

# INSTALLATION AND OPERATING INSTRUCTIONS

## SUL-X SULFUR REDUCTION SYSTEMS

### MODELS:

**CSX100**

**CSX200**

**Installer, please leave with homeowner.  
Homeowner, retain for future reference.**

**INSTR2190 0709**



**3M**



**CUNO Incorporated**  
400 Research Parkway  
Meriden, CT 06450 U.S.A.


# SAFETY INFORMATION

Read, understand, and follow all safety information contained in these instructions prior to installation and use of the CUNO Incorporated SUL-X Sulfur Reduction Systems. Retain these instructions for future reference.

**Intended use:**

The CUNO Incorporated SUL-X Sulfur Reduction Systems are intended for use in reducing sulfur levels in water in homes and have not been evaluated for other uses. The system is intended for indoor installations near the entry point of a home water line, and must be installed by qualified professional installers in accordance with these installation instructions and local plumbing codes.

<b>EXPLANATION OF SIGNAL WORD CONSEQUENCES</b>	
 <b>WARNING</b>	Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury and/or property damage.
 <b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or property damage.
<b>CAUTION</b>	Indicates a potentially hazardous situation, which, if not avoided, may result in property damage.

 <b>WARNING</b>
<p><b>To reduce the risk associated with choking:</b></p> <ul style="list-style-type: none"> <li>• Do not allow children under 3 years of age to have access to small parts during the installation of this product.</li> </ul>
<p><b>To reduce the risk associated with ingestion of contaminants:</b></p> <ul style="list-style-type: none"> <li>• Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.</li> </ul>
<p><b>To reduce the risk of physical injury:</b></p> <ul style="list-style-type: none"> <li>• Shut off inlet water supply and depressurize system as shown in manual prior to service.</li> </ul>
<p><b>To reduce the risk associated with a hazardous voltage:</b></p> <ul style="list-style-type: none"> <li>• If the home electrical system requires use of the cold water system as an electrical safety ground, a jumper must be used to ensure a sufficient ground connection across the filter installation piping — refer installation to qualified personnel.</li> <li>• Do not use the system if the power cord is damaged — contact qualified service personnel for repair.</li> </ul>
<p><b>To reduce the risk associated with back strain due to the heavy weight of the various system components:</b></p> <ul style="list-style-type: none"> <li>• Follow safe lifting procedures.</li> </ul>

 <b>CAUTION</b>
<p><b>To reduce the risk associated with skin, eye, and respiratory tract irritation from gravel and filter media during installation:</b></p> <ul style="list-style-type: none"> <li>• Gravel and several types of filter media may be used in this product, depending upon the application. During installation, dust may cause irritation to skin, eyes, and respiratory tract.</li> <li>• Utilize a NIOSH-approved dust filter mask, protective gloves, and appropriate eye protection when handling and pouring gravel and filter media.</li> <li>• To request an MSDS relating to this product, call 203-238-8965 or visit the web at <a href="http://solutions.3m.com/wps/portal/3M/en_US/MSDS">http://solutions.3m.com/wps/portal/3M/en_US/MSDS</a> (click MSDS search). For emergencies, call 800-364-3577 or 651-737-6501 (24 hours).</li> </ul>
<p><b>To reduce the risk associated with skin, eye, and respiratory tract irritation from water treatment chemicals:</b></p> <ul style="list-style-type: none"> <li>• Several types of water treatment chemicals may be used in this product, depending upon the application. During installation and use, exposure may cause irritation to skin, eyes, and respiratory tract.</li> <li>• Utilize a NIOSH-approved dust filter mask, protective gloves, and appropriate eye protection when handling and pouring water treatment chemicals.</li> <li>• To request an MSDS relating to this product, call 203-238-8965 or visit the web at <a href="http://solutions.3m.com/wps/portal/3M/en_US/MSDS">http://solutions.3m.com/wps/portal/3M/en_US/MSDS</a> (click MSDS search). For emergencies, call 800-364-3577 or 651-737-6501 (24 hours).</li> </ul>

## CAUTION

### To reduce the risk associated with property damage due to water leakage:

- **Read and follow** Use instructions before installation and use of this water treatment system.
- Installation and use **MUST** comply with existing state or local plumbing codes.
- **Protect from freezing**, relieve pressure and drain system when temperatures are expected to drop below 33°F (0.6°C).
- **Do not** install on hot water supply lines. The maximum operating water temperature of this filter system is 110°F (43.3°C).
- **Do not** install if water pressure exceeds 100 psi. If your water pressure exceeds 80 psi (552 kPa), you must install a pressure limiting valve. Contact a plumbing professional if you are uncertain how to check your water pressure.
- **Do not** install where water hammer conditions may occur. If water hammer conditions exist you must install a water hammer arrester. Contact a plumbing professional if you are uncertain how to check for this condition.
- **Do not** use a torch or other high temperature sources near filter system, cartridges, plastic fittings or plastic plumbing.
- On plastic fittings, never use pipe sealant or pipe dope. **Use PTFE thread tape only**, pipe dope properties may deteriorate plastic.
- Take care when using pliers or pipe wrenches to tighten plastic fittings, as damage may occur if over tightening occurs.
- **Do not** install in direct sunlight or outdoors.
- Mount system in such a position as to prevent it from being struck by other items used in the area of installation.
- Ensure all tubing and fittings are secure and free of leaks.
- **SHUT OFF FUEL OR ELECTRIC POWER SUPPLY TO WATER HEATER** after water is shut off.
- **Do not** install system where water lines could be subjected to vacuum conditions without appropriate measures for vacuum prevention.
- **Do not** apply heat to any fitting connected to Bypass or Control Valve as damage may result to internal parts or connecting adapters.
- Install on a flat/level surface. It is also advisable to sweep the floor to eliminate objects that could pierce the brine tank.

### To reduce the risk associated with property damage due to plugged water lines:

- Pay particular attention to correct orientation of control valve. Water flow should match arrow on control valve. The Inlet and Outlet of other water treatment equipment products will vary depending on the control valve brand used.

## IMPORTANT NOTES

- Failure to follow instructions may result in water leakage and will void warranty.

# TABLE OF CONTENTS

<b>SECTION</b>	<b>DESCRIPTION</b>
1	GENERAL INFORMATION
2	BEFORE INSTALLATION
3	INSTALLATION
4	PLUMBING SYSTEM CLEAN-UP
5	FINE-TUNING THE SUL-X SYSTEM
6	TROUBLESHOOTING
7	SPECIFICATION AND OPERATION DATA
8	COMPONENT LISTS

## SECTION 1: GENERAL INFORMATION

Congratulations on your purchase of a SUL-X Sulfur Reduction System! The SUL-X Sulfur Reduction System reduces the levels of hydrogen sulfide (sulfur) from your water supply. Contrary to conventional methods, your SUL-X Sulfur Reduction System requires NO retention tank, or chemical regenerant.

When properly installed, operated and maintained, the SUL-X Sulfur Reduction System will provide many years of dependable service. Read this manual carefully and follow the installation steps in the proper order.

### DESCRIPTION AND OPERATION OF THE SYSTEM:

The SUL-X Sulfur Reduction System consists of two major components:

- 1) An automatic backwashing type filter containing a special media that reduces the precipitated sulfur from the water and functions on the principal of depth filtration rather than surface filtration. The media DOES NOT require a chemical regenerant (such as potassium permanganate) for oxygen enrichment, as is necessary for a greensand filter system. Periodically the filter tank backwashes automatically for a few minutes (generally 10 minutes) which flushes the precipitated sulfur to the drain.
- 2) The second component consists of an electric feeder pump and solution tank for feeding a proprietary chemical solution (SUL-X Solution) into the water supply line. When the SUL-X solution comes into contact with the hydrogen sulfide, it causes the hydrogen sulfide to immediately form a precipitate. The precipitate is then collected in the filter tank as described above. The SUL-X solution contains no chlorine, and therefore requires no holding tank or activated carbon posttreatment filtration.

## IMPORTANT NOTE

If this installation has a very HIGH sulfur concentration and/or HIGH daily water consumption (such as in a large family), it may be more economical to install an aerator ahead of the SUL-X System. The aerator pretreatment will reduce the sulfur concentration by as much as 50 to 75%, thus reducing the consumption of SUL-X chemical solution by a like amount. If the result of multiplying the number of people in the family by the sulfur concentration (in ppm) exceeds 50 (Example: 6 people x 12 ppm = 72), an aerator MAY be recommended. Contact your dealer for more information.

## SECTION 2: BEFORE INSTALLATION

### Inspecting And Handling Your Filter:

Inspect the equipment for shipping damage. If damaged, notify the transportation company and request a damage inspection. Because your filter system is shipped in more than one carton, refer to the chart to determine the total number of cartons you should have for your particular model.

NOTE: SUL-X Concentrate (generally a case of four (4) one gallon bottles) is not included as an integral part of the system, but is sold as a separate item by the manufacturer.

Handle the filter with care. Damage can occur if dropped or set on sharp, uneven projections on the floor. Do not turn the filter upside down. Installation must comply with state and local laws and regulations.

COMPONENT	CSX100	CSX200	CSX300
Filter Tank	-	1	1
Media	-	2	3
Feeder Pump	-	1	1
Solution Tank & Parts	-	1	1
Total Cartons	1	5	6

### 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 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.

<b>IMPORTANT NOTE</b>
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

It is extremely important to have your water tested for the following items prior to installation of this filter into your home. Record your results below for future reference:

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

### Check Your Water Pressure And Pumping Rate

Two water system conditions must be checked carefully to avoid unsatisfactory operation or equipment damage. Failure to check water system conditions may result in unit failure and will void warranty:

- 1) Minimum water pressure required at the filter tank inlet is 20 psi (138 kPa). If pressure is over 100 psi (689 kPa), a pressure reducing valve must be installed in the water supply line.

<b>CAUTION</b>
<p><b>To reduce the risk associated with property damage due to water leakage:</b></p> <ul style="list-style-type: none"> <li>• <b>Do not</b> install if water pressure exceeds 100 psi. If your water pressure exceeds 80 psi (552 kPa), you must install a pressure limiting valve. Contact a plumbing professional if you are uncertain how to check your water pressure.</li> </ul>

## IMPORTANT NOTE

If you have a municipal or a community water supply and daytime water pressure is 85 psi (589 kPa) or more, nighttime pressure may exceed 100 psi (689 kPa). 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 high and low system pressure. Record your water pressure data below:

### WATER PRESSURE

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

## CAUTION

**To reduce the risk associated with property damage due to water leakage:**

- **Do not** install system where water lines could be subjected to vacuum conditions without appropriate measures for vacuum prevention.

