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AmericanAirFilter

OptiFlo® Pulse-Jet Cylindrical Cartridge Dust Collector

Installation, Operation, and Maintenance Instructions

The OptiFlo® pulse-jet cylindrical cartridge collector is a factory assembled, automatic self-cleaning dust collector. It uses a modular building block concept to meet any airflow capacities and design requirements. This bulletin contains the information necessary for installation, operation, and maintenance of the OptiFlo dust collector. Read the entire manual and check each carton and crate against the shipping sheet (Form 1281) before beginning installation.

Table of Contents

1.0 General Information

WARNING: In the event this unit is not placed in service within 60 days after receipt, the filter cartridges must be removed and stored in a clean, dry place to prevent possible moisture accumulation in the media.

1.1 Filter Elements

The basic filter element used in the OptiFlo dust collector is the OptiFlo cartridge filter. The OptiFlo filter consists of pleated media in a cylindrical configuration. This design allows for installation and change-out with a minimum of time and effort. Each OptiFlo filter is supplied with its own gasket to ensure a positive, airtight seal each time the filter is changed.

The filters are installed horizontally. Filters are cleaned automatically in sequence, so that only a small portion of the filters are off-line at any given time.

1.2 Normal Operation

During normal operation *(See Figure 1)*, air enters the OptiFlo dust collector through the inlet and passes through the filter elements. Dust is collected on the outside surfaces of the elements and clean air flows through the center of the elements into the clean air plenum, in true "downflow" fashion, where it exits through the clean air outlet.

During filter element cleaning, a solid-state control timer automatically selects the element or pair of elements to be cleaned, activating solenoid valves which open air diaphragm valves. High pressure air pulses directly into the center of the selected element, or pair of elements, for 100 milliseconds, blowing collected dust off the filter element(s). The dust is swept downward into the hopper by the prevailing airflow and by gravity.

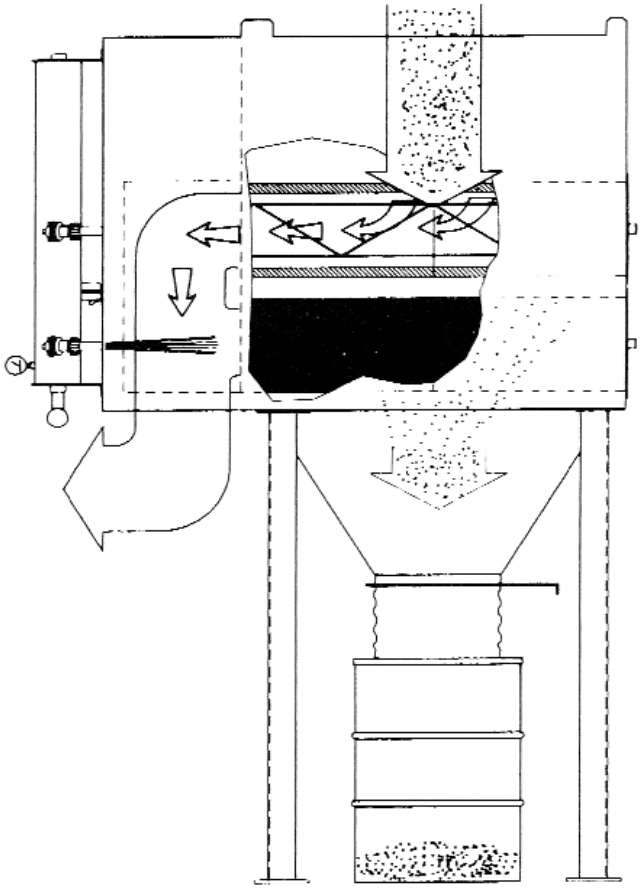


Figure 1

NOTE: For multiple module units, an inlet in each module is mandatory to optimize performance.

1.3 Sizes

The OptiFlo pulse-jet cartridge collector is available in these basic configurations: 2RC, 3RC, 4RC, and 5RC series. All modules are two filter elements wide. Sizes 2RC4 and 3RC6 are one filter deep—all other sizes are two filters deep.

