

GRITWIZARD™
ELECTRIC PRESSURE-HOLD
REMOTE CONTROL SYSTEMS
O. M. 31343

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REVISION:

 **WARNING**

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

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

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

© 2022 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



1.0 INTRODUCTION

1.1 Scope of Manual

1.1.1 This manual covers the installation, operation, maintenance, troubleshooting, and replacement parts for Clemco GritWizard™ Electric Pressure-Hold Remote Control Systems. Accessory manuals for equipment that may be used with the remote controls are shown below. Manuals are available on our web site at www.clemcoindustries.com.

Single Chamber Blast Machine	Manual No. 06160
Dual Chamber Blast Machine	Manual No. 06154
ACE Air Valve	Manual No. 23938
GritWizard™ Abrasive Metering Valve	Manual No. 31199
GW RLX Electric Control Handle	Manual No. 31340

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 and 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 operation manuals. The booklet is available in both English and Spanish; to request copies, email info@clemcoindustries.com.

1.2 Safety Alerts

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



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

NOTICE

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

CAUTION

Caution indicates a hazardous situation that, if not avoided, can 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 Table of Contents

SUBJECT	LOCATION
INTRODUCTION	1.0
Scope of Manual	1.1
Safety Alerts	1.2
Table of Contents	1.3
System Components	1.4
General Description	1.5
Operating Principles	1.6
INSTALLATION	2.0
Installation Notes	2.1
Blast Machines with Factory Installed Controls	2.2
Field Installation on Existing Blast Machine	2.3
Control Hose Connections	2.4
Blast Hose and Control Cord Connections	2.5
OPERATION	3.0
Startup	3.1
Personal Protective Equipment	3.2
Pressurize the Blast Machine and Prepare to Blast	3.3
Start Blasting	3.4
Operation and Function of Safety Valves and Vent Valve ..	3.5
Operation and Function of abrasive cutoff switch (ACS) ..	3.6
Stop Blasting	3.7
Depressurize the Blast Machine	3.8
ADJUSTMENTS	4.0
Adjust Abrasive Flow	4.1
Antifreeze Injector	4.2
PREVENTIVE MAINTENANCE	5.0
Daily Inspection	5.1
With air OFF, before blasting	5.1.1
With vessel under pressure but before blasting	5.1.2
Weekly Inspection	5.2
During blasting	5.2.1
Periodic Inspection	5.3

MAINTENANCE6.0
 GritWizard™ Abrasive Metering Valve6.1
 ACE Air Valve6.2
 GW RLX Control Handle6.3
 Cutting Control Hose and Reusing Fittings6.4
 Using Tube-Lock Fittings6.5

TROUBLESHOOTING7.0
 Blasting does not start when handle is pressed7.1
 Blasting does not stop when handle is released7.2
 Air or abrasive continues after handle is released7.3
 Heavy abrasive flow7.4
 Abrasive flow continues after ACS is switched off7.5
 Abrasive flow continues after control handle is released ..7.6
 Air flow only – no abrasive7.7
 Check operation of the 4-way pilot valve7.8

REPLACEMENT PARTS8.0
 GritWizard Electric Remote Control Systems8.1
 Replacement Valve Parts refer to Operation Manuals ...8.2
 GritWizard Electric Remote Control System Parts8.3
 Control Panels8.4

1.4 System Components

1.4.1 The principal components of the electric remote control are shown in Figure 1, The system include the electric control panel (120 VAC units have a transformer to

convert them to 12-volt AC; there is only 12 volts at the control handle with either system), GritWizard™ Abrasive Metering Valve, ACE Pneumatically-Operated Air Valve, GW Electric RLX Control Handle with abrasive cutoff (ACS) switch, 50 ft electric control cord, interconnecting control lines, and all necessary fittings.

1.5 General Description

1.5.1 The remote control system is an OSHA-required safety device, and it is required whenever an operator mans the blast nozzle. The control handle, located near the blast nozzle, is the activator of the remote control system. Blasting begins when the operator applies handheld pressure to the control handle lever. Blasting stops when the operator removes pressure from the lever.

⚠ WARNING

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

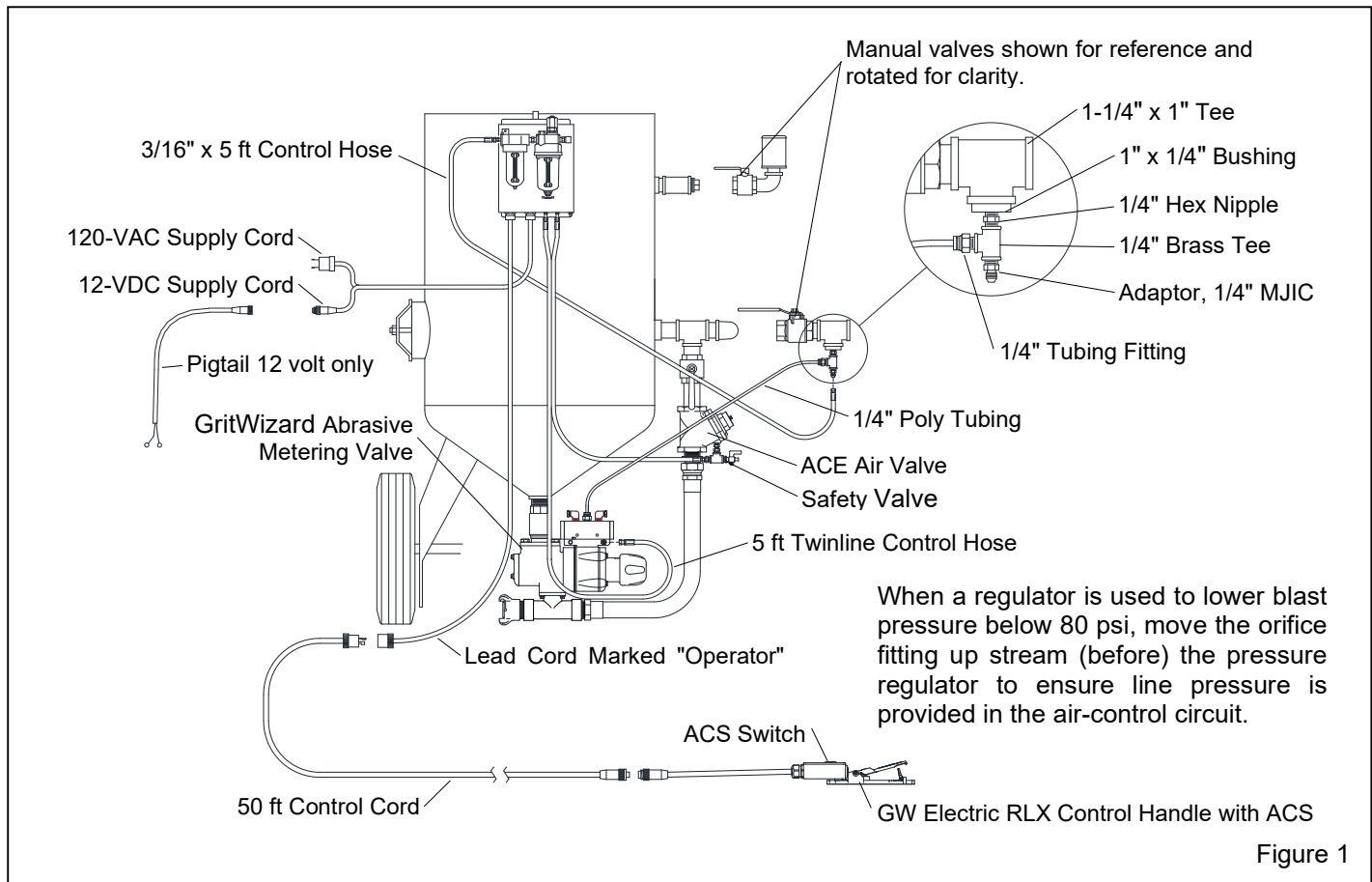


Figure 1

1.5.2 The remote control system "fails to safe," which means blasting stops when an interruption occurs for any reason in the control-air or electrical circuit, such as a break in the air lines, control cord, or should the operator drop the blast hose. When the operator presses the control handle lever, the normally closed (NC) abrasive metering valve and air valve open, which begins the blasting process. When the operator intentionally or unintentionally removes handheld pressure from the control handle, the abrasive metering valve and air valve return to their normally closed positions, stopping air and abrasive flow through the nozzle.

1.6 Operating Principles

1.6.1 GritWizard 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, which controls the blasting.

1.6.2 When compressed air is supplied to the blast machine, it is split into three streams.

One stream goes to the abrasive metering valve and assist in closing the valve.

One stream is the control air, control air travels through the 5 ft control hose, and into the control panel. Air stops at the normally closed solenoids within the panel and the media and air valves remain closed.

The third stream stops at the hand-operated inlet valve. Using the hand-operated inlet and outlet valves, the operator manually pressurizes and depressurizes the blast machine. When the operator manually opens the inlet valve, the air stream is split again. One stream goes directly into the blast machine and pressurizes it, the other goes to the pusher line, where it stops at the ACE Air Valve.

1.6.3 Although the machine is under pressure neither air nor abrasive exits from the nozzle because the normally closed (NC) GritWizard Metering 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.

1.6.4 Electric remote controls are recommended when the nozzle and remote control handle are farther than 100 feet from the blast machine. Pressure drop with pneumatic systems over longer distances increases actuation time, which prevents fast, safe operation.

