

**QUANTUM PNEUMATIC
REMOTE CONTROL SYSTEM
O. M. 25836**

DATE OF ISSUE: 04/03/13
REVISION:

 **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.

© 2013 CLEMCO INDUSTRIES CORP.
One Cable Car Dr.
Washington, MO 63090
Phone (636) 239-4300
Fax (800) 726-7559
Email: info@clemcoindustries.com
www.clemcoindustries.com



WARNING

- Employers are responsible for identifying all job site hazards, educating and training all persons who will operate and maintain these products, and ensuring that all blast operators and their assistants understand the warnings and information contained in these instructions relating to safe and proper operation and maintenance of this equipment.
- Serious injury or death can result from failure to comply with all Occupational Safety and Health Administration (OSHA) regulations and all manufacturer's instructions.
- This equipment is not intended for use in any area considered hazardous per National Electric Code NFPA 70 2011, Article 500.
- Read this document and follow all instructions before using this equipment.

OSHA regulations relating to abrasive blasting are contained in the Code of Federal Regulations, Title 29 (29 CFR 1910 General Industry; 1915 Maritime; 1926 Construction). The most pertinent include: 1910.94 Ventilation, 1910.95 Occupational Noise Exposure, 1910.132 Personal Protective Equipment, 1910.133 Eye and Face Protection, 1910.134 Respiratory Protection, 1910.135 Head Protection, 1910.244 (b) Remote Controls. Consult www.osha.gov for complete information.

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

Clemco proudly provides products for the abrasive blast industry and is confident that industry professionals will use their knowledge and expertise for the safe and efficient use of these products.

The products described in this material, and the information relating to these products, are intended for knowledgeable, experienced users.

No representation is intended or made as to: the suitability of the products described here for any purpose or application, or to the efficiency, production rate, or useful life of these products. All estimates regarding production rates or finishes are the responsibility of the user and must be derived solely from the user's experience and expertise, not from information contained in this material.

It is possible that the products described in this material may be combined with other products by the user for purposes determined solely by the user. No representations are intended or made as to the suitability of or engineering balance of or compliance with regulations or standard practice of any such combination of products or components the user may employ.

Abrasive blast equipment is only one component of an abrasive blasting job. Other products, such as air compressors, air filters and receivers, abrasives, scaffolding, hydraulic work platforms or booms, equipment for lighting, painting, ventilating, dehumidifying, parts handling, or specialized respirators or other equipment, even if offered by Clemco, may have been manufactured or supplied by others. The information Clemco provides is intended to support the products Clemco manufactures. Users must contact each manufacturer and supplier of products used in the blast job for warnings, information, training, and instruction relating to the proper and safe use of their equipment.

GENERAL INSTRUCTIONS

This material describes some, but not all, of the major requirements for safe and productive use of blast machines, remote controls, respirator systems, and related accessories. All equipment and accessories must be installed, tested, operated and maintained only by trained, knowledgeable, experienced users.

The blast operator and all workers in the vicinity must be properly protected from all job site hazards including those hazards generated by blasting.

Work environments involving abrasive blasting present numerous hazards. Hazards relate to the blast process from many sources that include, but are not limited to, dust generated by blasting or from material present on the surface being blasted. The hazards from toxic materials may include, but are not limited to, silica, cyanide, arsenic, or other toxins in the abrasives or in the coatings, such as lead or heavy metals. Other hazards from toxins include, but are not limited to, fumes from coating application, carbon monoxide from engine exhaust, contaminated water, chemicals or asbestos. In addition, physical hazards that may be present include, but are not limited to, uneven work surfaces, poor visibility, excessive noise, and electricity. Employers must identify all job site hazards and protect workers in accordance with OSHA regulations.

Never modify Clemco equipment or components or substitute parts from other manufacturers for any Clemco components or parts. Any unauthorized modification or substitution of supplied-air respirator parts violates OSHA regulations and voids the NIOSH approval.

IMPORTANT

Contact Clemco for free booklets:

Blast Off 2 – Guide to Safe, Productive, and Efficient Abrasive Blasting, and Abrasive Blasting Safety Practices – Guide to Safe Abrasive Blasting.

Clemco Industries Corp. One Cable Car Drive Washington MO 63090

Tel: 636 239-4300 — Fax: 800 726-7559

Email: info@clemcoindustries.com

Website: www.clemcoindustries.com

OPERATIONAL INSTRUCTIONS

OPERATOR SAFETY EQUIPMENT

WARNING

- OSHA regulation 1910.134 requires appropriate respiratory protection for blast operators and workers in the vicinity of blasting. These workers must wear properly-fitted, properly-maintained, NIOSH-approved, respiratory protection that is suitable for the job site hazards. Blast respirators are to be worn only in atmospheres not immediately dangerous to life or health from which wearers can escape without use of the respirator.
- The employer must develop and implement a written respiratory protection program with required worksite- specific procedures and elements for required respirator use. The employer must provide effective training to employees who are required to use respirators. The training must be comprehensive, understandable, and recur annually, and more often if necessary.
- NEVER use abrasives containing more than one percent crystalline silica. Fatal diseases, such as silicosis, asbestosis, lead or other poisoning, can result from inhalation of toxic dusts, which include, but are not limited to, crystalline silica, asbestos, and lead paint. Refer to NIOSH Alert 92-102; and OSHA CPL 03-00-007: “National Emphasis Program – Crystalline Silica”, in which OSHA describes policies and procedures for implementing a national emphasis program to identify and reduce or eliminate health hazards from exposure to crystalline silica. Numerous topics associated with the hazards of crystalline silica in silica blasting sand can be found on [http:// osha.gov/](http://osha.gov/). Clemco urges users of silica blasting sand to visit this website, and read and heed the information it contains.
- Always make sure the breathing air supply (respirator hose) is not connected to plant lines that supply gases that include, but are not limited to, oxygen, nitrogen, acetylene, or other non-breathable gas. Never modify or change respirator air line connections without first testing the content of the line for safe breathing air. Failure to test the line may result in death to the respirator user.

- Breathing air quality must be at least Grade D, as defined by the Compressed Gas Association specification G-7.1, per OSHA Regulation 29 CFR 1910.134. When compressed air is the breathing air source, a Clemco CPF (suitable sorbent bed filter) should be used. Respirator hose connecting the respirator to the filter must be NIOSH approved. Non- approved hose can cause illness from chemicals employed to manufacture the hose.

- All workers must always wear NIOSH-approved respirators when any dust is present. Exposure to dust can occur when handling or loading abrasive, blasting, cleaning up abrasive, or working in the vicinity of blasting. Before removing the respirator, test the air with a monitoring device to ensure it is safe to breathe.

