



Pulse Jet Filters

FS and FT

Installation and Operation Manual

Installation, Operation, and Service Information



FS Collector



FT Collector



This manual contains specific precautions related to worker safety. The hazard alert image denotes safety related instructions and warnings in this manual. **DO NOT** operate or perform maintenance on this collector until you have read and understood the instruction and warnings contained within this manual.

IMPORTANT NOTES

This manual has been supplied to assist with the installation, operation and maintenance for the collector purchased. Please read the manual before installing, operating, or performing maintenance on the collector as it contains specific precautions for worker safety. It is the owner's responsibility to ensure that this manual is available for use by installers, operators and maintenance personnel that will be working with this collector. This manual is the property of the owner and should be left with the collector when installation has been completed. DO NOT operate this collector until you have read and understood the instructions and warnings located in the installation and operation manual.

For additional copies of this manual, contact Donaldson Torit



The Safety Alert Symbol indicates a hazardous situation which, if not avoided could result in death or serious injury. Obey all safety messages following this symbol to avoid possible injury or death. The possible hazards are explained in the associated text messages.



CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE indicates a potential situation or practice which is not expected to result in personal injury, but which if not avoided, may result in damage to equipment.

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Safety Communication



Improper operation of dust collectors and/or dust control systems may contribute to conditions in a work area or facility which could result in severe personal injury, and product or property damage. All dust collection equipment should be used only for its intended purpose and should be properly selected and sized for its intended use.

Process owners have important responsibilities relating to identifying and addressing potential hazards in their processes. When the potential for handling combustible dust exists within a process the process owner should include combustion hazards in their risk management activities and should comply with applicable codes and standards related to combustible dust.

Electrical installation must be performed by a qualified electrician.

This equipment is not designed to support site ducts, piping, or electrical services. All ducts, piping, or electrical services must be adequately supported to prevent injury and/or property damage.

Site selection must account for wind, seismic zone, and other load conditions.

Equipment may reach peak sound pressure levels above 80 dB (A). Noise levels should be considered when selecting collector location.

Combustible Dust Hazards

Among other considerations, the current NFPA standards require owners whose processes involve potentially combustible materials to have a current Dust Hazard Analysis, which can serve as the foundation for their process hazard mitigation strategy. Mitigation may include but is not limited to:

- Prevention of all ignition sources from entering any dust collection equipment.
- Selection and implementation of fire and explosion mitigation, suppression, and isolation strategies appropriate for the risks in their process.
- Development and use of work practices to maintain safe operating conditions, and to ensure combustible dust does not accumulate within their plant or process equipment.

Donaldson designs, manufactures, and sells industrial air filtration products for a wide variety of applications. Some applications may include processes or materials with inherent fire and explosion hazards. Donaldson is neither an expert nor a certified consultant in fire, spark, or explosion detection, suppression, or control. Donaldson does not provide engineering consulting services related to process or dust hazard analyses, or code and standard compliance. Complying with applicable codes and standards and managing the risks associated with the process or materials remains the responsibility of the process owner/operator. Donaldson may provide referrals to consultants, suppliers of equipment or services related to the detection and/or mitigation of sparks, fires and/or explosions, but Donaldson does not assume responsibility for any such referrals, nor does Donaldson assume any liability for the fitness of a mitigation strategy or product for a particular installation or application. The process owner's final selection of dust collectors and risk mitigation strategies should be based on the outcome of a Dust Hazard / Process Hazard Analysis performed by the process owner. Although early engagement of a dust collector supplier provides helpful insights on the availability and features of various products, process owners should consult with a combustible dust expert and/or a process safety expert before making actual product and mitigation strategy selections.

Donaldson recommends that all industrial air filtration system designs be reviewed and approved by an expert consultant who is responsible for the integrity of the system design and compliance with applicable codes and standards. It is the process owner's responsibility to understand the risks in their process and mitigate those risks in accordance with all applicable laws, regulations and standards, including those published by the NFPA. Donaldson also recommends that proper maintenance and housekeeping procedures and work practices be evaluated, developed, and followed to maintain any industrial air filtration products in safe operating condition.

Many factors beyond the control of Donaldson can affect the use and performance of Donaldson products in a particular application, including the conditions under which the product is used. Since these factors are uniquely within the user's knowledge and control, it is essential the user evaluate the Donaldson products to determine whether the product is fit for the particular purpose and suitable for the user's application. All products, product specifications, and data (airflow, capacity, dimensions, or availability) are subject to change without notice, and may vary by region or country.

Description

The FS and FT baghouses are continuous duty dust collectors with bag-style filters. Used to collect airborne dust and particulate, the simple, reliable design efficiently handles low and high-volume dust. Continuous-duty means the filters are pulse-cleaned in sequence, one set at a time without turning the collector off. Standard FS and FT sizes range from 9 to 225 filter bags that are 4, 6, 8 and 10 feet in length.

Model FT allows walk-on, top-access filter bag removal. There is also an option for a walk-in plenum to protect maintenance personnel from inclement weather while changing the filter bags. Hopper inlets are standard. All models allow filter bag service from the clean-air side of the collector.

Model FS allows side access filter bag removal which allows the collector to be installed in applications where headroom is a concern. Hopper inlets are standard.

Purpose and Intended Use



Misuse or modification may result in severe personal injury and/or property damage.

Do not misuse or modify.

The FS and FT baghouse collectors are widely used in material conveying, weigh stations, mixing tanks, bin venting, material grinding, packaging, sawing, sanding and routing applications. The FS and FT are commonly used in the nut, wood, agriculture, chemical, foundry and mineral industries.

- Standard filter-bags are 10.5-oz Dura-Life™ felt, but optional medias are available.
- Pleated bags are another filter option for the FS and FT collectors.
- Operations involving high temperature, high humidity or chemicals may require special attention and possible custom collector modifications.

Inspection on Arrival

1. Inspect collector upon delivery.
2. Report any damage to the delivery carrier.
3. Request a written inspection report from the Claims Inspector to substantiate any damage claim.
4. File claims with the delivery carrier.
5. Compare collector received with description of product ordered.
6. Report incomplete shipments to the delivery carrier and your Donaldson Torit representative.
7. Remove crates and shipping straps. Remove loose components and accessory packages before lifting collector from truck.
8. Check for hardware that may have loosened during shipping.
9. Use caution removing temporary covers.

Installation Codes and Procedures



Codes may regulate recirculating filtered air in your facility.

Consult with the appropriate authorities having jurisdiction to ensure compliance with all national and local codes regarding recirculating filtered air.

Safe and efficient operation of the collector depends on proper installation.

Authorities with jurisdiction should be consulted before installing to verify local codes and installation procedures. In the absence of such codes, install collector according to the National Electric Code, NFPA No. 70-latest edition and NFPA 91 (NFPA 654 if combustible dust is present).

A qualified installation and service agent must complete installation and service of this equipment.

All shipping materials, including shipping covers, must be removed from the collector prior to or during collector installation.

NOTICE

Failure to remove shipping materials from the collector will compromise collector performance.

Inspect collector to ensure all hardware is properly installed and tight prior to operating collector.

Installation

CAUTION

Use proper equipment and adopt all safety precautions needed for servicing equipment.

Electrical service or maintenance work must be performed by a qualified electrician and comply with all applicable national and local codes.

Turn power off and lock out all power before performing service or maintenance work.

Do not install in classified hazardous atmospheres without an enclosure rated for the application.

Turn compressed air supply OFF, bleed and lock out lines before performing service or maintenance work.

Site selection must account for wind, seismic zone, and other load conditions when selecting the location for collectors.

Codes may regulate acceptable locations for installing dust collectors. Consult with the appropriate authorities having jurisdiction to ensure compliance with all national and local codes regarding dust collector installation.

Collectors must be anchored in a manner consistent with local code requirements.

Anchors must be sufficient to support dead, live, seismic, and other anticipated loads.

Consult a qualified engineer for final selection of anchorage.

NOTICE

Do not set compressed-air pressure above 100-psig as component damage can occur.

All compressed air components must be sized to meet the system requirements of 90-100-psig supply pressure.

The compressed-air supply must be oil and moisture free. Contamination in the compressed air used to clean filters will result in poor cleaning, cleaning valve failure, or poor collector performance.

Purge compressed air lines to remove debris before connecting to the collector's compressed air manifold.

The collector is suitable for either indoor or outdoor installations. Reference the Rating and Specification Information.

Foundations or Support Framing

Prepare the foundation or support framing in the selected location. Foundation or support framing must comply with local code requirements and may require engineering.

Foundation and support framing must be capable of supporting dead, live, wind, seismic and other applicable loads. Consult a qualified engineer for final selection of foundation or support framing.

Collector Location

CAUTION

Donaldson Torit equipment is not designed to support site installed

ducts, interconnecting piping, or electrical services. All ducts, piping, or electrical services must be adequately supported to prevent severe personal injury and/or property damage.

When hazardous conditions or materials are present, consult with local authorities for the proper location of the collector.

Dust collection equipment may reach peak sound pressure levels above 80 dB (A). Noise levels should be considered when selecting collector location.

Locate the collector to ensure easy access to electrical and compressed air connections, to simplify solids collection container handling and routine maintenance, and to ensure the straightest inlet and outlet ducts.

Provide clearance from heat sources and avoid any interference with utilities when selecting the location.

Note: Collectors with explosion vents are not available in portable configurations.

Site Selection

This collector can be located on a foundation or structural framing.

Hoisting Information

CAUTION

Failure to lift the collector correctly can result in severe personal injury and/or property damage.

Use appropriate lifting equipment and adopt all safety precautions needed for moving and handling the equipment.

A crane or forklift and qualified operator are recommended for unloading, assembly, and installation of the collector.

Location must be clear of all obstructions, such as utility lines or roof overhang.

Use all lifting points provided.

Use clevis connectors, not hooks, on lifting slings.

Use spreader bars to prevent damage to collector's casing.

Check the Specification Control drawing for weight and dimensions of the collector and components to ensure adequate crane capacity.

Allow only qualified crane or forklift operators to lift the equipment.

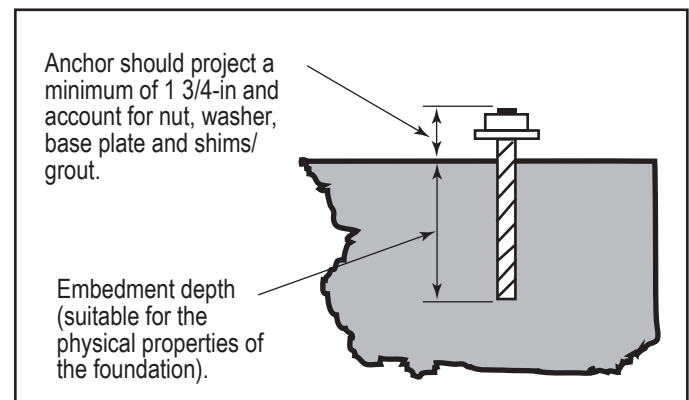
Refer to applicable OSHA regulations and local codes when using cranes, forklifts, and other lifting equipment.

Lift collector and accessories separately and assemble after collector is in place.

Use drift pins to align holes in section flanges during assembly.

Provisional Anchor Bolt Recommendations

1. Consider Hilti HIT-HY 200 Anchor System or equivalent. Quantity of anchor bolts should match the number of holes provided in the base plates.
2. Anchor diameter is typically 1/8-in less than baseplate hole diameter.
3. Corrosive environment or outdoor installation may require stainless steel anchors.



Typical Foundation Anchor

Compressed Air Installation

CAUTION

Turn compressed air supply OFF, bleed and lock out lines before performing service or maintenance work.

A safety exhaust valve should be used to isolate the compressed air supply. The safety exhaust valve should completely exhaust pressure in the collector manifolds when closed, should be capable of being interlocked with fire or explosion mitigation equipment and should include provisions to allow closed-position locking.

NOTICE

Do not set compressed-air pressure above 100-psig as component damage can occur.

All compressed air components must be sized to meet the system requirements of 90-100-psig supply pressure.

The compressed-air supply must be oil and moisture free. Contamination in the compressed air used to clean filters will result in poor cleaning, cleaning valve failure, or poor collector performance.

