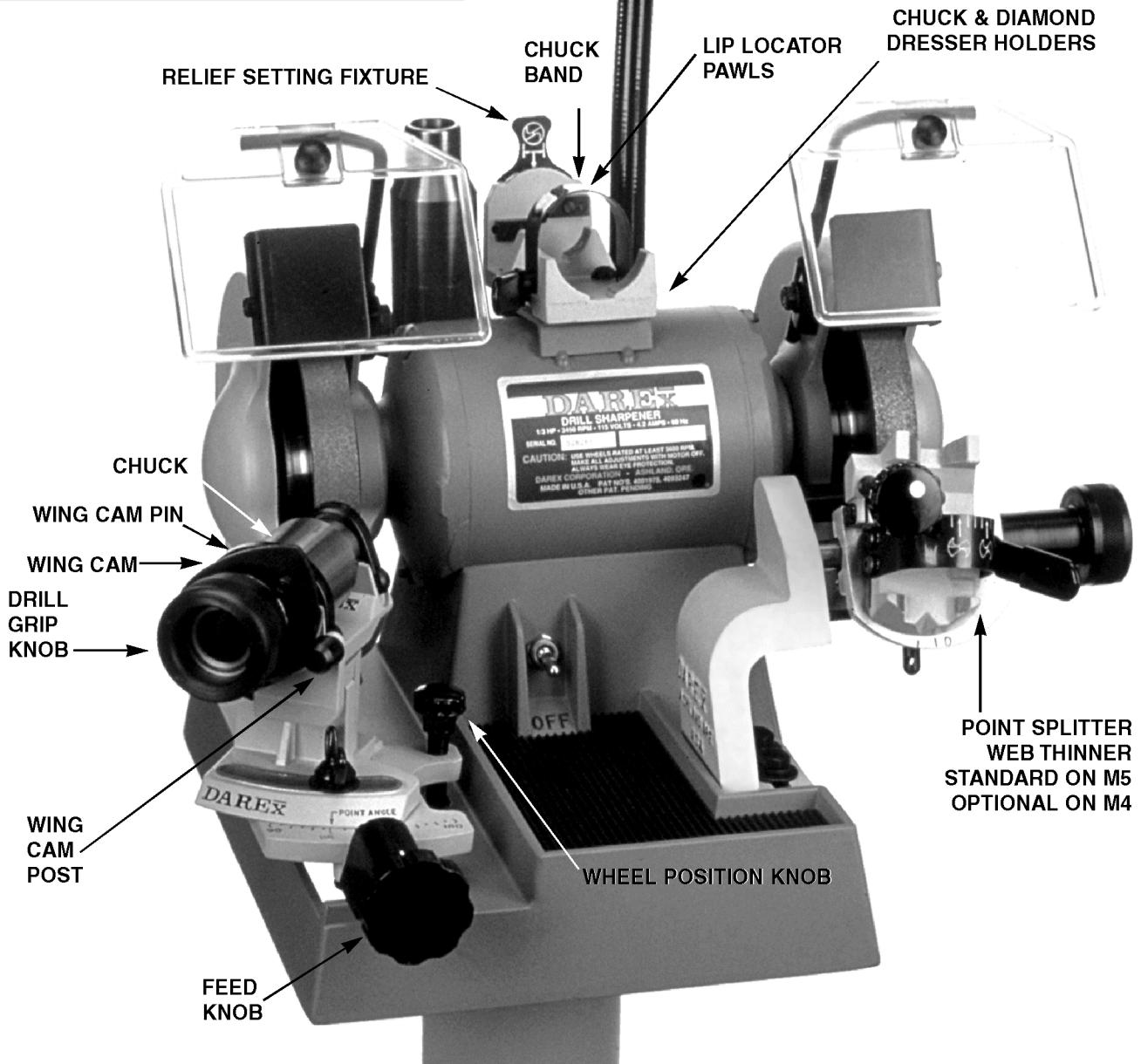


Getting To Know Your DAREX

M3, M4, or M5 Precision Drill Sharpener

*See other
sharpeners
on back!*

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OPERATING INSTRUCTIONS

SAFETY INSTRUCTIONS FOR DAREX M SERIES DRILL SHARPENERS

CAUTION

For Your Own Safety Read Instructions Manual Before Operating Grinder.

The M4 is equipped with a special wheel balancing device. Please read the safety information for this device found on page 11.

USE WHEELS MARKED AT OR OVER RPM OF 3450.

REPLACE CRACKED WHEEL IMMEDIATELY. ALWAYS USE GUARDS AND EYESHIELDS. DO NOT OVER TIGHTEN WHEEL NUT. USE ONLY FLANGES FURNISHED WITH THIS GRINDER.

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

AS WHEELS WEAR ADJUST TOOL REST SUPPORT TO MAINTAIN APPROXIMATELY 1/16" CLEARANCE BETWEEN TOOL REST AND WHEEL. GRIND ON PERIPHERY OF WHEELS ONLY. ALSO, ALWAYS MAINTAIN APPROXIMATELY 1/16" CLEARANCE BETWEEN SPARK RESISTOR & WHEEL.

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.

Adjust tool rest on support to desired position and tighten nut securely. Adjust tool rest support on guard to obtain approximately 1/16" clearance between tool rest and wheel and tighten nut securely.

Adjust eye shields to position aligning center of eye shield in line of sight to tool rest.

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 vitreous and similar type 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 .

Adjust tool rest supports as grinding wheels wear to maintain approximately 1/16" clearance between tool rest and grinding wheel. Grind on periphery of wheels only.

MAINTENANCE:

See adjustments on page10 Replacement of worn wheels will be needed. Wheels should be replaced after the diameter is reduced to 2 below original size.

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:

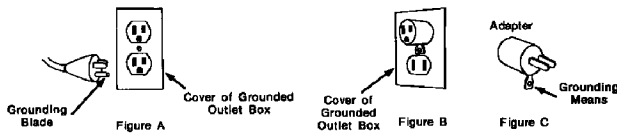
In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This tool is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet 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 property grounded outlet box.

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

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.
- B. 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 owners 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.
 1. Always unplug the grinder from its power source before attempting to adjust, repair, or replace anything on the machine.
 2. Only use rubber or plastic mallet to adjust the balancing disc and use care not to strike the grinding wheel with the mallet. It is possible to crack the wheel if it is mishandled in any way. This could cause the wheel to explode when in use. Don't use a wheel that has been struck or dropped.
 3. Always wear eye protection. Never turn on the grinder without wheel guards attached properly, and always stand to the side of the wheel when the grinder is first turned on.
- * Note : Wheel balancers are not necessary on the M-5 machines equipped with CBN or diamond wheels.

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BEGIN WITH A STANDARD DRILL POINT

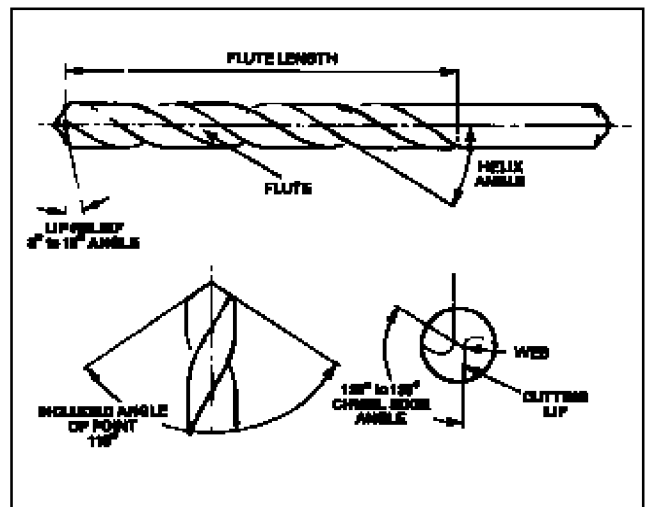
With these instructions and a Darex Drill Sharpener, you will find that getting “the touch” of good drill sharpening is not difficult. At first, as with anything new, the steps will seem unfamiliar, even if you have had some hand sharpening experience. But these instructions were designed to alleviate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

First of all, there are no hidden 'tricks' you need to know before you can get sharp drills. 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 drills with ease and precision .