The 2RC modules have filters arranged two-high, 3RC modules have filters arranged three-high, 4RC modules are four filters high, and 5RC modules are five filters high. Each series offers standard factory assembled collectors with model designations such as: 2RC8; 2RC16; 2RC24; 2RC32; 3RC12; 3RC24; 3RC36; 3RC48; 4RC16; 4RC32; 4RC48; 4RC64; 5RC20; 5RC40; and 5RC60. The second number in the model designation indicates the total number of cartridges per collector.

1.4 Factory Assembly

All OptiFlo dust collectors are shipped in sub-assemblies requiring only:

- Field bolting of the hoppers, legs, and braces
- Connection of ductwork and/or the fan
- Mounting and wiring of the control box
- Connection of compressed air supply
- Differential and air pressure gauge connections

The collectors are shipped with filter elements installed. Units shipped as 4 or greater assembled modules are not skidded. Instructions for field assembly are given in subsequent sections.

The main housing is constructed of 7 gauge carbon steel. Each module is complete with pulse-jet piping, 1-inch diaphragm pulse valves, pilot solenoid valve control boxes, and 6-inch diameter externally mounted compressed air reservoir. The compressed air reservoir is provided with (2) 1 1/2 inch NPT pipe couplings for compressed air attachment and drain.

2.0 Installation Instructions

2.1 Inspection

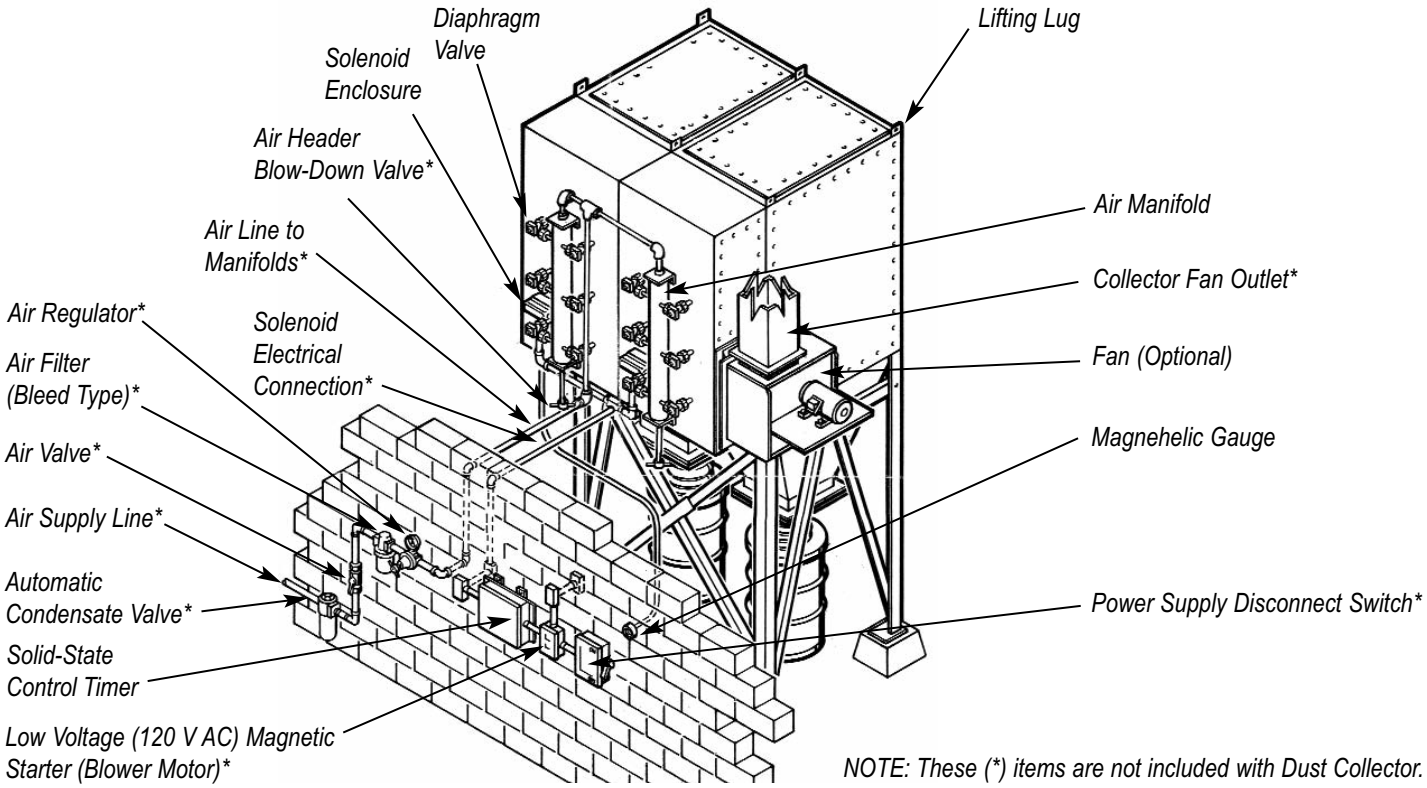
The OptiFlo dust collector is normally shipped by truck and should be checked for any damage that may have occurred en route. Any damage should be noted and the carrier notified within 24 hours.

