

FLEXIBLE AND TORSIONALLY RIGID.

BK

BELLOWS COUPLINGS

SERIES BK | 15 – 10,000 Nm



R+W[®]
COUPLING TECHNOLOGY

THE ULTIMATE COUPLING FROM 15 – 10,000 Nm

www.rwcouplings.com

TORSIONALLY STIFF METAL BELLOWS COUPLINGS

Areas of application:

- Servo drives
- CNC axes
- Robotic axes
- Manipulators
- Linear actuators
- Printing machines
- Packaging machines
- Woodworking machines
- Textile machinery
- Metal cutting machines

Properties of the product range:

- zero backlash
- high torsional stiffness
- exact transmission of angular motion and torque
- infinite life
- wear and maintenance free
- easy mounting and dismounting
- compensation of axial, lateral and angular shaft misalignment accompanied by quiet, uniform operation

MODEL

PROPERTIES

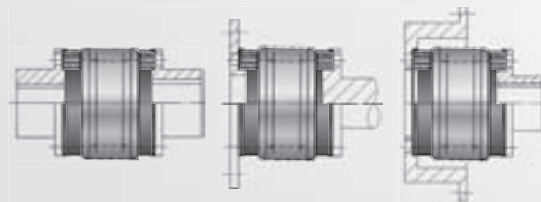
APPLICATION EXAMPLES

BK1



**with flange mounting
from 15-10,000 Nm**

- special design application



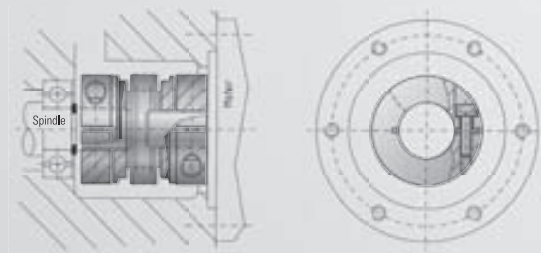
see page 5

BK 2



**with clamping hub
from 15-1,500 Nm**

- easy to mount
- suited for space restricted installations
- low moment of inertia
- finely balanced up to 40,000 rpm



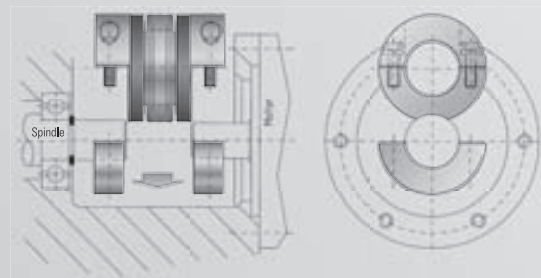
see page 6

BKH



**with split hub
from 15-1,500 Nm**

- for radial mounting
- suited for space restricted installations
- low moment of inertia
- finely balanced up to 40,000 rpm



see page 7

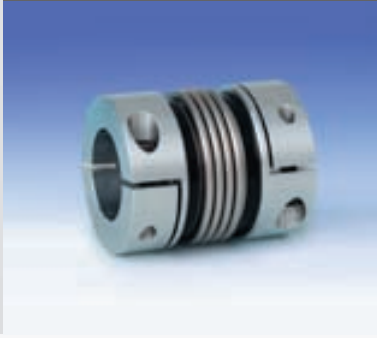
optional
stainless
steel

MODEL

PROPERTIES

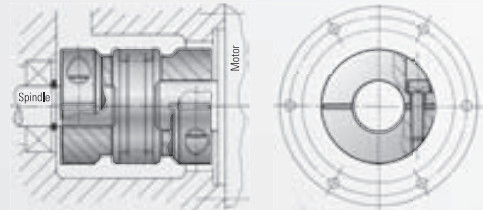
APPLICATION EXAMPLES

BKL



Economy Class with clamping hub from 2-500 Nm

- low cost version
- self opening clamping system optional



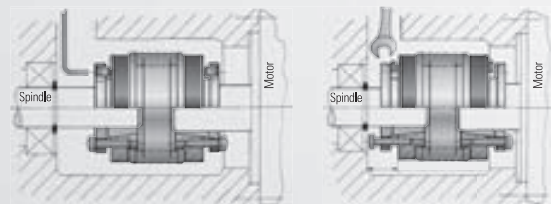
see separate catalog

BK 3



with tapered conical sleeves from 15-10,000 Nm

- high clamping forces
- high degree of operating dependability
- new draw off device suited for space restricted installations



Approach to date

The new approach

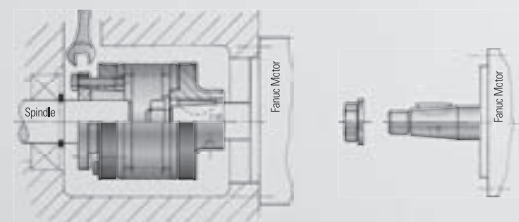
see page 8

BK 4



for Fanuc-drives from 15-80 Nm

- for conical shaft mounting
- easy to assemble
- high clamping forces, due to conical sleeves



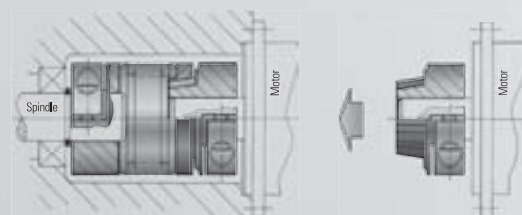
see page 9

BK 5



with tapered press-fit connection from 15-1,500 Nm

- absolutely backlash-free
- easy mounting and dismounting
- wear-free press fit connection
- electrically and thermally insulated



see page 10

TORSIONALLY STIFF METAL BELLOWS COUPLINGS

MODEL

PROPERTIES

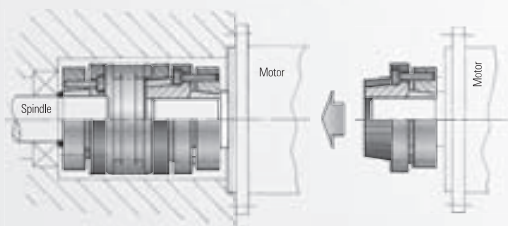
APPLICATION EXAMPLES

BK 6



with conical sleeve and tapered press-fit connection from 15-1,500 Nm

- for axial mounting
- absolutely backlash-free
- easy mounting and dismounting
- wear-free press-fit connection
- electrically and thermally insulated
- high degree of operating dependability



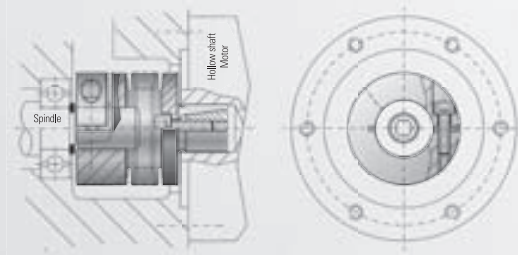
see page 11

BK 7



with expanding shaft from 15-300 Nm

- for hollow shaft mounting
- suited for space restricted installations
- easy mounting



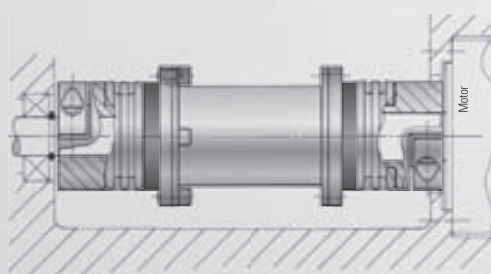
see page 12

ZA



Line shafts with clamping hub from 10-4,000 Nm

- removable intermediate tube section
- no additional bearing necessary
- standart length up to 6 m



see separate catalogue

ATEX



for the use in explosive environments

- available for the full product range
- for hazardous areas 1/21 and 2/22 bellows couplings are registered according to the directive ATEX 95/137

