

POOL PAL
1 CU. FT. CAPACITY BLAST MACHINE
O. M. 24813

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 **WARNING**

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

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

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

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

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AEROLYTE by Clemco Industries Corp.
Systems

1.0 INTRODUCTION

1.1 Scope

1.1.1 These instructions cover set-up, operation, maintenance, troubleshooting, and replacement parts for Aerolyte Pool Pal (1.0 cu ft. capacity) blast machine, remote controls, and accessories.

1.1.2 Blast operators and personnel involved with the blast machine operation must be trained in the safe operation of the blast machine and blasting accessories. All personnel involved with the abrasive blasting process must be made aware of the hazards associated with abrasive blasting. The Clemco booklet "Abrasive Blasting Safety Practices" Stock No. 22090, is included with every blast machine, and contains important safety information about abrasive blasting that may not be included in equipment operation manuals. Additional copies are available from Clemco Industries. Visit www.clemcoindustries.com

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 Description

1.3.1 The set-up and primary components of the blast machine and accessory package are shown in Figure 1. The remote controls and connections for the controls are shown in Figure 2.

1.3.2 Clemco blast machines (pressure vessels) are 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 owner's 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.

⚠ WARNING

Welding, grinding, or drilling on the blast machine could weaken the vessel. Compressed air pressure could cause a weakened blast machine 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.

1.3.3 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.

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

⚠ WARNING

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

1.3.5 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.

1.3.6 Remote Controls

1.3.6.1 The blast machine is equipped with remote controls that pressurize and depressurize the blast machine. Pressurization, which starts blasting, occurs when the operator presses the control handle lever located near the nozzle. Depressurization, which stops blasting, occurs when the operator releases the control handle lever.

1.3.6.2 A remote control system is an OSHA-required safety device. The control handle, located near the blast nozzle, is the activator for the remote control system. When the operator intentionally or unintentionally removes hand-held pressure from the control handle, the machine depressurizes, stopping air and abrasive flow through the nozzle. The remote control system "fails to safe", which means any interruption in the control-air circuit, deactivates the blast machine.

⚠ WARNING

Never modify or substitute remote control parts. Parts from other manufacturers are not compatible with Clemco equipment. If ANY part of the remote control system is altered, involuntary activation, which may cause serious injury, can occur.

