

Gear Hobbing Unit
Mounting of hobbing cutter and milling arbor

WTO TOOL HOLDER DESIGN

Gear Hobbing Units

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- To manufacture gears with different geometrics
- Usable for machining gear quality according to standard AGMA 8
- Maximum scale swing of $\pm 30^\circ$
- Easy cutting tool change through removable counter support and withdrawal of the complete milling arbor
- Interchangeable milling arbor available in different sizes



Gear hobbing tolerances

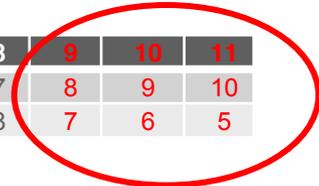
spur gears and splines



- The gear hobbing process at lathes for **spur gears** is “only” possible for pre-operation with a final grinding operation afterwards
- For splines, most of the times it is possible to produce the final quality.
- In tolerances for gears a class ISO1328 with quality 9-10-11 (AGMA 7-6-5) is possible to produce on a lathe.
- With a grinding process afterwards you can increase the quality to ISO1328 quality 3-7
- The gear and spline hobbing is a process. The tolerances are defined by the lathe, the cutting tool, the hobbing unit and the work piece

Gear Tolerance Classes

Tolerance Class ISO 1328	3	4	5	6	7	8	9	10	11
Tolerance Class DIN 3965	2	3	4	5	6	7	8	9	10
Tolerance Class AGMA	13	12	11	10	9	8	7	6	5



Scope of Application	Toleranceclass ISO 1328	Toleranceclass AGMA
Check wheels	2 - 4	13-12
Measuring instruments	3 - 6	13-10
Turbine reducers	3 - 5	13-11
Aircraft gear	3 - 6	13-10
Machine tools	3 - 7	13-9
Aircraft engines	5 - 6	11-10
High speed transmission	5 - 6	11-10
Passenger cars	6 - 7	10-9
Industrial gear unit	7 - 8	9-8
Light ship engines	7	9
Roll mills, locomotives	8 - 9	8-7
Heavy-duty engines for ships, tractors	8 - 9	8-7
Construction, agricultural machinery	8 - 10	8-6
Textile machinery	7 - 9	9-7

possible with gear hobbing units at lathes for spur gears

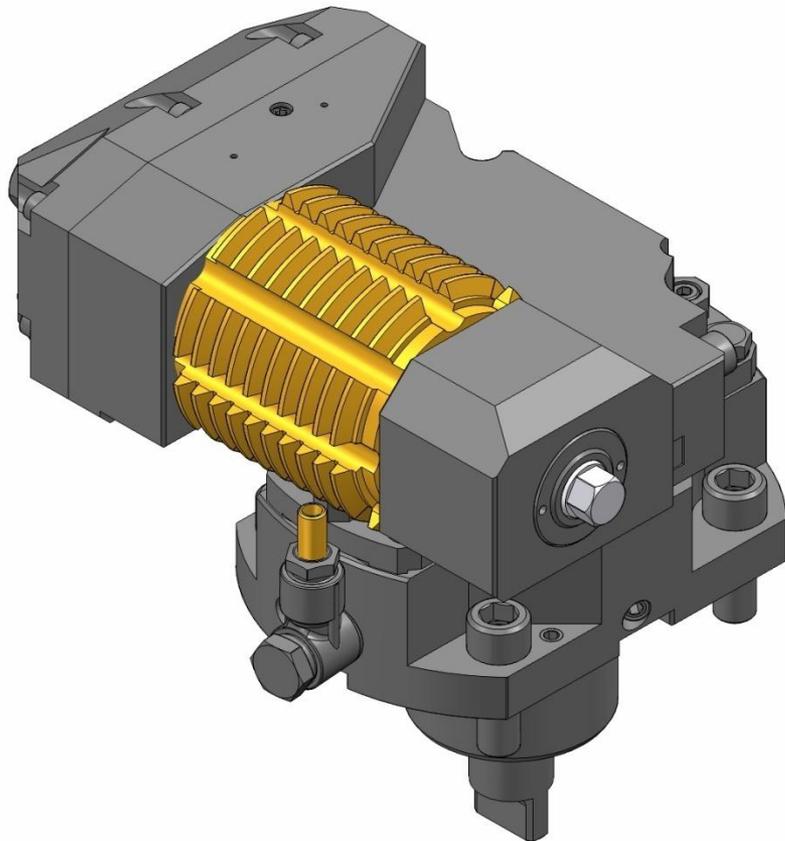
Machine Technology Requirements

- Required machine axis: Z, X, (Y), C, turret drive motor
- Synchronous movements of Z and C axis and turret drive motor
- Synchronous positioning of C axis and turret drive
- Minimized backlash in the turret drive and DTH
- Rigid turret interface



