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Owner's Manual For Automatic Vibrating Laps

392AVL – 394AVL – 396AVL
(Also applies to 220V, 50Hz International Models)

Packet Contents:

- **Safety Demands**
- **Instructions**
- **Schematic**
- **Polishing Chart**

Important Safety Demands For Vibrating Laps

Covington Engineering designs machines with safety in mind. Please read our Safety Demands Sheet carefully and follow for your safety and the safety of others.

ELECTRICAL

Have your licensed electrician electrically ground your machines and equipment (against electrical shock) by complying with federal, state, and local laws. Locate electrical and in-line switch or switches so operator can immediately shut them off in an emergency.

DO NOT allow more than one person to operate a machine, unless you have a switch for each person, which is wired so that any one of the switches will stop the machine in an emergency.

Keep children or visitors away from electrical devices and machinery.

DO NOT work in wet environments where electricity is present.

DO NOT plug into electricity until the motor switch is off and the proper voltage is supplied.

DO NOT leave motors running when not in use.

DO NOT wear jewelry or rings around electricity.

Keep all electrical cords away from moisture, rain, and moving parts.

Periodically check all cords for worn-frayed spots and replace or repair to code if needed.

Thermal protected motors will stop if overloaded. When they cool, they will start automatically without warning. If the motor stops, shut the switch off for your protection.

OPERATOR AND PERSONS

Protect your person when operating machinery so you will not be injured.

1. Wear tight clothing. Loose clothes can be drawn into machinery.
2. Wear closed-toe shoes.
3. Wear safety goggles to protect your eyes from flying particles.
4. Loose hair is very dangerous because it can easily get caught in moving parts. Use a net or cap that will secure your hair inside so it is not exposed to the machinery.
5. Keep your hands and fingers away from “danger spots” or “pinch points” where they might be injured.
6. Keep children, visitors, and pets away from machinery.
7. Use a respirator to protect yourself from particle inhalation.
8. Take off loose jewelry before using machines.
9. Be sure that all moving parts are shielded and all guards are in place before operating any equipment.

CHEMICAL



California Proposition 65 Warning

WARNING: Some of our products contain chemicals known to the State of California to cause cancer, and birth defects or other reproductive harm.

For more information: www.P65Warnings.ca.gov

Very few people are allergic to lapidary chemicals such as polishes, grits, abrasives, sawing solutions, etc. If you show signs of rash or allergies of any kind when using any of the products, determine which one it is and stop using it. Check with your doctor.

Keep all chemicals away from children and pets; never eat or drink these chemicals.

Keep all lapidary chemicals and grits out of your sewer drains or they may clog.

DO NOT allow liquids to get on floors. You could slip and fall.

MECHANICAL

IMPORTANT: NEVER MODIFY COVINGTON MACHINES – This will void all warranties and can be very dangerous.

PINCH POINTS – Pinch points on machines can be varied and numerous. These include but are not limited to areas with blades, belts, wheels, pulleys, discs, arbors, bearings, shafts, and other moving parts. This list is not exhaustive so please use discretion and take every safety precaution when operating equipment or performing maintenance.

Keep rags and foreign objects away from machines.

Be sure that all guards and/or covers are in place before running machines.

Instructions For Vibrating Lap

INTRODUCTION

Covington's vibrating laps abrade and polish automatically. These heavy, cast aluminum units are designed for lapping several relatively heavy pieces at a time. This unit is designed for use with loose grain abrasive grits. It will not work with diamond or silicon carbide pads. The vibrating laps are available in three table-top sizes: 10", 12", and 16" diameter.



Image 1

Place your vibrating lap on a level ground surface or sturdy workbench. It can be secured to your table using the holes conveniently placed in the base ring. Ensure that the unit is level before using.

Safety: Before plugging in your unit, read the first section of this packet labeled *Important Safety Demands for Vibrating Laps*.

MAINTENANCE

Motor: No lubrication is necessary on this motor. Occasionally blow out the interior of the motor with an air hose or air can to clean out any dust that has collected. **DO NOT** obstruct the space at the bottom of the unit. Air flow is necessary to cool the motor. **DO NOT ALLOW ABRASIVES OR POLISHING POWDERS TO RUN DOWN INTO THE MOTOR.**

Pan & Bumper Ring: Wash thoroughly between each cycle, before storing, and at the end of your work session. Do not let grit or polish sit in the pan. When the compounds dry in the pan, they become very hard to remove which can cause contamination in later steps. When installing the pan, ensure that the hold down screw and tri-knob are securely tightened to hold the pan in place.