- Clemco respirators DO NOT remove or protect against carbon monoxide or any other toxic gas. Monitoring devices must be used in conjunction with the respirator to ensure safe breathing air. Always locate compressors and ambient air pumps where contaminated air will not enter the air intake.

- Always use Clemco lenses with Clemco respirators; installing non-approved lenses voids the NIOSH approval. Respirator lenses are designed to protect the wearer from rebounding abrasive; they do not protect against flying objects, heavy high-speed materials, glare, liquids, or radiation.

INDUSTRY ORGANIZATIONS

For additional information, consult:

Occupational Safety and Health Administration (OSHA) - www.osha.gov

Compressed Gas Association (CGA) - www.cganet.com

The Society for Protective Coatings (SSPC) - www.sspc.org

National Association of Corrosion Engineers (NACE) - www.nace.org

American Society for Testing and Materials (ASTM) - www.astm.org

National Institute of Occupational Safety and Health (NIOSH) - www.niosh.gov

American National Standards Institute (ANSI) - www.ansi.org

PREFACE

BLAST MACHINES AND REMOTE CONTROLS

WARNING

OSHA regulation 1910.169 describes 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.

OSHA regulation 1910.244(b) requires the use of remote controls on blast machines.

Serious injury or death can result from many sources, among them:

- Involuntary activation of the remote controls. Never modify or substitute remote control parts; parts are not compatible among different manufacturers. Welding hose is not suitable for remote control hose. Its ID and material composition make it unsafe for remote control use.
- Exceeding the maximum working pressure. Clemco blast machines are built to ASME-code and carry a 'U' or 'UM' stamp, and National Board/serial number. Every machine is marked with its maximum working pressure. Never exceed the maximum working pressure limits of the blast machine.
- Uncontrolled blast stream. High-velocity abrasive particles will inflict serious injury. Always point the blast nozzle in the direction of the blast surface only. Keep unprotected workers out of the blast area.
- Welding on the blast machine. Never weld on the blast machine; welding voids the National Board approval and may affect the dimensional integrity of the vessel.
- Moving the blast machine. Never manually move a blast machine containing abrasive, any machine containing abrasive must be moved with appropriate mechanical lifting equipment.

HOSES, COUPLINGS, AND NOZZLE HOLDERS

- The inside diameter (ID) of air hoses, fittings, and connections should be at least four times larger than the nozzle orifice size. Blast hose ID should be three to four times the size of the nozzle orifice. Example: a #6 nozzle (3/8" diameter orifice) calls for 1-1/2" ID blast hose and 1-1/2" ID or larger compressor hose. All hose runs should be kept as short as possible and run in as straight a line as possible to reduce pressure loss.
- To install, squarely cut the end of the hose so that it fits snugly against the coupling or hose end shoulder. Always use the screws recommended by the manufacturer ensuring that they do not penetrate the inner wall. Make sure the couplings tightly fit the hose. Install cotter pins at every connection or use couplings with built-in lock-springs to prevent disengagement. Install safety cables at all connections to prevent whipping if hoses disengage or blow out.

MAINTENANCE AND REPAIR

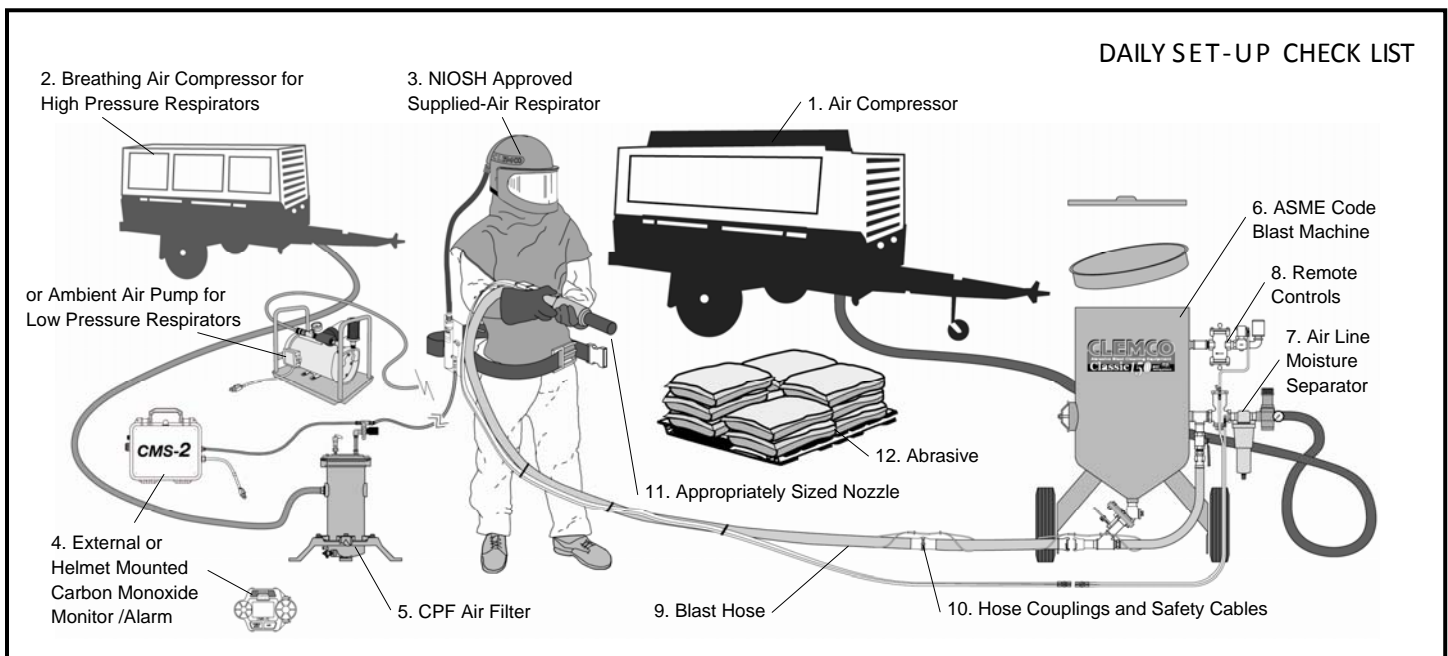
- Completely read and follow all service instructions and recommended maintenance intervals. Always shut off compressor and depressurize blast machine before performing any maintenance. At every service interval, clean all filters, screens, and alarm systems. If spring-loaded abrasive valves are used, always cage spring before disassembly.

