

DELTA PLUS



**DELTA PLUS
KEY-CUTTING MACHINE
INSTRUCTION MANUAL**

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1 PRESENTATION AND GENERAL ASPECTS

1.1 GENERAL POINTS

The DELTA PLUS key cutting machine has been designed taking into account the safety standards currently in force in the EU.

The safety of personnel involved in the handling of this type of machine is only achieved with a well designed worker safety programme, the implementation of a maintenance programme, and following recommended advice as well as compliance with the safety standards included in this manual.

Although the machine is not difficult to install, it is best not to try to install, adjust or use it without first having read this manual.

The machine leaves our factory ready for use and only requires the carrying out of calibration operations for the tools that are going to be used.

1.2 TRANSPORT AND PACKING

The machine comes packed in packing of the following size:

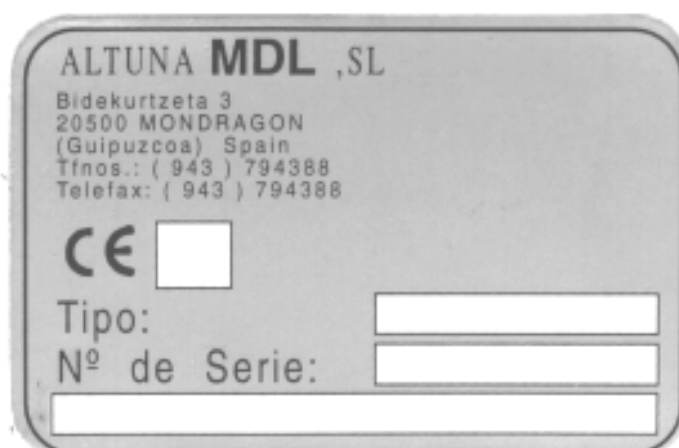
Width = 570 mm, length = 520 mm, height = 410mm

Machine weight = 28 Kg.

When the machine has been unpacked, check whether it has suffered any damage during transport. If you find any problems, please inform the carrier immediately and do not do anything with the machine until the carrier's agent has carried out an inspection.

1.3 IDENTIFICATION LABEL

The DELTA PLUS key cutting machine has an identification label, giving the serial number, the name and address of the manufacturer, the CE mark and the year of manufacture.



2 CHARACTERISTICS OF THE MACHINE

The DELTA PLUS is a modern machine for cutting single and double blade mortise lock keys, pump keys and special keys.

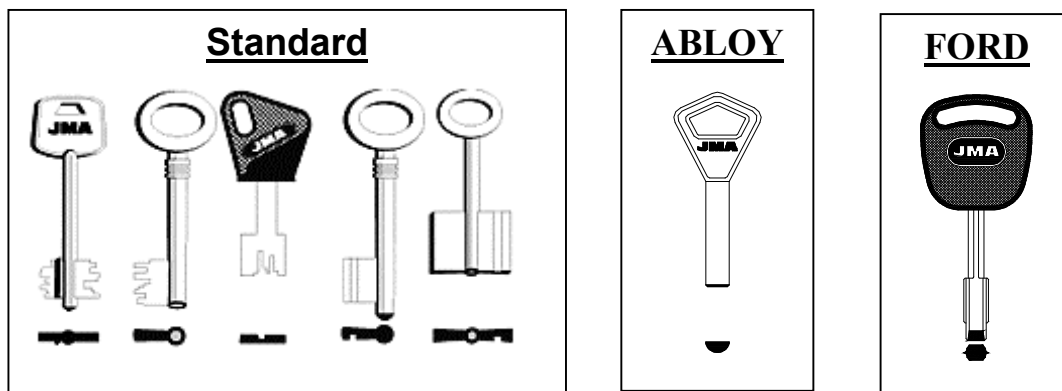
Equipped with clamps that have been hardened and milled in the clamping area, it securely locks all types of keys and enables any type of front cut to be made on bronze or steel, thanks to the two speeds of its powerful motor.

A number of special features, like the possibility of locking the slide in any position, the possibility of using the tracer point with spring action, the lamp for lighting the work area, the possibility of locking the rotation of the clamp make the DELTA PLUS a very practical and functional key cutting machine. The generous size of its functional elements ensures that it is robust enough to cut keys with great precision.

2.1 FAMILY OF KEYS

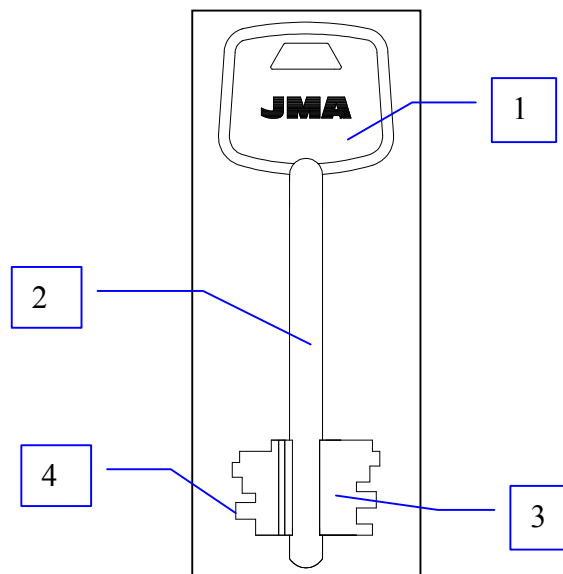
The DELTA PLUS can cut the following types of keys:

- Single and double blade mortise lock keys.
- Pump keys.
- Special keys.



2.2 PARTS OF A KEY

1. Head
2. Stem
3. Blade
4. Teeth



2.3 OPTIONAL FITTINGS

In order to get a more complete service from this key cutting machine, three optional fittings are available that enable its features to be improved.

RG FITTING

It has been designed to prepare the groove in mortise lock keys.

FT-COD FITTING

Enables you to cut FORD TIBBE keys, by means of a code.

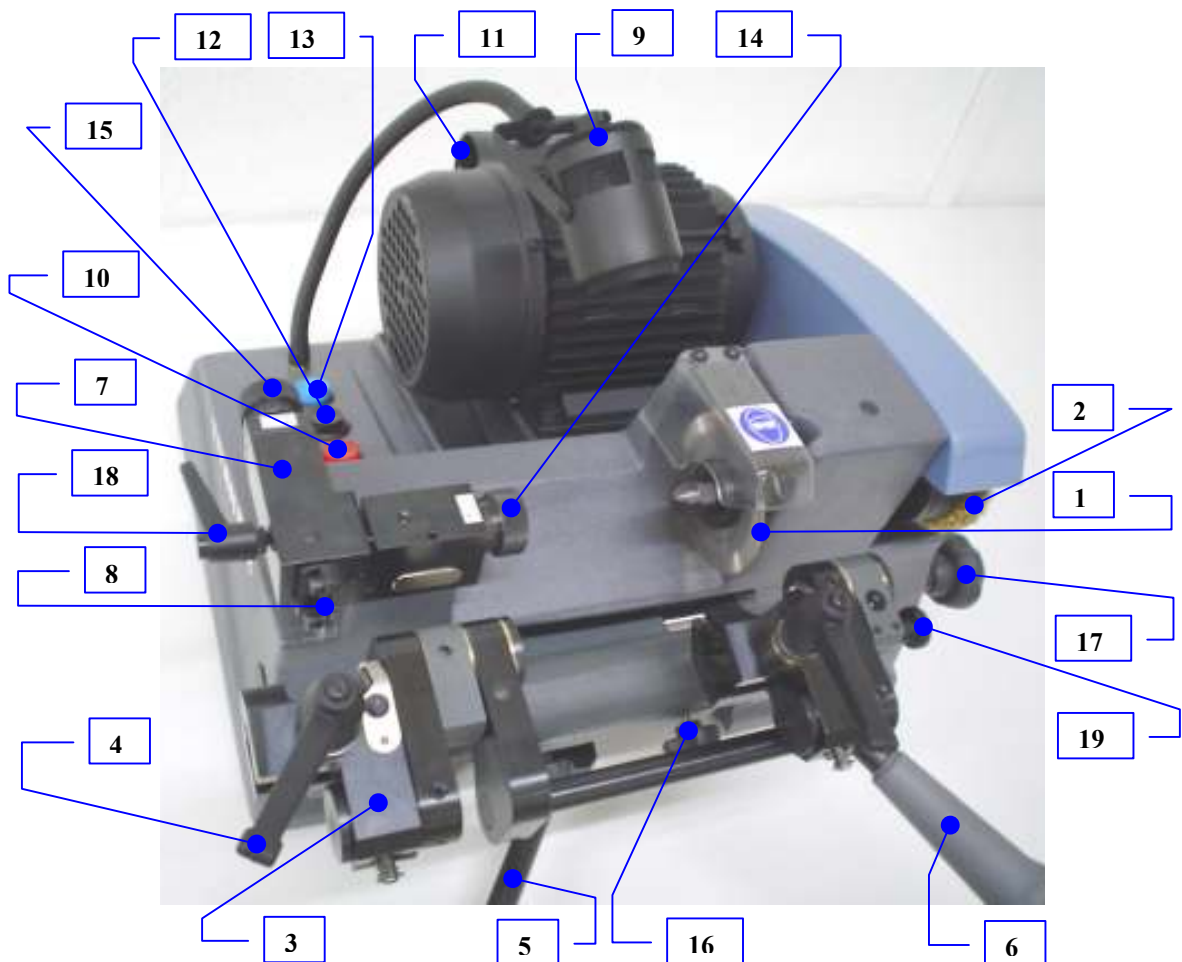
ABL FITTING

Enables you to cut ABLOY type keys.

