

ENGINEERING STANDARDS

Rosedale Products, Inc.
3730 West Liberty Road
Ann Arbor, MI 48103

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INSTALLATION, OPERATION, & MAINTENANCE MANUAL

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

ROSEDALE PRODUCTS, INC.



MODEL 8 AUTO-DUPLEX
ELECTRIC CONTROLLER
PNEUMATIC OPERATION
150 PSIG RATED FILTER UNIT

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Installation Instructions

Complete the following steps.

- Step 1.** Complete the Duplex Vessel Installation procedures as described in Section II. Individual component installation, operation, maintenance, and repair manuals can be found in Section VII.
- Step 2.** Air pressure is required to operate the air valves of the system. Air pressure of 60 PSI minimum will be adequate. Rosedale recommends a regulator and filter be installed to assure trouble free operation of the air valves. Connect the plant air line to the fitting located on the Numatics air valve assembly located behind the control box. Control Panel power 110/120V is required. Rosedale has provided a general purpose non-locking receptacle plug for system power. Connect receptacle plug to customer supplied power source.

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I. General Description

A. Introduction

Rosedale Products produces a basic two-filter unit with an electric/pneumatic control system that can automatically switch from one filter to the other when the pressure drop across the on-line filter gets too high. When a filter is off line, it is isolated from the fluid, and can be worked on to replace bags or perform other maintenance.

Thus the unit provides continuous service as long as maintenance personnel service each filter as soon as it comes off line, and get it ready to go back on line when the other filter pressure drop gets too high.

The system provides a differential pressure switch connected into the fluid inlet and outlet lines to monitor the pressure drop. The system puts one filter on line until it shows the highest permissible pressure drop, then switches the flow over to the second filter and isolates the first filter from the fluid.

Each time the pressure drop sensor calls for a switchover, it should also send an electric alarm signal to the customer's remote annunciator system, warning that one of the filters has gotten dirty and needs maintenance. These remote warning signals stay on until an operator comes to the site and manually resets the controls. This turns the warning signal off.

B. Description of the Fluid Circuits

Each filter has a 2-way fluid inlet valve and a 2-way fluid outlet valve. The parts list calls these valves "transfer valves". They are Bray butterfly valves actuated by Bray pneumatic actuators. These actuators are double air operated no spring actuators which have to be driven in both directions by air pressure.

It is a characteristic of this combination of hardware that the butterfly is always balanced to pressure reactions, and it takes a certain amount of torque to turn the butterfly shaft. The operator also has built-in friction and resistance to movement. So air pressure is needed to move the butterfly in either direction. The hardware combination is therefore analogous to a double air pilot operated 2-way liquid valve, detented in both positions.

The system also provides a Watts ball valve, provided with a Bray actuator, but this actuator is fitted with a return spring, and only has one air connection. The combination is air operated to open, spring return to close. The total combination therefore is a single pilot spring return normally closed 2-way liquid valve. This valve is called a "cross-connect valve".

The incoming liquid enters the branch outlet of a large pipe tee. From the run ports of this tee the liquid goes through the two filter inlet valves, then into the inlet ports of the filters.

The outlet ports of the filters connect to the (2) outlet valves, which in turn connect to the run ports of an