WARRANTY

The following is in lieu of all warranties, express, implied or statutory, and in no event shall seller or its agents, successors, nominees or assignees, or either, be liable for special or consequential damage arising out of a breach of warranty. This warranty does not apply to any damage or defect resulting from negligent or improper assembly or use of any item by the buyer or its agent or from alteration or attempted repair by any person other than an authorized agent of seller. All used, repaired, modified, or altered items are purchased "as is" and with all faults. In no event shall seller be liable for consequential or incidental damages. The sole and exclusive remedy of buyer for breach of warranty by seller shall be repair or replacement of defective parts or, at seller's option, refund of purchase price, as set forth below

1. Seller makes no warranty with respect to products used other than in accordance hereunder.
 2. On products seller manufactures, seller warrants that all products are to be free from defects in workmanship and materials for a period of one year from date of shipment to buyer, but no warranty is made that the products are fit for a particular purpose.
 3. On products which seller buys and resells pursuant to this order, seller warrants that the products shall carry the then standard warranties of the manufacturers thereof, a copy of which shall be made available to the customer upon request.
 4. The use of any sample or model in connection with this order is for illustrative purposes only and is not to be construed as a warranty that the product will conform to the sample or model.
 5. Seller makes no warranty that the products are delivered free of the rightful claim of any third party by way of patent infringement or the like.
 6. This warranty is conditioned upon seller's receipt within ten (10) days after buyer's discovery of a defect, of a written notice stating in what specific material respects the product failed to meet this warranty. If such notice is timely given, seller will, at its option, either modify the product or part to correct the defect, replace the product or part with complying products or parts, or refund the amount paid for the defective product, any one of which will constitute the sole liability of the seller and a full settlement of all claims. No allowance will be made for alterations or repairs made by other than those authorized by seller without prior written consent of seller. Buyer shall afford seller prompt and reasonable opportunity to inspect the products for which any claim is made as above stated.
- Except as expressly set forth above, all warranties, express, implied or statutory, including implied warranty of merchantability, are hereby disclaimed.

PREFACE



DAILY SET-UP CHECK LIST

Make sure all blast operators are properly trained and suitably attired with a blast suit, safety boots, leather gloves, respiratory and hearing protection. Every day before start up, check all equipment components, including piping, fittings, and hoses, and valves, for leaks, tightness, and wear. Repair or replace as needed. Use the following checklist.

- 1. PROPERLY-MAINTAINED AIR COMPRESSOR** sized to provide sufficient volume (cfm) at given pressure for nozzle and other tools. ADD 50% volume (cfm) reserve to allow for nozzle wear. Use large compressor outlet and air hose (at least 4 times the nozzle orifice diameter). For oil-lubricated compressors, the employer shall use a high- temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm. Follow the manufacturer's checklist and maintenance instructions.
- 2. BREATHING-AIR COMPRESSOR** (or oil-less ambient air pump) capable of providing Grade D quality air, located in a dust free area. Read # 1 above.
- 3. CLEAN, PROPERLY-MAINTAINED NIOSH-APPROVED SUPPLIED-AIR RESPIRATOR** worn by blast operators, and other workers exposed to blast dust. Make sure all respirator components are in place — all lenses, inner collar, and cape. Thoroughly inspect all components for wear. The NIOSH approval (approval number is listed in the owner's manual) is for a complete assembly from point of attachment on the CPF (sorbet bed) filter to the complete respirator. Substitution of any part voids the NIOSH approval.
- 4. CARBON MONOXIDE MONITOR/ALARM** installed at the CPF filter or inside the supplied-air respirator for monitoring for the presence of deadly CO gas and warning the operator(s) when the CO level reaches an unacceptable level. When an ambient air pump is used for breathing air, a CO monitor provides a measure of safety. Read # 1 above.
- 5. BREATHING-AIR FILTER (OSHA-REQUIRED sorbet bed filter)** for removal of moisture and particulate matter in the compressed air breathing-air supply. Monitor the condition of the cartridge and replace when odor is detected or at 3 month intervals, whichever comes sooner. The breathing air filter does NOT detect or remove carbon monoxide (CO). Always install a CO monitor/alarm.
- 6. BLAST MACHINE** (bearing U or UM stamp, National Board Number, and Maximum Working Pressure) sized to hold a 30-minute abrasive supply. Examine pop-up valve for alignment. Check piping, fittings, screens, valves for tightness, leaks, and wear. Always ground the machine to eliminate hazard of static shock. Install a blast machine screen to keep out foreign objects. Use a blast machine cover if left outdoors overnight. Never exceed the maximum working pressure of the vessel.
- 7. AIR LINE FILTER** (moisture separator) installed as close as possible to the blast machine inlet and sized to match the size of the inlet piping or larger air supply line. Clean filter and drain often. Damp abrasive causes operational problems.
- 8. REMOTE CONTROLS** are required by OSHA and must be in perfect operating condition. Test and check all components to ensure all parts are present and fully functional. Use genuine replacement parts. NEVER mix parts from different manufacturers. Never use welding hose for remote control hose.
- 9. BLAST HOSE** should have an inside diameter sized to suit the blast nozzle. The ID should be three to four times the size of the nozzle orifice diameter. Blast hose should be arranged in as straight a line as possible from the blast machine to the work area, avoiding sharp bends.
- 10. COUPLINGS AND NOZZLE HOLDERS** should fit snugly on the hose and be installed with manufacturer recommended screws. Coupling lugs must snap firmly into locking position. Gasket must always be used to form a positive seal, and cotter pins must be installed. Replace gasket when wear, softness or distortion is detected. Check nozzle holder for thread wear; replace at any sign of wear. Install safety cables at all connections.
- 11. NOZZLE** orifice size should be checked and nozzle replaced when worn 1/16" from original size. (No. 5 nozzle has 5/16" orifice diameter; replace when it measures 3/8"). Threads should be inspected daily for wear and nozzle should be replaced when wear is detected. Always use a nozzle washer.
- 12. ABRASIVE** must be a material specifically manufactured for blasting. It should be properly sized for the job. Check material safety data sheet for free-silica, cyanide, arsenic, lead and other toxins and avoid use when these toxic, harmful substances are present.
- SURFACE TO BE BLASTED** should be examined for hazardous substances. Take appropriate protective measures as required by OSHA to ensure the blast operator, other workers in the vicinity, and any bystanders are properly protected.

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1.0 INTRODUCTION

1.1 Scope

1.1.1 This manual covers the installation, operation, maintenance, troubleshooting, and replacement parts for Clemco Quantum Pneumatic Pressure-Hold Remote Control System. The following manuals may be used in conjunction with the Quantum system manual. They are available upon request from Clemco Industries Corp., or at our web site at www.clemcoindustries.com.

