

# Operations Manual for the Airbrasive® Model K Series II S. S. White Technologies, Inc.

## Section I: Introduction and Description

### 1. Introduction

A. **Scope.** This technical manual contains operation and service instructions, as well as an illustrated parts list for the Airbrasive® Model K Series II manufactured by S. S. White Technologies, Inc.

B. **Characteristics.** The Airbrasive® Model K Series II is an electrically powered device that incorporates a patented electro-magnetic vibratory feed system for powder delivery.

C. **Specifications.** The specifications of the Airbrasive® Model K Series II are listed in Table 1-1.

**Table 1-1**

Air supply requirements	50 to 110 PSI
Power requirements	115 VAC, 60HZ
Weight	33 Lbs. (15.9 kg)
Dimensions (inches)	Height 13 3/4" (35cm) Width 14 1/2: (37cm) Depth 14 3/4" (38cm)

D. **Equipment Supplied.** Table 1-2 contains a list of all standard equipment supplied with the unit and also lists optional equipment available for available for the Airbrasive® Model K Series II from S. S. White Technologies.

**Table 1-2**

<b>Airbrasive® Model K Series II</b>		
<u>Description</u>	<u>Part Number</u>	<u>Quantity</u>
Airbrasive® Model K	AU801	1
Air Supply Hose	AT122	1
Nozzle (Rt. Angle .018" I.D.)	AN118	1
Nozzle (Straight, Round, .018" I.D.)	AN119	1
Nozzle (Straight, Rectangular, .006"x.060")	AN124	1
AccuBrade 27 – Aluminum Oxide	AP101	5 lbs
AccuBrade 50 – Aluminum Oxide	AP105	5 lbs
Funnel	AM206	1
<b>Optional Equipment</b>		
<u>Description</u>	<u>Part Number</u>	<u>Quantity</u>
Spare Parts Kit	AK108	1

E. **Accessories.** In addition to the equipment supplied, the Airbrasive® Model K Series II requires a dust collection system and an external source of either clean air, dry compressed air, carbon dioxide, or nitrogen together with a single stage pressure regulator. The normal air supply to the Unit should be about 100 PSI.

**WARNING:**

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

**IMPORTANT:**

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

2. **Description.**

A. **General.** The unit includes an on/off pneumatic power switch, pneumatic power indicator, a powder flow control knob, handpiece, and an on/off foot switch. The power cord plugs into the rear of the unit. The black tubing extending from the rear is for an output from an air supply. The unit provides a mixture of powder and air to a tungsten carbide nozzle tip in the handpiece.

**Section II: Preparation for Use**

1. **Initial Procedure.**

A. The Airbrasive® Model K Series II and all standard equipment supplied with it are shipped in a single container. As the unit is unpacked, check all the items against the list of contents packed and the items listed in Table 1-2. Retain all packing material until all deliverable items have been checked against the list of contents.

B. **Unpacking.** Remove the Unit. Proceed as follows:

1. Unpack the vibrator/mixing chamber assembly and remove the 2 shipping blocks.
2. Install assembly into unit by inserting the four studs into the vibrator shock mounts on the bottom of the unit.
3. Connect the two hoses and the electrical connection for the vibrator. Be sure that the studs are completely nested in the shock mounts.

**NOTE:**

**Refer to the illustrations and parts lists in Section V to identify parts and components in these procedures.**

2. **Supply Requirements.**

A. **Air Supply Requirements.** A filtered compressed air line is required as the air supply for the unit. A cylinder of CO<sub>2</sub> or a cylinder of compressed air or nitrogen may be used.

**WARNING:** Do Not Use Oxygen as a gas air supply! An explosion can occur.

The normal supply to the unit should be approximately 80 PSI, but can range a minimum of 50 PSI to a maximum of 110 PSI. **Moisture filters must be used in order to avoid powder clogs in your machine and nozzle.** Filters can be purchased directly from S. S. White Technologies. **\*Please note that for safety reasons the Airbrasive® jet machine should never be pressurized beyond 120psi.**

B. **Electrical Supply Requirements.** The units electrical supply requirement is 115 VAC, 60 Hertz. The plug supplied is three pronged with a ground conductor.

