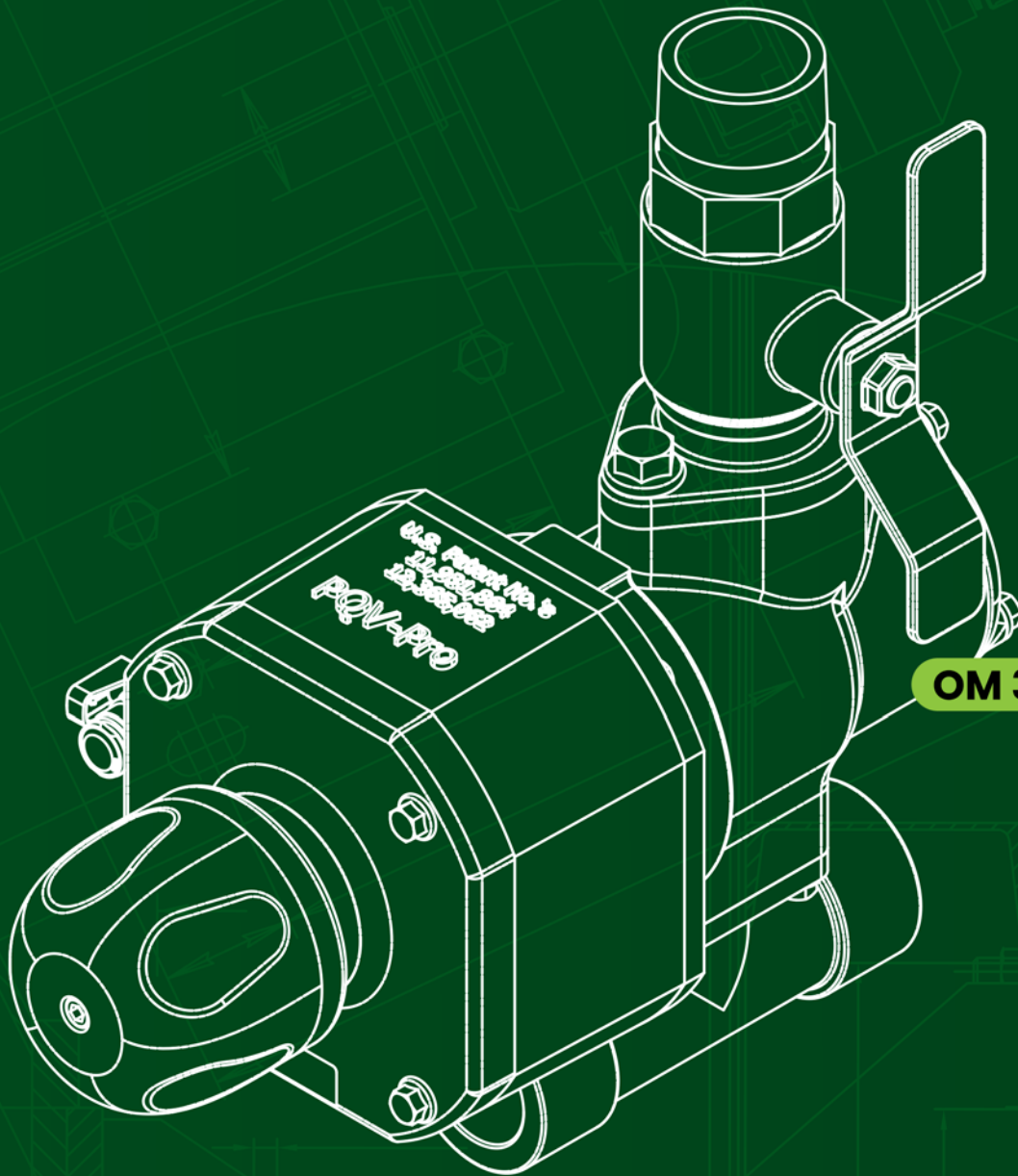


O P E R A T I O N M A N U A L



OM 32393

clemco

**PQV-Pro Pneumatically Operated
Abrasive Metering Valve**

Date of Issue: 09/25 | Rev. A, 12/25

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.

WARNING

OPERATOR SAFETY EQUIPMENT

- 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/>. 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

WARNING

BLAST MACHINES AND REMOTE CONTROLS

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.

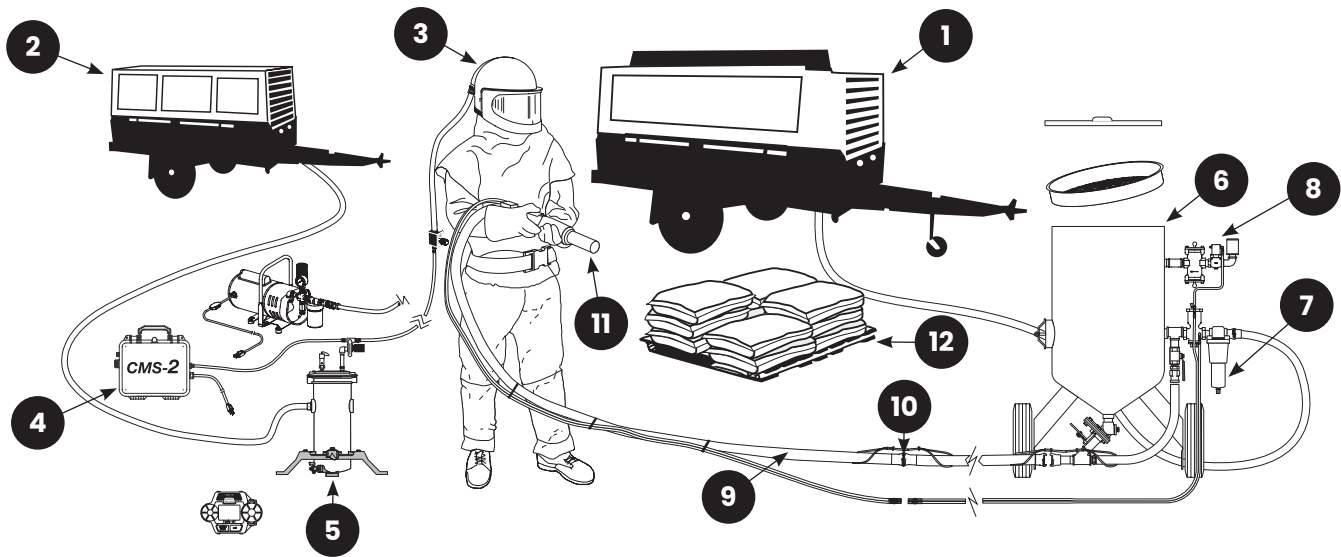
Warranty

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.



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 number is listed in the owner's manual) is for a complete assembly from point of attachment on the CPF (sorbent 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 sorbent 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.

WARNING

DO NOT use this equipment before **READING** this **MANUAL** and **UNDERSTANDING** its contents. These **WARNINGS** are included for the health and safety of the operator and those in the immediate vicinity. Failure to read and understand these warnings can result in **INJURY** or **DEATH**.

NOTICE

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. It is the responsibility of the user to insure that proper training of operators has been performed and a safe work environment is provided.

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.

This equipment is only one component of a blasting operation. Other products, such as air compressors, air filters and receivers, abrasives, equipment for ventilating, dehumidifying, 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 operation for warnings, information, training, and instruction relating to the proper and safe use of their equipment.

