

**THREE CU. FT. BLAST MACHINE WITH
PNEUMATIC TLR-100 REMOTE CONTROLS
O. M. 22564**

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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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1.0 INTRODUCTION

1.1 Scope of manual

1.1.1 These instructions cover set-up, operation, maintenance, troubleshooting, and replacement parts for Clemco Blast Machines with TLR-100 Pneumatic Recova Remote Controls. These instructions also contain important safety information required for safe operation of the machine. The following separate instruction manual is provided for the remote control handle.

RLX Control Handle, Manual No. 10574

1.1.2 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. The operators and all personnel involved with the abrasive blasting process must know about the hazards associated with abrasive blasting. Before using the machine, all personnel involved with the blast machine operation must read this entire manual, including the orange cover, and all accessory manuals.

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 Components and Operating Principles

1.3.1 Components

1.3.1.1 The primary components of the blast machine and the remote control system are shown in Figure 1. Additional components of the remote controls are shown in Figure 2.

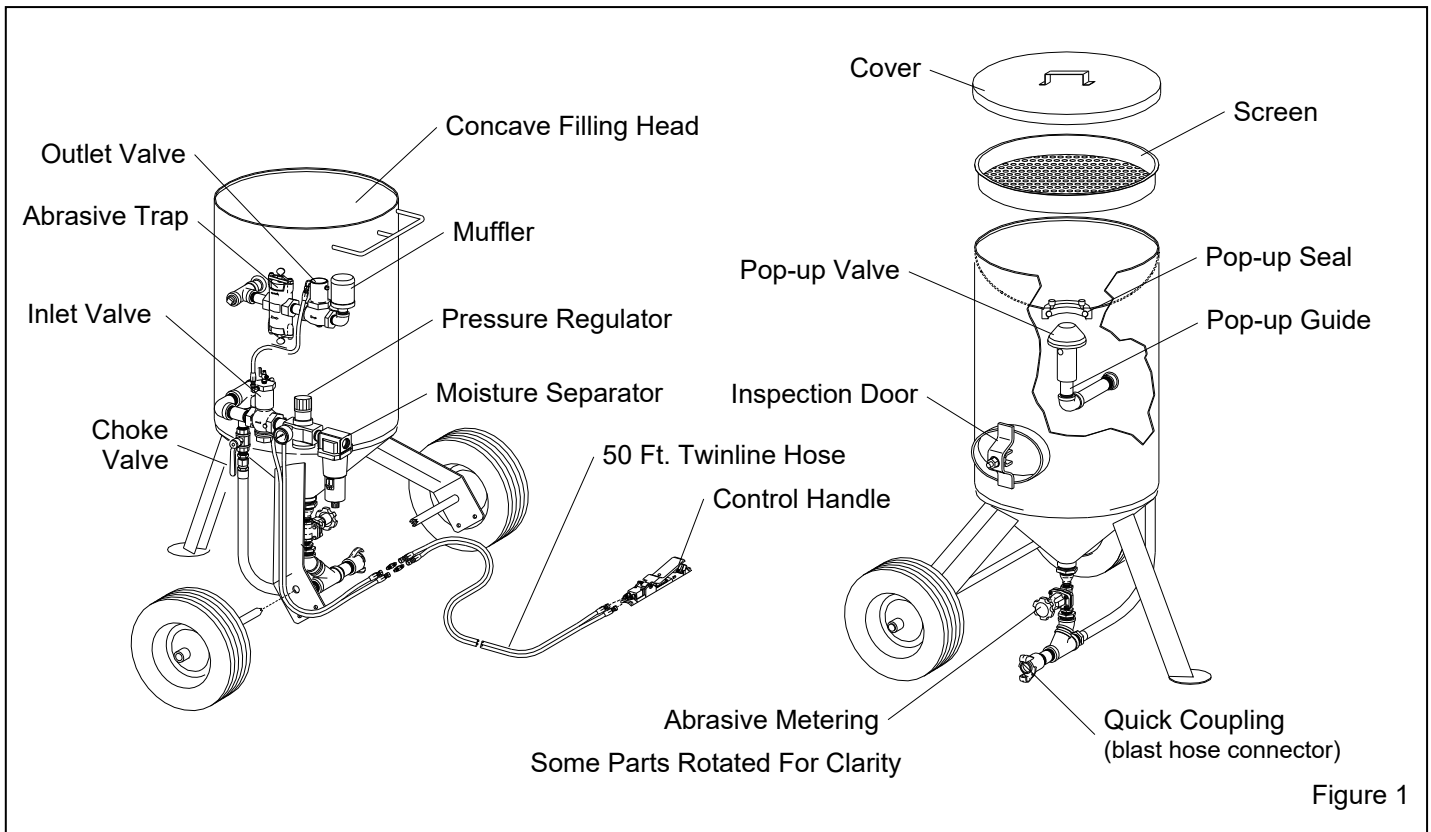
1.3.2 Blast Machine

1.3.2.1 Clemco blast machines (pressure vessels) are manufactured to American Society of Mechanical Engineers (ASME) standards, as described in Section VII, Div. 1, and carry National Board certification. It is the owner's responsibility to maintain the integrity of the vessel in accordance with the requirements of state regulations. Regulations may include regular inspection and hydrostatic testing as described in National Board Inspection Code and Jurisdictional Regulations and /or Laws.

WARNING

Welding, grinding, or drilling on the blast machine could weaken the vessel. Compressed air pressure could cause a weakened blast machine to rupture, resulting in death or serious injury. Welding, grinding, or drilling on the blast machine vessel, without a National Board "R" stamp voids the ASME and National Board certification.

1.3.2.2 All welding repairs done on the vessel must be performed by certified welders at shops holding a National Board "R" Stamp. Welding performed by any welder not properly qualified per the ASME Code voids ASME and National Board certification of the vessel.



1.3.2.3 This blast machine is rated for a maximum of 125 psi (pounds per square inch); do not exceed the rated pressure.

▲ WARNING

Excessive compressed air pressure could cause a blast machine to rupture. To prevent serious injury or death, do not exceed the rated pressure of the blast machine vessel.

1.3.2.4 OSHA does not require pressure relief valves on blast machines when air compressors supplying air to the blast machines are built to ASME⁽¹⁾ specifications and comply with OSHA⁽²⁾ regulations. ASME Manual section VIII, Division 1, UG-125, paragraph A90 (g) states that pressure relief valves or protective devices "...need not be installed directly on a pressure vessel when the source of pressure is external to the vessel and is under such positive control that the pressure in the vessel cannot exceed the maximum allowable working pressure at the operating temperature...". OSHA regulation 1910.169 refers to the above ASME code when describing the necessity of pressure relief valves on compressed air equipment. **DO NOT** operate blast machines with air compressors that are not equipped with properly functioning pressure relief valves.

(1) American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, 1989

(2) Occupational Safety and Health Administration, 29 CFR 1910, Subpart M - Compressed Gas and Compressed Air Equipment.

1.3.3 Remote Controls

1.3.3.1 The blast machine is equipped with remote controls that allows the blast operator to pressurize the machine to start blasting, and depressurize it to stop blasting, at the nozzle.

▲ 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, which may cause serious injury, can occur.

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

1.3.3.3 The components of the remote control system are shown in Figures 1 and 2. They include the inlet valve, outlet valve, RLX Control Handle, 50-foot and 5-foot long twinline control hoses, 2 control hose unions, and an 18-inch long interconnecting hose.

1.3.3.4 TLR-100 Remote Controls are pressure-release-style systems which control the pressurization and depressurization of the blast machine. Pressurization, which starts blasting, occurs when the control handle is pressed. Depressurization, which stops blasting, occurs when the handle is released.

1.3.3.5 Clemco remote controls operate pneumatically on return air (See Figure 2). If the control handle lever (the main activator of the system) is in the up (no blast) position, one stream of air travels down the outbound line, shown as the dark line in Figure 2, and escapes through an opening located under the lever. The normally-closed inlet valve remains closed, and the normally-open outlet valve remains open. When the control handle lever is pressed, the opening under the lever is sealed, and air in the outbound line returns through the inbound line to open the inlet valve and close the outlet valve. This action pressurizes the blast machine and begins the blasting process. Releasing the handle exhausts control air, which closes the inlet valve, and opens the outlet valve to depressurize the blast machine and stop blasting.

