Getting to Know Your
DAREX E-80, E-85 or E-90
Precision Endmill Sharpener

Operating Instructions
Safety Instructions for **DAREX** Grinders

**CAUTION**
For Your Own Safety Read Instructions Manual Before Operating Grinder.

**USE WHEELS MARKED AT OR OVER RPM OF 3450.**

Replace cracked wheel immediately. Always use guards and eyeshields. Securely tighten wheel screws. Use only washers furnished with this grinder.

Always disconnect grinder from the power supply while motor is being connected or reconnected.

**INSTALLATION**
Check grinder nameplate to make certain the rating is correct for the power supply, voltage and frequency.

Mount grinder on solid bench. It may be used without bolting down for light work. For heavy work it should be bolted down to the mounting surface. If mounted on pedestal, bolt grinder securely to pedestal and bolt pedestal to floor.

All attachment plugs and any receptacles shall be replaced with devices rated for the voltage for which the motor is reconnected.

After making connections, make sure they are secured and properly insulated.

When starting a grinder for the first time, or after installing a replacement wheel, it is most important that the operator stand aside for at least one minute.

This is the correct practice since grinding wheels can explode if they have received minor cracks from shipping.

**OPERATION**
Check that switch is in “OFF” position and that wheels rotate freely. Insert plug into receptacle and turn on switch. Grinder should come up to speed smoothly and without vibration.

**MAINTENANCE**
No maintenance, other than replacement of worn wheels, is needed. Wheels should be replaced when worn down to one half the original width.

The ball bearings used are lubricated for life and do not require additional lubrication.

Wipe off and dispose of grinding dust to prevent accumulation.

---

### Safety Instructions

**A. GROUNDING INSTRUCTIONS**

1. All grounded, cord-connected tools:

   In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This tool is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.

   Do not modify the plug provided—if it will not fit the outlet, have the proper outlet installed by a qualified electrician.

   Improper connection of the equipment-grounding conductor can result in a risk of electric shock. The conductor with insulation, having an outer surface that is green with or without yellow stripes, is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.

   Check with a qualified electrician or serviceman if the grounding instructions are not completely understood, or if in doubt as to whether the tool is properly grounded.

   Use only 3-wire extension cords that have 3-prong grounding plugs and 3-pole receptacles that accept the tool’s plug.

   Repair or replace damaged or worn cord immediately.

2. Grounded, cord-connected tools intended for use on a supply circuit having a nominal rating less than 150 volts:

   This tool is intended for use on a circuit that has an outlet that looks like the one illustrated in Figure A. The tool has a grounding plug that looks like the plug illustrated in Figure A. A temporary adapter, which looks like the adapter illustrated in Figures B and C, may be used (except in Canada) to connect this plug to a 2-pole receptacle as shown in Figure B. If a properly grounded outlet is not available. The temporary adapter should be used only until a properly grounded outlet can be installed by a qualified electrician. The green-colored rigid ear, lug, etc. extending from the adapter must be connected to a permanent ground such as a properly grounded outlet box.

3. Grounded, cord-connected tools intended for use on a supply circuit having a nominal rating between 150-250 volts, inclusive:

   ![Grounding Blade](image1)
   ![Cover of Grounded Outlet Box](image2)
   ![Cover of Grounded Outlet Box](image3)
   ![Adapter](image4)
   ![Grounding Means](image5)
B. FOR ALL TOOLS

