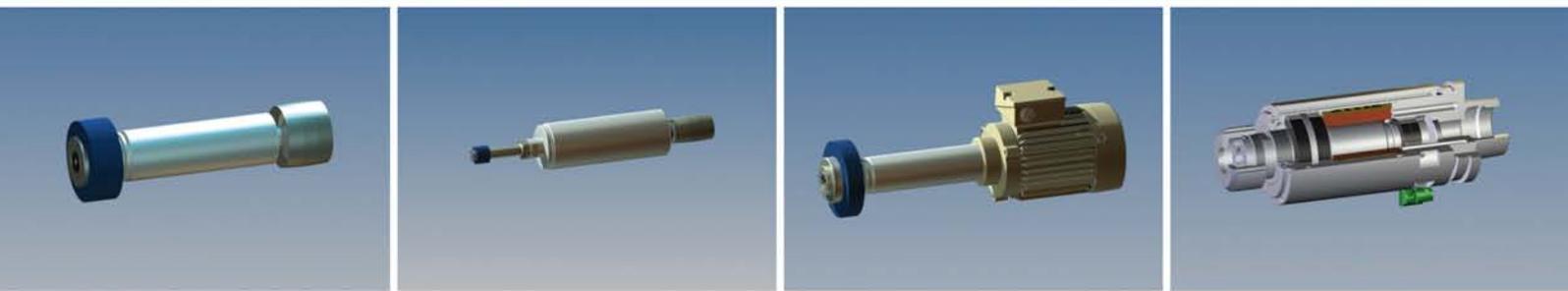


# Spindle Units



**SPINDEL- UND LAGERUNGSTECHNIK  
FRAUREUTH GMBH**



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### SLF-Spindle Units



SLF-spindle units can be produced with external and integrated drive.

Since 1993 the company **Spindel- und Lagerungstechnik Fraureuth GmbH (SLF)** has been continuing a tradition of more than 50 years in the field of development and production of bearings and spindle units at the location Fraureuth.

The company manufactures machine tool spindles such as grinding, milling and drilling spindles among others. In addition to product groups that are included in the catalogue special spindles in different dimensions according to customers' requirements can be produced too.

High and certified quality parameters apply to those products.

Our service also includes repair of spindles at a short notice. The repaired spindles are tested on test stands and are subject to final inspection with regard to vibration, radial run out, temperature and if necessary stiffness (with certificate) - similar to the procedure for newly produced spindles.

Furthermore ball, roller and special bearings with an outer diameter of 40 mm to 160 mm belong to the product range of Spindel- und Lagerungstechnik Fraureuth GmbH.

All products fulfil requirements of standard DIN resp. ISO. SLF succeeded in getting the certificate according to DIN EN ISO 9001:2008. The level of quality corresponds to those of comparable first brands. Our products are branded "DKFL" res. "SLF". Single packing, multi packing resp. bulk packing are available on request.

In case of any questions please ask for our catalogues, please call us or visit our website at [www.slf-fraureuth.de](http://www.slf-fraureuth.de).

The grinding spindle production program covers a carefully assorted variety of designs. This always enables us to offer you the grinding spindle best suitable for small-scale production and series production.

For special machining jobs our engineers can offer after consultation either a modified standard grinding spindle or a special grinding spindle, e.g.:

- belt-driven precision grinding spindles for high speed
- motor grinding spindles
- tool spindles, tooth-flank grinding spindles and special spindles
- accessories:
  - » belt pulleys, flanges
  - » screw-in mandrels

**When ordering a standard spindle** please indicate as follows:

- precise and complete type designation
- direction of rotation
- please order accessories separately, e.g. screw-in mandrels, flanges and belt pulleys

**Ordering a standard spindle for specific applications**

If you order a standard spindle for specific applications the following additional information is needed:

- purpose, required precision, dimensions of tool and work piece (Please enclose a drawing if possible.)
- mounting position: horizontal or vertical
- speed
- rating of the drive motor

- radial and axial loads acting on the spindle shaft
- installation space

For further information see section "Technical data".

**Ordering spare parts**

- Please indicate the type designation and serial number of the spindle.
- Before ordering spare parts for older spindles please inquire whether the parts are still available.

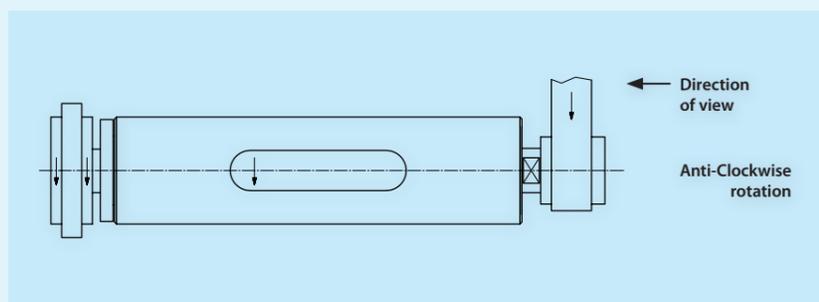
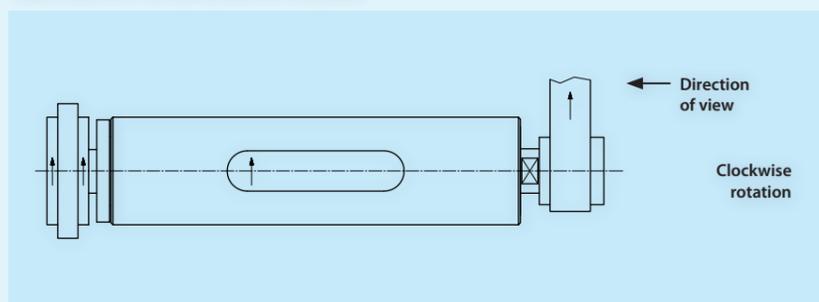
**Order example for a standard spindle**

- Type SSA
- Sleeve diameter of 100 mm
- Length of 500 mm
- Clockwise rotation
- Belt pulley with diameter of 200 mm
- Flange for grinding wheel diameter 250 mm width 50 mm and bore diameter 76 mm

**Complete ordering information**

- Grinding spindle SSA 100 x 500/3 R
- Belt pulley R 08-200 x 100
- Flange SA 08-76 x 130

**Definition of the direction of rotation**



**Belt-driven grinding spindle units with bearings**

**Standard grinding spindles with bearings of series B70...**

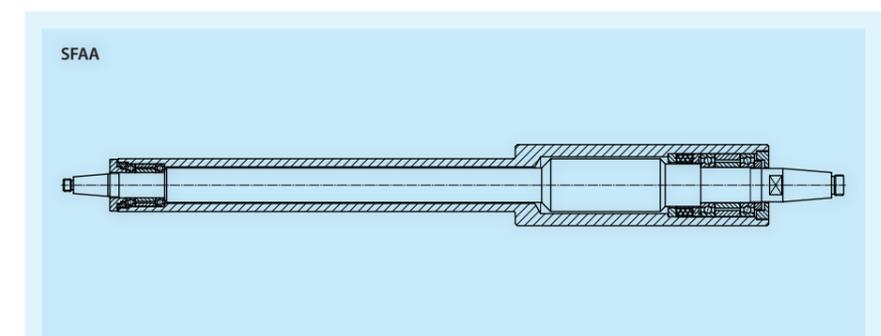
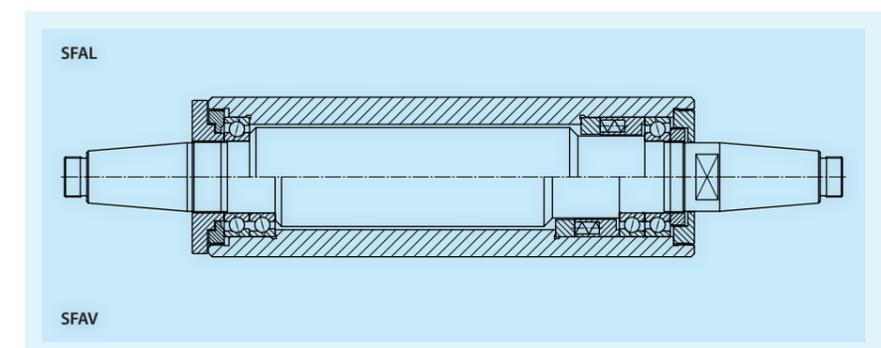
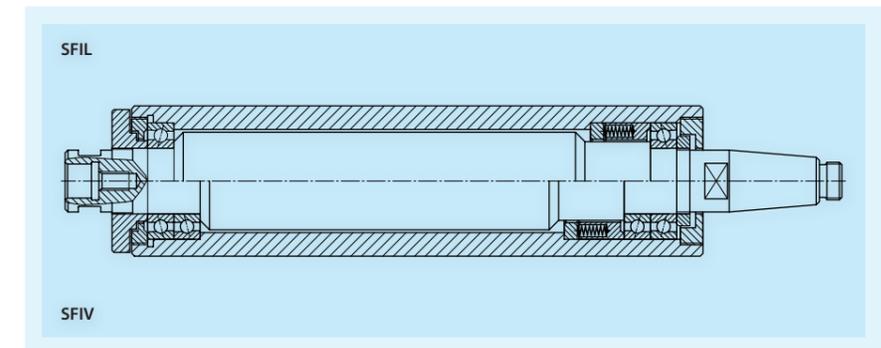
**SFIL** – For light grinding operations. For small and medium bore diameters: Series SFIL with inner cylinder for screw-in mandrels.

**SFIV** – For heavy grinding operations: Series SFIV in reinforced execution with inner cylinder for screw-in mandrels.

**SFAL** – For light grinding operations. For internal and external grinding: series SFAL with male taper for grinding wheel flanges.

**SFAV** – For heavy grinding operations: Series SFAV in reinforced execution with male taper for grinding wheel flanges.

**SFAA** – For internal grinding of particularly deep bores: Series SFAA with stepped sleeve and male taper for grinding wheel flanges.



**Belt-driven grinding spindle units with bearings**

**Standard grinding spindles with bearing series B72...**

The standard grinding spindles of types SSI, SSB and SSAA are designed for internal grinding of bores. Special Belleville springs are installed at the pulley end to ensure that the bearing arrangement always has zero clearance. For-life lubricated spindles require practically no maintenance.

Highly efficient seals prevent grinding fluids and other contaminants from penetrating into the spindles.

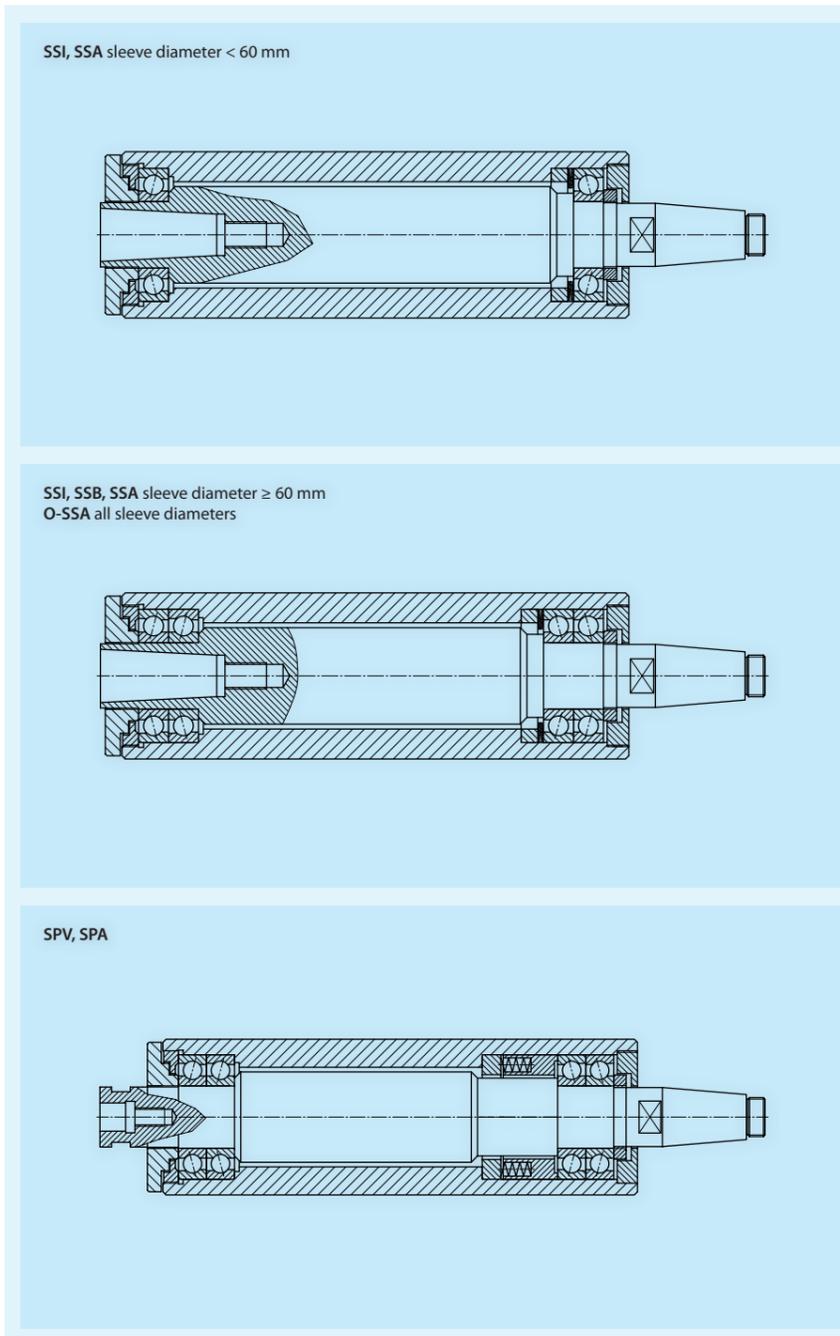
Standard spindles of SSA series are suited for internal and external grinding.

The standard spindles of O-SSA series are suited for external grinding, internal grinding of large bores and especially for face grinding. Precision ball bearings with an increased contact angle are used to absorb the higher axial loads.

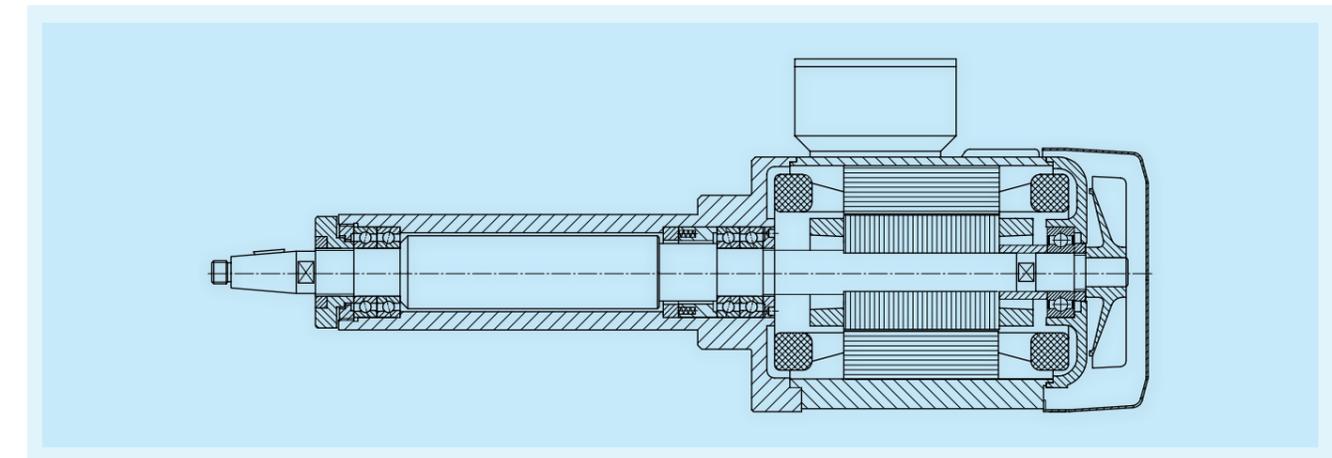
**Precision grinding spindles**

The grinding spindles of series SPV and SPA have a higher precision than standard grinding spindles.

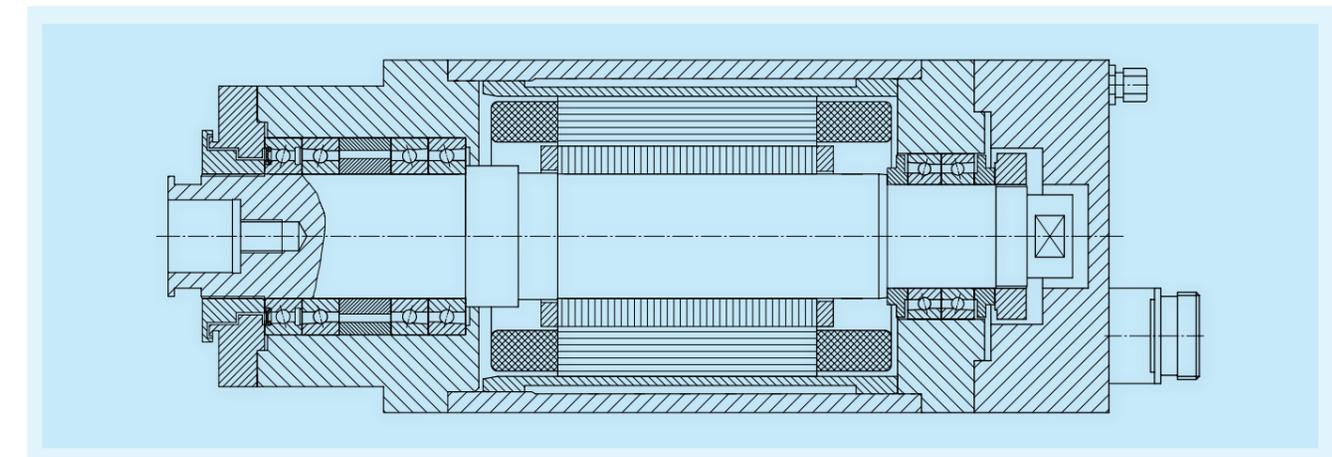
These spindles are used especially where a large number of different bores have to be ground with high quality requirements, particularly when it is still uneconomic to buy an assortment of electric grinding spindles.



**Motor-driven grinding spindle units with bearings**



**MNFA** - For all grinding operations:  
Series MNFA with flange-mounted motor and male taper.



**MF** - For internal cylindrical grinding:  
grinding spindle units with integrated motor and bearings

**FS** - For milling and drilling:  
grinding spindle units with integrated motor and bearings

Please find further information on that series in our catalogue "Motor Spindles" or do not hesitate to contact us.  
**E-Mail:** [slf@slf-fraureuth.de](mailto:slf@slf-fraureuth.de)  
**Phone:** +49 / 3761/801-0

**Order codes**

The type designation code is engraved as abbreviation on the belt-driven grinding spindles. The complete order numbers are listed in the particular

tables. Furthermore special numbers are used for special designs.

**Meaning of order designation:**

	SSA	80	x 400 /	0	R	
Series	←					→ R Clockwise rotation
Sleeve diameter	←					→ L Anti-clockwise rotation
Sleeve length including end cover	←					→ RL Clockwise and anti-clockwise rotation
Constructive stage of development	←					

**Special spindle design, example:**

	SSA	80	x 400 -	0000	
Series	←				→ Special spindle no. acc. to drawing
Sleeve diameter	←				→ Sleeve length including end cover

**Spindle holders**

The grinding spindle has to be chucked on a length which is at least twice the spindle diameter. If possible split spindle holders should be used provided with a spreading screw to facilitate mounting of the spindle. Avoid blows to the spindle. The spindle should also not be clamped in the spindle holder by means of thrust bolts which act directly on the spindle sleeve. When clamping the spindle sleeve to a holder please do not deform it into an oval shape. For grinding spindles with sleeve diameter smaller than bore of the spindle holder especially produced spacer sleeves can be used. Please observe the operating instructions.

**Spindle bearings**

The belt-driven standard grinding spindles are fitted with bearings of tolerance class P4S, DIN 620, ISO 1132. Special bearings for special applications can be designed after consulting our technical department.

**Speed**

The maximum speed for every spindle type indicated in the catalogue and on the grinding spindle must not be exceeded.

The maximum circumferential speed for grinding wheels indicated by the manufacturer must not be exceeded.

**Direction of rotation**

To allow smooth handling of orders please indicate the requested direction of rotation R or L. Spindles suitable for clockwise and anti-clockwise rotation need to be enquired separately. These spindles units have the designation RL.

**Lubrication**

All belt-driven grinding spindles are lubricated for life.

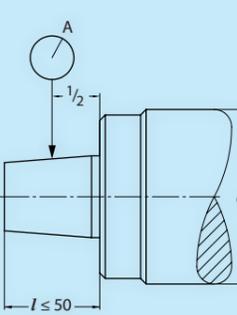
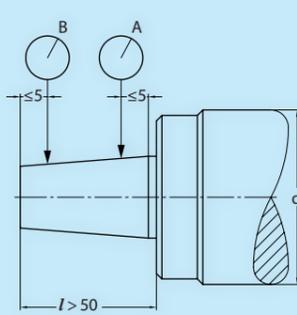
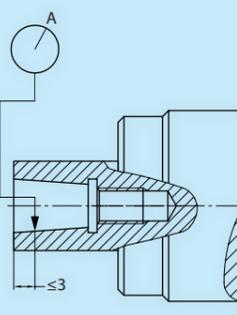
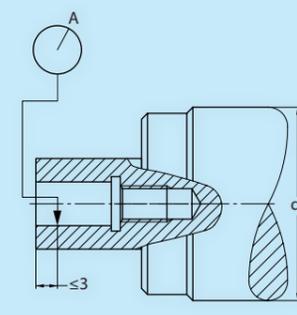
**Belt pulley**

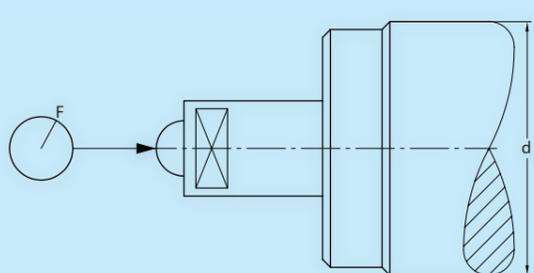
The belt pulleys are balanced dynamically. A suitable size is recommended in the tables respectively. Please turn to page 47 for the complete product range with order designations.

We recommend using continuously woven textile friction belts for low-vibration drive.

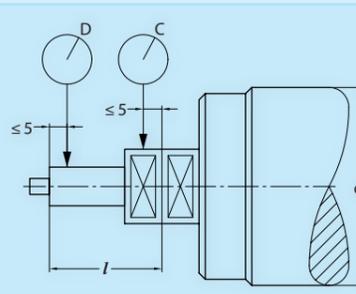
All grinding spindles are tested thoroughly in a test run lasting several hours. Shape and positional deviations of the shaft are especially monitored during the final inspection.

The following excerpt from our factory acceptance regulations for the use of our spindles contains the maximum shape and positional deviations of the front shaft ends of completely assembled spindle units.

