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**RÖHM** в России.

**RÖHM** – всемирно известный разработчик и производитель зажимных приспособлений для металлообрабатывающей промышленности и робототехники. Благодаря неизменно высокому качеству и новаторским решениям, продукция RÖHM находит применение в самых разных отраслях экономики.



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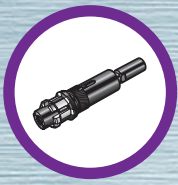
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efficient.

# Tool Clamping Systems <sup>2013/2014</sup>

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**RÖHM**  
driven by technology

## TOOL CLAMPING SYSTEM

### Micro spindle

Micro spindle ..... 8004

### Pull-in force measurement device

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### HSK Automatic clamping set

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## Tool clamping systems

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# Operation Guide

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Clamping set	hollow taper page 8004 direct mount page 8004	high-speed page 8008 standard page 8009 retaining collet page 8010	standard page 8026
Clamping system / Actuation	Complete system 	Clamping system without spring SUPER LOCK 	Clamping system without spring SUPER LOCK 
	pneumatical page 8004  	hydraulic page 8015  	hydraulic on request  
		electrical page 8014  	electrical on request  
		pneumatically on request  	pneumatically on request  
		Clamping system with spring Stationary actuated 	Clamping system with spring Stationary actuated 
		hydraulic page 8017  	hydraulic on request  
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		pneumatically on request  	pneumatically on request  
Fluid supply		Clamping system with spring integrated actuation 	
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# Operation Guide

Interface	SK page 8027	Clamping heads page 8037
Clamping set	DIN page 8028 MAS-BT page 8028 ANSI page 8028	
Clamping system / Actuation		Clamping heads
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	Clamping system with spring integrated actuation	
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## legend:



hydraulic actuated



electrical actuated



pneumatically actuated



spring actuated


self-locking  
mechanism

stationary  
actuation unit

integrated  
actuation unit

## Overview

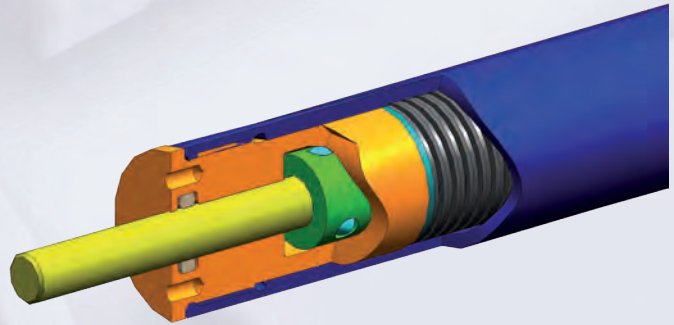
RÖHM micro spindles are especially suitable for the machining at high turning speeds. Micro spindles combine latest clamping technology in smallest construction space.



### Clamping set option 1:

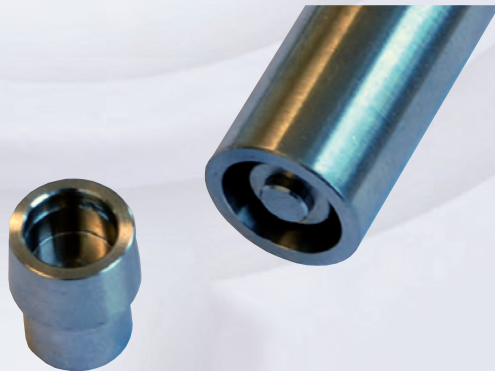
Tool direct mounting

- no additional tool adapter necessary



### Technical features of both clamping set options:

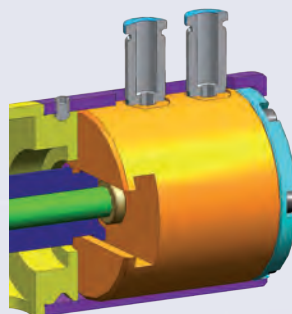
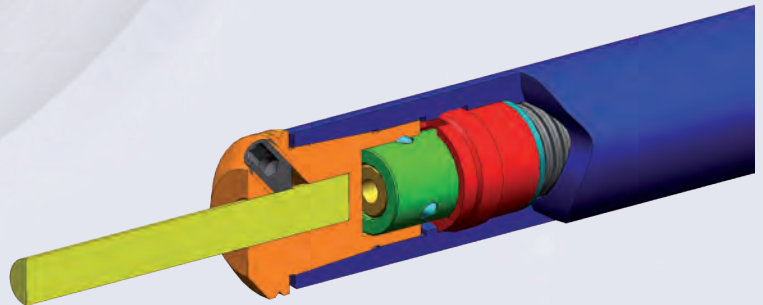
- depending on the clamping set option, the tool can be clamped directly or via taper
- short design for limited construction space
- smallest outer diameter of the spindle 10 mm
- shortest spindle length 40 mm
- smallest tool diameter via direct mounting 3 mm
- easy mounting from the front
- Replacement of the complete clamping unit in a few simple steps



### Clamping set option 2:

Tool clamping via taper

- various tool forms can be clamped by one interface



### Release unit:

The clamping set options, shown on this page can be combined with a release unit for automatic tool change.

No loading of the spindle bearing during the release process due to an internal power intensification between spindle and release unit.



## F-senso

The F-senso pull-in force measurement device enables you to check the pull-in force of your tool clamping system. The regular monitoring of the pull-in force makes it possible to detect changes in the clamping strength before they have an effect on the quality of processing.



### Product features:

- interchangeable attachments for HSK, PSC and steep-angle taper
- exact tool contour supports automatic change of the tool by the tool changing system
- revolving ring with gradations for simulating the tolerances of tool and spindle
- the last displayed readings are saved, and are shown when you switch the device on again
- automated switch-off
- long operating times thanks to optimised electrical components and 9V block battery
- compact design
- ergonomically designed handle

Coming with a suitable attachment for HSK, PSC or steep-angle taper, the measurement device is pulled into the spindle taper of your processing unit and so measures the pull-in force exactly. As the pull-in force of the tool clamping system has a crucial effect on the processing quality as well as having implications for safety, we recommend regular checks. Only in this way changes in the pull-in force can be detected at an early stage and counter-measures can be taken accordingly.

### Delivery includes:

- pull-in force measurement device F-senso 10-80 kN, Item no. 1255729
- battery and mounting bar
- delivered in a practical case with foam material, with space for additional adapter

### Adapter for F-senso

	Adapter Item no.
HSK-A 50	1255738
HSK-A 63	1255739
HSK-A 80	1255740
HSK-A 100	1255741
HSK-A 125	1255742

	Adapter Item no.
SK 40	1255744
SK 50	1255745
SK 60	1255746

	Adapter Item no.
PSC 40	1255748
PSC 50	1255749
PSC 63	1255750
PSC 80	1255751



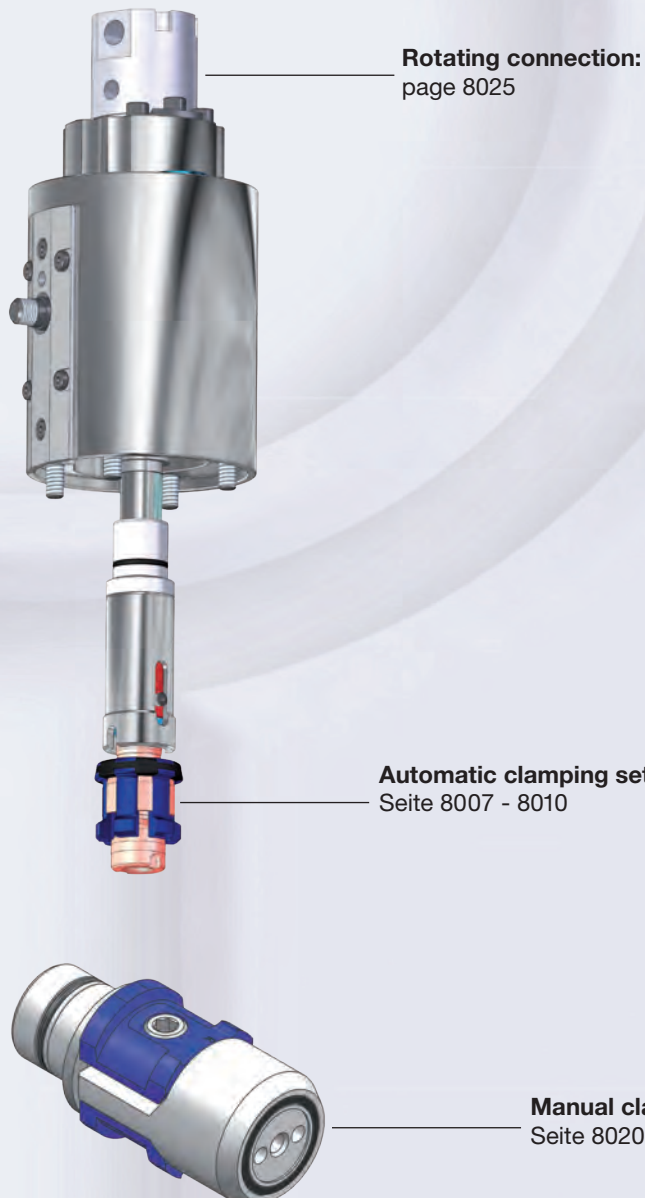
# Overview

The hollow taper shank (HSK) is the latest and worldwide available interface between machine and tool. The various forms from HSK-A to HSK-F and HSK-T are defined in the norms DIN 69893 and ISO 12164

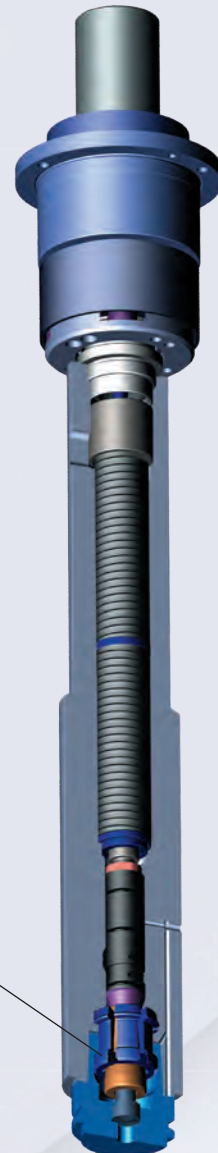
RÖHM offers the suitable clamping system also for your HSK application. For the automatic tool change we recommend the innovative clamping system without springs SUPER LOCK. We offer SUPER LOCK as well as the traditional clamping system with springs in a hydraulically, an electrically and on request a pneumatically actuated version. For the manual tool change we offer HSK built-in clamping sets in various HSK forms.

We would be pleased to design special solutions for your application. Please do not hesitate to contact us!

## Clamping system SUPER LOCK: page 8011



## Clamping system with spring: page 8016





## Technical features

For automatic tool clamping system of positive taper lock tools HSK to DIN 69893

### Advantages:

- Steady clamping force due to the symmetric clamping surfaces of the clamping segments
- Compact power flow resulting in high static and dynamic rigidity of the tool joint
- High power amplification by transmission of the clamping set
- Self-locking effect via the clamping bolt in the clamping set
- Force controlled release of the collet
- Automatic ejection of the tool by the clamping bolt during release
- Sealed central coolant supply system
- Perfect suitable to be built into the spindles of machine tools and machining centers

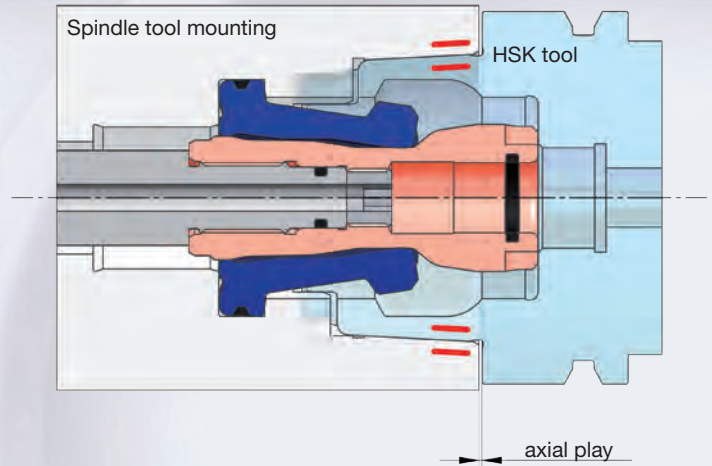
The advantages of the positive taper lock system originates in the combination of defined radial pretensioned taper and tool face stop. A safe transmission of the torque is achieved by the elastic deformation of the taper resulting in a gap-free connection with the tool. High interchanging and repeating accuracy is leading to increased production quality during the machining compared with the traditional machining.

The clamping process is started by the springs and the movement is transmitted to the clamping set by the draw bar, in direction  $F_Z$ . The clamping segments of the collet are pushed to the outside by the clamping bolt. The clamping forces are multiple amplified by the angled arrangement of the contact areas. The produced axial forces  $F_A$  and radial forces  $F_R$  result in a pretension of the positive taper on the entire taper area and, the axial contact area. The proportion of the axial contact force is over 80 % of the total clamping force. This explains the importance of the size of the axial contact area concerning the critical load and rigidity of the taper and hollow shank joint.

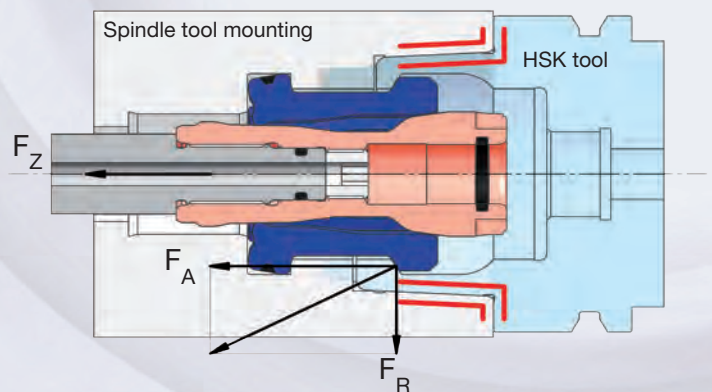
See also DIN 69893 - Hollow taper shanks types B, D and F. Hollow taper shanks types A and C have two additional positive drive grooves at the end of the taper which interlock with the tool mounting and produce a form-locking, orientated radial positioning.

During the release the tool will be positively unlocked and ejected from the tool spindle by the multifunctional clamping bolt and taper sleeve.

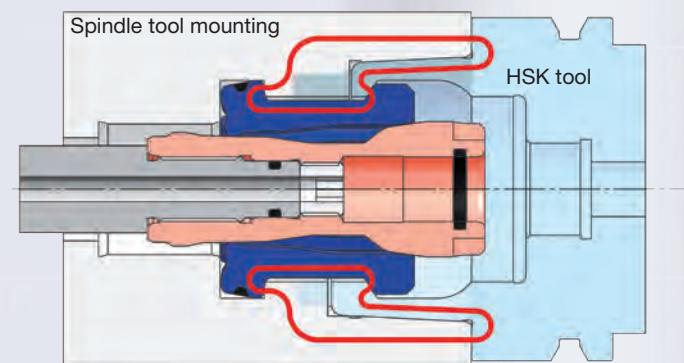
Joining position with locating surface



Clamping situation with locating surface

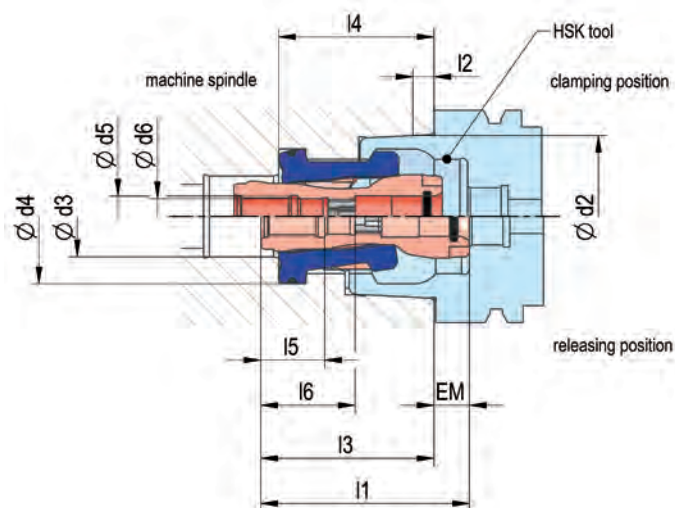


Clamping situation with compact power flow





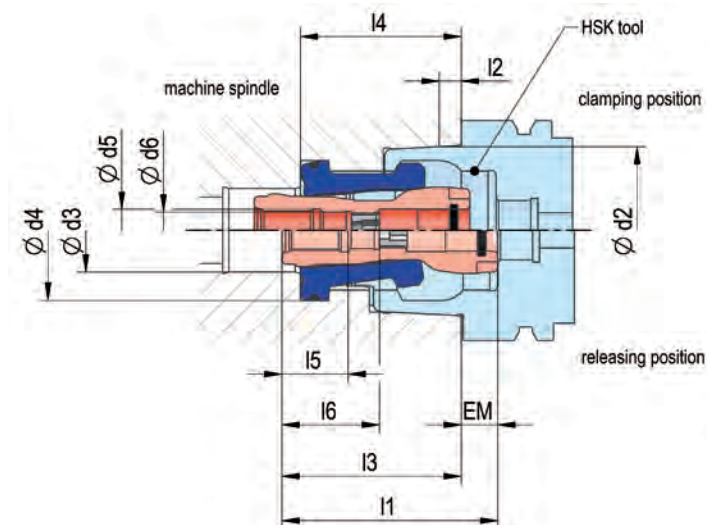
## High Speed - with guided collet



Tool group C 15  
Type 288-64  
**Automatic HSK-Clamping Set  
with guided collet**  
Precise guiding of the clamping  
segments makes this clamping  
set especially suitable for **higher  
speeds.**

Item no.	594332 ●	1035347 ●	1011063 ●	1037501 ●	1015151 ●	474917 ●	462324 ●
Clamping unit HSK	E25/B32	A32/B40	A40/B50	A50/B63	A63/B80	A80/B100	A100/B125
Total stroke	7	9	13	15	14	17	18
Pull-out stroke AM	0,2	0,3	0,5	0,5	0,5	0,5	0,8
Taper Ø d <sub>2</sub>	19	24	30	38	48	60	75
d <sub>3</sub>	10	12	15	18	24	32	40
d <sub>4</sub>	17	21	25,5	32	40	50	63
d <sub>5</sub>	M4	M6x0,75	M8x1	M10x1	M12x1	M16x1,5	M20x1,5
d <sub>6</sub>	4,2	6,5	6,4	8	10,5	14,3	17,5
l <sub>1</sub>	28,8	35,1	42,5	50	62	80	98,5
l <sub>2</sub>	2,5	3,2	4	5	6,3	8	10
l <sub>3</sub>	22,6	26,7	34	39,5	51,5	67	85,2
l <sub>4</sub>	20,3	24,5	31,9	37,2	46,2	59,7	73
l <sub>5</sub>	9,5	12,5	13	17	19	30	34,5
l <sub>6</sub>	2,5	3	20	26	28	42	51
Adjusting size EM	6,2	8,3	8,5	10,5	10,5	13	13,3
Draw bar pull kN	0,7	1	2	3	4	7,5	10
Pull-in-force kN	3,5	5	10	15	25	37,5	50
Max. application speed min <sup>-1</sup>	120000	80000	60000	50000	40000	30000	24000

