

Servo Couplings  
Safety Couplings



## The company JAKOB

**JAKOB Antriebstechnik GmbH** is an internationally leading manufacturer of servo couplings, safety couplings, and mechanical clamping elements.

For more than 40 years JAKOB has been developing and producing various types of torsionally stiff metal bellows couplings and safety couplings for the servo drive industry. Throughout our history we have earned ourselves a reputation of being a reliable and competent partner in the motion and drive industry.

JAKOB is the market leader in the area of mechanical tool and component clamping with its innovative and unique clamping technology.

The JAKOB wedge clamping technology provides the highest clamping forces with low actuation torques and, at the same time, maximum operational safety.

The goal of our servo and safety coupling catalog is to provide a general overview over our standard product range. More detailed information can be obtained at our homepage [www.jakobantriebstechnik.de](http://www.jakobantriebstechnik.de).

Highly trained engineers and technicians at our facility in Kleinwallstadt are always ready with a solution to best meet your requirements.



2D drawings in DXF format or 3D-models in STEP format are available for download at the corresponding site of our homepage. For special dimensions or different drawing types please contact JAKOB. Our other catalogs are also available upon request.

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All technical details are subject to change. For the most up-to-date data sheets, please check our website.



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## Elastomer Couplings

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- EKM** // plug-in // backlash-free // oscillation dampening  
 // different shore hardnesses // with radial clamping hub  
 // cost-effective standard series

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- ESM-A** // with conical hub on both sides  
 // rotational symmetry // high-speed

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**further series**

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## Miniature Couplings



- MKM** // miniature metal bellows coupling // standard series with radial clamping hub  
 // temperature range: -40°C to +300°C

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- MKP** // miniature metal bellows coupling // short design  
 // with radial clamping hub // temperature range: -40°C to +300°C

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- MKA** // miniature metal bellows coupling // cost-effective version with set screws  
 // temperature range: -20°C to +150°C

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- MJT/  
MJT-C** // miniature elastomer coupling  
 // MJT-C: with radial clamping hub // MJT: with set screws  
 // temperature range: -20°C to +70°C

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- MOH  
MOH-C** // miniature oldham-type coupling // temperature range: -20°C to +100°C  
 // MOH-C: with radial clamping hub // MOH: with set screws  
 // compensation of radial shaft misalignment

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## Distance Couplings



- WDS** // variable length between 0.2 and 6 m // simple installation  
 // split-hub design // high-speed  
 // temperature range: -40°C to +300°C

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- WDE** // variable length up to 3 m  
 // simple installation // split-hub design  
 // cost-effective version with reduced operational parameters

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- EKZ** // variable length up to 3 m  
 // simple installation // plug-in // backlash-free  
 // oscillation dampening // stainless version available

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# Safety Couplings I Contents

## Safety Couplings – Indirect Drives

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**SKB** // simple installation with clamping ring hub // for high axial and radial load  
// excellent run-out accuracy // ball-bearing-mounted

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**SKY** // with conical clamping hub // ball-bearing-mounted  
// small shaft diameters // excellent run-out accuracy

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**SKW** // easy keyway connection // ball-bearing-mounted  
// low-cost version

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**SKX-L** // with slide bearing // with small centric diameter of small size pulleys  
// simple installation with clamping ring hub

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**SKG** // with conical clamping hub // ball-bearing-mounted  
// optimal system integration // compact attachment

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## Safety Couplings – Direct Drives



**SKB-KP** // with bellows attachment // simple installation  
// with radial clamping hub on both sides

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**SKY-KS** // with bellows attachment // small shaft diameters  
// with conical clamping hub on both sides // high speed

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**SKB-EK** // with elastomer attachment // plug in // simple installation  
// with radial clamping hub on both sides

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**SKY-ES** // with elastomer attachment // small shaft diameters  
// with conical clamping hub on both sides // high speed

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# Servo Couplings I General

## Definition - Servo Couplings:

Servo couplings are compensating couplings with a backlash free and conformal torque transfer providing high torsional stiffness and a low moment of inertia.

According to these requirements, JAKOB metal bellows couplings can be regarded as the ideal solution. For more than 40 years, they have proven themselves in numerous servo drives as an excellent choice. Elastomer couplings with a flexible polyurethane spider can also represent a perfect alternative for different applications because of their product-specific advantages.