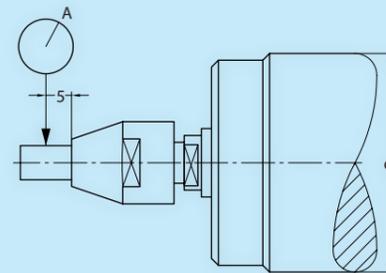
Max. admissible values according to in-house standard resp. DIN 8637		Concentricity of spindle shafts (Value in $\mu\text{m}$ )					
Set-up of measuring instruments	Spindle type	Measuring point					
		A		B			
		Spindle sleeves $\varnothing d$					
				$\leq 70$	$\geq 80$	$\leq 70$	$\geq 80$
	SSA O-SSA SSAA	5	6	5	8		
							
	SPA MNFA SFAL SFAV SFAA	2	2	3	4		
							
	SSI SSB	5	6	-	-		
	SPV SFIL SFIV	2	2	-	-		

Max. admissible values according to in-house standard resp. DIN 8637		Axial run out of spindle shaft		
Set-up of measuring instruments		Values in $\mu\text{m}$		
		Spindle type	Measuring point F	
		all types	1	

Max. admissible values according to in-house standard resp. DIN 8637		Concentricity of screw-in mandrels					
Set-up of measuring instruments		Values in $\mu\text{m}$					
		Spindle type	Measuring point C		Measuring point D		
			$\varnothing d$	$l \leq$			
			$\leq 70$	$\geq 80$	50	100	150
		SSI SSB	10	12	20	25	30
SSI, SSB, SPV, SFIL, SFIV		SPV SFIL SFIV	8	8	8	12	18

Max. admissible values according to in-house standard resp. DIN 8637		Concentricity of collet chuck	
Set-up of measuring instruments		Values in $\mu\text{m}$	
		Spindle type	Measuring point A
		SSI	50

Grinding is a machining process which uses a number of geometrically undetermined cutting edges. The grinding process is influenced by a variety of factors, e.g. bond, grade, grain size and porosity of the grinding wheels, cooling, speed of grinding wheel and work piece, infeed, feed rate and resistance of the work piece.

Generally the cutting force  $F_s$  can be calculated by the following formula:

$$F_s = \tau_0 \frac{a \cdot s \cdot u_w}{v_s \cdot 60} \text{ [N]}$$

$\tau_0$  = shear strength in N/mm<sup>2</sup>;  
for a first approximation  $\delta_B$   
can be used

$a$  = infeed (depth of cut) in mm

$s$  = longitudinal feed in mm/rev

$u_w$  = circumferential speed of the work piece in m/min

$v_s$  = circumferential speed of the grinding wheel in m/s

This formula applies both to internal and external grinding. It also applies to external plunge-cut-grinding if the cutting width is taken for the infeed "a", and for the flat grinding if the table traverse rate is taken for the circumferential speed of the work piece  $u_w$ .

For calculation of the motor power  $P_A$  applies the following:

$$P_A = \frac{F_s \cdot v_s}{\eta} \text{ [W]}$$

$\eta$  = Efficiency of the grinding spindle including the belt drive.

The standard value is  $\eta \approx 0,8$ .

For special requirements, e.g. construction of special machines, if necessary exact measurements of force, moment or power have to be carried out under similar cutting conditions in test.

## Flat grinding with grinding wheel circumference (Excerpt "Spanende Formung", published by Verlag Technik, Berlin)

Grain size, grade and speed of grinding wheel during grinding - table 1

Grinding	of	Steel, soft				Steel, hard				Cast iron				Light metal			
	with	Corundum				Corundum				Silicon carbide				Silicon carbide			
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Grain size <sup>1)</sup>		54	36	36	22	54	40	36	22	54	36	36	22	54	40	36	22
Grade		M	L	L	K	K	I	K	I	L	K	L	I	I	H	I	H
$v_s$ (m/s)		32	25	32	32	25	32	32	32	25	20	25	25	16	12	16	16
$q = 60 \cdot v_s / u_w$		125	80	80	50	125	80	80	50	100	63	63	40	50	32	32	20
<sup>1)</sup> Grain size according to DIN 69 101		H 6	... 24 coarse			I	Circular grinding, external				$v_s$	Speed of grinding wheel in m/s					
		H 30	... 60 medium			II	Circular grinding, internal										
		H 70	... 180 fine			III	Flat grinding with grinding wheel circumference				$u_w$	work piece = circular feed in m/min					
		H 220	... 1 200 very fine			IV	Flat grinding with grinding wheel face										

Depths of cut and feeds for grinding - table 2

Depth of cut a [ $\mu$ m]	Rough grinding	20... 50
	Finish grinding	2,5... 10
	Plunge-cut grinding	2... 8
Longitudinal feed s [mm/r]	Rough grinding	(2/3... 4/5) • $B_1$
	Finish grinding	(1/4... 1/2) • $B_1$

$B_1$  = Grinding wheel width in mm. The standard values apply well to all grinding methods. Sparking out without feed improves the precision and surface finish.

Standard values for circular feed have to be calculated with the help of the values of table 1.

**Belt-driven grinding spindle units with bearings**

This universal spindle type can be used for a different kind of bore grinding tasks. The large number of screw-in mandrels allows an optimal adaption to the respective grinding task.

**Scope of supply**

- Set of tools
- One hexagon socket nut for fastening the belt pulley
- A threaded pin for fastening the screw-in mandrel starting from sleeve diameter of 60 mm
- Operating manual

**Accessories**

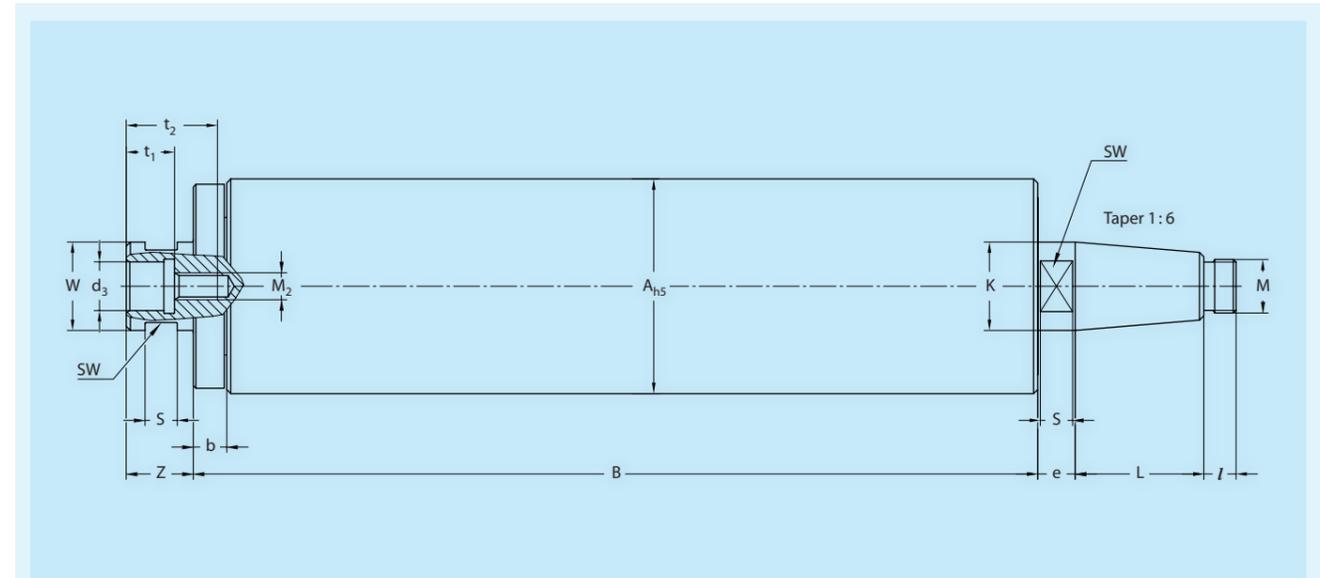
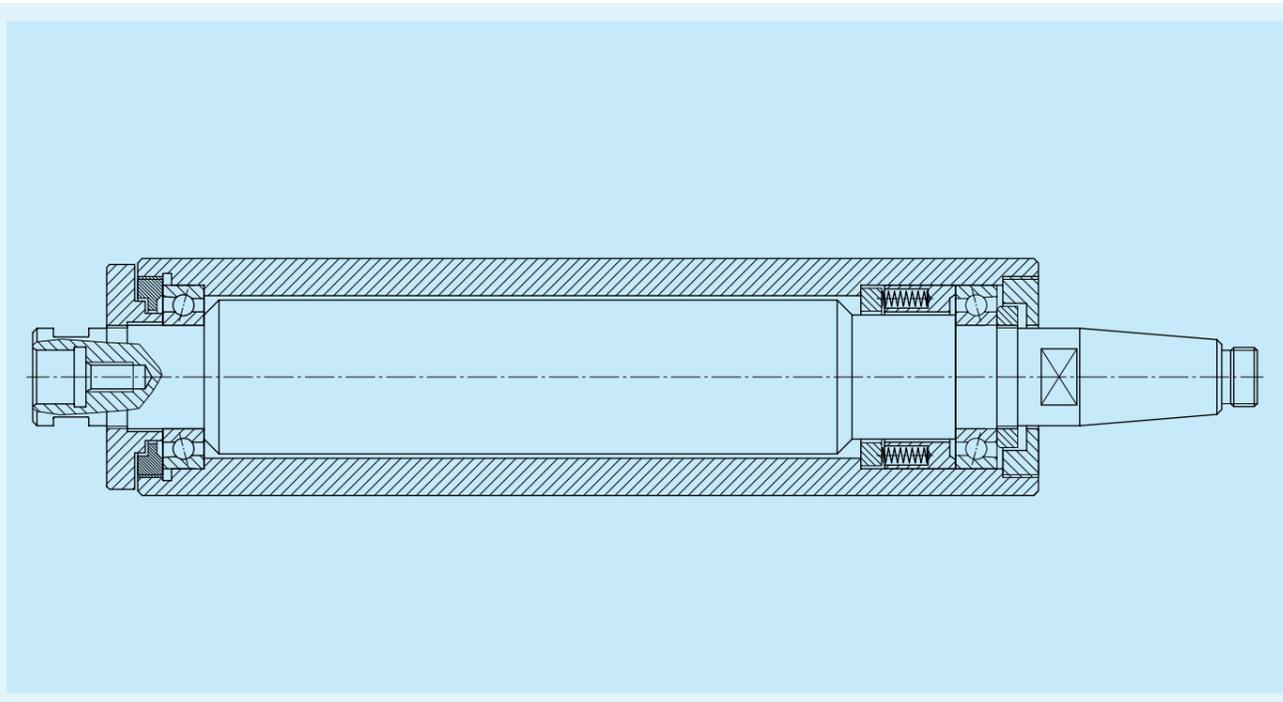
- Screw-in mandrel (see also page 20/21)
- Belt pulley (see also page 20/21)
- Extractor for belt pulley

**Lubrication**

- For-life grease lubrication

**Direction of rotation**

- Please always indicate the direction of rotation when placing an order



Spindle type	Dimensions in mm															n[rpm]
A x B	K	L	W	Z	e	b	M	l	d <sub>3</sub>	t <sub>1</sub>	M <sub>2</sub>	t <sub>2</sub>	SW	S	max.	
SFIL 40x160	13	20	13,5	12	8	7	M 8x1	7	7,2 <sup>+0,004</sup> <sub>0</sub>	10,5	M 6	22	11	6	35 000	
SFIL 40x200	13	20	13,5	12	8	7	M 8x1	7	7,2 <sup>+0,004</sup> <sub>0</sub>	10,5	M 6	22	11	6	35 000	
SFIL 40x250	13	20	13,5	12	8	7	M 8x1	7	7,2 <sup>+0,004</sup> <sub>0</sub>	10,5	M 6	22	11	6	35 000	
SFIL 50x160	15,5	24	15,5	12	9	8	M 10x1	8	8,2 <sup>+0,004</sup> <sub>0</sub>	12	M 8	24	13	6	29 000	
SFIL 50x200	15,5	24	15,5	12	9	8	M 10x1	8	8,2 <sup>+0,004</sup> <sub>0</sub>	12	M 8	24	13	6	29 000	
SFIL 50x250	15,5	24	15,5	12	9	8	M 10x1	8	8,2 <sup>+0,004</sup> <sub>0</sub>	12	M 8	24	13	6	29 000	
SFIL 60x160	22	34	23	16	10	8	M 12x1	10	13,2 <sup>+0,004</sup> <sub>0</sub>	13	M 6	26	19	8	22 000	
SFIL 60x200	22	34	23	16	10	8	M 12x1	10	13,2 <sup>+0,004</sup> <sub>0</sub>	13	M 6	26	19	8	22 000	
SFIL 60x250	22	34	23	16	10	8	M 12x1	10	13,2 <sup>+0,004</sup> <sub>0</sub>	13	M 6	26	19	8	22 000	
SFIL 60x315	22	34	23	16	10	8	M 12x1	10	13,2 <sup>+0,004</sup> <sub>0</sub>	13	M 6	26	19	8	22 000	
SFIL 70x200	28	42	28	20	13	9	M 15x1	11	16,2 <sup>+0,006</sup> <sub>0</sub>	16	M 8	30	24	10	18 000	
SFIL 70x250	28	42	28	20	13	9	M 15x1	11	16,2 <sup>+0,006</sup> <sub>0</sub>	16	M 8	30	24	10	18 000	
SFIL 70x315	28	42	28	20	13	9	M 15x1	11	16,2 <sup>+0,006</sup> <sub>0</sub>	16	M 8	30	24	10	18 000	
SFIL 80x200	33	48	33	25	14	10	M 20x1	12	18,2 <sup>+0,006</sup> <sub>0</sub>	18	M 10	34	27	12	17 000	
SFIL 80x250	33	48	33	25	14	10	M 20x1	12	18,2 <sup>+0,006</sup> <sub>0</sub>	18	M 10	34	27	12	17 000	
SFIL 80x315	33	48	33	25	14	10	M 20x1	12	18,2 <sup>+0,006</sup> <sub>0</sub>	18	M 10	34	27	12	17 000	

**Belt-driven grinding spindle units with bearings**

This spindle unit has the same dimensions as series SFIL. Due to reinforced bearing it is suitable for higher loads.

**Scope of supply**

- Set of tools
- One hexagon socket nut for fastening the belt pulley
- A threaded pin for fastening the screw-in mandrel starting from sleeve diameter of 60 mm
- Operating manual

**Accessories**

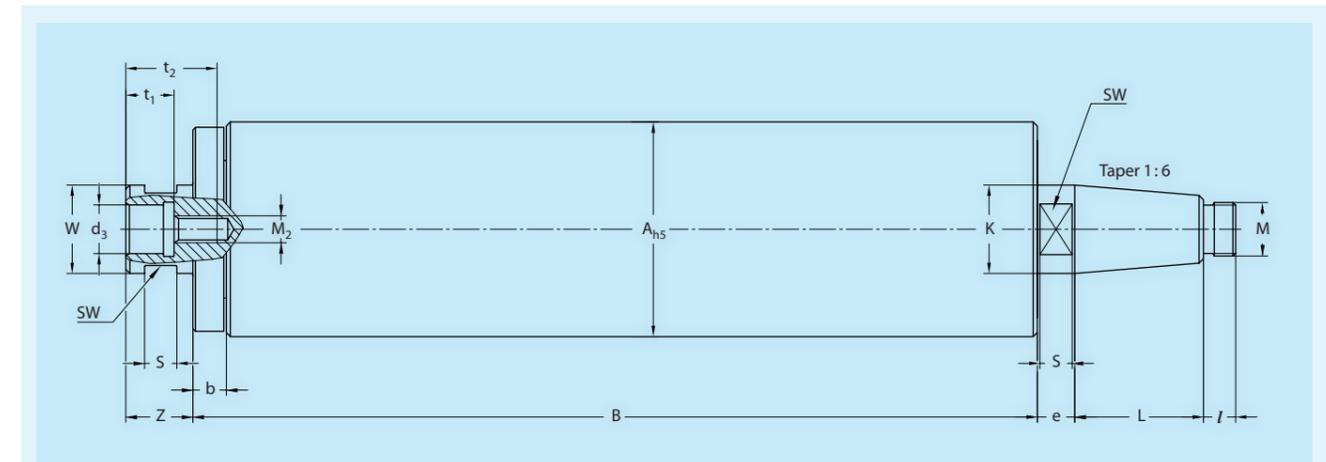
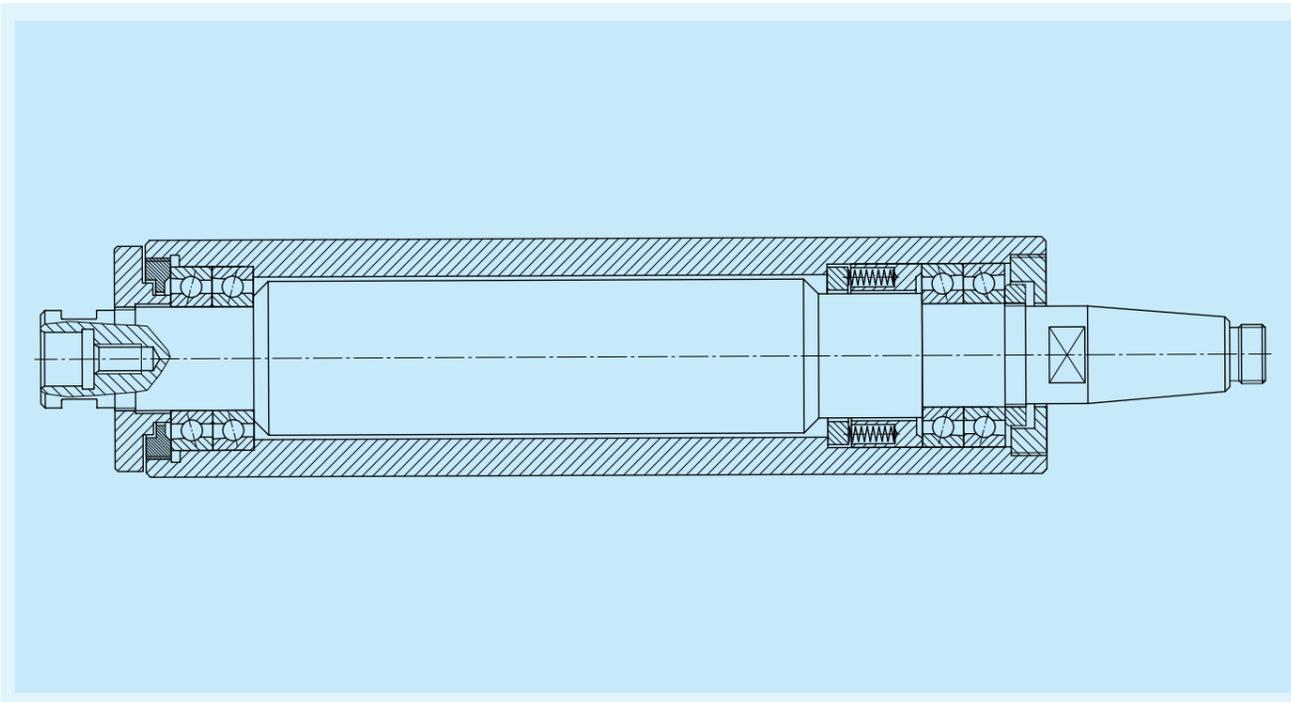
- Screw-in mandrel (see also page 20/21)
- Belt pulley (see also page 20/21)
- Extractor for belt pulley

