

# **BLAST CLEANING EQUIPMENT**

## **OPERATING AND MAINTENANCE MANUAL**

### **ULTRABLAST SINGLE CHAMBER BLAST MACHINE WITH RFS - SERIES TANK UNDER PRESSURE REMOTE CONTROL SYSTEM**

#### **MODELS COVERED**

<b>U-200</b>	<b>U-350</b>	<b>U-500</b>	<b>U-700</b>	<b>U-1000</b>
<b>U-200P</b>	<b>U-350P</b>	<b>U-500P</b>	<b>U-700P</b>	<b>U-1000P</b>
<b>U-200SP</b>	<b>U-350SP</b>	<b>U-500SP</b>	<b>U-700SP</b>	
	<b>U-350PC</b>		<b>U-700PC</b>	

#### **CAUTION**

**IMPROPER USE OF PRESSURE BLAST CLEANING EQUIPMENT CAN BE EXTREMELY HAZARDOUS. THIS MANUAL IS PROVIDED TO ASSURE THE SAFE OPERATION OF THE TITAN ULTRABLAST SERIES OF ABRASIVE BLAST CLEANING MACHINES. PLEASE READ CAREFULLY BEFORE PROCEEDING.**

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## **INSTALLATION INSTRUCTIONS FOR RFS SERIES REMOTE CONTROL SYSTEM**

NOTE: Additional piping and fittings may be necessary for completion of installation.

- 1.) Disconnect air supply from compressor
- 2.) Drain abrasive from tank
- 3.) Remove existing abrasive regulator
- 4.) Remove tee from existing abrasive regulator for re-use (providing tee is 1 1/4" N.P.T.)
- 5.) Install new 5700-17 valve assembly with arrow pointing away from tank bottom
- 6.) Install 1 1/4" tee under 5700-17 abrasive regulator (Not Provided)
- 7.) Adjust abrasive regulator handle 3 turns out from closed
- 8.) Remove piping from tee below 5700 valve to air inlet of tank
- 9.) Disassemble all elbows, tees and valving as some may be re-used
- 10.) Install pipe tee on side of tank inlet using a 2" nipple
- 11.) Install 45° elbow on tee below 5700 abrasive regulator using a 2" nipple
- 12.) Install 5720 air valve with arrow pointing toward 45° elbow using a 2" nipple
- 13.) Install 45° elbow on inlet end of 5720 valve using a 2" nipple
- 14.) Install ball valve from existing piping on tee from inlet to machine at lower side using a 3" nipple
- 15.) Use remaining piping and union to connect assembly
- 16.) Install 90° elbow (Not Provided) on upper end of tee facing front of machine
- 17.) Install ball valve from piping on 90° elbow
- 18.) Install moisture separator on ball valve
- 19.) Install 1/4" tee on top side of moisture separator with pressure gauge
- 20.) Install connection hose supplied between 5700 and 5720 valve

\* Follow operating instructions for RFS system beyond this point

## **SYSTEM OPERATION**

The TITAN ULTRABLAST RFS - SERIES "TANK UNDER PRESSURE" REMOTE CONTROL SYSTEM is a normally closed, pneumatically actuated system. It is necessary to pressurize a pilot line circuit to operate the control valves for air and abrasive flow. A loss of pilot line pressure will close the operating valves immediately, whether that loss originates from the operator releasing the hand held "deadman" switch or through damage to the air pilot lines.

During operation, except when refilling, the tank is pressurized at all times and the operating valves control and air flow and abrasive discharge.

## **INITIAL PREPARATION**

Reference Diagrams: Figure 1 System Diagram, Figure 2 coupling installation, Figure 3 Nozzle installation.

