

## Assembly and adjusting instructions for valve guide tools with the adjustable clamping component GP300 and hydraulic clamping of the insert reamers

Original version of the instructions

Version: 02/2019



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## 1 About these instructions

### 1.1 Read the operating instructions

Use and handling of the tool described below do not come naturally and are explained in the respective technical documentation.

The instructions help you to use the tool as intended, properly, effectively and safely. Thus, read the following chapters thoroughly. If necessary, keep looking up facts that are essential for operation and handling.

Request new operating instructions if parts have been lost or damaged. Always keep the instructions in a safe and accessible place close to the tool for future reference.



#### **See enclosed "General safety instructions" for essential information**

The safety instructions needed to use the tool properly can be found in the short version of the "General safety instructions" that come with the tool.

Read and strictly observe the instructions in this document.

#### **Remaining risks**

These documents give information and warn you of remaining risks for which the risk reduction by design and protective measures takes no or no complete effect.

### 1.2 Explanation of general icons

Icon	Explanation
	<b>Important information</b> This icon shows important extra information.
	<b>Information on machine documentation</b> This icon refers to other parts of the documentation that need to be given special or extra attention (as for example supplier's instructions etc).

Tab. 1: General icons




## 1.3 Safety and warning instructions

### 1.3.1 Structure of warning instructions

The warnings in this document are highlighted with icons and signal words. Icon and signal word show you the severity of the risk.

The warnings that precede all actions are shown as follows:

<b>RISK (1)</b>	
	<b>Type and source of risk (2)</b> Explanation of type and source of risk. (3) ➤ Measures to prevent risk. (4)


The warnings are structured as follows:

Position	Information	Content	Example
1	Level of risk	Severity and classification of risk with signal word and icon	Risk
2	Type and source of risk	What type of risk is it and what is the source?	Risk from electrical current
3	Possible consequences of the risk	What will or might happen if the warning is not observed?	When touching conductive parts, this could cause the risk of an electric shock on the body.
4	Measures to prevent or avoid risk	What to do: What not to do: Which protective measures need to be taken?	Works on electrical facilities or plants are to be carried out only by a qualified electrician.

Tab. 2: Structure of warnings

### 1.3.2 Warnings

The following warning instructions are used in this document:

<b>NOTE</b>	
	<b>Indicates a potentially harmful situation</b> If not avoided, this may cause damage to the system or any object in the surrounding area.



## 1.4 Representation of requirements and operating instructions

### 1.4.1 Requirements

If certain requirements are mandatory in order to carry out a certain action on the tool, they are indicated and represented in the text with a checkbox.

E.g. Requirement

...

The thread is lubricated with assembly paste

### 1.4.2 Operating instructions in fixed order

For many actions taken on the tool it is absolutely mandatory to carry out the working steps in a fixed order.

These steps are given operating instructions and have consecutive numbers. In addition, the operating instructions provide intermediate and final results. Intermediate results represent processes which are not run by the user and are marked by an arrowhead ▶. Final results indicate the end of the action and are marked with a checkmark ✓.

The order of the working steps needs to be absolutely maintained and operating instructions must be observed under all conditions.

E.g. Operating instructions in fixed order

1. Switch the machine on at main switch

▶ The machine control system boots

2. Start the software

▶ The software starts and the following screen appears:

✓ Machine and software are ready for use

## 2 Identification of tool

### 2.1 Tool identification

Tool name: Tools with adjustable clamping component GP300

Article number / SAP no.: See chapter 3.4 Technical data

Year of construction 2019

### 2.2 Manufacturer's data

#### Main headquarters:

Gühring KG

Herderstr. 50-54

72458 Albstadt

Germany

Phone +49 7431 17-0

Fax +49 7431 17-21279

Email [info@guehring.de](mailto:info@guehring.de)

Internet [www.guehring.com](http://www.guehring.com)



## 3 Tool description, Technical data

### 3.1 Tool description

The adjustable clamping component GP300 is part of the tool and therefore not an independent tool. It is mounted and inserted on a tool holder.

### 3.2 Proper use

Tools with the adjustable clamping component GP300 are intended for use on CNC-controlled machines or machining stations. The tools must only be operated if the machines are in perfect condition. An optical measuring or adjusting device must be available as tools with PCD or CBN cutting edges can only be measured optically. Tools with the adjustable clamping component GP300 are only suitable for valve ring and guide machining.

### 3.3 Improper use

Tools with the adjustable clamping component GP300 are not suitable for use on manual tool machines. Tools with PCD or CBN cutting edges must not be measured mechanically.

### 3.4 Technical data

Name	Material no.	Technical data	Wrench size
Ball pressure screw	333187806	M4x5.6	SW 2
Threaded pin	40011085	M4 x 8	SW 2
Torque clamping screw	4071 3.500	Size 170	T10
Clamping claw	333199819		
Cartridge	333199816		
Indexable insert (WSP)	7711	Cutting material: Solid carbide	
Indexable insert (WSP)	7712	Cutting material: PCD	
Indexable insert (WSP)	7733 - 7741	Cutting material: PCBN	

Tab. 2: Technical data

### Emission values

#### Important information



The tool itself does not cause any emissions. But the machine on which the tool runs does. Therefore, it is mandatory to observe the machine operating instructions!



## 4 Basic safety instructions



### See enclosed "General safety instructions" for essential information

The safety instructions needed for using the tool properly can be found in document "General safety instructions". You can find this via the QR Code or the link in the retrieve and download the summary of the general safety instructions enclosed with the tool.

If no access to the Internet is guaranteed or the General safety instructions are needed also in paper form, please do not hesitate to contact your partner at Gühring.

Gühring will of course send you the document in paper form.

Read and strictly observe the instructions in document "General safety instructions" and its short version.

## 5 Assembly and adjustment of clamping component

### 5.1 Preliminary remarks on safety



#### Important information for your safety

It lies in your responsibility!

In any case the safety instructions in document "General safety instructions" and the local safety regulations must be observed and followed.

### 5.2 General information

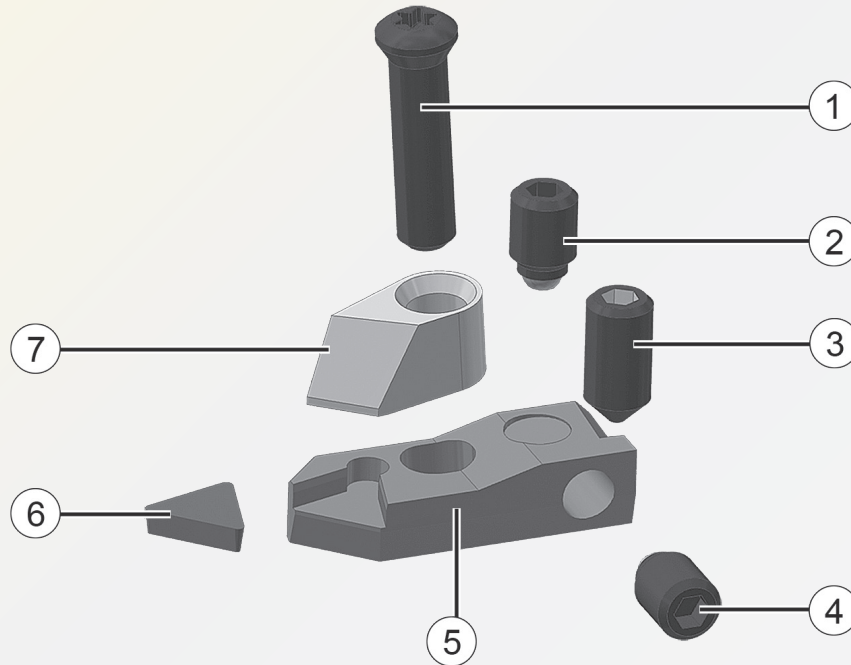
The following information is essential for general use of the tool.

