

THE COUPLING.



PRECISION COUPLINGS

Sizing and selection



Proper sizing of couplings is crucial to ensuring smooth and efficient power transmission. This involves taking the specific requirements and operating conditions of the application into account. Various factors such as torque, speed, temperature and shock loads must be considered when selecting the correct coupling type and size.

According to DIN 740 part 2

Legend Guide book precision couplings

T_{KN}	=	Rated torque of the coupling (Nm)
T_{KMAX}	=	Maximum torque rating of the coupling (Nm)
T_S	=	Peak torque applied to the coupling (Nm)
T_{AS}	=	Peak torque of the drive system (Nm)
T_{AN}	=	Nominal torque of the drive system (Nm)
T_{LN}	=	Nominal torque of the load (Nm)
P	=	Drive power (kW)
n	=	Drive speed (min. ⁻¹)
s	=	Screw lead (mm)
t	=	Acceleration / deceleration time (s)
ω	=	Angular velocity (1/s)
F_V	=	Feed force (N)
η	=	Spindle efficiency
d_0	=	Pinion dia. (pulley) (mm)
J_1	=	Moment of inertia of driving coupling half (kgm ²)
J_2	=	Moment of inertia of driven coupling half (kgm ²)
J_L	=	Total load inertia (e.g. spindle + slide + workpiece) (kgm ²)
J_A	=	Total driving inertia (motor [including gear ratio]) (kgm ²)
$J_{Masch.}$	=	Total load inertia (e.g. spindle + slide + workpiece + ½ of coupling) (kgm ²)
$J_{Mot.}$	=	Total driving inertia (motor [including gear ratio] + ½ of coupling) (kgm ²)
m	=	Ratio of the moment of inertia of the drive to the load
C_T	=	Torsional stiffness of the coupling (Nm/rad)
f_e	=	Natural frequency of the two mass system (Hz)
f_{er}	=	Excitation frequency of the drive (Hz)
φ	=	Torsional deflection (degree)
α	=	Angular acceleration (1/s ²)
v	=	Temperature at the coupling (observed radiant heat)
S_v	=	Temperature factor
S_A	=	Load factor
S_Z	=	Start factor (factor for the number of starts per hour)
Z_h	=	Number of starts per hour (1/h)

Sizing and selection

Formulas

According to troque

Couplings are normally sized for the highest torque to be regularly transmitted. The peak torque of the application should not exceed the rated torque of the coupling. The following calculation provides an approximation of the minimum required coupling size, and allows for the maximum rated speed and misalignment to exist in the application:

$$T_{KN} \geq 1.5 \cdot T_{AS} \text{ (Nm)}$$

According to accleration torque

A more detailed calculation takes acceleration and the driving and driven moments of inertia into account. A strong inertia ratio diminishes the effect of the load factor in the sizing calculation.

$$T_{KN} \geq T_{AS} \cdot S_A \cdot \frac{J_L}{J_A + J_L} \text{ (Nm)}$$

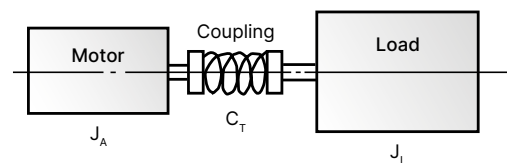
According to resonant frequency

The torsional natural frequency of the coupling must be significantly higher or lower than that of the equipment. For the mechanical substitution model the two mass system applies.

In practice the following applies: $f_e \geq 2 \cdot f_{er}$

$$f_e = \frac{1}{2 \cdot \pi} \sqrt{C_T \cdot \frac{J_A + J_L}{J_A \cdot J_L}} \text{ (Hz)}$$

Two Mass System



According to torsional defelction

To calculate transmission error as a result of torsional stress:

$$\varphi = \frac{180}{\pi} \cdot \frac{T_{AS}}{C_T} \text{ (degree)}$$



BK

Backlash free, torsionally stiff metal bellows couplings

2 – 10,000 Nm

Areas of application

for highly dynamic motion in:

- + Machine tools
- + Packaging machinery
- + Printing machinery
- + Paper converting machinery
- + Labeling machinery
- + Automation equipment

Service life

R+W bellows couplings are fatigue resistant and wear free for an infinite service life, as long as the technical limits are not exceeded.

Temperature range

-30°C to 100°C

Fit clearance

Overall shaft / hub clearance of 0.01 - 0.05 mm

Special solutions

Various materials, tolerances, dimensions and performance ratings available for custom applications on request.

Rotational speed

Standard up to 10,000 rpm.

Over 10,000 rpm in finely balanced version; up to grade ISO G=2.5 is available.

ATEX (Optional)

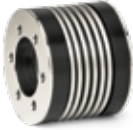




Available on request






Ordering Example	BK2	30	69	14	16	XX
Model	•					Special designation only (e.g. anodized hubs).
Size		•				
Overall length mm			•			
Bore Ø D1 H7				•		
Bore Ø D2 H7					•	

For custom features place an XX at the end of the part number and describe the special requirements (e.g. BK2 / 30 / 69 / 14 / 16 / XX=finely balanced for 25,000 rpm)

Torsionally stiff bellows couplings




2 – 10,000 Nm

Model		Features	Page
BK1		<p>With simple flange mounting 15 – 10,000 Nm</p> <ul style="list-style-type: none"> • For adapting the metal bellows to custom drive components • Custom flange patterns available 	23
BK2		<p>With clamping hub 15 – 10,000 Nm</p> <ul style="list-style-type: none"> • Easy to mount • Available in multiple lengths • Low moment of inertia 	24-25
BKH		<p>With split clamping hub 15 – 4,000 Nm</p> <ul style="list-style-type: none"> • Radial mounting possible • Easy to install onto pre-aligned shafts • Low moment of inertia 	26
BKL		<p>Economy class with clamping hub 2 – 500 Nm</p> <ul style="list-style-type: none"> • Easy to mount • Optional self-opening clamp system • Low moment of inertia 	27
BKC		<p>Compact version with clamping hub 15 – 500 Nm</p> <ul style="list-style-type: none"> • Low moment of inertia • Compact design • Optional self-opening clamp system 	28

Model	Features	Page
 <p>BKM</p>	<p>Torsional stiff with clamping hub 20 – 1,000 Nm</p> <ul style="list-style-type: none"> • High torque density • Ultra compact • Lowest moment of inertia of all clamping hub designs 	29
 <p>BKS</p>	<p>Welded with clamping hub 15 – 500 Nm</p> <ul style="list-style-type: none"> • All stainless steel construction • Temperatures up to 300°C • Easy to mount 	30
 <p>BK3</p>	<p>With conical clamping hub 15 – 10,000 Nm</p> <ul style="list-style-type: none"> • High clamping pressure • Modern design for removal system • Highly reliable 	31
 <p>SP3</p>	<p>With external clamping ring 60 – 10,000 Nm</p> <ul style="list-style-type: none"> • Highly concentric symmetrical design • Very true running to the shaft axis • For high speed applications 	32
 <p>BK5</p>	<p>With clamping hub and blind mate connection 15 – 1,500 Nm</p> <ul style="list-style-type: none"> • Backlash free with two piece design • Easy installation and removal • Available as separate components 	33

BK

Torsionally stiff bellows couplings 2 – 10,000 Nm

Model		Features	Page
BK6		With conical clamping ring and blind mate connection 15 – 1,500 Nm <ul style="list-style-type: none">• Eliminates need for screw access holes• Self centering hubs for highly concentric mounting• Easy installation and removal	34
BK7		With expanding shaft 15 – 300 Nm <ul style="list-style-type: none">• For hollow shaft mounting• Save space and cost• Solution for mismatched shaft/bore diameters	35
BK8		With ISO flange mounting 50 – 2,600 Nm <ul style="list-style-type: none">• For flange output gearboxes• allows for continuous hollow through axis with some right angle gearbox designs• compact layout	36

