The Ultima

Combination Micro Motor & Pyrography Tool

By PJL Enterprises

Read all of these instructions carefully before using

Failure to do so may result in injury to yourself or others, and may damage the tool itself!

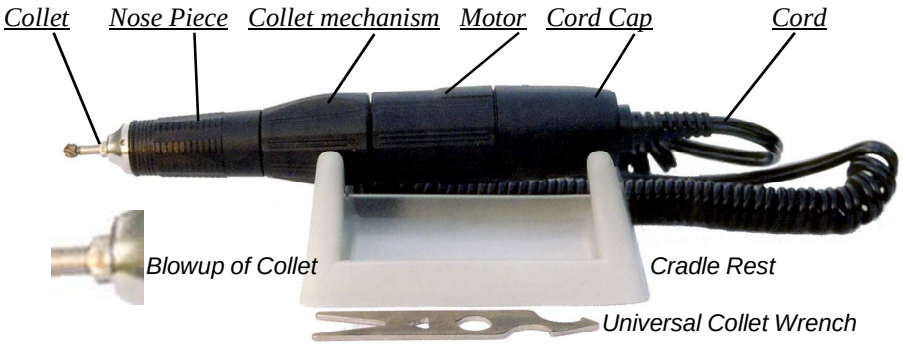
MICRO-MOTOR INSTRUCTIONS FOR USE

Please follow these safety rules when using the Ultima

A. Wear Eye Protection! It takes only one small piece of flying debris to cause serious eye injury.
B. Keep this and all power tools out of the reach of children.
C. Wear a dust mask, or use a dust collector, approved for the type of material you are grinding. Many materials can be dangerous to breathe when they are ground into small particles.

As you can see, the Ultima power supply has a fairly simple interface. The left knob controls the amount of power delivered to the pyrographic pen, and the right knob determines the speed of the micro motor. The top center switch determines weather your Ultima is in Burning mode, Off, or Grinding mode. The lower center switch controls direction of rotation of your micro motor. The pyrographic pen cord plugs into the lower left RCA receptical, and the micro motor plugs into the lower right DIN receptical.

1. HANDPIECE SECTION OUTLINE:
The handpiece is divided into six sections. From Front to rear they are: Collet, Nose Piece, Collet "Release/Secure" mechanism, motor, and cord cap. The collet mechanism has an "R <----> S" embossed on it. Keep these different "sections" in mind when reading the rest of these instructions. DO NOT TRY TO REMOVE THE "NOSE PIECE" SECTION OF THE HANDPIECE!



2. CHANGING BITS:
To Release a bit, hold the handpiece motor section, and turn the Secure/Release "Collet mechanism" section toward the "R" about 1/4 turn, until it locks open (you should hear a distinctive "click"), and then exchange bits. Then turn the collet/release section back in the "S" direction to Secure the bit. Be sure that your bits are clean, dry, rust, and dirt free before inserting into collet, to ensure clean operation of collets. NEVER turn the collet/release section while the unit is in operation! Do Not use oversized bits. If it does not fit into the collet, do not use it!

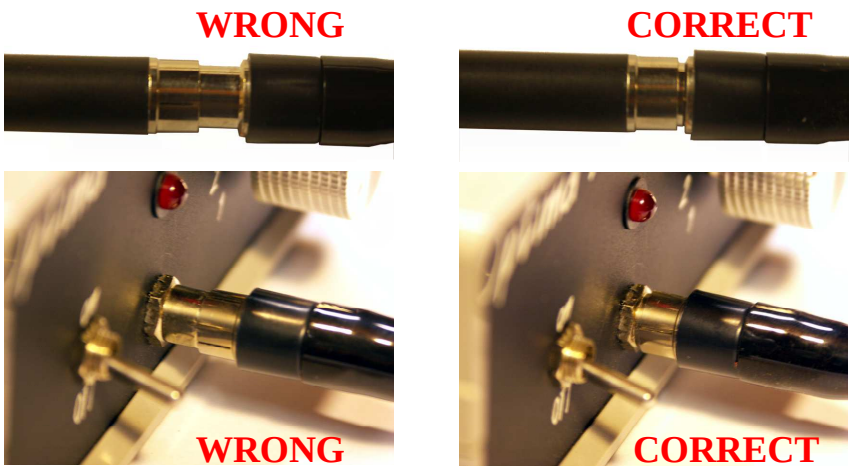
3. COLLET EXTRACTION AND INSTALLATION:
To extract a collet from your handpiece, twist the collet/release section toward "R" about 1/4 turn, until it locks into place. Use the triangular hole in the collet wrench to unscrew the collet counterclockwise (always keep a bit, or "blank bit" of the proper size, in the collet while doing this to prevent damage to the collet). Select another

