

**TLR 100/300 SERIES
PNEUMATIC REMOTE CONTROLS
O. M. 22428**

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 **WARNING**

Do not use this equipment until you have READ 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 Parts Guide, refer to the orange warnings insert preceding the Index before continuing with the enclosed instructions.**

Electronic files include a Preface containing important information.

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WARNING

- Employers are responsible for identifying all job site hazards, educating and training all persons who will operate and maintain these products, and ensuring that all blast operators and their assistants understand the warnings and information contained in these instructions relating to safe and proper operation and maintenance of this equipment.
- Serious injury or death can result from failure to comply with all Occupational Safety and Health Administration (OSHA) regulations and all manufacturer's instructions.
- This equipment is not intended for use in any area considered hazardous per National Electric Code NFPA 70 2011, Article 500.
- Read this document and follow all instructions before using this equipment.

OSHA regulations relating to abrasive blasting are contained in the Code of Federal Regulations, Title 29 (29 CFR 1910 General Industry; 1915 Maritime; 1926 Construction). The most pertinent include: 1910.94 Ventilation, 1910.95 Occupational Noise Exposure, 1910.132 Personal Protective Equipment, 1910.133 Eye and Face Protection, 1910.134 Respiratory Protection, 1910.135 Head Protection, 1910.244 (b) Remote Controls. Consult www.osha.gov for complete information.

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

Clemco proudly provides products for the abrasive blast industry and is confident that industry professionals will use their knowledge and expertise for the safe and efficient use of these products.

The products described in this material, and the information relating to these products, are intended for knowledgeable, experienced users.

No representation is intended or made as to: the suitability of the products described here for any purpose or application, or to the efficiency, production rate, or useful life of these products. All estimates regarding production rates or finishes are the responsibility of the user and must be derived solely from the user's experience and expertise, not from information contained in this material.

It is possible that the products described in this material may be combined with other products by the user for purposes determined solely by the user. No representations are intended or made as to the suitability of or engineering balance of or compliance with regulations or standard practice of any such combination of products or components the user may employ.

Abrasive blast equipment is only one component of an abrasive blasting job. Other products, such as air compressors, air filters and receivers, abrasives, scaffolding, hydraulic work platforms or booms, equipment for lighting, painting, ventilating, dehumidifying, parts handling, or specialized respirators or other equipment, even if offered by Clemco, may have been manufactured or supplied by others. The information Clemco provides is intended to support the products Clemco manufactures. Users must contact each manufacturer and supplier of products used in the blast job for warnings, information, training, and instruction relating to the proper and safe use of their equipment.

GENERAL INSTRUCTIONS

This material describes some, but not all, of the major requirements for safe and productive use of blast machines, remote controls, respirator systems, and related accessories. All equipment and accessories must be installed, tested, operated and maintained only by trained, knowledgeable, experienced users.

The blast operator and all workers in the vicinity must be properly protected from all job site hazards including those hazards generated by blasting.

Work environments involving abrasive blasting present numerous hazards. Hazards relate to the blast process from many sources that include, but are not limited to, dust generated by blasting or from material present on the surface being blasted. The hazards from toxic materials may include, but are not limited to, silica, cyanide, arsenic, or other toxins in the abrasives or in the coatings, such as lead or heavy metals. Other hazards from toxins include, but are not limited to, fumes from coating application, carbon monoxide from engine exhaust, contaminated water, chemicals or asbestos. In addition, physical hazards that may be present include, but are not limited to, uneven work surfaces, poor visibility, excessive noise, and electricity. Employers must identify all job site hazards and protect workers in accordance with OSHA regulations.

Never modify Clemco equipment or components or substitute parts from other manufacturers for any Clemco components or parts. Any unauthorized modification or substitution of supplied-air respirator parts violates OSHA regulations and voids the NIOSH approval.

IMPORTANT

Contact Clemco for free booklets:

Blast Off 2 – Guide to Safe, Productive, and Efficient Abrasive Blasting, and Abrasive Blasting Safety Practices – Guide to Safe Abrasive Blasting.

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OPERATIONAL INSTRUCTIONS

OPERATOR SAFETY EQUIPMENT

WARNING

- OSHA regulation 1910.134 requires appropriate respiratory protection for blast operators and workers in the vicinity of blasting. These workers must wear properly-fitted, properly-maintained, NIOSH-approved, respiratory protection that is suitable for the job site hazards. Blast respirators are to be worn only in atmospheres not immediately dangerous to life or health from which wearers can escape without use of the respirator.
- The employer must develop and implement a written respiratory protection program with required worksite- specific procedures and elements for required respirator use. The employer must provide effective training to employees who are required to use respirators. The training must be comprehensive, understandable, and recur annually, and more often if necessary.
- NEVER use abrasives containing more than one percent crystalline silica. Fatal diseases, such as silicosis, asbestosis, lead or other poisoning, can result from inhalation of toxic dusts, which include, but are not limited to, crystalline silica, asbestos, and lead paint. Refer to NIOSH Alert 92-102; and OSHA CPL 03-00-007: “National Emphasis Program – Crystalline Silica”, in which OSHA describes policies and procedures for implementing a national emphasis program to identify and reduce or eliminate health hazards from exposure to crystalline silica. Numerous topics associated with the hazards of crystalline silica in silica blasting sand can be found on [http:// osha.gov/](http://osha.gov/). Clemco urges users of silica blasting sand to visit this website, and read and heed the information it contains.
- Always make sure the breathing air supply (respirator hose) is not connected to plant lines that supply gases that include, but are not limited to, oxygen, nitrogen, acetylene, or other non-breathable gas. Never modify or change respirator air line connections without first testing the content of the line for safe breathing air. Failure to test the line may result in death to the respirator user.

- Breathing air quality must be at least Grade D, as defined by the Compressed Gas Association specification G-7.1, per OSHA Regulation 29 CFR 1910.134. When compressed air is the breathing air source, a Clemco CPF (suitable sorbent bed filter) should be used. Respirator hose connecting the respirator to the filter must be NIOSH approved. Non- approved hose can cause illness from chemicals employed to manufacture the hose.

- All workers must always wear NIOSH-approved respirators when any dust is present. Exposure to dust can occur when handling or loading abrasive, blasting, cleaning up abrasive, or working in the vicinity of blasting. Before removing the respirator, test the air with a monitoring device to ensure it is safe to breathe.

- Clemco respirators DO NOT remove or protect against carbon monoxide or any other toxic gas. Monitoring devices must be used in conjunction with the respirator to ensure safe breathing air. Always locate compressors and ambient air pumps where contaminated air will not enter the air intake.

- Always use Clemco lenses with Clemco respirators; installing non-approved lenses voids the NIOSH approval. Respirator lenses are designed to protect the wearer from rebounding abrasive; they do not protect against flying objects, heavy high-speed materials, glare, liquids, or radiation.

INDUSTRY ORGANIZATIONS

For additional information, consult:

Occupational Safety and Health Administration (OSHA) - www.osha.gov

Compressed Gas Association (CGA) - www.cganet.com

The Society for Protective Coatings (SSPC) - www.sspc.org

National Association of Corrosion Engineers (NACE) - www.nace.org

American Society for Testing and Materials (ASTM) - www.astm.org

National Institute of Occupational Safety and Health (NIOSH) - www.niosh.gov

American National Standards Institute (ANSI) - www.ansi.org

PREFACE

BLAST MACHINES AND REMOTE CONTROLS

⚠ WARNING

OSHA regulation 1910.169 describes 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.

OSHA regulation 1910.244(b) requires the use of remote controls on blast machines.

Serious injury or death can result from many sources, among them:

- Involuntary activation of the remote controls. Never modify or substitute remote control parts; parts are not compatible among different manufacturers. Welding hose is not suitable for remote control hose. Its ID and material composition make it unsafe for remote control use.
- Exceeding the maximum working pressure. Clemco blast machines are built to ASME-code and carry a 'U' or 'UM' stamp, and National Board/serial number. Every machine is marked with its maximum working pressure. Never exceed the maximum working pressure limits of the blast machine.
- Uncontrolled blast stream. High-velocity abrasive particles will inflict serious injury. Always point the blast nozzle in the direction of the blast surface only. Keep unprotected workers out of the blast area.
- Welding on the blast machine. Never weld on the blast machine; welding voids the National Board approval and may affect the dimensional integrity of the vessel.
- Moving the blast machine. Never manually move a blast machine containing abrasive, any machine containing abrasive must be moved with appropriate mechanical lifting equipment.

HOSES, COUPLINGS, AND NOZZLE HOLDERS

- The inside diameter (ID) of air hoses, fittings, and connections should be at least four times larger than the nozzle orifice size. Blast hose ID should be three to four times the size of the nozzle orifice. Example: a #6 nozzle (3/8" diameter orifice) calls for 1-1/2" ID blast hose and 1-1/2" ID or larger compressor hose. All hose runs should be kept as short as possible and run in as straight a line as possible to reduce pressure loss.
- To install, squarely cut the end of the hose so that it fits snugly against the coupling or hose end shoulder. Always use the screws recommended by the manufacturer ensuring that they do not penetrate the inner wall. Make sure the couplings tightly fit the hose. Install cotter pins at every connection or use couplings with built-in lock-springs to prevent disengagement. Install safety cables at all connections to prevent whipping if hoses disengage or blow out.

MAINTENANCE AND REPAIR

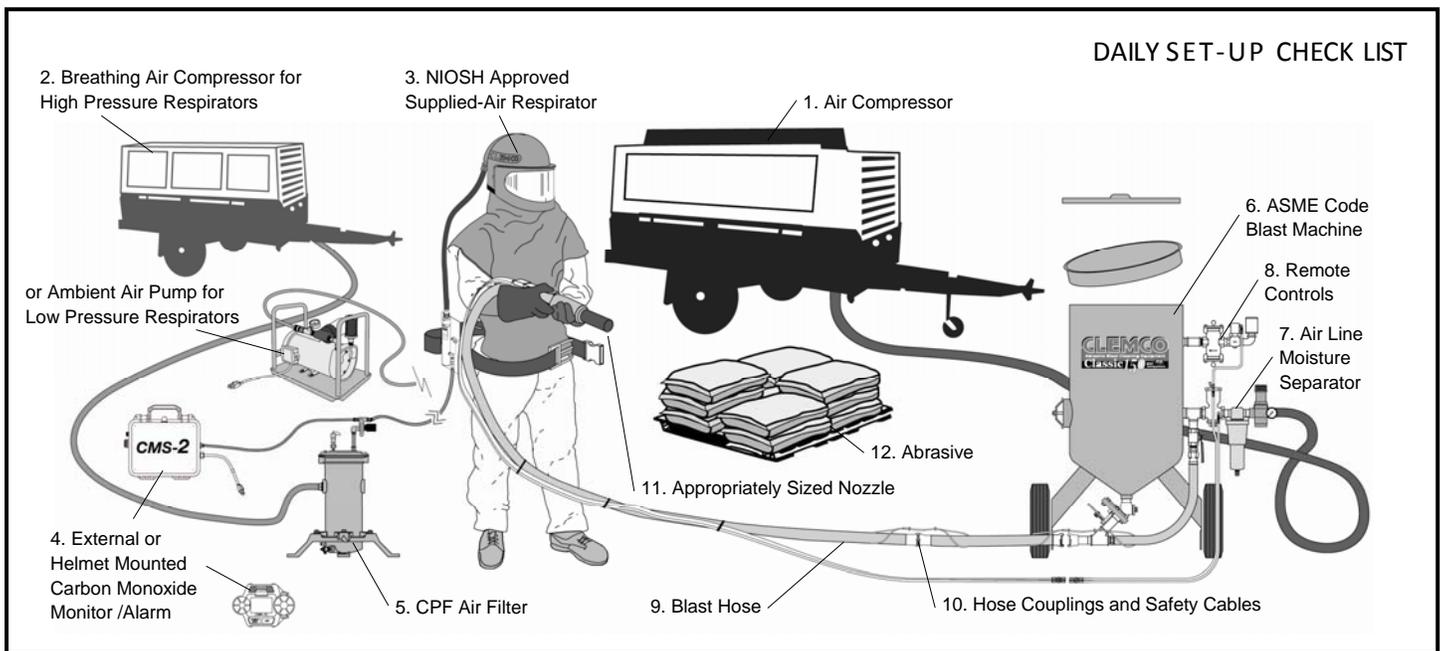
- Completely read and follow all service instructions and recommended maintenance intervals. Always shut off compressor and depressurize blast machine before performing any maintenance. At every service interval, clean all filters, screens, and alarm systems. If spring-loaded abrasive valves are used, always cage spring before disassembly.

