



LET OUR EXPERIENCE WORK FOR YOU

MODULAR CLAMPING TECHNOLOGY

OTT
Spanntechnik

JAKOB

You can rely on us.

We offer you the service that you can expect from the leader in technology. Selling good products is not enough. We also provide our customers with fast and efficient support so they are able to run their production without delays.

Our technical support team is always there for you and will answer your most difficult and complex questions. You find local hotline support in our sales offices all around the world and our main office in Lengenwang is also prepared to help you:

Call: OTT-JAKOB/Lengenwang:
+49 83 64 / 98 21 - 0 · www.Ott-Jakob.de

precise-rotation.ru



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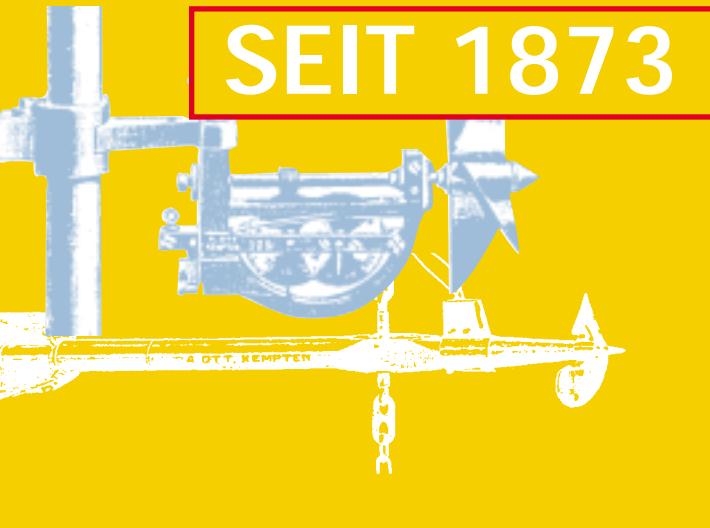
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SEIT 1873 HISTORY SINCE 1873



We combine traditional values like striving for perfection and precision with our commitment to innovation. New inventions and patents in all areas are the results.



Innovative competence is an OTT-JAKOB tradition.

Our company goes back to 1873 when Albert Ott founded the Mathematical-Mechanical Institute in Kempten

1880 - World exhibition in Melbourne

1897 - Exhibition in Chicago



In 1974 we developed the power drawbar, which has been continuously improved to meet new application requirements. Today, 250,000 machines worldwide are operating with the Ott power drawbar.

On March 1, 1993 the company Ott-Spanntechnik merged with the Jakob Group.
OTT-JAKOB Spanntechnik was born.



1998 - We are celebrating 125 years of world-renowned capability in precision mechanics and tool clamping technology.

A small company made its way to become the leading manufacturer of automatic tool clamping systems.

UNSER DENKEN PHILOSOPHY

OUR THINKING

In the past years OTT-JAKOB could further develop its leading position in tool clamping technology.

Out of this position we entered the following commitments:

1. Our highly motivated and trained employees produce customer oriented high-tech products in best quality. Know-how, team spirit and innovative power are the most important components for developing high-end clamping technology products for mechanical engineering



2. All OTT-JAKOB product lines guarantee the optimum in system safety on the highest level of technological development.

TRENDS ERKENNEN

RECOGNIZING

RECOGNIZING DYSLEXIA

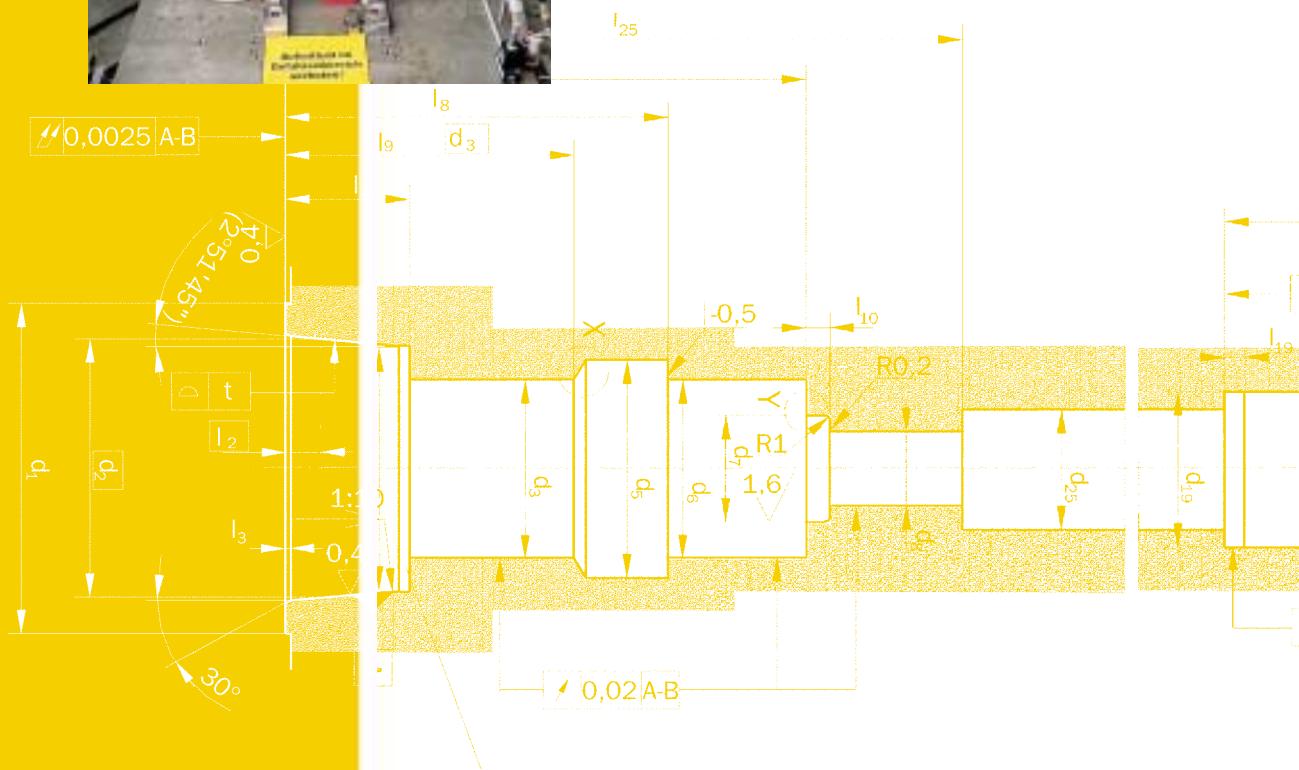
A shorter Time-to-Market ratio secures your investments. But first one has to recognize the trends.

Our Research & Development department cooperates with universities and research teams to develop customer oriented system solutions, which build trends for the future.



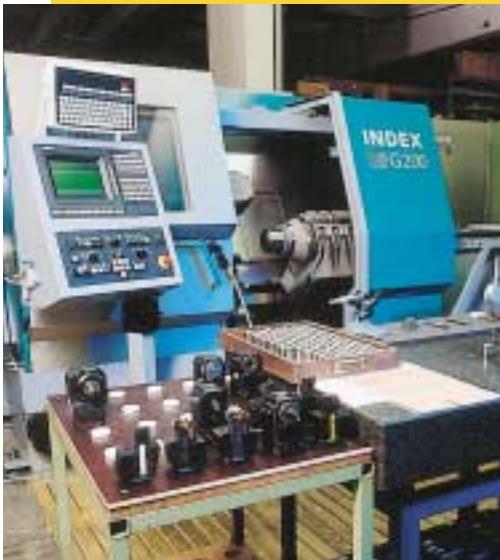
Sensational test results:
Our plant in Lengenwang tested several
clamping units.

The units were successfully clamped and released up to 9 million times with a speed of 0.13 seconds.



PERFEKTIONFERTIGEN

FINISHING



The employee and his knowledge are the center of attention

Ott employees have years of experience and are innovative. They are familiar with complex speed calculations and limitations thereof for machine tool applications, necessary unclamp forces and other parameters.

High-tech manufacturing machines and latest CAD software are employed with perfection.



Years of experience,
cooperation with leading
machine and spindle manufac-
turers, internationally recog-
nized competence and coopera-
tion with universities in the
development of standards
maximise our performance.
OTT-JAKOB maintains a close
contact with engineers in
research and development.
This guarantees user-specific
products, which work efficiently
in practical applications.
OTT-JAKOB –
Success through perfection.

OTT-JAKUB –
Success through perfection.



COMPLETE SYSTEMS



Standardization requires meeting the needs of the user. The Ott universal inside spindle contour is an important step towards modular tooling. It offers the manufacturer of machines and/or spindle units the ability to clamp different steep taper tools (taper/retention knob standard) simply by exchanging the gripper unit.

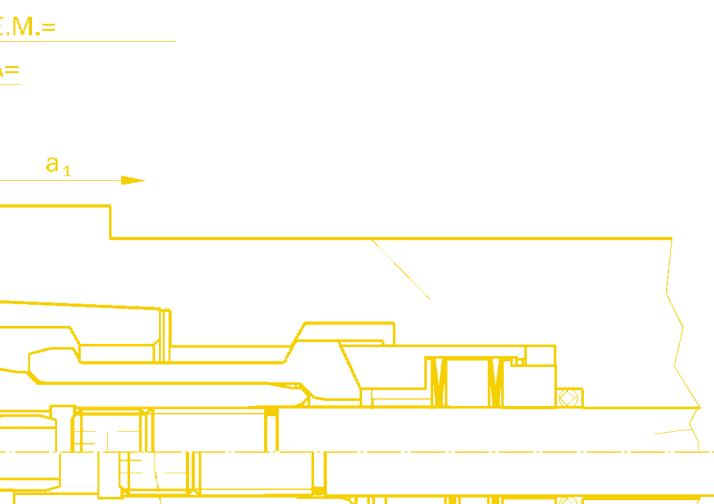
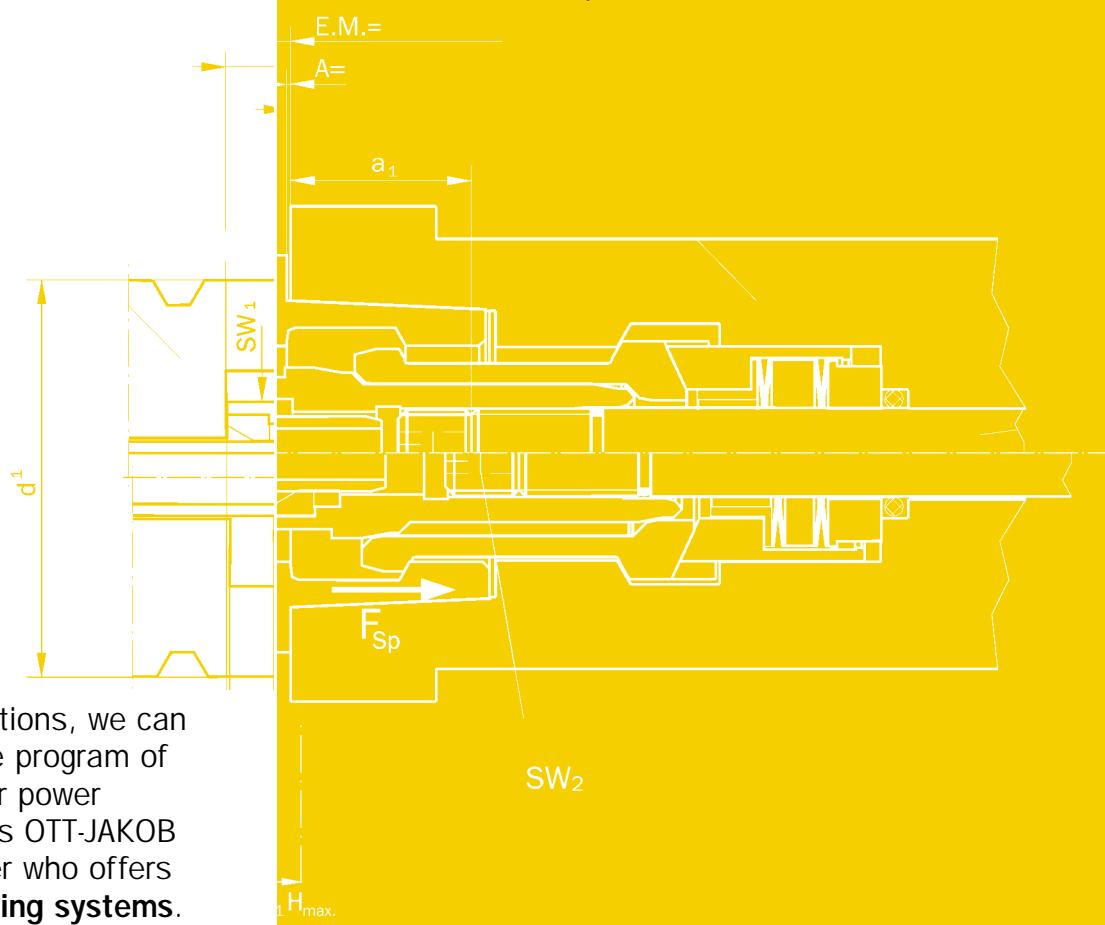
We would like you to benefit from this advantage.



Several variations of power drawbars with or without coolant, with hydraulic or pneumatic unclamp units can be built into the same spindles. Rotary unions and unclamp units are compatible and exchangeable.

We offer high performance at a fair price.





The impressive number of different modules with all necessary adaptations to customers and standards show the advantages of customer and user oriented product development.

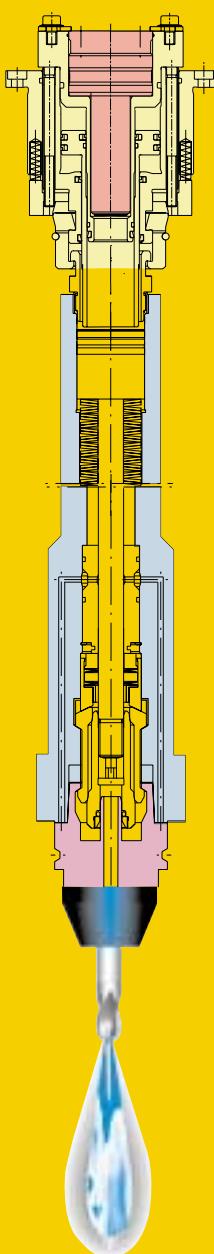
Take advantage of our professional design and engineering department to optimize your products and minimize your cost.

Minimalmengenschmierung:

MINIMUM VOLUME LUBRICATION

The latest technique of using minimum volumes of coolant for dry operations has become a focal point in the manufacturing industry. Ott-Jakob offers two variations for all HSK-clamping units:

Internal

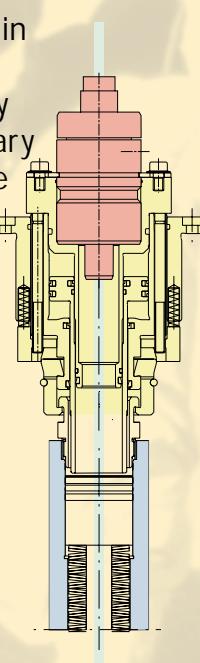


External minimum volume lubrication

Using external MMKS, the aerosol is produced in a special mixing device outside the spindle. Like coolant, the mixture is fed through a rotary union. OTT-JAKOB offers three variations of rotary unions to be used for external minimum volume lubrication for OTT-JAKOB HSK-clamping units:

- Dual-passage rotary union
(max. 10.000 RPM – mixed externally
 $p_{\text{max}} = 5 \text{ bar}$)
- Single-passage rotary union GDR for
OTT-JAKOB unclamp units (max. 16.000
RPM – mixed externally $p_{\text{max}} = 5 \text{ bar}$)
- Single-passage rotary union GD for
OTT-JAKOB unclamp units (max. 36.000
RPM – mixed externally $p_{\text{max}} = 5 \text{ bar}$)

External



Internal minimum volume lubrication

Using internal MMKS, the air-lubrication mixture is produced inside the spindle. Air and minimum amounts of lubrication are fed separately into the spindle through the OTT-JAKOB HSK-clamping unit.

They are mixed directly in front of the tool interface. Changing the mixture ratio allows for a quick adjustment of the aerosol doses.

You can rely on us - in every situation!

Both systems can be integrated as modules into existing as well as new HSK-clamping units.

HSC - High Speed Cutting:

Accelerated machining in the machine tool and mold making industry and in the cutting industry through High-Speed-Cutting (HSC) requires solutions for faster tool change. OTT-JAKOB's new clamping units, rotary unions and unclamp units meet these requirements.



A shorter tool changing time represents a constant challenge, which even increased with HSC-manufacturing. Fast working automatic clamping systems are necessary which have to be more accurate, rigid and universal than conventional systems. OTT-JAKOB met these requirements by developing a complete new HSC-clamping unit.

OTT-JAKOB has the necessary know-how

The table below shows the maximum RPM and the minimum length for HSK power drawbars:

HSK Power Drawbar (Revision 01/01)		
Size	Length from	RPM up to
HSK E 25	211 mm	80.000 min-1
HSK A/E 32 B 40	208 mm	60.000 min-1
HSK A/E 40 B/F 50	252 mm	50.000 min-1
HSK A/E 50 B/F 63	222 mm	45.000 min-1
HSK A/E 63 B/F 80	232 mm	40.000 min-1
HSK A 80 / B 100	229 mm	24.000 min-1
HSK A 100 / B 125	320 mm	18.000 min-1
HSK A 125 / B 160	575 mm	6.000 min-1
HSK E 160	451 mm	200 min-1

We are happy to answer your questions regarding HSC.

POWERCHECK



All SK work holders from SK30 to SK60 (DIN/ISO/ANSI) and all HSK work holders according to DIN 69893 (HSK-A 32/B 40 to HSK-A 125/B 160) can be used.

Conventional gages measure in accordance to the nominal component dimension. The manufacturing related tolerance range of the components could cause a false measuring result. The power check offers the possibility to take these tolerances into consideration during the measuring process!

The LCD-display shows the actual clamping force.

Display of the measuring results in Newton and Kilopound.

The critical guard

The pull force gage "Power Check" minimizes the down times for your machines. It is a compact unit with power supply and adjustable tolerance range, which should not be missing in any production facility. The Power Check measures the pull force of your machines fast and reliable and prevents tool breaking and down times.

Rely on OTT-JAKOB for the safety of your production!

KÜRZESTER SK-50 SPANNER

SHORTEST SK-50 GRIPPER

Highest Precision in smallest Space

OTT-JAKOB has been designing and manufacturing Power Drawbars for the machine tool industry for over 25 years.

In the area of Steep Tapers, the traditional manufacturer from Bavaria has just developed a SK-50 Power Drawbar with a sensational short spindle of 298 mm lenght.

Because of these new dimensions, new manufacturing methods became feasible of which machine tool designers in the past could only dream. This short spindle length of 298 mm allows for optimum flexibility and space saving.

5-axis heads, as well as nutating heads, can now be built more compact.

As spindle speed of 6,000 RPM and a pull force of 15,000 N (3,370 lbs)

are features which can be advantageously utilized for extreme applications.

Secure tool retention at extreme cutting conditions at any angle position can be realized.

The coolant/air supply is possible through single or double passage rotary unions.

The assembly of the OTT-JAKOB Power Drawbars can be done easily and quickly by average personnel.



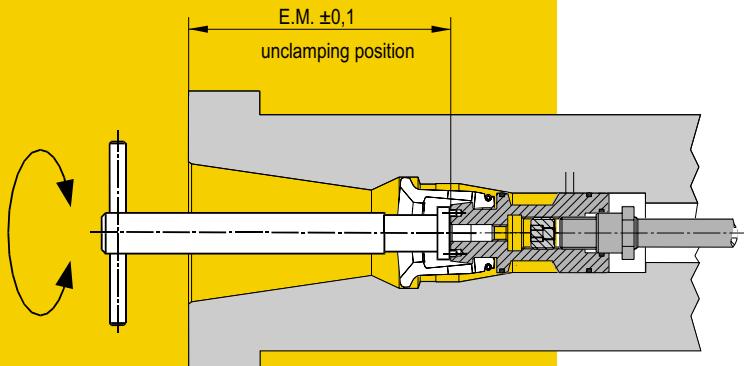
Thanks to the OTT-JAKOB universal contour....

.... the use of the most known standard tooling ist guaranteed:

- DIN 61871 / 69872
- ANSI B5.50
- ISO 7388/1/2 Typ A
- ISO 7388/1/2 Typ B
- MAS 403-1982 BT/PT 2 (30°)
- MAS 403-1982 BT/PT 1 (45°)

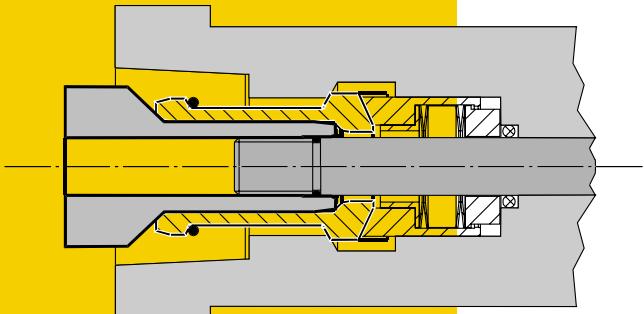
OTT-JAKOB HILFSGERÄTE

ACCESSORIES



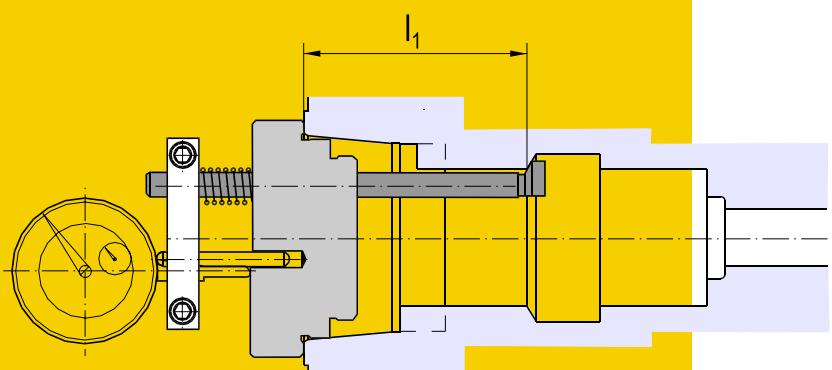
Steep taper assembly tool for gripper units

The OTT-JAKOB steep taper assembly tool allows for an easy gripper change or adjustment to the setting dimension. This tool is available in all steep taper sizes from SK30 to SK60.



HSK assembly tool for clamping units

The assembly tool facilitates the mounting of the clamping unit. It is available in all HSK sizes from HSK E 25 to HSK A 160.

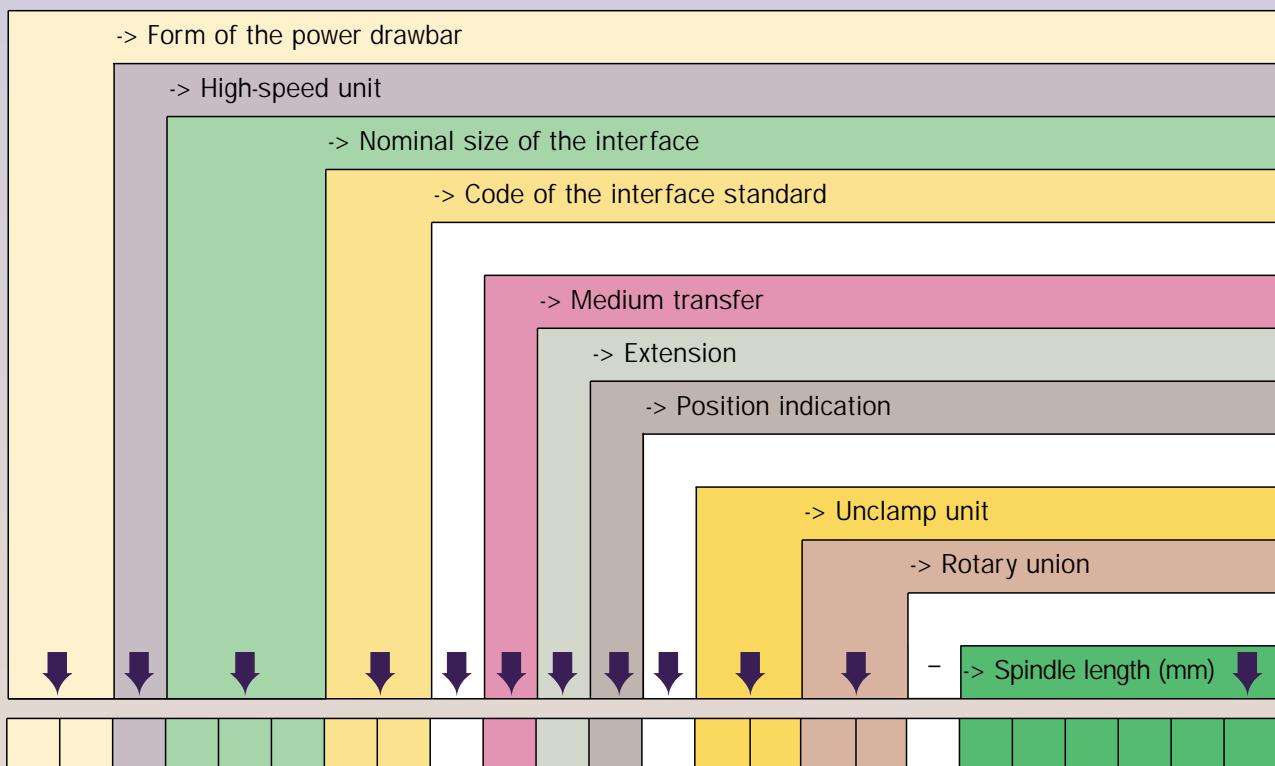


Gage for HSK spindle edge

The OTT-JAKOB gage for HSK spindle edge enables an easy determination of the dimension l_1 . The gage is available in all HSK sizes from HSK E 25 to HSK A 160.

Nomenclature - Information

We developed a new nomenclature system to be able to define complete tool clamping systems before the actual design process. This system characterizes the single modules and assembly units:



The following pages describe the different variations. All other forms are special designs and not part of this standard catalog:

Example: Nomenclature for steep taper power drawbars

- Spindle integrated steep taper power drawbar for steep taper tooling size ISO-40 (DIN 69871/2) SK 7 - 11
- Central coolant supply
- Position indication with signal ring at the diameter of the spindle shaft
- Without unclamp unit
- Dual-passage rotary union for hydraulic unclamping of power drawbars and central coolant supply or cleaning of the tool interface with air during tool change DDF 20
- Spindle length: 550.0 mm

I	S	-	4	0	-	A	1	-	2	-	G	-	0	0	2	5	-	0	5	5	0	,	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Example: Nomenclature for HSK-clamping units

- HSK-high speed units for tooling size HSK-A100 (DIN 69893) HSK 2 - 5
- Central coolant supply / radial air blast for cleaning the interface HSK 24
- One-piece drawbar shaft extension
- LE 95 with longer grippers - hydraulic unclamp unit with connection for single-passage rotary union position indication LE 6
- Single-passage high speed rotary union GD with closed seal unit to be used in OTT-JAKOB unclamp units (max. 36,000 RPM - 80 bar KSM-pressure) DDF 22
- Spindle length: 1.082,5 mm

I	F	H	1	0	0	A	K	-	4	V	K	-	0	5	2	1	-	1	0	8	2	,	5
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

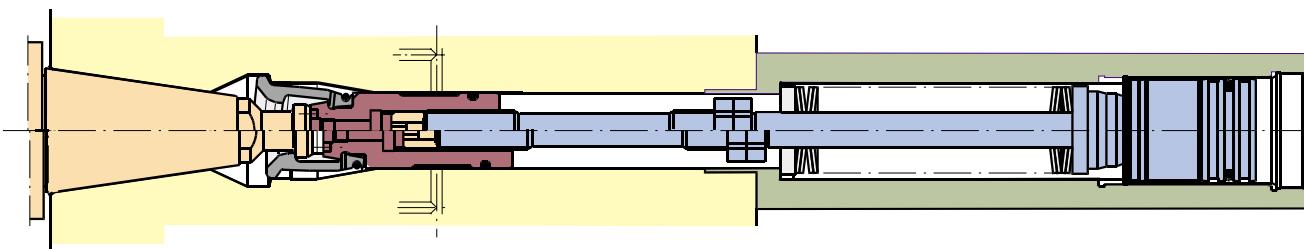
Form of the power drawbar

1	2	Nomenclature position
		Power drawbar for steep taper tools
A	S	Power drawbar
E	S	Inside spindle drawbar
I	S	Spindle integrated power drawbar
		HSK-clamping units
I	F	Spindle integrated spring loaded power drawbar

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

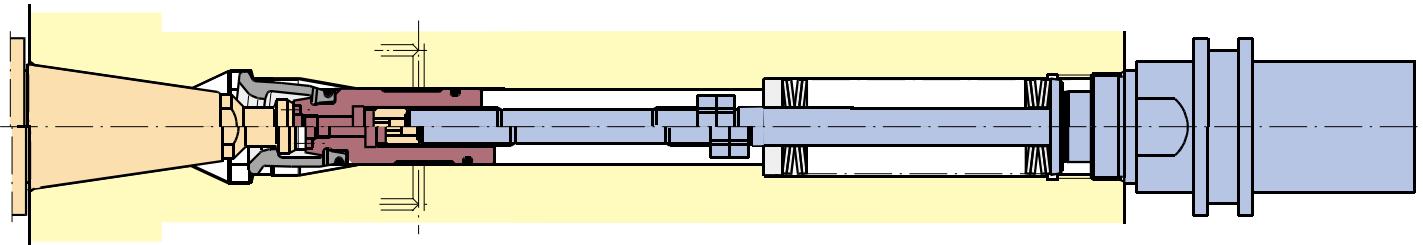
A	S	Power Drawbar
---	---	---------------

The complete power drawbar (spring stack, patented intensifying mechanism, piston, etc) is built into an added-on cylinder outside the spindle shaft to accomodate a short and narrow spindle:



E	S	Inside spindle drawbar
---	---	------------------------

Intensifying mechanism and piston are built into an added-on cylinder outside the spindle shaft. The spring stack is built inside the spindle shaft. A signal ring enables position indication at the end of the spindle:

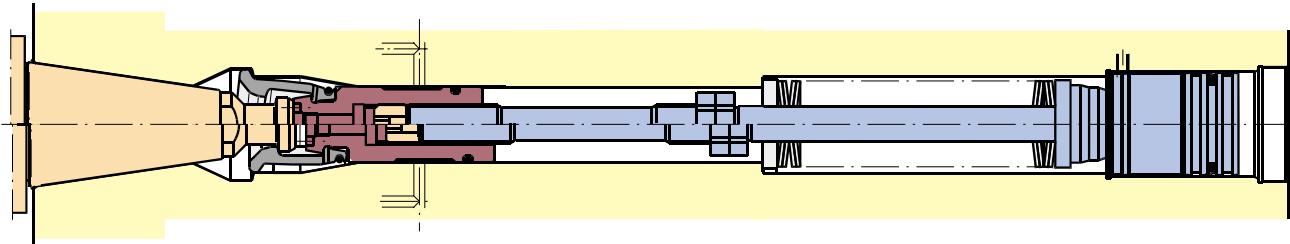


I

S

Spindle integrated power drawbar

The complete power drawbar is built into the spindle shaft. This form is used mainly for higher RPM:

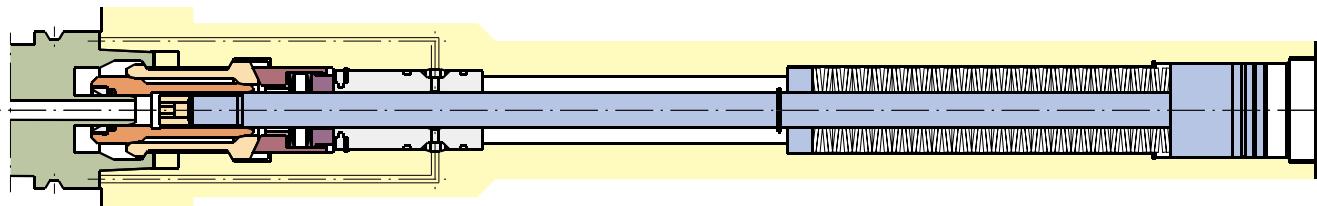


Function:

Grippers with preloaded spring stacks or special springs and standard retention knobs pull the cutting tools into the spindle. A special intensifying mechanism amplifies the spring force of OTT-JAKOB steep taper power drawbars. The clamping system is locked at the same time. The pull force is a measure for the transmittable horsepower or torque of the motor. The compact design of the Ott-Jakob power drawbars offers high pull forces and system safety in the smallest installation spaces.

I	F	Spindle integrated spring loaded power drawbar
---	---	--

HSK-clamping units use only one form, similar to the IS-form for steep taper power drawbars:



Function:

During clamping of the hollow shaft taper (HSK), the clamping cone of the clamping unit presses the gripper segments radially to the outside. The spindle and the tool support the gripper segments. They pull the oversize hollow shaft taper into the spindle and clamp it against the axial face of the spindle. The patented design of the OTT-JAKOB HSK-clamping units amplifies the spring force of the intensifier. The friction between the taper and the face contact as well as the keyways transmit the torque. Spring stack or special springs generate the pull force.

High-speed unit

	3	Nomenclature position
	H	High-speed unit

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
																							,

Attention:

Please note that high-speed units can only be designed after technical consultation and discussion of the intended application. Complex calculations are necessary to determine the RPM limit of the power drawbar. We will also give you all necessary parameters like unclamp pressure, clamping force, etc. with the drawing. Contact us!