BK1

With flange mounting

15 – 10,000 Nm



Features

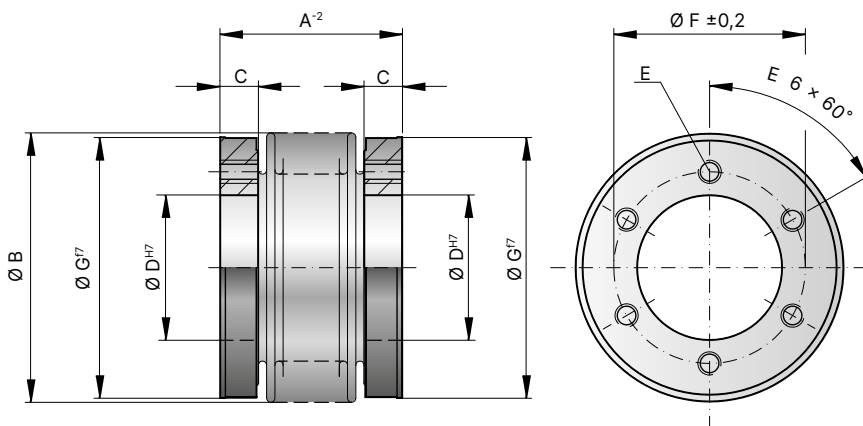
- For simple flange mounting to special drive components
- Custom flange patterns available

Material

- **Bellows:** high grade stainless steel
- **Hubs:** steel

Design

Two mounting flanges concentrically assembled to the flexible bellows. Brief overloads of up to 1.5x the rated torque are acceptable.



Model BK1

Size		15	30	60	150	200	300	500	800	1,500	4,000	6,000	10,000
Rated torque (Nm)	T_{KN}	15	30	60	150	200	300	500	800	1,500	4,000	6,000	10,000
Overall length (mm)	A^2	30 37	36 44	43 53	50 62	53 65	56 70	64 77	81	100	145	138	150
Outside Ø of bellows (mm)	B	49	55	66	81	90	110	124	133	157	200	253	303
Fit length/thread depth (mm)	C	7,5	10	11	13	14,5	15	16	18	22	30	30	36
Inside diameter H7 (mm)	D	25	28	38	50	58	65	70	75	85	100	145	190
Fastening threads	E	6 x M5	6 x M5	6 x M6	6 x M6	6 x M6	6 x M8	6 x M8	6 x M10	6 x M16	6 x M20	8 x M20	8 x M24
Bolt circle diameter ± 0.2 (mm)	F	35	37	46	62	70	80	94	90	110	140	190	234
Outside diameter f7 (mm)	G	49	55	66	81	90	110	122	116	140	182	235	295
Moment of inertia (10 ⁻³ kgm ²)	J_{ges}	0.07 0.08	0.14 0.15	0.30 0.32	0.90 0.95	1.30 1.40	1.95 2.10	3.0 3.4	4.3	10.6	46	132	350
Approximate weight (kg)		0.15	0.2	0.3	0.6	0.8	1.35	1.8	1.9	3.3	8.9	13.9	23.7
Torsional stiffness (10 ³ Nm/rad)	C_T	20 15	39 28	76 55	175 110	191 140	450 350	510 500	780	1,304	3,400	5,700	10,950
Axial ± (mm)		1 2	1 2	1.5 2	2 3	2 3	2.5 3.5	2.5 3.5	3.5	3.5	3.5	3	3
Lateral ± (mm)	C_a	0.15 0.2	0.2 0.25	0.2 0.25	0.2 0.25	0.25 0.3	0.25 0.3	0.3 0.35	0.35	0.35	0.4	0.4	0.4
Angular ± (degree)		1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1.5	1.5	1.5	1.5	1.5
Axial spring stiffness (N/mm)	C_a	25 15	50 30	72 48	82 52	90 60	105 71	70 48	100	320	565	1,030	985
Lateral spring stiffness (N/mm)	C_r	475 137	900 270	1,200 420	1,550 435	2,040 610	3,750 1,050	2,500 840	2,000	3,600	6,070	19,200	21,800

BK2

With clamping hub

15 – 200 Nm



Features

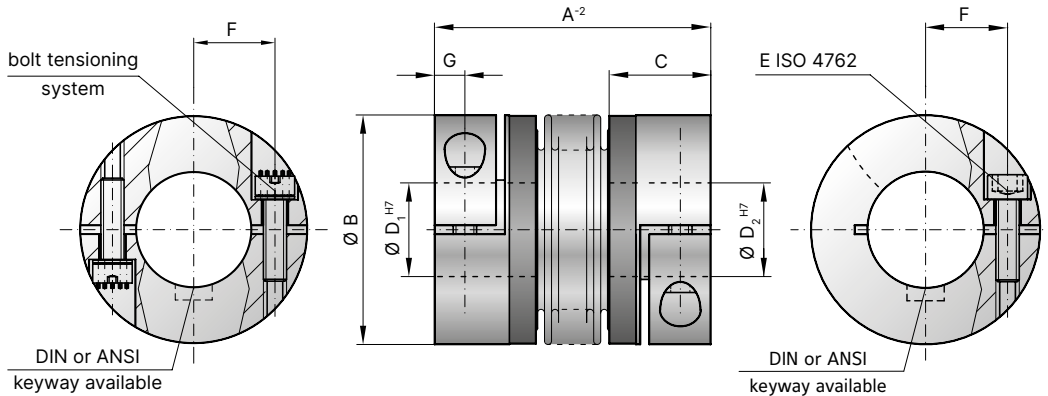
- Easy to mount
- Light weight and low moment of inertia

Material

- **Bellows:** high grade stainless steel
- **Hubs:** see table

Design

Two clamping hubs concentrically mounted to flexible bellows. Brief overloads of up to 1.5x the rated torque are acceptable.



Advantage: reduce screw tightening torques by up to 90% by using multiple smaller screws to create the same tension.

Optionally also available in other materials.

Model BK2

Size			15			30			60			80			150			200		
Rated torque (Nm)	T_{KN}		15			30			60			80			150			200		
Overall length (mm)	A^{-2}		59	66	99	69	77	113	83	93	130	94	106	143	95	107	144	105	117	163
Outside diameter (mm)	B		49			55			66			81			81			90		
Fit length (mm)	C		22			27			31			36			36			41		
Inside diameter possible from \varnothing to \varnothing H7 (mm)	D_1/D_2		8-28			10-30			12-35			14-42			19-42			22-45		
Fastening screw ISO 4762			M5			M6			M8			M10			M10			M12		
Tightening torque of the fastening screw (Nm)	E		8			15			40			50			70			120		
Distance between centerlines (mm)	F		17			19			23			27			27			31		
Distance (mm)	G		6.5			7.5			9.5			11			11			12.5		
Moment of inertia (10^{-3} kgm ²)	J_{ges}		0.06	0.07	0.08	0.12	0.13	0.14	0.32	0.35	0.4	0.8	0.85	0.9	1.9	2	2.1	3.2	3.4	3.6
Hub material			AL optional steel			AL optional steel			AL optional steel			AL optional steel			steel optional AL			steel optional AL		
Approximate weight (kg)			0.16			0.26			0.48			0.8			1.85			2.65		
Torsional stiffness (10^3 Nm/rad)	C_T		20	15	14	39	28	27	76	55	54	129	85	84	175	110	97	191	140	135
Axial \pm (mm)			1	2	3	1	2	3	1.5	2	3	2	3	4	2	3	4	2	3	4
Lateral \pm (mm)		Max. values	0.15	0.2	1	0.2	0.25	1	0.2	0.25	1	0.2	0.25	1	0.2	0.25	1	0.25	0.3	1
Angular \pm (degree)			1	1.5	2	1	1.5	2	1	1.5	2	1	1.5	2	1	1.5	2	1	1.5	2
Axial spring stiffness (N/mm)	C_a		25	15	84	50	30	118	72	48	165	48	32	144	82	52	130	90	60	280
Lateral spring stiffness (N/mm)	C_r		475	137	140	900	270	224	1,200	420	337	920	290	401	1,550	435	500	2,040	610	750

* 180° opposed in each clamping hub.

