

RPH DUST COLLECTORS



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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 of 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.

It is the responsibility of the knowledgeable, experienced users of the products mentioned in this material to familiarize themselves with the appropriate laws, regulations and safe practices that apply to these products, equipment that is connected to these products, and materials that may be used with these products.

It is the responsibility of the user to insure that proper training of operators has been performed and a safe work environment is provided.

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.

OWNER'S MANUAL

1.0 INTRODUCTION

1.1 Scope: This manual covers the assembly, installation, operation and maintenance of Zero RPH Reverse Pulse Jet 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 Hazard Alerts

1.2.1 Clemco Industries Corp. uses signal words, based on ANSI Z535.2-1991, to alert the user of a potentially hazardous situations 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.

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Introduction..... 1.0
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1.4 Theory of Operation

1.4.1 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 exhaust ducting, and out the exhauster. The accumulated dust is periodically released from the cartridges by a pulse of compressed air. A typical general arrangement with call-outs used in the manual are shown in Figure 1.

1.4.2 RPH Dust Collectors utilize reverse pulse jet cartridge filters. Compressed air used for the pulse 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.

1.4.3 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.

1.4.4 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. See Section 4.2.

1.4.5 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.

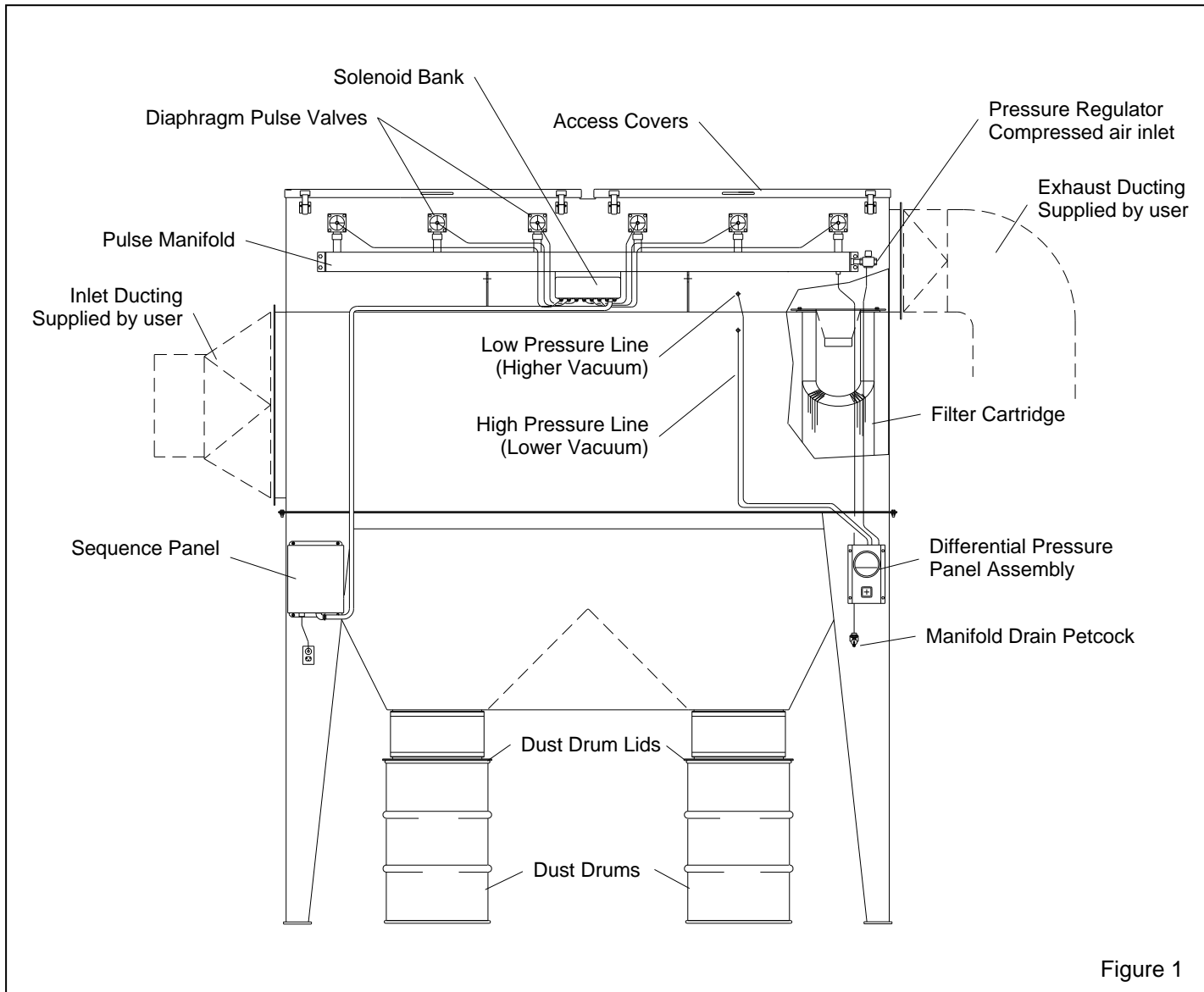


Figure 1

2.0 ASSEMBLY AND INSTALLATION

⚠ WARNING

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