These fittings are not included in the price of the machine, as they are optional purchases.

2.4 MAIN ELEMENTS OF THE MACHINE

1. Milling cutter
2. Plane
3. Clamp
4. Clamp handle
5. Slide advance control
6. Rounding control
7. Tracer point support
8. Tracer point
9. Light
10. Start switch
11. Motor speed switch
12. Plane start button
13. Light switch
14. Tracer point side adjustment control
15. Tracer point depth adjustment control
16. Slide securing knobs
17. Knob to lock slide in any position
18. Tracer point spring action knob
19. Knob to lock right-hand clamp rotation



2.5 TECHNICAL INFORMATION

The main technical information is as follows:

Motor: Single phase 220V; 50Hz; 2 speeds; 0.24/0,18Kw.

Milling cutter: Ø80 x 16 x 1.4 mm (three cuts), HSS.

The following milling cutters can also be supplied as optional extras:

- Ø80 x 16 x 1.25 mm (three cuts), HSS.
- Ø80 x 16 x 1.5 mm., HSS.
- Ø80 x 16 x 1 mm., HSS.

Speed: The machine has two rotation speeds:

- 325 rpm for cutting STEEL keys.
- 650 rpm for cutting BRASS keys.

Clamps: Self-centring.

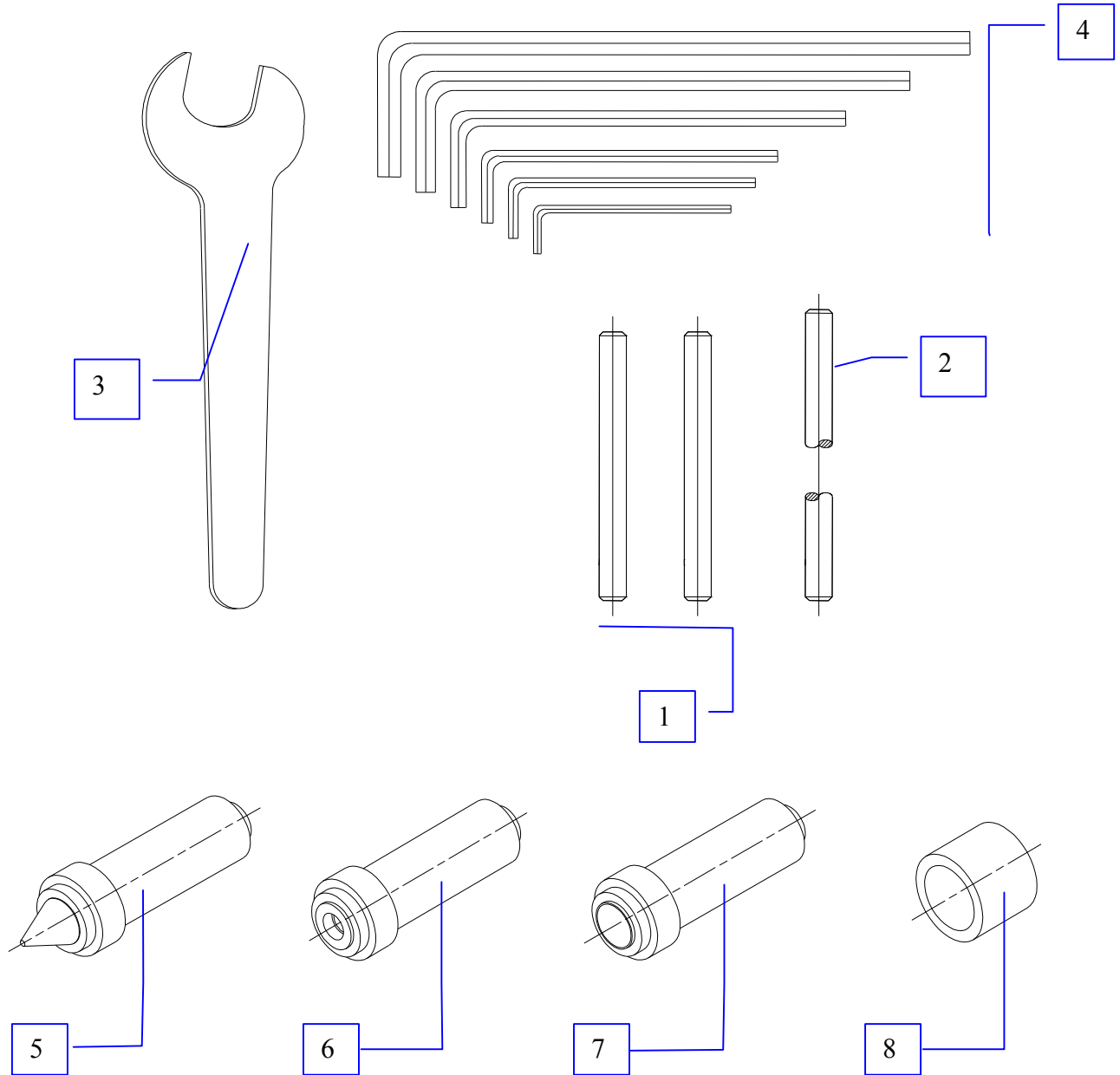
Lighting: Halogen desk type lamp.

Dimensions: Width = 400 mm, Depth = 420 mm, Height = 230 mm.

Weight: 28 Kg.

2.6 COMPONENTS AND FUNCTIONAL PARTS

2.6.1 Accessories

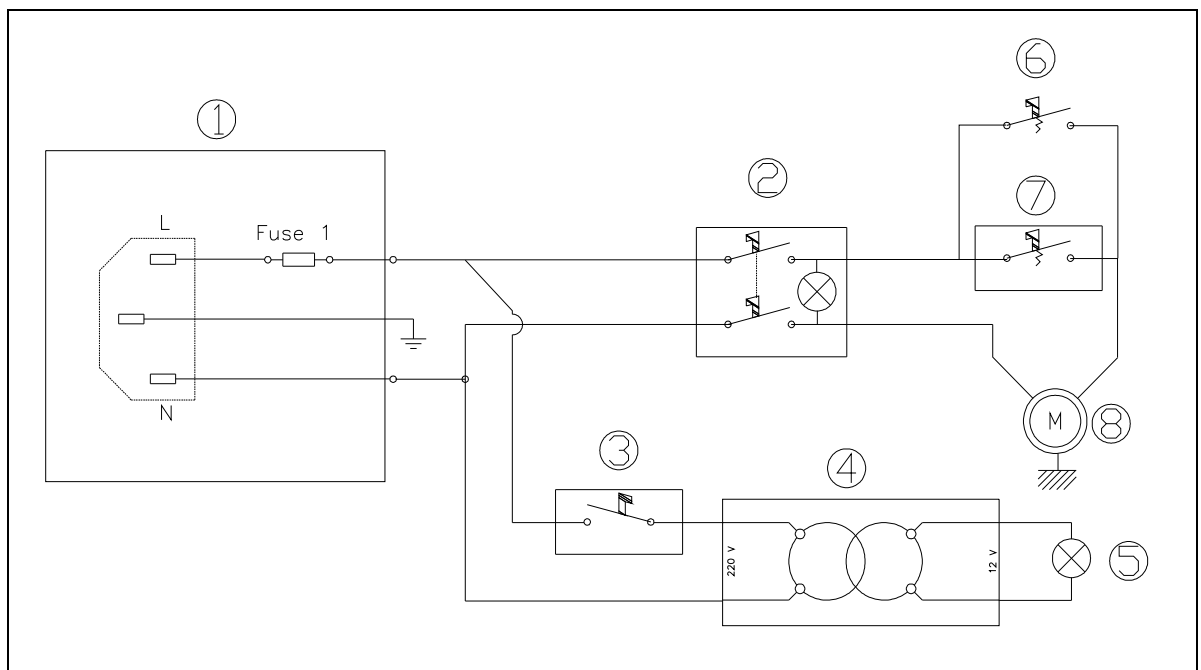


1. Adjustment rods.
2. Rod for changing milling cutter ($\varnothing 7 \times 140$)
3. Size 18 spanner.
4. Set of Allen keys (2, 2.5, 3, 4, 5, 6)
5. Tailstock for female keys
6. Tailstock for male keys with a thin stem
7. Tailstock for male keys with a thick stem
8. Tailstock extension bushing

2.6.2 Electric circuit

The main component of the electric circuit and the electronic components are as follows:

1. Socket.
2. Start switch with red light.
3. Blue light switch.
4. Transformer.
5. Halogen lamp.
6. Microswitch.
7. Black plane button.
8. 2-speed motor.