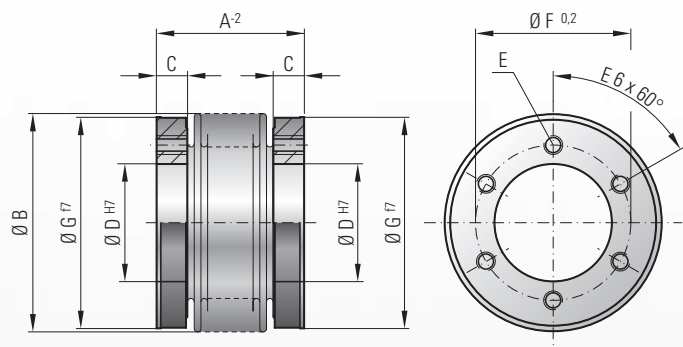


see page 13



MODEL BK1

TECHNICAL SPECIFICATIONS



Ordering example

BK1/150 / 62 /XX

Model
Series / Nm
Overall length
Non standard e.g. stainless steel

Properties:

Material:

Design:

Temperature range:

Speeds:

Service life:

Backlash:

Brief overloads:

Tolerance:

Non-standard application:

■ special design application

Bellows made of highly flexible high grade stainless steel, hub material: steel

The Hubs have six threaded metric mounting holes, and the ID and OD are concentrically machined to ISO H7 tolerances.

Hubs with custom bore size, mounting threads and bolt circles are available upon request.

-30 to +120° C (3.6 F - 270 F)

Up to 10,000 rpm, in excess of 10,000 with finely balanced version.




These couplings are maintenance-free if the technical limits are not exceeded

Absolutely backlash-free due to bolted connection.

Acceptable up to 1.5 times the value specified.

On the hub/shaft connection 0.01 to 0.05 mm

Custom designs with varied tolerances, keyways, non-standard material and bellows are available upon request.

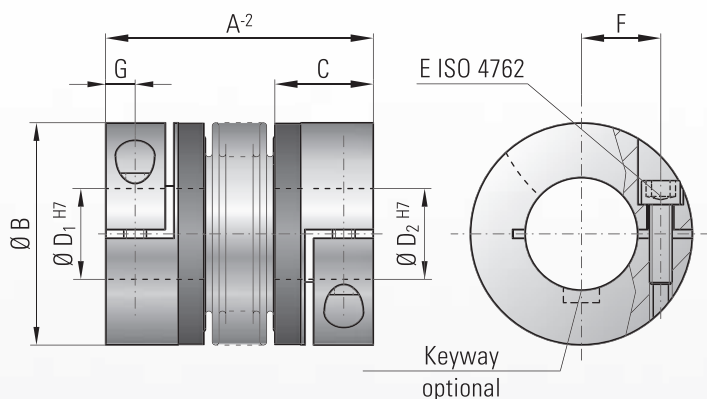
Model BK 1		Series																			
		15		30		60		150		200		300		500		800	1500	4000	6000	10000	
Rated torque (Nm)	T _{KN}	15		30		60		150		200		300		500		800	1500	4000	6000	10000	
Overall length (mm)	A	30	37	36	44	43	53	50	62	53	65	56	70	64	77	81	100	145	138	150	
Outer diameter of bellows (mm)	B	49		55		66		81		90		110		123		133	157	200	253	303	
Fit length thread depth (mm)	C	7.5		10		10		13		14		14		16		18	22	30	30	36	
Inner diameter H7 (mm)	D	25		28		38		50		58		65		70		75	85	100	145	190	
6 x fastening threads	E	M5		M5		M6		M6		M6		M8		M8		M10	M16	M20	8xM20	8xM24	
Hub bolt circle ± 0.2 (mm)	F	35		37		46		62		70		80		94		90	110	140	190	234	
Outer diameter f7 (mm)	G	49		55		66		81		90		110		122		116	140	182	235	295	
Moment of inertia (10 ⁻³ kgm²)	J _{total}	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	
Approx. weight (kg)		0.15		0.2		0.3		0.6		0.8		1.5		1.4		1.6	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	1304	3400	5700	10950	
axial 	Max. values	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 		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	0.4	0.4	0.4
angular 		1.5	2	1.5	2	1.5	2	1.5	2	1.5	2.2	1.5	2.2	1.8	2.3	2.2	2.2	2.5	2.5	2.5	
axial spring stiffness (N/mm)	C _a	25	15	50	30	72	48	82	52	90	60	105	71	70	48	100	320	565	1030	985	
lateral spring stiffness (N/mm)	C _r	475	137	900	270	1200	420	1550	435	2040	610	3750	1050	2500	840	2000	3600	6070	19200	21800	

(1Nm ≙ 8.85 in lbs)



MODEL BK2

TECHNICAL SPECIFICATIONS



Ordering example

BK2 / 80 / 94 / 20 / 22 / XX

Model
Series / Nm
Overall length
Ø D1 H7
Ø D2 H7
Non standard e.g. stainless steel

Properties:

- easy to mount
- suited for space restricted installations
- low moment of inertia

Material:

Bellows made of highly flexible high-grade stainless steel, hub material: see table below

Design:

With a single radial clamping screw per hub ISO 4762. Any imbalance of the clamping hubs is compensated with balancing bores located on the inside of the hub.

Temperature range:

-30 to +120° C (3.6 F - 270 F)

Speeds:

Up to 10,000 rpm, in excess of 10,000 with a finely balanced version.

Service life:

These couplings are maintenance-free if the technical limits are not exceeded.

Backlash:

Absolutely backlash-free due to frictional clamped connection.

Brief overloads:



Acceptable up to 1.5 times the value specified.

Tolerance:

On the hub/shaft connection 0.01 to 0.05 mm

Non-standard application:

Custom designs with varied tolerances, keyways, non-standard material and bellows are available upon request.

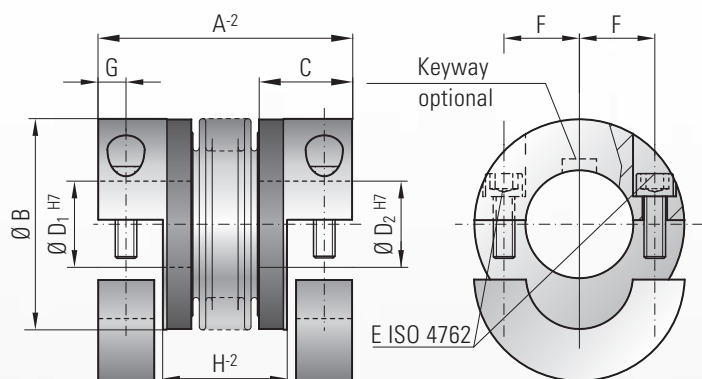
Model BK 2		Series																			
		15		30		60		80		150		200		300		500		800		1500	
Rated torque (Nm)	T _{KN}	15		30		60		80		150		200		300		500		800		1500	
Overall length (mm)	A	59	66	69	77	83	93	94	106	95	107	105	117	111	125	133	146	140	166		
Outer diameter (mm)	B	49		55		66		81		81		90		110		123		134		157	
Fit length (mm)	C	22		27		32		36		36		41		43		51		45		55	
Inner diameter possible from Ø to Ø H7 (mm)	D _½	8-28		10-30		12-32		14-42		19-42		22-45		24-60		35-60		40-75		50-80	
ISO 4762 fastening screw	E	M5		M6		M8		M10		M10		M12		M12		M16		2xM16*		2xM20*	
Tightening torque of the fastening screw (Nm)		8	15	40	50	70	120	130	200	250	470										
Distance between centers (mm)	F	17		19		23		27		27		31		39		41		2x48		2x55	
(mm)	G	6.5		7.5		9.5		11		11		12.5		13		16.5		18		22.5	
Moment of inertia (10 ⁻³ kgm²)	J _{total}	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	49.2		
Hub material (standard) (steel on request)		Al		Al		Al		Al		steel		steel		steel		steel		steel		steel	
Approx. weight (kg)		0.15		0.3		0.4		0.8		1.7		2.5		4		7.5		7		12	
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	1304		
axial  (mm)	Max. values	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		
lateral  (mm)		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		
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		
lateral spring stiffness (N/mm)	C _r	475	137	900	270	1200	420	920	290	1550	435	2040	610	3750	1050	2500	840	2000	3600		

