

# GUHRING

PROCESS RELIABILITY  
RATHER THAN NERVE TINGLING

**MQL**  
BY GÜHRING



## GM 300

CHECK AND MEASURING  
INSTRUMENTS FOR OPTIMAL TOOL CLAMPING  
AND LUBRICATION

# CHECK- AND MEASURING INSTRUMENTS

## OPTIMAL TOOL CLAMPING AND LUBRICATION

Pre-requisite for perfect machining results is not only the right choice of machine, tool holder, chuck and tool. Just as important is a constant check of tool clamping and lubrication. Optimal tool clamping and lubrication ensures long tool life, highest cutting performance as well as excellent quality and prevents tool breakage, chip congestion or inferior machining quality.

As a full-range supplier of tools, tool holders and chucks for all matters machining, Guhring has also developed a comprehensive program of instruments for measuring and checking the tool clamping and lubrication that are available as special solutions in the GM 300 program.

All measuring and inspection instruments are suitable for measuring or checking the tool clamping and the coolant supply directly on site on the machine in production. This allows a quick, simple and accurate measurement or inspection under actual machining conditions at any time.



From the holder to the tool, Guhring supplies measuring and inspection instruments for clamping and lubrication including minimal quantity lubrication.

### The Guhring check- and measuring instruments:

- ⇒ **Clamping force measuring instrument HSK/SK** for accurate measuring of HSK/SK clamping systems (page 3)
- ⇒ **SENSO 3000** for accurate measuring of the clamping force for hydraulic chucks (page 4)
- ⇒ **SENSO-SHRINK** for accurate measuring of the clamping force for shrink fit chucks (page 6)
- ⇒ **PQ 3000** for checking of pressure and volume of coolant flow with conventional lubrication (page 8)
- ⇒ **CC 3000** for checking of the filtering efficiency of the coolant system (page 9)
- ⇒ **MQL-CHECK 3000** for measuring of the coolant volume and the reaction time with the minimal quantity lubrication MQL (page 10)

# CLAMPING FORCE MEASURING INSTRUMENT HSK + ISO TAPER

## CLAMPING FORCE FOR CLAMPING SYSTEMS

The accuracy of the HSK connection does not only depend on the geometry but also on the drawing force of the HSK clamping system which plays an important part in ensuring a powerful and dimensionally accurate connection. To ensure operational safety, a regular clamping force check of the HSK interface is recommended. An entirely mechanical clamping force measuring instrument is now available from Guhring. Its operation is based on components, which are linear adjustable in length and positioned proportional to the

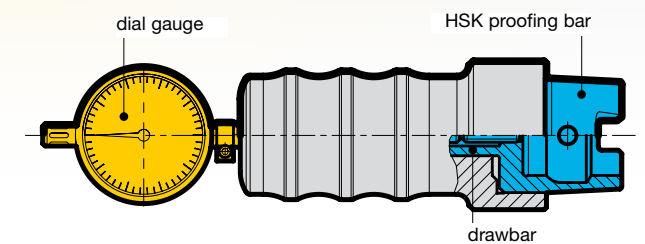
force. A force is associated with the alteration in length which is displayed via an analogue dial gauge.

### Specifications::

- few components, therefore cost-efficient
- robust design
- battery or mains connection not required
- patented operating principle which is also adaptable to other spindle designs

### Min. required pull forces for clamping systems

taper size HSK25	2.8 kN
taper size HSK32	5 kN
taper size HSK40	6.8 kN
taper size HSK50	11 kN
taper size HSK63	18 kN
taper size HSK80	28 kN
taper size HSK100	45 kN
taper size SK/BT30	6 kN
taper size SK/BT40	12 kN
taper size SK/BT50	25 kN



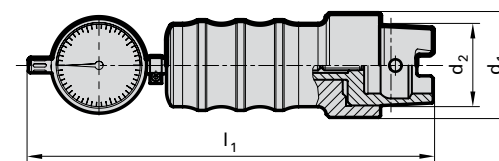
### Clamping force measuring instrument

#### Product information

- mechanical clamping force inspection instrument for HSK / ISO taper / BT\* clamping systems in machine tool spindles
- calibration on request

