

FLEXIBLE AND TORSIONALLY RIGID.

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 machinery
- Packaging machinery
- Woodworking machinery
- Textile machinery
- Metal cutting machines

Properties of the product range:

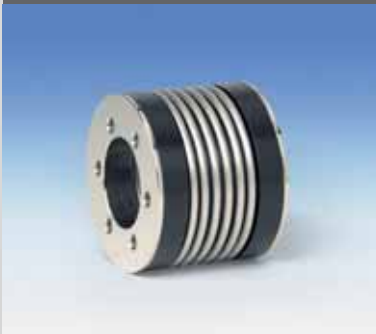
- zero backlash
- high torsional stiffness
- exact transmission of angular motion and torque
- infinite life
- wear and maintenance free
- easy mounting and dismantling
- compensation for axial, lateral and angular shaft misalignment accompanied by quiet, uniform operation

MODEL

PROPERTIES

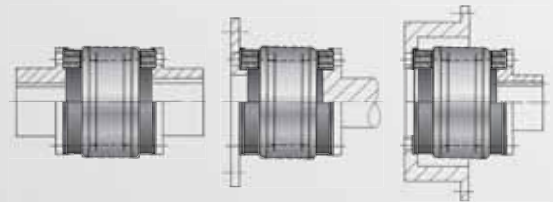
APPLICATION EXAMPLES

BK1



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

- special design application



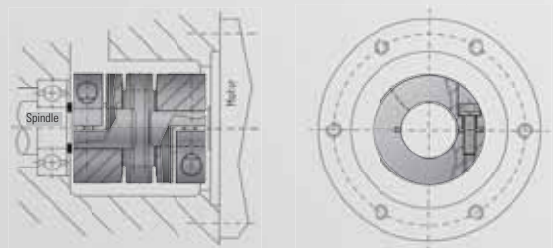
see page 5

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 available



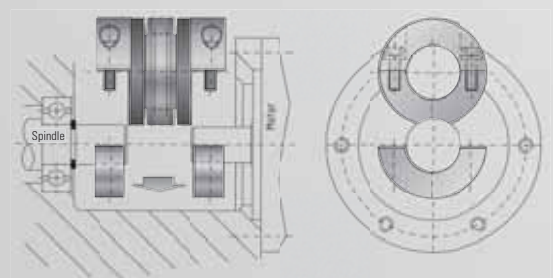
see page 6

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 available



see page 7

optional
stainless steel

MODEL

PROPERTIES

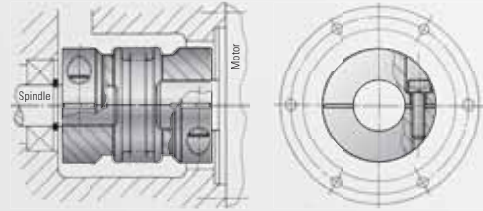
APPLICATION EXAMPLES

BKL



Economy Class with clamping hub from 2-500 Nm

- low cost version
- self opening clamping system optional



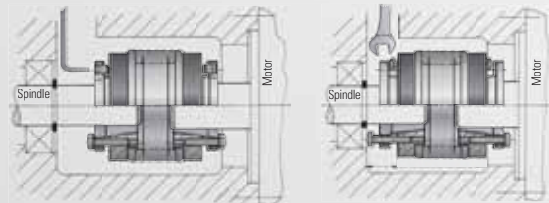
see separate catalog

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

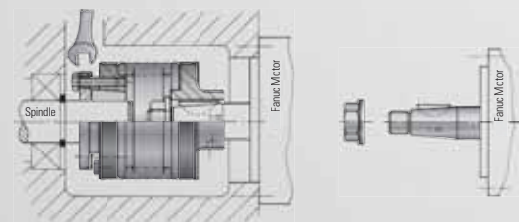
see page 8

BK 4



for Fanuc-drives from 15-150 Nm

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



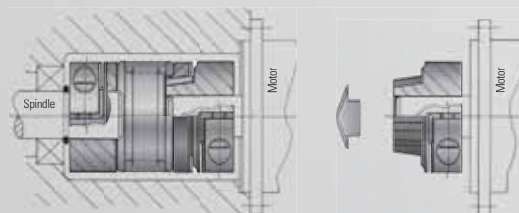
see page 9

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

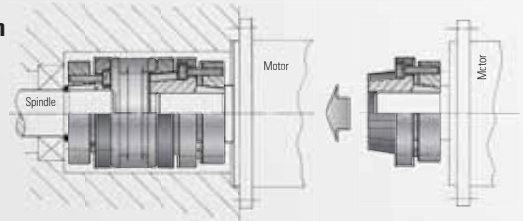
APPLICATION EXAMPLES

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



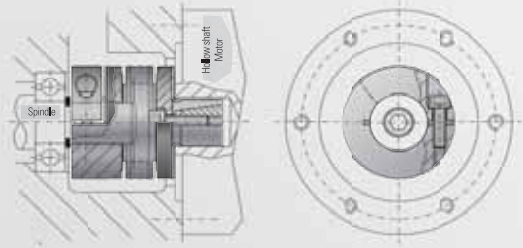
see page 11

BK 7



with expanding shaft from 15-300 Nm

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



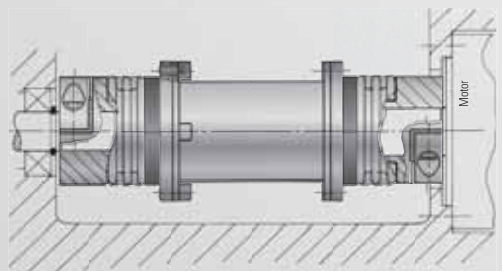
see page 12

ZA



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