2.1 Footing (Foundation)

2.1.1 The dust collector must be located on a sound footing/foundation.

⚠ 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 Assembly

CAUTION

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

2.2.1 The degree of assembly depends on the size and style of the collector. There may be exceptions; but they are usually as follows:

- RPH-2, RPH-3, RPH-6 & RPH-8: Factory assembled, each requires locating and anchoring to a sound footing, and assembly of the exhauster and ducting.
- RPH-4, RPH-10, RPH-12, & RPH-16: Each requires field assembly of the leg/hopper assembly and body, and assembly of the exhauster and ducting. It must be located and anchored to a sound footing/foundation.
- RPH-20 and larger: Each requires field erection of the structural leg and frame assembly, assembly of the hopper and body, ladder, hand rail, exhauster and ducting. It must be located and anchored to a sound footing/foundation.

2.2.2 Erect the collector 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 Anchors

WARNING

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

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

2.4 Exhauster Assembly

NOTE: 3600 cfm and larger exhausters are floor mounted, and require ducting from the collector, and an exhaust stack with a damper adjustable from 0-80% closed. Smaller exhausters are mounted on the collector body, and do not require additional ducting.

2.4.1 Anchor the exhauster in position. NOTE: Positioning of the exhauster must coincide with the placement of the outlet ducting. Use temporary anchors until the ducting is in place.

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

2.5 Ducting

2.5.1 Clemco Industries Corp. does not usually supply ducting, but does provide a general arrangement drawing for suggested ducting.

2.5.2 The illustration in Figure 2 shows a typical ducting and exhauster arrangement. The illustration is not to be used to fabricate ducting.

CAUTION

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

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.

