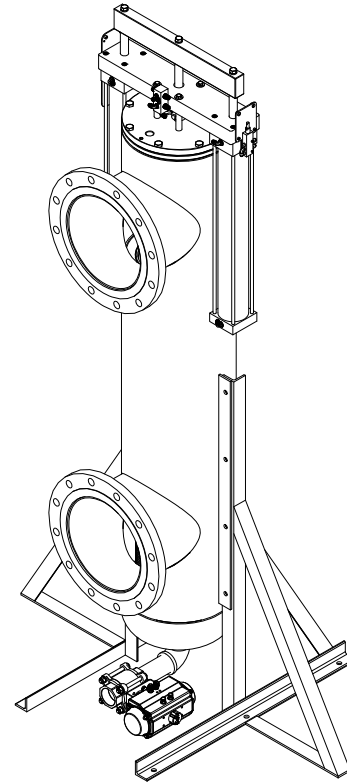


DCF-3000 Installation, Operation & Maintenance

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Description

Disc cleaned filter type DCF-3000 filter consists of a cylindrical 316 stainless steel filter screen sealed within a 316 stainless steel filter vessel. Unfiltered process fluid under pressure enters the filter vessel through the upper port. The process fluid enters the inside of the filter screen from above and the filtrate flows through the screen, exiting the filter vessel through the lower port. Contaminants are trapped on the inside of the screen. The contaminants are periodically scraped from the surface of the screen by two cleaning discs assemblies which travels across the surface of the screen. These contaminants are deposited in a collection chamber at the bottom of the filter vessel where they are periodically purged out of the bottom port of the filter vessel.



WARNING: This filter is a pressure vessel designed to operate under specific pressure, temperature, and other engineering parameters. There is a risk of explosion, process fluid leakage or electrical shock if the requirements set forth in this Manual are not followed either during installation, operation, inspection or servicing of this equipment. Equipment should be shut down and isolated from energy sources and other equipment before any inspection or servicing to prevent risk of shock or process fluid leakage. Appropriate PPE required. **FAILURE TO FOLLOW THIS WARNING MAY LEAD TO DEATH, SEVERE INJURY OR PROPERTY DAMAGE.**

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Specifications

The general specifications for a typical DCF-3000 filter system are:

Service Requirements

Electrical: None or 110-240 V AC 50/60 Hz based on controller type.
 Air: Minimum 80 PSIG (5.51 bar), Maximum 116 PSIG (8 bar) at 5.0 cfm (141.5 L/min) clean, dry, non-lubricated air, connection size is 1/4" NPT.

Materials of Construction

All welded and wetted materials are type 316 STAINLESS STEEL.
WARNING: The material selection for this vessel is specified by the customer. It is the customer's responsibility to ensure material compatibility with process and environment conditions. **SPECIFICATION OF INCOMPATIBLE MATERIALS MAY LEAD TO PRODUCT FAILURE, LEAKAGE, DEATH, SEVERE INJURY OR PROPERTY DAMAGE.**

Connections

Process inlet & outlet: 8" 150# ANSI raised face flange (standard) or option ordered.
 Purge: 2" NPT1 or option ordered.

Elastomers

Lid actuator rod packing – Urethane, Teflon®, Viton® and Gylon®/Viton® are available.
 Lid upper and lower element elastomer – EPT, Viton® and White Nitrile (food grade) are available.
 Cleaning disc blades – Delrin® and PEEK are available

Solid Removal Limit

Process stream should contain no more than 500 PPM of strainable solids by weight or volume (whichever is larger).

Design Pressures

Service: 150 PSIG (1035 kPa) maximum, 30 PSIG (207 kPa) minimum.
 Differential: Maximum differential pressure for slotted media is 50 PSID (345 kPa).

Design Temperature

Temperature limits vary based on process liquid, elastomers and cleaning disc materials. Normally this temperature is limited to 200 °F (93 °C).



