flexible and torsionally rigid

BELLOW COUPLINGS

Series BK · 15 – 10,000 Nm

R+W®
COUPLING TECHNOLOGY

www.rw-couplings.com

Torsionally stiff metal bellows couplings

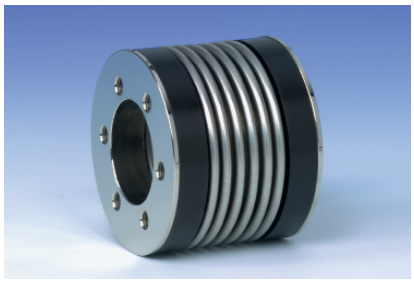
optional stainless steel

Areas of application:

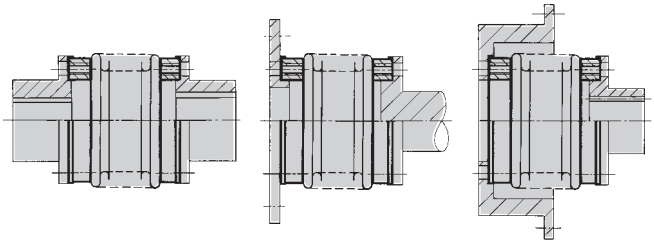
- Servo drives
- CNC axes
- Robotic axes
- Manipulators
- Linear actuators
- Printing machines
- Packaging machines
- Woodworking machines
- Textile machinery
- Metal cutting machines

Model	Application examples	Properties

BK 1 with flange mounting



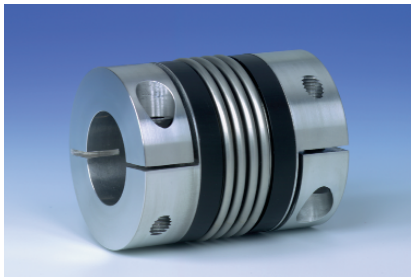
from 15-10,000 Nm



see page 4

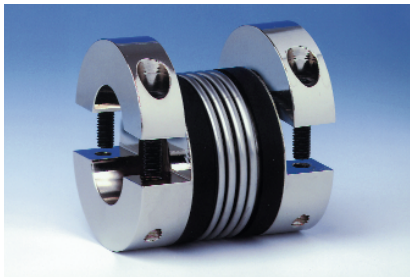
- special design applications

BK 2 with clamping hub



from 15-1,500 Nm

BK 2 (H) with split hub

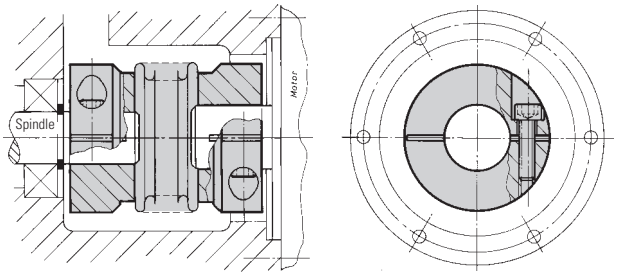


see page 5

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

BKL Economy Class with clamping hub

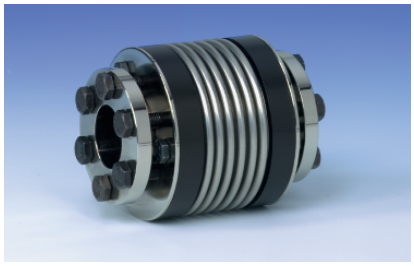
from 2-500 Nm



see separate catalog

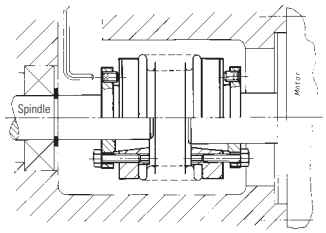
- low cost version

BK 3 with tapered concial sleeves

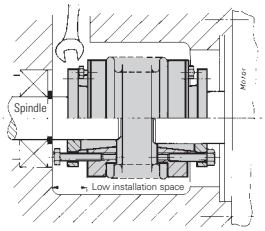


from 15-10,000 Nm

Approach to date



The new approach



see page 6

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

Torsionally stiff metal bellows couplings

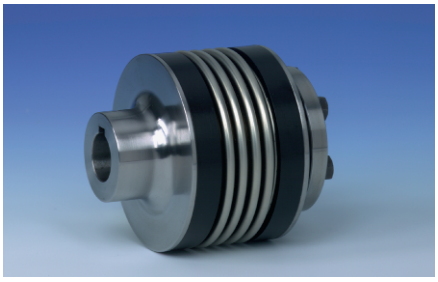
optional stainless steel

Properties of the product range:

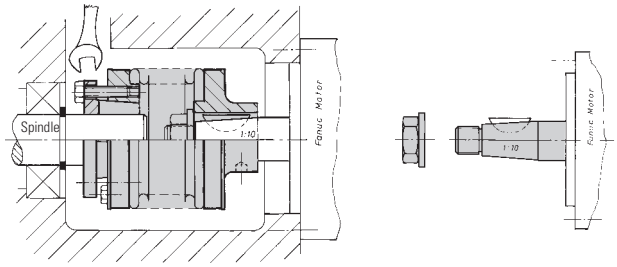
- high torsional stiffness
- compensation of axial, lateral and angular shaft misalignment accompanied by quiet, uniform operation
- exact transmission of angular motion and torque
- infinite life
- multi-walled bellows, dampen any vibrations
- easy mounting and dismounting

Model	Application examples	Properties

BK 4 for Fanuc-drives



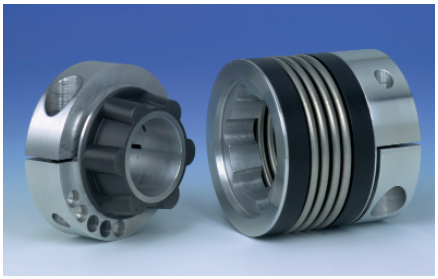
from 15-80 Nm



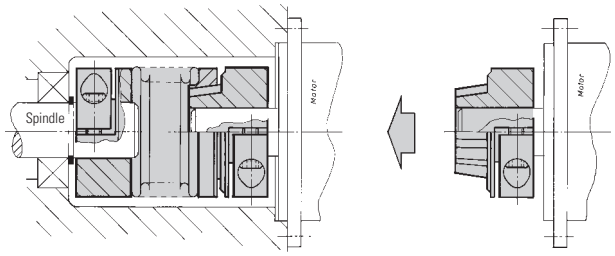
see page 7

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

BK 5 with tapered press-fit connection



from 15-500 Nm

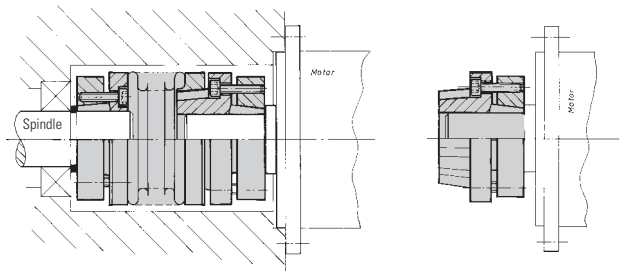


see page 8

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

BK 6 with conical sleeve and tapered press-fit connection

from 15-500 Nm



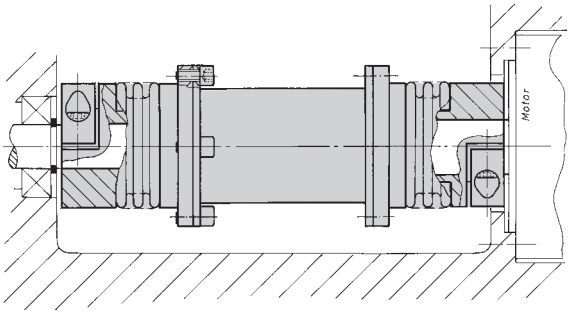
see page 9

for axial mounting

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

ZA Line shafts with clamping hub

from 10-4,000 Nm

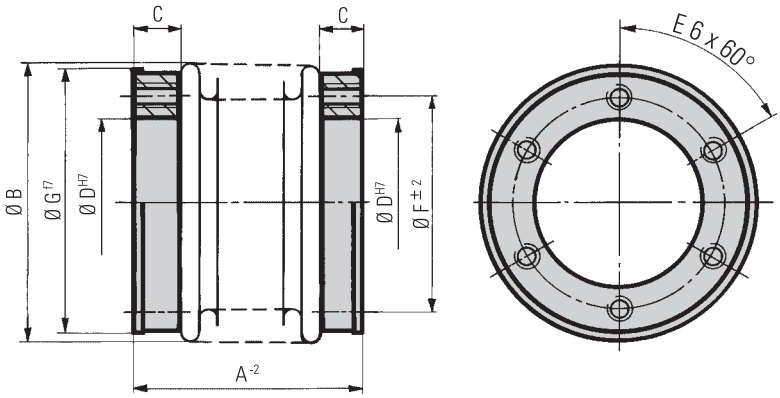


see separate cataloge

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

optional stainless steel

Model BK 1



– special design applications

Material:

Bellows made of highly flexible high grade stanless 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.

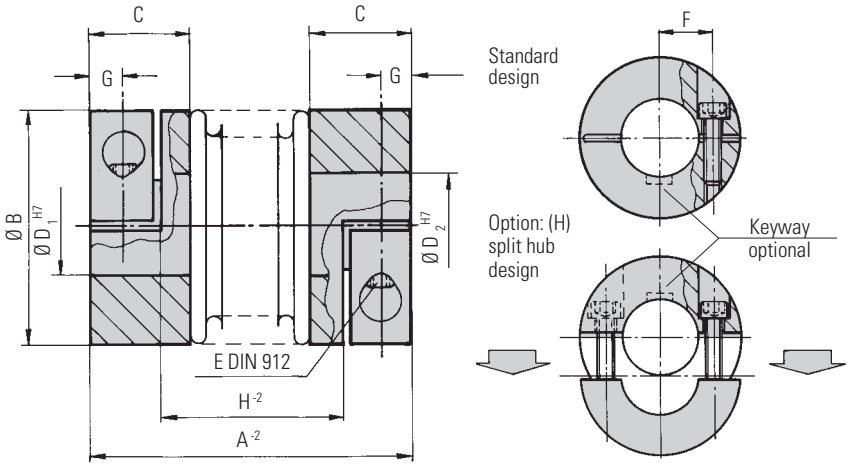
Hubs with custom bore size, mounting threads and bolt circles are avaiable upon request.

Technical specifications

Series / Rated torque (Nm)	Overall length (mm)	Outer diameter of bellows (mm)	Fit lenght thread depth (mm)	Inner diameter H7 (mm)	6 x fastening threads (mm)	Hub bolt circle ± 0,2 (mm)	Outer diameter f7 (mm)	Moment of inertia (10^{-3} kgm²)	Approx. weight (kg)	Torsional stiffness (10^3 Nm/rad)				Max. values				axial spring stiffness (N/mm)	lateral spring stiffness (N/mm)
											axial	lateral	angular	axial	lateral	angular			
T_{KN}	A	B	C	D	E	F	G	J_{total}		C_T								C_a	C_r
15	30	49	7	25	M5	35	49	0.07	0.15	20	1	0.15	1.5	25	475				
	37							0.08		15	2	0.2	2	15	137				
30	36	55	9	28	M5	37	55	0.14	0.2	39	1	0.2	1.5	50	900				
	44							0.15		28	2	0.25	2	30	270				
60	43	66	10	38	M6	46	66	0.30	0.3	76	1.5	0.2	1.5	72	1200				
	53							0.32		55	2	0.25	2	48	420				
80	49	81	12	50	M6	62	81	0.80	0.6	129	2	0.2	1.5	48	920				
	61							0.83		85	3	0.25	2	32	290				
150	50	81	12	50	M6	62	81	0.90	0.6	175	2	0.2	1.5	82	1550				
	62							0.95		110	3	0.25	2	52	435				
200	53	90	14	58	M6	70	90	1.30	0.8	191	2	0.25	1.5	90	2040				
	65							1.40		140	3	0.3	2.2	60	610				
300	56	110	14	65	M8	80	110	1.95	1.5	501	2.5	0.25	1.5	105	3750				
	70							2.10		295	3.5	0.3	2.2	71	1050				
500	64	123	16	70	M8	94	122	3.0	1.4	510	2.5	0.3	1.8	70	2500				
	77							3.4		500	3.5	0.35	2.3	48	840				
800	81	133	18	75	M10	90	116	4.3	1.6	780	3.5	0.35	2.2	100	2000				
1500	100	157	22	85	M16	110	140	10.6	3.3	1304	3.5	0.35	2.2	195	3600				
4000	145	200	30	100	M20	140	182	46	8.9	3400	3.5	0.4	2.5	265	6070				
6000	138	253	30	145	8xM20	190	235	132	13.9	5700	3	0.4	2.5	1030	19200				
10000	150	303	36	190	8xM24	234	295	350	23.7	10950	3	0.4	2.5	985	21800				

optional stainless steel

Model BK 2



– 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: standard
With a single radial clamping screw per hub DIN 912
Any imbalance of the clamping hubs single screw design, is compensated for with balancing bores located on the inside of the hub.

