

**AIRBRASIVE® JET MACHINE
MODEL HME
OPERATING MANUAL**

SPECIFICATIONS

1. Air Supply Requirements	110 ± 30 psi Minimum 0.5 CFM at 80 psi Maximum 140 psi Dry, clean, compressed air, carbon dioxide, or nitrogen.
2. Electrical Power Requirements	115V, 60HZ, Single Phase, Three Wire The plug supplied is three-prong, polarized, providing an earth ground.
3. Weight	Approx. 70 Lbs.
4. Dimensions	Height Width 14 7/8" (37.8 cm) Depth 9 5/8" (24.4 cm)

WARNING

The use of oxygen as a gas supply for the HME presents the possibility of an explosion occurring.

UNDER NO CIRCUMSTANCES SHOULD OXYGEN BE USED.

IMPORTANT

A suitable dust collector system is required to maintain operator's exposures to powder dusts below permissible exposure limits such as those regulated by OSHA or recommended annually by ACGIH (American Conference of Governmental Industrial Hygienist). Consult the manufacturer of the dust collector equipment for the correct filter for other dusts or air contaminants resulting from material being abraded.

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AIR SUPPLY NOTE

Many compressed air lines are contaminated with moisture, oil, and dirt which are detrimental to the performance and operation of the Unit. Moisture filters and un-loaders must be used. These items can be purchased directly from S. S. White Technologies Inc.

POWDER NOTE

The MODEL HME UNIT is designed to use specially prepared powders that are meticulously screened for uniform particle size. These specialty powders insure smooth flow through the many precision ports and feedthroughs. The use of any other type of powder can result in clogging of the internal components and potential damage to the unit. For more information on these powders contact S.S. White Technologies Inc. (1-800-SS WHITE) or one of its authorized distributors.

CONTENTS OF PACKAGE

Airbrasive® Model HME Series II: Standard Equipment

<u>Description</u>	<u>Part Number</u>	<u>Quantity</u>
Airbrasive® Model HME	AU407	1
Nozzle (Straight, Round, .050"/1.3mm)	AN145	1
AccuBrade 27 – Aluminum Oxide	AP101	4lbs
AccuBrade 50 – Aluminum Oxide	AP105	4lbs

Optional Equipment

<u>Description</u>	<u>Part Number</u>	<u>Quantity</u>
Spare Parts Kit	AK107	1

IMPORTANT:

The Airbrasive® Model HME Series II requires a suitable dust-collecting hood placed near the unit to collect used powder. S.S. White offers dust collectors and work chambers for this purpose. See Product Accessories.

WARNING

Do Not Use Oxygen as a gas supply for the unit! An explosion can occur.

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WHAT IS AIRBRASIVE?

Airbrasive® Jet Machining is a process in which high pressure air and very fine powder are blended together in a chamber to form an abrasive mixture. This mixture is then sent through a small, precisely machined nozzle. The result is a highly accurate abrasive stream that can be used for cleaning, cutting, drilling, deburring, and finishing all types of surfaces. Airbrasive® Machines have limitless applications. These highly engineered machines are incredibly versatile. They have the power to cut and drill materials as hard as diamonds, as well as the precision to delicately clean debris from ancient papyrus documents.

OPERATING PRINCIPLES

The Airbrasive® Machine is capable of many cutting and abrading tasks. From cutting very hard materials, such as diamonds, to cleaning extremely delicate items like fabric or paper. The key to taking advantage of its versatility is the knowledge of how it cuts. Knowing this, you can properly set the various controls to achieve your desired cutting results.

There are six key variables involved in the cutting process. 1) Air Pressure, 2) Powder Flow Rate, 3) Nozzle Size, 4) Type of Powder, 5) Nozzle Distance from Workpiece, and 6) Angle of Impingement.

AIR PRESSURE

The air pressure is directly related to the velocity of the powder particles striking your workpiece. The higher the air pressure the faster the particles and the greater the cutting speed. The lower the pressure the lower the cutting speed.

This is not a linear correlation. There are certain critical points you will notice as you experiment with different air pressure settings. When the particle velocity falls below a certain level the cutting action may suddenly stop altogether. Similarly, a small increase in air pressure may gain a large increase in cutting action.

