

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

**MANUAL NUMBER: 2068-1298  
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REVISION:**

** WARNING**

**Do not proceed with these instructions until you have READ the orange cover of this MANUAL and YOU UNDERSTAND its content.\* 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 Parts and Maintenance Guide refer to the orange warnings insert preceding the Index before continuing with the following instructions.**

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## 1.0 INTRODUCTION

### 1.1 Scope

**1.1.1** This manual covers installation, operation, maintenance, troubleshooting, and replacement parts for the following Clemco Recova Remote Control Systems.

TLR-100, 1" w/Piston outlet .....	01935
TLR-300, 1 <sup>1</sup> / <sub>4</sub> " (1 <sup>1</sup> / <sub>2</sub> " inlet) w/Piston outlet .....	01936
TLR-100D, 1" w/Diaphragm outlet .....	03449
TLR-300D, 1 <sup>1</sup> / <sub>4</sub> " (1 <sup>1</sup> / <sub>2</sub> " inlet) w/Diaphragm outlet...	03448

Note: The following remote control systems include an Abrasive Cut-off (ACS).

TLR-100-C, 1" w/Piston outlet
TLR-300-C, 1 <sup>1</sup> / <sub>4</sub> " (1 <sup>1</sup> / <sub>2</sub> " inlet) w/Piston outlet
TLR-100D-C, 1" w/Diaphragm outlet
TLR-300D-C, 1 <sup>1</sup> / <sub>4</sub> " (1 <sup>1</sup> / <sub>2</sub> " inlet) w/Diaphragm outlet

All blast operator(s) and machine (pot) tenders must be trained in the safe operation of the remote control system and all other equipment used. They must know about the hazards associated with abrasive blasting. To ensure safe blasting, before using the machine, read the manuals for the specific blast machine and all accessories to be used.

Blast Machine, Manual No. ....	06160
RLX Control Handle, Manual No. ....	10574
Muffler Service, Instruction No. ....	22322

### 1.2 Hazard Alerts

**1.2.1** Clemco uses signal words, based on ANSI Z535.2-1991, to alert the user of a potentially hazardous situations that may be encountered while operating this equipment. ANSI's definitions of the signal words are as follows:

## ! NOTICE

**"Notice"** is used to indicate a statement of company policy as the message relates directly or indirectly to the safety of personnel or protection of property.

## ! CAUTION

**"Caution"** is used to indicate a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

## ! WARNING

**"Warning"** is used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury.

## ! DANGER

**"Danger"** is used to indicate 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.**

**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 media), RLX Control Handle, 50-ft. long 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 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 Recova 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. Contact your local Clemco Distributor for more information.