(1 Nm \approx 8.85 in lbs) max. angular misalignment see BK 1 * two screws each hub, 180° apart



MODEL BKH

TECHNICAL SPECIFICATIONS



Ordering example

BKH / 80 / 94 / 20 / 22 / XX

Model
Series / Nm
Overall length
Ø D1 H7
Ø D2 H7
Non standard e.g. stainless steel



Properties:

- easy to mount
- suited for space restricted installations
- low moment of inertia

Material:

Bellows made of highly flexible high-grade stainless steel, hub material: see table below

Design:

Both clamping hubs are completely removable, due to split hubs and two radial screws ISO 4762 on each hub. Any imbalance of the clamping hubs is compensated with balancing bores located on the inside of the hub.

Temperature range:

-30 to +120° C (3.6 F - 270 F)

Speeds:

Up to 10,000 rpm, in excess of 10,000 with a finely balanced version.

Service life:

These couplings are maintenance-free if the technical limits are not exceeded.

Backlash:

Absolutely backlash-free due to frictional clamped connection.

Brief overloads:



Acceptable up to 1.5 times the value specified.

Tolerance:

On the hub/shaft connection 0.01 to 0.05 mm

Non-standard application:

Custom designs with varied tolerances, keyways, non-standard material and bellows are available upon request.

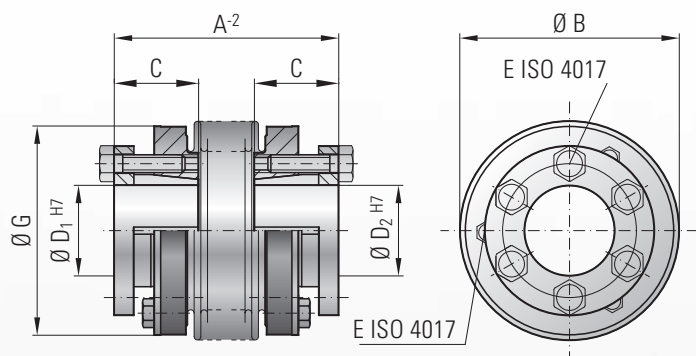
Model BK H			Series																			
			15		30		60		80		150		200		300		500		800		1500	
Rated torque (Nm)	T _{KN}		15		30		60		80		150		200		300		500		800		1500	
Overall length (mm)	A		59	66	69	77	83	93	94	106	95	107	105	117	111	125	133	146	140		166	
Outer diameter (mm)	B		49		55		66		81		81		90		110		123		134		157	
Fit length (mm)	C		22		27		32		36		36		41		43		51		45		55	
Inner diameter possible from Ø to Ø H7 (mm)	D _½		8-28		10-30		12-32		14-42		19-42		22-45		24-60		35-60		40-75		50-80	
ISO 4762 fastening screw	E		M5		M6		M8		M10		M10		M12		M12		M16		M16		M20	
Tightening torque of the fastening screw (Nm)			8		15		40		50		70		120		130		200		250		470	
Distance between centers (mm)	F		17		19		23		27		27		31		39		41		48		55	
	G		6.5		7.5		9.5		11		11		12.5		13		16.5		18		22.5	
Distance (mm)	H		29	36	35	43	41	51	47	59	48	60	51	63	55	69	62	75	65.5		71	
Moment of inertia (10 ⁻³ kgm²)	J _{total}		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		49.2	
Hub material (standard) (steel on request)			Al		Al		Al		Al		steel		steel		steel		steel		steel		steel	
Approx. weight (kg)			0.15		0.3		0.4		0.8		1.7		2.5		4		7.5		7		12	
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		1304	
axial  (mm)	Max. values		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	
lateral  (mm)			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	
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	
lateral spring stiffness (N/mm)	C _r		475	137	900	270	1200	420	920	290	1550	435	2040	610	3750	1050	2500	840	2000		3600	

(1Nm ± 8.85 in lbs) max. angular misalignment see BK 1



MODEL BK3

TECHNICAL SPECIFICATIONS



Ordering example

BK3 / 60 / 76 / 20 / 22 / XX

Model
Series / Nm
Overall length
Ø D1 H7
Ø D2 H7
Non standard e.g. stainless steel



Properties:

- high clamping forces
- high degree of operating dependability
- new draw off device suited for space restricted installations

Material:

Bellows made of highly flexible high-grade stainless steel, the hub material is steel.

Design:

With tapered conical sleeves and strong, captive ISO 4017 draw-off screws.

Temperature range:

-30 to +120° C (3.6 F - 270 F)

Speeds:

Up to 10,000 rpm, in excess of 10,000 with a finely balanced version.

Service life:

These couplings are maintenance-free if the technical limits are not exceeded.

Backlash:

Absolutely backlash-free due to frictional clamped connection.

Brief overloads:



Acceptable up to 1.5 times the value specified.

Tolerance:

On the hub/shaft connection 0.01 to 0.05 mm

Non-standard application:

Custom designs with varied tolerances, keyways, non-standard material and bellows are available upon request.

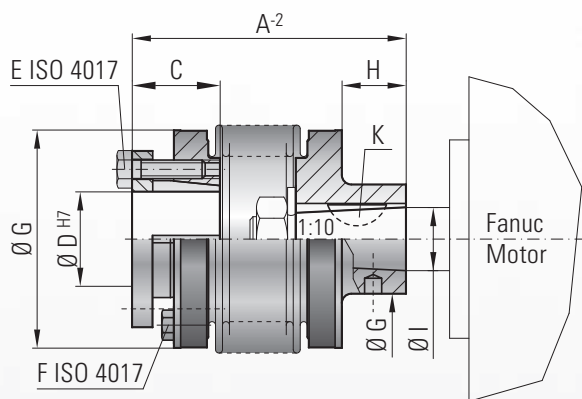
Model BK 3		Series																								
		15		30		60		150		200		300		500		800		1500		4000		6000		10000		
Rated torque	(Nm)	T _{KN}	15		30		60		150		200		300		500		800		1500		4000		6000		10000	
Overall length	(mm)	A	48	55	57	65	66	76	75	87	78	90	89	103	97	110	114	141	195	210			217			
Outer diameter of bellows	(mm)	B	49		55		66		81		90		110		123		133		157		200		253		303	
Fit length	(mm)	C	19		22		27		32		32		41		41		50		61		80		85		92	
Inner diameter from Ø to Ø H7	(mm)	D	10-22		12-23		12-29		15-38		15-44		24-56		24-60		30-60		35-70		50-100		60-140		70-180	
Fastening screws 6x		E	M4		M5		M5		M6		M6		M8		M8		M10		M12		M16		M16		8xM16	
Tightening torque of the fastening screws	(Nm)		4	6		8		12		14		18		25		40		70		120		150		160		
ISO 4017 draw-off screw 3x		F	M4		M4		M5		M5		M6		M6		M6		M6		M8		M10		M10		4xM10	
Outer diameter of hub	(mm)	G	49		55		66		81		90		110		122		116		145		175		246		295	
Moment of inertia	(10 ⁻³ kgm²)	J _{total}	0.12	0.59	0.3	0.34	0.54	0.73	1.2	1.6	1.7	2.5	2.95	5.8	9.1	9.9	13.2	34.9	85.5	254			629			
Approx. 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	1304	3400	5700			10950			
axial 	(mm)	Max. values	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			3	
lateral 	(mm)		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	
axial spring stiffness	(N/mm)	C _a	25	15	50	30	72	48	82	52	90	60	105	71	70	48	100	320	565	1030			985			
lateral spring stiffness	(N/mm)	C _r	475	137	900	270	1200	420	1500	435	2040	610	3750	1050	2500	840	2000	3600	6070	19200			21800			