C. **Dust Collection.** A dust collector is required to keep operator exposure to dust particles below the permissible exposure limits regulated by OSHA (Occupational Safety and Health Association) and ACGIH (American Conference of Government Industrial Hygienists). S. S. White's dust collector is available in either a 115V/60Hz or a 220V/50Hz model.

### 3. Installation.

A. **Filling the powder chamber.** Observe the following procedures when filling the powder chamber of the unit. **Follow these instructions every time you need to open the front panel.**

1. Turn the POWER switch OFF.
2. Raise the upper cover. Make sure that all pressure is released from the mixing chamber.
3. Vacuum all dust or debris from the top of the mixing chamber assembly.
4. Tap the spring-loaded trap door of the mixing chamber assembly. Be sure the pressure has been released and the door is free.

**CAUTION: DO NOT force the trap door.**

5. Insert the funnel into the trap door of the mixing chamber.
6. Carefully pour powder in mixing chamber until it is level with the tip of the funnel.

**CAUTION:**

**Make sure that lint, dirt, or other foreign substances do not get into the mixing chamber.**

## Section III: Using the Airbrasive® Model K Series II

### 1. Operating Instructions

#### A. **Turn-On Procedure.**

1. With POWER switch OFF and powder flow knob to light, connect external air supply to black tubing.
2. Plug power supply cord into an electrical outlet.
3. Turn POWER switch ON. Check to see that the red pneumatic indicator is actuated.
4. Check the reading on the AIR PRESSURE gauge. Adjust as follows:
5. To set pressure, pull knob and rotate.
6. To lock knob, push knob in.
7. Install nozzle on handpiece.
8. Set POWDER FLOW knob.
9. Actuate foot switch to obtain powder flow.

**IMPORTANT:**

**The foot-switch must be fully depressed for the unit to function properly.**

B. **Turn Off Procedures.** For short periods of time, turn POWER switch OFF. For an extended period of time, proceed as follows:

1. Turn POWER switch OFF.
2. Unplug power supply cord.
3. Disconnect external air supply from unit.

2. **Operating Procedures.** The following paragraphs describe the Airbrasive cutting process, the use of cutting speed, selection of powder, the flow to be used, and the selection of air pressure.

A. **Cutting Process.** The powder stream is cylindrical for a short distance (approximately 1/16") then spreads into a cone-shaped spray of 7 degrees conical angle. S. S. White Airbrasive® powders are recommended. With a short Nozzle Tip Distance (NTD), small holes and cuts can be made with straight walls.

B. **Cutting Speed.** Speed of cutting increases up to a certain NTD, approximately 1/2". Etching can be done by increasing NTD and aiming the stream at a sharp angle. Adjusting the powder flow, powder type, pressure setting, and type of nozzle may also vary the speed of cutting.

C. **Adjustment of Powder Flow.** The air/powder mixture is controlled by the POWDER FLOW knob that is connected to the vibrator. Excessive powder flow actually decreases the cutting rate. For a continuous flow of approximately 10 grams/minute, set the vibrator to 60-70%.

**Table 3-1: Operating Controls, Indicators, and Connectors**

<b>Panel Title or Name</b>	<b>Function or Operation</b>
Chamber Pressure, Setting	Indicates operating pressure
Chamber Pressure, Adjustment	Adjusts operating pressure
System Power, Red indicator	Indicated pneumatic power to unit
System Power ON/OFF	Turns on and off pneumatic power to unit
Powder Flow, Adjustment	As knob is rotated clockwise, vibrator action increases.
Powder Flow, Setting	Indicates powder flow
Handpiece	Hand Tool that holds the Nozzle
Foot switch	Controls powder flow to the handpiece nozzle
Power supply receptacle	Connects unit to electrical power cord.
Fuse	Current Overload protection

## Section IV: The Theory of Operation

1. General. This section includes theory of unit operation, inspection and maintenance procedures, and trouble shooting.

A. Electrical

1. Vibrator. Located below Mixing Chamber. The Vibrator agitates the Airbrasive powder.
2. Rheostat. Varies the voltage to vibrator.

