Superior Clamping and Gripping

SCHUNK®

T|E|N|D|O® E compact

The Universal Hydraulic Expansion Toolholder







Henrik A. Schunk, Kristina I. Schunk and Heinz-Dieter Schunk

Top Performance in the Team

SCHUNK is the world's No. 1 for clamping technology and gripping systems – from the smallest parallel gripper to the largest chuck jaw program.

In order to boost efficiency, SCHUNK customers have bought more than 2 000 000 precision toolholders, 1 000 000 gripping modules, and 100 000 lathe chucks or stationary workholding systems so far.

This makes us proud and spurs us to attain new top performances.

As a competence leader, we recognize and develop standards with a large potential for the future, which will drive the rapid progress in many industries.

Our customers profit from the expert knowledge, the experience and the team spirit of more than 1800 employees of our innovative family-owned company.

The Schunk family wishes you improved end results with our quality products.

Heinz-Dieter Schunk Henrik A. Schunk Kristina I. Schunk

Sensational!
Torque is now up to 900 Nm (Ø 20 mm) and 2000 Nm (Ø 32 mm)



TENDO® E compact

The Universal Hydraulic Expansion Toolholder for volume machining, drilling, reaming and tapping!

Tighter tolerances, lower manufacturing costs, better quality – TENDO E compact is the answer to the increasing demands of volume machining, which can't be done by ER collet chucks, heat shrink toolholders, Weldon mountings, or cheap hydraulic expansion toolholders anymore.

SCHUNK packed all high-performance parameters into the new hydraulic expansion toolholder and has achieved a modern toolholder which surpasses all the requirements of volume machining.

TENDO E compact comes at an amazing price, which helps facilitate the change from a mechanical or heat shrinking toolholder to a high-precision TENDO-quality toolholder.

- Highest torques, now of up to 900 Nm at a Ø 20 mm with dry clamping conditions, 520 Nm in oily conditions
- Highest torques, now of up to 2000 Nm at a Ø 32 mm with dry clamping conditions, 900 Nm in oily conditions
- Permanent run-out and repeat accuracy of less than 0.003 mm
- The all-rounder for milling, drilling, reaming and tapping
- Increases tool life of up to 40 %, which results in huge savings
- Tool change within seconds without peripheral equipment
- Clamping to the "dead stop"
- Excellent cost-performance ratio



The toolholder for almost every requirement

TENDO E compact is setting completely new standards. A strong performance during torque transmission, damping characteristics, rigidity and run-out accuracy, the TENDO E compact is perfect for precise and fast metal cutting – even for roughing applications.

1 Volume machining

TENDO E compact is the first hydraulic expansion toolholder, which is suitable for volume machining e.g. 400 cm³/ min (25 in³/min) with 42CrM04 (4140)*.
* depending on the machine tool and the tool

2 Reaming

During reaming the excellent vibration damping assures best workpiece surfaces and a permanent run-out accuracy for an excellent dimensional accuracy.

3 Drilling

Drilling – the classic strength of the TENDO-family. Vibration damping and a run-out accuracy of less than 0.003 mm are the main points of interest for the TENDO E compact.