**Lubrication**

- For-life grease lubrication

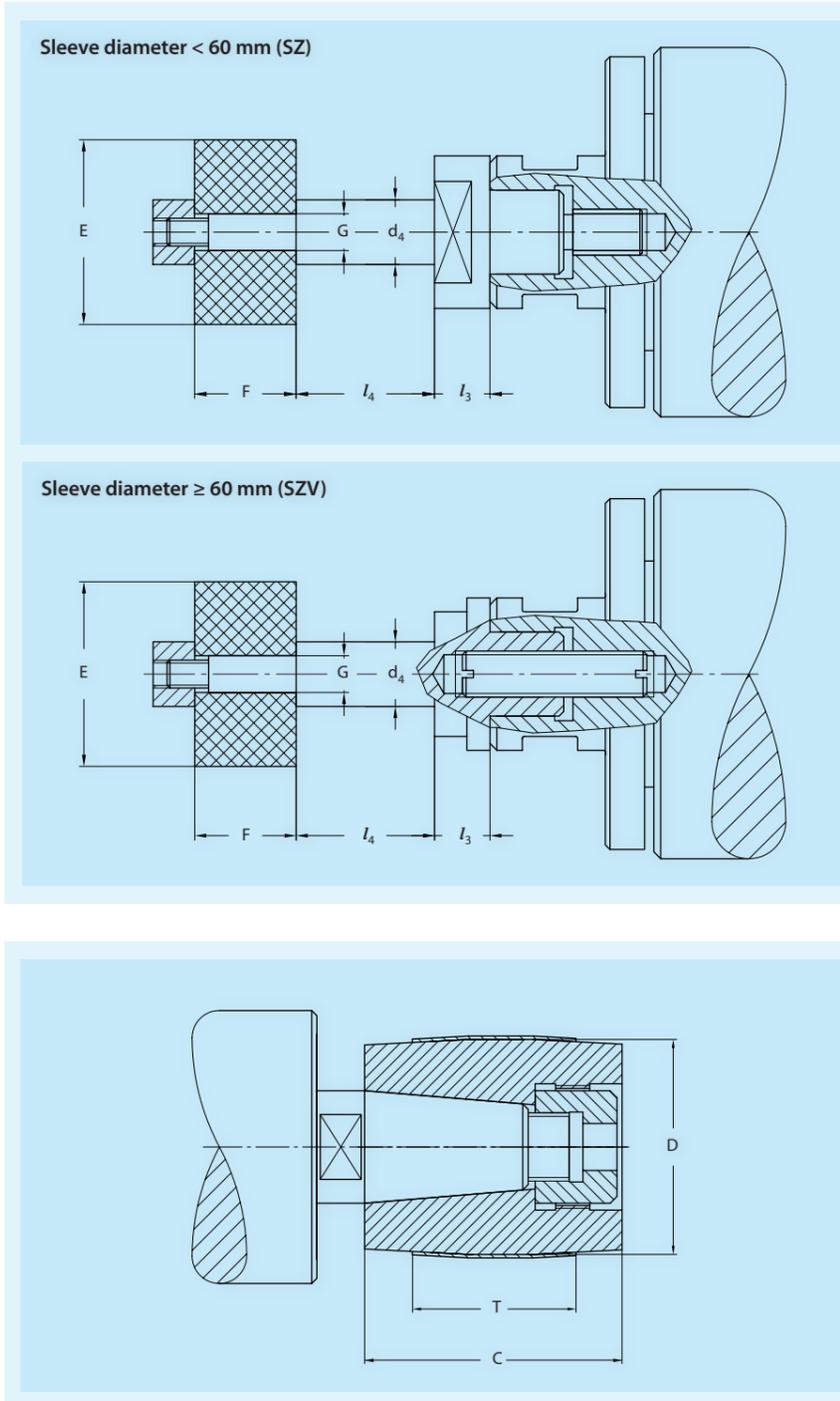
**Direction of rotation**

- Please always indicate the direction of rotation when placing an order



Spindle type	Dimensions in mm															n[rpm]
	A x B	K	L	W	Z	e	b	M	I	d <sub>3</sub>	t <sub>1</sub>	M <sub>2</sub>	t <sub>2</sub>	SW	S	
SFIV 40x160	13	20	13,5	12	6,5	7	M 8x1	7	7,2 <sup>+0,004</sup> <sub>0</sub>	10,5	M 6	22	11	6	30 000	
SFIV 40x200	13	20	13,5	12	6,5	7	M 8x1	7	7,2 <sup>+0,004</sup> <sub>0</sub>	10,5	M 6	22	11	6	30 000	
SFIV 40x250	13	20	13,5	12	6,5	7	M 8x1	7	7,2 <sup>+0,004</sup> <sub>0</sub>	10,5	M 6	22	11	6	30 000	
SFIV 50x160	15,5	24	15,5	12	9	8	M 10x1	8	8,2 <sup>+0,004</sup> <sub>0</sub>	12	M 8	24	13	6	24 000	
SFIV 50x200	15,5	24	15,5	12	9	8	M 10x1	8	8,2 <sup>+0,004</sup> <sub>0</sub>	12	M 8	24	13	6	24 000	
SFIV 50x250	15,5	24	15,5	12	9	8	M 10x1	8	8,2 <sup>+0,004</sup> <sub>0</sub>	12	M 8	24	13	6	24 000	
SFIV 50x315	15,5	24	15,5	12	9	8	M 10x1	8	8,2 <sup>+0,004</sup> <sub>0</sub>	12	M 8	24	13	6	24 000	
SFIV 60x160	22	34	23	16	10	8	M 12x1	10	13,2 <sup>+0,004</sup> <sub>0</sub>	13	M 6	26	19	8	20 000	
SFIV 60x200	22	34	23	16	10	8	M 12x1	10	13,2 <sup>+0,004</sup> <sub>0</sub>	13	M 6	26	19	8	20 000	
SFIV 60x250	22	34	23	16	10	8	M 12x1	10	13,2 <sup>+0,004</sup> <sub>0</sub>	13	M 6	26	19	8	20 000	
SFIV 60x315	22	34	23	16	10	8	M 12x1	10	13,2 <sup>+0,004</sup> <sub>0</sub>	13	M 6	26	19	8	20 000	
SFIV 60x400	22	34	23	16	10	8	M 12x1	10	13,2 <sup>+0,004</sup> <sub>0</sub>	13	M 6	26	19	8	20 000	
SFIV 70x250	28	42	28	20	13	9	M 15x1	11	16,2 <sup>+0,006</sup> <sub>0</sub>	16	M 8	30	24	10	18 000	
SFIV 70x315	28	42	28	20	13	9	M 15x1	11	16,2 <sup>+0,006</sup> <sub>0</sub>	16	M 8	30	24	10	18 000	
SFIV 80x250	33	48	33	25	14	10	M 20x1	12	18,2 <sup>+0,006</sup> <sub>0</sub>	18	M 10	34	27	12	17 000	
SFIV 80x315	33	48	33	25	14	10	M 20x1	12	18,2 <sup>+0,006</sup> <sub>0</sub>	18	M 10	34	27	12	17 000	
SFIV 80x400	33	48	33	25	14	10	M 20x1	12	18,2 <sup>+0,006</sup> <sub>0</sub>	18	M 10	34	27	12	14 500	
SFIV 100x315	43	63	43	28	16	10	M 25x1	14	24 <sup>+0,006</sup> <sub>0</sub>	24	M 12	42	36	14	13 000	
SFIV 100x400	43	63	43	28	16	10	M 25x1	14	24 <sup>+0,006</sup> <sub>0</sub>	24	M 12	42	36	14	13 000	
SFIV 100x500	43	63	43	28	16	10	M 25x1	14	24 <sup>+0,006</sup> <sub>0</sub>	24	M 12	42	36	14	13 000	

To be able to fully utilize this precision of spindle units in practical grinding process screw-in mandrels are fastened by means of a threaded pin from sleeve outside diameter of 60 mm. This fastening system guarantees utmost concentricity of the screwed-in mandrel.



Spindle type	Screw-in mandrel Designation	Grinding wheel in mm							Operating range in mm		Belt pulley in mm			n[rpm]
		d <sub>4</sub>	l <sub>4</sub>	l <sub>3</sub>	E	F	G	Bore	Depth	Designation	D	C	T	
SFIL 40 SFIV 40	SZK 02-6x16	6	16	8	13	13	4	20	25	R 02-28x40	28	40	32	30 000
	SZ 02-9x10	9	10	8	16	16	6	24	20					30 000
	SZ 02-9x25	9	25	8	16	16	6	24	35					25 000
	SZ 02-13x16	13	16	<sup>1)</sup>	20	20	6	30	34					25 000
	SZ 02-13x32	13	32	<sup>1)</sup>	20	20	3	30	50					25 000
SFIL 50 SFIV 50	SZ 03-9x10	9	10	9	16	16	6	24	20	R 03-28x50	28	50	40	25 000
	SZ 03-9x20	9	20	9	16	16	6	24	30					25 000
	SZ 03-12x16	12	16	9	20	20	6	30	40					25 000
	SZ 03-12x32	12	32	9	20	20	6	30	46					25 000
	SZ 03-15x20	15	20	<sup>1)</sup>	25	25	8	38	42					18 000
SZ 03-15x40	15	40	<sup>1)</sup>	25	25	8	38	62	18 000					
SFIL 60 SFIV 60	SZV 05-13x16	13	16	10	25	25	8	38	32	R 05-40x63	40	63	50	18 000
	SZV 05-13x32	13	32	10	25	25	8	38	48					18 000
	SZV 05-18x20	18	20	10	32	32	10	48	40					18 000
	SZV 05-18x40	18	40	10	32	32	10	48	60					18 000
	SZV 05-23x32	23	32	<sup>1)</sup>	40	40	13	60	68					14 500
SZV 05-23x50	23	50	<sup>1)</sup>	40	40	13	60	86	14 500					
SFIL 70 SFIV 70	SZV 06-18x20	18	20	10	32	32	10	48	40	R 06-45x71	45	71	60	14 500
	SZV 06-18x40	18	40	10	32	32	10	48	60					14 500
	SZV 06-22x32	22	32	10	40	40	13	60	54					14 500
	SZV 06-22x50	22	50	10	40	40	13	60	72					14 500
	SZV 06-28x40	28	40	<sup>1)</sup>	40	40	16	68	78					12 500
SZV 06-28x63	28	63	<sup>1)</sup>	40	40	16	68	100	12 500					
SFIL 80 SFIV 80	SZV 07-22x32	22	32	12	40	40	13	60	54	R 07-50x80	50	80	60	14 000
	SZV 07-22x50	22	50	12	40	40	13	60	72					14 000
	SZV 07-28x40	28	40	12	50	50	16	68	68					12 500
	SZV 07-28x63	28	63	12	50	50	16	68	90					12 500
	SZV 07-33x50	33	50	<sup>1)</sup>	50	50	20	75	95					11 000
SZV 07-33x80	33	80	<sup>1)</sup>	50	50	20	75	125	11 000					
SFIV 100	SZV 09-28x40	28	40	15	50	50	16	68	68	R 09-60x90	60	90	70	10 400
	SZV 09-28x63	28	63	15	50	50	16	68	90					10 400
	SZV 09-33x50	33	50	15	50	50	20	75	95					10 400
	SZV 09-33x80	33	80	15	50	50	20	75	125					10 400
	SZV 09-43x63	43	63	<sup>1)</sup>	63	63	25	85	120					10 400
SZV 09-43x100	43	100	<sup>1)</sup>	63	63	25	85	160	10 400					

<sup>1)</sup> These screw-in mandrels are not stepped. • Screw-in mandrels of type SZK are without nut, the grinding wheel is glued.

**Belt-driven grinding spindle units with bearings**

Grinding spindle for external grinding and for deep bores with diameter larger than the diameter of spindle.

**Lubrication**

- For-life grease lubrication

**Direction of rotation**

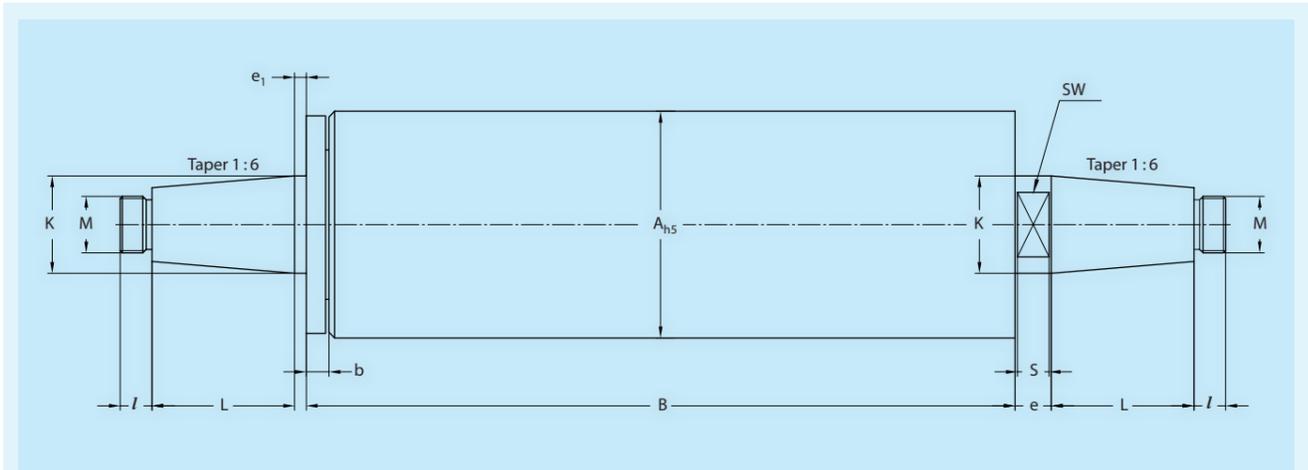
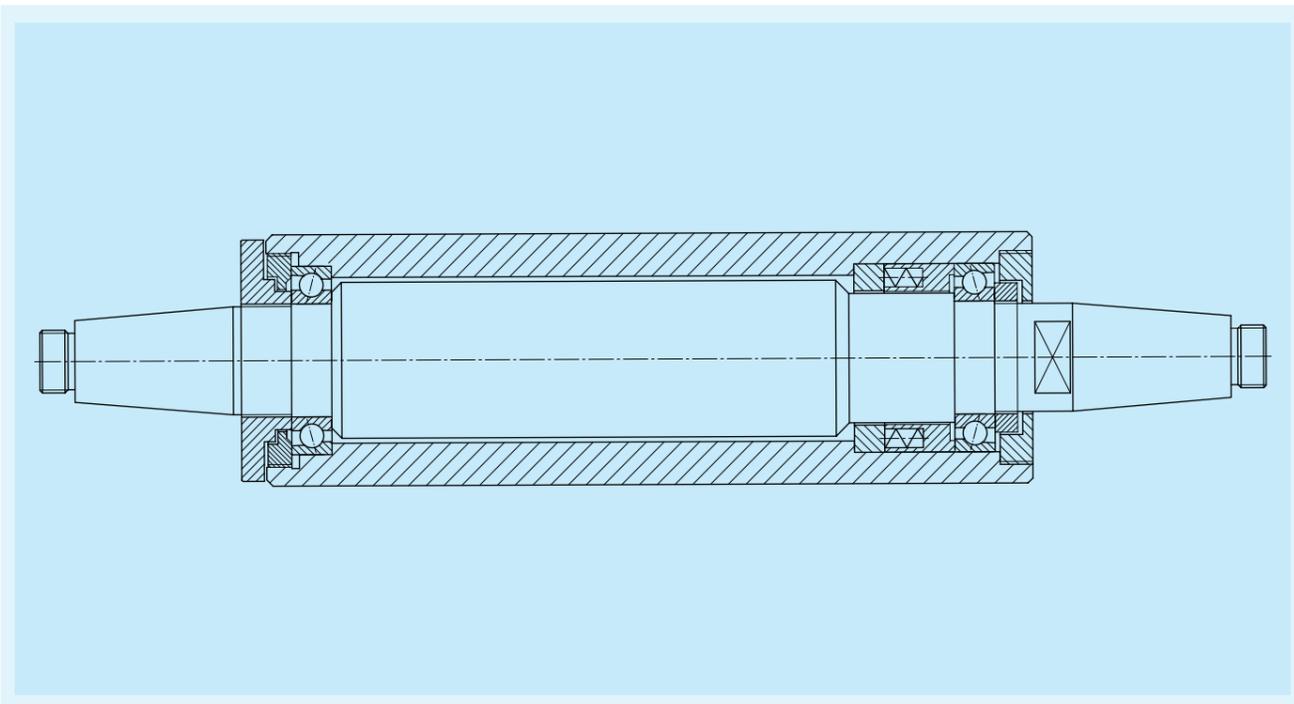
- Please always indicate the direction of rotation when placing an order

**Scope of supply**

- Set of tools
- Each one hexagon socket nut for fastening the belt pulley and the flange
- Operating manual

**Accessories**

- Flange (see also page 26/27)
- Belt pulley (see also page 26/27)
- Balancing mandrel for flange
- Extractor for belt pulley and flange



Designation of grinding spindle	Dimensions in mm									n[rpm]	
	A x B	K	L	e <sub>1</sub>	e	b	M	I	SW		S
SFAL 32x125											
SFAL 32x160		9	14	1,5	6	6	M 6x1	6	8	4	36 000
SFAL 32x200											
SFAL 40x160											
SFAL 40x200		13	20	2	8	7	M 8x1	7	11	6	35 000
SFAL 40x250											
SFAL 50x160											
SFAL 50x200		15,5	24	2	8	8	M 10x1	8	13	6	29 000
SFAL 50x250											
SFAL 60x200											
SFAL 60x250		22	34	2,5	10	8	M 12x1	10	19	8	22 000
SFAL 60x315											
SFAL 70x200											
SFAL 70x250		28	42	2,5	13	9	M 15x1	11	24	10	18 000
SFAL 70x315											
SFAL 80x200											
SFAL 80x250		33	48	3,2	14	10	M 20x1	12	27	12	17 000
SFAL 80x315											
SFAL 100x315											
SFAL 100x400		43	63	3,2	16	10	M 25x1	14	36	14	13 000
SFAL 100x500											

**Belt-driven grinding spindle units with bearings**

The design of grinding spindle up to sleeve diameter of 100 mm is identical in dimension with those of light series SFAL. Due to reinforced bearing arrangement it is suitable for higher loads.

**Accessories**

- Flange (see also page 26/27)
- Belt pulley (see also page 26/27)
- Balancing mandrel for flange
- Extractor for belt pulley and flange

**Scope of supply**

- Set of tools
- Each one hexagon socket nut for fastening the belt pulley and the flange
- Operating manual

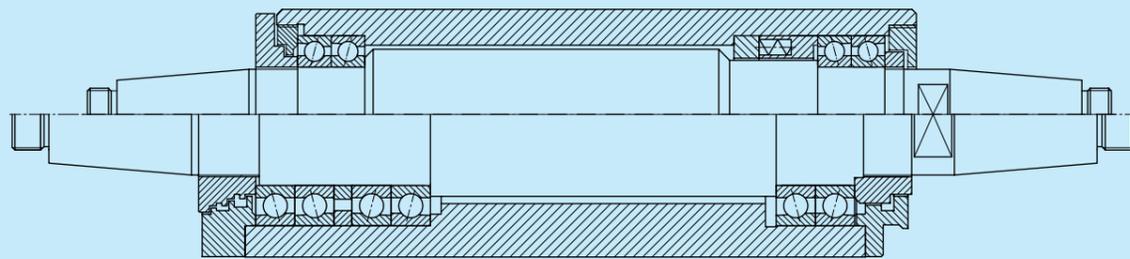
**Lubrication**

- For-life grease lubrication

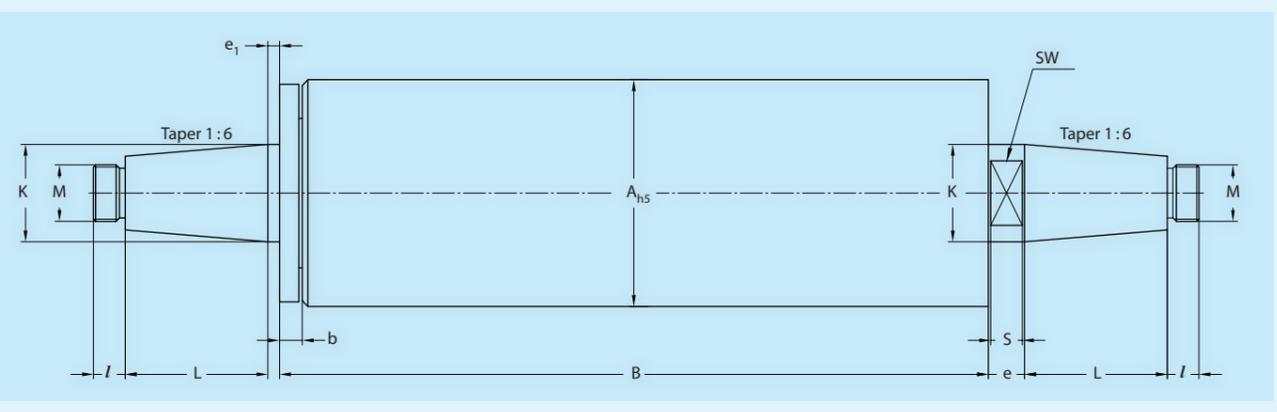
**Direction of rotation**

- Please always indicate the direction of rotation when placing an order

Sleeve diameter < 160 mm



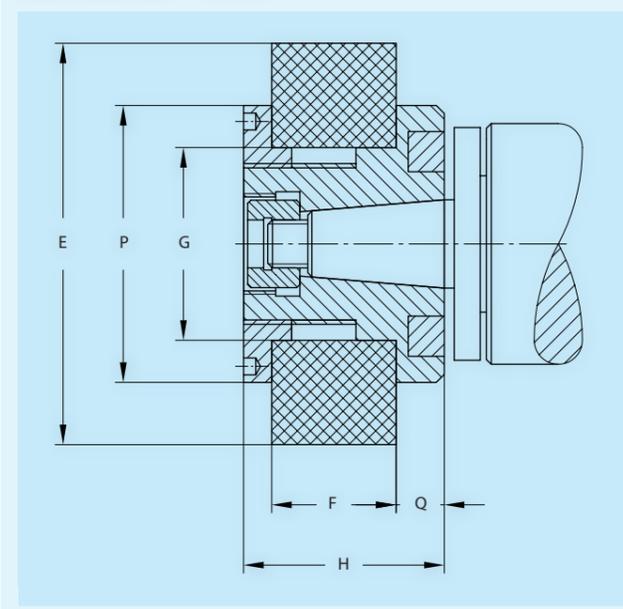
Sleeve diameter ≥ 160 mm



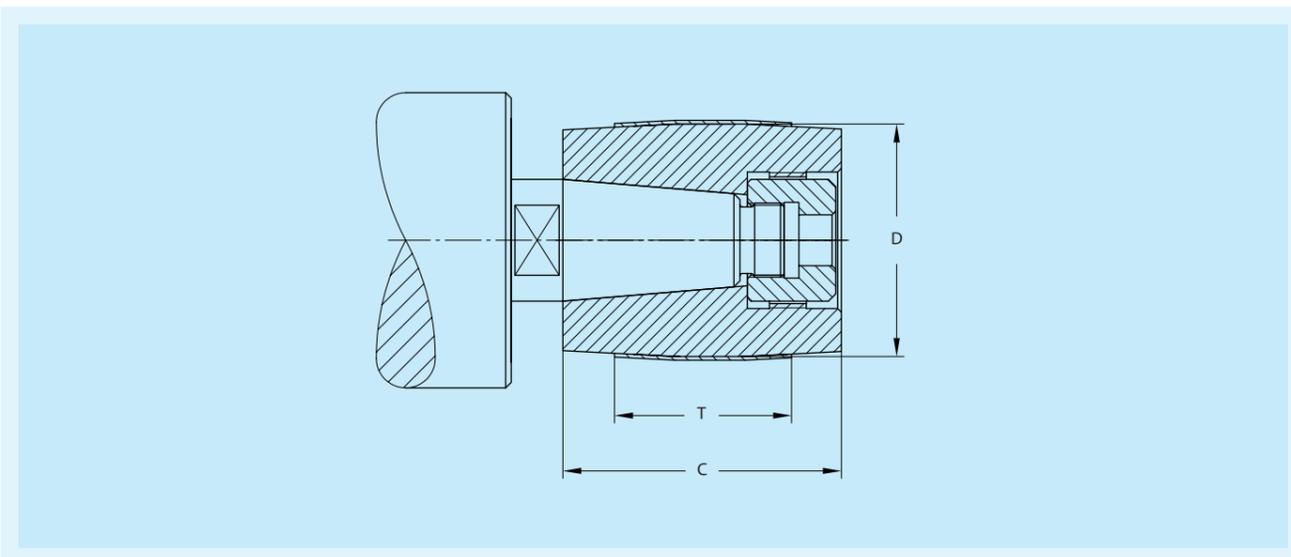
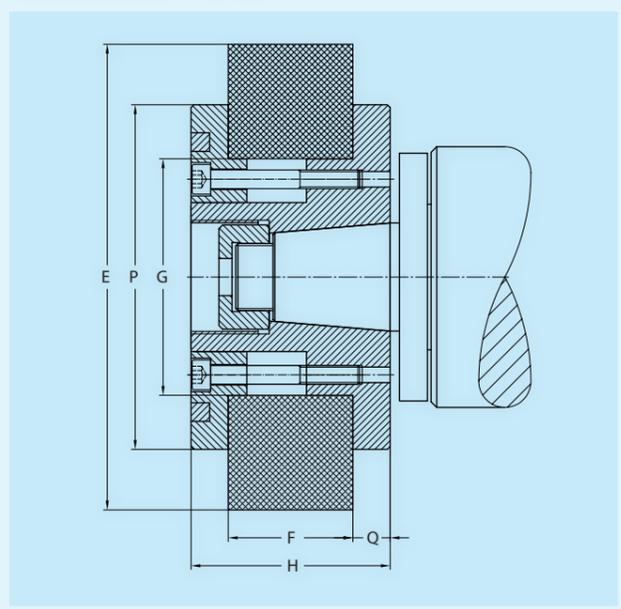
Designation of grinding spindle A x B	Dimensions in mm									n[rpm] max.									
	K	L	e <sub>1</sub>	e	b	M	l	SW	S										
SFAV 40x160	13	20	2	8	7	M 8x1	7	11	6	30 000									
SFAV 40x200										30 000									
SFAV 40x250										30 000									
SFAV 40x315										25 000									
SFAV 50x160	15,5	24	2	8	8	M 10x1	8	13	6	25 000									
SFAV 50x200										25 000									
SFAV 50x250										25 000									
SFAV 50x315										22 500									
SFAV 60x110	22	34	2,5	10	8	M 12x1	10	19	8	20 000									
SFAV 60x200										20 000									
SFAV 60x250										20 000									
SFAV 60x315										20 000									
SFAV 60x400										18 000									
SFAV 60x500										18 000									
SFAV 70x200	28	42	2,5	13	9	M 15x1	11	24	10	18 000									
SFAV 70x250										18 000									
SFAV 70x315										18 000									
SFAV 70x400										15 000									
SFAV 70x500										15 000									
SFAV 80x250										33	48	3,2	14	10	M 20x1	12	27	12	15 000
SFAV 80x315	15 000																		
SFAV 80x400	15 000																		
SFAV 80x500	12 500																		
SFAV 80x630	12 500																		
SFAV 100x315	43	63	3,2	16	10	M 25x1	14	36	14										13 000
SFAV 100x400										13 000									
SFAV 100x500										13 000									
SFAV 100x630										10 000									
SFAV 100x800										10 000									
SFAV 120x400										53	70	4	18	11	M 36x1,5	18	46	16	9 000
SFAV 120x500	9 000																		
SFAV 120x630	9 000																		
SFAV 120x800	8 000																		
SFAV 140x400	58	63	5	20	17	M 36x1,5	20	50	18										7 500
SFAV 140x500																			7 500
SFAV 140x630										7 500									
SFAV 160x400										68	80	4	24	26	M 40x1,5	20	60	20	7 000
SFAV 160x500	7 000																		
SFAV 160x630	6 000																		
SFAV 200x500	90	100	6	6	26	M 55x1,5	28	30	12	5 000									
SFAV 200x630										5 000									

The grinding wheel flanges are supplied with spacer discs that also allow clamping of smaller grinding wheel widths. For further belt pulley diameters see page 47.