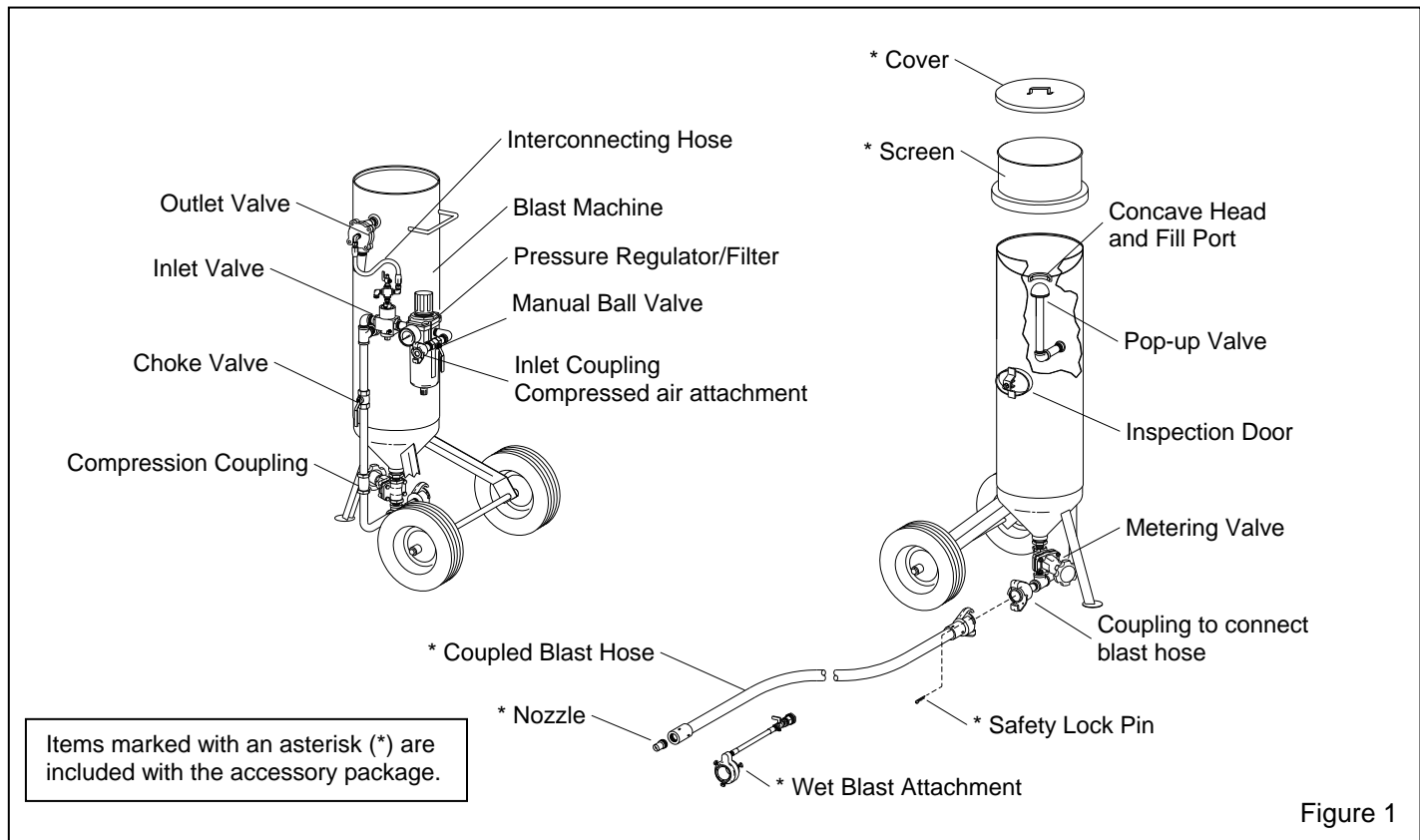


Figure 1

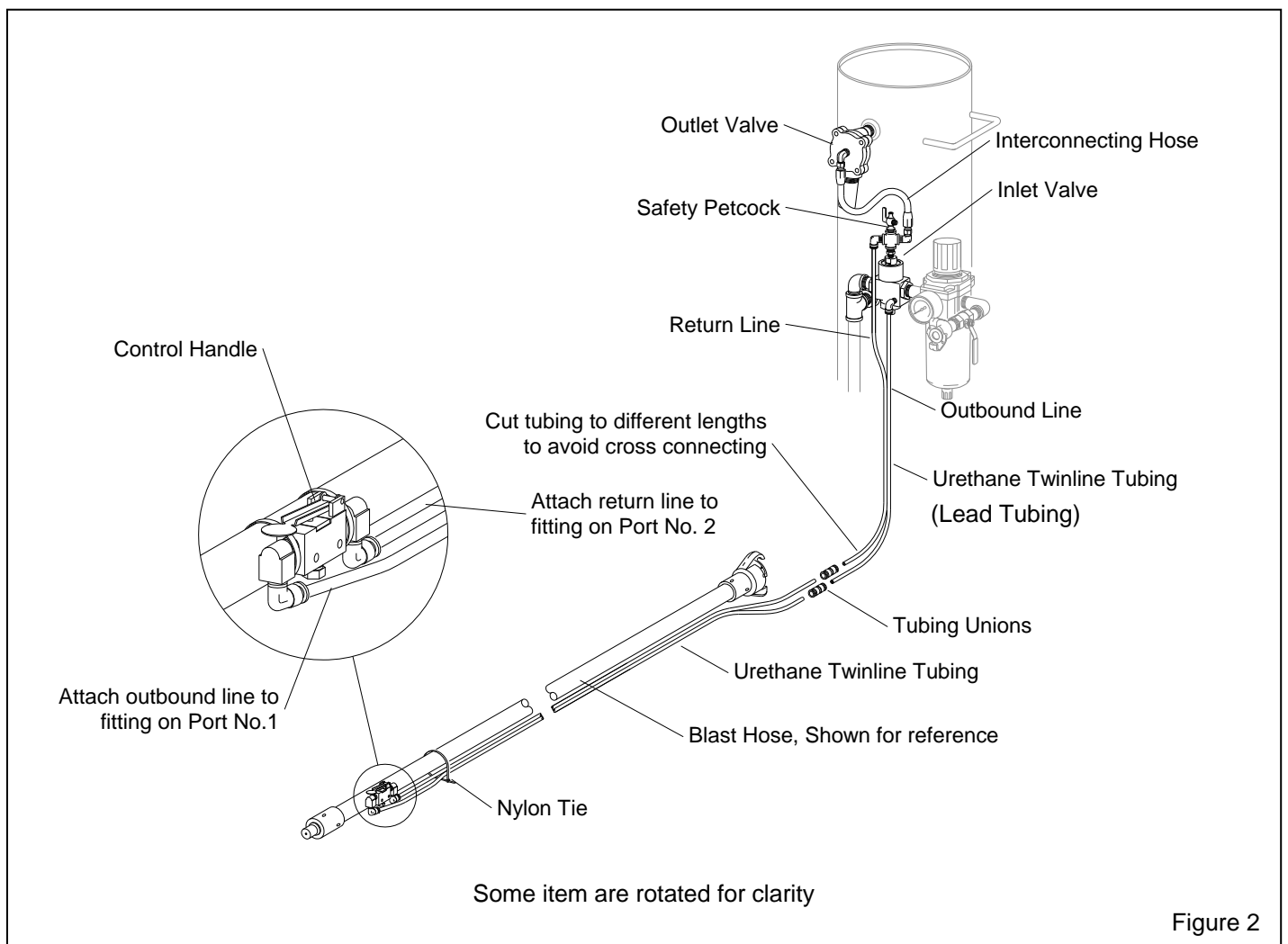
1.3.6.3 The components of the remote control system are shown in Figure 2. The controls include the inlet valve, diaphragm outlet valve, an 18-inch long interconnecting hose, control handle, 21-foot long urethane twinline control tubing, tubing unions, and nylon ties.

1.3.6.4 Clemco remote controls operate pneumatically on return air. If the control handle lever (the activator for the remote control system) is in the up (no blast) position, one stream of air travels down the outbound twinline (See Figure 2) and stops at the control handle. The normally-closed inlet valve remains closed, and the normally-open outlet valve remains open. As long as the control handle lever remains up, the remote control system is inactive. When the lever is pressed, air from the outbound line returns through the return line to open the inlet valve and close the outlet valve. This action pressurizes the blast machine and begins the blasting. Releasing the handle exhausts the control air, which closes the inlet valve and opens the outlet valve, which depressurizes the blast machine and stops the blasting.

1.3.7 Compressed-air Requirements

1.3.7.1 The size of the compressor required depends on the orifice size of the nozzle and blasting pressure. Unless specified otherwise, blast machine packages are supplied with a 1/8" orifice nozzle. Nozzles larger than 1/4" are not recommended because the accelerated velocity rapidly wears the blast hose.

1.3.7.2 Refer to the table in Figure 3 to determine 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 70% to 80% more air. Consult with a compressor supplier for suggested compressor size based on the air consumption of the next larger orifice size.



Compressed Air and Abrasives Consumption
Consumption rates are based on abrasives that weigh 100 pounds per cubic foot

Nozzle Orifice Size (in.)	Pressure At The Nozzle (psi)							Air, Power and Abrasive Requirements
	50	60	70	80	90	100	125	
No. 2 1/8"	11	13	15	17	19	20	25	Air (cfm)
	67	77	88	101	112	123	152	Abrasive (lbs/hr)
	2.5	3	3.5	4	4.5	5	5.5	Compressor (hp)
No. 3 3/16"	26	30	33	38	41	45	55	Air (cfm)
	150	171	196	216	238	264	319	Abrasive (lbs/hr)
	6	7	8	9	10	10	12	Compressor (hp)
No. 4 1/4"	47	54	61	68	74	81	98	Air (cfm)
	268	312	354	408	448	494	608	Abrasive (lbs/hr)
	11	12	14	16	17	18	22	Compressor (hp)

- Air requirements were measured by a flow meter under actual blasting conditions, and are therefore lower than figures for air alone, with no abrasive.
- Horsepower requirements are based on 4.5 cfm per horsepower.
- Figures are for reference only, and may vary for different working conditions. Several variables, including metering valve adjustments, can affect abrasive flow.
- Figures show approximate compressed air and abrasive consumption when nozzles are new. Consumption will increase as the nozzle wears.

Figure 3

2.0 INITIAL SET-UP

2.1 Blast Hose, Control Handle and Control Line

2.1.1 Urethane lead tubing: The urethane lead tubing is factory installed; this section explains the process for reference. Skip to Section 2.1.2 if not replacing lead tubing.

2.1.1.1 Use 4-feet of lead tubing. If necessary cut 4 ft from the 21-foot length (or bulk length) of urethane twinline tubing.

2.1.1.2 Separate (split) about 6-inches from one end of the 4-foot tubing. Measure the distance between the connector elbows (approximately 4-1/4") and shorten one side of the tubing accordingly. Refer to Figure 4.

2.1.1.3 Following the instructions in Figure 5, insert the short side of the tubing into the lower elbow on the inlet valve as shown in Figure 4. Tug on the tubing to make sure it is secure. This line becomes the "outbound" control line.

2.1.1.4 Insert the longer side of the tubing into upper elbow. This line becomes the "return" control line.

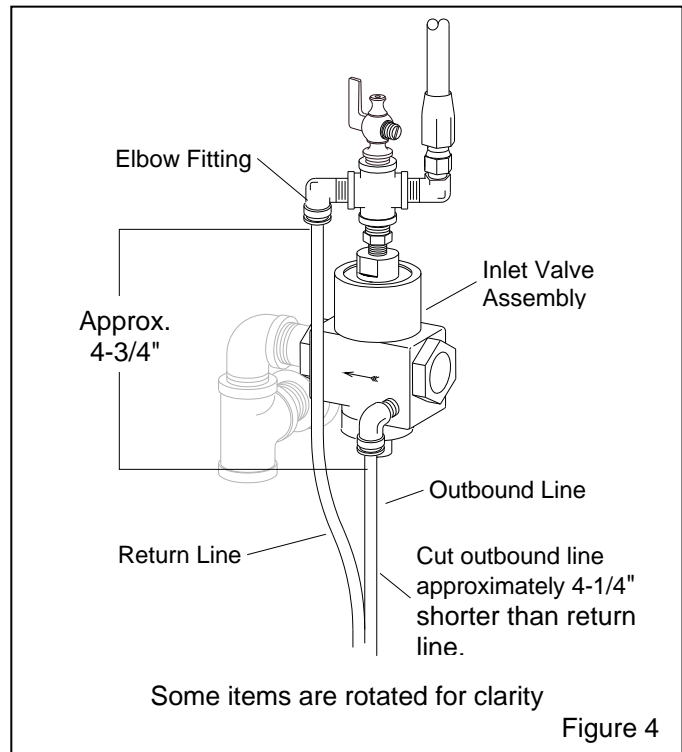
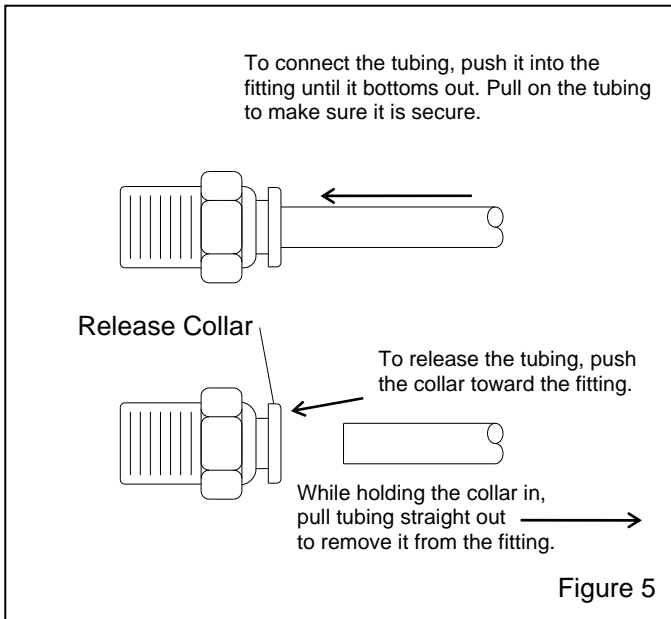


Figure 4

2.1.1.4 Band the tubing to the vertical, pusher-line piping along the side of the machine and to the nipple between the blast hose coupling at the bottom of the machine, and tee below the metering valve.

