

# Chem-Free™

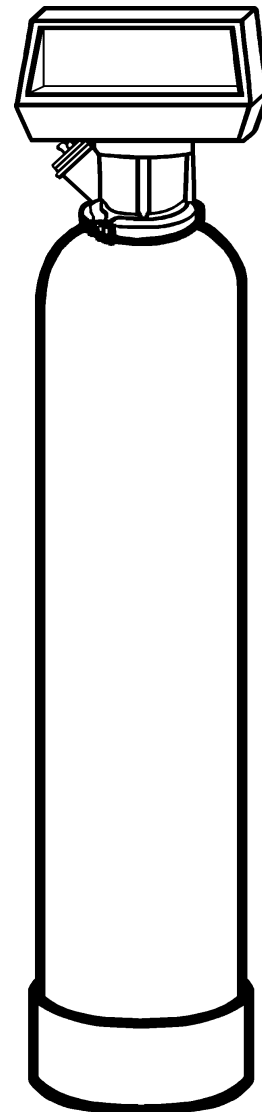
# IRON REMOVAL SYSTEMS

# INSTALLATION AND OPERATING

# INSTRUCTIONS

## MODELS:

MCA0750	MCA0750M
MCA0751	MCA0751M
MCA1000	MCA1000M
MCA1001	MCA1001M
MCA1500	MCA1500M
MCA1501	MCA1501M
MCA2000	MCA2000M
MCA2001	MCA2001M
MCA3001	MCA3001M



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## SECTION 1: GENERAL INFORMATION

Congratulations on your purchase of a Chem-Free™ Iron Removal System! The Chem-Free™ filter removes dissolved, precipitated and bacterial iron from your water supply. Contrary to conventional methods, your Chem-Free™ filter requires NO chemicals (either added to the water supply or the filter). The unique process is patented and requires ONLY periodic backwashing for a few minutes to flush out entrapped iron that has accumulated in the filter tank.

When properly installed, the Chem-Free Iron Removal System will provide many years of trouble-free service. Read this manual all the way through first, and then follow the instruction steps in the proper sequence.

### DESCRIPTION AND OPERATION OF THE SYSTEM:

The Chem-Free filter consists of two major components which are:

- (1) A HYDRO-CHARGER™, located between the well head and the pressure tank, adds a small amount of air to the iron-laden water whenever the well pump runs.
- (2) A backwashing type filter containing a special media that causes the iron in the "Hydro-Charged" water to precipitate throughout the filter bed (rather than on the surface as in chemical oxidizing filters). This process produces an iron removal capacity of from 30,000 to 50,000 parts per million (ppm) compared to 6,000 to 8,000 ppm for chemical oxidation processes. The media DOES NOT require a chemical regenerant (such as potassium permanganate) for oxygen enrichment, or salt, chlorine or any other chemicals.

Your Chem-Free filter automatically adjusts the pH to neutral or higher on acid water WITHOUT an acid neutralizer (a required piece of equipment with chemical oxidation filters whenever the pH is less than 6.7). The ability to raise pH when it is below neutral (7 or less) greatly enhances the Chem-Free filter's ability to remove iron efficiently.

**NOTE:** Replenishment of the component of the filter media that adjusts pH, "MpH Adder™", may be required periodically, the frequency of which is dependent on the raw water pH, the manganese (Mn) concentration in the water (if any) and the water consumption rate.

Periodic backwashing of the filter bed flushes the precipitated iron to the drain and readies the filter for use again. The duration of the backwash procedure will vary depending on several factors, but generally totals just 10 minutes (factory setting). The frequency of backwashing depends on iron concentration and water usage, and ranges from daily to once every 12 days. The volume of water consumed during the entire backwashing procedure is only 50 gallons at the factory backwash settings (models MCA1001 and MCA1001M).

## SECTION 2: BEFORE INSTALLATION

### INSPECTING AND HANDLING YOUR CHEM-FREE™ FILTER:

Inspect the equipment for shipping damage. If damaged, notify the transportation company and request a damage inspection.

Handle the filter unit with care. Damage can result if dropped or if set on sharp, uneven projections on the floor. Do not turn the filter unit upside down.

### MAKE SURE YOUR WATER HAS BEEN THOROUGHLY TESTED:

An analysis of your water should be made prior to the selection of your water conditioning equipment. Your Chem-Free dealer will generally perform this service for you, and may send a sample to the factory for analysis and recommendations. Enter your analysis below for a permanent record.

**NOTE:** Hydrogen sulfide (H<sub>2</sub>S) must be tested for at the well site. For accuracy, the sample must be drawn with the pump RUNNING, and the test be completed within ONE minute after the sample is drawn.

#### ANALYSIS OF YOUR WATER

Iron (Fe)	_____	ppm
Manganese (Mn)	_____	ppm
pH	_____	ppm
Tannins (Humic Acid)	_____	ppm
Hydrogen Sulfide (H <sub>2</sub> S)	_____	ppm
Hardness	_____	ppm
Other _____	_____	
Other _____	_____	

#### IRON (Fe)

Iron concentrations as low as 0.3 ppm (0.1 ppm under some conditions) will cause staining. The iron concentration, together with the flow rate demand and the consumption rate of the water determines the basic size filter system. The higher these factors are, the larger the required system. The Chem-Free filter system is capable of filtering out the three main types of iron found in water supplies; Soluble iron (also known as "clear water" or ferrous iron), precipitated iron (also known as "red water" or ferric iron) and bacterial iron (also known as iron bacteria). There is no apparent upper limit of iron concentration for the Chem-Free filter, but special care must be taken when selecting a filter model if your water has a combination of high iron, very low pH and/or manganese levels above 0.2 ppm.

The Chem-Free filter is not bactericidal, i.e. it does not remove or kill "bacterial iron". It removes the iron upon which the bacteria may live or which it deposits in your plumbing fixtures, thus eliminating its effects.

### MANGANESE (Mn)

The presence of manganese can be bothersome, even for a Chem-Free iron filter (and it is devastating for chemical oxidizing systems). As little as 0.05 ppm of manganese can produce a brownish or black stain. The ability of the Chem-Free filter to remove manganese depends on its concentration and the pH of the water.

Although not specifically designed for the removal of manganese, the oxidation of manganese is very similar to that of iron. Its oxidation is more pH dependent than that of iron, therefore, a pH of 8.2 or higher must be obtained. When this pH level is achieved, the precipitation of manganese may more readily occur. To accomplish this, models are available where the media contains additional quantities of MpH Adder, the pH raising component (model designations with "M" suffix). In any application involving manganese, a larger model filter is generally recommended (but only if the pumping rate is sufficient to backwash the larger size).

If however, the manganese concentration is low (0.1 ppm or less) and the pH is 6.5 or higher, a Chem-Free filter containing standard Chem-Free filter media will generally perform satisfactorily, although backwashing should be performed at more frequent intervals. Under more severe conditions where the pH is very low and/or the manganese concentration is high, an acid neutralizer installed ahead of the Chem-Free filter will maintain the required 8.2 pH level longer than the Chem-Free filter will between replenishment with MpH Adder.

#### pH

The pH of water measures its acidity. Water with a pH of less than 7.0 is acidic, above 7.0 it is alkaline, and a pH of 7.0 is neutral. The lower the pH value the greater the acidity, and the higher the pH value the more alkaline. Acidic water (pH less than 7.0) is corrosive to pipes, appliances, etc. A pH of 7.0 or higher facilitates iron removal - which is why the Chem-Free filter is designed to increase the pH when it is less than 7.0.

The pH increasing component of Chem-Free media is "sacrificial", that is, it slowly dissolves during the process of increasing pH. The rate this occurs is proportional to the degree of the pH increase and the water consumption rate (i.e., the greater the pH increase and water consumption, the greater the sacrificial rate). Thus, when the pH is increased to 8.2 or more, as is necessary when manganese is present, the sacrificial rate is even greater. Under the most severe conditions, the MpH component of the media may have to be replenished two to four times per year. On the other hand, if the raw water pH is 7.0 or above and no manganese is present, the sacrificial rate is very slight (see NOTE, Section 1).

## TANNINS (Humic Acid)

Tannins (a humic acid), which may be present in some water supplies, are the result of various forms of decaying vegetation (the test for tannins can be performed by your dealer). Tannins can cause problems in the operation of the Chem-Free filter by forming a sticky coating on the media, thus rendering it incapable of filtering the iron. Generally with tannin concentrations of 0.5 ppm or less, more frequent backwashing will prevent the sticky coating from forming. It does appear, however, that the level of tannin concentration affects the operation of the Chem-Free filter differently in different geographical areas (in some areas the Chem-Free filter will perform satisfactorily when tannin concentration is considerably greater than 0.5 ppm). It is therefore recommended that if the tannin concentration is **0.5 ppm or more**, contact your dealer BEFORE installing the system.

## HYDROGEN SULFIDE (H<sub>2</sub>S)

Hydrogen sulfide (often referred to as "sulfur"), is easily detectable by its objectionable "rotten egg" odor. Sulfur corrodes iron, brass, copper and silver. While the Chem-Free iron filter is not intended to be used as a sulfur filter, it is capable of removing sulfur in concentrations of up to 2 or 3 ppm, and sometimes as high as 5 ppm. Whenever hydrogen sulfide is present, backwashing must be performed at more frequent intervals, and the pumping system MUST include a standard air-to-water pressure tank with an air-relief valve.

## CHECK YOUR WATER PRESSURE AND PUMPING RATE:

Two water system conditions must be checked carefully to avoid unsatisfactory operation or equipment damage:

- (1) MINIMUM water pressure required at the filter tank inlet is 20 psi. IF PRESSURE IS OVER 100 PSI, A PRESSURE REDUCING VALVE MUST BE INSTALLED IN THE WATER SUPPLY LINE AHEAD OF THE HYDRO-CHARGER. **NOTE:** If you have a municipal or a community water supply and daytime water pressure is 85 psi or more, nighttime pressure may exceed 100 psi. Call your local water department or plant operator to obtain pressure readings. If you have a private well, the gauge on the pressure tank will indicate the high and low system pressure. Record your water pressure data below:

### WATER PRESSURE

Low \_\_\_\_\_ psi    High \_\_\_\_\_ psi

- (2) The pumping rate of your well pump must be sufficient for satisfactory operation of the HYDRO-CHARGER and to BACKWASH the filter. For models MCA1001 and MCA1001M the required rate is 5 gpm (refer to SPECIFICATIONS AND OPERATING DATA for the backwash requirement for other models). To measure the pumping rate of your pump, follow these instructions:

- a. Make certain no water is being drawn. Open spigot nearest pressure tank. When pump starts, close spigot and measure time (in seconds) to refill pressure tank (when pump shuts off). This figure represents CYCLE TIME.

