BNP PRESSURE BLAST CABINET CONVERSION KIT

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

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

No representation is intended or made as to the suitability of the products described herein for any particular purpose 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

 • Stock No.: 23920 • Manual No.: 2180-0703 • Date of Issue: 07/03.

1.0 INTRODUCTION

1.1 Scope of Manual

1.1.1 These instructions cover set-up, operation, maintenance, troubleshooting, optional accessories, and replacement parts for BNP pressure blast machine/ reclaimer conversion kit. A supplemental manual is provided for the Sentinel metering valve.

1.1.2 These instructions also contain important information required for safe operation of the equipment. Before using this equipment, all personnel associated with the blast cabinet operation must read this entire manual, and all accessory manuals to become familiar with the operation, parts and terminology.

1.1.3 The following instructions refer to cabinet functions for operational purposes only. The cabinet used with the conversion must have the air changes, velocities, dust collection, and other capacities to enable its use with this pressure system.

1.2 Safety Alerts

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

This is the safety alert symbol. It is used to alert the user of this equipment of potential personal injury hazards.
Obey all safety messages that follow this symbol to avoid possible injury or death.

CAUTION

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

⚠ CAUTION

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

⚠ WARNING

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

⚠ DANGER

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

1.3 General Description

1.3.1 BNP pressure conversion kits consist of two major components:

1. Blast Machine Assembly
2. Reclaimer Assembly

See Figure 1 for a push thru arrangement with a dry filter. Figure 2 shows a pull-thru arrangement with a reverse-pulse dust collector.

1.4 Theory of Operation

1.4.1 When the air supply is on, and the cabinet and exhauster are correctly set up for operation, the blast machine is ready for operation. Fully depressing the foot pedal pressurizes the blast machine, and propels the media through the blast hose and out the nozzle. After striking the object being cleaned, the media, along with fines, dust, and by-products generated by the process, fall through the mesh work table into the cabinet hopper. These particles are drawn into the reclaimer for separation. Dust and fines are first separated from the reusable media. Next, the media is screened of oversize particles, and held in the reclaimer hopper for reuse. Dust and fines are drawn through the reclaimer into the dust collector. When the foot pedal is released, blasting stops as the blast machine depressurizes, allowing stored media to refill the machine.

1.5 Blast Machine and Remote Controls

1.5.1 The blast machine pressure vessel is manufactured to American Society of Mechanical Engineers (ASME) standards, as described in Section VII, Div. 1, and carry a National Board certification. It is the owners responsibility to maintain the integrity of the vessel as may be required by some states. This may include regular inspection and hydrostatic testing as described in National Board Inspection Code and Jurisdictional Regulations and /or Laws.

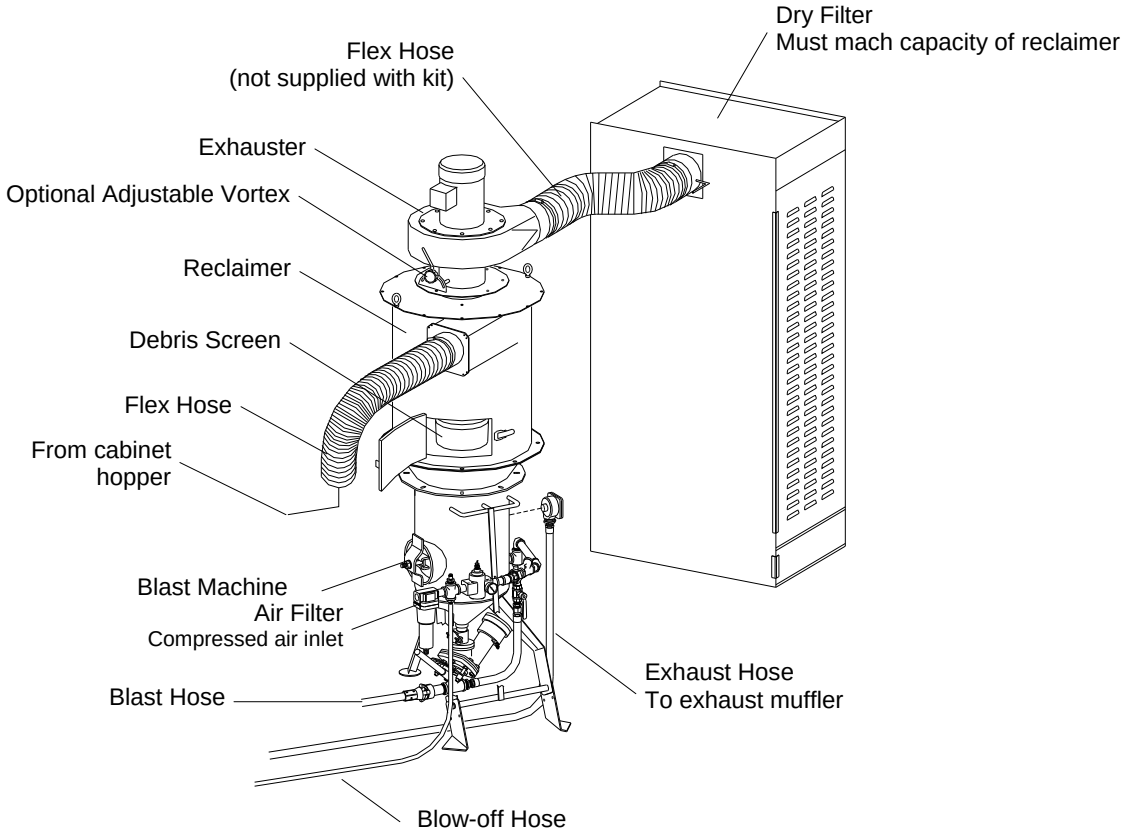


Figure 1

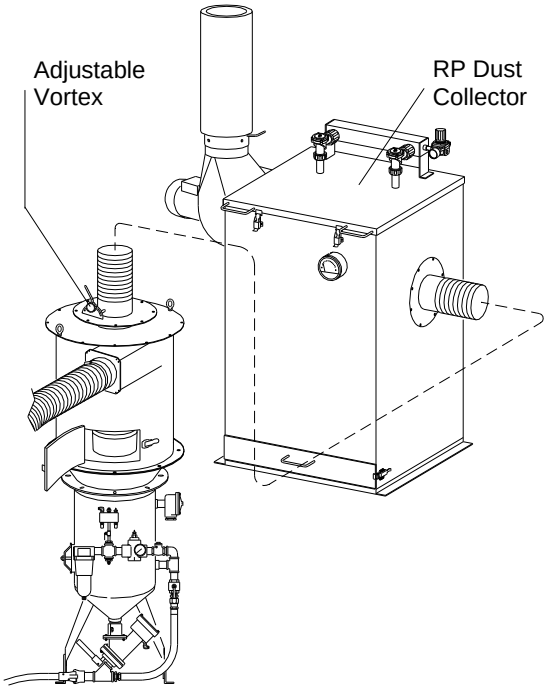


Figure 2

⚠ WARNING

Welding, grinding, or drilling on the blast machine could weaken the vessel. Compressed air pressure could cause a weakened vessel to rupture, resulting in death or serious injury. Welding, grinding, or drilling on the blast machine vessel, without a National Board ″R″ stamp voids the ASME and National Board certification.

1.5.2 All welding repairs done on the vessel must be performed by certified welders, at shops holding a National Board ″R″ Stamp. Welding performed by any welder not properly qualified per the ASME Code voids ASME and National Board certification of the vessel.

