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

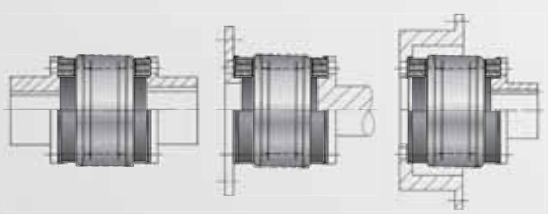
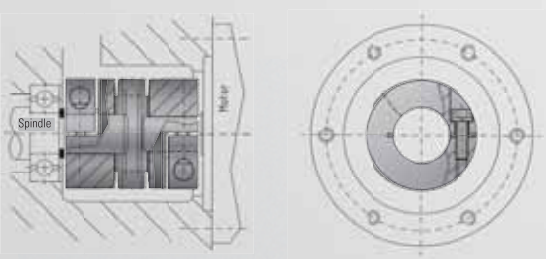
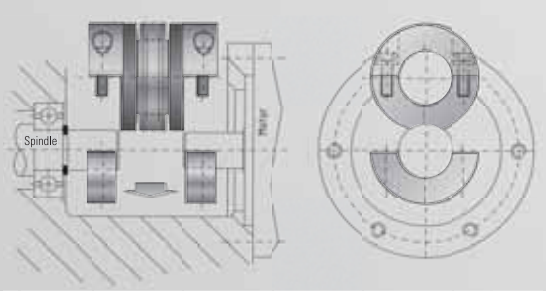
TORSIONALLY STIFF METAL BELLOWS COUPLINGS

Areas of application:

- Servo drives
- CNC axes
- Robotic axes
- Manipulators
- Linear actuators
- Printing 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

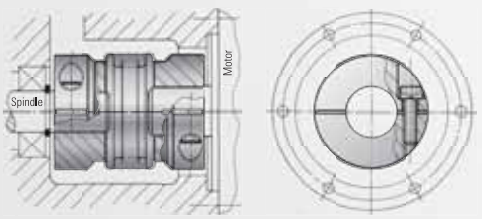
optional stainless steel

MODEL	PROPERTIES	APPLICATION EXAMPLES

BKL

Economy Class with clamping hub from 2-500 Nm

- low cost version
- self opening clamping system optional

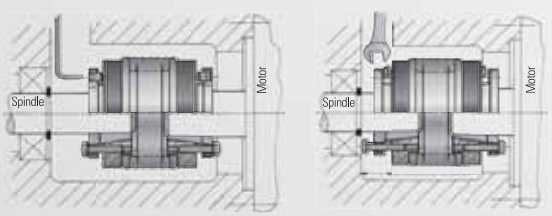


see separate catalog

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

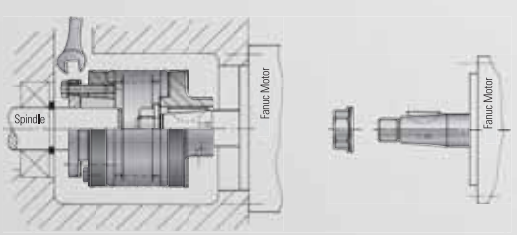
The new approach

see page 8

BK 4

for Fanuc-drives from 15-150 Nm

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

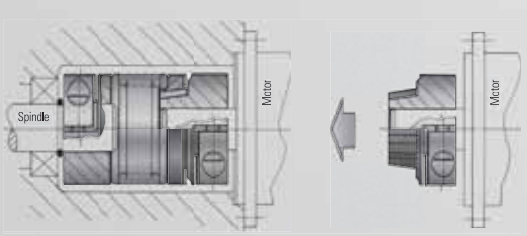


see page 9

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

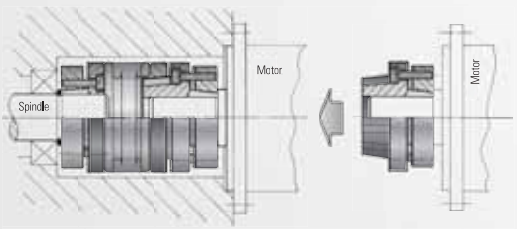
TORSIONALLY STIFF METAL BELLOWS COUPLINGS

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

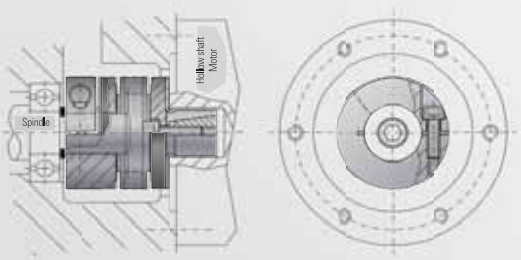


see page 11

BK 7

with expanding shaft from 15-300 Nm

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

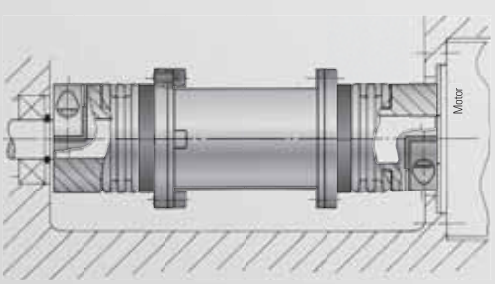


see page 12

ZA

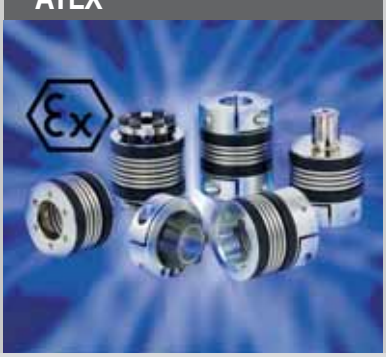
Line shafts with clamping hub from 10-4,000 Nm

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



see separate cataloge

ATEX



for the use in explosive environments

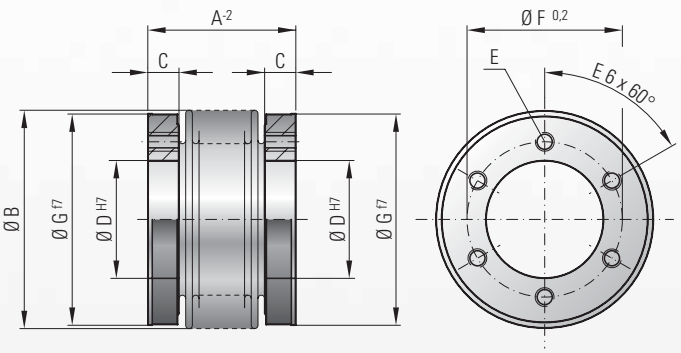
- available for the full product range
- for hazardous areas 1/21 and 2/22 bellows couplings are registered according to the directive ATEX 95/137

see page 13

optional stainless steel

MODEL **BK1**

TECHNICAL SPECIFICATIONS



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.

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

BK1/ 150 / 62 /XX

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

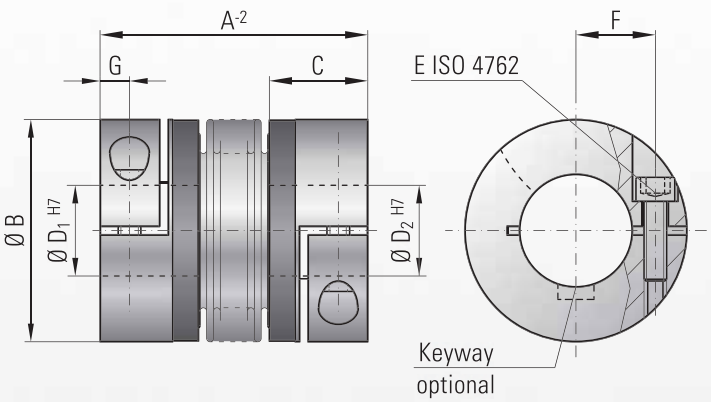
Model BK 1			Series																															
			15		30		60		150		200		300		500		800	1500	4000	6000	10000														
Rated torque	(Nm)	T_{KN}	15		30		60		150		200		300		500		800	1500	4000	6000	10000														
Overall length	(mm)	A	30	37	36	44	43	53	50	62	53	65	56	70	64	77	81	100	145	138	150													
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		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	(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	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	0.4	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	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)

optional stainless steel

MODEL **BK2**

TECHNICAL SPECIFICATIONS



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.

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

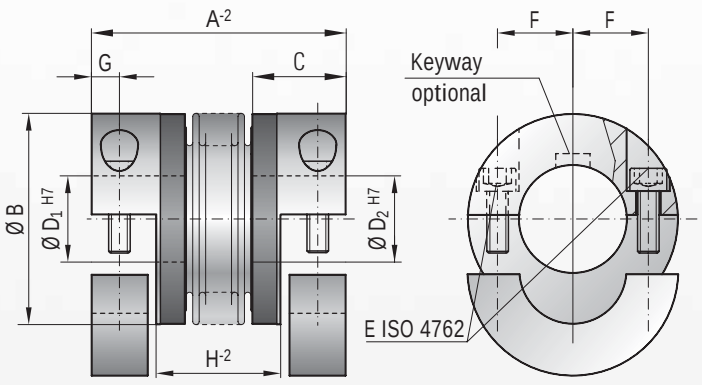
Model BK 2			Series																			
			15		30		60		80		150		200		300		500		800	1500
Rated torque	(Nm)	T_{KN}	15		30		60		80		150		200		300		500		800	1500
Overall length	(mm)	A	59	66	69	77	83	93	94	106	95	107	105	117	111	125	133	146	140	166
Outer diameter	(mm)	B	49		55		66		81		81		90		110		124		134	157
Fit length	(mm)	C	22		27		31		36		36		41		43		51		45	55
Inner diameter possible from Ø to Ø H7	(mm)	$D_{½}$	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*
Thightening 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

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

optional stainless steel

MODEL **BKH**

TECHNICAL SPECIFICATIONS



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.

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

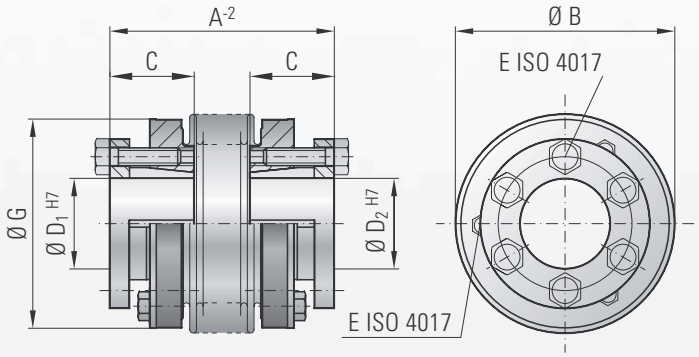
Model BK H			Series																			
			15		30		60		80		150		200		300		500		800		1500	
Rated torque	(Nm)	T_{KN}	15		30		60		80		150		200		300		500		800		1500	
Overall length	(mm)	A	59	66	69	77	83	93	94	106	95	107	105	117	111	125	133	146	140		166	
Outer diameter	(mm)	B	49		55		66		81		81		90		110		124		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)	$D_{½}$	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	
Thightening 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} 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

optional stainless steel

MODEL **BK3**

TECHNICAL SPECIFICATIONS



Properties:
- high clamping forces
- high degree of operating dependability
- new draw off device suited for space restriced 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.

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

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)	E	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	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	(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	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	0.4	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

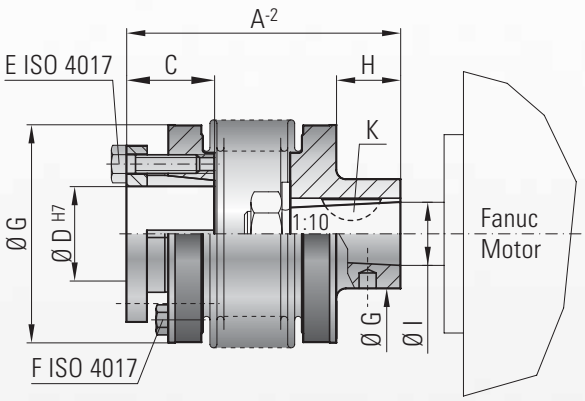
(1Nm ≙ 8.85 in lbs) max. angular misalignment see BK 1

optional stainless steel

MODEL **BK4**

TECHNICAL SPECIFICATIONS

for Fanuc-Motors



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.

Ordering example

BK4 / 150 / 82 / 20 / XX

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

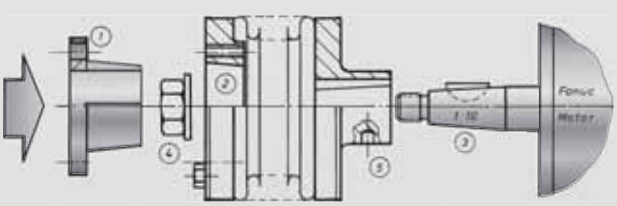
Model BK 4			Series							
			15		30		60		150	
Rated torque	(Nm)	T_{KN}	15		30		60		150	
Overall length	(mm)	A	47	54	68	76	72	82	82	94
Outer diameter of bellows	(mm)	B	49		55		66		81	
Fit length	(mm)	C	19		22		27		32	
Inner diameter from Ø to Ø H7	(mm)	D	10-22		12-23		12-29		15-37	
Fastening screws 6x		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} kgm²)	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)	(mm)	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 concial 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.



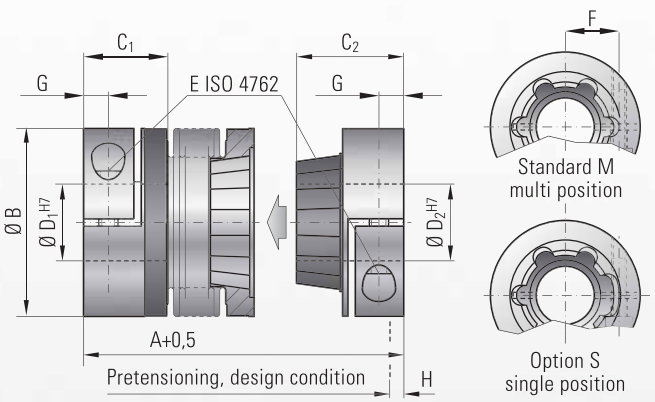
Key DIN 896 B

optional stainless steel

MODEL **BK5**

TECHNICAL SPECIFICATIONS

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

Properties:

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 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 150 and up steel. Tapered segment on hub face: glass-fiber reinforced plastic sprayed 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 / 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 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
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)		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} 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
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

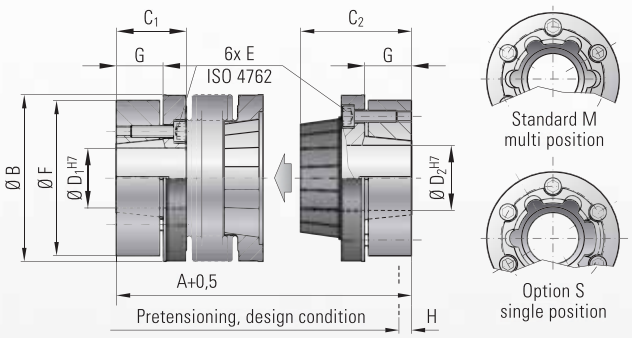
* two screws each hub, 180° apart
Higher torques on request
Missing bellows values see BK1

optional stainless steel

MODEL **BK6**

TECHNICAL SPECIFICATIONS

Press-fit precision metal bellows couplings



Material BK 6:

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

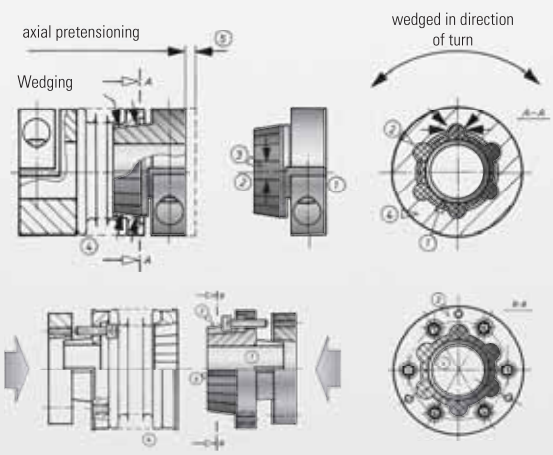
Tapered segment on hub face: glass-fiber rein forced plastic sprayed onto a steel hub.

Design BK 6:

One side concial sleeve with 6 fastening screws ISO 4762 and 3 draw-off threads. One side with backlash-free tapered concial 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 consits of a metal bellows with a tapered mounting (4). Absolutly 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 achives a strength roughly that of steel.

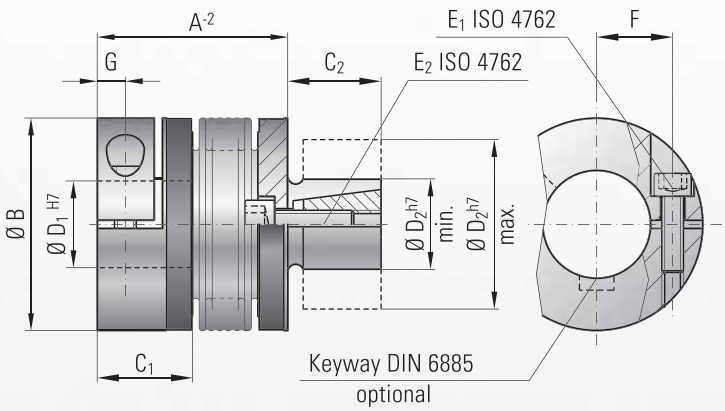
Model BK 6			Series															
			15		30		60		150		300		500		800		1500	
Rated toque	(Nm)	T_{KN}	15		30		60		150		300		500		800		1500	
Overall length (inserted)	(mm)	A	58	65	68	76	79	89	97	109	113	127	132	145	140		158	
Outer diameter	(mm)	B	49		55		66		81		110		124		133		157	
Fit length	(mm)	C_1	13.5		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} kgm²)	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 ≙ 8.85 in lbs) * allowed following maximum pretensioning Higher torques on request.
Missing bellow values see BK1

optional stainless steel

MODEL **BK7**

TECHNICAL SPECIFICATIONS



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.

Ordering example

BK7 /150 / 71 / 32 / 35 / XX

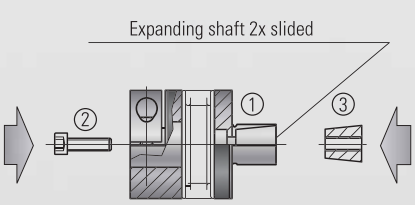
- Model
- Series / Nm
- Overall length
- Ø D1 H7
- Ø D2 h7
- non standard

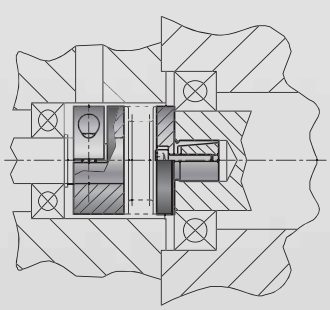
Model BK 7		Series									
		15		30		60		150		300	
Rated toque (Nm)	T_{KN}	15		30		60		150		300	
Overall length (inserted) (mm)	A	45	52	53	61	62	72	71	83	84	98
Outer diameter (mm)	B	49		55		66		81		110	
Fit length (mm)	C_1	22		27		32		36		43	
Inner diameter from Ø to Ø H7 (mm)	D_1	8-28		10-30		12-37		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} kgm²)	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)		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





optional stainless steel

MODEL **ATEX**

FOR USE IN HAZARDOUS AREAS AND EXPLOSIVE ATMOSPHERE

AT mosphere EX plosible

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-EEX do have an accreditation according to ATEX 95/137

Mounting, Design:

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

Installation and Operation instructions:

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
- Maintenace intervals
- Trouble shooting
- Marking of the coupling
- Declaration of conformity

Identification:

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

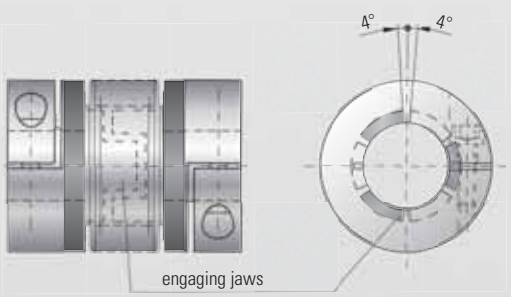
Example Accreditation data:

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-EEX metal bellows couplings

All BK-EEX 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 ± 4° 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.

optional stainless steel

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 uf 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 maschine 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)

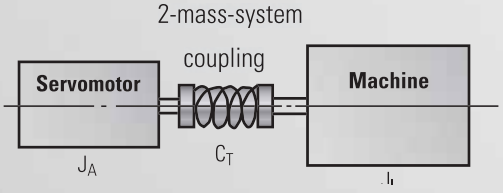
- or max. deceleration torque of the load face (Nm)

J_L = maschine´s moment of inertia (Spindle + slide + workpiece+ half of coupling) (kgm^2)

J_A = motor´s moment of inertia (kgm^2)

According to resonace 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)

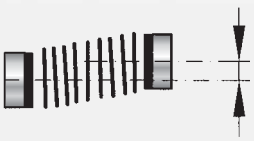
optional stainless steel

INSTALLATION INSTRUCTIONS

SERIES BK

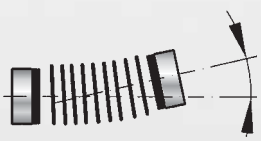
Misalignments

lateral



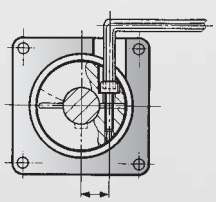
axial

angular



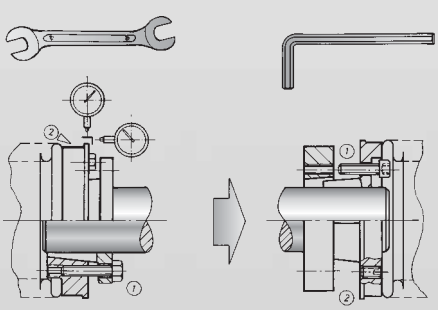
- When mounting the coupling ensure that the metal bellows are not damaged or bent.
- During mounting, the torque and axis misalignments may exceed 2 times the value specified without the operation of the coupling being restricted.
- However, for continuous operation, the axial and lateral misalignments 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 sufficent to dismount the coupling.

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

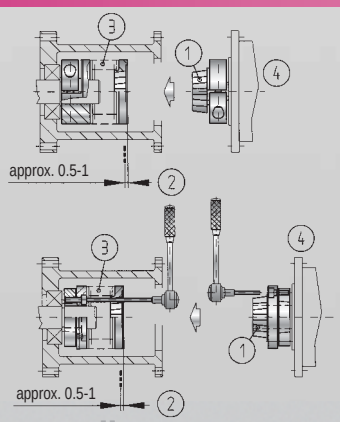


- It is absolutely essential that the fastening screws (1) are evenly tightened.
- Perform tightening of the fastening screws crosswise in order to avoid any distortion of the coupling hubs.
- Extraction of the tapered bushings for repair purposes is possible by means of 3x captive hexagonal draw-off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

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R+W Antriebselemente GmbH
Alexander-Wiegand-Straße 8
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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 – 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
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ELASTOMER COUPLINGS
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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

395/01/06/3.000

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MODEL **BKC + 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:

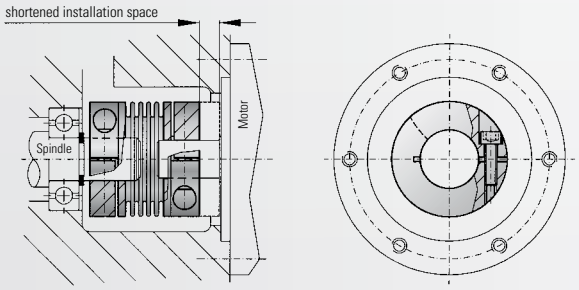
- high torsional stiffness
- compensates axial, lateral and angular misalignment
- exact angular transmission of motion and torque
- infinite life and maintenance free

MODEL	PROPERTIES	APPLICATION EXAMPLES

BKC

Economy Class with clamping hub from 15-500 Nm

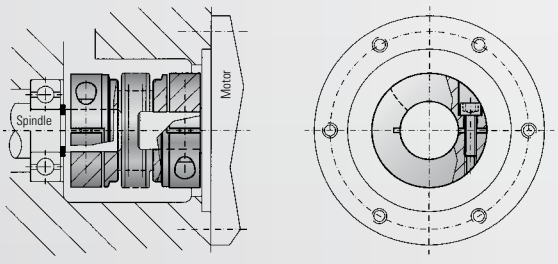
- compact design
- low cost version
- self opening clamping system optional



BKL

Economy Class with clamping hub from 2-500 Nm

- low cost version
- self opening clamp system optional



ATEX

for the use in explosive environments

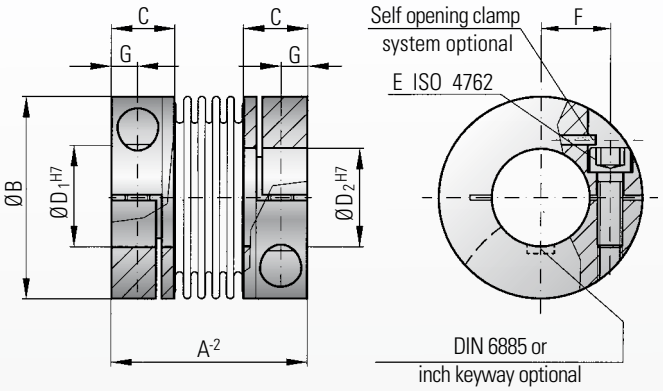
- available for the full product range
- for hazardous areas 1/21 and 2/22 bellows couplings are registered according to the directive ATEX 95/137

optional stainless steel

MODEL **BKC**

TECHNICAL SPECIFICATIONS

compact version



Properties:
- compact design
- 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: 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.

Ordering example

BKC / 60 / 26 / 22 / XX

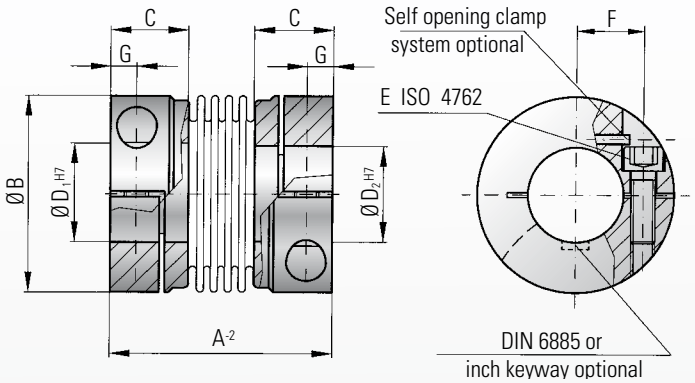
- Model
- Series Nm
- Ø D1 H7
- Ø D2 H7
- non standard

Model BKC			Series					
			15	30	60	150	300	500
Rated torque	(Nm)	T_{KN}	15	30	60	150	300	500
Overall length	(mm)	A	48	58	67	78	94	100
Outer diameter	(mm)	B	49	56	66	82	110	123
Fit length	(mm)	C	16.5	21	23	27.5	34	34
Inner diameter possible from Ø to Ø H7	(mm)	$D_{1/2}$	8-28	12-32	14-35	19-42	24-60	32-75
ISO 4762 fastening screw		E	M5	M6	M8	M10	M12	M12
Tightening torque of the fastening screw	(Nm)		8	15	40	75	120	125
Distance between centers	(mm)	F	17	20	23	27	39	45
Distance	(mm)	G	6.5	7.5	9.5	11	13	13
Moment of inertia	(10^{-3} kgm²)	J_{total}	0.05	0.09	0.18	0.65	7.2	8.7
Hub material (standard) (steel on request)			AL	AL	AL	AL	Steel	Steel
Approx. weight	(kg)		0.13	0.3	0.4	0.8	3.5	4.5
Torsional stiffness	(10^3 Nm/rad)	C_T	23	31	72	141	157	290
axial	(mm)	max. Werte	1	1	1.5	2	2	2.5
lateral	(mm)		0.15	0.15	0.15	0.15	0.15	0.20
axial spring stiffness	(N/mm)	C_a	30	50	67	77	112	72
lateral spring stiffness	(N/mm)	C_r	315	366	679	960	2940	2200

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

optional stainless steel

MODEL **BKL**



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

Hub material see technical specifications table

Design: 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.

Ordering example

BKL / 80 / 26 / 22 / XX

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

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	(10^3 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	0.20
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	2940	1450

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

optional stainless steel

MODEL **ATEX**

FOR USE IN HAZARDOUS AREAS AND EXPLOSIVE ATMOSPHERE

AT mosphere EX plosible

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-EEx do have an accreditation according to ATEX 95/137

Mounting, Design:

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

Installation and Operation instructions:

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
- maintenace intervals
- trouble shooting
- marking of the coupling
- declaration of conformity

Identification:

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

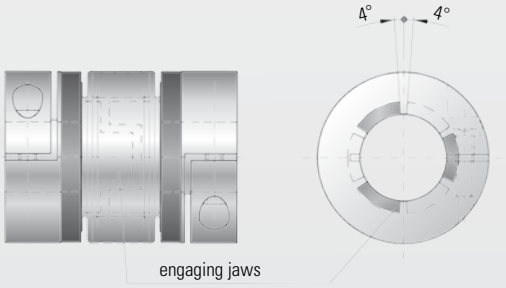
Example Accreditation data:

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-EEx metal bellows couplings

All BK-EEx 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 ± 4° 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.

optional stainless steel

THE SELECTION

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 maschine 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)

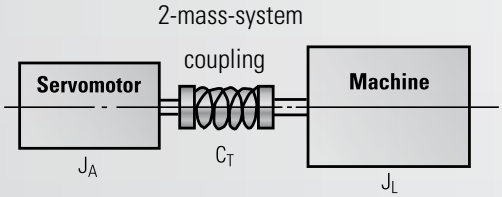
- or max. deceleration torque of the load face (Nm)

J_L = maschine´s moment of inertia (Spindle + slide + workpiece+ half of coupling) (kgm^2)

J_A = motor´s moment of inertia (kgm^2)

According to resonace 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)

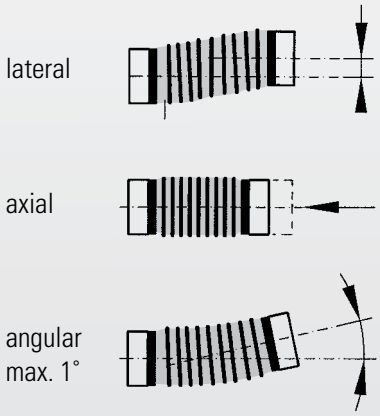
T_{AS} = max. torque (Nm)

INSTALLATION INSTRUCTION

Mounting preparation

- In the case of models BKC / BKL 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.
- 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).

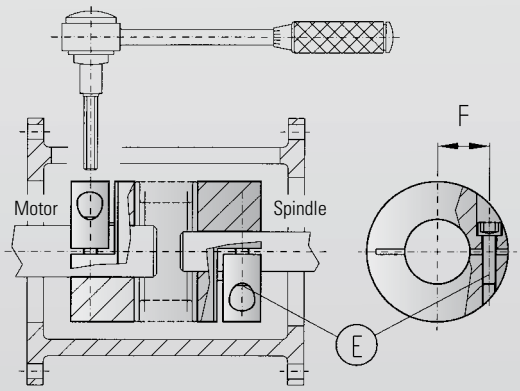
Maximum shaft misalignments



CAUTION: Lateral misalignment has a negative effect on the service life to the bellows. Exact alignment of the R+W metal bellows coupling considerably increases the service life of the coupling. By reducing or eliminating lateral misalignment the radial loading of the adjacent bearings is eliminated increasing service life and reducing heat.

For drives running at high speed we recommend aligning the R+W metal bellows coupling with a dial indicator.
(see values at table page 3 + 4)

Mounting



Mounting:
Prior to mounting make sure that the shafts to be connected do not exceed the angular or lateral misalignment limits for the coupling to be used. This data can be found in the catalog. Slide the metal bellows coupling onto the motor shaft end. When the correct axial position has been reached tighten the clamp screw (E) to the correct tightening torque as indicated in table 1 with a torque wrench. Insert the spindle shaft into the other end of the coupling to the proper axial position. Make sure that the coupling is free of any axial forces before tightening. Tighten the clamp screw (E) as above using a torque wre nch to the proper tightening torque. For the split hub design it is necessary to maintain the proper separation between shaft ends (dimension H in the catalog).

Dismounting:
Simply loosen the clamp screws and remove the coupling.

Maintenance

R+W metal bellows couplings are maintenance free as long as they are properly mounted and the maximum misalignment values are not exceeded.