- 1.) **BLAST HOSE COUPLINGS** - If couplings are not already installed they should be attached to the hose using the sheet metal screws provided. The hose end must be cut clean and square or the service life of the hose, couplings and nozzles will be significantly reduced. Connect the hose end coupling to the blast tank coupling at connection point "(A)" of the System Diagram. Press the coupling faces firmly together and rotate in a clockwise motion until the locking lugs are engaged. The couplings are locked in the proper position when the 1/8" drilled holes are aligned to allow the insertion of safety wires or pins which should be used to prevent the couplings from unlocking. See the Coupling Installation Diagram for more detail.
- 2.) **BLAST NOZZLE** - Before installing in the nozzle coupling the threads should be coated with anti-seize compound. Insert nozzle gasket (it may be attached to the nozzle) and thread the nozzle in until contact is felt, then hand tighten 1/4 turn. **DO NOT OVER TIGHTEN.** Over tightening will distort the gasket which may lead to premature nozzle wear.
- 3.) **MAIN AIR SUPPLY** - At distances up to 100' from the air source the smallest diameter inside the air supply line, including the couplings, should be at least as large as the blast machine piping or three times the size of the blast nozzle being used. Connect the air hose to the blast machine at air inlet point "(B)" as shown on the System Diagram.
- 4.) **GROUNDING** - In order for the blast hose to properly discharge the static electricity generated by the abrasive flow, the blast tank must be grounded. In most cases the unit will be well grounded simply by sitting on a normal surface, however, if the operator experiences discomfort from the static connect a wire from a tank support leg to a known ground point.

5.) REMOTE CONTROL SYSTEM - attach the open ends of the TWIN CONTROL LINE to the fittings under the PILOT VALVE. The connections are color coded and are different sizes to prevent improper connections. Attach the DEADMAN CONTROL SWITCH to the blast hose at a comfortable point near the nozzle, however, for safe operation, the front of the Switch should not be more than six inches from the nozzle coupling. The TWIN CONTROL LINE should be taped or strapped to the blast hose, being careful not to crush the twin line in the process.

### **TO STOP**

RELEASE DEADMAN CONTROL SWITCH - Blasting will stop. The blast tank now remains pressurized until refilling is necessary.

### **TO RESTART - WHEN TANK IS PRESSURIZED**

ACTIVATE DEADMAN CONTROL SWITCH - Blasting will start more quickly with the tank already pressurized.

### **TO STOP - WHEN REFILLING IS NECESSARY**

1. RELEASE DEADMAN CONTROL SWITCH - Blasting will stop
2. CLOSE MANUAL MAIN AIR CONTROL VALVE (B)
3. OPEN MANUAL EXHAUST VALVE ( C ) - TO DEPRESSURIZE THE TANK -  
CAUTION: The discharging air may contain particles of abrasive which can cause injury.

### **TO RESTART - AFTER FILLING**

PROCEDURE IS THE SAME AS THE INITIAL START

### **LEAVING THE UNIT UNATTENDED**

ALWAYS DEPRESSURIZE CHAMBER WHEN BLASTING IS FINISHED

### **FINE TUNING**

Reference: System diagram Figure 1

1. 5700 ABRASIVE REGULATOR - Turn crank handle clockwise to decrease the abrasive flow, counterclockwise to increase. When properly adjusted abrasive should be barely visible in the air flow from the nozzle. The chart in our catalog indicates the correct abrasive consumption for maximum performance and will serve as a comparison for your settings. Once the flow is correct it is usually not necessary to readjust this valve.

2. **CHOKE VALVE (D)** - Normally this valve will be in the fully open position. Should the abrasive flow become erratic or stop completely, and the tank is not empty, this valve may be slowly closed up to 30 degrees from the normal vertical position. This changes the air/abrasive ratio and usually restores the normal abrasive flow. During damp, humid weather it may be necessary to operate with the Choke Valve in a partially closed setting at all times. If partial closing does not restore the abrasive flow, close the valve completely for a few seconds, this will divert full air volume to the tank and should force the obstruction through the abrasive regulator.

If the choke valve operation will not restore the abrasive flow the unit is clogged (assuming it is not empty). Clogging is usually from an obstruction, often a piece of bag from the abrasive supply, lodged in the bottom outlet of the tank or in the 5700 Abrasive Regulator. See the maintenance section for information on servicing these components.

### **OPTIONAL OSHA/NIOSH RESPIRATORY COMPLIANCE PACKAGE**

**Package “H”** - No. 178 or No. 118 SUPPLIED AIR RESPIRATOR AND 41 AC AIR LINE FILTER USING A SOURCE MONITORED FOR THE PRESENCE OF CARBON MONOXIDE. From the source connect an air supply line of at least 3/4" I.D. to the 41 AC Air Line Filter. Follow the instructions package with the respirator selected.