Design: split hub
Both clamping hubs completely removable

Technical specifications

Series	Rated torque (Nm)	Overall length (mm)	Outer diameter (mm)	Fit length (mm)	Inner diameter possible from Ø to Ø H7 (mm)	DIN 912 fastening screw (mm)	Thightening torque of the fastening screw (Nm)	Distance between centers (mm)	Moment of inertia (mm)	Hub material (standard) (steel on request) (mm)	Approx. weight (10^{-3} kgm²)	Torsional stiffness (kg)	axial (10^3 Nm/rad)	lateral (mm)	axial spring stiffness (mm)	lateral spring stiffness (N/mm)	(N/mm)
T_{KN}	A	B	C	$D_{1/2}$	E		F	G	H	J_{total}			C_T	Max. values			C_a	C_r
15	59	49	23	8-28	M5	8	17	6.5	29	0.07	Al	0.15	20	1	0.15		25	475
	66								36	0.08			15	2	0.2		15	137
30	69	55	27	10-30	M6	15	19	7.5	35	0.14	Al	0.3	39	1	0.2		50	900
	77								43	0.15			28	2	0.25		30	270
60	83	66	32	12-32	M8	40	23	9.5	41	0.23	Al	0.4	76	1.5	0.2		72	1200
	93								51	0.26			55	2	0.25		48	420
80	94	81	36	14-42	M10	50	27	11	47	0.65	Al	0.8	129	2	0.2		48	920
	106								59	0.67			85	3	0.25		32	290
150	95	81	36	19-42	M10	70	27	11	48	2.5	steel	1.7	175	2	0.2		82	1550
	107								60	3.2			110	3	0.25		52	435
200	105	90	41	22-45	M12	120	31	12.5	51	4.5	steel	2.5	191	2	0.25		90	2040
	117								63	5.4			140	3	0.3		60	610
300	111	110	43	24-60	M12	130	39	13	55	8.5	steel	4	501	2.5	0.25		105	3750
	125								69	10.5			295	3.5	0.3		71	1050
500	133	123	51	35-60	M16	200	41	16.5	62	17.3	steel	7.5	510	2.5	0.3		70	2500
	146								75	19.6			500	3.5	0.35		48	840
800	140	135	49	40-75	2xM16	250	2x48	18	65.5	24.3	steel	7	780	3.5	0.35		100	2000
1500	166	157	55	50-80	2xM20	470	2x55	23	71	49.2	steel	12	1304	3.5	0.35		195	3600

Product description for model series BK 1 / BK 2

Temperature range:
-30 to +120° C

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

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

Service life:
These coupling are maintenance-free if the technical limits are not exceeded

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

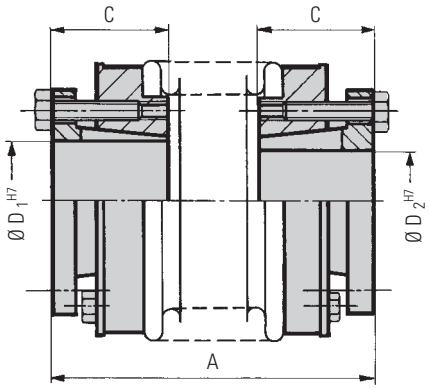
Ordering example

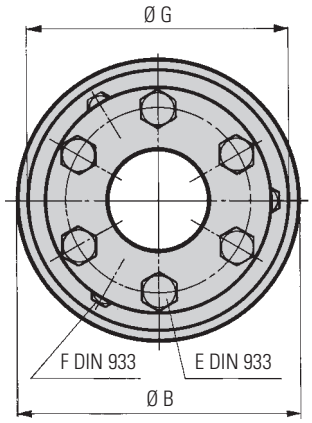
BK2 / 80 / 94 / H / 20 / 22 / xx

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

optional stainless steel

Model BK 3





– 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 of steel.

Design:

With tapered concial sleeves and strong, captive DIN 933 draw-off screws.

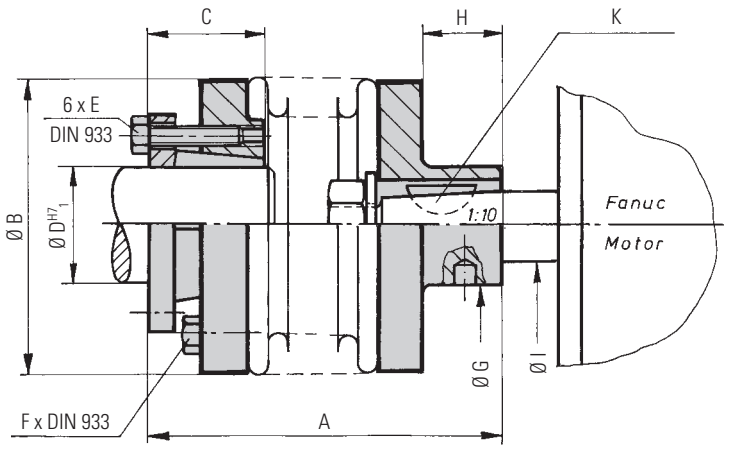
Technical specifications

Serie / Rated torque	Overall length	Outer diameter of bellows	Fit length	Inner diameter from Ø to Ø H7	Fastening screws	Thightening torque of the fastening screws	DIN 933 draw-off screw	Outer diameter of hub	Moment of inertia	Approx. weight	Torsional stiffness	Max. values axial	Max. values lateral	axial spring stiffness	lateral spring stiffness
	(Nm)	(mm)	(mm)	(mm)	(mm)	(Nm)	(mm)	(10^3 kgm²)	(kg)	10^3 Nm/rad		(mm)		(N/mm)	(N/mm)
T_{KN}	A	B	C	D	E		F	G	J_{total}		C_T			C_a	C_r
15	48	49	19	10-22	M4	3	M4	49	0.12	0.25	20	1	0.15	25	475
	55								0.59		15	2	0.2	15	137
30	57	55	22	12-23	M5	6	M4	55	0.3	0.4	39	1	0.2	50	900
	65								0.34		28	2	0.25	30	270
60	66	66	27	12-29	M5	8	M5	66	0.54	0.8	76	1.5	0.2	72	1200
	76								0.73		55	2	0.25	48	420
80	74	81	32	15-38	M6	10	M5	81	1.1	1.2	129	2	0.2	48	920
	86								1.5		85	3	0.25	32	290
150	75	81	32	15-38	M6	12	M5	81	1.2	1.2	175	2	0.2	82	1500
	87								1.6		110	3	0.25	52	435
200	78	90	32	15-44	M6	14	M6	90	1.7	1.8	191	2	0.25	90	2040
	90								2.5		140	3	0.3	60	610
300	89	110	41	24-56	M8	18	M6	110	2.95	3	501	2.5	0.25	105	3750
	103								5.8		295	3.5	0.3	71	1050
500	97	123	41	24-60	M8	23	M6	122	9.1	4.2	510	2.5	0.3	70	2500
	110								9.9		500	3.5	0.35	48	840
800	114	133	50	30-60	M10	40	M6	120	13.2	5.6	780	3.5	0.35	100	2000
1500	141	157	60	35-70	M12	70	M8	145	34.9	8.2	1304	3.5	0.35	195	3600
4000	195	200	80	50-100	M16	120	M10	175	85.5	23	3400	3.5	0.4	565	6070
6000	210	253	85	60-140	M16	150	M10	246	254	32.6	5700	3	0.4	1030	19200
10000	217	303	92	70-180	8xM16	180	4xM10	295	637	45.5	10950	3	0.4	985	21800

max. angular misalignment see BK 1

Model BK 4 for Fanuc-Motors

optional stainless steel



– 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 of steel.

Design:

Spindle-side
With conical sleeves and strong captive DIN 933 draw-off screws

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

Technical specifications

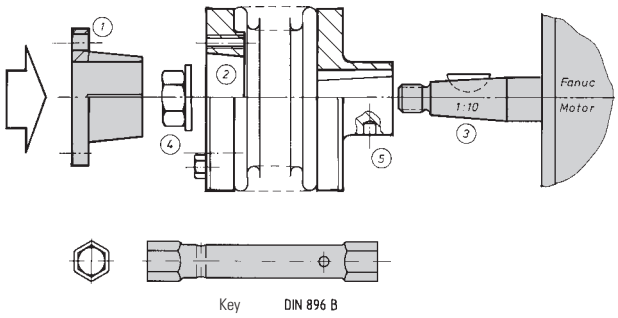
Series	Rated torque (Nm)	Overall length (mm)	Outer diameter of bellows (mm)	Fit length (mm)	Inner diameter from Ø to Ø H7 (mm)	Fastening screws DIN 933 6 x (mm)	Tightening torque of the fastening screws (Nm)	DIN 933 draw-off screw	Shaft diameter (mm)	Shaft length (mm)	Moment of inertia (10^{-3} kgm^2)	Approx. weight (kg)	Torsional stiffness axial (10^3 Nm/rad)	Torsional stiffness lateral (10^3 Nm/rad)	axial spring stiffness (mm)	lateral spring stiffness (mm)	cone Ø (Fanuc Motor) (N/mm)	Keyway width (N/mm)
T_{KN}	A	B	C	D	E		F	G	H	J_{total}		C_T	Max. values		C_a	C_r	I	K
15	47	49	19	10-22	M4	3.3	M4	20	8.5	0.10	0.25	20	1	0.15	20	475	11	4
	54									0.12		15	2	0.2	12	137		
30	68	55	22	12-23	M5	6	M4	27	22	0.22	0.4	39	1	0.2	50	900	16	5
	76									0.27		28	2	0.25	30	270		
60	72	66	27	12-29	M5	8	M5	30	18	0.58	0.8	76	1.5	0.2	72	1200	16	5
	82									0.61		55	2	0.25	48	420		
80	81	81	32	15-37	M6	10	M5	30	20	0.97	1.2	129	2	0.2	48	920	16	5
	93									1.30		85	3	0.25	32	290		

Higher torques on request.

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 bellowbody (4).