Polish Pad: Keep your polish pad free of all grit and grit dust because these can introduce scratches to your piece. **Important:** Your polish pad is only for your final polishing step; do not use it with grit. Let your pad dry thoroughly before storing to prevent mold from accumulating. Do not wash out your pad unless you wish to change polishing compounds. We recommend having a different pad for each compound rather than cleaning your pad which can lead to cross-contamination.

PROCEDURE

PREPARE YOUR PIECES

- Before placing your pieces on the pan, remove any nubs or rough edges.
- Small or thin pieces will need weight added to the back. Weight can be added to the back of a glass or stone slab using dop wax or double-sided tape. It is important to have sufficient weight added to counter the surface area of each piece otherwise the work pieces will hydroplane and not grind. We typically recommend a 1 to 1 ratio of weight to surface width. For example, if your piece is 4" across you would need about 4 pounds of total weight; if your piece is 6" across then you would need 6 pounds of weight.
- For beginners, we recommend getting an industrial sized permanent marker

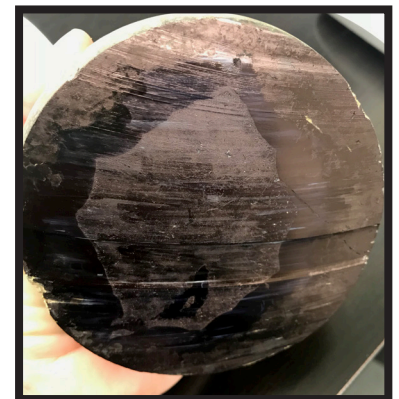


Image 2

and blacking out the face of each work piece (using a silver marker on black glass will have the same result). See image 2.

- It is important to have 1/2 to 2/3 of the pan covered with pieces. This will encourage movement across the entire plate surface and reduce the chances of irregular plate wear. If the pieces are fragile (ie. glass, obsidian, fluorite) it may be necessary to create a barrier between each piece to prevent chipping and breaking. A barrier can be as simple as a PVC tube, plastic milk carton, a cut off plastic cup, or a weighted bumper ring to prevent bumping (see image 3). If you notice any chips in your pan, remove them immediately so as not to create scratches.

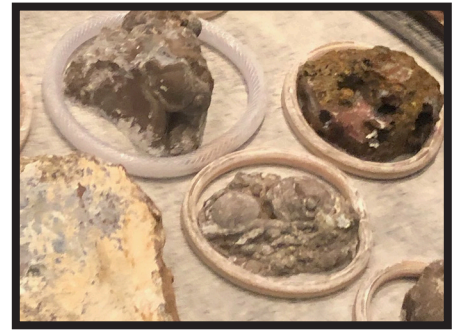
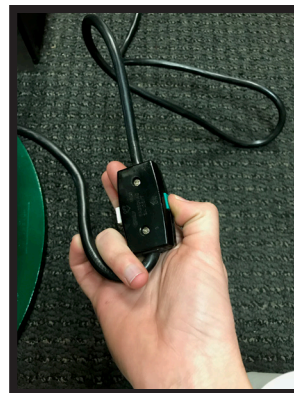


Image 3

Note: Covington's vibrating laps are made of cast aluminum. Because the pans are not machined, there may be slight imperfections on the plate surface. These imperfections will be removed during the initial grinding stage using 60/90 grit and a heavy work piece.

GRINDING STEPS

- For an effective grind, you must create a grit slurry in the pan. Begin by placing 2 to 3 tablespoons of grit and 1/3 cup of water directly into the aluminum pan. Do not use your polish pad for any grinding steps. Place your work pieces directly into the pan and turn on your lap. Larger pans will need a little more grit, while smaller pans will need a little less. These numbers are guidelines and some trial will be necessary to find the right amount for your pan size and operation. We recommend beginning with these numbers and adding small amounts of grit or water to the pan until you reach a creamy consistency (creamy like a light hand lotion or a crepe batter).
- **During All Steps:** Keep an eye (and ear) on the machine at all times. If you notice any pieces that aren't moving, you may need to add more water. If you notice any pieces aren't spinning, you may need to add more weight to the back of your piece. If your pieces stay in one place for too long without moving, you may get an imprint of the grid pattern from the pan on your piece. If this happens, you will need to restart the step (re-prep by coloring with marker) or go back a step to a coarser grit to remove the grid pattern. If you notice that the machine isn't making a scratching noise, it is probably time to add some fresh grit and a little more water. It is important to maintain the creamy consistency in the pan at all times. If your grit is splashing out of the pan, it may be too wet, or you may have too much grit/water/slurry in the pan. Water will evaporate over time, so if your slurry is too wet, you can either add grit to the pan, or you can let the water evaporate out of the pan to get the creamy consistency necessary for grinding effectively.