**Package “P”** - No. 178L SUPPLIED AIR RESPIRATOR WITH SELF CONTAINED EDP-SERIES “FREE AIR PUMP.” Locate the pump where it will not be subject to fumes from vehicle exhaust or other source of carbon monoxide. Although the pump will not produce CO internally, CO that is introduced through the pump inlet will not be removed by the system filter. Detailed instructions are included with each pump.

**WARNING: CARBON MONOXIDE CONTAMINATION BREATHING AIR HAVING CARBON MONOXIDE LEVELS EXCEEDING 20 PPM IS IN VIOLATION OF FEDERAL SAFETY STANDARD FOR SUPPLIED AIR RESPIRATOR EQUIPMENT. THE RESPONSIBILITY FOR SUPPLYING BREATHABLE AIR LIES WITH THE END USER. IF AIR QUALITY IS NOT KNOWN A CO MONITOR OR FREE AIR PUMP BREATHING SYSTEM SHOULD BE CONSIDERED.**

### **FINAL PREPARATIONS**

Reference: Figure 1 System Diagram

1. **FILL MACHINE WITH ABRASIVE** - Do not overfill, this will cause accelerated wear on the sealing plunger and gasket.
2. **SET CHOKE VALVE (D)** - Initial setting of this valve is full open (handle in line with the piping). See the FINE TUNING section for adjustment details.

3. SET ABRASIVE REGULATOR (F) - Initial setting should be 2-3 turns counterclockwise from fully closed. See the FINE TUNING section for later settings.
4. CLOSE MANUAL AIR INLET VALVE (E) - Only precaution. Machine with remote control systems will not start when the air lines are pressurized until the deadman switch is depressed.
5. TURN ON AIR FROM COMPRESSOR - This will pressurize all lines up to the blast machine including the remote control pilot lines and deadman switch.
6. HOLD BLAST HOSE AT NOZZLE END - Direct nozzle end away from personnel and equipment.
7. OPEN MANUAL AIR INLET VALVE (E) - The machine is now ready to operate.

**TO START  
WHEN MACHINE HAS BEEN DEPRESSURIZED**

ACTIVATE DEADMAN CONTROL SWITCH - Before the switch can be activated the safety button must be pressed into the side of the switch body to allow clearance for the operation handle. Depress the operating handle, blasting will start when the blast tank is pressurized. DO NOT EXCEED 125 P.S.I.

**MAINTENANCE / INSPECTION INTERVALS AND PROCEDURES**

**WARNING:  
THE TANK MUST BE DEPRESSURIZED AND THE AIR SUPPLY LINE  
DISCONNECTED AT THE MAIN AIR INLET BEFORE ANY MAINTENANCE  
SERVICE IS PERFORMED.**

**HOURLY OR AS NEEDED**

MOISTURE SEPARATORS - Depending upon options ordered the blast machine could be equipped with manual or automatic drain separators on the main air supply line and on the pilot system for the remote control. Manual drain models should be drained at each abrasive refill.

**DAILY**

BLAST HOSE - Inspect daily for wear. To avoid bursting replace the hose when the I.D. approaches the outer edge of the central tube. If bursting occurs replace the hose immediately.

BLAST NOZZLE - Carbide nozzles should be removed from the holder every few days and inspected for wear at the entrance. If the wear is uneven check the hose end for a square cut and the gasket for wear. Coat the threads with anti-seize compound before reinstalling.

## WEEKLY

COUPLINGS - Hose end and tank couplings should be inspected for gasket wear at least weekly.

## EVERY 200 HOURS OF OPERATION

REMOTE CONTROL SYSTEM - PART NO. 5700 ABRASIVE REGULATOR AND PART NO. 5720 INLET VALVE - A complete internal inspection should be performed. If possible, the unit should be empty when this is done.

