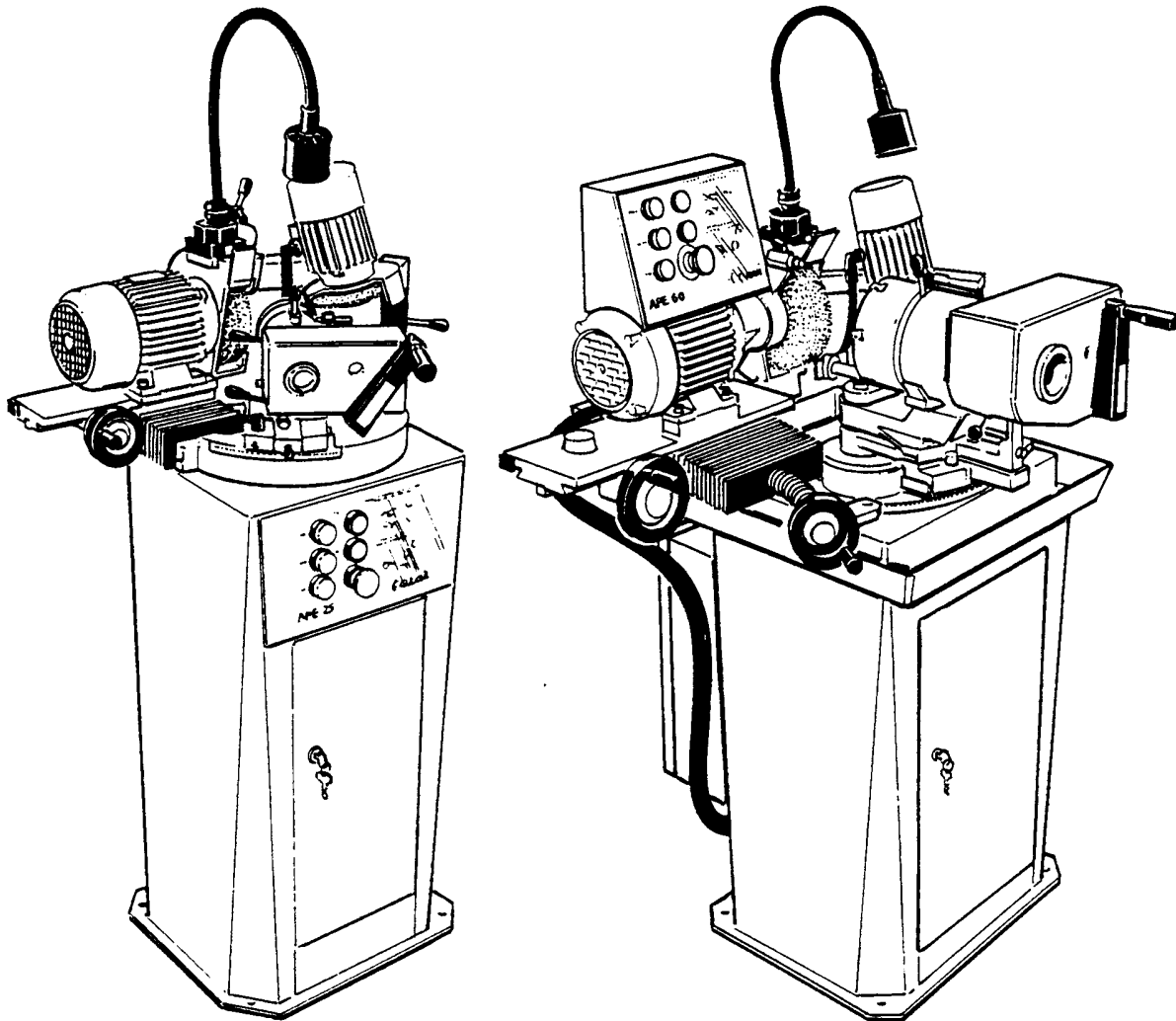
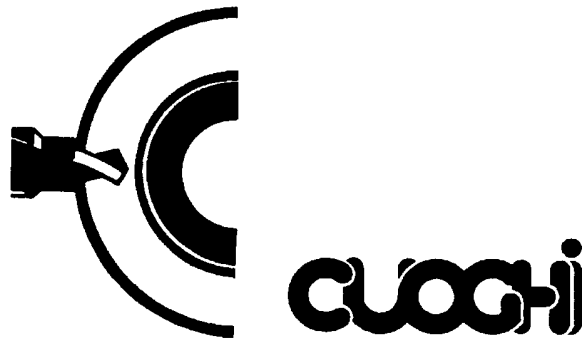


cucchi

APE 25 - 40 - 60



INSTRUCTION MANUAL



INSTRUCTION MANUAL

SHARPENING MACHINE

APE 25 - 40 - 60

(Updated 01.02.95)

**THIS
MACHINE
IS IN COMPLIANCE
WITH EUROPEAN
UNION DIRECTIVES
N° 89/392/EEC
N° 91/368/EEC**



IDENTIFICATION

•	CUOGHI/AFFILATRICI snc	•
	41100 MODENA - ITALY	
	VIA S. ALLENDE, 117 - 119	
	TEL. 059/251206	
	TELEFAX 059/252791	
	CE 95	
MODEL	<input type="text" value="DRILL SHARPENER"/>	
TYPE	<input type="text" value="APE"/>	
SERIAL N.	<input type="text"/>	
•		•

SAFETY REGULATIONS

Throughout this Manual the signal words **WARNING!**, **CAUTION!** **NOTE!** are used to highlight instructions or information regarded as critical or unusual.

These signal words are defined as follows:



WARNING!

Information or procedure that if not strictly observed can cause immediate personal injury.



CAUTION!

Information or procedure that if not strictly observed can cause serious damage to the machine.

NOTE!

Information or procedure that can facilitate or simplify maintenance operations or, in any event, a particularly important text to be underlined.

Read this manual carefully before commissioning, starting, servicing or any other work on this machine.

Do not allow unauthorized personnel to work on or with the machine. do not wear rings, wrist watches, jewelry, loose or dangling garments such as ties, scarves, unbuttoned

jackets, overalls with open zippers, torn garments that could be caught in moving parts.

Wear protective clothing.

Always use eye protection and gloves capable of protecting you from minute metal pieces.

Do not start the machine if it has broken down.

Before starting the machine check to make certain that all conditions dangerous to safe operation have been eliminated.

Inform the appropriate person of any operating problem.

Check to be certain that all guards are in place and all safety devices are present and working.

The maintenance (routine and special) area must be kept clean, dry and with all necessary equipment available and in good working order.

Before making any inspection, adjustment or repair be certain the machine is stationary and disconnected from the power source.

Observe the procedures and information given in this manual for maintenance and technical assistance.

Do not use gasoline, solvents or other flammable liquids as detergents. Use only authorized non-flammable and non-toxic commercially available products.

Do not use compressed air to clean the machine or parts of the machine. Where this cannot be avoided, wear eye protection with side guards and limit the pressure to 2 bar.

Do not use an naked flame as a light source when checking the machine or searching for leaks.

Do not lubricate the machine when it is moving.

Before making electric hook ups, check to be certain that the voltage and frequency are as required by the machine.

Make the electric hook up to a mains supply with an efficient grounding circuit.

Any work on the electric system such as replacing fuses, resetting overload cut-outs, etc. must be done exclusively by specialized personnel. The machine must be disconnected from the power source.

PACKING LIST

SHARPENER MOD. APE 25
 Mains power supply (V) _____
 Serial N _____

Cooling system _____

Cam N _____

Cutter rake tool _____

Miller sharpening tool _____

Magnifying glass with 5 diopter lens _____

Grinding wheel _____

Grinding wheel flange _____

SHARPENER MOD. APE 40
 Mains power supply (V) 380/50
 Serial N 95

Automatic revolver toolholder head _____

Cam N _____

Cutter rake tool _____

Miller sharpening tool _____

Static grinding wheel balancer _____

Magnifying glass with 5 diopter lens _____

Grinding wheel _____

Grinding wheel flange _____

SHARPENER MOD. APE 60
 Mains power supply (V) _____
 Serial N _____

Cam N _____

Cutter rake tool _____

Miller sharpening tool _____

Static grinding wheel balancer _____

Magnifying glass with 5 diopter lens _____

Grinding wheel _____

Grinding wheel flange _____

NOTE! _____

Always specify the **Machine Model** and **Serial N.** when contacting our Technical Assistance Service as this will help us give you fast and efficient service.

Always specify your machine's Model when contacting our Technical Assistance Service.

NOTICE

- This Instruction Manual contains information on the performance, technical features, use and maintenance for normal and correct machine operation.
- Read this manual carefully and strictly follow the instructions it gives as it contains important indications concerning safety during use and maintenance.

This Manual is part of the machine. Keep all instructions permanently with the unit available for further consultation by machine operators. Keep a photocopy for your files/technical office.

APE 25 - 40 - 60

**ARE SEMI-AUTOMATIC SHARPENING MACHINES
DESIGNED AND BUILT TO SHARPEN TWIST AND RIGHT
AND LEFT FLUTE DRILLS WITH 1-12 CUTTING EDGES.**



CAUTION!

Before any kind of sharpening work, read the entire chapter in this manual covering the operation planned so as to have a complete vision of all the dangers involved.

- The machine must only be used for the purpose it was specifically designed for. **Any other use is to be considered improper and unreasonable..**
- Manufacturer cannot be held responsible for any injury or damage caused by improper, incorrect or unreasonable use.

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1

TECHNICAL SPECIFICATIONS

APE 25

• Min. grinding diameter	mm 1,5
• Max. grinding diameter	mm 25
• Min. and max. drill angle	40° - 180°
• Tool flutes (left/right)	da 1 a 12
• Grinder drive motor rating	Kw 0,38
• Electric spindle motor rating	Kw 0,18
• Control push-button panel	V 24

APE 40

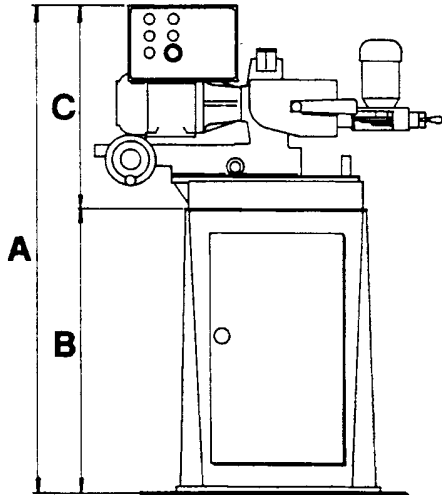
• Min. grinding diameter	mm 2
• Max. grinding diameter	mm 40
• Min. and max. drill angle	40° - 180°
• Tool flutes (left/right)	da 1 a 12
• Grinder drive motor rating	Kw 0,76
• Electric spindle motor rating	kw 0,18
• Electric pump motor rating	Kw 0,06
• Control push-button panel	V 24

APE 60

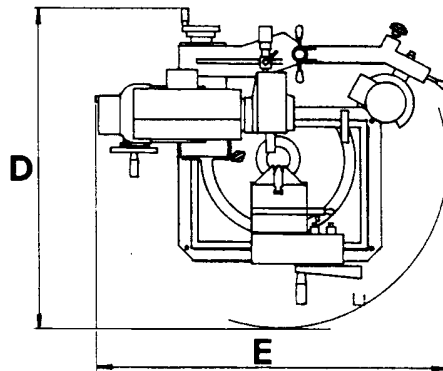
• Min. grinding diameter	mm 3
• Max. grinding diameter	mm 60
• Min. and max. drill angle	40° - 180°
• Tool flutes (left/right)	da 1 a 12
• Grinder drive motor rating	Kw 1,5
• Electric spindle motor rating	kw 0,18
• Electric pump motor rating	Kw 0,06
• Control push-button panel	V 24

2 HOISTING, OVERALL DIMENSIONS, WEIGHT

2.1 OVERALL DIMENSIONS



	APE 25	APE 40	APE 60
A mm.	1170	1200	1250
B mm.	820	720	720
C mm.	350	480	530
D mm.	680	820	750
E mm.	740	840	1040



2.2 WEIGHT

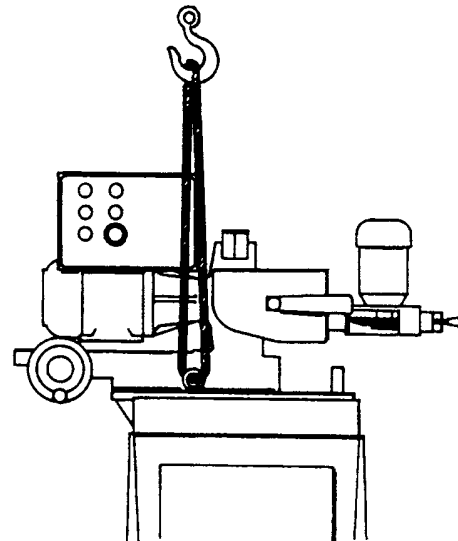
APE 25	100 Kg 220 LB
---------------	--------------------------------

APE 40	170 Kg 374 LB
---------------	--------------------------------

APE 60	215 Kg 473 LB
---------------	--------------------------------

2.3 HOISTING

To hoist the machine, put a wire or strap through the lifting lug and hook to a lifting tackle.

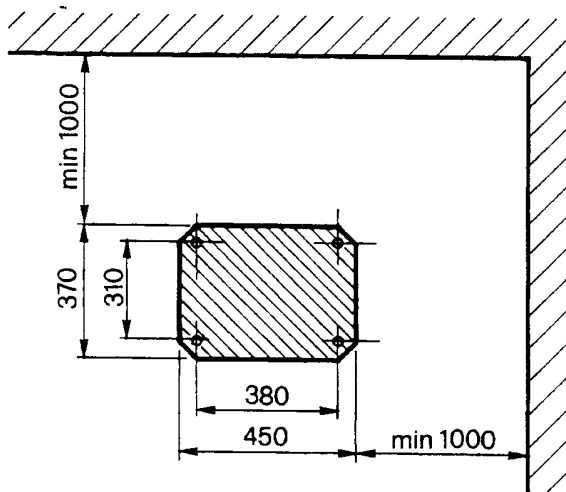
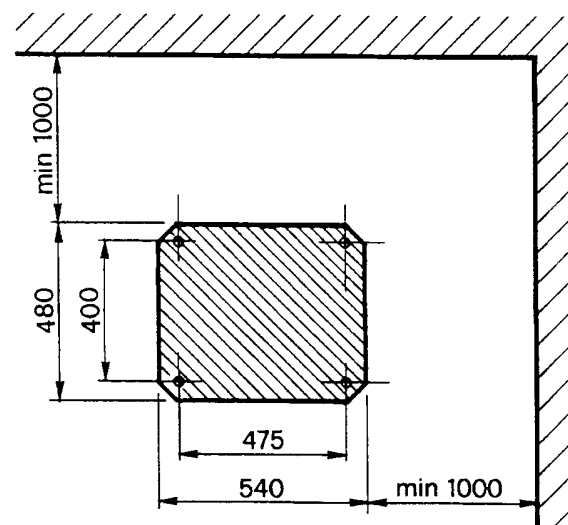


3**INSTALLATION****3.1 UNPACKING**

When the machine is delivered, unpack it and check it out thoroughly to be certain there are no visible signs of damage. If in doubt, do not use the machine but contact your dealer or refer the matter directly to Cuoghi.

3.2 PRESCRIPTIONS FOR FIXING

- Fix the machine with the four expansion bolts inserted through the holes pre-drilled in the base.
- Check the level with a precision level.
- For safe and operator-friendly running, install the machine at least 1000 mm from surrounding walls.

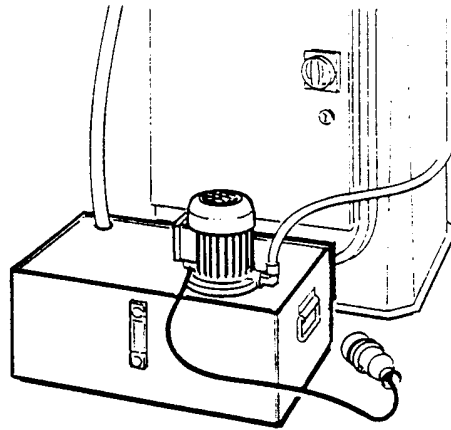
3.3 BASE DIMENSIONS**APE 25****APE 40 - 60**

3.4 CLEANING

Wear gloves and use a clean cloth to remove all the anti-rust grease coat used to protect all externally machined parts.

3.5 COOLING

- Fill the reservoir with water (30 l) and mix with synthetic or semi-synthetic oil suitable for grinding machines (1.5-2%).
- Plug the pump motor into a power socket.
- Connect the filler tube to the pump fitting and the drain tube to the hole in the reservoir.
- Adjust flow with tap 2.



WARNING!

Any work, even minor, on the electric system must be done by PROFESSIONALLY QUALIFIED PERSONNEL.

Manufacturer declines any and all liability for injury to persons or damage to things caused by failure to observe this warning.



NOTE!

Do not use cutting oil as this will gum the grinding wheel.

3.6 ELECTRIC CONNECTIONS AND FUNCTIONAL TEST

- First check to be certain the mains electricity supply is the same as that given on the machine's rating plate.
- For the electric connections use wire with min. $4 \times 1.5 \text{ mm}^2$ cross-section and a plug in conformity with European standards or with those of the country where the machine will be working.
- The plug must have a grounding contact.
- Check the efficiency of the grounding circuit.

APE 25

- Connect the plug in the machine's kit to a min. $4 \times 1.5 \text{ mm}^2$ cross-section cord respecting the terminal markings (R,S,T, GND). The neutral terminal (N) need not be connected.

APE 40-60

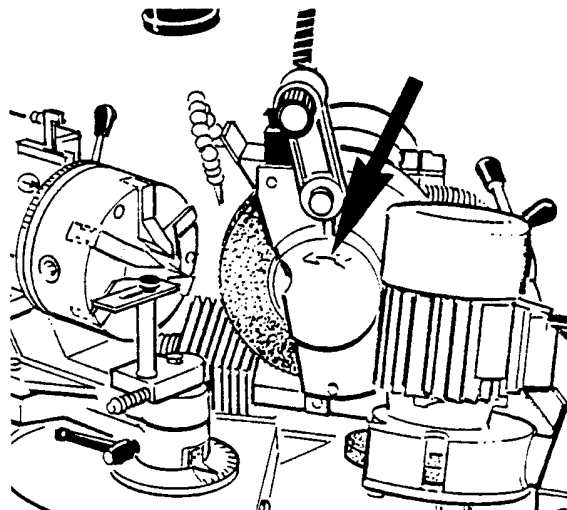
- Open the electric enclosure cover and connect a min. $4 \times 1.5 \text{ mm}^2$ cross-section cord to the terminals marked R,S,T GND.



CAUTION!