 **1 - Large Skew**	For burning larger feathers (life sized geese or eagle feathers). Very limited turning radius.
 **2 - Small Round**	Good for concave areas such as under necks. Good for not leaving a depression from the point.
 **2B - Shader**	The "2B" version is not sharpened, and is bent at a 45 degree angle for shading.
 **3 - Large Round**	Same as small round, just a bit larger diameter.
 **3B - Shader**	The 3B version is not sharpened, and is bent at a 45 degree angle for shading.
 **4 - Flat Skew**	Same as a Medium sized Skew knife, but at a lesser angle. Good for lefties'.
 **5 - Spear Point**	Good for getting into tight places like under wings. Can also be used to make a fuzzy raised hair on flat work or mammal carvings.
 **6 - Chisel Point**	Some carvers prefer this for running quill lines.
 **7 - Round Point Skew**	A variation of the Medium Skew, tip is rounded at both the point and heel. Turns easy if you lift the heal.
 **8 - Burnisher**	Works great for doing 1/2" to 1" high calligraphy lettering.
 **9 - Writing Tip**	Used for writing your name on your carvings.
 **9M/9MS Modified Writing Tip**	Similar to the #9, but has the end of the tip ground symmetrically, and the end is perfectly round. 9M= 0.04", 9MS=0.03". Pointillism, writing, etc...
 **9PP - Pin Point Tip**	This version of the #9 has been ground so that it comes to a sharp pin point.
 **10 - Small Skew**	Great for the miniature carver or anyone that needs to do small fine detailed work.
 **10S Micro Skew**	An even smaller version of the #10 pen tip. Song bird carvers use for fine features.
 **11 Medium Skew**	Smaller than the Large Skew, has many of the same uses. Medium to Long lines, limited turning radius.
 **12 - Small Rounded Skew**	Like the small skew, but can turn a corner real easily. This is the most popular pen that we sell. Used for fur & small feathers.
 **12S - Micro Rounded Skew**	An even smaller version of the ever popular #12 pen tip. Song bird carvers really like this pen, as do tagua nut pyrographers.
 **13 - Spade Shader/ Scaler**	Used on flatwork for buildings, carvers use it for fishscales & bumping feathers. (S=3/32", M=1/8", L=1/4")
 **14 - Guge RHV Feather Edger**	Used on bird carvings for "bumping" large primary feathers. Right handed version.
 **15 - Guge LHV Feather Edger**	Same as #14, but is the Left handed version.
 **16 - Small Chisel**	Basically looks like a small 1/8" chisel tip. Can be used for purposes other than calligraphy. Available in 1/16" version.
 **17 - Course Hair**	Used to make course hair on your caricature or mammal carvings (up to 1mm wide).
 **18 Spear Shader**	Flatwork shader used for animals, people, landscapes. Available in Large (*Shown*), Medium, & Small.
 **19 - Ball tip (S, M, L, & XL)**	Draw lines, writing, shading, pointillism, and much more. Available in four sizes: S=1/16", M=5/64", L=1/10", XL=1/8" (S *shown*).
 **20 & 20L Gourd Sawing tip**	Make straight line cuts into gourds with a sawing motion. The #20 can do gourds up to 1/4" thick, the 20L (*Shown*) can do up to a little over 3/8" thick gourds. VERY sharp, be careful!

8. *Use Optima brand pen cords only. Use of any "homemade" cords, another brand, or adapter jack/cord combinations may result in damage to the power supply if it shorts out, and will void any warranty coverage. Do not attempt to repair cords yourself, or have someone else do it. Send them in, or call, so that we may honor our warranty, and replace it for you.*

9. *The Ultima comes with 1 plastic pen holder clip. Place your pen into it by rotating the foam grip part of the pen into the open side of the pen clip (rotate clockwise when the open side of the pen clip is facing to the right). Do the reverse to extract pens. Keep and store pens in their original pen tubes when not in use.*

10. *Be sure to insert the cord plugs, on each end, fully into the power supply and pen jacks. If your cord plugs get excessively warm near one or both of the cord jacks, this could be the reason (loose jacks). You should only have about a 1/32" to 1/16" gap between the outer edge of the male jack and where the female jack gets larger, or turns into a hex head. When detaching the pen cord(s) from the pens or power supply, be sure NOT to pull on the pen cord (grasp the cord cap only). When attaching or detatching the cord from the unit or pens, only rotate jacks "clockwise" to keep from unscrewing either the cord jack or chassis mount unit jacks. If either cord jack still gets excessively hot, stop using that cord immediately, and contact PJL Enterprises for diagnosis and repair assistance.*



WARRANTY INFORMATION:

The Ultima micro motor handpiece is warranted against manufacturing defects for 2 years from date of purchase (copy of proof of purchase date, or receipt required), not including brush wear (a consumable) or operator misuse/abuse. The Ultima power supply is warranted against Manufacturer defects for life. Please call before sending it in for repair so that we can diagnose the problem first. DISASSEMBLY OF THE NOSE PIECE, OR POWER SUPPLY, WILL VOID YOUR WARRANTY! The collets, brushes, and cord are the ONLY user serviceable parts.

