To begin a regeneration, or recharge, the timer energizes the circuit to the valve motor. The motor rotates the switch activating cam (valve cam) and valve inner discs. As the cam rotates, the position switch lever is depressed by the cam. Upon reaching fill position, the lever is released outward to open the circuit to the motor.

NOTE: The position switch is "normally open".

A secondary switch turns on the solenoid valve. Conditioned water is directed through the solenoid valve and to the potassium permanganate feeder. A flow plug in the reducer fitting, at the nozzle assembly, maintains a 0.18 gallon per minute fill flow rate. From the fill flow plug, water passes into the feeder tank. The fill water dissolves potassium permanganate powder in the tank area. The float valve prevents tank overflows if other failure in the system occurs.

SOLUTION DRAW (Figure 16, page 18): The timer starts the motor again to rotate the valve into solution draw. Conditioned water is still directed to the nozzle, but filtered water flow to the venturi is stopped. Suction, created by the nozzle and venturi, draws potassium permanganate solution from the feeder tank. Solution travels to the nozzle assembly, and into the filter tank. The solution rinses slowly through the mineral bed to restore oxygen used during service. Rinse water flows to the drain.

BACKWASH (Figure 17, page 18): The motor drives the valve to backwash position. The conditioned water shutoff valve closes, stopping flow to the nozzle. In backwash, a fast *upward* flow of water through the mineral bed flushes dirt, sediments, iron deposits, etc., from the bed and to the drain. The fast flow lifts and expands the mineral bed for maximum cleaning.

FAST RINSE (Figure 18, page 19): After backwash, valve rotation places the valve in fast rinse. The continued fast flow of water changes direction to flow *downward* through the mineral bed. Any remaining solution, iron, etc., still at the bottom of the bed, are flushed up the standpipe and out the valve to the drain. The mineral bed is packed by the fast flow, and prepared for service. The motor is energized a final time to return the valve to service position.