- removable intermediate tube section
- no additional bearing necessary
- standard 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

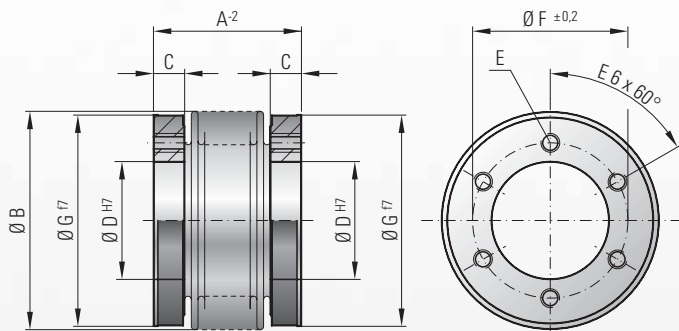


see page 13



MODEL BK1

TECHNICAL SPECIFICATIONS



with flange mounting

Ordering example

BK1/150/62/XX

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

Properties:

■ special design application

Material:

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

Design:

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.

Temperature range:

-30 to +120° C (3.6 F - 270 F)

Speeds:

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

Service life:

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

Backlash:

Absolutely backlash-free due to bolted connection.

Brief overloads:

Acceptable up to 1.5 times the value specified.

Non-standard application:

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

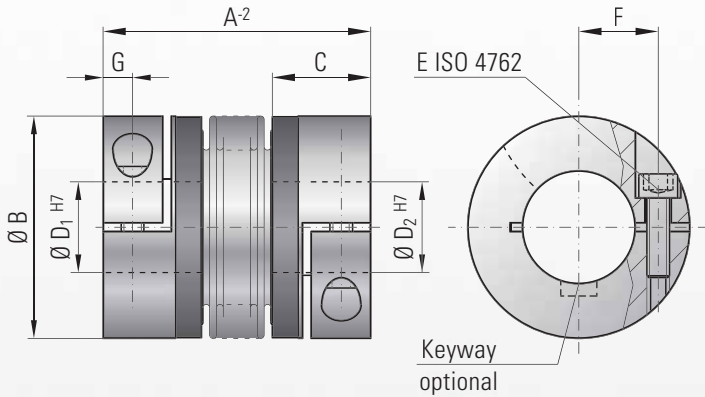
Model BK 1		Series																							
		15		30		60		150		200		300		500		800		1500		4000		6000		10000	
Rated torque (Nm)	T _{KN}	15		30		60		150		200		300		500		800		1500		4000		6000		10000	
Overall length (mm)	A	30	37	36	44	43	53	50	62	53	65	56	70	64	77	81	100	145	138	150					
Outer diameter of bellows (mm)	B	49		55		66		81		90		110		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	
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 kgm ²)	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		1.35		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	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	0.4	0.4	0.4					
angular		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	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 / 25.4 / XX

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



with clamping hub

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 for by 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 available with a finely balanced version.