Warranty/Repair Contact Information

PJL Enterprises
PO Box 273 / 720 Perry Ave. N.
Browerville, MN 56438
1-320-594-2811 or www.carvertools.com

collet, ensuring that its threads are clean and dirt free, insert into collet hole, put a bit or blank shank into collet, and screw it in clockwise by hand. Tighten with collet wrench until you feel some resistance, twist the collet/release section toward "S" (Secure bit) again before operating. You should tighten collets fully with collet wrench, or your handpiece may not operate properly. Do not over tighten, as you can strip the collet threads or even break the collet.

3A: COLLET REDUCER EXTRACTION AND INSTALLATION

This unit may have came equipped with a 1/8" to 3/32" collet reducer, instead of a 3/32" collet for easier bit size changes.

To use a 1/8" bit, remove the collet reducer by turning the collet mechanism to the R (Release) position, put your fingernail just under the lip of the reducer (on one of the flat sides of the collet) and lift it out.

To use a 3/32" bit, turn collet mechanism to "R" (Release), remove 1/8" bit/blank, insert the collet reducer into the 1/8" collet, and then insert your 3/32" bit into it.

4. TO REVERSE DIRECTION:

When changing the handpiece rotational direction, let the tool stop rotating COMPLETELY (switch in center, speed control knob set to low) before switching it to other direction. This will prolong the life of your motor handpiece tool greatly.

5. TO TURN OFF MACHINE:

Turn the "Burn / Grind" switch to the center "Off" position. The green and red lights should be off.

6: TO CHANGE BRUSHES (Or to check them)

Check brushes periodically (every 3~6 months), as they should be replaced at or before they reach 2 mm in thickness to the brush spring. Unscrew the cord cap. On either side of the black plastic assembly on the back, you will see indentations with copper colored strips with a silver colored solder ball on it, being held in by a small Phillips head screw. Use a small Phillips head screw driver to remove those screws (don't loose them), and remove each brush. Do one side at a time, so that you know how it is reassembled. Take note of how each brush is worn (direction of cupped wear), and be sure to reinsert used brushes exactly the same way they were prior to extraction. When finished, screw the cord cap back on. When installing new brushes, place the handpiece onto the cradle rest, and run the handpiece in forward, reverse, and then forward again at high speed for at least 30 minutes in each direction; to "break in" the brushes before using the handpiece again. Always be sure that the motor comes to a complete stop, and that your speed control dial is set to low before reversing motor direction.

7. The Ultima Handpiece uses precision ball bearings.

DO NOT OIL THEM OR THE COLLETS!, as that will ruin the special lubricant in them, and cause them to quickly fail (doing that will also void your warranty)!
DO NOT use compressed air, a vacuum cleaner, or even blowing air harshly by using your mouth; to clean out/off the handpiece or collet hole, as this will drive dust into the bearings, and blow the oil out of them. Use a clean cloth instead.

8. *NOTE:*

The Ultima power supply includes a built-in resettable circuit breaker that will cut off power to the handpiece if it is over worked or abused for 5 seconds or more. If this happens, turn off the machine (see #5) for 30 to 60 seconds, and then turn it back on. Go easier on the tool if this happens!

Micro Motor Trouble shooting

Handpiece does not work, or makes a strange noise, after changing collets.

Usually this means that you either did not screw the collet all of the way in, or that you still have the "Release/Secure" collet mechanism in the "Release" mode. The collet needs to be screwed all the way in for the shaft to rotate freely. Do not over tighten, as you may strip the collet threads on the collet when tightening it down with the wrench (use your fingers to start it). If your collet is in all the way, you should be able to freely rotate the bit, collet, and shaft assembly by rotating the bit with your fingers. If only the bit rotates, and the collet and shaft do not, then you do not have the Secure/Release mechanism in the proper position (turn it toward the S).

The handpiece was working, but now it stopped.

