

ENGINEERING STANDARDS

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

IOM
7_4_18 Model 8
AutoDuplex-JB.wpd
n:\iom\



Issue Date: 5 March 97
Revision: A
Revision Date: 30May2003

Specification No.
7.4.18
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INSTALLATION, OPERATION, & MAINTENANCE MANUAL

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

ROSEDALE PRODUCTS, INC.



**STANDARD MODEL 8 AUTOMATIC DUPLEX FILTER
with JUNCTION BOX
Electric/Pneumatic Operation**

150 PSI 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.
- 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 junction box.
- Step 3.** Connect control power to electrical junction box. See Junction Box Layout Drawing (see page 12).

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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 smaller Apollo ball valve, also provided with a smaller Bray pneumatic actuator. 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 pipe tee. From the run ports of this tee the liquid

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goes through the two filter inlet valves, then into the inlet ports of the filters.

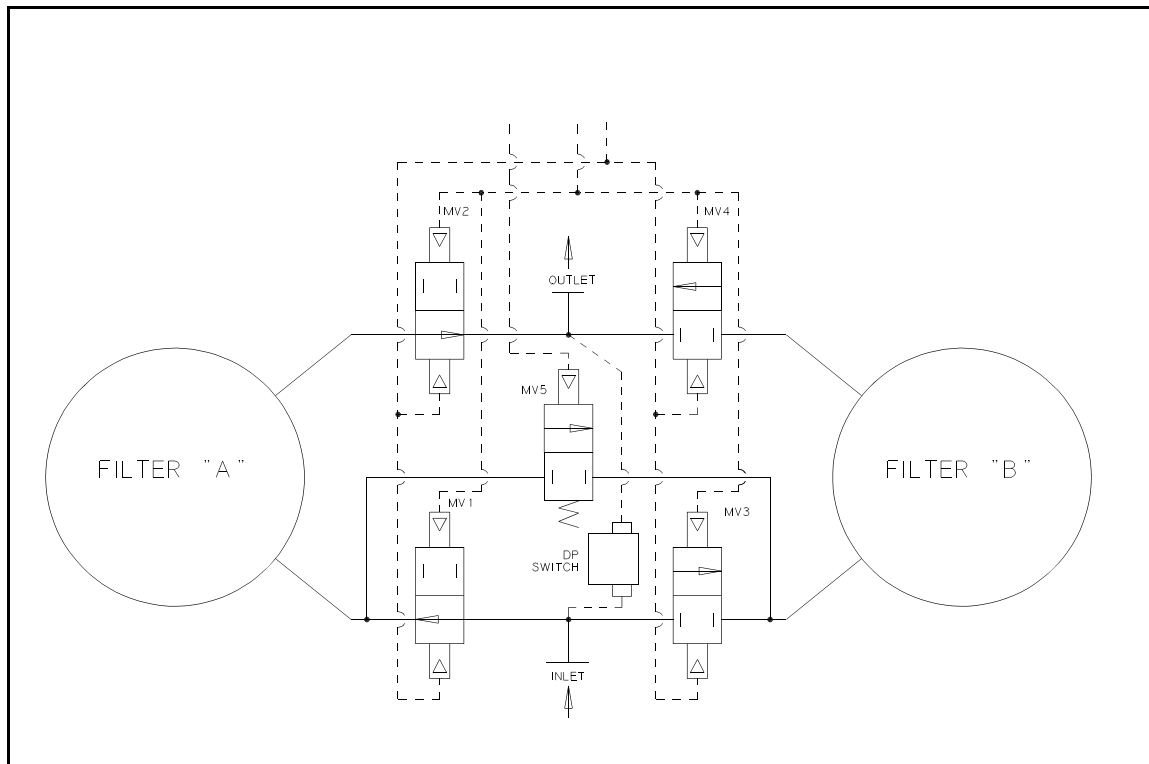
The outlet ports of the filters connect to the (2) outlet valves, which in turn connect to the run ports of an outlet tee. The branch outlet port of this tee is the main outlet port of the system.

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.



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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.

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 Duplex Filter in its proper location, secure the support legs to the floor. 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 11 of this manual.

The Model 8 Duplex Filter is now ready for connection to the system. The inlet service line should be connected to the inlet side of the system. The inlet service line is located near the top of the unit (above the basket level). The outlet service line is located on the opposite side of the filter from the inlet service line (below the basket level).

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

There are 1" NPT drains located on the bottom of each housing. These ports allow complete

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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 Duplex Filter unit has been factory pressure tested leak free, therefore, any seepage problems usually occur from improper installation connections.