Check by pressing briefly the main grinding wheel (34) RUN button that the turning direction is that shown by the arrow on the guard cowling. If it is not, switch two of the three wires in the plug (RST). **DO NOT INVERT THE TURNING DIRECTION OF THE INDIVIDUAL MOTORS.**

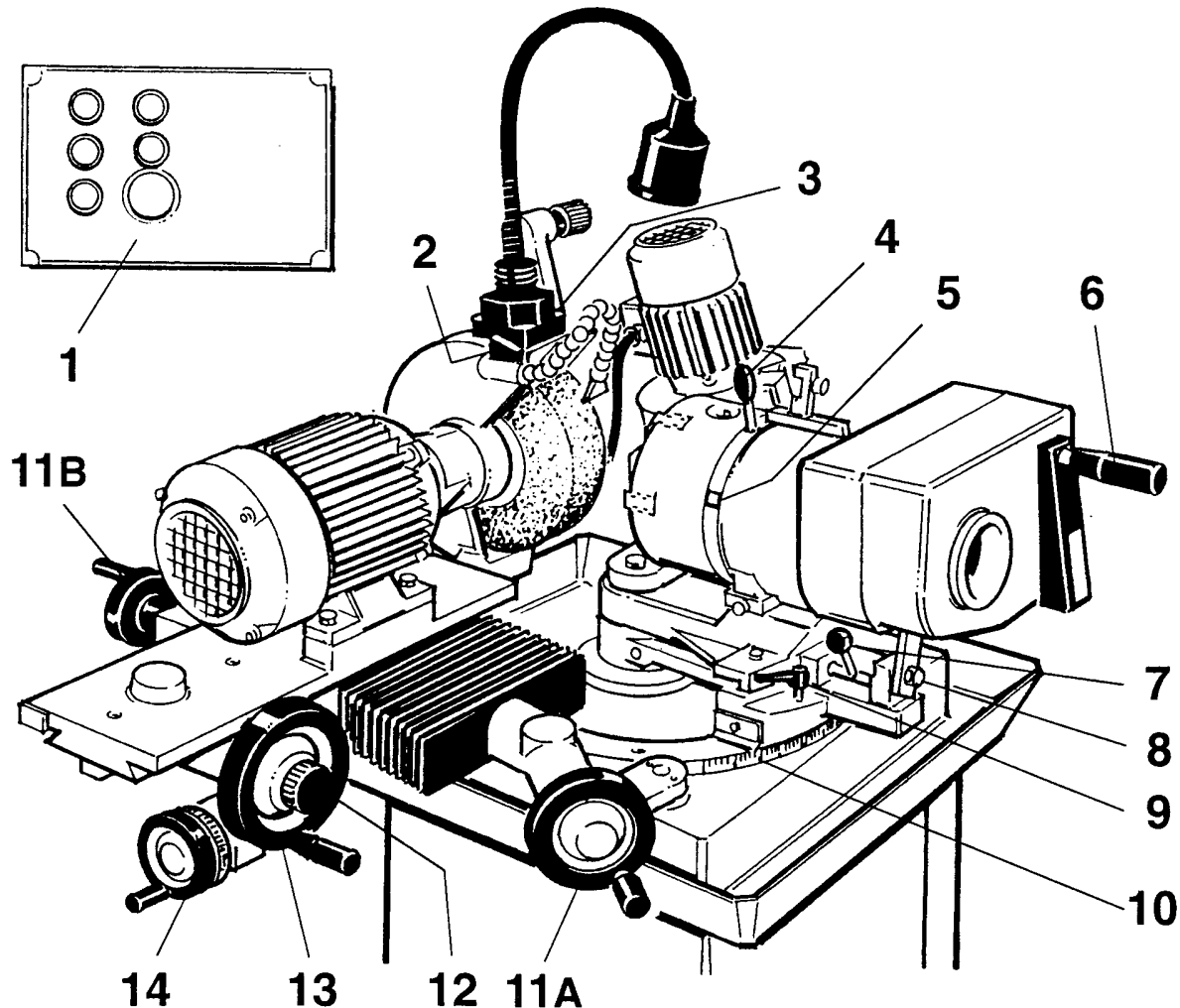
When the turning direction of the main grinding wheel motor is that shown by the arrow, the other motors (electric spindle and coolant pump) are enabled in the correct turning direction.



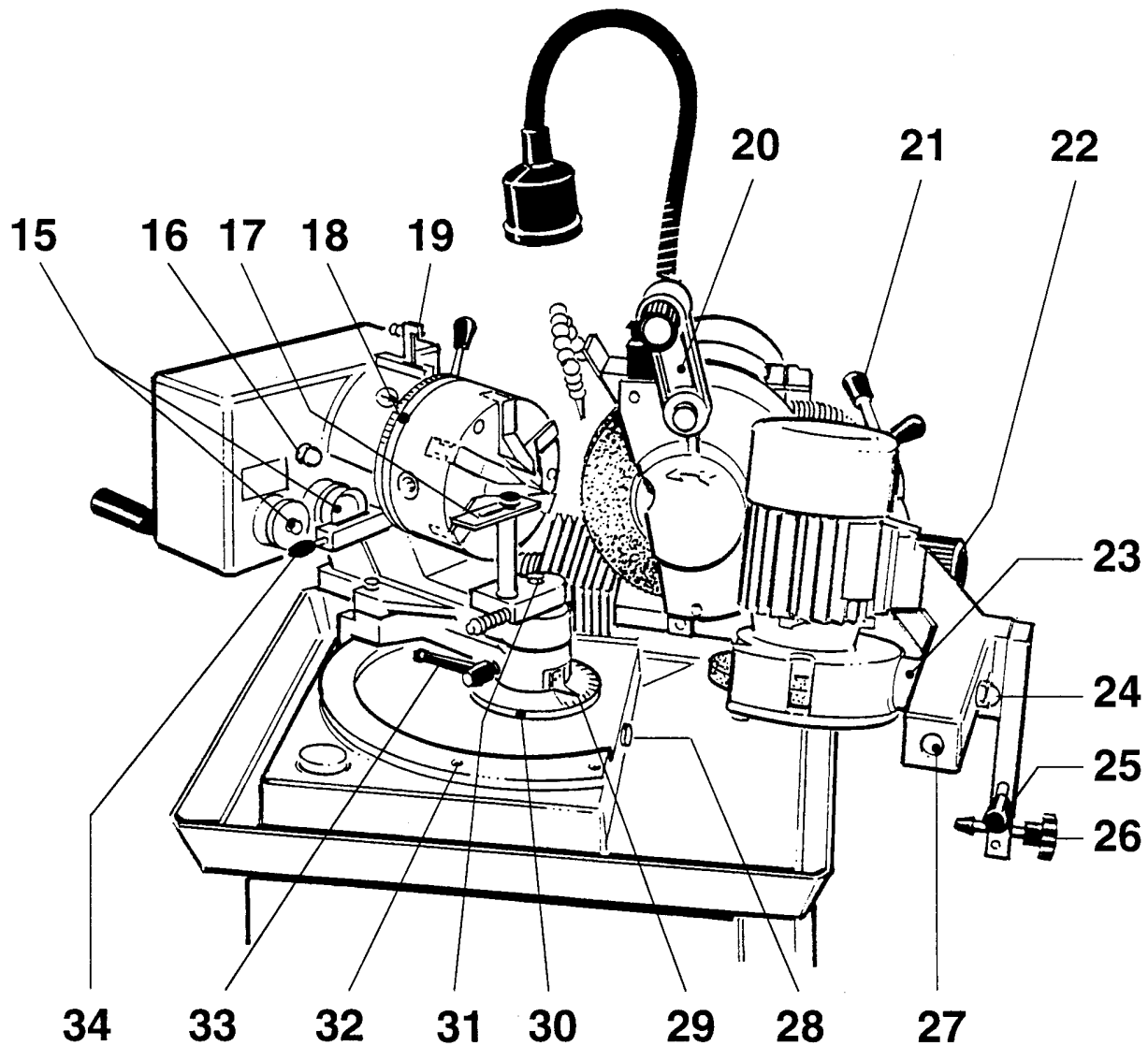
4

LIST OF CONTROL

4.1 LIST OF CONTROLS

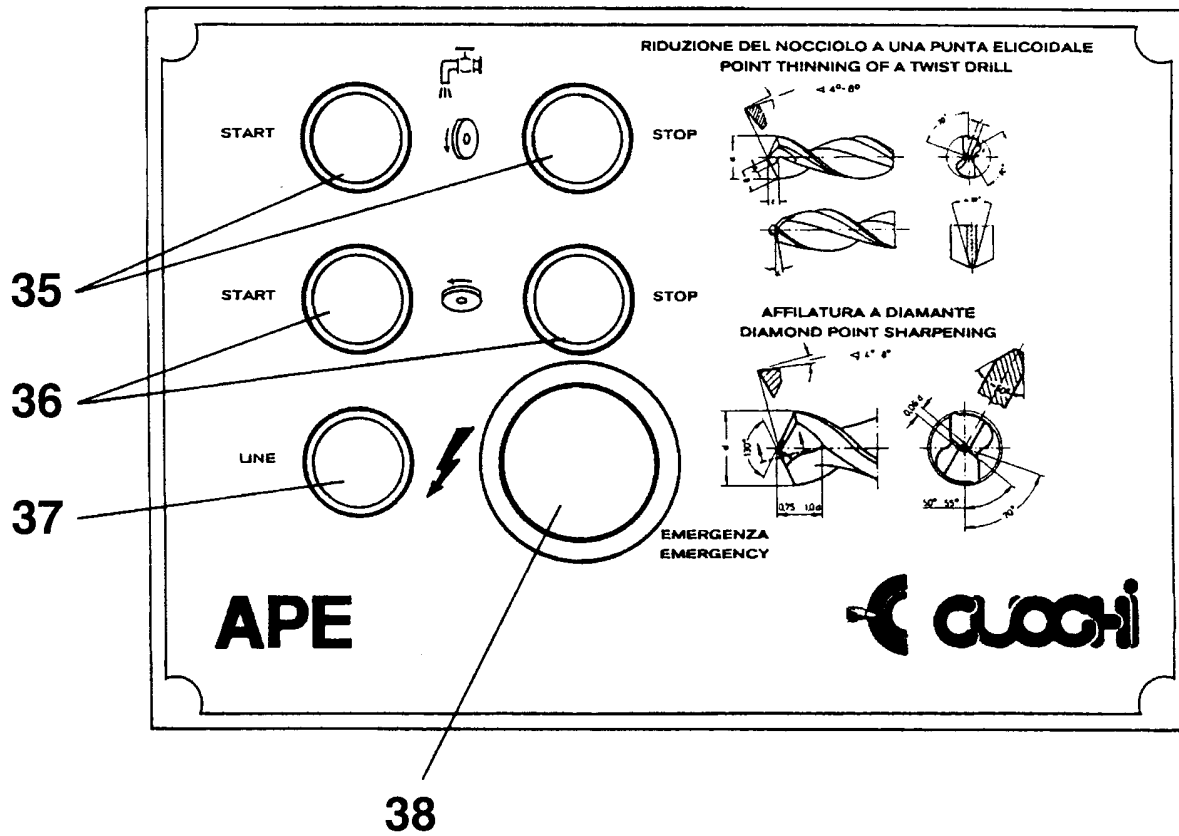


- 1 - PUSH-BUTTON CONTROL PANEL
- 2 - COOLING LIQUID TAP
- 3 - HALOGEN LIGHT SWITCH
- 4 - RAKE ANGLE REGULATING KNOB
- 5 - POSITIONING PINS
- 6 - OPERATING HANDLE
- 7 - ROTATION (A) OR OSCILLATION (B) KNOB
- 8 - LEVER LOCKING KNOB (APE 40) OR NUT (APE 25/60)
- 9 - POSITIONING PIN
- 10 - OUTSIDE GRADUATED SCALE
- 11A- APE 40,60 GRINDSTONE INCREASE WHEEL (0.01 MM)
- 11B- APE 25 GRINDSTONE INCREASE WHEEL (0.01 MM)
- 12 - FAST HANDWHEEL LOCKING NUT (APE 40/60)
- 13 - FAST LENGTHWISE MOVEMENT HANDWHEEL
- 14 - MICROMETRIC LENGTHWISE MOVEMENT HANDWHEEL (APE 40/60)



- 15 - CAM HOLDER RATIO 1:1 AND 1:2
- 16 - BELT TENSIONER LOCKING NUT
- 17 - SLIDING DRILL POSITIONING TEMPLATE
- 18 - RAKE ANGLE INDEX
- 19 - SPINDLE POSITIONING KEY
- 20 - RIGHTHAND ADJUSTMENT DIAMOND DRESSER MOUNT
- 21 - ELECTRIC SPINDLE HEIGHT REGULATING KNOB
- 22 - DIAMOND DRESSER
- 23 - ELECTRIC SPINDLE GRADUATED SCALE
- 24 - ELECTRIC SPINDLE LOCKING NUT
- 25 - ELECTRIC SPINDLE ARM GRIP
- 26 - ELECTRIC SPINDLE END TRAVEL REGULATION KNOB
- 27 - HOLE TO INSTALL DIAMOND DRESSER (ELECTRIC SPINDLE DRESSING)
- 28 - CENTRE PINION LOCKING SCREW
- 29 - CENTRE PROTRACTOR INDEX
- 30 - CENTRE PROTRACTOR
- 31 - DRILL POSITIONING BLOCK LOCKING NUT
- 32 - POSITIONING HOLE
- 33 - TOOLHOLDER HEAD LOCKING LEVER
- 34 - CAM CHANGING KNOB

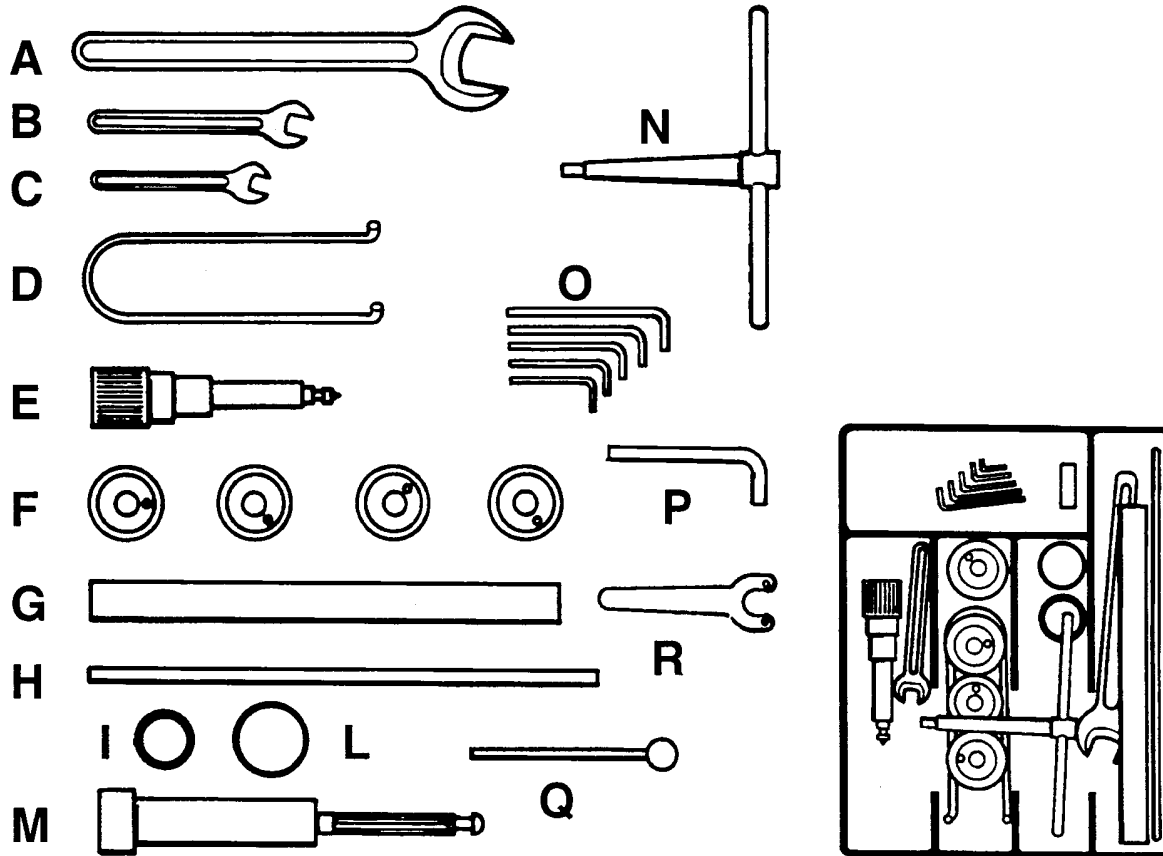
4.2 LIST OF PUSH-BUTTON PANEL CONTROLS



- 35 - MAIN GRINDER WHEEL MOTOR AND COOLANT PUMP MOTOR RUN/STOP BUTTONS
- 36 - ELECTRIC SPINDLE RUN/STOP BUTTONO
- 37 - POWER ON LED
- 38 - EMERGENCY STOP BUTTON

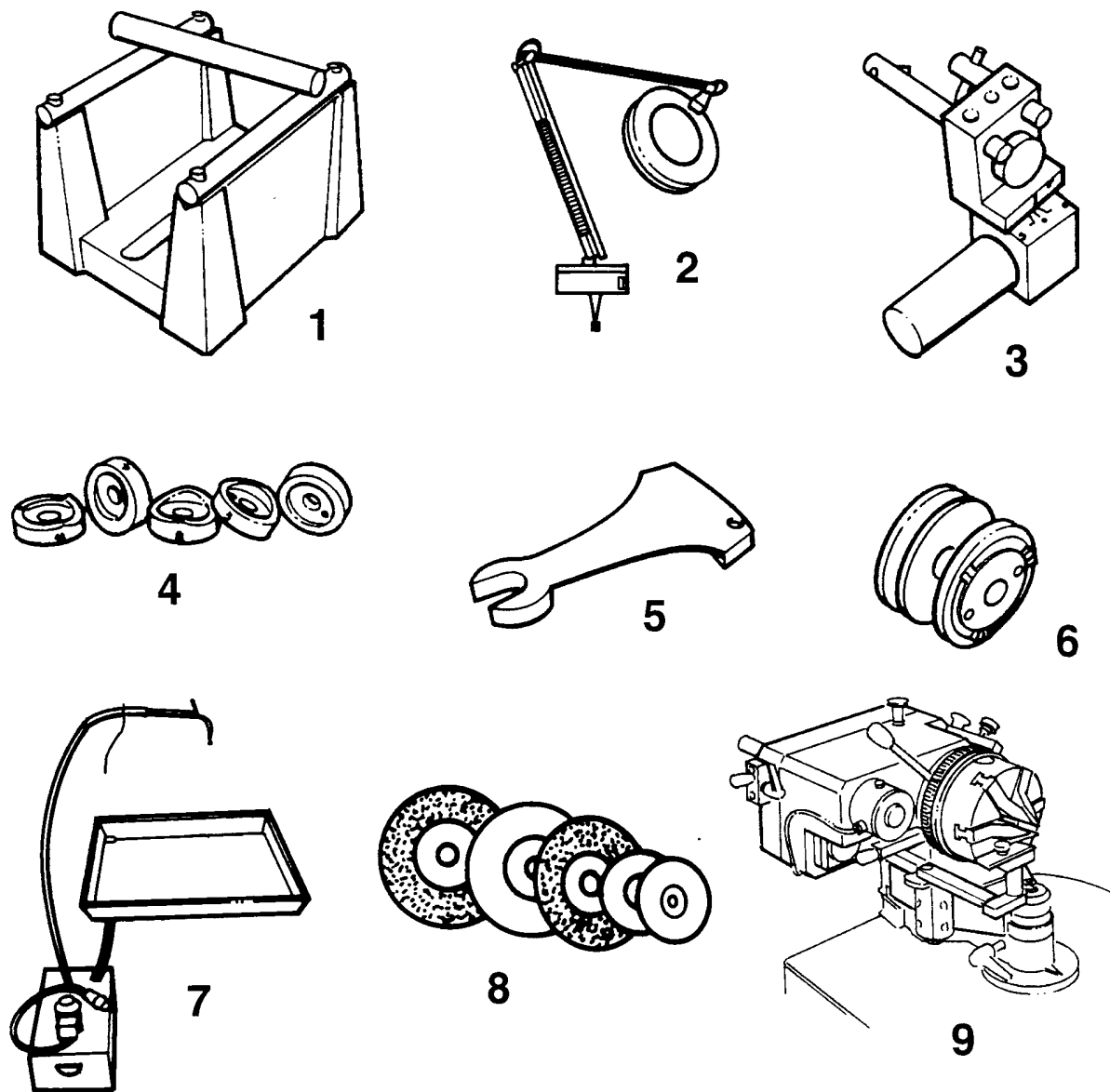
5 ACCESSORIES

5.1 STANDARD ACCESSORIES



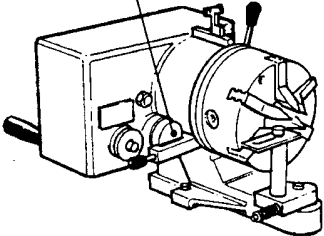
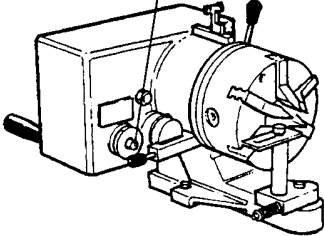
POS.	DESCRIPTION	25	40	60
A	32 MM WRENCH		•	•
B	17 MM WRENCH	•	•	•
C	13 MM WRENCH	•	•	•
D	HOOK WRENCH		•	•
E	DIAMOND HOLDER WITH 0.5 CT DIAMOND	•	•	•
F	SET OF 4 CAMS (2,6,8,10)	•	•	•
G	TAPER TANG DRILL CENTERING BUSH MORSE CONE 1-2	•	•	
H	DRILL EXTRACTOR	•	•	
I	MORSE CONE 3	•	•	
L	MORSE CONE 4		•	
M	TAPER TANG DRILL CENTERING BUSH MORSE CONE 5			•
N	TOOLHOLDER WRENCH		•	•
O	SETSCREW WRENCHES 2.5, 3, 4, 5,6	•	•	•
P	SETSCREW WRENCH 10		•	•
Q	TOOLHOLDER WRENCH	•		
R	FACE WRENCH	•	•	•

