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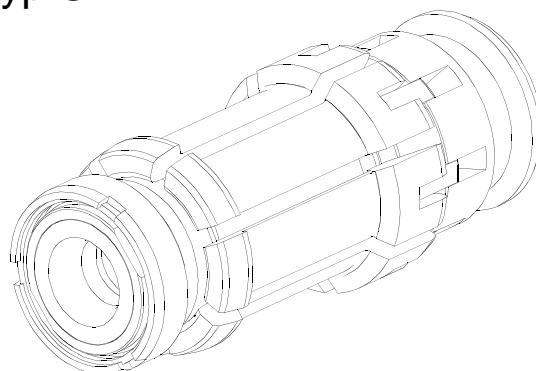
Spanntechnik

JAKOB

Product Information

Clamping-Unit HSK 2S

Typ C



95.600.050.D.E / 2005-07

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JAKOB
GRUPPE

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symbol explanation:



keep attention -
dangerous

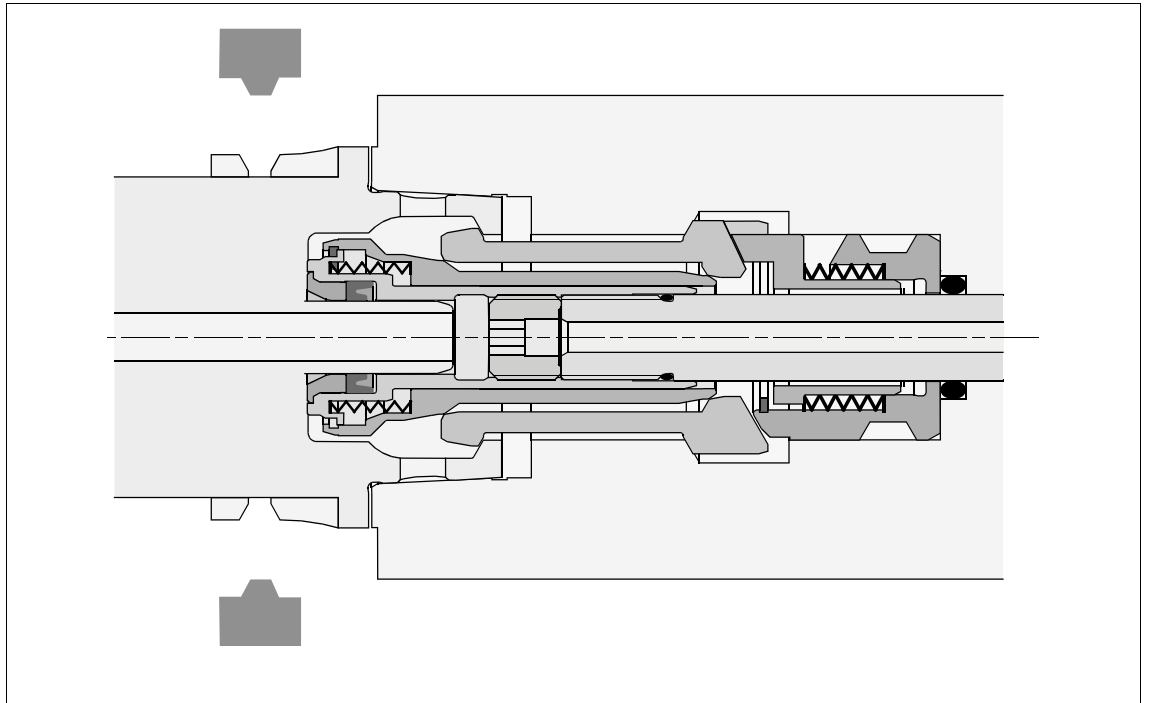


keep attention - malfunction

1 Product Description

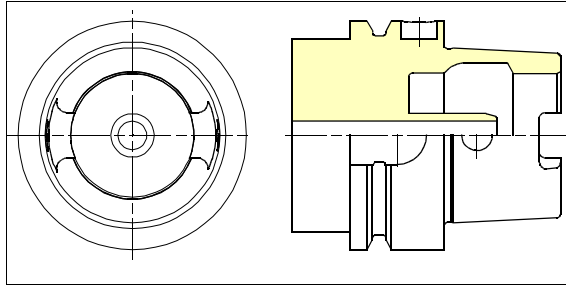
1.1 Features

- Positive tool lock and parallel moving segments
- surface contact and high life expectancy
- high static and dynamic stiffness due to amplified force
- central coolant supply
- holding of the tool before and after clamping (2S / two-steps)



1.2 Standard

hollow shaft taper ISO / CD 12164-1; form **A**



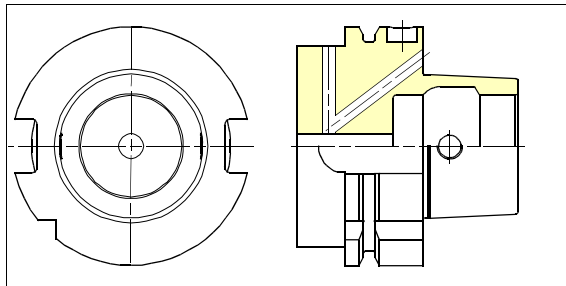
features:

- central, axial coolant supply with KSM-tube
- keyways at the taper end

application:

- machining centers, milling machines

hollow shaft taper DIN 69893-2; form **B**



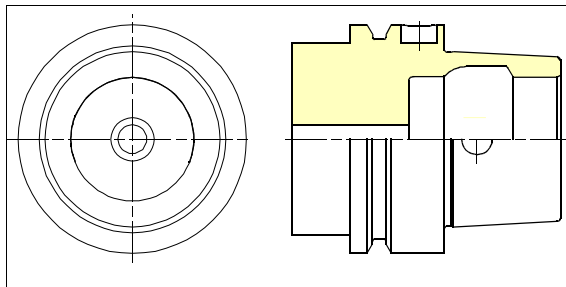
features:

- decentralized coolant supply over the flange or central coolant supply through coolant tube
- enlarged flange
- keyways at the flange

application:

- machining centers, heavy milling machines

hollow shaft taper DIN 69893-5; form **E**



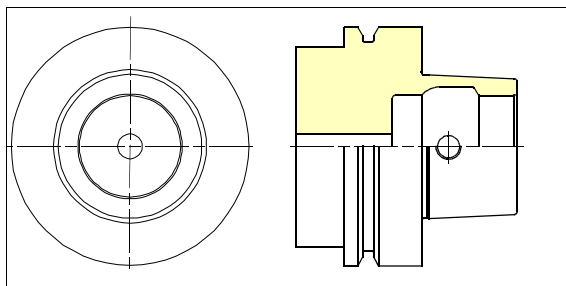
features:

- rotational symmetry without keyways

application:

- HSC-spindles

hollow shaft taper DIN 69893-6; form **F**



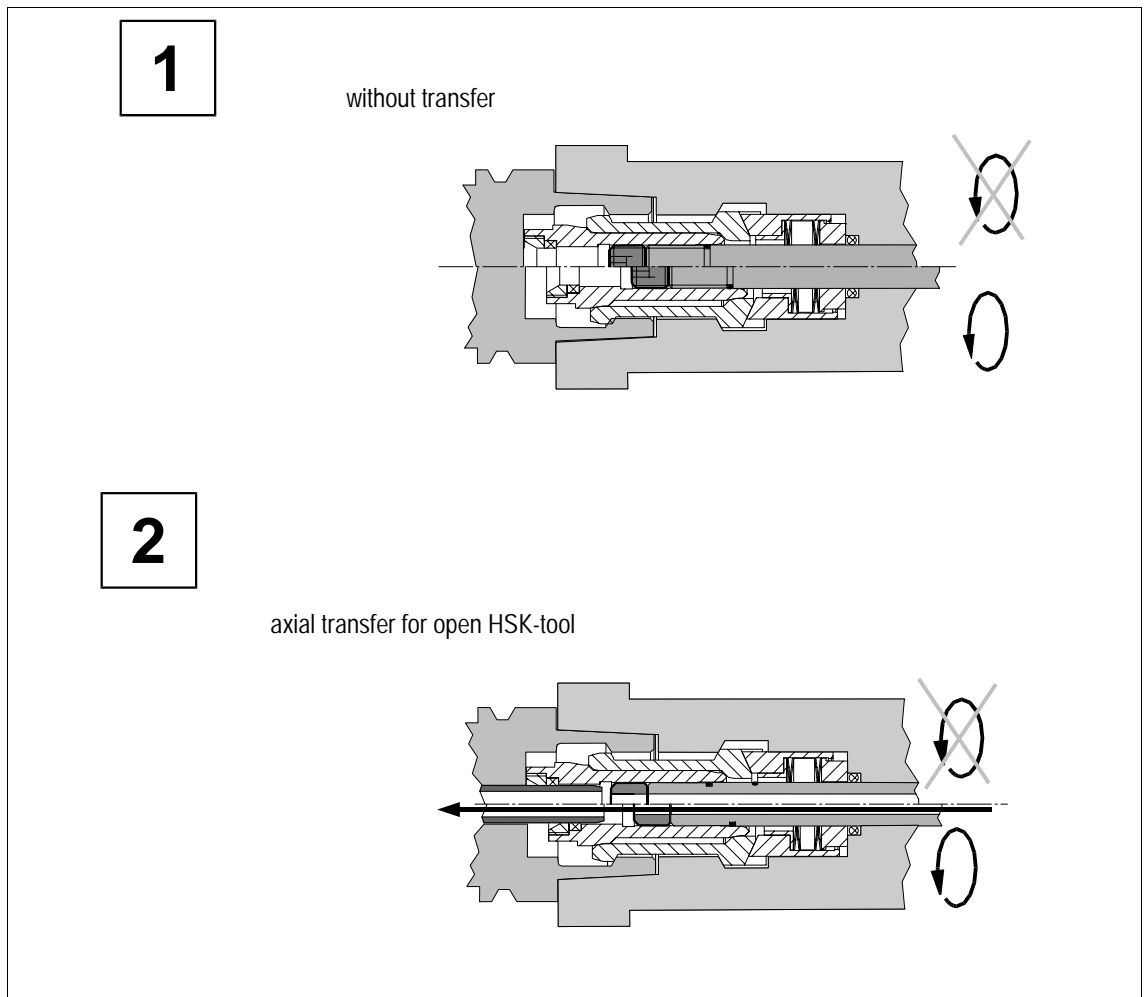
features:

- enlarged flange

application:

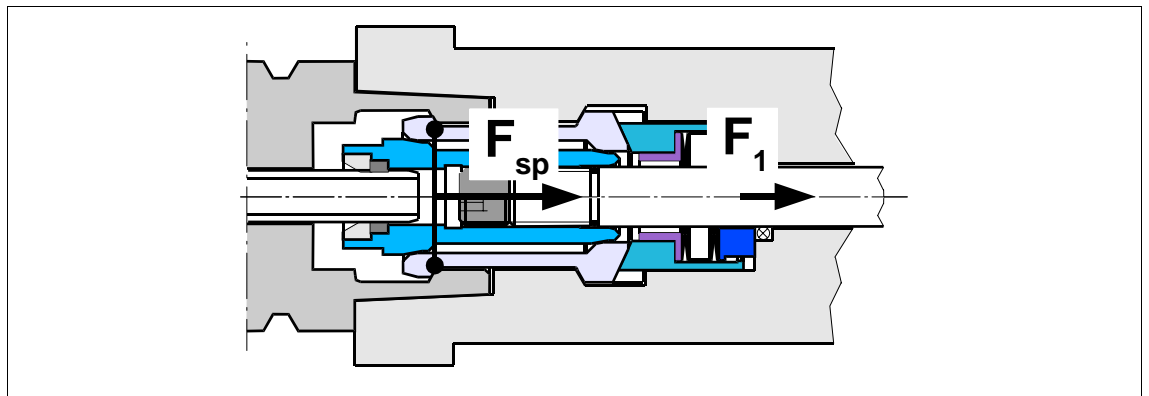
- HSC-spindles e. g. machining of wood and plastic