Service life:

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

Backlash:

Absolutely backlash-free due to frictional clamp 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.

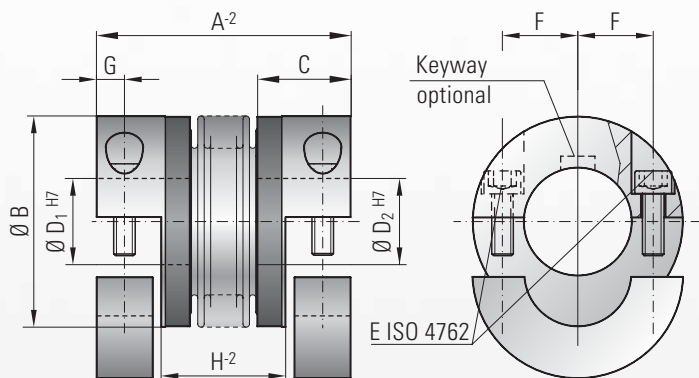
Model BK 2		Series																			
		15		30		60		80		150		200		300		500		800		1500	
Rated torque (Nm)	T_{KN}	15		30		60		80		150		200		300		500		800		1500	
Overall length (mm)	A	59	66	69	77	83	93	94	106	95	107	105	117	111	125	133	146	140	166		
Outer diameter (mm)	B	49		55		66		81		81		90		110		124		134		157	
Fit length (mm)	C	22		27		31		36		36		41		43		51		45		55	
Inner diameter possible from Ø to Ø H7 (mm)	$D_{1/2}$	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	
	G	6.5		7.5		9.5		11		11		12.5		13		16.5		18		22.5	
Moment of inertia (10^{-3} kgm ²)	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



with split hub

Ordering example

BKH / 80 / 94 / 20 / 25.4 / 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 separable, due to split hubs and two radial screws ISO 4762 on each hub. Any imbalance of the clamping hubs is compensated for by 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 available with a finely balanced version.

Service life:

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

Backlash:

Absolutely backlash-free due to frictional clamp 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		124		134		157	
Fit length (mm)	C	22		27		31		36		36		41		43		51		45		55	
Inner diameter possible from Ø to Ø H7 (mm)	$D_{1/2}$	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	
(mm)	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} kgm ²)	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 \approx 8.85 in lbs) max. angular misalignment see BK 1

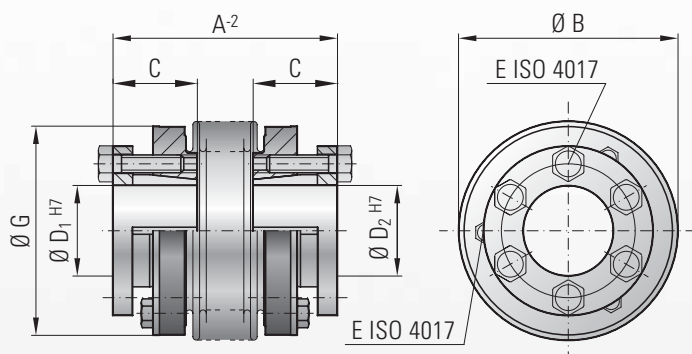


MODEL BK3

TECHNICAL SPECIFICATIONS



with tapered conical sleeves



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 available with a finely balanced version.

Service life:

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

Backlash:

Absolutely backlash-free due to frictional clamp 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.