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Single piece or press-fit design

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

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

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From 70 – 2.000 N
Thread M5 – M16

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MICROFLEX
Series FK 1

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

381/10/05/3.000

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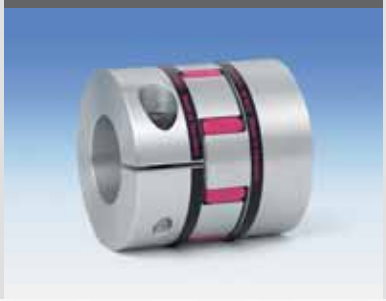
optional stainless steel

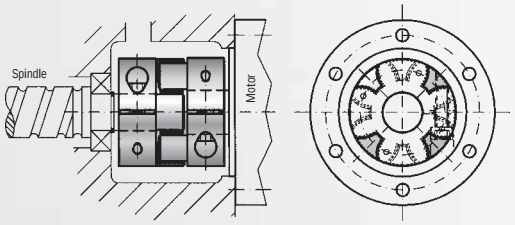
MODELS	PROPERTIES	APPLICATION EXAMPLES

EKL



with clamping hub, compact version

- short compact design
- low inertia
- easy assembly

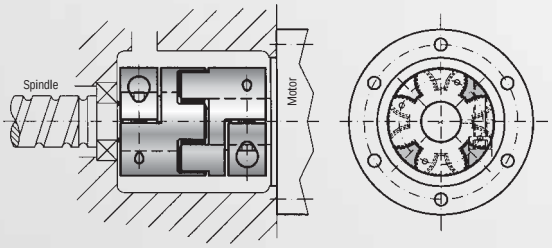


see page 5

EK2

with clamping hub

- very smooth running
- counterbalanced type
- easy assembly

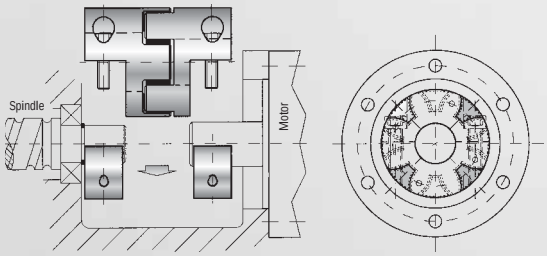


see page 6

EKH

with split clamping hubs

- easy assembly
- radial mounting, due to split clamping hubs

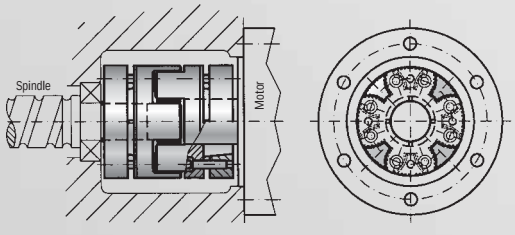


see page 7

EK6

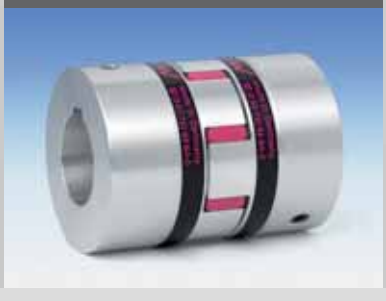
with conical clamping ring

- very smooth running
- high clamping forces
- axially mountable



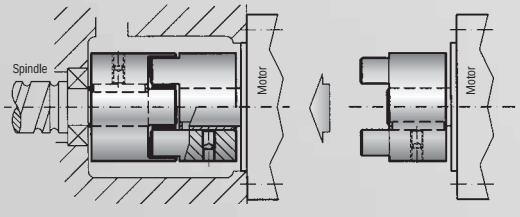
see page 8

EK1



with keyway-connection

- favorably priced design
- easy to modify



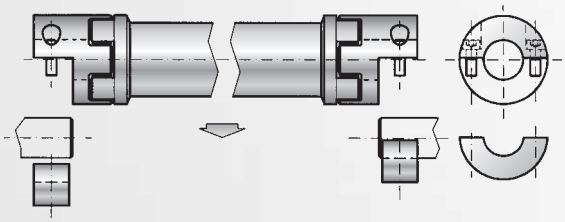
see page 9

MODELS	PROPERTIES	APPLICATION EXAMPLES

EZ2

line shaft with split clamping hub

- radial mounting due to split hubs
- no intermediate support bearing necessary
- conical clamping hubs available
- length up to 4 m

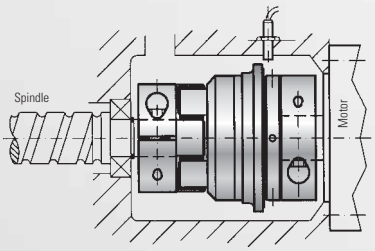


see page 10/11

ES2

torque limiter with clamping hub

- reliable torque overload protection
- backlash free due to patented R+W design
- easy to mount

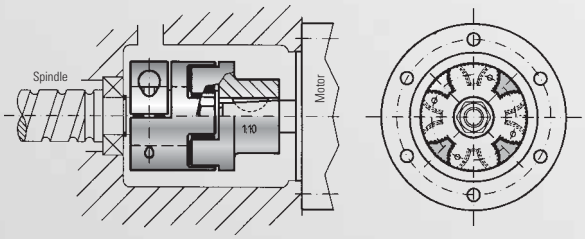


see page 12/13/14

EK4

for conical shaft ends

- for conical shaft ends e.g. Fanuc motors
- easy mounting
- conical hub mounts axially

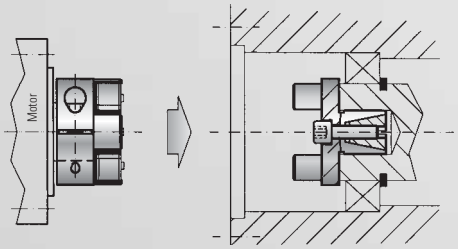


see page 15

EK7

with expanding shaft

- axial hub mounting with expanding shaft
- very smooth running
- high clamping forces



see page 16/17

EEx

for the use in explosive environments

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

see page 19

optional stainless steel

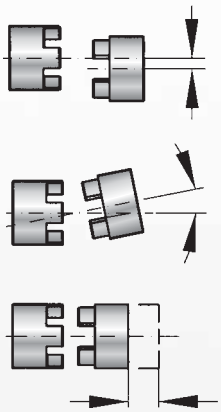
SERVOMAX® ELASTOMER COUPLINGS

Areas of application:

- Servo drives
- Machine tools
- Packaging machinery
- Plant automation
- Printing machinery
- Industrial robots
- Measurement and positioning units
- general mechanical engineering
- Linking screw jacks, linear actuaters, encoders

Properties of the product range:

- vibration dampening
- electrically insulating (standard)
- backlash-free
- press-fit design
- compensation of lateral-, angular- and axial misalignment



Function

The equalizing element of an EK coupling is the elastomer insert. It transmits the torque without backlash and vibration. The elastomer insert defines the features of the entire coupling and/or of the entire drive system.

The coupling is backlash free due to pretensioning of the elastomer insert between the two coupling halves.The Servomax-Coupling compensates for lateral, angular and axial misalignment.

Type A
Shore hardness 98 Sh A

Type B
Shore hardness 64 Sh D

Type C
Shore hardness 80 Sh A

Type D*
Shore hardness 92 Sh A

Specification of the Elastomer inserts

Type	Shore hardness	Color	Material	Relative damping (ψ)	Temperature range	Features
A	98 Sh A	red	TPU	0,4 - 0,5	-30°C to +100°C	high damping
B	64 Sh D	green	TPU	0,3 - 0,45	-30°C to +120°C	high torsional stiffness
C	80 Sh A	yellow	TPU	0,3 - 0,4	-30°C to +100°C	very high damping
D*	92 Sh A	black	TPU	0,3 - 0,45	-10°C to +70°C	electrically conductive*

* Due to the electrically conductiv properties of the insert electrostatic load of the coupling is prevented. This eliminates sparks during normal operation (Explosive areas). Technical datas available.

The values of the relative damping were determined at 10 Hz and +20˚C.

Model row EK		Series																										
		2			5			10			20			60			150			300			450			800		
Type (Elastomer insert)		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Static torsional stiffness (Nm/rad)	C_T	50	115	17	150	350	53	260	600	90	1140	2500	520	3290	9750	1400	4970	10600	1130	12400	18000	1280	15100	27000	4120	41300	66080	10320
Dynamic torsional stiffness (Nm/rad)	C_{Tdyn}	100	230	35	300	700	106	541	1650	224	2540	4440	876	7940	11900	1350	13400	29300	3590	23700	40400	6090	55400	81200	11600	82600	180150	28600
Lateral (mm)	Max. values	0,08	0,06	0,1	0,08	0,06	0,1	0,1	0,08	0,12	0,1	0,08	0,15	0,12	0,1	0,15	0,15	0,12	0,2	0,18	0,14	0,25	0,2	0,18	0,25	0,25	0,2	0,3
Angular (degree)		1	0,8	1,2	1	0,8	1,2	1	0,8	1,2	1	0,8	1,2	1	0,8	1,2	1	0,8	1,2	1	0,8	1,2	1	0,8	1,2	1	0,8	1,2
Axial (mm)		±1			±1			±1			±2			±2			±2			±2			±2			±2		

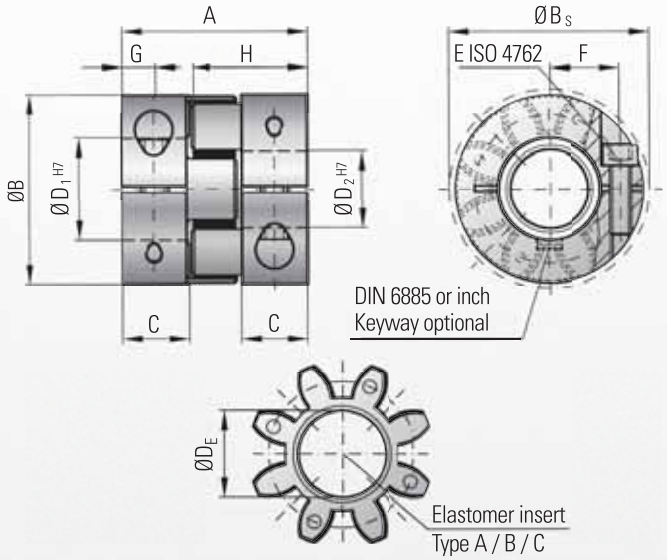
Static torsional stiffness at 50% T_{KN} Dynamic torsional stiffness at T_{KN} 1 Nm = 8,85 in lbs

optional stainless steel

MODEL **EKL**

TECHNICAL SPECIFICATIONS

Compact version



Properties:
- short compact design
- easy assembly
- vibration dampening
- electrically insulating
- backlash-free
- press-fit design

Material: Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design: Two coupling hubs are concentrically machined with concave driving jaws

***Speeds:** Over 4.000 rpm a finely balanced version is available

Tolerance: On the hub/shaft connection 0,01 to 0,05 mm

Model EKL			Series																									
			2			5			10			20			60			150			300			450			800		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	2	2,4	0,5	9	12	2	12,5	16	4	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240
Max. torque**	(Nm)	T_{Kmax}	4	4,8	1	18	24	4	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
Overall length	(mm)	A	20			26			32			50			58			62			86			94			123		
Outer diameter	(mm)	B	16			25			32			42			56			66,5			82			102			136,5		
Outer diameter with screwhead	(mm)	B_S	17			25			32			44,5			57			68			85			105			139		
Mounting length	(mm)	C	6			8			10,3			17			20			21			31			34			46		
Inner diameter range H7	(mm)	$D_{1/2}$	3 - 8			4 - 12,7			4 - 16			8 - 25			12 - 32			19 - 36			20 - 45			28 - 60			35 - 80		
Inner diameter max. (elastomer)	(mm)	D_E	6,2			10,2			14,2			19,2			27,2			30,2			38,2			46,2			60,5		
Mounting Screw (ISO 4762/12.9)		E	M2			M3			M4			M5			M6			M8			M10			M12			M16		
Tightening torque of the mounting screw	(Nm)		0,6			2			4			8			15			35			70			120			290		
Distance between centers	(mm)	F	5,5			8			10,5			15,5			21			24			29			38			50,5		
Distance	(mm)	G	3			4			5			8,5			10			11			15			17,5			23		
Hub length	(mm)	H	12			16,7			20,7			31			36			39			52			57			74		
Moment of inertia	(10^{-3} kgm^2)	J_1/J_2	0,0003			0,001			0,01			0,01			0,08			0,15			0,4			1,3			7,8		
Approx. weight	(kg)		0,008			0,02			0,05			0,12			0,3			0,5			0,9			1,5			8,5		
Speed*	(rpm)		28.000			22.000			20.000			19.000			14.000			11.500			9.500			8.000			4.000		

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

** Maximum transferable torque of the clamping hub depends on the bore diameters (bore/shaft clearance 0,01 mm to 0,05 mm shaft oiled)

Series	Ø 3	Ø 4	Ø 5	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35	Ø 45	Ø 50	Ø 55	Ø 60	Ø 65	Ø 70	Ø 75	Ø 80
2	0,2	0,8	1,5	2,5														
5		1,5	2	8														
10			4	12	32													
20				20	35	45	60											
60					50	80	100	110	120									
150						120	160	180	200	220								
300						200	230	300	350	380	420							
450								420	480	510	600	660	750	850				
800										700	750	800	835	865	900	925	950	1.000

Higher torque through additional key possible.

Ordering example

EKL / 60 / A / 19 / 24 / XX

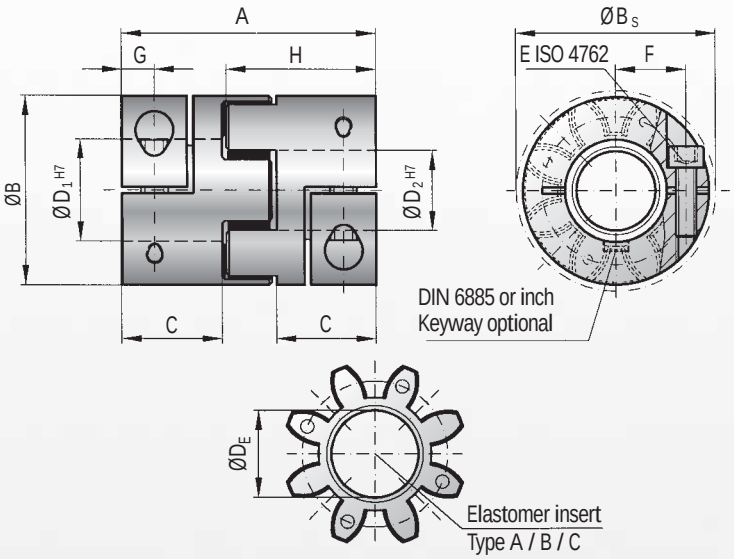
- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. finely balanced

All data is subject to change without notice.

optional stainless steel

MODEL **EK2**

TECHNICAL SPECIFICATIONS



Properties:

- easy assembly
- concentrically machined hubs
- vibration dampening
- electrically insulating
- backlash-free
- press-fit design

Material:

Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design:

Two coupling hubs are concentrically machined with concave driving jaws

***Speeds:**

Over 10.000 rpm a finely balanced version is available

Tolerance:

On the hub/shaft connection 0,01 to 0,05 mm

Model EK 2			Series																	
			20			60			150			300			450			800		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240
Max. torque**	(Nm)	T_{Kmax}	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
Overall length	(mm)	A	66			78			90			114			126			162		
Outer diameter	(mm)	B	42			56			66,5			82			102			136,5		
Outer diameter with screwhead	(mm)	B_S	44,5			57			68			85			105			139		
Mounting length	(mm)	C	25			30			35			45			50			65		
Inner diameter range H7	(mm)	$D_{1/2}$	8 - 25			12 - 32			19 - 36			20 - 45			28 - 60			35 - 80		
Inner diameter max. (elastomer)	(mm)	D_E	19,2			27,2			30,2			38,2			46,2			60,5		
Mounting screw (ISO 4762/12.9)		E	M5			M6			M8			M10			M12			M16		
Tightening torque of the mounting screw	(Nm)		8			15			35			70			120			290		
Distance between centers	(mm)	F	15,5			21			24			29			38			50,5		
Distance	(mm)	G	8,5			10			12			15			17,5			23		
Hub length	(mm)	H	39			46			52,5			66			73			93,5		
Moment of inertia	(10^{-3} kgm^2)	J_1/J_2	0,02			0,09			0,2			0,6			1,5			9,5		
Approx. weight	(kg)		0,15			0,35			0,6			1,1			1,7			10		
Speed*	(rpm)		19.000			14.000			11.500			9.500			8.000			4.000		

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

** Maximum transferable torque of the clamping hub depends on the bore diameters

Series	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35	Ø 45	Ø 50	Ø 55	Ø 60	Ø 65	Ø 70	Ø 75	Ø 80
20	20	35	45	60											
60		50	80	100	110	120									
150			120	160	180	200	220								
300			200	230	300	350	380	420							
450					420	480	510	600	660	750	850				
800							700	750	800	835	865	900	925	950	1.000

Higher torque through additional key possible.

Ordering example

EK2 / 60 / A / 19 / 24 / XX

- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. finely balanced

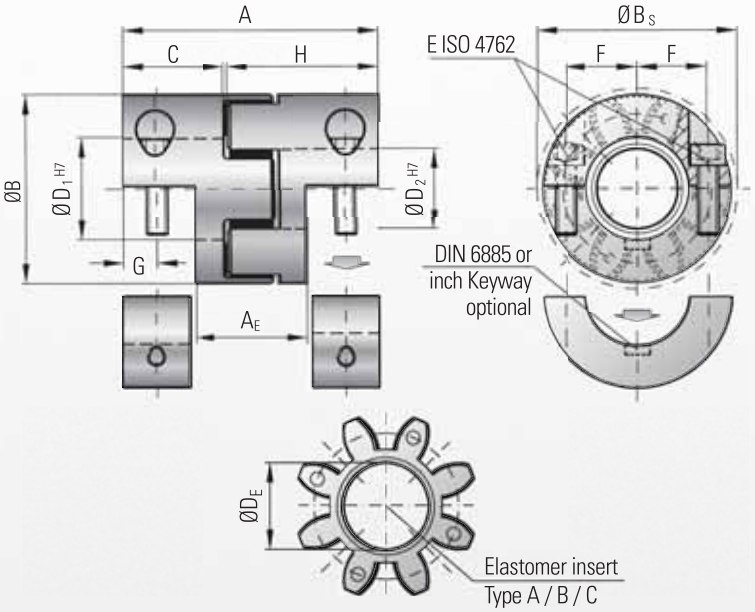
All data is subject to change without notice.

optional stainless steel

MODEL **EKH**

TECHNICAL SPECIFICATIONS

Split hubs



Properties:

- radial mounting possible
- high concentricity
- dampens vibrations
- electrical insulating
- easy mounting
- backlash-free

Material: Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design: Two split coupling hubs are concentrically machined with concave driving jaws

***Speeds:** Over 10.000 rpm a finely balanced version is available

Tolerance: On the hub/shaft connection 0,01 to 0,05 mm

Model EKH			Series																	
			20			60			150			300			450			800		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240
Max. torque**	(Nm)	T_{Kmax}	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
Overall length	(mm)	A	66			78			90			114			126			162		
Insertion length	(mm)	A_E	28			33			37			49			51			65		
Outer diameter	(mm)	B	42			56			66,5			82			102			136,5		
Outer diameter with screwhead	(mm)	B_S	44,5			57			68			85			105			139		
Mounting length	(mm)	C	25			30			35			45			50			65		
Inner diameter range H7	(mm)	$D_{1/2}$	8 - 25			12 - 32			19 - 36			20 - 45			28 - 60			35 - 80		
Inner diameter max. (elastomer)	(mm)	D_E	19,2			27,2			30,2			38,2			46,2			60,5		
Mounting screw (ISO 4762/12.9)		E	M5			M6			M8			M10			M12			M16		
Tightening torque of the mounting screw	(Nm)		8			15			35			70			120			290		
Distance between centers	(mm)	F	15,5			21			24			29			38			50,5		
Distance	(mm)	G	8,5			10			12			15			17,5			23		
Hub length	(mm)	H	39			46			52,5			66			73			93,5		
Moment of inertia	(10^{-3} kgm^2)	J_1/J_2	0,02			0,09			0,2			0,6			1,5			9,5		
Approx. weight	(kg)		0,15			0,35			0,6			1,1			1,7			10		
Speed*	(rpm)		19.000			14.000			11.500			9.500			8.000			4.000		

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

** Maximum transferable torque of the clamping hub depends on the bore diameters

Serie	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35	Ø 45	Ø 50	Ø 55	Ø 60	Ø 65	Ø 70	Ø 75	Ø 80
20	30	40	50	65											
60		65	120	150	180	200									
150			180	240	270	300	330								
300			300	340	450	520	570	630							
450					630	720	770	900	1.120	1.180	1.350				
800							1.050	1.125	1.200	1.300	1.400	1.450	1.500	1.550	1.600

Higher torque through additional key possible.

Ordering example

EKH / 60 / A / 19 / 24 / XX

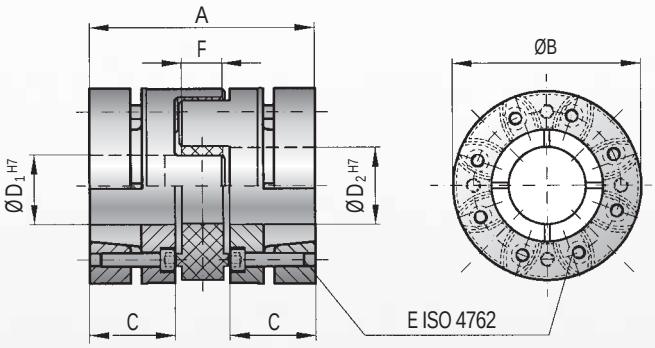
- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. finely balanced

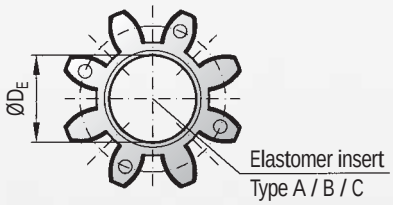
All data is subject to change without notice.

optional stainless steel

MODEL **EK6**

TECHNICAL SPECIFICATIONS





Properties:

- high clamping forces
- concentrically machined
- easy mounting
- dampens vibrations
- electrical insulating
- backlash-free
- press-fit design
- axial mounting possible

Material: Clamping hub and conical clamping: up to series 450 high strength aluminum, from series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design: Two coupling hubs are concentrically machined with concave driving jaws

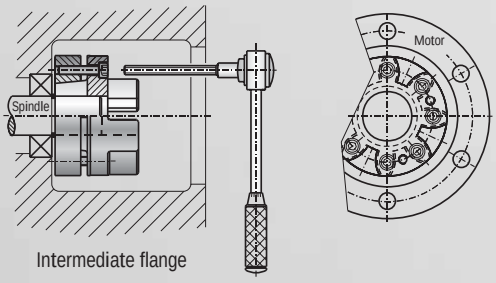
Tolerance: On the hub/shaft connection 0,01 to 0,05 mm

Model EK 6			Series																				
			10			20			60			150			300			450			800		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	12,6	16	4	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240
Max. torque	(Nm)	T_{Kmax}	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
Overall length	(mm)	A	42			56			64			76			96			110			138		
Outer diameter	(mm)	B	32			43			56			66			82			102			136,5		
Mounting length	(mm)	C	15			20			23			28			36			42			53		
Inner diameter range H7	(mm)	$D_{1/2}$	6 - 16			8 - 24			12 - 32			19 - 35			20 - 45			28 - 54			32 - 80		
Inner diameter max. (elastomer)	(mm)	D_E	14,2			19,2			27,2			30,2			38,2			46,2			60,5		
Mounting screw (ISO 4762/12.9)		E	3x M3			6x M4			4x M5			8x M5			8x M6			8x M8			8x M10		
Tightening torque of the mounting screw	(Nm)		2			3			6			7			12			35			55		
Width Elastomer insert	(mm)	F	9,5			12			14			15			18			20			25		
Moment of inertia	(10^{-3} kgm^2)	J_1/J_2	0,01			0,015			0,08			0,15			0,4			1,3			9,2		
Approx. weight	(kg)		0,08			0,12			0,3			0,5			0,9			1,5			9,6		
Speed	(rpm)		20.000			19.000			14.000			11.500			9.500			8.000			4.000		

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

Access holes in the mounting flange are not necessary for EK 6 couplings.
The unique assembly screw design (shown below) allows for easy axial mounting and dismounting of the coupling.



Ordering example

EK6 / 60 / A / 19 / 24 / XX

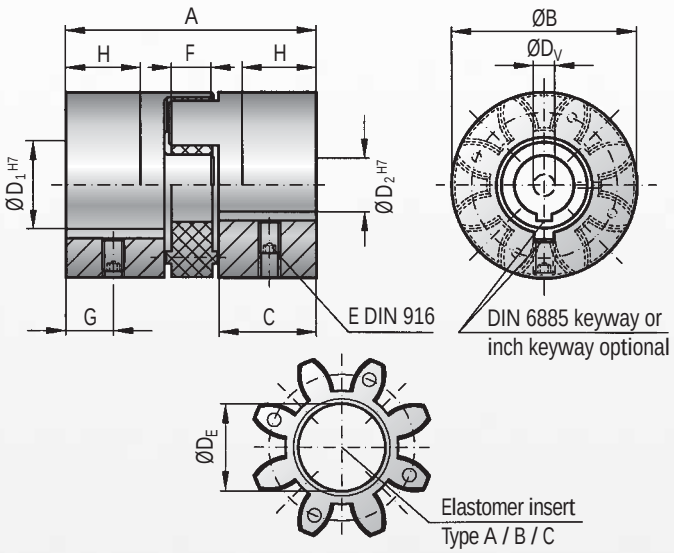
- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. anodized

All data is subject to change without notice.

optional stainless steel

MODEL **EK1**

TECHNICAL SPECIFICATIONS



Properties:
- economically priced
- concentrically machined
- dampens vibrations
- electrical insulating
- press-fit design
- low backlash, due to keyway connection

Material: Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design: Two coupling hubs are concentrically machined with concave driving claws
Bore tolerance H7 + keyway + set screw
DIN 916 or optional pilot bored (D_V)

***Speeds:** Over 10.000 rpm a finely balanced version is available

Tolerance: On the hub/shaft connection 0,01 to 0,05 mm

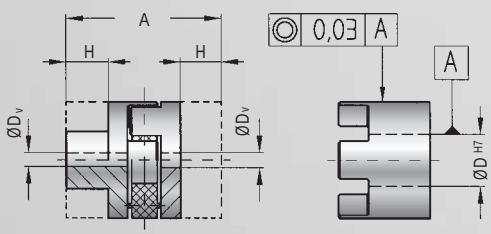
Model EK 1			Series																								
			2			5			10			20			60			150			300			450			800		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	2	2,4	0,5	9	12	2	12,5	16	4	17	21	6	60	75	20	160	200	42	325	405	84	450	660	95	950	1100	240
Max. torque	(Nm)	T_{Kmax}	4	4,8	1	18	24	4	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
Overall length	(mm)	A	20			34			35			66			78			90			114			126			162		
Outer diameter	(mm)	B	15			25			32			42			56			66,5			82			102			136,5		
Mounting length	(mm)	C	6,5			12			12			25			30			35			45			50			65		
Inner diameter pilot bored	(mm)	D_V	3			4			6			7			9			14			18			22			29		
Inner diameter range H7	(mm)	$D_{1/2}$	3 - 9			6 - 15			6 - 18			8 - 25			12 - 32			19 - 38			20 - 45			28 - 60			32 - 80		
Inner diameter max. (elastomer)	(mm)	D_E	6,2			10,2			14,2			19,2			27,2			30,2			38,2			46,2			60,5		
Set screws (DIN 916)		E	see table (depending on bore Ø)**																										
Width Elastomer insert	(mm)	F	5			8			9,5			12			14			15			18			20			25		
Distance	(mm)	G	3			5			6			9			11			12			15			17			30		
Possible shortening length	(mm)	H	4			6			6			19			22			26			32			37			43		
Moment of inertia	(10^{-3} kgm²)	J_1/J_2	0,0003			0,001			0,01			0,02			0,09			0,2			0,6			1,5			11,4		
Approx. weight	(kg)		0,008			0,03			0,08			0,15			0,35			0,6			1,1			1,7			11		
Speed*	(rpm)		28.000			22.000			20.000			19.000			14.000			11.500			9.500			8.000			4.000		

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

** Set screws	
D_1/D_2	E
Ø 6-10	M3
Ø 11-12	M4
Ø 13-30	M5
Ø 31-60	M8
Ø 59-80	M10

Details of pilot bored coupling hubs (D_V)



It´s critical that modifications of the hub are machined concentrically and perpendicular to the through bore.

EK1 hubs can be modified to customer specifications.

The coupling hub may be shortened by measurement H.

Ordering example

EK1 / 60 / A / 19 / D_V / XX

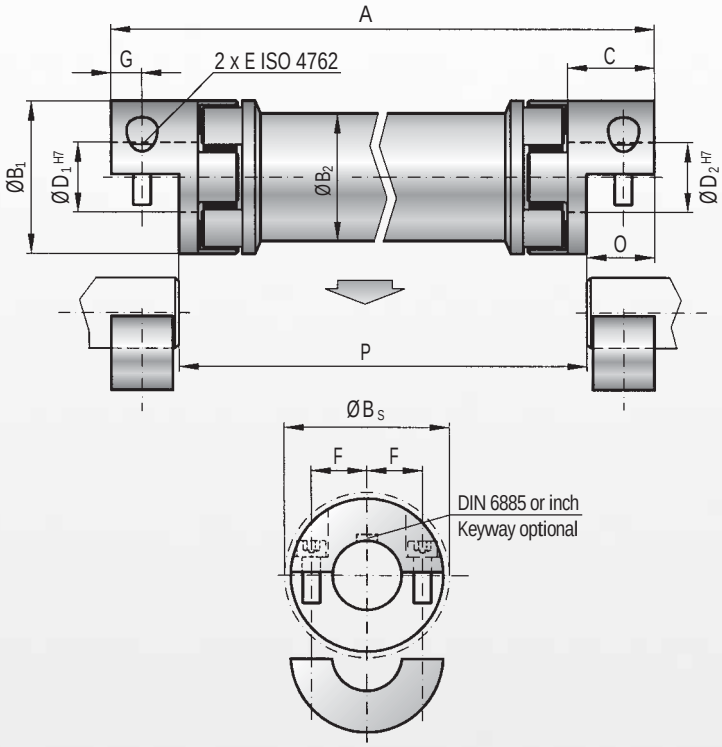
- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 prebored
- Non standard e.g. anodized

All data is subject to change without notice.

optional stainless steel

MODEL **EZ2**

TECHNICAL SPECIFICATIONS



Properties:

- Due to split hubs radial mounting possible
- Spans distances of up to 4 m
- No intermediate support bearing required
- Low moment of inertia
- dampens vibrations
- press-fit design
- backlash-free

Material:

Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer
Intermediate tube: precision machined aluminum tube; **steel and composite tube are optionally available**

Design:

Two coupling hubs are concentrically machined with concave driving jaws
Elastomer inserts are available in type A or B
The two coupling elements are connected with a precise and concentrically machined aluminum tube

Speed:

To control the critical resonant speed please advise the application speed when ordering or inquiring about EZ Line shafts

Tolerance:

On the hub/shaft connection 0,01 to 0,05 mm

Torsional stiffness:

To optimize the application different elastomer inserts with different shore hardnesses are available

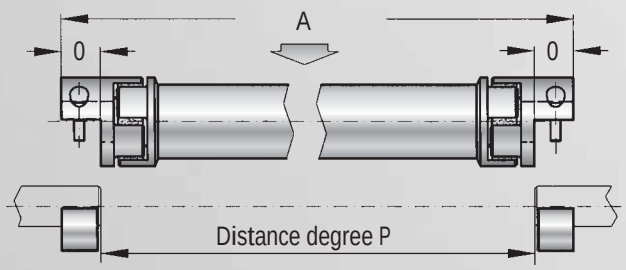
Ordering example

EZ2 / 020 / 1200 / A / 24 / 19 / XX

- Model
- Series
- Overall length
- Type Elastomer insert
- Bore Ø D1 H7
- BoreØ D2 H7
- Non standard e.g. finely balanced

All data is subject to change without notice.

Assembly instructions



The total length of the axis is defined by the distance P + 2x0.

R+W calculation program

With a specially developed sofware R+W can calculate the critical resonant speeds for each application.

Results of a calculation are shown below.

The critical speed can be altered by changing the tube material and/or other parameters.