Gear Hobbing Unit 4115 for Lathes

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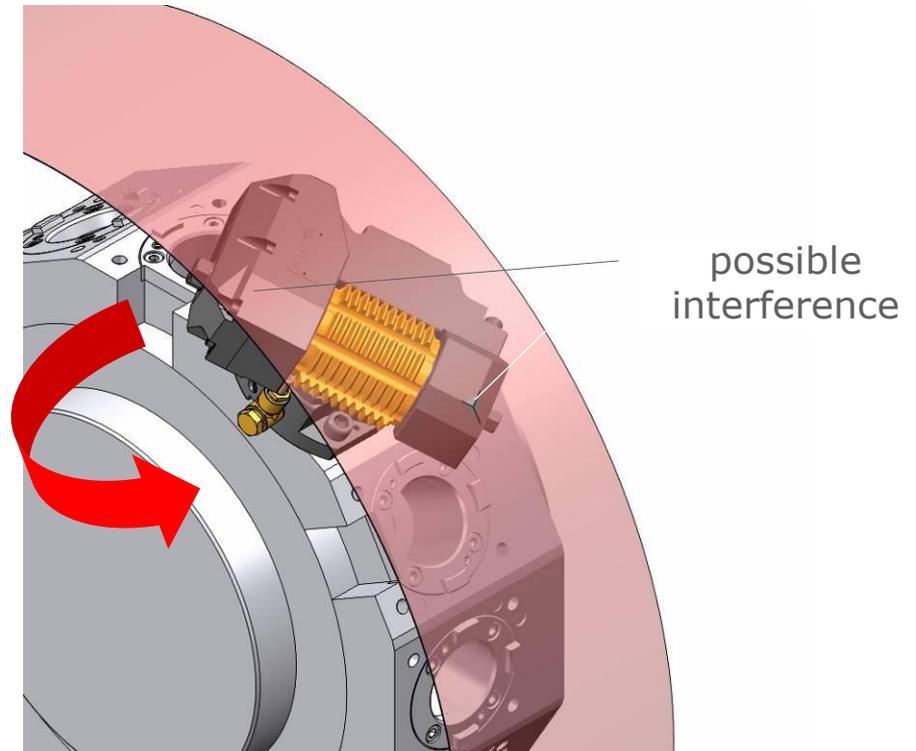
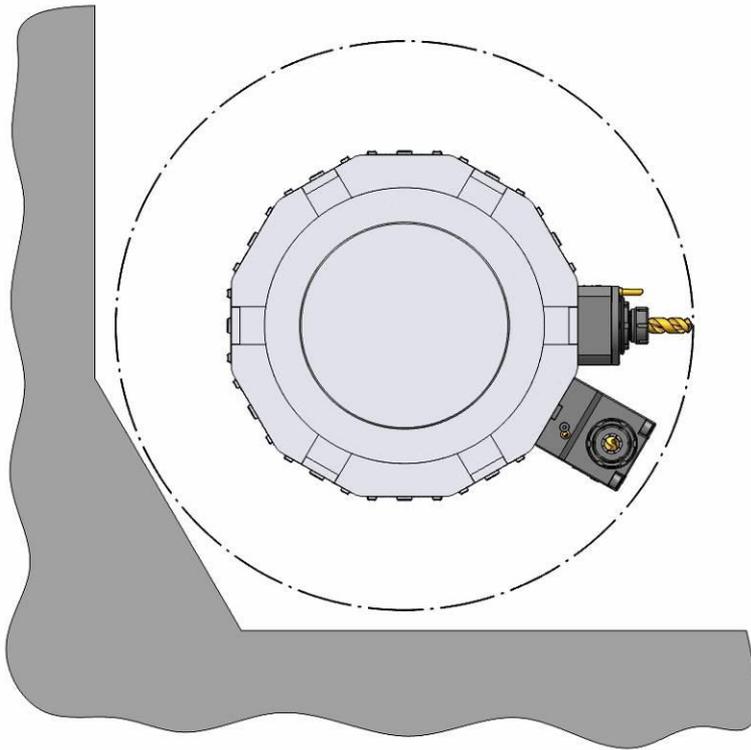


- normal module: max. 3 mm
- angle adjustment: up to + / - 30°
- easy replaceable milling arbor: 16, 22, 27, 5/8" 3/4" , 1"
- usable at main and sub spindle
- easy handling within the machine



Requirements for turning centers - angle adjustment range

+/- 30° angle adjustment range
Might be limited depending on the
machine type (clearance)