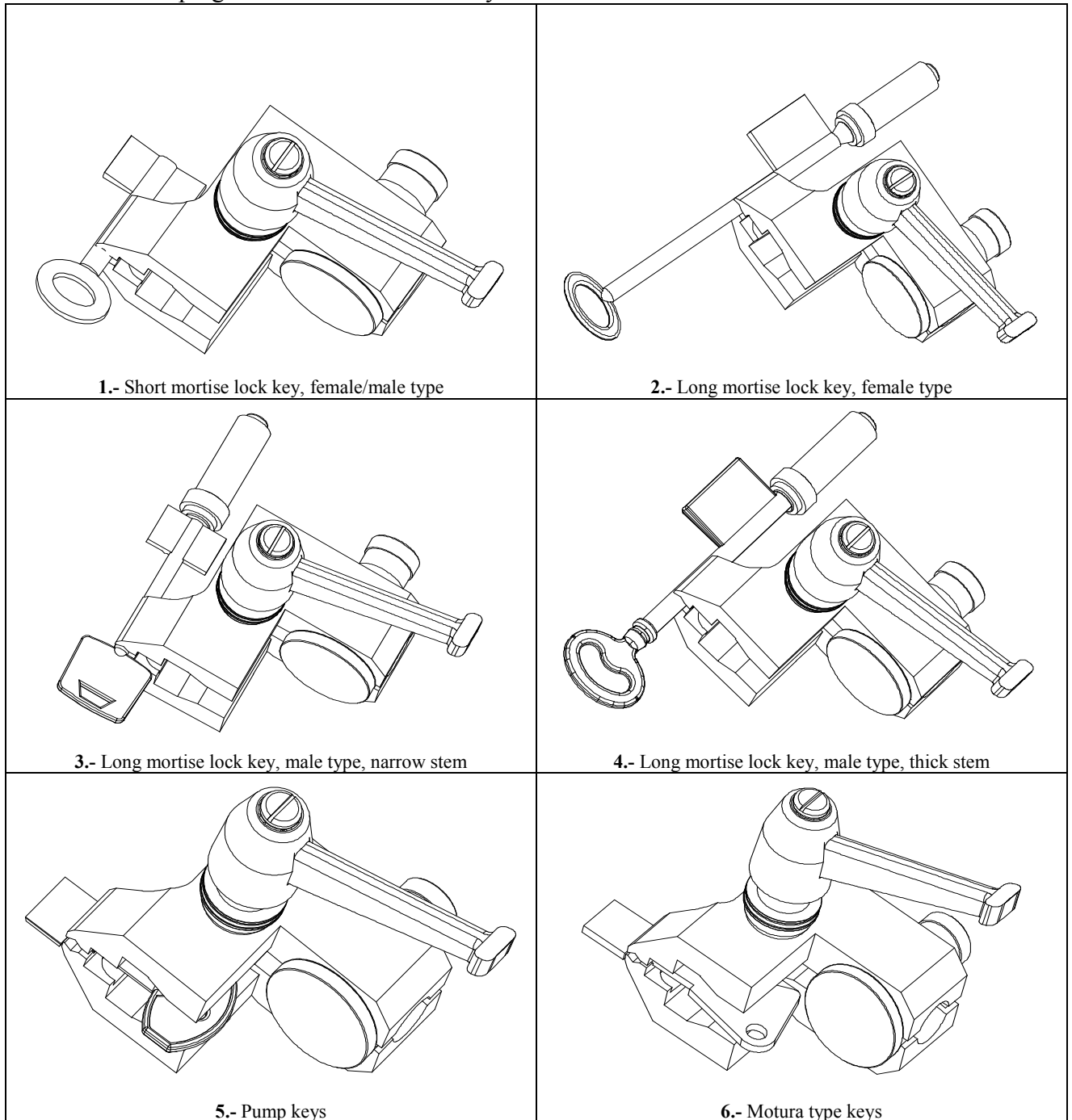


2.6.3 Clamp

The clamp is a fundamental part of each key cutting machine. The DELTA PLUS machine clamp has been specially designed to cut the largest number of keys possible, using tailstocks to cut some of them.

Moreover, as it is self-centring, mortise lock type keys can be cut without taking into account the diameter of the key stem (as when the round point of the key teeth is done, the key always rotates around the central axis of the stem, regardless of the diameter).

The clamping areas for the different keys are detailed below:



3 HOW THE MACHINE WORKS

3.1 MACHINE ADJUSTMENT

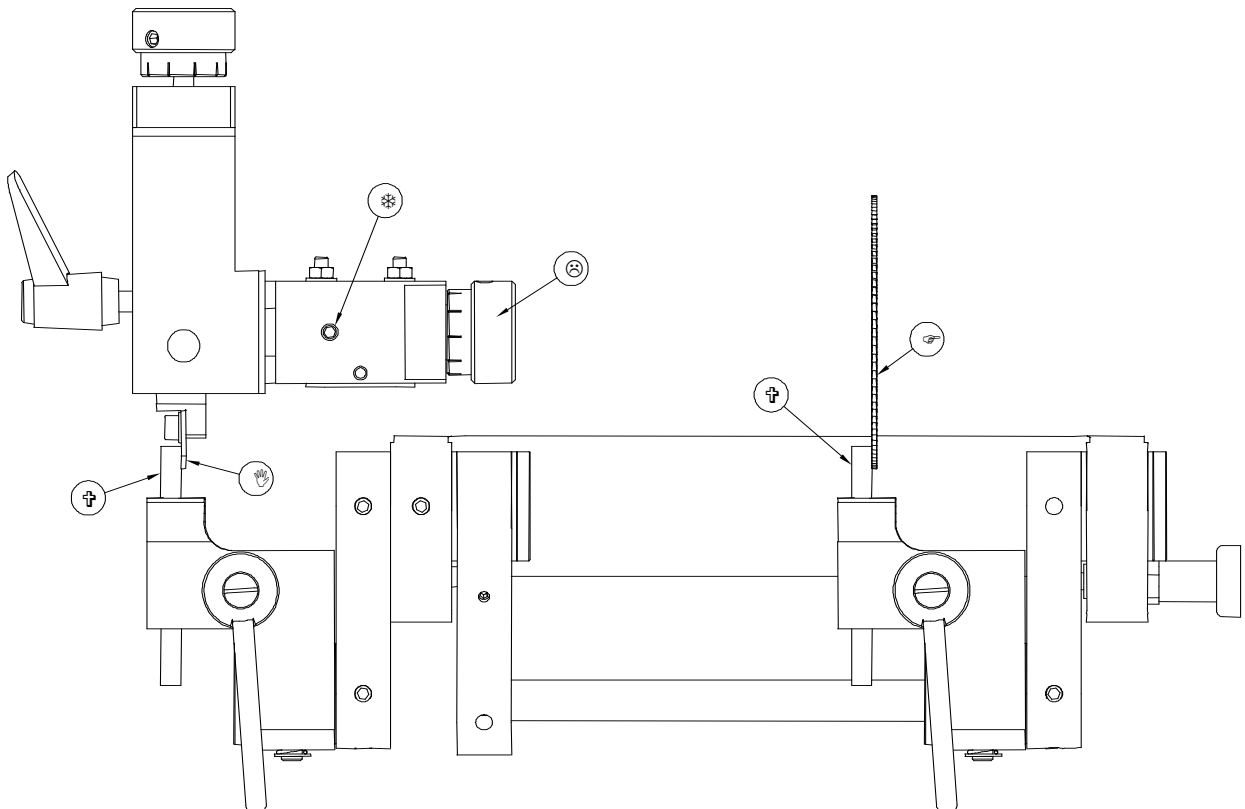
The DELTA PLUS key cutting machine leaves the factory fully adjusted.

However, when the milling cutter is changed, or after the machine has been used a lot, it is a good idea to make the following adjustments to keep the machine in perfect operating condition.

3.1.1 Control and side adjustment

- Clamp the two adjustment rods (V), in the area for pump keys.
- Bring the clamps towards the tracer point (I) and the milling cutter (F), so that one of the sides of the milling cutter-tracer point touches the adjustment rods (V).
- If the adjustment rods do not coincide with the milling cutter and the tracer point, proceed as follows:
 - Loosen the support screw (T) and turn the micrometric screw (L) clockwise or anti-clockwise, depending on whether you want to move the tracer point (I) to the right or to the left.
 - The distance is perfectly adjusted, with the tracer point and the milling cutter coinciding with their respective adjustment rods. Finally tighten the support screw (T) right up.

N.B. In order to carry out these operations more easily, you can lock the whole slide in a specific position, by using the corresponding knob. You can also block the rotation of the right-hand side clamp, by using the corresponding knob.