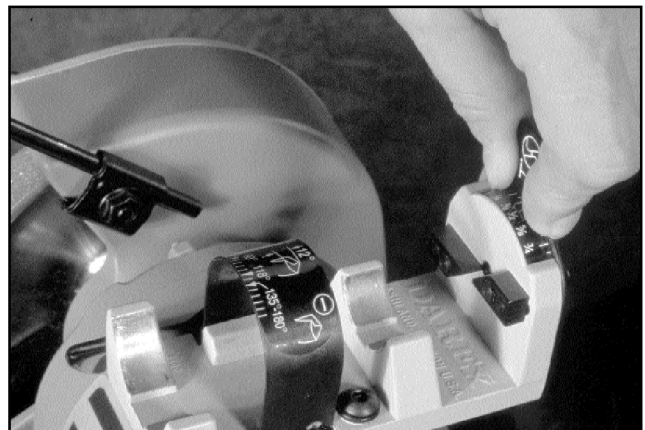
The real key is patience. Since you will learn by doing and by making some mistakes, don't feel bad about them. Within 20 or 30 drills, or about 1/2 hour of practice, you should find yourself comfortable with your Darex.

IMPORTANT! Start with a standard drill of at least 1/4" in diameter.

HELPFUL DRILL NOMENCLATURE



1. SET DRILL SIZE



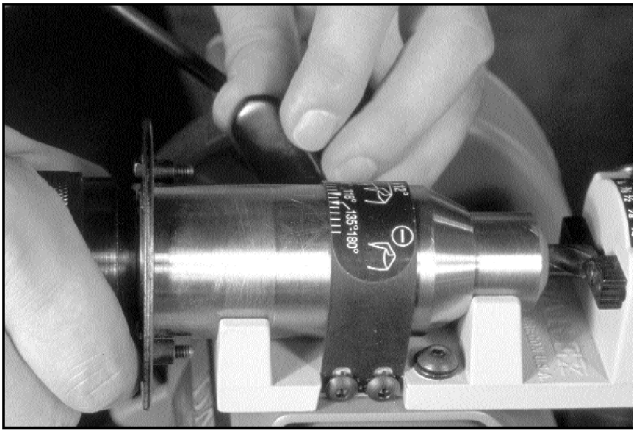
1. Move drill size lever on relief setting fixture so that arrow corresponds to approximate diameter of drill.

2. INSERT DRILL INTO CHUCK



1. Adjust drill chuck knob to grip drill loosely. (Drill should be loose enough to slide back and forth easily.)
2. Drill should protrude approximately one inch from end of chuck.

3. SET DRILL TO LENGTH



1. Loosen chuck grip lever on relief setting fixture.
2. Insert chuck into setting fixture as far as it will go.
3. Point of drill should butt against black dot on back plate of fixture and be pushed into chuck to proper length. (Some rotation of chuck may be required to ensure that point of drill butts against black dot on back plate.)

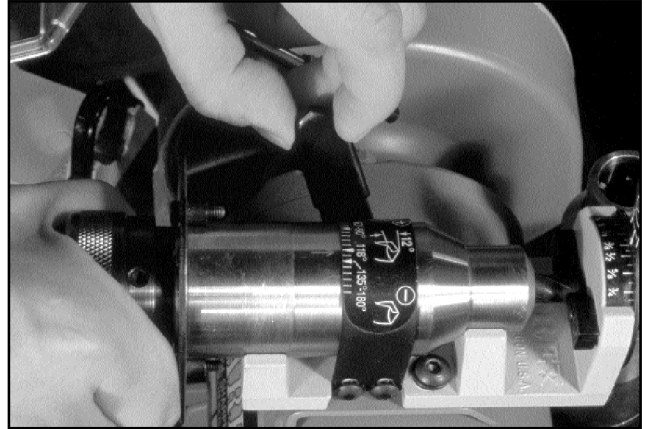
4. SET RELIEF ANGLE



1. Grasp wing cam and rotate chuck **CLOCKWISE** until alignment arrow coincides with 118 degree line on lip relief scale. (Be sure drill point stays in contact with back plate and never turn chuck counter-clockwise, even slightly. Just go around again.)

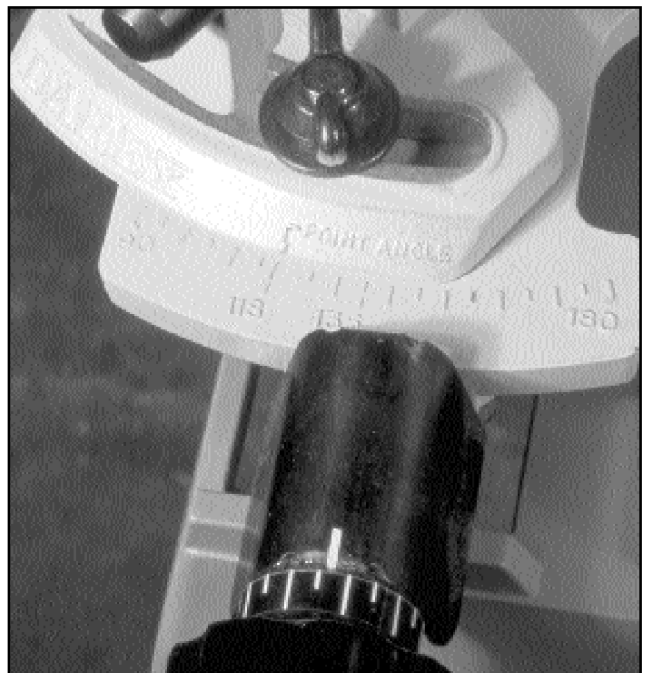
NOTE: This operation controls the relief (clearance) angle. Note that lip locator pawls on back plate hold drill in proper position during rotation of chuck. The drill cutting lips needs to lay flat on the pawls to get proper alignment - if they don't - merely move the size lever so the cutting lips lay flat on the pawls.

5. SECURE DRILL IN CHUCK



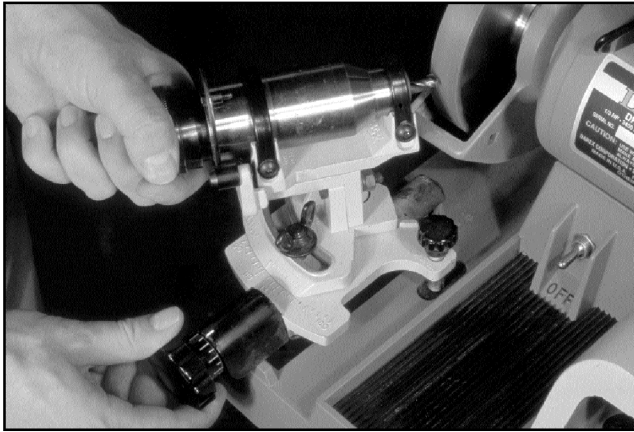
1. Secure chuck by gently depressing grip lever. (Lever will slip beyond point of greatest tension if pressed too hard. Just pull it back.)
2. Turn drill chuck knob until drill is tight in chuck.

6. SET POINT ANGLE



1. If necessary, loosen wing nut on sharpening fixture and slide fixture to 118 degree mark. Retighten wing nut.
2. Back up feed knob several turns.

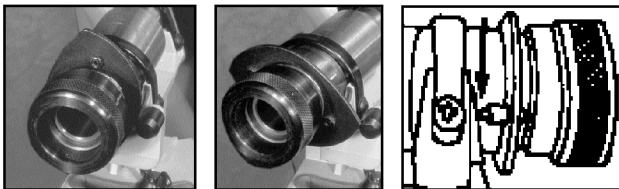
7. PREPARE TO SHARPEN



Turn motor on. Insert chuck in sharpening fixture. (Be careful not to hit drill point into grinding wheel.)

1. Rotate chuck back and forth while lightly holding wing cam against post. Pins on wing cam should also contact facing cam on sharpening fixture. (See contact point illustrations.)
2. Simultaneously advance drill point to grinding surface by turning feed knob until drill point just begins to spark against grinding wheel.

WING CAM ROTATION CONTACT POINT



8. SHARPEN DRILL



1. Advance feed knob 3 graduations.
2. Using two hands, and always going in the same direction, **TWIST CHUCK IN CLOCKWISE ROTATIONS**. Make each twist firmly, smoothly and quickly. (Be sure to keep cams against contact points by maintaining forward pressure.) **NOTE:** Some initial wear (until a groove forms) on the casting cam is normal.