Electric systems are also used in cold weather, when moisture in the air supply of pneumatic systems may freeze and cause the remote controls to fail. To prevent damp air from freezing, an antifreeze injector is installed on all electric remote control panels. NOTE: The maximum recommended total length of control cord is 300 feet. Distances greater than 300 feet will cause electrical resistance, resulting in remote control malfunctions. If an application requires greater distance, an appropriate cord with larger diameter wire must be provided by the user.

1.6.5 Electric remote controls are electric over pneumatic. The air and abrasive valves are pneumatically operated but the air circuit is controlled electrically. Control air travels through the filter and antifreeze injector on the electric panel, and stops at normally closed (NC) electric solenoid air valves within the panel. When the panel is connected to a power supply, one leg of power goes to the electric RLX control handle (which is the main activator of the system). As long as the control lever is up (in the nonblast position), the remote control's abrasive metering valve and air valve remains closed. When the operator presses the control lever, the circuit is completed and the electric solenoid valves within the panel open, sending control air to open both the abrasive metering valve and air valve, which begins the blasting process. Releasing the handle breaks the electric circuit, exhausts control air through the solenoids, and returns the valves to their normally closed position and stops blasting. Pressure remains in the abrasive chamber until it is manually depressurized.

1.6.6 Abrasive cutoff switch (ACS): An abrasive cutoff switch (ACS) is a standard feature of the GritWizard Remote Controls. The ACS switch is wired into the box at the back of the GW Electric RLX Control Handle, as shown in figures 1 and 4. The operator uses the switch to close the abrasive valve independently of the air valve, so air without abrasive exits the nozzle. This feature is used to clear abrasive from the blast hose or to blow-down the blasted surface. Refer to *Section 3.6: Operation of the Abrasive Cutoff Switch*.

2.0 INSTALLATION

WARNING

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

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

2.1 Installation Notes: To prevent thread galling, ensure airtight seals, and make assembly easier, apply pipe-thread sealant to all male NPT (pipe) threads.

Additional fittings may be required to connect the valve to some blast machines and piping configurations. Use 1-1/4-NPT Schedule 40 nipples, to connect the fittings, as shown in Figures 1 and 2.

2.2 Blast Machine with Factory Installed Controls: If the remote control system was factory installed onto a new blast machine, confirm the control hose and tubing connections in Figure 1, then skip to Section 2.4.

2.3 Field Installation on Existing Blast Machine
Figures 2 and 3.

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

2.3.2 Refer to Figure 2 for the final piping arrangement, and remove the existing abrasive metering valve and all unnecessary external piping from the blast machine. Save the external piping for reuse.

2.3.3 Refer to the GritWizard™ Abrasive Metering Valve operations manual No. 31199 and install the metering valve.

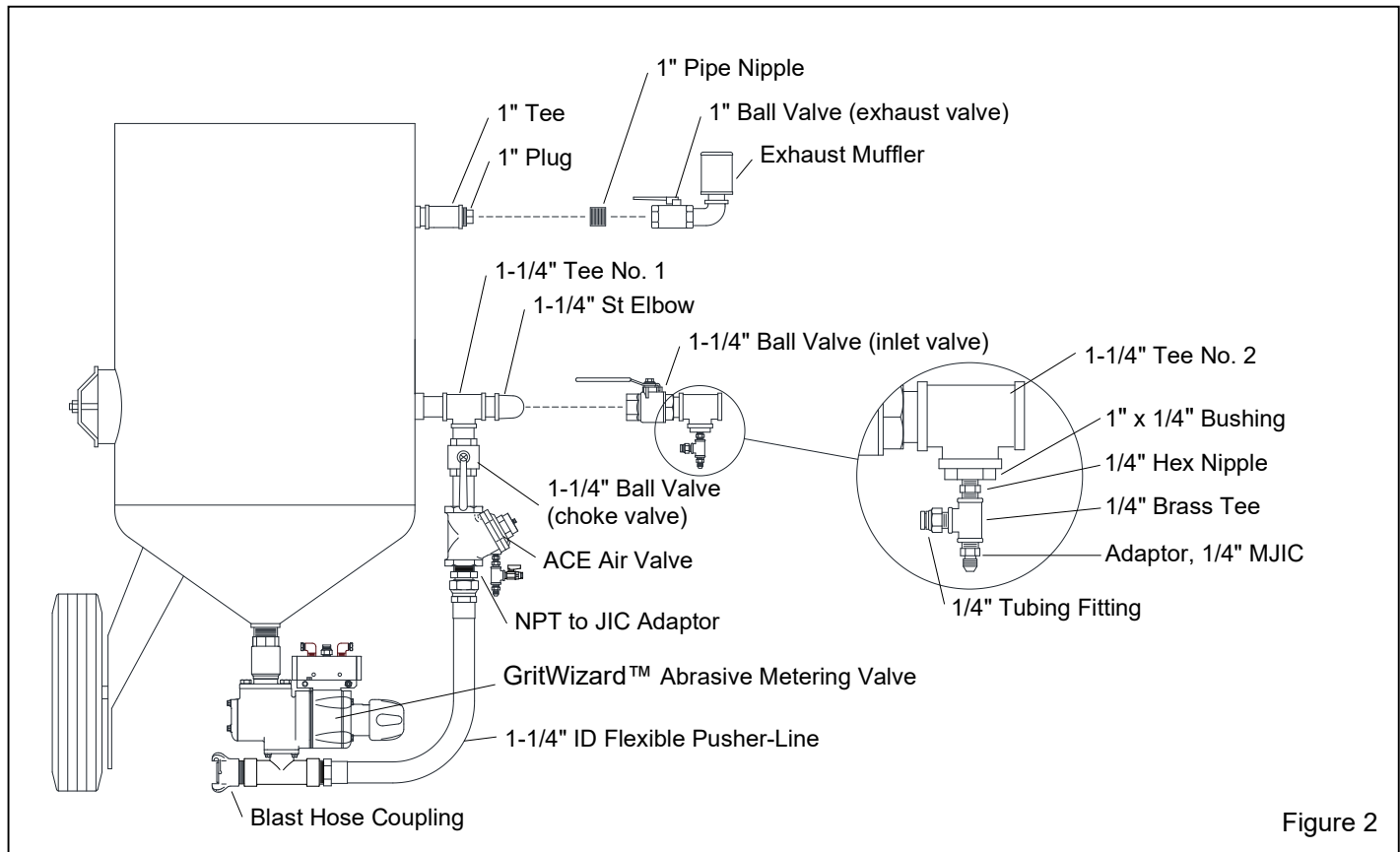


Figure 2

2.3.4 Install a 1-1/4" pipe tee (Tee No. 1) and street elbow at the blast machine inlet, as shown in Figure 2. NOTE: The elbow should be facing toward the back of the machine, so the weight of the piping puts the fittings in the tightening position.

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

2.3.6 Assemble a manual outlet valve assembly, and install it as shown. NOTE: Clemco installs an exhaust muffler, Stock No. 05068, with all blast machines 1.5 cubic feet and larger. The muffler is not part of the remote control system. The muffler reduces exhaust noise and directs the exhaust downward, which prevents abrasive from exhausting into the air. When the blast machine depressurizes, the muffler body pops up and diffuse the escaping air and abrasive. When the machine is fully depressurized, the muffler body drops,

permitting trapped abrasive to empty. For the muffler to work properly, it must be installed with the body facing up, as shown in Figures 1 and 2.

2.3.7 Loosely assemble a pusher-line under Tee No. 1, using standard pipe fittings as shown in Figure 2. Start at the tee and work downstream; this line must include a manual choke valve, ACE Air Valve, and NPT to JIC adaptor, in that order. A separate manual is provided for the ACE Air Valve.

2.3.8 Connect the flexible pusher line and check the fit. Remember the JIC fitting will be somewhat higher after the fittings are tightened. 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 shortening the nipples between the tee, choke valve, and ACE Valve, as shown in Figure 3. Tighten the fittings when certain the pusher line fits. **If the pusher line does not fit correctly, a shorter or longer pusher line is required.**