Critical resonant speed	n_k	=	1/min.
Torsional stiffness tube	C_T^{ZWR}	=	Nm/rad
Total stiffness EZ 2	C_{Tdyn}^{EZ}	=	Nm/rad
Angle of twist	φ	=	Degree-Min-Sec
Weight of total axes	m	=	kg
Critical resonance speed	n_e	=	1/min
Mass moment of inertia	J	=	kgm²
Permissible lateral misalignment	Δ Kr	=	mm

optional stainless steel

Model EZ 2			Series													
			10		20		60		150		300		450		800	
Type (Elastomer insert)			A	B	A	B	A	B	A	B	A	B	A	B	A	B
Rated torque	(Nm)	T_{KN}	12,5	16	17	21	60	75	160	200	325	405	530	660	950	1100
Max. torque**	(Nm)	T_{Kmax}	25	32	34	42	120	150	320	400	650	810	1060	1350	1900	2150
Overall length	(mm)	A	95 - 4.000		130 - 4.000		175 - 4.000		200 - 4.000		245 - 4.000		280 - 4.000		320 - 4.000	
Outer diameter hub	(mm)	B_1	32		42		56		66,5		82		102		136,5	
Outer diameter tube	(mm)	B_2	28		35		50		60		76		90		120	
Outer diameter with screwhead	(mm)	B_S	32		44,5		57		68		85		105		139	
Fit length	(mm)	C	20		25		40		47		55		65		79	
Inner diameter range H7	(mm)	$D_{1/2}$	5 - 16		8 - 25		14 - 32		19 - 36		19 - 45		24 - 60		35 - 80	
Mounting screw (ISO 4762/12.9)		E	M4		M5		M6		M8		M10		M12		M16	
Tightening torque of the mounting screw	(Nm)		4		8		15		35		70		120		290	
Distance between centers	(mm)	F	10,5		15,5		21		24		29		38		50,5	
Distance	(mm)	G	7,5		8,5		15		17,5		20		25		30	
Mounting length	(mm)	O	16,6		18,6		32		37		42		52		62	
Moment of inertia	(10^{-3} kgm^2)	J_1/J_2	0,01		0,02		0,15		0,21		1,02		2,3		17	
Inertia of tube per meter	(10^{-3} kgm^2)	J_3	0,075		0,183		0,66		1,18		2,48		10,6		38	
Dynamic torsional stiffness of the couplings	(Nm/rad)	C_{Tdyn}^{E}	270	825	1.270	2.220	3.970	5.950	6.700	14.650	11.850	20.200	27.700	40.600	41.300	90.000
Torsional stiffness of tube per meter	(Nm/rad)	C_T^{ZWR}	321		1.530		6.632		11.810		20.230		65.340		392.800	
Distance between centers	(mm)	N	26		33		49		57		67		78		94	
Length of the couplings	(mm)	H	34		46		63		73		86		99		125	

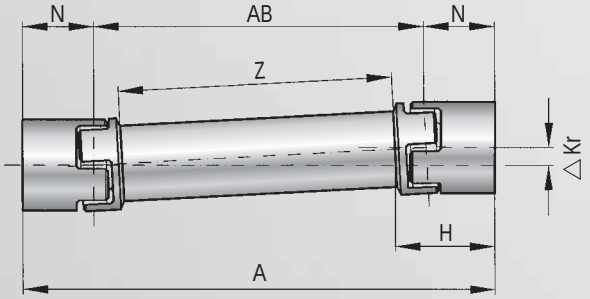
Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

** Max. transferable torque of the clamping hub see EKH (page 7)

The selection process for Servo-Insert-Couplings EZ 2

A	Overall length	m	C_{Tdyn}^{E}	Dynamic torsional stiffness of both elastomer inserts	Nm/rad	H	Length of the coupling	mm
AB	Length AB = (A – 2xN)	m	C_T^{ZWR}	Torsional stiffness of tube per meter	Nm/rad	N	Distance between center lines	mm
Z	Tube length Z = (A – 2xH)	m	C_{Tdyn}^{EZ}	Torsional stiffness of entire coupling	Nm/rad	M_{max}	Max. torque	Nm
						φ	Angle of twist	degree



According to torsional stiffness

$$C_{Tdyn}^{EZ} = \frac{C_{Tdyn}^{E} \times (C_T^{ZWR}/Z)}{C_{Tdyn}^{E} + (C_T^{ZWR}/Z)} \quad \text{(Nm/rad)}$$

According to angle of twist

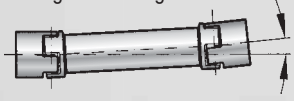
$$\varphi = \frac{180 \times M_{max}}{\pi \times C_{Tdyn}^{EZ}} \quad \text{(degree)}$$

Max. possible misalignments

Lateral misalignment Δ Kr

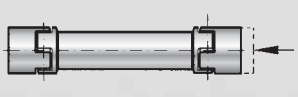
$$\Delta Kr_{max} = \tan \Delta \frac{Kw}{2} \cdot AB$$
$$AB = A - 2xN$$

Angular misalignment Δ Kw



$$\Delta Kw_{max} = \text{ca. } 2^{\circ}$$

Axial misalignment Δ Ka

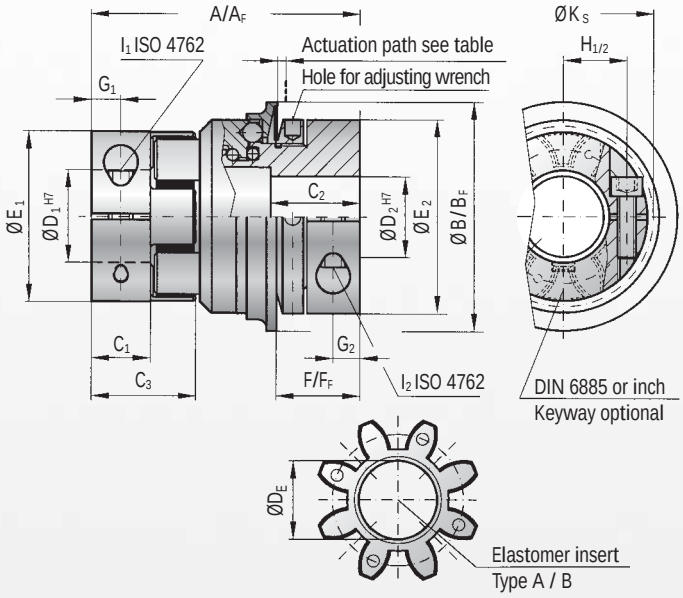


$$\Delta Ka_{max} = \text{ca. } \pm 2$$

optional stainless steel

MODEL **ES2**

TECHNICAL SPECIFICATIONS



Properties:

- reliabel torque overload protection
- short compact design
- backlash-free due to patented R+W design
- disengagement within msecs.
- high actuatuion path when disengaging
- electrically insulating
- press-fit design

Material:

Torque limiter: high strength hardened steel with rust protected surface (oxidized)
Clamping hub D_1: up to series 450 high strength aluminum, from series 800 and up steel
Clamping hub D_2: up to series 60 high strength aluminum, from serie 150 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design:

Two coupling hubs are concentrically machined with concave driving jaws
One side with an integrated torque limiter
The torque limiter is available in single position, multi position or full-disengagement versions.

Tolerance:

On the hub/shaft connection 0,01 to 0,05 mm

For table see right page.

W = single position re-engagement

- After the overload has been eliminated, the coupling will automatically reengage precisely 360° from the original disengagement position
- Achivement of the precise synchronus re-engagement due to patented R+W design
- Signal at overload with mechanical switch or proximity sensor

D = Multi position re-engagement

- Coupling re-engages at multiple set angular intervals.
- Immediate availability of the application as soon as the overload has been eliminated.
- Signal at overload with mechanical switch or proximity sensor
- Standard engagement every 60°
- Engagement at 30, 45, 90 and 120 degrees are optional.

F = Full disengagement

- Permanent separation of drive and driven loads in the event of a torque overload.
- No residual friction
- Signal at overload
- Rotating elements slow down freely
- Coupling can be re-engaged manually (Engagement every 60°)

Ordering example

ES2 / 10 / A / W / 14 / 12 / 8 /4-12 / XX

- Model
- Series
- Type Elastomer insert
- Function system (see page 13)
- Bore Ø D1 H7
- Bore Ø D2 H7
- Disengagement torque
- Adjustable range
- Non standard e.g. VA-Material

All data is subject to change without notice.

The selection of torque limiters

In general the torque limiters are sized according to the necessary disengagement torque. This torque must exceed the nominal torque of the application.

For more information see page 18.

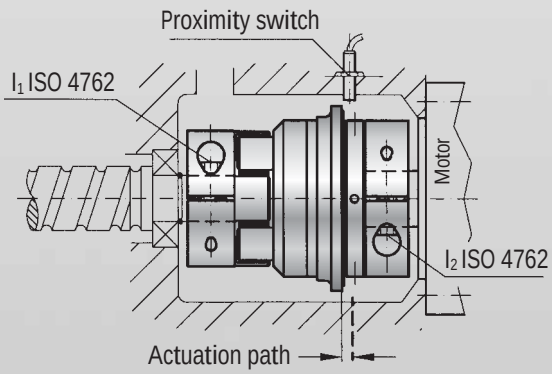
optional stainless steel

Model ES 2		Series						
		10	20	60	150	300	450	800
Adjustment range possible from -to (Nm) (approx. values)	T_{KN}	2 - 6 or 4 - 12	10 - 25 or 20 - 40	10 - 30 or 25 - 80	20-70 45-150 80-180	100 - 200 150 - 240 200 - 320	80 - 200 200 - 350 300 - 500	400 - 650 500 - 800 600 - 900
Adjustment range (full disengagement) possible from -to (Nm) (approx. values)	T_{KN}^F	2-5 or 5-10	8 - 20 or 16 - 30	20 - 40 or 30 - 60	20-60 40-80 80-150	120 - 180 or 160 - 300	60 - 150 100 - 300 250 - 500	200 - 400 or 450 - 800
Overall length (mm)	A	60	86	96	106	140	164	179
Overall length (full disengagement) (mm)	A_F	60	86	96	108	143	168	190
Outer diameter of actuation ring (mm)	B	45	65	73	92	120	135	152
Outer diameter of actuation ring (mm)	B_F	51,5	70	83	98	132	155	177
Fit length (mm)	C_1	10,3	17	20	21	31	34	46
Fit length (mm)	C_2	16	27	31	35	42	51	45
Length of hub (mm)	C_3	20,7	31	36	39	52	57	74
Inner diameter from Ø to Ø H7 (mm)	D_1	5 - 16	8 - 25	12 - 32	19 - 36	20 - 45	28 - 60	35 - 80
Inner diameter from Ø to Ø H7 (mm)	D_2	6 - 20	12 - 30	15 - 32	19 - 42	30 - 60	35 - 60	40 - 75
Diameter of the hub (mm)	E_1	32	42	56	66,5	82	102	136,5
Diameter of the hub (mm)	E_2	40	55	66	81	110	123	132
Distance (mm)	F	17	24	30	31	35	45	50
Distance full disengagement (mm)	F_F	16	22	29	30	35	43	54
Distance (mm)	G_1	5	8,5	10	11	15	17,5	23
Distance (mm)	G_2	5	7,5	9,5	11	13	17	18
Distance between centers (mm)	H_1	10,5	15	21	24	29	38	50,5
Screws (ISO 4762/12.9)	I_1	M4	M5	M6	M8	M10	M12	M16
Tightening torque of the mounting screw (Nm)	I_1	4	8	15	35	70	120	290
Distance between centers SK-side (mm)	H_2	15	19	23	27	39	41	48
Screws (ISO 4762/12.9)	I_2	M4	M6	M8	M10	M12	M16	2x M16
Tightening torque of the mounting screw (Nm)	I_2	4,5	15	40	70	130	200	250
Diameter with screwhead (mm)	K_S	32	44,5	57	68	85	105	139
Approx. weight (kg)		0,3	0,6	1,0	2,4	5,8	9,3	14,3
Moment of inertia (10^{-3} kgm^2)	J_{ges}	0,06	0,25	0,7	2,3	11	22	33,5
Actuation path (mm)		1,2	1,5	1,7	1,9	2,2	2,2	2,2
Type (Elastomer insert)		A B	A B	A B	A B	A B	A B	A B
Inner diameter (Elastomer insert) (mm)	D_E	14,2	19,2	27,2	30,2	38,2	46,2	60,5

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

Mounting instructions



Mounting: Slide the coupling on the shaft ends to the proper axial position. Using a torque wrench, tighten the clamp screws to the correct tightening torque as indicated (in the table page 12)

CAUTION! Both clamping hubs have different screws and different tightening torques.

Dismounting: Simply loosen the clamp screw I1, I2 and remove the safety coupling.

Emergency cut off: The axial path of the actuation ring activates the mechanical switch or the proximity sensor .

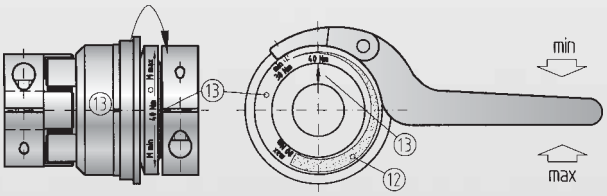
CAUTION! Upon assembly, it is absolutely necessary to check the function of the switch 100%

FUNCTION SYSTEMS ES2

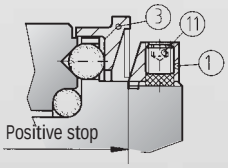
R+W torque limiting couplings are ball detent style overload couplings. They protect drive and driven mechanical components from damage associated with torque overloads.

- Backlash free torque transmission is accomplished by a series of steel balls (4) nested in hardened detents (5).
- Disc springs push against an actuation ring (3) keeping the balls nested.
- The disengagement torque is adjustable by means of an adjustment nut (1).
- In the event of an overload, the actuation ring (3) moves axially allowing the balls to come of the detents separating the drive and driven elements.
- The movement of the actuation ring (3) can be sensed by means of a mechanical switch or proximity sensor (6) triggering the drive to shut down.

Disengagement torque setting



At ES 2 couplings, the slot of the clamping hub serves as a marking (13).

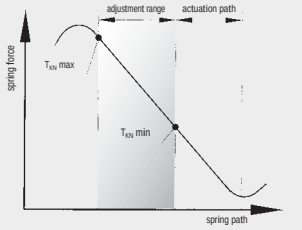


1 adjustment nut
11 locking screw
3 steel actuation ring
12 adjustment range
13 marking

R+W torque limiters are factory set to the customer specified disengagement torque, which is marked onto the coupling. The adjustment range (min/max) is also marked on the adjustment nut (1).
The customer can adjust the disengagement torque as long as it is in the range (12) indicated on the adjustment nut.

The adjustment range may not be exceeded while re-adjusting.

To adjust the disengagement torque, loosen the locking screws (11) and rotate the adjustment ring using a spanner wrench to the desired new setting. Tighten the 3 locking screws (11) and test the coupling.

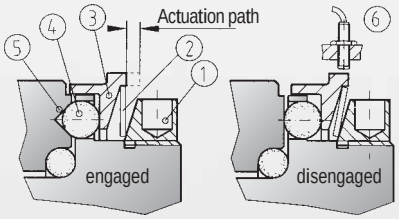


CAUTION:

R+W torque limiters incorporate disc springs that exhibit a special spring characteristic. It is important to stay in the max-min range of the coupling.

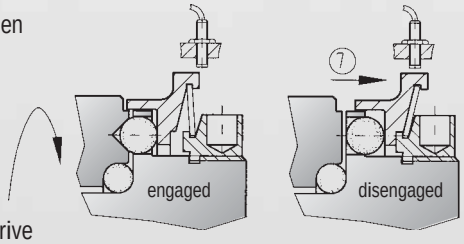
Single-position / Multi-position

In a torque overload, with the single-position design (standard) and multi-position design, the spring disengages to allow the balls to come out of their detents, separating the drive and driven elements. Very low residual spring pressure remains so that the coupling will re-engage once the torque is reduced below the overload setting.



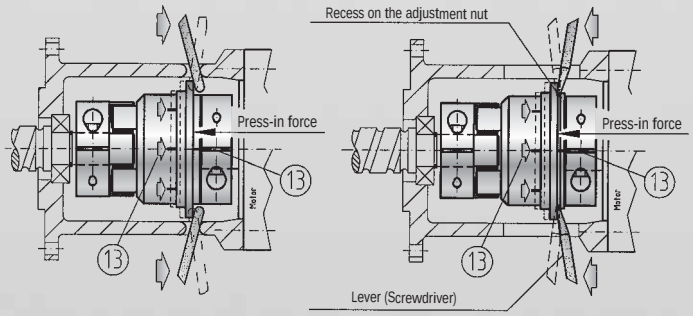
Full-disengage

With this design, when a torque overload is detected, the disc spring completely flips over and places no residual spring pressure on the actuation ring. The drive and driven elements are completely separated.



Re-engagement of the coupling is not automatic and must be performed manually (Picture 3a, 3b).

CAUTION:
Re-engagment should only be performed when the coupling stands still and not rotating!



Picture 3a **Picture 3b**

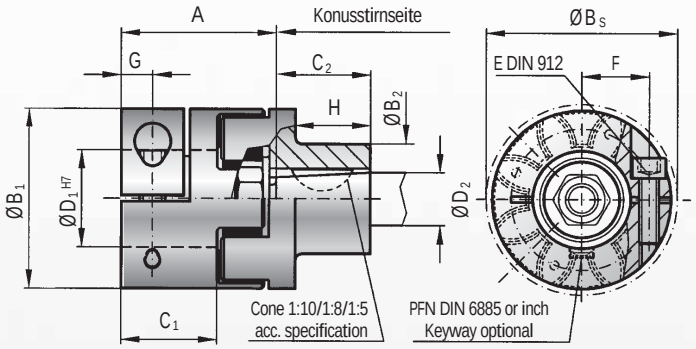
The R+W full-disengage torque limiting coupling can be re-engaged in six different positions or every 60 degrees with low „press-in" force (E). Marks on the actuation ring and body (13) of the coupling must line up and indicate the re-engagement points.

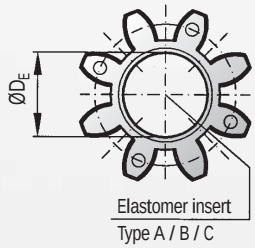
As of size 150 and up the re-engagement can be done with 2 lever which will be supported at a recess on the adjustment nut (picture 3b). Screwdrivers can be used as a lever.

optional stainless steel

MODEL **EK4**

TECHNICAL SPECIFICATIONS





Achtung: Die Masse C2 / H / und ØB2 sind vom verwendeten Konuszapfen abhängig.

Die Länge der Kupplung kann deshalb nur bis zur Konusstirnseite des verwendeten Konuszapfens vorab festgelegt werden.
Genaue Massangaben erhalten Sie nach der Festlegung der Konusgeometrie direkt von R+W.

Properties:
- for conical shaft ends
- short compact design
- easy assembly
- high concentricity
- backlash-free
- electrically insulating

Material: Clamping hubs: high strength aluminum
Conical hub: steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design: Two coupling hubs are concentrically machined with concave driving jaws
One side with clamping hub and a radial screw ISO 4762
One side with a hub conically bored with keyway according to customer equirement

Speed: Over 10.000 rpm a finely balanced version is available

Tolerance: On the hub/shaft connection 0,01 to 0,05 mm

Model EK 4			Series								
			20			60			150		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	17	21	6	60	75	20	160	200	42
Max. torque*	(Nm)	T_{Kmax}	34	42	12	120	150	35	320	400	85
Overall length	(mm)	A	42			50			57		
Outer diameter hub	(mm)	B_1	42			56			66,5		
Outer diameter conical hub	(mm)	B_2	variable			variable			variable		
Outer diameter with screwhead	(mm)	B_S	44,5			57			68		
Mounting length	(mm)	C_1	25			30			35		
Mounting length	(mm)	C_2	variable			variable			variable		
Inner diameter range H7	(mm)	D_1	8-25			12-32			19-36		
Possible conical diameter	(mm)	D_2	Acc. to customer requirement								
Inner diameter max (elastomer)	(mm)	D_E	19,2			27,2			30,2		
Mounting screw (ISO 4762/12.9)		E_1	M5			M6			M8		
Tightening torque of the mounting screw	(Nm)		8			15			35		
Distance between centers	(mm)	F	15,5			21			24		
Distance	(mm)	G	8,5			10			12		
Length	(mm)	H	variable			variable			variable		

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

** Maximum transferable torque of the clamping hub depends on the bore diameters (bore/shaft clearance 0,01 mm to 0,05 mm shaft oiled)

Series	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35
20	20	35	45	60			
60		50	80	100	110	120	
150			120	160	180	200	220

Higher torque through additional key possible.

Ordering example

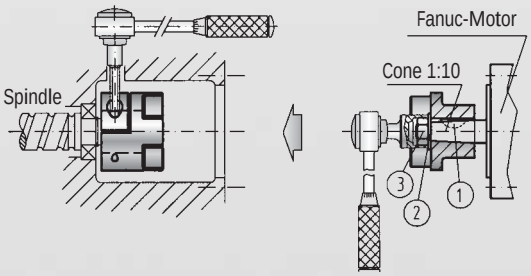
EK4 / 20 / A / 24 / 1:10 Ø11 / XX

- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Cone/ Ø D2
- Non standard e.g. finely balanced

All data is subject to change without notice.

Installation instruction

Mounting of the clamping hub: Slide the coupling on the shaft ends, at the right axial position thighten the mounting screw to the specified tightening torque as shown in the table (column E1).

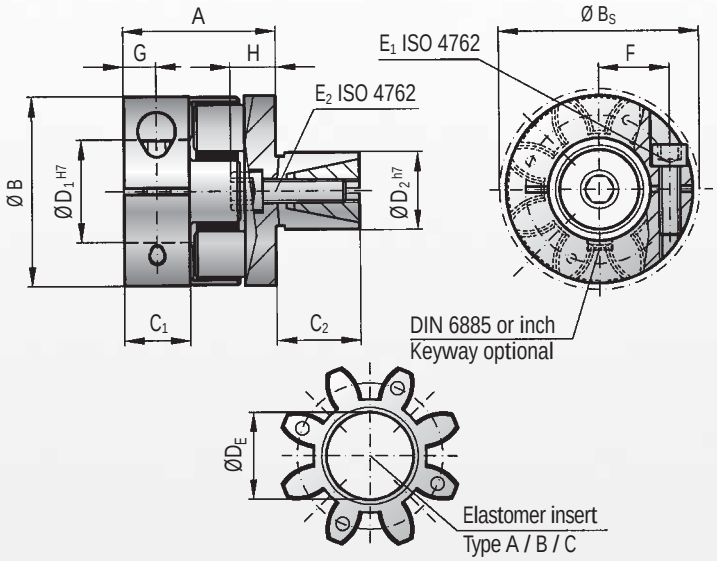


Mounting of the conical hub: After inserting the key into the keyway of the motor shaft slide the coupling hub on the shaft. Check if the conical hub has a proper seat on the shaft. Now the nut (3) can be tightened on the motor shaft using the exact tightening torque specified by the motor manufacturer.

optional stainless steel

MODEL **EK7**

TECHNICAL SPECIFICATIONS



Properties:
- short compact design
- easy mounting
- high concentricity
- axial mounting of the expanding shaft
- backlash-free
- electrical insulating

Material:
Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Expanding shaft & cone: steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design:
Two coupling hubs are concentrically machined with concave driving jaws
One side with clamping hub and a radial screw ISO 4762
One side with an expanding shaft and tapered clamping element
Suggested bore tolerance for the shaft: H7

Speed:**
Over 4.000 rpm a finely balanced version is available

Tolerance:
On the hub/shaft connection 0,01 to 0,05 mm

Model EK7			Series																								
			5			10			20			60			150			300			450			800				
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	
Rated torque	(Nm)	T_{KN}	9	12	2	12,5	16	4	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240	
Max. torque*	(Nm)	T_{Kmax}	18	24	4	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400	
Overall length	(mm)	A	22			28			40			46			51			68			76			94			
Outer diameter	(mm)	B	25			32			42			56			66,5			82			102			135			
Outer diameter with screwhead	(mm)	B_S	25			32			44,5			57			68			85			105			139			
Mounting length	(mm)	C_1	8			10,3			17			20			21			31			34			46			
Mounting length	(mm)	C_2	12			20			25			27			32			45			55			60			
Inner diameter range H7	(mm)	D_1	4 - 12,7			5 - 16			8 - 25			12 - 32			19 - 36			20 - 45			28 - 60			35 - 80			
Outer diameter range h7	(mm)	D_2	10 - 16			13 - 25			14 - 30			23 - 36			26 - 42			38 - 60			42 - 70			42 - 80			
Inner diameter max. (elastomer)	(mm)	D_E	10,2			14,2			19,2			27,2			30,2			38,2			46,2			60,5			
Mounting screw (ISO 4762/12.9)		E_1	M3			M4			M5			M6			M8			M10			M12			M16			
Tightening torque	(Nm)		2			4			8			15			35			70			120			290			
Mounting screw (ISO 4762/12.9)		E_2	M4			M5			M6			M8			M10			M12			M16			M16			
Tightening torque	(Nm)		4			9			12			32			60			110			240			300			
Distance between centers	(mm)	F	8			10,5			15,5			21			24			29			38			50,5			
Distance	(mm)	G	4			5			8,5			10			11			15			17,5			23			
Length	(mm)	H	7			7			10			11			16			20			27			27			
Moment of inertia	(10^{-3} kgm^2)		0,002			0,01			0,04			0,08			0,15			0,4			1,3			9,5			
Approx. weight	(kg)		0,04			0,05			0,12			0,3			0,5			0,9			1,5			7,6			
Speed**	(rpm)		22.000			20.000			19.000			14.000			11.500			9.500			8.000			4.000			

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

* Maximum transferable torque of the clamping hub depends on the bore diameters (bore/shaft clearance 0,01 mm to 0,05 mm shaft oiled)

TECHNICAL INFORMATION EK7

Series	Ø 3	Ø 4	Ø 5	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35	Ø 45	Ø 50	Ø 55	Ø 60	Ø 65	Ø 70	Ø 75	Ø 80
5		1,5	2	8														
10			4	12	32													
20				20	35	45	60											
60					50	80	100	110	120									
150						120	160	180	200	220								
300						200	230	300	350	380	420							
450								420	480	510	600	660	750	850				
800										700	750	800	835	865	900	925	950	1.000

Higher torque through additional keyway possible.

Ordering example

EK7 / 20 / A / 24 / 19 / XX

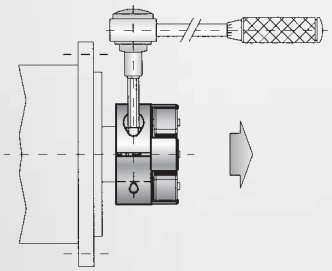
- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Shaft Ø D2 h7
- Non standard e.g. finely balanced

All data is subject to change without notice.

Mounting instructions

Mounting of the clamping hub:
Slide the coupling onto the shaft ends, at the right axial position tighten the mounting screw to the specified tightening torque E_1.

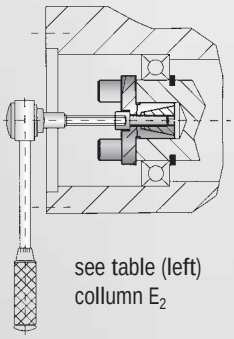
See page 16/collumn E_1.



Dismounting of the clamping hub:
For dismounting loosen the mounting screw E_1.

Mounting of the expanding shaft:
Push the shaft hub into the bore, at the right axial position thighten the mounting screw to the specified tightening torque E_2.

See page 16/collumn E_2



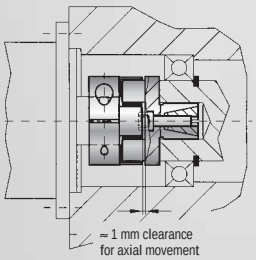
see table (left)
collumn E_2

Dismounting of the expanding shaft:
For dismounting loosen the screw E_2 a few turns.

By putting pressure on the screwhead, the inner cone slides out of its sleeve.

The shaft is now loose.

Advantage:
No access holes in the intermediate flange are neccessary in order to mount the coupling.



CAUTION:
The elastomer insert has to be able to axially move in order to compensate for axial mis-alignment.

optional stainless steel

FACTORS AND SIZING CALCULATIONS

Temperature factor S_υ

Temperature (υ)	A Sh 98 A	B Sh 64 D	C Sh 80 A
> -30° to -10°	1,5	1,7	1,4
> -10° to +30°	1,0	1,0	1,0
> +30° to +40°	1,2	1,1	1,3
> +40° to +60°	1,4	1,3	1,5
> +60° to +80°	1,7	1,5	1,8
> +80° to +100°	2,0	1,8	2,1
> +100° to +120°	–	2,4	–

Start factor S_Z

Z_h	up to 120	120 - 240	above 240
S_Z	1,0	1,3	on request

Shock and load factor S_A

Uniform load	S_A = 1,0
Non-uniform load	S_A = 1,8
High dynamics, frequent reversing loads	S_A = 2,5

T_{KN} = Rated torque of the coupling (Nm)
T_{Kmax} = Max. torque of the coupling (Nm)
T_S = Existing peak torque of the coupling (Nm)
T_{AS} = Peak torque of the drive element (Nm)
T_{AN} = Rated torque of the drive element (Nm)
T_{LN} = Rated torque of the driven element (Nm)
P_{LN} = Power of the driven element (KW)
n = Speed (rpm)
J_A = Motor´s moment of inertia (kgm²)
J_L = Machine´s moment of inertia (kgm²) (Spindle + slide + workpiece)
J_1 = Moment of inertia of a coupling half at the driving end (kgm²)
J_2 = Moment of inertia of a coupling half at the driven end (kgm²)
m = Ratio of the moments of inerta driving to driven element
υ = Temperature of the area around the coupling (observe radiant heat)
S_υ = Temperature factor
S_A = Shock or load factor
S_Z = Start factor (factor for the number of starts/hour)
Z_h = Cycle of starts (1/h)

Sizing of a Servomax® Elastomer Coupling

1. Calculation example without shock or reversing loads

The rated torque of the coupling (T_{KN}) needs to be higher than the rated torque of the driven element (T_{LN}) times the temperature factor S_υ at the coupling for the application. If T_{LN} is not known, T_{AN} can be used for the calculation instead.

Condition: $T_{KN} > T_{LN} \times S_\upsilon$

Auxiliary calculation: $T_{LN} = \frac{9550 \times P_{LN}}{n}$

Calculation example: (No loads and shocks)

Drive face: DC - motor
T_{AN} = **119 Nm**

Coupling conditons:
υ = **70°** C
S_υ = 1,7 (for 70°/Type A)

Driven face: Pump
T_{LN} = **85 Nm**

Condition: $T_{KN} > T_{LN} \times S_\upsilon$
$T_{KN} > 85 \text{ Nm} \times 1,7$
$T_{KN} > 144,5$ Nm → **Result:** A coupling type **EK 2/150/A** (T_{KN} = 160 Nm) is selected.

2. Calculation example with shock loads

In all cases the maximum rated torque (T_{Kmax}). of the coupling can not be exceeded. First calculate the rated torque (T_{KN}) of the coupling same as above. Compare this result to the peak torque (T_S) times the start factor (S_Z) times the temperature factor (S_υ) for the application. The greater of the two values must be less than (TKmax) of the coupling.

Condition: $T_{KN} > T_{LN} \times S_\upsilon$

Auxiliary calculation: $T_{LN} = \frac{9550 \times P_{LN}}{n}$

Condition: $T_{Kmax} > T_S \times S_Z \times S_\upsilon$

Auxiliary calculation: $T_S = \frac{T_{AS} \times S_A}{m + 1}$

$m = \frac{J_A + J_1}{J_L + J_2}$

optional stainless steel

MODEL **ATEX**

FOR USE IN HAZARDOUS AREAS AND EXPLOSIVE ATMOSPHERE

AT mosphere EX plosible

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.

Design of the Servomax EX:
No dimensional change of the EK standard series. The material of the hubs and the inserts will change.

Hubs:
In general steel or stainless steel hubs with be used ***Caution:*** Aluminum hubs may not be used in explosive enviroment.

Elastomer insert:
A special elastomer insert (Type D/92 Sh A), which is able to conduct electricity is used. This prevents the possibility of electrostatic loads and sparks.

Mounting, Sizing:
All misalignment values and the transmittable torques are reduced by 30%.

Maintanance:
A routine inspection of the coupling must be performed.

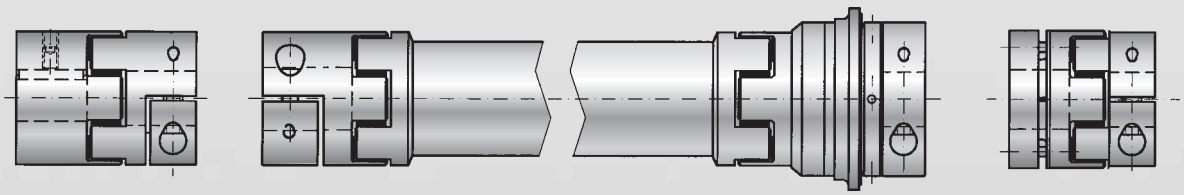
Mounting manuals:
Mounting and maintanance manuals are provided with every EEx coupling.

For the classified zones 1/21 and 2/22 the Servomax® Elastomer Coupling do have an accreditation according to ATEX 95/137

R+W solutions with standard components

All standards hubs and elastomer inserts are interchangable in the same sizes.

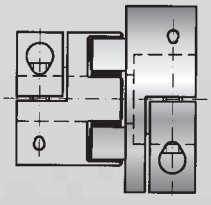
Example:



EK 1 **EK 2** **EZ-Coupling half** **ES-Coupling half** **EK 6** **EKL**

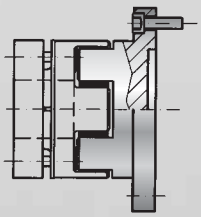
R+W non standard solutions with special hubs

EK 2 Non standard hub



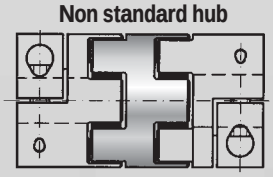
Non standard hubs for bigger bores

EK 6 Non standard hub



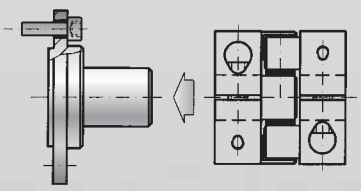
Non-standard hubs with flange

EK 2 EK 2
Non standard hub



Intermediate piece for higher lateral misalignment

EKL



Adapter flange for planetery gearboxes acc. to ISO 9409

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www.rwcouplings.com

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THE R+W-PRODUCT RANGE

TORQUE LIMITERS
Series SK

From 0,1 – 2.800 Nm, Bore diameters 4 – 70 mm
Available as a single position, multi-position, load holding, or full disengagement version
Single piece or press-fit design

BELLOW COUPLINGS
Series BK

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

BELLOW COUPLINGS
ECONOMY CLASS
Series BKL / BKC

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

SERVOMAX®
ELASTOMER COUPLINGS
Series EK

From 2 – 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

396/01/06/3.000

FLEXIBLE AND TORSIONALLY RIGID.

