

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

**DATE OF ISSUE: 12/98
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 **WARNING**

Do not use this equipment before **READING this **MANUAL** and **UNDERSTANDING** its contents.**

These **WARNINGS are included for the health and safety of the operator and those in the immediate vicinity. Failure to read and understand these warnings can result in injury or death.**

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

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1.0 INTRODUCTION

1.1 Scope of Manual

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

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

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

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

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

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

1.1.3 All personnel involved with the abrasive blasting process must be made aware of the hazards associated with abrasive blasting. The Clemco booklet "Abrasive Blasting Safety Practices" is included with every blast machine; it contains important safety information about abrasive blasting that may not be included in equipment operation manuals. The booklet is available in both English and Spanish; to request copies, email info@clemcoindustries.com.

1.2 Safety Alerts

1.2.1 Clemco uses safety-alert signal words, based on ANSI Z535.4-2011, to alert the user of a potentially hazardous situation that may be encountered while operating this equipment. ANSI's definitions of the signal words are as follows:



This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

NOTICE

Notice indicates information that is considered important, but not hazard-related, if not avoided, could result in property damage.

CAUTION

Caution indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

WARNING

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

DANGER

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

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1.4 Components and General Description

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

1.4.2 Additional parts used with optional ACS cutoff systems are shown in Figure 2. ACS systems include a 50 ft single-line hose, 18" 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.**

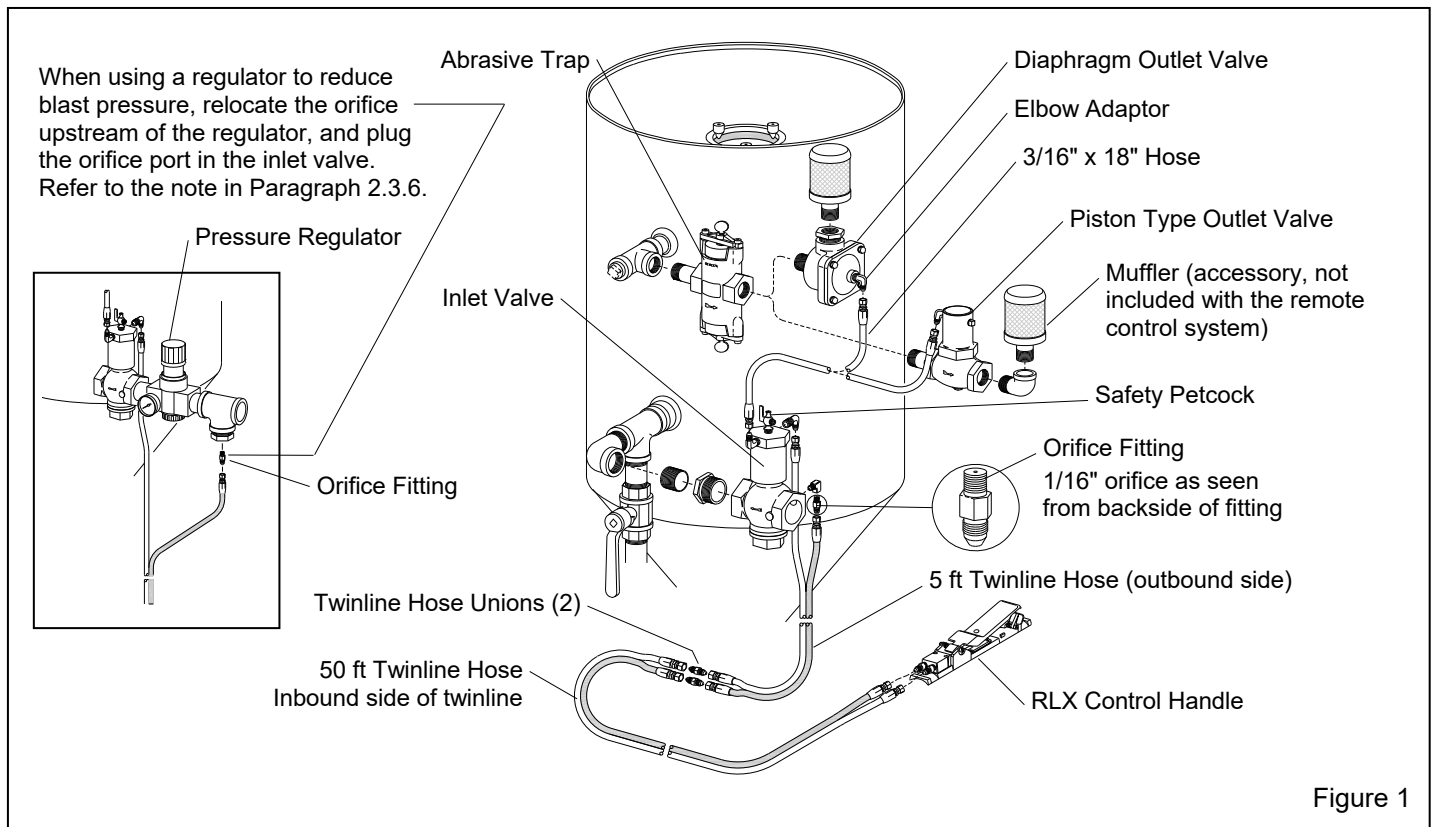
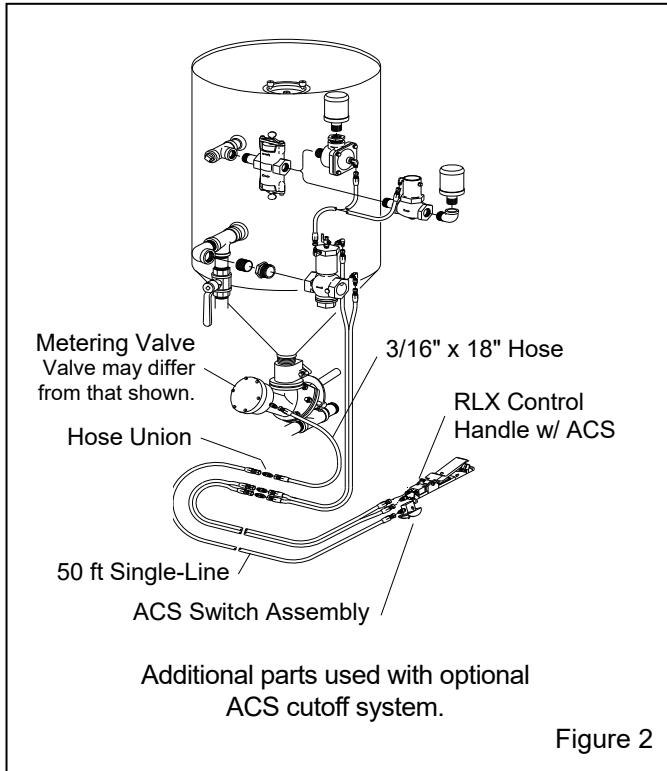


Figure 1

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



⚠ WARNING

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

1.5 Theory of Operation

1.5.1 TLR-100 and TLR-300 remote controls are pressure-release-style systems, which control the pressurization and depressurization of the blast machine. Pressurization, which starts blasting, occurs when the operator presses the control handle, and depressurization, which stops blasting, occurs when the operator releases pressure on the control handle.

1.5.2 Clemco remote controls operate pneumatically on a return-air principle (Refer to Figure 1). When compressed air is supplied to the machine, control air travels from the orifice fitting, down the outbound twinline (shown shaded in Figure 1) and escapes through an opening located under the control lever. As long as the control lever remains up, air escapes through the opening, and the normally closed inlet valve remains closed and the normally open outlet valve remains open (no blasting). When the control lever is pressed, a rubber button seals the opening, forcing air from the outbound side of twinline to return through the inbound side. Pressure in the return line opens the inlet valve and closes the outlet valve. This action pressurizes the blast machine and begins the blasting process. Releasing the handle exhausts the control air, closing the inlet valve, and opening the outlet valve to depressurize the blast machine and stop the blasting.

1.6 Abrasive Cutoff (ACS) Option

1.6.1 The abrasive cutoff switch is mounted on the control handle. It closes the metering valve so that air alone, without abrasive, exits the nozzle. This feature is used to clear the blast hose and to blowdown the blast surface. Refer to Section 3.4 for operation of the optional ACS.