Nominal size of the interface

	4	5	6	Nomenclature position		
				Power drawbar for steep taper tooling		
S	K	2	0			
S	K	2	5			
S	K	3	0	DIN	ANSI	MAS
S	K	4	0	DIN	ANSI	MAS
S	K	4	5	DIN	ANSI	
S	K	5	0	DIN	ANSI	MAS
S	K	6	0	DIN	ANSI	

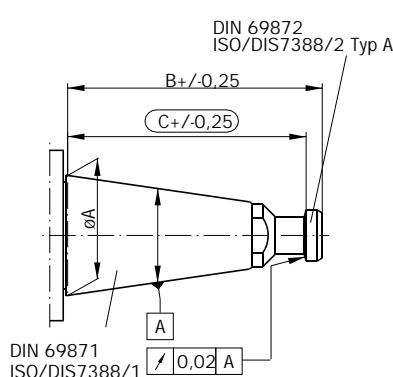
	4	5	6	Nomenclature position				
				HSK-clamping units				
				Form of the hollow shaft taper				
				A	B	E	F	AB
H	S	K	2	5		X		
H	S	K	3	2	X	X		X
H	S	K	4	0	X	X		X
H	S	K	5	0	X	X	X	X
H	S	K	6	3	X	X	X	X
H	S	K	8	0	X		X	X
H	S	K	1	0	0	X		X
H	S	K	1	2	5	X		
H	S	K	1	6	0	X		

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
																							,

Code for steep taper tool standards

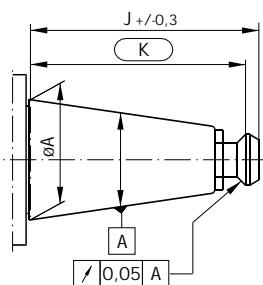
7	8	Nomenclature position																						
		Power drawbar for steep taper tooling																						
A	1	DIN 69871/2																						
C	1	ISO 7388 / 1 / 2 Typ A																						
E	1	ANSI B.5.50 - 78																						
F	1	ISO 7388 / 1 / 2 Typ B																						
G	H	MAS 403-1982 BT/PT 30-degree																						
I	J	MAS 403-1982 BT/PT 45-degree																						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	

SK-standards



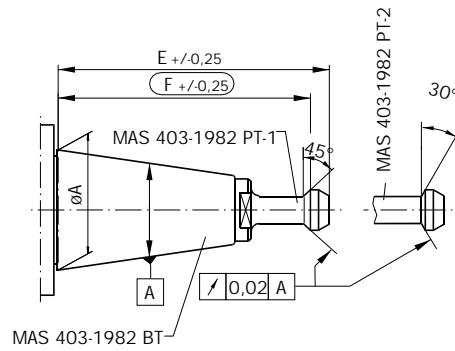
tool standard	code
DIN 69871/69872	
ISO 7388/1/2 Typ A	A1

	A	B +/- 0,25	C +/- 0,25
SK 30	31,75	71,65	66,65
SK 40	44,45	94,25	88,25
SK 50	69,85	135,60	126,60
SK 60	107,95	201,65	191,65



tool standard	code
ANSI B5.50-78	
ISO7388/1/2 Typ B	C1

	A	J +/- 0,3	K +/- 0,3
SK 30	31,75	59,30	55,65
SK 40	44,45	84,50	79,25
SK 50	69,85	127,00	119,40
SK 60	107,95	199,95	189,45

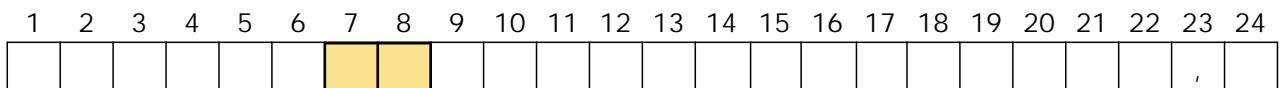


tool standard	code
MAS 403-1982 BT/PT30°	E1
MAS 403-1982 BT/PT45°	F1

	A	E +/- 0,25	F +/- 0,25
SK 30	31,75	71,35	66,35
SK 40	44,45	100,35	93,35
SK 50	69,85	146,75	136,75
SK 60	-	-	-

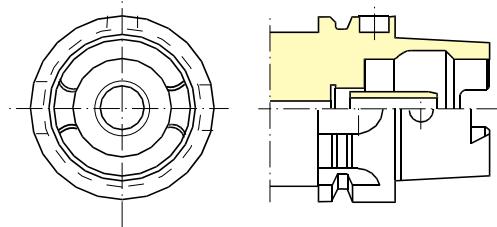
Code for HSK-standards

7	8	Nomenclature position
		HSK-clamping units
A	K	DIN 69893 - part 1 - form A with gripper grove
A	B	DIN 69893 - part 1 - form A with gripper grove - black
B	K	DIN 69893 - part 2 - form B with gripper grove
E	K	DIN 69893 - part 5 - form E with gripper grove
F	K	DIN 69893 - part 6 - form F with gripper grove



HSK-standards

hollow shaft tapers DIN 69893; Form A



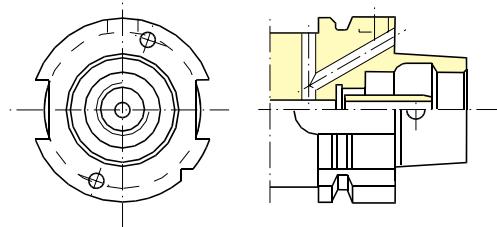
features

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

application

- machining centers,
milling machines

hollow shaft tapers DIN 69893; Form B



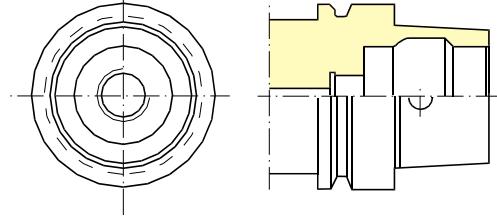
features

- 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 tapers DIN 69893; Form E



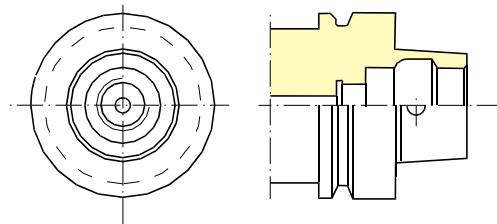
features

- rotational symmetry without keyways

application

- HSC-spindles

hollow shaft tapers DIN 69893; Form F



features

- enlarged flange

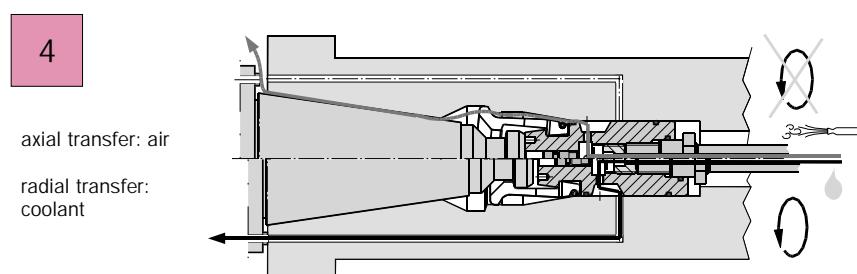
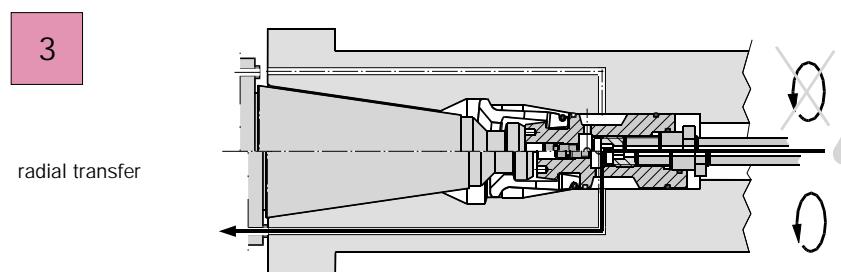
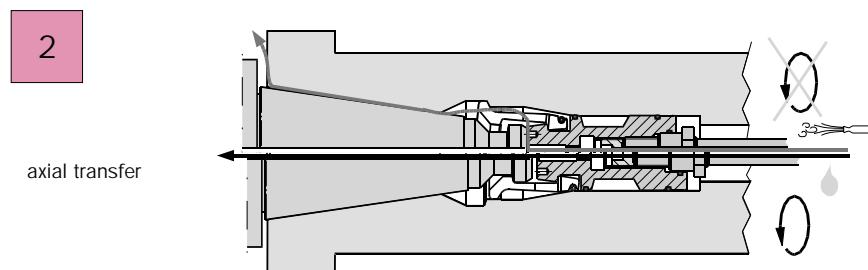
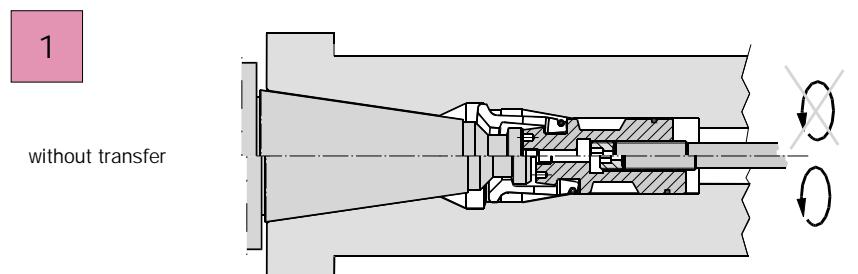
application

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

Medium transfer for steep taper power drawbars

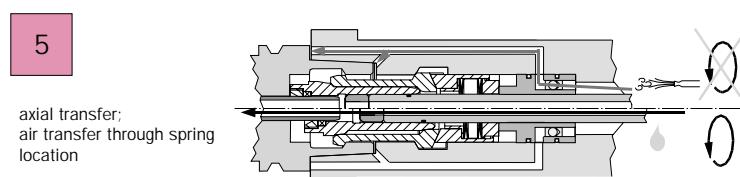
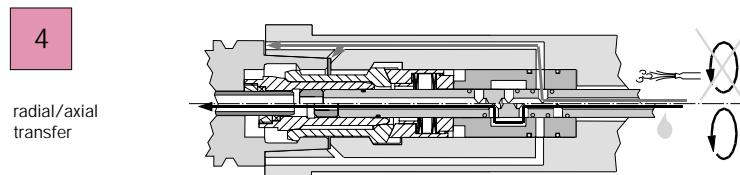
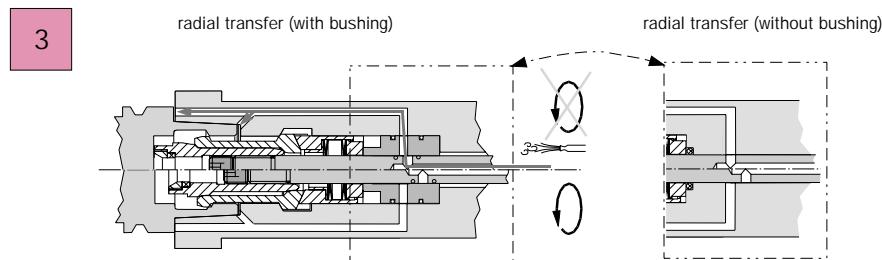
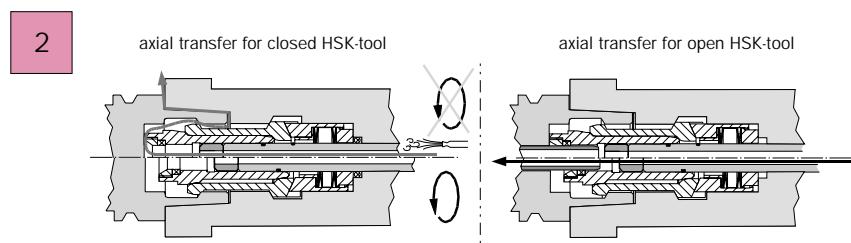
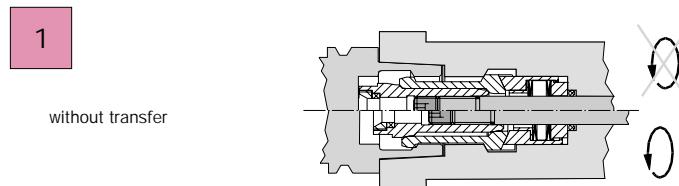
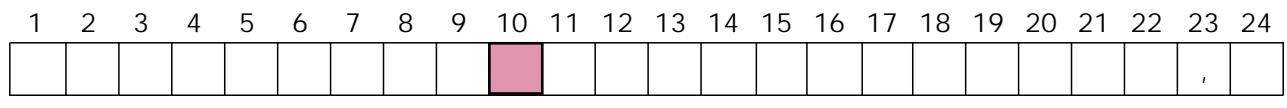
Nomenclature position	10	
Power drawbar for steep taper tooling		
Without medium transfer	1	
With central medium transfer	2	
With radial medium transfer	3	
With radial medium transfer and central air blast transfer	4	

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24



Medium transfer for HSK-clamping units

Nomenclature position	10
HSK-clamping units	
Without medium transfer	1
With central medium transfer	2
With radial medium transfer	3
With central medium transfer and radial air blast transfer	4
With central medium transfer and radial air blast transfer (special passage)	5

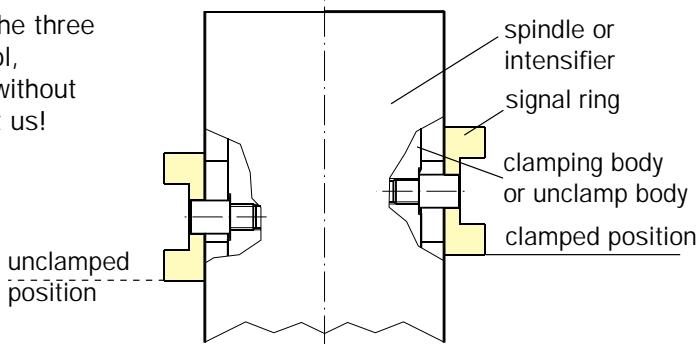


Position indication

Nomenclature position	12
Thread in clamping body	G
Signal ring	H
Indication through piston position	K
Without thread / without elongated hole	O

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
																							,

Please note that the position indication of the three possible settings, clamped position with tool, unclamped position, and clamped position without tool, can be done in different ways. Contact us!



Example rotary union 2KA-SR



Example LE95 - with longer grippers



Example LE102 – with analog sensor for integrated clamping stroke monitoring

Unclamp unit

Nomenclature position	14	15
Without unclamp unit	0	0
LE 60 - hydraulic unclamp unit with air blast connection	0	2
LE 92 - hydraulic unclamp unit with air blast connection	0	1
LE 95 - hydraulic unclamp unit with connection for single-passage rotary union	3	6
LE 95-B - hydr. unclamp unit with connection for single-passage rotary union incl. connection for air blast	5	8
LE 95 with longer grippers - hydr. unclamp unit with connection for single-passage rotary union (position indication)	0	5
LE 102-B hydraulic unclamp unit with connection for single-passage rotary union incl. connection for air blast	0	3
LE 133 - hydraulic unclamp unit with connection for single-passage rotary union incl. connection for air blast	1	2
LE 133 - hydraulic unclamp unit with connection for single-passage rotary union incl. connection for air blast	1	3
LE 95 - (fixed flange) - hydr. unclamp unit with connection for single-passage rotary union	0	4
LE 115 - (fixed flange) - hydr. unclamp unit with connection for single-passage rotary union	1	0
LE 124 - (fixed flange) - hydr. unclamp unit with connection for single-passage rotary union	1	1
LE 119-P1 - pneumatic unclamp unit (release force 3,1 kN)	2	1
LE 119-P2 - pneumatic unclamp unit (release force 6,2 kN)	2	2
LE 119-P3 - pneumatic unclamp unit (release force 9,2 kN)	2	3
LE 150-P1 - pneumatic unclamp unit (release force 5,5 kN)	3	1
LE 150-P2 - pneumatic unclamp unit (release force 10,9 kN)	3	2
LE 150-P3 - pneumatic unclamp unit (release force 16,4 kN)	3	3
LE 150-PA1 - pneum. LE (with connection for single-passage rotary union / release force 5,5 kN)	4	1
LE 150-PA2 - pneum. LE (with connection for single-passage rotary union / release force 10,9 kN)	4	2
LE 150-PA3 - pneum. LE (with connection for single-passage rotary union / release force 16,4 kN)	4	3

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Rotary union

Nomenclature position	16	17
without rotary union	0	0
Rotary union for hydraulic unclamping of power drawbars	1	1
Dual-passage rotary union for hydraulic unclamping of power drawbars and cleaning of the tool interface with air during tool change	1	4
Dual-passage rotary union for hydraulic unclamping of power drawbars and central coolant supply or cleaning of the tool interface with air during tool change	2	5
Dual-passage rotary union for hydraulic unclamping of power drawbars and central coolant supply or cleaning of the tool interface with air during tool change; including position indication with signal ring and proximity switch	2	6
Dual-passage rotary union for hydraulic unclamping of power drawbars and cleaning of the tool interface with air during operation and tool change	2	8
<i>Single-passage high speed rotary union GD - radial connection</i> with closed seal unit to be used in OTT-JAKOB unclamp units (max. 36.000 RPM - 80 bar KSM-pressure)	2	1
<i>Single-passage high speed rotary union GD - axial connection</i> with closed seal unit to be used in OTT-JAKOB unclamp units (max. 36.000 RPM - 80 bar KSM-pressure)	2	2
<i>Single-passage high speed rotary union GDR - radial connection</i> with closed seal unit to be used in OTT-JAKOB unclamp units (max. 16.000 RPM - 50 bar KSM-pressure)	2	3
<i>Single-passage high speed rotary union GDR - axial connection</i> with closed seal unit to be used in OTT-JAKOB unclamp units (max. 16.000 RPM - 50 bar KSM-pressure)	2	4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
																						,	

Spindle length

Nomenclature position	19	20	21	22	23	24
Spindle length	0	0	0	0	,	0

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
																						,	

Fax-Cover

Sender



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Order:

Request for tech.
information:

Ott-Jakob GmbH & Co
Spanntechnik KG
Industriestraße 3-7
D-87663 Lengenwang
Tel.: +49 83 64 / 98 21 - 0
Fax: +49 83 64 / 98 21 - 10
www.Ott-Jakob.de
info@Ott-Jakob.de

Nomenclature:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Technical data:

Tool interface:

Steep taper tooling

HSK-tooling

Size of the interface:

Tool standard:

Form of the power drawbar:

AS

ES

IS

IF

RPM range:

from _____ RPM

to _____ RPM

Pull force:

_____ N

Spindle length:

_____ mm

Spindle diameter at the front bearing:

_____ mm

Spindle diameter

at the rear bearing:

_____ mm

Desired medium supply

yes

no

Coolant:

_____ bar

medium transfer

Cleaning air:

_____ bar

1 2 3 4 5

Compressed air during rotation:

_____ bar

Spindle orientation:

horizontal

vertical

tilting spindle

overhead spindle

Available release pressure:

_____ bar

Mechanical release force _____ kN

Available pneumatic release pressure:

_____ bar

Position indication:

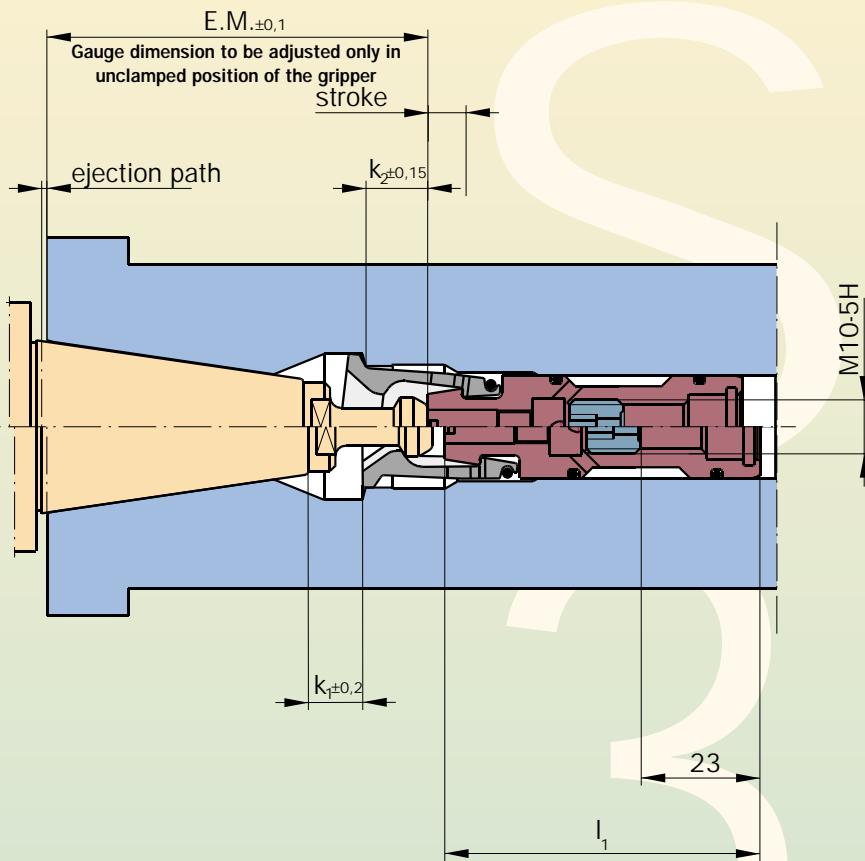
with signal ring indication

with piston indication

SK-Grippers
SK-Inside spindle intensifier



SK



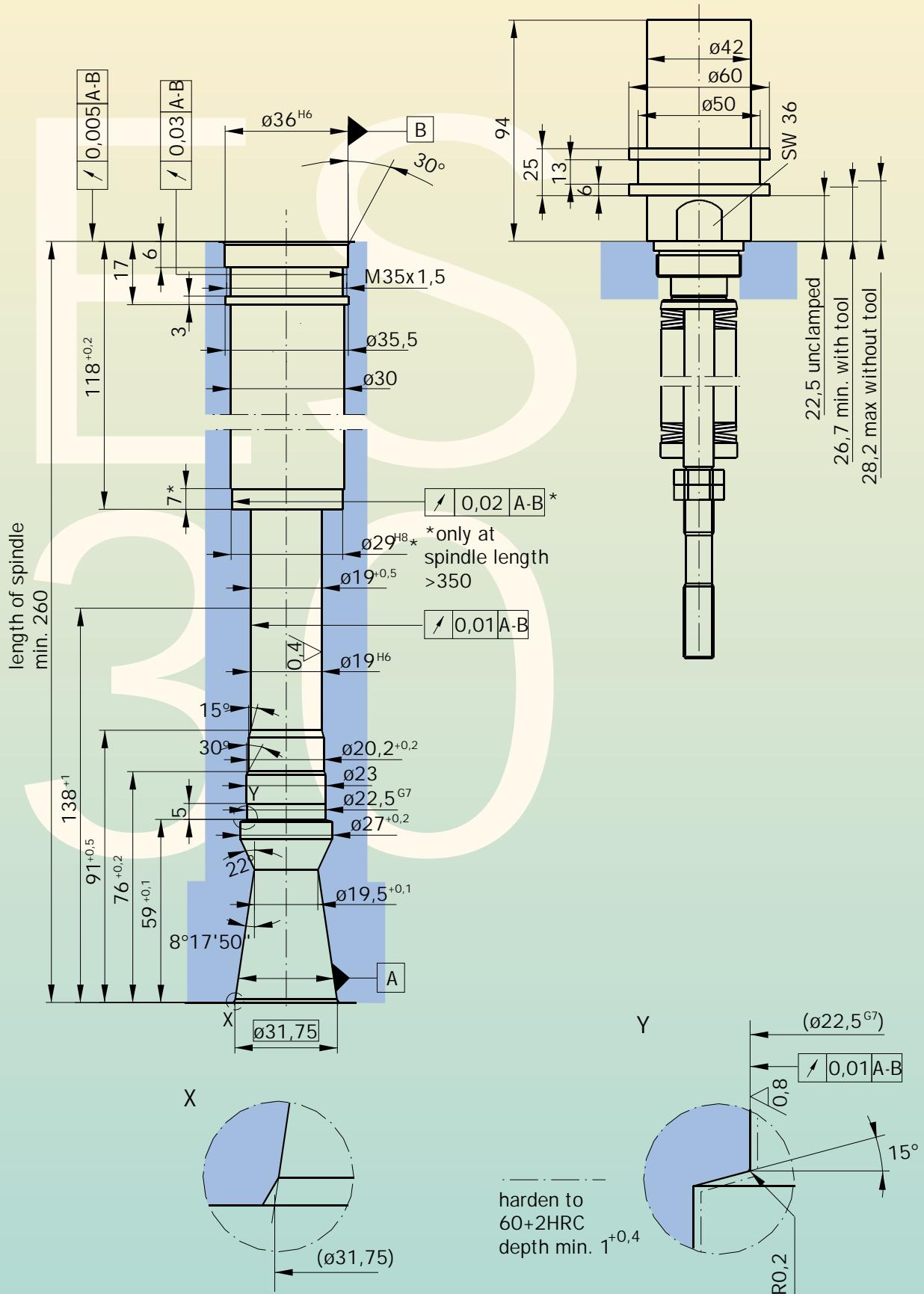
tool standard	code
DIN 69871/69872 ISO 7388/1/2 Typ A	A1
ANSI B 5.50 - 78 ISO 7388/1/2 Typ B	C1
MAS 403-1982 BT/PT 2 (30°)	E1
MAS 403-1982 BT/PT 1 (45°)	F1
medium transfer	
without transfer	1
axial transfer	2
radial transfer	3

Subject to modification due to technical advance!

rated quantity		SK 30			
[N]	code	A1	C1	E1	F1
medium transfer		1 / 2 / 3			
pull in force		6000		5500	
stroke		5,5	5,5	5,5	5,5
ejection path		0,95	1,6	0,95	0,95
reference gauge		70,7	57,7	70,4	70,4
k ₁		11,2	11,2	10,6	10,6
k ₂		11,7	-1,3	11,4	11,4
l ₁		57,5	72	57,5	57,5
order no.	mounting tool	95.101.280.9.2	95.101.280.9.2	95.101.280.9.2	95.101.280.9.2

Inside spindle drawbar
ES 30

4



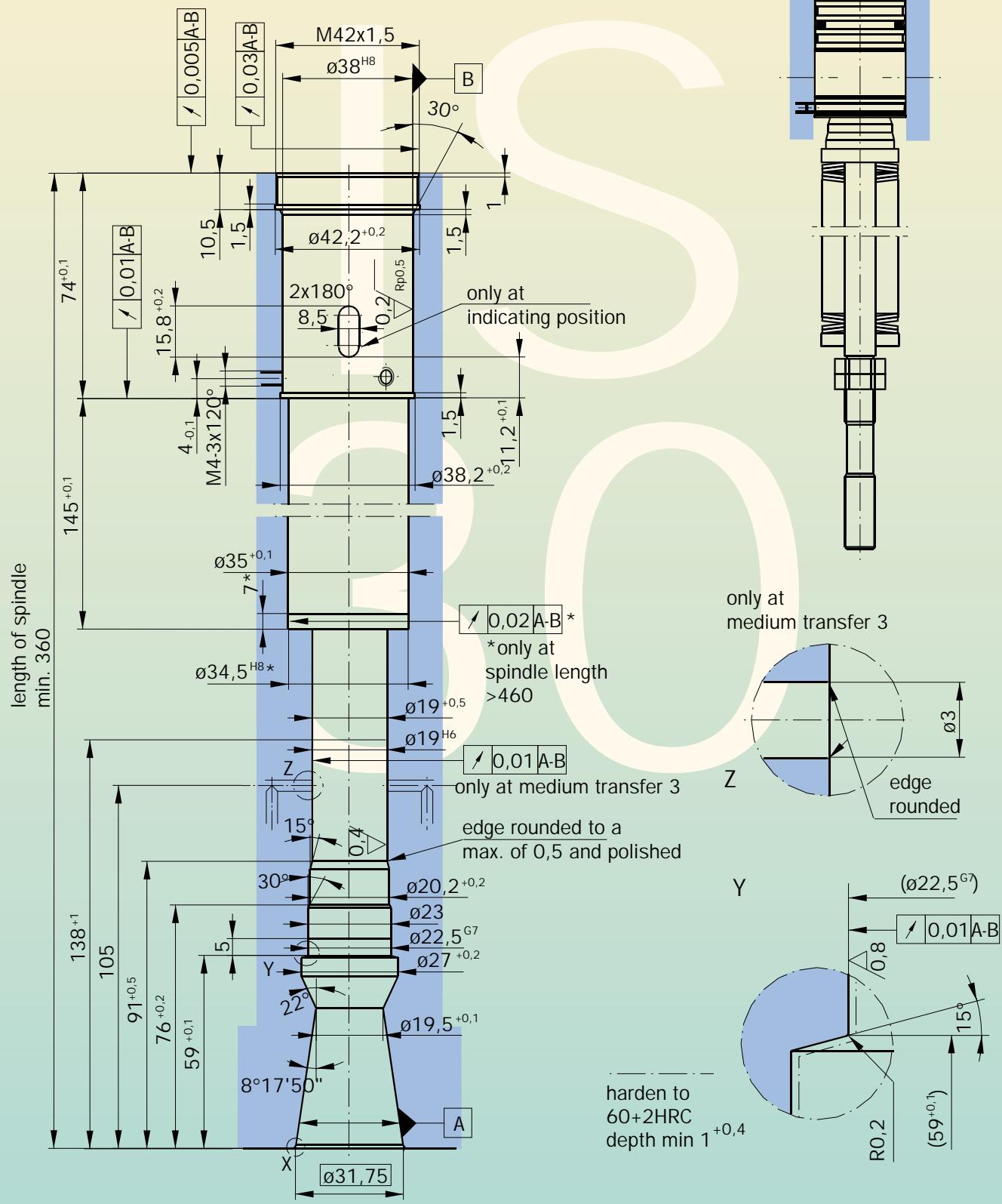
Not a spindle manufacturing drawing!

Technical data for the combination inside spindle intensifier-rotary union/unclamp unit in ES/IS-power-drawbar

page 22/23

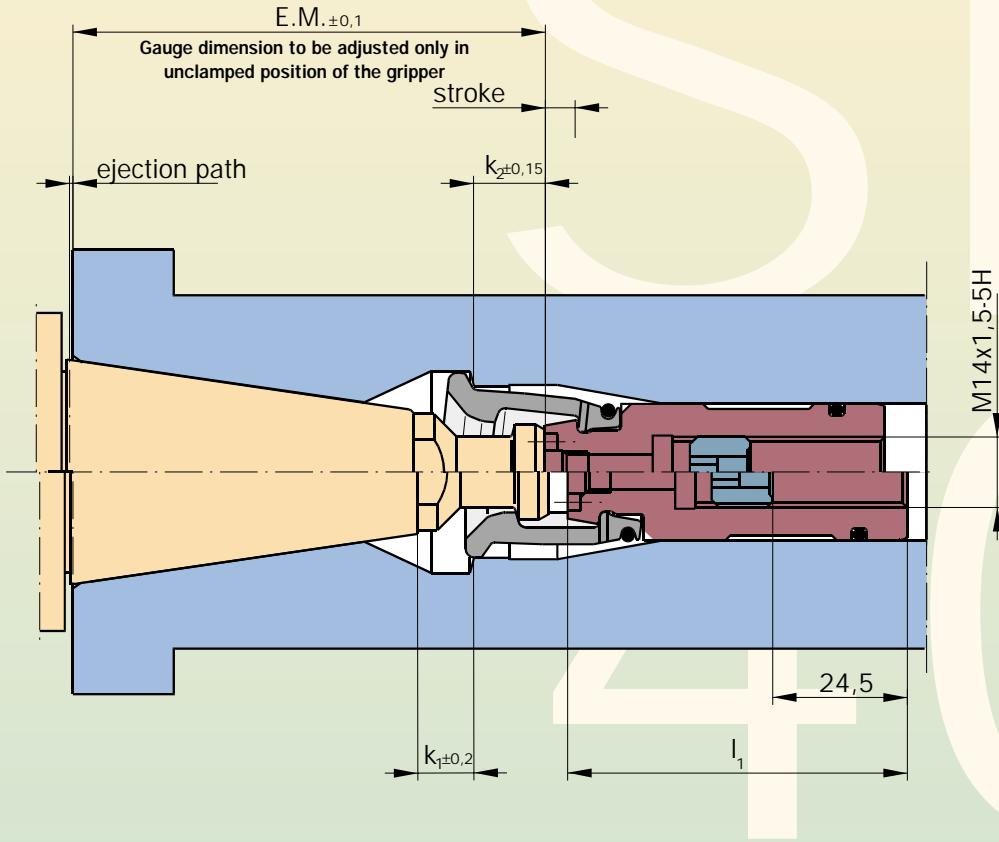
Spindle integrated power drwabar IS 30

Subject to modification due to technical advance!



Not a spindle manufacturing drawing!



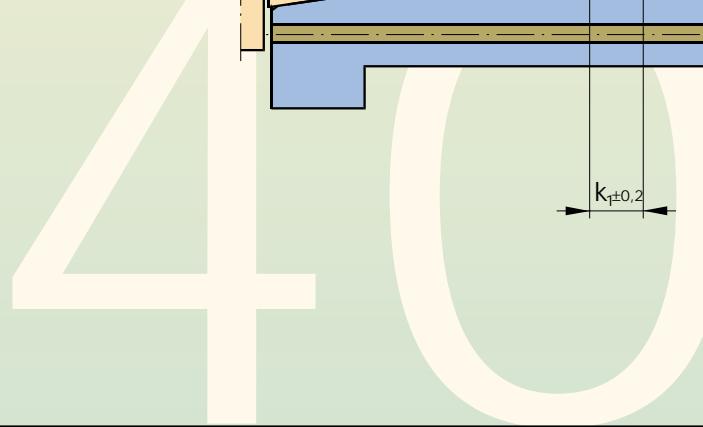


tool standard	code
DIN 69871/69872 ISO 7388/1/2 Typ A	A1
ANSI B 5.50 - 78 ISO 7388/1/2 Typ B	C1
MAS 403-1982 BT/PT 2 (30°)	E1
MAS 403-1982 BT/PT 1 (45°)	F1
medium transfer	
without transfer	1
axial transfer	2

Technical data for the combination
inside spindle intensifier - rotary
union/unclamp unit in ES/IS-power
drawbar
page 22/23

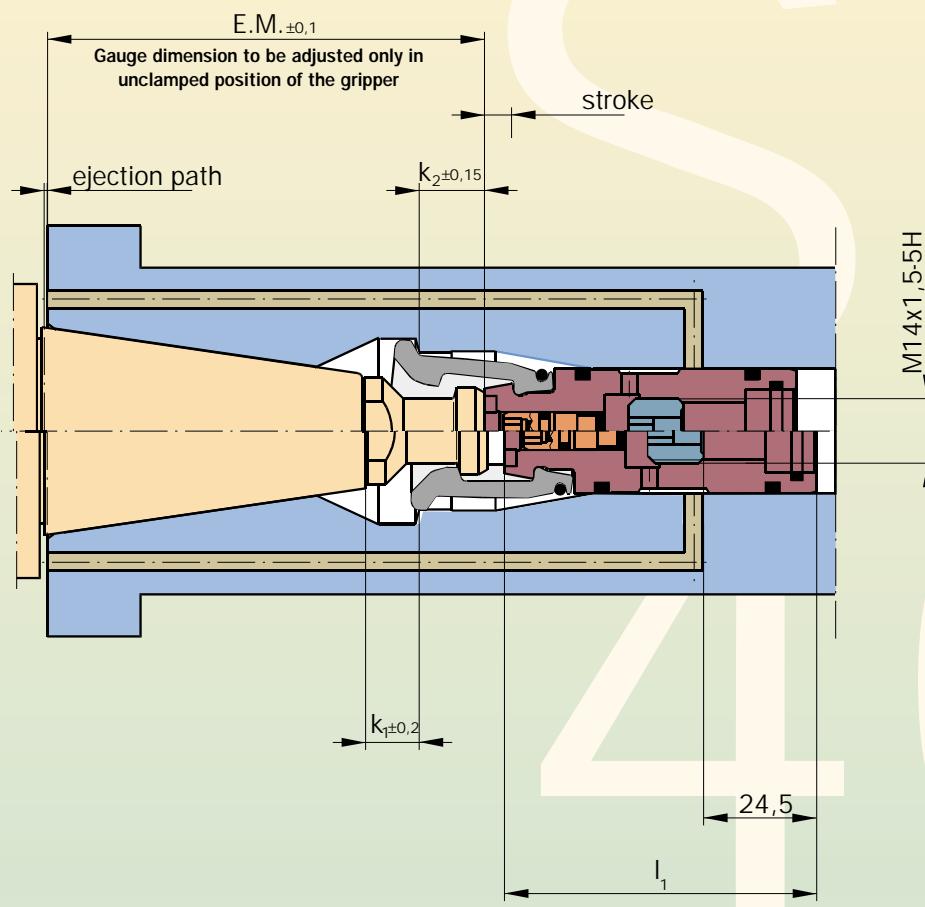
Subject to modification due to technical advance!

rated quantity		SK 40					
code		A1	A1	C1	C1	E1	F1
medium transfer		1	2	1	2	1 / 2	1 / 2
[N]	pull in force	12000		10500			
[mm]	stroke	5,5	5,5	5,5	5,5	5,5	5,5
	ejection path	0,65	0,65	1,6	1,6	0,65	0,65
	reference gauge	93,6	93,6	82,9	82,9	99,7	99,7
	k ₁	11,1	11,1	11,1	11,1	14,1	14,1
	k ₂	14,1	14,1	3,4	3,4	20,2	20,2
	l ₁	67,1	66,4	78,3	77,6	60,3	60,3
order no.	mounting tool	95.101.281.9.2	95.101.281.9.2	95.101.281.9.2	95.101.281.9.2	95.101.281.9.2	95.101.281.9.2



tool standard	code
DIN 69871/69872	A1
ANSI B 5.50 - 78	C1
MAS 403 - 1982 BT/PT 2 (30°)	E1
MAS 403 - 1982 BT/PT 1 (45°)	F1
medium transfer	
radial transfer	3

rated quantity		SK 40			
code		A1	C1	E1	F1
medium transfer		3			
[N]	pull in force	12000		10500	
[mm]	stroke	5,5	5,5	5,5	5,5
	ejection path	0,65	1,6	0,65	0,65
	reference gauge	93,6	82,9	93,6	93,6
	k ₁	11,1	11,1	11,1	11,1
	k ₂	14,1	3,4	14,1	14,1
	l ₁	67,4	78,3	67,4	67,4
order no.	mounting tool	95.101.281.9.2	95.101.281.9.2	95.101.281.9.2	95.101.281.9.2



tool standard		code
DIN 69871/69872	ISO 7388/1/2 Typ A	A1
ANSI B 5.50 - 78	ISO 7388/1/2 Typ B	C1
MAS 403 - 1982 BT/PT 2 (30°)		E1
MAS 403 - 1982 BT/PT 1 (45°)		F1
medium transfer		
radial / axial transfer		4