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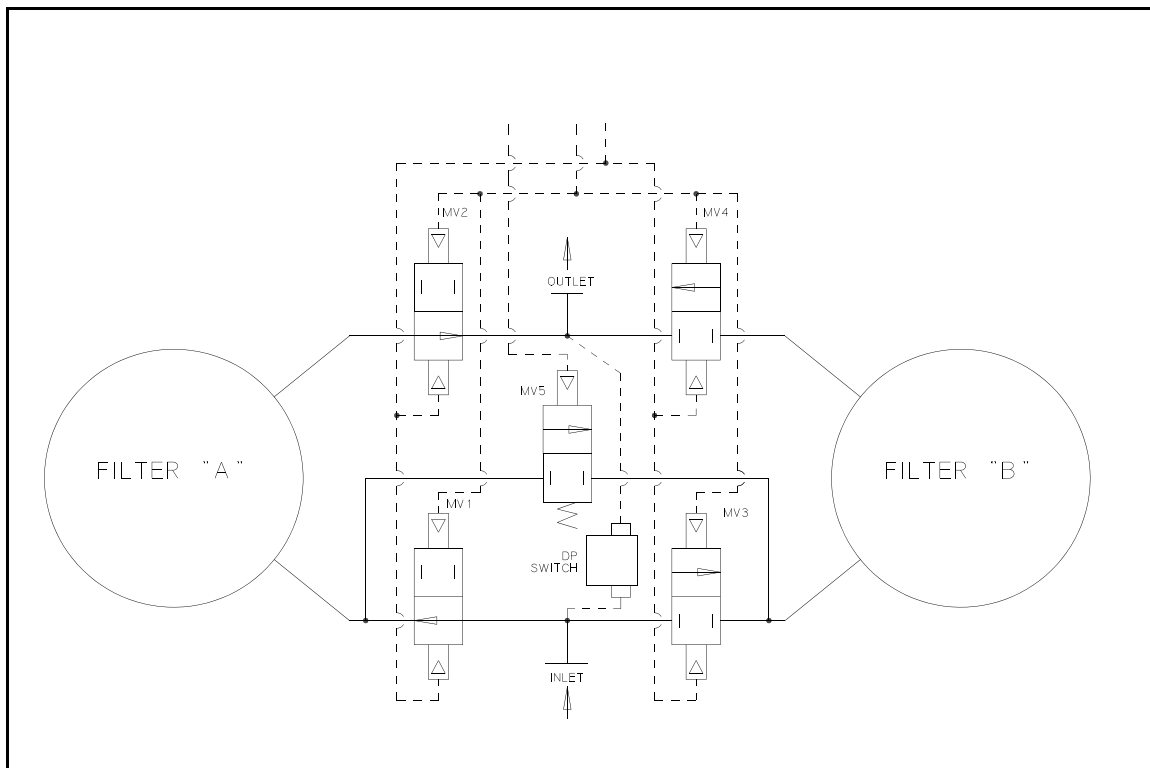
outlet tee. The branch outlet port of this tee is the main outlet port of the system.

A smaller liquid line taps into each filter inlet line between the inlet valve and the filter inlet port. The cross-connect valve is mounted in this cross-over line.

C. How the Fluid Circuits Work

To direct fluid through Filter A, the controls open inlet valve MV1 and outlet valve MV2, and close inlet valve MV3 and outlet valve MV4. The cross-connect valve MV5 is also closed. Liquid flows through Filter A, while Filter B is isolated from the fluid.

To direct fluid through Filter B, the controls close inlet valve MV1 and outlet valve MV2, and open inlet valve MV3 and outlet valve MV4. The cross-connect valve MV5 is also closed. Liquid flows through Filter B, while Filter A is isolated from the fluid.



The purpose of the cross-over valve is to bring the off-line filter up to liquid line pressure before opening the off-line filter's liquid valves. This prevents liquid hammer and hydraulic shock to the filter bags. There is also an automatic air vent on the cover of each filter housing that allows air to be automatically purged from each filter.

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Note that the inlet valve and the outlet valve for each filter always open together and close together. It is important also to note that when the Filter A liquid valves are open, the Filter B liquid valves are closed and vice versa. Thus, one filter or the other is always on line passing liquid.

The cross-connect valve is only opened during the pressure equalization period at the beginning of a switchover.

II. Installation of Duplex Filter System

A. Installation

Please remove all shipping and crating materials carefully. Be sure to remove the plugs from the inlet and outlet openings. Dispose of all crating materials safely.

After positioning the Model 8 Auto-Duplex Filter in its proper location, secure the filter support legs. This will provide a fixed location during your filtering process.

The inlet-outlet connections are centrally located in the system envelope. ANSI flanges are the standard connections, these connections have a branch tee style configuration. This is illustrated on page 20 of this manual.

The Model 8 Auto-Duplex Filter is now ready for connection to the system. The inlet service line should be connected to the inlet side of the system. It is very important to identify which is the inlet side of the Model 8 Auto-Duplex Filter System. The inlet is located above the outlet connection.

Another way to double check the identification of the inlet side of the system is by the location of the pressure balancing valve. The function of the valve is to fill the next filter and equalize the pressure difference before switching filters to limit surges within your piping system. This valve is always located on the inlet side of the system. Rosedale provides a timer delay inside the Control Panel allowing you to adjust the filling rate. Use your experience and flow rate data to calculate the desired delay required.

There are two float vents on the cover of your Model 8 Auto-Duplex Filter unit. These float vents are for automatic pressure relief for your application.

There are (2) NPT drains, (1) each, located on the bottom of each housing. These ports allow complete drainage of the filter housings.

Some installations require electrical grounding of all equipment, be sure to provide adequate grounding where necessary.

After completing installation be sure to double check connections for integrity. Your Model 8 Auto-Duplex Filter unit has been factory pressure tested leak free, therefore, any seepage problems usually occur from improper installation connections.

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You are now ready to install the filter baskets and bags. Remove cover by loosening clamp assemblies sufficiently to allow them to swing free. Loosen the last clamp assembly sufficiently to allow the cover to swing free. Swing cover away from housing to gain access to strainer baskets and/or filter bags.