- b. With the pressure tank full, draw water into a container of known volume, measure the number of gallons drawn until the pump starts again. This is DRAW-DOWN. Divide this figure by CYCLE TIME and multiply the result by 60 to arrive at the PUMPING RATE in gallons per minute (gpm). To aid in your calculation, insert the data in the following formula:

$$\text{DRAW-DOWN} \frac{\text{_____}}{\text{(gals.)}} \div \text{CYCLE TIME} \frac{\text{_____}}{\text{(secs.)}} \times 60$$
$$= \text{PUMPING RATE} \frac{\text{_____}}{\text{(gpm)}}$$

**EXAMPLE:** CYCLE TIME is 63 secs.; DRAW-DOWN is 8 gals.; then PUMPING RATE equals:

$$8 \text{ gals.} \div 63 \text{ secs.} \times 60 = 7.6 \text{ gpm}$$

**NOTE:** The addition of the HYDRO-CHARGER to the pumping system or plumbing and other water treatment devices (such as an acid neutralizer) may reduce the flow rate at the filter drain to an inadequate level to properly backwash the filter. If you are uncertain whether your flow rate is adequate, contact your dealer BEFORE installing your Chem-Free filter, so that corrective action, if required, may be taken.

## **LOCATE WATER CONDITIONING EQUIPMENT CORRECTLY:**

Select the location of your filter tank with care. Various conditions which contribute to proper location are as follows:

- (1) Locate as close as possible to water supply source.
- (2) Locate as close as possible to a floor or laundry tub drain.
- (3) Locate in correct relationship to other water conditioning equipment (See Figures 1, 2 or 3 in Sec. 3).
- (4) Filters and softeners should be located in the supply line BEFORE the water heater. Temperatures above 100°F (38°C) damage filters and softeners and will void the factory warranty.
- (5) Do NOT install a filter or softener in a location where freezing temperatures occur. Freezing may cause permanent damage to this type equipment and will also void the factory warranty.
- (6) Allow sufficient space around the unit for easy servicing.
- (7) If your water source is a community water supply, a public water supply, OR you wish to bypass water used for a geothermal heat pump, lawn sprinkling, out-buildings or other high demand applications, refer to Figures 2 or 3 for additional equipment required. Also, refer to the SPECIAL INSTRUCTIONS following Step 11 of Section 3, INSTALLATION.

## **THE IMPORTANCE OF YOUR PRESSURE TANK:**

The pressure tank found on private well systems becomes an integral part of the Chem-Free filter system by providing necessary mixing and "residence time" to the "Hydro-Charged" water. While the Chem-Free iron filter system will perform satisfactorily with either a captive-air ("bladder") type pressure tank or a standard air-to-water type with an air volume control (air-relief valve), the bladder type requires more careful adjustment of the HYDRO-CHARGER to prevent gasses from collecting in the pressure tank and the head area of the filter tank.

**A PROPERLY SIZED PRESSURE TANK OF EITHER STYLE WILL REQUIRE A MINIMUM PUMP CYCLE OF 60 SECONDS TO REFILL FROM THE WELL PUMP ON-TO-OFF PRESSURE SETTINGS.**

Under more severe operating conditions (low pH, high iron, manganese, and small concentrations of sulfur), a standard air-to-water type pressure tank with an air-relief valve MUST be used (if a bladder type tank is already in place - do not remove it - install the air-to-water pressure tank between the HYDRO-CHARGER and the bladder type tank).

**NOTE:** If your pressure tank (or any part of your water system) is not functioning properly, corrective action MUST be taken BEFORE installation of your Chem-Free Iron Filter.

## **FACTS TO REMEMBER WHILE PLANNING YOUR INSTALLATION:**

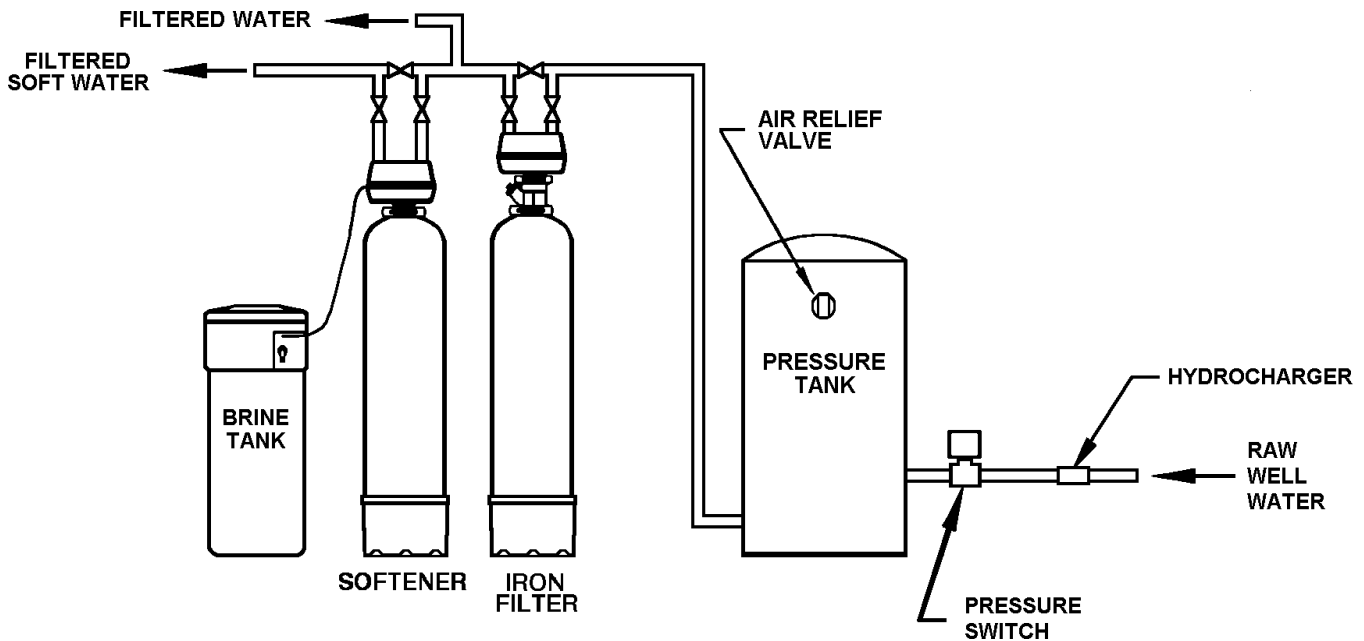
- (1) All installation procedures MUST conform to local and state plumbing codes.
- (2) All water MUST pass through the HYDRO-CHARGER ASSEMBLY, pressure tank and the Chem-Free filter, OR refer to the special instructions for a split-stream installation in Sec. 3. (System may malfunction if this instruction is ignored.)
- (3) If lawn sprinkling, a swimming pool, geothermal heating/cooling or water for other devices/activities are to be treated by the Chem-Free filter, a larger model filter MUST be selected to accommodate the higher flow rate demands of these items. The pumping rate of the well pump must be sufficient to accommodate these items plus the backwashing requirement of the filter. Consult your dealer for alternative instructions if the pumping rate is insufficient.
- (4) Remember that the filter INLET is attached to the pipe that supplies water (i.e. runs to the pump), and the OUTLET is the line that runs toward the hot water heater.
- (5) Before commencing the installation it is advisable to study the existing piping system and to determine the size, number and type of fittings required. Typical system schematics shown in these instructions (Figures 1, 2 or 3) will be of assistance.

**NOTE:** If the plumbing system is used as the ground leg of the electric supply, continuity should be maintained by installing ground straps around any nonconductive plastic piping used in installation.

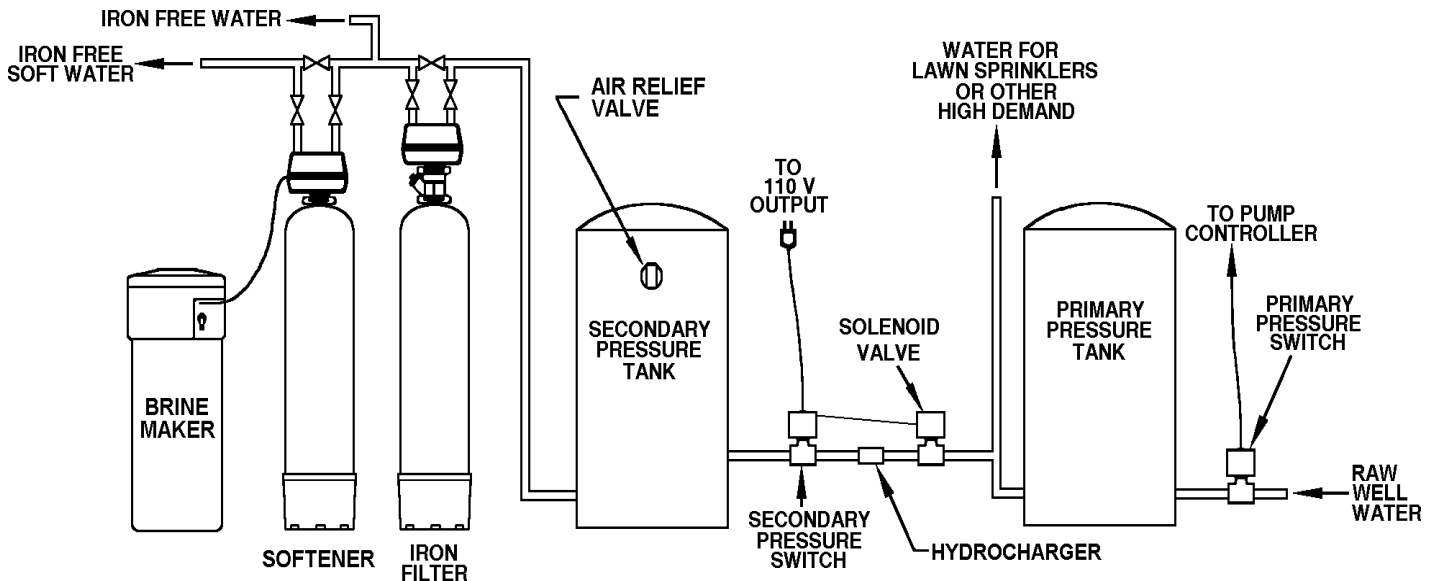
- (6) **IMPORTANT:** Always use thread tape on threaded plastic fittings. NEVER use pipe dope, as it will deteriorate the plastic fittings.