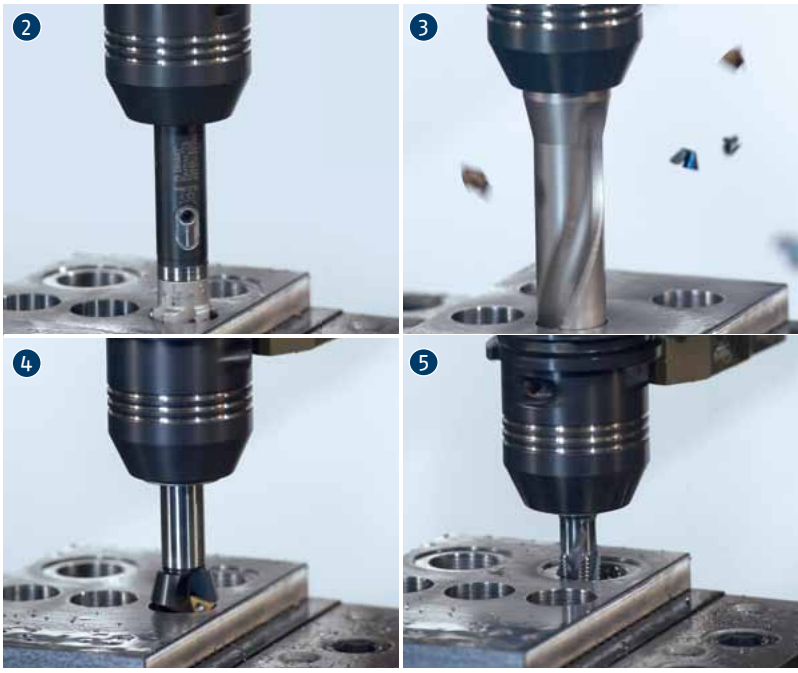
4 Countersinking/Chamfering

By using TENDO E compact, countersinking and chamfering are defined by precision and excellent run-out accuracy.

5 Tapping

At high torques (of up to 900 Nm at Ø 20 mm) and excellent vibration damping, the TENDO E compact was made for tapping.





Practical tests surprised experts



“Compared with a Weldon, service life of the tools increases by 30 to 35 % with the TENDO E compact.”

“The high clamping force is amazing to watch.“

Raimund Dinyer, Project Manager, and Andreas Scheuermann, cutting machine operator, Invenio GmbH Engineering Services, Nauheim, Germany



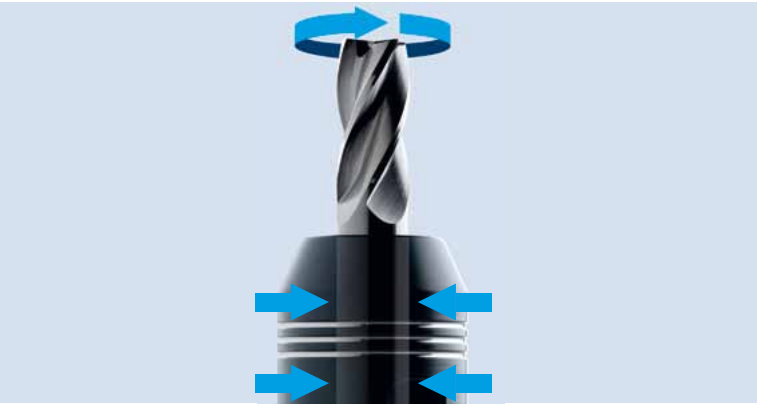
“I never dared to believe that such holding forces could be achieved by a hydraulic expansion toolholder. Nothing slips during machining, the new hydraulic expansion toolholder holds firmly.”

Jörg Kleemann, CEO of WKL NC-Technik GmbH, Bad Salzuflen, Germany

“The TENDO E compact absorbs the vibrations during rough machining. We wish we could have had rough machining like this in the past.”

Anton Schönfelder, CEO of SLZ Maschinenbau GmbH, Hanau, Germany

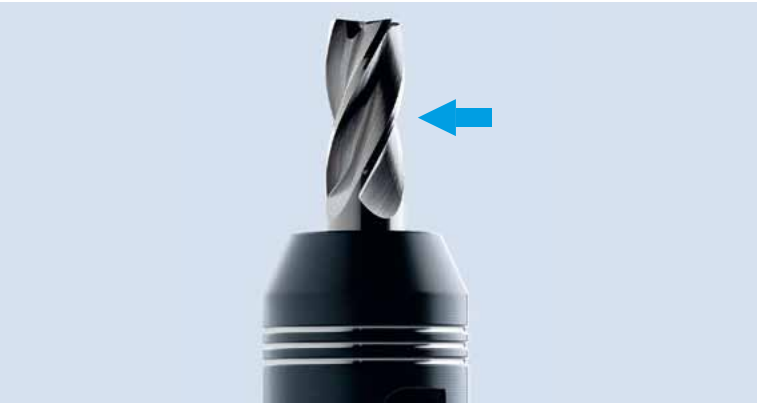




High torque of up to 900 Nm (Ø 20) and 2000 Nm (Ø 32) for highest volume machining

Due to the compact design, holding forces and a high torque transmission are guaranteed.

