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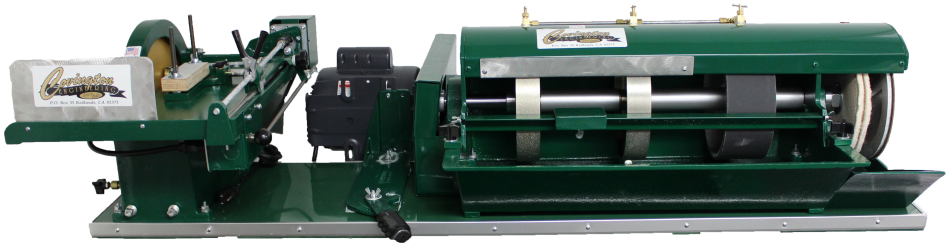
INSTRUCTIONS FOR 8" COMBINATION UNITS
SILICON CARBIDE & DIAMOND

DESCRIPTION



The combination lapidary unit is a complete machine designed to saw, grind, sand, and polish gemstone material. It will perform all the necessary functions for making cabochons. The unit is constructed of heavy, cast-aluminum, powder-coated tank and pan. Sealed ball bearings mounted in rubber ensure a quiet and smooth operation. Speed control allows shaft rotation to vary between 1100rpm and 1725rpm. Rotation of the shaft should turn the blade or wheel toward you and down. Adjustable cab and wheel rest provide cabbing convenience. Removable hood permits quick access to wheels for easy cleaning and wheel change. Water valve takes ¼" OD plastic tubing for gravity water flow or ¼" copper tubing for pressure systems. Spray nozzles wet entire wheel or drum face. To drain, remove the drain plug and replace with grinder drain kit which includes six feet of flexible PVC and a ⅜" pipe adapter.

INSTALLATION

Prior to using your machine, make sure that you have a clean usable workspace with access to water and an electrical power source. Read the Covington Safety Demand Sheet. The unit base should be placed on a sturdy, level bench to avoid vibration. Caution- always change the speed with the unit running so that the spring pulley will open easily.

MAINTENANCE

Proper care of grinding wheels is essential always follow the manufacturers instructions.

Silicon Carbide Grinding Wheels: Keep the wheel flushed clean so dust will not form. It is hazardous to your health to breath rock dust. Heat generated by dry grinding can damage the material being ground. Do not allow the wheel to absorb water as it upsets its balance. The wheel will slowly wear with use. If the surface becomes grooved or wavy, dress with a coarse silicon carbide dressing stick. Continuously spray water while dressing. Smooth surface with 100-grit silicon carbide sand paper over a wood block.

Diamond Grinding Wheels: If the wheels become glazed, dress the wheel by running a coarse silicon carbide dressing stick across the surface of the wheel using heavy pressure and continuous water spray. Flush away all loose grit.

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MAINTENANCE CONTINUED

Diamond Blades: Do not run dry or the heat generated will ruin the blade. Eventually the blade may become dull. This is caused by matrix residue glazing over the diamonds. To sharpen, use a 220-grit soft bond silicon carbide dressing stick. Mortar or soft red brick is also useful in removing the glaze.

CABBING

Cabachon cutting may be divided into four separate operations: (1) sawing, (2) grinding, (3) sanding, and (4) polishing. The rough gem materials often require reduction to proper shape, hence sawing is usually the first operation. The grinding wheels reduce the stone to the proper shape, while the sanding and polishing operations give the surface of the cabochon a high glossy finish.

PREPARING TO SAW

Before you begin to saw, check to make sure that the arbor hole in the blade is the correct size for the shaft; there must be no play. Shaft collars must fit evenly against the blade. Be sure there is no dirt between the collars and the blade. Coolant should be poured into the tank until the surface level comes up about ¼" onto the rim of the blade. When the blade is running, it should bring up a constant, fine spray of coolant. For proper operation of the saw, refer to "Trim Saw Instructions."

DOPPING

Prior to grinding or sanding, mount or "dop" the gemstone on a small round wooden stick. Melt the dop wax over a low flame while warming the stone. Dip the end of the stick into the wax and press onto the bottom of the stone. Mounted in this fashion, the stone is much easier to handle in the grinding, sanding, and polishing operations.

SPEED CHANGE

Faster speeds are best for hard gemstones as cutting time and wheel wear are reduced. For soft, delicate stones reduce speed. Experiment to find your own preferred speed. The variable pitch motor pulley allows eight speed changes. Change speed by moving the handle from one notch to another while the unit is running. As the handle moves to the right, the motor moves back causing the vari-drive spring pulley on the motor shaft to open, reducing the pulley diameter from 3" to 2" and increasing the belt speed to drive pulley, speeding up the grinder. Speed control allows the shaft rotation to vary between 1100rpm and 1725rpm. With an 8" diameter wheel, the surface feet per minute varies between 2290 and 3620.