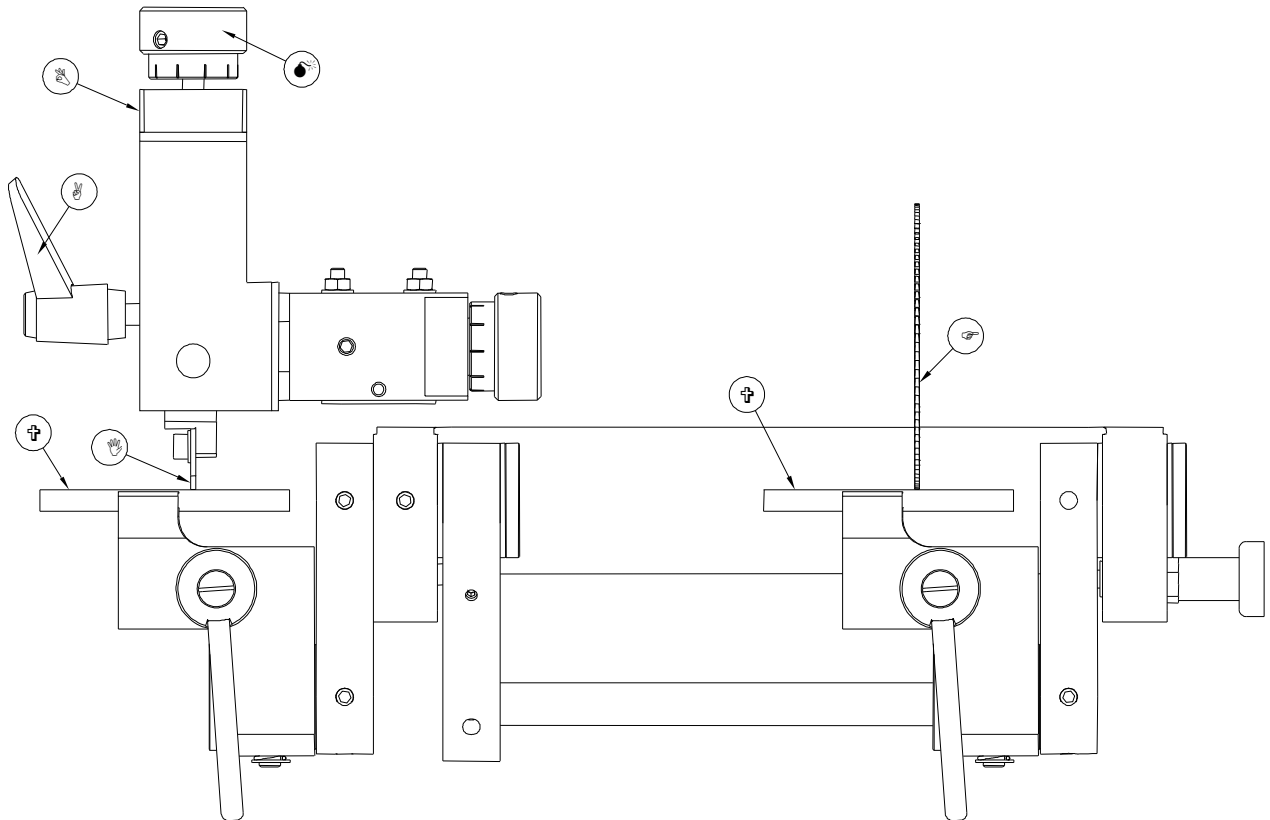
3.1.2 Control and adjustment of the cutting depth

- Clamp the two adjustment rods (V), in the area for mortise lock keys.
- Bring the clamps towards the tracer point (I) and the milling cutter (F), so that the adjustment rods rest on the tracer point and the milling cutter.
- Turn the milling cutter by hand. If the milling cutter lightly rubs against the corresponding adjustment rod (V), the machine is properly adjusted.
- If when the milling cutter is turned, it does so freely, without rubbing, this indicates that it is not cutting deeply enough. On the other hand, if the milling cutter jams up against the adjustment rod, this indicates that it is cutting too deeply.
- If either of these two situations should occur, proceed as follows:
 - Slightly loosen the setscrew (B) locking the tracer point's "internal stop". Turn the micrometric screw (M) clockwise or anticlockwise, depending on whether you want to move the tracer point (I) forward or back. Lock the tracer point's "internal stop" again, using the setscrew (B).

For the tracer point (I) to move, you have to release it every time you are going to turn the micrometric screw (M) and lock it every time you rest it on its "internal stop". The tracer point (I) is locked-released by means of the knob (A).

- Check that the machine has been adjusted. If it has not, repeat the previous point until the machine is properly adjusted.

N.B.: In order to carry out these operations more easily, you can block the rotation of the right-hand side clamp, by means of the corresponding knob.



3.1.3 Control and adjustment of the side stop

To cut the following types of keys:

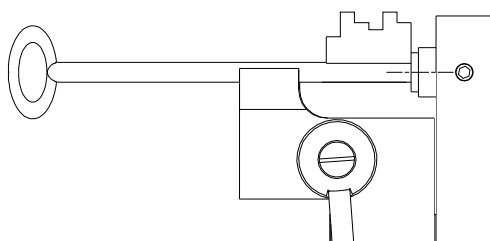
- Long mortise lock key, female type.
- Long mortise lock key, male type, narrow stem.
- Long mortise lock key, male type, thick stem.

It is best to fit one of the 3 different pairs of tailstocks supplied onto the machine, to ensure that the key is secured firmly.

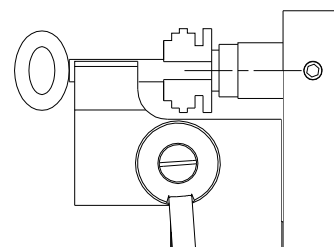
If you are going to copy this type of keys, but shorter, that is to say:

- o Short mortise lock key, female type.
- o Short mortise lock key, thin stem.
- o Short mortise lock key, male type, thick stem.

it is best to fit the extension bushings supplied on the relevant tailstocks, so that in this way, the end (tip) of the key reaches the relevant tailstock.



Tailstock



Tailstock with extension

When clamping the key into the clamp you have to push the end (tip) of the key against the tailstock you have fitted, until the blade of the key butts up against the stop face of the tailstock. In this position, you have to tighten the clamp until the key is fully locked in place. In this way, the key is firmly clamped and centred, preventing it from vibrating during the cutting operation. The distance between the stops of the two tailstocks must coincide with the distance already adjusted between the milling cutter and the tracer point. The position of the right-hand tailstock side stop is invariable. However, the left-hand tailstock is fitted on a laterally adjustable bushing. Acting on this bushing you can make the distance between the stops of the two tailstocks the same as the actual distance between the milling cutter and the tracer point. To do this, proceed as follows:

- Fit any of the pairs of tailstocks onto the machine slide.
- Without putting any keys in the clamps, rest the tailstock stops against the right-hand side of the milling cutter and the tracer point.
- If the side of the milling cutter and the side of the tracer point are in contact with the stop faces of their respective tailstocks, the adjustment is correct. If this is not the case:
 - Loosen the setscrew securing the left-hand tailstock adjustable bushing.
 - Move the bushing with its tailstock to the right or left, until the tailstock stop faces coincide with the sides of the milling cutter and tracer point.
 - Finally, tighten up again the setscrew locking the adjustable bushing.

N.B.: This adjustment of the side stop is carried out during the assembly phase of the machine, and therefore comes already done from the factory.