WARNING: Do not operate filter with superheated fluids (fluids that are above their boiling points at atmospheric pressure). Operating the purge valve with superheated fluids may result in a BLEVE (boiling liquid expanding vapor explosion).

FAILURE TO FOLLOW THIS WARNING MAY LEAD TO DEATH, SEVERE INJURY OR PROPERTY DAMAGE.

Filter Volume

Filter vessel: 48.8 US Gallons (185 L)
 Purge chamber: 3.2 US Gallons (12 L)

Airborne Noise Emissions

<70dB (A) during normal operation

Installation

This document applies to the installation of the filter vessel. See additional instructions for the installation of any filter unit controls.

Transportation

Move the filter system as close as possible to the installation site before it is removed from the crate or skid. Position the filter frame on a prepared, level foundation. Level the filter frame before it is anchored to the foundation.

Securing to Foundation

Anchor the filter frame legs to the foundation using the six, 5/8" diameter anchor holes located at the base of each frame leg. Connect the stand grounding tab to a suitable earth ground point.



WARNING: Do not remove vessel from included frame assembly. The unit is not intended to self-support by the process connections.

FAILURE TO FOLLOW THIS WARNING MAY LEAD TO DEATH, SEVERE INJURY OR PROPERTY DAMAGE.

Connecting to Process Piping

1. Attach the inlet and outlet connections to the interconnecting piping (customer supplied). Take care to avoid excessive nozzle loading at the filter connections. Consult your pump manufacturers' installation guide for minimum pipe run length between the pump outlet and the inlet of the filter unit.



Notice: Isolation/block valves (supplied by others) are required on all process connections on the filter unit. These valves allow the filter to be isolated from the process liquid in the event that service is required. Pressure gauges are also recommended on all process connections.

2. Connect the drain line (customer supplied) to the filter unit purge valve. To avoid restricting purge flow, the drain line should be: 1) the same size as the purge valve or larger, 2) as short as possible and 3) at or on a lower grade than the purge valve.

Checklist

- Verify that all process connections are secure and free of leaks.
- Check the condition of the filter element. It should be clean and free of damage.
- Confirm that the top and bottom element seals are installed properly.
- Confirm that proper element type be used, as process requires.
- Confirm that the gasket sealing the lid to the filter housing is in good condition and properly installed.
- Check Star packing wheel and tighten as required. Urethane seal requires only finger tight.
- Confirm that the element hold-down plate and 3/8-16 socket head cap screws are installed properly.
- Verify that all lid bolts are tight. The lid bolt torque spec is 45 ft.-lbs. Do not over tighten. Damage may occur to the lid O-ring and flange surfaces if overtightened.
- In its "home" position, the actuators of the filter should be extended and the crossbar in the raised position.
- Verify that the cleaning disc can be activated manually and automatically if so equipped.
- Verify that the purge valve is operable and normally in the closed position for operation and start-up.
- Check that the purge discharge line is directed in a suitable fashion to accept waste when purged.
- Check the safety switch is operable and functional. When triggered, it should extend the actuators and put the crossbar in the raised position.

Commissioning Procedure

1. Inspect the piping connections to the filter. Verify that the inlet connection on the filter is connected to the pipe containing the incoming process fluid. Repeat this procedure for the outlet and purge connections.
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 back flushing dirty process fluid into the filter. *Do not stroke the cleaning disc actuators when isolation valves are closed.*
3. Open the isolation valve for the outlet piping.
4. If this filter is supplied with a control package, turn on the power to the filter system controls.
5. Open the inlet isolation valve to allow approximately 25% of the flow to reach the filter.



Notice: Opening the inlet valve to the fully open position without proper ramping may cause particles to become wedged into the filter screen. If this happens, the screen will have to be removed and cleaned manually.

6. Over the next ½ hour, slowly introduce more of the flow until you reach 100%. You may want to manually initiate a purge during this time to ensure that piping debris is cleaned from the unit.