BK2

With clamping hub

300 – 10,000 Nm



Features

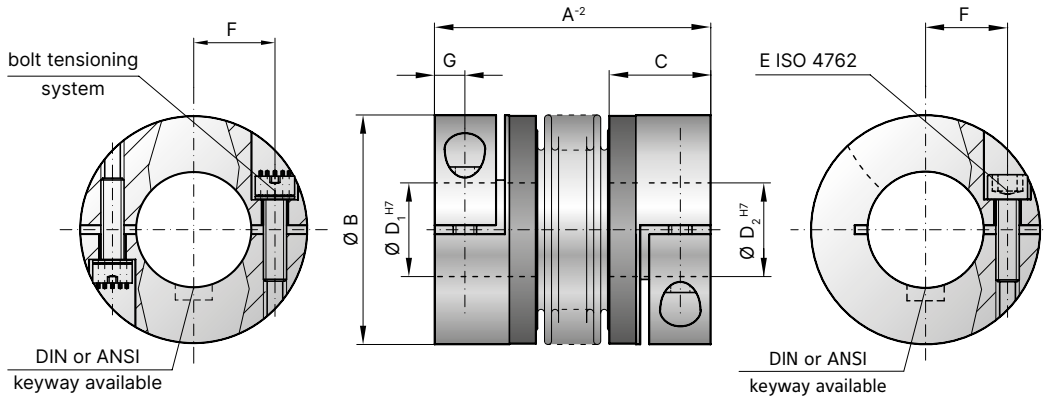
- Easy to mount
- Light weight and low moment of inertia
- Optional: bolt tensioning system in size 800 and up

Material

- **Bellows:** high grade stainless steel
- **Hubs:** see table

Design

Two clamping hubs concentrically mounted to flexible bellows. Brief overloads of up to 1.5x the rated torque are acceptable.



Advantage: reduce screw tightening torques by up to 90% by using multiple smaller screws to create the same tension.

Optionally also available in other materials.

Model BK2

Size			300			500			800		1,500		4,000		6,000		10,000	
Rated torque	(Nm)	T_{KN}	300			500			800		1,500		4,000		6,000		10,000	
Overall length	(mm)	A^{-2}	111	125	200	133	146	169	140	179	166	230	225	252	288			
Outside diameter	(mm)	B	110			124			134		157		200		253		303	
Fit length	(mm)	C	43			51			45		55		85		107		129	
Inside diameter possible from \varnothing to \varnothing H7	(mm)	D_1/D_2	24-60			35-60			40-75		50-80		50-90		60-140		70-180	
Fastening screw ISO 4762			M12			M16			2x M16*		2x M20*		2x M24*		2x M24*		2x M30*	
Tightening torque of the fastening screw	(Nm)	E	130			200			250		470		1,200		1,200		2,400	
Distance between centerlines	(mm)	F	39			41			2x48		2x55		2x65		2x90		2x117	
Distance	(mm)	G	13			16.5			18		22.5		28		35		42	
Moment of inertia (10^{-3} kgm ²)		J_{ges}	7.6	7.9	8.3	14.3	14.6	14.8	16.2	17	43	45	165	495	1,214			
Hub material			steel optional AL			steel optional AL			steel		steel		steel		steel		steel	
Approximate weight	(kg)		4			6.3			5.7		11.5		28.8		49.4		80.9	
Torsional stiffness	(10^3 Nm/rad)	C_T	450	350	340	510	500	400	780	711	1,304	1,180	3,400	5,700	10,950			
Axial	\pm (mm)	C_{max} values	2.5	3.5	4.5	2.5	3.5	4.5	3.5	4.5	3.5	4.5	3.5	3	3			
Lateral	\pm (mm)		0.25	0.3	1	0.3	0.35	1	0.35	1	0.35	1	0.4	0.4	0.4			
Angular	\pm (degree)		1	1.5	2	1	1.5	2	1.5	2	1.5	2	1.5	1.5	1.5			
Axial spring stiffness (N/mm)		C_a	105	71	605	70	48	85	100	285	320	440	565	1,030	985			
Lateral spring stiffness (N/mm)		C_r	3,750	1,050	1,200	2,500	840	614	2,000	1,490	3,600	1,700	6,070	19,200	21,800			

* 180° opposed in each clamping hub.

BKH

With split clamping hub

15 – 4,000 Nm



Features

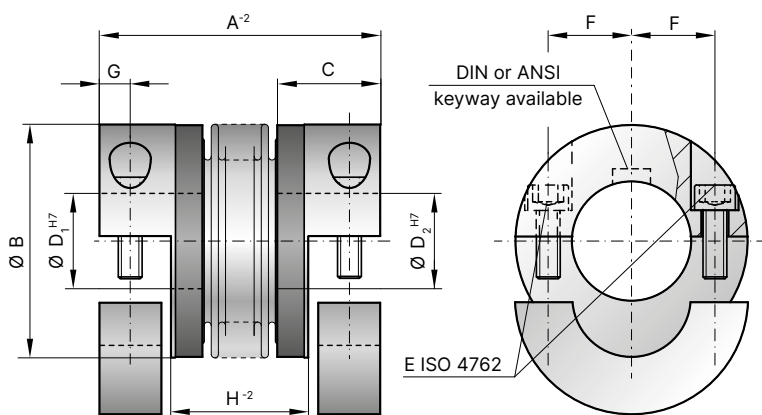
- Radial mounting possible
- Easy installation onto pre-aligned shafts
- Low moment of inertia

Material

- **Bellows:** high grade stainless steel
- **Hubs:** see table

Design

Two split clamping hubs with two screws in each.
Brief overloads of up to 1.5x the rated torque are acceptable.



Model BKH

Size			15	30	60	80	150	200	300	500	800	1,500	4,000
Rated torque (Nm)	T_{KN}		15	30	60	80	150	200	300	500	800	1,500	4,000
Overall length (mm)	A^{-2}		59 66	69 77	83 93	94 106	95 107	105 117	111 125	133 146	140 166	166 225	
Outside diameter (mm)	B		49	55	66	81	81	90	110	124	134	157	200
Fit length (mm)	C		22	27	31	36	36	41	43	51	45	55	85
Inside diameter possible from \varnothing to \varnothing H7 (mm)	D_1/D_2		8-28	10-30	12-35	14-42	19-42	22-45	24-60	35-60	40-75	50-80	50-90
Fastening screw ISO 4762			M5	M6	M8	M10	M10	M12	M12	M16	M16	M20	M24
Tightening torque of the fastening screw (Nm)	E		8	15	40	50	70	120	130	200	250	470	1,200
Distance between centerlines (mm)	F		17.5	19	23	27	27	31	39	41	48	55	65
Distance (mm)	G		7	7.5	9.5	12	12	12.5	14	16.5	18	22.5	28
Length of center section (mm)	H^{-2}		29 36	35 43	41 51	47 59	48 60	50 62	55 69	61 75	65.5 71	71 109	
Moment of inertia (10^{-3} kgm ²)	J_{ges}		0.07 0.08	0.14 0.15	0.23 0.26	0.65 0.67	2.5 3.2	4.5 5.4	8.5 10.5	17.3 19.6	24.3 29.6	49.2 165	
Approximate weight (kg)			0.15	0.3	0.4	0.8	1.7	2.5	4	7.5	7	12	28
Torsional stiffness (10^3 Nm/rad)	C_T		20 15	39 28	76 55	129 85	175 110	191 140	450 350	510 500	780 1,304	3,400	
Axial \pm (mm)			1 2	1 2	1.5 2	2 3	2 3	2 3	2.5 3.5	2.5 3.5	3.5 3.5	3.5 3.5	3.5
Lateral \pm (mm)		Max. values	0.15 0.2	0.2 0.25	0.2 0.25	0.2 0.25	0.2 0.25	0.25 0.3	0.25 0.3	0.3 0.35	0.35 0.35	0.35 0.4	0.4
Angular \pm (degree)			1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1.5 1.5	1.5
Axial spring stiffness (N/mm)	C_a		25 15	50 30	72 48	48 32	82 52	90 60	105 71	70 48	100 320	565	
Lateral spring stiffness (N/mm)	C_r		475 137	900 270	1,200 420	920 290	1,550 435	2,040 610	3,750 1,050	2,500 840	2,000 3,600	6,070	