FIGURE 14

SERVICE CYCLE

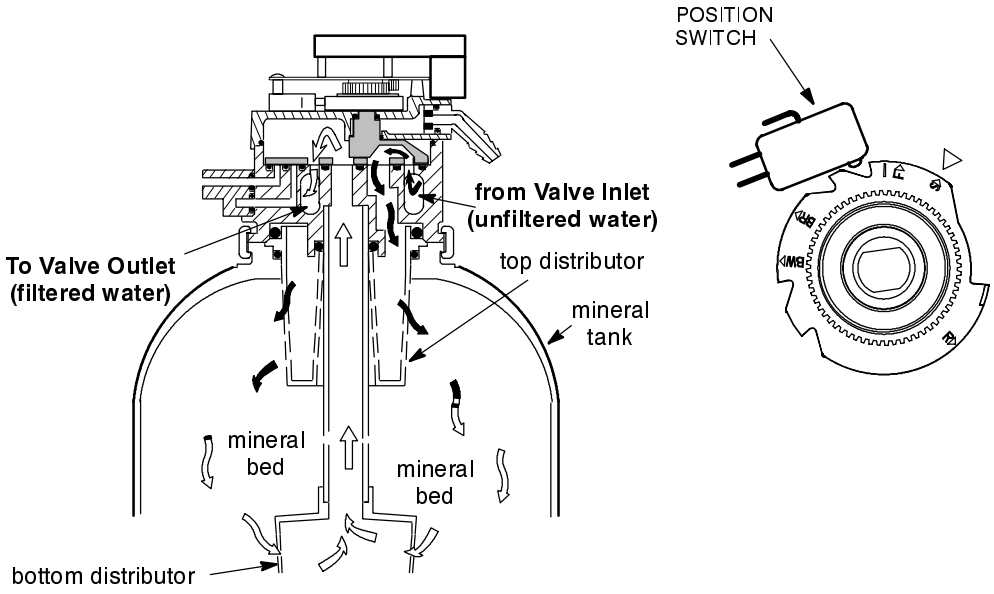


FIGURE 15

FILL CYCLE

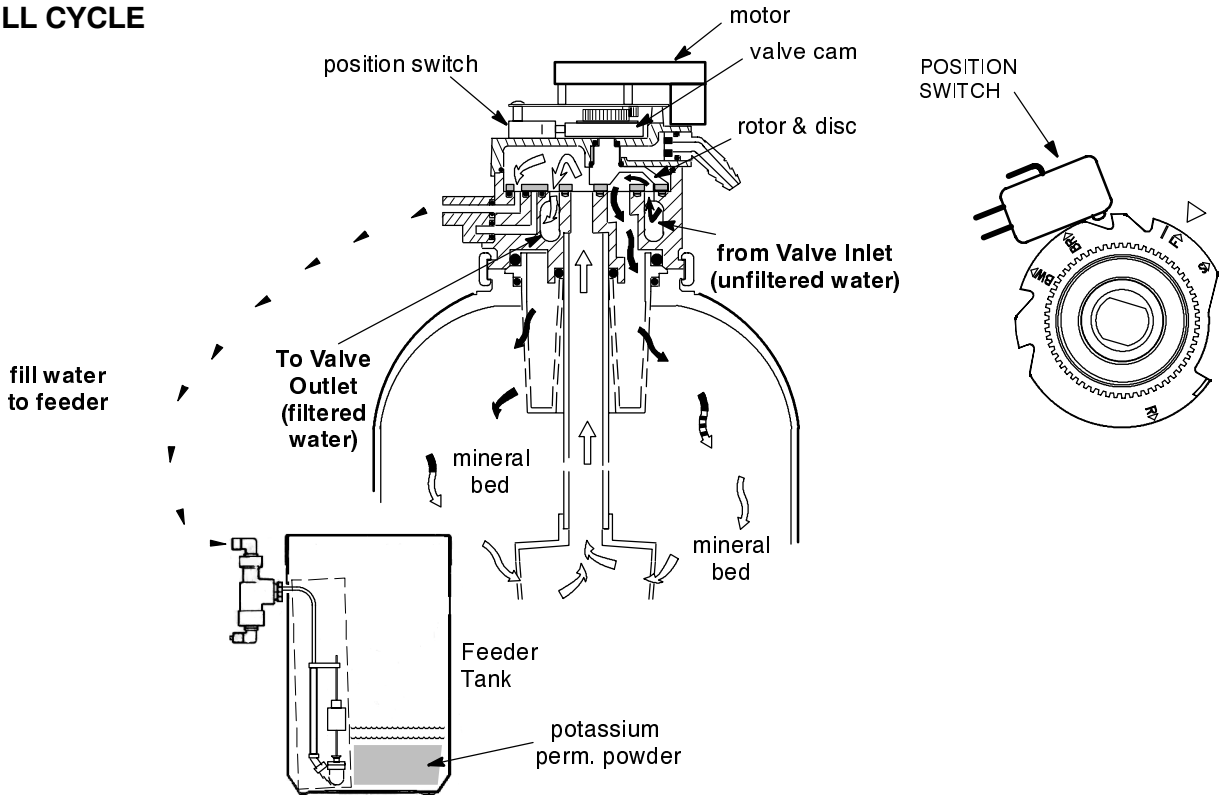


FIGURE 16

SOLUTION DRAW CYCLE

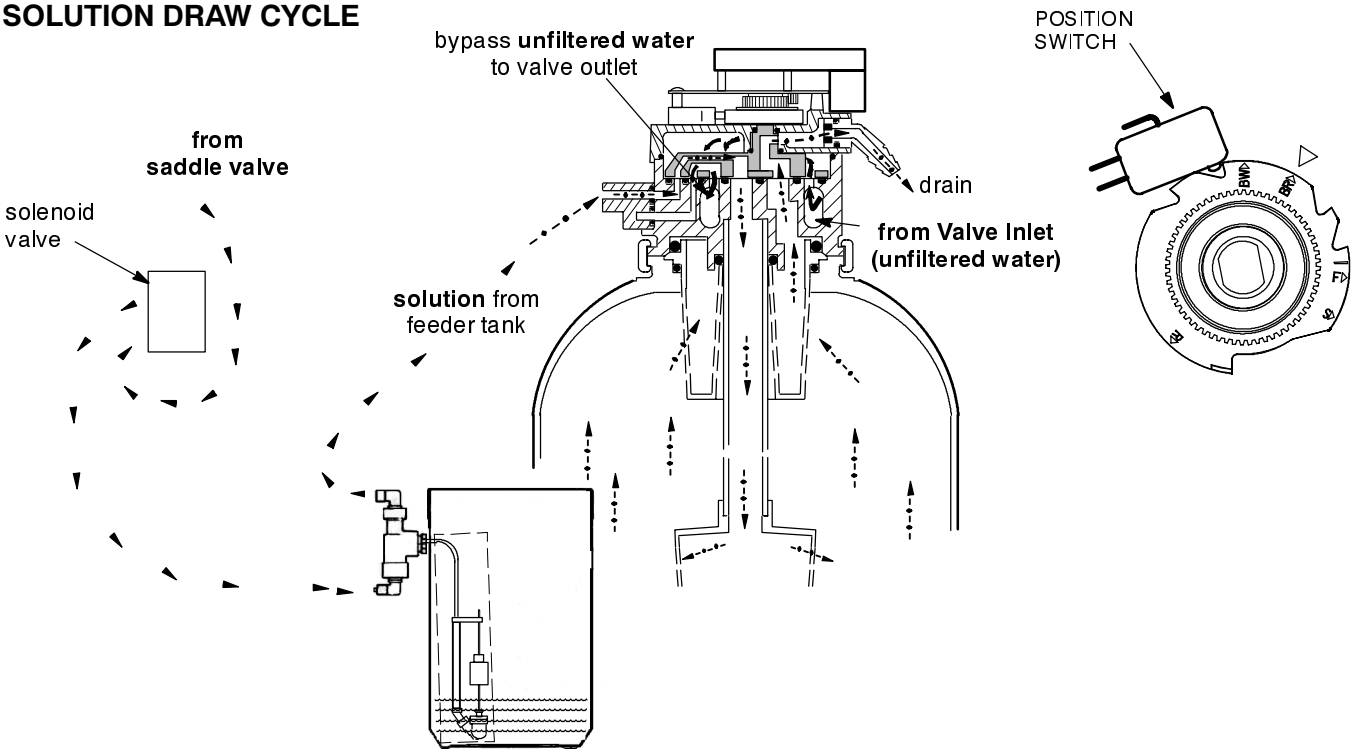


FIGURE 17

BACKWASH CYCLE

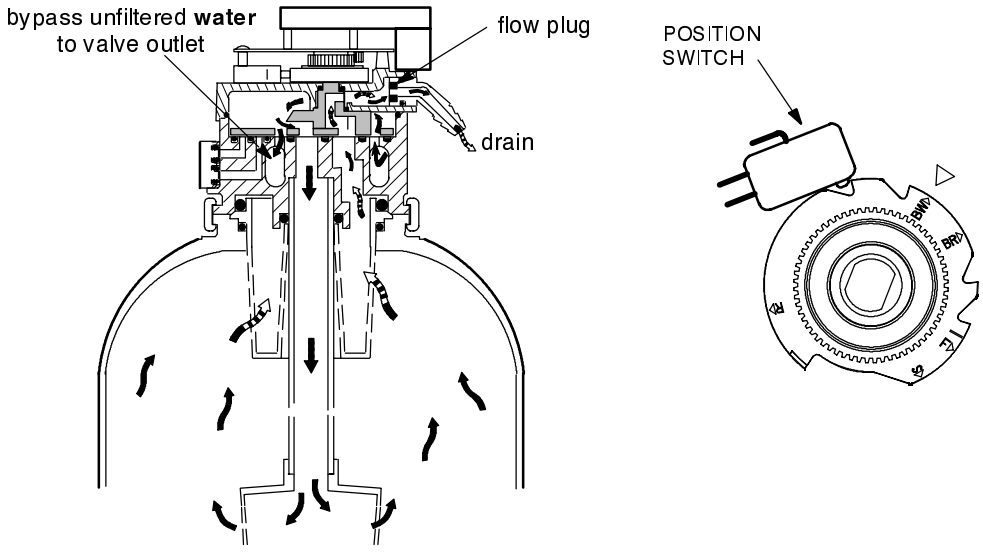
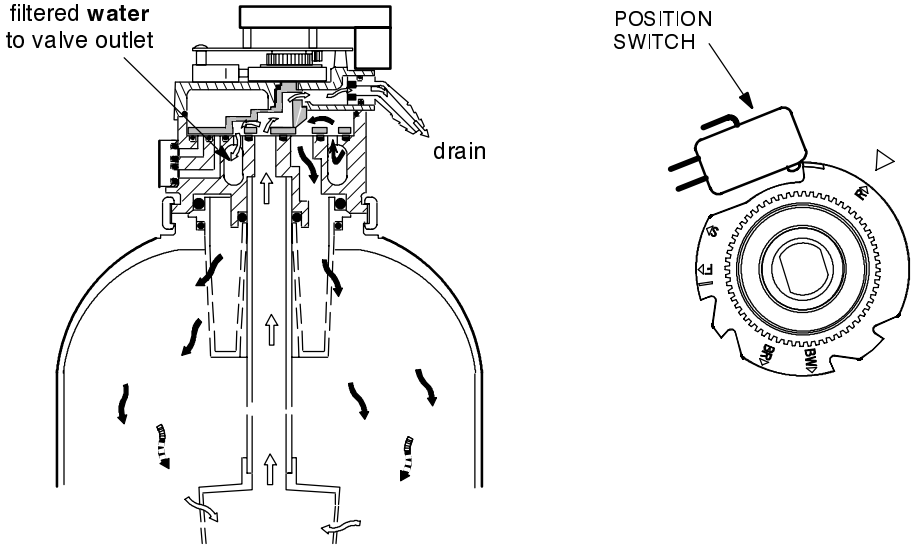


FIGURE 18

FAST RINSE CYCLE



HOW LONG DOES THE POTASSIUM PERMANGANATE LAST? Using 2 ounces of powder each regeneration (at 1 minute fill setting), 10 pounds of potassium permanganate powder will last for about 80 regenerations. Divide 80 by the number of regenerations needed each week. The answer is the approximate number of weeks the potassium permanganate should last. The 2 minute fill setting uses 3 ounces of powder, and 3 minutes uses 4 ounces.