Ordering example

BK3 / 60 / 76 / 20 / 25.4 / XX

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

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		124		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		M8		6xM8		6xM10		6xM10		8xM10	
Outer diameter of hub (mm)	G	49		55		66		81		90		110		122		116		135		175		246		295	
Moment of inertia (10 ⁻³ kgm ²)	J _{total}	0.12	0.59	0.3	0.34	0.54	0.73	1.2	1.6	1.7	2.5	5.1	5.9	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	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				
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

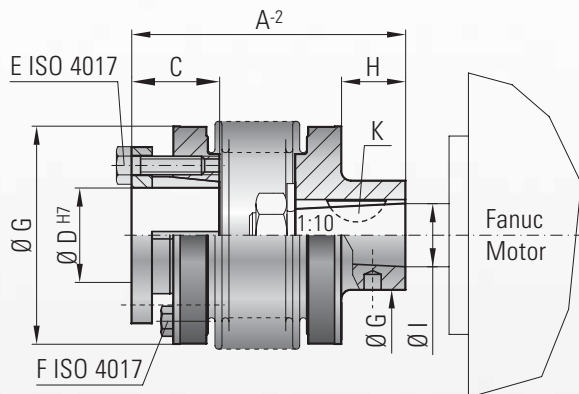
optional
stainless
steel

MODEL BK4

TECHNICAL SPECIFICATIONS



for Fanuc-Motors



Ordering example

BK4/150 / 82 / 20 / XX

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

Properties:

- for conical shafts
- easy mounting and dismantling
- 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 sleeve 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 available with a finely balanced version.

Service life:

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

Backlash:

Absolutely backlash-free due to frictional clamp 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.

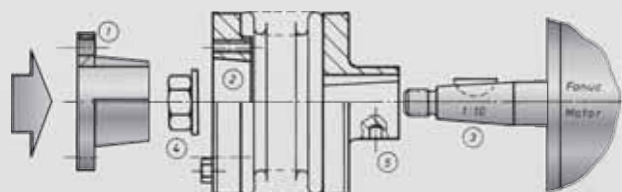
Model BK 4		Series							
		15	30	60	150				
Rated torque (Nm)	T_{KN}	15	30	60	150				
Overall length (mm)	A	47	54	68	76	72	82	82	94
Outer diameter of bellows (mm)	B	49	55	66	81				
Fit length (mm)	C	19	22	27	32				
Inner diameter from Ø to Ø H7 (mm)	D	10-22	12-23	12-29	15-37				
Fastening screws 6x	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 \approx 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 bellows body (4).

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

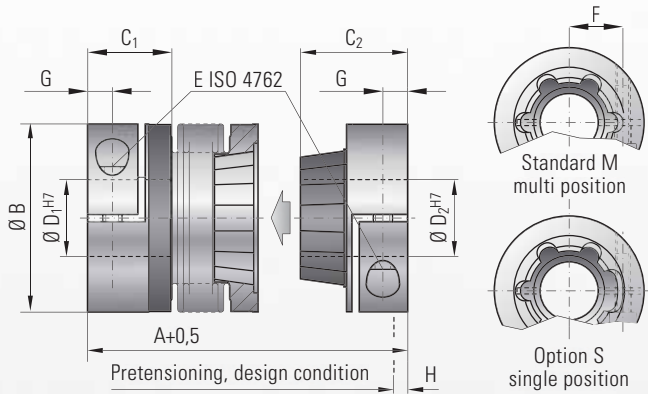


Key DIN 896 B



MODEL BK5

TECHNICAL SPECIFICATIONS



Press-fit, with clamping hub

Design details BK 5 / BK 6

Properties:

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

Temperature range:

-30 to +120° C (3.6 F - 270 F)

Speeds:

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

Service life:

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

Backlash:

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

Brief overloads:

Acceptable up to 1.5 times the value specified.

Tolerance:

On the hub/shaft connection 0.01 to 0.05 mm

Material BK 5:

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

Design BK 5:

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.