## SECTION 3: INSTALLATION

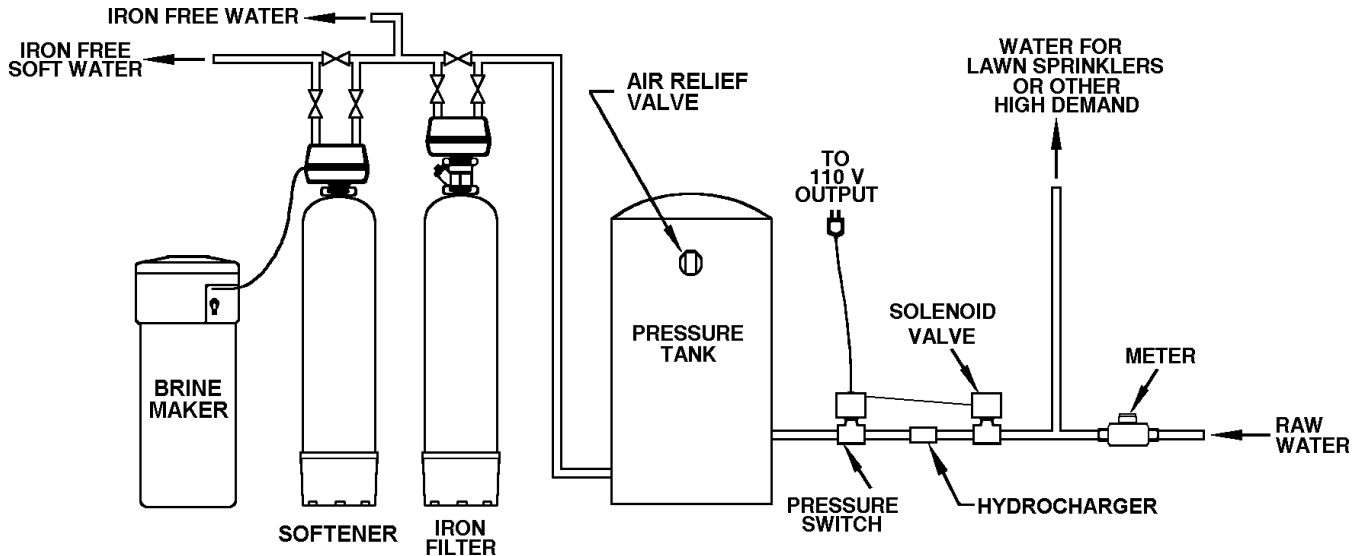
Proper installation sequence of water conditioning equipment is very important.  
Refer to the diagram following for your particular water supply.



**Figure 1: STANDARD INSTALLATION**



**Figure 2: SPLIT-STREAM INSTALLATION**



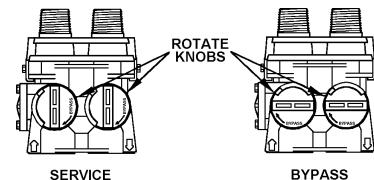
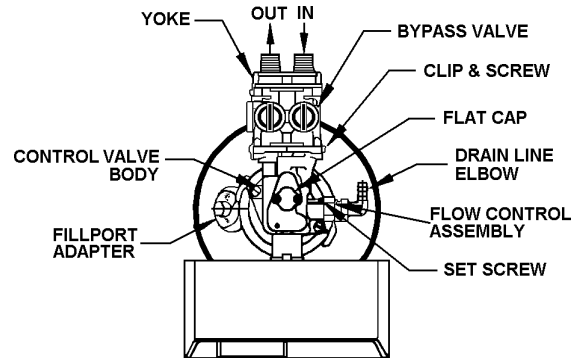
**Figure 3: PUBLIC WATER SUPPLY INSTALLATION**

**NOTE:** Have you read Section 4, PLUMBING SYSTEM CLEANUP, for instructions on some procedures that MAY need to be performed first?

Step 1. (a) If MEDIA is already in the MEDIA TANK, proceed to Step 2. If MEDIA is shipped separately, add media thru fillport adaptor using funnel (Figure 4). Fillport cap can be removed by removing quick release clip. NEVER ADD MEDIA ABOVE LINE INDICATED ON SIDE OF TANK. You may have received more media than required for the initial fill, save extra media for future replenishment.

(b) Reinstall fillport cap. Make sure cap is fully inserted before reinstalling clip.

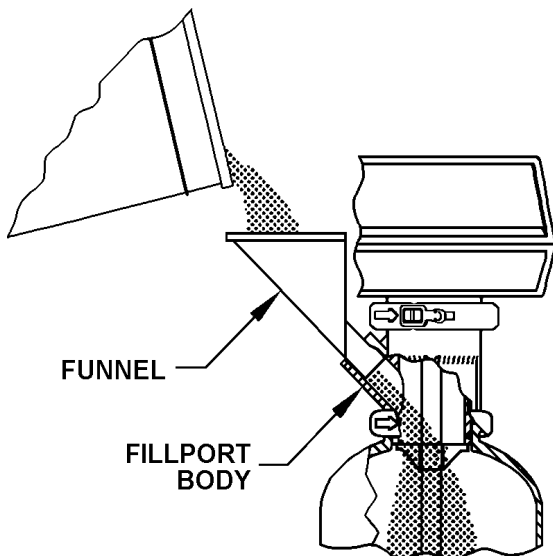
(c) Attach BYPASS VALVE and/or optional YOKE (refer to Figure 5) using ADAPTER COUPLINGS, CLIPS and SCREWS.



**Figure 5: INLET/OUTLET CONNECTIONS**

Step 2. Shut off all water at main supply. On a PRIVATE WELL SYSTEM, turn off power to pump and drain pressure tank. Make certain pressure is relieved from complete system by opening nearest faucet to drain system. SHUT OFF FUEL SUPPLY TO WATER HEATER.

Step 3. Cut main supply line as required to fit HYDRO-CHARGER in plumbing between well pump and pressure tank (HYDRO-CHARGER may be installed in a vertical or horizontal position). Position HYDRO-CHARGER so that WATER FLOW ADJUSTING SCREW is accessible for adjustment by screwdriver. Allow at least 6 to 8 in. of straight run of 1 in. pipe on both INLET and OUTLET side of HYDRO-CHARGER. Install unions at end of straight runs to facilitate HYDRO-CHARGER removal and inspection. Be certain direction of FLOW ARROW on HYDRO-CHARGER label points TOWARD pressure tank



**Figure 4: FILLING MEDIA TANK**

and pressure control switch is located on pressure tank side of the HYDRO-CHARGER as in Figures 1, 2 or 3 (rapid cycling of pump may occur if pressure switch is located on well side). If a check valve is located between HYDRO-CHARGER and pressure tank, it will prevent HYDRO-CHARGER from performing properly. Relocate to well side of HYDRO-CHARGER.

**NOTES:**

1. DO NOT apply heat near HYDRO-CHARGER, as damage may occur to rubber check valve and o-rings. On badly scaled, older plumbing systems, it may be advantageous to install a "WYE" strainer to prevent plugging of HYDRO-CHARGER nozzle with scale. WYE strainer must precede union on INLET side of HYDRO-CHARGER.

2. If existing water system includes a captive-air type pressure tank and it is desirable to install an additional air-to-water type with air release (**NOT** as a split-stream type installation), install air-to-water tank between hydro-charger and existing captive-air tank.

**IMPORTANT:** Before proceeding, with HYDRO-CHARGER installed, re-verify adequate pumping rate following the procedure described in Section 2. After verification of adequate flow, depressurize system as described previously.

Step 4. Cut main supply line as required to fit plumbing to INLET and OUTLET of BYPASS VALVE and/or optional YOKE.

Step 5. Attach plumbing. DO NOT apply heat to any fitting connected to BYPASS or CONTROL VALVE, as damage may result to internal parts or connecting adapters. MAKE CERTAIN WATER FLOW ENTERS THROUGH INLET AND DISCHARGES THROUGH OUTLET.

**NOTE:** If installation is to be SPLIT-STREAMED prior to MEDIA TANK (Figure 2) or is a PUBLIC WATER SUPPLY type installation (See Figure 3) refer to special instructions following Step 11.

Step 6. Loosen SET-SCREW and pull out DRAIN LINE FLOW CONTROL (DLFC) assembly from VALVE BODY (see Figure 5). Unscrew DRAIN LINE ELBOW from DLFC. Apply thread tape to threads. Reassemble to VALVE BODY, making certain DLFC assembly is FULLY inserted into VALVE BODY before tightening SET-SCREW.

**CAUTION:** SET-SCREW requires only FINGER pressure to hold plastic DLFC in place. Overtightening SET-SCREW may crack fitting.

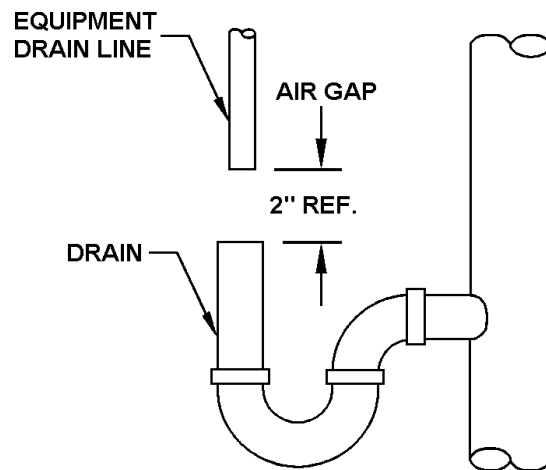
Step 7. Attach DRAIN LINE to DRAIN LINE ELBOW. To prevent back pressure from reducing flow rate below minimum required for backwash, DRAIN LINE **MUST** be sized according to run length and relative height. Be careful not to bend flexible drain tubing sharply enough to cause "kinking" (if kinking occurs DRAIN LINE **MUST** be replaced!).

Typical examples of proper DRAIN LINE diameters are:

- (1) 1/2 in. ID up to 15 ft. when discharge is lower than inlet.
- (2) 5/8 in. ID up to 15 ft. when discharge is slightly higher than inlet.
- (3) 3/4 in. ID when drain is 25 ft. away and/or drain is installed overhead.

Some areas prohibit the use of flexible drain lines. Check with local code officials prior to installation.

Step 8. Position DRAIN LINE over drain and secure firmly. To prevent back-siphoning of sewer water, provide an air-gap of at least 2 in. or 2 pipe diameters between end of drain hose and drain (Figure 6). Do not raise DRAIN LINE more than 10 ft. above floor.



**Figure 6: DRAIN**

Step 9. (a) Make certain BYPASS VALVE knobs are in "BYPASS" position (See Figure 5). Turn on power to well pump, or open main supply valve completely. Plug CONTROL VALVE POWER CORD into 110/120V, 60Hz non-switched power source. Manually stage control to BACKWASH POSITION (See HOW TO MANUALLY CYCLE PROGRAM, Page 5-4). Unplug CONTROL VALVE POWER CORD. Open INLET KNOB of BYPASS VALVE approximately 1/4 of the way to full open (SERVICE POSITION) allowing the unit to fill slowly. This will purge any entrapped air in the bed. Failure to fill tank slowly could result in loss of media to drain. Once water is flowing continually to drain, open both INLET and OUTLET KNOBS on BYPASS VALVE completely (See Figure 5).



(b) Check for leaks. Leave unit in BACKWASH for at least 10 minutes or until water runs clear to drain, whichever is longer. This procedure will "reclassify" media that may have been disturbed during shipping and handling. Plug CONTROL VALVE POWER CORD back into power source. Allow unit to complete a full regeneration cycle, see "HOW TO MANUALLY CYCLE PROGRAM", p.5-4.

Step 10. SET HYDRO-CHARGER by following these steps:

a) Open nearest faucet until pump starts, then close faucet.