It is important to add more potassium permanganate powder before it's entirely gone. If the filter goes too long without a regeneration, the mineral will permanently lose it's manganese coating. The complete mineral bed would need replacement.

ADDING MORE POTASSIUM PERMANGANATE:

WARNING: Handle the container of powder with care. Potassium permanganate stains deeply. Do not get it on your clothing or skin.

1. Remove the feeder tank cover.

2. Open the container of replacement powder and carefully pour into the tank.

3. Level the powder.

4. Replace the tank cover.

IMPORTANT: Each time powder is added, always do the following maintenance, as needed. Depending on several factors, this cleaning may be needed more or less often.

1. Check and clean the nozzle assembly, page 21.

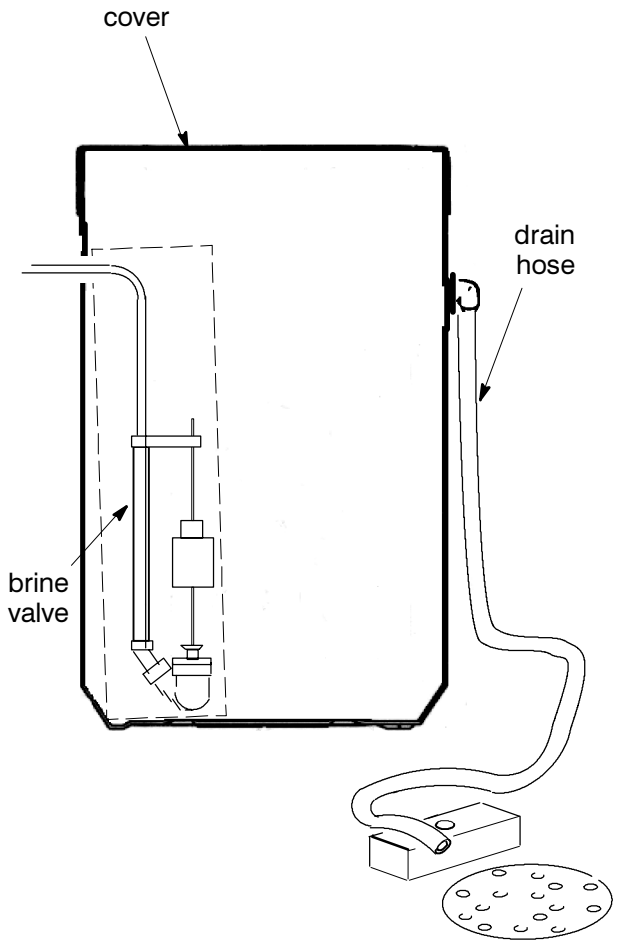
2. Check and clean all of the following as needed.