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



Product description for model series BK 3 / BK 4

Temperature range: -30 to +120°,

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

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

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

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

Ordering example

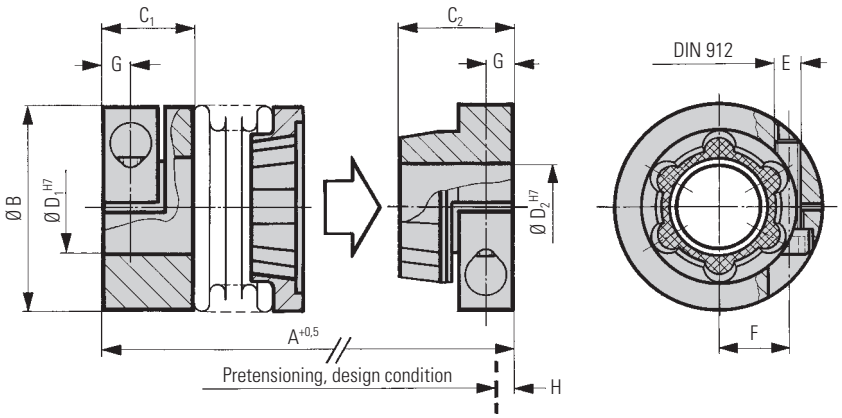
BK3 / 60 / 76 / 20 / 22 / xx
- xx: non standard
- 22: Ø D2 H7
- 20: Ø D1 H7
- 76: overall length
- 60: Series/Nm
- BK3: Model

BK4 / 80 / 81 / 20 / xx
- xx: non standard
- 20: Ø D1 H7
- 81: Overall length
- 80: Series/Nm
- BK4: Model

NEW!

optional stainless steel

Model BK 5 — Press-fit precision metal bellows couplings



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

Material:

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

Design:

One side comprised of clamping hub with DIN 912 screw
One side includes backlash-free clamping hub and tapered press-fit device. Any imbalance of the clamping hub and single screw design, is compensated for with balancing bores located on the inside of the hub.

Technical specifications

Series	Rated torque (Nm)	Overall length (inserted) (mm)	Outer diameter (mm)	Fit length (mm)	Fit length (mm)	Inner diameter from Ø to Ø H7 (mm)	Inner diameter from Ø to Ø H7 (mm)	DIN 912 screw	Tightening torque (Nm)	Distance between centers (mm)	Pretensioning approx. (mm)	Axial recovery force of coupling max. (N)	Mass moment of inertia (10^{-3} kgm^2)	Approx. weight (kg)	Torsional stiffness (10^3 Nm/rad) axial*	Torsional stiffness (10^3 Nm/rad) lateral	Lateral spring stiffness (N/mm) (mm)	Lateral spring stiffness (N/mm) (mm)
T_{KN}	A	B	C_1	C_2	D_1	D_2	E		F	G	H		J_{total}		C_T	Max. values		C_r
15	60	49	23	28	8-28	8-22	M5	8	17	6.5	0.2 to 1.0	20	0.07	0.1	18	0.5	0.15	475
	67											12	0.08	0.1	13	1	0.20	137
30	71	55	27	33	10-30	10-25	M6	15	19	7.5	0.5 to 1.0	50	0.14	0.3	35	0.5	0.20	900
	79											30	0.15	0.3	25	1	0.25	270
60	85	66	32	39	12-32	12-32	M8	40	23	9.5	0.5 to 1.5	70	0.23	0.4	68	0.5	0.20	1200
	95											45	0.26	0.4	50	1	0.25	420
80	94	81	36	43	14-42	14-38	M10	50	27	11	0.5 to 1.5	48	0.65	0.9	116	1	0.20	920
	106											32	0.67	0.9	76	2	0.25	290
150	95	81	36	43	14-42	14-38	M10	70	27	11	0.5 to 1.5	82	2.2	1.8	158	1	0.2	1550
	107											52	2.4	1.8	100	2	0.25	435
300	114	110	43	52	30-60	30-58	M12	130	39	13	0.5 to 1.5	157	7.4	4	451	1.5	0.25	3750
	128											106	7.9	4	266	2	0.3	1050
500	136	123	51	61	35-60	35-60	M16	200	41	16.5	0.5 to 2	140	13.7	6.5	460	2.5	0.3	2500
	149											96	14.4	6.7	450	3.5	0.35	840

** allowed following maximum pretensioning*

Higher torques on request.

Product description for model series BK 5 / BK 6

Temperature range: -30 to +120° C

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

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

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

Ordering example

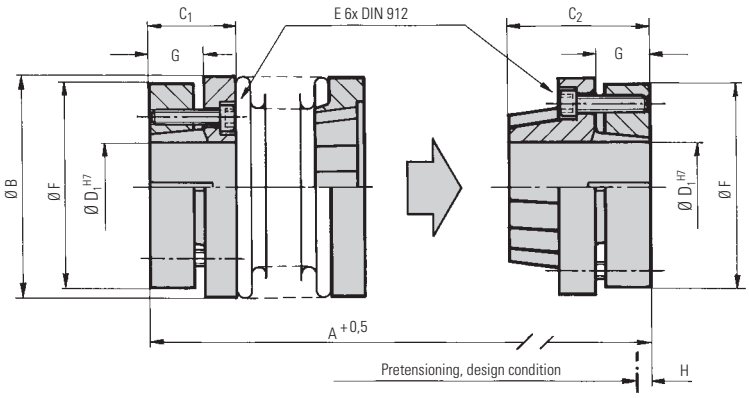
BK5 / 20 / 71 / 18 / 19 / xx

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

NEW!

optional stainless steel

Model BK 6 — Press-fit precision metal bellows couplings



axial mounting for space constrained applications

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

Material:

Bellows made of highly flexible, high-grade stainless steel; conical sleeves and tapered segment on bellows face made of steel. Tapered segment on hub face: glass-fiber reinforced plastic sprayed onto a steel hub.

Design:

One side concial sleeve with 6 fastening screws DIN 912 and 3 draw-off threads.
One side with backlash-free tapered concial sleeve with press-fit connection and 3 draw-off screws

Technical specifications

Series	Rated torque (Nm)	Overall length (inserted) (mm)	Outer diameter (mm)	Fit length (mm)	Fit length (mm)	Inner diameter from Ø to Ø H7 (mm)	Inner diameter from Ø to Ø H7 (mm)	DIN 912 screw (mm)	Tightening torque (Nm)	Diameter of clamping cone (mm)	Pretensioning approx. (mm)	Axial recovery force of coupling max. (N)	Mass moment of inertia (10^{-3} kgm^2)	Approx. weight (kg)	Torsional stiffness (10^3 Nm/rad)	axial * (mm)	lateral (mm)	Lateral spring stiffness (N/mm)
T_{KN}	A	B	C_1	C_2	D_1	D_2	E		F	G	H		J_{total}		C_T	Max. values		C_r
15	58	49	13.5	29	10-22	10-22	M4	3.5	45	9.5	0.2 to 1.0	20	0.10	0.3	18	0.5	0.15	475
	65											12	0.12	0.32	13	1	0.2	137
30	68	55	16	34	12-24	12-24	M5	6.5	51	10.5	0.5 to 1.0	50	0.20	0.5	35	0.5	0.20	900
	76											30	0.25	0.52	25	1	0.25	270
60	79	66	17.5	39	12-32	12-32	M5	8	60	11.5	0.5 to 1.5	70	0.40	0.82	68	0.5	0.2	1200
	89											45	0.45	0.84	50	1	0.25	420
150	97	81	23.5	49.5	15-40	15-40	M6	12	74	17.5	0.5 to 1.5	82	2.0	1.60	158	1	0.2	1550
	109											52	2.5	1.70	100	2	0.25	435
300	113	110	27	59	24-56	24-56	M8	30	102	20	0.5 to 1.5	157	5.4	4.10	451	1.5	0.25	3750
	127											106	6.1	4.20	266	2	0.3	1050
500	132	123	32	68	30-60	30-60	M8	32	114	23	0.5 to 2	140	8.4	6.00	460	2.5	0.3	2500
	145											96	9.1	6.30	450	3.5	0.35	840

** allowed following maximum pretensioning*

Higher torques on request.

Design details BK 5/6

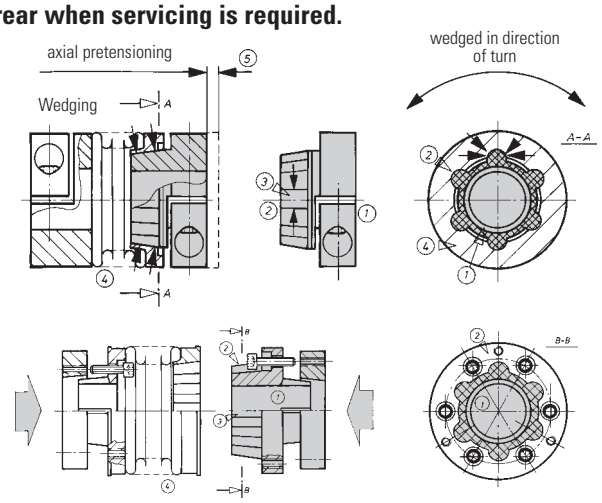
Due to the press-fit design the complete drive unit is simply removed to the rear when servicing is required.

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 bellow with a tapered mounting (4).

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

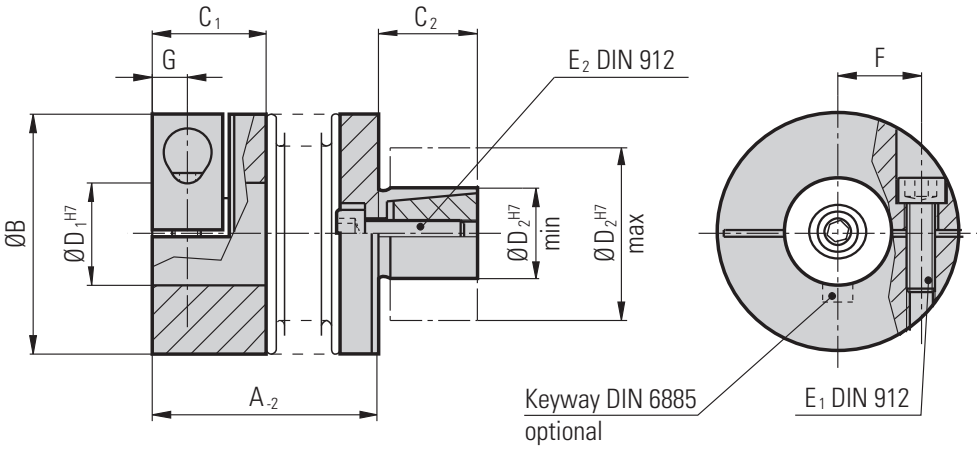


Description of the material of the plastic segment:

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.

optional stainless steel

Model BK 7



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 a clamping hub with DIN 912 screw
On one side an expanding shaft with tapered clamping element

Technical specifications

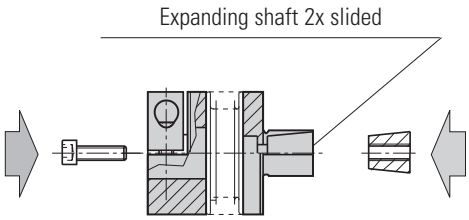
Series Rated torque (Nm)	Overall length (mm)	Outer diameter (mm)	Fit length (mm)	Inner diameter possible from Ø to Ø (H7)	Fit length (mm)	Shaft diameter from Ø to Ø (h7)	DIN 912 fastening screw	Tightening torque of the fastening screw	Distance between centers (Nm)	Distance (mm)	Moment of inertia 10^{-3} (mm)	Hub material (standard) (steel on request)	Approx. weight (kgm^2)	Torsional stiffness 10^3 (kg)	axial (Nm/rad)	lateral (mm)	axial spring stiffness (mm)	lateral spring stiffness (N/mm) (N/mm)
T_{KN}	A	B	C_1	D_1	C_2	D_2	$E_{1/2}$	$E_{1/2}$	F	G	J_{total}			C_T	Max. values			
15	45	49	23	8-28	20	13-25	M5	8	17	6.5	0.07	Al	0.15	20	1	0.15	20	315
	52										0.08			15	2	0.2	12	108
30	53	55	27	10-30	25	14-30	M6	14	19	7.5	0.14	Al	0.3	39	1	0.2	50	730
	61										0.15			28	2	0.25	30	230
60	62	66	32	12-32	27	23-36	M8	38	23	9.5	0.23	Al	0.4	76	1.5	0.2	72	1200
	72										0.26			55	2	0.25	48	380
150	71	81	36	19-45	32	26-42	M10	65	27	11	2.20	Steel	1.7	175	2	0.2	82	1550
	83										2.40			110	3	0.25	52	435
300	84	110	43	30-60	45	39-60	M12	120	39	13	5	Steel	4	501	2.5	0.25	105	3750
	98										5.8			295	3.5	0.3	71	1050

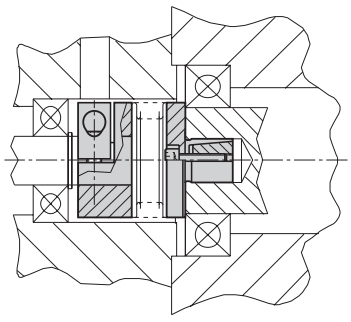
Installation instructions:

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





Product description for model series BK 7

Temperature range: -30 to +120° C

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

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

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

Ordering example:

BK7/150 / 71 / 32 / 35 / xx

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

optional stainless steel

The selection process for torsionally stiff metal bellows couplings

According to torque

In most cases couplings are rated according to the maximum peak torque to be regularly transmitted.
The peak torque may not exceed the rated torque of the coupling.