1.5.3 This vessel is rated for a maximum of 125 psi (pounds per square inch); do not exceed the rated pressure.

⚠ WARNING

Excessive air pressure could cause the blast machine to rupture. To prevent serious injury or death, do not exceed the rated pressure of the blast machine vessel.

1.5.4 OSHA does not require pressure relief valves on blast machines when air compressors supplying air to the blast machines are built to ASME[(1)] specifications and comply with OSHA[(2)] regulations. ASME Manual section VIII, Division 1, UG-125, paragraph A90 (g) states that pressure relief valves or protective devices **"...need not be installed directly on a pressure vessel when the source of pressure is external to the vessel and is under such positive control that the pressure in the vessel cannot exceed the maximum allowable working pressure at the operating temperature..."**. OSHA regulation 1910.169 refers to the above ASME code when describing the necessity of pressure relief valves on compressed air equipment. **DO NOT** operate blast machines with air compressors that are not equipped with properly functioning pressure relief valves.

[(1)] American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, 1989

[(2)] Occupational Safety and Health Administration, 29 CFR 1910, Subpart M - Compressed Gas and Compressed Air Equipment.

1.5.5 When the air supply is on, and the cabinet doors are closed, the blast machine is ready for actuation by the foot pedal. Pressing the foot pedal opens the normally closed main inlet regulator, and closes the normally open outlet valve. The incoming air pressurizes the blast machine, and blasting begins. When pressure on the foot pedal is released, the blast machine depressurizes, and blasting stops.

1.6 Nozzle Options

1.6.1 Unless specified at the time of order, machines are shipped with a 3/16" nozzle. Optional 1/8" nozzles are available for use with all machines, and 1/4" nozzles are for use with 900 cfm reclaimers only.

1.6.2 Use boron carbide nozzles when blasting with aggressive media. See Optional Accessories, Section 9.1

1.7 Metering Valve Options

1.7.1 Unless specified at the time of order, machines are shipped with a fine-mesh Sentinel metering valve. The valve is for use with 50 mesh and finer media, and #10 and finer glass bead. The optional Sentinel metering valve is for use with 50-mesh and coarser media. Conversions kits easily convert the valves either way. Kits are listed under Optional Accessories in Section 9.1.

1.8 Media

1.8.1 When the cabinet is adequately sized for the blast machine and reclaimer, the machine utilizes most common reusable media 25 mesh and finer (with the appropriate metering valve) that is specifically manufactured for dry blasting. The usable media size range depends on the cabinet inlet dust and outlet size, nozzle orifice size, media metering valve, and reclaimer cleaning rate. Several factors affecting the reclaimer cleaning rate include: air pressure, media/air mixture, media friability, contamination of parts being cleaned, and humidity. Media sizes shown under the media headings are guidelines only, based on standard 3/16″ orifice nozzle and average conditions.

As a rule, larger nozzles deliver more media, thus demand higher reclaimer cleaning rates. With larger nozzles, the maximum size of media decreases from those recommended. Media finer than those recommended may decrease visibility, and increase carryover to the dust collector. Using media in the 200 mesh and finer range will usually require the addition of the optional, externally adjustable vortex cylinder. See Section 5.4. The vortex cylinder is standard on pull-through systems (with reverse-pulse dust collectors). Media coarser than those recommended may be too dense for the reclaimer to recover from the cabinet hopper.

1.8.2 Steel: Steel shot finer than 170 mesh and steel grit finer than 40 mesh may be used with 900 cfm reclaimers. Steel grit or shot should not be used with 600 cfm reclaimers. Conveying hose on cabinets using steel media should be reduced and have a smooth durable lining. Rubber curtains should be used to protect the cabinet walls from peening and rapid wear.

1.8.3 Sand and Slag: Sand should never be used because of the hazards of using media containing free silica. Slags are not recommended because they rapidly breakdown.

1.8.4 Aggressive media: Aluminum Oxide, Silicon Carbide, Garnet, and abrasive such as these may be used but consideration must be given to accelerated wear on any part of the cabinet, reclaimer, nozzle and hoses, which comes in contact with the media. If aggressive media is used periodically, use an optional aluminum oxide kit. When these media are used extensively, use a fully rubber lined reclaimer, RP dust collector, and boron carbide nozzles.

1.8.5 Glass Bead: Most beads are treated to ensure free-flow operation even under moderately high humidity conditions. Glass beads subjected to excessive moisture may be reused after thorough drying and breaking up any lumps.

1.8.6 Fine-mesh Media: The optional adjustable vortex cylinder is should be installed when using 200-mesh and finer media. NOTE: The adjustable vortex cylinder is standard on pull-through systems . When using very fine media (200 mesh and finer), the inlet baffle of the reclaimer may also need to be removed. Consult the factory before proceeding with this option.

1.8.7 Lightweight Media: The optional adjustable vortex cylinder should be used when using all plastic media, and most agricultural media. NOTE: The adjustable vortex cylinder is standard on pull-through systems.

1.9 Compressed Air Requirements

1.9.1 The size of the compressor required to operate the equipment depends on the size of the nozzle and blasting pressure. See the table in Figure 3 to determine the cfm requirements. The table shows air consumption of nozzles when new. It does not show the recommended compressor size. As nozzles wear, they will consume up to 70% to 80% more air. Consult with a compressor supplier for a suggested compressor size based on the air consumption.

Compressed Air Consumption *(cfm)

Nozzle size	Air Pressure (psi) 50	60	70	80
1/8"	11	13	15	17
3/16"	26	30	33	38
1/4"	47	54	61	68

* Figures are approximate and for reference only, and may vary for different working conditions. Several variables, including media flow and nozzle wear affect cfm consumption.

Figure 3

1.9.2 The air filter at the blast machine inlet removes condensed water from the compressed air. Its use is especially important in areas of high humidity, or when fine-mesh media are used. Moisture causes media to clot and inhibits free flow through the metering valve. If moisture problems persist, an air dryer may be required.

1.10 Electrical Requirements

1.10.1 Electrical requirements depend on the size and phase of the motor. Standard push thru reclaimers are supplied as follows:

600 cfm reclaimer: 1 HP, 120/240V, 1-PH, 60 HZ

900 cfm reclaimer: 2 HP, 230/460V, 3-PH, 60 HZ

2.0 INSTALLATION

2.1 General Installation Notes

2.1.1 See Figure 1 and 2 for the general arrangement and Figure 4 for the control line schematic. Select a location where compressed air and electrical service are available. The location must comply with OSHA and local safety codes. Allow for full access to all doors and service areas. Ideally, locate the blast machine directly behind the cabinet with the blast hose connection toward the cabinet. The reclaimer may be rotated on the blast machine to enable hose connections with as few bends as possible. Determine the best location, and position all units before final assembly.

2.2 Assemble Blast Machine and Reclaimer

2.2.1 Apply adhesive-backed strip gasket to the top of the flange on the blast machine. Punch out an opening at each bolt hole.

2.2.2 Place the optional storage segment on the blast machine. The access door should be on the bottom, and rotated to allow access. Bolt into place. Apply adhesive backed gasket to the top flange as described in Section 2.2.1.

2.2.3 Using a lift, raise the reclaimer over the blast machine assembly, and lower it in place. Attach with fasteners provided.

⚠ WARNING

Do not work under the reclaimer while it is hanging from the lifting device. Severe injury or death could occur if the reclaimer is released before it is secured to the blast machine.