Gear Hobbing

⇒ Application: shaft-hub connections

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- DIN 5480, DIN 5482

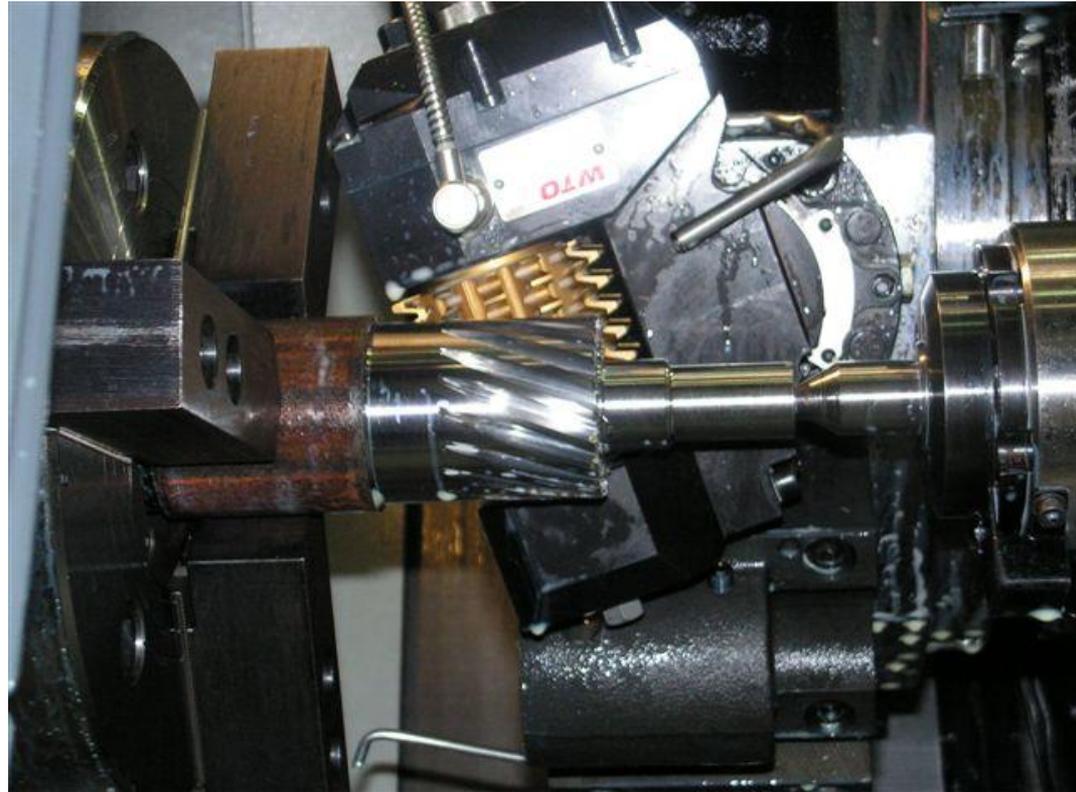
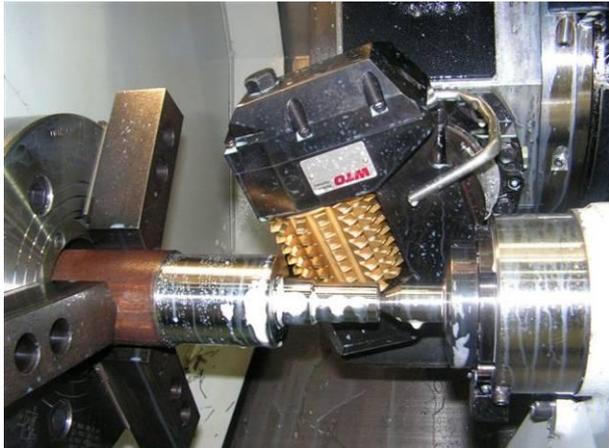


Gear Hobbing

⇒ **Application: helical spur gear**

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- Normal module: 3 mm
- Helix angle: 20 °
- Teeth: 17
- Feed: 1.9 mm / rev
- Speed: 600 rpm
- Material: 16MnCr5
- Gear quality: 8-10 DIN 3961

