Series 253 Valve / 440 Control

Filter Control System

Installation, Operation and Maintenance Manual

Table of Contents

Introduction

The Series 253 Filter Control System combines design simplicity with fiber reinforced plastic construction to provide the user with an uncommonly reliable appliance. The inherent reliability of the system means a long life of efficient, trouble-free, uninterrupted filtered water luxury.

Should maintenance become necessary, the Series 253 offers a unique “separation” capability which is illustrated in this manual.

Of interest to both the owner and his water conditioning dealer are the design and operation benefits detailed below.

Superior Design

- **Fewer Parts** than any control system of comparable function and most controls of lesser function.
- **Single synchronous electric motor** provides all the power for the program clock 440 timer and the operation of the control.
- **Electrical wiring is factory assembled.** System cannot be connected incorrectly.
- **Program clock (timer)** provides guest regeneration capability.
- **Control may be indexed manually with or without power** to its service or regeneration positions. Legend on timer face plate indicates control valve position.
- **No moving parts in water stream** means no close tolerance dimensions subject to fouling. Thus, the system is especially effective on iron-bearing water.
- **No dynamic seals** that could cause leakage through wear or fatigue.
- **Control accepts Noryl* or brass manifold or modular bypass valve without modification,** offering complete versatility and easy plumbing for any installation.
- **Automatic drain flow controller** is incorporated in the system.

*Noryl is a trademark of General Electric Company

Superior Operation

- **Direct acting system** functions independently of water pressure. No pistons or diaphragms that require a minimum water pressure to operate.
- **Three-cycle operation** provides for downflow (fast rinse).
- **Valve discs are held closed by water pressure** and are therefore leak tight. The sealing forces are increased as the water pressure is increased. Valve seats are in a vertical position, which is the design position least vulnerable to plugging.
- **System operation cannot get out of phase** or sequence. Control always returns to a fixed service position after regeneration regardless of where in the regeneration cycle it was started.
- **Bypass water is automatically available** during regeneration.

Installation

All plumbing and electrical connections must conform to local codes.

Inspect conditioner carefully for carrier shortage or shipping damage.

Location Selection

1. The distance between the conditioner and a drain should be as short as possible.
2. If it is likely that supplementary water treating equipment will be required, make certain adequate additional space is available.
3. Do not install any conditioner closer to a water heater than a total run of ten feet (3 m) of piping between the outlet of the conditioner and the inlet to the heater. Water heaters can sometimes overheat to the extent they will transmit heat back down the cold water pipe into the conditioner.

   Hot water can severely damage the conditioner. A 10-foot (3-m) total pipe run, including bends, elbows, etc., is a reasonable distance to help prevent this possibility. A positive way to prevent hot water from flowing from heat source to the conditioner, in the event of a negative pressure situation, is to install a check valve in the water piping from the conditioner. **If a check valve is installed, make certain the water heating conditioner is equipped with a properly rated temperature and pressure safety relief valve. Also, be certain that local codes are not violated.**
4. Do not locate conditioner where it or its' connections (including the drain line and overflow lines) will ever be subjected to room temperatures under 34°F (1°C) or over 120°F (49°C).
5. Do not install conditioner near acid or acid fumes.

Water Line Connection

The installation of a bypass valve system is recommended to provide for occasions when the conditioner must be bypassed for unfiltered water or for servicing.

The most common bypass systems are the Autotrol Series 256 Bypass Valve (Figure 1) and plumbed-in globe valves (Figure 2). Though both are similar in function, the 256 Autotrol Bypass offers simplicity and ease operation.

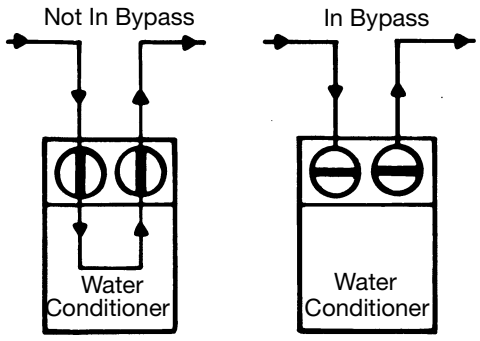


Figure 1

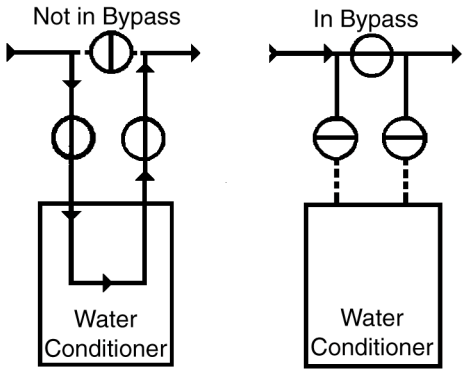


Figure 2

Drain Line Connection

1. Ideally located, the conditioner will be above and not more than 20 feet (6.1 m) from the drain. For such installations, using an appropriate adapter fitting (not supplied), connect 1/2-inch (1.3-cm) plastic tubing to the drain line connection of the conditioner.
2. If the conditioner is located more than 20 feet (6.1 m) from the drain, using an appropriate adapter fitting (not supplied), connect 3/4-inch (1.9-cm) plastic tubing to the drain line connection of the conditioner for runs up to 40 feet (12.2 m).
3. Where a drain empties into an overhead sewer line, a sink-type trap must be used.