If your application requires a basket seal, insert the basket seal into the collar groove.

The next step is to install the filter bag baskets, making sure the basket flange is firmly seated on top of the basket collar. Insert filter bag into the bag basket making sure the filter bag ring is firmly seated inside the basket. For best results, be sure filter bag is fully extended to the bottom of the basket.

Before replacing cover assembly, inspect cover seal gasket (replace as necessary). Close cover and alternately tighten the closure assemblies evenly to ensure a leak proof seal between cover and housing body. The recommended torque value for 5/8"-11 closure assemblies is 150^{foot-lbs}.

Your Rosedale Model 8 Auto-Duplex Filter unit is now ready for operation!

B. Operation

The Duplex system features continuous filtering capabilities. When it is determined that the operating filter vessel is dirty and needs cleaning the flow of fluid is diverted to the opposite filter vessel. This should be done slowly to ensure that the filter bag will not be displaced.

Filter System Start-Up Procedure:

Prior to turning on the flow to the inlet service, please make the following checks:

1. Check inside filter unit to be sure filter bags are in housing and do not require cleaning or replacement. If necessary install clean filter baskets and bags. The main liquid supply is OFF. MAIN POWER PULL ON/PUSH OFF palm button is OFF. All visual indicators are off.
2. Operator pulls the main power palm button control.
 - a. Electric power turns ON. MAIN POWER PULL ON/PUSH OFF indicator turns red.
3. Operator must decide which filter housing to place on line.
 - a. Depress momentarily the correct FILTER ? START button.
 - b. The correct FILTER ? ON LINE indicator turns green, tells the operator one filter's liquid valves are open and ready to receive liquid, and the other filter's liquid valves are closed.

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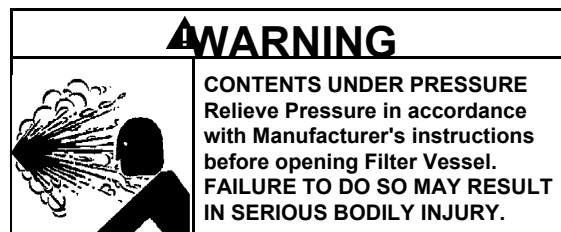
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4. Check that filter unit covers are securely fastened to housings and actuator pointers are positioned so that fluid flow is restricted to a single housing. This can be determined by the orientation of the pointer located on the top of each pneumatic actuator valve. When the pointer is in line with the piping of the housing, the valve is open and fluid can flow through that filter housing. If the pointer is perpendicular to the piping, the valve is closed and fluid is restricted through filter housing. Once you have determined which filter housing is operational you are now ready to open the flow to the inlet service line. Slowly open the inlet service line approximately 25% of normal operational flow (open slowly as not to displace filter bag inside the housing). After filter unit is pressurized and trapped air is vented, slowly open outlet service line valve until completely open. Complete opening of inlet service line until desired flow rate is reached. The system is on line. (Experience shows that as the liquid flow builds up through the system, it does NOT build up enough pressure drop to energize the pressure drop sensor.)

Once the desired service flow has been established, the filter will operate efficiently until dirty. A Differential Pressure Switch is provided with this Model 8 Auto-Duplex System. This sensor has been pre-set to approximately 15 PSI (Rosedale recommends changing filter bags at 15 PSI maximum differential pressure). Operating the filter unit with a high differential may cause filter bags to rupture and cause damage to filter system or downstream equipment. Should a different pressure be required, remove the face plate from the Allen-Bradley Differential Pressure Switch, and use an appropriate tool to adjust the piston following the arrow indicator provided.

When it becomes necessary to clean or replace filter media during continuous operating conditions, follow the procedure outlined below:

1. Divert fluid flow to clean filter vessel.
2. Relieve the pressure from the filter unit.



3. Drain housing sufficiently to access filter basket.
4. Remove cover by loosening closure assemblies sufficiently to allow them to swing free. Turn handwheel on top of housing to lift cover clear of basket retainer plate. Swing cover away from housing to gain access to strainer baskets and/or filter bags.
5. Remove filter basket and clean thoroughly, remove the filter bag and dispose of properly.
6. Remove debris and sludge from inside of bag/basket sealing surface and O-ring groove

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- to avoid interference with cover seal or flow of fluid being filtered.
7. Install clean filter basket and filter bag. Be sure filter bag is seated inside the basket retainer plate.
 8. Inspect cover gasket for cuts or other signs of failure and make sure it is properly seated.
 9. Swing cover back into position, and alternately tighten closure assemblies evenly to ensure a leak proof seal between cover and housing body. The recommended torque value for the 5/8"-11 closure assemblies is 150^{foot-lbs}.