(b) Place a finger lightly over SUCTION PORT (See Figure 7). A slight suction should be detected for approximately ONE-THIRD of pumping cycle TIME (do not confuse with one-third of PRESSURE RANGE.)

(c) If suction duration is too short, increase by turning WATER FLOW ADJUSTING SCREW (Figure 7) CLOCKWISE. To decrease duration, turn COUNTER-CLOCKWISE.

(d) Repeat steps (a) through (c) until proper setting is obtained.

**NOTE:** When the duration of the suction is too long, cold water may have a "milky" appearance caused by excess air in system. Correct this condition by reducing the duration of suction. This condition is commonly associated with bladder-type pressure tanks. In extreme cases where elimination of excess air prevents system from performing satisfactorily, it may be necessary to install a standard air-to-water type pressure tank with an air-relief valve (See Section 2, THE IMPORTANCE OF YOUR PRESSURE TANK.)

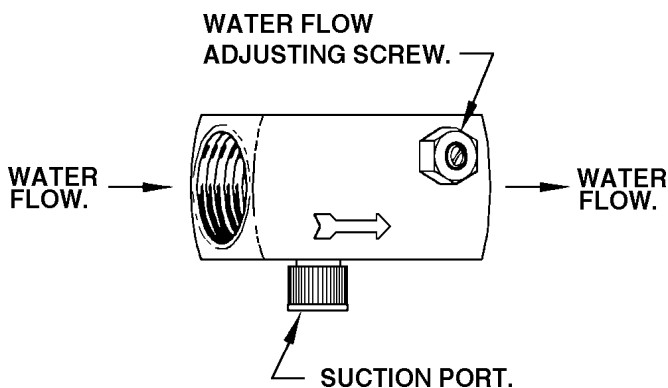


Figure 7: HYDRO-CHARGER

Step 11. Set Time-of-Day (See HOW TO SET TIME CONTROL, page 5-3) and set BACKWASH frequency (See Section 5, BACKWASHING INSTRUCTIONS). Installation is now complete.

**NOTE:** Due to the nature of the Chem-Free media, on start-up it sometimes requires 2 or 3 days for the Chem-Free filter to completely remove the iron. Do not become alarmed if this occurs. During the initial backwashings, a small amount of fine white media may be observed in drain water. This is normal and beneficial for the efficient operation of your filter system.

**SPECIAL INSTRUCTIONS FOR SPLIT-STREAM AND PUBLIC WATER SUPPLY TYPE INSTALLATION:**

For SPLIT-STREAM type installations, a secondary PRESSURE TANK must be installed as in Figure 2. On PUBLIC WATER SUPPLY type installations, a PRESSURE TANK must be installed as in Figure 3. It is recommended in both applications to use a standard air-to-water type pressure tank with a deep-well air volume control (air release valve). The pressure tank should be of same capacity as would normally be installed if water system were a standard private well type. Also note both applications require a NORMALLY-CLOSED SOLENOID VALVE. Follow standard installation procedures above with following additions and modifications.

- (1) Install PRESSURE TANK (SECONDARY PRESSURE TANK in Figure 2) as indicated by appropriate diagram.
- (2) Install NORMALLY-CLOSED SOLENOID VALVE, 110/120V, 60Hz after water meter and AFTER a line split for untreated water (if there is one).
- (3) On both types installation, install HYDRO-CHARGER between PRESSURE TANK (SECONDARY PRESSURE TANK on SPLIT-STREAM type installation) and NORMALLY-CLOSED SOLENOID VALVE.
- (4) Install PRESSURE SWITCH after HYDRO-CHARGER and wire it to SOLENOID VALVE (SECONDARY PRESSURE SWITCH on SPLIT-STREAM). Set HIGH pressure on PRESSURE SWITCH (which controls opening and closing of SOLENOID VALVE) 2 to 3 psi LOWER than LOW pressure on PRIMARY PRESSURE SWITCH. EXAMPLE: If PRIMARY PRESSURE SWITCH is set at 40/60 psi, set SECONDARY PRESSURE SWITCH at 20/38 psi.

For PUBLIC WATER SUPPLY type installations, contact your local water department or plant operator and ask what the normal LOW system pressure is. Set HIGH pressure on PRESSURE SWITCH 2 to 3 psi LOWER than this figure.

**NOTE:** Failure to set PRESSURE SWITCH as described above will NOT allow proper closing of SOLENOID VALVE during periods of low system pressure. Improper function of SOLENOID VALVE will cause total failure of system.

## INSTRUCTIONS FOR USE OF FILLPORT ADAPTER BASE

BEFORE PERFORMING ANY OF THE FOLLOWING OPERATIONS PLACE UNIT INTO BYPASS BY TURNING THE INLET AND OUTLET KNOBS TO "BYPASS" POSITION (SEE FIGURE 5).

### ATTACHING AR1 AIR RELEASE VALVE:

- (1) Relieve pressure by staging filter into backwash position.
- (2) Remove fill port cap, Figure 8.
- (3) Attach the AR1 Air Release Valve to the fillport cap, shipped with the air release valve, using an 1/8" 45° elbow. Air Release should be installed vertically.
- (4) Replace air release-cap assembly.
- (5) It is recommended that a length of 1/4" poly tubing be run from the top of the air release to a suitable drain. This is done so any entrained moisture will go to drain when the air release vents.
- (6) Return unit to service.

- (4) Lower end of drain line. Filter will now siphon itself empty of water. You can terminate the siphoning action at any time by staging the control valve to service position.

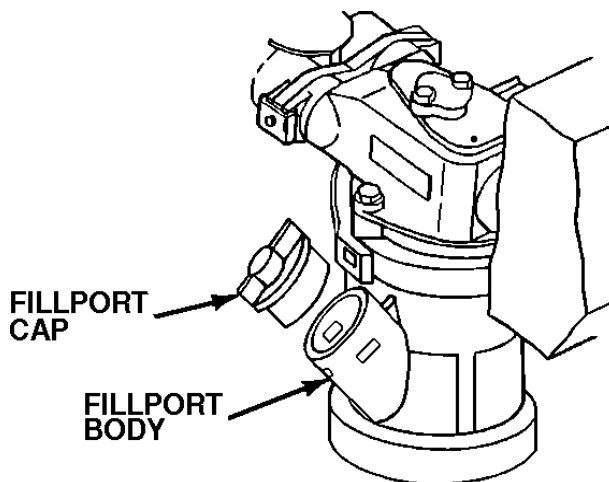


Figure 8: FILLPORT ADAPTER BODY

### REPLENISHING MEDIA:

- (1) In order to be able to replenish media, water must be drained from the tank. Therefore, perform the steps in the following section on DRAINING WATER FROM FILTER. You will not need to completely drain the tank, removal of approximately 1-2 gallons should be sufficient.
- (2) After draining the tank, insert the fill funnel, as shown in Figure 9.
- (3) Add the required amount of replenishment media.
- (4) Fill the mineral tank to the top with water, as required.
- (5) Replace fillport cap.
- (6) Return filter to service and backwash unit to mix new material with the old and remove any fines.

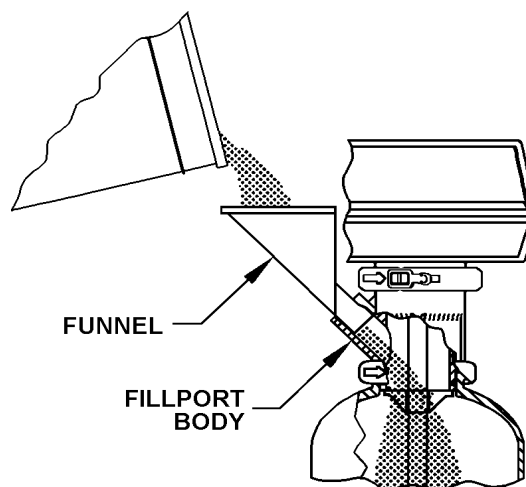


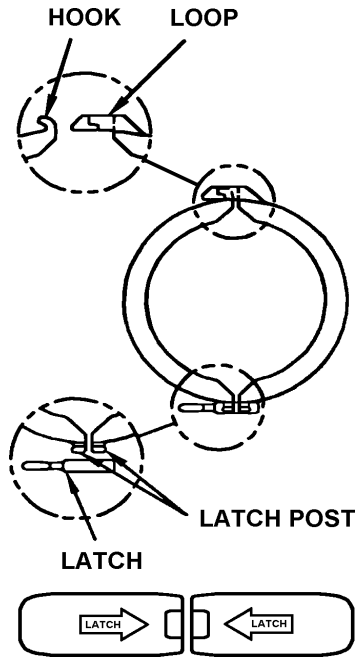
Figure 9: USE OF FILLPORT

### DRAINING WATER FROM FILTER:

- (1) Stage program wheel on control valve powerhead to backwash position to relieve pressure. **IMPORTANT:** Lift end of drain line to retain water in the line, DO NOT allow drain line to empty. If drain connection is to rigid pipe, disconnect it at the drain line flow control and attach a length of flexible tubing for this operation.
- (2) Stage program wheel to space between backwash and rapid rinse.
- (3) Remove fill port cap, Figure 8.

**SPECIAL SERVICE INSTRUCTIONS:**

Under normal circumstances removal of valve should never be required. However, if it must be removed, it can be done by disassembling the quick release clamp, by removing latch. Pressure should be relieved before attempting any disassembly. Upon reassembly, all o-rings should be lubricated with silicone grease. Reassemble clamp as shown in Figure 10. MAKE SURE ARROWS ON LATCH SIDE OF CLAMP ARE ALIGNED.



**Figure 10**

## **SECTION 4: PLUMBING SYSTEM CLEAN-UP**

**THE FOLLOWING PROCEDURES ARE GUIDELINES ONLY BUT HAVE PROVEN SUCCESSFUL IN MOST INSTANCES. UNDER NO CIRCUMSTANCES SHOULD ANY PROCEDURE OUTLINED BELOW BE FOLLOWED IF CONTRARY TO THE APPLIANCE MANUFACTURER'S INSTRUCTIONS. SHOULD THERE BE ANY QUESTIONS CONCERNING THE ADVISABILITY OF PERFORMING A PROCEDURE, IT IS STRONGLY RECOMMENDED THE MANUFACTURER'S AUTHORIZED SERVICE OUTLET BE CONSULTED PRIOR TO PERFORMING THE PROCEDURE.**

The plumbing system and water using appliances that have been exposed, even for a short time, to iron-fouled water need to be cleaned of the precipitated iron that has collected in them or iron "bleed" (staining) will continue to be a problem.

Depending on the amount of iron in the water and the length of time the water system has been exposed to iron fouling, select from the following procedures those that apply to the type system and appliances that need cleaned to assure iron-free water at the points of use.

### **SOFTENER**

It is not uncommon that the softener was installed in an effort to remove ferrous ("clear water") iron from the water supply. Typically, a softener will remove some ferrous iron until the resin bed becomes fouled to the extent that it will lose both hardness removal capacity and the limited capacity for iron removal. This is the condition to expect the softener to be in when planning a system clean-up.

