

**CDF MODULAR DUST COLLECTOR
OM 23478**

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 **WARNING**

Do not proceed with these instructions* until you have READ the orange cover of this MANUAL and YOU UNDERSTAND its contents.

These WARNINGS are included for the health and safety of the operator and those in the immediate vicinity.

***If you are using a Clemco Distributor Maintenance and Part Guide, refer to the orange warnings insert preceding the Index before continuing with the enclosed instructions.**

Electronic files include a Preface containing the same important information as the orange cover.

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INDUSTRIAL
Blast Facilities
by Clemco Industries Corp.

⚠ WARNING

- Read and follow ALL instructions before using this equipment.
- Failure to comply with ALL instructions can result in serious injury or death.
- In the event that the user, or any assistants of the user of this equipment cannot read or cannot completely understand the warnings and information contained in these instructions, the employer of the user and his assistants must thoroughly educate and train them on the proper operation and safety procedures of this equipment.

NOTICE TO PURCHASERS AND USERS OF OUR PRODUCTS AND THIS INFORMATIONAL MATERIAL

The products described in this material, and the information relating to those products, is intended for knowledgeable, experienced users of abrasive blasting equipment.

No representation is intended or made as to the suitability of the products described herein for any particular purpose or application. No representations are intended or made as to the efficiency, production rate, or the useful life of the products described herein. Any estimate regarding production rates or production finishes are the responsibility of the user and must be derived solely from the user's experience and expertise, and must not be based on information in this material.

The products described in this material may be combined by the user in a variety of ways for purposes determined solely by the user. No representations are intended or made as to the suitability or engineering balance of the combination of products determined by the user in his selection, nor as to the compliance with regulations or standard practice of such combinations of components or products.

Abrasive Blast Equipment is only a component of the range of equipment used in an abrasive blasting job. Other products may include an air compressor, abrasive, scaffolding, hydraulic work platforms or booms, paint spray equipment, dehumidification equipment, air filters and receivers, lights, ventilation equipment, parts handling equipment, specialized respirators, or equipment that while offered by Clemco may have been supplied by others. Each manufacturer and supplier of the other products used in the abrasive blasting job must be contacted for information, training, instruction and warnings with regard to the proper and safe use of their equipment in the particular application for which the equipment is being used. The information provided by Clemco is intended to provide instruction only on Clemco products. All operators must be trained in the proper, safe, use of this equipment. It is the responsibility of the users to familiarize themselves with, and comply with, all appropriate laws, regulations, and safe practices that apply to the use of these products. Consult with your employer about training programs and materials that are available.

Our company is proud to provide a variety of products to the abrasive blasting industry, and we have confidence that the professionals in our industry will utilize their knowledge and expertise in the safe efficient use of these products.

GENERAL INSTRUCTIONS

Described herein are some, **BUT NOT ALL**, of the major requirements for safe and productive use of blast machines, remote control systems, operator respirator assemblies, and related accessories. Completely read **ALL** instruction manuals prior to using equipment.

The user's work environment may include certain **HAZARDS** related to the abrasive blasting operation. Proper protection for the blaster, as well as anyone else that may be **EXPOSED** to the hazards generated by the blasting process, is the responsibility of the user and/or the employer. Operators **MUST** consult with their employer about what hazards may be present in the work environment including, but not limited to, exposure to dust that may contain **TOXIC MATERIALS** due to the presence of silica, cyanide, arsenic or other toxins in the abrasive, or materials present in the surface to be blasted such as lead or heavy metals in coatings. The environment may also include fumes that may be present from adjacent coatings application, contaminated water, engine exhaust, chemicals, and asbestos. The work area may include **PHYSICAL HAZARDS** such as an uneven work surface, poor visibility, excess noise, and electrical hazards. The operator **MUST** consult with his employer on the identification of potential hazards, and the appropriate measures that **MUST** be taken to protect the blaster and others that might be exposed to these hazards.

ALL machines, components and accessories **MUST** be installed, tested, operated and maintained only by trained, knowledgeable, experienced users.

DO NOT modify or substitute any Clemco parts with other types or brands of equipment. Unauthorized modification and parts substitution on supplied air respirators is a violation of OSHA regulations and voids the NIOSH approval.

OPERATIONAL INSTRUCTIONS

OPERATOR SAFETY EQUIPMENT

⚠ WARNING


- Blast operators and others working in the vicinity of abrasive blasting must always wear properly-maintained, NIOSH-approved, respiratory protection appropriate for the job site hazards.
- **DO NOT USE** abrasives containing more than one percent crystalline (free) silica. Ref. NIOSH Alert #92-102
- Inhalation of toxic dust (crystalline silica, asbestos, lead paint and other toxins) can lead to serious or fatal disease (silicosis, asbestosis, lead or other poisoning).

- **ALWAYS** wear NIOSH-approved supplied-air respirators as required by OSHA, in the presence of any dust including, but not limited to, handling or loading abrasive; blasting or working in the vicinity of blast jobs; and cleanup of expended abrasive. Prior to removing respirator, an air monitoring

instrument should be used to determine when surrounding atmosphere is clear of dust and safe to breathe.

- NIOSH-approved, supplied-air respirators are to be worn ONLY in atmospheres:
 - NOT IMMEDIATELY dangerous to life or health and,
 - from which a user can escape WITHOUT using the respirator.
- Clemco supplied-air respirators **DO NOT REMOVE OR PROTECT AGAINST CARBON MONOXIDE (CO) OR ANY OTHER TOXIC GAS.** Carbon monoxide and toxic gas removal and/or monitoring device must be used in conjunction with respirator to insure safe breathing air.
- Air supplied to respirator **MUST BE AT LEAST GRADE D QUALITY** as described in Compressed Gas Association Commodity Specification G-7.1, and as specified by OSHA Regulation 1910.139 (d).
- ALWAYS locate compressors to prevent contaminated air (such as CO from engine exhaust) from entering the air intake system. A suitable in-line air purifying sorbent bed and filter or CO Monitor should be installed to assure breathing air quality.
- ALWAYS use a NIOSH-approved breathing air hose to connect an appropriate air filter to the respirator. Use of a non-approved air hose can subject the operator to illness caused by the release of chemical agents used in the manufacture of non-approved breathing air hose.
- ALWAYS check to make sure air filter and respirator system hoses are NOT CONNECTED to in-plant lines that contain nitrogen, acetylene or any other non-breathable gas. NEVER use oxygen with air line respirators. NEVER modify air line connections to accommodate air filter/respirator breathing hose WITHOUT FIRST testing content of the air line. **FAILURE TO TEST THE AIR LINE MAY RESULT IN DEATH TO THE RESPIRATOR USER.**
- Respirator lenses are designed to protect against rebounding abrasive. They do not protect against flying objects, glare, liquids, radiation or high speed heavy materials. Substitute lenses from sources other than the original respirator manufacturer will void NIOSH-approval of this respirator.

BLAST MACHINES AND REMOTE CONTROLS

 WARNING
<ul style="list-style-type: none"> • ALWAYS equip abrasive blast machines with remote controls. • Abrasive blast machine operators must wear NIOSH-approved supplied-air respirators (ref: OSHA regulations 1910.94, 1910.132, 1910.139 and 1910.244).

- NEVER modify OR substitute remote control parts. Parts from different manufacturers are NOT compatible with Clemco

equipment. If controls are altered, involuntary activation, which may cause serious injury, can occur.

- Inspect the air control orifice DAILY for cleanliness. NEVER use welding hose in place of twinline control hose. The internal diameter and rubber composition are UNSAFE for remote control use.
- UNLESS OTHERWISE SPECIFIED, maximum working pressure of blast machines and related components MUST NOT exceed National Board approved 125 psig (8.5 BAR).
- NEVER weld on blast machine. Welding may affect dimensional integrity of steel wall and WILL VOID National Board approval.
- Point nozzle ONLY at structure being blasted. High velocity abrasive particles WILL inflict serious injury. Keep unprotected workers OUT of blast area.
- NEVER attempt to manually move blast machine when it contains abrasive. EMPTY machines, up to 6 cu. ft.(270kg) capacity, are designed to be moved:
 - on flat, smooth surfaces by AT LEAST two people;
 - with the Clemco "Mule"; or
 - with other specially designed machine moving devices.
- Larger empty blast machines or ANY blast machine containing abrasive MUST be transported by mechanical lifting equipment.

AIR HOSE, BLAST HOSE, COUPLINGS, AND NOZZLE HOLDERS

- Air hose, air hose fittings and connectors at compressors and blast machines MUST be FOUR times the size of the nozzle orifice. Air hose lengths MUST be kept as short as possible AND in a straight line. Inspect DAILY and repair leakage IMMEDIATELY.
- Blast hose inside diameter MUST be THREE to FOUR times the size of the nozzle orifice. AVOID sharp bends that wear out hose rapidly. Use SHORTEST hose lengths possible to reduce pressure loss. Check blast hose DAILY for soft spots. Repair or replace IMMEDIATELY.
- ALWAYS cut loose hose ends square when installing hose couplings and nozzle holders to allow uniform fit of hose to coupling shoulder. NEVER install couplings or nozzle holders that DO NOT provide a TIGHT fit on hose. ALWAYS use manufacturers recommended coupling screws.
- Replace coupling gaskets FREQUENTLY to prevent leakage. Abrasive leakage can result in dangerous coupling failure. ALL gaskets MUST be checked SEVERAL times during a working day for wear, distortion and softness.
- Install safety pins at EVERY coupling connection to prevent accidental disengagement during hose movement.
- ALWAYS attach safety cables at ALL air hose AND blast hose coupling connections. Cables relieve tension on hose and control whipping action in the event of a coupling blow-out.