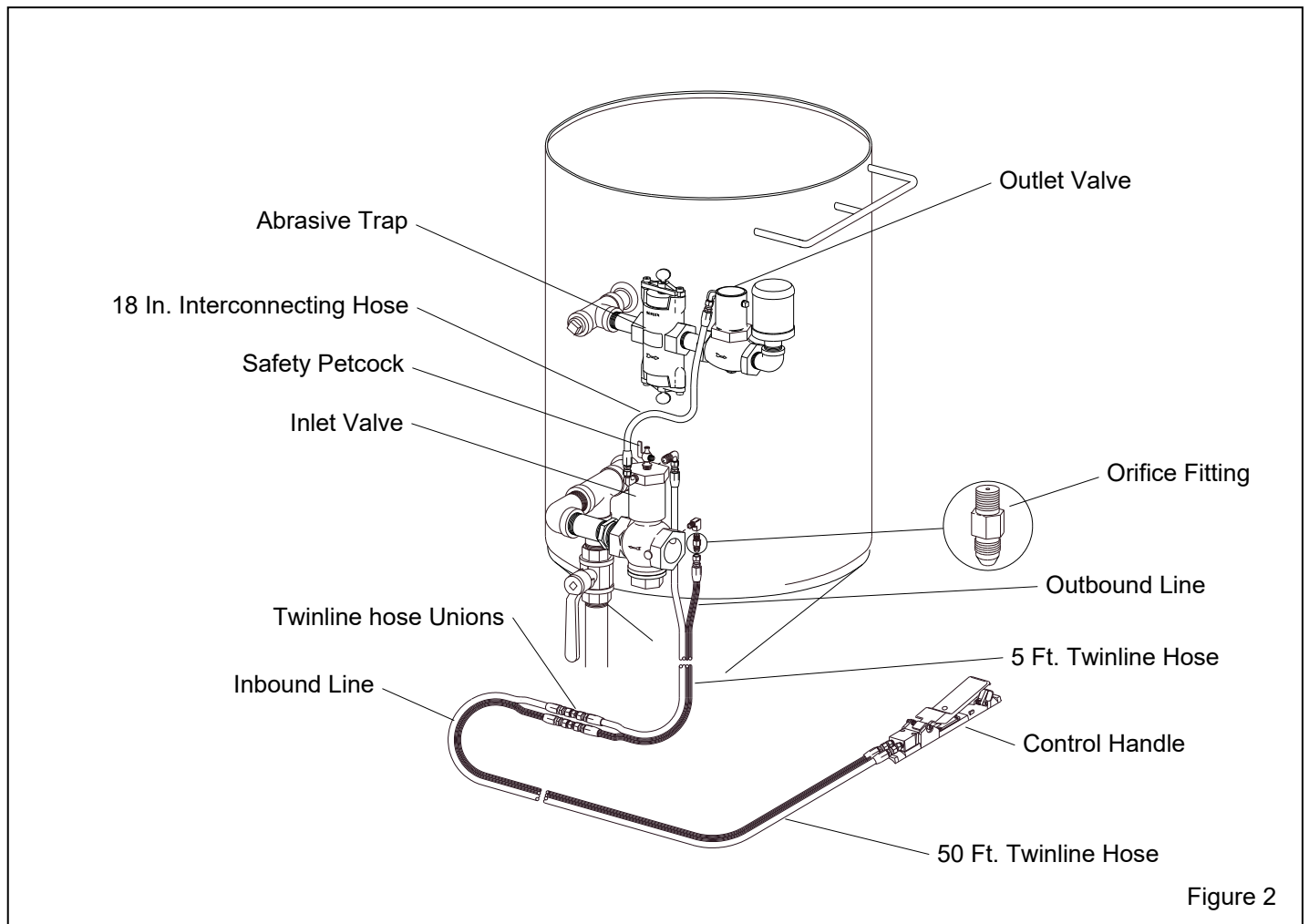


Figure 2

2.0 INITIAL SET-UP

2.1 Blast Machine Set-Up

▲ WARNING

Clemco supplies an exhaust muffler with all blast machines of 2 cu. ft. capacity and larger. The muffler reduces exhaust noise and prevents abrasive from exhausting upward or sideways into the air. When the blast machine is depressurized, the muffler body 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, as shown in Figure 1.

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 abrasive which escapes when the blast machine is depressurized.

▲ WARNING

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

2.1.1 Attach the 5-foot twinline hose to the inlet valve as shown in Figure 2, one side connects to the unused upper elbow, the other to the orifice fitting. Either side can connect to either fitting.

2.1.2 Locate the two twinline hose unions, and screw them into the unattached fittings of the 5-foot twinline hose.

2.1.3 Install an optional filter/moisture separator to the inlet valve. The filter is recommended at this location to remove moisture from air before it enters the machine.

2.1.4 Install an air supply hose fitting to the inlet valve (or moisture separator), that is compatible with the compressed-air supply hose. See Section 3.2.2.

2.2 Blast Hose and Control Hose Connections

▲ WARNING

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

2.2.1 Uncoil the blast hose and lay the 50-foot twinline hose alongside it.

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

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

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

2.2.5 Temporarily connect the blast hose to the quick coupling on the blast machine.

2.2.6 Connect the 50-foot twinline hose to the unions attached to the 5-foot twinline that is already attached to the blast machine. Either side of the twinline can connect to either union.

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

3.0 OPERATION

3.1 Transporting and moving

▲ WARNING

- Always empty the blast machine before lifting or hoisting.
 - Never hoist the machine by the handle or piping, or with a sling through the handle or piping.
 - Always use lift equipment that is rated higher than the weight of the machine and accessories.
 - When transporting a machine on a pallet, always securely attach the machine to a sturdy pallet.
 - Always securely anchor the machine to the transport vehicle.
 - Anyone using material handling equipment to move, transport, or lift the machine must be experienced, and able to recognize and avoid hazards associated with handling this type of machinery, and to safely operate the equipment.
 - Failure to observe these warnings could result in serious injury or death.
-

3.1.1 Transporting a blast machine

3.1.1.1 Always empty the machine before transporting. Transporting a machine containing abrasive may increase the weight to an unsafe handling limit, and could cause abrasive to settle in the piping.

3.1.2 Moving a blast machine

▲ WARNING

Never attempt to manually move a blast machine when it contains abrasive. Empty machines may be moved when the following criteria are met:

3.1.2.1 An empty machine may be moved manually, on level flat surfaces, by at least two people.

▲ WARNING

Do not manually move the machine on an incline, or on a slippery or irregular surface that could cause the operator to slip or lose balance. Sudden weight shifts when the machine is tilted on an incline, and slipping or tripping while moving the machine will cause the operator to lose control of the machine, causing severe injury and property damage.

3.1.2.2 Move the machine by pushing it in a forward direction. Do not back-up while moving the machine, as potential tripping hazards cannot be seen.

3.1.2.3 The Clemco Mule (Stock No. 20331) is designed to assist in moving empty Clemco blast machines. Contact a Clemco Distributor for additional information.

3.2 Set-Up for Operation

3.2.1 Locate the compressor upwind from the blasting operation to prevent contaminated air from entering the compressor intake.

3.2.2 Connect an air line from the compressor to the air supply hose connector installed on the blast machine inlet. For best blasting performance, use 1-1/4" ID or larger air line when using up to a 5/16" orifice nozzle, 1-1/2" or larger when using a 3/8" nozzle, and 2" or larger when using up to a 1/2" nozzle.

3.3 Start-Up

3.3.3 Make sure the coupling gaskets are in place (and in good condition) before connecting the blast hose to the quick coupling on the blast machine. Use safety lock-pins or safety wire to lock the couplings together, to prevent accidental separation during blasting.

Compressed Air Requirements and Abrasive Consumption								
Consumption rates are based on abrasive that weigh 100 pounds per cubic foot								
Orifice Size (in.)	Pressure At The Nozzle (psi)							Air, Power and Abrasive Requirements
	50	60	70	80	90	100	125	
No. 2 1/8"	11	13	15	17	19	20	25	Air (cfm)
	67	77	88	101	112	123	152	Abrasive (lbs/hr)
	2.5	3	3.5	4	4.5	5	5.5	Compressor (hp)
No. 3 3/16"	26	30	33	38	41	45	55	Air (cfm)
	150	171	196	216	238	264	319	Abrasive (lbs/hr)
	6	7	8	9	10	10	12	Compressor (hp)
No. 4 1/4"	47	54	61	68	74	81	98	Air (cfm)
	268	312	354	408	448	494	608	Abrasive (lbs/hr)
	11	12	14	16	17	18	22	Compressor (hp)
No. 5 5/16"	77	89	101	113	126	137	168	Air (cfm)
	468	534	604	672	740	812	982	Abrasive (lbs/hr)
	18	20	23	26	28	31	37	Compressor (hp)
No. 6 3/8"	108	126	143	161	173	196	237	Air (cfm)
	668	764	864	960	1052	1152	1393	Abrasive (lbs/hr)
	24	28	32	36	39	44	52	Compressor (hp)
No. 7 7/16"	147	170	194	217	240	254	314	Air (cfm)
	896	1032	1176	1312	1448	1584	1931	Abrasive (lbs/hr)
	33	38	44	49	54	57	69	Compressor (hp)
No. 8 1/2"	195	224	252	280	309	338	409	Air (cfm)
	1160	1336	1512	1680	1856	2024	2459	Abrasive (lbs/hr)
	44	50	56	63	69	75	90	Compressor (hp)

- For nozzle sizes 3/8" to 1/2", blast machines should be equipped with 1-1/4" or larger piping and inlet valve to prevent pressure loss.
- Air requirements were measured by a flow meter under actual blasting conditions, and are therefore lower than figures for air alone, with no abrasive.
- Horsepower requirements are based on 4.5 cfm per horsepower.
- Figures are for reference only, and may vary for different working conditions. Several variables, including metering valve adjustments, can affect abrasive flow.