BKL

With clamping hub

2 – 500 Nm**Features**

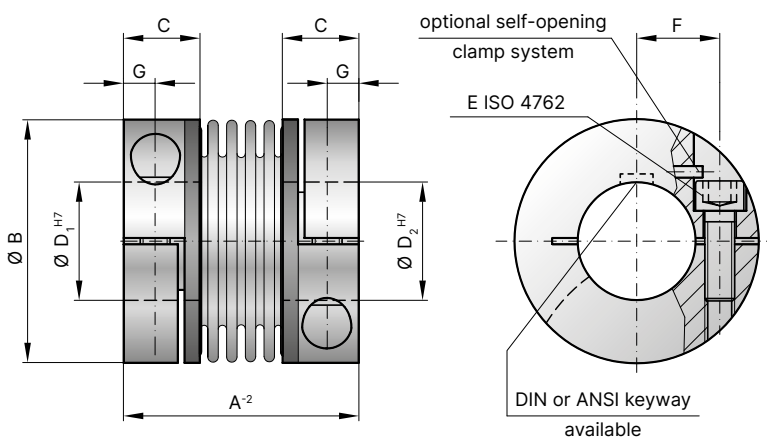
- Easy to mount
- Light weight and low moment of inertia

Material

- **Bellows:** high grade stainless steel
- **Hubs:** see table

Design

Two clamping hubs concentrically mounted to flexible bellows. Brief overloads of up to 1.5x the rated torque are acceptable.



Optional: self-opening clamp system to open the bore during installation and removal by backing out the clamping screw.

Model BKL

Size			2	3	4.5	10	15	30	60	80	150	300	500			
Rated torque (Nm)	T_{KN}		2	3	4.5	10	15	30	60	80	150	300	500			
Overall length (mm)	A^{-2}		30	32	40	44	58	68	79	92	92	109	114			
Outside diameter (mm)	B		25	25	32	40	49	56	66	82	82	110	123			
Fit length (mm)	C		10	10	13	13	21.5	26	28	32.5	32.5	41	42.5			
Inside diameter possible from \varnothing to \varnothing H7 (mm)	$D_{1/2}$		4-12.7	3-12.7	6-16	6-24	8-28	10-32	14-35	16-42	19-42	24-60	35-62			
Fastening screw ISO 4762			M3	M3	M4	M4	M5	M6	M8	M10	M10	M12	M16			
Tightening torque of the fastening screw (Nm)	E		2.3	2.3	4	4.5	8	15	40	70	85	120	200			
Distance between centerlines (mm)	F		8	8	11	14	17	20	23	27	27	39	41			
Distance (mm)	G		4	3.8	5	5	6.5	7.5	9.5	11	11	13	17			
Moment of inertia (10^{-3} kgm ²)	J_{ges}		0.002	20	0.007	0.016	0.065	0.12	0.3	0.75	1.8	0.8	7.5	3.1	11.7	4.9
Approximate weight (kg)			0.02	0.023	0.05	0.06	0.16	0.25	0.4	0.7	1.7	0.75	3.8	1.6	4.9	2.1
Torsional stiffness (10^3 Nm/rad)	C_T		1.5	0.994	7	9	23	31	72	80	141	157	290			
Axial \pm (mm)			0.5	1	1	1	1	1	1.5	2	2	2	2.5			
Lateral \pm (mm)		Max. values	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2			
Angular \pm (degree)			1	2	1	1	1	1	1	1	1	1	1			
Axial spring stiffness (N/mm)	C_a		8		35	30	30	50	67	44	77	112	72			
Lateral spring stiffness (N/mm)	C_r		50		350	320	315	366	679	590	960	2,940	1,450			

BKC

Compact design with clamping hub

15 – 500 Nm

Features

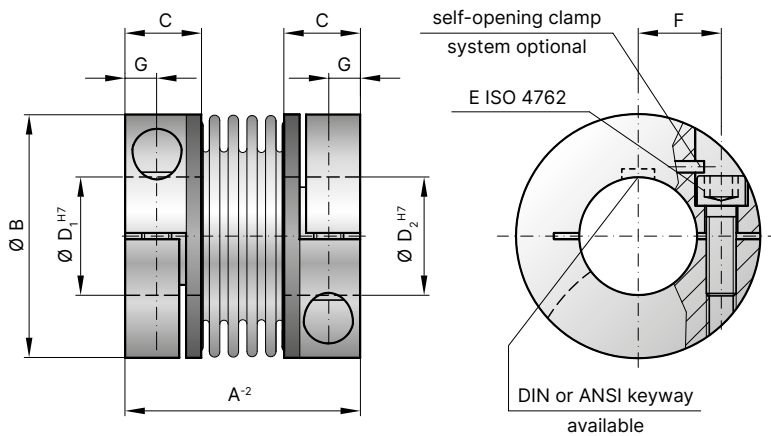
- For space restricted installations
- Light weight and low moment of inertia
- Easy to mount

Material

- **Bellows:** high grade stainless steel
- **Hubs:** see table

Design

Two clamping hubs concentrically mounted to flexible bellows. Brief overloads of up to 1.5x the rated torque are acceptable.



Optional: self-opening clamp system to open the bore during installation and removal by backing out the clamping screw.

Model BKC

Size			15	30	60	150	300	500
Rated torque	(Nm)	T_{KN}	15	30	60	150	300	500
Overall length	(mm)	A^{-2}	48	58	67	78	94	100
Outside diameter	(mm)	B	49	56	66	82	110	123
Fit length	(mm)	C	16.5	21	23	27.5	34	34
Inside diameter possible from \emptyset to \emptyset H7	(mm)	D_1/D_2	8-28	12-32	14-35	19-42	24-60	32-75
Fastening screw ISO 4762			M5	M6	M8	M10	M12	M12
Tightening torque of the fastening screw	(Nm)	E	8	15	40	75	120	125
Distance between centerlines	(mm)	F	17.5	20	23	27	39	45
Distance	(mm)	G	6.5	7.5	9.5	11	13	13
Moment of inertia	(10^{-3} kgm^2)	$J_{ges.}$	0.05	0.1	0.26	0.65	6.3	9
Hub material			AL	AL	AL	AL	steel	steel
Approximate weight	(kg)		0.13	0.21	0.37	0.72	3.26	3.52
Torsional stiffness	(10^3 Nm/rad)	C_T	23	31	72	141	157	290
Axial	\pm (mm)	Max. values	1	1	1.5	2	2	2.5
Lateral	\pm (mm)		0.2	0.2	0.2	0.2	0.2	0.2
Angular	\pm (degree)		1	1	1	1	1	1
Axial spring stiffness	(N/mm)	C_a	30	50	67	77	112	72
Lateral spring stiffness	(N/mm)	C_l	315	366	679	960	2,940	2,200
Speed max. with balancing	(min^{-1})		80,000	70,000	60,000	50,000	40,000	30,000

BKM

Torsional stiff with clamping hub

20 – 1,000 Nm



Features

- Extremely compact
- High torque density
- High torsional stiffness

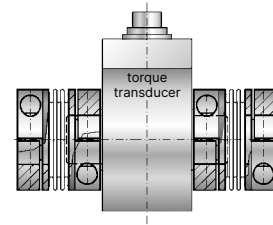
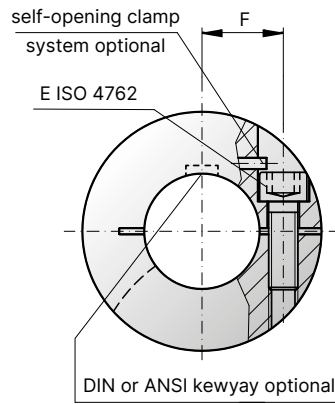
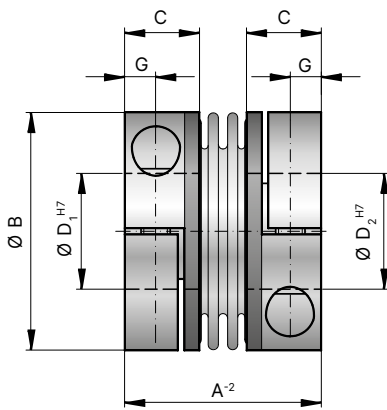
Material

- **Bellows:** high grade stainless steel
- **Hubs:** see table

Design

Two clamping hubs concentrically mounted to flexible bellows. Brief overloads of up to 1.5x the rated torque are acceptable.