## 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.

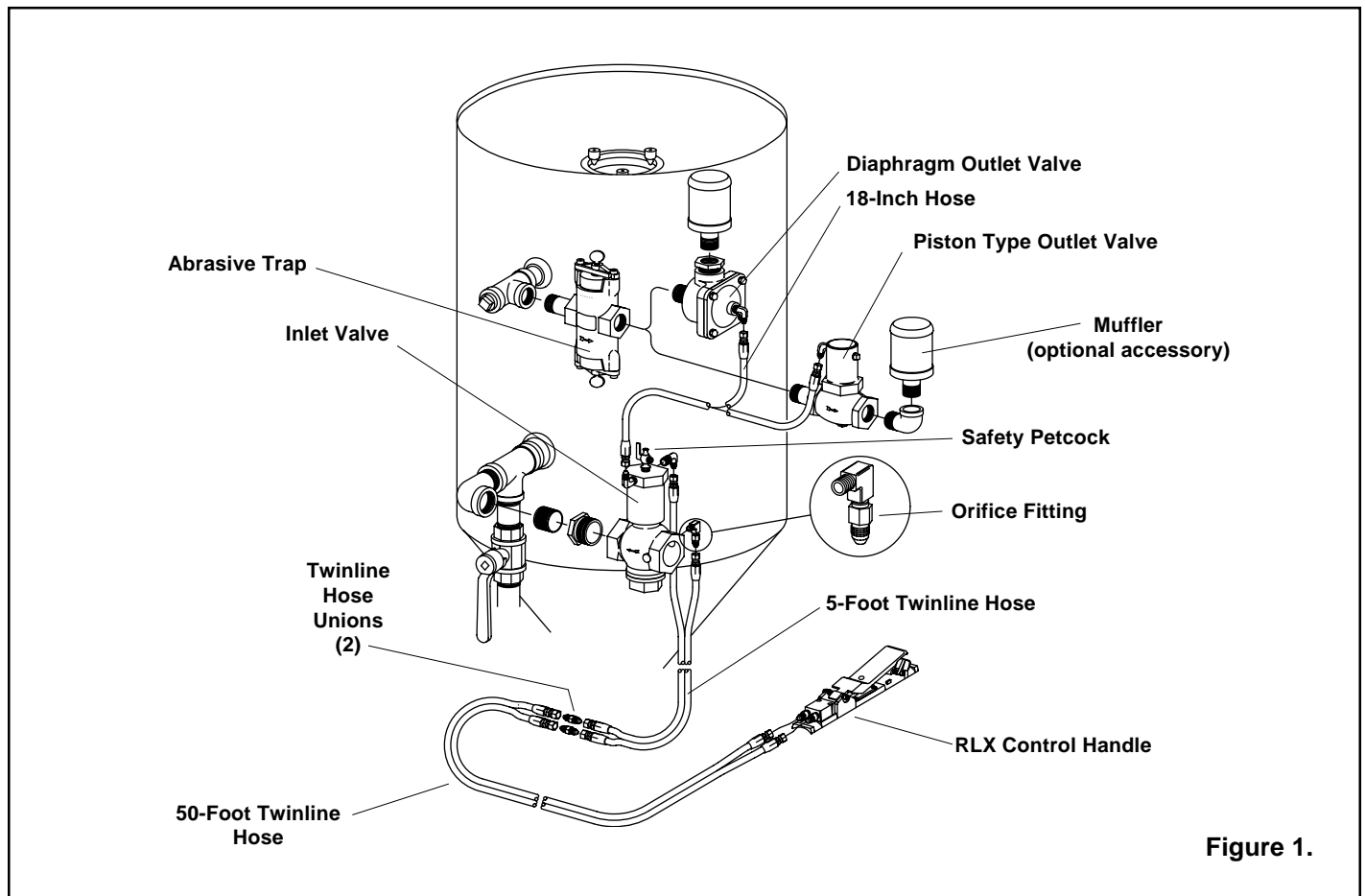


Figure 1.

## 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.
- Lock out and tag out 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 Recova 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, 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.