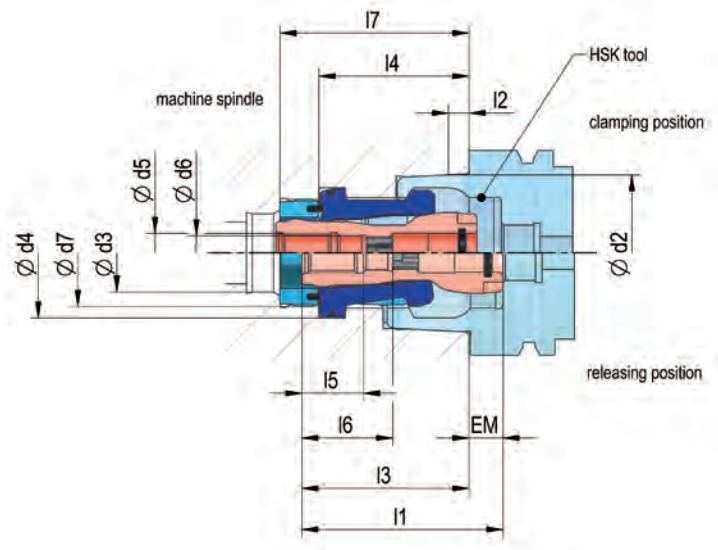
## Standard



Tool group C 15  
Type 288-64  
**Automatic HSK-Clamping set**  
- standard

Item no.	1037445 ▲	1037446 ●	1037447 ■	1037448 ●	1037449 ●	1037450 ●	1037451 ■	1037452 ▲
Clamping unit HSK	E25 / B32	A32 / B40	A40 / B50	A50 / B63	A63 / B80	A80 / B100	A100 / B125	A125 / B160
Total stroke	7	9	13	15	14	17	18	20
Pull-out stroke AM	0,2	0,3	0,5	0,5	0,5	0,5	0,8	0,8
Taper Ø d <sub>2</sub>	19	24	30	38	48	60	75	94,996
d <sub>3</sub>	10	12	15	18	24	32	40	46
d <sub>4</sub>	17	21	25,5	32	40	50	63	80
d <sub>5</sub>	M4	M6x0,75	M8x1	M10x1	M12x1	M16x1,5	M20x1,5	M24x1,5
d <sub>6</sub>	4,2	6,5	6,4	8	10,5	14,3	17,5	20
l <sub>1</sub>	28,8	35,1	42,5	50	62	80	98,5	121,2
l <sub>2</sub>	2,5	3,2	4	5	6,3	8	10	12,5
l <sub>3</sub>	22,6	26,7	34	39,5	51,5	67	85,2	104,4
l <sub>4</sub>	20,3	24,5	31,9	37,2	46,2	59,7	73	96,9
l <sub>5</sub>	9,5	12,5	13	17	19	30	34,5	40
l <sub>6</sub>	2,5	3	20	26	28	42	51	60
Adjusting size EM	6,2	8,3	8,5	10,5	10,5	13	13,3	16,8
Draw bar pull kN	0,7	1	2	3	4	7,5	10	15
Pull-in-force kN	3,5	5	10	15	25	37,5	50	70
Max. application speed min <sup>-1</sup>	70000	48000	36000	30000	24000	18000	14000	10000

## With retaining collet



Tool group C 15  
Type 288-64

### Automatic HSK-Clamping Set with retaining collet

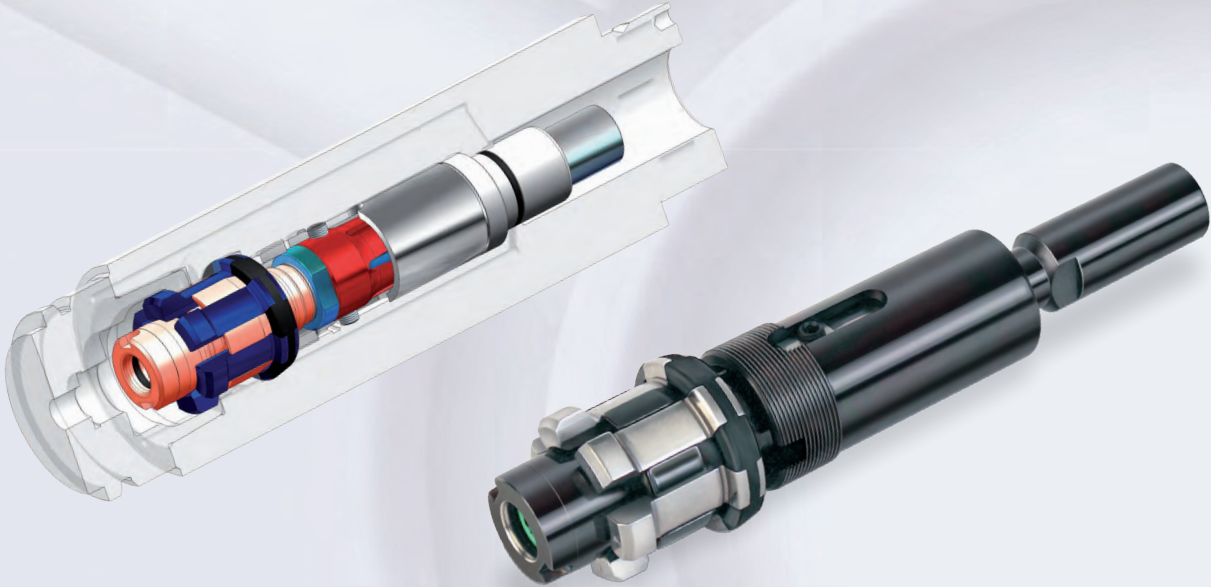
Saving time while changing tools, this clamping set with retaining collet will enable you to make multiple steps in the same time window.

Item no.	1024067 ●	1019609 ▲	1024145 ●	1015265 ■	1004827 ■
Clamping unit HSK	A40/B50	A50/B63	A63/B80	A80/B100	A100/B125
Total stroke	13	15	16	17	18
Pull-out stroke AM	0,5	0,5	0,5	0,5	0,8
Taper $\varnothing d_2$	30	38	48	60	75
$d_3$	15	18	24	27	40
$d_4$	25,5	32	40	50	63
$d_5$	M8x1	M10x1	M12x1	M16x1,5	M20x1,5
$d_6$	6,4	8	10,5	14,3	17,5
$d_7$	M20x1	M25x1	M33x1	M40x1	M53x1,5
$l_1$	42,5	50	62	80	98,5
$l_2$	4	5	6,3	8	10
$l_3$	34	39,5	51,5	67	85,2
$l_4$	31,85	37,15	46,2	59,7	73
$l_5$	13	17	19	30	34,5
$l_6$	20	26	28	42	51
$l_7$	38	41,5	58,2	75	106
Adjusting size EM	8,5	10,5	10,5	13	13,3
Draw bar pull kN	2	3	4	7,5	10
Pull-in-force kN	10	15	25	37,5	50
Max. application speed min <sup>-1</sup>	48000	40000	32000	24000	20000



## Technical features

**Space-saving and powerful: SUPER LOCK holds HSK totally without springs and compact design**



If high balancing quality combined with static and dynamic stiffness are demanded from the cutting tool in heavy metal cutting operations or with extremely high rotational speeds, the locking between hollow shank taper and the machine tool must meet enormous demands. Therefore, consistent and secure clamping elements are of utmost importance in the most challenging machining conditions, in order to ensure operational reliability.

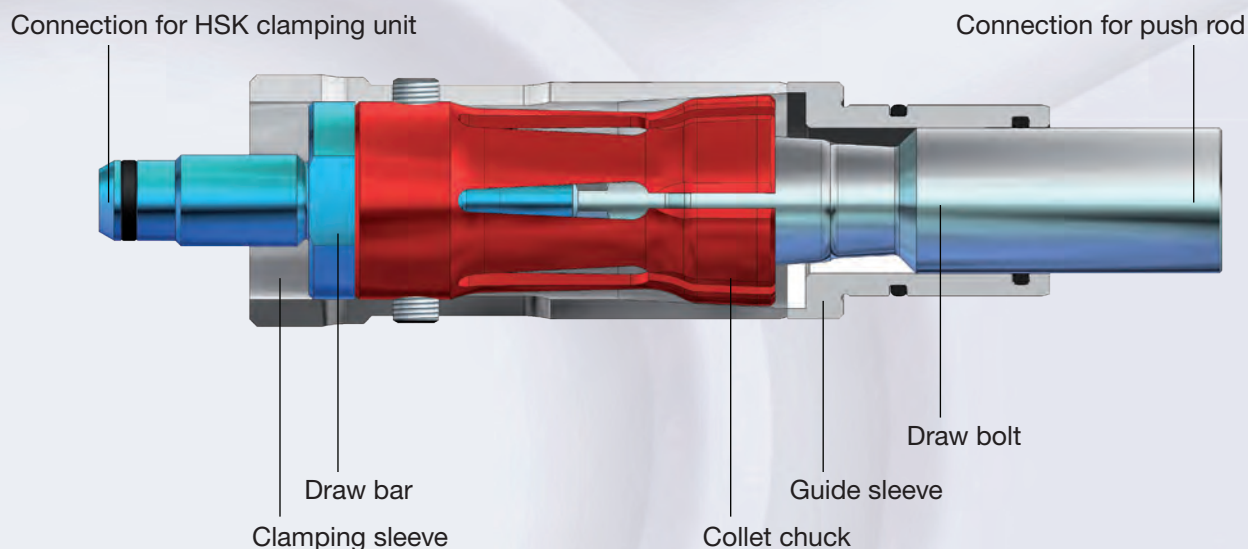
RÖHM presents a new and innovative clamping technique with a springless locking unit for hollow shank taper in machine tools: Self-locking without spring packet. This trend-setting principle not only improves the working procedure, but also distinctly facilitates space saving designs.

### Technical features:

- clamping without springs and additional retention force
- highest balancing quality
- space saving due to compact design
- front mounting in short spindles
- applicable to all HSK sizes
- secure clamping even with large HSK tolerances
- continuous, secure and self-locking
- optimised for use at high speeds
- ideal for HSC machining
- highly suitable for heavy-duty metal cutting
- high stiffness combined with the RÖHM HSK clamping unit

## Technical features

Self-locking system suitable for HSC and heavy roughing



### The Function of the Lock System SUPER LOCK:

The locking system SUPER LOCK serves as a revolutionary connecting link between the HSK clamping unit and the control rod. Even with large HSK tolerances, the unit safely transfers the actuating force and guarantees the connection through mechanical self-locking.

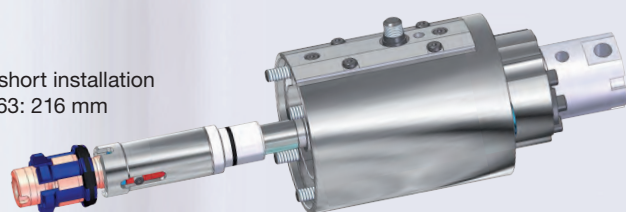
For the first time ever, the RÖHM SUPER LOCK needs no springs and no additional retention force, due to a symmetrical collet chuck. The coupled HSK clamping unit is simply moved to the clamping position, and the system locks itself in approx. 0.2 seconds, self-latching on the conical surfaces of the draw bolt and clamping sleeve.

For releasing, the actuating force of less than 2000 N (example for HSK-A 63) unlocks the draw bolt, pushes the drawbar and therefore the pressure pad of the HSK clamping unit forward. The HSK tool is ejected with less force than with spring systems, since there is no need to overcome the spring force.

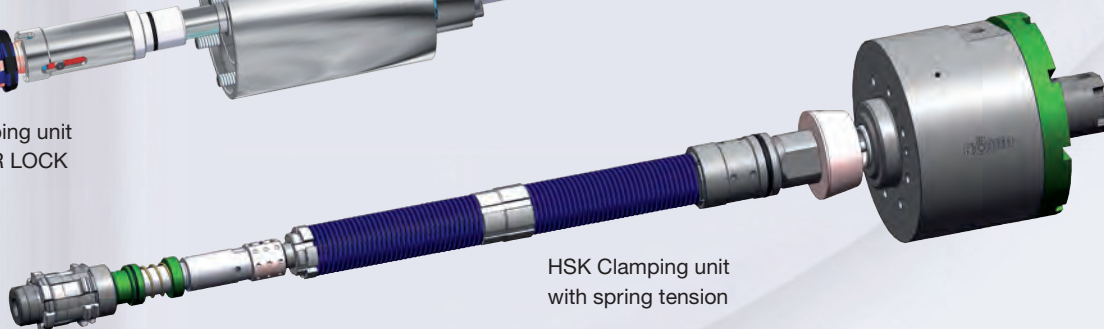
### Comparison of installation size:

Extremely short installation size:  
size: HSK 63: 216 mm

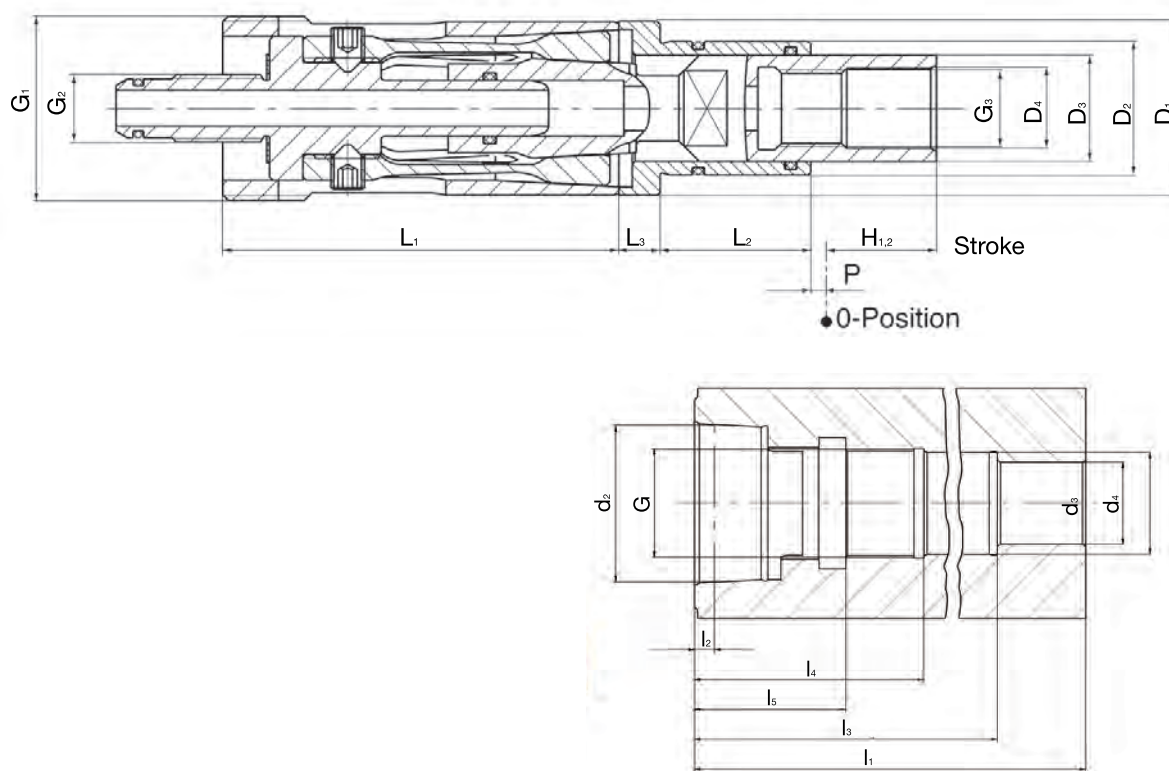
HSK-Clamping unit  
with SUPER LOCK



HSK Clamping unit  
with spring tension



## Clamping unit



Tool group C 15  
Type 288-69  
**Clamping unit SUPER LOCK**  
Self-locking mechanism  
**without springs**  
for automatic tool clamping

Item no.	1122572	1122574	1122718	1122725	1122569	1122731	1122581
HSK-A/E	25	32	40	50	63	80	100
D <sub>1</sub>	13,2	15,1	18,6	23,6	31	39	49
D <sub>3</sub>	11	12,5	16,4	20,4	25	31,2	40
D <sub>4</sub>	8	10	13	16	19	24	31
D <sub>5</sub>	6,2	8,2	10,3	12,5	14,4	17	21
G <sub>1</sub>	M14x0,5	M16x0,75	M20x1	M25x1	M33x1	M42x1,5	M52x2
G <sub>2</sub>	M4	M6x0,75	M8x1	M10x1	M12x1	M16x1,5	M20x1,5
G <sub>3</sub>	M6x0,75	M8x0,75	M10x1	M12x1,25	M14x1,5	M16x1,5	M20x2
H <sub>1</sub>	11,5	13,8	17,8	19,9	20	27,3	30,8
H <sub>2</sub>	16,3	17,5	22,8	26,3	28	38,1	42,4
L <sub>1</sub>	30	37	45	56	70,4	90	112
L <sub>2</sub>	15,4	14,5	20,4	23,7	27	44,3	55
L <sub>3</sub>	2,8	3,75	4,6	5,8	7,4	9,2	11,5
P	1	1,25	1,6	2	2,5	3,2	4
G	M14x0,5	M16x0,75	M20x1	M25x1	M33x1	M42x1,5	M52x2
d <sub>2</sub>	19	24	30	38	48	60	75
d <sub>3</sub>	11	12,5	16,4	20,4	25	31,2	40
d <sub>4</sub>	13,2	15,1	18,6	23,6	31	39	49
l <sub>1</sub>	71	83,5	106,4	127,7	157	211	262
l <sub>2</sub>	2,5	3,2	4	5	6,3	8	10
l <sub>3</sub>	56	69	86	104	130	167	207
l <sub>4</sub>	32,25	36,7	45,9	57	70	88,1	10
l <sub>5</sub>	20,25	24,5	31,85	37,15	46,2	59,65	73
Clamping set	<b>594332</b>	<b>1035347</b>	<b>1011063</b>	<b>1037501</b>	<b>1015151</b>	<b>474917</b>	<b>462324</b>
F1 (N)	3500	5000	10000	15000	25000	37500	50000
F2 (N)	700	1000	2000	3000	5000	7500	10000
Max. application speed min <sup>-1</sup>	120000	80000	60000	50000	40000	30000	24000

Further technical data on request



## Electrical clamp and release unit

The very compact electric unit is universally applicable. Together with the RÖHM SUPER LOCK the electrical clamping and release unit enables the realisation of extrem space saving spindles.



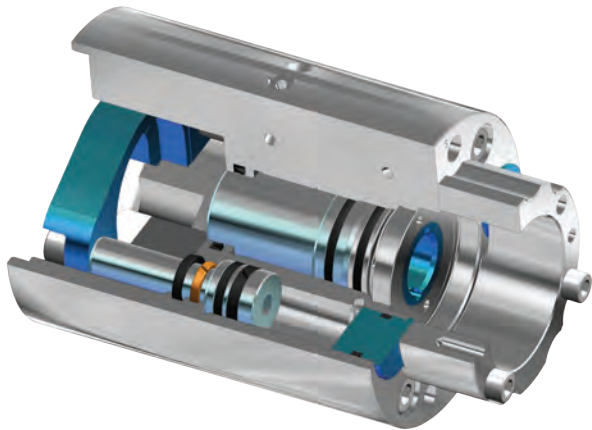
The clamping system without springs SUPER LOCK can be actuated with our electrical clamp and release unit, as an alternative to hydraulic or pneumatic clamping and release units. The very compact unit is designed for an universal application and can be optimally integrated into the control of the machine. All functions can be activated by the machine control and together with SUPER LOCK spring packages in tool clamping systems become redundant.

### Features:

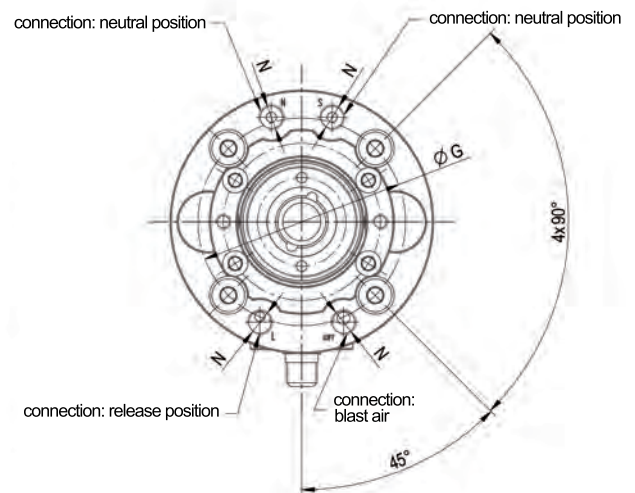
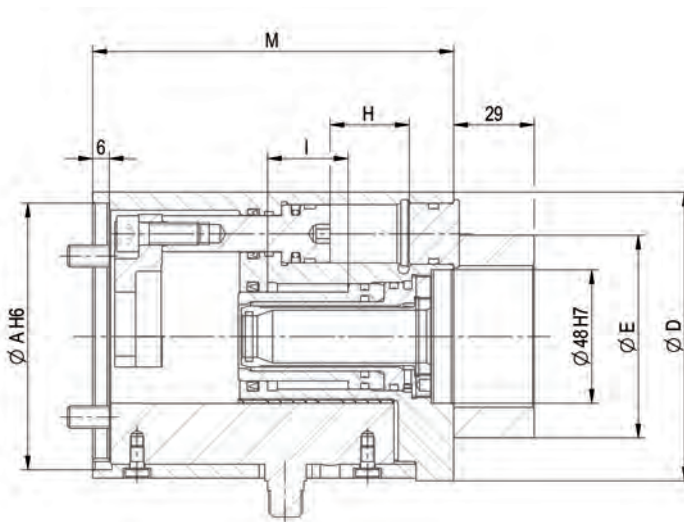
- compact and universal design
- easy integration into the control system of the machine
- implementation of coolant-rotating unit possible
- secure start-up and hold of the spindle-free position
- adjustment of the clamp and release position possible
- no hydraulic or pneumatic components necessary
- low maintenance
- saving of energy
- no heat up of the spindle
- permanent monitoring of the spindle

## Clamping and release unit hydraulically actuated

The hydraulic clamping and release unit together with the clamping unit SUPER LOCK and the RÖHM clamping set serves to clamp and release tools.