2.3 Support the Blast Machine

2.3.1 Use ropes or other means to temporarily support the blast machine and reclaimer during final assembly.

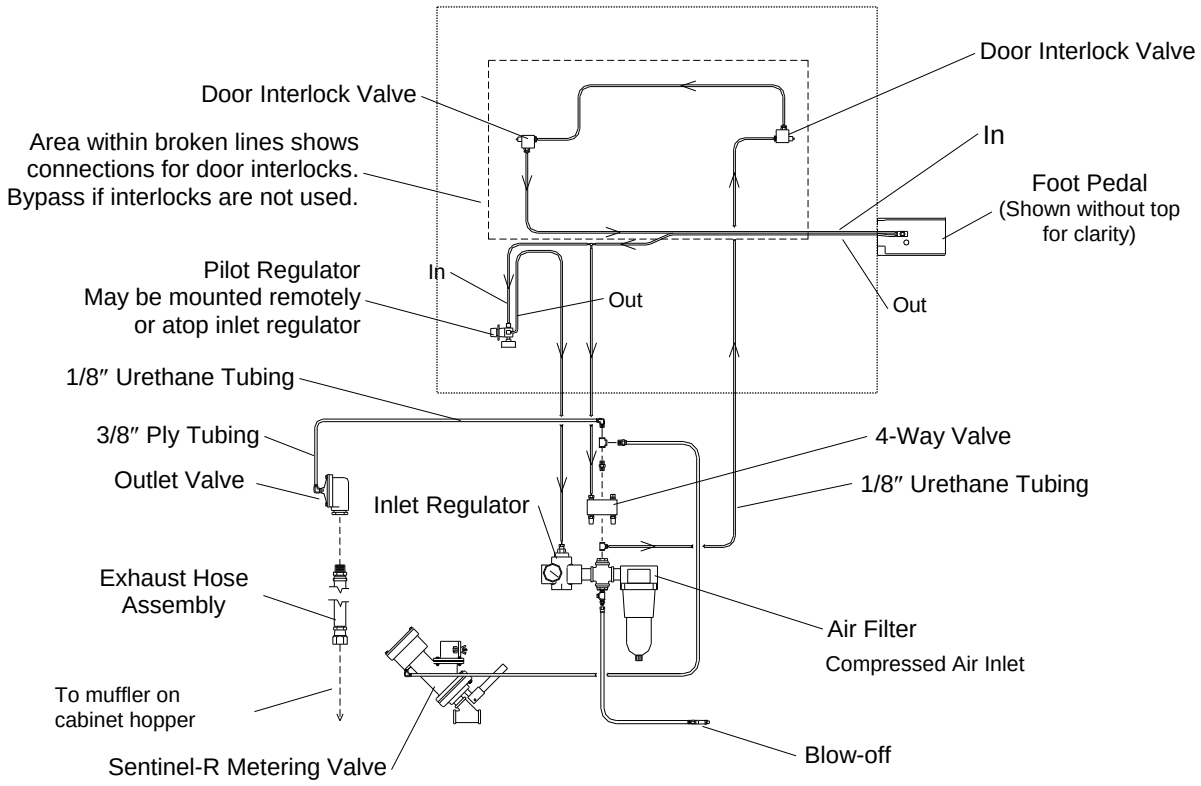


Figure 4

2.4 Connect Conveying Hose

2.4.1 Connect flexible conveying hose between the cabinet hopper transition and reclaimer inlet adaptor. It is easier to slip the hose over the adaptor and create a tighter seal if the first two or three inches of wire is removed from the inside of the hose. Use care not to damage the hose. NOTE: The wire helps dissipate static electricity in the conveying hose, and also helps ground each segment. In order for the hose wire to dissipate static electricity, the wire must touch the metal of each segment. Clamp the flex hose securely with worm clamps provided.

2.4.2 Connect flex hose between the reclaimer outlet and dust collector inlet.

2.5 Connect Blow-Off Hose

2.5.1 Attach the 1/2" blow-off hose from the compatible fitting between the air filter and regulator to inside the cabinet. See the schematic in Figure 4.

2.6 Connect Blast Hose

⚠ WARNING

Hose disconnection while under pressure could cause serious injury or death. Use safety lock-pins and safety cables on all coupling connections to help prevent hose couplings from accidental disconnection while under pressure. Lock-pins and safety cables are listed under Optional Accessories in Section 9.1.

2.6.1 Connect the blast hose from the coupling at the bottom of the blast machine, to the cabinet work chamber. Be sure coupling gaskets are in place and couplings are secured with safety lock-pins.

2.7 Attach Air Exhaust Hose

2.7.1 Install a 1” female pipe coupling to the cabinet hopper and screw the male end of the exhaust hose into the coupling. Connect the female swivel end to the adaptor on the blast machine outlet valve.

2.8 Connect Urethane Control Tubing

2.8.1 Uncoil the 1/8" urethane control tubing. The end of each tubing is numbered 1, 2 or 3. Connect the tubing to the adaptor with the corresponding number on the pressure regulator, piping, and 4-way air valve. Check the schematic in Figure 4 to confirm the connections.

2.9 Connect Compressed Air Supply Line

2.9.1 Install an isolation valve at the air source to enable depressurization for service, and connect a 1" ID or larger air line from the air source to the air filter on the blast machine. A smaller diameter hose may reduce blasting efficiency.

⚠ WARNING

If twist-on type air hose couplings are used, they must be secured by safety pins or wires to prevent accidental disconnection while under pressure. Hose disconnection while under pressure could cause serious injury.

2.10 Ground Cabinet

2.10.1 To prevent static electricity build up, attach an external grounded wire from an earth ground to the cabinet.

2.11 Connect Electrical Service

⚠ WARNING

Shorting electrical components could result in serious electrical shocks, or equipment damage. All electrical work must be performed by a qualified electrician, and comply with applicable codes.

2.11.1 Provide service from the users disconnect and starter, and wire the motor per instruction on the motor plate.

2.12 Check Motor Rotation

⚠ WARNING

Do not look into the reclaimer exhauster outlet while the paddle wheel is turning. Injury to the eye or face could occur from objects being ejected from the exhauster.

2.12.1 Check the motor rotation by jogging the starter (momentarily turn switch on and off). This causes the motor to rotate slowly. Look through the slots in the fan housing on top of the motor, where rotation of the fan can easily be observed. The fan should rotate clockwise when viewed from the fan end of the motor. Proper rotation is indicated by the arrow on the exhauster housing.

2.13 Anchor Blast Machine

2.13.1 When all the components are in their permanent position, remove the temporary supports, and bolt the blast machine to the floor. Anchor holes are located in the blast machine leg pads. Anchor through the holes to secure the machine to the floor.

2.14 Position the foot pedal on the floor at the front of the cabinet.

3.0 FIELD INSTALLED ACCESSORIES

3.3 Manometer

3.3.1 A constant static pressure balance is necessary for precise separation, as the reclaimer's efficiency is accomplished by a centrifugal balance of particle weight and size. The air balance and static pressure are set by adjusting the outlet damper. The manometer measures static pressure. Use the instruction sheet provided with the manometer, for installation and operation instructions. The optional manometer kit is listed in Section 9.1.