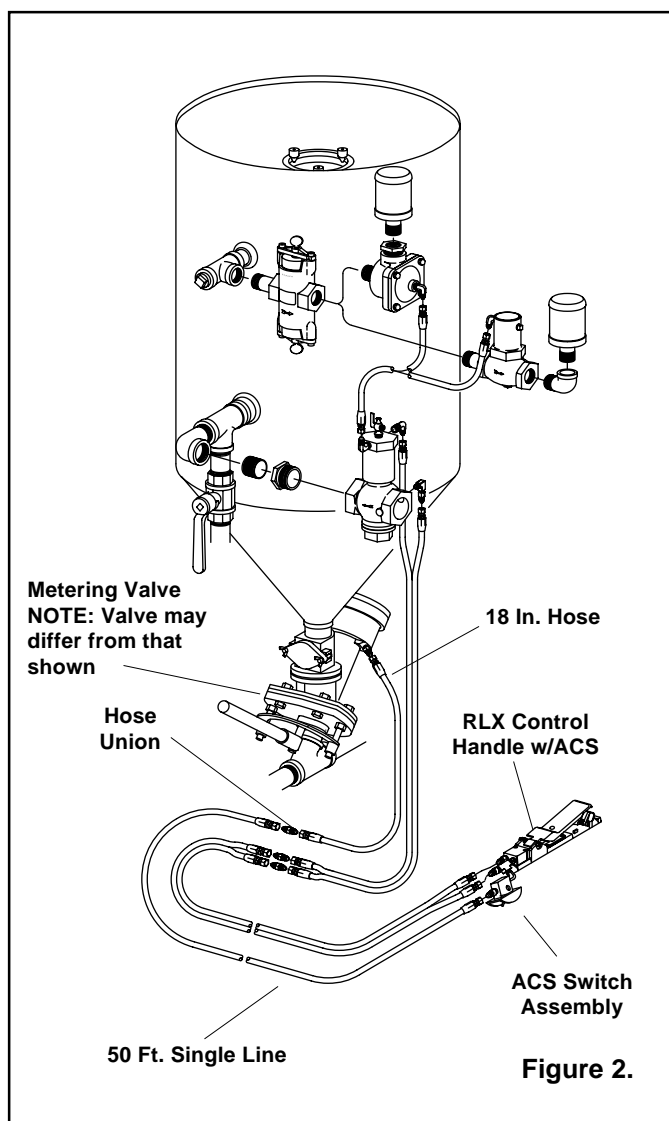
### ! WARNING

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.)



**2.3.1** Attach the 18-in. long hose to the fitting on the metering valve.

**2.3.2** Attach the 50-ft. long single line hose to the ACS air switch assembly located on the RLX control handle.

**2.3.3** Using one of the three unions, connect the 50-ft. hose to the 18-in. long hose.

**2.3.4** Proceed with the installation procedures beginning in 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. Use safety lock-pins or safety wire to lock the couplings together, to prevent accidental separation while under pressure.

### **!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.

**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

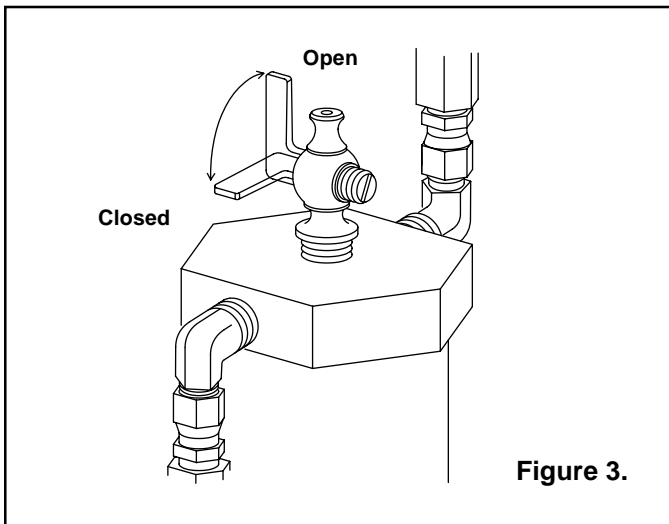
Refer to the manuals listed in paragraph 1.1. Do not operate this equipment before reading the instruction manuals for all equipment.

### 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 adequate 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 Recova Inlet Valve is open. The petcock is open when the petcock lever is in-line with the petcock, as shown in 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** Check to 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.

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## ! WARNING

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**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.**

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**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

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## ! WARNING

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**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.**

**Abrasive blasting could cause abrasive particles around the blast machine and blast nozzle to become airborne. The loud sounds of air released at the blast machine and nozzle could cause hearing damage. Anyone in the blasting area must wear approved eye protection and hearing protection.**

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**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.

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## ! CAUTION

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

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## ! WARNING

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**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)**

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### 3.4 Operation of Optional 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 vacuuming, prior to painting.**

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## !WARNING

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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.

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### 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.

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## !WARNING

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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.

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### 4.0 PREVENTIVE MAINTENANCE

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## ! NOTICE

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**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.**

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#### 4.1 Daily

**4.1.1** With the air off, before beginning 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 II 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.



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## ! WARNING

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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.

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**4.1.2** While blasting, inspect 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**

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## ! NOTICE

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**Periodic inspection of the following items will help avoid unscheduled down-time.**

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**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 II 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 light weight machine oil in the inlet valve through the safety petcock. This will lubricate the piston and O-rings in the inlet and outlet valves.

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**5.0** **SERVICE MAINTENANCE**

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## ! WARNING

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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.
  - Lock out and tag out the compressed air supply.
  - Bleed the air supply line to the blast machine.
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**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** As the cap is removed, 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 its 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 is 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 does not fit snugly on the cap recess.

**5.1.3.6** Lubricate the cylinder wall and piston cup, with light weight machine oil, such as 3 in 1 or equivalent.

**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 are 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 is loose in the bore, replace the piston assembly.