The unit is equipped with three hydraulic connections to reach the positions „clamp“, „spindle-free“ and „release“. During the clamping process the actuating rod of the locking system will be pulled down. Thus the tool is clamped and SUPER LOCK is locked. Then the clamping and release unit moves to the position „spindle-free“. There is no contact between the unit and the rotating components. After the machining process the actuating rod of the locking unit is pressed by a piston. The SUPER LOCK is unlocked, afterwards the clamping set is opened and finally the tool is ejected.



Tool group C 15  
Type 285-85  
**Hydraulically actuated clamping and release unit**  
to actuate the self-locking system,  
**for stationary mounting**

This stationary clamp and release unit allows a fast stroke movement.

- speed independent
- through-hole for cleaning air in release position
- connection for turning performance

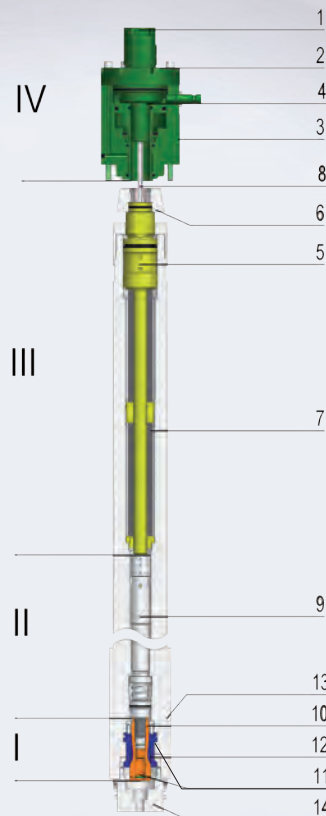
Item no.	1149321 ▲	1179403 ▲
For HSK size	A50/A63	A80/A100
Piston area (releasing) cm²	6,4	14,99
Max. opening force L bar	72-120	95-120
Max. clamping pressure S bar	72-120	95-120
Max. pressure neutral position N bar	72-120	95-120
Release and clamping stroke	29	43,4
A	96	130
D	104	137
E	73	90
G	82	112
H	28	43
I	29	43
M	130	170
N	M10x1	M10x1

Further technical data on request

## Technical features

### Clamping system with stationary release unit (for high speeds)

During the rotation of the spindle the stationary release unit is separated from the rotating system. Therefore this system is especially suitable for high speeds. We offer release units in a hydraulically, a pneumatically and an electrically actuated version.



#### Components and construction groups

##### Stationary opening unit - Construction group IV

1. Non-rotating distributor for coolant lubricant
2. Connections for actuation, air blast
3. Non-rotating housing
4. Unclamping piston

##### Clamping unit SEH - Construction group III

5. Draw bar
6. Ring for stroke control
7. Spring package
8. Connecting pipe

##### Draw bar extension - Construction group II

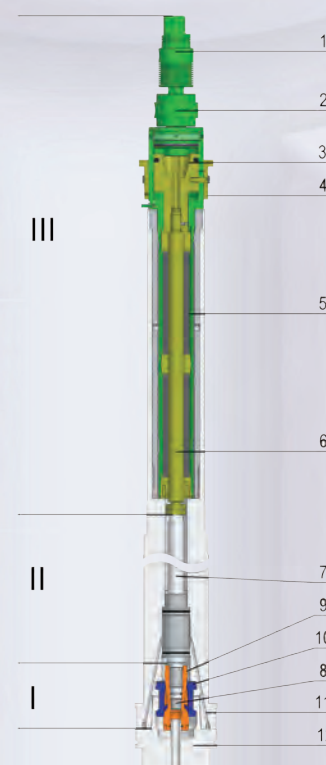
9. Draw bar extension

##### Clamping set - Construction group I

10. Collet actuator
11. Collet
12. Counter nut
13. Spindle
14. Tool

### Clamping system with integrated release unit (for speeds up to 10.000 min<sup>-1</sup>):

In this system the actuating piston is integrated in the rotating part of the spindle. The hydraulic medium for the release process is provided by a rotating connection. This system is especially suitable for speeds up to 10.000 min<sup>-1</sup>



##### Clamping unit - Construction group III

1. Non-rotating distributor for coolant lubricant or air
2. Non-rotating distributor for hydraulic unclamping
3. Unclamping piston
4. Strike control ring
5. Spring package
6. Draw bar

##### Draw bar extension - Construction group II

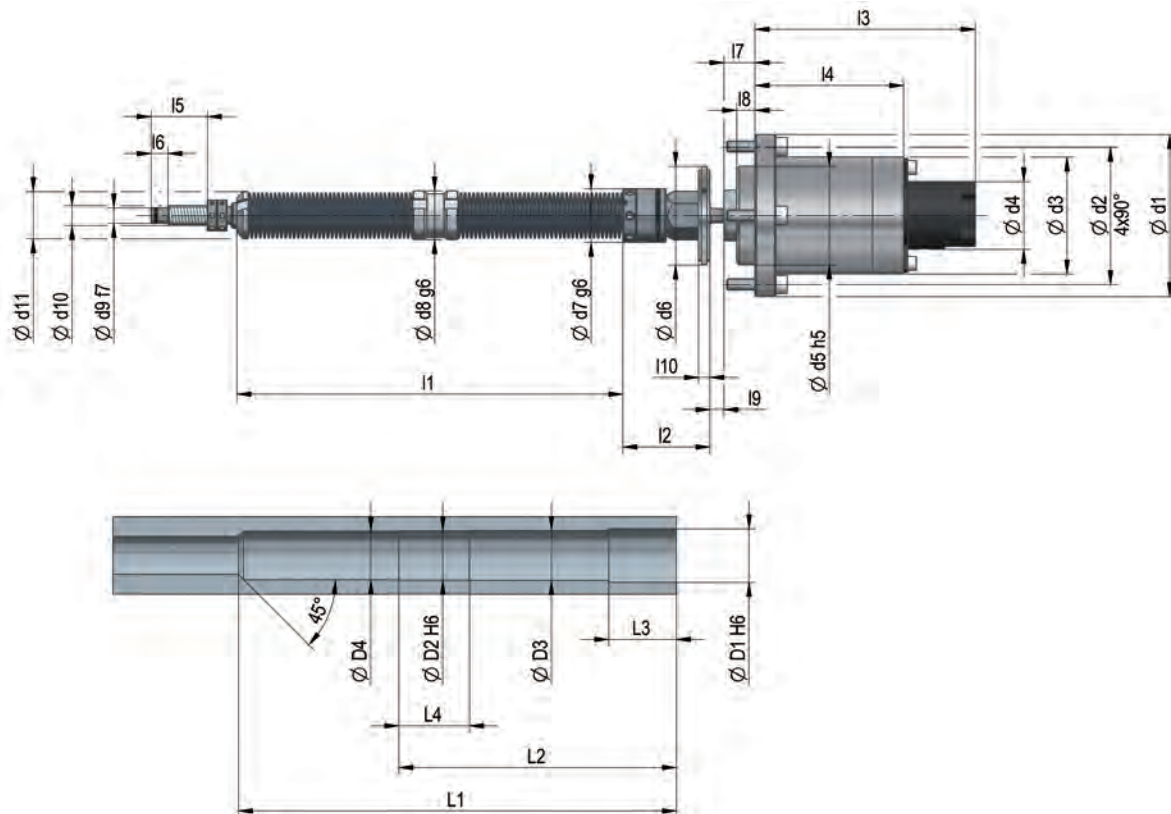
7. Draw bar extension

##### Clamping set - Construction group I

8. Counter nut
9. Collet actuator
10. Collet
11. Spindle
12. Positive Taper Lock - tool HSK



## Hydraulic clamping system stationary



Tool group C 15  
Type 286-13

**HSK-Clamping system with  
stationary release unit**

Item no.	1243668 ▲	1243669 ▲	1243670 ▲	1243671 ▲	1243672 ▲	1243673 ▲
Clamping unit HSK	32	40	50	63	80	100
d1	115	115	115	115	115	115
d2	98	98	98	98	98	98
d3	83	83	83	83	83	83
d4	48	48	48	48	48	48
d5	70	70	70	70	70	70
d6	70	70	70	70	70	70
d7	20	25	35	38	42	50
d8	18,5	22,5	30	35	38	42,5
d9	6,5	8,5	10	11	13	14,5
d10	M8x1	M10x1	M12x1,5	M14x1,5	M16x1,5	M18x1,5
d11	18	21,5	29	34	37	41,5
D1	20	25	35	38	42	50
D2	18,5	22,5	30	35	38	42,5
D3	19	23	30,5	35,4	38,5	43
D4	18,5	22	29,5	34,5	37,5	42,5
l1	150	190	225	274	282	350
l2	52	50	60	61,8	74	90
l3	150	150	156,5	156,5	160	160
l4	99	99	105,5	105,5	108	108
l5	22	26	32	40	40	45
l6	8	9	10	12	13	15
l7	12	12	22	22	18	18
l8	10	10	13	13	16	16
l9	8	8	10	10	10	10
l10	8	8	8	8	8	8
L1	190	240	270	311	325	396
L2	115	150	180	197	210	250
L3	34	40	48	48	56	70
L4	38	42	50	50	58	65
Pull-in force kN	5	10	15	25	35	50
Total stroke	9	13	15	16	18	20

Individual clamping systems on request

Hydraulical release units for the releasing process of tool clamping systems at the end of the spindle are replaced by the electrical release unit.



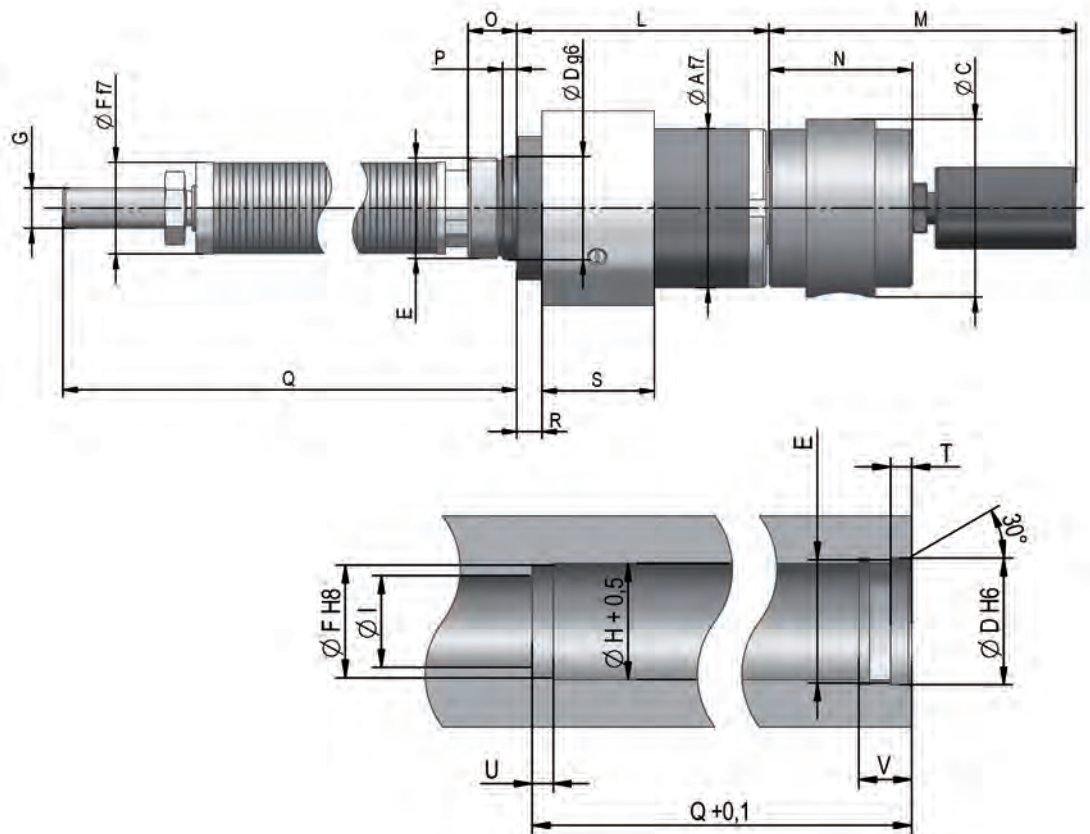
As an alternative to hydraulical or pneumatic release units tool clamping systems with spring can be released with electrical release units. The very compact unit is designed for an universal application and can be optimally integrated into the control of the machine. The electrical release unit meets all requirements as for example the implementation of a coolant-rotating unit.

The new electrical clamp and release unit is a component of the trendsetting “e-EQUIPMENT by RÖHM”. Under this label, RÖHM is developing energy saving products which already make the hydraulic free machine real. Energy on demand is one topic those components stand for.

**Features:**

- compact and universal design
- easy integration into the control system of the machine
- implementation of coolant-rotating unit possible
- adjustment of the release force possible
- no hydraulic or pneumatic components necessary
- low maintenance
- saving of energy
- no heat up of the spindle
- permanent monitoring of the spindle

## Hydraulic built-in clamping system



Tool group C 15  
Type 286-03  
**HSK-Clamping unit with  
built-in release unit**

Item no.	760437 ▲	760438 ▲	760439 ▲	760440 ▲	760441 ▲	760442 ▲
Clamping unit HSK	32/100	40/200	50/300	63/500	80/750	100/1000
A	36	40	48	55,5	65	84
B	44	48	60	68	77	97
C	48	48	62	62	67	67
D	25	32	36	36	48	70
E	25	32	36	36	48	70
F <sub>7</sub>	21	26	32	32	41	39
G	M 6	M 10	M 12 x 1,5	M 14 x 1,5	M 16 x 1,5	M 20 x 1,5
H	22	26	33	33	41,5	63
I	13	20	22	26	30	39
L	68	75	83,5	87	96	125
M	103	104	108	108	142	165
N	46	47	51	51	51	51
O	14	14	17	17	19	25
P	4	4	5	5	5	8
Q	104	167	193,4	261	264	279
Opening position	1,5	2	0,5	0,5	1,5	3
Clamping position R	6,5	10	8,5	8,5	12,5	15
S	30	34	38,5	39	45	60
T	5	5	6	6	6	9
U	3	4	6	6	6	5
V	15	15	18	18	20	26
Pull-in force kN	1	2	3	5	7,5	10
Max. opening force bar	80	80	80	80	80	120
Total stroke	9	13	16	16	18	20

## Technical features

The RÖHM-clamping system was specially designed for the positive taper lock clamping taking particularly into account the necessity of manual clamping.

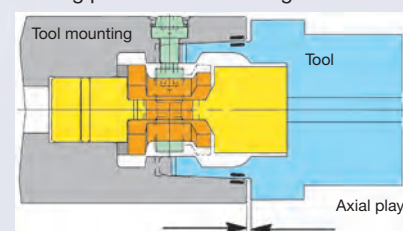


Positive Taper Lock System  
for manual tool clamping

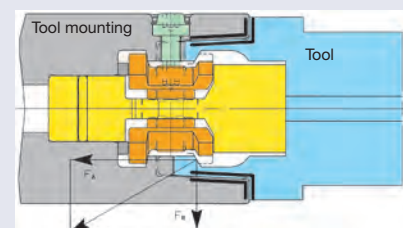
### Technical features:

- strong design
- compact power flow
- no clamping bore required in the taper, no dirt penetration possible during operation
- sealed central coolant supply
- steady clamping force due to four symmetric clamping surfaces
- automatic ejection of the tool during release
- highly suitable to be built into the spindle

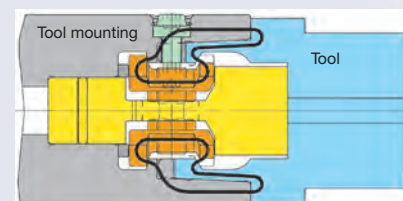
Joining position with locating surface



Clamping situation



Clamping situation with compact power flow



The advantage of the positive taper lock clamping system originates in the combination of the plane surfaces, together with the expansion of the taper during the clamping operation.

The precise adjustment of the nominal diameter of the taper creates an initial tension which is important for the quality of the HSK-system and can be measured by means of the axial play.

For the clamping operation the clamping jaws are expanded by turning the adjusting screw. The axial forces  $F_A$  and radial forces  $F_R$  generated by the symmetric gripping slope build up the necessary clamping force for the initial tension of the taper lock system over the entire taper surface and locating surface. Two T-nuts which are gripping the tool at the end of the shank of the tool mounting, guarantee a positive radial location.

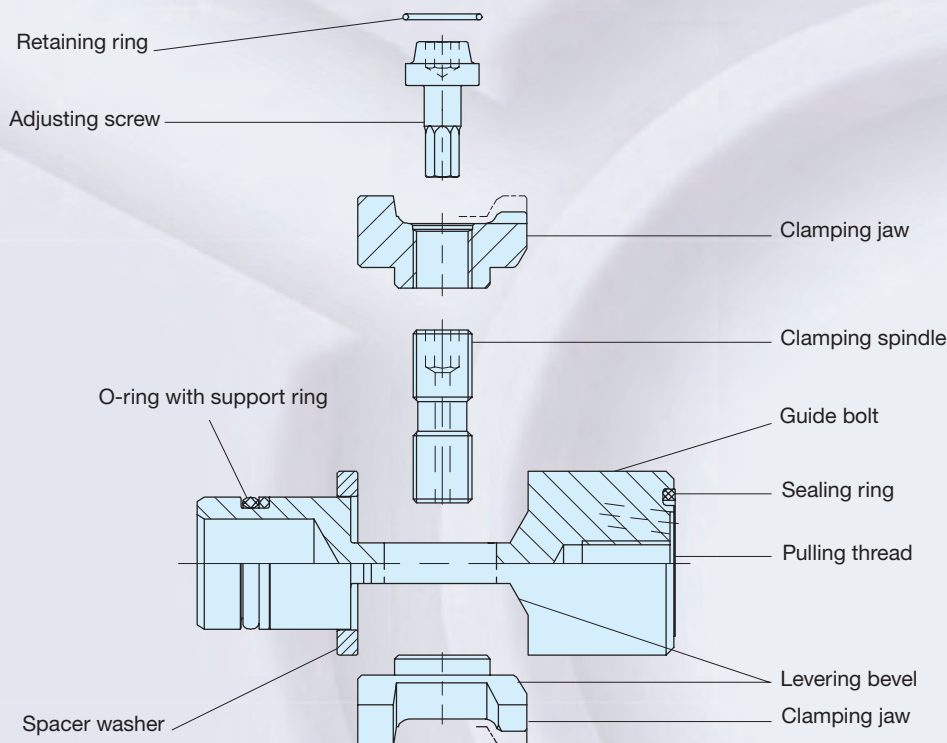
When the jaws are released, the tool is ejected automatically.

A compact power flow is important for the rigidity of the clamping system and improves the changing accuracy.



## Assembling guide

For built-in clamping system HSK-C and HSK-D for manual tool clamping of hollow shaft tools to DIN 69893



### Assembling the clamping sets:

- Lightly grease the clamping jaw seat on the guide pin, clamping bevels of the clamping jaws and the clamping spindle.
- Screw the clamping spindle into one clamping jaw by approximately one turn.
- Insert the clamping jaw with the clamping spindle into the guide pin.
- Screw the second clamping jaw onto the clamping spindle also by approximately one turn. Hold the spindle to prevent it from turning.
- Move both clamping jaws inwards by turning the clamping spindle with an hexagonal key.
- Check the seat of the clamping spindle - must be centred exactly between the clamping jaws.
- Fit the front face sealing ring and press it in.
- Fit the spacer washer, then fit the support ring and the rear O-ring.

