

**SENTINEL ELECTRIC  
REMOTE CONTROL SYSTEM  
O. M. 21018**

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 **WARNING**

**Do not proceed with these instructions until you have READ the orange cover of this MANUAL and YOU UNDERSTAND its contents. \* These WARNINGS are included for the health and safety of the operator and those in the immediate vicinity.**

**\*If you are using a Clemco Distributor Parts and Maintenance Guide refer to the orange warnings insert preceding the Index before continuing with the following instructions.**

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1.0 INTRODUCTION

1.1 Scope

1.1.1 This manual covers the installation, operation, maintenance, troubleshooting, and replacement parts for Clemco Sentinel Electric Pressure-Hold Remote Control Systems. The following manuals may be used in conjunction with the Sentinel system manual. They available upon request from Clemco Industries Corp., or at our web site at [www.clemcoindustries.com](http://www.clemcoindustries.com).

- Single Chamber Blast Machine .....Manual No. 06160
- Dual Chamber Blast Machine .....Manual No. 06154
- ACE Air Valve .....Manual No. 23938
- RLX Control Handle..... Manual No. 10574
- Sentinel Media Metering Valve .....Manual No. 20951

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

1.1.3 All personnel involved with the abrasive blasting process must be made aware of the hazards associated with abrasive blasting. The Clemco booklet "Abrasive Blasting Safety Practices" is included with every blast machine, and contains important safety information about abrasive blasting that may not be included in equipment operation manuals. Additional copies are available from Clemco Industries.

1.2 Safety Alerts

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



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

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

**CAUTION**

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

**CAUTION**

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

**WARNING**

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

**DANGER**

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

1.3 General Description

1.3.1 The components of the Sentinel Electric remote control system are shown in Figure 1. They include the Sentinel abrasive metering valve, ACE air valve, RLX electric control handle, electric panel assembly, 50-foot control cord with abrasive cut-off switch (ACS), all interconnecting control hoses, and all necessary fittings.

1.3.2 The remote control system is an OSHA-required safety device. The control handle, located near the blast nozzle, is the activator for the remote control system. When the operator intentionally or unintentionally removes hand-held pressure from the remote control handle, the abrasive metering valve and air valve close, stopping air and abrasive flow through the nozzle. The remote control system "fails to safe", which means any interruption in the control-air circuit for reasons, such as a break in the line, the compressor stops running, or the operator drops the blast hose, the remote controls stops the blasting.