WARRANTY

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

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

PREFACE



DAILY SET-UP CHECK LIST

Make sure all blast operators are properly trained and suitably attired with a blast suit, safety boots, leather gloves, respiratory and hearing protection. Every day before start up, check all equipment components, including piping, fittings, and hoses, and valves, for leaks, tightness, and wear. Repair or replace as needed. Use the following checklist.

- 1. PROPERLY-MAINTAINED AIR COMPRESSOR** sized to provide sufficient volume (cfm) at given pressure for nozzle and other tools. ADD 50% volume (cfm) reserve to allow for nozzle wear. Use large compressor outlet and air hose (at least 4 times the nozzle orifice diameter). For oil-lubricated compressors, the employer shall use a high- temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm. Follow the manufacturer's checklist and maintenance instructions.
- 2. BREATHING-AIR COMPRESSOR** (or oil-less ambient air pump) capable of providing Grade D quality air, located in a dust free area. Read # 1 above.
- 3. CLEAN, PROPERLY-MAINTAINED NIOSH-APPROVED SUPPLIED-AIR RESPIRATOR** worn by blast operators, and other workers exposed to blast dust. Make sure all respirator components are in place — all lenses, inner collar, and cape. Thoroughly inspect all components for wear. The NIOSH approval (approval number is listed in the owner's manual) is for a complete assembly from point of attachment on the CPF (sorbet bed) filter to the complete respirator. Substitution of any part voids the NIOSH approval.
- 4. CARBON MONOXIDE MONITOR/ALARM** installed at the CPF filter or inside the supplied-air respirator for monitoring for the presence of deadly CO gas and warning the operator(s) when the CO level reaches an unacceptable level. When an ambient air pump is used for breathing air, a CO monitor provides a measure of safety. Read # 1 above.
- 5. BREATHING-AIR FILTER (OSHA-REQUIRED sorbet bed filter)** for removal of moisture and particulate matter in the compressed air breathing-air supply. Monitor the condition of the cartridge and replace when odor is detected or at 3 month intervals, whichever comes sooner. The breathing air filter does NOT detect or remove carbon monoxide (CO). Always install a CO monitor/alarm.
- 6. BLAST MACHINE** (bearing U or UM stamp, National Board Number, and Maximum Working Pressure) sized to hold a 30-minute abrasive supply. Examine pop-up valve for alignment. Check piping, fittings, screens, valves for tightness, leaks, and wear. Always ground the machine to eliminate hazard of static shock. Install a blast machine screen to keep out foreign objects. Use a blast machine cover if left outdoors overnight. Never exceed the maximum working pressure of the vessel.
- 7. AIR LINE FILTER** (moisture separator) installed as close as possible to the blast machine inlet and sized to match the size of the inlet piping or larger air supply line. Clean filter and drain often. Damp abrasive causes operational problems.
- 8. REMOTE CONTROLS** are required by OSHA and must be in perfect operating condition. Test and check all components to ensure all parts are present and fully functional. Use genuine replacement parts. NEVER mix parts from different manufacturers. Never use welding hose for remote control hose.
- 9. BLAST HOSE** should have an inside diameter sized to suit the blast nozzle. The ID should be three to four times the size of the nozzle orifice diameter. Blast hose should be arranged in as straight a line as possible from the blast machine to the work area, avoiding sharp bends.
- 10. COUPLINGS AND NOZZLE HOLDERS** should fit snugly on the hose and be installed with manufacturer recommended screws. Coupling lugs must snap firmly into locking position. Gasket must always be used to form a positive seal, and cotter pins must be installed. Replace gasket when wear, softness or distortion is detected. Check nozzle holder for thread wear; replace at any sign of wear. Install safety cables at all connections.
- 11. NOZZLE** orifice size should be checked and nozzle replaced when worn 1/16" from original size. (No. 5 nozzle has 5/16" orifice diameter; replace when it measures 3/8"). Threads should be inspected daily for wear and nozzle should be replaced when wear is detected. Always use a nozzle washer.
- 12. ABRASIVE** must be a material specifically manufactured for blasting. It should be properly sized for the job. Check material safety data sheet for free-silica, cyanide, arsenic, lead and other toxins and avoid use when these toxic, harmful substances are present.
- SURFACE TO BE BLASTED** should be examined for hazardous substances. Take appropriate protective measures as required by OSHA to ensure the blast operator, other workers in the vicinity, and any bystanders are properly protected.

1.0 INTRODUCTION

1.1 Scope

1.1.1 This manual covers installation, operation, maintenance, troubleshooting, and replacement parts for the following Clemco remote control systems.

TLR-100, 1" w/piston outlet	01935
TLR-300, 1 ¹ / ₄ " (1 ¹ / ₂ " inlet) w/p outlet	01936
TLR-100D, 1" w/diaphragm outlet	03449
TLR-300D, 1 ¹ / ₄ " (1 ¹ / ₂ " inlet) w/diaphragm outlet...	03448

Note: The following remote control systems include an abrasive cut-off switch (ACS). The optional system uses a pneumatically-operated abrasive metering valve. Operation instructions and replacement parts for the metering valve are supplied with the valve.

TLR-100C, 1" w/piston outlet	07632
TLR-300C, 1 ¹ / ₄ " (1 ¹ / ₂ " inlet) w/piston outlet	07633
TLR-100DC, 1" w/diaphragm outlet.....	07634
TLR-300DC, 1 ¹ / ₄ " (1 ¹ / ₂ " inlet) w/diaphragm out.	07635

1.1.2 This manual contains important safety information. All operators and personnel involved with the abrasive blast process must read and understand the contents of these instructions, including the orange cover. It is equally important that the operator is trained and qualified to safely operate the blast machine and remote controls and all other equipment used with the blast machine. Accessory manuals for equipment that may be used with the remote controls are shown below. Manuals are available on our web site at www.clemcoindustries.com.

Classic Blast Machine with Remote Controls	22501
RLX Control Handle	10574
Muffler Service	22322

1.1.3 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" is included with every blast machine; it contains important safety information about abrasive blasting that may not be included in equipment operation manuals. The booklet is available in both English and Spanish; to request copies, 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.