2.2 Installation

(See Figure 2 for Typical Installation, and Figures 6 and 7, back page for parts.)

A crane is recommended for unloading, assembly and installation of the OptiFlo dust collector. Stand hopper(s) on their discharge side (hopper outlet) and apply caulk to hopper flanges in a figure-eight pattern around bolt holes. Lift cabinet from the truck, position over hopper(s) and bolt cabinet and hopper(s) together with 3/8" x 1 1/4" thread cutting bolts, flatwashers, lock-washers, and nuts as shown on Bolting Detail - Hopper to Cabinet, back page.

Figure 2. OptiFlo Cartridge Collector Typical Installation



NOTE: These (*) items are not included with Dust Collector.

WARNING:

- Connect lifting sling to at least four cabinet lifting lugs - distribute load equally.
- Connect lifting sling to double-thickness cabinet lifting lugs provided on collectors 3 and 4 modules wide. Always use spreader bars on collectors field assembled wider than 4 modules.
- Use clevices, not hooks, on lifting sling.
- Use of spreader bars is recommended on all lifting slings.

Attach legs — All legs are the same, however, they must be located in the proper position as shown in Figure 3. Also, leg crossbracing must be located as shown in Figure 3. Lift the entire cabinet/hopper assembly and attach legs with bolts (included), flatwashers, lockwashers, and nuts — **do not tighten bolts**. See Bolting Detail — Legs to Cabinet, back page.

WARNING: Do not disconnect crane or attempt to support cabinet on hoppers.

Attach leg crossbraces at rear of dust collector with included $^{5}/_{8}$" bolts, flatwashers, lockwashers, and nuts. See Figure 3 and Bolting Detail — Leg Crossbracing, back page – **do not tighten bolts**. Lift the assembled unit onto foundation anchor bolts.

Tighten all leg and crossbracing bolts. Fasten unit down to anchor bolts with flatwashers, lockwashers and nuts before removing crane.

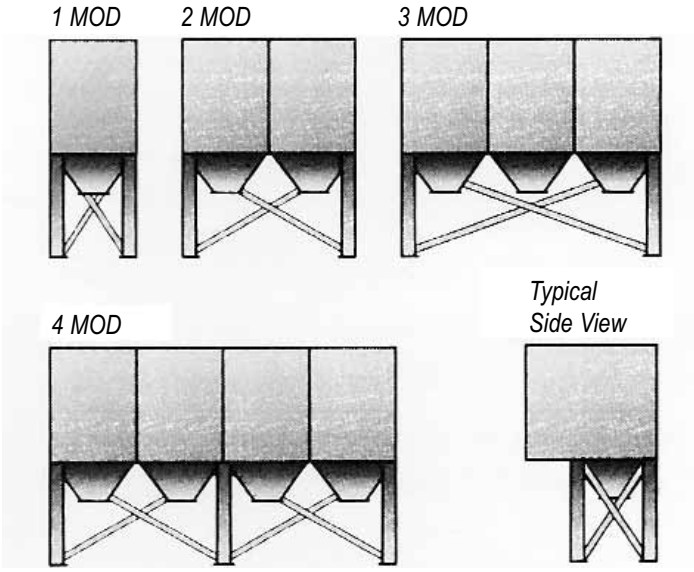


Figure 3 - As viewed from the cartridge access side

3.0 Foundations and Anchoring

See Sales Drawings for anchor bolt location. Anchor bolts must extend at least 1 3/4" above foundation. The collector should be located with consideration for emptying hopper, shortest run for location of duct work, electrical and air connections and maintenance. In the case of hazardous dust, consult local authorities for the location of the unit.