BELLOWS COUPLINGS

SERIES BK | 15 – 10,000 Nm

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THE ULTIMATE COUPLING FROM 15 – 10,000 Nm

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TORSIONALLY STIFF METAL BELLOWS COUPLINGS

Areas of application:

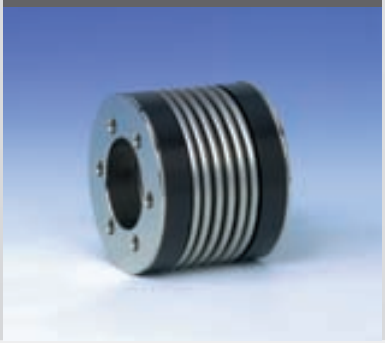
- Servo drives
- CNC axes
- Robotic axes
- Manipulators
- Linear actuators
- Printing machines
- Packaging machines
- Woodworking machines
- Textile machinery
- Metal cutting machines

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

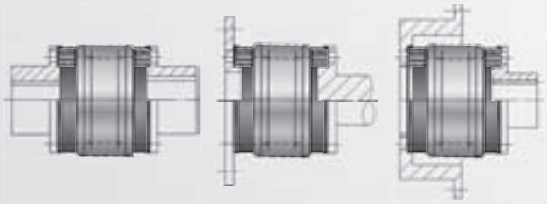
MODEL	PROPERTIES	APPLICATION EXAMPLES

BK1



with flange mounting
from 15-10,000 Nm

- special design application

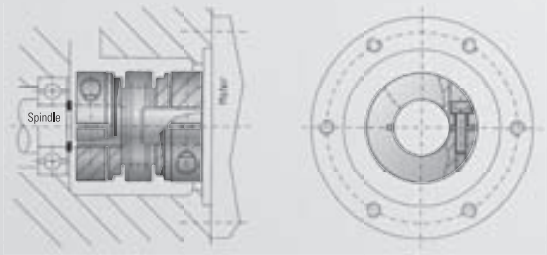


see page 5

BK 2

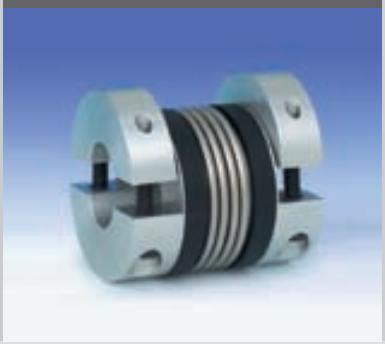
with clamping hub
from 15-1,500 Nm

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



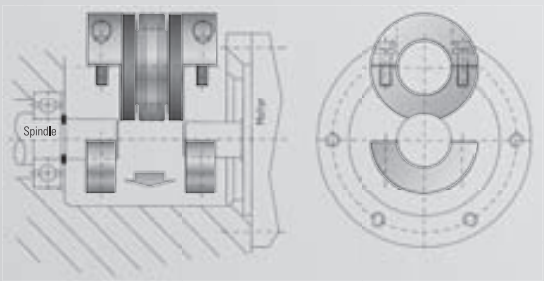
see page 6

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

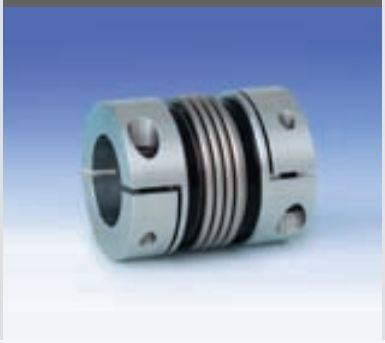


see page 7

optional stainless steel

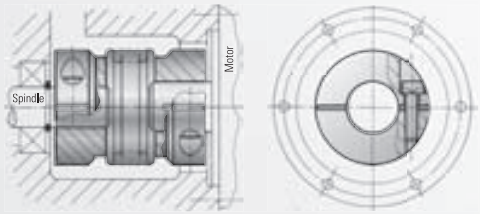
MODEL	PROPERTIES	APPLICATION EXAMPLES

BKL



Economy Class with clamping hub from 2-500 Nm

- low cost version
- self opening clamping system optional

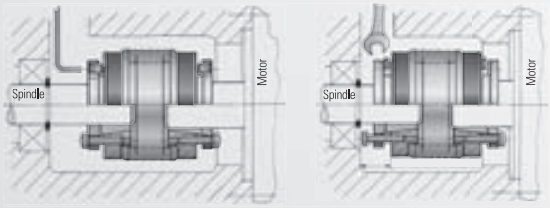


see separate catalog

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

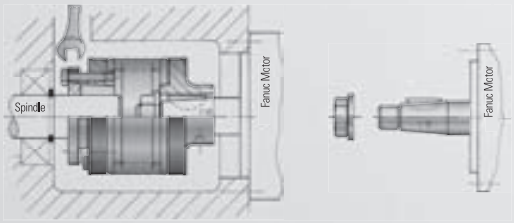
The new approach

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

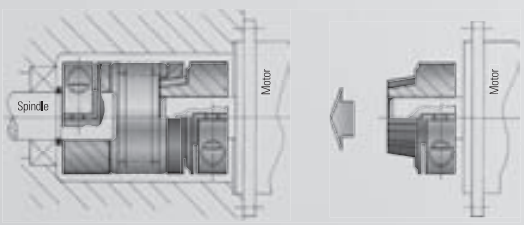


see page 9

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

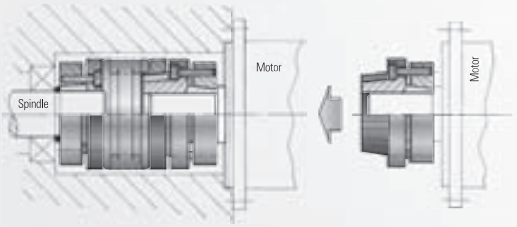
TORSIONALLY STIFF METAL BELLOWS COUPLINGS

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

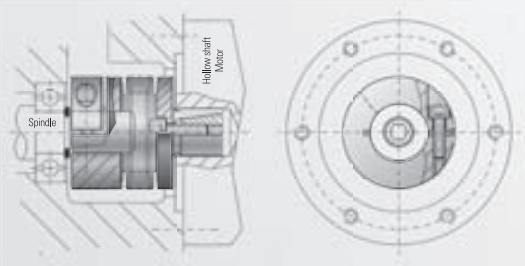


see page 11

BK 7

with expanding shaft from 15-300 Nm

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

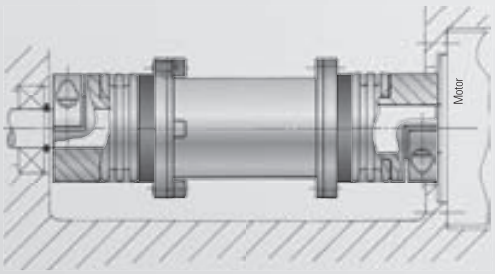


see page 12

ZA

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

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



see separate cataloge

ATEX

for the use in explosive environments

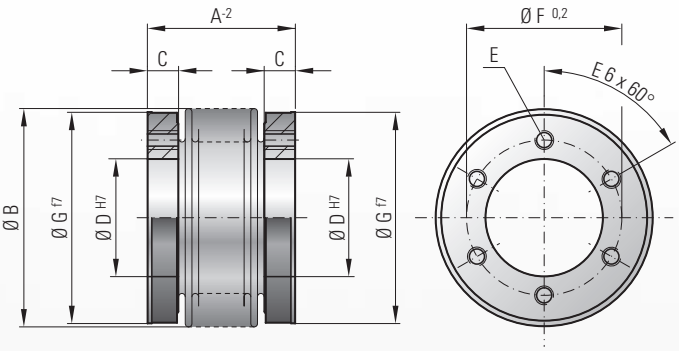
- available for the full product range
- for hazardous areas 1/21 and 2/22 bellows couplings are registered according to the directive ATEX 95/137

see page 13

optional stainless steel

MODEL **BK1**

TECHNICAL SPECIFICATIONS



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.

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

BK1/ 150 / 62 /XX

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

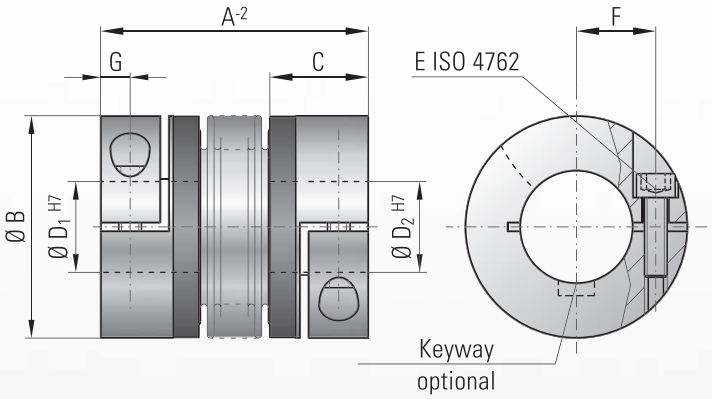
Model BK 1			Series											
			15	30	60	150	200	300	500	800	1500	4000	6000	10000
Rated torque	(Nm)	T_{KN}	15	30	60	150	200	300	500	800	1500	4000	6000	10000
Overall length	(mm)	A	30 / 37	36 / 44	43 / 53	50 / 62	53 / 65	56 / 70	64 / 77	81	100	145	138	150
Outer diameter of bellows	(mm)	B	49	55	66	81	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	(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	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	0.4	0.4	0.4
angular	(Grad)	Max. values	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)

optional stainless steel

MODEL **BK2**

TECHNICAL SPECIFICATIONS



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.

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

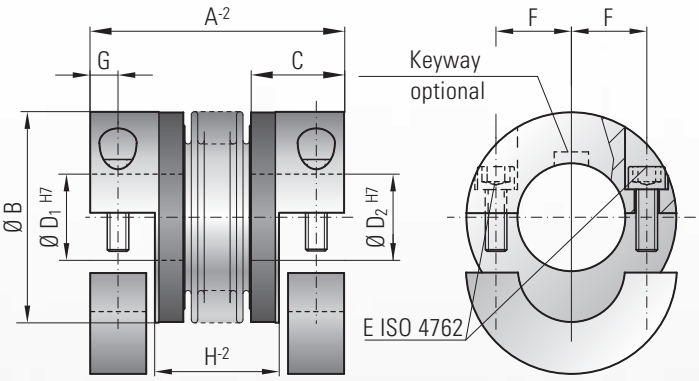
Model BK 2			Series																	
			15		30		60		80		150		200		300		500		800	1500
Rated torque	(Nm)	T_{KN}	15		30		60		80		150		200		300		500		800	1500
Overall length	(mm)	A	59	66	69	77	83	93	94	106	95	107	105	117	111	125	133	146	140	166
Outer diameter	(mm)	B	49		55		66		81		81		90		110		123		134	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*
Thightening 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

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

optional stainless steel

MODEL **BKH**

TECHNICAL SPECIFICATIONS



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.

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

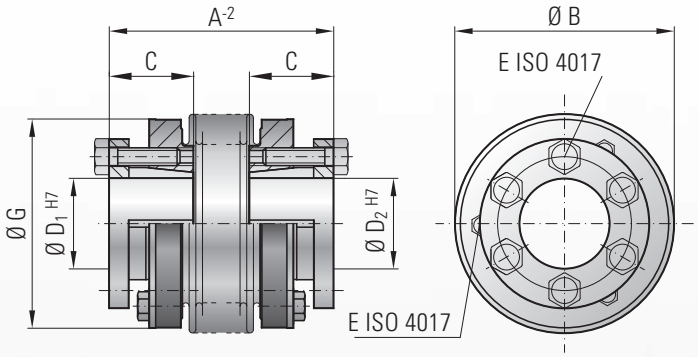
Model BK H			Series																	
			15		30		60		80		150		200		300		500		800	1500
Rated torque	(Nm)	T_{KN}	15		30		60		80		150		200		300		500		800	1500
Overall length	(mm)	A	59	66	69	77	83	93	94	106	95	107	105	117	111	125	133	146	140	166
Outer diameter	(mm)	B	49		55		66		81		81		90		110		123		134	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
Thightening 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} 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

optional stainless steel

MODEL **BK3**

TECHNICAL SPECIFICATIONS



Properties:
- high clamping forces
- high degree of operating dependability
- new draw off device suited for space restriced 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.

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

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)	E	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	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	0.4	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

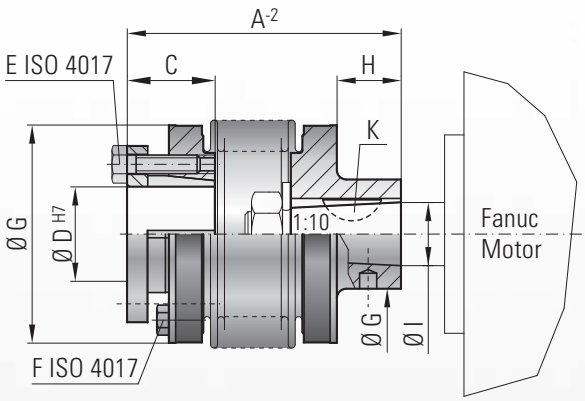
(1Nm ≙ 8.85 in lbs) max. angular misalignment see BK 1

optional stainless steel

MODEL **BK4**

TECHNICAL SPECIFICATIONS

for Fanuc-Motors



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.

Ordering example

BK4 / 150 / 82 / 20 / XX

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

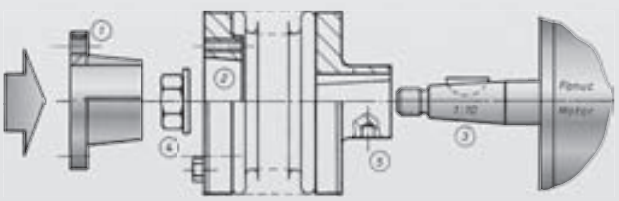
Model BK 4			Series 15		Series 30		Series 60		Series 150	
Rated torque	(Nm)	T_{KN}	15		30		60		150	
Overall length	(mm)	A	47	54	68	76	72	82	82	94
Outer diameter of bellows	(mm)	B	49		55		66		81	
Fit length	(mm)	C	19		22		27		32	
Inner diameter from Ø to Ø H7	(mm)	D	10-22		12-23		12-29		15-37	
Fastening 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} kgm²)	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)	(mm)	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 concial 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.



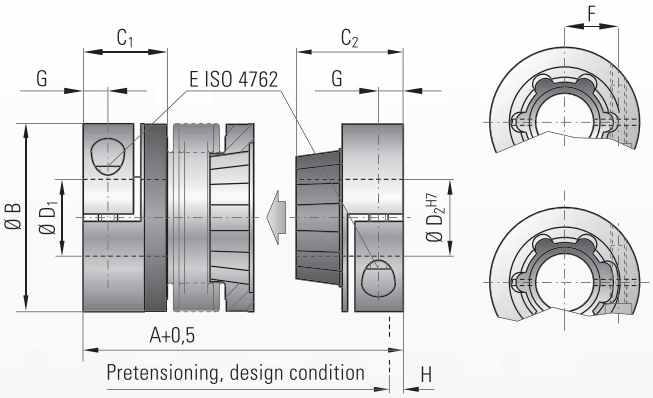
Key DIN 896 B

optional stainless steel

MODEL **BK5**

TECHNICAL SPECIFICATIONS

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

Properties:

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 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 150 and up steel. Tapered segment on hub face: glass-fiber reinforced plastic sprayed 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 / 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 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	
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	
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	
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

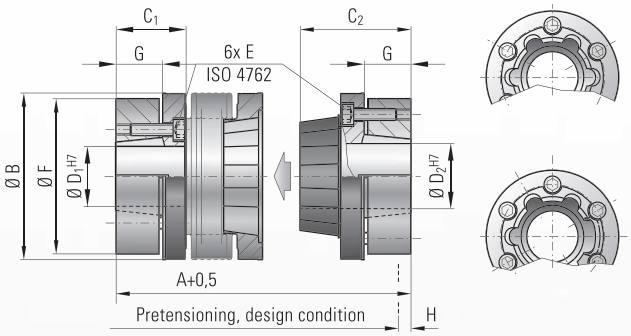
* two screws each hub, 180° apart
Higher torques on request
Missing bellows values see BK1

optional stainless steel

MODEL **BK6**

TECHNICAL SPECIFICATIONS

Press-fit precision metal bellows couplings



Material BK 6:

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

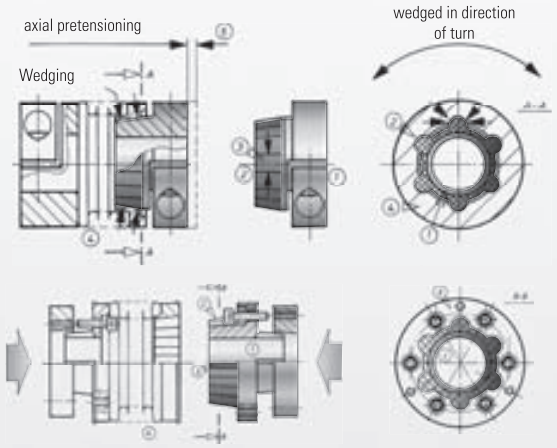
Tapered segment on hub face: glass-fiber rein forced plastic sprayed onto a steel hub.

Design BK 6:

One side concial sleeve with 6 fastening screws ISO 4762 and 3 draw-off threads. One side with backlash-free tapered concial 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 consits of a metal bellows with a tapered mounting (4). Absolutly 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 achives a strength roughly that of steel.

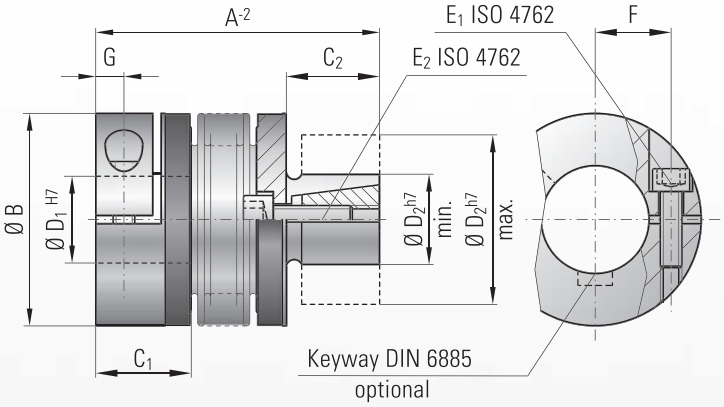
Model BK 6			Series															
			15		30		60		150		300		500		800	1500
Rated toque	(Nm)	T_{KN}	15		30		60		150		300		500		800	1500
Overall length (inserted)	(mm)	A	58	65	68	76	79	89	97	109	113	127	132	145	140	158
Outer diameter	(mm)	B	49		55		66		81		110		123		133	157
Fit length	(mm)	C_1	13.5		16.5		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	157	106	140	96	400	650
Moment of inertia	(10^{-3} kgm²)	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 ≙ 8.85 in lbs) * allowed following maximum pretensioning Higher torques on request. Missing bellow values see BK1

optional stainless steel

MODEL **BK7**

TECHNICAL SPECIFICATIONS



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.

Ordering example

BK7 / 150 / 71 / 32 / 35 / XX

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

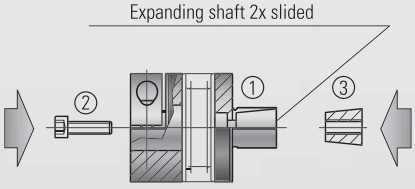
Model BK 7		Series									
		15		30		60		150		300	
Rated toque (Nm)	T_{KN}	15		30		60		150		300	
Overall length (inserted) (mm)	A	45	52	53	61	62	72	71	83	84	98
Outer diameter (mm)	B	49		55		66		81		110	
Fit length (mm)	C_1	22		27		32		36		43	
Inner diameter from Ø to Ø H7 (mm)	D_1	8-28		10-30		12-37		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} kgm²)	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.	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

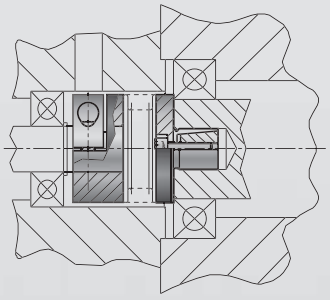
(1Nm ≙ 8.85 in lbs)

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





optional stainless steel

MODEL **ATEX**

FOR USE IN HAZARDOUS AREAS AND EXPLOSIVE ATMOSPHERE

AT mosphere EX plosible

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-EEX do have an accreditation according to ATEX 95/137

Mounting, Design:

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

Installation and Operation instructions:

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
- Maintenace intervals
- Trouble shooting
- Marking of the coupling
- Declaration of conformity

Identification:

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

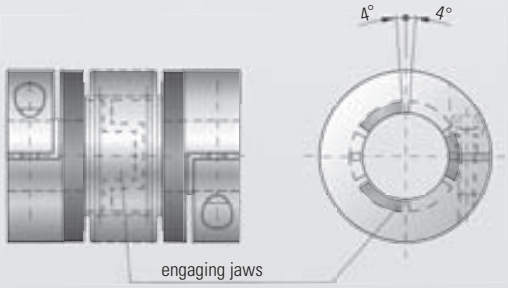
Example Accreditation data:

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-EEX metal bellows couplings

All BK-EEX 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 ± 4° 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.

optional stainless steel

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 uf 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 maschine 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)

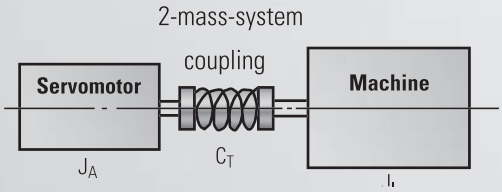
- or max. deceleration torque of the load face (Nm)

J_L = maschine´s moment of inertia (Spindle + slide + workpiece+ half of coupling) (kgm^2)

J_A = motor´s moment of inertia (kgm^2)

According to resonace 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)

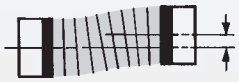
INSTALLATION INSTRUCTIONS

SERIES BK

Misalignments

axial

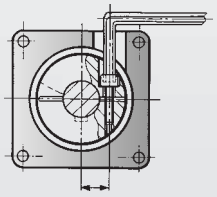
lateral



angular

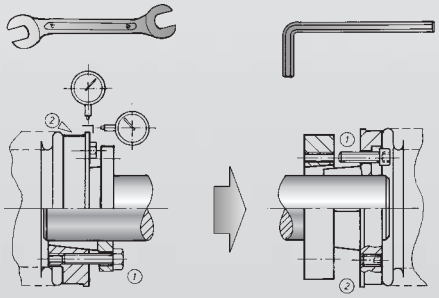
- When mounting the coupling ensure that the metal bellows are not damaged or bent.
- During mounting, the torque and axis misalignments may exceed 2 times the value specified without the operation of the coupling being restricted.
- However, for continuous operation, the axial and lateral misalignments 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 sufficent to dismount the coupling.

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

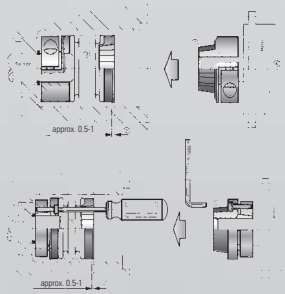


- It is absolutely essential that the fastening screws (1) are evenly tightened.
- Perform tightening of the fastening screws crosswise in order to avoid any distortion of the coupling hubs.
- Extraction of the tapered bushings for repair purposes is possible by means of 3x captive hexagonal draw-off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

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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

355/11/04/3000

PRECISE AND COMPACT.

SERVOMAX®
ELASTOMER COUPLINGS

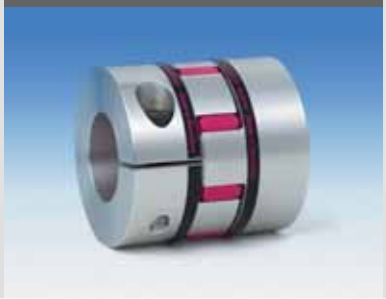
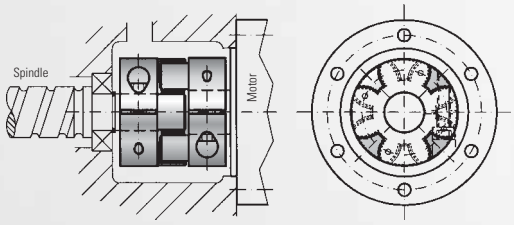
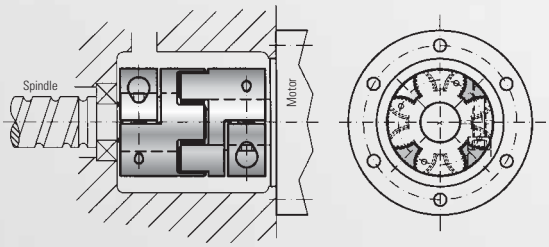
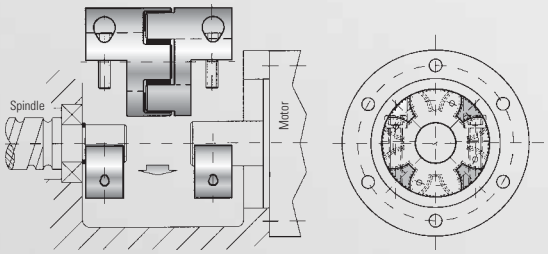
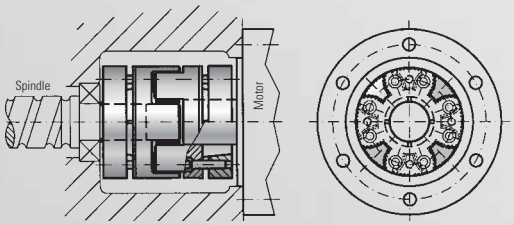
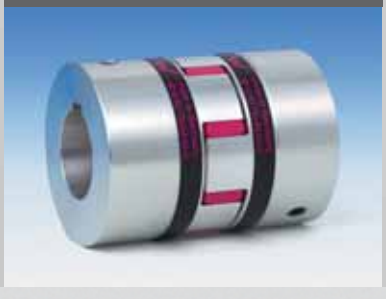
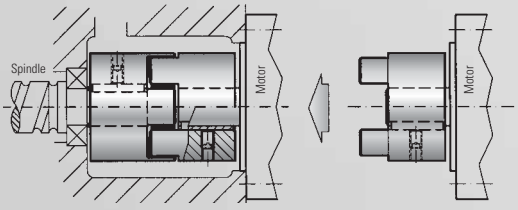
SERIES EK | 2 – 2,000 Nm

R+W®
COUPLING TECHNOLOGY

THE ULTIMATE COUPLING FROM 2 – 2,000 Nm

www.rwcouplings.com

optional stainless steel

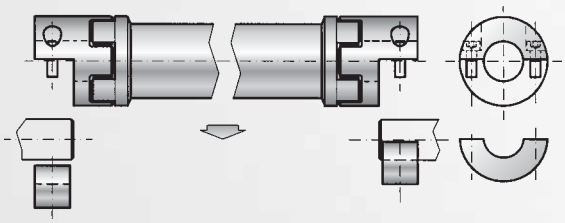
MODELS	PROPERTIES	APPLICATION EXAMPLES
EKL 	**with clamping hub, compact version** ■ short compact design ■ low inertia ■ easy assembly	 see page 5
EK2 	**with clamping hub** ■ very smooth running ■ counterbalanced type ■ easy assembly	 see page 6
EKH 	**with split clamping hubs** ■ easy assembly ■ radial mounting, due to split clamping hubs	 see page 7
EK6 	**with conical clamping ring** ■ very smooth running ■ high clamping forces ■ axially mountable	 see page 8
EK1 	**with keyway-connection** ■ favorably priced design ■ easy to modify	 see page 9

MODELS	PROPERTIES	APPLICATION EXAMPLES

EZ2

line shaft with split clamping hub

- radial mounting due to split hubs
- no intermediate support bearing necessary
- conical clamping hubs available
- length up to 4 m

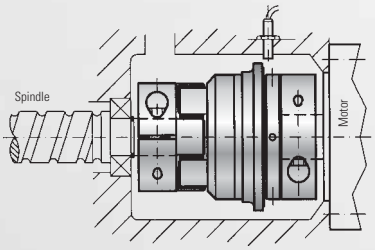


see page 10/11

ES2

torque limiter with clamping hub

- reliable torque overload protection
- backlash free due to patented R+W design
- easy to mount

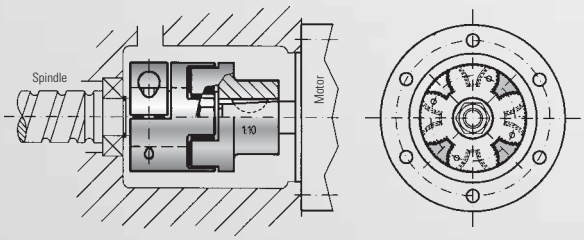


see page 12/13/14

EK4

for conical shaft ends

- for conical shaft ends e.g. Fanuc motors
- easy mounting
- conical hub mounts axially

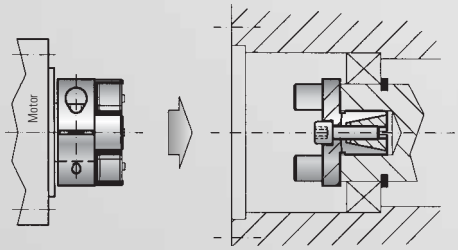


see page 15

EK7

with expanding shaft

- axial hub mounting with expanding shaft
- very smooth running
- high clamping forces



see page 16/17

EEx

for the use in explosive environments

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

see page 19

optional stainless steel

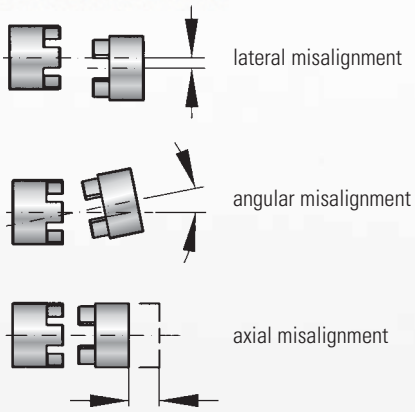
SERVOMAX® ELASTOMER COUPLINGS

Areas of application:

- Servo drives
- Machine tools
- Packaging machinery
- Plant automation
- Printing machinery
- Industrial robots
- Measurement and positioning units
- general mechanical engineering
- Linking screw jacks, linear actuaters, encoders

Properties of the product range:

- vibration dampening
- electrically insulating (standard)
- backlash-free
- press-fit design
- compensation of lateral-, angular- and axial misalignment



Function

The equalizing element of an EK coupling is the elastomer insert. It transmits the torque without backlash and vibration. The elastomer insert defines the features of the entire coupling and/or of the entire drive system.

The coupling is backlash free due to pretensioning of the elastomer insert between the two coupling halves.The Servomax-Coupling compensates for lateral, angular and axial misalignment.

Type A
Shore hardness 98 Sh A

Type B
Shore hardness 64 Sh D

Type C
Shore hardness 80 Sh A

Type D*
Shore hardness 92 Sh A

Specification of the Elastomer inserts

Type	Shore hardness	Color	Material	Relative damping (ψ)	Temperature range	Features
A	98 Sh A	red	TPU	0,4 - 0,5	-30°C to +100°C	high damping
B	64 Sh D	green	TPU	0,3 - 0,45	-30°C to +120°C	high torsional stiffness
C	80 Sh A	yellow	TPU	0,3 - 0,4	-30°C to +100°C	very high damping
D*	92 Sh A	black	TPU	0,3 - 0,45	-10°C to +90°C	electrically conductive*

* Due to the electrically conductiv properties of the insert electrostatic load of the coupling is prevented. This eliminates sparks during normal operation (Explosive areas). Technical datas available.

The values of the relative damping were determined at 10 Hz and +20°C.