1.3 Medium transfer

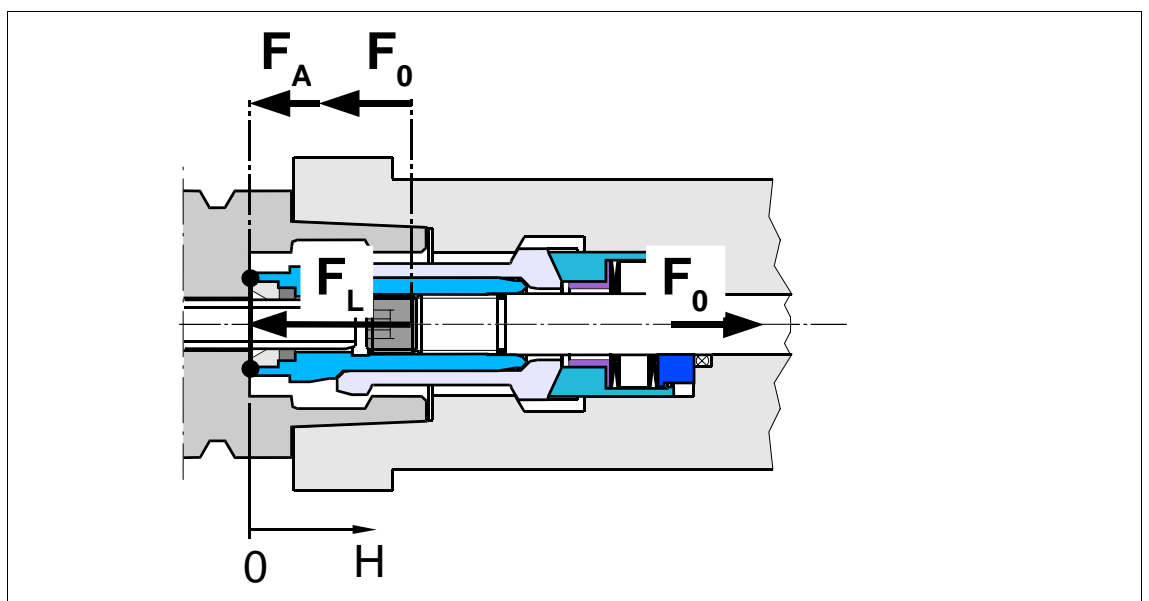


1.4 Forces at the HSK-clamping unit

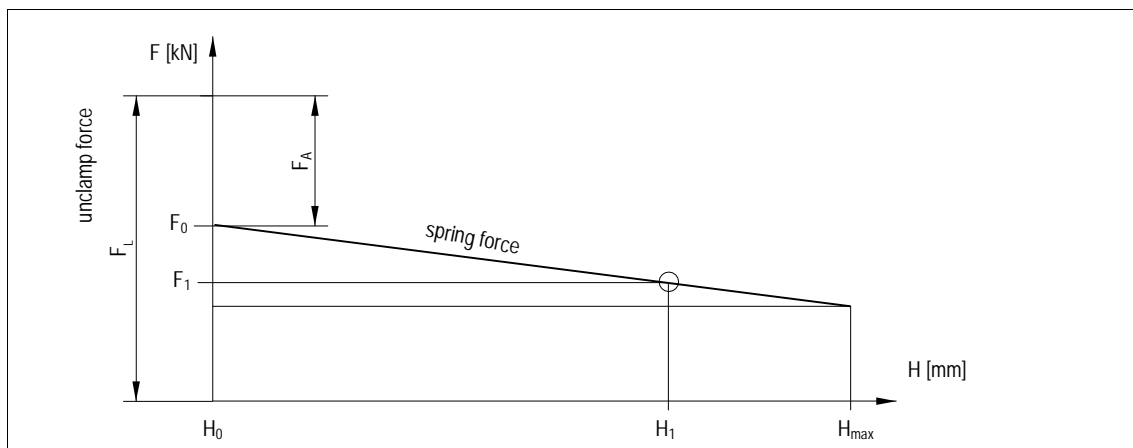
1.4.1 Clamped position



1.4.2 Unclamped position



1.4.3 Diagram



1.4.4 Table

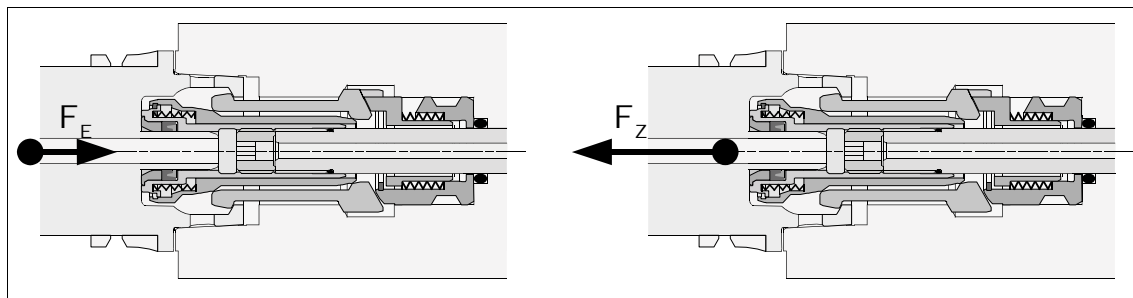
d_1	F_{sp} [kN]	F_1 max. [kN]	F_A [kN]
A63	18	6	3,2
A80	28	9,2	5,2
A100	45	15	7