The air pressure is limited at the high end by safety concerns and by what your main air supply is capable of producing. **The unit should never be pressurized beyond 140 PSI!**

POWDER FLOW RATE

The amount of powder exiting the nozzle per minute is referred to as the flow rate. The greater the flow rate, the greater the cutting action. In order to achieve the better cutting action with higher powder flow rates, it is often necessary to increase the air pressure. This is done to maintain particle velocity which tends to slow down as the mass the airstream must carry increases. Cutting action will decrease quickly at very high powder flow rates. This is due to interference between the powder particles bouncing off the workpiece and those coming out of the nozzle. Some brief experimentation at these high flow rates will quickly reveal your limits.

NOZZLE SIZE

Nozzle orifices are shaped to be either round or rectangular. The nozzle widths vary in size from .005 inches up to .032. The size of the nozzle determines the area that will be impacted by the powder. The larger the nozzle the greater the area. The shape of the nozzle is important for getting into unusually shaped spaces. A rectangular nozzle can lightly cover a large width or, when turned, heavily impact a narrow space.

TYPE OF POWDER

The cutting powder is the most important variable in the "Airbrasive" process. It determines the severity with which you will impact your part. Some powders are designed for aggressive removal of material while others for a gentle cleaning. In order to achieve consistent, sputter free smooth flow it is necessary to use uniformly sized powder. If the powder particles vary in size, even a little, the powder will have a tendency to clump together. This happens because the smaller particles fill in the gaps between the larger particles, effectively locking them all together. If all the particles are of the same size, then this locking action cannot take place.

NOZZLE DISTANCE TO WORKPIECE

The distance you hold the nozzle from the workpiece plays a large part in determining the area covered as well as the cutting rate.

ANGLE OF IMPINGEMENT

The angle you hold the nozzle at regulates the speed and efficiency material can removed from the workpiece. There are two theories at play here, one based on material removal by brittle failure and the other on material removal by ductile failure. Brittle failure occurs when impacting powder granules penetrate into the work surface and literally blast particles out of it. Ductile failure occurs when the powder granule strikes the work surface at an angle of less than 90 degrees and removes material by generating a chip.

Tests have shown that maximum material removal for ductile materials occurs between a 15 and 45 degree angle of incidence. For a brittle material, maximum removal occurs at an angle of 90 degrees.

1. POWDER REGULATION GAUGE A relative measurement of how much powder is entering the flow stream. The gauge measures voltage being applied to the vibrator/mixing chamber assembly. The higher the voltage the greater the vibration and resultant powder flow.

2. SYSTEM POWER ON/OFF The master switch for electrical current supplied to the unit. This will initiate bleeding of all pneumatic lines when switched off during use. Allow a minimum of 20 seconds after turning system power off before attempting to open powder chamber; it takes this long for all pneumatic lines to bleed off and reduce pressure in the chamber to safe levels.

3. POWDER REGULATION ADJUSTMENT This knob adjusts the voltage being applied to the vibrator/mixing chamber assembly. It regulates the powder flow rate exiting the nozzle

4. LOW POWDER INDICATOR The HME has a powder refill sensing circuit. It automatically indicates when the powder in the mixing chamber is low. The probe is mounted between the auxiliary and mixing chamber. When powder is low, the sensor sends a signal to the low powder indicator telling the end user to fill the auxiliary chamber with powder.

5. OPERATION TIME INDICATOR A cumulative time clock which represents the hours the unit has operated from the time of its purchase. Clock only runs when SYSTEM POWER ON/OFF switch is in the on position.

6. HAND PIECE HOSE The hose leaving the pinch tube assembly, passing through the front panel and connecting to the handpiece. The regulated air/powder mixture runs through this hose to the nozzle.

7. LEAK DETECTOR This pneumatically operated sensor will display a green dot in its window if the pinch tube leaks.

8. CHAMBER PRESSURE GAUGE A measure of the air pressure in the mixing chamber, auxiliary chamber. This is the air pressure that will be seen at the nozzle. Do not attempt to open auxiliary chamber to refill powder until this gauge reads "0 psi". This gauge is not field repairable and should be replaced with a new one if it malfunctions.