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

1.7 Electric Control Option

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

2.0 INSTALLATION

⚠ WARNING

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

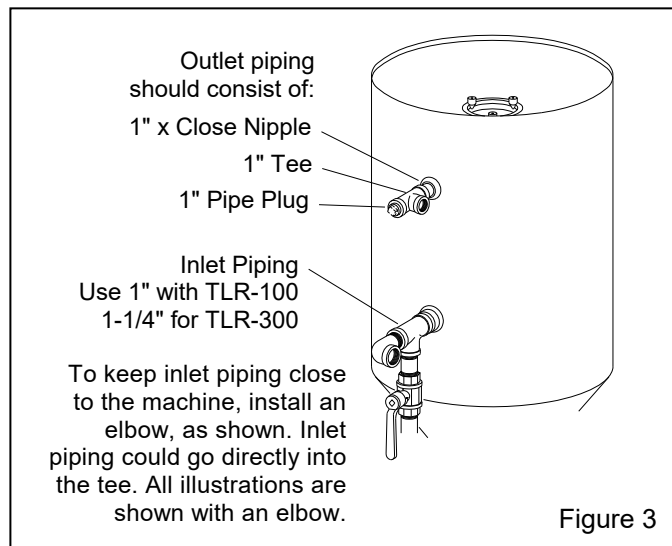
1. Empty the blast machine of abrasive.
2. Depressurize the blast machine.
3. Lockout and tagout the compressed-air supply.
4. Bleed the air-supply line to the blast machine.

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

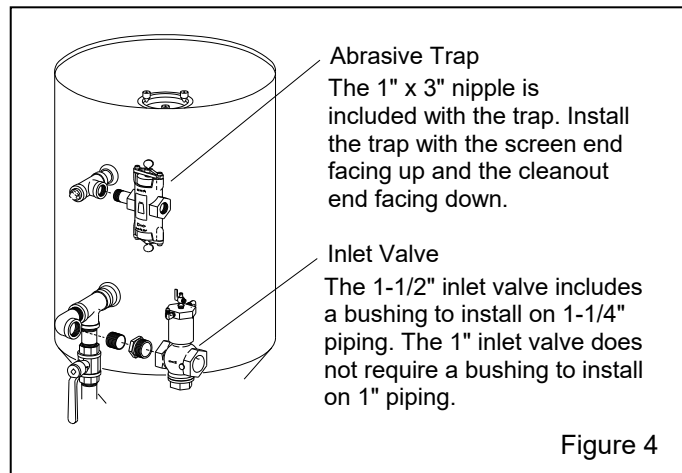
2.1 Install Valves onto Blast Machine

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

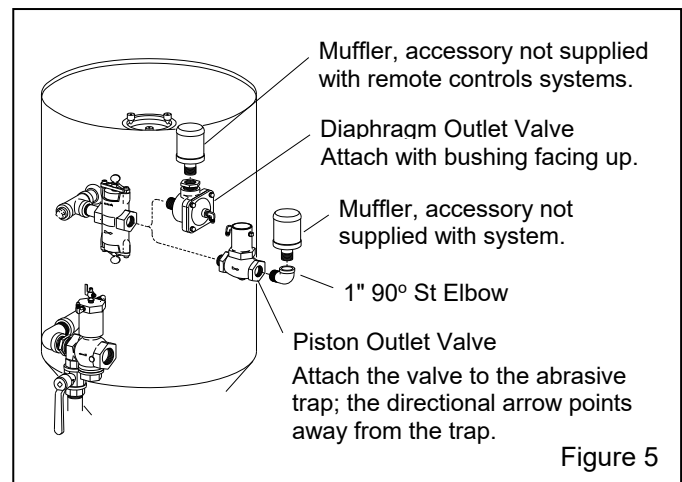
2.1.2 Remove the existing inlet valve and outlet valve from the machine. The machine should resemble the illustration in Figure 3. We recommend installing outlet piping, as shown in the illustration.



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



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



⚠ WARNING

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

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

2.1.5 Connect the 3/16" x 18" air hose between the elbow fitting on the outlet valve and the elbow fittings facing UP at the top of the inlet valve, as shown in Figure 6.

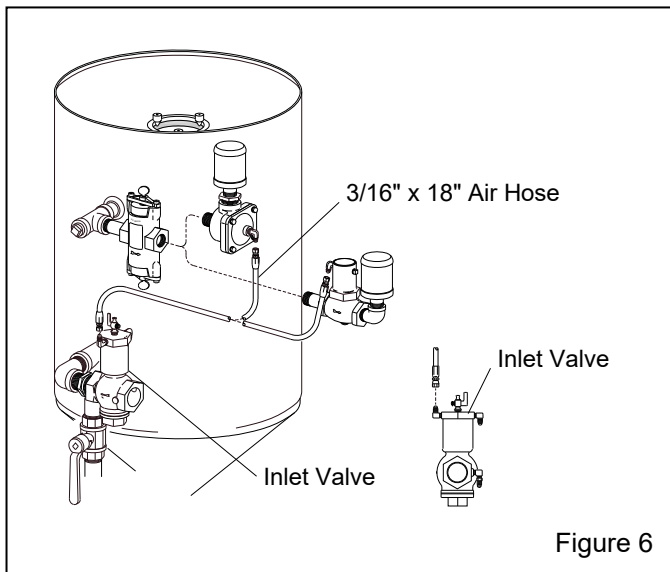


Figure 6

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

2.2.1 Where multiple blast machines are operating from a single air source, install a ball cone check valve at the air supply on each machine. Refer to the illustration in Figure 7 to install a check valve on a blast machine.

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

⚠ CAUTION

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

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

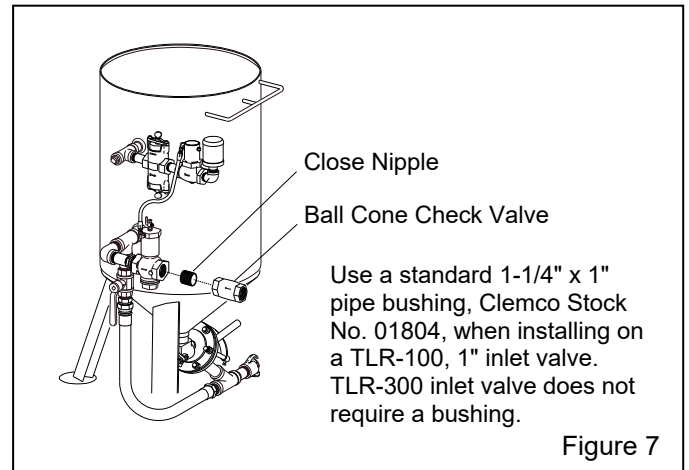


Figure 7

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

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

2.3 Prepare Blast Hose and Control Hose Connections

NOTE: Control hoses come with reusable hose ends. Excess hose may be cut-to-fit and recoupled, as explained in Section 5.5.

⚠ WARNING

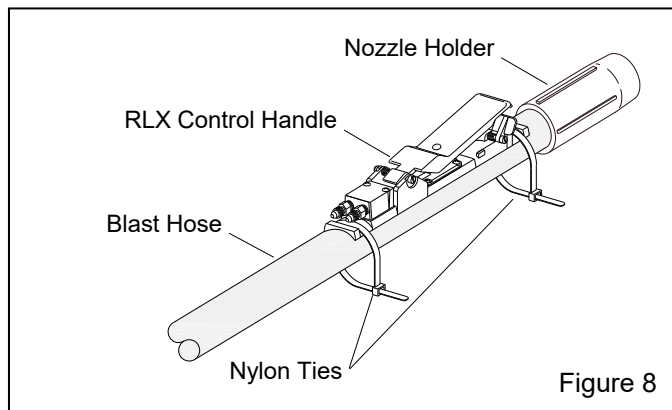
Where two or more blast machines are used in close proximity, care must be taken when tracing and connecting control lines and blast hose. Cross-connecting control hose or blast hose can lead to serious injury, death, or property damage from unintentional actuation of a blast machine. To prevent cross-connecting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

⚠ WARNING

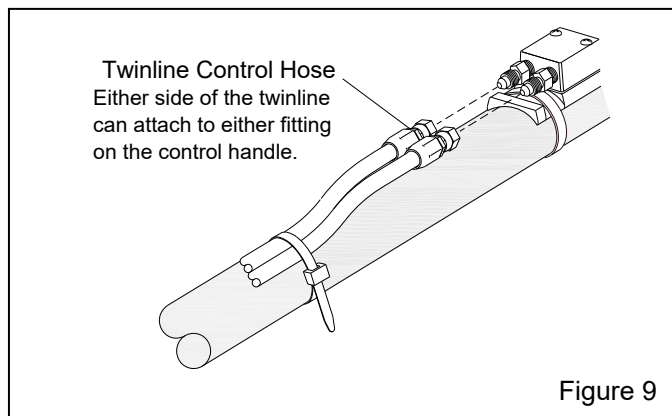
Moist air that freezes can cause blockage at the control handle or in the control lines. Blockage can cause involuntary activation of the remote controls or prevent the controls from deactivating upon release of the control handle. This situation can result in serious injury or death. If remote controls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

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

2.3.2 Band the control handle to the blast hose close to the nozzle holder, as shown in Figure 8, using the two nylon ties provided. After the control is firmly attached, clip the tie ends to avoid snags or interference with the operation of the control handle.