1.4.5 Transferable torque

by frictional resistance

d_1	transferable torque [Nm]
A63	97
A80	190
A100	365

1.4.6 Push-In-Force / Pull-Out-Force)



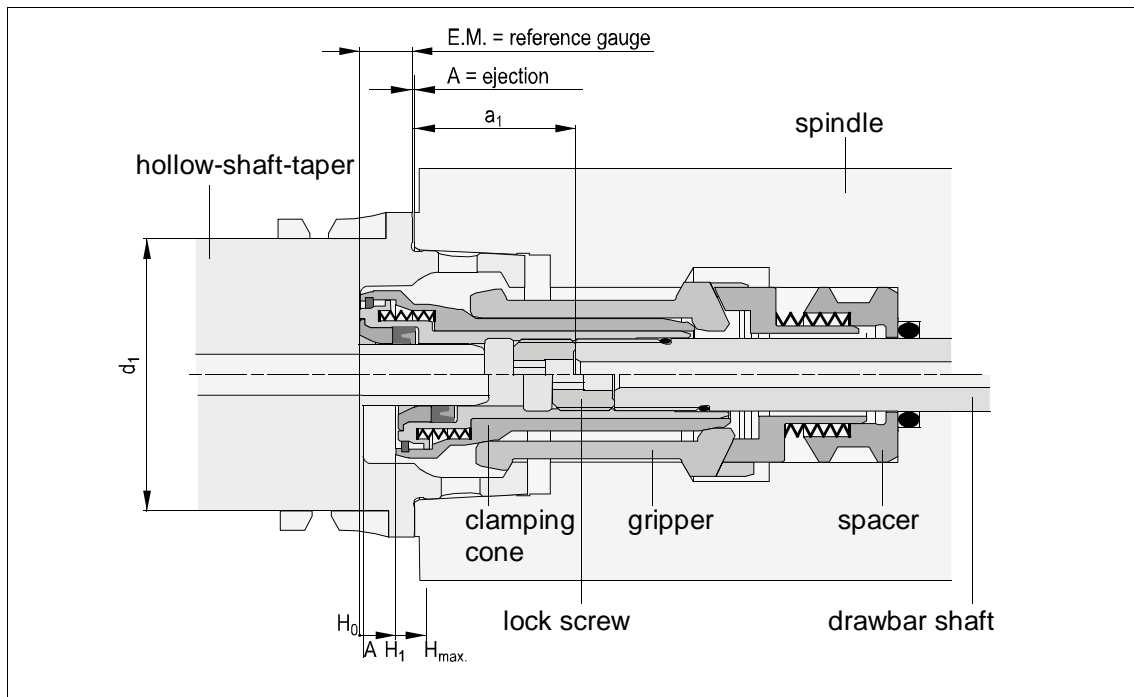
nominal size d_1	push-in-force F_E [N]	pull-out-force F_Z [N]
A63	~ 40	~ 200
	~ 60	~ 270
	~ 80	~ 400
A80	~ 90	~ 300
A100	~ 100	~ 400