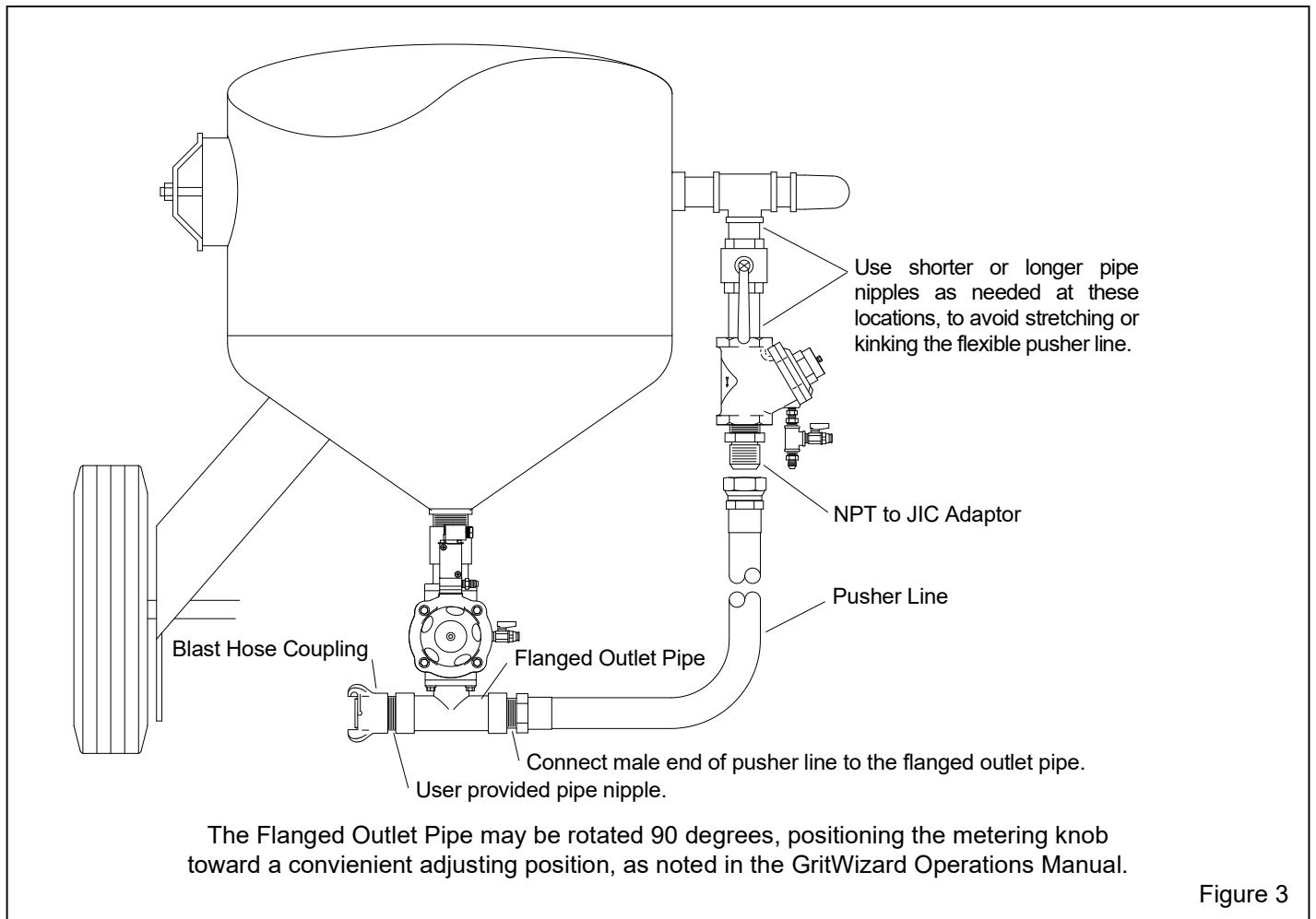


Figure 3

2.3.9 Refer to the detail circle in Figure 2, and assemble all fittings within the circle.

2.3.10 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" flanged outlet pipe) and connect the blast hose coupling to the outlet pipe, as shown in Figure 3.

2.4 Control Hose Connections – 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

When connecting controls on multiple outlet blast machines, carefully trace and mark control cord, control lines, and blast hose on each station. Accidentally switching control cords, control lines or blast hoses between operator stations will cause actuation of a blast line not intended for use. Unintentional actuation of a blast hose may lead to serious injury and property damage. Instructions in Sections 2.5.1 through 2.5.8 must be followed and stations properly color coded to safeguard against hose switching. Color coding instructions are provided in the color-coded hose identification marking kits (Stock No. 15890 for two-outlet kit, or Stock No. 15891 for four-outlet kit). Always recode replacement blast hose and control cords.

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

2.4.2 Connect the 3/16" x 5 ft control hose between the 1/4" hose adaptor fitting at the inlet tee and the fitting on the air filter mounted on the front of the control panel.

2.4.3 Connect one leg of the 5 ft twinline hose between the outlet fitting at the bottom of the panel marked "GRIT VALVE" and the fitting on the GritWizard Valve.

2.4.4 Connect the remaining leg of the 5 ft twinline hose between the panel outlet fitting marked "AIR VALVE" and the fitting on the ACE Air Valve.

2.4.5 Connect the 1/4" poly tubing between the fitting on the inlet tee and top fitting on the GritWizard's 4-way pilot valve. Six feet of tubing is provided, cut the tubing to fit and insert the tubing into the tube fittings. Refer to Section 6.5 for additional information on tube-lock fitting.

2.5 Blast Hose and Control Cord Connections

2.5.1 Band the electric control handle to the blast hose at a comfortable location behind the nozzle holder, as shown in Figure 4. Use the two nylon ties provided or similar means to secure the control handle to the hose. Once the control is firmly attached, clip the tie ends so they do not snag the operator's clothing or interfere with the operation of the control handle.

2.5.2 Connect the control cord to the RLX whip cord and wrap the cords once loosely around the blast hose, as shown in Figure 5.

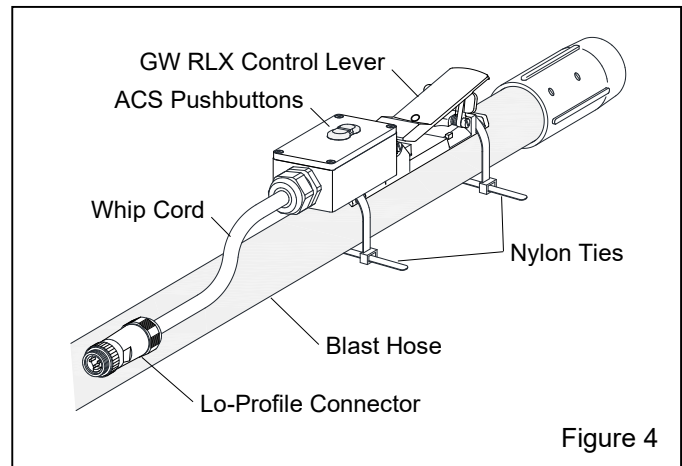


Figure 4

2.5.3 Band the cord to the blast hose on both sides of the cord connections, as shown in Figure 5.

2.5.4 Repeat the process for each section of blast hose and extension cords. **Note: The initial cord from the control panel comes with a twist-lock on one end and a lo-profile connector on the other end. Extension cords have lo-profile connectors on both end. Refer to Section 8.2 for extension cords.**

NOTICE

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

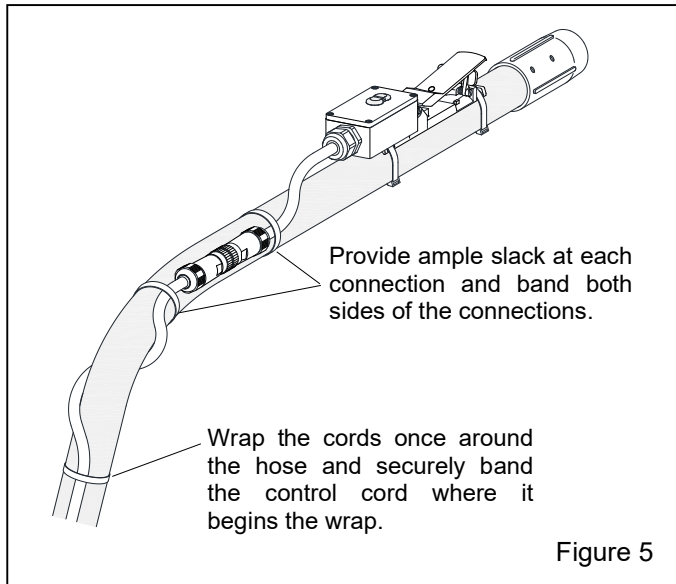


Figure 5

NOTE: Wrapping the cord provides slack; if the cord is not **wrapped and securely banded as described, excessive strain can cause the wires to pull out of the connectors or electric switch when the hose is curved or pulled.**

2.5.5 Working from the control handle back, band the cord to the blast hose every 4 to 6 feet. Also, band the cord on both sides of each electrical connection.

2.5.6 When attaching cord extensions wrap the cord around the blast hose and band the cord on both sides of each electrical connection. Band the cord extension to the blast hose every 4 to 6 feet.

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

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

2.5.9 Repeat steps 2.5.1 through 2.5.8 for multiple outlet blast machines.

2.5.10 Plug the power cord into an appropriate power source, 120-volt AC or 12-volt DC. 12-volt units are furnished with a pigtail with ring terminals to connect to a battery or other 12-volt DC power source.

WARNING

Do not use electrical adaptors that eliminate the ground prong on 120-volt plugs. Doing so can cause electric shock, and damage equipment.

2.5.11 Read all information regarding the operation of the controls. Test the operation of the blast machine and remote controls before loading the machine with abrasive.

3.0 OPERATION

3.1 Startup

3.1.1 Fill the injector with automotive-type antifreeze (ethylene glycol or methyl alcohol). **Do not use air system antifreeze, as it may damage the sight dome.**

NOTE: It is not necessary to use the injector unless temperatures fall to freezing. Close the injector when it is not required.

A separate manual is supplied for the operation of the antifreeze injector. Refer to the manual for operation and adjustment of the injector.

3.1.2 On the initial startup, close the abrasive metering valve, per Section 4.1.

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

3.1.4 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.

3.1.5 Make sure the control handle is in the up (no-blast) position and that it moves freely. Make sure the safety lever lock prevents the control lever from being pressed down and engage the RLX switch, as shown in Figure 6.