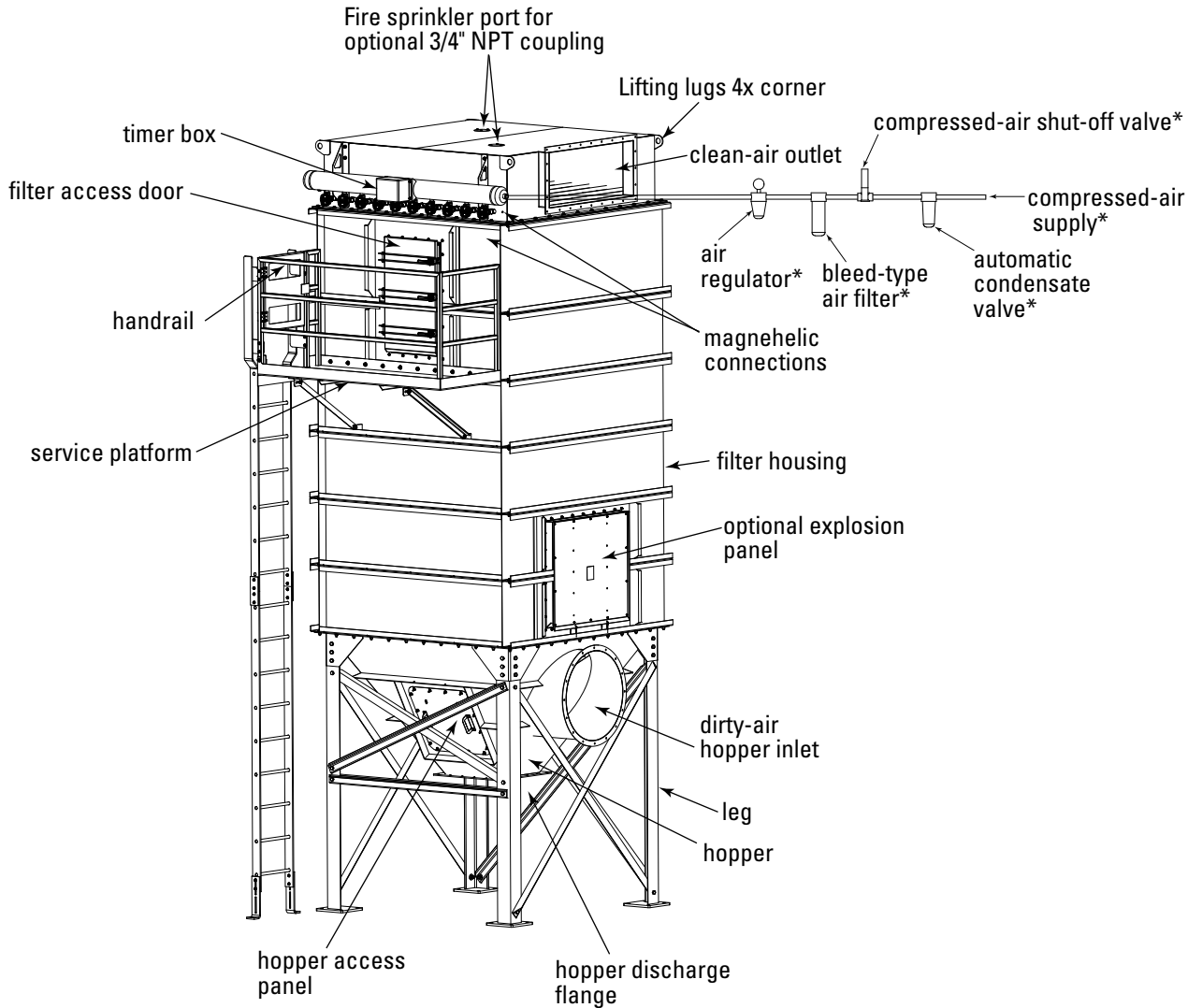
Purge compressed-air lines to remove debris before connecting to the collector's compressed-air manifold.

1. Remove the plastic pipe plug from the collector's air manifold and connect the compressed-air supply lines. Use thread-sealing tape or pipe sealant on all compressed-air connections.
2. Install a customer-supplied shut-off valve, bleed-type regulator with gauge, filter, and automatic condensate valve in the compressed-air supply line.
3. Set compressed-air supply pressure to a level suitable for the filters (90-psig). The pulse-cleaning controls are factory set to cycle once every two minutes.

CAUTION

Turn power off and lock out electrical power sources.

Turn compressed-air supply OFF and bleed lines before performing service or maintenance work.



*customer-supplied

Compressed Air and Component Connections

Preassembled Collectors

Collectors that arrive fully assembled can be lifted directly into final position. Anchor bolts should be installed and tightened before lifting equipment is disconnected from filter. All bolt connections should be checked and retightened if necessary.

Connect all ducting using RTV-silicone between all mating flanges. Connect compressed air supply line to manifold header. Compressed air must be clean, dry, oil-free and regulated. Maximum air pressure is 100-psi. Electrical connections will vary with options (see electrical next page).

Connect Magnehelic Gauge per diagram in this manual. Install bags and cages per diagram in this manual.

Partially Assembled Collectors

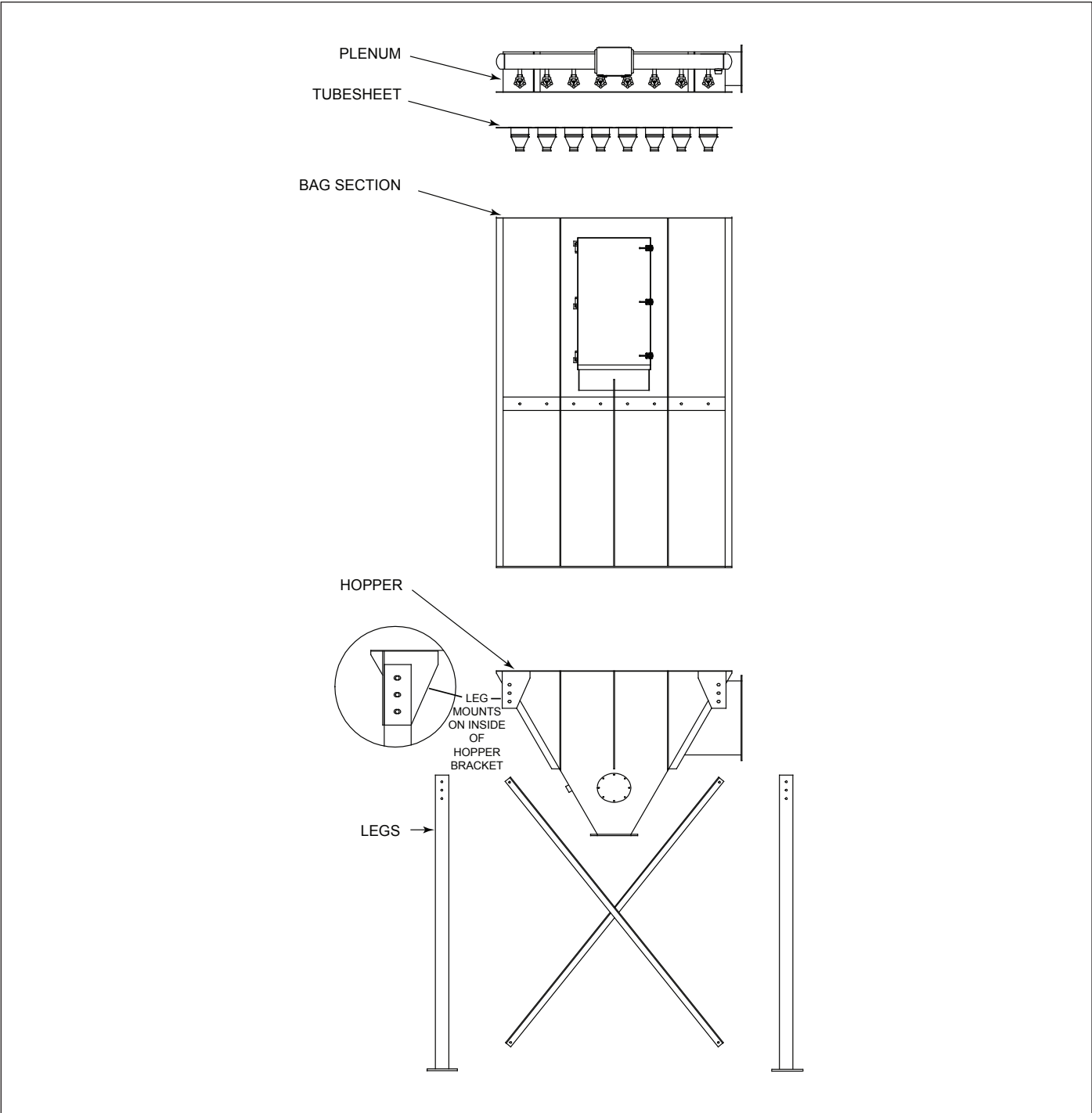
The degree of assembly upon arrival may vary on some collectors. The following steps are typical for assembling a filter.

1. Place hopper on level surface with product discharge flange up (i.e. upside down).
2. Attach legs and cross braces with supplied hardware.

Note: Leg is mounted on the inside of the hopper corner mounts.

3. Using appropriate lifting equipment (i.e. crane) right the hopper and leg assembly and lift into final position. Secure to foundation. Check all connections, retighten if necessary.
4. Right bag section if not already in righted position. Place a bead of RTV silicone on the top flange.
5. Lift tubesheet into position. Side door model tubesheets have venturis, top door models do not. Venturis point down into the bag section. Place a bead of RTV silicone on the top of the tube sheet.

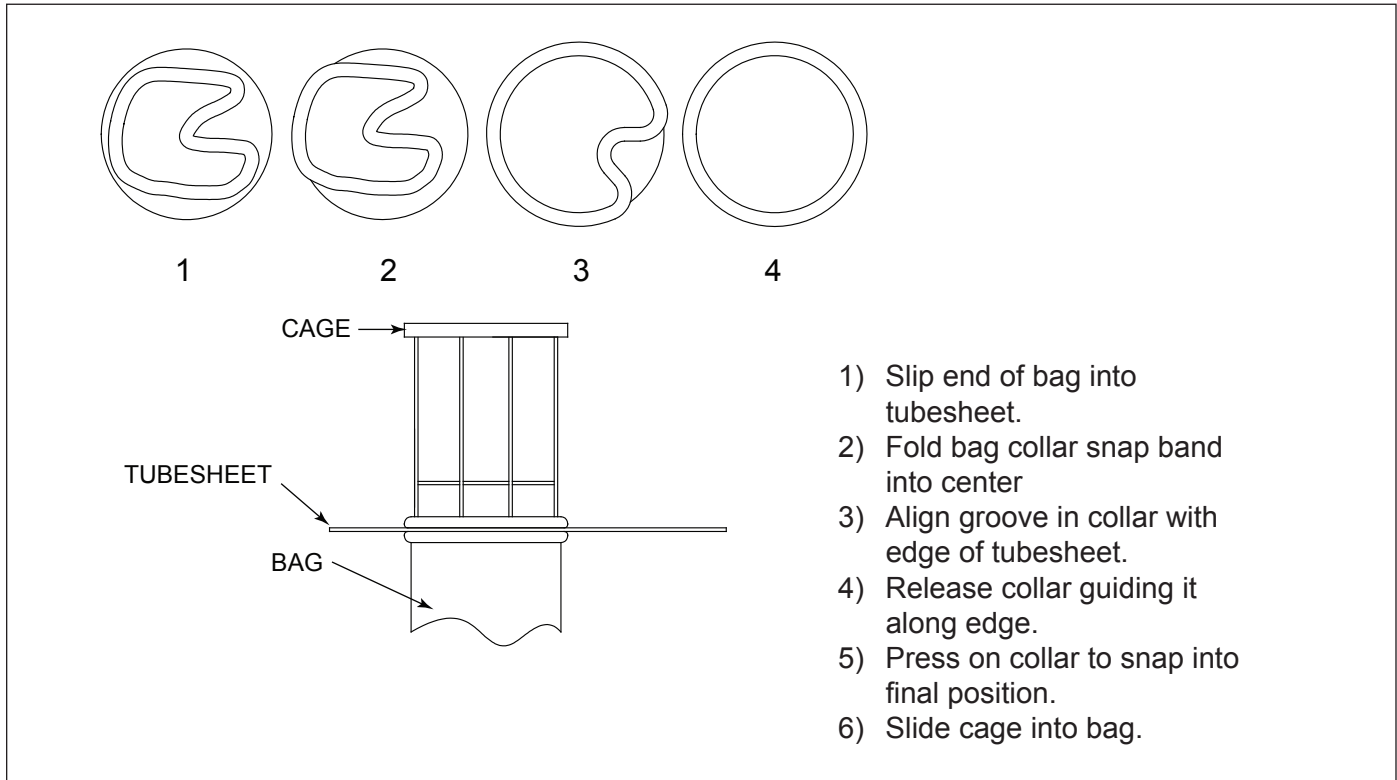
6. Lift plenum into position. Secure to bag section using supplied hardware. All bolts should be in place and tightened before attempting to lift plenum and bag section assembly. Top door models also have perimeter railing on the plenum section. Do not attempt to lift the plenum by the railing.
7. Place a bead of RTV silicone on the top hopper flange. Lift plenum/bag section assembly into position and install all hardware. Do not disconnect lifting equipment until all bolts are in place and tightened.
8. Follow instructions for preassembled collectors located earlier in this manual.
9. Install bags and cages or pleated bags. On FS models, slip cage into bag, fold top of bag into cage and place loosened clamp over bag and cage. Slide bag, cage and clamp or pleated bags and clamp onto venturi. Position clamp above venturi detent and tighten.