9. CHAMBER PRESSURE ADJUSTMENT Regulates incoming air line pressure to the desired level in the mixing chamber. This regulates the powder cutting pressure. This regulator is not field repairable. In the event of a malfunction, replace.

10. AIR PRESSURE INDICATOR This tells you if your incoming air line pressure is available.

11. CONTINUOUS or FOOT SWITCH ACTIVATED Set this to CONTINUOUS if you want a steady, uninterrupted stream of powder flow. Set to FOOT SWITCH ACTIVATED if you want to use the foot switch to control the stream of powder flow.

12. PINCH VALVE PRESSURE SETTING This shows the pressure that the pinch valve assembly is set at. It is the pressure being applied to the "pinch tube" to cut off powder flow when the unit is being used in the FOOT SWITCH ACTIVATED mode. The adjustment for this setting is located inside the unit.

13. PINCH VALVE ACTUATIONS A cumulative reading of the number of times the pinch valve has been pinched shut. Use these readings to determine maintenance schedules for the replacement of the pinch tube.

14. NOZZLE Where the powder leaves the unit under pressure. Nozzles come in a variety of shapes and sizes depending on what application you are dealing with.

15. AUXILIARY CHAMBER The purpose of the auxiliary chamber is to store powder and keep the mixing chamber level constant. This allows the mixing chamber to feed a constant amount of powder into the air stream.

16. POWDER LEVEL SENSOR The powder refill sensing circuit provides automatic indication of low powder level in the mixing chamber. When powder level is low, the sensor sends a signal to the pilot light on the front panel to warn the user to fill the auxiliary chamber with powder.

17. MIXING CHAMBER When the mixing chamber is vibrated, powder falls through small holes in the orifice plate assembly, and is entrained into the air stream flowing through the chamber base. This is where the air and powder are precisely blended into the mixture you need for your application.

18. PINCH VALVE ASSEMBLY This assembly provides a path for the air/powder mixture to flow to the handpiece. When the SYSTEM POWER SWITCH is "On", air enters the assembly to depress the pinch tube. This blocks the air/powder mixture to the handpiece. When the foot pedal is depressed or you are in a continuous powder flow mode, the air is bled out of the assembly, thus opening the tube to allow flow.

19. ELECTRICAL INTERLOCK Disengages electrical power when the front panel is opened while the unit is plugged into an electrical outlet. When the front panel is opened a limit switch opens the main electrical circuit, disabling the unit (the unit cannot be pressurized with the cover open). **SOME COMPONENTS ARE STILL CONNECTED TO YOUR EXTERNAL POWER SOURCE. THE MAIN POWER CORD SHOULD ALWAYS BE DISCONNECTED BEFORE SERVICING THE UNIT.**

20. PINCH VALVE SOLENOID Controls the air pressure to the pinch valve assembly. When the SYSTEM POWER SWITCH is "On", the solenoid allows air pressure to enter the pinch valve assembly. Air enters the bottom of the solenoid, flows through passages and ports to displace the piston which causes the depressor to pinch the tube closed.

When the foot pedal is depressed or you are in a continuous powder flow mode, the solenoid plunger retracts closing off the input air port in the base of the solenoid and opening the bleed port to exhaust the air in the piston chamber. The piston returns to its lower position, with the depressor moving along with it (due to spring return). The pinch tube is now open.

21. PINCH VALVE ASSEMBLY REGULATOR. Controls the amount of air pressure going to the pinch valve assembly. It is normally preset at 40 psi. This regulator is not field repairable. In the event of a malfunction, replace.

IMPORTANT

The Pinch Valve Regulator is factory adjusted and locked at 40 psi. This setting should not be changed. Less pressure will not operate the air pinch valve, more will result in abnormal wear.

22. VIBRATOR. The mixing chamber is oscillated by the vibrator assembly. The amplitude of vibration is controlled by the POWDER REGULATION ADJUSTMENT knob. The greater the vibration amplitude the higher the powder flow rate.

23. AIR SUPPLY SOLENOID VALVE. With the SYSTEM POWER SWITCH set to "On", this solenoid valve is energized providing the unit with air. When the SYSTEM POWER SWITCH is set to "Off", the valve closes, blocking air to the unit. The valve is not field repairable. Replace if it malfunctions.

