MB SERIES
ABRASIVE VACUUM SYSTEMS
O. M. 30801

DATE OF ISSUE: 06/22
REVISION:

⚠ WARNING

Do not use this equipment before READING this MANUAL and UNDERSTANDING its contents.

These WARNINGS are included for the health and safety of the operator and those in the immediate vicinity. Failure to read and understand these warnings can result in injury or death.

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

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1.0 INTRODUCTION

1.1 Scope of Manual

1.1.1 These instructions cover the setup, operation, maintenance, troubleshooting, and replacement parts for the following Clemco MB Series Vacuum Systems:

MB-750	**MB-1600**	**MB-2000**
MB-3000	**MB-4000**	**MB-5000**

Supplemental operations manuals are provided for the positive displacement blower (vacuum pump and blower motor).

1.1.2 These instructions contain important safety information. All operators and personnel involved with the abrasive vacuum process must read and understand the contents of these instructions, including supplemental operations manuals and the blasting-related orange safety cover. It is equally important that the operator is trained and qualified to safely operate the system and all other equipment used with the vacuum recovery process and blast machine.

1.1.3 All personnel involved with the abrasive recovery or blasting process must be made aware of the hazards associated with handling spent abrasive and abrasive blasting. The Clemco booklet ″Abrasive Blasting Safety Practices″ is included with every blast machine and contains important safety information about abrasive blasting that may not be included in equipment operations manuals. To order additional copies, visit www.clemcoindustries.com or email info@clemcoindustries.com.

1.2 Safety Alerts

1.2.1 Clemco uses safety alert signal words, based on ANSI Z535.4-2011, 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 you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

NOTICE

Notice indicates information that is considered important, but not hazard-related, if not avoided, could result in property damage.

⚠ CAUTION

Caution indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

⚠ WARNING

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

⚠ DANGER

Danger indicates a hazardous situation that, if not avoided, will result in death or serious injury.

1.3 Table of Contents

1.4 Components – Figure 1

1.4.1 The primary components of the vacuum system are shown in Figure 1. The system includes the suction unit, recovery storage hopper, recovery suction hose, suction nozzle, and interconnecting hose(s). Models used to recover spent, friable abrasive should also include an optional cyclone precleaner.

1.4.2 Suction unit

The suction unit is the vacuum source for the recovery system. It includes the following:

- An automatically sequenced reverse-pulse dust collector with a cyclone dust container.
- Acoustic-lined motor compartment containing an electric drive motor, positive displacement blower (vacuum pump), vacuum safety-relief valve, and exhaust silencer.
- Electric control panel with 24-volt DC controls.
- The module is equipped with access doors, forklift pockets, lifting eyes, and a vacuum gauge, which monitors vacuum (negative pressure) at the module.

1.4.3 Recovery storage hopper

The storage hopper is the collection point for recovered abrasive. It includes:

- The storage hopper with bolt-on leg extensions.
- An inlet connection for the recovery hose, and an outlet connections and the interconnecting hose.
- A top access hatch with deflector wear-plate and replaceable rubber pad.
- A hopper with a centrally located manually operated butterfly valve and four secondary ports for emptying stored abrasive into disposal containers or blast machines.

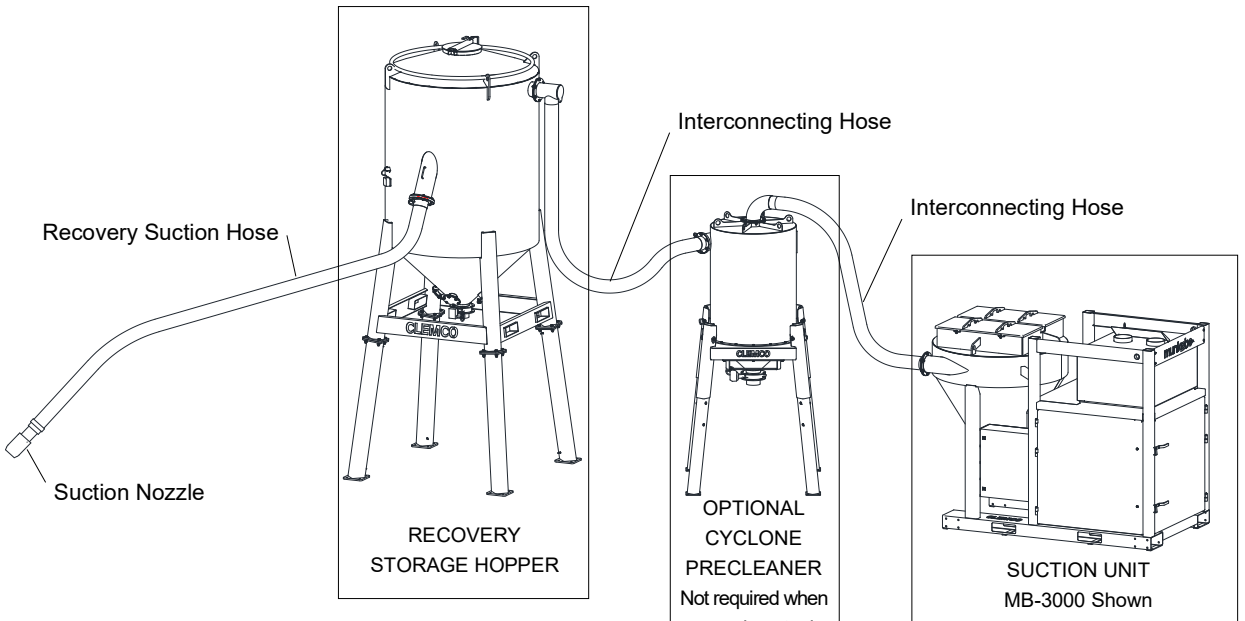


Figure 1

1.4.4 Optional cyclone precleaner

The optional precleaner is required when vacuuming slags, minerals or other spent, expendable abrasives. It is placed between the recovery storage hopper and suction module to remove fines and some dust particles, which prevents rapid filling of the dust collector.

1.4.5 Suction nozzle (bulk vacuum tool) and accessory vacuum tools

- The suction nozzle attaches to the end of the recovery hose and is used to pick up bulk abrasive from the recovery site.
- 2" Vacuum Tool: When dust-free cleaning is required from surface areas, obtain vacuum tools from a local vendor. A manifold and 2" suction hoses are required to adapt the recovery hose to a 2" vacuum tool. Manifolds are listed in *Section 11.1: Optional Accessories.*

1.5 Theory of Operation – Figure 2

1.5.1 The following description of the system's operation begins at the recovery site where spent abrasive is vacuumed, and ends at the suction module (the vacuum source) where clean, filtered air is discharged into the atmosphere. ***Review the process before operating the system.***

1.5.2 The system operates under a partial vacuum (negative pressure) and is designed to recover spent abrasives from the blast area into a storage hopper. Recyclable abrasives can be returned to the blast machine for reuse. Spent expendable abrasives are emptied into waste containers for disposal.

1.5.3 When the system is set up, power is provided to the control panel, and compressed air supplied to the reverse-pulse dust collector, the system is ready for operation by pushing the START button on the face of the control panel.

1.5.4 Pushing the white START button starts the electric motor, which drives the vacuum pump. The pump is the vacuum source for the recovery system. The vacuum circuit is sealed under negative pressure between the vacuum pump and suction nozzle, where it is used to vacuum spent abrasive.

1.5.5 During operation spent abrasive is vacuumed into the suction nozzle and conveyed through the recovery hose and delivered into the recovery storage hopper. Larger and heavier abrasive particles fall out of the vacuum circuit and stored in the hopper. The lighter fines and dust remain suspended and are drawing into the next system component.

1.5.6 The vacuum flow continues from the storage hopper through the first interconnecting hose. When recovering expendable slags and similar abrasives, the next component is the cyclone precleaner, where the first stage cleaning of fines and heavy dust takes place.

1.5.7 The vacuum flow continues from the precleaner through the second interconnecting hose and enters the dust collector for the final cleaning. Dust particulates are trapped on the outer surface of high-performance polyester filter cartridge(s), allowing only filtered air to exit the dust collector and enter the vacuum pump before being exhausted through a silencer and into the atmosphere.

1.6 System Components and Functions – Figure 3

1.6.1 Suction nozzle

1.6.1.1 Optimum recovery rates are obtained by maintaining a constant balance of abrasive and vacuum air flow. Keeping the end of the suction nozzle immerged in spent abrasive and regulating air induction at the nozzle maintains constant air flow and

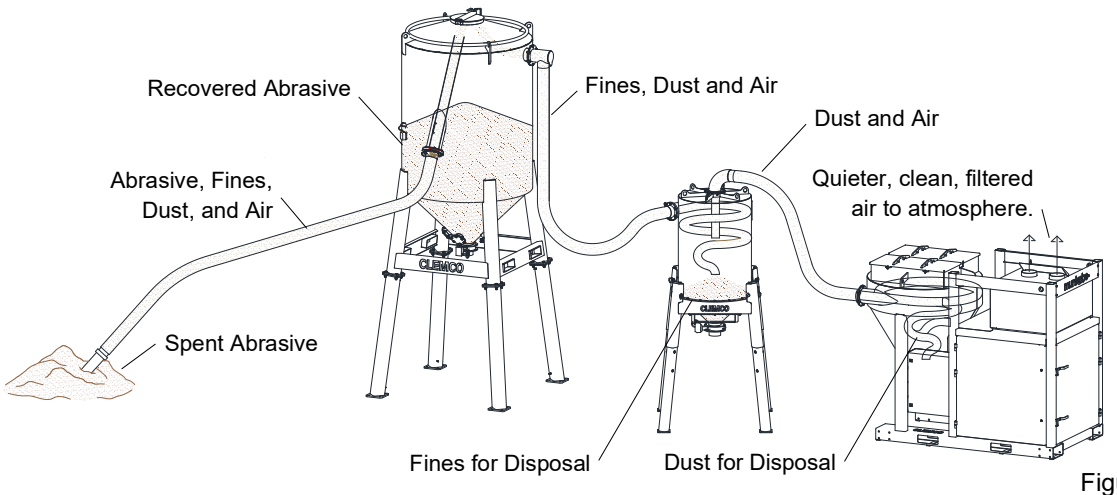


Figure 2

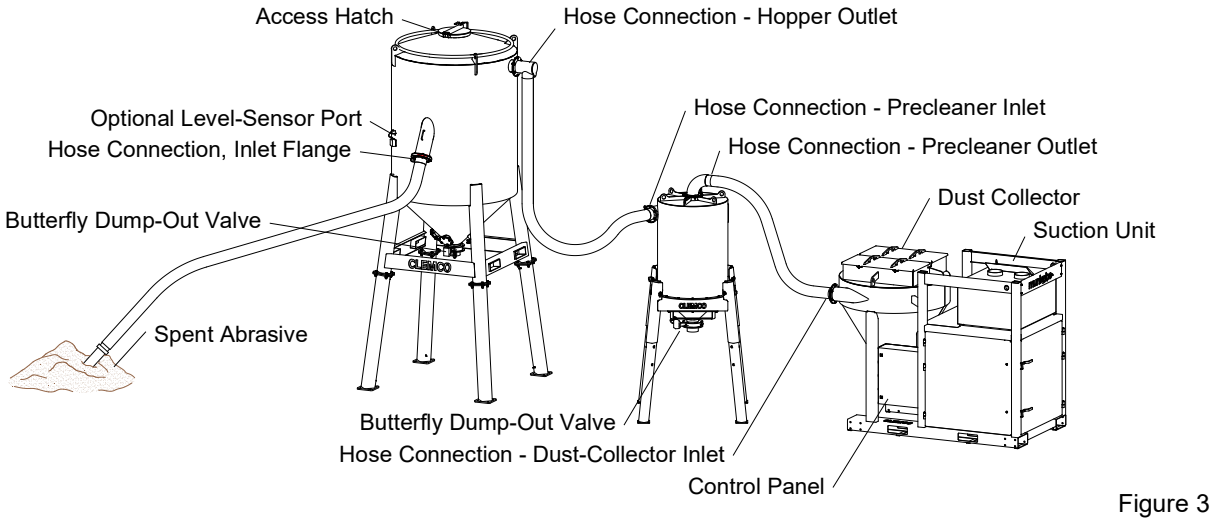


Figure 3

prevents abrasive saturation and blockage within the recovery hose. It is difficult to keep a steady flow of material and air when vacuuming without the suction nozzle. Optimum recovery rates are attained by use of a properly adjusted suction nozzle. Refer to Section 7.2 to adjust the nozzle.