**WARNING**

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

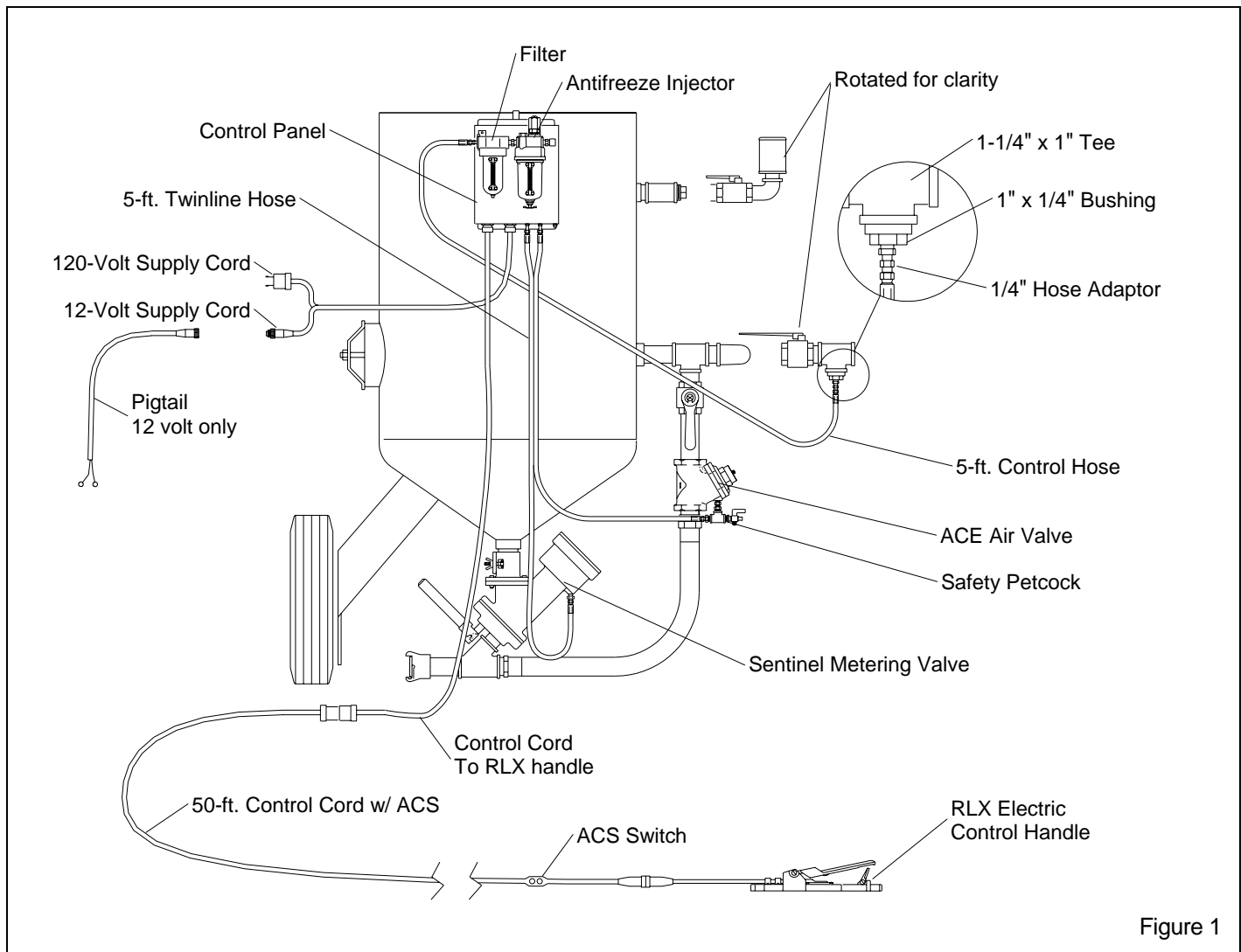


Figure 1

**1.3.3** Sentinel Remote Controls are pressure hold systems. Which means pressurization and depressurization of the blast machine is a separate function from the remote controls. Using hand operated inlet and outlet valves, the operator manually pressurizes and depressurizes the blast machine. Although the machine is under pressure, neither air nor abrasive comes out the nozzle because the normally closed (NC) Sentinel Valve shuts off abrasive flow, and the ACE Air Valve stops air flow. Blasting will not start until the operator activates the control handle. Pressure remains in the blast machine until it is manually depressurized.

#### 1.4 Operating Principles

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

**1.4.2** Sentinel electric remote controls (electric over pneumatic) operate pneumatically (See Figure 1). When the machine is manually pressurized, control air travels through the filter and antifreeze injector, and into the control panel. If the electric control handle lever (which is the main activator of the system) is in the up (no blast) position, air stops at the control panel and the media and air valves remain closed. Pressing the electric control handle lever allows air to pass through the panel to open the media and air valves, which starts the blasting process. When the control handle is released, control air exhausts at the panel, the valves close and blasting stops.

**1.4.3** An abrasive cut-off switch (ACS) is a standard feature of the Sentinel remote control. The cut-off switch is mounted on the control cord behind the control handle. The operator uses the switch to close the Sentinel Valve independently of the air valve, thus air without abrasive exits the nozzle to clear the blast hose, or for blow-down.

**1.4.4** Electric remote controls are required when the nozzle is farther than 100 feet from the blast machine. At that distance, pressure loss and actuation time of pneumatic systems may be too great to ensure 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 offer electrical resistance, and may cause the controls to malfunction. If an application requires greater distance, an appropriate cord with larger diameter wire must be provided by the user.

## 2.0 INSTALLATION

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

**2.2 Field Installation:** Refer to Figure 2.

**2.2.1** Empty the blast machine of abrasive. Depressurize the machine, shut down the compressed air source, disconnect the air supply line, and lockout and tagout the air supply.