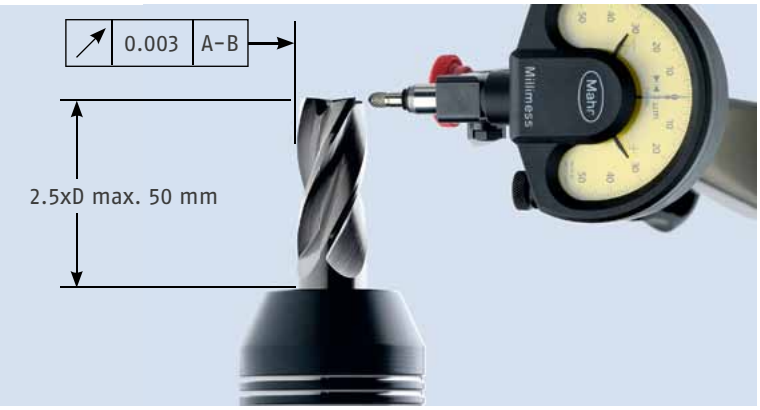
Your benefit:
highest material removal rate.



High radial rigidity for a better part geometry accuracy

The optimum radial rigidity resulting from a robust toolholder body, avoids lateral deflection during metal cutting.

Your advantage:
high part accuracy geometry at the workpiece and the highest material removal rates e.g. 400 cm³/min (25 in³/min) with 42CrM04 (4140)*.
* depending on the machine tool and the tool



Permanent run-out accuracy of less than 0.003 mm – without any fluctuations

This assures best surface results due to a uniform cutting action and highest reproducibility.

Your advantage:
safe and precise machining.



Excellent vibration damping

The hydraulic system absorbs vibrations, assures smooth running, and the best workpiece surfaces.

Your benefit:
high surface quality, the machine spindle is protected from damage, and service life is increased.

Tool change within seconds, micron-precise without peripheral equipment. Just screw to the dead stop

Easy handling. Turn in the actuation screw with an Allen key to the dead stop. The clamping results in a run-out accuracy of less than 0.003 mm without the need for additional peripheral equipment.

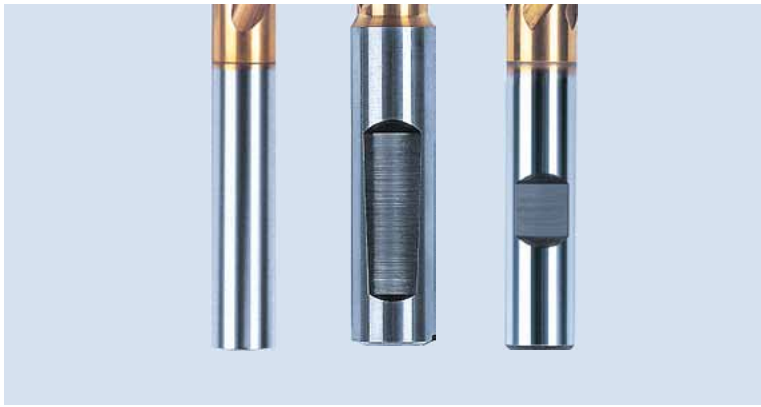
Your advantage:
time savings due to reduced set-up times and no investment costs for additional clamping devices.



All shaft types can be clamped

With TENDO E compact all customary tools (Ø 3 to 32 mm) with a smooth cylinder shank as well as recesses according to DIN 1835 Form B, E and DIN 6535 Form HB, HE can be clamped directly with or without intermediate sleeves.

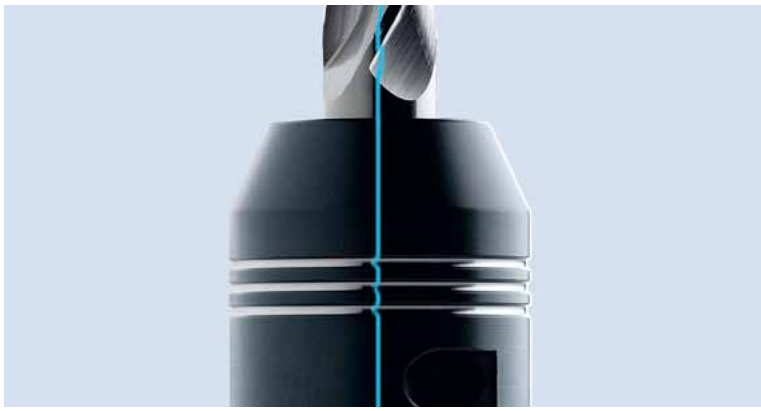
Your advantage:
no additional costs for new tools.