5.2 OPTIONAL ACCESSORIES



- 1 - STATIC BALANCER WITH PIN
- 2 - LAMP WITH 5X MAGNIFYING GLASS
- 3 - RAKE GRINDING FIXTURE
- 4 - CAM (SEE PAGE 16)
- 5 - MILLER SHARPENING LIFT PLATE
- 6 - GRINDING WHEEL HOLDER FLANGE
- 7 - COOLING SYSTEM (APE 25)
- 8 - GRINDING WHEEL (SEE P. 56)
- 9 - DRILL HOLDER ASS'Y WITH AUTOMATIC GRINDER ROTATION (APE 40)

5.3 LIST OF CAMS AND THEIR USE

SPINDLE-CAM RATIO		SPINDLE-CAM RATIO			
<p>1:2</p> 		<p>1:1</p> 			
		CAM N°	RIGHTHAND DRILLS Green cam	LEFTHAND DRILLS Red cam	RIGHTHAND DRILLS Green cam
	1		90°+140° 2 cutter drills		
	2	90°+140° 2 cutter drills			
	3		2-cutter 180° drills		
	4	2-cutter 180° drills			
	5		2-cutter drill + diamond		1-cutter countersinker
	6	2-cutter drill + diamond		1-cutter countersinker	
	7		Tap and 4-cutter drills		
	8	Tap and 4-cutter drills			
	9		6-cutter tap		Tap, drills, 3-cutter countersinker
	10	6-cutter tap		Tap, drills, 3-cutter countersinker	
	11		2-cutter drill, blank holes and sheeting		
	12	2-cutter drill, blank holes and sheeting			
	13				7-cutter tap
	14			7-cutter tap	
	15		8-cutter tap		
	16	8-cutter tap			
	17				9-cutter tap
	18			9-cutter tap	
	19		10-cutter tap		5-cutter tap
	20	10-cutter tap		5-cutter tap	
	21				11-cutter tap
	22			11-cutter tap	
	23		12-cutter tap		
	24	12-cutter tap			

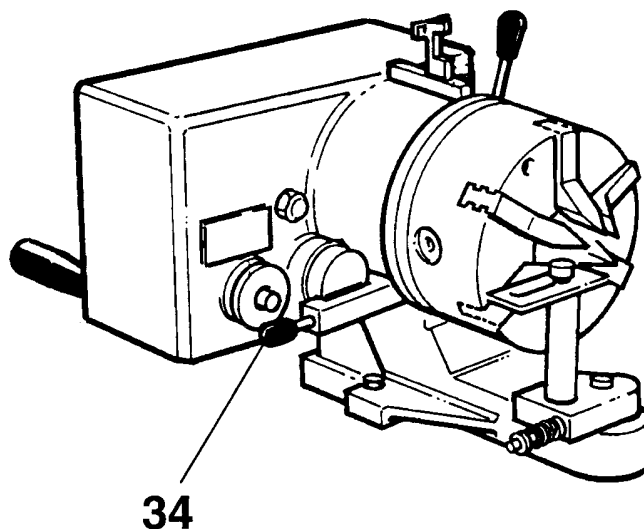
- Cams 2, 6, 8 and 10 are standard equipment
- The sharpening machine is delivered with cam 2 in the 1:2 mount
- Cam 5 and 6 in addition to pilot drills as indicated in the chart, can also be used with 2-cutter countersinks and drills with angles less than 80°.

CAUTION!

Cams 1, 2, 3 and 4 must be used with the oscillating movement engaged.

5.4 CHANGING CAMS

- Push knob 34 forward
- Remove the cam
- Insert the appropriate cam using the positioning pin on the cam holder as your reference point.



CAUTION!

Do not operate the machine with two cams installed.

OPERATING INSTRUCTIONS

6

GENERAL INFORMATION

The APE 25,40,60 sharpening machines are composed of a base on which a tool holder head, grinder holder and an electric spindle are mounted.

6.1 TOOLHOLDER HEAD ASS'Y

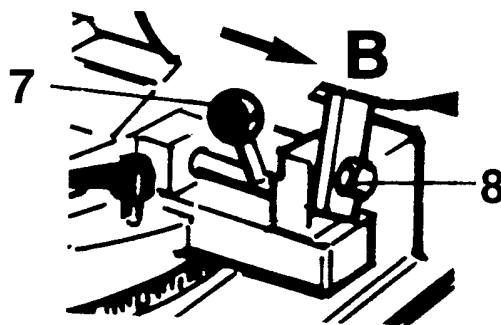
The tool holder head rotates on a pin connected to the centre of the base and can be positioned for any drill angle from 40°-180°.

This ass'y comprises a body holding the spindle shaft mounted on two appropriately spaced precision roller bearings. The drill is precision 6-jaw chuck holds the drill and guarantees excellent centering.

During sharpening, the drill is moved as follows:

- ROTATION around its axis to bring the cutters in contact with the grinding wheel
- FORWARD feed towards the grinding wheel controlled by a cam that creates the rake angle that can be regulated with knob (4).
- OSCILLATION to create the geometry for twist drills and is used only to sharpen 2-cutter drills.

OSCILLATION
ENGAGED

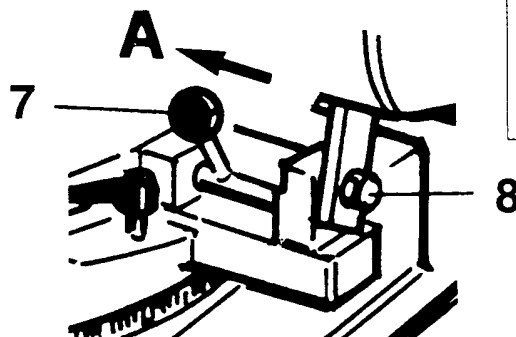


HANDLE OR
NUT 8
LOCKED

This oscillating movement can be cut-out to permit the machine to handle other types of drills such as pilot bits, step bit, countersinks, lead tap, ball end millers, etc. Sets of easily

interchangeable cams as listed in the previous page are available for these tools.

OSCILLATION
DISENGAGED



HANDLE OR
NUT 8
RELEASED

6.2 GRINDING WHEEL ASS'Y

The fully enclosed electric motor with cooling fan is mounted on a slide with cross movement to permit side movement and grinding wheel increment.

The grinding wheel is flanged directly onto the motor shaft to eliminate play and to guarantee the rigidity necessary for good finishing. The front shaft mounting comprises a rugged casing and a precision dual race ball bearing.

6.3 ELECTRIC SPINDLE ASS'Y

The electric spindle grinder, fixed to the cross movement slide, is used to thin the drill web. It can be regulated for height and depth for even web thinning.

Using appropriately contoured grinding wheels, various types of web thinning can be done on the basis of the geometry of the drill to be sharpened.



WARNING!

The tool to be sharpened must always be clamped in the chuck. It is absolutely forbidden to sharpen tools in any other way.

The manufacturer declines any and all liability for injury to persons or damage to things caused by improper use of the machine.



WARNING!

Do not use this machine to sharpen other objects nor as a bench grinder.

7

TOOL SHARPENING

7.1 SHARPENING TWIST DRILLS (WITH ANGLE FROM 90° - 140°)

- Position the drill holder and set the required sharpening angle on the outside graduated scale (10) and lock with lever (33).
For 118° drills, insert pin (9) in the positioning hole at the 118° setting on the outside graduated scale.
- Set oscillating mode (pin (7) in position B (cfr. Chapter 6) and tighten the knob or lever locking nut (8).
To ensure good results, do not forget to tighten the knob or the nut.
- For right flute twist drills install green cam 2 in the 1:2 ratio or red cam 1 for left flute drills.
- Lock spindle rotation by inserting tang (19) in the green notch for right flute drills or in the red notch for left flute drills. These notches are the starting points for correct tool timing with the cam.
- Insert the appropriate Morse cone on the drill shank and insert it into the back of the spindle.

IMPORTANT!

Bits should be held directly by the 6-jaw chuck to ensure concentric grip directly on the flute.

- Tighten the drill in the chuck and then slacken it off slightly so that the drill can be turned to be positioned correctly.
- Turn the drill so that the cutter edge touches the template (17) step matching the diameter of the drill to be sharpened
APE 25/40: drills with diameters more than 16 should always be positioned on the 16 diameter setting..
Right flute drills: template step turned upwards, green, letter D/R
Left flute drills: template step turned downwards, red, letter S/L
- Clamp the drill.
- Move the position template away and disengage tang (19) so that the spindle can turn.
- For a normal rake angle, turn knob (4) until the dial (18) is on the diameter of the drill to be sharpened.
For a larger rake angle, turn the dial to a higher setting.
For a smaller rake angle, turn the dial to a lower setting.
- Use handwheels 11 A/B and 13 to move the grinding wheel to its work position and then start the motor.

- Sharpen the drill by turning handle (6) clockwise for righthand flute drills and anticlockwise for left flute drills. Move the handwheel 11 A/B delicately and evenly to increase the grinding depth (0.05 mm per pass).

When the sharpening work is finished, move the grinding wheel slightly to the right and then left with handwheel (13). This ensures better surface finishing and grindwheel contact with the entire surface. This will also prevent uneven wear on the stone which will then have to be repaired by deeper diamond dressing with consequent increased grindstone consumption.

IMPORTANT!

Only sharpen a drill when its cutting edge has to be remade.

Given the flute design of these drills, it is good practice if large amounts of metal are removed, to repeat the timing operation described in sub-section 7 of this chapter.

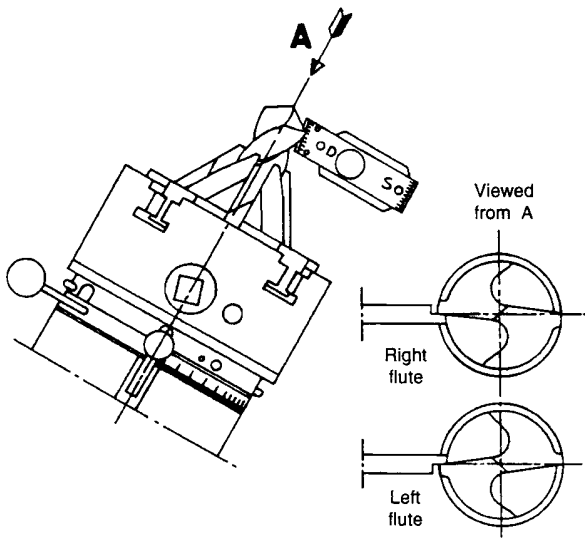
- Switch the motor off and move the grinding wheel ass'y to its outermost left position using handwheel 13.

Reinsert the tang (19) in the green or red notch and, once the grindstone has come to a complete stop, remove the drill.

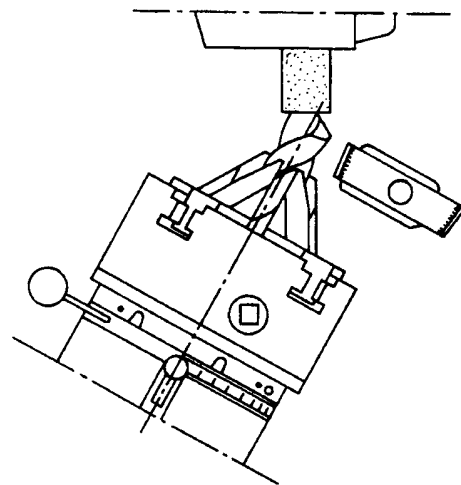
TO SUMMARIZE:

- Set the outside angle of the drill on the graduated scale
- Set the machine in oscillation mode
- Tighten the handle or lever (8) locking nut
- Mount of the 1:2 ratio either cam 2 green for right flute drills
cam 1 red for left flute drills
- Time the drill
- Set the rake angle

TIMING THE DRILL



SHARPENING THE DRILL



7.2 WEB THINNING WITH ELECTRIC SPINDLE GRINDER

The shortening of twist drills that occurs after a number of sharpenings, causes a lengthening at the top of the crosswise cutter (spudder) due to the increase in the web towards the shank.

When the thickness of the web is more than 1/10 the diameter of the drill, it should be thinned. To do this, after normal sharpening as described in the previous pages, follow these steps:

- When sharpening is finished, switch the motor off, move the grinder ass'y to the far left position with handwheel 13 but without moving it back at all.
- Notch tang (19) on one of the positioning pins (5). Red pins to thin right flute and green pins for left flute drills.

IMPORTANT!

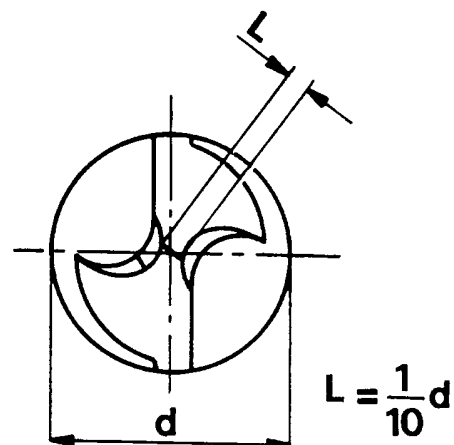
Don't forget that the positioning colour for web thinning is the opposite of that of the cam installed and the starting notch to time the drill.

- Set the grinding wheel on the electric spindle at about 15° as shown on the graduated scale (23).
- Adjust web thinning height with knob 21 so that the grindwheel is positioned below the drill web. Test this positioning with the motor off.
- Switch the spindle motor on by pressing button 36 and move the grinder forward to the required depth (set with limit switch 26).
- Bring the grindwheel back, disengage the tang (19), turn the spindle 180° and insert the pin in the opposite pin with the same colour.
- Repeat the web thinning operation as described here all the way to the limit (26) stop previously regulated for even metal removal.

IMPORTANT!

Examine the bit carefully before removing it from the chuck. This will enable you to adjust web thinning using knob 21 (height) and limit switch 26 (depth).

- Switch the spindle motor off, insert tang (19) in the green or red notch and remove the bit from the chuck.



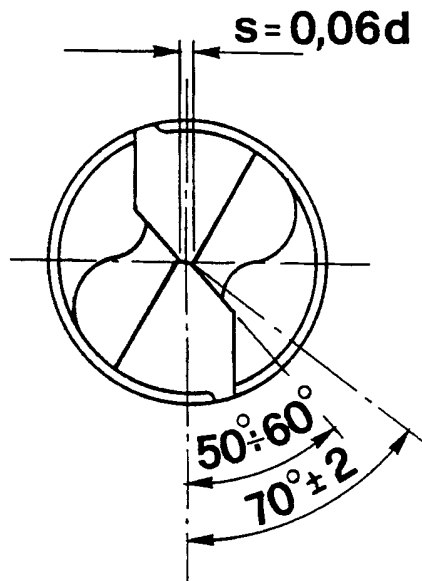
7.3 CROSS WEB THINNING (DIAMOND TIPS)

- Sharpen the bit setting an angle between 130 and 140° as described in section 7.1.
- Install a correctly shaped round grindwheel (C profile, page 56) following the instructions on p. 53.
- Position the spindle grinder at an angle between 0 and 8°.
- Regulate thinning height with knob 21 so that the wheel is positioned under the web. Test this with the motor off.
- Switch the spindle motor on by pressing button 36 and move the grinder forward to the required depth (set with limit switch 26).
- Pull the grindwheel back, disengage the tang (19), turn the spindle 180° and insert the pin in the opposite pin with the same colour.
- Repeat the web thinning operation as described here all the way to the limit (26) stop previously regulated for even metal removal.

IMPORTANT!

Examine the bit carefully before removing it from the chuck. This will enable you to adjust web thinning using knob 21 (height) and limit switch 26 (depth).

- Switch the spindle grinder motor off, insert tang (19) in the green or red notch and remove the bit from the chuck.



7.4 SHARPENING TWIST DRILLS (DRILL ANGLE LESS THAN 90°)

Twist drills with angle less than 90° are sharpened with the right face of the grindwheel.

- Slacken off lever (33) and position the tool holder in the righthand sector of the graduated scale. Set a drill angle half of that required reading off the setting from the centre protractor (30).
Lock in position with lever (33).
- Slacken off (max. one complete turn) lever 8 locking knob or lever and insert pin 7 in position A (rotation without oscillation).
- Put green cam 6 for right flute and 5 red cam for left flute drills in the 1:2 ratio.
- Lock spindle rotation by inserting tang (19) in the green notch for right flute twist drills or in the red notch for left flute twist drills. These notches are the starting points for correct tool timing with the cam.
- Insert the appropriate Morse cone on the drill shank and insert it into the back of the spindle.

IMPORTANT!

Bits should be held directly by the 6-jaw chuck to ensure concentric grip directly on the twist.

- Tighten the drill in the chuck and then slacken it off slightly so that the drill can be turned to be positioned correctly.
- Turn the drill so that the cutter edge touches the template (17) step matching the diameter of the drill to be sharpened.

Right flute drills: template step turned upwards, green, letter D/R

Left flute drills: template step turned downwards, red, letter S/L

- Clamp the drill.
- Move the position template away and disengage tang (19) so that the spindle can turn.
- For a **normal rake** angle, turn knob (4) until the dial (18) is on the diameter of the drill to be sharpened.

For a **larger rake** angle, turn the dial to a higher setting.

For a **smaller rake** angle, turn the dial to a lower setting.

- Use handwheels 11 A/B and 13 to move the grinding wheel to its work position and then start the motor.
- Tighten locking nut 12 all the way so that the micrometric handwheel (14) can be used (only APE 40/60).
- Sharpen the drill by turn handle (6) clockwise for right flute twist drills and anticlockwise for left flute drills. Move the handwheel (14) (APE 40/60) or (13) (APE 25) delicately and evenly to increase the grinding depth (0.03 mm per pass).