24. RELIEF VALVE. If primary system pressure is excessive the relief valve will pop open to reduce it. Once the pressure has been lowered the relief valve will reset automatically.

25. BLEED SOLENOID VALVE. Controls air pressure to bleed valve assembly. When the SYSTEM POWER SWITCH is set to "On", the solenoid allows air to enter the assembly. This closes the pinch tube within the assembly. When the SYSTEM POWER SWITCH is set to "Off", the solenoid blocks the air from entering the assembly, thus opening the pinch tube.

26. BLEED VALVE ASSEMBLY. This assembly allows a bleed path for the auxiliary chamber when the unit is shut down.

27. INTERLOCK CYLINDER. When the unit is pressurized, the interlock cylinder rod extends outward, locking the top cover to prevent opening. When the air supply solenoid valve blocks air flow, and the unit is bled, the cylinder rod retracts allowing the cover to be opened.

WARNING: This prevents opening of the auxiliary chamber when pressurized; a potentially dangerous situation.

WARNING

An Interlock is provided for additional operator safety and protection and should not be disabled.

28. RELAY. The relay provides a switch function for the operation time and pinch valve actuation indicators.

29. AIR IN. External air source is connected here.

30. POWER OUTLET. Your external power source is connected here.

31. FOOT PEDAL CONNECTION. Attach the foot pedal to this outlet.

32. BLEED HOSE. A hose is provided from the back panel to bleed pressure from the system when refilling powder or performing maintenance. This hose should be routed to an appropriate dust collection system.

UNPACKING

The MODEL HME UNIT and all accessories are shipped in a single container. When unpacking, check items against the list of contents. Do not discard the packing material until checking all items against the list of contents.

Remove the Unit from the shipping container and proceed as follows:

A. Take off the rear cover by removing the four attaching screws.

B. Reach into the HME and support the mixing chamber assembly (17) and vibrator assembly (22) and turn the HME onto the mixing chamber side. This permits easy access to the two bolts and the bracket which secure the vibrator assembly in position during shipment. Continue to support the mixing chamber assembly and vibrator assembly until the HME is again placed in an upright position .

C. From the bottom of the HME remove the two shipping bolts and the shipping bracket. Remove the two shipping blocks. One block is under the shipping bracket and will fall free when the bracket is removed. The other block is located directly under the vibrator assembly inside the Model H.

CAUTION

Failure to remove the shipping bracket and both shipping blocks will result in improper vibrator operation and improper powder flow and possible damage to the unit.

D. From the bottom of the Unit, screw the two 351-6352 studs (vibrator assembly legs shipped with the Unit) into the holes the two shipping bolts were removed from in Step "C". Make certain that the two studs are screwed in completely.

CAUTION

Make certain that the two studs are screwed in completely.

E. With the mixing chamber and vibrator assembly still supported, turn the MODELHMEUNIT right side up. Check to make certain that each of the vibrator assembly studs is nested in its corresponding vibrator shock mount.

F. Replace rear cover removed in Step "A".

FILLING THE AUXILIARY CHAMBER

Observe the following procedures when filling the **AUXILIARY CHAMBER** of the Unit:

- A. Place the **SYSTEM POWER ON/OFF** switch to "Off". This actuates the bleed valve to ensure that the mixing chamber pressure is released.
- B. Clean off any dust or debris from the **AUXILIARY CHAMBER** top.
- C. Rotate the knurled knob and open the cover.
- D. Carefully pour powder into the **AUXILIARY CHAMBER** until its level is to the inner lip.
- E. Replace cover, making sure it is seated properly in its groove. Tighten down securely by rotating knurled knob. Double check that cover is seated properly.

CAUTION

Make certain no lint, dirt, or other foreign substances enter the mixing chamber. They can clog the mixing chamber orifice plate.

INSTALLATION AND UNIT CHECKOUT.

- A. Attach the **BLOW OFF TUBING** (plastic tubing shipped with the Unit) to the fitting (32) on the rear of the Unit. Attach the other end of the **BLOW OFF TUBING** to an available exhaust system to evacuate excess powder from the Unit.
- B. Connect the end of the **AIR IN** fitting (29) to the external air supply (see page 1 for supply requirements).
- C. Set the **SYSTEM POWER ON/OFF** switch on the front panel to "Off", and the **POWDER REGULATION SETTING** knob completely counterclockwise.
- D. Connect the provided power cord to the unit's power outlet (30) and plug the other end into an available outlet (see page for electrical requirements).
- E. Set **SYSTEM POWER ON/OFF** switch to "On".