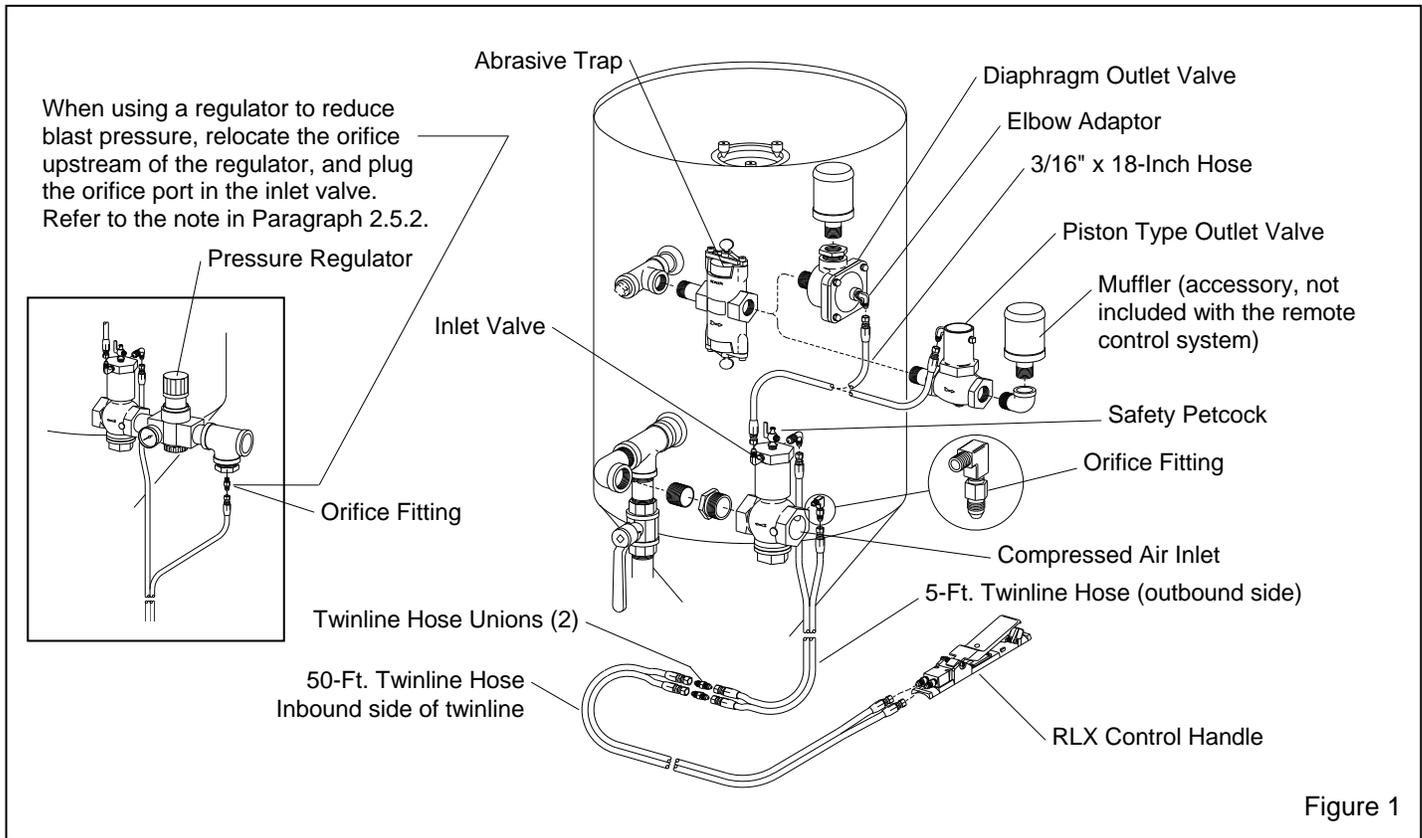
DANGER

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

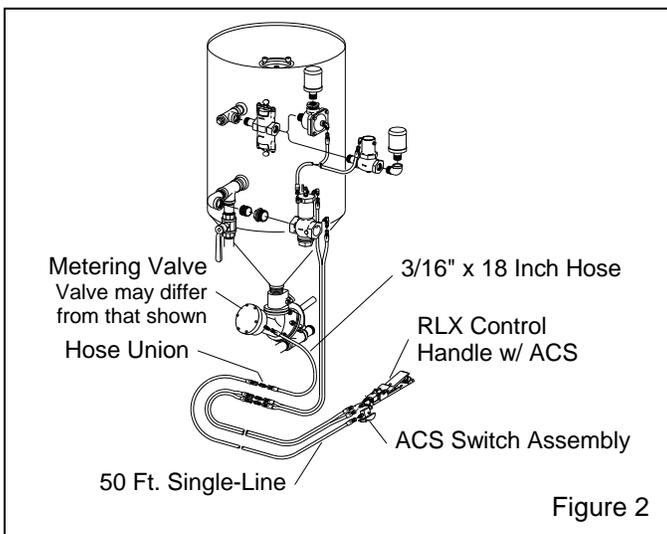
1.3 General Description

1.3.1 The components of a standard system are shown in Figure 1. They include the inlet valve, piston or diaphragm outlet valve (the piston valve is used in most applications, the diaphragm valve is recommended for use with fine mesh, or aggressive abrasive), abrasive trap, RLX control handle, 55-ft. and 5-ft. long twinline control hoses, 2 control hose unions, and an 18-in. long interconnecting hose.

1.3.2 Additional parts used with optional ACS cut-off systems are shown in Figure 2. ACS systems include a 50 ft. single-line hose, and additional 18-in. long interconnecting hose, an RLX control handle with ACS air switch assembly, and a pneumatically-operated metering valve. The metering valve supplied with the system may differ from that shown. NOTE: Instructions and replacement parts are in the manual supplied with the metering valve.



1.3.3 A remote control system is an OSHA-required safety device; it is required when an operator mans the nozzle. The control handle, located near the blast nozzle, is the activator of the remote control system. When the operator intentionally or unintentionally removes hand-held pressure from the control handle, the machine depressurizes and blasting stops. The remote control system "fails to safe"; which means if an interruption in the control-air circuit occurs, for any reason, the remote control deactivates the blast machine and blasting stops.



⚠ 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 could occur, causing serious injury.

1.4 Operating Principles

1.4.1 TLR-100 and TLR-300 remote controls are pressure-release-style systems which control the pressurization and depressurization of the blast machine. Pressurization, which starts blasting, occurs when the control handle is pressed, and depressurization, which stops blasting, occurs when the handle is released.

1.4.2 Clemco remote controls operate pneumatically on a return-air principle (Refer to Figure 1). When compressed air is supplied to the machine, control air travels from the orifice fitting, down the outbound twinline and escapes through an opening located under the control handle lever. As long as the control handle lever remains up, air escapes through the opening, and the normally-closed inlet valve remains closed and the normally-open outlet valve remains open (no blasting).

When the control handle lever is pressed, a rubber button seals the opening, forcing air from the outbound side of twinline to return through the inbound side. Pressure in the return line opens the inlet valve and closes the outlet valve. This action pressurizes the blast machine and begins the blasting process. Releasing the handle exhausts the control air, closing the inlet valve, and opening the outlet valve to depressurize the blast machine and stop the blasting.

1.4.3 Abrasive Cut-Off (ACS) Option

1.4.3.1 The abrasive cut-off switch is mounted on the control handle. It closes the metering valve so that air alone, without abrasive exits the nozzle. This feature is used to clear the blast hose and to blow-down the blast surface.

NOTE: The ACS feature requires a pneumatically-operated abrasive metering valve. It is not available on Lo-Pot blast machines, which do not have adequate clearance for the metering valve.

1.5 Electric Control Option

1.5.1 Electric remote controls (electro-pneumatic) are recommended when the nozzle and remote control handle are farther than 100 feet from the blast machine. Pressure loss through pneumatic systems over longer distances delays actuation time, and could prevent fast, safe depressurization time should an accident or an emergency occur. For additional information contact your local Clemco Distributor, visit www.clemcoindustries.com or email info@clemcoindustries.com.

2.0 INSTALLATION

WARNING

Failure to observe the following procedure before performing any service on a blast machine or pneumatic accessories could cause serious injury or death from the sudden release of trapped compressed air.

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

Installation Note: To prevent thread galling and to provide an airtight seal, use thread-sealant on all male NPT (pipe) threads.

2.1 Factory Installed Controls

If the remote control system was factory installed, skip to Section 2.3.

2.2 Field Installation

2.2.1 Empty the blast machine of abrasive. Depressurize the machine. Shut down the compressed air source. Bleed the air supply line. Lockout and tagout the air supply. Disconnect the air supply line.

2.2.2 Remove the existing inlet valve and outlet valve from the machine. The machine should resemble the illustration in Figure 3. We recommend installing outlet piping as shown in the illustration.

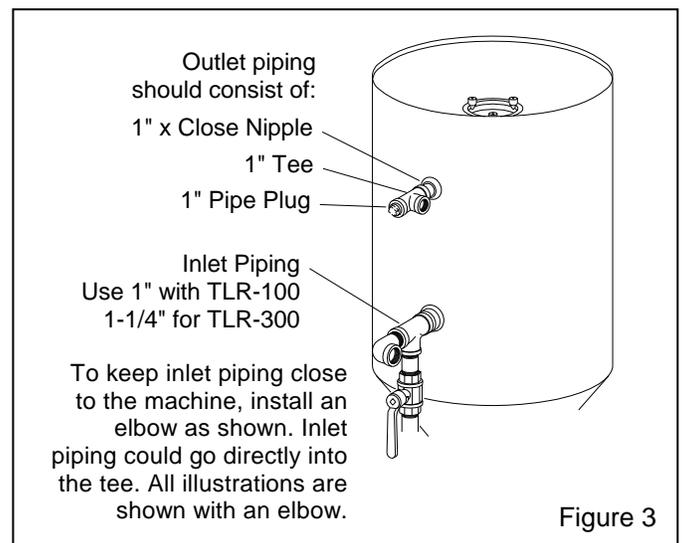


Figure 3

2.2.3 Attach the inlet valve and abrasive trap as shown in Figure 4. The directional arrow on the inlet valve points toward the blast machine, indicating the direction of air flow. The arrow on the abrasive trap points away from the machine.

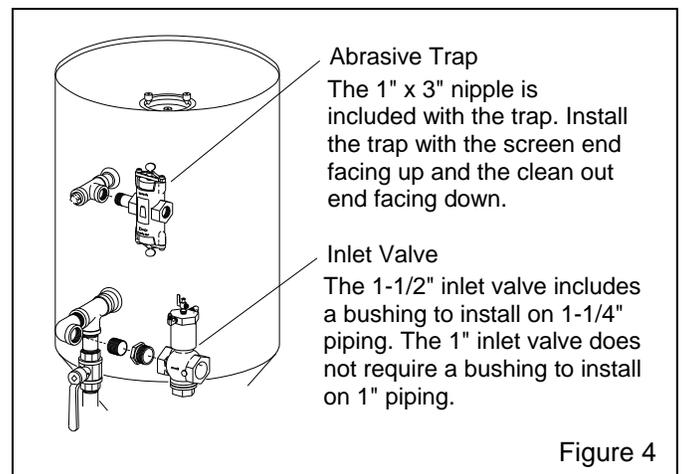


Figure 4

2.2.4 Install the piston or diaphragm outlet valve and muffler as shown in Figure 5.

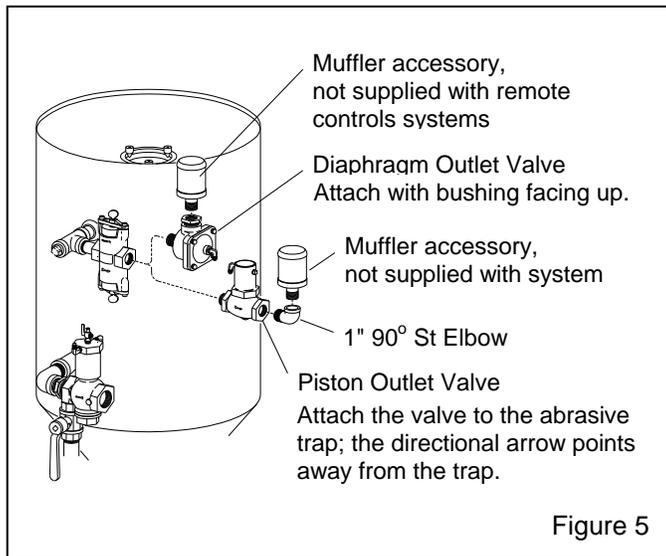


Figure 5

⚠ WARNING

Clemco supplies an exhaust muffler with all blast machines of 2 cu. ft. capacity and larger. The muffler reduces exhaust noise and prevents abrasive from exhausting upward or sideways into the air. When the blast machine is depressurized, the muffler body will pop up to diffuse the air and abrasive. When the machine is fully depressurized, the muffler body will drop, permitting trapped abrasive to empty. For the muffler to work properly, it must be installed with the body facing up, as shown in Figure 5.

If an application requires the muffler to be removed, the exhaust piping must be plumbed to direct exhausting air in a direction that ensures no persons will be exposed to possible injury from high velocity air and media which escapes when the blast machine depressurizes.

2.2.5 Connect the 3/16" x 18" air hose between the outlet valve and one of the elbow fittings at the top of the inlet valve, as shown in Figure 1.

2.3 Set Up for Multiple Blast Machines Operating From a Common Compressed Air Supply

2.3.1 Where multiple blast machines are operating from a single air source, install a ball-cone check valve at the air supply on each machine. Refer to the illustration in Figure 6 to install a check valve on a blast machine.

2.3.2 If the machines are positioned close together, use a receiver tank or manifold and run separate air lines to each machine. The check valves may be located on the receiver tank outlets if the air line goes directly to the blast machine and nowhere else.

⚠ CAUTION

If multiple machines are operating from a common compressed air supply, and a machine is under pressure, when another machine is pressurized, the sudden, increased demand for air could reverse air flow from the machine that is under pressure, and contaminate the compressed air supply with abrasive-laden air. Install check valves at the piping inlet to prevent the reversal of air.