### Installing the clamping sets:

Direct installation of the built-in clamping set into spindles, clamping chuck or mounting adapters

- Fit or press the clamping set into the spindle or adapter so that the clamping spindle access hexagon aligns with the adjusting screw bore. Insert the adjusting screw into the clamping spindle hexagon or insert into the spindle bore and secure with the snap ring.

### Note:

Because of the face sealing at the tool (positive taper) the O-Ring mentioned in the German Standards DIN is idle and may be removed.

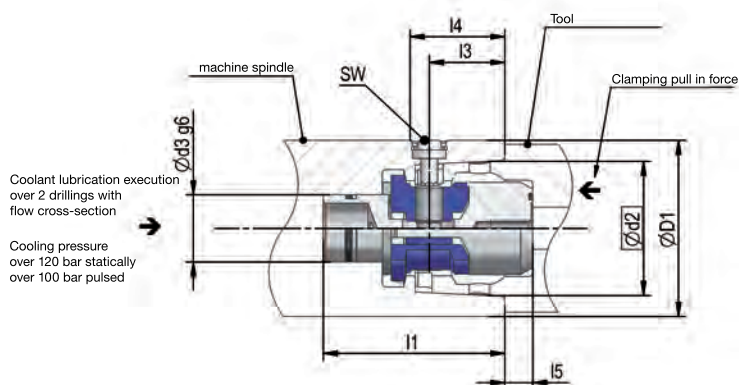
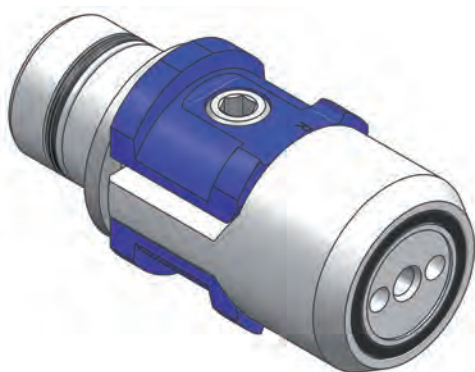
### Notes on the use of the clamping set:

- Always use a closing plug when using a spindle or adapter fitted with a clamping set without tools.
- With tool inserts subjected to low radial loads, e.g. drilling and friction operation, it is permissible to lower the maximum torques by approximately 25%.
- When changing tools always clean the tool and the spindle taper with a taper wiper.
- The clamping set should be greased after prolonged use. These intervals depend on the tool changing frequency, the machining method and the coolant lubricant. Greasing should be performed at least every six months.

### Dismantling:

- Remove the snap ring with a screwdriver on the dismantling bevel in the spindle or mounting adapter.
- Remove the adjusting screw.
- When the jaws are released pull out the clamping set by the guide pin or, on newer versions, with the central pulling thread.

## HSK-C

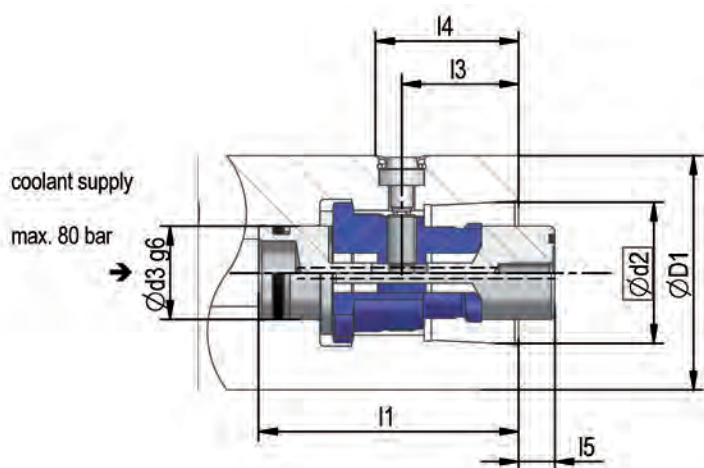
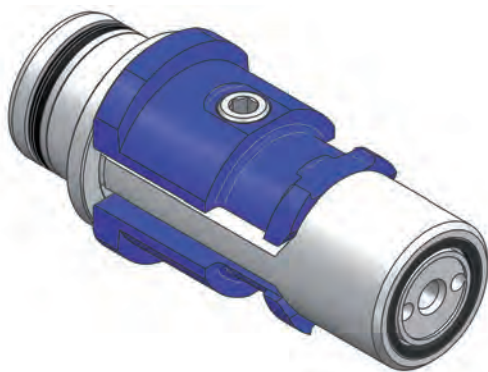


Tool group C 15  
Type 288-60

**Built-in Clamping System HSK-C with coolant supply through the centre** (except size 25) for hollow taper shanks  
**DIN 69893 HSK-A and -C**  
Inner spindle taper contour with integrated driving notches

Item no.	760530	784603	812617	831435	586214	475170	475172	483213	831306
Initial size $D_1$	25	32	40	50	63	80	100	125	160
Taper $\varnothing d_2$	19	24	30	38	48	60	75	95	120
$d_{3\ H7/g6}$	10	12	15	18	24	32	40	48	60
$l_1$	28	34	45	55	65	80	97,5	124	160
$l_3$	11,4	14	17,5	21,5	27	34	42	53	68
$l_4$	15	18,5	22	27	34	42	53	67	85
$l_5$	6	8	8	10	10	12,5	12,5	16	16
Key SW	2,5	2,5	3	4	5	6	8	10	12
Tightening torque Nm	1,8	2,5	3	8	14	25	42	80	100
Pull-in force kN	3,5	5	6,8	11	18	30	45	70	115
Flow cross-section mm <sup>2</sup>	-	6,3	10,6	14,1	27,7	56,5	100,5	100,5	157
Adjusting screw complete Item no.	760628	1176471	760463	760464	760465	760466	760467	812815	831311

## HSK-D

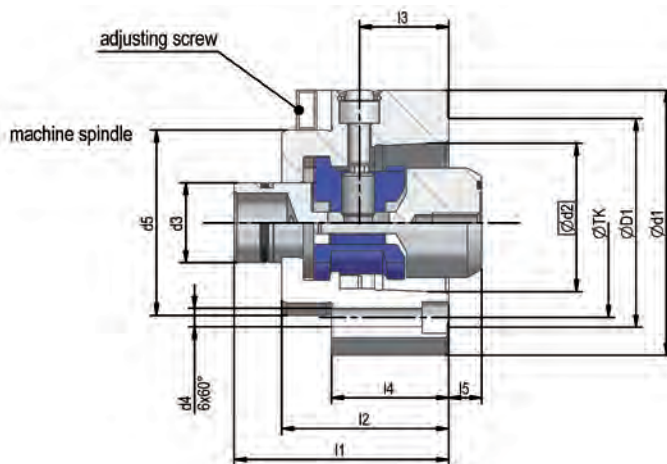
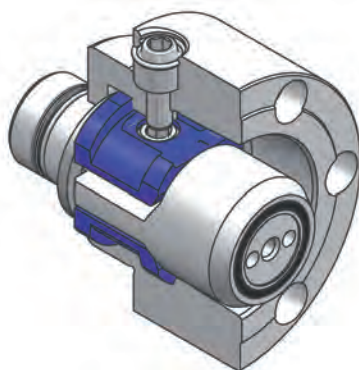











Tool group C 15  
Type 288-61

**Built-in Clamping System HSK-D with coolant supply through the centre** (except size 32) for hollow taper shanks  
**DIN 69893 HSK-B, -D, -E, -F**  
without driving slots at the hollow tapered shank end

Item no.	784624	466327	101116	845214	101117	101118	101119	1011098
Initial size $D_1$	32	40	50	63	80	100	125	160
Taper $\varnothing d_2$	19	24	30	38	48	60	75	95
$d_{3\ H7/g6}$	13	16,5	20	25	32	36	50	60
$l_1$	36	45	57,5	70	90	104	134	162
$l_3$	16	20	25	31,5	40	48	61	76,2
$l_4$	20	30	32	40	48	56	72	90
$l_5$	6	8	8	10	10	12,5	12,5	16
Key SW	2,5	2,5	3	4	5	6	8	10
Tightening torque Nm	1,8	2,5	3	8	14	25	42	80
Pull-in force kN	3,5	5	6,8	11	18	30	45	70
Flow cross-section mm <sup>2</sup>	-	10,6	14,1	27,7	56,5	100,5	100,5	157
Adjusting screw complete Item no.	870031	870032	760464	870034	870035	870036	870037	870029

## HSK-C with adaptor

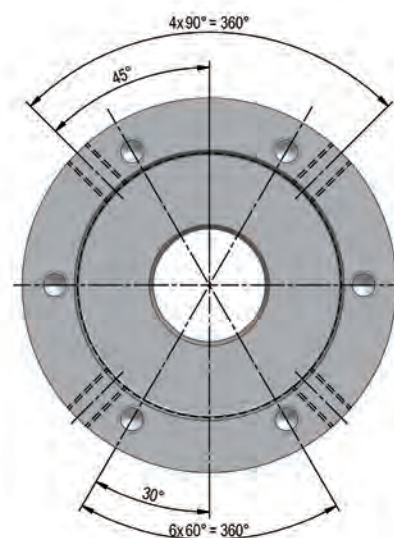
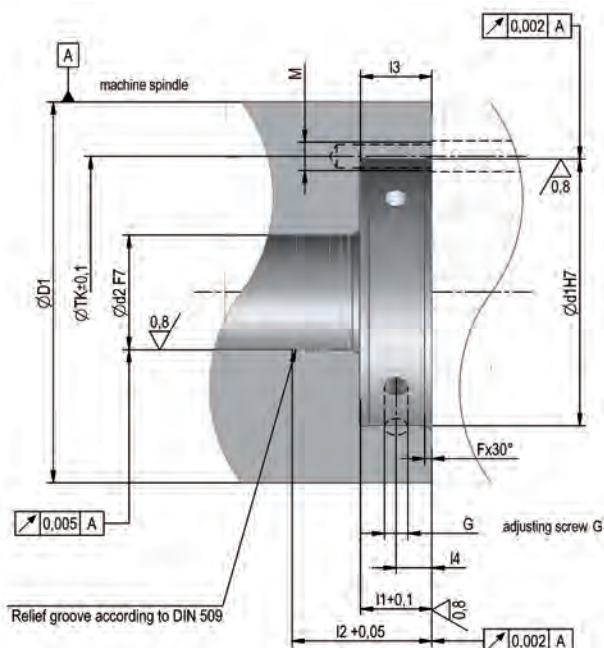


Tool group C 15 Type 288-70 <b>Adaptors with Built-in Clamping System HSK-C,</b> with adjusting screw <b>with coolant supply through the centre</b> (except size 25) with built-in clamping system for taper DIN 69893 HSK-A and -C for manual tool change	Item no.	850333 	795296 	795297 	795298 	795299 	795300 	795301 	850335 	850337 
	Initial size D <sub>1</sub>	25	32	40	50	63	80	100	125	160
	d <sub>1</sub>	37	40	50	63	80	100	123	148	190
	Taper Ø d <sub>2</sub>	19	24	30	38	48	60	75	95	120
	d <sub>3</sub> F <sub>7</sub> g <sub>6</sub>	10	12	15	18	24	32	40	48	60
	d <sub>4</sub>	3,4	3,4	4,5	5,5	6,5	9	11	13	17
	d <sub>5g6</sub>	24	27	33,5	42	56	68	84	100	125
	Ø-TK	29	32	40,5	52	66	82	102	125	160
	l <sub>1</sub>	26	34	45	55	65	80	97,5	124	160
	l <sub>2</sub>	22	26	34	41	50	64	76	97	126
	l <sub>3</sub>	11,4	14	17,5	21,5	27	34	42	53	68
	l <sub>4</sub>	15,5	19	23	28	35	44	54	68	86
	l <sub>5</sub>	6	8	8	10	10	12,5	12,5	16	16
	Adjusting screw complete Item no.	870022	870023	870024	870025	870026	870027	870028	870029	870030

Special customised versions are available on request

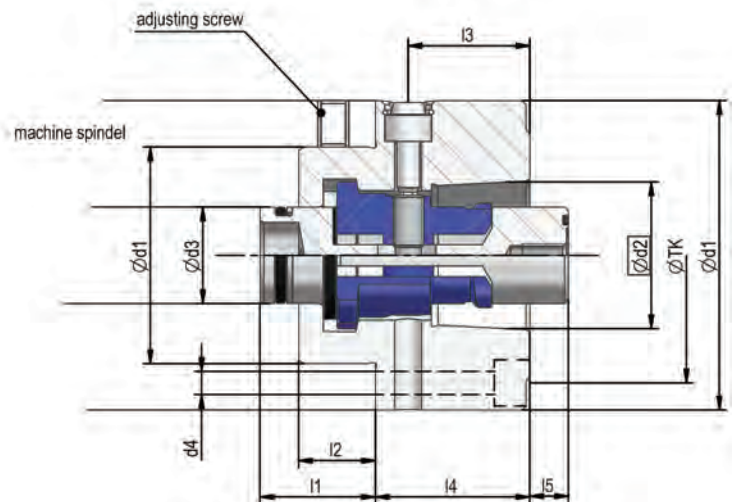
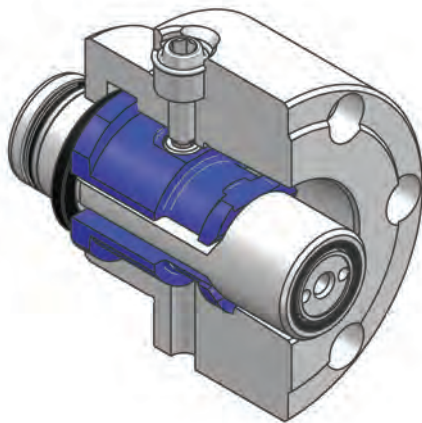
<b>Tool group C 15</b> Type 288-70 <b>Adaptors with Built-in Clamping System HSK-C</b> “high precision design”	<b>Item no.</b>	<b>850322 ▲</b>	<b>820802 ■</b>	<b>820803 ■</b>	<b>820804 ●</b>	<b>820805 ■</b>	<b>820806 ●</b>	<b>820807 ▲</b>
	Initial size D <sub>i</sub>	25	32	40	50	63	80	100
	Adjusting screw complete Item no.	870022	870023	870024	870025	870026	870027	870028

dyn. balanced: G 2,5 DIN ISO 1940





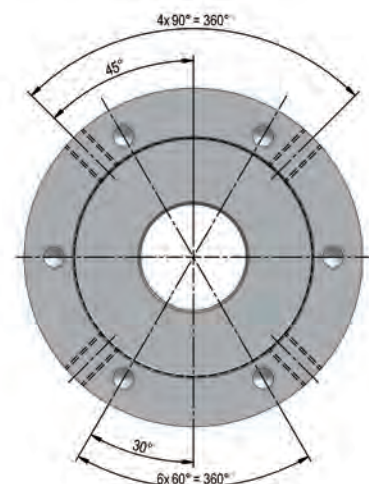
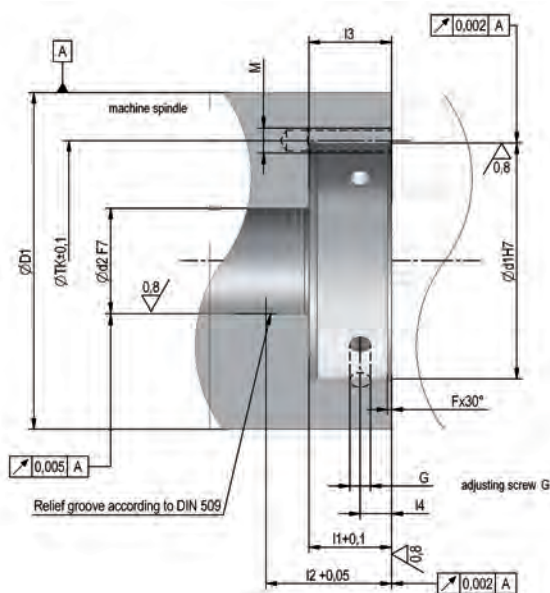
## HSK-D with adaptor



Tool group C 15  
Type 288-72  
**Adaptors with Built-in Clamping System HSK-D,**  
with adjusting screw  
**with coolant supply through the centre** (except size 32)  
for hollow taper shanks  
**DIN 69893 HSK-B,-D,-E,-F**  
without driving slots

Item no.	895270 ▲	466329 ▲	466330 ▲	820471 ▲	806428 ▲	466331 ▲	820796 ▲
Initial size	32	40	50	63	80	100	125
D <sub>1</sub>	40	50	63	80	100	110	138
d <sub>1</sub>	27	33,5	42	56	68	72	100
Taper Ø d <sub>2</sub>	24	30	38	48	60	75	95
d <sub>3</sub>	13	16,5	20	25	32	36	50
d <sub>4</sub>	6 x M3	6 x M4	6 x M5	6 x M6	6 x M8	6 x M10	6 x M10
d <sub>6</sub>	19	24	30	38	48	60	75
Ø-TK	32	40,5	52	66	82	90	116
l <sub>1</sub>	16	20	24,5	30	34	44	59
l <sub>2</sub>	10	12	13	19,5	20	28	34
l <sub>3</sub>	16	20	25	31,5	40	48	61
l <sub>4</sub>	20	25	33	40	56	60	75
l <sub>5</sub>	6	8	8	10	10	12,5	12,5

High precision design on request



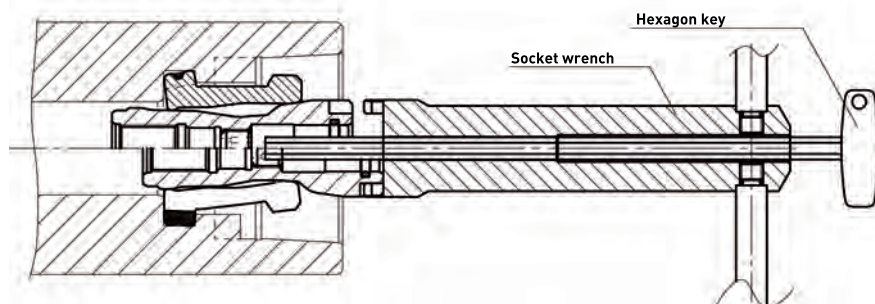
## Accessories

Tool group C 15

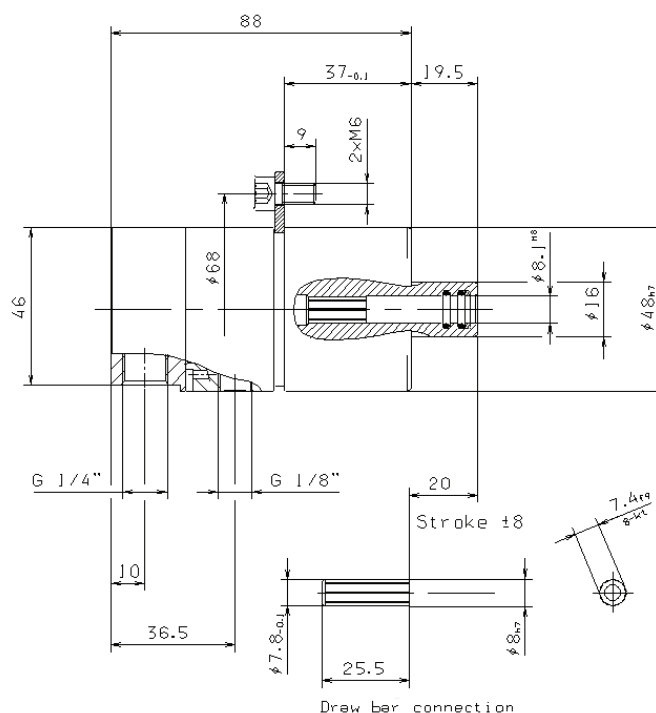
Type 288-91 **Socket wrench**

For manifold assembly of the pressure piece

Item no. Socket wrench	Design	Item no. Hexagon key	L	Key-width SW
<b>830252</b> ▲	HSK-A32/B40	<b>830253</b> ●	Lever pin	-
<b>831296</b> ●	HSK-A40/B50	<b>863494</b> ●	200	3
<b>831291</b> ■	HSK-A50/B63	<b>817262</b> ●	200	4
<b>831274</b> ●	HSK-A63/B80	<b>844250</b> ●	200	5
<b>831289</b> ■	HSK-A80/B100	<b>756660</b> ●	200	6
<b>831434</b> ●	HSK-A100/B125	<b>381601</b> ●	200	8
<b>812550</b> ▲	HSK-A125	<b>698938</b> ●	200	10
<b>800163</b> ▲	HSK-A160	<b>698938</b> ●	200	10





## Rotating connection



Tool group C 15

Type 289-50/60

**Rotating connection**  
for speeds up to 36000 rpm<sup>-1</sup>

Item no.	490967 	460658 
Speed min <sup>-1</sup>	18000	36000
Bearing	spindle ball bearing	hybrid bearing
Flow cross-section mm <sup>2</sup>	38,5	28,3
Coolant pressure max. bar	80	80
Aerosol for IMMS bar	10	10
Cleaning air (max. n=0 min <sup>-1</sup> ) bar	10	10
Max. air pressure (n<10.000 min <sup>-1</sup> ) bar	5	5
Filter mesh µm	<50	<50

Further technical data on request

## Standard

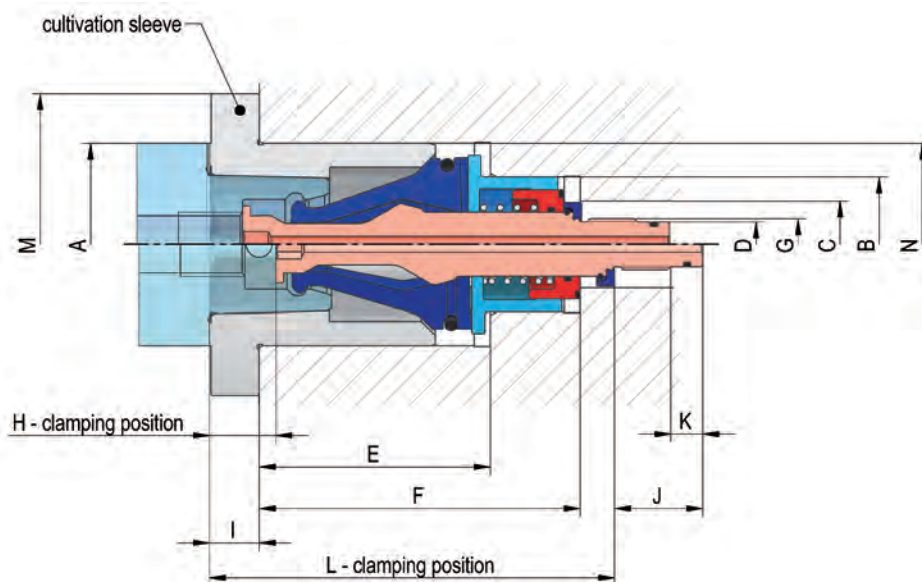
Significant for the PSC tool interface according to ISO 26623 is the polygonal taper, which assures secure and scope-free position fixing and a high torque transmission without additional elements.



