



PART NO.
48051-EN

SPECIFICATIONS

SERVICE REQUIREMENTS: (for automated units)

Electrical: 115 VAC or 230 VAC 50/60 Hz (see FIG 1).

Air: Minimum 60 PSIG (4 bar), Maximum 116 PSIG (8 bar) at 5.0 CFM (140 dm³/m) clean, dry, non-lubricated air (see FIG 2).

MATERIAL: All welded and wetted materials are type 316/316L stainless steel.

The material selection for this vessel was based on the information provided when the unit was ordered. It is the customer's responsibility to ensure material compatibility.

CONNECTIONS: ANSI 150# lap joint flanged or DIN equivalent.

ELASTOMERS: Buna-N (Nitrile), EPT (Nordel®), Food Grade White Neoprene (FGL), Teflon® encapsulated Viton® (TEV), Silicone (SIL) and Viton® are available. See Table 2.

DESIGN PRESSURE: 250 PSIG (limited to 80 PSI for Teflon® elastomers)

FILTER VOLUME: Each filter body: Approximately 2.5 gallons (9.5 liters).

AIRBORNE NOISE EMISSIONS: <70 dB(A) During normal operation.

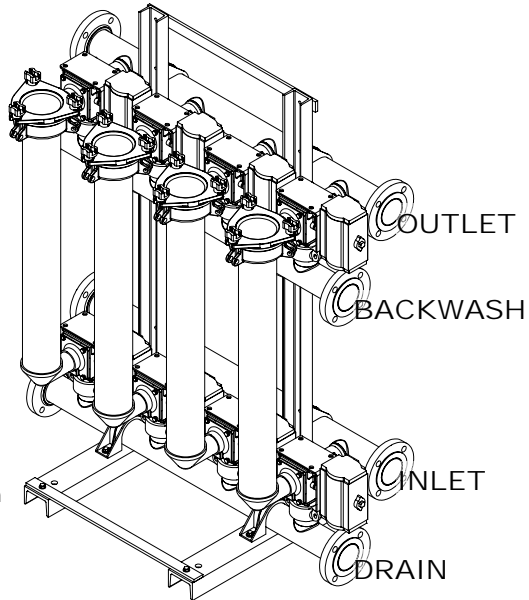
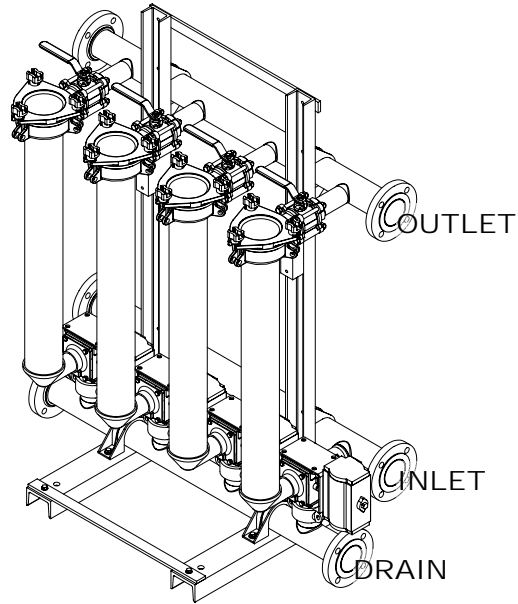
INSTALLATION INSTRUCTIONS


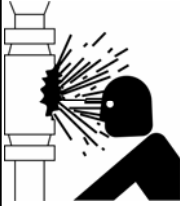
- 1) TRANSPORTATION
 - a) Lift the entire filter system from the bottom of the filter frame or skid only. DO NOT lift with an overhead crane or hoist.
 - b) Move the filter system as close as possible to the installation site before it is removed from the crate or skid.
 - c) Position the filter frame on a prepared, level foundation. Level the filter frame before it is anchored to the foundation.
- 2) SECURING TO THE FOUNDATION