Figure 3

3.3.4 Make sure that all compressed-air supply hose connections are secured with safety lock pins and safety cables to prevent accidental separation or disconnection. Lock pins and safety cables are listed in Section 7.1.

3.3.5 Connect the ends of the 50-foot twinline hose to the unions on the 5-foot twinline hose. Either side of the hose can be attached to either fitting.

3.3.6 Check to make sure that all fittings are secure. Leaks will cause the system to malfunction.

3.3.7 Make sure that all blast hose and compressed-air supply hose connections are secured with safety lock pins and safety cables to prevent accidental disconnection.

3.3.8 Check that the choke valve is open (handle in-line with the piping).

⚠ WARNING

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

3.3.9 Close the abrasive metering valve. Closed position is when the metering knob is turned fully clockwise.

3.3.10 Make sure that the safety petcock located on the inlet valve is open. Open position is when the lever is in-line with the petcock, as shown in Figure 4.

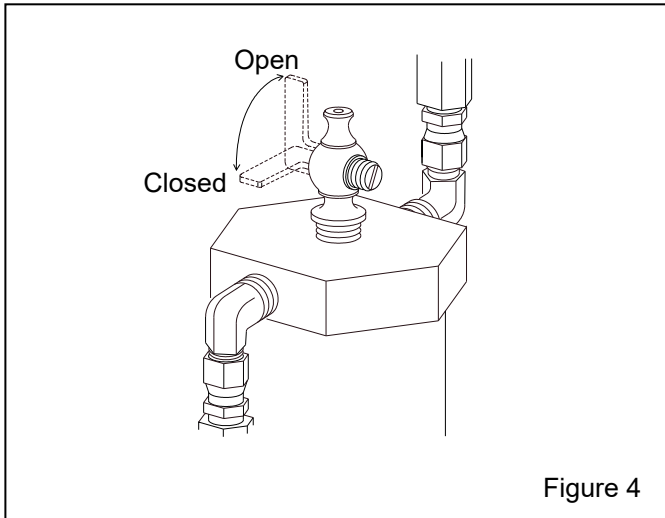


Figure 4

▲ 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.

3.3.11 Check to make sure that the remote control handle lever is in the up (no blast) position, and that the handle lever and safety lock move freely.

▲ WARNING

A separate manual is supplied with the remote control handle. Do not operate the machine before reading the remote control handle operating instructions.

3.3.12 Check to make sure that the handle lever will not seal the opening on the 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 could result from unintentional blasting.

3.3.13 Close the air valve on the compressor. Start the compressor, and bring it to operating temperature and pressure. The pressure must be more than 50 psi, but not exceed 125 psi.

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

3.3.15 Load abrasive into the machine by following the instructions in Section 3.7.

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

▲ WARNING

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

3.3.17 When the blast operator is ready to blast, either the operator or the machine tender, while standing back and facing away from the concave filling head of the blast machine and the exhaust muffler, closes the safety petcock. Closing the petcock prepares the machine for remote operation, and activation by the control handle. Air should be heard escaping from the orifice under the control handle lever but nowhere else. The noise from air escaping at the control handle is an audible signal, that air is supplied to the blast machine, which activate if the control handle is pressed.

3.4 Blasting

WARNING

Failure to wear approved respirators could result in serious lung disease or death. Abrasive blasting produces harmful dust. Do not blast without the use of a properly fitted and maintained NIOSH-approved, type CE Supplied-Air Respirator that is approved for abrasive blasting. Everyone in the blasting area must wear an approved respirator.

During abrasive blasting, abrasive particles in the area around the blast machine and blast nozzle become airborne. Loud noise generated by the use of compressed air could cause hearing damage. Anyone in the blasting area must wear approved eye and hearing protection.

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

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

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

CAUTION

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

WARNING

OSHA requires the use of remote controls on all blast machines. To comply with OSHA regulations, the remote control handle, which starts and stops the flow of air and abrasive, must be held down manually. Do not tie down the control handle lever or attempt to bypass any part of the remote control system. Doing so will defeat the purpose of the fail-to-safe feature of the remote control. Serious injury or death could result from uncontrolled blasting. Ref. 29 CFR 1910.244 (b)

3.4.4 If the abrasive metering valve is closed as instructed, only air will exit the nozzle. Adjust abrasive flow per Section 3.5.

3.5 Adjust Abrasive Metering Valve

3.5.1 Abrasive flow is adjusted with the knob.

3.5.2 Begin adjustments with the metering valve closed. The valve is closed when the metering knob is turned fully clockwise. Metering valves are adjusted by turning the knob clockwise for less abrasive, or counterclockwise for more abrasive.

3.5.3 While the operator is blasting, the machine tender increases abrasive flow by turning the knob counterclockwise 1/4 turn at a time, allowing time for the flow to stabilize before readjusting.

3.5.4 Optimum abrasive flow depends on the type and size of abrasive and blasting pressure, and can best be determined by experience. Use as little abrasive as possible while maintaining the maximum cleaning rate. The air/abrasive mixture should be mainly air. As a rule, the stream of abrasive coming out of the nozzle should barely discolor the air when seen against a contrasting background.

3.6 Stop Blasting

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

3.6.2 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.

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

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

3.7 Loading Abrasive into the Blast Machine

WARNING

When approaching an idle blast machine, and before loading the blast machine with abrasive, make sure the safety petcock is open. If it is closed, open it while standing away from the concave head and exhaust muffler. 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.

NOTE: Use only abrasives specifically manufactured for blast cleaning, that are compatible with the surface being blasted. Abrasive produced for other applications may be inconsistent in size and shape, and contain particles that could jam the abrasive metering valve, or cause irregular wear. Some abrasive may contain salts, corrosives, or other materials that could contaminate the surface.

3.7.1 Load abrasive into the machine by pouring it into the concave head. Using an optional screen, placed over the head, prevents large objects from falling inside. A screen is recommended to keep objects such as pieces of abrasive bags and rocks from falling into the machine. Foreign objects will jam the machine. Abrasive flows through the filling port into the machine. Keep the abrasive level below the pop-up valve. Abrasive on the pop-up valve could be forced up and out of the top of the machine when it is pressurized.

3.7.2 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 closes the safety petcock.

3.8 Emptying the Machine of Abrasive

3.8.1 When working in environments subject to extreme temperature changes, or very humid conditions, condensation may develop inside the machine. Condensation, wets abrasive and causes flow problems. To prevent this, empty the machine of all abrasive, when shutting down for the day. This will eliminate trouble from moist abrasive when starting a new day's blasting. One way to avoid having to empty the machine is to load only as much abrasive as will be used during the work period. If the machine must be purged of abrasive, proceed as follow:

3.8.2 With the blast machine OFF, turn the blast pressure to approximately 40-50 psi, close the choke valve and set the abrasive metering valve at full open.

3.8.3 To prevent rapid wear of the nozzle holder threads, the nozzle should be firmly attached to the nozzle holder. Removal of the nozzle is not recommended. If circumstances require the nozzle to be removed, also remove the nozzle washer. Purging the machine without a nozzle, will eventually erode the thread area of the nozzle holder, which could cause a hazardous condition when the nozzle is reinstalled.

WARNING

The threads on the nozzle and nozzle holder must be inspected each time the nozzle is secured to the holder. Check that the threads are not worn, and that the nozzle holder securely grips the nozzle. The nozzle washer must also be inspected for wear. Worn nozzle washers cause thread erosion. A loose fitting nozzle may eject from the holder under pressure and could cause severe injury.

3.8.4 Point the nozzle into a drum or suitable storage or disposal container or in the directional the abrasive is to be disposed.

3.8.5 Hold the hose securely (do not leave the hose unattended), and pressurize the machine by activating the control handle. Be prepared; for surging, or recoil of the hose, which can be severe.

3.8.6 When the machine is empty, release the control handle lever, open the safety petcock located on the inlet valve, and open the choke valve.

3.8.7 If the nozzle was removed, thoroughly inspect the nozzle holder threads for wear before installing the nozzle washer and attaching the nozzle.