## DISASSEMBLY

- 1.) (ABRASIVE REGULATOR ONLY) - If the machine contains abrasive the tank should be placed on its side to prevent the abrasive from flowing out during service. If the machine must remain in a vertical position, remove the Cleanout Plug (18) and insert a short length of 3/4" O.D. pipe or tubing through the Valve Body into the Ball Seat (15) to block abrasive flow.
- 2.) Remove the air pilot line from the Valve Cover (6).
- 3.) Release tension from spring by removing Tensioner (4 or 25).
- 4.) Remove the 6 nuts from 3/8" Hex Head Bolts (9) that hold the valve cover in place.
- 5.) Using a small hammer LIGHTLY tap around the Outer Spacer ring (14). This will free up the entire outer assembly for removal. DO NOT use a screwdriver or similar tool to pry off spacer ring and cover. The Valve Cover (6), Ball and Stem (20). Ball Stem Nut (19), Diaphragms (11) and the Spacer Ring (14) should be removed as one unit. Remove the Hex head Bolts and separate the Valve Cover from the remaining parts.
- 6.) Inspect Diaphragms (11) for tearing and replace if necessary. \* To replace Spring Diaphragm the following instructions must be followed to insure proper operation and safety precautions.
- 7.) A drill press or manual press must be used to compress the valve spring. To compress the spring install assembly with diaphragm toward drill chuck. Open drill chuck to allow spring bolt to enter inside during assembly. Insert socket head wrench through hole in base of press, spring retainer, and into spring bolt. Compress spring using handle of press. Remove threaded washer (13) and relieve pressure slowly from handle.
- 8.) The Ball and Stem (20) should be replaced if any sign of wear is present.
- 9.) The Ball Seat (15) should be replaced when any wear is visible or the Ball and Stem will wear prematurely. A 1-3/4" socket is required to remove the Seat. When installing a new seat coat the threads with pipe joint compound and tighten to 30 ft. lbs. Of torque, DO NOT OVER TIGHTEN.

10.) Holding the Valve Cover (8), check the operation of the Control Handle (1). It should turn freely without binding. Inspect the Control stem for worn or damaged threads, replace if necessary.

### **RE-ASSEMBLY:**

1.) Spring Assembly - Check condition of threads on spring bolt (9), replace if necessary. Spring Washer (10) should be flat and the center hole should be round. Replace if wear is evident. To reassemble spring install assembly in press as described in removal instructions. Compress spring with handle of press and attach spring bolt to threaded washer. The entire assembly should be tightened until the diaphragm does not move on the assembly.

2.) Valve Assembly - Prior to installation of components remove the Spacer Piston (15) and inspect for wear. Replace o-ring and/or piston if wear is evident. Apply small amount of grease on o-ring prior to installation. Locate bleed holes on Valve cover (6) and Center Spacer (14). Both bleed holes should face the ground when installed on machine.

3.) Insert the 6 - 3/8" Hex Head Bolts (9) through the Valve cover and install the spacer/diaphragm assembly on the main body. Install the nuts on the Hex Head Bolts and torque to 35 ft. lbs. In two stages using a cross pattern, remove the tool from the cleanout port, install cleanout plug and torque to 60 ft. lbs.

4.) Apply tension to spring by turning tensioner in until it is tight against valve cover. DO NOT OPERATE WITH TENSIONERS PARTIALLY APPLIED. This will affect machine operation.

5.) Install air pilot line on the Valve cover.

### **THE FOLLOWING COMPONENTS DO NOT HAVE A MAINTENANCE SCHEDULE - SERVICE AS REQUIRED**

REMOTE CONTROL SYSTEM - PILOT VALVE PART NO. 6029 (ELECTRIC MODELS ONLY) - Perform an internal inspection of this valve under the following circumstances: (a). The operation of the remote control system changes in any way, particularly with respect to starting and stopping time, or (b). During service on the NO. 5700 Abrasive Regulator ruptured inner and outer diaphragms that allow abrasive grit to enter the pilot system. The Pilot Valve can be serviced without removing the Valve Body (6) from the blast machine.

1.) Remove the Operator (1) leaving the air hose attached. The Operator Plunger (2) and Retainer should remain in the operator. Remove the Spool (4) and the Spring (5) from the Valve Body (6). Check the o-ring on the spool, if damaged, the spool chamber may be scored and the entire valve will have to be replaced. If the spool chamber is not scored, a repair kit, Part No. 6042, is available and contains a new spool with o-ring installed. The o-rings are not serviced separately.

2.) Clean the Valve Body, particularly the spool cylinder, insert the Spring (5). Lubricate the Spool with a light lithium or molykote lubricant (DO NOT USE OIL OR SPRAY LUBRICANTS which may cause the o-ring to swell) and insert in Valve Body, the end with the wide rubber seal opposite the spring. Manually depress the spool for smooth, non-binding movement.