1.6.2 Recovery hose

1.6.2.1 The recovery process vacuums spent abrasive, which contains abrasive, fines, and dust, from the recovery site, through the recovery hose, to the storage hopper inlet. Keep the recovery hose as short as possible and with as few bends as possible.

1.6.3 Recovery storage hopper

1.6.3.1 Heavier, coarser recovered abrasive is stored in the hopper while lighter fines and dust that are churned up and airborne are carried through the interconnecting hose to the next segment. If the abrasive is recyclable, it can be reused by placing a blast machine under the hopper's central butterfly valve. If the abrasive is expendable, a waste container may be placed under the hopper's central butterfly valve.

1.6.3.2 When finished vacuuming or when the storage hopper is full, shut down the system by pressing the black stop button and empty the hopper by opening the butterfly valve or secondary ports. The valves must be kept fully closed and sealed while vacuuming.

NOTICE

Keep the butterfly valve and secondary ports fully closed during vacuuming. A minor leak at the valves will cause considerable wear around the leak point and reduce performance.

1.6.4 Interconnecting hose(s)

1.6.4.1 The vacuum flow continues from the storage hopper through the interconnecting hose. Fines and dust are taken from the storage hopper and transferred to the dust collector, or, if expendable spent abrasive is vacuumed, to the cyclone precleaner. Interconnecting hoses are attached to the system components inlets with flanged couplers and slipped over the component outlets.

1.6.5 Optional cyclone precleaner

1.6.5.1 The precleaner is not needed when vacuuming steel abrasive. It is required when vacuuming slags, minerals or other spent, expendable abrasives that contain high levels of broken abrasive and fines. The precleaner removes fines and prevents rapid filling of the dust collector and prolongs the life of the filter cartridge(s).

1.6.5.2 When finished vacuuming or before the precleaner is full, shut down the system and open the butterfly valve to empty the contents into a suitable disposal container. All butterfly valves must be kept fully closed while vacuuming.

1.6.6 Dust collector (Mounted on the suction unit outside the motor compartment.)

1.6.6.1 The dust collector is a cyclonic, automatically sequenced, reverse-pulse dust collector.

1.6.6.2 As the vacuum flow passes through the dust collector, most of the dust is removed by the cyclonic action of the collector; remaining dust collects on the outer surface of the filter cartridge(s). Cartridge cleaning is performed by jet pulses of compressed air. For this purpose, the unit must be supplied with clean, dry compressed air with a maximum of 85 psi. Higher pressure does not clean cartridges better and reduces cartridge life. Optimum pressure is between 75 and 80 psi. Refer to Section 7.3 to adjust pulse pressure.

1.6.6.3 Filter cartridges are cleaned at one-minute intervals by a jet pulse of compressed air. The jet pulse momentarily reverses air flow through the cartridges, removing dust that has accumulated on the outer surface. When the unit is stopped, the pulse-jet cleaning continues for 10 minutes.

NOTE: The pulse intervals can be changed if needed. Different configurations are built into the programable logic controller (PLC). Contact Clemco if adjustment is needed.

1.6.6.4 A dust compartment is mounted at the bottom of the filter section. The bottom is fitted with a butterfly valve for discharge of dust to a waste bag or bucket (not included). The dust-collector butterfly valve includes a switch, which is connected to the control panel. If the valve is open, the yellow indicator light flashes and prevents operation. Empty the dust compartment frequently and at regular intervals. Vacuuming materials with high dust concentration will require emptying the compartment frequently. **It is essential that dust does not overfill the dust compartment and enter the filter area.**

NOTICE

Empty the collector as often as necessary to keep dust level below the filter section. High dust level will reduce efficiency, damage the filter cartridge, decrease filter life, and elevate vacuum pressure leading to overheating, which could damage the vacuum pump.

1.6.6.5 The dust-collector pulse mechanism is an integral part of the collector.

1.6.6.6 After dust is trapped on the filter cartridge(s) within the dust collector, the vacuum air flow (air cleaned by the dust collector) is drawn into the vacuum pump located within the motor compartment.

1.6.7 Motor compartment

1.6.7.1 The acoustically lined motor compartment houses the electric drive motor, vacuum pump, and related accessories, and electric control panel. The motor drives the vacuum pump using a series of V-belts. The pump creates the negative pressure (vacuum) that pulls air through the system. The vacuum that draws air in at the suction nozzle is created at the vacuum pump.

1.6.7.2 A vacuum safety-relief valve is located on the inlet side of the vacuum pump. The purpose of the relief valve is to prevent the vacuum pump from overheating. The valve is under negative pressure, and it opens when pressure increases due to a blockage in the vacuum-air-flow circuit. Blockages cause the negative pressure to increase, which can overheat the vacuum pump, and if allowed to continue, will damage the pump and motor. As negative pressure builds due to a blockage, the vacuum relief opens to allow air in, decrease pressure, and cool the pump.

1.6.7.3 The vacuum relief valve is factory set, but it should be periodically checked and adjusted per Section 7.4.

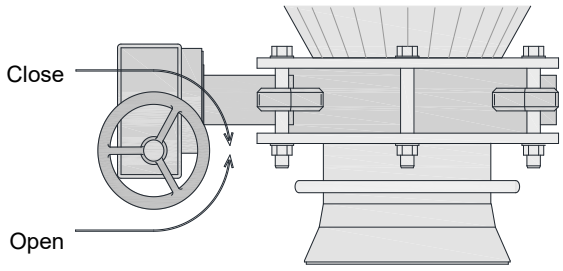
1.6.7.4 The outlet side of the vacuum pump pushes cleaned air through the silencer mounted on top of the compartment, discharging clean air to the environment.

1.6.8 Butterfly dump-out valves – Figure 4

NOTICE

Air drawn into a partially open or leaking butterfly valve will cause considerable damage to the bottom outlet. To avoid rapid and unnecessary wear, butterfly valves must be fully closed during operation.

1.6.8.1 The Butterfly valve on the dust collector (suction unit) includes a gear wheel to open and close the valve and a switch, which is connected to the control panel, so the unit cannot run if the butterfly valve is not completely closed, and causes the yellow indicator light to flash. Butterfly valves on the recovery storage hopper (and cyclone precleaner when added) include only the gear wheel but no switch, and is not connected to the control panel. **Make sure all butterfly valves are completely closed during operation; an open or leaking butterfly valve will cause considerable damage to the bottom outlet**. It takes approximate 10 to 11 turn to fully open and close the valve.



Butterfly Dump-Out Valve

Turn wheel clockwise (to the right) to close.

Turn wheel counterclockwise (to the left) to open.

Figure 4

1.6.9 Vacuum gauge

1.6.9.1 The gauge shows the negative operating pressure, in bar and inches of mercury (Hg), at the suction module. It is useful to monitor vacuum pressure and to adjust the vacuum relief valve.

1.6.9.2 The optimum vacuum while transferring abrasive is between -0.3 to -0.4 bar/9" and 12" Hg. Constant higher vacuum is an indication of blockage in the hose, which can be due to insufficient air induction at the suction nozzle.

NOTICE

Press the stop button to shut down the system if the vacuum exceeds -0.5 bar/14.5" Hg. Continuing operation when vacuum is above -0.5 bar/14.5" Hg will overheat the vacuum pump causing extensive damage, and void the warranty.

1.6.10 Electric control-panel function and controls

1.6.10.1 The panel houses all the controls, which include 24-volt DC controls, soft start, PLC controls, dust-collector controls, and butterfly-valve control on the suction unit.

1.6.10.2 The door panel includes a keyed door locks, lockable main breaker, operation buttons, and function lights.

1.6.10.3 Typical operation buttons and function lights included on a panel are:

- **START Button:** Pushing the white START Button starts the vacuum system motor and all controls.
- **STOP Button**: Pushing the black STOP Button stops the vacuum system. The automatic pulse-cleaning cycle continues for 10 minutes after pushing the button.
- **POWER Indicator Light:** The white indicator lights up when the main breaker is turned ON.
- **ON Indicator Light:** The green lamp lights up during operation and flashes for 10 minute after system is shut off, indicating the automatic pulse-cleaning cycle is in operation.
- **FAULT Indicator Light**
- If the red indicator flashes on the initial startup, it indicates phase-rotation is backward and the power supply leads need to be switched.
- If the indicator flashes on subsequent startups, it indicates a motor overload. Immediately push the STOP Button and determine the cause of the overload. Refer to Section 10.3.
- **EMERGENCY STOP Button:** Shuts down all functions. Once the emergency stop button is pressed, the button must be pulled out before the system can be restarted.

1.6.10.4 All wiring within the module is completed. The user needs only to supply the required power to the panel.

2.0 SETUP

2.1 Placement

2.1.1 Using lifting eyes

⚠ WARNING

Use only qualified riggers and operators when picking and moving this equipment. Improper rigging of the equipment can result in injury or death.

2.1.1.1 Lifting eyes are for lifting empty system components only. Use a spreader for uniform, vertical lift on each lifting eye. Do not lift any component when it contains any abrasive or dust.

⚠ WARNING

Empty this equipment before lifting. The lifting eyes will not support the weight of the equipment if it contains abrasive or dust. If overloaded or lifted laterally, the lifting eyes may fail. Failure can result in serious injury or death.

NOTE: All system components must be placed on firm, level ground, allowing full access to all doors, connectors, and service areas, and securely anchored.