NOTE

If the SYSTEM POWER ON/OFF switch does not light, it indicates loss of electrical power. Check Unit fuse (30) and if OK, check input power source.

- F. Check reading on the **CHAMBER PRESSURE GAUGE**. Set the main air pressure to desired level by adjusting the **CHAMBER PRESSURE ADJUSTMENT** regulator.
- G. Set the **CONTINUOUS OR FOOT SWITCH ACTIVATED** switch to **FOOT SWITCH**.
- H. Press foot pedal. Air should flow from the handpiece nozzle.

CAUTION

Never direct the nozzle towards the face when operating the foot switch. Always use a suitable dust collector system whenever using the unit.

- I. Set **SYSTEM POWER ON/OFF** switch to "Off". This bleeds off any residual air remaining in the mixing chamber.

CAUTION

Keep SYSTEM POWER ON/OFF switch to "Off" for a minimum of 20 seconds each time the Unit is turned off. This will allow enough time to bleed the mixing chamber.

- J. Install nozzle in handpiece (14).

K. Place **SYSTEM POWER ON/OFF** switch to "On" and set **POWDER REGULATION ADJUSTMENT** knob to obtain the desired amount of powder flow for the operation to be performed (nominal setting for most operations is in MED range of **POWDER REGULATION GAUGE**).

L. Set unit to **CONTINUOUS OR FOOT SWITCH ACTIVATED** as desired to obtain powder flow through nozzle.

UNIT SHUTDOWN.

Place **SYSTEM POWER ON/OFF** switch to "Off". Remove hose connection from air supply source.

OPERATION INSTRUCTIONS

This section includes a description of the operating procedures and controls. The operation instructions also describe the capability and use of the MODEL HME UNIT.

TURN-ON PROCEDURE. To turn on Unit, proceed as follows.

NOTE

This procedure applies after the Unit has been installed and checked.

- A. Set SYSTEM POWER switch to "Off", and rotate POWDER REGULATION ADJUSTMENT knob completely counterclockwise; also set CONTINUOUS POWDER FLOW/FOOT SWITCH ACTIVATED to FOOT SWITCH.
- B. Connect AIR IN fitting to an external air supply.
- C. Check that power supply cord is plugged into an electrical outlet.
- D. Set SYSTEM POWER switch to "On". Check that the switch is glowing red.
- E. Check psi reading on CHAMBER PRESSURE SETTING gauge. Adjust CHAMBER PRESSURE ADJUSTMENT knob as required.
- F. Check that no air flow is coming from the handpiece. This indicates the pinch valve tube is closed. If necessary, adjust pinch valve regulator until there is no flow of air/powder from nozzle of handpiece. When adjusting the pinch valve regulator (21), the front panel must be opened. This opens the ELECTRICAL INTERLOCK (19) which disengages electrical power to the unit. To adjust pressure, the ELECTRICAL INTERLOCK must be held in place. This will mimic the front panel being closed. You may now adjust the regulator (21) until there is no air/powder flow from the regulator. **Please adjust slowly. Less pressure will not operate the PINCH VALVE ASSEMBLY, more will result in abnormal wear.**
- G. Set SYSTEM POWER switch to "Off".

CAUTION

Do not set pinch valve air pressure too high, it will result in excessive tube wear. Do not direct handpiece towards the face.

- H. Select and install proper nozzle in handpiece for the operation to be performed.
- I. Check powder in auxiliary chamber. Refer to page if necessary to add powder.
- J. Set POWDER REGULATION ADJUSTMENT knob until POWDER REGULATION SETTING gauge is at desired setting. For normal operation, the gauge should be in MED range.

K. Set SYSTEM POWER ON/OFF switch to "On". The MODELHMEUNIT is ready for operation.

L. For continuous powder flow, without actuating footswitch, set CONTINUOUS POWDER FLOW/FOOT SWITCH ACTIVATED switch to CONTINUOUS.