All JAKOB servo couplings are backlash-free and flexible to allow for compensation of shaft misalignments. Because of the unique characteristics of the different series, the designer will most likely find the best solution within the large-scale JAKOB coupling program. The area of application ranges from highly dynamic feed drives of the axes in machine tools to high performance drives in machine tool design.

## Characteristics - JAKOB Servo Couplings:

- /// absolutely backlash-free, precise torque transfer
- /// low moment of inertia // high balancing quality
- /// excellent operational characteristics // high speed
- /// compensation of shaft misalignments // low restoring forces
- /// frictional, easy-to-fit shaft-hub-connection
- /// metal bellows: max. torsional stiffness, wear-free, up to 350°C
- /// elastomer spider: plug-in, oscillation dampening, up to 120°C
- /// compact dimensions, flexible areas of applications
- /// large number of types and sizes available (modular system)
- /// precise production // best quality // long life

## The JAKOB Modular System:

As flexible compensating parts, stainless steel bellows are used in different forms as well as polyurethane spiders with different shore hardnesses, oldham-type spacer as polyacetal and stainless steel membrane hubs. Another important aspect is the kind of connection between the drive shafts or the primary shafts and the coupling hubs. Several versions of backlash-free frictional clamping hubs or conical hubs are available.

In this catalog, the most important and widely used series of compensating elements and kinds of hubs, derived from the numerous possibilities of combinations, are described. A well-contrived modular system, which provides multiple uses for many parts, enables production in cost-effective batch sizes and very short delivery periods.

## The JAKOB coupling program is divided into the following four main groups:

- /// metal bellows couplings
- /// elastomer couplings
- /// miniature couplings
- /// distance couplings

*For decades, the center of the JAKOB coupling program has been a large variety of different metal bellows couplings.*



# Safety Couplings I General

## Definition – Safety Couplings:

Due to the constantly increasing automation and dynamics of modern work processes, the devices which protect the complex and expensive units against damages in case of errors are becoming more important. JAKOB safety couplings reduce expensive machine damages, repairs and downtime by acting as torque limiters and overload protection absolutely reliably. JAKOB safety couplings are the life insurance for your machines, no matter whether the error occurs due to incorrect operation, programming error, material overload or tool breakage.

JAKOB safety couplings are the result of decades of continuous research and development as well as the experience gained from numerous different applications worldwide.

Unique design aspects, high-quality materials, precision machining of the individual components are some of the factors which make JAKOB couplings some of the leading couplings today. The safety couplings are used in all areas of the machine tool industry, ranging from critical servo drive applications to overload protection in conveyor systems.

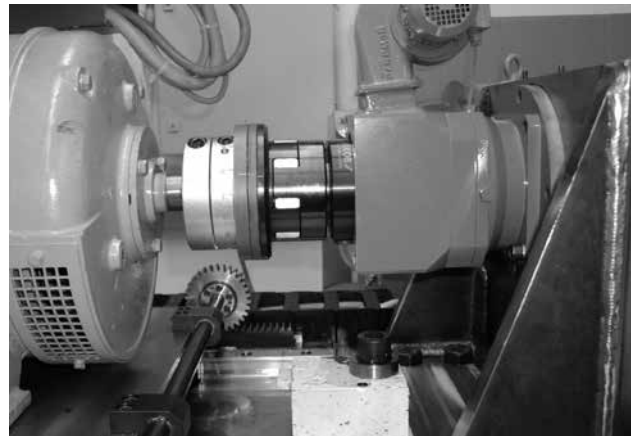
## Performance Characteristics – JAKOB Safety Couplings:

- ✓ optimal overload and crash protection
- ✓ backlash-free, precise torque transfer
- ✓ stepless disengagement torque adjustment
- ✓ fixed point reengagement (360° synchronised position)
- ✓ automatic reengaging (optional feature)
- ✓ degressive spring characteristic ✓ precise disengagement function
- ✓ excellent dynamic functional characteristics
- ✓ low moments of inertia ✓ high-speed
- ✓ large selection of types (modular system)
- ✓ integral fitting of pulleys or gear wheels
- ✓ stop-signal (emergency stop) by use of a proximity switch

## Application examples:



*Collision protection of a drive spindle with safety coupling series SKB-K with bellows attachment*



*Safety coupling series SKB-E with elastomer attachment for overload protection of a planetary gearbox*

# Couplings I Dimensioning

## Technical Information - Definitions / Details:

### Nominal torque of the coupling: $T_N$ - [Nm]

The nominal torque of the coupling defines the max. load of the prolonged alternating-stress strength. If in normal operation,  $T_N$  is not exceeded, an infinite number of operation cycles can be carried out (see d „durability“).