### **⚠ WARNING**

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

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

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

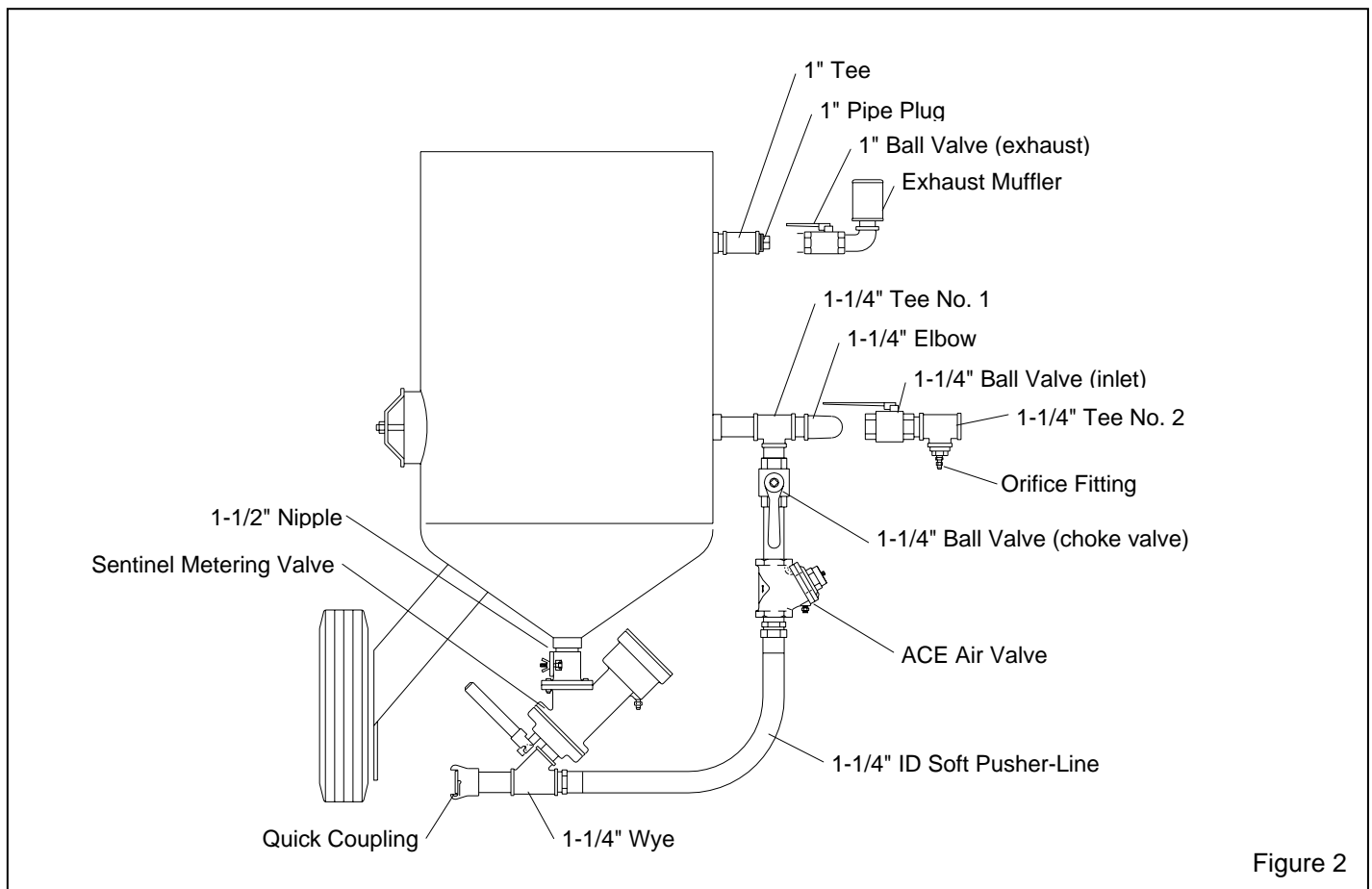


Figure 2

**2.2.3** Remove the four cap screws holding the flanged adaptor to the sentinel valve assembly.

**2.2.4** Use a 1-1/2" x close, schedule 80 pipe nipple to connect the flanged adaptor to the outlet at the bottom of the blast machine. If the adaptor has an inspection plate, position the plate toward the blast hose connection. If an adaptor without an inspection plate is used, align the bolt holes fore and aft, with the wide gap toward the blast hose connection.

**2.2.5** Position the adaptor gasket between the flanged adaptor and valve assembly, and bolt the parts together.

**2.2.6** Install a 1-1/4" pipe tee (tee #1) at the blast machine inlet as shown in Figure 2.

**2.2.7** Assemble a pusher-line between the Sentinel Valve and the tee-fitting using standard pipe fittings. Starting at the Sentinel Valve and working upstream, this line must include the ACE Air Valve and a manual choke valve, in that order.