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Safety Alerts Key



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

NOTICE

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

CAUTION

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

WARNING

DANGER

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

1.0 Introduction

1.1 Scope of Manual

1.1.1 | These instructions cover the setup, operation, maintenance, and replacement parts for Clemco’s PQV-Pro Pneumatically Operated Abrasive Metering Valves.

1.1.2 | This manual contains important safety information. All operators and personnel involved with the abrasive blasting process must read and understand the contents of these instructions, including the orange cover. It is equally important that the operator is trained and qualified to safely operate the blast machine, remote controls, and all other equipment used with the blast machine.

1.1.3 | All personnel involved with the abrasive

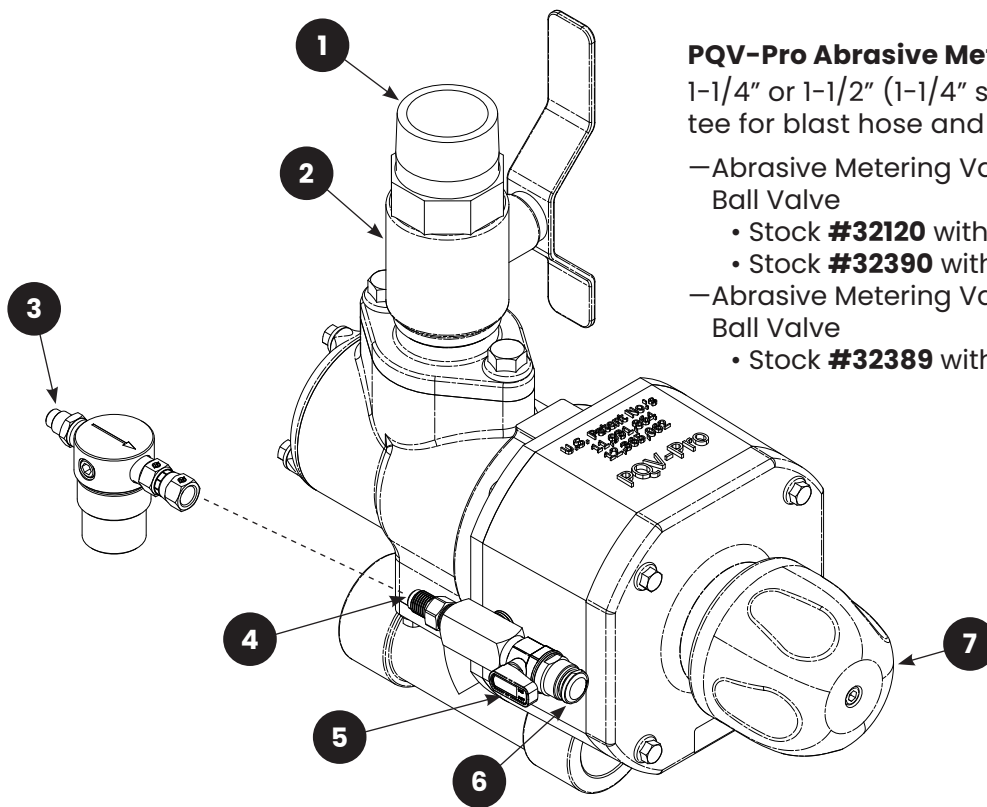
blasting process must be made aware of the hazards associated with abrasive blasting. The Clemco booklet, *Abrasive Blasting Safety Practices* is included with every blast machine; the booklet contains important safety information about abrasive blasting that may not be included in equipment operations manuals. To request additional copies, email info@clemcoindustries.com.

1.2 Pressure Specifications

Pressure to fully open the valve.....80 psi
 Maximum working pressure.....175 psi

1.3 Components and Operating Principles

1.3.1 | Main components of the metering valve assembly are shown in **Figure 1** and include the



PQV-Pro Abrasive Metering Valve
 1-1/4" or 1-1/2" (1-1/4" shown), flanged outlet tee for blast hose and pusher line connections.

- Abrasive Metering Valve with Flanged Ball Valve
 - Stock **#32120** with 1-1/4" Outlet Tee
 - Stock **#32390** with 1-1/2" Outlet Tee
- Abrasive Metering Valve less Flanged Ball Valve
 - Stock **#32389** with 1-1/4" Outlet Tee

FIGURE 1: (1) 1-1/2" NPT Nipple; (2) Ball valve with Flange shown with Handle in Open Position; (3) Connection from RLX/ACS shown, or Optional Restrictor Kit, P/N 32400, order kit when media adjustment is required during blasting, order separately; (4) Connect Blast Control Signal Here; (5) Safety Petcock; (6) No Connection Here; (7) Abrasive Flow Adjustment Knob

metering valve and a 1-1/2" nipple to connect the valve to the blast machine. There are three valve options as noted below:

- Metering valve with a flanged (shutoff) ball valve and 1-1/4" outlet tee.
- Metering valve with a flanged ball valve and 1.50" outlet tee.
- Metering valve without the flanged ball valve and includes a 1-1/4" outlet tee.

1.3.2 | Operating Principles: The PQV-Pro is a normally closed, pneumatically operated, abrasive metering valve. When the valve is idle (the control handle is up), air assisted spring pressure keeps the valve closed. When control air is applied (the control handle is pressed), the air-assist vents and control-air pressure overcomes the spring pressure and opens the valve to a specific point set by turning the metering knob. When the control handle is released, control pressure vents and spring pressure closes the valve, stopping abrasive flow.

1.4 Abrasives

WARNING

Abrasives and dust from blasting may contain toxic materials (e.g., lead paint, silica) that are hazardous to workers. Before blasting, obtain a safety data sheet (SDS) for the blast abrasive and identify all substances removed by the blasting process:

- Silica sand (crystalline) can cause silicosis, lung cancer, and breathing problems in exposed workers.
- Slags can contain trace amounts of toxic metals such as arsenic, beryllium, and cadmium and have the potential to cause lung disease.

NO DUST IS SAFE TO BREATHE. DUST PRODUCED FROM ANY ABRASIVE OR FROM THE BLASTING PROCESS CAN CAUSE SERIOUS LUNG DISEASE AND DEATH WHEN INHALED. It is the employer's responsibility to train employees to identify hazardous substances and to provide suitable policies, procedures, monitoring, recordkeeping, and personal protective equipment.

NOTICE

Use only abrasives specifically manufactured for blasting that are compatible with the surface being blasted. Abrasives produced for other applications may be inconsistent in size and shape and produce an unsatisfactory finish, contain particles that can jam the abrasive metering valve, or cause irregular wear.

1.4.1 | Selection of blasting abrasive can play a significant part in worker health risk, job productivity, and maintenance of the blast machine. **DO NOT USE** abrasives containing more than 1% crystalline (free) silica. Obtain safety data sheets (SDS) for the blasting abrasive prior to blasting, paying particular attention to worker health risks and presence of any hazardous/toxic substances.

1.4.2 | Abrasive size: The PQV-Pro is designed to be used with most common abrasives ranging in sizes from 16-mesh to 220-mesh. However, the blast machine or accessories may limit the size and type of abrasive to something between the coarse and fine limitations of the valve. The choice of abrasive size depends on the desired profile, cleaning rate, nozzle size, and availability of clean dry air. Generally, larger and denser abrasive provide a deeper profile, while smaller abrasives clean faster. Most abrasive blasting is done with abrasive sizes between 16- and 80-mesh. Abrasive for cabinet use is generally between 50-mesh and 180-mesh. Coarse mesh sizes may be used if the nozzle orifice is large enough to prevent multiple particles to pass without jamming. Finer abrasive requires clean dry air to prevent bridging in the blast machine or metering valve.