**5.2.8** Lubricate the cylinder wall and piston cup, with light weight machine oil, such as 3 in 1 or equivalent.

**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.

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## ! NOTICE

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**If the bonnet does not screw on hand tight, do not force it. Recheck alignment and repeat.**

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**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 machined 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 remove the cap

**5.4.6** Empty 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 service 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 service instructions in the manual.

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## 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.

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## ! WARNING

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

- Turn off the air, and lock out and tag out 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 No blast action 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** Check that the safety petcock is closed.

**6.1.3** Check for air leaks in control hose, fittings, and control handle. (RLX II 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** Check that 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** Check the metering valve. It must be 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 is 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.

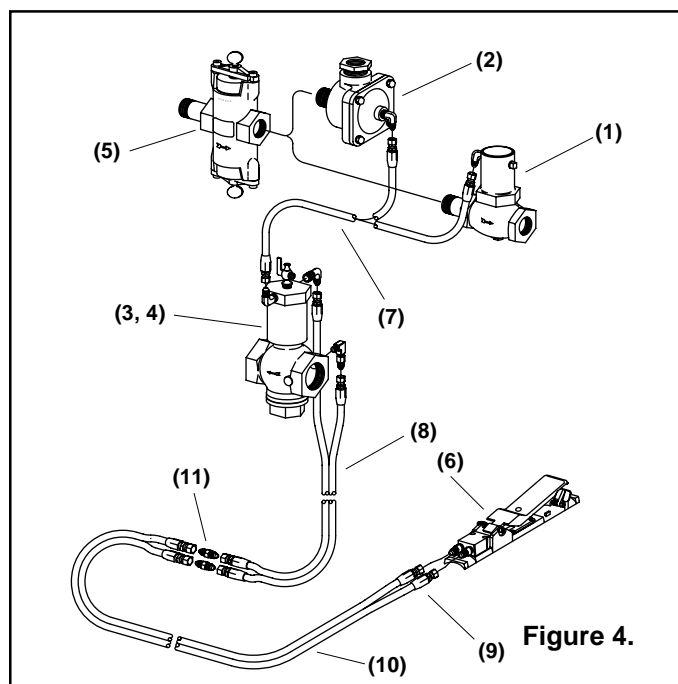
## 7.0 REPLACEMENT PARTS

### 7.1 TLR-100/300 Systems, Complete

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

### 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
10.	Hose, 50' Twinline coupled .....	01951
11.	Union, Twinline hose .....	01944



**7.3 ACS Systems Replacement parts, Figure 5**

NOTE: 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 .....	01951
3.	Hose , 3/16" x 18" coupled .....	02454
4.	Union, Twinline hose .....	01944

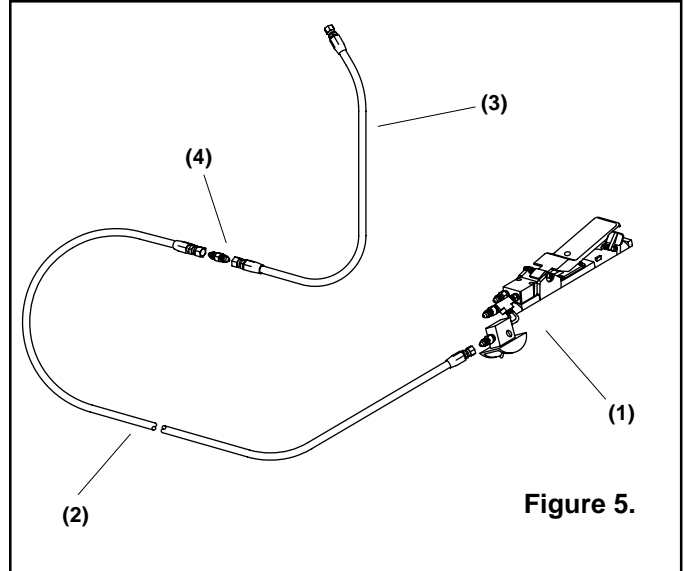


Figure 5.