- Single Chamber Blast MachineManual No. 06160
- Dual Chamber Blast MachineManual No. 06154
- ACE Air ValveManual No. 23938
- RLX Control HandleManual No. 10574
- Quantum Media Metering ValveManual No. 22565

1.1.2 These instructions also contain important information required for safe operation of the blast machine. All blast operator(s) and machine (pot) tenders must be trained in the safe operation of the blast machine, remote control system, and all blasting accessories. Before using the machine, all personnel involved with the blast machine operation must read this entire manual, including the orange cover, and all accessory manuals.

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, and contains important safety information about abrasive blasting that may not be included in equipment operation manuals. Additional copies are available from Clemco Industries.

1.2 Safety Alerts

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



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

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

CAUTION

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

CAUTION

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

WARNING

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

DANGER

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

1.3 General Description

1.3.1 The components of the Quantum remote control system are shown in Figure 1. They include the Quantum pneumatically-operated abrasive metering valve, ACE air valve, RLX Control Handle with abrasive cut-off (ACS) air switch assembly, 50-foot twinline control hose, 50-foot single-line control hose, 18-inch hose, 3-foot and 5-foot control hose, and all necessary fittings.

1.3.2 The 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 abrasive metering valve and air valve close, stopping air and abrasive flow through the nozzle. The remote control system "fails to safe", which means when any interruption in the control-air circuit occurs, for reasons such as a break in the line, the compressor stops running, or the operator drops the blast hose, the remote control stops the blasting.

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.

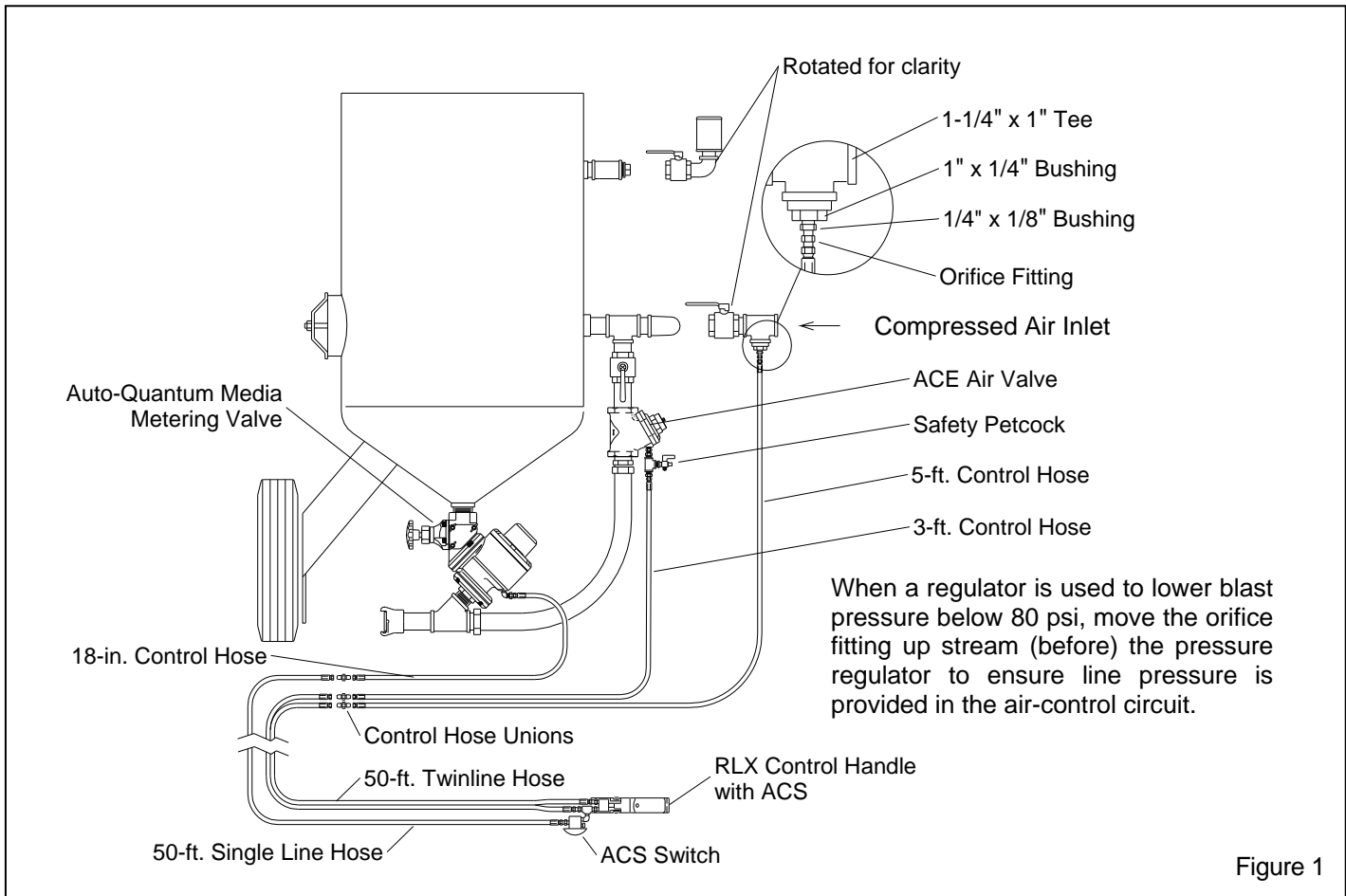


Figure 1

1.4 Operating Principles

1.4.1 Quantum remote controls are pressure-hold type systems. This means that pressurization and depressurization of the blast machine is a separate function from the remote controls. Using hand operated inlet and outlet valves, the operator manually pressurizes and depressurizes the blast machine. Although the machine is under pressure neither air nor abrasive exits from the nozzle because the normally closed (NC) Quantum valve shuts off abrasive flow, and the ACE air valve shuts off air flow. Blasting will not start until the operator activates the control handle. Pressure remains in the blast machine until it is manually depressurized.

1.4.2 Compressed air enters the blast machine through the inlet piping, and is split into three streams. One stream goes directly into the blast machine, the second stream goes into the pusher-line, and the third stream is the control air used to operate the remote controls.

1.4.3 Quantum remote controls operate on the "return air" principle (refer to Figure 1). When the machine is manually pressurized, control air travels from the orifice, down the outbound twinline and escapes through an opening located under the control handle lever. As long as air escapes through the opening, the

remote control system remains inactive. When the control handle lever is pressed, the a rubber button seals the opening, and air from the outbound line returns through the inbound twinline, opening both the abrasive metering valve and air valve to start the blasting process. Releasing the handle exhausts the control air, causes the valves to close and blasting stops.

1.4.4 An abrasive cut-off switch (ACS) is a standard feature of the Quantum remote control. The abrasive cut-off switch is mounted on the control handle. The operator uses the switch to close the abrasive valve independently of the air valve, so air without abrasive exits the nozzle to clear the blast hose or to blow-down the surface.