Your Rosedale Model 8 Auto-Duplex Filter is now ready for operation. Refer to filter system start-up procedure.

III. How the System Works

The purpose of this system is to provide continuous filtration, in spite of the filters getting clogged and needing cleaning or changing bags. The general idea is that one of the two filters will be on line at all times, allowing maintenance to change bags or perform service on one filter while the other filter is doing the filtering. The design of this system assumes that during startup liquid pressure will be OFF.

A. Typical Automatic Switchover Sequence (for reference only):

Assume for this explanation that the system has been actuated and reset, Filter B is on line, and the system is about to switch over to Filter A.

1. The pressure drop sensor senses that the pressure drop is too high, tells the controls "Pressure drop is too high".
2. Cross-connect valve opens, admits liquid under pressure from the Filter B inlet pipe to the inlet port of Filter A. Since filter A liquid valves are closed, Filter A quickly builds up to the liquid line pressure. Start cross-connect timer. Stop reading pressure drop sensor.
3. When enough time has elapsed the timer times out. Simultaneously, controls command Filter B liquid valves to close, and Filter A liquid valves to open. Controls also command cross-connect valve to close.
4. As the Filter B liquid valves start to close, the Filter A liquid valves start to open, and the opening of the Filter A valves proceeds at about the same rate as the closing of the Filter B valves. Thus, there is no interruption of liquid flow during the switch over from Filter B to Filter A.
5. Eventually the Filter B liquid valves get fully closed, and the Filter A liquid valves get fully open. The switch over is complete. Filter A is on line.
6. The controls start reading the condition of the pressure drop sensor again.

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Case 1 - Initial Start-up Sequence:

Initial condition:

Main liquid supply is OFF. MAIN POWER PULL ON/PUSH OFF palm button is OFF. All visual indicators are off.

1. Operator pulls the main power palm button control.
 - a. Electric power turns ON. MAIN POWER PULL ON/PUSH OFF indicator turns red.
2. Operator must decide which filter housing to place on line.
 - a. Depress momentarily the correct FILTER ? START button.
 - b. The correct FILTER ? ON LINE indicator turns green, tells the operator one filter's liquid valves are open and ready to receive liquid, and the other filter's liquid valves are closed.

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3. If the operator is satisfied with the choice of filter on line, he may now open the external liquid valves, and allow the liquid to start flowing through the system. The system is on line. (Experience shows that as the liquid flow builds up through the system, it does NOT build up enough pressure drop to energize the pressure drop sensor.)
4. If the operator is NOT satisfied with the choice of filter on line, he may delay turning on the liquid, and may switch filters by depressing the ARM SWITCHOVER button and holding for 5 seconds, until the CROSS-CONNECT OPEN VALVE indicator light turns amber.
 - a. The controls perform a normal switch-over sequence as detailed in Case 3.
5. When the switchover is complete, the FILTER ? ON LINE indicator for the new filter will turn green, indicating that the controls have commanded the power valves for the selected filter to open. The operator may then turn on the liquid flow, and the system is on line.
6. Operator pushes ARM SWITCHOVER button.
 - a. SWITCHOVER ARMED indicator will turn blue, indicating that the differential pressure drop switch is ready for pressure drop through the system.

(If operator has to disarm the SWITCHOVER ARMED feature, he can do so by momentarily depressing the CANCEL ALARMS/SWITCHOVER button. SWITCHOVER ARMED indicator turns off.)

Case 2 - Normal Shut-down:

Initial Conditions:

Liquid flow is normal. Electric power is ON. MAIN POWER PULL ON/PUSH OFF indicator is red. One filter is on line, and its FILTER ? ON LINE indicator is green. SWITCHOVER ARMED indicator light may be either to blue if ARMED or off if UNARMED.

1. Operator closes external liquid valves, turns off the flow of liquid.
2. Operator pushes MAIN POWER PULL ON/PUSH OFF.
 - a. Electrical power turns off. All indicators turn off.
 - b. Pneumatic actuators and liquid inlet and outlet valves will stay in current position. System is shut down.

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Case 3 - Normal Switchover:

Initial Conditions:

Electrical power is ON. MAIN POWER PULL ON/PUSH OFF indicator is red.

ARM SWITCHOVER push button is armed. SWITCHOVER ARMED indicator is blue. Controls are reading the condition of the pressure drop sensor. Pressure drop sensor is telling the controls "Pressure drop is OK".

One filter is on line. (Let us say that Filter B is on line). FILTER B ON LINE indicator is green. Filter A is off line, but ready to go on line. FILTER A ON LINE indicator is off. FILTER A DIRTY indicator and FILTER B DIRTY indicator are off. FILTER A IS DIRTY and FILTER B IS DIRTY remote alarm signals are OFF. CROSS-CONNECT VALVE OPEN indicator is off.