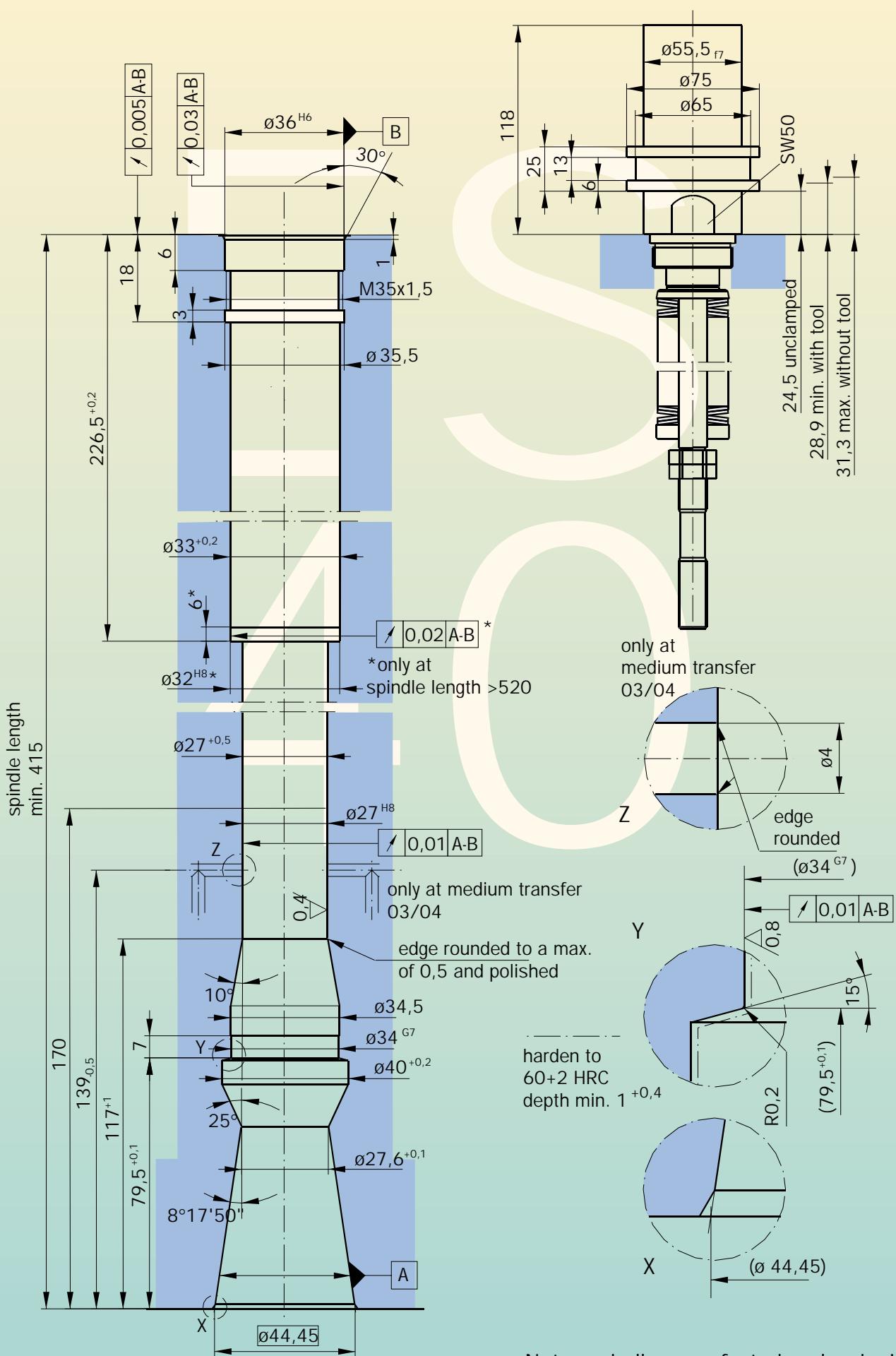
Technical data for the combination
inside spindle intensifier - rotary
union/unclamp unit in ES/IS-power
drawbar
page 22/23

Subject to modification due to technical advance!

rated quantity		SK 40				
code		A1	C1	E1	F1	
medium transfer		4				
[N]	pull in force	12000		10500		
[mm]	stroke	5,5	5,5	5,5	5,5	
	ejection path	0,65	1,6	0,65	0,65	
	reference gauge	93,6	82,9	93,6	93,6	
	k_1	11,1	11,1	11,1	11,1	
	k_2	14,1	3,4	14,1	14,1	
	I_1	67,4	78,3	67,4	67,4	
order no.	mounting tool	95.101.281.9.2	95.101.281.9.2	95.101.281.9.2	95.101.281.9.2	

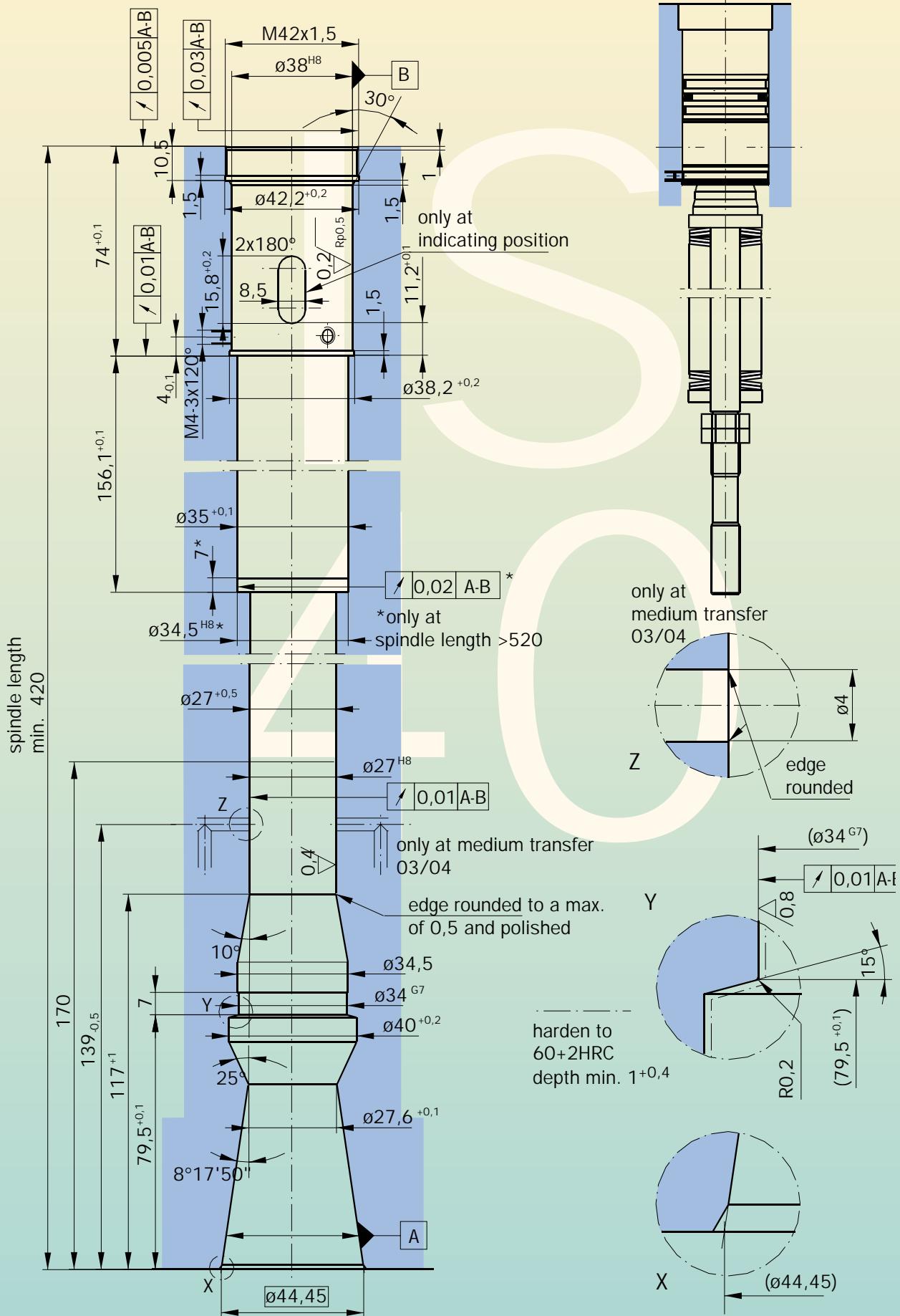
Inside spindle drawbar
ES 40

10



Not a spindle manufacturing drawing!

Subject to modification due to technical advance!

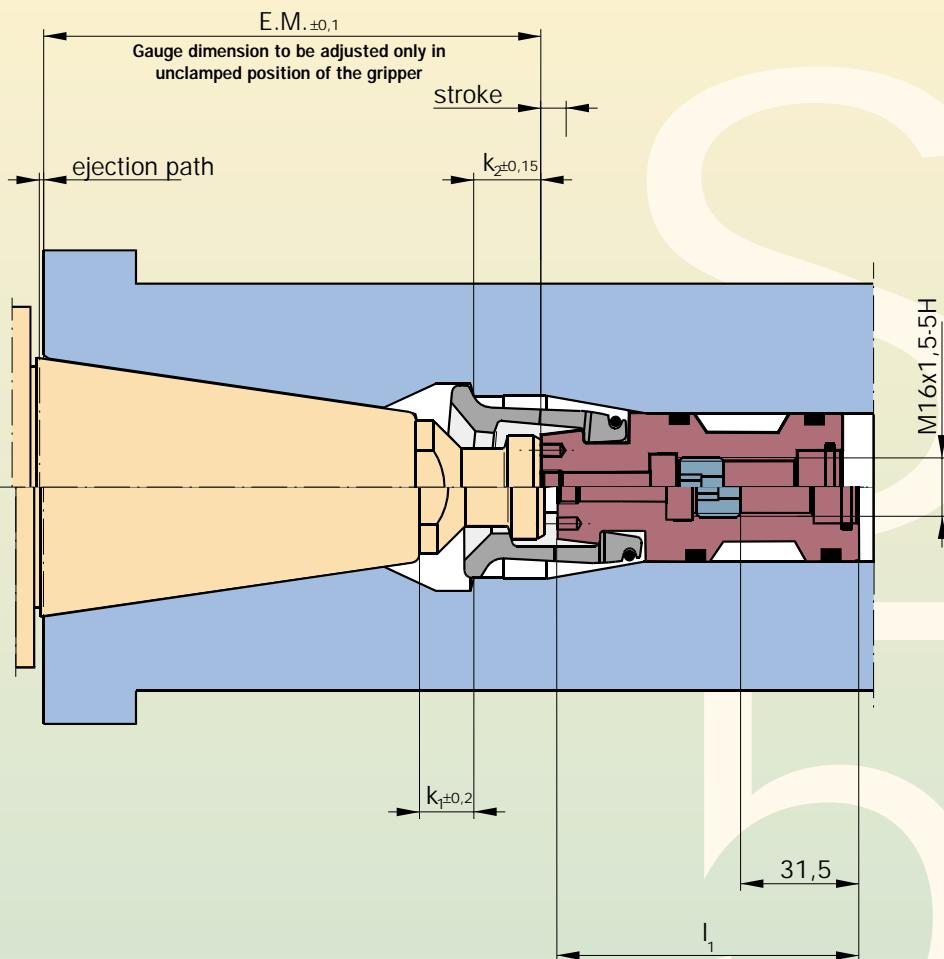


Not a spindle manufacturing drawing!

Technical data for the combination inside spindle intensifier-rotary union/unclamp unit in ES/IS-power drawbar

page 22/23



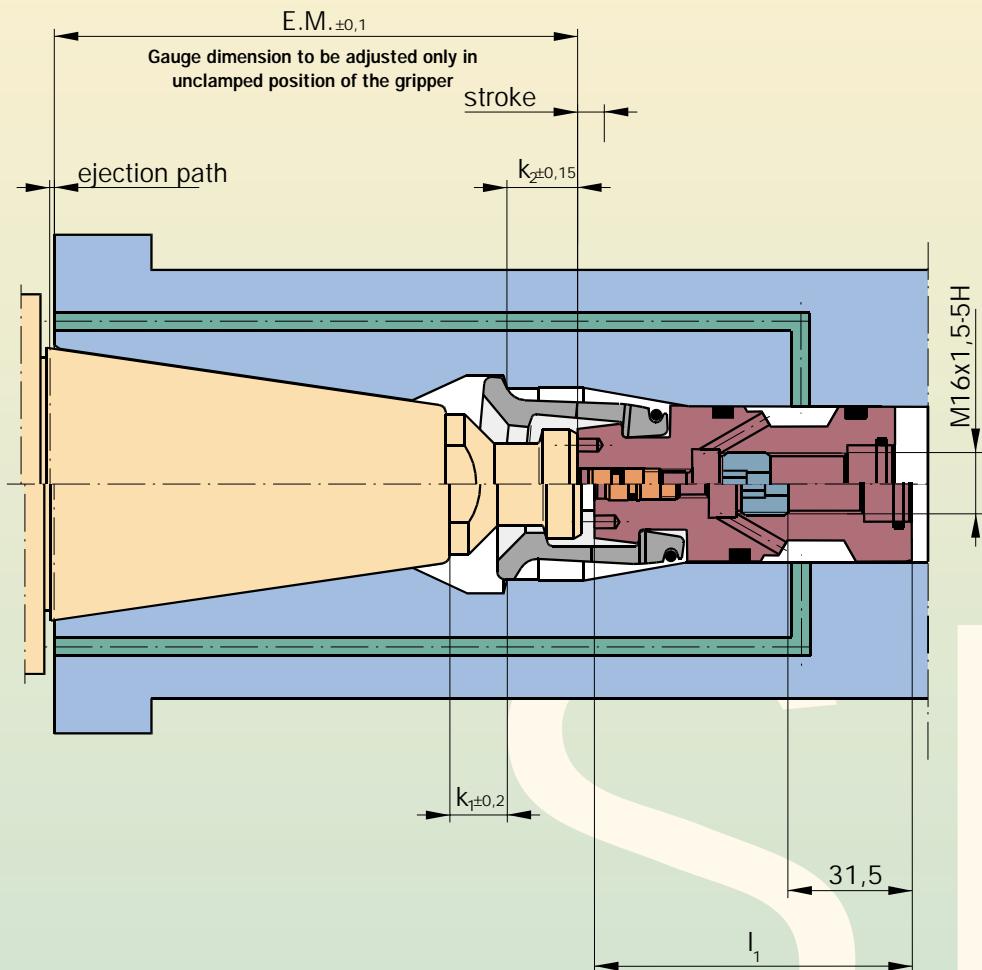


tool standard		code
DIN 69871/69872	ISO 7388/1/2 Typ A	A1
ANSI B 5.50 - 78	ISO 7388/1/2 Typ B	C1
MAS 403 - 1982 BT/PT 2 (30°)		E1
MAS 403 - 1982 BT/PT 1 (45°)		F1
medium transfer		
without transfer		1
axial transfer		2

Technical data for the combination
insider spindle intensifier - rotary
union/unclamp unit in ES/IS-power
drawbar
page 22/23

Subject to modification due to technical advance!

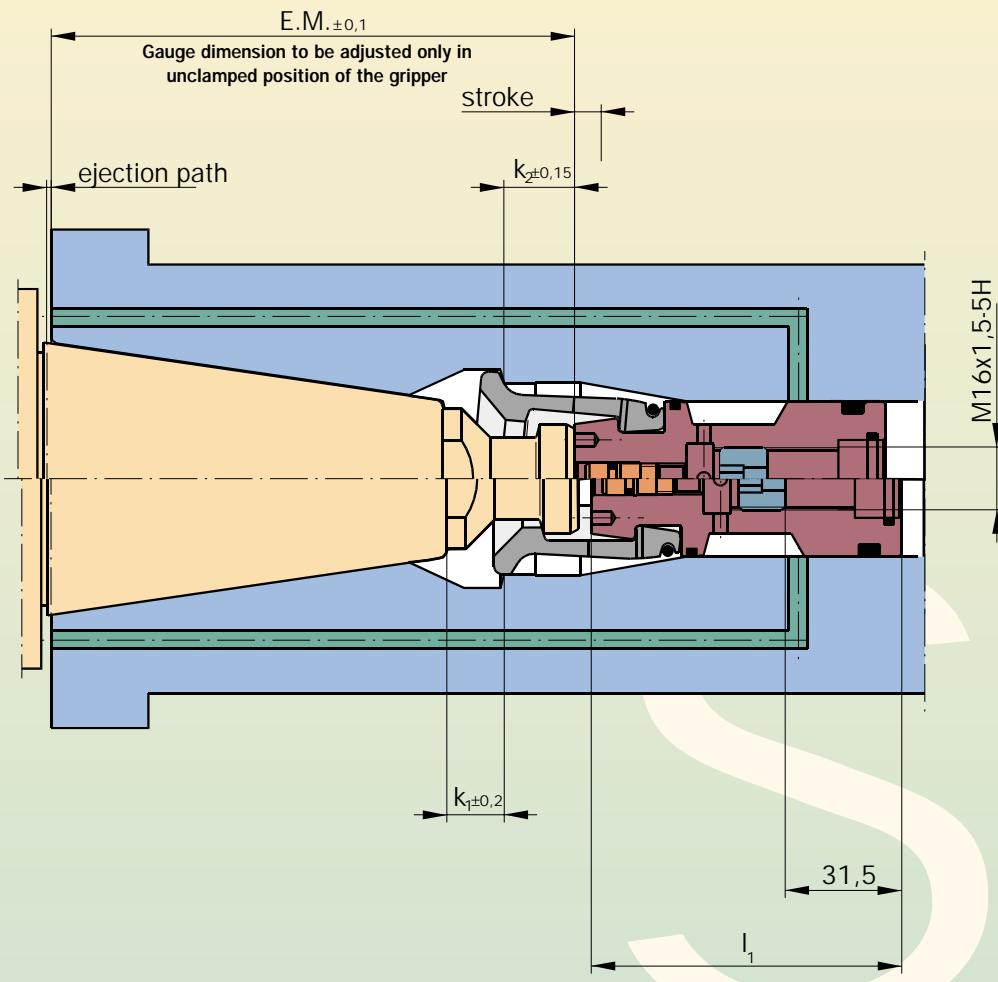
rated quantity		SK 50				
code		A1	C1	E1	F1	
medium transfer		1 / 2				
[N]	pull in force	25000		23000		
[mm]	stroke	6	6	6	6	
	ejection path	1	1	1	1	
	reference gauge	134,6	126	145,75	145,75	
	k ₁	14,75	14,75	14,7	14,7	
	k ₂	18,1	9,5	29,25	29,25	
	l ₁	79,7	87,9	68,8	68,8	
order no.	mounting tool	95.101.337.9.2	95.101.337.9.2	95.101.337.9.2	95.101.337.9.2	



tool standard	code
DIN 69871/69872	ISO 7388/1/2 Typ A
medium transfer	
radial transfer	3

rated quantity	SK 50
code	A1
medium transfer	3
[N]	pull in force
	25000
[mm]	stroke
	6
	ejection path
	1
	reference gauge
	134,6
	k_1
	14,75
	k_2
	18,1
	l_1
order no.	mounting tool
	95.101.337.9.2

Technical data for the combination inside spindle intensifier - rotary union/unclamp unit in ES/IS-power drawbar
page 22/23



tool standard		code
DIN 69871/69872	ISO 7388/1/2 Typ A	A1
ANSI B 5.50 - 78	ISO 7388/1/2 Typ B	C1
medium transfer		
radial / axial transfer		4

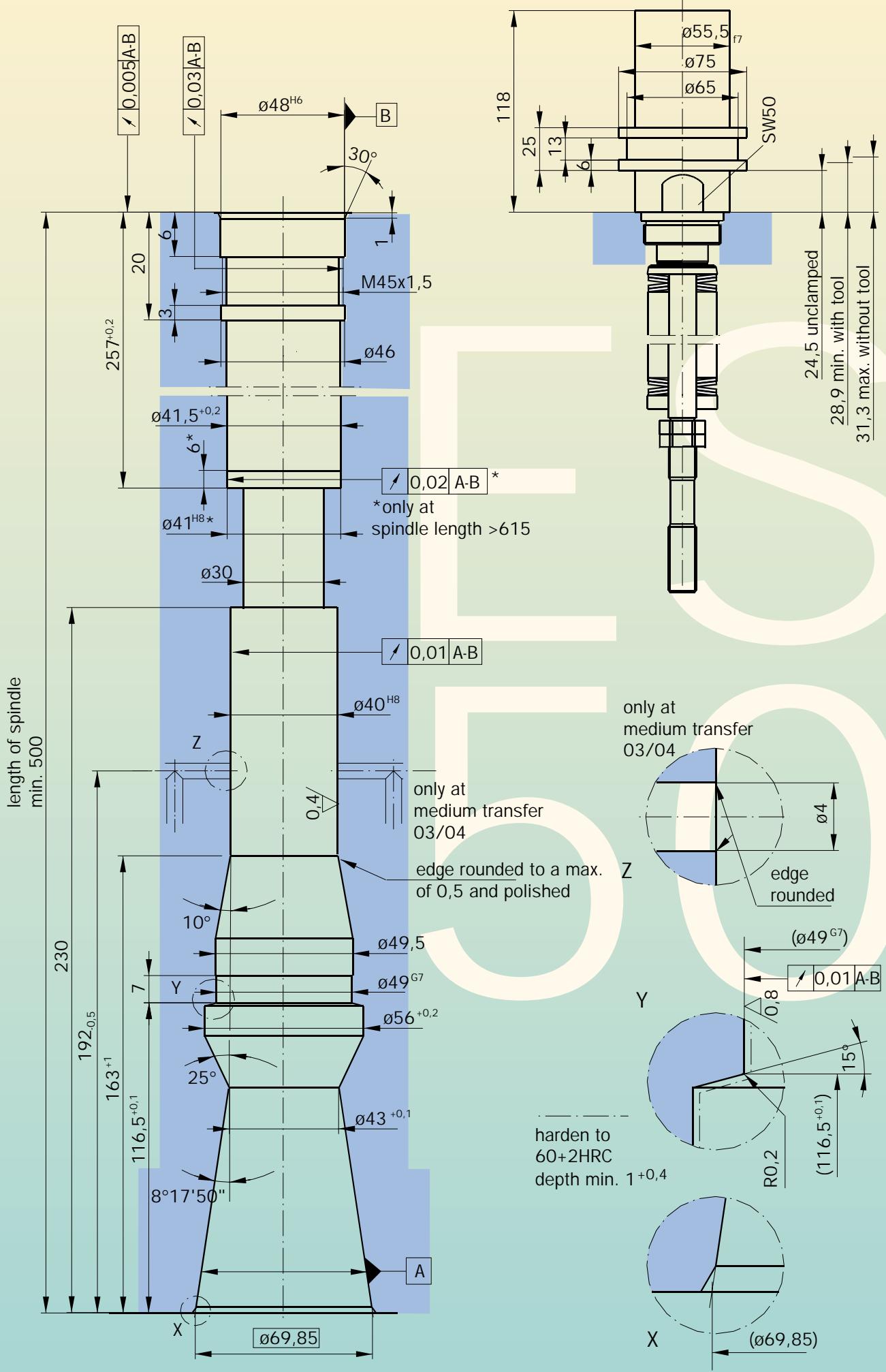
Technical data for the combination
inside spindle intensifier - rotary union/unclamp unit in ES/IS-power
drawbar
page 22/23

Subject to modification due to technical advance!

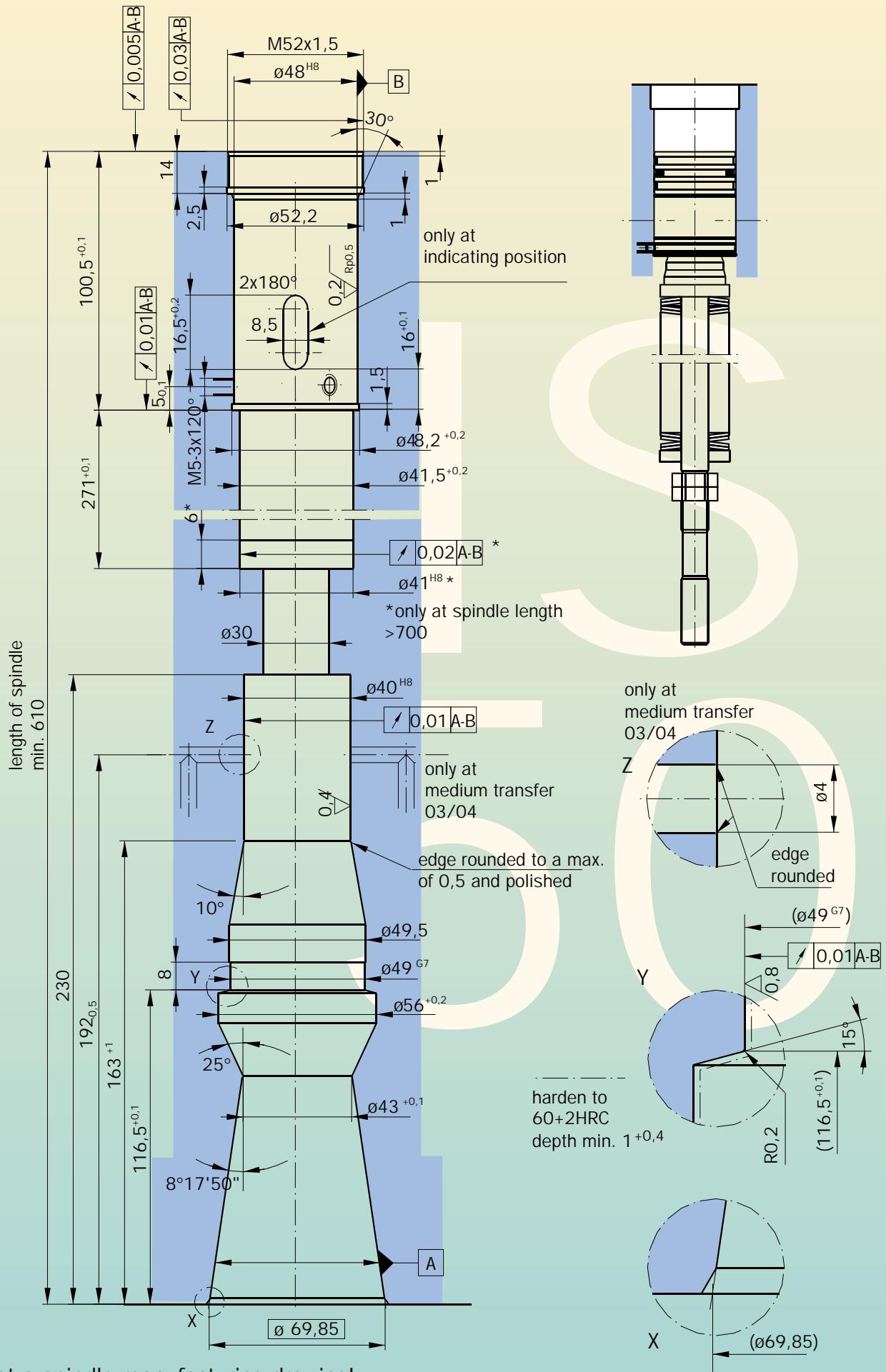
rated quantity		SK 50	
code		A1	C1
medium transfer		4	
[N]	pull in force	25000	23000
[mm]	stroke	6	6
	ejection path	1	1
	reference gauge	134,6	126
	k₁	14,75	14,75
	k₂	18,1	9,5
	l₁	79,7	87,9
order no.	mounting tool	95.101.337.9.2	95.101.337.9.2

Inside spindle drawbar
ES 50

16



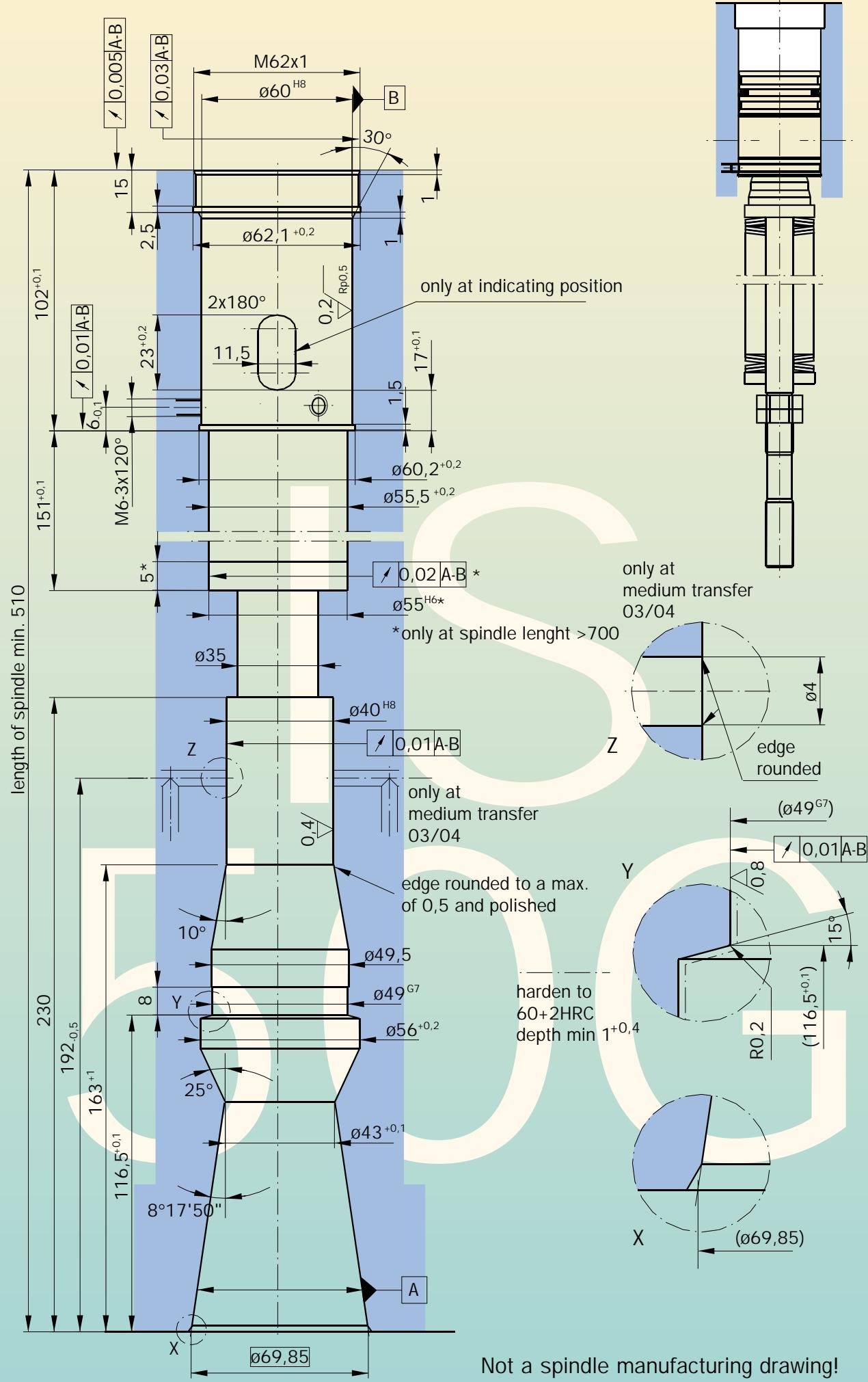
Not a spindle manufacturing drawing!



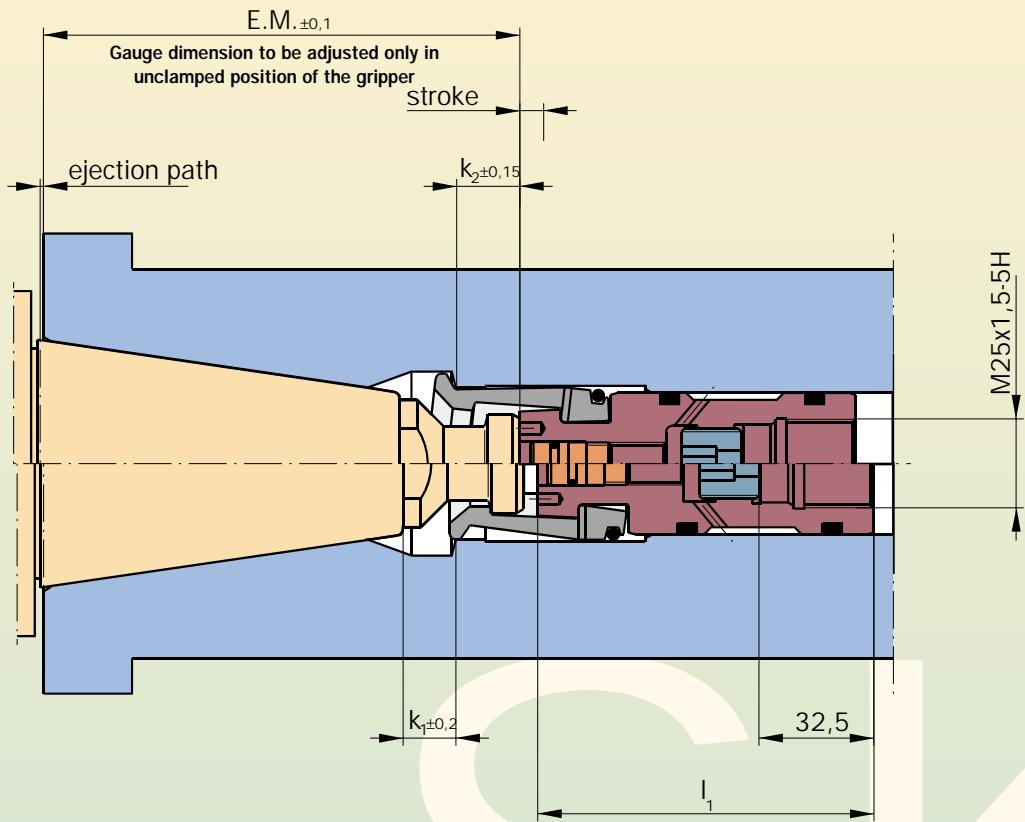
Subject to modification due to technical advance!