2.1.2 Bolt the storage-hopper extension legs to the hopper legs. **NOTE: Before lifting the hopper and bolting on the legs, review the recovery hose flanged inlet connections in Section 2.2.2. The recovery hose is heavy and intentionally stiff. It may be easier to connect the hose before attaching the legs. The disadvantage to installing the hose first is the weight and pull of the hose can hinder raising the hopper and maneuvering it into its final position.**

2.1.3 Place the storage hopper on firm level ground, as close as possible to the recovery site, and within the limits of the recovery hose while keeping the hose as straight as possible. Position the hopper so the inlet side of the hopper is toward the recovery site. Make sure the recovery hose is long enough to reach between the recovery site and hopper inlet.

2.1.4 If a cyclone precleaner is required (when recovering spent slags or similar expendable abrasive with high levels of fines), place it on firm level ground and as close as possible to the storage hopper, and position it so the tangential inlet faces toward the storage hopper outlet. Make sure it is located so the interconnecting hose reaches between the hopper outlet and precleaner inlet. Adjust the sliding legs as needed, per Section 7.6.

2.1.5 Place the suction module so that the dust-collector tangential inlet faces toward the storage hopper (or precleaner) outlet and within the reach of the interconnecting hose.

2.1.6 After the equipment is placed, the following can be done concurrently or in any sequence.

1. Attach interconnecting hose(s).
2. Connect electrical service.
3. Connect compressed-air supply.

2.2 Suction Hose Connections

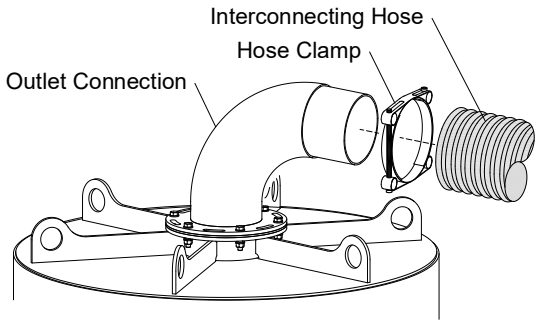
NOTICE

To prevent shocks from static electricity and damage to electronic processors, use only static conductive recovery hose and interconnecting hoses.

Installation Notes:

- **Outlet connections:** Interconnecting hose(s) fit over the outlet of each unit and are held with clamps, as noted in Section 2.2.1 and Figure 5.
- **Flanged inlet connections:** Recovery hose and interconnecting hoses are attached to the inlet flanges of each unit with flanged connections, as noted in Section 2.2.2 and Figure 6.
- **Connecting additional recovery hoses:** Additional recovery hoses are coupled together using hose-extension couplings and clamps, as shown in Section 2.2.3, Figure 8.

2.2.1 Outlet connections – Figure 5



NOTE: The precleaner connection is shown for reference. Use the same method to connect the hose to the recovery-hopper outlet connection.

Figure 5

2.2.1.1 Lay out the interconnecting hoses between the hopper outlet and dust-collector inlet. The optional cyclone precleaner fits between the storage hopper and dust collector and requires an additional interconnecting hose.

2.2.1.2 Place a hose clamp over one end of an interconnecting hose, as shown in Figure 5. Note: The hose connection shown in Figure 5 is for the optional precleaner. Use the same method to connect the hose to the bottom of the angled outlet connection (shown in Figure 3) on the recovery storage hopper.

2.2.1.3 Slide the hose onto the outlet connector and tighten the clamp screws to secure the hose.

2.2.2 Flanged inlet connections – Figure 6

2.2.2.1 Layout the recovery hose(s) from the recovery site to the recovery storage hopper. Do not use longer lengths of hose than required and run hose in straight lines, avoiding unnecessary bends. Bends cause rapid wear along the outside radius. When bends are required, routinely rotate the hose to redirect wear areas and prolong hose life. Never vacuum with coiled recovery hose, which can decrease recovery rates and accelerate hose wear.

2.2.2.2 Avoid sharp bends and tight radius that could kink the hose and any condition that could deform the hose and cause restrictions, elevated vacuum, and possible damage to the vacuum pump.

NOTICE

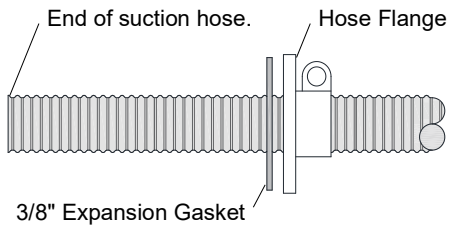
The recovery hoses must be extremely rigid to avoid collapse under high vacuum. Do not lay the hose in traffic areas where the hose could be run over. Damaged hose can rarely be straightened, and it will cause high wear, decreased recovery rates, and elevated vacuum pressure, which could cause the vacuum pump to overheat, causing extensive damage and voiding the warranty.

2.2.2.3 Refer to the upper image (Step 1) in Figure 6. Slide the hose flange and 3/8" expansion gasket onto the end of the recovery suction hose that is closest to the storage hopper.

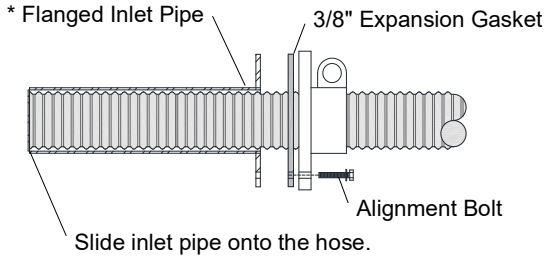
Excluding:

MB-750: The recovery suction hose is attached directly to the flanged inlet connections with clamps.

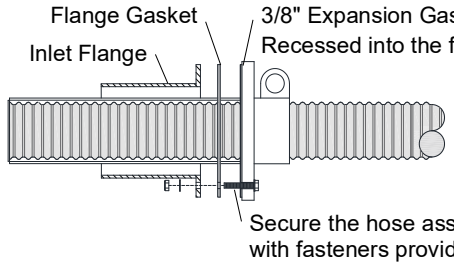
6" diameter interconnecting hoses: A flanged inlet pipe is not used to connect 6" ID hose. Instead, the 6" hose is inserted directly into the inlet flange, which has a hose stop to prevent the hose from being inserted too far. The hose flange with an expansion gasket bolts directly onto the flanged inlet.



Step 1



Step 2



Step 3

* Flanged inlet pipes are used with 3", 4", and 5" flanged Inlet connections. Six-inch hose is inserted into the inlet flange, and the hose flange with the gasket are bolted directly onto the inlet flange.

Figure 6

2.2.2.4 Refer to the middle image (Step 2) in Figure 6. Slide the flanged inlet pipe onto the hose until the hose reaches the stop at the end of the pipe.

2.2.2.5 Place a bolt and washer through mounting holes in the hose flange, expansion gasket, and inlet pipe to keep them aligned.

2.2.2.6 Refer to the lower image (Step 3) in Figure 6. Place the flange gasket over the inlet pipe and alignment bolt and insert the inlet pipe and hose assembly into the inlet flange. Hold the hose assembly in place while tightening all mounting nuts. Once tightened, the expansion gasket spreads and grips the hose.

2.2.2.7 Repeat the process to connect the interconnecting hose to the dust-collector inlet, and to the precleaner inlet when a precleaner is used.

2.2.3 Connect additional lengths of recovery hose

2.2.3.1 The table in Figure 7 shows hose information for all models; it shows hose diameter, hose length(s) supplied with each system, maximum conveying distance, minimum and maximum lengths of individual hoses, and hose and coupler stock numbers. Hose-extension couplings and clamps are not included with the system; they must be ordered separately when required.

2.2.3,2 When more than the standard 65 ft of recovery hose is needed, a hose-extension coupling and two clamps are required to join each additional length of hose. Slide a hose clamp over one end of one of the recovery hoses and push the hose onto the coupling as close to the stop as possible, as shown in Figure 8. Repeat the process for the additional hose and tighten the clamps to secure the hoses to the coupling.

MODEL	MB- 750 E4	MB- 1600 E5	MB- 2000 E5	MB- 3000 E5	MB- 4000 E5	MB- 5000 E5
Recovery Hose Diameter	3"	4"	5"	5"	6"	6"
Interconnecting Hose Diameter	3"	5"	5"	6-In	6-In	6-In
Length Supplied	65 ft	65 ft	65 ft	65 ft	65 ft	65 ft
Max Recovery Dist.	100 ft	240 ft	490 ft	820 ft	1000 ft	1300 ft
Min Single Length	*25 ft*	*25 ft	*25 ft	*25 ft	*25 ft	*25 ft
Max Single Length	*65 ft	*65 ft	*65 ft	*65 ft	*65 ft	*65 ft
Recovery Hose Stock No.	**30746 (3")	**30747 (4") **30748 (5")	**30748 (5")	**30748 (5") **30749 (6")	**30749 (6")	**30749 (6")
Hose-Extension Coupling	30736	30737	30738	30738	30739	30739
Hose Clamps	30728 (3")	30729 (4") 30730 (5")	30730 (5")	30730 (5") 30731 (6")	30731 (6")	30731 (6")

* Hose is sold in 65 ft increments.
** Stock numbers are for bulk hose of 65 ft.
NOTE: Each additional section of recovery hose requires one hose-extension coupling and two clamps. *Recovery hoses, couplings, and clamps are listed in Section 11.1: Accessories.*

Figure 7

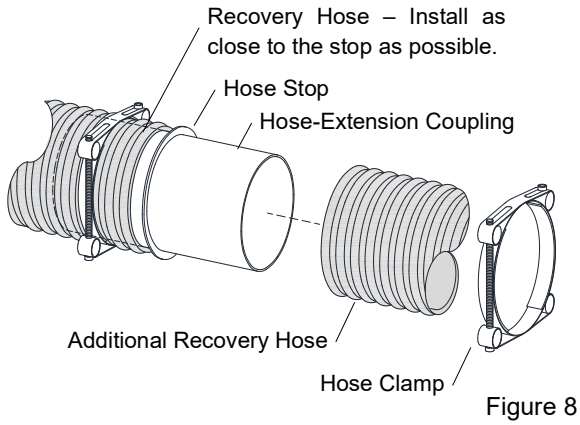


Figure 8

2.3 Connect Suction Nozzle to Recovery Hose Figure 9

2.3.1 Slide the hose clamp provided over the end of the recovery hose closest to the recovery site. Insert the suction-nozzle end about halfway into the hose and secure the nozzle to the hose using the clamp provided. Adjust the nozzle per Section 7.2.

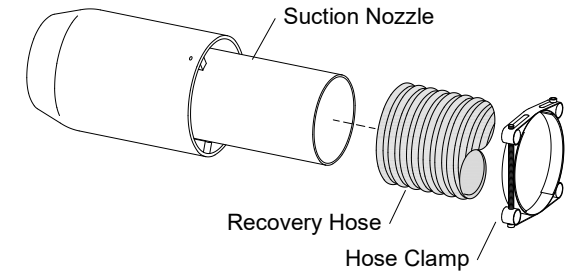


Figure 9

2.3.2 Avoid using a hose without a nozzle to vacuum. Doing so can cause frequent blockage, resulting in high vacuum and decreased recovery rates.

2.4 Electrical Requirements and Connections

⚠ WARNING

Lockout and tagout the electrical supply before performing any electrical service. Shorting electrical components could result in serious electrical shocks, death, 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.

