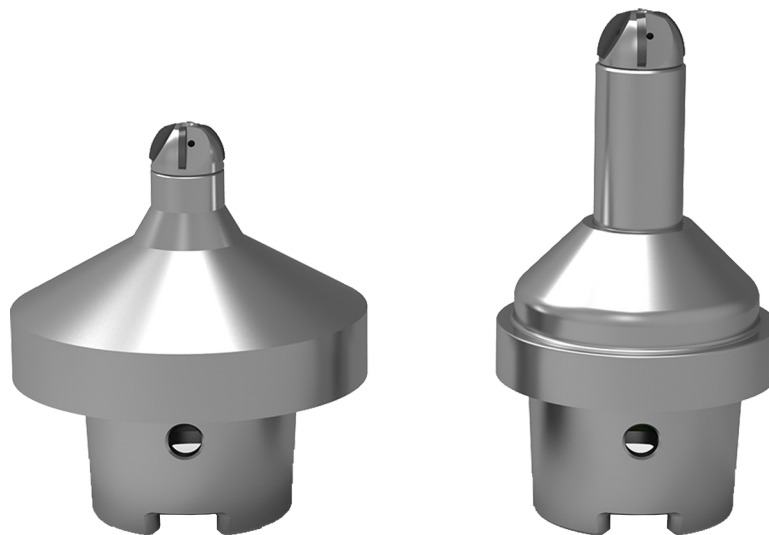


## Mounting instructions for ball race milling cutter

Version: 09/2023



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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 Representation of requirements and operating instructions

### 1.3.1 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 coated with holder lubricant

### 1.3.2 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 on machine 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

Name of tool: Ball race milling cutter

Article number / SAP no.: See chapter 3.3 Technical data

Year of construction 2017

### 2.2 Manufacturer's data

#### Main headquarters

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## 3 Tool description, Technical data

### 3.1 Proper use

Ball race milling cutters are suitable for use on CNC milling cutters or machining stations with a HSK tool holder. The tools must be installed only on machines that are in perfect conditions.

Only ball race milling cutters and holders by Gühring are compatible and can be used together.

The following applies only to CBN-equipped ball race milling cutters:

Compressed air with approx. 6 bar is to be used as a coolant for internal cooling. The tools are only suitable for machining hardened steel. In addition, these tools are only suitable for final machining with a max. cutting depth of 0.8 mm. Further materials or tool holders upon request.

### 3.2 Improper use

CBN-equipped ball race milling cutters are not suitable for machining non-ferrous metals.

Furthermore, no coolant lubricant emulsions or minimal lubrication is to be used for these

CBN-equipped tools. They are not supposed to run on manual machine tools. CBN-equipped ball race milling cutters are not suitable for roughing end machining (the cutting depth must not exceed

0.8 mm). Ball race milling cutters by Gühring must not be used in holders by third-party manufacturers.

If the tool is used with any machine or material that is not appropriate, the tool's function cannot be guaranteed. No liability is assumed for any damages caused to the tool, machine or work piece.

### 3.3 Technical data

Name	Cone size	Machining	Article no.	Thread	Wrench size
Clamping sleeve	7.5	Outer Race	400156751	M6	SW 4
Clamping sleeve	10.0 bis 16.0	Outer Race	400156760	M8	SW 6
Forcing-off disk	7.5	Outer Race	400156761	M10	SW 6
Forcing-off disk	10.0 bis 16.0	Outer Race	400156762	M14	SW 8
Clamping nut	7.5	Inner Race	303275885	M6	SW 12
Clamping nut	10.0 bis 16.0	Inner Race	303172306	M8	SW 12

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



### Important information in document „General safety instructions“

The safety instructions needed for using the tool properly can be found in document „General safety instructions“. These can be viewed or downloaded via the QR code or the link in the short version of the general safety instructions that come 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 Mounting of tool

### 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 Name of single components

To ensure a clear definition and name of the single components they are named according to the following sectional views.