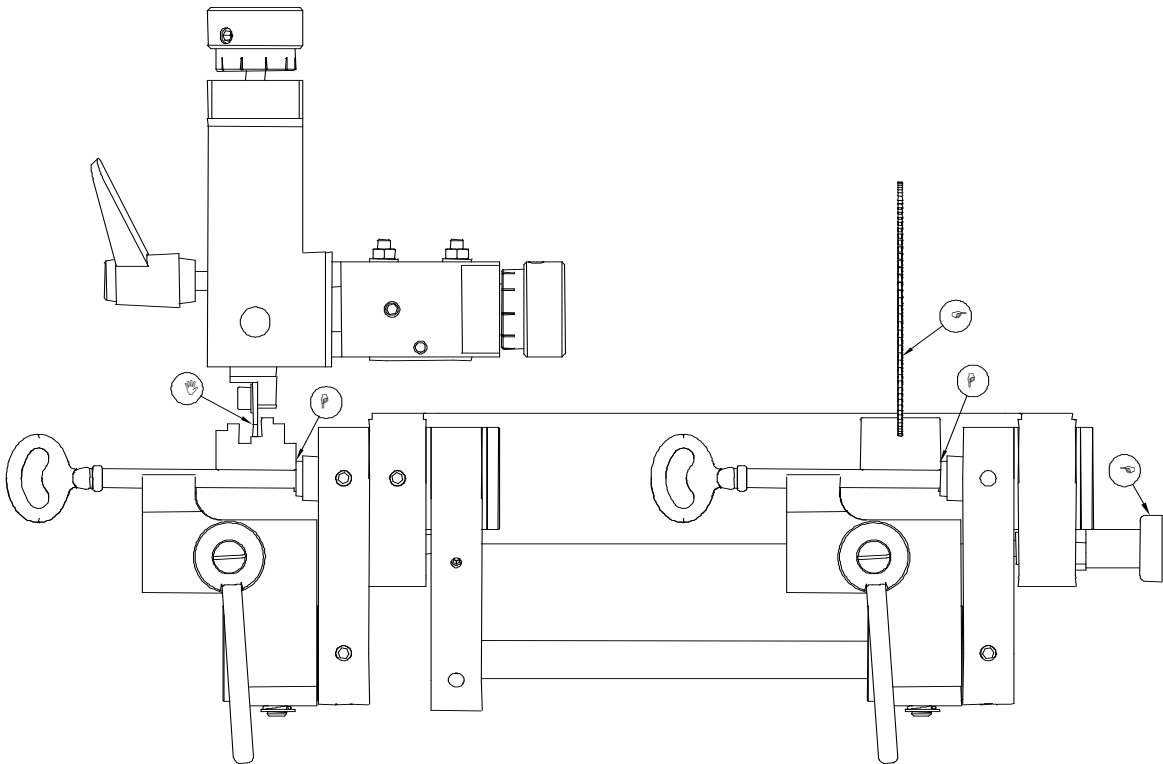
3.2 KEY CUTTING

3.2.1 Cutting mortise lock keys

- Put the keys into the clamps pushing them to the right, ensuring that their ends are inserted into their respective tailstocks until the blade of the key comes up against the tailstock's stop face (H). Tighten the clamps making sure that the keys are secured in the bottom of the jaws. Check that the blades of both keys are as parallel as possible. To do this more easily, it is best to block the rotation of the right-hand clamp, by means of the knob (E).

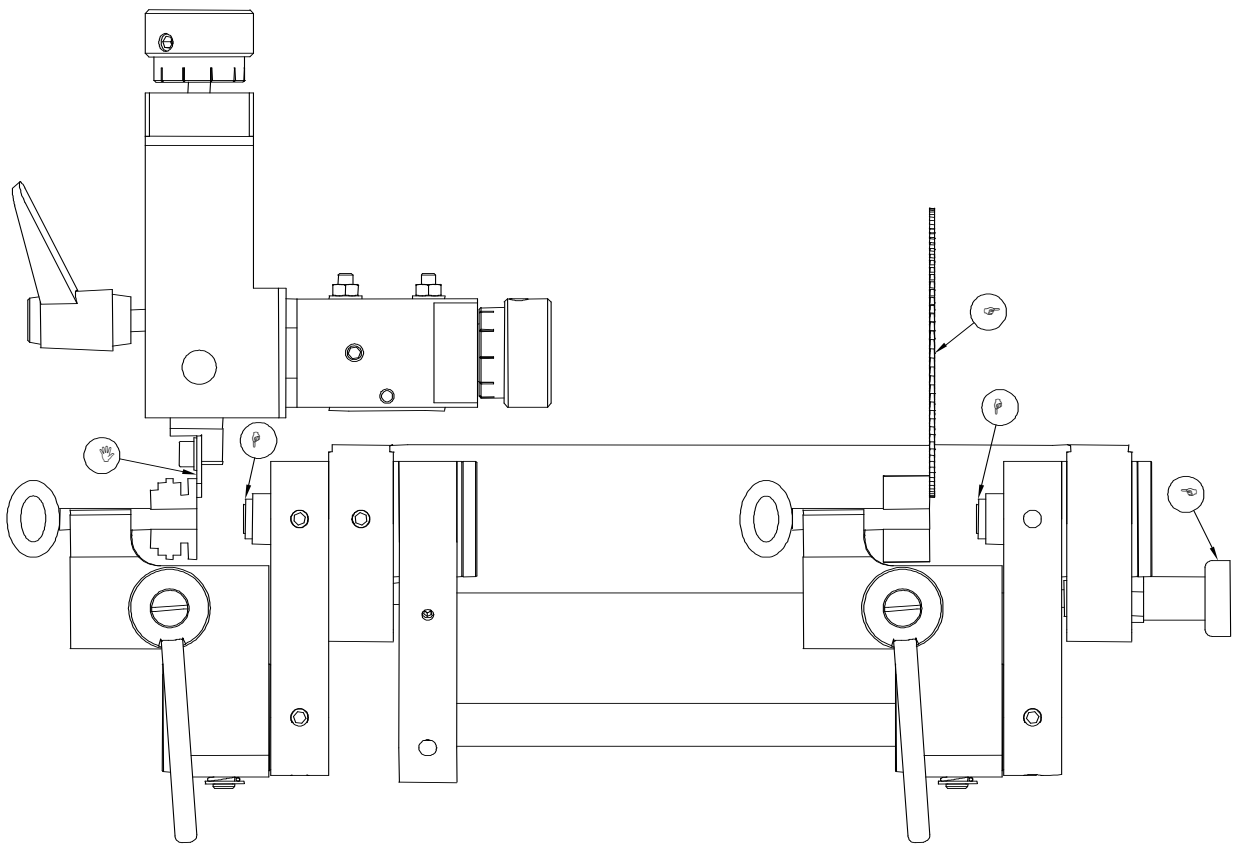
N.B.: One type of tailstock or another will be fitted to the slide, depending on the type of key to be cut (see *page 10*).

- Set the motor switch to position 1 (low speed) for steel keys.
- Set the motor switch to position 2 (high speed) for brass keys.
- Release the rotation of the right-hand side clamp, and carefully bring the slide to the milling cutter (F) and the tracer point (I). We recommend that you work slowly, without forcing the milling cutter. The rounded area is achieved by rotating the right-hand clamp with the relevant control. The length of the rounded area is limited internally.
- When doing the rounded area, it is a good idea to rotate the lever from top to bottom, as this will mean that the cutting is carried out more smoothly.
- If there are deep cuts at the start of the blade on the right, limit the rotation of the lever so as not to touch the side stop (H) with the milling cutter.
- For double bladed keys, turn both keys and repeat the operations described above.
- If the key cutting operation has left some burrs on the cut key, these can be removed with the plane that the machine has been fitted with for that purpose.



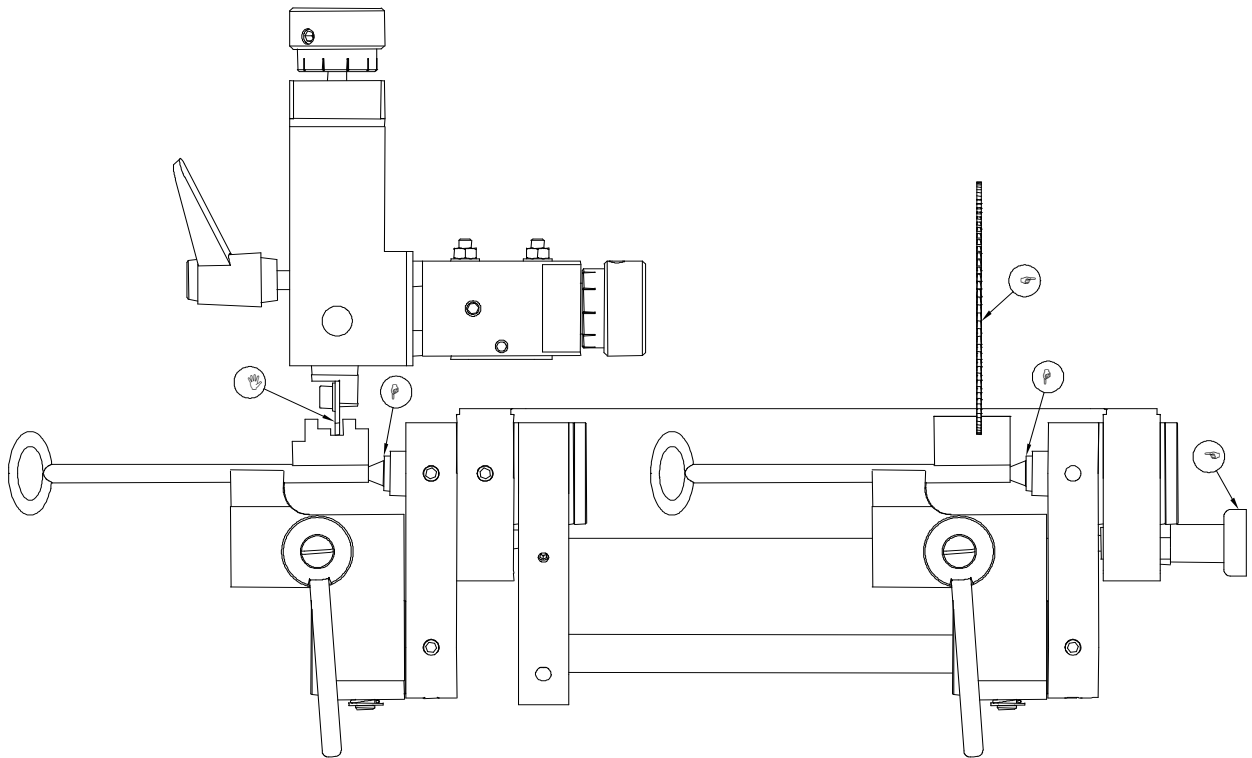
When you want to cut a very short key that does not reach the side stop (H) (not even with the extension bushing fitted on the tailstock), proceed as follows:

- Clamp the blank key in the middle of the right-hand clamp.
- Raise the slide and rest the key blade against the side of the milling cutter (F). In this position, lock the machine slide by means of the relevant knob.
- Clamp the key to be copied in the left-hand clamp resting the blade against the side of the tracer point (I). This will ensure that the two keys are in the perfect position. To do this more easily, it is best to block the rotation of the right-hand clamp, by means of the knob (E).
- Release the slide locking knob. Release the knob blocking the rotation of the right-hand clamp.
- Cut the key without forcing it, bearing in mind that the key is not supported by the tip.