WARNING: DO NOT DISCONNECT CRANE BEFORE TIGHTENING ALL LEG, CROSSBRACING, AND ANCHOR BOLTS.

The OptiFlo dust collector is usually mounted on a reinforced concrete foundation. However, roof mounting is also possible. When calculating for foundation or roof mounting, the weight of the dust collector, material collected, and all auxiliary equipment must be considered together with snow, wind and seismic loads, See Individual Specification Control Drawing for dust collector weight.

WARNING: Do not disconnect crane or attempt to support cabinet on hoppers. Locations must be clear of all obstructions such as utility lines or roof overhang (see specification control drawing), as a crane must be used to move the collector into position.

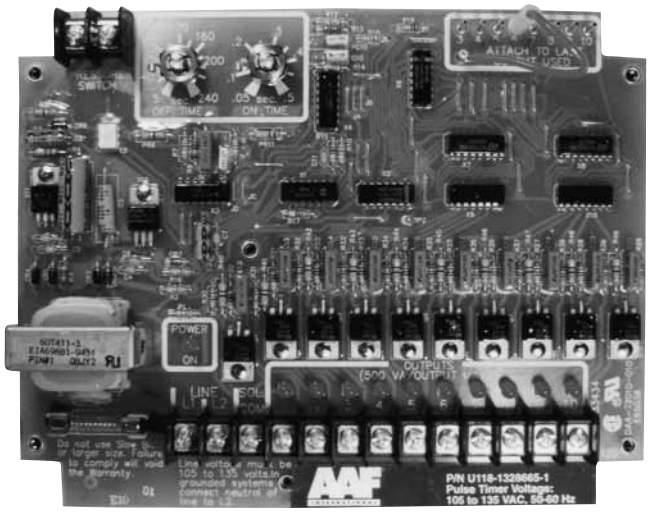
4.0 Ductwork and Accessories

Connect the inlet duct to the inlet(s) above the access ports on the collector, or to the top inlet. Connect the clean air duct (or manifold) to outlet(s) located on the bottom and lower sides of the clean air plenum. Ductwork should be of sufficient gauge to withstand the system design pressure and should be independently supported. ***The OptiFlo collector is not designed to support ductwork.*** Attach hopper discharge device(s) per manufacturer's instructions.

* Modules supplied with explosion vents are supplied with additional installation drawings.

The hoppers are not designed for dust storage. A hopper discharge device must be attached to the hopper in order to seal the system. A hopper discharge air leak will result in improper operation of the unit.

5.0 Electrical Controls and Wiring



Printed Circuit Program Timer Control

WARNING: Potential shock hazard. Disconnect power before servicing. Only qualified electrical personnel should work on this system.

The OptiFlo pulse-jet cartridge collector is supplied with NEMA 4 electrical solenoids and pulse control (one control system per unit). NEMA 9 option is available.

Control wiring must be field installed between the solenoid valves and the pulse output terminals as shown on the electrical connection diagram. If the optional factory wiring option has been purchased, the solenoids are prewired to a junction box with terminal strip.

The pulse timer panel has a set of normally jumpered terminals, labeled "pressure switch," used only when an optional remote control device (called demand pulse option) is used. The metal jumper is removed and the "normally open" contacts of the optional pressure switch are then connected to the "PS" terminals — see wiring diagram provided with this option.

WARNING: To avoid permanent damage to the solid state control, ***do not***:

1. Connect 120v to the "PS" terminals.
2. Connect 120v to any of the "Output" terminals.
3. Connect an "Output" terminal to ground. The fuse on the panel does not protect from a direct short.

Check to be sure the program wire (top right of timer panel as shown) is connected to the correct program pin. To do this, make sure that the program wire/pin matches the wiring diagram. Power should be supplied to the solid state timer board across terminals L1 and L2 as shown on the connection diagram. When the power is energized, the "Power On" light should illuminate and the unit should start pulsing within the time limit set by the "off timer" timer. With the demand pulse option, the pressure switch settings (both knobs) must be 'zero' to start pulsing. The collector should not be allowed to pulse for any extended time without compressed air being supplied to the collector. Operation without compressed air can damage the solenoid valves.