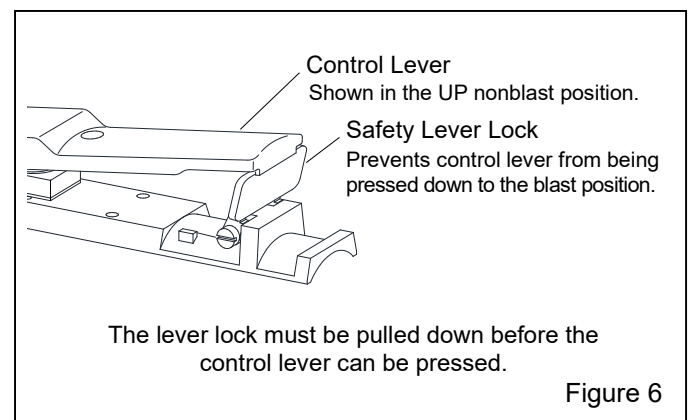
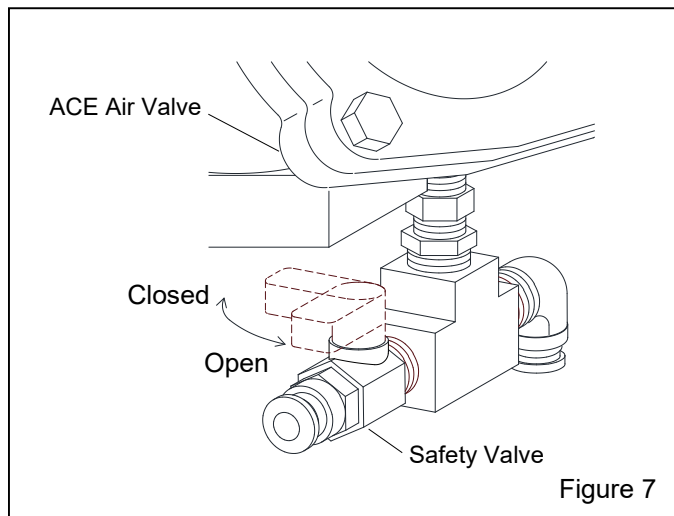


Figure 6

⚠ WARNING

A separate manual is supplied with the remote control handle. Do not operate the machine before first reading the remote control handle operations manual. A malfunctioning control handle could cause unintentional actuation of a blast machine, or prevent a machine from deactivating upon releasing the handle. A malfunctioning control handle must be taken out of service immediately and repaired or replaced.

3.1.6 Make sure that the safety valve, located on the ACE Air Valve, is open. The valve is open when the valve lever is in line with the valve's body, as shown in Figure 7.

**⚠ WARNING**

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

3.1.7 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.

3.1.8 On the initial startup and before loading the machine with abrasive, check the operation of the blast machine and remote controls, per Sections 3.3 and 3.4 .

3.1.9 When certain the machine is operational, depressurize the chamber, open the safety valve, load the machine with abrasive by following the instructions in the blast machine operations manual, and prepare the machine for blasting.

3.2 Personal Protective Equipment**⚠ WARNING**

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

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

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

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

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

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

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

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

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

3.3 Pressurize the Blast Machine and Prepare to Blast

The following are general guidelines; follow the manufacture's instruction to pressurize the blast machine:

3.3.1 Don all protective blasting attire, per Section 3.2.

3.3.2 Press the ACS pushbutton closest to the nozzle, doing so open the abrasive valve when the control handle is pressed. Refer to *Section 3.6: Operation of the Abrasive Cutoff Switch*.

3.3.3 When the blast operator is ready to blast, the operator or the machine tender closes the outlet valve, and open the inlet valve. Air entering the machine causes it to pressurize.

3.3.4 Close the safety valve. No air should be heard escaping from any valve, hose, or fitting.

3.4 Start Blasting

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

3.4.2 Fold down the safety lever lock and depress the remote control handle, as shown in Figure 8. Be prepared for blasting to begin within a few seconds.

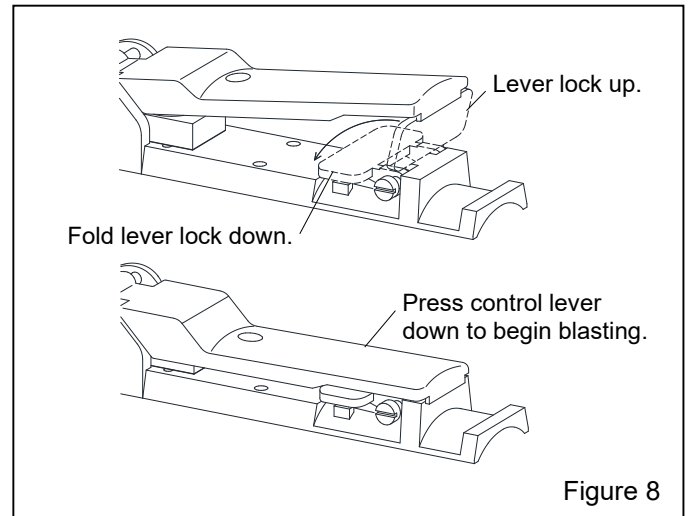


Figure 8

⚠ WARNING

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

3.4.3 Adjust abrasive flow per Section 4.1.

3.5 Operation and Function of Safety Valves and Vent Valve – Figure 9

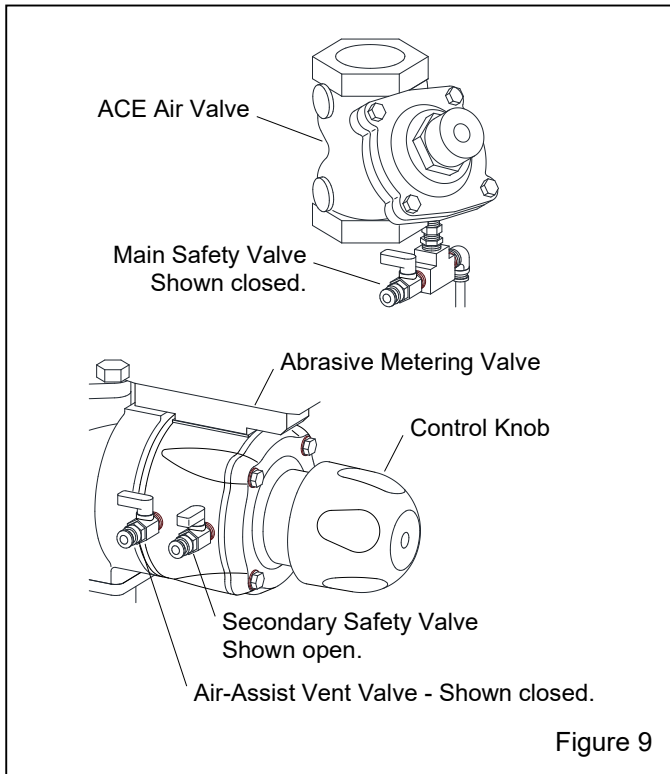
3.5.1 Safety valves prevent the operation of the blast station when it is not being used, and when necessary, allows the pot tender or supervisor to stop blasting from the machine. The valves are open when the valve lever is in line with the valve's body, as shown in Figure 9.

3.5.2 Main Safety Valve: The main safety valve is located on the ACE Air Valves, as shown in Figure 9. Opening the safety valve prevents accidental operation of the blast machine. Always open the safety valve during work breaks, when an operator station is not being used on a dual operator system, and at the end of the work shift.

When ready to blast, close the safety valve. Closing the valve prepares the machine for remote operation and activation by the control handle.

⚠ WARNING

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



3.5.3 Secondary Safety Valve: The secondary valve is located on the side of the metering valve, closest to the metering knob, as shown. This valve should be open when servicing the metering valve and to test if control air is reaching the valve. The metering valve is normally closed; air in the chamber behind the safety valve opens the valve during blasting.

3.5.4 Air-Assist Vent Valve: Located on the side of the metering valve, farthest from the metering knob, as shown. This valve should be kept closed during operation and opened before servicing the metering valve to make sure compressed air is vented and to test that no air is present during blasting. When not blasting, air pressure in the chamber behind the vent valve assist in closing the valve.

3.6 Operation and Function of the Abrasive Cutoff Switch (ACS) – Figure 10

3.6.1 The ACS closes the abrasive metering valve so that air alone without abrasive exits the nozzle. Common uses for this feature are:

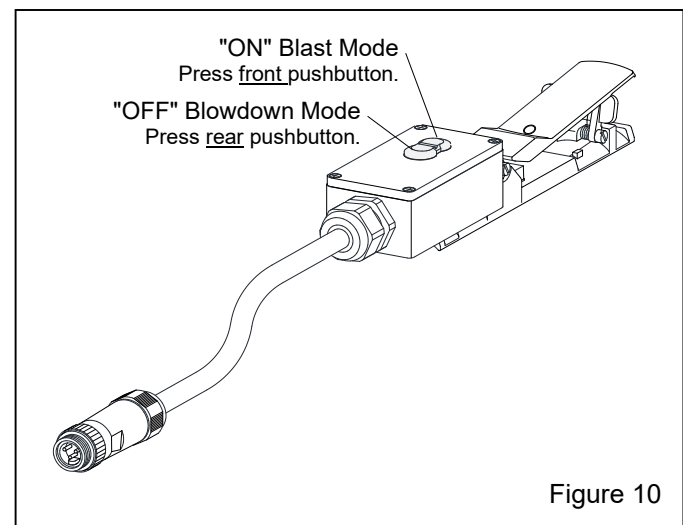
1. Clearing abrasive from the blast hose when finished blasting. This is helpful in many applications and is necessary when blasting vertically to prevent abrasive from collecting in low spots in the blast hose, eliminating excessive abrasive slugging at startup.