Model row EK		Series																										
		2			5			10			20			60			150			300			450			800		
Type (Elastomer insert)		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Static torsional stiffness (Nm/rad)	C_T	50	115	17	150	350	53	260	600	90	1140	2500	520	3290	9750	1400	4970	10600	1130	12400	18000	1280	15100	27000	4120	41300	66080	10320
Dynamic torsional stiffness (Nm/rad)	C_{Tdyn}	100	230	35	300	700	106	541	1650	224	2540	4440	876	7940	11900	1350	13400	29300	3590	23700	40400	6090	55400	81200	11600	82600	180150	28600
Lateral (mm)	Max. values	0,08	0,06	0,1	0,08	0,06	0,1	0,1	0,08	0,12	0,1	0,08	0,15	0,12	0,1	0,15	0,15	0,12	0,2	0,18	0,14	0,25	0,2	0,18	0,25	0,25	0,2	0,3
Angular (mm)		1	0,8	1,2	1	0,8	1,2	1	0,8	1,2	1	0,8	1,2	1	0,8	1,2	1	0,8	1,2	1	0,8	1,2	1	0,8	1,2	1	0,8	1,2
Axial (mm)		±1			±1			±1			±2			±2			±2			±2			±2			±2		

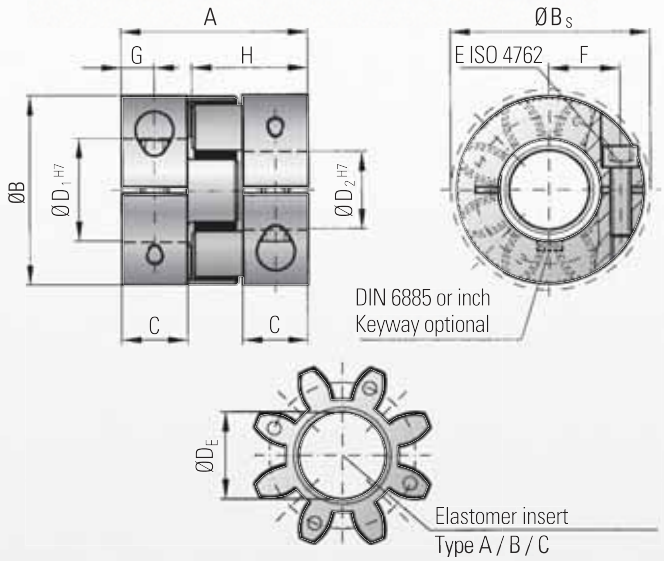
Static torsional stiffness at 50% T_{KN} Dynamic torsional stiffness at T_{KN} 1 Nm = 8,85 in lbs

optional stainless steel

MODEL **EKL**

TECHNICAL SPECIFICATIONS

Compact version



Properties:
- short compact design
- easy assembly
- vibration dampening
- electrically insulating
- backlash-free
- press-fit design

Material: Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design: Two coupling hubs are concentrically machined with concave driving jaws

***Speeds:** Over 4.000 rpm a finely balanced version is available

Tolerance: On the hub/shaft connection 0,01 to 0,05 mm

Model EKL			Series																									
			2			5			10			20			60			150			300			450			800		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	2	2,4	0,5	9	12	2	12,5	16	4	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240
Max. torque**	(Nm)	T_{Kmax}	4	4,8	1	18	24	4	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
Overall length	(mm)	A	20			26			32			50			58			62			86			94			123		
Outer diameter	(mm)	B	16			25			32			42			56			66,5			82			102			136,5		
Outer diameter with screwhead	(mm)	B_S	17			25			32			44,5			57			68			85			105			139		
Mounting length	(mm)	C	6			8			10,3			17			20			21			31			34			46		
Inner diameter range H7	(mm)	$D_{1/2}$	3 - 8			4 - 12,7			4 - 16			8 - 25			12 - 32			19 - 35			20 - 45			28 - 60			35 - 80		
Inner diameter max. (elastomer)	(mm)	D_E	6,2			10,2			14,2			19,2			27,2			30,2			38,2			46,2			60,5		
Mounting Screw (ISO 4762/12.9)		E	M2			M3			M4			M5			M6			M8			M10			M12			M16		
Tightening torque of the mounting screw	(Nm)		0,6			2			4			8			15			35			70			120			290		
Distance between centers	(mm)	F	5,5			8			10,5			15,5			21			24			29			38			50,5		
Distance	(mm)	G	3			4			5			8,5			10			11			15			17,5			23		
Hub length	(mm)	H	12			16,7			20,7			31			36			39			52			57			74		
Moment of inertia	(10^{-3} kgm^2)	J_1/J_2	0,0003			0,001			0,01			0,01			0,08			0,15			0,4			1,3			7,8		
Approx. weight	(kg)		0,008			0,02			0,05			0,12			0,3			0,5			0,9			1,5			8,5		
Speed*	(rpm)		28.000			22.000			20.000			19.000			14.000			11.500			9.500			8.000			4.000		

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

** Maximum transferable torque of the clamping hub depends on the bore diameters (bore/shaft clearance 0,01 mm to 0,05 mm shaft oiled)

Series	Ø 3	Ø 4	Ø 5	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35	Ø 45	Ø 50	Ø 55	Ø 60	Ø 65	Ø 70	Ø 75	Ø 80
2	0,2	0,8	1,5	2,5														
5		1,5	2	8														
10			4	12	32													
20				20	35	45	60											
60					50	80	100	110	120									
150						120	160	180	200	220								
300						200	230	300	350	380	420							
450								420	480	510	600	660	750	850				
800										700	750	800	835	865	900	925	950	1.000

Higher torque through additional key possible.

Ordering example

EKL / 60 / A / 19 / 24 / XX

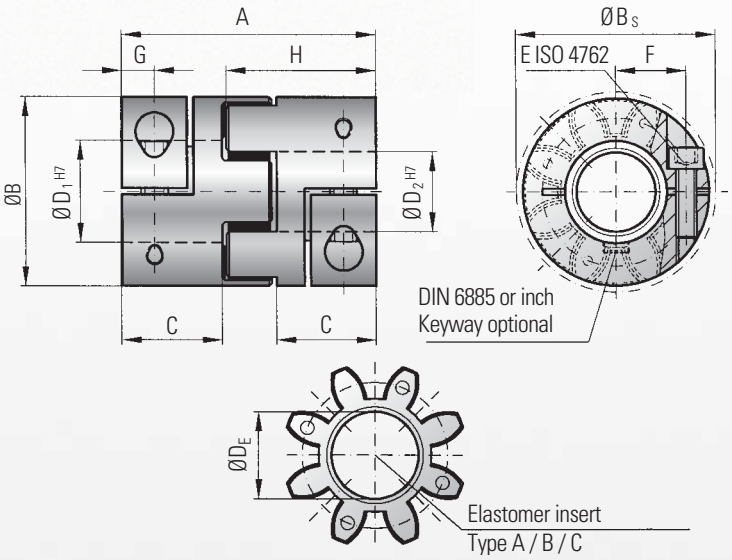
- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. finely balanced

All data is subject to change without notice.

optional stainless steel

MODEL **EK2**

TECHNICAL SPECIFICATIONS



Properties:

- easy assembly
- concentrically machined hubs
- vibration dampening
- electrically insulating
- backlash-free
- press-fit design

Material:

Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design:

Two coupling hubs are concentrically machined with concave driving jaws

***Speeds:**

Over 10.000 rpm a finely balanced version is available

Tolerance:

On the hub/shaft connection 0,01 to 0,05 mm

Model EK 2			Series																	
			20			60			150			300			450			800		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240
Max. torque**	(Nm)	T_{Kmax}	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
Overall length	(mm)	A	66			78			90			114			126			162		
Outer diameter	(mm)	B	42			56			66,5			82			102			136,5		
Outer diameter with screwhead	(mm)	B_S	44,5			57			68			85			105			139		
Mounting length	(mm)	C	25			30			35			45			50			65		
Inner diameter range H7	(mm)	$D_{1/2}$	8 - 25			12 - 32			19 - 35			20 - 45			28 - 60			35 - 80		
Inner diameter max. (elastomer)	(mm)	D_E	19,2			27,2			30,2			38,2			46,2			60,5		
Mounting screw (ISO 4762/12.9)		E	M5			M6			M8			M10			M12			M16		
Tightening torque of the mounting screw	(Nm)		8			15			35			70			120			290		
Distance between centers	(mm)	F	15,5			21			24			29			38			50,5		
Distance	(mm)	G	8,5			10			12			15			17,5			23		
Hub length	(mm)	H	39			46			52,5			66			73			93,5		
Moment of inertia	(10^{-3} kgm^2)	J_1/J_2	0,02			0,09			0,2			0,6			1,5			9,5		
Approx. weight	(kg)		0,15			0,35			0,6			1,1			1,7			10		
Speed*	(rpm)		19.000			14.000			11.500			9.500			8.000			4.000		

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

** Maximum transferable torque of the clamping hub depends on the bore diameters

Series	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35	Ø 45	Ø 50	Ø 55	Ø 60	Ø 65	Ø 70	Ø 75	Ø 80
20	20	35	45	60											
60		50	80	100	110	120									
150			120	160	180	200	220								
300			200	230	300	350	380	420							
450					420	480	510	600	660	750	850				
800							700	750	800	835	865	900	925	950	1.000

Higher torque through additional key possible.

Ordering example

EK2 / 60 / A / 19 / 24 / XX

- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. finely balanced

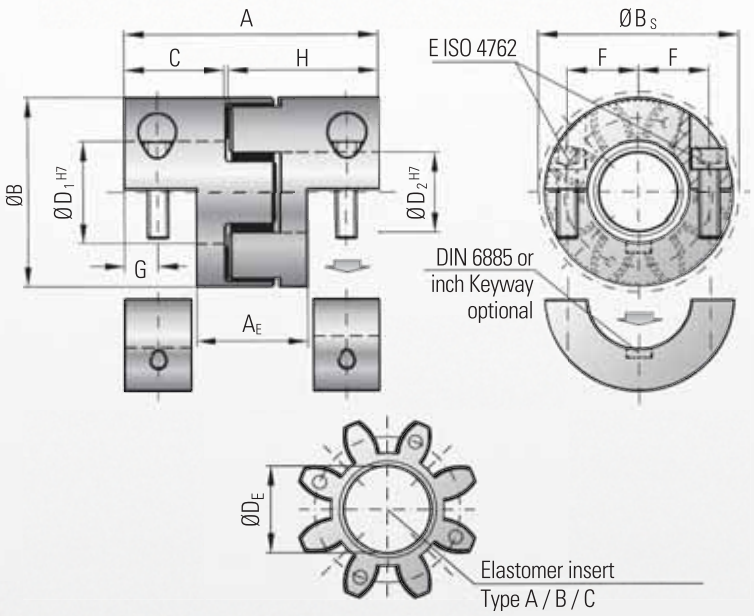
All data is subject to change without notice.

optional stainless steel

MODEL **EKH**

TECHNICAL SPECIFICATIONS

Split hubs



Properties:
- radial mounting possible
- high concentricity
- dampens vibrations
- electrical insulating
- easy mounting
- backlash-free

Material: Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design: Two split coupling hubs are concentrically machined with concave driving jaws

***Speeds:** Over 10.000 rpm a finely balanced version is available

Tolerance: On the hub/shaft connection 0,01 to 0,05 mm

Model EKH			Series																	
			20			60			150			300			450			800		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240
Max. torque**	(Nm)	T_{Kmax}	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
Overall length	(mm)	A	66			78			90			114			126			162		
Insertion length	(mm)	A_E	28			33			37			49			51			65		
Outer diameter	(mm)	B	42			56			66,5			82			102			136,5		
Outer diameter with screwhead	(mm)	B_S	44,5			57			68			85			105			139		
Mounting length	(mm)	C	25			30			35			45			50			65		
Inner diameter range H7	(mm)	$D_{1/2}$	8 - 25			12 - 32			19 - 35			20 - 45			28 - 60			35 - 80		
Inner diameter max. (elastomer)	(mm)	D_E	19,2			27,2			30,2			38,2			46,2			60,5		
Mounting screw (ISO 4762/12.9)		E	M5			M6			M8			M10			M12			M16		
Tightening torque of the mounting screw	(Nm)		8			15			35			70			120			290		
Distance between centers	(mm)	F	15,5			21			24			29			38			50,5		
Distance	(mm)	G	8,5			10			12			15			17,5			23		
Hub length	(mm)	H	39			46			52,5			66			73			93,5		
Moment of inertia	(10^{-3} kgm^2)	J_1/J_2	0,02			0,09			0,2			0,6			1,5			9,5		
Approx. weight	(kg)		0,15			0,35			0,6			1,1			1,7			10		
Speed*	(rpm)		19.000			14.000			11.500			9.500			8.000			4.000		

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

** Maximum transferable torque of the clamping hub depends on the bore diameters

Serie	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35	Ø 45	Ø 50	Ø 55	Ø 60	Ø 65	Ø 70	Ø 75	Ø 80
20	30	40	50	65											
60		65	120	150	180	200									
150			180	240	270	300	330								
300			300	340	450	520	570	630							
450					630	720	770	900	1.120	1.180	1.350				
800							1.050	1.125	1.200	1.300	1.400	1.450	1.500	1.550	1.600

Higher torque through additional key possible.

Ordering example

EKH / 60 / A / 19 / 24 / XX

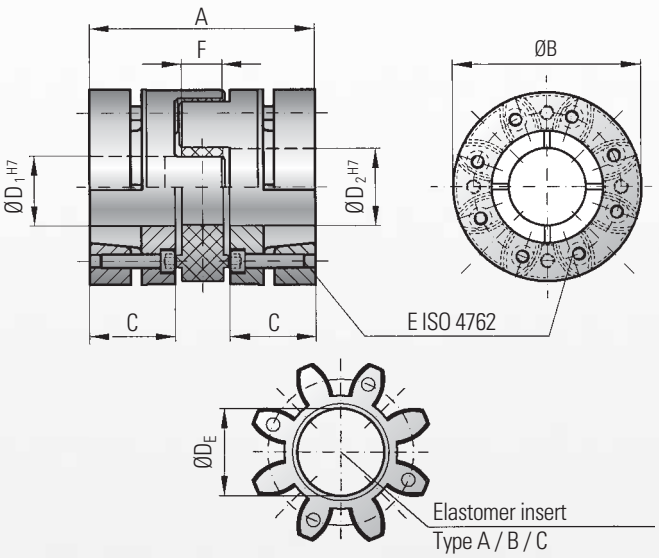
- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. finely balanced

All data is subject to change without notice.

optional stainless steel

MODEL **EK6**

TECHNICAL SPECIFICATIONS



Properties:

- high clamping forces
- concentrically machined
- easy mounting
- dampens vibrations
- electrical insulating
- backlash-free
- press-fit design
- axial mounting possible

Material: Clamping hub and conical clamping: up to series 450 high strength aluminum, from series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design: Two coupling hubs are concentrically machined with concave driving jaws

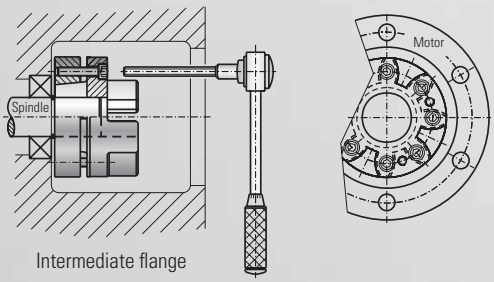
Tolerance: On the hub/shaft connection 0,01 to 0,05 mm

Model EK 6			Series																				
			10			20			60			150			300			450			800		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	12,6	16	4	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240
Max. torque	(Nm)	T_{Kmax}	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
Overall length	(mm)	A	42			56			64			76			96			110			138		
Outer diameter	(mm)	B	32			43			56			66			82			102			136,5		
Mounting length	(mm)	C	15			20			23			28			36			42			53		
Inner diameter range H7	(mm)	$D_{1/2}$	6 - 16			8 - 24			12 - 32			19 - 35			20 - 45			28 - 54			32 - 80		
Inner diameter max. (elastomer)	(mm)	D_E	14,2			19,2			27,2			30,2			38,2			46,2			60,5		
Mounting screw (ISO 4762/12.9)		E	3x M3			6x M4			4x M5			8x M5			8x M6			8x M8			8x M10		
Tightening torque of the mounting screw	(Nm)		2			3			6			7			12			35			55		
Width Elastomer insert	(mm)	F	9,5			12			14			15			18			20			25		
Moment of inertia	(10^{-3} kgm^2)	J_1/J_2	0,01			0,015			0,08			0,15			0,4			1,3			9,2		
Approx. weight	(kg)		0,08			0,12			0,3			0,5			0,9			1,5			9,6		
Speed	(1/min)		20.000			19.000			14.000			11.500			9.500			8.000			4.000		

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

Access holes in the mounting flange are not necessary for EK 6 couplings.
The unique assembly screw design (shown below) allows for easy axial mounting and dismounting of the coupling.



Ordering example

EK6 / 60 / A / 19 / 24 / XX

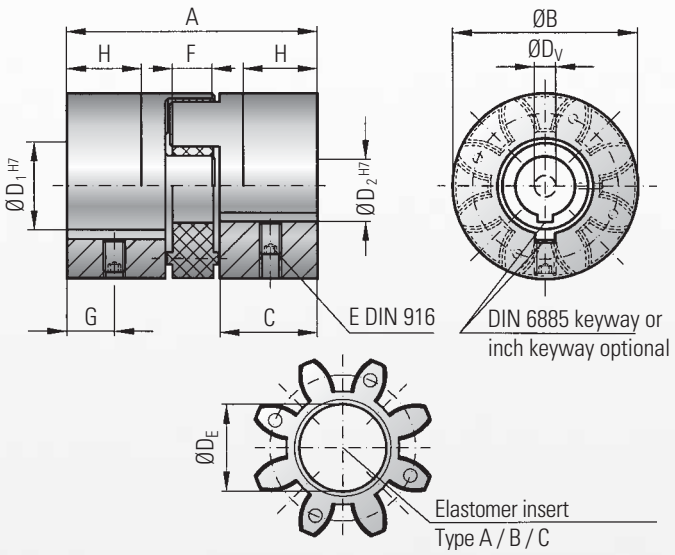
- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. anodized

All data is subject to change without notice.

optional stainless steel

MODEL **EK1**

TECHNICAL SPECIFICATIONS



Properties:
- economically priced
- concentrically machined
- dampens vibrations
- electrical insulating
- press-fit design
- low backlash, due to keyway connection

Material: Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design: Two coupling hubs are concentrically machined with concave driving claws
Bore tolerance H7 + keyway + set screw
DIN 916 or optional pilot bored (D_V)

***Speeds:** Over 10.000 rpm a finely balanced version is available

Tolerance: On the hub/shaft connection 0,01 to 0,05 mm

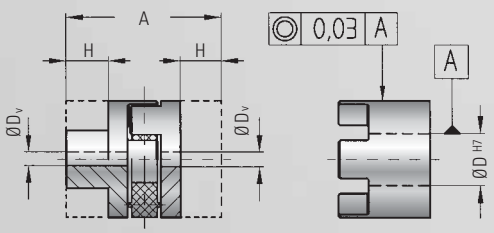
Model EK 1			Series																								
			2			5			10			20			60			150			300			450			800		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	2	2,4	0,5	9	12	2	12,5	16	4	17	21	6	60	75	20	160	200	42	325	405	84	450	660	95	950	1100	240
Max. torque	(Nm)	T_{Kmax}	4	4,8	1	18	24	4	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
Overall length	(mm)	A	20			34			35			66			78			90			114			126			162		
Outer diameter	(mm)	B	15			25			32			42			56			66,5			82			102			136,5		
Mounting length	(mm)	C	6,5			12			12			25			30			35			45			50			65		
Inner diameter pilot bored	(mm)	D_V	2,8			4			6			7			9,5			14			18			22			29		
Inner diameter range H7	(mm)	$D_{1/2}$	3 - 9			6 - 15			6 - 18			8 - 25			12 - 32			19 - 38			20 - 45			28 - 60			32 - 80		
Inner diameter max. (elastomer)	(mm)	D_E	6,2			10,2			14,2			19,2			27,2			30,2			38,2			46,2			60,5		
Set screws (DIN 916)		E	see table (depending on bore Ø)**																										
Width Elastomer insert	(mm)	F	5			8			9,5			12			14			15			18			20			25		
Distance	(mm)	G	3			5			6			9			11			12			15			17			30		
Possible shortening length	(mm)	H	4			6			6			19			22			26			32			37			43		
Moment of inertia	(10^{-3} kgm²)	J_1/J_2	0,0003			0,001			0,01			0,02			0,09			0,2			0,6			1,5			11,4		
Approx. weight	(kg)		0,008			0,03			0,08			0,15			0,35			0,6			1,1			1,7			11		
Speed*	(rpm)		28.000			22.000			20.000			19.000			14.000			11.500			9.500			8.000			4.000		

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

** Set screws	
D_1/D_2	E
Ø 6-10	M3
Ø 11-12	M4
Ø 13-30	M5
Ø 31-60	M8
Ø 59-80	M10

Details of pilot bored coupling hubs (D_V)



It´s critical that modifications of the hub are machined concentrically and perpendicular to the through bore.

EK1 hubs can be modified to customer specifications.

The coupling hub may be shortened by measurement H.

Ordering example

EK1 / 60 / A / 19 / D_V / XX

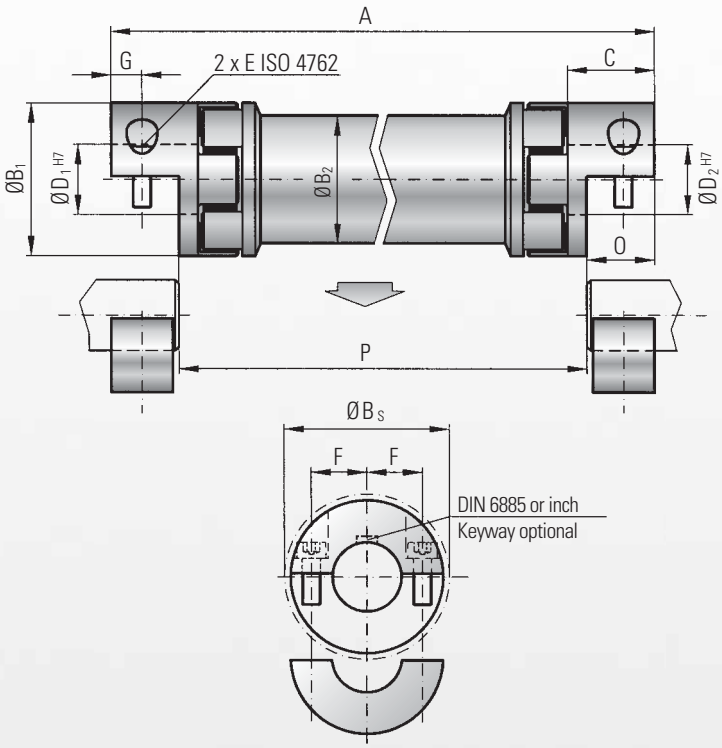
- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 prebored
- Non standard e.g. anodized

All data is subject to change without notice.

optional stainless steel

MODEL **EZ2**

TECHNICAL SPECIFICATIONS



Properties:

- Due to split hubs radial mounting possible
- Spans distances of up to 4 m
- No intermediate support bearing required
- Low moment of inertia
- dampens vibrations
- press-fit design
- backlash-free

Material:

Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer
Intermediate tube: precision machined aluminum tube; **steel and composite tube are optionally available**

Design:

Two coupling hubs are concentrically machined with concave driving jaws
Elastomer inserts are available in type A or B
The two coupling elements are connected with a precise and concentrically machined aluminum tube

Speed:

To control the critical resonant speed please advise the application speed when ordering or inquiring about EZ Line shafts

Tolerance:

On the hub/shaft connection 0,01 to 0,05 mm

Torsional stiffness:

To optimize the application different elastomer inserts with different shore hardnesses are available

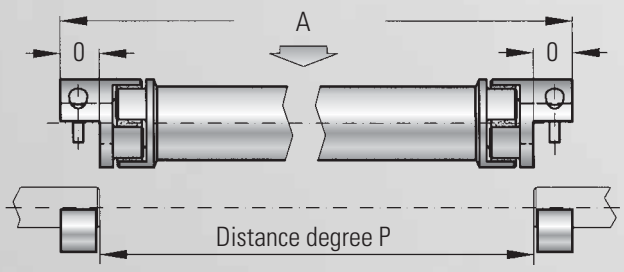
Ordering example

EZ2 / 020 / 1200 / A / 24 / 19 / XX

- EZ2 — Model
- 020 — Series
- 1200 — Overall length
- A — Type Elastomer insert
- 24 — Bore Ø D1 H7
- 19 — BoreØ D2 H7
- XX — Non standard e.g. finely balanced

All data is subject to change without notice.

Assembly instructions



The total length of the axis is defined by the distance P + 2x0.

R+W calculation program

With a specially developed sofware R+W can calculate the critical resonant speeds for each application.

Results of a calculation are shown below.

The critical speed can be altered by changing the tube material and/or other parameters.

Critical resonant speed	n_k	=	1/min.
Torsional stiffness tube	C_T^{ZWR}	=	Nm/rad
Total stiffness EZ 2	C_{Tdyn}^{EZ}	=	Nm/rad
Angle of twist	φ	=	Degree-Min-Sec
Weight of total axes	m	=	kg
Critical resonance speed	n_e	=	1/min
Mass moment of inertia	J	=	kgm²
Permissible lateral misalignment	Δ Kr	=	mm

optional stainless steel

Model EZ 2

		Series													
		10		20		60		150		300		450		800	
Type (Elastomer insert)		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Rated torque (Nm)	T_{KN}	12,5	16	17	21	60	75	160	200	325	405	530	660	950	1100
Max. torque** (Nm)	T_{Kmax}	25	32	34	42	120	150	320	400	650	810	1060	1350	1900	2150
Overall length (mm)	A	95 - 4.000		130 - 4.000		175 - 4.000		200 - 4.000		245 - 4.000		280 - 4.000		320 - 4.000	
Outer diameter hub (mm)	B_1	32		42		56		66,5		82		102		136,5	
Outer diameter tube (mm)	B_2	28		35		50		60		76		90		120	
Outer diameter with screwhead (mm)	B_S	32		44,5		57		68		85		105		139	
Fit length (mm)	C	20		25		40		47		55		65		79	
Inner diameter range H7 (mm)	$D_{1/2}$	5 - 16		8 - 25		14 - 32		19 - 35		19 - 45		24 - 60		35 - 80	
Mounting screw (ISO 4762/12.9)	E	M4		M5		M6		M8		M10		M12		M16	
Tightening torque of the mounting screw (Nm)		4		8		15		35		70		120		290	
Distance between centers (mm)	F	10,5		15,5		21		24		29		38		50,5	
Distance (mm)	G	7,5		8,5		15		17,5		20		25		30	
Mounting length (mm)	O	16,6		18,6		32		37		42		52		62	
Moment of inertia (10^{-3} kgm^2)	J_1/J_2	0,01		0,02		0,15		0,21		1,02		2,3		17	
Inertia of tube per meter (10^{-3} kgm^2)	J_3	0,075		0,183		0,66		1,18		2,48		10,6		38	
Dynamic torsional stiffness of the couplings (Nm/rad)	C_{Tdyn}^{E}	270	825	1.270	2.220	3.970	5.950	6.700	14.650	11.850	20.200	27.700	40.600	41.300	90.000
Torsional stiffness of tube per meter (Nm^2/rad)	C_T^{ZWR}	321		1.530		6.632		11.810		20.230		65.340		392.800	
Distance between centers (mm)	N	26		33		49		57		67		78		94	
Length of the couplings (mm)	H	34		46		63		73		86		99		125	

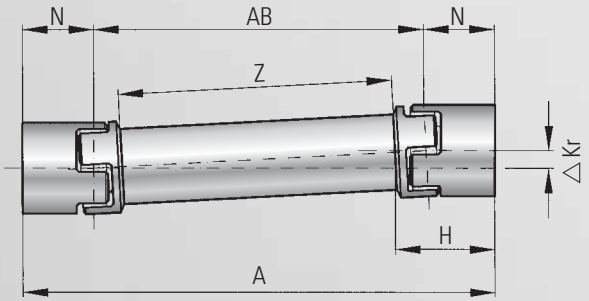
Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

** Max. transferable torque of the clamping hub see EKH (page 7)

The selection process for Servo-Insert-Couplings EZ 2

A	Overall length	m
AB	Length AB = (A – 2xN)	m
Z	Tube length Z = (A – 2xH)	m
C_{Tdyn}^{E}	Dynamic torsional stiffness of both elastomer inserts	Nm/rad
C_T^{ZWR}	Torsional stiffness of tube per meter	Nm^2/rad
C_{Tdyn}^{EZ}	Torsional stiffness of entire coupling	Nm/rad
H	Length of the coupling	mm
N	Distance between center lines	mm
M_{max}	Max. torque	Nm
φ	Angle of twist	degree



According to torsional stiffness

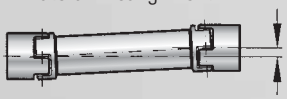
$$C_{Tdyn}^{EZ} = \frac{C_{Tdyn}^{E} \times (C_T^{ZWR}/Z)}{C_{Tdyn}^{E} + (C_T^{ZWR}/Z)} \quad \text{(Nm/rad)}$$

According to angle of twist

$$\varphi = \frac{180 \times M_{max}}{\pi \times C_{Tdyn}^{EZ}} \quad \text{(degree)}$$

Max. possible misalignments

Lateral misalignment Δ Kr

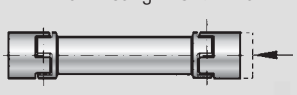


$$\Delta Kr_{max} = \tan \Delta \frac{Kw}{2} \cdot AB$$
$$AB = A - 2xN$$

Angular misalignment Δ Kw

$$\Delta Kw_{max} = \text{ca. } 2°$$

Axial misalignment Δ Ka

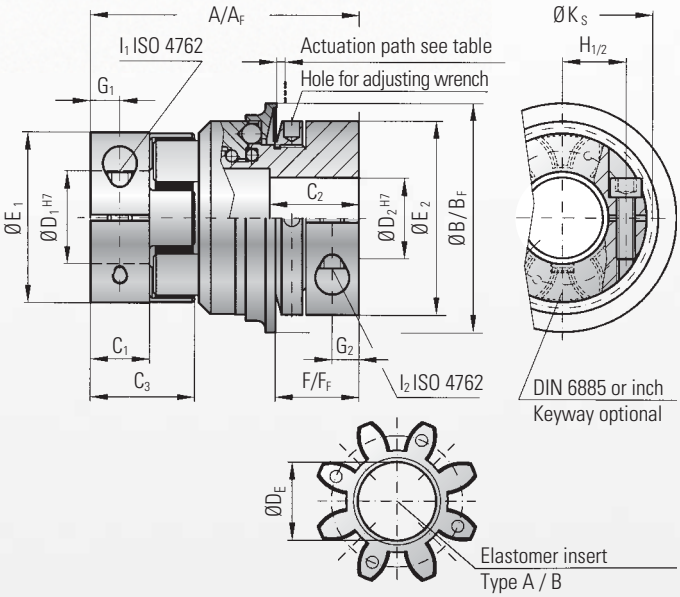


$$\Delta Ka_{max} = \text{ca. } \pm 2$$

optional stainless steel

MODEL **ES2**

TECHNICAL SPECIFICATIONS



Properties:
- reliabel torque overload protection
- short compact design
- backlash-free due to patented R+W design
- disengagement within msecs.
- high actuatuion path when disengaging
- electrically insulating
- press-fit design

Material: Torque limiter: high strength hardened steel with rust protected surface (oxidized)
Clamping hub D_1: up to series 450 high strength aluminum, from series 800 and up steel
Clamping hub D_2: up to series 60 high strength aluminum, from serie 150 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design: Two coupling hubs are concentrically machined with concave driving jaws
One side with an integrated torque limiter
The torque limiter is available in single position, multi position or full-disengagement versions.

Tolerance: On the hub/shaft connection 0,01 to 0,05 mm

For table see right page.

W = single position re-engagement
- After the overload has been eliminated, the coupling will automatically reengage precisely 360° from the original disengagement position
- Achivement of the precise synchronus re-engagement due to patented R+W design
- Signal at overload with mechanical switch or proximity sensor

D = Multi position re-engagement
- Coupling re-engages at multiple set angular intervals.
- Immediate availability of the application as soon as the overload has been eliminated.
- Signal at overload with mechanical switch or proximity sensor
- Standard engagement every 60°
- Engagement at 30, 45, 90 and 120 degrees are optional.

F = Full disengagement
- Permanent separation of drive and driven loads in the event of a torque overload.
- No residual friction
- Signal at overload
- Rotating elements slow down freely
- Coupling can be re-engaged manually (Engagement every 60°)

Ordering example

ES2 / 10 / A / W / 14 / 12 / 8 /4-12 / XX

- Model
- Series
- Type Elastomer insert
- Function system (see page 13)
- Bore Ø D1 H7
- Bore Ø D2 H7
- Disengagement torque
- Adjustable range
- Non standard e.g. VA-Material

All data is subject to change without notice.

The selection of torque limiters

In general the torque limiters are sized according to the necessary disengagement torque. This torque must exceed the nominal torque of the application.

For more information see page 18.