MAINTENANCE

- ALWAYS shut off compressor and depressurize blast machine BEFORE doing ANY maintenance.
- Always check and clean ALL filters, screens and alarm systems when doing any maintenance.
- ALWAYS cage springs BEFORE disassembling valves IF spring-loaded abrasive control valves are used.
- ALWAYS completely follow owner's manual instructions and maintain equipment at RECOMMENDED intervals.

ADDITIONAL ASSISTANCE

- Training and Educational Programs. Clemco Industries Corp. offers a booklet, Blast-Off 2, developed to educate personnel on abrasive blast equipment function and surface preparation techniques. Readers will learn safe and productive use of machines, components and various accessories, including selection of abrasive materials for specific surface profiles and degrees of cleanliness.
- The Society for Protective Coatings (SSPC) offers a video training series on protective coatings including one entitled "Surface Preparation." For loan or purchase information, contact SSPC at the address shown below.

TECHNICAL DATA AND RESEARCH COMMITTEES

- The following associations offer information, materials and videos relating to abrasive blasting and safe operating practices.

The Society for Protective Coatings (SSPC)
 40 24th Street, Pittsburgh PA 15222-4643
 Phone: (412) 281-2331 • FAX (412) 281-9992
 Email: research@sspc.org • Website: www.sspc.org

National Association of Corrosion Engineers (NACE)
 1440 South Creek Drive, Houston TX 77084
 Phone: (281) 228-6200 • FAX (281) 228-6300
 Email: msd@mail.nace.org • Website: www.nace.org

American Society for Testing and Materials (ASTM)
 100 Barr Harbor Dr., West Conshohocken, PA 19428
 Phone (610) 832-9500 • FAX (610) 832-9555
 Email: service@astm.org • Website: www.astm.org

NOTICE

This equipment is not intended to be used in an area that might be considered a hazardous location as described in the National Electric Code NFPA 70 1996, article 500.


WARRANTY

The following is in lieu of all warranties express, implied or statutory and in no event shall seller or its agents, successors, nominees or assignees, or either, be liable for special or consequential damage arising out of a breach of warranty. This warranty does not apply to any damage or defect resulting from negligent or improper assembly or use of any item by the buyer or its agent or from alteration or attempted repair by any person other than an authorized agent of seller. All used, repaired, modified or altered items are purchased "as is" and with all faults. In no event shall seller be liable for consequential or incidental damages. The sole and exclusive remedy of buyer for breach of warranty by seller shall be repair or replacement of defective parts or, at seller's option, refund

- of the purchase price, as set forth below:
1. Seller makes no warranty with respect to products used other than in accordance hereunder.
 2. On products seller manufactures, seller warrants that all products are to be free from defects in workmanship and materials for a period of one year from date of shipment to buyer, but no warranty is made that the products are fit for a particular purpose.
 3. On products which seller buys and resells pursuant to this order, seller warrants that the products shall carry the then standard warranties of the manufacturers thereof, a copy of which shall be made available to customer upon request.
 4. The use of any sample or model in connection with this order is for illustrative purposes only and is not to be construed as a warranty that the product will conform to the sample or model.
 5. Seller makes no warranty that the products are delivered free of the rightful claim of any third party by way of patent infringement or the like.
 6. This warranty is conditioned upon seller's receipt within ten (10) days after a buyer's discovery of a defect, of a written notice stating in what specific material respects the product failed to meet this warranty. If such notice is timely given, seller will, at its option, either modify the product or part to correct the defect, replace the product or part with complying products or parts, or refund the amount paid for the defective product, any one of which will constitute the sole liability of seller and a full settlement of all claims. No allowance will be made for alterations or repairs made by other than those authorized by seller without the prior written consent of seller. Buyer shall afford seller prompt and reasonable opportunity to inspect the products for which any claim is made as above stated.

Except as expressly set forth above, all warranties, express, implied or statutory, including implied warranty of merchantability, are hereby disclaimed.

DAILY SET-UP CHECK LIST

 WARNING
<ul style="list-style-type: none"> • ALL piping, fittings and hoses MUST be checked DAILY for tightness and leakage. • ALL equipment and components MUST be thoroughly checked for wear. • ALL worn or suspicious parts MUST be replaced. • ALL blast operators MUST be properly trained to operate equipment. • ALL blast operators MUST be properly outfitted with abrasive resistant clothing, safety shoes, leather gloves and ear protection. • BEFORE blasting ALWAYS use the following check list.

1. PROPERLY MAINTAINED AIR COMPRESSOR sized to provide sufficient volume (cfm) for nozzle and other tools PLUS a 50% reserve to allow for nozzle wear. Use large compressor outlet and large air hose (4 times the nozzle orifice size). FOLLOW MANUFACTURERS MAINTENANCE INSTRUCTIONS.

2. BREATHING AIR COMPRESSOR (oil-less air pump) capable of providing Grade D Quality air located in a dust free, contaminant free area. If oil-lubricated air compressor is used to supply respirator, it should have high temperature monitor and CO monitor or both. If CO monitor is not used, air **MUST** be tested **FREQUENTLY** to ensure proper air quality.

3. Clean, properly maintained NIOSH-APPROVED SUPPLIED-AIR RESPIRATOR. ALL components should ALWAYS be present. NEVER operate without inner lens in place. Thoroughly inspect ALL components DAILY for cleanliness and wear. ANY substitution of parts voids NIOSH approval i.e. cape, lenses, breathing hose, breathing air supply hose, air control valve, cool air or climate control devices.

4. OSHA required BREATHING AIR FILTER for removal of moisture and particulate matter from breathing air supply. THIS DEVICE DOES NOT REMOVE OR DETECT CARBON MONOXIDE (CO). ALWAYS USE CO MONITOR ALARM.

5. ASME CODED BLAST MACHINE sized to hold 1/2 hour abrasive supply. ALWAYS ground machine to eliminate static electricity hazard. Examine pop up valve for alignment. Blast machine MUST be fitted with a screen to keep out foreign objects and a cover to prevent entry of moisture overnight.

6. AIR LINE FILTER installed AS CLOSE AS POSSIBLE to machine inlet. Sized to match inlet piping or larger air supply line. Clean filter DAILY. Drain OFTEN.

7. REMOTE CONTROLS MUST be in PERFECT operating condition. ONLY use APPROVED spare parts, including twin-line hose. DAILY: test system operation and check button bumper and spring action of lever and lever lock. DO NOT USE WELDING HOSE.

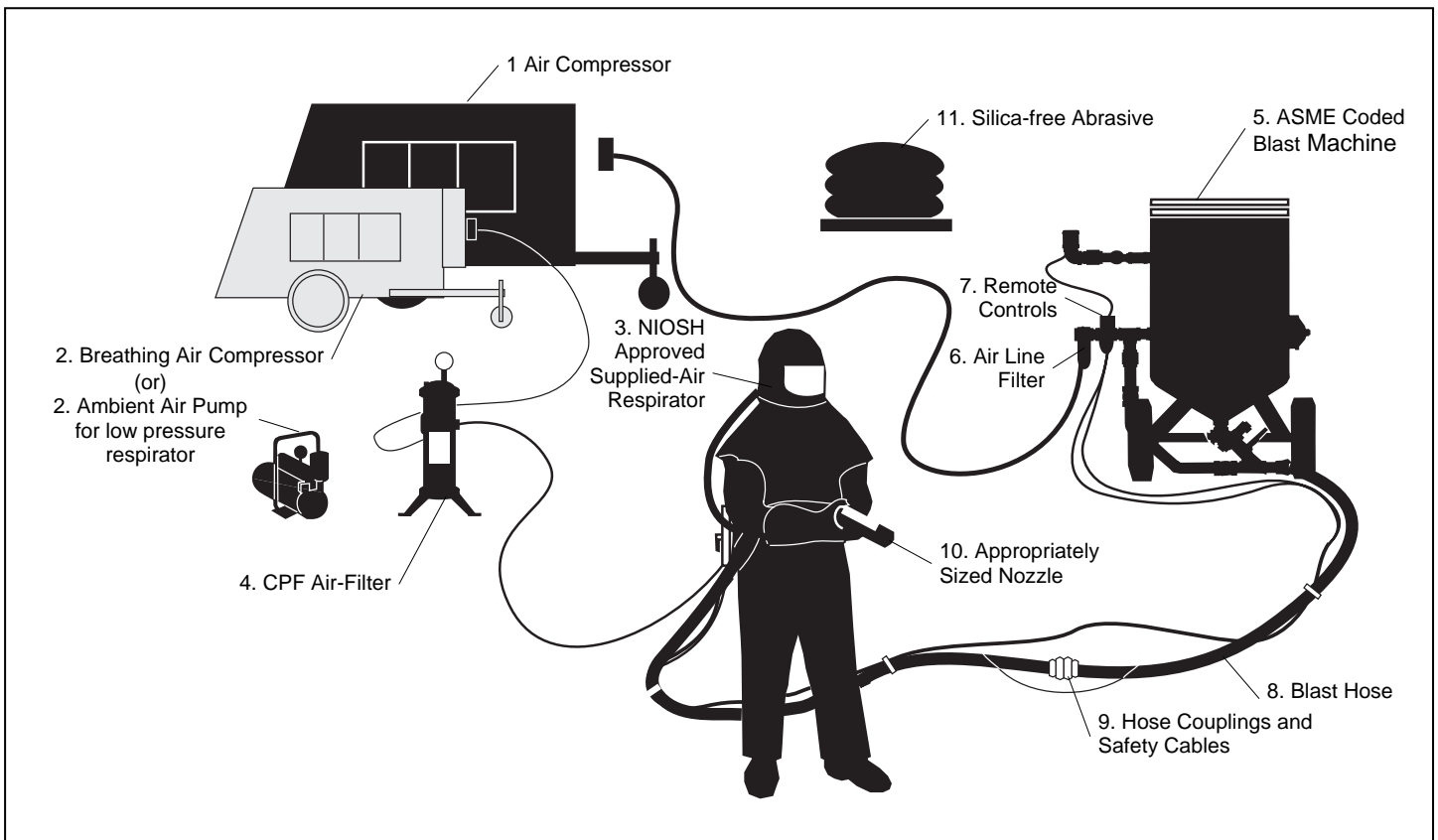
8. BLAST HOSE with ID 3 to 4 times the nozzle orifice. Lines MUST be run AS STRAIGHT AS POSSIBLE from machine to work area with NO sharp bends. Check DAILY for internal wear and external damage.