Ordering example BK 5 / BK 6

BK5 / 30 / 71 / 18 / 19.5 / XX

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

Model BK 5	Series																	
	15		30		60		80		150		300		500		800		1500	
Rated torque (Nm)	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	
Outer diameter (mm)	B	49		55		66		81		81		110		124		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		24-60		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		24-58		35-60		40-62		50-75
ISO 4762 screw	E	M5		M6		M8		M10		M10		M12		M16		2xM16*		2xM20*
Tightening torque (Nm)	E	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	
Mass moment of inertia (10 ⁻³ kgm ²)	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	
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	
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* (mm)	Max. values	0.5	1	0.5	1	0.5	1	1	2	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	0.2	0.25	0.25	0.3	0.3	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	

(1Nm ≅ 8.85 in lbs)

* allowed following maximum pretensioning

* two screws each hub, 180° apart

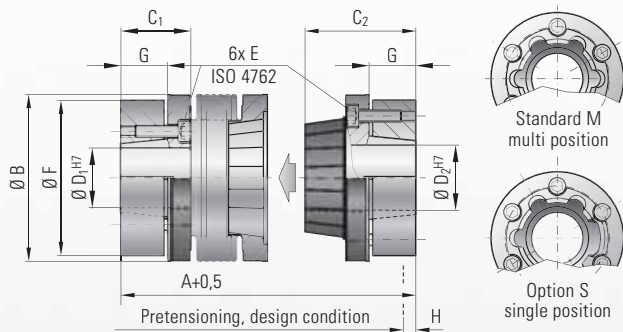
Higher torques on request

Missing bellows values see BK1

optional
stainless
steel

MODEL BK6

TECHNICAL SPECIFICATIONS



Press-fit, with conical sleeve

Material BK 6:

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

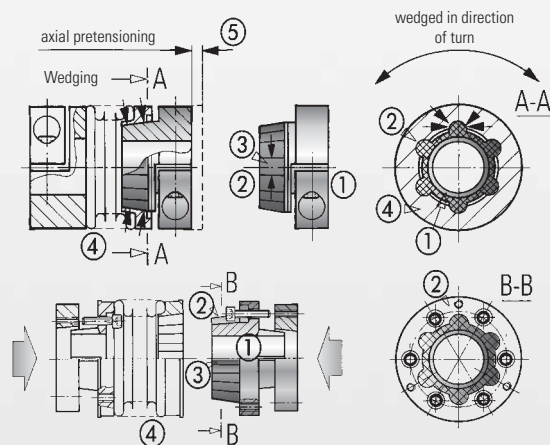
Tapered segment on hub face: glass-fiber reinforced plastic deposited onto a steel hub.

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 pulled away when servicing is required.

Six self-centering, tapered drive projections (2) have been formed into the plastic conical element, which has been deposited 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 female mounting element (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 and rigidity 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		124		133		157	
Fit length (mm)	C_1	13.5		16.5		18		23.5		27		32		42		53	
Fit length (mm)	C_2	29		34		39		49.5		59		68		74		90.5	
Inner diameter from Ø to Ø H7 (mm)	D_1	10-22		12-24		12-32		15-40		24-56		30-60		40-62		50-75	
Inner diameter from Ø to Ø H7 (mm)	D_2	10-22		12-24		12-32		15-40		24-56		30-60		40-62		50-75	
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		146	
(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		0.5 up to 1.5	
Axial recovery force of coupling max. (N)		20	12	50	30	70	45	82	52	157	106	140	96	400	650		
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_r	475	137	900	270	1200	420	1550	435	3750	1050	2500	840	2000	3600		

(1Nm $\hat{=}$ 8.85 in lbs)

* allowed following maximum pretensioning

Higher torques on request.

