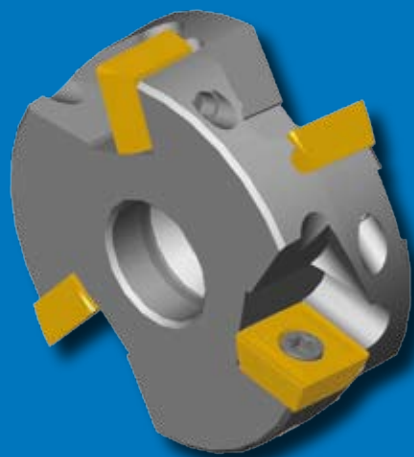
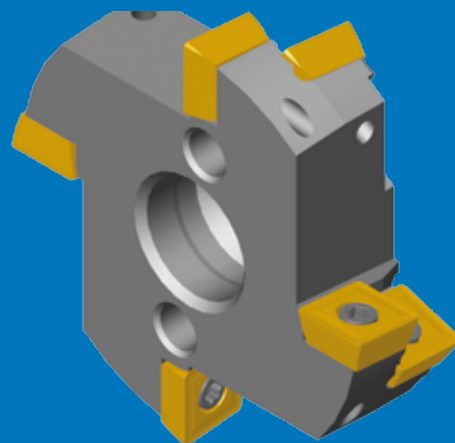


