

**EAC & EDC 100/300 SERIES  
ELECTRIC REMOTE CONTROLS  
O. M. 03390**

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 **WARNING**

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

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

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

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

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## 1.1 Scope

**1.1.1** This manual covers installation, operation, maintenance, troubleshooting, and replacement parts for the following Clemco electric pressure-release remote control systems and pneumatic to electric conversion kits. Refer to Section 7.2 for a list of the control systems.

**1.1.2** These instructions also contain important information required for safe operation of the machine. All blast operator(s) and machine (pot) tenders must be trained in the safe operation of the blast machine, remote control system, and all blasting accessories. 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. The following Clemco manuals are available for equipment that may be used with the electric remote controls. These and other Clemco manuals are available on our website [www.clemcoindustries.com](http://www.clemcoindustries.com).

Classic Blast Machine 22501  
RLX Control Handle 10574

**1.1.3** All personnel involved with the abrasive blasting process must be made aware of the hazards associated with abrasive blasting. The Clemco booklet "Abrasive Blasting Safety Practices" is included with every Clemco blast machine, and contains important safety information about abrasive blasting that may not be included in equipment operation manuals. Additional copies are available from Clemco Industries.

## 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 or electrical 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.

**1.3.2** Electric (electro-pneumatic) remote controls (electric controls operating pneumatic valves) 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.

### 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.

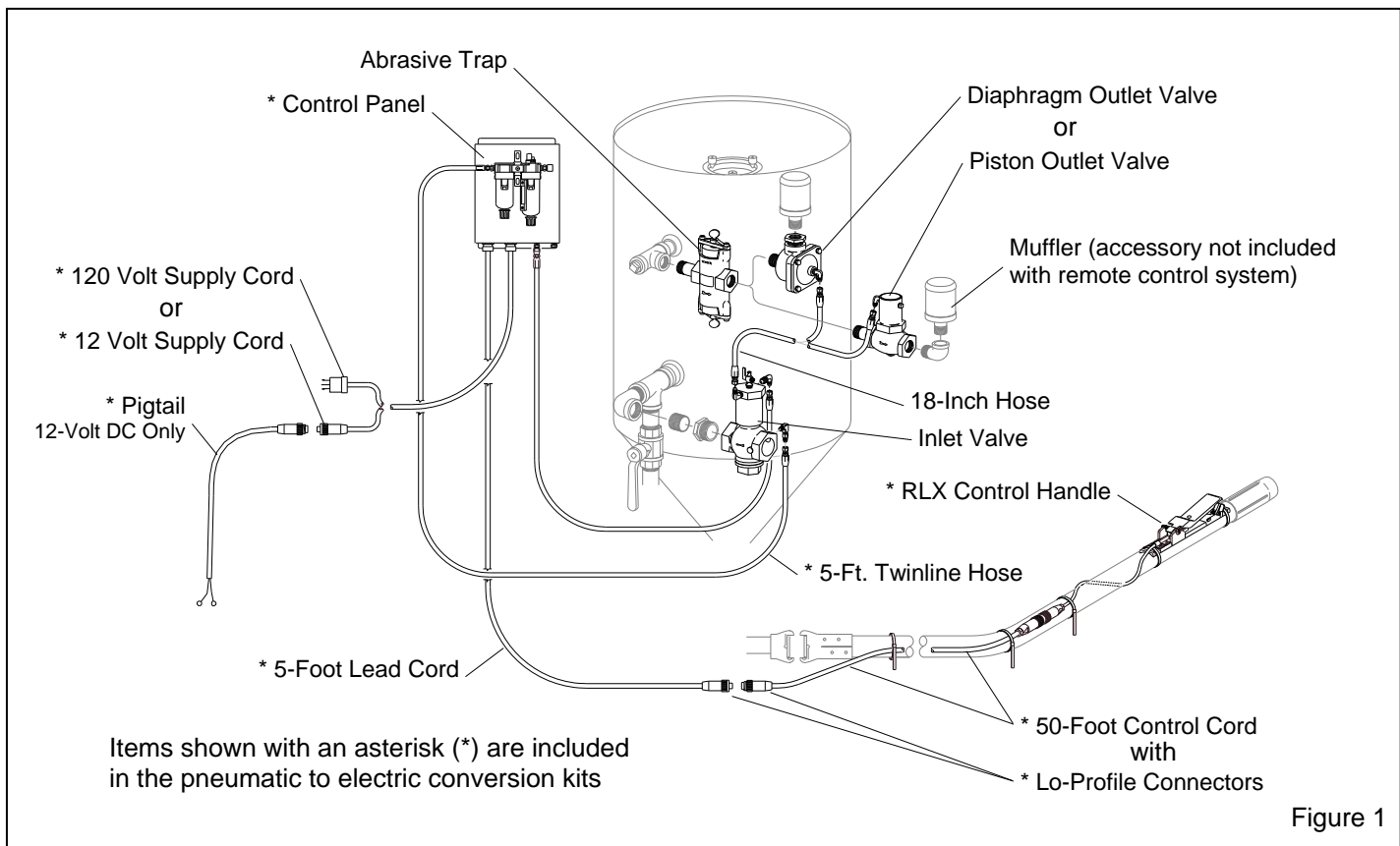


Figure 1

**1.3.3** The components of a standard system (no abrasive cut-off) 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, 50-ft. control cord, 5-ft. twinline hose, and an 18-in. long interconnecting hose.

**1.3.4** Additional and substitute parts used with the optional abrasive cut-off systems (ACS) are shown in Figure 2. ACS systems include: an ACS control panel (Note standard panels cannot be used with ACS systems) 50-ft. control cord with switch, 5-ft. long hose, and a pneumatically-operated abrasive metering valve. The metering valve supplied with the system may differ from that shown but the air connection is the same. An owner's manual for the metering valve is supplied with the valve.