**2.2.8** Connect the manual inlet valve and a second tee (tee #2) to the blast machine as shown. NOTE: The second tee and all fittings necessary to complete the assembly shown in the detail circle in Figure 1 are included with the remote system.

**2.2.9** Refer to the detail circle in Figure 1, and install the bushings and 1/4" hose adaptor.

**2.2.10** Assemble a manual outlet valve assembly, and install it as shown. NOTE: Clemco supplies an exhaust muffler with all blast machines 1.5 cubic feet and larger. The muffler reduces exhaust noise and directs the exhaust downward, which prevents abrasive from exhausting into the air. When the blast machine is depressurized, the muffler body will pop up and diffuse the escaping air and abrasive. When the machine is fully depressurized, the muffler body will drop, permitting trapped abrasive to empty. For the muffler to work properly, it must be installed with the body facing up, as shown in Figure 1.

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

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

## **WARNING**

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

**2.3.1** 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.

**2.3.2** Connect the 5-ft. x 3/16" 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.

**2.3.3** Connect one leg of the 5-ft. twinline hose between the panel outlet fitting marked "GRIT VALVE" and the fitting on the Sentinel Valve.

**2.3.4** Complete the control hose connections by attaching 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.

**2.3.5** Uncoil the blast hose and lay the 50-ft. control cord alongside it. Note: The control cord has the ACS switch wired into it. Place the switch end of the cord at the nozzle end of the blast hose.

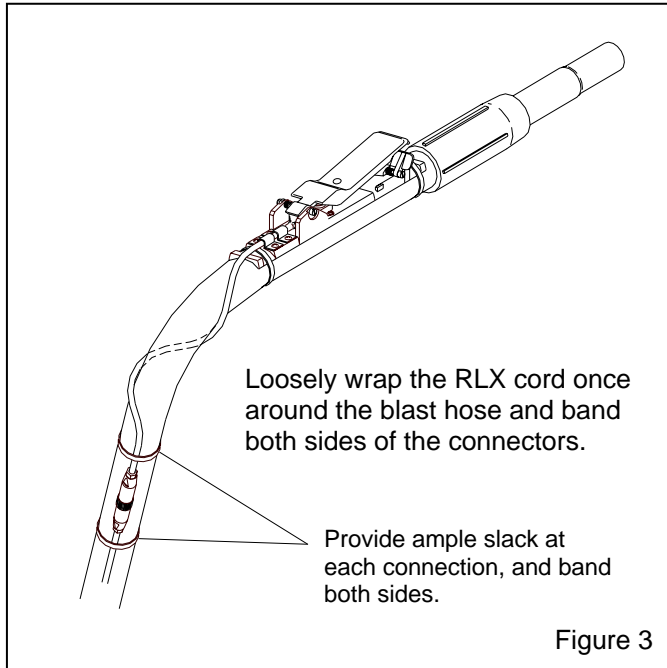
**2.3.6** Band the electric control handle to the blast hose at a suitable, comfortable position behind the nozzle holder, using the two nylon ties provided. The tie ends should be clipped so they will not snag the operator's clothing or interfere with the operation of the control handle.

**2.3.7** Loosely wrap the whip cord from the electric control handle once around the blast hose as shown in Figure 3, and then connect it to the control cord. If the cord is not wrapped and securely banded as described, excessive strain will cause the wires to pull out of the connectors or electric switch when the hose is bent or pulled.

## CAUTION

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.

**2.3.8** Band the cord to the hose on both sides of the cord connections as shown in Figure 3.



**2.3.9** Band the cord to the blast hose every 4 to 6 feet. When attaching control cord extensions, band the cord on both sides of each electrical connection.

**2.3.10** Attach the blast hose to the blast machine. Use safety wires to securely lock the couplings.

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

**2.3.12** 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.

## WARNING

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

## 3.0 OPERATION

### 3.1 Start-Up

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

## WARNING

Defective control handles could cause unintentional actuation of a blast machine, or prevent a machine from deactivating upon release. Defective control handles must be taken out of service immediately and repaired or replaced.

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

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

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

## WARNING

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

**3.1.5** Start the compressor, and bring it up to operating temperature and pressure. The pressure must be more than 70 pounds per square inch (psi) but not more than the pressure rating of the blast machine.

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

**3.1.7** Close the safety petcocks. There should not be any air escaping from any place in the blast system.

### 3.2 Blasting Attire

**3.2.1** Operators and anyone else that may be exposed to the hazards generated by the blasting process must wear appropriate protective gear, including abrasive-resistant clothing, leather gloves, eye and hearing protection, and a NIOSH-approved Type CE Supplied-Air Respirator.