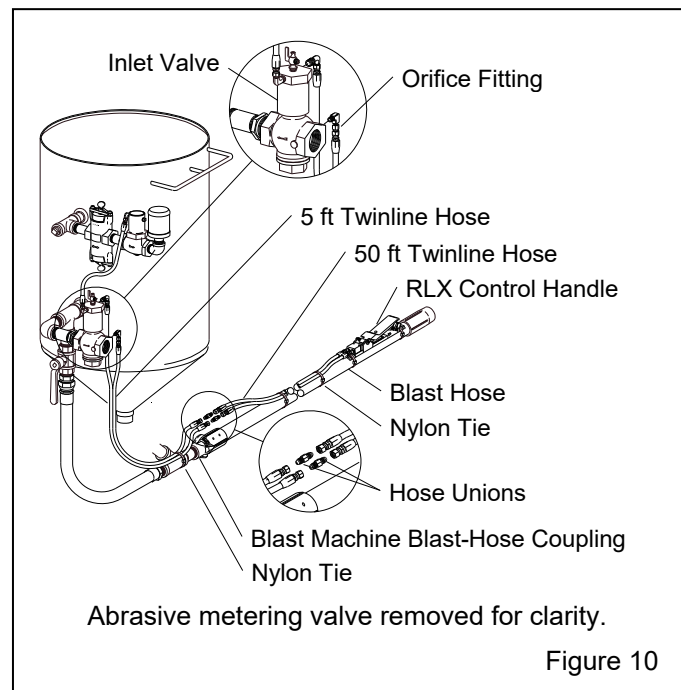
2.3.3 Attach the 50 ft twinline hose to the two fittings on the control handle, as shown in Figure 9. Either side of the hose can be attached to either fitting. When using the ACS option, attach the single-line hose noted in Section 2.4.1.



NOTE: When attaching Clemco twinline hose to a Clemco inlet valve or control handle, either side of the twinline hose can be attached to either twinline fitting on the valves.

2.3.4 Working backward from the control handle, band the twinline hose to the blast hose every four to six feet and as close to the couplings as possible. **NOTE:** When using the optional ACS feature, band all hoses after the single ACS hose is attached to the RLX.

2.3.5 Temporarily connect the blast hose to the quick coupling on the blast machine, as shown in Figure 10.



2.3.6 Attach the 5 ft twinline control hose to the inlet valve, as shown in Figure 10; one side of the hose connects to the unused upper elbow, the other side to the orifice fitting. **NOTE:** When using a pressure regulator to reduce blast pressure below 60 psi (80 psi when using a pneumatically operated abrasive metering valve), relocate the orifice upstream of the regulator, as shown in the insert in Figure 1, and plug the orifice port in the inlet valve. Doing so provides full line-pressure to the pneumatic control circuit.

2.3.7 Connect the two hose unions to the other end of the 5 ft hose and place the ends next to the blast-hose coupling.

2.3.8 Band the 5 ft twinline control hose, on the blast machine side of the unions, to the quick-coupling nipple.

2.3.9 Attach the 50 ft twinline hose to the unions on the 5 ft twinline.

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

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

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

⚠ WARNING

Hose disconnection while under pressure can cause serious injury or death. Use safety lock pins or safety wire to lock the couplings together and prevent accidental separation while under pressure. Use safety cables to prevent hose from whipping should separation occur.

NOTE: When installing the optional ACS feature, refer to Section 2.4 for additional instructions.

2.4 Set Up for Optional ACS Feature – Figure 11

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

2.4.2 Attach the 18" long hose to the fitting on the metering valve.

2.4.3 Use the remaining union to connect the 50 ft hose to the 18" hose.

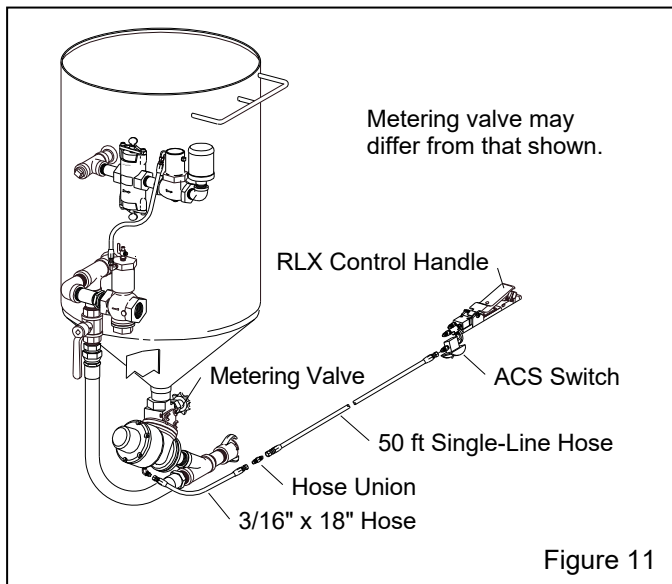


Figure 11

2.5 Install Compressed-Air Coupling and Air Hose

2.5.1 Apply thread sealant to the male pipe threads of an air fitting that is compatible with the air-supply hose, as noted in Section 2.5.2, and install it onto the inlet valve, as shown in Figure 12. The style of connection shown is for reference only.

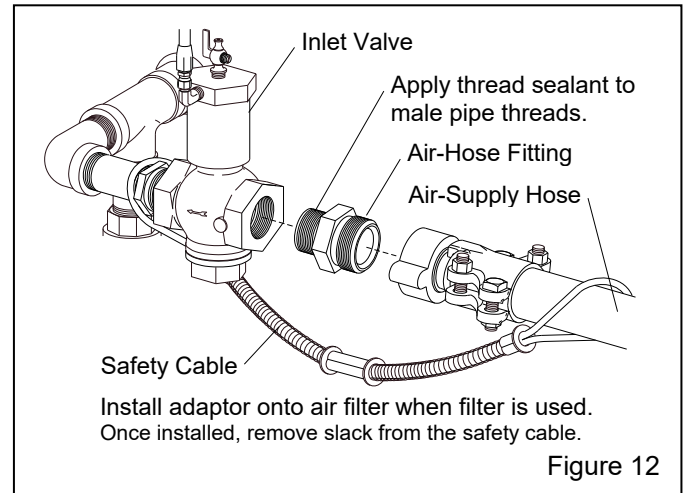


Figure 12

⚠ WARNING

Hose disconnection while under pressure can cause serious injury or death. Use safety lock pins or safety wire to lock twist-on (claw-type) couplings together and prevent accidental separation while under pressure and use safety cables to prevent hose from whipping should separation occur.

2.5.2 Attach an air line from the compressor to the hose fitting installed on the blast machine inlet. For best blasting performance, refer to the table in Figure 13 for the minimum recommended hose size based on the nozzle orifice size. A smaller diameter hose could result in a reduction in nozzle pressure.

AIR LINE RECOMMENDATIONS BASED ON NOZZLE SIZE	
Nozzle Orifice Size	Recommended Air-Supply Line
No. 3, 3/16"	3/4" ID or larger
No. 4, 1/4"	1" ID or larger
No. 5, 5/16"	1-1/4" ID or larger
No. 6, 3/8"	1-1/2" ID or larger
No. 7, 7/16"	2" ID or larger
No. 8, 1/4"	2" ID or larger

Figure 13

3.0 OPERATION

⚠ WARNING

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

3.1 Startup

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

3.1.2 Make sure that the safety petcock located on the inlet valve is open to prevent unintentional blasting. The petcock is open when the petcock lever is in-line with the petcock, as shown in Figure 14.