## 1.4 Operating Principles

**1.4.1** EAC and EDC-100/300 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.

**1.4.2** Electric (electric over pneumatic) 100/300 remote controls operate pneumatically (See Figure 1).

When compressed air is supplied to the machine, control-air travels from the lower fitting on the inlet valve through the filter and antifreeze injector on the panel cover, and into the control panel. If the electric control handle lever (which is the main activator of the system) is in the up (no blast) position, air stops at the control panel and the normally-closed inlet valve remain closed. Pressing the control handle lever allows air to pass through the panel to open the inlet valve and close the outlet valve. This action pressurizes the blast machine and begins the blasting process. When the control handle is released, control-air exhausts at the panel, which closes the inlet valve, and opens the outlet valve to depressurize the blast machine and stop the blasting.

**1.4.3** Electric remote controls are required when the nozzle is farther than 100 feet from the blast machine. At that distance, pressure loss and actuation time of pneumatic systems may be too great to ensure fast, safe operation. Electric systems are also used in cold weather, when moisture in the air supply of pneumatic systems may freeze and cause the remote controls to fail. To prevent damp air from freezing, an antifreeze injector is installed on all electric remote control panels. NOTE: The maximum recommended total length of control cord is 300 feet. Distances greater than 300 feet will offer electrical resistance, and may cause the controls to malfunction. If an application requires greater distance, an appropriate cord with larger diameter wire must be provided by the user.

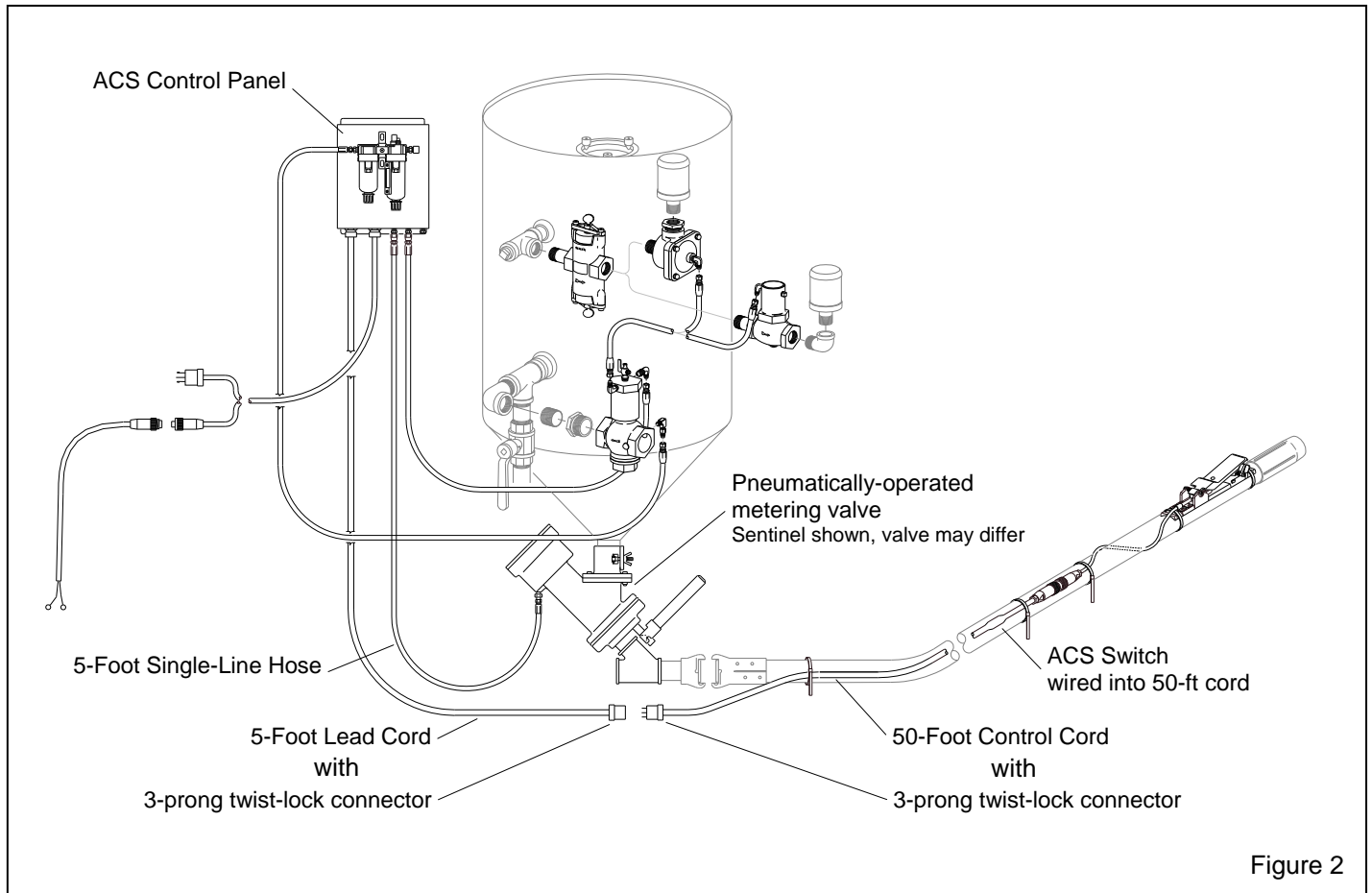


Figure 2

## 1.5 Abrasive Cut-Off (ACS) Option

**1.5.1** The ACS switch is wired into the 50-foot control cord just before the connection for the control handle. The operator uses the switch to close the abrasive metering valve independently of the blasting, so air without abrasive exits the nozzle to clear the blast hose, or for blow-down.

**1.5.2** ACS extension cords are three-wire cords with 3-prong twist-lock connectors. Refer to Section 7.4 for stock numbers and replacement parts.

## 2.0 INSTALLATION

**2.1 Factory installation:** If the remote control has been factory installed, skip to Paragraph 2.5.

**2.2 Pneumatic to electric conversion kit:** Skip to Section 2.5 to convert an existing pneumatic remote control system to electric controls.

## 2.3 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.

**Installation Note:** To prevent thread galling use thread-sealant on all male NPT (pipe) threads.

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

**2.3.2** Remove the existing outlet valve.

**2.3.3** Install the abrasive trap on the blast machine as shown in Figure 1. The directional arrow must point away from the machine, and the screen end must face up and clean-out down.

**2.3.4** Install the piston or diaphragm outlet valve as follows:

**2.3.4.1 Piston outlet valve** must have the directional arrow pointing away from the abrasive trap. Attach an elbow and accessory muffler. The muffler must face up and fully vertical as shown in Figure 1.