When the sharpening work is finished, move the grinding wheel slightly forward and back with handwheel (11 A/B). This ensures better surface finishing and grindwheel contact with the entire surface. This will also prevent uneven wear on the stone which will then have to be repaired by deeper diamond dressing with consequent increased grindstone consumption.

IMPORTANT! _____

Only sharpen a drill when its cutting edge has to be remade.

Given the flute design of these drills, it is good practice if large amounts of metal are removed, to repeat the timing operation described in sub-section 7 of this chapter.

- Switch the motor off and move the grinding wheel ass'y to its outermost left position using handwheel 13.

Reinsert the tang (19) in the green or red notch and, once the grindstone has come to a complete stop, remove the drill.

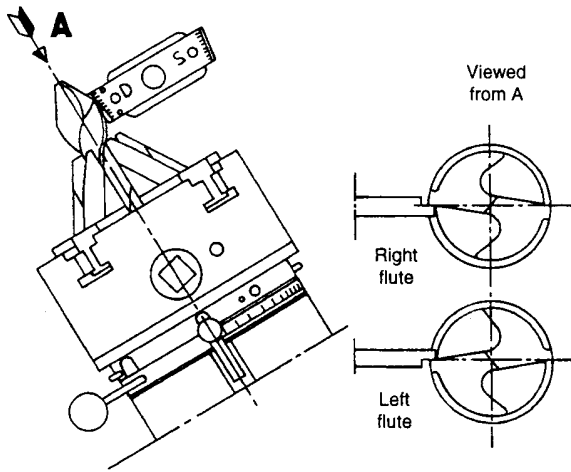
IMPORTANT! _____

With this type of sharpening the web takes on a particular shape. It is therefore recommended to thin this web considerably to reduce the penetrating force needed when drilling.

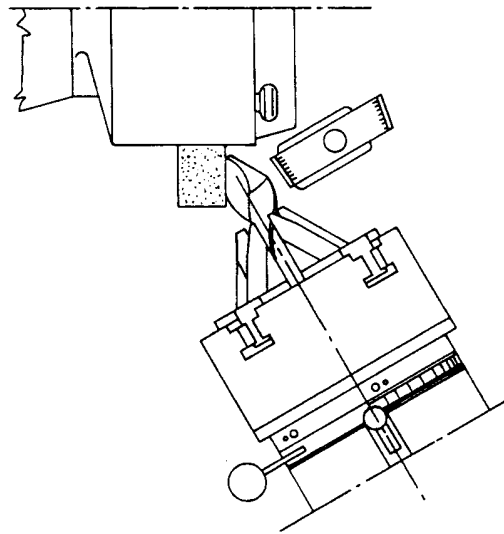
TO SUMMARIZE:

- Set the drill angles on the centre protractor
- Disengage in oscillation mode
- Mount of the 1:2 ratio either cam 6 green for right flute drills
cam 5 red for left flute drills
- Time the drill
- Set the rake angle

TIMING THE DRILL



SHARPENING THE DRILL



7.5 SHARPENING TWIST DRILLS (DRILL ANGLE 180°)

Twist drills with 180° angle are sharpened with the right face of the grindwheel.

- Lock spindle rotation by inserting tang (19) in the green notch for right flute twist drills or in the red notch for left flute twist drills. These notches are the starting points for correct tool timing with the cam.
- Insert the appropriate Morse cone on the drill shank and insert it into the back of the spindle.

IMPORTANT!

Bits should be held directly by the 6-jaw chuck to ensure concentric grip directly on the flute.

- Tighten the drill in the chuck and then slacken it off slightly so that the drill can be turned to be positioned correctly.
- Turn the drill so that the cutter edge touches the template (17) step matching the diameter of the drill to be sharpened.

APE 25/40: drills with diameters more than 16 should always be positioned on the 16 diameter setting.

Right flute twist drills: template step turned upwards, green, letter D/R

Left flute twist drills: template step turned downwards, red, letter S/L

- Clamp the drill.
- Move the position template away and disengage tang (19) so that the spindle can turn.
- Engage head oscillation so that pin (7) is in position B (See Chapter 6) and lock lever (8) with its knob of locking nut.

For good sharpening performance, this knob or nut locking must be done.

- Place green 4 cam for right flute or red 3 cam for left flute drills in the 1:2 ratio.
- Release locking nut (31) and remove the entire drill positioning ass'y.
- Slacken off lever (33) and move the tool holder head toward the right until it

is parallel with the grindwheel motor axis. Insert positioning pin (9) in hole 32.

- For a sufficient rake angle, turn knob (4) until the dial (18) is on the maximum setting.
- Use handwheels 11 A/B and 13 to move the grinding wheel to its work position and then start the motor.
- Tighten locking nut 12 all the way so that the micrometric handwheel (14) can be used (only APE 40/60).
- Sharpen the drill by turning handle (6) clockwise for right flute twist drills and anticlockwise for lefthand flute drills. Move the handwheel (14) (APE 40/60) or (13) (APE 25) delicately and evenly to increase the grinding depth (0.03 mm per pass).

When the sharpening work is finished, move the grinding wheel slightly forward and back with handwheel (11 A/B). This ensures better surface finishing and grindwheel contact with the entire surface. This will also prevent uneven wear on the stone which will then have to be repaired by deeper diamond dressing with consequent increased grindstone consumption.

IMPORTANT!

Only sharpen a drill when its cutting edge has to be remade.

Given the twist design of these drills, it is good practice if large amounts of metal are removed, to repeat the timing operation described in sub-section 4 of this chapter.

- Switch the motor off and move the grinding wheel ass'y to its outermost left position using handwheel 13.

Reinsert the tang (19) in the green or red notch and, once the grindstone has come to a complete stop, remove the drill.

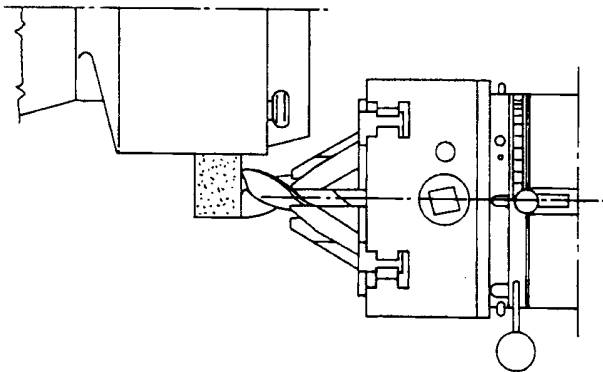
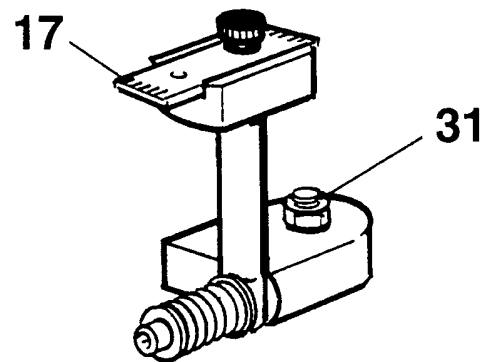
- We recommended rough-grinding bits with normal angles (118°) by hand before doing the 180° sharpening. This will reduce wear on the grindstone.

IMPORTANT!

With this type of sharpening the web takes on a particular shape. It is therefore recommended to thin this web considerably to reduce the penetrating force needed when drilling.

TO SUMMARIZE:

- Time the drill
- Remove the drill positioning unit
- Move the tool holder axis parallel with the motor axis
- Insert the pin in the positioning hole
- Set in oscillation mode
- Tighten lever (8) locking knob or nut
- Mount of the 1:2 ratio either
cam 4 green for right flute drills
cam 3 red for left flute drills

SHARPENING THE DRILL**DRILL POSITIONING UNIT****IMPORTANT!**

Manual rough-grinding should be done with grindstones other than those of the APE 25, 40, 60.

**WARNING!**

The tool to be sharpened must always be clamped in the toolholder. It is strictly forbidden to sharpen tools in any other way.

Manufacturer declines any liability for injury to persons or damage to things caused by improper use of this machine.

**WARNING!**

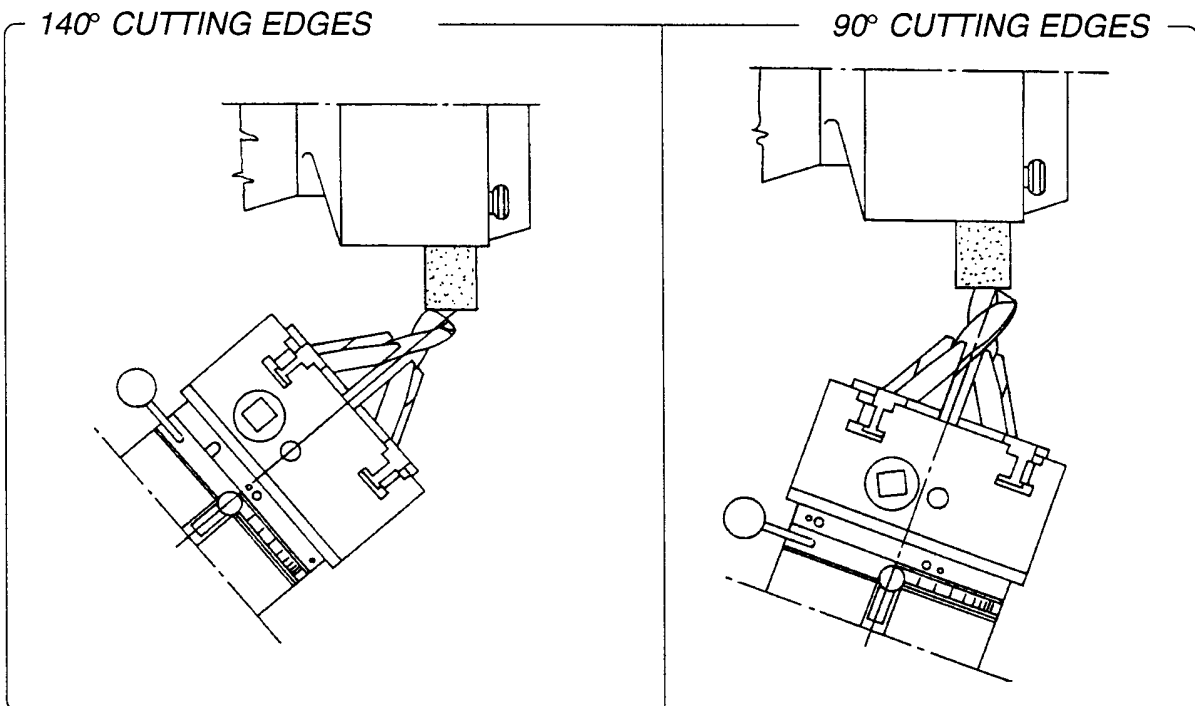
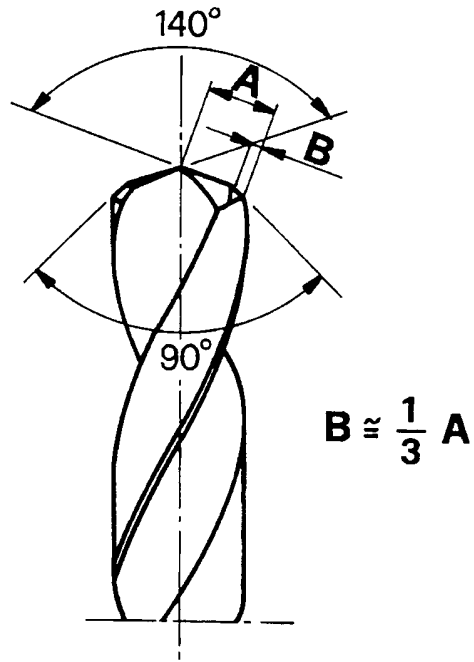
Do not use this machine to sharpen other items nor use it as a bench grinder.

7.6 SHARPENING 2-RAKE DRILLS FOR STAINLESS STEEL

- If, when drilling particularly hard materials, the outer section of the cutter tends to wear, we recommend sharpening the bit as shown in the figure here.

In this way, the metal is removed from a longer section of the cutting edge which, therefore, lasts longer. Sharpening the 90° section also gives holes with lower than average surface roughness.

- Set an angle of ~ 140° on the outside graduated scale (10).
- Sharpen the bit as described in section 7.1
- Set an angle of ~ 90° on the outside graduated scale (10).
- Repeat the operations explained in section 7.1 but sharpening only 1/3 of the cutting edge length.



7.7 SHARPENING PLATE DRILLS

- Slacken off lever (33) and position the tool holder in the righthand sector of the graduated scale. Set a drill angle of 40° required reading off the setting from the centre protractor (30).
Lock in position with lever (33).
- Slacken off (max. one complete turn) lever 8 locking knob or lever and insert pin 7 in position A (rotation without oscillation).
- Put green cam 12 for right flute and 11 red cam for left flute drills in the 1:2 ratio.
- Lock spindle rotation by inserting tang (19) in the green notch for right flute twist drills or in the red notch for left flute twist drills. These notches are the starting points for correct tool timing with the cam.
- Insert the appropriate Morse cone on the drill shank and insert it into the back of the spindle.

IMPORTANT!

Bits should be held directly by the 6-jaw chuck to ensure concentric grip directly on the twist.

- Tighten the drill in the chuck and then slacken it off slightly so that the drill can be turned to be positioned correctly.
- Turn the drill so that the cutter edge touches the template (17) step matching the diameter of the drill to be sharpened.
 - Right flute twist drills:** template step turned upwards, green, letter D/R
 - Left flute twist drills:** template step turned downwards, red, letter S/L
- Clamp the drill.
- Move the position template away and disengage tang (19) so that the spindle can turn.
- For a **normal rake** angle, turn knob (4) until the dial (18) is on the diameter of the drill to be sharpened.
For a **larger rake** angle, turn the dial to a higher setting.
For a **smaller rake** angle, turn the dial to a lower setting.
- Use handwheels 11 A/B and 13 to move the grinding wheel to its work position and then start the motor.
- Tighten locking nut 12 all the way so that the micrometric handwheel (14) can be used (only APE 40/60).
- Sharpen the drill by turning handle (6) clockwise for right flute twist drills and

anticlockwise for lefthand flute drills. Move the grindwheel in to create a guide point at the centre.

- Shift the grinder to the far left position using handwheel (13).
- Set the grinder at an angle of 10-15° and grind the front but leave the guide point made previously.

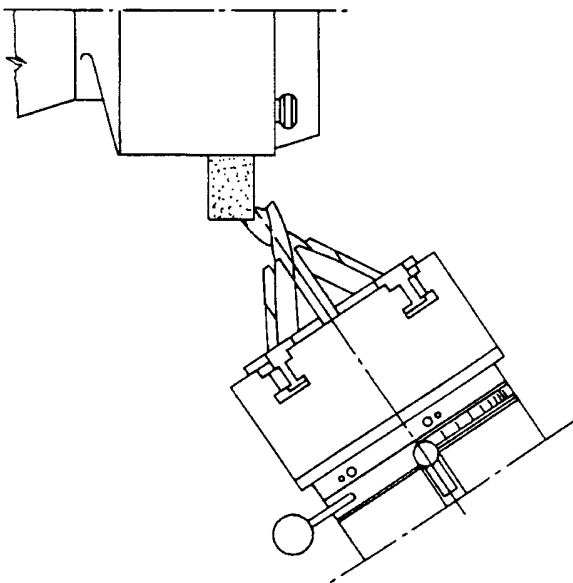
IMPORTANT!

With this type of sharpening the web takes on a particular shape. It is therefore recommended to thin this web considerably to reduce the penetrating force needed when drilling.

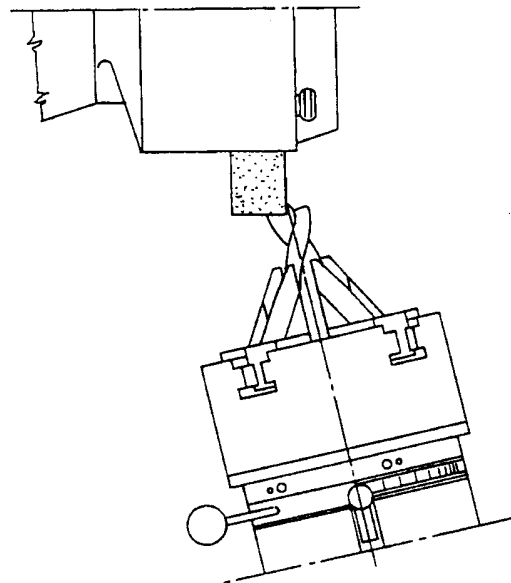
TO SUMMARIZE:

- Disengage oscillation mode.
- Mount of the 1:2 ratio either cam 12 green for right flute drills
cam 11 red for left flute drills
- Time the drill
- Set 40° on the centre protractor
- Sharpen the drill creating a guide point
- Set 10-15° on the centre protractor
- Grind front surface

40° ON CENTRE
PROTRACTOR



10°÷15° ON CENTRE
PROTRACTOR



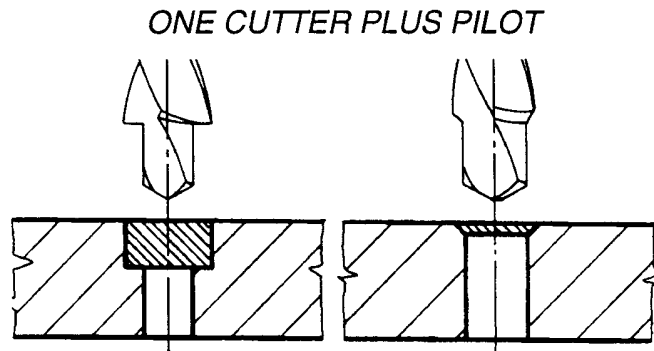
7.8 SHARPENING DEAD HOLE DRILLS

Follow the procedures described previously. The only difference is the toolholder is positioned with the centre protractor set at 0° rather than 10-15°.

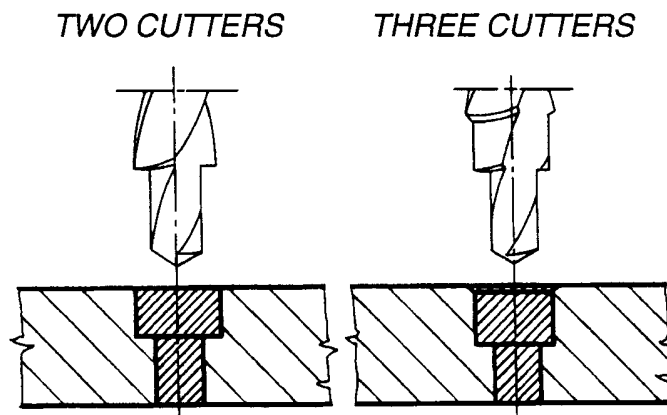
7.9 SHARPENING MULTI-DIAMETER DRILLS

Using Cuoghi APE 25, 40, 60 sharpening machines you can make multi-diameter drills from ordinary twist drills and, naturally, sharpen commercially sold multi-diameter drills. These drills can be divided into two main types: twist drills with pilot multi-cutter diameter twist drills.

- In the first case, the bottom diameter is cylindrical and the cutter without rake. Thus it does not cut but guides the larger diameter into a pre-drilled hole.



- In this latter case, all the sections of the drill have cutting edge backs with a degree of rake.