TURN-OFF PROCEDURES When turning the HME off for short periods of time, set the SYSTEM POWER ON/OFF switch to "Off" position. If the HME is to be shut down for an extended period of time, proceed as follows:

- A. Set SYSTEM POWER ON/OFF switch to "Off".
- B. Unplug power supply cord.
- C. Disconnect air supply hose from external source.

SERVICE INSTRUCTIONS

PERIODIC INSPECTION

This unit should be inspected periodically for the following signs of wear.

- A. Damaged case or top cover.
- B. Frayed or worn hoses.
- C. Frayed or broken wires.
- D. Blown indicator lamp.
- E. Worn nozzle.
- F. Loose hose connections.

PERIODIC CLEANING

- A. Clean out dust, dirt and spilled powder from the HME interior using low pressure compressed air. Remove stubborn dirt with a brush. Do not use cleaning fluid on the hoses.
- B. Clean the HME external surface with a soft lint-free cloth moistened with a suitable non-toxic cleaning solution.

COMPONENT MAINTENANCE

NOZZLE TIPS A .05a" I.D. nozzle tip supplied with the unit (See page 2), and made of sintered tungsten carbide, must be handled with care. Nozzle tips for special applications are available. Nozzle tips wear through the bore enlarging the side wall and piercing through. A fuzzy air powder stream, with lack of definition, is a sign that the nozzle is worn and should be replaced. Replace a nozzle by unscrewing the tip from its connector and replace with a new one. Screw the new nozzle securely to the handpiece connector to avoid powder leaks.

CAUTION

Nozzle tips are manufactured of sintered tungsten carbide, and may break if not carefully handled. They should be stored in a safe place when not in use.

On occasions the nozzle will clog due to an excessive flow of powder. Unclog a nozzle as follows:

- A. Remove nozzle from its connector.
- B. Turn the POWDER REGULATION ADJUSTMENT knob completely CCW.
- C. Hold the tip end of the nozzle tight against the connector.

D. Turn the HME on and actuate the foot switch, supplying air to reverse flush the clogged tip. This should be done in an exhaust chamber.

PINCH VALVE TROUBLESHOOTING If the pinch valve fails to operate properly the problem could be caused by the solenoid or foot switch. Low voltage across the solenoid coil will cause it to hum and not click. Check the voltage across the solenoid coil. If it is low, check the power line voltage. If line voltage is correct check for a drop across the foot switch contacts. If there is a drop replace the foot switch. If not replace the solenoid. If the pinch valve tube stays open when the unit has air, troubleshoot as follows::

A. Remove the bottom hose connection from the pinch valve and check if there is air pressure. It should be approx. 90 psi. If the pressure is incorrect adjust the pinch solenoid regulator. If no adjustment is possible replace the regulator.

B. If pressure is available remove and disassemble the pinch valve assembly. Clean parts and replace any that are worn or damaged.

The hose from the mixing chamber, which goes through the pinch valve assembly, wears and will eventually leak. The valve does not have to be removed from the Unit for tube replacement which is accomplished as follows:

A. Set SYSTEM POWER ON/OFF switch to "Off" position.

B. Disconnect hoses from air pinch valve tube.

C. Remove top block from assembly by removing two knurled screws. Remove worn pinch valve tube from bottom block. Carefully insert the new pinch valve tube into the bottom block indentation. Align the pinch tube's seam to the side of the block.

D. Carefully replace top block, again making certain that the tube aligns with the indentations in the top block. Secure top block in place with attaching hardware.

E. Connect hoses removed in step (b) above.

F. Turn Unit on and check for proper operation with no air leaks.

POWDER REGULATION ADJUSTMENT knob The powder flow rheostat adjusts the magnetic coil voltage level. If it malfunctions check electrical connections at the rheostat. If this is not the problem then check operation as follows:

A. Connect a voltmeter across the input to the magnetic coil of the vibrator assembly.

B. Turn the POWDER REGULATION ADJUSTMENT knob completely counterclockwise.

C. With the SYSTEM POWER ON/OFF switch set to "On" and the foot switch actuated, observe the reading on the POWDER REGULATION SETTING gauge while slowly turning the

POWDER REGULATION ADJUSTMENT knob CW. The range of the gauge reading from completely CCW to fully CW should be from low to high.