Suitable for HSC/HPC machining – precision-balanced as standard

With a balancing grade G 2.5 at 25000 rpm, the HSK-A63 version for high speeds is perfectly suitable for HPC/HSC machining centers.

Your advantage:
perfect for HSK high speed spindles.



Maintenance-free

The sealed system of the TENDO E compact blocks the penetration of dirt, coolant, lubricants or chips. The clamping area will not be damaged and proper function is guaranteed.

Your advantage:
maintenance-free and a long service life.



TENDO® E compact in Details

Innovative Hydraulic Expansion Technology

1 The actuation screw
The actuation piston is moved with the actuation screw and can be tightened to a dead stop without a torque wrench.

2 The actuation piston
The actuation piston compresses the hydraulic fluid into the chamber system.

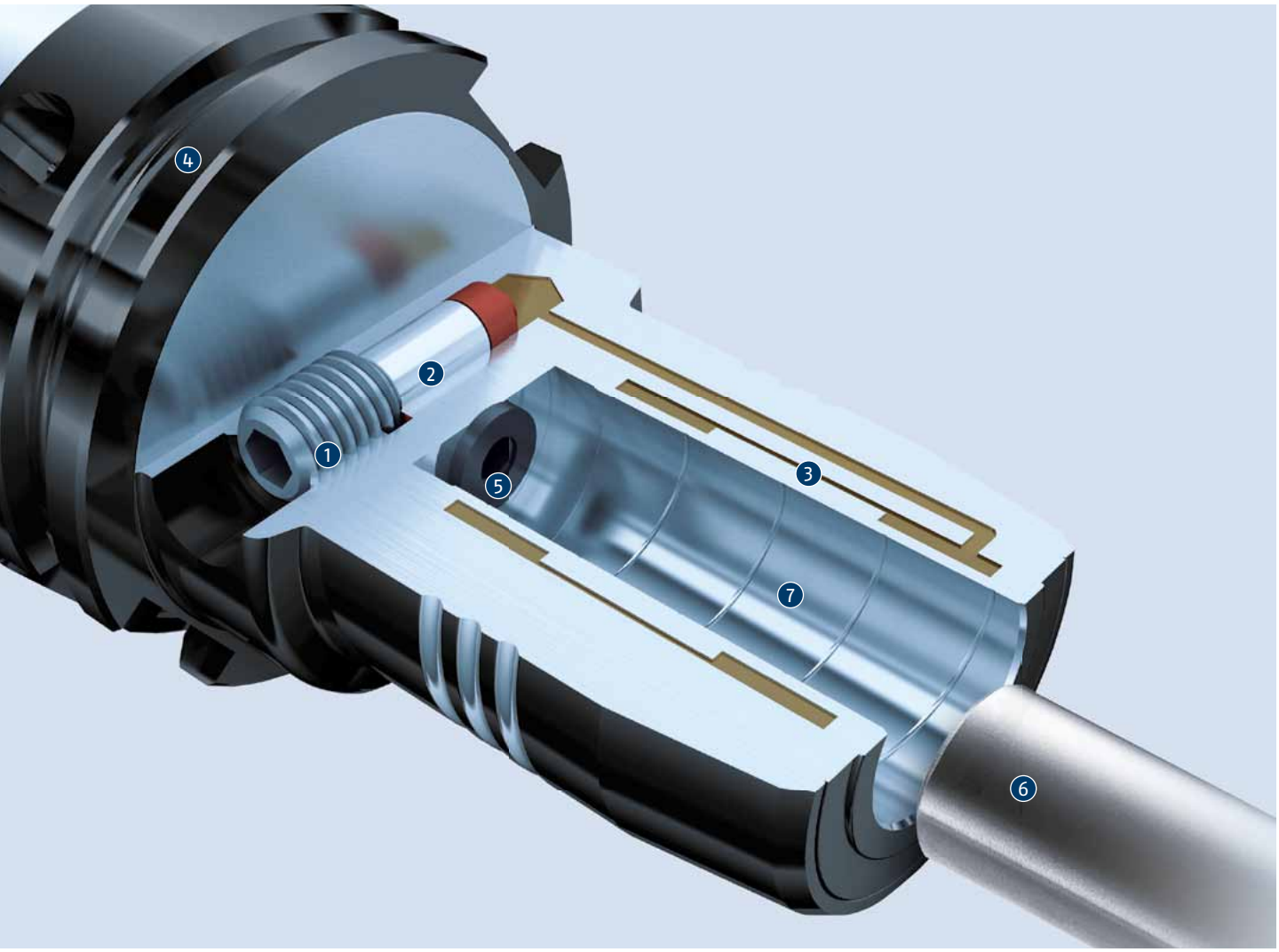
3 The expansion sleeve and chamber system
The expansion sleeve expands against the tool shank. This clamping process first centers the tool shank before fully clamping it over the whole surface. The chamber system fills with hydraulic fluid, exerting a damping effect on the clamped tool. Wear on the cutting edge of the tool is minimized, service life is increased by up to 40 %.