- The clamping component GP300 in angle has an adjustment travel of  $\pm 0.5^\circ$  of the nominal size
- The clamping component GP300 in axial has an adjustment travel of  $\pm 0.3^\circ$  of the nominal size
- The tools come completely set up and balanced
- Before using the tools for the first time, the setting needs to be checked and re-set, if required.



## 5.3 Name of single components

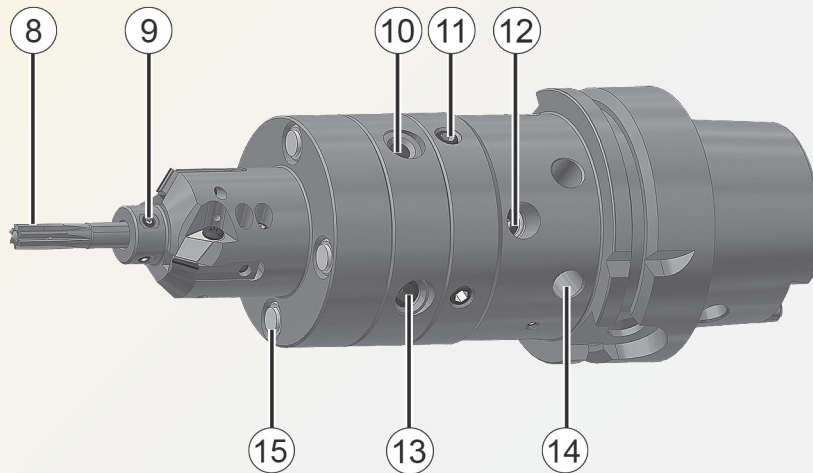
To ensure a clear name of the single components they are named according to the following exploded view:



III. 1: Exploded view single components GP300

1	Torque clamping screw (clamping clamping claw)	4	Ball pressure screws (angle setting)	7	Clamping claw
2	Ball pressure screws (clamping cartridge)	5	Cartridge		
3	Threaded pin (axial setting)	6	Indexable inserts (WSP)		





III. 2: Single component base body GP300

8	Reamers	11	Radial adjusting screws hydraulic module (sealed)	14	Balancing bores (sealed)
9	Fine adjustment Concentricity reamers	12	Bolt radial length adjustment of reamers	15	Fastening screws (sealed with caps)
10	Sealed vent screw	13	Clamping screw for hydraulic clamping		

## NOTE



### Potential damage of tool

Do not remove the sealing of the vent screw (19), the radial adjusting screws (11), the balancing bores (14) and the fastening screws (15), the hydraulic system and do not turn it. The tool's function cannot be guaranteed if the instructions are ignored.

## 5.4 Changing of indexable insert

When delivered, the adjustable clamping component GP 300 is already mounted and fully adjusted.

Use your measuring and adjusting unit to check if the dimensions on the customer drawing or the measurement protocol are identical.

If you wish to re-adjust the mounted and adjusted clamping component, start with chapter "5.5 Adjusting the clamping component".



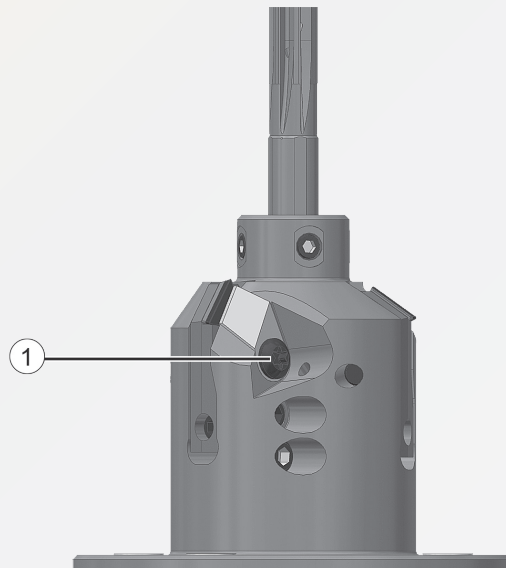
If the reamers or indexable insert need to be replaced, follow the instructions in this chapter.

**Requirement:**

- New WSP / unused side on installed indexable insert
- Torque wrench with matching torque insert T10
- Torque wrench (T10)
- Optical measuring device\*

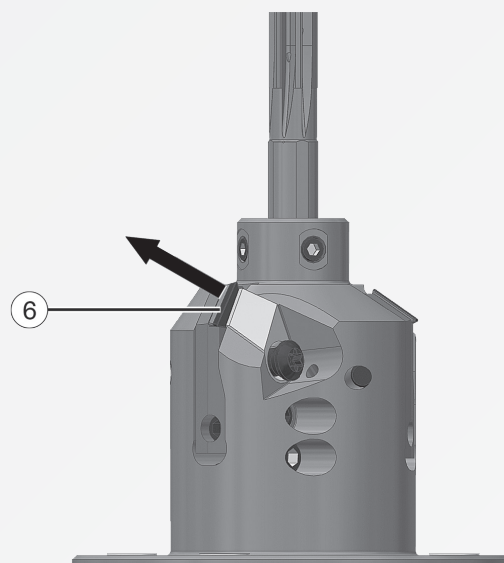
\* If requested, Gühring provides an optical measuring device for your intended use.

1. Loosen torque clamping screw (1) by one to two turns. The clamping screw does not need to be removed. Use a torque wrench (T10) to loosen the torque clamping screw (1).



III. 3: Loosen torque clamping screw

2. Remove the indexable insert (6) and turn it so that an unused side faces towards the front. If all sides have been used, use a new indexable insert.



III. 4: Remove indexable insert



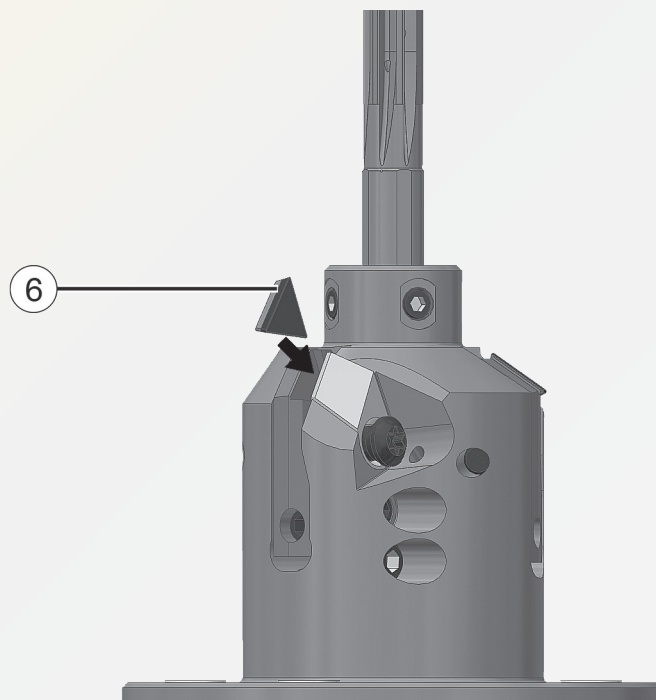
- Put the indexable inserts (6) into the insert seat and push it back to the two contact surfaces.