2.4.1 An electrical control panel is mounted on the suction module and a wiring diagram is enclosed within the panel. Voltage requirement is determined at the time of order. All module wiring is completed; the user needs only to supply appropriate 3-PH power to the panel. A wiring schematic showing voltage is stowed in the control panel.

2.4.2 The table in Figure 10 shows nominal full-load amps based on motor voltage. All electrical work must be done by qualified electricians and comply with applicable codes.

2.4.3 Pass an electrical supply cable through the entry at the base of the control panel and make electrical connection per the wiring diagram stowed inside the panel. Make sure grounding is to an earth ground. A cable clamp is provided on larger models; secure the supply cable with the clamp.

ELECTRICAL REQUIREMENTS

	MB-750 Motor Size 15 kW/20 HP	MB-1600 Motor Size 30 kW/40 HP	MB-2000 Motor Size 45 kW/60 HP	MB-3000 Motor Size 75 kW/100 HP	* MB-4000 Motor Sizes 90 kW/125 HP	MB-5000 Motor Size 110 kW/150 HP
NOMINAL FLA						
230 VAC/60 Hz	54	104	154	248	312	360
460 VAC/60 Hz	27	52	77	124	156	180
575 VAC/60 Hz	22	41	62	99	125	144
Disconnect/Fuses						
230 VAC	80 A	150 A	200 A	350 A	400 A	500 A
460 VAC	45 A	70 A	100 A	175 A	200 A	250 A
575 VAC	30 A	60 A	80 A	125 A	175 A	200 A

Amps shown are based on 2-pole motors.
* MB-4000 utilizes two suction units, each with its own motor. Amps shown is the sum of both motors.

Figure 10

2.4.4 Test electrical functions

2.4.4.1 Turn the main breaker to the "I ON" position. Make sure the white POWER indicator light is lit.

2.4.4.2 Press the white START button. The motor will start. If the red "FAULT" indicator light is flashing, interchange two of the three phases on the power-supply cable terminals in the control panel. DO NOT restart until correct rotation is established.

2.5 Ground Each System Components

Static electricity can be generated during the recovery operation. All system components must be earth grounded and only static conductive hose must be used.

2.5.1 Attach an external ground from an earth ground to the grounding bolts on each system components.

NOTICE

To prevent shocks from static electricity and damage to electronic processors, attach an external-grounded wire from an earth ground to each system component. Use only static conductive suction hoses with the system.

2.6 Compressed-Air Requirements and Connections

⚠ WARNING

To avoid the risk of injury from the releases of trapped compressed air, install an isolation valve and bleed-off valve where the air supply is tapped into the compressed-air system. This enables depressurization of the compressed-air lines before performing maintenance.

2.6.1 Dust-Collector Pulse Chamber – Figure 11

The compressed-air supply to the pulse chamber must be clean dry air, maximum of 85 psi, cfm noted below:

- Models 750, 1600, and 2000 require 7 cfm
- Models 3000, 4000, and 5000 require 14 cfm

NOTICE

Compressed air supplied to the dust-collector pulse chamber must be clean, dry air. Moist air will decrease filter cleaning efficiency and reduce filter cartridge life.

2.6.1.1 Apply thread sealant to the male pipe threads of an air fitting that is compatible with the air-supply hose fitting, as noted in Section 2.6.1.2, and install it onto the pressure regulator inlet, mounted to the end cap on the dust-collector pulse chamber, as shown in Figure 11. **NOTE: MB-750 pulse chamber is mounted atop the dust-collector lid.**

⚠ WARNING

Hose disconnection while under pressure can cause serious injury or death. Use safety lock pins or safety wire to lock twist-on couplings together and to help prevent accidental separation, and use safety cables to prevent hose from whipping should separation occur. Safety lock pins and safety cables are listed in *Section 11.1: Optional Accessories.*

2.6.1.2 Connect an air hose of at least the same ID as the regulator thread size, and connect it from the air source to the previously installed air fitting on the pressure regulator.

2.6.1.3 Provide air to the regulator and set pressure to 75 to 80 psi. Do not exceed 85 psi. Refer to Section 7.3 to adjust pulse pressure.

The type of air fitting and hose connections are for reference only.
When using twist-on couplings, install safety lock pins to prevent accidental disconnections.
Use a safety cable to secure the air hose to the suction unit to prevent the hose from whipping should separation occur.

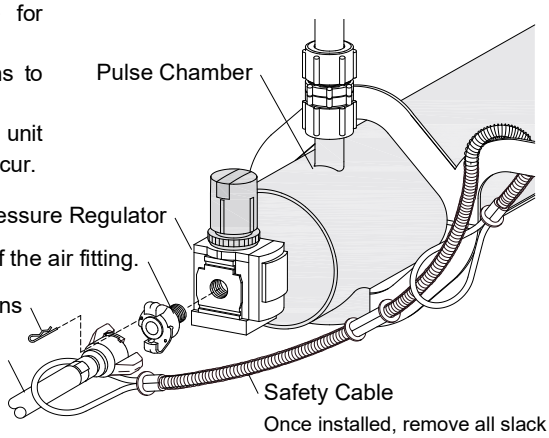


Figure 11

2.7 Place Abrasive and/or Waste Containers

2.7.1 Recovery storage hopper: Place a blast machine(s), abrasive storage container, or waste container under the central dump valve. Recyclable abrasive can be returned to the blast machine for reuse or stored in weather-tight containers. Spent expendable abrasives are emptied into waste containers for disposal.

2.7.2 Cyclone precleaner: Place a waste container or tie a disposal bag under the precleaner butterfly dump-out valve.

2.7.3 Dust-collector hopper: Place a waste container or tie a disposal bag under the dust-collector butterfly dump-out valve.

3.0 ACCESSORIES

3.1 Multiple Vacuum-Hose Manifolds

Hose manifolds divide a single, large-diameter recovery hose for use with multiple, smaller-diameter hoses.

NOTICE

Although smaller-diameter hoses are easier to manage, splitting the hose can reduce recovery rates by 30% to 50%

3.1.1 Refer to the table in Figure 12 to determine the recommended manifolds for recovery hose diameter. Manifolds and recovery hoses are listed in *Section 11.1: Accessories.*

RECOMMENDED VACUUM-HOSE MANIFOLDS

Recovery Hose Dia.	Manifold Recommendation
6" ID	6" x two 4"
5" ID	5" x two 3"
4" ID	* 4" x three 2"

* 2" ID Hose is for dust removal only, used with a suction nozzle, floor brush, and similar broad attachments.

Figure 12

3.2 Vacuum Tools for Dust Removal

3.2.1 Commercial vacuum heads such as floor and brush attachments are available from local vendors. Make sure they can be used with 2" ID vacuum hose.

4.0 INITIAL STARTUP

Perform an initial startup each time the equipment is setup, as noted in Section 2.0.

4.1 Refer to the blower (vacuum pump) operations manual and check oil in both sides of the blower.

4.2 Perform all routine startup instructions, as noted in Section 6.0.

5.0 PERSONAL PROTECTIVE EQUIPMENT

⚠ WARNING

All dust is hazardous to breath. Before blasting, test the coating and substrate for toxic materials, such as lead or other heavy metals, or asbestos. These hazards require special measures to protect operators and the environment.

Obtain a safety data sheet (SDS) for the blast abrasive to identify hazardous substances. Silica sand (crystalline) can cause silicosis, lung cancer, and breathing problems in exposed workers. Slag abrasives may contain trace amounts of toxic metals such as arsenic, beryllium, and cadmium. Any abrasive dust has potential to cause lung disease.

Abrasive blasting and recovery operations can create high levels of dust and noise. No dust is safe to breathe. Abrasive blasting can produce harmful dust. Failure to wear NIOSH-approved respirators can result in serious lung disease or death. The respirators must be properly fitted and maintained. Use only NIOSH-approved, Type CE supplied-air respirators approved for abrasive blasting.

Everyone working in the vicinity of abrasive blasting must wear properly maintained, NIOSH-approved, respiratory protection, eye protection, and hearing protection appropriate for the job site hazards.

It is the employer's responsibility to train employees to identify hazardous substances and to provide suitable policies, procedures, monitoring, recordkeeping, and personal protective equipment.

5.1 Who Is Required to Wear Protective Clothing: Operators and anyone else who may be exposed to the hazards generated by the blasting and recovery process must wear appropriate protective gear, including eye and hearing protection, and NIOSH-approved respiratory protection appropriate for the job site hazards.

5.2 Donning Protective Clothing: Don protective attire outside the blast and recovery area in a clean nonhazardous environment, free of contaminants, and where the air is safe to breathe.

5.3 Doffing Protective Clothing: When finished with the recovery process and after cleanup is completed, remove the respirator and protective clothing outside the respirator-use area in a clean environment where the air is safe to breathe.

6.0 OPERATION

⚠ WARNING

This equipment is designed for use with nonflammable and nonexplosive dust. Before putting this equipment into full service, the user must test the dust for fire and explosive hazards. Failure to follow this warning can result is injury or death from fire or explosion.

6.1 Startup

6.1.1 Make sure all hose connections are secure and all doors are closed and secured.

Recovery Hopper:
- Access hatch must be closed and secure.
- Butterfly valve must be tightly closed. **A partially open or leaking butterfly valve will cause considerable damage to the bottom outlet.**
- Secondary ports must be capped or closed.
- Recovery hose and interconnecting hoses must be connected and secure.
- Suction nozzle is attached to the pickup end of the recovery hose.

Cyclone Precleaner:
- Butterfly valve must be tightly closed. **A partially open or leaking butterfly valve will cause considerable damage to the bottom outlet.**
- Interconnecting hoses must be connected and secure.

Dust Collector:
- Make sure the butterfly valve is tightly closed. **The unit will not start if the valve is open or partially open.**
- Make sure the air connection is made, air supply is on, and air pressure is set between 75 psi and 80 psi.
- Make sure inlet hose is secure.
- Make sure the dust-collector cover plates are closed and secure.

Motor Compartment:
- Front and side covers are latched and bolted.
- Make sure electrical connection is made and that electrical power is supplied to the suction module panel.

If additional units are included, each unit must be checked.

6.1.2 Turn the main breaker to the "I ON" position. Make sure the white POWER indicator light is lit. If it is not lit, check the power supply.

6.1.3 Press the white START button; the motor will start. **If the red indicator light marked "FAULT" is flashing on the initial startup, interchange two of the three phases on the power-supply cable terminals in the control panel.**

NOTICE

Do not restart until the correct rotation is established by interchanging two of the three phases on the power-supply cable terminals in the control panel.

If the "FAULT" light flashes during subsequent start-ups, check for the probable cause, per *Section 10.3: Red lamp marked FAULT flashes.*

6.1.4 System is now ready for operation by pressing the white START button.

6.2 Operation

6.2.1 Start the recovery equipment by pressing the white START button.

6.2.2 Check the operation of the safety valve, per Section 9.6.

6.2.3 Adjust the suction nozzle, per Section 7.2, and begin recovery.

NOTE: Operating vacuum is usually between 4" to 8" Mercury (Hg), as indicated on the vacuum gauge. Constant lower vacuum normally indicates a vacuum leak or that the suction nozzle adjustment is open too far. Constant higher vacuum usually indicates not enough air enters the suction nozzle. Some applications may obtain better conveying rates with lower or higher than normal vacuum. Best conveying rates will be achieved by monitoring the vacuum gauge and air-abrasive mixture.

