

Series 163 Valve / 440 Control

**Filter Control System
Installation, Operation and Maintenance Manual**

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Installation

All plumbing and electrical connections must conform to local codes.

Inspect unit 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 space is available.

3. Do not install conditioner closer to a water heater than a total run of 10 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 unit 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 the conditioner where it or its connections (including the drain 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

A bypass valve system must be installed since there may be occasions when the water conditioner must be bypassed for unfiltered water or for servicing.

The most common bypass systems are the Autotrol Series 165 Bypass Valve (Figure 1) and plumbed-in globe valves (Figure 2) Though both are similar in function, the 165 Autotrol Bypass offers simplicity and ease of operation.

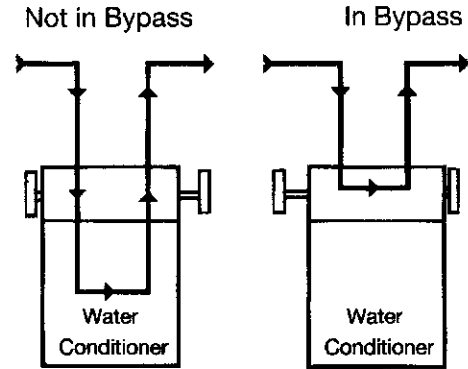


Figure 1 Autotrol Series 165 Bypass Valve

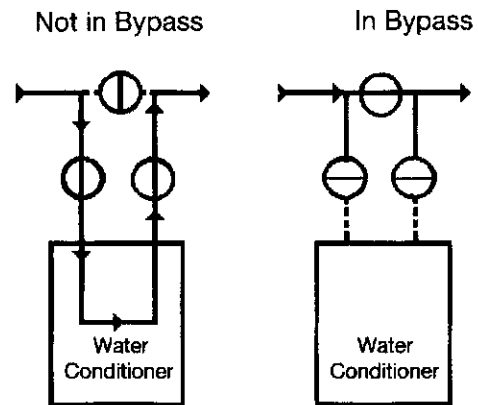


Figure 2 Typical globe valve bypass system

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.

- Where drain line is elevated but empties into a drain below the level of the control valve, form a 7 inch (18 cm) loop at the far end of the line so that the bottom of the loop is level with the drain line connection. This will provide an adequate siphon trap.



Caution

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

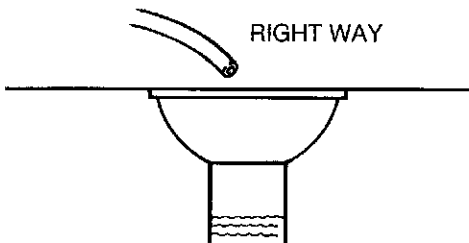


Figure 3

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

Electrical Connection

100VAC, 115VAC and 230VAC Units:

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

12VAC and 24VAC units:

The power supply transformer should have a minimum rating of 3 volt-amps. Connect the plug of the transformer secondary cable to the mating socket at the rear of the timer housing.

Be certain the transformer is plugged into the correct voltage source that is not controlled by a wall switch.

Placing Conditioner into Operation

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

- 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 firmly. With knob held in, rotate **COUNTER-CLOCKWISE** until arrow or knob points to desired position. (Rotation is made much easier if you grasp the camshaft with your free hand and turn it at the same time.) Then permit pointer knob to spring back out.

- Insert screwdriver into slot in pointer knob, (Figure 4). Press in and rotate pointer knob **COUNTER-CLOCKWISE** until arrow points directly to the word **BACKWASH**.
- Fill mineral tank with water.
 - With the water supply off, place the bypass valve(s) into the "not in bypass" position.
 - Open water supply valve very slowly to approximately the 1/4 open position.
 - 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.



Caution

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

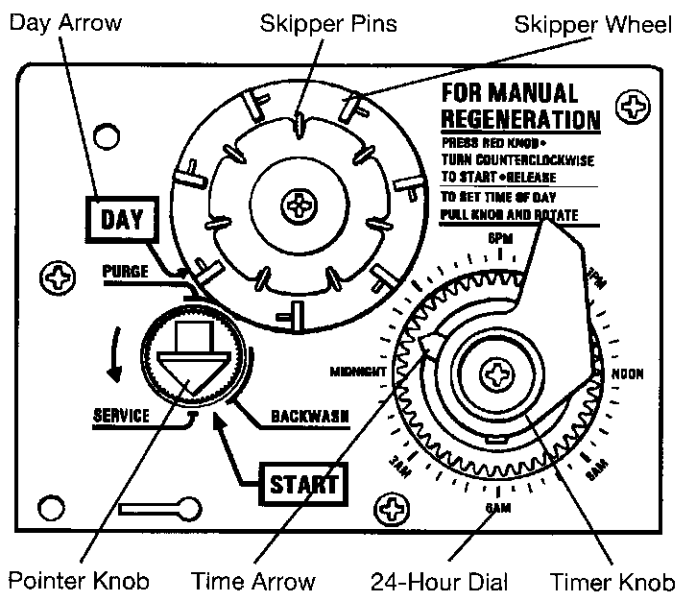


Figure 4

- 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 operation.
- 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.