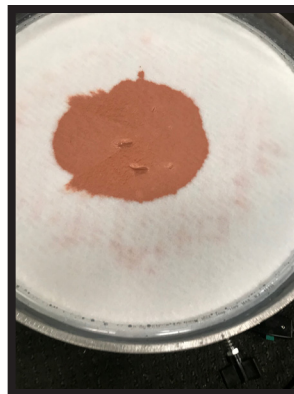
- **Step 1:** Most people begin their lapping process with a 60/90 silicon carbide grit blend. You will want to leave the piece on the lap until the whole surface has been completely ground (all the black marker on the surface from the preparation step has disappeared). See image 4. In the image, there is still black marker on the surface of the geode. That means it needs to continue to grind on the lap until all of the marker is gone. At the end of this step, thoroughly wash out your pan, bumper ring, and any individual barriers you used around your pieces to prep them for step two. We find that Dawn dish soap and a scrub brush do a great job of breaking up the grit on the surface of the pan and removing sediment to eliminate cross-contamination.

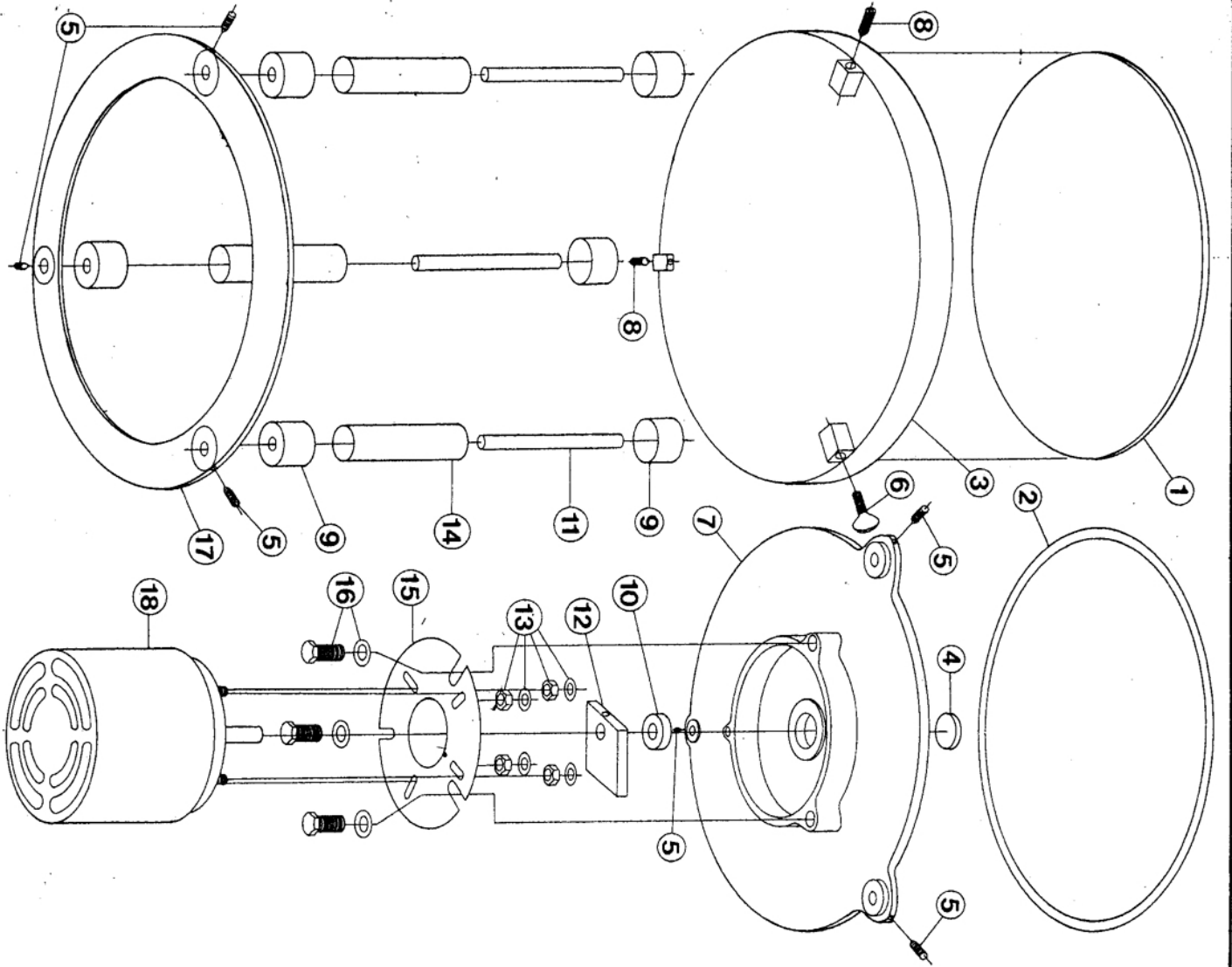


Image 4

- **Step 2:** In this step, you repeat the process from step one with a 120/220 grit blend. Beginners should, again, black out the surface of their piece with a marker to make sure this step is complete before moving on. Add your grit and water directly into the aluminum pan, turn the machine on, add your pieces, and keep an ear and eye on the machine while it runs. This step usually takes less time than the initial grind since you are only removing the scratches from the previous step. A well monitored lap machine can usually complete this step in one to two hours. Again, thoroughly clean out the pan before moving on to the next steps.
- **Steps 3 and 4:** These steps are the same as prior steps with the use of 3F-400 grit for step three, and C-Brand 600 grit for step four. Like in step two, black out the surface as a preparatory action to ensure your pieces are ready to move on to the fourth step (600) and then polishing step. Harder stones may require steps beyond the 600 grit. If you find your pieces aren't polishing, adding an 800 or 1000 grit step to your cycle can help move you along.

- **Polishing Step:** For this step, make sure your pan, bumper ring, and barriers are completely clean. You do not want to contaminate your polishing pad with any kind of grit. Place your White, C-Brand Polishing Pad into your aluminum plate and secure it into place using the bumper ring. If you turn on your machine, and the pad moves, you need to expand the bumper ring and place it back in the pan. Once the pad is sitting securely and not moving, you are ready to continue. You will want to add two to three tablespoons of your polish powder directly onto the surface of the pad. The very first time you use a pad, it will require more polish powder than it will once it becomes "charged" with polish. Add a little bit of water (1/3 to 1/2 cup to start) to your pad and then add your pieces. Once again, you are looking for a creamy consistency on the pad. Too much water on this step will lengthen the time required to polish. You will begin to see a polish on the outer