1.5 Ceiling speed

d_1	ceiling speed [min ⁻¹]
A63	27201
A80	20897
A100	15466

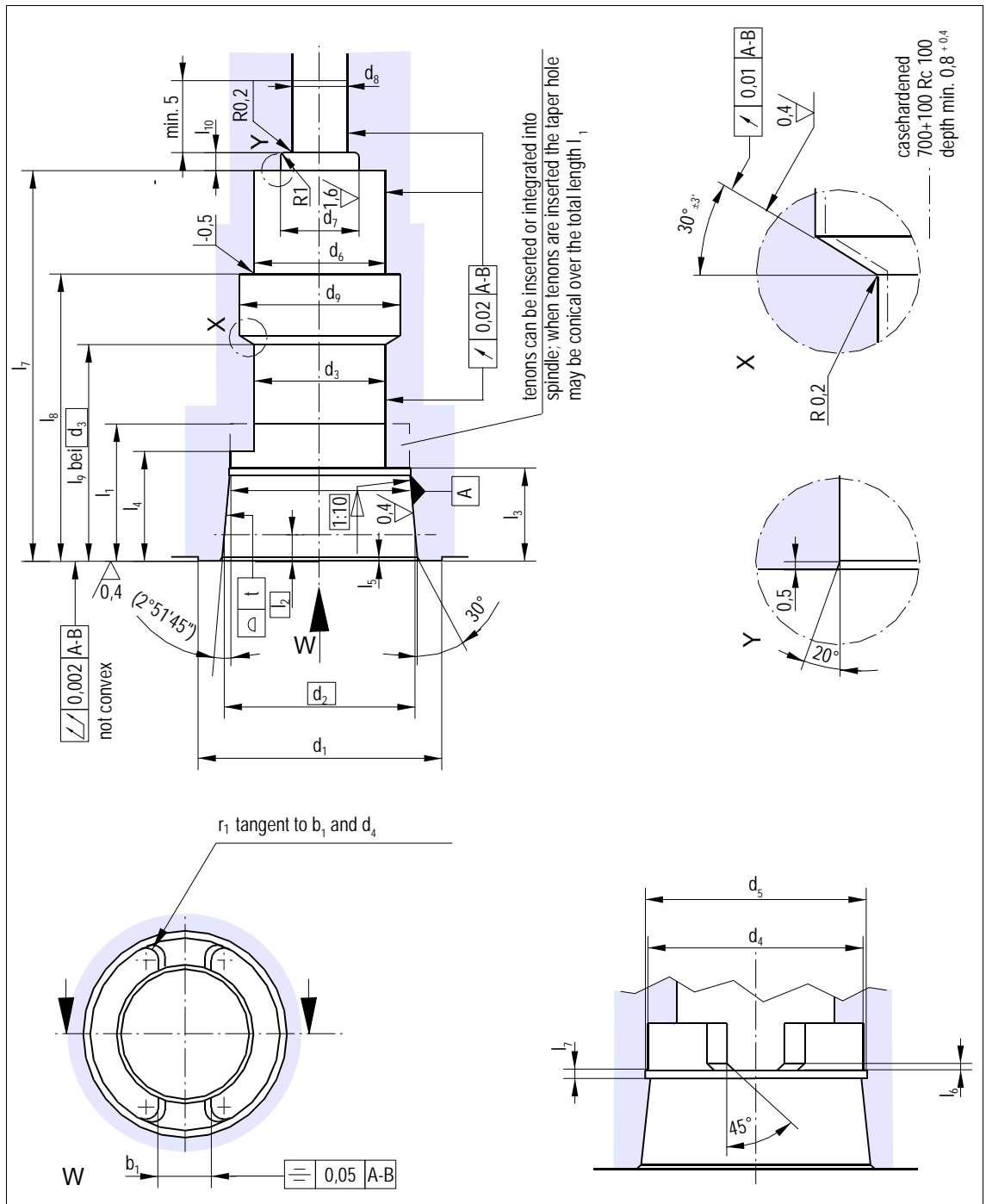
1.6 Dimension

1.6.1 Clamping unit



mm	d_1	A63	A80	A100
	A	0,5	0,5	0,5
	E.M.	10,5	13	13
	$H_{max.}$	10	11	12,5
	H_1	7,4	8,3	9,15
	a_1	31,5	31,5	40,5

1.6.2 Spindle inside contour HSK form A



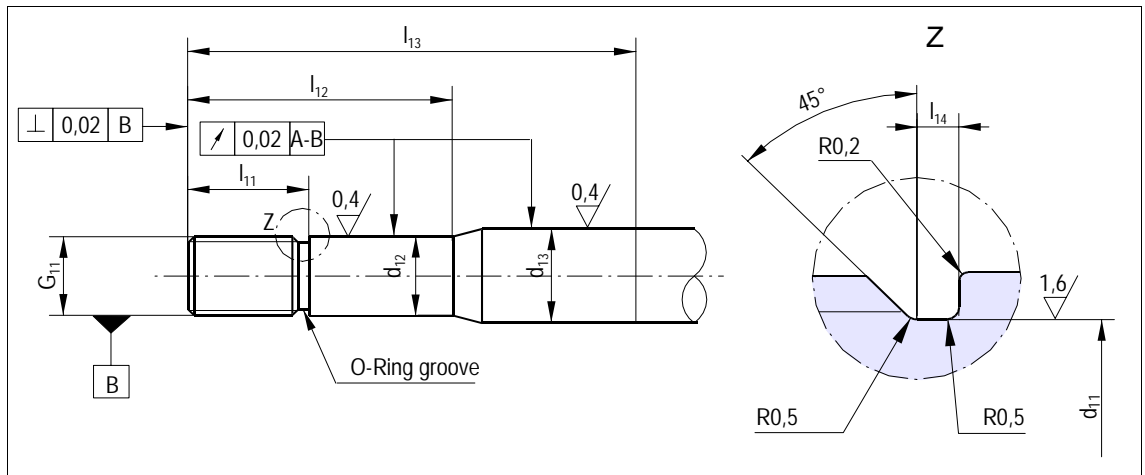
		d₁		63	80	100
ISO / CD 12164-2 *	[mm]	b₁	±0,05	12,3	15,8	19,78
		d₂		47,998	59,997	74,997
		d₃	H10	34	42	53
		d₄	+0,1	46,53	58,1	72,6
		d₅	+0,2	47,2	58,8	73,4
		l₁	+0,2	33	41	51
		l₂		6,3	8	10
		l₃	+0,2	22,4	28,4	35,4
		l₄	+0,2	26,4	32,4	40,4
		l₅		1	1,5	1,5
		l₆	+0,1	1,5	2	2
		l₇	±0,1	2,5	3,0	3,0
		r₁	-0,05	3	4	5
t **		0,0020	0,0025	0,0030		
clamping unit	[mm]	d₆	H6	34	42	53
		d₇	+0,1	20,4	22,4	24,2
		d₈	+0,1	14,6	16,6	18,4
		d₉	+0,2	41,6	50	63
		l₇	-0,2	94	98	124
		l₈	±0,1	69	72	93
		l₉	js8 bei d ₃	52	56	70
		l₁₀	+0,2	4,2	4,2	4,2

The dimensions in the clamping unit section are for spindle speeds up to 10000 rpm. For higher spindle speeds we recommend to reduce the tolerance of dimension d₈ and the runout. Please let us know if you need additional information.