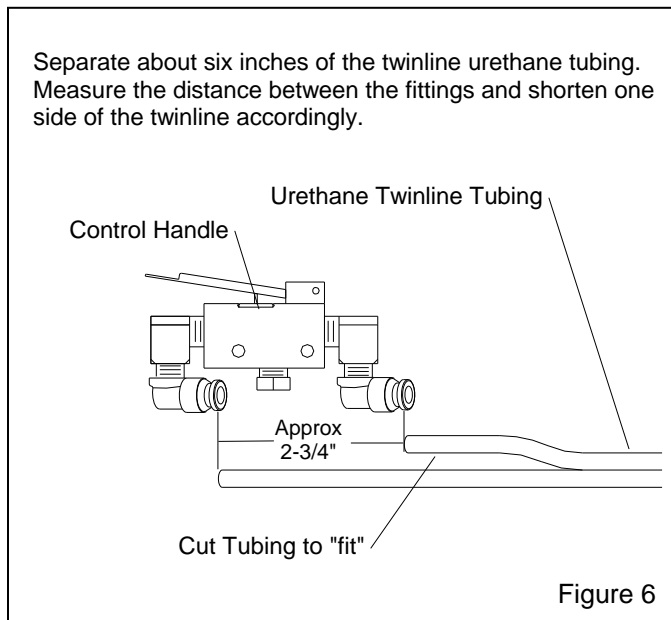


2.1.2 Urethane Twinline Control Tubing

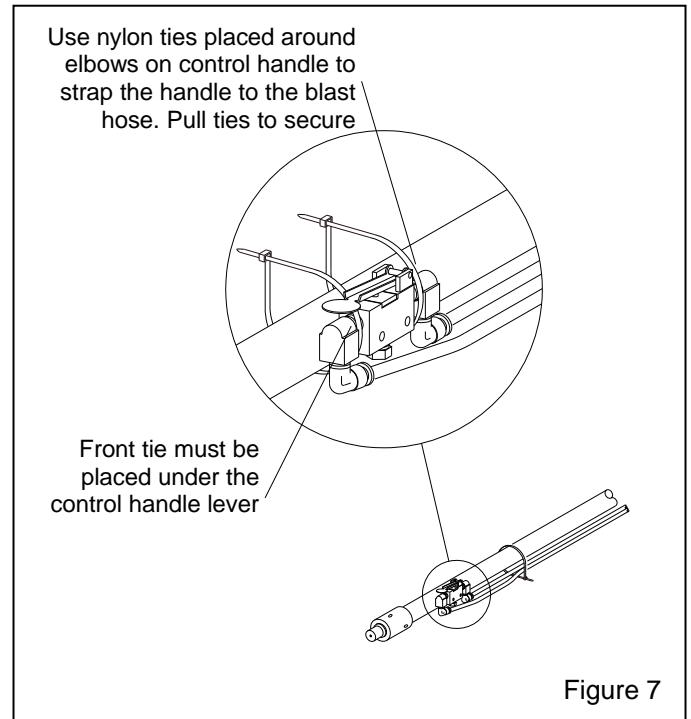
2.1.2.1 Temporarily connect the blast hose to the quick coupling at the bottom of the blast machine.

2.1.2.2 Separate approximately six-inches from one end of the twinline tubing. Cut one side to the correct length as shown in Figure 6 (remove approximately 2-3/4"). This makes what becomes the "return" line, slightly shorter than the "outbound" line.

2.1.2.3 Connect the urethane tubing to the control handle elbows as explained in Figure 5. Tug on the tubing to make sure it is secure.



2.1.2.4 Position the control handle on the side of the blast hose where it is the most comfortable to operate while holding the hose. Use nylon ties placed around elbows on control handle to strap the handle to the blast hose, as shown in Figure 7. Pull the ties to secure, and then clip the loose ends.



2.1.2.5 Working from the control handle back, band the twinline tubing to the blast hose every 18 to 24 inches. Make sure the tubing is straight with no twists, as the lines must be traced. The last band should be just behind the hose coupling that connects to the blast machine.

2.1.2.6 Overlap the lead tubing (on the blast machine) and the control tubing on the blast hose. Separate the ends of both tubing.

2.1.2.7 Carefully trace the lines; leaving slack in both sides of the tubing, cut the ends at different lengths as shown in Figure 2. Make sure the outbound line (the lower elbow on the inlet valve) connects to Port No. 1 on the control handle, and the return line (upper elbow on the inlet) connects to port NO. 2 on the control handle, as shown in Figure 2.

Note: Offsetting the lengths of the tubing reduces the possibility of switching lines when uncoupling and coupling the hoses.

2.1.2.8 Use the tubing unions to connect the lead tubing to the longer control tubing. Tug on the tubing to make sure they are secure.

2.2 Optional Wetblast Head

2.2.1 Loosen the three holding screws and slide the collar onto the nozzle holder as shown in Figure 8. Tighten the screws to secure.

2.2.2 Connect a garden hose from a faucet to the swivel adapter on the attachment.

2.2.3 When ready to use open the water faucet and control water flow at the petcock on the attachment. It may be necessary to loosen the three holding screws and slide the collar on the nozzle holder to obtain the best flow into the air stream.

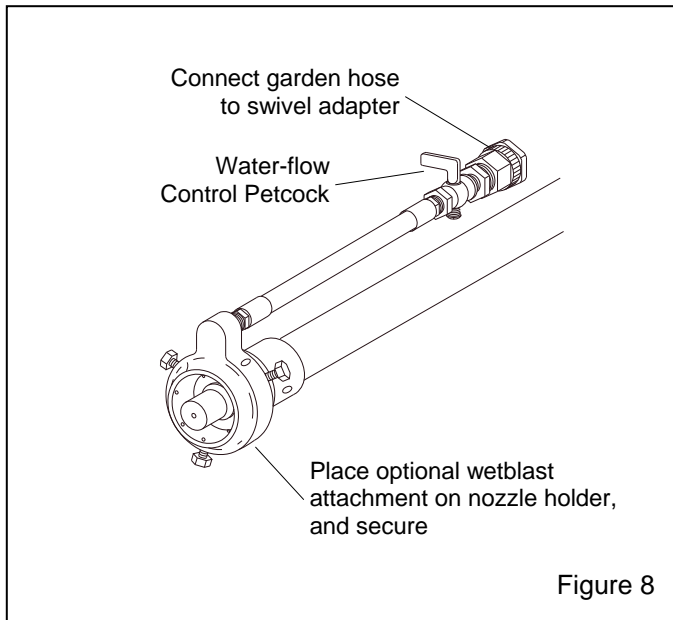


Figure 8

3.0 OPERATION

3.1 Transporting and moving

3.1.1 Transporting a blast machine

3.1.1.1 Always empty the machine before transporting. Transporting a machine containing abrasive may increase the weight to an unsafe handling limit, and could cause abrasive to settle in the piping.