IMPORTANT: Never connect drain line into a drain, sewer line or trap. Always allow an air gap between the drain line and wastewater to prevent the possibility of sewage being back-siphoned into conditioner.

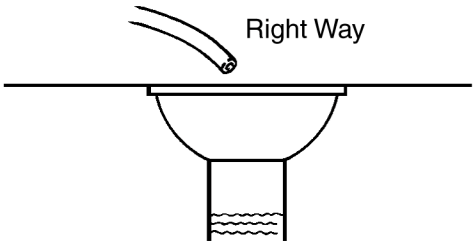


Figure 3

Note: Standard commercial practices have been expressed here. Local codes may require changes to these suggestions.

Electrical Connection

Remove the twist tie from the power cord and extend the cord to its full length. Make sure the power source matches the rating printed on the timer. Plug into an electrical outlet that will accept a 3-prong adapter in standard outlet. Be sure the outlet you select is not controlled by a wall switch.

Placing Filter into Operation

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

1. Remove the control valve cover.

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

2. Insert screwdriver into slot in pointer knob. (Figure 4). Press in and rotate knob **COUNTERCLOCKWISE** until arrow points directly to the word **BACKWASH**.
3. Fill media tank with water.
   a. With water supply off, place the bypass valve(s) into the “not in bypass” position.
   b. Open water supply valve very slowly to approximately the 1/4 open position.

IMPORTANT: If opened too rapidly or too far, media may be lost. In this position, you should hear air escaping slowly from the drain line.

   c. When all of the air has been purged from the tank (water begins to flow steadily from the drain), open the main supply valve all the way.
   d. Allow water to run to drain until clear.
   e. Turn off water supply and let the unit stand for about 5 minutes. This will allow all trapped air to escape from the tank.
4. Put into service.
   a. Open water supply valve slowly to full open position.
   b. Advance pointer knob **COUNTERCLOCKWISE** to **SERVICE.**
   c. Run water from a nearby faucet until the water is clear.

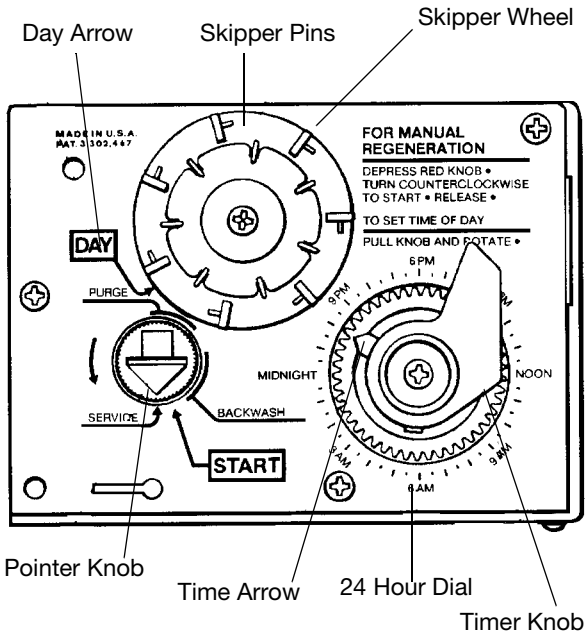


Figure 4

Adjustment of Timer

1. Set days of regeneration on skipper wheel (Figure 4).
   - Pull all skipper pins outward (away from control).
   - Rotate skipper wheel until day arrow points to current day or number 1.
   - Depress skipper pin(s) at day(s) for which regeneration is desired.
2. Set the time of day.
   - Grasp timer knob and pull outward.
   - Rotate in either direction until actual time of day on 24-hour dial is in line with time arrow.

Note: With the time of day properly set, the filter will regenerate at about 2:30 a.m. If you prefer to have the unit regenerate at an earlier or later time, simply set the current time of day accordingly. (e.g., To have the unit

regenerate at 4:30 a.m. - 2 hours later - set the clock 2 hours earlier than the actual current time).

Special Features of Timer

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

Manual Regeneration. Electricity is used only to run the timer and to rotate the camshaft. All other functions are operated by water pressure. Therefore, in the event of a power outage, all the various regeneration positions may be dialed manually by depressing the pointer knob and turning **COUNTERCLOCKWISE** to each cycle.

Manual time cycle:

BACKWASH.....20 minutes
PURGE.....10 minutes

Removing the Series 253 Valve for Servicing

1. Unplug the power cord.
2. Shut off the water supply or put the bypass valve(s) into bypass position.
3. Remove the cover (Figure 5), and with a screwdriver, relieve tank pressure by pushing open the drain valve disc (#5) as shown (Figure 6).