1.4.3 | Sand: Sand should never be used because of the respiratory hazards associated with abrasive containing free silica.

1.4.4 | Slags: Slag abrasives are compatible with the valve. Obtain a safety data sheet (SDS) to identify hazardous substances.

1.4.5 | Steel: Steel shot and steel grit may be used but attention must be given to moisture in the compressed air, the recovery process, and weight of the abrasive. Steel abrasive rusts under humid conditions, especially with day and night temperature changes, or when compressed air supplied to the vessel is damp with condensation. Steel abrasives weigh approximate 250 lbs per cu ft. Steel abrasives are normally used in blast rooms with recovery systems and protected from the elements.

1.4.6 | Silicon carbide, aluminum oxide, and garnet: These are the most aggressive of the commonly used abrasives. Although aggressive abrasives such as these may be used, the service life of any equipment components which come in contact with these abrasives will be reduced. To avoid unscheduled downtime, periodically inspect the metering valve, hoses, and nozzles

for abrasive wear. Use nozzles lined with boron carbide with aggressive abrasives.

1.4.7 | Glass bead and crushed glass: These are compatible with the PQV-Pro Metering Valve.

1.4.8 | Lightweight Abrasive: Plastic media and agricultural media are compatible with the PQV-Pro Valve, but generally require a blast machine with 60 degree conical bottom for continuous, uninterrupted media flow.

2.0 Installation

2.1 Remove Existing Metering Valve from Blast Machine

2.1.1 | Empty the blast machine of abrasive and depressurize the machine.

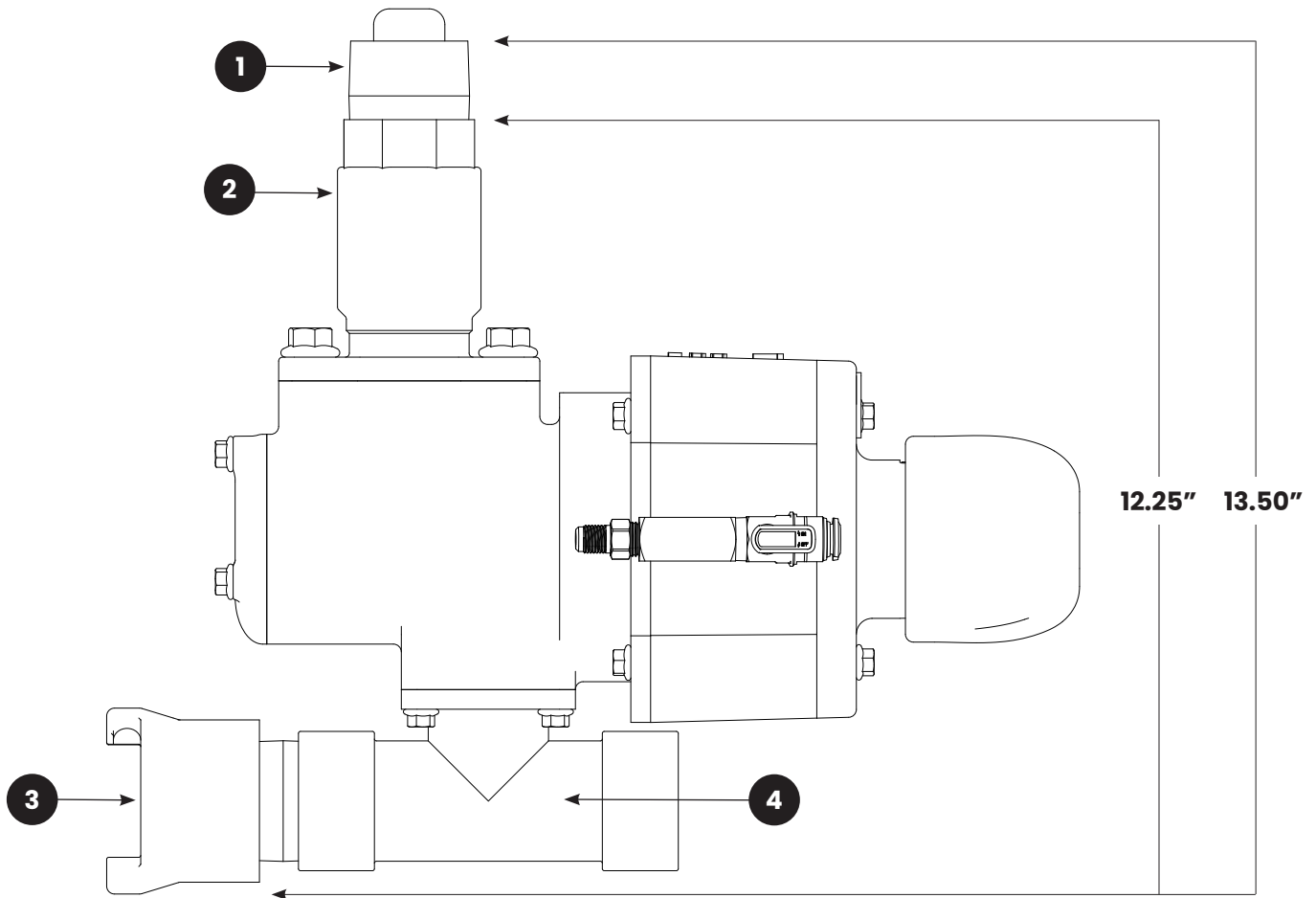


FIGURE 2: (1) 1-1/2" Installation Nipple; (2) Flanged Ball Valve; (3) Hose Coupling (REF) not included; (4) Outlet Tee

! WARNING

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

- Depressurize the blast machine.
- Bleed the compressed-air supply line to the blast machine.
- Lockout (be certain the air supply is off and that it cannot be started while work is in process) and tagout (make sure the air supply is clearly marked to prevent restarting while work is in process) the compressed-air supply.

2.1.2 | Shut down the compressed-air source, lockout and tagout the air supply, and drain the air-supply line.

2.1.3 | Before removing the existing metering valve, refer to **Figure 2** to determine the ground clearance required for each of the valve options. Besides the height of the PQV-Pro Valve, an additional 1-3/4" is needed to allow for the installation nipple and blast hose coupling. Measure the distance from the bottom of the blast machine to ground level to make sure the blast machine has the clearance to accommodate the valve. **NOTE:** A 1-1/2" x 1-1/4" bushing may be required on the blast machine, depending on the vintage of the machine. The bushing increases the clearance needed to install the valve.

2.1.4 | Make a note of the connections on the existing metering valve because connections shown in the illustrations can differ based on remote control options. Remove control hose(s). If the type of control connections are different from those supplied with the PQV-Pro Valve, save the connections and hoses from the existing valve for reuse.

2.1.5 | Remove all blast machine piping (pusher line adaptors, and blast hose fittings) from the metering valve. Save them as they will be reused.