3.9 Shutdown

3.9.1 Close the compressed-air supply valve at the compressor.

3.9.2 Drain receiver tank, filters, and water collecting devices, and bleed the compressed-air supply hose.

3.9.3 Shutdown the compressor.

3.9.4 Cover the machine when not in use.

4.0 PREVENTIVE MAINTENANCE

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

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 a day, 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 5.6.
- Inspect the blast hose for wear; look for soft spots. Soft spots mean the hose is worn. Replace the blast hose before the tube wears as far as the fabric plies.

▲ WARNING

Worn blast hose could suddenly fail by bursting. Couplings and nozzle holders may not adequately grip worn hose causing them to blow off under pressure. Compressed air and abrasive escaping from a burst hose, or disconnected coupling or nozzle holder, could cause severe injury.

- Check to make sure that couplings are secure and lock pins and safety cables are in place.
- Make sure the nozzle washer is in place and not worn.

▲ WARNING

The threads on the nozzle and nozzle holder must be inspected each time the nozzle is secured to the holder. Check that the threads are not worn, and that the nozzle holder securely grips the nozzle. The nozzle washer must also be inspected for wear. Worn nozzle washers cause thread erosion. A loose fitting nozzle may eject from the holder under pressure and could cause severe injury.

- Inspect the RLX II Control Handle; look for the following:
 - The lever must not seal the opening on the control unless the safety lever lock is pulled down.
 - The **handle lever** must return to the "up" position when released.
 - The **safety lever lock** must return to the "up" position when the handle lever is released.
 - Both the handle lever and safety lever lock must move freely with no drag or binding.

▲ WARNING

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

4.1.2 During blasting, inspect the following:

- Check the control handle for leaks.
- Inspect all couplings and coupling gaskets for leaks.
- Check the blast machine for leaks. If leaks are found around the pop-up valve, inspection door, or pipe fittings at the bottom of the cone, stop blasting immediately and repair or replace worn parts. If leaks are allowed to continue, abrasive erosion could cause irreparable damage to the blast machine.
- Check all external piping, control hoses, and valves for leaks. If leaks are found, stop blasting and repair.
- Inspect blast hose, couplings, and nozzle holders for leaks. At the first sign of a leak, stop blasting and repair or replace worn parts.

▲ WARNING

Leaks around couplings and nozzle holders indicate worn or loose-fitting parts. Nozzle holders and couplings that do not fit tight on hose, and nozzles that do not fit tight in nozzle holders could disconnect while under pressure. Impact from nozzles, couplings, hoses, or abrasive, from parts disconnected by pressure during operation could cause severe injury.

4.2 Weekly

4.2.1 With the air off, before blasting, inspect the following:

- Remove the nozzle for inspection. Replace if the diameter is worn 1/16" or more, or if the liner is cracked.
- When a moisture separator is used, inspect the filter element, and clean the bowl.

4.2.2 During Blasting inspect the following:

- Note the time it takes to fully depressurize the machine after the control handle is released. When depressurizing time increases noticeably, inspect the exhaust muffler per Section 5.10.

4.3 Monthly inspection

4.3.1 With the air off, before blasting, inspect the following:

- Check the pop-up valve's urethane coating for cracks and grooves. Replace the pop-up valve at the first sign of wear per Section 5.7.
- Inspect the rubber pop-up seal, and replace at the first sign of wear, drying, or cracking. See Section 5.8.
- Inspect the exhaust muffler for blockage and wear, per Section 5.10.

4.4 Periodic Inspection

4.4.1 The remote control system is a safety device. For safety and to avoid unscheduled down-time, periodically inspect the internal parts of the inlet valve, outlet valve, and abrasive trap. Inspect for wear and lubrication of O-rings, pistons, springs, seals, and castings. See Service Maintenance in Sections 5.3, 5.4 and 5.5.

4.4.2 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 may cause the handle lever or safety lever lock to bind. See the RLX II Owners Manual for service instructions.

4.5 Lubrication

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

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.**
 - **Lock-out (Be certain the air supply is off and that it cannot be started while work is in process) and tag-out (Be certain the air supply is clearly marked to prevent re-starting while work is in process) the compressed air supply**
 - **Bleed the air supply line to the blast machine.**
-

5.1 Removing damp abrasive from the blast machine.

5.1.1 To clear a minor blockage caused from damp abrasive, during operation, rapidly open and close the choke valve several times.

5.1.2 For more difficult blockages, proceed as follows: See Section 5.2 to check for obstructions in the metering valve.

5.1.3 With the blast machine off, disconnect the blast hose and remove the gasket from the quick coupling on the machine.

5.1.4 Place the machine so that the outlet is pointed away from any objects or persons.

WARNING

The machine's outlet must be pointed away from any objects or persons. Stand clear of the path of exiting abrasive. It may come out at high velocity. Impact from exiting abrasive could cause severe injury.

5.1.5 Close the choke valve and fully open the abrasive metering valve. Pressurize the machine to force out any damp abrasive.

5.1.6 When the obstruction has been removed, depressurize the machine. Remove the nozzle and nozzle washer, and reconnect the hose. Open the choke valve and close the abrasive metering valve. Pressurize the machine to clear the hose. When the hose is cleared, depressurize the machine and attach the nozzle and nozzle washer.

⚠ WARNING

The threads on the nozzle and nozzle holder must be inspected each time the nozzle is secured to the holder. Check that the threads are not worn, and that the nozzle holder securely holds the nozzle. The nozzle washer must also be inspected for wear. Worn nozzle washers could erode nozzle threads. A loose fitting nozzle may eject under pressure and could cause severe injury.

5.1.7 With the hose cleared, start the machine using normal procedures.

5.2 Clearing obstructions in the abrasive metering valve and blast machine.

5.2.1 If the nature of the obstruction permits emptying the machine of abrasive, do so by following the instructions per Section 3.8.

5.2.2 Turn off the compressed air supply. Lock-out and tag-out the air supply, and bleed the air supply line to the blast machine.

5.2.3 Remove the four nuts and cap screws securing the knob assembly. Remove the knob assembly and diaphragm.

5.2.4 Check the metering valve for blockage, by inserting a finger, wire or similar object into the opening to feel for an obstruction or foreign object.

5.2.5 If the metering valve is clear, remove the blast machine inspection door, and check for foreign objects.

5.2.6 Make sure the inspection door gasket is in good condition and in place before bolting the door onto the machine.

5.2.7 Make sure the abrasive metering diaphragm is in good condition before reassembling the valve.

5.2.8 Make sure the inspection door and fittings are secure before starting the air supply.

5.3 Inlet Valve, Ref. Figure 10

5.3.1 All service on the inlet valve must be done with the blast machine and air supply hose bled, the compressed air off and the air supply locked-out and tagged-out.

5.3.2 Bottom Section

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

5.3.2.2 As the cap is removed, the spring and plug assembly will drop from the opening. Do not allow them to fall to the ground as that may damage the castings.

5.3.2.3 Clean all parts and inspect for wear:

- The spring is approximately 1-11/16" long. If it's 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.

5.3.2.4 If the top section of the valve requires service, go to Section 5.3.3, otherwise refer the illustration in Figure 10, to reassemble the valve in reverse order.

5.3.3 Top Section

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

5.3.3.2 Use a large wrench to remove the cylinder cap.

5.3.3.3 If the bottom cap has not been removed, remove it, and all other parts per Section 5.3.2.

5.3.3.4 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.

5.3.3.5 Inspect all items for wear and damage.

- The piston cup should fit snugly 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.

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

5.3.3.7 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.

5.3.3.8 Refer to the illustration in Figure 10 to reassemble the valve in reverse order.

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

▲ WARNING

The orifice fitting must not be removed, modified, or substituted with another fitting. Altering the orifice fitting may cause involuntary activation of the blast machine or some other malfunction which could result in serious injury or death.

5.4 Outlet Valve, Ref. Figure 11

5.4.1 All service on the outlet valve must be done with the blast machine and air supply hose bled, the compressed air off, and the air supply locked-out and tagged-out.

5.4.2 Remove the control hose from the valve bonnet.

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

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

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

5.4.6 Remove the piston from the bonnet, by pulling the piston stem.

5.4.7 Inspect all parts for wear and damage:

- Inspect the valve plug washer, valve plug, and plug retainer for damage. Replace all damaged parts. When reassembling the valve plug assembly, tighten the retainer enough to compress the washer, but not so tight to cause it to bulge.
- Examine the body casting for wear. If the body or the machined seat is worn, replace the body.
- Examine the spring guide-bolt and nylon washer. If either are worn, replace both.
- The spring is approximately 1-5/8" long, If it is worn, rusted 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 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.

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

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

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

5.4.11 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.

5.4.12 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.

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

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

5.5 Control handle

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

5.6 Abrasive Trap

5.6.1 All service on the abrasive trap must be done with the blast machine and air supply hose bled, the compressed air off, and the air supply locked-out and tagged-out.