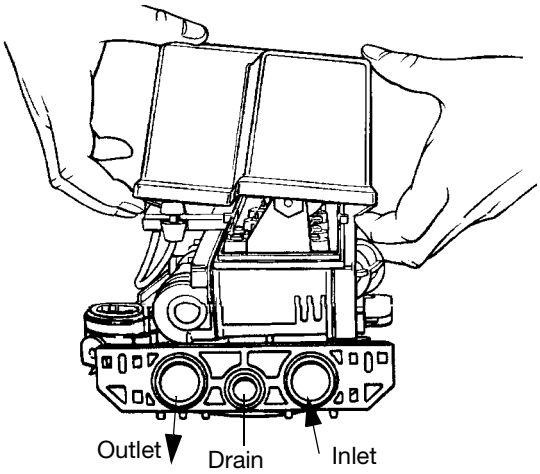


Figure 5

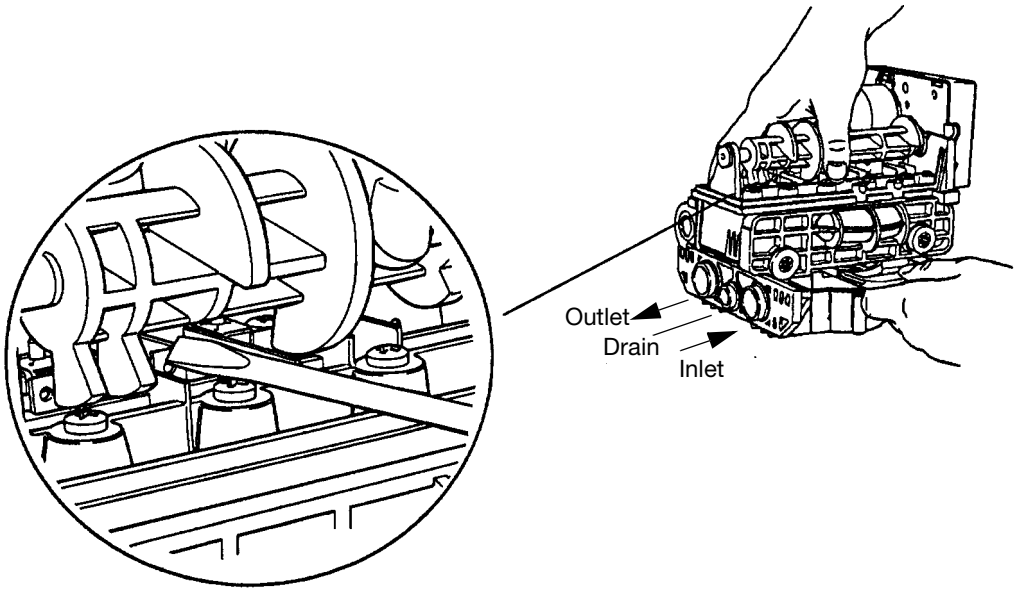


Figure 6

4. Remove the screw in the locking bar (Figure 7).

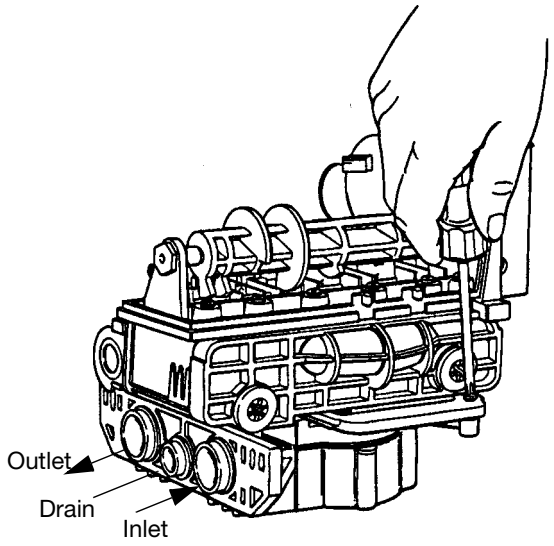


Figure 7

5. Apply downward hand pressure on the valve and pull the locking bar out (Figure 8).

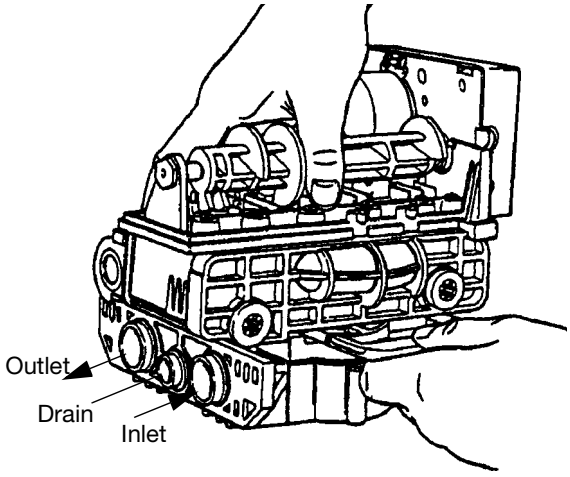


Figure 8

6. Using a rocking motion, lift the valve from the tank adapter (Figure 9). If O-ring seals come off with the valve put them back into the tank adapter sockets. Lubricate O-rings with silicone lubricant.