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

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

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

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

According to acceleration torques

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

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

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

S_A = Shock or load factor

$S_A = 1$ (uniform load)

$S_A = 2$ (non-uniform load)

$S_A = 3\text{-}4$ (Shocking load)

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

T_{KN} = rated torque of coupling (Nm)
T_{AS} = max. acceleration torque on the drive face (Nm)
or max. deceleration torque of the load face (Nm)
J_L = machine's moment of inertia (kgm^2)
(Spindle + slide + workpiece + half of coupling)
J_A = motor's moment of inertia (kgm^2)

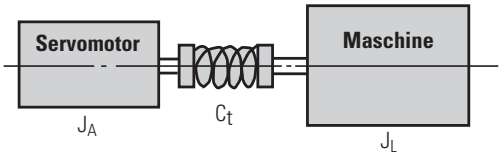
According to resonance frequency

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

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

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

2-mass-system



C_t = torsional stiffness of the coupling (Nm/rad)
f_e = resonance frequency of the 2 mass system (Hz)
f_{er} = frequency of the drive (Hz)

According to torsional stiffness:

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

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

φ = angle of turn (degrees)
C_t = torsional stiffness of coupling (Nm/rad)
T_{AS} = max. torque (Nm)

optional stainless steel

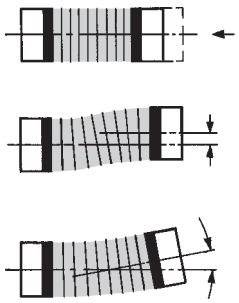
Installation instructions for coupling series BK

- 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).

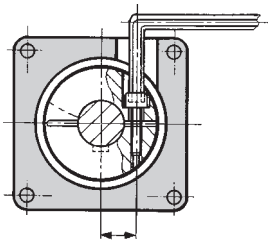
- In the case of models BK 2/3/4/5/6 the tolerance between shaft/hub connection must not exceed 0.01 and 0.05 mm.
- Prior to mounting check for smooth running of the coupling hub on the shaft.
- Prior to mounting, make sure that the shaft is slightly oiled. Shaft keyways have no effect upon the function of the clamped connection.

Misalignments



Model BK 2/5

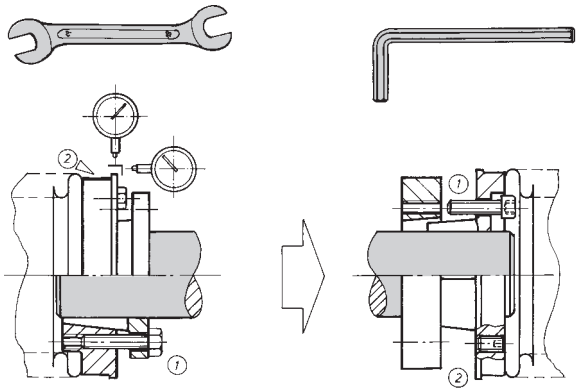
- The torque values of the fastening screws must be precisely applied in order to ensure secure clamping of the hubs.
- The dimensions for application of the mounting bore can be found under "F" and "G" in the table.



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

- It is absolutely essential that the fastening screws (1) be evenly tightened.
- Perform tightening of the fastening screws crosswise in order to avoid any distortion of the coupling hubs.
- Finally, check the torque of the screws in their order. The values in the tables must not be exceeded.
- 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.



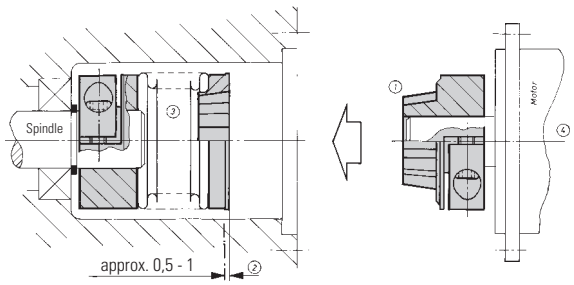
The alignment surfaces on the outer faces of the hubs are for the purpose of checking hub distortion during mounting and for retro-measurement of the misalignment of the axes.

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

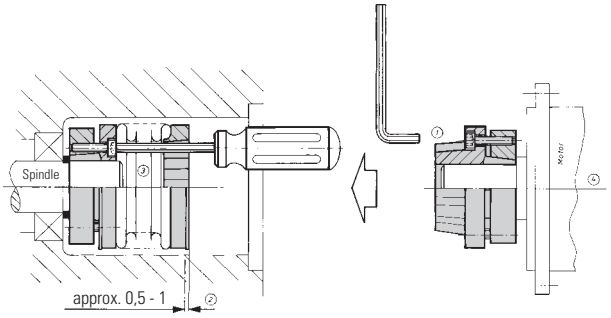
Model BK 5 / BK 6

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

BK 5



BK 6



Low cost and reliable

BELLOW COUPLINGS ECONOMY CLASS

Series BKL · 2 – 500 Nm

Performance · Quality · Price

R+W®
COUPLING TECHNOLOGY

www.rw-couplings.com

Areas of application

for high dynamic servo drives

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

Properties

optional stainless steel

- backlash free
- high degree of torsional stiffness
- compensates for axial, lateral and angular misalignment combined with quiet, smooth operation
- exact angular motion and torque transmission
- infinite life
- optimized against resonance frequencies

The selection process for model series BKL

According to torque

In most cases rate couplings 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 or plant 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.

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

S_A = Shock or load factor
$S_A = 1$ (uniform load)
$S_A = 2$ (non-uniform load)
$S_A = 3\text{-}4$ (Shocking load)

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

T_{KN} = rated torque of coupling (Nm)
T_{AS} = max. acceleration torque on the drive face (Nm)
or max. deceleration torque of the load face (Nm)
J_L = machine's moment of inertia (Spindle + slide + workpiece + half of coupling) (kgm^2)
J_A = motor's moment of inertia (kgm^2)

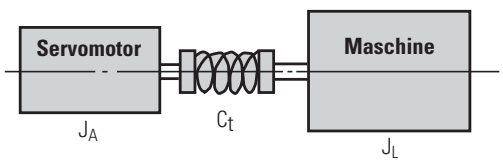
According to resonance frequency

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

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

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

2-mass-system



C_t = torsional stiffness of the coupling (Nm/rad)
f_e = resonance frequency of the 2 mass system (Hz)
f_{er} = frequency of the drive (Hz)

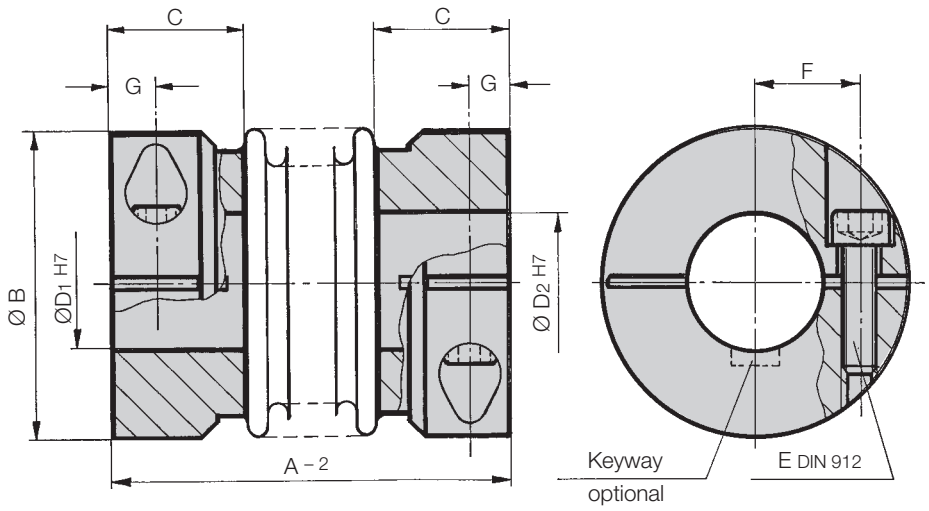
According to torsional stiffness:

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

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

φ = angle of turn (degrees)
C_t = torsional stiffness of coupling (Nm/rad)
T_{AS} = max. torque (Nm)

Model BKL



- 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 DIN 912

Technical specifications

Series	Rated torque (Nm)	Overall length (mm)	Outer diameter (mm)	Fit length (mm)	Inner diameter possible from Ø to Ø H7 (mm)	DIN 912 fastening screw	Tightening torque of the fastening screw (Nm)	Distance between centers (mm)	Moment of inertia (mm)	Hub material (standard) (steel on request)	Approx. weight (10^{-3} kgm^2)	Torsional stiffness kg	Max. values (10^3 Nm/rad) axial	Max. values (mm) lateral	Axial spring stiffness (mm)	Lateral spring stiffness (N/mm)	max. angular misalignment 1 degree (Nm)
T_{KN}	A	B	C	$D_{1/2}$	E		F	G	J_{total}			C_T			C_a	C_r	
2	30	25	10	4-13	M3	2.3	8	4	0.002	Al	0.02	1.5	0.5	0.15	8	50	
4.5	40	32	13	6-16	M4	4	11	5	0.01	Al	0.05	7	1	0.15	35	350	
10	44	40	13	6-24	M4	4.5	14	5	0.02	Al	0.08	9	1	0.15	30	320	
15	58	49	16.5	8-28	M5	9	17	6.5	0.05	Al	0.13	23	1	0.15	30	315	
30	68	56	19	12-32	M6	15	20	7.5	0.09	Al	0.3	31	1	0.15	50	366	
60	79	66	23.5	14-35	M8	40	23	9.5	0.18	Al	0.4	72	1.5	0.15	67	679	
80	92	82	23	16-42	M10	70	27	11	0.54	Al	0.7	80	2	0.15	44	590	
150	92	82	28	19-42	M10	85	27	11	1.8 0.65	Steel optional AL	1.6 0.8	141	2	0.15	77	960	
300	109	110	35	24-60	M12	120	39	13	7.5 2.68	Steel optional AL	3.8 1.7	157	2	0.15	124	2940	
500	114	123	35	35-62	M16	200	41	17	9.0 4.85	Steel optional AL	4.8 2.2	290	2.5	0.20	35	1450	

Product description for series BKL

Temperature range:
– 30°C to +100°C

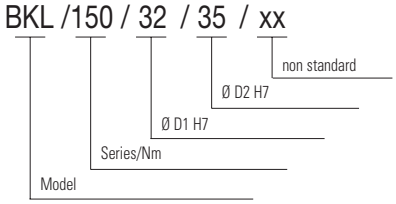
Backlash:
Absolutely backlash-free due to frictional clamped connection.

Brief overloads:
Acceptable up to 1.5 times the value specified.

Tolerance:
On the hub/shaft connection 0.01 to 0.04 mm.