1. Filter B begins to clog. Pressure drop rises. Pressure drop sensor actuates, tells controls "Pressure drop is too high".
 - a. Differential pressure switch trips, produces an output. FILTER B DIRTY indicator turns red. FILTER B DIRTY tells remote annunciator that Filter B is dirty.
 - b. Controls stop reading pressure drop sensor.
 - c. SWITCHOVER ARMED indicator turns off.
 - d. Open cross-connect valve. CROSS-CONNECT VALVE OPEN indicator turns amber. Liquid starts to pressurize Filter A housing.
 - e. Start cross-connect timer.
2. When set time has elapsed to pressurize Filter A to inlet line pressure, cross-connect timer times out.
 - a. Controls tell cross-connect valve to close. CROSS-CONNECT VALVE OPEN indicator turns off.
 - b. Controls tell Filter B inlet and outlet valves to close. FILTER B ON LINE indicator turns off.
 - c. Controls tell Filter A inlet and outlet valves to open. FILTER A ON LINE indicator turns green.
3. Cross-connect valve closes. Filter B liquid valves close. Filter A liquid valves open. As the liquid flow switches from dirty Filter B to clean Filter A, flow returns to normal, and the pressure

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drop across the system returns to normal. Pressure drop sensor resets, tells controls "Pressure drop is OK". System will not switchover until ARM SWITCHOVER button is depressed and indicator light is blue.

Switchover to Filter A is complete.

(CAUTION- Relieve pressure in filter vessel and drain before servicing!!!)

4. Operator opens filter B and installs new bags, closes housing ready to go back on line.
5. Operator depresses CANCEL ALARMS/SWITCHOVER button and holds for 5 seconds.
 - a. FILTER B DIRTY indicator turns off, FILTER B IS DIRTY remote alarm signal turns OFF.
6. Operator pushes ARM SWITCHOVER button.
 - a. SWITCHOVER ARMED indicator will turn blue, indicating that the differential pressure drop switch is ready for pressure drop through the system.

(If operator has to disarm the SWITCHOVER ARMED feature, he can do so by momentarily depressing the CANCEL ALARMS/SWITCHOVER button. SWITCHOVER ARMED indicator turns off.)

System is back on line, with Filter A on line, Filter B ready to go online when a switchover occurs, and the SWITCHOVER ARMED circuit ready to go into action when called upon to do so.

7. Filter A begins to clog. Pressure drop rises. Pressure drop sensor actuates, tells controls "Pressure drop is too high".
 - a. Differential pressure switch trips, produces an output. FILTER A DIRTY indicator turns red. FILTER A DIRTY tells remote annunciator that Filter A is dirty.
 - b. Controls stop reading pressure drop sensor.
 - c. SWITCHOVER ARMED indicator turns off.
 - d. Open cross-connect valve. CROSS-CONNECT VALVE OPEN indicator turns amber. Liquid starts to pressurize Filter A housing.
 - e. Start cross-connect timer.
8. When enough time has elapsed to pressurize Filter B to inlet line pressure, cross-connect timer times out.

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- a. Controls tell cross-connect valve to close. CROSS-CONNECT VALVE OPEN turns off.
 - b. Controls tell Filter A inlet and outlet valves to close. FILTER A ON LINE indicator turns off.
 - c. Controls tell Filter B inlet and outlet valves to open. FILTER B ON LINE indicator turns green.
9. Cross-connect valve closes. Filter A liquid valves close. Filter B liquid valves open. As the liquid flow switches from dirty Filter A to clean Filter B, flow returns to normal, and the pressure drop across the system returns to normal. Pressure drop sensor resets, tells controls "Pressure drop is OK". System will not switchover until ARM SWITCHOVER button is depressed and indicator light is blue.

Switchover to Filter B is complete.

(CAUTION- Relieve pressure in filter vessel and drain before servicing!!!)

10. Operator opens filter A and installs new bags, closes housing ready to go back on line.
11. Operator depresses CANCEL ALARMS/SWITCHOVER button and holds for 5 seconds.
 - a. FILTER B DIRTY indicator turns off, FILTER B IS DIRTY remote alarm signal turns OFF.
12. Operator pushes ARM SWITCHOVER button.
 - a. SWITCHOVER ARMED indicator will turn blue, indicating that the differential pressure drop switch is ready for pressure drop through the system.

(If operator has to disarm the SWITCHOVER ARMED feature, he can do so by momentarily depressing the CANCEL ALARMS/SWITCHOVER button. SWITCHOVER ARMED indicator turns off.)

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System is back on line, with Filter B on line, Filter A ready to go online when a switchover occurs, and the SWITCHOVER ARMED circuit ready to go into action when called upon to do so.