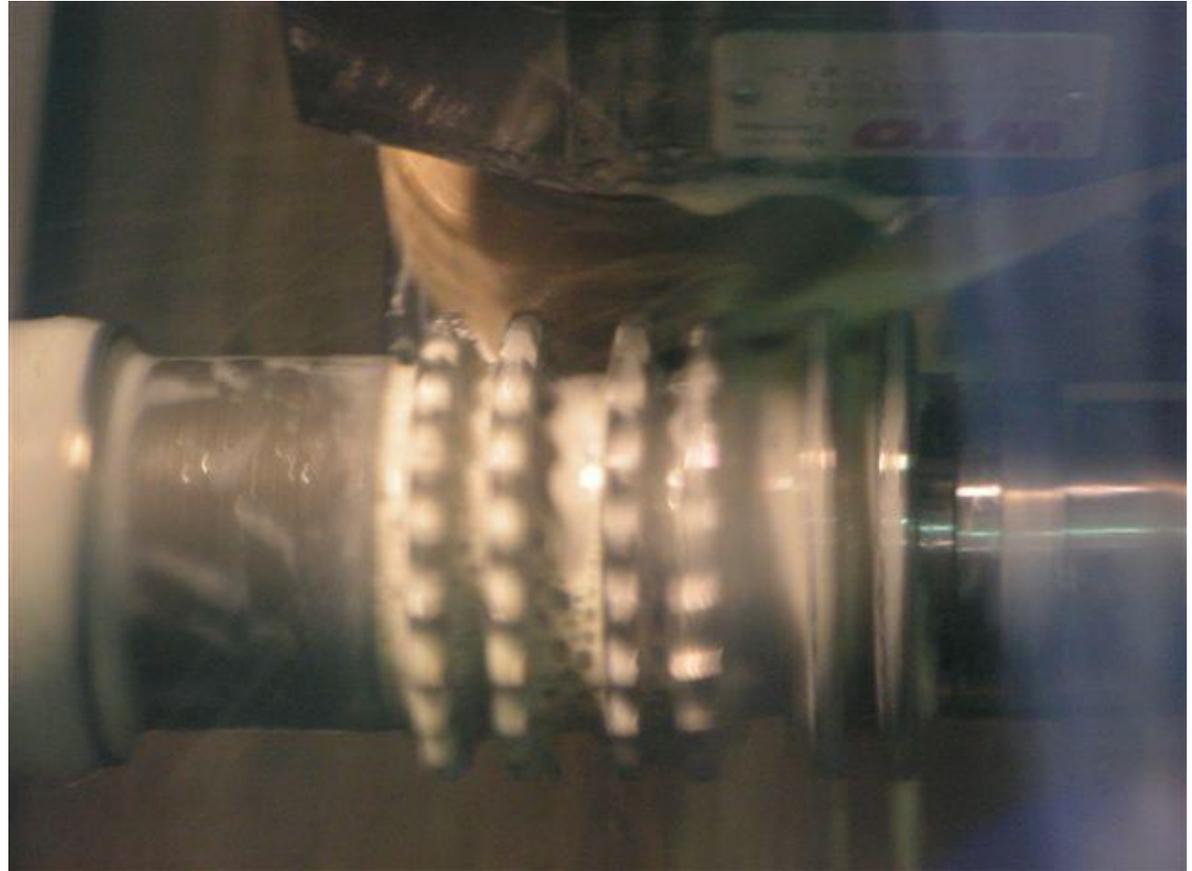
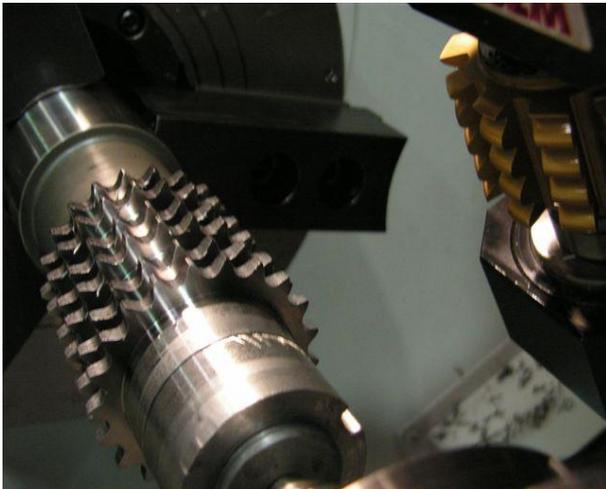


Gear Hobbing

⇒ **Application: chain gear**

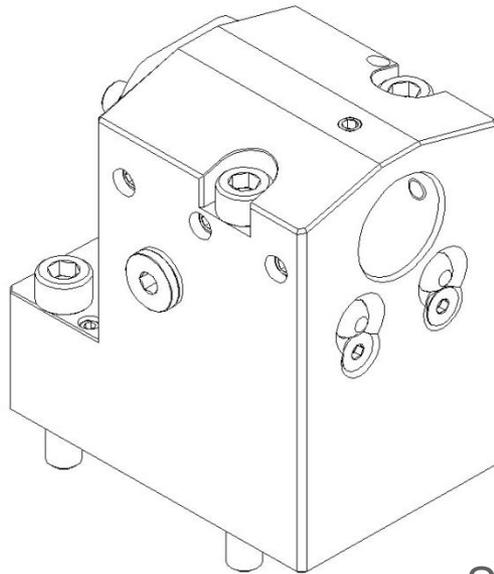
- Pitch: 8 mm (DIN8196)
- Teeth: 21
- Feed: 1 mm / rev
- Speed: 800 rpm
- Material: 16MnCr5

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Tailstock for Lathes with Sub Spindle

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Standard boring bar holders



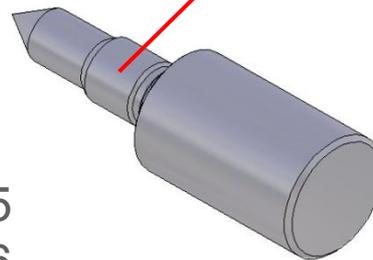
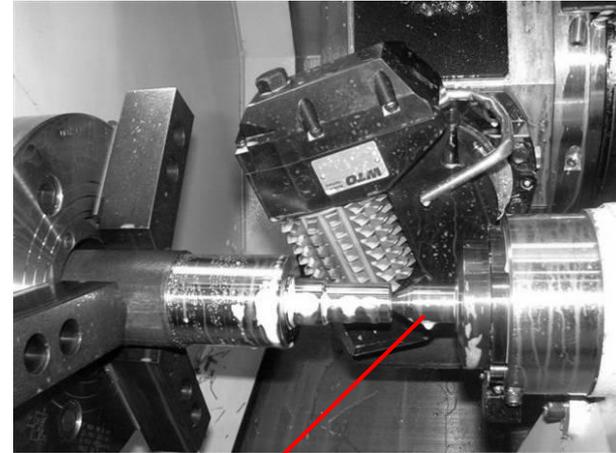
Sleeve:

Ø 32: 48-86705

Ø 40: 48-86706

Ø 1 ¼": 48-86708

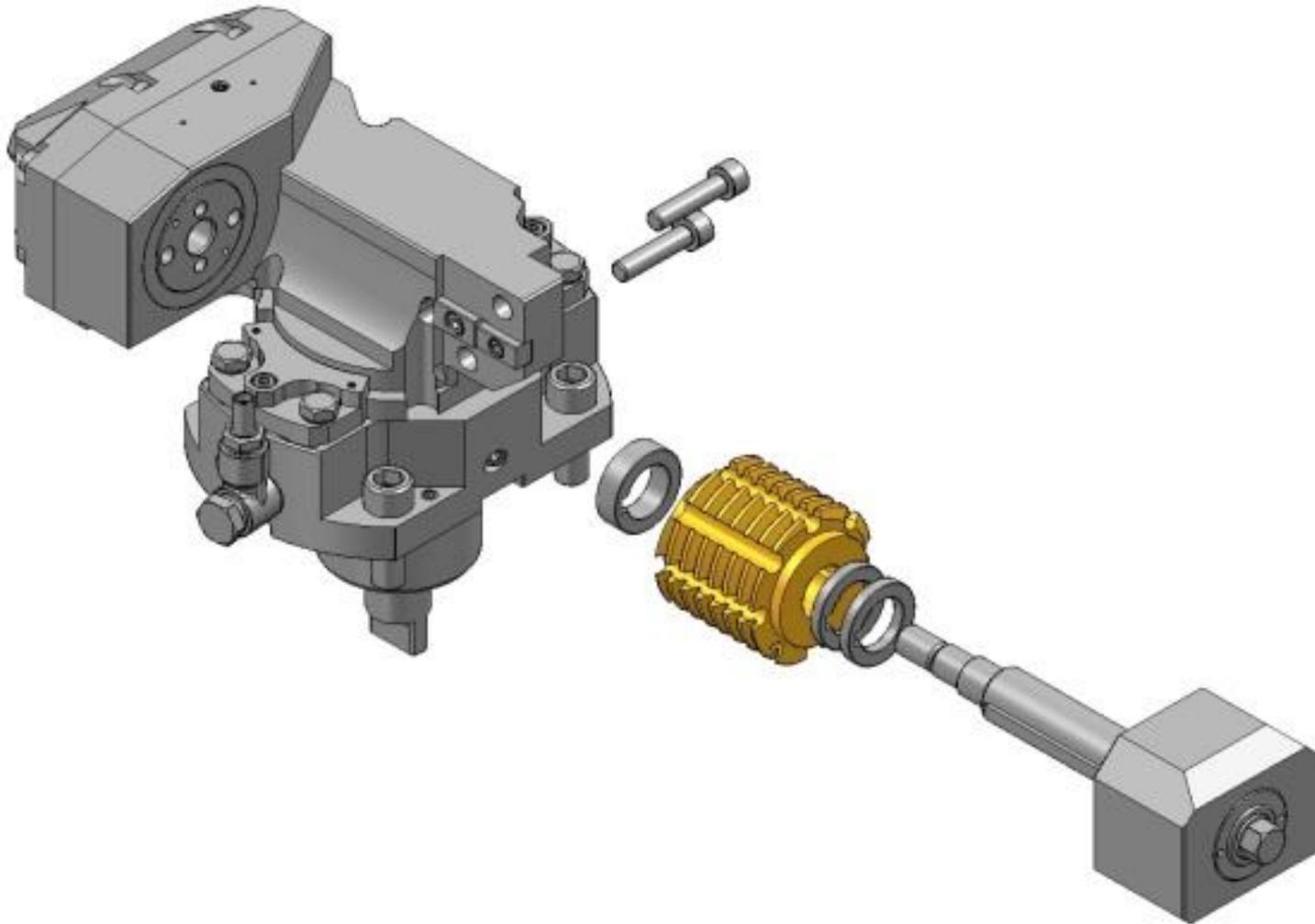
Ø 1 ½": 48-86707



Tailstock
for all sleeves: 48-
86693

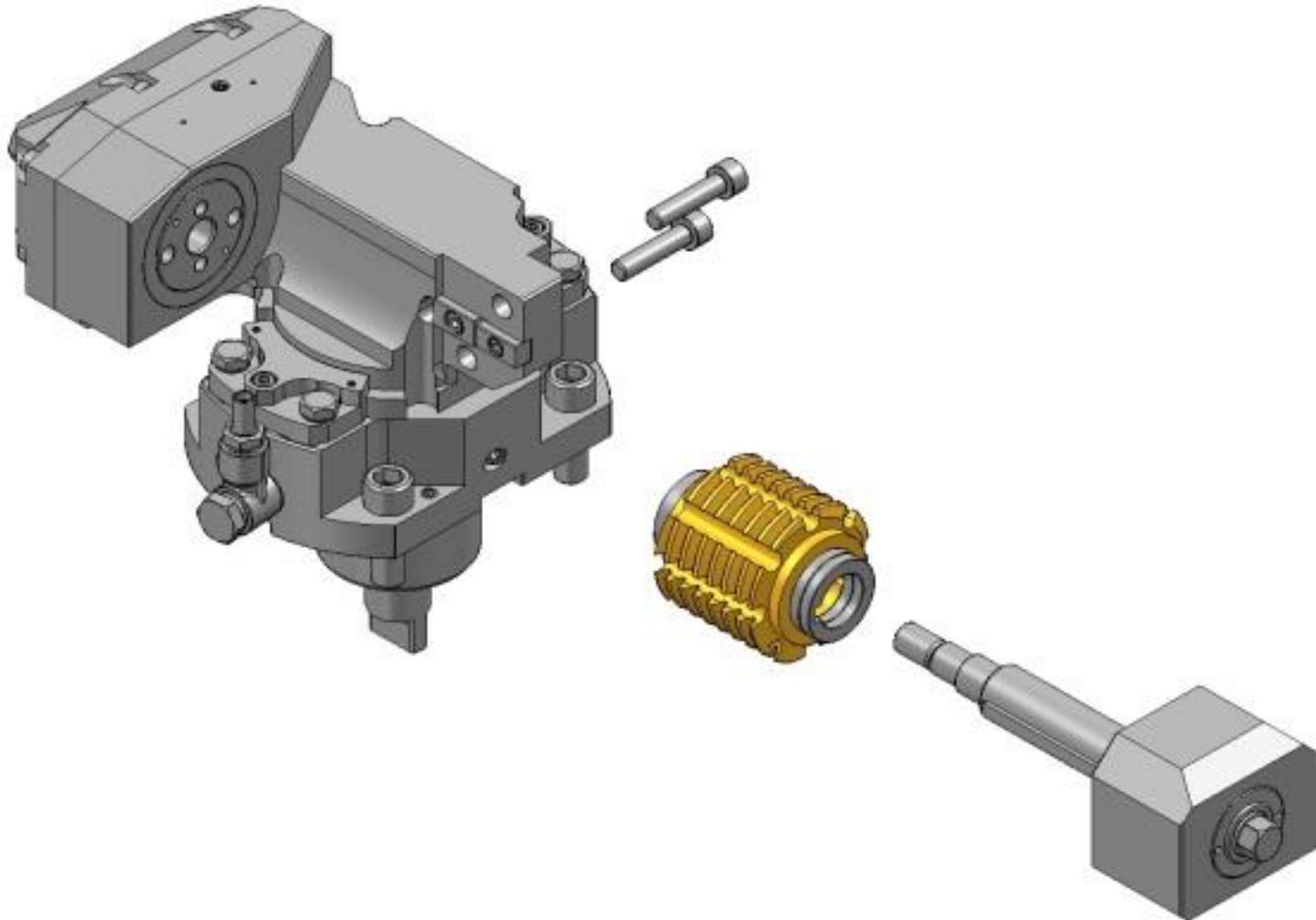