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

Ordering example



versatile and precise

MINIATURE METAL BELLOWS COUPLINGS

Series MK · 0.05 – 10 Nm

R+W®
COUPLING TECHNOLOGY

www.rw-couplings.com

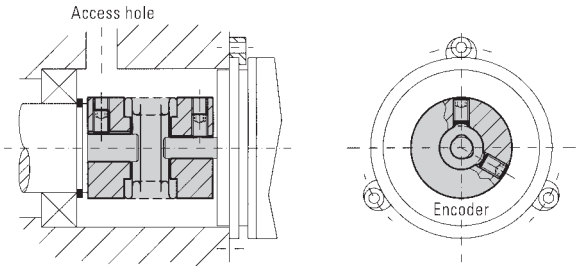
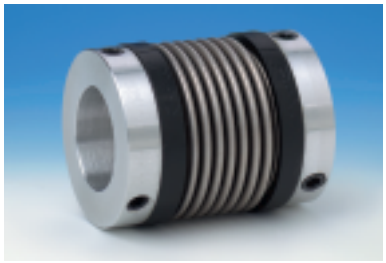
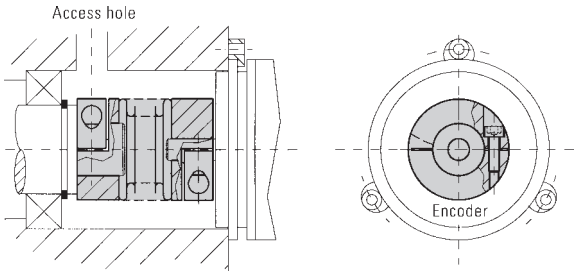
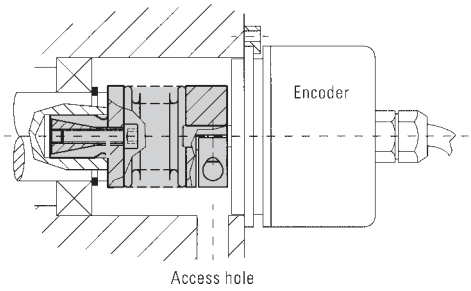
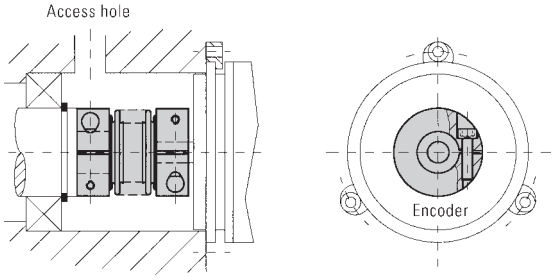
Backlash free miniature bellow couplings

optional stainless steel

Applications:

Ideal for transmitting precise angular motion and torque. Used with the following:

- Optical encoders
- Potentiometers
- Tachometers
- Small servo motors
- Stepper motors
- Angular measurement systems

Models	Application examples	Properties
MK 1 with radial set screws		- cost effective design - integrated "dismounting groove"
		
from 0.05 - 10 Nm	see page 4	
MK 2 with clamping hub		- easy assembly - for highly dynamic applications - finely balanced up to 90,000 rpm possible
		
from 0.5 - 10 Nm	see page 5	
MK 3 with expanding shaft		- compact design - for hollow shaft mounting - saves assembly space and cost
		
from 0.5- 10 Nm	see page 6	
Ecoflex with clamping hub		- extremely cost effective - easy assembly - temperature range up to 170˚C
		
up to 3 Nm	seperate datasheet	

Backlash free miniature bellow couplings

optional stainless steel

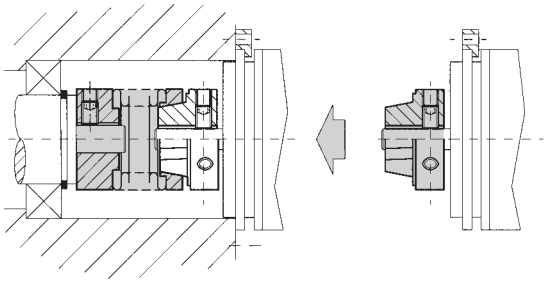
Properties of the product range:

- zero backlash
- torsionally rigid
- precise transmission of angular motion and torque
- maintenance free
- compensates for axial, angular and lateral misalignment
- easy assembly and disassembly

Models	Application examples	Properties

MK 4 with radial set screws

from 0.5 - 10 Nm

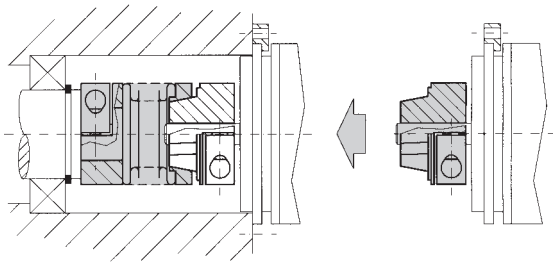


see page 7

- blind-mate press-fit design
- electrically + thermally insulated
- with integrated „dismounting groove“
- easy assembly

MK 5 with clamping hub

from 0.5 - 10 Nm

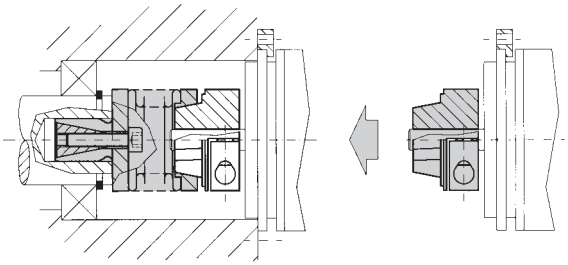


see page 8

- blind mate press-fit design
- electrically + thermally insulated
- easy assembly

MK 6 with clamp hub + expanding shaft

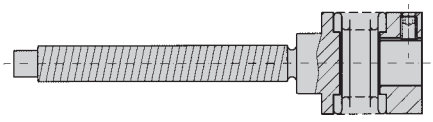
from 0.5 - 10 Nm



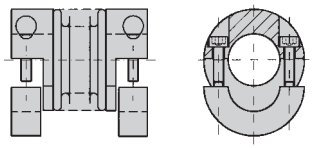
see page 9

- blind mate press-fit
- compact design
- for hollow shaft connections
- saves assembly space + cost
- easy assembly

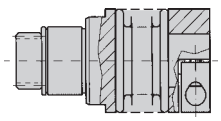
MK Special designs



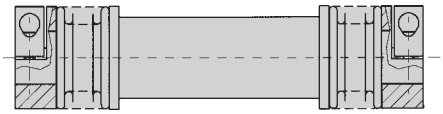
miniature bellow coupling with integrated spindle



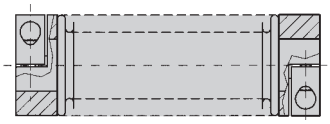
miniature bellow coupling with split hubs



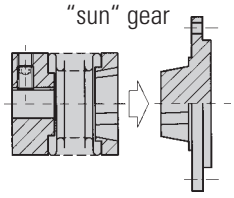
miniature bellow coupling with integrated “sun” gear



miniature line shaft



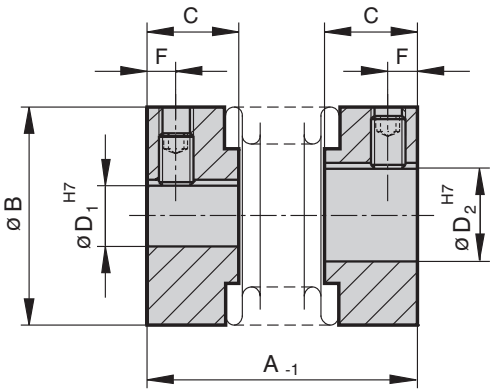
miniature bellow coupling with special bellow

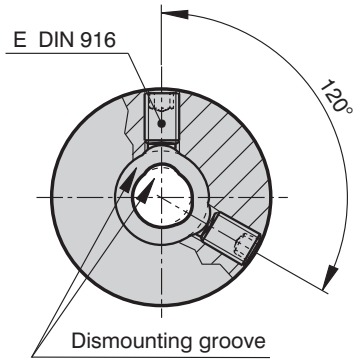


blind-mate coupling with special male segment

optional stainless steel

Model MK 1

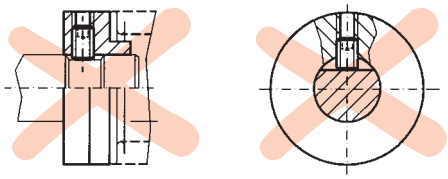




PROPERTIES:

- low-cost design
- backlash-free and torsionally rigid
- low moment of inertia
- compensates for 3-axis of misalignment
- a mounting groove or flattening off of the shaft is not required due to the integrated dismounting groove

common solutions:



Material:

Bellows are made of highly flexible high-grade stainless steel, hubs from aluminium.

Design:

Hubs with DIN 916 radial set screw and **integral dismounting groove.**

Technical specifications

Series	Rated torque (Nm)	Overall length (mm)	Outer diameter (mm)	Fit length of hub (mm)	Special bores from Ø to Ø (mm)	Standard bore H7 (mm)	Clamping screws DIN 916	Distance (mm)	Mass moment of inertia (gcm^2)	Weight (g)	Torsional stiffness (Nm/rad)	axial (mm)	lateral (mm)	angular (degrees)
	T_{KN}	A	B	C	$D_{1/2}$	$D_{1/2}$	E	F	J_{ges}		C_T	Max. values		
0.5	0.05	14	6.5	4	1-3	2	1xM2	1.5	0.1	1	50	0.4	0.1	1
1	0.1	20	10	5	1-5	3	1xM2.5	1.8	0.4	5	70	0.4	0.15	1
5	0.5	20	15	6.5	3-9	6	1xM3	2	1.1	6	280	0.4	0.15	1
		23							1.2	6	210	0.5	0.2	1.5
		26							1.3	6	170	0.6	0.25	2
10	1.0	22	15	6.5	3-9	6	1xM3	2	1.3	6	510	0.4	0.15	1
		25							1.8	7	380	0.5	0.2	1.5
		28							2	8	320	0.6	0.25	2
15	1.5	24	19	7.5	3-12	6/10	2xM3	2	4.7	12	750	0.5	0.15	1.5
		29							5.5	14	700	0.7	0.2	1.5
20	2.0	26	25	11	3-16	6/10	2xM4	2.5	15	22	1200	0.5	0.15	1.5
		31							18	24	1300	0.6	0.2	1.5
		35							20	26	1200	0.7	0.25	2
45	4.5	37	32	13	6-22	10	2xM5	3.5	65	54	7000	0.7	0.2	1.5
		45							70	58	5000	1	0.25	2
100	10	43	40	15	6-28	10	2xM6	4	180	106	9050	1	0.2	1.5
		53							220	114	8800	1.2	0.3	2

Integral dismounting groove from bore diameter 4 mm and larger. Tightening torques for mounting screws page 10.

1 Nm = 8.85 lbs

Temperature range: -30˚ to +100° C (3,6 F to 237 F), peaks up to 120°C (270 F).

Speeds: Up to 20,000 rpm, in excess of 20,000 rpm with balanced version.

Backlash: Absolutely backlash-free due to the frictional clamp connection.

Tolerance: On the hub/shaft connection 0.01 to 0.08 mm.

Service life: These coupling have an infinite servicelife, and are maintenance free, if the technical limits are not exceeded.

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

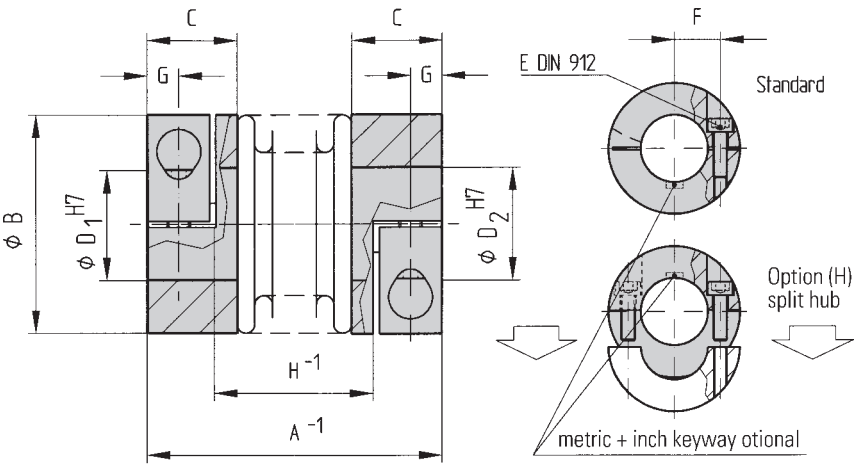
Ordering example:

MK1 / 5 / 26 / 4 / 5 / xx

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

Model MK 2

optional stainless steel



PROPERTIES:

- frictional connection utilizing clamping hubs
- for high dynamic applications
- backlash-free and torsionally rigid
- low moment of inertia
- compensates for 3-axis of misalignment

Material:

Bellows are made of highly flexible high-grade stainless steel, hubs from aluminium.