- 2) The pumping rate of your well pump must be sufficient for satisfactory backwash. Refer to Section 7, Page 7-1 for the backwashing requirements. 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 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.; DRAWDOWN is 8 gals.; then PUMPING RATE equals:

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

### Locate Water Conditioning Equipment Correctly:

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

## CAUTION

**To reduce the risk associated with property damage due to water leakage:**

- **Protect from freezing**, relieve pressure and drain system when temperatures are expected to drop below 33°F (0.6°C).
- **Do not** install on hot water supply lines. The maximum operating water temperature of this filter system is 110°F (43.3°C).
- **Do not** install if water pressure exceeds 100 psi. If your water pressure exceeds 80 psi (552 kPa), you must install a pressure limiting valve. Contact a plumbing professional if you are uncertain how to check your water pressure.
- **Do not** install where water hammer conditions may occur. If water hammer conditions exist you must install a water hammer arrester. Contact a plumbing professional if you are uncertain how to check for this condition.
- Mount system in such a position as to prevent it from being struck by other items used in the area of installation.
- **Do not** install system where water lines could be subjected to vacuum conditions without appropriate measures for vacuum prevention.
- Install on a flat/level surface. It is also advisable to sweep the floor to eliminate objects that could pierce the brine tank.

- 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 a correct relationship to other water conditioning equipment
- 4) Sulfur Reduction filters should be located in the supply line **BEFORE** the water heater. Temperatures above 110°F (43.3°C) damage filters and softeners and will void the factory warranty.
- 5) Do not install the Sulfur Reduction filter in a location where freezing temperatures can occur. Freezing can cause permanent damage to this type of equipment and will also void the factory warranty.
- 6) Allow sufficient space around the unit for easy servicing.

## The Importance Of Your Pressure Tank:

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

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 filter.

### CAUTION

**To reduce the risk associated with property damage due to water leakage:**

- **Do not** install system where water lines could be subjected to vacuum conditions without appropriate measures for vacuum prevention.

## Facts To Remember While Planning Your Installation:

### WARNING

**To reduce the risk associated with a hazardous voltage:**

- If the home electrical system requires use of the cold water system as an electrical safety ground, a jumper must be used to ensure a sufficient ground connection across the filter installation piping — refer installation to qualified personnel.
- **Do not** use the system if the power cord is damaged — contact qualified service personnel for repair.

### CAUTION

**To reduce the risk associated with property damage due to water leakage:**

- Installation and use **MUST** comply with existing state or local plumbing codes.
- **Do not** install if water pressure exceeds 100 psi. If your water pressure exceeds 80 psi (552 kPa), you must install a pressure limiting valve. Contact a plumbing professional if you are uncertain how to check your water pressure.
- **Do not** install where water hammer conditions may occur. If water hammer conditions exist you must install a water hammer arrester. Contact a plumbing professional if you are uncertain how to check for this condition.
- **Do not** use a torch or other high temperature sources near filter system, cartridges, plastic fittings or plastic plumbing.
- On plastic fittings, never use pipe sealant or pipe dope. **Use PTFE thread tape only**, pipe dope properties may deteriorate plastic.
- Take care when using pliers or pipe wrenches to tighten plastic fittings, as damage may occur if over tightening occurs.
- **Do not** install system where water lines could be subjected to vacuum conditions without appropriate measures for vacuum prevention.

**To reduce the risk associated with property damage due to plugged water lines:**

- Pay particular attention to correct orientation of control valve. Water flow should match arrow on control valve. The Inlet and Outlet of other water treatment equipment products will vary depending on the control valve brand used.

If lawn sprinklers, a swimming pool, geothermal heating/cooling or water for other devices/activities are to be treated by the 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 installer for alternative instructions if the pumping rate is insufficient. Failure to do so may result in leakage and will void warranty.

Remember that the filter **INLET** is attached to the pipe that supplies water (i.e. runs to the pump) and **OUTLET** is the line that runs toward the water heater or other water treatment equipment device.

The injection point for feeding SUL-X Solution **MUST** be located between the well pump and the pressure tank. The injection fitting **MUST** enter the bottom of the supply line, rather than side or top entry. (Figure 5)

The solution tank should be located in as close proximity to the injection point as possible.

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 Figure 1 will be of assistance.

It is advisable to sweep the floor to eliminate foreign objects that could pierce the solution tank, causing it to leak.

Hydrogen sulfide can be very corrosive to copper and galvanized pipe, therefore installation should be performed using PVC or other approved plastic. The pressure tank should be a captive-air type rather than a galvanized air-water type for this reason.

## SECTION 2: INSTALLATION

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

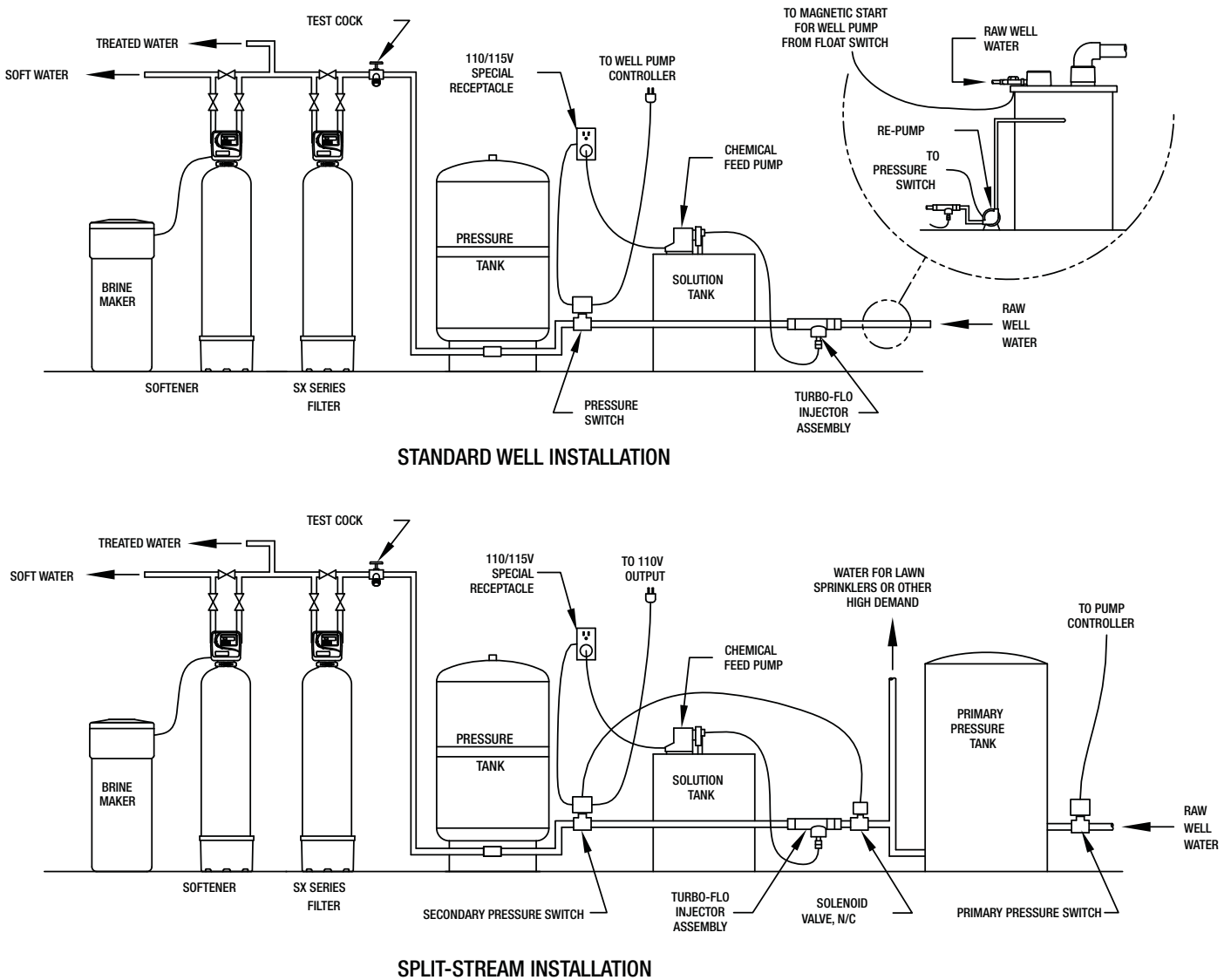


Figure 1

### CAUTION

**To reduce the risk associated with property damage due to plugged water lines:**

- Pay particular attention to correct orientation of control valve. Water flow should match arrow on control valve. The Inlet and Outlet of other water treatment equipment products will vary depending on the control valve brand used.



## Step 1

### CAUTION

To reduce the risk associated with skin, eye, and respiratory tract irritation from gravel and filter media during installation:

- Gravel and several types of filter media may be used in this product, depending upon the application. During installation, dust may cause irritation to skin, eyes, and respiratory tract.
- Utilize a NIOSH-approved dust filter mask, protective gloves, and appropriate eye protection when handling and pouring gravel and filter media.
- To request an MSDS relating to this product, call 203-238-8965 or visit the web at [http://solutions.3m.com/wps/portal/3M/en\\_US/MSDS](http://solutions.3m.com/wps/portal/3M/en_US/MSDS) (click MSDS search). For emergencies, call 800-364-3577 or 651-737-6501 (24 hours).

- Remove the CONTROL VALVE by removing the latch and then the clamp around the adaptor base (Figure 2). Before loading the MEDIA into the tank, the distributor must be all the way to the bottom of the tank. It is therefore recommended that the distributor be removed and the gravel dumped out and saved. The distributor tube should then be replaced in the empty tank making sure it rests on the bottom. Use the centering tool provided to hold the riser tube in center and prevent MEDIA from entering the distributor. Material lodged in the distributor tube can enter the CONTROL VALVE, thus damaging it. First pour the gravel removed earlier back into the MEDIA TANK, followed by the MEDIA.
- Lubricate the o-ring on the adapter base with silicone grease. Reinstall the CONTROL VALVE making sure the riser tube fits into the valve body tube adaptor protruding from the bottom of valve body and being careful not to pinch the o-ring. Arrows on clamp should align (see below).
- If not factory pre-installed, attach BYPASS VALVE and/or YOKE ASSEMBLY using ADAPTER COUPLINGS, CLIPS and SCREWS to CONTROL VALVE (Figure 4).