B. Pneumatic

C. Switch On. When the power switch is turned on, the indicator turns color to red, the unit is pressurized.

D. Switch Off. When the main power switch is turned OFF, the indicator color turns black, and the air pressure is relieved.

E. Main Air Regulator. The main air regulator controls the air pressure to the mixing chamber. The air pressure is read on the Chamber Pressure setting gauge in front.

2. Periodic Inspection. The unit should be inspected periodically for the following conditions:

- A. Damaged case or top cover
- B. Frayed or worn hoses
- C. Frayed or broken wires
- D. Worn nozzle
- E. Loose hose connections.
- F. Worn pinch tube
- G. Air Filter replacement

3. Periodic Cleaning. Periodic maintenance is recommended for the unit. Clean the unit as follows:

A. Brush or vacuum all dust, dirt, and spilled powder from the interior of the unit. **Do not use cleaning fluid on the air or powder hoses.**

B. Clean external surface of the unit with a soft lint free cloth moistened with suitable (non toxic) solvent or cleaning solution.

4. Removal and Replacement. Disconnect electrical power and relieve air pressure before maintenance. Use the illustrations in Section V during maintenance when required.

### **CAUTION:**

**Before doing any maintenance on the unit, shut the unit off and disconnect electrical supply cord.**

## 5. Component Maintenance

A. **Nozzle and Hose Assembly.** Nozzle tips must be handled with care. Use care in removing and reinstalling to avoid cross threading. Nozzle assemblies with tips for special applications are available for purchase at S. S. White Technologies.

B. **Nozzle Assemblies.** An irregular powder stream may mean that the nozzle is worn and should be replaced.

C. **Nozzle Clogs.** At times the nozzle may clog with excessive powder. To unclog a nozzle, proceed as follows:

1. Remove nozzle from nozzle connector.
2. Blow out obstruction using shop air hose.

D. **Pinch Valve Assembly.** The air pinch valve assembly is mounted on the base of the unit.

1. **Pinch Valve Stays Open.** If the pinch valve tube stays open letting powder flow through when the foot pedal is not pressed then proceed as follows:
  - a. Remove the hose connection from base of air pinch valve assembly and check that air pressure is available from air pinch valve regulator.
  - b. If pressure is available then turn unit off, remove, and disassemble air pinch valve assembly. Replace worn or damaged parts.

### **CAUTION:**

**The pinch valve regulator is factory adjusted and locked to 40 PSI. DO NOT change this adjustment.**

E. **Pinch Tube.** The air pinch valve is a rubber tube. It is pinched closed when unit is on. It opens when the foot switch is pressed.

1. **Pinch Tube Replacements.** It is not necessary to remove the entire pinch valve assembly from the unit to replace this tube. Proceed as follows:
  - a. Turn machine off.
  - b. Remove top block from assembly. Pull the tube off the fittings. Insert new pinch valve tube into fittings and bottom block, making certain to align the molds on the tube with the bottom block and the tube seams horizontal to the block.
  - c. Replace top block. Secure in place.
  - d. Connect hoses.
  - e. Turn unit on and check for proper operation with no air leaks.

F. **Main Power Toggle Switch** The main power switch controls the pneumatic power to the unit.

G. **Red Indicator** The red indicator actuates if the unit has pneumatic power.

H. **Main Air Regulator** The main air regulator adjusts pressure of the main air supply within the unit.

I. **Main Air Pressure Gauge** should be replaced if it malfunctions or fails to operate.

J. **Rheostat** Rheostat operation can be checked without removing it from the unit as follows:

1. Turn the POWDER FLOW knob completely counter-clockwise.
2. With the unit turned on and the foot switch pressed, check the reading on the voltmeter while slowly turning the POWDER FLOW knob clockwise.
3. If the voltmeter reading in Step (B) does not indicate any change over a wide range of knob movement and then suddenly jumps to a maximum reading, it indicates a faulty rheostat.