1.5 Electric Control Option

1.5.1 Electric remote controls (electro-pneumatic) are recommended when the nozzle and remote control handle are farther than 100 feet from the blast machine. Pressure drop of pneumatic systems over longer distances increases actuation time, which prevents fast, safe operation. Contact your local Clemco Distributor for more information.

2.0 INSTALLATION

2.1 Factory Installation: If the remote control system was factory installed, skip Section 2.2 and make the connections described in Section 2.3.

2.2 Field Installation: Refer to Figures 2 and 3.

2.2.1 Empty the blast machine of abrasive. Depressurize the machine. Shut down the compressed air source. Disconnect the air supply line; and lockout and tagout the air supply.

⚠ WARNING

Depressurize the blast machine, lockout and tagout the compressed air supply, and bleed the air circuit before performing any maintenance on the machine or pneumatic accessories. Failure to do so could cause severe injury or death from the sudden release of trapped compressed air.

2.2.2 Remove the existing abrasive metering valve and all external piping from the blast machine.

NOTE: To ensure airtight seals, use pipe sealant on all male pipe threads.

2.2.3 Install the 1-1/4" outlet nipple and wye on the metering valve, and position them as shown in Figure 2.

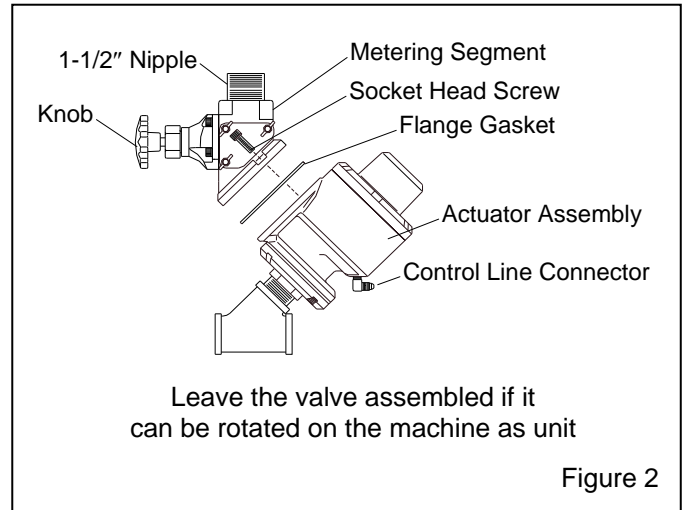
NOTE: The following describes installation of the Quantum valve on a machine with minimal rotation clearance. If the valve assembly will freely rotate beneath the blast machine, it may be installed as a unit.

2.2.4 Remove the four socket head screws holding the metering assembly to the actuator, and remove the actuator assembly as shown in Figure 2.

2.2.5 Use the 1-1/2" x close, schedule 80 pipe nipple to connect the metering segment to the outlet coupling at the bottom of the blast machine. Position the metering knob as shown in the illustrations.

2.2.6 Make sure the flange gasket is in place, and bolt the actuator to the metering segment.

2.2.7 Install a 1-1/4" pipe tee (Tee No.1) at the blast machine inlet as shown in Figure 3.



2.2.8 Assemble a pusher-line between the tee fitting and the Quantum valve using standard pipe fittings or flexible pusher-line as shown in Figure 3. Start at the tee and work downstream; this line must include a manual choke valve and the ACE air valve, in that order.

2.2.9 Connect a manually operated ball valve (inlet valve) and a second tee (Tee No. 2) to the blast machine as shown. NOTE: The second tee and all fittings necessary to complete the assembly shown in the detail circle in Figure 1 are included with the remote system.

2.2.10 Refer to the detail circle in Figure 1, and install the bushings and 1/16" orifice fitting.

2.2.11 Assemble a manual outlet valve assembly, and install it as shown. NOTE: Clemco supplies an exhaust muffler with all blast machines 1.5 cubic feet and larger. The muffler reduces exhaust noise and directs the exhaust downward, which prevents abrasive from exhausting into the air. When the blast machine is depressurized, the muffler body will pop up and diffuse the escaping 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 Figures 1 and 3.