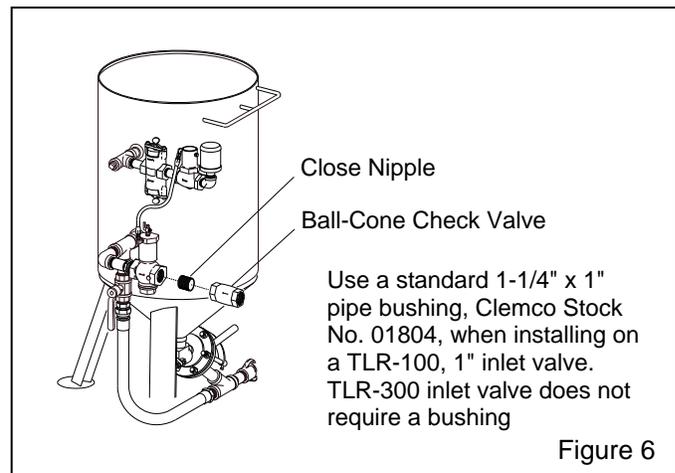


Figure 6

Note: Do not use a swing check valve, as the swing gate may break in blast machine applications. When installing the valve, make sure the directional arrow is pointing in the direction of the air flow (toward the machine).

2.3.3 Use a Clemco ball-cone check valve shown below to reduce pressure drop through the valve. A smaller-size valve could restrict air movement and reduce nozzle pressure.

- TLR-100 with 1-NPT inlet valve
Use 1-1/4-NPT check valve Stock No. 02088
- TLR-300 with 1-1/2-NPT inlet valve
Use 1-1/2-NPT check valve Stock No. 02296

2.4 Install Compressed Air Coupling and Air Hose

2.4.1 Connect a compressed-air hose coupling that is compatible with the air-supply hose to the inlet valve (or optional air filter). **NOTE: The ID of the air-supply hose should be at least 4 times the diameter of the nozzle orifice. A smaller diameter hose could result in a reduction in nozzle pressure.**

2.5 Prepare Blast Hose and Control Hose Connections

⚠ WARNING

Where two or more blast machines are used in close proximity, care must be taken when tracing and connecting control lines and blast hose. Cross connecting control hose or blast hose could lead to serious injury, death, or property damage from unintentional actuation of a blast machine. To prevent cross connecting blast hose and control hose, the hoses should be of equal lengths and the hoses and blast machine couplings clearly marked, using optional hose identification kits, stock no. 15890 for use with two blast machines, or stock no. 15891 for up to four machines. Mark each hose and corresponding connection per the instructions supplied with the kit, and carefully trace and verify each connection before operating.

⚠ WARNING

Moist air that freezes could cause blockage at the control handle or in the control lines. Blockage could cause involuntary activation of the remote controls, or prevent the controls from deactivating upon release of the control handle. This situation could result in serious injury or death. If remote controls are operated in freezing or near-freezing weather, install a Clemco Anti-Freeze Injector, stock no. 05537, on the remote control air-supply line.

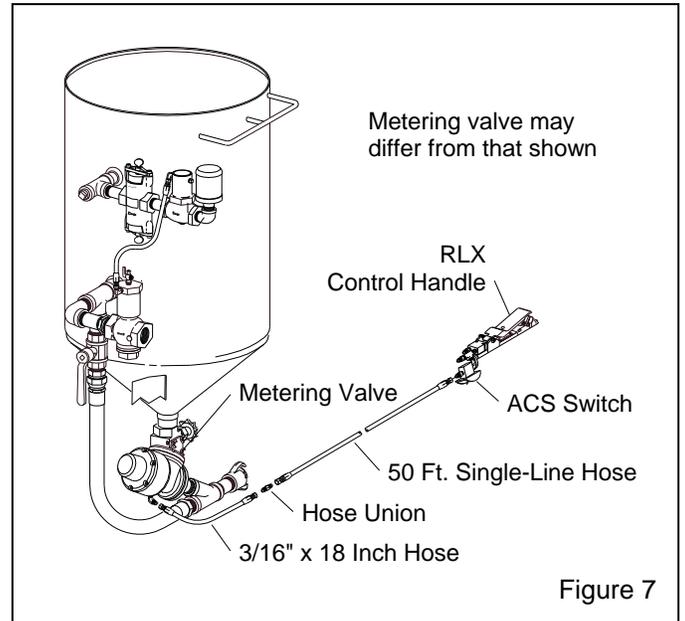
2.5.1 Set up for optional ACS feature. Refer to Figure 7. If the remote control does not have the ACS feature, skip to Paragraph 2.5.2.

2.5.1.1 Attach the 50-foot long single-line hose to the ACS air switch located on the RLX control handle.

2.5.1.2 Attach the 18-inch long hose to the fitting on the metering valve.

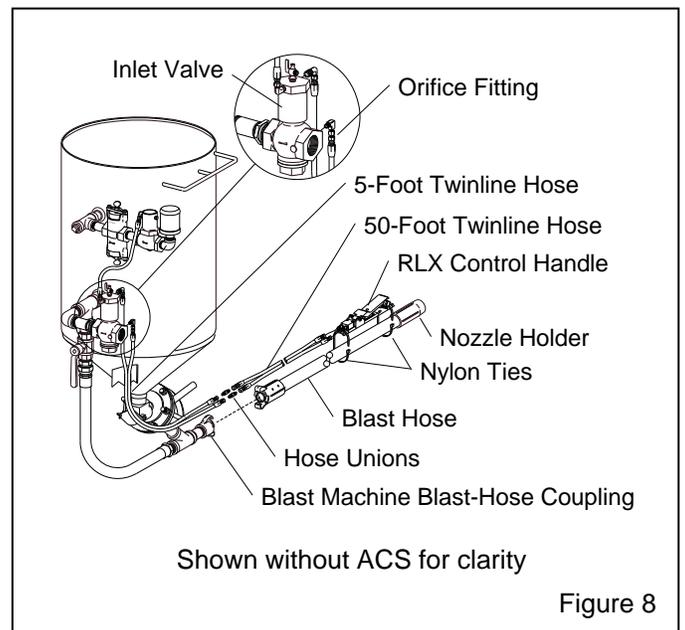
2.5.1.3 Use one of the three unions to connect the 50-foot hose to the 18-inch hose.

2.5.1.4 Proceed with Paragraph 2.5.2.



2.5.2 Attach the 5-ft. twinline hose to the inlet valve as shown in Figure 8; one side of the hose connects to the unused upper elbow, the other to the orifice fitting. **NOTE:** When using a pressure regulator to reduce blast pressure below 80 psi, relocate the orifice upstream of the regulator as shown in the insert in Figure 1, and plug the orifice port in the inlet valve. Doing so provides full line-pressure to the pneumatic control circuit.

2.5.3 Connect the two hose unions to the other end of the 5-ft. twinline hose and place the ends next to the blast machine's blast-hose coupling.



2.5.4 Uncoil the blast hose and lay the 50-ft. twinline hose (and optional, single ACS hose when used) alongside it.

2.5.5 Temporarily connect the blast hose to the blast machine's blast hose coupling.

2.5.6 Band the RLX control handle to the blast hose close to the nozzle holder, using the two nylon ties provided. After the control is firmly attached, clip the tie ends to avoid snags or interfere with the operation of the control handle.

2.5.7 Attach the 50-foot twinline hose to the two adaptor fittings on the control handle. Either side of the hose can be attached to either fitting.

NOTE: When attaching Clemco twinline hose to any Clemco valves; either side of the hose can be attached to either twinline fitting the valve.

2.5.8 Working backward from the control handle, band or tape the twinline hose (and single ACS hose) to the blast hose every four to six feet, and as close to the couplings as possible.

2.5.9 Connect the 50-foot twinline hose to the unions on the 5-ft. twinline.

2.5.10 Band the 5-foot twinline hose to the coupling nipple on the blast machine.

2.5.11 Make sure that all fittings are tight. Leaks will cause the system to malfunction.

NOTE: When removing the blast hose from the machine, disconnect the 50-foot twinline hose (and optional ACS hose) at the unions.

When attaching the blast hose make sure all twinline fittings are tight. Make sure coupling gaskets are in place and in good condition before connecting the blast hose to the blast machine. Use safety lock-pins or safety wire to lock the couplings together and prevent accidental separation while under pressure. Safety cables and lock-pins are listed in Section 7.1

⚠ WARNING

Hose disconnection while under pressure could cause serious injury or death. Use safety lock-pins and safety cables on all hose coupling connections to help prevent hose couplings from accidental disconnection.

3.0 OPERATION

⚠ WARNING

Refer to the manuals listed in paragraph 1.1.2. Do not operate this equipment before reading the instruction manuals for all equipment.

3.1 Start-Up

3.1.1 Connect the air supply to the blast machine inlet. The compressor should be located upwind from the blasting operation to prevent dust from entering the compressor intake.

3.1.2 Make sure that the safety petcock located on the inlet valve is open. The petcock is open when the petcock lever is in-line with the petcock, as shown in Figure 9.

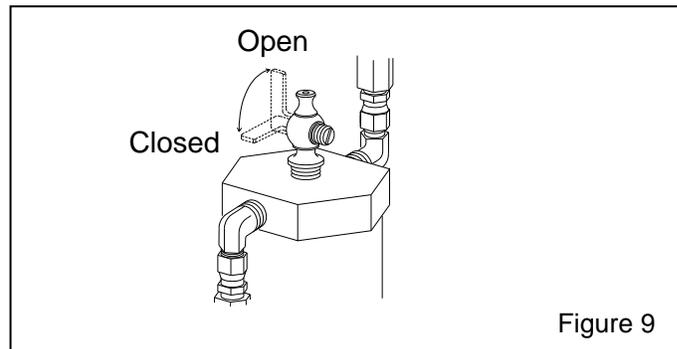


Figure 9

⚠ WARNING

To prevent severe injury from accidental activation of the blast machine, open the safety petcock when the blast machine is not in use. Opening the petcock prevents unintentional blasting. The control handle will not activate the machine when the petcock is open.

3.1.3 Make sure that the remote control handle lever is in the up (no blast) position, and that the handle lever and safety lock move freely.

⚠ WARNING

A separate manual is supplied with the RLX remote control handle. Do not operate the machine before first reading the manual for the control handle.

3.1.4 Check to make sure that the handle lever will not seal the opening on control handle unless the safety lever lock is pulled down.

WARNING

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

3.1.5 Start the compressor, and bring it up to operating temperature and pressure. The pressure must be more than 50 pounds per square inch (psi) but must not exceed the blast machine's rated pressure.

3.1.6 Fill the machine with screened, clean, dry abrasive that is specifically manufactured for blasting.

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

3.1.8 Do not allow anyone around the blast machine except the blast operator or machine tenders, who are appropriately attired in approved personal protective equipment as noted in Section 3.2.

3.1.9 When the blast operator is ready, either the operator, or the machine tender, stands away from the concave filling head of the blast machine and the exhaust muffler, and then closes the safety petcock. Closing the petcock prepares the machine for remote operation, and activation by the control handle. Air should be heard escaping from the orifice under the control handle lever but nowhere else. The air escaping at the handle is an audible signal that means air is supplied to the blast machine, and will activate when the control handle is pressed.