BELLOWS
COUPLINGS BK



Key application:
For mounting on a torque transducer.

Model BKM

Size			20	200	400	1,000
Rated torque	(Nm)	T_{KN}	20	200	400	1,000
Overall length	(mm)	A^{-2}	40	59	75	89
Outside diameter	(mm)	B	49	66	82	110
Fit length	(mm)	C	16.5	23	27.5	34
Inside diameter possible from \varnothing to \varnothing H7	(mm)	$D_{1/2}$	15-28	24-35	32-42	40-60
Fastening screw ISO 4762			M5	M8	M10	M12
Tightening torque of the fastening screw	(Nm)	E	8	40	60	130
Distance between centerlines	(mm)	F	17	23	27	39
Distance	(mm)	G	6	9.5	11	13
Moment of inertia	(10^{-3} kgm ²)	$J_{ges.}$	0.05	0.18	0.62	7.2
Hub material			AL	AL	AL	steel
Approximate weight	(kg)		0.13	0.4	0.7	3.5
Torsional stiffness	(10^3 Nm/rad)	C_T	41.9	138	170	570
Axial	\pm (mm)	Max. values	1	1.5	1	2
Lateral	\pm (mm)		0.06	0.08	0.1	0.1
Angular	\pm (degree)		0.5	0.5	0.5	0.5
Axial spring stiffness	(N/mm)	C_a	55.8	153	114	148
Lateral spring stiffness	(N/mm)	C_r	3,710	11,000	6,058	9,010
Speed max. with balancing	(min ⁻¹)		80,000	60,000	50,000	40,000

BKS

Welded with clamping hub

15 – 500 Nm



Features

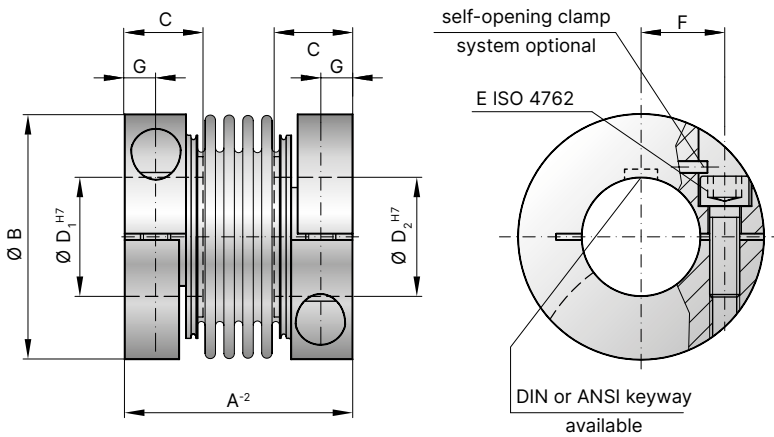
- For high temperatures and aggressive media
- Compact design
- Welded version

Material

- **Bellows:** high grade stainless steel
- **Hubs:** high grade stainless steel
- **Screws:** Grade 12.9 Geomet coated (alternate materials on request)

Design

Two clamping hubs concentrically mounted to flexible bellows.
Brief overloads of up to 1.5x the rated torque are acceptable.
From -40°C to +300°C operating temperature.



Optional:
self-opening clamp system to open the bore during installation and removal by backing out the clamping screw.

Model BKS

Size			15	30	60	150	300	500
Rated torque	(Nm)	T_{KN}	15	30	60	150	300	500
Overall length	(mm)	A^{-2}	45	52	66	76	89	95
Outside diameter	(mm)	B	49	56	66	82	110	123
Fit length	(mm)	C	17	20	24	30	34	35
Inside diameter* possible from \varnothing to \varnothing H7	(mm)	D_1/D_2	12-28	14-32	14-35	19-42	24-60	32-75
Fastening screw ISO 4762			M5	M6	M8	M10	M12	M12
Tightening torque of the fastening screw	(Nm)	E	8	15	40	75	120	125
Distance between centerlines	(mm)	F	17.5	20	23	27	39	45
Distance	(mm)	G	6	7.5	9.5	11	13	13
Moment of inertia (10^{-3} kgm ²)		$J_{ges.}$	0.1	0.2	0.53	1.5	5.5	8.1
Approximate weight	(kg)		0.27	0.42	0.78	1.5	2.9	3.5
Torsional stiffness (10^3 Nm/rad)		C_T	23	31	72	141	157	290
Axial	\pm (mm)	Max. values	1	1	1.5	2	2	2.5
Lateral	\pm (mm)		0.2	0.2	0.2	0.2	0.2	0.2
Angular	\pm (degree)		1	1	1	1	1	1
Axial spring stiffness	(N/mm)	C_a	30	50	67	77	112	72
Lateral spring stiffness	(N/mm)	C_r	315	366	679	960	2,940	2,200
Speed max. with balancing	(min ⁻¹)		60,000	50,500	50,000	40,500	40,000	30,000

* Smaller bore diameter available at reduced torque capacity

BK3

With conical clamping system

15 – 10,000 Nm



Features

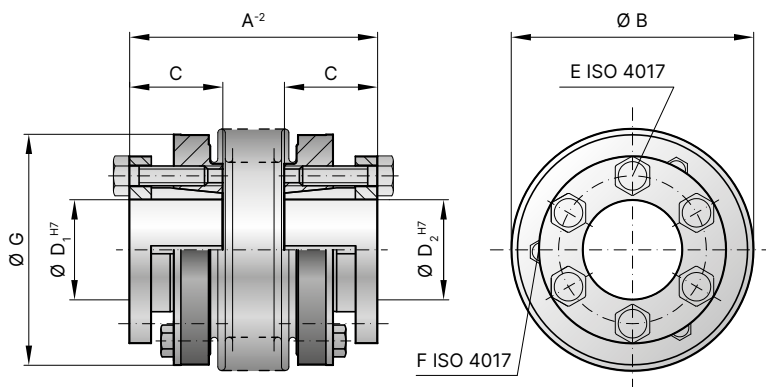
- High clamping pressure
- High torque version
- Compact design
- Suitable for space restricted installation spaces, with easy removal due to jack screws

Material

- **Bellows:** high grade stainless steel
- **Hubs:** steel

Design

Two conical clamping hubs concentrically mounted to flexible bellows. Brief overloads of up to 1.5x the rated torque are acceptable.



