

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

MC FILE NUMBER: 2068-1298
DATE OF ISSUE: 12/98
REVISION: B, 10/09

 **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.

© 2009 CLEMCO INDUSTRIES CORP.
ONE CABLE CAR DR.
WASHINGTON, MO 63090
Phone (636) 239-4300
Fax (800) 726-7559
Email: info@clemcoindustries.com
www.clemcoindustries.com



⚠ WARNING

- Read and follow ALL instructions before using this equipment.
- Failure to comply with ALL instructions can result in serious injury or death.
- In the event that the user, or any assistants of the user of this equipment cannot read or cannot completely understand the warnings and information contained in these instructions, the employer of the user and his assistants must thoroughly educate and train them on the proper operation and safety procedures of this equipment.

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

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

No representation is intended or made as to the suitability of the products described herein for any particular purpose or application. No representations are intended or made as to the efficiency, production rate, or the useful life of the products described herein. Any estimate regarding production rates or production finishes are the responsibility of the user and must be derived solely from the user's experience and expertise, and must not be based on information in this material.

The products described in this material may be combined by the user in a variety of ways for purposes determined solely by the user. No representations are intended or made as to the suitability or engineering balance of the combination of products determined by the user in his selection, nor as to the compliance with regulations or standard practice of such combinations of components or products.

Abrasive Blast Equipment is only a component of the range of equipment used in an abrasive blasting job. Other products may include an air compressor, abrasive, scaffolding, hydraulic work platforms or booms, paint spray equipment, dehumidification equipment, air filters and receivers, lights, ventilation equipment, parts handling equipment, specialized respirators, or equipment that while offered by Clemco may have been supplied by others. Each manufacturer and supplier of the other products used in the abrasive blasting job must be contacted for information, training, instruction and warnings with regard to the proper and safe use of their equipment in the particular application for which the equipment is being used. The information provided by Clemco is intended to provide instruction only on Clemco products. All operators must be trained in the proper, safe, use of this equipment. It is the responsibility of the users to familiarize themselves with, and comply with, all appropriate laws, regulations, and safe practices that apply to the use of these products. Consult with your employer about training programs and materials that are available.

Our company is proud to provide a variety of products to the abrasive blasting industry, and we have confidence that the professionals in our industry will utilize their knowledge and expertise in the safe efficient use of these products.

GENERAL INSTRUCTIONS

Described herein are some, BUT NOT ALL, of the major requirements for safe and productive use of blast machines, remote control systems, operator respirator assemblies, and related accessories. Completely read ALL instruction manuals prior to using equipment.

The user's work environment may include certain HAZARDS related to the abrasive blasting operation. Proper protection for the blaster, as well as anyone else that may be EXPOSED to the hazards generated by the blasting process, is the responsibility of the user and/or the employer. Operators MUST consult with their employer about what hazards may be present in the work environment including, but not limited to, exposure to dust that may contain TOXIC MATERIALS due to the presence of silica, cyanide, arsenic or other toxins in the abrasive, or materials present in the surface to be blasted such as lead or heavy metals in coatings. The environment may also include fumes that may be present from adjacent coatings application, contaminated water, engine exhaust, chemicals, and asbestos. The work area may include PHYSICAL HAZARDS such as an uneven work surface, poor visibility, excess noise, and electrical hazards. The operator MUST consult with his employer on the identification of potential hazards, and the appropriate measures that MUST be taken to protect the blaster and others that might be exposed to these hazards.

ALL machines, components and accessories MUST be installed, tested, operated and maintained only by trained, knowledgeable, experienced users.

DO NOT modify or substitute any Clemco parts with other types or brands of equipment. Unauthorized modification and parts substitution on supplied air respirators is a violation of OSHA regulations and voids the NIOSH approval.

OPERATIONAL INSTRUCTIONS

OPERATOR SAFETY EQUIPMENT

⚠ WARNING


- Blast operators and others working in the vicinity of abrasive blasting must always wear properly-maintained, NIOSH-approved, respiratory protection appropriate for the job site hazards.
- DO NOT USE abrasives containing more than one percent crystalline (free) silica. Ref. NIOSH Alert #92-102
- Inhalation of toxic dust (crystalline silica, asbestos, lead paint and other toxins) can lead to serious or fatal disease (silicosis, asbestosis, lead or other poisoning).

- ALWAYS wear NIOSH-approved supplied-air respirators as required by OSHA, in the presence of any dust including, but not limited to, handling or loading abrasive; blasting or working in the vicinity of blast jobs; and cleanup of expended abrasive. Prior to removing respirator, an air monitoring

instrument should be used to determine when surrounding atmosphere is clear of dust and safe to breathe.

- NIOSH-approved, supplied-air respirators are to be worn ONLY in atmospheres:
 - NOT IMMEDIATELY dangerous to life or health and,
 - from which a user can escape WITHOUT using the respirator.
- Clemco supplied-air respirators **DO NOT REMOVE OR PROTECT AGAINST CARBON MONOXIDE (CO) OR ANY OTHER TOXIC GAS.** Carbon monoxide and toxic gas removal and/or monitoring device must be used in conjunction with respirator to insure safe breathing air.
- Air supplied to respirator **MUST BE AT LEAST GRADE D QUALITY** as described in Compressed Gas Association Commodity Specification G-7.1, and as specified by OSHA Regulation 1910.139 (d).
- ALWAYS locate compressors to prevent contaminated air (such as CO from engine exhaust) from entering the air intake system. A suitable in-line air purifying sorbent bed and filter or CO Monitor should be installed to assure breathing air quality.
- ALWAYS use a NIOSH-approved breathing air hose to connect an appropriate air filter to the respirator. Use of a non-approved air hose can subject the operator to illness caused by the release of chemical agents used in the manufacture of non-approved breathing air hose.
- ALWAYS check to make sure air filter and respirator system hoses are NOT CONNECTED to in-plant lines that contain nitrogen, acetylene or any other non-breathable gas. NEVER use oxygen with air line respirators. NEVER modify air line connections to accommodate air filter/respirator breathing hose WITHOUT FIRST testing content of the air line. **FAILURE TO TEST THE AIR LINE MAY RESULT IN DEATH TO THE RESPIRATOR USER.**
- Respirator lenses are designed to protect against rebounding abrasive. They do not protect against flying objects, glare, liquids, radiation or high speed heavy materials. Substitute lenses from sources other than the original respirator manufacturer will void NIOSH-approval of this respirator.

BLAST MACHINES AND REMOTE CONTROLS

 WARNING
<ul style="list-style-type: none"> • ALWAYS equip abrasive blast machines with remote controls. • Abrasive blast machine operators must wear NIOSH-approved supplied-air respirators (ref: OSHA regulations 1910.94, 1910.132, 1910.139 and 1910.244).

- NEVER modify OR substitute remote control parts. Parts from different manufacturers are NOT compatible with Clemco

equipment. If controls are altered, involuntary activation, which may cause serious injury, can occur.