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

5.6.3 To check the abrasive trap screen, loosen the top thumb screw, and swing the lock bar off the cap, and remove the cap.

5.6.4 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.

5.6.5 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.

5.6.6 Empty all abrasive from the bottom and top sections.

5.6.7 Install the screen in the top section. The small end of the screen must face up.

5.6.8 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.

5.7. Replacing the Pop-Up Valve, Figure 5

5.7.1 All service on the pop-up valve must be done with the blast machine and air supply hose bled, the compressed air off, and the air supply locked-out and tagged-out.

5.7.2 To gain access to the pop-up valve, remove the inspection door assembly.

5.7.3 Using a small pipe wrench, unscrew the pop-up valve guide by turning it counterclockwise. Remove the pop-up valve and guide from the machine.

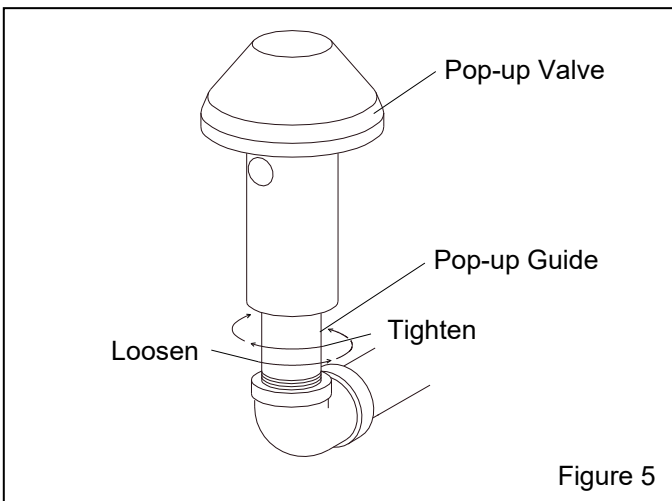


Figure 5

5.7.4 While the pop-up valve is out, check alignment as follows: Screw a 1-1/4" nipple, that is at least 12"

long, into the elbow in place of the pop-up guide. Check the alignment through the pop-up filling port. The nipple should be close to the center of the port. If it is not, adjust the horizontal pipe. A misaligned pop-up valve could result in early valve failure, or abrasive leakage when the machine is pressurized or depressurized.

5.7.5 Slide the new pop-up valve over the guide, then screw the valve guide (with the pop-up valve on it) into position inside the machine. Tighten the guide snug, but not wrench-tight. Over-tightening the guide will make it difficult to remove, the next time the pop-up valve needs replacement.

5.7.6 Refer to Figure 6 to check the pop-up height. If the pop-up sits too low, misalignment could occur when the pop-up comes up against the seal. If the pop-up sits too high, it will take longer for abrasive to flow through the opening. Adjust the height by replacing the guide with one that is longer or shorter.

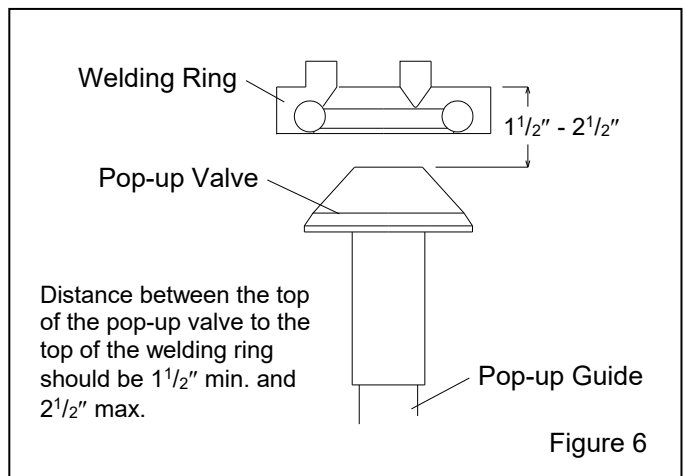


Figure 6

5.7.7 Put a new gasket on the inspection door assembly before bolting the door onto the machine.

5.8 Replacing the Pop-Up Seal

5.8.1 All service on the blast machine must be done with the blast machine and air supply hose bled, the compressed air off and the air supply locked-out and tagged-out.

5.8.2 Remove the old seal using fingers, screwdriver, or similar object, to work the seal out of the retaining groove.

5.8.3 Push the new seal all the way through the port and then fit it into the retaining groove. For the last few inches, pull up on the seal and allow it to pop into position.

5.9 Abrasive Metering Valve

5.9.1 Empty the machine of abrasive. Turn off the compressed air supply. Lock-out and tag-out the air supply, and bleed the air supply line to the blast machine.

5.9.2 Remove the four nuts and cap screws securing the valve body and knob assembly.

5.9.3 Remove the knob assembly and diaphragm.

5.9.4 Inspect the valve body, diaphragm and knob assembly for wear, replace if worn or damaged. If any part of the knob assembly is worn or damaged, the whole assembly must be replaced.

5.9.5 The diaphragm is threaded onto the knob assembly. To replace the diaphragm, turn the metering knob clockwise to extend the metering foot. While holding the knob assembly, rotate the diaphragm until it is free.

5.9.6 Before installing a new diaphragm, make sure the metering foot is recessed into its guides in the knob assembly housing. Screw a new diaphragm onto the foot until it is snug tight.

5.9.7 Turn the knob counterclockwise until the diaphragm is flush with the knob assembly housing.

5.9.8 Reassemble the knob and diaphragm assembly to the valve body, making sure the nuts are tight.

5.10 Exhaust Muffler, Figure 7

▲ WARNING

Service the muffler, and replace the element body as soon as the time it takes to depressurize the blast machine increases noticeably. Longer depressurization time indicates the porous element body is becoming clogged. If the element becomes plugged, excessive air pressure could build up inside the element, and cause it to burst, which could result in injury

5.10.1 All service on the muffler must be done with the blast machine and air supply hose bled, the compressed air off, and the air supply locked-out and tagged-out.

5.10.2 Using a pipe wrench, remove the muffler assembly from the exhaust elbow by unscrewing the 1" pipe guide.

5.10.3 Remove the three lock-nuts and screws, and separate all parts.

5.10.4 Inspect for wear. Replace parts that show signs of wear. Replace the cap if the urethane coating is worn. Always replace the element body.

5.10.5 Ensure that the guide nut is tight on the guide.

▲ WARNING

Replace the guide and guide nut if the nut is not tightly fused to the guide. A loose fitting nut could work off the guide, permitting the muffler assembly to launch under pressure, and cause severe injury.

5.10.6 Clean parts to be reused, with a non-caustic solvent or detergent, and dry thoroughly.

5.10.7 Reassemble, taking care to correctly insert the screws in the seat plate. The screw holes are the three closest to the center. See the illustration in Figure 7.

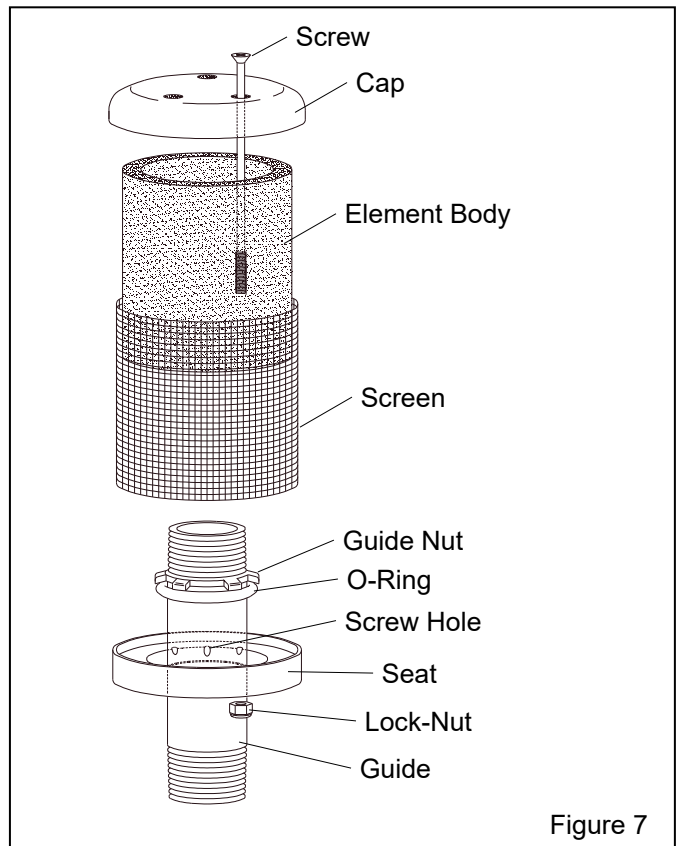


Figure 7

5.10.8 Firmly tighten the lock-nuts.

5.10.9 Use a pipe wrench to attach the muffler assembly to the elbow. In its final position, the muffler must face up.

▲ WARNING

When installed on the machine, the muffler must face up. The muffler reduces exhaust noise, and prevents abrasive from exhausting upward or sideways when the blast machine is depressurized. To reduce risk of injury from abrasive carried by high velocity air, the muffler must be installed with the body facing up.