⚠ WARNING

- Always empty the blast machine before transporting.
- Never hoist the machine by the handle or piping, or with a sling through the handle or piping.
- When transporting a machine on a pallet, always securely attach the machine to a sturdy pallet.
- Always securely anchor the machine to the transport vehicle.
- Failure to observe these warnings could result in serious injury or death.

3.1.2 Moving a blast machine

⚠ WARNING

Never manually move a blast machine when it contains abrasive. Empty machines may be moved when the following criteria are met.

3.1.2.1 An empty machine may be moved manually, on level flat surfaces.

3.1.2.2 Move the machine by pushing it in a forward direction. Do not back-up while moving the machine, as potential tripping hazards may be out of view.

3.2 Set-up

3.2.1 Locate the compressor upwind and/or away from the blasting operation to prevent contaminated air from entering the compressor intake.

3.2.2 Connect a 3/4" ID or larger air line from the compressor to the inlet coupling. NOTE: If the air line supplies air to other pneumatic tools, install an isolation valves to enable depressurization of each line for service.

 WARNING

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

3.2.3 Make sure the coupling gaskets are in place and in good condition before connecting the blast hose to the quick coupling on the blast machine. To prevent accidental separation during blasting, use safety lock-pins or safety wire to lock the couplings together. See Section 7.1 for optional safety cables.

3.2.4 Connect the urethane twinline control tubing to the urethane lead tubing.

3.2.5 Make sure the choke valve is open (handle in-line with the piping).

3.2.6 Close the abrasive metering valve. The valve is closed when the metering knob is turned fully clockwise.

3.2.7 Close the manual ball valve on the blast machine inlet piping.

3.2.8 Close the air valve on the compressor. Start the compressor, and bring it up to operating temperature and pressure. The pressure must not exceed 125 psi.

3.2.9 Load abrasive into the machine by following the instructions in Section 3.7.

3.2.10 Slowly open the compressor air valve to pressurize the air supply line. Listen for noise that indicates any open lines or leaks.

3.3 Blasting Attire

3.3.1 Operators must wear appropriate protective gear, including: abrasive-resistant clothing, leather gloves, hearing protection, and a NIOSH-approved, and properly maintained supplied-air respirator.

 WARNING

Abrasive blasting produces harmful dust. Everyone in the blasting area must wear a properly fitted and properly maintained NIOSH-approved supplied-air respirator.

3.4 Blasting

3.4.1 Make sure the control handle lever is in the "up" (no blast) position, and then open the manual ball valve on the inlet piping.

3.4.2 Close the safety petcock located on the inlet valve. Closing the petcock prepares the machine for remote operation and activation by the control handle.

3.4.3 Hold the blast hose securely and point the nozzle only at objects intended to be blast cleaned.

3.4.4 Press the control handle lever. Be prepared; blasting will begin as soon as the machine pressurizes.

 WARNING

OSHA requires remote controls on all blast machines when an operator controls the nozzle. Do not tie down the control handle or attempt to bypass any part of the remote control system. Doing so will defeat the purpose of the fail-to-safe feature of the remote control. Severe injury can result from uncontrolled blasting.

3.4.5 Adjust blast pressure per Section 3.5.

3.4.6 If the abrasive metering valve is closed as instructed, in Section 3.2.6, only air will exit the nozzle. Adjust the metering valve per Section 3.6.

3.4.7 To stop blasting, release the control handle lever.

3.4.8 Open the safety petcock. Always open the safety petcock during work breaks to prevent unintentional blasting.

3.5 Adjust Blasting Pressure

3.5.1 The filter/pressure regulator combination, located on the inlet piping, enables the user to adjust blasting pressure to suit the application. The suitable pressure depends on the application. Lower pressures may be used for delicate work, and higher pressure used on tough cleaning jobs on durable substrates. In all cases, highest production can be achieved only when pressure is carefully monitored.

3.5.2 To adjust pressure, unlock the knob, and turn it clockwise to increase pressure or counter-clockwise to decrease pressure. Pressure will usually drop from closed-line pressure when blasting is started. After pressure is set, lock the knob to maintain the setting.

3.6 Adjust Abrasive Metering Valve

3.6.1 Abrasive flow is adjusted with the knob.

3.6.2 Begin adjustments with the metering valve closed. The valve is closed when the metering knob is turned fully clockwise.

3.6.3 While blasting, increase abrasive flow by turning the knob counterclockwise at 1/4 turn increments. Allow time for the flow to stabilize before readjusting.

3.6.4 Optimum abrasive flow depends on the type and size of abrasive and blasting pressure, and can best be determined by experience. Use as little abrasive as possible while maintaining the maximum cleaning rate. The air/abrasive mixture should be mainly air. Abrasive exiting the nozzle should barely discolor the air when seen against a contrasting background.

3.7 Loading Abrasive into the Blast Machine

3.7.1 Depressurize machine using normal procedures. The pop-up valve automatically drops when air is expelled from the machine and pressure equalizes.

3.7.2 Load abrasive into the machine by pouring it into the concave head. Using an optional screen, placed over the head, prevents large objects from falling inside. A screen is recommended to keep objects such as pieces of abrasive bags or other objects from falling into the machine. Foreign objects will jam the machine. Abrasive flows through the fill port into the machine. Keep the abrasive level below the pop-up valve. Abrasive on the pop-up valve could be forced up and out of the top of the machine when the machine is pressurized.

NOTE: Use only abrasive specifically manufactured for blast cleaning, and that is compatible with the surface being blasted.

3.7.3 After the machine is filled, use normal procedures to begin blasting.

3.8 Emptying the Machine of Abrasive

3.8.1 When working in environments subject to extreme temperature changes, or very humid conditions, condensation may develop inside the machine. Condensation wets abrasive and causes flow problems. To prevent this, empty the machine of all abrasive when shutting down for the day. This will eliminate trouble from moist abrasive when starting a new day's blasting. One way to avoid having to empty the machine is to load only as much abrasive as will be used during the work period. If the machine must be purged of abrasive, do the following:

3.8.2 With the blast machine off, turn the blast pressure to approximately 40-50 psi, close the choke valve and set the abrasive metering valve at full open.

3.8.3 To prevent rapid wear of the nozzle holder threads, the nozzle should be firmly attached to the nozzle holder. Removal of the nozzle is not recommended. If circumstances require the nozzle to be removed, also remove the nozzle washer. Purging the machine without a nozzle, will eventually erode the thread area of the nozzle holder, which could cause a hazardous condition.

3.8.4 Point the nozzle (or hose end) into a drum or suitable container, or in the direction the abrasive is to be disposed.

3.8.5 Hold the hose securely (do not leave the hose unattended), and pressurize the machine by activating the control handle. Be prepared for surging, or recoil of the hose, which can be severe.

3.8.6 When the machine is empty, release the control handle lever, open the safety petcock, and open the choke valve.

3.8.7 If the nozzle was removed, thoroughly inspect the nozzle holder threads for wear before installing the nozzle washer and attaching the nozzle.

WARNING

Inspect the threads on the nozzle and nozzle holder each time the nozzle is secured to the holder. Check threads for wear, and make sure nozzle holder securely grips the nozzle. The nozzle washer must also be inspected for wear. Worn nozzle washers cause thread erosion. A loose fitting nozzle may eject from the holder under pressure and cause severe injury.

3.9 Shutdown

3.9.1 When finished blasting, and after cleanup is completed, remove the respirator outside the respirator-use area and where the air is safe to breathe.

3.9.2 Close the air supply valve at the compressor.

3.9.3 Drain the air filter (bottom section of the filter/regulator combination), drain receiver tank, and water collecting devices, and bleed the compressed-air supply hoses.