-OR-

**2.3.4.2 Diaphragm outlet valve** should be installed as shown, with the accessory muffler facing up and fully vertical. Install the 1/4" adaptor elbow to the port on the cap.

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## WARNING

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**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 depressurizes, the muffler body pops up to diffuse the air and abrasive. When the machine is fully depressurized, the muffler body drops, permitting trapped abrasive to empty. For the muffler to work properly, it must be installed with the body facing up and fully vertical, 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 depressurizes.**

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**2.3.5** 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. If the remote control does not have the ACS feature, skip to Section 2.5.

## **2.4 Optional ACS set up Ref. Figure 2.**

**2.4.1** Remove the manual abrasive metering valve and install the pneumatically-operated valve as instructed in the manual provided with the valve. Continue with Section 2.5.

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## **2.5 Blast hose, control hose, and control cord connections**

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### WARNING

**Take care when tracing and connecting control lines and blast hose where two or more blast machines are used. Cross connecting control cords 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 cord, the hose and cord should be of equal lengths and the hose, cord 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.**

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**2.5.1** Uncoil the blast hose and lay the 50-ft. control cord alongside it. Note: ACS systems have a switch wired into one end of the cord. The switch end of the cord must be at the nozzle end of the blast hose.

**2.5.2** Band the electric control handle to the blast hose at a suitable, comfortable position behind the nozzle holder, using the two nylon ties provided. After 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.

**2.5.3** Loosely wrap the whip cord from the electric control handle once around the blast hose as shown in Figure 3, and then connect it to the control cord. If the cord is not loosely wrapped and securely banded as described, excessive strain will cause the wires to pull out of the connectors or electric switch when the blast hose is bent or pulled.

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## **CAUTION**

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**Provide enough slack at all cord connections to prevent the cord from pulling out of the connectors when the blast hose is pulled or dragged. Securely band the cord to the blast hose on both sides of all connections.**

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**2.5.4** Band the cord to the hose on both sides of the cord connections as shown in Figure 3.

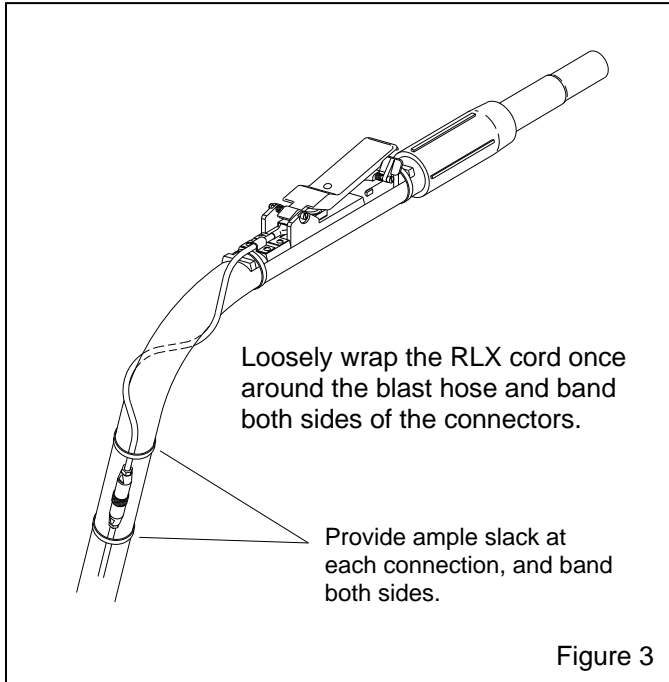


Figure 3

**2.5.5** Band the cord to the blast hose every 4 to 6 feet. When attaching control cord extensions, provide slack at each connection and band the cord on both sides of each electrical connection.

**2.5.6** Attach the blast hose to the blast machine. Use safety wires to securely lock the couplings.

**2.5.7** Use the panel mounting bracket to hang the panel on the blast machine rim. If preferred, for stationary blast machines the panel may be wall mounted.

**2.5.8** Connect one leg of the 5-foot twinline hose between the lower fitting on the inlet valve and the fitting on the air filter mounted on the front of the control panel.

**2.5.9** Attach the remaining leg of the 5-foot twinline hose between the panel outlet fitting marked "AIR VALVE" and the unused fitting on the top of the inlet valve.

**2.5.10 Additional connection for optional ACS panel:** Connect the 5-foot long single-line hose between the panel outlet fitting marked "GRIT VALVE" and the fitting on the abrasive metering valve.

**2.5.11** Connect the control cord to the control panel, lead cord marked "OPERATOR".

**2.5.12** Connect the power cord into an appropriate power source

- 120-volt AC: Plug the power cord into a 120-volt AC GFI protected power source.

## **⚠ WARNING**

**Do not use 120 volt AC models in any application where water exposure is possible, unless the power source is protected by a ground-fault circuit interrupt. Do not use electrical adaptors that eliminate the ground prong on 120-volt plugs. Doing so can cause electric shock, and damage equipment.**

- 12-volt DC units are furnished with a pigtail with ring terminals to connect to a battery or other 12-volt DC power source.

**2.5.13** 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 all instruction manuals for associated equipment.**

#### **3.1 Start-Up**

**3.1.1** Make sure that all hose and cord connections are secure. Install safety lock pins on all quick couplings. Use lock pins and safety cables on all quick coupling connections to help prevent accidental separation of hoses.

**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 inlet valve is open. The petcock is open when the petcock lever is in-line with the petcock, as shown in Figure 4.

### **⚠ 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.**

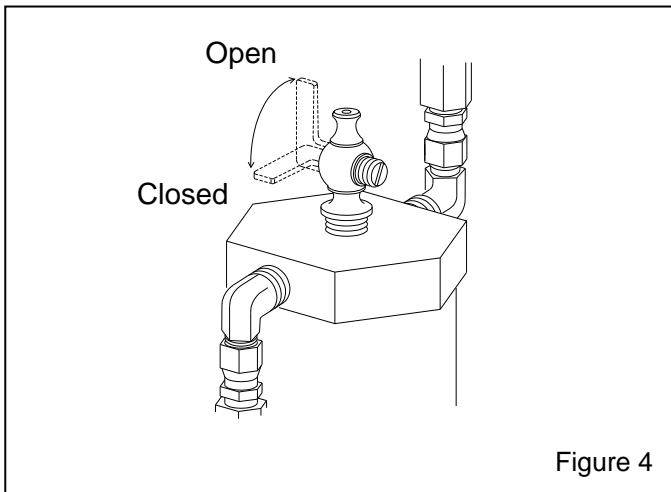


Figure 4

**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** Make sure that the handle lever will not engage the switch 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 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.