Operation



Notice: Do not exceed the normal operating temperature of the lowest rated component. In most cases this is 200 °F (93 °C).

1. The unit self-cleaning controls should be on whenever flow is occurring through the filter. The controls should be off when there is no flow.
2. The cleaning disc should stroke the filter element clean to keep the differential pressure between the inlet and outlet of the filter between 3 to 5 PSID (21 to 34 kPa). Stroking too frequently will shorten the life of all wear components.
3. The filter unit is supplied with a valve used to purge the contaminants from the vessel. This valve should be opened before the collected contaminants exceed the purge chamber volume and cause a differential pressure increase.
4. If the filter element is removed from the unit, avoid high pressure washing from the inside of the element. This may force contaminants into the filter media and cause permanent blockage and/or element damage.
5. Always pressurize the unit slowly on startup and watch for leaks.
6. The unit is equipped with a 3/4" port in the lid for placement of overpressure vent, for use as an air release and/or connection for fluid filing of vessel.
7. Monitoring of the differential pressure between the inlet and outlet pressures should be used to determine stroking and purging rates. Normal operation should exhibit low differential pressure of 3-5 psi that is maintained continuously

Operational Modes

Filtering

Pressurized dirty process fluid enters thru the inlet port, passes through the filter screen where contaminants are removed and clean process fluid exits through the outlet port.

Screen Cleaning

The cleaning process occurs periodically during the filtering process. As the dirty process fluid passes thru the filter screen, contaminants are collected on the inside of the screen. The cleaning disc scrapes the length of the element screen and pushes the contaminants into the purge chamber.

Purging

The purging process occurs periodically during the filtering process. The purge valve is opened, allowing the flow and pressure in the vessel to push the concentrated contaminants collected in the purge chamber out of the vessel.



CAUTION: Do not backwash or operate the DCF-3000 in any circumstance where flow can reverse between the inlet and outlet ports. **Backwashing mechanically cleaned vessels may result in damage to the element and cleaning disc assemblies.**

Inspection, Disassembly & Reassembly

To service the unit: Isolate from process fluids, from the process air and electric supply by using proper lockout tagout procedures. Depressurize unit by opening purge and vent valve in that order and de energize all sources of power.