**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

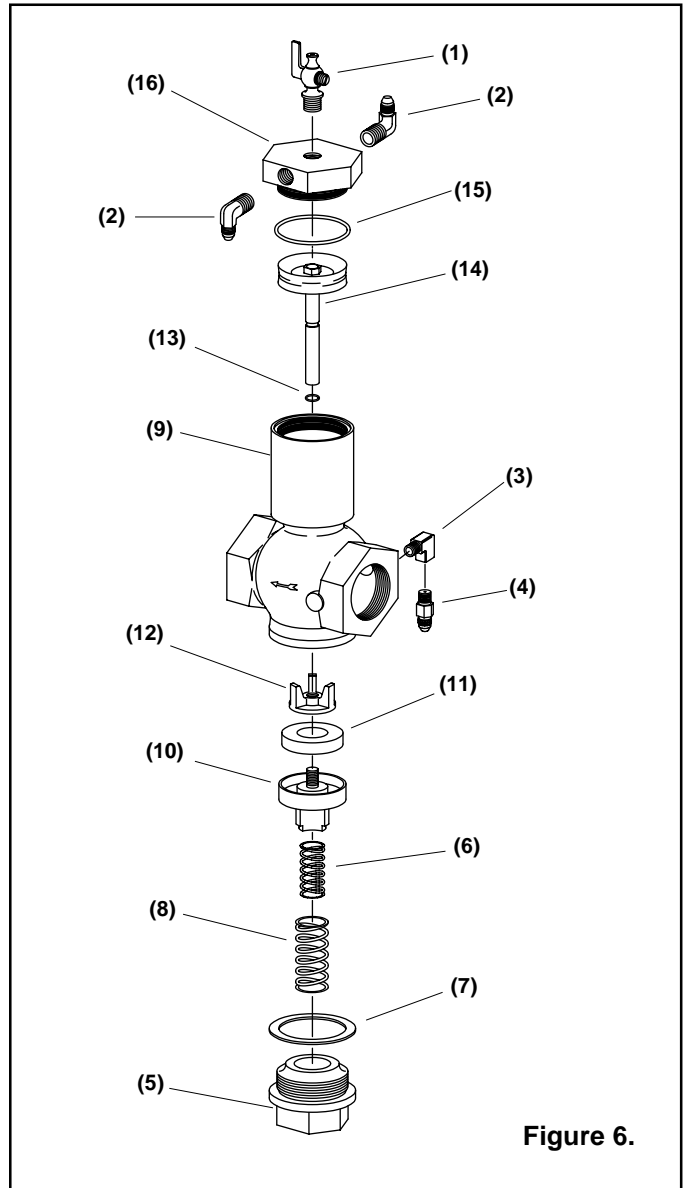


Figure 6.