3.2 Blasting Attire

3.2.1 Operators and anyone else exposed to the hazards generated by the blasting process must wear appropriate protective gear, including abrasive-resistant clothing, leather gloves, eye and hearing protection, and a NIOSH-approved type CE supplied-air respirator.

3.2.2 Don protective blasting attire outside the blast area, in a clean non-hazardous environment, free of contaminants, where the air is safe to breathe.

WARNING

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 the operators and the environment.

No dust is safe to breathe. Abrasive blasting produces harmful dust. Failure to wear approved respirators could result in serious lung disease or death. Blast operators must wear properly fitted and maintained NIOSH-approved, type-CE supplied-air respirators approved for abrasive blasting.

During abrasive blasting, abrasive particles and dust in the area around the blast machine and blast nozzle become airborne. Everyone in the vicinity of abrasive blasting must wear properly-maintained, NIOSH-approved, respiratory protection appropriate for the job site hazards. Noise generated by compressed air could cause hearing damage. Everyone in the blasting area must wear approved hearing protection.

3.3 Blasting

3.3.1 Don all protective, blasting attire, per Section 3.2.

3.3.2 Hold the blast hose securely and point the nozzle only toward objects intended to be blasted.

WARNING

OSHA requires the use of remote controls on all blast machines when an operator controls the nozzle. To comply with OSHA regulations, the remote control handle, which starts and stops the flow of air and abrasive, must be held down manually. Do not tie down the control handle lever 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. Serious injury or death could result from uncontrolled blasting. Ref. 29 CFR 1910.244 (b).

3.3.3 Fold down the safety lever lock and depress the remote control handle. Within a few seconds the pop-up valve automatically closes and the blast machine will pressurize to start blasting.

CAUTION

Be prepared for recoil from the blast hose. Blasting should begin within a few seconds after pressing the control handle lever.

3.4 Operation of the Optional Abrasive Cut-Off Switch (ACS)

WARNING

OSHA sets exposure limits for people and the environment. Airborne dust could increase the exposure levels beyond permissible limits. OSHA prohibits blowing with compressed air as a cleaning method for lead-based paint dust or other hazardous dust, unless the compressed air is used in conjunction with a ventilation system designed to capture the volume of airborne dust created by the compressed air, 29 CFR 1926 (h). The ACS is for blowing abrasive off a blasted surface, NOT as a general area clean-up tool.

3.4.1 The ACS serves two purposes:

1. Clearing abrasive from the blast hose when blasting is finished. This is helpful in a lot of applications and necessary when blasting vertical, to prevent abrasive from collecting in low spots in the blast hose, eliminating excessive abrasive slugging at startup.
2. Blowing abrasive off the blasted surface. NOTE: Small amounts of residual abrasive may exit the nozzle with the air, requiring blowing off or otherwise cleaning surface outside the blasting area prior to painting.

3.4.2 The abrasive cut-off switch is mounted directly behind the control handle. The switch may be flipped "ON" or "OFF" at any time, but will not operate the metering valve unless the control handle is pressed.

3.4.3 Blast Mode

3.4.3.1 Moving the ACS toggle away from the nozzle, to the "ON" ("CYL" port) position, sends control-air to the abrasive metering valve, opens the valve and the blast machine operates normally, with air and abrasive coming out the nozzle.

3.4.4 Blow-Down Mode

3.4.4.1 Moving the ACS toggle toward the nozzle, to the "OFF" position, cuts off the control-air to the abrasive metering valve, closes the valve and stops the abrasive flow. This action allows air alone to exit the nozzle, useful for clearing the blast hose before shutting down, and blowing abrasive off the blasted surface.

3.5 Stop Blasting

3.5.1 To stop blasting, release the control handle lever. The outlet valve will open and the blast machine will depressurize. The pop-up valve automatically drops when air is expelled from the machine and pressure equalizes.

3.5.2 When the control handle lever is released, the safety lever lock will flip up to lock the handle lever in the up (no blast) position.

3.5.3 Always open the safety petcock during work breaks and before filling the blast machine. Opening the petcock prevents unintentional blasting.

WARNING

When approaching an idle blast machine, and before loading the blast machine with abrasive, always check to make sure the safety petcock is open. This step is especially important if one worker (a machine tender) loads the machine with abrasive while another worker (the blast operator) controls the blasting. The blast operator could pressurize the machine before the machine tender has moved away from the machine. During pressurization abrasive could be forced out of the top of the machine, and cause injury.

3.5.4 When finished blasting, and after cleanup is completed, remove the respirator and protective clothing outside the blasting area, in a clean environment where the air is safe to breathe.

4.0 PREVENTIVE MAINTENANCE

NOTE: The following preventive maintenance instructions pertain to the remote controls only. Read the manuals for the blast machine, control handle, and all blast accessories for their inspection and maintenance.

4.1 Daily

4.1.1 With the air OFF, before blasting, do the following:

- Empty the abrasive trap and clean the abrasive trap screen. Do this at least twice daily, or more often, if the machine is frequently cycled. Failure to clean the abrasive trap on a regular basis is a major cause of system malfunction. Refer to Section 5.4.
- Inspect the RLX control handle; look for the following:
 - The lever must not seal the opening on the control unless the safety lever lock is pulled down.
 - The **handle lever** must return to the "up" position when released.
 - The **safety lever lock** must return to the "up" position when the handle lever is released.
 - Both the handle lever and safety lever lock must move freely with no drag or binding.

WARNING

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

4.1.2 During blasting, do the following:

- Check the control handle for leaks.

4.2 Weekly

4.2.1 Inspect the following while blasting:

- Inspect all control hoses and valves for leaks. If leaks are found, stop blasting and repair.

4.3 Periodic Inspection

NOTE: Periodic inspection of the following items will prevent unscheduled down-time.

4.3.1 The remote control system is a safety device. For safety and to avoid unscheduled down-time, periodically inspect the internal parts of the inlet valve, outlet valve, and abrasive trap. Inspect for wear and lubrication of o-rings, pistons, springs, seals, and castings. Refer to Service Maintenance in Section 5.

4.3.2 The control handle is the actuator of the remote control system. Periodically clean around the springs, handle lever, and safety lever lock to ensure that the unit is free of abrasive and debris that could cause the handle lever or safety lever lock to bind. Refer to the RLX manual for service instructions.

4.4 Lubrication

4.4.1 Once per week, while the air is OFF, put one or two drops of lightweight machine oil in the inlet valve through the safety petcock. This will lubricate the piston and o-rings in the inlet and outlet valves.

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 trapped compressed air.

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

5.1 Inlet Valve

All service on the inlet valve must be done with the air OFF and the air supply locked-out and tagged-out. It is not necessary to remove the valve from the blast machine.

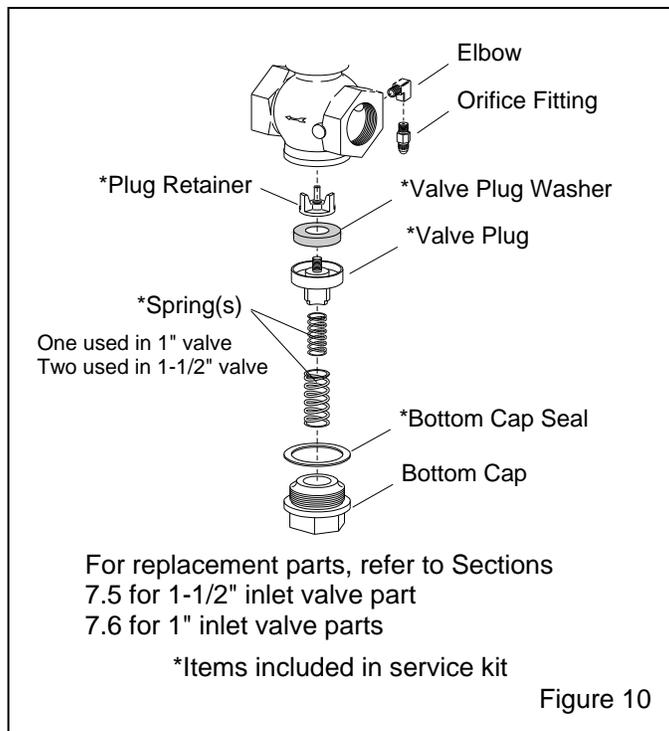
5.1.1 Bottom Section, Refer to Figure 10

5.1.1.1 Use a pipe wrench to loosen the bottom cap until it can be removed by hand.

5.1.1.2 Use care when removing the cap as the spring(s) (two are used in the 1-1/2" inlet valve) and plug assembly could drop from the opening. Do not allow them to fall to the ground as damage to the castings could occur.

5.1.1.3 Clean all parts and inspect for wear as follows:

- The small spring (only one used in 1" valve) is approximately 1-11/16" long. If it is rusty or compressed, replace it.
- The large spring (not used in 1" valve) is approximately 2-1/16" long. If it is rusty or compressed, replace it.
- Inspect the valve plug washer, valve plug, and plug retainer for damage. Replace all damaged parts. When reassembling the valve plug assembly, tighten the retainer enough to compress the washer, but not so tight to cause it to bulge.
- Look into the lower opening in the valve body. If the machined seat is worn, replace the body.
- Inspect the bottom cap seal, and replace if damaged.



5.1.1.4 Remove the lower twinline hose connection, and remove the orifice fitting for inspection. Clean the 1/16" orifice and reassemble the connection.

WARNING

For proper operation, the orifice fitting must always be in place. Do not modify it, or substituted another fitting. Altering the orifice fitting may cause involuntary activation of the blast machine or some other malfunction which could result in serious injury or death.

5.1.1.5 If the top section of the valve requires service, go to Section 5.1.2, otherwise refer to the illustration in Figure 10 to reassemble the valve in reverse order.

5.1.2 Top Section, Refer to Figure 11

5.1.2.1 Remove the control hose and fittings from the cylinder cap to make sure they are not damaged by a wrench.

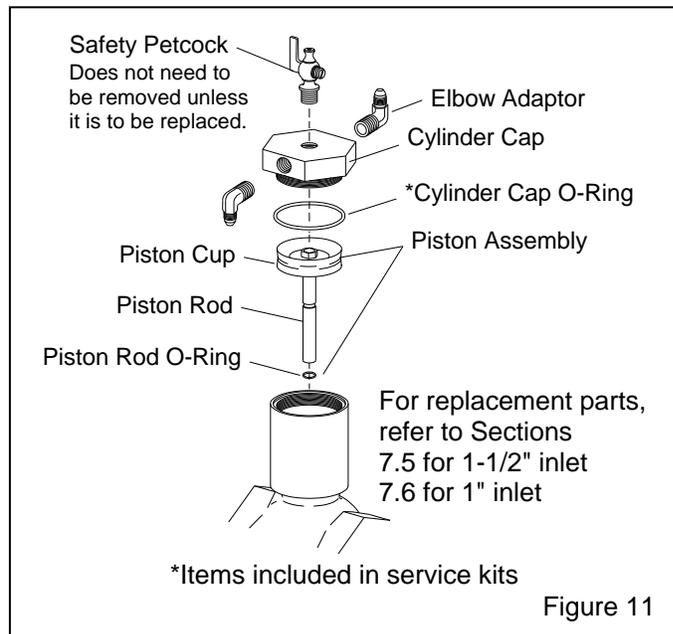
5.1.2.2 Use a pipe wrench to remove the cylinder cap.