**MILLING
RINGS
FP 328**



**FLEXIBLE
&
PRECISE**

**MILLING TOOLS...
...MADE BY
JONGEN**



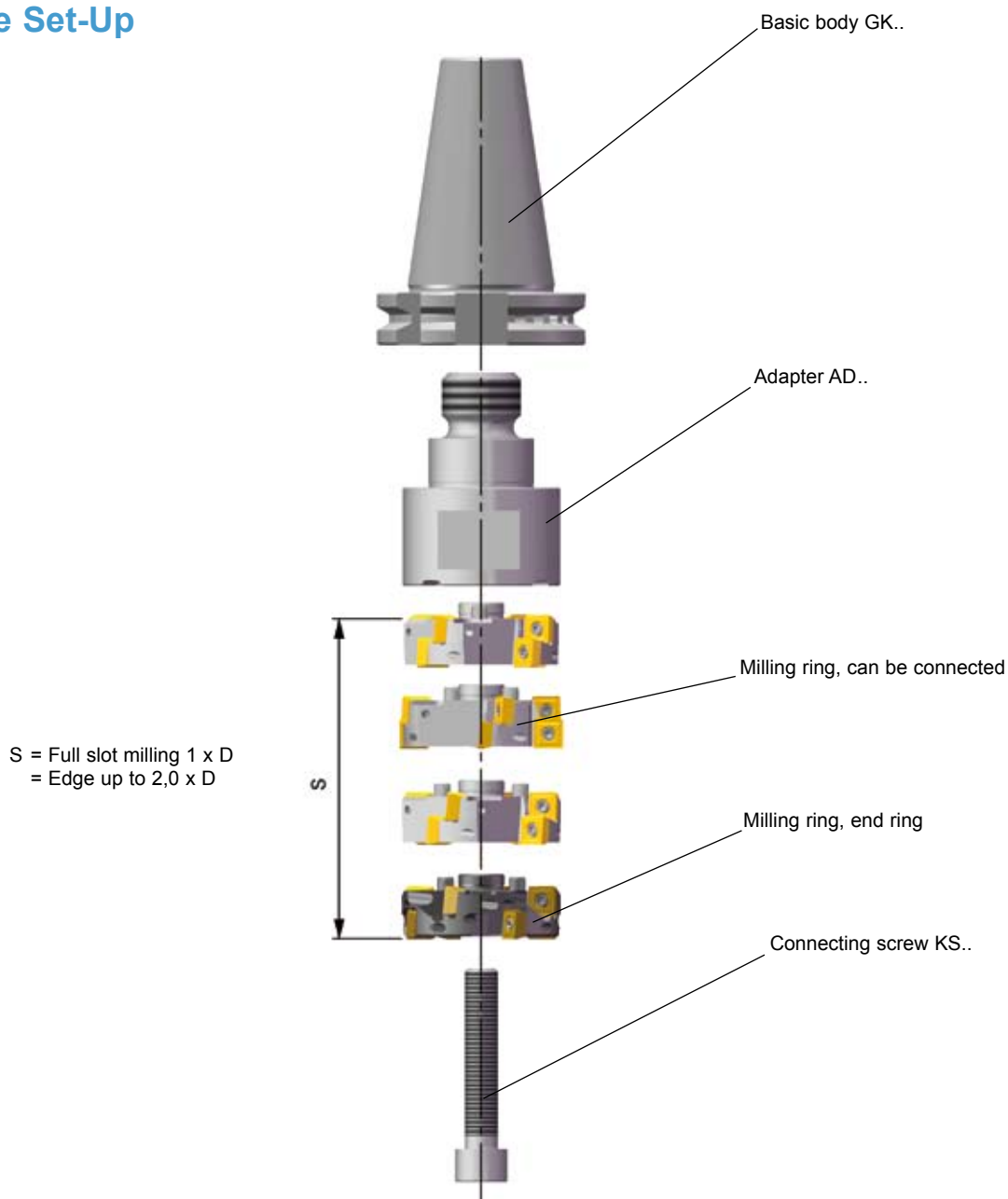
Characteristics

- » Modular construction
- » Individual choice of different cutting lengths
- » Individual choice of different cantilever lengths

Advantages

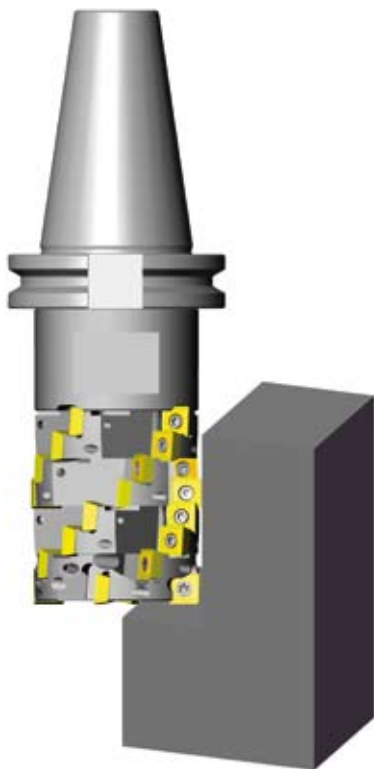
- » Flexible system due to different cutting lengths
- » Flexible system due to different cantilever lengths due to the disposal of intermediate adapters
- » Suitable for all usual machines and tool holder systems
- » Simple set-up of milling rings, thanks to exact connection.
- » Very solid material
- » For full slot milling it is possible to work with up to: 1 x Diameter.
- » For side-milling it is possible to work with up to: 2 x Diameter