6.0 TROUBLESHOOTING

NOTE: This section only identifies conditions and problems in the blast machine and remote control system. Always refer to the appropriate section of this manual, or manuals for accessory equipment, before servicing the equipment. A separate manual is provided for the RLX II Control Handle.

▲ WARNING

To avoid serious injury, observe the following when troubleshooting the machine and remote controls.

- **Turn off the compressed air, and lock-out and tag-out the air supply.**
 - **When checking the controls requires air, always enlist the aid of another person to operate the control handle while holding the nozzle securely and pointing it in a safe direction.**
 - **Never strap the remote control handle lever down in the operating position.**
-

6.1 Neither abrasive nor air comes out of the nozzle while the machine is under pressure.

6.1.1 Depressurize the blast machine. After the pop-up valve has dropped, remove the nozzle, and check for obstruction.

6.1.2 Make sure that both the abrasive metering valve and choke valve are open.

6.2 Air only (no abrasive) comes out the nozzle

6.2.1 Abrasive metering valve may be closed or needs adjustment. Adjust the metering valve per Section 3.5.

6.2.2 Blast machine may be empty.

6.2.3 Abrasive may be damp. See Section 5.1 to clear damp abrasive.

6.2.4 Check the abrasive metering valve for obstructions per Section 5.2.

6.3 Heavy abrasive flow

6.3.1 Check that the choke valve is open. The valve is open when the handle is in-line with the piping.

6.3.2 Abrasive metering valve may be open too far. See Section 3.5.

6.4 Abrasive surging

6.4.1 A certain amount of abrasive surge is normal at start-up. Should the flow of abrasive continue to surge, reduce the amount of abrasive in the air stream by adjusting the metering valve. See Section 3.5.

6.4.2 Check the abrasive trap and exhaust muffler for blockage. Slow depressurization will load the blast hose with abrasive, and cause surging at start-up.

6.4.3 See Section 6.7.

6.5 Intermittent abrasive flow.

6.5.1 Moisture in the blast machine or in the air supply. Drain moisture from the compressor's receiver tank, and if so equipped, the blast machine's moisture separator. If moisture continues to be a problem, a dryer or aftercooler may be required in the air supply line.

6.5.2 Abrasive may be worn from recycling. Replace abrasive.

6.6 Blast machine will not pressurize.

6.6.1 Check that the compressor is on and all air supply valves to the machine are open.

6.6.2 Check that the safety petcock is closed.

6.6.3 Check that the rubber button on the control handle is not worn or damaged, and that the opening on the control handle seals when the handle is pressed. (RLX II Control Handle is covered in Owners Manual No. 10574)

6.6.4 Check for air escaping from the opening under the control handle lever. If no air is escaping, the orifice on the inlet valve Figure 10 item 4 is blocked, or the line from the orifice to the control handle is blocked and must be cleared.

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

6.6.6 Check control lines and fittings for leaks or breaks.

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

- The opening on the control handle is not being sealed off.
- The control handle leaks.
- The line from the control handle to the upper fitting on the inlet valve is blocked.

If air does come out, then the inlet valve is not functioning. Turn off the compressed air supply and service the valve per Section 5.3.

6.6.8 Close the safety petcock, and press the control handle lever. Check that no air escapes through the vent hole on the cylinder body of the inlet valve body. Air escaping from this vent indicates a worn piston in the inlet valve. See Section 5.3.

6.6.9 Insufficient-size air supply hose or reduced-size fittings between the compressor and blast machine. See Section 3.2.2.

6.6.10 Dirty filter in moisture separator. Check filter element.

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

6.7 Blast machine will not depressurize or depressurizes too slowly.

6.7.1 Abrasive trap screen blocked, or abrasive trap needs cleaning. Clean the trap at least twice daily

6.7.2 Exhaust muffler blocked. See Section 5.10.

6.7.3 Check that the pneumatic adaptor gasket on the control handle is not swollen, restricting air flow through the handle. Refer to the control handle manual.

6.7.4 Check for blockage in the control hose.

6.7.5 Check that the lower fitting on the inlet valve (Figure 10, item 4) has not been switched for a fitting with a full flow orifice. The orifice on the 1/8" NPT end of the fitting must be 1/16" diameter.

6.7.6 Check that the inlet valve closes. If it does not seal-off incoming air, the valve requires service. See Section 5.3

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

6.8 Outlet valve will not seal

6.8.1 Outlet valve requires service. Refer to Section 5.4.

7.0 REPLACEMENT PARTS

7.1 Blast Machine and Accessories, Figure 8

Item	Description	Stock No.
1.	Ball valve with handle, 1"	02396
2.	Handle, 1" ball valve	22531
3.	Hose assembly pusher line, 1"	22569
4.	Adaptor, 1" male NPT x 1" male flare	11720
5.	Moisture separator, 1" filter w/ man. drain	22424
6.	Coupling, 1-1/4" CF	00551
7.	Wye, 1-1/4" standard	01818
8.	Metering valve, 1/2"	99555
9.	Gasket, CQG coupling, (package of 10)	00850
10.	Wheel and tire, 16 x 400, each	20427
11.	Axle for 3 cu. ft. machine	02402
12.	Retaining ring, 1" axle, each	03824
13.	Thrust washer, 1" axle, each	03825

14.	Inspection door assembly, 6" x 8"	02377
15.	Gasket, 6" x 8" inspection door	02369
16.	Seat, pop-up, gum rubber, standard use	02325
17.	Seat, pop-up, neoprene, for hot climates	02380
18.	Muffler, exhaust	05068
19.	Pop-up valve, 4" with external sleeve	03699
20.	Internal pop-up guide, 1-1/4" x 6-1/2"	01754
21.	Cover, 16" diameter machine	02335
22.	Screen, 16" diameter machine	03099
23.	Regulator, 1" pressure w/gauge	01904
24.	Hose, 3/4" x 50' Supa blast T	23102
25.	Coupling, hose CQPS-3/4	11395
26.	Holder, nozzle NHP-3/4	11398
27.	Gasket, for CQPS-3/4 coupling, (pkg of 10)	08852
28.	Nozzle, TMP 5	23521
29.	Washer, nozzle, NW-25 (pkg of 10)	91024
30.*	Lock pin, coupling (package of 25)	11203
31.*	Safety cable, 3/4" to 1-1/2" ID blast hose	15013