(1Nm ≙ 8.85 in lbs) max. angular misalignment see BK 1



MODEL BK4

TECHNICAL SPECIFICATIONS



Ordering example

BK4/150 / 82 / 20 / XX

Model
Series / Nm
Overall length
Ø D H7
Non standard e.g. stainless steel



for Fanuc-Motors

Properties:

- for conical shafts
- easy mounting and dismounting
- high degree of operating dependability

Material:

Bellows made of highly flexible high-grade stainless steel, the hub material is steel.

Design:

Spindle-side:
With conical sleeves and strong captive ISO 4017 draw-off screws

Motor-side:
Conical hub 1 : 10 and a keyway.

Temperature range:

-30 to +120° C (3.6 F - 270 F)

Speeds:

Up to 10,000 rpm, over 10,000 rpm with a finely balanced version.

Service life:

These couplings are maintenance-free if the technical limits are not exceeded.

Backlash:

Absolutely backlash-free due to frictional clamped connection.

Brief overloads:

Acceptable up to 1.5 times the value specified.

Tolerance:

On the hub/shaft connection 0.01 to 0.05 mm

Custom Designs:

With varied tolerances, keyways, non-standard material, and bellows are available upon request.

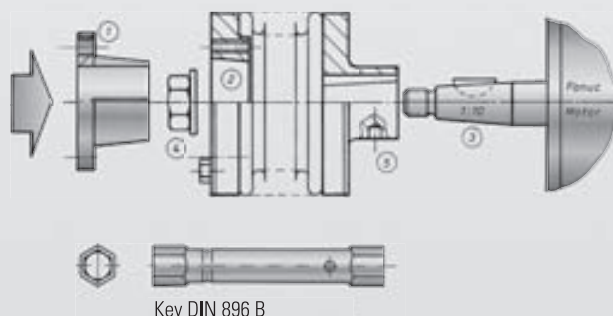
Model BK 4		Series							
			15	30	60	150			
Rated torque (Nm)	T _{KN}		15	30	60	150			
Overall length (mm)	A	47	54	68	76	72	82	82	94
Outer diameter of bellows (mm)	B	49	55	66	81				
Fit length (mm)	C	19	22	27	32				
Inner diameter from Ø to Ø H7 (mm)	D	10-22	12-23	12-29	15-37				
Fastening screws 6x	E	M4	M5	M5	M6				
Tightening torque of the fastening screws (Nm)		4	6	8	12				
DIN 933 draw-off screw 3x	F	M4	M4	M5	M5				
Shaft diameter (mm)	G	20	27	30	30				
Shaft length (mm)	H	8.5	22	18	20				
Moment of inertia (10 ⁻³ kgm ²)	J _{total}	0.10	0.12	0.22	0.27	0.58	0.61	1.1	1.4
Approx. weight (kg)		0.25	0.4	0.8	1.35				
Torsional stiffness (10 ⁻³ Nm/rad)	C _T	20	15	39	28	76	55	175	110
axial (mm)	Max. values	1	2	1	2	1.5	2	2	3
lateral (mm)		0.15	0.2	0.2	0.25	0.2	0.25	0.2	0.25
axial spring stiffness (N/mm)	C _a	25	15	50	30	72	48	82	52
lateral spring stiffness (N/mm)	C _r	475	137	900	270	1200	420	1500	435
cone Ø (Fanuc Motor)	I	11	16	16	16				
Keyway wide (mm)	K	4	5	5	5				

(1Nm ≈ 8.85 in lbs) Higher torques on request max. angular misalignment see BK 1

Technical instructions:

Before mounting the coupling, the conical sleeve (1) has to be removed. After sliding the coupling on to the motor shaft (3) the nut (4) can be put on through the bellowsbody (4).

To tighten the nut a special key DIN 896 B is used. The boring (5) is used for holding while tightening the nut.

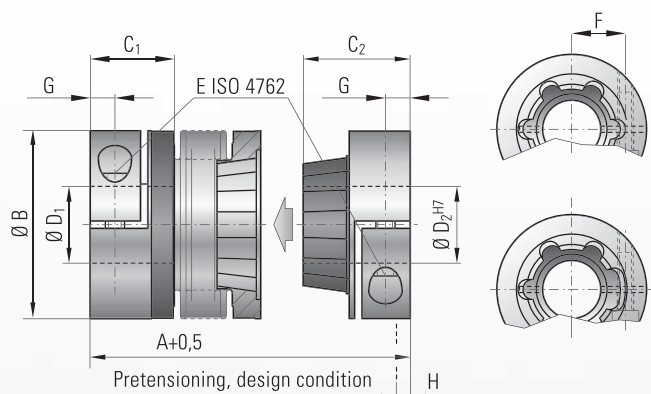


Key DIN 896 B



MODEL BK5

TECHNICAL SPECIFICATIONS



Ordering example BK 5 / BK 6

BK5 / 30 / 71 / 18 / 19 / XX

Model
Series / Nm
Overall length
Ø D1 H7
Ø D2 H7
Non standard e.g. stainless steel

Properties:

Temperature range:

Speeds:

Service life:

Backlash:

Brief overloads:

Tolerance:

Material BK 5:

Design BK 5:

Press-fit precision metal bellows couplings

Design details BK 5 / BK 6

- absolutely backlash-free and torsionally stiff
- easy mounting and dismounting
- electrically and thermally insulated
- wear-free and maintenance-free
- low moment of inertia
- compensation for misalignment

-30 to +120° C (3.6 F - 270 F)

Up to 10,000 rpm, over 10,000 rpm with a finely balanced version.

These couplings have an infinite life and are maintenance-free if the technical specifications are not exceeded.



Absolutely backlash-free due to frictional clamped connection and axial pretensioning of the tapered press-fit segments.

Acceptable up to 1.5 times the value specified.

On the hub/shaft connection 0.01 to 0.05 mm

Bellows made of highly flexible, high-grade stainless steel; clamping hubs up to series 80 aluminium 150 and up steel. Tapered segment on hub face: glass-fiber reinforced plastic sprayed onto an aluminium hub.

One side with a single radial clamping screw ISO 4762. One side includes backlash-free clamping hub and tapered press-fit device. Any imbalance of the clamping hub, is compensated with balancing bores located on the inside of the hub.