## NOTE



### Potential damage of tool

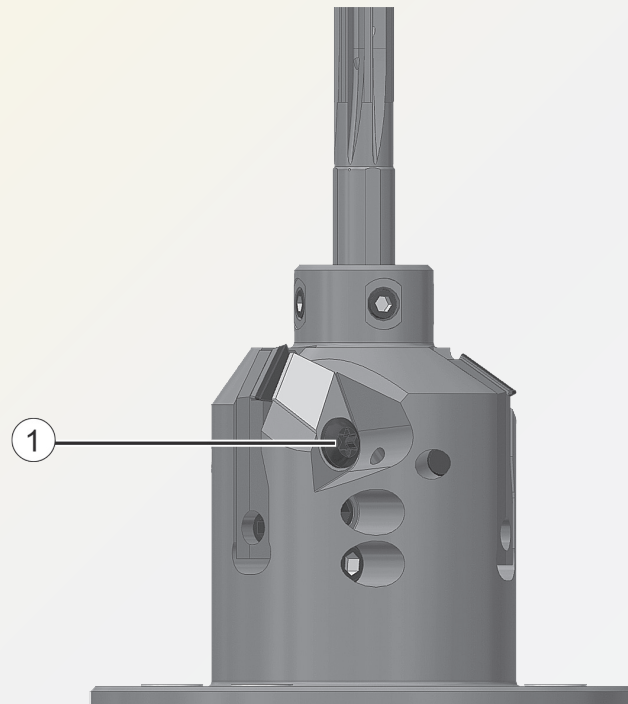
Make sure that the indexable insert are positioned properly in the insert seat and that they touch both contact surfaces. If not, the indexable insert might crack.



III. 5: Insert indexable insert

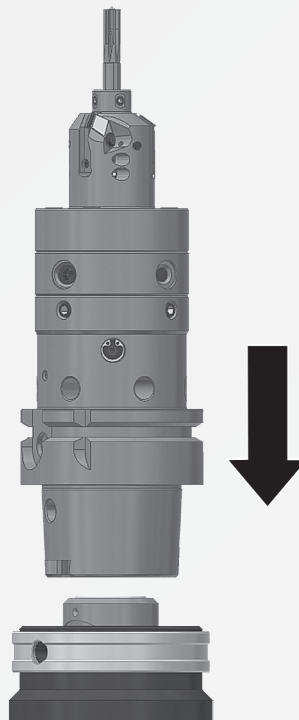


4. Tighten the torque clamping screw (1) with a torque of 100 Ncm. Use a torque wrench with a torque insert T10.



III. 6: Tighten torque clamping screw

5. Clamp the tool into the holder of your adjusting or measuring device.



III. 7: Clamp tool in holder of adjusting or measuring device



6. Use your measuring or adjusting unit to check if the axial length (referring to the diameter gauges) and the angle of the indexable insert on the customer drawing are identical. If not, repeat steps 1 to 4 or re-adjust the adjustable clamping component GP300. This is explained in the next chapter.

**Important information:**

Basically there is no need to re-adjust the clamping component GP300 after the indexable insert has been replaced.

- ✓ Changing of indexable insert completed.

## 5.5 Setting of clamping component

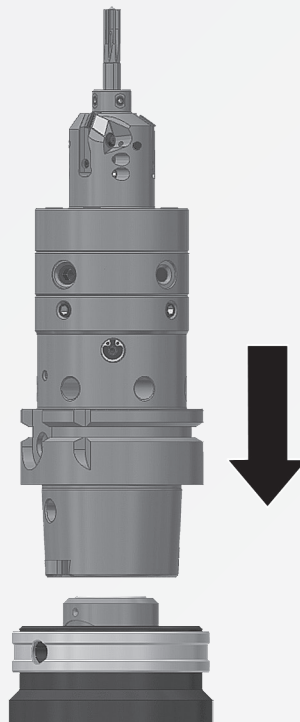
**Requirement:**

- Optical measuring device\*
- Torque wrench with matching torque insert T10 and hexagon insert SW2
- Hexagon socket wrench (SW2)
- Drawing of tool (submitted by customer)

\* If requested, Gühring provides an optical measuring device for your intended use.

To adjust the clamping component, follow the instructions in this chapter.

1. Clamp the tool into the holder of your adjusting or measuring device.



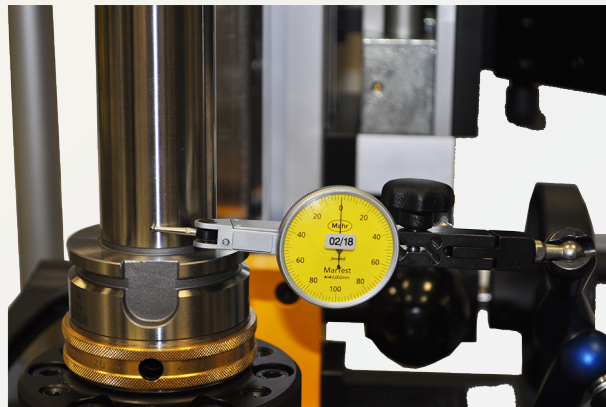
III. 8: Clamp tool in holder of adjusting or measuring device



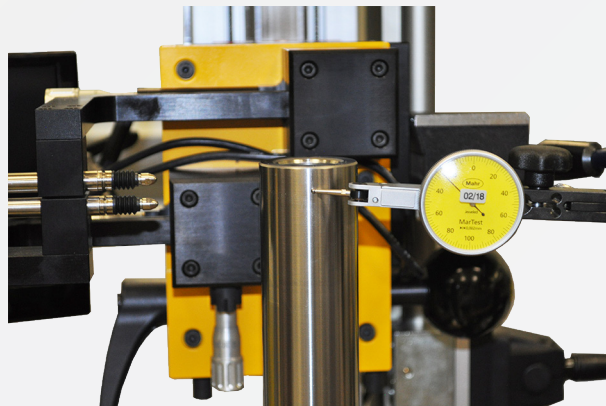
**Important information:**

Before starting to make the setting, check the spindle of the adjusting or measuring device.  
Use a test pin and a dial gauge with stand.

Concentricity and angle error should be  $\leq 3 \mu\text{m}$  (measured on a programming length of at least 250 mm). If this is not the case, re-adjust the spindle of the adjusting unit.