5.1.2.3 If the bottom cap has not been removed, remove the cap and all parts in the bottom section per Section 5.1.1.

5.1.2.4 Use a wooden hammer handle or similar object, inserted into the bottom of the valve body, pushed through the seat area, to drive the piston rod up. Doing so will push the piston out the top of the valve body.

5.1.2.5 Inspect all items for wear and damage.

- The piston cup should fit snug against the cylinder wall. If it does not, replace the piston assembly.
- The piston rod should be free of deep abrasion and move freely in the rod's bore. If it is badly abraded, drags in the bore, or loose in the bore, replace the piston assembly.
- If the piston rod o-ring is flattened, replace the o-ring.
- Inspect the cylinder cap o-ring. Replace it if it is cut or if it does not fit snugly into the recess at the end of the threads.



5.1.2.6 Lubricate the cylinder wall and piston cup, with lightweight machine oil or tool oil.

5.1.2.7 Install the piston into the cylinder. As the piston cup contacts the cylinder, it may be difficult to press into place. Do not pound the piston, as that could damage the cup; make sure the lower lip of the cup does not curl in or get cut. Rotating the piston while applying thumb pressure makes assembly easier.

5.1.2.8 Refer to the illustrations in Figure 10 and 11 to reassemble the remainder of the valve in reverse order.

5.2 Piston Outlet Valve, Refer to Figure 12

Refer to Section 5.3 to service the diaphragm outlet valve.

5.2.1 All service on the outlet valve must be done with the air OFF and the air supply locked-out and tagged-out. It is not necessary to remove the valve from the blast machine.

5.2.2 Remove the control hose from the valve bonnet's elbow adaptor. Note: The elbow adaptor and plug do not need to be removed unless they need to be replaced.

5.2.3 Use a large wrench to loosen the bonnet from the valve body, until it can be removed by hand.

5.2.4 To remove the bonnet, lift it straight up until the piston rod clears the spindle guide.

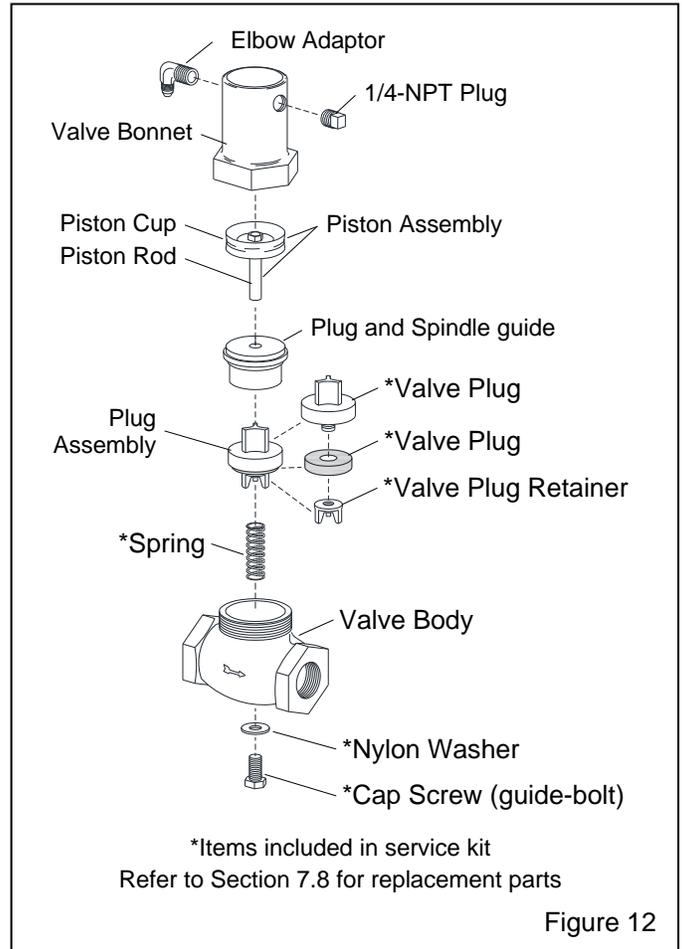
5.2.5 Remove the spindle, plug assembly, and spring from the valve body.

5.2.6 Remove the piston from the bonnet by pulling the piston rod.

5.2.7 Inspect all parts for wear and damage as follows:

- Inspect the valve plug washer, valve plug, and plug retainer for damage. Replace all damaged parts. When reassembling the valve plug assembly, tighten the retainer enough to compress the washer, but not so tight to cause it to bulge.
- Examine the body casting for wear. If the body or the machined seat is worn, replace the body.
- Examine the spring guide-bolt and nylon washer. If either is worn, replace both.
- The spring is approximately 1-5/8" long; if it is abrasive worn, rusty, or compressed, replace it.
- The piston cup should fit snugly against the bonnet's cylinder wall. If it does not, replace the piston assembly.
- The piston rod should be free of deep abrasion and move freely in the spindle guide's bore. If it is badly abraded, drags in the bore, or is loose in the bore, replace the piston assembly.

5.2.8 Lubricate the cylinder wall and piston cup with lightweight machine oil or tool oil.



5.2.9 Install the piston into the bonnet's cylinder. Cocking the piston so it enters the bonnet at a slight angle, and rotating it while applying pressure makes assembly easier. Do not push the piston fully into the bonnet; the rod should be flush with the opening.

5.2.10 Place the spring over the guide-bolt, and place the plug assembly (retainer down) on the spring.

5.2.11 Place the spindle in the body. The large opening faces down, and fits over the plug fins. The spindle shoulder will not rest on the valve body due to the force of the spring.

5.2.12 To assemble the bonnet to the valve body, first insert the piston rod into the spindle guide hole. While keeping the bonnet, spindle, and body aligned, screw the bonnet onto the body. If all parts are correctly aligned, the body will screw on hand-tight until it is seated. **NOTE: If the bonnet does not screw on hand tight, do not force it; recheck alignment and repeat assembly.**

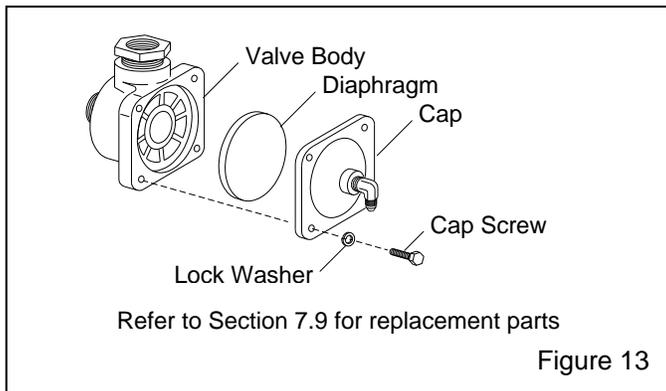
5.2.13 After the bonnet is fully seated on the body, tighten the assembly with a wrench.

5.2.14 Attach the control hose to the fitting on the bonnet.

5.3 Diaphragm Outlet Valve, Refer to Figure 13

Refer to Section 5.2 to service the piston outlet valve.

5.3.1 All service on the outlet valve must be done with the air OFF and the air supply locked-out and tagged-out. It is not necessary to remove the valve from the blast machine.



5.3.2 Remove the cap by unscrewing the four cap screws.

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

5.3.4 Inspect the seat in the body. If worn, replace the body.

5.3.5 Reassemble in reverse order.

5.4 Abrasive Trap, Refer to Figure 14

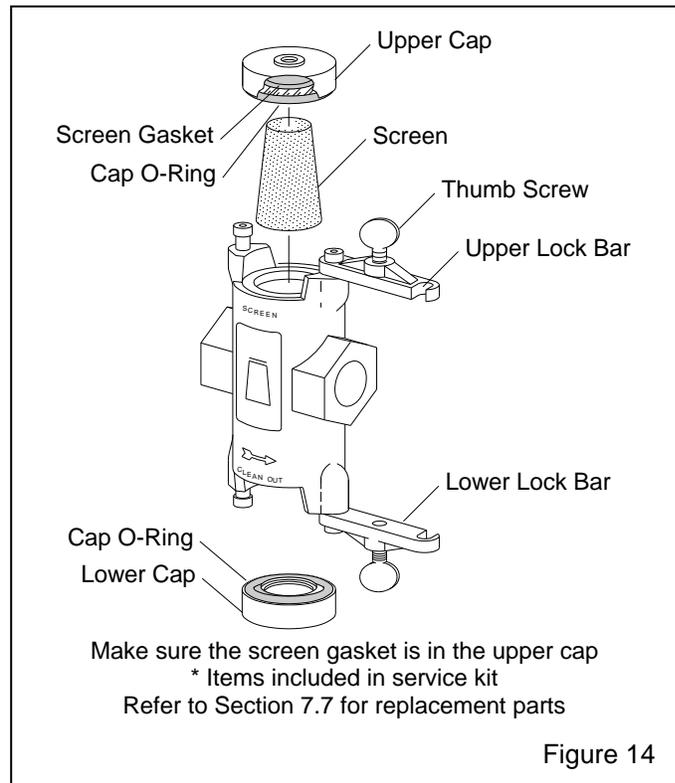
5.4.1 All service on the abrasive trap must be done with the air OFF and the air supply locked-out and tagged-out.

5.4.2 Clean abrasive trap screen and empty the trap twice daily. NOTE: Failure to clean the abrasive trap on a regular basis is a major cause of system malfunction.

5.4.3 To check the abrasive trap screen, loosen the thumb screw on the upper lock bar, swing the lock bar off the cap, and remove the cap.

5.4.4 Remove the screen and inspect it for wear and blockage. Replace it when it is clogged or worn. Keep spare screens on hand. Do not install the screen in the

trap until the bottom section of the trap is cleaned per the following instructions.



5.4.5 To clean the bottom section of the trap, loosen the thumb screw on the lower lock bar, swing the lock bar off the lower cap, and then remove the cap.

5.4.6 Empty all abrasive from the bottom and top sections.

5.4.7 Install the screen in the top section. The smallest diameter end of the screen must face up as shown in Figure 14.

5.4.8 Reassemble the upper and lower caps.

NOTE: The upper and lower caps are identical except the screen gasket is glued into the upper cap. Make sure the screen gasket is in place in the upper cap, and the o-rings are in place on both caps before assembly.

5.5 Control handle

5.5.1 A separate manual is provided for the control handle. Follow instructions in the manual.

5.6 Metering Valve (for ACS systems only)

5.6.1 A separate manual is provided for the metering valve. Follow instructions in the manual.

6.0 TROUBLESHOOTING

NOTE: This section applies to the remote control system only. Always refer to the appropriate section of this manual, or manuals for accessory equipment when troubleshooting and before servicing the equipment.