Anchor the filter frame legs to the foundation using the anchor holes located at the base of each frame leg.
- 3) CONNECTING TO PROCESS PIPING
 - a) Support all external process piping independently from the filter system. The filter system is not designed to support external loads.
 - b) Connect the inlet and outlet process piping (customer supplied) to the filter system's respective headers. Consult you pump manufacturer's installation guide for minimum pipe runs between the pump's outlet and the inlet of the filter system. NOTE: Isolation / block valves (supplied by others) are required on all process connections of the filter unit so it may be isolated from process liquids in the event that service is required.
 - c) Connect the drain line (customer supplied) to the filter system's drain header. Do not restrict or prohibit the flow of backwash liquids from the filter. Lack of proper flow (90 GPM, 340 l/min) for SINGLE and Tri-Cluster® elements, (150 GPM, 570 l/min) for ACCUFLUX®-7 elements and pressure (45 PSI, 3 bar) during the backwash cycle will compromise the regeneration of the filter media. NOTE: When using fabric media, an orifice plate or flow control valve in the drain piping may be required to limit the differential pressure across the filter element to approximately 60 PSI (4 bar). This will prevent damage to the filter media.
 - d) Connect the backwash supply line to the filter system's backwash header (on external backwashing units only).
- 4) CONNECTION OF THE ELECTRICAL SUPPLY (Automated units only)

Connect the incoming single-phase electrical supply to the panel mounted disconnect switch inside the automation enclosure. Line voltage (Load) connects to pin 1, neutral connects to pin 3 and ground connects to the buss bar mounted to the left of this switch inside the control panel.
- 5) CONNECTION OF THE AIR SUPPLY (Automated units only)

This filter system is equipped with an air filter/regulator/lockout device. This device supplies air to the individual solenoid valves and the rotary actuators.



 <h2 style="margin: 0;">WARNING</h2> <p style="margin: 0;">Pressure vessel.</p>	
	<p>Maximum working pressure is: 250 PSI (17.2 bar)</p>
	<p>Maximum differential pressure is: 150 PSI (10.3 bar)</p>
	<p>This unit is a pressure vessel. Extreme care must be taken when inspecting or servicing the equipment.</p>