Spindle integrated power drawbar IS 50 G

18



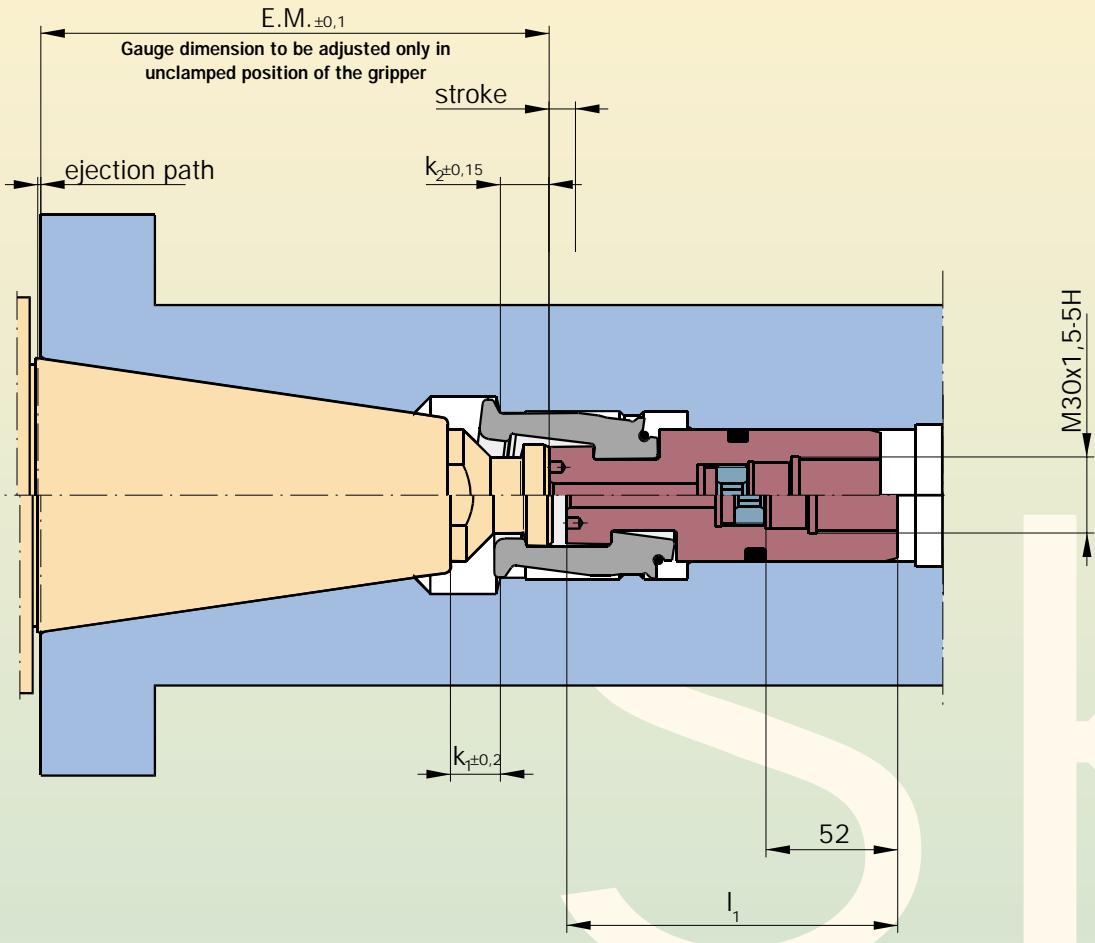
Not a spindle manufacturing drawing!



tool standard		code
DIN 69871/69872	ISO 7388/1/2 Typ A	A1
ANSI B 5.50 - 78	ISO 7388/1/2 Typ B	C1
medium transfer		
without transfer		1
axial transfer		2
radial transfer		3

Power drawbar and spindle contour for reinforced design upon request

rated quantity		SK 50 increased	
code		A1	C1
medium transfer		1 / 2 / 3	
[N]	pull in force	35000	
[mm]	stroke	9	9
	ejection path	1	1
	reference gauge	134,6	134,6
	k₁	14,75	14,75
	k₂	18,1	9,5
	l₁	94,6	103,2
order no.	mounting tool	95.101.336.9.2	95.101.336.9.2

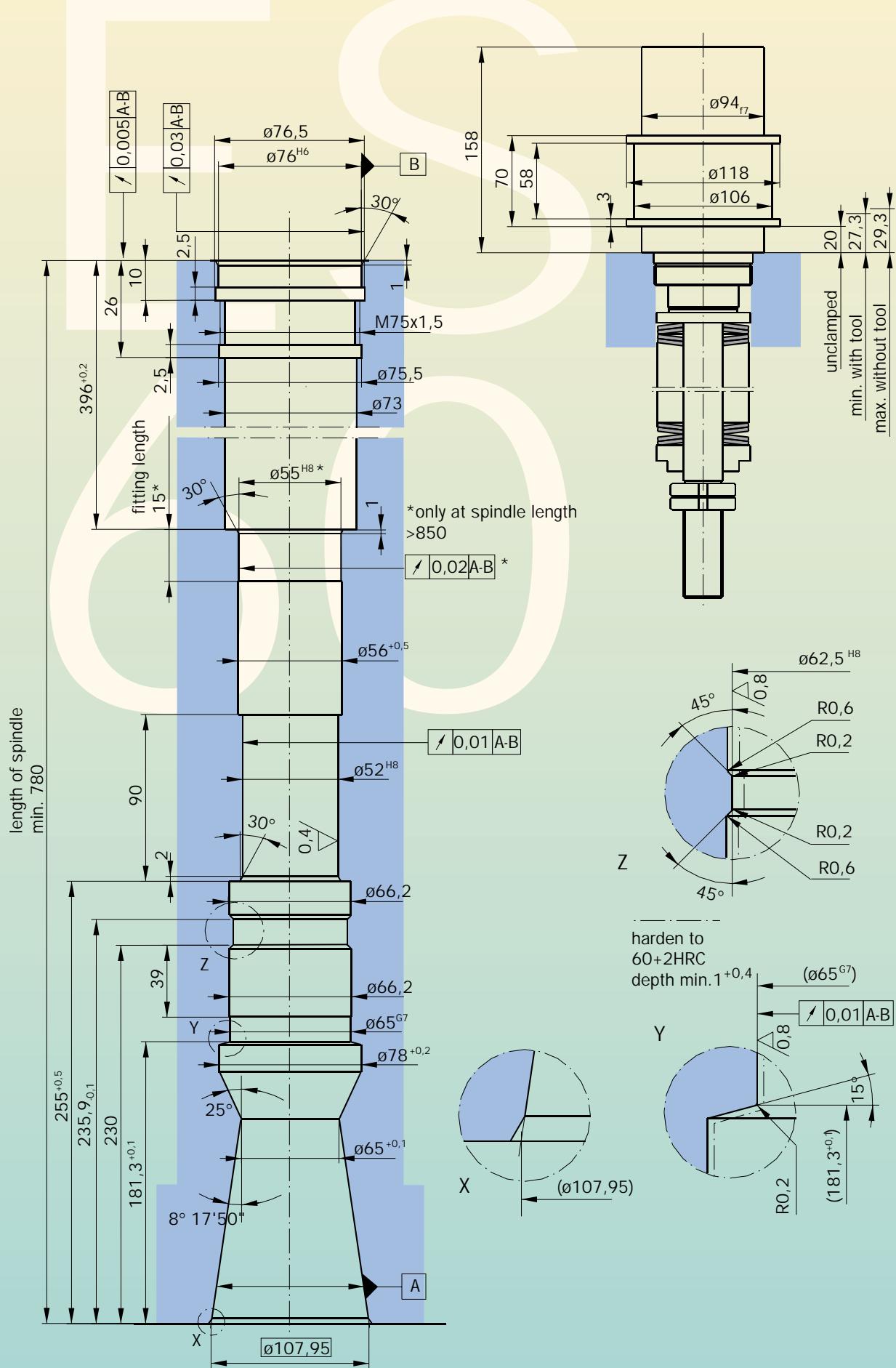


tool standard	code
DIN 69871/69872	ISO 7388/1/2 Typ A
ANSI B 5.50 - 78	ISO 7388/1/2 Typ B
medium transfer	C1
without transfer	1
axial transfer	2

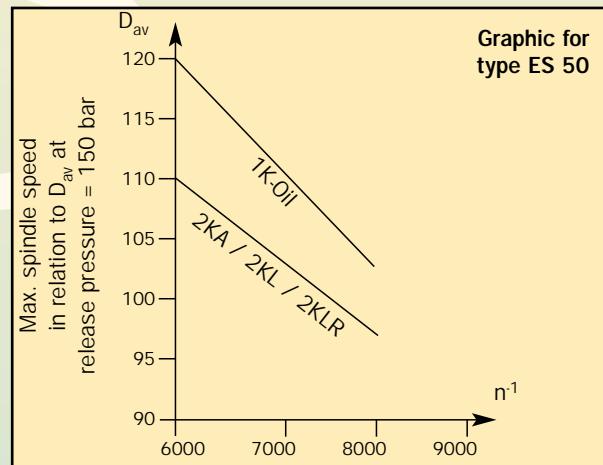
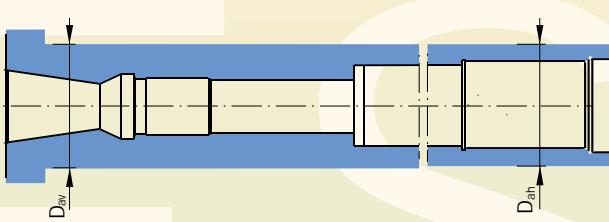
tool standard		SK 60	
code		A1	C1
medium transfer		1 / 2	
[N]	pull in force	65000	60000
[mm]	stroke	8,5	8,5
	ejection path	1,15	0,95
	reference gauge	200,5	199
	k ₁	19,5	19,2
	k ₂	19,2	17,7
	l ₁	130,5	132,2
	order no.	mounting tool	95.101.284.9.2

Technical data for the combination
inside spindle intensifier - rotary
union/unclamp unit in ES/IS-power
drawbar
page 22/23

Subject to modification due to technical advance!



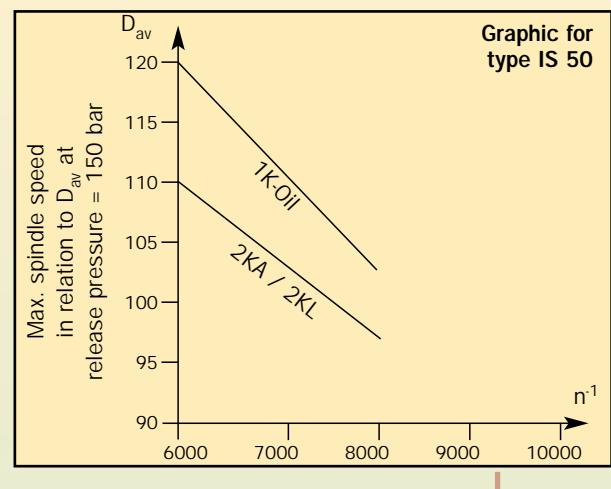
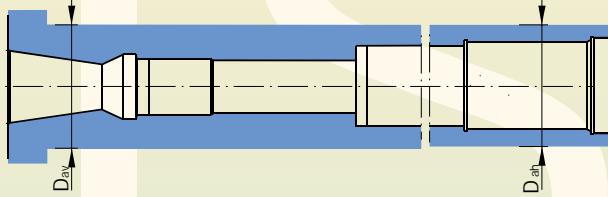
For the combination inside spindle intensifier-
rotary union / unclamp unit in **ES-power drawbar**



ES 30	1K-Oil	2KA	2KL	2KLR
spindle speed max.	[min ⁻¹]	10000		
piston area	[cm ²]	10,78		
oil volume	[cm ³]	17,0		
release pressure max.	[bar]	120		
ES 40	1K-Oil	2KA	2KL	2KLR
spindle speed max.	[min ⁻¹]	10000	8000	8000
piston area	[cm ²]	18,1	17,15	17,3
oil volume	[cm ³]	31,7	55	55
release pressure max.	[bar]	160	160	160
cleaning air; n=0; max.	[bar]	–	10	10
air pressure max.	[bar]	–	–	10
coolant pressure max.	[bar]	–	80	–
ES 50	1K-Oil	2KA	2KL	2KLR
spindle speed max.	[min ⁻¹]	siehe Diagramm		
piston area	[cm ²]	18,1	17,15	17,3
oil volume	[cm ³]	31,7	55	55
release pressure max.	[bar]	160	160	160
cleaning air; n=0; max	[bar]	–	10	10
air pressure max.	[bar]	–	–	10
coolant pressure max.	[bar]	–	80	–
ES 60	1K-Oil	2KA	2KL	
spindle speed max.	[min ⁻¹]	8000	8000	8000
piston area	[cm ²]	50,26	43,3	43,5
oil volume	[cm ³]	106	104	104
release pressure max.	[bar]	160	160	160
cleaning air; n=0; max	[bar]	–	10	10
coolant pressure max.	[bar]	–	80	–

For the combination inside
spindle intensifier-rotary
union/unclamp unit in
IS-power drawbar

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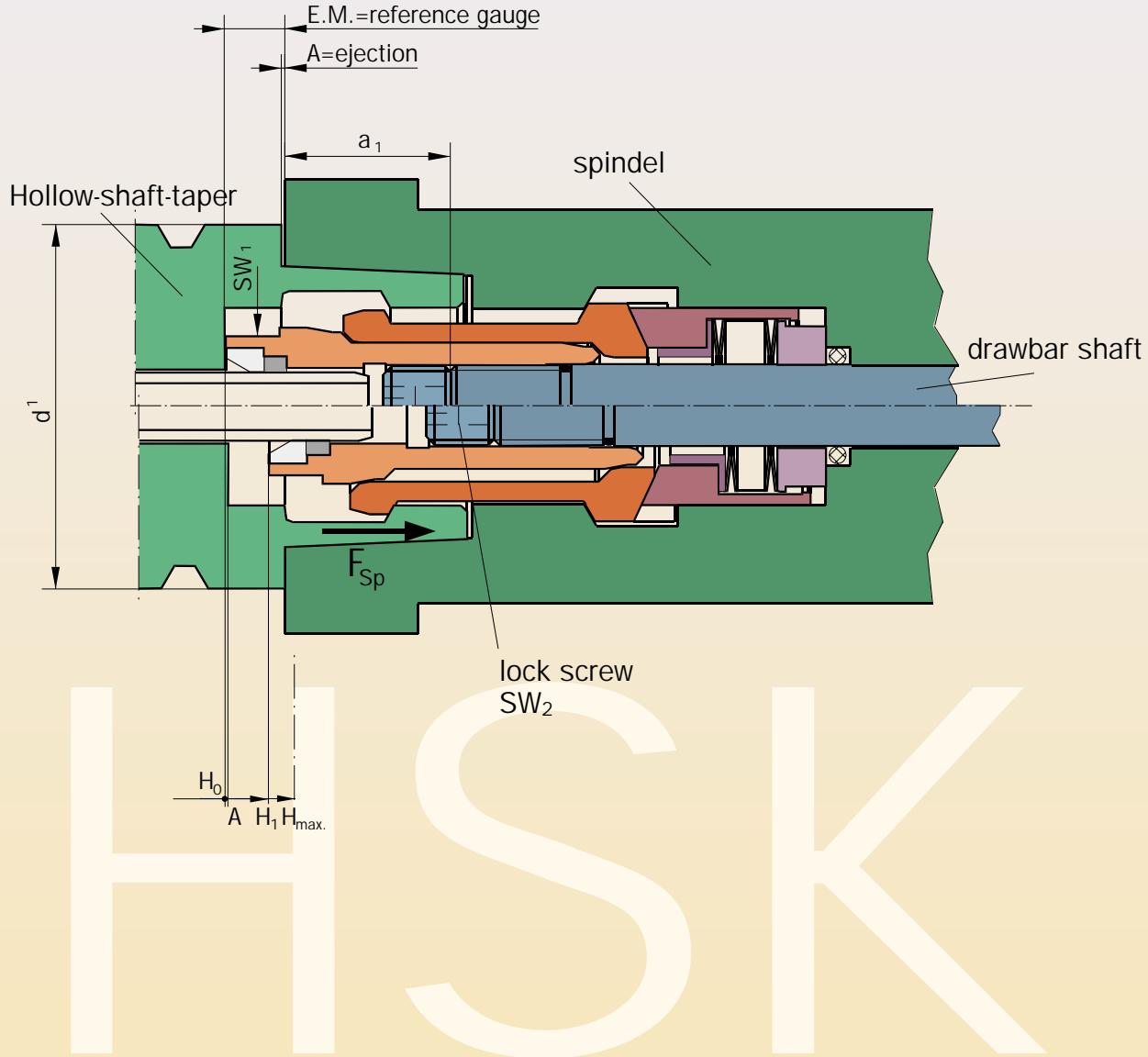
HSC-module										
IS 30		1K-Oil	2KA	2KL	2KLR	LE 95+GD	LE 95+GDR	LE 92	LE 150P	
spindle speed max.	[min ⁻¹]	10000	10000	10000	on request					
piston area	[cm ²]	11,34	10,39	10,56	10,56	19,36	19,36	16,5	→ data sheet	
oil volume	[cm ³]	20,4	23,5	20,4	20,4	45	45	38	-	
release pressure max.	[bar]	120	120	120	120	100	100	100	-	
cleaning air; n=0; max.	[bar]	-	10	10	10	10	10	10	10	
air pressure max.	[bar]	-	-	-	10	5	5	-	-	
coolant pressure max.	[bar]	-	80	-	-	80	50	-	-	
IS 40		1K-Oil	2KA	2KL	2KLR	LE + GD	LE + GDR	LE 92	LE 150P	
spindle speed max.		10000	10000	10000	on request					
piston area	[cm ²]	11,34	10,39	10,56	10,56	19,36	19,36	16,5	→ data sheet	
oil volume	[cm ³]	20,4	23,5	23,9	23,9	45	45	38	-	
release pressure max.	[bar]	160	160	160	160	160	160	160	-	
cleaning air; n=0; max	[bar]	-	10	10	10	10	10	10	10	
air pressure max.	[bar]	-	-	-	10	5	5	-	-	
coolant pressure max.	[bar]	-	80	-	-	80	50	-	-	
IS 50		1K-Oil	2KA	2KL	2KLR	LE + GD	LE + GDR		LE 150P	
spindle speed max.		see diagram			on request					
piston area	[cm ²]	18,1	17,15	17,3	17,3	19,36	19,36		→ data sheet	
oil volume	[cm ³]	31,7	54,5	55	55	45	45		-	
release pressure max.	[bar]	160	160	160	160	160	160		-	
cleaning air; n=0; max	[bar]	-	10	10	10	10	10		10	
air pressure max.	[bar]	-	-	-	10	5	5		-	
coolant pressure max.	[bar]	-	80	-	-	80	50		-	
IS 50 G		1K-Oil	2KA	2KL	2KLR				LE 150P	
spindle speed max.		10000	10000	10000	on request					
piston area	[cm ²]	28,3	27,4	27,5	17,3				→ data sheet	
oil volume	[cm ³]	55	53	54	55				-	
release pressure max.	[bar]	160	160	160	160				-	
cleaning air; n=0; max.	[bar]	-	10	10	10				10	
air pressure max.	[bar]	-	-	-	10				-	
coolant pressure max.	[bar]	-	80	-	-				-	

HSK-Grippers
HSK-Inside spindle intensifier



HSK-Clamping-Unit/Form A

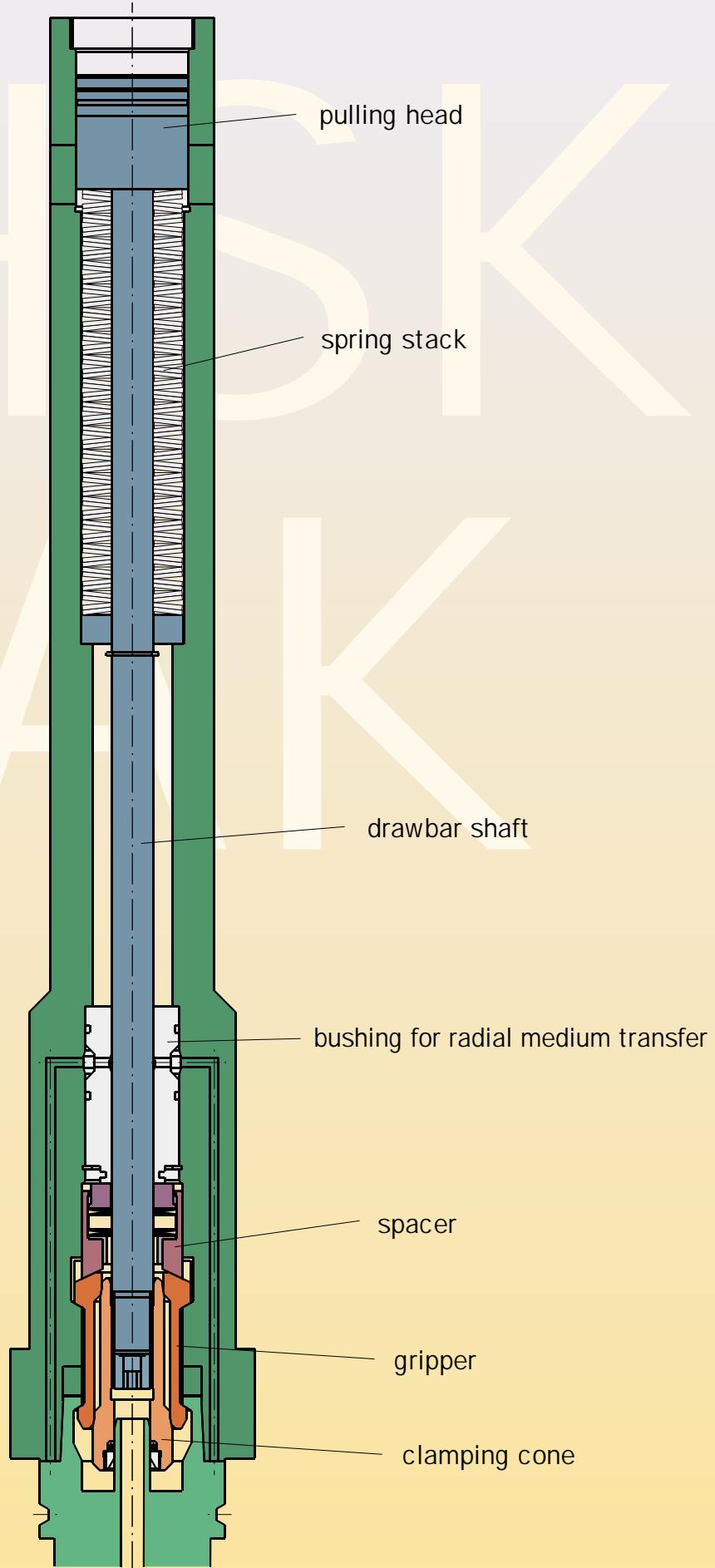
2



Hollow-shaft-tapers Form A		code
DIN 69893 - 1	ISO 12164-1	AK

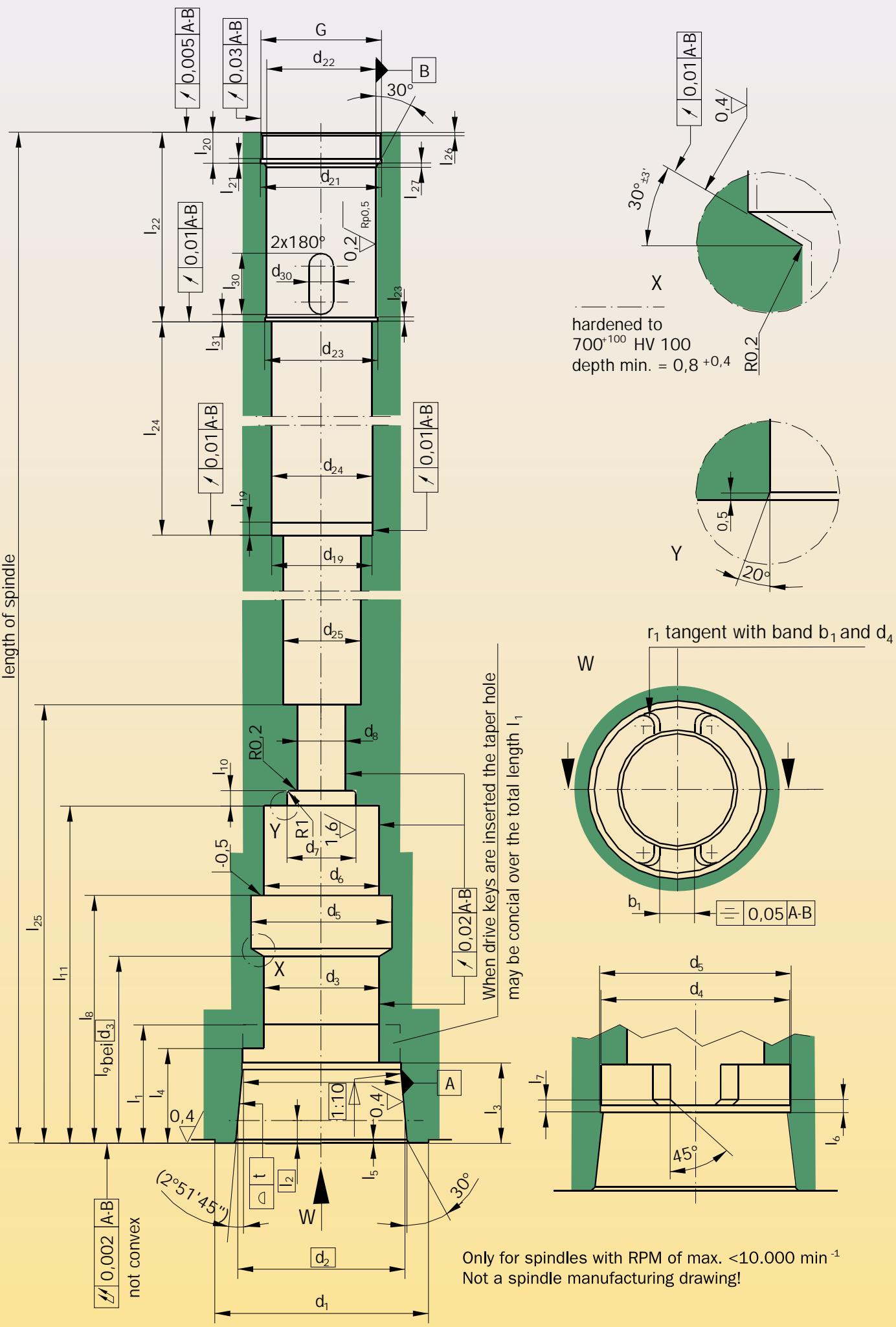
[mm]	d1	32	40	50	63	80	100	125	160	
[mm]	F _{Sp}		5	6,8	11	18	28	45	70	115
	A		0,5	0,5	0,5	0,5	0,5	0,5	0,5	1
	E.M.	±0,1	8,5	8,5	10,5	10,5	13	13	16,5	17
	H _{max}		7,5	8	9	10	11	12,5	15,8	24,5
	H ₁		5,1	5,6	6,4	7,4	8,3	9,15	10,8	17,5
	SW ₁		12	15	18	22	27	36	46	55
	SW ₂		3	4	4	5	6	6	14	16
	a ₁		19,5	27	26,5	31,5	29	34,5	40,5	56
mounting tool		95.601.111.3.1	95.601.112.3.1	95.601.113.3.1	95.601.114.3.1	95.601.115.2.1	95.601.116.2.1	95.601.117.2.1	95.601.118.2.1	

Inside spindle Intensifier with Clamping Unit HSK-AK



Subject to modification due to technical advance!

4 spindle inside contour AK



Spindle inside contour AK

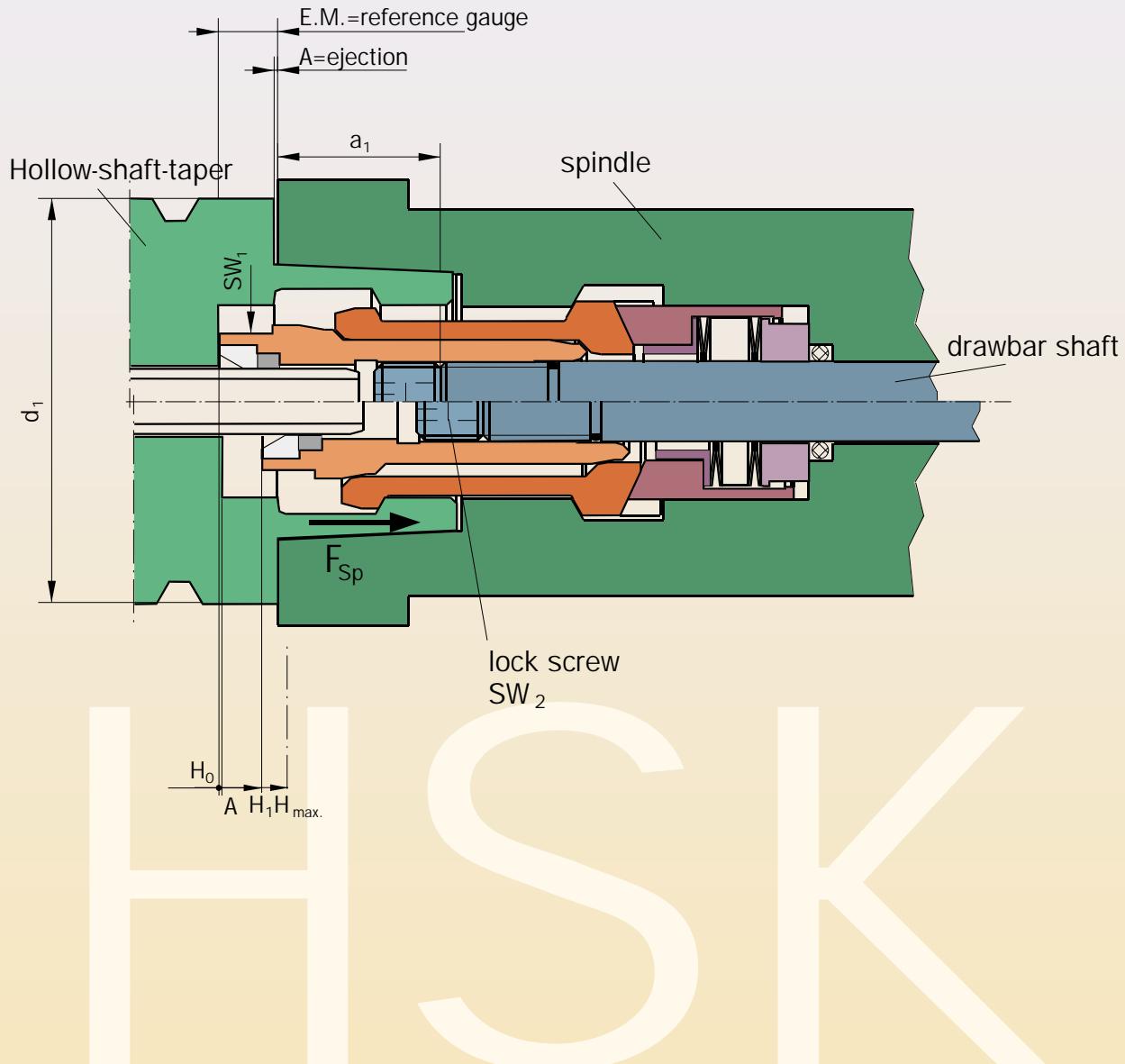
5

Dimensions not approved for spindle manufacturing! Subject to modification due to technical advance!

	d ₁		32	40	50	63	80	100	125	160		
	b ₁	+0,05 -0,05	6,8	7,8	10,3	12,3	15,8	19,78	24,78	29,78		
	d ₂		23,998	29,998	37,998	47,998	59,997	74,997	94,996	119,996		
	d ₃	H10	17	21	26	34	42	53	67	85		
	d ₄	+0,1	23,28	29,06	36,85	46,53	58,1	72,6	92,05	116,1		
	e ₁		8,91	11,08	14	18,11	22,07	27,56	35,58	44,54		
	e ₂		4,9	5,9	7,65	9,15	11,9	14,89	18,39	22,89		
	l ₁	+0,2	16,5	20,5	25,5	33	41	51	64	81		
	l ₂		3,2	4	5	6,3	8	10	12,5	16		
	l ₃	+0,2	11,4	14,4	17,9	22,4	28,4	35,4	44,4	57,4		
	l ₄	+0,2	13,4	16,9	20,9	26,4	32,4	40,4	51,4	64,4		
	l ₅		0,8	0,8	1	1	1,5	1,5	2	2		
	l ₆	+0,1	1	1	1,5	1,5	2	2	2,5	2,5		
	l ₇	±0,1	2,0	2,0	2,0	2,5	3,0	3,0	4,0	4,0		
	r ₁	+0,025 -0,025	1,5	2	2,5	3	4	5	6	8		
	t ^{**}		0,0015	0,0015	0,0020	0,0020	0,0025	0,0030	0,0035	0,0035		
DIN 69063-1 1996-01 bzw. ISO / WD 12164-2*	clamping unit	[mm]	d ₅	+0,2	22,5	26,5	33	41,6	50	63	79	104
		[mm]	d ₆	H6	17	21	26	34	42	53	67	85
		[mm]	d ₇	+0,1	10,3	13,2	15,2	20,4	22,4	24,2	32	37,2
		[mm]	d ₈	+0,1	6,6	8,6	10,6	14,6	16,6	18,4	25,4	32,4
		[mm]	l ₈	±0,1	43	58	61	69	72	93	112,5	148
		[mm]	l ₉	js8 at d ₃	30	44	45	52	56	70	86	113
		[mm]	l ₁₀	+0,2	3	3,6	3,6	4,2	4,2	4,2	4,7	4
		[mm]	l ₁₁	-0,2	62,5	78	84	94	98	124	149	188
			G		M42x1,5	M42x1,5	M42x1,5	M52x1,5	M52x1,5	M85x1,5		
			d ₂₁	+0,2	42,2	42,2	42,2	52,2	52,2	85,5		
			d ₂₂	H8	38	38	38	48	48	80		
			d ₂₃	+0,2	38,2	38,2	38,2	48,2	48,2	80,2		
			d ₂₄	+0,2	32	32	35	41,5	44	72		
			d ₂₅	+0,2	20	20	27	27	36	57		
			l ₂₀	+0,2	10,5	10,5	10,5	14	14	17		
			l ₂₁		1,5	1,5	1,5	1,5	1,5	2,5		
			l ₂₂	+0,1	65,5	65,5	65,5	86,5	86,5	118		
			l ₂₃		1,5	1,5	1,5	1,5	1,5	2		
			l ₂₄	-0,2	100	100	158	167	298	405,5		
			l ₂₅	-0,5	85	95	105	110	135	160		
			l ₂₆		1	1	1	1	1	2		
			l ₂₇		1,5	1,5	1,5	2,5	2,5	1,5		
			at a spindle length of more than:				350	450				
	d ₁₉	H8		31,5	31,5	34,5	41	43,5	71,5			
	l ₁₉			6			7					
			at position indication C:									
	d ₃₀			8,5	8,5	8,5	8,5	8,5	13			
	l ₃₀	+0,2		19	20	20	21	22,5	32			
	l ₃₁	+0,1		2,5	2,5	2,5	2	2	7			

* see updated standard!!