edges of your pieces first. The polish will then begin to spread in towards the center. This is because the surface feet per minute is higher on the outer edge of the piece as it spins than it is in the center. Typically, the polishing stage takes the longest. Harder materials will take longer to polish than softer materials. Different materials also like different types of polish. We usually recommend beginning with our standard cerium oxide (the pink one) because it is an economical compound that can achieve a polish on glass and most types of rocks. If that polish doesn't work, we recommend trying our Gold Polish #2, a micro fine aluminum oxide, that gets results on some of the harder-to-polish rocks. See our [polishing chart](#) (pg. 8) for additional recommendations on polishing compounds based on more specific rock specimens. Once your pieces are polished, thoroughly clean out your pan and accessories. Prepare your polish pad for storage by letting it dry completely. Once dry, store it in a clean bag in a cool, dry place with a label naming the polishing compound used on it. You don't want your pad to get contaminated, so proper storage is key to a long pad life.





vibrating lap

- 1 pad
- 2 bumper ring
- 3 pan #135
- 4 soft plug
- 5 spring rod locking set screw
- 6 locking thumb screw 1/4-20
- 7 intermediate plate #144
- 8 anchor screws 1/4-20
- 9 rubber stabilizer caps
- 10 outer motor bearing #br9903
- 11 spring rods
- 12 counter weight
- 13 8/32" motor nut with std washers
- 14 stabilizer tubes
- 15 universal motor plate
- 16 motor plate anchor bolts 1/4-20
x 3/4 h.h. with washers
- 17 base #143
- 18 motor #5K004 with cord



BUFF & POLISH INTRODUCTION

1. Many stones polish equally well with several buff and polishing compound combinations. A very hard gem can be polished by a much softer polish powder. Only one polishing agent should be used on a buff.
2. Polishing does not remove any material from the surface. If scratches develop, the stone must be re-sanded.
3. It is impossible to obtain a high glossy finish on very soft materials, especially if they tend to be slightly porous, fibrous, or granular. As a last resort with this type of material, a finish gloss can be given by the use of spray varnish.

POLISHING COMPOUNDS

CERIUM OXIDE: Covington cerium oxide will polish at a faster rate than conventional polishing compounds and produce a superior optical lens surface with no staining or caking. Because it will polish faster, a lower concentration can be used. It is recommended for use on leather, felt, polyurethane foams, and thermoplastic polishing pads. It is a favored polish for quartz type minerals and other gemstone types. It is not recommended for gemstones that will under cut.

LINDE "A": A .3 micron aluminum powder that is carefully graded for uniformity of grain size. It is excellent for polishing stones that will under cut. Excellent for hard to polish stones.