#### 5.2.1 Name of single components for outer race tools

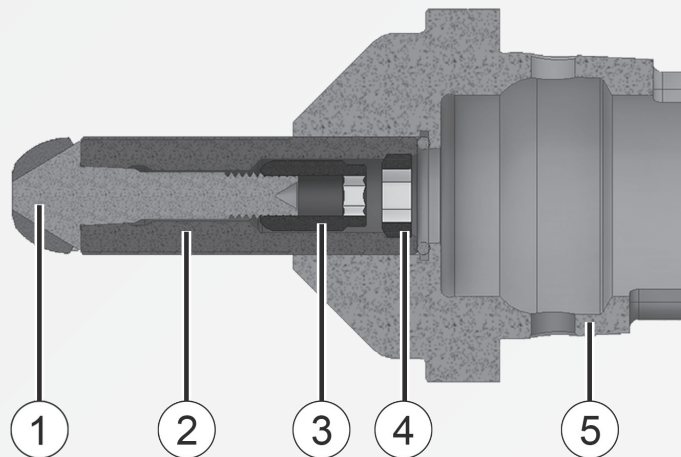


Fig. 1: Sectional view Outer race tool

1	Ball race milling cutter	2	Hard metal shaft	3	Clamping sleeve
4	Forcing-off disk	5	Base body		



#### Important information

The hard metal shaft (2) and the base body (5) form the holder.



## 5.2.2 Name of single components for inner race tools

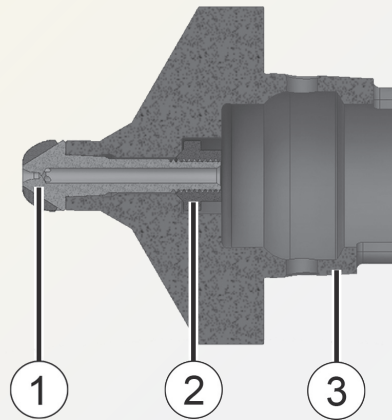


Fig. 2: Sectional view Inner race tools

1	Ball race milling cutter	2	Clamping nut	3	Holder
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## 5.3 Mounting process for outer race tools

### Requirement

- SW 8 Allen key (or SW 6 with cone size 7.5)
- Torque wrench with SW 6 hexagon socket wrench (or SW 4 with cone size 7.5)
- Cloth for cleaning and assembly cleaner
- Drawing of tool (submitted by customer)
- Tool mounting block

In order to mount the ball race milling cutter, proceed as follows:

1. Clean the ball race milling cutter and the holder. The cone areas and contact faces are essential. Make sure that the segments are not damaged.

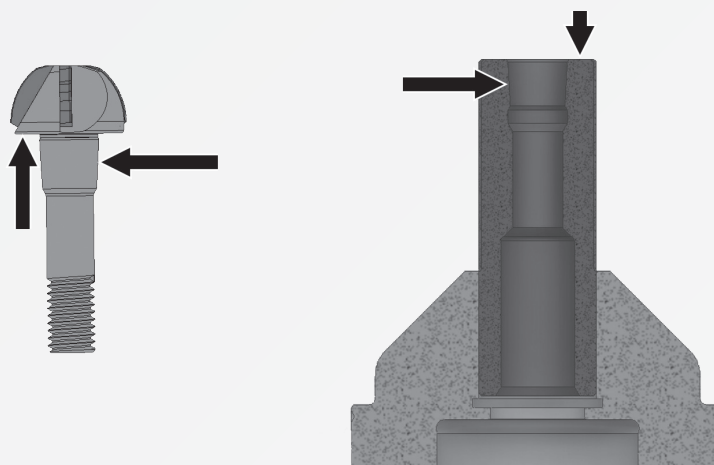


Fig. 3: Clean cone areas and contact faces on ball race milling cutter and holder



2. Insert clamping sleeve with chamfer in forward direction into drilled hole.

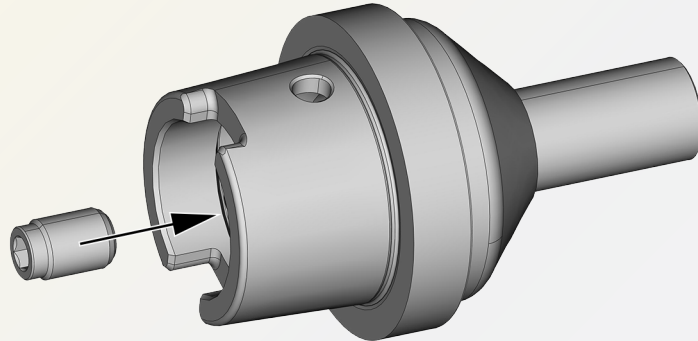


Fig. 4: Insert clamping sleeve

3. Screw in the locking disc. Turn the setting screw towards the inside until it rests against the clamping sleeve. Then turn the forcing screw back again by approximately half a turn. Use an SW 8 Allen key (or SW 6 with cone size 7.5). Each time the locking disc is assembled, it must be secured with Loctite 243 (material number 400107540)