3. Each successive twist sharpens a drill lip. Continue until sparking nearly stops. Advance feed knob as before and repeat sharpening rotation until drill is sharp.

When you have finished, remove chuck and examine the drill point. Do not loosen or remove drill from chuck. If lip relief is slightly off. Just check item 2 in "Trouble Shooting" and you will be back on the right track

SHARPENING SPECIAL DRILL POINTS

135° ANGLE POINT



This point is frequently preferred for hard and tough materials such as high alloy steels. Increasing the point angle increases the effective rake angle of the cutting edge (lip) and reduces the length of the lip. The result is a reduction of the driving torque required to drill these materials. The feed pressures are increased. Reducing the lip relief angle strengthens the lip. To produce this point, simply set point angle at 135° and align chuck arrow with 135° mark on chuck grip band of relief setting fixture.

118° ANGLE POINT



This point is the standard general purpose or manufacturers' standard. It is used for a wide variety of materials and job conditions, especially softer materials including wood, aluminum and softer steels.

90° ANGLE POINT



Many soft and low strength materials, such as some cast irons, aluminum, plastic and wood can be drilled more efficiently with a reduced point angle. Although this change reduces the effective rake angle of the cutting edge (lip) and the length of the lip is increased, the driving torque required to drill these materials usually remains within acceptable limits. The reduced feed pressures and the increased lip relief angle frequently permit higher feed rates.

To produce this point simply set point angle at 90° and align chuck arrow with 90° mark on chuck grip band of relief setting fixture.

GRINDING CUTTING EDGE TO A NEGATIVE RAKE (For drilling brass and soft bronze or composites, plastics-soft materials)

Sharpen the drill to an angle appropriate for the material you are drilling.

Loosen the drill in the chuck. Put the chuck in the setting fixture and put chuck arrow at the 90 degree mark on the clamping band and tighten the chuck.

Unlock point splitter chuck holding fixture lever-rotate fixture counter-clockwise so that "V" mark on fixture is approximately 1/16" to the left of the "D" mark on the bronze compound.

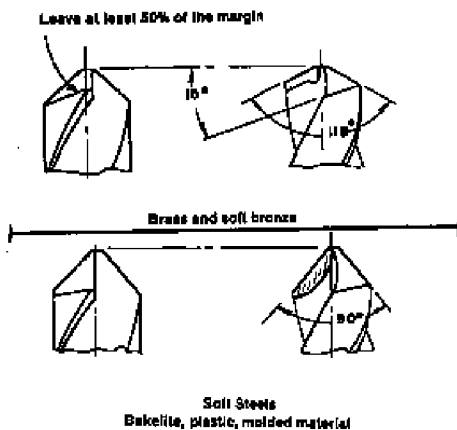
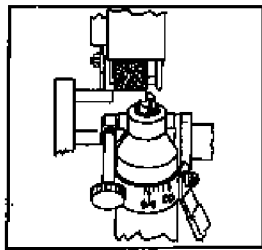
Turn cross feed knob so point splitter compound moves to the point approximately 1/2" from the original point split setting-locating the drill point center at the right edge of the wheel.

Rotate chuck so that the cutting lip points straight down and is parallel to the side of the wheel (as shown).

Adjust cross feed knob closely so a very small amount of the cutting lip is ground off-leaving at least 50% of the margin.

Noting the location of the chuck at the clamping band lock, rotate chuck 180 degrees, so the opposite arrow comes to the same band location. Lock band down and tip drill down to grind the other lip.

Note: Depending upon what type of material is being drilled, you may want to experiment with different negative rake angles. To change this angle go back to line #3 and reset fixture.



CHAMFERED POINT (CAST IRON)

Secondary Angle

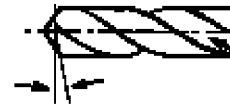


The results that this point can give are well worth the few extra moments it takes to produce. The chamfered point can reduce burr generation in many materials. The chamfer is also very effective in reducing wear at the corner of the lip in abrasive materials such as cast iron or fiberglass.

1. Sharpen the drill to the standard 118° or 135° point configuration in the conventional manner.
2. Align the drill in alignment fixture at 2 1/2 marks to the right of the 90° point mark on the clamping band.
3. Set the sharpening fixture point angle to 90°.
4. Proceed as if sharpening a 90° point angle drill but only until the desired chamfer is produced.

CONTROLLING RELIEF (CLEARANCE) ANGLE

Lip Relief



Aligning the chuck arrow with 118- arrow on the grip band will normally give you 12° relief. If you don't get the 12° relief, or if you want a different amount of relief, re-align the chuck arrow. Relief may be affected by web thickness of the drill. For thicker web drills disregard size lever markings and move the lever to the right until the cutting lips of the drill lay flat on the pawls. For more relief: Leave the chuck arrow toward the left and the plus sign. For less relief: Leave the chuck arrow toward the right and the minus sign.

FLAT BOTTOM



The settings on the alignment are variable depending on the size of the drill to sharpen. The alignment table is as follows:

- 1/4" - set the chuck arrow 1/2 line to the left of the 118° mark.
- 3/8" - set the chuck arrow (2) lines to the left of the 118° mark
- 1/2" - set the chuck arrow (3) lines to the left of the 118° mark.
- 5/8" - set the chuck arrow (4) lines to the left of the 118° mark.
- 3/4" - set the chuck arrow (4 1/2) lines to the left of the 118° mark.

You might have to vary the alignment a small amount to get the chisel edge at the proper angle. Split the center of the drill to make an effective center cutting drill.

HELICAL POINT



This point has better self-centering characteristics than a standard point and is often used for NC applications. With this point it is also possible to increase relief or clearance angle without increasing chisel angle.

The point is produced in the same manner as a standard 118° point, except the drill is positioned on the right side of the wheel using the wheel positioning knob in such a way that as the chuck is rotated the chisel edge just leaves the right side of the wheel. The amount of helical relief is controlled by how far the drill moves off the right side of the wheel.

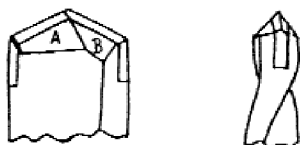
SHARPENING CARBIDE DRILLS

Carbide-tipped, solid carbide and masonry drills can be sharpened on the Darex drill sharpener with a diamond wheel available from Darex (Cat. #4857). The basic technique for sharpening these drills is the same as for high-speed steel drills. For best results:

1. Handle carbide drills carefully. They are subject to damage from impact. (For masonry impact drills, see next section).
2. The carbide drill will not sharpen as quickly as a high-speed steel drill. Material cannot be removed as fast.

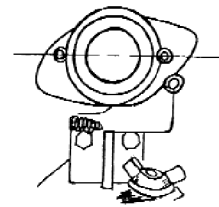
MASONRY IMPACT DRILLS

Fig. 1



1. Install diamond wheel on Darex drill sharpener.
2. Loosen wing nut on the sharpening mechanism and set unit at 90 degree setting.
3. Insert drill loosely in the chuck and place in the sharpening mechanism.
4. Rotate chuck so that wing cam pins on chuck are horizontal to each other. Fig. 2.

Fig. 2.



5. Push drill toward grinding wheel so that area (A) of Fig. 1 is parallel with wheel face, Fig. 3, then tighten drill in chuck.

Fig. 3

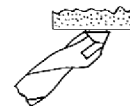


Fig. 4



6. Hold chuck firmly in sharpening mechanism while not allowing it to rotate. Now feed drill only enough to touch wheel and surface slightly.
7. While still holding chuck in sharpening mechanism, push the swing fixture to the left against the spring tension which will move the point of the drill away from the wheel. Now, rotate the chuck 180 degrees so that the wing cam pins are again horizontal to each other. Let swing fixture go back to normal under spring pressure and grind will occur on that side.
8. Turn feed knob, backing sharpening mechanism away from the wheel.
9. Loosen wing nut and change sharpening mechanism to one line left of 110 degree mark.
10. Loosen drill in chuck, set wing cam pins horizontal to each other.
11. Turn drill so grind area (B) of Fig. 1 is parallel with wheel face, Fig. 4 and tighten drill in chuck.
12. Proceed to sharpen as described in lines 6 and 7.