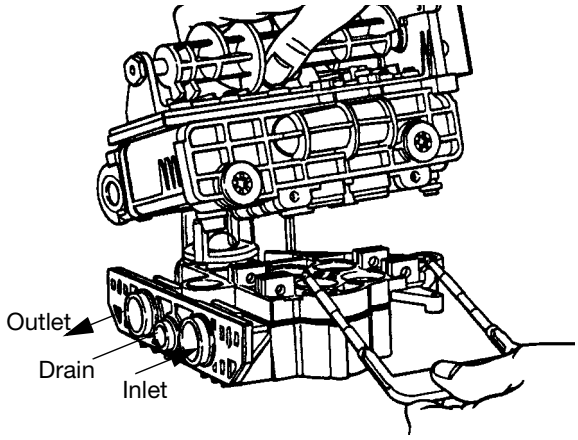
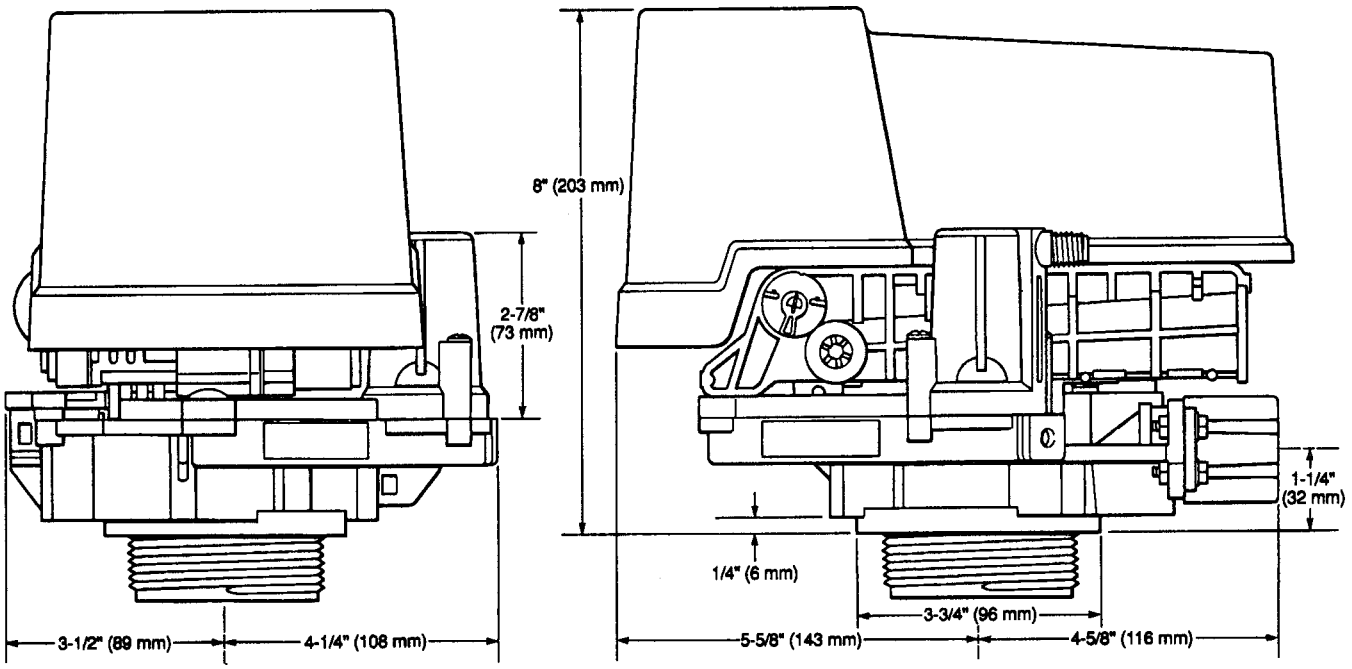