H. **Vibrator** Each vibrator assembly is factory adjusted to produce an acceptable vibration. If a vibrator does not function properly return it to the factory for readjustment and repair.

1. To Remove the vibrator assembly first disconnect main power cord and air supply, then the electrical leads and hoses from the vibrator and mixing chamber.
2. The vibrator assembly and mixing chamber assembly may now be lifted directly from the shock absorbers.
3. Remove the mixing chamber from the vibrator assembly by removing attaching hardware.
4. After replacement, check the unit for proper operation and air leaks.

I. **Mixing Chamber.** The mixing chamber assembly feeds powder particles into the main air stream and to the handpiece nozzle.

1. **Mixing Chamber Cleaning.** To disassemble and clean the mixing chamber, first remove it from the unit and then, proceed as follows:

- a. Unscrew the Cap Nut and dump out all powder from the chamber.
- b. Invert the mixing chamber in a vise and remove the Base Screws (3). Remove Base Gasket.
- c. Reach into the mixing chamber and push the Orifice Plate Assembly out through the base.
- d. Clean orifice holes in the assembly by using fine wire brush and low-pressure compressed air.
- e. Vacuum the interior of the mixing chamber.
- f. Re-assemble the mixing chamber in reverse order.

J. **Replacement.** S. S. White advises you to keep the following Spare Parts Kit on hand, replenishing as parts are used.

**Spare Parts Kit (AK108)**

<b><u>Part#</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
AR106X	Powder Filter Ass'y	1
AR119	Top Block	1
AR142	Pinch Tube	10
AR112	Bottom Block	1
AH112	Connector, Nozzle	5
AQ130X	Nipple Ass'y	2
AQ129X	Nipple Ass'y	2
AF700	Washer, Flat	10
AT105	Hose, polyurethane	25ft.

## Section V: Service Tips

1. Flow Difficulties. Some causes of powder flow difficulties are as follows:

- A. Worn or clogged nozzle assemblies.
- B. Over filled or nearly empty mixing chamber.
- C. Reused, contaminated, or improper powders. **Never reuse powder.**
- D. Insufficient nozzle pressure, due to leaks, this will reduce the cutting speed.
- E. Air leaks at the Door, Cap Assembly, and Mixing Chamber Fittings, may decrease powder flow.
- F. Leaks around the Base of the Mixing Chamber, may result in decreased powder flow.
- G. Inoperative vibrator.
- H. Loose or broken vibrator springs or improper vibrator adjustment.

2. Testing for Leaks. Observe the following service tips:

- A. To check for total system, turn on air pressure until the system pressurized, then shut off the external air supply valve and watch the AIR PRESSURE gauge. If the pressure drops more than 15 PSI in five minutes then check internal parts and fittings for air leaks.
- B. Most leaks can be traced either by ear, touch, or use of soap and water. The presence of powder inside the unit may indicate a leak.
- C. Check for leakage at the Mixing Chamber Gasket and "O" ring.
- D. Leakage can occur if the small nylon gaskets in the hose fittings are not in place.
- E. Pressurize the system with 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.

3. Troubleshooting

<b>Trouble</b>	<b>Possible Cause</b>	<b>Remedy</b>
<b>1. Constant Airflow from nozzle with unit on.</b>	<b>A. Pinch Valve Pressure is set too low</b>	<b>A. Increase pressure between 40- 50 PSI</b>
		<b>by turning knob CW until air flow stops. If this has no effect, remove hose from bottom of pinch valve and check for air pressure. If no change over range of knob, inspect pinch valve assembly. If okay, replace regulator.</b>
	<b>B. Foot Switch.</b>	<b>B. Check air output through N.O. and N.C. ports of switch. Pinch Valve should be attached to N.O. port of Switch. Replace foot switch if defective.</b>