Sleeve diameter < 140 mm



Sleeve diameter ≥ 140 mm



Spindle type	Flange Designation	Grinding wheel in mm						Operating range in mm		Belt pulley in mm			n [rpm]	
		P	H	Q	E	F	G	Bore	Depth	Designation	D	C		T
SFAL 32	SA 00-20x31	31	24	4	50	16	20	40-60	1)	R 00-50x32	50	32	25	12 500
SFAL 40	SA 02-20x40	40	35	6	50	16	20	40-60	1)	R 02-80x40	80	40	32	7 800
SFAV 40	SA 02-32x48	48	38	8	80	25	22	60-90	1)					
SFAL 50	SA 03-32x58	58	43	11	100	25	32	70-110	1)	R 03-100x50	100	50	40	6 250
SFAV 50														
SFAL 60	SA 05-32x60	60	52	12	80	25	32	50-90	1)	R 05-100x63	100	63	50	6 250
SFAV 60	SA 05-51-69	69	52	12	100	32	51	80-130	1)					
SFAL 70	SA 06-51x79	79	62	14	125	40	51	90-160	1)	R 06-125x71	125	71	60	5 000
SFAV 70	SA 06-51x100	100	62	14	200	40	51	150-260	1)					
SFAL 80	SA 07-51x89	89	74	15	125	50	51	100-190	1)	R 07-125x80	125	80	60	5 000
SFAV 80	SA 07-51x120	120	74	15	200	50	51	150-260	1)					
SFAL 100	SA 09-76x99	99	85	15	160	50	76	120-210	1)	R 09-180x90	180	90	70	3 500
SFAV 100	SA 09-76x130	130	85	15	250	50	76	130-325	1)					
SFAV 120	SA 11-76x120	120	100	19	200	63	76	150-260	1)	R 11-200x100	200	100	80	3 150
SFAV 120	SA 11-76x150	150	100	19	315	63	76	240-400	1)					
SFAV 140	SA 12-127x185	185	110	20	450	70	127	500	1)	R 12-210x100	210	100	80	1 500 <sup>2)</sup>
SFAV 140	SA 12-76x140	140	100	20	250	60	76	375	1)					
SFAV 160	SA 14-203x260	260	124	22	500	80	203	700	1)	R 14-230x120	230	120	100	1 370 <sup>2)</sup>
SFAV 200	SA 20-203x270	270	128	24	600	80	230	800	1)					

1) Max. grinding depth:  $B + e1 + Q + \frac{2}{3}F$  - chucking length  
 Drive: Motor speed 2 860 n[rpm]  
 Motor belt pulley  $\varnothing$  220 mm  
 2) Motor belt pulley  $\varnothing$  110 mm

**Belt-driven grinding spindle units with bearings**

These spindles are suitable for grinding particularly deep bores which cannot be ground with any other spindle type.

**Lubrication**

- For-life grease lubrication

**Direction of rotation**

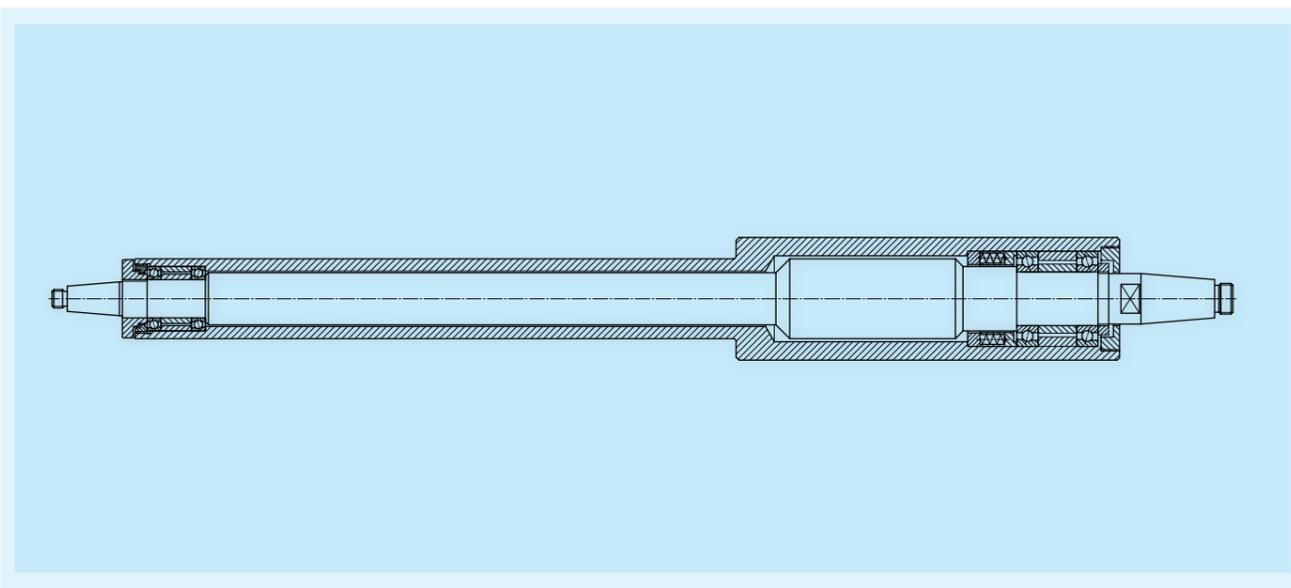
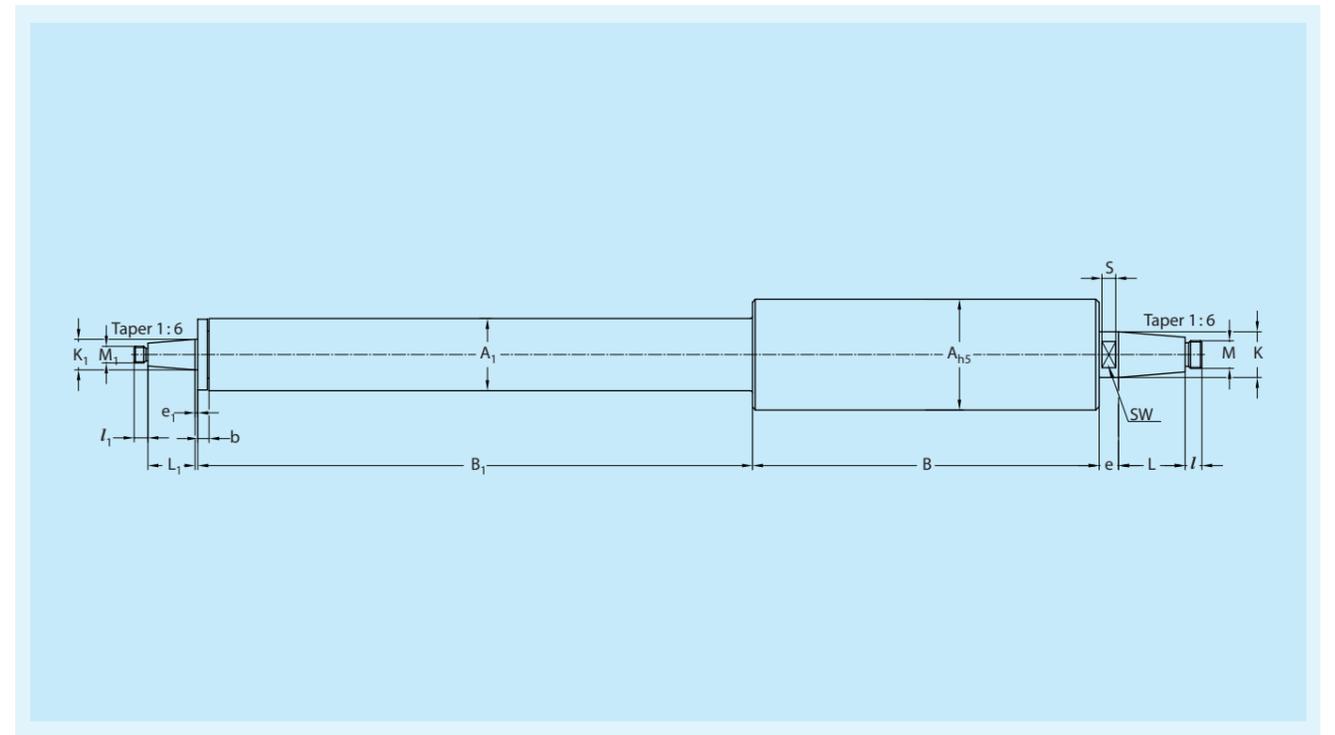
- Please always indicate the direction of rotation when placing an order

**Scope of supply**

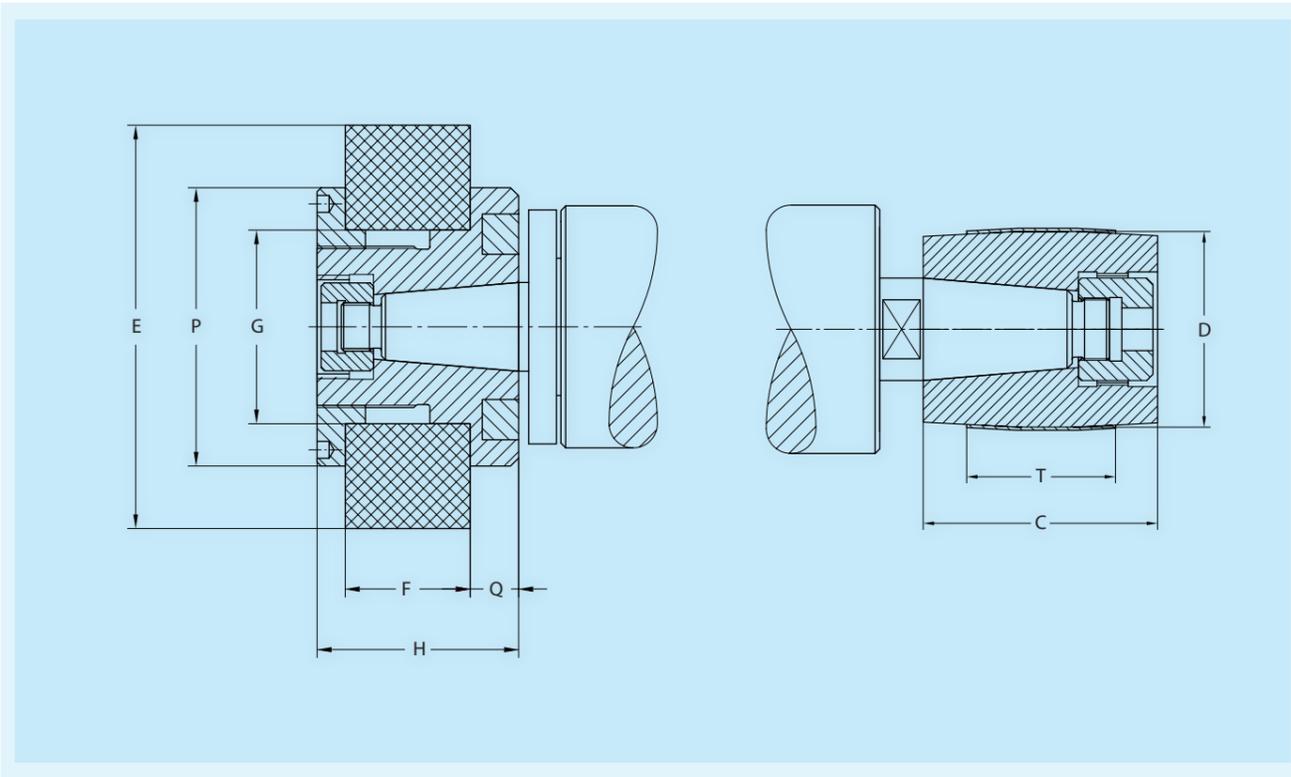
- Set of tools
- Each one hexagon socket nut for fastening the belt pulley and the flange
- Operating manual

**Accessories**

- Flange (see page 30)
- Extractor for flange
- Balancing mandrel for flange
- Belt pulley (see page 30)
- Extractor for belt pulley



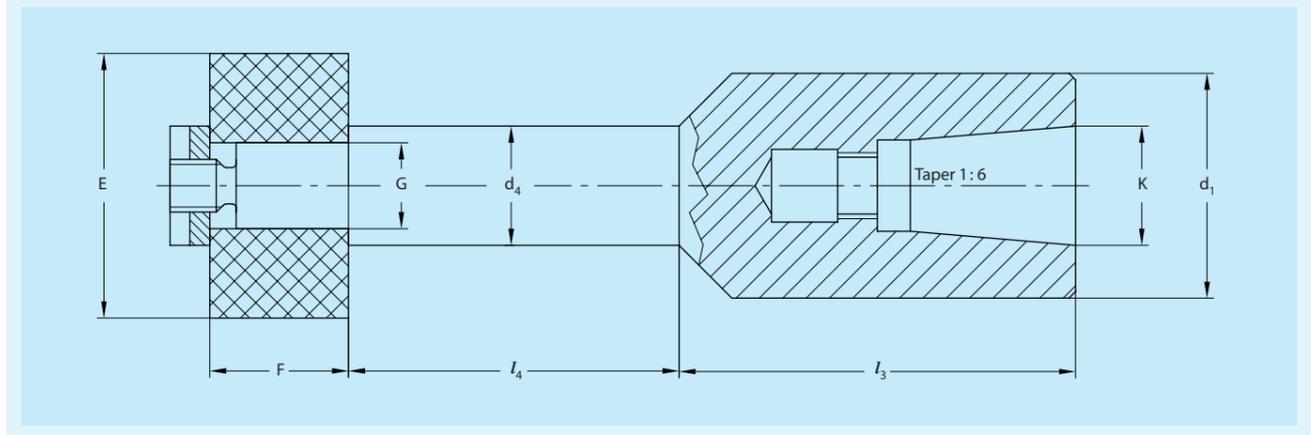
Designation of grinding spindle	Dimensions in mm														n[rpm]
	K	L	K <sub>1</sub>	L <sub>1</sub>	e <sub>1</sub>	e	b	M	I	M <sub>1</sub>	I <sub>1</sub>	SW	S	max.	
SFAA 60x250-50x160	22	34	15,5	24	2	10	8	M 12x1	10	M 10x1	8	19	8	12 000	
SFAA 60x250-50x200															
SFAA 60x250-50x250															
SFAA 60x250-50x315	33	48	22	34	2	14	8	M 20x1	12	M 12x1	10	27	12	8 000	
SFAA 80x250-60x200															
SFAA 80x250-60x250															
SFAA 80x250-60x315															
SFAA 80x250-60x400	43	63	33	48	3	16	10	M 25x1	14	M 20x1	12	36	14	6 000	
SFAA 100x315-80x315															
SFAA 100x315-80x400															
SFAA 100x315-80x500	53	70	48	63	4	18	10	M 36x1,5	18	M 30x1	18	46	16	5 500	
SFAA 120x500-100x300															



Spindle type	Flange in mm			Grinding wheel in mm			Operating range in mm		Belt pulley in mm			n[rpm]		
	Designation	P	H	Q	E	F	G	Bore	Depth	Designation	D		C	T
SFAA 60	SA 03-32x50	50	43	11	80	25	32	55-120	1)	R 05-80x63	80	63	50	7 850
SFAA 80	SA 05-32x60	60	52	12	100	25	32	65-150	1)	R 07-100x80	100	80	60	6 300
SFAA 100	SA 07-51x80	80	70	15	125	32	51	85-180	1)	R 09-125x90	125	90	70	5 000
SFAA 120	SA 10-76x130	130	60	15	300	30	76	200-380	1)	R 11-160x100	160	100	80	3 900

1) Max. grinding depth:  $B + B_1 + e_1 + Q + \frac{2}{3}F$  - chucking length • Drive: motor speed 2 860 rpm • Motor belt pulley  $\varnothing$  220 mm

Grinding arbor SAI for internal grinding small bores



Grinding spindle Type	Grinding wheel arbor with slotted nut in mm Designation	Grinding wheel arbor with slotted nut in mm				Grinding wheel in mm			Operating range in mm		
		d <sub>1</sub>	K	d <sub>4</sub>	l <sub>3</sub>	l <sub>4</sub>	E	F	G	Bore up to	Depth
SFAL 40	SAI 02-6x36	19	13	6	40	36	13	6	4	20	40
SFAV 40	SAI 02-8x48	19	13	8	40	48	13	13	4	20	56
SSA 50	SAI 02-10x60	19	13	10	40	60	20	13	6	30	68
SFAL 60 SFAV 60	SAI 05-7x25	34	22	7	60	25	13	6	4	20	30
	SAI 05-7x50	34	22	7	60	50	13	13	4	20	58
	SAI 05-12x50	34	22	12	60	50	20	13	6	30	58
	SAI 05-12x75	34	22	12	60	75	20	13	6	30	84
	SAI 05-14x63	34	22	14	60	63	32	13	10	45	72
	SAI 05-14x93	34	22	14	60	93	32	13	10	45	100
	SAI 05-18x78	34	22	18	60	78	40	13	13	60	86
SFAL 70 SFAV 70 SSA 80	SAI 05-18x117	34	22	18	60	117	40	20	13	60	130
	SAI 06-15x60	42	28	15	68	60	32	13	10	45	68
	SAI 06-19x35	42	28	19	68	35	40	10	13	60	42
	SAI 06-19x105	42	28	19	68	105	40	16	13	60	116
SFAL 80 SFAV 80	SAI 06-23x120	42	28	23	68	120	40	25	13	60	136
	SAI 07-16x70	46	33	16	75	70	32	13	10	45	78
	SAI 07-20x86	46	33	20	75	86	40	16	13	60	98
	SAI 07-20x129	46	33	20	75	129	40	20	13	60	140
	SAI 07-25x108	46	33	25	75	108	50	20	16	70	120
	SAI 07-25x162	46	33	25	75	162	50	25	16	70	180

**Grinding spindle with female taper for internal grinding of small bores**

This universal spindle type can be used for a different kind of bore grinding tasks. The large number of screw-in mandrels allows an optimal adaption to the respective grinding task.

For 100 mm sleeve size we have developed additionally a mandrel fixing with cylindrical guidance as well as a tightening of the mandrel by a threaded pin. This guaranties a better loosening (see also table of connecting dimensions page 48 to 51).

When selecting the mandrels please look after short and strong shafts.

**Scope of supply**

- Tools for putting spindle unit into operation
- One hexagon socket nut for fastening the belt pulley
- A threaded pin for fastening the screw-in mandrel for spindle type SSB
- Operating manual

**Accessories**

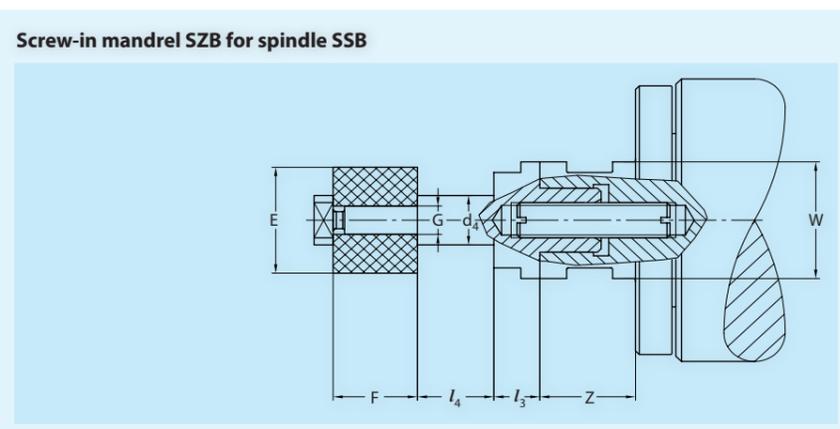
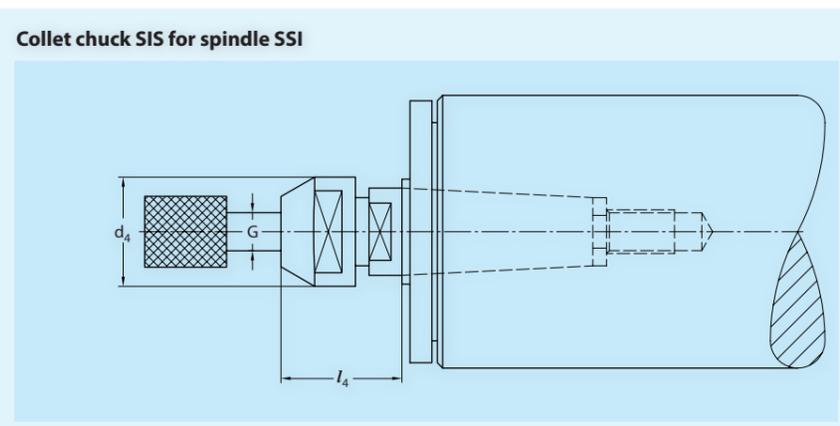
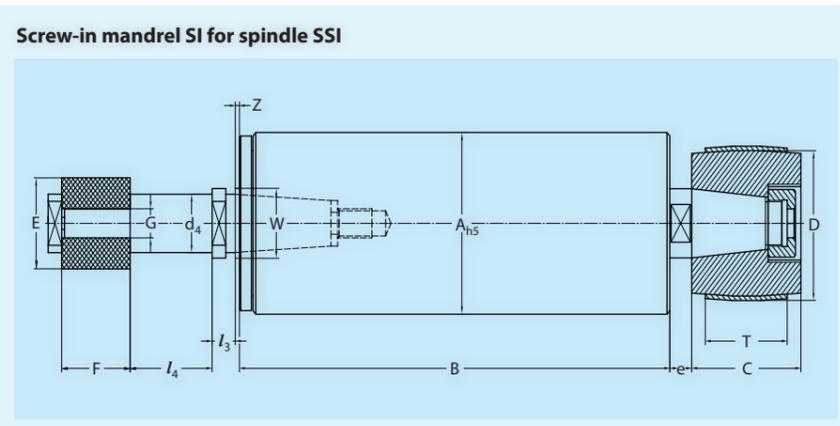
- Screw-in mandrel
- Collet chuck (SIS)
- Belt pulley (see page 47)
- Extractor for belt pulley