Figure 9

7. To replace the valve, reverse the above procedure.

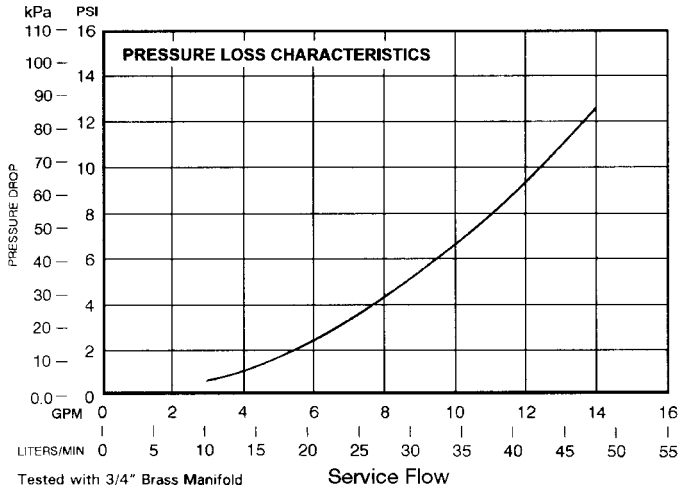
Specifications

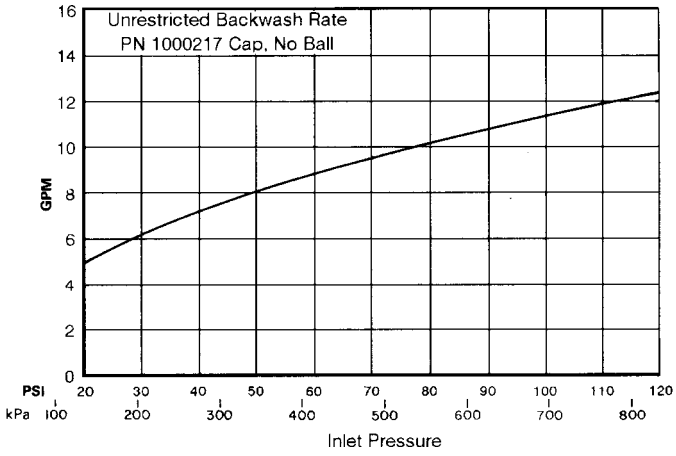


Hydrostatic Test Pressure	300 psi (20.69 bar)
Working Pressure	20-127 psi (1.39-8.76 bar)
Working Pressure in Canada	20-100 psi (1.39-6.895 bar)
Standard Electrical Rating	115V 60 Hz
Optional Electrical Rating	115V 50 Hz, 230V 50 Hz, 200V 60 Hz, 24V 60 Hz, 24V 50 Hz, 100V 60 Hz, 100V 50 Hz
Electric Cord (Standard Rating)	60 inch (1.5-m) long, 3-wire with plug
Pressure Tank Thread	2 1/2 inch -8 Male
Riser Pipe Diameter Required	13/16 inch OD (20.6 mm)
Riser Pipe Length	1-1/4-inch (31.8-mm) higher than top of mineral tank
Standard Manifold Connection	3/4-inch NPT inlet-outlet, 3/8-inch NPT drain
Optional Manifold Connections	1-inch NPT inlet-outlet, 1/2-inch NPT drain; 3/4-inch BSPT inlet-outlet, 3/8-inch BPST drain; 1-inch BPST inlet-outlet, 1/2-inch BSPT drain
Optional Bypass Valve	3/4-inch (19.1-mm) or 1-inch (25.4-mm) copper tailpiece, 1/2-inch NPT male drain
Control Module, Tank Adapter, Optional Bypass Valve	Glass reinforced Noryl
Inlet-Outlet Manifold	Brass or glass reinforced Noryl
Rubber Goods	Compounded for cold water service
Program Clock (Timer)	Available in 6- or 7-day English
Backwash Controllers Available for	6 through 14 inch (15.2 through 30.5 cm) diameter mineral tanks All are sized to flow 4.5 gpm/sq ft (183 L/min/m^2) of bed area.

Pressure Graphs

Pressure loss data is representative of a single 255 Valve.

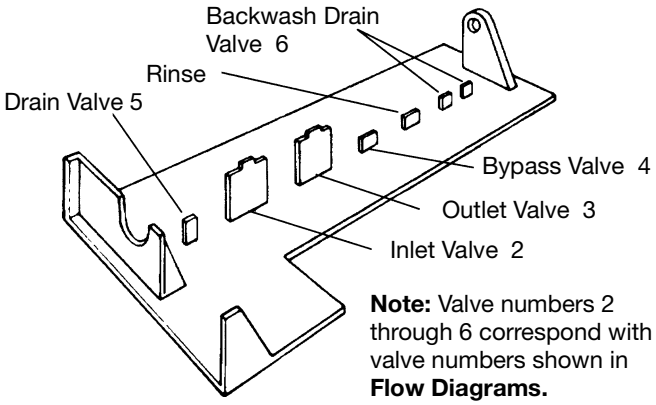




Backwash Number	6	7	8	9	10	12	13	14
Flow in GPM	0.88	1.20	1.57	1.99	2.45	3.53	4.15	4.81
Flow in L/M	3.34	4.56	5.97	7.56	9.31	13.41	15.77	18.28

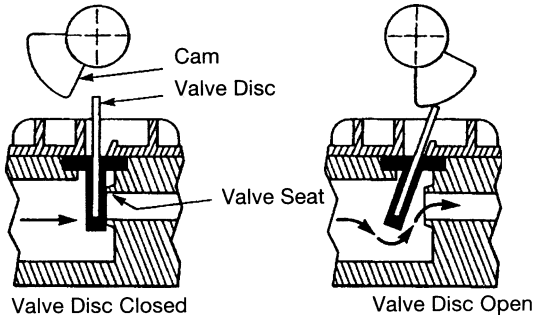
Flow Diagrams

Identification of Control Valving



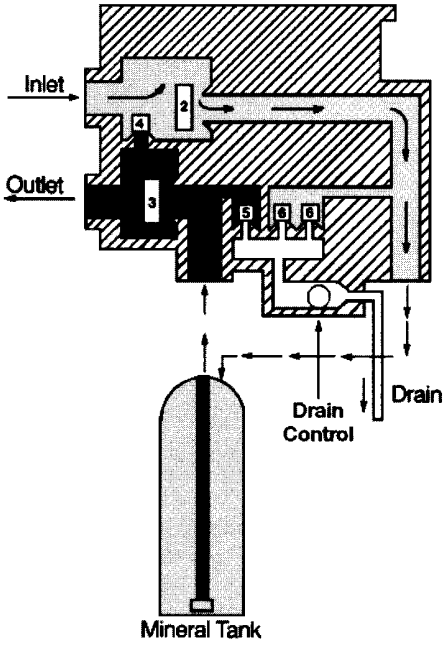
Note: Valve numbers 2 through 6 correspond with valve numbers shown in **Flow Diagrams.**