The Set-Up



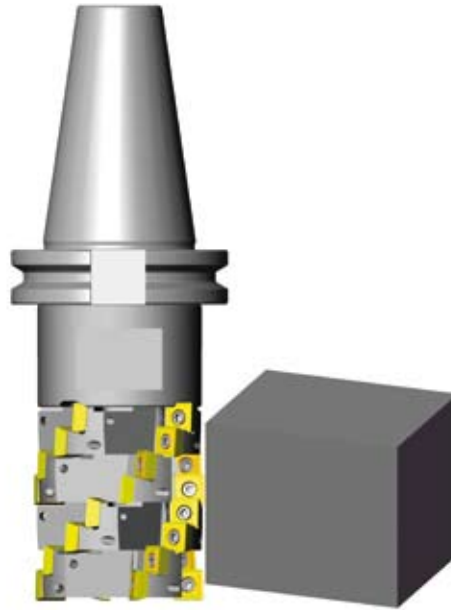
Operation Examples

Step Milling



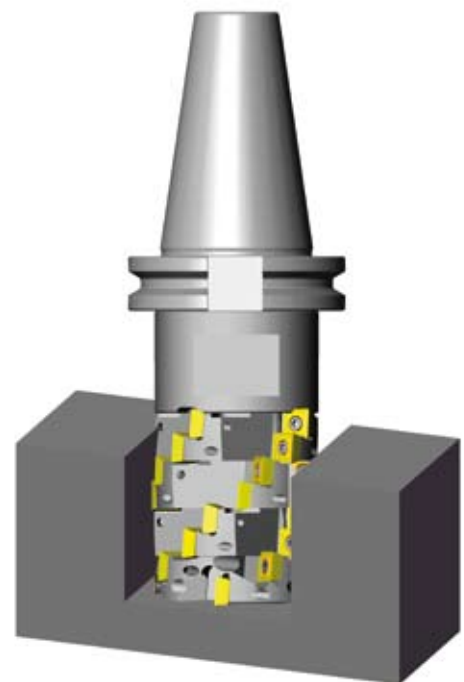
The step milling work requires the end ring as final ring.

Side-Milling



For the side-milling operation the intermediate milling ring, as well as the end ring, can be both used as final ring.

Full Slot Milling

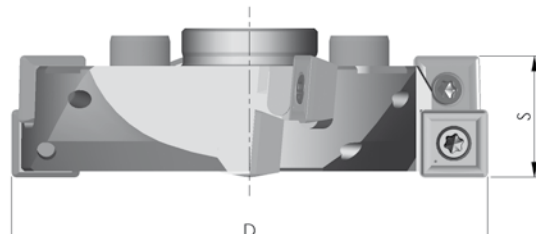


Also the full slot milling requires the end ring as final ring.

Technical Data



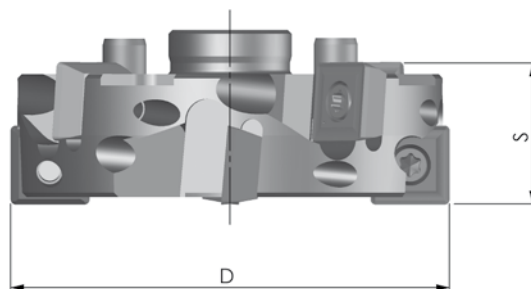
Milling ring, can be connected



Order No.	D	S	Z _{eff.}	ZZ	for adapter
FR 40-328-3	40	16	3	6	AD 40-...-328
FR 50-328-4	50	16	4	8	AD 50-...-328
FR 63-328-4	63	16	4	8	AD 63-...-328

Milling ring, end ring




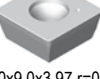
NEW!!



Order No.	D	S	Z _{eff.}	ZZ	for adapter
FR 40-328-3 HO	40	16	3	6	AD 40-...-328
FR 50-328-4 HO	50	16	4	8	AD 50-...-328
FR 63-328-4 HO	63	16	4	8	AD 63-...-328

Milling rings type FR...-328 can be connected and added as required up to the stability limit.

Inserts




 9,0x9,0x3,97 r=0,6	FP 327 (B12)	TA50	Precision sintered insert with chip-breaker groove, chamfered and rounded cutting edge, supporting surface ground Application areas: 1-6 (see page 8)
 9,0x9,0x3,97 r=0,6	FP 328 (B12)	HT50 TA50 Ti20 SR30	Precision sintered insert with chip-breaker groove, chamfered and rounded cutting edge, supporting surface ground Application areas: 1-6 (see page 8)
 9,0x9,0x3,97 r=0,8	FP 332 (B12)	HT35	Precision ground insert, supporting surface ground, very high positive chip-groove Application areas: 4 & 7 (see page 8)
 9,0x9,0x3,97 r=0,6	FP 348 (B12)	KT25	Precision sintered insert with chamfered and rounded cutting edge, reinforced cutting edge, supporting and cutting surfaces ground Application areas: 5,6 & 8 (see page 8)

Type codes:

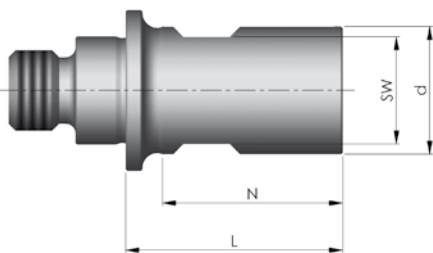
Ti20=1 TA50=2 SR30=3 P25M=6 HS20=7 K15M=8 TiN-HSSE=9 AL10=10 KD10=11 MG15=12 MG30=13 KT20=14 KT25=15 KD16=16 HT35=19