- Inspect the air control orifice DAILY for cleanliness. NEVER use welding hose in place of twinline control hose. The internal diameter and rubber composition are UNSAFE for remote control use.
- UNLESS OTHERWISE SPECIFIED, maximum working pressure of blast machines and related components MUST NOT exceed National Board approved 125 psig (8.5 BAR).
- NEVER weld on blast machine. Welding may affect dimensional integrity of steel wall and WILL VOID National Board approval.
- Point nozzle ONLY at structure being blasted. High velocity abrasive particles WILL inflict serious injury. Keep unprotected workers OUT of blast area.
- NEVER attempt to manually move blast machine when it contains abrasive. EMPTY machines, up to 6 cu. ft.(270kg) capacity, are designed to be moved:
 - on flat, smooth surfaces by AT LEAST two people;
 - with the Clemco "Mule"; or
 - with other specially designed machine moving devices.
- Larger empty blast machines or ANY blast machine containing abrasive MUST be transported by mechanical lifting equipment.

AIR HOSE, BLAST HOSE, COUPLINGS, AND NOZZLE HOLDERS

- Air hose, air hose fittings and connectors at compressors and blast machines MUST be FOUR times the size of the nozzle orifice. Air hose lengths MUST be kept as short as possible AND in a straight line. Inspect DAILY and repair leakage IMMEDIATELY.
- Blast hose inside diameter MUST be THREE to FOUR times the size of the nozzle orifice. AVOID sharp bends that wear out hose rapidly. Use SHORTEST hose lengths possible to reduce pressure loss. Check blast hose DAILY for soft spots. Repair or replace IMMEDIATELY.
- ALWAYS cut loose hose ends square when installing hose couplings and nozzle holders to allow uniform fit of hose to coupling shoulder. NEVER install couplings or nozzle holders that DO NOT provide a TIGHT fit on hose. ALWAYS use manufacturers recommended coupling screws.
- Replace coupling gaskets FREQUENTLY to prevent leakage. Abrasive leakage can result in dangerous coupling failure. ALL gaskets MUST be checked SEVERAL times during a working day for wear, distortion and softness.
- Install safety pins at EVERY coupling connection to prevent accidental disengagement during hose movement.
- ALWAYS attach safety cables at ALL air hose AND blast hose coupling connections. Cables relieve tension on hose and control whipping action in the event of a coupling blow-out.

MAINTENANCE

- ALWAYS shut off compressor and depressurize blast machine BEFORE doing ANY maintenance.
- Always check and clean ALL filters, screens and alarm systems when doing any maintenance.
- ALWAYS cage springs BEFORE disassembling valves IF spring-loaded abrasive control valves are used.
- ALWAYS completely follow owner's manual instructions and maintain equipment at RECOMMENDED intervals.

ADDITIONAL ASSISTANCE

- Training and Educational Programs. Clemco Industries Corp. offers a booklet, Blast-Off 2, developed to educate personnel on abrasive blast equipment function and surface preparation techniques. Readers will learn safe and productive use of machines, components and various accessories, including selection of abrasive materials for specific surface profiles and degrees of cleanliness.
- The Society for Protective Coatings (SSPC) offers a video training series on protective coatings including one entitled "Surface Preparation." For loan or purchase information, contact SSPC at the address shown below.

TECHNICAL DATA AND RESEARCH COMMITTEES

- The following associations offer information, materials and videos relating to abrasive blasting and safe operating practices.

The Society for Protective Coatings (SSPC)
 40 24th Street, Pittsburgh PA 15222-4643
 Phone: (412) 281-2331 • FAX (412) 281-9992
 Email: research@sspc.org • Website: www.sspc.org

National Association of Corrosion Engineers (NACE)
 1440 South Creek Drive, Houston TX 77084
 Phone: (281) 228-6200 • FAX (281) 228-6300
 Email: msd@mail.nace.org • Website: www.nace.org

American Society for Testing and Materials (ASTM)
 100 Barr Harbor Dr., West Conshohocken, PA 19428
 Phone (610) 832-9500 • FAX (610) 832-9555
 Email: service@astm.org • Website: www.astm.org

NOTICE

This equipment is not intended to be used in an area that might be considered a hazardous location as described in the National Electric Code NFPA 70 1996, article 500.

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 the 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 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 a 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 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 the 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.

DAILY SET-UP CHECK LIST

 WARNING
<ul style="list-style-type: none"> • ALL piping, fittings and hoses MUST be checked DAILY for tightness and leakage. • ALL equipment and components MUST be thoroughly checked for wear. • ALL worn or suspicious parts MUST be replaced. • ALL blast operators MUST be properly trained to operate equipment. • ALL blast operators MUST be properly outfitted with abrasive resistant clothing, safety shoes, leather gloves and ear protection. • BEFORE blasting ALWAYS use the following check list.

1. PROPERLY MAINTAINED AIR COMPRESSOR sized to provide sufficient volume (cfm) for nozzle and other tools PLUS a 50% reserve to allow for nozzle wear. Use large compressor outlet and large air hose (4 times the nozzle orifice size). FOLLOW MANUFACTURERS MAINTENANCE INSTRUCTIONS.

2. BREATHING AIR COMPRESSOR (oil-less air pump) capable of providing Grade D Quality air located in a dust free, contaminant free area. If oil-lubricated air compressor is used to supply respirator, it should have high temperature monitor and CO monitor or both. If CO monitor is not used, air **MUST** be tested FREQUENTLY to ensure proper air quality.

3. Clean, properly maintained NIOSH-APPROVED SUPPLIED-AIR RESPIRATOR. ALL components should ALWAYS be present. NEVER operate without inner lens in place. Thoroughly inspect ALL components DAILY for cleanliness and wear. ANY substitution of parts voids NIOSH approval i.e. cape, lenses, breathing hose, breathing air supply hose, air control valve, cool air or climate control devices.

4. OSHA required BREATHING AIR FILTER for removal of moisture and particulate matter from breathing air supply. THIS DEVICE DOES NOT REMOVE OR DETECT CARBON MONOXIDE (CO). ALWAYS USE CO MONITOR ALARM.

5. ASME CODED BLAST MACHINE sized to hold 1/2 hour abrasive supply. ALWAYS ground machine to eliminate static electricity hazard. Examine pop up valve for alignment. Blast machine MUST be fitted with a screen to keep out foreign objects and a cover to prevent entry of moisture overnight.

6. AIR LINE FILTER installed AS CLOSE AS POSSIBLE to machine inlet. Sized to match inlet piping or larger air supply line. Clean filter DAILY. Drain OFTEN.

7. REMOTE CONTROLS MUST be in PERFECT operating condition. ONLY use APPROVED spare parts, including twin-line hose. DAILY: test system operation and check button bumper and spring action of lever and lever lock. DO NOT USE WELDING HOSE.