Model BK3

Size		15	30	60	150	200	300	500	800	1,500	4,000	6,000	10,000
Rated torque (Nm)	T_{KN}	15	30	60	150	200	300	500	800	1,500	4,000	6,000	10,000
Overall length without screw head (mm)	A^{-2}	48 55	57 65	66 76	75 87	78 90	89 103	97 110	114 141	195 210	210 217		
Outside diameter (mm)	B	49	55	66	81	90	110	124	133	157	200	253	303
Fit length (mm)	C	19	22	27	32	32	41	41	50	61	80	85	92
Inside diameter possible from Ø to Ø H7 (mm)	$D_{1/2}$	10-22	12-23	12-30	15-37	15-44	24-60	24-60	30-60	35-70	50-100	60-140	70-180
Fastening screw ISO 4017	E	6 × M4	6 × MS	6 × MS	6 × M6	6 × M6	6 × M8	6 × M8	6 × M10	6 × M12	6 × M16	6 × M16	8 × M16
Tightening torque of the fastening screw (Nm)	E	4	6	8	12	14	18	25	40	70	120	150	160
Jack screw ISO 4017	F	3 × M4	3 × M4	3 × M5	3 × M5	3 × M6	3 × M6	3 × M6	3 × M8	6 × M8	6 × M10	6 × M10	4 × M10
Outside diameter of hub (mm)	G	49	55	66	81	90	110	122	116	135	180	246	295
Moment of inertia (10^{-3} kgm ²)	J_{ges}	0.07 0.08	0.15 0.16	0.39 0.41	1.2 1.6	1.7 2.5	5.1 5.9	9.1 9.9	13.2	34.9	85.5	254	629
Approximate weight (kg)		0.25	0.4	0.8	1.2	1.8	3	4.2	5.6	8.2	23	32.6	45.5
Torsional stiffness (10^3 Nm/rad)	C_T	20 15	39 28	76 55	175 110	191 140	450 350	510 500	780	1,304	3,400	5,700	10,950
Axial ± (mm)		1 2	1 2	1.5 2	2 3	2 3	2.5 3.5	2.5 3.5	3.5 3.5	3.5 3.5	3.5 3.5	3 3	3 3
Lateral ± (mm)	$Max. values$	0.15 0.2	0.2 0.25	0.2 0.25	0.2 0.25	0.25 0.3	0.25 0.3	0.3 0.35	0.35 0.35	0.35 0.35	0.4 0.4	0.4 0.4	0.4 0.4
Angular ± (degree)		1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1.5 1.5	1.5 1.5	1.5 1.5	1.5 1.5	1.5 1.5
Axial spring stiffness (N/mm)	C_a	25 15	50 30	72 48	82 52	90 60	105 71	70 48	100	320	565	1,030	985
Lateral spring stiffness (N/mm)	C_r	475 137	900 270	1,200 420	1,500 435	2,040 610	3,750 1,050	2,500 840	2,000	3,600	6,070	19,200	21,800

SP3

With external clamping ring

60 – 10,000 Nm
High speed



Features

- Very high balancing quality due to symmetrical design
- High operating speeds
- Extremely smooth running

Material

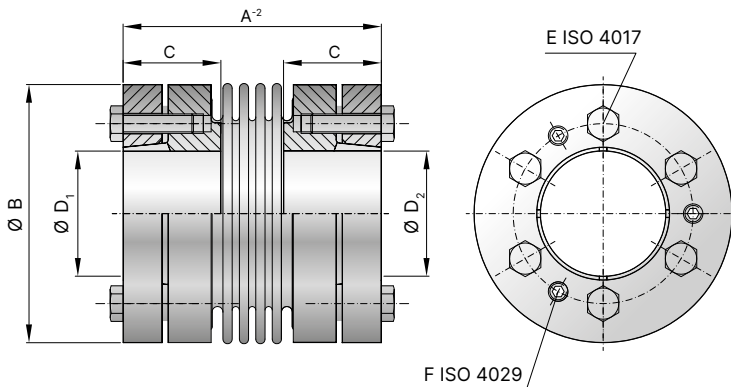
- **Bellows:** high grade stainless steel
- **Hubs and clamping ring:** steel

Design

Two precision machined clamping ring hubs mounted concentrically to a flexible bellows. Brief overloads of up to 1.5x the rated torque are acceptable.

Fit clearance

Overall shaft / hub tolerance 0.01 - 0.025 mm



Model SP3

Size		60	150	200	300	500	800	1,500	4,000	6,000	10,000
Rated torque (Nm)	T_{KN}	60	150	200	300	500	800	1,500	4,000	6,000	10,000
Overall length without screw head (mm)	A^{-2}	66 76	75 87	76 88 89 103	97 111	117	133	195	250	300	
Outside diameter (mm)	B	66	81	90	110	124	133	157	200	253	300
Fit length (mm)	C	25	30	32	36	40	40	53	65	86	95
Inside diameter possible from \emptyset to \emptyset H7 (mm)	D_1/D_2	14-32	18-35	20-42	22-55	25-60	32-60	42-75	50-100	60-140	70-180
Fastening screw ISO 4017		6 x M5	6 x M6	6 x M6	6 x M8	6 x M8	6 x M10	6 x M10	6 x M12	6 x M16	8 x M16
Tightening torque of the fastening screw (Nm)	E	8.5	14	14	30	35	50	60	120	260	295
Jack screw ISO 4017	F	3 x M5	3 x M6	3 x M6	3 x M8	3 x M8	3 x M10	3 x M10	3 x M12	3 x M16	4 x M16
Moment of inertia (10^{-3} kgm ²)	J_{ges}	0.58 0.60	1.6 1.62	2.42 2.52	6.38 6.56	10.35 10.67	10.9	24.3	107.9	466.2	1,187.4
Approximate weight (kg)		0.9 0.92	1.7 1.8	2.1 2.2	3.52 3.6	4.73 4.83	4.9	7.9	19.0	45.0	80.5
Torsional stiffness (10^{-3} Nm/rad)	C_T	76 55	175 110	191 140	450 350	510 500	780	1,304	3,400	5,700	10,950
Axial \pm (mm)		1.5 2	2 3	2 3	2.5 3.5	2.5 3.5	3.5	3.5	3.5	3.0	3.0
Lateral \pm (mm)	$\begin{matrix} \text{Max.} \\ \text{values} \end{matrix}$	0.2 0.25	0.2 0.25	0.25 0.3	0.25 0.3	0.3 0.35	0.35	0.35	0.4	0.4	0.4
Angular \pm (degree)		1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1.5	1.5	1.5	1.5	1.5
Axial spring stiffness (N/mm)	C_a	72 48	82 52	90 60	105 71	70 48	100	320	565	1,030	985
Lateral spring stiffness (N/mm)	C_l	1,200 420	1,500 435	2,040 610	3,750 1,050	2,500 840	2,000	3,600	6,070	19,200	21,800
Speed standard (min ⁻¹)	n	22,500	16,500	16,500	13,500	12,500	10,000	8,000	6,000	5,000	3,000

* Recommended fit pairing H7 / k6; H6 / j5 (short spindle); starting at \emptyset 55 G7 / m6

BK5

Blind mate with clamping hub

15 – 1,500 Nm



Features

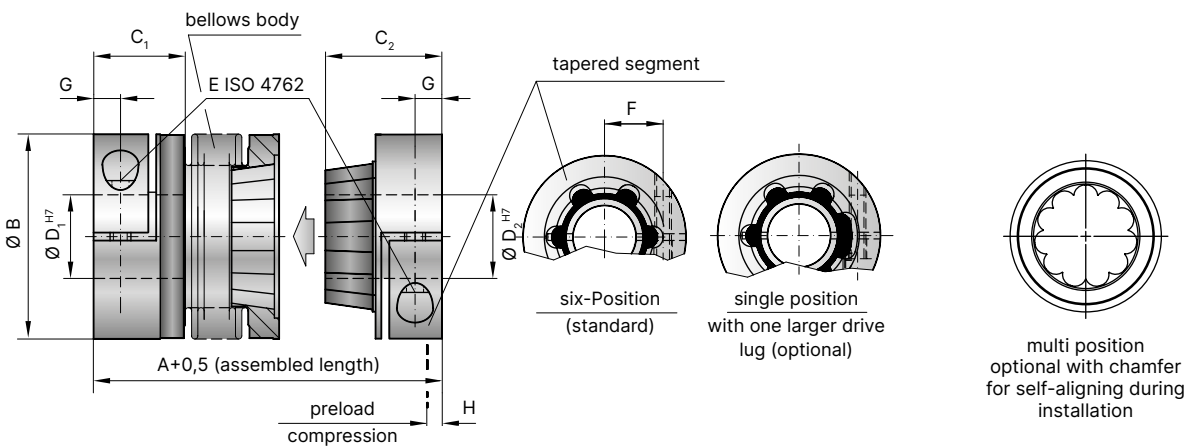
- Easy installation and removal due to blind mate
- Electrically and thermally isolating
- Absolutely backlash free assembly

Material

- **Bellows:** high grade stainless steel
- **Hubs:** Up through size 80 Aluminum, size 150 and up steel
- **Tapered male segment:** High strength plastic

Design

Two clamping hubs, one of which has a tapered male projection for blind mate connection. Brief overloads of up to 1.5x the rated torque are acceptable.