## 3.2 Blasting Attire

**3.2.1** Operators and anyone else that may be exposed to the hazards generated by the blasting process must wear appropriate protective gear, including abrasive-resistant clothing, leather gloves, eye and hearing protection, and a NIOSH-approved Type CE Supplied-Air Respirator.

### **⚠ 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 working in the vicinity of abrasive blasting must wear properly-maintained, NIOSH-approved respirators. Dust produced in the blasting area and the loud sounds of air released at the blast machine and nozzle requires that eye protection and hearing protection appropriate for the job site hazards be worn by anyone in the blasting area.**

## 3.3 Blasting

**3.3.1** Do not allow anyone within 10 feet of the blast machine except machine tenders who are appropriately fitted with proper protective attire.

### **⚠ WARNING**

**All persons except for a properly attired machine tender must stay clear of the blast machine. The blast operator could pressurize or depressurize the machine at any time without warning.**

**3.3.2** When the blast operator is ready, either the operator or the machine tender stands away from the concave filling head of the blast machine and the exhaust muffler, and then closes the safety petcock. Closing the petcock prepares the machine for remote operation, and activation by the control handle.

### **⚠ WARNING**

**Before blasting, test the coating and substrate for toxic materials (such as lead or other heavy metals, or asbestos). These hazards require special measures to protect the operators and the environment.**

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

**3.3.4** 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

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

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### 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)**

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#### **3.4 Operation of Abrasive Cut-Off Switch**

**3.4.1** The abrasive cut-off switch is wired into the control cord behind the control handle. By pressing the front (closest to the nozzle) "off" button, the air supply to the abrasive 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, which can be used to clear the blast hose before shut-down, and to blow abrasive off the blasted surface. Pressing the rear pushbutton (farthest from the nozzle) returns control-air to the metering valve, this opens the valve, and starts abrasive flow for normal blasting. The switch can be opened or closed at any time, but will not activate the metering valve unless the control handle is pressed.

NOTE: The purpose of the ACS is to clear the blast hose and to blow abrasive off the blasted surface at the blasting area. Small amounts of abrasive may come out the nozzle with the air. Residual abrasive may remain that will have to be removed outside the blast area prior to painting.

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### WARNING

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

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#### **3.5 Stop Blasting**

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

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

**3.5.3** Make sure the control handle safety lever lock is up, and 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

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

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## 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 those items.

### 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 engage the switch 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.**

### 4.2 Weekly

4.2.1 Enlist the aid of another person to inspect the following while blasting.

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

4.2.2 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.

### 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. Refer to the RLX Owner's Manual for service instructions.

## 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 7 (1-1/2" valve) or Figure 8 (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 7 or 8, 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 avoid damage from the 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 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 7 or 8 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 prevent the safety petcock from operating correctly.**

### 5.2 Piston Outlet Valve, Ref. Figure 10

Refer to Section 5.3 to service the diaphragm outlet valve.

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

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

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

**5.2.9** Install the piston into the bonnet 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 approximately flush with the opening.

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

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

**5.2.12** To assemble the bonnet to the valve body, first insert the piston 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 11**

Refer to Section 5.2 to service the piston outlet valve.

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

**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 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. Refer to the control handle owner's manual for service instructions for the control handle.

### **5.6 Metering Valve (for ACS systems only)**

**5.6.1** A separate manual is provided for the metering valve. Refer to the metering valve owner's manual for service instructions for the metering valve.

## 6.0 TROUBLESHOOTING

**NOTE:** This section applies to the remote control system only. Refer to the appropriate manuals 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.
- Shorting electrical components could result in serious electrical shocks or equipment damage. All electrical troubleshooting or any work done inside the control panel must be performed by a qualified electrician.
- 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** Listen to the control panel to determine if it clicks when the control handle is pressed and released. If it does, the fault may not be electrical. Confirm this by pushing the white manual override button on the top of the solenoid valve. This should operate the control system if the problem is electrical. For pneumatic troubleshooting, begin at Section 6.1.6.

**6.1.2** Check for fault in the control panel by removing the 50-ft. control cord from the 5 ft. lead cord coming from the panel. Place a jumper between the connector as follows:

**For Standard Controls (No ACS):** Place jumper across pins No. 1 and 3 in the Lo-Profile connector

**For ACS Controls:** Hold the lead cord socket so the angled slot is facing up. The slot to the left (counter-clockwise of the angled slot) carries the power from the panel (hot line). Jump between the hot line and the angled slot.

If the solenoid does not click, it is most likely one of the following:

- Faulty solenoid. Push override button and check terminal connectors for power.
- Check for faulty fuse (120-volt systems only) and loose connections in the control panel.
- Check for inadequate power to the control panel.
- Check for loss of power in all panel wiring and to solenoids.
- Check for faulty transformer (120-volt systems only).

**6.1.3** Check each control cord extension, by connecting them one at a time to the panel, and jump across the extension cord socket as explained in Section 6.1.2. Check all extension cords in like manner.

**6.1.4** Optional ACS Cord: Check the end control cord (with ACS switch) by jumping across terminals No. 1 and 3 on the lo-profile connector. The upper solenoid (air valve solenoid) should click. With the jump in place, operate the ACS switch on and off. Toggling the ACS switch should cause the lower (media valve solenoid) solenoid to click. If the panel does not click, the cord, connectors or switch are faulty and should be repaired or replaced. If the panel does click, the remote control handle is the probable cause and should be repaired. Refer to the RLX Control Handle Owner's Manual.

**6.1.5** Check RLX Control handle. The easiest method to check the control handle is to substitute the control handle with one that is functioning properly. If this isn't possible, disconnect the control handle at the control cord. With the handle lever down, check continuity on the RLX connector as follows:

- Lo-profile connector: Check across pins No. 1 and 3.
- Twist-lock connector: Check across the two prongs.