### Moment of inertia: $J_K$ - [ $10^{-3}$ kgm<sup>2</sup>]

The values for the moment of inertia are defined for medium hub-bores in the given diameter range  $D_{min}/D_{max}$ . Conversion: [kgcm<sup>2</sup>] = [ $10^{-4}$ kgm<sup>2</sup>]

### Torsional stiffness: $C_{TK}$ - [Nm/arc min]

The values for the specific torsional stiffness of all couplings are converted from the existing values [103 Nm/rad] to “Newton meter per angular minute”. This enables the constructor to determine the torsion angle failure quite easily (see b below) under consideration of the operating torque. 60 angular minutes (resp. arc minutes) correspond to one angular degree. This defines the conversion factor 1 rad = 57,3° = 3438 arcmin.

Conversion: [103Nm/rad = 0,291 Nm/arcmin] resp. [1Nm/arcmin = 3438 Nm/rad=3,44 kNm/rad]

Example: Size KM 170: 17,5 Nm/arcmin= 60 kNm/rad

### Max. misalignment of shafts: [mm]

The maximum misalignment of shafts is the largest allowed misalignment between drive and output shaft, which results from the calculation of the prolonged alternating-stress strength for compensating elements. If the allowed misalignment values are not exceeded, an infinite number of load alternations can be carried out. In exceptional cases (e.g. during fixing) particularly at reduced numbers of load alternations, the misalignment values may be considerably higher (please contact for further consultation).

- /// axial misalignment: usually without problems (expansion due to temperature)
- /// angular misalignment: usually without problems - allowed max. value: 1 to 2 degrees
- /// lateral or parallel misalignment: If the admissible values are considerably exceeded, permanent distortion at the bellows and higher wear of the elastomer spider can occur. Special care must be taken during fitting!

### Spring stiffness - axial / lateral: [N/mm]

Restoring forces of metal bellows or elastomer spiders, caused by shaft misalignments.

## Dimensioning of the coupling

### a) according to torque:

Usually, the size of the coupling is chosen according to the required torque. For exact determination of the necessary drive torque, difficult calculations are necessary (see formularies). If the size of the motor is fixed, the necessary nominal torque of the coupling  $T_{KN}$  can be calculated as follows:

$$T_N > 1,25 \cdot T_A \max \cdot i$$

$T_A \max$  = peak torque of the motor  
 $i$  = transmission / reduction of the toothed belt drive or the spur-toothed wheel

### b) according to torsional stiffness:

For applications with very precise requirements (position control, transmitter), transfer errors due to high elastic deformation can be an important criterion for selection of the coupling. The torsional angle “ $\alpha T$ ” is calculated as follows:

$$\alpha T = \frac{T_A}{C_{TK}}$$

[arc minutes] with  $T_A$ = drive torque [Nm] /  $C_{TK}$ = torsional stiffness of the coupling [Nm/arcmin]

Very seldomly, metal bellows couplings may have resonance sounds (e.g. a whistling or a humming), when coupling types with a higher torsional stiffness or vibration reducing elastomer couplings are recommended.



# Couplings I Dimensioning

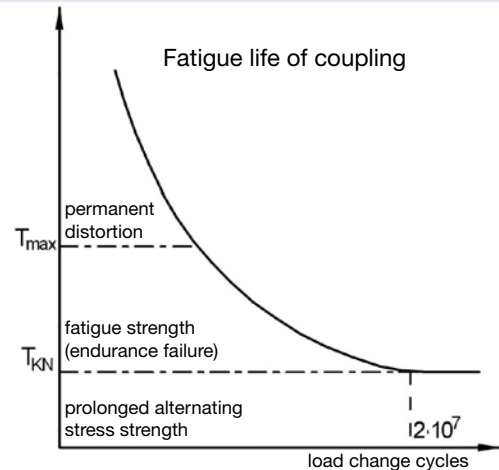
## c) according to shaft diameter:

After selecting the coupling type, it must be checked whether the requested shaft diameter corresponds with the allowed diameter ( $D_{min}$  /  $D_{max}$ ) of the hub bores. Another coupling type or size must be chosen, if the shaft diameter is overdimensioned in relation to the torque, which means it is larger than  $D_{max}$  of the hub.

note: hub bores which are smaller than “ $D_{min}$ ” are possible, but an optimal transfer of the nominal torque cannot be guaranteed in this case, so a reduction of the drive torque is necessary.