**Lubrication**

- For-life grease lubrication

**Direction of rotation**

- Please always indicate the direction of rotation when placing an order



Designation of grinding spindle	Short mark	Dimensions in mm						n[rpm]	Screw-in mandrel/Collet chuck			Grinding wheel			Operating range													
		Shaft		Belt pulley					Designation			in mm			Bore	Depth												
A x B	(engraved)	W	Z	e	D	C	T	max.		d <sub>4</sub>	I <sub>4</sub>	I <sub>3</sub>	E	F	G	up to												
SSI 40x160/2 SSI 40x200/2 SSI 40x250/2	2.4-2/2	11	1,6	6	25	40	32	32 000		SIK 01-6x20	6	20	7	10	13	3	15	25										
	2.4-3/2									SI 01-9x20	9	20		16	20	6	24	30										
	2.4-4/2									SI 01-9x32	9	32																
										SIS 01-3	13	26									3	12						
SSI 50x160/2 SSI 50x200/2 SSI 50x250/2 SSI 50x315/2	2.5-2/2	13	2	7	32	50	40	25 000		SIK 02-6x20	6	20	7	10	13	3	15	25										
	2.5-3/2									SI 02-9x20	9	20		16	20	6	24	30										
	2.5-4/2									SI 02-9x32	9	32																
										SI 02-11x32	11	32							20	25	6	30	45					
	2.5-5/2									SI 02-11x50	11	50																
										SIS 02-3	13	26									3	12						
	SSI 60x200/3 SSI 60x250/3 SSI 60x315/3									2.6-3/3	18	2		8	32	63	50	20 000		SI 04-9x32	9	32	8	16	20	6	24	42
										2.6-4/3										SI 04-9x50	9	50						
SI 04-11x32		11	32	20	25	6	30	45																				
2.6-5/3		SI 04-11x60	11	60																								
		SI 04-13x40	13	40						25			32							8	38	60						
SSI 80x250/3 SSI 80x315/3 SSI 80x400/3		2.8-4/3	28	2,5	13	40	80	60	14 000				SI 06-13x40							13	40	12		25	32	8	38	60
		2.8-5/3											SI 06-13x80							13	80							
													SI 06-18x60							18	60							
		2.8-7/3											SI 06-18x100							18	100							
													SI 06-22x40							22	40							
	SSI 100x200/3 SSI 100x315/3 SSI 100x400/3 SSI 100x500/3	2.10-3/3									38	3	16	63	100	80	10 000		SI 06-22x80	22	80		13	40	50	13	60	110
		2.10-5/3																	SI 06-22x125	22	125							
																			SI 08-28x40	28	40							
2.10-7/3		SI 08-28x80	28	80																								
		SI 08-28x125	28	125						63									63	20	95	140						
2.10-9/3		SI 08-32x60	32	60																								
		SI 08-32x100	32	100						63									63	20	95	140						
SSB 100x250 SSB 100x315 SSB 100x400 SSB 100x500		2.10-3/3	38	28	16	63	100	80	10 000										SI 08-32x140	32	140	14		63	63	20	95	180
		2.10-5/3																	SZB 08-22x40	22	40							
																			SZB 08-22x80	22	80							
		2.10-7/3																	SZB 08-22x125	22	125							
																			SZB 08-28x40	28	40							
	2.10-9/3	SZB 08-28x80									28	80																
		SZB 08-28x125									28	125						50					155					
	SSB 100x500	2.10-9/3									SZB 08-38x40	38	40															
											SZB 08-38x60	38	60						63					100				
											SZB 08-38x80	38	80						63	20	95		120					
SZB 08-38x100			38	100	63	20	95	140																				
SZB 08-38x140			38	140	63	20	95	180																				
SZB 08-38x140			38	140	63	20	95	180																				

Screw-in mandrel of type SIK is without nut - grinding wheel is glued - Type SIS are collet chucks for fixture of grinding pins.

**Grinding spindle with male taper for internal grinding of deep bores and for external grinding**

Grinding spindle for deep bores with diameter larger than the diameter of spindle.

Flanges for sleeve diameter starting from 60 mm have counterbalance weights for accurately balancing the grinding wheels.

**Scope of supply**

- Tools for putting spindle unit into operation
- Each one hexagon socket nut for fastening the belt pulley and the flange
- Operating manual

**Accessories**

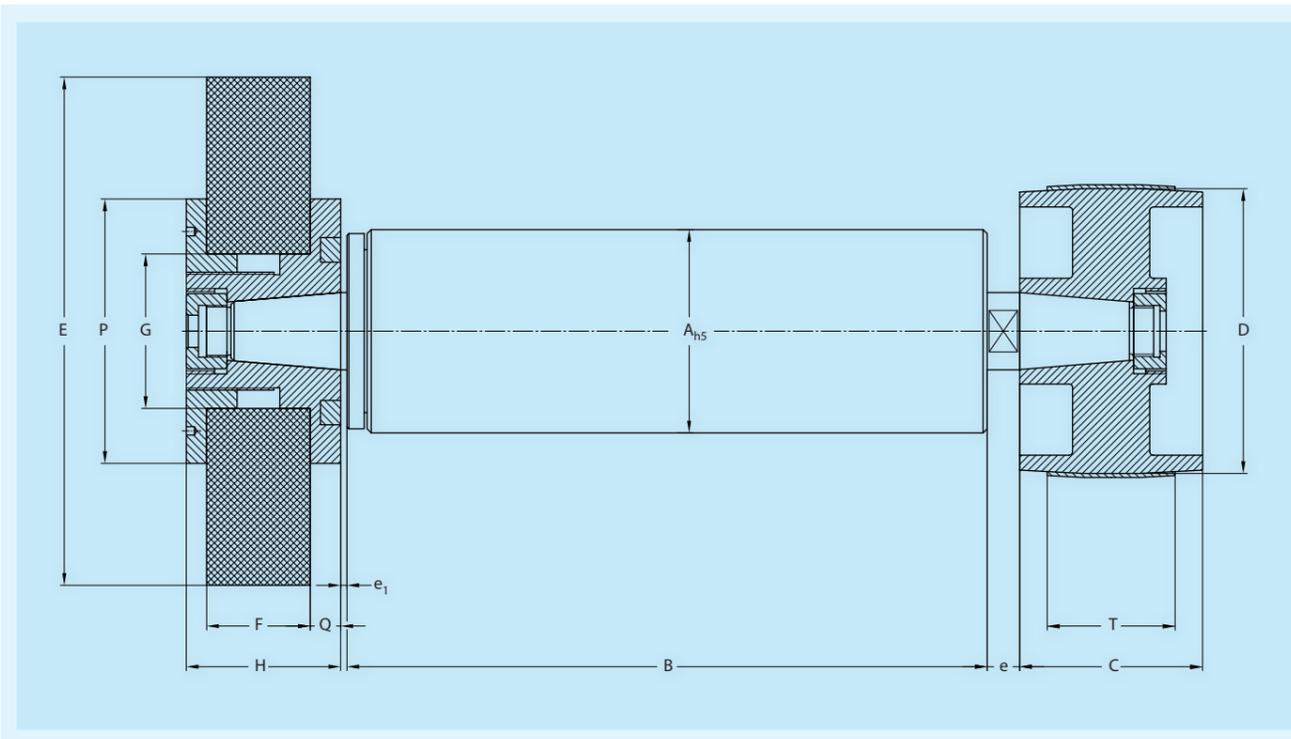
- Flange
- Belt pulley (see page 47)
- Balancing mandrel for flange
- Extractor for belt pulley and flange

**Lubrication**

- For-life grease lubrication

**Direction of rotation**

- Please always indicate the direction of rotation when placing an order



Designation of grinding spindle	Dimensions in mm	n[rpm]	Dimensions in mm						Operating range in mm								
			Belt pulley			Flange			Grinding wheel			Bore	Depth				
Type	Short mark		e <sub>1</sub>	e	D	C	T	max.	Designation	P	H	Q	E	F	G		
SSA 40x160/2	3.4-2/2	32 000	1,6	6	63	40	32	32 000	SA 01-25x38	38	32	6	63	20	25	50-70	1)
SSA 40x200/2	3.4-3/2																
SSA 40x250/2	3.4-4/2																
SSA 40x315/2	3.4-5/2																
SSA 50x160/2	3.5-2/2	25 000	2	7	80	50	40	25 000	SA 02-20x40	40	35	6	50	20	20	60-90	1)
SSA 50x200/2	3.5-3/2																
SSA 50x250/2	3.5-4/2																
SSA 50x315/2	3.5-5/2																
SSA 60x200/3	3.6-3/3	20 000	2	8	100	63	50	20 000	SA 04-32x58	58	42	11	100	25	32	70-100	1)
SSA 60x250/3	3.6-4/3																
SSA 60x315/3	3.6-5/3																
SSA 60x400/3	3.6-7/3																
SSA 60x500/3	3.6-9/3																
SSA 60x600/3	3.6-10/3																
SSA 80x160/3	3.8-2/3	14 000	2,5	13	100	80	60	14 000	SA 06-51x79	79	60	14	125	40	51	90-160	1)
SSA 80x250/3	3.8-4/3																
SSA 80x315/3	3.8-5/3																
SSA 80x400/3	3.8-7/3																
SSA 80x450/3	3.8-8/3																
SSA 80x500/3	3.8-9/3																
SSA 80x630/3	3.8-11/3																
SSA 80x700/3	3.8-12/3																
SSA 80x800/3	3.8-13/3																
SSA 100x315/3	3.10-5/3																
SSA 100x400/3	3.10-7/3																
SSA 100x450/3	3.10-8/3																
SSA 100x500/3	3.10-9/3																
SSA 100x630/3	3.10-11/3																
SSA 100x800/3	3.10-13/3																
SSA 100x850/3	3.10-14/3	9 000	4	18	125	125	100	9 000	SA 10-76x124	124	86	17	200	50	76	135-300	1)
SSA 125x400/3	3.12-7/3																
SSA 125x500/3	3.12-9/3																
SSA 125x630/3	3.12-11/3																
SSA 125x800/3	3.12-13/3	6 000															

1) Max. grinding depth:  $B + e_1 + Q + \frac{2}{3}F$  - chucking length • The grinding wheel flanges are supplied with shims which also allow narrower grinding wheels to be chucked. SSA 70x250 on request

**Grinding spindle with male taper for external, internal and face grinding**

This spindle type is suitable for external, internal grinding but in particular for face grinding. Bearing arrangement has been reinforced compared to that of series SSA. Mounted precision bearings have a larger contact angle. Therewith higher axial loads can be absorbed too. This spindle has to be used always if there are particular high radial and axial grinding forces.

The flange design is identical with that of the spindle series SSA.

**Scope of supply**

- Tools for putting spindle unit into operation
- Each one hexagon socket nut for fastening the belt pulley and the flange
- Operating manual

**Accessories**

- Flange
- Belt pulley (see page 47)
- Balancing mandrel for flange
- Extractor for belt pulley and flange

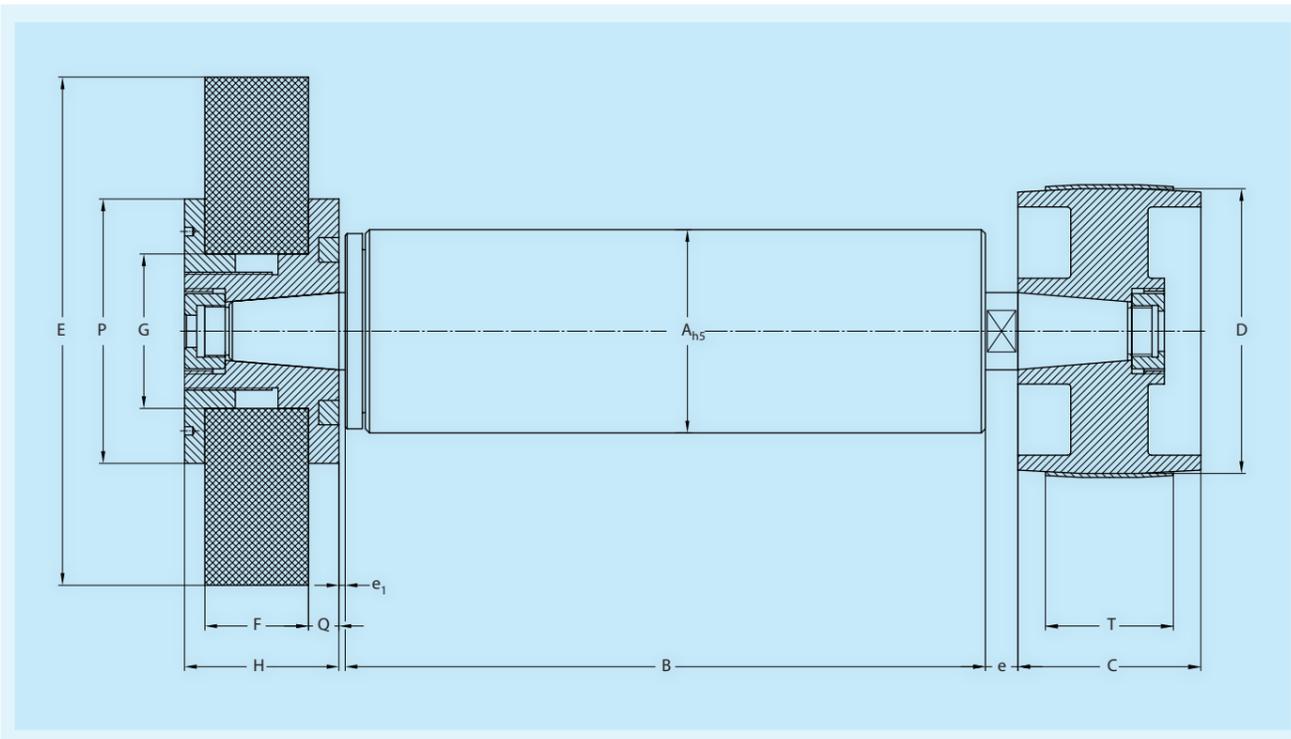
**Lubrication**

- For-life grease lubrication

**Direction of rotation**

- Please always indicate the direction of rotation when placing an order

The grinding wheel flanges are supplied with shims that also allow clamping of smaller grinding wheel widths.



Designation of grinding spindle		Dimensions in mm			n[rpm]	Dimensions in mm			Operating range in mm							
Type	Short mark	e <sub>1</sub>	e	Belt pulley			max.	Flange			Grinding wheel			Bore	Depth	
A x B	(engraved)			D	C	T		Designation	P	H	Q	E	F			G
0-SSA 40x160/2	5.4-2/2															
0-SSA 40x200/2	5.4-3/2															
0-SSA 40x250/2	5.4-4/2	1,6	6	63	40	32	15 000	SA 01-25x38	38	32	6	63	20	25	50-70	1)
0-SSA 40x315/2	5.4-5/2															
0-SSA 40x355/2	5.4-6/2															
0-SSA 50x160/2	5.5-2/2															
0-SSA 50x200/2	5.5-3/2															
0-SSA 50x250/2	5.5-4/2	2	7	80	50	40	11 000	SA 02-32x48	48	38	8	80	25	32	60-90	1)
0-SSA 50x315/2	5.5-5/2															
0-SSA 60x250/4	5.6-4/4															
0-SSA 60x315/4	5.6-5/4	2	8	100	63	50	9 000	SA 04-32x58	58	42	11	100	25	32	70-100	1)
0-SSA 60x400/4	5.6-7/4															
0-SSA 70x250/4	5.7-4/4	2,5	10	100	63	50	8 000	SA 05-51x69	69	52	12	100	32	51	80-140	1)
0-SSA 80x250/4	5.8-4/4															
0-SSA 80x315/4	5.8-5/4	2,5	13	100	80	70	7 000	SA 06-51x79	79	60	14	125	40	51	90-160	1)
0-SSA 80x400/4	5.8-7/4			160				SA 06-51x100	100			200				
0-SSA 100x315/4	5.10-5/4			125				SA 08-76x99	99			160	50	76	110-230	1)
0-SSA 100x400/4	5.10-7/4	3,2	16	100	80	5 000			75	15		250				
0-SSA 100x500/4	5.10-9/4			200				SA 08-76x130	130			315				
0-SSA 125x400/4	5.12-7/4			125	125	90	4 000	SA 10-76x124	124	85	17	200	50	76	135-300	1)
0-SSA 125x500/4	5.12-9/4	4	18	200				SA 10-76x150	150			315				

1) Max. grinding depth:  $B + e_1 + Q + \frac{2}{3} F$  - chucking length

**Precision grinding spindle for higher speed**

This spindle series permits grinding at speed which could be reached so far only by electric grinding spindles. SPV spindles provide a considerably higher grinding precision. Precision angular contact ball bearings are used as rigidity is particularly high.

To be able to fully utilize this precision of spindle units in practical grinding process screw-in mandrels are fastened by means of a threaded pin from sleeve outside diameter of 80 mm. This new fastening system guarantees utmost concentricity of the screwed-in mandrel.

Except for mass production usage of these spindles is recommended where the use of electric grinding spindles has not yet become cost-effective. To obtain a convenient belt pulley transmission ratio the drive unit should be fitted with medium frequency motors.

**Scope of supply**

- Tools for putting spindle unit into operation
- One hexagon socket nut for fastening the belt pulley
- A threaded pin for fastening the screw-in mandrel at SZV
- Operating manual

**Accessories**

- Screw-in mandrel
- Belt pulley (see page 47)
- Extractor for belt pulley

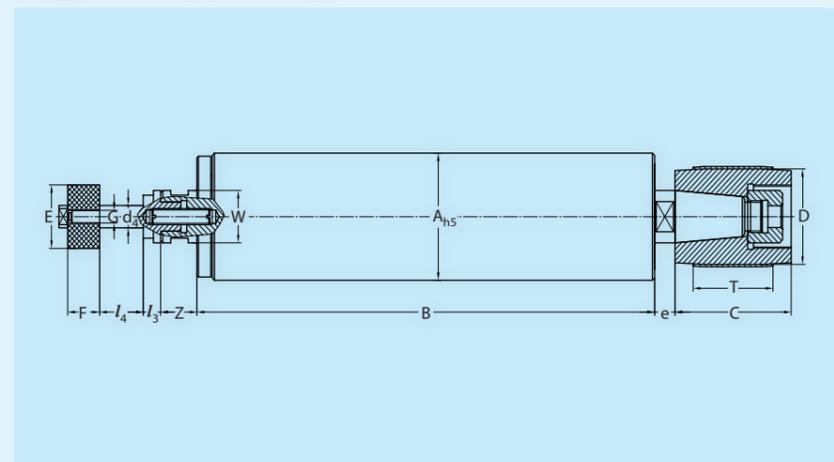
**Lubrication**

- For-life grease lubrication

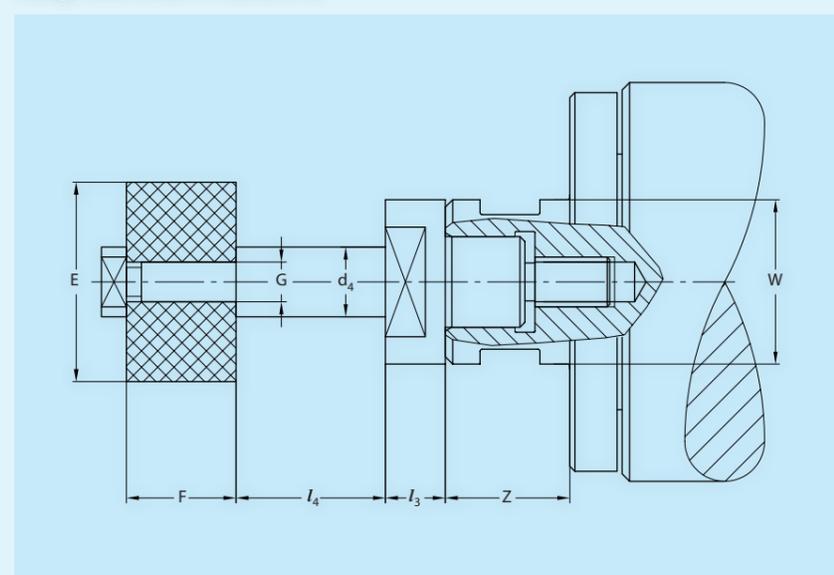
**Direction of rotation**

- Please always indicate the direction of rotation when placing an order

**Design with screw-in mandrel SZV**



**Design with screw-in mandrel SZ**



Designation of grinding spindle	Dimensions in mm	n[rpm]	Screw-in mandrel in mm			Grinding wheel in mm			Operating range in mm																								
			Designation	d <sub>4</sub>	l <sub>4</sub>	l <sub>3</sub>	E	F	G	Bore	Depth																						
SPV 50x160-13/3	9.5-2.2/3	38 000	SZK 02-6x16 SZ 02-9x10 SZ 02-9x25 SZ 02-13x16 SZ 02-13x32	6 9 13	16 10 25 16 32	8 1) 1)	13 16 20	13 16 20	4 6 6	20 24 30	25 20 34 50																						
												SPV 60x250-15/3	9.6-4.3/3	33 000	SZ 03-9x10 SZ 03-9x20 SZ 03-12x16 SZ 03-12x32 SZ 03-15x20 SZ 03-15x40	9 12 15	10 20 16 32 20 40	9 9 1) 1)	16 20 20 25	16 20 6 8	24 30 30 38	20 30 46 42 62											
																							SPV 60x250-18/3	9.6-4.4/3	27 000	SZ 04-9x10 SZ 04-9x25 SZ 04-13x20 SZ 04-13x32 SZ 04-18x25 SZ 04-18x40	9 13	10 25 20 32 25 40	10 1) 1)	20 25 32	20 25 8	30 38 48	24 36 48 55 70
SPV 80x250-28/3	9.8-4.6/3	19 000	SZV 06-18x20 SZV 06-18x40 SZV 06-22x32 SZV 06-22x50 SZV 06-28x40 SZV 06-28x63	18 22 28	20 32 50 40 63	10 1) 1)	32 40 40	32 13	10 16	48 60 72 78 100																							
											SPV 100x315-33/3	9.10-5.7/3	16 000	SZV 07-22x32 SZV 07-22x50 SZV 07-28x40 SZV 07-28x63 SZV 07-33x50 SZV 07-33x80	22 28 33	32 50 40 63 50 80	12 1) 1)	40 50 50	32 13	16 20	60 68 90 95 125												
																						SPV 100x315-38/3	9.10-5.8/3	13 500	SZV 08-22x32 SZV 08-22x50 SZV 08-28x40 SZV 08-28x63 SZV 08-38x50 SZV 08-38x80	22 28 38	32 50 40 63 50 80	14 1) 1)	40 50 63	40 16	13 16	60 75 90 100 130	
																																	SPV 125x315-48/3

Screw-in mandrels of type SZK are without nut, the grinding wheel is glued.

<sup>1)</sup> These screw-in mandrels are not stepped (d<sub>4</sub> = W)

**Precision grinding spindle with male taper for grinding deep bores and for external grinding**

These grinding spindles provide a higher precision than spindles of SSA series. Precision ball bearings are used. Please ensure that grinding wheels are particularly carefully balanced. The grinding wheel flanges are supplied with shims that also allow clamping of smaller grinding wheel widths.

