

INSTRUCTION MANUAL

zeus® RF2-LD
Knurling tools 241-08/10/12/16M



1. Assembly of knurling wheels – Knurling profile on knurling wheel (DIN 403)

Tool series	Tool direction	Knurling profile on work piece (DIN 82)	
		RGE 30°	RGE 45°
241-08/10/12/16M	Axial	2xAA	BL15°/BR15°

2. Tool description – Right-hand version

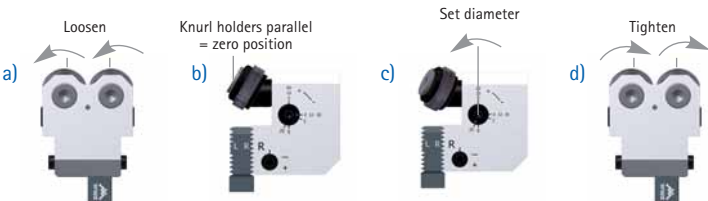


3. Work piece preparation

Chamfer work piece (in an angle 30°–45° and with a minimum depth that corresponds to the tooth depth of the knurling wheels) on the beginning of the work piece or after a groove. Concentricity: +/- 0,05 mm.

4. Angle adjustment of the knurling wheels

Loosen both locking screws (F1) of the knurl holders (a). Adjust the work piece diameter through turning the spindle (E2) with the required scale value. In order to set the diameter, start off from the zero-position (see figure (b) = both knurl holders are parallel). Turn into +direction up to the scale position for the required diameter. (c) (e.g. work piece diameter Ø 12 are two full revolutions). Tighten locking screws (F1) again.



5. Centre height adjustment

5.1 Generally, the centre height is integrated in the middle of the tool head (centre of 2 mm bore).



5.2 Height adjustment of tool head - Centre height adjustment.

Loosen both locking screws (F2) of the cut knurling head. Turn spindle (E1) to check height adjustability of the tool head, then align the marked line on the tool head with the upper shank side.

6. Tool clamping

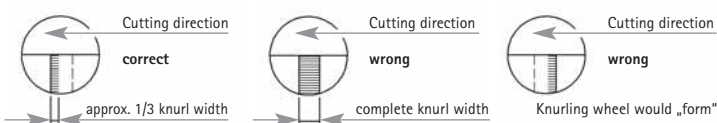
Clamp tool 90° against work piece.

7. Fine adjustment of knurling tool head (Symetry of knurling wheels)

Move knurling tool carefully against work piece. Both knurling wheels have to touch the work piece equally. If they don't, correct the height of the tool as shown in 5.2.

8. Check knurl impression / Correction of the clearance angle

Touch work piece carefully again and check the impression of the knurl:



Adjust knurl holder (according to 4), until approx. 1/3 of the knurling wheel is impressed. If the complete knurling wheel width is impressed, the diameter has to be reduced.

9. Zero position of the tool

Approach work piece in X-direction = zero position on the work piece on X-axis.



10. Starting position of the knurling wheel

Move the tool with its cutting edge to the following position: Z-direction: approx. 0,5-1 mm (after chamfer), X-direction: X+0,3 mm.



11. Setting profile in X-direction

Set the profile by moving in X-direction.

Feeding according to recommended feed and speed rate. After achieving profile depth, dwell time should be 0,5-1 second (time for knurl centering). Profile depth = Tooth depth +0,1 mm +/-0,05 mm.

12. Feeding in Z-direction

Recommended values for feed and speed rate are included in the zeus Knurling Technology Catalogue or can be downloaded from the Internet: www.zeus-tooling.de/support. Start feeding in Z-direction. Retract from work piece in X-direction. Check profile. If the profile is not fully formed, repeat setting in X-direction.

Note: Please adhere to the order of step 10, 11 and 12. Ensure sufficient supply of coolant and lubrication.

Trouble Shooting:

Problem:	Cause:	Solution:
Undefined knurling profile.	Knurling wheels not correctly assembled.	Change knurling wheels according to (see 1.).
Material displacement on knurl end. Profile appears "squeezed".	Working angle not adjusted correctly. Tool presses on work piece.	Correct working angle adjustment (see 8.).
Profile not fully formed.	X-feeding too small.	Set profile depth according to (see 11.).
Uneven profile sharpness.	Working piece does not run smoothly.	Turn work piece diameter to achieve concentricity (see 3.).
Uneven profile depth.	Incorrect fine adjustment of tool head, one wheel mills deeper than the other.	Correct fine adjustment (see 7.).
The profile at the beginning of the knurl is not clean.	No chamfer/ chamfer is too small.	Preparation of work piece (see 3.).
Profile appears with irregular structure.	Knurling wheels do not run smoothly.	Clean and lubricate knurling wheels, and assemble according to (see 1.).
Uneven profile, shows scratches, little mountains and broken tips.	Chips are rolled into the profile.	Ensure sufficient supply of lubrication/coolant.
Knurling profile is not sharp.	Worn knurling wheels.	Replace with new zeus knurling wheels.

Further application support (feed and speed rates, material displacement table, spare part drawings, etc.) are available from our catalogue or from the zeus Online Support. Please go to www.zeus-tooling.de/support for registration.

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