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

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

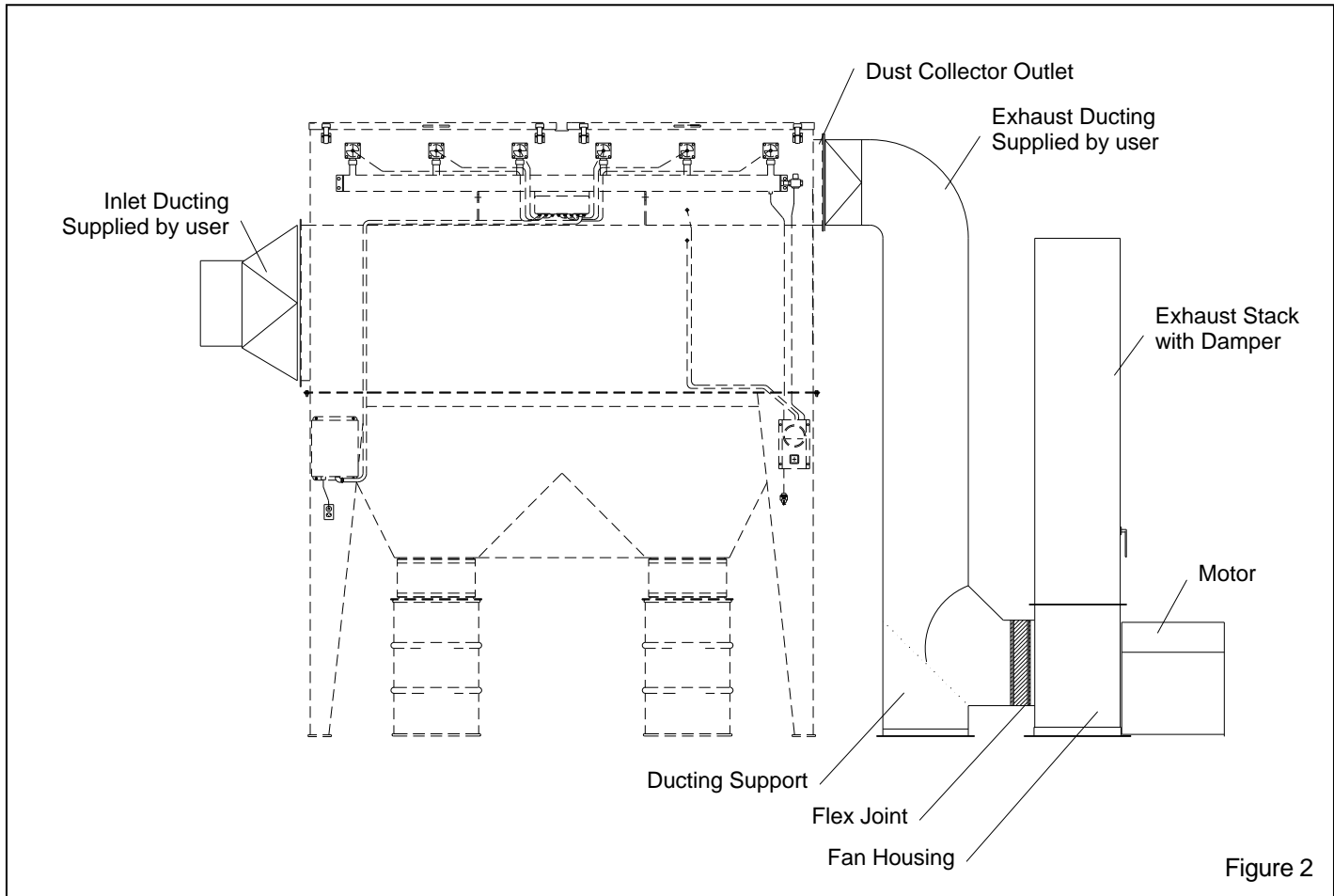


Figure 2

2.6 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.

2.6.1 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.

2.6.2 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.

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

2.7 External Grounding

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

2.8 Compressed Air Connections

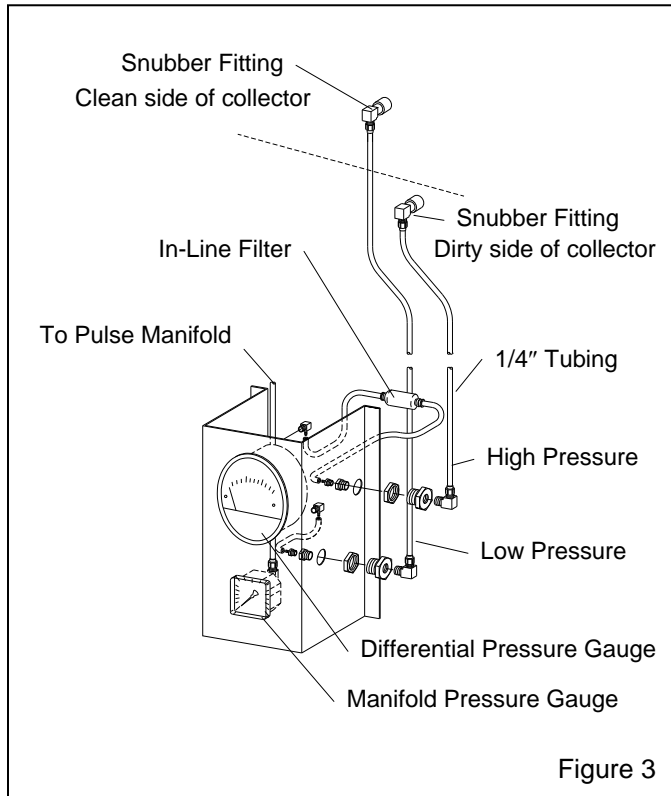
CAUTION

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

2.8.1 An air line must be supplied to the pressure regulator located on the pulse manifold inlet. The size of the line depends on the size of the collector. 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.