The pulse interval and duration are controlled by the solid-state timer. The pulse interval is factory set at 30 seconds which is satisfactory for most installations. However, since dust loads, media velocity and other factors will vary from one installation to another, it may be necessary to readjust the pulse interval to meet individual requirements. The duration, or "on time" is pre-set at 100 milliseconds.

This duration should not be adjusted without consulting your AAF International representative. Contact your AAF International representative for assistance.

DCT Digital Pulse Controls are supplied with separate I.O.M. E-97 which is located inside the box. AAF control centers, complete with motor starterd, are shipped separate. The I.O.M. and wiring schematics are shipped in the box.

6.0 Compressed Air Connection

The OptiFlo dust collector requires dry compressed air (-40F dewpoint, 90-100 psig) for cleaning. The timer circuit is factory pre-set to pulse at a 30 second interval. This will require nominal compressed air supplies as shown in the OptiFlo Brochure APC-1-102.

NOTE: Adverse system conditions could require a reduced pulse interval which will ***increase*** compressed air usage.

The compressed air connection should be made at the top of the air manifold on each module where a 1 1/2" NPT pipe connection is supplied. There is also a connection at the bottom of the manifold to attach a drain.

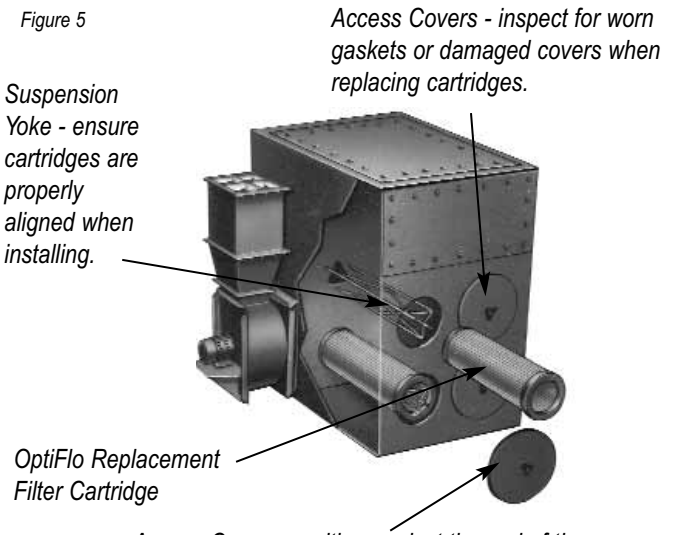
7.0 Gauge Installation

The magnehelic (pressure gauge) must be installed before initial start-up. Using appropriate tubing and connectors, connect the gauge high pressure port to the housing (dirty air) side, connect the gauge low pressure port to the plenum (clean air) side. Both parts are located on the side of the collector. Install the air pressure gauge in the coupling on the compressed air reservoir.

8.0 Filter Installation (Figure 5)

1. Remove access covers and set aside in a safe place.
2. Rock used cartridges to break the gasket seal between cartridges and tubesheet (back wall).
3. Slide used cartridges out of the collector and dispose of properly.
4. Clean access covers, wipe off gaskets. Inspect covers and gaskets for damage. Replace any worn gaskets or damaged access covers. **It is highly recommended that all access cover gaskets be replaced with each new filter cartridge change out.**
5. Inspect new cartridges for damage from shipping, storage, or handling. **Do not** use damaged cartridges.
6. Slide new cartridges, **gasket end first**, onto the suspension yoke. While installing, be careful that cartridges do not contact the housing, handrails, open doors, or any other objects which might damage or puncture the cartridge. On two deep cartridge units, before the second cartridge is completely inside the collector, position the access cover against the end of the cartridge. Push the cartridge with access cover into the collector. If any resistance is felt as the second cartridge is pushed, remove the access cover and check for obstructions. Pull the second cartridge out far enough to reposition the access cover and reinsert. Tighten the handle on the access cover. It is important to ensure the (4) guide tabs are correctly positioned inside the door opening to ensure sealing the door against the unit.
   Hand tighten only—do not use a wrench.