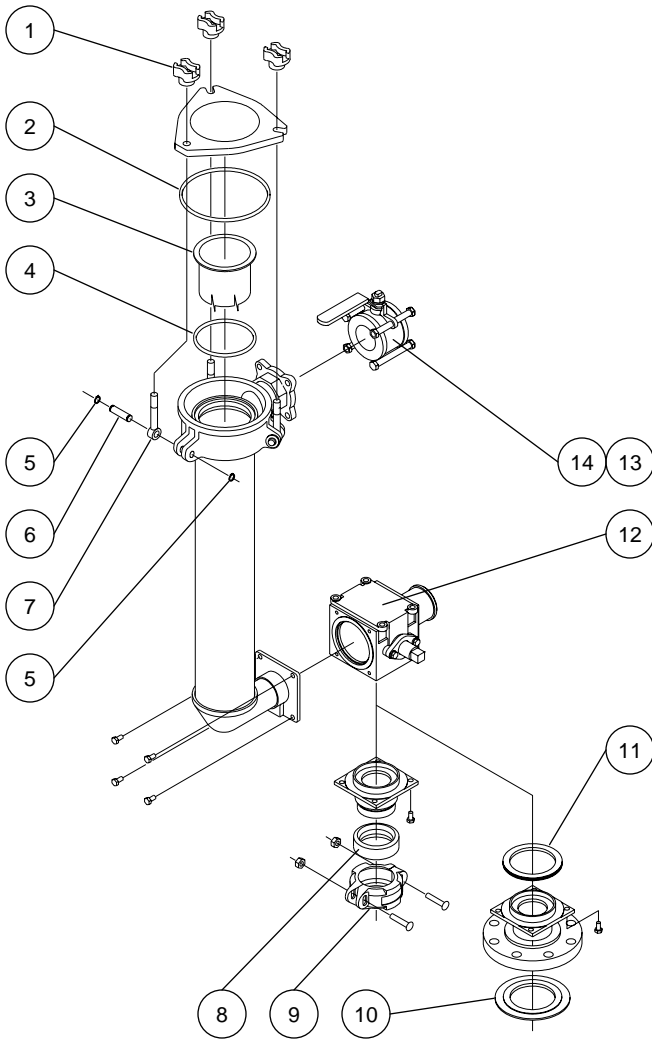


Figure 1: Filter body assembly

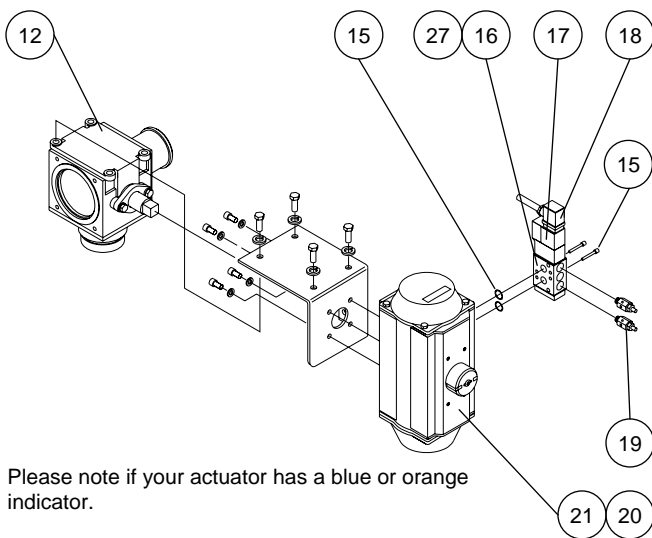
INSTALLATION CHECKLIST

Complete this checklist before operating the system:

- Verify that all headers are piped correctly and supported independently from the filter system.
- Verify that all filter body couplers (quick-coupler option), vent and drain plugs are closed tightly.
- Verify that the input power wiring is attached correctly to the main disconnect switch mounted inside the enclosure. (Automated units only)
- Verify that the incoming automation electrical supply is the proper voltage. Improper voltage will cause serious damage to the filter system's electrical systems. The proper voltage is 115 volts or 230 volts (single phase VAC). Reference the electrical schematic or label located on the inside of the enclosure for the proper voltage of this unit. (Automated units only).
- Verify that all incoming instrument air pressure matches the requirements for this filter system (Minimum 60 PSIG (4 bar), Maximum 116 PSIG (8 bar) at 5.0 CFM (140 dm³/m) clean, dry, non-lubricated).

COMMISSIONING PROCEDURE

- 1) Inspect the piping connections to the filter. Verify that the inlet header on the filter is connected to the inlet side on the process fluid. Repeat this procedure for the outlet, drain and backwash headers (if equipped).
- 2) All isolation valves to the filter should be closed. If there is a bypass loop around the filter, that loop should be closed to prevent backflushing dirty process fluid into the filter.
- 3) With the unit empty, verify all PLC settings and initiate a backwash procedure. Verify the proper operation of the filter unit.
- 4) Confirm that there is sufficient backpressure on the filter system. In the absence of backpressure, the filter may immediately initiate a backwash and remain in a continuous backwash. The net differential between the backwash source (outlet or backwash header) and the drain must be at least twice the pressure drop through the dirty screen for effective cleaning. For example, to backwash at the recommended 15 PSID dirt loss between the inlet and outlet, the outlet (or backwash header) must be at least 30 PSI (assuming an atmospheric drain pressure, 0 PSI). This equates to a minimum 45 PSI inlet pressure.
- 5) Open the isolation valves for the outlet and drain piping.
- 6) Turn the power to the filter system ON.
- 7) Open the inlet isolation valve to allow approximately 25% of the flow to reach the filter.
WARNING: Opening the inlet valve to the fully open position without proper ramping will cause the particles to become wedged into the filter media. If this happens, the filter media will have to be removed and cleaned manually.
- 8) Over the next ½ hour, slowly introduce more of the flow until you reach 100%. It is recommended that a manual backwash be initiated each time flow is increased to ensure that piping debris is cleaned from the unit.



Please note if your actuator has a blue or orange indicator.