6.3 Shutdown

6.3.1 Remove the suction nozzle from the abrasive and run the system long enough to clear the recovery hose and interconnecting hoses.

6.3.2 Press the black STOP button to shut off the vacuum-pump motor.

NOTE: After pressing the STOP button, an after-sequence pulse-cleaning cycle continues for 10 minutes. During that period, the GREEN ON lamp flashes.

NOTICE

Do not shut off the compressor or the power supply to the system until the after-sequence cleaning period is completed and the green lamp has stopped flashing. Shutting off the compressor or interrupting the power supply prematurely ends the pulse-cleaning period.

6.3.3 Turn the main breaker to position "O OFF". The white lamp marked POWER switches off.

6.3.4 Make sure the exhaust flap on the top of the **dust-collector silencer is closed. Close it if it is open.**

6.3.5 Open the butterfly valves on the recovery hopper, precleaner hopper, and dust-collector hopper and empty the contents into suitable containers.

NOTICE

Depending on the type of abrasive, it might be necessary to empty the dust compartment several times a day. Check the contents frequently. It is essential that the dust collection compartment is not allowed to overfill, as this will reduce operating efficiency, cause cartridge wear, and elevate vacuum pressure, leading to overheating and damage to the vacuum pump.

7.0 ADJUSTMENTS

7.1 Pulse Intervals

7.1.1 Filter cartridges are cleaned by a jet pulse once per minute. When the unit is stopped, the pulse-cleaning cycle continues for 10 minutes. *Although The pulse intervals do not usually require changing, different configurations are built into the PLC so that the pulse intervals can be changed if needed.*

7.2 Suction Nozzle – Figure 13

Best recovery rates are obtained by maintaining a consistent balance of abrasive and vacuum air-flow.

NOTICE

Restriction of airflow into the recovery hose will cause decreased recovery rates, blockages in the recovery hose, and high vacuum, which overheats the vacuum pump and motor, causing extensive damage, and also voids the warranty.

7.2.1 Make a mark on the inner tube along the rim of the outer tube. Doing so provides a fast reference for measuring the offset and to return the tool to factory setting. Factory setting is 3/8” between the end of the inner tube and spacer stops, as shown in Figure 13.

7.2.2 Loosen the three setscrews on the outer nozzle-tube collar, at the hose end of the suction nozzle, as shown in Figure 13.

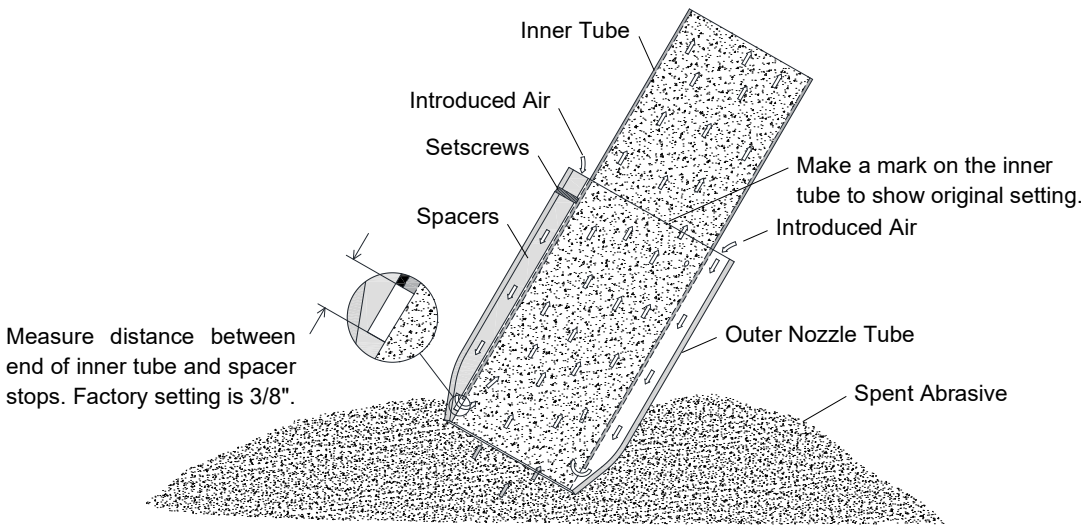


Figure 13

7.2.3 Slide the outer tube up or down in 1/8" or less increments.

- Increase distance to draw in more air, for longer hose, and more bends.
- Decrease distance to draw in less air, for shorter hose, and few bends.

7.2.4 Tighten the setscrews, making sure they are positioned on the spacers on the inner nozzle-tube.

7.2.5 Test the recovery rate by checking (usually in seconds, no more than one minute) the time required to recover from a container or measured amount of abrasive.

7.2.6 Repeat the process, making minor adjustments until optimum recovery time is achieved.

7.2.7 Measure the distance between the end of the inner tube and spacer stops, and make a note of the distance for future reference

7.3 Pulse Pressure – Figure 14

7.3.1 A pressure regulator is located on the pulse chamber inlet. **NOTE: MB-750 pulse chamber and regulator are mounted atop the dust collector lid.** Set pressure to 75 to 80 psi.

7.3.2 To adjust pressure:

1. Pull up on the knob; a short snap as the knob is pulled up unlocks it.
2. Turn the knob clockwise to increase pressure or counterclockwise to decrease pressure.
3. Once operating pressure is set, push down on the knob to lock it and maintain the setting.

NOTICE

Do not exceed 85 psi. Optimum pressure is between 75 and 80 psi. Higher pressure does not improve cartridge cleaning and reduces cartridge life.

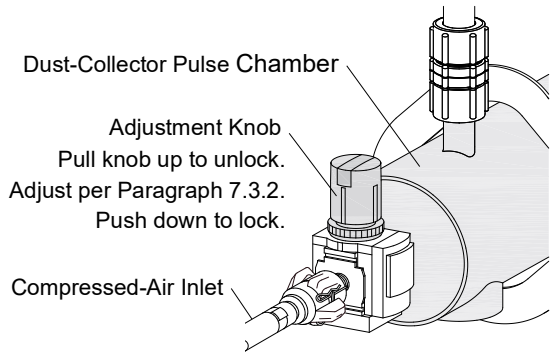


Figure 14

7.4 Adjusting the Vacuum Safety-Relief Valve Figure 15

7.4.1 Check the operation of the relief valve, as noted in Section 9.6. If the reading exceeds -0.5 bar / 14.5" Hg or if it does not go above -0.4 bar / 13" Hq, the safety valve must be adjusted.

7.4.2 Open the motor-compartment door but do not remove the guard. The safety-relief valve, as shown in Figure 15, is located inside the motor compartment on the inlet side of the vacuum pump.

⚠ WARNING

- **Always perform an approved electrical lockout and tagout procedure before removing the safety guard.**
- **Never remove the safety guard when the vacuum pump motor is operating.**
- **Never turn ON the motor if the safety guard is not securely bolted in place.**

Failure to follow these warnings can result in severed limbs, death, or other injury from moving parts.

7.4.3 After electrical power is locked out and tagged out, loosen the upper and lower jam nuts on both side of the safety guard and pull the guard (the guard mounting tabs are slotted) off the mounting bolts.

NOTE: Because the relief valve is inside the motor chamber, all adjustments must be made with the motor turned OFF and locked out and tagged out.

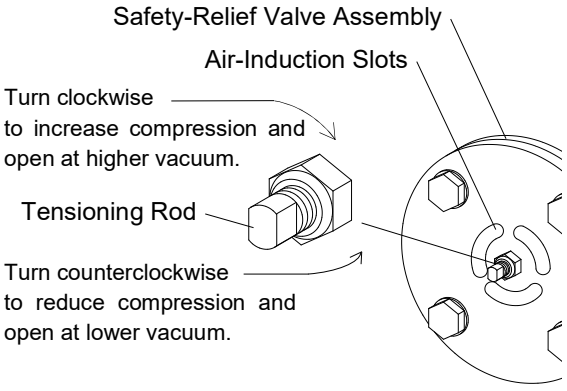


Figure 15

7.4.4 *If negative pressure exceeds -0.5 bar / 14.5" Hq* when the inlet is totally blocked, turn the tensioning rod with a wrench one full-turn counterclockwise to open the valve at lower vacuum, as shown in Figure 15.

Replace the guard, apply power, and press the START button to start the motor and recheck the vacuum.

Repeat the process until the vacuum does not exceed -0.5 bar / 14.5" Hq with the inlet totally blocked.

7.4.5 *If negative pressure stays at or below -0.4 bar/13" Hq* when the inlet is totally blocked, turn the tensioning rod with a wrench one full-turn clockwise to open the valve at higher vacuum, as shown in Figure 15.

Replace the guard and recheck the vacuum.

Repeat the process until the vacuum does not exceed -0.5 bar/14.5" Hq with the inlet totally blocked.

7.4.6 The optimum vacuum while transferring abrasive is between and -0.3 to -0.4 bar/9" and 12" Hg, but has a lot to do with hose dimension and recovery distance. High vacuum is an indication of blockage in the hose or a full or a segment hopper that full and needs to be emptied. Recurrent higher vacuum is an indication of insufficient air induction at the suction nozzle. Refer to Section 7.2 to adjust the nozzle. Avoid using a hose without a nozzle to vacuum. Doing so can cause frequent blockage resulting in high vacuum.

7.5 Tensioning V-Belts – Figure 16

7.5.1 Perform an approved electrical lockout and tagout procedure. **This step is especially important with the optional storage-hopper level sensor, which could start the system without notice.**

⚠ DANGER

Operating V-belts pose an extreme pinching hazard. Before starting the vacuum-pump motor, make sure the motor-compartment safety guard is securely fastened to avoid access to the belts. Before removing the safety guard to check belts, make sure the power supply is locked out (be certain the electrical power supply is off and that it cannot be started while work is in process) and tagged out (be certain the electrical power supply is clearly marked to prevent restarting while work is in process). Serious injury or death will occur if limbs or clothing are caught in the belts of a starting or running vacuum-pump motor.

7.5.2 Open the motor-compartment door, loosen the upper and lower jam nuts on both side of the safety guard, and pull the guard (the guard mounting tabs are slotted) off the mounting bolts.

⚠ DANGER

Never remove the motor-compartment safety guard until an approved electrical lockout and tagout is performed. Moving parts within the motor compartment pose extreme pinching hazards, which can result in severing limbs or death.