Prior to closing main supply valve or turning power off to a private well system and preparatory to installing the Chem-Free Filter System, do the following:

- (1) Disconnect brine draw line from brine cabinet and place the loose end into a five gallon plastic pail filled with a solution of hot water and 10 ozs. of resin mineral cleaner (IRON-X™).
- (2) Manually advance control timer to BRINE DRAW position (refer to instructions provided with your softener), and allow all hot mineral cleaner solution to be drawn into mineral bed. Then IMMEDIATELY:
- (3) Close main water supply valve or turn power off to pump and proceed with filter installation. During time required to install filter system, iron-fouled softener resin will be chemically cleaned.
- (4) After filter installation is completed, final adjustments made with water turned on and brine draw tube reconnected, manually reposition timer on softener to BACKWASH position. Allow timer to perform an automatic, complete backwash and regeneration cycle. During backwashing of softener, all iron cleaned from the resin will be washed down drain. It is advisable after chemically cleaning softener to regenerate system twice to fully restore capacity lost due to iron-fouling.

### **HOT WATER HEATER**

If the water heater has been exposed to both iron and hardness for a long period of time, replacement of the heater tank may be the only practical solution to prevent continued staining originating from this source.

After completing the installation of the Chem-Free Filter System, clean the water heater by following these instructions:

- (1) Shut off fuel supply to water heater and close heater inlet water valve.
- (2) Drain hot water tank completely. Open inlet water valve allowing heater tank to be refilled with iron-free water. Continue flushing until water runs clear to drain.
- (3) If after approximately 30 minutes flushing, water does NOT clear, terminate flushing operation. Refill water heater with water and pour approximately 1/2 gallon of household bleach into top of heater tank. Allow bleach solution to stand in tank for 20 to 30 minutes. Flush tank again until water is clear at drain. Turn fuel supply on.

**NOTE:** If water does not clear in approximately 10 minutes, water heater probably should be replaced.

### **DISHWASHER**

Consult owner's handbook and follow manufacturer's instructions.

### **TOILET FLUSH TANKS**

Prior to commencing installation of the Chem-Free Filter System, pour 4 to 6 ounces of resin mineral cleaner (IRON-X) or inhibited muriatic acid into flush tanks and bowls and let stand. When installation is completed, flush toilets several times with iron-free water. If iron deposits or stains remain, repeat procedure until clear.

# SECTION 5: BACKWASHING INSTRUCTIONS

Periodic BACKWASHING of the Chem-Free filter bed is required to flush out the entrapped iron that has accumulated. This procedure is performed automatically at 1:00 a.m. for a period of approximately 10 minutes, and will not interfere with a softener regeneration which is usually set for 2:00 a.m.

## TO SET BACKWASH FREQUENCY FOR NORMAL HOUSEHOLD APPLICATIONS:

To determine and set BACKWASH FREQUENCY, follow these instructions:

- (1) Select BACKWASHING FREQUENCY SCHEDULE corresponding to your model.
- (2) Locate box intersected by number of persons in your family and iron concentration of water (if iron concentration is between two numbers in SCHEDULE, use higher number.)
- (3) Number in box represents number of times, in 12 days, timer should be set to regenerate. Refer to HOW TO SET TIME CONTROL to set timer.

**EXAMPLE:** You have model MCA1001, 4 in family and 8 ppm iron. Refer to SCHEDULE for model MCA1001 and locate box intersected by 4 in family and 8 ppm iron. The figure "2" in box indicates a BACKWASH frequency of two times per 12 days (if a "1", "3", "4", "6", or "12" were in box, frequencies of once, three, four, six and twelve times per twelve days, respectively, would be indicated.)

**NOTE:** The BACKWASHING FREQUENCY SCHEDULES are based on average water consumption rates and are merely guides. They are NOT intended to be used if water is used by outside spigots, a swimming pool, geothermal heat pump, or other high water usage devices or activities. If your application includes any of these, and you have already determined your model Chem-Free filter is capable of handling the flow rates involved, refer to the next paragraph for instructions on setting BACKWASH FREQUENCY.

## TO SET BACKWASH FREQUENCY FOR COMMERCIAL MODELS AND NON-STANDARD HOUSEHOLD APPLICATIONS:

If your filter is to be used for a commercial application or for reasons covered above, the BACKWASHING FREQUENCY SCHEDULE is not applicable. Determine the backwashing frequency as follows:

- (1) Estimate DAILY IRON REMOVAL by multiplying iron concentration by estimated daily water consumption (use 60 gals. per person per day for normal household applications):

$$\begin{aligned} & \text{Est. Daily Water Usage} \frac{\text{_____}}{\text{(gals.)}} \times \text{Iron Concentration} \frac{\text{_____}}{\text{(ppm)}} \\ & = \text{Daily Iron Removal} \frac{\text{_____}}{\text{(ppm - gals.)}} \end{aligned}$$

- (2) Calculate BACKWASH FREQUENCY by inserting DAILY IRON REMOVAL from above into following formula (refer to specifications for IRON REMOVAL CAPACITY of your model):

$$\begin{aligned} & \frac{\text{Iron Removal Capacity of Your Model} \frac{\text{_____}}{\text{(ppm-gals.)}}}{\text{Daily Iron Removal} \frac{\text{_____}}{\text{(ppm-gals.)}}} \\ & = \text{Backwash Frequency} \frac{\text{_____}}{\text{(days)}} \end{aligned}$$

The resulting number of days between backwashings should be converted to the nearest MORE FREQUENT obtainable timer setting (i.e., a calculated frequency of 4.7 days should be converted to a 4 day interval, and a 9.2 frequency to a 6 day interval). It is not possible, however, to set the timer less frequently than once every 12 days.

If your water contains a high iron concentration, manganese, tannins or hydrogen sulfide it may be advisable to increase the backwash frequency up to daily, if necessary. It should be noted, however, that increasing the frequency or duration of backwashing **WILL NOT** overcome an insufficient pumping rate.

# BACKWASHING FREQUENCY SCHEDULES

MODELS: MCA0750, MCA0750M, MCA0751, MCA0751M

Persons In Family	IRON CONTENT - (PPM)							
	2	4	6	8	10	12	14	16
1	1	1	1	1	1	1	1	2
2	1	1	1	2	2	2	2	3
3	1	1	2	2	2	3	3	4
4	1	2	2	3	3	4	4	6
5	1	2	2	3	4	4	6	6
6	1	2	3	4	4	6	6	12

MODELS: MCA1000, MCA1000M, MCA1001, MCA1001M

Persons In Family	IRON CONTENT (PPM)									
	2	4	6	8	10	12	14	16	18	20
1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	2	2	2	2	2
3	1	1	2	2	2	2	3	3	3	3
4	1	1	2	2	2	3	3	4	4	4
5	1	1	2	2	3	3	4	4	6	6
6	1	2	2	3	3	4	6	6	6	6

MODELS: MCA1500, MCA1500M, MCA1501, MCA1501M

Persons In Family	IRON CONTENT (PPM)									
	2	4	6	8	10	12	14	16	18	20
1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	2	2	2	2
3	1	1	1	1	2	2	2	3	3	3
4	1	1	1	2	2	2	3	3	4	4
5	1	1	1	2	2	3	3	4	4	6
6	1	1	2	2	3	3	3	4	6	6
7	2	2	3	3	3	4	6	6	6	12
8	2	3	3	3	4	6	6	6	12	12

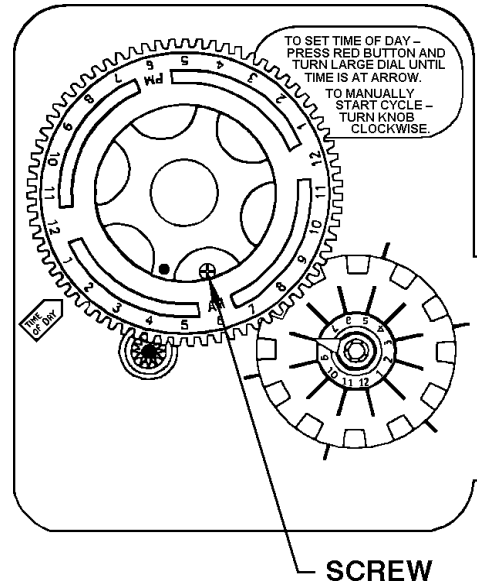
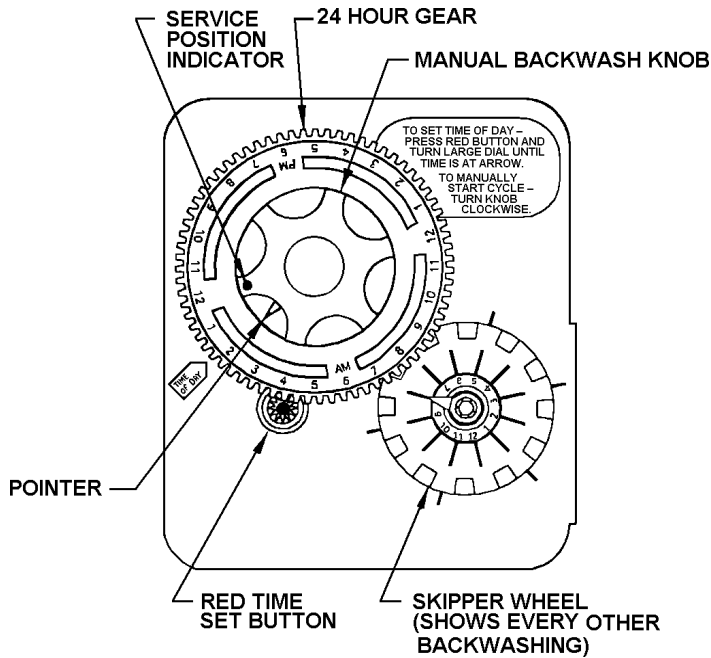
MODELS: MCA2000, MCA2000M, MCA2001, MCA2001M

Persons In Family	IRON CONTENT - (PPM)											
	5	10	12	14	16	18	20	22	24	26	28	30
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	2	2	2	2	2
3	1	1	1	2	2	2	2	2	2	2	3	3
4	1	1	2	2	2	2	2	3	3	3	3	3
5	1	2	2	2	2	3	3	3	3	4	4	4
6	1	2	2	3	3	3	3	4	4	4	6	6
7	1	2	3	3	3	4	4	4	6	6	6	6
8	1	2	3	3	4	4	4	6	6	6	6	6
9	2	3	3	4	4	4	6	6	6	6	12	12
10	2	3	4	4	4	6	6	6	6	12	12	12

MODELS: MCA3001, MCA3001M

Persons In Family	IRON CONTENT - (PPM)											
	10	12	14	16	18	20	22	24	26	28	30	32
1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1	1	1	1	2
3	1	1	1	1	2	1	2	2	2	2	2	2
4	1	1	1	2	2	2	2	2	2	2	2	3
5	1	1	2	2	2	2	2	2	3	3	3	3
6	1	2	2	2	3	2	3	3	3	3	3	4
7	2	2	2	2	3	3	3	3	3	4	4	4
8	2	2	2	3	3	3	3	4	4	4	4	6
9	2	2	3	3	3	3	4	4	4	6	6	6
10	2	2	3	3	3	4	4	4	6	6	6	6

# HOW TO SET TIME CONTROL



## HOW TO SET DAYS ON WHICH FILTER IS TO BACKWASH:

Rotate the skipper wheel until the number "1" is at the red pointer. Set the days that backwash is to occur by sliding the tabs on the skipper wheel outward to expose trip fingers. Each tab is one day. Finger at red pointer is tonight. Moving clockwise from the red pointer, extend or retract fingers to obtain the desired backwashing schedule.