## d) durability:

The durability of JAKOB compensating couplings is basically determined by the peak torque and the existing shaft misalignment. If the admissible maximum values for the axial, lateral and angular misalignment are not exceeded and the operating torque is below the nominal torque  $T_{KN}$ , then the coupling is within the range of fatigue limit. An infinite number of start-stop-cycles or accelerations and decelerations can be carried out without having to expect a breakdown of the coupling during operation.

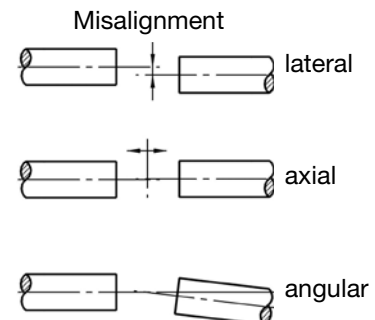


## e) max. load:

In special cases, the couplings (metal bellow, elastomer spider) can be overloaded for a short time with twice the nominal torque ( $2 \times T_{KN}$ ). The shaft-hub-connection, however, must then be calculated separately.

## f) bearing load:

Due to the flexibility of the compensating couplings in all directions, considerable bearing loads are prevented, in spite of possible axial, lateral or angular misalignment from drive to output shaft. Therefore, an early breakdown or higher wear of the rolling bearing can be prevented. This means less difficult and expensive repairs.



## g) operating temperatures:

Metal bellows couplings are, as whole metal couplings, extremely insensitive to temperature and can be used at temperatures up to 300°C without limitations. The temperature limits of the elastomer spider are at 90°C (98 Sh-A) and 120°C (72 Sh-D). At high operating temperatures, an appropriate correction factor needs to be applied.

## h) speeds:

Due to precision machining, the rotation symmetry, and the additional balance pin, the compensating couplings are generally suitable for high speeds up to 20,000  $\text{min}^{-1}$  even without additional balancing. The standard balancing quality is approx. Q6.3 to Q16. Couplings with conical hubs or hubs with tapered ring can be operated with speeds of over 25,000  $\text{min}^{-1}$  (please contact us for further information). The low moment of inertia also has a positive effect.

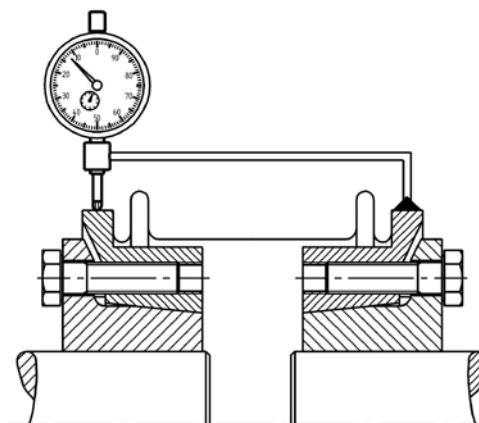
## i) maintenance and wear:

Compensating couplings are maintenance and wear free under normal conditions. The polyurethane spiders of the elastomer couplings should be changed in suitable periods, if critical operation parameters are given.

# Couplings I Installation Instructions

## Alignment of shafts:

Axial and angle misalignment are usually without problems and also simple to measure. To obtain the lateral misalignment, it is recommended to proceed as follows: Fit a dial gauge with an appropriate holding device on one shaft end or on one hub of the coupling and bring the feeler onto the second shaft end or onto the second coupling half (sketch). Now the shafts are turned with the dial gauge and the deflection is read. One half of the total deflection is the lateral misalignment. The admissible value for the shaft misalignments must be taken from the technical data sheets of the appropriate series.



## Shaft-hub connection

The couplings are generally supplied with finished bores, in exceptional cases they are also supplied prebored. The seat shaft / hub is to be selected as a transitional seat (example: hub bore diameter 28 G6 - shaft diameter 28 k6). Prior to mounting, the finished bore shaft end conical sleeve should be oiled to prevent fretting corrosion. The coupling is then ready for assembly between the two shafts. An existing keyway in the shaft will not affect the frictional connection.

### a) radial clamping hub

Admissible seat clearance shaft hub: **min. 0,01mm / max. 0,04mm**. Very simple fitting by tightening only one radially arranged clamping screw (DIN 912). The value for the relevant tightening torques can be found in the data sheets. One hole in the housing is sufficient to tighten the clamping screw (see EASY-clamp system).