9. HOSE COUPLINGS, NOZZLE HOLDERS fitted SNUGLY to hose end and installed using PROPER coupling screws. Coupling lugs MUST be snapped FIRMLY into locking position. Gasket MUST form positive seal with safety pins inserted through pin holes. Check gaskets and replace if ANY sign of wear, softness or distortion. ALWAYS install safety cables at every connection to prevent disengagement. Check nozzle holder for worn threads. NEVER MIX DIFFERENT BRANDS OF COMPONENTS. Check each of these components DAILY.

10. Inspect NOZZLE and GASKET DAILY for wear. Replace nozzle when 1/16" larger than original size or if liner appears cracked. Check nozzle threads for wear.

11. Use abrasive that is properly sized and free of harmful substances; such as, free silica, cyanide, arsenic or lead. Check material data sheet for presence of toxic or harmful substances.

12. Test surface to be blasted for toxic substances. Take appropriate, and NIOSH required, protective measures for operator and bystanders which pertain to substances found on the surface to be blasted.



1.0 INTRODUCTION

1.1 Scope of Manual

1.1.1 This manual covers the assembly, installation, operation and maintenance of Clemco CDF Modular, Reverse Pulse Dust Collectors. Some equipment may vary slightly due to size and configuration. Drawings supplied with this manual apply to the specific dust collector provided. Use the drawings with the manual, to assemble the collector, and order replacement parts. The dust collector is one part of a larger system. This manual is to be used in conjunction with all other manuals provided with the equipment.

1.2 Safety Alerts

1.2.1 Clemco Industries Corp. uses safety alert signal words, based on ANSI Z535.4-1998, to alert the user of a potentially hazardous situation that may be encountered while operating this equipment. ANSI's definitions of the signal words are as follows:



This is the safety alert symbol. It is used to alert the user of this equipment of potential personal injury hazards.

Obey all safety messages that follow this symbol to avoid possible injury or death.

CAUTION

Caution used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

 **CAUTION**

Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

 **WARNING**

Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

 **DANGER**

Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

1.3 Table of Contents

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 Assembly, Installation..... 2.0
 Operation..... 3.0
 Adjustments..... 4.0
 Preventive Maintenance..... 5.0
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 Troubleshooting..... 7.0
 Accessories and Replacement Parts 8.0

1.4 General Description

1.4.1 CDF Dust Collector modules come in three body sizes; CDF-4, CDF-6 & CDF-8. The design of the modules is the same in each body size. Using the CDF-4 as the base-line, two racks (4 cartridges) are added to the top to make a CDF-6 module, which increased the body height accordingly, and four cartridge racks are added on CDF-8 modules.

1.4.2 Each rack contains two cartridges. Each cartridge has 252 ft² of filter media and is nominally rated at 500 cfm, rating each rack at 500 ft² and 1000 cfm.

CDF-4: Each module comes with four cartridge racks for a total of eight cartridges. Each module is nominally rated at 4000 cfm.

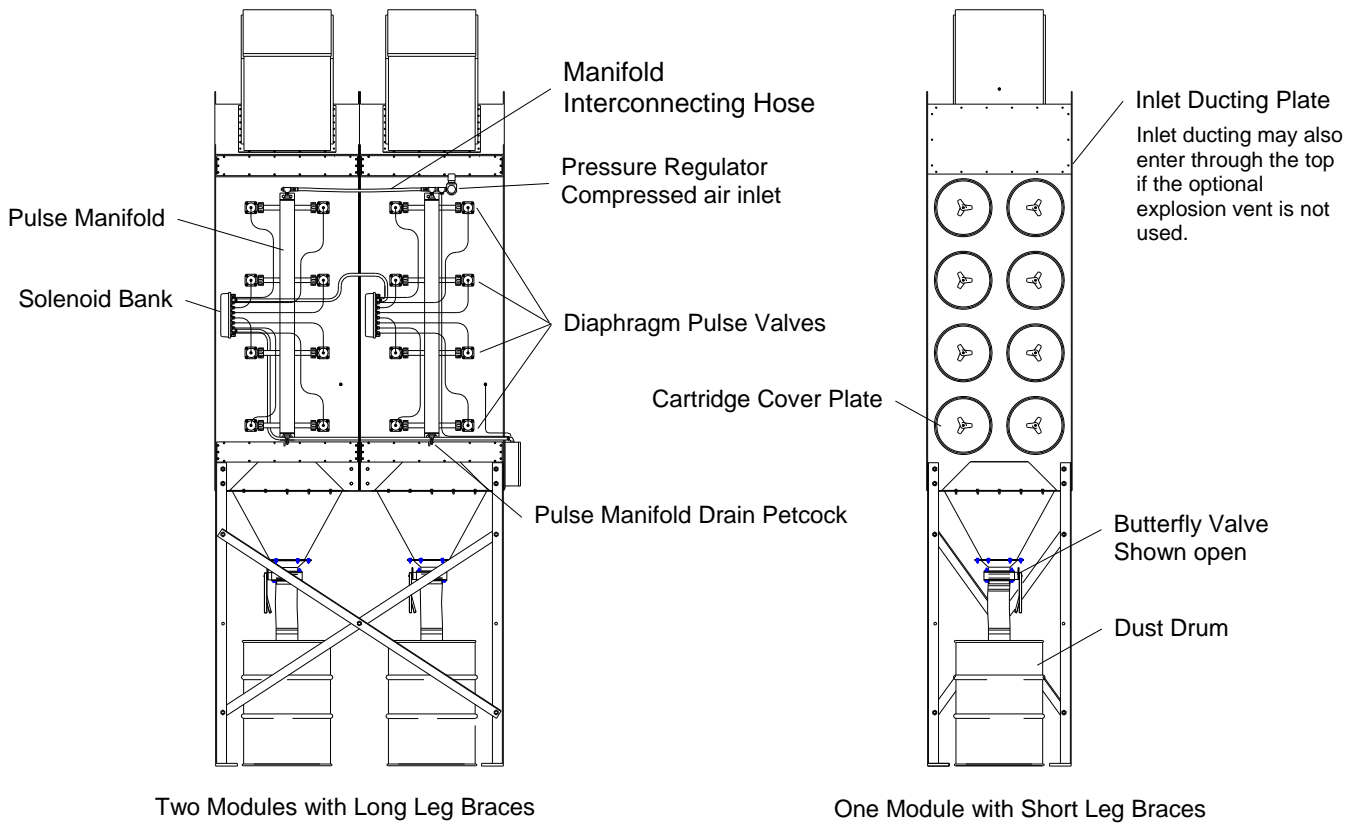
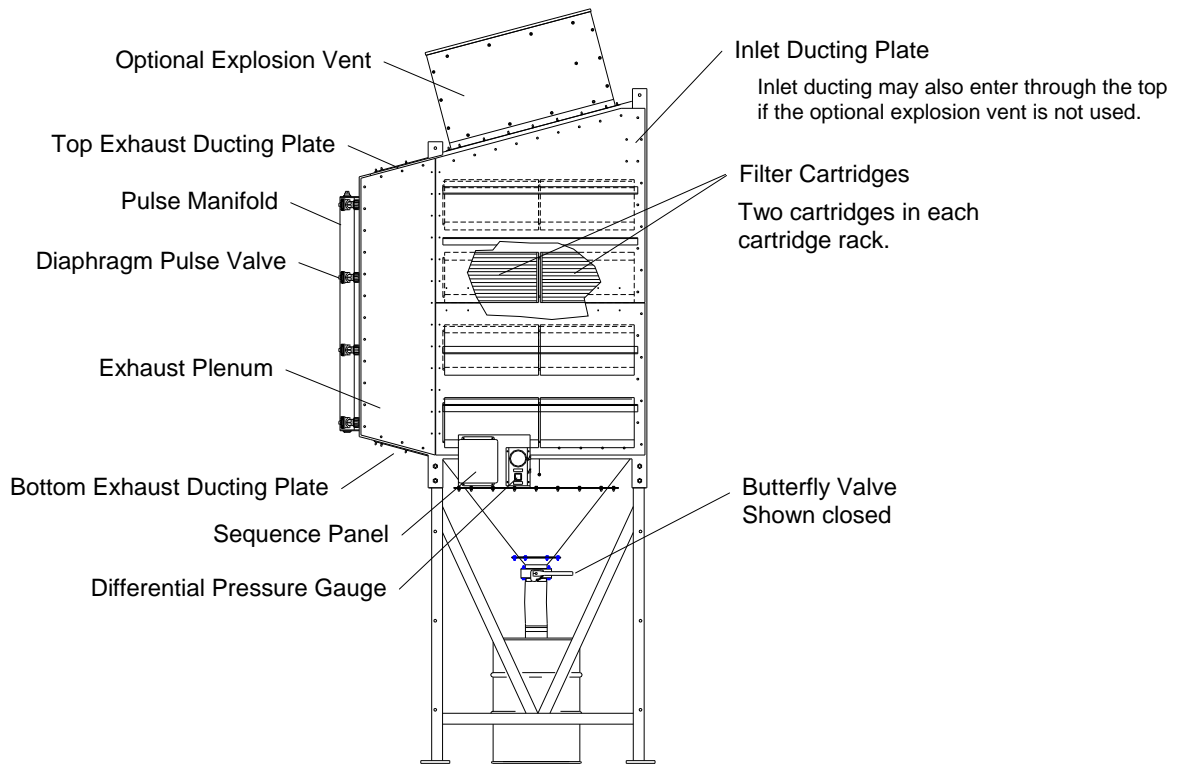
CDF-6: Each module comes with six cartridge racks, for a total of twelve cartridges. Each module is nominally rated at 6000 cfm.