Adjustment of Timer

1. Set days of regeneration on skipper wheel (Figure 4).
 - A. Pull all skipper pins outward (away from control).
 - B. Rotate skipper wheel until day arrow points to current day (7 day timer) or number 1 (6 day timer).
 - C. Depress skipper pin(s) at day(s) for which regeneration is desired.
2. Set the time of day
 - A. Grasp timer knob and pull outward.
 - B. Rotate in either direction until actual time-of-day on 24-hour dial is in line with time arrow.
 - C. Release timer knob.

Note: With the time of day properly set, the conditioner 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.

Example:

To have the conditioner REGENERATE/BACKWASH at 4:30 a.m. – 2 hours later – set the clock 2 hours earlier than the actual current time).

Special Features of Timer

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**.

Manual time cycle:

BACKWASH 20 minutes
 PURGE 10 minutes

Removing the Valve for Servicing

1. Unplug the power cord.
2. Shut off the water supply or put bypass valve(s) into bypass position.
3. Remove the cover, and with screwdriver, relieve tank pressure by pushing open valve No. 5 or 6 on the control.
4. Disconnect the drain line and the inlet and outlet water lines; save the gaskets for reinstallation.
5. Unscrew the valve counterclockwise to remove it from the mineral tank; be careful not to lose the large o-ring.
6. To reinstall the valve, reverse above procedure.

Optional Auxiliary Backwash Valve

The auxiliary backwash valve (Figure 5) provides higher backwash rates of 5, 6, 7, 8, 9 or 10 GPM (18.9, 22.7, 26.5, 30.3, 34.1, or 37.8 l/m) that are needed to properly backwash filter media.

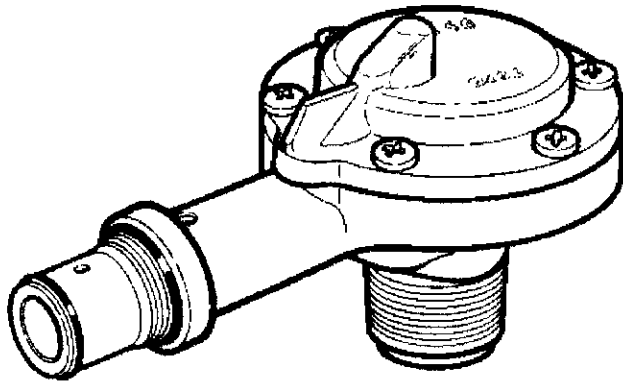


Figure 5

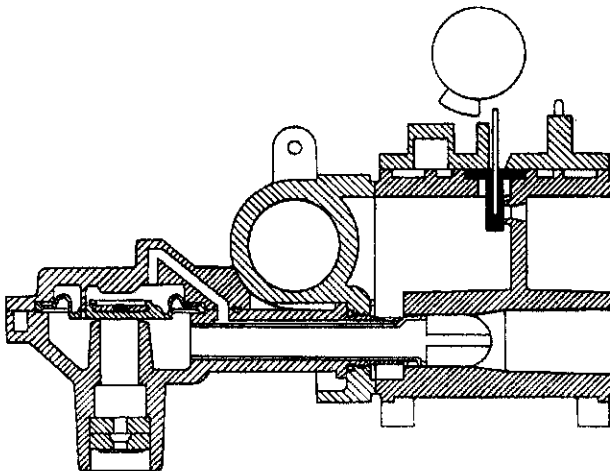


Figure 6 - Closed

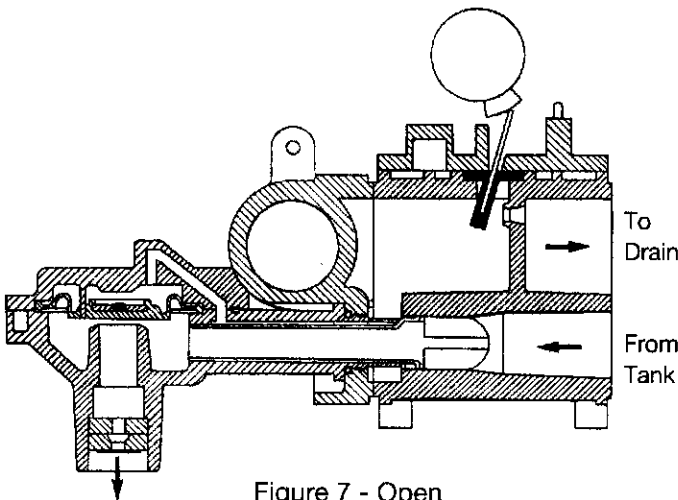


Figure 7 - Open

In the closed position, the backwash flapper is closed. The orifice in the diaphragm of the auxiliary backwash valve allows pressure to build up above the diaphragm. Spring force together with water pressure on top of the diaphragm forces the diaphragm against the valve seat, shutting off flow through the auxiliary backwash valve (Figure 6).

In the open position, the backwash flapper is opened by a cam. Pressure built up above the diaphragm of the auxiliary backwash valve is relieved to drain through the drain orifice. The higher pressure now working against the bottom of the diaphragm lifts the diaphragm off the seat to allow flow through the auxiliary valve to drain (Figure 7).

Installation Instructions

If so equipped, remove the backwash control and ball from the Series 163 valve body. Refer to the 163 valve **Replacement Parts** section for location of backwash control and ball.

Do not use lubricant on the auxiliary backwash valve o-rings. To install, wet o-rings with water.



Caution

It takes approximately 3-1/2 turns to properly position the valve. Do not overtighten. Use flexible tubing to route the drain line.