## HOW TO SET THE TIME-OF-DAY:

- (1) Press and hold the red button in to disengage the drive gear.
- (2) Turn the large gear until the actual time of day is opposite the time of day pointer. Unit will now start backwashing at 1:00 a.m. (See note below to adjust this time.)
- (3) Release the red button to again engage the drive gear.

## HOW TO MANUALLY BACKWASH YOUR FILTER AT ANY TIME:

Turn the manual backwash knob clockwise until the knob engages the program wheel. This slight movement of the knob will start the backwash program. The backwash knob will make one revolution in approximately three hours and stop in the position shown in the drawing. Even though it takes three hours for the knob to complete one revolution, the backwash cycle of your unit might be only 12 to 20 minutes in duration.

In any event, filtered water may be drawn after rinse water stops flowing from the filter drain line.

## How to Adjust Regeneration Time:

1. Disconnect the power source.
2. Locate the three screws behind the manual regeneration knob by pushing the red button in and rotating the 24 hour dial until each screw appears in the cut out portion of the manual regeneration knob.
3. Loosen each screw slightly to release the pressure on the time plate from the 24 hour gear.
4. Locate the regeneration time pointer on the inside of the 24 hour dial in the cut out.
5. Turn the time plate so the desired regeneration time aligns next to the raised arrow.
6. Push the red button in and rotate the 24 hour dial. Tighten each of the three screws. Do not overtighten.
7. Push the red button and locate the pointer one more time to ensure the desired regeneration time is correct.
8. Reset the time of day and restore power to the unit.



# HOW TO SET REGENERATION CYCLE PROGRAM

## HOW TO SET THE REGENERATION CYCLE PROGRAM:

The regeneration cycle program on your filter has been factory preset. However, portions of the cycle or program may be lengthened or shortened in time to suit local conditions.

To expose cycle program wheel, grasp timer in upper left-hand corner and pull, releasing snap retainer and swinging timer to the right.

To change the regeneration cycle program, the program wheel must be removed. Grasp program wheel and squeeze protruding lugs towards center, lift program wheel off timer. (Switch arms may require movement to facilitate removal.)

Return timer to closed position engaging snap retainer in back plate. Make certain all electrical wires locate above snap retainer post.

## HOW TO CHANGE THE LENGTH OF THE BACKWASH TIME:

The program wheel as shown in the drawing is in the service position. As you look at the numbered side of the program wheel, the group of pins starting at zero determines the length of time that your unit will backwash.

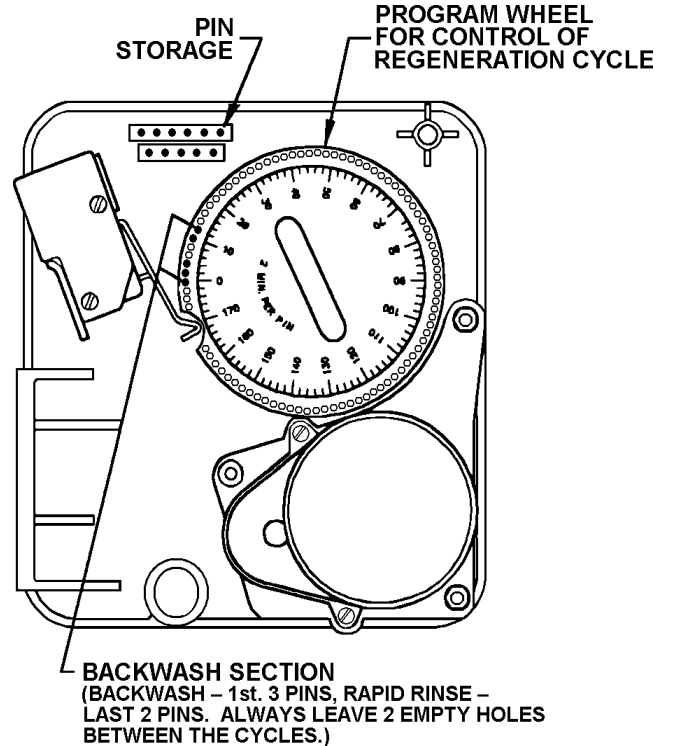
**FOR EXAMPLE:** If there are three pins in this section, the time of backwash will be six minutes (2 min. per pin). To change the length of backwash time, add or remove pins as required. The number of pins times two equals the backwash time in minutes.

## HOW TO CHANGE THE LENGTH OF RAPID RINSE TIME:

The second group of pins on the program wheel determines the length of time that your filter will rapid rinse (2 min. per pin.)

To change the length of rapid rinse, add or remove pins at the higher numbered end of this cycle as required (See note below). The number of pins times two equals the rapid rinse time in minutes.

The regeneration cycle is complete when the outer micro-switch drops off the last pin in the rapid rinse group of pins. The program wheel, however, will continue to rotate until the inner micro-switch drops into the notch on the program wheel.



**NOTE:** Always leave two empty holes between BACKWASH and RAPID RINSE cycles. This is required for proper cycle staging.

## HOW TO MANUALLY CYCLE PROGRAM:

Manually cycling control is useful when it is desirable to check control functions. Depress red button on front of timer (See page 5-3). While depressing button, slowly rotate PROGRAMMING WHEEL counter clockwise until valve drive motor engages. Release PROGRAM WHEEL until motor STOPS. Control will be in BACKWASH cycle. Continue rotating wheel repeating above procedure and motor will drive piston to the second (intermediate) position. Repeating procedure will cause motor to drive piston to RAPID RINSE position. Control may be returned to SERVICE by rotating PROGRAM WHEEL to HOME POSITION (Micro-switch lever will drop into notch on PROGRAM WHEEL).

## SECTION 6: TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
1. Water CLEAR when drawn, turns RED upon standing (Stain producing)	<ul style="list-style-type: none"> <li>A. Insufficient air-draw by Hydro-Charger.</li> <li>B. Bypass open or leaking.</li> <li>C. Filter bed overloaded with precipitated iron due to insufficient backwash, or failure to backwash due to malfunction of control timer or unplugged control valve power cord.</li> <li>D. Presence of manganese or tannins.</li> <li>E. Flow rate excessive for model.</li> <li>F. Check-valve located between Hydro-Charger and pressure tank, disrupting water flow.</li> <li>G. Pumping cycle too short, limiting residence time in pressure tank (may be water-logged).</li> <li>H. pH of treated water too low (should be 7.0 or higher; with manganese, pH must be 8.2).</li> </ul>	<ul style="list-style-type: none"> <li>A. Check Hydro-Charger adjustment. If unable to adjust for long enough draw, check pumping rate.</li> <li>B. Close bypass valve and/or repair as necessary.</li> <li>C. Upon correction of problem (increase backwash frequency if problem determined to be insufficient frequency), manually backwash until backwash water starts to clear (in more severe iron fouling cases, filter bed may need chemical cleaning - contact dealer).</li> <li>D. Recheck water analysis.</li> <li>E. Reread Sec. 2, FACTS TO REMEMBER WHILE PLANNING YOUR INSTALLATION.</li> <li>F. Relocate check-valve.</li> <li>G. Correct condition.</li> <li>H. Replenish MpH component in media (contact dealer).</li> </ul>
2. Water RED when drawn from tap	<ul style="list-style-type: none"> <li>A. Filter bed overloaded with precipitated iron due to insufficient backwash flow rate.</li> <li>B. Filter bed overloaded with precipitated iron due to insufficient backwash, or failure to backwash due to malfunction of control timer or unplugged control valve power cord.</li> <li>C. Hydro-Charger drawing too much air, causing early precipitation of iron.</li> <li>D. Hydro-Charger installed too far from pressure tank or pressure tank located too far from filter tank causing iron to precipitate before filter tank.</li> <li>E. Solenoid valve (SPLIT-STREAM or PUBLIC WATER SUPPLY type installation) malfunction or inadequate supply system pressure/flow rate.</li> </ul>	<ul style="list-style-type: none"> <li>A1. Recheck well pumping rate and repair or replace as required.</li> <li>2. Check for obstructions or kink in drain line.</li> <li>3. Check for improper drain line flow controller (see specs.) Upon correction of this problem, if manually backwashing does not clear bed of iron, filter bed may need chemical cleaning - contact dealer)</li> <li>B. Upon correction of problem (increase backwash frequency if problem determined to be insufficient frequency), manually backwash until backwash water starts to clear (in more severe iron-fouling cases, filter bed may need chemical cleaning - contact dealer).</li> <li>C. Reduce Hydro-Charger air-draw.</li> <li>D. Relocate to a location closer to filter inlet.</li> <li>E. Repair or replace solenoid valve and verify adequate supply system pressure and flow rate.</li> </ul>
3. Excessive pressure loss through filter	<ul style="list-style-type: none"> <li>A. Filter bed overloaded with precipitated iron.</li> <li>B. Control inlet/outlet valve(s) not fully open.</li> <li>C. Sand, silt or mud collecting in filter bed.</li> <li>D. Filter bed not properly "classified."</li> <li>E. "Cementing" or "channeling" of filter media.</li> </ul>	<ul style="list-style-type: none"> <li>A. Refer to Section 2 above.</li> <li>B. Open as necessary.</li> <li>C. Check well for these conditions.</li> <li>D. Manually backwash to reclassify.</li> <li>E. Prod (stir) filter bed to break up hardened layer. Increase backwash frequency to prevent recurrence.</li> </ul>
4. "Milky" or "bubbly" water (Appears to contain small bubbles)	<ul style="list-style-type: none"> <li>A. Excess Hydro-Charger air-draw.</li> <li>B. Excess gases in water (carbon dioxide, hydrogen sulfide, methane).</li> </ul>	<ul style="list-style-type: none"> <li>A. Check adjustment for duration of draw in excess of one-third pumping cycle (see Sec. 3, Step 10).</li> <li>B. May require draining of water system or installation of air-relief control on the fill port cap of valve adapter base, (contact dealer).</li> </ul>

## SECTION 7: SPECIFICATION & OPERATING DATA

ITEM	MCA0751 MCA0751M	MCA1001 MCA1001M	MCA1501 MCA1501M	MCA2001 MCA2001M	MCA3001 MCA3001M
Media Volume, cu.ft. (Note 1)	0.75	1.0	1.5	2.0	3.0
Gravel Underbed, (lbs.)	9	18	18	22	25
Nominal Capacity (ppm-gal.)	22,500	30,000	45,000	60,000	90,000
Operating Flow Rate, (gpm) (Note 2):					
Continuous	2	3	3	4	5
Service	4	6	7	9	12
Peak	6	10	11	13	16
Pressure Loss @ Flow Rates (psi)					
Continuous	1	2	2	2	2
Service	4	5	7	8	10
Peak	7	13	14	14	20
Backwash Flow Rate, (gpm) (Note 3)	3.5	5	5	7	10
Service Pipe Size, (in.) (Note 4)	1	1	1	1	1
Filter Tank Diameter x Height, (in.)	8 x 44	10 x 44	10 x 54	12 x 54	14 x 65
Minimum Space Required, (in.):					
Width	12	12	12	12	14
Depth (w/Bypass)	18	18	18	18	18
Height	52	52	62	62	74
Approximate Shipping Weight, (lbs.)	123	157	193	264	383

Maximum Operating Temperature 100°F (38°C); Electrical requirements 110V/60Hz; Operating Pressure 20-100 psi.  
Specifications subject to change without notice.