Mounting of gear hobber

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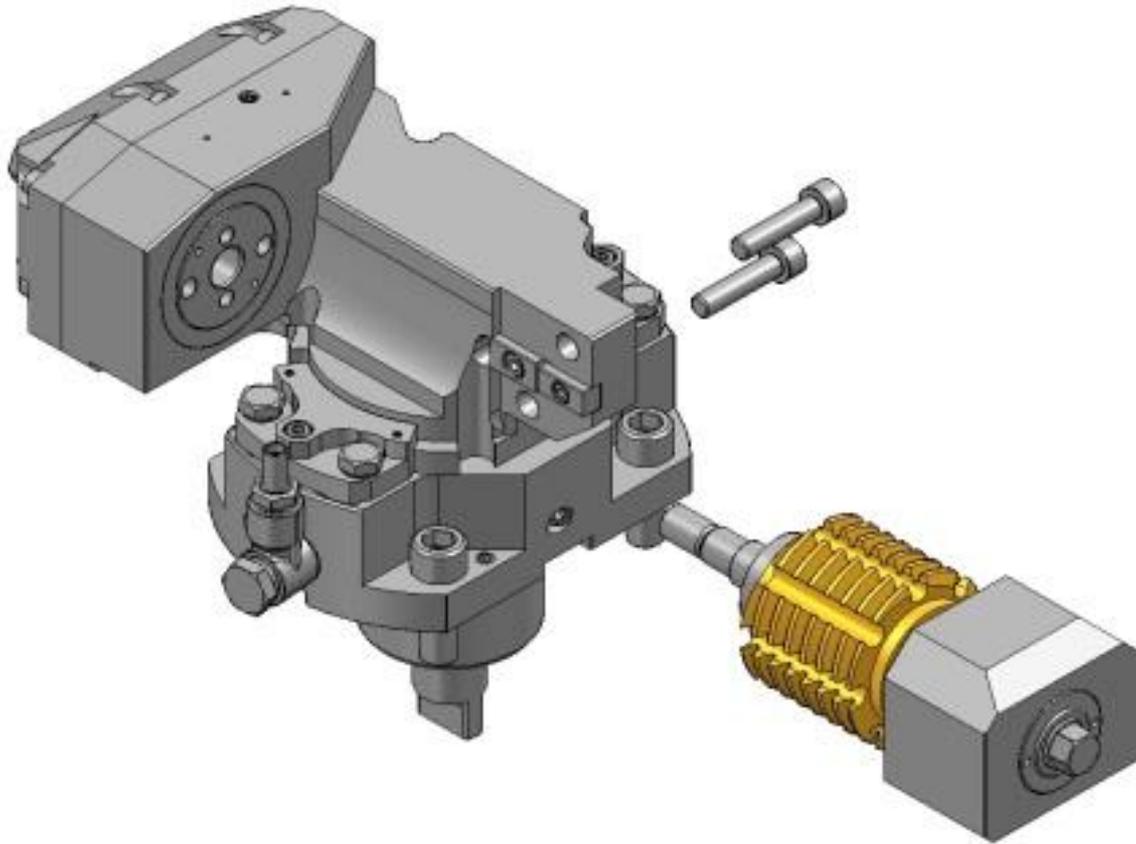
Mounting of gear hobber

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