The automatic PSC Clamping set guarantees a fast and trouble-free tool change. Suitable clamping systems with or without springs can be delivered upon request.

### Technical features:

- very compact fitting space
- gear ratio in the clamping set, therefore high power intensification and compact force transmission
- automatic tool eject by releasing the clamping bolt
- sealed system for central coolant supply
- separately air-cleaning of the clamping set possible



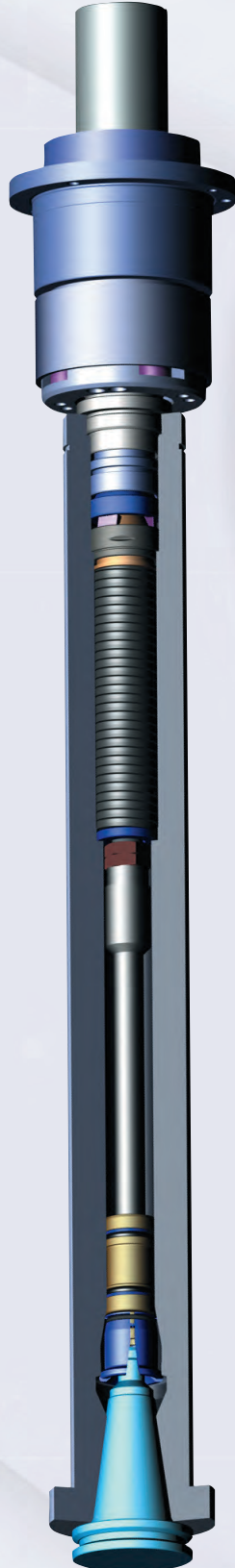
Tool group C 15  
Type 287-65  
**PSC-Automatic clamping set**  
Standard

Item no. Clamping set complete	1191003 ▲	1191004 ▲	1191005 ▲	1191006 ▲	1191008 ▲
Size	PSC-32	PSC-40	PSC-50	PSC-63	PSC-80
A	32	40	50	63	80
B	28	26	35	42	54
C	16	15	21	27	32
D	8	8,5	12	14	18
E	36	38	57	72	90
F	57	55,5	79	100	123
G	M10x1	M10x1	M14x1,5	M16x1,5	M20x1,5
Clamping position H	10,2	12,8	16,8	20,7	29,1
Opening position H	5,3	8,6	9,3	10,3	19,3
H max.	11,5	14,3	19,2	23,3	31,7
I	12,1	16	15,5	15,5	16
J	23	20	27,5	27,5	36,5
K	6	7	10	10	10
L	77,2	77,7	104,3	126,2	150,6
L max	78,5	79,2	106,7	128,8	153,2
Draw bar pull N	4000	7000	10000	13000	16000
Pull-in-force N	13000	22000	30500	39000	48000
Clamping set	1202748 ▲	1215409 ▲	1202754 ▲	1202760 ▲	1202766 ▲
Cultivation sleeve	1202749 ▲	1201454 ▲	1202755 ▲	1202761 ▲	1202767 ▲
M	70	74	82	94	125
N	34	40	52	63	76



## Overview

Tools with taper mount and draw-in bolts. Especially suitable for machine tools with rotating work spindle, high speeds and high clamping forces.



The RÖHM Power draw bar for automatic tool-change of tools with steep taper mounting is a complete unit. In terms of operational reliability, quiet running, speeds and clamping force, the RÖHM Power Draw Bar complies with all requirements of the practice.

### Technical features:

- Multiple clamping force transmission of cup spring force through guided wedge-element surfaces.
- High safety against pull-out forces because of the self-locking wedge system.
- In case of power failure, tool remains firmly clamped.
- Power transmission during clamping and unclamping without any influence to the spindle bearings.
- Quick-acting clamping system, therefore short time for tool change.
- Compact design resulting in low rotating masses.

### 1. Clamping system with stationary release unit:

During the rotation of the spindle the stationary release unit is separated from the rotating system. Therefore this system is especially suitable for high speeds.

### 2. Clamping system with integrated release unit ASP:

The wedge gearing and the actuating piston are screwed down at the end of the spindle. The spring set enters into the spindle. The hydraulic medium for the release process is provided by a turning performance.

### 3. Clamping system with integrated release unit ESP:

The complete clamping system is integrated into the spindle.

**Further clamping systems on request!**

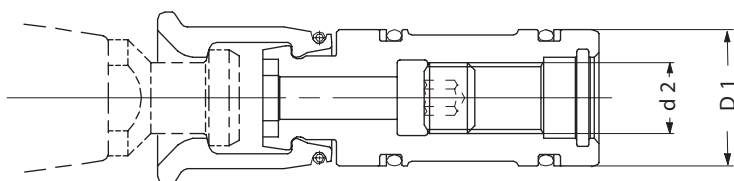
## DIN

Tool group C 15  
Type 285-70 Clamping sets type DIN 69871/72



Item no.	Design	D1	d 2	Pull-in force max. N
490968 ▲	SK 30 - IKZ	19	M10x1,5	7500
756340 ●	SK 40 - IKZ	27	M 14x1,5	15000
760392 ●	SK 40 - IKR	27	M 14x1,5	15000
760391 ●	SK 50 - IKZ	40	M 16 x1,5	26000
760393 ▲	SK 50 - IKR	40	M 16 x1,5	26000
760390 ▲	SK 60	52	M 30x1,5	80000

IKZ = with internal coolant supply  
Further versions are available on request



## MAS-BT

Tool group C 15  
Type 285-71 Clamping sets type MAS BT 45°

Item no.	Design	D1	d 2	Pull-in force max. N
1070315 ■	SK 30	19	M10x1,5	6000
861930 ■	SK 40 - IKZ	27	M14x1,5	15000
795390 ■	SK 50 - IKZ	40	M16x1,5	26000

IKZ = with internal coolant supply  
Further versions are available on request

## ANSI

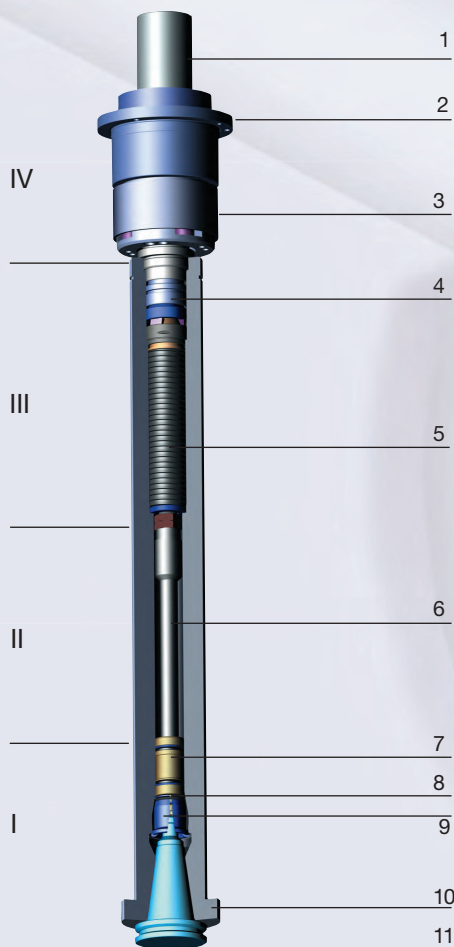
Tool group C 15  
Type 285-71 Clamping sets type ANSI 5.50-78

Item no.	Design	D1	d 2	Pull-in force max. N
890828 ■	SK 30 - IKZ	19	M10x1,5	6000
766334 ▲	SK 40 - IKZ	27	M14x1,5	15000
831393 ■	SK 50 - IKZ	40	M16x1,5	26000

IKZ = with internal coolant supply  
Further versions are available on request

## Design principle / Technical features

### Components and construction groups



#### Stationary opening unit - Construction group IV

1. Non-rotating distributor
2. Non-rotating housing
3. Housing, axial movable

#### Power draw bar - integrated type - Construction group III

4. Wedge gearing for clamping force transmission
5. Spring package

#### Draw bar extension - Construction group II

6. Draw bar extension

#### Clamping set - Construction group I

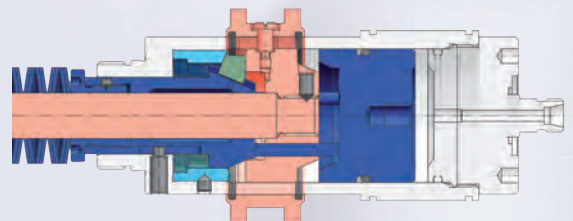
7. Clamping piece
8. Spring
9. Collet
10. Spindle
11. Tool

The collet pulls the steep taper tool into the spindle.

#### Function clamping:

Due to the spring force of the cup spring package the pressure sleeve pushes the wedge elements outwards between mounting sleeve and piston. The increase in power is the result of a combination of the adequate angles. The draw bar which is screwed into the piston moves the collet actuator and the collet. The steep taper tool is pulled into the spindle and positively locked.

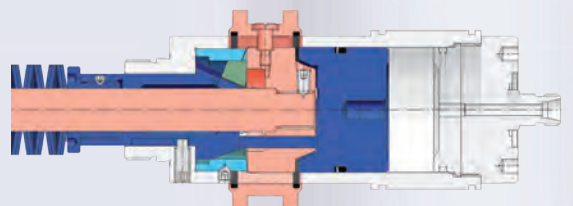
Clamped position



#### Function release:

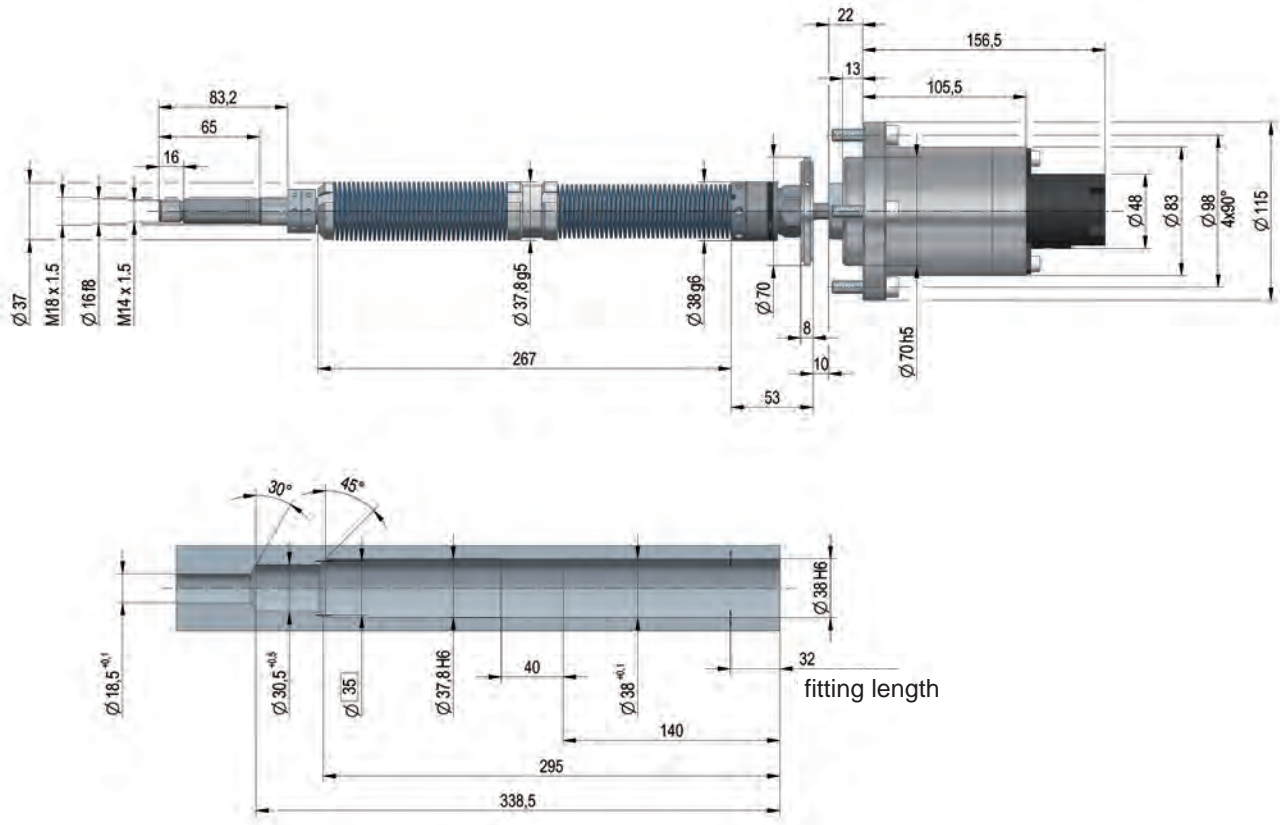
The hydraulically actuated piston moves the actuating pins, gets the wedge elements unlocked and force-retracted. At the same time the cup spring package is depressed by the pressure sleeve. Via the draw bar the collet actuator opens the collet. The face of the collet actuator ejects the tool by a defined amount.

Released position





## Hydraulic clamping unit - SK 40

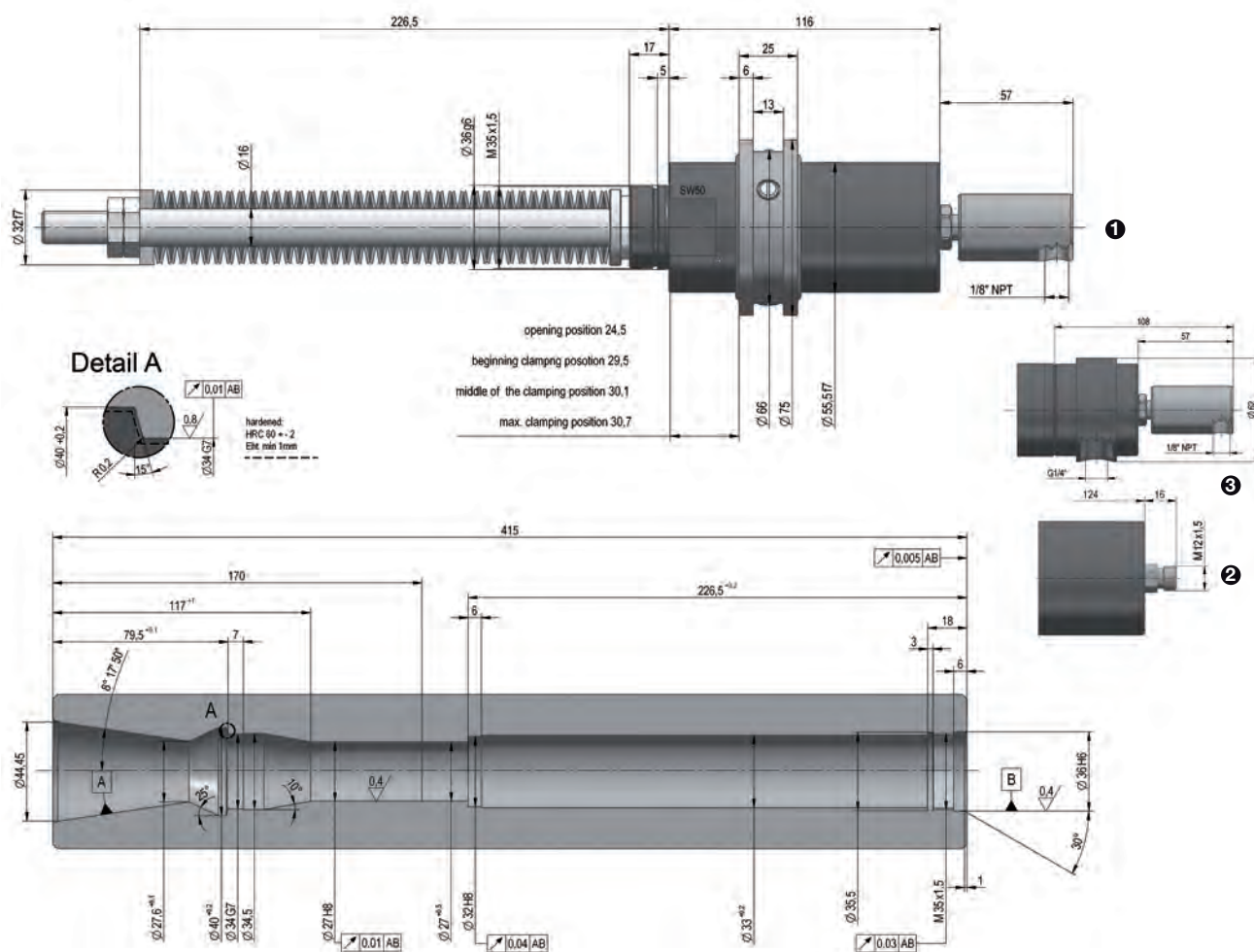


Tool group C 15  
Type 285-42  
**Hydraulic clamping system  
40/1200**  
**with spring set and  
stationary release unit  
with stroke control,  
with or without internal coolant  
lubrication, for clamping of tools  
with steep taper size no. 40**

Item no.	1243626 ▲
Spring pressure in clamping position N	12000
Spring arrangement	helical disk
Pull-in force in clamping position N	12000
Speed min <sup>-1</sup>	18000
Opening force bar	80
Opening force max. bar	120
Piston-Ø 56/28 - piston area cm <sup>2</sup>	18,5
Wedge stroke mm	10
Total clamping stroke mm	7