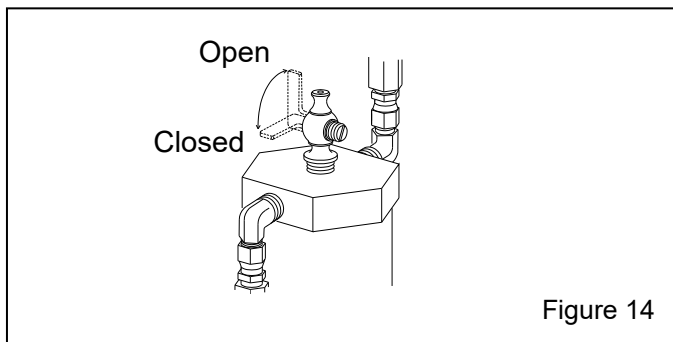


Figure 14

⚠ WARNING

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

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

⚠ WARNING

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

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

⚠ WARNING

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

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

3.1.6 Fill the machine with screened, clean, dry abrasive that is specifically manufactured for abrasive blasting. **NOTE: Use only abrasives specifically manufactured for blasting that are compatible with the surface being blasted. Abrasives produced for other applications may be inconsistent in size and shape and produce an unsatisfactory finish, contain particles that could jam the abrasive metering valve, or cause irregular wear.**

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

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

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

3.2 Blasting Attire

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

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

▲ WARNING

All dust is hazardous to breath. 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.

Obtain a safety data sheet (SDS) for the blast abrasive to identify hazardous substances. Silica sand (crystalline) can cause silicosis, lung cancer, and breathing problems in exposed workers. Slag abrasives may contain trace amounts of toxic metals such as arsenic, beryllium, and cadmium. Any abrasive dust has potential to cause lung disease.

Abrasive blasting operations can create high levels of harmful dust and noise. No dust is safe to breathe. Failure to wear NIOSH-approved respirators can result in serious lung disease or death. The respirators must be properly fitted and maintained. Use only NIOSH-approved, Type CE supplied-air respirators approved for abrasive blasting.

Loud noise generated by the use of compressed air can cause hearing damage. Everyone in the blasting area must wear approved hearing protection.

During abrasive blasting, abrasive and dust particles in the area around the blast machine and blast nozzle become airborne. Everyone working in the vicinity of abrasive blasting must wear properly maintained, NIOSH-approved, respiratory protection, eye protection, and hearing protection, appropriate for the job site hazards.

It is the employer's responsibility to train employees to identify hazardous substances and to provide suitable policies, procedures, monitoring, recordkeeping, and personal protective equipment.

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

3.3 Pressurize Blast Machine to Start Blasting

3.3.1 Don all protective blasting attire, per Section 3.2.

3.3.2 When the blast operator is ready to blast, the operator or the machine tender must 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 opening under the control lever but from nowhere else. The air escaping at the control handle is an audible signal meaning air is supplied to the blast machine, which will activate when the control handle is pressed.

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

3.3.4 Fold down the safety lever-lock and press the remote control handle, as shown in Figure 15. Within a few seconds the pop-up valve will automatically close, and the blast machine will pressurize to start blasting.

▲ WARNING

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

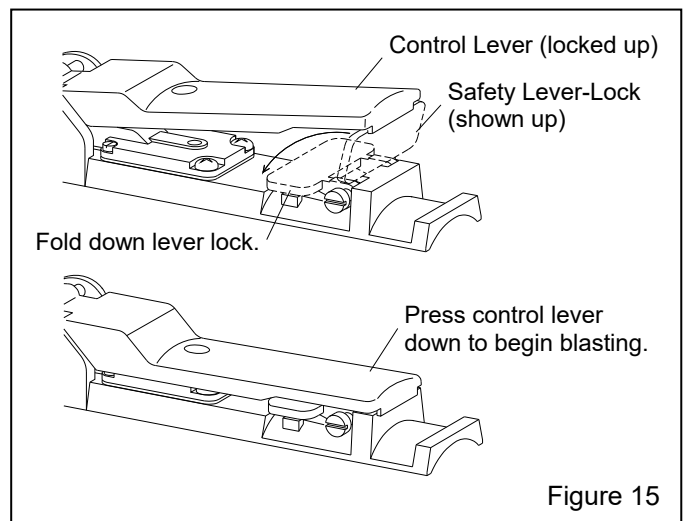


Figure 15

▲ WARNING

OSHA requires the use of remote controls on all blast machines when an operator controls the nozzle. To comply with OSHA regulations, the remote control handle, which starts and stops the flow of air and abrasive, must be held down manually. Never tie down the control-handle lever or attempt to bypass any part of the remote control system. Doing so will defeat the purpose of the fail-to-safe feature of the remote control. Serious injury or death can result from uncontrolled blasting. Ref. 29 CFR 1910.244 (b).

3.3.5 If the abrasive metering valve is closed as instructed, only air will exit the nozzle. Adjust abrasive flow as instructed in the blast machine's operation manual.

⚠ WARNING

OSHA requires the use of remote controls on all blast machines when an operator controls the nozzle. To comply with OSHA regulations, the remote control handle, which starts and stops the flow of air and abrasive, must be held down manually. Never tie down the control-handle lever or attempt to bypass any part of the remote control system. Doing so will defeat the purpose of the fail-to-safe feature of the remote control. Serious injury or death can result from uncontrolled blasting. Ref. 29 CFR 1910.244 (b).

3.4 Operation of the Optional Abrasive Cutoff Switch (ACS) – Figure 16

3.4.1 The ACS allows the operator to open and close the metering valve so that air alone without abrasive exits the nozzle. Common uses for this feature are:

- Clearing abrasive from the blast hose when blasting is finished. This is helpful in many applications and necessary when the blast hose is vertical. It prevents abrasive from collecting in low spots in the blast hose, eliminating excessive abrasive slugging at startup.
- Blowing abrasive off the blasted surface. **NOTE: Small amounts of residual abrasive may exit the nozzle with the air, requiring blowing off or otherwise cleaning surface outside the blasting area prior to painting.**
- When wetblasting with an injector or wetblast attachment, the ACS is used to assist in drying the surface after it is washed down.

3.4.2 The abrasive cutoff switch is situated directly behind the control handle. The switch may be flipped open or closed at any time, but it will not operate the metering valve unless the control handle is pressed.

3.4.2.1 Blast Mode Moving the ACS toggle away from the nozzle to the ON (CYL port) position sends control air to the abrasive metering valve and opens the valve so that the blast machine operates normally with air and abrasive coming out the nozzle.

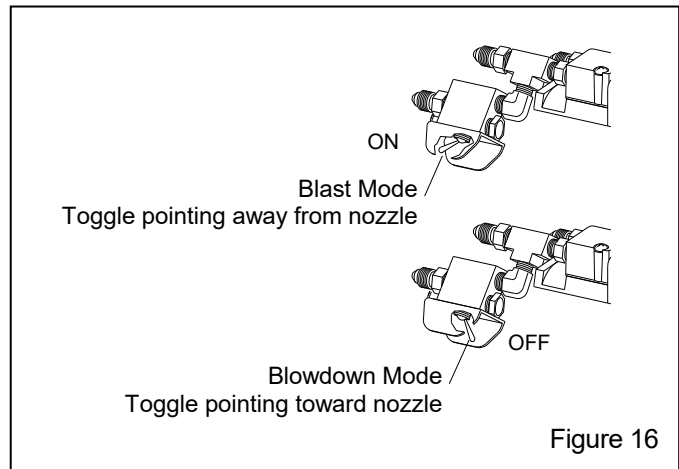


Figure 16

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

⚠ WARNING

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

3.5 Stop Blasting

3.5.1 To stop blasting, release the control-handle lever. The inlet valve closes, the outlet valve opens 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 lever is released, the safety lever-lock will flip up to lock the control lever in the UP (no blast) position. Make sure the safety lever-lock is UP to prevent the control lever from engaging.

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

WARNING

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

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

4.0 PREVENTIVE MAINTENANCE

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

4.1 Daily Inspection and Maintenance

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

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

WARNING

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

4.1.2 During blasting, do the following:

- Check the control handle for leaks.

4.2 Weekly Inspection and Maintenance

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 and Maintenance

NOTE: Periodic inspection of the following items will prevent unscheduled downtime.

4.3.1 The remote control system is a safety device; for safety and to avoid unscheduled downtime, periodically inspect the internal parts of the inlet valve, outlet valve, and abrasive trap. Inspect for wear and lubrication of O-rings, pistons, springs, seals, and castings. Refer to *Section 5.0: Service Maintenance*.