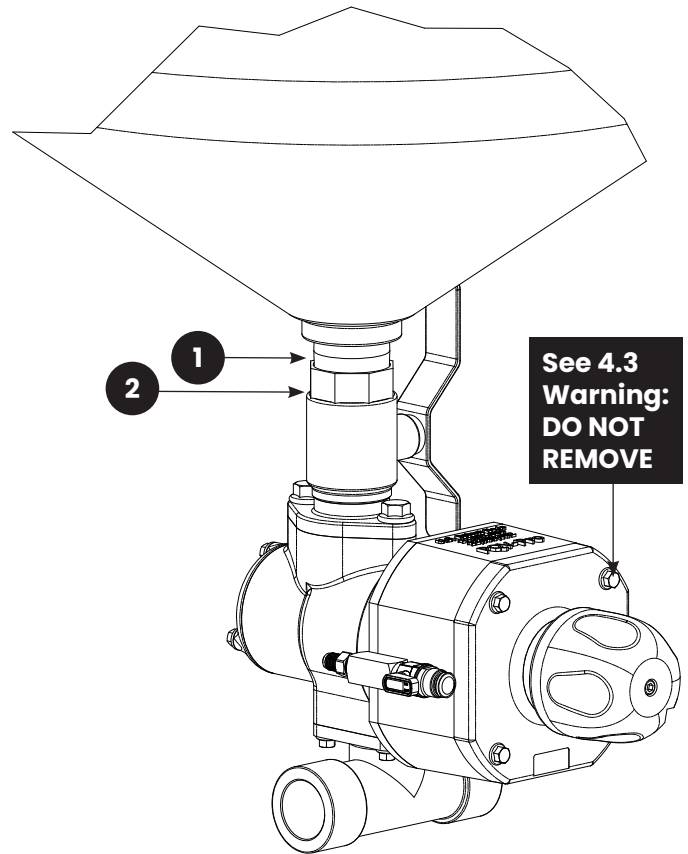


FIGURE 3: (1) 1-1/2" Installation Nipple; (2) Use wrench to tighten only on wrench flats

2.1.6 | Remove the existing metering valve from the blast machine.

2.2 Install PQV-Pro Valve onto the Blast Machine — Figure 3

Installation Notes:

Tighten and align the valve by using a wrench on the flanged inlet nipple or ball valve only, as shown in **Figure 3**. Avoid applying pressure on the valve body or outlet pipe (lower flange) to tighten or align the valve. Doing so could damage the upper or lower flanges.

! NOTICE

Avoid tightening the valve to the blast machine or aligning the valve by using a wrench or applying leverage on any part of the valve at or below the upper flange. Doing so could damage the flanges.

To ensure airtight seals and make assembly easier, apply pipe-thread sealant to all male pipe threads.

Additional fittings may be required to connect the valve to some blast machines and piping configurations.

The PQV-Pro Valve is non-directional; air flow can enter through either end of the outlet pipe, and the pipe can be rotated 90 degrees in either direction.

2.2.1 | Apply thread sealant to both ends of the 1-1/2" NPT installation nipple and use the nipple to attach the upper flange to the machine as, shown in **Figure 3**.

2.2.2 | Use a pipe wrench or strap wrench to grip the valve body or body of the inlet nipple to tighten it onto the blast machine. Do not use a wrench on or below the flanges, as noted in **Figure 3**. Doing so could damage the flanges.

2.2.3 | The valve body may be rotated 90 degrees in either direction. Rotate the body to the inlet flange, as needed to provide the best access to the metering knob, and clean-out cover. Make sure the O-ring is in place before bolting the body onto the inlet flange.

2.2.4 | The outlet pipe flange may be rotated 90 degrees in either direction. Rotate the outlet pipe to the valve body, as needed to provide the best alignment with the pusher line and blast hose connection. Make sure the O-ring is in place before reconnecting the outlet pipe to the valve body.

2.3 Connect Piping to the Metering Valve – Figure 4

2.3.1 | Apply pipe thread sealant to the male threads of a new 1-1/4" NPT nipple (1-1/2" NPT when using the 1-1/2" outlet pipe) and connect the blast hose coupling to the outlet pipe as shown in **Figure 2**.

2.3.2 | Apply pipe thread sealant to the male threads of the pusher line and connect the pusher line to the outlet pipe, as shown. **NOTE:** The old pusher line may be too long or too short to connect to the fittings without it stretching or kinking. Some adjustment can be done by lengthening or shorting the nipples between the side-piping tee and choke valve. **If the pusher line does not fit correctly, a shorter or longer pusher line is required.**

2.4 Replacing GritWizard with PQV-Pro

2.4.1 | GritWizard Removal Notes: Figure 4

1. Remove all pressure from pressure vessel plumbing.
2. Remove current GritWizard at the ball valve.
3. Use existing control line to install on new valve as shown.
4. Remove the 1/4" tubing air supply line from valve and vessel. Plug port on corresponding port using 1/4" plug
5. Remove control line to open/close valve.
 - with JIC hose fitting for cabinets.
 - push to connect fittings for Big Clems.

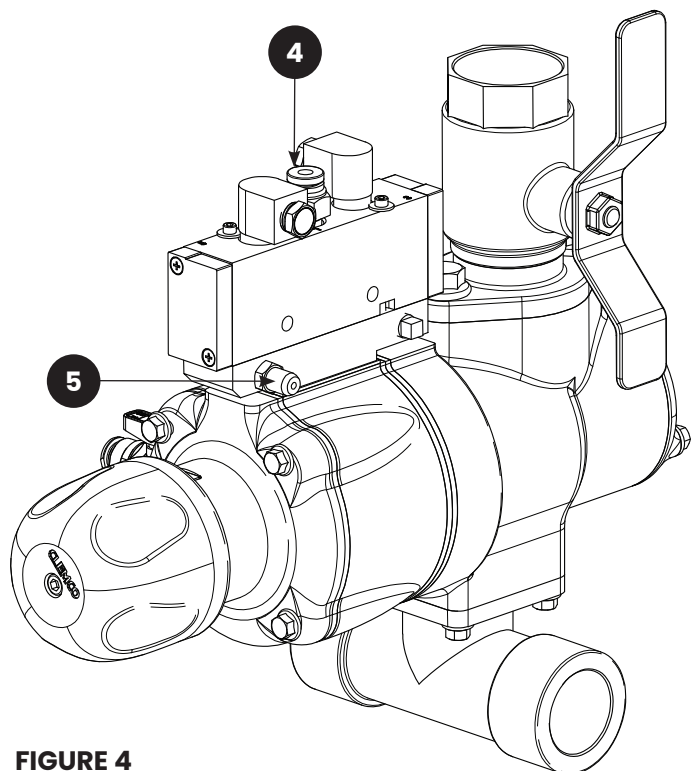


FIGURE 4

2.4.2 | PQV-Pro Install Notes: Figure 5

1. Install full valve under pressure vessel.
Use supplied 1-1/2" nipple if needed.
2. Use control line from existing GritWizard to install on the PQV-Pro as shown.
 - with JIC hose fitting for cabinets.
 - push to connect fittings for Big Clems.