Figure 2: Automated 3-way ball valve controls

MAINTENANCE

ISOLATING A FILTER STATION

Automated internal backwashing units:

- Relieve pressure before servicing filter or removing element.
- On the station to be serviced, push in and turn the manual override button on the solenoid 90°. Pushing this button will cause the inlet valve to rotate to its off-stream position. Turning it 90° will lock the button in this position.
- Close off flow to the outlet header by rotating the ball valve located between the filter station and the outlet header.
- Close the air supply slide valve to prevent the valve from being turned back accidentally.

Automated external backwashing units:

- Relieve pressure before servicing filter or removing element.
- On the station to be serviced, push in and turn the manual override button on the solenoid 90°. Pushing this button will cause the inlet valve to rotate to its off-stream position. Turning it 90° will lock the button in this position.
- Close the air supply slide valve to prevent the valve from being turned back accidentally.

BODY TUBE ASSEMBLY / DISASSEMBLY

- Unscrew the two (2) lid nuts at the rear of the lid and swing them out of the way. Loosen the front lid nut enough to swing the lid down. Be careful not to damage the o-ring.
- Reach into the top of the filter housing and lift out the filter screen. Be careful not to damage the filter screen or gaskets.
- Inspect the filter screen for damage. If damage exists, repair or replace

the filter screen. Clean the filter screen thoroughly. Clean and inspect all gaskets carefully. Replace damaged gaskets with factory replacement parts.

OPERATIONAL MODES

The F-Series filter unit is a clean-in-place system that regenerates its permanent filter media via backwashing. The backwashing process can either be achieved from redirecting clean filtrate ("internal" backwashing) or by introducing an outside liquid source ("external" backwashing). Please see below for a step-by-step description of each of the operating modes of both internal backwashing and external backwashing F-Series filter units.

Internal Backwashing

Headers: The internal backwashing system consists of (3) headers. They are the inlet, outlet and drain (backwash outlet).

Valves: Each filter station is supplied with a 3-way ball valve connected to the inlet and drain headers for diverting flow during the backwashing process. A 2-way ball valve is also supplied at the outlet connection of each filter body for isolation purposes.

Theory of Operation:

On stream: In the normal filtering mode, dirty fluid enters the filter system through the inlet header, distributing solids on the outside of the filter screens. Clean fluid passes through the filter elements and into the outlet header and downstream (Figure 3). As the solids build on the filter screens, the pressure drop through the filter increases. Once it reaches 15 PSID, it is recommended that a backwash be initiated. Depending on the options taken when the unit was purchased, this will either happen manually or automatically.

Backwash: Backwash flow is achieved by turning the 3-way valve on the first station 90 degrees counter-clockwise so that the inlet is closed and the filter body is open to the drain header (the other stations continue filtering). Due to the fact that the pressure in the drain header is very low, the pressure drop between the outlet header and the drain header causes a percentage of the clean outlet flow to be redirected through the first station in the reverse direction, forcing clean fluid thru the filter screen from the inside-out and pushing the solids down the drain (Figure 4). **NOTE: For proper operation and successful regeneration, it is critical for the valve to open quickly.** After 5-10 seconds, the filter screen is regenerated and ready to be put back in the filter mode. This process is repeated for the remaining stations.

External Backwashing

Headers: The external backwashing system consists of (4) headers. They are the inlet, outlet, backwash inlet and drain (backwash outlet).

Valves: Each filter station is supplied with (2) 3-way ball valves, (1) connected to the inlet and drain headers and (1) connected to the outlet and backwash headers for diverting flow during the backwashing process. A 2-way butterfly valve is also optional on the backwash header (standard for automated units).

Theory of Operation:

On stream: In the normal filtering mode, dirty fluid enters the filter system through the inlet header, distributing solids on the outside of the filter screens. Clean fluid passes through the filter elements and into the outlet header and downstream (Figure 5). As the solids build on the filter screens, the pressure drop through the filter increases. Once it reaches 15 PSID, it is recommended that a backwash be initiated. Depending on the options taken when the unit was purchased, this will either happen manually or automatically.