2. Blowing abrasive off the blasted surface. NOTE: Small amounts of residual abrasive may exit the nozzle with the air, requiring additional blowing off or otherwise cleaning the surface outside the blasting area prior to painting.
3. When wet blasting with an injector or wetblast attachment, it is used to assist in blow drying the surface after it is washed down.

⚠ WARNING

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

3.6.2 The ACS switch is wired into the box at the back of the GW Electric RLX Control Handle, as shown in Figure 10. The switch may be pressed ON or OFF at any time, but will not operate the metering valve unless the control handle is pressed.



3.6.2.1 Blast mode: Abrasive flow is ON when the front pushbutton (closest to the nozzle) is pressed. This action sends control air to the abrasive metering valve and opens the valve, which enables the blast machine to operate normally, with air and abrasive coming out the nozzle.

3.6.2.2 Blowdown mode: The ACS switch is OFF (no abrasive) when the rear pushbutton (farthest from the nozzle) is pressed, cutting off the air supply to the abrasive metering valve, closing the valve, and stopping the abrasive flow. This action allows air alone to exit the nozzle, which is useful for clearing the blast hose before shutting down and for blowing abrasive off the blasted surface.

3.7 Stop Blasting

3.7.1 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. Refer to *Section 3.6: Operation of the Abrasive Cutoff Switch*.

3.7.2 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.

3.7.3 Open the safety valve located on the ACE air valve and/or GritWizard metering valve. Always open the safety valves during work breaks to prevent unintentional blasting.

3.7.4 It is not necessary to depressurize the machine between short blasting pauses. The abrasive valve and air valve close when the control handle lever is released. To prevent accidental activation, depressurize the blast machine before any work break.

3.8 Depressurize the Blast Machine

The following are general guidelines; follow the manufacturer's instruction to depressurize the blast machine:

3.8.1 Close the manual inlet valve.

3.8.2 While standing back and facing away from the exhaust muffler, promptly open the manual outlet valve; as air exhaust from the outlet valve the machine depressurizes. The pop-up valve automatically drops when air is expelled from the machine and pressure equalizes.

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

4.0 ADJUSTMENTS

4.1 Adjust Abrasive Flow – Figure 11

4.1.1 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 11. Begin with the knob set two turns from fully closed. Adjust abrasive flow by turning the knob no more than 1/4 turn before rechecking flow. Continue adjusting as described until the correct flow is attained.

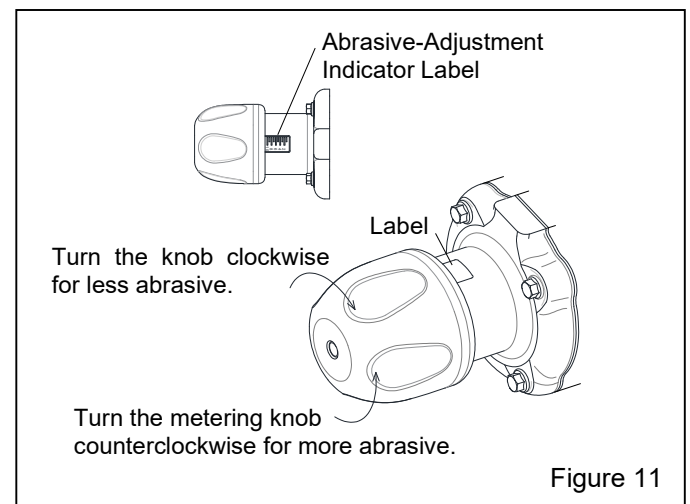


Figure 11

4.1.2 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.

4.1.3 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.

4.2 Antifreeze Injector

NOTE: It is not necessary to use the injector unless temperatures fall below freezing. Close the injector when it is not required. Fill the injector with automotive-type antifreeze (ethylene glycol or methyl alcohol). **Do not use air system antifreeze, as it may damage the plastic sight dome.** A separate manufacturer operating instruction is provided for the operation of the antifreeze injector.

4.2.1 Turn the metering knob fully clockwise to close.

4.2.2 Turn the metering knob counterclockwise to start the flow. Observe the antifreeze flow through the drip-rate sight glass. All the antifreeze seen in the glass enters into the air stream. Flow rate depends on air flow, temperature range, and relative humidity in which the unit is operated. Keep in mind that air flow to the pneumatic portion of the system is very low. Trial and error will be necessary to determine the minimum antifreeze delivery to prevent the remote control system from freezing. Antifreeze dripping from the exhaust port on the panel is an indication that the flow rate should be decreased.

4.2.3 Increase the antifreeze delivery by rotating the adjustment knob counterclockwise. To decrease the delivery rate, rotate the knob clockwise.

5.0 PREVENTIVE MAINTENANCE

NOTE: The following preventive maintenance instructions pertain to the blast machine. Refer to operations manuals listed in paragraph 1.1.1 for inspection and maintenance of those components.

5.1 Daily Inspection

To avoid unscheduled downtime and to improve safety, establish a daily inspection schedule. Inspect all parts subjected to abrasive contact, including the blast hose, nozzle, and all items covered in this section.

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

- Inspect the GW RLX Control Handle; look for the following:
 - Make sure the lever does not engage the switch unless the lever lock is intentionally folded 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

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

5.1.2 With the vessel under pressure but before blasting, do the following:

- Check the blast machine vessel for leaks. If leaks are found around the pop-up valve, inspection door, or any pipe-fittings ports on the vessel, repair or replace worn parts immediately.

NOTICE

If leaks are allowed to continue, abrasive erosion can cause extensive or irreparable damage to the blast machine.

- Check for air leaking from the nozzle. If air is felt from the nozzle, close the choke valve on the corresponding pusher line.
 - If the leak stops, the air valve requires service. Refer to the ACE Valve operations manual for service instructions.
 - If the leak continues, the abrasive metering valve requires service. Refer to the GritWizard Abrasive Metering Valve operations manual for service instructions.

5.2 Weekly

5.2.1 During blasting do the following:

- 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, periodically inspect the internal parts of the air and metering valves. Inspect for wear and lubrication of O-rings, pistons, springs, seals, and castings. Refer to the operations manuals listed in Paragraph 1.1.1 for service instructions of those items.

5.3.2 GW RLX control handle: The control handle is the actuator of the remote control system. Periodically clean around the springs, control lever, and safety lever lock to ensure that the unit is free of abrasive and debris that may cause the control lever or safety lever lock to bind. Refer to the GW Electric RLX Control Handle operations manual No. 31340, for service instructions.

6.0 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.
- Turn OFF the compressed-air supply.
- Lockout and tagout the compressed-air supply.
- Bleed the air-supply line to the blast machine.
- Open the safety valve(s).

6.1 GritWizard Abrasive Metering Valve

Refer to operations manual No. 31199 for GritWizard Metering Valve service and maintenance.

6.2 ACE Air Valve

Refer to operations manual No. 23938 for ACE Air Valve service and maintenance.

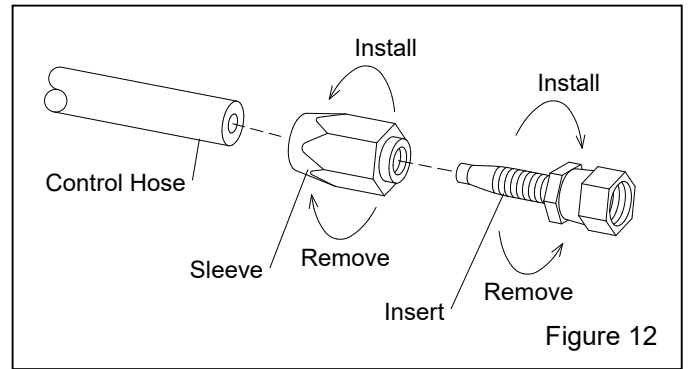
6.3 GW RLX Control Handle

Refer to operations manual No. 31340 for GW RLX Electric Control Handle service and maintenance.

6.4 Cutting Control Hose and Reusing Control-Hose Fittings – Figure 12

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

- 6.4.1** 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.
- 6.4.2** Turn the sleeve clockwise to remove it from the hose.
- 6.4.3** Cut hose to the required length.
- 6.4.4** 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.
- 6.4.5** Push the end of the insert into the sleeve and turn it clockwise to tighten until the insert hex is against the sleeve.



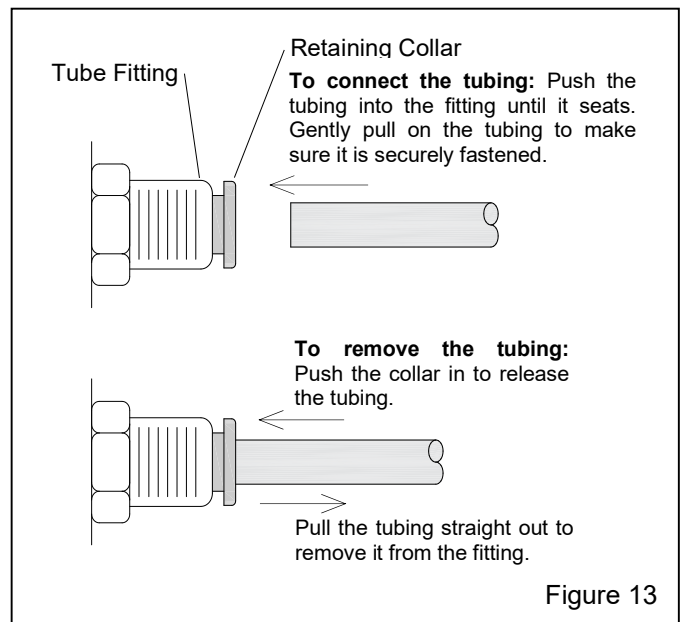
6.5 Using Tube-Lock Fittings – Figure 13

⚠ WARNING

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

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

6.5.1 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.