1. KEEP GUARDS IN PLACE and in working order.
2. REMOVE ADJUSTING KEYS AND WRENCHES. Form habit of checking to see that keys and adjusting wrenches are removed from tool before turning it on.
3. KEEP WORK AREA CLEAN. Cluttered areas and benches invite accidents.
4. DON'T USE IN DANGEROUS ENVIRONMENT. Don't use power tools in damp or wet locations, or expose them to rain. Keep work area well lighted.
5. KEEP CHILDREN AND VISITORS AWAY. Remove starter keys and turn off master switches.
6. PADLOCK EQUIPMENT or work area when not in use.
7. DON'T FORCE TOOL. It will do the job better and safer at the rate for which it was designed.
8. USE RIGHT TOOL. Don't force tool or attachment to do a job it was not designed for.
9. WEAR PROPER APPAREL. No loose clothing, neckties, rings, bracelets, or other jewelry to get caught in moving parts. Non-slip footwear is recommended. Wear protective hair covering to contain long hair.
10. ALWAYS USE SAFETY GLASSES. Also use face or dust mask if cutting operation is dusty. Everyday eyeglasses only have impact resistance lenses; they are NOT safety glasses.
11. SECURE WORK. Use clamps or a vise to hold work when practical. It's safer than using your hand and it frees both hands to operate tool.
12. DON'T OVERREACH. Keep proper footing and balance at all times.
13. MAINTAIN TOOLS WITH CARE. Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.
14. DISCONNECT TOOLS before servicing: when changing accessories such as blades, bits, cutters, etc.
15. AVOID ACCIDENTAL STARTING. Make sure switch is in "OFF" position before plugging in.
16. USE RECOMMENDED ACCESSORIES. Consult the owner's manual for recommended accessories. The use of improper accessories may cause hazards.
17. NEVER STAND ON TOOL. Serious injury could occur if the tool is tipped or if the cutting tool is accidentally contacted.
18. CHECK DAMAGED PARTS. Before further use of the tool, a guard or other part that is damaged should be carefully checked to assure that it will operate properly and perform in its intended function—check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.
19. NEVER LEAVE TOOL RUNNING UNATTENDED. Turn power off.
Endmill Sharpener Instructions

INSTALL THE SPINDLE

1. Attach compressed air of at least 90 psi to the sleeve housing. (It’s best to have an air filter and water trap installed between the shop air and the air spindles.)

   Thoroughly clean the spindle and the sleeve bore (with the air on) using a clean lint-free cloth and a cleaner that leaves no residue.

2. Remove the drawbar from the spindle and with the air on, carefully place the spindle into the sleeve.

3. Make sure the spindle is in its highest position by loosening the spindle lever knob and moving the spindle lever all the way to the left (Figure 2).

BEGIN WITH A STANDARD ENDMILL

With these instructions and a Darex Endmill Sharpener, you will find that getting “the feel” of good endmill sharpening is not difficult. At first, as with anything new, the steps will seem unfamiliar, even if you have had sharpening experience. But these instructions were designed to alleviate any apprehension you might have.

First of all, there are no hidden “tricks” you need to know before you can sharpen your endmills. Everything is revealed step-by-step in these instructions. If you start at the beginning and take your time, you will soon learn how to sharpen endmills with ease and precision.

The real key is patience. Since you will learn by doing and by making some mistakes, don’t feel bad about them. Figure on an hour or so of practice to become comfortable with your Darex. IMPOR-
TANT: Start with a two or four flute endmill of at least 3/8” in diameter. It’s sometimes helpful to color the areas you will be grinding with a felt pen. This helps you see what you have ground.

SHARPENING THE PRIMARY ANGLE ON THE FLUTES

1. MOUNT THE ENDMILL IN THE SPINDLE
   a. Clean the proper sized collet and inside of spindle.
   b. Place endmill in collet up to flute. Place collet in spindle and tighten drawbar.

2. POSITION THE STYLUS
   a. Position stylus fixture in its “Primary” position. To do this, loosen the angle knob and rock the fixture down and one quarter clockwise as far as it will go. The stylus should now be in its highest position.
   b. Loosen the size adjustment knob and slide the stylus in or out so it rides the very outside edge of the endmill flute.
3. POSITION THE GRINDING WHEEL
   a. Using cross feed knobs, position grinding wheel so stylus is aligned with the watermarked corner of wheel. Note: It may be necessary to reposition the stylus on the wheel if there is not enough adjustment with the cross feed knobs.
   b. Using the feed knobs, back wheel away from stylus.