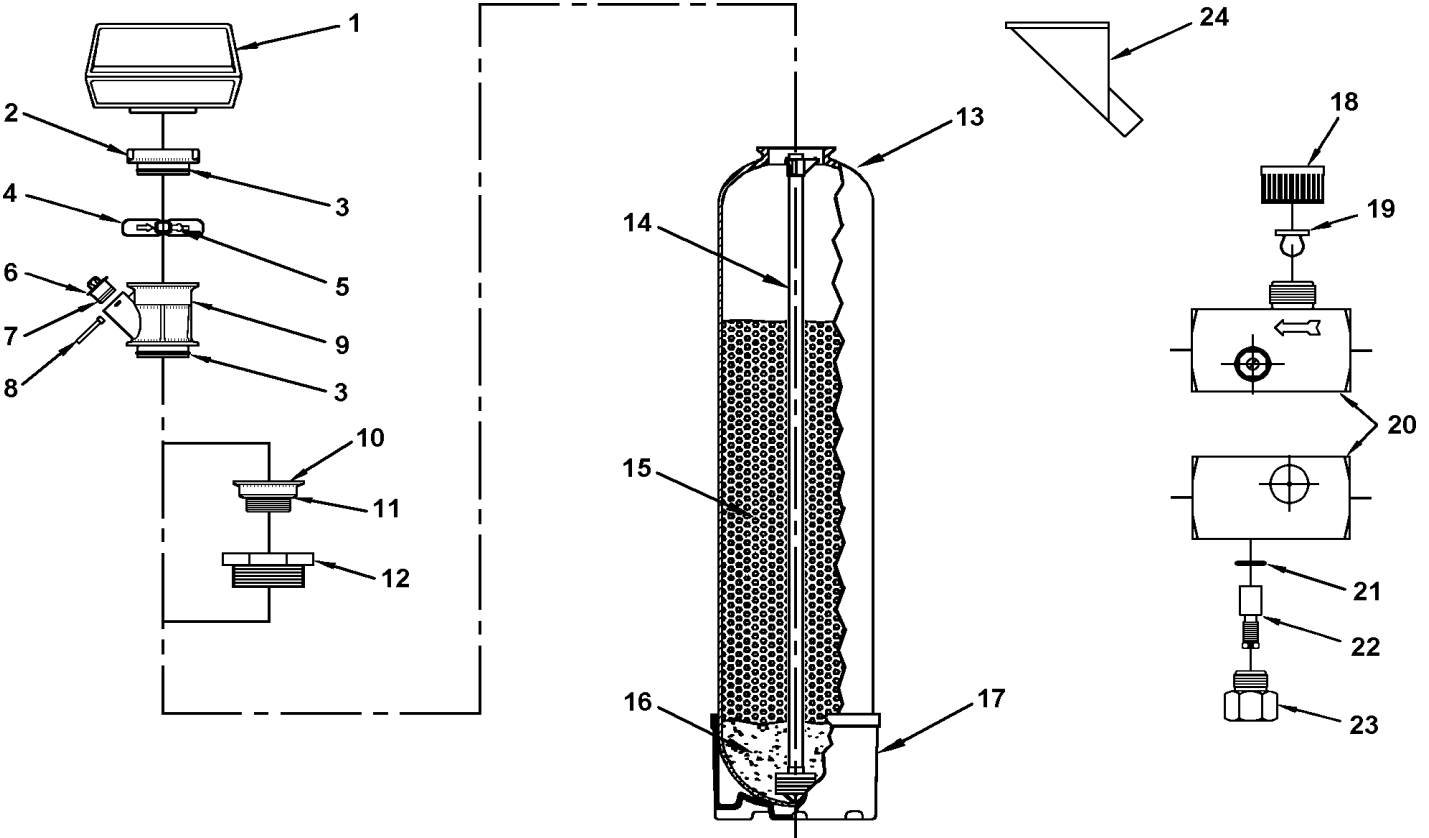
**NOTES:**

- (1) Replenishment of pH adjusting component of media may be required periodically, the frequency of which is dependent on raw water pH, manganese concentration and water consumption rate. Consult dealer for more information.
- (3) For system to operate properly, pumping rate of well pump **MUST** be sufficient to backwash unit at rate specified.
- (2) For satisfactory performance, indicated durations should not be exceeded. Flow rates specified are adequate for normal residential applications. Do not use Service or Peak flow rates when sizing commercial applications or if treated water is to supply a geothermal heat pump, swimming pool, etc. (contact dealer before selecting equipment). Service flow rates have been tested against NSF Standard 42 and have a rated pressure drop of less than 10 psi.
- (4) Service Pipe size is 3/4" on models not shown above: MCA0750, MCA0750M, MCA1000, MCA1000M, MCA1500, MCA1500M, MCA2000, MCA2000M.