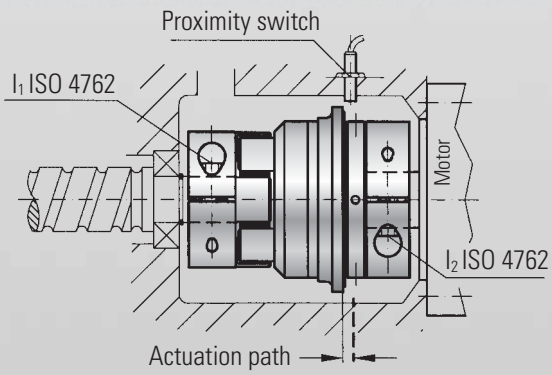
optional stainless steel

Model ES 2		Series						
		10	20	60	150	300	450	800
Adjustment range possible from -to (Nm) (approx. values)	T_{KN}	2 - 6 or 4 - 12	10 - 25 or 20 - 40	10 - 30 or 25 - 80	20 - 70 or 40 - 170	100 - 200 150 - 240 200 - 320	80 - 200 200 - 350 300 - 500	400 - 650 500 - 800 600 - 900
Adjustment range (full disengagement) possible from -to (Nm) (approx. values)	T_{KN}^F	4 - 10	8 - 20 or 16 - 30	20 - 40 or 30 - 60	80 - 150	120 - 180 or 180 - 300	60 - 150 100 - 300 250 - 500	200 - 400 or 450 - 800
Overall length (mm)	A	60	86	96	106	140	164	179
Overall length (full disengagement) (mm)	A_F	60	86	96	108	143	168	190
Outer diameter of actuation ring (mm)	B	45	65	73	92	120	135	152
Outer diameter of actuation ring (mm)	B_F	51,5	70	83	98	132	155	177
Fit length (mm)	C_1	10,3	17	20	21	31	34	46
Fit length (mm)	C_2	16	27	31	35	42	51	45
Length of hub (mm)	C_3	20,7	31	36	39	52	57	74
Inner diameter from Ø to Ø H7 (mm)	D_1	5 - 16	8 - 25	12 - 32	19 - 35	20 - 45	28 - 60	35 - 80
Inner diameter from Ø to Ø H7 (mm)	D_2	6 - 20	12 - 30	15 - 32	19 - 42	30 - 60	35 - 60	40 - 75
Diameter of the hub (mm)	E_1	32	42	56	66,5	82	102	136,5
Diameter of the hub (mm)	E_2	40	55	66	81	110	123	132
Distance (mm)	F	17	24	30	31	35	45	50
Distance full disengagement (mm)	F_F	16	22	29	30	35	43	54
Distance (mm)	G_1	5	8,5	10	11	15	17,5	23
Distance (mm)	G_2	5	7,5	9,5	11	13	17	18
Distance between centers (mm)	H_1	10,5	15	21	24	29	38	50,5
Screws (ISO 4762/12.9)	I_1	M4	M5	M6	M8	M10	M12	M16
Tightening torque of the mounting screw (Nm)	I_1	4	8	15	35	70	120	290
Distance between centers SK-side (mm)	H_2	15	19	23	27	39	41	48
Screws (ISO 4762/12.9)	I_2	M4	M6	M8	M10	M12	M16	2x M16
Tightening torque of the mounting screw (Nm)	I_2	4,5	15	40	70	130	200	250
Diameter with screwhead (mm)	K_S	32	44,5	57	68	85	105	139
Approx. weight (kg)		0,3	0,6	1,0	2,4	5,8	9,3	14,3
Moment of inertia (10^{-3} kgm^2)	J_{ges}	0,06	0,25	0,7	2,3	11	22	33,5
Actuation path (mm)		1,2	1,5	1,7	1,9	2,2	2,2	2,2
Type (Elastomer insert)		A B	A B	A B	A B	A B	A B	A B
Inner diameter (Elastomer insert) (mm)	D_E	14,2	19,2	27,2	30,2	38,2	46,2	60,5

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

Mounting instructions



Mounting: Slide the coupling on the shaft ends to the proper axial position. Using a torque wrench, tighten the clamp screws to the correct tightening torque as indicated (in the table page 12)

CAUTION! Both clamping hubs have different screws and different tightening torques.

Dismounting: Simply loosen the clamp screw I1, I2 and remove the safety coupling.

Emergency cut off: The axial path of the actuation ring activates the mechanical switch or the proximity sensor .

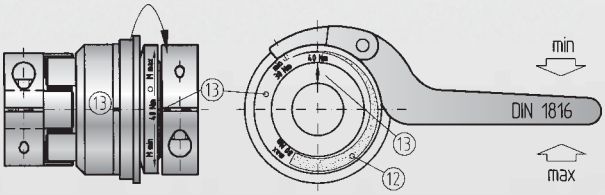
CAUTION! Upon assembly, it is absolutely necessary to check the function of the switch 100%

FUNCTION SYSTEMS ES2

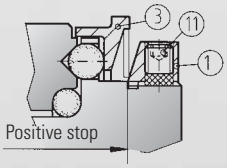
R+W torque limiting couplings are ball detent style overload couplings. They protect drive and driven mechanical components from damage associated with torque overloads.

- Backlash free torque transmission is accomplished by a series of steel balls (4) nested in hardened detents (5).
- Disc springs push against an actuation ring (3) keeping the balls nested.
- The disengagement torque is adjustable by means of an adjustment nut (1).
- In the event of an overload, the actuation ring (3) moves axially allowing the balls to come of the detents separating the drive and driven elements.
- The movement of the actuation ring (3) can be sensed by means of a mechanical switch or proximity sensor (6) triggering the drive to shut down.

Disengagement torque setting



At ES 2 couplings, the slot of the clamping hub serves as a marking (13).

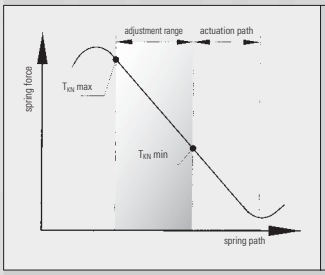


1 adjustment nut
11 locking screw
3 steel actuation ring
12 adjustment range
13 marking

R+W torque limiters are factory set to the customer specified disengagement torque, which is marked onto the coupling. The adjustment range (min/max) is also marked on the adjustment nut (1).
The customer can adjust the disengagement torque as long as it is in the range (12) indicated on the adjustment nut.

The adjustment range may not be exceeded while re-adjusting.

To adjust the disengagement torque, loosen the locking screws (11) and rotate the adjustment ring using a spanner wrench to the desired new setting. Tighten the 3 locking screws (11) and test the coupling.

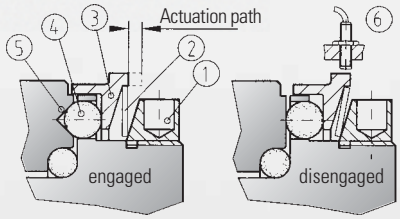


CAUTION:

R+W torque limiters incorporate disc springs that exhibit a special spring characteristic. It is important to stay in the max-min range of the coupling.

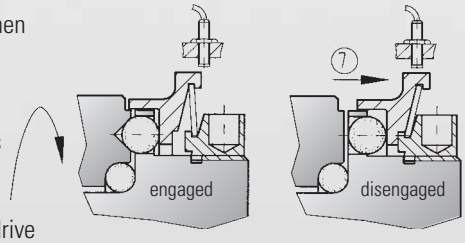
Single-position / Multi-position

In a torque overload, with the single-position design (standard) and multi-position design, the spring disengages to allow the balls to come out of their detents, separating the drive and driven elements. Very low residual spring pressure remains so that the coupling will re-engage once the torque is reduced below the overload setting.



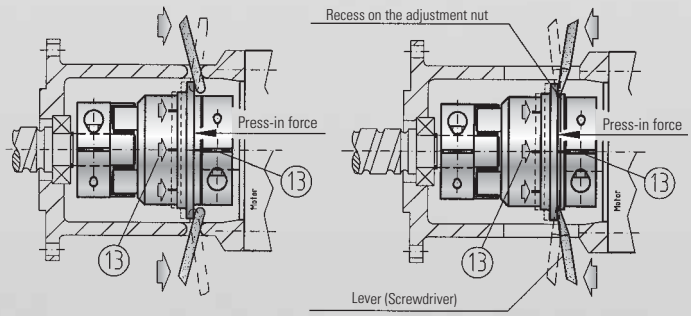
Full-disengage

With this design, when a torque overload is detected, the disc spring completely flips over and places no residual spring pressure on the actuation ring. The drive and driven elements are completely separated.



Re-engagement of the coupling is not automatic and must be performed manually (Picture 3a, 3b).

CAUTION:
Re-engagment should only be performed when the coupling stands still and not rotating!



Picture 3a **Picture 3b**

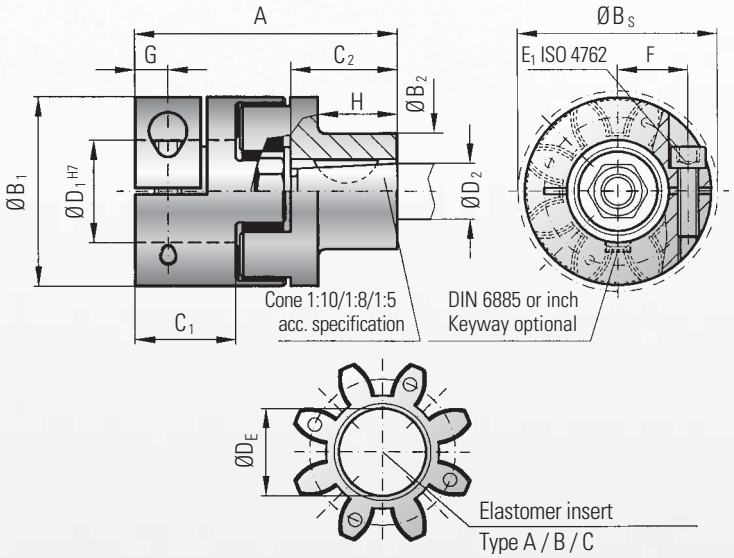
The R+W full-disengage torque limiting coupling can be re-engaged in six different positions or every 60 degrees with low „press-in" force (E). Marks on the actuation ring and body (13) of the coupling must line up and indicate the re-engagement points.

As of size 200 and up the re-engagement can be done with 2 lever which will be supported at a recess on the adjustment nut (picture 3b). Screwdrivers can be used as a lever.

optional stainless steel

MODEL **EK4**

TECHNICAL SPECIFICATIONS



Properties:
- for conical shaft ends
- short compact design
- easy assembly
- high concentricity
- backlash-free
- electrically insulating

Material: Clamping hubs: high strength aluminum
Conical hub: steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design: Two coupling hubs are concentrically machined with concave driving jaws
One side with clamping hub and a radial screw ISO 4762
One side with a hub conically bored with keyway according to customer equirement

Speed: Over 10.000 rpm a finely balanced version is available

Tolerance: On the hub/shaft connection 0,01 to 0,05 mm

Model EK 4			Series								
			20			60			150		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	17	21	6	60	75	20	160	200	42
Max. torque*	(Nm)	T_{Kmax}	34	42	12	120	150	35	320	400	85
Overall length	(mm)	A	57			77			84		
Outer diameter hub	(mm)	B_1	42			56			66,5		
Outer diameter conical hub	(mm)	B_2	20			28			30		
Outer diameter with screwhead	(mm)	B_S	44,5			57			68		
Mounting length	(mm)	C_1	25			30			35		
Mounting length	(mm)	C_2	16			29			29		
Inner diameter range H7	(mm)	D_1	8-25			12-32			19-35		
Possible conical diameter	(mm)	D_2	Acc. to customer requirement								
Inner diameter max (elastomer)	(mm)	D_E	19,2			27,2			30,2		
Mounting screw (ISO 4762/12.9)		E_1	M5			M6			M8		
Tightening torque of the mounting screw	(Nm)		8			15			35		
Distance between centers	(mm)	F	15,5			21			24		
Distance	(mm)	G	8,5			10			12		
Length	(mm)	H	9,5			21			19		

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

** Maximum transferable torque of the clamping hub depends on the bore diameters (bore/shaft clearance 0,01 mm to 0,05 mm shaft oiled)

Series	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35
20	20	35	45	60			
60		50	80	100	110	120	
150			120	160	180	200	220

Higher torque through additional key possible.

Ordering example

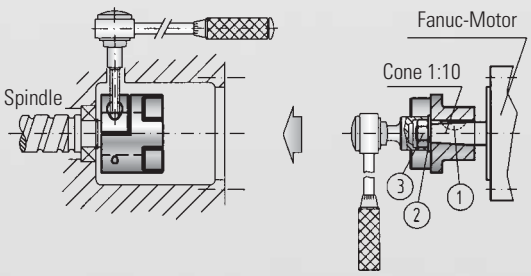
EK4 / 20 / A / 24 / 1:10 Ø11 / XX

- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Cone/ Ø D2
- Non standard e.g. finely balanced

All data is subject to change without notice.

Installation instruction

Mounting of the clamping hub: Slide the coupling on the shaft ends, at the right axial position thighten the mounting screw to the specified tightening torque as shown in the table (column E1).

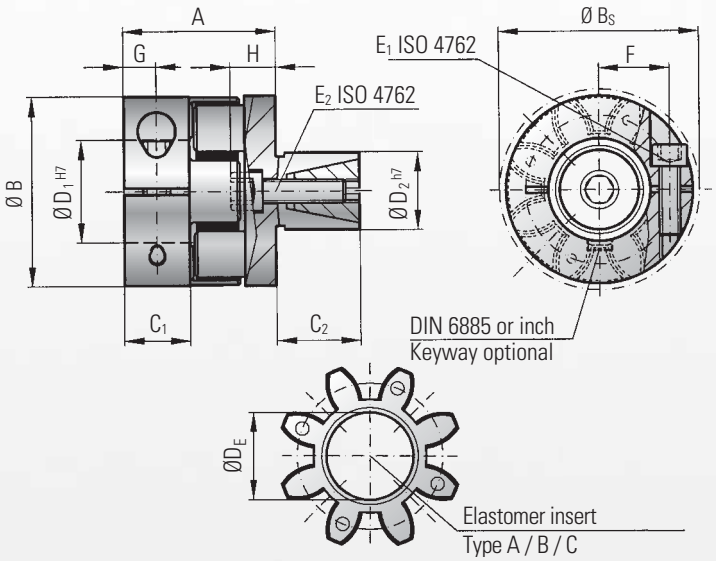


Mounting of the conical hub: After inserting the key into the key-way of the motor shaft slide the coupling hub on the shaft. Check if the conical hub has a proper seat on the shaft. Now the nut (3) can be tightened on the motor shaft using the exact tightening torque specified by the motor manufacturer.

optional stainless steel

MODEL **EK7**

TECHNICAL SPECIFICATIONS



Properties:

- short compact design
- easy mounting
- high concentricity
- axial mounting of the expanding shaft
- backlash-free
- electrical insulating

Material:

Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Expanding shaft & cone: steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design:

Two coupling hubs are concentrically machined with concave driving jaws
One side with clamping hub and a radial screw ISO 4762
One side with an expanding shaft and tapered clamping element
Suggested bore tolerance for the shaft: H7

Speed:**

Over 4.000 rpm a finely balanced version is available

Tolerance:

On the hub/shaft connection 0,01 to 0,05 mm

Model EK7			Series																								
			5			10			20			60			150			300			450			800				
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	
Rated torque	(Nm)	T_{KN}	9	12	2	12,5	16	4	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240	
Max. torque*	(Nm)	T_{Kmax}	18	24	4	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400	
Overall length	(mm)	A	22			28			40			46			51			68			76			94			
Outer diameter	(mm)	B	25			32			42			56			66,5			82			102			135			
Outer diameter with screwhead	(mm)	B_S	25			32			44,5			57			68			85			105			139			
Mounting length	(mm)	C_1	8			10,3			17			20			21			31			34			46			
Mounting length	(mm)	C_2	12			20			25			27			32			45			55			60			
Inner diameter range H7	(mm)	D_1	4 - 12,7			5 - 16			8 - 25			12 - 32			19 - 35			20 - 45			28 - 60			35 - 80			
Outer diameter range H7	(mm)	D_2	10 - 16			13 - 25			14 - 30			23 - 36			26 - 42			38 - 60			42 - 70			42 - 80			
Inner diameter max. (elastomer)	(mm)	D_E	10,2			14,2			19,2			27,2			30,2			38,2			46,2			60,5			
Mounting screw (ISO 4762/12.9)		E_1	M3			M4			M5			M6			M8			M10			M12			M16			
Tightening torque	(Nm)		2			4			8			15			35			70			120			290			
Mounting screw (ISO 4762/12.9)		E_2	M4			M5			M6			M8			M10			M12			M16			M16			
Tightening torque	(Nm)		4			9			12			32			60			110			240			300			
Distance between centers	(mm)	F	8			10,5			15,5			21			24			29			38			50,5			
Distance	(mm)	G	4			5			8,5			10			11			15			17,5			23			
Length	(mm)	H	7			7			10			11			16			20			27			27			
Moment of inertia	(10^{-3} kgm^2)		0,002			0,01			0,04			0,08			0,15			0,4			1,3			9,5			
Approx. weight	(kg)		0,04			0,05			0,12			0,3			0,5			0,9			1,5			7,6			
Speed**	(rpm)		22.000			20.000			19.000			14.000			11.500			9.500			8.000			4.000			

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 4

1 Nm = 8,85 in lbs

* Maximum transferable torque of the clamping hub depends on the bore diameters (bore/shaft clearance 0,01 mm to 0,05 mm shaft oiled)

TECHNICAL INFORMATION EK7

Series	Ø 3	Ø 4	Ø 5	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35	Ø 45	Ø 50	Ø 55	Ø 60	Ø 65	Ø 70	Ø 75	Ø 80
5		1,5	2	8														
10			4	12	32													
20				20	35	45	60											
60					50	80	100	110	120									
150						120	160	180	200	220								
300						200	230	300	350	380	420							
450								420	480	510	600	660	750	850				
800										700	750	800	835	865	900	925	950	1.000

Higher torque through additional keyway possible.

Ordering example

EK7 / 20 / A / 24 / 19 / XX

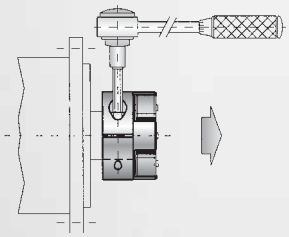
- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Shaft Ø D2 H7
- Non standard e.g. finely balanced

All data is subject to change without notice.

Mounting instructions

Mounting of the clamping hub:
Slide the coupling onto the shaft ends, at the right axial position tighten the mounting screw to the specified tightening torque E_1.

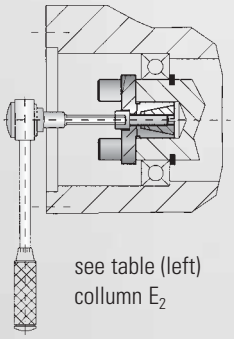
See page 16/collumn E_1.



Dismounting of the clamping hub:
For dismounting loosen the mounting screw E_1.

Mounting of the expanding shaft:
Push the shaft hub into the bore, at the right axial position thighten the mounting screw to the specified tightening torque E_2.

See page 16/collumn E_2



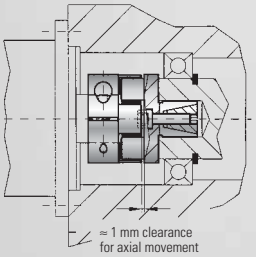
see table (left)
collumn E_2

Dismounting of the expanding shaft:
For dismounting loosen the screw E_2 a few turns.

By putting pressure on the screwhead, the inner cone slides out of its sleeve.

The shaft is now loose.

Advantage:
No access holes in the intermediate flange are neccessary in order to mount the coupling.



CAUTION:
The elastomer insert has to be able to axially move in order to compensate for axial mis-alignment.

optional stainless steel

FACTORS AND SIZING CALCULATIONS

Temperature factor S_υ

Temperature (υ)	A Sh 98 A	B Sh 64 D	C Sh 80 A
> -30° to -10°	1,5	1,7	1,4
> -10° to +30°	1,0	1,0	1,0
> +30° to +40°	1,2	1,1	1,3
> +40° to +60°	1,4	1,3	1,5
> +60° to +80°	1,7	1,5	1,8
> +80° to +100°	2,0	1,8	2,1
> +100° to +120°	–	2,4	–

Start factor S_Z

Z_h	up to 120	120 - 240	above 240
S_Z	1,0	1,3	on request

Shock and load factor S_A

Uniform load	S_A = 1,0
Non-uniform load	S_A = 1,8
High dynamics, frequent reversing loads	S_A = 2,5

T_{KN} = Rated torque of the coupling (Nm)
T_{Kmax} = Max. torque of the coupling (Nm)
T_S = Existing peak torque of the coupling (Nm)
T_{AS} = Peak torque of the drive element (Nm)
T_{AN} = Rated torque of the drive element (Nm)
T_{LN} = Rated torque of the driven element (Nm)
P_{LN} = Power of the driven element (KW)
n = Speed (rpm)
J_A = Motor´s moment of inertia (kgm²)
J_L = Machine´s moment of inertia (kgm²) (Spindle + slide + workpiece)
J_1 = Moment of inertia of a coupling half at the driving end (kgm²)
J_2 = Moment of inertia of a coupling half at the driven end (kgm²)
m = Ratio of the moments of inerta driving to driven element
υ = Temperature of the area around the coupling (observe radiant heat)
S_υ = Temperature factor
S_A = Shock or load factor
S_Z = Start factor (factor for the number of starts/hour)
Z_h = Cycle of starts (1/h)

Sizing of a Servomax® Elastomer Coupling

1. Calculation example without shock or reversing loads

The rated torque of the coupling (T_{KN}) needs to be higher than the rated torque of the driven element (T_{LN}) times the temperature factor S_υ at the coupling for the application. If T_{LN} is not known, T_{AN} can be used for the calculation instead.

Condition: $T_{KN} > T_{LN} \times S_\upsilon$

Auxiliary calculation: $T_{LN} = \frac{9550 \times P_{LN}}{n}$

Calculation example: (No loads and shocks)

Drive face: DC - motor
T_{AN} = **119 Nm**

Coupling conditons:
υ = **70°** C
S_υ = 1,7 (for 70°/Type A)

Driven face: Pump
T_{LN} = **85 Nm**

Condition: $T_{KN} > T_{LN} \times S_\upsilon$
$T_{KN} >$ 85 Nm x 1,7
$T_{KN} >$ **144,5 Nm** → **Result:** A coupling type **EK 2/150/A** (T_{KN} = 160 Nm) is selected.

2. Calculation example with shock loads

In all cases the maximum rated torque (T_{Kmax}). of the coupling can not be exceeded. First calculate the rated torque (T_{KN}) of the coupling same as above. Compare this result to the peak torque (T_S) times the start factor (S_Z) times the temperature factor (S_υ) for the application. The greater of the two values must be less than (TKmax) of the coupling.

Condition: $T_{KN} > T_{LN} \times S_\upsilon$

Auxiliary calculation: $T_{LN} = \frac{9550 \times P_{LN}}{n}$

Condition: $T_{Kmax} > T_S \times S_Z \times S_\upsilon$

Auxiliary calculation: $T_S = \frac{T_{AS} \times S_A}{m + 1}$ $\quad m = \frac{J_A + J_1}{J_L + J_2}$

optional stainless steel

MODEL **ATEX**

FOR USE IN HAZARDOUS AREAS AND EXPLOSIVE ATMOSPHERE

AT mosphere EX plosible

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.

Design of the Servomax EX:
No dimensional change of the EK standard series. The material of the hubs and the inserts will change.

Hubs:
In general steel or stainless steel hubs with be used ***Caution:*** Aluminum hubs may not be used in explosive enviroment.

Elastomer insert:
A special elastomer insert (Type D/92 Sh A), which is able to conduct electricity is used. This prevents the possibility of electrostatic loads and sparks.

Mounting, Sizing:
All misalignment values and the transmittable torques are reduced by 30%.

Maintanance:
A routine inspection of the coupling must be performed.

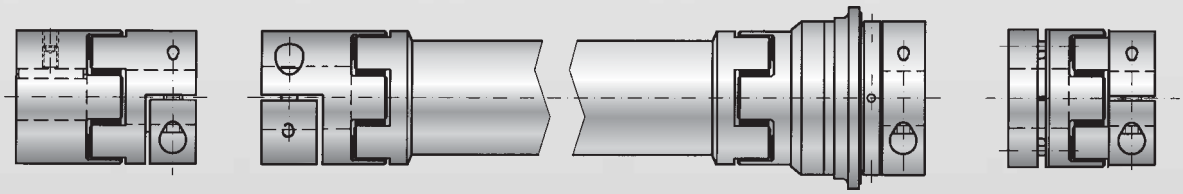
Mounting manuals:
Mounting and maintanance manuals are provided with every EEx coupling.

For the classified zones 1/21 and 2/22 the Servomax® Elastomer Coupling do have an accreditation according to ATEX 95/137

R+W solutions with standard components

All standards hubs and elastomer inserts are interchangable in the same sizes.

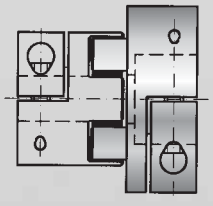
Example:



EK 1 **EK 2** **EZ-Coupling half** **ES-Coupling half** **EK 6** **EKL**

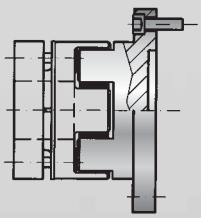
R+W non standard solutions with special hubs

EK 2 Non standard hub



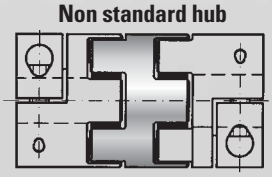
Non standard hubs for bigger bores

EK 6 Non standard hub



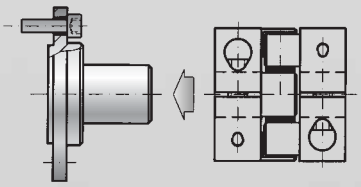
Non-standard hubs with flange

EK 2 EK 2
Non standard hub



Intermediate piece for higher lateral misalignment

EKL



Adapter flange for planetery gearboxes acc. to ISO 9409

THE R+W-PRODUCT RANGE

R+W®
COUPLING TECHNOLOGY

Experience and Know-how for your special requirements.

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

SERVOMAX®
ELASTOMER COUPLINGS
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

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www.rwcouplings.com

QUALITY MANAGEMENT
We are certified
according to ISO 9001-200

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COMPACT AND BACKLASH FREE.

single-position
multi-position
load holding
full disengagement

SK

TORQUE LIMITERS

SERIES SK | 0.1 – 2,800 Nm

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R+W®
COUPLING TECHNOLOGY

THE ULTIMATE COUPLING FROM 0.1 – 2,800 Nm

www.rwcouplings.com

single-position
multi-position
load holding
full disengagement

optional stainless steel

SK SERIES

PATENTED BACKLASH-FREE TORQUE LIMITERS FROM R+W

Reliable Torque Overload Protection

The trend in industry is to design and incorporate more automation into production processes. Machines are becoming more accurate, requiring a higher degree of precision. They are becoming faster, using servo and DC drive technology, and they are more rigid to withstand the dynamic loads necessary to increase capacity and productivity.

Torque overloads caused by material jams, operator error, or a whole host of unforeseen reasons pose a significant threat to machine downtime.

Machine downtime in an automated production environment is very costly. Broken components, expensive technicians, and long lead times for custom components can make the difference between operating profitably or not. Torque overload couplings are an inexpensive insurance against downtime.

This catalog contains many different torque overload coupling designs. They all incorporate the patented R+W design principle. The couplings are all torsionally rigid with absolute zero backlash.

The use of a patented R+W Torque Limiter will isolate the driving from the driven elements within a matter of milliseconds, once the torque reaches a preset overload value. Incorporating **R+W Torque limiting couplings** into modern machine design will help insure high productivity and higher profits.

Areas of application

- Machine tools
- CNC machining centers
- Woodworking machines
- Automation equipment
- Textile machinery
- Industrial robots
- Sheet metal processing machines
- Printing + Converting machinery
- Servo + DC motor drives

Features

- Precise overload protection
- Absolutely backlash-free and torsionally rigid (R+W patented principle)
- Compact, simple design
- Disengagement detection is achieved through indexing ring movement
- Low residual friction following disengagement
- Low moment of inertia
- Disengagement within msecs

Table of contents

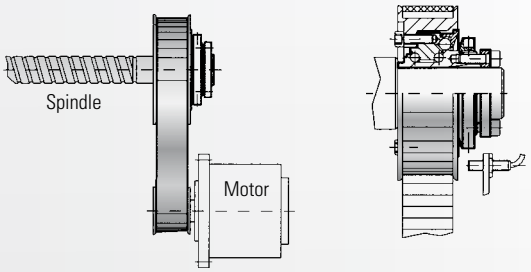
single-position
multi-position
load holding
full disengagement

MODELS	FEATURES	POSSIBLE APPLICATIONS

SK 1 / SKP

With conical clamp or clamping hub

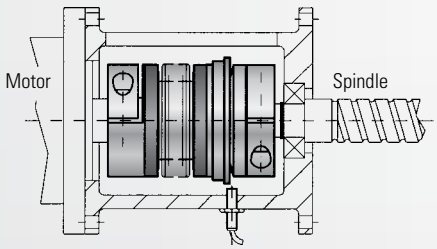
- Integral bearings for timing belt pulley or sprocket gear
- Compact, simple design
- Adjustable settings



SK 2

With clamping hub for direct drives

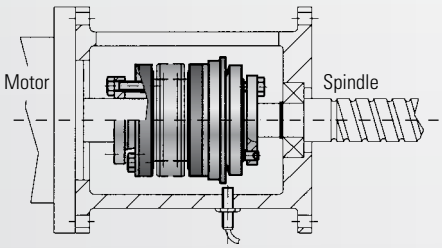
- Easy assembly
- Low moment of inertia
- Small installation space
- Compensates for shaft misalignment
- Adjustable settings



SK 3

With conical clamp connection for direct drives

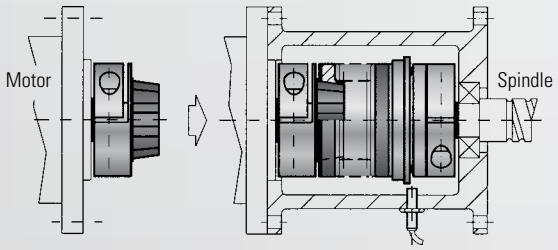
- High clamping forces
- High degree of operational dependability
- Compensates for shaft misalignment
- Adjustable settings



SK 5

With clamping hub, press-fit version for direct drives

- Easy mounting and dismounting
- Electrically and thermally insulated
- Compensates for shaft misalignment
- Adjustable settings

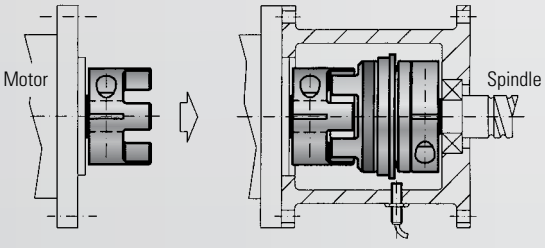


ES 2

With clamping hub, press-fit version for direct drives

- Easy assembly
- Dampens vibrations
- Compensates for shaft misalignment
- Adjustable settings

(see separate catalog)

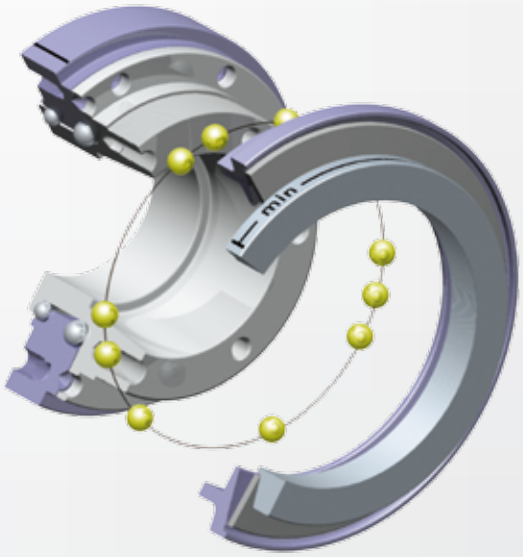


optional stainless steel

OVERVIEW

PATENTED BACKLASH-FREE TORQUE LIMITERS FROM R+W

Single-position re-engagement



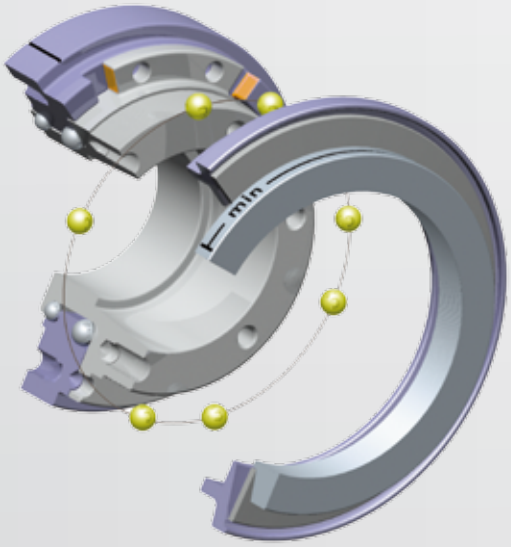
Standard version

- After the overload has been removed, the coupling will reengage precisely 360 ° from the original disengagement position.
- Signal at overload
- Suitable for use, in machine tools, packing machines and automation systems and other applications requiring precise timing.

Every model in this catalog is available in all 4 versions.

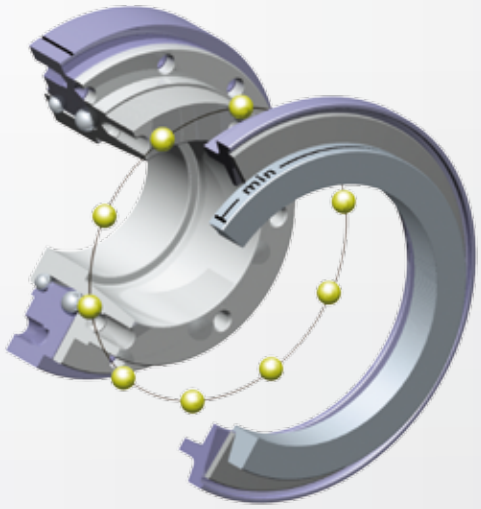
Load holding Version

- Torque measurement coupling
- In the event of a torque overload, the drive and driven elements are not separated and are only allowed limited rotation.
- Guaranteed to hold the load and signal an overload.
- Automatic engagement after the torque level has dropped.
- Signal at overload to detect with mechanical switch or proximity sensor.
- Suitable for use, on presses, load lifting equipment or on any applications where the drive and driven elements cannot be separated.