V-BELT TENSION TABLE

MB Vacuum System Model	Belt Condition	Newton Force	Pound Force
MB-750	New Belts	354 N to 379 N	80 psi to 85 psi
	Used Belts	304 N to 329 N	68 psi to 74 psi
MB-1600	New Belts	473 N to 506 N	106 psi to 114 psi
	Used Belts	405 N to 439 N	91 psi to 98 psi
MB-2000 and MB-4000	New Belts	675 N to 723 N	151 psi to 162 psi
	Used Belts	578 N to 627 N	130 psi to 141 psi
MB-3000	New Belts	797 N to 854 N	179 psi to 192 psi
	Used Belts	683 N to 740 N	153 psi to 166 psi
MB-5000	New Belts	904 N to 969 N	203 psi to 218 psi
	Used Belts	775 N to 839 N	174 psi to 188 psi

Each belt should fall within the force range noted. If they do not deflect uniformly, replace the entire set.

Figure 16

7.5.3 Use an Optikrik I, Optikrik II, or equal tension gauge that measures the force requirements noted in the table in Figure 16.

7.5.4 If the force is below the range noted in the table, tighten the belts by lowering the motor plate. If the force is above the range noted, loosen the belts by raising the motor plate. **NOTE: Tension force is different for new and old belts; make sure the force is taken from the correct column.**

7.6 Optional Cyclone Precleaner Legs

⚠ WARNING

Always use lift equipment that is rated higher than the weight of the machinery. Anyone using material handling equipment to move, transport, or lift the equipment must be trained and experienced with the hazards associated with handling this type of machinery. Failure to observe these warnings could result in serious injury or death.

7.6.1 Make sure the hopper is empty.

7.6.2 Lift the precleaner by the lifting eyes until the legs are just off the ground.

7.6.3 Remove the safety pin from the hitch pin and remove the hitch pins.

7.6.4 Raise the precleaner slightly higher than the required height and slide the legs to align the pin holes. NOTE: Stops at the top of the sliding legs prevent the legs from falling out of the guides.

7.6.5 Insert the hitch pins at each leg and install the safety pins with the rings facing up.

7.6.6 Lower the precleaner onto firm level ground.

8.0 PREVENTIVE MAINTENANCE

⚠ WARNING

Prior to doing any maintenance, the employer must meet required OSHA standards including but not limited to 29 CFR 1910 for:

- **Appropriate Respirator**
- **Personal Protective Equipment**
- **Toxic and Hazardous Substances**
- **Fall Protection**
- **Confined Space**
- **Combustible Dust**
- **Lockout and Tagout**
- **Hazard Communication**

All dust is hazardous to breath, some much more than others. Toxicity and health risk vary with type of dust generated by blasting. Identify all material that is being removed by blasting and obtain a Safety Data Sheet (SDS) for the blast media. Waste dust in the collector can cause serious injury or death through inhalation, absorption, or consumption, and by fire or explosion. It is the employer's responsibility to do a job hazard analysis and meet all OSHA requirements, including but not limited to those noted above.

8.1 General Preventive Maintenance

8.1.1 To ensure long-lasting and properly operating equipment, a suitable, competent person should perform regular inspection and maintenance.

8.1.2 Combustible Dusts: The user must validate the dust is noncombustible, per ASTM 1226. If dust is combustible, the user must comply with NFPA 652 and NFPA 654.

8.1.3 Any maintenance or any work done inside the electrical panel, must be performed by qualified electricians, and comply with applicable codes.

8.1.4 The system operates under vacuum (negative pressure). Any vacuum leaks will cause inlet turbulence that causes wear. Any leaks must be corrected as soon as they are detected.

8.1.5 Shut down immediately if dust is seen coming from the top of the suction unit. Inspect the filter cartridge(s), as noted in Section 9.3. Continued use will cause extensive damage to the vacuum pump.

8.1.6 Never vacuum abrasive without the suction nozzle. Using a hose without a suction nozzle can cause frequent blockage, resulting in high vacuum and will usually decrease recovery rates.

8.1.7 Avoid leaving abrasive in the storage hopper or blast machine, fines in the precleaner hopper, or dust in the dust-collector hopper overnight. Condensation may develop in the hoppers, which could cake and impair flow through butterfly valves.

8.1.8 Empty any hoppers as needed to prevent overfilling. Continuing operation after any of the system components are full can cause carryover to the next component.

NOTICE

Empty hoppers as often as necessary to prevent overfilling. Overfilling any system components will reduce efficiency and elevate vacuum pressure, leading to overheating that could damage the vacuum pump.

8.1.9 Keep recovery hose as straight as possible. Bends in the hose will accelerate wear and decrease efficiency.

8.1.10 Remove unnecessary lengths of recovery hoses. Extra hose causes needless wear and decreases efficiency.

8.2 Inspection and Maintenance Schedule

NOTE: Maintenance interval depends on the media type and contamination. Recovering spent, friable abrasive containing high concentrations of fines and dust will require more frequent emptying of the precleaner and dust-collector hopper. Recovering recyclable abrasive may need more frequent inspection of wear items.

8.2.1 Daily maintenance

Dust collector

- Empty the dust-collector hopper at least daily and when shutting down. Adjust inspection based on dust loading. Recovering dusty abrasive requires more frequent emptying. Refer to Section 9.1 to empty the dust-collector hopper.
- Check dust-collector pulse pressure. Optimum pressure is between 5 and 5.5 bar/75 to 80 psi. Do not exceed 6 bar/85 psi. Refer to Section 7.3 to adjust pulse pressure.

Precleaner

- Empty the precleaner hopper at least daily and when shutting down. Adjust inspection based on dust loading. Recovering dusty abrasive requires more frequent emptying. Refer to Section 9.1 to empty the precleaner.

Storage hopper

- Empty the storage hopper daily and as often as required and when shutting down the system. Refer to Section 9.2 to empty the storage hopper.

8.2.2 Weekly maintenance

Motor compartment

- Check oil levels on both sides of the blower (vacuum pump). Refer to the blower operations manual.
- During a normal shutdown, notice if the blower momentarily reverses. If it reverses, inspect the backflow gates (not used on MB-750), per Section 9.7.

Dust collector

- Check operation of the dust-collector pulse sequence; it should pulse each cartridge once every minute.
- Check exhaust flaps on top of the dust-collector silencer. Make sure the flap(s) moves freely.
- Check exhaust air at the top of the dust collector for dust. Dust indicates a loose or leaking filter cartridge. Inspect the filters, per Section 9.3, if dust is noticed.
- Inspect butterfly valve for wear and function, making sure it completely seals when closed. A partially open valve or a minor leak at the valve will cause considerable damage to the bottom outlet.

Precleaner option

- Inspect butterfly valve for wear and function, making sure it completely seals when closed. A partially open valve or a minor leak at the valve will cause considerable damage to the bottom outlet.
- Check outlet connection and elbow for wear and accumulated dust.

Storage hopper

- Inspect the rubber pad on the recovery-hopper deflector plate (located under the top access hatch) and replace it before it wears through.
- While the access hatch is open, inspect the hatch gasket. Remove all remnant gasket material and glue-in the replacement gasket using good quality contact adhesive.
- Inspect butterfly valve for wear and function, making sure it completely seals when closed. A partially open valve or a minor leak at the valve will cause considerable damage to the bottom outlet.
- Check outlet connections and elbow for wear and accumulated dust.

Hoses and hose connections

- Check recovery hoses for any sign of wear.
- Check suction nozzle for wear and blockages in the air inlets. Clear blockage or replace nozzle as necessary.
- Check all hose couplings for leaks and wear.
- Check all outlet connections and elbows for wear and accumulated dust.

Compressed-air installation

- Inspect compressed-air lines and connections for leaks.

8.2.3 Monthly maintenance

Recovery suction hose

- Unbolt the recovery hose at the storage hopper inlet and rotate the hose, hose flange, and inlet pipe 120 degrees. Rotating the hose shifts high-wear areas and prolongs hose life.

Motor compartment

- Check the vacuum-pump-motor V-belts tension, per Section 7.5
- Inspect V-belts and pulleys for wear and alignment.
- Refer to the electric-motor operations manual. Some motors may require lubrication. If lubrication is required, make a note of the lubrication schedule.
- Check operation of the vacuum gauge and safety-relief valve, per Section 9.6.

Dust collector

- Open the dust-collector cover plates and check the compartment for dust. Inspect the filters if dust is detected.
- Inspect the filter cartridge(s), per Section 9.3.
  - The polyester filter cartridges can be cleaned and reused several times; refer to Section 9.4 to wash filter cartridges.
- Refer to Section 9.7 and inspect the rubber seal on backflow gates. Replace rubber when worn or damaged. **Note exceptions in Section 9.7.1 concerning location of backflow gates.**

Level sensor – storage hopper option

- Check function of optional level sensor.
  - Start the recovery system (without abrasive)
  - Activate the level sensor through the inspection plug, located next to the level indicator. This should activate the stop procedure for the recovery system. If stop procedure is not activated, replace the level indicator.

8.2.4 Six-month maintenance

Motor compartment

- Refer to the blower operations manual and change the oil in both chambers in the vacuum pump.

8.3 Perform Additional Dust-Collector Cartridge Pulsing

A noticeable decrease in recovery rates could be an indication of overloaded filter cartridges and the need for addition cartridge pulsing.

8.3.1 Every time the black STOP button is pressed, it begins a 10-minute, automatic, pulse-cleaning cycle. After the pulse cycle is completed, press the white START button and immediately thereafter press the black STOP button. Doing so begins another 10-minute, pulse-cleaning cycle. Repeat the process as often as needed.

9.0 SERVICE MAINTENANCE

⚠ WARNING

Prior to doing any maintenance or opening the dust collector, the employer must meet required OSHA standards including but not limited to 29 CFR 1910 for:

- **Appropriate Respirator**
- **Personal Protective Equipment**
- **Toxic and Hazardous Substances**
- **Fall Protection**
- **Confined Space**
- **Combustible Dust**
- **Lockout and Tagout**
- **Hazard Communication**

All dust is hazardous to breath, some much more than others. Toxicity and health risk vary with type of dust generated by blasting. Identify all material that is being removed by blasting and obtain a Safety Data Sheet (SDS) for the blast media. Waste dust in the collector can cause serious injury or death through inhalation, absorption, or consumption, and by fire or explosion. It is the employer's responsibility to do a job hazard analysis and meet all OSHA requirements, including but not limited to those noted above.

9.1 Empty Dust-Collector and Precleaner Hoppers

9.1.1 Push the black STOP button. The automatic, after-sequence, pulse-cleaning cycle continues for 10 minutes after pushing the button. During that period the GREEN, ON lamp flashes.

NOTICE

Do not open any of the butterfly dump-out valves until the 10-minute, after-sequence, pulse-cleaning cycle is complete. Doing so can cause dust leakage with each pulse.

9.1.2 Dust-Collector Hopper: After the pulse cycle times out, turn off the air supply to the dust collector and drain the pulse chamber. The drain is located on the bottom of the pulse chamber, as shown in Figure 17. **NOTE: MB-750 pulse chamber is mounted atop the dust collector lid.**

9.1.3 Make sure the dust-disposal containers or bags are in place and sealed around the bottom of the butterfly dump-out openings.

9.1.4 Open the butterfly dump-out valves to let dust enter the disposal container.

⚠ WARNING

To avoid spilling harmful dust, close the butterfly valve before the dust container is full. The container must have the capacity to hold dust left in the tube after the valve is closed.