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

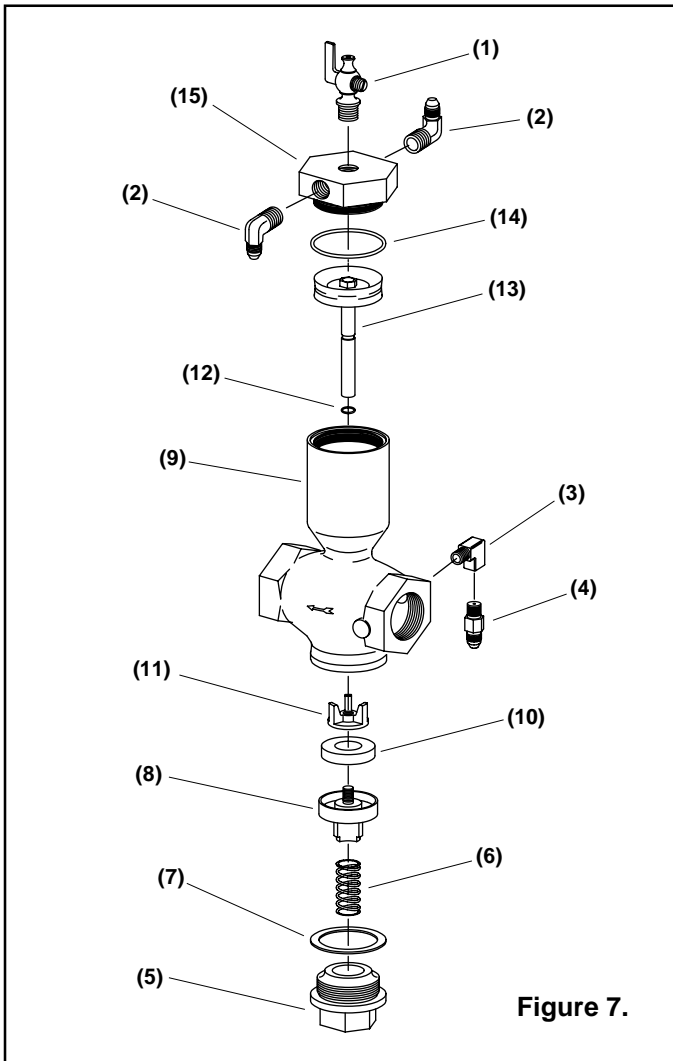


Figure 7.

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	02129
(-)	Service kit, includes items marked *, quantity is shown in ( )	01925

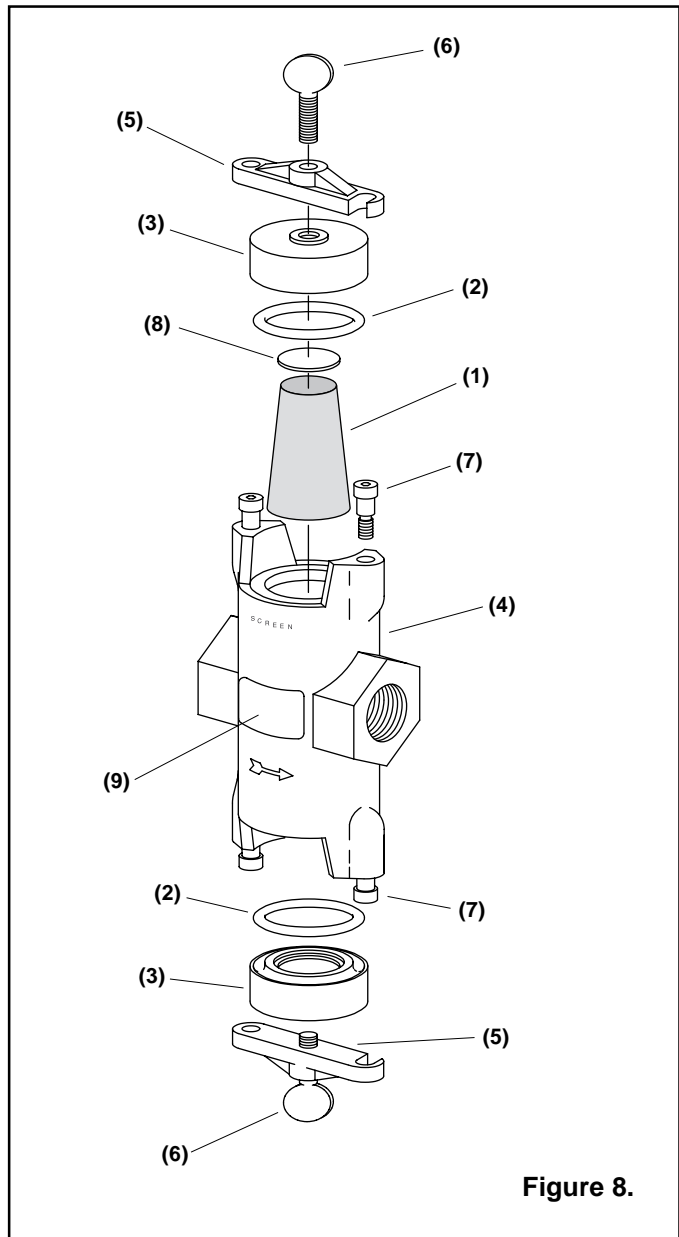


Figure 8.