1. Install a tee on or downstream of the auxiliary backwash valve (Refer to Figure 9).
2. Connect the tee and the 3/8 in NPT port at the rear of the 163 valve with 1/2 in plastic tubing.
3. Connect drain line (3/4 in plastic tubing) to tee.

As an alternate, the tee can be eliminated by installing separate drain lines from the 163 valve and the auxiliary backwash valve.

Note: Drain line(s) must be independently supported.

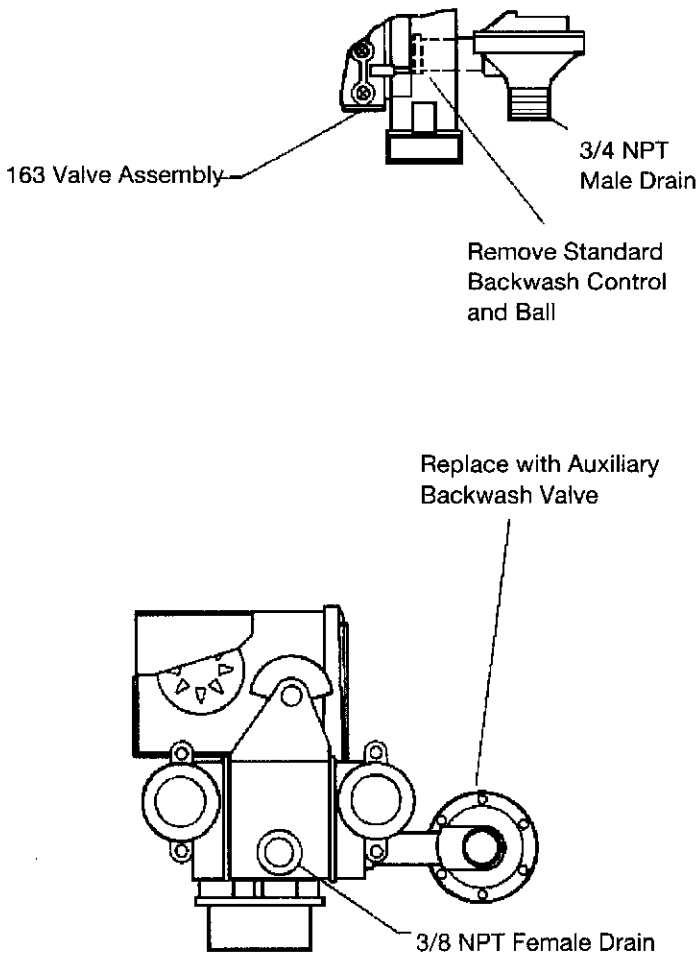


Figure 8

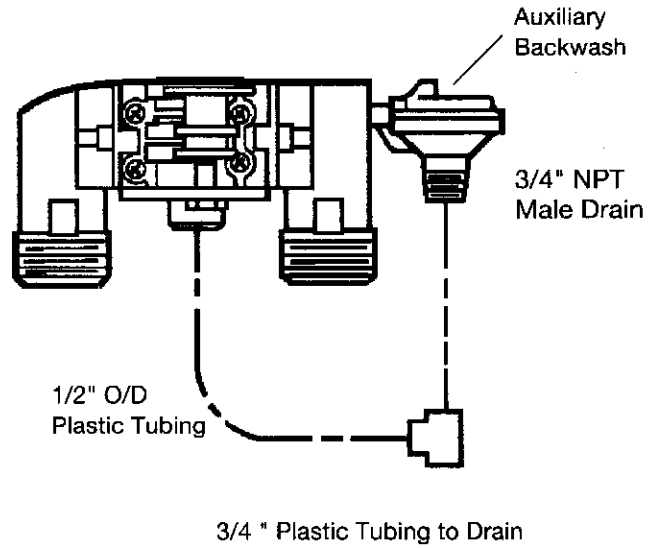
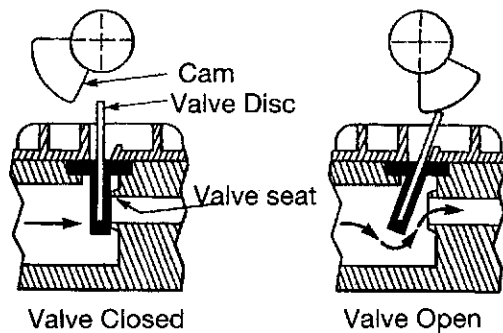
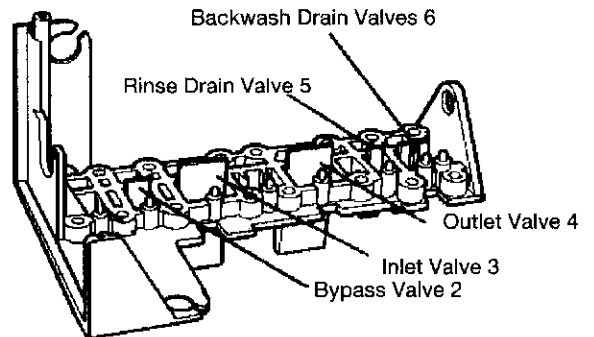