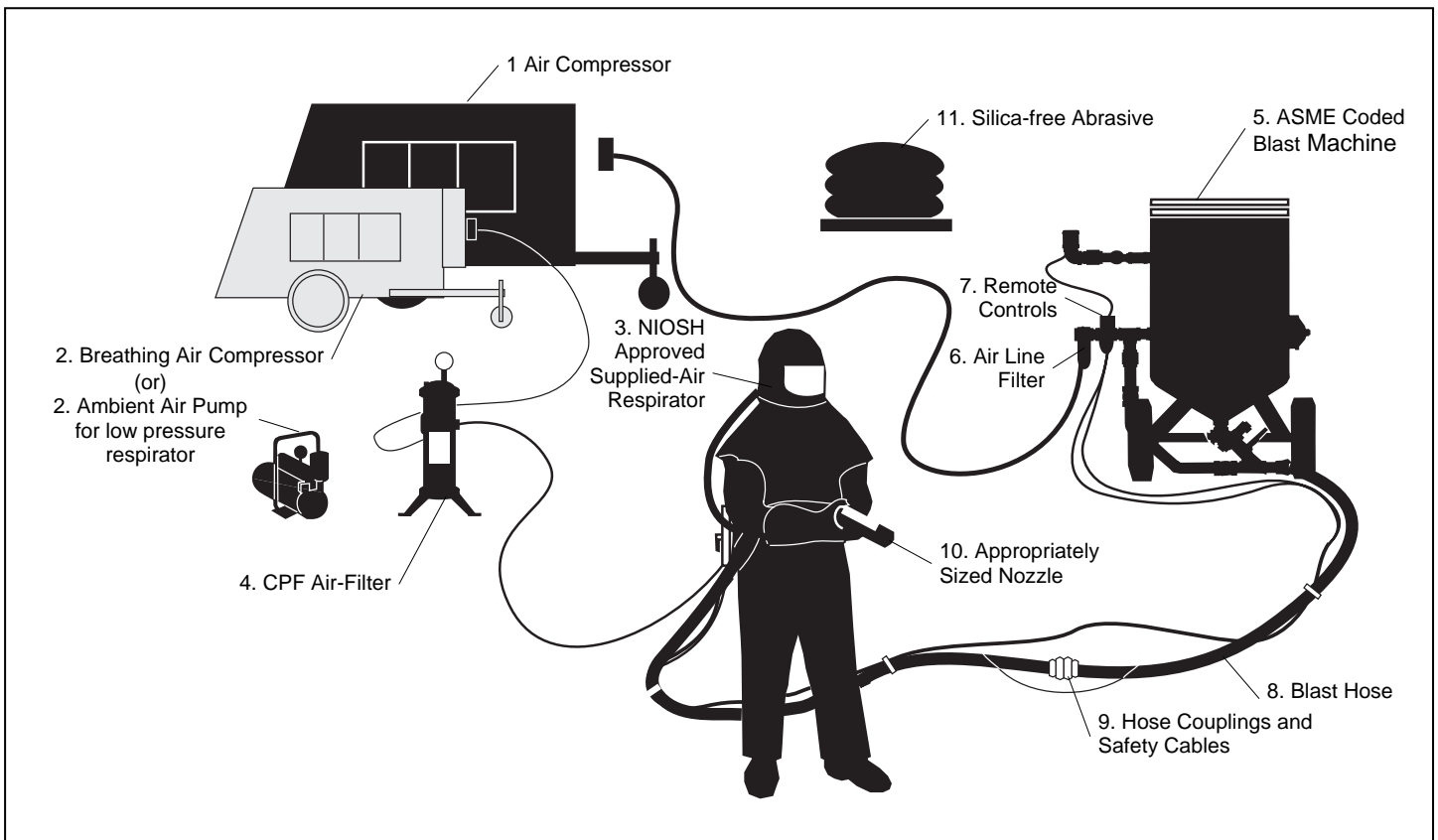
8. BLAST HOSE with ID 3 to 4 times the nozzle orifice. Lines MUST be run AS STRAIGHT AS POSSIBLE from machine to work area with NO sharp bends. Check DAILY for internal wear and external damage.

9. HOSE COUPLINGS, NOZZLE HOLDERS fitted SNUGLY to hose end and installed using PROPER coupling screws. Coupling lugs MUST be snapped FIRMLY into locking position. Gasket MUST form positive seal with safety pins inserted through pin holes. Check gaskets and replace if ANY sign of wear, softness or distortion. ALWAYS install safety cables at every connection to prevent disengagement. Check nozzle holder for worn threads. NEVER MIX DIFFERENT BRANDS OF COMPONENTS. Check each of these components DAILY.

10. Inspect NOZZLE and GASKET DAILY for wear. Replace nozzle when 1/16" larger than original size or if liner appears cracked. Check nozzle threads for wear.

11. Use abrasive that is properly sized and free of harmful substances; such as, free silica, cyanide, arsenic or lead. Check material data sheet for presence of toxic or harmful substances.

12. Test surface to be blasted for toxic substances. Take appropriate, and NIOSH required, protective measures for operator and bystanders which pertain to substances found on the surface to be blasted.



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/Piston 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 (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-100-C, 1" w/Piston outlet	07632
TLR-300-C, 1 ¹ / ₄ " (1 ¹ / ₂ " inlet) w/Piston outlet	07633
TLR-100D-C, 1" w/Diaphragm outlet.....	07634
TLR-300D-C, 1 ¹ / ₄ " (1 ¹ / ₂ " inlet) w/Diaphragm out. .	07635

1.1.2 All blast operator(s) and machine (pot) tenders must be trained in the safe operation of the remote control system and all blasting accessories. The operators and all personnel involved with the abrasive blasting process must know about the hazards associated with abrasive blasting. Before using the machine, all personnel involved with the blast machine operation must read this entire manual, including the orange cover, and all accessory manuals. Some accessory manuals 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

1.2 Safety Alerts

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



This is the safety alert symbol. It is used to alert the user of this equipment of potential personal injury hazards.

Obey all safety messages that follow this symbol to avoid possible injury or death.

CAUTION

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

CAUTION

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

WARNING

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

DANGER

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

1.3 General Description

1.3.1 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 remote control handle, the machine deactivates, stopping air and abrasive flow through the nozzle. The remote control system "fails to safe", which means any interruption in the control-air circuit for reasons such as a break in the line, the compressor stops running, or the operator drops the blast hose, the remote controls deactivate the blast machine.

WARNING

Never modify or substitute remote control parts. Parts from different 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.