Backwash: Backwash flow is achieved by turning the (2) 3-way valves on the first station 90 degrees counter-clockwise so that the inlet and outlet are closed and the filter body is open to the drain and backwash headers (the other stations continue filtering). The external backwashing fluid is directed through the first station in the reverse direction, forcing backwashing fluid thru filter screen from the inside-out and pushing the solids down the drain (Figure 6). **WARNING: For proper cleaning, the backwash fluid must be at least as clean as the retention level of the filter screens.** Failure to observe this warning will cause unwanted solids higher than the rated retention of the screens to be pushed downstream once the filter is back in the on stream

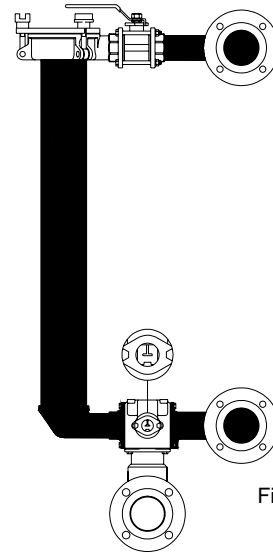


Figure 3: Internal Backwashing On Stream Mode

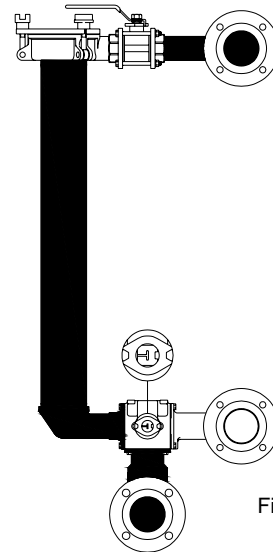


Figure 4: Internal Backwashing Backwash Mode

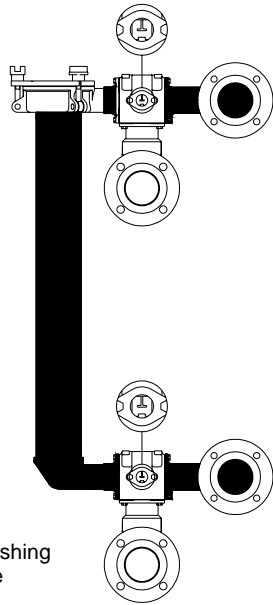


Figure 5: External Backwashing On Stream Mode

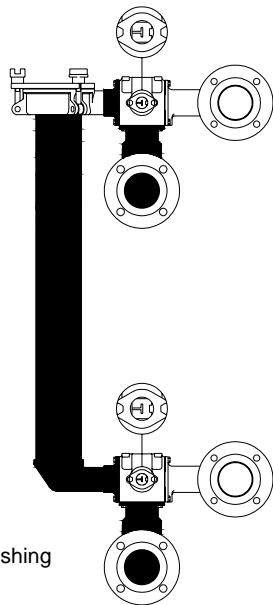


Figure 6: External Backwashing Backwash Mode

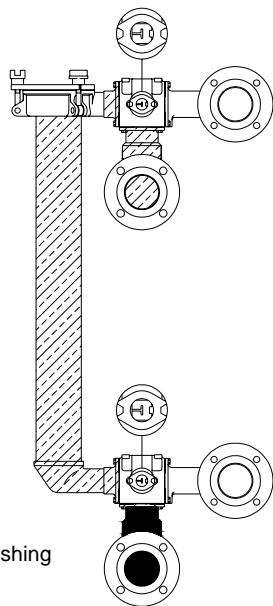


Figure 7: External Backwashing Drain Mode

mode. After 5-10 seconds, the filter screen is regenerated and ready to be either drained (see the next section) or put back in the on stream mode. This process is repeated for the remaining stations.

Filter Body Drain (applies only to units supplied with Backwash Supply Butterfly Valve):

In order to prevent the backwash water left in the body from diluting the downstream flow, the backwash supply butterfly valve can be used to help drain the filter body after the backwash process. After the 5-10 second backwash duration is complete as listed above, the backwash supply valve closes, isolating the filter body from the backwash flow, but leaving it open to the drain header (Figure 7). The vacuum breaker, installed on the backwash header, introduces air for quicker draining. After 3-5 seconds, the (2) 3-way valves are returned to the on stream mode.