Valve Disc Operation



1 Service Position

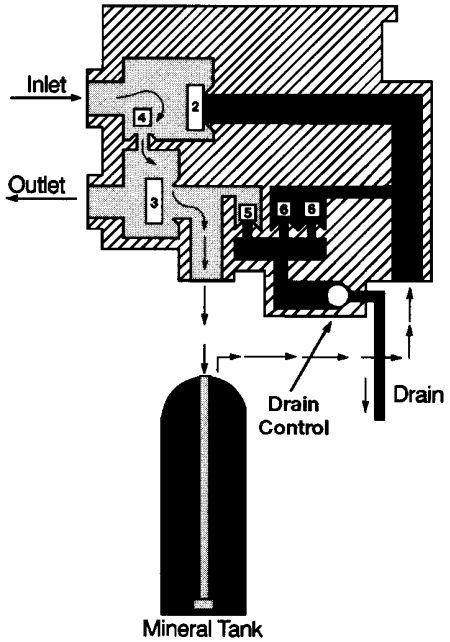
Unfiltered Water
Filtered Water



Valve No.
2 – Open
3 – Open
4 – Closed
5 – Closed
6 – Closed

2 Backwash Position

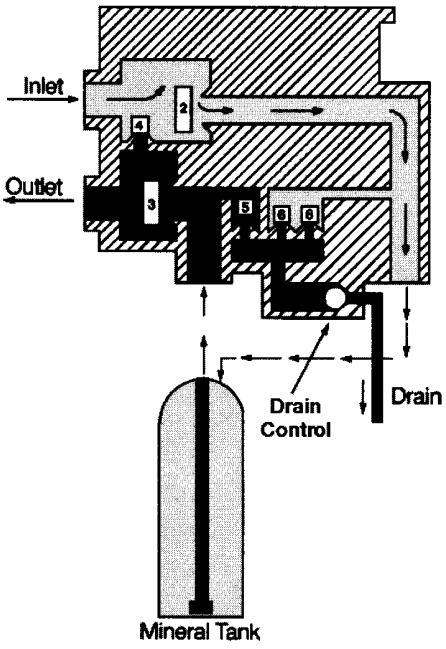
Unfiltered Water
Backwash Water



Valve No.
2 – Closed
3 – Open
4 – Open
5 – Closed
6 – Open

3 Purge Position

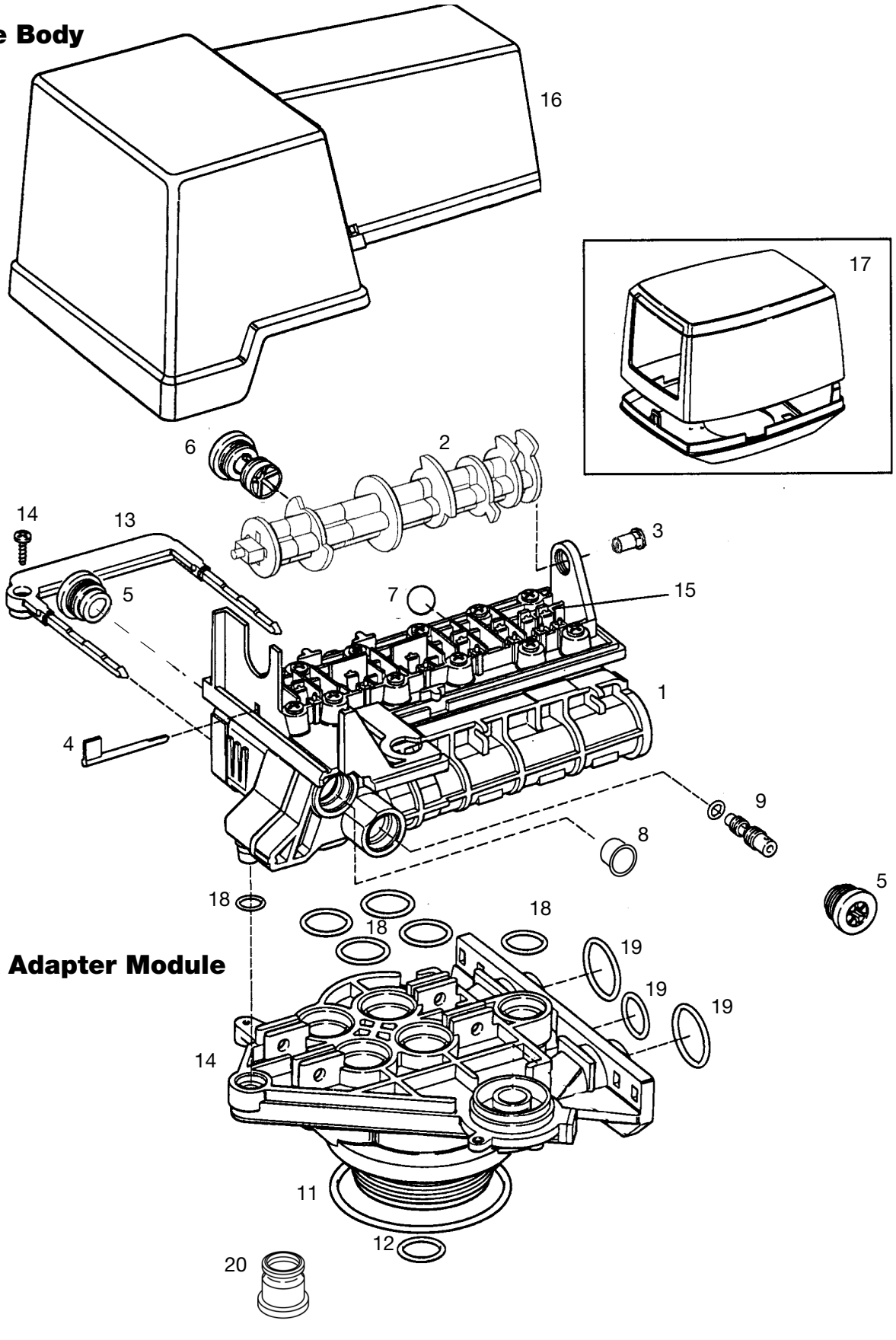
Unfiltered Water
Filtered Water



Valve No.
2 – Open
3 – Open
4 – Closed
5 – Open
6 – Closed

Replacement Parts

Valve Body

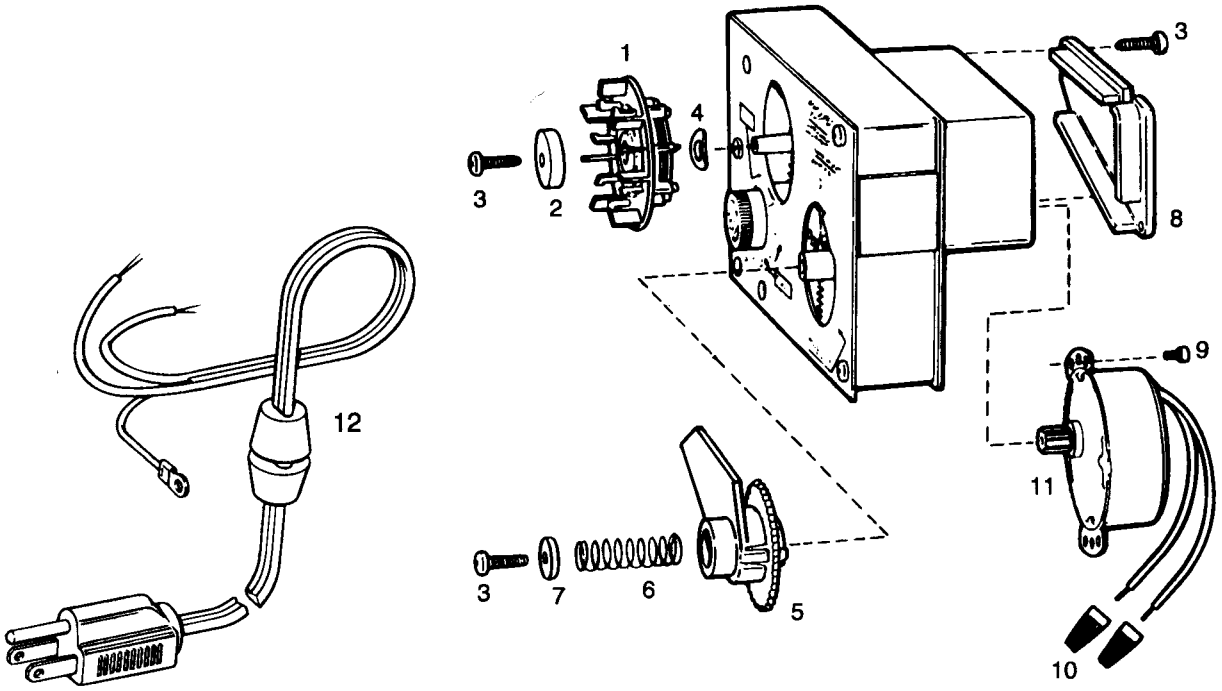


Valve

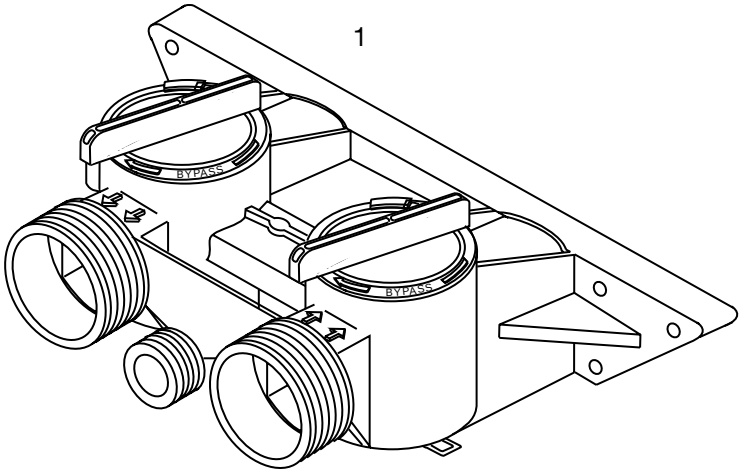
Code	Part No.	Description	Qty.	Code	Part No.	Description	Qty.
1	1000232	Valve Assembly, w/o Flow Control	1	11	1010429	O-Ring BN	1
2	1033256	Camshaft Assembly	1	12	1010428	O-Ring EP	1
3	1030501	Camshaft Bearing	1	13	1031402	Locking Bar, English	1