SHARPENING SMALL DRILLS 1/16"-.5/32"

The sharpening of small drills does require more care and patience. Excellent points can be produced as follows:

1. Be sure unit is adjusted to closest possible tolerances. See adjustment section
2. Remove only a few thousandths at a time (it is very easy to remove too much).
3. Rotate chuck quickly, with a "light touch" to remove an equal amount from each side of drill.
4. After sharpening, examine drill before removing from chuck. If Necessary, reinsert chuck into sharpening fixture and touch up one lip to balance drill.

Note: Negative relief can be created by removing too much material off the tip of the drill. To prevent this from happening, either advance the timing (see Control Relief) or re-align the drill in the chuck after the initial sharpening, and sharpen again.

#4200

SHARPENING LARGE DRILLS (3/4 to 1 1/8")

The Darex M3, M4 or M5 are capable of doing an excellent job of sharpening these drills with an optional attachment (Cat. #4200) Please refer to the instructions that accompany the attachment. A separate chuck (#4270) is available to hold drills from 1 to 1 1/4".

#4300

SHARPENING LEFT-HAND DRILLS

An attachment is available for the Darex M3, M4 or M5 (Cat #4300) consisting of a special chuck, alignment fixture and sharpening mechanism.

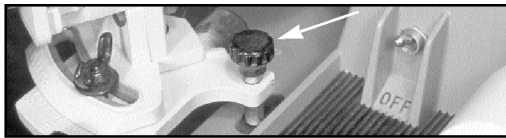
WHEEL DRESSING (M4 only)

Wheel dressing can be kept to a minimum by repositioning drill sharpening action to different areas of the sharpening wheel face using the wheel positioning knob. Dress when discoloration of the drill occurs or the face of the wheel appears glazed or grooved.

TO DRESS:

1. Grip the diamond dresser in drill chuck and set point angle adjustments between 135° and 180°.
2. Retract the sharpening fixture by Turning the feed knob counter-clockwise until diamond will clear wheel when chuck is placed in fixture.
3. Turn the wheel positioning knob until diamond is approximately 1/16" (1.5 mm) beyond right edge of wheel .

Wheel Positioning Knob



4. Holding chuck and fixture firmly, apply force to move the fixture past the face of the wheel and approximately 1/16 (1.5 mm) beyond the left edge (pivotal motion).
5. Turn feed knob clockwise to remove desired material and then allow fixture and diamond to travel slowly across the face of the wheel.

NOTE: Traveling too quickly across the face of the wheel will produce a "threaded" condition that results in a rough drill point finish.

6. Repeat steps 4 and 5 until wheel is dressed square and clean.

NOTE: If your sharpener is equipped with an electroplated CBN (Borazon) or a diamond wheel DO NOT dress with a diamond dresser.

SOME HINTS FOR BETTER DRILL SHARPENING

When the drill bit has been allowed to wear beyond desirable limits or is broken, do not attempt to do the whole sharpening job without resetting the drill bit in the chuck. No more than .040" - about 1 turn of the feed knob--can be removed at one chuck setting without beginning to adversely affect the chisel and relief angles.

When heating of the drill bit occurs during roughing or sharpening, do not cool by placing in water. Checking of the drill surfaces may occur, resulting in reduced durability of the cutting edges. Allow the drill to air cool and then remove any discolored portion of the drill with continued sharpening.

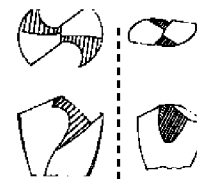
When setting the drill up in the chuck, the drill cutting lips should lay flat on the locator pawls. If you are working with special drill styles (**PARABOLIC FLUTE, COBALT, THICK WEBBED**, etc.) disregard setting using the correct diameter and simply move the size lever to the right until the cutting lips lay flat on the pawls.

The very best sharpening results are obtained on smaller diameter drills if you sharpen on the right side of the wheel. Reposition the drill if necessary by using the wheel positioning knob.

Clean this tool frequently. Use compressed air to blow grinding residue from the surfaces of the machine and the of the chuck. Doing this each time after wheel dressing (M4 only) will prolong the life of this tool.

Lubrication of this tool is not normally required. The bearings within the unit are of the self-lubricating type.

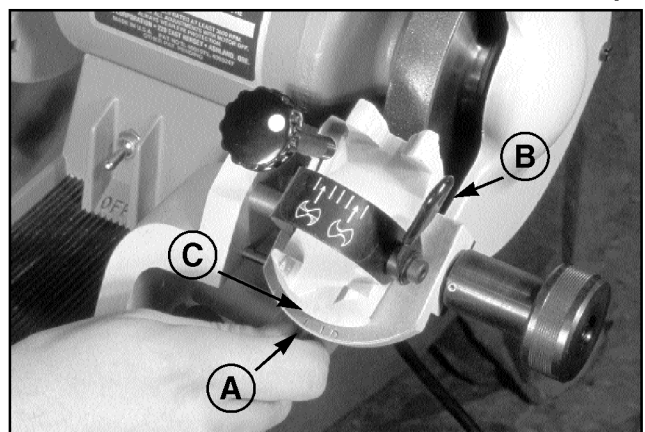
POINT SPLITTING/WEB THINNING ON THE M-5 (OPTIONAL ITEM ON THE M-4: CAT. NO. 4900)



Standard Parabolic

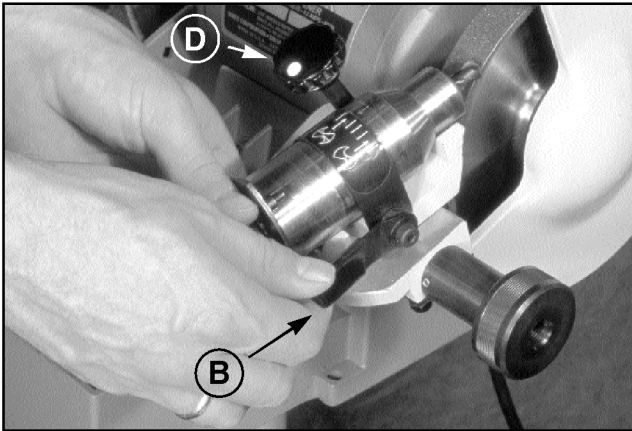
1. Sharpen the cutting edges of the drill at the angle you prefer, 118°, 135° etc., as shown on pages 2 and 3. DO NOT remove the drill from the chuck after sharpening
2. Loosen chuck holder by moving handle "A" to the left and swing chuck holder so it aligns with the line (C) on the left. Then tighten chuck holder.

Fig. 1



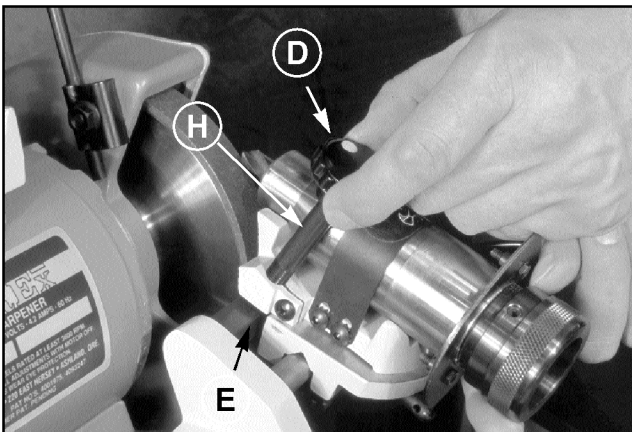
3. Move handle "B" back and insert chuck into chuck holder, pushing it forward until it stops. Then rotate chuck until the arrow on the chuck lines up with the point-split arrow. If the chisel edge of the drill isn't lined up parallel with the side of the wheel (straight up and down) then adjust accordingly. Now lock the chuck into position using handle "B". -Fig. 2

Fig. 2



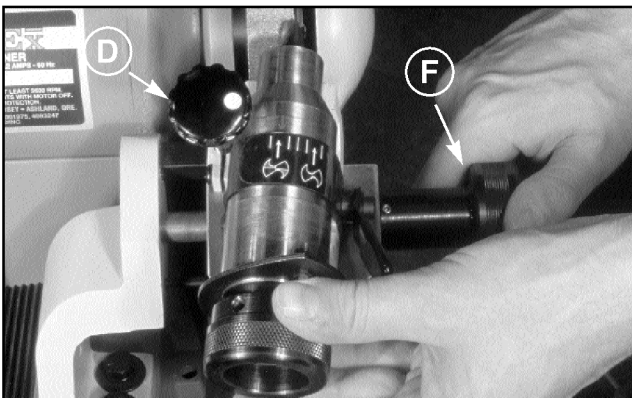
4. Swing the chuck and chuck holder up until feed screw "H" butts up against stop pin "E". Feed knob "D" may have to be turned in, to keep the drill from engaging the wheel initially.