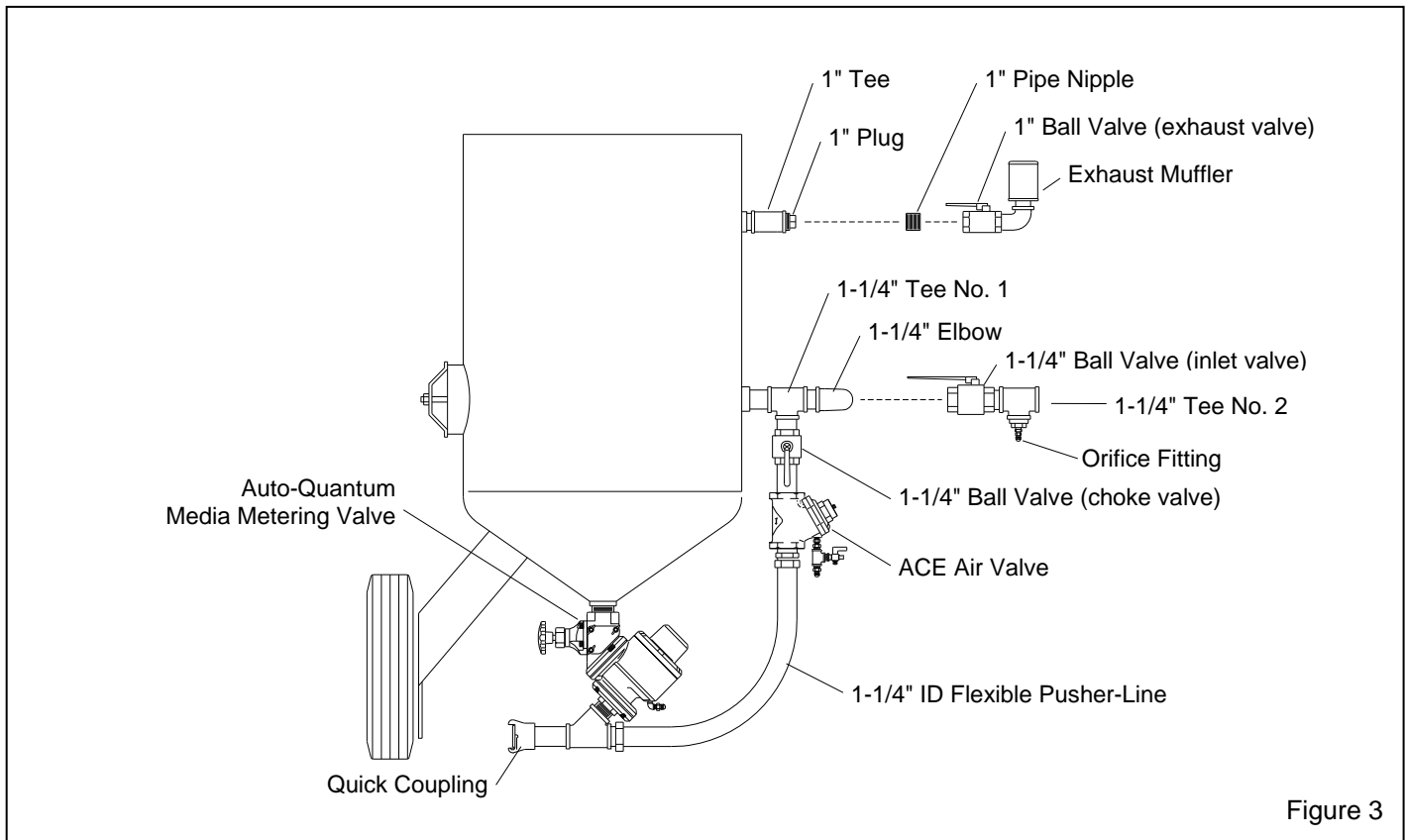


Figure 3

2.3 Blast Hose and Control Hose Connections
Refer to Figure 1.

NOTE: The following instructions explain the connections on a single operator blast machine and remote control system. Connections for dual operator machines are the same except the connections must be made twice; once for operator #1 and again for operator #2. Controls for operator #1 and #2 must be kept separate. Read the following warning before making the connections.

WARNING

Carefully trace, connect, and mark, control lines and blast hose on multiple-outlet blast machines, or where two or more blast machines are used. Switching control lines or blast hose, could lead to injury and property damage from unintentional actuation of a blast machine. To reduce the possibility of hose switching, blast hose and control cord should be of equal lengths. Hose identification kits, part no. 15890 for two outlets, or part no. 15891 for up to four outlets should be used where multiple blast hose and control lines are in use.

2.3.1 Uncoil and stretch out the blast hose and lay the 50-foot twinline hose and 50-foot single line hose alongside it.

WARNING

The fittings used in the tee assembly shown in Figure 1 must have a 1/16" orifice in the end that threads into the bushing. Never use fittings that do not have the 1/16" restricting orifice. Any other fitting will cause accidental actuation of the blast machine which can result in property damage, injury, or death.

2.3.2 Band the control handle to the blast hose at a suitable, comfortable position behind the nozzle holder, using the two nylon ties provided. The tie ends should be clipped so they will not snag the operator's clothing or interfere with the operation of the control handle.

2.3.3 Attach the 50-foot single line control hose to the ACS cut-off switch mounted on the control handle.

2.3.4 Attach the 50-foot twinline hose to the two fittings on the control handle. Either leg can be coupled to either fitting.

2.3.5 Working from the control handle back, band or tape the twinline and single-line hoses to the blast hose every four to six feet.

2.3.6 Attach the blast hose to the blast machine. Use safety lock pins or wires to securely lock the couplings.

2.3.7 Screw the three hose unions into the unattached fittings of the twinline and single-line hose.

2.3.8 Connect the 18-inch control hose between the Quantum valve and the union on the 50-foot single line.

2.3.9 Connect the 5-foot control hose between the orifice fitting on the inlet tee and either one of the unions on the twinline hose.

2.3.10 Complete the control hose connections by connecting the 36-inch control hose between the ACE air valve and the remaining union on the twinline hose.

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

3.0 OPERATION

3.1 Start-Up

3.1.1 Make sure the control handle is in the up (no-blast) position and that it moves freely. Make sure it will not engage unless the safety 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.

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

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

3.1.4 Make sure the safety petcocks on the Quantum metering valve and ACE air valve are open. The ACS feature requires two separate control lines, one for the Quantum and one for the ACE valve. To prevent actuation of either valve, both safety petcocks must be open.

WARNING

To prevent severe injury or death from accidental activation of the blast machine, open both safety petcocks when the blast machine is not in use. The control handle will not activate the machine when the petcocks are open.

3.1.5 Start the compressor, and bring it up to operating temperature and pressure. The pressure must be more than 80 pounds per square inch (psi) but not more than the maximum working pressure rating of the blast machine.

3.1.6 Close the outlet valve, and open the inlet valve. The machine will pressurize.

3.1.7 Close the safety petcocks. Air should be heard escaping from the orifice under the control handle lever but nowhere else.

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.

WARNING

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

No dust is safe to breathe. Abrasive blasting produces harmful dust. Failure to wear approved respirators could result in serious lung disease or death. Blast operators must wear properly fitted and maintained NIOSH-approved, type-CE supplied-air respirators approved for abrasive blasting.

During abrasive blasting, abrasive particles and dust 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 appropriate for the job site hazards.

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

3.3 Start Blasting

3.3.1 The toggle on the ACS switch should point away from the nozzle. See Operation ACS in Section 3.6.

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

3.3.3 Pull back the safety lever lock and depress the remote control handle. Be prepared for blasting to begin within a few seconds.

 **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)

3.3.4 Adjust abrasive flow per Section 4.1.

3.4 Stop Blasting

3.4.1 Before releasing the control handle, the operator may use the ACS to shut off the abrasive flow to clear the blast hose, or blow-down the blast surface. See Section 3.6.

3.4.2 To stop blasting, release the control handle lever. The control handle safety lever will flip up to lock the handle lever in the up (no blast) position to prevent accidental activation of the blast machine.

3.4.3 Open the safety petcocks located on the ACE air valve and Quantum metering valve. Always open the safety petcocks during work breaks to prevent unintentional blasting.

3.4.4 It is not necessary to depressurize the machine between short blasting pauses. The media valve and air valve close when the control handle lever is released. To

prevent accidental activation, depressurize the blast machine before any work break.

3.5 Depressurize the Blast Machine

3.5.1 Close the manual inlet valve.

3.5.2 Open the manual outlet valve. The machine will depressurize and the pop-up valve will open.

3.6 Operation of Abrasive Cut-Off Switch

3.6.1 The abrasive cut-off switch is situated directly behind the control handle. The ACS valve is "OFF" (no abrasive) when the toggle position is toward the nozzle ("EXH" port). Abrasive flow is "ON" when the toggle position is away from the nozzle ("CYL" port).