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

2.8.3 Connect tubing to the differential pressure indication panel as shown in Figures 1 and 3.



2.9 Dust Containers

2.9.1 Attach a flex hose and dust drum lid to the bottom of the dust hopper.

2.9.2 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 covers must be closed, and the dust drums secure when the dust collector is in operation.

3.2 Initial Start-up

WARNING

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

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 exhauster 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, adjust the pulse pressure to 70 psi, and 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 dust drums are secure.

3.3.2 Check to make sure the sequence switch is "on".

CAUTION

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

3.3.3 Start the exhauster at the control panel.

3.3.4 Pressurize the pulse manifold and check the manifold pressure.

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 exhauster.

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. See Figure 1. Drain whenever the air supply is turned off.

3.4.5 Empty all dust receptacles.

4.0 ADJUSTMENTS

4.1 Pulse Manifold Pressure

4.1.1 A pressure regulator and gauge is provided on the manifold inlet to adjust pressure to 70 psi. An additional manifold pressure gauge is mounted on the differential pressure gauge panel to enable monitoring pressure from ground level. The panel is usually mounted on one of the dust collector legs. See Figure 3.

4.2 Pulse Sequence Control Panel and Timer

4.2.1 A toggle switch mounted on the sequence control panel cover (located on the dust collector stand), enables or disables the sequencer. 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 15/100 of a second "on". Every 40 seconds, one filter bank 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 below the recommended changeover pressure of 4". A constant reading higher than 4" is an indication that more frequent pulse cycles or higher pressure are needed. When the differential pressure gauge shows a constant pressure difference greater than 4", adjust the "off" time setting by half. **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 4", or if a decrease in the efficiency is noted, increase pulse pressure in increments of 10 psi until the maximum of 100 psi is reached.

4.2.5 When the frequency of the pulse cycles and higher pulse pressure will not lower the differential pressure below the changeover pressure of 4" w. c., the filter cartridges should be replaced, and the timer "off" time should be reset to 40 seconds, and pressure set to 70 psi. See Section 6.1.

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 drums 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 Empty and/or replace the drums, ensuring that the drum lids are secure.

5.1.2 Check the exhaust air during a pulse cycle.

5.1.2.1 If dust is emitting from the exhaust, filters are leaking or damaged. Check immediately. To determine which cartridge is leaking, turn the sequence switch off, open the top access door and check the inside of the collector for dust trails. NOTE: A small amount of dust egress is normal for a short period 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 of 2" to 4". If the reading is continually high (greater than 4"), adjust

pressure and/or sequence timing per Sections 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 dust filter located behind the gauge panel. See Figure 3.

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.

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

6.1.2 Empty the dust receptacles.

6.1.3 Open the top access door.

6.1.4 Remove the wing nuts securing the filter hold-down plate.

6.1.5 Remove the hold-down plates and venturi tubes.

6.1.6 Remove all filter cartridges. A small amount of force may be necessary to loosen the seal of the filter gasket.

6.1.7 When all filters 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 (top side) of the cartridge sheet.

6.1.8 Install new filter cartridges; center each cartridge, install venturi tube, and secure with hold-down plate as each cartridge is installed.

6.1.9 Inspect the gasket on the access door. Replace the gasket if it is worn or damaged. Close the access door and secure.

6.1.10 Reset timer "off" time to 40 seconds, and set pulse pressure to 70 psi.

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

6.2 Seasoning Cartridges

6.2.1 New cartridges must be seasoned. Cartridges are seasoned by letting a dust cake develop on the filter media before starting the pulse cycle.

6.2.2 Operate the dust collector without pulsing (sequence switch turned off) until the differential pressure gauge reads the recommended changeover pressure of 4". At that point turn on the sequence switch to start the pulsing cycle.

6.3 Tube fittings

6.3.1 If it becomes necessary to remove or replace the tubing between quick-release valves and panel, be sure the tubing does not bottom out in the fitting. If the tubing is inserted too far into the fitting, it will block the air passage, and cause the pulse to malfunction.

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 red 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 the pulse sequence board. Check outlet voltage to solenoids.

7.2 Some Cartridges Not Pulsing

7.2.1 Solenoid defective. Have a qualified electrician check for electrical malfunction.

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 Make sure the tubing has not been inserted so far into the tube connection to block the tube ends.