CDF-8: Each module comes with eight cartridge racks, for a total of sixteen cartridges. Each module is nominally rated at 8000 cfm.

1.4.3 All illustrations used in this manual show CDF-8 modules. Except where noted, assembly and operation are the same regardless of the body size. A typical general arrangement is shown in Figure 1.

1.5 Theory of Operation

1.5.1 The exhauster draws dust-laden air through the ducting from the ventilated area, and through the filter cartridges. As the air passes through the cartridges, dust accumulates on the outer surface. Cleaned air flows through the center of the cartridges, through the plenum, exhaust ducting, and out the exhauster. The accumulated dust is periodically released from the cartridges by a pulse of compressed air.



Leg braces are installed on the manifold side to enable removal of the dust drum without interference from the pulse mechanism or exhaust ducting.

Figure 1

1.5.2 CDF Modular Dust Collectors utilize reverse pulse jet cartridge filters. Compressed air used for the pulse cleaning is released from the pulse manifold by quick-release diaphragm pulse valves. At regular timed intervals the sequence timer sends a signal to one of the solenoid valves, releasing a pulse of air, which in turn opens the respective diaphragm valve. The momentary opening of the valve releases a burst of compressed air from the manifold to the clean air side of the filter cartridges, thus reversing the air flow to remove accumulated dust.

1.5.3 Each solenoid and diaphragm valve is opened in sequence until all cartridges have been cleaned once, and then the cycle is repeated. If the switch on the sequence panel is kept in the ON position, the sequence control panel energizes when the exhauster is turned on, and stops when the exhauster is turned OFF.

1.5.4 The timers that control the ON and OFF time of the air pulse are located in the sequence control panel. The ON time should never be adjusted. The OFF time controls the length of time between each pulse. The shorter the OFF time, the more frequent the pulse cycles.

1.5.5 The differential pressure gauge shows the pressure difference between the dirty and clean side of the filters. The gauge helps determine the proper setting for the timer OFF time. See Section 4.2.

2.0 ASSEMBLY AND INSTALLATION

WARNING

Weight and bulk of the components require that erection and placement of the collector modules be performed by personnel experienced with handling structural steel, and able to safely operate material handling equipment needed to assemble the collector. Failure to recognize and avoid hazards associated with handling structural steel could result in death or serious injury.

CAUTION

All seams assembled on the job site must be sealed to weather-tight condition. Use mastic tape, caulking or gaskets on all seams, as shown on the assembly drawings.

2.1 Footing (Foundation)

2.1.1 The modules must be located on sound footing.

WARNING

All footings must be designed by a qualified engineer. Inadequate footing could result in hazardous shifting of the collector and ducting, which could result in death or serious injury.

2.2 Individual Module Assembly

2.2.1 The modules require field erection of the structural legs and brace assembly, assembly of the hopper and body, plus accessories such as ladder, hand rail, exhauster and ducting, and explosion vents.

2.2.2 Erect the collector modules as shown in the enclosed assembly drawings. Pay special attention to the orientation of the inlet and outlet duct openings, access doors, ladder, handrail, and exhauster location. If the collector is part of a facility, use the general arrangement drawings for the placement of the components.

2.3 Connecting Modules Together

2.3.1 All fasteners to bolt modules together are accessible from the outside except for the bolts on the inside of the exhaust plenum (between the plenum and cartridge chamber).

2.3.2 Check the assembly drawings for the sealing material (mastic, weather-strip gasket, caulking, etc.), and make sure the correct sealing material is in place before bolting the modules together.

2.3.3 Connect the side panels to the end modules using the seal and fasteners shown on the assembly drawings.

2.4 Anchors

WARNING

All anchors must be calculated and specified by a qualified engineer. Inadequate anchoring to the footing could result in hazardous shifting of the collector and ducting, which could result in death or serious injury.

2.4.1 Anchor modules to the footing with anchors specified by a qualified engineer.

2.5 Exhauster Assembly

NOTE: The exhauster is usually floor mounted, and requires ducting from the collector, and an exhaust stack with a damper adjustable from 0-80% closed. Some small, single module collectors may have the exhauster mounted on the collector body, and do not require additional ducting.

2.5.1 Anchor the exhauster into position. NOTE: Positioning of the exhauster must coincide with the placement of the outlet ducting. Use a temporary anchor until the ducting is in place.

2.5.2 Attach exhaust stack and damper assembly to the exhauster outlet.

2.6 Ducting

2.6.1 Clemco Industries Corp. does not usually supply inlet or exhaust ducting, but does provide a general arrangement drawing for suggested ducting. The top or bottom exhaust ducting plate, and inlet ducting plate may serve as a mounting flange, by cutting an opening and welding the ducting to the plate.

2.6.2 All duct work must be designed and installed by qualified licensed contractors familiar with industrial ventilation practices, and must conform to applicable codes. Where state or local codes conflict with the other, or with specifications by Clemco Industries Corp., the more stringent regulation shall be followed.

CAUTION

All ducts, joints, and connections must be tight. Any leaks will affect the overall performance of the system.

CAUTION

Ducting must be supported sufficiently to place no load on connecting equipment.

2.6.3 Exhaust Ducting

CAUTION

The joint between the duct and exhauster housing must be flexible, such as canvas or rubber with band clamps. The ducting must be self supporting. NO LOAD IS TO BE APPLIED TO THE EXHAUSTER BY THE DUCTING.

2.6.3.1 The illustration in Figure 2 shows a typical ducting and exhauster arrangement. The illustration is for reference only; it is not to be used to fabricate ducting.

2.6.4 Inlet Ducting

2.6.4.1 The illustration in Figure 3 shows typical inlet ducting. The illustration is for reference only; it is not to be used to fabricate ducting.

2.7 Electrical Connections

WARNING

Shorting electrical components could result in death, serious electrical shocks, or equipment damage. All electrical work, or any work done inside an electrical panel, must be performed by qualified electricians, and comply with applicable codes.

NOTE: Wiring schematic for the sequence panel, exhauster motor, control panel and other electrical accessories are included when accessories are furnished by Clemco Industries Corp. Refer to the Table of Contents for the locations of the electrical wiring schematics.

2.7.1 The dust collector should be controlled by a separate switch to enable operation before and after all other components in the system. Wire all other components to start in series to prevent the overloading of any component. The last segment in the system that the abrasive reaches should start first and stop last. A complete blast and recovery facility will have the dust collector start first; followed by the abrasive cleaner, bucket elevator, and floor recovery. Shutdown is in reverse order.

2.7.2 Electrical connections are required for the exhauster motor and sequence control panel. Unless the collector is operated in conjunction with a Clemco-provided system control panel, a customer-supplied starter is also required. When the exhaust fan is connected, make sure it rotates in the direction of the scroll.

2.7.3 Sequence panel wiring must enter through the bottom of the panel to avoid potential leakage.

2.8 External Grounding

2.8.1 To dissipate static electricity, attach an external grounded wire from an earth ground to the grounding lug located next to the sequence panel.