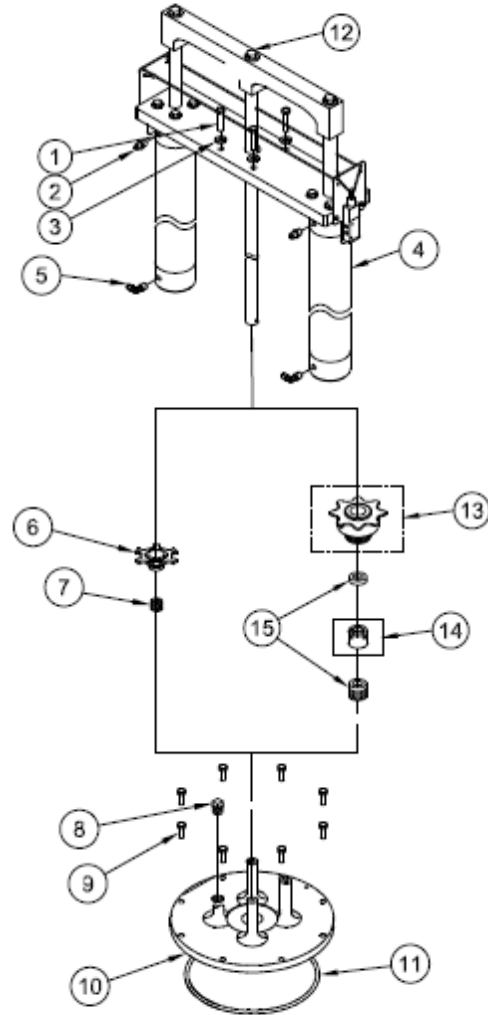


Figure 1

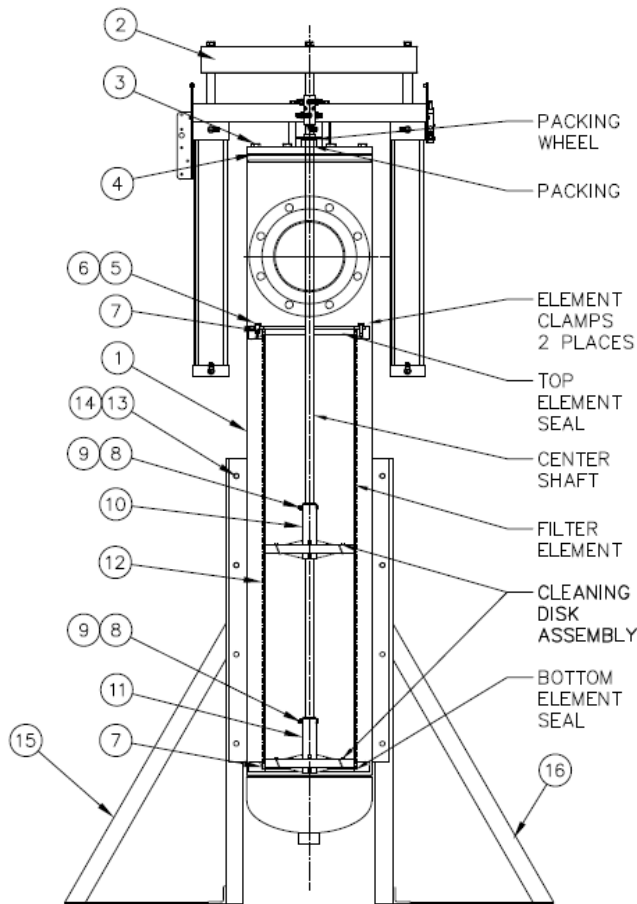


Figure 2



WARNING: Equipment should be shut down and isolated from energy sources and other equipment before any inspection or servicing to prevent risk of shock or process fluid leakage.

FAILURE TO FOLLOW THIS WARNING MAY LEAD TO DEATH, SEVERE INJURY OR PROPERTY DAMAGE.

1. Disconnect all remote airlines running to the assembly, marking all airlines before removing. *Isolate all sources of energy before disconnecting any fitting.* Remove the center shaft connection bolt (Figure 1, item 12) and the four bolts (Figure 1, item 1) holding the twin assembly to the lid. Remove the twin assembly.
2. Hand tighten packing compression wheel (Figure 1, item 6 or 13) to prevent lid from moving on the shaft. Remove lid assembly with both upper and lower cleaning discs attached.
3. Remove the 8 bolts (Figure 1, item 9) from the lid. Inspect the lid O-ring for damage and replace if necessary (Figure 1, item 11)
4. With the lid assembly removed, wash down the inside of vessel to remove all remaining process fluids and solids.
5. Remove 1/4-20 hex nut and screw (Figure 2, item 8, 9) to dismantle upper and lower cleaning disc from actuator rod.
6. Inspect the cleaning disc blades while inside the unit. If the spacing between the edge of the blade and the inside edge of the plate is approximately 1/8" then the blades need to be replaced. See Figure 3.