TROUBLESHOOTING

Below is a list of common problems and ways to resolve them. If problems persist, please contact your local Eaton Filtration sales representative or customer service at the number listed at the end of this manual.

- **Filter does not allow any flow through the outlet at startup.** Make sure that the steps listed in the Installation and Commissioning sections were followed completely. It is critical that the outlet of the filter is pressurized. Failure to follow this requirement may make it impossible to flow product thru the filter. If by nature the application outlets to atmosphere, a partially closed valve can be added to the outlet for creating backpressure.
- **Filter does not return to “clean” differential pressure of 3 to 5 PSI after backwash.** This is most likely caused by insufficient backwash pressure and flow, along with slow turning ball valves. Make sure that the requirements called out in the Commissioning procedure are followed, at a minimum. If this condition progresses past a clean (after backwash) differential pressure of 15 PSID, the elements may need to be manually cleaned. If problems still persist, backwash diffusers are recommended.
- **“Water Hammer” is experienced during the clean process.** Water hammer is a phenomenon that occurs when sections of pipe are exposed to a significant pressure and flow change at a rapid rate due to the closing of a valve. This hammering can be greatly reduced by slowing down the speed at which the valves close during the backwash process. For automatic units, flow control exhaust mufflers (ref. number 19 shown in Figures 2 and 5) are supplied for restricting exhaust flow and controlling valve rotation speed. For both the 3-way valves and the backwash supply butterfly valve, port 5 on the solenoid (ref. number 16) controls how fast the valve opens to backwash flow, while port 4 controls how fast the valve closes. The closing speed can be adjusted by loosening the locknut and screwing the “needle” clockwise into the muffler. If the needle is inserted too far, it will plug the exhaust and cause the valve to lock the valve in the open position. Please note that the station pause time (adjustable parameter for automatic units only) may need to be increased if the valve closes slower than 2 seconds. For effective backwash energy, the muffler on port 5 should remain wide open (needle fully retracted).

TABLE 1 – REPLACEMENT PARTS		
Ref	Part Number	Description
1	AM-30129-SS4	NUT, FB FLTR
2	25610-1	O-RING, LID "F" SERIES BUN
	25610-2	O-RING, LID "F" SERIES SIL
	25610-3	O-RING, LID "F" SERIES TFV
	25610-4	O-RING, LID "F" SERIES VIT
	25610-5	O-RING, LID "F" SERIES EPT
	25610-6	O-RING, LID "F" SERIES FGL
3	*VARIES*	ELEMENT
4	25609-1	O-RING, ELMT "F" SERIES BUN
	25609-2	O-RING, ELMT "F" SERIES SIL
	25609-3	O-RING, ELMT "F" SERIES TFV
	25609-4	O-RING, ELMT "F" SERIES VIT
	25609-5	O-RING, ELMT "F" SERIES EPT
	25609-6	O-RING, ELMT "F" SERIES FGL
5	P-30210-SS2	RETAINER RING, 3100-50-SS2
6	P-30223-SS4	PIN, EYEBOLT FB SE
7	P-30135-SS4	ROD END,1/2-13 304 SS,LINKAGE
8	P-22206-BUN	GASKET, VICTAULIC CPLG 2-1/2
	P-22206-EPT	GASKET, VICTAULIC CPLG 2-1/2
	P-22206-FGL	GASKET, VICTAULIC CPLG 2-1/2
	P-22206-SIL	GASKET, VICTAULIC CPLG 2-1/2
	P-22206-VIT	GASKET, VICTAULIC CPLG 2-1/2
9	P-22205-CST	CPLG, VICT 2-1/2 GALV L/GASKET
10	P-12407-SS6	GASKET, 3" 150# FLXT 316SS
11	S-67009-TBG	GASKET, 4" QC BUN/TFE ENV 10F
	S-67009-TSG	GASKET, 4" QC SIL/TFE ENV 10F
	S-67009-TVG	GASKET, 4" QC VIT/TFE ENV 10F
12	S-30342-BUN	KIT, REP BV 2200-250/350 3W
	S-30342-EPT	KIT, REP BV 2200-250/350 3W
	S-30342-FGL	KIT, REP BV 2200-250/350 3W
	S-30342-SIL	KIT, REP BV 2200-250/350 3W
	S-30342-VIT	KIT, REP BV 2200-250/350 3W
13	41003	BODY,BV 2" FULL PT 3PC PARKER
14	41006	KIT, REPAIR 2.0" 2W BV PARKER
	P-41271	KIT, REP BV 2W SKT SS6 FULL PT
15	54118	KIT, BOLT 800 SERIES MAC NAMUR
16	54117	KIT, REPAIR BODY NAMUR MAC
17	54124	COIL, REPL MAC800 110VAC W/CON
	54125	COIL, REPL MAC800 220VAC W/CON
18	54114	PILOT ASSY, 24VDC MAC
	54115	PILOT ASSY, 110VAC MAC
	54116	PILOT ASSY, 220VAC MAC
19	40658	FLOW CONTROL,1/4" PNEUM SPEED
20	60178	ACTUATOR, ROTARY, VPVL250DAB (blue)
21	60179	KIT, REPAIR FOR 60178 ACTUATOR (blue)
	P-21075	KIT, REP ACT FOR P-21076/41551 (orange)