4.0 OPERATION

4.1 Media Loading and Unloading

4.1.1 Media Capacity: Media capacity depends on the reclaimer size. Media capacity of 600 cfm units is approximately 1.6 cu. ft. Full capacity will be below the opening of the pop-up valve. Capacity of 900 cfm units is approximately 2.0 cu. ft. Full capacity will be at the pop-up valve opening. Overfilling will result in media carryover to the dust collector and possible blockage in the conveying hose. The optional storage segment provides nearly 2 additional cubic feet of media storage, and raises the overall height by approximately 17 inches.

4.1.2 Media Loading: With the exhauster off, add clean dry media, by pouring it into the reclaimer hopper through the reclaimer door. **Do not pour media directly into the cabinet hopper, as overfilling may occur**. Overfilling will result in media carryover to the dust collector and possible blockage in the conveying hose. Refill only after all media has been recovered from the cabinet.

4.1.3 Media Unloading: To empty the cabinet and blast machine of media, allow all media to be recovered from the cabinet, and reduce pressure to 40 psi. Place an empty container, such as a bucket, on the cabinet grate. Remove nozzle and nozzle washer, close the door, close the choke valve and press the foot pedal. Direct media flow into the container. Empty the container when full or before it is too heavy to handle, and repeat the process until the machine is empty. Return the choke valve to the full open position. Clean the nozzle holder threads and inspect the threads on the nozzle and nozzle holder before reinstalling the nozzle washer and nozzle. If complete purging of media is required, use a vacuum to clean media residue in cabinet hopper and blast machine head.

4.2 Blasting Operation

⚠ CAUTION

- **Always close cabinet, reclaimer and dust collector doors before blasting. Keep all doors closed during blasting.**
- **Always wear blast gloves.**
- **Avoid pointing the blast nozzle toward the view window.**
- **Use the blow-off nozzle to blow media off parts before opening doors.**
- **After blasting, keep doors closed and exhauster on until the cabinet is clear of all airborne dust.**
- **Stop blasting immediately if dust leaks are detected.**

4.2.1 Slowly open the air valve on the air supply hose to the blast machine. Check for air leaks on the initial start up and periodically thereafter.

4.2.2 Turn on the lights and exhauster.

4.2.3 Load parts.

4.2.4 Close door. Be certain door is sealed securely.

4.2.5 Firmly grasp the nozzle and apply pressure to the foot pedal. Blasting will begin immediately.

⚠ WARNING

Shut down the cabinet immediately if dust discharges from the cabinet or dust collector. Prolonged breathing of any dust could result in serious lung disease or death. Short term ingestion of toxic dust such as lead, poses an immediate danger to health.

4.2.6 Adjust the pilot pressure to the required blasting pressure.

4.3 Stop Blasting

4.3.1 To stop blasting, remove pressure on the foot pedal. The blast machine will depressurize each time the foot pedal is released.

4.3.2 The blast machine refills with media stored in the reclaimer each time the foot pedal is released. Refilling takes approximately 15 seconds.

4.3.3 Use the blow-off nozzle to blow media off cleaned parts. Allow the exhauster to clear the cabinet of airborne dust before opening the door.

4.3.4 Unload parts, shut off the air supply valve, and switch off the lights and exhauster.

4.4 Blasting Technique

4.4.1 Blasting technique is similar to spray painting technique. Smooth continuous strokes are most effective. The distance from the part affects size of blast pattern. Under normal conditions, hold the nozzle approximately 6" from the surface of the part.

5.0 ADJUSTMENTS

5.1 Blasting Pressure

5.1.1 The pilot pressure regulator enables the user to adjust the blasting pressure to suit the application. The suitable pressure for most purposes is around 80 psi. Lower pressures may be required on delicate substrates, and will reduce media breakdown. Higher pressure may be required for difficult blasting jobs on durable substrates, but will increase media breakdown. In all cases, highest production can only be achieved when pressure is carefully monitored.

5.1.2 If the application requires blasting below 40 psi, first pressurize the blast machine at 40 psi, then turn the pressure to the required setting before blasting the part. If the initial pressure is below 40 psi the pop-up valve may not seal.

5.1.3 Pressure registers on the gauge only while blasting. While holding the nozzle securely, adjust air pressure at the pilot regulator.

5.1.4 To adjust, unlock the knob, and turn it clockwise to increase pressure or counter-clockwise to decrease pressure. Once operating pressure is set, lock the knob to maintain the setting.

5.2 Media Metering

These instructions are for a standard machines with Sentinel Metering Valve. Optional metering valves may function differently, but the process is similar.

5.2.1 Media flow is adjusted by the metering valve located at the bottom of the blast machine. The valve is closed when the handle is fully right. To adjust, close the valve and slowly move the handle to the left to increase media flow. Allow time for the flow to stabilize before further adjusting. The valve is fully open when the handle is at the full left position. The correct flow rate will depend on the type and size of media and blasting pressure, and can best be determined by experience. Use as little media as possible to do the job while maintaining the best cleaning rate. Generally, with the correct mixture, abrasive can be seen as light discoloration as it exits the nozzle.

5.3 Static Pressure

5.3.1 Correct static pressure varies with size of reclaimer and the size, weight and type of media.

5.3.2 Adjust static pressure by adjusting the damper as recommended by the dust collector manufacturer. If the damper is not opened enough, the reclaimer will not remove fines, resulting in dusty media, poor visibility, and possible media blockage in the conveying hose. If the damper is opened too far, it may cause carryover (usable media carried into the dust collector) and result in excessive media consumption. Open only as far as necessary to obtain a balance of dust removal without media carryover.

5.3.3 A manometer is useful when adjusting or monitoring static pressure. Manometer kit is listed under Optional Accessories in Section 9.1. The following are static pressure starting points for given media. Static pressure may need to be lower with finer media, higher with coarser media.

Glass Bead No. 8 to 13 .....2-1/2 - 3"
Alox. 60 & coarser ..... 4 - 5"
Alox. 80 & finer ..... 2-1/2 - 3"
Steel Grit ..... 6 - 7"

5.3.4 If the damper has been adjusted and carryover or excessive dust in the media continues to be a problem, the optional adjustable vortex cylinder, which is standard on pull through reclaimers, may help retain media. The vortex cylinder is usually required only when using 200 mesh and finer media, or lightweight media. See Section 5.4, and Accessories in Section 9.1.

5.4 Optional Externally Adjustable Vortex Cylinder (standard on pull-through reclaimers). For use with fine-mesh or lightweight media.

5.4.1 The adjusting lever for the vortex cylinder is mounted on the spacer above the reclaimer body. Start with the lever in the vertical position. Before adjusting the vortex cylinder, adjust the damper on the dust collector to increase or decrease static pressure per Section 5.3. Once the damper is adjusted, adjust the cylinder as follows.

5.4.2 Dusty Media: If the reclaimer is not removing sufficient quantities of dust, raise the cylinder by moving the lever left toward "COARSE", in 1/4" increments at the indicator plate. Do not adjust again until the media has gone through several cycles, to be certain further adjustment is required.

5.4.3 Media Carryover: If too much media is carried to the dust collector, lower the vortex cylinder by moving the lever right toward "FINE", in 1/4" increments at the indicator plate. NOTE: If the cylinder is lowered too far, the reclaimer will again begin to allow usable media to be carried over, and cause abnormally high static pressure.

5.4.4 When using very fine media (200 mesh and finer), the reclaimer inlet baffle may also need to be removed. Consult the factory before proceeding with this option.

6.0 PREVENTIVE MAINTENANCE

⚠ WARNING

Failure to wear approved respirators and eye protection when servicing dust-laden areas of the cabinet and dust collector, and when emptying the dust collector 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. The respirator must be approved for the type of dust generated. Identify all material being removed by blasting, and obtain a material safety data sheet for the blast media.