Typical Filter Assembly

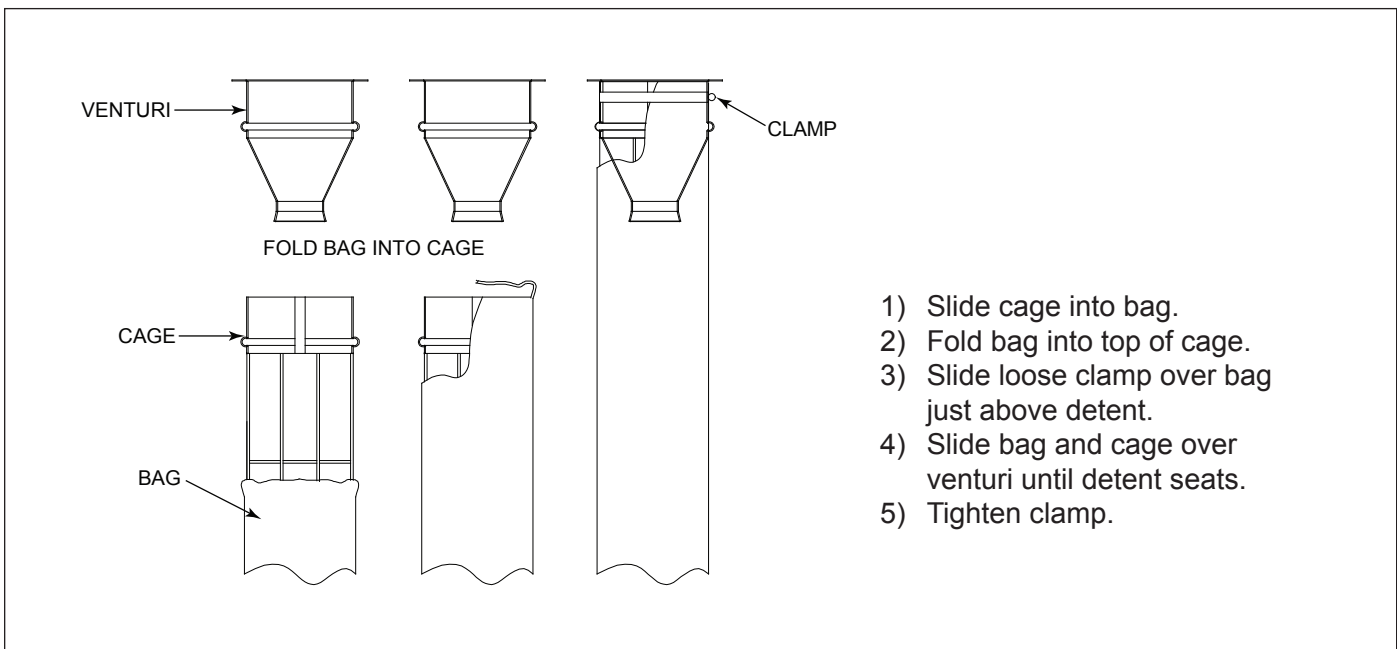
Bag Installation

On FT models, slip bag through top of tubesheet and snap top band into place. Slide cage into bag making sure that cage top lip covers bag collar.



- 1) Slip end of bag into tubesheet.
- 2) Fold bag collar snap band into center
- 3) Align groove in collar with edge of tubesheet.
- 4) Release collar guiding it along edge.
- 5) Press on collar to snap into final position.
- 6) Slide cage into bag.

FT Bag Installation



- 1) Slide cage into bag.
- 2) Fold bag into top of cage.
- 3) Slide loose clamp over bag just above detent.
- 4) Slide bag and cage over venturi until detent seats.
- 5) Tighten clamp.

FS Bag Installation

FS Pleated Bag Installation

Slowly push the filter up onto the bag cup until the flexible boot snaps into place on the groove.



Install the clamp between the outer groove markings on the flexible boot.

Use of a lined clamp is strongly recommended to prevent cutting the polyurethane boot.

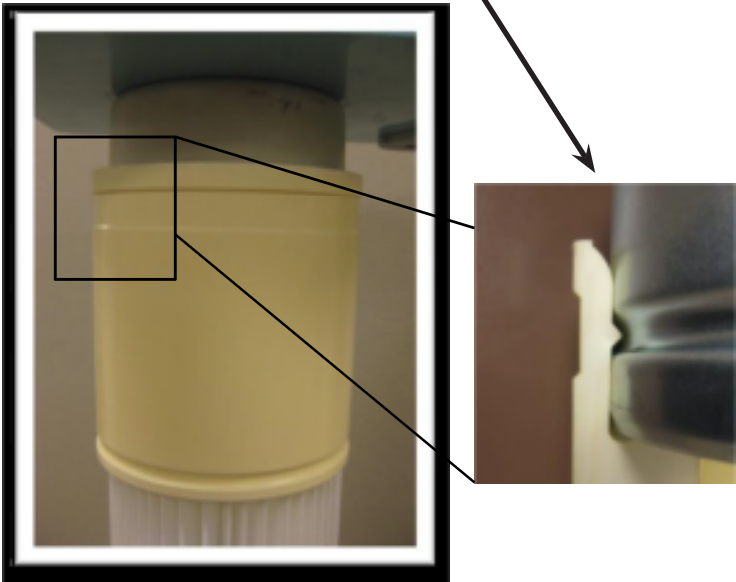
Using a nut driver, hand tighten the clamp, making sure it stays in place between the other groove markings. Do not over tighten. Over tightening may cut the polyurethane.

After tightening, you should not be able to rotate the filter element y hand. Make sure the filter elements hang plumb and are not touching each other or obstructions such as the sidewalls or internal stiffeners.



Pull the element down slightly and rotate it to ensure the internal bead is properly engaged in the groove in the bag cup / venturi connection (see inset for cutaway detail).

Inset showing proper bead/groove alignment.



FT Pleated Bag Filter Installation

NOTICE

In the case of filters with ePTFE membrane, care should be taken to stack or store the filters in such a manner to prevent or minimize damaging the fragile ePTFE membrane. The iSeal™ gasket will help protect the pleat tips during installation, but cardboard or other smooth material should cover potential scrape hazards such as door frames and handrails.

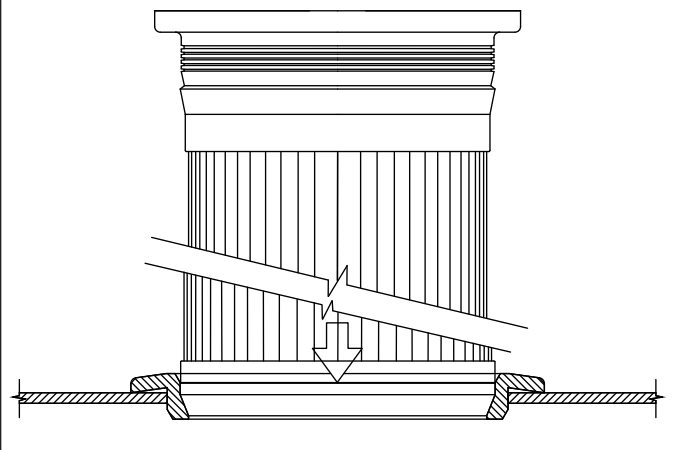
In the case of conductive media/filter designs utilizing the iSeal electrically conductive gasket, ensure that the inside diameter of the tubesheet hole is not coated or painted, as this is the area where electrical grounding will occur.

If the filter has a stainless steel ground wire, please see additional instruction sheet shipped with filter for proper attachment of the grounding wire.

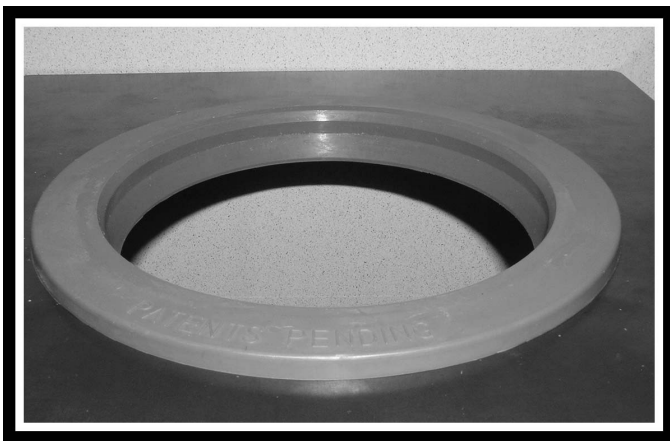
1. Remove the clean-air plenum access doors.
2. Inspect each filter for damage from shipping, storage, or handling.
3. Place the gasket in the tubesheet hole with beveled bottom lip facing downward (the outer top flange with printing should be facing upward) and press the gasket gently into the tubesheet hole by hand. The

gasket will self-center and seat. A properly installed gasket will have no deformations around the ID of the gasket and the top flange will be flush against the top of the tubesheet.

4. Place the bottom puck of the filter element inside the gasket and press the filter down through the inside diameter of the gasket.

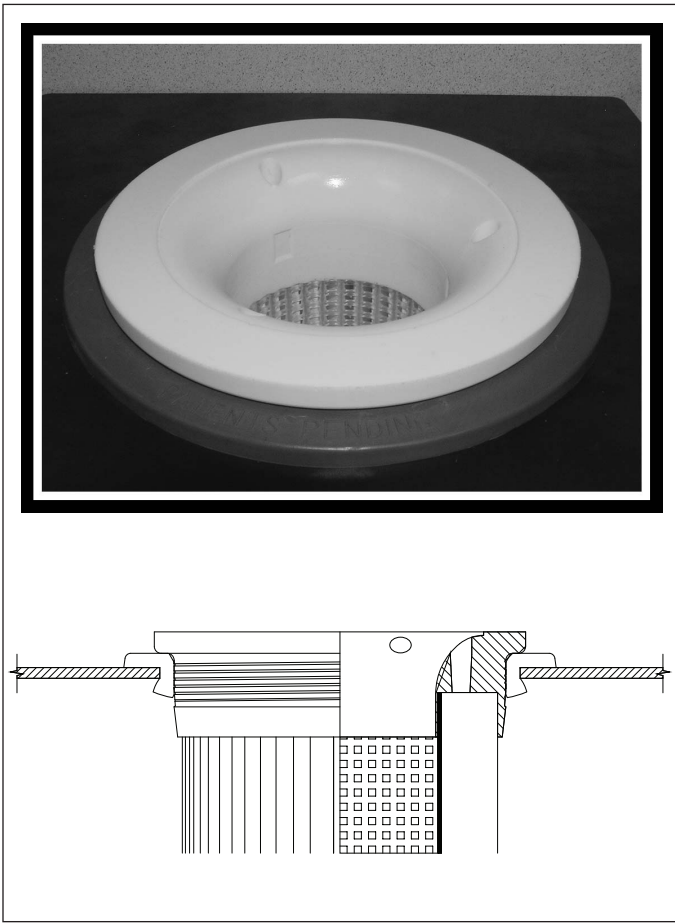


Step 4



Step 3

- 5. Once the filter is lowered all the way into the gasket, the final sealing of the filter into the gasket will require slow, firm pressure to seat the stepped top down into the gasket and kick out the bottom flange to engage the seal. Stepping on the filter top is acceptable as long as steady, even pressure is applied.