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

4.4 Lubrication

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

5.0 SERVICE MAINTENANCE

⚠ WARNING

To avoid serious injury from the sudden release of trapped compressed air, observe the following before performing any maintenance:

1. Depressurize the blast machine.
2. Turn OFF the compressed-air supply.
3. Bleed the air-supply line to the blast machine.
4. Lockout (be certain the air supply is OFF and that it cannot be started while work is in process) and tagout (be certain the air supply is clearly marked to prevent re-starting while work is in process) the compressed-air supply.

5.1 Inlet Valve

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

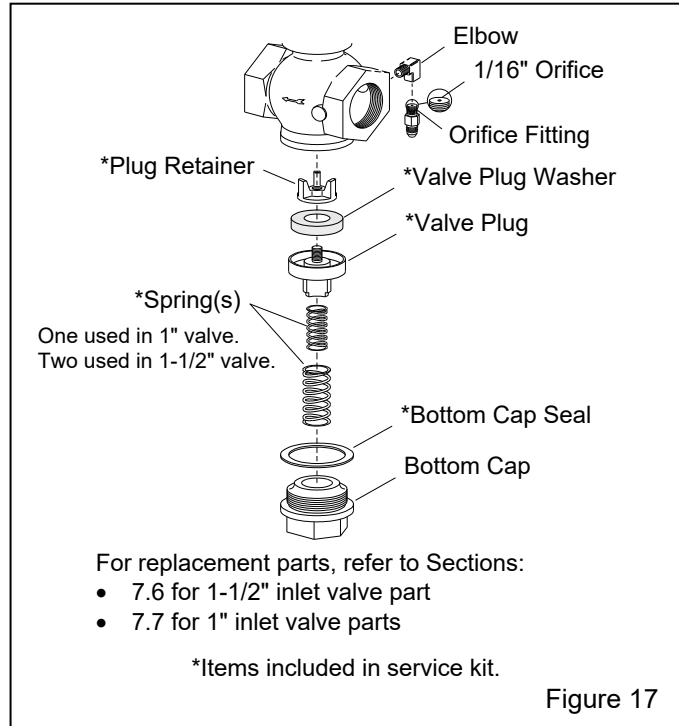
5.1.1 Bottom Section – Figure 17

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

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

5.1.1.3 Clean all parts and inspect for wear as follows:

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



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

⚠ WARNING

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

5.1.1.5 If the top section of the valve requires service, continue to Section 5.1.2. Otherwise, refer to the illustration in Figure 17 to reassemble the valve in reverse order.

5.1.2 Top Section – Figure 18

5.1.2.1 Remove the control hose and fittings from the cylinder cap to prevent damaged by a wrench.

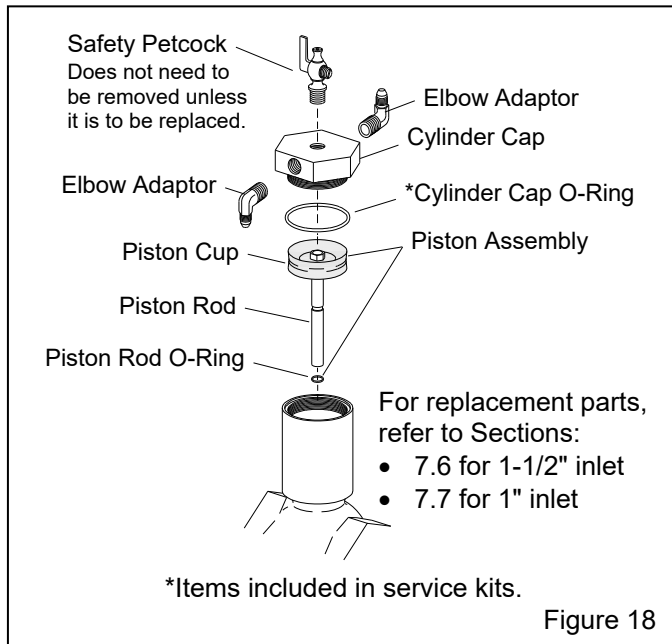
5.1.2.2 Use a pipe wrench to remove the cylinder cap.

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

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

5.1.2.5 Inspect all items for wear and damage:

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



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

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

5.1.2.8 Refer to the illustrations in Figure 17 and 18 to reassemble the remainder of the valve in reverse order.

5.2 Piston Outlet Valve – Figure 19

To service the diaphragm outlet valve, refer to Section 5.3.

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

5.2.2 Remove the control hose from the valve bonnet's elbow adaptor. **NOTE: The elbow adaptor and**

plug do not need to be removed unless they need to be replaced.

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

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

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

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

5.2.7 Inspect all parts for wear and damage as follows:

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

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

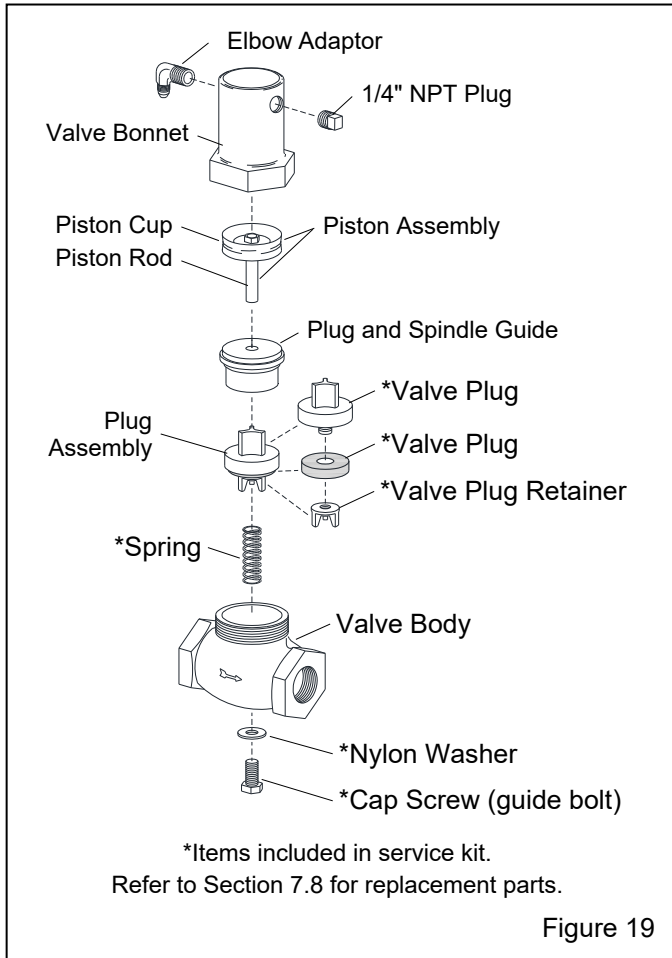
5.2.9 Install the piston into the bonnet's cylinder. Cocking the piston so it enters the bonnet at a slight angle, and rotating it while applying pressure makes assembly easier. Do not push the piston fully into the bonnet; the rod should be flush with the opening.

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

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

5.2.12 To assemble the bonnet to the valve body, first insert the piston rod into the spindle guide hole. While keeping the bonnet, spindle, and body aligned, screw the bonnet onto the body. If all parts are correctly aligned, the body will screw on hand-tight until it is seated.

NOTE: If the bonnet does not screw on hand tight, do not force it; recheck alignment and repeat assembly.



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

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

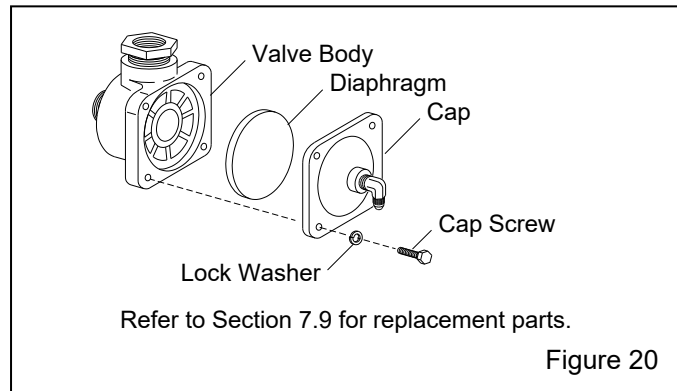
5.3 Diaphragm Outlet Valve – Figure 20

To service the piston outlet valve, refer to Section 5.2.