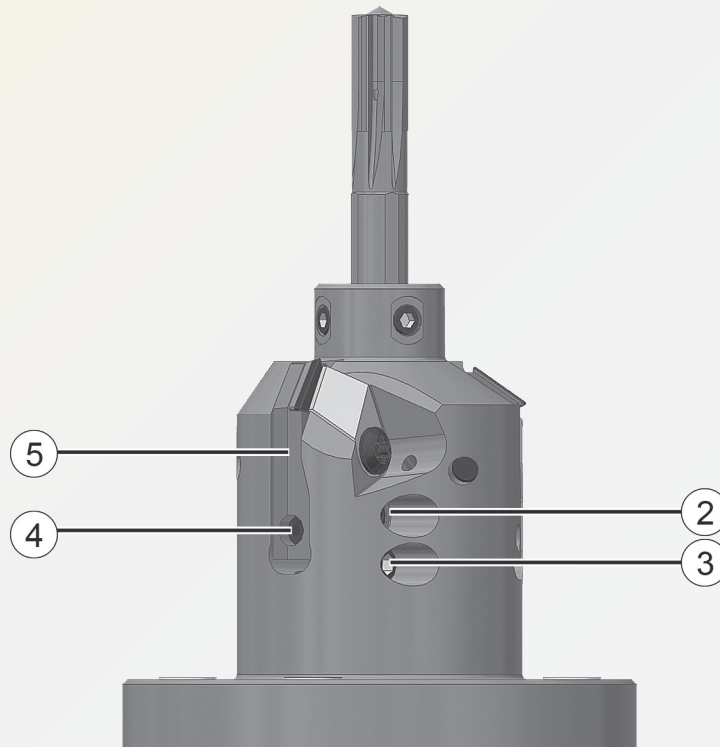
III. 9: Check concentricity of spindle by means of test pin and dial gauge



III. 10: Check angle error of spindle by means of test pin and dial gauge



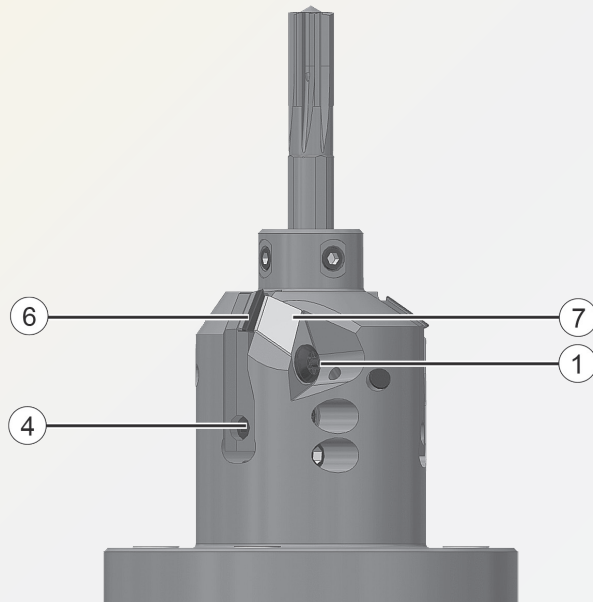
2. Place all components in their lowest position to ensure that the cartridge (5) lies close to the base body. First loosen the ball pressure screw (2) by approx. a turn. Then turn the threaded pin (3) and the ball pressure screw (4) counterclockwise. Use an SW 2 hexagon socket wrench. Push the cartridge (5) into its lowest position and slightly tighten the ball pressure screw (2).



III. 11: Place cartridge into its lowest position

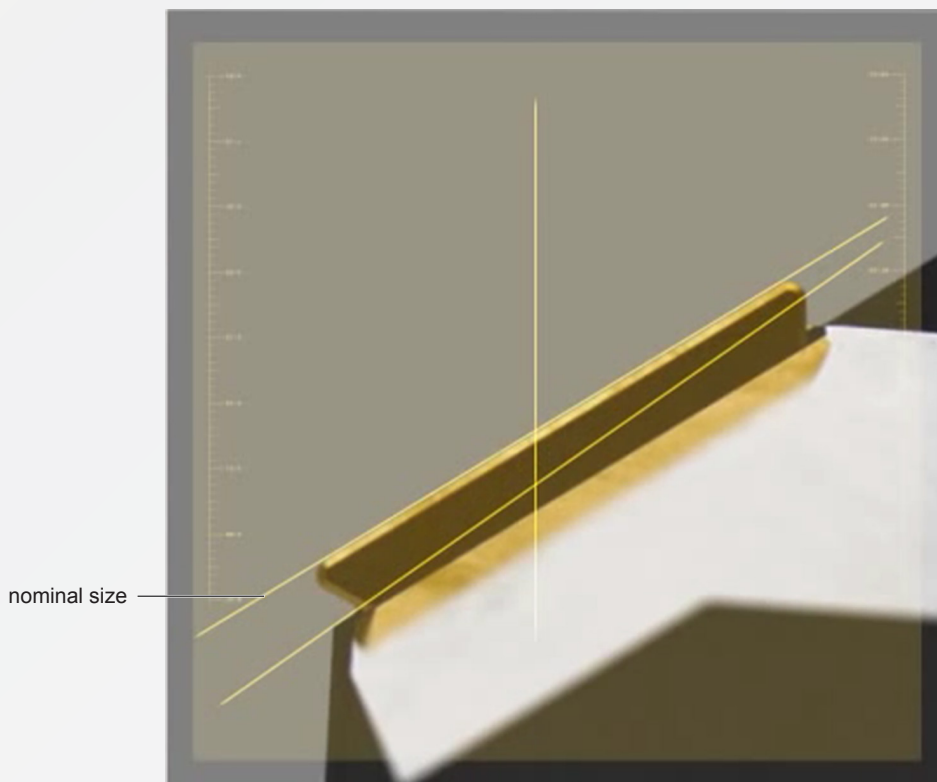


3. Clamp the indexable insert (6) by using the clamping claw (7). Tighten the torque clamping screw (1) with a torque of 100 Ncm. Use a torque wrench with a torque insert T10.



III. 12: Clamp indexable insert

4. Turn the ball pressure screw (4) clockwise for angle setting until the indexable insert is on nominal dimension (angle).

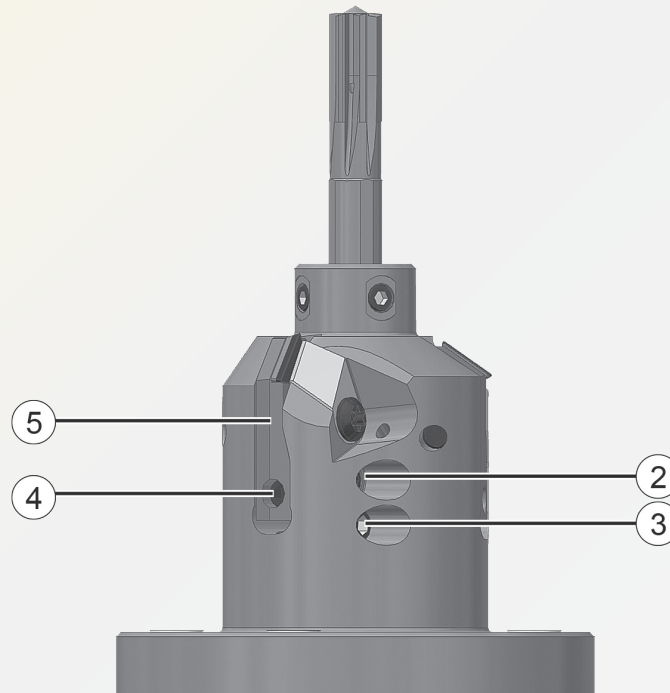


III 13: The indexable insert is to be set to nominal dimension (angle).  
(Note: The illustration is not true to scale. It is only a schematic illustration.)