Design:

With a single radial clamping screw per hub DIN 912

Design split hub (option H):

Both clamping hubs completely removable

Technical specifications

Series	Rated torque (Nm)	Overall length (mm)	Outer diameter (mm)	Fit length of hub (mm)	Special bores from Ø to Ø (mm)	Standard bore H7 (mm)	Screws DIN 912 (mm)	Distance between centers (mm)	Distance (mm)	Mass moment of inertia (gcm²)	Weight (g)	Torsional stiffness (Nm/rad)			
	T_{KN}	A	B	C	$D_{1/2}$	$D_{1/2}$	E	F	G	H	J_{ges}		C_T	Max. values		
														axial (mm)	lateral (mm)	angular (degrees)
5	0.5	25	15	9	3-7	6	M2	4.5	3	12	2.6	9	280	0.4	0.15	1
		28								15	2.8	9	210	0.5	0.2	1.5
		31								18	3	9	170	0.6	0.25	2
10	1.0	27	15	9	3-7	6	M2	4.5	3	14	3	9	510	0.4	0.15	1
		30								17	3.4	10	380	0.5	0.2	1.5
		33								20	3.6	11	320	0.6	0.25	2
15	1.5	30	19	11	3-8	6	M2.5	6	3.5	14.5	8.5	22	750	0.5	0.15	1.5
		35								19.5	9.5	24	700	0.7	0.2	1.5
20	2.0	35	25	13	3-12.7	6/10	M3	8	4	17	25	36	1200	0.5	0.15	1.5
		40								22	27	38	1300	0.6	0.2	1.5
		44								26	29	40	1200	0.7	0.25	2
45	4.5	46	32	16	5-16	10	M4	10	5	23.5	100	74	7000	0.7	0.2	1.5
		54								31.5	108	78	5000	1	0.25	2
100	10	50	40	16	5-24	10	M4	15	5	27.5	160	120	9050	1	0.2	1.5
		60								37.5	205	130	8800	1.2	0.3	2

Tightening torques for mounting screws page 10.

1 Nm = 8.85 in lbs

Temperature range: -30˚C to +100°C (3,6 F to 237 F), peaks up to 120°C (270 F).

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

Backlash: Absolutely backlash-free due to frictional clamp connection.

Tolerance: On the hub/shaft connection 0.01 to 0.05 mm.

Service life: These coupling have an infinite life, and are maintenance-free if the technical limits are not exceeded.

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

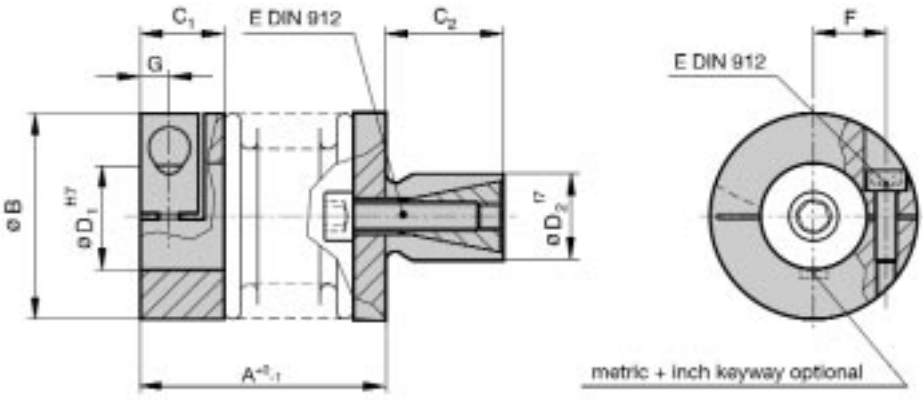
Ordering example:

MK2 / 5 / 25 / H / 4 / 5 / xx

- MK2 — Model
- 5 — Series / Nm
- 25 — Overall length
- H — Split hub (optional)
- 4 — Ø D1 H7
- 5 — Ø D2 H7
- xx — Non standard

optional stainless steel

Model MK 3



PROPERTIES:

- compact design, conserves space while saving cost
- easy mounting
- backlash-free and torsionally rigid
- low moment of inertia
- compensates for 3-axis of misalignment

Material:

Bellows are made of highly flexible high-grade stainless steel, clamping hub aluminium. Expanding hub and cone (steel).

Design:

On one side a clamping hub with DIN 912 screw
On one side an expanding shaft with tapered clamping element

Technical specifications

Series	Rated torque (Nm)	Overall length (mm)	Outer diameter (mm)	Fit length (mm)	Shaft length (mm)	Special bores from Ø to Ø (mm)	Standard bore H7 (mm)	Standard shaft f7 (mm)	Screws DIN 912 (mm)	Distance between centers (mm)	Distance (mm)	Screws DIN 912 (mm)	Mass moment of inertia (gcm^2)	Torsional stiffness (Nm/rad)	Max. values axial (mm)	Max. values lateral (mm)	Max. values angular (degrees)
	T_{KN}	A	B	C_1	C_2	D_1	D_1	D_2	E	F	G	H	J_{ges}	C_T			
5	0.5	20	15	9	10	3-7	6	8	M2	4.5	3	M3	2.6	280	0.4	0.15	1
		23											2.8	210	0.5	0.2	1.5
		26											3.0	170	0.6	0.25	2
10	1	22	15	9	10	3-7	6	8	M2	4.5	3	M3	3.0	510	0.4	0.15	1
		25											3.4	380	0.5	0.2	1.5
		28											3.6	320	0.6	0.25	2
15	1.5	24	19	11	12	4-8	6	10	M2.5	6	3.5	M4	8.5	750	0.5	0.15	1.5
		30											9.5	700	0.7	0.2	1.5
20	2	27	25	13	12	4-12.7	6/10	12	M3	8	4	M4	25	1200	0.5	0.15	1.5
		33											27	1300	0.6	0.2	1.5
		36											29	1200	0.7	0.25	2
45	4.5	36	32	16	15	5-16	10	14	M4	10	5	M5	100	7000	0.7	0.2	1.5
		44											108	5000	1	0.25	2
100	10	41	40	16	20	6-24	10	16	M4	15	5	M6	160	9050	1	0.2	1.5
		51											205	8800	1.2	0.3	2

Tightening torques for mounting screws page 10.

1 Nm = 8.85 in lbs

Temperature range: -30˚ to +100° C (3,6 F to 237 F), peaks up to 120°C (270 F).

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

Backlash: Absolutely backlash-free due to frictional clamp connection.

Tolerance: On the hub/shaft connection 0.01 to 0.05 mm.

Service life: These coupling have an infinite life, and are maintenance-free if the technical limits are not exceeded.

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

Ordering example:

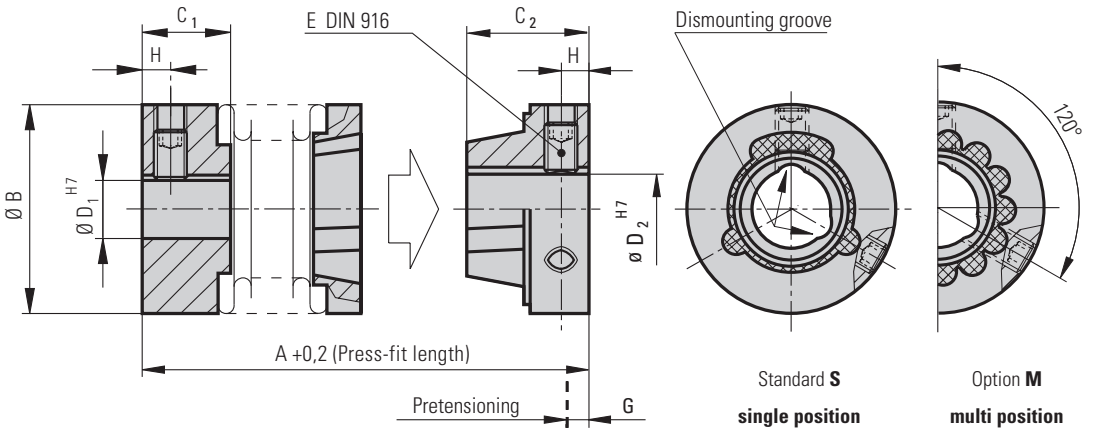
MK3 /20 / 36 / 6 / 12 / xx

- MK3 — Model
- /20 — Series / Nm
- / 36 — Overall length
- / 6 — Ø D1 H7
- / 12 — Ø D2 f7
- / xx — Non standard

NEW!

optional stainless steel

Model MK 4 — Press-fit precision metal bellows couplings



PROPERTIES:

- electrically insulated
- no wear
- easy mounting and dismounting
- absolutely backlash-free and torsionally rigid
- low moment of inertia
- compensates for 3-axis of misalignment

Material:

Bellows made of highly flexible high-grade stainless steel; clamping hubs and tapered segment on bellows face from aluminium. Tapered segment on the hub face: glass-fiber reinforced plastic sprayed onto an aluminium hub.

Design:

Both hubs have radial set screws and **integral dismounting grooves.** One hub incorporates a blind mate press-fit connection.

Technical specifications

Series	Rated torque (Nm)	Overall length without any pretensioning (mm)	Outer diameter (mm)	Fit length (mm)	Fit length (mm)	Special bores from Ø to Ø (mm)	Special bores from Ø to Ø (mm)	Standard bore H7 (mm)	Screws DIN 912 (mm)	Pretensioning approx. (mm)		Axial recovery force of coupling (N)	Mass moment of inertia (gcm^2)	Torsional stiffness (Nm/rad)			Max. values (mm)		
															axial		lateral		angular (degrees)
	T_{KN}	A	B	C_1	C_2	D_1	D_1	$D_{1/2}$	E	G	H		J_{ges}	C_T					
5	0.5	22	15	6.5	9	3-9	3-6.35	6	1xM3	0.4	2	5	2.0	280	0.4	0.15	1		
		25										3	2.2	210	0.5	0.2	1.5		
		28										2	2.5	170	0.6	0.25	2		
15	1.5	26	19	7.5	10	3-12	3-9	6	2xM3	0.5	2	4	5.5	750	0.5	0.15	1.5		
		31										3	6.0	700	0.7	0.2	1.5		
20	2	28	25	11	11	3-16	3-12.7	6/10	2xM4	0.5	2.5	3	21	1200	0.5	0.15	1.5		
		33										4	23	1300	0.6	0.2	1.5		
		37										3	25	1200	0.7	0.25	2		
45	4.5	39	32	13	14	6-22	6-16	10	2xM5	0.7	3.5	15	80	7000	0.7	0.2	1.5		
		47										10	85	5000	1	0.25	2		
100	10	46	40	15	16	6-28	6-20	10	2xM6	1	4	25	200	9050	1	0.2	1.5		
		56										30	210	8800	1.2	0.3	2		

Integrated dismounting groove from bore diameter 4 mm and larger.
Tightening torques for mounting screws page 10.

1 Nm = 8.85 in lbs

Temperature range: -30˚ to +100° C (3,6 F to 237 F), peaks up to 120°C (270 F).

Speeds: Up to 20,000 rpm

Backlash: When the coupling is properly pretentioned it is absolutely backlash-free and torsionally rigid.

Tolerance: On the hub/shaft connection 0.01 to 0.08 mm.

Service life: These couplings have an infinite life, and are maintenance-free if the technical limits are not exceeded.

Non-standard design applications: custom designs with varied tolerances, keyways, non-standard material and bellows are available upon request.