Step 5

Electrical Wiring

CAUTION

Electrical installation, service, or maintenance work must be performed by a qualified electrician and comply with all applicable national and local codes.

Turn power off and lock out all power before performing service or maintenance work.

Do not install in classified hazardous atmospheres without an enclosure rated for the application.

All electrical wiring and connections, including electrical grounding, should be made in accordance with the National Electric Code (NFPA No. 70-latest edition).

Check local ordinances for additional requirements that apply.

The appropriate wiring schematic and electrical rating must be used. See collector's rating plate for required voltage.

An electric disconnect switch having adequate amp capacity shall be installed in accordance with Part IX, Article 430 of the National Electrical Code (NFPA No. 70-latest edition). Check collector's rating plate for voltage and amperage ratings.

Refer to the wiring diagram for the number of wires required for main power wiring and remote wiring.

Solid-State Timer Installation

CAUTION

Electrical installation, service or maintenance work during installation must be performed by a qualified electrician and comply with all applicable national and local codes.

Turn power off and lock out all power before performing installation, service, or maintenance work.

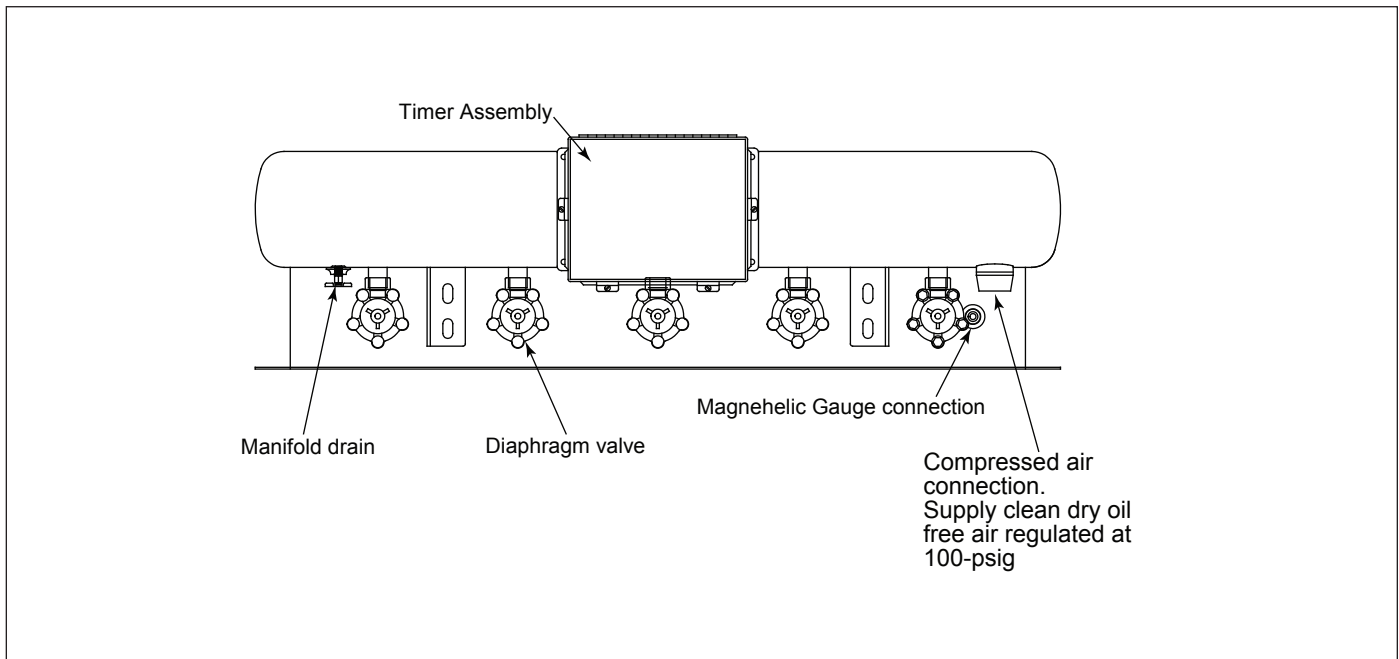
Do not install in classified hazardous atmospheres without an enclosure rated for the application.

The solid-state timer is used to control the filter cleaning system. The solid-state timer board is enclosed in a control box with solenoids and is shipped attached to the compressed air manifold. The timer board is factory wired to the solenoids and hoses come factory plumbed from the solenoids to the diaphragms.

1. Using the wiring diagram supplied, wire the fan motor, fan-motor starter, solid-state timer. Solenoids ship factory wired to the solid-state timer. Use appropriate wire gauge for rated amp load as specified by local codes.
2. With power supply ON, check the operation of the timer and valves. The valves should open and close sequentially at factory set intervals per the table found in this manual.
4. If a gauge or similar device is used to control the solid-state timer, the jumper on the pressure switch portion of the timer should be removed. The solenoid valves pulse only when the differential pressure reaches the high-pressure setpoint. The valves will continue to pulse until the low-pressure setpoint is reached.

NOTICE

The solid-state timer voltage must match the voltage of the rating of the timer provided (typically 120 VAC, 240 VAC also available).



Manifold Detail

ON AND OFF Times for FS/FT Collectors

Model	ON Time	OFF Time	Valves
9 FS/FT	100 milliseconds	40	3
16 FS/FT	100 milliseconds	30	4
25 FS/FT	100 milliseconds	24	5
36 FS/FT	100 milliseconds	20	6
49 FS/FT	100 milliseconds	17	7
64 FS/FT	100 milliseconds	15	8
81 FS/FT	100 milliseconds	13	9
100 FS/FT	100 milliseconds	12	10
121 FS/FT	100 milliseconds	11	11
144 FS/FT	100 milliseconds	10	12
169 FS/FT	100 milliseconds	9	13
196 FS/FT	100 milliseconds	9	14
225 FS/FT	100 milliseconds	8	15

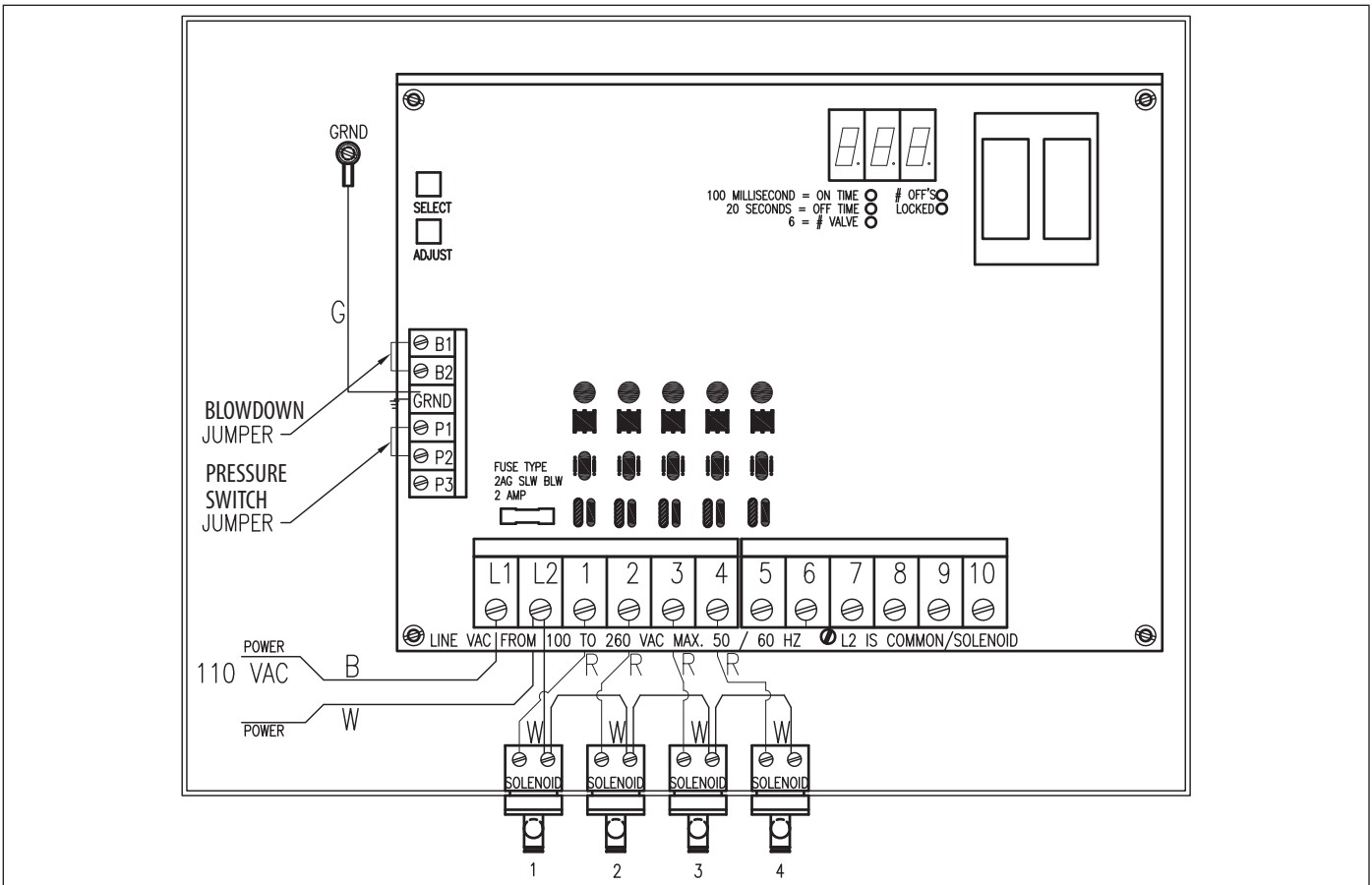
Solenoid Connection

The collector is equipped with electric solenoid valves (typically 120V) that controls the pulse-cleaning valves, which in turn clean the filters. The solenoids ship enclosed in the control box. These are factory wired to the solid-state timer and connected to the diaphragm valves.