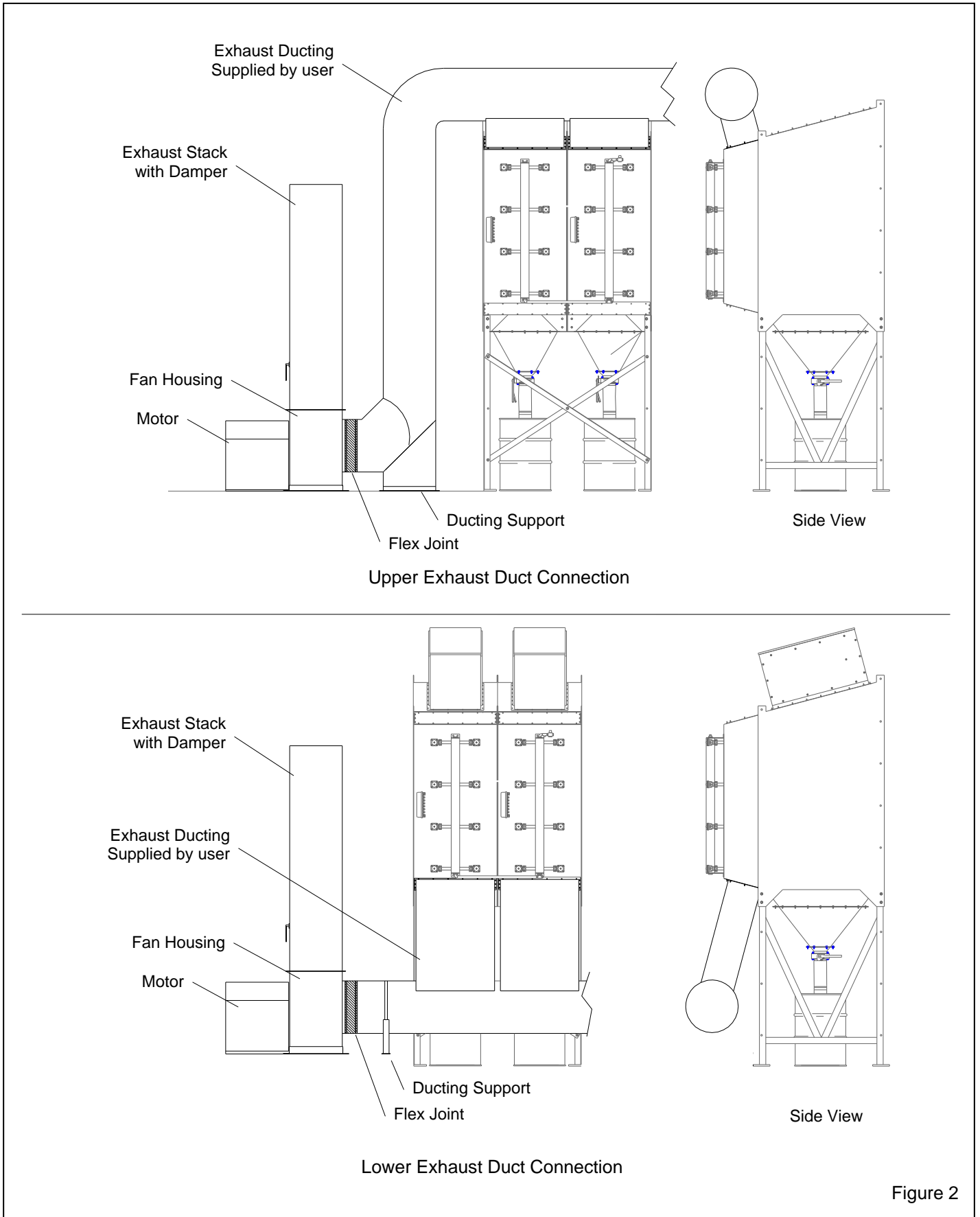


Figure 2

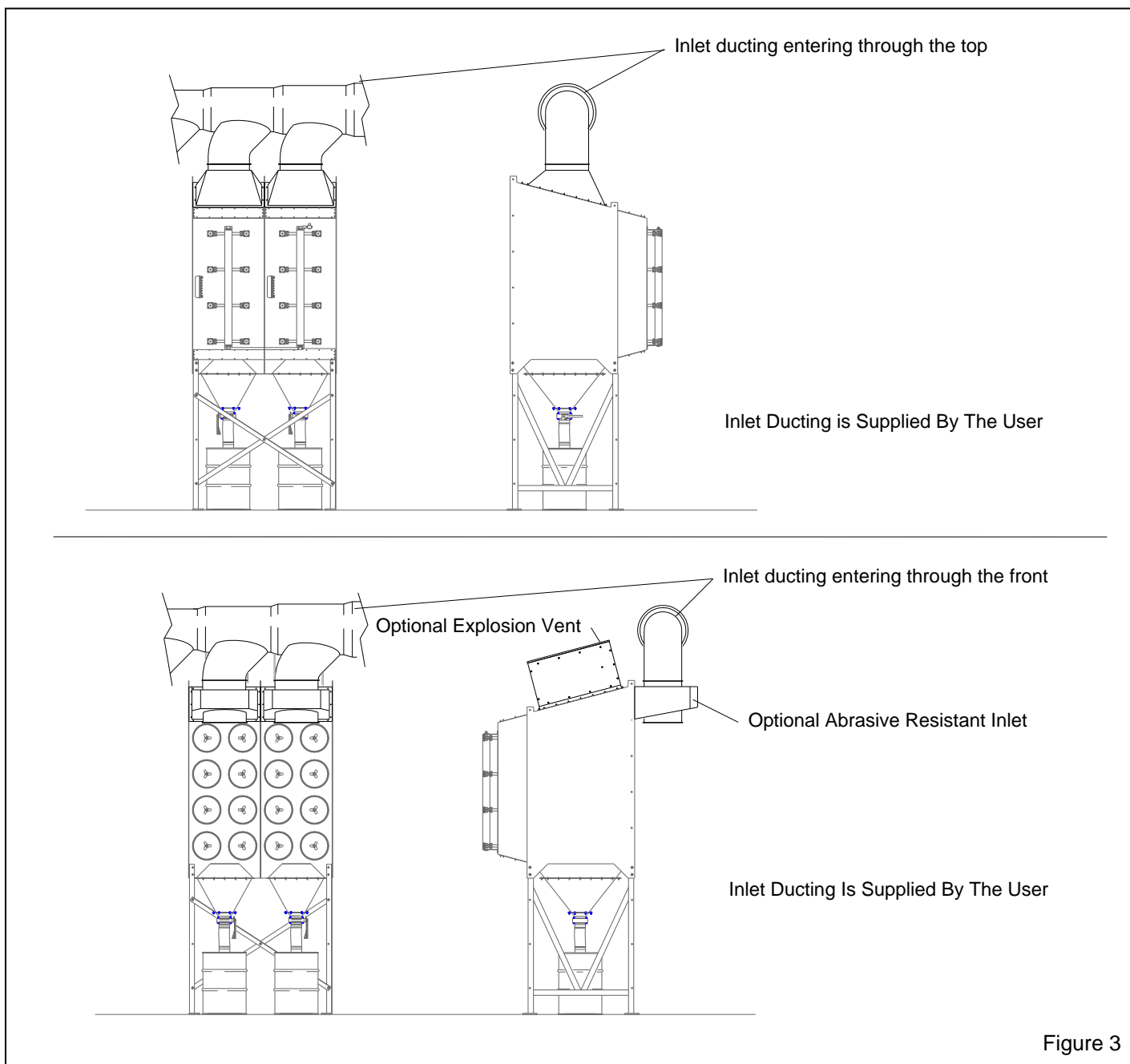


Figure 3

2.9 Compressed Air Connections

CAUTION

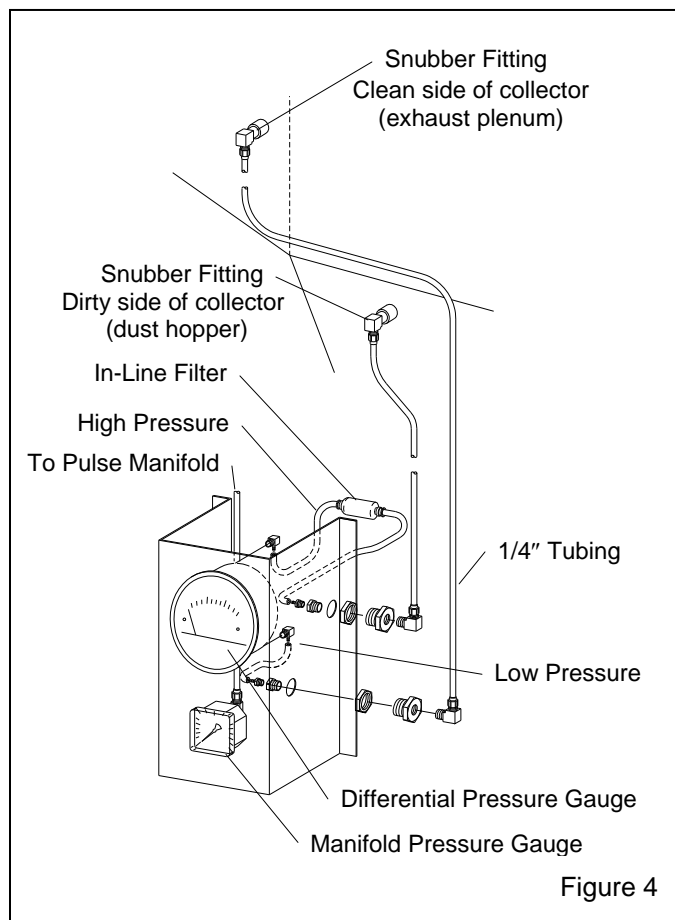
The air source for the filter pulse must be 35 to 50 degrees Fahrenheit dew point and be free of any oil contaminants. If line air does not meet this requirement, an optional air dryer is recommended. Moisture or oil contaminants in the pulse system will decrease cartridge life and filtering efficiency

2.9.1 Connect a link hose between each pulse manifold.

2.9.2 An air line must be supplied to the pressure regulator located on the pulse manifold inlet. The size of the line depends on the number of modules. The compressor and piping supplying air to the pulse manifold must be large enough to provide at least 3 cfm per cartridge. The air line should not be smaller in diameter than the manifold inlet at the regulator.