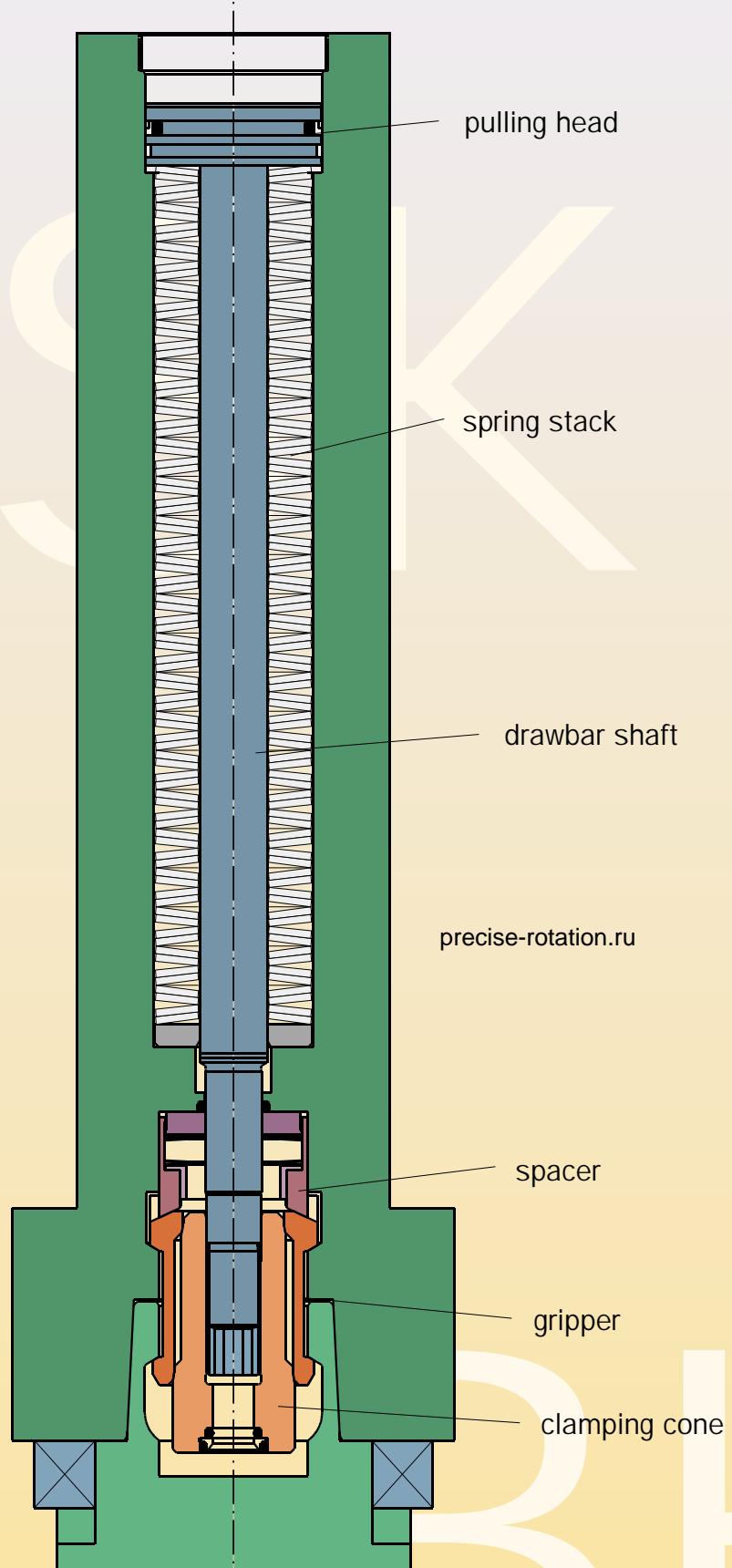
** see ISO 1101 and ISO 3040



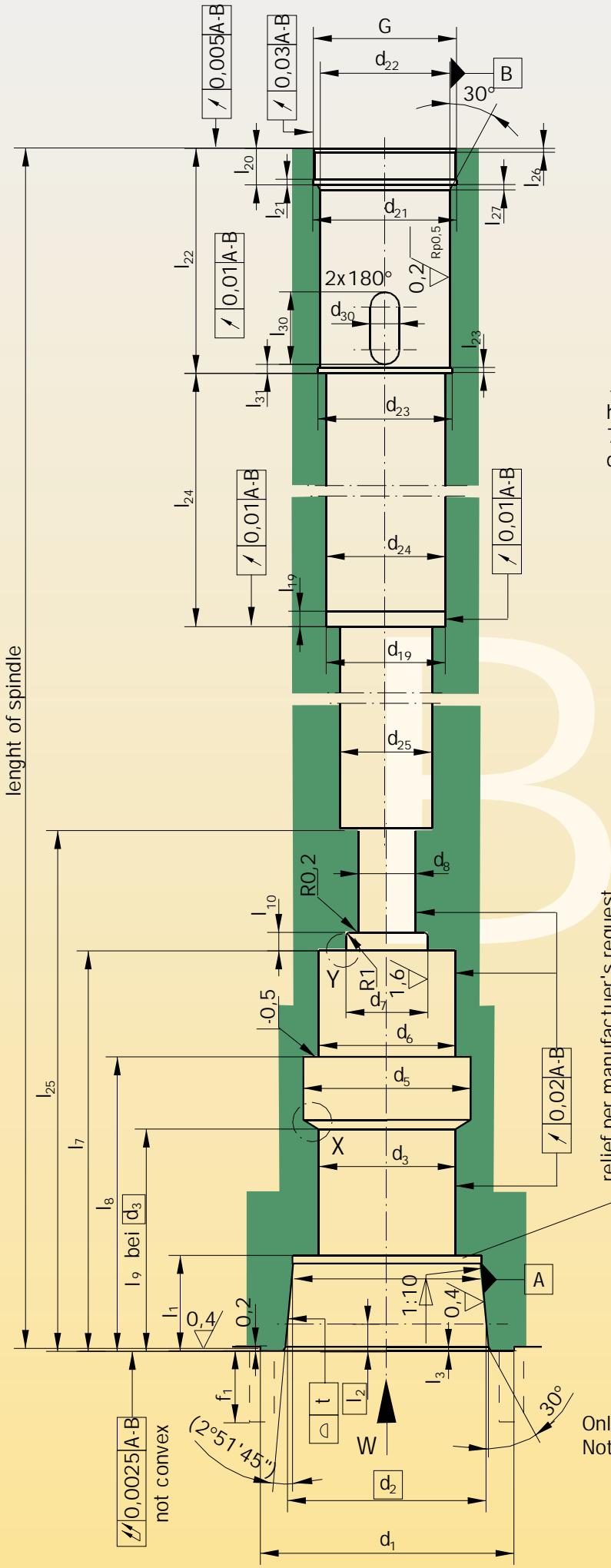
Hollow-shaft-tapers Form B		code
DIN 69893 - 2		BK

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[mm]	d ₁	40	50	63	80	100	125	160
[mm]	F _{Sp}	5	6,8	11	18	28	45	70
	A	0,5	0,5	0,5	0,5	0,5	0,5	0,5
	E.M.	±0,1	8,5	8,5	10,5	10,5	13	13
	H _{max.}	7,5	8	9	10	11	12,5	15,8
	H ₁	5,1	5,6	6,4	7,4	8,3	9,15	10,8
	SW ₁	12	15	18	22	27	36	46
	SW ₂	3	4	4	5	6	6	14
a ₁		19,5	27	26,5	31,5	29	34,5	40,5
mounting tool		95.601.111.3.1	95.601.112.3.1	95.601.113.3.1	95.601.114.3.1	95.601.115.2.1	95.601.116.2.1	95.601.117.2.1

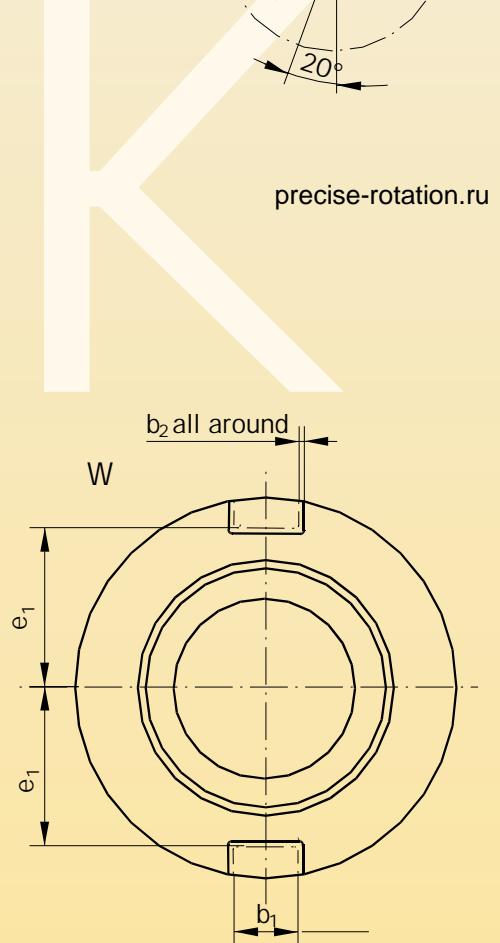
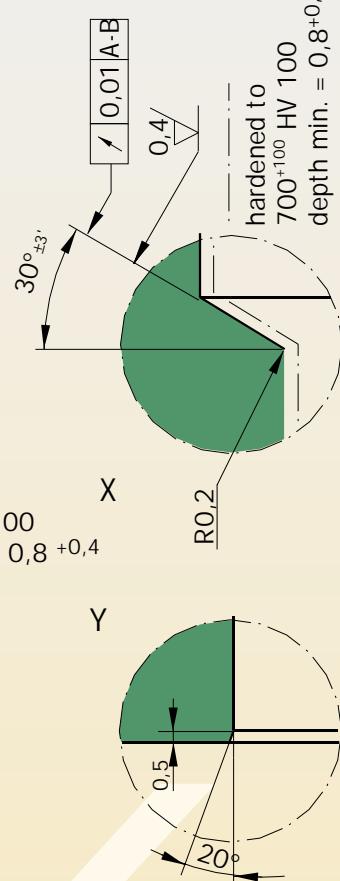


spindle inside contour BK



Only for spindle with RPM max. $< 10.000 \text{ min}^{-1}$
Not a spindle manufacturing drawing !

hardened to
 700^{+100} HV 100
depth min. = $0,8^{+0,4}$



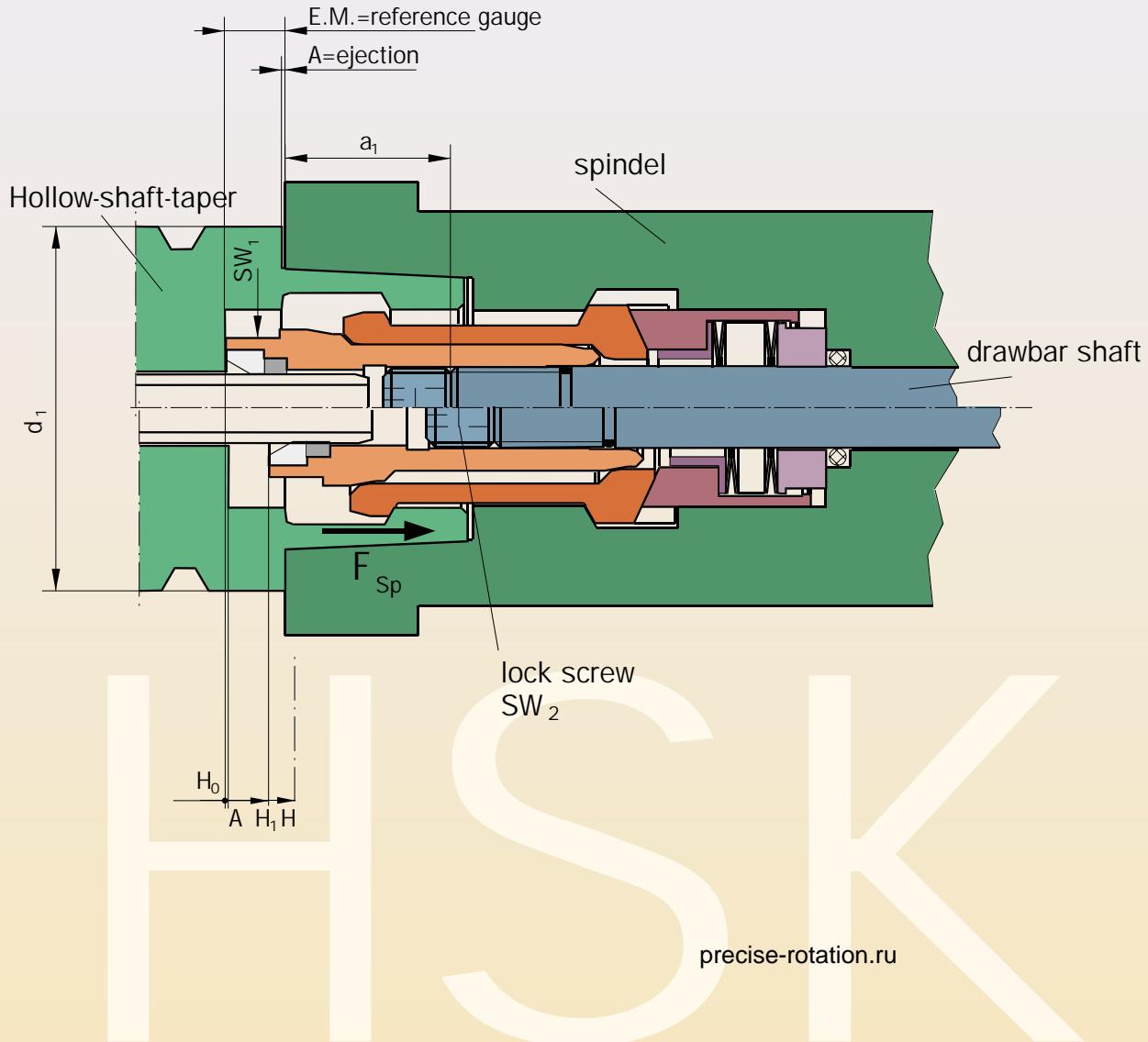
precise-rotation.ru

Dimensions not approved for spindle manufacturing! Subject to modification due to technical advance!

		d1	40	50	63	80	100	125	160	
DIN 69063-2 1996-01 *	[mm]	b ₁	+0,05 -0,05	9,9	11,9	15,9	17,9	19,9	24,9	31,9
		b ₂		1	1	1	1	2	2	2
		d ₂		23,998	29,998	37,998	47,998	59,997	74,997	94,996
		d ₃	H10	17	21	26	34	42	53	67
		e ₁	+0,2	16,2	20,2	25,2	31,7	40,2	50,2	62,7
		f ₁	max.	19,5	25,5	25,5	25,5	28,5	28,5	30,5
		l ₁	+0,2	16,5	20,5	25,5	33	41	51	64
		l ₂		3,2	4	5	6,3	8	10	12,5
		l ₃		0,8	0,8	1	1	1,5	1,5	2
		t**		0,0015	0,0015	0,0020	0,0020	0,0025	0,0030	0,0035
		d ₅	+0,2	22,5	26,5	33	41,6	50	63	79
		d ₆	H6	17	21	26	34	42	53	67
		d ₇	-0,1	10,3	13,2	15,2	20,4	22,4	24,2	32
		d ₈	+0,1	6,6	8,6	10,6	14,6	16,6	18,4	25,4
inside spindle intensifier	clamping unit	l ₇	-0,2	62,5	78	84	94	98	124	149
		l ₈	±0,1	43	58	61	69	72	93	112,5
		l ₉	js8 at d3	30	44	45	52	56	70	86
		l ₁₀	+0,2	3	3,6	3,6	4,2	4,2	4,2	4,7
		G		M42x1,5	M42x1,5	M42x1,5	M52x1,5	M52x1,5	M85x1,5-5H	
		d ₂₁	+0,2	42,2	42,2	42,2	52,2	52,2	85,5	
		d ₂₂	H8	38	38	38	48	48	80	
		d ₂₃	+0,2	38,2	38,2	38,2	48,2	48,2	80,2	
		d ₂₄	+0,2	32	32	35	41,5	44	72	
		d ₂₅	+0,2	20	20	27	27	36	57	
		l ₂₀	+0,2	10,5	10,5	10,5	14	14	17	
		l ₂₁		1,5	1,5	1,5	1,5	1,5	2,5	
		l ₂₂	+0,1	65,5	65,5	65,5	86,5	86,5	118	
		l ₂₃		1,5	1,5	1,5	1,5	1,5	2	
		l ₂₄	-0,2	100	100	158	167	298	405,5	
		l ₂₅	-0,5	85	95	105	110	135	160	
		l ₂₆		1	1	1	1	1	2	
		l ₂₇		1,5	1,5	1,5	2,5	2,5	1,5	
		at a spindle length of more than:				350	450			
on request	[mm]	d ₁₉		31,5	31,5	34,5	41	43,5	71,5	
		l ₁₉		6			7			
		at position indication G:								
		d ₃₀		8,5	8,5	8,5	8,5	8,5	13	
		l ₃₀	+0,2	19	20	20	21	22,5	32	
		l ₃₁	+0,1	2,5	2,5	2,5	2	2	7	

* see updated standard!

** see ISO 1101 and ISO 3040

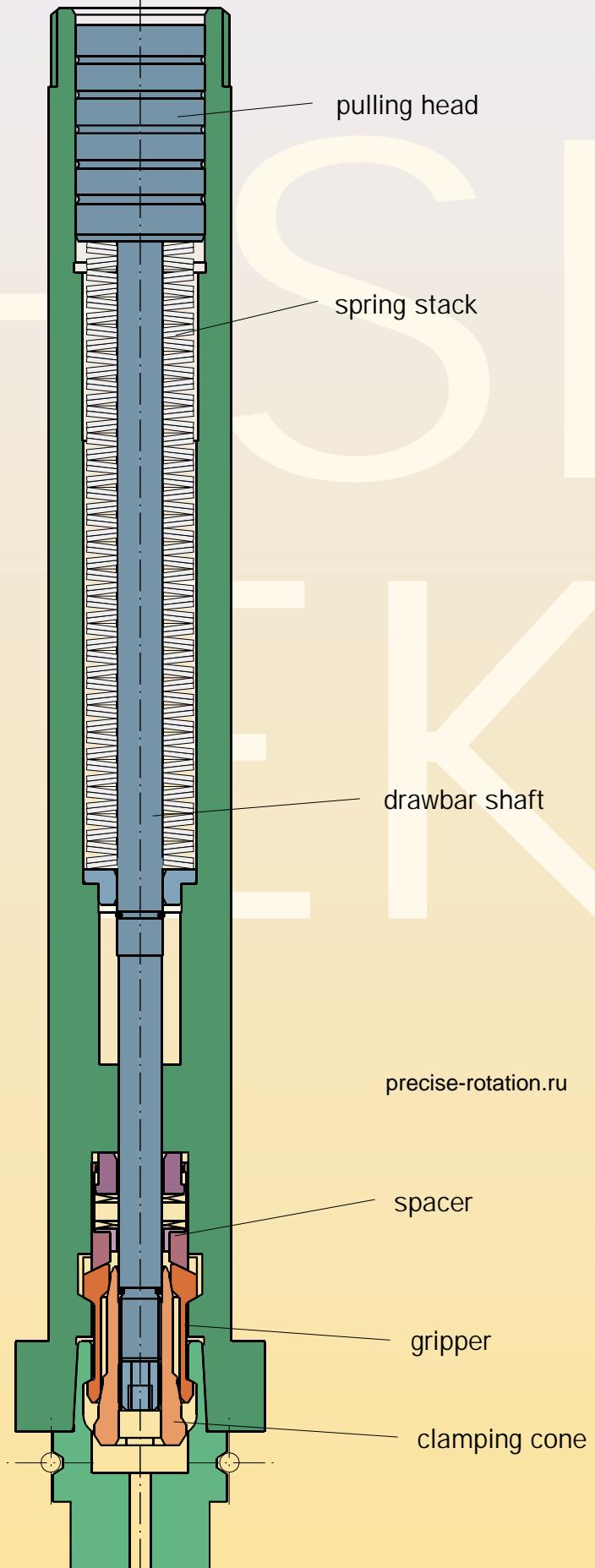


Hollow-shaft-tapers Form E		code		
DIN V 69893 - 5		EK		

[mm]	d1	25	32	40	50	63
[mm]	F_{Sp}	2,8	5	6,8	11	18
	A	0,5	0,5	0,5	0,5	0,5
	E.M.	$\pm 0,1$	6,5	8,5	8,5	10,5
	$H_{max.}$	7	7,5	8	9	10
	H_1	4,6	5,1	5,6	6,4	7,4
	SW_1	10	12	15	18	22
	SW_2	3	3	4	4	5
a_1		5,5	19,5	27	26,5	31,5
mounting tool		95.601.110.3.1	95.601.111.3.1	95.601.112.3.1	95.601.113.3.1	95.601.114.3.1

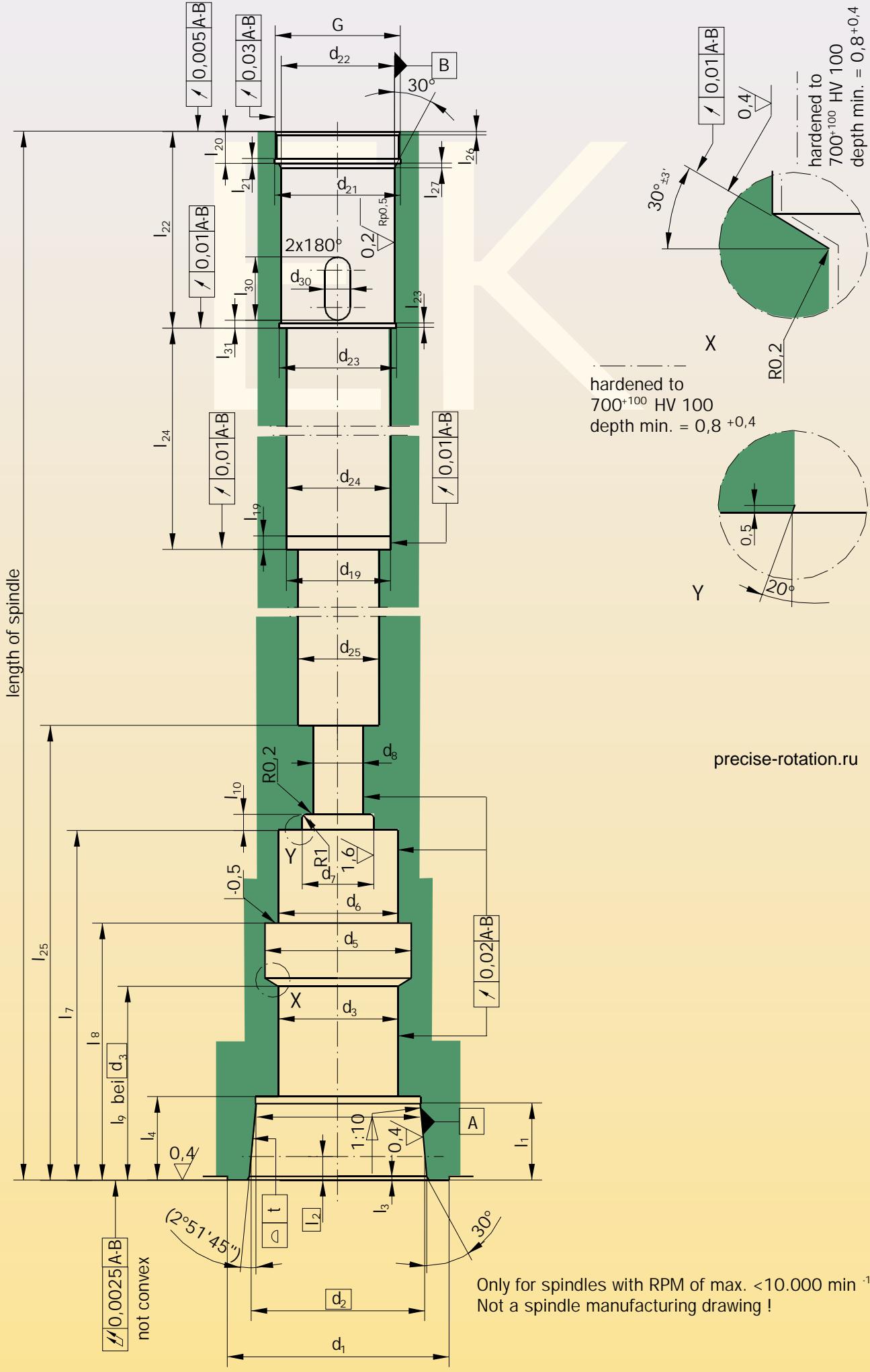
11 Inside spindle Intensifier with Clamping Unit HSK-EK

11



spindle inside contour EK

12

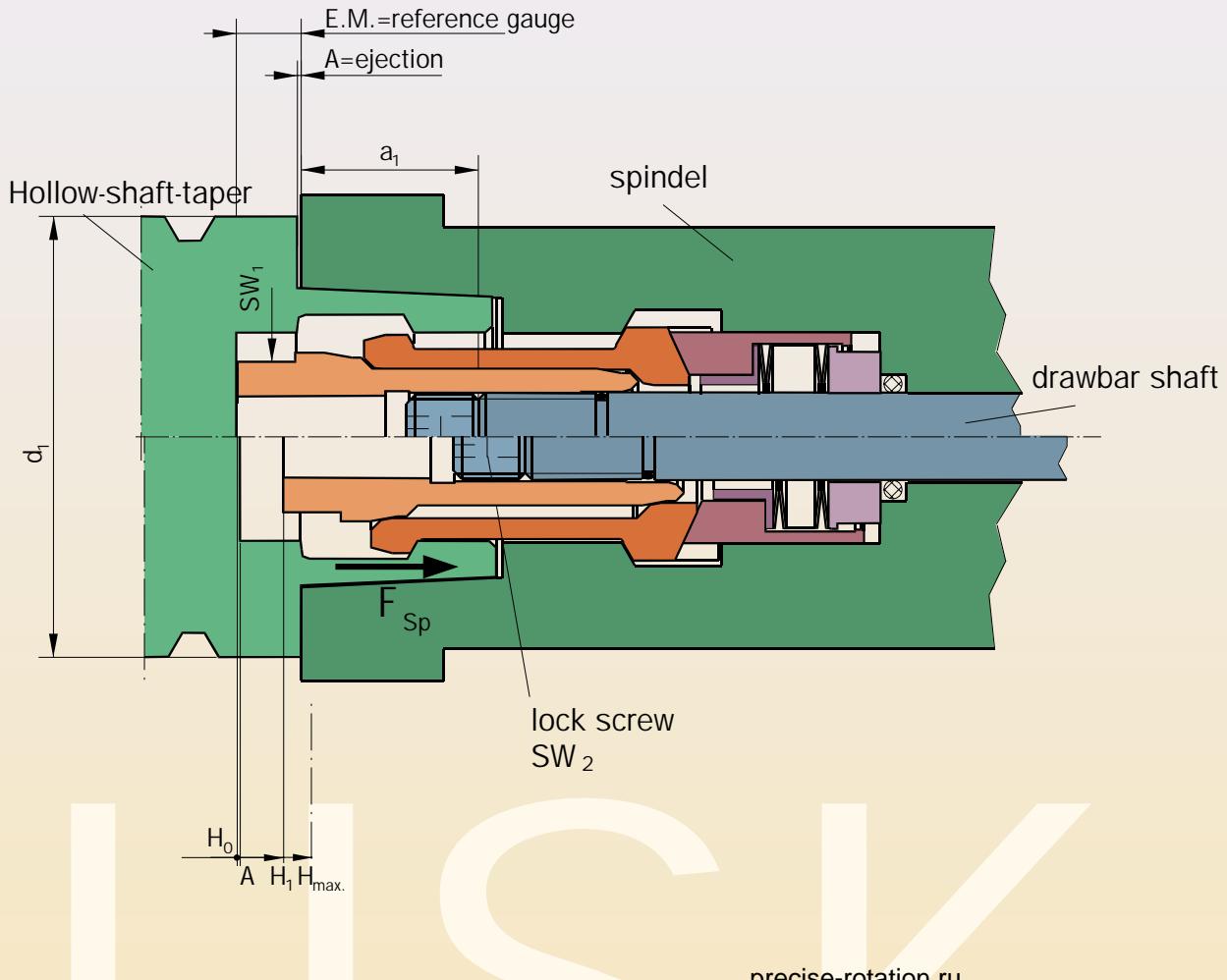


Dimensions not approved for spindle manufacturing! Subject to modification due to technical advance!

		d1	25	32	40	50	63
		d ₂	18,998	23,998	29,998	37,998	47,998
		l ₁	13	16	20	25	32
		l ₂	2,5	3,2	4	5	6,3
		l ₃	0,5	0,8	0,85	1	1
		l ₄	13,5	16,5	20,5	25,5	33
		t**	0,001	0,0015	0,0015	0,0020	0,0020
clamping unit		d ₃	H10	14	17	21	34
		d ₅	+0,2	18	22,5	26,5	41,6
		d ₆	H6	14	17	21	34
		d ₇	+0,1		10,3	13,2	20,4
		d ₈	+0,1	6,6	6,6	8,6	14,6
		l ₇	-0,2	40	62,5	78	84
		l ₈	±0,1	25,5	43	58	69
		l ₉	js8 at d3	18,5	30	44	52
		l ₁₀	+0,2		3	3,6	4,2
inside spindle intensifier		G		on request		M42x1,5	M42x1,5
		d ₂₁	+0,2			42,2	42,2
		d ₂₂	H8			38	38
		d ₂₃	+0,2			38,2	38,2
		d ₂₄	+0,2			32	32
		d ₂₅	+0,2			20	20
		l ₂₀	+0,2			10,5	10,5
		l ₂₁				1,5	1,5
		l ₂₂	+0,1			65,5	65,5
		l ₂₃				1,5	1,5
		l ₂₄	-0,2			100	100
		l ₂₅	-0,5			85	95
		l ₂₆				1	1
		l ₂₇				1,5	1,5
at a spindle length of more than:				350		450	
d ₁₉		H8		31,5		34,5	
l ₁₉				6		7	
at position indication G:							
d ₃₀				8,5		8,5	
l ₃₀		+0,2		19		20	
l ₃₁		+0,1		2,5		2,5	

* see updated standard!

** see ISO 1101 and ISO 3040



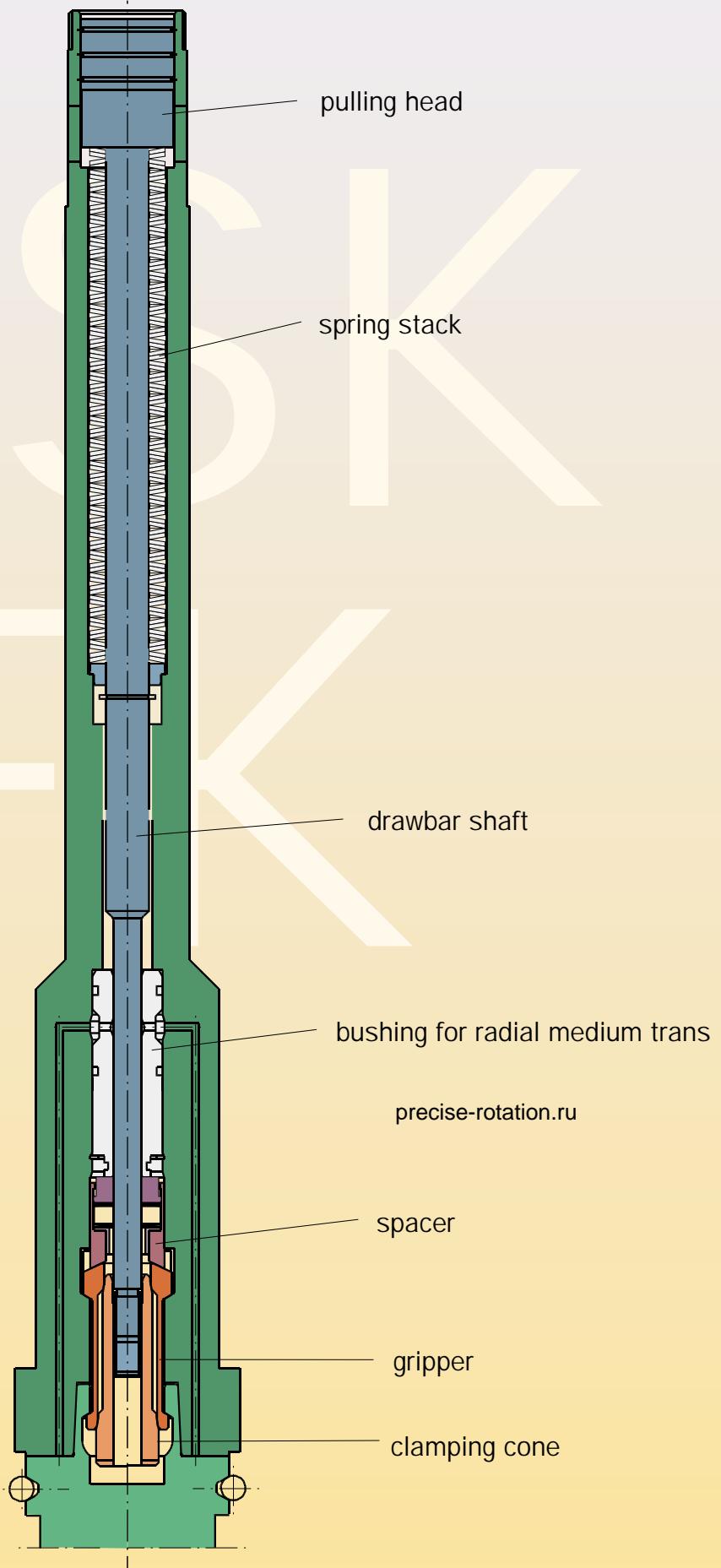
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Hollow-shaft-tapers Form F		code
DIN V 69893 - 6		FK

[mm]	d1	50	63	80
	F _{Sp}	6,8	11	18
	A	0,5	0,5	0,5
	E.M.	±0,1	8,5	10,5
	H _{max.}		8	9
	H ₁	5,6	6,4	7,4
	SW ₁	15	18	22
	SW ₂	4	4	5
a ₁		27	26,5	31,5
mounting tool		95.601.112.3.1	95.601.113.3.1	95.601.114.3.1

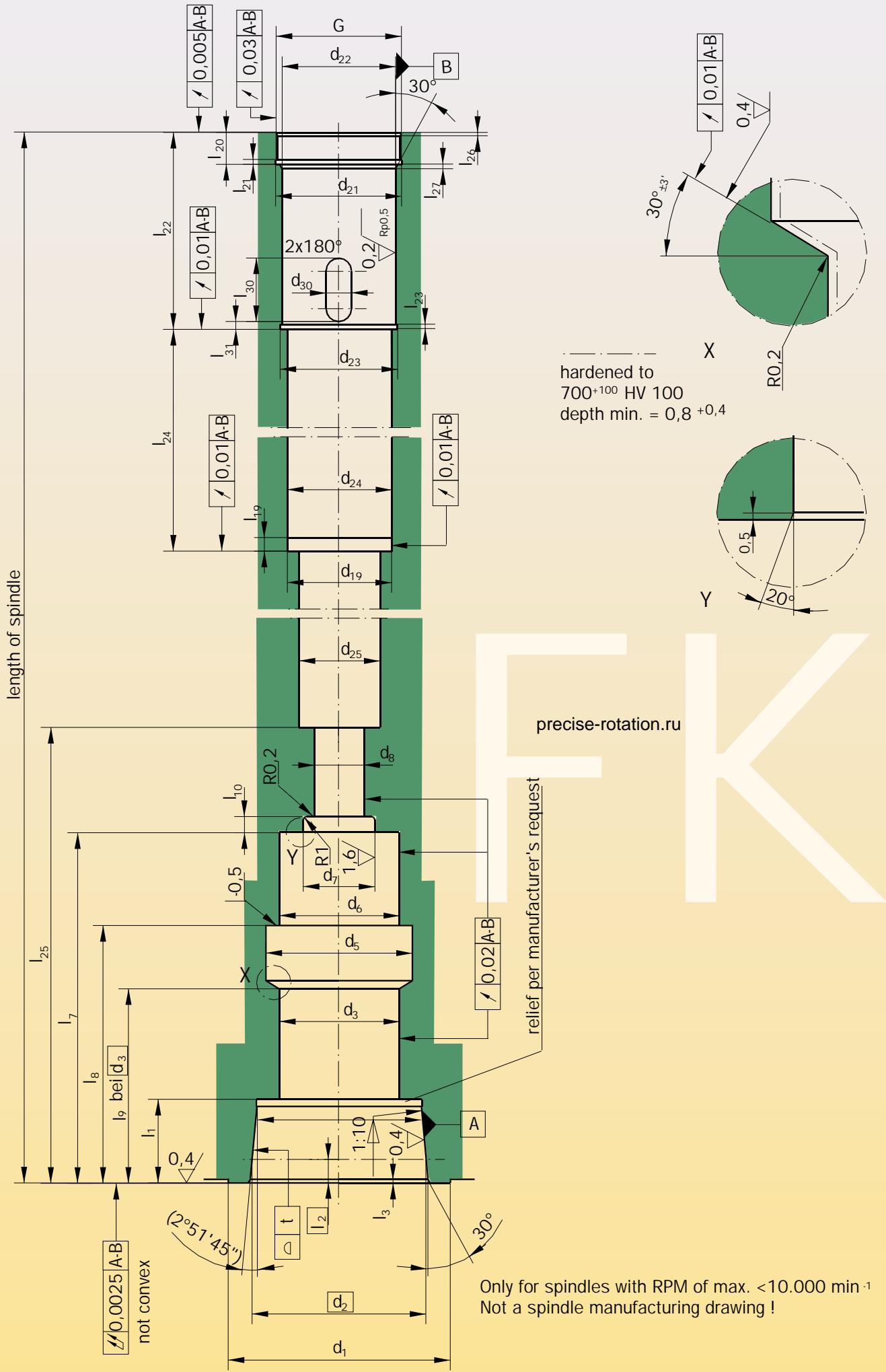
Inside spindle Intensifier with Clamping Unit HSK-FK

15



spindle inside contour FK

16



Dimensions not approved for spindle manufacturing! Subject to modification due to technical advance!

inside spindle intensifier [mm]	clamping unit [mm]	d1	50	63	80
		DIN V 69063-6 1996-01*			
		d ₂	29,998	37,998	47,998
		d ₃	H10	21	26
		l ₁	+0,2	20,5	25,5
		l ₂		4	5
		l ₃	+0,2	0,8	1
		t**		0,0015	0,0020
		d ₅	+0,2	26,5	33
		d ₆	H6	21	26
		d ₇	+0,1	13,2	15,2
		d ₈	+0,1	8,6	10,6
		l ₇	-0,2	78	84
		l ₈	±0,1	58	61
		l ₉	js8 at d3	44	45
		l ₁₀	+0,2	3,6	3,6
		G		M42x1,5	M42x1,5
		d ₂₁	+0,2	42,2	42,2
		d ₂₂	H8	38	38
		d ₂₃	+0,2	38,2	38,2
		d ₂₄	+0,2	32	32
		d ₂₅	+0,2	20	20
		l ₂₀	+0,2	10,5	10,5
		l ₂₁		1,5	1,5
		l ₂₂	+0,1	65,5	65,5
		l ₂₃		1,5	1,5
		l ₂₄	-0,2	100	100
		l ₂₅	-0,5	85	95
		l ₂₆		1	1
		l ₂₇		1,5	1,5
	at a spindle length of more than:			350	450
	d ₁₉		31,5	31,5	34,5
	l ₁₉		6		7
		at position indication G:			
	d ₃₀		8,5	8,5	8,5
	l ₃₀	+0,2	19	20	20
	l ₃₁	+0,1	2,5	2,5	2,5

* see updated standard!