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

7.0 TROUBLESHOOTING

NOTE: This section only identifies conditions and problems in the remote control system. For service information, always refer to the appropriate section of this manual, manuals listed in Paragraph 1.1.1, or manuals for accessory equipment when troubleshooting and before servicing the equipment.

⚠ 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 requires 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 lever down in the operating position.**

7.1 Blasting does not start (no air and no abrasive) when the control handle lever is pressed

NOTE: The easiest way to check a dual panel is to substitute one control cord and handle with another until the fault is found.

7.1.1 Make sure the blast machine is pressurized.

7.1.2 Make sure the safety valves on the ACE Air Valve and GritWizard Abrasive Metering Valve are both closed.

7.1.3 Check the nozzle for blockage: Open the safety valve on the ACE Air Valve and make sure blast machine is depressurized. Remove the nozzle and check it for an obstruction. When clear of obstruction, replace the nozzle and close the safety valves, and pressurize the machine.

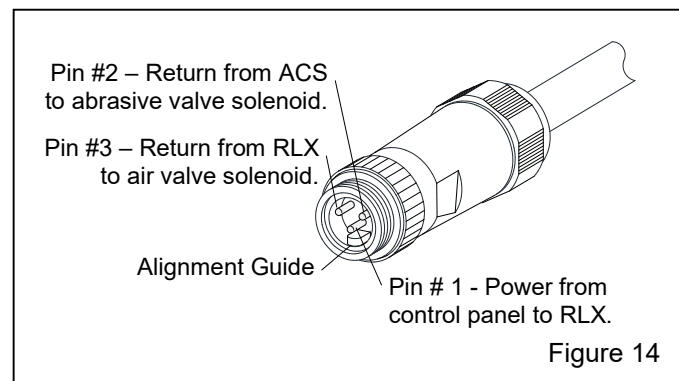
7.1.4 Listen to the control panel to determine if the solenoids click when the control handle is pressed and released.

If it does click, the fault is probably not electrical and in the pneumatic circuit or 4-way pilot valve. Skip to Section 7.1.8 for pneumatic checks.

If it does not click, check the operation of the GW RLX Control Handle, per Section 7.1.5, the control panel, per Section 7.1.6, and control cords, per Section 7.1.7.

7.1.5 Check operation of the GW RLX Control Handle: The easiest way to check the control handle is to substitute it with one that is functioning properly. If that is not possible, turn off the compressed-air supply, disconnect the control handle at the initial control cord and check continuity as follows:

1. Press the ON front pushbutton (closest to the control lever). Press the control lever and check continuity across pins No. 1 and 3 in the male lo-profile connector, as shown in Figure 14, and again across pins No. 1 and 2. If either pin fails the continuity test, Refer to the GW RLX operations manual No. 31340 to check wire connections. If wire connections are good, the switch is faulty, and the control handle must be replaced.
2. Press the OFF pushbutton (farthest from the control lever), and repeat the tests. There should be continuity across pins No. 1 and 3 in the lo-profile connector, and no continuity across pins No. 1 and 2. Refer to the GW RLX operations manual No. 31340 to check wire connections. If wire connections are good, If either pin fails the continuity test, the control handle is faulty and must be replaced.
3. If the control handle passes both tests, the handle is good.



7.1.6 Check for fault in the control panel and operator lead cord(s)

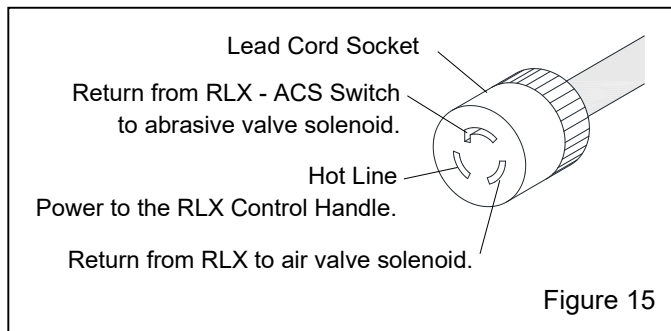
An electrical schematic is stowed inside the control panel; a qualified electrician can use the schematic to check voltage and continuity for all panel wiring and solenoids.

1. Make sure all wire connections are tight.
2. Remove the 50 ft control cord from the 5 ft lead cord coming from the panel. Hold the lead cord socket so the angled slot is facing up, as shown in Figure 15. The slot to the left (counterclockwise of the angled slot) carries the power from the panel (hot line).
3. Jump between the hot line and the angled slot (abrasive valve solenoid), and listen for a click from the lower solenoid valve.

4. Then jump between the hot line and the slot to the right of the angled slot (air valve solenoid). The upper solenoid valve should click.

If both valves click, check the electric control handle, per Section 7.1.5 and the control cord(s), per Section 7.1.7. If one solenoid does not click, it is most likely faulty. If neither solenoid clicks, the problem may be in both solenoids, but more likely one of the following:

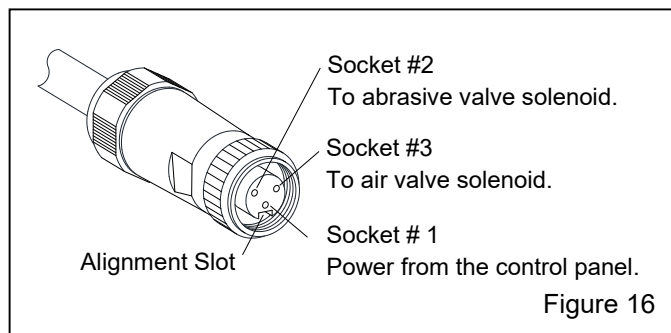
- Check for faulty fuse or loose connections in the control panel (120-VAC systems only).
- Check for inadequate power to the control panel.
- Check voltage and continuity for all panel wiring and solenoids.
- Check for faulty transformer (120-VAC systems only).



7.1.7 Check for faulty control cord(s) – Figure 16

Refer to Figure 16 to check each control cord and extension, by connecting them one at a time to the panel, and jump across the socket as follows:

1. Jump between Socket #1 and Socket #2 and listen for a click from the panel's lower (abrasive valve) solenoid valve.
2. Then jump between Socket #1 and Socket #3, the upper (air valve) solenoid should click.
3. Continue to check all cords and extensions in like manner.



7.1.8 With safety valves closed, press the control handle and check for air leaks in all control hoses,

tubing, fittings, control panel, ACE Air Valve, and abrasive metering valve. After the control handle is pressed there should be no air leaks anyplace in the air circuit. Any air leak can prevent the control from operating correctly and must be corrected.

7.1.9 Loosen the 3/16" supply hose fitting from the front of the panel and check for blockage, clear or replace the hose if blocked.

7.1.10 Open the safety valve on the ACE Air Valve and press the control handle. If air does not come out of the safety valve, check for blockage in the control line between the panel and valve.

7.1.11 Check air supply to the abrasive metering valve:

1. Open the safety valve closest to the cleanout on the abrasive metering valve, press the front pushbutton on the ACS box, and press the control handle. If air does not escape from the valve:
 - Check for blockage or leak between the metering valve and "Grit Valve" fitting at the bottom of the control panel.
 - Check the operation of the 4-way pilot valve, per Section 7.8.

7.2 Blasting does not stop when the control handle lever is released

7.2.1 Remove the exhaust muffler on the bottom of the control panel. If blasting stops, the muffler is blocked and must be replaced.

- 7.2.2** Open the ACE Safety Valve:
- If blasting stops, check the return lines and fittings from the ACE Valve to the control panel for blockage.
 - If air continues to flow, remove the air line from the "Air Valve" fitting at the bottom of the panel. Any leak indicates a stuck solenoid or a short in the electrical circuit. Inspect the following if it does not function as noted:
 - Check the GW RLX Control Handle, per Section 7.1.5.
 - Check the control panel, per Section 7.1.6.
 - Check the control cords, per Section 7.1.7.
 - Check the 4-way pilot valve, per Section 7.8.

7.3 Air or abrasive continues to leak from the nozzle after the control handle lever is released

7.3.1 When air or abrasive leaks from the nozzle and the control lever is up, either the ACE Air Valve or the GritWizard Abrasive Metering Valve is not closing.

7.3.2 To find out which valve is leaking, close the choke valve:

If the leak stops, the problem is with the ACE Valve or controls to the ACE Valve.

- The ACE Air Valve may require service. Refer to the operations manuals 23938 and inspect the air valve.
- There could be a blockage in the control line between the air valve and control panel.
- The air valve solenoid (upper solenoid) is stuck.

If the leak continues, the problem is with the abrasive metering valve or controls to the metering valve.

- Make sure the air-assist vent valve (farthest from the metering knob) is closed.
- Open the metering valve's safety valve (closest to the metering knob).

If air escapes and the metering valve closes, there may be a blockage in the line between the side of the 4-way adaptor plate and the control panel.

If air does not escape and the leak continues, the abrasive metering valve plunger may be worn or damaged. Refer to the operations 31199, and inspect the metering valve.