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

5.3.2 Remove the cap by unscrewing the four cap screws.

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



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

5.3.5 Reassemble in reverse order.

5.4 Abrasive Trap – Figure 21

⚠ WARNING

To avoid serious injury from the sudden release of trapped compressed air, all service on the blast machine must be done with the air OFF, the air supply locked out and tagged out, and the air-supply line bled.

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

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

5.4.2 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:

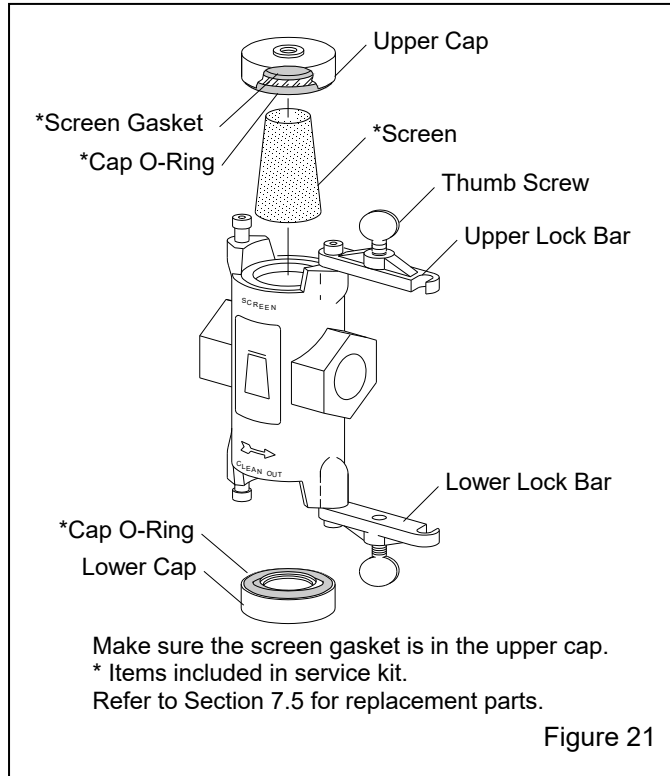
5.4.3 To clean the bottom section of the trap, loosen the thumb screw on the lower lock bar, swing the lock bar off the lower cap, and then remove the cap.

5.4.4 Empty all abrasive from the bottom and top sections.

5.4.5 Install the screen in the top section. The smallest diameter end of the screen must face up, as shown in Figure 21.

5.4.6 Reassemble the upper and lower caps.

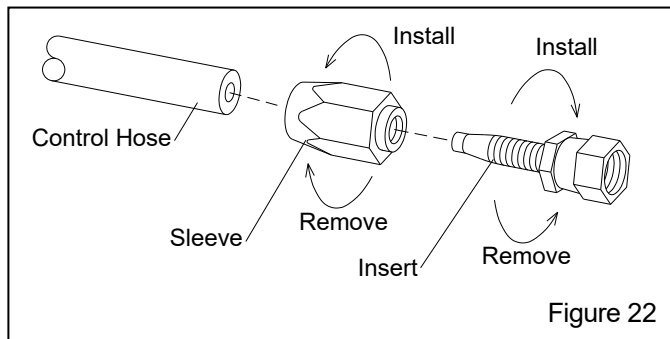
NOTE: The upper and lower caps are identical except the screen gasket is glued into the upper cap. Make sure the screen gasket is in place in the upper cap and the O-rings are in place on both caps before assembly.



5.5 Remove and Install Reusable Control-Hose Fittings – Figure 22

5.5.1 Control hoses may be shortened and cut to length as follows:

1. Remove the hose end by placing the sleeve in a vise or use a backup wrench on the sleeve to prevent it from turning. Unscrew the insert by turning it counterclockwise.
2. Turn sleeve clockwise to remove from the hose.
3. Cut hose to length.
4. Lubricate inside and outside of hose with SAE 20 or equal oil.



5. Turn sleeve counterclockwise to install on hose. Do not overtighten the sleeve; stop tightening as soon as the hose bottoms out against the sleeve's internal shoulder, and back it out 1/4 turn. Overtightening will cause the hose to curl inward and could cause blockage.
6. Push end of insert into sleeve and turn clockwise to tighten until the insert hex is against the sleeve.

5.6 RLX Control Handle

5.6.1 A separate manual is provided for the control handle. Refer to manual 10575 to service the RLX Control Handle.

5.7 Metering Valve (for ACS systems only)

5.7.1 A separate manual is provided for the metering valve. Follow instructions in the manual to service the metering valve.

6.0 TROUBLESHOOTING

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

⚠ WARNING

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

- Turn OFF the air, and lockout and tagout the air supply.
- When air is required to check the controls, always enlist the aid of another person to operate the control handle while holding the nozzle securely and pointing it in a safe direction.
- Never strap down the remote-control-handle lever in the operating position.

6.1 Blasting does not start when the control-handle lever is depressed

6.1.1 Does the blast machine pressurize? If it does, refer to the troubleshooting section of the blast-machine operation manual.

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

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

6.1.4 With the control lever up, check for air escaping through the opening under the lever. If no air is escaping, the orifice fitting on the inlet valve (refer to Figure 23) is blocked, or the outbound line from the orifice to the control handle is blocked and must be cleared.

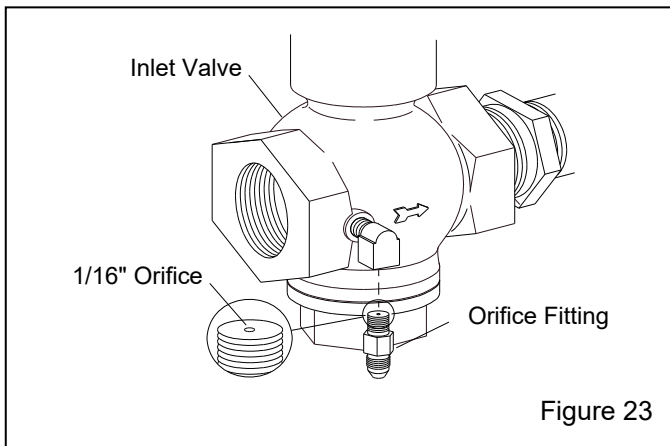


Figure 23

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

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

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

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

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

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

6.1.9 Close the safety petcock and press the control lever. Make sure no air escapes through the vent hole

on the cylinder body of the inlet valve body. Air escaping from this vent indicates a worn piston or piston O-ring in the inlet valve. Refer Section 5.1.

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

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

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

6.2 Outlet valve won't exhaust or exhausts too slowly

6.2.1 Abrasive trap screen blocked, or abrasive trap needs to be emptied. Empty the trap and clean the screen at least twice daily. Replace the screen as needed. Refer to Section 5.4.

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

6.2.3 After releasing the control handle, open the safety petcock on the inlet valve:

- If the machine does depressurize, control air remains in the control lines. Refer to Paragraphs 6.2.4, 6.2.5, 6.2.6, and 6.2.7.
- If the machine does not depressurize, the inlet valve is not fully closing or the outlet valve is not fully opening. Refer to Paragraphs 6.2.8, 6.2.9, and 6.2.10.

6.2.4 Check the pneumatic adaptor gasket on the control handle for swelling, which restricts air flow through the handle exhaust opening. The RLX control handle is covered in Manual No. 10574.

6.2.5 Inspect the exhaust opening in the control-handle pneumatic adaptor; make sure it is clear of obstruction that restricts air from escaping through the opening.

6.2.6 Check for blockage in the control hose.

6.2.7 Inspect the orifice fitting on inlet valve (refer to Figure 23) and make sure it has not been switched for a fitting with a full-flow orifice. The orifice on the 1/8" NPT end of the fitting must be 1/16" diameter.

6.2.8 Make sure the inlet valve closes when the control handle is released. If it does not seal off incoming compressed air, the valve requires service. Refer to Section 5.1.

6.2.9 Make sure the piston outlet valve fully opens when the control handle is released. If it does not, service the valve, per Section 5.2.

6.2.10 Diaphragm in optional diaphragm outlet valve has taken a set toward the blast machine. Refer to Section 5.3 and reverse the diaphragm.

6.3 Optional ACS Feature

6.3.1 No abrasive when the ACS toggle is moved to ON blast mode

6.3.1.1 Machine empty of abrasive. Check abrasive level.

6.3.1.2 Make sure the metering valve’s abrasive flow control is in the open position.

7.3.1.3 Make sure the ACS toggle is pointing in the ON position, away from the nozzle.

6.3.1.4 Check for leak or blockage in the single-line hose or fittings between the control handle’s ACS switch and the metering valve.