#### Scope of delivery

- supplied in wooden case with inspection protocol, calibrated, with measuring instructions
- for ISO taper order pull studs Guhring no. 4925, 4926 separately
- for BT\* order shortened special pull studs separately



HSK-A/C/E d <sub>1</sub>	ISO taper/ BT*	d <sub>2</sub> mm	l <sub>1</sub> mm	Guhring no. 4973		Guhring no. 4974	
				Code no.	Availability	Code no.	Availability
				Discount group 114			
	30	32	216	30,000	●		
	40	44	248	40,000	●		
	50	69	285	50,000	●		
25	-	19	187			19,000	●
32	-	24	192			24,000	●
40	-	30	196			30,000	●
50	-	38	203			38,000	●
63	-	48	235			48,000	●
80	-	60	250			60,000	●
100	-	75	260			75,000	●



# SENSO 3000

## CLAMPING FORCE FOR HYDRAULIC CHUCKS

The hydraulic clamping technology is a well-known, proven and reliable method for the clamping of tools. Thanks to its completely closed design the system is sealed and impervious, requires extremely low maintenance and guarantees longevity. Following many years of general use, however, thermal and mechanical influences can lead to a reduction in clamping force. The result can be a poor tool life and a diminished surface quality including expensive tool breakages during machining operations.

Determining the loss of clamping force was until now extremely costly and inaccurate. It involved either determining the number of clamping screw rotations or the torque with the assistance of a proofing bar and a torque key or the expansion rate applying an accurate internal measuring instrument.

The new Guhring SENSO 3000 measuring instrument offers a precise, quick and simple as well as consistent method of measuring the clamping force. An added advantage is the mobility of the system, i.e. for measuring within machines and fixtures.

SENSO 3000 determines the clamping force of the hydraulic chuck via a pressure sensitive plug gauge. The entire length of the plug gauge is clamped in the hydraulic chuck so that when tightening the clamping screw the clamping pressure of the chuck is optimally applied. The clamping force measuring instrument displays the clamping force as an absolute measurement value on the one hand and as a percentage clamping force in relation to a reference value that can be

set individually on the other. This way, SENSO 3000 can be adapted to customer specific application conditions and requirements.

The clamping force measuring instrument is supplied with a plug gauge for the respective clamping diameter as well as a carbide proofing bar for calibration purposes and a CR 2430 type battery – all in a sturdy and handy case.



Senso 3000

### Scope of delivery

- supplied respectively with measuring arbor, carbide proofing arbor, battery and case



clamping diameter mm	Guhring no. 4038	
	Code no.	Availability
6.0	6,000	●
8.0	8,000	●
10.0	10,000	●
12.0	12,000	●
14.0	14,000	●
16.0	16,000	●
18.0	18,000	●
20.0	20,000	●
25.0	25,000	●
32.0	32,000	●

# GUHRING REPAIR SERVICE

Save through maintenance!

Costings prove: inspection and repair is profitable!

Insufficient clamping force of hydraulic chucks can have disastrous consequences: poor cutting rates and tool life of the clamped tools, reduced surface quality of the machined workpiece and breakage of tool, holder and workpiece. Our test measurements show: one in 10 chucks displays a loss in clamping force!

Regular hydraulic chuck clamping force inspections can protect against such unwelcome and expensive consequences. Therefore, we provide a new service to ensure optimum performance of you hydraulic chucks - from any manufacturer:

### 1. Professional clamping force inspection

The measurement is taken quickly, without exertion of force and in the machine or equipment at your premises for your production with Guhring's SENSO 3000 clamping force measuring instrument.

### 2. Our repair service

If the existing clamping force is insufficient, we check the cause of the loss in clamping force, replace the necessary components, re-fill the hydraulic system and carry out a final inspection.

### 3. New hydraulic chucks

If the hydraulic chuck is irreparable, we will offer you a new hydraulic chuck from our current Guhring GM 300-program!



For further information regarding Guhring's hydraulic chuck repair service please contact your regional Guhring representative.