- brine valve
- screen on the bottom of brinewell
- **feeder tank drain hose**
- feeder tank (flush with fresh, clean water)
- all tubing

NUMBER OF FULL WEEKS 10 LBS OF POTASSIUM PERMANGANATE POWDER LASTS			
no. of regenerations each week	FILL CYCLE MINUTES		
	1	2	3
1	80	53	40
2	40	40	20
3	26	17	13
4	20	13	10
5	16	10	8
6	13	8	6
7	11	7	5

Note: The refill container has 10 lbs of potassium permanganate powder.

FIGURE 19



CLEANING THE NOZZLE & VENTURI: The nozzle and venturi create the suction to transfer solution from the feeder tank, into the mineral bed. If they become plugged or restricted with dirt, iron buildup, etc., they will not work. You should disassemble and clean the nozzle & venturi each time potassium permanganate powder is added. Depending on the type and/or amount of iron, you may need to clean them more often.

Important: Potassium permanganate solution may overflow from the feeder tank if the nozzle and venturi are not functioning correctly. Also refer to the important note, page 20, and do step 2.

Clean the nozzle & venturi while the filter is in "service" (**no water pressure** at nozzle assembly) and not while in regeneration. Be sure RECHARGE NOW is not flashing in the time display.

1. Disconnect bottom tubing at the nozzle assembly (Figure 20) and turn the nozzle housing out of the nozzle & venturi housing.

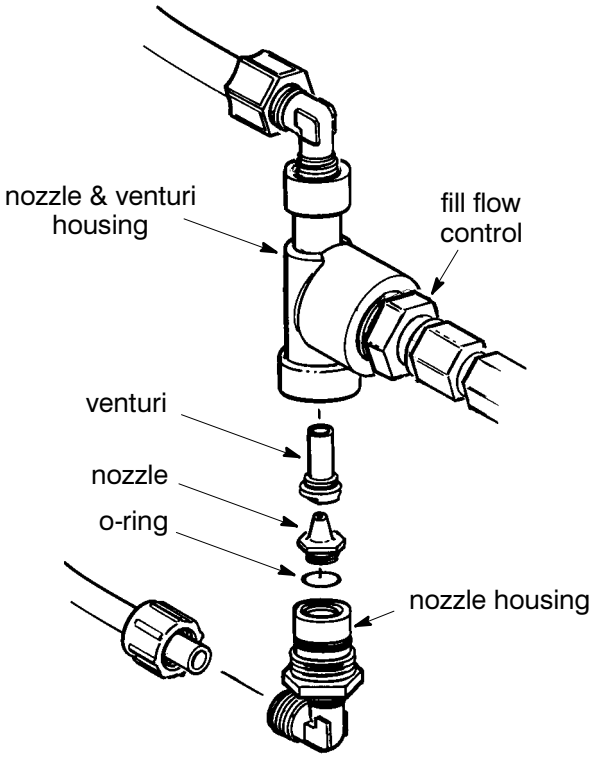
2. Turn the nozzle out of the nozzle housing. If needed, remove the venturi with a long, needle-nose pliers to clean.

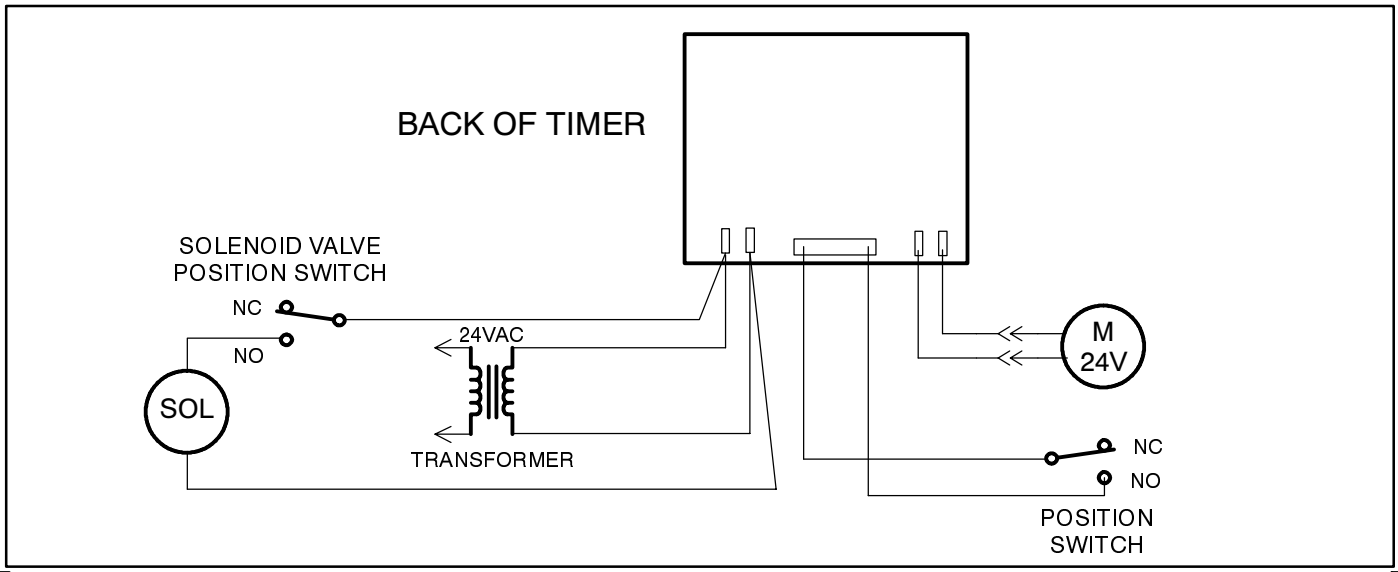
3. Clean parts in hot, soapy water. Use a small wire to clean holes in the nozzle and venturi. Use extreme care not to scratch, enlarge or misshape the holes, or surfaces around them. Flush parts in fresh, clean water.