6.3.1.5 Obstruction in abrasive valve or valve requires service. Refer to the metering valve manual for operation of the metering valve.

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

6.3.2.1 Brass filter on ACS switch clogged. Inspect filter for blockage.

6.3.2.2 Metering valve requires service. Refer to the metering valve manual for operation of the metering valve.

7.0 REPLACEMENT PARTS

7.1 Hose Safety Accessories – Figure 24

NOTE: Spring-lock pins are affixed to nylon couplings. When connecting two nylon coupling together, make sure the coupling lock pins are at 180 degrees (pins should enter the open hole of the adjoining coupling). One lock pin, as shown in Figure 24, is used when connecting a nylon coupling to a metal coupling, and two lock pins are used when connecting two metal couplings together.

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

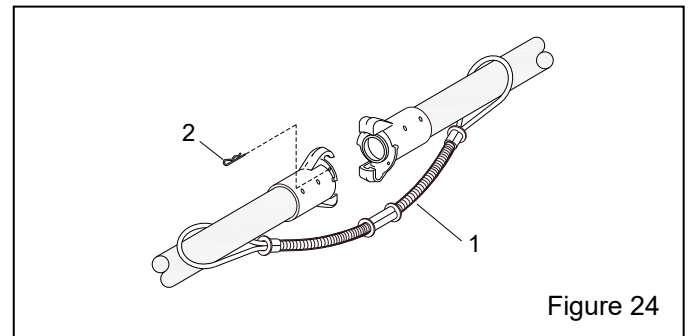


Figure 24

7.2 TLR-100/300 Remote Control Systems

Standard Remote Control Systems (without ACS)

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

Remote Control Systems with ACS

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

7.3 System Replacement Parts – Figure 25

Item	Description	Stock No.
1.	Outlet valve, 1" piston	01967
2.	Outlet valve, 1" diaphragm	03371
3.	Inlet valve 1"	01980
4.	Inlet valve 1-1/2"	01995
5.	Abrasive trap	02011
6.	RLX control handle	10565
7.	Hose, 3/16" x 18" coupled	02454
8.	Hose, 5' twinline coupled	01952
9.	Hose end, reusable	01943
10.	Hose, 50' twinline coupled	01951
11.	Union, twinline hose	01944
12.	Elbow, 1/4" NPT adaptor	02513

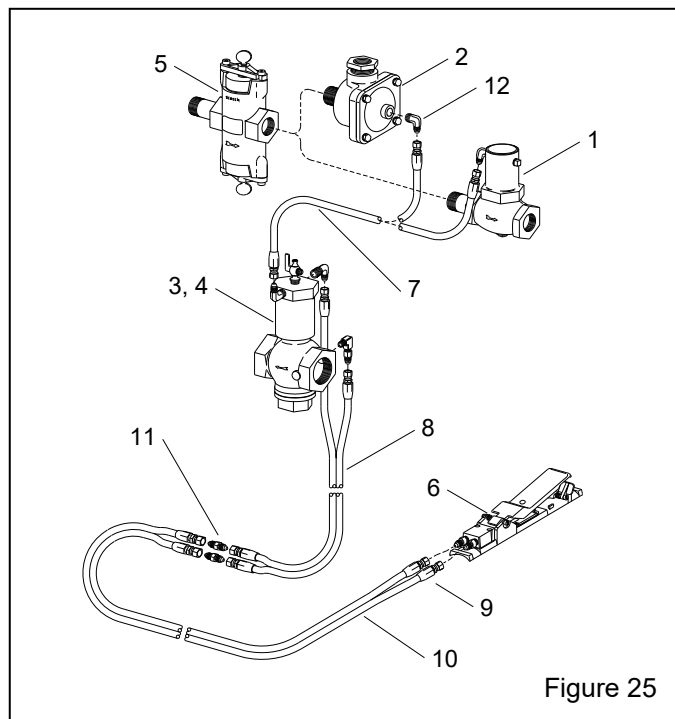


Figure 25

7.4 ACS System Replacement Parts – Figure 26

All other parts are the same, as shown in Section 7.3 and Figure 25. Refer to the RLX manual for replacement parts for the ACS Control. Refer to the metering valve manual for metering valve replacement parts.

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

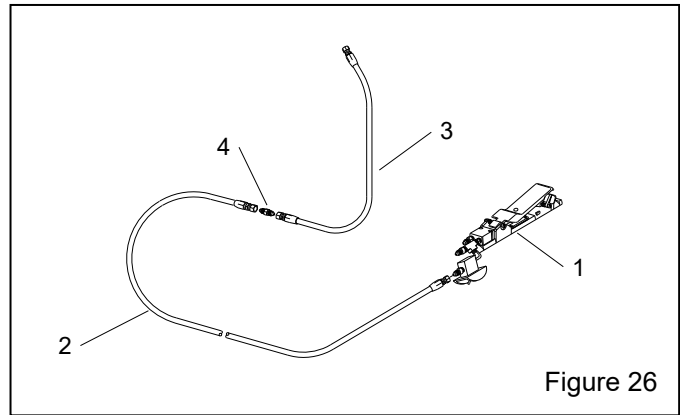


Figure 26

7.5 Abrasive Trap – Figure 27

Item	Description	Stock No.
(-)	Abrasive trap, complete	02011
1.*	Screen (3)	02012
2.*	O-ring (2)	02013
3.	Cap	02014
4.	Body	02015
5.	Lock bar	02016
6.	Screw, 3/8" NC x 1" thumb	03289
7.	Screw, 3/8" x 3/8" shoulder	03291
8.*	Gasket, screen, 1/8" thick (1)	02434
9.*	Label, "clean screen twice daily" (1)	02129
10.	Nipple, 1" NPT x 3" long	01703
(-)	Service kit, includes items marked *, quantity is shown in ()	01925

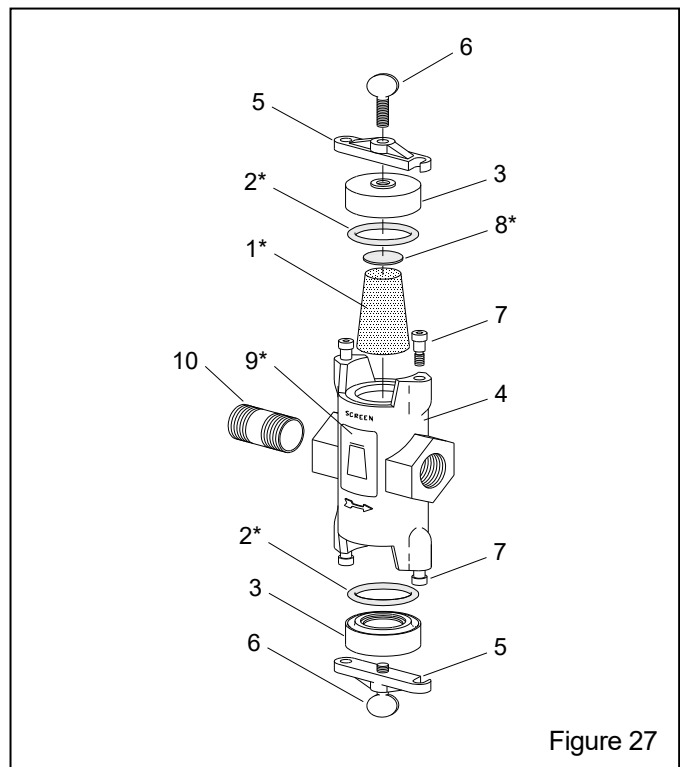
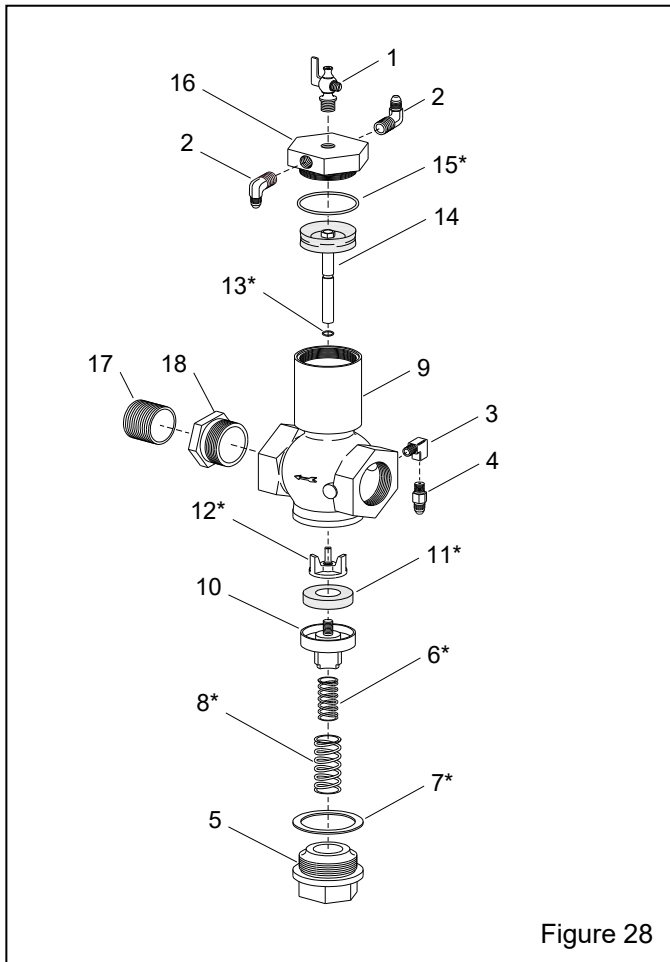