You are now ready to install the filter baskets and bags. Remove cover by loosening cover eye nuts. The eye nuts in the slotted corners should be loosened sufficiently to swing free. Loosen the third eye nut sufficiently to allow the top cover and closure assembly to swing away from top of the unit.

Insert basket seal into the basket collar groove.

The next step is to install the filter bag baskets. Make sure the basket flange is firmly seated into the basket collar. Then insert filter bag into the bag basket making sure the filter bag ring is firmly seated inside the basket flange. 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 three 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 60-90^{ft-lbs}.

Your Rosedale Model 8 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 basket and filter bag are in housing and do not require cleaning or replacement. If necessary install clean filter basket and bag.
2. 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

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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.

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 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 the cover eye nuts. The eye nuts in the slotted corners should be loosened sufficiently to swing free. Loosen the third eye nut sufficiently to allow the top cover and closure assembly to swing away from the top of the unit.
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 to avoid interference with cover seal or flow of fluid being filtered.
7. Install clean filter basket and filter bag. Place the basket into the filter housing, make sure the basket flange is firmly seated into the basket collar. Be sure filter bag

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is seated firmly inside the basket flange. For best results, be sure the filter bag is installed fully extended to the bottom of the basket.

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 the three 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 60-90^{ft-lbs}.

Your Rosedale Model 8 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):

(System control logic to be determined by owner, the following scenario is for example 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

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open. The switch over is complete. Filter A is on line.

6. The controls start reading the condition of the pressure drop sensor again.
7. The controls should provide a reset feature to avoid switching of the fluid flow from the second dirty filter back to the first dirty filter. A system reset should occur after servicing the first dirty filter.

IV. Spare Parts for Automatic Duplex

Your Rosedale Model 8 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.

SPARE PARTS LIST			
Item	Description	Part No.	Time-Frame
1	Cross-Connect (3/4" Apollo Ball Valve, Bray Single Acting/Fail Close Pneumatic Actuator)		as needed
2	Transfer Valve (Size <i>per order</i> Bray Butterfly Valve, Bray Double Acting Pneumatic Actuator)		as needed
3	Allen Bradley Pressure Differential Switch	5-5217	as needed
4	Numatics Solenoid Assembly 120 VAC	5-1043	as needed
5	Cover Seal (Buna, EPDM, Viton, or Teflon)	8150-CG-*	as needed
6	Basket Seal (Buna, EPDM, Viton or Teflon)	8-BG-*	as needed
7	Rodend	8-RENI	as needed
8	Eyenut	8-ENNI	as needed
9	Clevis Pin Assembly	8-CPNI	as needed
10	Filter Bag	per order	as needed

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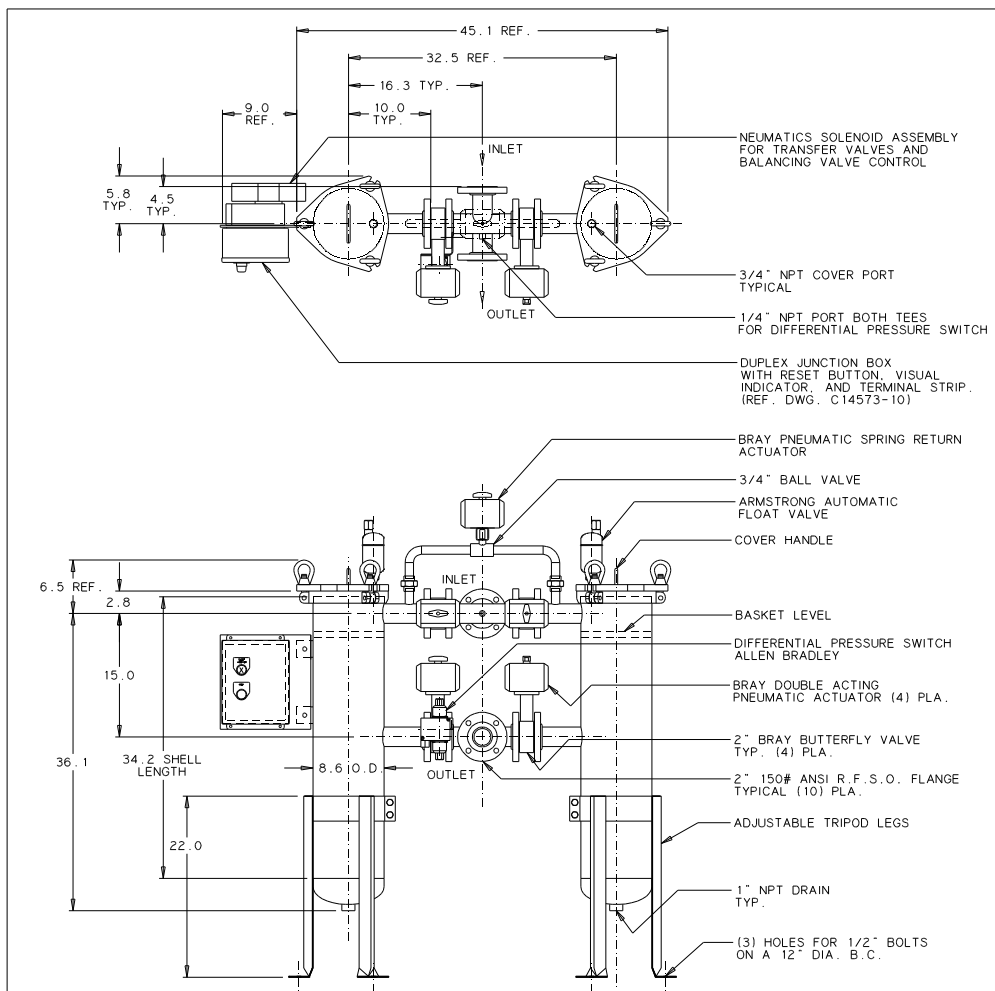