3.9.4 Shutdown the compressor.

3.9.5 Cover the machine when not in use.

4.0 PREVENTIVE MAINTENANCE

4.1 Daily

4.1.1 With the air off, before blasting, inspect the following:

- Make sure that couplings are secure and lock pins and safety cables are in place.
- Make sure the nozzle washer is in place and not worn.
- Inspect the control handle, the lever must move freely with no drag or binding, and must return to the "up" position when released.

WARNING

Malfunctioning control handles could cause unintentional actuation of a blast machine, or prevent a machine from deactivating upon release. Malfunctioning control handles must be taken out of service immediately and repaired or replaced. Serious injury can result from unintentional blasting.

4.1.2 During blasting, inspect the following:

- Inspect all couplings and coupling gaskets for leaks.
- Check the blast machine for leaks. If leaks are found around the pop-up valve, inspection door, or pipe fittings at the bottom of the cone, stop blasting immediately and repair or replace worn parts. If leaks are allowed to continue, abrasive erosion could cause irreparable damage to the blast machine.
- Check all external piping, control hoses, and valves for leaks. If leaks are found, stop blasting and repair.
- Inspect blast hose, couplings, and nozzle holders for leaks. At the first sign of a leak, stop blasting and inspect all items for wear.

WARNING

Leaks around couplings and nozzle holders indicate worn or loose-fitting parts. Nozzle holders and couplings that do not fit tightly on hose, and nozzles that do not fit tightly in nozzle holders could disconnect while under pressure. Impact from nozzles, couplings, hoses, or abrasive, and parts disconnected while under pressure could cause severe injury.

4.2 Weekly

4.2.1 With the air off, before blasting, do the following:

- Remove the nozzle for inspection. Replace if the orifice diameter is worn 1/16" or more, or if the liner is cracked.
- Inspect the blast hose for wear; look for soft spots. Soft spots mean the hose is worn. Replace the blast hose before the tube wears as far as the fabric plies.

WARNING

Worn blast hose could suddenly fail by bursting. Couplings and nozzle holders may not adequately grip worn hose, causing them to blow off under pressure. Compressed air and abrasive escaping from a burst hose, or disconnected coupling or nozzle holder, could cause severe injury.

4.2.3 Monthly inspection

With the air off, before blasting, inspect the following:

- Check the pop-up valve's urethane coating for cracks and grooves. Replace the pop-up valve at the first sign of wear. See Section 5.3.
- Inspect the rubber pop-up seal, and replace at the first sign of wear, drying, or cracking. See Section 5.4.

5.0 SERVICE MAINTENANCE

⚠ WARNING

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

- Depressurize the blast machine.
- Lockout and tagout the compressed air supply.
- Bleed the air supply line to the blast machine.

5.1 Removing damp abrasive from the blast machine.

5.1.1 To clear a minor blockage caused from damp abrasive, while blasting, rapidly open and close the choke valve several times.

5.1.2 For more difficult blockages, proceed as follows: See Section 5.2 to check for obstructions in the metering valve.

5.1.3 With the blast machine off, disconnect the blast hose and remove the gasket from the quick coupling on the machine.

5.1.4 Place the machine so that the outlet is pointed away from any objects or persons.

⚠ WARNING

Place the machine so that the outlet is pointed away from any objects or persons. Stand clear of the path of exiting abrasive. It may come out at high velocity. Impact from exiting abrasive could cause severe injury.

5.1.5 Close the choke valve and fully open the abrasive metering valve. Pressurize the machine to force out any damp abrasive.

5.1.6 When the obstruction has been removed, depressurize the machine. Remove the nozzle and nozzle washer, and reconnect the hose. Open the choke valve and close the abrasive metering valve. Pressurize the machine to clear the hose. When the hose is cleared, depressurize the machine so the nozzle and nozzle washer can be attached.

⚠ WARNING

The threads on the nozzle and nozzle holder must be inspected each time the nozzle is secured to the holder. Check the threads for wear, and make sure nozzle holder securely grips the nozzle. The nozzle washer must also be inspected for wear. Worn nozzle washers cause thread erosion. A loose fitting nozzle may eject from the holder under pressure and could cause severe injury.

5.1.7 With the hose cleared, start the machine using normal procedures.

5.2 Clearing obstructions in the abrasive metering valve and blast machine.

5.2.1 If the nature of the obstruction permits emptying the machine of abrasive, follow the instructions per Section 3.8.

5.2.2 Turn off the compressed air supply. Lockout and tagout the air supply, and bleed the air supply line to the blast machine.

5.2.3 Remove the inspection door and check the inside of the machine for obstructions from foreign objects

5.2.4 Check the inside of the machine for signs of moisture. If moisture is present, condensation is in the compressed air, and must be eliminated.

5.2.5 Make sure the inspection door gasket is in good condition and that it is correctly in place before bolting the door onto the machine.

5.2.6 Check to make sure all inspection door and hoses are secure before starting the compressed air supply.

5.3. Replacing the Pop-Up Valve, Figure 9

5.3.1 All service on the pop-up valve must be done with the compressed air off and the air supply locked-out and tagged-out.

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

5.3.3 Using a small pipe wrench, unscrew the pop-up valve guide by turning it counterclockwise. Remove the pop-up valve and guide from the machine.

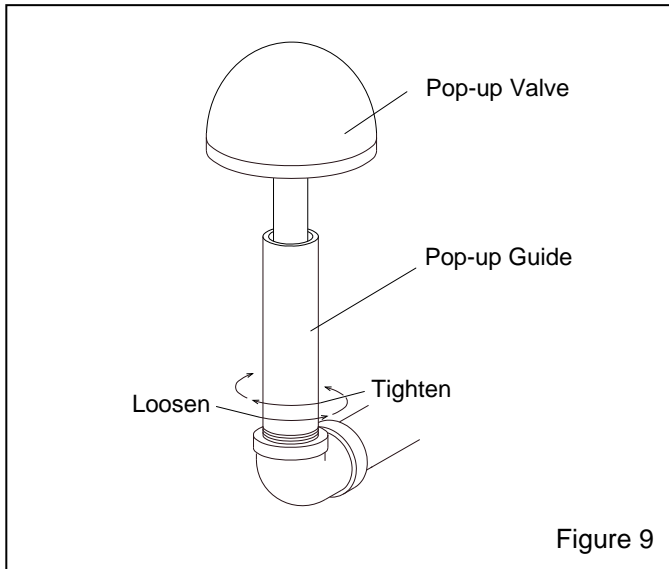


Figure 9

5.3.4 Slide the new pop-up valve into the guide, and then screw the valve guide (with the pop-up valve in it) into position inside the machine. Tighten the guide snug, but not wrench-tight. Over-tightening the guide will make it difficult to remove, the next time the pop-up valve needs replacement.

5.3.5 Check alignment through the pop-up opening. If necessary use a large screw driver or pry-bar to realign. A misaligned pop-up valve could result in early valve failure, or abrasive leakage when the machine is pressurized or depressurized.

5.3.6 Put a new gasket on the inspection door assembly before bolting the door onto the machine.

5.4 Replacing the Pop-Up Seal

5.4.1 All service on the blast machine must be done with the compressed air off and the air supply locked-out and tagged-out.

5.4.2 If unable to change the seal using the following methods, or if the seal falls inside the machine, remove the inspection door and work from inside the machine.

5.4.3 Remove the old seal using fingers, screwdriver, or similar object, to work the seal out of the retaining groove.

5.4.4 Push the new seal all the way through the fill port and then fit it into the retaining groove. When most of the seal is seated in the groove, pull up on the seal and allow it to pop into position.

5.5 Inlet Valve, Ref. Figure 15

5.5.1 All service on the inlet valve must be done with the air off and the air supply locked-out and tagged-out.

5.5.2 Use snap-ring pliers to remove the top and bottom retaining rings.

5.5.3 To remove the top cap, twist the petcock/cross assembly while pulling up.

5.5.4 Pull down on the bottom plug to remove it. If necessary, use pliers to grab the wrench flats to remove it from the body. Cup the bottom opening to catch the spring, retainer, and washer as the plug is removed.