# SENSO-SHRINK 3000

## CLAMPING FORCE FOR SHRINK FIT CHUCKS

With SENSO-SHRINK 3000 Guhring offers a clamping force measuring instrument for shrink fit chucks. SENSO-SHRINK 3000 simply, quickly and accurately determines the clamping force of the shrink fit chuck by measuring the bore volume on your premises. The measuring result displayed by SENSO SHRINK 3000 is the deviation percentage from the nominal value of a reference chuck. Measuring results in a range between 95 % and 105 % indicate optimal clamping of the tool.



**90 %**

< 95 %:  
bore worn  
or widened,  
therefore clamping force too small

**100 %**

95 % ... 105 %:  
optimal clamping force

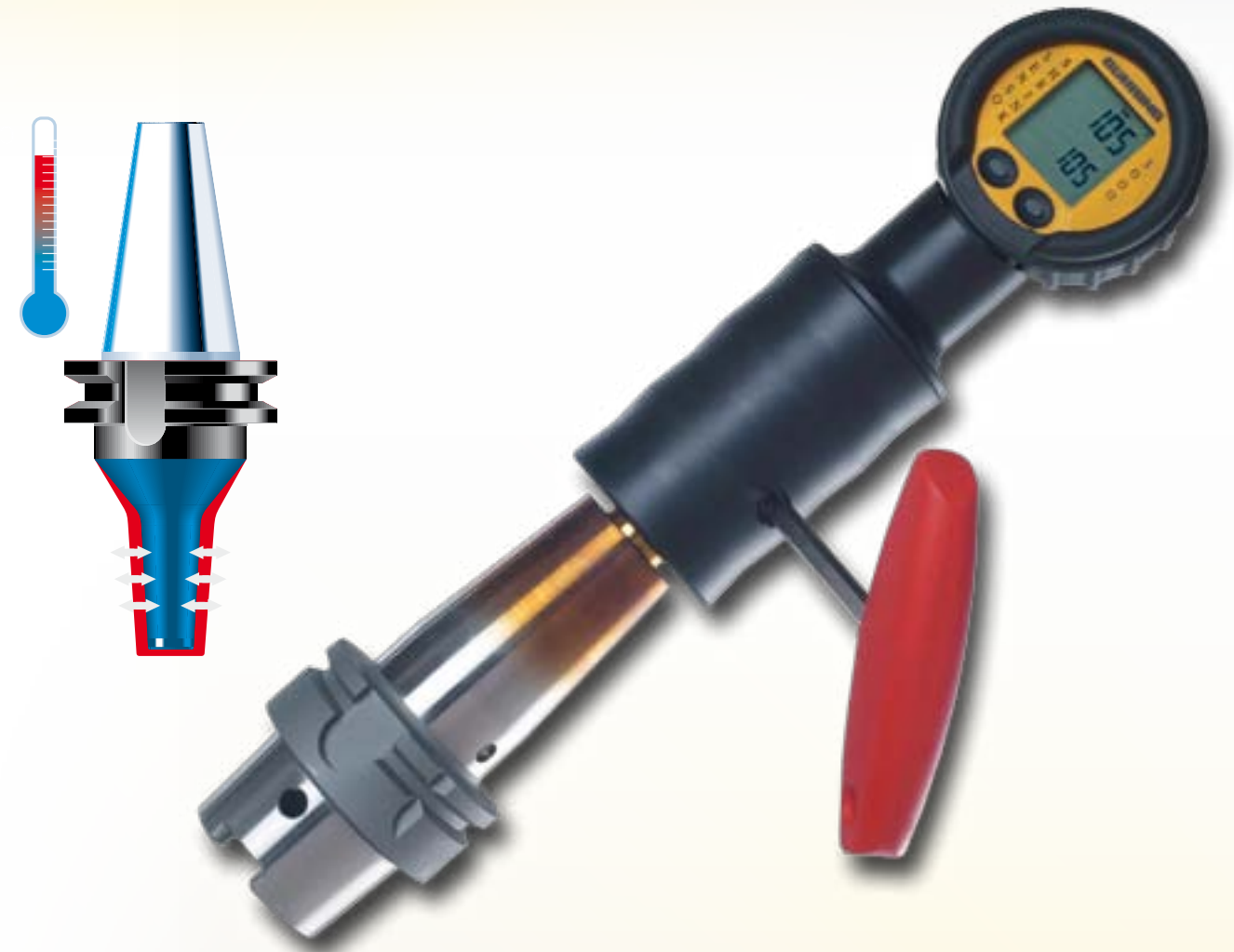
**110 %**

> 105 %:  
bore too small,  
shrink fit ability endangered, i.e. through  
overheating during shrink fitting or  
deformation

## SENSO-SHRINK 3000 OFFERS THE USER THE FOLLOWING BENEFITS:

- simple, quick and accurate measuring of the shrink fit chuck clamping force directly on your premises
- early recognition of wear and incorrect handling of shrink fit chucks
- considerable increase of process reliability during use
- quality assurance of overall system: tool, chuck and tool holder
- wireless system, providing reproduceable measuring data at any time

An optional data interface enables the documentation of measuring results and further evaluations on a PC.



### Technical Data:

Measuring range: 70 % to 130 %  
Tool diameter range: 6, 8, 10, 12, 14, 16, 18, 20, 25, 32 mm  
Power supply: battery

### SENSO-SHRINK 3000 consists of:

- clamping force measuring instrument with proofing bar for the respective clamping diameters
- data interface and PC software are optional



# PQ 3000

## COOLANT PRESSURE AND VOLUME

Guhring's PQ 3000 enables quick and simple measuring of pressure and volume of coolant flow directly in the machine using the actual tool applied.

Guhring has developed the PQ 3000 instrument for quick, simple and direct measuring of the existing coolant pressure and rate of flow for tools with internal cooling.

PQ 3000 enables the measuring of pressure and rate of flow of coolant when the actual tool is clamped directly



in the stationary tool spindle. This way, it is possible to establish the real conditions of the relevant machine and tool configuration and measure the resulting actual rate of flow.

PQ 3000 provides the following information:

- pressure and volume flow of the coolant pump, the so-called P/Q characteristic curve
- possible pump or seal wear as well as rotary transmission losses
- possible narrowed cross sections in the line through machine, spindle and tool holder
- possible blocked filters
- possible narrowed cross sections resulting from deposits on the surface of the coolant ducts in the tool
- the coolant duct layout in the tool.

to identify and rectify possible weak points in the overall system, this way, the tool life of the applied tool can be optimised preventing tool breakage as well as chip congestion and jamming!

PQ 3000 provides data of sensors and indicates the measuring results on the display fixture. A data interface enables an evaluation via software on your PC (interface and software are available on request).

### PQ 3000

#### Product information

- pressure checking range: 1 to 120 bar
- rate of flow checking range: 2 to 40 l/min
- diameter holder shank: 16 mm
- diameter range tool holder: ER 32 / 6 to 20 mm
- display for existing pressure P in bar also rate of flow volume Q in l/min

#### Scope of delivery

- clamping fixture and checking instrument
- display fixture with grip and connection socket
- checking data cable with connector plug, length 3 m
- ER 32 collet holder and sealing washer set for standard shanks with collets from 6 to 20 mm diameter
- clamping key for tensioning nut



Guhring no.	4068	
Discount group	Net price	
	Code no.	Availability
case complete	10,000	●
interface and PC-Software		on request

# CC 3000 FILTERING EFFICIENCY OF THE COOLANT SYSTEM

With Guhring's CC 3000 you can quickly and simply check the filtering efficiency of the coolant system.

Guhring has developed the inspection instrument CC 3000 for quick, simple and direct check of the coolant filtering efficiency.

Thanks to replaceable stainless steel filters, the user can adapt the instrument specifically to the filtering of the coolant system. CC 3000 establishes the present condition of the individual system and displays the actual filter efficiency.

In order to analyse and rectify possible weak points of the filter system, the following information is provided:

- perfect operation of the coolant filtering system
- defective filters
- insufficient filtering for the applied tool

In addition, it is possible to determine the oil concentration of the applied soluble oil with the included refractometer.