Further versions are available on request

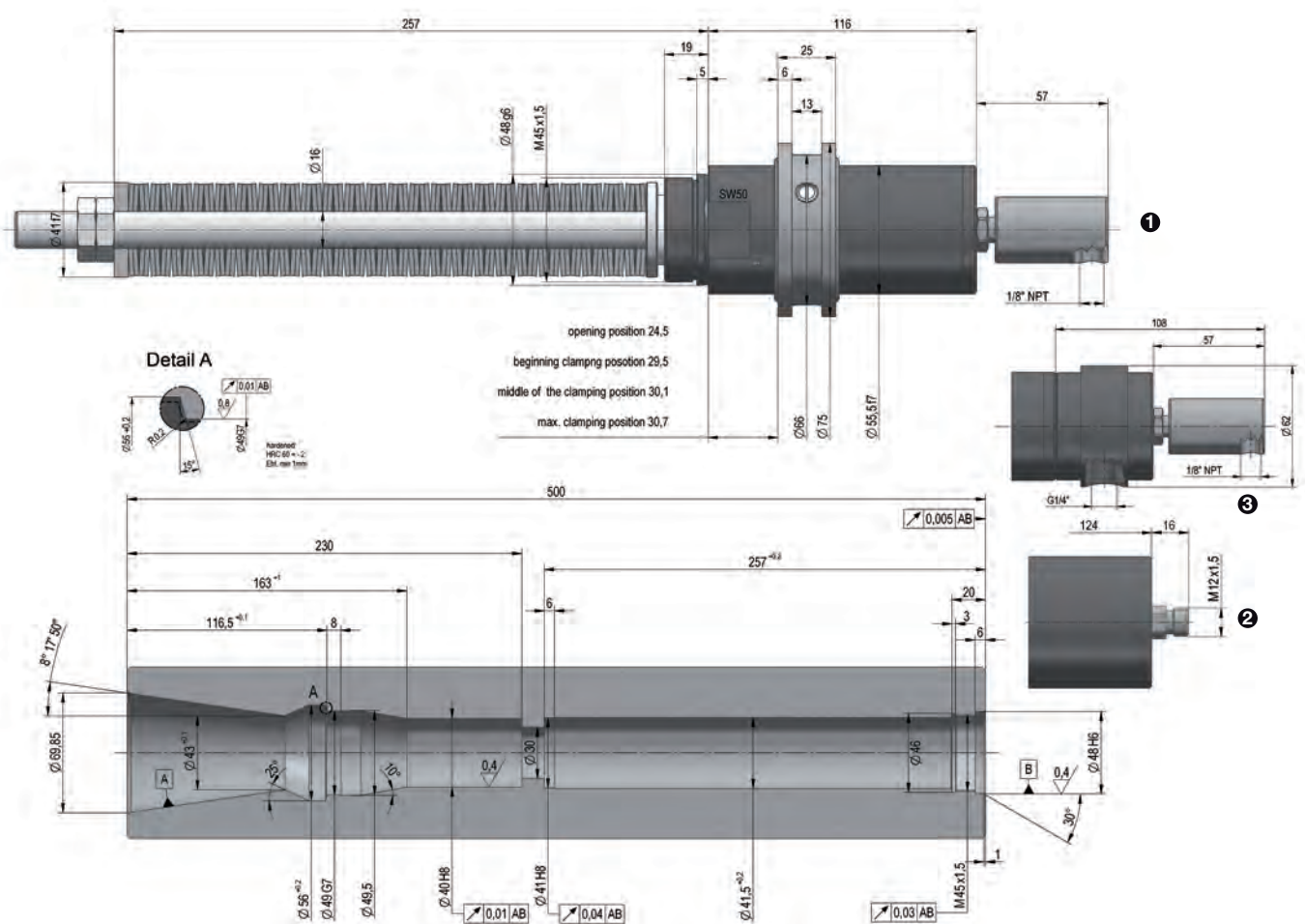
# Hydraulic clamping unit - SK 40



Tool group C 15  
Type 285-21/23  
**Hydraulic clamping unit with built-in release unit ASP 40/1200 with stroke control, with or without internal coolant lubrication, for clamping of tools with steep taper size no. 40**

Item no.	749179 ▲ ①	812773 ▲ ②	752958 ● ③
Design	without internal coolant lubrication	without internal coolant lubrication	with internal coolant lubrication
Spring pressure in clamping position N	4000	4000	4000
Spring arrangement	single	single	single
Pull-in force in clamping position N	ca. 12000	ca. 12000	ca. 12000
Speed min <sup>-1</sup>	10000	10000	10000
Opening force bar	80	80	80
Opening force max. bar	120	120	120
Piston-Ø 48 - piston area cm <sup>2</sup>	17,35	17,35	16,85
Coolant lubrication bar	-	-	max. 80
Air bar	-	-	max. 10
Wedge stroke mm	16,1	16,1	16,1
Total clamping stroke mm	6,2	6,2	6,2

# Hydraulic clamping unit - SK 50

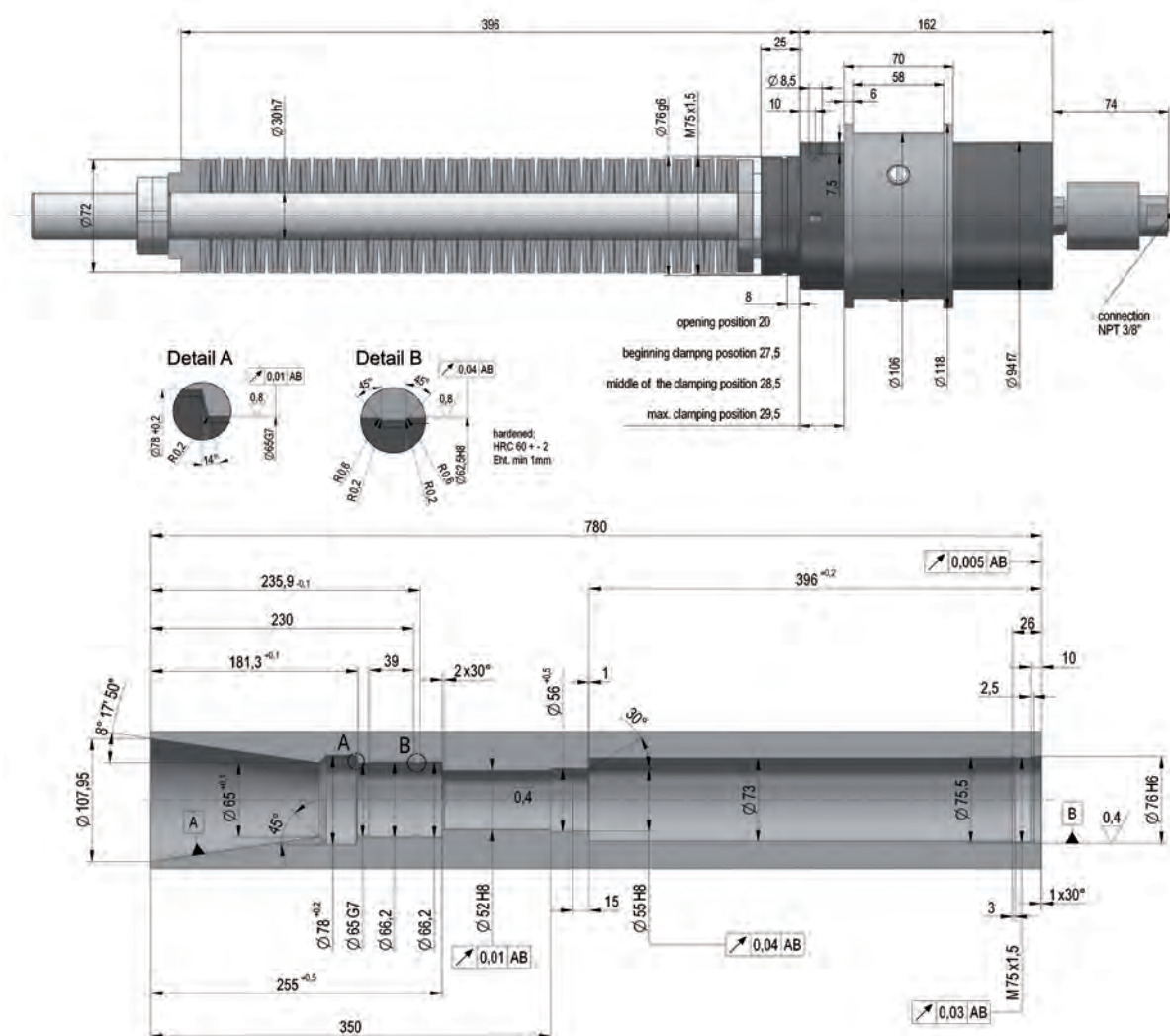


Tool group C 15  
Type 285-21/23  
**Hydraulic clamping unit ASP 50/2500**  
**with built-in release unit**  
**with stroke control,**  
**with or without internal coolant**  
**lubrication, for clamping of tools**  
**with steep taper size no. 50**

Item no.	734793 ▲ ①	812774 ▲ ②	752968 ▲ ③
Design	without internal coolant lubrication	without internal coolant lubrication	with internal coolant lubrication
Spring pressure in clamping position N	7500	7500	7500
Spring arrangement	double	double	double
Pull-in force in clamping position N	ca. 25000	ca. 25000	ca. 25000
Speed min <sup>-1</sup>	6300	6300	6300
Opening force bar	100	100	80
Opening force max. bar	120	120	120
Piston-Ø 48 - piston area cm <sup>2</sup>	17,35	17,35	16,85
Coolant lubrication bar	-	-	max. 80
Air bar	-	-	max. 10
Wedge stroke mm	16,1	16,1	16,1
Total clamping stroke mm	6,2	6,2	6,2



## Hydraulic clamping unit - SK 60



Tool group C 15  
Type 285-21  
**Hydraulic clamping unit  
ASP 60/6500**  
**with spring set and  
built-in release unit  
with stroke control,**  
for clamping of tools with  
**steep taper size no. 60**

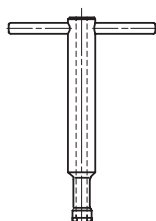
Item no.	734463 ▲
Spring pressure in clamping position N	19760
Spring arrangement	double
Pull-in force in clamping position N	ca. 65000
Speed min <sup>-1</sup>	4500
Opening force bar	110
Opening force max. bar	150
Piston-Ø 80 - piston area cm <sup>2</sup>	50,26
Wedge stroke mm	22,8
Total clamping stroke mm	9,5

Item no.	766411 ▲ ❶	812776 ▲ ❷	812777 ▲ ❸
Design	without internal coolant lubrication	without internal coolant lubrication	with internal coolant lubrication
Spring pressure in clamping position N	4000	4000	4000
Spring arrangement	single	single	single
Pull-in force in clamping position N	ca. 12000	ca. 12000	ca. 12000
Speed min <sup>-1</sup>	10000	10000	10000
Opening force bar	80	80	80
Opening force max. bar	120	120	120
Piston-Ø 38 - piston area cm <sup>2</sup>	11,34	11,34	10,84
Wedge stroke mm	14,2	14,2	14,2
Total clamping stroke mm	6,0	6,0	6,0

## Accessories

Tool group C 15

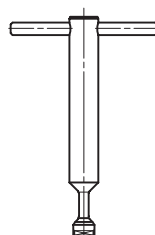
Type 285-91 **Socket wrench with through-hole**



Item no.	Size
772214 <span style="color: yellow;">■</span>	SK 30
756393 <span style="color: green;">●</span>	SK 40
760229 <span style="color: green;">●</span>	SK 50
747337 <span style="color: green;">●</span>	SK 60

Tool group C 15

Type 285-91 **Socket wrench without through-hole**



Item no.	Size
756396 <span style="color: yellow;">■</span>	SK 40-60

Tool group C15

Type 7023  
**Hexagon key**



Item no.	Size	Length l <sub>1</sub>	Key-width SW
367665 <span style="color: green;">●</span>	SK 30	183	4
802094 <span style="color: green;">●</span>	SK 40	350	6
769078 <span style="color: green;">●</span>	SK 50/60	400	8

Tool group C15

Type 234-00 **Draw-in Bolts DIN 69872 A**



Item no.	Size	Thread
698582 <span style="color: red;">▲</span>	SK 30	M 12
347325 <span style="color: green;">●</span>	SK 40	M 16
367315 <span style="color: red;">▲</span>	SK 45	M 20
367316 <span style="color: yellow;">■</span>	SK 50	M 24

Tool group A 34

Type 234-05 **Draw-in Bolts DIN 69872 B**



Item no.	Size	Thread
698583 <span style="color: red;">▲</span>	SK 30	M 12
698584 <span style="color: red;">▲</span>	SK 40	M 16
698585 <span style="color: red;">▲</span>	SK 45	M 20
698586 <span style="color: red;">▲</span>	SK 50	M 24

Tool group A 34

Type 234-10 **Draw-in Bolts ISO 7388/II-B**



Item no.	Size	Thread
367569 <span style="color: red;">▲</span>	SK 40	M 12
698587 <span style="color: red;">▲</span>	SK 45	M 16
698588 <span style="color: red;">▲</span>	SK 50	M 20

Tool group A 34

Type 234-41 **Draw-in Bolts MAS BT 1 (30°)**



Item no.	Size	Thread
698592 <span style="color: red;">▲</span>	SK 30	M 12
367320 <span style="color: red;">▲</span>	SK 40	M 16
698593 <span style="color: red;">▲</span>	SK 45	M 20
698594 <span style="color: red;">▲</span>	SK 50	M 24

Tool group A 34

Type 234-40 **Draw-in Bolts MAS BT 2 (45°)**



Item no.	Size	Thread
698589 <span style="color: red;">▲</span>	SK 30	M 12
367319 <span style="color: red;">▲</span>	SK 40	M 16
698590 <span style="color: red;">▲</span>	SK 45	M 20
698591 <span style="color: red;">▲</span>	SK 50	M 24

Tool group A 34

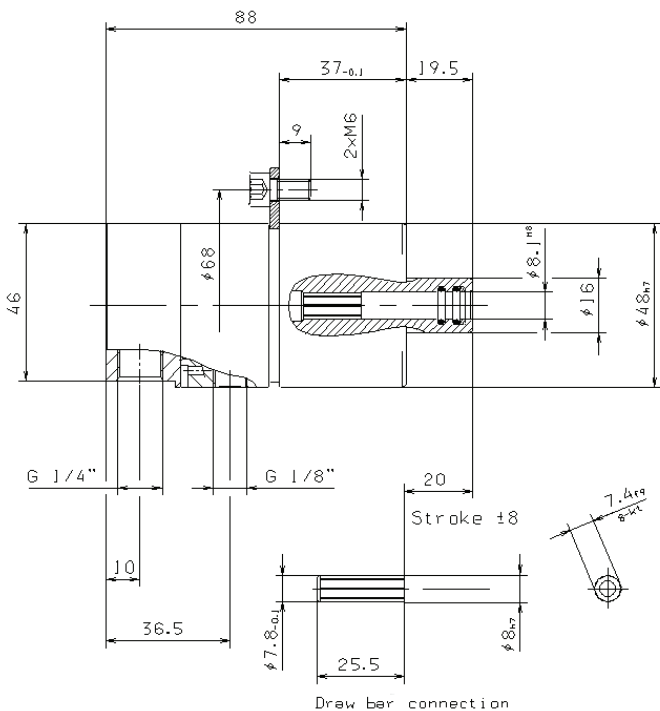
Type 234-50 **Draw-in Bolts ANSI B5.50**



Item no.	Size	Thread
620770 <span style="color: red;">▲</span>	SK 40	M 16
698595 <span style="color: red;">▲</span>	SK 45	M 20
620771 <span style="color: red;">▲</span>	SK 50	M 24



# Rotating connection



Tool group C 15  
Type 289-50/60  
**Rotating connection**  
for speeds up to 36000 rpm<sup>-1</sup>

Item no.	490967 ●	460658 ▲
Speed min <sup>-1</sup>	18000	36000
Bearing	spindle ball bearing	hybrid bearing
Flow cross section mm <sup>2</sup>	38,5	28,3
Coolant pressure max. bar	80	80
Aerosol for IMMS bar	10	10
Cleaning air (max. n=0 min <sup>-1</sup> ) bar	10	10
Max. air pressure (n<10.000 min <sup>-1</sup> ) bar	5	5
Filter mesh µm	<50	<50

Further technical data on request

## Overview

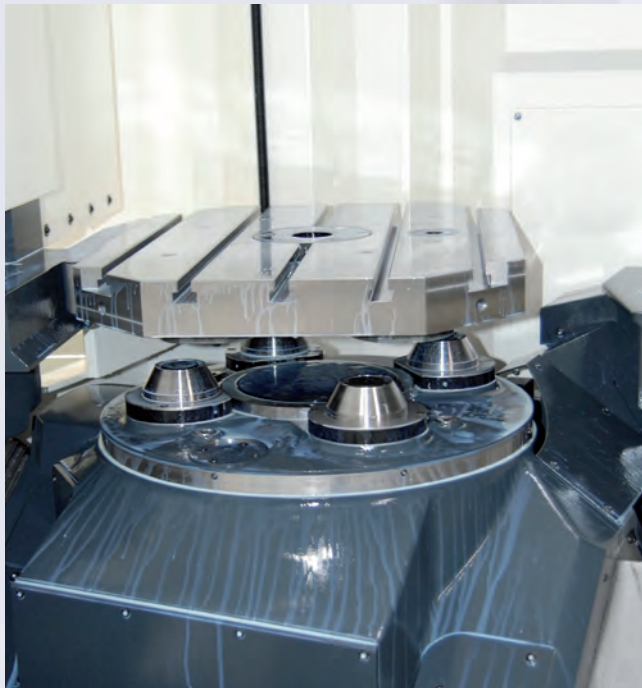
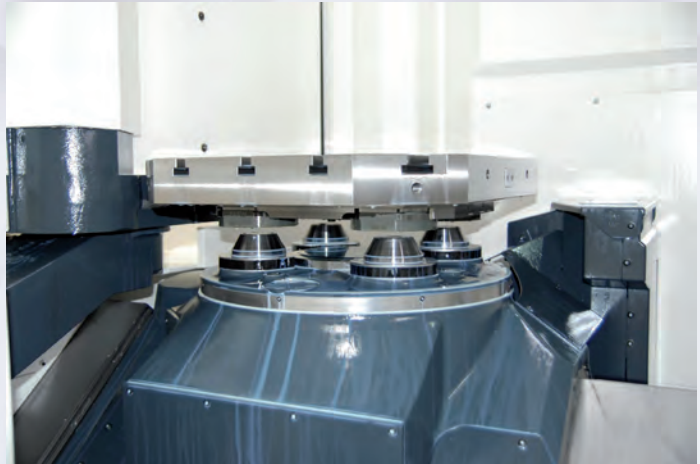
**Clamping heads are suitable for all existing sorts of pallet clampings.  
Preferable for very high repeatability i.e. at machining centres and transfer lines.**

Clamping cones with massive power in a minimum of space safely and precisely clamp workpiece pallets. Extreme accuracy in the axial run and radial run ensure a huge increase in productivity and thus in profit.

### Function:

The precise positioning is here taken over by the clamping system. Because the clamping cones virtually grip the pull studs of the pallet, pull them into the conical cylinders, calibrate and clamp them centrically, a possible oblique transfer of the pallet is not taken over during clamping. The pallet is always positioned horizontally and centricly. This ensures great axial and radial run values.

The space around the segment pulling collet and the mounting taper is cleaned during the clamping process in order to remove shavings. This can occur with compressed air as well as with cooling lubricant. Respective bores and channels conduct the medium and ensure the quick removal of shavings.



### Technical features:

- preferable for very high repeatability
- compact design
- universal application
- noticeable optimisation of the start-up time
- pallet always clamped horizontally and centricly
- cleaning of the area around mounting taper and segment pulling collet during the clamping process

## Built-in clamping head RESK-H

The new RESK-H built-in clamping head with integrated locking system provides a powerful clamping device for linking all the interfaces that occur in processing machines.