* see update standard

** see ISO 1101 and ISO 3040

1.6.3 Draw bar HSK form A

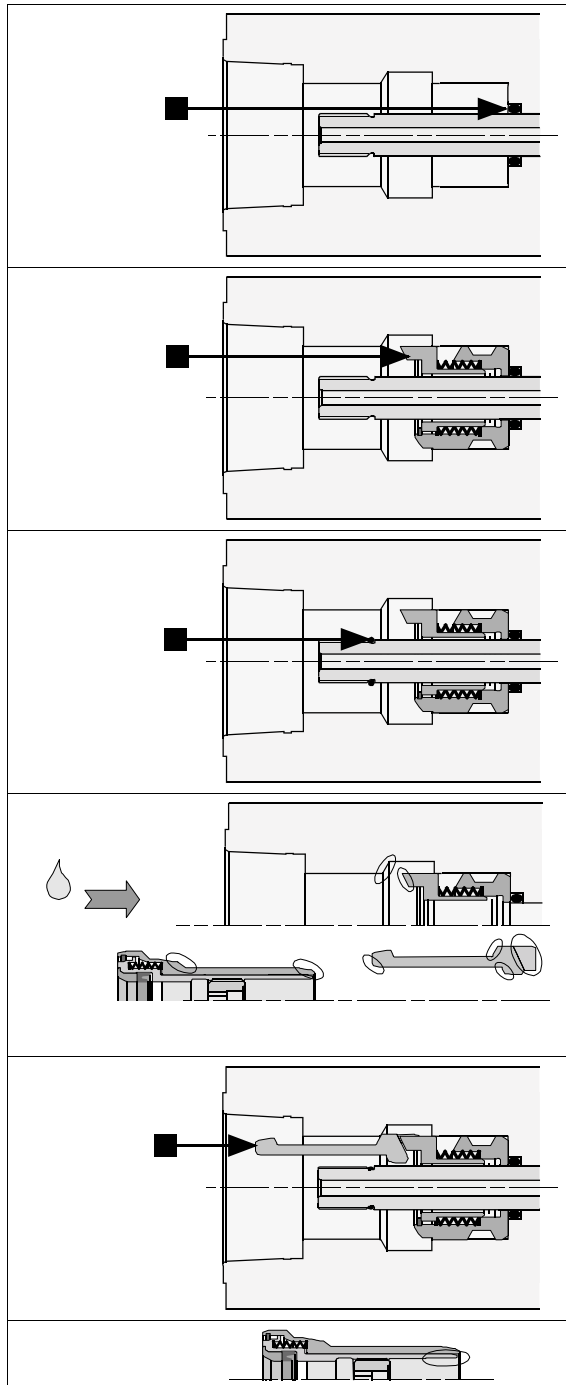


	d_1		63	80	100
[mm]	d_{11}	-0,1	11,9	13,9	13,9
	d_{12}		14,2 _{g7}	16,2 _{g7}	16,2 _{h8}
	d_{13}		-	-	18 _{g7}
	G_{11}	-4g	M14x1,5	M16x1,5	M16x1,5
	l_{11}		18,5	21,5	32
	l_{12}		76	80	50
	l_{13}		-	-	101
	l_{14}		1,4 ^{+0,1}	1,4 ^{+0,1}	1,4 ^{+0,1}

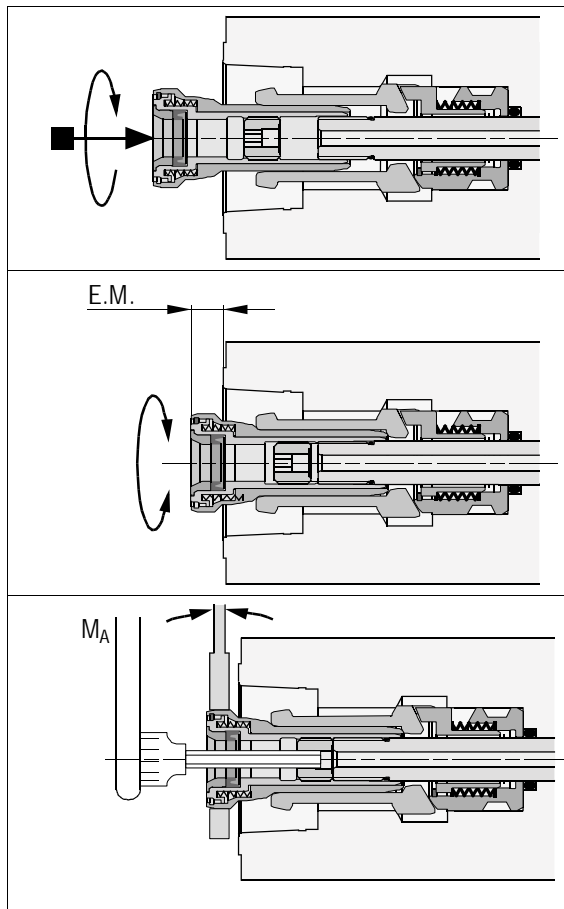
1.7 Order number

clamping-unit	pull-out-force	order number
HSK A63 C	400 N	95.600.052.2.6
	200 N	95.600.052.2.6 V01
	270 N	95.600.052.2.6 V02
HSK A80 C	300 N	95.600.053.2.6
HSK A100 C	400 N	95.600.057.2.6

2 Assembly



- Clean spindle inside contour
 - make sure that edges are properly rounded
 - grease O-rings
 - mount o-ring in the spindle
 - push spacer into spindle and check for ease of movement
 - mount o-ring on the drawbar
- Protective sleeve obtainable:
HSK A 63: 95.601.169.4.1
- grease area of contact
 - ➔ METAFLUX-Paste 70-8508
 - or
 - ➔ KLÜBER-Paste ME 31-52
- do not mix the grease!
- snap gripper segments in the spacer; ensure that the numbers match
 - grease clamping cone with mounting grease



- screw clamping cone (pre-assembled with seal, protective sleeve and lock screw) on to the drawbar shaft at maximum to the setting dimension; do not continue to turn since otherwise the o-ring on the drawbar shaft will be damaged!

in unclamped position:

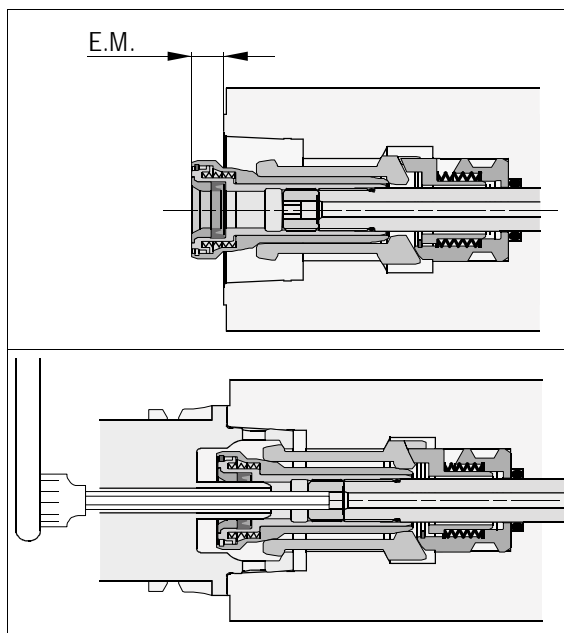
- adjust gauge dimension E.M.