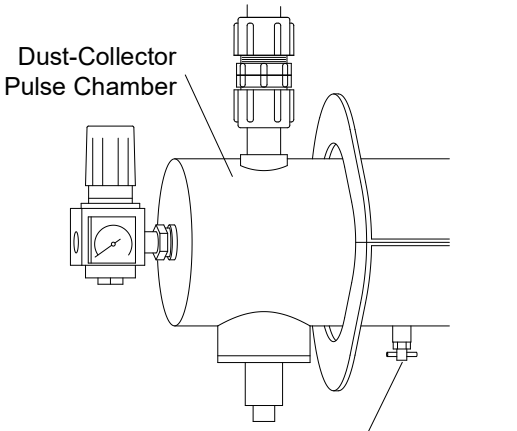


Figure 17

9.1.5 dispose of the dust or sealed bags in a suitable disposal receptacle.

NOTE: Blasting media is usually nontoxic; however, some materials being removed by the blast process may be toxic. Obtain SDS sheets for the media and identify all material removed by the blast process. Check with proper authorities for disposal restrictions.

9.1.6 Repeat the process until the dust-collector hopper and precleaner are empty.

9.2 Empty the Recovery Storage Hopper

9.2.1 Push the black STOP button.

9.2.2 Use the centrally located, manually operated butterfly valve or install valves on any of the four secondary ports to empty stored abrasive into disposal containers or blast machines.

9.2.3 Recyclable abrasive can be returned to the blast machine for reuse. Spent expendable abrasives are emptied into waste containers for disposal.

9.3 Inspect and Replace Filter Cartridges Figure 18

9.3.1 Run the collector through two additional pulse cycles, per Section 8.3.

⚠ WARNING

Before servicing any parts of the dust collector, lockout and tagout compressed air and electrical power, and drain compressed air from the pulse chamber. Failure to do so can cause injury from the release of trapped compressed air and/or electrical shock.

9.3.2 Empty the dust-collector hopper, per Section 9.1.

9.3.3 Remove the bolts and nuts securing the dust-collector cover plates and remove the cover plates.

9.3.4 Loosen the pulse pipe unions and remove the pulse pipes (not used with MB-750) through the access openings.

9.3.5 Each filter cartridge is secured with a 3-lug top flange. Remove the three retaining bolts and lift the filter straight up to remove it; a small amount of force may be needed to loosen the filter gasket's seal.

9.3.6 Lift the filter and immediately place it into a plastic bag or other suitable receptacle to contain the dust. Tie off or otherwise seal the top of the receptacle to take it to a cleaning area, as noted in Section 9.4, or to dispose of it into a suitable disposal container.

9.3.7 After all filter cartridges are removed, clean the top side of the cartridge plate, especially from around the cartridge sealing area. **For all models except MB-750 and MB-3000, inspect backflow gates, per Section 9.7.2, while cover plates are off.**

9.3.8 Inspect the cartridge for damage to the filter media, sealing gasket, or metal parts. If there is no visible damage, additional cleaning may be done to remove hardened or caked dust by washing the cartridge, per Section 9.4.

9.3.9 Remove any rubber left from the old filter that remained on the top of the cartridge plate.

9.3.10 Lower the new or cleaned cartridges into the opening, placing the flange lugs under the mounting bolt heads and washers.

9.3.11 Tighten all three bolts to secure the filter.

9.3.12 Reassemble the pulse pipe.

9.3.13 Inspect the cover-plate gaskets and replace any that are worn or damaged.

9.3.14 Replace the covers and tighten the bolts to secure.

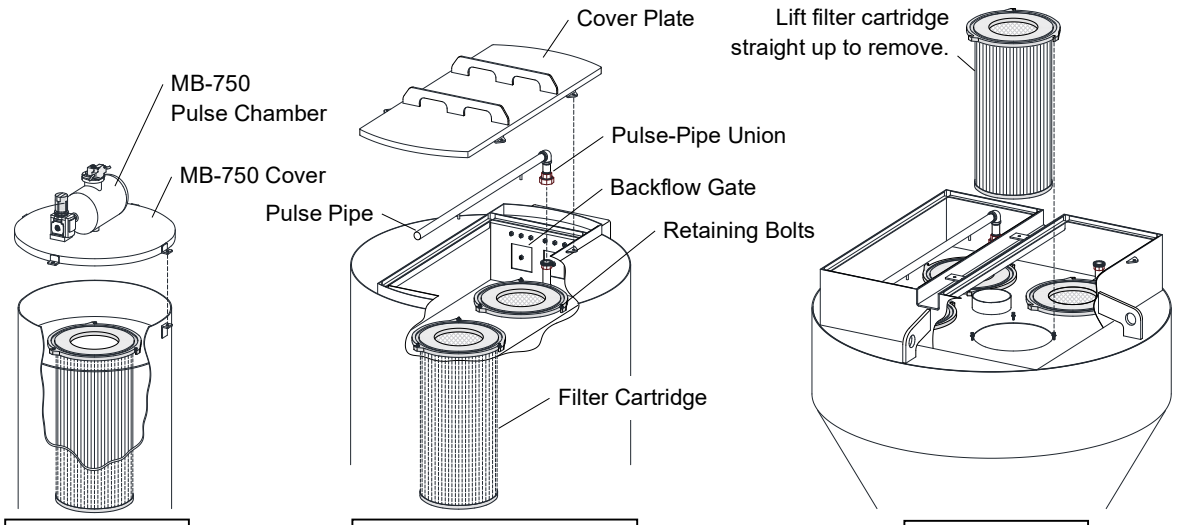


Figure 18

9.4 Washing Filter Cartridges

Washing filters removes packed dust and reopens clogged filter media.

9.4.1 Perform additional cartridge pulsing, per Section 8.3, and then remove the cartridges, as noted in Section 9.3.

9.4.2 Before cleaning a cartridge, thoroughly inspect it for damage to the filter media, sealing gasket, or metal parts. If there is any damage, the cartridge must be replaced.

9.4.3 Use a power washer with maximum pressure of 50 bar/725 psi and a standoff distance of at least 1/2 meters/20 inches to clean the element with water.

9.4.4 A nonsynthetic detergent may be used if necessary.

9.4.5 Allow filters to dry thoroughly.

9.4.6 Reinspect the filter media to make sure no damage has occurred during the washing process. Replace any filter cartridge that shows signs of media weakness or damage to the metal parts.

9.4.7 Install the filter cartridges, as noted in Section 9.3.

9.5 Servicing Diaphragm Pulse Valve(s) Figures 19 and 20

Diaphragm pulse valves and solenoid coil are attached to the bottom of the pulse chamber, as shown in Figure 19. **Note: MB-750 pulse valve is attached to the top of the pulse chamber.**

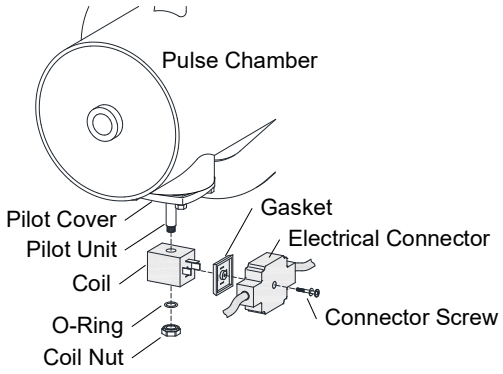


Figure 19

⚠ WARNING

Before servicing any parts of the dust collector, lockout and tagout compressed air and electrical power, and drain compressed air from the pulse chamber. Failure to do so can cause injury from the release of trapped compressed air and/or electrical shock.

9.5.1 Remove the screw connecting the electrical connector to the coil and remove the connector and gasket from the coil.

9.5.2 Remove the coil nut and slide the coil off the pilot unit, as shown n Figure 19. **NOTE: The coil nut O-ring is loose on the nut; do not misplace it when removing the nut.**

9.5.3 If a faulty coil is the issue, replace the coil; no additional service is needed. Reattach the connector.

9.5.4 To service the pulse valve, refer to Figure 20 and remove the four cap screws and lock washers, securing the pilot cover and pilot unit to the pulse chamber. Carefully remove the cover and note the orientation of the cover, spring, and diaphragm. They must be reassembled in the same position.

9.5.5 Replace all items from the solenoid kit and reassemble in reverse order.

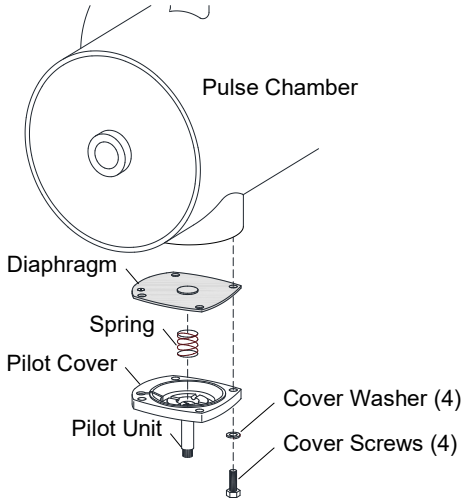


Figure 20

9.6 Check Operation of the Vacuum Gauge and Safety-Relief Valve – Figure 21

When adjustment is required, refer to Section 7.4 to adjust the safety-relief valve.

9.6.1 The vacuum gauge is mounted on the duct pipe between the dust-collector hopper and motor compartment, as shown in Figure 21.

9.6.2 Press the white START button to start the motor.

9.6.3 Use a suitably sized wooden or steel plate to increasingly block off the pickup end of the recovery hose or inlet connector on the storage hopper.

⚠ WARNING

Make sure the plate will not cause injury or damage when it is released by the sudden reduction in vacuum when the system is stopped.

9.6.4 The reading on the vacuum gauge increases as the inlet becomes progressively covered. The safety valve should begin to open at about -0.4 bar/11.5 inches of mercury (Hq) and fully open at about -0.5 bar/14.5" Hq, as noted on the gauge mounted on the steel tube between the dust-collector hopper and motor compartment.

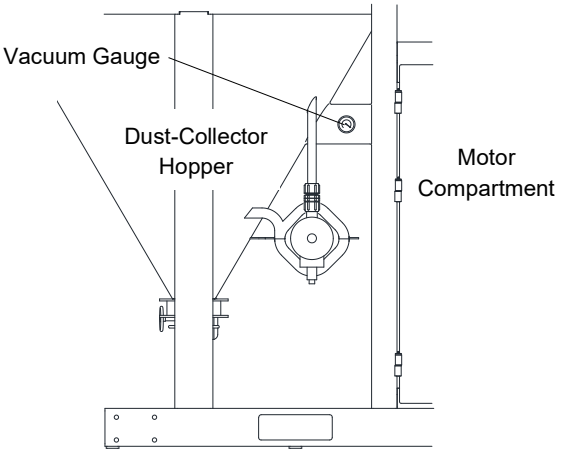


Figure 21

If negative pressure on the gauge exceeds -0.5 bar/14.5" Hq, **immediately press the black STOP button.** The safety valve must then be adjusted per Section 7.4.

NOTICE

Press the STOP button to shut down the system if the vacuum exceeds -0.5 bar/14.5" Hg. Continued operation above -0.5 bar/14.5" Hg will overheat the vacuum pump, causing extensive damage, and also void the warranty.