Figure 9

Valve Disc Operation



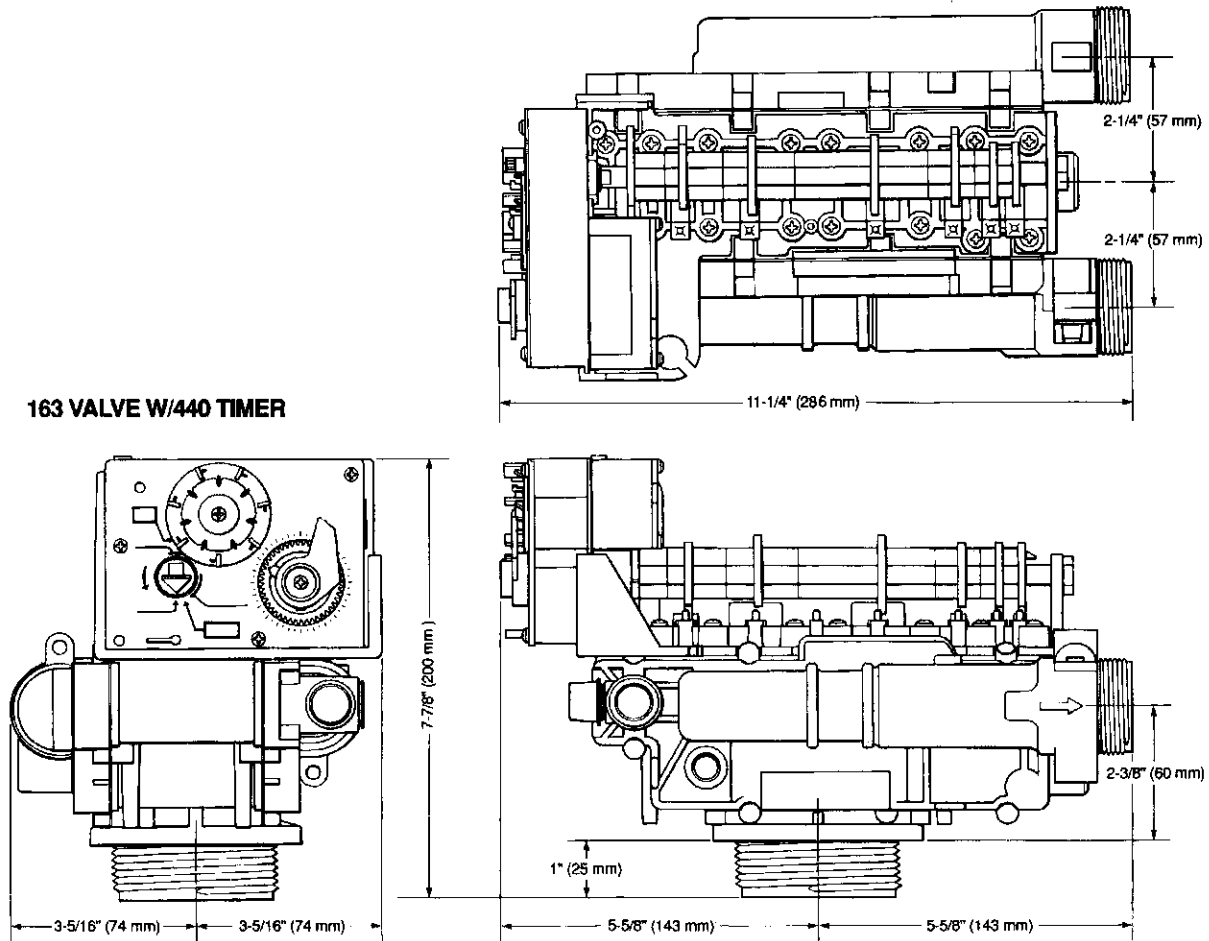
Valve Disc Identification



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

Specifications

163 VALVE W/440 TIMER



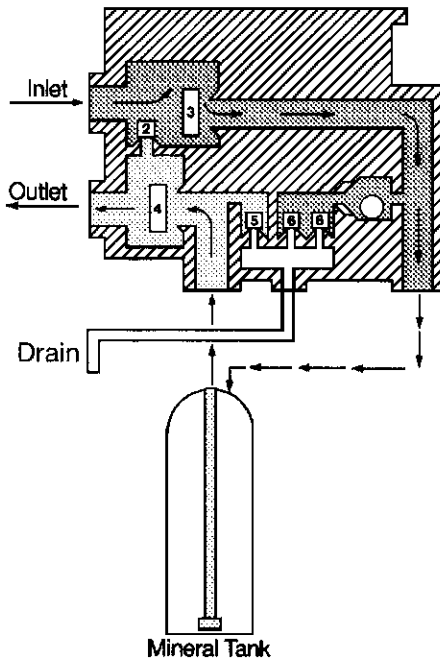
- Hydrostatic Test Pressure 300 psi (2068 kPa)
- Working Pressure 20-127 psi (138-876 kPa)
- Standard Electrical Rating 115V 60Hz
- Optional Electrical Rating 115V 50Hz, 230V 50Hz, 200V 60Hz, 24V 60Hz, 24V 50Hz, 100V 60Hz, 100V 50Hz
- Electric Cord 60 in (1.5 m) long, 3-wire with plug
- Pressure Tank Thread 2-1/2 in -8 NPSM
- Riser Pipe Diameter Required 1.050 in OD (26.7 mm)/optional 13/16 in OD (20.6 mm)
- Riser Pipe Length 1-1/4 in (31.8 mm) higher than top of mineral tank
- Standard Connection 1 in (25.4 mm) copper tube adapters
- Optional Connections 3/4 in copper tube adapters; 22 mm copper tube adapters; 28 mm copper tube adapters; 3/4 in BSPT brass pipe adapters; 1 in BSPT brass pipe adapters; 1 in NPT brass pipe adapters
- Drain Line Connection 3/8 in NPT, female
- Optional Bypass Valve 3/4 in (19.1 mm) or 1 in (25.4 mm) copper tailpiece
- Control Module, Tank Adapter, Optional Bypass Valve Reinforced NORYL
- Inlet-Outlet Manifold Brass or reinforced NORYL
- Rubber Goods Compounded for cold water service
- Program Clock (Timer) Available in 6- or 7-day English, German, French, Italian, Spanish, or Japanese
- Backwash Controllers Available for 6, 7, 8, 9, 10, 12 in (15.2, 17.8 20.3, 22.9, 25.4, 30.5 cm) diameter mineral tanks. All sizes to flow 4.5 gpm/sq ft (183 l/m²) of bed area