Model BK5

Size		15	30	60	80	150	300	500	800	1,500
Rated torque (Nm)	T_{KN}	15	30	60	80	150	300	500	800	1,500
Overall length (inserted) (mm)	$A^{+0,5}$	60 67	71 79	85 95	94 106	95 107	114 128	136 149	150 176	
Outside diameter (mm)	B	49	55	66	81	81	110	124	133	157
Fit length (mm)	C_1	22	27	31	36	36	43	51	45	55
Fit length (mm)	C_2	28	33	39	43	43	52	61	74	94
Inside diameter possible from \emptyset to \emptyset H7 (mm)	D_1	8-28	10-30	12-35	14-42	14-42	24-60	35-60	40-75	50-80
Inside diameter possible from \emptyset to \emptyset H7 (mm)	D_2	8-22	10-25	12-32	14-38	14-38	24-58	35-60	40-62	50-75
Fastening screw ISO 4762		M5	M6	M8	M10	M10	M12	M16	2 x M16**	2 x M20**
Tightening torque of the fastening screw (Nm)	E	8	15	40	50	70	130	200	250	470
Distance between centerlines (mm)	F	17	19	23	27	27	39	41	2 x 48**	2 x 55**
Distance (mm)	G	6.5	7.5	9.5	11	11	13	16.5	18	22.5
Preload compression (mm)		0.2 - 1.0	0.5 - 1.0	0.5 - 1.5	0.5 - 1.5	0.5 - 1.5	0.5 - 1.5	1.0 - 2.0	1.0 - 2.5	0.5 - 1.5
Axial recovery force at maximum pretensioning (N)	H	20 12	50 30	70 45	48 32	82 52	157 106	140 96	200	650
Moment of inertia (10^{-3} kgm ²)	J_{ges}	0.07 0.08	0.14 0.15	0.23 0.26	0.65 0.67	2.2 2.4	7.4 7.9	13.7 14.4	21.5	51.4
Approximate weight (kg)		0.1 0.1	0.3 0.3	0.4 0.4	0.9 0.9	1.8 1.8	4 4	6.5 6.7	9	15.3
Torsional stiffness (10^3 Nm/rad)	C_T	10 8	20 14	38 28	65 43	88 55	225 175	255 245	400	650
Axial* \pm (mm)		0.5 1	0.5 1	0.5 1	1 2	1 2	1.5 2	2.5 3.5	3	2
Lateral \pm (mm)	Max. values	0.15 0.2	0.2 0.25	0.2 0.25	0.2 0.25	0.2 0.25	0.25 0.3	0.3 0.35	0.35	0.35
Angular \pm (degree)		1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1.5	1.5
Lateral spring stiffness (N/mm)	C_r	475 137	900 270	1,200 420	920 290	1,550 435	3,750 1,050	2,500 840	2,000	3,600

*in addition to maximum allowable pretension **180° opposed in each clamping hub.

BK6

Blind mate with conical clamping ring

15 – 1,500 Nm



Features

- Axial mounting possible
- Easy installation and removal due to blind mate
- Naturally very well balanced due to self centering clamping ring system
- Absolutely backlash free assembly

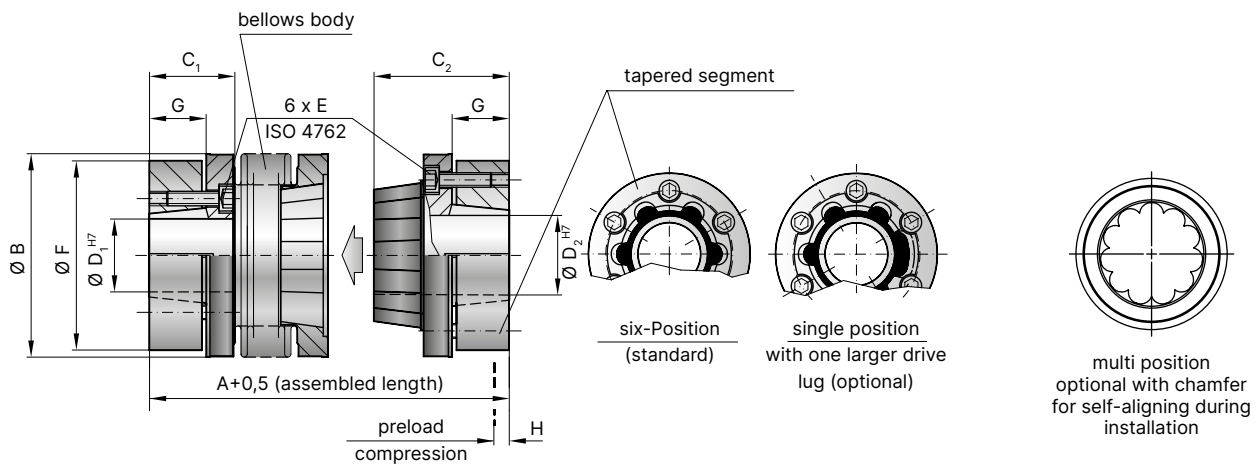
Material

- **Bellows:** high grade stainless steel
- **Hubs:** steel
- **Tapered male segment:** high strength plastic

Design

Two conical clamping ring hubs, one of which has a tapered male projection for blind mate connection.

Brief overloads of up to 1.5x the rated torque are acceptable.



Model BK6

Size		15	30	60	150	300	500	800	1,500
Rated torque (Nm)	T_{KN}	15	30	60	150	300	500	800	1,500
Overall length (inserted) (mm)	$A^{+0.5}$	58 65	68 76	79 89	97 109	113 127	132 145	140 158	157
Outside diameter (mm)	B	49	55	66	81	110	124	133	157
Fit length (mm)	C_1	13.3	21.5	17.5	30	37	32	42.5	53
Fit length (mm)	C_2	29	34	39	49.5	59	68	74	90.5
Inside diameter possible from Ø to Ø H7 (mm)	$D_{1/2}$	10-22	12-24	12-32	15-40	24-56	30-60	40-62	50-75
Fastening screw ISO 4762		M4	M5	M5	M6	M8	M8	M10	M12
Tightening torque of the fastening screw (Nm)	E	3.5	6.5	8	12	30	32	55	110
Diameter of clamping ring (mm)	F	46.5	51	60	74	102	114	126	146
Clamping ring length (mm)	G	9.5	10.5	11.5	17.5	20	23	27	32
Preload compression (mm)		0.2 - 1.0	0.5 - 1.0	0.5 - 1.5	0.5 - 1.5	0.5 - 1.5	1.0 - 2.0	1.0 - 2.0	0.5 - 1.5
Axial recovery force at maximum pretensioning (N)	H	20 12	50 30	70 45	82 52	157 106	140 96	400	650
Moment of inertia (10^{-3} kgm ²)	J_{ges}	0.1 0.12	0.2 0.25	0.4 0.45	2.0 2.5	5.4 6.1	8.4 9.1	17.5	44
Approximate weight (kg)		0.3 0.32	0.5 0.52	0.82 0.84	1.6 1.7	4.1 4.2	6.0 6.3	8.1	16.2
Torsional stiffness (10^3 Nm/rad)	C_T	10 8	20 14	38 28	88 55	225 175	255 245	400	660
axial* ± (mm)		0.5 1	0.5 1	0.5 1	1 2	1.5 2	2.5 3.5	3	2
lateral ± (mm)	Max. values	0.15 0.2	0.2 0.25	0.2 0.25	0.2 0.25	0.25 0.3	0.3 0.35	0.35	0.35
angular ± (degree)		1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1.5	1.5
Lateral spring stiffness (N/mm)	C_f	475 137	900 270	1,200 420	1,550 435	3,750 1,050	2,500 840	2,000	3,600

* in addition to maximum allowable pretension. Higher torques upon request.