3.) Reassemble the Valve in reverse order and torque Operator screws to 15 inch lbs.

**THE FOLLOWING COMPONENTS ARE ILLUSTRATED IN THE COMPONENT PART AND SYSTEM DIAGRAMS PRICE LIST.**

REMOTE CONTROL SYSTEM - DEADMAN CONTROL SWITCH PART NO. 6100 - In normal operation service will be limited to occasional replacement of the Part NO. 6106 Sealing Bumper (1) which does not require disassembly or explanation.

1.) For internal service to replace the Plunger (5) or Plunger Spring (12), Remove the 4 base screws (13) and carefully separate the base Strap (11) from the Switch Body (10). Remove and replace the Plunger and Plunger Spring and replace the Base Strap, making certain that the o-ring (6) is in place in the bottom of the Switch Body. Insert screws and torque to 20 inch lbs.

BLAST TANK INTERNAL COMPONENTS - SEALING PLUNGER PART NO. SP-1 Under normal operating conditions the Sealing Plunger does not require service and will last indefinitely. However, erosion grooves may develop on the plunger face if the unit is overfilled frequently. These grooves will destroy the sealing o-rings very quickly if the plunger is not replace.

The Plunger is serviced through the inspection door opening on the side of the tank. Remove the door by loosening the nut on the yoke, turn the yoke, then allow the door to drop into the tank as one unit, do not remove nut. The door can be removed but some require very exact positioning for removal.

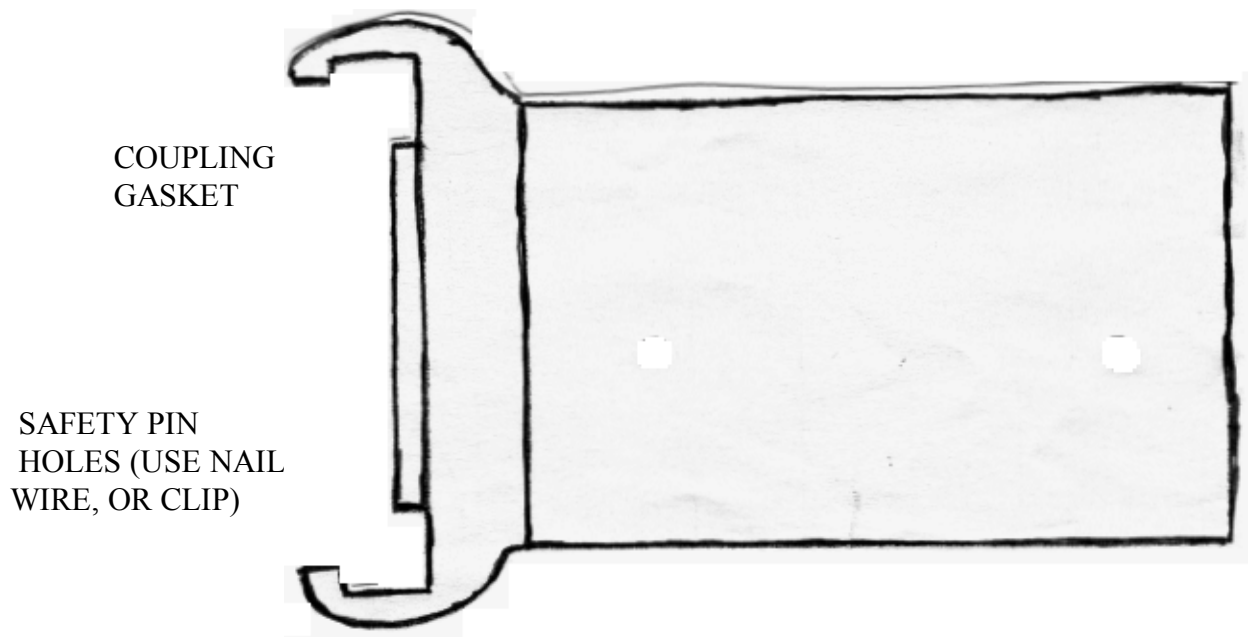
Reach into the inspection door opening and locate the plunger support pipe. Unscrew the support pipe and remove plunger and pipe as one unit. Inspect the support pipe for wear and replace if necessary.