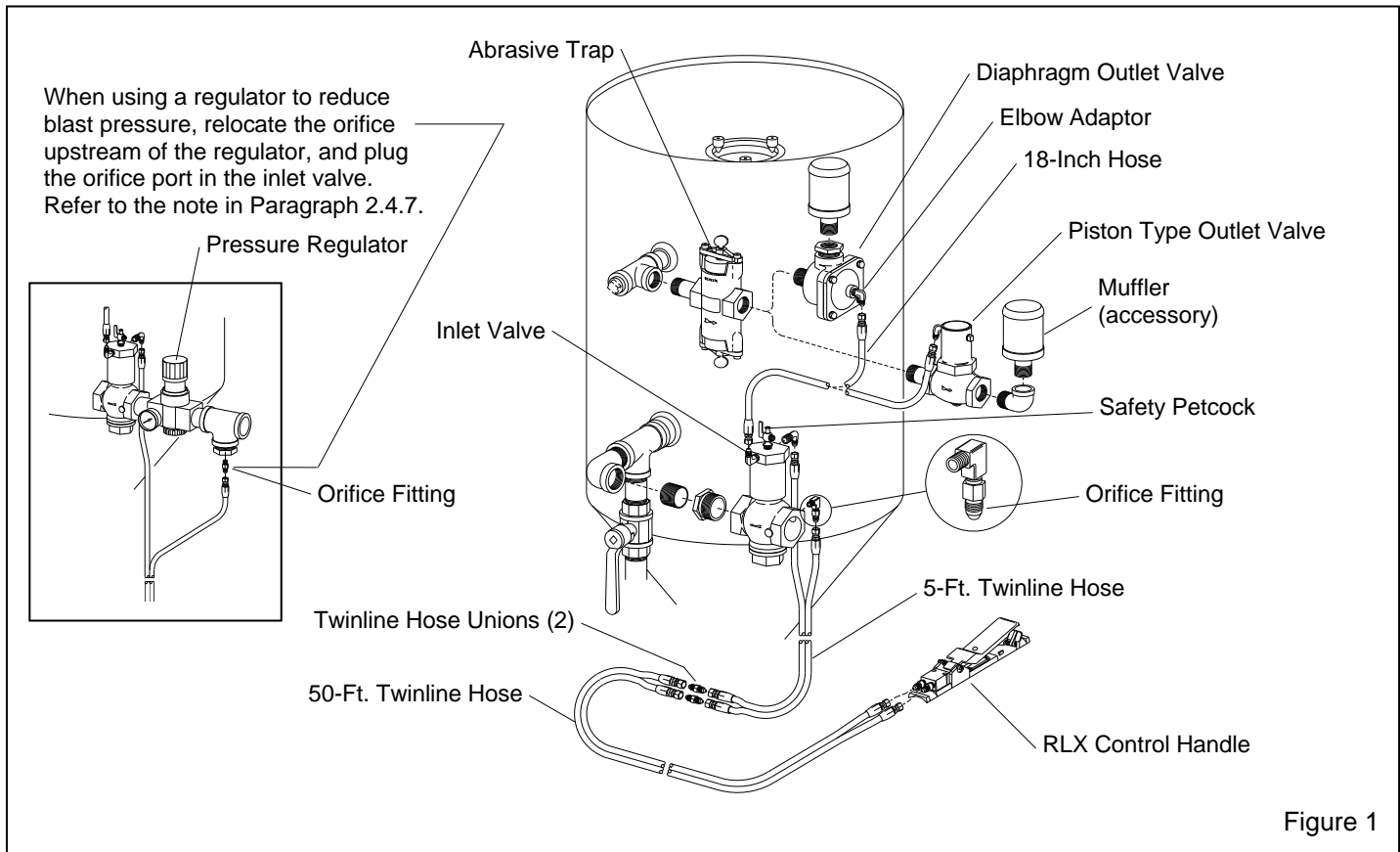


Figure 1

1.3.2 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), RLX Control Handle, 55-ft. and 5-ft. long twinline control hoses, 2 control hose unions, and an 18-in. long interconnecting hose.

1.3.3 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.

1.3.4 TLR-100 and TLR-300 Remote Controls are pressure-release style systems which control the pressurization and depressurization of the blast machine. Pressurization occurs when the control handle is pressed and depressurization occurs when the handle is released.

1.4 Operating Principles

1.4.1 Clemco TLR Remote Controls operate pneumatically on return air (See Figure 1). If the control handle lever (the main activator of the system) is in the up (no blast) position, one stream of air travels down the outbound side of the twinline and escapes through an opening located under the lever. The normally-closed inlet valve remains closed, and the normally-open outlet valve remains open. When the control handle lever is pressed, the opening is sealed, and air in the outbound line returns through the inbound line to open the inlet valve and close the outlet valve. This action pressurizes the blast machine and begins the blasting process. Releasing the handle exhausts the control air, which closes the inlet valve, and opens the outlet valve to depressurize the blast machine and stop the blasting.

1.4.2 Abrasive Cut-Off (ACS)

The abrasive cut-off switch is mounted on the control handle. The ACS closes the metering valve independently of the blasting, so air without abrasive exits the nozzle. The operator uses this feature for blow-down.

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 of pneumatic systems over longer distances increases actuation time, which prevents fast, safe operation.

2.0 INSTALLATION

2.1 Factory installation: If the remote control has been factory installed, skip to Paragraph 2.4. If the remote system is equipped with the optional ACS feature skip to Section 2.3.

2.2 Field Installation: Refer to Figure 1.

⚠ WARNING

Failure to observe the following procedure could cause serious injury or death from the sudden release of 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.

2.2.1 Remove the existing inlet valve and replace it with the TLR Inlet Valve. The directional arrow on the valve points toward the blast machine, indicating the direction of air flow.

2.2.2 Remove the existing outlet valve.

2.2.3 Install the abrasive trap on the blast machine as shown in Figure 1. The air flow directional arrow points away from the machine, and with the screen end up and clean-out down.

2.2.4 Install the piston or diaphragm outlet valve as follows:

2.2.4.1 Piston outlet valves must have the directional arrow pointing away from the abrasive trap. Attach an elbow and optional muffler. The muffler must face up as shown in Figure 1.

-OR-

2.2.4.2 Diaphragm outlet valves should be installed as shown, with the optional muffler facing up.

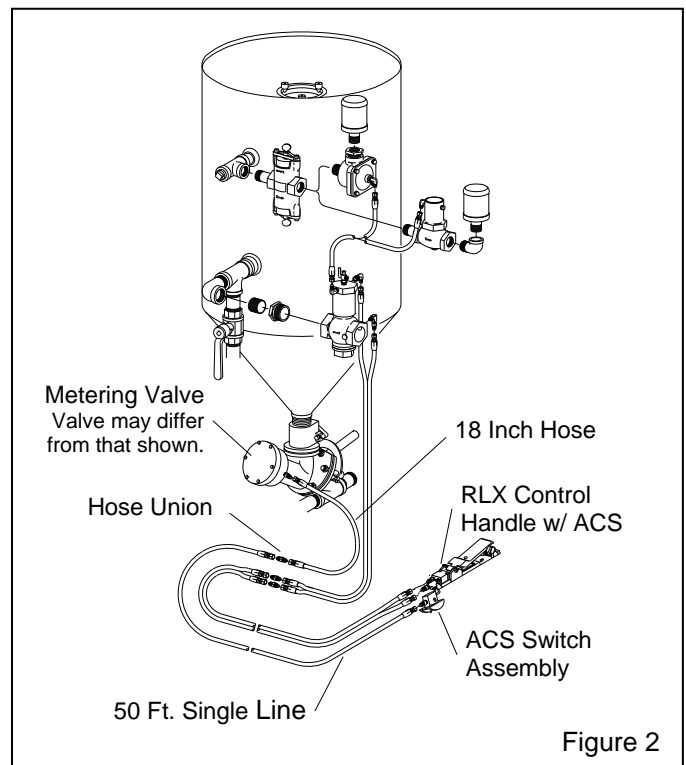
⚠ WARNING

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 1.