## WARNING

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

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

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

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

### 3.3 Start Blasting

**3.3.1** Press the ACS button farthest from the nozzle. (See Operation of ACS in Section 3.6)

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

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

## CAUTION

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

## WARNING

**OSHA requires remote controls on all blast machines. Do not tie down the control handle 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. Severe injury or death can result from uncontrolled blasting.**

**3.3.4** Adjust Abrasive flow per Section 4.1.

### 3.4 Stop Blasting

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

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

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

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

### 3.5 Depressurize the Blast Machine

**3.5.1** Close the manual inlet valve and open the manual outlet valve. The machine will depressurize and the pop-up valve will open.

### 3.6 Operation of Abrasive Cut-Off Switch

**3.6.1** The abrasive cut-off switch is wired into the control cord behind the control handle. By pressing the front (closest to the nozzle) "off" button, the air supply to the abrasive metering valve is cut off, closing the valve and stopping the abrasive flow. This allows the operator to have air alone coming from the nozzle, which can be used to clear the blast hose before shut-down, and to blow abrasive off the blasted surface. Pressing the rear pushbutton (farthest from the nozzle) returns control air to the metering valve, this opens the valve, and starts abrasive flow. The switch can be opened or closed at any time, but will not activate the metering valve unless the control handle is pressed.

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

## WARNING

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

## 4.0 ADJUSTMENTS

### 4.1 Abrasive Metering

**4.1.1** The abrasive flow is adjusted at the metering handle. The valve is closed when the handle is fully right. To adjust, close the valve and slowly move the handle to the left to increase media flow. Use as little abrasive as possible to do the job while maintaining the best cleaning rate. Generally, with the correct mixture, abrasive can be seen as light discoloration as it exits the nozzle. The valve is fully open when the handle is fully left.

### 4.2 Antifreeze Injector

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

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

## 5.0 PREVENTIVE MAINTENANCE

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

for inspection and maintenance schedules of those items.

### 5.1 Daily

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

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

## WARNING

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

### 5.2 Weekly

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

### 5.3 Periodic Inspection

**NOTE: Periodic inspection of the following items will help avoid unscheduled down-time.**

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

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



## 6.0 SERVICE MAINTENANCE

### WARNING

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

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

### 6.1 Sentinel Metering Valve

Refer to the Sentinel valve owner's manual for service instructions for the Sentinel metering valve.

### 6.2 ACE Air Valve

Refer to the ACE air valve owner's manual for service instructions for the air valve.

### 6.3 RLX Control Handle

Refer to the RLX control handle owner's manual for service instructions for the control handle.

## 7.0 TROUBLESHOOTING

### 7.1 Blasting Does Not Start 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** Listen to the control panel to determine if it clicks when the control handle is pressed and released. If it does, the fault may not be electrical, go to Section 7.1.5 for pneumatic checks.

**7.1.2** Check for fault in the control panel by removing 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. The slot to the left (counter-clockwise of the angled slot) carries the power from the panel (hot line). Jump between the hot line and the angled slot (media valve solenoid), and listen for a click from the lower solenoid valve. Then jump between the hot line and the slot to the right (air valve solenoid) of the angled slot. The upper solenoid valve should click. If both valves click, check the control cord and electric RLX control handle per

Section 7.1.3 and 7.1.4. 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.
- Check for inadequate power to the control panel.
- Check continuity of all panel wiring and solenoids.
- Check for faulty transformer (120-volt systems only).

**7.1.3** Check each control cord extension, by connecting them one at a time to the panel, and jump across the extension cord socket as explained in Section 7.1.2. Continue to check all extension cords in like manner.

**7.1.4** Check the end control cord (with ACS Switch) by jumping across terminals No. 1 and 3 on the lo-profile connector. The upper solenoid (air valve solenoid) should click. With the jump in place, move the ACS Switch on and off. Moving the ACS switch should cause the lower (media valve solenoid) solenoid to click. If the panel does not click, the cord, connectors or switch are faulty and should be repaired or replaced. If the panel does click, the remote control handle is the probable cause and should be repaired. Refer to the RLX Control Handle Owner's Manual.