7. Inspect both cleaning disc (Figure 2, item 10, 11) for excessive wear. If replacement is required, refer to instructions included with replacement disc.
8. After complete inspection, and if necessary replacement, slide the cleaning disc on actuator rod and plug it with 1/4-20 screw and nut. First install the upper cleaning disc (Figure 2, item 10) and then lower cleaning disc. (Figure 2, item 11)
9. Remove the filter element (Figure 2, item 12) from the housing by removing two screws (Figure 2, item 6) of element hold down plates (Figure 2, item 5), and inspect the filter element for damage. Damage may consist of deformation, dents, holes or blockage.
10. Clean the element from the outside. High pressure washing may damage the filter element. Replace as needed
11. Remove and inspect the element O-rings (Figure 2, item 7) for damage and replace as needed.
12. Clean and remove any debris from the bottom of the housing. Inspect the purge chamber to ensure it is clean and free of large debris.
13. Re-install the element O-rings (Figure 2, item 7) and lower the element into the filter housing. When the element reaches the bottom, a small amount of force is needed to seat the element into the base.
14. Screw up the two element holding down plates to fix the element
15. Place the lid "O" ring (Figure 1, item 11) on the upper body flange, flat and centered.
16. Replace lid and cleaning disc assembly on the filter housing. Replace the lid bolt and tighten. (Figure 1, item 9)
17. Replace the twin assembly insuring that the safety device is in place of operating.
18. Loosen the packing compression wheel (Figure 1, item 6 or 13) to proper operating specification.
19. Reconnect the airlines.
20. Place the system back on line using proper plant procedures.
21. Test the safety device by tripping it while the unit is in motion. The unit should stop moving. If this does not work, lock the unit out and contact Eaton customer service. If unit operates correctly, reset the safety switch and put the unit back online.

For maintenance of other items such as lid seals, actuators, and valves, see instructions supplied with repair kits.

Blade removal instructions

1. Inspect the cleaning disc blades for wear and damage.
2. To replace the blades, remove the two screws holding the blade to the plate. Between the blade and the plate there is a spring. This spring must be replaced when the blade is replaced.
3. Place a new spring into the pocket in the new cleaning disc blade. Slide the blade onto the plate and insert the two screws into the blade.

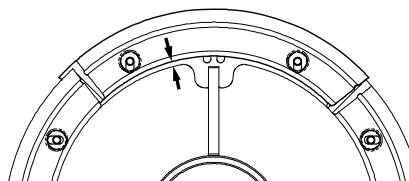


Figure 3

Spare Parts Lists

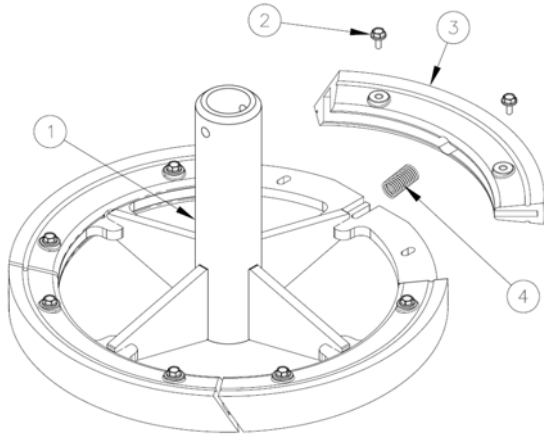


Figure 4

Table for Figure 4 - Disc Assembly lower and upper

Ref	Part Number	Description (qty)
1	WER0000014	PLATE ASSY, LOWER MCS-1500 FAB SS6
	WER0000013	PLATE ASSY, UPPER MCS-1500 FAB SS6
2	RPR000004	SCREW, #8-18X1/2 SELF DRILLING HEXWASHER HD410MO (8)
3	59273	BLADE, CLN DISC HF1500 DERLIN (4)
4	40111	SPRING, DISC ASSY MCF 4 BLADE (4)
	59274	KIT, MCS-1500 BLADES, SPRINGS (contains items 2, 3 and 4 for one disc assembly.)