4 The toolholder body
The toolholder body includes the machine interface, e.g. HSK, SK, JIS-BT, CAT, etc.

5 The length adjustment screw
For fast and easy presetting.

6 The tool
The tool is clamped centrically to the center axis – highest run-out and repeat accuracy of less than 0.003 mm

7 The groove
The enormous clamping pressure of the TENDO hydraulic expansion toolholder creates a displacement of oil, grease, or lubricant residues into the goove causing surfaces to remain dry.



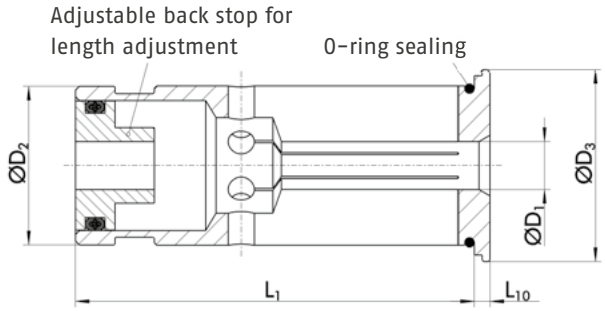
Intermediate sleeves GZB-S



Flexible clamping areas through intermediate sleeves

SCHUNK intermediate sleeves allow the clamping of several different diameters with just one toolholder, which is standard for all SCHUNK toolholders. The GZB-S uniform intermediate sleeves are available in two versions: coolant-tight and with innovative peripheral cooling. Both can be used in the SCHUNK toolholder systems **TENDO**, **TRIBOS** and **SINO-R**.

Your advantage:
reduction of the purchase cost and higher clamping force at shaft diameter.





The tool length can be adjusted flexibly via a moveable intermediate piece.



Optimized coolant emission: GZB-S 20/16 peripheral cooling combined with a TENDO E compact