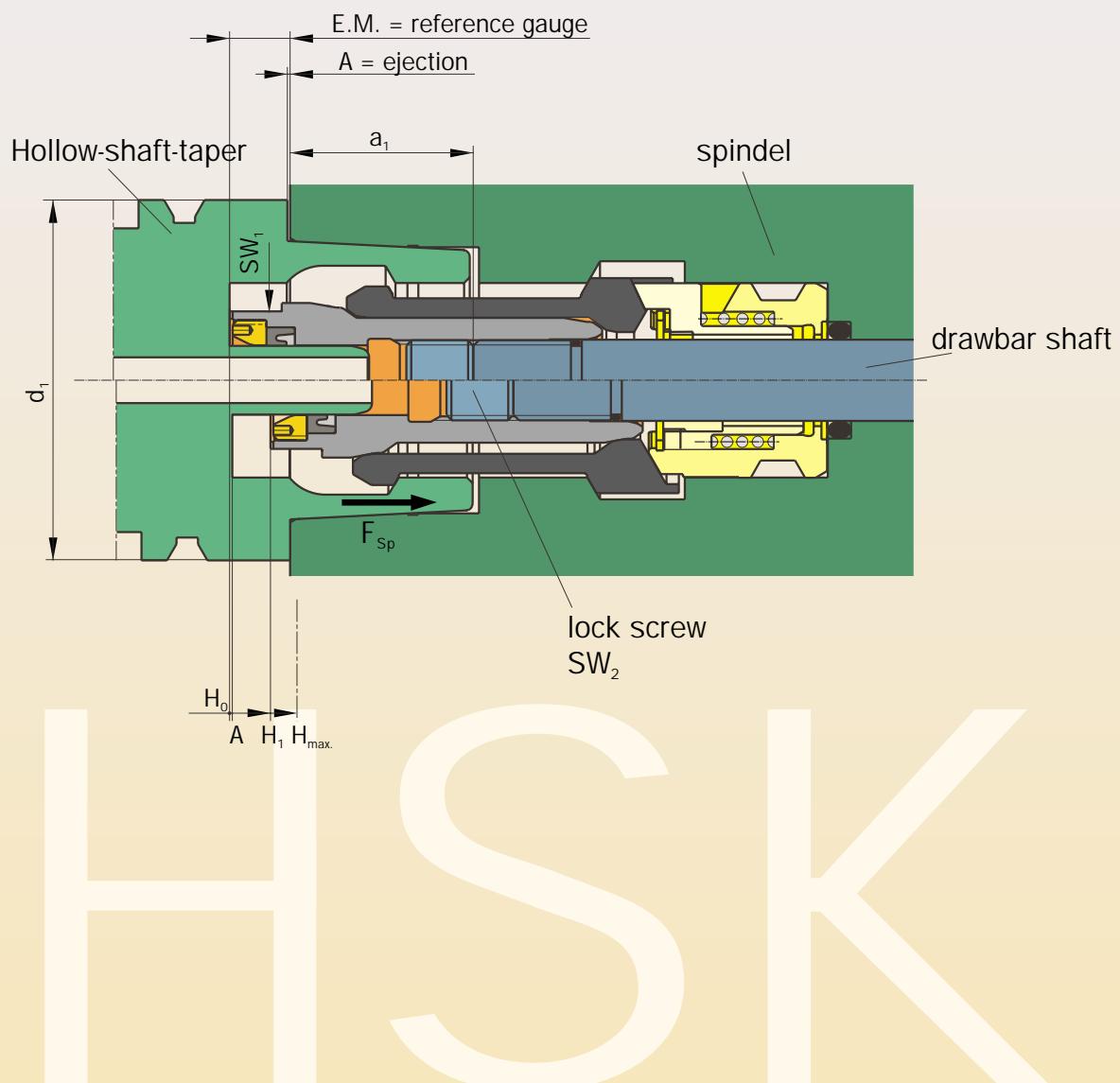
** see ISO 1101 and ISO 3040

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HSK-Grippers
HSK-Inside spindle intensifier



precise-rotation.ru

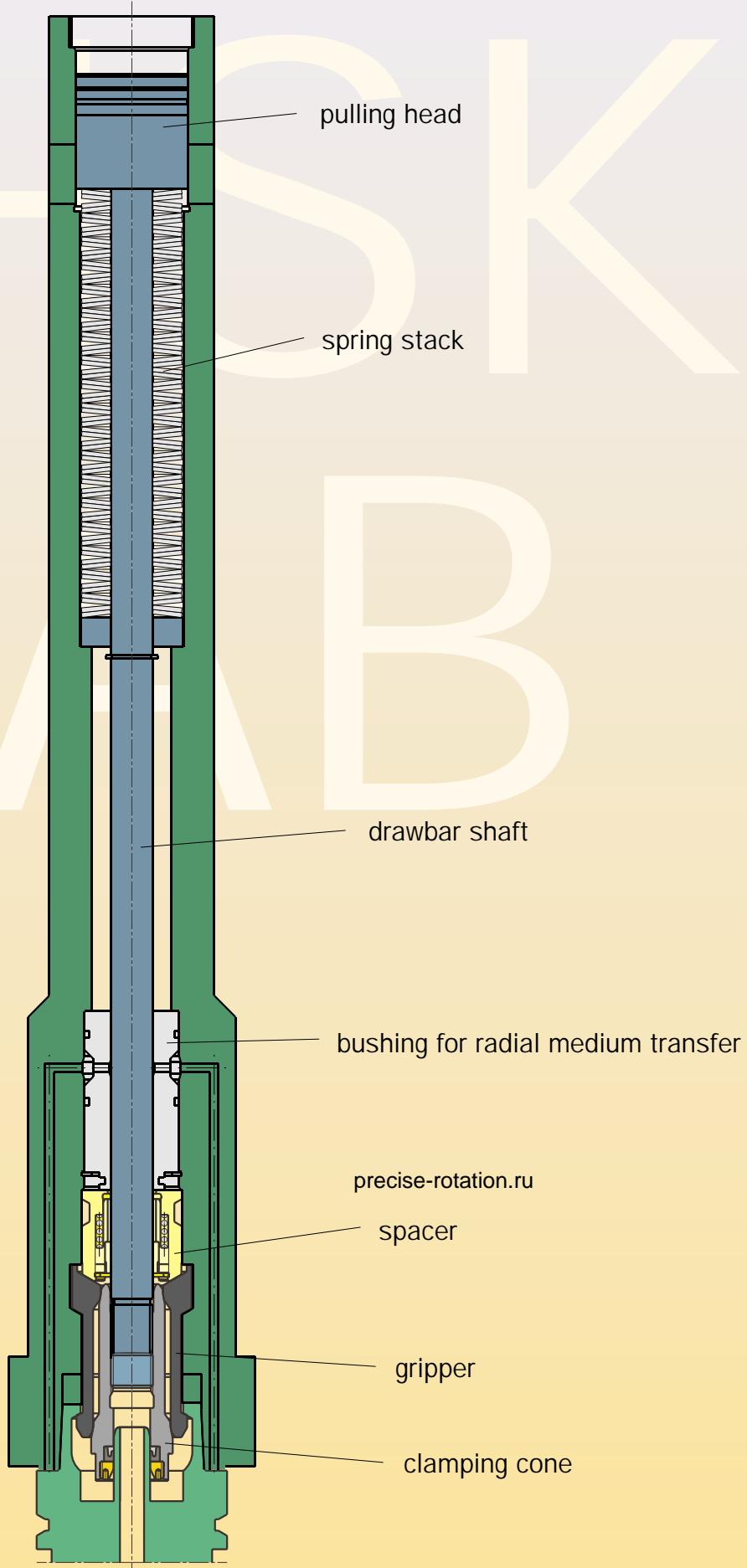


Hollow-shaft-tapers Form A / Series B		code
DIN 69893 - 1	ISO 12164-1	AB

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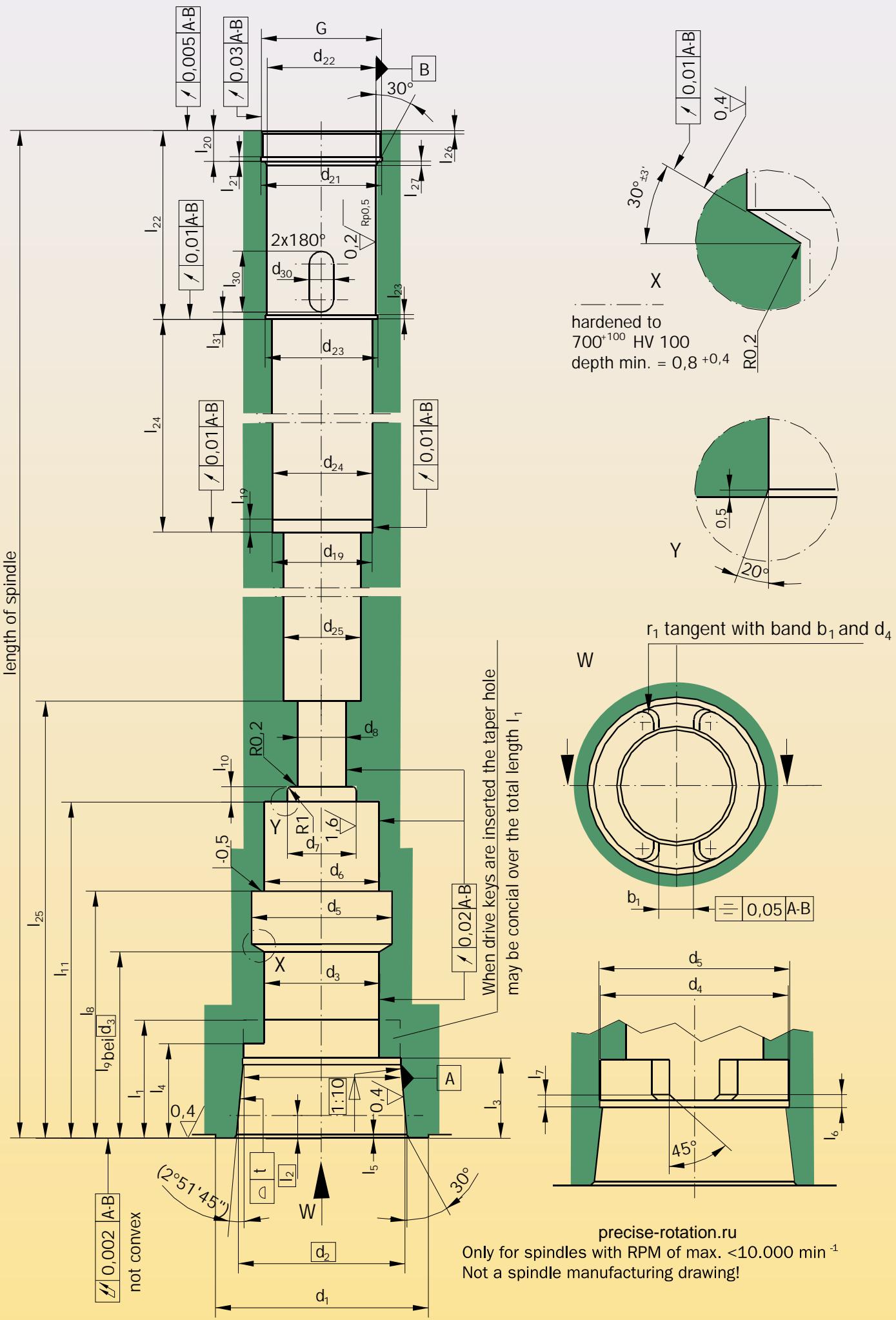
	d_1	32	40	50	63	80	100
[kN]	F_{Sp}	5	6,8	11	18	28	45
[mm]	A	0,5	0,5	0,5	0,5	0,5	0,5
	E.M.	$\pm 0,1$	8,5	8,5	10,5	10,5	13
	$H_{max.}$		7,5	8	9	10	12,5
	H_1		5,1	5,6	6,4	7,4	8,3
	SW_1		12	15	18	22	36
	SW_2		3	4	4	5	6
	a_1		19,5	27	26,5	31,5	29

Subject to modification due to technical advance!



spindle inside contour AB

20



Dimensions not approved for spindle manufacturing! Subject to modification due to technical advance!

	d ₁		32	40	50	63	80	100
	b ₁	+0,05 -0,05	6,8	7,8	10,3	12,3	15,8	19,78
	d ₂		23,998	29,998	37,998	47,998	59,997	74,997
	d ₃	H10	17	21	26	34	42	53
	d ₄	+0,1	23,28	29,06	36,85	46,53	58,1	72,6
	e ₁		8,91	11,08	14	18,11	22,07	27,56
	e ₂		4,9	5,9	7,65	9,15	11,9	14,89
	l ₁	+0,2	16,5	20,5	25,5	33	41	51
	l ₂		3,2	4	5	6,3	8	10
	l ₃	+0,2	11,4	14,4	17,9	22,4	28,4	35,4
	l ₄	+0,2	13,4	16,9	20,9	26,4	32,4	40,4
	l ₅		0,8	0,8	1	1	1,5	1,5
	l ₆	+0,1	1	1	1,5	1,5	2	2
	l ₇	±0,1	2,0	2,0	2,0	2,5	3,0	3,0
	r ₁	+0,025 -0,025	1,5	2	2,5	3	4	5
	t**		0,0015	0,0015	0,0020	0,0020	0,0025	0,0030
	d ₅	+0,2	22,5	26,5	33	41,6	50	63
	d ₆	H6	17	21	26	34	42	53
	d ₇	+0,1	10,3	13,2	15,2	20,4	22,4	24,2
	d ₈	+0,1	6,6	8,6	10,6	14,6	16,6	18,4
	l ₈	±0,1	43	58	61	69	72	93
	l ₉	js8 at d3	30	44	45	52	56	70
	l ₁₀	+0,2	3	3,6	3,6	4,2	4,2	4,2
	l ₁₁	-0,2	62,5	78	84	94	98	124
	G			M42x1,5	M42x1,5	M42x1,5	M52x1,5	M52x1,5
	d ₂₁	+0,2		42,2	42,2	42,2	52,2	52,2
	d ₂₂	H8		38	38	38	48	48
	d ₂₃	+0,2		38,2	38,2	38,2	48,2	48,2
	d ₂₄	+0,2		32	32	35	41,5	44
	d ₂₅	+0,2		20	20	27	27	36
	l ₂₀	+0,2		10,5	10,5	10,5	14	14
	l ₂₁			1,5	1,5	1,5	1,5	1,5
	l ₂₂	+0,1		65,5	65,5	65,5	86,5	86,5
	l ₂₃			1,5	1,5	1,5	1,5	1,5
	l ₂₄	-0,2		100	100	158	167	298
	l ₂₅	-0,5		85	95	105	110	135
	l ₂₆			1	1	1	1	1
	l ₂₇			1,5	1,5	1,5	2,5	2,5
	at a spindle length of more than: 350					450		
	d ₁₉	H8		31,5	31,5	34,5	41	43,5
	l ₁₉			6			7	
	at position indication G:							
	d ₃₀			8,5	8,5	8,5	8,5	8,5
	l ₃₀	+0,2		19	20	20	21	22,5
	l ₃₁	+0,1		2,5	2,5	2,5	2	2



Technical data for the combination HSK-rotary union/ unclamp unit in **IF-tool clamping units**

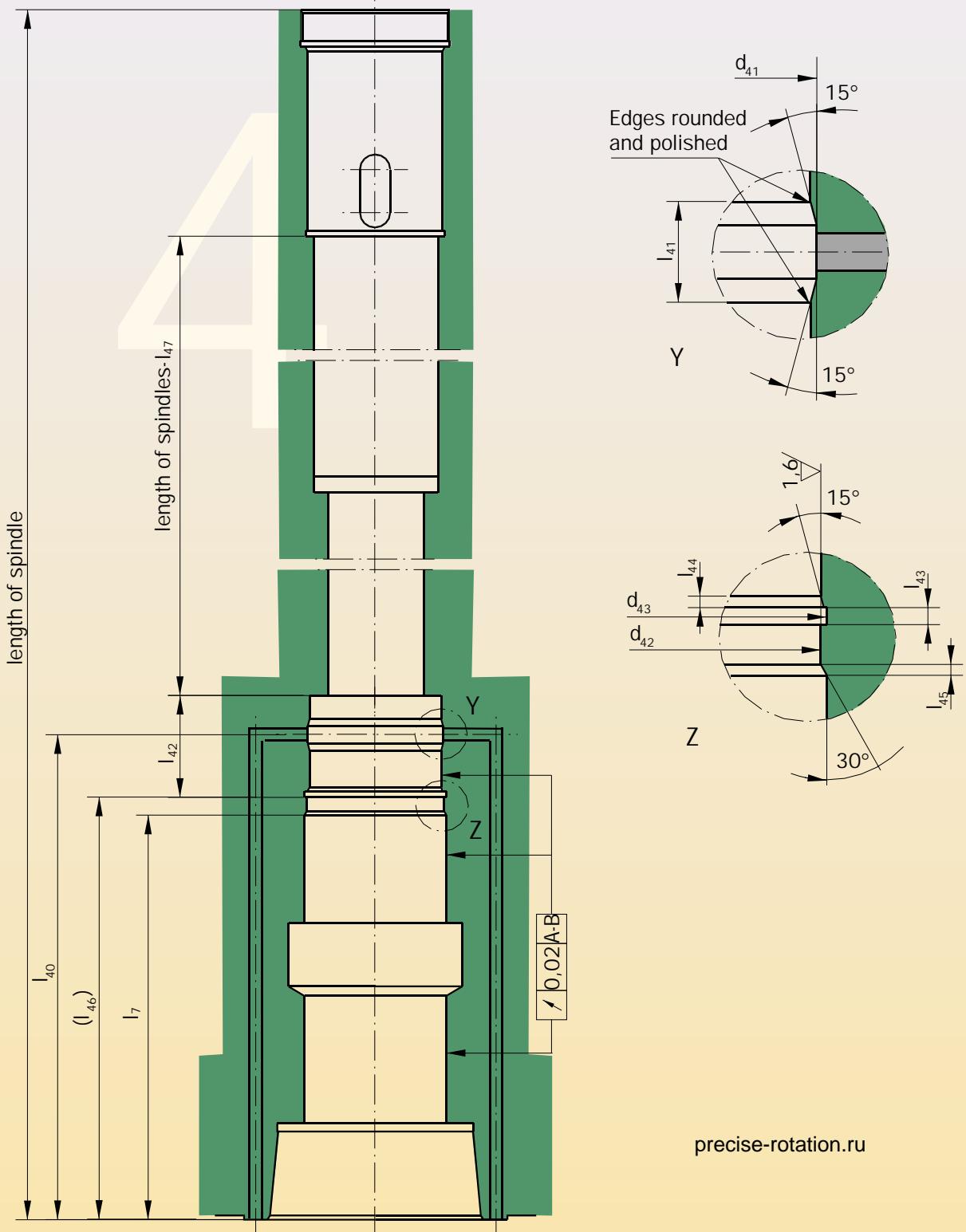
HSC-Module									
E 25							LE 60		LE 150 P
pull force	[N]							2.800	2.800
spindle speed max.	[min ⁻¹]	on request							
piston area	[cm ²]							5,8	
oil volume	[cm ³]							12	
release pressure max.	[bar]							100	8
cleaning air; n=0; max.	[bar]							10	10
air pressure max.	[bar]							–	
coolant pressure max.	[bar]							–	→ data sheet
A 32 / B 40 / E 32				LE95+GD	LE95+GDR	LE 60	LE 92	LE 150 P	
pull force	[N]							5.000	
spindle speed max.	[min ⁻¹]	on request							
piston area	[cm ²]							19,36	16,5
oil volume	[cm ³]							45	38
release pressure max.	[bar]							100	100
cleaning air; n=0; max.	[bar]							10	10
air pressure max.	[bar]							5	–
coolant pressure max.	[bar]							80	→ data sheet
A 40 / B 50 / E 40 / F 50	1K-ÖI	2KA	2KL	2 KLR	LE95+GD	LE95+GDR		LE 92	LE 150 P
pull force	[N]	6.800			6.800			6.800	
spindle speed max.	[min ⁻¹]	10.000	10.000	10.000	on request				
piston area	[cm ²]	11,34	10,39	10,56	10,56	19,36	19,36		16,5
oil volume	[cm ³]	9	8,2	8,3	8,3	45	45		38
release pressure max.	[bar]	100	100	100	100	100	100		100
cleaning air; n=0; max.	[bar]	–	10	10	10	10	10		10
air pressure max.	[bar]	–	–	–	10	5	5	–	→ data sheet
coolant pressure max.	[bar]	–	80	–	–	80	50	–	–
A 50 / B 63 / E 50 / F 63	1K-ÖI	2KA	2KL	2 KLR	LE95+GD	LE95+GDR		LE 92	LE 150 P
pull force	[N]	11.000			11.000			11.000	
spindle speed max.	[min ⁻¹]	10.000	10.000	10.000	on request				
piston area	[cm ²]	11,34	10,39	10,56	10,56	19,36	19,36		16,5
oil volume	[cm ³]	10,2	9,4	9,5	9,5	45	45		38
release pressure max.	[bar]	160	160	160	160	160	160		160
cleaning air; n=0; max.	[bar]	–	10	10	10	10	10		10
air pressure max.	[bar]	–	–	–	10	5	5	–	→ data sheet
coolant pressure max.	[bar]	–	80	–	–	80	50	–	–

Subject to modification due to technical advance!

HSC-Module										
A 63 / B 80 / E 63 / F 80		1 K-Öl	2 KA	2 KL	2 KLR	LE95+GD	LE95+GDR		LE 92	LE 150 P
pull force	[N]	18.000			18.000				18.000	
spindle speed max.	[min ⁻¹]	10.000	10.000	10.000	on request					
piston area	[cm ²]	11,34	10,39	10,56	10,56	19,36	19,36		16,5	
oil volume	[cm ³]	11,4	10,4	10,6	10,6	45	45		38	
release pressure max.	[bar]	160	160	160	160	160	160		160	
cleaning air; n=0; max.	[bar]	-	10	10	10	10	10		10	
air pressure max.	[bar]	-	-	-	10	5	5		-	
coolant pressure max.	[bar]	-	80	-	-	80	50		-	
A 80 / B 100		1 K-Öl	2 KA	2 KL	1 KLR	LE95+GD	LE95+GDR		LE 92	LE 150 P
pull force	[N]	28.000			28.000				28.000	
spindle speed max.	[min ⁻¹]	10.000	10.000	10.000	on request					
piston area	[cm ²]	18,1	17,15	17,3	17,3	19,36	19,36		16,5	
oil volume	[cm ³]	20	18,9	19	19	45	45		38	
release pressure max.	[bar]	160	160	160	160	160	160		160	
cleaning air; n=0; max.	[bar]	-	10	10	10	10	10		10	
air pressure max.	[bar]	-	-	-	10	5	5		-	
coolant pressure max.	[bar]	-	80	-	-	80	50		-	
A 100 / B 125		1K-Öl	2KA	2KL	2 KLR	LE95+GD	LE95+GDR			
pull force	[N]	45.000			45.000					
spindle speed max.	[min ⁻¹]	10.000	10.000	10.000	on request					
piston area	[cm ²]	18,1	17,15	17,3	17,3	19,36	19,36			
oil volume	[cm ³]	22,6	21,4	21,6	21,6	45	45			
release pressure max.	[bar]	160	160	160	160	160	160			
cleaning air; n=0; max.	[bar]	-	10	10	10	10	10			
air pressure max.	[bar]	-	-	-	10	5	5			
coolant pressure max.	[bar]	-	80	-	-	80	50			
A 125 / B 160		1 K-Öl	2 KA	2 KL	2 KLR					
pull force	[N]	70.000								
spindle speed max.	[min ⁻¹]	9.500	9.500	9.500	9.500					
piston area	[cm ²]	50,2	49,25	49,4	49,4					
oil volume	[cm ³]	79,3	77,8	78	78					
release pressure max.	[bar]	160	160	160	160					
cleaning air; n=0; max.	[bar]	-	10	10	10					
air pressure max.	[bar]	-	-	-	-	10				
coolant pressure max.	[bar]	-	80	-	-	-				

Medium transfer 4

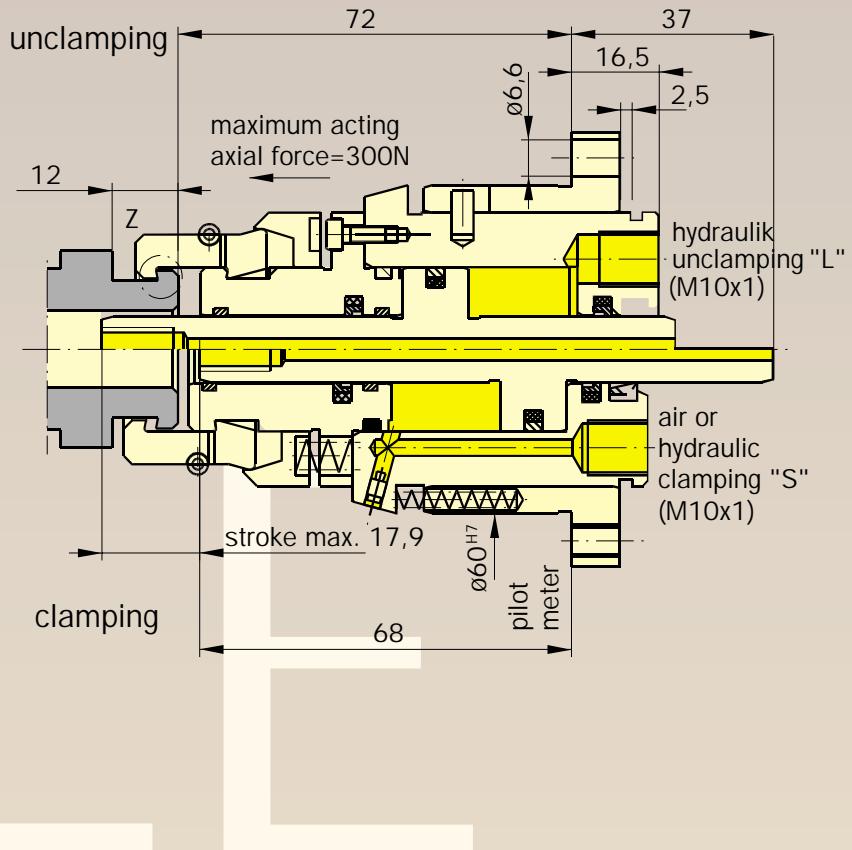
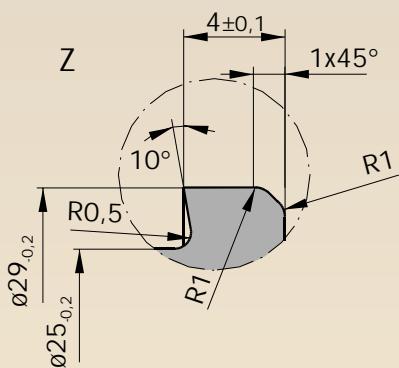
24



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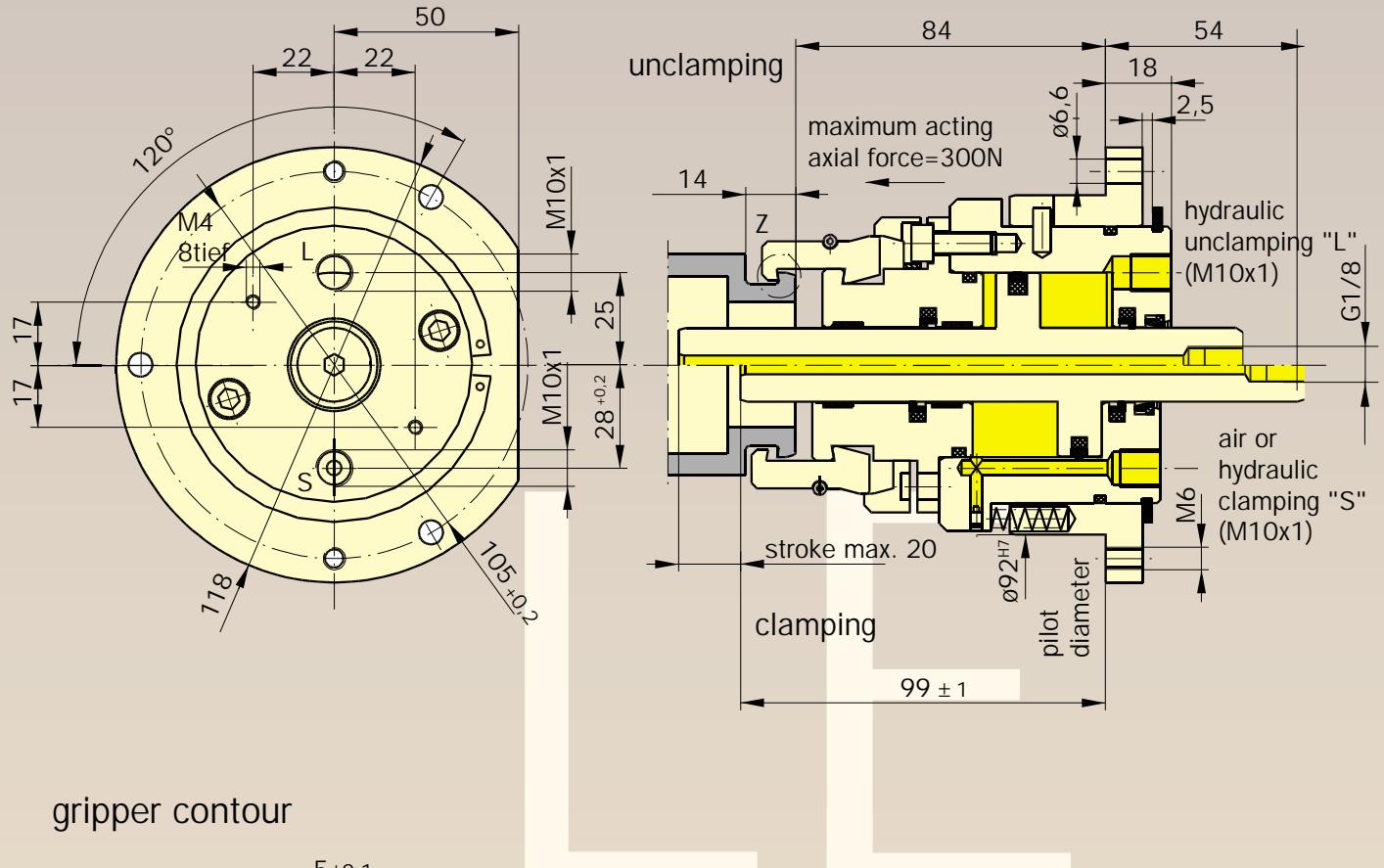
gripper contour



code	
0	2

technical data	
piston area "L" [cm ²]	5,8
piston area "S" [cm ²]	5,8
hydraulic pressure "L" max. [bar]	160
air or hydraulic pressure "S" min. [bar]	5

features	
<ul style="list-style-type: none"> passage for air cleaning in unclamped position low bearing load easy to assemble RPM independant 	



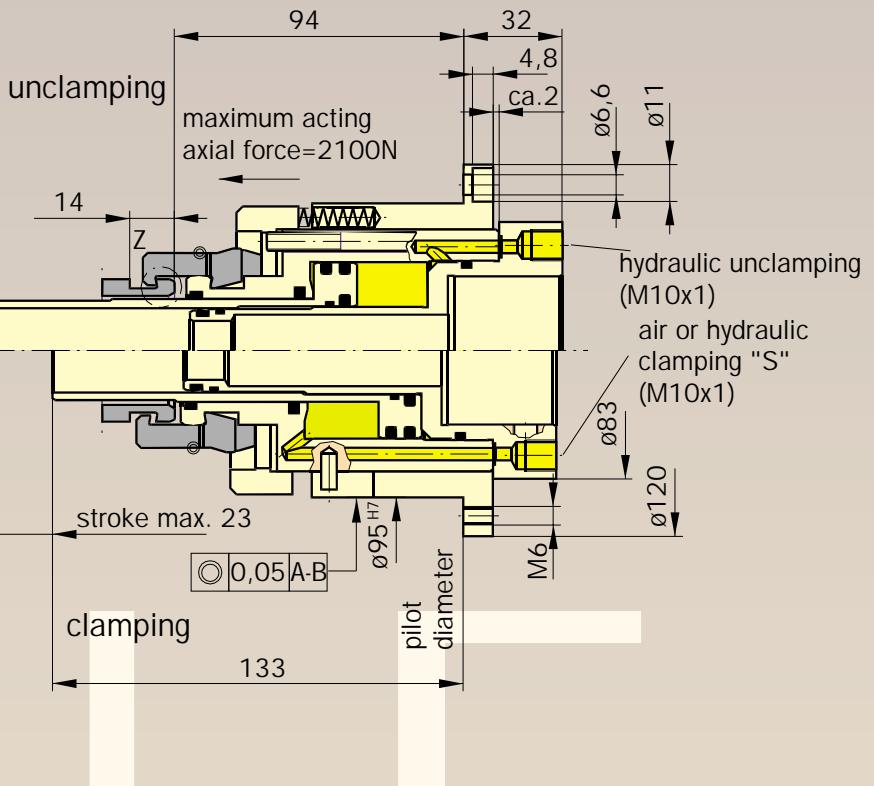
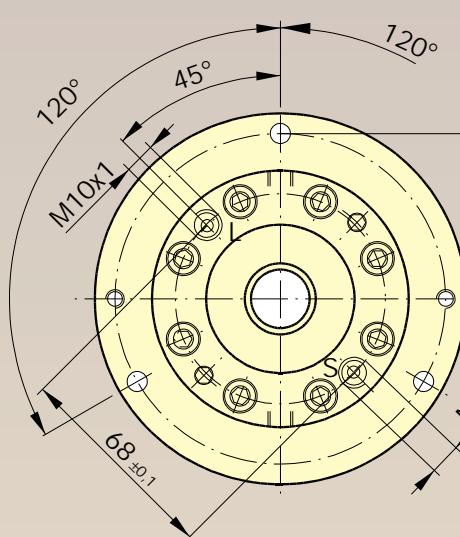
gripper contour

code	
0	1

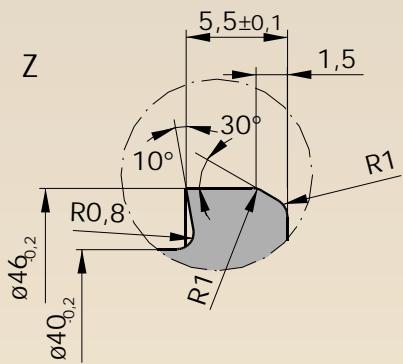
technical data	
piston area "L" [cm ²]	16,5
piston area "S" [cm ²]	16,5
hydraulic pressure "L" max. [bar]	160
air or hydr. pressure "S" min. [bar]	5

features	
<ul style="list-style-type: none"> • passage for air cleaning in unclamped position • low bearing load • easy to assemble • RPM independant 	

Subject to modification due to technical advance!



gripper contour



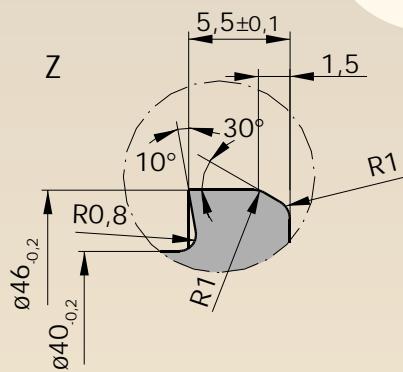
code	
3	6

technical data	
piston area "L" [cm ²]	19,36
piston area "S" [cm ²]	17
hydraulic pressure "L" max. [bar]	160
air or hydr. pressure "S" min. [bar]	5

features	
<ul style="list-style-type: none"> • low bearing load • easy to assemble • RPM independant • suitable for holding 1K-rotary unions 	

Subject to modification due to technical advance!