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

1. Service Position

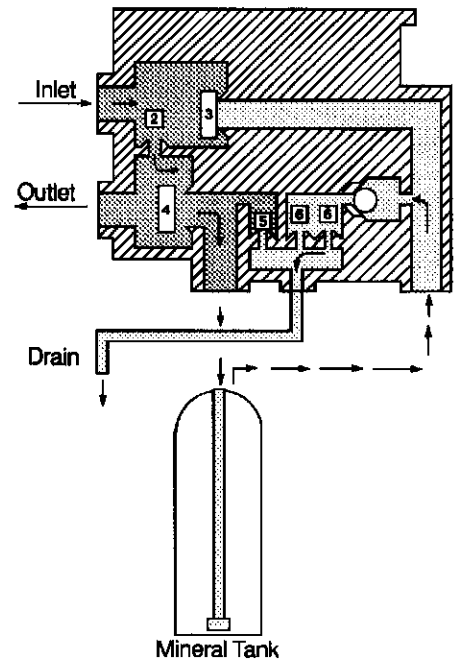
- Unfiltered Water
- ▨ Filtered Water



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

2. Backwash Position

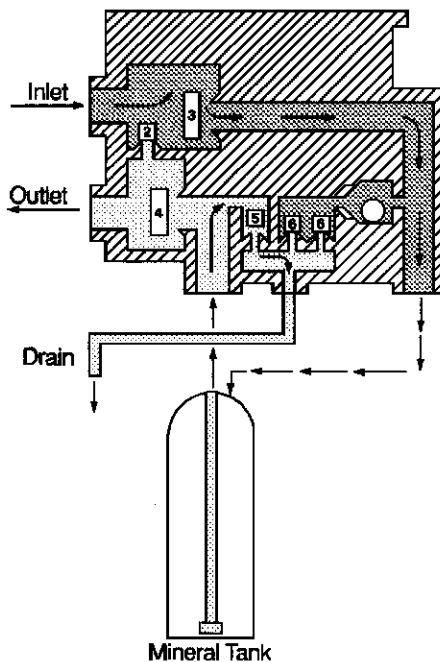
- Unfiltered Water
- ▨ Backwash Water



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

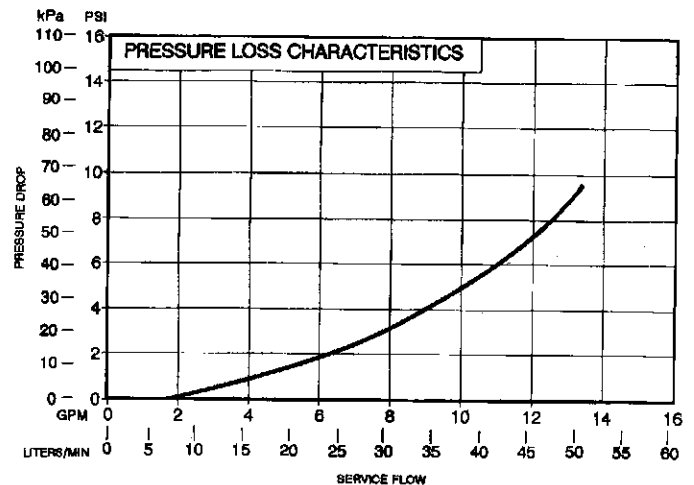
3. Purge Position

- Unfiltered Water
- ▨ Purge Water



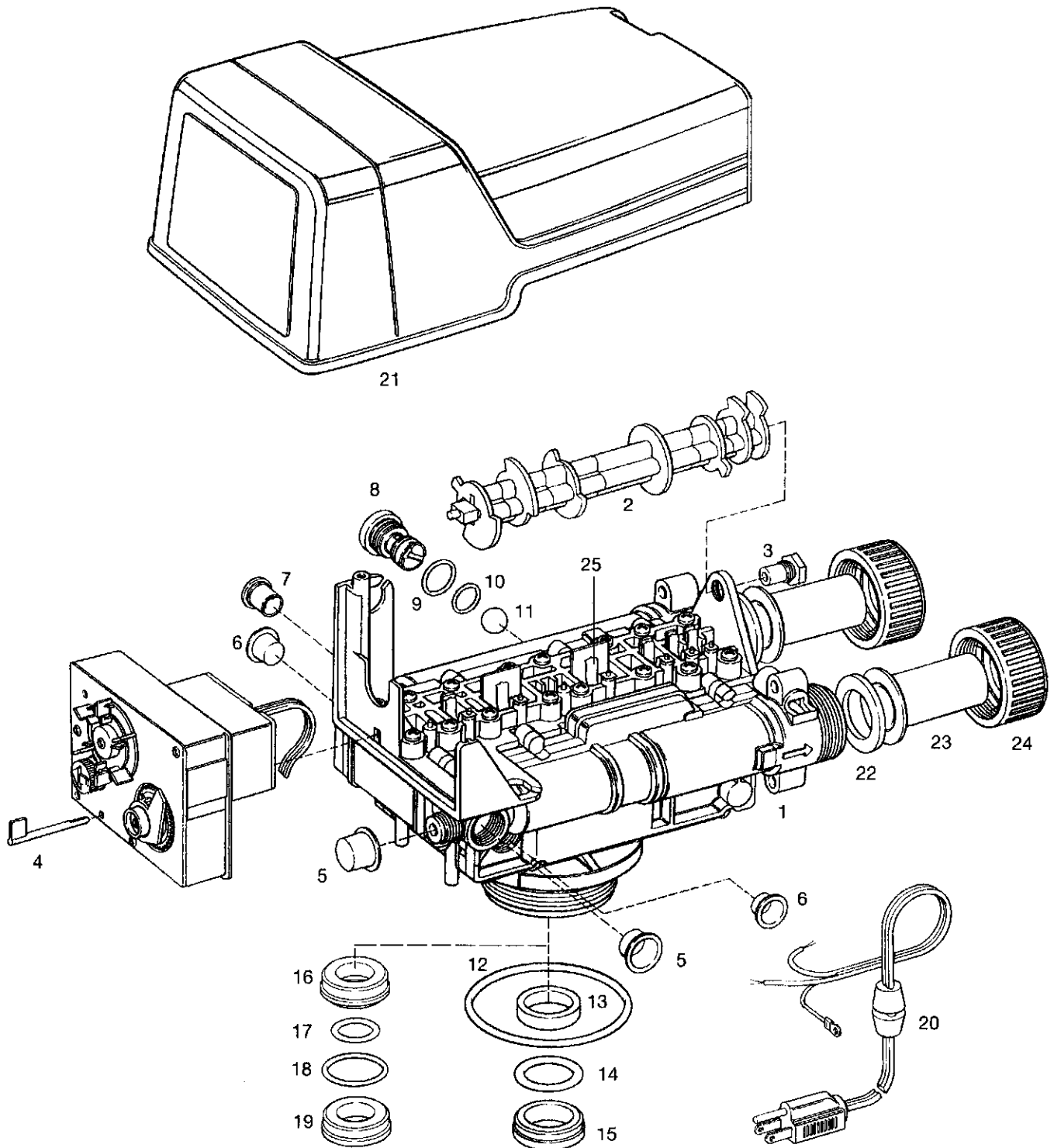
- Valve No.
- 2 - Closed
 - 3 - Open
 - 4 - Open
 - 5 - Open
 - 6 - Closed