3.6.2 Moving the switch to the "OFF" (forward) position cuts off the air supply to the abrasive metering valve, closes the valve and stops the abrasive flow. This action allows air alone to exit the nozzle, useful for clearing the blast hose before shut-down and blowing abrasive off the blasted surface. The switch can be opened or closed any time but will not activate the metering valve unless the control handle is pressed.

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

 **WARNING**

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

4.0 ADJUSTMENTS

4.1 Abrasive Metering

4.1.1 Adjust abrasive flow by turning the knob on the metering valve located at the bottom of the blast machine.

4.1.2 The hole in the knob is a rotation reference enabling the operator to monitor its rotation and count turns as the knob is rotated. The reference hole helps return the setting to its original position, should temporary adjustments be required.

4.1.3 The valve is closed when the knob has been turned fully clockwise. Begin with the knob set 1-1/2 turns from fully closed. To increase abrasive flow, the machine tender turns the knob no more than 1/4 turn counterclockwise while the operator is blasting. Allow 10 to 15 seconds for the flow to stabilize before readjusting. Continue making adjustments as described until the correct flow is attained. The valve is fully open when the knob is turned fully counterclockwise.

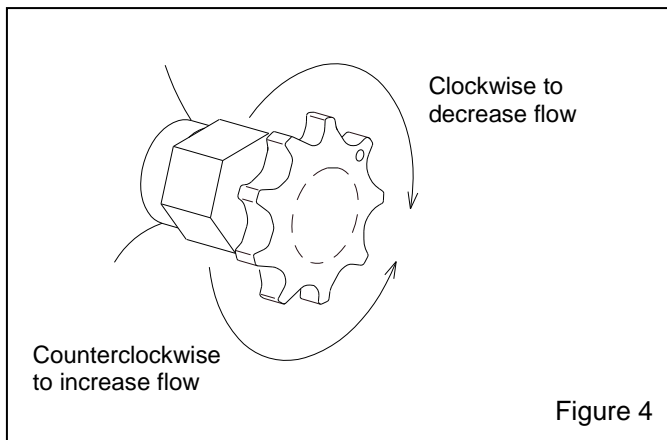


Figure 4

4.1.4 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.

5.0 PREVENTIVE MAINTENANCE

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

5.1 Daily

5.1.1 With the air off, before beginning blasting, inspect the following:

Inspect the RLX Control Handle; look for the following:

- The lever must not seal the opening on the control unless the safety lever lock is pulled down.
- The **handle lever** must return to the "up" position when released.
- The **safety lever lock** must return to the "up" position when the handle lever is released.
- Both the handle lever and safety lever lock must move freely with no drag or binding.

WARNING

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

5.1.2 While blasting, check the control handle for leaks.

5.2 Weekly

5.2.1 While blasting, inspect all control hoses, and valves for leaks. If leaks are found, stop blasting and repair.

5.3 Periodic Inspection

NOTE: Periodic inspection of the following items will prevent unscheduled down-time.

5.3.1 The remote control system is a safety device. For safety and to avoid unscheduled down-time, inspect the internal parts of the Quantum valve and ACE air valve. Inspect them for wear and lubrication of O-rings, pistons, springs, seals, and castings. Refer to the individual owner's manuals for equipment listed in Section 6.

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

6.0 SERVICE MAINTENANCE

 **WARNING**

Failure to observe the following before performing any maintenance could cause serious injury or death from the sudden release of trapped compressed air.

- Depressurize the blast machine.
- Lockout and tagout the compressed air supply.
- Bleed the air supply line to the blast machine.

6.1 Quantum Metering Valve

Refer to the Quantum valve owner's manual, No. 22565 for service instructions for the Quantum metering valve.

6.2 ACE Air Valve

Refer to the ACE air valve owner's manual, No. 23938 for service instructions for the air valve.

6.3 RLX Control Handle

Refer to the RLX control handle owner's manual, No. 10574 for service instructions for the control handle.

7.0 TROUBLESHOOTING

NOTE: This section only identifies conditions and problems in the remote control system. Always refer to the appropriate section of this manual, or manuals for accessory equipment when troubleshooting the equipment.

 **WARNING**

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

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

7.1 Blasting Does Not Start When the Control Handle Lever is Pressed.

7.1.1 Make sure the safety petcock is closed.

7.1.2 Check for air leaks in all control lines and fittings.

7.1.3 Check for air escaping from the orifice under the control handle. If no air is escaping, the orifice fitting or the line to the handle is plugged.

7.1.4 Open the safety petcocks, and press the control handle lever. Air should come out of the petcocks. If it does not, either the orifice under the lever is not being sealed, or the lines between the handle and the petcocks are blocked.

7.2 Air Continues to Leak From the Nozzle After the Control Handle Lever is Released.

7.2.1 Close the choke valve. If the leak stops, the problem is in the ACE air valve or a blockage in the control line between the air valve and control handle. If the leak continues, the Quantum requires service, or there is a blockage in the control line between the Quantum and the control handle.

7.3 Heavy Abrasive Flow.

7.3.1 Adjust the metering valve per Section 4.1.

7.3.2 Make sure the choke valve is open.

7.3.3 Inspect the metering plate in the Quantum valve for wear. Refer to the Quantum valve owner's manual for service instruction for the Quantum metering valve.

7.3.4 Inspect diaphragm in the ACE air valve for damage.

7.4 Abrasive Flow Does Not Stop When the ACS Toggle is Forward Toward the Nozzle.

7.4.1 Check the exhaust port on the front of the ACS switch, air should momentarily exhaust from the port when the ACS toggle is moved from the back position to the forward position. If it does not, check the following:

- Remove the muffler and check for blockage.
- Obstruction in the air line between the Quantum valve and ACS switch. Check for obstruction.
- Faulty ACS switch.
- Worn seat or plunger in Quantum valve. Inspect valve for wear.

7.5 Air Flow, but No Abrasive.

7.5.1 Make sure the machine contains abrasive.

7.5.2 Make sure the Quantum valve is not closed. The valve is closed when the knob is turned fully clockwise.

7.5.3 Make sure the ACS switch is in the blast position (toggle pointing away from nozzle) Refer to Section 3.6.

7.5.4 Check for a leak or blockage in the hose or fittings from the control handle to the Quantum valve.

7.5.5 The Quantum valve may require service. Refer to the Quantum valve owner's manual.

7.5.6 Use the following methods to check for obstruction in the Quantum valve.

7.5.6.1 Fully open the metering valve. The valve is full open when the knob is turned fully counterclockwise. While blasting, close the choke valve to force out small obstructions or wet abrasive.

 **WARNING**

Depressurize the blast machine, and lockout and tagout the air supply before continuing.

7.5.6.2 For large obstructions shut down the machine to examine the Quantum valve. Remove the inspection plate from the flanged adaptor and clear obstruction.