Figure 5



9.0 On-line Cleaning

1. A timer continuously and progressively energizes the solenoid on each valve (attached to the compressed air reservoir) releasing a sharp burst of compressed air to a pulse pipe in line with a cartridge or column of cartridges. On special applications using the demand pulse option, the timer operation can be activated (or deactivated) at high (or low) pressure drop settings.
2. This sharp burst of compressed air into the pulse pipe results in a shock wave traveling upstream through the center of the cartridge(s).
3. The shock wave and additionally induced clean air from the outlet plenum momentarily reverse airflow and dislodge accumulated dust from the filter cartridge(s).
4. The configuration allows discharged dust to fall freely into the hopper below. Additionally, the downward path of the incoming air will blow the dislodged dust toward the hopper.

10.0 Initial Start-Up Instructions

1. Check the compressed air lines to be sure they are connected to the NPT connection on the compressed air manifold(s). Turn on the compressed air supply to the manifold(s). Pressure should be 90-100 psig.
2. Check that cartridges are properly installed. Close the access ports and secure tightly.
3. Be sure the hopper discharge device is operating properly. ***Follow manufacturer's instructions.***
4. Energize the solid-state pulse panel. The "On" light inside the enclosure will illuminate. With the demand pulse option, decrease the pressure switch set points to "zero" to activate timer.
5. Listen for firing of the pilot solenoids and diaphragm pulse valves to determine that they are operational. Note that as each solenoid is activated, a small puff of air vents from the hole at the solenoid valve base.
6. Partially open the fan damper or duct blast gates.
7. Start fan and note the initial differential pressure gauge reading. This gauge reading indicates the pressure drop across the filter face and eventually the dust cake. Rising pressure readings indicate that dust is being collected.

WARNING: Efficient fan sizing includes an allowance for pressure drop across filter media with a thin residual dust cake as the normal operating condition. During the initial dust caking period for ***New*** media, unit airflow may have to be restricted to avoid fan motor overload. Partial blank-off of the inlet or outlet will do. Fan motor amperage readings will indicate need and adequacy.

Do not operate fan for extended periods without imposing the pressure drop induced by conditioned media or checking fan motor amperage.

NOTE: With a light dust load, pressure drop may take days to change appreciably.

8. The final operating pressure drop reading should be in the range for 2 to 4 inches w.g. Cleaning pulses will cause momentary spikes in the pressure reading. In making adjustments to the factory settings, remember the following:
   - Increasing the time interval between pulses will increase the pressure drop.
   - Decreasing the time interval will tend to lower the pressure drop.
   - Excessive pulsing can cause premature cartridge wear and adversely affect overall filtration efficiency.

With the demand pulse option adjust only the pressure settings.

Never adjust the pulse duration ("on time") without first consulting your AAF representative.

10.1 Maintenance

1. Daily or Weekly — Record the collector pressure drop for at least the first 30 days of operation. Adverse operating conditions can be detected by a change in pressure drop. After start-up, the pressure drop will gradually rise to its normal operating level, which will generally be less than 4.0" w.g.
2. Monthly — Open the air reservoir drain plugs to expel condensation. Check the compressed air line regulator, dryer, and filter for proper operation. Also inspect the hopper outlet discharge device(s) for proper operation and air seal.

   Follow manufacturer's instructions for inspection and maintenance.
3. Six Months — Ducts leading to and from the collector should be inspected for dust build-up at least once every six months. In addition, perform the following inspections:
   a. Examine the filter cartridges. Look for signs of excessive wear or damage on the cartridges.
   b. Inspect joints for evidence of air or dust leakage.
   c. Check for evidence of moisture or dust buildup within the collector.
   d. Check all electrical apparatus for proper operation.
   e. Check to see if the diaphragm pulse valves and solenoid valves are pulsing when energized by the timer.
   f. Check discharge air condition for signs of dust.
4. Filter Cartridge Replacement — Follow the procedures in the sections for Filter Cartridge Installation and Initial Start-Up Instructions.

11.0 Troubleshooting

11.1 High Pressure Drop Reading

- Improper Timer Operation
  Check the wiring, fuses, and setting of pulse duration and interval.