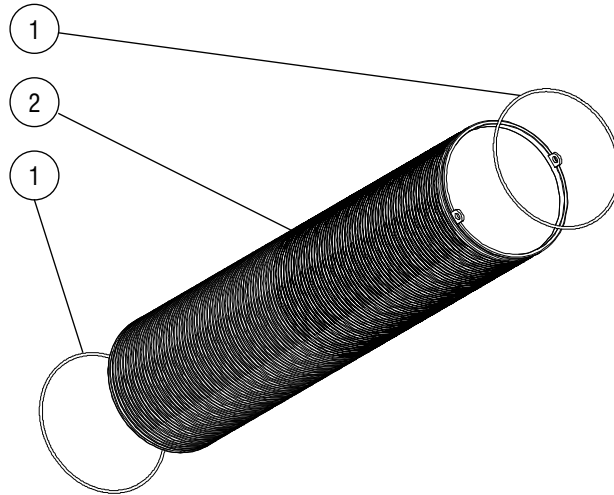


Figure 5

O-RINGS		
MATERIAL	LID FIG.1 #11	ELEMENT FIG.5 #1
VITON	RPS0000000	59231
EPT	RPS0000001	59230
NIT*	RPS0000031	RPS0000008

*White ,FDA approved food grade.

SLOTTED ELEMENT SIZE		
P/N	RETENTION	(MICRON)
RPE0000026	.001	25
RPE0000067	.0015	38
59267	.002	50
RPE0000027	.003	75
RPE0000013	.004	100
RPE0000028	.005	125
59260	.006	150
59268	.007	175
59269	.008	200
RPE0000065	.009	230
59261	.010	250
59262	.015	380
59263	.024	610
59264	.030	760
59265	.045	1140

PACKING KITS		
MATERIAL	STANDARD PACKING Figure 1 item 7	FLUID SEAL PACKING Figure 1 item 15
	PART NO.	PART NO.
URETHANE	42958	45406
TEFLON	42919	45407
VITON	45498	RPS0000038
GYLON/VITON	RPS0000014	RPS0000037

Maintenance

To service the DCF-3000 filter unit, isolate it from the process air and electrical supply using proper lockout/tagout plant procedures. Depressurize and de-energize all sources of power. Utilize proper application of PPE for the process conditions.



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Maintenance Schedule

Frequency of inspection is at the discretion of the customer and may need to be increased or decreased accordingly. The wear of certain items depends on how often the filter is used and the abrasiveness of the product being filtered.

Weekly

- Inspection for leakage around the actuator shaft seal. To eliminate weeping, tighten that packing as necessary by tuning star wheel (Figure 1, item 6 or 13) clockwise. If the packing (Figure 1, item 7 or 15), has reach maximum adjustment and or leaking persists after adjustment disassemble the unit and replace the packing.

Monthly

- Inspect the cleaning discs for excessive wear. Remove the cleaning discs and inspect.
- Remove the actuator lid assembly and inspect the inside of the filter element. Inspect the inside of the filter element for excessive wear. The lid seal (Figure 1, item 11) should be replaced to maintain a proper seal. If the element is removed from the housing, the seals (Figure 2, item 7) should be replaced to maintain a proper seal. Over time, gaskets will take on a permanent "set".
- Inspect the actuator assembly. When the actuator begins to fail, the differential pressure will rise. This occurs because the actuator cannot sufficiently drive the cleaning disc assembly. Remove the actuator assembly and check for air leakage around the gland seal. Check for any side to side movement in the actuator shaft. If either of these problems exist, the actuator can be rebuilt (Figure 2, item 2) Inspect the actuator shaft for damage or excessive wear. If damage exists to the shaft, the actuator shaft must be replaced.

Troubleshooting

Symptoms

- A Actuator doesn't operate properly
- B Purge valve will not operate properly
- C Leakage at lid seal
- D Reduction in flow rate or high differential pressure
- E Drop in filtrate quality

Possible Faults

- A Actuator doesn't operate properly
 - 1 No power
 - a Check safety switch position.
 - b Check to see if the filter system is receiving adequate power.