Missing bellow values see BK1

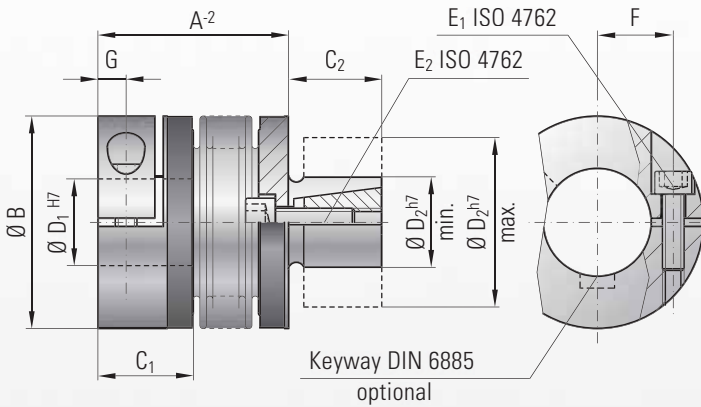


MODEL BK7

TECHNICAL SPECIFICATIONS



with expanding shaft



Properties:

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

Material:

Bellows made of highly flexible high-grade stainless steel, hub material: see 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 available with a finely balanced version.

Service life:

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

Backlash:

Absolutely backlash-free due to frictional clamp 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.

Ordering example

BK7 / 150 / 71 / 32 / 35 / XX

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

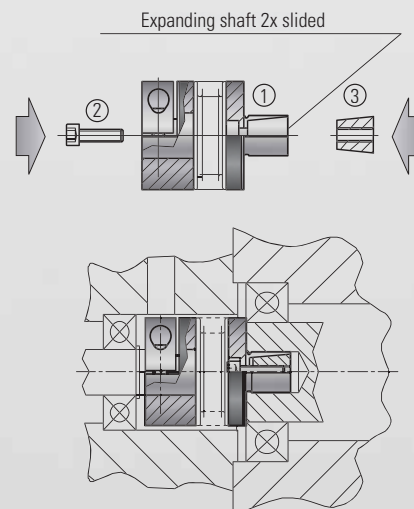
Model BK 7	Series										
		15		30		60		150		300	
Rated torque (Nm)	T _{KN}	15		30		60		150		300	
Overall length (inserted)(mm)	A	45	52	53	61	62	72	71	83	84	98
Outer diameter (mm)	B	49		55		66		81		110	
Fit length (mm)	C ₁	22		27		32		36		43	
Inner diameter from Ø to Ø H7 (mm)	D ₁	8-28		10-30		12-37		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 caused to expand. The coupling is designed for high dynamic hollow shaft connections eg. gear boxes. Recommended bore tolerance: ISO H7



optional
stainless
steel

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 consists out of a mixture of air and flammable substances in the form of gas, vapor or mist and is present frequently, continuously or for extended 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 consists of a mixture of air with flammable substances in the form of gas, vapor or mist, and 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 consists out of mixture of air with flammable substances in the form of gas, vapor or mist and 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-EEX do have an accreditation according to ATEX 95/137

Assembling the BK-EEX metal bellows couplings

The coupling cross section is insulated throughout the outside under the use of a flange or cover plate. The cover has to be electrical conductive.

Min. sealing according to IP2X

Tolerance: On the hub/shaft connection must be within 0,01-0,05 mm

Assembling: To ensure a safe clamping, the tightening torque rates of the clamping screws (1) must be noticed at any time.

ATTENTION!

A permanent observation of the driving and driven side must be ensured. A shut off must follow right afterwards.

Mounting, Design:

Installation and Operation instructions:

Identification:

Example Accreditation data:



AT mosphere EX plisible

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

Installation and operating instructions are an essential part of the BK-EEx 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

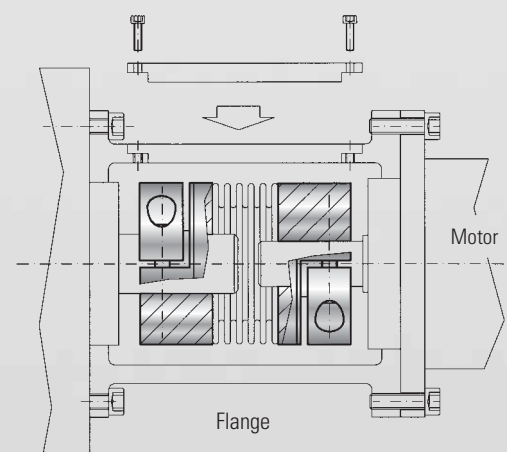
All BK-EEx couplings are permanent labeled to display manufacturer and accreditation data.