  Do not adjust the pulse duration on time without consulting an AAF representative.

- Insufficient Compressed Air
  Check the air supply to be sure the compressor is providing 90-100 psig. Check for a plugged filter in the compressed air line.
- Solenoid Pilot Valve Malfunction
  Listen to be sure the solenoids are firing. Check for momentary air venting each time each solenoid fires. Clean and replace, if necessary.
- Leaky Dust Discharge Device
  A leaking rotary lock, screw conveyor, slide gate, etc., can overload the collector by preventing dust discharge. This will cause high pressure drop, reduced airflow, and shorter filter life. **Follow manufacturer's recommended service procedures.**
- Condensation
  High humidity will create blinded filter cartridges which results in excessive pressure drop. Run the cleaning mechanism with the fan off and timer activated to release the dust cake. If condensation is a recurring problem, pre-processing warm-up and post-processing purge periods of 15 to 20 minutes may help. Exterior insulation may also be necessary. Sources of moisture may come from leaky process ductwork, moisture in the process gas stream, or moisture in the compressed air system. Try blow-down of the compressed air reservoir(s) to eliminate condensation and verify the dryer system is operating properly.
- Collector Overloads
  Too much air or too much dust will create high pressure drops across the collector. Check the fan speed, system design, pre-cleaners and the damper position. Be sure the dust load and air volume are those the system was designed to handle.

11.2 Visible Discharge

- Improper Cartridge Installation
  Check that the access covers are securely fastened and sealed and that the filters are installed correctly with the gasket-end first.
- Improper Sealing of Cartridge
  Check sealing gasket on cartridge.
- Insufficient Dust Cake
  The unit could be pulsing too frequently resulting in over-cleaning. Increase pulse interval or raise the high setting on the optional demand pulse switch to increase pressure drop slightly.
- Cartridge Replacement Required
  Eventually the filter cartridge will wear out. Normally this results in excessive pressure drop. However, if the dust is very abrasive, leaks can occur.

11.3 Insufficient Hood Control

- Incorrect Fan Rotation
  The incorrect rotation of the fan will not provide the system static pressure or volume required.
- Fan V-belt Slippage
  Tighten the v-belts if necessary. Replace worn, broken, or stretched belts.
- Leaks
  Leaking ductwork, access doors, explosion vents, dust discharge devices, or housing will cause insufficient suction at the pick-up point. Seal all leaks. ***Follow manufacturer's recommended procedures for service on discharge devices.***
- Clogged Air Passages
  Clogged ducts, closed dampers, or closed gates will shut off airflow.
- Undersized Ducts
  Undersized ducts will create excessive pressure losses for which the fan may not have been sized.

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OptiFlo Pulse-Jet Cylindrical Cartridge Dust Collector

Figure 6 Parts Drawing (Size 3RC24 shown)