4. Assemble all parts being sure to fully seat the nozzle and venturi in their respective locations. **Do not forget the o-ring seal on the nozzle.**

5. Replace the nozzle housing and reconnect the tubing. See page 10 for correct routing.

FIGURE 20





TROUBLESHOOTING

ALWAYS MAKE THESE **INITIAL CHECKS** FIRST

1. Does the time display show the correct time of day?

...If display is blank, check power source to the filter.

...If time is flashing, power was off for over two days. The filter resumes normal operation but recharges occur at the wrong time.

2. Plumbing bypass valve(s) must be in SERVICE position (see Figure 11, page 12).

3. The inlet and outlet pipes must connect to the filter inlet and outlet respectively.

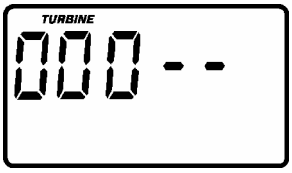
4. Is the transformer plugged into a “live” grounded wall outlet, and the power cable fastened securely?

5. The valve drain hose must be free of kinks and sharp bends.

If you do not find the problem after making the initial checks, do the MANUAL ADVANCE DIAGNOSTICS.

MANUAL INITIATED ELECTRONICS DIAGNOSTIC

1. To enter diagnostics, press and hold the SELECT keypad until (000– –) shows in the display.



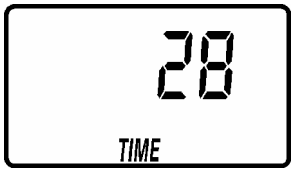
The letter (P) and dash or dashes indicate position switch operation. The letter shows if the switch is closed. A dash shows when the switch is open.

SWITCH DISPLAYS	VALVE CYCLE STATUS
– –	valve in service, fill, draw, backwash or fast rinse position
– P	valve rotating from one position to another

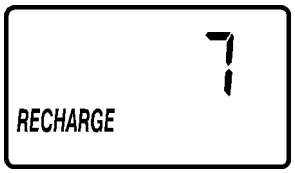
Use the RECHARGE keypad to manually advance the valve into each cycle and check correct switch operation.

While in this diagnostic screen, the following information is available and may be beneficial tor various reasons. This information is retained by the computer from the first time electrical power is applied to the face plate.

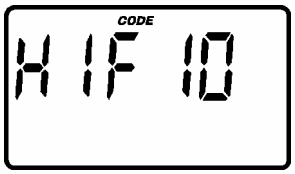
...Press the UP keypad to display the number of days this face plate has had electrical power applied.



...Press the DOWN keypad to display the number of regenerations initiated by this face plate since the model code number was entered.



2. Press the SELECT keypad and *hold* for 3 seconds until the model code appears in the display.



NOTE: For correct filter operation, the model code must be HIF10.

To reset the code, press the UP or DOWN keypads until the correct model code shows in the display.

3. Press the SELECT keypad to return the present time display. If the code was changed, make ALL the timer settings, page 13 and 14.

NOTE: If the face plate is left in a diagnostic display (or a flashing display when setting times or days to recharge), preset time automatically returns if a button is not pressed within 4 minutes.

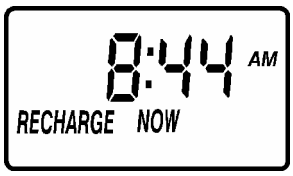
MANUAL ADVANCE DIAGNOSTIC

Use the following procedures to advance the filter valve through the regeneration cycles to check operation.

Remove the top cover to observe cam and switch operation during valve rotation.

DISPLAY MUST SHOW TIME AND DAY

1. Press and hold the RECHARGE keypad for 3 seconds until RECHARGE NOW flashes in the display and the filter moves into the fill cycle.



...If the motor does not run, check the motor and all wiring connections.

Check for fill water flow to the brine tank. If water does not enter the tank, look for an obstructed nozzle and venturi, fill flow plug or brine tubing.

2. After verifying fill, press the RECHARGE keypad to move the valve into solution draw. A slow flow of water to the drain will begin. Verify solution draw from the brine tank by shinning the flashlight into the brinewell and observing a noticeable drop in the liquid level.

If the unit does not draw brine, check for...
...dirty or defective nozzle and venturi
...nozzle and venturi not seated on the gasket, or gasket defective
...restriction in valve drain, causing a back-pressure (bends, kinks, elevated too high, etc.),
...obstruction in brine valve or brine tubing
...inner valve failure (obstructed rotor disc, wave washer defective, etc.)