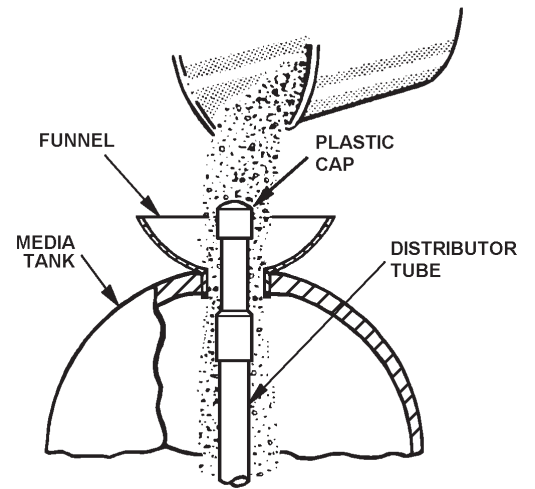


Figure 2. FILLING MEDIA TANK

## 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 HOT WATER HEATER.

## Step 3

The feed pump and solution tank require assembly prior to use (Figure 5).

- Unpackage feed pump.
- Install Turbo-flo injection fitting in water supply line prior to pressure tank and pressure switch.
- Attach bleed valve to top of feed pump head. The white nut on discharge (top) of feed pump must be removed. The bleed valve can now be attached, make sure to use o-ring provided.

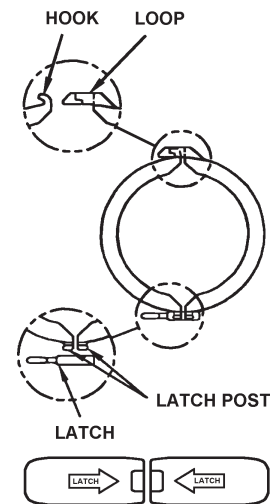


Figure 3. CLAMP ASSEMBLY

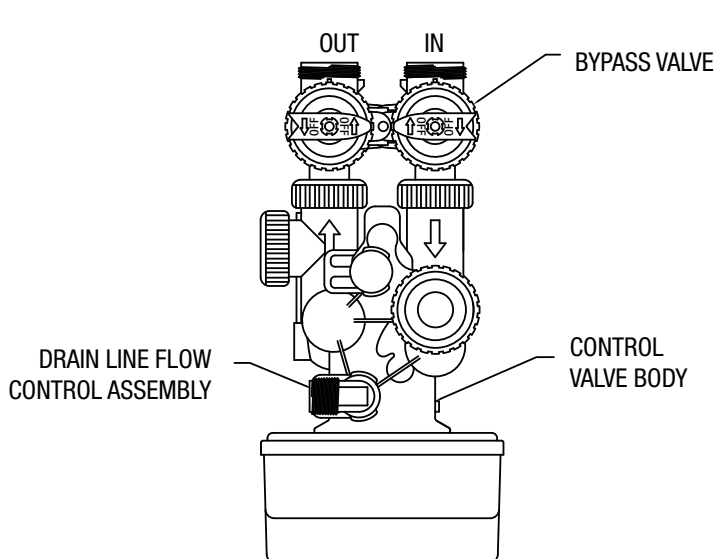
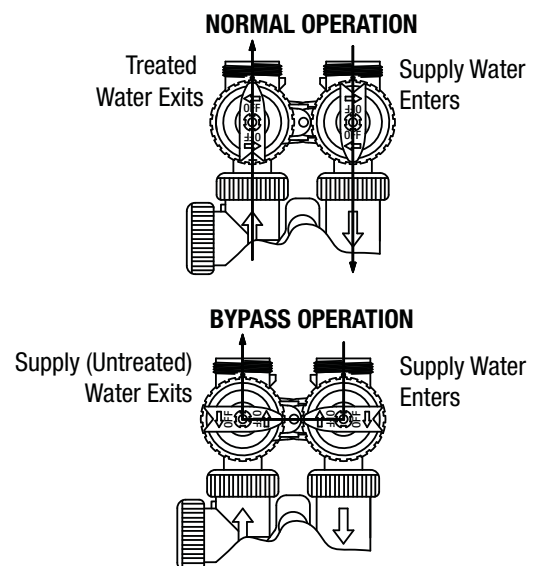
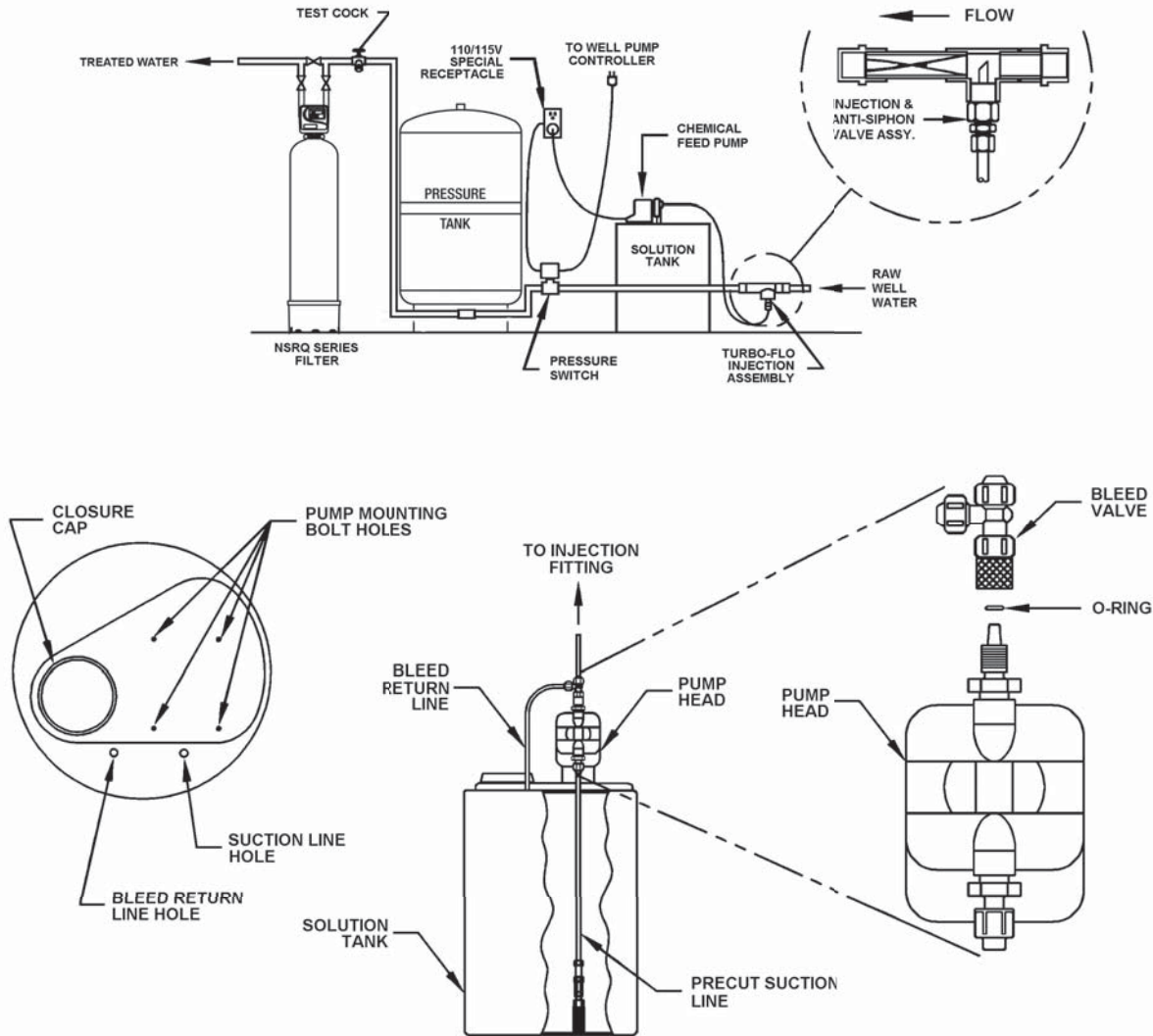


Figure 4. FILTER ASSEMBLY TOP VIEW



- d) Feed pre-cut suction line (clear tube with strainer/foot valve pre-installed) up through proper hole in top of solution tank and attach to suction fitting on bottom of pump head.
- e) Mount feed pump to top of solution tank using nuts and bolts provided.
- f) Attach bleed return line (Short white tubing) to connection on side of bleed valve and feed down into solution tank through predrilled hole.
- g) Attach discharge line (remaining long white tubing) to connection on top of bleed valve. Cut and attach this line to the injector installed in Step 3b.
- h) Electrical power to the feeder pump must be provided through a properly grounded 110V or 220 V special receptacle which is controlled by the pressure switch (see "WARNING" notice and Figure 5 for wiring instructions). NOTICE: CUTTING OF FEEDER PUMP POWER CORD VOIDS MANUFACTURER'S WAR-



**Figure 5. FEEDER SYSTEM SCHEMATIC**

RANTY. Refer to instruction manual enclosed in feeder pump carton for more information.

### IMPORTANT NOTE

Chemical Feed Pump must be connected to the same voltage as the well pump or power supply. (Do not cut feed pump power cord.)

#### Step 4

Cut main supply line as required to fit plumbing to INLET and OUTLET of BYPASS VALVE or yoke.

#### Step 5

Attach plumbing. DO NOT apply heat to any fittings 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.

## CAUTION

To reduce the risk associated with property damage due to water leakage:

- Do not use a torch or other high temperature sources near filter system, cartridges, plastic fittings or plastic plumbing.
- On plastic fittings, never use pipe sealant or pipe dope. Use PTFE thread tape only, pipe dope properties may deteriorate plastic.
- Take care when using pliers or pipe wrenches to tighten plastic fittings, as damage may occur if over tightening occurs.

