

# **BLAST CLEANING EQUIPMENT OPERATING AND MAINTENANCE MANUAL**

## **TITAN SODIUM BICARBONATE BLAST MACHINE WITH RCP - SERIES TANK UNDER PRESSURE**

### **MODELS COVERED**

**100CS      200CS      350CS      500CS      700CS      1000CS**

### **CAUTION**

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

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## **SYSTEM OPERATION**

The TITAN SODIUM BICARBONATE RCP - 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 the 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 OVERTIGHTEN.** Overtightening will distort the gasket which may lead to premature nozzle wear.
3. **MAIN AIR SUPPLY** - At distance 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.

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

PACKAGE "H" - NO. 117 OR NO. 118 SUPPLIED AIR RESPIRATOR AND 41AC 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 41AC Air Line Filter. Follow the instructions packaged with the respirator selected.

PACKAGE "P" - NO. 117L SUPPLIED AIR RESPIRATOR WITH SELF CONTAINED EDP-SERIES "FREE AIR PUMP." Locate the pump where it will not be subjected 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 filters. 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 STANDARDS FOR SUPPLIED AIR RESPIRATORY EQUIPMENT. THE RESPONSIBILITY FOR SUPPLYING BREATHABLE AIR LIES WITH THE END USER. IF THE 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 a precaution. Machines 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. SECURELY 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 operating handle. Depress the operating handle, blasting will start when the blast tank is pressurized. DO NOT EXCEED 125 P.S.I.

**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. OPEN MANUAL EXHAUST VALVE ( C ) TO DEPRESSURIZE THE TANK - CAUTION: The discharging air may contain particles of abrasive which can cause injury.
3. CLOSE MANUAL MAIN AIR CONTROL VALVE (B) - A precaution should someone accidentally depress the deadman switch while the tank is being filled.

**TO RESTART - AFTER REFILLING**

PROCEDURE IS THE SAME AS THE INITIAL START.

## LEAVING THE UNIT UNATTENDED

PROCEDURE IS THE SAME AS FOR REFILLING - To prevent unintended starting.

### 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 easily 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 has abrasive in it, 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 hopefully 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 out of abrasive). 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.

### MAINTENANCE / INSPECTION INTERVALS AND PROCEDURES

Reference: Figure 1 - System Diagram, Figure 4 - 5700 Valve exploded view, Figure 5 - 6060/6061 Air Inlet Valve exploded view, Figure 6 - 6110 Pilot Line Filter, Figure 7 - 6019 Pilot Valve, Figure 8 - 6100 Deadman Control Switch

**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 least hourly.

## **DAILY**

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

BLAST NOZZLE - Carbide nozzles should be removed from the holder every few days and checked 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 coupling should be checked for gasket wear at least weekly.

REMOTE CONTROL SYSTEM - PILOT LINE FILTER PART NO. 06110 - Remove filter bowl (threaded) and inspect for the presence of abrasive particles. If present, check the operation of the lower check valve located in the machine piping before the 5700 Abrasive Regulator. See the non - scheduled maintenance section for directions to disassemble the check valve.

## **EVERY 200 HOURS OF OPERATION**

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

## **DISASSEMBLY**

1. 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 the abrasive flow.
2. Remove the air pilot line from the Valve Cover (8).
3. Remove the 6 nuts from 3/8" Hex head Bolts (9) that hold the valve cover in place.
4. Using a small hammer LIGHTLY tap around the Outer Spacer Ring (13). 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 (8), Ball and Stem (11), Ball stem Nut (10), Diaphragms (12) and the Outer and Inner Spacer Ring (14) should be removed as one unit. Remove the Hex Head Bolts and separate the Valve Cover from the remaining parts.
5. Inspect Diaphragms (12) for tearing and replace if necessary. It is a good idea to replace the inner diaphragm each time this service is performed.

6. The Ball and Stem (11) should be replaced if any sign of wear is present.
7. 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 OVERTIGHTEN.
8. Holding the Valve Cover (8), check the operation of the Control Handle (1). It should turn freely without binding. If the handle is difficult to turn remove the Packing Nut (4) and Packing Retainer (7) and turn the handle counter-clockwise to remove the entire assembly including the Control Stem (3). Inspect the Control stem for worn or damaged threads and straightness, replace if necessary.