POSSIBLE FUNCTION SYSTEMS

Multi-position coupling



- Coupling re-engages at multiple set angular intervals.
- Immediate availability of the machine as soon as the overload has been removed.
- Signal at overload with mechanical switch or proximity sensor
- Standard engagement every 60°
- Engagement after 30, 45, 90 and 120 degrees optional

E LIMITERS

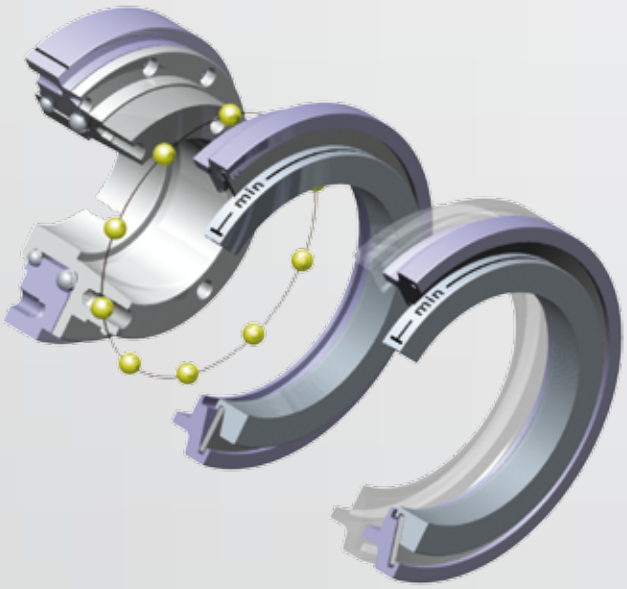
Full disengagement

Indication:

Coupling can be disengaged manually.

Please contact R+W.

- Permanent separation of drive and driven face in the event of a torque overload.
- Signal at overload with mechanical switch or proximity sensor
- No residual friction
- Rotating elements slow down freely
- Coupling can be re-engaged manually (Engagement every 60°); other engagements optional
- For use in high dynamic applications



optional stainless steel

single-position
multi-position
load holding
full disengagement

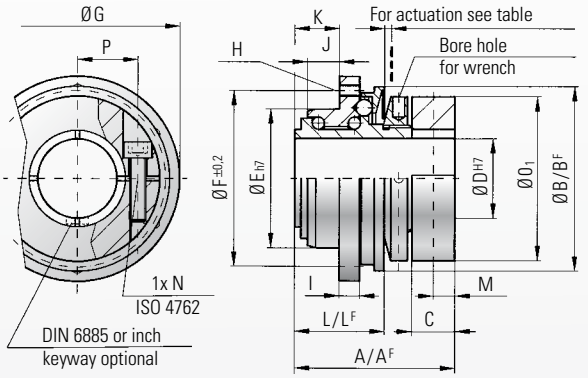
MODEL **SK1/SKP**

BACKLASH FREE TORQUE LIMITER

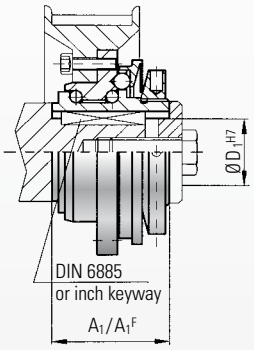
with conical clamp connection

Miniature Design Series 1.5 - 10

SK 1 with clamping hub

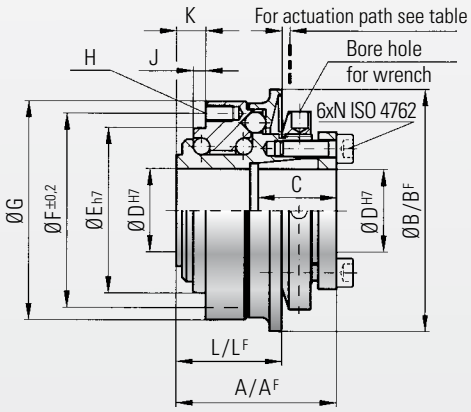


SKP with a pure key connection

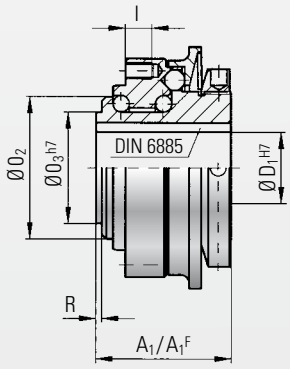


Design Series 15-2,500

SK 1 with conical clamp



SKP with a pure key connection



Material
High-strength steel

Design

Model SK1 from 1.5-10 Nm with clamping hub

Model SK1 from 15-2,800 Nm with conical clamp
Optional clamping hub available upon request

Model SKP with pure keyway connection

Temperature range:
-30° C to +120° C
Temperature peaks up to + 150° C

Backlash:
Absolutely backlash-free as a result of the frictional clamp connection and the patented R+W principle

Service life:
These couplings are maintenance-free and have extreme service life as long as all the performance units are not exceeded.

Optional sealed version for wash down and foodservice application.
See page 16

Ordering specifications

SK1 / 10 / W / 14 / 4 / 2-6 / xx

- Model
- Series
- Version
- Bore Ø D H7
- Disengagement torque Nm
- Adjustment range Nm
- e.g. stainless steel

Possible versions

W = Single-position engagement
D = Multi-position engagement
G = Load holding
F = Full disengagement

For the maximum permissible radial load capacity for all SK 1 / SKP models, see installation instructions on page 14

optional stainless steel

single-position
multi-position
load holding
full disengagement

with pure keyway connection

Miniature Design

Model SK 1/SKP			Series													
			1.5	2	4.5	10	15	30	60	150	200	300	500	800	1500	2500
Adjustment range possible from - to (approx. values)	(Nm)	T_{KN}	0.1-1 or 0.3-2	0.2-1.5 0.5-2.2 1.5-3.5	1-3 2-4.5 3-7	2-6 4-12 7-18	5-15 12-25 20-40 35-70	5-20 10-30 20-60 50-100	10-30 25-80 50-115	20-70 45-150 80-225	30-90 60-200 140-280 250-400	100-200 150-240 220-440	80-200 200-350 320-650	400-650 500-800 650-950	600-800 700-1200 1000-1800	1500-2000 2000-2500 2300-2800
Adjustment range possible from - to (approx. values) (full disengagement)	(Nm)	T_{KN}	0.3-0.8 or 0.6-1.3	0.5-2	2.5-4.5	2-5 4-10 8-15	7-15	8-20 or 16-30	10-30 20-40 30-60	20-60 40-80 80-150	80-140 or 130-200	120-180 or 130-300	50-150 100-300 250-500	200-400 or 450-850	1000-1250 or 1250-1500	1400-2200 or 1800-2700
Overall length	(mm)	A	23	28	32	39	40	50	54	58	63	70	84	95	109	146
Overall length (full disengagement)	(mm)	A^F	23	28	32	39	40	50	54	58	66	73	88	95	117	152
Overall length A1	(mm)	A_1	15.5	20	22	28	34	43	46	48.5	54	57	71.5	80	93	135
Overall length A1 (full disengagement)	(mm)	A_1^F	15.5	20	22	28	34	43	46	48.5	57	60	75	91	110	141
Actuation ring Ø	(mm)	B	23	29	35	45	55	65	73	92	99	120	135	152	174	242
Actuation ring Ø (full disengagement)	(mm)	B^F	24	32	42	51.5	62	70	83	98	117	132	155	177	187	258
Clamping fit length	(mm)	C	7	8	11	11	19	22	27.5	32	32	41	41	49	61	80
Inner diameter from Ø bis Ø H7	(mm)	D	4-8	4-12	5-14	6-20	8-22	12-22	12-29	15-37	20-44	25-56	25-56	30-60	35-70	50-100
Inner diameter max. Ø H7	(mm)	D_1	8	10	12	16	19	25.4	30	38	44	50	58	60	73	95
Centering diameter h7	(mm)	E	14	22	25	34	40	47	55	68	75	82	90	100	125	168
Hole circle diameter ± 0.2	(mm)	F	22	28	35	43	47	54	63	78	85	98	110	120	148	202
Flange diameter -0.2	(mm)	G	26	32	40	50	53	63	72	87	98	112	128	140	165	240
Thread		H	4xM2	4xM2.5	6xM2.5	6xM3	6xM4	6xM5	6xM5	6xM6	6xM6	6xM8	6xM8	6xM10	6xM12	6xM16
Thread length	(mm)	I	3	4	4	5	6	8	9	10	10	10	12	15	16	24
Centering length -0.2	(mm)	J	2.5	3.5	5	8	3	5	5	5	5	6	9	10	13.5	20
Distance	(mm)	K	5	6	8	11	8	11	11	12	12	15	21	19	25	34
Distance	(mm)	L	11	15	17	22	27	35	37	39	44	47	59	67	82	108
Distance	(mm)	L^F	11.5	16	18	23	27	37	39	41.5	47	51.5	62	75	91	120
Distance	(mm)	M	2.5	5	4	5										
Screw ISO 4762		N	M2.5	M3	M4	M4	M4	M5	M5	M6	M6	M8	M8	M10	M12	M16
Tightening torque in	(Nm)		1	2	4	4.5	4	4	7	12	14	18	25	36	70	120
Outside diameter clamp ring	(mm)	O_1	20	25	32	40										
Diameter	(mm)	O_2	13	18	21	30	35	42	49	62	67	75	84	91	112	154
Diameter h7	(mm)	O_3	11	14	17	24	27	32	39	50	55	65	72	75	92	128
Distance between centers	(mm)	P	6.5	8	10	15										
Distance	(mm)	R	1	1.3	1.5	1.5	2.5	2.5	2.5	2.5	3	3	4	4	4.5	6
Moment of inertia	(10^{-3} kgm²)	J_{ges}	0.01	0.02	0.05	0.07	0.15	0.25	0.50	1.60	2.70	5.20	8.60	20	31.5	210
Approx. weight	(kg)		0.03	0.065	0.12	0.22	0.4	0.7	1.0	1.3	2.0	3.0	4.0	5.5	10	28
Actuation path	(mm)		0.7	0.8	0.8	1.2	1.5	1.5	1.7	1.9	2.2	2.2	2.2	2.2	3.0	3.0

A^F, B^F, L^F = Full disengagement version

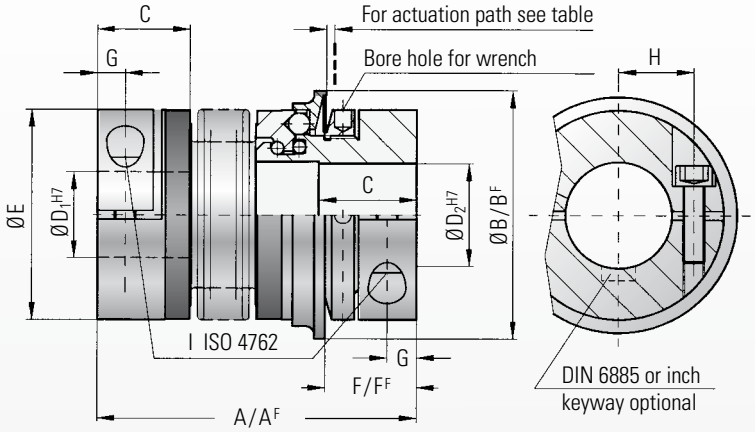
optional stainless steel

single-position
multi-position
load holding
full disengagement

MODEL **SK2**

BACKLASH FREE TORQUE LIMITER

with clamping hub



Optional sealed version for wash down and food service application. See page 16.

Material: Bellows made of highly elastic stainless steel
Safety section: High strength hardened steel
Hub material: up to series 80 aluminium
from series 150 steel

Design: With a single radial clamping screw per hub

Temperature range: -30° C to +120° C

Backlash: Absolutely backlash free as a result of the frictional clamp connection and the patented R+W principle

Service life: These coupling are maintenance free and have extreme service life as long as the performance limits are not ecxeeded.

Fit tolerance: Tolerance between hub and shaft 0.01-0.05 mm

Ordering specifications: see page 11

Model SK 2		Series												
		1.5	2	4.5	10	15	30	60	80	150	200	300	500	800	1500
Adjustment range possible from - to (approx. values) (Nm)	T_{KN}	0.1-0.6 0.4-1 0.8-1.5	0.2-1.5 or 0.5-2	1-3 or 3-6	2-6 or 4-12	5-20	10-25 or 20-40	10-30 or 25-80	20-70 or 30-90	40-160	30-90 60-160 120-240	100-200 150-240 200-320	80-200 200-350 300-500	400-650 500-800 650-850	650-800 700-1200 1000-1800
Adjustment range possible from - to (approx. values) (full disengagement) (Nm)	T_{KN}	0.3-0.8 or 0.6-1.3	0.5-2	2.5-4.5	2-5 or 5-10	7-15	8-20 or 16-30	20-40 or 30-60	20-60 or 40-80	80-150	80-140 or 130-200	120-180 or 180-300	60-150 100-300 250-500	200-400 or 450-800	1000-1250 or 1250-1500
Overall length (mm)	A	42	46 51	57 65	65 74	75 82	87 95	102 112	115 127	116 128	128 140	139 153	163 177	190	223
Overall length, (full disengagement) (mm)	A^F	42	46 51	57 65	65 74	75 82	87 95	102 112	117 129	118 130	131 143	142 156	167 181	201	232
Actuation ring Ø (mm)	B	23	29	35	45	55	65	73	92	92	99	120	135	152	174
Actuation ring Ø (ful disengagement) (mm)	B^F	24	32	42	51.5	62	70	83	98	98	117	132	155	177	187
Fit length (mm)	C	11	13	16	16	22	27	31	35	35	40	42	51	48	67
Inner diameter from Ø to Ø H7 (mm)	D_1/D_2	3-8	4-12	5-14	6-20	10-26	12-30	15-32	19-42	19-42	24-45	30-60	35-60	40-75	50-80
Outer diameter of coupling (mm)	E	19	25	32	40	49	55	66	81	81	90	110	123	134	157
Distance (mm)	F	12	13	15	17	19	24	30	31	31	35	35	45	50	63
Distance (full disengagement) (mm)	F^F	11.5	12	14	16	19	22	29	31	30	33	35	43	54	61
Distance (mm)	G	3.5	4	5	5	6.5	7.5	9.5	11	11	12.5	13	17	18	22.5
Distance between centers (mm)	H	6	8	10	15	17	19	23	27	27	31	39	41	2x48	2x55
ISO 4762 screws	I	M2.5	M3	M4	M4	M5	M6	M8	M10	M10	M12	M12	M16	2xM16	2xM20
Tightening torque (Nm)	I	0.85	2	4	4.5	8	15	40	50	70	120	130	200	250	470
Approx. weight (kg)		0.035	0.07	0.2	0.3	0.4	0.6	1.0	2.0	2.4	4.0	5.9	9.6	14	21
Moment of inertia (10^{-3} kgm²)	J_{ges}	0.01	0.01 0.01	0.02 0.02	0.06 0.07	0.10 0.15	0.27 0.32	0.75 0.80	1.80 1.90	2.50 2.80	5.10 5.30	11.5 11.8	22.8 23.0	42.0	83.0
Torsional stiffness (10^3 Nm/rad)	C_T	0.07	1.2 1.3	7 5	9 8	20 15	39 28	76 55	129 85	175 110	191 140	420 350	510 500	780	1304
Lateral misalignment max. (mm)		0.15	0.15 0.20	0.20 0.25	0.20 0.30	0.15 0.20	0.20 0.25	0.20 0.25	0.20 0.25	0.20 0.25	0.25 0.30	0.25 0.30	0.30 0.35	0.35	0.35
Angular misalignment max. (degrees)		1	1 1.5	1.5 2	1.5 2	1 1.5	1 1.5	1 1.5	1 1.5	1 1.5	1.5 2	1.5 2	2 2.5	2.5	2.5
Lateral spring stiffness (N/mm)		70	40 30	290 45	280 145	475 137	900 270	1200 420	920 255	1550 435	2040 610	3750 1050	2500 840	2000	3600
Actuation path (mm)		0.7	0.8	0.8	1.2	1.5	1.5	1.7	1.9	1.9	2.2	2.2	2.2	2.2	3

A^F, B^F, F^F = Full disengagement version

(smaller sizes on request)

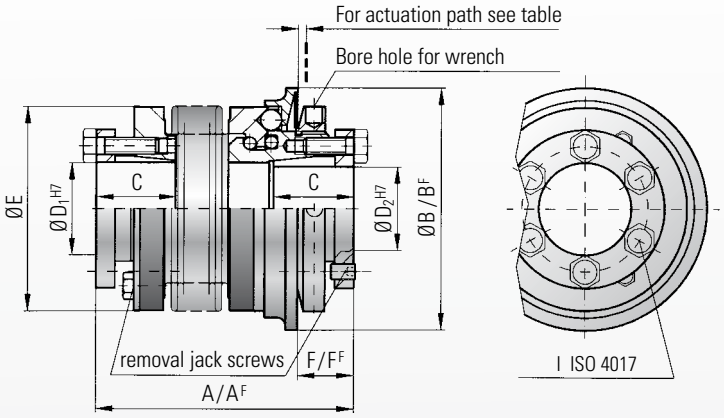
optional stainless steel

single-position
multi-position
load holding
full disengagement

MODEL **SK3**

BACKLASH FREE TORQUE LIMITER

with tapered clamp connection



Material: Bellows made of highly elastic stainless steel
Safety section: High strength hardened steel.
Hub material: Steel

Design: With slotted tapered conical sleeves and removal jack screws

Temperature range: -30° C to +120° C

Backlash: Absolutely backlash free as a result of the frictional clamp connection and the patented R+W principle

Service life: These coupling are maintenance free and have extreme service life as long as the performance limits are not ecxeeded.

Fit tolerance: Tolerance between hub and shaft 0.01-0.05 mm

Ordering specifications: see page 11

Optional sealed version for wash down and foodservice application. See page 16.

Model SK 3			Series																					
			15		30		60		150		200		300		500		800		1500		2500			
Adjustment range possible from (approx. values)	(Nm)	T_{KN}	5-20		10-25 or 20-40		10-30 or 25-80		20-70 45-150 80-200		30-90 60-160 140-280		100-200 150-240 220-400		80-200 200-350 300-500		400-650 500-800 600-900		650-850 700-1200 1000-1800		1500-2000 2000-2500 2300-2800			
Adjustment range possible from (approx. values) (full disengagement)	(Nm)	T_{KN}	7-15		8-20 or 16-30		20-40 or 30-60		20-60 40-80 80-150		80-140 or 130-200		120-180 or 180-300		60-150 100-300 250-500		200-400 or 450-800		1000-1250 or 1250-1500		1400-2200 or 1800-2700			
Overall length	(mm)	A	62	69	72	80	84	94	93	105	99	111	114	128	123	136	151		175		246			
Overall length (full disengagement)	(mm)	A^F	62	69	72	80	84	94	93	105	102	114	117	131	127	140	151		184		252			
Actuation ring Ø	(mm)	B	55		65		73		92		99		120		135		152		174		243			
Actuation ring Ø (full disengagement)	(mm)	B^F	62		70		83		98		117		132		155		177		187		258			
Fit length	(mm)	C	19		22		27		32		32		41		41		49		61		80			
Inner diameter from Ø to Ø H7	(mm)	D_1/D_2	10-22		12-23		12-29		15-37		20-44		25-56		25-60		30-60		35-70		50-100			
Outer diameter of coupling	(mm)	E	49		55		66		81		90		110		123		133		157		200			
Distance	(mm)	F	13		16		18		19		19		23		25		31		30		37			
Distance (full disengagement)	(mm)	F^F	13		14		17		18		17		20		22		20		26		31			
6x ISO 4017		I	M4		M5		M5		M6		M6		M8		M8		M10		M12		M16			
Tightening torque	(Nm)	I	4		6		8		12		14		18		25		40		70		120			
Approx. weight	(kg)		0.3		0.4		1.2		2.3		3.0		5.0		6.5		9.0		16.3		35			
Moment of inertia	(10^{-3} kgm²)	J_{ges}	0.10	0.15	0.28	0.30	0.75	0.80	1.90	2.00	2.80	3.00	5.50	6.00	11.0	12.8	20.00		42.00		257			
Torsional stiffness	(10^3 Nm/rad)	C_T	20	15	39	28	76	55	175	110	191	140	420	350	510	500	780		1304		3400			
Lateral misalignment max.	(mm)		0.15	0.20	0.20	0.25	0.20	0.25	0.20	0.25	0.25	0.30	0.25	0.30	0.30	0.35	0.35		0.35		0.35			
Angular misalignment max.	(degrees)		1	1.5	1	1.5	1	1.5	1	1.5	1.5	2	1.5	2	2	2.5	2.5		2.5		2.5			
Lateral spring stiffness	(N/mm)		475	137	900	270	1200	380	1550	435	2040	610	3750	1050	2500	840	2000		3600		6070			
Actuation path	(mm)		1.5		1.5		1.7		1.9		2.2		2.2		2.2		2.2		3		3			

A^F, B^F, F^F = Full disengagement version

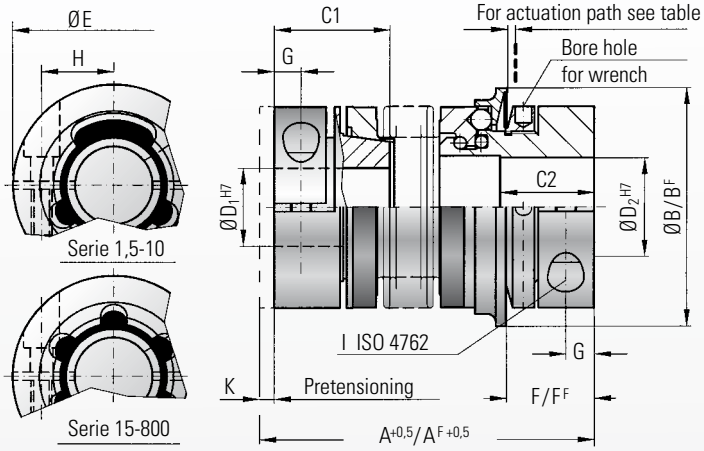
optional stainless steel

single-position
multi-position
load holding
full disengagement

MODEL **SK5**

BACKLASH FREE TORQUE LIMITER

press-fit version, with clamping hub



Optional sealed version for wash down and foodservice application. See page 16.

Material: Bellows made of highly elastic stainless steel
Safety section: High strength hardened steel

Clamping hubs: up to series 80 aluminium from series 150 steel

Design: With a single radial clamping screw per hub

Temperature range: -30° C to +120° C

Backlash: Absolutely backlash free as a result of the frictional clamp connection and the patented R+W principle

Service life: These couplings are maintenance free and have extreme service life as long as the performance limits are not ecxeeded.

Fit tolerance: Tolerance between hub and shaft 0.01-0.05 mm

Ordering specifications: Page 11

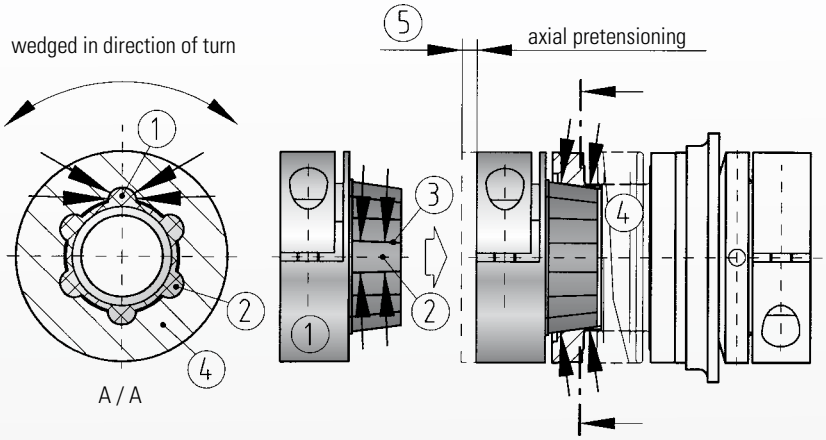
Model SK 5		Series																					
		1.5		2		4.5		10		15		30		60		80		150		300		500		800
Adjustment range possible from - to (approx. values) (Nm)	T_{KN}	0.1-0.6 0.4-1 0.8-1.5		0.2-1.5 or 0.5-2		1-3 or 3-6		2-6 or 4-12		5-20		10-25 or 20-40		10-30 or 25-80		20-70 or 30-90		40-160		100-200 150-240 200-320		80-200 200-350 300-500		400-650 500-800 650-850
Adjustment range possible from - to (approx. values) (full disengagement) (Nm)	T_{KN}	0.3-0.8 or 0.6-1.3		0.5-2		2.5-4.5		2-5 or 5-10		7-15		8-20 or 16-30		20-40 or 30-60		20-60 or 40-80		80-150		120-200 or 160-300		60-150 100-300 250-500		200-400 or 450-800
Overall length +0,5 inserted (mm)	A	44		48	54	60	68	70	79	76	83	89	97	105	115	115	127	116	128	143	157	166	180	196
Overall length +0,5 inserted (full disengagement) (mm)	A^F	44		48	54	60	68	70	79	76	83	89	97	105	115	117	129	118	130	146	160	170	184	207
Actuation ring Ø (mm)	B	23		29		35		45		55		65		73		92		92		120		135		152
Actuation ring Ø (full disengagement) (mm)	B^F	24		32		42		51.5		62		70		83		98		98		132		155		176
Fit length C_1/C_2 (mm)	C_1/C_2	14	11	16/13		19/16		21/16		28/22		33/27		39/31		43/35		43/35		52/42		61/52		74/48
Inner diameter from Ø to Ø H7 (mm)	D_1	3-8		4-12		5-16		5-20		8-22		10-25		12-32		14-38		14-38		30-56		35-60		40-75
Outer diameter from Ø to Ø H7 (mm)	D_2	3-8		4-12		5-14		5-20		8-26		10-30		12-32		14-42		14-42		30-60		35-60		40-75
Outer diameter of coupling (mm)	E	19		25		32		40		49		55		66		81		81		110		123		134
Distance (mm)	F	12		13		15		17		19		24		30		31		31		35		45		50
Distance (full disengagement) (mm)	F^F	11.5		12		14		16		19		22		29		31		30		36		43		54
Distance (mm)	G	3.5		4		5		5		6.5		7.5		9.5		11		11		13		17		18
Distance between centers (mm)	H	6		8		10		15		17		19		23		27		27		39		41		2x48
ISO 4762 screws	I	M2.5		M3		M4		M4		M5		M6		M8		M10		M10		M12		M16		2xM16
Tightening torque (Nm)	I	0.85		2		4		4.5		8		15		40		50		70		130		200		250
Pretensioning, approx. (N)	K	0.1 to 0.5		0.2 to 0.7		0.2 to 0.7		0.2 to 1.0		0.2 to 1.0		0.5 to 1.0		0.5 to 1.0		0.5 to 1.0		0.5 to 1.0		0.5 to 1.5		0.5 to 2.0		0.5 to 2.0
Axial recovery of coupling max. (N)		4		8	5	15	10	25	30	20	12	50	30	70	45	48	32	82	52	157	106	140	96	200
Approx. weight (kg)		0.038		0.07		0.2		0.3		0.4		0.6		1.4		2		2.4		5.9		9.6		15
Moment of inertia (10^{-3} kgm²)	J_{ges}	0.01		0.01	0.01	0.02	0.02	0.06	0.07	0.10	0.15	0.27	0.32	0.75	0.80	1.80	1.90	2.50	2.80	6.50	7.00	13.0	17.0	50
Torsional stiffness (10^3 Nm/rad)	C_T	0.7		1.2	1.3	7	5	8	7	12	10	18	16	40	31	68	45	90	60	220	190	260	250	390
Lateral misalignment max. (mm)		0.15		0.15	0.20	0.20	0.25	0.20	0.30	0.15	0.20	0.20	0.25	0.20	0.25	0.20	0.25	0.20	0.25	0.25	0.30	0.30	0.35	0.35
Angular misalignment max. (degrees)		1		1	1.5	1.5	2	1.5	2	1	1.5	1	1.5	1	1.5	1	1.5	1	1.5	1.5	2	2	2.5	2.5
Lateral spring stiffness (N/mm)		70		40	30	290	45	280	145	475	137	900	270	1200	420	920	290	1550	435	3750	1050	2500	840	2000
Actuation path (mm)		0.7		0.8		0.8		1.2		1.5		1.5		1.7		1.9		1.9		2.2		2.2		2.2

A^F, B^F, F^F = Full disengagement version

optional stainless steel

single-position
multi-position
load holding
full disengagement

press-fit version, with clamping hub



Design details

Six self-centering, tapered drive projections (2) have been formed into the 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 bellow with a female tapered mounting segment (4).

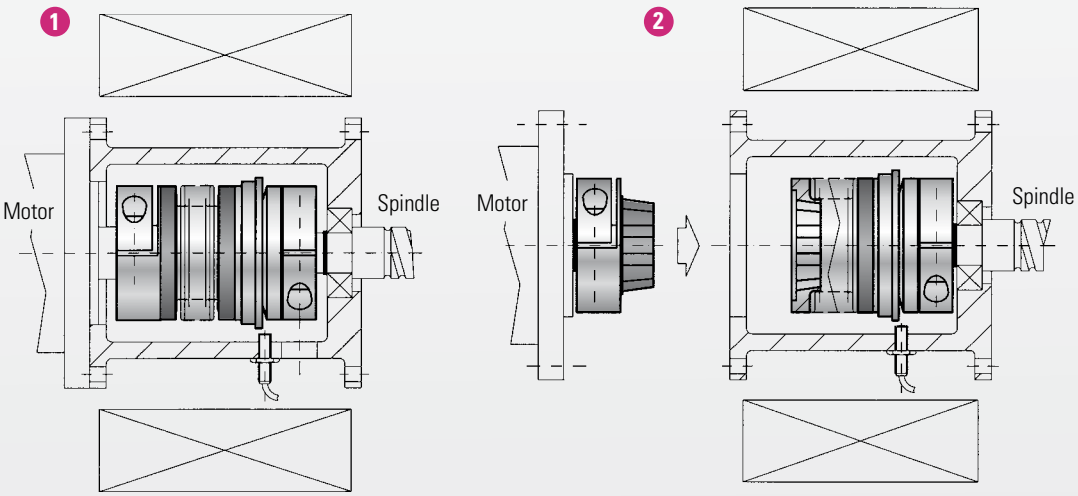
Absolutely backlash-free torque transmission is ensured due to the axial pretensioning (5) of the metal bellows during mounting. This slight pretensioning has no negative influence on the operation of the metal bellows or on the shaft bearing.

Possible applications for backlash-free, press-fit torque limiter SK 5

❶ Applications with limited accessibility. The dismounting of a single-piece coupling is too labor intensive.

❷ The **press fit design** allows the complete drive unit to be removed by simply pulling it out when servicing is required.

Dismounting the coupling is possible **without loosening** the hub fastening screws. Therefore, clamping screw access holes are not required.



Ordering specifications

Required information for models SK 2, SK 3 and SK 5

SK2 / 60 / 102 / D / 16 / 19 / 25/10-30/XX

- Model
- Series
- Overall length (mm)
- Version
- Bore Ø D1 H7
- Bore Ø D2 H7
- Disengagement torque (Nm)
- Adjustment range (Nm)
- e.g. stainless steel

Possible versions:

W = single position
D = multi position
G = Load holding
F = Full disengagement

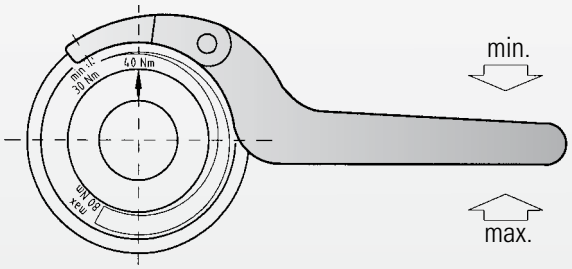
optional stainless steel

ACCESSORIES

PATENTED BACKLASH-FREE TORQUE LIMITERS FROM R+W

Torque adjusting wrench for DIN 1816 nuts

Order-No.: see table



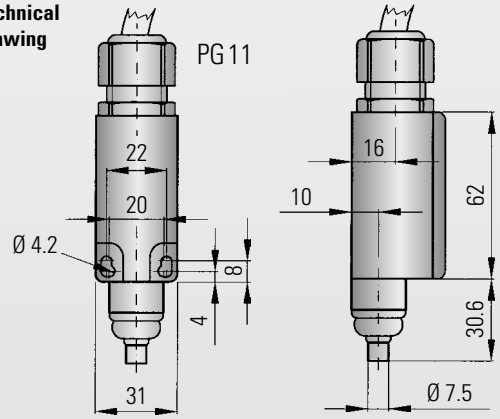
Small coupling sizes do not require a wrench. The adjusting nuts for series 1.5 / 2 / 4.5 / 10 can be adjusted with a bolt.

Coupling series			Wrench
15			Order-No. 60/4
20/30	40/60	80/150	Order-No. 90/5
200			Order-No. 90/6
300			Order-No.155/6
500			Order-No.155/8
800	1500	2500	Order-No. 230/8

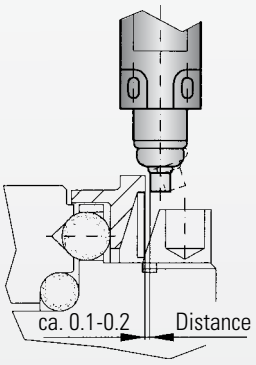
Mechanical switch for Emergency Cut-Off (appropriate from series 10 on)

Order-No.: 618.6740.425

Technical drawing



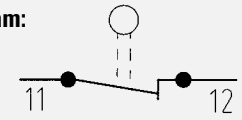
Important:
Upon assembly, it is absolutely necessary to check the function of the switch 100%.