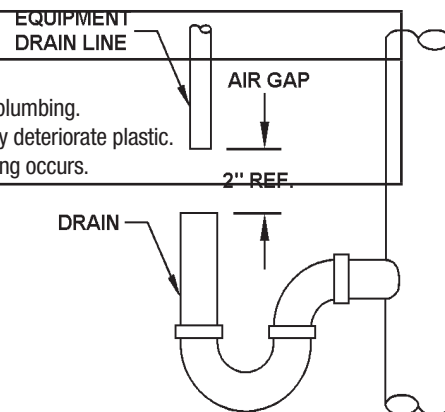


Figure 6. DRAIN

## IMPORTANT NOTE

If installation is to be a split stream prior to media tank (figure 2) refer to special instructions following STEP 14.

### Step 6

Loosen SET-SCREW and pull out DRAIN LINE FLOW CONTROL (DLFC) assembly from VALVE BODY (Figure 4). 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-tightening 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 15 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.

### Step 9

## CAUTION

To reduce the risk associated with skin, eye, and respiratory tract irritation from water treatment chemicals:

- Several types of water treatment chemicals may be used in this product, depending upon the application. During installation and use, exposure may cause irritation to skin, eyes, and respiratory tract.
- Utilize a NIOSH-approved dust filter mask, protective gloves, and appropriate eye protection when handling and pouring water treatment chemicals.
- To request an MSDS relating to this product, call 203-238-8965 or visit the web at [http://solutions.3m.com/wps/portal/3M/en\\_US/MSDS](http://solutions.3m.com/wps/portal/3M/en_US/MSDS) (click MSDS search). For emergencies, call 800-364-3577 or 651-737-6501 (24 hours).

Pour 2 gallons of SUL-X concentrate into the solution tank. Under most operating conditions SUL-X concentrate should be diluted with an equal amount of SULFUR-FREE (preferably soft) water. In some situations, however, where a high sulfur concentration and/or a high pumping rate exists, the SUL-X Concentrate must be used in undiluted form in order to provide a high enough SUL-X feed rate to precipitate all the sulfur. To determine if the SUL-X Concentrate should be diluted or undiluted, multiply the pumping rate of your well pump by the sulfur concentration:

$$\text{Pumping Rate} \quad \underline{\hspace{2cm}} \quad \times \quad \text{Sulfur} \quad \underline{\hspace{2cm}} \quad = \quad \underline{\hspace{2cm}}$$

(gpm)                      (ppm)                      (Number)

\* Refer to HOW TO MEASURE PUMPING RATE OF PUMP, Section 2 for proper method of determining pumping rate.

If the resulting number is LESS than 90, DILUTE the SUL-X Concentrate with an equal amount of water. If the number is 90 or above, DO NOT DILUTE the SUL-X Concentrate. (EXAMPLE: 8 gpm pumping rate x 8 ppm sulfur = 64. 64 is LESS than 90 - therefore, dilute the SUL-X Concentrate with an equal amount of water. This is the starting point for setting the correct SUL-X feed rate).

## Step 10

Normally the feed pump operates only when the well pump runs; however, to facilitate calibrating the feed pump, remove the feed pump power cord from the special receptacle controlled by the pressure switch and plug it into any 110/115V power source or 220 volt outlet. To prime pump, turn knob on bleed valve to "BLEED" position and allow pump to run until solution appears in bleed return line. Turn knob on bleed valve to "PUMP" position and continue running feed pump until discharge tube fills to Turbo-flo injector assembly, plug feed pump power cord into special receptacle controlled by pressure switch.

## Step 11

Set feed pump stroke length to 50%. Make certain that filter BYPASS VALVE is in BYPASS POSITION (Figure 4). Turn on power to well pump. Allow water system to repressurize. After system has pressurized check for leaks in plumbing.

## Step 12

Open a cold water faucet, so that well pump continues to run at 1/2 pressure; i.e., 30 psi if system operates at 20/40 psi. Continue to draw sample of water from test cock. Adjust feed pump rate just enough to eliminate sulfur odor in water coming from test cock. (Dark brown color of sample water is normal and is caused by precipitated sulfur and will be reduced by the SUL-X Filter). Refer to special Section 4 on dilution procedures to fine tune SUL-X feed rate and concentration (dilution) for most efficient and economical setting. Close cold water faucet.

### IMPORTANT NOTE

Should a sulfur odor persist even when the dial setting is at its maximum, reread STEP 9. Also, check to determine if the odor is in the hot water only, and, if it is, the hot water heater may need to be drained and cleaned.

## Step 13

- Make certain BYPASS VALVE INLET and OUTLET KNOBS are in "BYPASS" position (Figure 4). Plug timer into a 110/120V, 60 Hz non-switched power source. Manually stage CONTROL VALVE to BACKWASH POSITION by turning "MANUAL REGENERATION KNOB", Page 6-1, clockwise to "BACKWASH" position. Open BYPASS VALVE INLET KNOB 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. Once water is flowing to drain, open both the BYPASS VALVE INLET and OUTLET KNOBS completely.
- Check for leaks. Leave unit in BACKWASH for at least 10 minutes or until drain line water runs clear, whichever is longer. This procedure will "reclassify" media that may have been disturbed during shipping and handling. After this preliminary backwash, stage CONTROL VALVE to SERVICE position. Manually initiate a complete "regeneration" process, allowing the unit to automatically proceed through a backwash and rapid rinse, see "HOW TO MANUALLY BACKWASH YOUR FILTER AT ANY TIME", Page 6-1.

## Step 14

Set the TIME-OF-DAY (see HOW TO SET TIME CONTROL). The BACKWASH frequency is factory preset for every other day. This frequency need not be adjusted unless the sulfur reduction is great enough to require daily backwashing. Refer to HOW TO SET BACKWASH CYCLE PROGRAM if change is required.

NOTE: Should you experience a water system pressure loss or bleed-through of the precipitant prior to a scheduled backwash, put the system into a manual backwash and increase the frequency of regeneration.

IMPORTANT INSTRUCTIONS: IF WATER IS SUPPLIED BY A PUBLIC OR COMMUNITY SOURCE, OR WATER LINE IS SPLIT-STREAMED ANYWHERE AHEAD OF THE FILTER TANK (See Figure 1):

When application is a split stream installation (Figure 2). Note the placement of the solenoid valve. The HIGH setting of the pressure control switch (which controls the opening and closing of solenoid valve) must be set a minimum of 2 to 3 lbs. LOWER than the normal LOW pressure encountered on the supply system. FAILURE TO DO THIS WILL NOT ALLOW PROPER CLOSING OF THE SOLENOID VALVE DURING PERIODS OF LOW SYSTEM PRESSURE.

### SPECIAL SERVICE INSTRUCTIONS:

During normal operation removal of control valve should never be required. Pressure should be relieved before attempting any disassembly. However, if it must be removed, it can be done by disassembling the quick release clamp, by removing latch. Upon reassembly, all o-rings should be lubricated with silicone grease. Reassemble clamp as shown in Figure 9. MAKE SURE ARROWS ON LATCH SIDE OF CLAMP ARE ALIGNED.

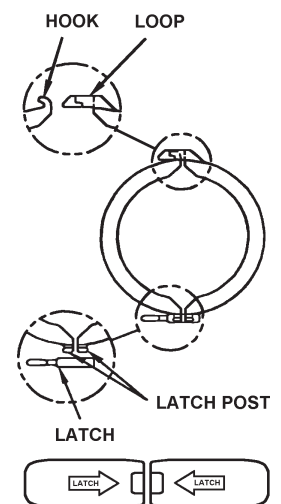


Figure 7. CLAMP ASSEMBLY

## SECTION 4: PLUMBING SYSTEM CLEAN-UP

### IMPORTANT NOTE

The following procedures are guidelines only but have proven successful in most instances. UNDER NO CIRCUMSTANCES WILL CUNO INCORPORATED BE RESPONSIBLE FOR PROPERTY DAMAGE, INCLUDING DAMAGE TO APPLIANCES AND THIS FILTER SYSTEM DUE TO IMPROPER INSTALLATION AND USE. 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 untreated water need to be cleaned or they will continue to be a problem.

Depending on the amount of iron in the water and the length of time the water system was exposed to iron fouled water, select from the following procedures those that apply to the type of system and appliance(s) that need cleaning.

### SOFTENER

It is not uncommon that the softener was installed in an effort to reduce ferrous ("clear water") iron from the water supply. Typically, a softener will reduce some ferrous iron until the resin bed becomes fouled to the extent that it will lose both hardness reduction capacity and the limited capacity for iron reduction. 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 SUL-X Sulfur Reduction 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 oz. of IRON-X resin mineral cleaner.
- 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 and 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.

### WATER HEATER

If the water heater has been exposed to untreated water 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 SUL-X Sulfur Reduction 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 treated 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.

### IMPORTANT NOTE

If water does not clear in approximately 10 minutes, the 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 SUL-X Sulfur Reduction System, pour 4 to 6 ounces of IRON-X resin mineral cleaner or inhibited muriatic acid into flush tanks and bowls and let stand. When installation is completed, flush toilets several times with filtered water. If iron deposits or stains remain, repeat procedure until clear.

## SECTION 5: FINE TUNING THE SUL-X SYSTEM

In order to make the installation and operation of your SUL-X Sulfur Reduction System the most economical, a brief discussion of the concept of dilution must be undertaken. Dilution is defined as the reduction of concentration of a particular constituent by the addition of another. In the case of SUL-X concentrate, the dilution is performed with the addition of treated water. The idea of dilution rate and ratio may be best demonstrated by several examples.

### EXAMPLE 1

Initial concentration: 1 Gallon of SUL-X Concentrate

If we add: 1 Gallon of Water

Total solution: 2 Gallons of mixture

In the final 2 gallons of mixture, 1/2 (1 gallon out of 2 gallons) is SUL-X concentrate. This can be stated two different ways. First, the dilution ratio is 1:1 (1 gallon SUL-X/1 gallon water) or secondly, by saying a 50% dilution was performed (1/2, i.e. 50%, of the final mixture is SUL-X Concentrate).

### EXAMPLE 2

Initial concentration: 1 Gallon of SUL-X

If we add: 3 Gallons of water

Total Solution: 4 Gallons of mixture

In this example, we end up with 1 gallon of SUL-X in 4 gallons of mixture, therefore 1/4 or 25% of the final mixture is SUL-X Concentrate. Again this can be stated two different ways, first, the dilution ratio is 1:3 (1 gallon SUL-X/3 gallons water) and secondly by saying a 25% dilution was performed (1/4, i.e. 25%, of the final mixture is SUL-X Concentrate).