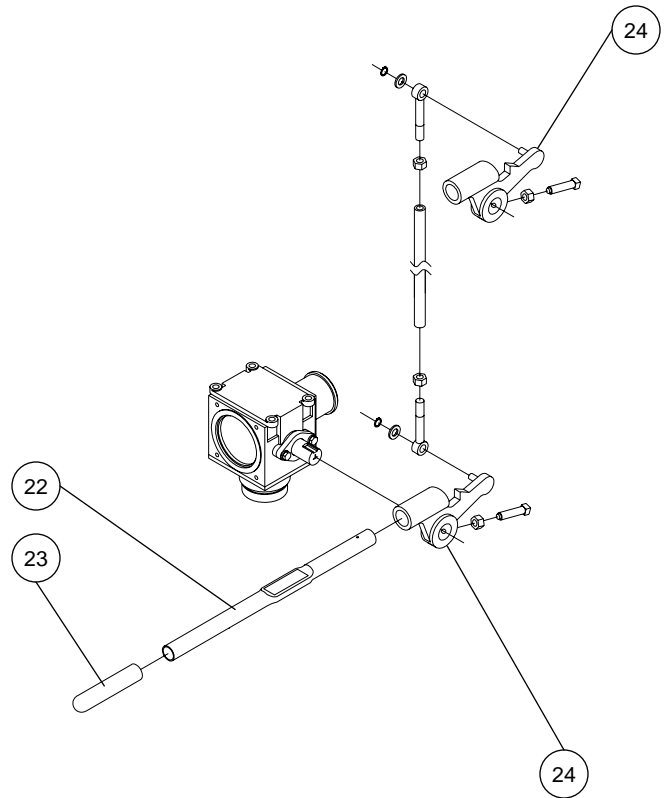


Figure 8: Manual 3-way ball valve controls

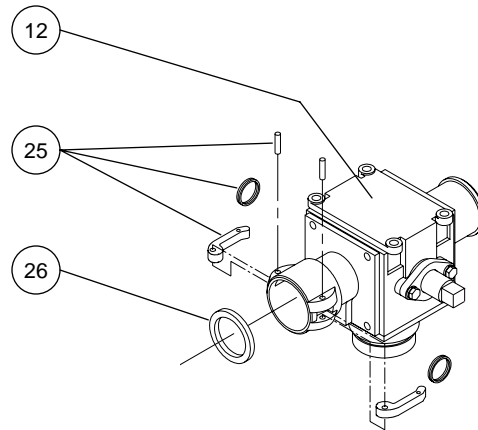
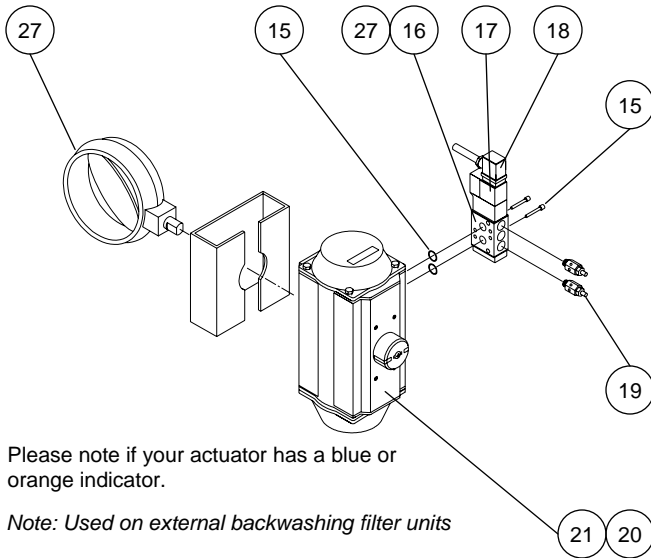