**Scope of supply**

- Tools for putting spindle unit into operation
- One hexagon socket nut for fastening the belt pulley and the flange
- Operating manual

**Lubrication**

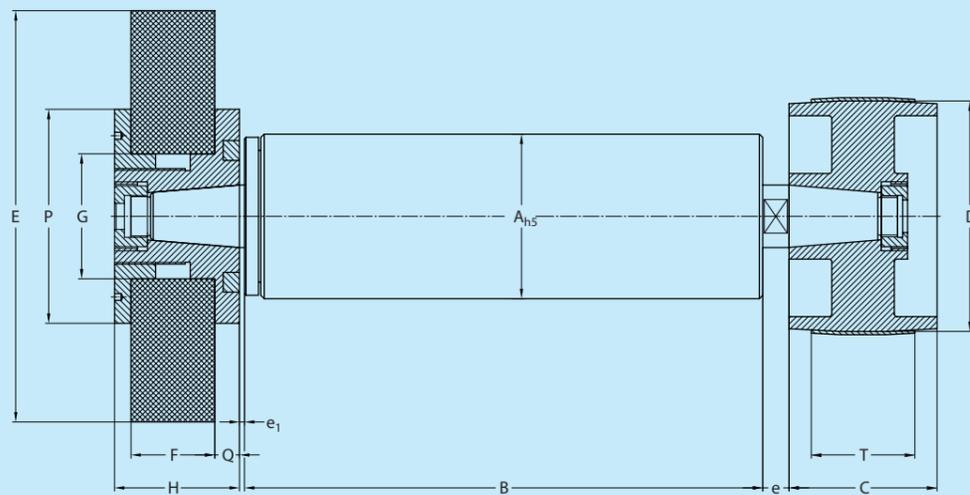
- For-life grease lubrication

**Accessories**

- Flange
- Belt pulley (see page 47)
- Balancing mandrel for flange
- Extractor for belt pulley and flange

**Direction of rotation**

- Please always indicate the direction of rotation when placing an order



Designation of grinding spindle		Dimensions in mm						n[rpm]	Dimensions in mm						Operating range in mm	
Type	Short mark	Belt pulley			Flange				Grinding wheel			Bore	Depth			
A x B	(engraved)	e <sub>1</sub>	e	D	C	T	max.	Destination	P	H	Q	E	F	G		
SPA 60																
On request																
SPA 100x315/2	11.10-5/2	3,2	16	125	100	80	12 000	SA 08-76x99	99	75	15	160	50	76	110-230	1)
SPA 100x400/2	11.10-7/2			200				SA 08-76x130	130			250				
SPA 125x400/2	11.12-7/2	4	18	125	100	10 000	SA 10-76x124	124	86	17	200	50	76	135-300	1)	
				200			SA 10-76x150	150			315					

1) Max. grinding depth: B + e<sub>1</sub> + Q + 2/3 F - chucking length

**Tooth-flank and thread grinding spindles**

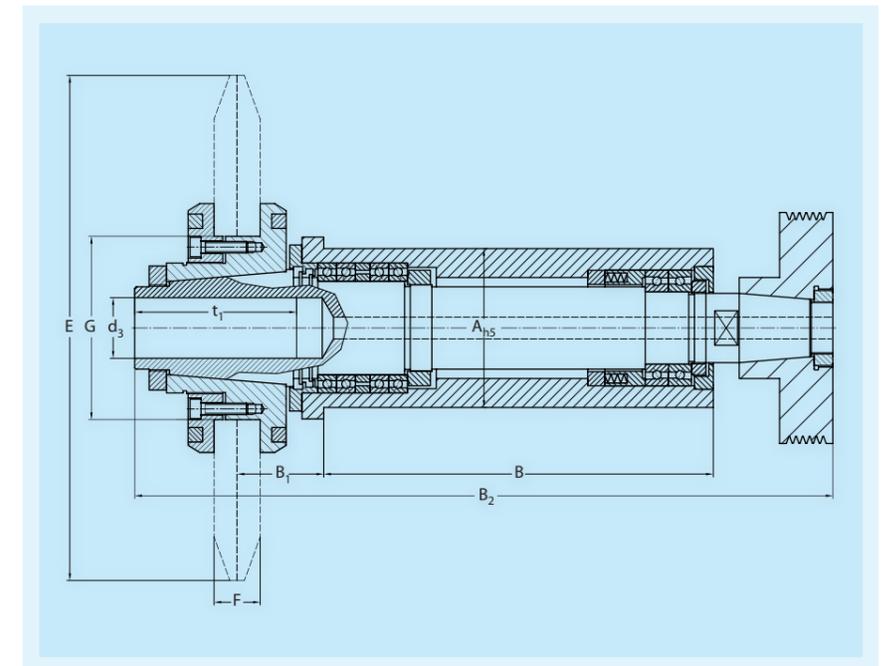
Tooth-flank and thread grinding spindles are spindles of highest precision.

**They fulfil specific requirements**

- Zero clearance
- Deviation of radial runout and face runout (drive end) 0,001 mm
- High radial and axial stiffness
- Slight temperature exaggeration and slight shaft elongation during operation

They are fitted with high-speed respectively hybrid spindle bearings. Spindle units fitted with hybrid spindle bearings are designed for high-speed machining.

The spindle units are driven by Poly-V-belt drive.



**Tooth-flank grinding spindle, equipped for insert of built-in balance apparatus**

Spindle type	n[rpm]	ΔT o. RT	Main dimensions in mm						Grinding wheel in mm		
			A	B	B <sub>1</sub>	B <sub>2</sub>	d <sub>3</sub>	t <sub>1</sub>	G	E	F
SPAZ 110-708/21 <sup>1)</sup>	3 200	6	110	270	61	486	42	120	127	350	25; 32
SPAZ 125-664/22 <sup>1)</sup>	3 200	6	125	425	85	642,5	50	130	127	350	25; 32; 35; 40; 50; 63

**Tooth-flank grinding spindle, clockwise or anti-clockwise rotation**

Spindle type	n[rpm]	ΔT o. RT	Main dimensions in mm				Grinding wheel in mm		
			A	B	B <sub>1</sub>	B <sub>2</sub>	G	E	F
SPAZ 100-605/2 <sup>2)</sup>	3 200	8 <sup>3)</sup>	100	340	32 35	492	127 90	350	32
SPAZC 100-605/2 <sup>2)</sup> (Hybrid bearings)	9 000	10	100	340	-	492	-	-	4)
SPAZ 110-611/1	3 200	8 <sup>3)</sup>	110	270	57	477	127	350	25; 32
SPAZ 125-634/1	3 200	8 <sup>3)</sup>	125	425	65	632	127	350	25; 32; 40; 50; 63

1) Spindle units for clockwise and anti-clockwise rotation

3) Temperature exaggeration measured at bei n = 2 400 / 2 200 n[rpm]

2) SPAZ 100: Spindle sleeve without fastening flange

4) Special CBN-grinding wheels and flanges

**Face grinding spindle units**

These spindles are especially designed for the face grinding appliances of internal grinding machines.

**Scope of supply**

- Tools for putting spindle unit into operation
- One hexagon socket nut for fastening the belt pulley and the flange
- Operating manual

**Accessories**

- Flange
- Belt pulley
- Balancing mandrel for flange (only for SSST 200/2)

**Lubrication**

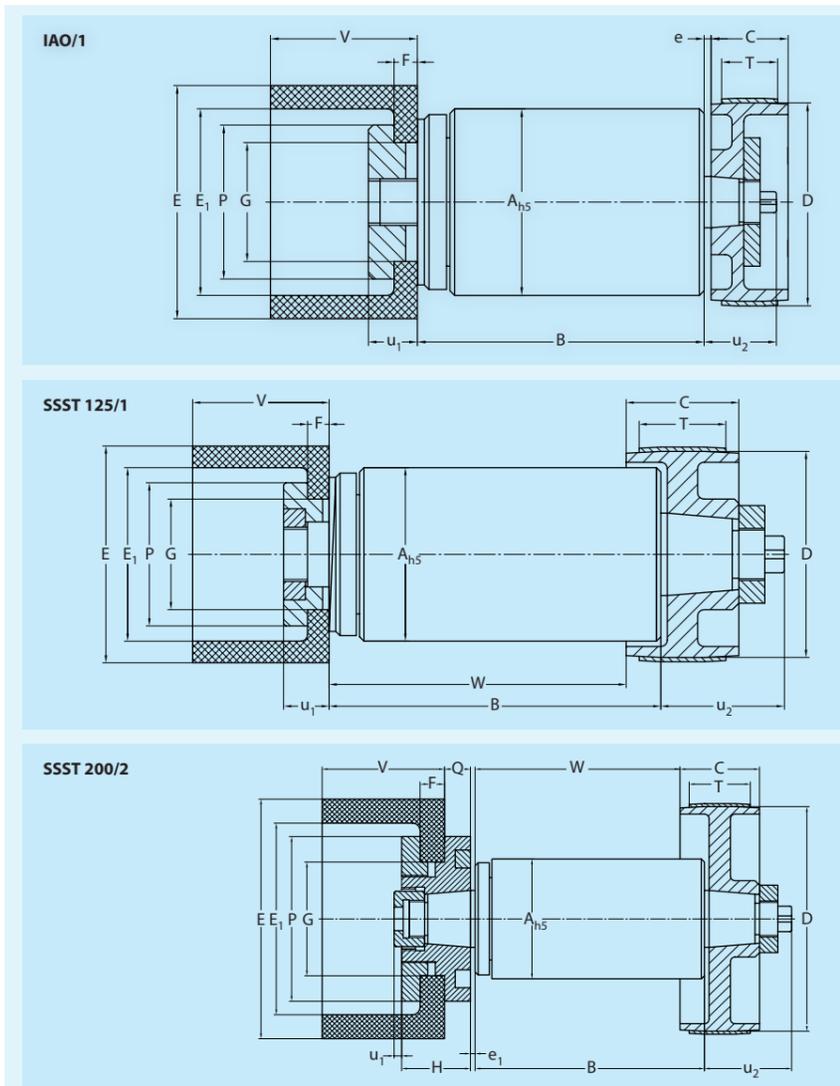
- For-life grease lubrication

**Direction of rotation**

- Please always indicate the direction of rotation when placing an order

**Order designation of belt pulleys**

IAO/1	RSo 02 – 56 x 40
SSST 125/1	RSo 05 – 90 x 50
SSST 200/2	RSo 06 – 142 x 52



Grinding spindle Type	Main dimensions in mm				Belt pulley in mm			n[rpm] max.	Flange in mm				Grinding wheel in mm							
	A	B	u <sub>2</sub>	W	u <sub>1</sub>	e	e <sub>1</sub>		D	C	T	Designation	P	H	Q	E	E <sub>1</sub>	V	G	F
IAO/1	50	70	32	-	14	2	-	56	40	32	11 000	IAO/1:15	46	-	-	63 <sup>1)</sup>	53	40	32	8
SSST 125/1	75	135	45	113	21	-	-	90	50	40	15 000	SSST 125/1:15	66	-	-	100 <sup>1)</sup>	80	63	51	10
SSST 200/2	80	150	50	130	5	-	2	142	52	40	12 500	SSST 200/2-76x110	110	45	18	160 <sup>1)</sup>	134	80	76	16

<sup>1)</sup> Cup-type grinding wheel (Type 140 and 142)

**Grinding spindles with male taper and stepped spindle sleeve for internal grinding deep bores**

These spindle are suitable for grinding particularly deep bores which cannot be ground with any other spindle type. The flange design is identical with those of the spindles of series SSA referring to sleeve diameter A<sub>1</sub>.

**Scope of supply**

- Tools for putting spindle unit into operation
- One hexagon socket nut for fastening the belt pulley and the flange
- Operating manual

**Accessories**

- Flange
- Extractor for flange
- Balancing mandrel for flange
- Belt pulley (see page 47)
- Extractor for belt pulley

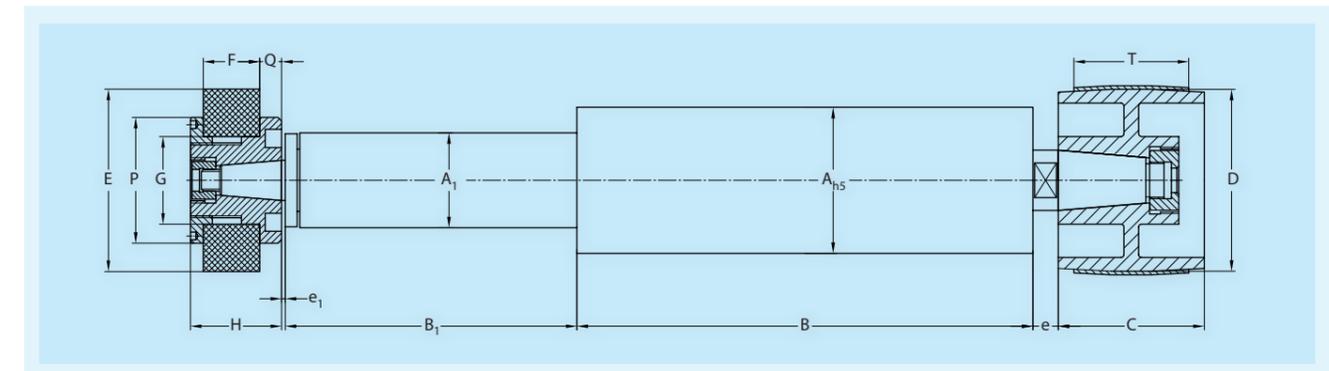
**Lubrication**

- For-life grease lubrication

**Direction of rotation**

- Please always indicate the direction of rotation when placing an order

The grinding wheel flanges are supplied with shims that also allow clamping of smaller grinding wheel widths.



Designation of grinding spindle Type	Short mark (engraved)	Dimensions in mm					n[rpm] max.	Dimensions in mm				Operating range in mm				
		e <sub>1</sub>	e	D	C	T		Flange			Grinding wheel		Bore	Depth		
SSAA 60x250-50x160/3	4.6-4-2/3	2	8	80	63	50	10 000	SA 02-32x48	48	38	8	80	25	32	60-90	1)
SSAA 60x250-50x200/3	4.6-4-3/3															
SSAA 60x250-50x250/3	4.6-4-4/3															
SSAA 60x250-50x315/3	4.6-4-5/3	2	13	100	80	60	7 000	SA 04-32x58	58	42	11	100	25	32	70-100	1)
SSAA 80x250-60x250/3	4.8-4-4/3															
SSAA 80x250-60x315/3	4.8-4-5/3															
SSAA 80x250-60x400/3	4.8-4-7/3															
SSAA 80x315-60x200/3	4.8-5-3/3															
SSAA 80x315-60x250/3	4.8-5-4/3	2	13	100	80	60	7 000	SA 04-32x58	58	42	11	100	25	32	70-100	1)
SSAA 80x315-60x315/3	4.8-5-5/3															
SSAA 80x315-60x400/3	4.8-5-7/3															

<sup>1)</sup> Max. grinding depth: B + B<sub>1</sub> + e<sub>1</sub> + Q + <sup>2</sup>/<sub>3</sub> F - chucking length

**Grinding spindles with bearings and motor drive**

The motor grinding spindle is suitable for external, internal and flat grinding. All spindle units are suitable for clockwise rotation and anti-clockwise rotation. The direction of rotation can be altered by reversing the poles of the electrical connection. During operation with a frequency converter the speed of motor can be adjusted.

**Scope of supply**

- Set of tools
- One hexagon socket nut for fastening the flange
- Operating manual

**Accessories**

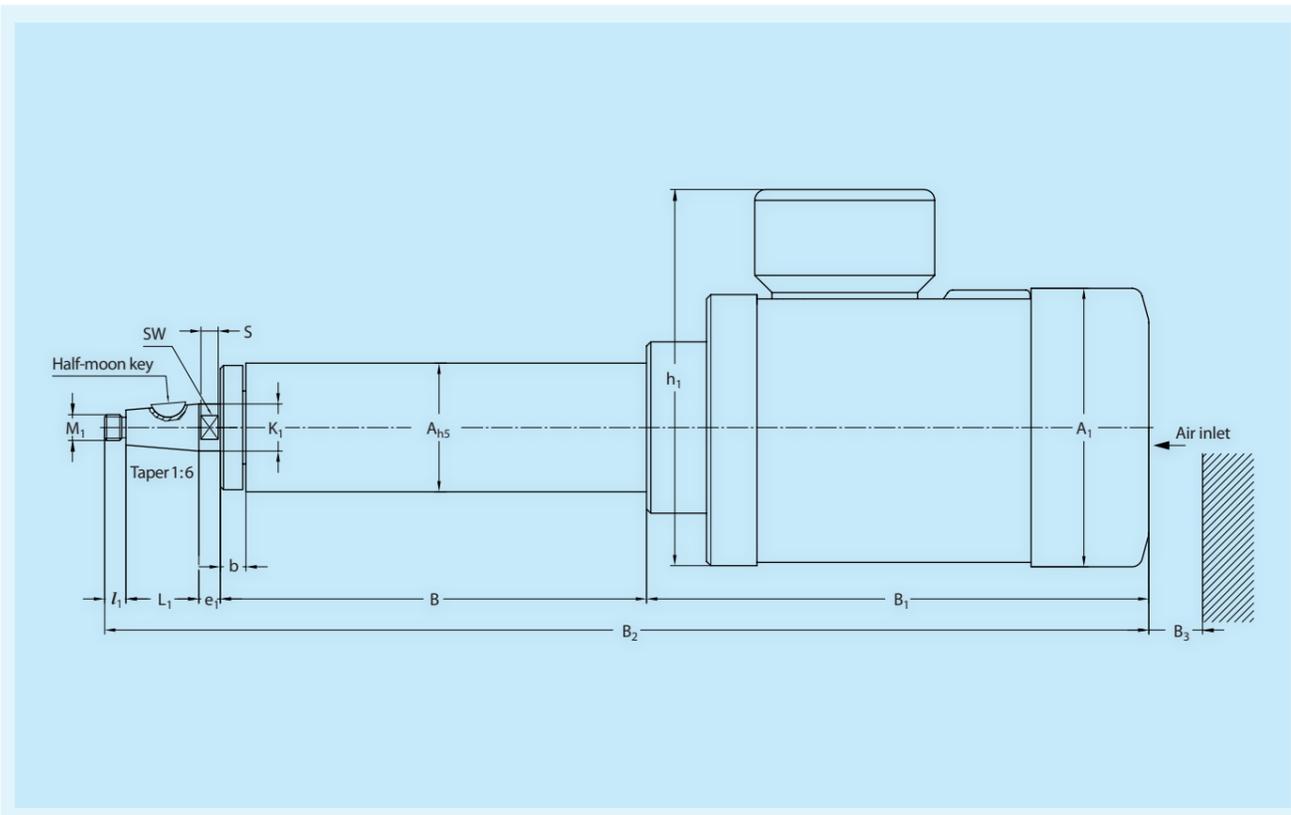
- Flange (see page 46)
- Balancing mandrel for flange
- Extractor for flange

**Lubrication**

- For-life grease lubrication

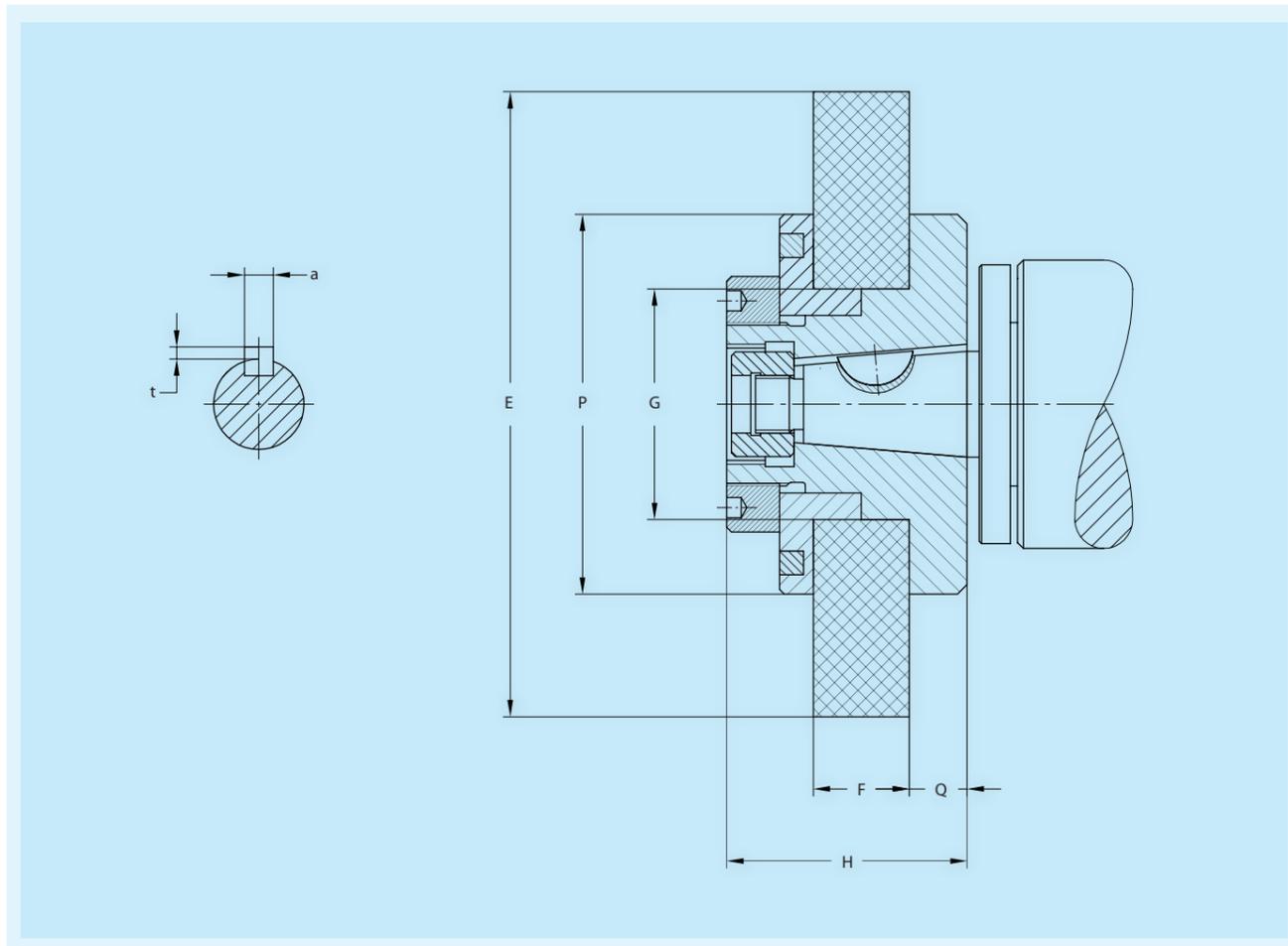
**Technical data**

Nominal voltage U = 230/400 V  
 Frequency f = 50 Hz  
 Degree of protection IP 54



Designation of grinding spindle Type	Dimensions in mm													Half-moon key	Motor type	n <sub>max</sub> rpm	Power kW	Current A	Weight kg			
	A x B	K <sub>1</sub>	L <sub>1</sub>	e <sub>1</sub>	b	M <sub>1</sub>	I <sub>1</sub>	SW	S	h <sub>1</sub>	A <sub>1</sub>	B <sub>1</sub>	B <sub>2</sub>							B <sub>3</sub>		
MNFA 60x200/21													490					2 800				16
MNFA 60x315/21	22	34	10	11	M 12x1	10	19	8	180	139	240		605	≥ 16	4x6,5	71G2		1,1	2,6		18	
MNFA 60x400/21													690					6 000 <sup>1)</sup>				20
MNFA 80x270/27													635					2 830				33
MNFA 80x315/27	28	42	12	12	M 15x1	11	24	10	200	157	300		680	≥ 16	5x6,5	80G2		2,2	4,7		35	
MNFA 80x400/27													765							6 000 <sup>1)</sup>		38
MNFA 80x500/27													865									41
MNFA 80x270/28													635					1 410				33
MNFA 80x315/28	28	42	12	12	M 15x1	11	24	10	200	157	300		680	≥ 16	5x6,5	80G4		1,5	3,8		35	
MNFA 80x400/28													765							3 000 <sup>1)</sup>		38
MNFA 80x500/28													865									41
MNFA 100x315/21													725					2 850				50
MNFA 100x400/21	43	63	16	15	M 25x1	13	36	14	216	177	320		810	≥ 18	6x9	90L2		3	6,3		54	
MNFA 100x500/21													910							6 000 <sup>1)</sup>		60
MNFA 100x600/21													1 010									66
MNFA 100x315/22													725					1 410				50
MNFA 100x400/22	43	63	16	15	M 25x1	13	36	14	216	177	320		810	≥ 18	6x9	90L4		2,2	6,3		54	
MNFA 100x500/22													910							3 000 <sup>1)</sup>		60
MNFA 100x600/22													1 010									66
MNFA 125x400/21	58	63	18	16	M 36x1,5	20	50	16	290	216	430		931	≥ 35	6x9	112M4		5,5	12		100	
MNFA 125x500/21													1 031							3 000 <sup>1)</sup>		109
MNFA 125x400/22	58	63	18	16	M 36x1,5	20	50	16	290	216	430		931	≥ 35	6x9	112M2		7,5	15		100	
MNFA 125x500/22													1 031							6 000 <sup>1)</sup>		109
MNFA 140x400/21	58	63	18	16	M 36x1,5	20	50	16	290	216	430		931	≥ 35	6x9	112M4		5,5	12		110	
MNFA 140x500/21													1 031							3 000 <sup>1)</sup>		124
MNFA 140x400/22	58	63	18	16	M 36x1,5	20	50	16	290	216	430		931	≥ 35	6x9	112M2		7,5	15		110	
MNFA 140x500/22													1 031							6 000 <sup>1)</sup>		124

<sup>1)</sup> Max. admissible speed for operating with frequency converter up to 100 Hz.