3. Again press the RECHARGE keypad to move the valve into backwash. Look for a fast flow of water from the drain hose (see specifications, page 4).

...An obstructed flow indicates a plugged top distributor, backwash flow plug, or drain hose.

NOTE: Be sure household water pressure (well system) is maintained at a minimum of 20 psi. Adjust the pump switch upward, if needed.

4. Press the RECHARGE keypad to move the filter into fast rinse. Again, look for a drain flow rate about the same as backwash.

5. To return the filter to service, press the RECHARGE keypad once.

OTHER SERVICE

UNFILTERED WATER BYPASS (unfiltered water "bleeds" into filtered water supply.

1. Missing or defective o-ring(s) at resin tank to valve connection (see pages 24 and 25).

2. Defective rotor disc, seal or wave washer (see pages 26 and 27).

WATER LEAKS FROM DRAIN HOSE (during service)

1. Defective rotor disc, seal, or wave washer.

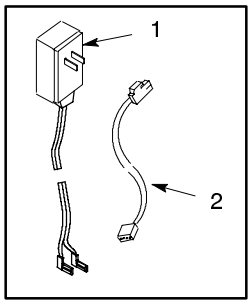
2. Defective o-ring on disc shaft.

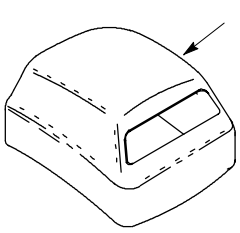
AUTOMATIC ELECTRONIC DIAGNOSTICS

The face plate has a self diagnostic function for the electrical systems (except input power). The face plate monitors the electronic components and circuits for correct operation. If a malfunction occurs, an error code appears in the face plate display.

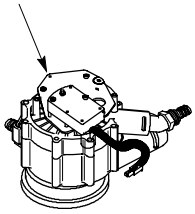
CODE	POSSIBLE DEFECT MOST LIKELY ➤---------➤ LEAST LIKELY
Err 01, Err 03 & Err 04	wiring harness or connection to position switch / switch / valve defect causing high torque / motor inoperative
Err 05	faceplate

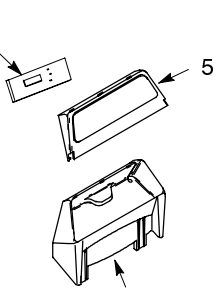
PROCEDURE FOR REMOVING ERROR CODE FROM FACEPLATE: 1. Unplug transformer---- 2. Correct defect---- 3. Plug in transformer---- 4. Wait for 12 minutes. The error code will return if the defect was not corrected. Press and hold the RECHARGE keypad for 3 seconds as an alternate way to clear an error code.