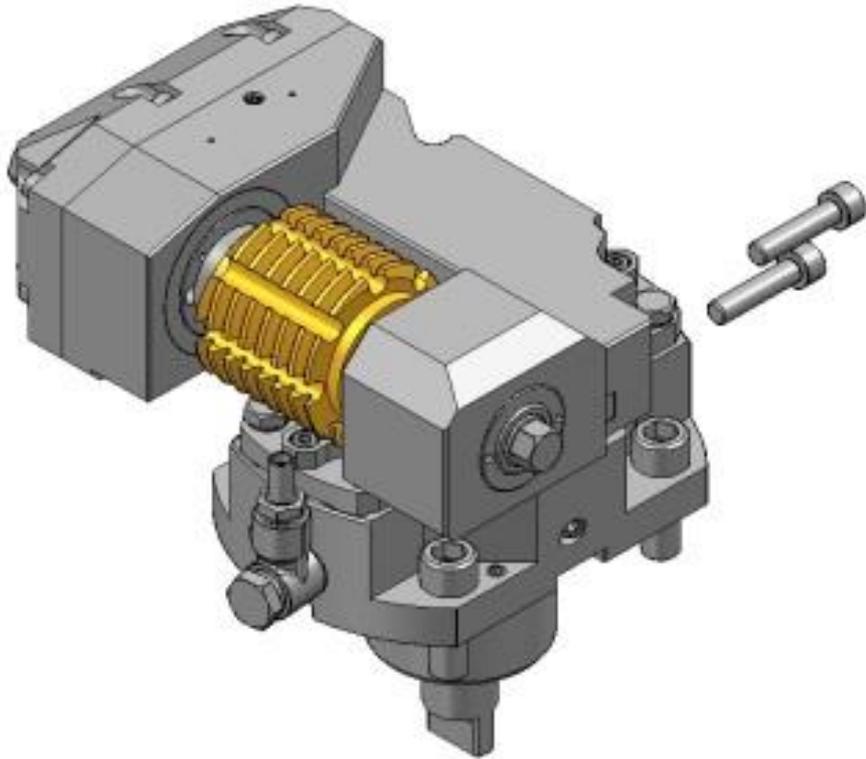
Mounting of gear hobber

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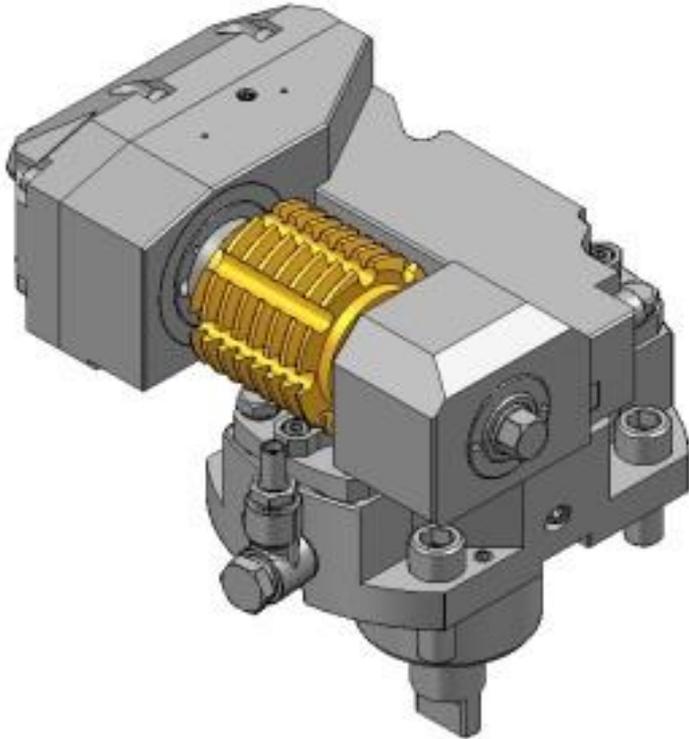
Mounting of gear hobber