End of one complete switchover cycle.

Case 4 - Normal Switchover Occurs but Operators DO NOT Service the Off Line Filter:

Suppose the operator puts the system on line, with (let us say) Filter B on line and Filter A waiting, ready to go on line.

Filter B will eventually clog, and a normal switchover will occur. The system will take Filter B off line and will put Filter A on line as outlined in Case 3 above. The FILTER B IS DIRTY remote alarm output will turn ON and the FILTER B DIRTY indicator will turn red. The system is on Filter A.

Now, suppose that maintenance DOES NOT respond to the FILTER B IS DIRTY alarm, and DOES NOT service Filter B. Eventually filter A will also get clogged.

What happens NOW?

When the pressure drop sensor tells the controls "Pressure drop is too high":

- a. FILTER A DIRTY indicator will turn red.
- b. FILTER A IS DIRTY remote alarm output will turn ON.
- c. Filter A will stay on line and the FILTER A ON LINE indicator will stay green.

When an operator finally does come to the site, he will see:

- a. FILTER A DIRTY indicator is red.
- b. FILTER B DIRTY indicator is red.
- c. FILTER A ON LINE indicator is green.
- d. FILTER B ON LINE indicator is off.

The operator thereby knows that BOTH filters are dirty, and that filter B got dirty first, and filter A got dirty second. He also knows that Filter B is the one that is isolated, and that Filter A is running on borrowed time, because he does not know HOW LONG filter A has been on line since switchover, and could be nearly completely plugged.

Operator now has a choice as to which filter he will service first. He knows that Filter B switched over

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when the pressure drop sensor first sensed too high a pressure drop. He also knows that Filter A turned on its FILTER DIRTY warning alarm when it reached the same condition, but it has continued to run, and is clearly more clogged than Filter B. So he may decide to service Filter A first, knowing that Filter B is probably less clogged than filter A.

Servicing Filter A first:

1. Operator momentarily depresses the ARM SWITCHOVER button and holds for 5 seconds, until the CROSS-CONNECT OPEN VALVE indicator light turns amber.
 - a. The system will perform a normal switchover. The FILTER A ON LINE indicator will turn off, then the FILTER B ON LINE indicator will turn green.
2. When FILTER B ON LINE indicator turns green, operator knows that Filter A is isolated, and he can now open it up and service it.

(CAUTION- Relieve pressure in filter vessel and drain before servicing!!!)

3. Operator opens Filter A housing and changes bags, closes housing up.
4. Operator now momentarily depresses ARM SWITCHOVER button and holds for 5 seconds, until the CROSS-CONNECT OPEN VALVE indicator light turns amber.
 - a. System performs a normal switchover from Filter B to Filter A. FILTER B ON LINE indicator turns off. FILTER A ON LINE indicator turns green.

(CAUTION- Relieve pressure in filter vessel and drain before servicing!!!)

5. Operator now opens filter B housing and services Filter B.
6. When Filter B has been serviced, and housing closed up, operator can leave the system on Filter A or switch back to Filter B, as he chooses.
7. When he has the correct filter on line, operator depresses CANCEL ALARMS/SWITCHOVER button and holds for 5 seconds.
 - a. The FILTER ? DIRTY indicators turn off.
 - b. The FILTER ? IS DIRTY remote electric alarms reset.
8. Operator pushes the ARM SWITCHOVER button, and the system is back on line ready to run normally. SWITCHOVER ARMED indicator will turn blue, indicating that the differential pressure drop switch is ready for pressure drop through the system.

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Servicing Filter B First:

(CAUTION- Relieve pressure in filter vessel and drain before servicing!!!)

If the operator decides to leave Filter A on line and service Filter B first, he does NOT switch filters. He simply opens the Filter B housing and changes bags, then closes Filter B housing up, and then switches over to Filter A and changes bags in Filter A.

When both filters have been serviced, he cancels the alarms, pushes the ARM SWITCHOVER button and the system is back in operation.

Case 5 - Operator Must Operate on One Filter Only:

If the unusual situation arises where one filter is completely out of service, and all filtering must be done by the other filter, with the consequent interruption of service while the filter is down for bag change, it can be accomplished as follows:

1. Perform the startup sequence as outlined in Case 1, but select the filter you want by momentarily depressing its FILTER ? START button and performing a normal switchover before turning on the liquid supply.
2. DO NOT DEPRESS THE ARM SWITCHOVER PUSH BUTTON.

(If operator has to disarm the SWITCHOVER ARMED feature, he can do so by momentarily depressing the CANCEL ALARMS/SWITCHOVER button. SWITCHOVER ARMED indicator turns off.)