### b) conical hub / conical ring hub

Admissible seat clearance shaft-hub: **max. 0,02 mm**. Assembly of the conical bush or of the conical clamping ring with several, concentrically arranged mounting screws (as a rule 6x DIN 933). One side of the coupling is fit onto the shaft end by evenly tightening the screws crosswise (to prevent uneven draw-on). The drive or output is now turned by a few revolutions, so that the shaft pinion turns in the second hub and the hub can move on the shaft for axial release. Now the six screws of the second hub are also evenly tightened.

### c) split-hub

Admissible seat clearance shaft-hub: **min. 0,01mm / max. 0,04mm**. Two radial clamping screws (DIN 912) are arranged oppositely. The hubs or couplings are split and consist of two loose halves. One of the split-hubs can be put onto the aligned shaft. Tighten clamping screws evenly, alternating between both sides (note specified tightening torques). A larger opening must be provided in the housing for easy installation.

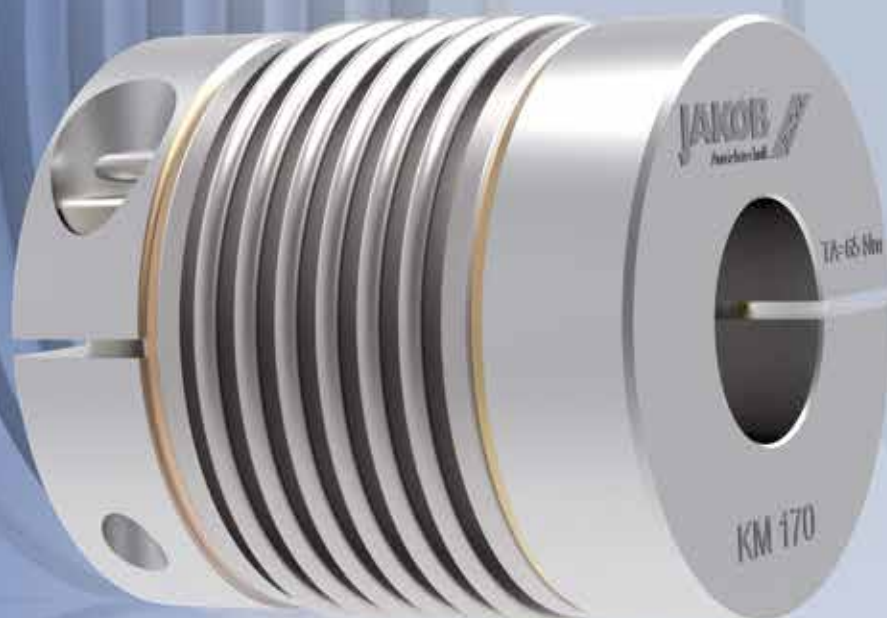
### d) disassembly

After releasing the six retaining screws, the hubs are released with three push-off threads each. In axially tight space conditions, it is advisable to screw in and secure the push-off-screws before fitting. For disassembly an opening in the housing should be provided. Disassembly of radial clamping hub: see EASY-clamp System page 7!