If there is an interruption check the wire connections or remove the old switch and install a replacement as needed.

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

**6.1.7** Make sure the safety petcock is closed.

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

**6.1.9** With compressed air on, press the control handle lever, check for air leaks in connecting hoses and tube fittings inside the panel. Check metering valve for leaks if using the optional ACS feature.

**6.1.10** With compressed air on, inspect 3/16" connecting hoses for blockage, clear or replace hose as necessary.

**6.1.11** With compressed air on, close the safety petcock, and press the control handle lever. No air should escape through the vent hole on the cylinder body of the inlet valve. Air escaping from this vent indicates a worn piston or piston-stem o-ring in the inlet valve. Service the inlet valve per Section 5.1.

**6.2 Blasting begins as soon as compressed air and electrical power are applied to the blast machine (without pressing the control handle).**

**6.2.1** Electrical short in control cord connections or control handle. Disconnect the connector at the RLX control handle. If the machine does not depressurize disconnect each connection one at a time from the control handle to the panel. When the connection with the short is disconnected, the machine will depressurize.

**6.2.2** Sticking solenoid: Remove electrical power, if the machine depressurizes and if the cords were checked per Paragraph 6.2.1, the likely problem is the solenoid.

**6.3 Outlet valve won't exhaust or exhausts too slowly.**

**6.3.1** Blockage in abrasive trap: Clean or replace abrasive trap screen. Clean screen twice daily. Refer to Section 5.4 to service the abrasive trap.

**6.3.2** Check to make sure that the lower fitting on inlet valve (Figure 7, item 4 or Figure 8, item 4) has not been replaced with for a fitting with a full-flow orifice. The orifice on the 1/8" NPT end of the fitting must be 1/16" diameter.

**6.3.3** Make sure the inlet valve closes. If it does not seal-off incoming air, the valve requires service per Section 5.1.

**6.3.4** Inspect and service the piston outlet valve per Section 5.2, or diaphragm valve per Section 5.3.

**6.3.5** Clean or replace the muffler element or muffler. The procedure to service the muffler is covered in the blast machine owner's manual or Muffler Service Instruction No. 22322.

**6.3.6** Sticking solenoid, refer to Paragraph 6.2.2.

**6.4 No abrasive flow when the ACS switch is toggled to "ON" position.**

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

**6.4.2** Blast machine empty; make sure the machine contains abrasive.

**6.4.3** Check for leak or blockage in the single-line hose or fittings from the control panel to the metering valve.

**6.4.4** Lower solenoid in the panel sticking or not receiving electrical power. With the control handle pressed, check for power on solenoid terminals. Toggle the ACS switch to make sure it is on. If the solenoid is receiving power push the white override button, if the valve operates, the solenoid is faulty.

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

**6.5 Abrasive flow does not stop when ACS switch is toggle to "OFF" position.**

**6.5.1** Check the lower solenoid terminals for electrical power; power should disengage when the switch is off and engage when the switch is on.

- If it **does not** operate accordingly, check the control cord connectors and switch for an electrical short.
- If it **does** operate accordingly, the solenoid is most likely faulty.

**6.5.2** Metering valve requires service.

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**7.0 REPLACEMENT PARTS**

**7.1 Pneumatic to Electric Conversion Kits For standard (non ACS) systems.**

Converts pneumatic to 120-volt AC ..... 02201  
 Converts pneumatic to 12-volt DC ..... 02202  
 Includes items with asterisk (\*) shown in Section 7.3.

**7.2 Remote Control Systems**

**Standard Remote Control Systems (without ACS)**

Description	Stock No.
<b>120-Volt AC Systems</b>	
EAC-100, 1" inlet valve w/piston outlet .....	03384
EAC-300, 1-1/4" (1-1/2" inlet) w/piston outlet .....	03385
EAC-100D, 1" inlet valve w/diaphragm outlet .....	03476
EAC-300D, 1-1/4" (1-1/2" inlet) w/diaphragm outlet..	03478
<b>12-Volt DC Systems</b>	
EDC-100, 1" inlet valve w/piston outlet .....	03380
EDC-300, 1-1/4" (1-1/2" inlet) w/piston outlet .....	03381
EDC-100D, 1" inlet valve w/diaphragm outlet .....	03474
EDC-300D, 1-1/4" (1-1/2" inlet) w/diaphragm outlet .	03477

**Remote Control Systems with ACS**

Note: The following remote control systems include an Abrasive Cut-off (ACS) and pneumatically-operated abrasive metering valve.

<b>120-Volt AC Systems</b>	
EAC-100-C, 1" inlet valve w/piston outlet .....	21181
EAC-300-C, 1-1/4" (1-1/2" inlet) w/piston outlet .....	21182
EAC-100D-C, 1" inlet valve w/diaphragm outlet ....	21185
EAC-300D-C, 1-1/4" (1-1/2" inlet) w/diaph. outlet ....	21186
<b>12-Volt DC Systems</b>	
EDC-100-C, 1" inlet valve w/piston outlet .....	21183
EDC-300-C, 1-1/4" (1-1/2" inlet) w/piston outlet .....	21184
EDC-100D-C, 1" inlet valve w/diaphragm outlet ....	21187
EDC-300D-C, 1-1/4" (1-1/2" inlet) w/diaph. outlet ....	21188

**7.3 Standard, Non-ACS Systems, Figure 5**  
 Refer to Section 7.4 for ACS system parts

Item	Description	Stock No.
1.	Outlet valve, 1" piston .....	01967
2.	Outlet valve, 1" diaphragm .....	03371
3.	Elbow, 1/4" NPT adaptor .....	02513
4.	Inlet valve 1" .....	01980
5.	Inlet valve 1-1/2" .....	01995
6.	Abrasive trap .....	02011
7.*	RLX control handle w/lo-profile connector.....	10840
8.	Hose, 3/16" x 18", coupled .....	02454
9.*	Hose, 5' twinline, coupled .....	01952
10.	Cord, control with lo-profile connectors * 50-foot length .....	10835
	100-foot length .....	10836
11.*	Control panel 120-volt AC .....	07676
	12-volt DC .....	07677
12.	Nylon tie .....	02195

\* Items marked with an asterisk (\*) are included in pneumatic to electric conversion kits.