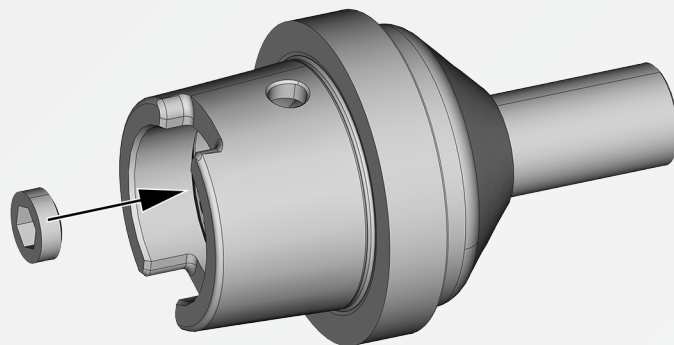


Fig. 5: Screw in forcing-off disk

4. Insert milling cutter and tighten clamping sleeve (use an SW 6 Allen key (or an SW 4 with cone size 7.5). Make sure that the segments are not damaged).

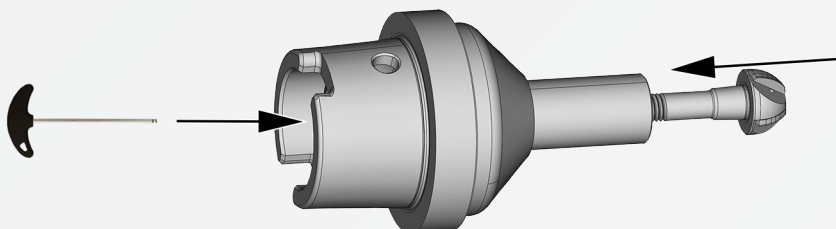


Fig. 6: Insert milling cutter and tighten with clamping sleeve





5. Fasten the holder with the ball race milling cutter in a tool mounting block.  
Make sure that the segments are not damaged.
6. Tighten the clamping sleeve with the provided torque wrench. Please see the table below for respective data. Use a torque wrench with an SW 6 hexagon socket wrench (or an SW 4 with cone size 7.5).



Fig. 7: Tighten clamping sleeve with torque wrench

Cone size	Torque [Nm]	Wrench size
7.5	12	4
10	14	6
12.5	14	6
16	16	6



7. Check the gap between ball race milling cutter and holder. There must be no visible gap between the contact face of the ball race milling cutter and the holder.

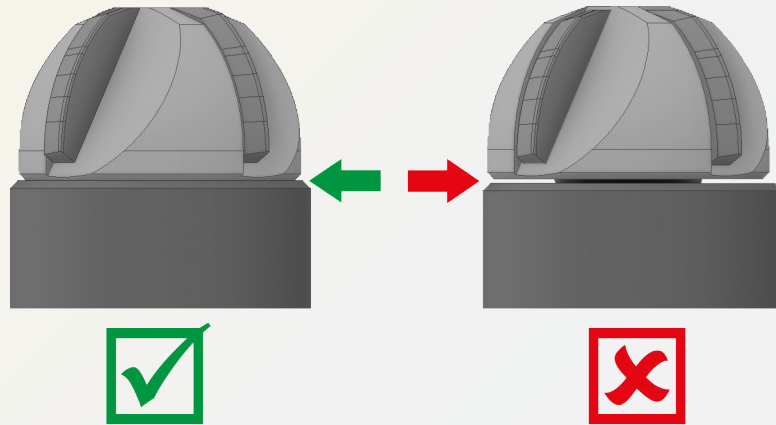


Fig. 8: Check gap between ball race milling cutter and holder.

Left: Correct, no gap visible.

Right: Incorrect, gap visible.

- ▶ If there is a gap, dismantle the ball race milling cutter and repeat steps 1 to 7.  
If there is still a gap, please contact your partner at Gühring.
- ✓ Mounting of ball race milling cutter completed. The tool is now ready for operation.



## 5.4 Mounting process for inner race tools

### Requirement

- ☑ SW 12 hexagon socket wrench
- ☑ Torque wrench with SW 12 hexagon socket wrench
- ☑ Cloth for cleaning purpose
- ☑ Drawing of tool (submitted by customer)
- ☑ Tool mounting block

In order to mount the ball race milling cutter, proceed as follows:

1. Clean the ball race milling cutter and the holder. The cone areas and contact faces are essential. Make sure that the segments are not damaged.