The actuation tappet should be put as close as possible to the actuation ring of the torque limiter (approx. 0.1-0.2)

Technical data	
Max. voltage:	500 V AC
Max. constant current:	10 A
Protective System:	IP 65
Contact system:	Opener (forced separating)
Ambient temperature:	- 30° C - +80 °C
Actuation:	Tappet (metal)

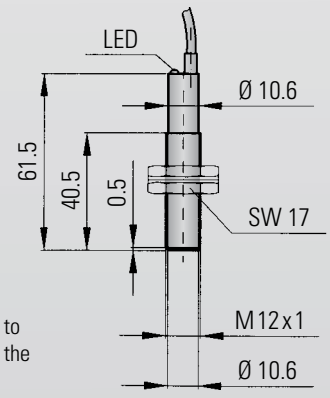
Switch diagram:



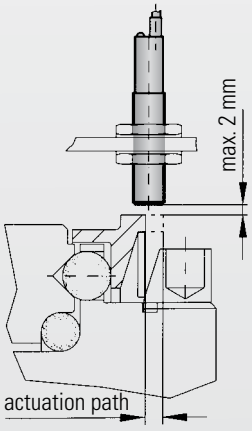
Proximity switch for Emergency cut-off

Order-No.: 650.2703.001

Technical drawing

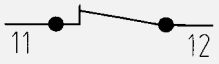


Important:
Upon assembly, it is absolutely necessary to check the function of the switch 100%.



Technical data	
Voltage:	10 bis 30 V DC
Output current:	200 mA
Switch frequency:	800 Hz
Temperature range:	-25°C bis +70°C
Protective System:	IP 67
Switch Type:	normally open
Max. detection gap:	max. 2 mm

Switch diagram:



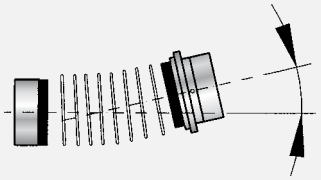
GENERAL FUNCTION

R+W torque limiting couplings are ball detent style overload couplings. They protect drive and driven mechanical components from damage associated with torque overloads.

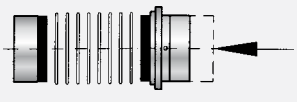
- Backlash free torque transmission is accomplished by a series of steel balls (4) nested in hardened detents (5).
- Disc springs push against an actuation ring (3) keeping the balls nested.
- The disengagement torque is adjustable by means of an adjustment nut (1).
- In the event of an overload, the actuation ring (3) moves axially allowing the balls to come of the detents separating the drive and driven elements.
- The movement of the actuation ring (3) can be sensed by means of a mechanical switch or proximity sensor (6) triggering the drive to shut down.

max. misalignment SK 2 - SK 5

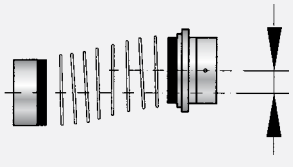
Angular misalignment Δ Kw



Axial misalignment Δ Ka



Lateral misalignment Δ Kr



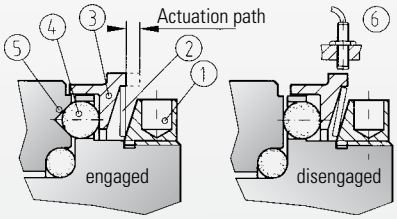
CAUTION:
Exact alignment of the R+W Torque Limiter considerably increases the service life of the metal bellow.

Reducing or eliminating lateral misalignment eliminates the radial loading of the adjacent bearings, increasing service life and reducing heat.

For drives running at high speed it is recommended to align the coupling with a dial indicator.

Max. misalignment values see table. Axial misalignment between 1-2 mm.

Single-position / Multi-position

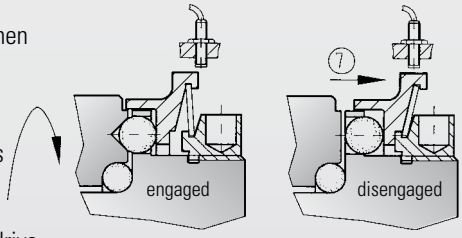


In a torque overload, for the single-position design (standard) and multi-position design, the spring disengages to allow the balls to come out of their detents separating the drive and driven elements. Very low residual spring pressure remains so that the coupling will re-engage once the torque is reduced below the overload setting.

At the load holding version the drive and driven elements are only allowed limited rotation in order to achieve a movement of the actuation ring.

Re-engagement may only be effected at low speed.

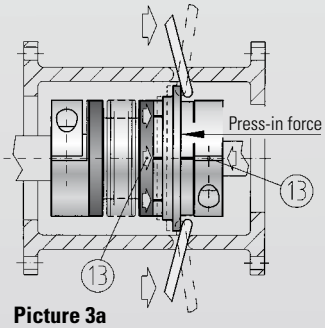
Full-disengage



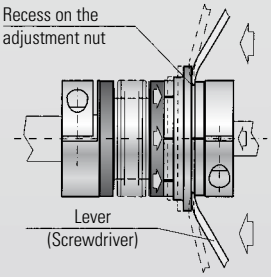
With this design, when a torque overload is detected, the disc spring completely flips over and places no residual spring pressure on the actuation ring. The drive and driven elements are completely separated.

Re-engagement of the coupling is not automatic and must be performed manually (Picture 3a, 3b).

CAUTION:
Re-engagment should only be performed when the coupling is still and not rotating!



Picture 3a



Picture 3b

The R+W full-disengage torque limiting coupling can be re-engaged in six different positions or every 60 degrees with low „press-in" force (E). Marks on the actuation ring and body (13) of the coupling must line up and indicate the re-engagement points.

As of size 200 and up the re-engagement can be done with 2 lever which will be supported at a recess on the adjustment nut (picture 3b). Screwdrivers can be used as a lever.

optional stainless steel

MOUNTING-INSTRUCTIONS

PATENTED BACKLASH-FREE TORQUE LIMITERS FROM R+W

- All torque limiters are supplied to ISO bore tolerance grade H7. For models SK1 to SK 5 the fit tolerance of the hub/shaft connection must be between 0.01 and 0.05 mm.
- Ensure that the coupling mounts smoothly onto the shaft prior to final installation.
- Lightly oil the shaft prior to installation. Do not use sliding grease, or oils and grease with molybdenum disfluide or other high-pressure additives. Any keyways in the shaft will not affect the functioning of the clamped connection.

Model SK1/SKP

Model SK1 has an integrated bearing a for support of the attached component (for example a pulley or sprocket wheel).

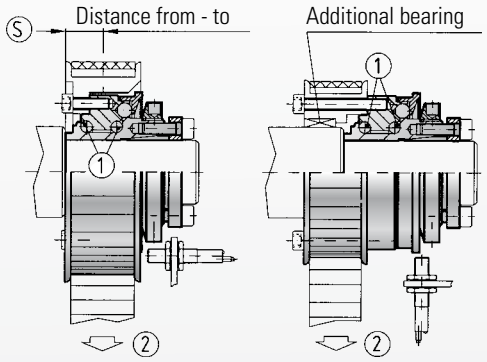
Do not exceed the maximum radial force 2 (see table)

By centering the load between the dimension S , addition separate bearing support is not required.

For offset mounting, additional bearings are required.

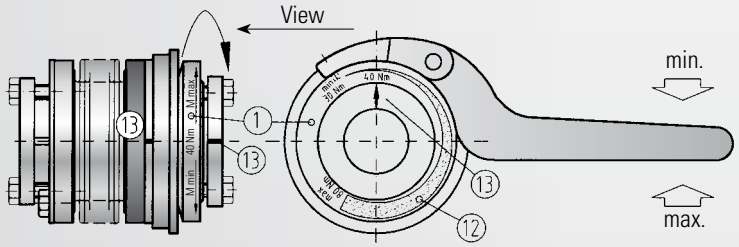
This is recommended, for example, if the attached component has a very small diameter or the drive element has a very large width.

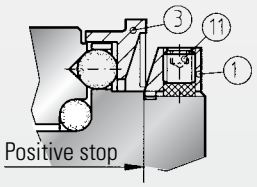
Depending on the installation situation, ball bearings, needle bearings or bushings may be used.



Series	1.5	2	4.5	10	15	30	60	150	200	300	500	800	1500	2500
Radial load capacity,max (N)	50	100	200	500	1400	1800	2300	3000	3500	4500	5600	8000	12000	20000
(S) from-to	3-6	5-8	6-10	6-12	7-14	8-18	8-18	12-20	12-22	12-23	12-25	14-34	20-42	32-60

Disengagement torque setting



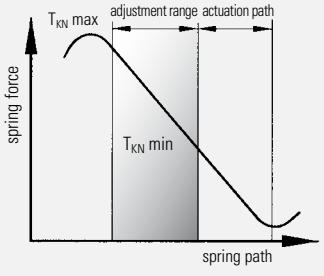


① adjustment nut
⑪ fastening screw
③ steel actuation ring
⑫ adjustment range
⑬ marking

R+W torque limiters are factory set to the customer specified disengagement torque, which is marked onto the coupling. The adjustment range (min/max) is also marked on the adjustment nut (1). The customer can adjust the disengagement torque as long as it falls into the range (12) indicated on the adjustment nut.

The adjustment range may not be left during setting.

To adjust the disengagement torque, loosen the locking screws (11) and rotate the adjustment ring using a spanner wrench to the desired new setting. Tighten the 3 locking screws (11) and test the coupling.

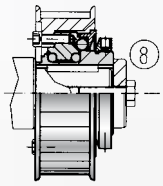


CAUTION:

R+W torque limiters incorporate disc springs that exhibit a special spring characteristic. It is important to stay in the max-min range of the coupling.

MOUNTING AND DISMOUNTING: SK MODELS

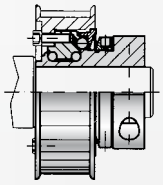
SKP
with key way



Mounting:
Slide the coupling onto the shaft. Lock it in position, with an endplate (8) for example.

Dismounting:
Remove the end plate and slide the coupling off the shaft using an appropriate tool.

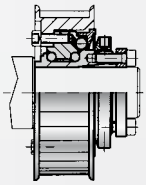
SK 1
with clamping hub
Series 1.5 - 10



Mounting:
Slide the coupling onto the shaft to the proper axial position. Using a torque wrench tighten the clamp screw to the proper tightening torque as indicated. (see page 7)

Dismounting:
Simply loosen the clamp screw and remove the coupling.

SK 1
with tapered bushing

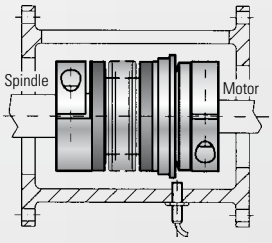


Mounting:
Slide the coupling onto the shaft to the proper axial position. Using a torque wrench, uniformly tighten the clamping screws using a cross-wise tightening pattern. Apply 1/3, 2/3 and full torque until all the clamping screws are evenly tightened to the correct tightening torque as given on page 6.

CAUTION: Further tightening of the clamping screws may destroy the tapered bushing connection. While tightening the coupling may move slightly towards the tapered bushing.

Dismounting:
Loosen the clamping screw. Insert the three jack screws into the taped holes on the tapered segment apply even pressure to remove the tapered segment. Remove the coupling.

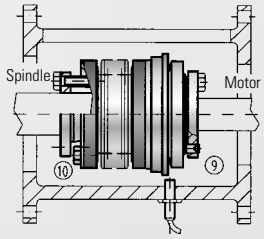
SK 2
with clamping hub



Mounting:
Prior to mounting make sure that the shaft to be connected does not exceed the angular or lateral misalignment limits for the coupling size to be used. This data can be found in the catalog. Slide the coupling on the first shaft end to the proper axial position. Using a torque wrench, tighten the clamp screw to the correct tightening torque as indicated (page 8). Insert the second shaft into the other end of the coupling to the proper axial position. Make sure that the coupling is free of any axial forces before tightening. Tighten the clamp screw as above using a torque wrench.

Dismounting:
Simply loosen the clamp screw and remove the coupling.

SK 3
with tapered bushing

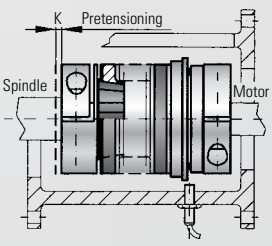


Mounting:
Prior to mounting make sure that the shaft to be connected does not exceed the angular or lateral misalignment limits for the coupling size to be used. This data can be found in the catalog. Slide the coupling onto the first shaft to the proper axial position. Using a torque wrench, uniformly tighten the clamping screws using a cross-wise tightening pattern. Apply 1/3, 2/3 and full torque until all the clamping screws are evenly tightened to the correct tightening torque (see page 9).

CAUTION: Mounting is completed. Further tightening of the clamp screws may destroy the tapered bushing connection.

Dismounting:
Loosen the clamping screws. Use the three jackscrews 9 conveniently mounted in the taper segment and 10 on the bellow body to evenly back out the tapered segment. Remove the coupling.

SK 5
with press-fit tapered clamping hubs



Mounting:
Prior to mounting it is necessary to consider the overall length of the assembled coupling. The press-fit coupling requires a specific pre-tensioning (K) between the two coupling halves to ensure backlash free operation. Mount the „female" coupling half containing the bellow onto the first shaft end to the proper axial position. Using a torque wrench tighten the clamp screw to the proper tightening torque. Mount the „male" coupling segment onto the second shaft end. The proper axial position is when the two couplings come together and coupling is compressed by the proper pre-tension distance (K). See page 10. When the coupling segment is properly positioned tighten the clamp screw to the proper torque.

Dismounting:
Pull the coupling apart. Simply loosen the clamp screws and remove the coupling from the shaft.

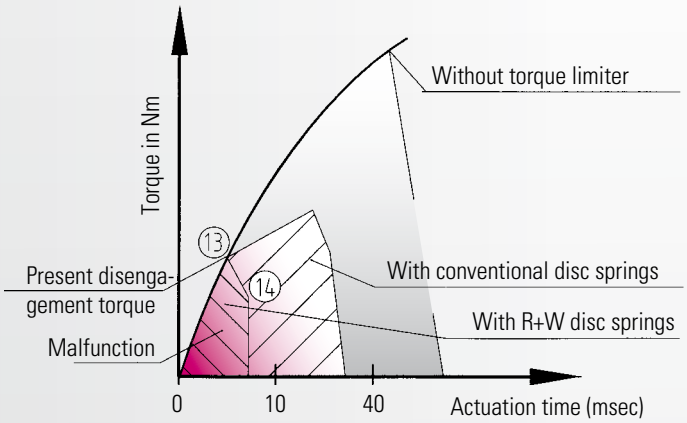
optional stainless steel

ADDITIONAL INFORMATION

PATENTED BACKLASH-FREE TORQUE LIMITERS FROM R+W

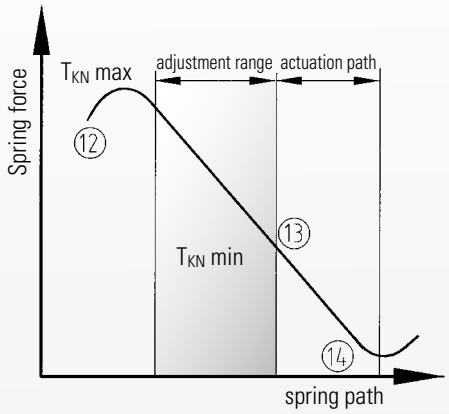
Behaviour and characteristic

Disengagement behavior



Spring characteristic

Degressive spring characteristic



Spring package:
R + W torque limiters function by means of a disc spring with a digressive characteristic developed exclusively for this application. Upon the couplings actuation, this characteristic (13) brings about an immediate drop in the torque (14) and an interruption of the force flux.

The spring force of the disc spring drops to a lower value after the disengagement process.

This advantage guarantees extremely short actuation times (1-3 ms), low wear and very low residual friction (between 2-5 %).

Speed:
The service life of the coupling is essentially determined by the number of rotations after disengagement.

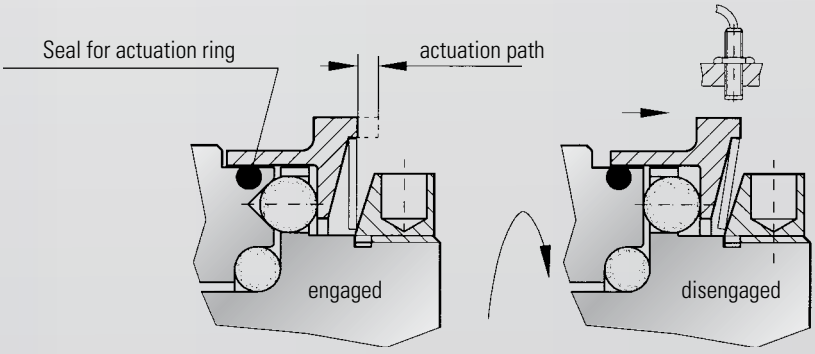
Wear:
No wear occurs during engaged operating condition. In the event of an overload the drive should be stopped through a mechanical limit switch or proximity switch immediately.

Maintenance:
When properly engaged, the torque limiters are wear free, and therefore require no maintenance. The ball detent mechanism within each coupling is permanently lubricated.

Seal:
Optional sealing of the coupling is possible:

Advantages of the sealing:

- Protection from dirt and liquid contamination
- Appropriate for food service and light washdown environments
- No escape of grease possible



Prior technical approval is suggested, for applications using our products other than specified.

SELECTION

According to disengagement torque

As a rule torque limiters are rated according to the required disengagement torque, which must be greater than the torque that is necessary for regular machine operation.

The disengagement torque of the torque limiters is determined as a rule in accordance with the drive specifications.

The following calcucation has proven itself as a rule of thumb solution:

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

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

or

$$T_{KN} \geqq 9550 \cdot \frac{P_{AN}}{n} \cdot 1.5 \quad (Nm)$$

T_{KN} = rated torque of coupling (Nm)
P_{AN} = drive power (kw)
n = speed of drive (rpm))

According to acceleration torque (start-up at no load)

S_A = jerk or load factor
$S_A = 1$ (uniform load)
$S_A = 2$ (non-uniform load)
$S_A = 3$ (jerky load)

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

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

T_{KN} = rated torque of coupling (Nm)
α = angular acceleration $\frac{1}{s^2}$

$$\alpha = \frac{\omega}{t} = \frac{\pi \cdot n}{t \cdot 30}$$

t = acceleration time (s)
ω = angular speed in (s^{-1})
n = speed of drive (rpm)
J_L = moment of inertia on load side (kgm^2)
J_A = moment of inertia on driving side (kgm^2)
T_{AS} = peak torque of motor (Nm)

According to acceleration and load torque (start with load)

$$T_{KN} \geqq \alpha \cdot J_L + T_{AN} \geqq \left[\frac{J_L}{J_A + J_L} \cdot (T_{AS} - T_{AN}) + T_{AN} \right] \cdot S_A \quad (Nm)$$

S_A = jerk or load factor
$S_A = 1$ (uniform load)
$S_A = 2$ (non-uniform load)
$S_A = 3$ (jerky load)

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

T_{KN} = rated torque of coupling (Nm)
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n = speed of drive (rpm)
J_L = moment of inertia on load side (kgm^2)
T_{AN} = load torque (Nm)
J_A = moment of inertia on driving side (kgm^2)
T_{AS} = peak torque of motor (Nm)

SELECTION

PATENTED BACKLASH-FREE TORQUE LIMITERS FROM R+W

According to feed force

Spindle drive

$$T_{AN} = \frac{s \cdot F_V}{2000 \cdot \pi \cdot \eta} \quad (Nm)$$

T_{AN}	=	load torque	(Nm)
S	=	spindle pitch	(mm)
F_V	=	feed force	(N)
η	=	spindle efficiency	

Timing belt drive

$$T_{AN} = \frac{d_0 \cdot F_V}{2000} \quad (Nm)$$

T_{AN}	=	load torque	(Nm)
d_0	=	pinion dia. (pulley)	(mm)
F_V	=	feed force	(N)

According to resonant frequency (SK 2 / 3 / 5 with bellows attachment)

Usually high resonant frequencies of the couplings are required in order to make high acceleration values possible and avoid any vibration excitation.

For the purpose of caclulation the drive is reduced to a 2 mass sytem.

$$f_e = \frac{1}{2 \cdot \pi} \sqrt{C_T \times \frac{J_{Masch} + J_{Mot}}{J_{Masch} \cdot J_{Mot}}} \quad (Hz)$$

C_T	=	torsional stiffness of the coupling	(Nm/rad)
$J_{Masch.}$	=	moment of inertia of machine (spindle + slide + workpiece + half of coupling)	(kgm^2)
$J_{Mot.}$	=	moment of inertia of motor (motor's rotor + half of coupling)	(kgm^2)
f_e	=	Resonant frequency of a two mass system	(Hz)

According to torsional sitiffness (SK 2 / 3 / 5 with bellows attachment)

Transmission errors due to a torsional stress on the metal bellows:

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

φ	=	angle of turn	(degrees)
C_T	=	torsional stiffness of coupling	(Nm/rad)
T_{AS}	=	peak torque of motor	(Nm)

According to the function system

Load holding version: On SK1 / SKP models the load holding version has a double load safety margin. Ensure that models with bellows (SK2, 3 and 5) are of adequate size. The blocking load in this case should not exceed the nominal torque of the coupling.

R+W: QUALITY AND KNOW-HOW

Quality and know-how for couplings in servo, NC and stepper motor systems.

The demands on drive technology have dramatically and steadily increased in the last few years. Our company **R+W** is proud to have reached a leading market position within the same few short years and we continue to work hard in the areas of design and technical development to stay there. **R+W** has representatives in more than 40 countries all over the world and is opening more branches every year.

Our range of high-quality precision couplings meet the needs of the most demanding applications. But for our technical staff this is not enough. We are constantly developing, new solutions, new designs, new possibilities.

We want you to contact us, to give us the opportunity to create a solution and to earn your business. Each person on the **R+W** staff knows that quality comes from his or her personal engagment with, and listening to, the customer.

Benefit from our quality and efficiency.

We are ISO 9001 certified. Our production and customer service department have been organized to maximize efficiency and minimize delivery time.

Extensive quantities of component inventory are kept on hand to ensure the quickest possible delivery, often within one day. Special designs are a major part of our business and are immediately processed, designed and built. **R+W** also has developed proprietary software to calculate resonant frequencies and aid.

R+W continues to reinvest to ensure that our couplings remain innovative to improve their efficiency and operating dependability with your applicatons.

QUALITY MANAGEMENT
We are certified
according to ISO 9001-200

Special low cost rust protection process

Corrosion protection which is equivalent to that of galvanized or chrome-plated surfaces is available.

The positive features of this include good resistance to wear and corrosion.

The parts are resistant to a salt spray test pursuant to DIN 50021 for a period of 140 hours.

This process represents a genuine, low cost alternative to expensive stainless steel materials.

Couplings with this surface treatment have been used for many years by well-known companies in the food industry.

Versions in explosion-proof design

All models can be supplied in an explosion-proof design to order without any change in dimensions.

DXF + 3D files

The complete product range can be supplied on CD-ROM in DXF and DWG files.This allows the files to be imported into design programs easily. 3 dimensional drawings of the couplings are also available.

Download

All the drawings can be down loaded directly from our homepage **www.rwcouplings.com**.

DIN ISO 9001

Quality awareness is a high priority at R+W.

The introduction of DIN ISO 9001 has meant the refinement of quality procedures and the appropriate documentation.

In a one-year preparation peroid, the ISO 9001 quality system was produced and certified on 4 March 1997.

Constant monitoring and improvement of the system ensures a technically superior product with a quality standard second to none.

R+W®
COUPLING TECHNOLOGY

Experience and Know-how for your special requirements.

R+W Antriebselemente GmbH
Alexander-Wiegand-Straße 8
D-63911 Klingenberg/Germany

Tel. +49-(0)9372 – 9864-0
Fax +49-(0)9372 – 9864-20

info@rw-kupplungen.de
www.rwcouplings.com

QUALITY MANAGEMENT
We are certified
according to ISO 9001-200

TGA-ZM-05-91-00
Registration No. 9605022

THE R+W-PRODUCT RANGE

TORQUE LIMITERS
Series SK

From 0,1 – 2.800 Nm, Bore diameters 4 – 70 mm
Available as a single position, multi-position, load holding, or full disengagement version
Single piece or press-fit design

BELLOW COUPLINGS
Series BK

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

BELLOW COUPLINGS
ECONOMY CLASS
Series BKL / BKC

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

SERVOMAX®
ELASTOMER COUPLINGS
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

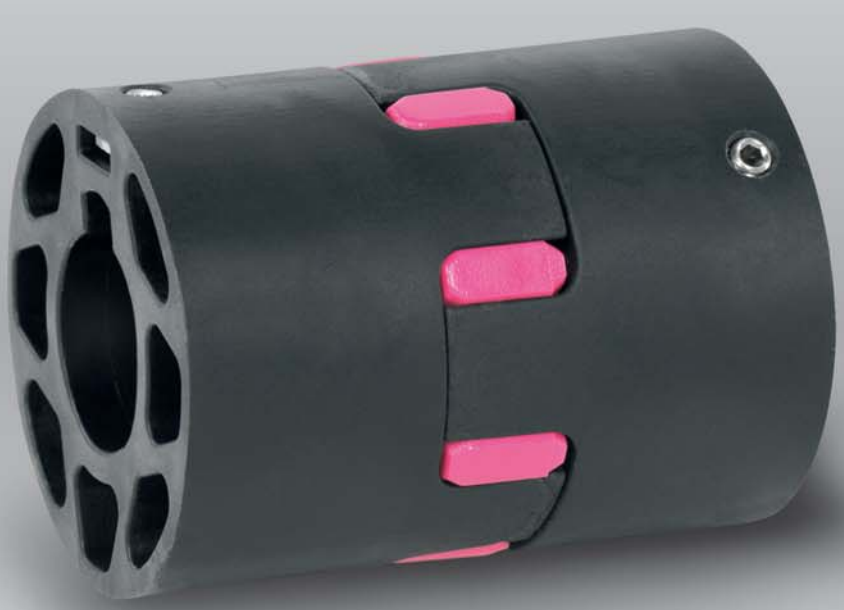
Rated torque 1 Ncm
Bore diameters 1 – 1,5 mm

382/11/05/3.000

LOW COST AND RELIABLE.

ECOLIGHT®
ELASTOMER COUPLINGS

SERIES TX 1 | 2 – 810 Nm



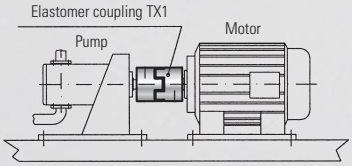
R+W®
COUPLING TECHNOLOGY

THE ULTIMATE COULING FROM 2 – 810 Nm

www.rw-america.com

ELASTOMER COUPLING ECOLIGHT®

APPLICATION EXAMPLES

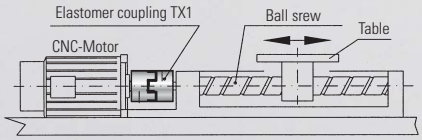


AREAS OF APPLICATION

- Pumps
- Rolling gate drives

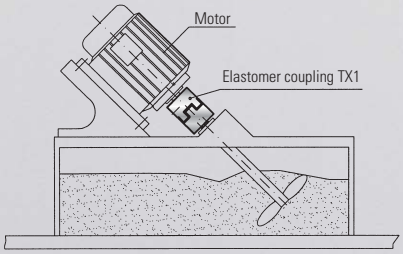
PROPERTIES

- High damping
- Compensation for misalignment
- Wear and maintenance free
- Corrosion resistant



- NC-axes
- Ball-screws
- Actuators

- Low backlash
- High rigidity
- Vibration damping



- Agitator
- Pumps for the chemical industry

For the use in explosive environments

- Available for the full product range
- For the hazardous areas 1/21 and 2/22 the ECOLIGHT® Elastomer couplings are registered according to the directive ATEX 95/137

Function

The equalizing element of an EK coupling is the convex elastomer insert. It transmits the torque without backlash or vibration. The elastomer insert defines the features of the entire coupling and/or of the entire drive system. The ECOLIGHT®-Coupling compensates for lateral, angular and axial misalignment.

Type A
Shore hardness 98 Sh A

Type B
Shore hardness 64 Sh D

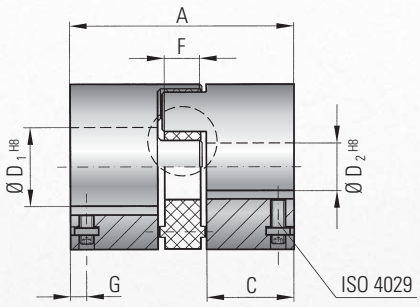
Type C
Shore hardness 80 Sh A

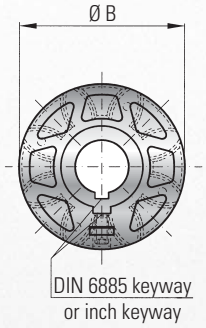
Specification of the Elastomer inserts

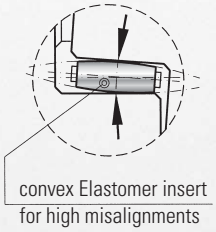
Type	Shore hardness	Color	Material	Relative damping (ψ)	Temperature range	Features
A	98 Sh A	red	TPU	0,4 - 0,5	-30°C to +100°C	high damping
B	64 Sh D	green	TPU	0,3 - 0,45	-30°C to +120°C	high torsional stiffness
C	80 Sh A	yellow	TPU	0,3 - 0,4	-30°C to +100°C	very high damping

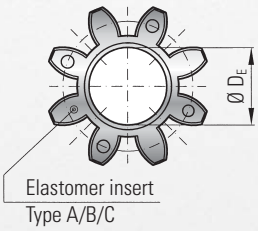
The values of the relative damping were determined at 10 Hz and +20° C.

MODEL **TX 1**









Properties:
- Low moment of inertia
- Economically priced
- Corrosion resistant
- Low backlash, due to keyway connetion
- Electrically insulating
- Vibration damping

Material: Hubs: high strength fiber reinforced plastic
Elastomer insert: precision molded wear restistant and thermally stable polymer

Design: Two couplings hubs concentrically molded with concave driving jaws
Bore tolerance H8 + keyway + clamping set screw

Speed: See below, higher speeds on request

Tolerance: On the hub/shaft connection max. 0.1 mm

Temperature: -20°C to +100°C

Model TX 1			Series														
			10			20			60			150			300		
Elastomer insert			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	12,5	16	4	17	21	6	60	75	20	160	200	42	325	405	84
Max. torque	(Nm)	T_{Kmax}	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170
Overall length	(mm)	A	35			66			78			90			114		
Outer diameter	(mm)	B	32			42			56			66,5			82		
Mounting length	(mm)	C	12			25			30			35			45		
Inner diameter possible from - to	(mm)	$D_{1/2}$	6 -16			10 - 24			16 - 30			19 - 38			20 - 45		
Inner diameter max. (elastomer)	(mm)	D_E	14,2			19,2			27,2			30,2			38,2		
Set screw		E	M3			M4			M5			M6			M6		
Tightening torque	(Nm)		1			2			3			8			8		
Width elastomer insert	(mm)	F	9,5			12			14			15			18		
Distance	(mm)	G	4			5			6			7			7		
Moment of inertia (hub)	(10^{-3} kgm²)	J_1/J_2	0,0014			0,01			0,03			0,067			0,18		
Approx. weight	(kg)		0,03			0,08			0,18			0,27			0,51		
Speed	(1/min)		10.000			9.000			8.000			7.000			6.000		
Static torsional stiffness	(Nm/rad)	C_T	260	600	90	1140	2500	520	3290	9750	1400	4970	10600	1130	12400	18000	1280
Dynamic torsional stiffness	(Nm/rad)	C_{Tdyn}	541	1650	224	2540	4440	876	7940	11900	1350	13400	29300	3590	23700	40400	6090
Lateral	(mm)	Max. values	0,2	0,17	0,2	0,2	0,2	0,2	0,22	0,22	0,25	0,25	0,25	0,25	0,28	0,28	0,3
Angular	(degree)		1,5			1,5			1,5			1,5			1,5		
Axial	(mm)		±1			±1,5			±1,5			±2			±2		

Static torsional stiffness at 50% T_{KN} Dynamic torsional stiffness at T_{KN} 1 Nm = 8,85 lbs

The prebored bore diameter depends on the inner structure					
Series	**10**	**20**	**60**	**150**	**300**
Structure I from Ø to Ø	6 - 12.9	10 - 14.9	16 - 20.9	19 - 26.9	20 - 28.9
Structure II from Ø to Ø	13 - 16	15 - 19.9	21 - 25.9	27 - 33.9	29 - 38.9
Structure III from Ø to Ø		20 - 24	26 - 30	34 - 38	39 - 45

Ordering example

TX1 / 60 / A / 20 / 24 / XX

- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H8
- Bore Ø D2 H8
- Non standard e.g. ATEX

THE R+W-PRODUCT RANGE

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COUPLING TECHNOLOGY

Experience and Know-how for your special requirements.

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Series FK 1

Rated torque 1 Ncm
Bore diameters 1 – 1.5 mm

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Bensenville, IL 60106

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www.rw-america.com

QUALITY MANAGEMENT
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A030/09/06/1.500