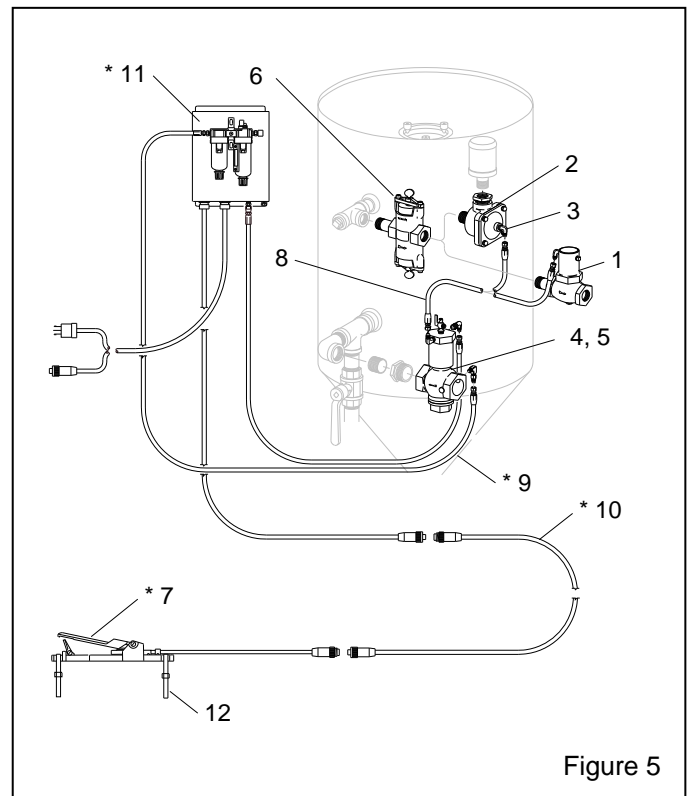


Figure 5

7.4 ACS Systems, Figure 6

Refer to Section 7.3 for non-ACS system parts

Item	Description	Stock No.
1.	Outlet valve, 1" piston .....	01967
2.	Outlet valve, 1" diaphragm .....	03371
3.	Elbow, 1/4" NPT adaptor .....	02513
4.	Inlet valve 1" .....	01980
5.	Inlet valve 1-1/2" .....	01995
6.	Abrasive trap .....	02011
7.	RLX control handle w/lo-profile connector .....	10840
8.	Hose, 3/16" x 18", coupled .....	02454
9.	Hose, 5' twinline, coupled .....	01952
10.	Hose, 5' single-line, coupled .....	03083
11.	Cord, 50-ft. control with ACS switch .....	10847
12.	Extension control cord 50-foot length .....	15138
	100-foot length .....	19528
13.	Control panel 120-volt AC .....	07650
	12-volt DC .....	05621
14.	Sentinel abrasive metering valve .....	23600
15.	Nylon tie .....	02195

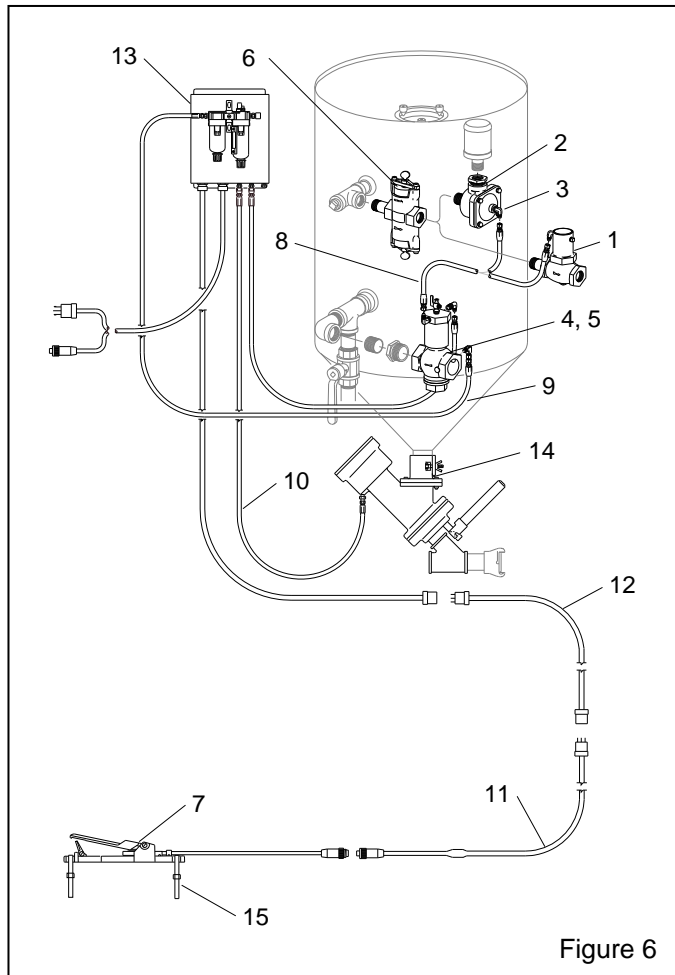


Figure 6

7.5 1-1/2" Inlet Valve, Figure 7

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 *, quantities are shown in ( ) .....	01927