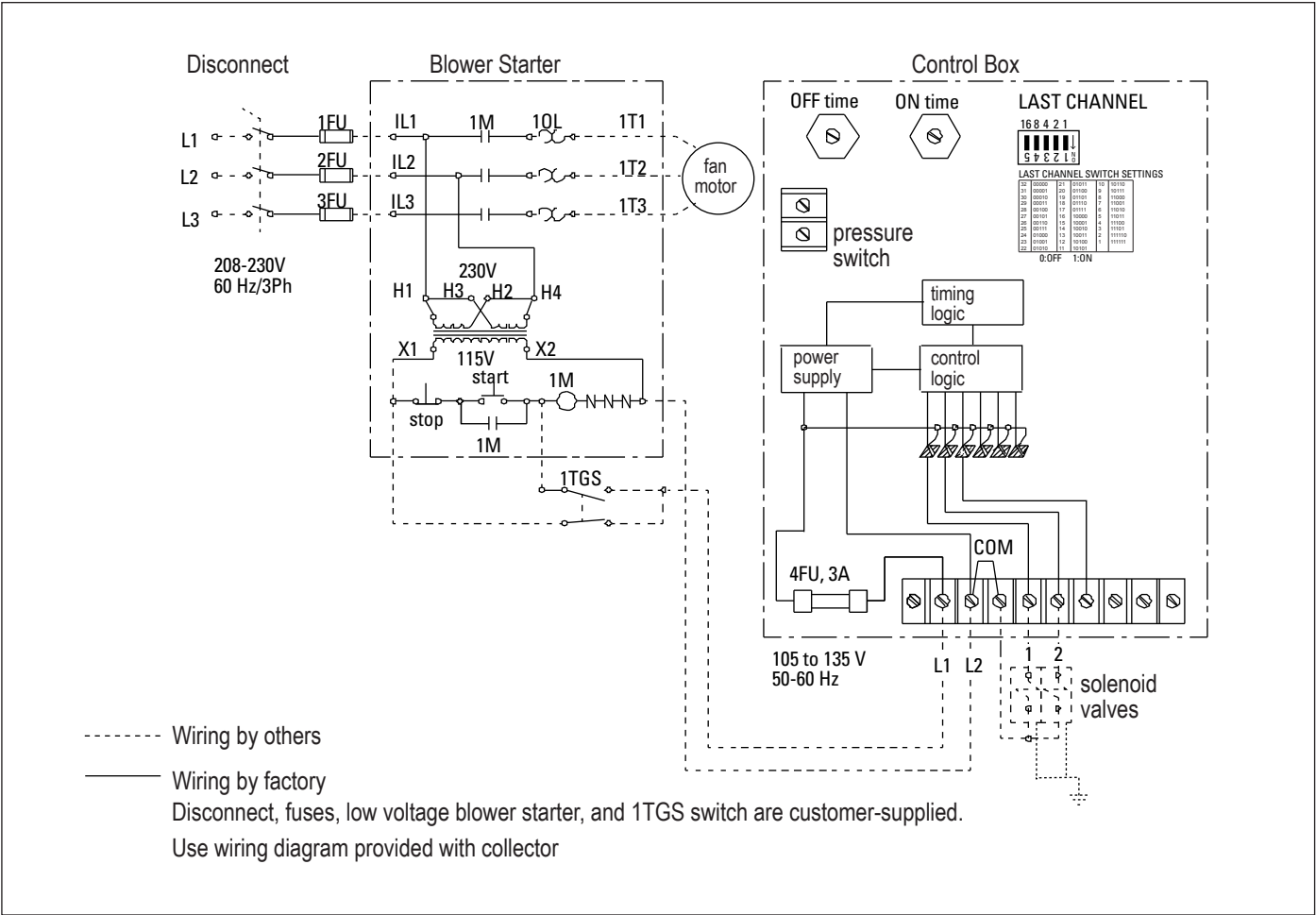
Timer and Solenoid Specifications

Power to the solid-state timer is supplied to Terminals L1 and L2, which are intended to operate in parallel with the fan starter's low-voltage coil. On fan start-up, power is supplied to the timer and the preset OFF time is initiated. At the end of the OFF time, the timer energizes the corresponding solenoid valve to provide the ON time cleaning pulse for one diaphragm valve and then steps to the next until all filters have been cleaned.

To pulse when the fan is OFF, install a toggle switch as shown on the Solid-State Timer Wiring Diagram. When the toggle switch is ON, the timer receives power and energizes the solenoid valves' pulse-cleaning operation even though the fan is turned OFF.



Typical FS/FT Control Box with Timer Board and Solenoids



Typical Wiring Diagram - Wiring from Timer Board to Blower Starter

Preliminary Start-Up Check

Instruct all personnel on safe use and maintenance procedures.

CAUTION

Electrical work during installation, service or maintenance must be performed by a qualified electrician and comply with all applicable national and local codes.

Turn power off and lock out all power before performing service or maintenance work.

Turn compressed air supply OFF, bleed and lock out lines before performing service or maintenance work.

Check that the collector is clear and free of all debris before starting.

Do not install in classified hazardous atmospheres without an enclosure rated for the application.

Optional fans over 600 lbs must be independently supported.

1. Check all electrical connections for tightness and contact.
2. Check for proper rotation on all motors as described below.

To reverse rotation, single-phase power supply:
Follow manufacturer's instructions on the motor's nameplate.

To reverse rotation, three-phase power supply:
Switch any two leads on the motor junction box.

CAUTION

Do not look into fan outlet to determine rotation. View the fan rotation through the back of the motor.

Check that the exhaust plenum is free of tools or debris before checking blower/fan rotation.

Stand clear of exhaust to avoid personal injury.

Do not interchange a power lead with the ground wire. Severe personal injury and/or property damage may result.

3. All access panels should be sealed and secure.
4. Check that the dust container is properly sealed and clamped.

5. Check that fan exhaust damper is set to the fully-closed position.
6. Check and remove all loose items in or near the inlet and outlet of the collector.
7. Check that all remote controls and solenoid enclosures (if applicable) are properly wired and all service switches are in the OFF position.
8. Check that all optional accessories are installed properly and secured.
9. Turn power ON at source.
10. Turn the compressed-air supply ON. Set compressed-air supply pressure to a level suitable for the filters (90-psig).
11. Turn fan motor ON.
12. Adjust airflow with the exhaust damper.

NOTICE

Excess airflow can shorten filter life, cause electrical system failure and fan motor failure.

13. Turn powered hopper discharge devices ON.

Start up Sequence - Typical

- 1) Start rotary airlock (if applicable)
- 2) Start timer/sequencer.
- 3) Start blower.
- 4) Start process equipment.

Shut down Sequence - Typical

- 1) Stop process equipment. Allow filter to continue operating for 10-15 minutes.
- 2) Stop blower. Allow airlock and timer to continue running for 10-15 minutes.
- 3) Stop timer and air lock.

Maintenance Information

Instruct all personnel on safe use and maintenance procedures.

CAUTION

Use proper equipment and adopt all safety precautions needed for servicing equipment.

Use appropriate access equipment and procedures. Note the standard collector is not equipped with access platforms unless noted on the specification drawings.

Electrical service or maintenance work must be performed by a qualified electrician and comply with all applicable national and local codes.

Turn power off and lock out all power before performing service or maintenance work.

Do not install in classified hazardous atmospheres without an enclosure rated for the application.

Turn compressed air supply OFF, bleed and lock out lines before performing service or maintenance work.

NOTICE

Do not set compressed-air pressure above 100-psig as component damage can occur.

All compressed air components must be sized to meet the system requirements of 90-100 psig supply pressure.

The compressed-air supply must be oil and moisture free. Contamination in the compressed air used to clean filters will result in poor cleaning, cleaning valve failure, or poor collector performance.

Purge compressed air lines to remove debris before connecting to the collector's compressed air manifold.

Operational Checklist

1. Monitor the physical condition of the collector and repair or replace any damaged components.

Routine inspections will minimize downtime and maintain optimum system performance. This is particularly important on continuous-duty applications.

2. Periodically check the compressed air components and replace compressed air filters.

Drain moisture following the manufacturer's instructions. With the compressed air supply ON, check the cleaning valves, solenoid valves, and tubing for leaks. Replace as necessary.

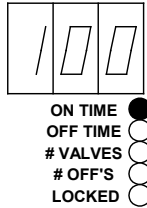
3. Monitor pressure drop across filters.

Abnormal changes in pressure drop may indicate a change in operating conditions and possibly a fault to be corrected. For example, prolonged lack of compressed air will cause an excess build-up of dust on the filters resulting in increased pressure drop. Cleaning off-line with no airflow usually restores the filters to normal pressure drop.

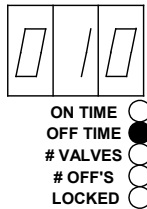
4. Monitor exhaust.
5. Monitor dust disposal.

Timer Programming

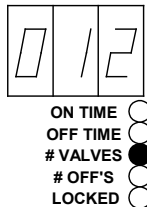
Step 1) ON TIME - Press the select button until the "ON TIME" led is lit, then press the adjust button until the required on time in milliseconds is indicated. (100 milliseconds is shown)



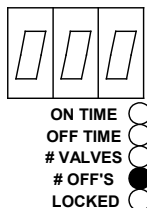
Step 2) OFF TIME - Press the select button until the "OFF TIME" led is lit, then press the adjust button until the required off time in seconds is indicated. (10 seconds is shown)



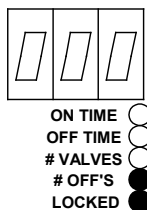
Step 3) NUMBER OF VALVES - Press the select button until the "# VALVES" led is lit, then press the adjust button until the required number of valves connected is indicated. (12 valves shown)



Step 4) BLOWDOWN CYCLES - Press the select button until the "OFF'S" led is lit, then press the adjust button until the required of blowdown cycles is indicated. (0 cycles is shown)



Step 5) SETTINGS LOCKED - Press the select button until the "LOCKED" led is lit. All settings are now locked. The "# OFF'S" value and led will be displayed along with the "LOCKED" led.



The timer sequencer is set at the factory, however can be adjusted in the field to accommodate varying loading conditions. To adjust the various settings on the timer. Open the timer box and locate the "SELECT" and "ADJUST" buttons on the upper left hand side of the circuit board. Press "SELECT" until the appropriate L.E.D. is lit. Then press the "ADJUST" button until the desired value is displayed. Once all settings are at the desired values press the "SELECT" button until the "LOCKED" L.E.D. is lit. See programming example on next page.

All pulse type filters are subjected to cyclic stresses produced by the cleaning pulse. It is therefore important to inspect the filter housing for signs of fatigue as the filter ages. Bolt connections should be checked for integrity on a bimonthly basis. Also check the structural support for any signs of rust or fatigue and take appropriate steps to correct any problems.

"ON TIME" settings of greater than 100 milliseconds will cause a higher rate of compressed air consumption without the benefit of additional cleaning. Do NOT exceed 100 milliseconds.

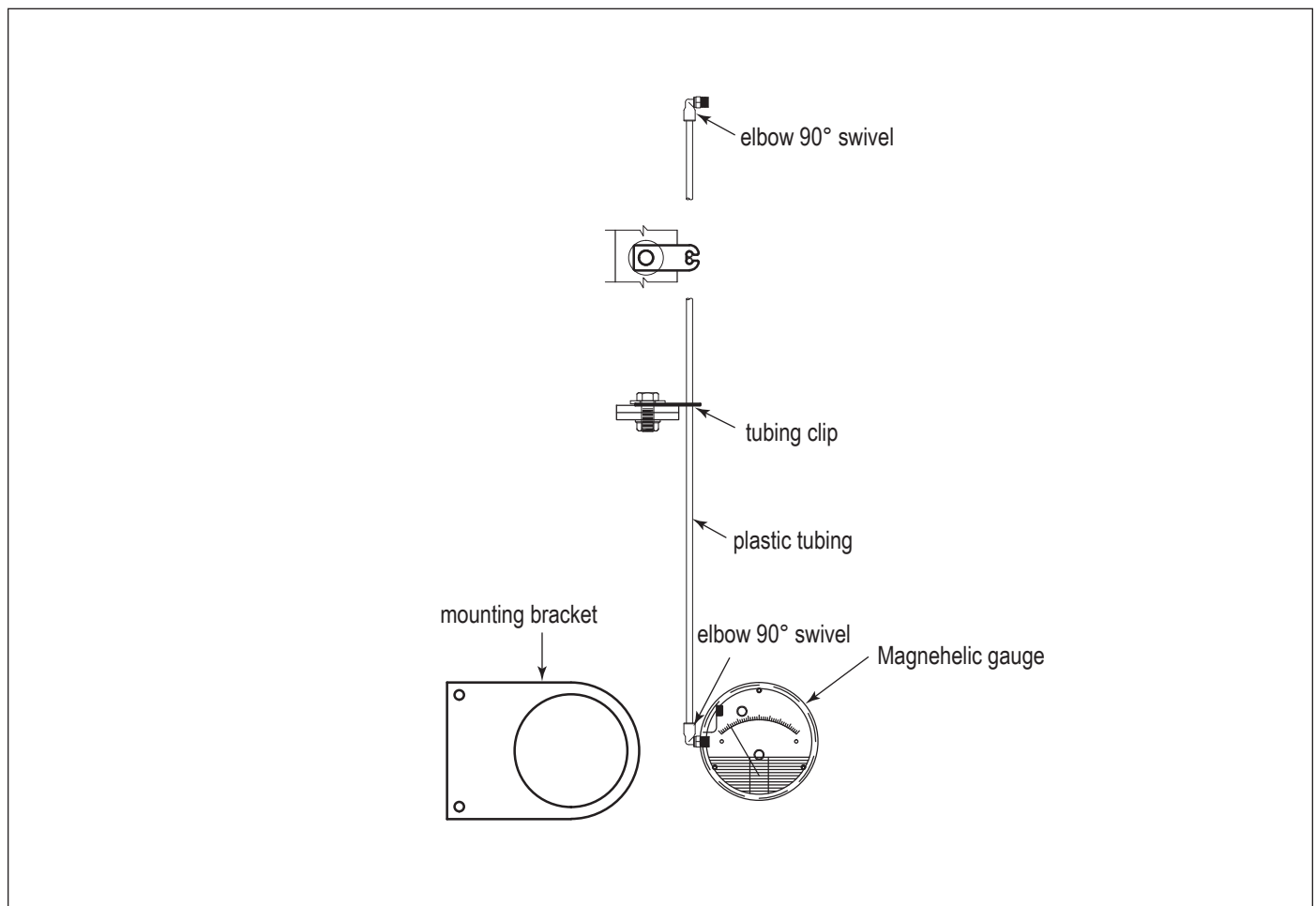
Typically timers are factory set to cycle once every two minutes therefore the "OFF TIME" can be determined by dividing 120 seconds by the number of valves.