Figure 27

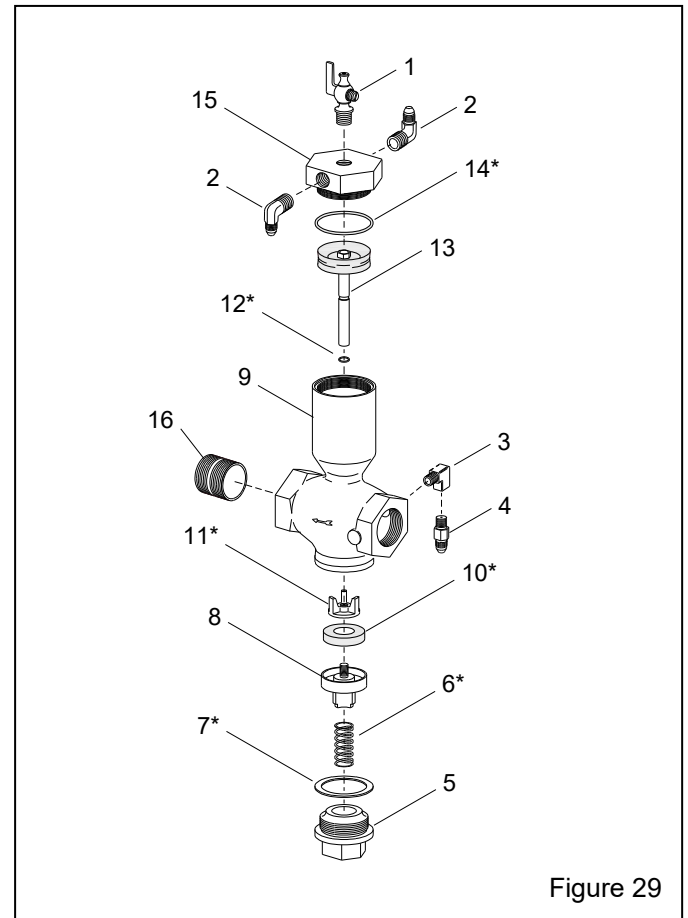
7.6 1-1/2" Inlet Valve – Figure 28

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
17.	Nipple 1-1/4" NPT x close	01717
18.	Bushing, 1-1/2" NPT x 1-1/4"	01805
(-)	Service kit, includes items marked *, quantity is shown in ()	01927



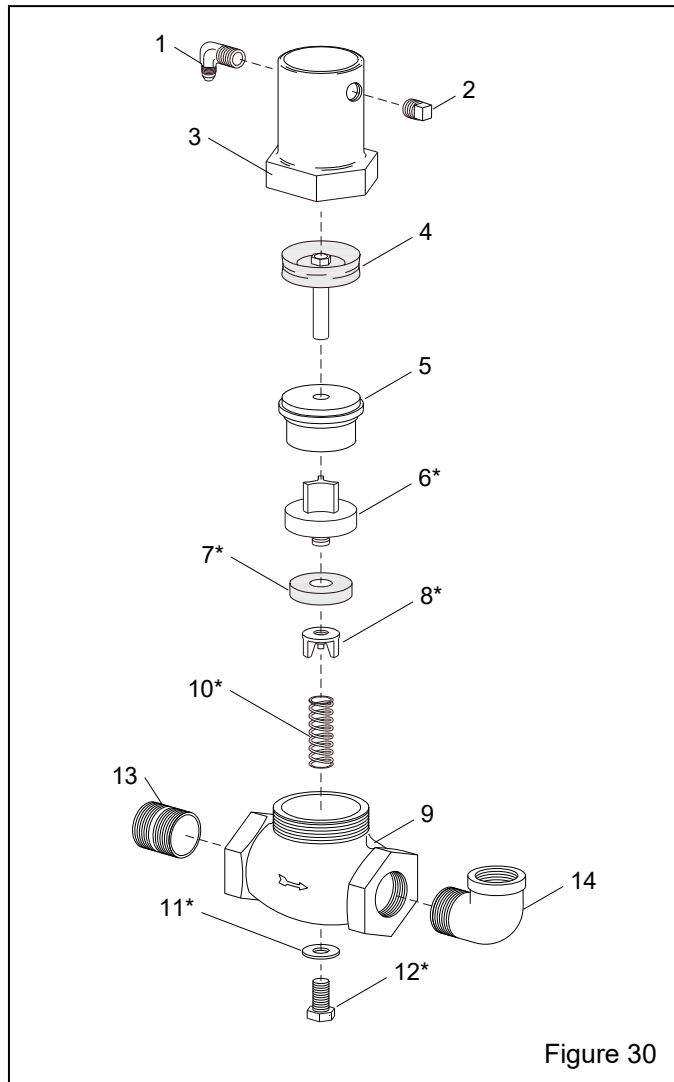
7.7 1" Inlet Valve – Figure 29

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
16.	Nipple, 1" x close	01701
(-)	Service kit, includes items marked *, quantity is shown in ()	01929



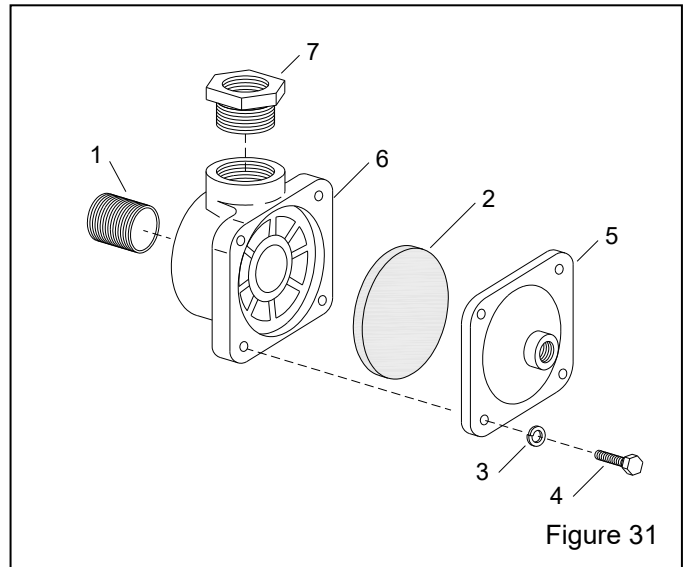
7.8 1" Piston Outlet Valve – Figure 30

Item	Description	Stock No.
(-)	1" Piston outlet valve, complete	01967
1.	Elbow, 1/4" NPT adaptor	02513
2.	Plug, 1/4" NPT	01950
3.	Bonnet	01970
4.	Piston and rod assembly	01976
5.	Plug and spindle guide	01971
6.*	Valve plug (1)	01972
7.*	Washer, valve plug (2)	01969
8.*	Retainer, valve plug washer (1)	01986
9.	Valve body	01968
10.*	Spring, 7/16" x 1-5/8" long (1).....	01974
11.*	Washer, nylon (1)	01979
12.*	Cap screw, 3/8-NC x 3/4" (1)	03251
13.	Nipple, 1" x close	01701
14.	Elbow, 1" x 90° street	01775
(-)	Service kit, includes items marked *, quantity is shown in ()	01928



7.9 1" Diaphragm Outlet Valve – Figure 31

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



7.10 RLX Pneumatic Control Handle

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