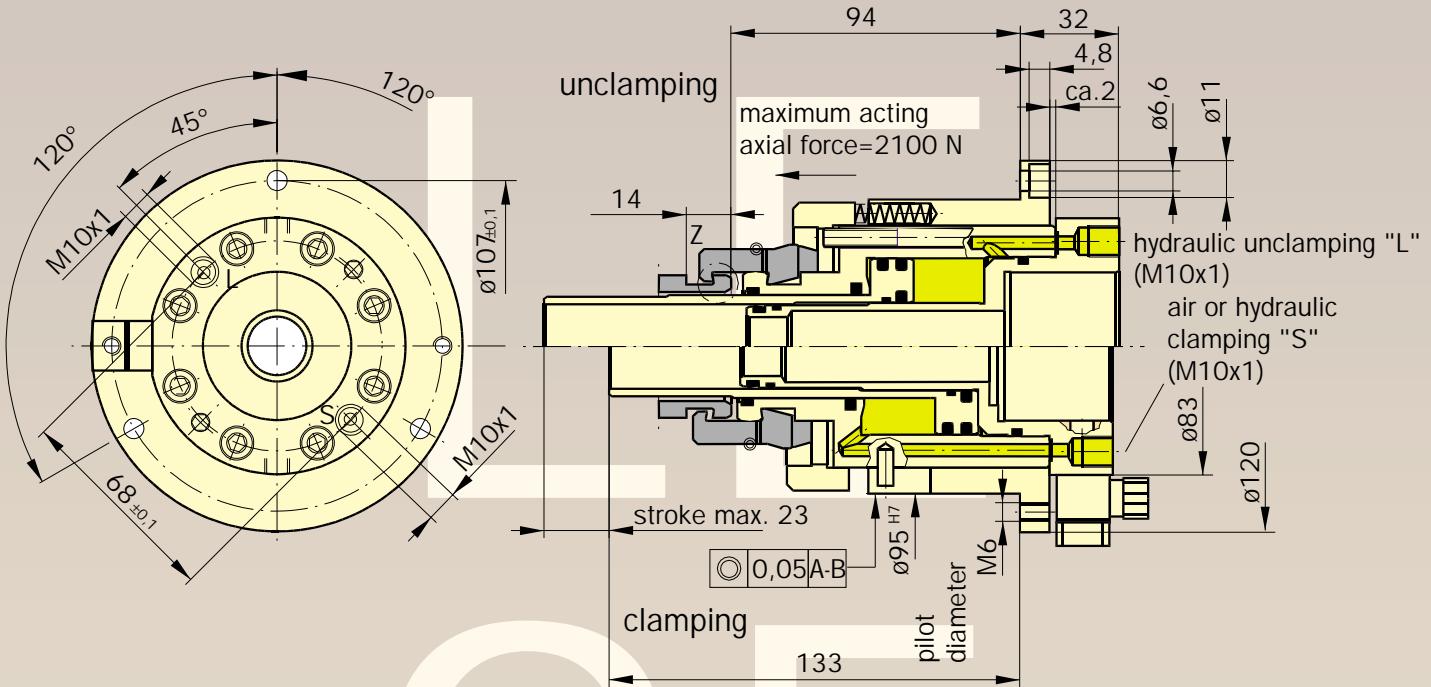
gripper contour

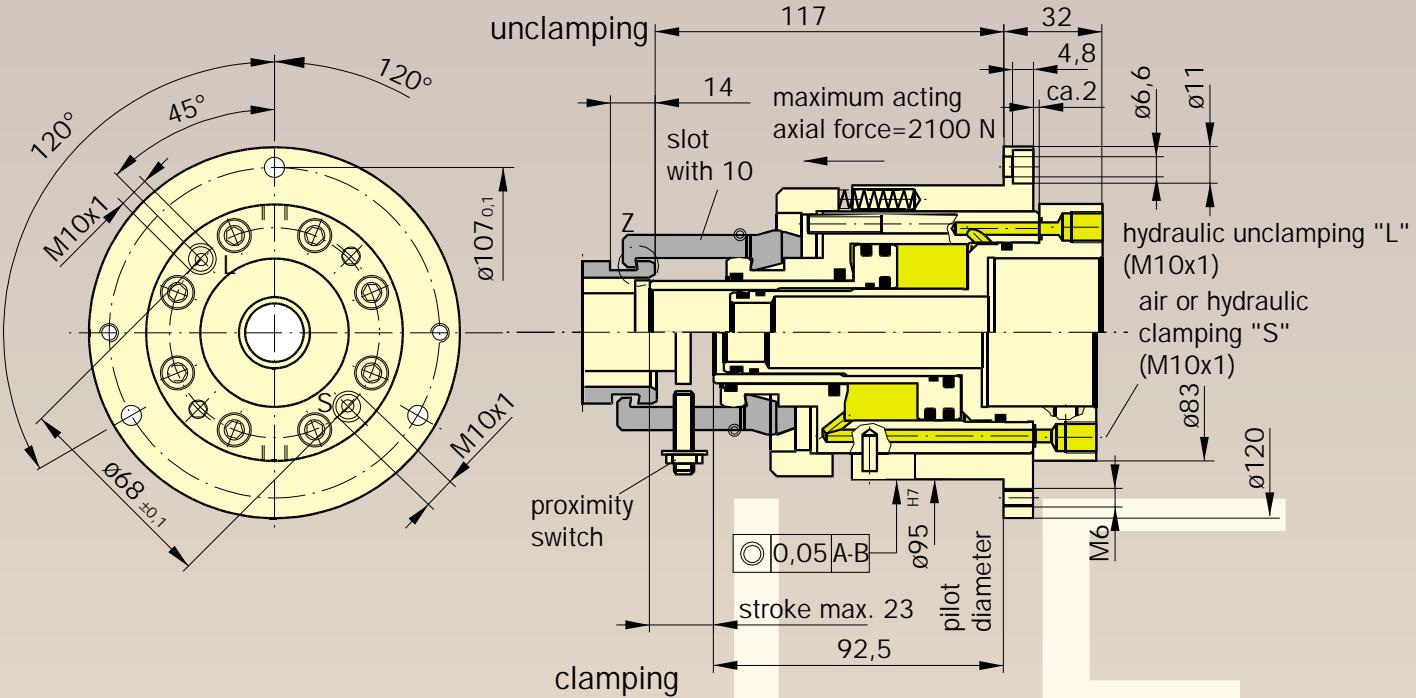


code	
5	8

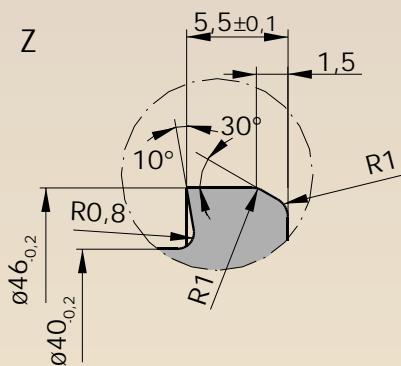
technical data	
piston area "L" [cm ²]	19,36
piston area "S" [cm ²]	17
hydraulic pressure "L" max. [bar]	160
air or hydr. pressure "S" min. [bar]	5

features	
<ul style="list-style-type: none"> • purge passage • low bearing load • easy to assemble • RPM independant • suitable for holding 1K-rotary unions 	





gripper contour



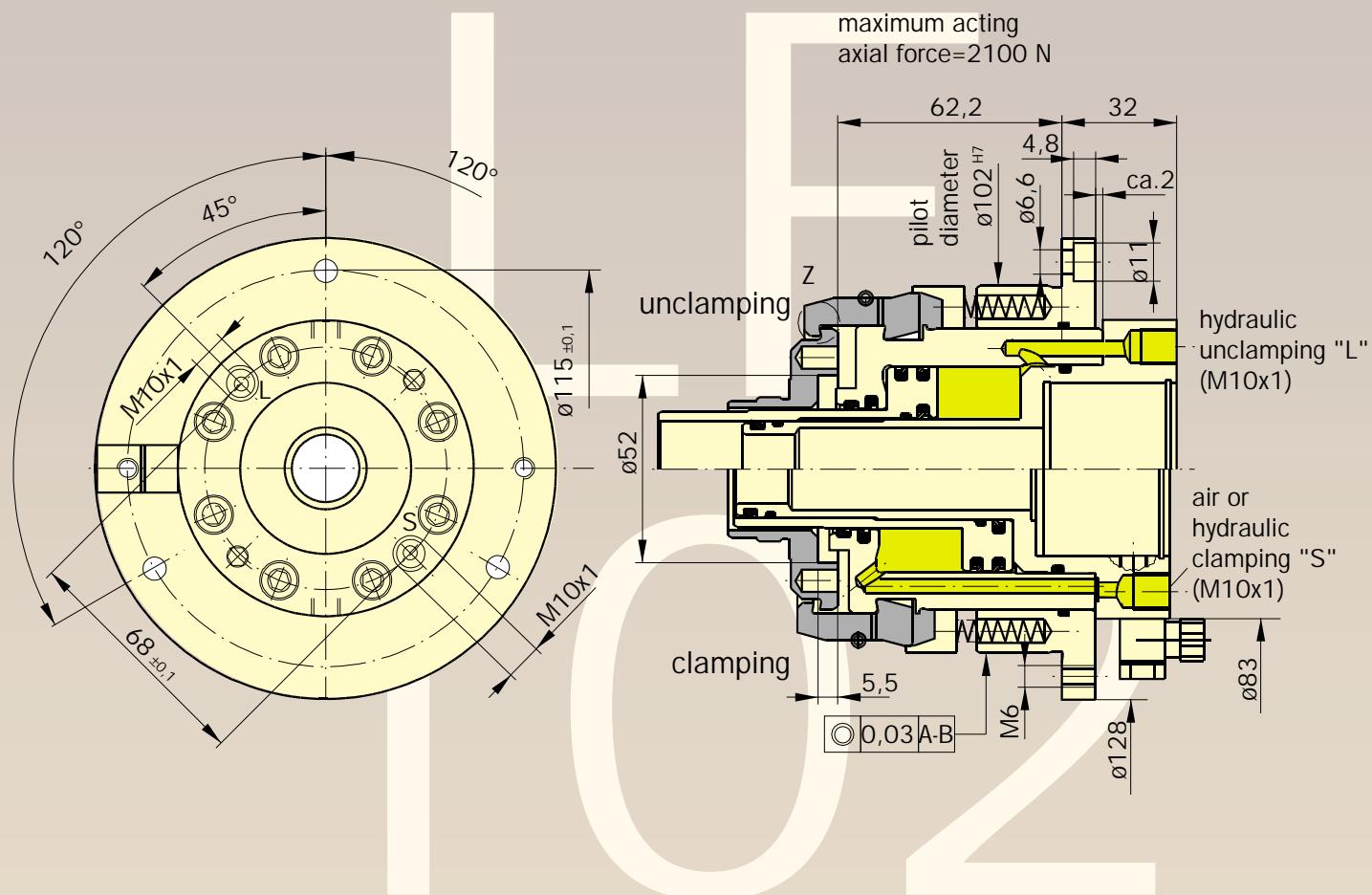
code	
0	5

95

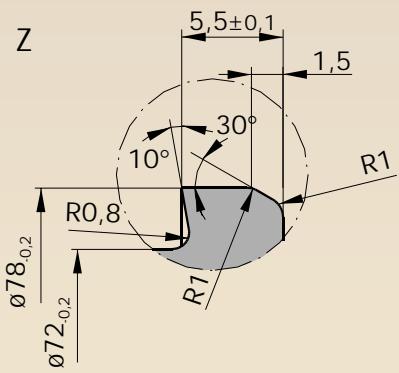
technical data	
piston area "L" [cm ²]	19,36
piston area "S" [cm ²]	17
hydraulic pressure "L" max. [bar]	160
air or hydr. pressure "S" min. [bar]	5

features	
<ul style="list-style-type: none"> • suitable for indicating position at spindle end • low bearing load • easy to assemble • RPM independant • suitable for holding 1K-rotary unions 	

Subject to modification due to technical advance!



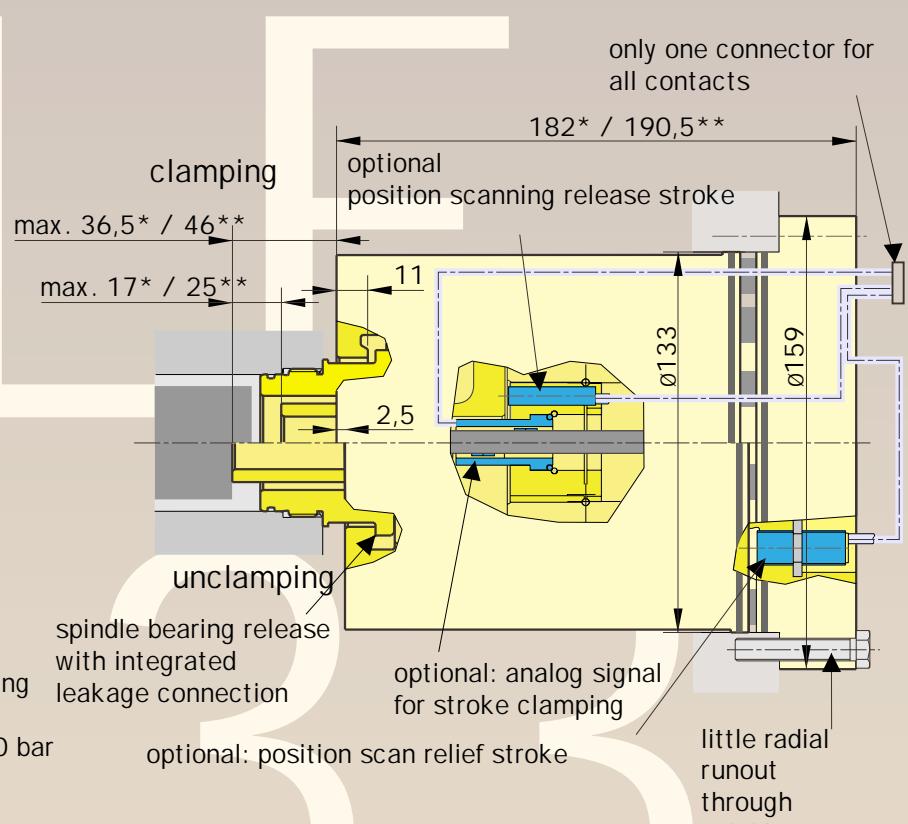
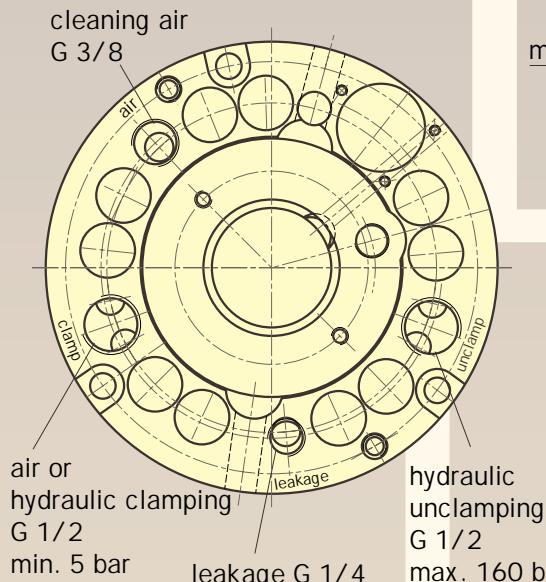
gripper contour



code	
0	3

technical data	
piston area "L" [cm ²]	19,36
piston area "S" [cm ²]	17
hydraulic pressure "L" max. [bar]	160
air or hydr. pressure "S" min. [bar]	5

features	
<ul style="list-style-type: none"> • purge passage • low bearing load • easy to assemble • RPM independant • suitable for holding 1K-rotary unions • optional with analog clamping stroke scan 	

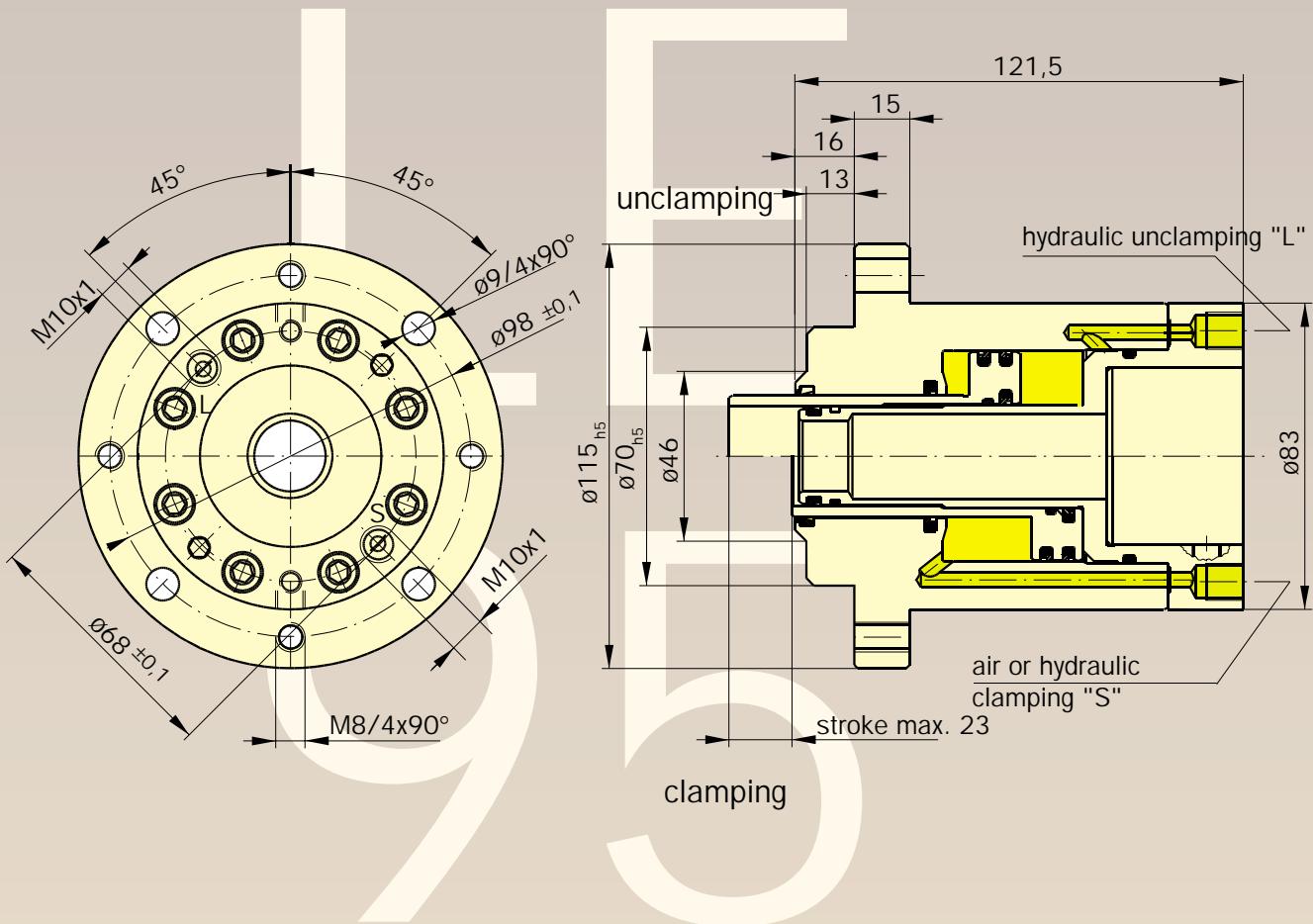


code		
*	1	2
**	1	3

technical data	
release pressure at 160 bar [kN]	80
piston area "unclamping" [cm ²]	50,27
piston area "clamping" [cm ²]	40,06
hydraulic pressure "unclamping" max. [bar]	160
air or hydr. pressure "S" min. [bar]	5

features
<ul style="list-style-type: none"> • purge passage • spindle bearing release • easy to assemble • RPM independant • leakage connection • suitable for holding 1K-rotary unions • no moving or extended parts • optional position scan for release stroke and relief stroke and analog signal for clamping stroke

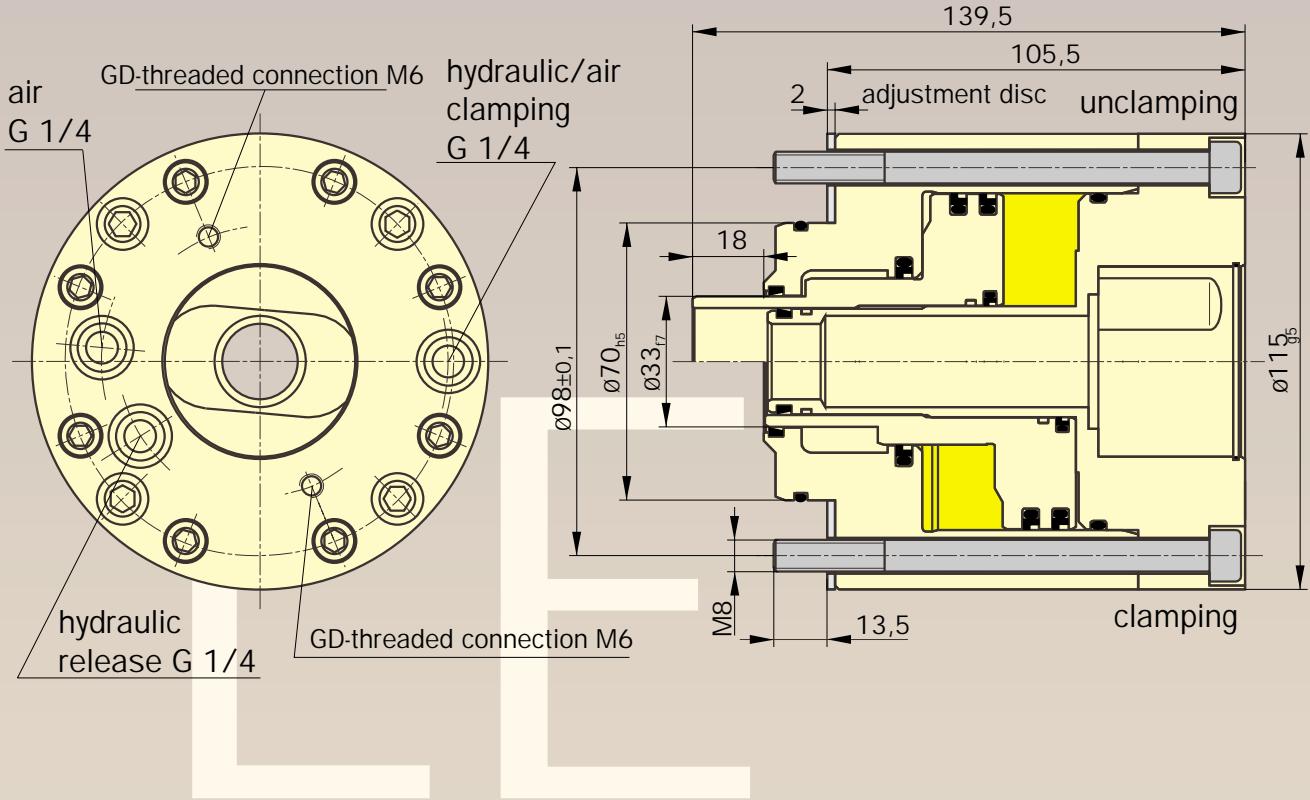
Subject to modification due to technical advance!



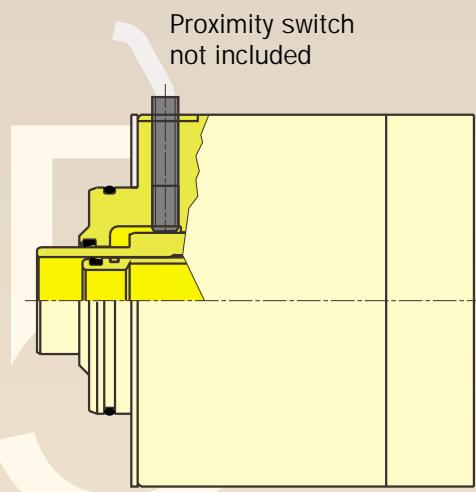
code	
0	4

technical data	
piston area "L" [cm ²]	19,36
piston area "S" [cm ²]	17
hydraulic pressure "L" max. [bar]	160
air or hydr. pressure "S" min. [bar]	5

features	
<ul style="list-style-type: none"> • easy to assemble • suitable for holding 1K-rotary unions • RPM independant 	



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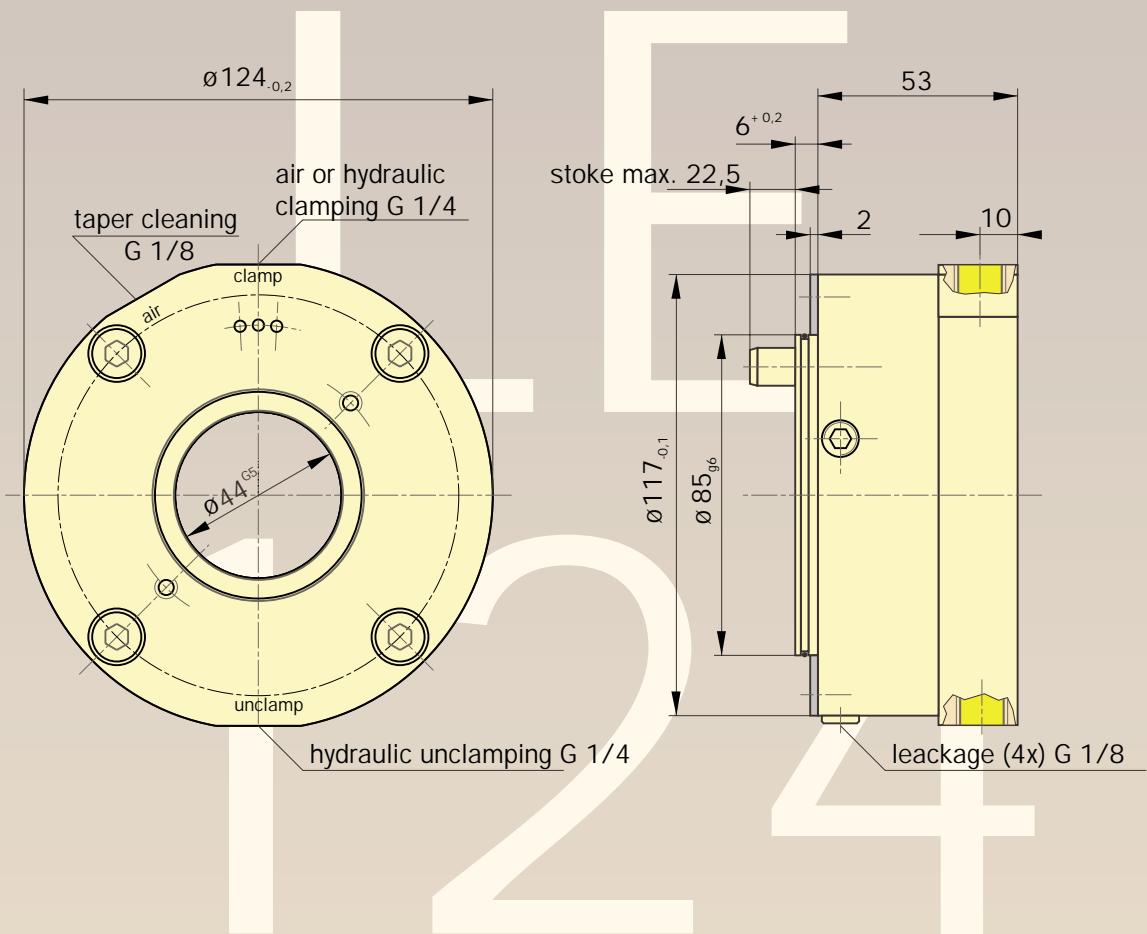


code	
1	0

technical data	
piston area "L" [cm ²]	50,6
piston area "S" [cm ²]	42,9
hydraulic pressure "L" max. [bar]	120
air or hydr. pressure "S" min. [bar]	5

features
<ul style="list-style-type: none"> • easy to assemble • suitable for holding 1K-rotary unions • RPM independant

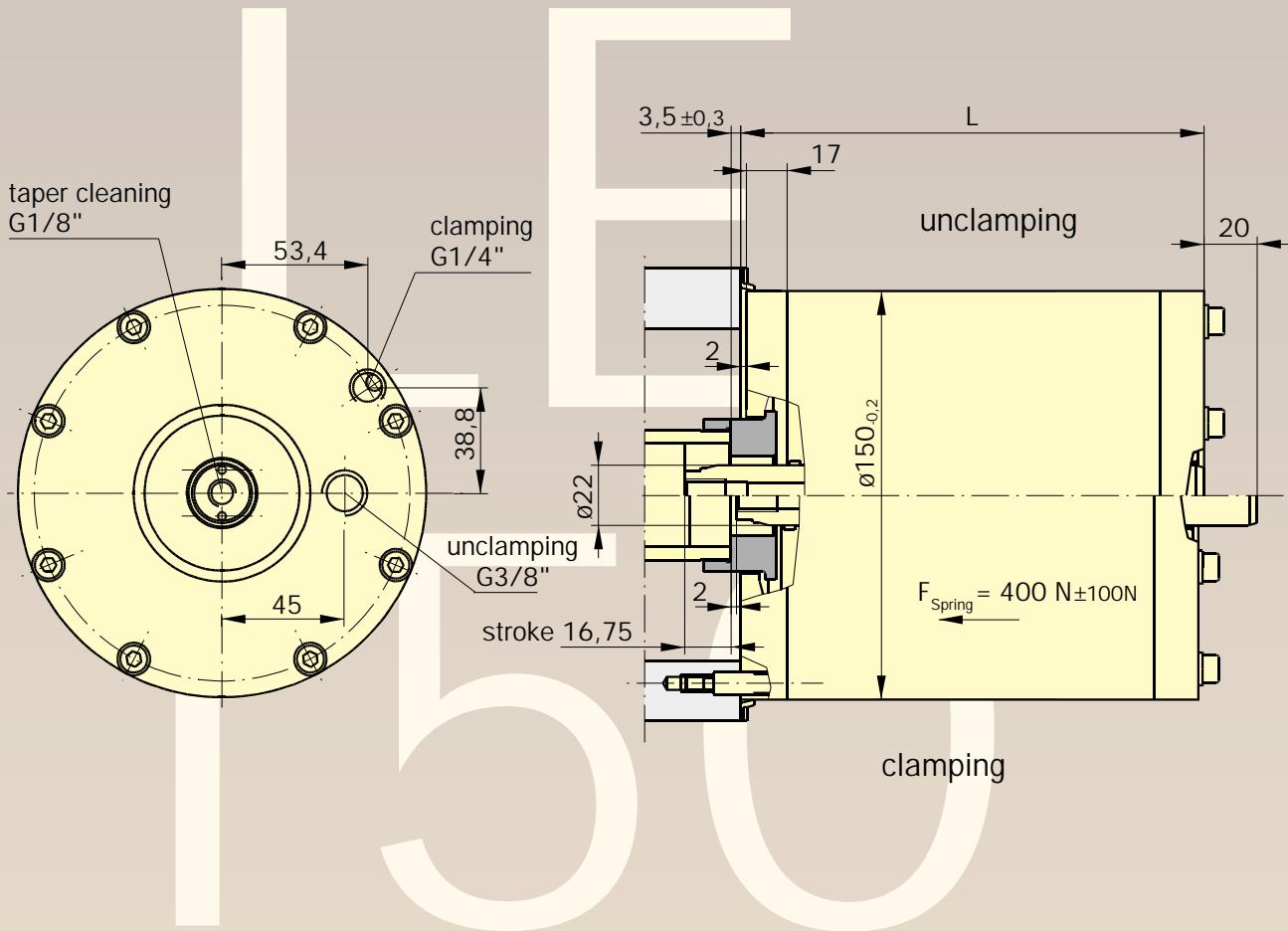
Subject to modification due to technical advance!



code	
1	1

technical data	
release pressure at 120 bar [kN]	38,5
piston area "unclamping" [cm ²]	32,11
piston area "clamping" [cm ²]	19,55
hydraulic pressure "unclamping" max. [bar]	120
air or hydr. pressure "S" min. [bar]	5

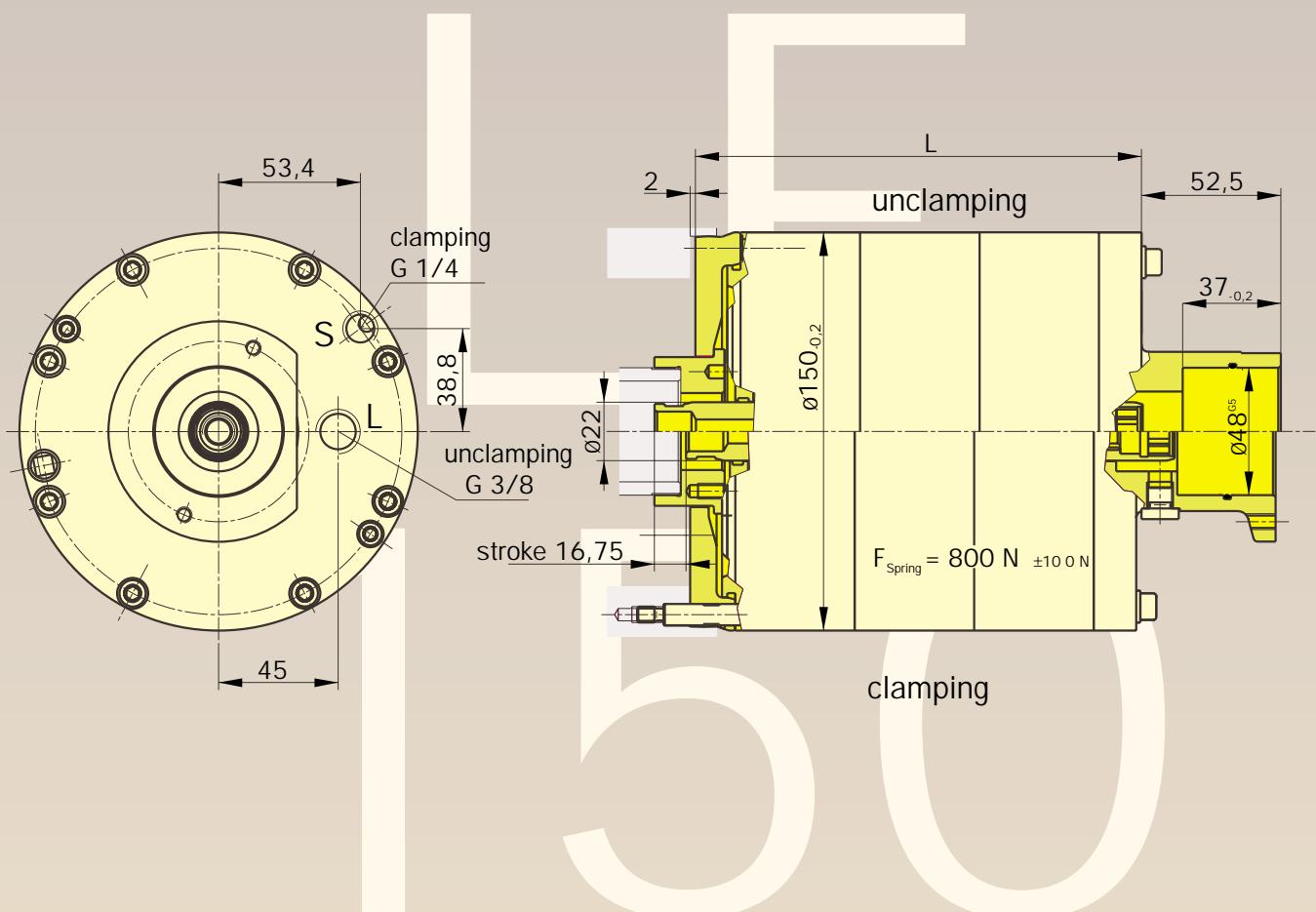
features	
<ul style="list-style-type: none"> • short design • easy to assemble • RPM independant • leakage connection • purge passage • suitable for holding 1K-rotary unions 	



code						
3	1	3	2	3	3	3

technical data	LE 150 - P1	LE 150 - P2	LE 150 - P3
"L" [mm]	80	125	170
piston area [cm ²]	119	238	357
max. piston stroke [mm]	21	21	21
max. stroke volume [cm ³]	250	500	750
unclamp force at $p_e = 5 \text{ bar}$ [kN]	5,5	10,9	16,4
unclamping: max. allowable pressure [bar]	8	8	8
clamping: max. allowable pressure [bar] (hold pressure while spindle is rotating!)	1 - 8	1 - 8	1 - 8

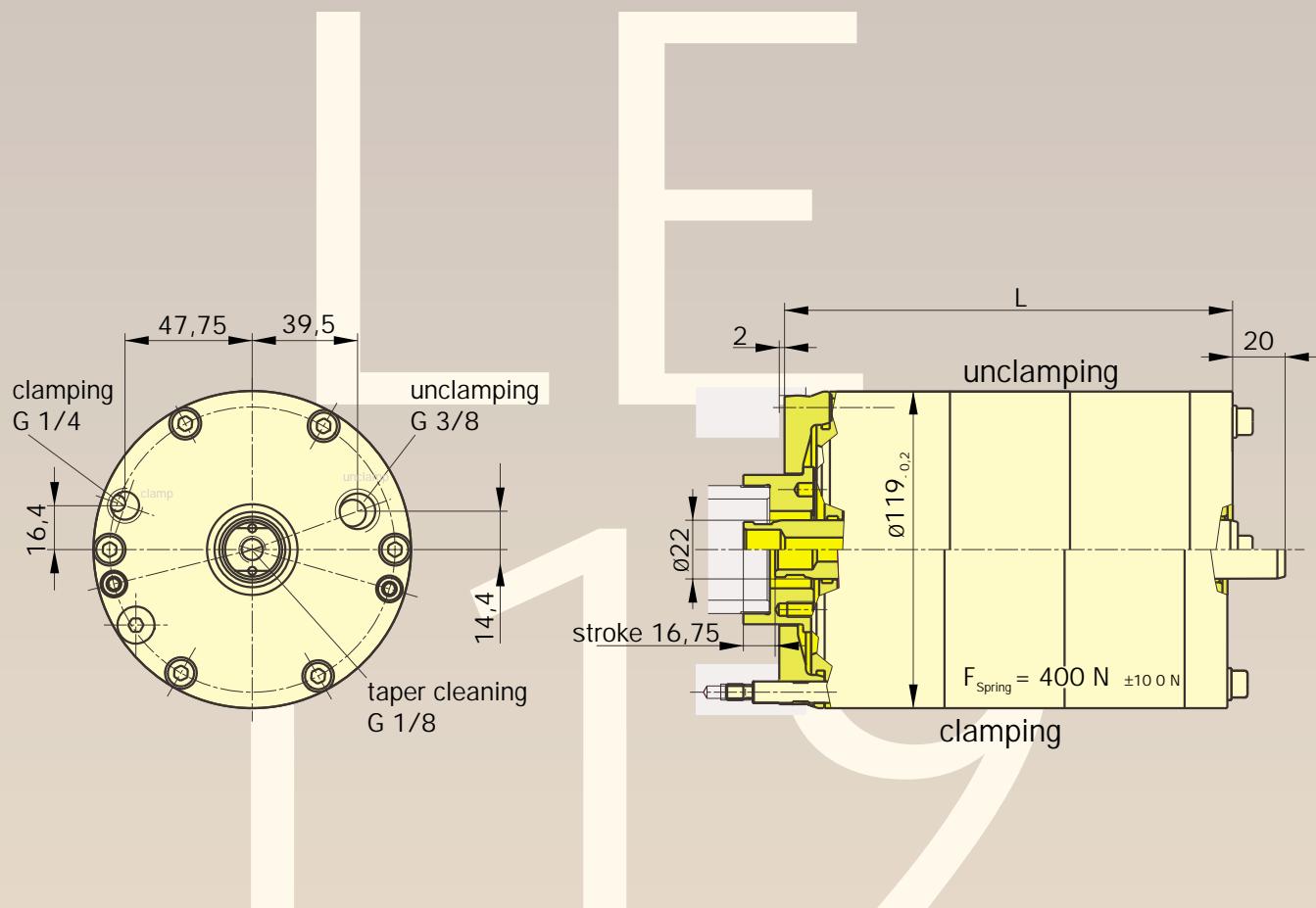
features
<ul style="list-style-type: none"> • low bearing load • enclosed housing • modular • RPM independant



code					
4	1	4	2	4	3

technical data	LE 150 - P1A	LE 150 - P2A	LE 150 - P3A
"L" [mm]	80	125	170
piston area [cm ²]	119	238	357
max. piston stroke [mm]	21	21	21
max. stroke volume [cm ³]	250	500	750
unclamp force at p _e = 5 bar [kN]	5,5	10,9	16,4
unclamping: max. allowable pressure [bar]	8	8	8
clamping: max. allowable pressure [bar] (obligatory while spindle is rotating!)	1 - 8	1 - 8	1 - 8

features
<ul style="list-style-type: none"> • low bearing load • enclosed housing • modular • RPM independant • suitable for holding 1K-rotary unions