Model BK 5			Series																	
			15		30		60		80		150		300		500		800		1500	
Rated toque	(Nm)	T _{KN}	15		30		60		80		150		300		500		800		1500	
Overall length (inserted)	(mm)	A	60	67	71	79	85	95	94	106	95	107	114	128	136	149	150	172	172	172
Outer diameter	(mm)	B	49		55		66		81		81		110		123		133		157	
Fit length	(mm)	C ₁	22		27		32		36		36		43		51		45		55	
Fit length	(mm)	C ₂	28		33		39		43		43		52		61		74		94	
Inner diameter from from Ø to Ø H7	(mm)	D ₁	8-28		10-30		12-32		14-42		14-42		30-60		35-60		40-75		50-80	
Inner diameter from from Ø to Ø H7	(mm)	D ₂	8-22		10-25		12-32		14-38		14-38		30-58		35-60		40-62		50-75	
ISO 4762 screw		E	M5		M6		M8		M10		M10		M12		M16		2xM16*		2xM20*	
Tightening torque	(Nm)		8	15		40		50		70		130		200		250		470		
Distance between centers	(mm)	F	17		19		23		27		27		39		41		2x48*		2x55*	
	(mm)	G	6.5		7.5		9.5		11		11		13		16.5		18		22.5	
Pretensioning approx.	(mm)	H	0.2 up to 1.0		0.5 up to 1.0		0.5 up to 1.5		0.5 up to 1.5		0.5 up to 1.5		0.5 up to 1.5		1.0 up to 2.0		1.0 up to 2.5		1.0 up to 2.5	
Axial recovery force of coupling max.	(N)		20	12	50	30	70	45	48	32	82	52	157	106	140	96	200	650	650	650
Mass moment of inertia	(10 ⁻³ kgm²)	J _{total}	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	26.2	51.4	51.4	51.4
Approx. 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	8.2	15.3	15.3	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	650	650
axial*	 (mm)	Max.	0.5	1	0.5	1	0.5	1	1	2	1	2	1.5	2	2.5	3.5	3	2	2	2
lateral	 (mm)	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	0.35	0.35
Lateral spring stiffness	(N/mm)	C _r	475	137	900	270	1200	420	920	290	1550	435	3750	1050	2500	840	2000	3600	3600	3600

(1Nm ± 8.85 in lbs)

* allowed following maximum pretensioning

* two screws each hub, 180° apart

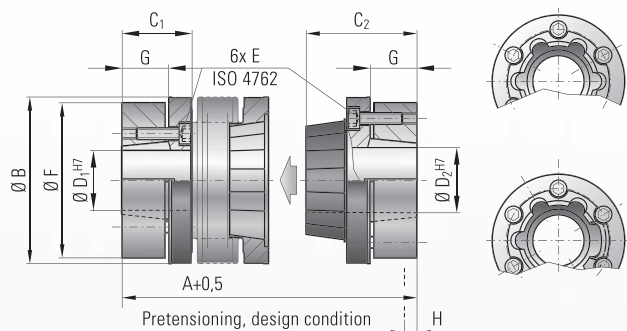
Higher torques on request

Missing bellows values see BK1

optional
stainless
steel

MODEL BK6

TECHNICAL SPECIFICATIONS



Material BK 6:

Press-fit precision metal bellows couplings

Bellows made of highly flexible, high-grade stainless steel; conical sleeves and tapered segment on bellows face are made of steel.

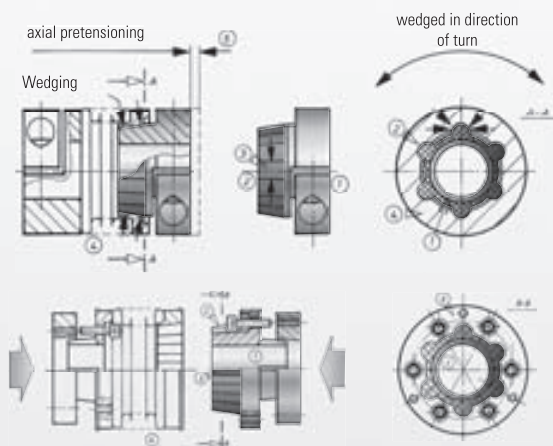
Tapered segment on hub face: glass-fiber reinforced plastic sprayed onto a steel hub.

Design BK 6:

One side conical sleeve with 6 fastening screws ISO 4762 and 3 draw-off threads. One side with backlash-free tapered conical sleeve with press-fit connection and 3 draw-off screws

axial mounting for space constrained applications

Design details BK 5 / BK 6



Due to the press-fit design the complete drive unit can be simply removed to the rear when servicing is required.

Six self-centering, tapered drive projections (2) have been formed into the plastic conical element, which has been molded onto an aluminium hub (1). The six axially arranged projections are configured conically in a longitudinal direction (3). The mating piece consists of a metal bellows with a tapered mounting (4). Absolutely backlash-free torque transmission is ensured due to the axial pretensioning (5) of the metal bellows during its mounting. This slight pretensioning has no negative influence on the operation of the metal bellows coupling or of the shaft bearing.

Material description of the plastic segment:

This is a glass-fiber reinforced plastic of the duromer group. With a glass-fiber content of 65% it achieves a strength roughly that of steel.

Model BK 6		Series															
		15		30		60		150		300		500		800		1500	
Rated torque (Nm)	T _{KN}	15		30		60		150		300		500		800		1500	
Overall length (inserted) (mm)	A	58	65	68	76	79	89	97	109	113	127	132	145	140		158	
Outer diameter (mm)	B	49		55		66		81		110		123		133		157	
Fit length (mm)	C ₁	13.5		16.5		18		23.5		27		32		42		50	
Fit length (mm)	C ₂	29		34		39		49.5		59		68		74		95	
Inner diameter from Ø to Ø H7 (mm)	D ₁	10-22		12-24		12-32		15-40		24-56		30-60		40-62		50-72	
Inner diameter from Ø to Ø H7 (mm)	D ₂	10-22		12-24		12-32		15-40		24-56		30-60		40-62		50-72	
ISO 4762 screw	E	M4		M5		M5		M6		M8		M8		M10		M12	
Tightening torque (Nm)		3.5		6.5		8		12		30		32		55		110	
Diameter of clamping cone (mm)	F	46.5		51		60		74		102		114		126		145	
(mm)	G	9.5		10.5		11.5		17.5		20		23		27		32	
Pretensioning approx. (mm)	H	0.2 up to 1.0		0.5 up to 1.0		0.5 up to 1.5		0.5 up to 1.5		0.5 up to 1.5		1.0 up to 2.0		1.0 up to 2.0		1.0 up to 2.0	
Axial recovery force of coupling max. (N)		20		12		50		30		70		45		82		52	
Moment of inertia (10 ⁻³ kgm ²)	J _{total}	0.1	0.12	0.2	0.25	0.4	0.45	2.0	2.5	5.4	6.1	8.4	9.1	19.5		44	
Approx. 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	9.4		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)	Max. values	0.5	1	0.5	1	0.5	1	1	2	1.5	2	2.5	3.5	3		2	
lateral (mm)		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	
Lateral spring stiffness (N/mm)	C _L	475	137	900	270	1200	420	1550	435	3750	1050	2500	840	2000		3600	

(1Nm ≙ 8.85 in lbs)

* allowed following maximum pretensioning

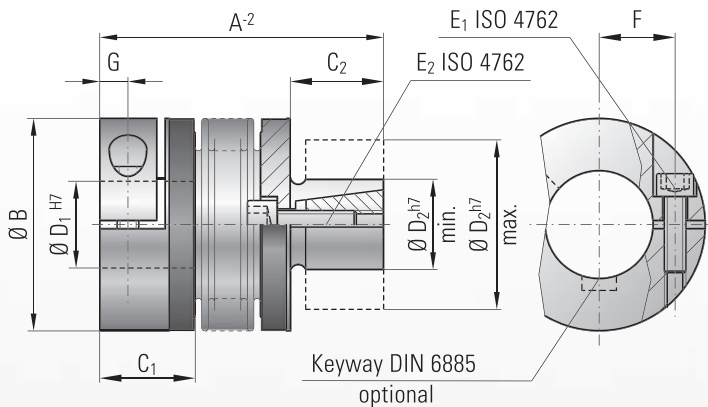
Higher torques on request.