Pressure Loss Characteristics



Replacement Parts

Valve



Valve

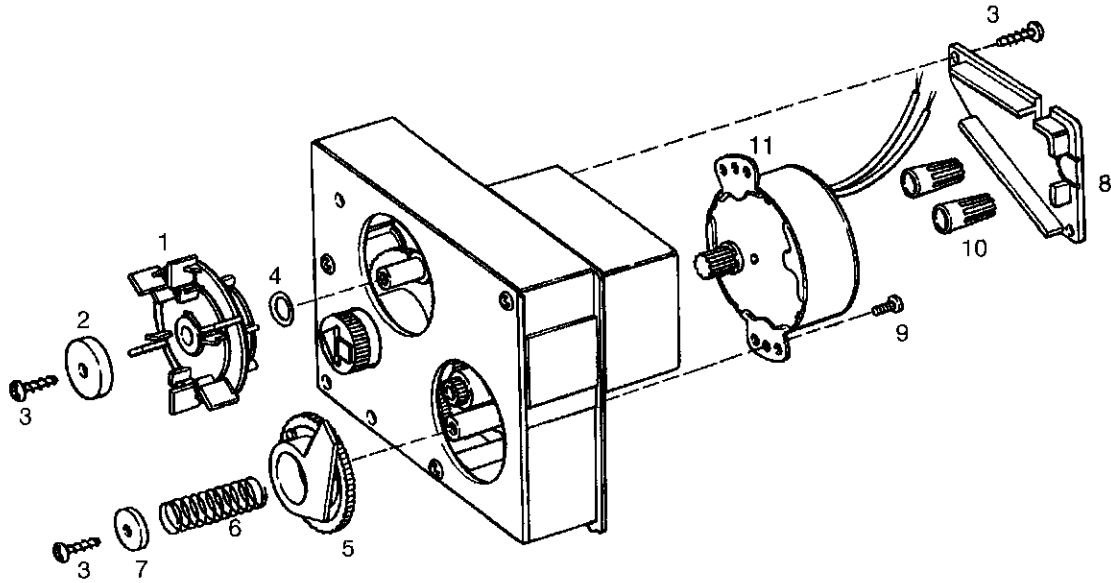
Item Code No.	Part No.	Description	Qty.	Item Code No.	Part No.	Description	Qty.
1		Valve Body Assembly:	1	19	1030642	Retainer, 13/16 in Riser	1
	24S-1-63	w/ 1.050 in Riser Adapter		20	90F	Power Cord, Flat (SPT-2)	1
	24S-63	w/ 13/16 in Riser Adapter	1	21		New Cover Assembly	
2	21S-63	Camshaft Assembly	1	22		Gasket:	2
3	22F	Camshaft Bearing	1		54F-1	For 1 in Pipe or Tube	
4	5F	Timer Locking Pin	1		54F	For 3/4 in Pipe or Tube	
5	1S	Caplug	2	23		Plumbing Adapter:	2
6		Caplug	2		55F-1	3/4 in Copper Tube	
7		Caplug	1		55F-2	1 in Copper Tube	
8		Backwash Control w/ O-Rings:	1		55F-4	1 in NPT, Brass	
	25F-6	No. 6 (0.9 GPM) *			55F-5	3/4 in BSPT, Brass	
	25F-7	No. 7 (1.2 GPM) *			55F-6	1 in BSPT, Brass	
	25F-8	No. 8 (1.6 GPM) *			55F-7	22 mm Copper Tube	
	25F-9	No. 9 (2.0 GPM) *			55F-8	28 mm Copper Tube	
	25F-10	No. 10 (2.5 GPM) *				3/4 in CPVC Pipe	
	25F-12	No. 12 (3.5 GPM) *				1 in CPVC Pipe	
	25F-13	No. 13 (4.15 GPM)***				3/4 in Plastic NPT Male	
	25F-14	No. 14 (4.81 GPM)***		24		Adapter Nut:	2
9	2F	O-Ring	1		56F-1	For 3/4 in Copper Tube	
10	3F	O-Ring	1		56F-2	For 1 in Copper Tube	
11	4F	Ball	1		56F-3	For 3/4 in Pipe	
12	43F	O-Ring	1		56F-4	For 1 in Pipe	
13		Adapter, 1 in Riser	1	25		Spring, Valve Flapper	8
14	44S	O-Ring, 1 in Riser	1	**		Adapter Kit Elbow 90°, 1.75-12 UN	
15		Retainer, 1 in Riser	1	**		Adapter Kit, Piping .75-14 NPT Male	
16		Adapter, 13/16 in Riser	1	**		1033013 Valve Disc Kit	
17		O-Ring, 13/16 in Riser	1	**		1040526 Valve Disc Kit, Severe Service	
18	44F	O-Ring, 13/16 in Riser	1	**		1040527 13/16 in Riser Kit	
				**		1040528 1 in Riser Kit	

* Nominal flow rate at 60psi (414 kPa) Refer to Auxiliary Backwash Valve for higher flow rates