Fig. 3



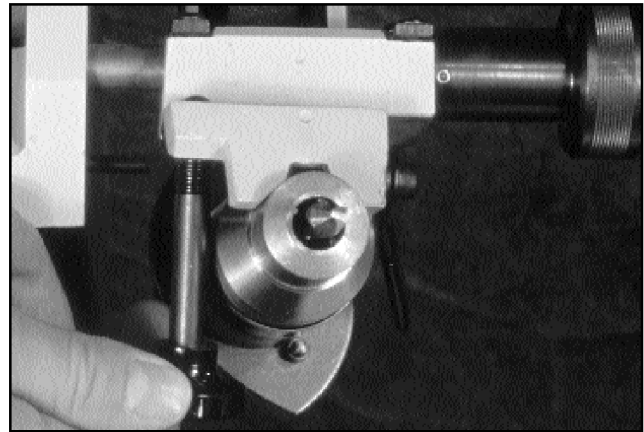
5. Using cross-feed knob "F", position the center of the drill in line with the right edge of the grinding wheel (Fig. 6). Then using feed knob "D", feed drill slowly into the wheel.

Fig. 4



6. Occasionally swing the fixture back to observe if more material needs to be removed, (Fig. 5) until just before you reach the center of the drill.

Fig. 5



7. Then loosen handle "B" and rotate chuck 180°- until the other arrow (on the chuck) aligns with the point split arrow (or your original line up position). Lock the chuck using handle "B". Again, slowly push drill into the wheel, until feed screw "H" butts against stop pin "E". (Fig. 3 & 6)

Fig. 6



NOTE:

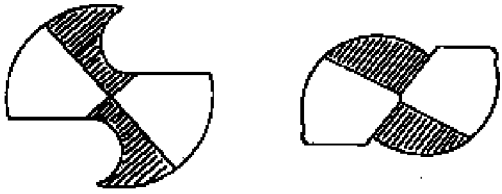
A. This procedure described above is used on drills that have already been split and are just being touched up. For drills that have never been split before care must be taken not to "burn" them. Because of the amount of material being removed, you should push the drill into the wheel for no more than 1 or 2 seconds, then let the drill cool before pushing in again.

B. A new or clean wheel has less of a tendency to burn drills.

C. Once the proper locations of feed knob "D" and cross-feed knob "F" are set...very little adjustment is required on subsequent drills.

D. IMPORTANT: Be sure tension setting screws on both handles "F" and "D" are tight enough to maintain your settings.

PARABOLIC FLUTE AND COBALT DRILLS

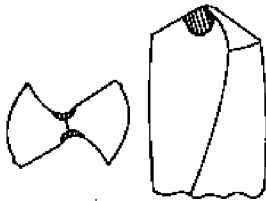


Cobalt

Parabolic

Sharpening parabolic flute drills is easily accomplished on your Darex but a slightly different technique is required. When positioning the drill in the alignment fixture the “drill size” figures should be disregarded. This is because the web of this type of drill is much thicker than a standard drill. Move the drill size lever to the right to position the pawls so that the cutting lips lay flat on the pawls. Then sharpen as if a standard drill. For point splitting or web thinning some experimentation will be required to find the best position on the fixture for your particular drills.

WEB THINNING



Web thinning is accomplished in the same steps used for point splitting except, the arrow on the chuck should be lined up with the “web thin” arrow on the chuck strap. It should be understood that there are many different types of web thinning. By placing the chuck arrow to the right or left of the web thin “arrow” different types of web thinning can be produced. Experiment to determine just what type of thinning you can produce.

A VERSATILE ATTACHMENT (Point Splitter 4900)

Once you have become familiar with this attachment you will find that it is possible to create numerous point variations. For example, the attachment can be used in grinding a zero or negative rake angle at the cutting edge. See page 4. This type of point is often used for drilling brass or free cutting steels. Narrow wheels or special dressing of a vitrified wheel can also be used to create variations in point splitting and web thinning.

NOTE:

A. The M-5 drill sharpener is equipped with CBN Electroplated wheels. This type of wheel does not need truing or dressing. **DO NOT** use a diamond dresser on this wheel or severe damage to the wheel will result. If cleaning of wheel is needed, merely spray or apply solvent to wheel and use a stiff brush to remove any residue.

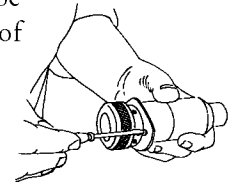
B. The point split wheel will eventually become worn on the right corner. When this occurs merely remove the wheel and rotate it so the other corner is at the right side.

Tips or other information

SHARPENER ADJUSTMENTS

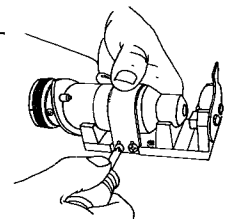
WING CAM PIN ADJUSTMENT

In the event that all drills appear to be sharpened off-center, an adjustment of a cam follower-screw is necessary. To adjust, loosen lock nut on either screw and turn follower screw 1/4 turn in either direction. Sharpen drill to see if off center condition becomes better or worse. Then continue adjustment until desired accuracy is obtained and tighten lock nut.



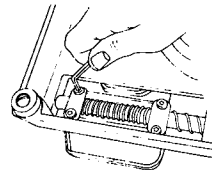
CHUCK BAND ADJUSTMENT

With chuck in place as shown, and grip lever in unlocked position, loosen band screws and press band down. Re-tighten.



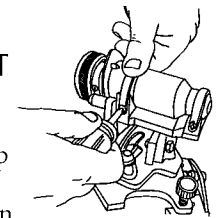
SLIDE PAD ADJUSTMENT

Occasionally slide pad adjustment is required. Be sure not to over-tighten.

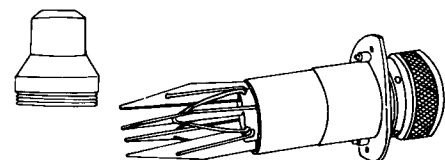


CHUCK STRAP ADJUSTMENT

When excessive tolerance develops between chuck and fixture, straps should be adjusted by loosening strap screws. Insert this shim between strap and chuck, pressing straps down over chuck. Then re-tighten strap screws. **DO NOT OVER TIGHTEN**, that may cause the chuck to bind.



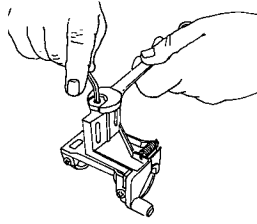
CHUCK DISASSEMBLY



If the chuck becomes exceedingly dirty it may be necessary to remove front nose portion of chuck. Jaws, springs, etc., can now be easily blown off. Make sure to mark jaw and spring positions if further disassembly is necessary. Lubricate the threads with CRC Industrial grade 3-36 spray can lube.

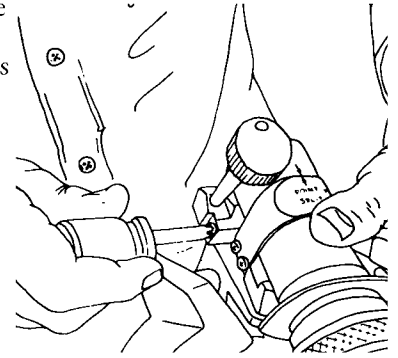
HINGE BEARING ADJUSTMENT

If the sharpening swing fixture gets “sloppy” it may be adjusted by tightening tapered bearing as shown.



FEED KNOB TENSION ADJUSTMENT

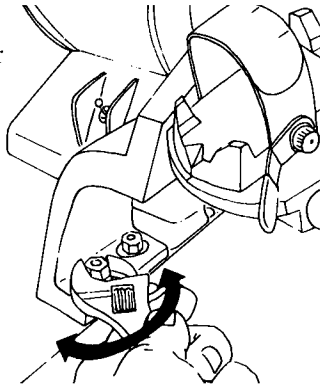
This adjustment is made to keep a slight tension on the feed knob threads to prevent unscrewing because of vibration. Adjust as needed.