Given the different shapes of these drills, we have divided their sharpening operations into three parts:

*HOBBING A NUMBER OF DIFFERENT DIAMETERS ON TWIST DRILLS
SHARPENING DRILLS WITH PILOT AND MULTI-DIAMETERS
MAKING THE RAKE ON CUTTERS*

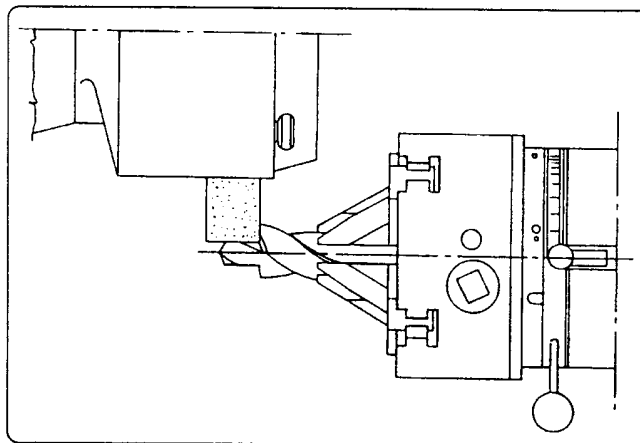
HOBBIING A NUMBER OF DIFFERENT DIAMETERS ON TWIST DRILLS

- Lock spindle rotation by inserting tang (19) in the green notch for right flute twist drills or in the red notch for left flute twist drills. These notches are the starting points for correct tool timing with the cam.
- Insert the appropriate Morse cone on the drill shank and insert it into the back of the spindle.

IMPORTANT!

Bits should be held directly by the 6-jaw chuck to ensure concentric grip directly on the twist.

- Tighten the drill in the chuck so that just enough protrudes to permit the pilot to be rough ground.
- Tighten lever (8) locking knob or nut max. one turn and insert pin (7) in position "A" (rotation without oscillation).
- Put green cam 6 for right flute and 5 red cam for left flute drills in the 1:2 ratio.



- Slacken off locking nut (31) and remove the drill positioning ass'y.
- Slacken off lever (33) and position the tool holder to the right so that its axis is parallel with the grinder motor assembly axis. Insert positioning pin (9) in hole 32.
- For a normal rake angle, turn knob (4) until the dial (18) is on the diameter of the drill to be sharpened.
For a larger rake angle, turn the dial to a higher setting.
For a smaller rake angle, turn the dial to a lower setting.
- Use handwheels 11 A/B and 13 to move the grinding wheel to its work position and then start the motor.
- Tighten locking nut 12 all the way so that the micrometric handwheel (14) can be used (only APE 40/60).
- Rough out the drill by turning handle (6) clockwise for right flute twist drills and anticlockwise for lefthand flute drills. Move the handwheel (11/A) (APE 40/60) or (11/B) (APE 25) delicately and evenly to increase the grinding depth (0.03 mm per pass).
- When the diameter is a couple of 1/10ths more than the required, use handwheel (13) to move the grindwheel to the far left position. Stop the motor and loosen the chuck jaws. Retime the drill for the finishing sharpening.

SHARPENING DRILLS WITH PILOT AND MULTI-DIAMETERS (front cutting edges)

The cutters on the lesser diameter sector are sharpened as any normal twist drill (Refer to Chapter 7.1).

The larger diameter cutters can be sharpened a number of ways depending on the shape of the cutters and different work needs to be assessed on a case by case basis.

180° CUTTERS

- Slacken off lever (33) and move the tool holder to 0° in the centre protractor so that the drill axis is perpendicular with the motor axis.
- Slacken off (max. one turn) lever 8 locking knob or lever and insert pin 7 in position A (rotation without oscillation).
- Place green 6 cam for right flute or red 5 cam for left flute drills in the 1:2 ratio.
- Lock spindle rotation by inserting tang (19) in the green notch for right flute twist drills or in the red notch for left flute twist drills. These notches are the starting points for correct tool timing with the cam.
- Insert the appropriate Morse cone on the drill shank and insert it into the back of the spindle.

IMPORTANT!

Bits should be held directly by the 6-jaw chuck to ensure concentric grip directly on the flute.

- Tighten the drill in the chuck and then slacken it off slightly so that the drill can be turned to be positioned correctly.
- Turn the drill so that the cutter edge touches the template (17) step matching the diameter of the drill to be sharpened.
 - Right flute twist drills:** template step turned upwards, green, letter D/R
 - Left flute twist drills:** template step turned downwards, red, letter S/L
- Clamp the drill.
- Move the position template away and disengage tang (19) so that the spindle can turn.
- For a **normal rake** angle, turn knob (4) until the dial (18) is on the diameter of the drill to be sharpened.

For a **larger rake** angle, turn the dial to a higher setting.

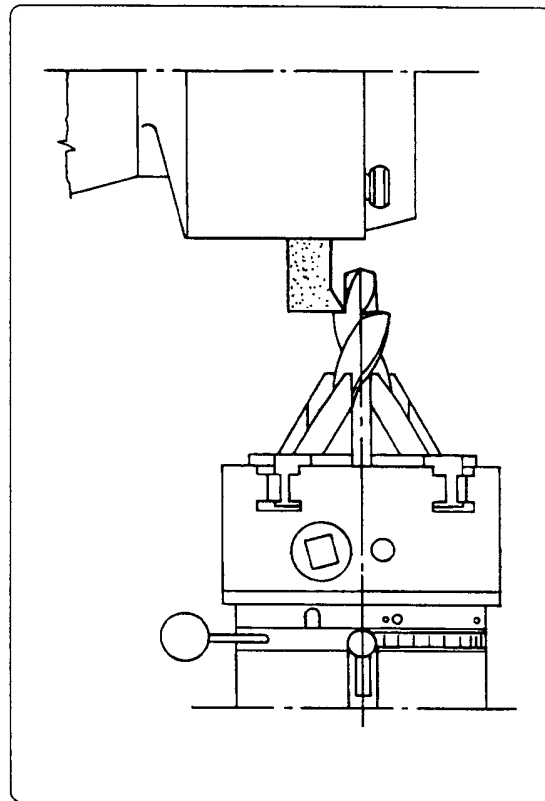
For a **smaller rake** angle, turn the dial to a lower setting.

- Use handwheels 11 A/B and 13 to move the grinding wheel to its work position and then start the motor.
- Tighten locking nut 12 all the way so that the micrometric handwheel (14) can be used (only APE 40/60).
- Sharpen the front cutting edges by turning handle (6) clockwise for right flute drills and anticlockwise for lefthand flute drills. Move the handwheel 11/A/B delicately and evenly to increase the grinding depth (0.03 mm per pass).
- Switch the motor off and move the grinding wheel ass'y to its outermost left position using handwheel 13.

Reinsert the tang (19) in the green or red notch and, once the grindstone has come to a complete stop, remove the drill.

IMPORTANT!

We recommend doing this sharpening operation with a special shaped wheel as shown in the illustration here to protect the smaller diameter.

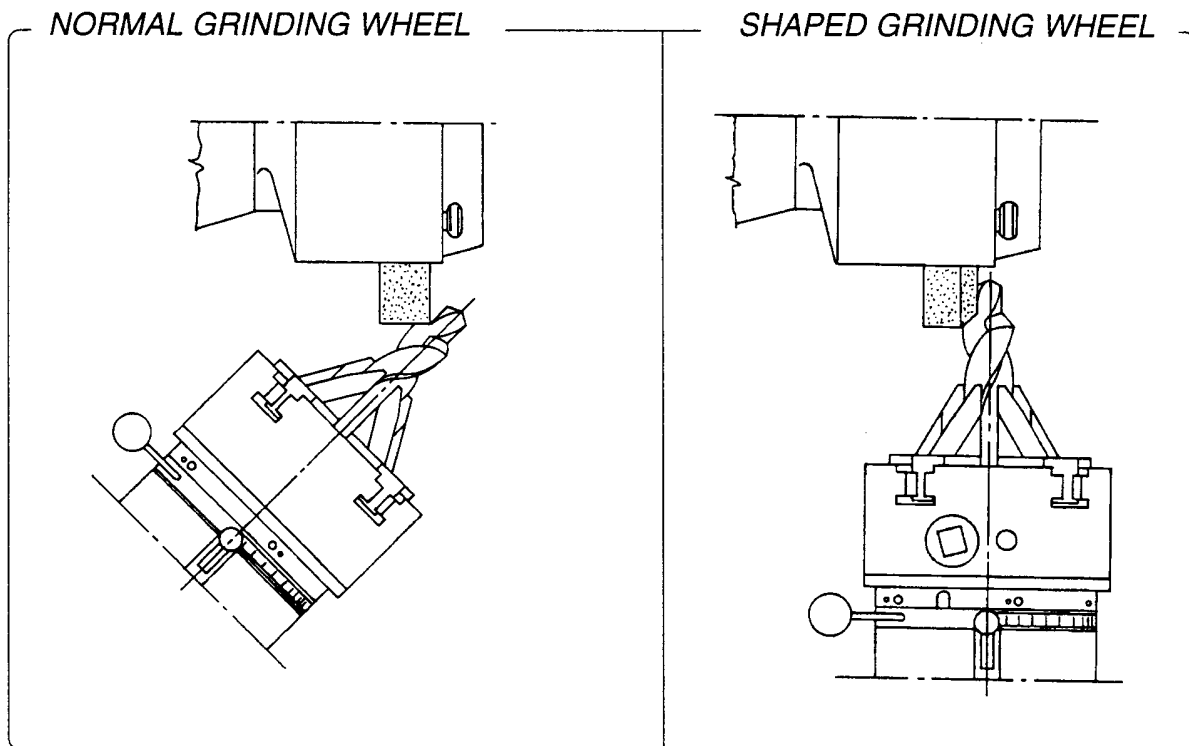


WARNING!

All tool tightening, regulating, adjusting operations must be done only with the grinding wheel stopped and the wheel holder ass'y moved to its outer left position.

CUTTING EDGES WITH ANGLES LESS THAN 180°

The difference here from the procedure described above is the location of the tool holder head. This is determined by the angle to be given to the cutting edges. The same results can be achieved by shaping the disk as needed and position the drill perpendicular with the motor axis. This latter solution can be very useful in some cases when specific angles have to be repeated a number of times. The specially shaped grinding wheels can be kept mounted on their flanges and ready for use in the magazine.

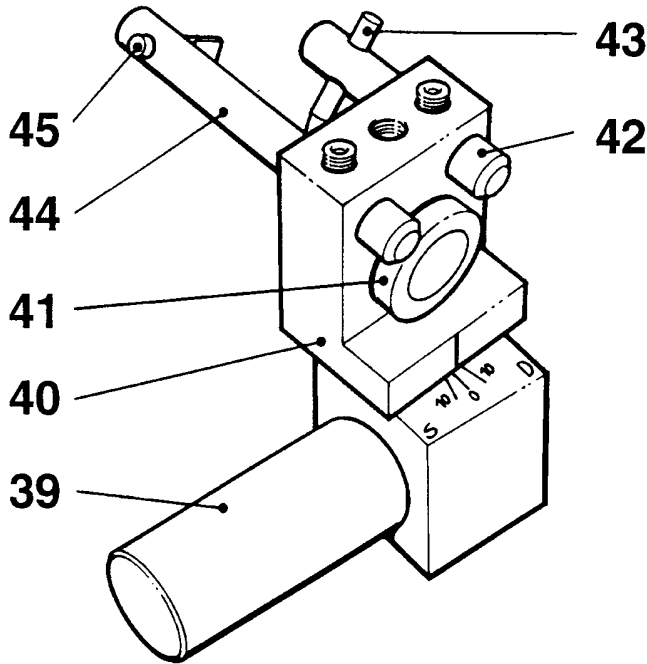


TO SUMMARIZE:

- Disengage oscillating mode
- Set the drill angle on the centre protractor
- Mount on the 1:2 ratio either
cam 6 green for right flute drills
cam 5 red for left flute drills

MAKING THE RAKE ON CUTTERS

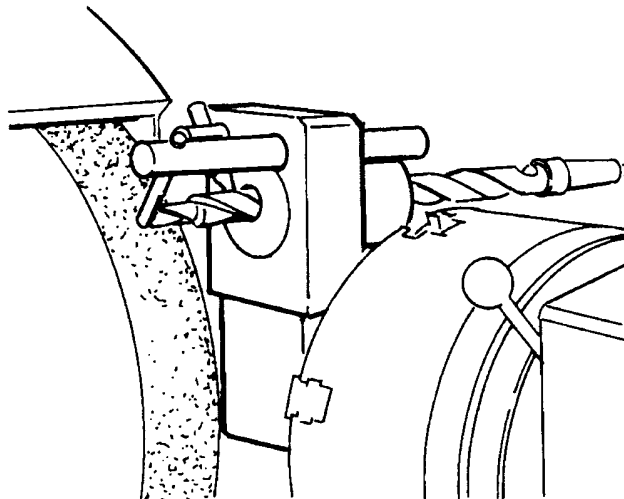
A special optional device is used to make the rake on cutters.



FIXTURE TO MAKE RAKE ON CUTTERS

- 39 - FIXED POSITION MOUNT
- 40 - SWIVEL MOUNT
- 41 - BUSHING LENGTH ~THREE TIMES DRILL DIAMETER
- 42 - GUIDE ARM
- 43 - GUIDE ARM
- 44 - STOP ARM
- 45 - STOP PIN

- Slacken off lever 33 and position the tool holder at 90° to the grindwheel shaft axis. Insert pin 9 in the corresponding positioning hole.
- Insert pin 7 in position "A" : rotation and release the lever by slackening off the knob or nut (8).
- Insert tang (19) in one of the notches to prevent the spindle from turning.
- Clamp the device's fixed position mounting (39) between the chuck jaws and check to make sure the device is perfectly straight.
Set the direction mounting index (40) on one of the settings on the fixed position mounting (39): 10° D for right flute or 10° S for left flute drills.



- Mount a bushing (41) suitable for the larger diameter and put the bit in this.
- Position pin (45) and arm (44) for the length of the pilot to be raked. Use handwheels 13 and 11 A/B to move the grindwheel until it barely touches the bit.
- Pull the bit out from the guide bushing until the edge of the bit and the edge of the grindwheel coincide. Bring the guide pin (43) into contact with the twist fluting.
- Use handwheel 11 A/B to move the grindwheel in slightly and manually give the bit its typical screw movement by combining movement towards pin (45) and, guided by pin (43), rotation according to drill fluting.
- When the machine has reached its stop point at pin (45), pull out the bit pushing it against pin (43) and repeat the rake cutting operation on the other flute.

If necessary, increase grinding pass depth and repeat the operations moving the grindwheel forward in steps as required.

- To clean the rake completely, slacken off the arm retaining set screw (42) and slowly turn the bit on its axis. Re-clamp the arm (42) and repeat the procedures described above.

The rake will be formed by a number of small steps.



WARNING!

Device regulating as described above must only be done with the grindwheel at a complete stop.

7.10 SHARPENING COUNTERSINKING DRILLS

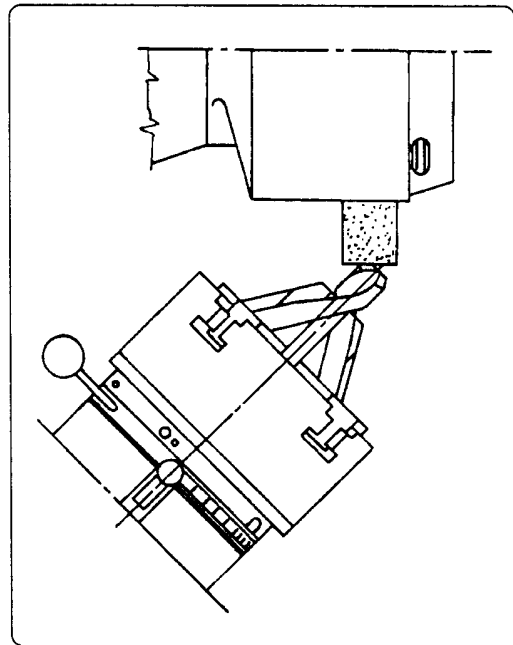
3-CUTTER COUNTERSINKING DRILLS

- Slacken off (max. one complete turn) lever 8 locking knob or lever and insert pin 7 in position A (rotation without oscillation).
- Put green cam 10 for right flute and 9 red cam for left flute drills in the 1:1 ratio.
- Lock spindle rotation by inserting tang (19) in the green notch for right flute twist drills or in the red notch for left flute twist drills. These notches are the starting points for correct tool timing with the cam.
- Tighten the drill in the chuck and then slacken it off slightly so that the drill can be turned to be positioned correctly.
- Turn the drill so that the cutter edge touches the template (17) step matching the diameter of the drill to be sharpened.

Right flute drills: template step turned upwards, green, letter D/R

Left flute drills: template step turned downwards, red, letter S/L

- Clamp the drill.
- Move the position template away and disengage tang (19) so that the spindle can turn.
- For a normal rake angle, turn knob (4) until the dial (18) is on the diameter of the drill to be sharpened.
- Slacken off lever (33) and position the tool holder by reading off the required angle on the centre protractor (30). Clamp with lever (33).
- Use handwheels 11 A/B and 13 to move the grinding wheel to its work position and then start the motor.
- Sharpen the countersink drill by turning handwheel (6) clockwise for right flute and anticlockwise for left flute drills. Move the handwheel 11 A/B delicately and evenly to increase the grinding depth (0.03 mm per pass).



7.11 SHARPENING 2-12 CUTTING EDGE TAPS LEFT OR RIGHT TWIST DRILLS

A tap will need to be sharpened when the first teeth are broken or worn (tap lead-in).

The tap will have to be shortened and the lead-in created by sharpening the first teeth with a 15-30° angle.

These operations are described here in two parts:

SHORTENING THE TAP

SHARPENING THE TAP LEAD-IN

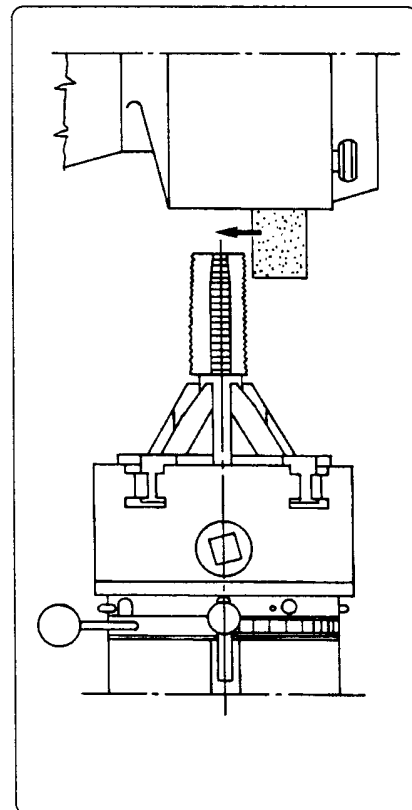
SHORTENING THE TAP

- Slacken off (max. one turn) lever 8 locking knob or lever and insert pin 7 in position A (rotation without oscillation).
- Remove the cam.
- Clamp the tap in the toolholder.
- Slacken off lever (33) and move the tool holder to 0° in the centre protractor so that the drill axis is perpendicular with the motor axis.

Clamp with lever 33.

- Use handwheels 11 A/B and 13 to move the grinding wheel to its work position and then start the motor.
- Disengage tang (19) so that the spindle can turn.
- Shorten the tap by turning handle (6) clockwise and turning handwheel (13) delicately and evenly so that the grinding wheel makes a complete pass.