- c Check to see if the filter system is set to the proper voltage.
 - d Check all wiring connections.
 - 2 No air supply
 - a Check to see if the filter system is receiving adequate air.
 - b Check for air leaks.
 - c If included check to see if the air bleed valve is closed and the air block valve is open.
 - d Check to see if the airlines are connected to the correct ports.
 - 3 Actuator seals have worn out
 - a Check the air filter and water separator for operation.
 - b Replace the actuator
 - 4 Actuator installed improperly
 - a Confirm the element hold-down plates are properly installed and are securing the actuator.
 - 5 Faulty solenoid valve
 - a Check to see whether the manual override button on the solenoid valve actuates the cylinder.
 - 6 Actuator cleaning disc carrier is seized.
 - a Inspect and clean actuator assembly of built-up solids.
 - 7 Cleaning disc not cleaning the filter screen
 - a Inspect and clean the filter screen.
 - b Inspect and replace the cleaning disc.
- B Purge valve will not operate properly
 - 1 No power
 - a Check to see if the filter system is receiving adequate power.
 - b Check to see if the filter system is set to the proper voltage.
 - c Check all wiring connections.
 - 2 No air
 - a Check to see if the filter system is receiving adequate air.
 - b Check for air leaks.
 - c Check to see if the air bleed valve is closed and the air block valve is open.
 - d Check to see if the airlines are connected to the correct ports.
 - 3 Damaged rotary Actuator seals
 - a Order a factory repair kit and replace the seals.
 - 4 Faulty solenoid valve
 - a Check to see whether the manual override button on the solenoid valve actuates the cylinder
 - 5 Damaged purge valve
 - a Replace or rebuild purge valve
 - 6 Debris caught in purge valve
 - a Remove debris from purge valve
- C Leakage at lid seal
 - 1 Loose lid nuts/bolts
 - a Tighten lid/nut bolts.
 - 2 Dirty lid sealing surfaces
 - a Clean lid sealing surfaces
 - 3 Damaged sealing surfaces
 - a Repair or replace filter station
 - 4 Damaged lid O-ring
 - a Remove and replace with factory lid O-ring

- D Reduction in flow rate or high differential pressure
 - 1 Cleaning interval set too long
 - a Decrease cleaning timer setting
 - 2 Purge interval set too long
 - a Decrease purge timer setting
 - 3 Purge valve not functioning
 - a Inspect and replace purge valve
 - 4 Dirty or damaged filter screen
 - a Inspect and clean or replace filter screen
 - 5 Flow, viscosity or solids increase
 - a Consult factory
 - 6 Cleaning disc not properly cleaning element
 - a Inspect cleaning disc for wear and replace if necessary
- E Drop in filtrate quality
 - 1 High differential pressure
 - a Refer to reduction in flow rate or high differential pressure above
 - 2 Improper Assembly
 - a Confirm the Element Hold-Down plate is properly installed
 - 3 Damaged filter screen O-rings
 - a Remove and replace with factory element screen O-rings
 - 4 Damaged filter screen
 - a Remove and replace with factory filter screen
 - 5 Filter screen too coarse
 - a Consult factory for ability of filter system to accept finer screen retention. Remove and replace with factory filter screen.

Warranty

WARRANTY

All products manufactured by Seller are warranted against defects in material 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. OUR SOLE OBLIGATION UNDER THIS WARRANTY IS TO REPAIR OR REPLACE, AT OUR OPTION, ANY PRODUCT OR ANY PARTS OR PARTS THEREOF FOUND TO BE DEFECTIVE. SELLER MAKES NO OTHER REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WE SHALL NOT BE LIABLE FOR CARTAGE, LABOR, CONSEQUENTIAL DAMAGES OR CONTINGENT LIABILITIES. OUR MAXIMUM LIABILITY SHALL NOT IN ANY EVENT EXCEED THE CONTRACT PRICE FOR THE PRODUCT.

If you are interested in ordering spare parts or having service performed on your filter, please contact Customer Service.

Eaton reserves the right to change specifications, dimensions and model designations without prior notice.

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