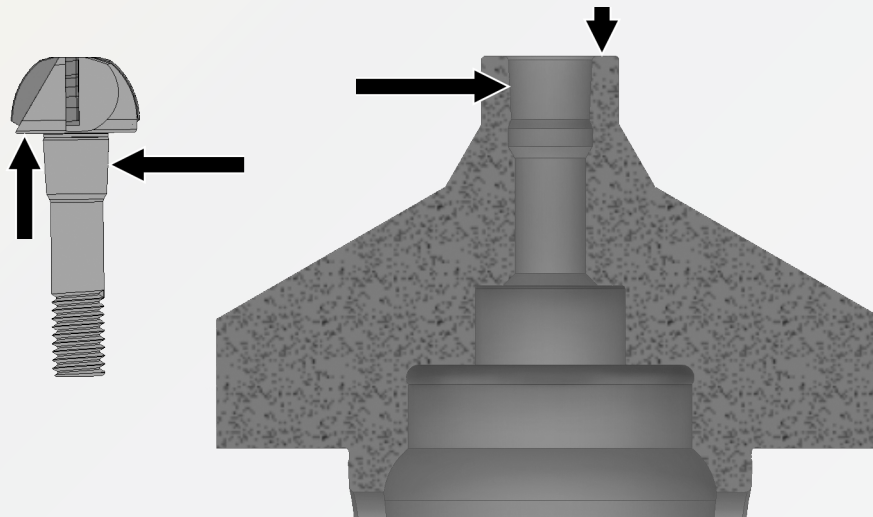


Fig. 9: Clean ball race milling cutter (inner race)

2. Insert ball race milling cutter and tighten with clamping nut. Use an SW 12 hexagon socket wrench.

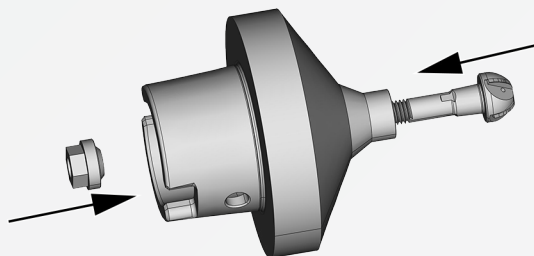


Fig. 10: Insert ball race milling cutter and tighten with clamping nut

3. Fasten the holder with the ball race milling cutter in a tool mounting block. Make sure that the segments are not damaged.



4. Tighten the clamping nut with the provided torque wrench. Please see the table below for respective data. Use a torque wrench with an SW 12 hexagon socket wrench.



Fig. 11: Tighten clamping nut with torque wrench

Cone size	Torque [Nm]	Wrench size
7.5	12	12
10	14	12
12.5	14	12
16	16	12



5. Check the gap between ball race milling cutter and holder. There must be no visible gap between the contact face of the ball race milling cutter and the holder.

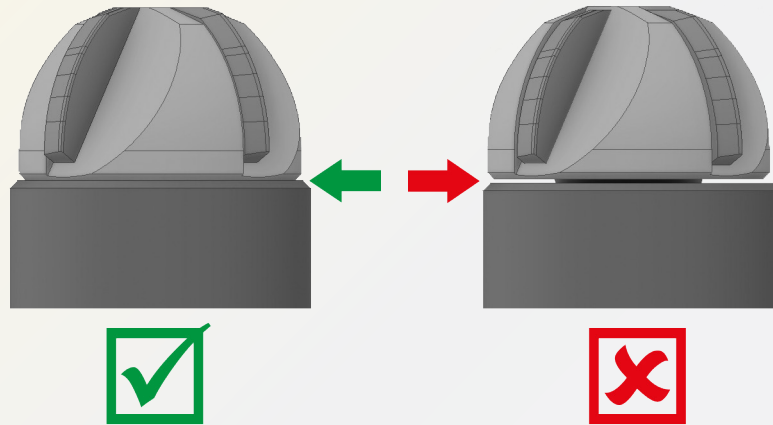


Fig. 12: Check gap between ball racer milling cutter and holder.

Left: Correct, no gap visible.

Right: Incorrect, gap visible.

- ▶ If there is a gap, dismantle the ball racer milling cutter and repeat steps 1 to 5.  
If there is still a gap, please contact your partner at Gühring.
- ✓ Mounting of ball race milling cutter completed. The tool is now ready for operation.