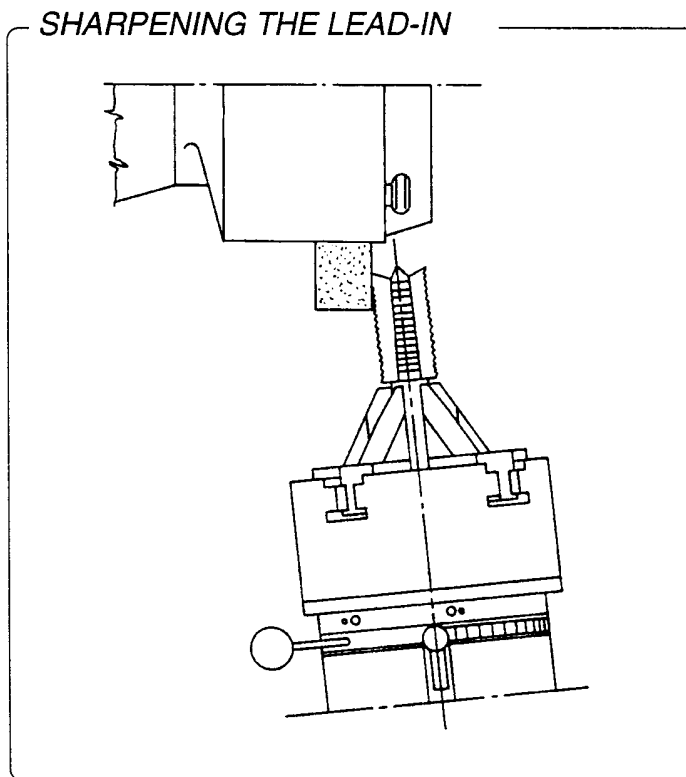
Repeat this procedure until the worn part of the tap has been removed.



SHARPENING THE TAP LEAD-IN

The lead-in is normally sharpened on the right side face of the grindwheel.

- Slacken off (max. one turn) lever 8 locking knob or lever and insert pin 7 in position A (rotation without oscillation).
- Install the right cam for the number of tap cutters (see summary chart).
- Lock spindle rotation by inserting tang (19) in the green notch for right flute twist drills or in the red notch for left flute twist drills. These notches are the starting points for correct tool timing with the cam.
- Tighten the drill in the chuck and then slacken it off slightly so that the drill can be turned to be positioned correctly.
- Turn the drill so that the cutter edge touches the template (17) step.



Right flute drills: template step turned upwards, green, letter D/R

Left flute drills: template step turned downwards, red, letter S/L

- Clamp the tap.

- Move the positioning template (17) away and disengage tang (19) to permit the spindle to turn.
- Slacken off lever 33 and position the tool holder at the right of the carriage and set an angle of 15-30° on the centre protractor (33). Clamp with lever 33.
- Use handwheels 11 A/B and 13 to move the grindwheel to its working position and start the motor.
- Tighten locking nut 12 all the way so that the micrometric handwheel (14) can be used (only APE 40/60).
- Sharpen the tap by turning handle (6) clockwise for right flute drills and anticlockwise for lefthand flute drills. Move the handwheels 14 (APE 40/60) or 13 (APE 25) delicately and evenly to increase the grinding depth (0.03 mm per pass).
- Make the tap lead-in by sharpening at least three tap teeth and, once the sharpening operation is completed, move the grindwheel delicately forward and back using handwheel 11 A/B.

This ensures better surface finishing and grindwheel contact with the entire surface. This will also prevent uneven wear on the stone which will then have to be repaired by deeper diamond dressing with consequent increased grindstone consumption.

- Switch the motor off and move the grinding wheel ass'y to its outermost left position using handwheel 13.

Reinsert the tang (19) in the green or red notch and, once the grindstone has come to a complete stop, remove the drill.



IMPORTANT!

Rake set with knob 4 must not be based on the diameter of the tap as in previous sharpening operations but on the basis of the lead-in angle.

Ex.: *lead-in angle 15° = set max. rake*
lead-in angle 30° = set min. rake



DANGER!

Always wear protective glasses when doing the operations described here.

CAM N°	RATIO 1:2		RATIO 1:1	
	Right taps	Left taps	Right taps	Left taps
5		2-cutter tap		
6	2-cutter tap			
7		4-cutter tap		
8	4-cutter tap			
9		6-cutter tap		3-cutter tap
10	6-cutter ta		3-cutter tap	
19		10-cutter tap		5-cutter tap
20	10-cutter tap		5-cutter tap	

To sharpen taps with cutters not listed here, refer to the complete list of cams on p. 16.

SUMMARY:

- Disengage oscillation
- Set the lead-in angle on the centre protractor
- Install the appropriate cam
- Time the tap
- Set the rake

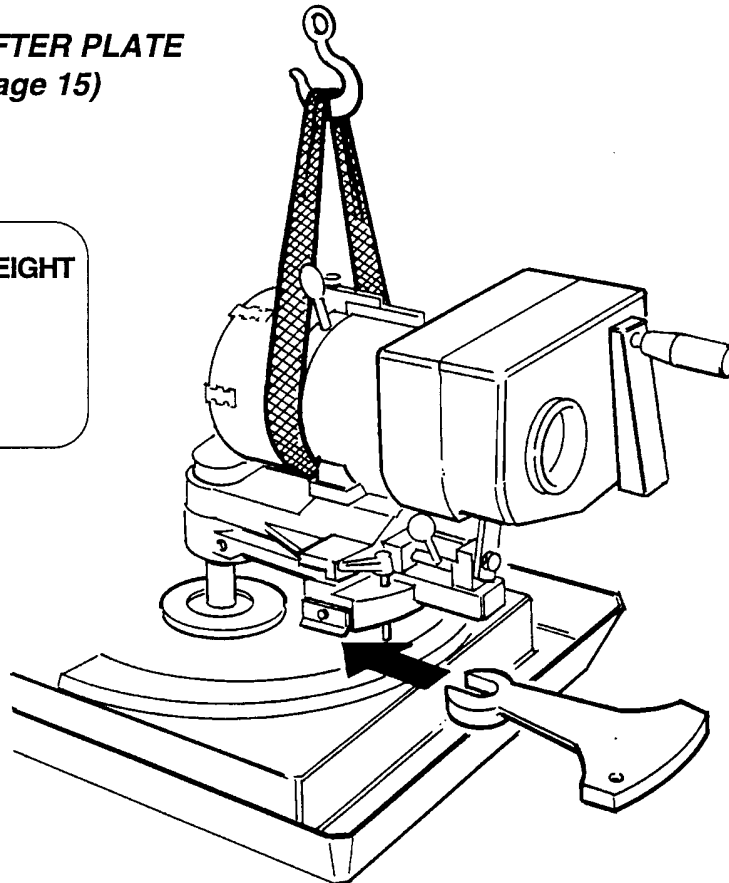
7.12 SHARPENING 2,3,4 HEAD BALL END MILLER

These millers are sharpened by misaligning the tool with the grindwheel axis so that its radius gives the rake on the primary cutter.

INSERTING THE LIFTER PLATE (Optional 4, page 15)

TOOLHOLDER ASS'Y WEIGHT

APE 25 - Kg 9
APE 40 - Kg 20
APE 60 - Kg 34



WARNING!

To hoist the toolholder ass'y use a wire or strap with a lifting block as shown in the diagram.

- Slacken off (max. one turn) lever 8 locking knob or lever and insert pin 7 in position A (rotation without oscillation).
- Remove the cam.
- Lock spindle rotation by inserting tang (19) in the green notch.
- Tighten the miller in the chuck and then slacken it off slightly so that the miller can be turned to be positioned correctly.
- Turn the miller so that the cutter edge touches the template (17) step.
- Clamp the miller.

- Slacken off lever 33 and position the tool holder at 0° on the centre protractor. Clamp with lever 33.
- Slacken off screw 28 and raise the toolholder ass'y as shown in the diagram.
- Insert the raising plate under the toolholder ass'y as shown in the diagram.
- Lower the toolholder ass'y and clamp the centre pin with screw (28).
- Slacken off lever 33 and set the required angle reading it off the centre protractor (30): 0° if you want to sharpen a flat miller; from 3-5° left if you want to have a miller with cutter raked towards the centre.
- Lock with lever (33).
- Use handwheels 11 A/B and 13 to move the grindwheel to its working position and start the motor.
- Sharpen the miller by turning handwheels 11 A/B and 13. Stop when the edge of the grindstone is at the centre of the miller.

**WARNING!**

Do not turn handle 6!

Millers are sharpened with the toolholder clamped.

- Move the grindwheel ass'y to the far left using handwheel (13).
- Lift tang (19) and notch it in the opposite pin (if the miller is 2-cutter) or in the correct one of 120° splitting (3-cutters) or 90° (4-cutters).
- Move the grindwheel forward with handwheel 11 A/B and repeat the sharpening procedures on the other cutters.
- Switch the motor off and move the grindwheel ass'y to the outside left position with handwheel (13).

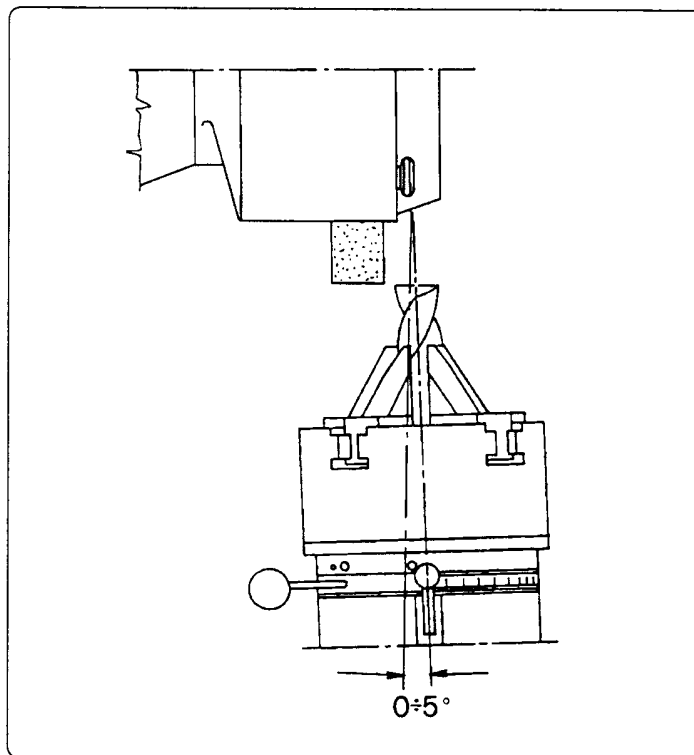
Re-insert tang (19) in the green or red notch and, when the grindstone has come to a complete stop, remove the miller.

SUMMARY:

- Disengage oscillation
- Remove the cam
- Insert the lifter plate
- Set the required angle (3-5°) on the centre protractor.
- Do not turn the toolholder during sharpening.

IMPORTANT!

The steps described above can also be used to sharpen spot-facers.

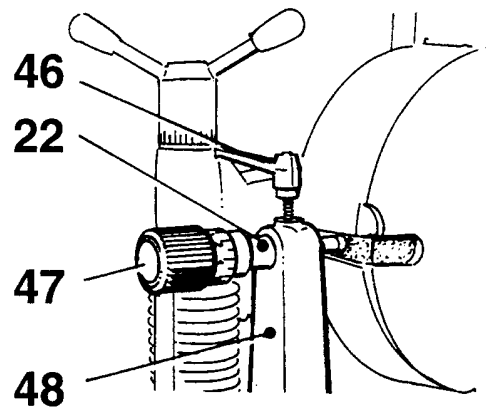


8**GRINDING WHEEL DRESSING**

When the sharpening surface is rough or corrugated or if you hear an abnormal noise during sharpening operation, or when the tool tends to heat up to a considerable degree, the stone will have to be dressed.

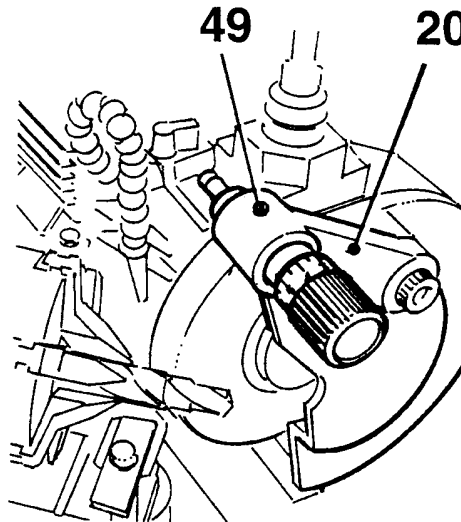
8.1 MAIN GRINDING WHEEL***DRESSING THE DIAMETER***

- Install the diamond holder (22) in its mounting (48) and bring the diamond tip close to the stone.
- Clamp the diamond holder with handle (46).
- Switch the main stone on with button (35).
- Bring the diamond tip into contact with stone using knob (47) and move the lengthwise carriage with handwheel 13 (APE 25) or 14 (APE 40/60). Movement should be very gradual, no more than 10 mm a minute.
- Use knob 47 to increase to diamond to 0.02/0.03 mm per pass.
- Switch the motor off.



DRESSING THE RIGHT SIDE OF THE STONE

- Install the diamond holder (22) in its mounting (48) and bring the diamond tip close to the stone.
- Clamp the diamond holder with set screw (49).
- Switch the main stone on with button (35).
- Bring the diamond tip into contact with stone using knob (47) and move the diamond by hand at a moderate speed of around 10 mm/min.
- Switch the motor off.



IMPORTANT!

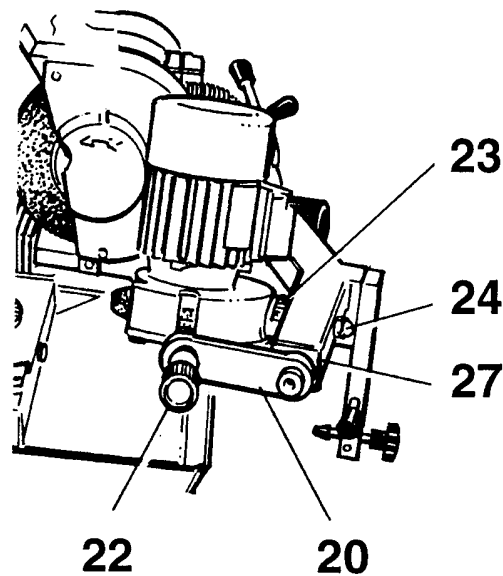
To reduce grindstone consumption, it is good operating practice to limit the diamond dressing passes to 2 or 3.

8.2 ELECTRIC SPINDLE GRINDER WHEEL

As a general rule the electric spindle grinder wheel is dressed manually with the help of a stone dresser bar.

To dress this wheel, if specific angles have to be given, use the diamond dresser (22):

- Install the diamond dresser (22) mounting in its seating (27).
- Set the dressing angle by slackening off nut (24) and setting the value on the graduated scale (23).
- Switch the electric spindle grinder with button (36)
- Bring the diamond tip into contact with stone using knob (47) and move the diamond by hand at a moderate speed of around 10 mm/min.
- Switch the motor off.



**WARNING!**

Always wear safety glasses.

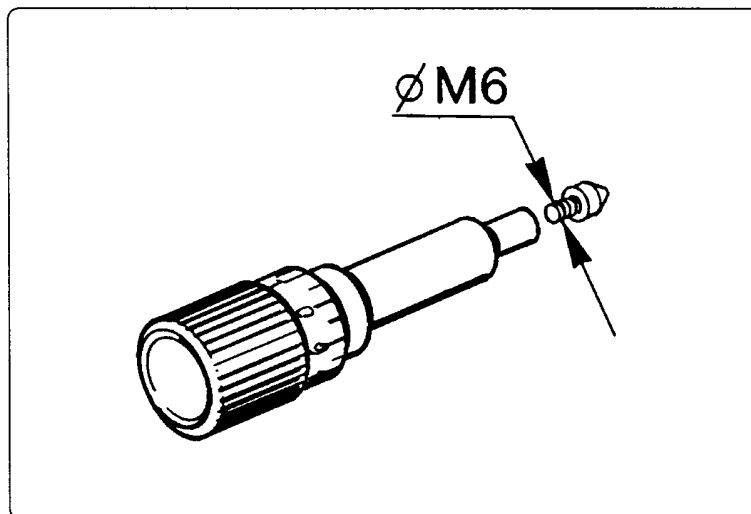
**WARNING!**

Electric grinder wheel hand dressing must be done with the utmost care and attention by qualified personnel.

8.3 CHANGING THE DIAMOND WHEEL DRESSER

- Unscrew the worn diamond and remove it.
- Screw the new diamond all the way down.
- Tighten it home with a vice.

To order wheel dressing diamonds, contact your area dealer or CUOGHI.



MAINTENANCE

To ensure ongoing machine efficiency and correct operation, it is essential to keep it clean and carry out the **routine maintenance** outlined here. Routine maintenance should be carried out by the user following the instructions given in this Manual.



WARNING!

Before any cleaning, repair, service or maintenance operation on the machine DISCONNECT IT FROM ITS POWER SOURCE.



WARNING!

Do not touch the grindstone before it has come to a complete stop.

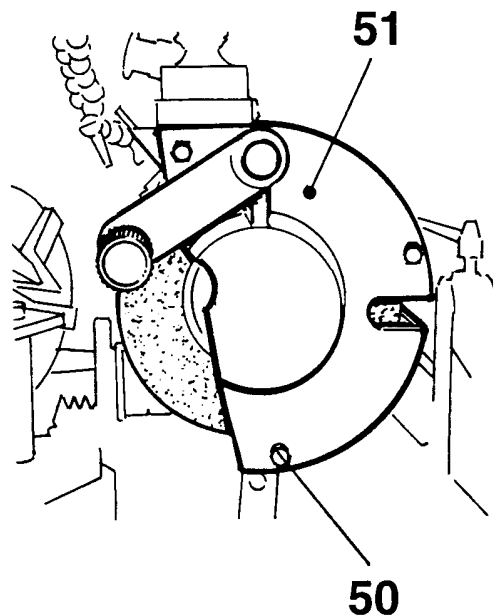
9

CHANGING THE GRINDING WHEEL

9.1 CHANGING THE GRINDING WHEEL

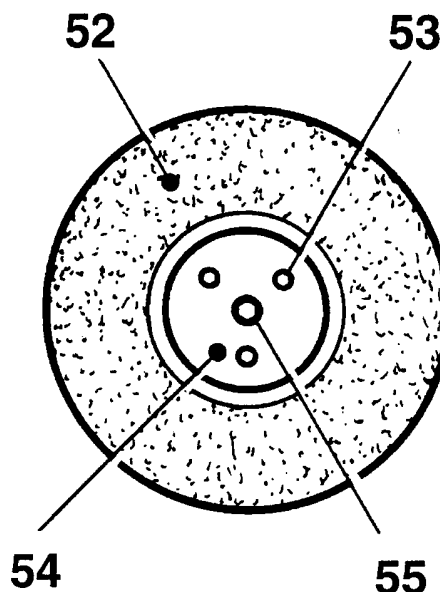
Follow these step to change the main grindstone:

- Remove the 3 screws (50).
- Remove guard (51).



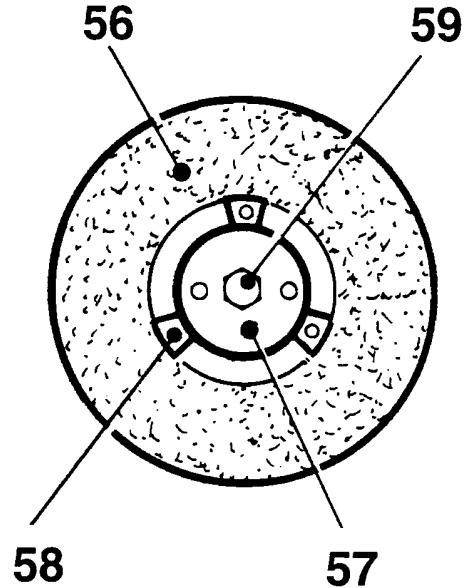
APE 25

- Remove screw (55) using the Allen wrench in the kit and remove the grind wheel with its flange.
- Remove the three flange (54) retainer screws (53).
- Make the sound test on the new grinder wheel.
- Clean the flange and grindstone shim adjustments thoroughly.
- Mount the new stone on the flange (54) and turn it by hand on its axis to ensure perfect surface to surface contact.
- Fix stone and flange with retainer screws (53).
- Mount the stone/flange assembly on the motor shaft.
- Tighten screw (55) home.
- Replace the guard casing (51).