2. Vibrator inoperative.	A. Open rectifier.	A. Replace with another.
	B. Open rheostat.	B. Check for proper operation of rheostat.
	C. Vibrator magnetic coil burnt out.	C. Replace vibrator assembly.
3. No powder flow from mixing chamber.	A. Clogged orifice plate in mixing chamber.	A. Remove, disassemble, and clean mixing chamber.
	B. Contaminated powder.	B. Check to see if powder is dry and storage method.
4. Powder spray pattern from nozzle not well defined.	A. Worn nozzle.	A. Replace nozzle.
5. With powder switch on, red indicator does not activate.	A. Switch is defective. B. No air pressure to unit.	A. Replace. B. Connect air supply.
6. With power switch on, red indicator on, adjustment of air pressure regulator does not change reading on gauge.	A. Inoperative main air pressure regulator.	A. Operate foot switch and check for air flow at nozzle. Vary main air pressure knob from fully CCW. An increase in air pressure should be noticed at the nozzle, if not replace main air pressure regulator.
	B. Inoperative main air pressure gauge.	B. Replace gauge.
7. Traces of powder observed at air pinch valve.	A. Ruptured air pinch valve tube.	A. Replace tube.
8. No air flow at nozzle with unit on and foot switch actuated. Air pressure gauge shows PSI.	A. Nozzle clogged. B. Powder in pinch valve assembly. C. Foot Switch D. Defective Foot Switch	A. Clean nozzle. B. Clean and inspect pinch valve assembly. C. Check Pinch Valve connection to N.O. Port. D. Replace Foot Sw.

## Section VI: Illustrated Parts Breakdown

1. Introduction. The illustrated parts breakdown lists and describes all parts for the Airbrasive® Model K Series II. The breakdown is useful for identifying parts and illustrating assembly and disassembly relationships.

2. Illustrations. The assemblies are shown as drawings with bill of material lists or illustrations accompanying descriptive information keyed to the illustration. The illustrations or assembly drawings are assigned figure numbers to serve as a reference when discussed in the manual.

## Airbrasive Powders

<u>Name</u>	<u>Material</u>	<u>Particle Size</u>	<u>Part #</u>	<u>Size</u>
AccuBRADE-10	Aluminum Oxide	10 Micron	AP107 AP108	3 lb. 40 lb.
AccuBRADE-17	Aluminum Oxide	17 Micron	AP109 AP131 AP110	3 lb. 10 lb. 45 lb.
AccuBRADE-27	Aluminum Oxide	27 Micron	AP101 AP121 AP102	4 lb. 15 lb. 50 lb.
AccuBRADE-27 Electronics Special	Aluminum Oxide	27 Micron	AP104	50 lb.
AccuBRADE-50	Aluminum Oxide	50 Microns	AP105 AP123 AP106	4 lb. 15 lb. 50 lb.
AccuCLEAN-50	Sodium Bicarbonate	50 Micron	AP111 AP124 AP112	2.5 lb. 10 lb. 35 lb.
AccuCLEAN-50 Electronics Special	Sodium Bicarbonate	50 Micron	AP113 AP132	10 lb. 25 lb.
AccuCUT-50	Silicone Carbide	50 Micron	AP114 AP128 AP115	3 lb. 10 lb. 45 lb.
AccuPEEN-44	Glass Bead	44 Micron	AP116 AP129 AP117	3 lb. 10 lb. 40 lb.
AccMATTE-75	Crushed Glass	75 Micron	AP118 AP119	2.5 lb. 35 lb.