GRINDING

After outlining the gem's design, grind away material around the outline. Hold the stone so the wheel cuts from the bottom to the top of the gem using light pressure. "Cabochon Cutting" is an excellent reference for more information on grinding techniques. Use the coarse (100g) wheel to shape the cabochon; use the medium (220g) wheel to refine the shape and remove ridgelines.

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SANDING

The 8" lever-lock drum with 400-grit sanding cloth will remove the bumps and scratches left by the grinding process and give the cabochon its final shape and size. To sand on a drum sander, rock and rotate the dopped stone against the drum. Do not hold the stone still at any time or you may deform the contour or develop a flat spot. Use light to medium pressure. A 600-grit silicon carbide sanding disc or a 1200 grit diamond belt will smooth the cabochon before polishing. Fine grit should only be used to remove slight imperfections and hairline scratches.

After sanding, dry the work piece and inspect it under a bright light. All scratches and blemishes must be removed.

POLISHING

The final step is polishing. Polishing does NOT remove any material. If scratches develop, the stone must be sanded again.

Polish Powder: Mix polish powder with water to the consistency of cream and brush mixture on the buff. Work the stone on the buff with light pressure. Occasionally you may need to add powder to the buff (use sparingly). Do not allow the stone to overheat.

Diamond Compound: Use with leather. Diamond compound is available in syringes that make application easy. Graduated marks along the side of the syringe indicate amount. Apply the compound in tiny dots; apply extender fluid and spread evenly across the leather pad with your fingertip. Rotate the part being ground and check frequently for overheating. Add an occasional drop of extender fluid to cool off the work piece. Recharge the buff only when necessary as the diamond lasts a long time.

Muslin Buffs: These buffs are made from several thicknesses of cloth that are held together by rows of stitching and are useful for polishing soft stones and gems that are sensitive.

The Finished Gemstone: If you have done a good sanding job, a fine polish will soon appear. Wash the stone. Place the gem and dop stick in a glass of crushed ice for a few moments. The stone will easily snap off dop stick.

HELPFUL HINTS & HARMFUL ERRORS

Drain the water pan to ensure the grinding wheels do not stand in water. The wheel will absorb moisture resulting in making the wheel "out of balance" and causing the unit to vibrate.

Dresser Rest: The rest is removable. Use as a bench to rest your hand on while dressing wheels or cabbing.

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HELPFUL HINTS & HARMFUL ERRORS CONTINUED

Balance: Dress all grinding wheels that are grooved (from not using the whole wheel face), or that are out of round. If you have excessive vibration, unscrew the polish buff and hex nut and change the position of the grinding wheels by rotating one wheel one quarter of a turn, then tighten nut buff. Start and check the unit for vibration. Repeat if necessary by following the same procedure (advancing the same wheel one quarter turn).

Blade Removal: Remove the trim saw tabletop by removing the three hold down bolts. Next, remove the diamond blade by unscrewing the large left hand nut on the arbor end. Replace blade. Now reassemble the tabletop, leaving the table bolts loose. Next, move the table top to the left against the two alignment bolts in the upper left side of the tank. This will align the tabletop. Now tighten the table bolts.

Wheel Removal: Loosen the bolts in the back of the pan and remove the wing nuts in front on each end. Move the hood towards you and up, removing the hood. Remove the polish buff and end nut from the shaft. Lift the right end of the shaft so that the wheels will slide off while the bearing next to the v-pulleys rest on the pan. Next, place a suitable wood block in the buff pan to rest the right end of the shaft on. If the shaft is kept level it saves stress on the flex coupling that is still connected. When disassembling the parts on the shaft, lay the items removed in line so that you can re-assemble everything back in proper order. Reverse the procedure to re-assemble. Start the unit and check for balance and vibration. Adjust the position of the wheels as necessary to obtain balance.

Sanding Cloth Replacement: To replace sanding cloth on the vise-lock drum, remove or hinge the hood back. Cut the 3” wide cloth long enough so that the cloth will circle the drum and the ends will fold down into the drum slot, but not long enough to contact the lock bolt. Wrap the cloth around the drum and thread both ends through the slot. With a pair of pliers, pull the two ends tight. With the cloth tight against the drum face, tighten the locking nut.

Whenever you change from one grit to another, be sure to wash your hands, the stone, and the dop stick. This is very important. If a grain of coarser grit is carried to a finer grit cloth, it can scratch the stone. Washing is especially important between sanding and polishing operations.

Aluminum Disc Head: The leather, felt or sanding disc is installed on the rubber face of the head with a tacky adhesive such as “Feathering Disc Adhesive” which permits easy installation and removal of discs.