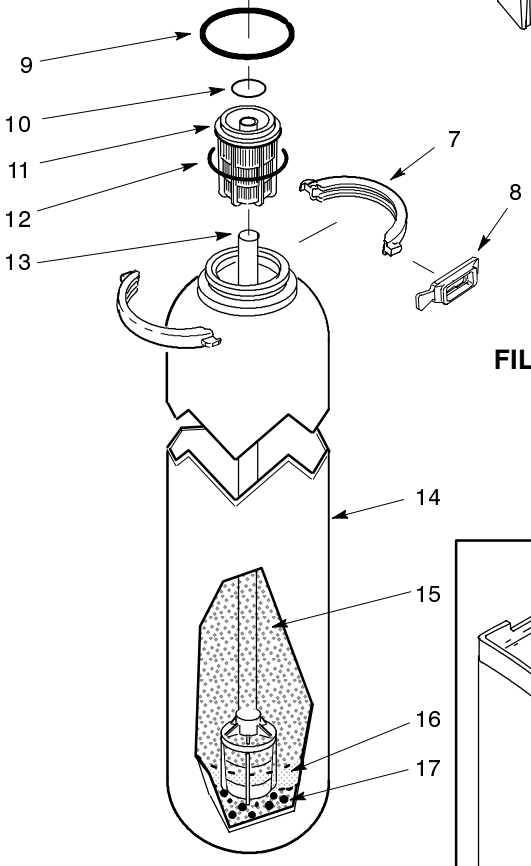




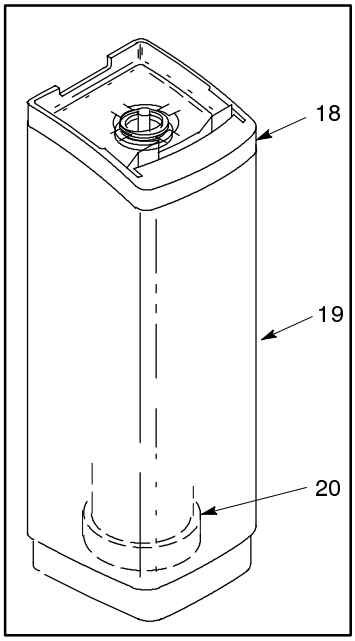
See pages 26 & 27



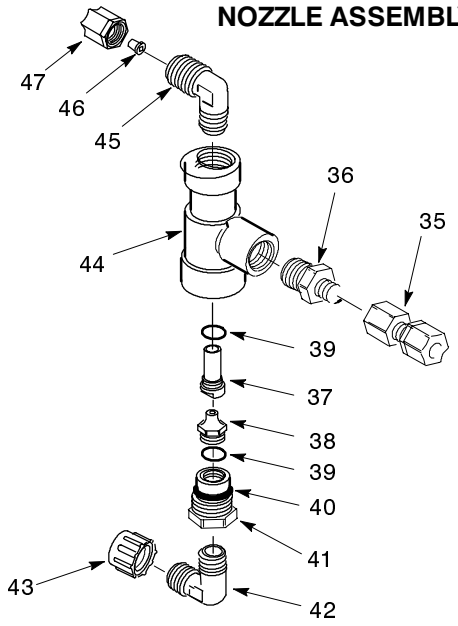




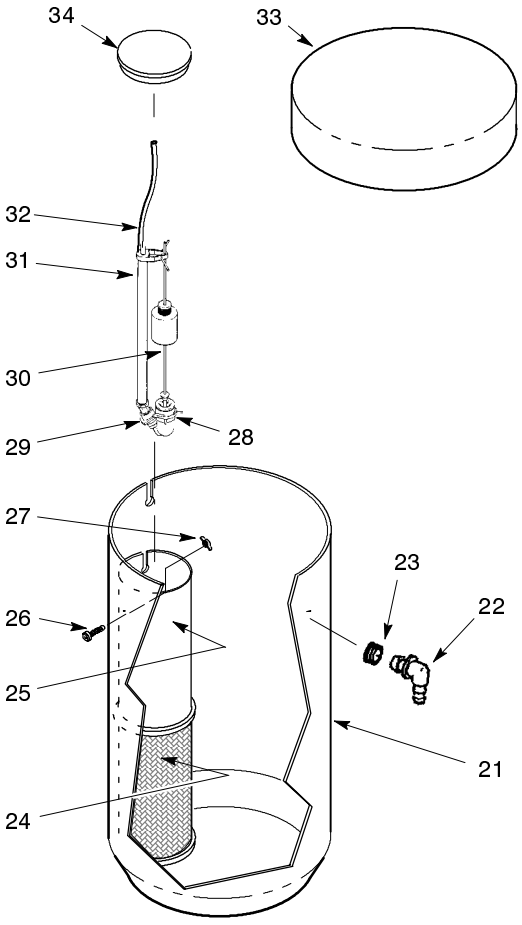
FILTER ASSEMBLY



NOZZLE ASSEMBLY



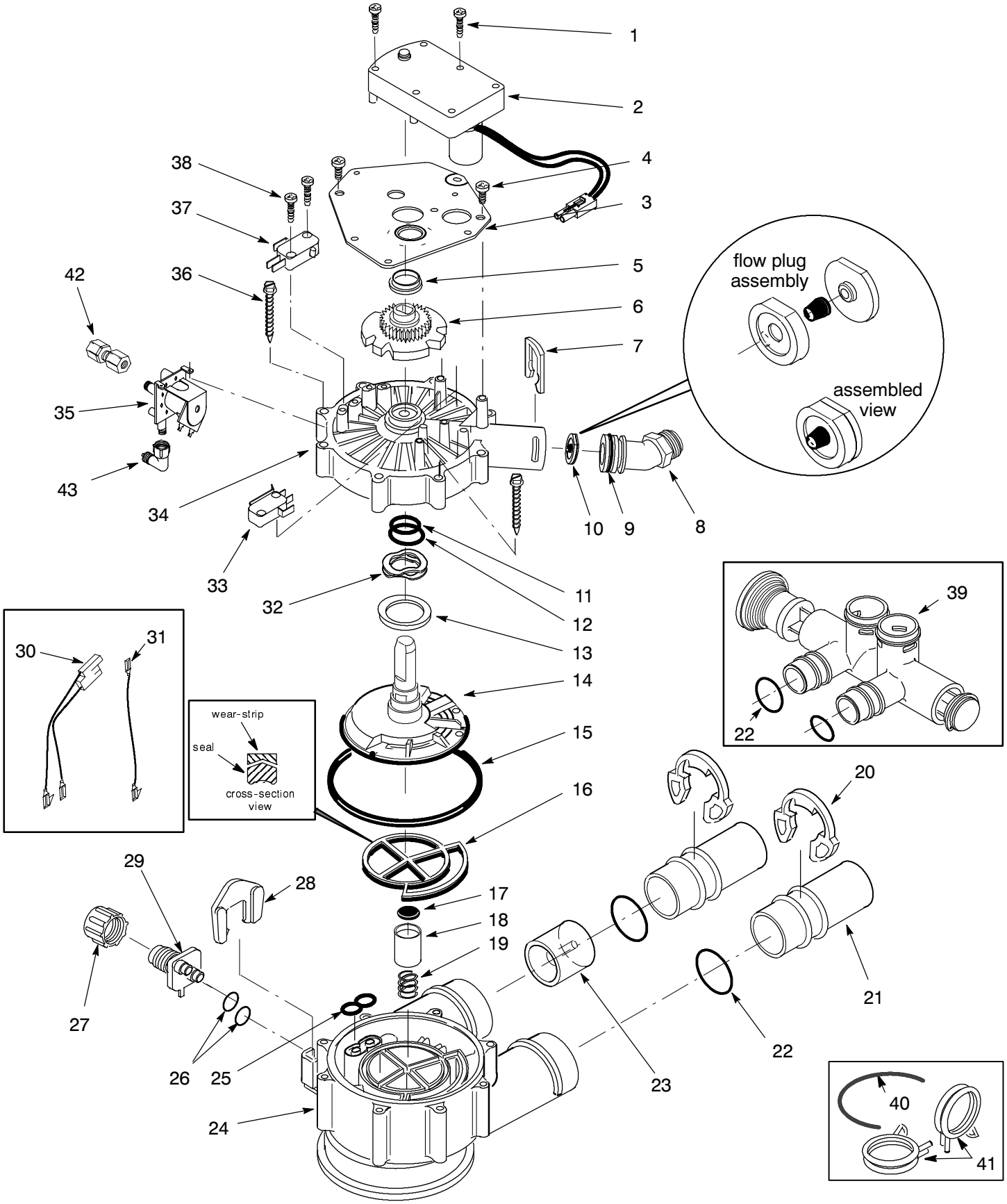
POTASSIUM PERMANGANATE FEEDER ASSEMBLY



KEY NO.	PART NO.	DESCRIPTION
1	7252373	Transformer, 24VAC – 10VA
2	7130767	Wire Harness
3	7218670	Top Cover
4	7260059	Rep'l PWA
5	7210509	Faceplate (order decal also)
-	7259901	Faceplate Decal
6	7211173	Faceplate Support
7	7176292	Clamp Section, 2 req.
8	7088033	Clamp Retainer, 2 req.
9	7170296	O-ring, 2-7/8" I.D. x 3-1/4"
10	7170254	O-ring, 13/16" I.D. x 1-1/16"
11	7088855	Top Distributor
12	7170270	O-ring, 2- 3/4" I.D. x 3" O.D.
13	7105047	Replacement Distributor, Bottom
14	7092202	Resin Tank, 10" dia. x 47"
15	0509957	Ferrite (Birm), 1-1/4 cu ft ■
-	0501676	Manganese Greensand, 1 cu ft ■
16	0501783	Filter Sand, 10 lbs ■
17	7025027	Gravel (order amount needed)
18	7210460	Rim
19	7218646	Shroud, 10" x 47"
20	7141205	Tank Base
21	7218117	Feeder Tank
22	1103200	Hose Adaptor
23	9003500	Grommet
24	7182390	Screen, Brinewell

KEY NO.	PART NO.	DESCRIPTION
25	7106962	Brinewell
26	7219587	Screw
27	7219595	Washer
28	1205500	Clip
29	7080653	Clip
30	7113008	Float, Stem & Guide Assembly
31	7221762	Brine Valve Asm. (incl. key nos. 28, 29, 30 & 32)
32	7113016	Tubing Assembly
33	7071133	Tank Cover
34	0500283	Brinewell Cover
35	7147390	Connector
36	2129501	Reducer Bushing (incl. .22 gpm fill flow plug)
37	0513437	Venturi
38	0513433	Nozzle
39	0900060	O-ring, 3/8" I.D. x 1/2" O.D. (2 req'd)
40	7170327	O-ring, 5/8" I.D. x 13/16" O.D.
41	1109700	Nozzle Housing
42	1162200	Elbow
43	1202600	Nut – Ferrule
44	1109600	Nozzle & Venturi Housing
45	9004503	Elbow
46	7131349	Tubing Insert
47	9003203	Nut, 3/8" Tube