Optional Equipment

Magnehelic® Gauge

The Magnehelic is a differential pressure gauge used to measure the pressure difference between the clean-air and dirty-air plenums and provides a visual display of filter change requirements. The high-pressure tap is located in the dirty-air plenum and the low-pressure tap is located in the clean-air plenum.

1. Choose a convenient, accessible location on or near the collector for mounting that provides the best visual advantage.
2. Plug the pressure ports on the back of the gauge using two, 1/8-in NPT pipe plugs supplied. Install two, 1/8-in NPT male adapters supplied with the gauge into the high- and low-pressure ports on the side of the gauges.
3. Attach the mounting bracket using three, #6-32 x 1/4-in screws supplied.
4. Mount the gauge and bracket assembly to the supporting structure using two, self-drilling screws.
5. Thirty-five feet of plastic tubing is supplied and must be cut in two sections. Connect one section of tubing from the gauge's high-pressure port to the pressure fitting located in the dirty-air plenum. Connect remaining tubing from the gauge's low-pressure port to the fitting in the clean-air plenum. Additional tubing can be ordered from your representative.
6. Zero and maintain the gauge as directed in the manufacturer's Operating and Maintenance Instructions provided.



Magnehelic Gauge Installation

Photohelic® Gauge

CAUTION

Electrical installation, service, or maintenance work must be performed by a qualified electrician and comply with all applicable national and local codes.

Turn power off and lock out all power before performing service or maintenance work.

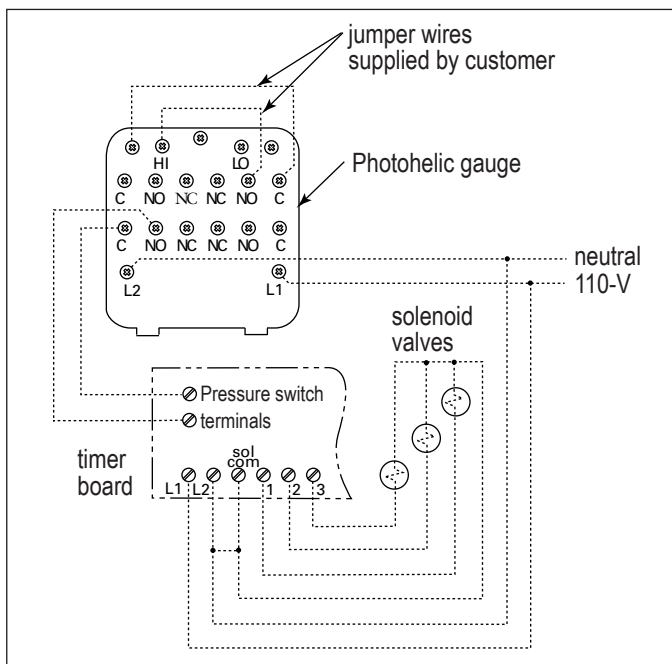
Do not install in classified hazardous atmospheres without an enclosure rated for the application.

The Photohelic combines the functions of a differential pressure gauge and a pressure-based switch. The gauge function measures the pressure difference between the clean-air and dirty-air plenums and provides a visual display of filter condition. The high-pressure tap is located in the dirty-air plenum and a low-pressure tap is located in the clean-air plenum. The pressure-based switch function provides high-pressure ON and low-pressure OFF control of the filter cleaning system.

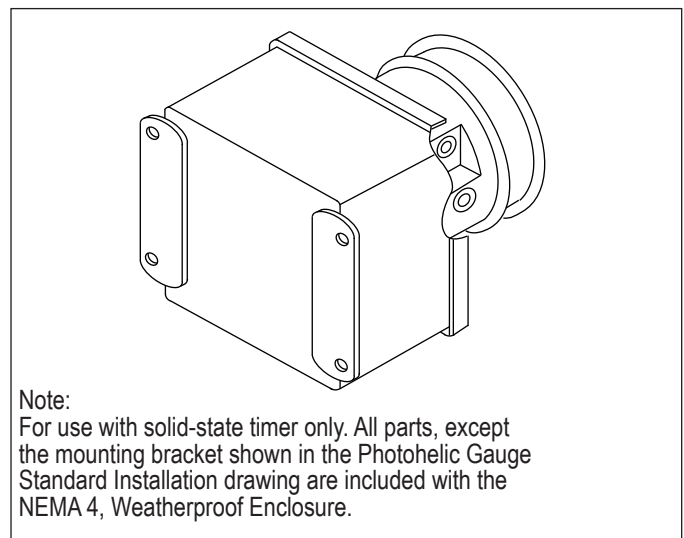
1. Choose a convenient, accessible location on or near the collector for mounting that provides the best visual advantage.
2. Mount the gauge to the remote panel or door using the mounting ring, retaining ring, and four #6-32 x 1

1/4-in screws. Do not tighten screws. Connect two, 1/8-in NPT x 1/4-in OD male adapters to the gauge's high- and low-pressure ports. Tighten screws.

3. On the back of the gauge, remove four #6-32 x 5/16-in screws and plastic enclosure. Set aside. Add two jumper wires supplied by customer. Remove the jumper from the pressure switch located on the timer board, if equipped. Using the 3/4-in conduit opening, wire the gauge as shown. Reassemble and fasten enclosure securely.
4. Thirty-five feet of plastic tubing is supplied and must be cut in two sections. Connect one section of tubing from the gauge's high-pressure port to the pressure fitting located in the dirty-air plenum. Connect remaining tubing from the gauge's low-pressure port to the fitting in the clean-air plenum. Additional tubing can be ordered from your representative.
5. Zero and maintain the gauge as directed in the manufacturer's Operating and Maintenance Instructions provided.
6. To install the Photohelic Gauge mounted in a NEMA 4, Weatherproof Enclosure, follow Steps 4 and 5.

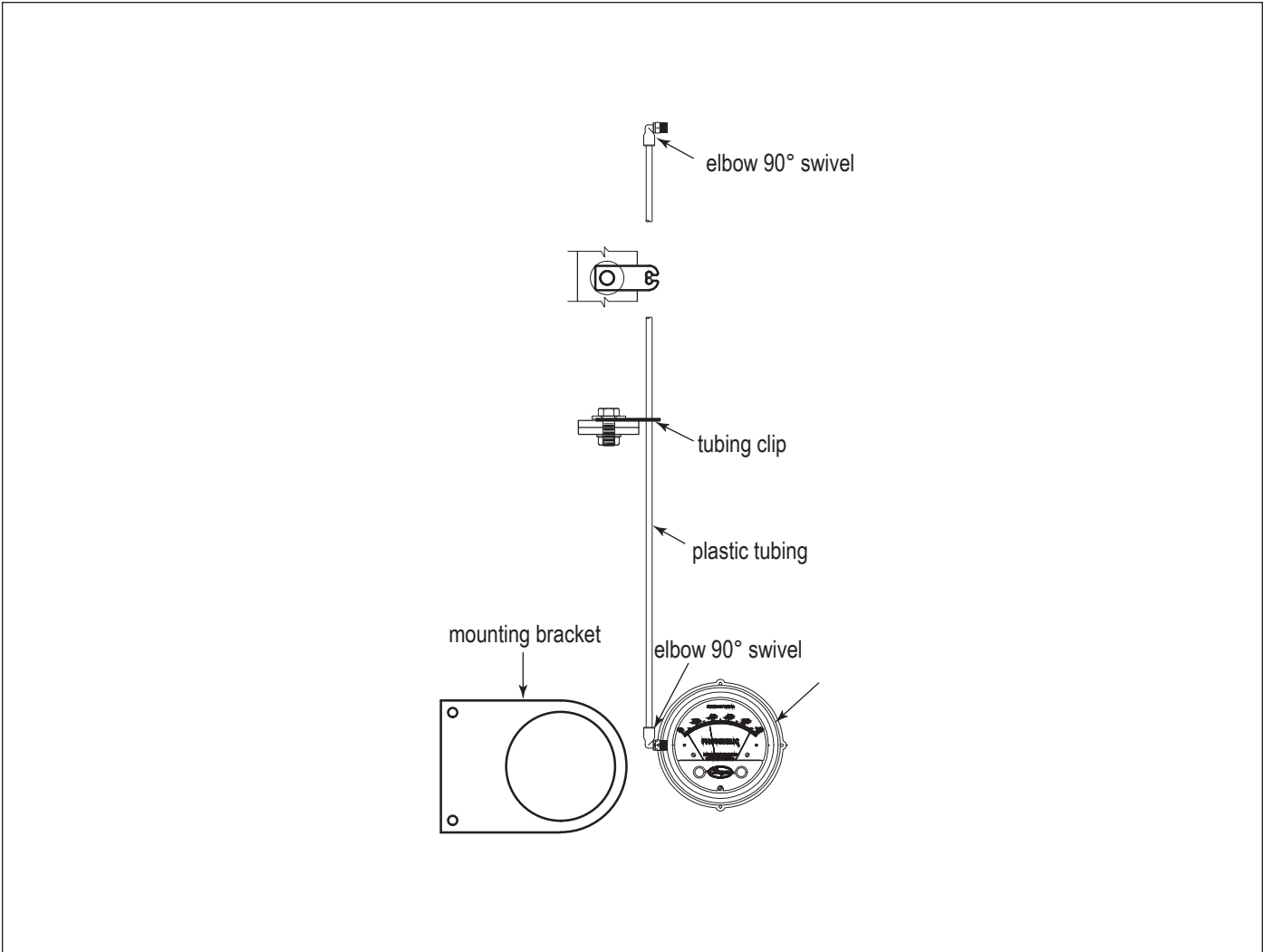


Photohelic Gauge Wiring Diagram



Note:
For use with solid-state timer only. All parts, except the mounting bracket shown in the Photohelic Gauge Standard Installation drawing are included with the NEMA 4, Weatherproof Enclosure.

Photohelic Gauge in Optional NEMA 4 Weatherproof Enclosure



Photohelic Gauge Installation

Delta P Control

For complete information, see the most current version of the Delta P Installation, Operation, and Maintenance manual.

Description

The Delta P Controller monitors the differential pressure between the clean-air and dirty-air plenums, providing a visual display of the filter condition. When combined with a pulse timer, it manages the pressure drop by turning the cleaning mechanism On and Off at the chosen limits. There are three (3) set points: High Pressure On, Low Pressure Off, and Alarm. The first two, High Pressure On and Low Pressure Off, control the filter cleaning system. The third, Alarm, provides a relay output to activate an external alarm supplied by others.

Operation

Normal

The Delta P Controller monitors the pressure in the clean-air and dirty-air air plenums while the collector is running. The blower draws air through the filters, creating a pressure drop. The Delta P Controller measures the pressure drop and provides a visual display in inches water gauge or metric (SI) units of daPa.