Before installing the new SP-1 Plunger and support pipe lubricate the threads with pipe joint compound or other anti-seize product. Install the plunger and pipe and tighten AS MUCH AS POSSIBLE BY HAND, DO NOT USE A WRENCH. Always install a new Sealing O-Ring with a new Plunger.

BLAST TANK INTERNAL COMPONENTS - SEALING O-RING SG-1 - Should be replaced when complete sealing no longer occurs. The Sealing O-Ring is easily removed and replaced by hand using a rolling motion, however, if tools are used be careful not to damage the steel retaining ring. Do not use adhesive on the o-ring or the retaining ring.



## COUPLING INSTALLATION (FIGURE 2)



HOSE MUST BE CUT CLEAN AND SQUARE.  
HOSE MUST BE TIGHT AGAINST INTERIOR  
WALL OF COUPLING.

SHEET METAL SCREWS

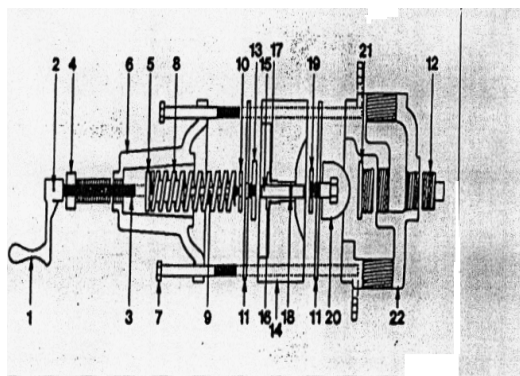
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## PARTS BREAKDOWN - RFS-14 AND RFE-14 REMOTE CONTROL SYSTEMS

### MODEL 5700 REMOTE CONTROL ABRASIVE REGULATORS

(PILOT AIR TO OPEN OPERATION. REGULATOR HELD NORMALLY CLOSED BY SPRING TENSION.)

PART NO.	KEY	DESCRIPTION
5700-17	[0]	COMPLETE VALVE
5771	[1]	Control Handle
5772	[2]	Retaining Pin
5773	[3]	Control Stem
5774	[4]	Spring Tensioner
5777	[5]	Spring Retainer
5778	[6]	Valve Cover
5779	[7]	Valve Bolts (6), Each
5780	[8]	Valve Spring
5781	[9]	Spring Bolt with Nut
5782	[10]	Spring Washer
5712	[11]	Diaphragms, each
5718	[12]	Clean-Out Plug
5784	[13]	Threaded Washer
5785	[14]	Center Spacer
5786	[15]	Spacer Piston
5787	[16]	Piston Guide
5788	[17]	Guide O-Ring
5789	[18]	Piston O-Ring
5710	[19]	Ball and Stem Nut
5791	[20]	Ball and Stem
5715	[21]	Valve Seat (1")
5716	[21]	Valve Seat (5/8")
5717	[22]	Valve Body



### MODEL 5720-17 REMOTE CONTROL AIR INLET VALVE

(PILOT AIR TO OPEN OPERATION. VALVE HELD NORMALLY CLOSED BY SPRING TENSION.)