4	1031391	Timer Locking Pin	1	14	1006093	Screw, No. 8 x 9/16 inch	1
5	1000217	Cap with O-Ring	1	15	1001580	Spring, Valve Flappers	9
6		Drain Control Assembly w O-Rings:	1	16	1032565	Valve Cover, Standard, Black	1
	1000209	No. 7 (1/2 gpm; 4.5 Lpm)				High Style Covers:	Opt.
	1000210	No. 8 (1.6 gpm; 6.1 Lpm)		17	1041087	Beige/Tan	
	1000211	No. 9 (2.0 gpm; 7.6 Lpm)			1041088	Black/White	
	1000212	No. 10 (2.5 gpm; 9.5 Lpm)			1041091	Beige/Black	
	1000213	No. 12 (3.5 gpm; 13.2 Lpm)					
	1000214	No. 13 (4.1 gpm; 13.2 Lpm)		*		Valve Disc kit Replacement:	
	1000215	No. 14 (4.8 gpm; 18.2 Lpm)			1000250	Standard	
7	1030502	Ball, Flow Control	1		1000252	Severe Service	
8	1009021	Caplug	1	18	1001404	O-Ring Group: Tank Adapter	
9	1032978	Injector, Blank with O-Rings	1	19	1040459	O-Ring Group: Piping Boss	
10	1033064	Tank Adapter Assembly	1	20	1041010	13/16 Riser Insert (Optional)	