- tighten the lock screw

starting torque::

- E25: 7 Nm
- A32 / B40 / E32: 10 Nm
- A40 / B50 / E40 / F50: 15 Nm
- A50 / B63 / E50/ F63: 20 Nm
- A63 / B80 / E63 / F80: 30 Nm
- A80 / B100: 30 Nm
- A100: 50 Nm

2.0.1 Check after approx. 100 strokes



In unclamped position


- Check dimension gauge E.M.

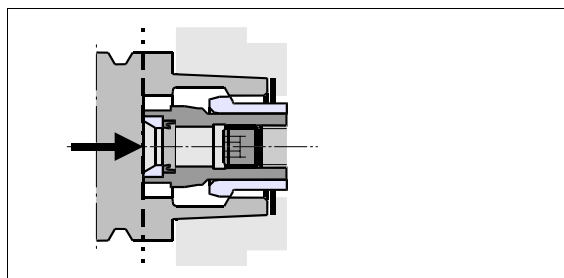
- re-tighten through a clamped tool

3 Operation


ATTENTION

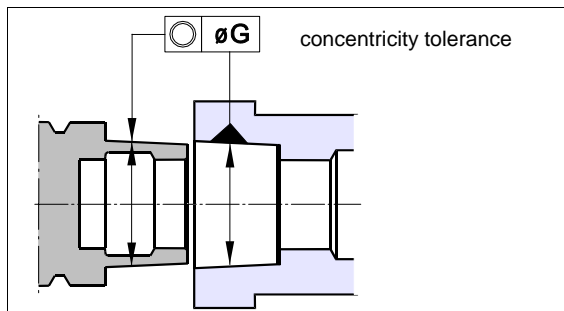
No rotation without clamped tool!


Important



Do not insert tool into the spindle taper when rotating!

The tool has to be inserted all the way to the plane surface of the clamping cone to prevent misclamping!



Our recommendation for the concentricity tolerance for tool changing as well as the maximum force on the plane surface on the clamping cone is shown in the table below:

standard size	A 63	A 80	A 100
concentricity (øG)	0,8	1,0	1,0
tool changer force max. [kN]	3,6	5,6	9

Recommendation: install a limit switch for the drawbar

In order to minimize wear, the coolant tube at the interface of the gripper assembly and tool should be shaped as follows:

- minimum and easy going and angular flexing (per ISO/DIS 12164-1)
- ground

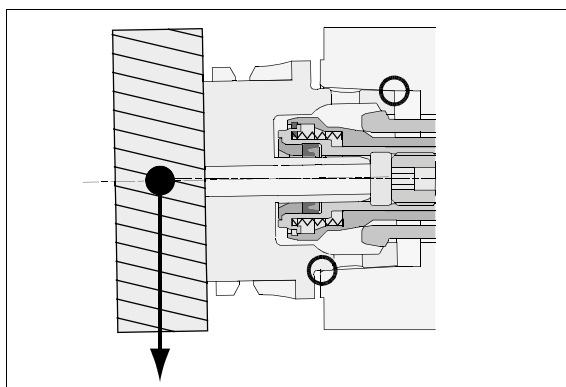
Follow preventive maintenance schedule!

Holding Function

The Power Drawbar features a holding function for the tool. When the power drawbar is positioned for tool change, the tools are held by a specified force in the tool change position. With automatic tool changing, the tool changer must be rigidly designed to withstand the tool pull forces.

Forces occurred by acceleration in the different axis, as well as, the cleaning process using air or coolant, could be greater than the holding forces developed by the drawbar and could push out the tool. Therefore, make sure that the external forces are smaller than the actual holding forces.

Especially quick acting ejecting cylinders accelerate the tool so much that the holding function of the power drawbar could be overcome. The adjustments for the unlocking function must also suit this situation. For vertical tool change, the weight of the tools must also be considered.



At horizontal application pay attention to the wear at the support points because of the dumping tool.

4 Maintenance

4.1 Preventive maintenance schedule

To guarantee the function of the power drawbar the following preventive maintenance schedule must be adhered to.

Every week

- Check the packing ring in the clamping unit (visual check)
- Check the gripper, is it damaged or dirty, is it sufficient greased (visual check) ?
Pay attention to:
The regrease cycle depends on the loss of lubrication of the clamping unit.
Cause for the loss of lubrication:
 - Seal in the clamping cone is defective
 - Type of medium used can desolve grease
 - Cleaning spray from outside directly on the clamping unit etc
- Note: METAFLEX Moly-Spray No.70-82 is recommended for a quick regreasing of the clamping unit without gripper-disassembly .

Every six month or after 200.000 tool changes at the latest

- In unclamped position: Check dimension gauge E.M.
- counter through a clamped tool again.
- Test Pull-in-force (we recommend:use Power-Check):
If the pull-in-force is smaller than 70% of the nominal value, following procedures have to be performed in the following sequence:
 - regrease and test pull-in force again
 - exchange gripper and test again
 - exchange drawbar completely

Every year or after 500.000 tool changes at the latest

- Exchange the packing ring ⇒ 4.3 / S.21

4.2 Wearing part list

4.2.1 Grease for HSK-clamping unit

<i>name</i>	<i>quantity</i>	<i>order-no.</i>
* METAFLUX-grease-paste Nr. 70-8508	4 g	0.929100.012
METAFLUX-moly-spray Nr. 70-82	400 ml	06.21001.010
KLÜBER-grease-paste ME 31-52	10 g	06.21001.014
KLÜBER-spray ALTEMP Q NB 50	400 ml	06.21001.015