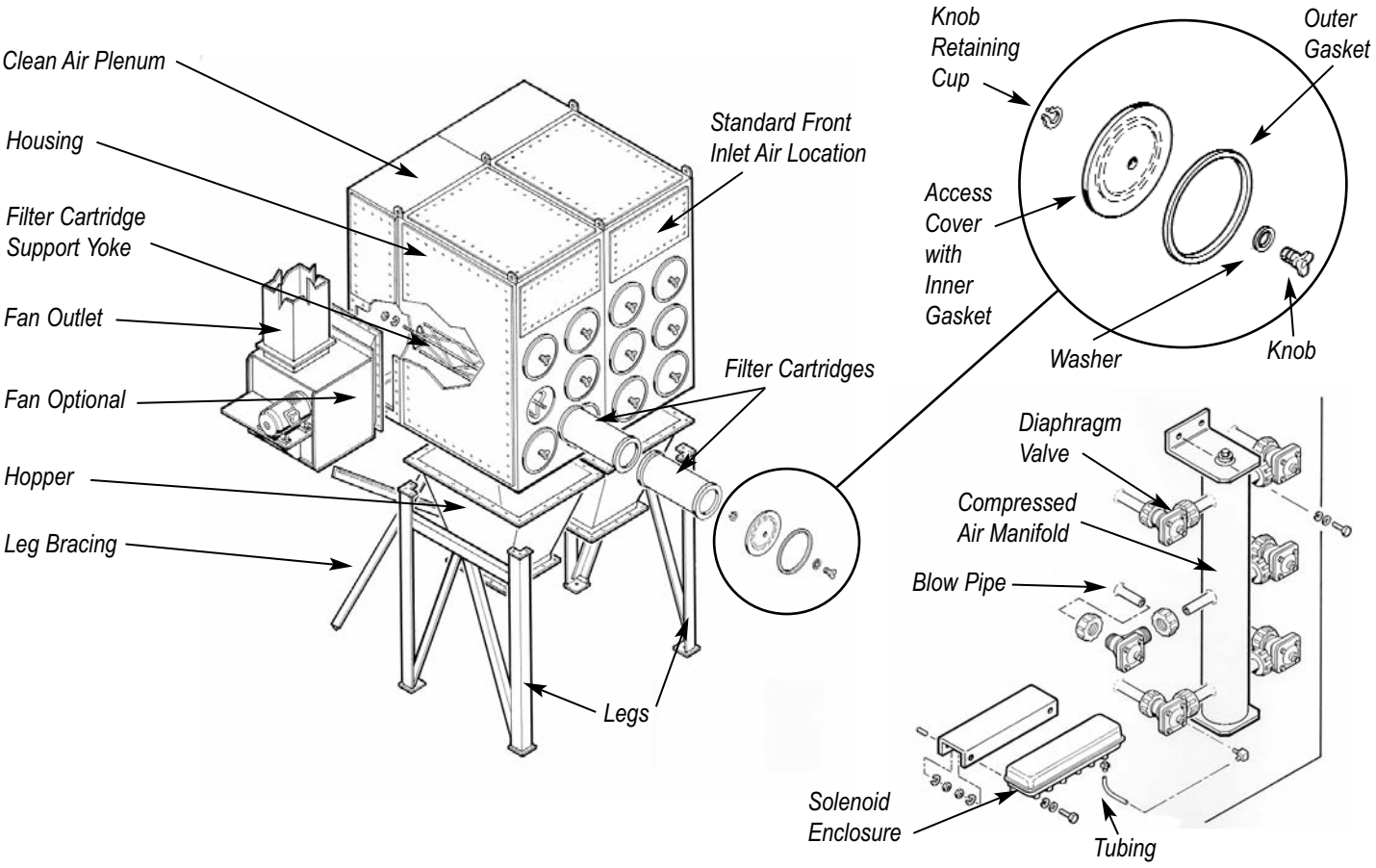
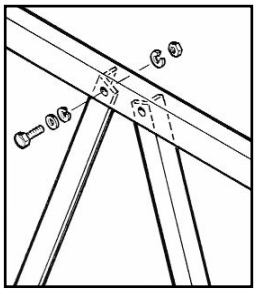
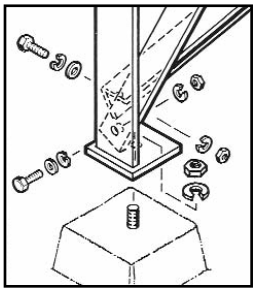


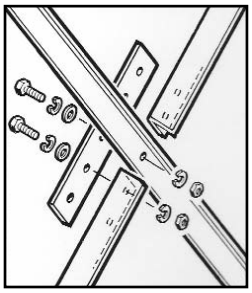
Figure 7 Legs and Bracing (All sizes except 2RC4 and 3RC6)



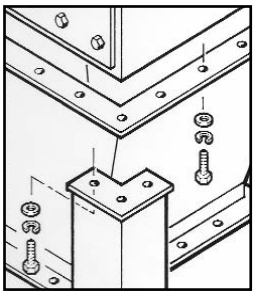
Side Bracing - All bolts are 5/8"-11 x 1 3/4" A325 with 5/8 A563 nuts and flat washers



Bracing and Leg Anchor - All bolts are 5/8" x 11 x 1 3/4" A325 with 5/8 A563 nuts and flat washers



Leg Cross Bracing - All bolts are 5/8" x 11 x 1 3/4" A325 with 5/8 A563 nuts and flat washers



Hopper and Legs to Cabinet - 1/2"-13 x 1 1/2" Lg. with washer and lockwasher

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