5.5.5 If the piston cannot be removed with finger or thumb force, use a dowel or similar object inserted through the bottom opening to push the piston assembly out the top.

5.5.6 Clean all parts and inspect for wear as follows:

- The spring is approximately 1" long. If it is rusted or compressed, replace it.
- Inspect the piston, rubber washer, washer retainer top cap and bottom plug for damage. Replace all damaged parts.
- Look into the bottom opening in the valve body. If the machined seat is worn, replace the body.
- Inspect all O-rings. If any are damaged or flattened, replace them.

5.5.7 Lubricate all O-rings, and use the illustration in Figure 12, to reassemble the valve in reverse order, assembling the top end first.

5.6 Diaphragm Outlet Valve, Ref. Figure 14

5.6.1 All service on the outlet valve must be done with the air off and the air supply locked-out and tagged-out.

5.6.2 Remove the cap by unscrewing the four cap screws.

5.6.3 Remove the diaphragm and inspect it for damage. Replace as necessary.

5.6.4 Inspect the machined seat in the body. If worn, replace the body.

5.6.5 Reassemble in reverse order.

6.0 TROUBLESHOOTING

NOTE: This section only identifies conditions and problems in the blast machine. Always refer to the appropriate section of this manual, or manuals for the remote controls or other accessory equipment, before servicing the equipment.

⚠ WARNING

To avoid serious injury or death, observe the following when troubleshooting the machine and remote controls:

- Turn off the air, and lock out and tag out the air supply.
- When checking the machine or controls requires air, always enlist the aid of another person to operate the control handle while holding the nozzle securely and pointing it in a safe direction.
- Never strap down the remote control handle lever in the operating position.

6.1 Neither abrasive nor air comes out of the nozzle while the machine is under pressure.

6.1.1 Depressurize the blast machine. After the pop-up valve has dropped, remove the nozzle, and check for obstruction.

6.1.2 Make sure that both the abrasive metering valve and choke valve are open.

6.2 Air only (no abrasive) comes out the nozzle

6.2.1 Abrasive metering valve may be closed or needs adjustment. Adjust the metering valve per Section 3.6.

6.2.2 Blast machine may be empty.

6.2.3 Abrasive may be damp. See Section 5.1 to clear damp abrasive.

6.2.4 Check the machine for obstructions per Section 5.2.

6.3 Heavy abrasive flow

6.3.1 Make sure the choke valve is open. The valve is open when the handle is in-line with the piping.

6.3.2 Abrasive metering valve may be open too far. See Section 3.6.

6.4 Abrasive surging

6.4.1 A certain amount of abrasive surge is normal at start-up. Should the flow of abrasive continue to surge, reduce the amount of abrasive in the air stream by adjusting the metering valve. See Section 3.6.

6.5 Intermittent abrasive flow.

6.5.1 Moisture in the blast machine or saturated air filter. Drain moisture from the compressor's receiver tank, and air filter. If moisture continues to be a problem, a dryer or aftercooler may be required in the air supply line.

6.6 Blast machine does not pressurize when the control handle is pressed.

6.6.1 Make sure the safety petcock is closed.

6.6.2 Make sure that the air supply is on and all supply valves are open.

6.6.3 Insufficient-size air supply hose or reduced-size fittings between the compressor and blast machine. See Section 3.2.2.

6.6.4 Check all control lines and fittings for air leaks. There should be no leaks anywhere in the system.

6.6.5 Pop-up valve stuck, or internal piping worn or out of alignment. Inspect internal piping.

6.6.6 Press the control handle and check for air escaping from the muffler under the control handle. If air escapes when the handle is pressed, the tubing is connected backwards. Refer to Paragraph 2.1.2.7 and the illustration in Figure 2. Trace the lines to make sure they are connected correctly.

6.6.7 Open the safety petcock and press the control handle lever. Air should come from the petcock. If air does not escape, check the following:

- The control line to or from the control handle is blocked. Inspect tubing for blockage.
- Inspect the outlet valve diaphragm for a rupture.

6.6.8 Close the safety petcock, and press the control handle lever. Check that no air escapes through the vent hole on the cylinder body of the inlet valve body. Air escaping from this vent indicates a worn piston or O-ring in the inlet valve. See Section 5.5.

6.7 Outlet valve does not exhaust or exhausts too slowly.

6.7.1 Make sure the inlet valve closes. If it does not seal-off incoming air, the valve requires service.

6.7.2 Diaphragm in outlet valve has taken a set. Remove the cap and reverse the diaphragm.

6.8 Pop-up valve seats for a short time and then falls, or it "hovers" but fails to seat.

6.8.1 Insufficient air supply. Check the compressor output, air supply hose and isolation valves.

6.8.2 Outlet valve diaphragm may be worn or ruptured. Inspect it and replace worn parts.

7.0 REPLACEMENT PARTS

7.1 Accessories, not shown

Description	Stock No.
Pool Pal, 1.0 cu. ft. capacity blast machine with remote controls	24774
Pool Pal Package: include all items shown above plus, 16 ft. coupled blast hose, CT-2 nozzle, screen, cover, and wetblast attachment	24775
WB-1 Wetblast attachment	02701
Safety cable, 1/2" to 1-1/4" OD hose	15012
Cover, blast machine, poly	15097

7.2 Blast Machine and Accessories, Figure 10

Item	Description	Stock No.
1.	Seal, pop-up, rubber	01245
2.	Pop-up valve and shaft	01242
3.	Handle, 1/2" ball valve	01252
4.	Valve, 1/2" NPT ball w/ handle	01241
5.	Wheel, 10" diameter, rubber tire	20349
6.	Metering valve, abrasive	99555
7.	Coupling, CFA-1/2, 1/2" NPT alum.	00558
8.	Gasket, inspection door, 3" x 4"	01249
9.	Inspection door assembly, 3" x 4"	01267
10.	Gaskets, CQG, for 00558, pack of 10	00850
11.	Formed pipe pusher line, 1/2"	11013
12.	Coupling, 1/2" Compression	11086
13.	Bushing, shoulder, each, two required per wheel	25257
14.	Washer, 3/4" thrust	03804
15.	Retaining ring, 3/4"	03805

16.	Screen, 10" dia.	03362
17.	Cover, 10" dia.	03107
18.	Blast hose, 1/2" ID coupled 16 ft., standard length	01251
	25 ft., Optional length	01268
19.	Holder, nozzle, CHE-1/2	00577
20.	Coupling, CQA-1/2 quick	00599
21.	Nozzle, tungsten lined, 3/4" NPT x 1-3/4" CT-2, 1/8" orifice	01351
	CT-3, 3/16" orifice	01352
	CT-4, 1/4" orifice	01353
22.	Washers, NW-1, pack of 10	21580
23.	Lock pin, coupling, package of 25	11203
24.	Filter Regulator w/gauge, 1/2"	05530
25.	Coupling, 1/2" NPT universal female	00594
26.	Axle, 3/4" x 26-13/16"	25251
27.	Extension, leg	25258
28.	Screw, 1/4-NC x 1-1/4" cap	03054
29.	Nut, 1/4-NC hex	03111
30.	Washer, 1/4" flat	03116
31.	Washer, 1/4" lock	03117