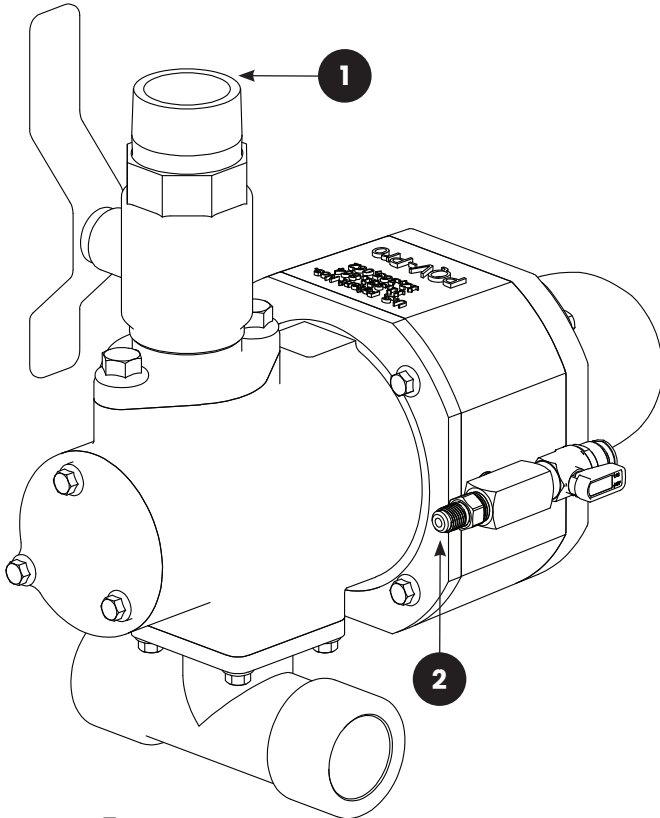


FIGURE 5

3.0 Adjust Abrasive Flow — Figure 6

3.1 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.

3.2 The valve is closed when the knob is fully clockwise. Increase abrasive flow by turning the knob counterclockwise and decrease abrasive flow by turning the knob clockwise, as shown in Figure 6. Begin with the knob set two turns from

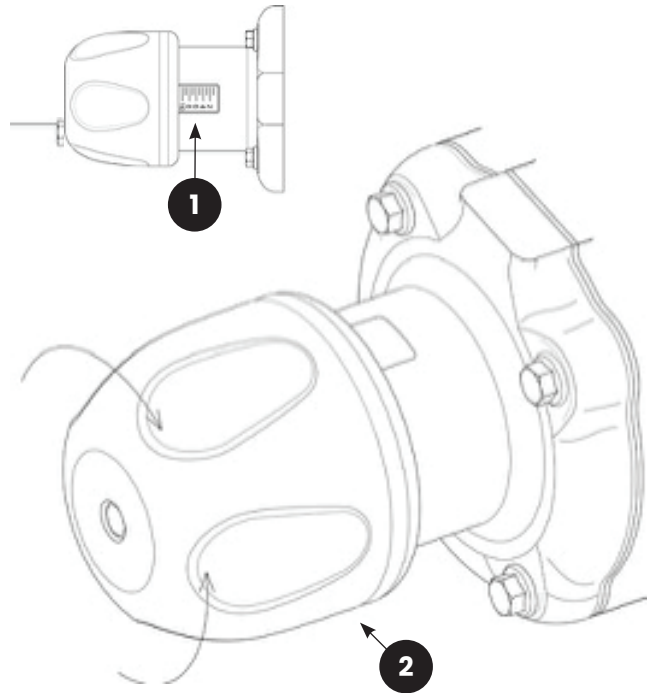


FIGURE 6: (1) Adjustment-Position Indicator Label; (2) Turn the metering knob clockwise for less abrasive. Turn the metering knob counterclockwise for more abrasive.

fully closed. Increase flow by turning the knob no more than 1/4 turn counterclockwise. Allow 10 to 15 seconds for the flow to stabilize before readjusting. Continue adjusting as described until the correct flow is attained.

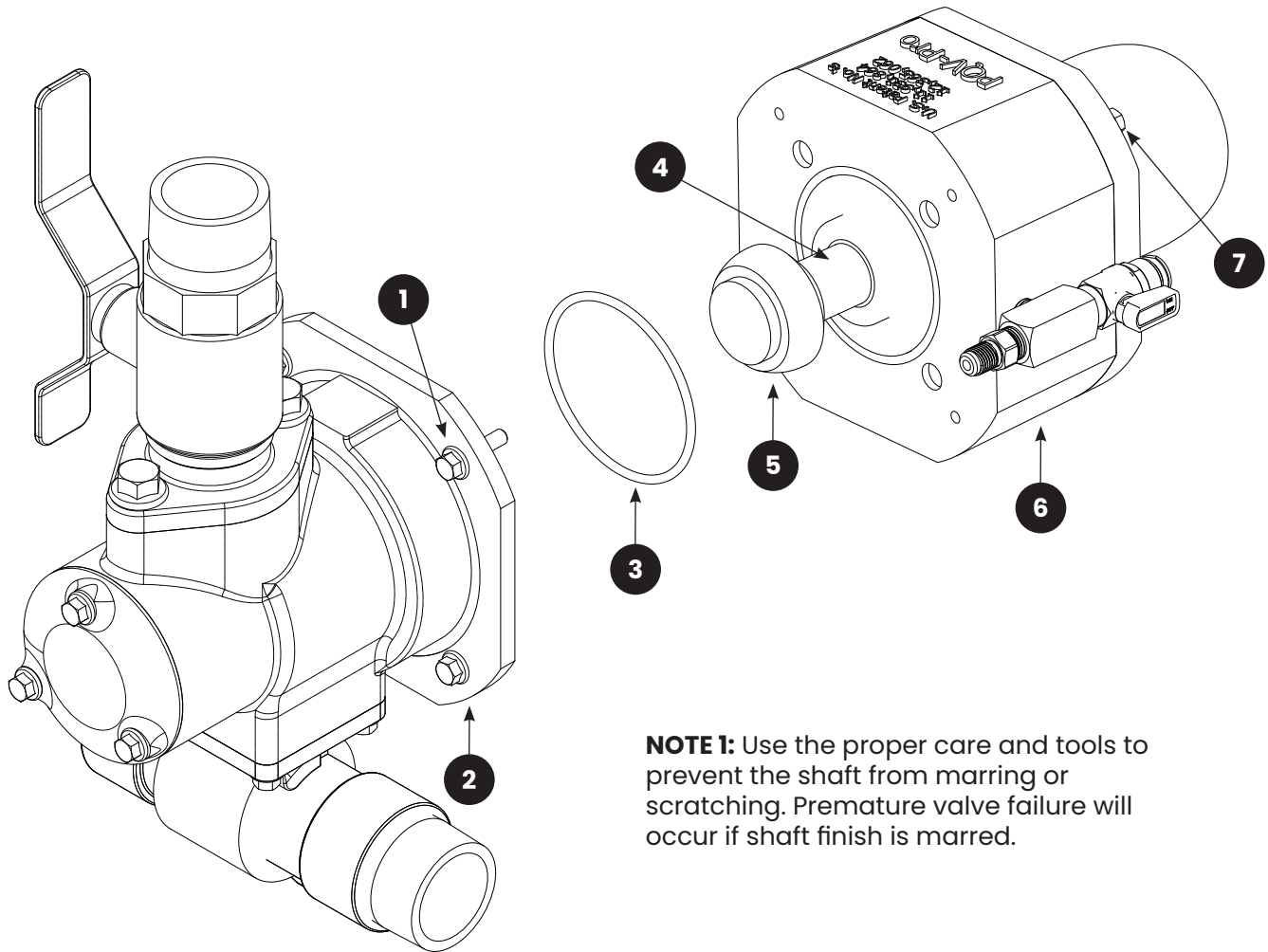
3.3 The indicator label behind the knob shows how far the metering valve is open. When the knob is turned in or out it moves over the label, allowing the operator to reset the valve to the same position when abrasive flow is temporarily changed.