**7.1.5** Make sure the blast machine is pressurized.

**7.1.6** Make sure the safety petcocks are closed.

**7.1.7** Check for air leaks in Sentinel valve, ACE air valve, connecting hose, and tube fittings inside the panel.

**7.1.8** Inspect the air filter and 3/16" supply hose for blockage, clean if necessary.

**7.1.9** Open the petcock on the ACE air valve and press the control handle. If air does not come out the petcock, check for blockage in the control lines.

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

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

### 7.3 Heavy Abrasive Flow.

**7.3.1** Make sure the choke valve is open.

**7.3.2** Inspect the metering plate in the Sentinel valve for wear. Refer to the Sentinel valve owner's manual for service instruction for the Sentinel Metering Valve.

**7.3.3** Check the solenoid operating the air valve (upper solenoid).

**7.3.4** Inspect the diaphragm in the ACE air valve for damage.

**7.4 Abrasive Flow Does Not Stop When the ACS "Off" (forward) Button is Pressed.**

**7.4.1** 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:

- Obstruction in the line between the Sentinel Valve and the "GRIT VALVE" connection on the panel.
- Faulty ACS switch.
- Faulty solenoid.

**7.5 Air Flow, but No Abrasive.**

**7.5.1** Make sure the Sentinel Valve is not closed. Closed is when the metering handle is fully right.

**7.5.2** Make sure the ACS switch is in the "ON" position. See Section 3.6.1.

**7.5.3** Check for leaks or blockage in the hose or fittings from the control panel to the Sentinel Valve, and for leaks inside the panel.

**7.5.4** Check the solenoid operating the Sentinel valve (lower solenoid).

**7.5.5** Make sure the machine contains abrasive.

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

**7.5.6.1** Fully open the metering valve. The valve is open when the metering handle is fully left. While blasting, close the choke valve to force out small obstructions or wet abrasive.

** WARNING**

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

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

** WARNING**

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

**7.5.7** The Sentinel valve may require service. Refer to the Sentinel Valve Owner's Manual.

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

**7.6.1** Inspect Sentinel valve seat for wear or obstruction. Refer to the Sentinel Valve Owner's Manual.

**7.6.2** Inspect Sentinel valve shut-off piston for wear.

**7.7 Sentinel Metering Handle Will Not Move.**

**7.7.1** Damp or hardened abrasive has packed around Sentinel valve metering plate. Disassemble valve to clean.

**7.8 Air Leaks Through Relief Hole in Sentinel Valve Cylinder Cap.**

**7.8.1** Replace worn piston cup. Refer to the Sentinel Valve Owner's Manual.

**7.9 Abrasive in Sentinel Valve Spring Chamber.**

**7.9.1** Replace worn seal and wiper. Refer to the Sentinel Valve Owner's Manual.

**8.0 REPLACEMENT PARTS**

**8.1 Remote Control Systems**

Item Description	Stock No.
120-volt Single-operator system .....	20991
12-volt Single-operator system .....	20999
120-volt Dual-operator system .....	21007
12-volt Dual-operator system .....	21015

8.2 Sentinel Remote Control System, Figure 4

Item	Description	Stock No.
1.	Panel, single-operator control 12-volt DC .....	05621
	120-volt AC .....	07650
2.	Panel, dual-operator control 12-volt DC .....	05622
	120-volt AC .....	07651
3.	Media metering valve, Sentinel Standard, 50-mesh and coarser media ..	20608
	Fine-mesh, finer than 50-mesh media ...	21439
4.	Air valve, ACE w/ fittings.....	24044
5.	RLX electric control handle .....	10840
6.	Cord, 50-ft. control w/ACS switch .....	10847
7.	Extension cord, 50' for ACS, w/twist lock ....	15138
8.	Extension cord, 100' for ACS, w/twist lock ..	19528

9.	Hose, 5-ft. coupled .....	03083
10.	Hose, 5-ft. twinline, coupled .....	01952
11.	Tee, 1-1/4" x 1" pipe .....	01811
12.	Bushing, 1" x 1/4" .....	02023
13.	Adaptor, 1/4" NPT .....	02494
14.	Pigtail, for 12-volt DC only, with lo-profile connector .....	10831
15.	Nylon tie .....	02195

8.3 Valve Replacement Parts

NOTE: Refer to the following manuals for replacement parts for the Sentinel Valve, ACE Air Valve, and RLX Control Handle.  
Sentinel Media Metering Valve, Manual No. .... 20951  
ACE Air Valve, Manual No. .... 23938  
RLX Control Handle, Manual No. .... 10574