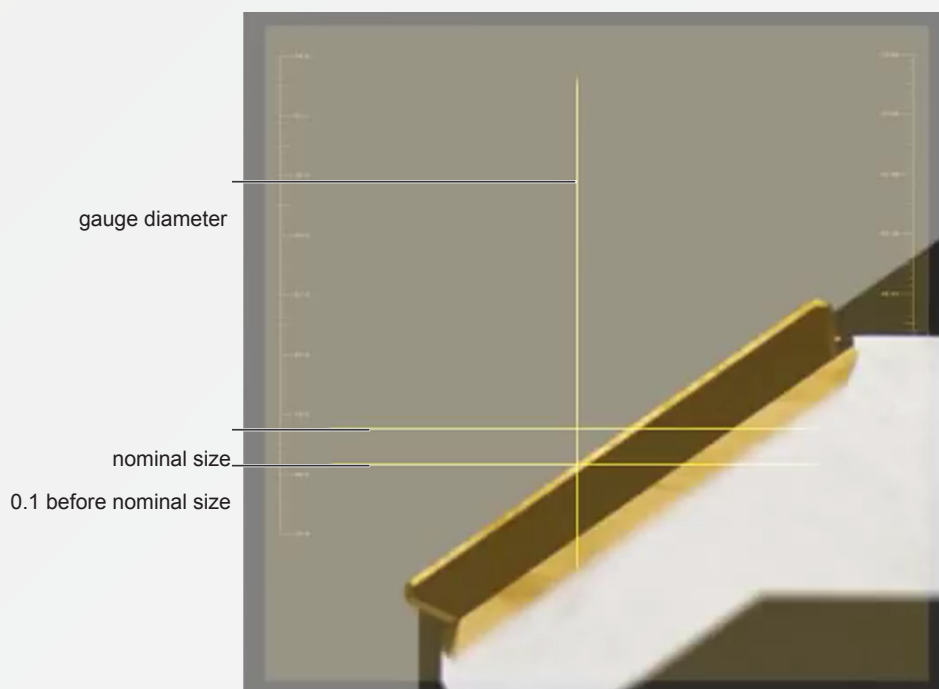




5. Make the cartridge settings (5). To do so turn the threaded pin clockwise (3) for axial adjustment until the indexable insert is 0.1 mm before the final axial position. Use the hexagon socket wrench SW 2. Note: The ball pressure screw (2) must not come into contact, they must be loose.



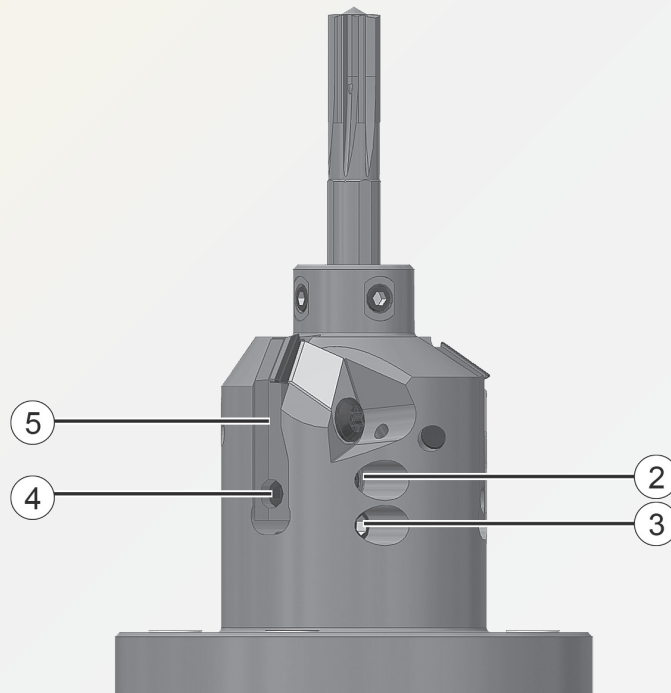
III 14: Adjust cartridge to 0.1 mm before axial final position



III. 15: Set indexable insert 0,1mm ahead of nominal dimension.  
(Reference: The illustration is not true to scale. It is only a schematic illustration.)



6. Check the angle adjustment and re-adjust if necessary. To do so turn the ball pressure screw (4) clockwise for the angle adjustment until the indexable insert is on nominal dimension (angle).
7. Turn the threaded pin (3) clockwise for axial adjustment until the indexable insert is 0.010 mm to 0.020 mm before the axial final position. Use the hexagon socket wrench SW 2.
8. Clamp the cartridge (5) with the ball pressure screw (2). Tighten it with a torque of 120 Ncm. Use a torque wrench with a hexagon socket wrench SW 2.