CHROMIUM OXIDE: Chromium oxide is a hard polishing agent. It is green in color and stains badly. It is useful for polishing jade and stones that will under cut.

TIN OXIDE: Tin oxide is an excellent general-purpose polish. It is used to provide a final high gloss finish.

DIAMOND: Diamond grit is the most efficient polishing medium. It is especially useful for polishing difficult-to-polish stones.

BUFFS

CANVAS: Canvas is useful when polishing heat-sensitive stones because it develops very little friction.

MUSLIN: Muslin buffs are recommended for soft stones and gems that are heat-sensitive.

LEATHER: Leather is a versatile buffing material that is both efficient and economical. Leather generates heat, but not as much as felt.

FELT: Felt is useful for polishing glass and stones of even texture. It is not recommended for gemstones that under cut. Friction on felt generates heat rapidly.

PHENOLIC: Phenolic tools or phenolic lap disc (cab laps) are useful when impregnated with diamond grit. 14,000 Micron (pre-polish) or 50,000 Micron (polish) diamond compound can be applied to the surface of the gemstone and worked with a phenolic carving tool. It can also be applied to the surface of a phenolic lap disc and worked with the gemstone mounted at the end of a dop stick. The diamond will charge the phenolic plate making smoothing and polishing easier.

Material	Best	Next Best	Third Best
Agate	Felt & Cerium	Leather & Cerium	Phenolic & Cerium
Amethyst	Felt & Cerium	Leather & Cerium	Phenolic & Cerium
Beryl	Felt & Cerium	Leather & Linde 'A'	Leather & Chrome Oxide
Calcite	Muslin & Tin Oxide	Leather & Tin Oxide	N/A
Chloastrolite	Felt & Cerium	N/A	N/A
Feldspar	Felt & Cerium	N/A	N/A
Garnet	Felt & Chrome Oxide	Felt & Cerium	Phenolic & Diamond
Glass	Felt & Cerium	N/A	N/A
Goldstone	Felt & Cerium	N/A	N/A
Hematite	Muslin & Cerium	Canvas & Linde 'A'	N/A
Howlite	Felt & Tin Oxide	Leather & Linde 'A'	N/A
Jadeite	Leather & Linde 'A'	Leather & Chrome Oxide	Muslin & Tin Oxide
Jasper	Felt & Cerium	Leather & Linde 'A'	N/A
Lapis Lazuli	Leather & Linde 'A'	Leather & Chrome Oxide	N/A
Malachite	Leather & Linde 'A'	Leather & Chrome Oxide	N/A
Nephrite-Jade	Leather & Linde 'A'	Leather & Chrome Oxide	Muslin & Tin Oxide
Obsidian	Felt & Cerium	N/A	N/A
Opal-Australian	Felt & Cerium	Muslin & Tin Oxide	N/A
Opal-Mexican	Phenolic & Diamond	N/A	N/A
Psilomelane	Leather & Linde 'A'	Leather & Tin Oxide	N/A
Petosky Stone	Canvas & Tin Oxide	N/A	N/A
Quartz	Felt & Cerium	Leather & Cerium	Phenolic & Diamond
Rhodochrosite	Leather & Linde 'A'	Leather & Tin Oxide	N/A
Rhodonite	Leather & Linde 'A'	Leather & Cerium	N/A
Serpentine	Leather & Linde 'A'	Leather & Tin Oxide	N/A
Sodalite	Felt & Cerium	N/A	N/A
Thomsonite	Felt & Cerium	N/A	N/A
Tigers Eye	Leather & Linde 'A'	N/A	N/A
Tourmaline	Leather & Linde 'A'	Leather & Chrome Oxide	Canvas & Diamond
Turquoise	Leather & Linde 'A'	Leather & Tin Oxide	N/A
Unakite	Felt & Cerium	N/A	N/A
Variscite	Leather & Linde 'A'	Felt & Cerium	Felt & Tin Oxide
Wonderstone	Leather & Linde 'A'	Felt & Cerium	Felt & Tin Oxide

**Covington carries several grades of cerium oxide. We generally recommend the standard pink C85 cerium for general purposes and inexperienced users. The super and platinum ceriums are more finely graded by size and are an excellent choice for users with more experience. Both soft and hard glass can be polished using the felt and cerium.

**If you don't see your material in the chart, we recommend starting with one of the more inexpensive polishes and testing small pieces to test results. Keep a journal of your results so you can track which items work best for your materials.

**Remember, these recommendations are guidelines and not hard and fast rules. Results will vary depending on the user methods. Items that are not ground, tumbled, or pre-polished properly are not likely to have good polishing results.