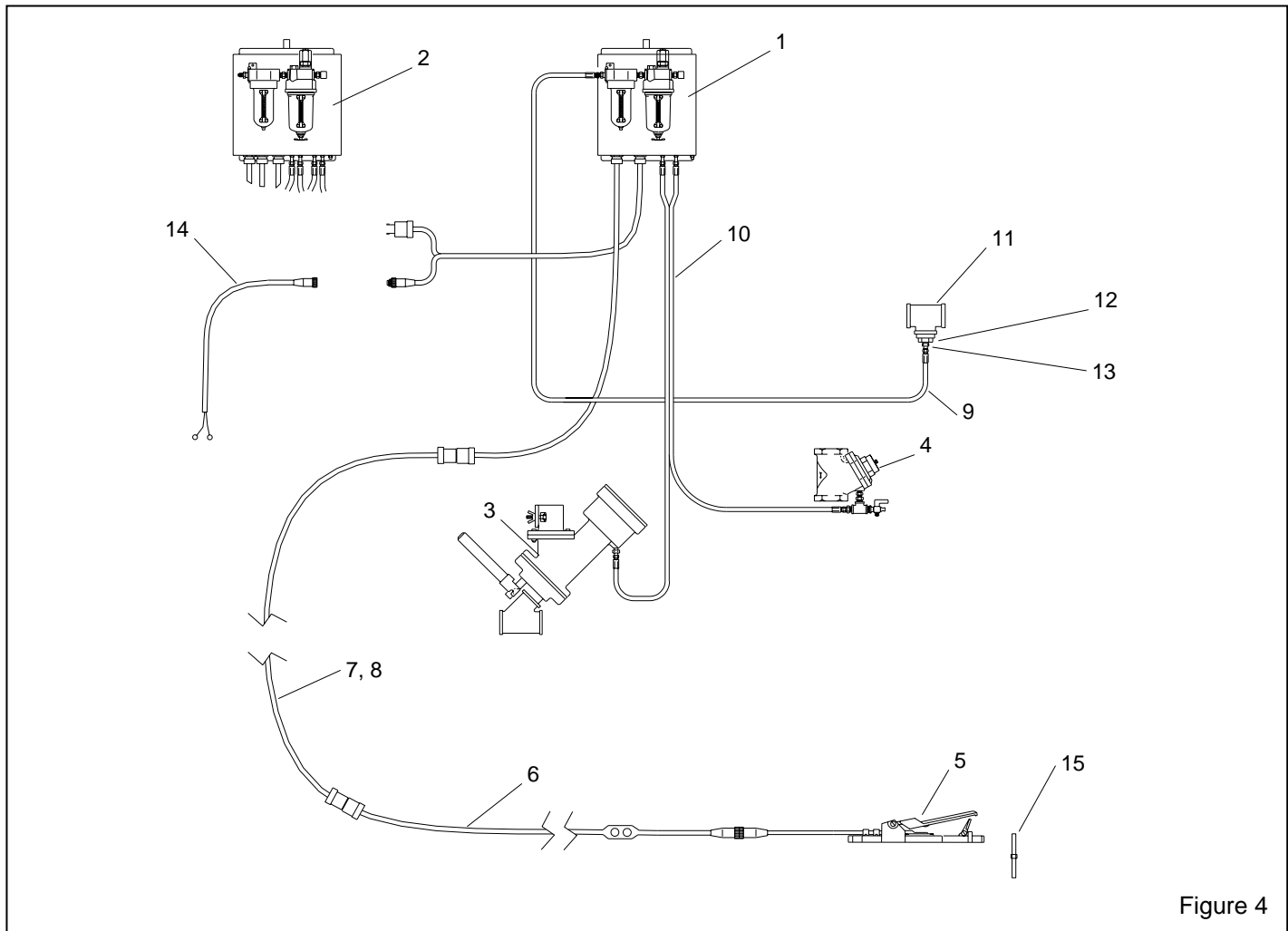


Figure 4

8.4 Control Panel, Figure 5

Item	Description	Stock No.
(-)	Control panel, single operator	
	12-volt .....	05621
	120-volt .....	07650
(-)	Control panel, dual operator	
	12-volt .....	05622
	120-volt .....	07651
1.	Air filter, 1/4" .....	05617
2.	Antifreeze injector, 1/4" .....	05616
3.	Valve, 3-way, 12-volt DC (for 12-volt panel) .....	07664
	12-volt AC (for 120-volt 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" brass street .....	02027
8.	Coupling, 1/4" female bulkhead .....	05605
9.	Bushing, 1/4 x 1/8, exhaust .....	02010
10.	Adaptor, 1/4" female bulkhead .....	03432
11.	Supply cord, 5-foot 12-volt, with lo-profile connector .....	10833
	120-volt, with twist-lock connector.....	02216
12.	Cord, control whip .....	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 .....	02198

