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 $S_A = 2\text{-}3$ 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)

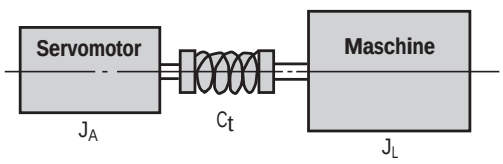
According to resonance frequency

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)

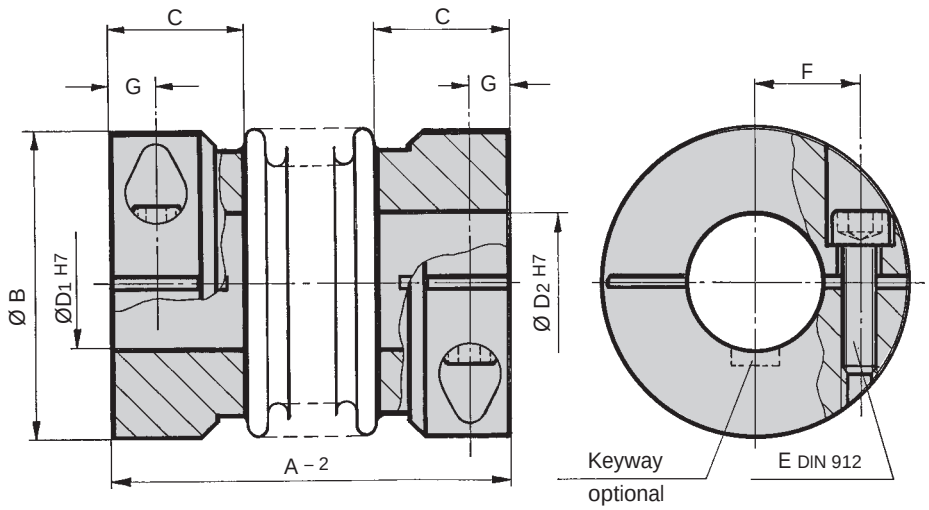
According to torsional stiffness:

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 axial (10^3 Nm/rad)	Max. values lateral (mm)	C_a axial spring stiffness (mm)	C_r 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

BKL /150 / 32 / 35 / xx

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

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

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