Spindle type	Designation	Flange in mm			Grinding wheel in mm			Operating range in mm		n[rpm]		
		P	H	Q	a	t	E	F	G		Bore	Depth
MNFA 60	SARL 05-51x75	75	55	7	4 <sup>H9</sup>	2,3	125	25	51	70 - 180	1)	2 800
							160					
MNFA 80	SARL 06-51x85	85	62	8	5 <sup>H9</sup>	2,3	160	32	51	100 - 250	1)	2 830
							200					1 410
MNFA 100	SARL 09-76x122	122	82	12	6 <sup>H9</sup>	2,8	200	50	76	160 - 300	1)	2 850
							250					1 410
MNFA 125	SARL 12-127x164	164	88	12	6 <sup>H9</sup>	2,8	250	50	127	200 - 400	1)	2 850
MNFA 140							300					1 440

<sup>1)</sup> Max. grinding depth: B + e<sub>1</sub> + Q + 2/3 F - chucking length

Besides the standard belt pulleys other dimensions are also available. The belt pulley diameters are graded according to the standardized series R 10 respectively R 20 so that there is a well assorted variety of belt pulleys available for solving each drive problem. Because of higher speed and in general lower drive of precision spindles narrower belt pulleys are designed.

**Design**

Belt pulleys are produced in quality execution and are balanced. They can be used alternatively for standard or for precision grinding spindles.

**Order example**

Belt pulley for a grinding spindle of series SSA with sleeve diameter of 60 mm, a diameter of 80 mm and a width of 63 mm:

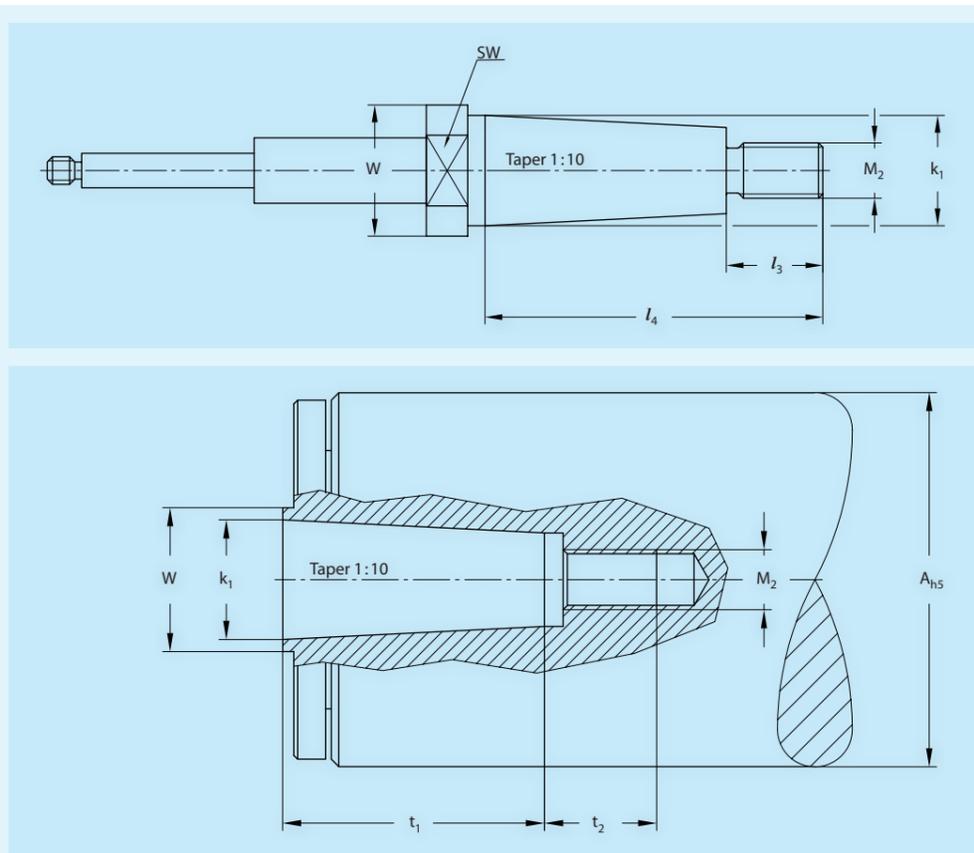
R 04-80 x 63

Code letter:		R	00	-	∅	x	b		
Belt pulley for one direction	R						b	Width of belt pulley	
Belt pulley for clockwise and anti-clockwise rotation	RRL				∅			Diameter of belt pulley	
			00					Taper code number	

Designation	Range of grinding spindles																	Widths in mm	Spindle types						
	Belt pulleys (diameter in mm)																								
	20	25	28	32	40	45	50	(56)	63	(71)	80	(90)	100	(110)	125	(140)	160	180	200	210	230	280			
R 00-...																								32	SF... 32x...
R 01-...																								40	SS... 40x...
R 02-...																								40;	SF... 40x...
																								50	SS... 50x...
R 03-...																								40;	SPV... 50x160-13
																								50	SF... 50x...
R 04-...																								50;	SS... 60x250-15
																								63	SPV... 60x250-18
R 05-...																								63	SF... 60x...
																									SPV... 80x250-23
R 06-...																								71;	SF... 70x...
																								80	SS... 80x...
R 07-...																									SPV... 80x250-28
																								80	SF... 80x...
R 08-...																									SPV... 100x315-33
																								90;	SS... 100x...
R 09-...																								100	SPV... 100x315-38
																								90	SF... 100x...
R 10-...																								100;	SS... 125x...
																								125	SPV... 125x315-48
R 11-...																								100	SFAV 120x...
R 13-...																								100	SFAV 140x...
R 14-...																								120	SFAV 160x...
R 20-...																								130	SFAV 200x...

Connection dimensions

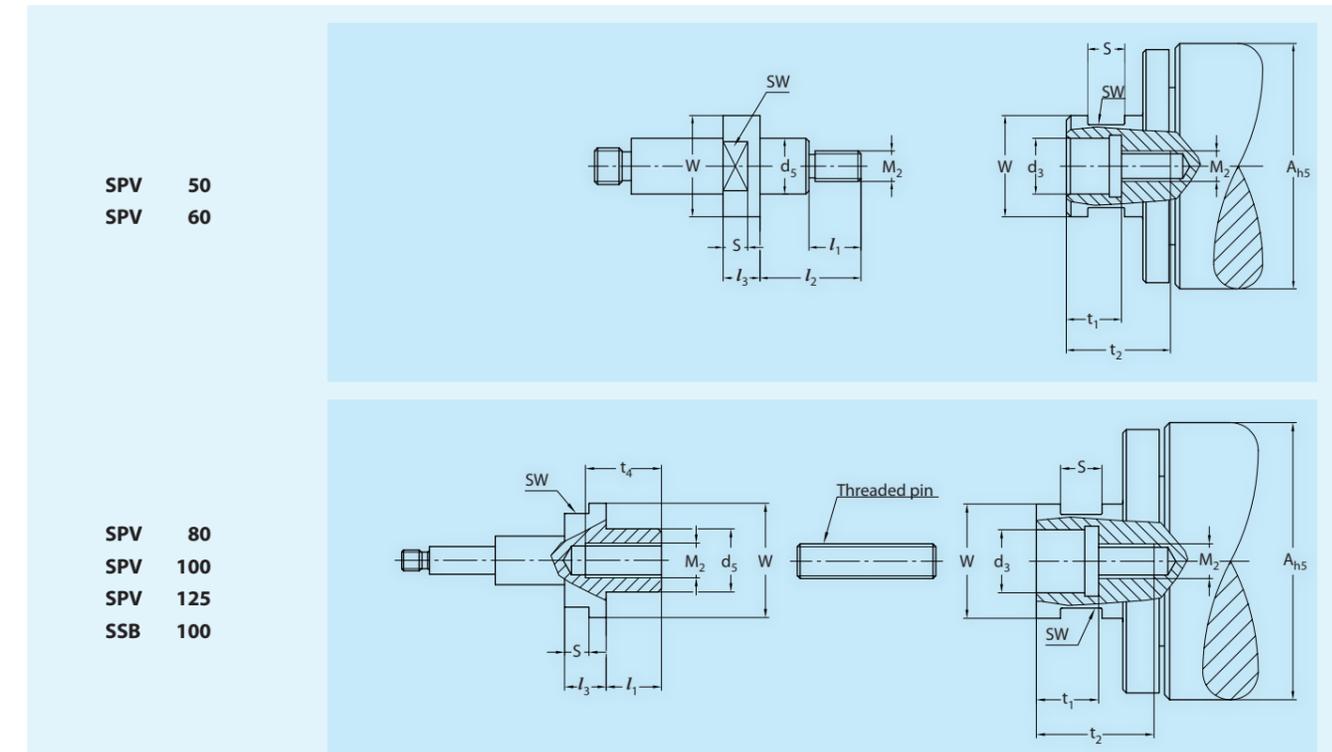


Connecting dimensions for belt-driven grinding spindles with female taper and screw-in mandrel

Grinding spindle in mm		Grinding side with screw-in mandrel in mm							
Type	A	W	k <sub>1</sub>	M <sub>2</sub> <sup>1)</sup>	l <sub>3</sub>	l <sub>4</sub>	t <sub>1</sub>	t <sub>2</sub>	SW
SSI 40	40	11	8	M 5	12	32	20	15	9
SSI 50	50	13	10	M 6	14	39	25	17	11
SSI 60	60	18	14	M 8	18	53	35	21	14
SSI 80	80	28	22	M 12	27	82	55	29	24
SSI 100	100	38,5	32	M 16	28	98	70	30	32

<sup>1)</sup> Clockwise rotation → right-hand thread; anti-clockwise rotation → left-hand thread

Connection dimensions



SPV 50  
SPV 60

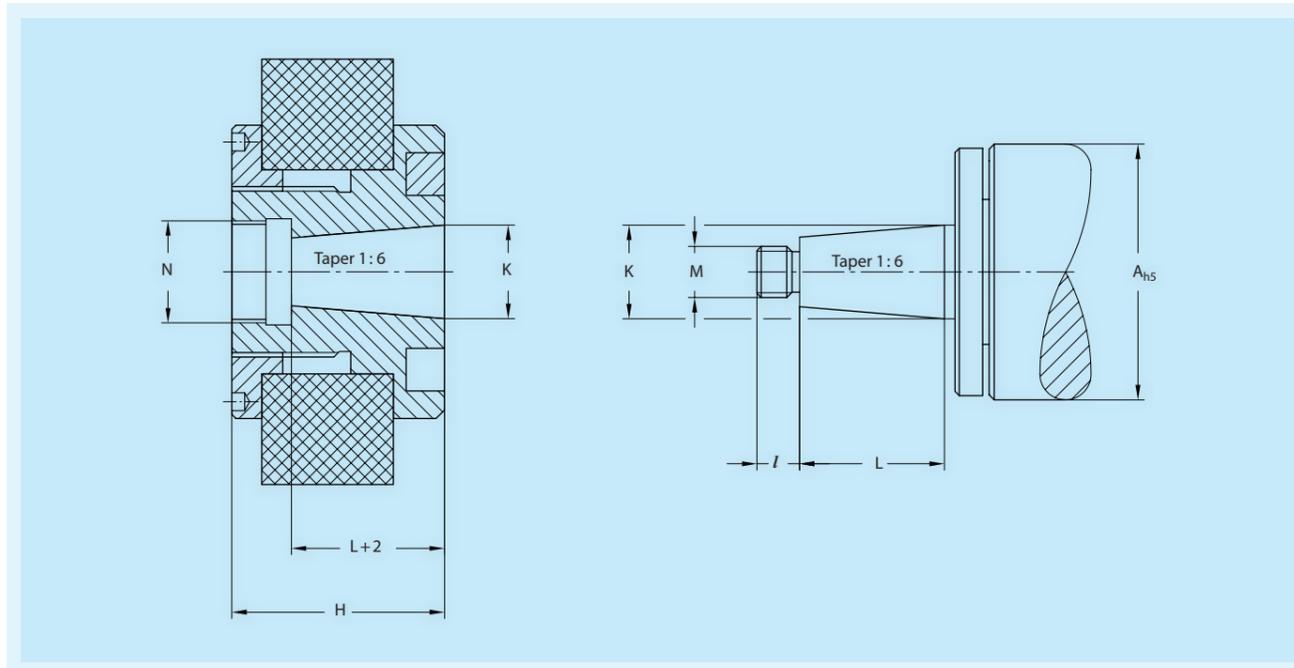
SPV 80  
SPV 100  
SPV 125  
SSB 100

Connecting dimensions for belt-driven grinding spindles with inner cylinder

Grinding spindle in mm	Grinding side with screw-in mandrel in mm												Threaded pin	
	Type	A	W	d <sub>3</sub>	M <sub>2</sub> <sup>1)</sup>	d <sub>5</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	t <sub>1</sub>	t <sub>2</sub>	t <sub>4</sub>		S
SPV 50x160-13/3	50	13,5	7,2 <sup>+0,004</sup> <sub>0</sub>	M 6	7,2 <sup>-0,002</sup> <sub>-0,004</sub>	11,5	21	8	10,5	22	-	6	11	-
SPV 60x250-15/3	60	15,5	8,2 <sup>+0,004</sup> <sub>0</sub>	M 8	8,2 <sup>-0,002</sup> <sub>-0,005</sub>	13	23	9	12	24	-	6	13	-
SPV 60x250-18/3	60	18	10,2 <sup>+0,004</sup> <sub>0</sub>	M 10x1	10,2 <sup>-0,002</sup> <sub>-0,005</sub>	15	28	10	15	29	-	6	14	-
SPV 80x250-23/3	80	23	13,2 <sup>+0,004</sup> <sub>0</sub>	M 6	13,2 <sup>-0,002</sup> <sub>-0,005</sub>	11	-	9	13	26	15	8	19	M 6x30
SPV 80x250-28/3	80	28	16,2 <sup>+0,006</sup> <sub>0</sub>	M 8	16,2 <sup>-0,002</sup> <sub>-0,005</sub>	14	-	10	16	30	19	10	24	M 8x35
SPV 100x315-33/3	100	33	18,2 <sup>+0,006</sup> <sub>0</sub>	M 10	18,2 <sup>-0,002</sup> <sub>-0,005</sub>	16	-	12	18	34	22	12	27	M 10x40
SPV 100x315-38/3	100	38	22,0 <sup>+0,006</sup> <sub>0</sub>	M 12	22,0 <sup>-0,002</sup> <sub>-0,005</sub>	18	-	14	22	40	28	14	32	M 12x50
SSB 100	100	38	22,0 <sup>+0,013</sup> <sub>0</sub>	M 12	22,0 <sup>0</sup> <sub>-0,009</sub>	18	-	14	22	40	28	14	32	M 12x50
SPV 125x315-48/3	125	48	26,0 <sup>+0,013</sup> <sub>0</sub>	M 12	26,0 <sup>-0,002</sup> <sub>-0,005</sub>	22	-	16	26	45	28	16	41	M 12x50

<sup>1)</sup> Clockwise rotation → right-hand thread; anti-clockwise rotation → left-hand thread

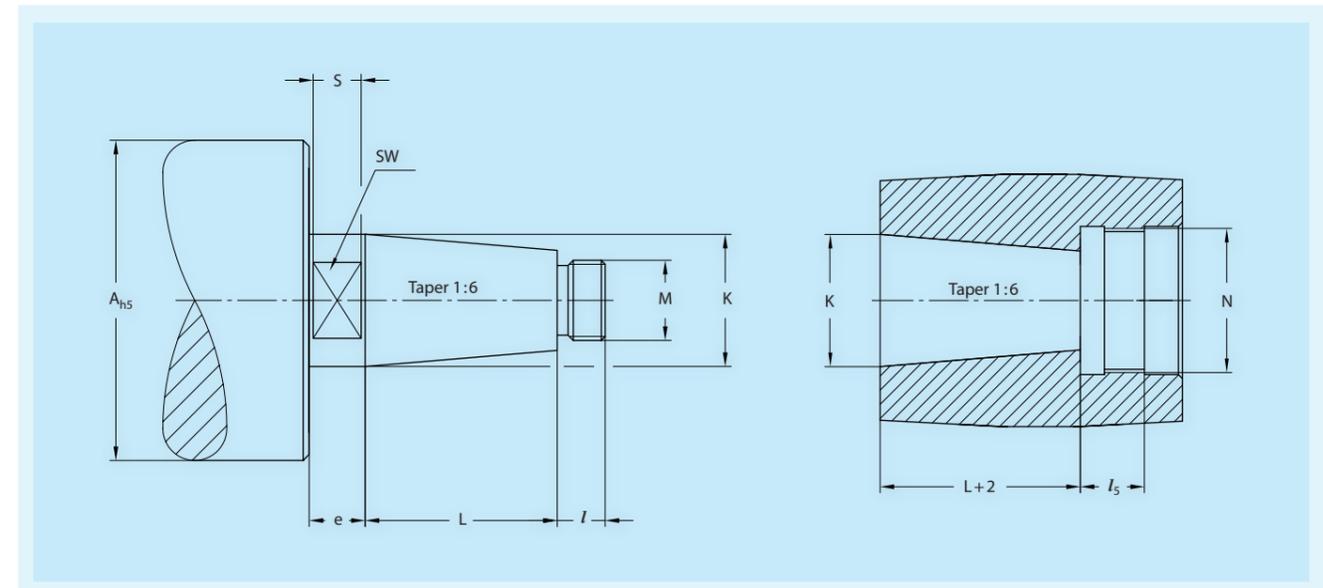
Connection dimensions



Connecting dimensions for belt-driven grinding spindles with male taper and flange							
Grinding spindle in mm		Grinding side with flange in mm					
Type	A	K	M <sup>1)</sup>	N	L	<i>l</i>	H
SSA	32	9	M 6	M 12x1	14	6	25
SSA, O-SSA	40	11	M 6	M 16x1,5	17	6	32
SSA, O-SSA, SSAA 60	50	13	M 8x1	M 18x1,5	20	7	38
SSA, O-SSA, SPA, SSAA 80	60	18	M 10x1 <sup>2)</sup>	M 20x1,5	28	8	42
SSA, O-SSA, SPA	80	28	M 15x1 <sup>2)</sup>	M 32x1,5	42	10	60
SSA, O-SSA, SPA, SPAZ 100-605/2	100	38	M 25x1 <sup>2)</sup>	M 40x1,5	54	12	75
SSA, O-SSA, SPA, SPAZ 125-634/1	125	48	M 30x1 <sup>2)</sup>	M 50x1,5	63	12	85

<sup>1)</sup> Clockwise rotation → right-hand thread; anti-clockwise rotation → left-hand thread    <sup>2)</sup> Clockwise and anti-clockwise rotation (only for SSA and O-SSA → right-hand thread)

Connection dimensions



Connecting dimensions of all types										
Grinding spindle in mm	Drive side with belt pulley in mm									
Type	A	S	SW	e	K	M <sup>1)</sup>	N	L	<i>l</i>	<i>l</i> <sub>5</sub>
SSA	32	4	8	5	9	M 6	M 12x1	14	6	9
SSI, SSA, O-SSA	40	5	9	7	11	M 6	M 16x1,5	17	6	11
SSI, SSA, O-SSA, SPV 50x160-13/3	50	6	11	7	13	M 8x1	M 18x1,5	20	7	11
SPV 60x250-15/3	60	6	13	7	15,5	M 10x1 <sup>2)</sup>	M 20x1,5	24	8	12
SSV, SSI, SSA, O-SSA, SSAA, SPA, SPV 60x250-18/3	60	7	14	8	18	M 10x1 <sup>2)</sup>	M 20x1,5	28	9	13
SPAV 80x250-23/3	80	8	19	10	22	M 12x1	M 24x1,5	34	10	16
SSV, SSI, SSA, O-SSA, SSAA, SPA, SPV 80x250-28/3	80	10	24	13	28	M 15x1 <sup>2)</sup>	M 32x1,5	42	10	16
SPV 100x315-33/3	100	12	27	14	33	M 20x1 <sup>2)</sup>	M 36x1,5	48	14	16
SSV, SSB, SSA, O-SSA, SPA, SPV 100x315-38/3, SPAZ 100	100	14	32	16	38	M 25x1 <sup>2)</sup>	M 40x1,5	54	14	16
SSA, O-SSA, SPA, SPV 125x315-48/3	125	16	41	18	48	M 30x1 <sup>2)</sup>	M 50x1,5	63	14	18

<sup>1)</sup> Clockwise rotation → right-hand thread; anti-clockwise rotation → left-hand thread    <sup>2)</sup> Clockwise and anti-clockwise rotation (only for SSA and O-SSA → right-hand thread)

For putting a spindle into operation and for fastening grinding wheels on flange or screw-in mandrel the requirements of the DIN standard must be observed. The safety instructions indicated should be considered as minimum requirements.