4. DETERMINE SPINDLE POSITION AND MOVEMENT
   a. Grab the spindle steady pull knob and while keeping a slight pressure on the collet tightening knob with the ends of your fingers, pull the spindle back slowly until the endmill falls off of the stylus. Use care to keep the endmill on the stylus at all times until you reach the end. If there is not enough spindle travel, reposition the spindle fixture on the way. Note: if there is not enough travel in the spindle to grind the flutes of the endmill, remove the index collet from the spindle. This will add about 1” of travel.

5. PREPARE TO SHARPEN
   a. Place endmill on stylus and position stylus as close to the shank end as possible.
   b. Turn on motor (on E-90) turn reversing switch so wheel turns clockwise. Holding flute against stylus, use feed knob to approach endmill with wheel until it just begins to spark.

6. SHARPEN PRIMARY CUTTING EDGES
   a. Advance feed knob 1/2 graduations (100).
   b. Slowly pull endmill away from wheel until it falls off stylus.
   c. Push clearance handle down and position next flute on stylus. Slowly release clearance handle. Repeat above with remaining flutes.
   Note: To assure accuracy, do not re-adjust feed knob until all flutes have been ground. For a better finish, take 2 passes per flute without changing feed knob setting.

SHARPENING THE SECONDARY ANGLE

Only sharpen the secondary angle if the primary becomes too wide and the endmill will not cut. If you accidentally sharpen the secondary before the primary, it’s no problem. The primary and secondary don’t need to be sharpened in any order.

1. POSITION THE STYLUS
   a. Back wheel away from endmill using feed knob.
   b. Move stylus into secondary position by loosening angle knob and rocking fixture up and back (clockwise) as far as possible.

2. SHARPEN THE SECONDARY ANGLE
   a. Sharpen secondary using same procedure as the primary. Be careful not to remove too much material. The primary land should end up between 0.04” - 0.05” wide.
   Note: If you sharpen too far and remove the primary, just reset the stylus to the primary position and grind the primary again.
SHARPEN THE ENDS

Make sure the corner of the grinding wheel is sharp before sharpening the end. (See wheel dressing, page 7). The sharpener is set to automatically produce a 2 degree "fish-tail" on the end.

Note: E-80 users should position the grinding wheel so its centerline height is approximately 1/4" above the center height of the spindle in its highest position.

1. PREPARE INDEX COLLAR
   a. With motor off, loosen side knob to move stylus back out of the way.
   b. Loosen index collar and slide forward on the spindle until index pin can drop into a hole marked with a number that corresponds with the number of flutes on your endmill. (Holes marked with 2 for 2 flutes, 3 for 3 flutes, etc.)

2. POSITION THE ENDMILL
   a. With pin engaged in a hole, loosen index collar and position endmill so outside corner of wheel can grind the end.
   b. Position endmill flute horizontally and tighten index collar lock knob. (If flute may not be horizontal.)
   c. Move wheel to desirable inclination from endmill. (It may be necessary to reposition index collar to clear endmill.)

3. PREPARE TO SHARPEN
   a. Using both in feed and cross feed knobs, feed wheel towards endmill until it just touches the end.
   b. Using only feed knob, back wheel away from endmill.
   c. Advance on feed in 1/2 graduations towards endmill.

4. SHARPEN PRIMARY ANGLE
   a. Using feed knob, feed wheel into endmill using a slow, even motion until edge of wheel reaches center of endmill. Then back wheel away from endmill with feed knob.
   b. Index spindle to most appropriate number on index collar and repeat above on remaining flutes.
   c. Note: When sharpening a center cutting endmill, note the position of the feed knob when the wheel is at the center of the endmill so you can go to this position with the feed after flutes.