4.0 Service Maintenance

4.1 Servicing Notes

4.1.1 | Valve Disassembly

- The flanged shutoff valve may be used to help service the valve without the need to drain the media in the blast machine.



NOTE 1: Use the proper care and tools to prevent the shaft from marring or scratching. Premature valve failure will occur if shaft finish is marred.

FIGURE 7: (1) Using 1/4" x 1" Flange Bolts—4, attach to actuator body with o-rings in groove; (2) Adaptor Flange; (3) O-Ring, fits in actuator body flange; (4) Hold shaft with non-marring grips when replacing plunger—See note 1; (5) Turn counterclockwise to remove plunger from shaft, using blue loctite on plunger threads turn plunger in shaft to re-install, see figure 5 for valve plunger seat and gasket replacement; (6) Actuator Body Assembly; (7) **DO NOT REMOVE THESE BOLTS**

! WARNING

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

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

- After the energy is removed in the system and the shutoff valve handle is in the horizontal position, the valve can be disassembled.
- The following instructions cover the complete disassembly and reassembly of all the parts recommended for servicing. If service is not required in an area, skip to the next step.

4.1.2 | Actuator Removal – See Figure 7

- Use a 9/16" wrench to remove control line fitting going to the brass tee in the Actuator body.
- To avoid injury, do not remove the four bolts on the (green) knob end of the unit.

- No internal service is required on the Actuator assembly.
- The actuator portion of the valve may be removed to access the plunger and seat. Use a 3/8" wrench to remove the four, 1/4" x 1" flanged bolts connecting the actuator assembly to the main housing assembly at the flange.

4.1.3 | Plunger removal – See Figure 7

- With Actuator removed, inspect Plunger for wear. If worn, remove by hand turning in the counterclockwise direction. Use proper care and tools to prevent marring the shaft.
- Ensure O-ring remains intact with the groove on actuator body for re-assembly.

4.1.4 Seat Removal – See Figure 9

- With Actuator removed, use a 2" socket to remove the valve seat from the main housing assembly.
- Remove the seat gasket from the valve seat.

4.1.5 Main Housing Disassembly – See Figure 9

- The main body may be removed at the ball valve flange by removing 2 bolts using a 5/8" wrench.
- Remove Outlet Tee by removing four, 1/4" x 1" flanged bolts.
- Remove Clean-out cover by removing three, 1/4" x 1" flanged bolts.
- Bolts and O-rings may be cleaned and reused or replaced if worn or damaged.

4.1.6 | Main Housing Re-assembly – See Figure 9

- Safely blow out all threaded holes and ensure all bolts are free from debris before reassembling.
- Clean all parts that are to be reused and replace any worn or damaged parts.
- Place O-ring on the clean-out cover and use three flange bolts to attach the cover to the housing. Use a 3/8" wrench to tighten the flange bolts.
- Place O-ring into the groove on the outlet pipe flange and use four flange bolts to attach the pipe to the bottom of the housing. Use a 3/8" wrench to tighten the flange bolts
- Place O-ring into the groove at the top of the housing and use two flange bolts to attach

- the housing to the flanged ball valve. Use 5/8" wrench to tighten the bolts securely.
- Make sure all fasteners are tight, as leaks will cause the valve to malfunction.

4.1.7 Seat Re-assembly – See Figure 9

- Remove debris around and blow out threaded hole before installing seat.
- Place new seat gasket on the valve seat and thread into housing.
- Use a 2" socket to tighten the valve seat into the main housing assembly. Torque seat to 35 ft. lbs.

4.1.8 Plunger re-assembly – See Figure 7

- Thread Plunger into threaded hole in shaft, tighten by hand turning in the clockwise direction.
- Ensure O-ring is intact with the groove on actuator body for re-assembly.

4.1.9 | Actuator Re-assembly – See Figure 7

- Safely blow out the 4 threaded holes in the actuator and ensure all bolts are free from debris before reassembling. Bolts and O-rings may be cleaned and reused or replaced if worn or damaged.
- Place actuator into the main body flange with the 'PQV-Pro' logo positioned in the same direction as the upper port with 2 threaded holes. With actuator in place there will be a gap of approximately 1/8" between flange and actuator.
- Align the 4 hex bolts with the mounting holes in the main housing and tighten to secure and seal the valve actuator section.
- Reconnect the control line fitting going to the brass tee in the actuator body and tighten using a 9/16" wrench.

4.2 Reconnect Piping & Control Tubing

4.2.1 | Apply thread sealant compound to male NPT pipe threads before reconnecting the pusher line and blast-hose coupling piping.

4.2.2 | Test the valve for leaks and function before returning it to service.

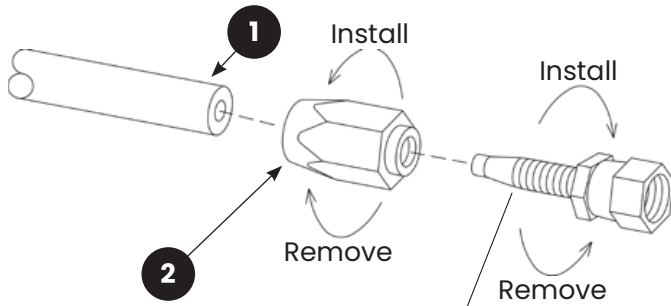


FIGURE 8: (1) Control Hose; (2) Sleeve

4.3 Cutting Control Hose and Reusing Control Hose Fittings – Figure 8

! WARNING

Failure to observe the following procedure before performing any maintenance can cause injury from the sudden release of trapped compressed air:

- Bleed all compressed air-supply lines.
- Lockout and tagout the compressed-air supply.

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

4.3.1 | Remove the hose end by placing the sleeve in a vise or use a backup wrench on the sleeve to prevent it from turning. Unscrew the insert by turning it counterclockwise.

4.3.2 | Turn the sleeve clockwise to remove it from the hose.

4.3.3 | Cut hose to the required length.

4.3.4 | Turn the sleeve counterclockwise to install it onto the hose. Do not over-tighten the sleeve, stop tightening as soon as the hose bottoms against the sleeve's internal shoulder. Over-tightening will cause the hose to curl inward and could cause blockage.

4.3.5 | Push the end of the insert into the sleeve, and turn it clockwise to tighten until the insert hex is against the sleeve.

4.4 Using Tube-Lock Fittings

! WARNING

Failure to observe the following procedure before performing any maintenance can cause injury from the sudden release of trapped compressed air:

- Bleed all compressed air-supply lines.
- Lockout and tagout the compressed-air supply.

4.4.1 | To remove the tubing from tube-lock fittings, push the retaining collar toward the fitting, which releases the tubing so it can be easily removed by pulling it out. Do not force it, only a slight pull on the tubing is required if the retaining collar is pushed in correctly.

4.4.2 | Reconnect the tubing by inserting it through the collar until it seats. Tug on the tubing to make sure it is tight.

4.4.3 | To connect the tubing, push the tubing into the fitting until it seats. Gently pull on the tubing to make sure it is securely fastened.