* Recommended accessories

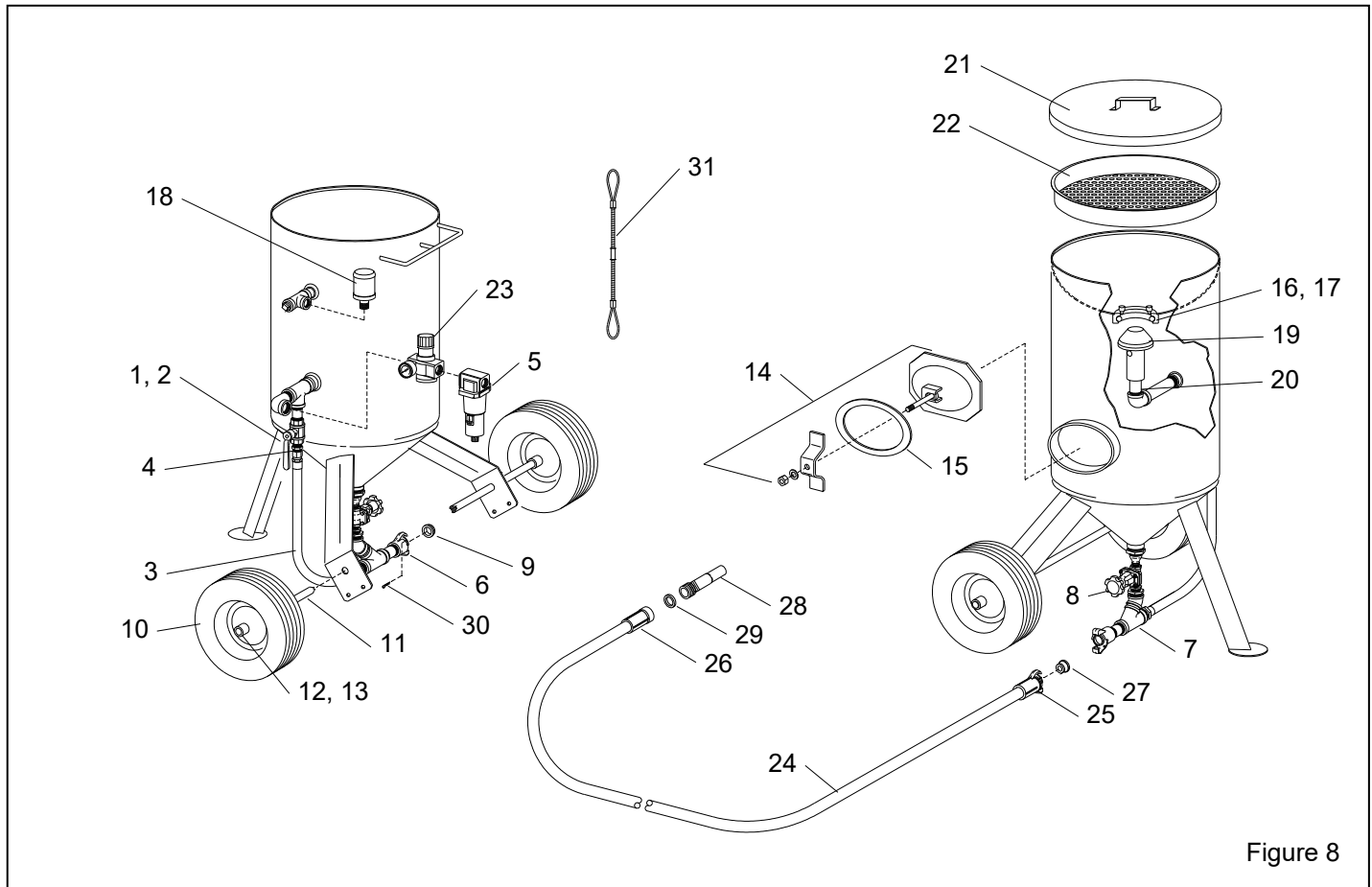


Figure 8

7.2 TLR-100 Remote Control, Figure 9

Item	Description	Stock No.
(-)	TLR-100, 1" remote system	01935
1.	Outlet valve, 1" piston	01967
2.	Inlet valve 1"	01980
3.	Abrasive trap	02011
4.	RLX Control handle	10565
5.	Hose, 3/16" x 18 inch cpld.	02454
6.	Hose, 5 foot twinline cpld.	01952
7.	Hose end, reusable	01943
8.	Hose, 50 foot twinline cpld.	01951
9.	Union, hose	01944

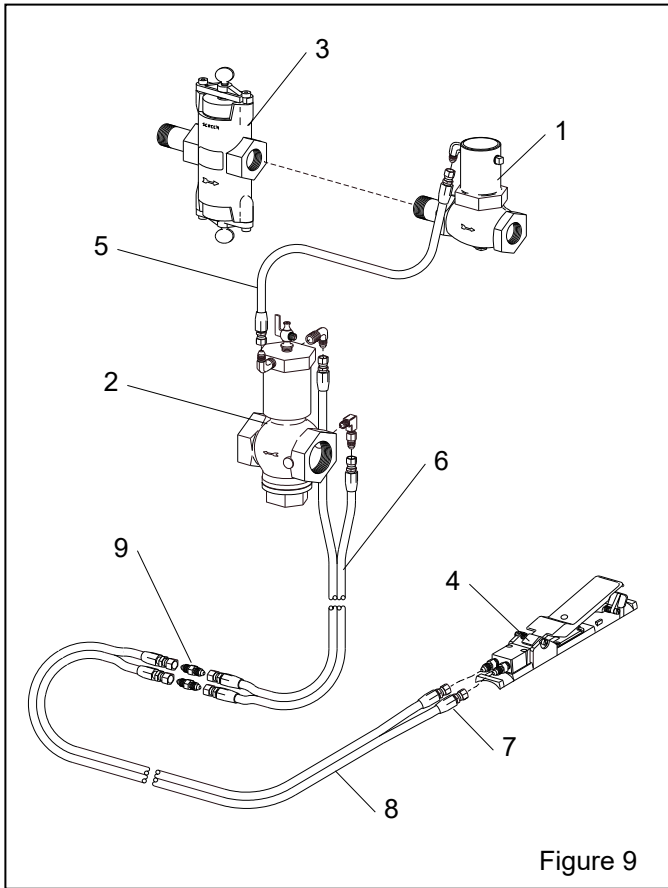


Figure 9

7.3 1" Inlet Valve, Figure 10

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" NPT brass street	03993
4.	Adaptor 1/8" NPT with 1/16" orifice	01945
5.	Bottom cap	01985
6.*	Spring, 5/8" x 1-11/16" long, (1)	01982
7.*	Seal, bottom cap, (1)	01989
8.	Valve plug	01984
9.	Valve body	01981
10.*	Washer, valve plug, (2)	01969
11.*	Retainer, valve plug washer ,(1)	01986
12.*	O-Ring 3/16" ID x 1/16", (1)	01992
13.	Piston and rod assembly	01987
14.*	O-Ring 1-3/4" OD, (1)	01990
15.	Cylinder cap	01983
(-)	Service kit, includes items marked *, quantity is shown in ()	01929