### **REASSEMBLY**

1. Valve Cover (8) assembly. Insert the Control Stem (3) into the Valve Cover and turn until the threads are not visible in the packing chamber. Install new graphite packing (approximately 2 wraps of 3/16" packing) around the Control Stem, install the Packing Retainer (7) and Packing Nut (4) and tighten the nut until a slight drag is felt when turning the Control Handle. Check this adjustment again when the equipment is placed back in operation.
2. Assemble the Inner Spacer Ring (14), Outer Spacer Ring (13), Diaphragms (12), Ball and Stem (11) and the Ball Stem Nut (10) into a single unit. Tighten the Ball Stem Nut hand tight after replacing. Make certain that the spacer rings are installed with the taper in the direction shown, this is crucial to the operation of the valve. Locate the 1/8" hole in the Outer Spacer Ring. When the assembly is installed on the Valve Body (17) this hole must be located facing the ground when the blast machine is in operation.
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. If the cleanout plug was removed because of abrasive in the tank, remove the tool from the cleanout port, install cleanout plug and torque to 60 ft. lbs.
4. Install air pilot line on the Valve Cover.

REMOTE CONTROL SYSTEM - INLET VALVE PART NO. 16060-16061 - A complete internal inspection be performed without removing the valve from the machine.

## **DISASSEMBLY**

1, Disconnect the air pilot line from the valve Cap (2). Remove the four 3/8" Cover Bolts (8) from the valve cover (3) and remove the cover from the Valve Body (1). Remove Diaphragm and Seat (6) assembly and inspect for cracking or wear. Inspect bleed pin for damage, insert a small wire into center of pin and valve body to remove any obstructions. This hole must remain open at all times. Also check cover hole for obstruction. Inspect the spring on the Diaphragm and Seat assembly for compression wear. Remove the 3 small screws and separate the Cap from the Cover. Inspect O-ring (13) in Cap for damage.

2. Set the Cap aside and carefully remove the Rubber Stopper (12) from the Cover. Place the cover on a flat surface and remove "C" Clip (10) from the Internal Piston (7). Remove Internal Piston from bottom of cover, Internal Spring (4) and Metal Washer (9) from the top. Inspect Piston and O-ring for damage. If replacement is necessary a complete kit, Part No. 6068, is available to repair the cover. Clean bare Cover assembly with solvent and dry thoroughly.

## **REASSEMBLY**

1. Cover (3) - Coat the Internal Piston (7) with a light lithium grease. **DO NOT OIL OR USE SPRAY LUBRICANTS!** Hold the Piston in the bottom of the cover and install the Internal Spring (4), Metall Washer (9) and "C" Clip (10) from the top of the Cover. Coat the Rubber Stopper (12) with grease and install flange side up. Replace the O-ring in the Cap and install the Cap with the three screws.

2. Body (1) - Install diaphragm and seat assembly (6) metal side up. **IMPORTANT: THE 1/8" HOLE IN THE DIAPHRAGM PERIMETER MUST BE PROPERLY ALIGNED WITH THE CORRESPONDING HOLE IN THE BODY AND THE BLEED PIN INSTALLED OR THE VALVE WILL NOT OPERATE.** Install spring and cover assembly, tighten bolts in a cross pattern to 25 ft. lbs. Install the air hose on the valve cap and test operation.

**A NOTE ON VALVE OPERATION:** When this valve is in operation a small amount of air (1-2 CFM) is vented from the ports in the side of the Cover. **DO NOT BLOCK OFF THESE PORTS OR THE VALVE WILL NOT OPERATE.**

**REMOTE CONTROL SYSTEM - PILOT LINE FILTER PART NO. 06610** - Internal service can be performed without removing the filter from the machine.

1. Unscrew Filter Bowl (7) and disassemble filter as shown in the exploded view.
2. If the Filter Element, normally white, has turned a brown color and cannot be cleaned with a plastic tolerant solvent, it should be replaced. A repair kit includes O-ring (2), Gasket (3) and Element (5). Order Part No. 3652-09.
3. Reassemble as shown.

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

REMOTE CONTROL SYSTEM - PILOT VALVE PART NO. 6019 - 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). Service work on the No. 5700 Abrasive Regulator turned up ruptured inner and outer diaphragms that allowed abrasive grit to enter the pilot system. The Pilot Valve can be serviced without removing the Valve Body (6) from the blast machine piping.

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-rings 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 check the spool operation 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 PARTS AND SYSTEM DIAGRAMS PRICE LIST DATED JULY 1, 1989.

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 replaced.

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.

BLAST TANK INTERNAL COMPONENTS - INSPECTION DOOR PART NO. 1604 - Inspect the Part No. 1605 Gasket on the Inspection Door and replace if damaged. Install door in the original position, aligning the gasket evenly around the sealing area. Tighten nut to one full turn past hand tight. Pressurize unit and inspect for leaks.