### EXAMPLE 3

Suppose we have performed a 1:1 (50%) dilution by mixing 1 gallon of concentrate with 1 gallon of water. We now have a total of 2 gallons of mixture. After performing the dilution, we decide the mixture is not concentrated enough, so we add 1 gallon of concentrate to the 2 gallon mixture. The ratio of SUL-X to water is now 2:1 (2 gallons of concentrate/1 gallon of water) and the total amount of mixture is now 3 gallons. The SUL-X Concentrate is now diluted 2/3, 66.7% (2 gallons SUL-X/3 gallons mixture).



## CAUTION

**To reduce the risk associated with skin, eye, and respiratory tract irritation from water treatment chemicals:**

- Several types of water treatment chemicals may be used in this product, depending upon the application. During installation and use, exposure may cause irritation to skin, eyes, and respiratory tract.
- Utilize a NIOSH-approved dust filter mask, protective gloves, and appropriate eye protection when handling and pouring water treatment chemicals.
- To request an MSDS relating to this product, call 203-238-8965 or visit the web at [http://solutions.3m.com/wps/portal/3M/en\\_US/MSDS](http://solutions.3m.com/wps/portal/3M/en_US/MSDS) (click MSDS search). For emergencies, call 800-364-3577 or 651-737-6501 (24 hours).

## IMPORTANT NOTES

A ratio relates the different components of a mixture, when they all have the same units of measure, i.e. gallons of SUL-X to gallons of water, ounces of SUL-X to ounces of water, pounds of SUL-X to pounds of water, etc. In the examples above the ratios were expressed as 1:1, 1:3 and 2:1.

A dilution rate relates one component to the total mixture.

The final amounts of SUL-X concentrate and water mixed together in your installation should be recorded below.

Mixture Ratio

\_\_\_\_ gallons SUL-X      \_\_\_\_ 1.0 \_\_\_\_  
\_\_\_\_ gallons water      \_\_\_\_\_

These two numbers can be used to determine the mixture ratio. By dividing the gallons of water by the gallons of SUL-X an easy to remember ratio can be found (see following example).

### EXAMPLE 4

Suppose a final mixture contains 2 gallons of SUL-X and 4 gallons of water:

Ratio = 2:4 then Mixture Ratio =  $2/2:4/2 = 1.0:2.0$

Suppose we now wish to make up 12 gallons of solution, we would mix 4 gallons of concentrate with 8 gallons of water. This mixture contains 1 gallon of SUL-X for every 2 gallons of water, therefore our ratio of 1:2 is maintained.

Any amount of solution can be mixed using the following formulas.

Desired Gallons of Solution

Mixture Ratio of SUL-X + Mixture Ratio of Water = Gallons of SUL-X Required

Desired gallons of solution - gallons of SUL-X = gallons of water

Using the above example:

Desired gallons of solution = 12

Mixture ratio of SUL-X = 1.0

Mixture ratio of water = 2.0

$$\frac{12}{1.0 + 2.0} = \frac{12}{3.0} = 4 \text{ gallons of SUL-X required}$$

$$12 - 4 = 8 \text{ gallons of water required}$$

### EXAMPLE 5

Desired gallons of solution = 10

Mixture ratio of SUL-X = 1.0

MIXTURE RATIO OF WATER = 2.0

$$\frac{10}{1.0 + 2.0} = \frac{10}{3.0} = 3.33 \text{ gallons of SUL-X required}$$

$$10 - 3.33 = 6.67 \text{ gallons of water required}$$

### EXAMPLE 6

A ratio of 1:1 exists and we have 1 gallon of SUL-X and 1 gallon of water for a total of 2 gallons of mixture, the dilution rate of SUL-X is 1/2 or 50%, since there is 1 gallon of concentrate in 2 gallons of mixture.

A ratio of 1:3 gives 4 gallons of mixture, so the dilution rate of SUL-X is 1/4 or 25%.

A ratio of 2:1 gives 3 gallons of mixture, so the dilution rate of SUL-X is 2/3 or 66.7%.

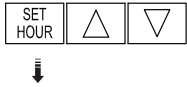
It should be noted that the dilution is stated as: 1 gallon of SUL-X is diluted with 1 gallon of water (1:1 ratio), 1 gallon of SUL-X is diluted with 3 gallons of water (1:3 ratio) or 2 gallons of SUL-X is diluted with 1 gallon of water (2:1 ratio). It would be just as correct to state: 3 gallons of water is diluted with 1 gallon of SUL-X, but the ratio should now be changed from 1:3 to 3:1. The dilution rate can be stated for any component in a mixture, but care should be taken when it is referred to in the ratio form.

Now that we have discussed the ideas of dilution rate and ratio, we can discuss the fine-tuning of the SUL-X system to the most economical operating condition. The basic, underlying idea of the fine-tuning process is to have the highest feed pump stroke frequency at the highest dilution rate of the solution. The decision whether or not to dilute can be based roughly on the stroke frequency percentage at the point where the sulfur odor disappears. If the percentage is 50% or less, the solution can be diluted 50%. After the dilution, the feed pump should once again be adjusted to the point where the smell disappears. This adjustment process should be repeated until the feed rate exceeds 75%. There is no need to adjust the feed pump to a precise setting each time. Since the hydrogen sulfide concentration will vary from day-to-day, the best, most precise setting today may not be tomorrow. The feed pump should be adjusted until it is set above 75%.

If upon initial installation you find the feed rate is above 75% and you are feeding undiluted SUL-X Concentrate, it may be more economical to include an aerator in the treatment system. An aerator will reduce the sulfur concentration 50 - 75%, depending on its efficiency and could reduce the cost of operation for the SUL-X system substantially.

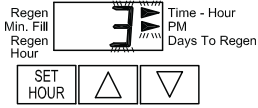
Although we have discussed the concepts of dilution in specific relation to the SUL-X system, the same ideas hold true in other instances where dilutions may be necessary. These situations could include chlorination, soda ash addition for pH adjustment or even when conducting tests on water samples.

## HOW TO SET TIME OF DAY



### STEP 1

Press **SET HOUR** and release.



### STEP 2

Set the clock display to the closest hour by pressing the  $\Delta$  or  $\nabla$ . An arrow will appear in the display pointing to **PM** during PM hours.

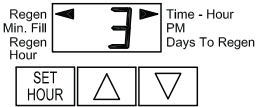


### STEP 3

Press **SET HOUR** to return to the display mode.

**Note:** After an extended power outage the time of day may need to be reset.

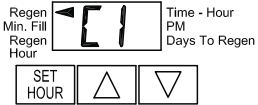
## HOW TO MANUALLY INITIATE IMMEDIATE REGENERATION



### STEP 1

Press and hold  $\Delta$  and  $\nabla$  buttons simultaneously until valve motor starts (usually about three (3) seconds).

**Note:** Once a manual regeneration has been initiated, it cannot be stopped.



### STEP 2

Once the valve display is in **C1**, it is in **Backwash**. To advance to **Rapid Rinse** press and hold  $\Delta$  and  $\nabla$  buttons simultaneously until valve motor starts (usually about three (3) seconds).



### STEP 3

Once the valve display is in **C4**, it is in **Rapid Rinse**. To advance to the display mode, press and hold  $\Delta$  and  $\nabla$  buttons simultaneously until valve motor starts (usually about three (3) seconds).

## HOW TO MANUALLY INITIATE DELAYED REGENERATION



### STEP 1

Press and release the  $\Delta$  and  $\nabla$  buttons simultaneously.

**Note:** An arrow will appear in the display pointing to **Regen** indicating regeneration will occur at the programmed time.



## HOW TO CHANGE DAYS BETWEEN REGENERATION



### STEP 1

Press and hold **SET HOUR** and  $\Delta$  buttons simultaneously for three (3) seconds and release.



### STEP 2

Press **SET HOUR** button.



### STEP 3

Press  $\Delta$  and  $\nabla$  buttons to change the number of days between regenerations.



### STEP 4

Press **SET HOUR** to return to the display mode.

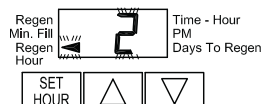
Note: Your Sulfur Reduction filter is factory preset for 30 days between regenerations.

## HOW TO CHANGE TIME OF REGENERATION



### STEP 1

Press and hold **SET HOUR** and  $\Delta$  buttons simultaneously until the display begins flashing (usually about three (3) seconds).



### STEP 2

Set the clock display to the closest hour by pressing  $\Delta$  or  $\nabla$  button. An arrow will appear in the display pointing to PM during PM hours.



### STEP 3

Press and release **SET HOUR** and  $\Delta$  buttons simultaneously to return to the display mode.

Note: Your Sulfur Reduction filter is factory set to regenerate at 12:00 AM.

## HOW TO CHANGE THE REGENERATION PROGRAM SETTINGS



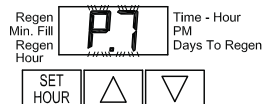
### STEP 1

Press and hold **SET HOUR** and  $\Delta$  buttons simultaneously until the display begins flashing (usually about three (3) seconds).



### STEP 2

Press and hold **SET HOUR** and  $\Delta$  buttons simultaneously until the display begins flashing (usually about three (3) seconds).



### STEP 3

Press the  $\Delta$  button to change the display to P8 or P9.



### STEP 4

Press the **SET HOUR** button five (5) times to return to the display mode. The time of day should be in the display.

## Control Valve Function and Cycles of Operation

The AC adapter comes with a 15 foot power cord that is designed for use with the control valve. The AC adapter is for dry location use only. If the power goes out, only the time of day needs to be reset. All other settings are permanently stored in the nonvolatile memory.

The following chart shows the time for the backwash and rapid rinse cycles for the three available programming options.

### Regeneration Cycles and Times for Different Programs

Program Number	Length of Cycle Times (Minutes)	
	BACKWASH (C1)	RAPID RINSE (C4)
P7	6	4
P8	10	6
P9	14	8

**Note:** Your Sulfur Reduction Filter is factory preset to program number P7, changing the setting to P8 or P9 is rarely needed. But if a change is desired. Please refer to **“How to Change the Regeneration Program Settings”** on page 2-6.

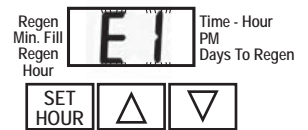
## HOW TO SET TIMER CONTROL

### Power Loss

If the power goes out, current time of day will need to be reset. If the power goes out while the system is regenerating, the cycle picks up where it was when the power went out.