-	7161807	Tubing, 5/16" x 20'
-	7161768	Tubing, 5/16" x 100'
-	7204354	Potassium Permanganate Powder (10 lbs)

■ Mineral bed not included with the filter.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flow plug assembly
assembled view
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wear-strip
seal
cross-section view
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KEY NO.	PART NO.	DESCRIPTION
1	7224087	Screw, #8-32 x 1" (2)
2	7228544	Motor (incl. 2 ea. of Key No. 1)
3	7231393	Motor Plate
4	0900857	Screw, #6-20 x 3/8 (3)
5	7171250	Bearing
6	7219545	Cam and Gear
7	7169180	Clip (Drain)
8	7172793	Drain Hose Adaptor
9	7170288	O-ring, 15/16 x 1-3/16
10	7228560	Flow Plug, 7 gpm (greensand)
-	7178189	Flow Plug, 5 gpm (birm)
11	-	O-ring, 5/8 x 13/16 ◆
12	-	O-ring, 1-1/8 x 1-1/2 ◆
13	7174313	Bearing, Wave Washer
14	7185500	Rotor & Disc
15	-	O-ring, 4-1/2 x 4-7/8 ◆
16	-	Rotor Seal ◆
17	-	Seal ◆
18	7171187	Plug (Drain Seal)
19	7129889	Spring
20	7089306	Clip (2 req.)
21	7077642	Copper Tube, 1" (2)
22	7170262	O-ring, 1-1/8 x 1-3/8 (4)
23	7078240	Support
24	7171145	Valve Body
25	-	Seal ◆

KEY NO.	PART NO.	DESCRIPTION
26	7170319	O-ring, 1/4 x 3/8 (2)
27	1202600	Nut–Ferrule
28	7081201	Retainer
29	7128760	Adaptor, Nozzle Venturi
30	7220130	Wire Harness
31	7220148	Wire Harness
32	7175199	Wave Washer
33	7030713	Switch, Lever (solenoid)
34	7171161	Valve Cover
35	7142722	Solenoid
36	7172997	Screw, #10 x 2-5/8 (8 req.)
37	7145186	Switch, Button (position)
38	7140738	Screw, #4-24 x 3/4 (2 req.)
39	7214383	Bypass Valve (Includes following parts)
-	7172882	Stem
-	7173016	O-ring, 1.109 I.D. x 1.387 O.D. (4)
-	7175238	C-ring
40	7207726	Ground Wire
41	7163427	Hose Clamp (2)
42	7147390	Connector, 5/16" Tube x 1/4" NPT
43	7120526	Elbow, 90°
◆	7185487	Seal Kit (incl. key nos. 11, 12, 15, 16, 17 and 25)