POINT SPLITTING/WEB THINNING ATTACHMENT

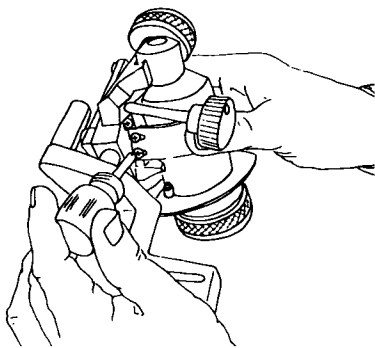
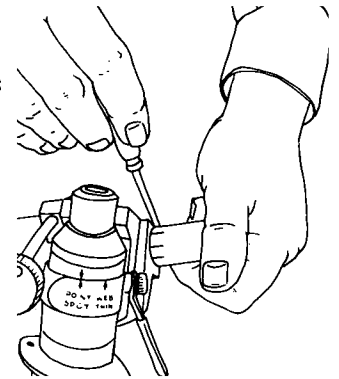
IN-FEED ADJUSTMENT

Make sure point splitter is square to the wheel. Just loosen the two mounting bolts and move the attachment accordingly.



CROSS-FEED KNOB TENSION ADJUSTMENT

This adjustment is made to keep a slight tension on the cross-feed knob to prevent its turning when swinging the chuck holder up and down. Adjust as necessary.

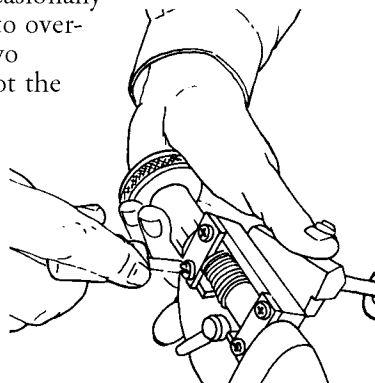


CHUCK BAND ADJUSTMENT

With chuck in place as shown, and lever in unlocked position, loosen band screws and press band down. Re-tighten.

SLIDE PAD ADJUSTMENT

This adjustment is occasionally required. Be sure not to over-tighten. Adjust the two adjusting nuts only, not the screws.



DAREX M4 WHEEL BALANCER INSTRUCTIONS

Imbalance can be found in most vitrified grinding wheels which causes varying degrees of wheel vibration. Because of this, we have incorporated a balancing device with our M4 drill sharpener. If your grinder is so equipped, (please follow the instructions below.

IMPORTANT! Please read safety instructions below before attempting to adjust, remove, and / or install this device.

Instructions for replacing grinding wheels on Darex Drill sharpeners equipped with wheel balancers.

1. Disconnect grinder from power source.
2. Remove wheel guard cover.
3. Remove three Allen head screws.
4. Remove the outer and balancing washers and old wheel.
5. Install new wheel. Important! It is highly recommended that only grinding wheels purchased from Darex be used in conjunction with this balancing device. Darex wheels are marked to locate the light side. Without this

mark, it is very difficult to use the balancing device. If you don't have a Darex grinding wheel, just leave the balance washer off.

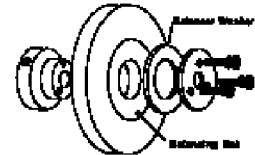
6. Install balancing and outer washer as shown (figure 1).
Note: the screws should be firm, not tight, move the balancer washer toward the dot on the wheel about 1/16" from center, then tighten the screws.
7. Make a mark or note of where the balancing washer is located in relation to the red dot.
8. Put wheel cover on and turn on grinder to check for vibration. If vibration amount is acceptable, you are finished and ready to grind. If not, go to the next steps.
9. Remove wheel guard cover.
10. Loosen the screws slightly, only enough to move the balancing washer. Using a rubber or plastic mallet, slide

the balancer washer either towards or away from the dot on the wheel by striking the washer either opposite or toward the balancing dot. Move the balancer washer about 1/8".

11. Install wheel guard cover.
12. Turn on grinder and check for vibration.

Repeat steps 10-12 and experiment sliding the washer towards and away from the wheel mark until minimum vibration is attained

Fig. 1



| TROUBLE SHOOTING GUIDE | | |
|--|---|--|
| PROBLEM | CAUSE | SOLUTION |
| <p>1. Drill Off Center</p> | <ol style="list-style-type: none"> 1. Improper sharpening 2. Wing cam pin out of adjustment. 3. Excessive dirt or dust in chuck. | <ol style="list-style-type: none"> 1. No problem...just reinsert chuck into procedure. fixture and remove a little more material from the lip. After a little practice you will find this is not necessary. Just apply light and equal pressure as both edges are ground. Do not attempt to advance drill more than 3 gradations of feed knob per setting (about .005). 2. If all drills are off-center it is generally an adjustment indication that a wing-cam pin needs adjustment (see "Adjustments" - Page 8). 3. Normally occasional blowing out with air is all that is required to service dirty chucks. In extreme cases it may be necessary to disassemble chuck to thoroughly clean. |
| <p>2. Improper Relief</p> <p>NEG. °</p> | <ol style="list-style-type: none"> 1. Improper relief setting 2. Drill not in proper position 3. Removing too much material 4. See "Controlling Relief Angle" Section on pg.4 | <ol style="list-style-type: none"> 1. Arrow on chuck must coincide with point angle on relief setting fixture. 2. Make sure drill size arrow is in proper position in relief setting fixture and drill is always pushed into contact with black dot and cutting edges rest on pawls. 3. On extremely dull or broken off end of drill. drills, reset drill after initial roughing in |
| <p>3. Curved Relief</p> | <ol style="list-style-type: none"> 1. Attempting to remove too much feed knob material off end of drill feed knob setting. 2. Cams not held in proper engagement | <ol style="list-style-type: none"> 1. Only remove 3-5 thousandths material off end of drill. per each with each setting. 2. Make sure cams are held against contact points. |
| <p>4. Drill Burning</p> | <ol style="list-style-type: none"> 1. Rotating drill too slowly 2. CBN or diamond wheel worn out. 3. Glazed Wheel | <ol style="list-style-type: none"> 1. Chuck should be rotated quite quickly during sharpening (approx. one full turn per second). 2. Turning too slowly allows heat to build up in drill. 3. If grinding wheel appears glazed or slightly glazed or slightly shiny, wheel needs redressing. (M4 only) Note: Never quench drills in water after grinding or else checking and cracking of the drill point will result. |
| <p>5. Drilled Hole Oversize or out of round</p> <p>FIG. A TOO STEEP FIG. B BETTER</p> | <ol style="list-style-type: none"> 1. Drill sharpened off center 2. Chisel edge angle too great 3. Work piece not clamped 4. Excessive wear in spindle | <ol style="list-style-type: none"> 1. See off-center instructions above. 2. Adjust Lip Relief on setting fixture to "less" (Fig A) position until chisel edge angle is similar to Fig.B 3. Secure work piece 4. See drilling equipment manufacturers instructions |

M-5 Chuck Model# 3500 1/2" Chuck

| DIAGRAM # | PART # | DESCRIPTION | QUANTITY |
|-----------|-----------|------------------------|----------|
| 1 | PP03502TF | 1/2" Nose | 1 |
| 2 | PP03510TF | 1/2" Closing Screw | 1 |
| 4 | PP03640NF | Felt Seal (all chucks) | 1 |
| 5 | SA03515SA | 1/2" Chuck Jaws (SET) | 4 |
| 6 | SA03520RA | 1/2" Jaw Springs (SET) | 4 |
| 9 | PP03501TF | 1/2" Closing Sleeve | 1 |
| 10 | PP03645NF | Nylon Thrust Washer | 1 |
| 11 | SA03505TA | 1/2" Body,Cam,Key | 1 |
| 12 | SA03626FA | Screws & Nuts | 2 each |
| 13 | PP03610FF | Knob Set Screw | 1 |
| 14 | PP03605TA | 1/2" Chuck Knob | 1 |