### Error Message

If “E1” “E2” or “E3” appears on the display, contact CUNO Incorporated Technical Support Services @1-800-222-7880. These are error codes and will need to be resolved before the control valve will function. These codes indicate that the control valve did not function properly.

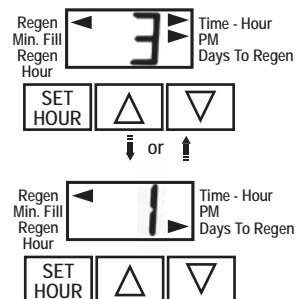


## USER DISPLAYS

### General Operation

When the system is operating, one of two displays will be shown. Pressing UP or DOWN button will alternate between the displays. One of the displays is always the current time of day (to the nearest hour). The second display is the days remaining until the next regeneration. If the days remaining is equal to one, a regeneration will occur at the next preset regeneration time. The user can scroll between displays as desired.

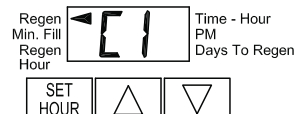
If the system has called for a regeneration that will occur at the preset time of regeneration, the arrow will point to Regen.



### Regeneration Mode

Typically a filter system is set to regenerate at a time of low water usage. Your Sulfur Reduction filter is factory preset to regenerate at 12:00 AM. If there is a demand for water during the regeneration period, untreated water will be used.

When the system begins to regenerate, the display will change to indicate the cycle of the regeneration process that is occurring (see chart on page 2-7) and an arrow will also point to **REGEN**. The system will run through the steps automatically and will reset itself to provide treated water when the regeneration is completed.



## SECTION 6: TROUBLESHOOTING

Problem	Cause	Solution
1. Timer does not display the correct time of day.	A. Transformer is unplugged.	1. Reconnect transformer.
	B. No power at outlet.	1. Repair or use working outlet. 2. Check circuit breaker in main power box.
	C. Defective transformer.	1. Replace transformer.
	D. Defective PC board.	1. Replace PC board.
2. Timer does not display the correct time of day.	A. Outlet on a switched circuit.	1. Use a non-switched circuit.
	B. Power outage.	1. Reset time of day.
	C. Defective PC board.	1. Replace PC board.
	D. Time of day set wrong.	1. Reset to the correct time.
3. Error followed by a code number.  Error Code E1 — Unable to recognize start of regeneration. Error Code E2 — Unexpected stall Error Code E3 — Motor ran too long. Timed out trying to reach next cycle position If other codes appear, contact factory.	A. Valve just serviced.	1. Press SET HOUR and ∇ for 3 seconds or momentarily unplug power source from PC board.
	B. Foreign material stuck in valve.	1. Check piston and spacer stack for obstruction.
	C. Excessive piston resistance.	1. Replace piston and spacer assembly. ∇
	D. Position not in the home position.	1. Press SET HOUR and ∇ or momentarily unplug power source from PC board.
4. Excessive pressure drop through filter.	A. Filter not backwashing.	1. Pre-Treat with Ramjet.
	B. Filter bed loaded with well sand.	1. Increase Sul-X feed rate or increase concentration.
	C. No Sul-X Feed.	1. Probe media bed for this condition, verify adequate pumping rate for backwashing. 2. Check for frozen, plugged, kinked or restricted drain line. ∇ 3. Ensure no vinyl tubing or garden hose has been used as a drain line. 4. Check for adequate backwashing rate.
5. Inadequate Hydrogen Sulfide Reduction	A. Greater than 15 ppm of Hydrogen Sulfide.	1. Check bypass valve is in "Service" position, replace or repair as necessary.
	B. Low Sul-X solution Feed.	1. Check piston and seal and spacers — replace as necessary.
	C. Distributor tube not properly seated in control valve.	1. Check for power to feed pump 2. Check fuse on circuit board 3. Injector plugged
6. Regenerates at wrong time of day.	A. Wrong time of day displayed.	1. Reset the time of day.
	B. Past power outage.	1. Reset the time of day.
	C. Time of regeneration set wrong.	2. Reset the time of regeneration.
7. Water runs to drain in the service position.	A. Piston and seal assembly damaged.	1. Replace piston and seal assembly together.
8. Discoloration in treated water drain upon start up of filter.	A. Media not sufficiently washed to P8 or P9.	1. Change regeneration programming.
	B. Iron in treated water.	1. Check raw water quality and correct with the appropriate products (contact technical services for help.)
6. Taste in treated water.	A. Iron in feed water.	1. Treat with the appropriate treatment product. Contact technical services for equipment recommendations.
	B. Organics in treated water.	1. Treat with the appropriate treatment product. Contact technical services for equipment recommendations.
10. Media in aerators at the faucets.	A. Unit installed backwards.	1. Ensure that the piping enters to inlet side of bypass and exits on the outlet side. (Refer to red handles on bypass to check for flow direction.)
	B Distributor is damaged.	1. Remove distributor tube from filter tank and inspect. Replace as needed.
	C. Media was loaded in distributor tube while loading filter unit.	1. Remove distributor tube from filter tank, clean and reinstall correctly. Cover distributor tube with plug sent or something appropriate.
11. Water leaking from mineral tank.	A. Mineral tank was subjected to a vacuum condition.	1. Replace mineral tank and check to see that either a check valve or back flow prevention device is installed and operating.
	B. Mineral tank has failed.	1. Contact installing contractor to have evaluated and replaced.
	C. Pin hole in mineral tank.	1. Contact installing contractor to have evaluated and replaced.
12. Time of day flashes on and off.	A. Power has been off for more than two hours.	1. Reset the time of day.
	B. Transformer was unplugged from either wall outlet or from PC board.	1. Reset the time of day.
	C. SET HOUR was pressed.	1. Reset the time of day.

13. Valve stalled in regeneration.	A. Motor not operating.	1. Replace motor.
	B. No power at the outlet	1. Repair outlet or use a working one. 2. Check circuit breaker at the main power box.
	C. Defective transformer.	1. Replace transformer.
	D. Defective PC board.	1. Replace PC board.
	E. Broken drive gear or drive cap assembly.	1. Replace gear or drive cap assembly.
	F. Broken piston retainer.	1. Replace main piston assembly.
	G. Broken main piston.	1. Replace main piston assembly.
14. Valve does not regenerate automatically when the $\Delta$ and $\nabla$ buttons are pushed.	A. Transformer unplugged.	1. Connect transformer and the PC board power
	B. No power at outlet.	1. Restore or repair power source.
	C. Broken drive gear or drive cap assembly.	1. Replace gear or drive cap assembly.
	D. Defective PC board.	1. Replace PC board.
15. Valve does not regenerate automatically, but does when $\Delta$ and $\nabla$ are depressed.	A. Programming error.	1. Review programming of control valve.
	B. Defective PC board.	1. Replace PC board.

## SECTION 7: SPECIFICATION AND OPERATING DATA

ITEM	CSX100	CSX200
Nominal Media Volume, cu. ft. (cu. mtr.)	1.0 (0.03)	2.0 (0.06)
Gravel Underbed, lbs (kg)	18 (8.2)	22 (10)
Operating Flow Rate, gpm (lpm) (Note 1)		
Continuous (no duration limit)	3.0 (13.6)	4.0 (18.2)
Service (intermittent)	6.0 (27.3)	9.0 (40.9)
Peak (10 minutes max. duration)	10.0 (45.5)	13.0 (59.1)
Pressure Loss @ Flow Rates, psi (kPa)		
Continuous	2 (0.013)	2 (0.013)
Service	5 (0.034)	8 (0.055)
Peak	13 (0.89)	14 (0.097)
Backwash Rate, (Note 2), gpm (lpm)	5 (22.7)	7 (31.8)
Service Pipe Size, inches (cm)	1 (2.5)	1 (2.5)
Tank Diameter x Height, inches (cm)	10 x 44 (25.4 x 112)	12 x 54 (30.5 x 137)
Minimum Space Required		
Width, inches (cm)	30 (76.2)	32 (81.3)
Depth, inches (cm)	18 (45.7)	18 (45.7)
Height, inches (cm)	56 (142.2)	66 (167.6)
Approximate Shipping Weight, lbs (kg)	163 (73.9)	271 (122.9)

Maximum operating temperatures 110°F (43.3°C); Electrical requirements 110 Volt (60 Hz); Operating pressure 20-100 psi (138-689 kPa).

**Notes:**

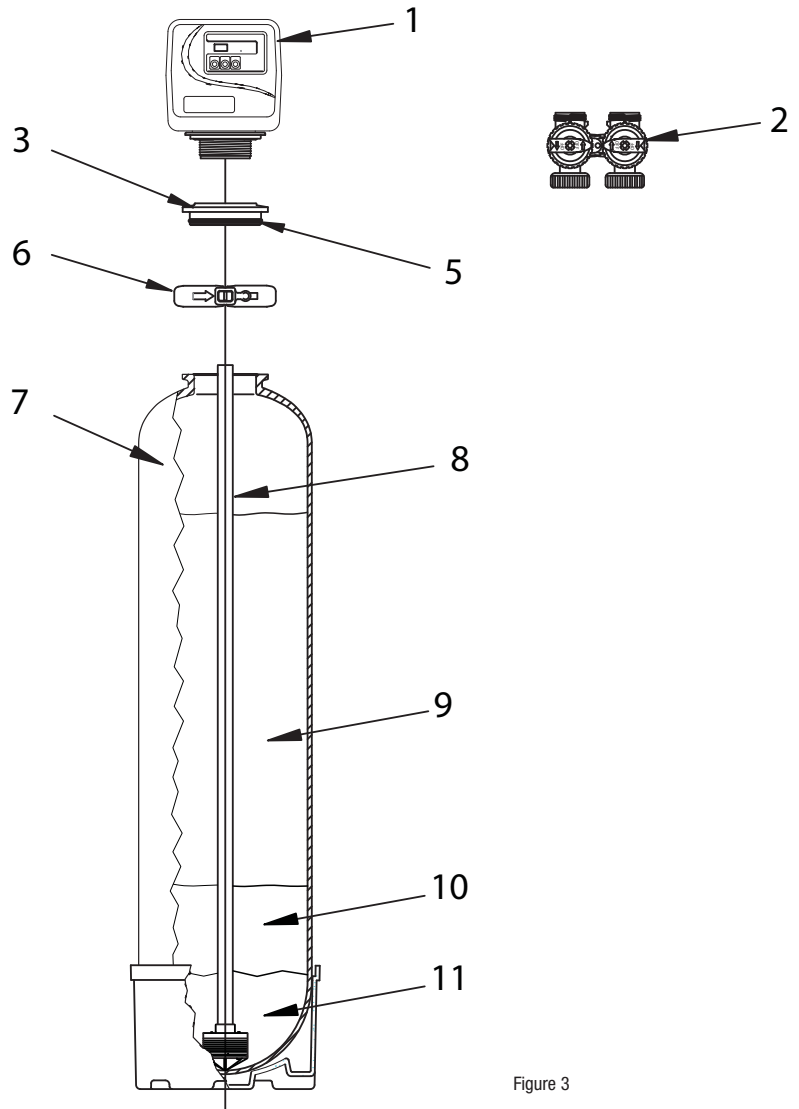
- (1) For satisfactory performance, indicated durations should not be exceeded; Flow rates specified are adequate for normal residential applications. This filter system is not intended to treat commercial applications.
- (2) Indicated pressure loss is for new systems, these losses will increase as the filter is used and the longer the duration since last regeneration.