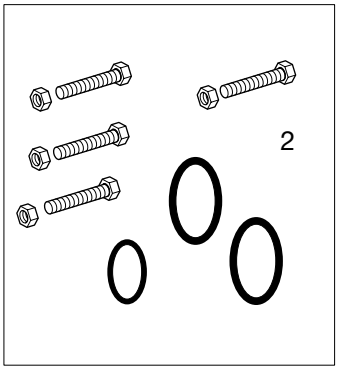
* Not Shown

440 Timer

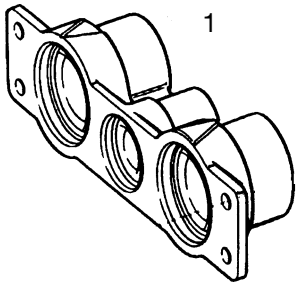


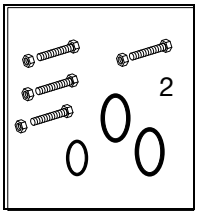
Bypass Valve





Piping Boss





Note: Do not use pipe joint compound when threading pipe into the Noryl piping boss. Use only Teflon® pipe tape. Do not overtighten pipe into Noryl piping boss.

*Teflon is a registered trademark of E.I. Dupont and Company.

440 Timer

Code	Part No.	Description	Qty.
1		Skipper Wheel Assembly	1
	1031740	6-Day	
	1031742	7-Day	
2	1030659	Washer	1
3	1066091	Screw, No. 6 x 1/2 inch	7
4	1006601	Bowed Washer	1
5	1031756	Tripper Arm Assembly	1
6	1030830	Spring	1
7	1030821	Retainer	1
8	1031751	Motor Cover	1
9	1005615	Screw, No. 4-40 x 1/4 inch	1
10	1007483	Wire Nut	2
11		Motor:	1
	1030846	115V, 60 Hz	
	1030847	115V, 50 Hz	
	1030848	230V, 50 Hz	
	1031557	200V, 60 Hz	
	1030850	24V, 60 Hz	
	1030849	24V, 50 Hz	
	1031348	100V, 60 Hz	
	1031347	100V, 50 Hz	
12	1007490	Cord Set, Flat (SPT-2)	1

Code	Part No.	Description	Qty.
	1040524	Install Kits	
13	1001606	3/4-inch Copper Tube Adapter Kit	1
	1001670	1-inch Copper Tube Adapter Kit	1
	1001608	22 mm Copper Tube Adapter Kit	1
	1001609	28 mm Copper Tube Adapter Kit	1
	1001613	3/4-inch CPVC Tube Adapter Kit	1
	1001614	1-inch CPVC Tube Adapter Kit	1
	1001615	25-mm CPVC Tube Adapter Kit	1
	1001769	3/4-inch NPT Plastic Pipe Adapter Kit	1
	1001603	1-inch NPT Plastic Pipe Adapter Kit	1
	1001604	3/4-inch BSPT Plastic Pipe Adapter Kit	1
	1001605	1-inch BSPT Plastic Pipe Adapter Kit	1
	1001611	3/4-inch BSPT Brass Pipe Adapter Kit	1
	1001610	1-inch NPT Brass Pipe Adapter Kit	1
	1001612	1-inch BSPT Brass Pipe Adapter Kit	1

Piping Boss

Code	Part No.	Description	Qty.
1	Kit	Piping Boss (Includes Hardware)	1
	1040277	3/4-inch NPT, Brass	
	1040278	1-inch NPT, Brass	
	1040281	3/4-inch BSPT, Brass	
	1040282	1-inch BSPT, Brass	
	1040279	3/4-inch NPT, Noryl	
	1040280	1-inch NPT, Noryl	
	1040283	3/4-inch BSPT, Noryl	
	1040284	1-inch BSPT, Noryl	
	1001386	3/4-inch NPT, Noryl, Male	2
2	1040339	Piping Boss Install Kit	1

*Not Shown

Troubleshooting

The technology upon which the Series 253 Filter Control System is based is well established and proven in service over many years. However, should a problem or question arise regarding the operation of the system, the valve can be very easily serviced. The valve can be quickly replaced or adjustments can be made at the installation. For parts mentioned, refer to exploded views in the **Replacement Parts** section of this manual.

Problem	Cause	Solution
1. Control will not backwash automatically.	a. Electric cord unplugged. b. Defective timer motor. c. Skipper pins not down on timer skipper wheel. d. Binding in gear train of timer.	a. Connect power. b. Replace motor. c. Depress pins for days backwash required. d. Replace timer.
2. Control backwash is at wrong time of day.	a. Timer set incorrectly.	a. Correct setting according to instructions.
3. Control backwashes or purges at excessively low or high rate.	b. Incorrect backwash controller used. c. Foreign matter affecting controller operation.	a. Replace with correct size controller. b. Remove controller; clean both controller and ball.
4. Flowing or dripping water at drain line after backwash.	a. Drain valve (5 or 6) held open by foreign matter or particle. b. Valve stem return spring on top plate weak.	a. Manually operate valve stem to flush away obstruction. b. Replace spring.

Printed in the USA P/N 1017956 Rev. B