4.4.4 | To remove the tubing, push the collar in to release the tubing.

5.0 Troubleshooting

! WARNING

To avoid serious injury from the sudden release of compressed air, observe the following when troubleshooting the machine and remote controls.

- Turn OFF the air supply, and lockout and tagout the air supply.
- Drain the air-supply line.
- When checking if the controls require air, always enlist the aid of another person to operate the control handle, hold the nozzle securely, and point it in a safe direction.
- Never strap the remote control handle lever down in the operating position.

NOTE: This section only identifies conditions and problems in the blast machine and remote control system. For service information, always refer to the appropriate section of this manual and accessory equipment manuals before servicing the equipment.

5.1 Air Flow Only — No Abrasive Flow

5.1.1 | Metering valve closed or needs to be adjusted. Adjust abrasive flow, per **Section 3.0**.

5.1.2 | Optional ACS switch is closed. Make sure the ACS is in the ON position with the ACS toggle pointing away from nozzle. Refer to the RLX Control Handle operations manual.

5.1.3 | Leak or blockage in the control hose or fittings between the control handle and the PQV-Pro Metering Valve. Make sure control air is reaching the side port fitting on the brass tee. Refer to **Section 5.8**.

5.1.4 | Blast machine is empty. Check abrasive level.

5.1.5 | Obstruction in metering valve. Clear as follows:

WARNING

To avoid serious injury, depressurize the blast machine, and lockout and tagout the compressed-air supply before continuing.

Fully open the control valve. (It is fully open when the metering knob is turned fully counterclockwise.) While blasting, close the pusher line choke valve to force out small obstructions or wet abrasive.

For larger obstructions, shut the machine down to examine the abrasive valve. Remove the clean-out cover from the main body or actuator body (**Figure 8**) and clear obstruction.

5.1.7 | The metering valve may require service. Refer to **Section 4.0** to service the valve.

5.1.8 | Abrasive bridging in the blast machine. Refer to the blast machine operations manual and inspect the inside of the machine for foreign material.

5.2 Heavy Abrasive Flow

5.2.1 | Make sure the choke valve is fully open (handle in-line with the valve and piping).

5.2.2 | Abrasive metering valve may be open too far. Refer to **Section 3.0** to adjust the metering valve.

5.2.3 | Inspect the metering valve for wear. The metering valve may require service. Refer to Section 4.0 to service the valve.

5.2.4 | If the valve is used with a pressure-hold remote control system, check the diaphragm in the ACE Air Valve for damage.

5.3 Irregular Abrasive Flow

5.3.1 | Check the abrasive metering valve and air control lines for air leaks. The abrasive valve is a normally closed valve and requires air to open; any leak or fluctuation in pressure can cause the valve to close or partially close.

5.3.2 | Abrasive metering valve may be open too far. Refer to **Section 3.0** to adjust the metering valve.

5.3.3 | Refer to **Section 5.9** for additional information on moisture.

5.3.4 | Check control line pressure. Pressure below 80 psi will cause the metering valve to begin to close. Pressure fluctuations cause the metering valve to partially close and reopen.

5.4 Abrasive or Air Flow Continues After Releasing the Control Handle

5.4.1 | Control air may not be fully exhausting from the control handle. Refer to the control handle and remote control systems operation manuals.

5.4.2 | Control air may not be fully exhausting from the metering valve.

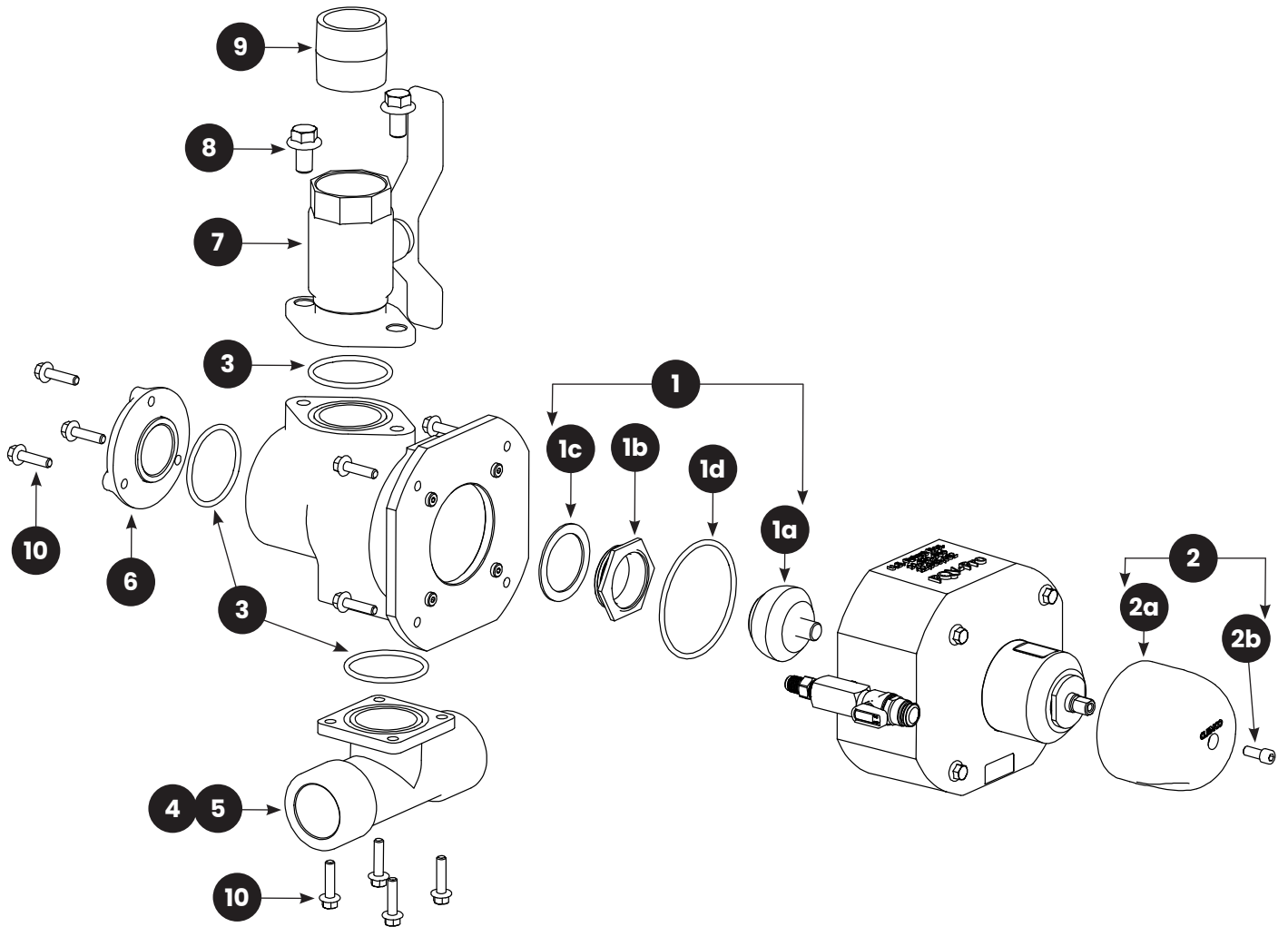


FIGURE 9: (1) **Service Kit**—1a: Plunger, 1b: Seat, 1c: Gasket, 1d: O-ring Acuator; (2) **Service Kit**—2a: Knob, metering, 2b: Screw 1/4" x 5/8" socket head; (3) O-ring 2-1/8" O.D.; (4) Flanged outlet pipe 1-1/4" FNPT; (5) Flanged outlet pipe 1-1/2" FNPT; (6) Cover, cleanout; (7) Valve, 1-1/2" NPT flanged ball; (8) Bolt, 7/16, 14 x 3/4" hex; (9) Nipple, 1-1/2" NPT close, schedule 80; (10) Bolt, 1/4, 20 x 1" flanged hex

5.4.3 | If the valve is used with a pressure-hold remote control system, inspect the metering valve plunger and seat for wear. Refer to service instructions in **Section 4.0**.