NOTE: To avoid unscheduled downtime, establish a weekly inspection schedule. Inspect all parts subjected to media contact, including; nozzle, media hose, flex hose, plus all items covered in this section.

6.1 Reclaimer Debris Screen

6.1.1 The screen is accessible through the reclaimer door. With the exhauster off, remove the screen and empty it daily or when loading media. Empty the screen more often if parts being blasted causes excessive debris. Do not operate the machine without the screen in place.

6.2 Air Filter

6.2.1 The blast machine is equipped with an auto-drain air filter. The filter automatically drains when moisture fills the bowl to a certain level. Moist air inhibits the flow of media. If moisture continues to be a problem, a dryer or after cooler may be required in the air supply line.

6.3 Abrasive Trap (optional)

Recommended for 40 mesh and coarser media.

6.3.1 Check and clean the abrasive trap screen and empty the trap twice a day.

6.4 Blast Hose and Couplings

6.4.1 To avoid unscheduled down-time, inspect the blast hose for thin spots by pinching it every 6 to 12 inches. Check coupling gaskets and couplings for leaks and wear.

6.5. Sentinel Metering Valve

6.5.1 Refer to the Sentinel valve owners manual for

7.0 SERVICE MAINTENANCE

7.1 Nozzle

7.1.1 Replace the nozzle when its diameter has increased by 1/16", or sooner if pressure diminishes noticeably. Make sure the nozzle gasket is in place before screwing the nozzle into the nozzle holder.

7.2 Pop-up Valve Replacement

7.2.1 Empty the machine of media as described in Section 4.1.3.

7.2.2 Depressurize the blast machine, and lock out and tag out the compressed-air supply.

⚠ WARNING

Failure to observe the following procedure before performing any maintenance could cause serious injury or death from the sudden release of compressed air.

- **Depressurize the blast machine.**
- **Lock out and tag out the compressed air supply.**
- **Bleed the air supply line to the blast machine.**

7.2.3 To gain access to the pop-up valve, remove the inspection door assembly.

7.2.4 Using a small pipe wrench, unscrew the pop-up valve guide (Figure 8 Item 12), by turning it counterclockwise. Remove the pop-up valve and guide from the machine. Place the new pop-up valve over the guide, and screw the valve guide (with the pop-up valve on it) back into position inside the machine. Tighten the guide as tight as possible without using a wrench.

7.2.5 Put a new gasket on the inspection door and bolt the door back onto the machine.

7.3 Pop-up Valve Seat Replacement

7.3.1 The easiest method to replace the rubber pop-up seat is through the reclaimer access door. If for some reason replacement can not be made through the reclaimer, observe the warning in Section 7.2, and empty the machine and bleed the air supply line. Remove the inspection door assembly and work through the opening.

7.3.2 Remove the old seat by using a finger, screwdriver, or similar object, to work the seat out of the retainer groove.

7.3.3 Push the new seat all the way through the port and then fit it into the groove. For the last few inches, pull up on the seat and allow it to "pop" into position.

7.4 Reclaimer Wear Plate Replacement

7.4.1 Remove the reclaimer inlet adaptor and old wear plate. The wear plate is held in place by screws attached from the outside of the reclaimer.

7.4.2 Angle the new wear plate into reclaimer inlet until it is in position with the straight end at the reclaimer inlet. Using a board or similar object as leverage, pry the wear plate against the inner wall of the reclaimer and install sheet metal screws to hold in place. Caulk any gaps or voids around the wear plate to prevent rapid wear in those areas.

8.0 TROUBLESHOOTING

⚠ WARNING

To avoid serious injury, observe the following when troubleshooting.

- **Turn off the air, and lock out and tag out the air supply.**
- **If checking the controls requires air, always enlist the aid of another person to:**
  Hold the nozzle securely.
  Operate the foot pedal.
- **Never bypass the foot pedal or wedge it in the operating position.**
- **Never override the door interlock system.**

8.1 Poor Visibility

8.1.1 Motor rotating backwards. The motor should rotate as indicated by the arrow on the housing. If it does not rotate in the proper direction, LOCK-OUT AND TAG-OUT POWER and switch the motor leads as shown on the motor plate.

8.1.2 Hole worn in flex hose between cabinet hopper and reclaimer inlet (if RP collector is used also check hose between the reclaimer outlet and dust collector inlet). Replace hose and route it with as few bends as possible to prevent wear.

8.1.3 Reclaimer door open.

8.1.4 Obstruction in flex hose between the cabinet hopper and reclaimer inlet.

8.1.5 Paddle wheel worn. Check wheel for wear.

8.2 Abnormally High Media Consumption

8.2.1 Door on reclaimer open, or improper fit or worn door gasket. Air entering the reclaimer at this point will cause media to be carried into the dust collector. DO NOT operate unless all doors are closed.

8.2.2 Dust collector damper open too far. Adjusts static pressure per Section 5.3.

8.2.3 Media may be too fine or worn-out.

8.2.4 Using friable media that rapidly breaks down.

8.2.5 Nozzle pressure too high for the media, causing media to break down.

8.2.6 Hole worn in reclaimer, or leak in reclaimer seams. Check entire reclaimer for negative-pressure leaks.

8.2.7 Optional externally adjustable vortex cylinder out of adjustment, See Section 5.4.

8.2.8 If using very fine media (200 mesh and finer), the inlet baffle of the reclaimer may need to be removed. Consult the factory before proceeding with this option.

8.3 Reduction In Blast Cleaning Rate

8.3.1 Low media level reducing media flow. Check and fill if low.

8.3.2 Incorrect metering valve adjustment. Adjust per Section 5.2.

8.3.3 Reduced air pressure. This may be caused by a malfunctioning regulator, a dirty filter element in air filter, partially closed air valve, leaking air line, or other air tools in use.

8.3.4 Blockage in nozzle. Blockage may occur as a result of a missing debris screen.

8.3.5 Moist media. Frequent bridges or blockage in the area of the metering valve can be caused by moisture. See Section 8.5.

8.4 Plugged Nozzle

8.4.1 A damaged or missing reclaimer screen will allow large particles to pass and block the nozzle. Replace or re-install as necessary.

8.5 Media Bridging

8.5.1 Frequent bridging or blockage in the media metering valve can be caused by damp media. Media becomes damp by blasting parts that are slightly oily, from moisture in the compressed air line, or from absorption.

8.5.2 To avoid contaminating media from the workpiece, all parts put into the cabinet should be clean and dry. If parts are oily or greasy, degrease and dry them prior to blasting.

8.5.3 Moist compressed air may be due to a faulty compressor that overheats, or pumps oil or moisture into the air line, too long an air line permitting moisture to condense on the inside, and from high humidity. Drain filters and receiver tank regularly. If the problem persists,

it may be necessary to change media more often, or install an aftercooler or air dryer.

8.5.4 Absorption. Some media tends to absorb moisture from the air, especially fine-mesh media in high humidity areas. Empty the media and store it in an airtight container when cabinet is not in use.