## Nozzles

<b>Part No.</b>	<b>Size (in.) i.D./O.D.</b>	<b>Orifice Style</b>	<b>Body Style</b>
AN127	.006x.060/.050x.090	Carbide Rectangle	Right Angle
AN101	.006x.100/.045x.128	Carbide Rectangle	Straight
AN102	.007x.150/.045x.180	Carbide Rectangle	Straight
AN103	.007x.125/.045x.157	Carbide Rectangle	Straight
AN105	.006x.075/.045x.112	Carbide Rectangle	Straight
AN110	.006x.020/.045x.065	Carbide Rectangle	Straight
AN111	.010x.030/.045x.065	Carbide Rectangle	Straight
AN124	.006x.060/.050x.090	Carbide Rectangle	Straight

AN125	.003x.060/.050x.090	Carbide Rectangle	Straight
AN130	.006x.040/.050x.086	Carbide Rectangle	Straight
AN120	.018/.053	Carbide Round	45 Degrees
AN109	.032/.053	Carbide Round	Right Angle
AN118	.018/.053	Carbide Round	Right Angle
AN121	.026/.074	Carbide Round	Right Angle
AN104	.005/.034	Carbide Round	Straight
AN106	.032/.070	Carbide Round	Straight
AN115	.026/.076	Carbide Round	Straight
AN116	.032/.070	Carbide Round	Straight
AN117	.018/.052	Carbide Round	Straight
AN119	.018/.053	Carbide Round	Straight
AN122	.026/.074	Carbide Round	Straight
AN126	.011/.052	Carbide Round	Straight
AN132	.018/.035	Carbide Round	Straight
AN135	.006x.060/.029x.084	Carbide Round	Straight
AN145	.050/.187 (HME adapter)	Carbide Round	Straight
AN107	.026/.050	Sapphire Round	Straight
AN143	.018/.052	Sapphire Round	Straight

### Components of the Model KII Unit

<b>Part #</b>	<b>Description</b>	<b>Qty.</b>
AV104Y	Vibrator Assembly. 110/60HZ	1
AR142Z3	Pinch Valve Assembly	1
AC153X	Mixing Chamber Assembly	1
AE153X	Pressure Switch Assembly	1
AR105X	Foot Switch Assembly	1
AR140W1	Pinch Valve Regulator Assembly	1
AR172X	Air Valve Assembly	1
AG111X	Pressure Gage Assembly	1
AR140W	Pressure Regulator Assembly	1
AG105Y	Pressure Indicator Assembly	1
AR178Y	Pneumatic Switch Assembly	1
AH101Y	Handpiece Assembly	1
AR106X	Powder Filter Assembly	1
AV110	Vibrator Shock Mount Front	2
AV117	Shock Mount (Rear)	2
AE128	Rectifier Silicon	1
AE180	Terminal Block	1
AE181	Plug Connector	1
AE182	Fuseholder/Socket	1
AE104	Fuse 250V/2.5AMP	1
AG112	Voltmeter 0-110 VAC	1

AM178	Rubber Mount (Cabinet Assembly )	4
AM304	Handle - Pocket Pull Southco P2-52	2
AF137	Screw 8-32 3/8 PAN SLTD	22
AF713	Washer Lock .168/.336 INT	22
AT143	"Orange" Polyurethane Tubing	2
AT123	Tubing OD-1/4 ID-1/8 Brown	2
AT122	Tubing OD-1/4 ID-1/8 Black	2
AT144	"Red" Polyurethane Tubing	2
AT145	"Yellow" Polyurethane Tubing	2
AT125	Tubing OD-1/8 ID-1/16 Green	2
AT107	Hose OD-1/4 ID-1/8 for Foot Valve	8
AM206	Funnel	1
AN119	Nozzle Type A .018 Diameter	1
AN118	Nozzle Type D .018 Diameter 90 Degrees	1
AN124	Nozzle Type F .006 x .060	1
AP105	#3 AccuBRADE-50/Aluminum Oxide/4lb Bottle	1
AP101	#1 AccuBRADE-27/Aluminum Oxide/4lb Bottle	1
AM244	Tee Handle	1
AR142	Pinch Tube-Small Pinch Valve	2
AM301	Cabinet Assembly	1
AE129X	Rheostat Assembly	1
AM307	Latch, Swell Southco #19-81-10	2
AM168	Knob Skirted for H/HME	1