2.9.3 Purge the air supply line to remove moisture or other foreign material before connecting it to the pulse manifold.

2.9.4 Connect tubing to the differential pressure indication panel as shown in Figures 1 and 4.



2.10 Install Filter Cartridges, Ref. Figure 5

CAUTION

Use extreme care when handling the cartridges. Minor dents could cause the cartridge to leak.

2.10.1 Slide two cartridges (gasket end first) over the support guide.

2.10.2 Place the cover plate (Make sure the rim gasket is in place and the cartridge gasket is toward the inside) over the support rod.

2.10.3 Place the rubber-backed washer (rubber facing the cover plate) over the support rod.

2.10.4 Tighten the tensioning knob securely.

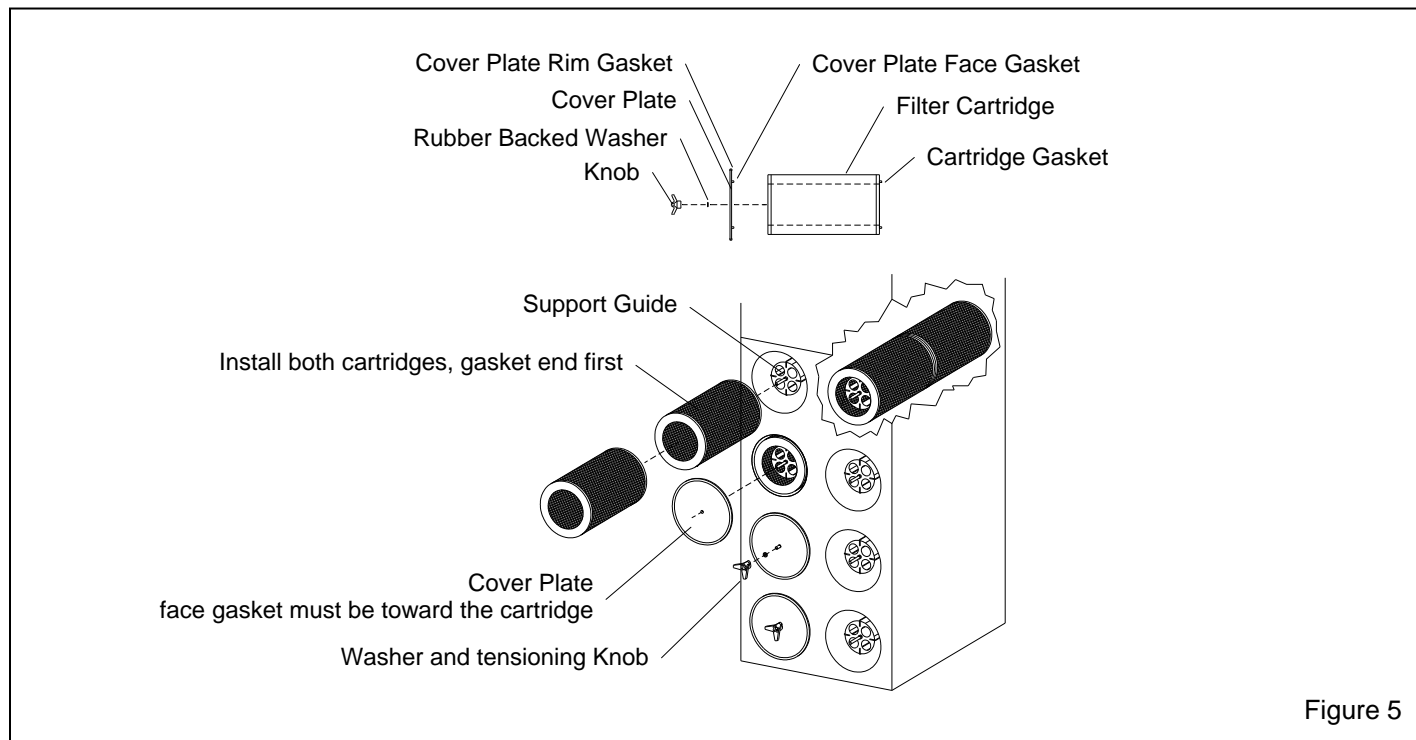
2.11 Dust Containers

2.11.1 Attach a flex hose and dust drum lid to the bottom of the dust hopper dump-out valve.

2.11.2 Place a dust drum under the dust lid and securely attach the lid to the drum.

CAUTION

All flex hose connections made at the bottom of the hopper and the lid must be air tight.



3.0 OPERATION

WARNING

All persons operating this equipment must be made aware of the hazards of abrasive blasting, and handling toxic materials, including lead and silica dust. Toxicity and health risk vary with the type of media, and dust generated by blasting. Identify all material being removed by blasting, and obtain a materials safety data sheet for the blast media.

3.1 The dust collector access doors and cover plates must be closed, and the dump-out valves open when the dust collector is in operation.

3.2 Initial Start-up

WARNING

Do not look into the exhaustor outlet while the fan is turning. Injury to the eye or face could result from objects being ejected from the exhaustor.

3.2.1 Check motor rotation by jogging the starter (momentarily turn switch on and off). This will cause the motor to rotate slowly. Look through the slots in the fan housing on the end of the motor where rotation of the fan can easily be observed. Proper rotation is indicated by the arrow on the exhaustor housing. The fan should rotate toward the scroll.

CAUTION

Do not pulse new dust collectors or replacement cartridges until the cartridges are properly seasoned. See Section 6.2. Pulsing unseasoned cartridges could cause premature cartridge failure or decrease the efficiency of dust collector.

3.2.2 With the sequence switch OFF, pressurize the pulse manifold to 100 psi and check pneumatic connections for leaks.

3.2.3 Turn pulse pressure to 20 psi and switch the pulse sequence ON. Check the air pulse and sequence of the diaphragm pulse valves, solenoids, and panel timer. After all items are checked, turn the sequence switch OFF. **Do not switch the sequence panel on until the cartridges are seasoned per Section 6.2.**

3.3 Operational Start-Up

3.3.1 Make sure access doors are closed, and slide gates or dump-out valves are open.

3.3.2 Start the exhaustor at the control panel.

3.3.3 Pressurize the pulse manifold and check the manifold pressure.

3.3.4 Check the differential pressure gauge. If differential pressure is greater than 5", turn the sequence switch ON. Leave the switch OFF if the differential pressure is less than 5". **NOTE: Optimal filtering efficiency is obtained with differential pressure between 3" and 5". Use the sequence toggle switch to start or stop the pulse sequence as need to maintain 3" and 5" differential pressure.**

CAUTION

Do not turn the sequence switch ON until the cartridges are seasoned. See Section 6.2.

3.4 Shutdown

3.4.1 Allow the system to run until all system components are empty (see the accessory components operation manual) and all areas ventilated are free of airborne dust.

3.4.2 Turn off the exhaustor.

3.4.3 Shut off the air supply to the pulse manifold.

3.4.4 Drain the pulse manifolds. The drain cock is mounted at the bottom of each manifold. Refer to Figure 1. Drain whenever the air supply is turned off.

3.4.5 Close the dust hopper dump valves, and empty all dust receptacles.

4.0 ADJUSTMENTS

4.1 Pulse Manifold Pressure

4.1.1 A pressure regulator is provided on the manifold inlet. Start the pulse cycle with the pressure at 40 psi. An additional manifold pressure gauge is mounted on the differential pressure panel to enable monitoring pressure from ground level. The panel is usually mounted on the back, right side of the collector. Refer to Figure 4.

4.2 Pulse Sequence Control Panel and Timer

4.2.1 The toggle switch mounted on the sequence control panel cover enables or disables the pulse sequencing. If the switch is ON, the pulse sequence will automatically start whenever the dust collector exhauster is started. If the switch is OFF, the pulse sequence will not occur. The switch should be left OFF (no pulse) until the cartridges are seasoned. See Section 6.2.

4.2.2 The timer is factory set at 40 seconds OFF and approximately 15/100 of a second ON. Every 40 seconds, one filter rack is pulsed in sequence until all filters have gone through a cycle.

4.2.3 As the filters cake with dust, the pulse may not clean them well enough to bring the differential pressure within the optimal range of 3" to 5". A pressure reading higher than 5" is an indication that more frequent pulse is needed. When the differential pressure gauge shows a constant pressure difference greater than 5", adjust the OFF time setting to 20 seconds. DO NOT ADJUST ON TIME. Increasing ON time will consume more air, but will NOT increase cleaning efficiency.

4.2.4 When the frequency of the pulse cycles will not lower the differential pressure to less than 5.5" or if a decrease in the efficiency is noted, increase pulse pressure by 10 psi and reset the OFF time to 40 seconds. Continue to alternate OFF time and pressure (each time pressure is increased reset OFF time to 40 seconds) by 10 psi increments until the maximum of 100 psi and 20 second OFF time is reached.

4.2.5 When the frequency of the pulse cycles and higher pulse pressure will not lower the differential pressure below 5.5 or when efficiency decreases, the filter cartridges should be replaced and the timer OFF time reset to 40 seconds, and pressure set to 40 psi. See Section 6.1.