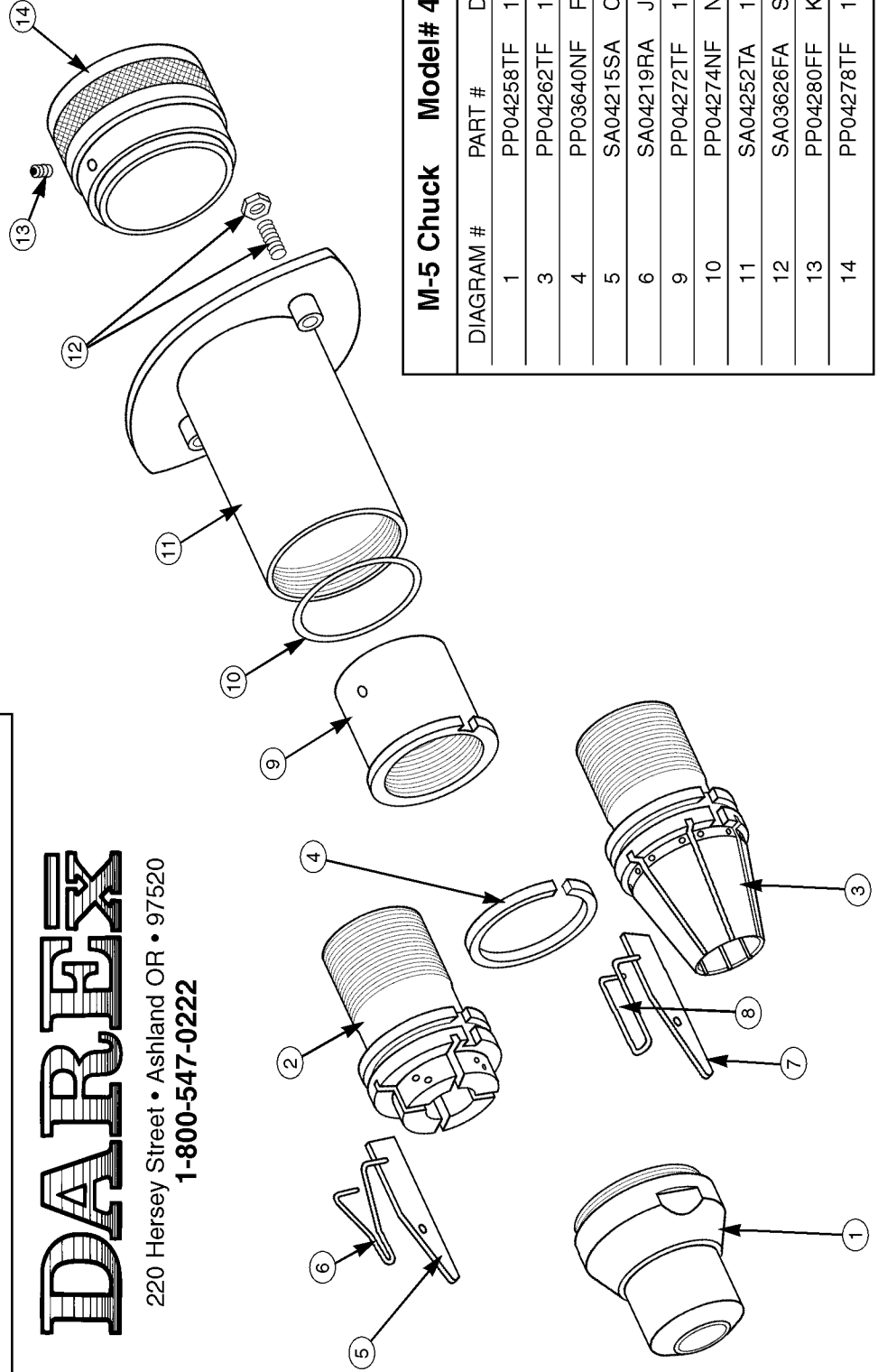
M-5 CHUCK PARTS

M-5 Chuck, Model# 3815 3/4" Chuck

| DIAGRAM # | PART # | DESCRIPTION | QUANTITY |
|-----------|-----------|------------------------|----------|
| 1 | PP03700TF | 3/4" Nose | 1 |
| 3 | PP03710AF | 3/4" Closing Screw | 1 |
| 4 | PP03640NF | Felt Seal (all chucks) | 1 |
| 7 | SA03715SA | 3/4" Chuck Jaws (SET) | 6 |
| 8 | SA03720RA | 3/4" Jaw Springs (SET) | 6 |
| 9 | PP03701TF | 3/4" Closing Sleeve | 1 |
| 10 | PP03645NF | Nylon Thrust Washer | 1 |
| 11 | SA03505TA | 3/4" Body,Cam,Key | 1 |
| 12 | SA03626FA | Screws & Nuts | 2 each |
| 13 | PP03610FF | Knob Set Screw | 1 |
| 14 | PP03605TA | 3/4" Chuck Knob | 1 |

DAIRTEX

220 Hersey Street • Ashland OR • 97520
1-800-547-0222



M-5 Chuck Model# 4250 1-1/8" Chuck

| DIAGRAM # | PART # | DESCRIPTION | QUANTITY |
|-----------|-----------|------------------------|----------|
| 1 | PP04258TF | 1-1/8" Nose | 1 |
| 3 | PP04262TF | 1-1/8" Closing Screw | 1 |
| 4 | PP03640NF | Felt Seal (all chucks) | 1 |
| 5 | SA04215SA | Chuck Jaws (SET) | 8 |
| 6 | SA04219RA | Jaw Springs (SET) | 8 |
| 9 | PP04272TF | 1-1/8" Closing Sleeve | 1 |
| 10 | PP04274NF | Nylon Thrust Washer | 1 |
| 11 | SA04252TA | 1-1/8" Body,Cam,Key | 1 |
| 12 | SA03626FA | Screws & Nuts | 2 each |
| 13 | PP04280FF | Knob Set Screw | 1 |
| 14 | PP04278TF | 1-1/8" Chuck Knob | 1 |

Chuck Disassembly, Cleaning, Repair and Re-assembly M3, M4, or M5

Disassembly:

- A. Using a wrench on nose flats, unscrew nose from body, with jaws all the way open.
- B. Mark jaws & springs before removing them, so they may be installed in their original location.
- C. Remove chuck knob by loosening Allen head set screw and pulling knob off end of sleeve.
- D. Separate chuck body from sleeve.
- E. Unscrew sleeve from closing screw.
- F. For re-assembly see attached view for proper placement-sequence of parts.

Problem: Chuck opens and closes with difficulty:

- A. Look at sleeve where chuck knob setting screw nests in dimple, check inside threads, if set screw was over-tightened the threads could be damaged. To Repair: Replace sleeve.
- B. Make sure threads are clean of grit, and not damaged. Recommended lubrication for the Darex drill chucks is a spray-can lubricant. This product is called CRC Technical Grade 3-36, #03003. If this can't be located locally, call CRC at 1-800-272-4620 and they can inform you of a local supplier of the product.
- C. Check felt washer, see if it has jammed into key way. To Repair: Pull out of key way - clean out pieces - install new felt washer.
- D. Check jaw springs, make sure they are pushed all the way into the holes, if one is not completely in, it will drag inside.

Problem: Knob turns and won't tighten on drill:

If the jaws turn with the tightening knob, the key inside has broken loose.
To Repair: Return to factory for repair.

Problem: Chuck won't grip drill bits tight enough:

(First be sure you are firmly tightening the knob)

- A. Jaws may be bent, close chuck all the way down and make sure the jaws line up with each other and appear straight. Replace if necessary.
- B. Upon removing nose of chuck, inspect inside of nose for grooves, if grooves are visible, nose piece should be replaced. For 1/2" chuck - if nose of body need replaced, send to Darex for this type of repair.
- C. Check springs and make sure they are pushed into their mounting holes all the way into closing screw.

D. If tightening knob set screw has been set too tight, a dent will appear on the inside threads of the sleeve and result in making it difficult to tighten chuck properly.

E. Closing screw could be dirty with grit. Pull apart and clean with solvent & brush. Lubricate as mentioned in problem #1

Problem: Drill grind changes with same alignment settings:

A. Check wing cam for tightness on chuck body. If wing cam is loose and has moved, even slightly, the timing of drill in chuck will not be correct. To fix, return to Darex for repair.