5. SHARPEN SECONDARY ANGLE
   Note: Only sharpen secondary when primary becomes too wide.
   a. Loosen spindle knob and move spindle lever to the right so spindle is in its lowest position.
   b. Use same procedure as for sharpening primary. Don’t remove too much material. Leave about a 1/16 - 1/8" wide primary edge.
   c. Guiding can be done free hand or if you own a Darex Drill Sharpener with a point splitter, you can use the point splitter to sharpen the gash. (It may not be possible to grind secondary on small 6 or 8 flute endmills.)
CHANGING THE RELIEF ON THE FLUTES

Changing the relief of the primary and secondary angle is very simple. For more relief, instead of aligning the stylus in the middle of the outside edge of the wheel, position it to the right of the high point. The further to the right you go, the more relief you will get. To get less relief, simply lower the spindle height a small amount using the spindle lever. The lower the spindle is, the less relief you will get.

DRESSING THE WHEEL

If you have a diamond dresser attachment (Darex No. 9050) first remove the stylus fixture and the spindle fixture from the ways. Mount the dresser attachment to the ways so the handle swings parallel to the grinding wheel. (It should also be parallel with the wheel guard cover.) Feed the wheel into the dresser and swing the dresser across the face of the wheel.

If you do not have a Darex diamond dresser attachment, manually dress the wheel with a dressing stick.

RE-SETTING THE STYLUS HEIGHT

If the stylus is accidentally ground, its height will have to be re-set to .010" below the center of the spindle. This is easily accomplished using the gauge supplied with your machine. You will find it located in the collet storage area.

To set the stylus, mount the gauge in the spindle using a 3/8” collet. Position the stylus under the gauge. (Make sure the stylus fixture is in the “primary” position.) Loosen the stylus lock nut and adjust the stylus until the tip intersects the bottom of the flat area at the tip of the gauge, as shown.

If there is not enough adjustment, the stylus will have to be replaced. Order Darex Part No. 8152.
WHEEL BALANCER INSTRUCTIONS

The Darex endmill sharpeners are equipped with a device for balancing the grinding wheel. It is a washer than can be offset to counter-balance variations in the grinding wheel. Loosen the three wheel mounting screws and try positioning the washer in different positions until the machine runs smoothly. (Wheels purchased from Darex will have an arrow indicating the light side of the grinding wheel.)

## Trouble Shooting Guide

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>CAUSE</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flutes don’t cut.</td>
<td>1. Stylus not in proper position.</td>
<td>Use the cross feed knob to move edge of the wheel so it aligns with the center on the stylus.</td>
</tr>
<tr>
<td></td>
<td>2. Stylus not at proper height.</td>
<td>Re-set the height of the stylus. (See setting stylus height, page 7.)</td>
</tr>
<tr>
<td></td>
<td>3. Primary edge too wide.</td>
<td>Sharpen more off the secondary angle.</td>
</tr>
<tr>
<td>Endmill won’t plunge cut.</td>
<td>1. End needs to be re-gashed.</td>
<td>By hand, on a bench grinder.</td>
</tr>
<tr>
<td></td>
<td>2. End primary too wide.</td>
<td>Grind more off secondary.</td>
</tr>
<tr>
<td>Spindle won’t float.</td>
<td>1. Spindle and/or sleeve not clean.</td>
<td>Remove spindle and clean spindle and sleeve.</td>
</tr>
<tr>
<td></td>
<td>2. Spindle sleeve holes plugged.</td>
<td>Remove sleeve from sleeve housing and clean out holes with small wire.</td>
</tr>
<tr>
<td></td>
<td>3. Not enough air pressure</td>
<td>Increase PSI to 90 or above.</td>
</tr>
<tr>
<td>Index pin won’t drop in index collar holes.</td>
<td>1. Spindle sleeve not in proper position.</td>
<td>Move sleeve in housing until you can drop pin into index collar.</td>
</tr>
<tr>
<td>Inconsistent results (not grinding the same amount off each flute.)</td>
<td>1. Collet and/or spindle taper where collet seats is not clean.</td>
<td>Clean thoroughly with a clean lint-free cloth.</td>
</tr>
<tr>
<td></td>
<td>2. Collet is not accurate.</td>
<td>Try another collet that you know is accurate.</td>
</tr>
<tr>
<td>Machine vibrates excessively</td>
<td>1. Wheel needs balancing.</td>
<td>See wheel balancing instructions above.</td>
</tr>
</tbody>
</table>
SHARPENING A BALL ENDMILL

1. SET RADIUS
   a. If the radius fixture is not set to zero, loosen the 3 cap screws and slide the fixture to the zero position as shown. Then retighten the cap screws.
   b. Insert radius stop pin.