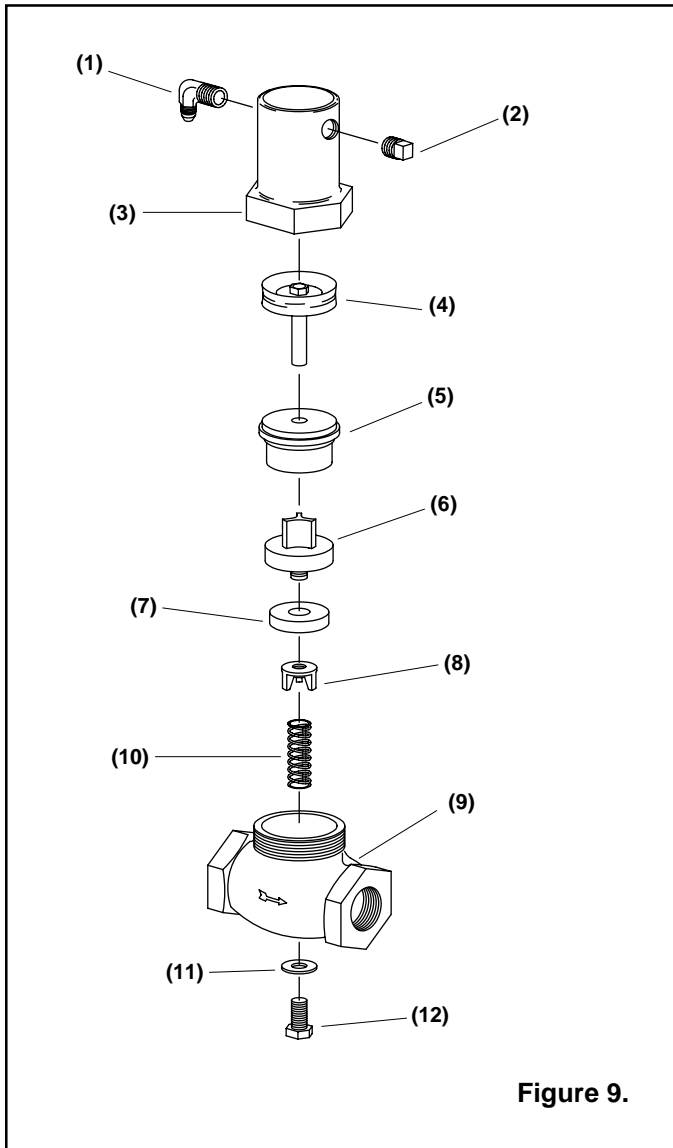


Figure 9.

**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 .....	01979
12.	Cap screw, 3/8-NC x 3/4" .....	03331
(-)	Service kit, includes items marked *, quantity is shown in ( ) .....	01928

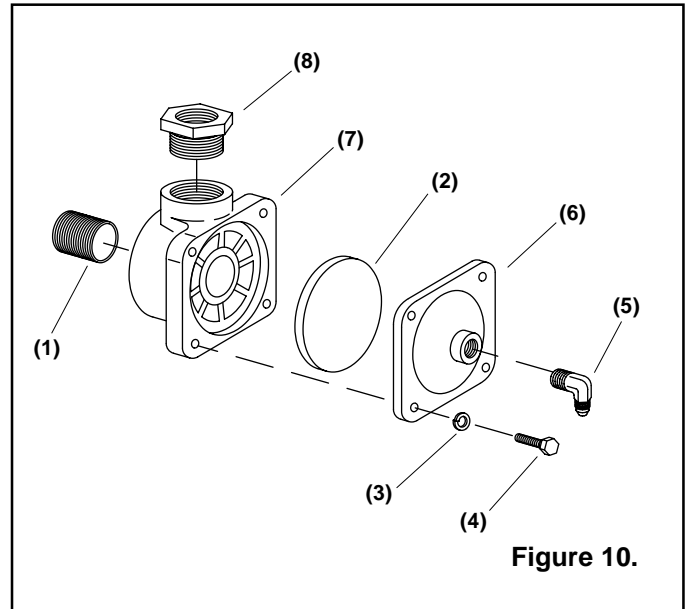


Figure 10.

**7.8 1" Diaphragm Outlet Valve, Figure 10**

Item	Description	Stock No.
(-)	1" Diaphragm outlet valve, complete .....	03371
1.	Nipple, 1" x close .....	01701
2.	Diaphragm .....	06149
3.	Lockwasher, 1/4" .....	03117
4.	Cap screw, 1/4-NC x 1" hh .....	03053
5.	Elbow, 1/4" npt adaptor .....	02513
6.	Cap, diaphragm outlet .....	03393
7.	Body, diaphragm outlet .....	06135
8.	Bushing, 1-1/4" x 1" .....	01804

**7.9 RLX II Pneumatic Control Handle**

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