- The 4-way pilot valve requires service; refer to Section 7.8.
- The metering valve solenoid (lower solenoid in the panel) is stuck.

7.4 Heavy abrasive flow.

7.4.1 Abrasive metering valve may be open too far. Refer to Section 4.1 to adjust the metering valve.

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

7.4.3 Inspect the internal parts in the GritWizard Valve for wear. Refer to the GritWizard Metering Valve operations manual for service instruction.

7.4.4 Inspect diaphragm in the ACE Air Valve for damage. Refer to the ACE Valve operations manual.

7.4.5 Loosen the "Air Valve" fitting at the bottom of the control panel. With air to the panel, press the control handle; air should bleed from the fitting when the handle is pressed and stop when it is released. Inspect the following if it does not function as noted:

- Check the RLX Control Handle, per Section 7.1.5.
- Check the control panel, per Section 7.1.6.
- Check the control cords, per Section 7.1.7.
- Check the 4-way pilot valve, per Section 7.8.

7.5 Abrasive flow continues after ACS is switched OFF

NOTE: The ACS will not function unless the control handle is pressed.

7.5.1 Check the exhaust port on the bottom of the panel, air should momentarily exhaust from the port when the ACS switch is turned off. If it does not, check the following:

- Exhaust filter may be clogged. Remove the filter and inspect it for blockage.
- Obstruction in the line between the abrasive metering valve and the "GRIT VALVE" connection on the panel. Check for blockage.
- Faulty ACS switch. Check the RLX Control Handle, per Section 7.1.5.
- Faulty solenoid. Check the control panel, per Section 7.1.6.
- Fault in a control cord. Check control cords, per Section 7.1.7.

7.5.2 Follow the steps in Section 7.6.

7.5.3 Worn plunger or plunger seat, or an obstruction between the plunger and seat. Refer to the metering valve operations manual listed in Paragraph to service the metering valve.

7.6 Abrasive flow continues after the control handle lever is released.

7.6.1 There could be a short in the electrical circuit in the RLX Control Handle, control panel, or control cord. The easiest way to find which item is at fault is to switch one item with another that is known to be working. If that is not possible, do the following:

- Check the RLX Control Handle, per Section 7.1.5.
- Check the control panel, per Section 7.1.6.
- Check the control cords, per Section 7.1.7.

7.6.2 Remove the exhaust muffler on the bottom of the control panel. If abrasive flow stops, the muffler is blocked and must be replaced.

7.6.3 Control air may not be fully exhausting from the metering valve:

- Make sure the air-assist vent valve (farthest from the metering knob) is closed.
- Open the metering valve's safety valve (closest to the metering knob).

If air escapes and the metering valve closes, there may be a blockage in the line between the side of the 4-way adaptor plate and "Grit Valve" fitting at the bottom of the panel.

If air does not escape and the leak continues, the abrasive metering valve plunger may be worn. Inspect the metering valve, per operations manual 31199.

7.6.4 Check operation of the 4-way valve, per Section 7.8.

7.7 Air flow only - no abrasive.

7.7.1 Make sure the machine contains abrasive.

7.7.2 Abrasive metering valve may be closed or needs adjustment. Adjust the metering valve, per Section 4.1.

7.7.3 Make sure the front ACS pushbutton is pressed. Refer to Section 3.6.

7.7.4 Check for leaks or blockage in the hose or fittings from the control panel to the metering valve, and for leaks and kinked tubing inside the panel.

7.7.5 Abrasive may be damp. Refer to Section 7.7.8 to clear damp abrasive or minor obstruction in the abrasive metering valve and abrasive chamber.

7.7.6 The metering valve may require service. Refer to the metering valve operations manual.

7.7.7 Loosen the corresponding "Grit Valve" fitting (second from the left or right, depending on which operator station is being checked) at the bottom of the control panel. With air to the panel, press the control handle (make sure the front ACS pushbutton is pressed); air should bleed from the fitting when the handle is pressed and stop when it is released. If it does not function as noted:

- Check the GW RLX Control Handle, per Section 7.1.6.
- Check the control panel, per Section 7.1.7.
- Check the control cords, per Section 7.1.8.
- Check operation of the 4-way pilot valve, per Section 7.8.

7.7.8 Use the following methods to clear minor obstruction in the GritWizard valve.

7.7.8.1 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 damp abrasive.

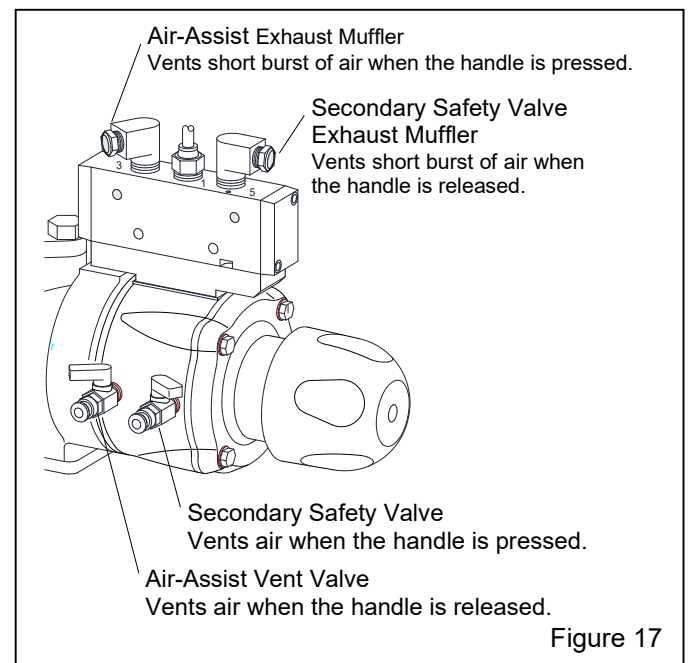
7.7.8.2 For larger obstructions refer to the GritWizard operations manual 31199.

7.8 Check Operation of the 4-Way Pilot Valve Figure 17

NOTE: To avoid blasting from the nozzle, the following tests should be done with the vessel depressurized but with all blasting controls operational.

7.8.1 With air to the control circuit and the control handle UP, in the nonblast position, gradually open the air-assist vent valve until air is barely noticeable coming from the valve.

7.8.2 Press the control handle lever. A short burst of air should come from (Port 3) the air-assist exhaust muffler, shown in Figure 17. Before releasing the control handle, gradually open the secondary safety valve until air is barely noticeable coming from the valve.



7.8.3 Release the control handle lever. A short burst of air should come from (Port 5) the secondary safety valve exhaust muffler, and air should now come from the air-assist vent valve.

7.8.4 Summary

When the control handle is pressed, air should come from the secondary safety valve and vent a short burst of air from the air-assist muffler.

When the control handle is released, air should come from the air-assist valve and vent a short burst of air from the secondary safety valve muffler.

Replace the 4-way valve if it does not operate as noted.

8.0 REPLACEMENT PARTS

8.1 GritWizard Electric Remote Control Systems

Item	Description	Stock No.
(-)	GritWizard 120-volt single operator.....	25830
(-)	GritWizard 12-volt single operator.....	25831
(-)	GritWizard 120-volt dual operator	25832
(-)	GritWizard 12-volt dual operator	25833

8.2 Replacement Valve Parts

NOTE: Refer to the following manuals for valve replacement parts:

- GritWizard™ Abrasive Metering Valve .. Manual No. 31199
- ACE Air Valve Manual No. 23938
- GW RLX Electric-Control Handle Manual No. 31340

8.3 GritWizard Electric Remote Control System Replacement Parts – Figure 18

Item	Description	Stock No.
1.	Panel, single-operator control with ACS 12-Volt DC	05621
	120-Volt AC	07650
2.	Panel, dual-operator control with ACS 12-Volt DC	05622
	120-Volt AC	07651
3.	Cord, 50 ft. initial control, from panel with lo-profile and twist-lock connectors	31168

4.	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
5.	GW RLX electric control handle	31167
6.	GritWizard abrasive metering valve 1-1/2" outlet pipe and flanged ball valve ...	31158
	1-1/4" outlet pipe and flanged ball valve ...	31172
	1-1/4" outlet pipe w/o flanged ball valve ...	31171
7.	Extension cord, includes items 11 and 12 50 ft extension	31148
	100 ft extension	31149
8.	Hose, 5-ft. coupled	03083
9.	Hose, 5-ft. twinline, coupled	01952
10.	Tubing, 1/4" OD Poly, specify ft required	12480
11.	Tee, 1/4-NPT brass	02025
12.	Adaptor, 1/4" NPT	02494
13.	Fitting, 1/4" MNPT x 1/4" OD tube	11737
14.	Nipple, 1/4-NPT brass hex	02808
15.	Cross, 1/4-NPT brass	02193
16.	Connector, lo-profile female electrical	31146
17.	Connector, lo-profile male electrical	31147
18.	Plug, 3-wire twist-lock	02275
20.	Tee, 1-1/4" x 1" for single operator controls	01811
	2" x 1" for dual operator controls	01812
21.	Bushing, 1" x 1/4"	02023
22.	Pigtail, 12-VDC only, w/lo-profile connector	31169
23.	Nylon tie, 15" nominal	02195