Thus, it is possible to optimise the tool life of the applied tool, to prevent tool breakage and subsequent production stoppage!



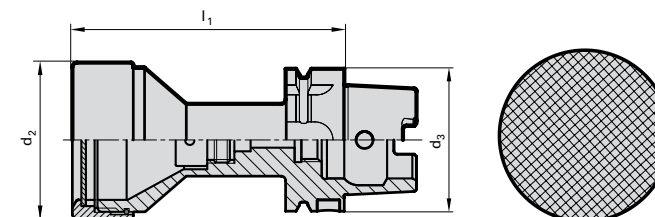
### CC 3000

#### Product information

- range of application 50 - 500 min-1
- suitable for coolant pressure up to 80 bar

#### Scope of delivery

- inspection instrument with HSK 63-A interface
- high-grade steel filter sizes 100, 200 and 300 µm
- refractometer including accessories
- magnifying glass, 8-fold magnification
- coolant delivery set guhring no. 4949 code 18,063
- order high-grade steel filter size 60 µm separately



Guhring no.	4076		4077	
Discount group	Net price		Net price	
	Code no.	Availability	Code no.	Availability
case complete	10,063	●		
high-grade steel filter size 60, Guhring no. 4077			60,000	●
high-grade steel filter size 100, Guhring no. 4077			100,000	●
high-grade steel filter size 200, Guhring no. 4077			200,000	●
high-grade steel filter size 300, Guhring no. 4077			300,000	●



# MQL-CHECK 3000

## COOLANT VOLUME AND REACTION TIME WITH MQL

The development of Guhring's new MQL-Check 3000 allows simple and quick measuring of the coolant volume and the reaction time with minimal quantity lubrication (MQL) directly at the tool point. For the user, the result is a considerable increase in process reliability with MQL machining.

Especially with minimal quantity lubrication, an optimal delivery of the minimal coolant volume to the cutting edge is paramount. An insufficient delivery or a delayed response time respectively can lead to fatal results such as premature wear, a deterioration in machining quality or even tool breakage. In contrast, an excessive coolant volume results in increased costs through unnecessary coolant consumption and additional cleaning expense for components or machines as well as an unnecessary impact on the environment and personnel.

Until now, measuring the coolant volume exiting at the tool point was practically impossible. With the MQL-Check 3000, Guhring is for the first time offering a simple to operate measuring instrument for quickly checking the coolant volume directly at the tool point. MQL-Check 3000 is simply installed in the machine, the tool point is passed into the measuring opening of the measuring unit and the coolant delivery switched on. The measuring unit of the MQL-Check 3000 sends the recorded data wireless to the associated display equipment, on which the resulting values are displayed in ml/h. Furthermore, the data interface on the display facility allows the transfer of the data to a PC as an option, making further evaluations and above all the documentation of the measurements possible.



### Subsequently, the user benefits from:

- simple, quick measuring of the coolant volume directly at the tool point
- ascertaining the actual response time, i.e. the time from starting the system to the coolant exiting at the tool point
- reproduceable and at any time comparable measuring data
- a workshop suitable system, wireless operation - in terms of power supply as well as data transfer
- comparative measuring regarding function of MQL equipment, machine, spindle, tool holder and tool

## MQL-CHECK 3000 CONSISTS OF:

- ⇒ measuring unit incl. sender and magnetic base for installation with horizontal machining
- ⇒ display facility with receiver
- ⇒ measuring filter for measuring range up to 12 ml/h, up to 30 ml/h and up to 60 ml/h

Data interface and PC software are available as an option.



### Technical Data

Measuring range:	5 to 60 ml/h
Tool diameter range:	3 to 20 mm
Measuring position:	0 to 90° (vertical and horizontal machining)
Power supply:	battery

DRILLING

TAPPING/THREAD MILLING/  
FLUTELESS TAPPING

MILLING

REAMING

PCD



SPECIAL TOOLING  
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MODULAR TOOLING  
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TOOL RESTORATION SERVICE

# GUHRING

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