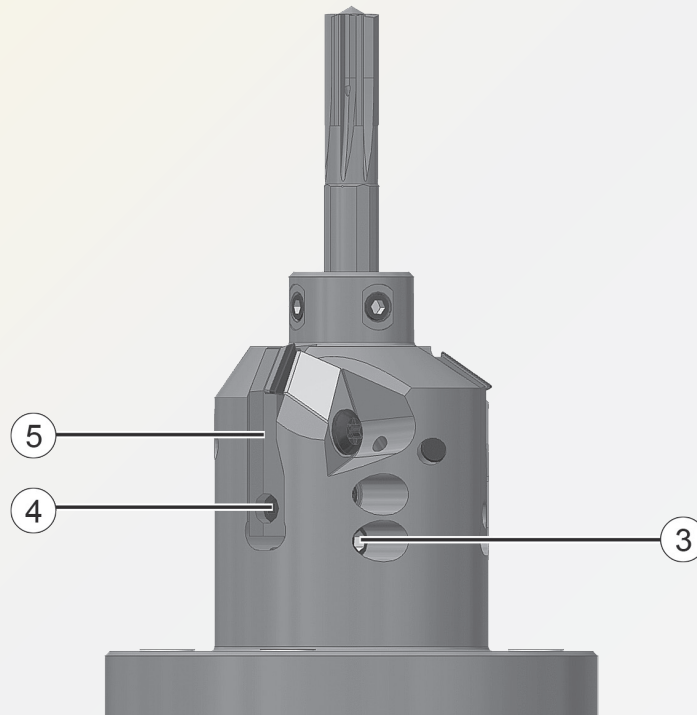


III. 16: Clamp cartridge

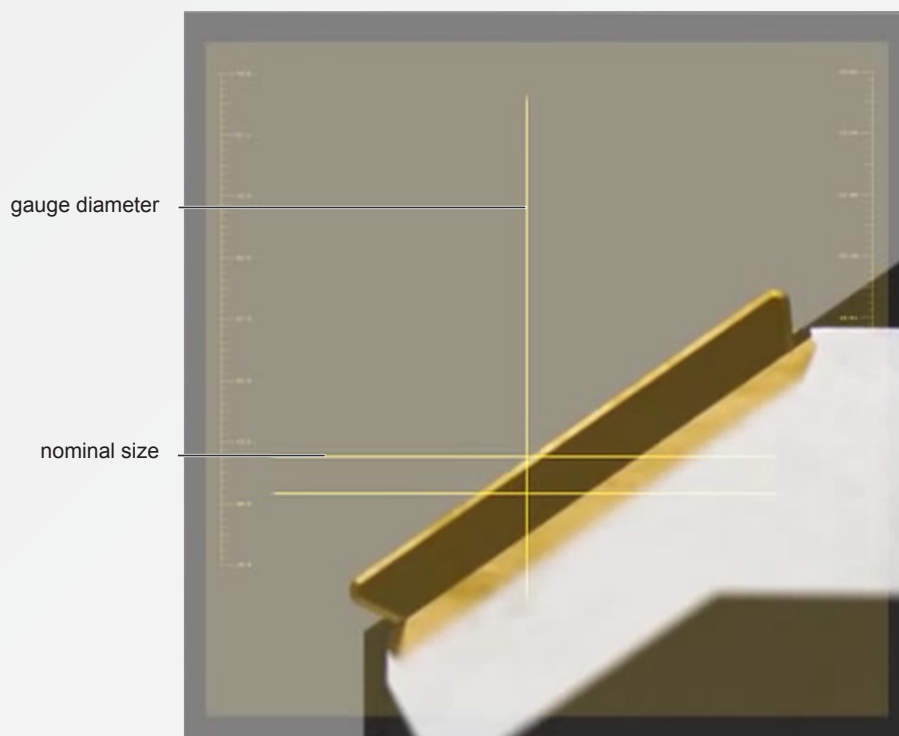
9. Check the angle adjustment and re-adjust if necessary. To do so turn the ball pressure screw (4) clockwise for the angle adjustment until the indexable insert is on nominal dimension (angle).



10. Make the cartridge (5) settings. Turn the ball pressure screw (4) for angle setting and the threaded pin (3) for axial adjustment clockwise until the indexable insert is on the final angle and the axial final position. Use an SW 2 hexagon socket wrench.



III. 17: Adjust cartridge to final angle and axial final position



III. 18: Adjust indexable insert to nominal dimension (angle)  
(Reference: The illustration is not true to scale. It is only a schematic illustration.)

**Important information:**

If the nominal dimension (axial or angle ) has been exceeded, go back to the beginning of chapter 5.5 "Adjusting the clamping component" and make steps 1.-6.

- ✓ The cartridge has been adjusted.

## 5.6

### Changing of reamers

#### 5.6.1

#### Disassembling of reamers

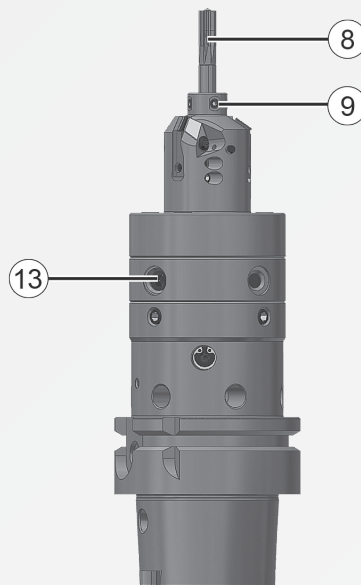
**Requirement:**

- Worn-out reamers
- Provided hexagon wrench SW4 (Art. no. 4912 4,600)
- Hexagon socket wrench (SW1.5)

1. Loosen clamping screw (13) using a hexagon wrench SW 4 until the clamping pressure is reduced. Approx. 3 wrench turns are required for loosening.

**Important information:**

The clamping screw (13) is not secured against falling out.



III. 19: Loosen clamping screw

2. Loosen all screws of fine adjustment for a smooth concentricity of the reamers (9) by approx. one turn. Use an SW 1.5 hexagon socket wrench.
  3. Remove the worn-out reamers (8).
- ✓ Disassembling of reamers completed.



## 5.6.2 Assembly of reamers

### NOTE



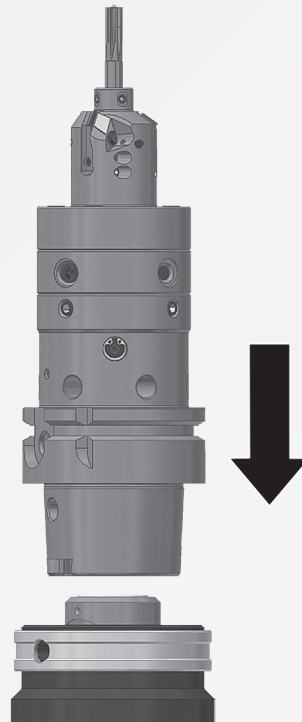
#### Potential damage of tool

Never clamp the hydraulic chucks without using a tool.  
The clamping screw (13) must not be applied with a power-driven screwdriver.  
Only use the supplied hexagon wrench for the clamping screw (13).  
The max. torques indicated must not be exceeded during adjusting.  
In case instructions are ignored, the clamping system might get damaged.

#### Requirement:

- New reamers
- Provided hexagon wrench SW 2.5 (Art. no. 4912 2,509)
- Provided hexagon wrench SW4 (Art. no. 4912 4,600)
- Optical measuring device

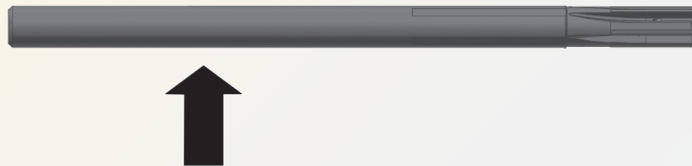
1. Clamp the tool into the holder of your adjusting or measuring device.



III. 20: Clamp tool in holder of adjusting or measuring device



2. Make sure that the reamers (8) on the shank are free of burrs and dirt.



III. 21: Check shank of reamers

3. Insert the reamers (8) in vertical direction into the hydraulic chucks.

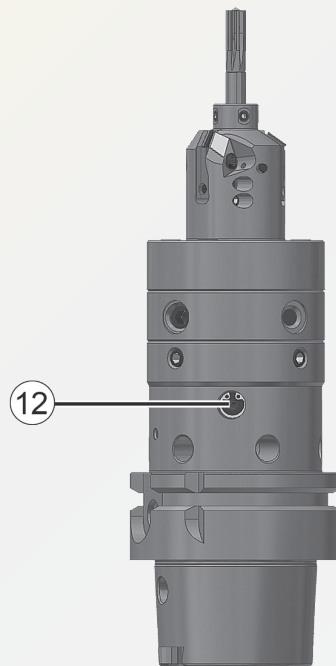


III. 22: Insert reamers



4. Insert the hexagon wrench supplied (article no. 4912 2,509) into the bolt for radial length adjustment (12).

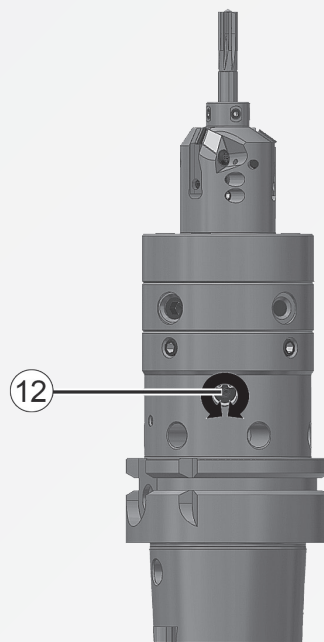
**Warning:** The clamping screw (13) must be loosened (see step 1 in chapter 5.6.1 Disassembly of reamers).