Filter Cleaning

When the pressure drop across the filters exceeds the High Setpoint, the controller closes an output relay allowing a timer to trigger the cleaning valves sequentially. When the controller senses that the pressure drop is below Low Setpoint, the relay opens and the cleaning cycle stops. This sequence continues as long as the collector is in use, maintaining the pressure drop within a narrow range.

Alarm

The Alarm setpoint is set to a higher setting than the High Pressure On setpoint used to start the filter cleaning cycle. It indicates situations when the cleaning system cannot reduce the pressure drop due to cleaning system failure, lack of compressed air, or the end of the filter's useful life. There is a time delay prior to setting the Alarm to prevent nuisance trips. The Delta P Controller also provides an input connection for a remote alarm reset.



Delta P Control Display

Delta P Plus Control

For complete information, see the most current version of the Delta P Plus Installation, Operation, and Maintenance manual.

Description

The Delta P Plus Controller monitors the differential pressure between the clean-air and dirty-air plenums, providing a visual display of the filter condition. When combined with a pulse timer, it manages the pressure drop by turning the cleaning mechanism On and Off at the chosen limits. There are three (3) set points: High Pressure On, Low Pressure Off, and Alarm. The first two, High Pressure On and Low Pressure Off, control the filter cleaning system. The third, Alarm, provides a relay output to activate an external alarm supplied by others.

The user can program the Delta P Plus Controller to pulse while the collector is running, to maintain a relatively constant pressure drop across the filters, pulse only after the collector is shut down (after-shift cleaning), or a combination of both, cleaning while running as well as end of the shift.

Operation

Normal

The Delta P Plus Controller monitors the pressure on both sides of the tubesheet while the collector is running. As air flows through the filters, the resistance of the media and collected dust creates a pressure difference or "drop" between the dirty and clean air plenums. The Delta P Plus Controller measures the pressure drop and provides a visual display in inches water gauge or metric (SI) units of daPa.

Filter Cleaning

The Delta P Plus Controller offers three filter cleaning options.

1. **Differential Pressure Cleaning (DFF)** - When the pressure drop across the filters exceeds the High Setpoint, the Controller closes an output relay allowing a sequential timer to trigger the cleaning valves. When the Controller senses that the pressure drop is below the Low Setpoint, the relay opens and the cleaning cycle stops. This sequence continues as long as the collector is in use, maintaining the pressure drop within a narrow range.

2. **Downtime Cleaning (DTC)** - The Delta P Plus Controller monitors the collection system. When the pressure drop exceeds the Low Pressure Off set point and then approaches zero again, the Delta P Plus Controller runs a delay timer to allow the blower to come to a stop and then engages the cleaning mechanism for a preselected time.
3. **Combined Differential and Downtime Cleaning (ALL)** - The Delta P Plus Controller combines the two functions described above; maintaining the pressure drop in a narrow band and downtime cleaning the filters when the collector is shut down. The downtime cleaning function can be toggled On or Off from the keyboard.

Alarm

The Alarm setpoint is set to a higher setting than the High Pressure On used to start the filter cleaning cycle. It indicates situations when the cleaning system cannot reduce the pressure drop due to cleaning system failure, lack of compressed air, or the end of the filter's useful life. There is a time delay prior to setting the Alarm to prevent nuisance trips. The Delta P Plus Controller also provides an input connection for a remote Alarm reset.



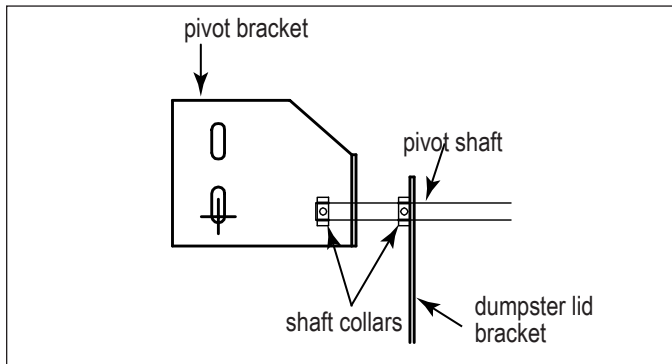
Delta P Plus Control Display

Dumpster Pack

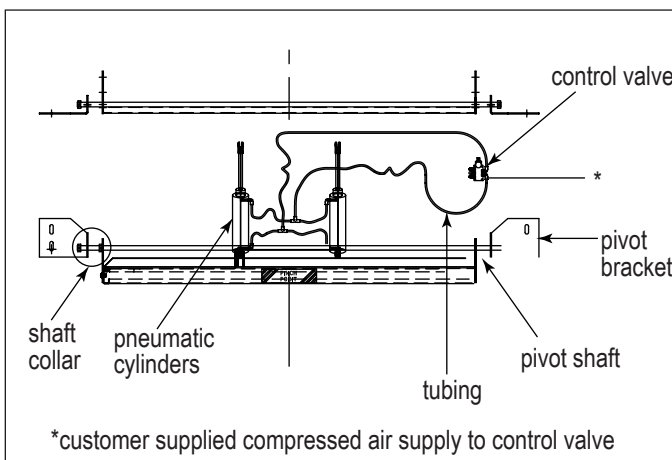
The dumpster, cover and all associated hardware are provided as a complete pack. This includes a flex hose to connect dumpster lid to hopper and guides to locate dumpster in correct position under the hopper.

Installation

1. Fully install dust collector as outlined in the IOM and installation drawings.
2. Install dumpster guides as illustrated in the dump hopper and leg pack drawing and arrangement drawings shipped with the Dumpster Pack.
3. Place lid on dumpster then place dumpster under hopper. Install flex hose to hopper bottom.
4. Place pivot rod through lid and leg pivot point. Be sure to place shaft collars as illustrated.



Pivot Bracket



Dumpster Mechanism

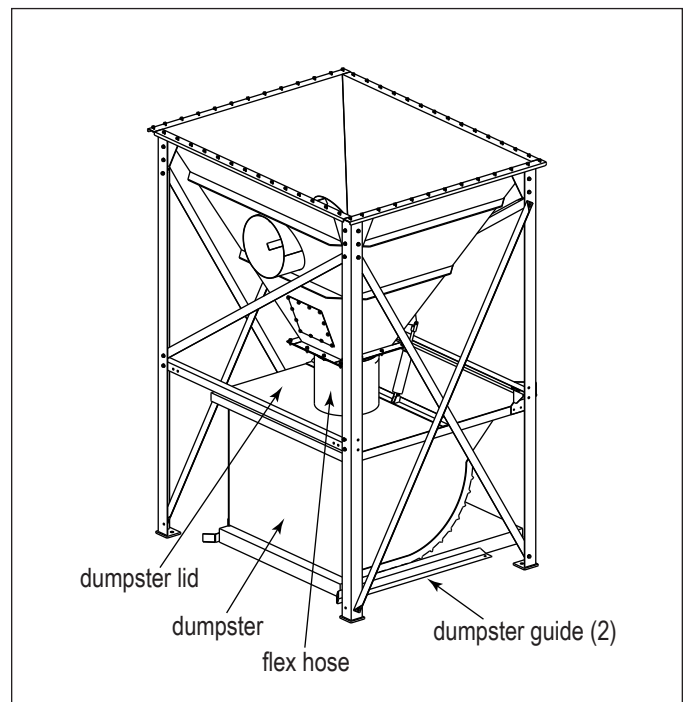
5. Mount pneumatic cylinders. Run tubing to control valve after installing control valve in convenient location.
6. Connect a compressed air source to the pneumatic control valve.
7. Connect flex hose from the hopper to the dumpster lid and tighten using hose clamp.

Operation



Improper operation or installation of dumpster pack can lead to injury.

1. Lift lid by moving valve lever until lid is totally separated from dumpster.
2. Lift dumpster with fork lift. Use caution when clearing lid.
3. Empty dumpster.
4. Return dumpster and position correctly.
5. Use caution closing lid. Watch for pinch points.
6. Secure lid with locked clamps (if equipped).



Dumpster Pack

Explosion Vent

CAUTION

Personal injury, death, and/or property damage can result from material discharge during venting.

The material discharged during the venting of an explosion must be safely directed outdoors away from areas occupied by personnel to reduce risk of personal injury and/or property damage.

The risk of personal injury and/or property damage can be minimized or avoided by locating vented equipment outside buildings and away from normally occupied areas.

Explosion vents should be inspected regularly to confirm physical and operational condition. Replace any damaged parts immediately.

Standard explosion vents are intended for outdoor installations only.

Unless otherwise noted, the explosion venting calculations are based on formulas from NFPA-68 for outdoor applications only, with no duct or obstructions on the explosion vent panel.

Contact Donaldson Torit for assistance in calculating specific venting requirements for equipment.

NFPA 68 can provide guidance on both the frequency of and appropriate details for inspections.

Sprinkler

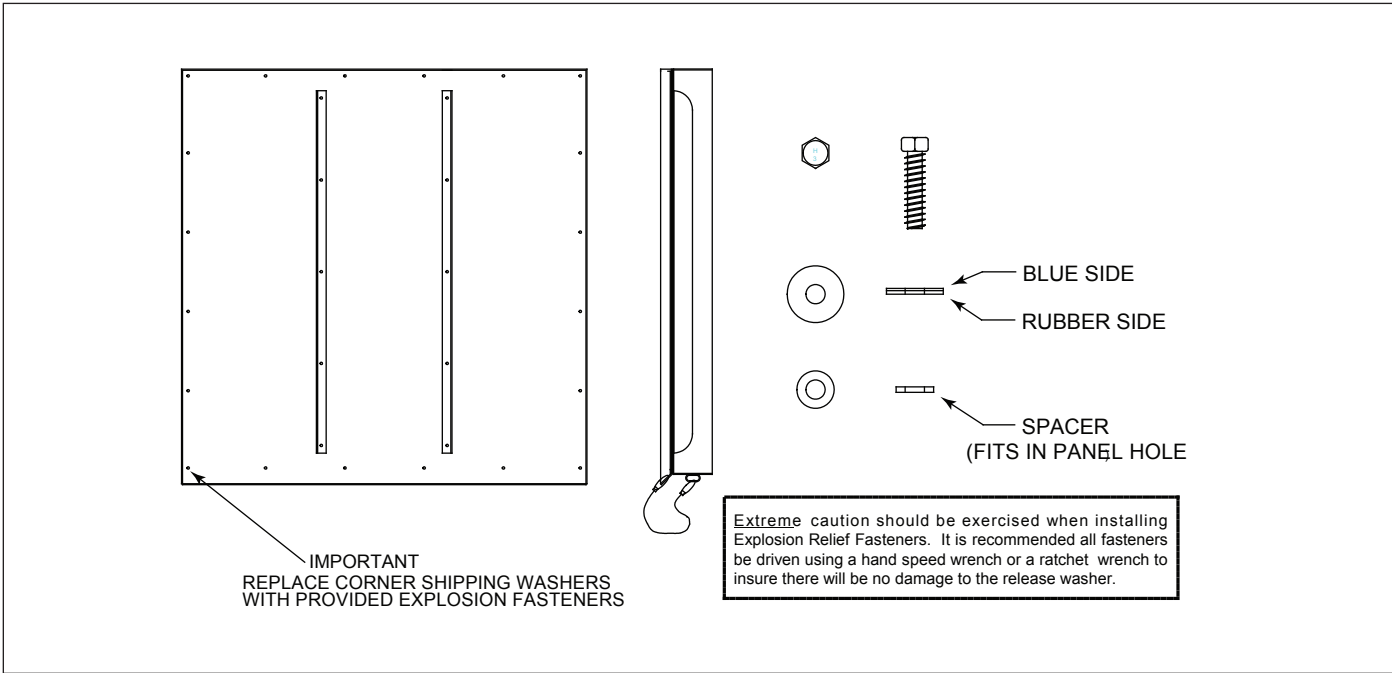
CAUTION

Sprinklers can place a large quantity of water in the dust collector when activated. Provide adequate drainage to remove water. Excess water weight can cause the leg structure to collapse.

NOTICE

Consult with local authorities when installing fire control systems on dust collection equipment.

Sprinkler couplings are provided for the convenience of fire control system installers. The fire control system installer shall make their own decisions on the appropriate location of fire control system components.