Special Notes:

*Do not attempt to hold chuck in a bench vise or clamp with pliers. Body of chuck will become out of round.

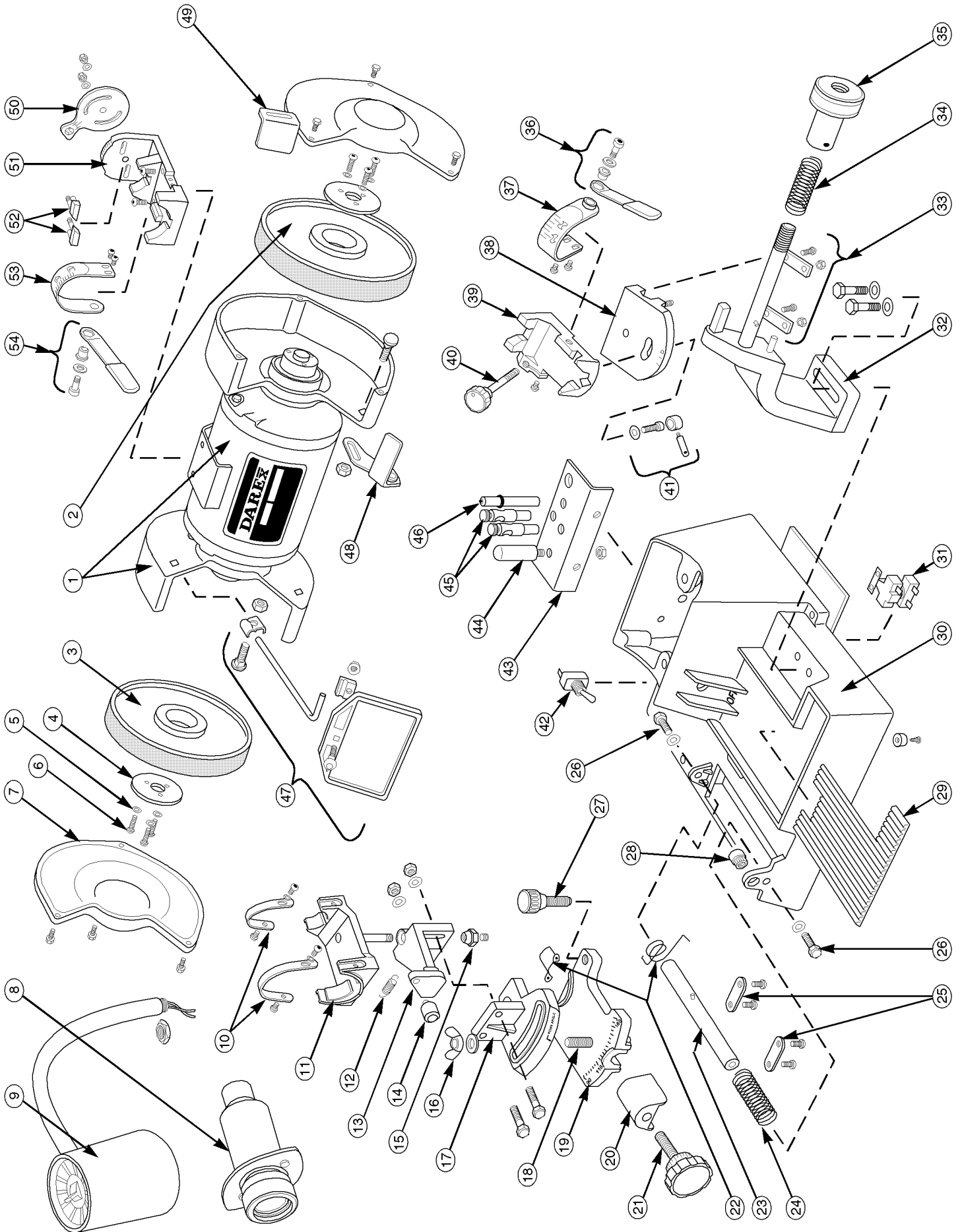
*When disassembling chuck, if removing jaws & jaw spring, be sure to mark them prior to removal.

*When installing closing knob, be sure not to over tighten the Allen head set screw. It could result in damage to inner threads of sleeve.

If any problems exist with your drill holding chucks and you wish not to fix them yourself, please UPS the item to Darex with a note informing us as to what the problem is and we will maintain it as requested.

DAREX CORPORATION
PO Box 277
220 Hersey
Ashland, OR 97520

Phone (541)488-2224
(800)547-0222



M5 PARTS LIST

| ILLUS. # | PART # | ILLUS. # | PART # |
|----------|-----------|----------|---|
| 1 | SA04003MA | 28 | PP03345TF |
| 1 | SA04002MA | 29 | PP04051PF |
| 2 | 4863 | 30 | PP04000CF |
| 2 | 4858 | 31 | PP04120MF |
| 3 | 4862 | 31 | PP04119MF |
| 4 | PP08646SF | 32 | SA03901CA |
| 5 | PP08650FF | 33 | PP03918BF |
| 6 | PP08648FF | 34 | PP03916RF |
| 7 | PP04110MF | 35 | SA03930AA |
| 8 | SA03500AA | 36 | SA03411SA |
| 8 | SA03815AA | 37 | SA03936SA |
| 9 | PP05868EF | 38 | PP03920CF |
| 10 | SA03008PA | 39 | SA03935CA |
| 11 | SA03003CA | 40 | SA03953PA |
| 12 | PP03110RF | 41 | SA03925TA |
| 13 | PP03100CF | 42 | PP04160MF |
| 14 | PP03105TF | 42 | PP04162EF |
| 15 | PP03025TF | 43 | PP04154MF |
| 16 | PP03220FF | 44 | PP03811TF |
| 17 | PP03200CF | 45 | SA05823TA |
| 18 | PP03309BF | 46 | SA03820NA |
| 19 | PP03300CF | 47 | SA04052MA |
| 20 | PP04018SF | 48 | SA04053MA |
| 21 | SA04021PA | 49 | PP04158MF |
| 22 | SA04015SA | 50 | PP03430SF |
| 24 | PP03324RF | 51 | SA03402CA |
| 25 | SA03327SA | 52 | SA03413BA |
| 26 | PP03330FF | 53 | SA03409SA |
| 27 | SA03306PA | 54 | SA03411SA |
| | | | SA03525BA |
| | | | M-SERIES CHUCK WRENCH |
| | | | Not Shown |
| | | | FEED SCREW NUT |
| | | | TOOL TRAY MAT |
| | | | BASE CASTING |
| | | | 115 VOLT MOTOR STARTING RELAY |
| | | | 230 VOLT MOTOR STARTING RELAY |
| | | | Pnt. spl. casting w/arbor/roll pin & upper stop pin |
| | | | PNT. SPLT. ARBOR RETAINING PLATE |
| | | | PNT. SPLT. COMPOUND BRONZE CASTING |
| | | | PNT. SPLT. CROSS FEED KNOB/SET SCREWS |
| | | | PNT. SPLT. LOCKING LEVER COMPONENTS |
| | | | PNT. SPLT. HOLD DOWN STRAP/BUSHING |
| | | | PNT. SPLT. COMPOUND BRONZE CASTING |
| | | | PNT. SPLT. HOLDING FIXTURE CASTING/PIN |
| | | | PNT. SPLT. KNOB/SCREW |
| | | | PNT. SPLT. SCREW HANDLE/BUSHING |
| | | | 115 VOLT ON/OFF SWITCH |
| | | | 230 VOLT ON/OFF SWITCH |
| | | | BRACKET FOR LAMP & TOOL HOLDING |
| | | | CHUCK MOUNTING STUD |
| | | | Pnt. spl. dresser h/drs w/knobs |
| | | | (M5 only-prior s/n528294) |
| | | | Diamond dresser/Grit ring |
| | | | (M5 only-prior s/n528294) |
| | | | EYE SHIELDS & HARDWARE (2) |
| | | | TOOL REST ASSEMBLY (M4 ONLY) |
| | | | SPARK GUARD |
| | | | PAWL CAM |
| | | | SETTING FIXTURE CASTING & PIN |
| | | | PAWLS (SET OF 2) |
| | | | SETTING FIXTURE HOLD DOWN STRAP/BUSHING |
| | | | STRAP LOCKING LEVER/COMPONENTS |