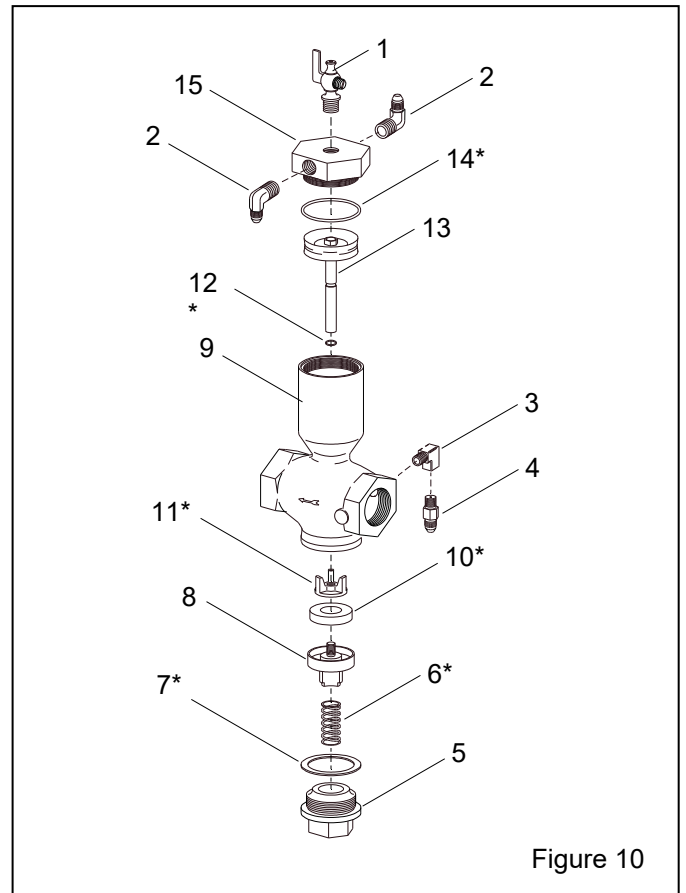


Figure 10

7.4 1" Piston Outlet Valve, Figure 11

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

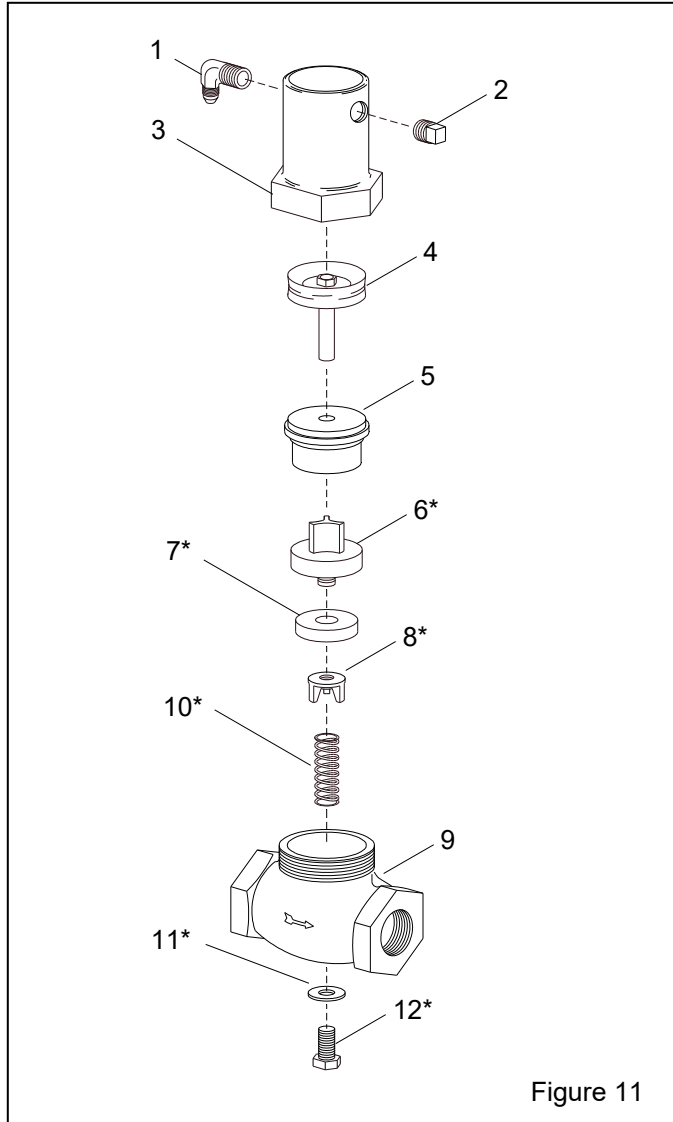


Figure 11

7.5 Abrasive Trap, Figure 12

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

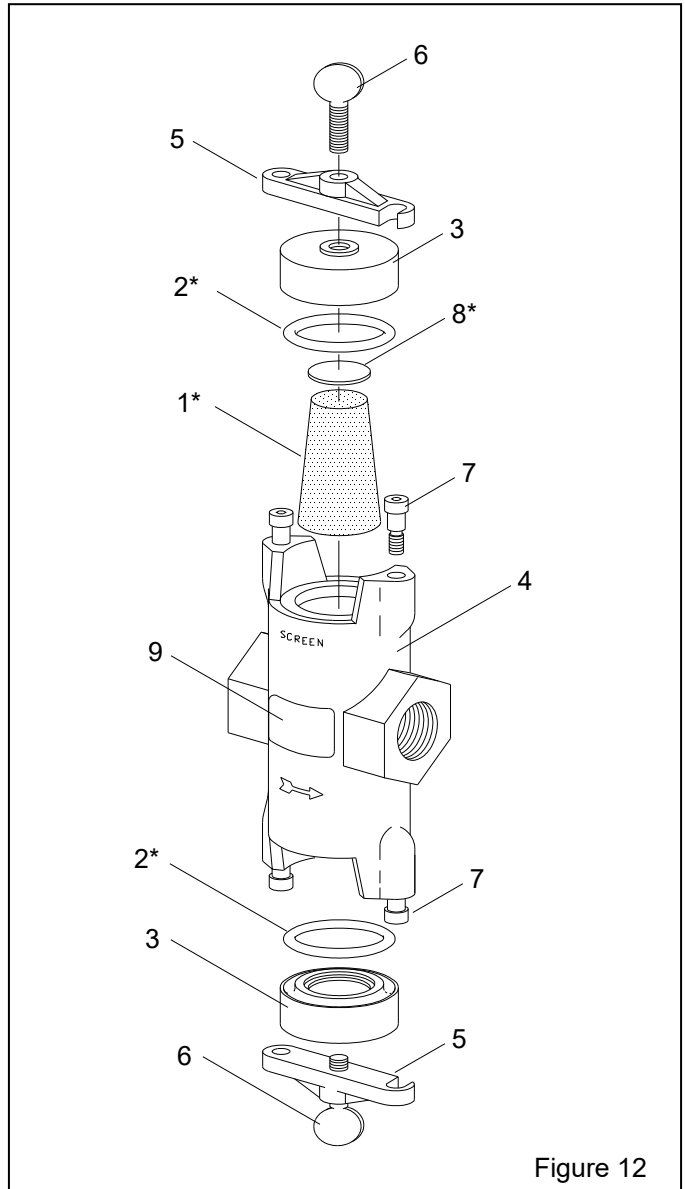


Figure 12

7.6 Exhaust Muffler, Figure 13

Item	Description	Stock No.
(-)	Muffler, complete	05068
1.	Screw, 8-32" x 4"	05061
2.	Cap, coated	05067
3.	Body, element	05065
4.	Screen	05060
5.	Guide w/ guide nut	22344
6.	O-ring, 1-1/4" ID	05069
7.	Seat	05062
8.	Lock-nut, 8-32 ss	05815

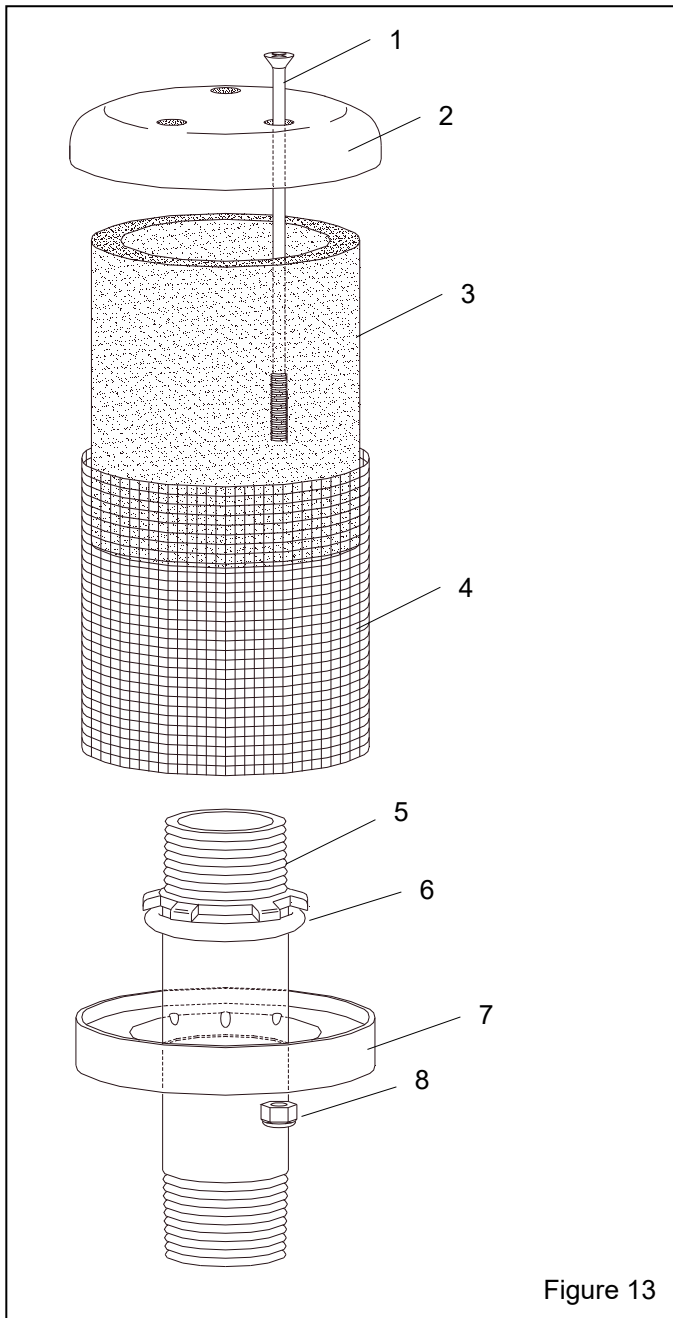


Figure 13

7.7 Abrasive Metering Valve, Figure 14

Item	Description	Stock No.
(-)	Metering valve, 1/2", complete	99555
1.	Valve body	22562
2.	Diaphragm	22563

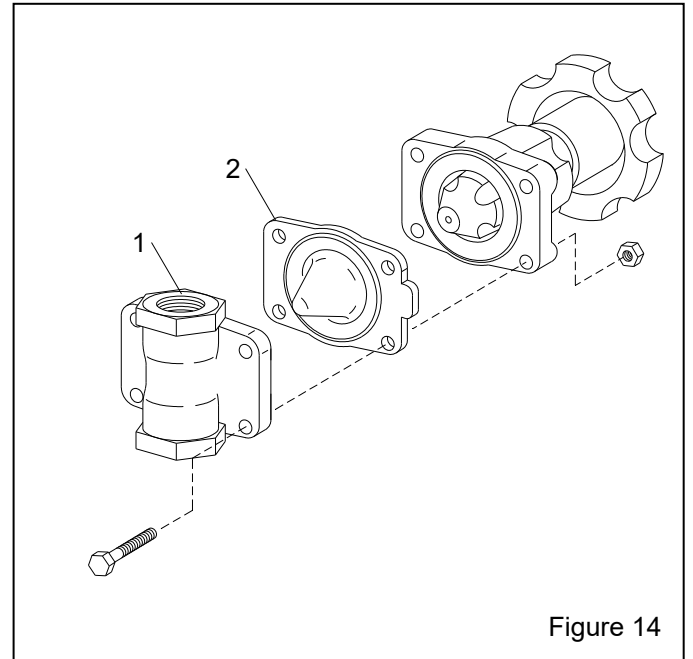


Figure 14

7.8 RLX II Pneumatic Control Handle

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