1 coolant-proof up to 80 bar 2 with peripheral cooling

TENDO® E compact in Comparison

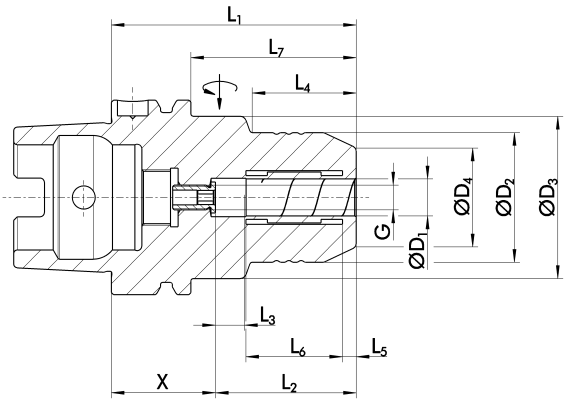
Characteristics	TENDO E compact	ER collet chucks	Weldon	Heat shrinking toolholders
Run-out accuracy – Even cutting action – Influences damping and balance grade – Cost reduction	++ 0.003 mm (measured at 2.5 x D permanent)	– 0.01 – 0.02 mm	– 0.01 – 0.02 mm	+ 0.003 mm (measured inside the bore hole)
Process reliabilty – Permanent run-out accuracy	++	–	–	–
Torque at Ø 20 mm – Highest volume machining – Process reliability	++ up to 900 Nm	○ 220 Nm	++ Form-fit clamping	+ 420 Nm
Radial rigidity – Higher part geometry accuracy at the workpiece at rough machining – Lower cost for remachining	++	–	++	–
Damping – Increased tool service life – Prevents the machine spindle from damage – Lower costs – for remachining – Avoiding chatter marks	++	○	–	–
Flexible by using intermediate sleeves – Enlarged field of applications – Cost reduction – Higher clamping force at given shafts – Peripheral cooling	++	++ (Collet chucks)	–	–
Clamping of all shafts (Weldon, Whistle Notch, ...)	++	++	–	–
Handling and Operability – No operator training necessary – Avoids clamping errors – Low set-up costs	++	+	+	–
Resistant to dirt – No maintenance – Lower costs	++	–	+	–
Exact length pre-adjustment	++	–	–	–
Necessary peripheral equipments (regarding costs)	++ Allen key	○ Hook wrench + assembly device	○ Allen key + assembly device	– Induction unit

++ very good + good ○ neutral – bad

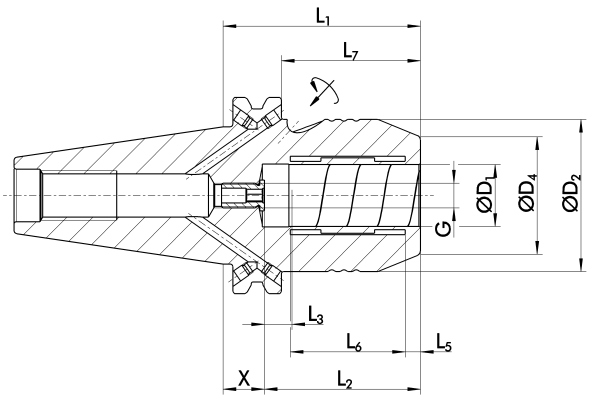
Summary: TENDO E compact combines all the performance parameters.

Technical Data

HSK-A63 / HSK-A100**



SK40 / BT30* / BT40 / SK50 / BT50 / CAT40 / CAT50



Mounting	ID	D1	D2	D3	D4	L1	L2	L3	L4	L5	L6	L7	X	G
HSK-A63	0206404	12.0	42.00	52.50	32.00	80.00	46.00	10.00	34.00	4.50	31.00	54.00	34.00	M8x1
SK40	0206414	12.0	42.00	–	32.00	50.00	46.00	10.00	–	4.50	31.00	31.00	4.00	M8x1
SK50	0206424	12.0	42.00	–	32.00	50.00	46.00	10.00	–	4.50	31.00	31.00	4.00	M8x1
BT30*	0206554	12.0	42.00	–	32.00	69.00	46.00	10.00	–	4.50	31.00	47.00	23.00	M8x1
BT40	0206434	12.0	42.00	–	32.00	58.00	46.00	10.00	–	4.50	31.00	31.00	12.00	M8x1
BT50	0206444	12.0	42.00	–	32.00	69.00	46.00	10.00	–	4.50	31.00	31.00	23.00	M8x1
HSK-A63	0206456	3/4"	53.00	–	38.00	80.00	51.00	10.00	–	5.00	37.00	54.05	29.00	M8x1
HSK-A63	0206406	20.0	52.50	–	38.00	80.00	51.00	10.00	–	5.00	37.00	54.00	29.00	M8x1
HSK-A100**	0206566	20.0	52.50	–	38.00	90.00	51.00	10.00	–	5.00	37.00	61.05	39.00	M8x1
SK40	0206416	20.0	49.25	–	38.00	64.50	51.00	10.00	–	5.00	37.00	45.50	13.50	M8x1
SK50	0206426	20.0	49.25	–	38.00	64.50	51.00	10.00	–	5.00	37.00	45.50	13.50	M8x1
BT30*	0206556	20.0	42.00	–	38.00	90.00	51.00	10.00	–	5.00	37.00	47.00	39.00	M8x1
BT40	0206436	20.0	49.25	–	38.00	72.50	51.00	10.00	–	5.00	37.00	45.50	21.50	M8x1
BT50	0206446	20.0	49.25	–	38.00	83.50	51.00	10.00	–	5.00	37.00	45.50	32.50	M8x1
CAT40	0206466	3/4"	49.25	–	38.00	64.50	51.00	10.00		5.00	37.00	45.45	14.00	M8x1
CAT40	0206486	20.0	49.25	–	38.00	64.50	51.00	10.00	–	5.00	37.00	45.45	14.00	M8x1
HSK-A100**	0206568	32.0	72.00	–	58.50	100.00	61.00	10.00	–	6.00	44.00	71.05	39.00	M8x1
SK50	0206428	32.0	72.00	–	58.50	81.00	61.00	10.00	–	6.00	44.00	62.00	20.00	M8x1
BT50	0206448	32.0	72.00	–	58.50	90.00	61.00	10.00	–	6.00	44.00	52.00	29.00	M8x1
CAT50	0206478	1 1/4"	72.00	–	58.50	81.00	61.00	10.00	–	6.00	44.00	61.95	20.00	M8x1
CAT50	0206498	32.0	72.00	–	58.50	81.00	61.00	10.00	–	6.00	44.00	61.95	20.00	M8x1