If a muffler is not used, 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 is depressurized.

2.2.5 Connect a 3/16" x 18" air hose between the outlet valve and one of the elbow fittings near the top of the inlet valve as shown.

2.3 Optional ACS set up Ref. Figure 2. If the remote control does not have the ACS feature skip to Section 2.4.



2.4 Blast hose and control hose connections

WARNING

Where two or more blast machines are used, 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, part no. 15890 for use with two blast machines, or part 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.

2.4.1 Uncoil the blast hose and lay the 50-ft. twinline hose alongside it.

2.4.2 Band the control handle to the blast hose close to the nozzle holder, using the two nylon ties provided. Once the control is firmly attached, clip the tie ends so they will not snag the operator's clothing or interfere with the operation of the control handle.

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

2.4.4 Working from the control handle back, band or tape the twinline hose to the blast hose every four to six feet, and as close to the couplings as possible.

2.4.5 Make sure the coupling gaskets are in place and not worn before connecting the blast hose to the quick

coupling on the blast machine. To prevent accidental separation while under pressure, use safety lock-pins or safety wire to lock the couplings together.

WARNING

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

2.4.6 Screw the two hose unions into the unattached fittings of the 50-ft. twinline hose.

2.4.7 Attach the 5-ft. twinline control hose to the inlet valve as shown in Figure 1. 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. This allows the pneumatic control circuit to operate at line pressure.

2.4.8 Connect the other end of the 5-ft. twinline to the hose unions on the 50-ft. twinline. Either side can connect to either union.

2.4.9 Band the control hoses on the blast machine side of the unions to the quick coupling nipple.

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

3.0 OPERATION

WARNING

Refer to the manuals listed in paragraph 1.1. Do not operate this equipment before reading the instruction manuals for all equipment.

3.1 Start-Up

3.1.1 Make sure that all hose connections are secured with safety lock-pins and safety cables to prevent accidental separation or disconnection.

3.1.2 Connect the blast machine to an air supply. The compressor should be located upwind from the blasting

operation to prevent dust from entering the compressor intake.

3.1.3 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 3.

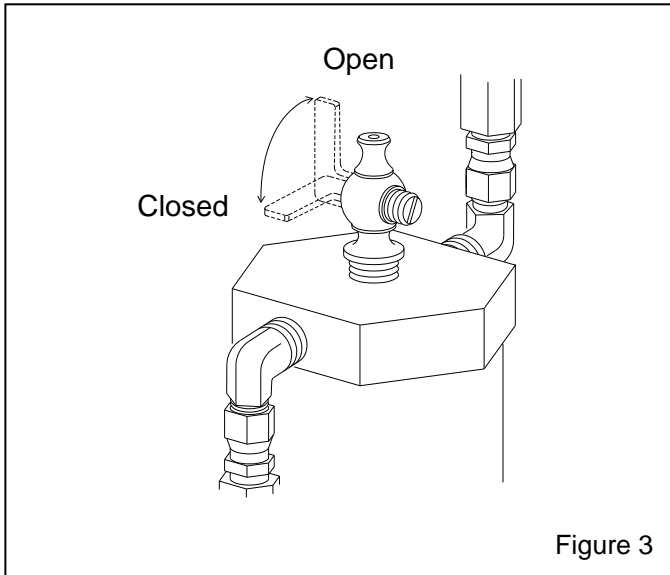


Figure 3

⚠ 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 can not activate the machine when the petcock is open.

3.1.4 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 remote control handle. Do not operate the machine before first reading the remote control handle operating instructions.

3.1.5 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

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 or death can result from unintentional blasting.

3.1.6 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 pressure rating.

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

3.1.8 Open the compressor air supply valve, to pressurize the air supply line. Listen for noise that indicates any open lines or leaks.

3.1.9 Do not allow anyone within 10 feet of the blast machine except machine tenders who are appropriately fitted with proper protective equipment. The blast operator could pressurize and depressurize the machine without warning.

⚠ WARNING

All persons except for the machine tender must stay clear of the blast machine. The blast operator could pressurize or depressurize the machine at any time. The noise generated by the sudden release of compressed air when the machine is pressurized or depressurized, may startle bystanders, and could vent abrasive under pressure. Either condition could result in injury. The machine tender must wear a suitable respirator, plus satisfactory eye, face, and hearing protection.

3.1.10 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 close 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 noise from air escaping at the control handle is an audible signal, warning that air is supplied to the blast machine, and will activate if the control handle is pressed.

3.2 Blasting

WARNING

Failure to wear approved respirators could result in serious lung disease or death. Abrasive blasting produces harmful dust. Do not blast without the use of a properly fitted and maintained NIOSH-approved, type CE Supplied-Air Respirator that is approved for abrasive blasting. Everyone in the blasting area must wear an approved respirator. Dust produced in the blasting area, and the loud noise of air released at the blast machine and nozzle requires that approved eye protection and hearing protection be worn by anyone in the blasting area.

3.2.1 Operators must wear appropriate protective gear, including: abrasive-resistant clothing, leather gloves, eye and hearing protection, and a NIOSH-approved Type CE Supplied-Air Respirator.

3.3 Start Blasting

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

3.3.2 Pull back the safety lever lock and depress the remote control handle. Within a few seconds the pop-up valve will automatically pop up and the blast machine will pressurize to start blasting.

CAUTION

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

WARNING

OSHA requires the use of remote controls on all blast machines. 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 can result from uncontrolled blasting. Ref. 29 CFR 1910.244 (b)

3.4 Operation of abrasive cut-off switch

3.4.1 By moving the ACS toggle to the "OFF" (forward toward the nozzle) position, air supply to the metering valve is cut off, closing the valve and stopping the abrasive flow. This allows the operator to have air alone coming from the nozzle, to blow abrasive off the blasted surface. The switch can be opened or closed any time but will not activate the metering valve unless the control handle lever is pressed.

Note: The purpose of the ACS is to blow off abrasive from a blasted surface. Small amounts of abrasive may come out the nozzle with the air. Any residual abrasive will require blow off with clean air, or other cleaning, prior to painting.

WARNING

People and the environment can tolerate only limited amounts of toxins. Airborne dust could increase exposure levels beyond permissible limits. OSHA prohibits blowing abrasive or dust with compressed air as a clean-up method for lead based paint dust or other hazardous dust, unless used in conjunction with a ventilation system designed to capture the airborne dust created by the compressed air, 29 CFR 1926 (h). The ACS is not to be used as a clean-up method that will cause dust to become airborne.