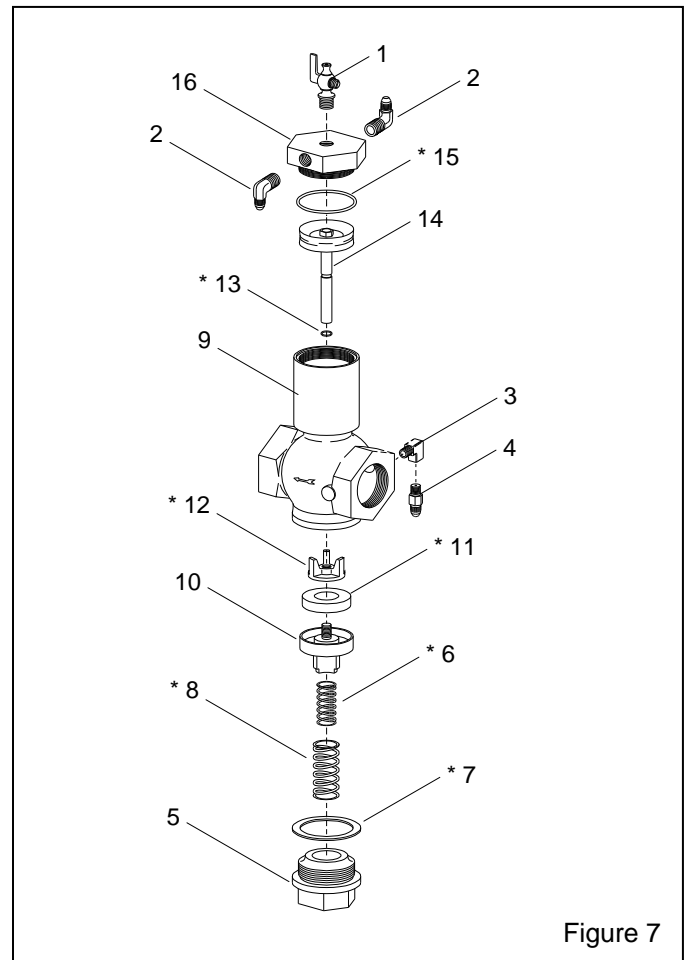


Figure 7

7.6 1" Inlet Valve, Figure 8

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 *, quantities are shown in ( ) .....	01929

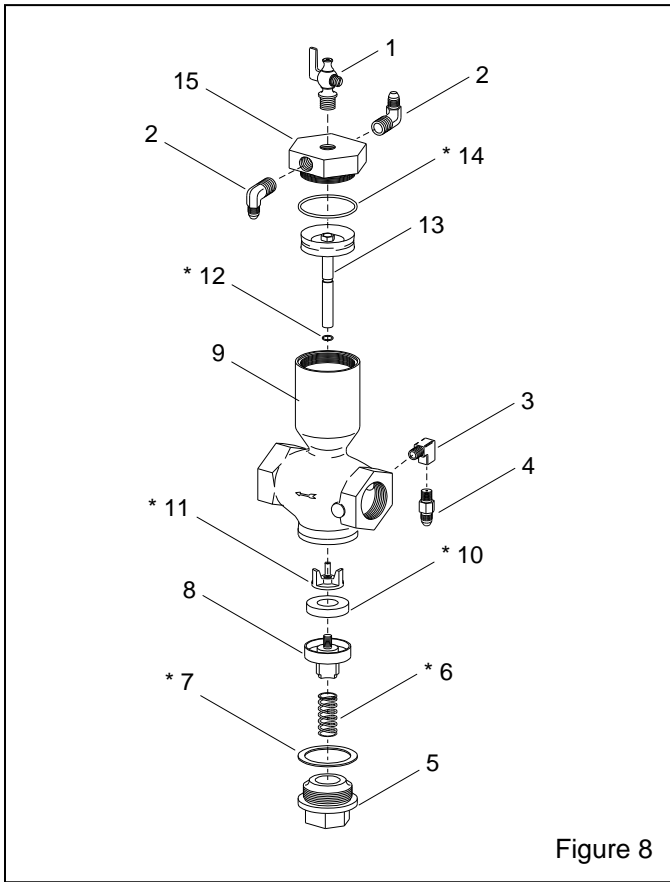


Figure 8

7.7 Abrasive Trap, Figure 9

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 *, quantities are shown in ( ) .....	01925

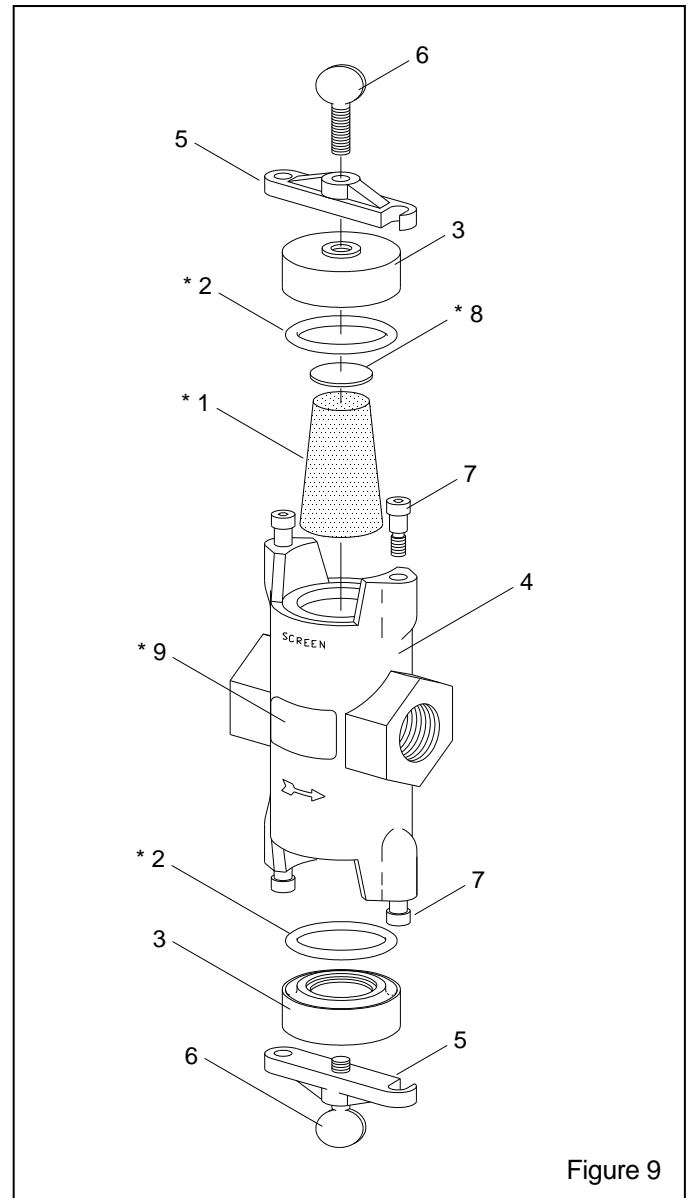


Figure 9



7.8 1" Piston Outlet Valve Figure 10

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 *, quantities are shown in ( ) .....	01928

