

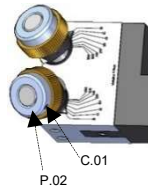
1 FEASIBLE PATTERNS

| KNURLING PROFILE | KNURL | | FEED (Drawing.3) F |
|------------------|--------|--------|--------------------|
| | AXLE L | AXLE R | |
| RGE 30° | AA | AA | ✓ |
| RGE 45° | BL15° | BR15° | ✓ |

MF 42 cut knurling tool is conceived to perform knurling on workpieces with diameters between 100 and 3000 mm.

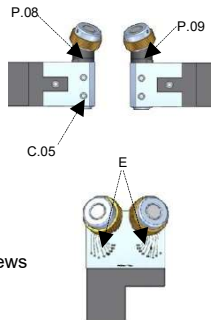
2 KNURL ASSEMBLY

- Loosen the screws C.01 of the washers P.02.
- Put the knurls into their axles, bearing in mind where each one goes, it is advisable that the bore of the knurl be cleaned before and graphite grease be spread.
- Place the washers P.02 above the knurl.
- Firmly tighten the screws of the washers C.01, make sure that the knurls run free.



3 SETTING THE KNURLS ACCORDING TO THE WORKPIECE'S DIAMETER

- Loosen stud screws C.05 that locks the orientation shafts P.08 and P.09.
- Right after, with the same allen wrench inserted in the back side of the axles P.08 and P.09, set the shafts until that the graduated scale E indicates the diameter of the corresponding piece to knurl.
- Take into account that the scale does not cover infinite values, so the position not always is exact. In case of the diameter of the workpiece does not appear in the scale, shafts must be oriented in an approximate.
- Once scale is correct, firmly tighten the locking stud screws C.05.

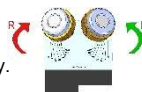


4 HEAD ASSEMBLY FOR LEFT OR RIGHT VERSION

MF42 tool model is reversible, just turning over the head we will get the right or left version of it.

To turn the head over, we must proceed as we describe below:

- Slightly loosen adjusting stud screws.
- Loosen and take out the head fixing screws.
- Turn 180° the head of the tool.
- Place screws P.02 again into its housing and tighten firmly.
- Tighten stud screws C.01 up to make contact with the screws.



5 PRE-ALIGNMENT OF THE TOOL

For a good performance, the head must be aligned to the upper face of the tool shank, this is achieved as follows:

- Loosen the screws that lock the tool head without taking it out.
- Move the tool head by means of the stud screws until their faces are coincident with those of the tool shank.
- Fix again the tool head with the screws.

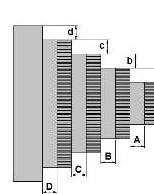
6 CLAMPING AND SETTING THE TOOL INTO THE MACHINE

After having pre-aligned the tool, having it secured to the turret of the lathe and, make the chuck turn at very low speed or by hand, make contact the workpiece with the knurls and check that both rotate simultaneously. If not, it could be due to:

- The workpiece rotation axis and the tool-head are not aligned, correct the alignment between the head and the shank.
- Angular position of the orientation axles is not adequate, follow the steps described in section 4.

7 KNURLING ON STEPPED WORKPIECES

On stepped workpieces, it is possible to knurl all the cylinder up to the shoulder. Depending on the diameter of the knurls, in order to avoid the tool ramming smack against the workpiece and/or mechanical parts on the machine, the following minimum distances have to be taken into account.



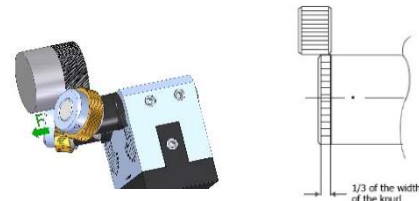
| | Ø42 |
|---|-----|
| a | 3 |
| A | 14 |
| b | 6.5 |
| B | 17 |
| c | 12 |
| C | 20 |
| D | 25 |
| D | 23 |

8 BEGINNING TO KNURL

With the chuck rotating according to the conditions recommended in table 1, move the tool until the knurl is positioned in the corner of the workpiece with only 1/3 of the width of the knurl on the workpiece and 2/3 in the air.

Once the knurl contacts the piece, plunge until the desired depth is got, by no means plunge in the beginning more than 45÷48 knurl's pitch being used. When the knurling is being performed, we realize that there is an angular misalignment and that misalignment does not exceed 5°, we correct the position of the head.

We feed longitudinally following the parameters shown on the table 1.



9 BEAR IN MIND BEFORE AND WHILE WORKING PROCESS

Make sure that the knurl pins are firmly fastened. Make sure that the axis of the knurl is aligned with the axis of the workpiece. Always work plenty of coolant, lubricant or cutting oil. The working direction, longitudinal advance, will always be against the tool.

10 TROUBLE SHOOTING

| PROBLEM | CAUSE | SOLUTION |
|------------------------------|---|---|
| Double knurling | Shafts are not correctly set to the diameter of the workpiece | Ajustar la posición de los índices de los ejes portamoletas en la escala al diámetro de la pieza de trabajo |
| | Little radial feed at the beginning of the knurling | Aumentar el avance radial al comienzo del moleteado* |
| Easy breaking of the knurls | Shafts are not correctly set to the diameter of the workpiece | Set the position of the shafts to the diameter of the piece to knurl |
| | Knurls have play | Tighten the knurls against the shafts |
| Excessive wear of the knurls | Excessive knurling depth | Adjust the depth of the knurling to a correct |
| | Working conditions are not adequate | Check cutting and feed speeds |

*Sometimes is not possible increase the feed radially or simply, cannot work radially or the workpiece if it is small or the secure is unstable

11 RECOMMENDED SETTINGS

| MATERIAL | Ø WORKPIECE (mm) | Ø KNURL (mm) | CUTTING SPEED (m/min) | RADIAL FEED (mm/rev) | LONGITUDINAL FEED PITCH (mm) | | | | |
|-----------------------------|------------------|--------------|-----------------------|----------------------|------------------------------|---------|---------|------|------|
| | | | | | 0.3÷0.6 | 0.6÷1.2 | 1.2÷1.6 | | |
| Acero 600 N/mm ² | 200÷300 | 42 | 60÷80 | 0.05÷0.10 | 0.30 | 0.25 | 0.20 | 0.15 | |
| Acero 900 N/mm ² | | | 35÷55 | 0.04÷0.08 | 0.20 | 0.15 | 0.10 | 0.08 | |
| Acero inoxidable | | | 60÷80 | 0.05÷0.10 | 0.30 | 0.25 | 0.20 | 0.15 | 0.15 |
| Acero fundido | | | 80÷110 | | | | | | |
| Aluminio | | | 70÷90 | | | | | | |
| Latón | | | | | | | | | |

Tabla 1