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

7.5.5 Snubber fitting blocked with dust. Clean or replace. See Figure 3.

7.5.6 The sequence "off" time may need adjusting. See Section 4.2.

7.5.7 The filter cartridges may need to be replaced. See Sections 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 have not been reversed. See Figure 3.

7.7 Dust Emitting From Exhauster.

7.7.1 Check for loose or damaged filter cartridge.

8.0 REPLACEMENT PARTS

Refer to the enclosed 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 Differential Pressure Panel Assembly, Figure 4

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

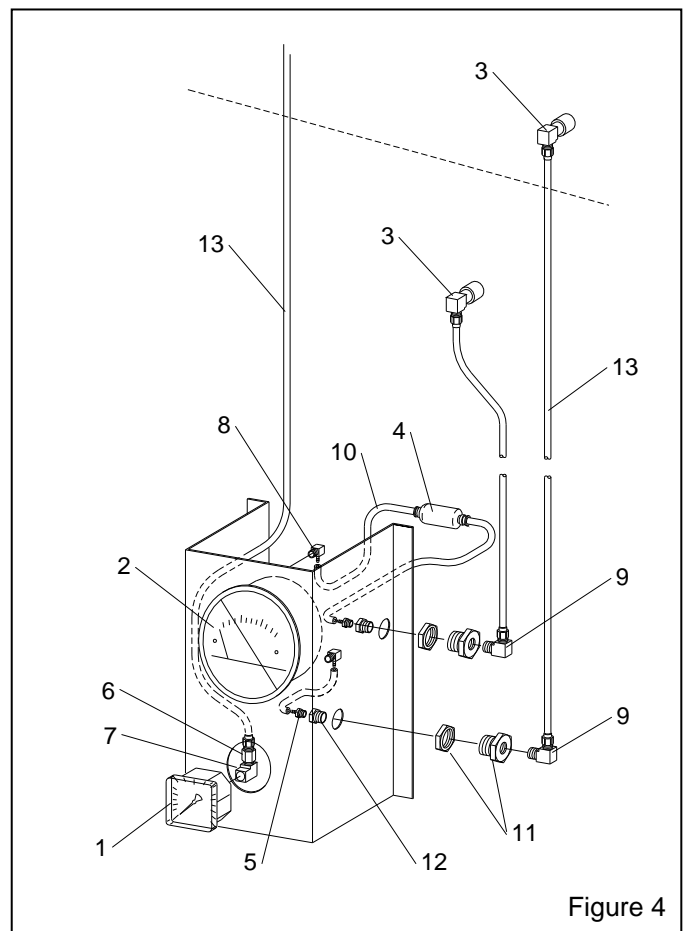


Figure 4

8.2 Common Replacement Parts, Figure 5

Item	Description	Stock No.
1.	Valve, 1-1/2" diaphragm pulse	15818
(-)	Service kit for 1-1/2" pulse valve (above) .	21601
2.	Cartridge, filter	15781
3.	Solenoid, not shown for RPH-2 & RPH-3 only	23869
4.	Solenoid assembly, 5 valve bank for RPH-4 and larger	15743
5.	Tubing, 1/4" OD, specify feet required	15892
6.	Petcock, 1/4" drain	01993
7.	Circuit board, pulse sequence (not shown) for RPH-2 & RPH-3 only	10261
	Dwyer board for earlier collectors RPH-4 and larger except RPH-16.....	23871
	Ametek NCC board for current collectors RPH-4 and larger except RPH-16	15745
	Ametek NCC board for RPH-16	15746

8.	Flex hose, specify feet required 16" dia., RPH-2 thru RPH-16	15667
	6" dia., for RPH-20 and larger	12452
9.	Latch	10290
10.	Dust drum 30-Gallon for RPH-2 thru RPH-16	15668
	55-Gallon for RPH-20 and larger	10796
11.	Lid/hose adaptor, dust drum 30-Gallon, w/16" dia. hose inlet	15670
	55-Gallon, w/6" dia. hose inlet	06633
	55-Gal., w/16" hose inlet (special use) ..	22947
12.	Lock ring, used only with 55-Gallon lid	06634
13.	Gasket, 1" x 5/16" adhesive backed used only with 30-Gallon lid	00187
14.	Clamp, flex hose 6.5", for 6" hose	00750
	8.5", for 16" hose (use 2 on each end) ..	11576
15.	Regulator, pressure 1/2" for RPH-2 thru RPH-4	01902
	1" for RPH-6 thru RPH-16	01904
	1-1/2" RPH-20 and larger	01906