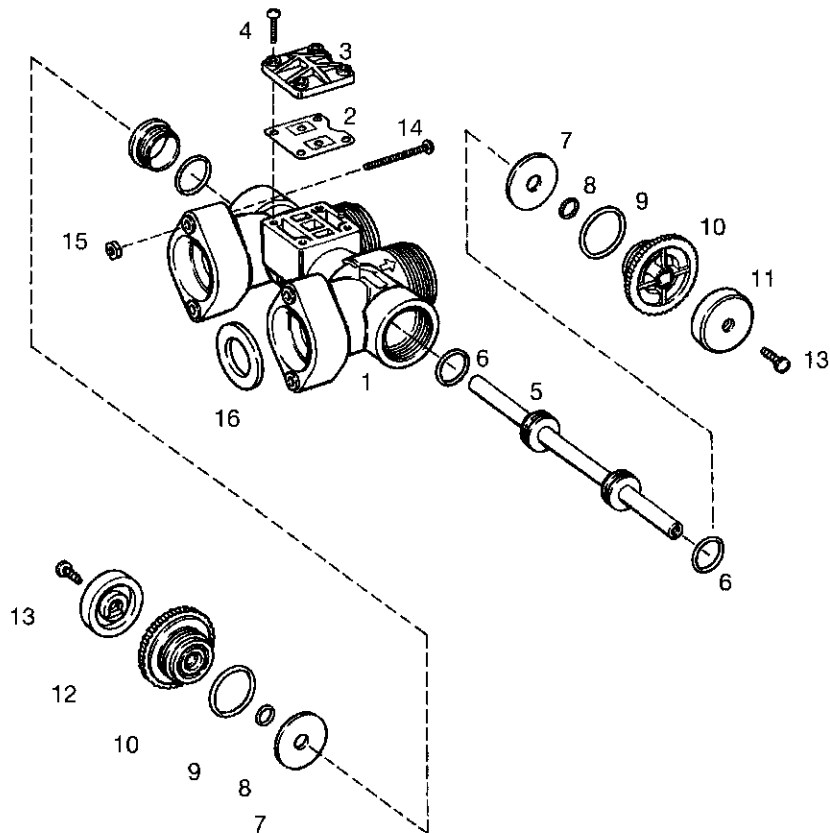
** Not Shown

*** 4F ball is not required with a No. 13 or 14 backwash flow control.

440 Timer



Bypass Valve



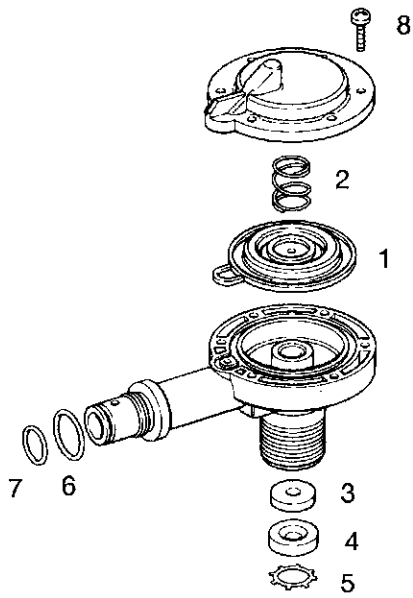
440 Timer

Bypass Valve

Item Code No.	Part No.	Description	Qty.	Item Code No.	Part No.	Description	Qty.
1		Skipper Wheel Assembly:	1	1	51S	Bypass Valve Assembly	1
	14F-6	6-Day		2	71F	Gasket	1
	14F-7	7-Day		3	95S	Cover Plate	1
2	89F	Washer	1	4	32H	Screw, No 8 x 3/4 in	4
3	85F	Screw, No. 6 x 1/2 in	7	5		Valve Stem w/ O-Rings	1
4	15F	Bowed Washer	1	6	102N	O-Ring	2
5	99F	Tripper Arm Assembly	1	7	50F	Washer	2
6	87F	Spring	1	8	48F	O-Ring	2
7	88F	Retainer	1	9	49F	O-Ring	2
8		Motor Cover:	1	10	47F	End Cap	2
	84F	Motor Cover		11	46F-1	Knob, White	1
		Motor Cover, Low Voltage		12	46F-2	Knob, Black	1
9	18F	Screw, No. 4-40 x 1/4 in	2	13	33F	Screw, No. 8 x 9/16 in	2
10	19F	Wire Nut	2	14	52S	Screw, No. 10-24 x 2 in	4
11		Motor:	1	15	53N	Nut, No. 10-24	4
	98F-1	115V, 60 Hz		16	54F	Gasket	2
	98F-2	230V, 50 Hz					
	98F-3	24V, 60 Hz					
	98F-4	115V, 50 Hz					
		220V, 60 Hz					
	98F-6	24V, 50 Hz					
		100V, 60 Hz					
		100V, 50 Hz					
		12V, 50 Hz					
		12V, 60 Hz					
		Conn. Assy., Low Volt Motor (12V)					
*	1000811	Wall Transformer North American Plug 12V, 60 Hz	1				

* Not Shown

Optional Auxiliary Backwash Valve



Code	Item No.	Part No.	Description	Qty.
1		1030627	Diaphragm	1
2		1030492	Spring	1
3			Flow Control Washer:	1
		1030632	5.0 GPM	
		1030633	6.2 GPM	
		1030634	7.0 GPM	
		1030635	8.3 GPM	
		1030636	9.0 GPM	
		1030637	10.0 GPM	
4		1030631	Seat, Flow Washer	1
5		1004496	Retaining Ring	1
6		1010110	O-Ring	1
7		1010108	O-Ring	1
8		1006093	Screw, No. 8 x 9/16 in	6
			Auxiliary Backwash Valve Assemblies:	
		1030473	No Flow Control Washer	
		1040269	5.0 GPM	
		1040270	6.2 GPM	
		1040271	7.0 GPM	
		1040272	8.3 GPM	
		1040273	9.0 GPM	
		1040274	10.0 GPM	

Troubleshooting