III. 23: Insert hexagon wrench into bolt

5. Turn the bolt (12) counterclockwise or clockwise to adjust and set the length adjusting screw to the required direction. Make sure that the max. torque of 3 Nm is not exceeded.

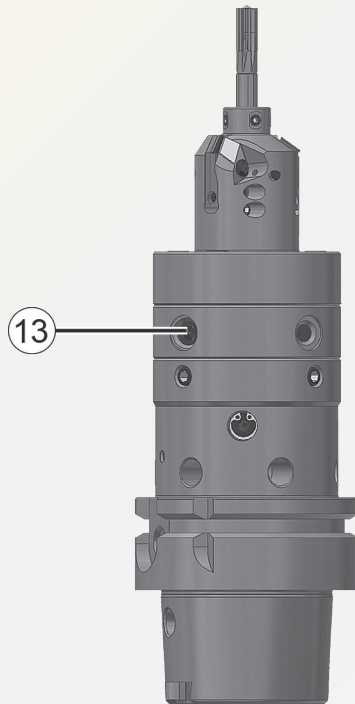
**Warning:** The clamping screw (13) must be loosened.



III. 24: Apply length adjusting screw



6. During clamping the clamping screw (13) must be turned manually to the clear stop.  
Make sure that the torque of 10 Nm is not exceeded. Use the supplied hexagon wrench SW4 (article no. 4912 4,600)



III. 25: Apply clamping screw

- ✓ Assembly of reamers completed



**Important information:**

For size SW 4 (article no. 4912 4,600) use a reinforced hexagon wrench SW4/6.



**Important information:**

If a new reamer has been installed, the reamer concentricity must be re-adjusted. Follow the instructions in the following chapter. "5.7 Setting of concentricity of reamers through fine adjustment".





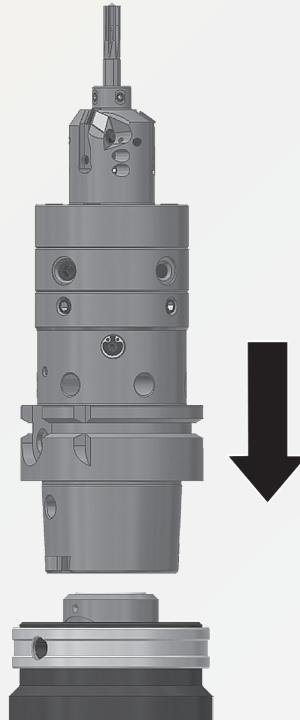
## 5.7 Setting of concentricity of reamers through fine adjustment



### Important information:

We recommend to take the following steps directly in the machine spindle to make sure that a higher accuracy is achieved.

1. Clamp the tool into the machine spindle or into the measuring and adjusting device.



III. 26: Clamp tool into holder of adjusting or measuring device

2. Position the dial gauge as far forward as possible at the diameter of the reamers.



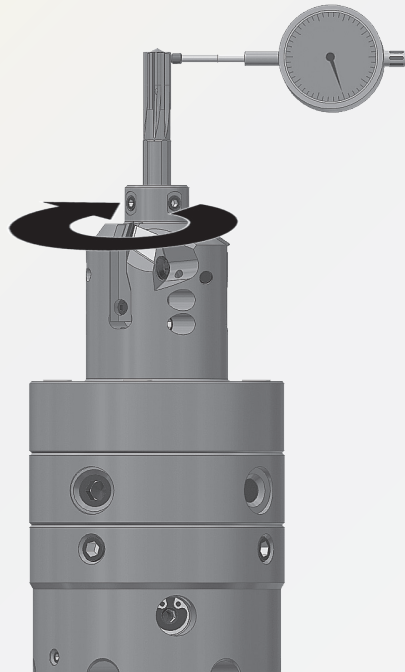
III. 27: Attach dial gauge to reamer



**Important information:**

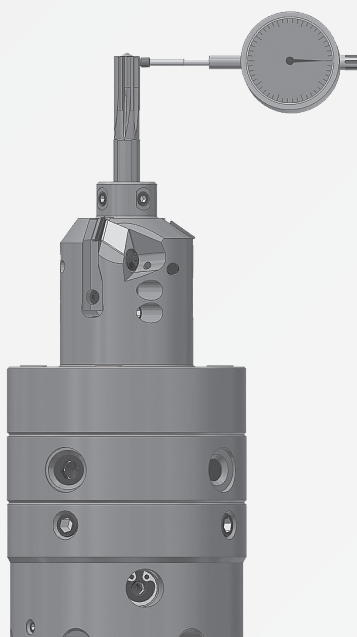
The pre-stressing of the dial gauge should not exceed 40  $\mu\text{m}$  as sensitive cutting edges or guiding rails could outbreak. The same applies to the spring force. It must not exceed 1N.

3. Find the highest measuring point by turning the tool against the cutting direction. Remember the dial gauge's displacement (for example 0.01 mm).



III. 28: Determine the measuring point

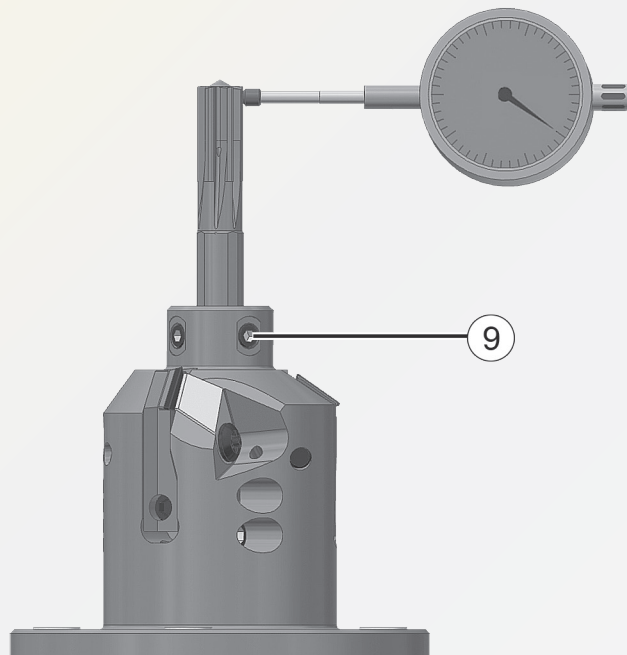
4. Set the dial gauge to "Zero".



III. 29: Zerose the dial gauge



5. Now adjust the concentricity of the reamers. Turn the screw for fine adjustment (9) which is of the dial gauge's side by using the fitting hexagon socket wrench (SW 1.5) clockwise until the pointer of the dial gauge indicates counterclockwise half of the concentricity errors (in this example 0.005 mm). Repeat this procedure from point 3 on until the concentricity error is  $\leq 0.003$  mm.