3.4.2 Blast Mode

3.4.2.1 Abrasive flow is "on" when the toggle is pointing away from the nozzle (toward the "CYL" port). The metering valve is open and the blast machine operates normally, with air and abrasive coming out the nozzle.

3.4.3 Blow-Down

3.4.3.1 Abrasive flow is "off" when the toggle is pointing toward the nozzle (toward the "EXH" port). With the abrasive flow off, only air comes out the nozzle for blow-down.

3.5 Stop Blasting

3.5.1 To stop blasting, release the control handle. 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 (open) position.

3.5.3 Make sure that the control handle safety lever lock is up, and that it prevents the handle lever from engaging.

3.5.4 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.

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

4.0 PREVENTIVE MAINTENANCE

NOTE: These preventive maintenance instructions pertain to the remote controls only. Read the owners manuals for the blast machine and all blast accessories, for inspection and maintenance schedules of that equipment.

4.1 Daily

4.1.1 With the air off, before blasting, inspect 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. See 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

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 or death could result from unintentional blasting.

4.1.2 While 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 help avoid unscheduled down-time.

4.3.1 The remote control system is a safety device. To be safe and to avoid unscheduled down-time, the internal parts of the inlet valve, outlet valve, and abrasive trap should be inspected periodically. Inspect them for wear and lubrication of O-rings, pistons, springs, seals, and castings. See 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. See the RLX Owners 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 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, Ref. Figure 6 (1-1/2" valve) or Figure 7 (1" valve).

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

5.1.2 Bottom Section

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

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

5.1.2.3 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 rusted or compressed, replace it.
- The large spring (not used in 1" valve is approximately 2-1/16" long. If it is rusted 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.

5.1.2.4 If the top section of the valve requires service, go to Section 5.1.3, otherwise use the illustration in Figure 6 or 7, and reassemble the valve in reverse order.

5.1.3 Top Section

5.1.3.1 Remove the control hose and fittings from the cylinder cap to ensure they are not damaged by a wrench.

5.1.3.2 Use a large wrench to remove the cylinder cap.

5.1.3.3 If the bottom cap has not been removed, remove it, and all other parts per Section 5.1.2.

5.1.3.4 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 stem up. Doing so will push the piston out the top of the valve body.

5.1.3.5 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 stem should be free of deep abrasion and move freely in the stem bore. If it is badly abraded, drags in the bore, or loose in the bore, replace the piston assembly.
- If the piston stem O-ring is flattened, replace the O-ring.
- Check the cylinder cap O-ring. Replace it if it is cut or if it does not fit snugly on the cap recess.

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

5.1.3.7 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 it could damage the cup. Rotating the piston while applying thumb pressure eases assembly.

5.1.3.8 Use the illustration in Figure 6 or 7 and reassemble the valve in reverse order.

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

WARNING

The orifice fitting must not be removed, modified, or substituted with 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.

5.2 Piston Outlet Valve, Ref. Figure 9

See 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.

5.2.2 Remove the control hose from the valve bonnet.

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 As the bonnet is removed, lift it straight up until the piston stem clears the spindle.

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 stem.

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, rusted, or compressed, replace it.
- The piston cup should fit snug against the bonnet's cylinder wall. If it does not, replace the piston assembly.
- The piston stem should be free of deep abrasion and move freely in the spindle bore. If it is badly abraded, drags in the bore, or 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 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 stem should be even 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 stem 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.

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, Ref. Figure 10

See 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.

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

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 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 top thumb screw and 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 bottom thumb screw and swing the lock bar off the bottom 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 small end of the screen must face up.

5.4.8 Reassemble the top and bottom caps. Make sure the screen gasket is in place in the top 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. See the appropriate manual for troubleshooting the blast machine, control handle, and accessories.

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

6.1.2 Make sure the safety petcock is closed.

6.1.3 Check for air leaks in control hose, fittings, and control handle. (RLX Control Handle is covered in Owners Manual No. 10574)

6.1.4 Check for air escaping from the opening under the control handle. If no air is escaping, the orifice on the inlet valve (Figure 6, item 4, or Figure 7, item 4) or the line from the orifice to the control handle is blocked and must be cleared.

6.1.5 Open the safety petcock and depress the control handle. Air should come from the petcock. If it doesn't, check the following:

- The opening on the control handle is not being sealed off.
- The control handle leaks.
- The line from the control handle to the upper fitting on the inlet valve is blocked.
- If a diaphragm outlet valve is used, check the diaphragm for a rupture.

If air does rush out, then the inlet valve is not functioning. Turn off the air supply and service it per Section 5.1, disassemble the valve, clean and lubricate it, and replace all worn or damaged parts.

6.1.6 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 in the inlet valve. See Section 5.1.

6.1.7 With the compressor off and the blast machine depressurized, check the nozzle for blockage.

6.2 Outlet valve won't exhaust or exhausts too slowly.

6.2.1 Clean or replace abrasive trap screen. Clean screen twice daily.

6.2.2 Check to make sure that the lower fitting on inlet valve (Figure 6, item 4 or Figure 7, item 4) 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.

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 flow when the ACS toggle is moved to "ON" position.

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

6.3.2 Check for leak or blockage in the single line hose or fittings from the control handle to the metering valve.

6.3.3 Obstruction in abrasive valve or valve requires service. See metering valve manual.

6.3.4 Machine empty.

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

6.4.1 Brass filter on ACS switch clogged.

6.4.2 Metering valve requires service.

- 10. Hose, 50' Twinline coupled 01951
- 11. Union, Twinline hose 01944
- 12. Elbow, 1/4" NPT adaptor 02513

7.0 REPLACEMENT PARTS

7.1 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-100-C, 1" w/ piston outlet valve	21152
TLR-300-C, 1-1/4" w/ piston outlet valve	21153
TLR-100D-C, 1" w/ diaphragm outlet valve	21154
TLR-300D-C, 1-1/4" w/ diaphragm outlet valve	21155