8.5.5 A vibrator mounted either on the blast machine leg or on a bolt on the media metering valve may help prevent bridging of fine-mesh media

8.6 Neither Media Nor Air Comes Out The Nozzle When The Foot Pedal Is Pressed

8.6.1 Depressurize the blast machine, and check the nozzle to see if it is plugged. See Section 8.4.

8.6.2 Check that the blast machine pressurizes when the foot pedal is pressed. If it does not, see Section 8.11.

8.6.3 Check that the media metering valve and the choke valve are open.

8.7 Blast machine Will Not Depressurize Or Depressurizes Too Slowly

8.7.1 Check for blockage in the 4-way valve mufflers.

8.7.2 Check that the 3-way valve in the foot pedal exhausts air when pedal is released. If it does not, check the line for blockage, and check the switch for defect.

8.7.3 Check the outlet muffler for blockage.

8.7.4 Check 4-way air valve for jamming. See Section 8.10.4 and 8.10.5.

8.8 Heavy Media Flow

8.8.1 Make sure the choke valve is open.

8.8.2 Media metering valve open too far. Adjust per Section 5.2. If adjusting the media valve does not regulate media flow, empty the machine, depressurize the machine, and inspect the internal parts of the valve for wear.

8.9 Media Surge: A small amount of surge is normal at start-up.

8.9.1 Heavy media flow. Adjust per Section 5.2

8.9.2 Empty, and depressurize the blast machine, and inspect the internal parts of the metering valve for wear.

8.10 Air Only (no media) Comes Out The Nozzle

8.10.1 Make sure the machine contains media.

8.10.2 Check that the media metering valve is not closed.

8.10.3 Check for minor blockage in the media metering valve by fully opening the metering valve, and closing the choke valve. Activate the foot pedal to blow out obstructions. If this procedure fails, depressurize the machine, open the metering valve clean out cap and check for foreign objects.

8.10.4 Check the muffler on the 4-way air valve. Air should exhaust from the muffler when the foot pedal is pressed. If air does not exhaust, remove the muffler and try again. If air exhausts now, the muffler is blocked. If air still does not exhaust, the 4-way valve may be faulty.

8.10.5 Check the 4-way valve as follows: Depressurize the air supply line. Remove the tubing leading to either the media metering valve or diaphragm outlet valve. Pressurize the air supply line. No air should exhaust from the tube adaptor. Press the foot pedal, air should start exhausting at the adaptor, and stop when pressure on the pedal is released. If it does not operate accordingly, the 4-way valve is probably faulty.

8.11 Blast Machine Will Not Pressurize

8.11.1 Make sure that the air compressor is on and air supply valves are open.

8.11.2 Check that pressure regulator is not turned down. Minimum pressure is 40 psi. See Section 5.1.

8.11.3 Inadequate air supply. Check table in Figure 3.

8.11.4 Inspect the diaphragm in the outlet valve for wear.

8.11.5 Inspect pop-up valve and seat for wear and alignment.

8.11.6 Blocked or leaking control line. Check all fittings and urethane tubing for blockage or leaks.

8.11.7 Foot pedal valve malfunction. Check foot pedal for alignment, and inlet and outlet lines for pressure.

8.11.8 Make sure the lines are not reversed on the foot pedal or pilot regulator. See schematic in Figure 4.

8.11.9 Check the 4-way valve per Sections 8.10.4 and 8.10.5.

8.11.10 Inspect the check valve for obstruction or broken flap.

8.12 Static Shocks

8.12.1 Cabinet and/or operator not grounded. Abrasive blasting creates static electricity. The cabinet must be grounded to prevent static build-up. If shocks persist, the operator may be building up static. Attach a small ground wire (such as a wrist strap) from the operator to the cabinet.

9.0 ACCESSORIES AND REPLACEMENT PARTS

9.1 Optional Accessories

Description	Stock No.
Storage segment, 16": Fits between the reclaimer and blast machine. Provides nearly 2 additional cubic feet of media storage	21128
Vortex cylinder assembly, adjustable for exhauster mounted reclaimer	
600 cfm	19062
900 cfm	23047
Flex hose, heavy lined, for heavy usage with aluminum oxide. Available in 15 ft. lengths only	
5" ID	12465
6" ID	12457
Boron carbide nozzle	
CTB-2, 1/8" orifice	21090
CTB-3, 3/16" orifice	21091
CTB-4, 1/4" orifice	21092
Lock pins (pkg of 25) for twist-on hose couplings	11203
Safety cable, blast hose	15012
Manometer kit	12528
Abrasive trap	02011
Conversion kits, Sentinel metering valve	
To convert from fine mesh media to coarse	22848
To convert from coarse mesh media to fine	22849

9.2 Foot Pedal Assembly, Figure 5

Item	Description	Stock No.
(-)	Foot pedal assembly, less tubing	20483
1.	Top, foot pedal	20017
2.	Base, foot pedal	19991
3.	Valve, 3-way n/c	20026
4.	Drive pin, grooved	20109
5.	Screw, 1/4 nf x 3/4" soc. hd.	03086
6.	Screw, 10-32 x 1/2" fh	19571
7.	Adaptor, 10-32 thrd. x 1/8" barb	11731
8.	Spring, 1-1/4" x 3-1/2"	20121
9.	Screw, 8-32 x 3/8″ thread cutting	11389
10.	Bumper, rubber (feet)	21522

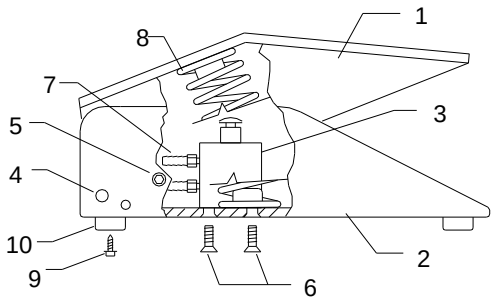


Figure 5

9.3 1" Diaphragm Outlet Valve, Figure 6

Item	Description	Stock No.
(-)	1" Diaphragm outlet valve, complete	03371
1.	Nipple, 1" x close	01701
2.	Diaphragm, outlet valve	06149
3.	Lock washer, 1/4"	03117
4.	Cap screw, 1/4"x 1"	03053
5.	Cap, diaphragm outlet	03393
6.	Body, diaphragm outlet	06135
7.	Bushing, 1-1/4" x 1"	01804