## SECTION 8: COMPONENT LIST

REF NO.	DESCRIPTION	CSX100	CSX200
1	Control Valve, Complete, Less Bypass Valve	W217530-003-0N	W217720-003-0N
2	Bypass Valve	V3006	V3006
3	Threaded Tank Adapter	FA45TX	FA45TX
5	O-ring Included with Item #3	ORG-234	ORG-234
6	Clamp Assembly	FC45XX	FC45XX
7	Media Tank w/Base	MTP1044FB	MTP1054FB
8	Distributor Tube	C37S-16-44	C37S-16-54
9	Media	SX-10P	SX-10P (2)
10	Gravel Underbed Underbed 1/4" x 1/8"	QC-12P	QC-15P

**Note:** When ordering replacement or repair components be sure to always specify by the unit or model number to ensure the correct parts are ordered.

Items Not Shown	
Description of Item	Part Number
Wrench	V3193- 01
Funnel	U1006
1" Plumbing Connection Fitting Straight Male NPT Fitting Straight Brass Sweat Fitting	V3007-04 V3007-02
Adapter Kit - 1" NPT - 1" Sweat Fittings	V3007-02* V3007-04*
Weather Cover	V3175-WCA



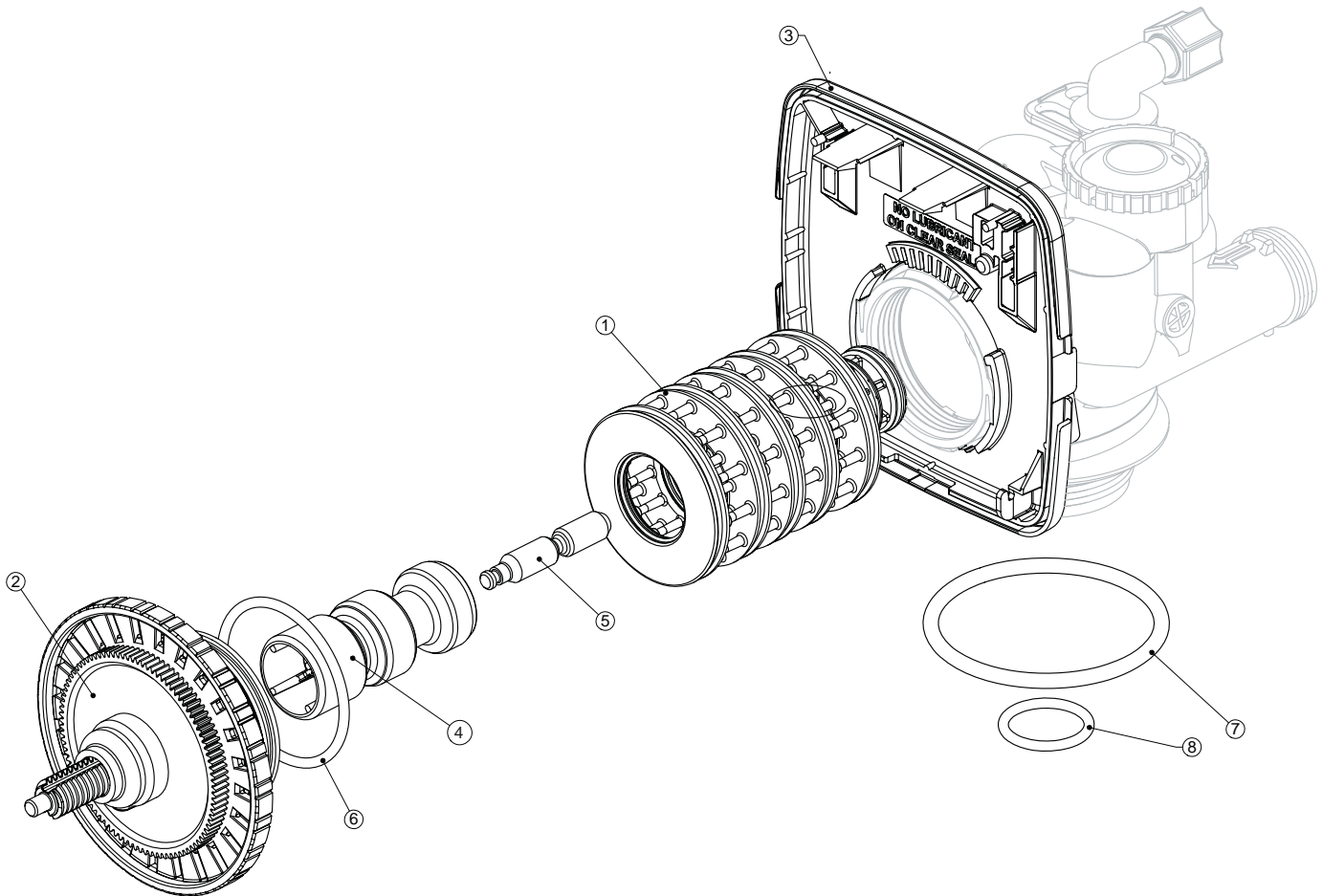
\*See assemblies drawing for individual components

Figure 3

## SECTION 8: FILTER VALVE ASSEMBLIES

### FILTER DRIVE CAP ASSEMBLY, DOWNFLOW PISTON, AND SPACE STACK ASSEMBLY

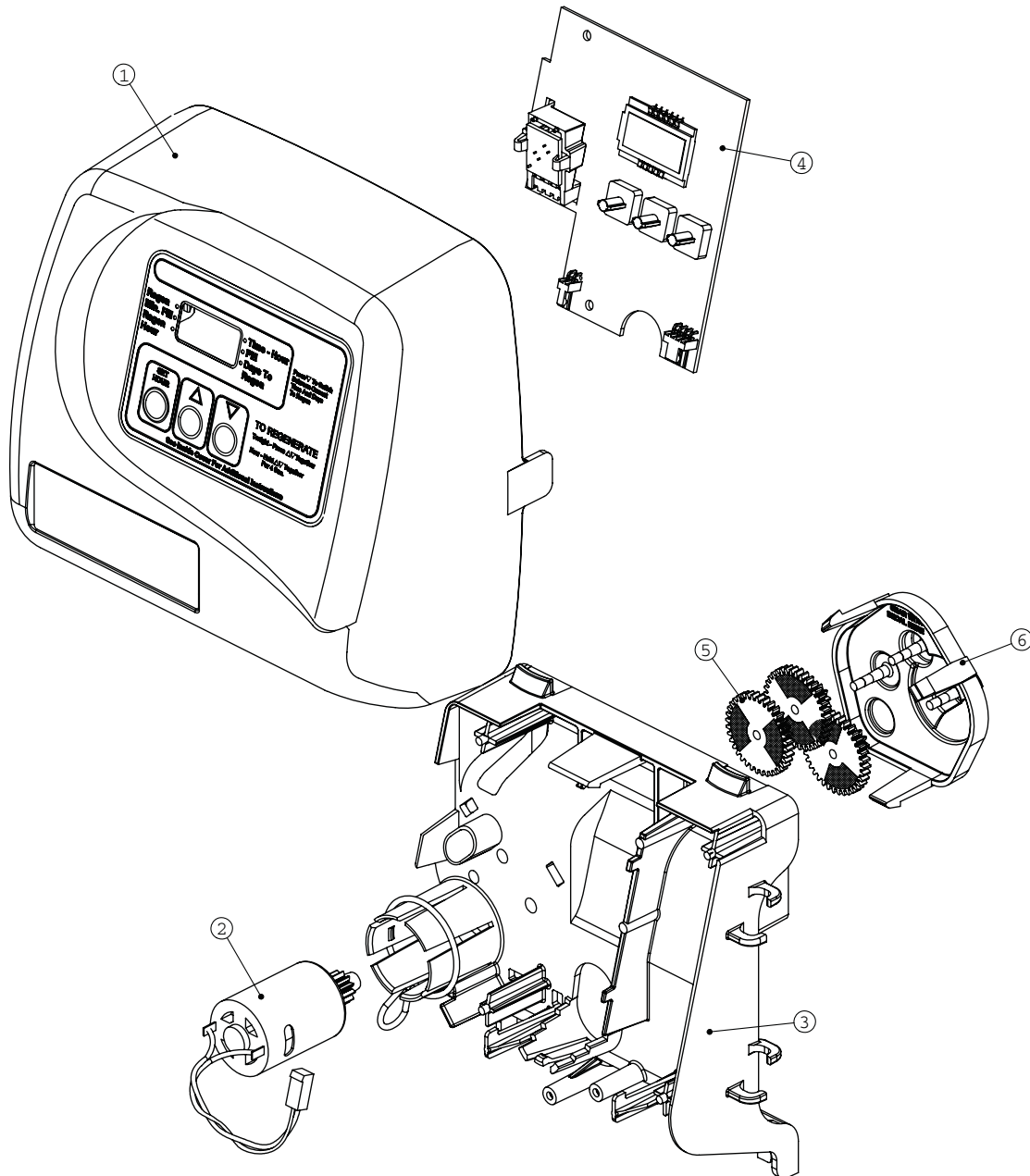
Reference No.	Part No.	Description	Quantity
1	V3005	Spacer Stack Assembly	1
2	V3004	Drive Cap Assembly	1
3	V3178	Drive Back Plate	1
4	V3001	Piston Downflow Assembly	1
6	V3135	O-ring 228	1
7	V3180	O-ring 337	1
8	V3105	O-ring 215 Pilot Tube	1
NOT SHOWN	V3001	Downflow body Assembly	1