7.2 System Replacement Parts, Figure 4

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

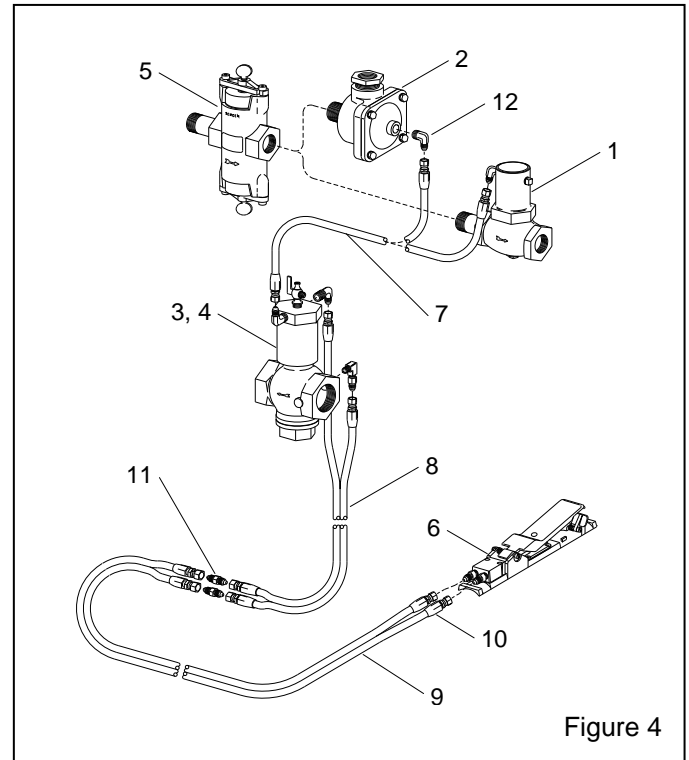


Figure 4

7.3 ACS Systems Replacement parts, Figure 5

All other parts are the same as shown in Section. 7.2 and Figure 4. 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

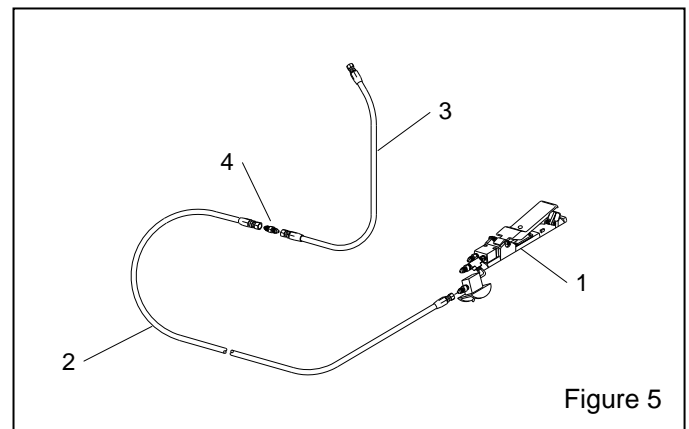


Figure 5

7.4 1-1/2" Inlet Valve, Figure 6

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

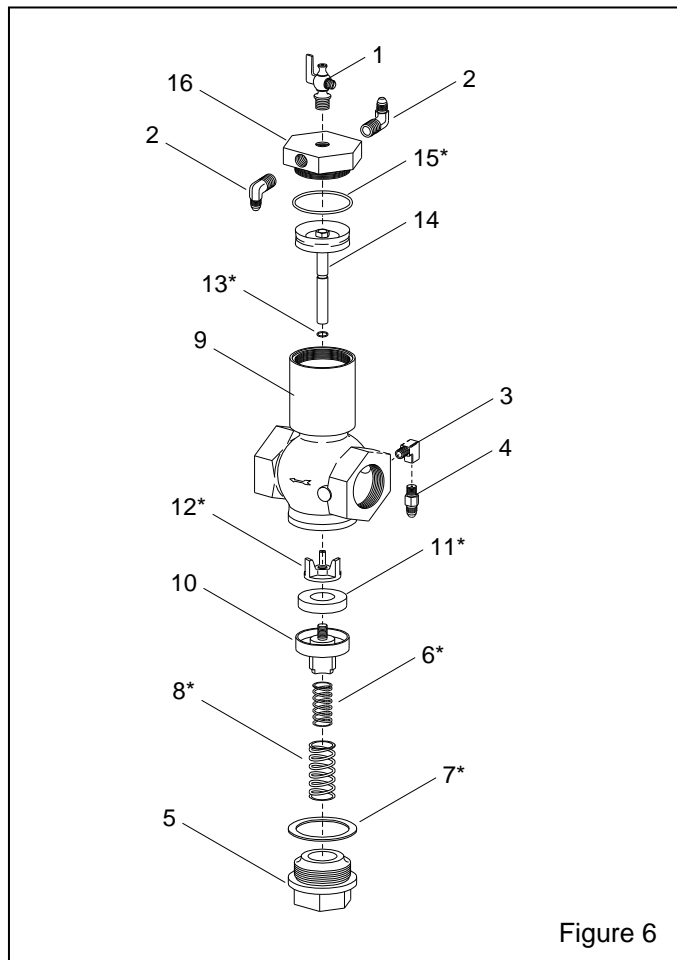


Figure 6

7.5 1" Inlet Valve, Figure 7

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

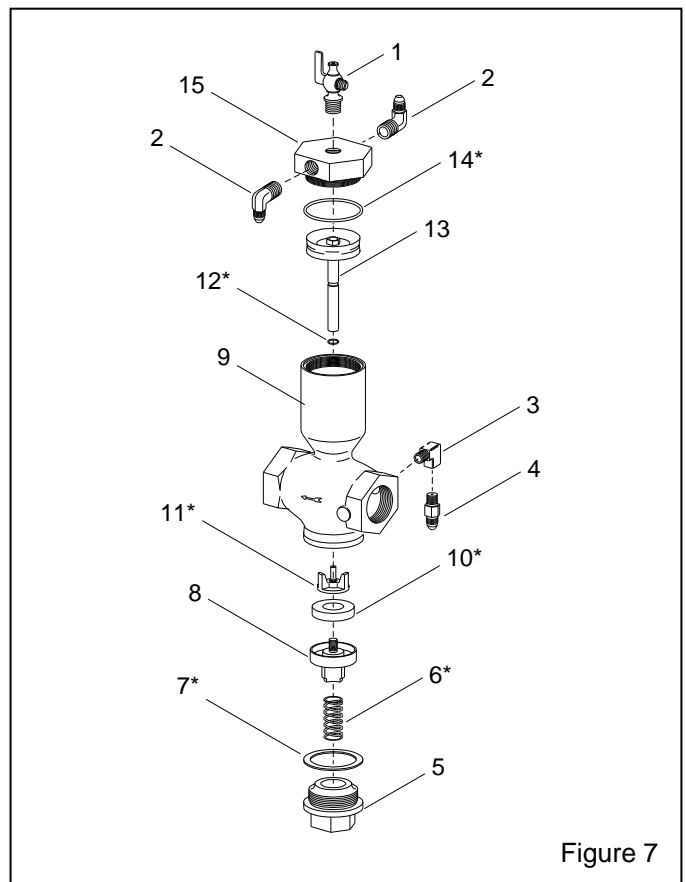
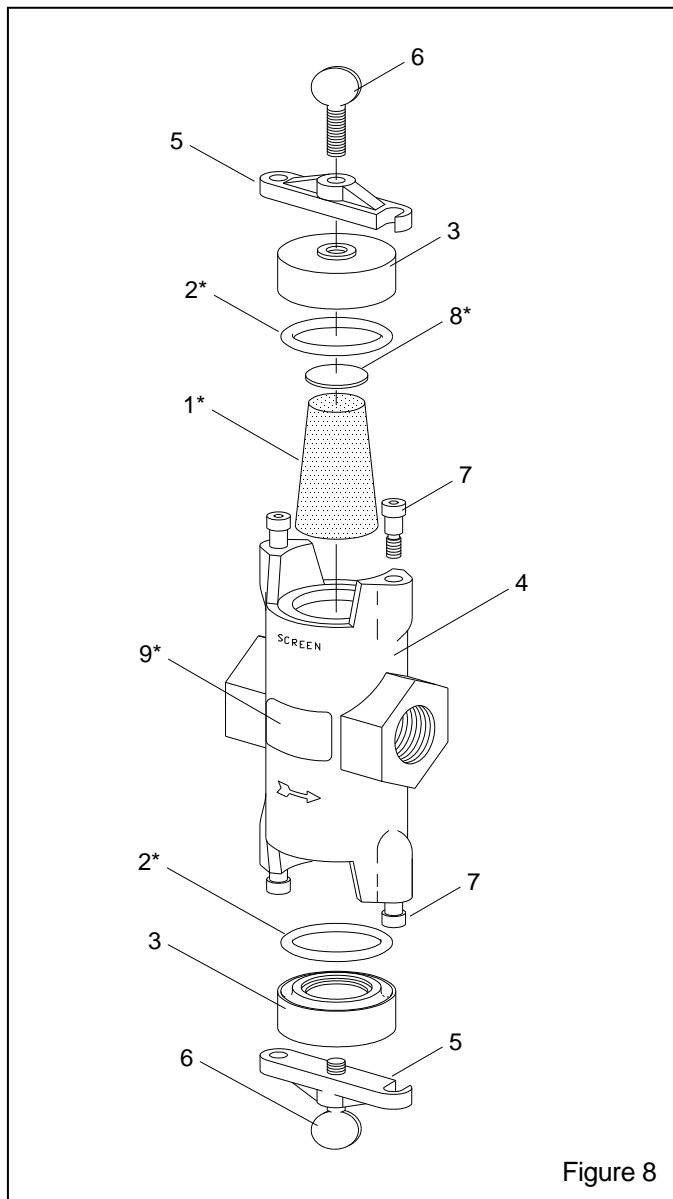