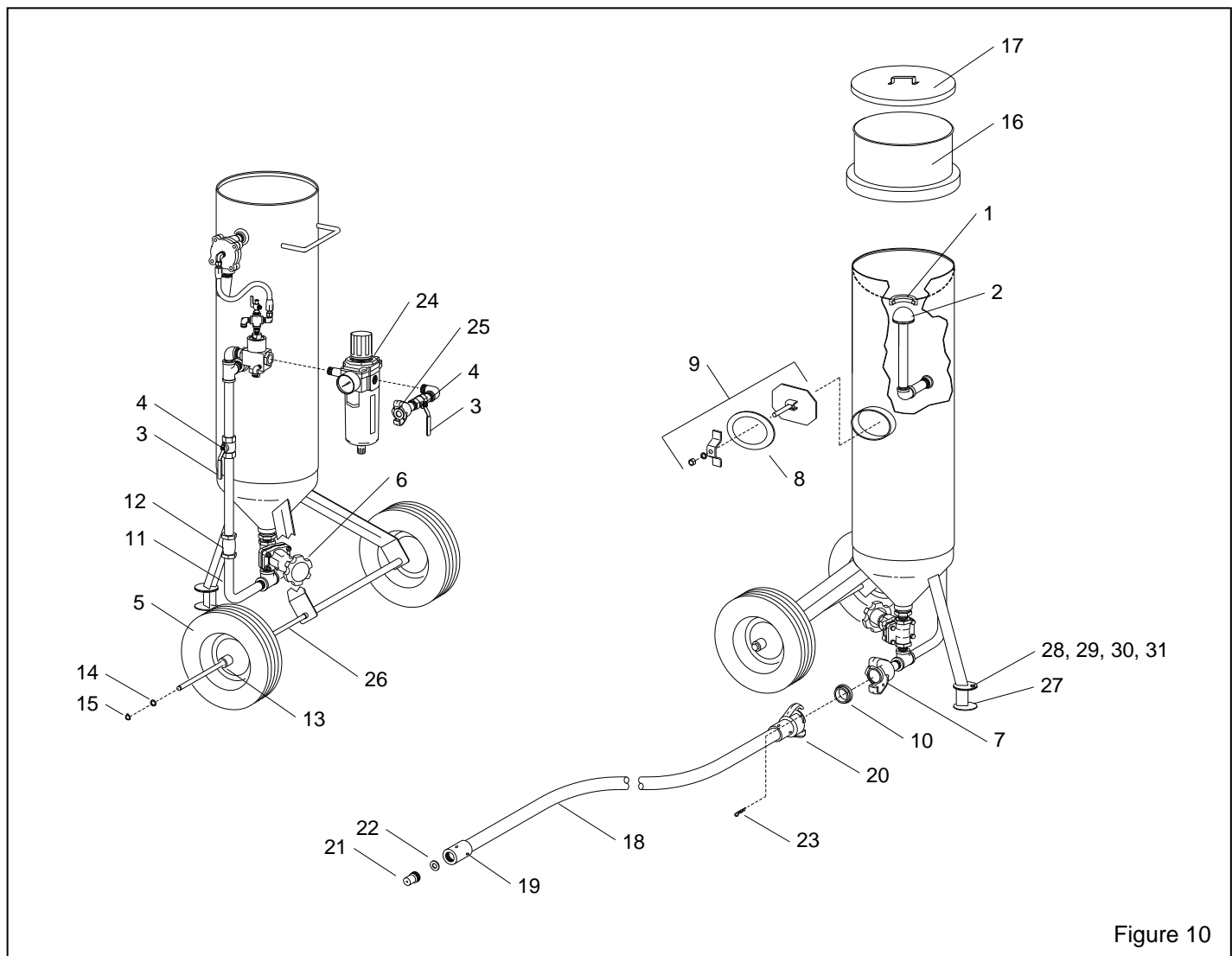


Figure 10

7.3 Remote Controls, Figure 11

Item	Description	Stock No.
1.	Control handle assembly	24800
2.	Tubing, urethane twinline specify feet required, 21 ft standard	19577
3.	Valve, 1/2" inlet	24803
4.	Valve, 1/2" diaphragm outlet	02512
5.	Hose, 3/16" x 18 in. coupled	02454
6.	Nylon tie	12140
7.	Union, urethane tubing	24472

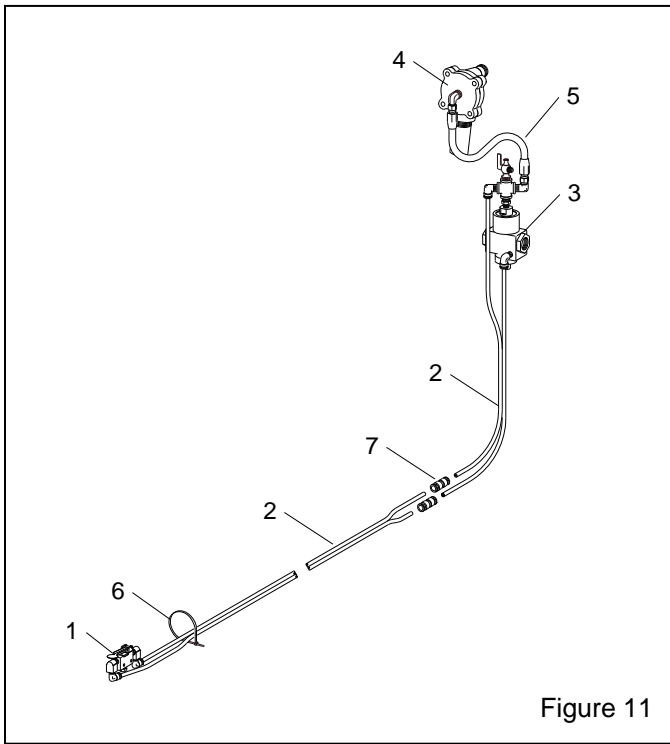


Figure 11

7.4 Abrasive Metering Valve, Figure 12

Item	Description	Stock No.
(-)	Metering valve, 1/2", complete	99555
1.	Valve body	22562
2.	Diaphragm	22563

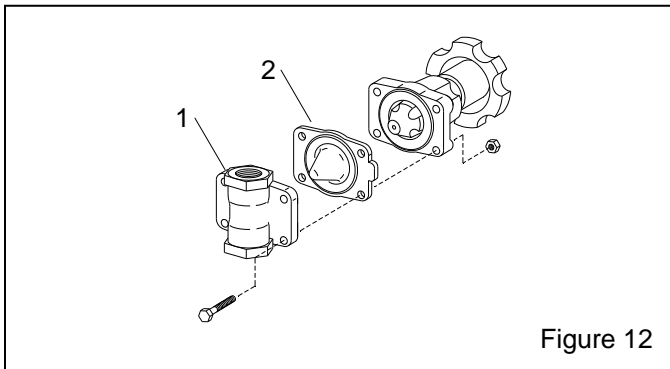


Figure 12

7.5 Control Handle Assembly, Figure 13

Item	Description	Stock No.
(-)	Control handle assembly	24800
1.	Control valve	24809
2.	Elbow, 1/8" NPT, 90° brass st.	03993
3.	Elbow, 1/8" NPT x 90°, 1/4" tubelock	11740
4.	Muffler, 1/8" NPT breather	07657
5.	Nylon tie	12140

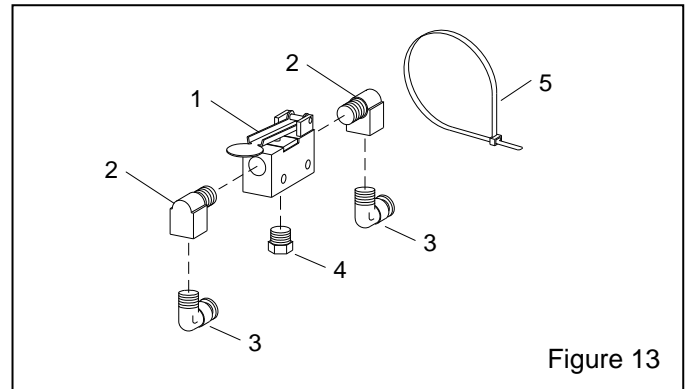


Figure 13

7.6 1/2" Diaphragm Outlet Valve, Figure 14

Item	Description	Stock No.
(-)	1/2" NPT Diaphragm outlet valve	02512
1.	Nipple, 1/2" NPT x close	01733
2.	Diaphragm	02511
3.	Washer, 1/4" lock	03117
4.	Elbow, 1/4" NPT adaptor	02513
5.	Cap	02299
6.	Body	02298
7.	Nipple, 1" NPT x 3" TOE	01841
8.	Screw, 1/4-NC x 1" cap	03053