2. PREPARE INDEXING COLLAR
   a. Rotate spindle until you can push the pin into a hole marked with a number that corresponds to the number of flutes you will be sharpening (2 for 2 flutes, 3 for 3 flutes, etc.).
   b. Clean collet and spindle, place endmill into collet and collet into spindle. Rotate flute to horizontal position and tighten collet with collet lock nut.

3. LOCATE SIDE OF ENDMILL
   a. With fixture swung clockwise as far as possible, use crossfeed knobs and touch wheel to COG of endmill. (reposition fixture one way if wheel will not touch.)

4. LOCATE END OF ENDMILL
   a. Back endmill away using radius fixture feed knob. Pivot fixture counterclockwise as far as possible. Use radius fixture feed knobs and machine feed knobs as outside edge of wheel touches the center of the ball end (or for a corner radius, until it touches the end of the endmill).

5. SHARPEN BALL
   a. Advance the crossfeed knob 1/2 graduation and rotate the fixture 90° to sharpen the radius.
   b. With the fixture in this position, push the wheel clearance handle all the way down and index the spindle around to the next flute. Rotate the fixture 90° back and repeat this process until all flutes have been sharpened.
   If you need to remove more material, use only the fixture feed knobs to feed the endmill onto the wheel.

SHARPENING A CORNER RADIUS

SHARPENING A CORNER RADIUS

a. Loosen the cap screws and slide the fixture to a position that is equal to half the diameter of your endmill minus the radius. Example: to cut a 45° radius on a 3/4" endmill, 7/8" - 3/4" = 1/4" (as shown).

b. Repeat steps #2 to #5.
SHARPENING A TAPERED ENDMILL

1. LOCK FIXTURE
   a. Remove the radius stop pin.
   b. Pivot the fixture so it's parallel with the base and tighten the lock screw on the bottom of the base. This will stop the fixture in this position.

2. MOUNT FIXTURE
   a. Mount the back taper fixture and its stylus as shown.
   b. Place endmill into pilfer and adjust into spindle and tighten using the collet tightening knob.

3. POSITION STYLUS AND SET ANGLE
   a. Position the stylus in relation to the grinding wheel as you would for a standard endmill except for the back taper stylus so it's 15° to the right of the edge of grinding wheel.
   b. Loosen 2 bolts and set fixture to desired taper angle.

4. CHECK MOVEMENT
   a. Use taper fixture feed knob and make sure there is enough movement to sharpen the full length of the flutes. If not, reposition the endmill in the collet until you can. Make sure the stylus is set at the primary position (same as you would with a standard endmill).

5. PREPARE TO SHARPEN
   a. Set the end of one of the flutes on the stylus. Use the feed knob on the machine and slowly approach the endmill with the grinding wheel until it just touches. Back off the endmill off the stylus using the taper feed knobs.
   b. Advance the wheel towards the stylus 1-2 graduations.

6. SHARPEN ENDMILL
   a. Using the feed feed knob and the spindle knob, carefully place one of the endmill flutes on the stylus and feed the endmill until the stylus reaches the shank. Be sure the endmill starts on the stylus at all times by turning it with the spindle knob at the same time you feed the endmill with the feed knob. Only sharpen from end to shank, never shank to end.
   b. Push the wheel clearance handle all the way down and rotate the endmill off the stylus using the spindle knob. Then back the endmill away from the stylus using taper fixture feed knobs.
   c. Repeat a. and b. for the remaining flutes.

SHARPENING SECONDARY ANGLE
Sharpen the secondary the same way after re-positioning the stylus for a secondary angle the same way you would for a standard endmill.