4.3 Exhauster Damper Setting, for Recovery Applications

4.3.1 Refer to the reclaiming manual for damper settings when the dust collector is used for recovery.

4.4 Exhauster Damper Setting, Room Ventilation

4.4.1 Set the exhaust damper to match the ventilation requirements (feet per minute) for which the blast enclosure is designed. This information is on the General Arrangement Drawing on Clemco supplied blast rooms.

5.0 PREVENTIVE MAINTENANCE

WARNING

Make sure the following conditions are met before performing any maintenance on the collector.

- Turn off compressed air supply and drain air from pulse manifolds.
- Turn off sequence control switch.

Failure to observe the above warnings could result in serious injury from the sudden release of trapped compressed air or the operator losing balance.

- Always wear a properly-fitted and maintained, NIOSH-approved respirator, eye protection and safety clothing when servicing dust-laden areas of the dust collector.

Failure to do so could result in serious eye irritation and lung disease or death. Toxicity and health risk vary with type of media, and dust generated by blasting. Identify all material that is being removed by blasting, and obtain a Materials Safety Data Sheet for the blast media.

5.1 Daily

5.1.1 Empty dust drums.

NOTE: Check dust drum(s) daily until the dust collection rate is determined. At that time setup a program to empty the drums before they are 2/3 full. Dust should never accumulate in the hoppers.

5.1.1.1 Close the butterfly valve by pulling the release lever toward the handle and turn the handle horizontal. Loosen the clamp ring and remove the drum lid. Remove the drum from under the collector and empty the dust into a suitable container. Replace the lid and make sure the lid clamp ring is secured.

5.1.1.2 Open the butterfly valve by turning the handle vertical.

5.1.2 Check the exhaust air during a pulse cycle.

5.1.2.1 If dust discharges from the exhauster, filters are leaking or damaged. Check immediately. To determine which module is leaking remove the exhaust ducting plate and check the inside of the air plenum for dust trails. NOTE: A small amount of dust egress is normal for a short period of time when cartridges are new.

5.1.3 Check the differential pressure gauge at least once daily, and more often under dusty conditions. Turn

the sequence switch ON or OFF as necessary to maintain optimal differential pressure (3" to 5"). If the reading is continually high (greater than 5.5"), adjust pressure and/or sequence timing per Section 4.1 and 4.2.

5.2 Weekly

5.2.1 Check the inside of the collector for moisture. If moisture is caused by leaks, repair immediately.

5.2.2 Clean the differential pressure gauge in-line filter located behind the gauge panel. Refer to Figure 4.

6.0 SERVICE MAINTENANCE

6.1 Replacing Filter Cartridge

WARNING

Make sure the following conditions are met before performing any maintenance on the collector.

- Turn off compressed air supply and drain air from pulse manifolds.
- Turn off sequence control switch.

Failure to observe the above warnings could result in serious injury from the sudden release of trapped compressed air or the operator losing balance.

- **Always wear a properly-fitted and maintained, NIOSH-approved respirator, eye protection and safety clothing when servicing dust-laden areas of the dust collector.**

Failure to do so could result in serious eye irritation and lung disease or death. Toxicity and health risk vary with type of media, and dust generated by blasting. Identify all material that is being removed by blasting, and obtain a Materials Safety Data Sheet for the blast media.

NOTE: When removing filter cartridges, remove one set at a time. Start at the top and work down.

6.1.1 Lock out and tag out the compressed air supply and electrical power.

6.1.2 Empty the hoppers and dust receptacles.

6.1.3 Remove the knob and rubber-backed washer securing the cover plate.

6.1.4 Rotate the cartridge 180° to remove dust from the top, and remove the cartridges. A small amount of side ward force may be necessary to loosen the seal of the cartridge gaskets. NOTE: Contain dust by sliding a durable plastic bag over the cartridge as it is removed.

6.1.5 When all cartridges are removed, clean the inside of the collector to remove loose dust or hardened dust clods, particularly from the cartridge sealing surface, and the clean-air side (back) of the cartridge sheet.

6.1.6 Inspect the cover plate rim seal, and replace if it is hardened or damaged.

6.1.7 Install new cartridges per Section 2.10.

6.1.8 Reset timer OFF time to 40 seconds, and set pulse pressure to 70 psi.

6.1.9 Turn the sequence panel off and season cartridges per Section 6.2.

6.2 Seasoning Cartridges

NOTE: Filter cartridges must be seasoned before the initial start-up and each time the cartridges are replaced.

6.2.1 New cartridges must be seasoned before starting the pulse cycle. Cartridges are seasoned by letting a dust layer develop on the outside surface of the filter media. The dust layer protects the filter cartridge, and enhances the filtering efficiency. Use one of the following methods to season the cartridges:

6.2.2 Seasoning without conditioner

6.2.2.1 Operate the dust collector without pulsing (sequence switch turned off) until the differential pressure gauge reads the recommended changeover pressure of 5". At that point turn on the sequence switch to start the pulsing cycle.

6.2.2.2 After the differential pressure is reached, turn the sequence switch ON to start the pulse cycle.

6.2.3 Seasoning with pre-treat conditioner

6.2.3.1 Before conditioning the filter cartridges, the following conditions must be met:

1. All cartridges must be installed and the cover plated tightly secured.
2. The sequence switch turned OFF to prevent pulsing.
3. The exhaust damper should be fully opened.

6.2.3.2 The recommended treatment is 10 lbs. per 1000 ft² (two cartridge racks {4 cartridges}) of filter material. Conditioner comes in 5 gallon buckets containing 7.6 lb. of conditioner, or 23 lb. bags. Make sure enough conditioner is on hand to treat the cartridges as follows:

Model	Filter Area	Lb. of Conditioner
CDF-4	2000 sq. ft.	20 lbs. (3 buckets*)
CDF-6	3000 sq. ft.	30 lbs. (4 buckets)
CDF-8	4000 sq. ft.	40 lbs. (6 buckets*)
CDF-12	6000 sq. ft.	60 lbs. (8 buckets)
CDF-16	8000 sq. ft.	80 lbs. (11 buckets*)

Use conditioner proportionately for larger collectors

* It does not harm the cartridges to add additional amount of conditioner, Use the conditioner rather than store partially full buckets.

6.2.3.3 With the exhauster running, add the conditioner to the dirty-air side of the ventilation system that has sufficient velocity to carry the conditioner away, such as blast room outlet baffle or reclaim access door. Feed the conditioner at a slow enough rate that it does not fall out of the air stream at the intake point.

6.2.3.4 Allow the exhauster to run an additional five minutes after all conditioner is in the system, then readjust the damper to the correct setting.

6.2.3.5 Operate the collector without pulsing until the differential pressure gauge reads 4". After the 4" differential pressure is reached turn the sequence switch ON to start the pulse cycle.

6.2.4 Set Pulse Sequence Timer

6.2.4.1 After the differential pressure is reached, set the timer OFF time to 40 seconds, and set the pulse pressure at 40 psi. See Section 4.1 and 4.2.

7.0 TROUBLESHOOTING

⚠ WARNING

Shut down the collector immediately when dust emits from the exhauster. Check to make sure filters are correctly seated and not worn or damaged. Prolonged breathing of abrasive dust and blasting by-product dust could result in serious lung disease or death. Short term ingestion of toxic dust such as lead, poses an immediate danger to health. Identify all materials that are to be removed by blasting, and obtain a Material Safety Data Sheet for the blast media.

7.1 Collector Not Pulsing

7.1.1 Check the manifold pressure gauge. If pressure is low, check the compressed air supply; look for a closed supply valve.

7.1.2 Check function of the pressure regulator located on the pulse manifold inlet.

7.1.3 Make sure the sequence switch located on the panel cover is ON.

7.1.4 Check the fuse in the sequence control panel. Replace as necessary.

7.1.5 Have a qualified electrician check for electrical malfunction; check the supply voltage to pulse sequence board. Check outlet voltage to solenoids.

7.2 Some Cartridges Not Pulsing

7.2.1 Solenoid defective. Have a qualified electrician check supply voltage to solenoids.

7.2.2 Check the diaphragm pulse valves.

7.2.3 Check for blockage in the tubing between the diaphragm pulse valve and solenoid assembly.

7.3 Pulse Is a Steady Stream of Air Instead Of a Quick Pulse

7.3.1 Check for a leak or split in the tubing between the diaphragm pulse valve and solenoid assembly.

7.3.2 Solenoid remaining in open position. Have a qualified electrician check for electrical malfunction, clean, or replace.

7.4 Exhauster Not Running

7.4.1 Exhauster overload could be tripped. Have a qualified electrician reset and check for overload.

7.4.2 Make sure that the main disconnect is in the ON position.

7.4.3 Motor faulty. Have a qualified electrician check for electrical malfunction.

7.5 Excessive Differential Pressure

7.5.1 Valves may not be pulsing properly. See 7.1.

7.5.2 The differential pressure gauge lines may be plugged with dust. Check and clean.

7.5.3 The in-line dust filter may be blocked. Check and replace.

7.5.4 Snubber fitting blocked with dust. Clean or replace. Refer to Figure 4.

7.5.5 The sequence OFF time may need adjusting. See Section 4.2.

7.5.6 Manifold pressure may need to be increased. See Section 4.2.4 and 4.2.5.

7.5.7 The filter cartridges may need to be replaced. See Section 4.2 and 6.1.

7.6 No Reading on Differential Pressure Gauge

7.6.1 Check to make sure the low and high-pressure lines are not reversed. Refer to Figure 4.

7.7 Dust Emitting From Exhauster

7.7.1 Check for damaged filter cartridge. Look for wear or damage on the filter material, dented ends, and damaged gaskets.