Ordering example:

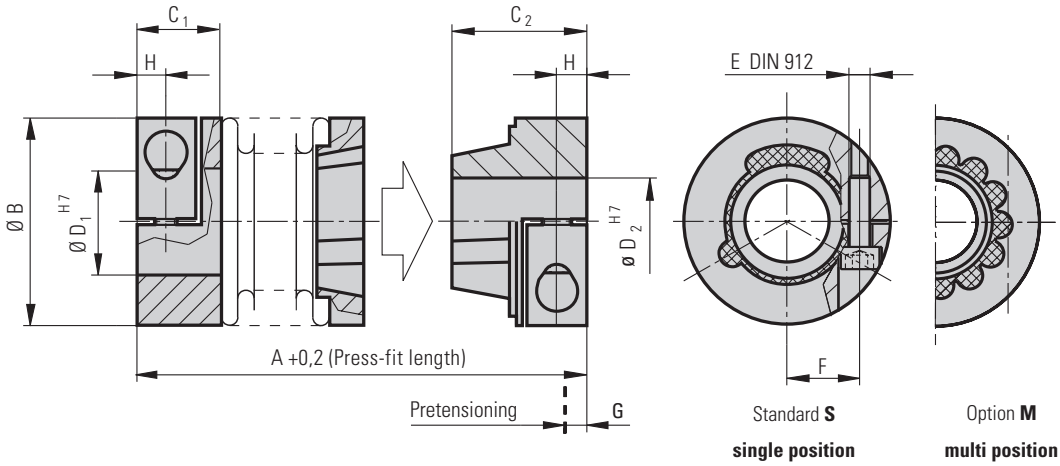
MK4 /20 / 37 / 8 / 10 / xx

- Model
- Series / Nm
- Overall length
- Ø D1 H7
- Ø D2 H7
- Non standard e.g. Option M

NEW!

optional stainless steel

Model MK 5 — Press-fit precision metal bellows couplings



PROPERTIES:

- electrically insulated
- no wear
- easy mounting and dismounting
- absolutely backlash-free and torsionally rigid
- low moment of inertia
- compensates for 3-axis of misalignment

Material:

Bellows made of highly flexible high-grade stainless steel, the clamping hubs and tapered segment on the bellows face are aluminium. Tapered segment on the hub face: glass-fiber reinforced plastic sprayed onto an aluminium hub.

Design:

Both clamping hubs with a DIN 912 screws.
On one side a clamping hub with a backlash-free, blind mate press-fit connection

Technical specifications

Series	Rated torque (Nm)	Overall length without any pretensioning +0,2 (mm)	Outer diameter (mm)	Fit length (mm)	Fit length (mm)	Non-standard bore from Ø to Ø (mm)	Standard bore H7 (mm)	Screws DIN 912	Distance between centers (mm)	Pretensioning approx. (mm)	Axial recovery force of coupling (N)	Mass moment of inertia (gcm^2)	Torsional stiffness (Nm/rad)			
														Max. values		
	T_{KN}	A	B	C_1	C_2	$D_{1/2}$	$D_{1/2}$	E	F	G	H		J_{ges}	C_T	axial	lateral (mm)	angular (degrees)
5	0.5	27	15	9	12	3-6.35	6	M2	4.5	0.4	3	5	3.0	280	0.4	0.15	1
		30										3	3.2	210	0.5	0.2	1.5
		33										2	3.5	170	0.6	0.25	2
15	1.5	34	19	11	14	3-7	6	M2.5	6	0.5	3.5	4	9.0	750	0.5	0.15	1.5
		39										3	10	700	0.7	0.2	1.5
20	2	37	25	13	16	3-12.7	6/10	M3	8	0.5	4	3	28	1200	0.5	0.15	1.5
		43										4	30	1300	0.6	0.2	1.5
		46										3	33	1200	0.7	0.25	2
45	4.5	49	32	16	20	5-16	10	M4	10	0.7	5	15	110	7000	0.7	0.2	1.5
		57										10	120	5000	1	0.25	2
100	10	55	40	16	21.5	5-20	10	M4	15	1	5	25	220	9050	1	0.2	1.5
		65										30	230	8800	1.2	0.3	2

Tightening torques for mounting screws page 10.

1 Nm = 8.85 in lbs

Temperature range: -30° to +100° C (3,6 F to 237 F), peaks up to 120°C (270 F).

Speeds: Up to 10,000 rpm, over 10,000 rpm with balanced version.

Backlash: When the coupling is properly pretentioned it is absolutely backlash-free and torsionally rigid.

Tolerance: On the hub/shaft connection 0.01 to 0.05 mm.

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

Non-standard design applications: custom designs with varied tolerances, keyways, non-standard material and bellows are available upon request.

Ordering example:

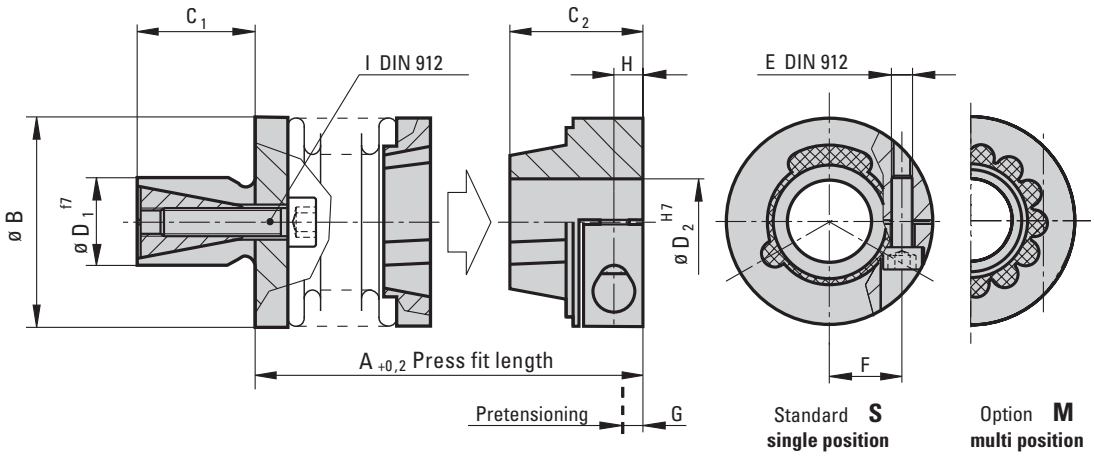
MK5 /20 / 37 / 6 / 10 / xx

- Model
- Series / Nm
- Overall length
- Ø D1 H7
- Ø D2 H7
- Non standard e.g. Option M

NEW!

Model MK 6 — Press-fit precision metal bellows couplings

optional stainless steel



PROPERTIES:

- electrically insulated
- self-adjusting
- no wear
- easy mounting and dismounting
- blacklash-free and torsionally rigid
- low moment of inertia
- compensates for 3-axis of misalignment

Material:

Bellows made of highly flexible high-grade stainless steel, clamping hub from aluminium. Expanding hub and cone (steel)

Design:

On one side an expanding shaft with tapered clamping element
On one side a clamping hub with a backlash-free, blind mate press-fit connection (glass-fiber reinforced plastic)

Technical specifications

Series	Rated torque (Nm)	Length without pretensioning (mm)	Outer diameter (mm)	Shaft length (mm)	Standard shaft Ø f7 (mm)	Fit length (mm)	Special bores from Ø to Ø (mm)	Standard bore H7 (mm)	DIN 912 screws (mm)	Distance between centers (mm)	Pretensioning approx. (mm)	DIN 912 screws (mm)	Axial recovery force (N)	Mass moment of inertia (gcm²)	Torsional stiffness (Nm/rad)	lateral (mm)	angular (degrees)
	T_{KN}	A	B	C_1	D_1	C_2	D_2	D_2	E	F	G	H	I		J_{total}	C_T	Max. values	
5	0.5	21	15	10	8	12	3-6.35	6	M2	4.5	0.4	3	M3	5	3.0	280	0.15	1
		24												3	3.2	210	0.2	1.5
		27												2	3.5	170	0.25	2
15	1.5	27	19	12	10	14	3-7	6	M2.5	6	0.5	3.5	M4	4	9.0	750	0.15	1.5
		32												3	10	700	0.2	1.5
20	2	28	25	12	12	16	3-12.7	6/10	M3	8	0.5	4	M4	3	28	1200	0.15	1.5
		34												4	30	1300	0.2	1.5
		38												3	33	1200	0.25	2
45	4.5	38	32	15	14	20	5-16	10	M4	10	0.7	5	M5	15	110	7000	0.2	1.5
		46												10	120	5000	0.25	2
100	10	45	40	20	16	21.5	5-20	10	M4	15	1	5	M6	25	220	9050	0.2	1.5
		55												30	230	8800	0.3	2

Tightening torques for mounting screws page 10.

1 Nm = 8.85 in lbs

Temperature range: -30° to +100° C (3,6 F to 237 F), peaks up to 120°C (270 F).

Speeds: Up to 10.000 rpm, in excess of 10.000 rpm with balanced version.

Backlash: When the coupling is properly pretentioned it is absolutely backlash-free and torsionally rigid.

Tolerance: On the hub/shaft connection 0.01 bis 0.05 mm.

Service life: These couplings have an infinite life, and are maintenance-free if the technical limits are not exceeded.

Non-standard design applications: custom designs with varied tolerances, keyways, non-standard material and bellows are available upon request.

Ordering example:

MK6 /20 / 28 / 12 / 12 / xx

- Model
- Series
- Overall length (mm)
- Shaft Ø D1 f7
- Bore Ø D2 H7
- non standard e.g. Option M

Assembly instructions

Areas of application
R+W couplings are designed and manufactured to guarantee high precision. They provide backlash free transmission of angular motion and torque which are particular useful in closed loop control applications.

The coupling hubs are bored and assembled concentrically eliminating any residual restoring forces. This manufacturing and assembly technique also guarantees the quietest and truest transmission of angular motion critical for optical encoders and pulse generators.

Tightening torque for the mounting screws (Nm)

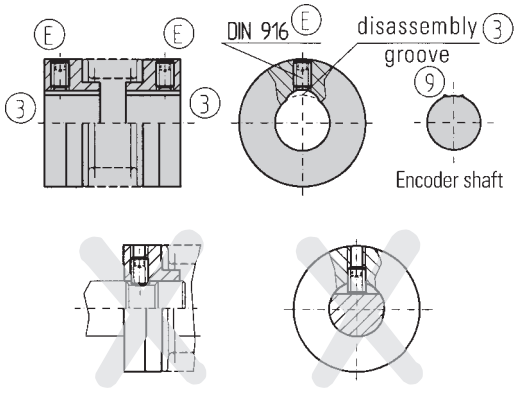
Model / Series	Coupling hub						Expanding shaft
	MK1	MK2	MK3	MK4	MK5	MK6	MK3 / MK6
0.5	0.35						
1	0.75						
5	1.3	0.43	0.43	1.3	0.43	0.43	1.5
10	1.3	0.43	0.43				1.5
15	1.3	0.85	0.85	1.3	0.85	0.85	3
20	2.5	2	2.3	2.5	2.3	2.3	4
45	4	3.5	3.5	4	3.5	3.5	6.5
100	6	4.5	4.5	6	4.5	4.5	11

Assembly preparation

During assembly and disassembly the bellow can only be stretched or deformed by 1.5 times the stated catalog values. The shafts and couplings bores must be clean and free of burrs, nicks, and deformations. Double check the shaft and bore dimensions and tolerances to ensure a proper fit. R+W couplings are bored to an ISO H7 tolerance. The clearance between the expanding shaft of the MK3 und MK6 and the bore should be no more than 0.01 to 0.05 mm to ensure a proper fit and clamping strength. A slight film of oil on the expanding shaft will aid in the assembly and disassembly of the coupling without compromising the strength of the coupling.

Important! "Oil and grease with molybdenum disulfide or ohter high pressure additives, as well as slide grease, must not be used."