* original lubrication and first equipment



Important

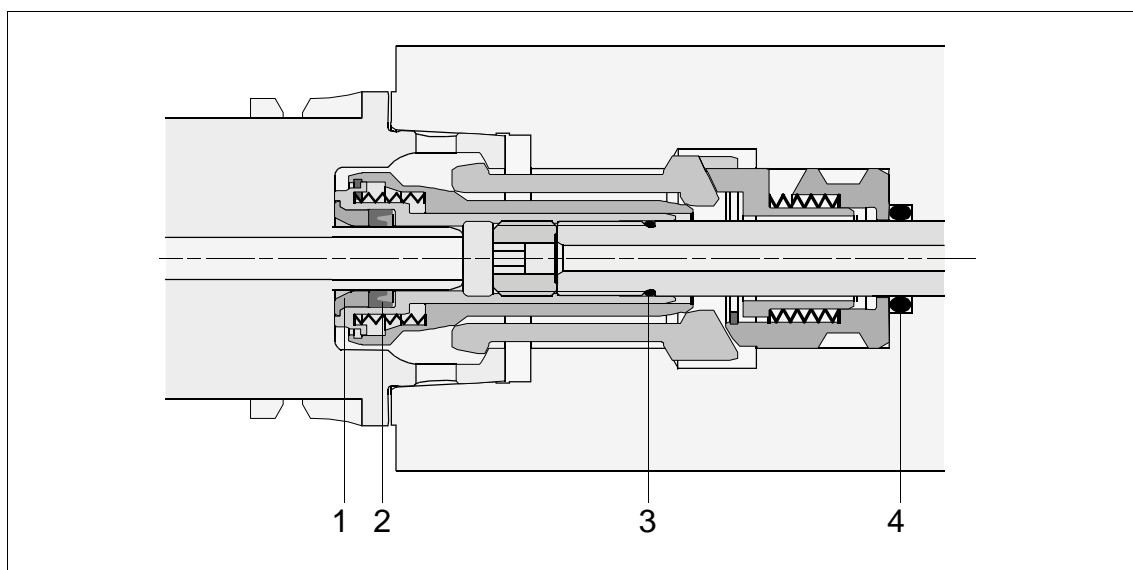
Note: take only grease of one company; do not mix the grease!

METAFLUX	Metaflux AG Industriestraße 11 CH-4313 Möhlin Tel.: +41-61-851 08 00 Fax: +41-61-851 08 08	KLÜBER	Klüber Lubrication München KG Postfach 701047 D-81310 München Tel.: (0 89) 78 76 -0 Fax: (0 89) 78 76 -333
	TECHNO-SERVICE GmbH Detmolder Straße 515 D-33605 Bielefeld Tel.: (05 21) 9 24 44 -0 Fax: (05 21) 20 74 32		

Aid for regreasing with paste in mounted state (clamped without tool):

<i>name</i>	<i>HSK-size</i>	<i>order-no.</i>
Bürste	A50 - A100	06.16001.001

4.2.2 O-rings and lip seal parts - HSK C

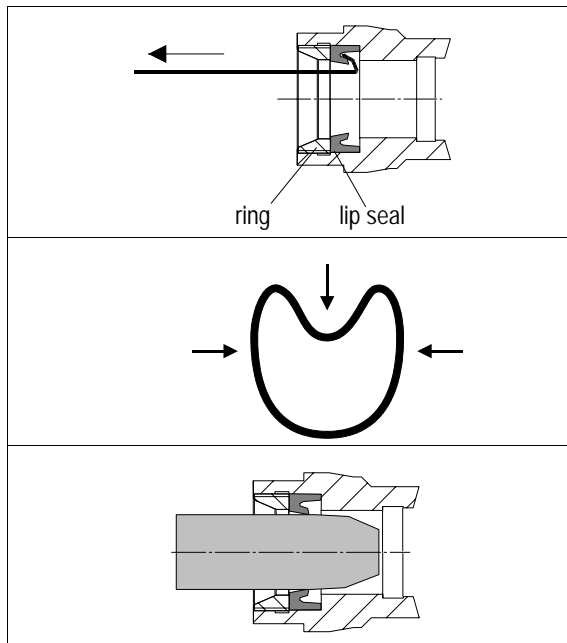


clamping unit HSK C		lip seal		O-rings	
		1	2	3	4
A63	95.600.052.2.6	95.602.194.3.1	0.926030.103	0.926010.156	0.926010.164
		-	12 x 18,5 x 4,5	12,0 x 1,5	13,87 x 3,53
A80	95.600.053.2.6	95.601.050.4.1	0.926030.108	0.926010.167	0.926010.173
		/	14 x 20 x 4,8	14 x 1,5	16 x 3,5
A100	9560005726	9560118941	0926030109	0.926010.167	0.926010.169
		/	16 x 24 x 5,5	14 x 1,5	18 x 3,5

material: viton, hardness 80 SHORE A

4.3 Exchange of the lip seal

For dismounting the lip seal it is not necessary to take away the ring. Only when the ring is damaged it must be exchanged.



- Take away the damaged lip seal with a hook or pliers
- Compress the lip ring and build in; look for the build in position
- press the seal with a blunt object against the lining
- take a mandrel to bring it in the finally position

4.4 Trouble shooting HSK C

trouble	reason
tool is not pulled in correctly	gage dimension out of adjustment
	lock screw got loose
	wrong or faulty spindle-inside-contour
	wrong or faulty tool-inside-contour
	spring stack broken (travel not sufficient)
	wear of clamping unit
	tool feed not correct
	air blow off prevents tool from seating during tool change
tool is pulled out during work cycle	gripper segments, clamping cone or drawbar broken
	tool shank broken
	springs broken
	pull-in force not sufficient
when in hold position, tool falls out of the spindle	tool is released thru cleaning air blast
	tool is pushed out of the spindle thru cleaning air blast
	axial acceleration too high
	unclamping speed too high
	gripper assembly worn - holding force insufficient
loss of pull force	lack of lubrication on clamping set
	<i>recommendation: check pull-in force!</i>