5.5 Abrasive Flow Continues After the Optional ACS is Switched Off

5.5.1 | While blasting, turn the ACS switch OFF (toggle pointing toward the nozzle). A short spurt of air should exhaust from the muffler. If it does, the ACS is working. If air does not exhaust, remove the muffler and try again. If it now exhaust, the muffler is plugged and should be replaced. If it

still does not exhaust, check the ACS control line for blockage.

5.5.2 | Worn plunger or plunger seat, or an obstruction between the plunger and seat. Service the valve as needed, per **Section 4.0**.

5.6 Abrasive Flow Decreases Shortly After Blasting Starts

5.6.1 | Air leak in the blast machine causing pressure imbalance:

- Check for leaks in the blast machine and around the metering valve.

- Make sure the exhaust (outlet) valve is not leaking. Once the RLX Control Handle is pressed, there should be NO leaks anywhere on the blast machine, valves, or control lines.

5.6.2 | Abrasive bridging in the blast machine. This is usually caused from using very fine abrasive, using spent abrasive, or from moist air. Refer to **Section 5.9** for additional information on moisture.

5.7 Turning the Metering Knob Does Not Change Abrasive Flow

5.7.1 | Inspect the seat and plunger for wear, per **Sections 4.2, 4.4, and 4.6.**

5.7.2 | Summary: When the control handle is pressed, air should come from near the metering knob.

5.8 Abrasive Bridging From Moisture

5.8.1 | Frequent bridging or blockage in the blast machine and metering valve can be caused by damp abrasive. Blast media becomes damp from moisture in the compressed-air line, from absorption from ambient air, and by blasting parts that are slightly oily (when using recycled abrasive).

5.8.2 | Moist compressed air: Moisture in the air supply can result from several factors, including an overheating compressor that leaks oil or moisture into the air line, an excessively long air line that allows condensation to form inside, or high ambient humidity. Drain filters and receiver tank regularly. If moisture in the air is a recurring problem, a dryer or after-cooler may be required in the air-supply line.

5.8.3 | Absorption: Some abrasive tends to absorb moisture from the air, especially fine-mesh abrasive in high-humidity areas. Empty abrasive from portable blast machines at the end of the workday and store the machine in an area protected from damp environment.

5.8.4 | Condensation: When working in conditions of extreme temperature change or

humidity, condensation may develop inside the machine. Condensation dampens abrasive and causes flow problems. To eliminate trouble from moist abrasive, empty abrasive from the machine before shutting down for the day.

6.0 Replacement Parts

6.1 Replacement PQV-Pro Metering Valves – Figure 10

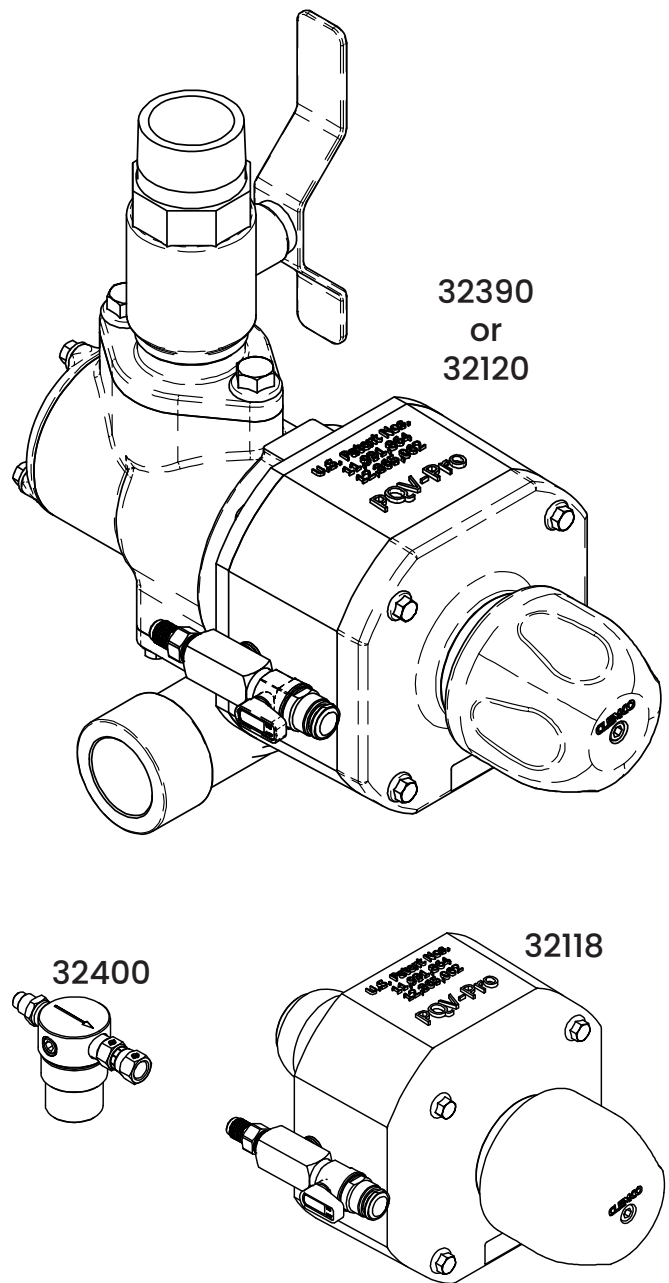


FIGURE 10

Description **Stock No.**

- Metering Valve assembly with 1-1/2" outlet pipe
 - with flanged ball valve32390
- Metering Valve assembly with 1-1/4" outlet pipe
 - with flanged ball valve 32120
 - without flanged ball valve32389
- Actuator only-with plunger32118

Description **Stock No.**

- Restrictor Kit
(adjustable metering under pressure).....32400

6.2 PQV-Pro Abrasive Metering Valve Components – Figure 9

Description **Stock No.**

1. **Service Kit: Plunger, Seat, Gasket, & O-ring**32394
 - a. Plunger (1)
 - b. Seat (1)
 - c. Gasket (1)
 - d. O-ring Actuator (1)
2. **Service kit: Metering knob assembly**.....31187
 - a. Knob, metering (1)
 - b. Screw ¼ x 5/8" socket head (1)
3. O-ring 2-1/8" O.D.02007
4. Flanged outlet pipe-1-1/4" FNPT.....31191
5. Flanged outlet pipe-1-1/2" FNPT 31155
6. Cover, cleanout..... 31153
7. Valve, 1-1/2" NPT flanged ball 31134
8. Bolt, 7/16, 14 x 3/4" hex.....31141
9. Nipple, 1 ½" NPT close, schedule 80 01791
10. Bolt, 1/4, 20 x 1" flanged hex..... 31138

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OPERATION MANUAL

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