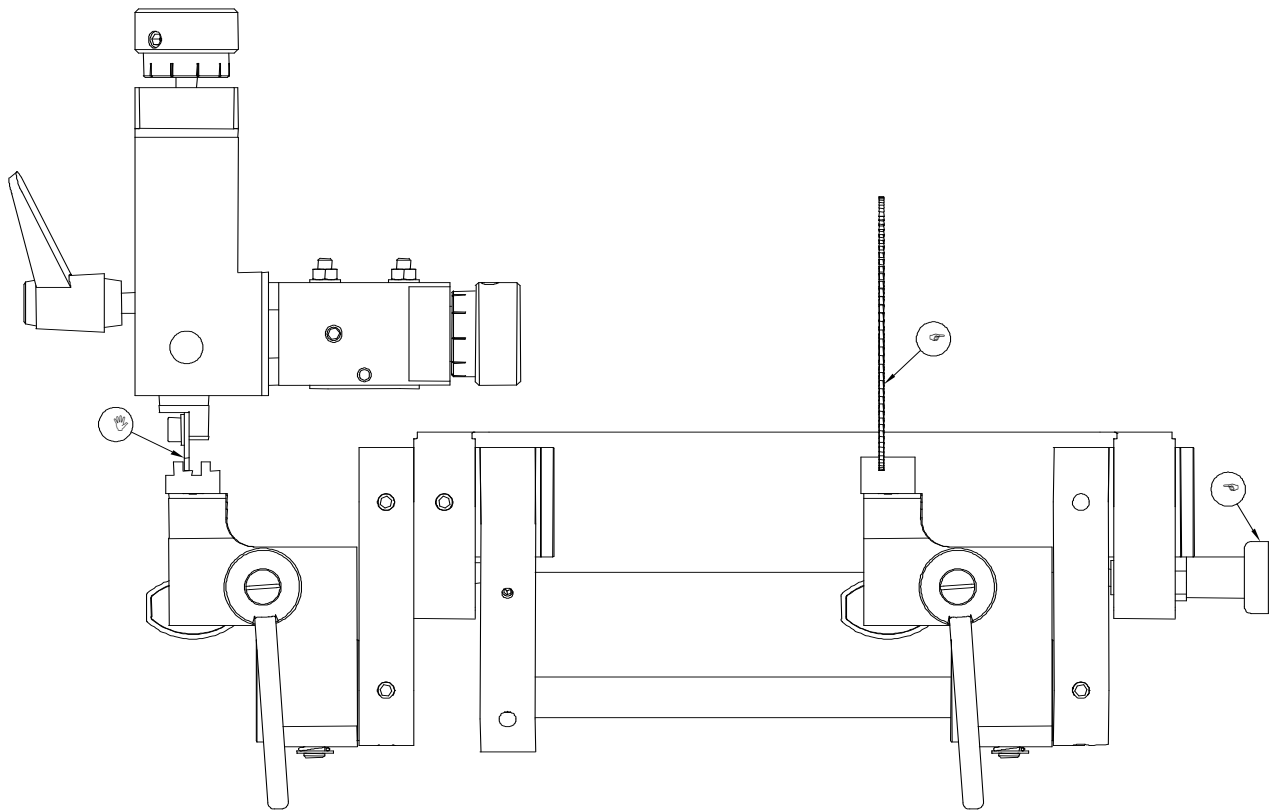
3.2.2 Cutting “female type” mortise lock keys

- In order to cut female type mortise lock keys (these are the ones that have a hole in the end of the stem), you have to fit to the slide the tailstocks supplied with the machine for that purpose. This tailstock can be fitted quickly and easily onto the slide, and replaced with another model when you are going to another type of key.
- Put the keys into the clamps pushing them to the right, ensuring that their ends are inserted into their respective tailstocks until the blade of the key comes up against the tailstock’s stop face (H). Tighten the clamps making sure that the keys are secured in the bottom of the jaws. Check that the blades of both keys are as parallel as possible. To do this more easily, it is best to block the rotation of the right-hand clamp, by means of the knob (E).
- If you want to cut a short key, it is best to fit the extension bushing supplied on the tailstock. In this way, the end (tip) of the key will reach the tailstock’s stop face (H).



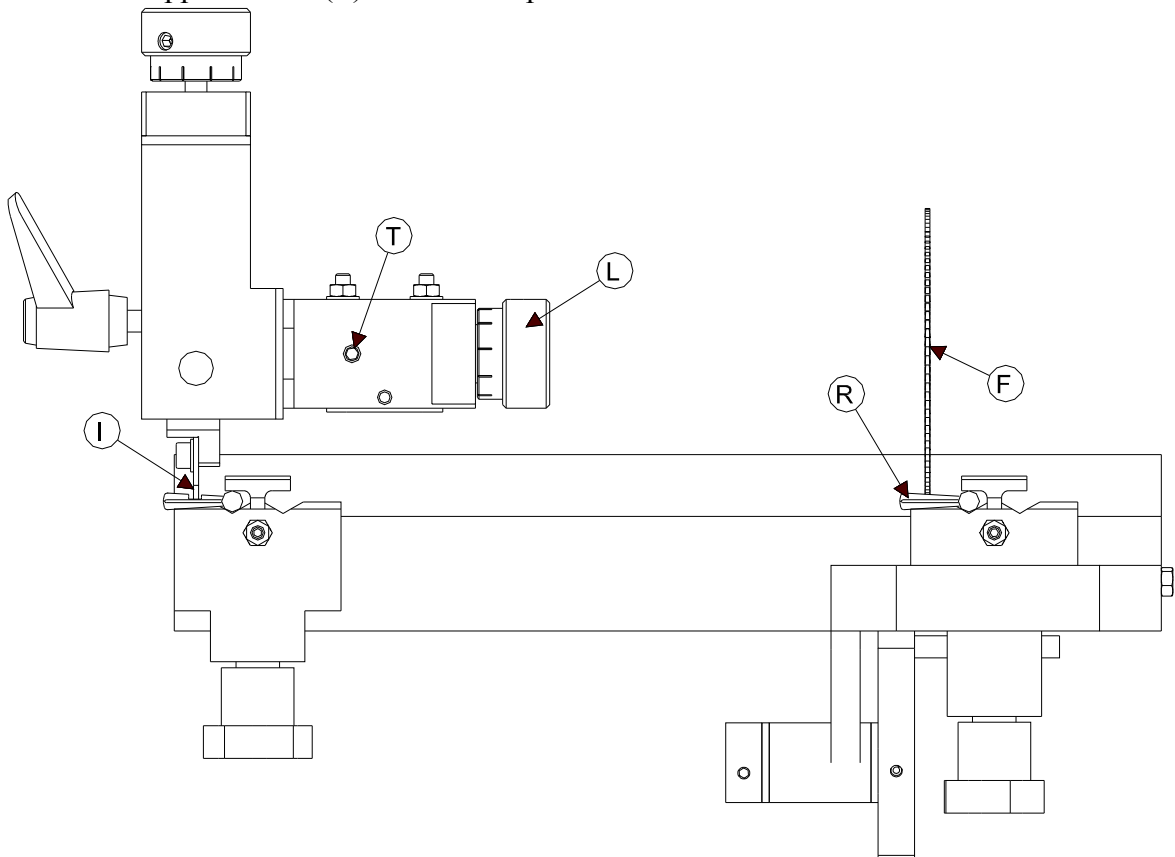
3.2.3 Cutting pump keys

- Clamp the key in the transversal jaws of the clamp. Insert the key, positioning it so that the asymmetrical blade is looking down in respect of the stem, and push the blade against the front face of the clamp. Make sure that the blade is as horizontal as possible.
- Block the rotation of the right-hand clamp, by means of the knob (E).
- Start the machine and, holding the slide by means of the slide advance control, move the keys towards the tracer point (I) and the milling cutter (F).
- We recommend that you work slowly, without forcing the milling cutter.