BK7

With expanding shaft

15 – 300 Nm



Features

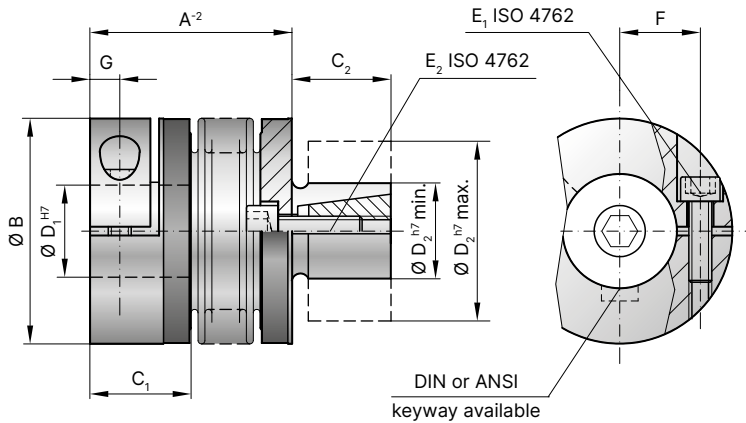
- For hollow shaft mounting
- Short design saves installation space
- Solution for mismatched shaft / bore

Material

- **Bellows:** high grade stainless steel
- **Hubs:** see table
- **Expanding mandrel system:** steel

Design

One clamping hub on one end with an expanding shaft on the other end. Brief overloads of up to 1.5x the rated torque are acceptable.



Model BK7

Size			15	30	60	150	300					
Rated torque (Nm)	T_{KN}		15	30	60	150	300					
Overall length (mm)	A^2		45	52	53	61	62	72	71	83	84	98
Outside diameter (mm)	B		49	55	66	81	110					
Fit length (mm)	C_1		22	27	31	36	43					
Shaft length (mm)	C_2		20	25	27	32	45					
Inside diameter possible from \emptyset to \emptyset H7 (mm)	D_1		8-28	10-30	12-35	19-42	30-60					
Shaft diameter from \emptyset to \emptyset h7 (mm)	D_2		13-28	14-30	23-38	26-45	38-60					
Fastening screw ISO 4762	$E_{1/2}$		M5	M6	M8	M10	M12					
Tightening torque of the fastening screw (Nm)	$E_{1/2}$		8	14	38	65	120					
Distance between centerlines (mm)	F		17	19	23	27	39					
Distance (mm)	G		6.5	7.5	9.5	11	13					
Moment of inertia (10^{-3} kgm ²)	J_{ges}		0.07	0.08	0.14	0.15	0.23	0.26	2.2	2.4	6.5	8.9
Hub material			AL	AL	AL	steel	steel					
Approximate weight (kg)			0.15	0.3	0.4	1.7	4					
Torsional stiffness (10^3 Nm/rad)	C_T		20	15	39	28	76	55	175	110	450	350
axial \pm (mm)			1	2	1	2	1.5	2	2	3	2.5	3.5
lateral \pm (mm)		Max. values	0.15	0.2	0.2	0.25	0.2	0.25	0.2	0.25	0.25	0.3
angular \pm (degree)			1	1.5	1	1.5	1	1.5	1	1.5	1	1.5
Axial spring stiffness (N/mm)	C_a		20	12	50	30	72	48	82	52	105	71
Lateral spring stiffness (N/mm)	C_r		315	108	730	230	1,200	380	1,550	435	3,750	1,050

BK8

With iso flange connection

50 – 2,600 Nm



Features

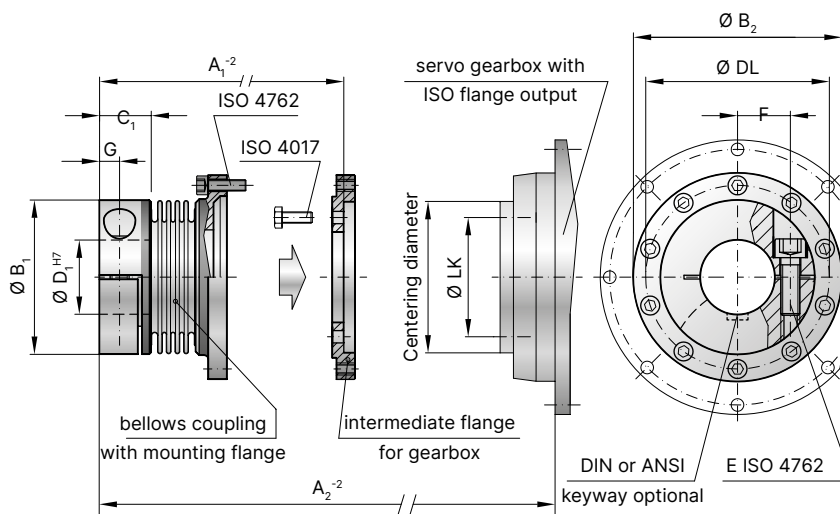
- for ISO flange output gearboxes
- allows for continuous hollow through axis with some right angle gearbox designs
- compact design

Material

- **Bellows:** high grade stainless steel
- **Hubs:** up through size 300 aluminum, size 1500 and up steel
- **Adapter flange:** steel

Design

One clamping hub on one end with an integral flange and adapter flange on the other end. Maximum transmittable torque depends on the bore diameter.



Model BK8

Size			15	60	150	300	1,500
Flange centering diameter	(mm)		40 h7	63 h7	80 h7	100 h7	160 h7
Flange bolt circle / thread Ø	(mm)		31.5 / 8 x M5	50 / 8 x M6	63 / 12 x M6	80 / 12 x M8	125 / 12 x M10
Maximum torque*	(Nm)		50	210	380	750	2,600
Length -2	(mm)	A ₁	48.5	67	72	90	140
Length -2	(mm)	A ₂	68	97	101	128	190
Outside diameter of hub	(mm)	B ₁	49	66	82	110	157
Flange diameter	(mm)	B ₂	63.5	86	108	132	188
Fit length	(mm)	C ₁	16.5	23	27.5	34	55
Inside diameter possible from Ø to Ø H7	(mm)	D ₁	12-28	14-35	19-42	24-60	50-80
Hub bolt circle	(mm)	DL	56.5	76	97	120	170
Fastening threads	(mm)		10 x M4	10 x M5	10 x M6	12 x M6	16 x M8
Fastening screws ISO 4762		E ₁	1 x M5	1 x M8	1 x M10	1 x M12	2 x M20
Tightening torque of the fastening screw	(Nm)		8	45	80	120	470
Distance between centerlines	(mm)	F	1 x 17.5	1 x 23	1 x 27	1 x 39	2 x 55
Distance	(mm)	G	6.5	9.5	11	13	22.5
Approximate weight	(kg)		0.3	0.7	1	2.8	10
Moment of inertia	(10 ⁻³ kgm ²)	J _{ges}	0.15	0.65	1.3	5.5	45
Lateral	± (mm)		0.25	0.25	0.25	0.25	0.25
Angular	± (degree)	Max. values	1	1	1	1	1
Axial	± (mm)		1	1.5	2	2.5	3