Figure 9: Quick Coupler body connection option



Please note if your actuator has a blue or orange indicator.

Note: Used on external backwashing filter units

Figure 10: External backwash supply valve

TABLE 1 – REPLACEMENT PARTS, cont'd		
Ref	Part Number	Description
22	P-20699-CST	EXTENSION, HANDLE R-P VALVE
23	P-10791	GRIP, HDL PLASTIC 1 X 5-1/2
24	25629	HANDLE, BV F MANUAL W/PIN
25	S-10108-SS4	HANDLE ASSY, 1.5-2.5 CPLR SPARE
26	P-10009-BUN	GASKET, 2" QC X 1/4" BUN N #3
	P-10009-EPT	GASKET, 2" QC X 1/4" EPT #3
	P-10009-FGL	GASKET, 2" QC X 1/4" FGL #3
	P-10009-SIL	GASKET, 2" QC X 1/4" SIL #3
	P-10009-VIT	GASKET, 2" QC X 1/4" VIT #3
	S-67003-TBG	GASKET, 2" QC BUN/TFE ENV #3
	S-67009-TSG	GASKET, 2" QC SIL/TFE ENV #3
	S-67009-TVG	GASKET, 2" QC VIT/TFE ENV #3
27	54113	SOL, MAC800 24VDC NAMUR 4WAY
	54123	SOL, MAC800 120VAC NAMUR 4WAY
	54122	SOL, MAC800 240VAC NAMUR 4WAY

TABLE 2 – ELASTOMER INFORMATION		
Elastomer Type	Abbr	Max. Temp.
Buna-N	BUN	225°F (107°C)
Nordel®	EPT	300°F (149°C)
Neoprene (white)	FGL	225°F (107°C)
Viton®	VIT	350°F (176°C)
Silicone	SIL	450°F (232°C)
Teflon® / Buna-N	TBG ¹	225°F (107°C)
Teflon® / Silicone	TSG ¹	350°F (176°C)
Teflon® / Viton®	TVG ¹	350°F (176°C)

¹Do not use Teflon® envelope gaskets above 80 PSI (5.5 bar)

If you are interested in having service performed on your filter, please contact Customer Service at +1-800-525-4214 or by email to service@ronningen-petter.com. For additional ordering information or application assistance, please contact our Customer Service department or check our web page at www.ronningen-petter.com for a representative near you.

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WARRANTY
 Eaton Filtration warrants its products against defects in materials and workmanship under normal use and service for which such products were designed for a period of eighteen (18) months after shipment from our factory or twelve (12) months after start-up, whichever comes first. This warranty is in lieu of any other liability for defects. We make no warranty of merchantability and no warranty that our products shall be fit for any particular purpose, nor are there any other warranties, expressed or implied, by operation of law or otherwise. Any claim by Buyer on account of breach of warranty shall be deemed waived conclusively unless written notice thereof is given to us within thirty (30) days after discovery of the defect. We shall have the option of requiring the return of the defective product to our factory, with transportation charges prepaid, to establish the claim and our liability shall be limited to the repair or replacement of the defective product, F.O.B. our factory and without charge. We shall not be liable for any expense incurred in repair or alterations made outside our factory without our prior authorization, nor shall we be responsible for the performance of equipment to which any revisions or alterations have been made by others. We shall in no event be liable for damages or delay nor any consequential, special or contingent damages for breach of warranty.

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