Packed in boxes of: 20 pieces

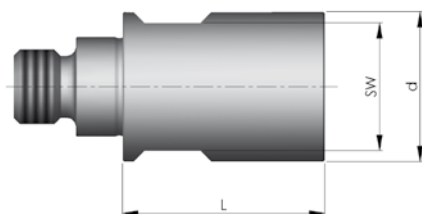
Spare Parts

	SS3,0-2	Fixing screw (tightening torque 1,8 Nm)
	T09	Screwdriver
	FETT	Heavy duty grease 100g

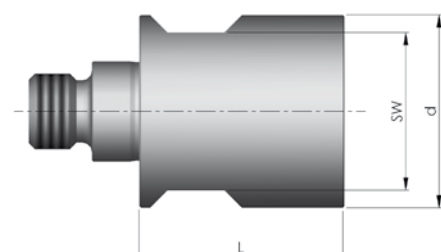
Adapters



Order No.	L	N	d	SW	Milling ring
AD 40-30-328	30	19	38	32	FR 40-328-3
AD 40-65-328	65	54	38	32	FR 40-328-3
AD 40-100-328	100	89	38	32	FR 40-328-3

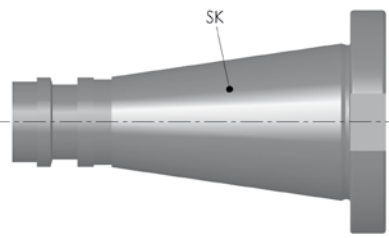


Order No.	L	d	SW	Milling ring
AD 50-30-328	30	48	41	FR 50-328-4
AD 50-65-328	65	48	41	FR 50-328-4
AD 50-100-328	100	48	41	FR 50-328-4



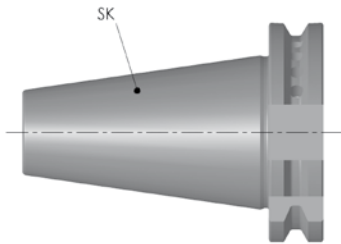
Order No.	L	d	SW	Milling ring
AD 63-30-328	30	61	50	FR 63-328-4
AD 63-65-328	65	61	50	FR 63-328-4
AD 63-100-328	100	61	50	FR 63-328-4

Basic Bodies



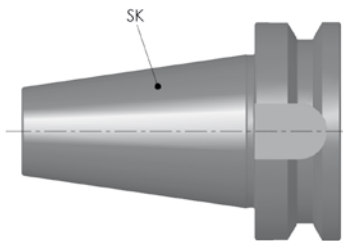
Tapered shank bodies DIN 2080

Order No.	SK
GK 40	40
GK 50	50



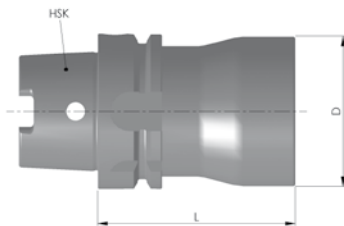
Tapered shank bodies DIN 69871 form A

Order No.	SK
GK 40 A	40
GK 50 A	50



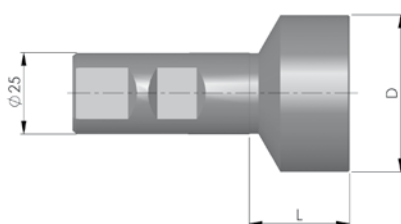
Tapered shank bodies MAS-BT (JIS B 6339)

Order No.	SK
GK 40 BT	40
GK 50 BT	50



Tapered shank bodies HSK A

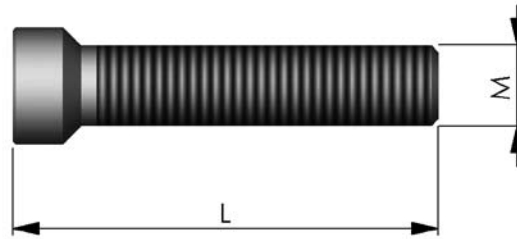
Order No.	HSK	L	D
GK-HSK-63-A	63	80,0	61
GK-HSK-80-A	80	64,5	78
GK-HSK-100-A	100	85,0	98



Basic bodies GK 25..