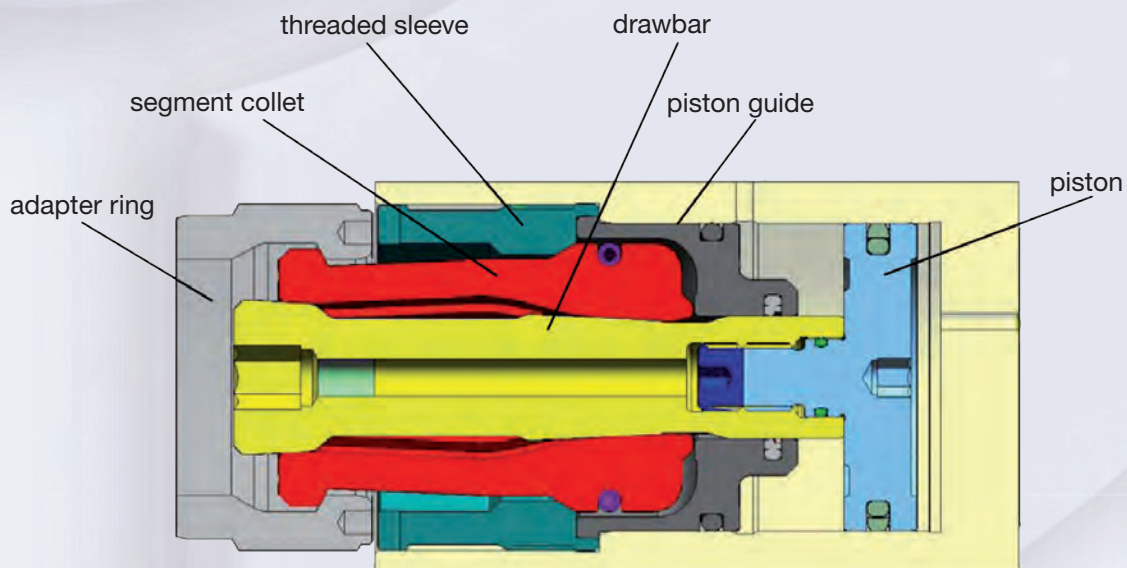


With its considerable pull-in force and self-inhibiting locking system, fast and secure clamping is possible for flexible assembly groups like changeable milling heads and spindle attachments, as well as devices on forming machines. As well as offering shorter changeover times in the processing of big workpieces, the RESK-H extends the working range of medium to large processing centres.

### Function:

The built-in clamping head achieves a stable and secure connection in which the segmented collet chucks engage with the clamping diagonals of the screwed-in adapter rings and clamp the replacement element on the machine with considerable pull-down force. As a result of the mechanical self-inhibition in the angular combination between the segmented collet chuck and the connecting rod, the clamping operation can be carried out without the need of hydraulic pressure. So the RESK-H also works in an extremely energy-efficient way.

### Assembly of the built-in clamping head:





The e-clamping head is the perfect alternative to the hydraulic clamping heads.  
The clamping process is effected by springs, the releasing process is realised by an electric motor.

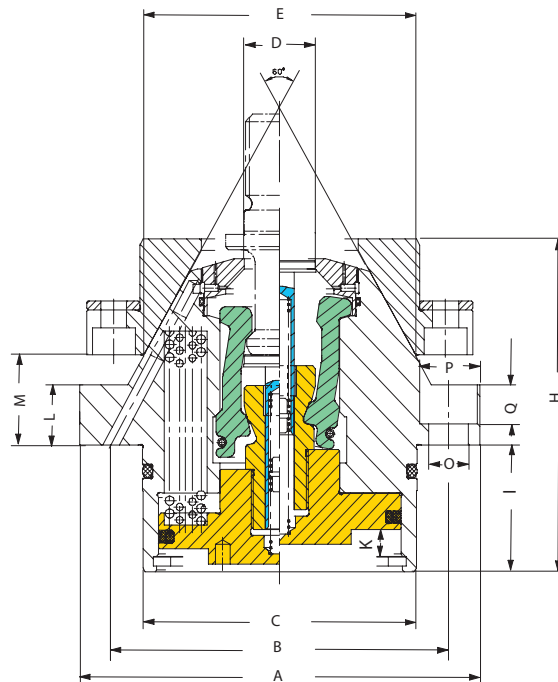


The very compact unit is designed for an universal application and can be optimally integrated into the control of the machine. Here the spring-operated clamping is enhanced by factor 3 to 4 with an integrated transmission of the clamping powers. As a substitution of the hydraulics, the release process of this component occurs electrically. The control permits the exact reversal and release of the unit in the final position at a specified force.

### Features:

- preferable for very high repeatability
- compact and universal design
- easy integration into the control system of the machine
- adjustment of the release force possible
- no hydraulic or pneumatic components necessary
- low maintenance
- saving of energy
- low heat up
- integrated sensors

## Spring operated clamping head



Tool group C 15  
Type 285-96  
**Spring operated clamping head**  
for clamping pallets,  
release process occurs hydraulically

Item no.	1154381	1154382	1137915	1130674
Size A	100	110	125	140
B	86	92	105	118
C	70	76	85	96
D	19	19	20	25
E	70	75	85	95
H	90	96	93	104
I	43	49	43	42
K	-	9,5	9,5	9,5
L	11	15	15	20
M	22	23	25	30
O	6,6	9	9	14
P	14	15	15	20
Q	7	8,5	8,5	13
Piston area: releasing cm <sup>2</sup>	28,3	33,18	44,1	56,7
Min. release pressure bar	-	50	40	40
Pull-in-force N	15000	20000	20000	40000
Blast-air pressure bar	10	10	10	10
Weight kg	2,5	3	4	6

Sets can be aligned in height on request

### Application range:

The mechanically actuated clamping head may be suitable for all existing sorts of pallet clampings. Preferable for very high repeatability i.e. at machining centres and transfer lines.

### Technical features:

The advantages of the mechanically operated clamping head are the power amplification of the segment collet operated by coiled springs in a very rigid and fully ribbed housing. The mechanical lock of the segment collet provides a pull-out safety device without any additional elements. Only to release - and therefore during standstill - a hydraulic unit will be needed.

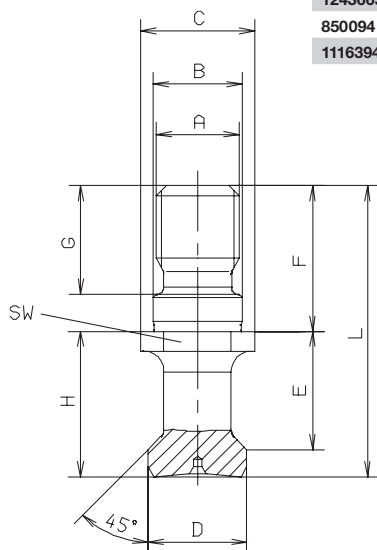
### Function:

Immediately after switching off the release pressure the springs are activating the clamping process. The springs are moving the draw-in bolt via the release piston. The segment collet encloses the draw-in bolt and clamping wedges will multiply the effect of the spring force at the end of the stroke. Via the draw-in bolt the pallet is pulled onto the reception cone and then it is mechanically locked.

The clamping position may be monitored via air sensing and the values can be processed by the machine control unit. During the clamping sequence pressurized air cleans the area of the collet and the reception taper.

# Accessories spring operated clamping head

Tool group A 34  
Type 285-95 **Draw-in bolts  
for clamping heads**

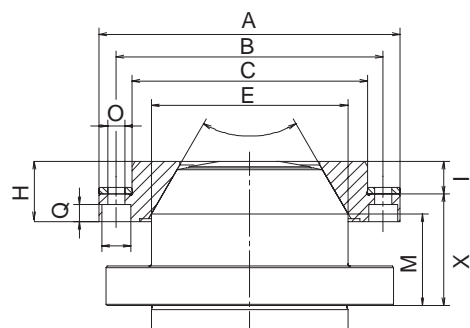


Item no.	For clamping head size	Size A	B	C	D	E	F	G	H	L	Key-width SW
1243664 ●	100	M18x1,5	19	25,4	15,5	23,7	21	19	28,2	49	22
1243665 ●	110	M18x1,5	19	25,4	19	25,1	23	20	30,3	53	22
850094 ●	125	M20	21	34	19	29	30	23	35	65	30
1116394 ▲	140	M24	25	38	23	34,7	40	32	40	80	30

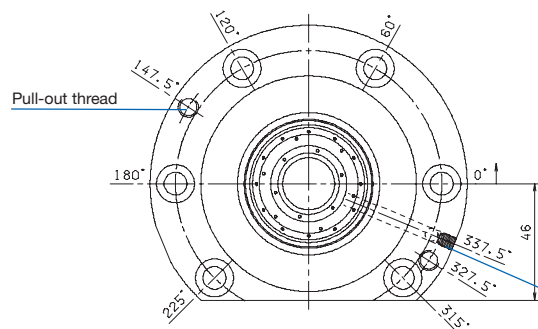
Tool group C 15  
Type 285-95 **Mounting flange  
for clamping heads**

Item no.	For clamping head size	Size A	B	Partition	C	E	H	I	M	O	P	Q	X
1176444 ●	100	105	90	6x60°	80	64	20	9	27,2	6,6	11	6,8	33
1176382 ●	110	110	96	6x60°	85	68	20	7,5	29,06	6,6	11	6,8	35,5
497213 ▲	125	125	106	4x90°	88	85	32,5	18,5	25	9	15	9	39
1116393 ▲	140	135	116		98	95	38,5	23,5	30	9	15	9	45

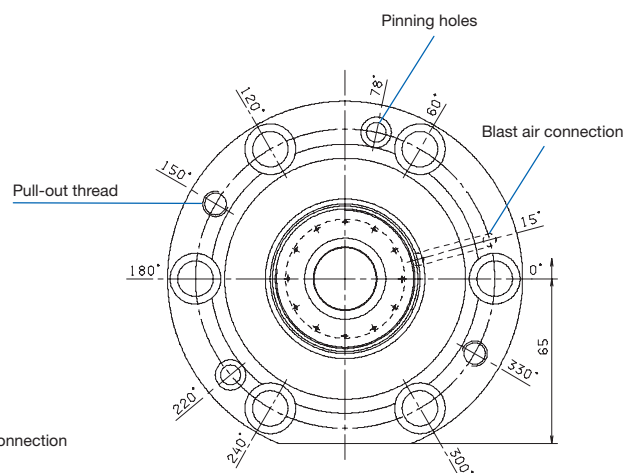
Further details on request



Position of mounting screws and medium terminals:



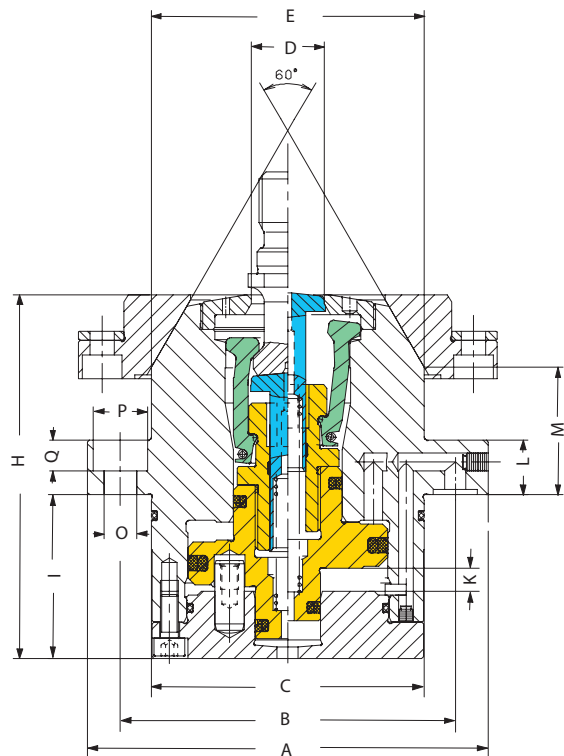
Clamping Head 125



Clamping Head 140



## Hydraulic clamping head



Tool group C 15  
Type 285-96  
**Hydraulic clamping head**  
for clamping pallets

Item no.	486816 ●	850092 ▲	869832 ●	489556 ▲
Size A	110	125	140	148
B	92	105	118	125
C	75	85	96	106
D	20	20	29,5	29,5
E	75	85	98	100
H	100	106,5	121,5	131
I	45	55	58	63
K	6,3	6,3	6,8	6,5
L	15	15	20	22
M	35	25	30	39,9
O	9	9	11	11
P	15	15	18	18
Q	8,5	8,5	11	11
Piston area: clamping cm²	16,7	24	37	28,9
Piston area: releasing cm²	23,7	31,2	44,2	33,3
Max. operating pressure bar	130	85	80	130
Pull-in-force N	21700	20400	29600	37500
Blast-air pressure bar	10	10	10	10
Weight kg	4	6	8	9

Sets can be aligned in height on request

### Application range:

The hydraulic actuated clamping device may be suitable for all existing sorts of pallet clampings.  
Preferable for very high repeatability i.e. at machining centres and transfer lines.

### Function:

The bottom side of the pallet - equipped with flanges and draw-in bolts - is placed on the reception tapers of the clamping heads and centered while the draw-in bolts are pushing back the spring loaded covers of the clamping heads. The pallet can either be loaded with a workpiece or not.

When activating the hydraulic clamping terminal with an appropriate pressure the collet encloses the draw-in bolt by the stroke of the clamping piston and the pallet will be drawn against the reception taper and locked.

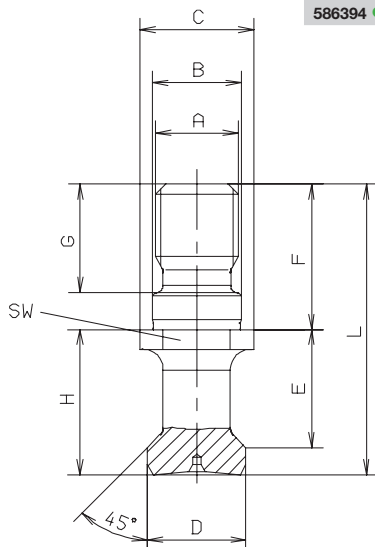
The clamping position may be monitored via air sensing and the values can be processed by the machine control unit.

During the clamping sequence pressurized air cleans the area of the collet and the reception taper.

## Accessories hydraulic clamping head

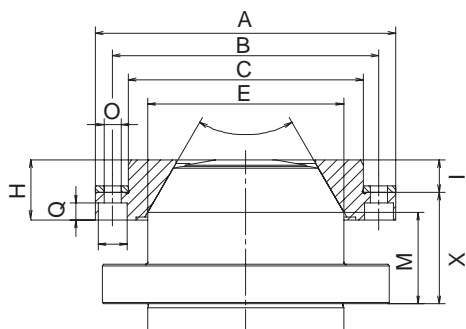
Tool group A 34  
Type 285-95 **Draw-in bolts for clamping heads**

Id.-Nr.	For clamping head size	Size A	B	C	D	E	F	G	H	L	SW
586393 ●	110	M16	17	21,9	18,95	22,75	28	21	28	56	19
850094 ●	125	M20	21	34	19	29	30	23	35	65	30
869859 ●	140	M24	25	41,5	27,5	34	40	33,5	40	80	36
586394 ●	148	M24	25	41,5	27,5	34	40	33,5	40	80	36

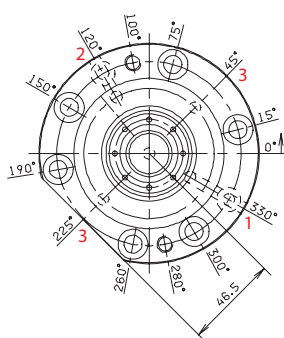


Tool group C 15  
Type 285-95 **Mounting flange for clamping heads**

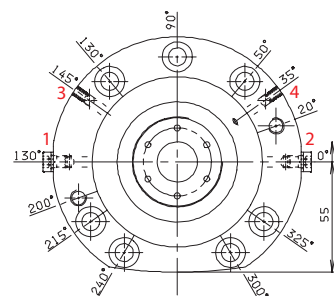
Id.-Nr.	For clamping head size	Size A	B	Partition	C	E	H	I	M	O	P	Q	X
488858 ●	110	115	102	4x90°	90	75	23	12,5	35	6,6	11	6,3	42,5
497213 ▲	125	125	106	4x90°	88	85	32,5	18,5	25	9	15	9	39
497214 ▲	140	135	116	6x60°	98	98	38,5	23,5	30	9	15	9	45
489557 ●	148	160	140	6x60°	120	100	38	23,5	39,9	9	15	9	50,5



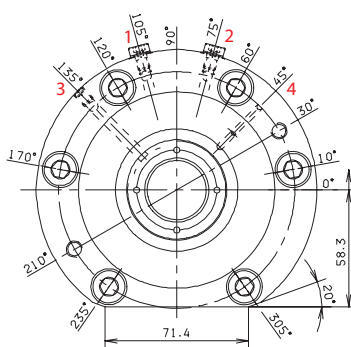
Position of mounting screws and medium terminals:



Clamping Head 110



Clamping Head 125





# The headquarter: our parent plant in Sontheim/Brenz.

The RÖHM parent plant is located in Sontheim/Brenz. In this ultra-modern production facility comprising 41,000 m<sup>2</sup>, optimum conditions have been achieved in order to solve the extensive range of discerning construction and production tasks making the company even better, faster and more efficient in the future.



Sontheim/Brenz



All national and international activities are planned and co-ordinated at the administrative headquarters in Sontheim. Thanks to the excellent infrastructure and transport routes available, this location is ideal for a company relying on perfect product quality as well as maximum flexibility. Furthermore, the region around Sontheim offers another key basis for the success of our company: it is rich in quality awareness and motivated employees with the result that we are ideally prepared for the challenges of the future. The parent plant uniquely unites mass production, serial production and customised individual production under a single roof.

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# Key locations for the company: Dillingen and St. Georgen.

Such strong growth on the part of the RÖHM Group is also obviously associated with higher requirements on development and production capacities. The demands of today and tomorrow can be complied with the two facilities in Dillingen and St. Georgen.



Dillingen/Danube

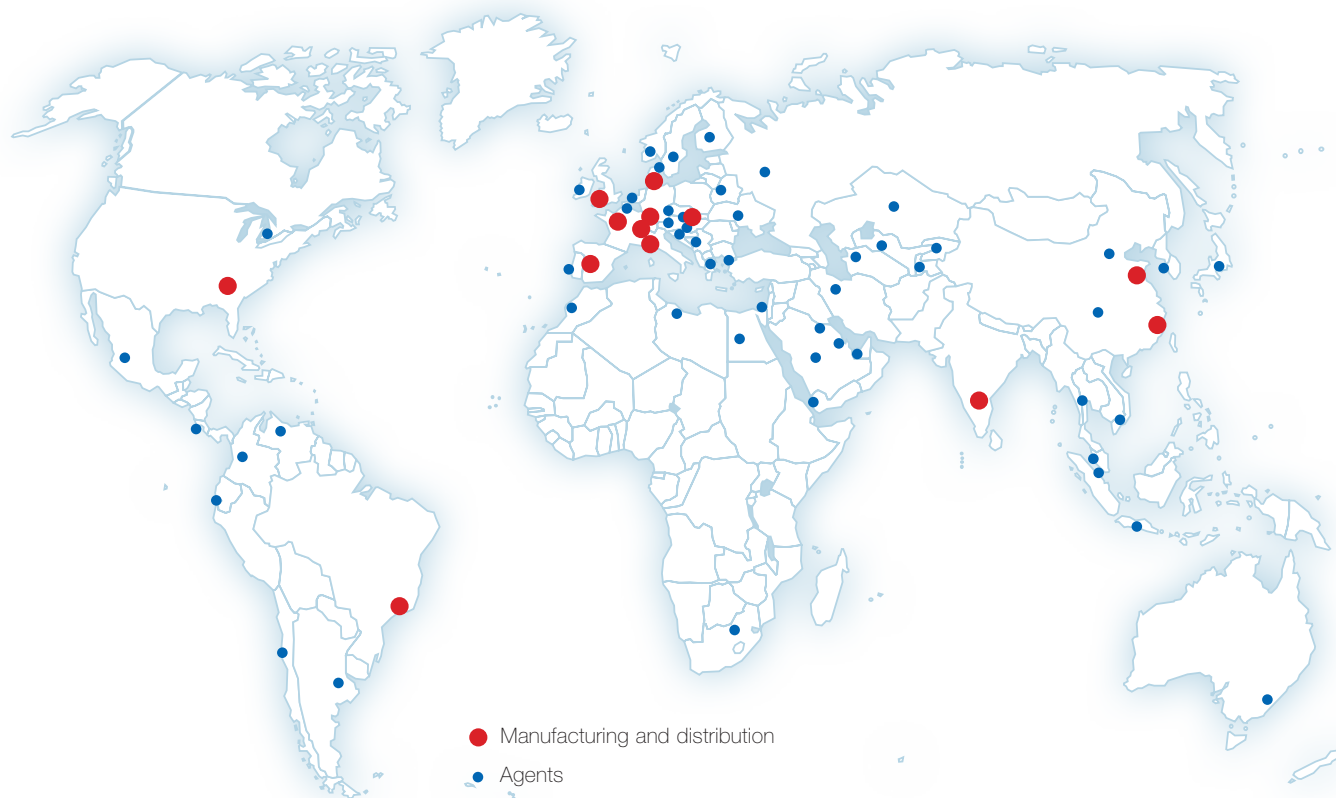


St. Georgen

**Plant: Dillingen/Danube** | This branch plant in Dillingen was put into operation by the RÖHM Group as early as 1953. Thanks to extremely positive development, the plant is subject to constant expansion and modernisation. For this reason, new modern production facilities were built in 1982 and 1991. In 2007 RÖHM built a new production hall for two portal turning and milling machines. This enables machining of workpieces up to 4 metres in length which will secure a leading market position for the RÖHM brand in the future.