Troubleshooting

Problem	Probable Cause	Remedy
Fan blower and motor do not start	Improper motor wire size	Rewire using the correct wire gauge as specified by national and local codes.
	Not wired correctly	Check and correct motor wiring for supply voltage. See motor manufacturer's wiring diagram. Follow wiring diagram and the National Electric Code.
	Collector not wired for available voltage	Correct wiring for proper supply voltage.
	Input circuit down	Check power supply to motor circuit on all leads.
	Electrical supply circuit down	Check power supply circuit for proper voltage. Check for fuse or circuit breaker fault. Replace as necessary.
	Damaged motor	Replace damaged motor.
Fan blower and motor start, but do not stay running	Incorrect motor starter installed	Check for proper motor starter and replace if necessary.
	Access doors are open or not closed tight	Close and tighten access doors. See Filter Installation.
	Hopper discharge open	Check that dust container is installed and properly sealed.
	Damper control not adjusted properly	Check airflow in duct. Adjust damper control until proper airflow is achieved and the blower motor's amp draw is within the manufacturer's rated amps.
	Electrical circuit overload	Check that the power supply circuit has sufficient power to run all equipment.
Clean-air outlet discharging dust	Filters not installed correctly	See Filter Installation.
	Filter damage, dents in the end caps, gasket damage, or holes in media	Replace filters as necessary. Use only genuine Donaldson replacement parts. See Filter Installation.
	Access cover(s) loose	Tighten access doors securely. See Filter Installation.
Insufficient airflow	Fan rotation backwards	Proper fan rotation is clockwise when viewed from the motor side or counterclockwise when viewed through the inlet cone. See Preliminary Start-Up Check.
	Access doors open or not closed tight	Check that all access doors are in place and secured. Check that the hopper discharge opening is sealed and that dust container is installed correctly.
	Fan exhaust area restricted	Check fan exhaust area for obstructions. Remove material or debris. Adjust damper flow control.
	Filters need replacement	Remove and replace using genuine Donaldson replacement filters. See Filter Removal and Installation.

Problem	Probable Cause	Remedy
Insufficient airflow continued	Lack of compressed air	See the Specification Control Drawing shipped with the collector for compressed air supply requirements.
	Pulse cleaning not energized	Use a voltmeter to check the solenoid valves in the control panel. Check pneumatic lines for kinks or obstructions.
	Dust storage area overfilled or plugged	Clean out dust storage area. See Dust Disposal.
	Pulse valves leaking compressed air	Lock out all electrical power to the collector and bleed the compressed air supply. Check for debris, valve wear, pneumatic tubing fault, or diaphragm failure by removing the diaphragm cover on the pulse valves. Check for solenoid leaks or damage. If pulse valves or solenoid valves and tubing are damaged, replace.
	Solid-State timer failure	Using a voltmeter, check supply voltage to the timer board. Check and replace the fuse on the timer board if necessary. If the fuse is good and input power is present but output voltage to the solenoid is not, replace the timer board. See Solid-State Timer Installation.
	Solid-State timer out of adjustment	See Solid-State Timer and Solid-State Timer Wiring Diagram.
No display on the Delta P Controller	No power to the controller	Use a voltmeter to check for supply voltage.
	Fuse blown	Check the fuse in the control panel. See wiring diagram inside the control panel. Replace if necessary.
Display on Delta P Controller does not read zero when at rest	Out of calibration	Recalibrate as described in Delta P Maintenance Manual.
	With collector discharging outside, differential pressure is present from indoor to outdoor	Recalibrate with the pressure tubing attached as described in the Delta P Maintenance Manual.
Delta P Controller ON, but cleaning system does not start	Pressure tubing disconnected, ruptured, or plugged	Check tubing for kinks, breaks, contamination, or loose connections.
	Not wired to the timing board correctly	Connect the pressure switch on the timer board to Terminals 7 and 8 on TB3.
	Faulty relay	Using a multimeter, test relay for proper closure. Replace if necessary.

Troubleshooting

Problem	Probable Cause	Remedy
Pulse cleaning never stops	Pressure switch not wired to the timer board correctly	Connect the pressure switch on the timer board to Terminals 7 and 8 on TB3.
	Pressure switch terminals on the timer board jumpered	Remove jumper wire on Solid-State Timer board before wiring to the Delta P Control.
	High Pressure On or Low Pressure Off setpoint not adjusted for system conditions	Adjust setpoints to current conditions.
	Pressure tubing disconnected, ruptured, plugged, or kinked	Check tubing for kinks, breaks, contamination, or loose connections.
Alarm light is ON	Alarm setpoint too low	Adjust to a higher value.
	Excess pressure drop	Check cleaning system and compressed air supply. Replace filters if filters do not clean down.
	Pressure tubing disconnected, ruptured, plugged, or kinked	Check tubing for kinks, breaks, contamination, or loose connections.
Delta P arrow keys do not work	Improper operation	Press and hold one of the three setpoint keys to use arrow keys.
	Programming keys disabled	Remove the Program Disable jumper from Terminals 3 and 4 on TB2.
Cleaning light is ON, but cleaning system not functioning	Improper wiring	Check wiring between the Delta P Control and the timer board, and between the timer board and solenoid valve coils.
	Defective solenoids	Check all solenoid coils for proper operation.
	Timer board not powered	Check power ON light on timer board's LED display. If not illuminated, check the supply voltage to the timer board. Check the fuse on the timer board. Replace if necessary.
	Timer board defective	If LED is illuminated, observe the output display. Install a temporary jumper across the pressure switch terminals. Output levels should flash in sequence. Check output using a multimeter set to 150-Volt AC range. Measure from SOL COM to a solenoid output. The needle will deflect when LED flashes for that output if voltage is present. If LED's do not flash, or if no voltage is present at output terminals during flash, replace the board.

Problem	Probable Cause	Remedy
<p>Monitor magnehelic gauge readings - in most applications the gauge will indicate 1"-4" of static pressure drop.</p> <p>Note: new, clean filters could have pressure drop lower than this.</p>	<p>If pressure drop is consistently higher than 6" the filter is either plugged or the cleaning interval is too long.</p>	<p>Check for excessive or unusual dust loading at the dust source.</p> <p>Check for proper flow at product discharge flange on filter hopper.</p> <p>Check for adequate air supply to manifold.</p> <p>Check diaphragm valve operation.</p> <p>Check timer interval.</p>
<p>If the pressure drop is consistently below 2" the cleaning interval can be lengthened or there is a broken bag. Usually a broken bag will be accompanied by excess particulates in the exhaust air stream.</p>	<p>Check exhaust air stream for excess particulates.</p>	<p>If excess particulates are found, shut filter system down and check for broken bag(s). Follow confined space procedures whenever servicing filter(s).</p> <p>Check for excessive or unusual dust loading at the dust source.</p> <p>Check for proper flow at product discharge - flange on filter hopper.</p> <p>Check for adequate air supply to manifold.</p> <p>Check diaphragm valve operation.</p> <p>Check timer interval.</p> <p>Check dust source for unusually low dust loading.</p>

Product Information (Process Owner to complete and retain for your records)

Model Number _____	Serial Number _____
Ship Date _____	Installation Date _____
Filter Type _____	
Collected Dust _____	
Dust Properties: Kst _____ Pmax _____ MIE _____ MEC _____	
Accessories _____	
Other _____	

Service Notes

Date	Service Performed	Notes

Donaldson Industrial Air Filtration Warranty

Donaldson warrants to the original purchaser only that the Goods will be free from defects in material and manufacture for the applicable time periods stated below: (1) Major structural components for a period of ten (10) years from the date of shipment; (2) Non-Structural, Donaldson-built components and accessories including Donaldson Airlocks, TBI Fans, TRB Fans, Fume Collector products, Donaldson built electrical control components, and Donaldson-built Afterfilter housings for a period of twelve (12) months from date of shipment; and (3) Donaldson-built filter elements for a period of eighteen (18) months from date of shipment.

Buyer is solely responsible for determining if goods fit Buyer's particular purpose and are suitable for Buyer's process and application. Seller's statements, engineering and technical information, and recommendations are provided for the Buyer's convenience and the accuracy or completeness thereof is not warranted. If, after Seller receives written notice, within the warranty period, that any goods allegedly do not meet Seller's warranty, and Seller, in its sole discretion, determines that such claim is valid, Seller's sole obligation and Buyer's exclusive remedy for breach of the foregoing warranty or any Seller published warranty, will be, at Seller's option, either: (i) repair or replacement of such goods or (ii) credit or refund to Buyer for the purchase price from Seller. In the case of repair or replacement, Seller will be responsible for the cost of shipping the parts but not for labor to remove, repair, replace or reinstall the allegedly defective goods. Refurbished goods may be used to repair or replace the goods and the warranty on such repaired or replaced goods shall be the balance of the warranty remaining on the goods which were repaired or replaced. Any repair or rework made by anyone other than Seller is not permitted without prior written authorization by Seller, and voids the warranty set forth herein. Seller warrants to Buyer that it will perform services in accordance with the Sales Documents using personnel of required skill, experience and qualifications and in a professional and workmanlike manner in accordance with generally recognized industry standards for similar services. With respect to any services subject to a claim under the warranty set forth above, Seller shall, in its sole discretion, (i) repair or re-perform the applicable services or (ii) credit or refund the price of such services at the pro rata contract rate and such shall be Seller's sole obligation and the exclusive remedy for breach of the foregoing warranty on services. Products manufactured by a third party ("Third Party Product") may constitute, contain, be contained in, incorporated into, attached to or packaged together with, the goods. Buyer agrees that: (a) Third Party Products are excluded from Seller's warranty in this Section 7 and carry only the warranty extended by the original manufacturer, and (b) Seller's liability in all cases is limited to goods of Seller's design and manufacture only. EXCEPT FOR SELLER'S WARRANTY OF TITLE TO THE GOODS, SELLER EXPRESSLY DISCLAIMS AND EXCLUDES ALL OTHER WARRANTIES WHATSOEVER, WHETHER, EXPRESSED OR IMPLIED, ORAL, STATUTORY, OR OTHERWISE, INCLUDING BUT NOT LIMITED TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY AND ANY WARRANTIES ARISING FROM TECHNICAL ADVICE OR RECOMMENDATIONS, COURSE OF DEALING OR OF PERFORMANCE, CUSTOM OR USAGE OF TRADE. Seller's obligations do not cover normal wear and tear or deterioration, defects in or damage to any goods resulting from improper installation, accident or any utilization, maintenance, repair or modification of the goods, or any use that is inconsistent with Seller's instructions as to the storage, installation, commissioning or use of the goods or the designed capabilities of the goods or that, in its sole judgment, the performance or reliability thereof is adversely affected thereby, or which is subjected to abuse, mishandling, misuse or neglect or any damage caused by connections, interfacing or use in unforeseen or unintended environments or any other cause not the sole fault of Seller, and shall be at Buyer's expense. Seller's warranty is contingent upon the accuracy of all information provided by Buyer. Any changes to or inaccuracies in any information or data provided by Buyer voids this warranty. Seller does not warrant that the operation of the goods will be uninterrupted or error-free, that the functions of the goods will meet Buyer's or its customer's requirements unless specifically agreed to, or that the goods will operate in combination with other products selected by Buyer or Buyer's customer for its use.

The terms of this warranty may only be modified by a special warranty document signed by a Director, General Manager or Vice President of Donaldson. To ensure proper operational performance of your equipment, use only genuine Donaldson replacement parts.

This Product is provided subject to and conditioned upon Donaldson's Terms of Sale ("Terms"), a current copy of which is located at termsofsale.donaldson.com. These Terms are incorporated herein by reference. By purchasing or using this Product, the user accepts these Terms. The Terms are available on our website or by calling our customer service line at 1-800-365-1331.

Significantly improve the performance of your collector with genuine Donaldson Torit replacement filters and parts.

Important Notice

Many factors beyond the control of Donaldson can affect the use and performance of Donaldson products in a particular application, including the conditions under which the product is used. Since these factors are uniquely within the user's knowledge and control, it is essential the user evaluate the products to determine whether the product is fit for the particular purpose and suitable for the user's application. All products, product specifications, availability and data are subject to change without notice, and may vary by region or country.



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