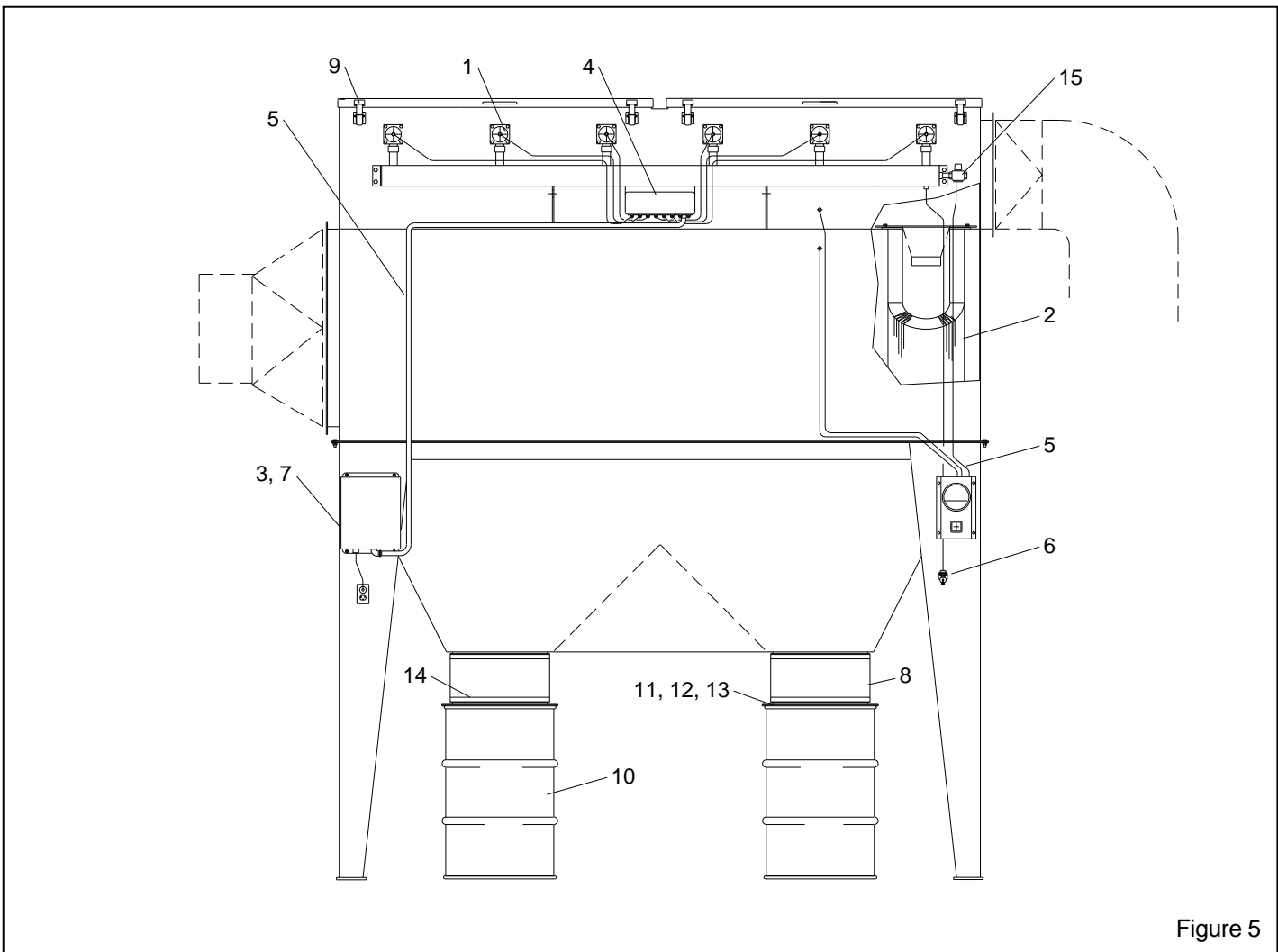


Figure 5