D. If the gauge reading in step (c) above does not indicate any change over a wide range of knob movement and then suddenly jumps to maximum reading, it indicates faulty wiper arm contact or an open winding in the rheostat. Replace rheostat; the item is not field repairable.

VIBRATOR. Each vibrator assembly (22) is factory adjusted to produce the desired vibrating characteristic.

CAUTION

The POWDER REGULATION ADJUSTMENT knob should never be set too high. This will cause audible striking of the pole pieces by the magnetic coil armature. It will create an excessive amount of vibration that could cause damage to the Unit.

If the Vibrator does not function properly while under warranty, it must be removed and returned to S. S. White Technologies, Inc., for readjustment and/or repair. To remove the assembly disconnect all electrical wires and pneumatic hoses (and tag) from the vibrator and mixing chamber (17,22). The vibrator and mixing chamber assemblies can now be lifted directly from the multi-plane mounting shock absorbers. Detach the mixing chamber from the vibrator by removing the attaching hardware. To reassemble and install reverse the above procedure. After installation, check the Unit for proper operation with no leaks.

AUXILIARY CHAMBER AND MIXING CHAMBER. The auxiliary chamber (15) and mixing chamber (17) function together. The purpose of the auxiliary chamber (which is mounted above the mixing chamber) is to store powder and keep the mixing chamber level constant. This allows the mixing chamber to feed a constant amount of powder into the air stream. The auxiliary chamber doesn't vibrate, mixing chamber vibratory motion is absorbed by the hose assembly (which joins the two chambers together) resiliency. Powder flow rate is determined by air pressure level (set by CHAMBER PRESSURE ADJUSTMENT knob) and vibration amplitude (controlled by the POWDER REGULATION ADJUSTMENT knob) imparted on the mixing chamber by the vibrator assembly.

AUXILIARY CHAMBER AND MIXING CHAMBER MAINTENANCE. The auxiliary chamber (15) does not normally require maintenance unless a new O-ring is needed . When removing the O-ring make certain the old one is completely removed from its groove, and no parts of it fall into the chamber. If they do, remove them.

CAUTION

The O-ring must be seated in its groove when top cover is secured. If the ring is not properly installed, air leaks will occur.

It is normally not necessary to remove the mixing chamber (17) unless the powder cakes (due to excessive moisture in the compressed air) or the orifice plate needs replacement. If it is necessary proceed as follows:

- A. Mark the position of the mixing chamber on the vibrator (22). This is necessary, so when reassembling it, it is not put in another location causing the vibrator to change its vibratory characteristics. This will also prevent stretching and kinking of air and powder hoses.
- B. Remove the one screw that retains the mixing chamber to vibrator via the small cleat. Loosen the other two screws from the larger double cleat.

- C. Loosen the three screws which retain the base cap of the mixing chamber.

- D. Remove hoses going to mixing chamber after tagging them. Make sure you do not lose the fiber washers on the hose nut fittings.

- E. With the mixing chamber upright in the vise, reach into the mixing chamber and grasp the tube portion of the orifice plate assembly and push the assembly out through the base.

- F. Remove the base cap.

- G. Position a container under the chamber and remove the orifice plate, and shake the mixing chamber, causing the powder to fall into the container

- H. Clean the orifice plate, if required, with a fine wire brush and low pressure compressed air. Replace the gasket.
To reassemble reverse the above procedure, making certain the base cap gasket is properly seated and the chamber located to its scribed position. Clean away any powder that has fallen into the vibrator assembly or Unit itself.

SERVICE TIPS

FLOW DIFFICULTIES. Some causes of powder flow difficulties are the following:

- A. Worn or clogged nozzle tips.

- B. Overfilled or nearly empty mixing chambers. Both conditions can cause an increase in powder flow. When the foot switch is first actuated an initial heavy burst of powder is usually seen for a fraction of a second. This momentary heavy mix is normal. It is due to small amounts of settled powder in the line. A slightly heavier than normal flow is also noticeable after the mixing chamber has been filled.

- C. Reused, contaminated, or improper powders. Such powders can decrease flow or clog the Unit completely, especially at the mixing chamber orifices and and at the handpiece nozzle. Never reuse powder. Use of S. S. White Technologies ABRASIVE® Powders exclusively is recommended. We strongly recommend against the use of other commercial powders because they are rarely classified adequately for use with the AIRBRASIVE® apparatus, causing needless maintenance and repairs. They may also have toxic substances present which could be harmful to your health.