If negative pressure stays at or below -0.4 bar/13" Hq, press the black STOP button and adjust the valve per Section 7.4.

9.7 Inspect and Service Backflow Gates

Backflow gates are check flaps that prevent the vacuum pump from momentarily reversing due to negative pressure in the vacuum stream when the motor is shut OFF.

⚠ WARNING

Lockout and tagout the electrical supply and the compressed-air supply and drain the air-supply line before performing any service on the dust collector or within the motor compartment. Failure can result in ever injury, especially within the motor compartment.

9.7.1 Location of the backflow gates.

Model 750: No backflow gates.

Models 1600, 2000, 4000, and 5000: Refer to Section 9.7.2 and Figure 22. Backflow gates are located in the top section of the dust collector.

Model 3000: Refer to Section 9.7.3 and Figure 23. Backflow gates are located inside the motor compartment and within the steel blower frame.

9.7.2 Models 1600, 2000, 4000, and 5000 backflow gates – Figure 22

MB-4000 and MB-5000 models are furnished with two dust collectors (four backflow gates). Inspect gates on both dust collectors.

9.7.2.1 Make sure the electrical power and compressed-air supply is locked out and tagged out and the air-supply line is bled.

9.7.2.2 Remove the bolts and nuts securing the dust-collector cover plate(s) and remove the cover plate(s).

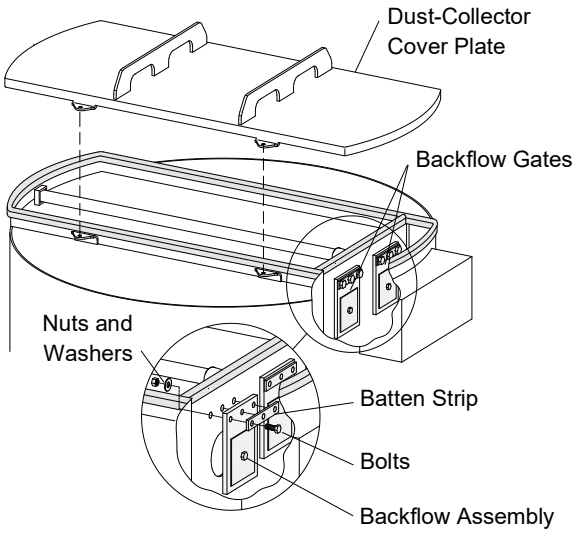


Figure 22

9.7.2.3 Use a backup wrench to hold the nuts from the backside of the housing and remove fasteners holding the batten strips.

9.7.2.4 Remove the backflow assembly from the housing and inspect all items for wear.

9.7.2.5 Inspect the rubber seal. If it is worn or otherwise damaged, remove it from the backing plate and replace it.

9.7.2.6 Reassemble the backflow assembly and hoses in reverse order.

9.7.3 MB-3000 backflow gates – Figure 23

9.7.3.1 Make sure the electrical power is locked out and tagged out before opening the motor-compartment door and removing the safety guard.

9.7.3.2 Loosen the lower hose clamps and remove both exhaust hoses from the backflow housing collars.

9.7.3.3 Remove the batten-strip nuts and washers from the backside of the housings.

9.7.3.4 Reach through the collars and remove batten strips and backflow assembly from the housing.

9.7.3.5 Inspect the rubber seal; if it is worn or otherwise damaged, remove it from the backing plate and replace it.

9.7.3.6 Reassemble the backflow assembly and hoses in reverse order.

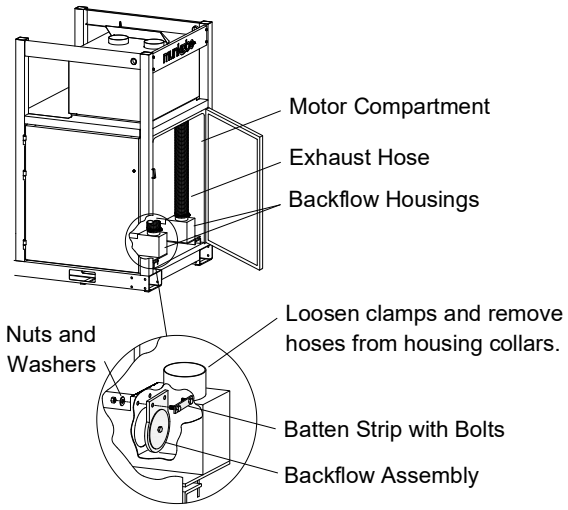


Figure 23

9.8 Replacing Gaskets on Doors and Hatches

9.8.1 Doors and hatch gaskets are adhered with contact adhesive. Remove all remnant gasket material and glue-in the replacement gasket using good quality contact adhesive.

10.0 TROUBLESHOOTING

⚠ WARNING

Prior to any troubleshooting, the employer must meet required OSHA standards including but not limited to 29 CFR 1910 for:

- **Appropriate Respirator**
- **Personal Protective Equipment**
- **Toxic and Hazardous Substances**
- **Fall Protection**
- **Confined Space**
- **Combustible Dust**
- **Lockout and Tagout**
- **Hazard Communication**

It is the employer's responsibility to do a job hazard analysis and meet all OSHA requirements, including but not limited to those noted above.

10.1 Motor Does Not Start When Start Button Is Pressed

10.1.1 Main breaker not switched ON and white lamp not lit

1. Turn main breaker to "I ON" position.

10.1.2 Start button not activated and green lamp not lit

1. Press white button marked START.

10.1.3 Red lamp marked "FAULT" flashes

1. Refer to Section 10.3.

10.1.4 Pilot circuit fuses blown in control panel

1. Replace fuse; Refer to the wiring diagram stowed in the control panel.

10.1.5 Main fuse(s) in isolator bow blown

1. Replace with new fuse(s).
2. Make sure fuse size is correct.

10.1.6 Yellow lamp marked BUTTERFLY OPEN flashes

1. Close the butterfly valve on the bottom of the dust-collector hopper.

10.1.7 Emergency stop activated

1. Release emergency stop (pull button out).

10.1.8 Electrical motor malfunctioning

1. Replace or rewind motor.

10.1.9 Optional high-level sensor in the abrasive-storage hopper engaged

1. Empty the hopper.

10.2 Motor Runs But Recovery Rate Is Low

10.2.1 Cover or access door(s) open or leaking

1. Make sure all doors are closed and that seals are not leaking.
2. Check the recovery hose, interconnecting hoses, and couplings for leaks.
3. Make sure the storage hopper access cover, butterfly valves, and the secondary ports at the base of the hopper are not leaking.

10.2.2 Blocked air-inlet vents on suction nozzle

1. Clear vents.
2. Check nozzle adjustment, per Section 7.2.

10.2.3 Blocked recovery hose

1. Clear blockage in the hose.
2. Check nozzle adjustment, per Section 7.2.

10.2.4 Loaded filter cartridges restricting airflow

1. Perform additional pulsing, per Section 8.3.
2. Wash filter cartridges, per Section 9.4.
3. Replace filter cartridges, per Section 9.3.

10.2.5 Blockage in the dust-collector hopper and/or hopper is overfilled

1. Clear the blockage and empty dust-collector hopper.

10.2.6 Blockage in the storage hopper or precleaner hopper and/or hopper(s) overfilled

1. Remove blockage and empty the hoppers.

10.2.7 V-belts slipping on the pulleys

1. Check belt tension and tighten, as needed, per Section 7.5.

10.3 Red Lamp Marked FAULT Flashes

10.3.1 Wrong phase sequence

1. Interchange two phase.

10.3.2 Supply-cable wire gauge is too small for the application

1. Replace supply cable with appropriate gauged wire.

10.3.3 Bolt connections on wire terminals are loose or corroded

1. Tighten bolts and/or clean terminals.

10.3.4 Operating vacuum too high, caused by blockages in suction nozzle or recovery hose

1. Clear blockage in hose.

2. Check nozzle adjustment, per Section 7.2.

10.3.5 Motor rotating backward

1. Check motor rotation and interchange two of the three power-supply cable phases.

10.3.6 One or both backflow gates loose or damaged and causing blockage of the air flow

1. Replace rubber on backflow gates.

10.4 Vacuum Pump (Blower) Momentarily Reverses When the System Is Shut Off

10.4.1 Backflow gates are not sealing

1. Refer to Section 9.7 to inspect and replace backflow seals.

11.0 ACCESSORIES AND REPLACEMENT PARTS

11.1 Accessories and Options

Description	Stock No.
Lock pins, pk of 25, for twist-on hose couplings	11203
Safety cable, for 1/2" to 1-1/4" OD hose	15012
Hoses, suction, per 65 ft lengths	
2" ID x 65-ft	30745
3" ID x 65-ft	30746
4" ID x 65-ft	30747
5" ID x 65-ft	30748
6" ID x 65-ft	30749
Hoses, interconnecting, per 16 ft lengths	
3" ID x 16-ft	30742
5" ID x 16-ft	30743
6" ID x 16-ft	30744
Couplings, hose extension	
for 3" ID hose	30736
for 4" ID hose	30737
for 5" ID hose	30738
for 6" ID hose	30739
Clamps, suction hose, each	
for 2" ID hose	30727
for 3" ID hose	30728
for 4" ID hose	30729
for 5" ID hose	30730
for 6" ID hose	30731
Manifolds, multiple suction hose. Divides recovery suction hose into multiple, smaller diameter hoses.	
One 4" x three 2"	30750
One 5" x two 3"	30751
One 6" x two 4"	30752
Nozzle, suction	
2” bulk pick up	30753
3” bulk pick up	30754
4” bulk pick up	30755
5” bulk pick up	30756
6” bulk pick up	30757

11.2 Motor Compartments

Description	Stock No.
V-Belt, individual. If a belt needs replacement, it is recommended that all belts be replaced.	
for MB-750, 2 belts required	30723
for MB-1600, 3 belts required	30724
for MB-2000, 3 belts required	30724
for MB-3000, 4 belts required	30724
for MB-4000, 6 belts required	30724
for MB-5000, 5 belts required	30725
Gasket, compartment door, per foot, specify feet required	30734

11.3 Dust Collectors

Description	Stock No.
Gasket, dust collector cover plate, all models	30735
Filter cartridge, each	
for MB-750, 1 required	30740
for MB-1600, 2 required	30741
for MB-2000, 2 required	30741
for MB-3000, 4 required	30740
for MB-4000, 4 required	30741
for MB-5000, 4 required	30741
Valve, solenoid pulse kit	30758
Valve, butterfly w/switch,	
for MB-750	30761
for MB-1600, 2000, 3000, 4000, and 5000	30762

11.4 Recovery Storage Hoppers

Description	Stock No.
Gasket, access hatch, D-profile, 5 ft required	30799
Valve, butterfly, without switch,	
for MB-750	30759
for MB-1600, 2000, 3000, 4000, and 5000	30760

11.5 Precleaners

Description	Stock No.
Valve, butterfly, without switch,	
for MB-750	30759
for MB-1600, 2000, 3000, 4000, and 5000	30760