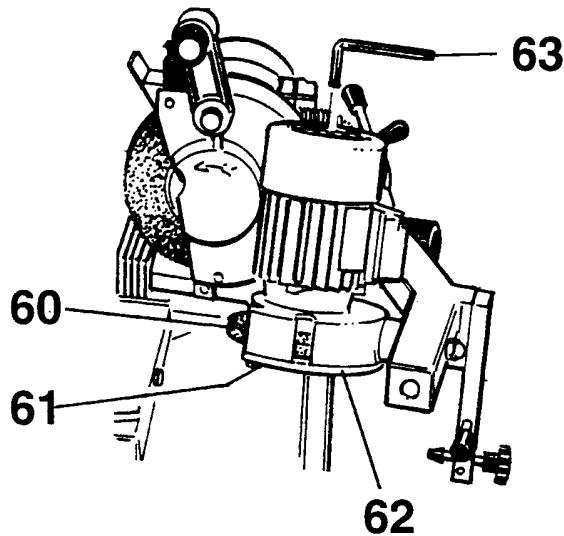
APE 40/60

- Remove nut (59) using the wrench A in the kit and remove the grind wheel (56) with its flange.
- Remove the flange using the hook wrench D in the tool kit.
- Make the sound test on the new grinder wheel.
- Clean the flange and grindstone shim adjustments thoroughly.
- Mount the new stone on the flange (57) and turn it by hand on its axis to ensure perfect surface to surface contact.
- Fix stone and flange together with the hook wrench D.
- Remove the counterweights (58).
- Mount the stone/flange ass'y on the motor shaft.
- Tighten home nut (59)
- Replace the guard casing (51).



9.2 CHANGING THE ELECTRIC SPINDLE GRINDER

Follow these steps to change the electric spindle grinder wheel:



- Remove the 3 screws (61).
- Remove guard casing (62)
- Insert the Allen wrench (63) in the tool kit into the motor shaft.
- Remove flange using the pin wrench (R) and remove the grindwheel (60).
- Make the sound test on the new grinder wheel.
- Clean the flange and grindstone shim adjustments thoroughly.
- Mount the new stone on the flange and turn it by hand on its axis to ensure perfect surface to surface contact.
- Mount the stone/flange ass'y on the motor shaft using pin wrench (R) in the tool kit.
- Replace the guard casing (62).



DANGER!

An essential precaution to be adopted when first switch on a new grindstone is to check to make sure that there is nobody standing in front of the stone when the motor is switched on. The reason is that even stones that ring true can break due to a manufacturing or installation error.

10 BALANCING THE MAIN GRINDING WHEEL

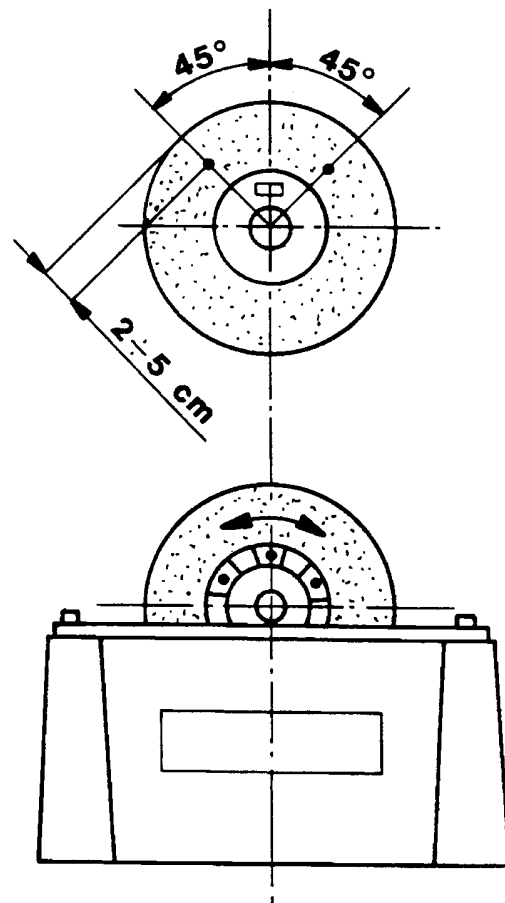
SOUND TEST

Before tightening the grinding wheel between the flanges, check its soundness with the “ping” test.

To do this test, hold the wheel with a pin through its hole and hit it lightly with a hammer at two different points of the face close to the edge (2-5 cm from the outside) and at about 45° to its axis. A sound wheel should give a clear “ping” while a defective one will give an off-key note.

BALANCING

- Mount the wheel and its flange on the machine following precisely all the instructions given in Chapter 9.
- Remove the counterweights by loosening their grub screws.
- Hit the run button (35) and allow the stone to turn for about a minute. Then do a diamond dressing on the right plane following the instructions given in Chapter 8.
- When the wheel has come to a complete stop, remove it from the shaft and mount it on the balancing fixture with the corresponding pin. Spin the wheel and allow it to come to a complete stop on its own.
- Mount the three counterweights on the top and move the two side weights keeping them symmetric. After a few trials, the perfect balance position will be reached. The wheel should never stop in the same position.



BALANCING FIXTURE
(Optional)

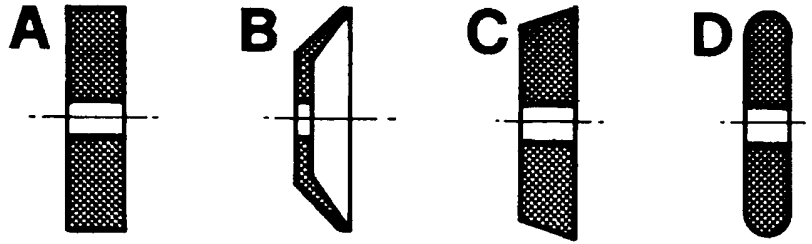
Rebalance the grindstone whenever you note vibration or if the tool surface finish is not satisfactory.

IMPORTANT!

The grindstone and electric spindle grinder on the APE 25 sharpening machine do not need balancing thanks to their small weight and dimensions.

11

LIST OF GRINDING WHEELS



PROFILE	CODE	DESCRIPTION	DIMENSIONS	MACHINE	
A	EQPT 029	NORTON 3 SG 60 LVS	150X20X32	APE 25	MAIN GRINDSTONE
A	EQPT 030	NORTON 38 A 80 LVS	150X20X32	APE 25	
A	EQPT 031	NORTON 38 A100 LVS	150X20X32	APE 25	
A	EQPT 045	NORTON 3 SG 60 JVS	200X25X32	APE 40	
A	EQPT 039	NORTON 38 A 54 JVS	200X30X32	APE 40	
A	EQPT 040	NORTON 38 A 60 JVS	200X25X32	APE 40	
A	EQPT 041	TIAC TB A 80 JVS	200X25X32	APE 40	
A	EQPT 050	NORTON 23 A 54 JVS	200X45X32	APE 60	
A	EQPT 055	NORTON 3 SG 54 JVS	200X45X32	APE 60	
A	EQPT 063A	CBN 150 D 12X2 B151W 75 RCR	150X12X32	} APE 25 APE 40	
A	EQPT 066	DIAM. 150 D 12X2 D151 W 75 RR	150X12X32		APE 60
B	EQPT 060	NORTON 38 A 60 LVS TAZZA	125X13X20	} APE 25 APE 40 APE 60	ELECTRIC SPINDLE GRINDER
A	EQPT 061	NORTON 38 A 60 MVS CIL.	125X7X20		
A	EQPT 062	NORTON 38 A 60 MVS CIL.	125X16X20		
C	EQPT 062A	NORTON 38 A 60 MVS 15°	125X16X20		
C	EQPT 064B	CBN 125 DS10X2 B 151 W 75 RCR 15°	125X10X20		
D	EQPT 064C	CBN 125 E6X2 B 151 W 75 RCR R=3	125X6X20		
C	EQPT 065	DIAM. 125 DS 10X2 D 151 W 75 RPN 15°	125X10X20		
D	EQPT 067	DIAM. 125 E6X2 D 151 W 75 RR R=3			

Grindstones for the APE 40 can also be used on the APE 60

12**CLEANING**

Daily use a paintbrush or dry cloth to remove the emery powder from the machine. Always wear gloves.

From time to time clean the water collecting tray and top up the water level to the outside level mark.

**WARNING!**

Before any cleaning, repair, service or maintenance operation on the machine DISCONNECT IT FROM ITS POWER SOURCE.

**WARNING!**

Check to be sure that the percentage of oil does not exceed manufacturer recommendations.

The harmful substances produced by the machine such as cooling liquid emulsion, must be disposed of in compliance with current regulations.

Do not use gasoline, solvents or other flammable liquids as detergents.

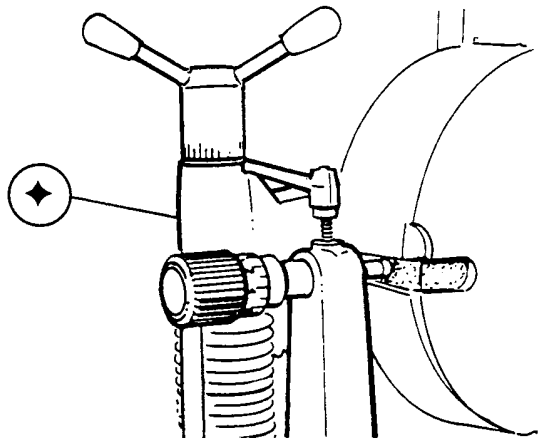
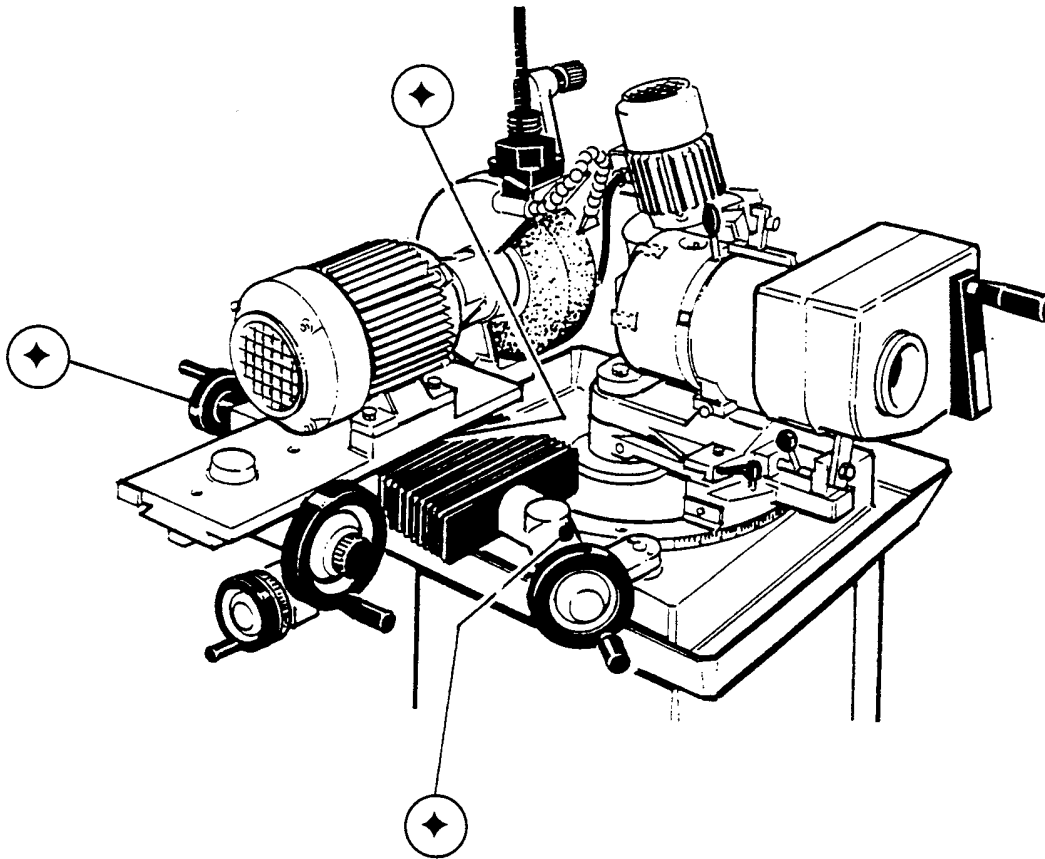
Use only authorized non-flammable and non-toxic solvents.

Do not use compressed air to clean the machine. Where this cannot be avoided, always wear safety glasses with side guards and keep the pressure to a max. 2 bar.

Do not use a naked flame as a light source when checking the machine or looking for leaks.

13**LUBRIFICATION**

Daily lubricate the points highlighted in the Figures below.

**WARNING!**

Do not lubricate when the machine is running.

14 REGISTERING THE CROSS SLIDE

IMPORTANT!

SLIDE registration is extraordinary maintenance to be done only if there is play in the runners.

Best to have this SLIDE registration done by qualified personnel.

Follow these steps to register play in the slide:

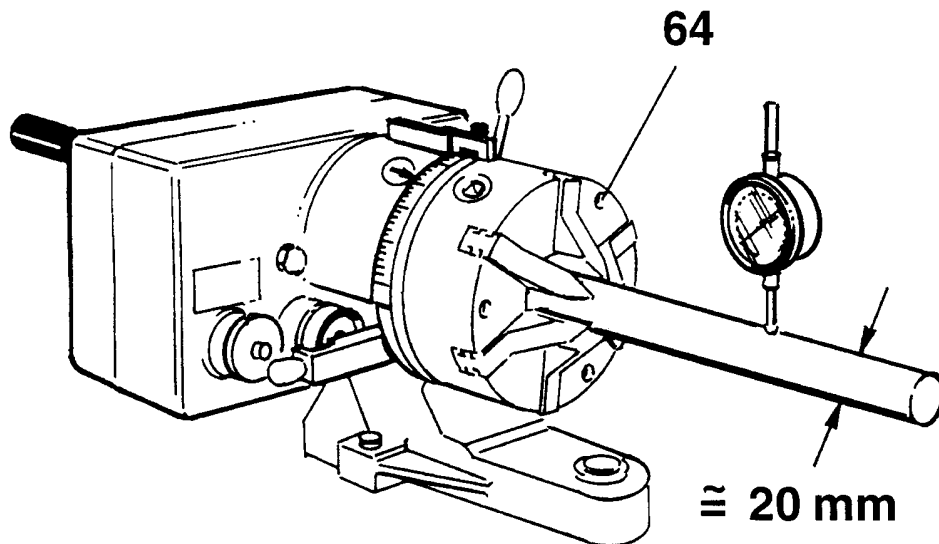
- Slacken off the 6 MA nuts along the side of the slide.
- Use the hex wrench in the tool kit to tighten slightly the registration set screws until the play is eliminated but without interfering with the original smooth movement parameters of the runners.
- When the registration is perfect, tighten home the 6 MA nuts.

15**REGISTERING THE TOOLHOLDER ASS'Y**

After a long period of operation, the toolholder ass'y can go out of true and, as a result, sharpening is off-centre.

To register the toolholder, follow these steps:

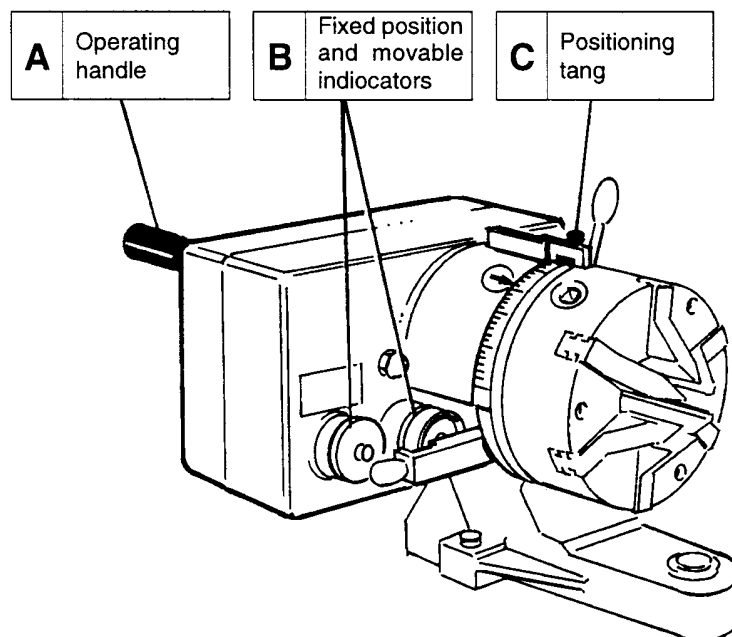
- Remove the cam.
- Slacken lever (8) knob or nut locking (at most one turn) and insert pin (7) in position "A" (rotation without oscillation).
- Clamp a trued pin (diameter approx. 20 mm) in the chuck and use a 100th gauge to test it for out-of-centre.
- Slacken off the 3 screws (64) and use a plastic hammer to hit the toolholder until its out-of-centre is within 0.02-0.03.
- Re-tighten the 3 screws (64).



16**TIMING (ONLY APE 25)****16.1 CHECKING THE TIMING**

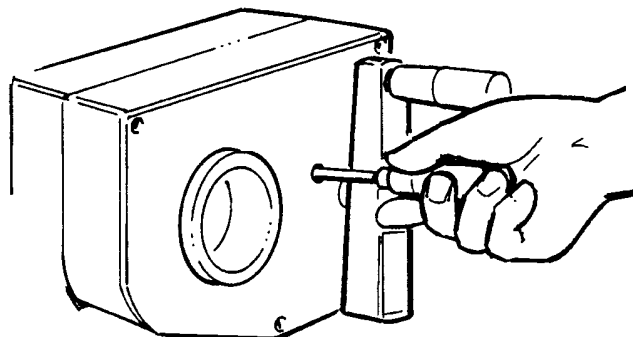
The toolholder ass'y is correctly timed when, as shown in the Figure, the following conditions are found **all together**:

- A** The Operating handle is at the top right corner of the toolholder head viewed from the operator's position.
- B** The toolholder positioning tang is inserted in the chuck couple in the green notch.
- C** The movable indicators are lined up with the fixed position indicators.