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V. Filter Layout Drawing



NOTES:

1. CONSTRUCTION ALL WELDED CONSTRUCTION. ASME CODE STAMP AVAILABLE
2. MATERIALS OF CONSTRUCTION ALL WETTED PARTS TO BE CARBON STEEL OR 300 SERIES S.S. ALL WELDED ATTACHMENTS TO BE CARBON STEEL OR 300 SERIES S.S. CLOSURE ASSEMBLIES TO BE SWING BOLT TYPE BRAY BUTTERFLY VALVES W/BRAY PNEUMATIC ACTUATORS APOLLO BALL VALVE W/BRAY PNEUMATIC ACTUATOR VESSEL DESIGN PRESSURE 150 PSIG SYSTEM DESIGN PRESSURE 150 PSIG DESIGN TEMPERATURE 400° F
3. FILTER BAG BASKET 304 STAINLESS STEEL 4.4 FT² AREA EACH VESSEL 9/64" DIA. HOLES ON 3/16" ST. CL'S (51% OPEN)
4. FILTER BAG PER ORDER
5. O-RING MATERIAL (BUNA, EPDM, VITON, OR TEFLON) AVAILABLE
6. MODEL NUMBER AD8302F1150*****
7. DISTRIBUTOR ROSEDALE PRODUCTS, INC.

SPECIAL CONSTRUCTION:
DUPLEX UNIT IS AUTOMATIC SWITCHING ELECTRO-PNEUMATIC OPERATION EACH VALVE TO BE INDIVIDUALLY ACTUATED.

NOTE: PNEUMATIC CONNECTIONS NOT SHOWN FOR CLARITY

DO NOT SCALE DRAWING		DISC FILE NO.	MATERIAL	SEE NOTES	TITLE	LET.	REVISION	BY	DATE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		ASS'Y REF.			MODEL 8 AUTO DUPLEX AD8302F1150***** STANDARD LAYOUT				
TOLERANCES		DR.	EWL	DATE					
1 PLACE ±	2 PLACE ±	OTHER ±	ANGULAR ±	SMAR07					
MACHINING FINISHES		CH.	DATE						
✓ FILED FINISH		DATE							
SCALE 1/8"									