The technology upon which the Series 163 control is based, is well established and proven in service over many years. However, should a problem or question arise regarding the operation of the system, the control can be very easily serviced. For parts mentioned, refer to exploded views in the **Replacement Parts** section of this manual.



Caution

Service procedures that require the water pressure to be removed from the system are marked with a after the possible cause. To remove water pressure from the system, put the bypass valve or three-valve bypass into the bypass position and open the Backwash Drain Valve (the sixth valve back from the control) with a screwdriver. Restore system water pressure when the service work is completed.

Problem	Possible Cause	Solution
1. Control will not regenerate automatically.	<ul style="list-style-type: none"> a. Electric cord unplugged. b. Skipper pins not down on skipper wheel. c. Defective timer motor. 	<ul style="list-style-type: none"> a. Connect power. b. Depress pins for days regeneration required. c. Replace motor.
2. Control regenerates at wrong time.	<ul style="list-style-type: none"> a. Time set incorrectly. 	<ul style="list-style-type: none"> a. Make correct setting according to instructions.
3. Control backwashes at excessively low or high rate.	<ul style="list-style-type: none"> a. Incorrect backwash controller used. b. Foreign matter affecting controller operation. 	<ul style="list-style-type: none"> a. Replace with correct size controller. b. Remove and clean controller and ball.
4. Flowing or dripping water at drain after regeneration.	<ul style="list-style-type: none"> a. Drain valve (5 or 6) held open by foreign matter or particle. b. Valve stem return spring on top plate weak. 	<ul style="list-style-type: none"> a. Manually operate valve stem to flush away obstruction. b. Replace spring.
5. Auxiliary backwash valve flows water to drain when control valve is not in backwash.	<ul style="list-style-type: none"> a. Ruptured diaphragm. b. Weak or missing spring. 	<ul style="list-style-type: none"> a. Replace diaphragm. b. Replace spring.

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