WARNING

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

- **Turn OFF the air, and lockout and tagout the air supply.**
- **When checking the 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 Blasting does not start when the control handle is depressed

6.1.1 Does the blast machine pressurize? If it does, refer to the troubleshooting section of the blast machine owner's manual.

6.1.2 Make sure the compressor is on and all air-supply valves to the machine are open.

6.1.3 Make sure the safety petcock on the inlet valve is closed.

6.1.4 With the control handle lever up, check for air escaping through the opening under the control handle lever. If no air is escaping, the orifice fitting on the inlet valve (refer to Figure 10) is blocked, or the outbound line from the orifice to the control handle is blocked and must be cleared.

6.1.5 Check the rubber button on the control handle for wear or damage, and make sure the rubber totally seals the opening when the handle is pressed. (RLX control handle is covered in Manual No. 10574)

6.1.6 Press the control handle lever. Feel for and listen for air leaks anyplace on the handle. No air should escape when the handle lever is pressed. If there is a leak, it must be located and repaired.

6.1.7 Press the control handle lever and check control hoses and fittings for air leaks.

6.1.8 Open the safety petcock and press the control handle lever; air should come out of the petcock. If air does not come out the petcock.

- Make sure the rubber bumper seals the opening on the control handle when the handle is pressed.
- Check for air leaks in control handle.
- Check the line from the control handle to the upper fitting on the inlet valve for blockage.
- If a diaphragm outlet valve is used, check the diaphragm for split or damage.

If air does come out the petcock, the inlet valve is not functioning. Turn OFF the compressed air supply and service the valve per Section 5.1.

6.1.9 Close the safety petcock, and press the control handle lever. Make sure 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 piston o-ring in the inlet valve. Refer Section 5.1.

6.1.10 Insufficient-size air-supply hose or reduced-size fittings between the compressor and blast machine. Inside diameter of air-supply hose should be three to four times the diameter of the nozzle.

6.1.11 Dirty element in optional air filter. Inspect filter element.

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

6.2 Outlet valve won't exhaust or exhausts too slowly

6.2.1 Clean or replace the abrasive trap screen. Clean screen at least twice daily. Refer to Section 5.4.

6.2.2 Inspect the orifice fitting on inlet valve (refer to Figure 10) make sure it has not been switched for a fitting with a full flow orifice. The orifice on the 1/8" NPT end of the fitting must be 1/16" diameter.

6.2.3 Make sure the inlet valve closes. If it does not seal-off incoming air, the valve requires service. Refer to Section 5.1.

6.2.4 Disassemble the piston outlet valve, clean and lubricate it. Replace all worn or broken parts.

6.2.5 Clean or replace the muffler element or muffler. The procedure to service the muffler is covered in Muffler Service Instruction No. 22322.

6.3 No abrasive when the ACS toggle is moved to ON position

6.3.1 Make sure the metering valve's abrasive flow control is in the open position.

6.3.2 Check for leak or blockage in the single-line hose or fittings from the control handle's ACS switch to the metering valve.

6.3.3 Obstruction in abrasive valve or valve requires service. Refer to the metering valve manual.

6.3.4 Machine empty of abrasive. Check abrasive level.

6.4 Abrasive flow does not stop when ACS toggle is moved to the OFF position

6.4.1 Filter on ACS switch clogged. Replace filter.

6.4.2 Metering valve requires service. Refer to the metering valve manual.

7.0 REPLACEMENT PARTS

7.1 Accessories

Description	Stock No.
Safety cable, 1-1/2" to 3" OD hose	15013
Safety cable, 1-1/2" to 4" OD hose	27405
Lock pin, coupling (package of 25)	11203

7.2 TLR-100/300 Remote Control Systems

Standard Remote Control Systems (without ACS)

Description	Stock No.
TLR-100, 1" w/ piston outlet valve	01935
TLR-300, 1-1/4" w/ piston outlet valve	01936
TLR-100D, 1" w/ diaphragm outlet valve	03449
TLR-300D, 1-1/4" w/ diaphragm outlet valve	03448

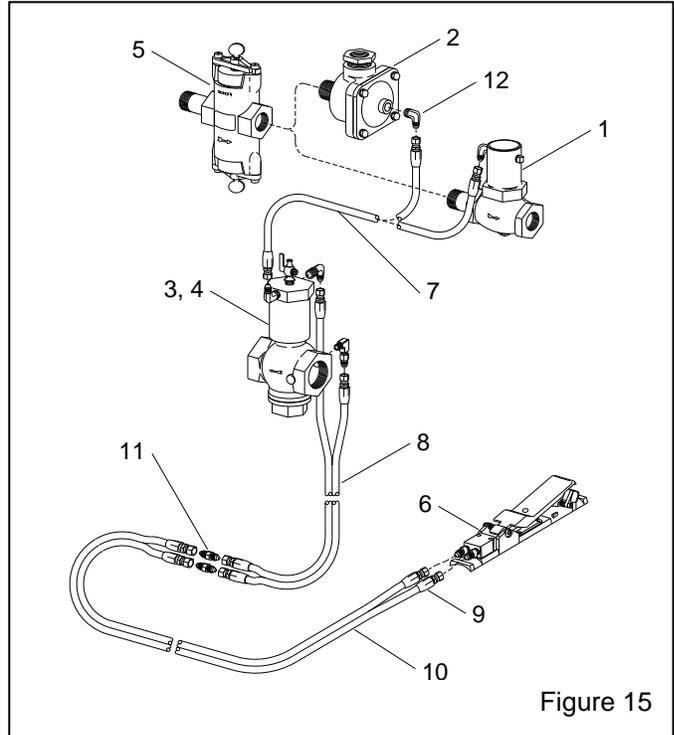
Remote Control Systems with ACS

Description	Stock No.
TLR-100C, 1" w/ piston outlet valve	21152
TLR-300C, 1-1/4" w/ piston outlet valve	21153
TLR-100DC, 1" w/ diaphragm outlet valve	21154
TLR-300DC, 1-1/4" w/ diaphragm outlet valve	21155

7.3 System Replacement Parts, Figure 15

Item	Description	Stock No.
1.	Outlet valve, 1" piston	01967
2.	Outlet valve, 1" diaphragm	03371
3.	Inlet valve 1"	01980
4.	Inlet valve 1-1/2"	01995
5.	Abrasive trap	02011
6.	RLX control handle	10565

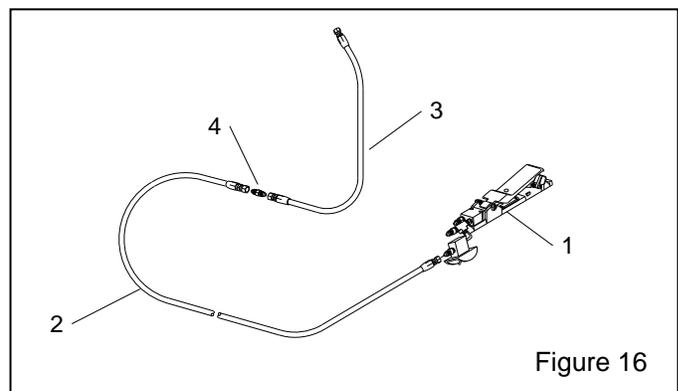
7.	Hose, 3/16" x 18" coupled	02454
8.	Hose, 5' twinline coupled	01952
9.	Hose end, reusable	01943
10.	Hose, 50' twinline coupled	01951
11.	Union, twinline hose	01944
12.	Elbow, 1/4" NPT adaptor	02513



7.4 ACS System Replacement Parts, Figure 16

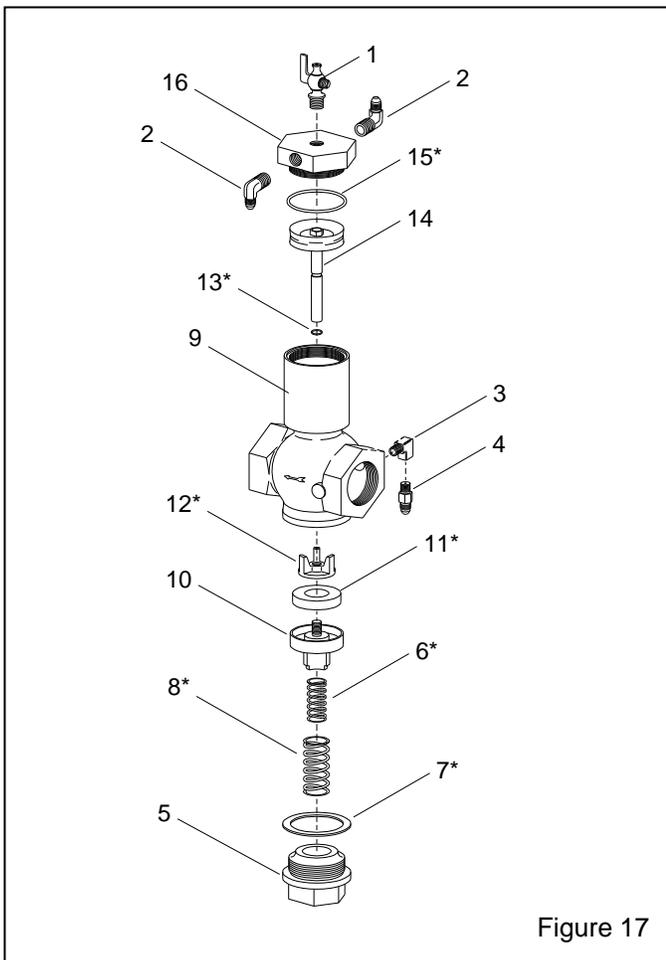
All other parts are the same as shown in Section 7.3 and Figure 15. Refer to the RLX manual for replacement parts for the ACS Control. Refer to the metering valve manual for metering valve replacement parts.