III. 30: Adjust concentricity of reamers

6. Apply all screws of fine adjustment (9).
  7. Check again the concentricity of the reamers using the dial gauge. The value must be  $\leq 0.003$  mm.  
If concentricity deviates, loosen all screws of the fine adjustment and repeat point 3 to 7.
- ✓ The tool is now adjusted and ready for operation.



## 6 Service, maintenance, storage and repair

We recommend to clean the clamping surfaces regularly after each tool replacement to secure the clamping force and accuracy by means of a solvent-based detergent.



### Important information:

When using solvent-based detergents please observe the safety and environment instructions of the manufacturer.

We recommend to regularly lubricate the clamping screw (13) with a copper paste.

If the cleaning temperatures are higher than 50°C, up to max. 80°C first the clamping pressure of the hydraulic chucks on the clamping screw (13) needs to be reduced.

Lightly grease the total surface of the tool before storing it. Only store the hydraulic chucks if in tension-free condition.

Any repair works should only be carried out by Gühring staff. For any repairs or works carried out by the customer or third-party companies the warranty expires.

## 7 Checking of clamping force hydraulic clamping system

The clamping force of the hydraulic modules is checked with an approved minimum torque. This check is to be carried out before using it for the first time, after the tool has been replaced after approx. 100 times and every 3 months at the latest. To ensure the tool's proper function, this applies especially during changing of reamers. The check can be carried out by using the torque test pin by Gühring.

### Equipment required

The following components are necessary or recommended for the check:

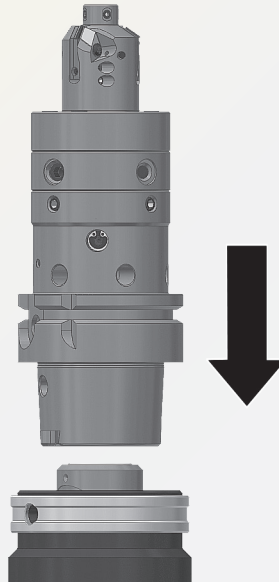
Designation	Size	Gühring article recommended
Tool mounting block	450.063	4990 450.063
Hexagon wrench	SW 1.5	4912 1,500 (Type B)
Hexagon wrench	SW 4	4912 4,000 (type A)
Torque wrench	Area 5 – 50 Nm	4915 50.000 (3/8")
Socket wrench insert	SW 20 drive 3/8"	
Torque test pin	Ø6 -SW 20	303268360

To check the clamping force proceed as follows:

<b>NOTE</b>	
	<p><b>Potential damage of tool</b></p> <p>If the appropriate torque has been exceeded the tool's function can be irreparably affected.</p>



1. Clean the tool from impurities.
2. Fix the tool in a firm holder. The tool assembly block by Gühring is recommended.



III. 31: Fixing tool in holder

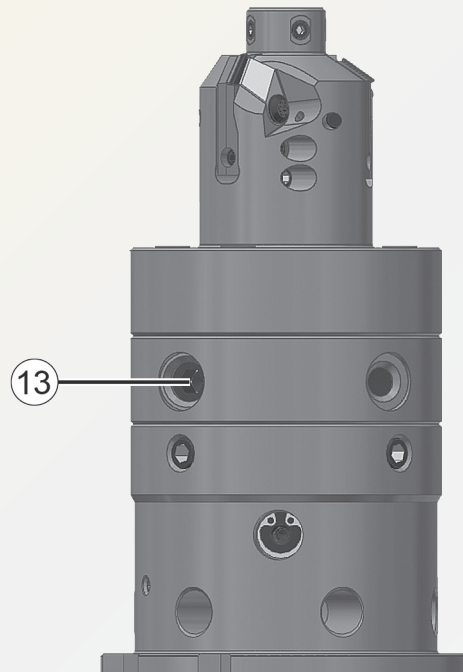
3. Loosen the inserted screws of the fine adjustment (9) with an appropriate hexagon wrench SW 1.5.



III. 32: Loosen the screws at the tool collar



4. Completely relieve the hydraulic module by turning the clamping screw (13) counterclockwise and remove, if necessary, an integrated reamer. Use an appropriate hexagon wrench SW 4.



III. 33: Relief the hydraulic module

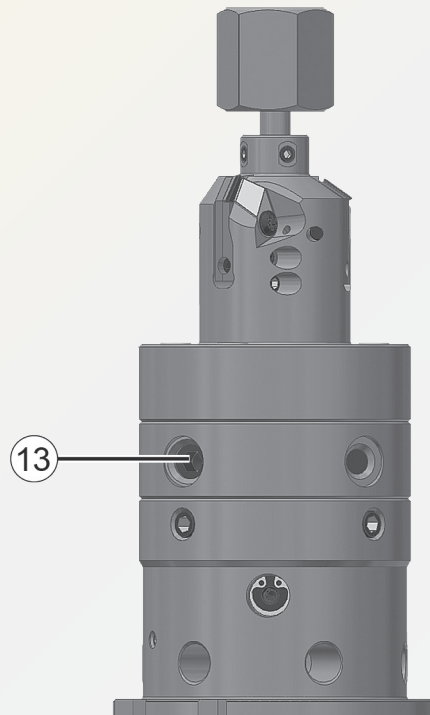
5. Insert the degreased test pin ( $\varnothing 6$ ) to the lower stop of the hydraulic module.



III. 34: Insert test pin

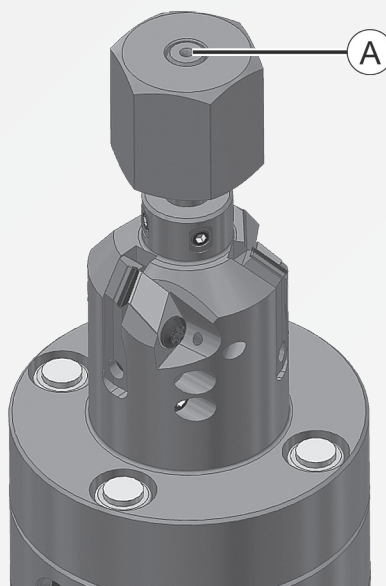


6. Manually clamp the hydraulic module by turning the clamping screw (13) clockwise always to the clear stop. Use the supplied hexagon wrench SW4,



III. 35: Clamp hydraulic module

7. Set a suitable torque wrench to a torque of  $11.5 \text{ Nm} \pm 0.5 \text{ Nm}$ . Fasten a socket wrench insert SW 20 to the torque wrench and plug it on the hexagon bolt of the test pin (A).



III. 36: Attach torque wrench



8. Check the valid torque of the hydraulic module on the appropriate minimum torque of 11 Nm, as indicated by the torque wrench manufacturer.

The check on the tension force is positive if the test pin cannot be turned with 11 Nm during the torque test.



**Important information:**

If the test pin can be turned with 11 Nm during the torque test, the tension force test is negative. Contact the Guhring service.

- ✓ Checking the minimum torque and ensuring that the hydraulic module has sufficient tension force for processing is completed.