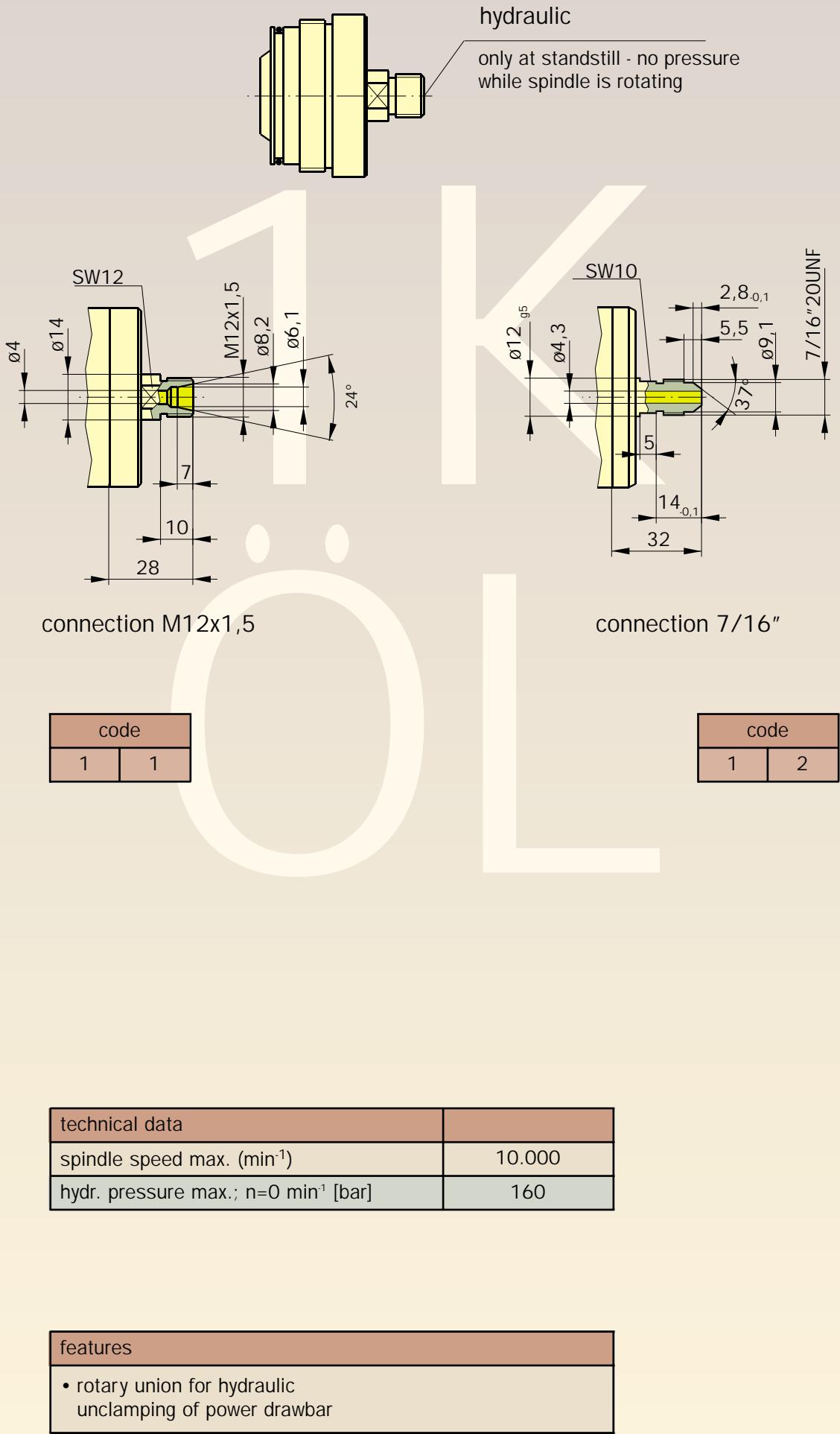


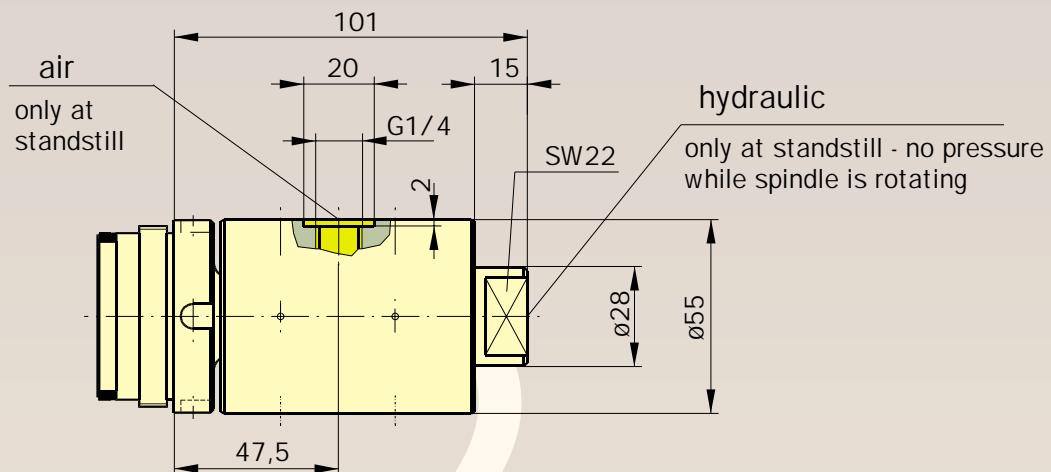
code					
2	1	2	2	2	3

technical data	LE 150 - P1A	LE 150 - P2A	LE 150 - P3A
"L" [mm]	80	125	170
piston area [cm ²]	119	238	357
max. piston stroke [mm]	21	21	21
max. stroke volume [cm ³]	250	500	750
unclamp force at p _e = 5 bar [kN]	5,5	10,9	16,4
unclamping: max. allowable pressure [bar] (dry or oil lubricated air)	8	8	8
clamping: max. allowable pressure [bar] (dry or oil lubricated air) obligatory while spindle is rotating!	1 - 8	1 - 8	1 - 8

features
<ul style="list-style-type: none"> • low bearing load • enclosed housing • modular • RPM independant • optional suitable for holding 1K-rotary unions

Subject to modification due to technical advance!



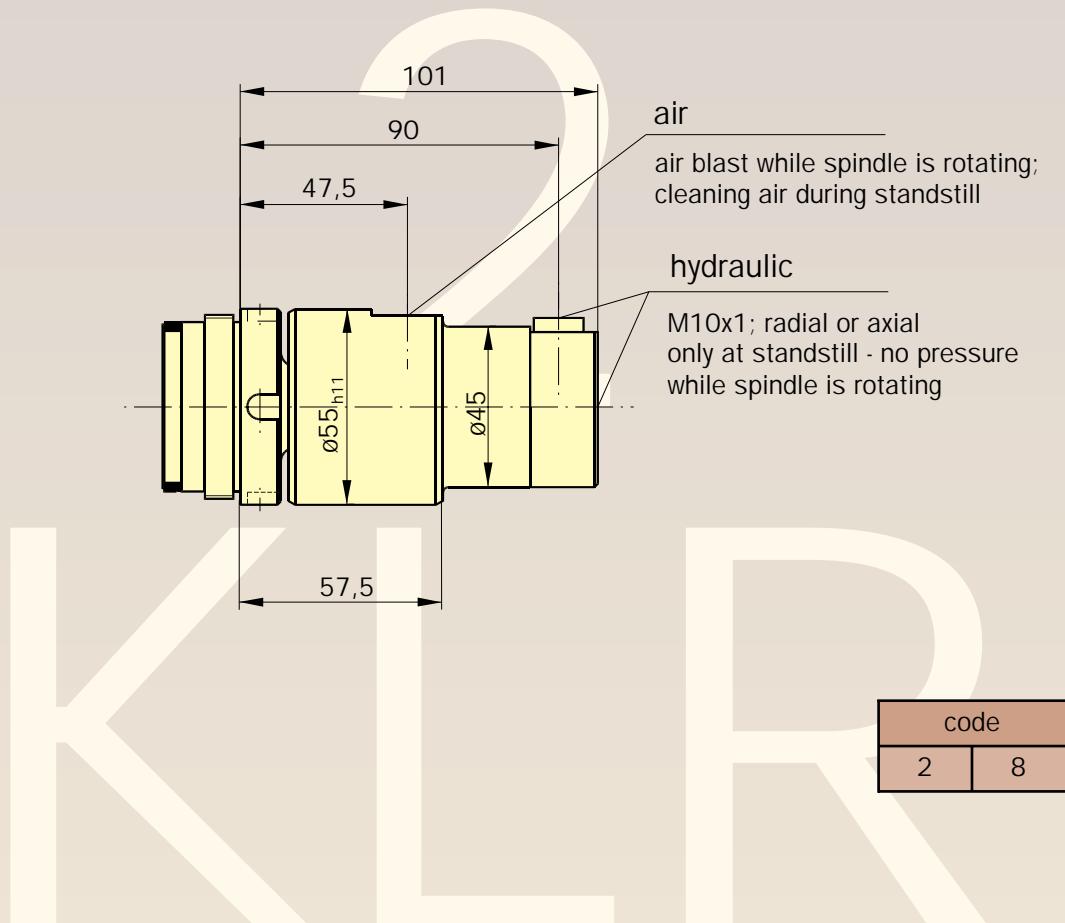


code	
1	4

KL

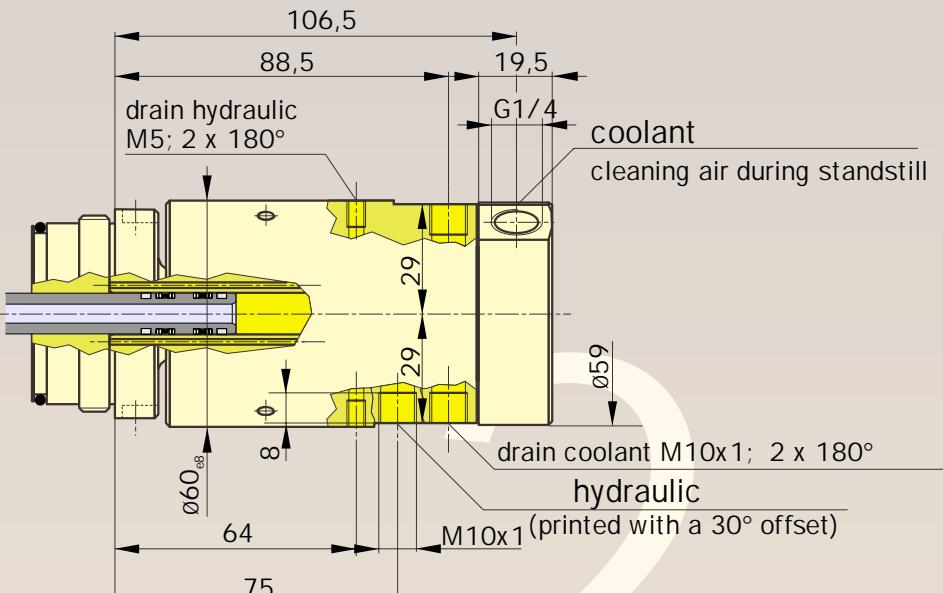
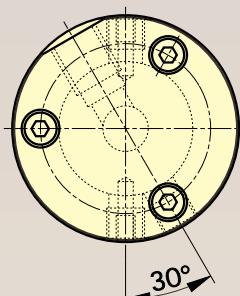
technical data	
spindle speed max. (min^{-1})	10.000
hydr. pressure max.; $n=0 \text{ min}^{-1}$ [bar]	160
air pressure max.; $n=0 \text{ min}^{-1}$ [bar]	10

features
<ul style="list-style-type: none"> • cleaning air during tool changing • hydraulic unclamping of power drawbars

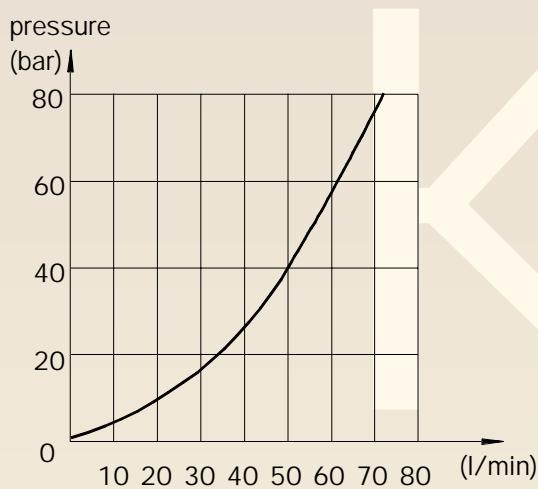


technical data	
spindle speed max. (min^{-1})	20.000
hydr. pressure max.; $n=0 \text{ min}^{-1}$ [bar]	160
air pressure max. [bar]	10

features	
<ul style="list-style-type: none"> due to aluminium housing, hybrid bearing and air blast during rotation especially suitable for HSC-operations on wood, plastic, light alloy and other dry operations hydraulic unclamping of HSC-power drawbars 	



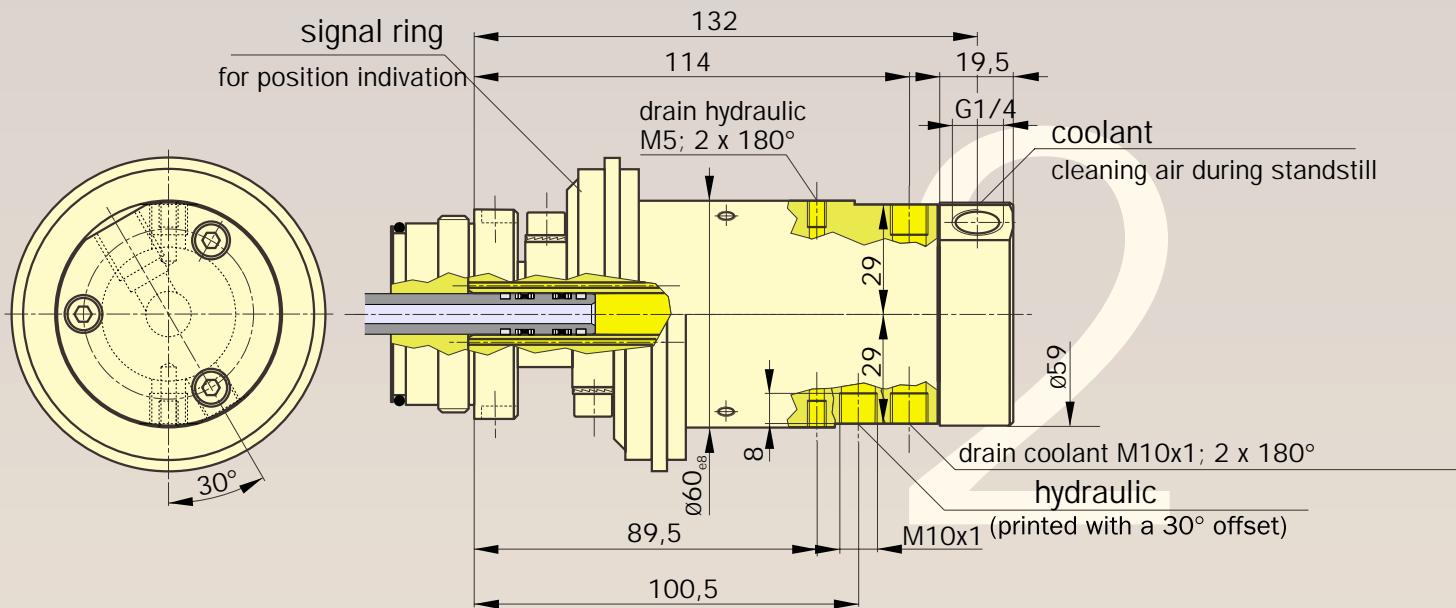
flow volume
at orifice Ø5



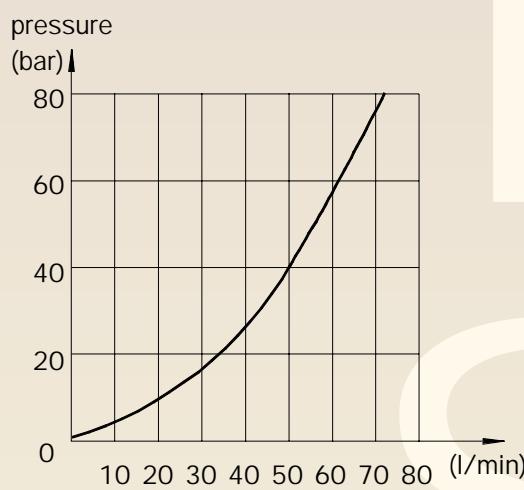
code	
2	5

technical data	
spindle speed max. (min. ⁻¹)	10.000
coolant pressure max. [bar]	80
hydr. pressure max.; n=0 min. ⁻¹ [bar]	160
air pressure max.; n=0 min. ⁻¹ [bar]	10
required media purity according to ISO 4406 filter grade [µm]	-/16/13 <50

features	
<ul style="list-style-type: none"> • suitable for dry operation • hydraulic unclamping of power drawbars • central coolant supply • cleaning air during tool changing 	



flow volume
at orifice ø5

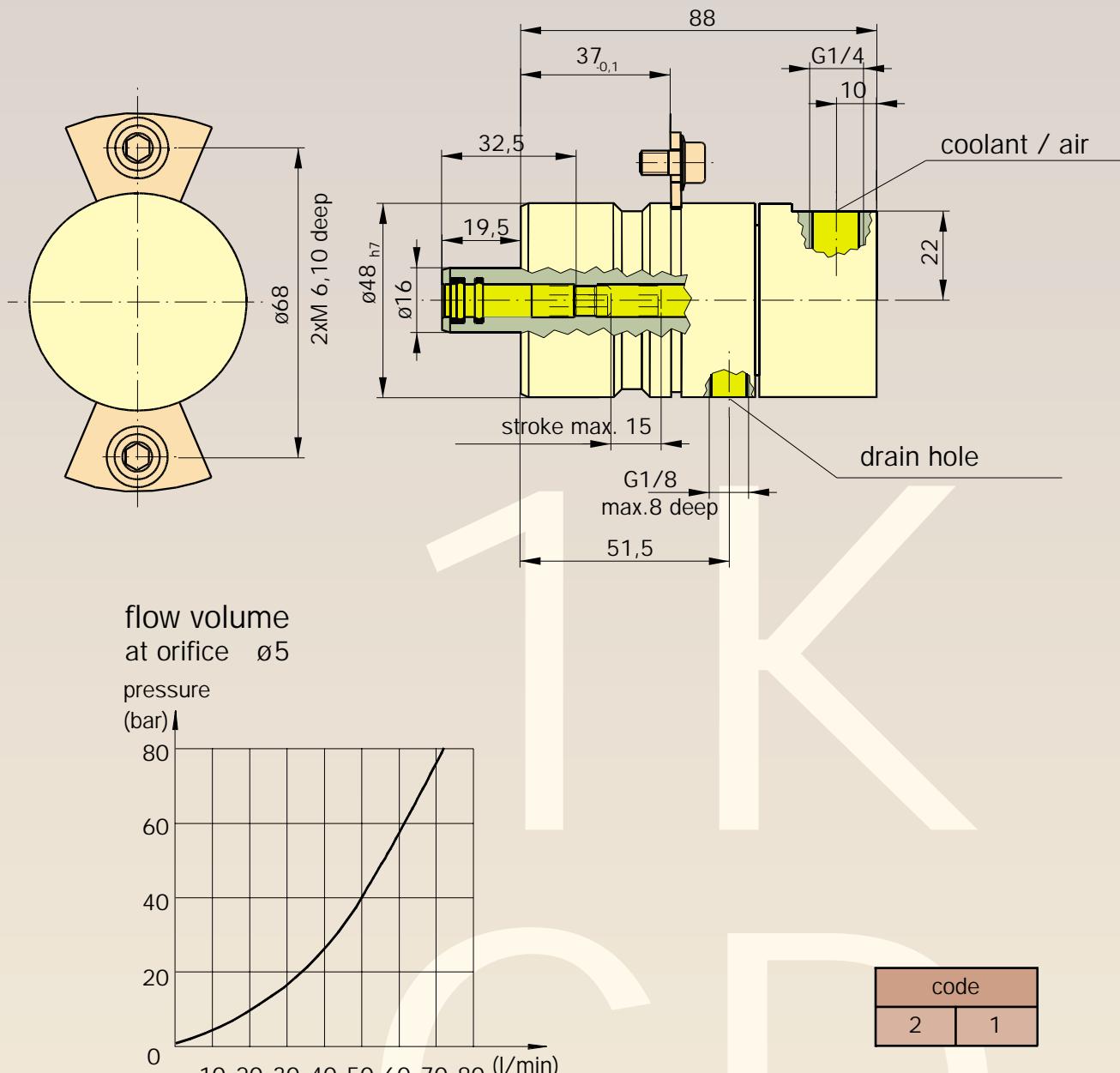


code	
2	6

technical data	
spindle speed max. (min ⁻¹)	8.000
coolant pressure max. [bar]	80
hydr. pressure max.; n=0 min. ⁻¹ [bar]	160
air pressure max.; n=0 min. ⁻¹ [bar]	10
required media purity according to 4406 filter grade [µm]	-/16/13 <50
stroke of signal ring max. [mm]	12,5

features	
<ul style="list-style-type: none"> • suitable for dry operation • hydraulic unclamping of power drawbars • central coolant supply • cleaning air during tool changing • signal ring for position indication 	

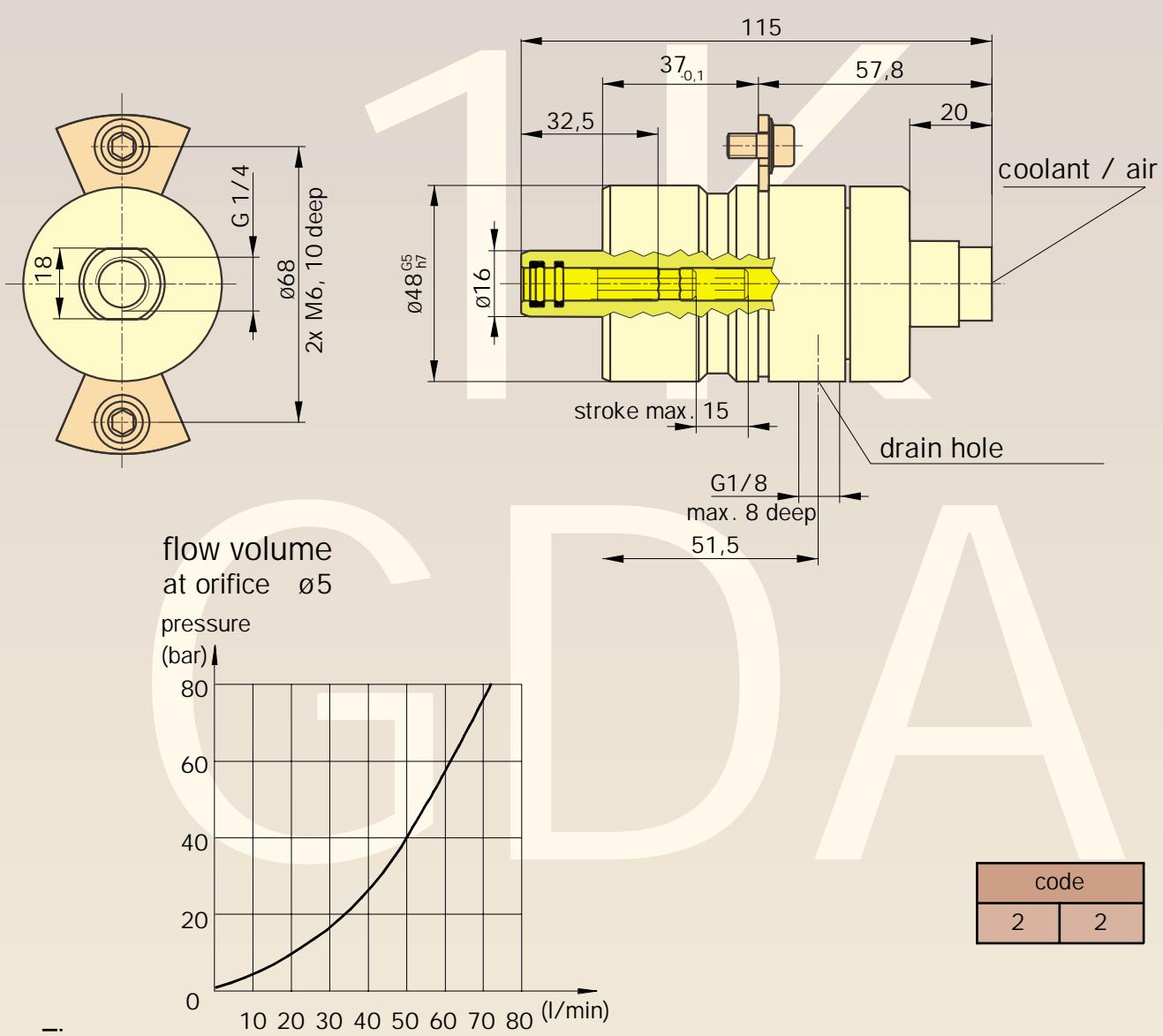
Subject to modification due to technical advance!



technical data	
spindle speed max. (min^{-1})	36.000
coolant pressure max. [bar]	80
cleaning air max.; $n=0 \text{ min}^{-1}$ [bar]	10
pressure air max.; $n < 10000 \text{ min}^{-1}$ [bar]	5
required media purity according to ISO 4406 filter grade [μm]	-/16/13 <50

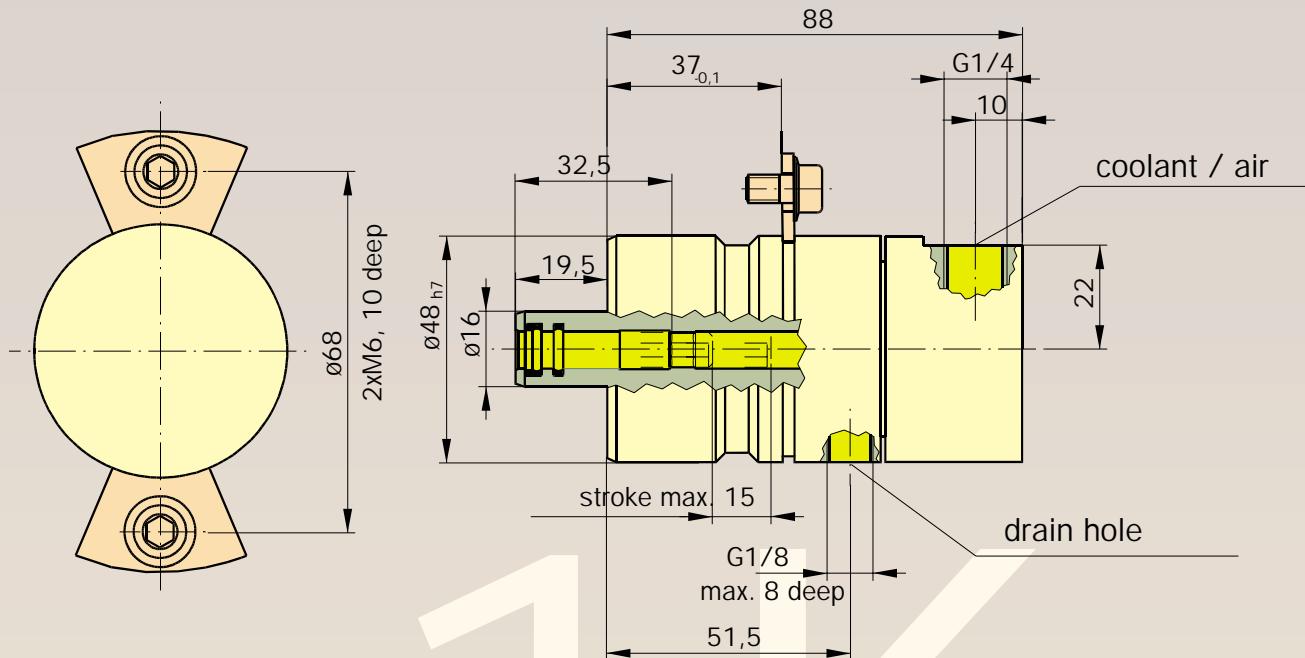
features	
<ul style="list-style-type: none"> hybrid bearing closed sealing surface balanced design coolant minimum volume lubrication (mixed externally) $p_{\max} = 5 \text{ bar}$ dry operation 	

Subject to modification due to technical advance!



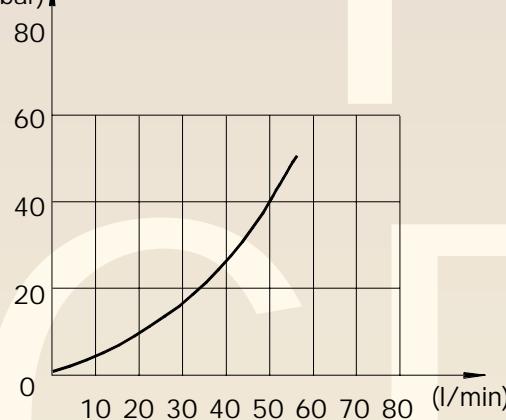
technical data	
spindle speed max. (min^{-1})	36.000
coolant pressure max. [bar]	80
cleaning air max.; $n=0 \text{ min}^{-1}$ [bar]	10
pressure air max.; $n < 10000 \text{ min}^{-1}$ [bar]	5
required media purity according to ISO 4406 filter grade [μm]	-/16/13 <50

features
<ul style="list-style-type: none"> • hybrid bearing • closed sealing surface • balanced design • coolant • minimum volume lubrication (mixed externally) $p_{\max} = 5 \text{ bar}$ • dry operation



flow volume
at orifice $\varnothing 5$

pressure
(bar)



code

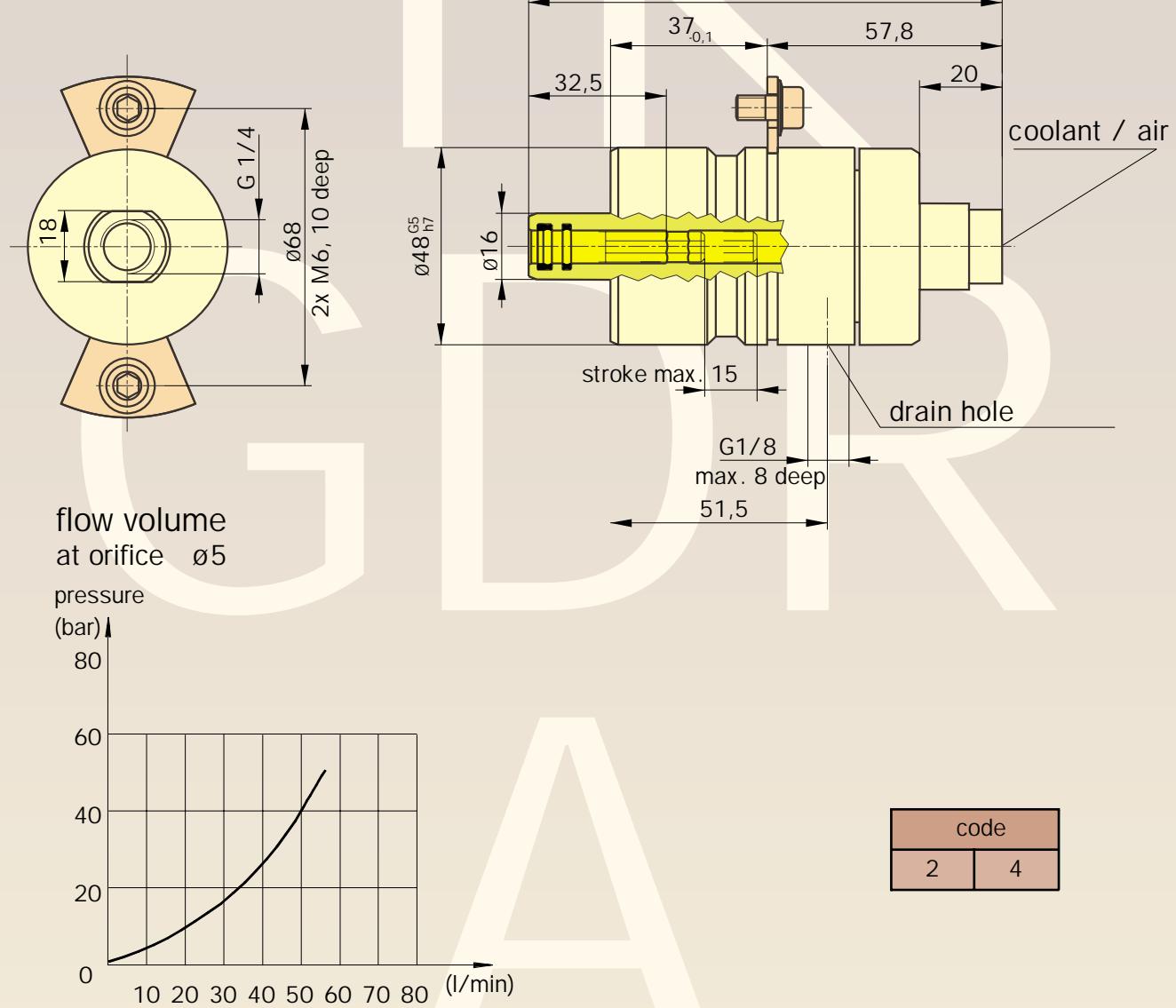
2

3

technical data	
spindle speed max. (min^{-1})	16.000
coolant pressure max. [bar]	50
cleaning air max.; $n=0 \text{ min}^{-1}$ [bar]	10
pressure air max.; $n < 10000 \text{ min}^{-1}$ [bar]	5
required media purity according to ISO 4406 filter grade [μm]	-/16/13 <50

features

- closed sealing surface
- coolant
- minimum volume lubrication (mixed externally) $p_{\max} = 5 \text{ bar}$
- dry operation



technical data	
spindle speed max. (min ⁻¹)	16.000
coolant pressure max. [bar]	50
cleaning air max.; n=0 min ⁻¹ [bar]	10
pressure air max.; n < 10000 min ⁻¹ [bar]	5
required media purity according to ISO 4406 filter grade [μm]	-/16/13 <50

features	
<ul style="list-style-type: none"> closed sealing surface coolant minimum volume lubrication (mixed externally) $p_{\max} = 5$ bar dry operation 	



WORLDWIDE

Our international market share has increased considerably during the past several years.

Companies in over 30 countries rely on OTT-JAKOB power drawbars.

Please call us, if you need details about service availability or distributors in your area; or visit our web site:

<http://www.Ott-Jakob.de>

Lengenwang



Our own sales team assists
customers directly in Germany,
Switzerland and Austria.

- Existing Ott-Jakob sales organizations
- Ott-Jakob sales territories



USA	Canada	Argentina	Brazil	France	Spain	England	Italy	Sweden	Czech Republic / Slovakia	Turkey	Israel	India	Taiwan	Korea	Japan	Australia
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The world we are working in
Lengenwang, the site of our plant, is situated in the middle of the beautiful Allgäu, where in the spring time the dandelions shine on the deep green



meadows and the eyes are following the outlines of the Alps on the horizon. The landscape forms the people living there and it is also reflected in our company. The yellow of the dandelion meadows symbolizes human warmth and sunny friendliness in today's high-tech world.

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