3. The system will run until the pressure drop sensor tells the controls "Pressure drop is too high". Then it will turn the FILTER ? DIRTY indicator red, and will turn on the FILTER ? IS DIRTY remote alarm signal, but it WILL NOT perform a switchover. It will keep the selected filter on line, even though the pressure drop goes higher and higher as the bags clog completely.
4. When maintenance comes to service the filter, they must turn OFF the liquid supply to the unit.
5. Operator pushes MAIN POWER PULL ON/PUSH OFF.

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- a. Electrical power turns off. All indicators turn off.
- b. Pneumatic actuators and liquid inlet and outlet valves will stay in current position. System is shut down.

(CAUTION- Relieve pressure in filter vessel and drain before servicing!!!)

6. When you have closed up the active filter, the operator pulls the main power palm button control.
 - a. Electric power turns ON. MAIN POWER PULL ON/PUSH OFF indicator turns red.
7. Depress momentarily the correct FILTER ? START button.
 - a. The operator must now look at the pneumatic actuator indicators to determine which filter is open and ready to receive liquid. The indicator is a black plastic knob located on the top of the actuator. When the indicator is in line with the piping of the filter, the butterfly valve is "OPEN". If the indicator is perpendicular with the piping of the filter the butterfly valve is "CLOSED".
 - b. Once the operator decides which filter has its liquid valves open, they must depress the FILTER ? START button to the corresponding filter which has its liquid valves "OPEN". FILTER ? ON LINE indicator turns green, tells the operator which filter has its liquid valves open and is ready to receive liquid. This will always be the filter that was on line when last the system was shut down.
 - c. The operator may now open the system liquid valves, and allow the liquid to start flowing through the system. The system is on line. (Experience shows that as the liquid flow builds up through the system, it does NOT build up enough pressure drop to energize the pressure drop sensor.)
 - d. DO NOT DEPRESS THE ARM SWITCHOVER PUSH BUTTON.

(If operator has to disarm the SWITCHOVER ARMED feature, he can do so by momentarily depressing the CANCEL ALARMS/SWITCHOVER button. SWITCHOVER ARMED indicator turns off.)

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IV. Spare Parts for Automatic Duplex

Your Rosedale Multi-Bag Duplex Filter unit will give you many years of reliable service provided periodic inspections are made of various components and replacement of worn parts are made promptly. The following is meant to be a recommended spare parts list.

(The following drawings and Spare Parts List is representative of a typical Automatic Duplex filter system. The part numbers are descriptive of the components required for your specific system.)

SPARE PARTS LIST			
Item	Description	Part No.	Time-Frame
1	Cross-Connect (3/4" Watts Ball Valve w/Bray Single Acting/Fail Close Actuator) Series 91/83 Actuator	3/4BVLV	as needed
2	Transfer Valve (3" Bray Butterfly Valve, Double Acting Actuator) Series 30 Valve, Series 91/83 Actuator	3BVLV	as needed
3	Allen Bradley "386T-D4542J", Differential Pressure Switch	5-5217	as needed
4	Numatics Solenoid Assembly 120 VAC	5-1043	as needed
5	Cover Seal (Buna)	8150CG-B	as needed
6	Basket Seal (Buna)	8BG-B	as needed
7	Rodend	8RENI	as needed
8	Eyenuit	8ENNI	as needed
9	Clevis Pin Assembly	8CPNI	as needed
10	Filter Bag	per order	as needed
11	Filter Basket	0-730-B/PB 9/64 304	as needed

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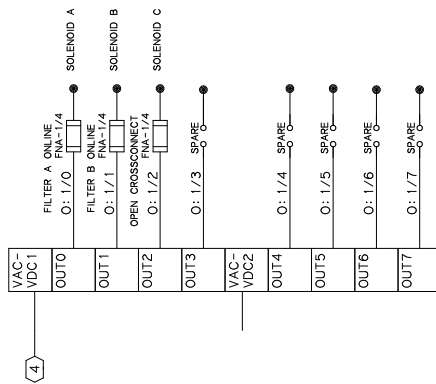
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NOTE: OUTPUTS O: 1/4 - 7 RESERVED FOR INTERLOCK/ALARM WIRING. VAC-VDC2 TERMINAL NOT WIRED FOR THIS REASON.