Missing bellows values see BK1



MODEL BK7

TECHNICAL SPECIFICATIONS



Ordering example

BK7 / 150 / 71 / 32 / 35 / XX

Model
Series / Nm
Overall length
Ø D1 H7
Ø D2 h7
non standard

Properties:

- compact design, conserves space while saving cost
- easy mounting
- backlash-free and torsionally stiff
- low moment of inertia
- compensation of misalignment

Material:

Bellows made of highly flexible high-grade stainless steel, hub material: see in the table, Expanding hub and cone (steel).

Design:

On one side with a single radial clamping screw ISO 4762. On one side an expanding shaft with tapered clamping element.

Temperature range:

-30 to +120° C (3.6 F - 270 F)

Speeds:

Up to 10,000 rpm, over 10,000 rpm with a finely balanced version.

Service life:

These couplings have an infinite life and are maintenance-free if the technical specifications are not exceeded.

Backlash:

Absolutely backlash-free due to frictional clamped connection.

Brief overloads:

Acceptable up to 1.5 times the value specified.

Tolerance:

On the hub/shaft connection 0.01 to 0.05 mm

Custom Designs:

With varied tolerances, keyways, non-standard material, and bellows are available upon request.



Model BK 7

Series

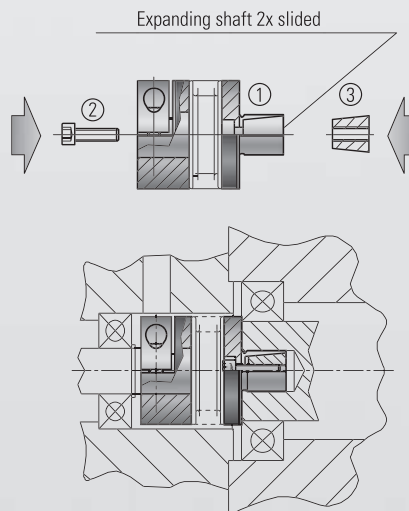
		15	30	60	150	300
Rated torque (Nm)	T _{KN}	15	30	60	150	300
Overall length (inserted)(mm)	A	45 52	53 61	62 72	71 83	84 98
Outer diameter (mm)	B	49	55	66	81	110
Fit length (mm)	C ₁	22	27	32	36	43
Inner diameter from Ø to Ø H7 (mm)	D ₁	8-28	10-30	12-37	19-42	30-60
Fit length (mm)	C ₂	20	25	27	32	45
Shaft diameter from Ø to Ø h7 (mm)	D ₂	13-25	14-30	23-38	26-42	38-60
ISO 4762 fastening screw	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 centers (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 _{total}	0.07 0.08	0.14 0.15	0.23 0.26	2.2 2.4	6.5 8.9
Hub material (standard) (steel on request)		Al	Al	Al	Steel	Steel
Approx. 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 (mm)	Max. values	1 2	1 2	1.5 2	2 3	2.5 3.5
lateral (mm)	values	0.15 0.2	0.2 0.25	0.2 0.25	0.2 0.25	0.25 0.3
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	1200 380	1550 435	3750 1050

(1Nm ≅ 8.85 in lbs)

Max. angular misalignment 1 degree

Installation instructions:

By tightening the screw through the bellow body, the shaft is expanded. The coupling is designed for high dynamic hollowshaft connections eg. gear boxes. Recommended bore tolerance: ISO H7





MODEL ATEX

FOR USE IN HAZARDOUS AREAS AND EXPLOSIVE ATMOSPHERE

The ATEX 95 / ATEX 137 is regulated by the new European directive. Generally the explosive atmosphere is classified in 3 different zones.

Zone 0:

A place in which an explosive atmosphere is consisting out of a mixture of air and flammable substances in the form of gas, vapor or mist is present frequently, continuously or for longer periods.

Zone 20:

Is relevant for an explosive atmosphere in the form of clouds of combustible dust in air under the same conditions as above.

Zone 1:

Described as a place in which an explosive atmosphere is existing of a mixture of air and flammable substances in the form of gas, vapor or mist is likely to occur in normal operation occasionally.

Zone 21:

Is relevant for an explosive atmosphere in the form of clouds of combustible dust in air under the same conditions as above.

Zone 2:

A Place in which an explosive atmosphere is consisting out of mixture with air of flammable substances in the form of gas, vapor or mist is not likely to occur in normal operation but, if it does occur, it will persist for a short period only.

Zone 22:

Relevant for an explosive atmosphere in the form of a cloud of combustible dust in air under the same conditions as above.

For the classified zones 1/21 and 2/22 the metal bellows couplings BK-EEEx do have an accreditation according to ATEX 95/137

Mounting, Design:

Installation and Operation instructions:

Identification:

Example Accreditation data:



AT mosphere EX plosible

For security reasons all misalignment values and torque ratings are decreased by 20%

Installation and operating instructions are an essential part of the BK-EEEx metal bellows couplings.

Including the following facts:

- Design of the BK EEx metal bellows couplings
- Exact tightening torques and misalignment values
- How to put in operation
- Maintenance intervals
- Trouble shooting
- Marking of the coupling
- Declaration of conformity

All BK-EEEx couplings are permanent labeled to display manufacturer and accreditation data.



Type: BKL 150 EEx-2003
II 2 G D
EEx II c 40°C
Ser.No.: A 44305
Tech.Ref.No.:2003/003RW

Design of the BK-EEEx metal bellows couplings

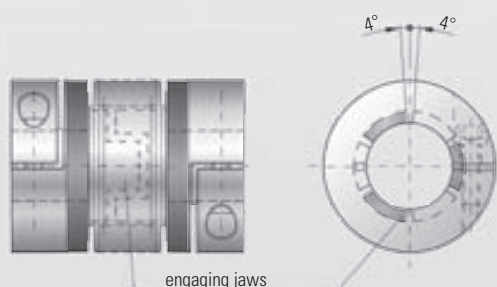
All BK-EEEx metall bellows couplings are designed that neither sparking nor an increasing in excess of the allowable temperature at the surface can occur, even while malfunctions.

All dimensions of the standard models are retained. The coupling hubs are generally equipped with internal jaws for additional support of the bellows. If the bellows were to tear or break, the internal jaws would eliminate the risk of sparking or heating and continue to drive the load. In case of damage the angle of turn between the driving and the driven side is $\pm 4^\circ$ degrees . All hubs are made of steel or stainless steel materials only.

ATTENTION!

A monitoring of the driving- and driven face is required.

The shut off function has to take place immediately.



THE SELECTION

THE SELECTION PROCESS FOR TORSIONALLY STIFF METAL BELLOWS COUPLINGS

According to torque

In most cases couplings are rated according to the maximum peak torque to be regularly transmitted.