Order No.	L	D	for milling ring
GK 25-40	21	38	ø40
GK 25-50	31	48	ø50
GK 25-63	31	61	ø63

Connecting Screws



Order No.	M	L	for adapter	for milling ring	number or rings	tightening torque (Nm)
KS 150	M 8	38,0	AD 40-..	FR 40-328-3	1	80
KS 160	M 8	50,0	AD 40-..	FR 40-328-3	2	80
KS 170	M 8	65,0	AD 40-..	FR 40-328-3	3	80
KS 180	M 8	80,0	AD 40-..	FR 40-328-3	4	80
KS 220	M10	35,0	AD 50-..	FR 50-328-4	1	100
KS 230	M10	50,0	AD 50-..	FR 50-328-4	2	100
KS 40	M10	65,0	AD 50-..	FR 50-328-4	3	100
KS 250	M10	75,0	AD 50-..	FR 50-328-4	4	100
KS 50	M10	94,0	AD 50-..	FR 50-328-4	5	100
KS 30	M12	46,5	AD 63-..	FR 63-328-4	1	100
KS 60	M12	63,5	AD 63-..	FR 63-328-4	2-3	100
KS 190	M12	90,0	AD 63-..	FR 63-328-4	4	100
KS 80	M12	94,0	AD 63-..	FR 63-328-4	5	100
KS 200	M12	120,0	AD 63-..	FR 63-328-4	6	120
KS 100	M12	124,0	AD 63-..	FR 63-328-4	7	120
KS 210	M12	140,0	AD 63-..	FR 63-328-4	8	120

Technical Information

Calculation of rotation number of main spindle:

$$n = \frac{1000 \cdot v_c}{D \cdot \pi} \quad [\text{min}^{-1}]$$

n = Rotation number (min^{-1})
 v_c = Cutting speed (m/min)
 D = tool diameter (mm)

Feed rate:

$$v_f = f_z \cdot Z \cdot n \quad [\text{mm/min}]$$

v_f = Feed speed at the tool tip (mm/min)
 f_z = Feed rate per tooth (mm)
 Z = Number of teeth
 n = Rotation number (min^{-1})

The average chip thickness has to be considered with side-milling operations!

Mean Chip Thickness:

$$h_m \approx f_z \sqrt{\frac{a_e}{D}} \quad [\text{mm}] \quad \rightarrow \quad f_z \approx h_m \sqrt{\frac{D}{a_e}} \quad [\text{mm}]$$

h_m = Mean chip thickness (mm)
 f_z = Feed rate per tooth (mm)
 a_e = radial infeed
 D = tool diameter (mm)

Cutting Data

Material	cutting speed v_C [m/min]					
	TA50	HT50	SR30	Ti20	KT25	HT35
1 Unalloyed steel Structural steel	225 (150-300)	250 (150-350)	200 (120-280)	300 (200-400)	-	-
2 Low alloy steel	200 (100-300)	220 (120-320)	150 (100-200)	250 (200-300)	-	-
3 High grade steel	225 (150-300)	245 (170-320)	200 (150-250)	250 (180-320)	-	-
4 Stainless steel High grade steel	240 (80-400)	240 (80-400)	200 (150-250)	-	-	185 (120-250)
5 Grey cast iron	265 (180-350)	265 (180-350)	-	300 (200-400)	230 (160-300)	-
6 Grey cast iron with globular graphite	190 (130-250)	205 (130-280)	-	200 (150-250)	230 (160-300)	-
7 Aluminium Plastics	-	-	-	750 (500-1.000)	-	750 (500-1.000)
8 Hardened steel	-	-	-	-	140 (60-220)	-

Feed rates per tooth f_z [mm]	TA50, HT50, SR30	Ti20	KT25	HT35
FP 327 / FP 328	0,2 (0,1 - 0,4)	0,2 (0,1 - 0,3)	-	-
FP 348	-	-	0,2 (0,1 - 0,4)	-
FP 332	-	-	-	0,15 (0,05 - 0,3)
FP 330	-	0,2 (0,1 - 0,3)	-	-

The above-mentioned data are standard values.

Up and down corrections are admitted depending on the machine type, tool and setting.