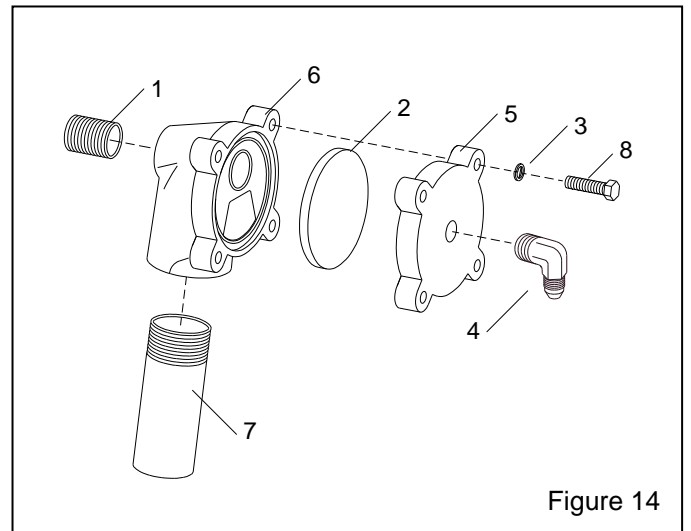


Figure 14

7.7 Inlet Valve, Figure 15

Item	Description	Stock No.
(-)	1/2" Inlet Valve, complete	24803
*	Service kit, 1/2" Inlet Valve (Fig. 15a)	07814
1.	Cap	02175
2.	Piston	02192
3.	Body	02170
4.	Plug, bottom	02176
5.	Elbow, 1/4" NPT adaptor	02513
6.	Reducer, 1/4" NPT x 1/8" NPT	02026
7.	Cross, 1/4" NPT brass	02193
8.	Petcock 1/4" NPT	01993
9.	Elbow, 1/8" NPT x 90°, 1/4" tubelock	11740
10.	Elbow, 1/4" NPT x 90°, 1/4" tubelock	11738
11.	Nipple, 1/2" NPT x close	01733

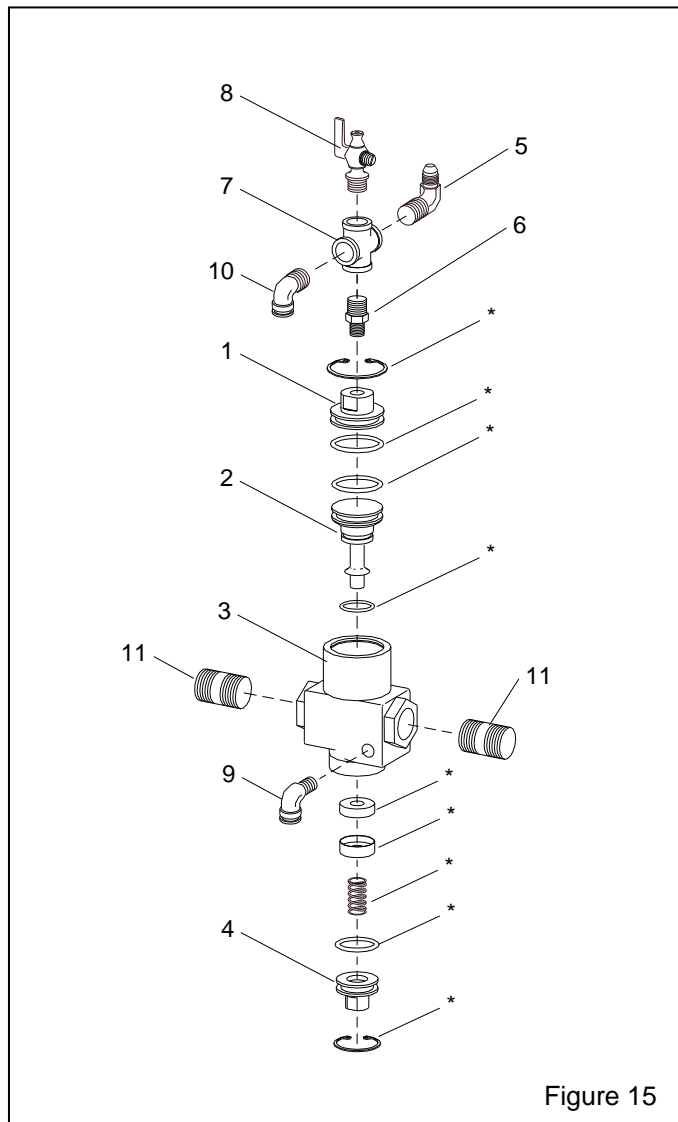


Figure 15

07814 SERVICE KIT
TLR-50 INLET VALVE

Item	Qty.	Description
1.	1	Retaining ring, cap
2.	1	Retainer, washer
3.	1	Spring, 17/32" OD x 1" long
4.	1	Retaining ring, bottom plug
5.	1	O-ring, 7/8" ID x 1/8" C/S
6.	1	Washer
7.	1	O-ring, 3/4" ID x 3/32" C/S
8.	1	O-ring, 1-1/8" ID x 1/8" C/S
9.	1	O-ring, 1-3/16" ID x 1/8" C/S

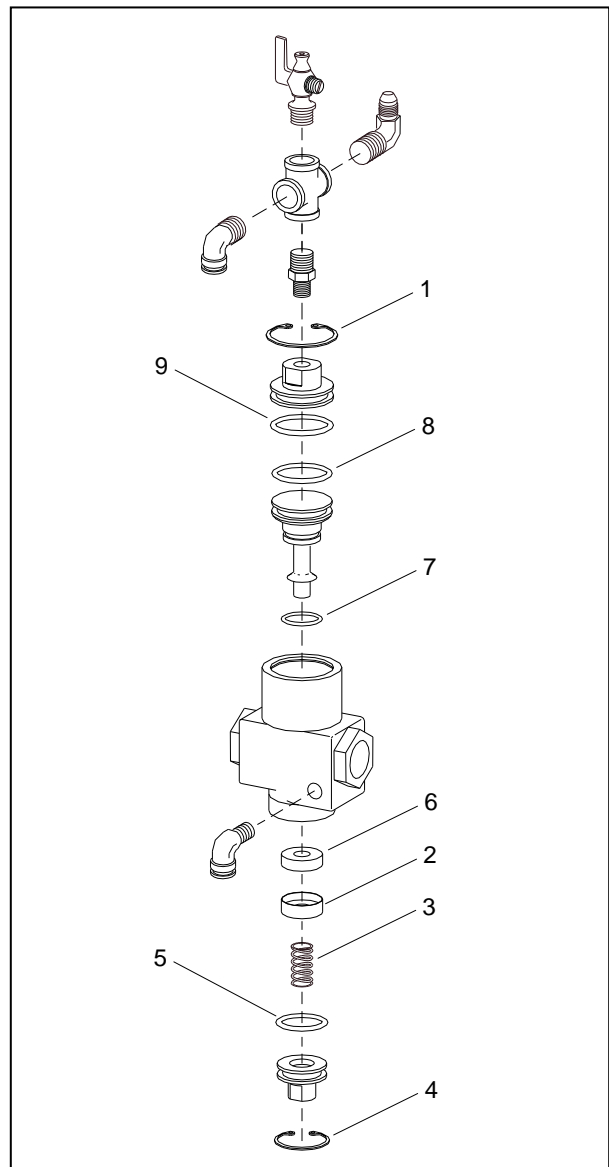


Figure 15a