The peak torque may not exceed the rated torque of the coupling.

By rated torque we mean: the torque that is continuously transmittable within the specified acceptable speed and misalignment ranges.

The following calculation has proven itself to be a good rule of thumb:

$$T_{KN} \geq 1,5 \cdot T_{AS} \quad (\text{Nm})$$

T_{KN} = rated torque of coupling (Nm)

T_{AS} = peak torque of motor (Nm)

According to acceleration torques

For precise rating, the acceleration torque and moments of inertia of the entire machine have to be taken into consideration.

In the case of servo motors ensure that their acceleration or deceleration torque is greater than their torque by a multiple.

S_A = Shock or load factor

S_A = 1 (uniform load)

S_A = 2 (non-uniform load)

S_A = 3-4 (Shocking load)

Values for S_A = 2-3 are usual for servo drives on machine tools.

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

T_{KN} = rated torque of coupling (Nm)

T_{AS} = max. acceleration torque on the on the drive face (Nm)

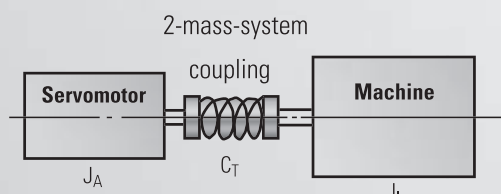
- or max. deceleration torque of the load face (Nm)

J_L = machine's moment of inertia (Spindle + slide + workpiece+ half of coupling) (kgm²)

J_A = motor's moment of inertia (kgm²)

According to resonance frequency

For the mech. substitutional model of the 2-mass-system is valid:



As a value of practise is valid: $f_e \geq 2 \times f_{er}$

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

C_T = torsional stiffness of the coupling (Nm/rad)

f_e = resonance frequency of the 2 mass system (Hz)

f_{er} = frequency of the drive (Hz)

According to torsional stiffness

Transmission errors due to the torsional load:

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

φ = angle of turn (degrees)

C_T = torsional stiffness of coupling (Nm/rad)

T_{AS} = max. torque (Nm)

INSTALLATION INSTRUCTIONS

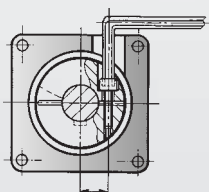
SERIES BK

Misalignments



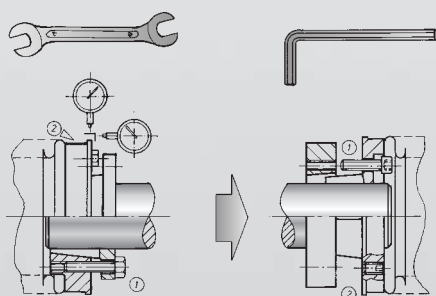
- When mounting the coupling ensure that the metal bellows are not damaged or bent.
- During mounting, the torque and axis misalignments may exceed 2 times the value specified without the operation of the coupling being restricted.
- However, for continuous operation, the axial and lateral misalignments specified in the catalog must not be exceeded. Only then the coupling will provide infinite performance.
- **Lateral axis misalignment requires special attention (see table values).**
- In the case of models BK 2/3/4/5/6 the tolerance between shaft/hub connection must not exceed 0.01 and 0.05 mm.
- Prior to mounting check for smooth running of the coupling hub on the shaft.
- Prior to mounting, make sure that the shaft is slightly oiled. Shaft keyways have no effect upon the function of the clamped connection.

Model BK 2 / BK 5 page 6 / page 10



- The torque values of the fastening screws must be precisely applied in order to ensure secure clamping of the hubs.
- The dimensions for application of the mounting bore can be found under „F“ and „G“ in the table.
- No additional securing of the screw is necessary. Loosening of the fastening screws is sufficient to dismount the coupling.

Model BK 3 / BK 4 / BK 6 page 8 / page 9 / page 11

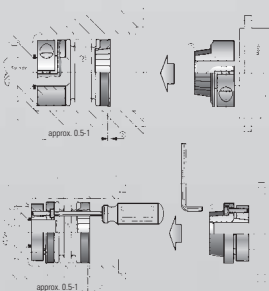


- It is absolutely essential that the fastening screws (1) are evenly tightened.
- Perform tightening of the fastening screws crosswise in order to avoid any distortion of the coupling hubs.
- Extraction of the tapered bushings for repair purposes is possible by means of 3x captive hexagonal draw-off screws (2).
- When dismounting assure during draw off that constant, synchronous unscrewing of the 3x hexagon screws is maintained.

The alignment surfaces on the outer faces of the hubs are for the purpose of checking hub distortion during mounting and for retromasurement of the misalignment of the axes.

Caution! An increase of tension on the tapered bushings is still achievable even after the screws have been tightened several times crosswise (max.3 times). This must be avoided without fail, otherwise destruction of the clamped connection may be the result.

Model BK 5 / BK 6 page 10 / page 11



- The press-fit couplings do not need mounting holes on the intermediate flange. Model BK 6 will be mounted axial.
 - The six axially arranged projections (1) are configured conically in a longitudinal direction. Due to this a axial pretensioning (2) is needed.
The metal bellows (3) is used as a spring
 - Please maintain the pretensioning values which are printed in the table (page 8 + 9)
- Caution! When mounting the drive unit the pretensioning must be noticed.**

**Experience and
Know-how
for your special
requirements.**

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TGA-ZM-05-91-00
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THE R+W-PRODUCT RANGE



TORQUE LIMITERS Series SK

From 0,1 – 2.800 Nm, Bore diameters 4 – 100 mm
Available as a single position, multi-position, load holding, or full disengagement version
Single piece or press-fit design



BELLOWS COUPLINGS Series BK

From 15 – 10.000 Nm
Bore diameters 10 – 180 mm
Single piece or press-fit design



BELLOWS COUPLINGS ECONOMY CLASS Series BKL

From 2 – 500 Nm
Bore diameters 4 – 62 mm



LINE SHAFTS Series ZA/ZAe

From 10 – 4.000 Nm
Bore diameters 10 – 100 mm
Available up to 6 mtr. length



MINIATURE BELLOWS COUPLINGS Series MK

From 0,05 – 10 Nm
Bore diameters 1 – 28 mm
Single piece or press-fit design



SERVO-INSERT-COUPLINGS SERVOMAX Series EK

From 5 – 2.000 Nm, Shaft diameters 5 – 80 mm
backlash-free, press-fit design



LINEAR COUPLINGS Series LK

From 70 – 2.000 N
Thread M5 – M16



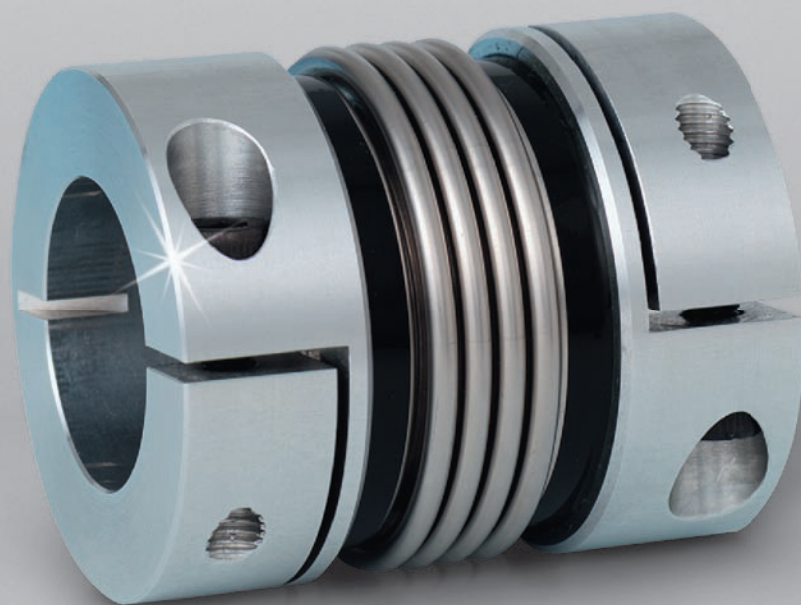
POLYAMID COUPLINGS MICROFLEX Series FK 1

Rated torque 1 Ncm
Bore diameters 1 – 1,5 mm

LOW COST AND RELIABLE.