## Front Cover and Drive Assembly

Reference No.	Part No.	Description	Quantity
1	V3175TC-01	Time Clock Front Cover Assembly	1
2	V3107-01	Motor	1
3	V3106-01	Drive Bracket & Spring Clip	1
4	V3108TC	Time Clock PC Board	1
5	V3110	Drive Gear 12 x 36	1
6	V3109	Time Clock Cover	1
	V3002TC	Time Clock Drive Assembly	1
NOT SHOWN	V3186	AC Adapter 110V - 12V	1
NOT SHOWN	V3175-WCA	Weather Cover	1

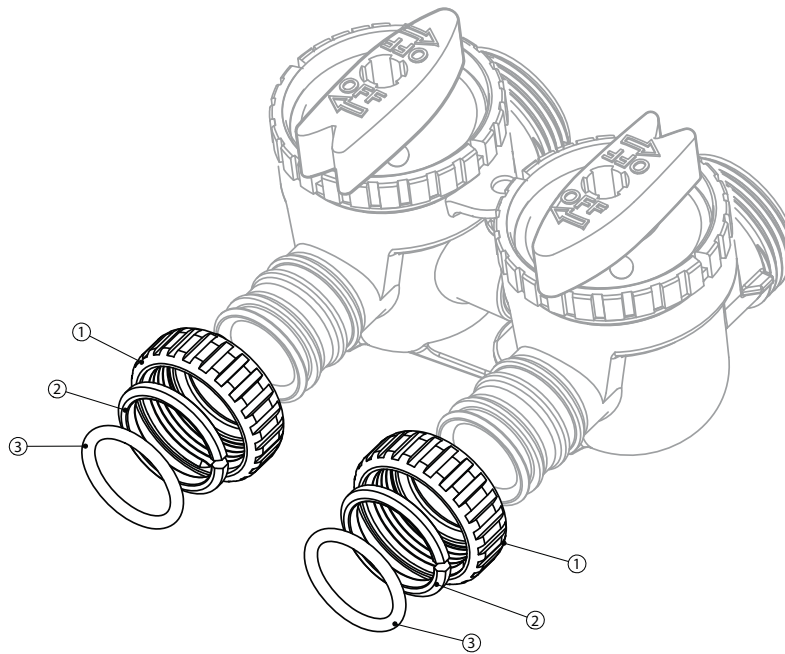
Drawing number parts 2 through 6 may be purchased as a complete assembly, part V3202.





### Quick Connect Bypass Valve

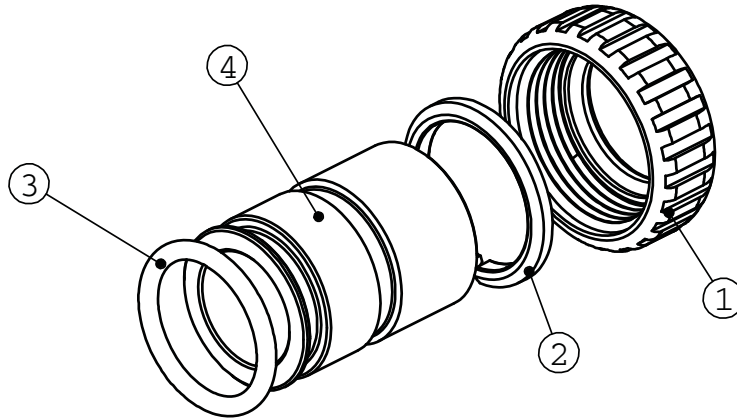
Reference No.	Part No.	Description	Quantity
1	V3151	Nut 1" Quick Connect	2
2	V3150	Split Ring	2
3	V3105	O-ring	2



**Installation Fitting Assemblies  
Quick Connect Assemblies**

**Part # V3007-02**

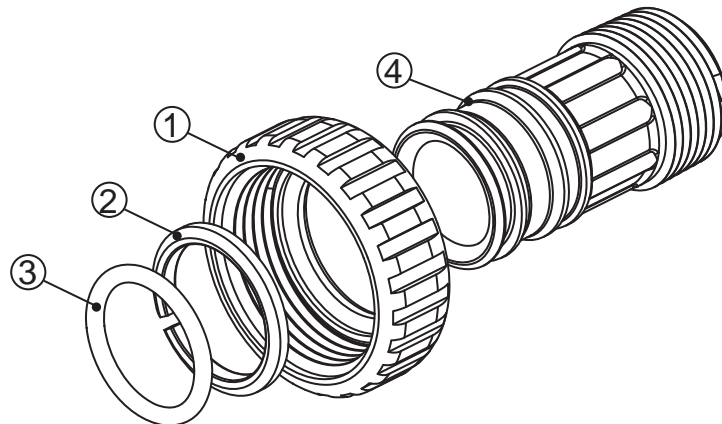
Reference No.	Part No.	Description	Quantity
1	V3151	1" Quick Connect Nut	2
2	V3150	1" Quick Connect Split Ring	2
3	V3105	1" Quick Connect O-Ring 215	2
4	V3188	1" Brass Sweat Assembly	2



**Part # V3007-04**

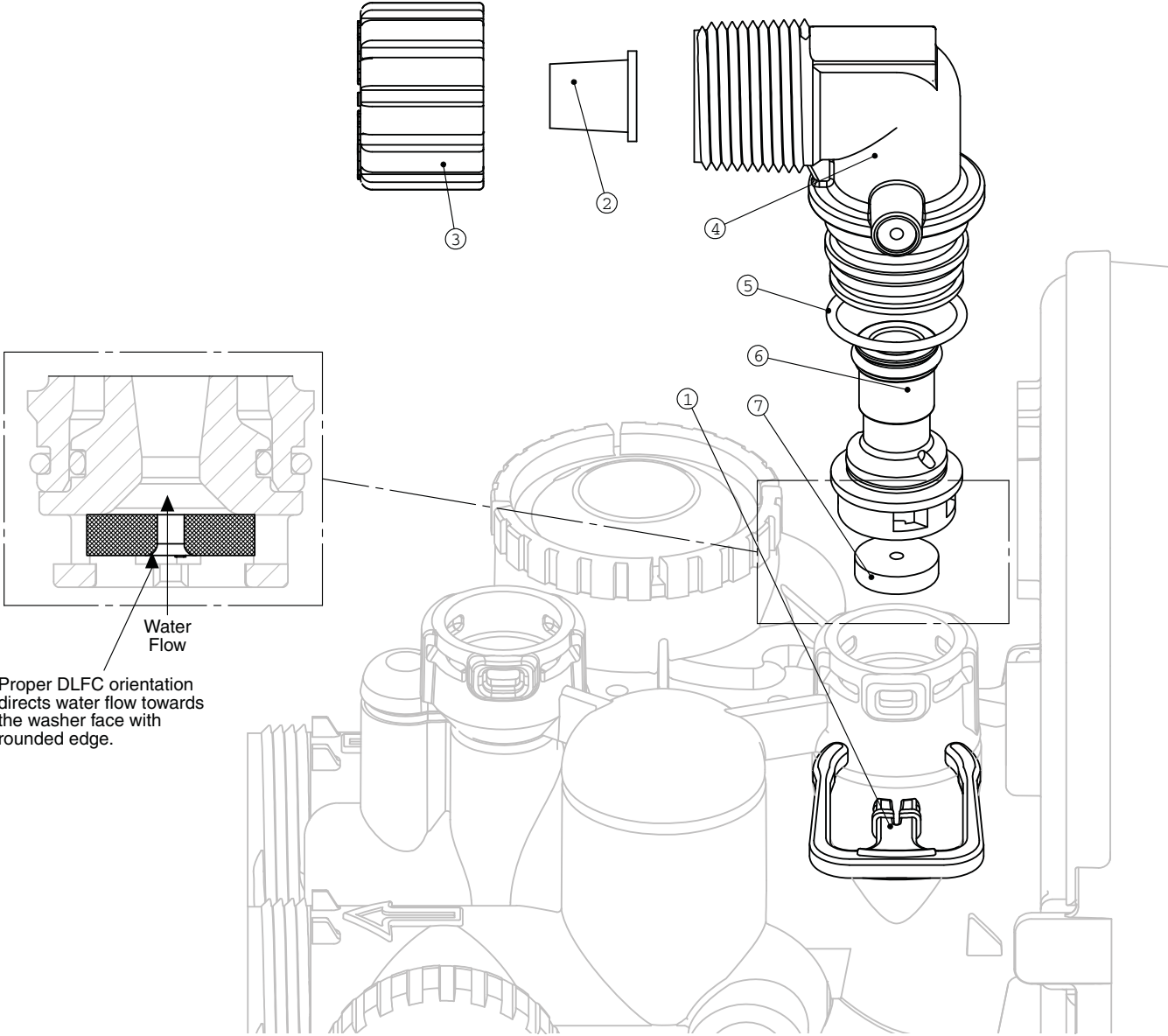
**Description: 1" Plastic Male NPT Assembly**

Reference No.	Part No.	Description	Quantity
1	V3151	1" Quick Connect Nut	2
2	V3150	1" Quick Connect Split Ring	2
3	V3105	1" Quick Connect O-Ring 215	2
4	V3164	1" NPT Quick Connect Plastic Male Assembly	2



### Quick Connect 3/4" Drain Line Housing

Reference No.	Part No.	Description	Quantity
1	H4615	Elbow Locking Clip	1
2	PKP10T58-BLK	5/8" Insert Sleeve	
3	V3192	Quick Connect 3/4" Drain Elbow Nut	1
4	V3158-01	Quick Connect 3/4" Drain Elbow	1
5	V3163	O-ring 019	1
6	V3159-01	Drain Line Flow Control Retainer Assembly	1
7	V3162-027	2.7 gpm Drain Line Flow Control Button	1
7	V3162-032	3.2 gpm Drain Line Flow Control Button	1
7	V3162-53	5.3 gpm Drain Line Flow Control Button	1



## **WARRANTY**

For any warranty questions, please refer to the enclosed warranty card or call 1-800-222-7880 or mail your request to:

CUNO Incorporated  
400 Research Parkway  
Meriden, CT 06450