Item	Description	Stock No.
1.	RLX control handle w/ ACS switch	07625
2.	Hose, 50' single-line coupled	03087
3.	Hose, 3/16" x 18" coupled	02454
4.	Union, twinline hose	01944



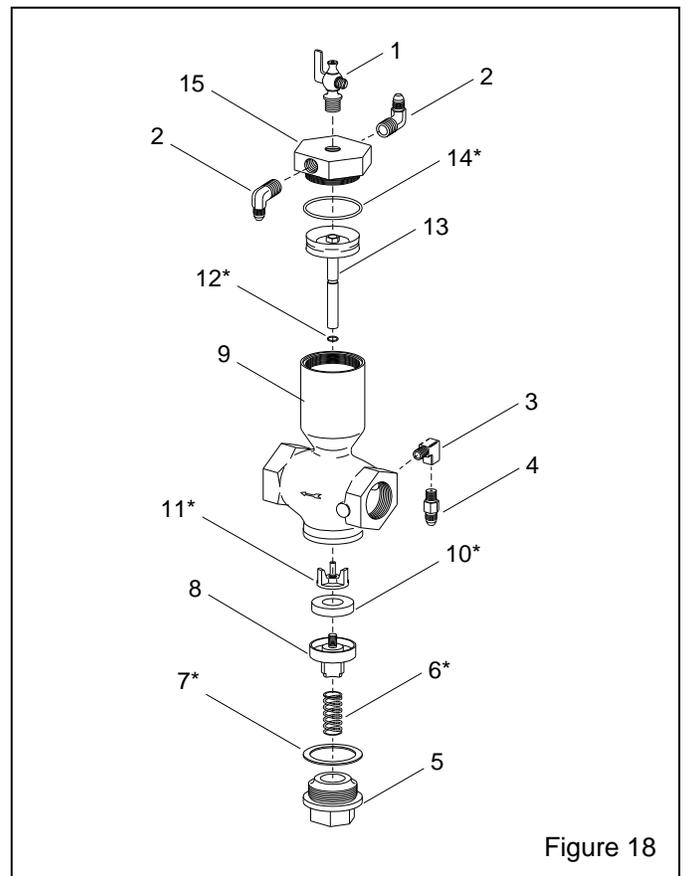
7.5 1-1/2" Inlet Valve, Figure 17

Item	Description	Stock No.
(-)	1-1/2" Inlet valve, complete	01995
1.	Petcock 1/4" NPT	01993
2.	Elbow, 1/4" NPT adaptor	02513
3.	Elbow, 1/8" brass street	03993
4.	Adaptor 1/8" NPT with 1/16" orifice	01945
5.	Bottom cap	02001
6.*	Spring, inner, 5/8" x 1-11/16" long (1)	01982
7.*	Gasket, bottom cap (1)	02006
8.*	Spring, outer (1)	02000
9.	Valve body	01996
10.	Valve plug	01999
11.*	Washer, valve plug (2)	01998
12.*	Retainer, valve plug washer (1)	02002
13.*	O-Ring, 7/16" OD (1)	02008
14.	Piston and rod assembly	02003
15.*	O-Ring 2-1/4" OD (1)	02007
16.	Cylinder cap	01997
(-)	Service kit, includes items marked *, quantity is shown in ()	01927



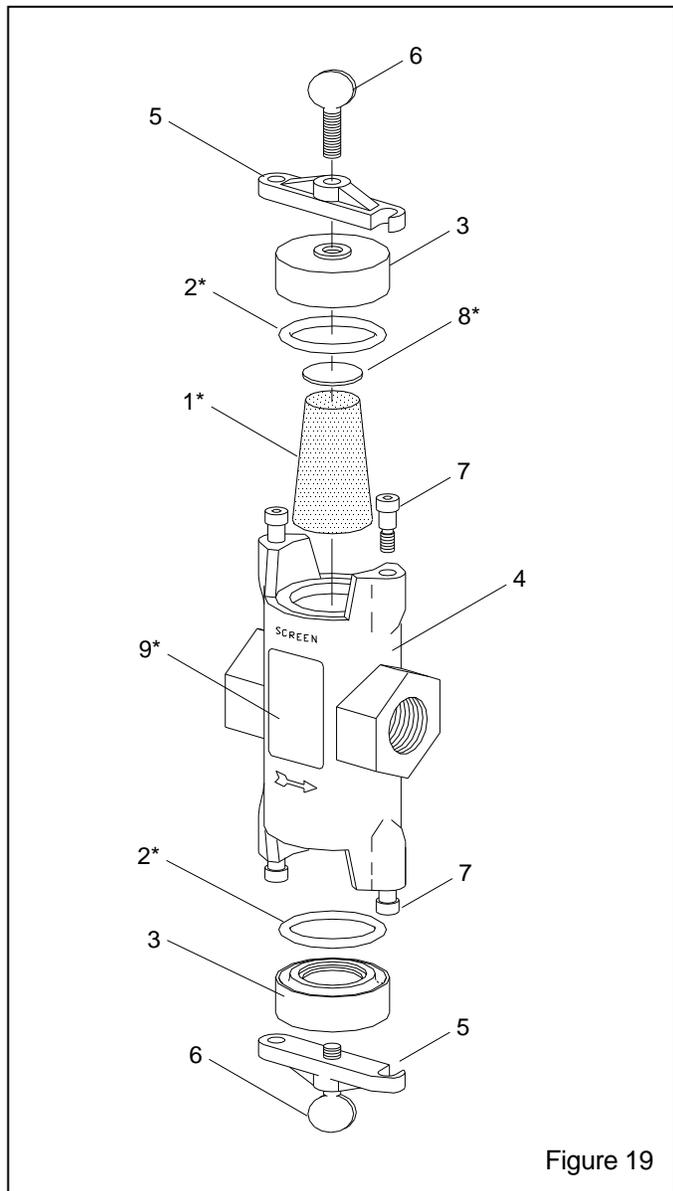
7.6 1" Inlet Valve, Figure 18

Item	Description	Stock No.
(-)	1" Inlet valve, complete	01980
1.	Petcock 1/4" NPT	01993
2.	Elbow, 1/8" NPT adaptor	02827
3.	Elbow, 1/8" brass street	03993
4.	Adaptor 1/8" NPT with 1/16" orifice	01945
5.	Bottom cap	01985
6.*	Spring, 5/8" x 1-11/16" long (1)	01982
7.*	Seal, bottom cap (1)	01989
8.	Valve plug	01984
9.	Valve body	01981
10.*	Washer, valve plug (2)	01969
11.*	Retainer, valve plug washer (1)	01986
12.*	O-ring 3/16" ID x 1/16" (1)	01992
13.	Piston and rod assembly	01987
14.*	O-ring 1-3/4" OD (1)	01990
15.	Cylinder cap	01983
(-)	Service kit, includes items marked *, quantity is shown in ()	01929



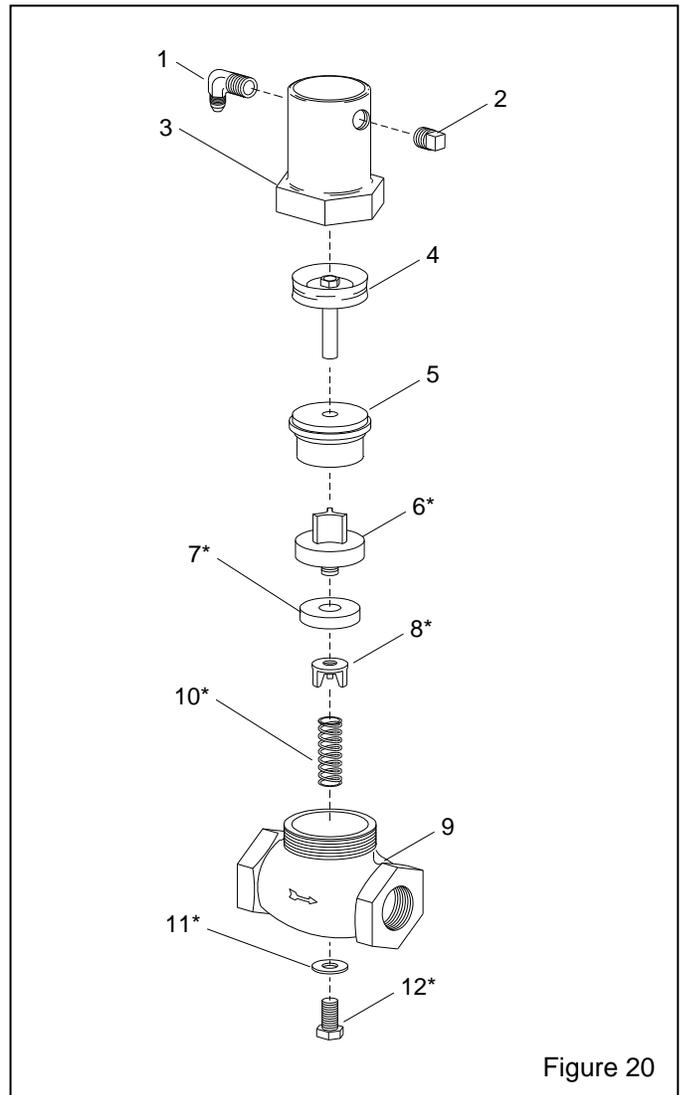
7.7 Abrasive Trap, Figure 19

Item	Description	Stock No.
(-)	Abrasive trap, complete	02011
1.*	Screen (3)	02012
2.*	O-ring (2)	02013
3.	Cap	02014
4.	Body	02015
5.	Lock bar	02016
6.	Screw, 3/8" NC x 1" thumb	03289
7.	Screw, 3/8" x 3/8" shoulder	03291
8.*	Gasket, screen, 1/8" thick (1)	02434
9.*	Label, clean screen (1)	02129
(-)	Service kit, includes items marked *, quantity is shown in ()	01925



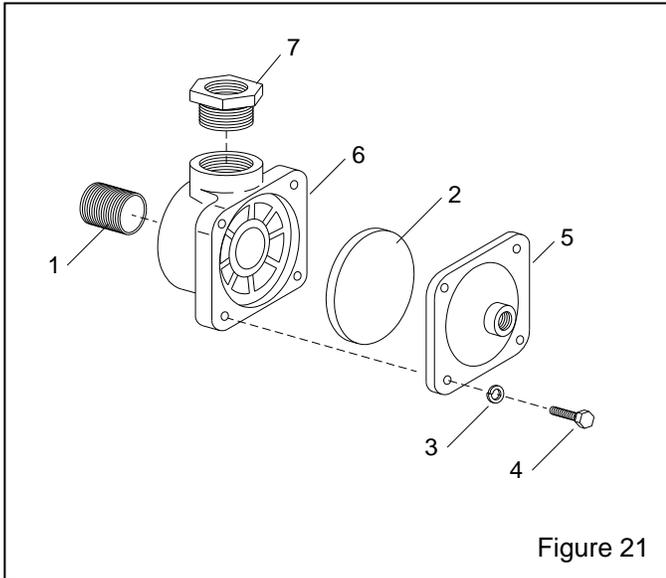
7.8 1" Piston Outlet Valve, Figure 20

Item	Description	Stock No.
(-)	1" Piston outlet valve, complete	01967
1.	Elbow, 1/4" NPT adaptor	02513
2.	Plug, 1/4" NPT	01950
3.	Bonnet	01970
4.	Piston and rod assembly	01976
5.	Plug and spindle guide	01971
6.*	Valve plug (1)	01972
7.*	Washer, valve plug (2)	01969
8.*	Retainer, valve plug washer (1)	01986
9.	Valve body	01968
10.*	Spring, 7/16" x 1-5/8" long (1).....	01974
11.*	Washer, nylon (1)	01979
12.*	Cap screw, 3/8-NC x 3/4" (1)	03251
(-)	Service kit, includes items marked *, quantity is shown in ()	01928



7.9 1" Diaphragm Outlet Valve, Figure 21

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



7.10 RLX Pneumatic Control Handle

Refer to RLX Control Handle Manual No. 10574 for RLX replacement parts.