ECONOMY CLASS BELLOWS COUPLINGS

SERIES BKL | 2 – 500 Nm



R+W[®]
COUPLING TECHNOLOGY

THE ULTIMATE COUPLING FROM 2 – 500 Nm

www.rwcouplings.com

MODEL BKL

Areas of application:

for high dynamic servo drives of:

- Machine tools
- CNC milling / grinding machines
- Woodworking machines
- Assembly machines
- Automated plants
- Textile machines
- Industrial robots
- Processing machines
- Printing machinery
- Packaging machines

Properties:

- high degree of torsional stiffness
- compensates axial, lateral and angular misalignment combined with quiet, smooth operation
- exact angular transmission of motion and torque
- infinite life and maintenance free

The selection process for model series BKL

■ According to torque:

In most cases the couplings are rated according to the maximum peak torque to be regularly transmitted.

The peak torque may not exceed the rated torque of the coupling.

By rated torque we assume: the torque that is continuously transmitted within the specified acceptable speed and misalignment ranges.

The following calculation has proven to be a good rule of thumb:

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

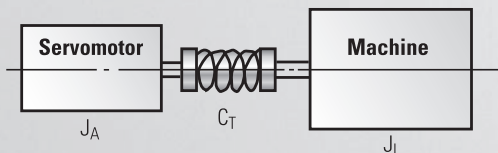
T_{KN} = rated torque of coupling (Nm)

T_{AS} = peak torque of motor (Nm)

■ According to resonance frequency:

For the mech. substitutional model of the 2-mass-system is valid:

2-mass-system



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

As a value of practice is valid: $f_e \geq 2 \times f_{er}$

C_T = torsional stiffness of the coupling (Nm/rad)

f_e = resonance frequency of the 2-mass-system (Hz)

f_{er} = frequency of the drive (Hz)

■ According to torsional stiffness:

Transmission errors due to the torsional load on the metal bellows:

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

φ = angle of turn (degrees)

C_T = torsional stiffness of coupling (Nm/rad)

T_{AS} = max. torque (Nm)

■ According to acceleration torques:

For precise rating, the acceleration torque and moments of inertia of the entire machine or plant have to be taken into consideration.

In the case of servo motors ensure that their acceleration or deceleration torque is higher than their nominal torque by a multiple.

S_A = shock or load factor

$S_A = 1$ (uniform load)

$S_A = 2$ (non-uniform load)

$S_A = 3-4$ (shocking load)

Values for $S_A = 2-3$ are usual for servo drives on machine tools.

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

T_{KN} = rated torque of coupling (Nm)

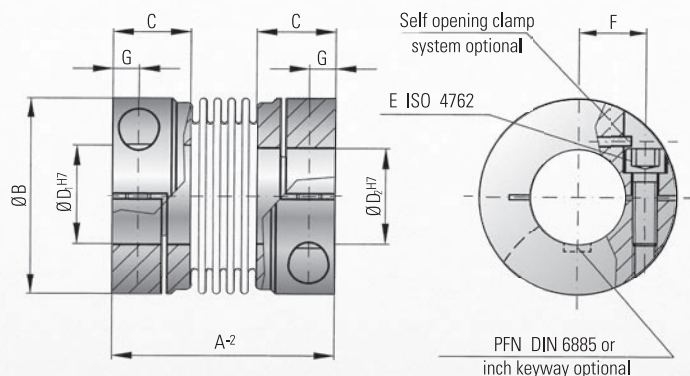
T_{AS} = max. acceleration torque on the drive face (Nm)

- or max. deceleration torque on the load face (Nm)

J_L = machine's moment of inertia (kgm²)
(Spindle + slide + workpiece + half of coupling)

J_A = motor's moment of inertia

optional
stainless
steel



Ordering example

BKL / 80 / 26 / 22 / XX

Model
Series/Nm
Ø D1 H7
Ø D2 H7
non standard

Properties:

- easy to mount
- suited for space restricted installations
- low moment of inertia
- economically priced

Material:

Bellows made of highly flexible high-grade stainless steel

Design:

Hub material see technical specifications table

With a single radial clamping screw per hub ISO 4762.

Self opening clamp system optional:
Loosening the clamping screw applies force to the pin, which will force the clamp into the open position for easy mounting and dismounting.

Temperature

range:

-30 to +100° C (3,6 F to 237 F)

Backlash:

Absolutely backlash-free due to frictional clamped connection.

Service life:



These couplings have an infinite life and are maintenance-free if the technical specifications are not exceeded.

Tolerance:

On the hub/shaft connection 0.01 to 0.05 mm.

Non standard:

Custom designs with varied tolerances, keyways, non-standard material and bellows are available upon request.

Model BKL			Series												
			2	4.5	10	15	30	60	80	150	300	500			
Rated torque	(Nm)	T _{KN}	2	4.5	10	15	30	60	80	150	300	500			
Overall length	(mm)	A	30	40	44	58	68	79	92	92	109	114			
Outer diameter	(mm)	B	25	32	40	49	56	66	82	82	110	123			
Fit length	(mm)	C	10.5	13	13	21.5	26	28	32.5	32.5	41	42.5			
Inner diameter possible from Ø to Ø H7	(mm)	D½	4-13	6-16	6-24	8-28	12-32	14-35	16-42	19-42	24-60	35-62			
ISO 4762 fastening screw		E	M3	M4	M4	M5	M6	M8	M10	M10	M12	M16			
Tightening torque of the fastening screw	(Nm)		2.3	4	4.5	8	15	40	70	85	120	200			
Distance between centers	(mm)	F	8	11	14	17	20	23	27	27	39	41			
	(mm)	G	4	5	5	6.5	7.5	9.5	11	11	13	17			
Moment of inertia	(10 ⁻³ kgm²)	J _{total}	0.002	0.01	0.02	0.05	0.09	0.18	0.54	1.8	0.65	7.5	2.68	9.0	4.85
Hub material (standard) (steel on request)			AL	AL	AL	AL	AL	AL	AL	Steel optional AL		Steel optional AL		Steel optional AL	
Approx. weight	(kg)		0.02	0.05	0.08	0.13	0.3	0.4	0.7	1.6	0.8	3.8	1.7	4.8	2.2
Torsional stiffness	(10³ Nm/rad)	C _T	1.5	7	9	23	31	72	80	141		157		290	
axial 	(mm)	Max. values	0.5	1	1	1	1	1.5	2	2		2		2.5	
lateral 	(mm)		0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15		0.15		0.20
axial spring stiffness	(N/mm)	C _a	8	35	30	30	50	67	44	77		124		35	
lateral spring stiffness	(N/mm)	C _r	50	350	320	315	366	679	590	960		2940		1450	

max. angular misalignment 1 degree (1 Nm = 8.85 in lbs)

**Experience and
Know-how
for your special
requirements.**

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