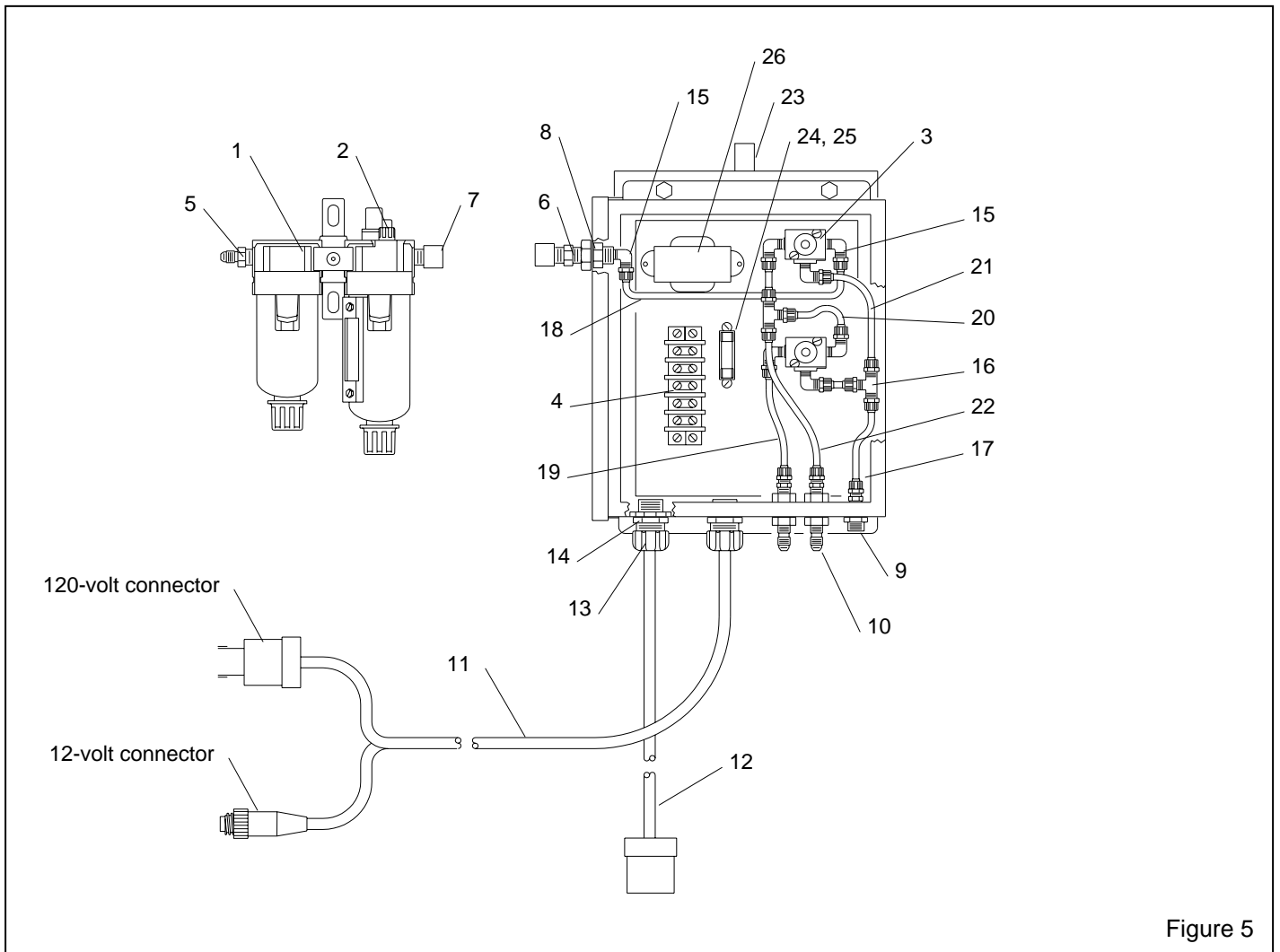


Figure 5