 **WARNING**

Do not stick fingers into the piston area of the inspection opening. The piston is under spring pressure, and could suddenly close when the obstruction is cleared.

7.6 Abrasive Flow Does Not Stop After the Control Handle Lever is Released.

7.6.1 The control air may not be exhausting from the Quantum valve or control handle. Refer to the RLX control handle manual.

7.6.2 If an ACS is used, check the exhaust filter on the ACS switch for blockage.

7.6.3 Inspect Quantum plunger and valve seat for wear or obstruction. Refer to the Quantum valve owner's manual.

7.7 Quantum Metering Knob Will Not Move.

7.7.1 Damp or hardened abrasive has packed around metering plate. Disassemble valve to inspect and clean.

7.8 Air Leaks Through Relief Hole in Quantum Valve Cylinder Cover.

7.8.1 Replace worn piston cup.

8.0 REPLACEMENT PARTS

8.1 Quantum Remote Control Systems

Item	Description	Stock No.
(-)	Quantum Pneumatic Single-Operator	25834
(-)	Quantum Pneumatic Dual-Operator	25835

8.2 Quantum Remote Control System Replacement Parts, Figure 5

Item	Description	Stock No.
1.	Auto Quantum metering valve with 1-1/4" wye, standard	24447
	with 1-1/2" wye, for 1-1/2" piping	25281
2.	ACE 1-1/4" air valve, standard valve only, without fittings	24074
	valve assembly with fittings	24044
	ACE 1-1/2" air valve, for 1-1/2" piping valve only, without fittings	25288
	valve assembly with fittings	25289
3.	RLX Control handle assembly, complete with ACS	07625

4.	Union, twinline hose (3 required)	01944
5.	Adaptor, 1/8" NPT w/ 1/16" orifice	01945
6.	Hose, twinline, 50-ft. coupled	01951
7.	Hose, single line, 50-ft, 3/16" coupled	03087
8.	Hose, 5-ft. coupled	03083
9.	Hose, 18" coupled	02454
10.	Hose, 3-ft. coupled	02498
11.	Tee, 1-1/4" x 1" pipe	01811
12.	Bushing, 1" x 1/4"	02023
13.	Bushing, 1/4" X 1/8" brass	02010
14.*	Tee, 2" x 1"	01812
15.*	Nipple, 1/4" close	01829
16.*	Tee, 1/4"	01785
17.	Nylon tie	02195
*	Used on dual controls only	

8.3 Valve Replacement Parts

NOTE: Refer to the following manuals for replacement parts for the Quantum Valve, ACE Air Valve, and RLX Control Handle:

- Quantum Abrasive Metering Valve . Manual No. 22565
- ACE Air Valve Manual No. 23938
- RLX Control Handle Manual No. 10574

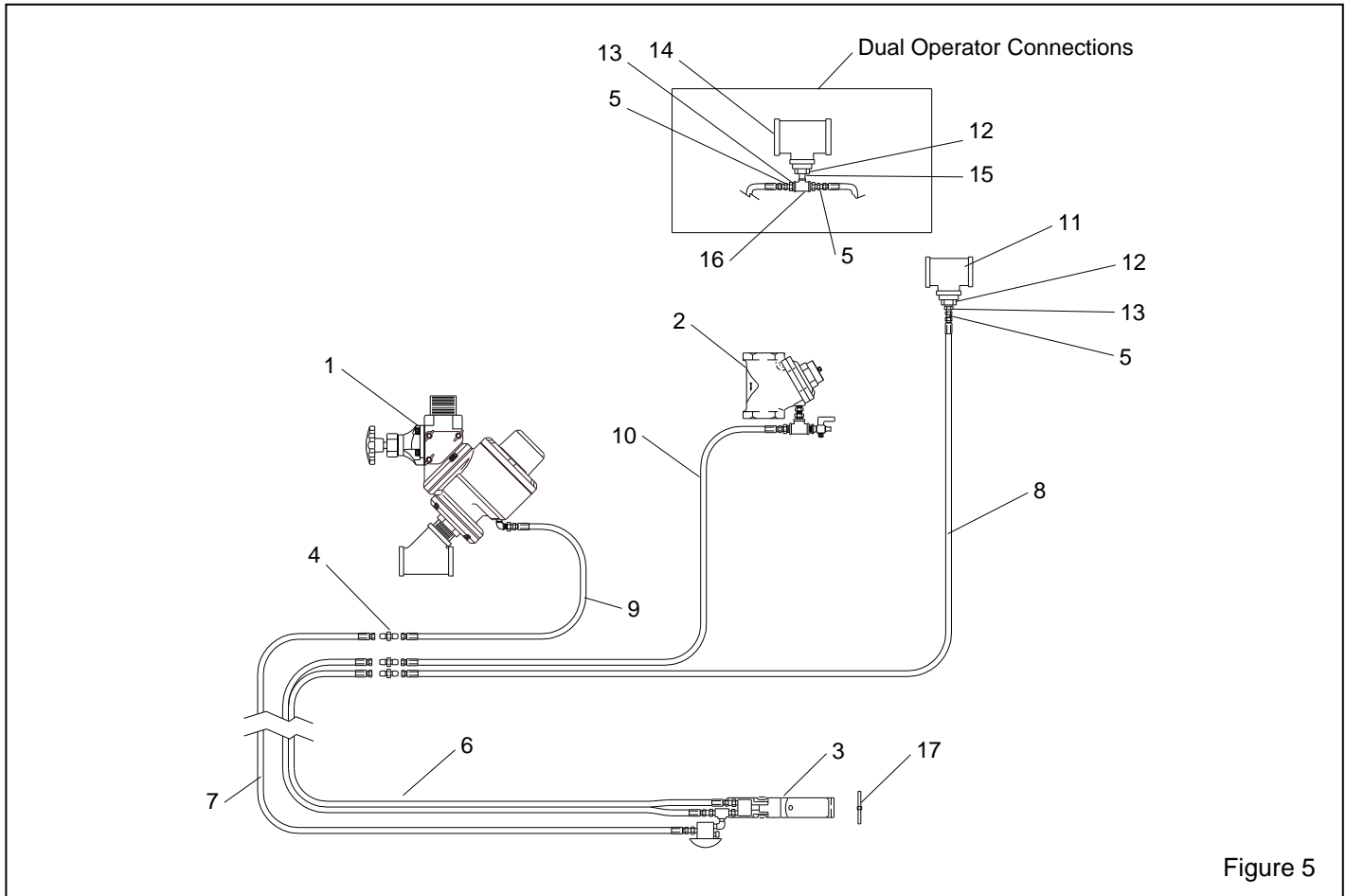


Figure 5