More than 300 employees are primarily involved in engineering and manufacturing lathe chucks, machine vices and special clamping equipment for turning and milling machinery as well as for machining centres.

**Engineering and sales department St. Georgen** | Apart from standard mandrels, tailor-made solutions for a wide variety of requirements are also manufactured here in this small but accomplished high-tech forge. RÖHM retains mechanical or power-operated mandrels, sliding jaw mandrels and hydraulic mandrels for its customers for tensioning workpieces in drill holes or interior contours.



# Always close to our customers. With locations all around the world.

Customer orientation at RÖHM has less to do with marketing than with attitude. We consider customer proximity as an intensive dialogue with our partners as well as direct presence on key international markets.

The RÖHM manufacturing and distribution bases:



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FIXAÇÃO LTDA.  
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China



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# General conditions of sale and delivery

## § 1 Quotation, Formation of Contract and Content of Contract

1. The present General Terms of Sale and Delivery apply exclusively. We do not recognise any terms and conditions that are contradictory or different from our own, unless we have explicitly given our written agreement to do so. Our Terms of Sale and Delivery will also apply if we effect delivery to the Purchaser without any reservation in full awareness of the contradictory or different nature of the terms of the Purchaser, as compared to our own Terms.
2. Our quotations are always subject to change without notice unless they have been explicitly described as binding. The contract will only materialise upon our written confirmation and in line with the content thereof and by way of performance/delivery on our part. If delivery/service is immediately provided without any confirmation, the invoice will also be deemed to be the order confirmation.
3. Our General Terms of Sale and Delivery will only apply to a business entity as defined in Section 14 BGB [German Civil Code].
4. Costs for the compilation of drawings for specific constructions will be borne by the Orderer if, for reasons for which we are not responsible, the quotation does not lead to an order placement.
5. All particulars regarding weights, dimensions, services and technical data that feature in our printed matter, catalogues, price lists or in other contract documents are only approximate, unless they have been explicitly described as binding.
6. We retain the right to amend the construction and form of the subject of contract, providing this does not involve unreasonable alterations for the Orderer.
7. The documentation comprises an assembly layout, piece list with details of the wearing and spare parts, as well as operational and maintenance instructions; this is always in the German language. Documentation is only in paper form or in digital form. For digital forms, the texts are provided in the formats .TXT, .RTF or .DOC; drawings and piece lists are in the .TIF format (grid format). Any documentation in excess thereof will be billed and is subject to particular arrangement.
8. For testing, when specific temperatures, times and other measurements or control values are to apply, the appropriate measurement methods must be specified prior to delivery and acknowledged by both Parties. Unless such values are so defined, our own measurement methods will apply.
9. Samples will only be delivered subject to a fee.
10. Assurances given, ancillary agreements and changes to the contract will require the written form to be operative. It will not be possible to waive this requirement.
11. An order placement will be deemed irrevocable unless the Deliverer has agreed in writing to cancel it.
12. For export transactions, delivery will be subject to the conditions specified on the order confirmation; in addition, the respectively current version of the international trade definitions most commonly used in international sales contracts (incoterms 1953) will apply as devised by the International Chamber of Commerce.
13. In addition to the General Terms of Delivery and Sale, compliance with our "product information" sheets, the technical data sheets as well as other product-specific publications will apply, each in their current version.

## § 2 Prices

1. Failing specific written agreement, prices apply as in the Federal Republic of Germany, free house plus the value added tax required by law. For export transactions, the item to be delivered is deemed sold "ex works", unless the contract stipulates otherwise about the type of sale. For single orders for a value of goods less than 100.00 € net, a handling fee of 10.00 € plus the value added tax required by law will be charged throughout the country.
2. Please note that we only despatch the consignment at the request of the customer. Irrespective of this, the rulings laid down in Section 5 will apply.
3. We bill the prices that were valid when the contract was drawn up, based on the cost factors applicable at the time. Should these cost factors (particularly material, wages, energy etc.) alter during the period between the drawing up of contract and the agreed delivery time, we will be entitled to amend prices accordingly. For export transactions, the Deliverer will be entitled to cancel that part of the order that has not yet been completed or to adjust prices appropriately if the currency in which the contract was drawn up has devalued.
4. With an "ex works" contract, the goods will be transported at the expense and risk of the Orderer. For all consignments, the respectively current version of the provisions of incoterms 1953 will apply to the insurance and bearing of risk.
5. For parts/products that are produced in line with Purchaser requirements, we will notify the Purchaser of our production quantity. The Purchaser undertakes to take receipt of the quantity thus confirmed.
6. Over-deliveries and short-deliveries are admissible up to 5%; for special tooling up to 10% is admissible, at least, however, 2 (two) pieces. The respective delivery will be billed.

## § 3 Modalities of Payment

1. Failing specific arrangements, payment is due without deduction and without charges within 10 days of the date of invoice - even for delivery instalments.
2. We are not bound to accept cheques or bills. In the event cheques or bills are accepted subject to prior arrangement in individual circumstances, this will only be as conditional payment, taking due account of discount charges and collection fees that are to be paid immediately in cash by the Customer. The ultimate credit entry of bills of exchange and cheques will be after their redemption. The acceptance of cheques or bills will be without prejudice for subsequent commitments to payment. We will not be liable for the punctual presentation, protest, notification and return of a bill in the event it is not honoured.
3. Any overshooting of the payment deadline will incur interest to the amount of the banks' borrowing costs, at least, however 8% in excess of the respective basic interest rate of the European Central Bank.
4. If a bill or a cheque is not honoured on time or if a deadline for payment is over-reached, all receivables still outstanding, including those that are deferred and those for which bills or cheques have been given, will become due for immediate payment.
5. The Purchaser will only be entitled to offset if the counterclaims he asserts have been established by declaratory judgment, if they are undisputed or have been acknowledged by us. The Purchaser will be authorized to exercise a right of retention to the extent his counterclaim is derived from the same contractual relations.
6. For export transactions, payments will be paid subject to the modalities of payment contracted.

7. Costs of payment transactions, particularly bank charges of foreign payment transfers to us, are in principle for debits of the client.

## § 4 Delivery Period

1. The delivery period we specify begins to run providing all technical issues have been fully clarified. The delivery deadlines we give are in principle not binding and only constitute a probable delivery time.
2. The compliance with our commitment to deliver depends on the Purchaser having punctually and properly fulfilled his commitments, particularly his commitment to comply with the contracted terms of payment. The right to plea non-performance of contract will be retained. This right will also be derived from commitments that have not been satisfied in full from previous deliveries.
3. The period of delivery commences upon the despatch of the order confirmation, yet not before the Orderer has provided the documents, permits, clearance papers etc. to be procured and not before the agreed deposit has been received.
4. If a fixed delivery date has been arranged, the Deliverer will effect delivery on time. Compliance with the delivery period will be deemed given if the item to be delivered has left the works or the readiness for despatch has been notified before the expiry of said delivery period, subject to timely and accurate delivery from our own suppliers. If the Orderer amends parts of the consignment to be delivered, the delivery period will run anew upon confirmation of said amendment.
5. Force majeure, war, uprising, strike, lock-out or measures enforced by the authorities for whatever reason that impede delivery, as well as a lack of raw materials, means of transport and theft – even with our own suppliers – will release the Deliverer from his commitment to deliver within the specified period of time. The Orderer will be notified immediately of the occurrence of the hindrance and of the likely repercussions.
6. It is admissible to effect delivery prior to the expiry of the specified delivery period and to deliver in appropriate instalments.
7. Compliance with the delivery period depends on the fulfilment of all contractual duties of the Orderer.
8. In the event of delivery delays or of the impossibility of delivery, the provisions of Section 10 will apply.

## § 5 Transfer of Risk and Taking Receipt

1. Risk will pass to the Orderer at the latest with the despatch of the consignment, even if delivery is to be in instalments or if we still have other services to provide, e.g. despatch costs or transport and delivery as well as installation.
2. At the request and at the expense of the Orderer, we will ensure insurance cover of the consignment to be delivered for theft, breakage and damages from transportation, fire and water and for other insurable risks.
3. If despatch is delayed for reasons for which the Orderer is responsible, the risk will pass to the Orderer as from the date of readiness for despatch; nevertheless, we undertake to ensure insurance cover at the request and expense of the Orderer as called for by the Orderer.
4. Even if the delivered items feature insignificant defects, the Orderer will take receipt thereof irrespective of the rights laid down in Section 8.

## § 6 Default of Acceptance, Call-off Orders

1. If the Orderer fails to take receipt of the items contracted on time, we will be entitled to set the Orderer a subsequent period of grace after which we will be entitled to dispose of the items otherwise and supply the Orderer subject to a subsequently lengthened delivery period. Irrespective of this, we will be entitled to withdraw from the contract as defined in Section 326 BGB [German Civil Code] and to call for compensation for damages owing to non-performance. In the event we call for compensation for non-performance, we will be able to claim compensation of 25% of the agreed price plus value added tax without having to provide evidence. We retain the right to assert actual damages of a greater dimension.
2. Orders, which we confirm for call-off must be accepted within one year of the date of order placement at the latest - unless otherwise arranged. The same will apply to fixed reservations or to permanent "call-off" statuses. Section 6.1 will apply accordingly in the event the goods are not called off.

## § 7 Retention of Title

1. The items for delivery (the goods subject to the retention of title) will remain our property until all claims to which we are entitled from the Purchaser from the business relations have been satisfied in full. Where the value of all security interests to which we are entitled against the Purchaser exceeds all secured claims by more than 10%, we will release some of the security interests as appropriate at the request of the Purchaser.
2. During the period in which title to the goods is retained, the Purchaser is not allowed to pledge or assign the goods as security and is only permitted to resell to resellers in normal business transactions and only providing the reseller receives payment from its own customer or subjects the customer's ownership of the item to the full satisfaction of the customer's commitments to payment.
3. In the event of attachment, seizure or any other disposition or third-party intervention in respect of the goods, the Purchaser will notify us immediately so that we can file action subject to Section 771 ZPO [German Code of Civil Procedure]. If the third party is not able to reimburse us for the court and out-of-court costs of legal action pursuant to Section 771 ZPO, the Purchaser will be liable for the loss we thus incur.
4. The Purchaser undertakes to treat the item purchased with care. In particular, the Purchaser undertakes at his own expense to ensure it is adequately insured at reinstatement value against damages from fire, water and theft. Should maintenance and inspection work be required, the Purchaser will have this carried out in good time at his own expense.
5. In the event of breaches of duty on the part of the Purchaser, particularly with default in payment, we will be entitled to cancel the contract and to take back the goods; the Purchaser undertakes to surrender the goods. If we take back the goods and/or assert the retention of title, this does not mean we are cancelling the contract, unless we have explicitly declared as much.

# General conditions of sale and delivery

6. If the Purchaser has resold the item purchased in regular business transactions, the Purchaser herewith now assigns to us all claims to payment in the amount of the final invoice amount (including value added tax), such as due to the Purchaser from the resale to his customer or a third party, irrespective of whether the item purchased has been resold without or after further reworking. The Purchaser remains authorized to collect this payment, even after assignment. Our own authority to collect payment ourselves will not be affected hereby. However we undertake not to collect payment providing the Purchaser satisfies his own commitments to payment from the proceeds collected, does not default in payment and in particular providing the initiation of insolvency proceedings is not petitioned or payments cease to be made. Should this, however, be the case, we will be able to demand that the Purchaser provides us with details of the assigned payments and their debtors as well as all information necessary to collect payment, that he hands over the relevant documentation to us and notifies the debtors (third parties) of the assignment.

7. The processing or reworking of the item purchased by the Purchaser will always be carried out on our behalf. If the item purchased is processed with other items not belonging to us, we will acquire co-ownership to the new item to the value of the item purchased (final invoice amount including value added tax) in relation to the other processed items at the time of reworking. The same will apply to the thus newly created items as for the items delivered subject to retention of title.

8. If the item purchased is processed with other items not belonging to us, we will acquire co-ownership to the new item to the value of the item purchased (final invoice amount including value added tax) in relation to the other processed items at the time of reworking. If the intermixing is such that the Purchaser's item is to be deemed the main item, it is herewith agreed that the Purchaser will transfer co-ownership to us proportionately. The Purchaser will keep the property in which we hold exclusive ownership or co-ownership on our behalf.

## § 8 Quality Defects

We are liable for defects in quality as follows:

1. All parts or services will be remedied, at our discretion, free of charge or redelivered or provided again that are found to feature a quality defect during the statutory period of limitation - irrespective of service life - providing the origin thereof already existed at the time of the passing of risk.
2. Claims to quality defects will become statute-barred in 12 (twelve) months. The period of time commences with the passing of risk (Section 6).
3. The Purchaser will immediately file written objection to the quality defect with us.
4. In the event objections are filed, the Purchaser will be permitted to refrain from payment to an extent appropriate to the quality defects featured. The Purchaser will only be able to refrain from payment if an objection is asserted, the justification of which cannot be doubted. If the objection has been asserted unjustifiably, we will be entitled to call for the reimbursement of the expenses incurred by us.
5. Initially we will always be granted an opportunity to remedy a defect within an appropriate period of grace.
6. Should the remedy fail, the Purchaser – notwithstanding any claims to damages – will be able to cancel the contract or reduce remuneration. The Purchaser will only be able to call for the reimbursement of fruitless expenditure if the defect in question is attributable to our own wilful intent or gross carelessness for which we are responsible.
7. Claims to defects in quality are not given if the divergence from the agreed nature of the product is only minimal, if usability is only insignificantly impaired, in cases of natural depreciation or damages generated after passing of the risk as a result of faulty or negligent treatment, excessive exposure, unsuitable operating media or because of specific outer impact that was not to be expected given the contract, as well as in cases of non-reproducible software errors. If amendments or repair work is carried out improperly by the Purchaser or by third parties, there will be no claims to the defects resulting or the effects thereof. The same will apply to a lack of compliance with our instructions on handling and other instructions and if maintenance is not carried out properly.
8. Claims of the Purchaser to a refund of the expenses incurred for the purpose of remedy, such as costs of transport, travel, labour and materials will be ruled out, when such expenses increase because the item delivered was brought to a destination other than the Purchaser's branch premises, unless said relocation is in accordance with the intended use of the item.
9. Legal claims to recourse against us on the part of the Purchaser will only be given if the Purchaser has entered into no agreement with his customer in excess of those claims to defects regulated by the law.
10. Claims to compensation for damages will be governed by Section 9. Any farther-reaching claims to quality defects or others than those governed in this Section or in Section 9 will be ruled out.

## § 9 Industrial Property Rights and Copyrights, Defects of Title

Unless otherwise agreed, we undertake to only effect delivery free from proprietary rights and third party copyrights (referred to in the following as industrial property rights) in the country of the delivery destination. In the event a third party files justified claims against the Purchaser for a breach of industrial property rights derived from deliveries we effected that are being used as contracted, we will be liable towards the Purchaser for the period of time specified in Section 8.2 as follows:

1. At our discretion and at our own expense, we will either procure a licence for the deliveries in question, alter them so that there is no breach of industrial property rights or we will provide a substitute. Should this not prove possible at appropriate conditions, the Purchaser will be entitled to the rights of cancellation or reduction as laid down by the law. The Purchaser will only be able to call for the reimbursement of fruitless expenditure if we are to blame for wilful intent or gross negligence. Our commitment to provide compensation for damages is governed by Section 10.
2. The above commitments will only be given if the Purchaser has given us immediate, written notification of the claims asserted by the third party, does not recognise any breach of rights and if we retain the right to initiate defence measures and negotiate a settlement. If the Purchaser ceases to use the item delivered in order to reduce damages or for other good cause, the Purchaser undertakes to inform the third party that this discontinuation of use does not embody any acknowledgement of a breach of industrial property rights.
3. Claims of the Purchaser will be ruled out if the Purchaser is responsible for the breach of industrial property rights.
4. Any claims of the Purchaser will also be ruled out if the breach of industrial property

rights was derived from specific specifications of the Purchaser, from an application that we could not foresee or from the item delivered being altered by the Purchaser or used in combination with products that we have not delivered.

5. In the case of breaches of industrial property rights, the provisions of Sections 8.4, 8.5 and 8.9 will apply appropriately to the claims of the Purchaser governed by Section 13.

6. Any farther-reaching claims to defects of title of the Purchaser or claims other than those governed by the present Section 9 against us or our vicarious agents will be ruled out.

## § 10 Overall Liability

1. Claims of the Purchaser to compensation for damages – irrespective of the legal nature of the claim asserted – will be ruled out.
2. The exceptions are:
  - a) Damages due to the violation of major contractual duties (cardinal duties). However, in the case of simple negligence, liability for damages will be restricted to foreseeable, typically occurring damages.
  - b) Damages derived from injury to life and limb if we are responsibility for the breach of duty.
  - c) Damages attributable to wilfully intentional or negligent violations, said breach of duty on the part of our legal representatives or vicarious agents being of equal status to any breaches of duty on our part.
  - d) Claim to damages for impossibility or inability.
3. Any alteration of the onus of proof to the detriment of the Purchaser does not relate to the above provisions.
4. Liability subject to the Product Liability Act remains unaffected hereby.
5. Where liability for compensation is ruled out or restricted in our respect, this will also apply to the personal liability for damages of our employees, our trade representatives and our vicarious agents.

## § 11 Duties to Involvement of the Purchaser

1. The involvement of the Purchaser that has been agreed to explicitly or implicitly in the contract will be subject to no specific remuneration, unless otherwise explicitly agreed.
2. The Purchaser undertakes to inform us in good time of all facts, which indicate that stocks and products we have made available in the light of our notified production capacities cannot be used or not be used in full. Where stock remains, in the case of a premature change to his planning, the Purchaser will take over the remainder and any costs of destruction that might be incurred. This will also apply to products for which we have had to place orders for minimum quantities from our own suppliers, providing we previously advised the customer thereof.
3. The Purchaser guarantees that the products delivered by him for reworking are suitable for the purpose. We do not undertake to check the products delivered by the Purchaser for their quality and aptitude for reworking. In ongoing business relations and whenever an item for reworking has been initially checked, tested and released, the Purchaser undertakes to inform us in writing of each and every product amendment without actually being requested to do so. When items are being reworked, after every change in production conditions on his premises, in particularly when substituting tooling, machinery or introducing new production processes, the Purchaser also undertakes to examine the item to be processed by us for any divergence and alteration and to notify us in writing of any such divergence and alteration.
4. Instructions from our Purchaser, the selection of material or other specifications laid down by the Purchaser do not oblige us to check them for accuracy.
5. The Purchaser will hence check all instructions it issues as well as the quality of the material specified to us or made available to us for compliance with the law and technical regulations.
6. Should the Purchaser default in terms of its duties to provide or to become involved, we will be entitled to the rights stipulated by law.
7. In any case, goods may only be returned subject to the explicit consent of the Deliverer. Their return will be free-house and details of the order number and delivery date will be given as well as the original delivery packaging. The goods will be in their original condition, i.e. in an undamaged state. For the handling of a return, we charge 20% of the value of the goods, at least, however, 50.00 € plus value added tax. In individual circumstances, the Deliverer retains the right to charge the Orderer a higher sum based on evidence.

## § 12 Place of Performance and Jurisdiction/ Other

1. The place of performance and payment will be the registered office of our company in Sontheim/Brenz.
2. Exclusively the laws of the Federal Republic of Germany will govern the present contractual relations. The application of the United Nations Convention dated 11.04.80 on Contracts for the International Sale of Goods (CISG – "Wiener Kaufrecht") is ruled out.
3. For all disputes derived from contractual relations, if the Orderer is a registered businessperson, a legal entity under public law or a separate estate under public law, legal action will be filed with the court of law with jurisdiction for our registered office. We will also be entitled to file legal action at the location of the registered seat of the Orderer.
4. Should any one condition of our General Terms of Sale and Delivery be void for any reason whatsoever, the validity of the remaining provisions will not be affected hereby.
5. We will save your data in accordance with Section 23 BDSG [Federal Data Protection Act].

RÖHM GmbH

D-89565 Sontheim/Brenz

Revised: September 2012





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