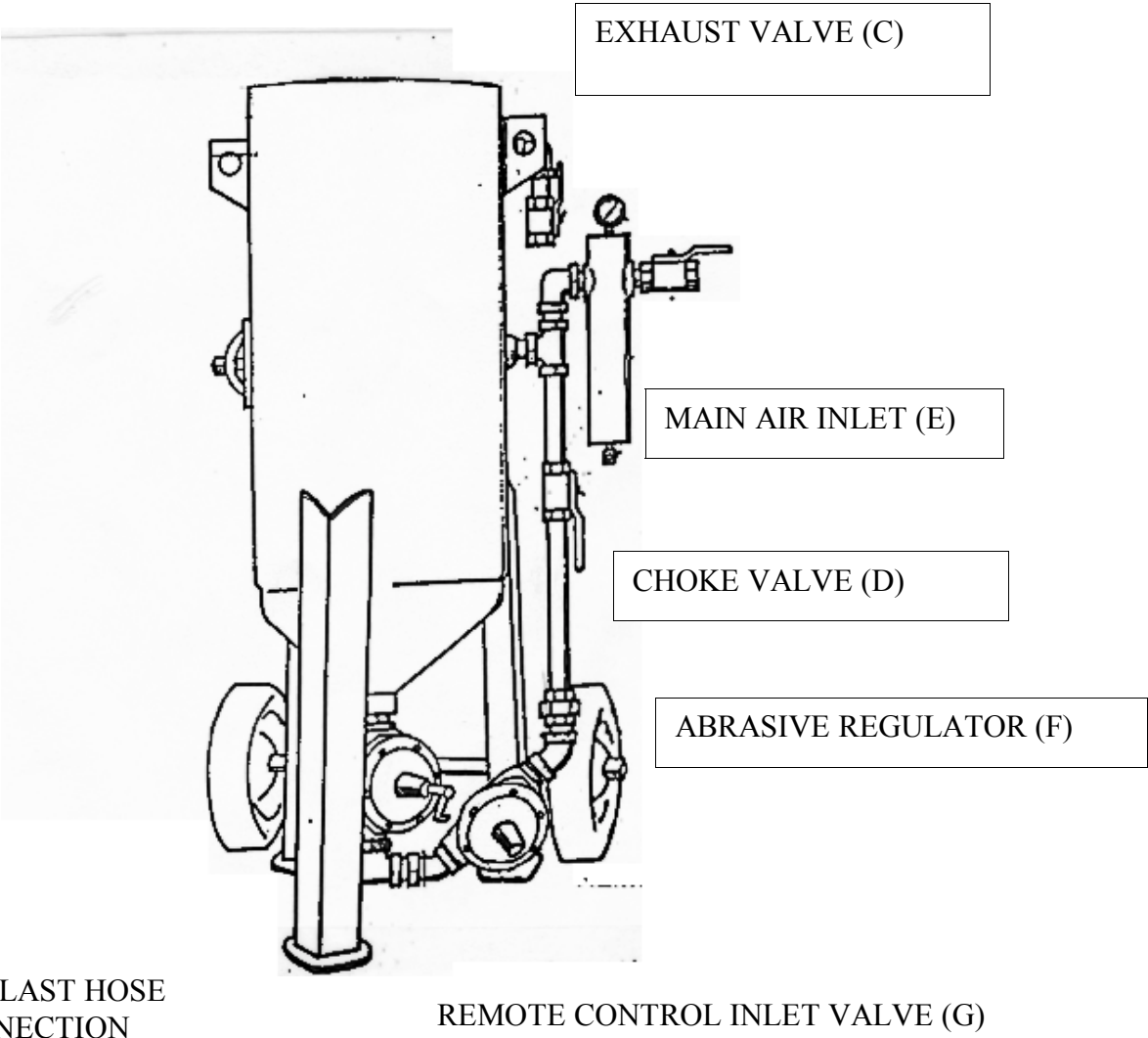
5720- 1	[0]	COMPLETE VALVE
5792	[23]	Valve Seat (1 1/4")
5793	[24]	1" x 1/4" Bushing
5775	[25]	Spring Tensioner

ALL OTHER PARTS ARE SAME AS THE 5700-17 ABRASIVE REGULATOR ABOVE



# BLAST CLEANING EQUIPMENT

FIGURE 1 SYSTEM DIAGRAM



**TITAN ABRASIVE SYSTEMS, INC**  
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## RECOMMENDED SPARE PARTS FOR TITAN ULTRABLAST MACHINES

### Blast Machine

- (2) 1613 6 X 8 door gasket
- (2) SG-1 o-ring

### RFS - Remote Control System

- (1) 6016 1' interconnect line
- (1) 6053 55' twin control line

### Air Inlet Valve and Abrasive Regulator - RFS System

- (4) 5791 valve ball & stem
- (4) 5712 diaphragm
- (2) 5788 guide o-ring
- (2) 5789 piston o-ring
- (2) 5755 valve seat

### (1) 6100 Deadman Switch

- (6) 6106 sealing bumper
- (1) 6104 handle
- (2) 6107 fitting 1/8"
- (1) 6103 plunger
- (2) 6109 o-ring
- (2) 6112 safety spring
- (2) 6105 operating spring
- (2) 6114 plunger spring
- (1) 6115 set, base screws
- (1) 6116 set, handle screws

### Air Exhaust Valve - RFE System

- (4) 5711 valve ball & stem
- (8) 5712 diaphragm
- (2) 5715 ball seat

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