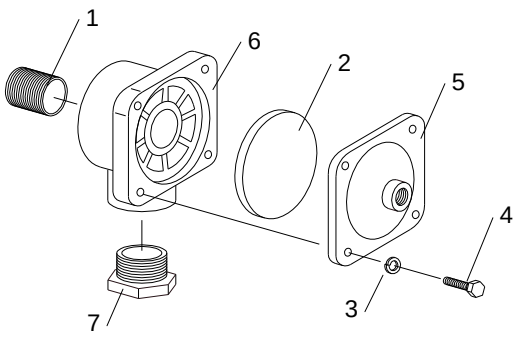


Figure 6

9.4 Plumbing Assembly, Figure 7

Item	Description	Stock No.
1.	Filter, 1" w/ auto drain	22425
2.	Adaptor, 1/8" NPT x 1/8" barb	11732
3.	Tubing, 1/8" ID urethane, specify ft reqd.	12475
4.	Tubing, 1/8" ID twin urethane specify feet required	19577
5.	Adaptor, straight 1/4" male NPT x 3/8" tube	11736
6.	Tubing, 3/8" OD poly, specify ft. required	12478
7.	Tee, 1/8" tube barb	11734
8.	Metering valve, Sentinel	
	for 50 mesh and finer media, standard	21439
	for 50 mesh and coarser media	20608
9.	Hose end, 1" x 1" female	11719
10.	Valve, 4-way air	12203
11.	Adaptor, elbow 1/4" male NPT x 3/8" tube	11685
12.	Valve, 1" diaphragm outlet	03371
13.	Hose end, 1" barb x 1" male NPT	11721
14.	Clamp, hose, 1-7/16" dia.	21270
15.	Bushing 1/4" x 1/8" NPT.	02010
16.	Hose, 1" Supa-T, bulk, 10 ft. required	23103
17.	Muffler, 1/4" bronze	03988
18.	Adaptor, 1/2" NPT x 1/2" male flare	11351
19.	Hose end, 1/2" barb x 1/2" female swivel	15002
20.	Hose end, 1/2" barb x 3/8" male NPT	06369
21.	Blow-off nozzle	13116
22.	Hose, 1/2" ID air, bulk, specify feet reqd.	12472
23.	Regulator, 1/8" NPT pilot	12715
24.	Gauge, pressure	01908
25.	Adaptor, 1/8" NPT elbow x 1/8" barb	11733
26.	Foot pedal assembly, less tubing	20483
27.	Regulator, 1" pilot operated w/ gauge	12052
28.	Tee, 1/4" brass	02025
29.	Nipple, 1/4" Hex	02808

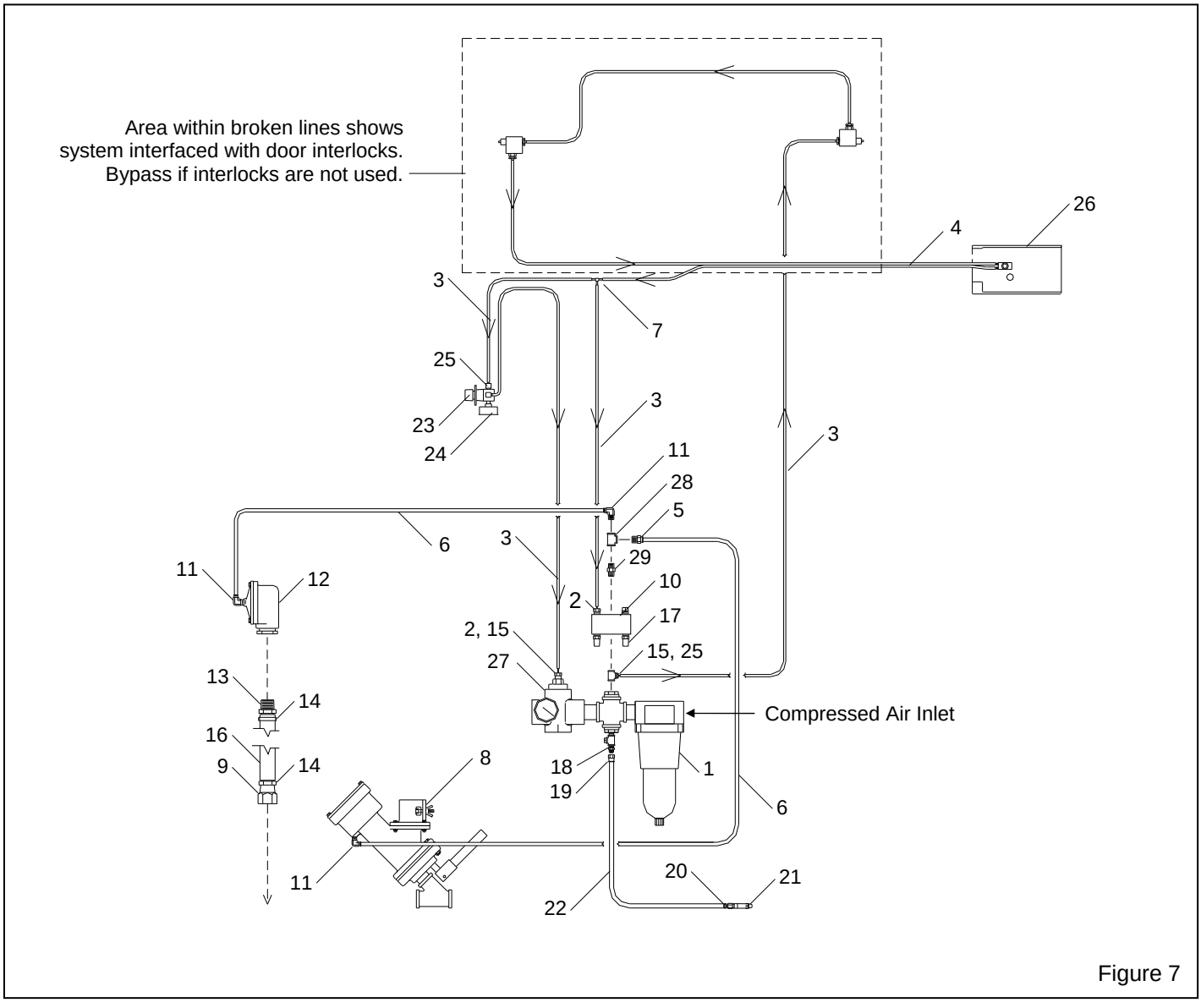


Figure 7

9.5 Blast Machine, Figure 8

Item	Description	Stock No.
(-)	Blast machine assembly, 16", 2 cu. ft. cap.	21135
1.	Ball valve, 1" with handle (choke valve)	02396
2.	Handle, 1" ball valve	22531
3.	Leg pad, right for 1642	20735
4.	Leg pad, left for 1642	20736
5.	Adaptor, 1" male NPT x 1" male flare	11720
6.	Hose assembly, 1" x 21" pusher line	22508
7.	CF Coupling 1-1/4" NPT	00551
8.	Media metering valve, Sentinel	
	for 50 mesh and finer media, standard	21439
	for 50 mesh and coarser media	20608
9.	Inspection door assembly, 6" x 8"	02377
10.	Gasket, 6" x 8" inspection door	02369
11.	Pop-up valve with external sleeve	03699
12.	Guide 1-1/4" x 6" toe	01722
13.	Seat, pop-up valve	02325
14.	Valve, 1" diaphragm outlet	03371
15.	Regulator, 1" pilot operated w/ gauge	12052
16.	Gauge, 1/4" cbm	11830
17.	Filter, 1" w/ auto drain	22425
18.	Check valve, 1" swing	12187
19.	Gasket, CQG, pkg of 10	00850
20.	Coupling, 1/2" ID hose, CQA-1/2	00599
21.	Valve, 4-way air	12203
22.	Nozzle holder, CHE-1/2	00577
23.	Blast hose, 1/2" ID x 16 ft. coupled, includes items 20 & 22	01251
24.	Nozzle, tungsten carbide	
	CT-2, 1/8" orifice	01351
	CT-3, 3/16" orifice, standard	01352
	CT-4, 1/4" orifice	01353
25.	Nozzle washer, NW-1, pkg. of 10	21580
26.	Hose end, 1" barb x 1" male	11721
27.	Clamp, hose, 1-7/16" dia.	21270
28.	Hose end, 1" barb x 1" female	11719
29.	Hose, 1" Supa-T, bulk 10 feet required	23103
30.	Lock pin, coupling (package of 25)	11203
31.	Adaptor, elbow 1/4" male NPT x 3/8" tube	11685
32.	Adaptor, straight 1/4" male NPT x 3/8" tube	11736
33.	Muffler, 1/4" bronze	03988