7.7.2 Loose cover plates, make sure the cover plate tensioning knobs are tight.

7.7.3 Cartridges not seasoned, see Section 6.2.

8.0 ACCESSORIES and REPLACEMENT PARTS

Refer to assembly drawings for replacement parts for specific dust collectors. Any replacement parts that do not have a stock number should be ordered by referencing the job order number, drawing number, part description, location, and quantity.

8.1 Conditioner, Cartridge Pre-Treatment

- 7.6 lb. bucket23770
- 23 lb. bag23771

8.2 Differential Pressure Panel Assembly, Fig. 6

Item	Description	Stock No.
1.	Gauge, pressure	19150
2.	Gauge, differential pressure	10188
3.	Snubber fitting	15786
4.	Filter, in-line dust	23415
5.	Fitting, 1/8" NPT straight x 1/8" barb	11732
6.	Fitting, 1/8" NPT-F x 1/4" tubing	15703
7.	Elbow, 1/8" x 90° brass st.	03993
8.	Fitting, 1/8" NPT elbow x 1/8" barb	11733
9.	Fitting, 1/4" NPT elbow x 1/4" tubing	03428
10.	Tubing, 1/8" urethane, Specify ft. req.	12475
11.	Fitting, 1/4" NPT female bulkhead	05605
12.	Bushing, 1/4" NPT x 1/8" NPT brass	02010
13.	Tubing, 1/4" OD, specify feet required	15892

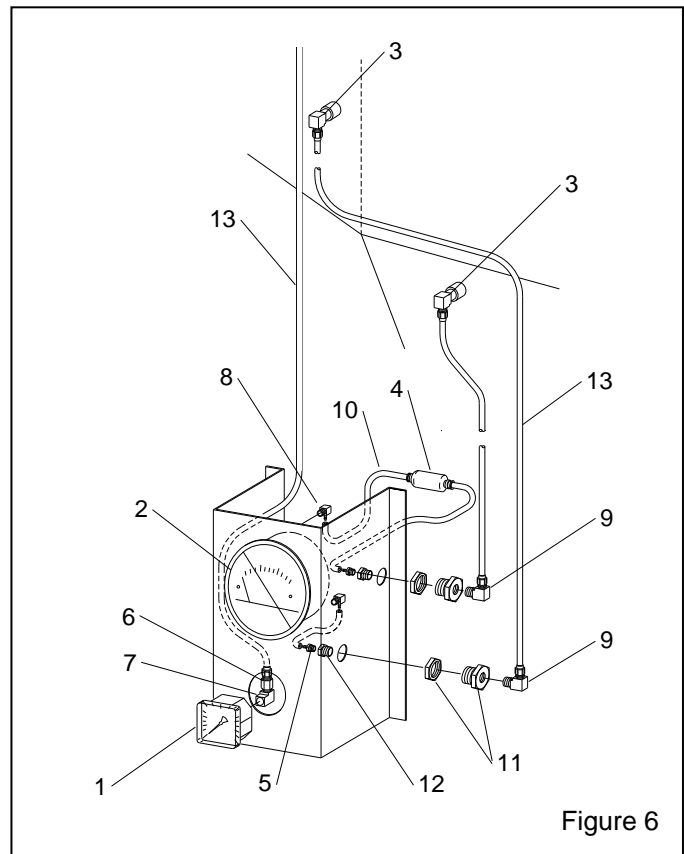


Figure 6

8.3 Common Replacement Parts, Figure 7

Item	Description	Stock No.
1.	Valve, 1" diaphragm pulse	10392
(-)	Repair kit for 1" pulse valve (above)	21600
2.	Cover plate, cartridge	23695
3.	Seal, cover plate rim	23742
4.	Gasket, cover plate face	23715
5.	Cartridge, filter (2 required per rack)	23744
6.	Knob, 3-arm tensioning	23741
7.	Washer, rubber-backed	23739
8.	Solenoid assembly,	
	5 valve bank	15743
	6 valve bank	15742
	8 valve bank	15744
9.	Solenoid, individual replacement	
	for 5 & 8 solenoid bank	24198
	for 6-solenoid bank	27044
10.	Tubing, 1/4" OD, specify feet required	15892
11.	Clamp, 6-1/2"	00750

12.	Hose, 6" flex, 1 ft. required	12452
13.	Fitting, 1/8" NPT elbow x 1/4" tubing	15787
14.	Fitting, 1/4" NPT straight x 1/4" tubing	11737
15.	Petcock, 1/4" drain	01993
16.	*Regulator, 1/2" pressure w/gauge	01902
17.	Fitting, 1/2" NPT x 1/2" male 37°	11351
18.	Hose end, 1/2" barb x 1/2" female swivel	15002
19.	Hose, 1/2" ID air, 4 ft. required	12472
20.	Gauge, 1/8" cbm pressure (replacement)	01908
21.	Bushing, 1/4" x 1/8" brass, (not shown)	02010
22.	Circuit board, pulse sequence (not shown)	
	six-output board	15745
	ten-output board	15746
23.	Gasket, 3/16" x 1" adhesive backed	
	specify feet required	00186
24.	Valve, 5" butterfly	21289
25.	Gasket, 5" butterfly valve, 2 required	21455

* Used with up to size CDF-24 dust collector. For larger size collectors, refer to the parts/assembly drawing provided with the dust collector.

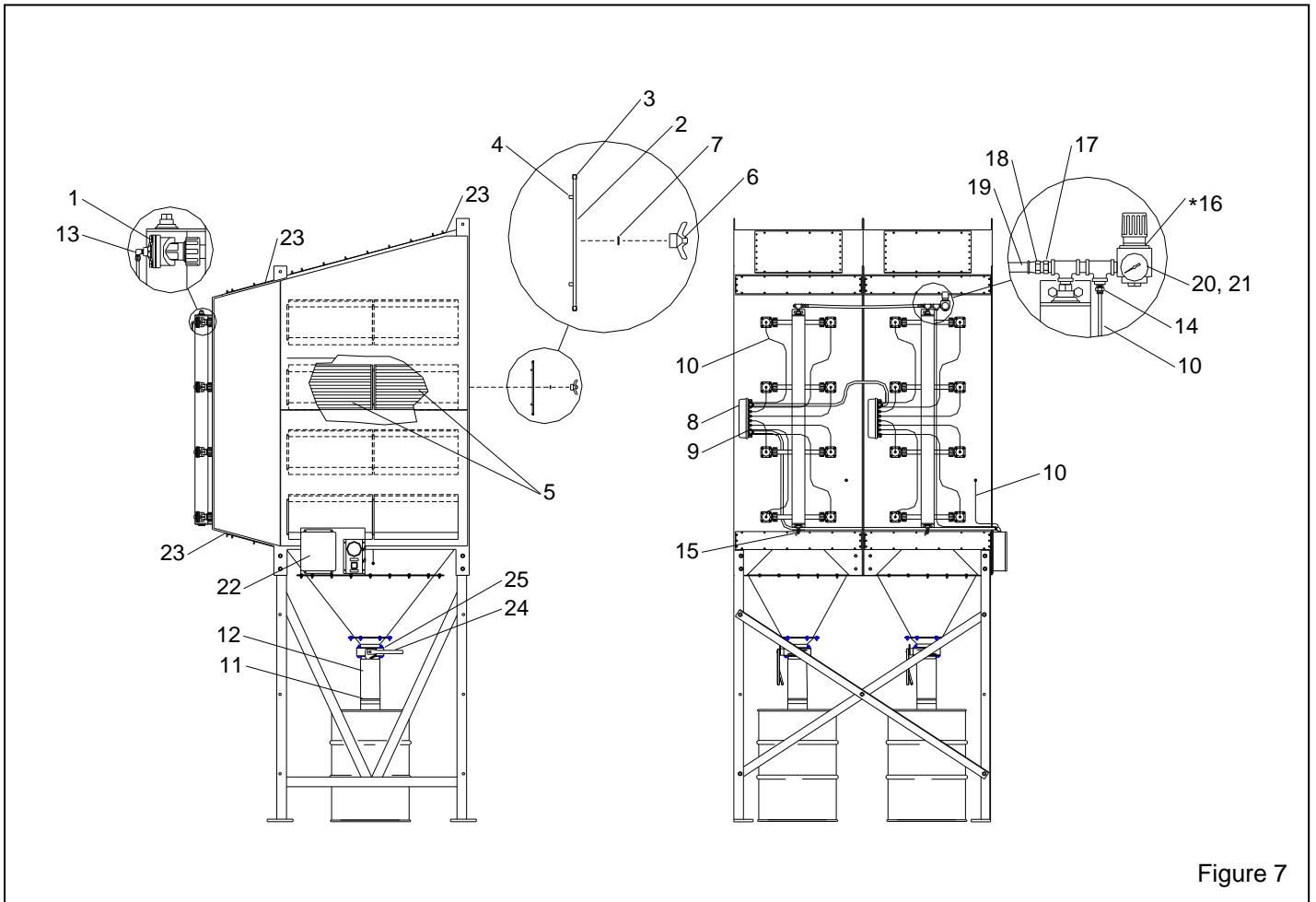


Figure 7