- D. Insufficient nozzle pressure, usually due to leaks, will reduce cutting speed.

E. Leaks around the mixing chamber, auxiliary chamber cap, and at fittings may increase powder flow. This condition exists especially at low voltage (Powder Flow control knob set at lower range) and when the footswitch is actuated intermittently every second or so.

F. Leaks around the base of the mixing chamber can result in decreased powder flow.

G. Visible leaks which can be detected by the pressure of powder.

H. Inoperative vibrator caused by broken, loose or shorted magnetic coil leads.

I. Loose or broken vibrator springs or improper vibrator adjustment.

TESTING FOR LEAKS. Unit leakage may affect its performance and cause an excessive use of powder. The following service tips should be observed:

A. To check for total system leakage, turn on air pressure until the system is pressurized. Shut off the external air supply valve and observe the Chamber Pressure Setting gauge. If pressure does not drop more than 15 psi during five minutes, the system leakage is less than one cubic foot per hour. This is negligible.

B. Most leaks are traced by ear, touch, or the use of soap and water. The presence of powder can indicate a leak.

C. To check for leakage at the auxiliary chamber top cover, have the chamber pressurized, and apply soap and water. Look for leakage bubbles. Be certain to wipe off all traces of the soap after test completion.

D. Auxiliary chamber and mixing chamber gaskets are subject to leakage and require periodic replacement.

E. Make certain that the small nylon gaskets in the hose fittings are in place.

F. With the system pressurized and the air pinch valve tube closed, leakage through the pinch valve tube should not exceed three bubbles per second with the nozzle tip immersed in water.

TROUBLESHOOTING

A troubleshooting chart has been provided to aid in repairing a unit which is malfunctioning. Use it with the Unit electrical schematic/wiring diagrams and pneumatic diagram when required.

TROUBLE	POSSIBLE CAUSE	REMEDY
1. With SYSTEM POWER ON/ OFF switch "On", switch does not light.	a. Blown back panel fuse. b. Switch burnt out. c. No input power.	a. Replace fuse. b. Replace switch. c. Check external input power.
2. With SYSTEM POWER	a. Inoperative air pressure	a. Turn Powder Regulation

ON/OFF switch "On" and with external air connected to unit, rotation of Chamber Pressure Adjustment does not change psi reading on Chamber Pressure Setting.	regulator. b. Inoperative air pressure gauge.	Adjustment fully CCW. Operate footswitch and check for air flow at nozzle tip. Vary Chamber Pressure from fully CCW to fully CW. A definite change in air flow should be noted at the nozzle tip as the knob is rotated its full range. If not, replace air pressure regulator. b. Replace gauge.
3. Traces of powder at pinch valve.	Ruptured air pinch tube.	Replace tube

TROUBLE	POSSIBLE CAUSE	REMEDY
4. No air flow at nozzle tip with unit on and foot switch actuated. (Chamber Pressure gauge shows psi.)	a. Nozzle tip clogged. b. Inoperative pinch valve solenoid.	a. Clean nozzle tip. b. Check solenoid operation.
5. Air flow at nozzle tip when Continuous Powder Flow/Foot Switch Activated switch is in foot switch position and foot switch is not actuated.	a. Shorted foot switch. b. Loss of air supply from pinch solenoid regulator to pinch solenoid valve.	a. Check foot switch operation b. Remove hose from bottom of pinch valve and check for air flow. If no air flow try to adjust pinch solenoid regulator; if there is air flow, remove and check pinch valve assembly
6. Vibrator Inoperative	a. Open rectifier b. Open Powder Regulation adjustment rheostat. c. Vibrator magnetic coil burnt out.	a. Connect good rectifier in parallel with rectifier on unit If vibrator operates, replace bad rectifier. b. Check operation of rheostat c. Replace vibrator assembly
7. No powder flow from mixing chamber.	Clogged orifice plate in mixing chamber.	Remove, disassemble, and clean mixing chamber
8. Powder spray from nozzle tip loses definition.	Worn nozzle tip.	Replace nozzle tip.