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Mounting of gear hobber

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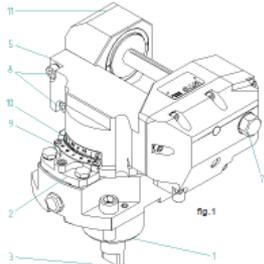
Operation instruction

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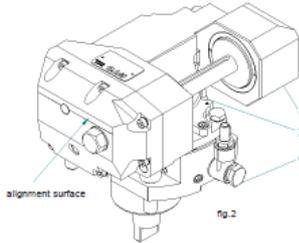
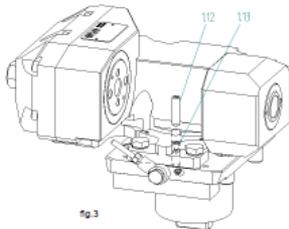
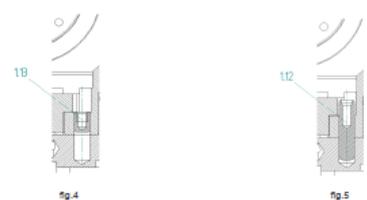
- Please read our operational instruction carefully

WTO WTO DRIVEN TOOL HOLDER TYPE 4115
OPERATING INSTRUCTION

CONSTRUCTION



- 1 shaft for pick-up and holding of the cross-milling unit
- 2 terminal plate for fixing of the rotary milling head
- 3 drive shaft
- 4 cooling-agent nozzle
- 5 housing
- 6 collet for mill arbors
- 7 clamping bolt
- 8 bolts for fixation of the overarm
- 9 scale
- 10 nonius
- 11 overarm with mill arbor
- 12 cylinder pin 6m6x24
- 13 cylinder pin 6m6x8

Page 2 - 4 approved: KHJ written: JOG Operating instruction B-18-006 © WTO GmbH 05.2012

WTO DRIVEN TOOL HOLDER TYPE 4115
OPERATING INSTRUCTION **WTO**

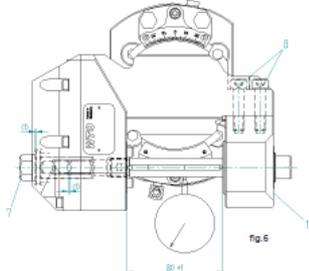
MOUNTING ONTO THE TOOL MACHINE

- 1) Prepare the required devices and tools.
- 2) Clean the mutual contact faces at the unit and the turret.
- 3) Put the cross-milling unit onto the turret.
- 4) Fix the unit and all provided supplies in consideration of the instructions of the manufacturer of your machine tool under the following approach:
- 5) Remove the cylinder pin (Pos.1.12) if plugged and unscrew the 4 hexagon head bolts at both terminal plates as far as the housing (Pos.5) of the unit can be rotated on the shaft (Pos.1).
- 6) Put the cross-milling unit without the overarm as deep into the support of the turret as the fixation bolts (cylinder head bolts) contact the plan surface of the turret. Make sure that the unit is secured of being dropped.
- 7) Rotate the housing (Pos.5) in order to gain access to the fixing bolts of the unit. Tighten the fixing bolts sequentially and progressively in the threads of the turret.

(Regarding units with high shanks the fixing bolts can be tightened straight, regarding units with lower shanks the fixing bolts can just be tightened sequential for just 1-2 pitches.

ADJUSTMENT OF THE CROSS-MILLING UNIT

- 1) Put the complete mill arbor with overarm (without cutter and collars) into the collet and tighten the bolts (Pos.8) to fix the overarm. The clamping bolt is just hand-tightened.



- 2) The fine adjustment of the angular position is effected by scanning the alignment surface with a dial gauge. Tighten the 4 hexagon head bolts of the both terminal plates (Pos.2) with 30Nm. Mind that the cylinder pin (Pos.1.13) is inserted in the corresponding dowel hole. Optionally the 0°- position can be fixed with a cylinder pin (Pos.1.12).

The permitted swing of the unit for your machine tool is shown in the dimensional drawing. The maximum swing of the unit is $\pm 30^\circ$.

- 3) Demount the mill arbor complete including the overarm and equip it with cutter and collars. The pitch 80 ± 1 mm has to be considered!
- 4) Tighten the clamping bolt (Pos.7) by simultaneous countering at the end of the mill arbour.

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