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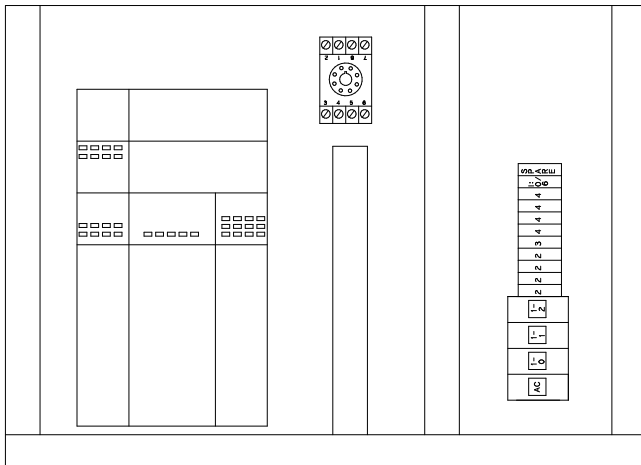


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ITEM	QTY	DESCRIPTION	MFG.	PART #	ITEM #
PROC	1	SLC000, 12 IN (AO), 8 OUT (RELAY)	A-B	1747-L20A	SV-3656
EPROM	1	1K MEMORY CHIP	A-B	1747-M1	SV-3656
EXP	1	Z SLOT EXPANSION RACK	A-B	1746-A2	SV-3661
OUT	1	8 POINT RELAY OUTPUT CARD	A-B	1746-0WB	SV-3750
FILLER	1	SLOT FILLER	A-B	1746-N2	SV-3667
TIMER	1	1-180 SEC. TIMER	A-B	700-HT 12BA.1	SV-3937
SOCKET	1	TIMER SOCKET	SG-D	850-HR24-A	SV-3968
START FLT	2	GRN FLUSH PB	A-B	800H-AR101	SV-4004
ARM S-O	1	BLU FLUSH PB	A-B	800H-AR201	SV-4005
	2	BLK FLUSH PB	A-B	800H-AR201	SV-4005
	1	PR LOCK-OUT	A-B	800H-N140	SV-3929
MAIN POWER	1	PUSH-PULL PR/LT	A-B	800H-FR1P.6BD4	SV-4003
LIGHT	6	PILOT LIGHT, STANDARD	A-B	800H-RR16	SV-4001
LENS	1	PILOT LT LENS, AMBER	A-B	800T-N2BA	SV-3647
LENS	1	PILOT LT LENS, BLUE	A-B	800T-N2BB	SV-3648
LENS	2	PILOT LT LENS, GREEN	A-B	800T-N2BB	SV-3645
PLATE	11	LEGEND PLATE PLASTIC JAMBRO, WHITE	A-B	800H-W050U	800H-W050U
PLATE	4	FUSED TERMINAL BLOCKS	A-B	800H-W050U	800H-W050U
	11	300V TERM BLSKS	A-B	1492-F11	SV-3729
	1	TERM MOUNTING PAIR	A-B	1492-H44	SV-3707
	11	END BARRIER, CE2	A-B	1492-N17	SV-3827
	2	END ANCHOR	A-B	1492-N2	SV-3931
	4	FUSE PALLETS	A-B	1492-N12	SV-3708
FUSE	1	POWER FUSE	BUSSMANN	FM, 10	SV-3710
FUSE	3	VALVE ACTUATOR FUSES	BUSSMANN	FM, 1/4	SV-3711
ENCL	1	ENCLOSURE, REAR/DB, FIBERGLASS	HOFMANN	A-3204-600020B-P	SV-4012
PLATE	1	BACKPLATE, 20 X 16	HOFMANN	A-3205-16	SV-3702
GRND	1	GROUND BAR	SG	TD-1	SV-3720
DUCT	1	1" W X 3" D DUCT, 6"	GLD-TAYLOR	91031	SV-3705
DUCT	1	1" DUCT COVER, 6"	GLD-TAYLOR	98010	SV-3706
	1	CORD 'C'	CORD-14-3-YEL-370		SV-3669
	1	POWER PLUG, 110V	WOOD-1447		SV-3700
	1	CORD CONNECTOR	JMS-02-3726		SV-3701
	1	CONNECTOR NUT	TR-141		SV-3702
	1	CONNECTOR O-RING	TR-3582		SV-3703
		WIRE, RED (100 FT.)			SV-3765
		WIRE, WHITE (10 FT.)			SV-3767
		WIRE, GREEN (5 FT.)			SV-3768



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			ROSEDALE PRODUCTS, INC. P.O. BOX 1085 ANN ARBOR, MI 48106		SCALE: NONE

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VII. Product Bulletins *(see following pages, information listed in order as shown below)*

(Description/Catalog or Bulletin Number.)

- A. **Bray Butterfly Valve, Series 30/31.**
- B. **Bray Pneumatic Actuator, Series 90/91.**
- C. **Allen Bradley "386T-D4542J", Differential Pressure Switch**
- D. **Numatics Solenoid Valve Assembly, Mark 15 Line.**

VIII. Programmable Logic Controller Data *(pages following product bulletins)*