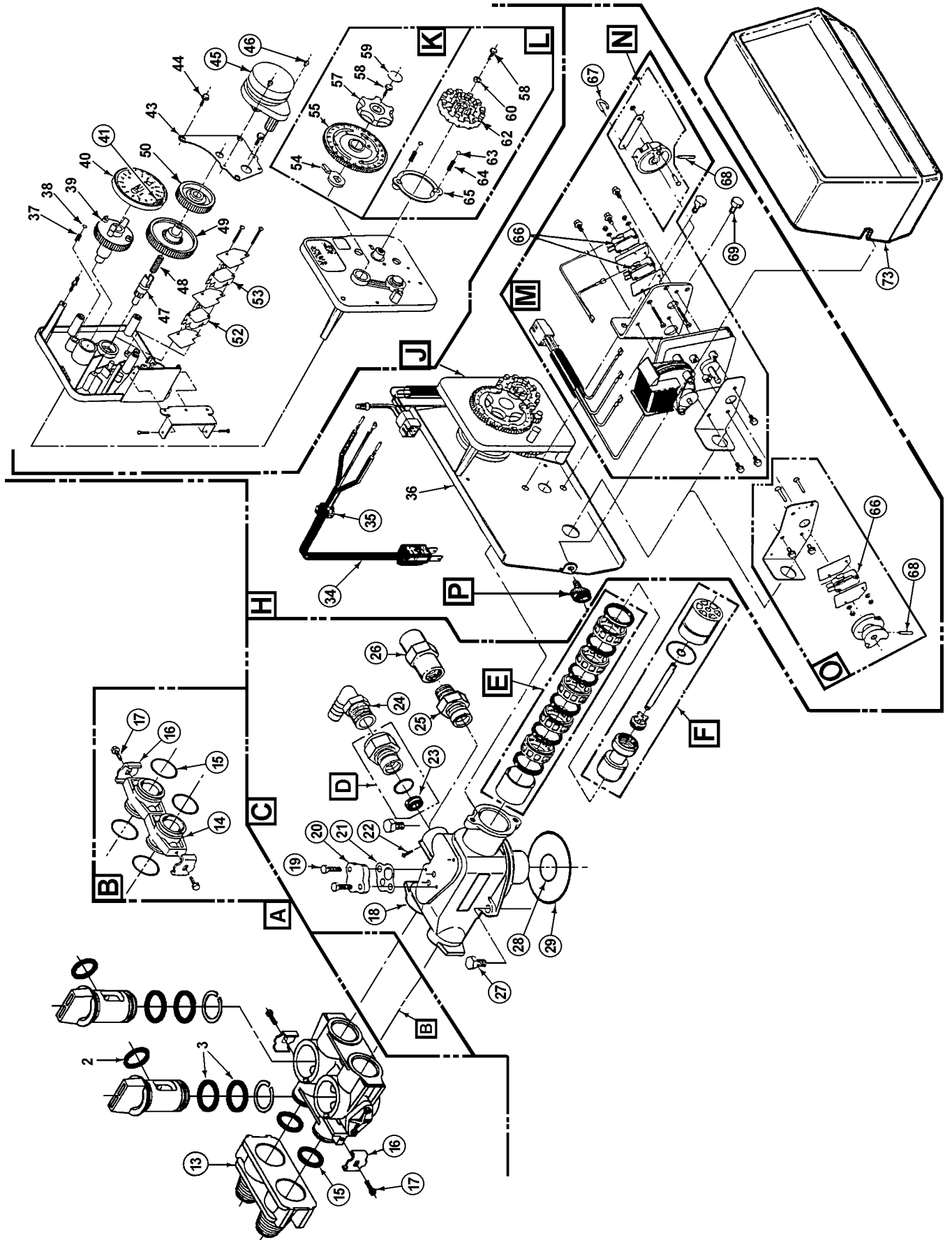
# COMPONENT PARTS LIST

Ref. No.	Description	MCA0751 MCA0751M	MCA1001 MCA1001M	MCA1501 MCA1501M	MCA2001 MCA2001M	MCA3001 MCA3001M
1	Control Valve, Complete, less bypass	C210350-003	C210500-003	C210500-003	C210700-003	C210000-003
2	Adapter Assy., Flange- CEC (Incl. Ref. 3)	FA45CX	FA45CX	FA45CX	FA45CX	FA45CX
3	O-ring	ORG-234	ORG-234	ORG-234	ORG-234	ORG-234
4	Clamp Assy. (Incl. Ref. 5)	FC45XX	FC45XX	FC45XX	FC45XX	FC45XX
5	Latch, Clamp	FC45C	FC45C	FC45C	FC45C	FC45C
6	Fillport Cap Assy. (Incl. Ref. 7 & 8)	FF45CX	FF45CX	FF45CX	FF45CX	FF45CX
7	O-ring	ORG-214	ORG-214	ORG-214	ORG-214	ORG-214
8	Quick Release Clip	QRC20	QRC20	QRC20	QRC20	QRC20
9	Fillport Adapter Assy. Flange, (Incl. Ref. 3, 6, 7 & 8)	FF45BX	FF45BX	FF45BX	FF45BX	FF45BX
10	Adapter Assy., Thread Tank-Flange (Incl. Ref. 11)	-	-	-	-	FA45RX
11	O-ring	-	-	-	-	10381
12	Bushing, 2-1/2 - 8 x 4 - 8	-	-	-	-	2752-2
13	Media Tank w/Base	MTP0844FB	MTP1044FB	MTP1054FB	MTP1254FB	MTP1465B
14	Distributor	C37S-16-48	C37S-16-48	C37S-16-58	C37S-16-58	T37S-16-69
15	Filter Media:					
	Standard Models	MC-075P	MC-10P	MC-10P & MC-050P	MC-10P(x2)	MC-10P(x3)
	-M Models	MC-075MP	MC-10MP	MC-10MP&MC-050MP	MC-10MP(x2)	MC-10MP(x3)
16	Gravel Underbed	QC-9	QC-18	QC-18	QC-22	QC-25
17	Tank Base	T06-08P	T06-10P	T06-10P	T06A-12P	T06A-14P
18	Air Check Cap	HC10-2	HC10-2	HC10-2	HC10-2	HC10-2
19	Air Check	HC10-3	HC10-3	HC10-3	HC10-3	HC10-3
20	Hydrocharger, Complete	HC10	HC10	HC10	HC10	HC10
21	O-ring	HC10-4	HC10-4	HC10-4	HC10-4	HC10-4
22	Bypass Screw	HC10-5	HC10-5	HC10-5	HC10-5	HC10-5
23	Screw Retainer	HC10-6	HC10-6	HC10-6	HC10-6	HC10-6
24	Fill Funnel	FNL-1	FNL-1	FNL-1	FNL-1	FNL-1
Ref.	Repair Kit (Incl. Ref. 19 & 21)	HC10-RK	HC10-RK	HC10-RK	HC10-RK	HC10-RK

**NOTE:** When ordering components, always specify model no. Components for models ending with "0" (i.e., MCA1000) and/or with "Y" suffix (i.e., MCA0750Y) are same as equivalent model above.



# CEC1000 SERIES BACKWASH CONTROL

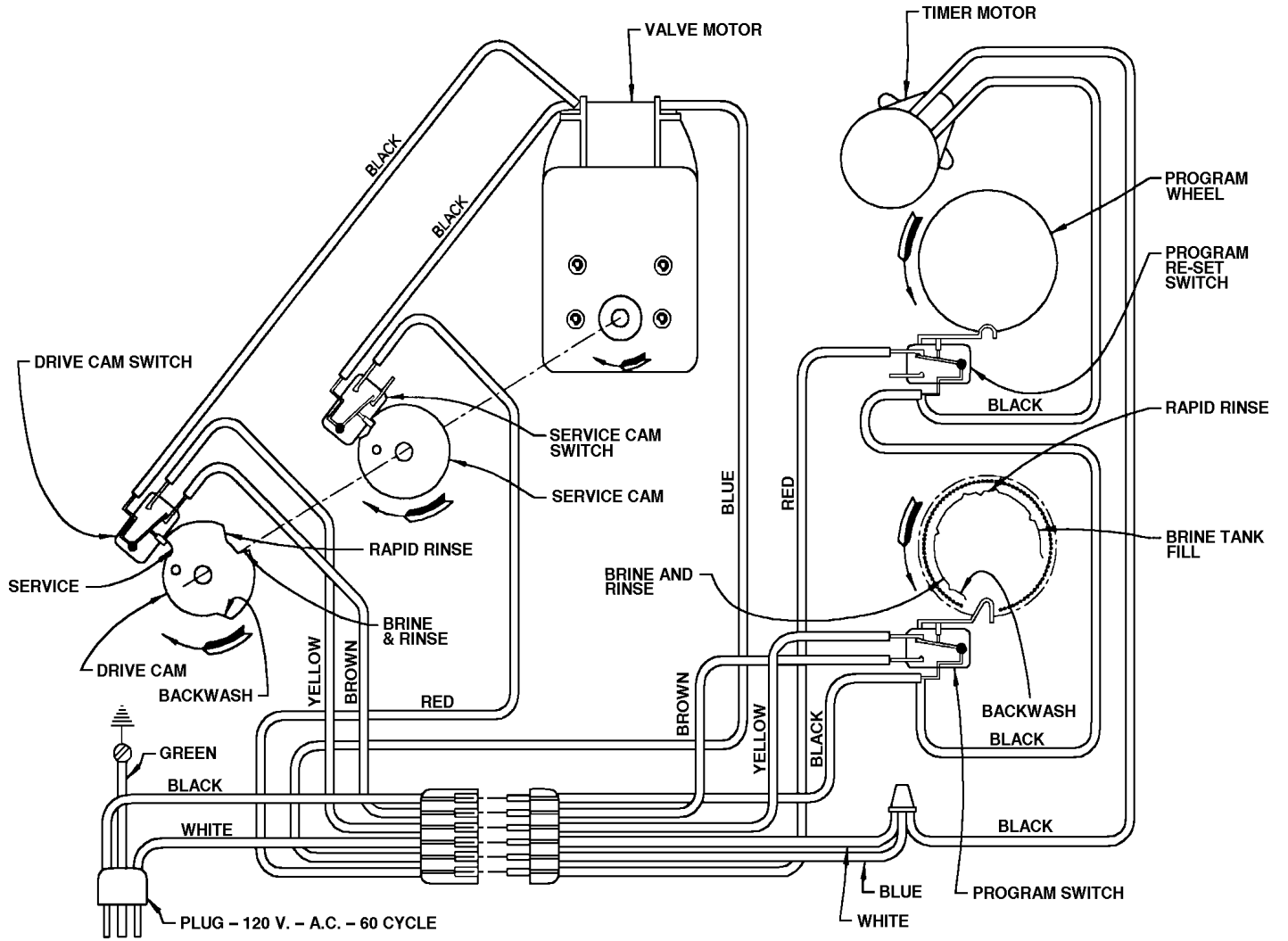


# CEC1000 SERIES BACKWASH CONTROL

**ONLY THOSE PARTS CIRCLED IN DRAWING AND/OR LISTED BELOW ARE STOCK ITEMS.  
ALL OTHERS ARE SPECIAL ORDER, NON-RETURNABLE.**

REF.	PART NO.	DESCRIPTION
A	60049/18706X	1" Bypass Valve Assy. (Incl. Ref. Items 2, 3, 13, 15, 16 & 17)
	60049/18706-02X	3/4" Bypass Valve Assy. (Incl. Ref. Items) (Optional)
B	10090x	Adapter Coupling Assy. (Incl. 2 ea. Ref. Items 18-33, E & F)(Specify Model)
C	10070	Control Valve Body Assy. (Incl. Ref. Items 18-33, E & F)(Specify Model)
D	60705	Drain Line Flow Control Assy. (Specify Size)
E	60121C	Seal Kit
F	60090	Piston Kit
H	60407-BW	Power Head Assy., I/Cover (Incl. Ref. Items 34-72 & F)
J	60304B-13	Timer Assy. (1:00 a.m. Init.) (Incl. Ref. Items 37-65)
K	13007X	24-Hour Gear Assy. (Incl. Ref. Items 54-59)
L	14381X	Skipper Wheel Assy. (Incl. Ref. Items 58 & 60-65)
M	60050	Drive Motor Assy., Complete (Specify Model) (Incl. Ref. Items 66 & N)
N	60160-00	Drive Cam Assy. - White
O	10025X	FAS Auxillary Switch Assy. (Optional) (Incl. Ref. Items 66 & 68)
P	19367	Cover Mounting Screw
2	18660	O-ring
3	18661	O-ring (ORG-218)
13	18706-02	3/4" NPT Adapter Yoke
	18706	1" NPT Adapter Yoke
14	13709	Adapter Coupling
15	13305	Coupling O-ring
15	13255	Adapter Clip
17	13314	Screw-Adapter Coupling
18	15058	Control Valve Body - CEC1000
19	12112	Hex Head Machine Screw
20	11893	Injector Flat Cap - CEC1000
21	11475	Injector Body Gasket
22	11180	Flow Control Retainer Screw
23		DLFC Button (Listed by Model Series):
	12090	3.5 GPM (0751)
	12092	5.0 GPM (1001, 1501)
	12408	7.0 GPM (2001)
24	12338	Drain Ftg. Elbow (1/2 in. Thread to Hose)
25	11912	Drain Line Flow Control Ftg.
26	60700-09	Flow Control 9.0 GPM (3001)
27	BLT0015	Hex Head Cap Screw
28	11710	Inside Tube O-ring
29	11208	Seal O-ring
34	11838	Power Cord, 7 ft.
35	13547	Strain Relief - Flat Cord
41	15493	Roll Pin
45	18743	Timer Motor, 110V/60Hz
56	13278	Screw-Motor Mounting
52	10896	Micro-Switch
53	15320	Micro-Switch
66	10218	Micro-Switch
67	10909	Connecting Rod Pin
68	10338	Drive Roll Pin
69	10231	Box Mounting Screw
73	14779-5P	Control Cover (Specify Model)

# WIRING DIAGRAM FOR VALVE DRIVE MOTOR AND TIMER CEC1000 SERIES VALVES



# Chem-Free™ Filter System Five Year Limited Warranty

## GENERAL CONDITIONS

Damage to any part of this water conditioner because of misuse, misapplication, neglect, alteration, accident, installation or operation contrary to our printed instructions, or damage caused by freezing, flood, fire, vacuum or Act of God, is not covered by this warranty. In all such cases, regular parts and service charges will apply.

We assume no warranty liability in connection with this water conditioner other than specified herein. This warranty is in lieu of all other warranties, expressed or implied, including warranties of fitness for a particular purpose. We do not authorize any person or representative to assume for us any other obligations on the sale of this water conditioner.

Should a defect or malfunction occur, contact your dealer. If you are unable to contact your dealer, return the part, freight prepaid, directly to the factory (address below). Enclose with the part a full description of the problem, with your name, full address, date purchased, model and serial number and selling dealer's name and address. We will repair or replace the part and return it to you at no cost if our repair department determines it to be defective under the terms of this warranty.

This water conditioner is manufactured by:

Cuno Water Treatment  
12628 U.S. 33 North, Churubusco, IN 46723

## WARRANTY POLICY

Cuno Water Treatment, Churubusco, Indiana warrants this water conditioner as stated herein:

From the date of installation, we will repair or replace any part, within the warranty period described below, which we find defective because of faulty materials or workmanship or corrosion. You pay only freight to our factory and local labor charges.

- One year on entire unit.
- Three years on complete control valve.
- Five years on control valve excluding internal and electrical parts.
- Five years on mineral tank excluding mineral.

### FILL IN THE FOLLOWING AND KEEP FOR YOUR RECORDS

\_\_\_\_\_  
Date Purchased                      Model No.                      Serial No.

\_\_\_\_\_  
Name of Original Purchaser

\_\_\_\_\_  
Address of Original Installation

\_\_\_\_\_  
City    State    Zip

\_\_\_\_\_  
Dealer Purchased From

\_\_\_\_\_  
Dealer Address