3.2.4 Cutting keys with the slide for making GROOVES

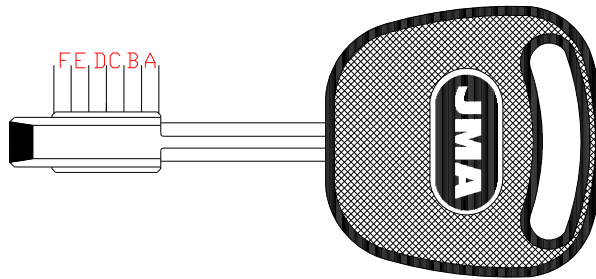
- First of all you have to replace the slide fitted in the machine with the one for making grooves. To do this, release the two “slide fixing knobs” and remove the slide, pulling it to the left.
- Then fit the slide for making grooves by inserting it from left to right, until it will go no further. In this position, secure it in place by means of the two “slide fixing knobs”.
- Put in two blank keys (R), one in each clamp on the left or right and check that the milling cutter (F) and the tracer point (I) touch the blades of their respective keys. If the milling cutter or the tracer point do not touch the key blade, you have to adjust the slide:
 - Slightly loosen the two screws at the bottom of the slide, which secure the strip we have inserted into the machine channel. In this way, we can move the slide in order to leave it in a position so that both the tracer point and the milling cutter are touching the blade of the key (R).
 - Tighten up the two screws you loosened.
You only need to make this adjustment the first time, as from then on the slide will remain adjusted for future cutting operations.
- If you want greater precision in the side position of the cutting channel, you can make a quick, small side adjustment to the tracer point (I):
 - To do this, loosen the support screw (T) and turn the micrometric screw (L) clockwise or anticlockwise, depending on whether you want to move the tracer point (I) to the right or to the left.
 - The distance is perfectly adjusted, with the tracer point and the milling cutter coinciding with the sides of their respective adjustment (V). Finally tighten the support screw (T) to lock it in place.



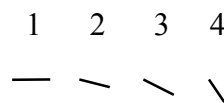
3.2.5 Cutting FO-6P keys

Reading the code of the original key

- The original key has 6 cutting positions, which are indicated by the following letters: A, B, C, D, E and F, as shown in the following figure.



For each of the positions of the key, 4 different combinations are possible (indicated by numbers), indicated and numbered below:

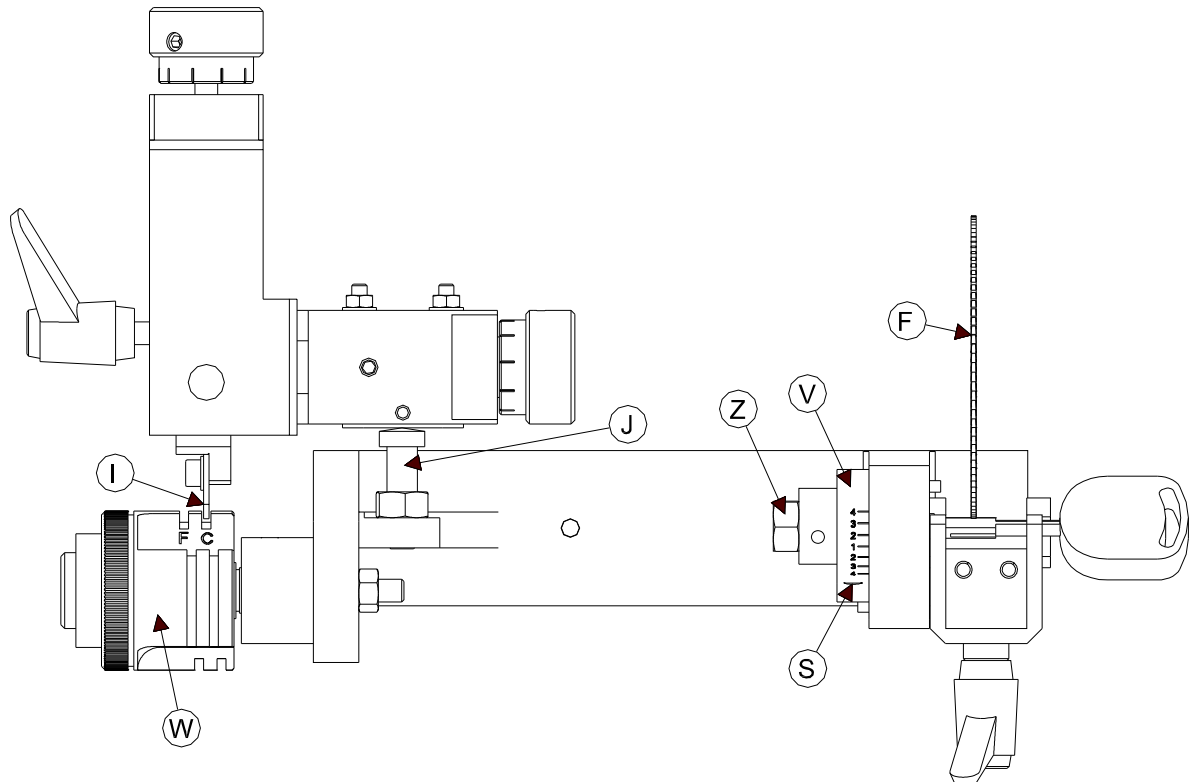


- “Height” no. 1, indicates that it should not be cut. Position no. 2 indicates that there is a small recess on the key. When it is slightly bigger it corresponds to height no. 3. Height no. 4 is the biggest recess on the key.
- You then take the key and mark the combinations for each of the 6 positions, as shown below, by way of example:

POSITION	A	B	C	D	E	F
COMBINATION	3	4	1	2	4	2

NOTE: The series of numbers for the combination is the code for the key.

- Once you know the code for the key to be cut, place the key blank in the clamp. Put the part (V) in position 1, the key must be completely flat so that if the key is moved towards the milling cutter, this will make a mark in the centre of the key.



- If it does not, loosen the stud bolt (S), and then centre the key.
- The screw (J) serves to adjust the depth of the teeth, which is fixed for all teeth in all keys. Once adjusted, it does not have to be touched again unless it becomes maladjusted over time.
- The part (W) is the code ball with 6 letters, corresponding to the 6 positions.
- The part (Z) is used for the horizontal adjustment of the key.
- The part (V) is used to angle the key correctly, depending on the corresponding combination.

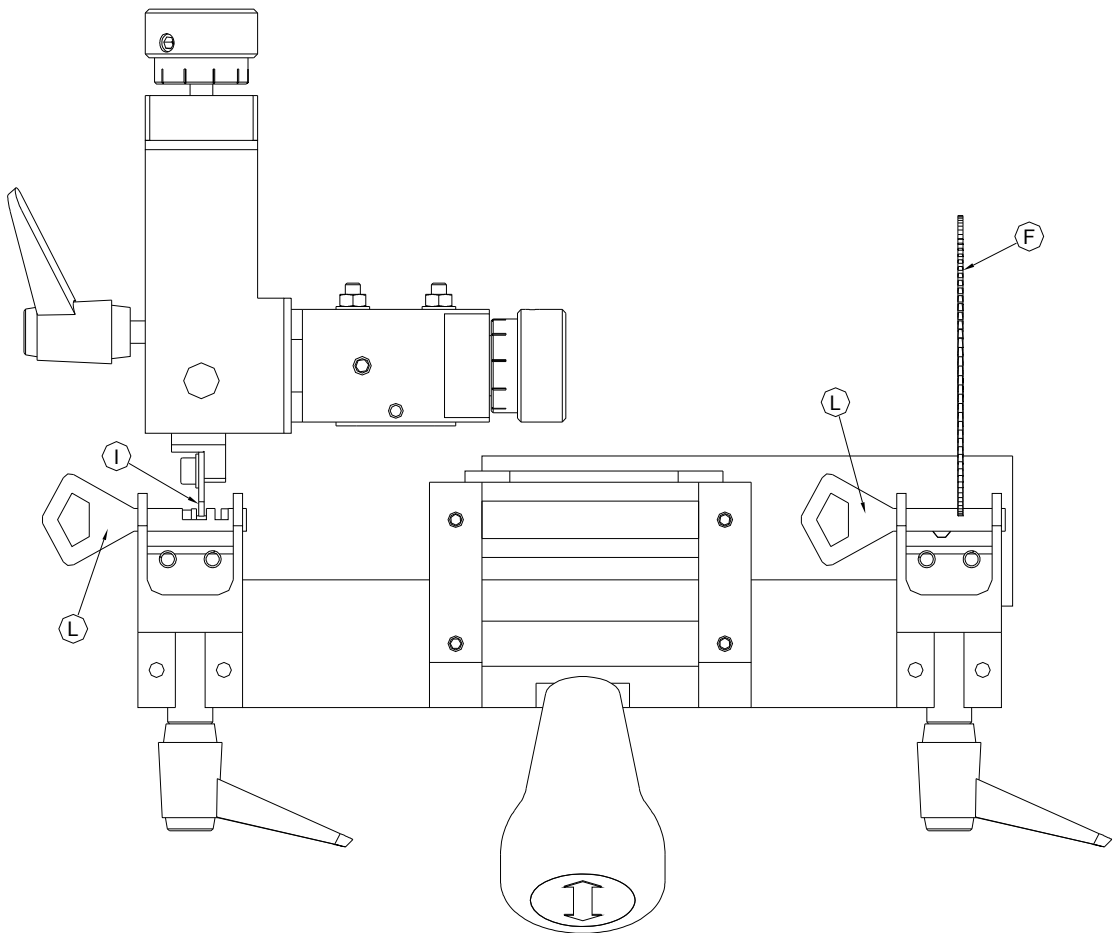
Here is a quick example with the previous reading:

$$\begin{bmatrix} A & B & C & D & E & F \\ 3 & 4 & 1 & 2 & 4 & 2 \end{bmatrix}$$

- Place the part (V) in the top position 3, and insert the tracer point in letter A of the part (W), and make the corresponding cut. Do the same operation for height 4, inserting the tracer point in letter B of the part (W). Carry on in the same way until the 6 positions have been completed.
- Then do the same with the 4 bottom numbers of the part (V), thereby cutting the other side of the same face of the key.
- To cut the other face of the key, turn it over and carry out the same operation again, always using the same code, as the key is symmetrical and therefore keeps the same code.