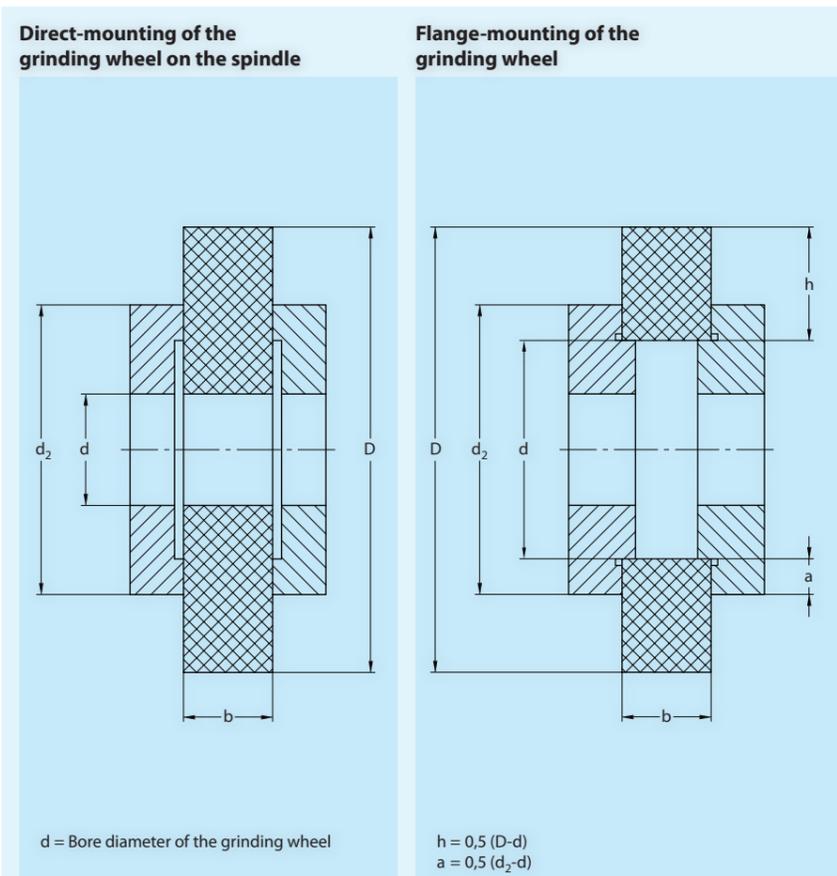
Potential dangers may be caused by screw-in mandrel or grinding wheel. Worn-out parts especially for screw-in mandrels have to be replaced in time. Out-of-round mandrels have to be replaced in time as well. If you produce mandrels by yourself make sure that the replacement mandrels are of the same quality as the original ones. Overlong mandrels possibly require a speed reduction. In such cases we recommend consulting the manufacturer.

The security performance of the mounted spindle has to be proved in connection with the grinding machine.

Spindle and flanges have durable arrows showing direction of rotation.

For spindles with clockwise rotation and anti-clockwise rotation only flanges and belt pulleys for clockwise rotation and anti-clockwise rotation (RL) may be used especially if both directions of rotation are used.

When choosing the spindle speed please take care that admissible circumferential speed of the grinding wheels is not exceeded also in idle operation.



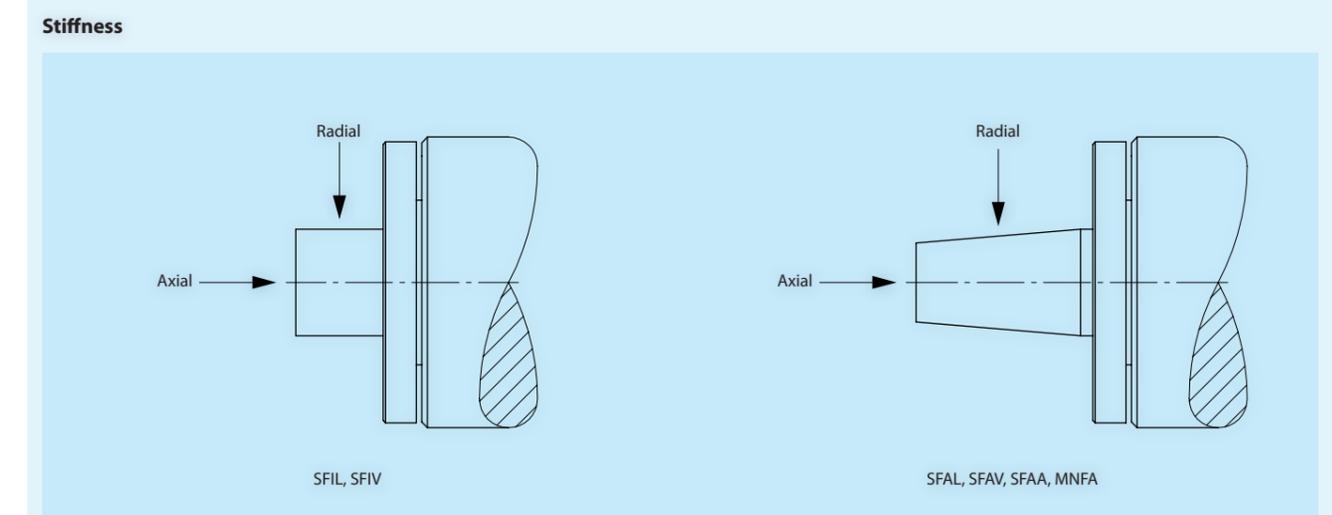
**Clamping flanges used for different machines (excerpt)**

Grinding machine		Grinding wheel in mm				Clamping flange in mm	
Type	Protection cover	Shape	Bond type	Outer diameter	Width	Diameter	Overlap
				D	b	d <sub>2</sub>	a
						$\frac{d}{D} \leq 0,2$	$\frac{d}{D} > 0,2$
Stationary grinding machines	without	straight				$\geq \frac{2}{3}D$	
		chamfered on both sides	all	≤ 250		$\geq \frac{1}{2}D$	
	with	all	all	all	all	$\geq \frac{1}{3}D$	$\geq \frac{1}{6}h$

**Stiffness of grinding spindle units**

Indicated stiffness ratings are guiding values for selection of the most suitable spindle type for a specific application. The radial ratings of stiffness are mean values and

therefore they are valid for all lengths of spindles. In certain bounds the stiffness can be adjusted optimally to particular application by selective measures.



Type	Stiffness in N/μm		Type	Stiffness in N/μm		Type	Stiffness in N/μm	
	axial	radial		axial	radial		axial	radial
SFIL 40	30	25	SFAV 40	131	16	SFAA 60	138	22
SFIL 50	36	30	SFAV 50	138	22	SFAA 80	166	43
SFIL 60	41	50	SFAV 60	166	43	SFAA 100	193	70
SFIL 70	52	60	SFAV 70	175	60	SFAA 120	234	90
SFIL 80	59	70	SFAV 80	193	70	MNFA 60	131	16
SFIV 60	166	75	SFAV 100	234	90	MNFA 80	175	60
SFIV 70	175	100	SFAV 120	250	120	MNFA 100	234	90
SFIV 80	193	125	SFAV 140	250	140	MNFA 125	250	140
SFIV 100	234	150	SFAV 160	290	170	MNFA 140	250	140
SFAL 32	22	10	SFAV 200	380	220			
SFAL 40	30	16						
SFAL 50	36	20						
SFAL 60	41	36						
SFAL 70	52	46						
SFAL 80	59	50						

Spindle weight without accessories

Spindle type	Weight in kg	Spindle type	Weight in kg	Spindle type	Weight in kg	Spindle type	Weight in kg
SFIL 40x160	1,4	SFAL 80x250	8,8	SFAA 80x250-60x315	16,6	SSA 100x500	28,6
SFIL 40x200	1,7	SFAL 80x315	11,2	SFAA 80x250-60x400	17,3	SSA 100x630	38,8
SFIL 40x250	2,1	SFAL 100x315	20,0	SFAA 100x315-80x315	28,6	SSA 100x800	46,0
SFIL 50x160	2,2	SFAL 100x400	24,0	SFAA 100x315-80x400	31,6	SSA 125x400	36,8
SFIL 50x200	2,7	SFAL 100x500	29,5	SFAA 100x315-80x500	35,3	SSA 125x500	45,7
SFIL 50x250	3,4	SFAV 40x160	1,5	SFAA 125x500-100x300	56,3	SSA 125x630	57,6
SFIL 60x160	3,0	SFAV 40x200	1,8	SSI 40x160	1,5	SSA 125x800	73,5
SFIL 60x200	3,8	SFAV 40x250	2,2	SSI 40x200	1,9	O-SSA 40x160	1,4
SFIL 60x250	4,8	SFAV 40x315	2,8	SSI 40x250	2,1	O-SSA 40x200	1,7
SFIL 60x315	6,0	SFAV 50x160	2,2	SSI 50x160	2,1	O-SSA 40x250	2,1
SFIL 70x200	5,2	SFAV 50x200	2,7	SSI 50x200	2,6	O-SSA 40x315	2,7
SFIL 70x250	6,5	SFAV 50x250	3,4	SSI 50x250	3,0	O-SSA 40x355	3,0
SFIL 70x315	8,2	SFAV 50x315	4,3	SSI 50x315	3,3	O-SSA 50x160	2,2
SFIL 80x200	6,8	SFAV 60x200	3,8	SSI 60x200	3,5	O-SSA 50x200	2,7
SFIL 80x250	8,8	SFAV 60x250	4,8	SSI 60x250	4,4	O-SSA 50x250	3,4
SFIL 80x315	11,2	SFAV 60x315	6,0	SSI 60x315	5,5	O-SSA 50x315	4,3
SFIV 40x160	1,4	SFAV 60x400	7,6	SSI 80x250	8,7	O-SSA 60x250	4,8
SFIV 40x200	1,7	SFAV 60x500	9,5	SSI 80x315	11,0	O-SSA 60x315	6,0
SFIV 40x250	2,1	SFAV 70x200	5,5	SSI 80x400	12,2	O-SSA 60x400	7,6
SFIV 50x160	2,2	SFAV 70x250	6,8	SSI 100x200	10,0	O-SSA 70x250	7,4
SFIV 50x200	2,7	SFAV 70x315	8,5	SSI 100x315	17,5	O-SSA 80x250	8,8
SFIV 50x250	3,4	SFAV 70x400	10,8	SSI 100x400	21,5	O-SSA 80x315	11,2
SFIV 50x315	4,3	SFAV 70x500	13,5	SSI 100x500	27,4	O-SSA 80x400	14,3
SFIV 60x200	3,8	SFAV 80x250	8,8	SSB 100x315	18,5	O-SSA 100x315	18,9
SFIV 60x250	4,8	SFAV 80x315	11,2	SSB 100x400	22,5	O-SSA 100x400	22,9
SFIV 60x315	6,0	SFAV 80x400	14,3	SSB 100x500	28,4	O-SSA 100x500	28,6
SFIV 60x400	7,6	SFAV 80x500	17,8	SSA 32x125	0,6	O-SSA 125x400	36,8
SFIV 70x250	6,5	SFAV 80x630	22,7	SSA 32x160	0,8	O-SSA 125x500	45,7
SFIV 70x315	8,2	SFAV 100x315	18,9	SSA 32x200	1,0	SPV 50x160-13	2,2
SFIV 80x250	8,8	SFAV 100x400	22,9	SSA 40x160	1,4	SPV 60x250-15	4,5
SFIV 80x315	11,2	SFAV 100x500	28,6	SSA 40x200	1,7	SPV 60x250-18	4,7
SFIV 80x400	14,0	SFAV 100x630	38,8	SSA 40x250	2,1	SPV 80x250-23	8,5
SFIV 100x315	18,9	SFAV 100x800	46,0	SSA 40x315	2,7	SPV 80x250-28	9,0
SFIV 100x400	22,9	SFAV 120x400	31,7	SSA 50x160	2,2	SPV 100x315-33	18,0
SFIV 100x500	28,6	SFAV 120x500	39,6	SSA 50x200	2,7	SPV 100x315-38	19,5
SFAL 32x125	0,6	SFAV 120x630	49,9	SSA 50x250	3,4	SPV 125x315-48	29,5
SFAL 32x160	0,8	SFAV 120x800	63,3	SSA 50x315	4,3	SPAZ 100-605	18,6
SFAL 32x200	1,0	SFAV 140x400	39,9	SSA 60x200	3,8	IAO/1	1,1
SFAL 40x160	1,4	SFAV 140x500	53,9	SSA 60x250	4,8	SSST 125/1	4,1
SFAL 40x200	1,7	SFAV 140x630	67,9	SSA 60x315	6,0	SSST 200/2	5,3
SFAL 40x250	2,1	SFAV 160x400	56,3	SSA 60x400	7,6	SSAA 60x250-50x160	7,4
SFAL 50x160	2,2	SFAV 160x500	70,4	SSA 60x500	9,5	SSAA 60x250-50x200	7,9
SFAL 50x200	2,7	SFAV 160x630	88,7	SSA 60x600	11,5	SSAA 60x250-50x250	8,6
SFAL 50x250	3,4	SFAV 200x500	110,0	SSA 80x250	8,8	SSAA 60x250-50x315	9,5
SFAL 60x200	3,8	SFAV 200x630	138,5	SSA 80x315	11,2	SSAA 80x250-60x250	14,2
SFAL 60x250	4,8	SFAA 60x250-50x160	7,4	SSA 80x400	14,3	SSAA 80x250-60x315	16,6
SFAL 60x315	6,0	SFAA 60x250-50x200	7,9	SSA 80x500	17,8	SSAA 80x250-60x400	17,3
SFAL 70x200	5,2	SFAA 60x250-50x250	8,6	SSA 80x630	22,7	SSAA 80x315-60x200	15,5
SFAL 70x250	6,5	SFAA 60x250-50x315	9,5	SSA 100x315	18,9	SSAA 80x315-60x250	16,5
SFAL 70x315	8,2	SFAA 80x250-60x200	12,9	SSA 100x400	22,9	SSAA 80x315-60x315	17,8
SFAL 80x200	7,0	SFAA 80x250-60x250	14,6	SSA 100x450	25,8	SSAA 80x315-60x400	19,5

Grinding spindle speed	Outer diameter of grinding wheel in mm																					
	3	4	5	6	8	10	13	16	20	25	32	40	50	63	80	100	125	160	200	250	315	
n [rpm]	Circumferential speed v in m/s																					
120 000	18,9	25,1	31,4	37,7	50,3	62,8																
96 000	15,1	20,1	25,1	30,2	40,2	50,3	65,4															
72 000	11,3	15,1	18,9	22,6	30,2	37,7	49,0	60,3														
60 000		12,6	15,7	18,9	25,1	31,4	40,8	50,3	62,8													
48 000			12,6	15,1	20,1	25,1	32,7	40,2	50,3	62,8	80,4											
43 000				13,5	18,0	22,5	29,3	36,1	45,1	56,3	72,1											
40 000					16,8	21,0	27,2	33,5	41,9	52,4	67,0	83,8										
36 000					15,1	18,9	24,5	30,3	37,7	47,1	60,3	75,4										
33 000					13,8	17,3	22,5	27,7	34,6	43,2	55,3	69,2										
32 000					13,4	16,8	21,8	26,8	33,5	41,9	53,6	67,0	83,8									
30 000						15,7	20,4	25,1	31,4	39,3	50,3	62,8	78,6									
29 000						15,2	19,7	24,3	30,4	38,0	48,6	60,7	75,9									
27 000						14,1	18,4	22,6	28,3	35,4	45,3	56,5	70,7									
25 000						13,1	17,0	20,9	26,2	32,7	41,9	52,4	65,5									
24 000							16,3	20,1	25,1	31,4	40,2	50,2	62,8	79,1								
22 500							15,3	18,8	23,6	29,5	37,7	47,1	58,9	74,2								
21 000							14,3	17,6	22,0	27,5	35,2	44,0	55,0	69,2								
20 000								16,8	20,9	26,2	33,5	41,9	52,4	66,0	83,8							
19 000								15,9	19,9	24,9	31,9	39,8	49,8	62,7	79,6							
18 000								15,1	18,9	23,6	30,2	37,7	47,1	59,4	75,5							
16 000									16,8	21,0	26,8	33,5	41,9	52,8	67,1	83,8						
15 000									15,7	19,6	25,1	31,4	39,3	49,5	62,8	78,6						
14 000									14,7	18,3	23,5	29,3	36,7	46,2	58,6	73,3						
13 500									14,1	17,7	22,6	28,3	35,4	44,6	56,6	70,7						
13 000									13,6	17,0	21,9	27,2	34,0	42,9	54,5	68,1						
12 500										16,4	20,9	26,2	32,7	41,2	52,4	65,5	81,8					
12 000										15,7	20,1	25,1	31,4	39,6	50,3	62,9	78,6					
11 500										15,1	19,3	24,1	30,1	38,0	48,2	60,2	75,3					
11 000											18,4	23,0	28,8	36,3	46,1	57,6	72,0	92,2				
10 500											17,6	22,0	27,5	34,6	44,0	55,0	68,7	88,0				
10 000											16,7	20,9	26,3	33,0	41,9	52,4	65,5	83,8				
9 000												18,9	23,6	29,7	37,7	47,1	58,9	75,4	94,3			
8 000												16,8	20,9	26,4	33,5	41,9	52,4	67,0	83,8			
7 500												15,7	19,6	24,7	31,4	39,3	49,1	62,8	78,5			
7 000													18,3	23,1	29,3	36,7	45,8	58,6	73,7	91,6		
6 000													15,7	19,8	25,1	31,4	39,3	50,3	62,8	78,6		
5 500													14,4	18,1	23,0	28,8	36,0	46,4	57,6	72,0		
5 000														16,8	21,3	26,6	33,2	42,5	53,2	66,5	83,8	
4 000														13,2	16,8	20,9	26,2	33,5	41,9	52,4	66,0	
2 850															9,4	11,9	14,9	16,7	23,9	29,8	37,3	47,0
1 440																6,0	7,5	9,4	12,1	15,1	18,9	23,8

$v = 5,24 \cdot 10^{-5} \cdot d \cdot n$       v [m/s]      d [mm]      n [rpm]

High-speed grinding wheels required

Standard grinding wheels (up 35 m/s)

**Production program**

- Ball, roller and customer-specific bearings up to an outer diameter of 1600 mm
- Ceramic bearings
- Diverse belt-driven grinding spindles and accessories
- Motor grinding spindles with flange-mounted motor
- Electric grinding spindles

**Customer-specific spindles**

The company Spindel- und Lagerungstechnik Fraureuth GmbH manufactures spindles according to customer needs. The following spindle types belong to our range:

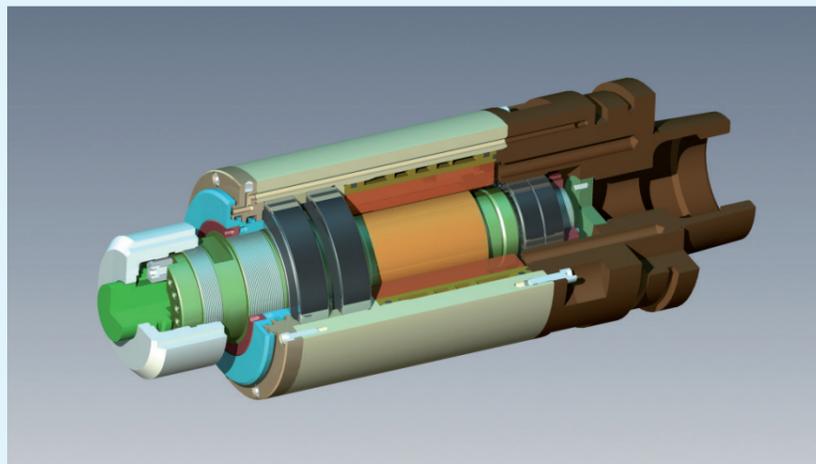
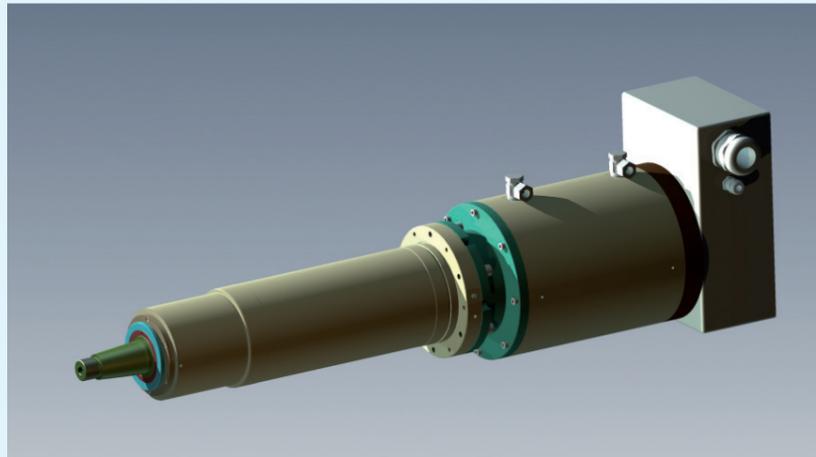
- Lathe spindles
- Milling spindles
- Grinding spindles
- Drilling spindles
- Spindles for wood machining

Catalogues and information regarding our production program are available on request.

*For any further questions we are at your disposal.*

**Phone:** +49 / 3761/801-0  
**E-Mail:** slf@slf-fraureuth.de

Examples for special spindles



**Repairs and bearing change**

Repairs at spindle units require specialized knowledge. They should be entrusted to the manufacturer if no specialist is available.

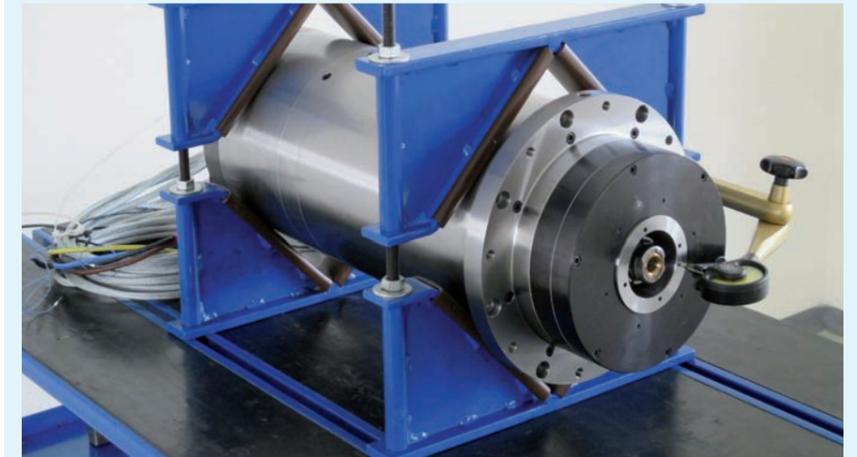
Changing bearings requires specialized knowledge regarding handling of the high-precision rolling bearings.

We urgently recommend that you entrust us with this work. Our repair service guarantees a fast execution. The repaired spindles are of high quality. Agreements on replacement spindles can also be concluded with us.

If you repair the spindles on your own we can supply replacement bearings at any time.

Furthermore we are able to repair spindle units of other manufacturers – except hydrostatic and hydrodynamic spindles.

Repair spindle and replacement bearings



Terms of delivery

Spindel- und Lagerungstechnik Fraureuth GmbH

General terms and conditions are individually stipulated between Spindel- und Lagerungstechnik Fraureuth GmbH and its customers.

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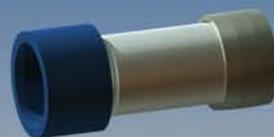


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