Figure 7

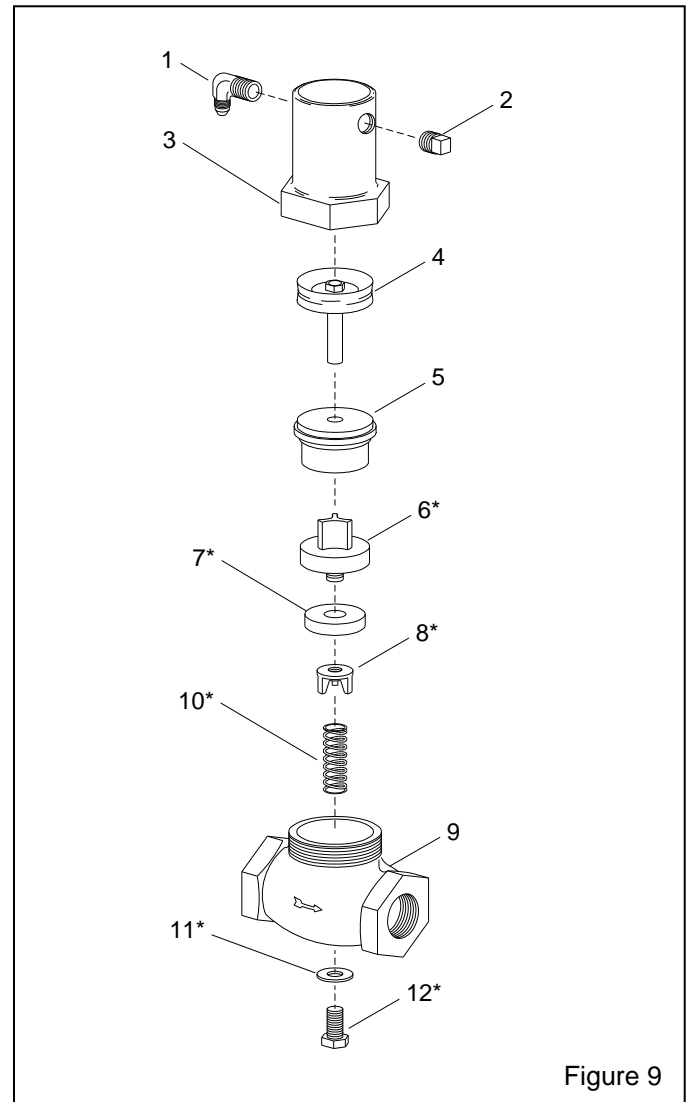
7.6 Abrasive Trap, Figure 8

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.	Shoulder screw, 3/8" x 3/8"	03291
8.*	Gasket, screen, 1/8" thick (1)	02434
9.*	Decal, clean screen (1)	02129
(-)	Service kit, includes items marked *, quantity is shown in ()	01925



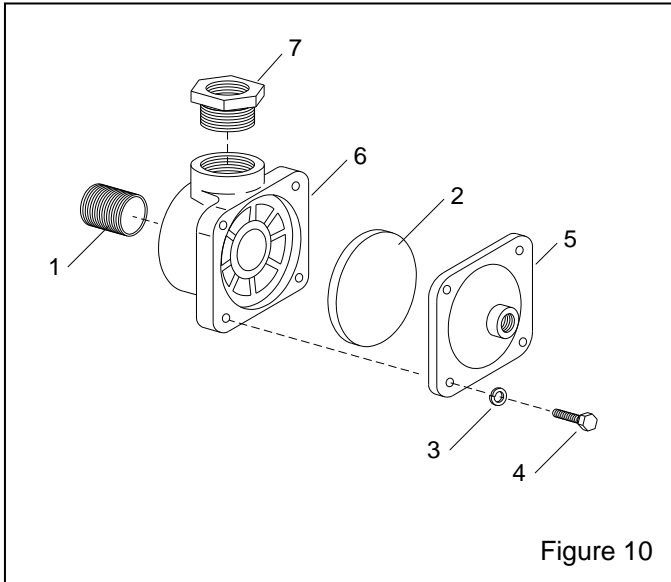
7.7 1" Piston Outlet Valve Figure 9

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.*	Nylon washer (1)	01979
12.*	Cap screw, 3/8-NC x 3/4" (1)	03251
(-)	Service kit, includes items marked *, quantity is shown in ()	01928



7.8 1" Diaphragm Outlet Valve Figure 10

Item	Description	Stock No.
(-)	1" Diaphragm Outlet Valve, complete03371
1.	Nipple, 1" x close01701
2.	Diaphragm06149
3.	Lockwasher, 1/4"03117
4.	Cap screw, 1/4-NC x 1" hh03053
5.	Cap, diaphragm outlet03393
6.	Body, diaphragm outlet06135
7.	Bushing, 1-1/4" x 1"01804

**7.9 RLX Pneumatic Control Handle**

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