Type: BKL 150 EEx-2003
II 2 G D
EEx cT4/135°C
Ser.No.: A 44305
Tech.Ref.No.:2003/003RW

Example for installation:

Cover plate sealed min. according to IP2X





THE SELECTION

THE SELECTION PROCESS FOR TORSIONALLY RIGID METAL BELLOWS COUPLINGS

According to torque

In most cases couplings are rated according to the 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 driving element (Nm)

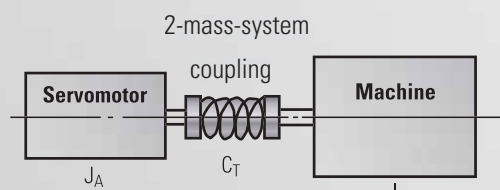
- or max. deceleration torque of the load (Nm)

J_L = machine 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 the following is valid:



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

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

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

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

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

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 = Torsional deflection (degrees)

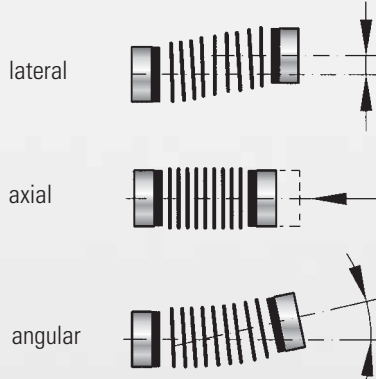
C_T = torsional stiffness of coupling (Nm/rad)

T_{AS} = max. torque (Nm)

INSTALLATION INSTRUCTIONS

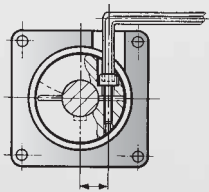
SERIES BK

Misalignments



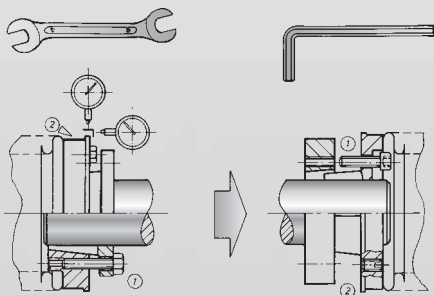
- When mounting the coupling ensure that the metal bellows has not been damaged or bent.
- During mounting, the torque and axis misalignments may exceed 2 times the rating without the performance of the coupling being effected.
- However, for continuous operation, the axial and lateral misalignments specified in the catalog must not be exceeded. Only then will the coupling 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 clamp 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 coupling bolt access hole 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

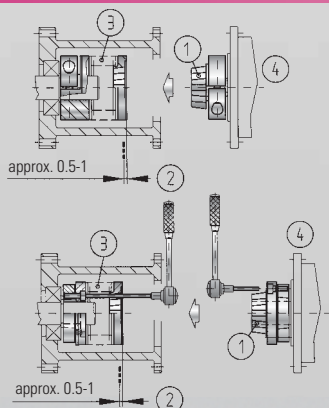


- It is absolutely essential that the fastening screws (1) are evenly tightened.
- Perform tightening of the fastening screws crosswise in order to avoid any distortion of the coupling hubs.
- Extraction of the tapered bushings for repair purposes is possible by means of 3x captive hexagonal draw-off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

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 clamp connection may result.

Model BK 5 / BK 6 page 10 / page 11



- The press-fit couplings do not need access holes on the intermediate flange. Model BK 6 will be mounted axially.
- The six axially arranged projections (1) are configured conically in a longitudinal direction. Due to this an 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 achieved.

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

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Registration No. 9605022

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THE R+W-PRODUCT RANGE



TORQUE LIMITERS Series SK

From 0.1 – 2,800 Nm, Bore diameters 3 – 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 3 – 75 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



SERVOMAX[®] ELASTOMER COUPLINGS Series EK

From 5 – 2,000 Nm, Shaft diameters 3 – 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