7.9 1" Diaphragm Outlet Valve Figure 11

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.	Cap, diaphragm outlet .....	03393
6.	Body, diaphragm outlet .....	06135
7.	Bushing, 1-1/4" x 1" .....	01804

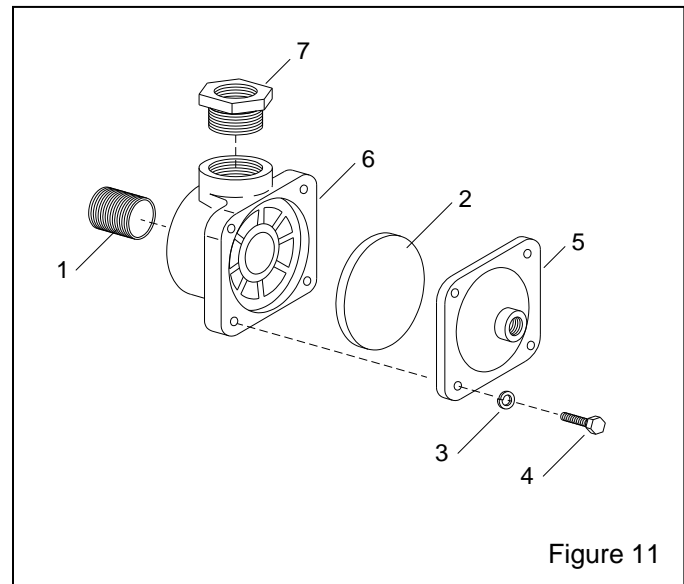


Figure 11

7.10 RLX Pneumatic Control Handle

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

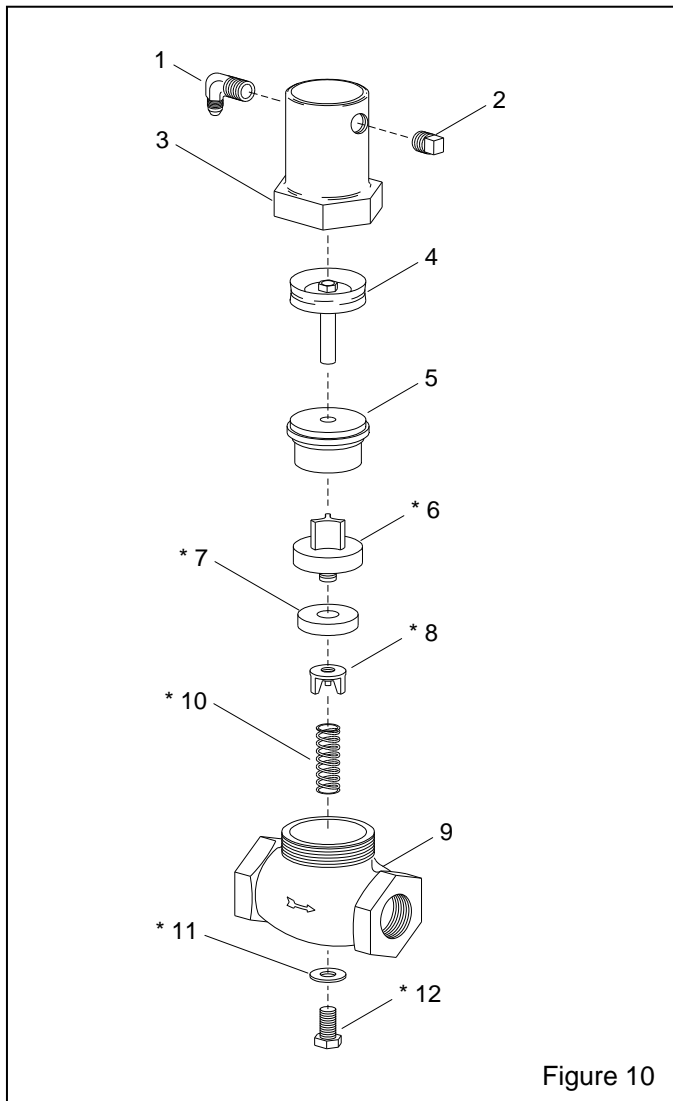


Figure 10

7.11 Control Panel, Figure 12

Item	Description	Stock No.
(-)	Control panel, standard non-ACS system	
	120-volt AC	07676
	12-volt DC	07677
(-)	Control panel for ACS system	
	120-volt AC	07650
	12-volt DC	05621
1.	Air filter, 1/4"	05617
2.	Antifreeze injector, 1/4"	05616
3.	Valve, 3-way, 12-volt AC (for 120-volt panel)	07662
	12-volt DC (for 12-volt panel)	07664
4.	Terminal block, 5 pole	02268
5.	Adaptor, 1/4" NPT	02494
6.	Hex nipple, 1/4" NPT	02808
7.	Elbow, 1/4" brass street	02027
8.	Coupling, 1/4" female bulkhead	05605

9.	Bushing, 1/4 x 1/8, exhaust	02010
10.	Adaptor, 1/4" female bulkhead	03432
11.	Supply cord, 5-foot 120-volt, with twist-lock connector	02216
	12-volt, with lo-profile connector	10833
12.	Cord, control whip	07675
13.	Connector, 1/2" strain relief	02213
14.	Locknut, 1/2" conduit	02925
15.	Elbow, male 1/4" NPT x 1/4" tube	03428
16.	Tee, 1/4" tube	03351
17.	Connector, 1/8" NPT x 1/4" tube	03430
18.	Tubing, 1/4" white, specify feet required	03427
19.	Tubing, 1/4" red, specify feet required	05612
20.	Tubing, 1/4" blue, specify feet required	05613
21.	Tubing, 1/4" green, specify feet required	05614
22.	Tubing, 1/4" orange, specify feet required	05615
23.	Bracket, panel mount	04188
24.	Fuse, 2-amp 1/4" x 1-1/4", 120-volt only	03039
25.	Fuse block, 120-volt only	03040
26.	Transformer, 12.6-volt	02198
27.	Pigtail supply cord, 12-volt DC only	10831