Set Screw mounting instructions for models MK1 and MK4



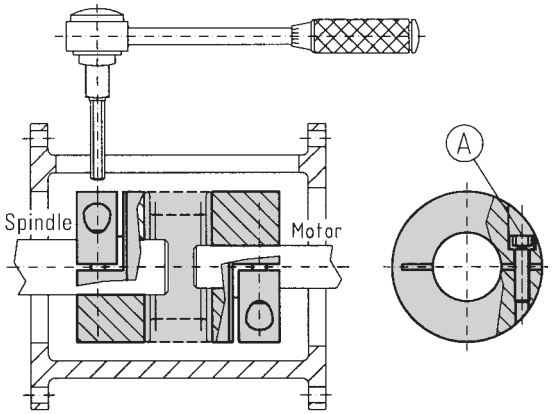
A set screw groove or flat are not necessary

Assembly:
Slide the coupling onto the shaft of the drive element and position it in place. Tighten the set screw (E) using a torque wrench to the proper torque value listed in the table above. Slide the shaft of the driven element (an encoder for example) into the coupling bore to its proper position. Tighten the second set screw (E) using a torque wrench to the proper torque value.
Series 1 - 10: 1 set screw per hub
Series 15 - 100: 2 set screws per hub set 120 degree apart

Disassembly:
Disassembly is very easy with R+W coupling. Simply loosen the set screw (E) and slide the coupling off the shaft. R+W has incorporated a disassembly groove (3) into the coupling design so that clearance is provided fot the set screw "burr" (9).

Assembly instruction Model MK

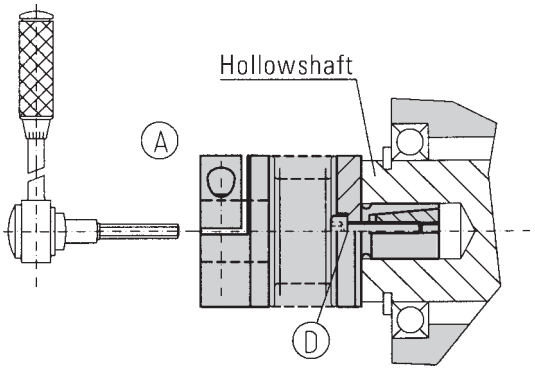
Single screw clamping hub design, Model MK 2 / MK 5 / Ecoflex



Assembly:
Slide the coupling onto the drive element (a motor for example) to the proper axial position. Using a torque wrench tighten the mounting screw (A) to the proper tightening torque listed in the table on the previous page. Slide the driven element (a spindle or encoder for example) into the coupling to it's proper axial position and tighten the mouning screw using the same procedure as before.

Disassembly:
Simply loosen the mounting screws (A) and remove the coupling.

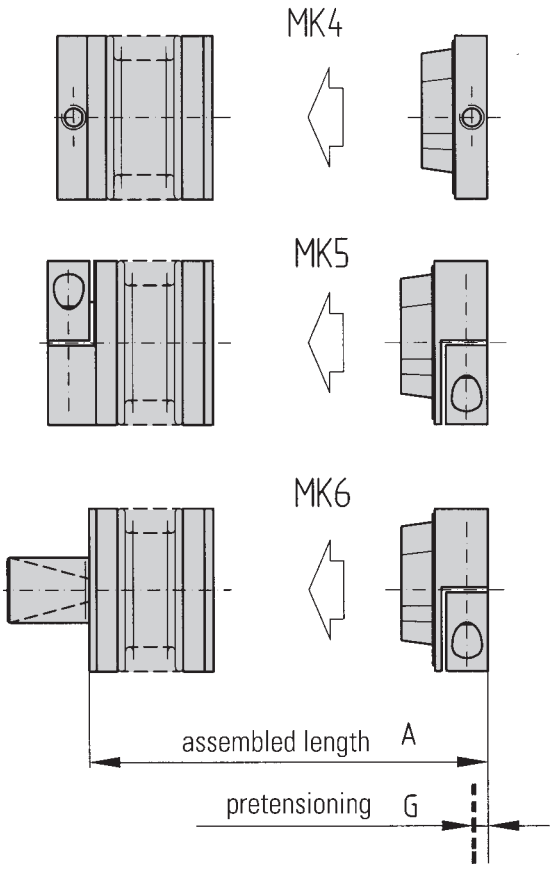
Expanding shaft design, Model MK 3 / MK 6

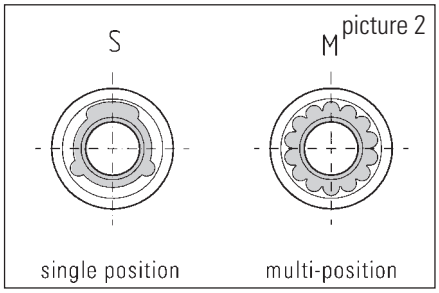


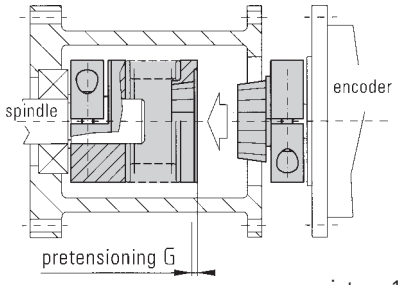
Assembly:
Completely insert the expanding shaft of the coupling into the shaft hollow bore until it seats. Using a torque wrench tighten the mounting screw (D) to the proper torque value listid in the table on the previous page. Insert the shaft into the other end of the coupling to its proper position. Tighten mouning screw (a) to the proper torque value with a torque wrench.

Disassembly:
Simply loosen the mounting screws (a) and (d) and remove the coupling. The expanding shaft connection can be loosened by partially unscrewing mounting screw (D) and applying axial pressure to it.

Pretensioning of the press-fit coupling design, Model MK4 / MK 5 / MK 6







picture 1

Assembly
Important! It is extremely important that the overall length of the assembled coupling be noted and taken into consideration in the assembly process. Models MK 4, MK 5 and MK 6 are blind mate press-fit couplings. They will provide absolute backlash free operation only if they are properly **pretensioned** in the assembly process. Mount the female segment of the coupling onto the driven element. Next loosely mount the male segment onto the drive element so that it slides with friciton on the shaft. Mount the drive element onto the coupling flange (picture 1). Remove the drive element from the flange and note the position of the male coupling segment. Slide the male coupling segment towards the female segment by the distance (G) (Pre-tension distance) and tighten the mounting screws. Proper torque values are given in the table on the previous page. Two versions of the blind mate coupling are available, the single position and the multi position (picture 2).

ECOFLEX®: Quality can't be better!

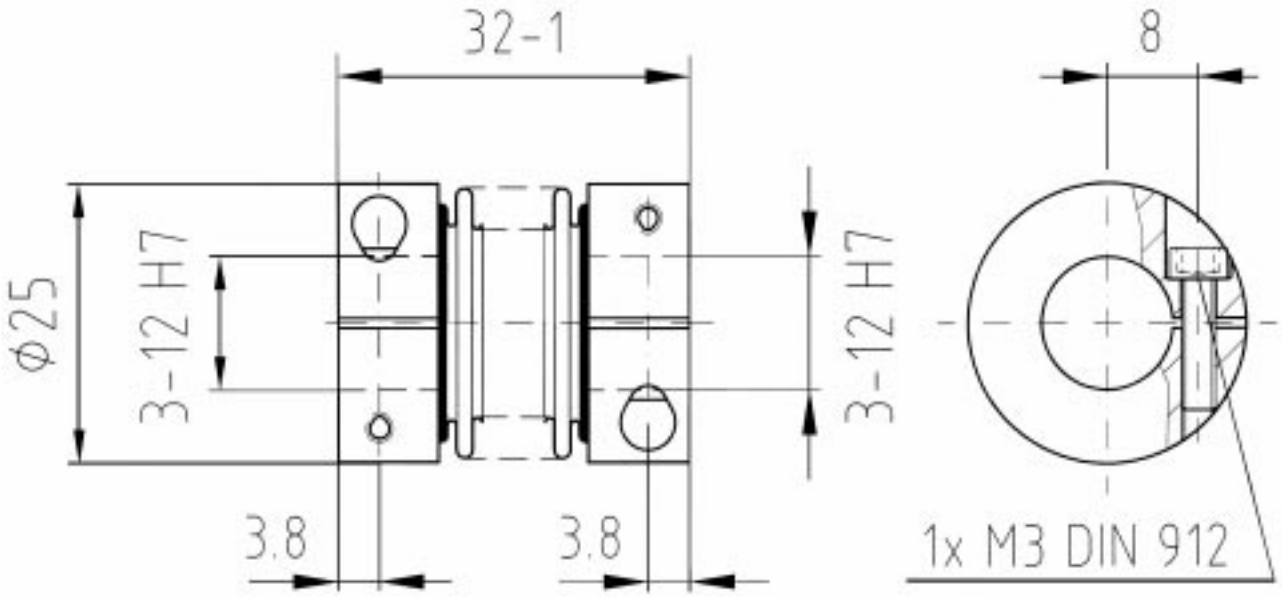
Prices, that move!

The miniature coupling that sets a good standard for shaft encoders, potentiometers, stepping motors, and small servo drives.

R+W Antriebselemente GmbH
Alexander-Wiegand-Straße 8, 63911 Klingenberg
Phone: +49-93 72-98 64-0 Fax: +49-93 72-98 64-20
E-Mail: info@rw-antriebselemente.de
Internet: www.rw-antriebselemente.de

R+W®
COUPLING TECHNOLOGY

ECOFLEX®: The low priced alternative for Encoder, Potentiometer, Steppermotors and small Servodrives.



- backlash-free and torsionall stiff
- rated torque: 3 Nm
- temperature range: -40° bis 170° degree
- bore diameters:
  3 / 4 / 5 / 6 / 6,35 / 8 / 9 / 9,53 / 10 / 12 mm

- Compensation of:

  lateral misalignment up to 0.2mm
  axail misalignment up to 1 mm
  angular misalignment up to 2° degree

Fax back and profit from ECOFLEX®:
+49-9372-9864-20

☐ Please send us a quotation of _____ pieces ECOFLEX miniture couplings with bore diameter D1_____, D2_____.

Send us more information about R+W products

☐ Bellow couplings ☐ Torque limiters

☐ Elastomer couplings ☐ Miniature couplings

☐ Please call back

Company

Name Department

Street Town

Phone/Fax E-Mail

Date Signature

R+W Antriebselemente GmbH
Alexander-Wiegand-Straße 8, 63911 Klingenberg
Phone: +49-93 72-98 64-0 Fax: +49-93 72-98 64-20
E-Mail: info@rw-antriebselemente.de
Internet: www.rw-antriebselemente.de

R+W® COUPLING TECHNOLOGY

The R+W product range

Experience and Know-how for your special requirements.

TORQUE LIMITERS
Series SK

From 0.1 – 2,500 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

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

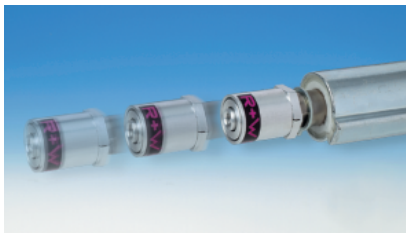
From 0.05 – 10 Nm
Bore diameters 1 – 28 mm
Single piece or press-fit design

SERVO-INSERT-COUPLINGS
SERVOMAX
Series EK

From 10 – 1,100 Nm
Shaft diameters 5 – 60 mm
backlash-free, press-fit design

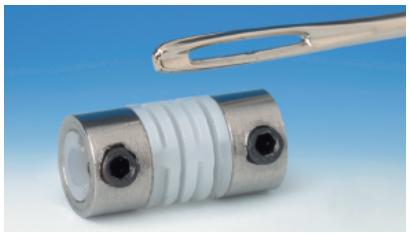
LINEAR COUPLINGS
Series LK

From 70 – 800 N
Thread M5 – M12



POLYAMID COUPLINGS
MIKROFLEX
Series FK 1

Rated torque 1 Ncm
Bore diameters 1 – 1.5 mm



ISO 9001 APPROVED

TGA-ZQ-031/95-00
Registrierungs-Nr. 9605022

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.rw-couplings.com

R+W®
COUPLING TECHNOLOGY

260/02/02/3000