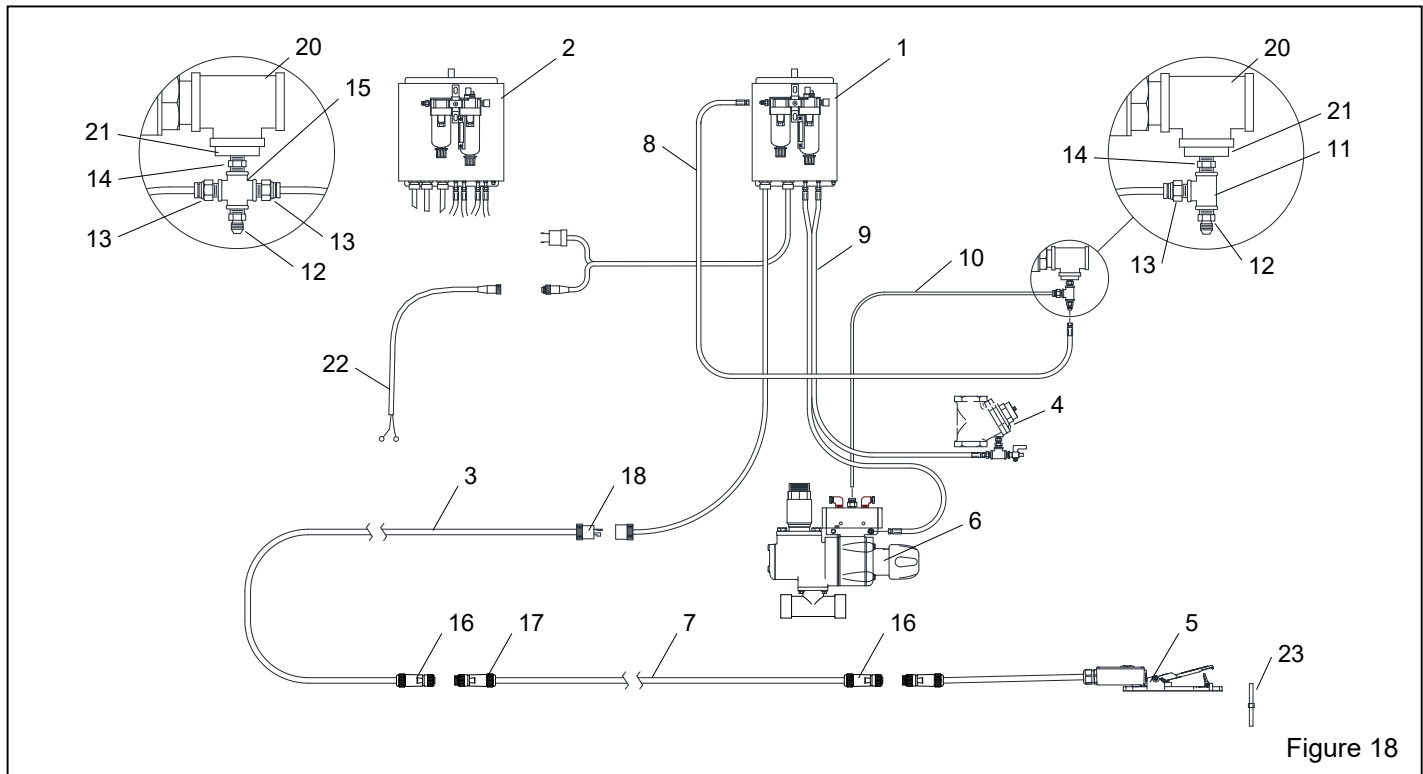


Figure 18

8.4 Control Panels – Figure 19

Item	Description	Stock No.
(-)	Control panel, single operator	
	12-volt DC	05621
	120-volt AC	07650
(-)	Control panel, dual operator	
	12-volt DC	05622
	120-volt AC	07651
1.	Air filter, 1/4-NPT	05617
2.	Antifreeze injector, 1/4-NPT	05616
3.	Valve, 3-way air	
	12-volt DC (for 12-volt DC panel)	07664
	12-volt AC (for 120-volt AC panel)	07662
4.	Terminal block, 5 pole	02268
5.	Adaptor, 1/4-NPT	02494
6.	Hex nipple, 1/4-NPT	02808
7.	Elbow, 1/4-NPT brass street	02027
8.	Fitting, 1/4-NPT female bulkhead	05605
9.	Bushing, 1/4-NPT x 1/8 (exhaust port)	02010
10.	Adaptor, 1/8-NPT fem bulkhead x JIC	03432
11.	Supply cord, 5-foot	
	12-volt, w/lo-profile connector (item 28) ...	31215
	120-volt, w/twist-lock connector (item 29) ...	02216
12.	Cord, control whip, includes item 30	07675
13.	Connector, 1/2" strain relief	02213
14.	Locknut, 1/2" conduit	02925
15.	Elbow, male 1/4-NPT x 1/4" tube	03428
16.	Tee, 1/4" tube	03351
17.	Connector, 1/8-NPT x 1/4" tube	03430
18.	Tubing, 1/4" white, specify feet required	03427
19.	Tubing, 1/4" red, specify feet required	05612
20.	Tubing, 1/4" blue, specify feet required	05613
21.	Tubing, 1/4" green, specify feet required	05614
22.	Tubing, 1/4" orange, specify feet required	05615
23.	Bracket, panel mount	04188
24.	Fuse, 2-amp 1/4" x 1-1/4", 120-volt only	03039
25.	Fuse block, 120-volt only	03040
26.	Transformer, 12.6-volt, 120-volt only	02198
27.	Bracket, Filter-Lubricator mount	21908
28.	Connector, lo-profile male	31147
29.	Plug, male 3-wire twist lock	02275
30.	Connector, female 3-wire twist lock	06327

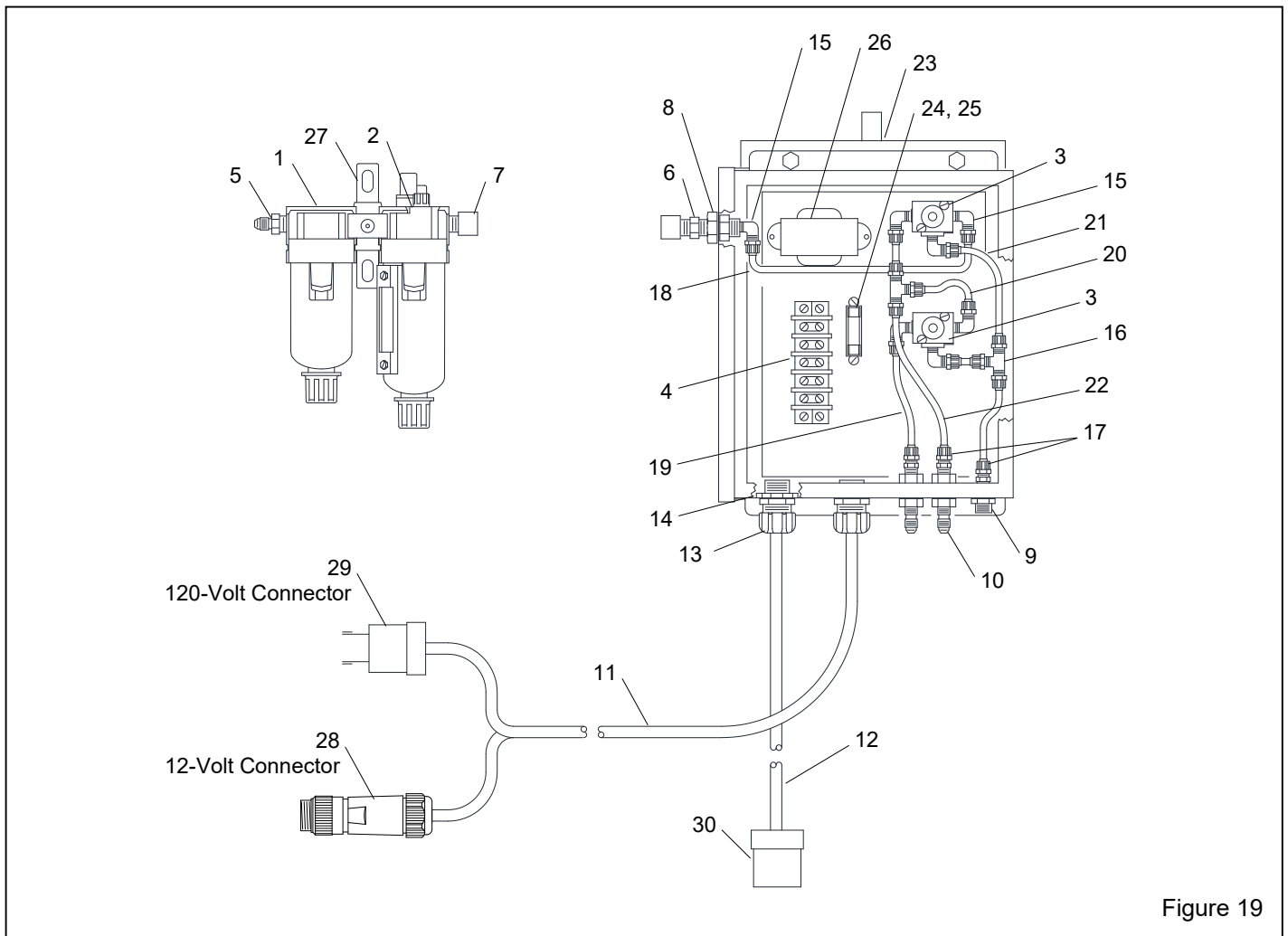


Figure 19