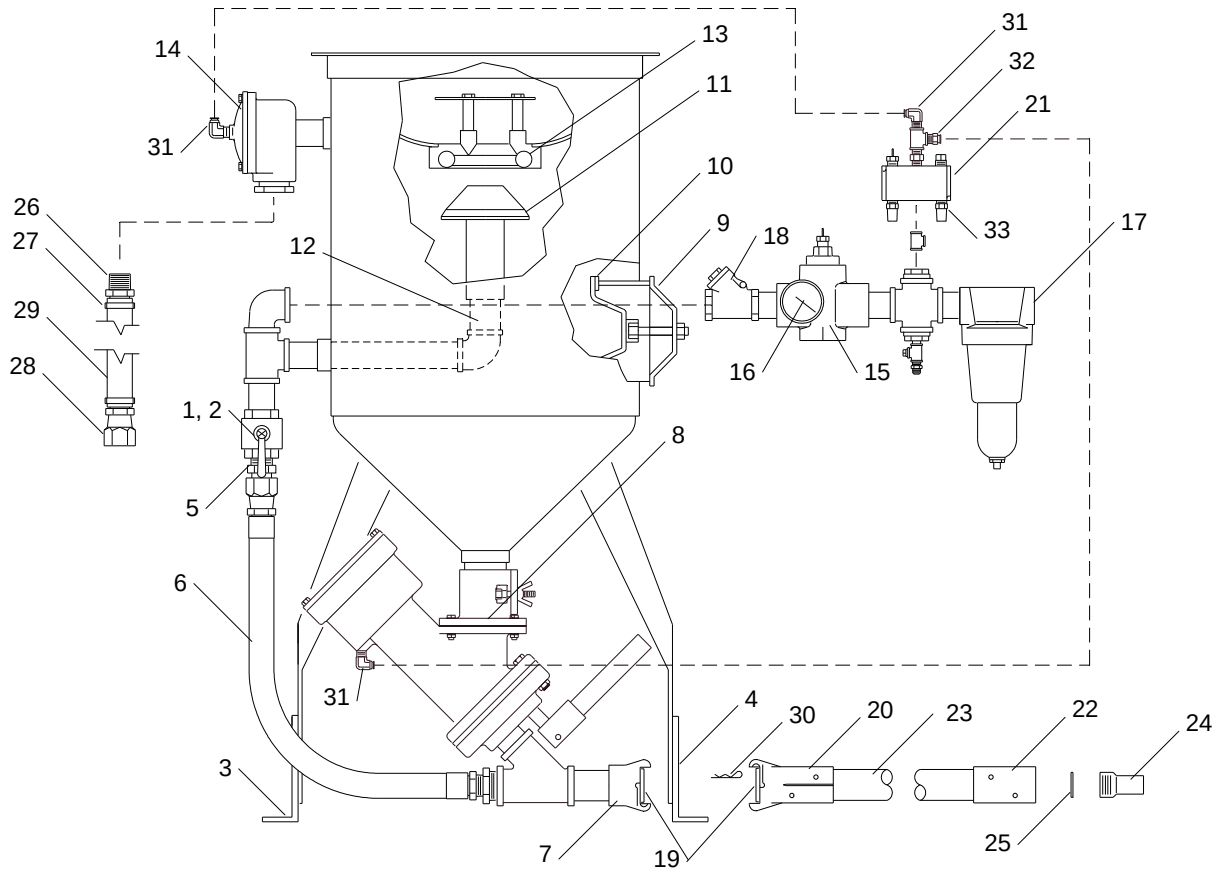


Figure 8

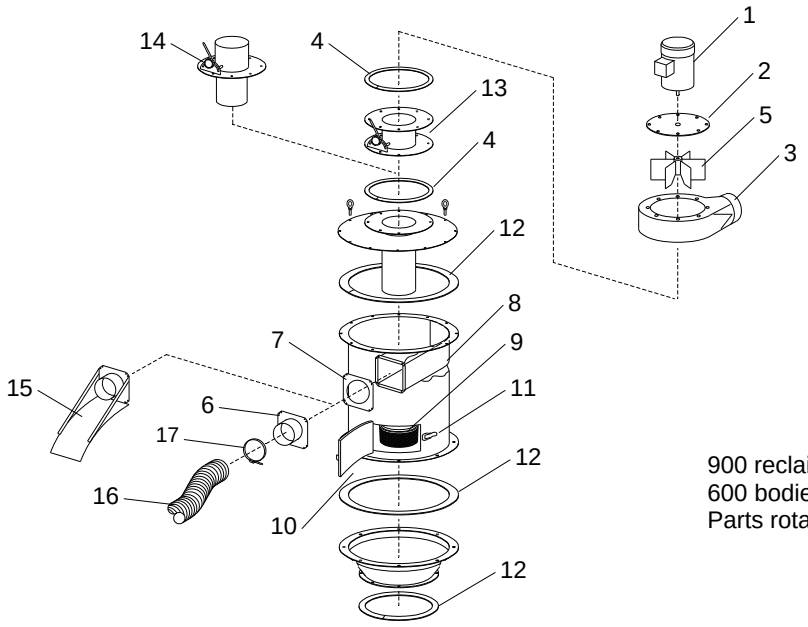
9.6 Sentinel Valve Replacement Parts

Refer to the Sentinel valve owner's manual for replacement parts.

9.7 Reclaimer, for 16 ″ Dia. Blast Machine Figure 9

NOTE: Flex hose, clamp and lower adhesive backed gasket are not supplied with replacement reclaimers.

Item	Description	Stock No.
(-)	Reclaimer assembly, with exhauster	
	600 cfm	21251
	900 cfm	21253
(-)	Reclaimer assembly, less exhauster	
	600 cfm	21250
	900 cfm	21252
(-)	Reclaimer assembly, pull-through type	
	600 cfm	21292
	900 cfm	21293
1.	Motor, exhauster	
	for 600 cfm reclaimer, 1 HP, 1-PH	12314
	for 900 cfm reclaimer, 2 HP, 3-PH	12309
2.	Plate, motor mount	
	600 cfm	12004
	900 cfm	12005
3.	Housing,	
	600 cfm exhauster	12272
	900 cfm exhauster	12271
4.	Gasket, 5/16" x 1" adhesive backed, (4 ft. required for each location)	00187
5.	Paddle wheel	
	600 cfm	12334
	900 cfm	12335
6.	Inlet pipe adaptor	
	600 cfm, 5"	12361
	900 cfm, 6"	12363
	900 cfm, 5" for steel media	14411
7.	Gasket, inlet adaptor	
	600 cfm	11779
	900 cfm	11759
8.	Wear plate	
	600 cfm	13011
	900 cfm	14055
9.	Screen assembly	21265
10.	Gasket, door	11745
11.	Spring latch assembly	12263
12.	Gasket, 2" adhesive backed, specify ft. required	13089
13.	Vortex cylinder assembly, adjustable, for exhauster mounted reclaimer, optional	
	600 cfm	19062
	900 cfm	23047
14.	Vortex cylinder assembly, adjustable, standard with pull-through reclaimer	
	600 cfm	19080
	900 cfm	23046
15.	Hose support inlet, optional for 900 cfm only	
	5", for use with steel media, w/5" hose	22324
	6", standard	16887
16.	Hose, light lined flex, specify feet required	
	5" ID for 600 cfm	12467
	6" ID for 900 cfm	12468
17.	Clamp, hose	
	For 600 cfm, 5-1/2"	11578
	For 900 cfm, 6-1/2"	00750



900 reclaimer body shown
600 bodies differ.
Parts rotated for clarity.

Figure 9