Check to see that the indicator light on the power supply is on. If not, your unit may have become unplugged, or a circuit breaker may have tripped. Check that the handpiece coil cord is fully plugged in, and that their are no breaks or cuts in the cord. Check to see that your "Forward / Reverse" switch is not in the center off position. If only the bit rotates, and the collet and shaft do not, then you do not have the Collet mechanism in the proper position (turn it toward the S).

Otherwise, you may have been working the handpiece a bit too hard and tripped the unit's internal circuit breaker, and you need to shut the main control off for at least 30 seconds (See #5 in main instructions). If this happens a lot, you may need to use smaller diameter bit heads (larger bit head = more torque required). This tool is meant for doing fine detail work, not roughing out large amounts of material with large bits (5/16" sized bit head or smaller is recommended).

If you are using a proper bit size, and not using excessive force when carving, but you are running the unit at lower RPMs for an extended period of time? Then the heat sink may be over heating, and that may have caused the motor protection circuit to trip. You can prevent that from happening, by putting the power supply near the intake of your dust collector, or some place where the heat sink has enough air flowing over it to cool it properly (The back panel of the power supply unit also serves as the voltage regulator heat sink)

If all else fails!

Then give us a call, and we'll try to diagnose or fix any problems that you may be having with your Optima 2 Plus unit. Many times it does not have to be sent in, if it can be diagnosed over the phone, and you may be able to repair it yourself with our help.

Ultima - Pyrography Tool Operation

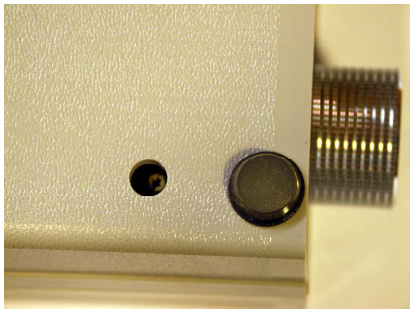
1. *Do not use excessive pressure on the Ultra Fine pen tips. The Optima 1 Ultra fine tips are made for fine, professional type texturing, and the finer tips will bend or break if too much pressure is used. The HD tips can stand a bit more heat and pressure, but tip lifetime is still dependent upon what type of usage they are exposed to.*

2. *Do not turn the power supply up into the "red-hot" range to "condition" tips, or to "burn off" carbon deposits, as some other brands may recommend. For most burning, you should not have to turn the control past "6" on the dial. However, if you intend carve deeply into material at low heat, you may want to anneal the tip first, by turning the control dial to high until you can not see anymore temperature change; and then slowly turn it all the way down within a 30 second time period.*

3. *Do not clean the pen tips with a stone, coarse sandpaper (< 1500 grit), or any other harsh abrasive, as this will wear out the tip prematurely. Use a leather or fabric strop, or a felt buffing wheel, with a bit of metal polishing compound on it to clean off carbon deposits and keep the tip polished. Aluminum oxide polishing compound on a strop works very well ("paper white" in color). If you are using a fine sandpaper (=> 1500 grit), you only need to move the side of the tip 1/16", just enough to pop off the carbon. Tips will turn blackish in color upon moderate usage. This is not necessarily carbon, but Chromium Oxide. Do not remove this protective layer (hence, no sandpaper), as it keeps the tip from oxidizing further, and it tends to keep carbon from sticking to the tips in the first place. Pen tip is clean when it reflects light (carbon won't polish).*

4. *Send the pen into PJL Enterprises for tip replacement when necessary. The fee is $7.00 plus $1.75 shipping via US first class mail (in the US, up to 2 pens). Send $1.92 for shipping for 3 pens, $2.05 for 4 pens, $2.26 for 5 pens, $2.43 to 6 pens. 7 to 10 pens $5.00.*

5. *The Ultima has an adjustment to allow you to set the low end of the temperature range to wherever you prefer. Insert a small flat screwdriver into the trim adjust slot, located in the small hole on the bottom of the unit. Turn it counterclockwise all the way. Turn the main adjustment to low also. Turn the unit on, and then plug a pen into the cord (be "aware" of where that potentially hot pen tip is during this procedure). Turn the adjustment clockwise very slowly while listening very closely to the unit. When you hear a slight buzzing sound coming from the unit, your at the best setting possible. You don't necessarily need to do this adjustment, do it ONLY if your low end is too hot, or the tip has no heat at the lowest setting (i.e.: it turns on at 2 or 3 settings).*



6. *Turn off the Ultima while not in use to prolong tip life, and to avoid fire hazard.*

7. *KEEP THIS AND ALL DANGEROUS TOOLS OUT OF THE REACH OF CHILDREN. TIPS ARE SHARP AND VERY HOT, AND WILL BURN SKIN MUCH EASIER THAN WOOD!*