* coolant supply for BT 30 according to DIN 69871 AD ** available as of the 3rd quarter of 2012

Subject to change without notice.

Add to your order: RGG Cleaning Unit

The simple way to clean. The RGG Cleaning Unit from SCHUNK is designed for cleaning workpieces and the interior machine room with air or coolant. It fits on every conventional tool mounting with a clamping diameter of 20 mm and reduces down-time. Six jets release air or coolant out of the ball head, which is pressed out of the tool mounting from a bore in the shaft of the cleaning unit. While the machine spindle is moving, the head can rotate to every corner of the machining area.



Suitable for all SCHUNK tool mountings*

*except heat shrinking

Toolholding systems

THE ORIGINAL WITH THE THREE RINGS

TOTAL TOOLING

In order to reach perfect results faster and more precise, numerous companies choose SCHUNK for Toolholders, Gripping Systems, Rotary and Linear Modules or customer specific applications. Precision does not allow for any compromises. And this is exactly where SCHUNK kicks off with its TOTAL TOOLING program.

The innovative and high-precision toolholding systems in our TOTAL TOOLING program cover a unique range of customer requirements and machining tasks. This is for your benefit. Because of our program variety we are not merely preoccupied with the toolholder. Instead, we focus on your particular application and objectively determine the optimal toolholding system for your tasks.

TOTAL TOOLING – for the benefit of our customer.



Request our catalog for Toolholding Systems now.

SCHUNK Toolholding systems



TENDO Hydraulic Expansion Toolholders

"The original" **TENDO** is the technological leader of hydraulic expansion toolholders from SCHUNK – universal in use, efficient and absolutely precise. Profit from the unique features of the **TENDO** family: **TENDO** with consistent run-out and repeat accuracy of <0.003 mm for roughing, drilling, reaming and finishing.



TRIBOS Polygonal Clamping

With the **TRIBOS** polygonal technology, SCHUNK offers a tooling system with a flexible and comprehensive spectrum of applications – from heavy-duty cutting to micro cutting. Excellent features of centric run-out of 0.003 mm result in longer lifetime and better surface quality. **TRIBOS** polygonal clamping technology is suitable for HSC and tested up to 205 000 rpm.



SINO-R Expansion Toolholders

With **SINO-R**, SCHUNK designed a universal toolholder for a wide variety of purposes based on expansion technology. The expansion toolholder **SINO-R** has superior performance in regards to quality, flexibility and cost saving towards the conventionally used tooling systems such as Weldon, Whistle Notch, or ER collet chucks. **SINO-R** is ideally suitable for heavy-duty cutting. The tool is clamped with superior torques up to 850 Nm (tool shank Ø 32.0/quality h6).

Exceptional precision from the competence leader for clamping technology and gripping systems.

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