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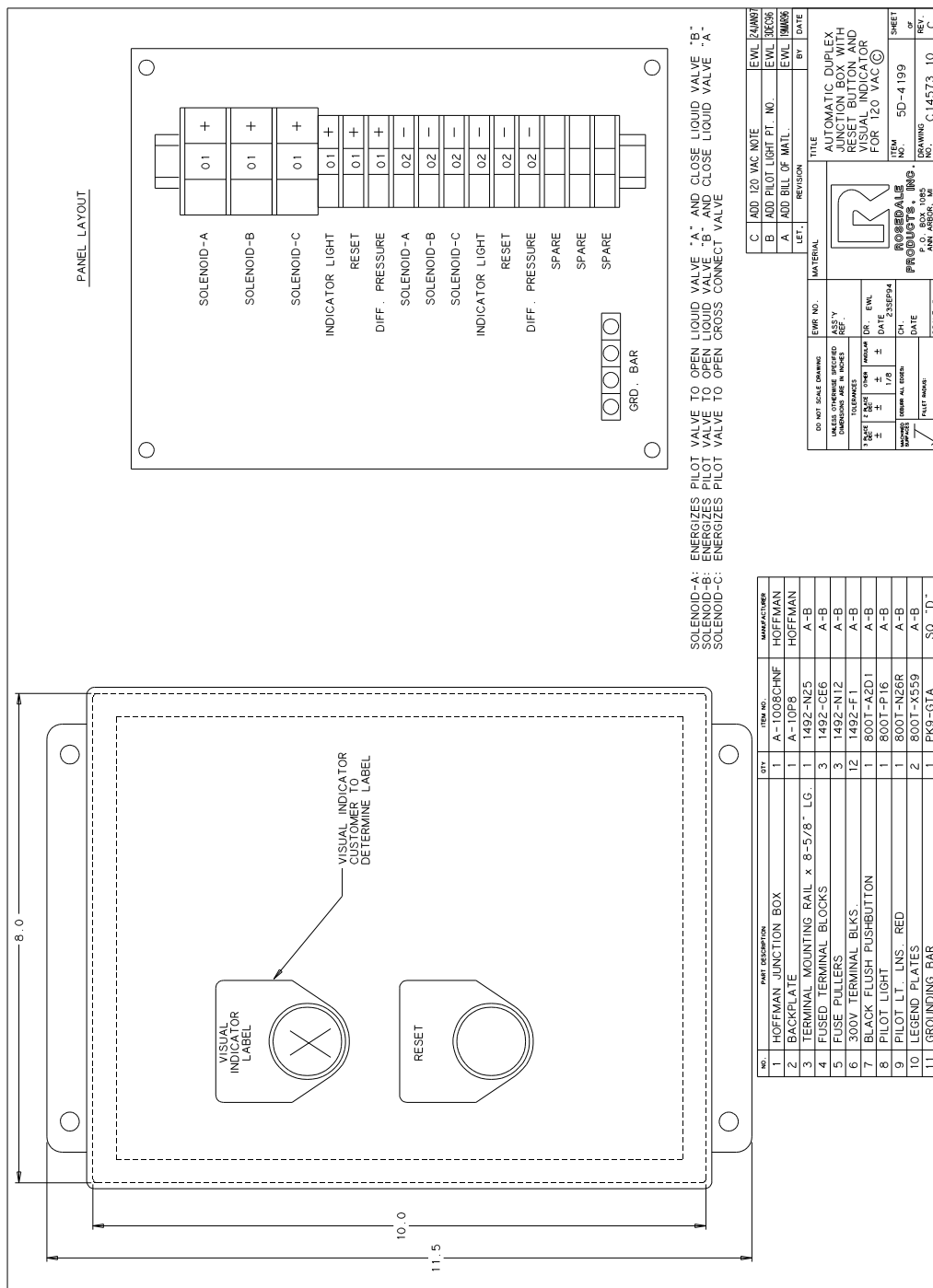


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VI. Junction Box Layout Drawing



REV. NO.		DATE		DESCRIPTION	
1	A-1083CHNF			HOFFMAN	HOFFMAN
2	BACKPLATE			HOFFMAN	HOFFMAN
3	TERMINAL MOUNTING RAIL x 8-5/8" LG.			A-B	A-B
4	TERMINAL BLOCKS			A-B	A-B
5	FUSE PULLERS			A-B	A-B
6	300V TERMINAL BLKS.			A-B	A-B
7	BLACK FLUSH PUSHBUTTON			A-B	A-B
8	PILOT LIGHT			A-B	A-B
9	PILOT LT. LENS. RED			A-B	A-B
10	LEGEND PLATES			A-B	A-B
11	GROUNDING BAR			A-B	A-B

REV. NO.	DATE	DESCRIPTION	BY	DATE
C		ADD 120 VAC NOTE	EVL	2/4/97
B		ADD PILOT LIGHT PT. NO.	EVL	3/5/97
A		ADD BILL OF MATL.	MMK	

LET.	REV. NO.	DESCRIPTION	DATE

TITLE		DATE
AUTOMATIC DUPLEX JUNCTION BOX WITH MOTOR OPERATED PILOT VALVE AND VISUAL INDICATOR FOR 120 VAC		

ITEM NO.	DESCRIPTION	DATE
1	PILOT LIGHT	2/25/94
2	PILOT LIGHT LENS	2/25/94
3	PILOT LIGHT	2/25/94
4	PILOT LIGHT	2/25/94
5	PILOT LIGHT	2/25/94
6	PILOT LIGHT	2/25/94
7	PILOT LIGHT	2/25/94
8	PILOT LIGHT	2/25/94
9	PILOT LIGHT	2/25/94
10	PILOT LIGHT	2/25/94
11	PILOT LIGHT	2/25/94

REV. NO.	DATE	DESCRIPTION	BY	DATE