3.2.6 Copying ABLOY keys

- First of all you have to replace the slide fitted in the machine with the one for copying Abloy type keys. To do this, loosen the two “slide fixing levers” and remove the slide, pulling on it to the left.
- Then fit the slide for copying Abloy type keys, inserting it from left to right until it goes no further. Secure it in this position by means of the two “slide fixing levers”.
- Position two blank keys (L), one in each clamp on the left or right and check that the milling cutter (F) and the tracer point (I) are touching the blades of the respective keys. If the milling cutter or tracer point is not touching the blade of the key, you have to adjust the slide:
 - Slightly loosen the screws at the bottom of the slide which secure the guide rule you have inserted into the machine channel. In this way, you can orient the slide so that it is in a position in which both the milling cutter and the tracer point touch the blade of the key.
 - Tighten up the two screws you loosened.
You only have to carry out this adjustment the first time, as from then onwards the slide is adjusted for future copying.
- For the tip stop, one of the keys must be touching the side of the milling cutter and the other key touching the side of the tracer point.



4 MAINTENANCE AND SAFETY

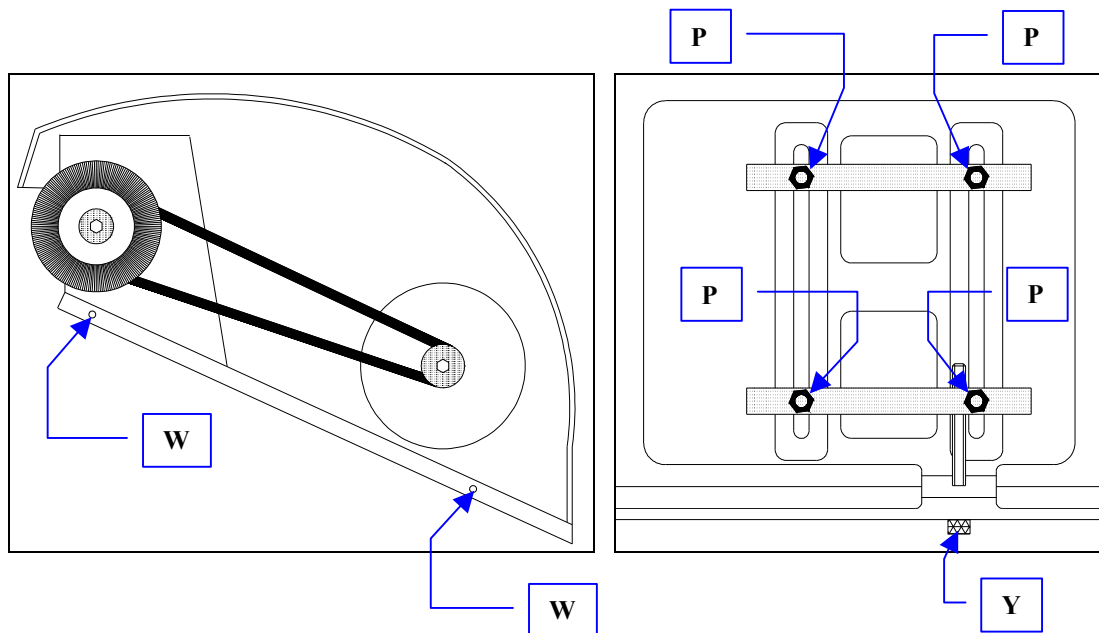
When carrying out maintenance operations, the following requirements must be met:

- Never carry out any operation with the machine switched on.
- The power cord must be unplugged.
- The indications in this manual must be strictly adhered to.
- Only original spare parts must be used.

4.1 REPLACING THE BELTS

To check the tensioning of the belts or to replace them, you must follow these steps:

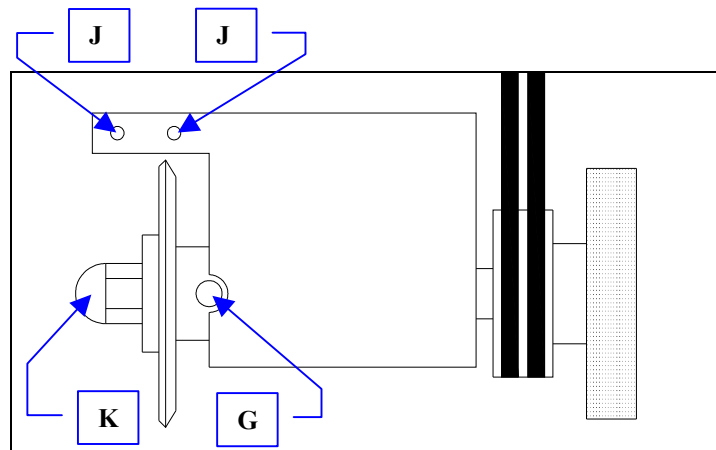
- Undo the two screws (W) securing the “the plane and belt guard”. Remove the guard and check that the belts are properly tensioned. If they need replacing:
 - Access the inside of the machine.
 - Undo the four nuts (P) to release the motor support. Turn the screw (Y) to detension the belts and be able to change them.
 - Replace the belts.
 - Once the belts have been replaced, turn the screw (Y) in the opposite direction to tighten the belts. Finally, tighten the four nuts (P) to secure the motor.



4.2 REPLACING THE MILLING CUTTER

Proceed as follows to replace the milling cutter:

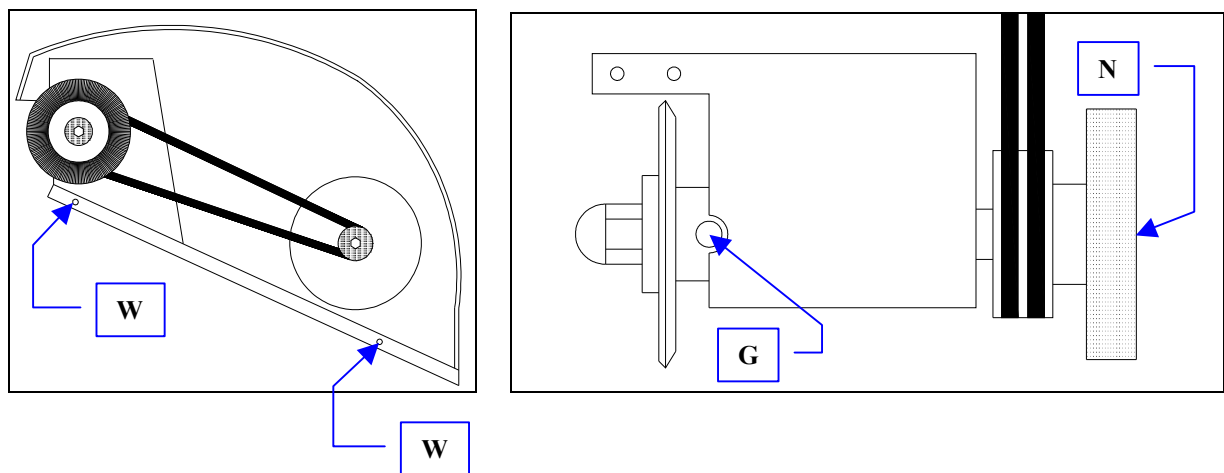
- Undo the two screws (J) securing the milling cutter guard and remove the guard.
- Insert the $\varnothing 7$ rod provided with the machine, into the hole in the shaft (G) and into the nut (K) –left-hand thread- turning it clockwise, using the spanner provided with the machine to do it. Manually remove the milling cutter, pulling it to the left.
- To fit the new milling cutter, carry out the same operations, but in reverse.



4.3 REPLACING THE PLANE

To replace the plane, proceed as follows:

- Undo the two screws (W) holding the “plane and belt guard” in place and remove it.
- Insert the $\varnothing 7$ rod provided with the machine, in the shaft hole (G) and remove the screw (N), using an Allen key.
- To fit a new plane, carry out the same operations, but in reverse.



4.4 SAFETY RECOMMENDATIONS

- Do not try and start or use the machine until all safety matters, installation instructions, operators guides and maintenance procedures have been fulfilled and understood.
- Always switch off the power supply before carrying out any cleaning or maintenance operations.
- Keep the machine and the area around it clean.
- Work with dry hands.
- Use safety glasses, even if the machine is fitted with guards.
- Ensure that the machine is earthed.