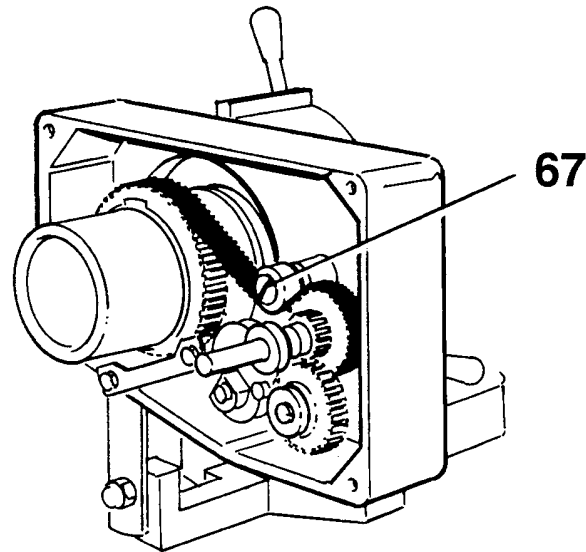
**16.2 TIMING**

If the movable indicators on the cam holder are not lined up with the fixed position ones, follow these steps:

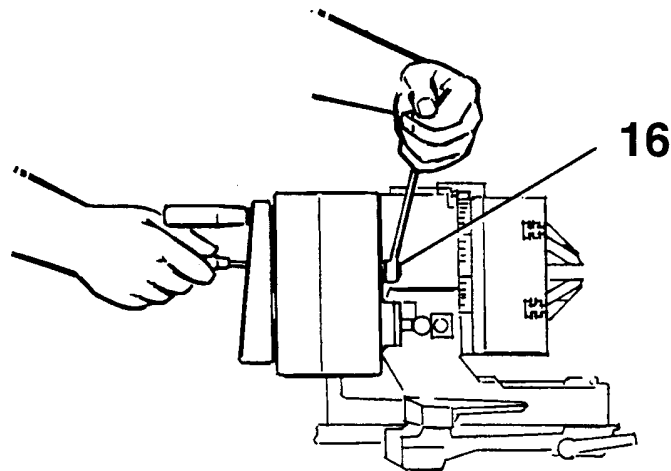
- Insert a screwdriver in the hole in toolholder head casing.



- Hold the screwdriver firmly in the slot on the eccentric pin (67) as shown in the figure.



- Use a 13 mm wrench to slacken off the locking nut (16) that protrudes from the toolholder ass'y. Turn the screwdriver anticlockwise to slacken off the belt.



- Turn the cam holder shafts to line up the fixed position and mobile markers and tighten the nut by turning the screwdriver clockwise.

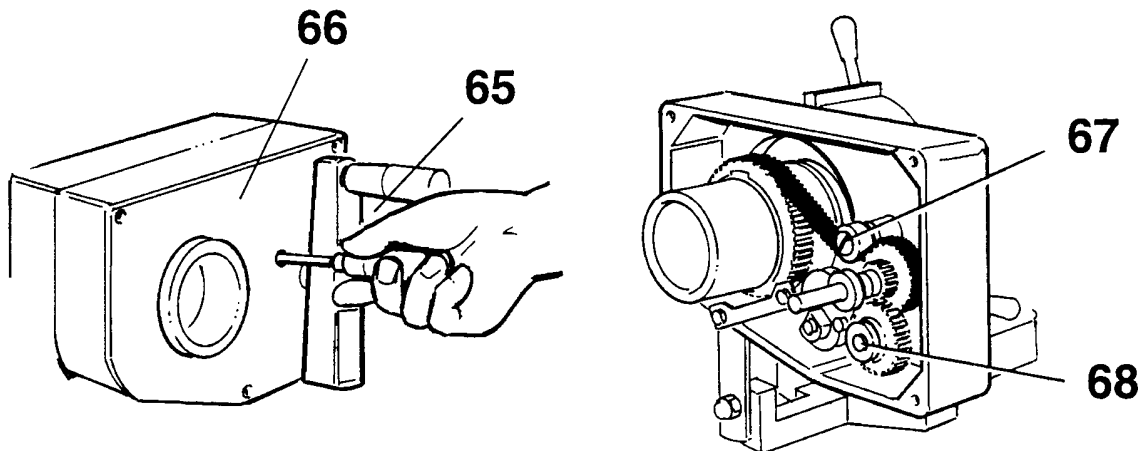
IMPORTANT!

We recommended tensioning eccentric pin (67) adequately: insufficient tensioning will put the toolholder ass'y out of timing. Excessive tensioning, on the other hand, will make handle (6) abnormally stiff.

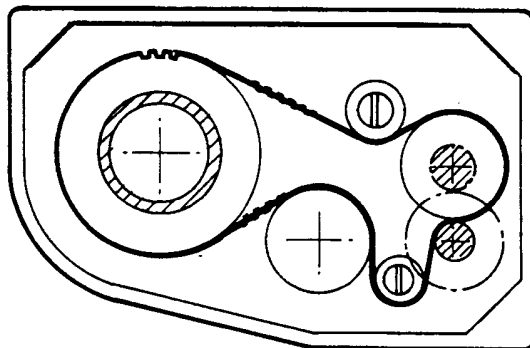
16.3 CHANGING THE BELT

Follow these steps to change the belt:

- Slacken off the retainer set screw and remove operating handle (6).
- Remove the 3 screws (65) and casing (66).
- Remove the eccentric pin with its roller (67).
- Remove the worn belt.
- Remove the gear wheel (68).
- Install the new belt as shown in the figure.
- Replace the gear wheel (68) and the eccentric pin with roller (67).
- Replace the casing (66)
- Replace the handle (6)
- Tension the belt as described previously in 16.2.



16.4 BELT ROUTE APE 25



APE 25 belt Ordering Code N. : C2D 160 X L 037
Contact CUOGHI to order belt replacements.

17**STORING AND DEMOLISHING****17.1 FOR A PERIOD OF INACTIVITY**

If you decide to store the machine temporarily or when it is not being used, REMOVE THE PLUG FROM THE POWER OUTLET. Clean the machine thoroughly, remove any powder, dust or dirt. Remove the cooling liquid from the reservoir.

17.2 DEFINITIVE INACTIVITY

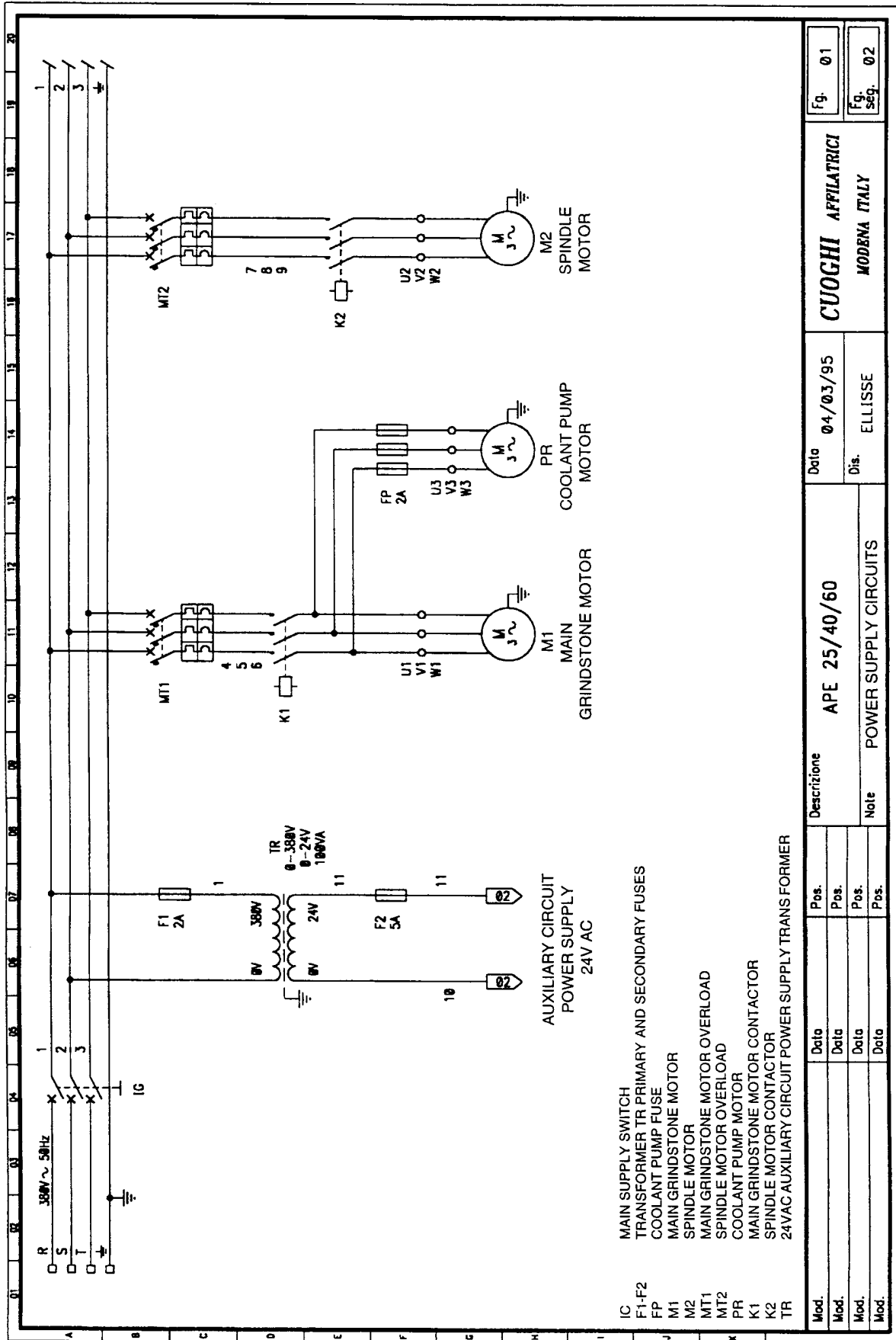
If the machine is not to be used any long, make it non-operating BY REMOVING THE POWER CORD ONCE YOU HAVE UNPLUGGED IT FROM THE POWER OUTLET.

17.3 DEMOLITION

Since this sharpening machine is regarded as a special waste product, keep all the same type of dismantled material together and dispose of them in compliance with current regulations.

18

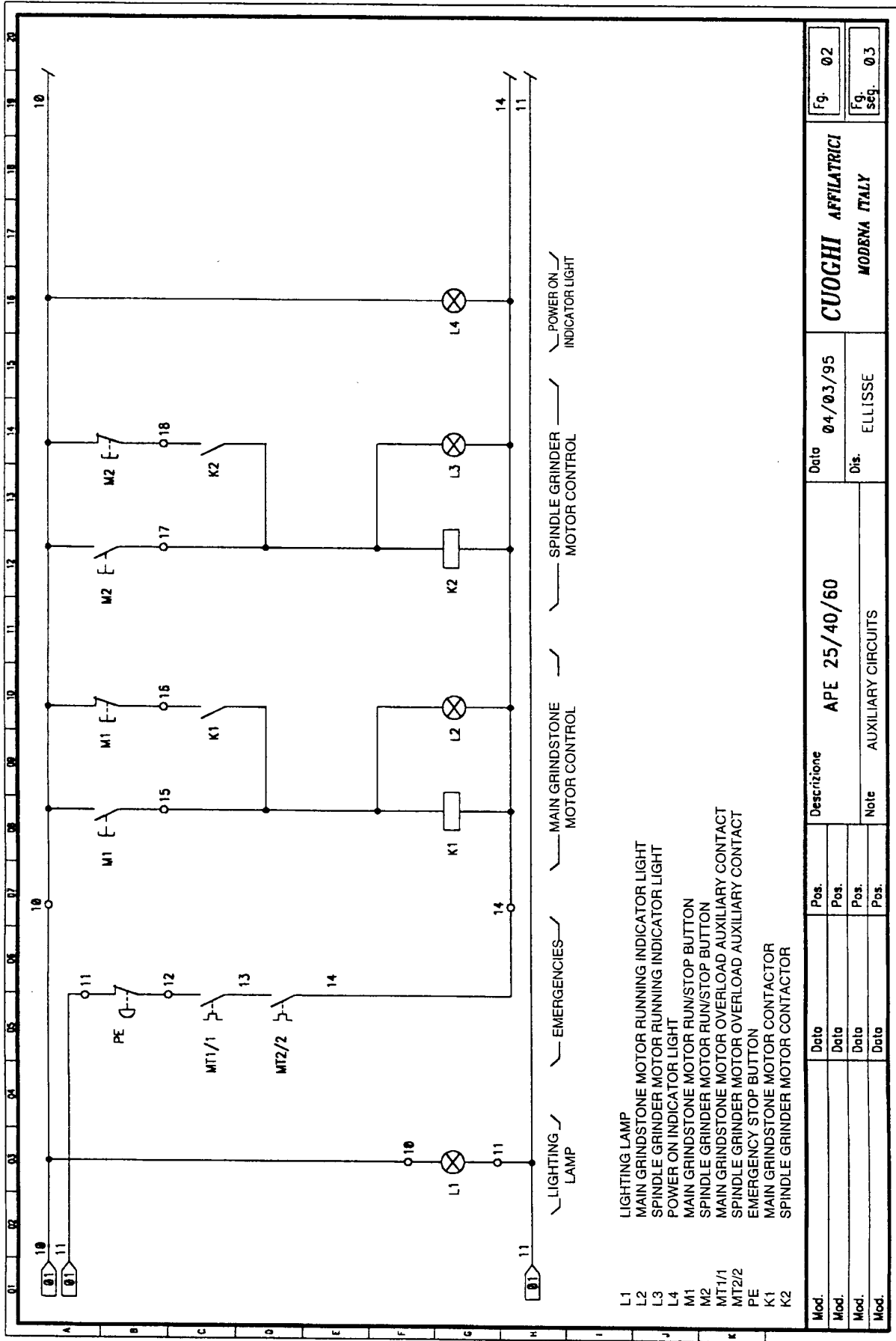
ELECTRIC SYSTEM LAYOUT



- IC MAIN SUPPLY SWITCH
- TR TRANSFORMER TR PRIMARY AND SECONDARY FUSES
- FP COOLANT PUMP FUSE
- M1 MAIN GRINDSTONE MOTOR
- M2 SPINDLE MOTOR
- MT1 MAIN GRINDSTONE MOTOR OVERLOAD
- MT2 SPINDLE MOTOR OVERLOAD
- PR COOLANT PUMP MOTOR
- K1 MAIN GRINDSTONE MOTOR CONTACTOR
- K2 SPINDLE MOTOR CONTACTOR
- TR 24VAC AUXILIARY CIRCUIT POWER SUPPLY TRANSFORMER

Mod.	Data	Pos.	Descrizione	Data	Fg.
Mod.	Data	Pos.	APE 25/40/60	04/03/95	01
Mod.	Data	Pos.	POWER SUPPLY CIRCUITS	ELLISSE	02
Mod.	Data	Pos.			
Mod.	Data	Pos.			

CUOGHI AFFILIATICI
MODENA ITALY



- L1 LIGHTING LAMP
- L2 MAIN GRINDSTONE MOTOR RUNNING INDICATOR LIGHT
- L3 SPINDLE GRINDER MOTOR RUNNING INDICATOR LIGHT
- L4 POWER ON INDICATOR LIGHT
- M1 MAIN GRINDSTONE MOTOR RUN/STOP BUTTON
- M2 SPINDLE GRINDER MOTOR RUN/STOP BUTTON
- MT1/1 MAIN GRINDSTONE MOTOR OVERLOAD AUXILIARY CONTACT
- MT2/2 SPINDLE GRINDER MOTOR OVERLOAD AUXILIARY CONTACT
- PE EMERGENCY STOP BUTTON
- K1 MAIN GRINDSTONE MOTOR CONTACTOR
- K2 SPINDLE GRINDER MOTOR CONTACTOR

Mod.	Data	Descrizione	Data	Fg. 02
Mod.	Data	APE 25/40/60	04/03/95	Fg. 03
Mod.	Data	AUXILIARY CIRCUITS	ELLISSE	
Mod.	Data			

CUOGHI AFFILIATRICI
MODENA ITALY

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LIST OF ELECTRICS PARTS

INITIALS	FUNCTION	MAKE	TYPE
IG	MAIN SWITCH: APE 25 APE 40 APE 60	LE2 12 1753 LA2 12 1753 LA2 12 1753	BRETER BRETER BRETER
MT1	OVERLOAD: APE 25 APE 40 APE 60	LMS 25 1 - 1,6 LMS 25 1,6 - 2,5 LMS 25 2,5 - 4	LOVATO LOVATO LOVATO
MT2	APE 25 OVERLOAD	LMS 25 0,63 - 1	LOVATO
MT1/1	CIRCUIT BREAKER AUX. CONTACT	11 LMH 11 1 NO+1 NC	LOVATO
MT2/1	CIRCUIT BREAKER AUX. CONTACT	11 LMH 11 1 NO+1 NC	LOVATO
K1	CONTACTOR	11 MC9 10 24	LOVATO
K2	CONTACTOR	11 MC9 10 24	LOVATO
F1	FUSE HOLDER	VDE 0110 GR C750V	CABUR
F2	FUSE HOLDER	VDE 0110 GR C750V	CABUR
FP	FUSE HOLDER (3X)	VDE 0110 CR C750V	CABUR
TR	TRANSFORMER	380 - 24V 100 VA	CUOGHI
L1	HALOGEN LIGHT	24V - 14400	SUNNEX
START M1+L2	LIGHTED BUTTON	ZA2 BW33 ZA2 BW061	TELEMECANIQUE TELEMECANIQUE
STOP M1	BUTTON	ZAB BA4+ZA2BZ102	TELEMECANIQUE
START M2+L3	LIGHTED BUTTON	ZA2 BW33 + ZA2 BW061	TELEMECANIQUE TELEMECANIQUE
STOP M2	BUTTON	ZAB BA4+ZA2BZ102	TELEMECANIQUE
L4	LED	ZA2 BV6+ZA2 BV03	TELEMECANIQUE
PE	EMERGENCY STOP BUTTON	ZA2 BS54+ZA2 BZ102	TELEMECANIQUE

LIST OF COMPONENTS

- 1 - PUSH-BUTTON CONTROL PANEL
- 2 - COOLING LIQUID TAP
- 3 - HALOGEN LIGHT SWITCH
- 4 - RAKE ANGLE REGULATING KNOB
- 5 - POSITIONING PINS
- 6 - OPERATING HANDLE
- 7 - ROTATION (A) OR OSCILLATION (B) KNOB
- 8 - LEVER LOCKING KNOB (APE 40) OR NUT (APE 25/60)
- 9 - POSITIONING PIN
- 10 - OUTSIDE GRADUATED SCALE
- 11A - APE 40,60 GRINDSTONE INCREASE WHEEL (0.01 MM)
- 11B - APE 25 GRINDSTONE INCREASE WHEEL (0.01 MM)
- 12 - FAST HANDWHEEL LOCKING NUT (APE 40/60)
- 13 - FAST LENGTHWISE MOVEMENT HANDWHEEL
- 14 - MICROMETRIC LENGTHWISE MOVEMENT HANDWHEEL (APE 40/60)
- 15 - CAM HOLDER RATIO 1:1 AND 1:2
- 16 - BELT TENSIONER LOCKING NUT
- 17 - SLIDING DRILL POSITIONING TEMPLATE
- 18 - RAKE ANGLE INDEX
- 19 - TOOLHOLDER POSITIONING KEY
- 20 - RIGHTHAND ADJUSTMENT DIAMOND DRESSER MOUNT
- 21 - ELECTRIC SPINDLE GRINDER HEIGHT REGULATING KNOB
- 22 - DIAMOND DRESSER
- 23 - ELECTRIC SPINDLE GRINDER GRADUATED SCALE
- 24 - ELECTRIC SPINDLE GRINDER LOCKING NUT
- 25 - ELECTRIC SPINDLE GRINDER ARM GRIP
- 26 - ELECTRIC SPINDLE GRINDER END TRAVEL REGULATION KNOB
- 27 - HOLE TO INSTALL DIAMOND DRESSER (SPINDLE GRINDER DRESSING)
- 28 - CENTRE PINION LOCKING SCREW
- 29 - CENTRE PROTRACTOR INDEX
- 30 - CENTRE PROTRACTOR
- 31 - DRILL POSITIONING BLOCK LOCKING NUT
- 32 - POSITIONING HOLE
- 33 - TOOLHOLDER HEAD LOCKING LEVER
- 34 - CAM CHANGING KNOB