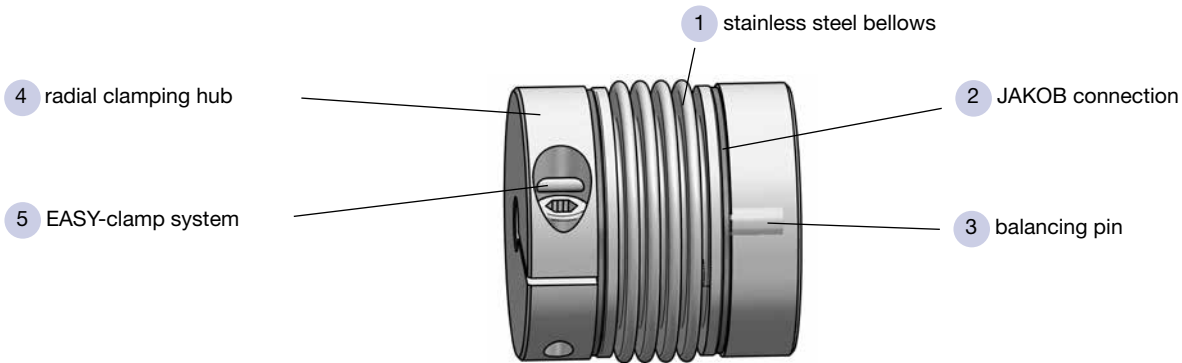
### e) special notes

- ✓ As the metal bellows consist of thin stainless steel sheeting, special care during fitting and disassembly is necessary. Damages to the bellows can render the coupling useless
- ✓ **hub bores which are smaller than "Dmin"** are possible, but an optimal transfer of the nominal torque cannot be guaranteed in this case
- ✓ at smaller shaft diameters, the conical hub (larger section thickness) is slotted additionally
- ✓ you will find further type specific technical details and characteristics in the data sheets

# Metalbalgkupplungen



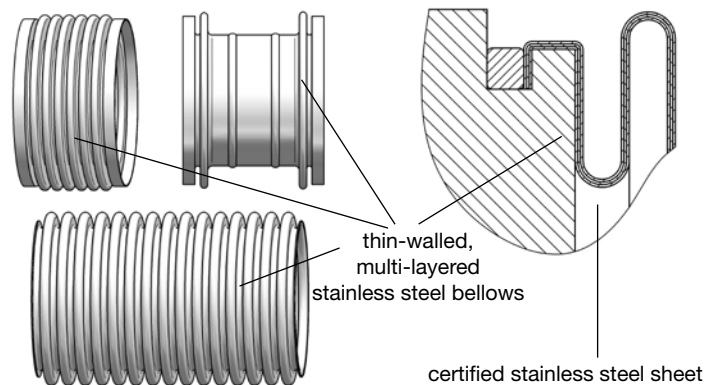
# Metal Bellows Servo Couplings | Technical Details



## 1. Stainless Steel Bellows

### advantages:

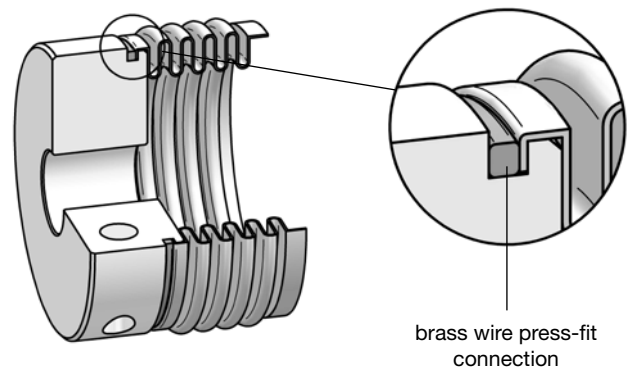
- ✓ absolutely backlash-free, precise torque transmission
- ✓ extremely high torsional stiffness
- ✓ high flexibility for compensation of shaft misalignments
- ✓ minimized moment of inertia
- ✓ maintenance and wear-free up to 300°C
- ✓ high-quality precision manufacture
- ✓ system modules with a multitude of different bellows variations
- ✓ maximized JAKOB-KNOW-HOW of the specific bellows dimensioning
- ✓ 100% final inspection



## 2. Connection Method

### advantages:

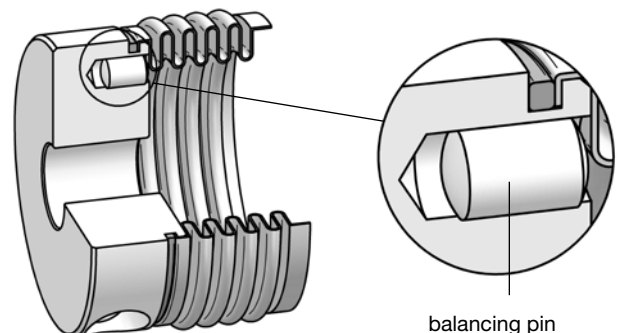
- ✓ JAKOB developed and patented the brass-wire press-fit method in 1974, which is the optimal, backlash-free connection of aluminum hubs with multi-layered stainless steel bellows. Alternatively, the steel or stainless steel hubs are connected to the metal bellows via plasma welding
- ✓ in contrast to glue connections, these methods are long-life and the torque is safely induced into the hubs



## 3. Balancing of the Hub

### advantages:

- ✓ the balancing pin ensures a standard balancing quality of Q16
- ✓ high speeds of up to 20.000 rpm
- ✓ smooth running to prevent oscillations
- ✓ can be specially balanced for balancing quality Q1 - Q2,5

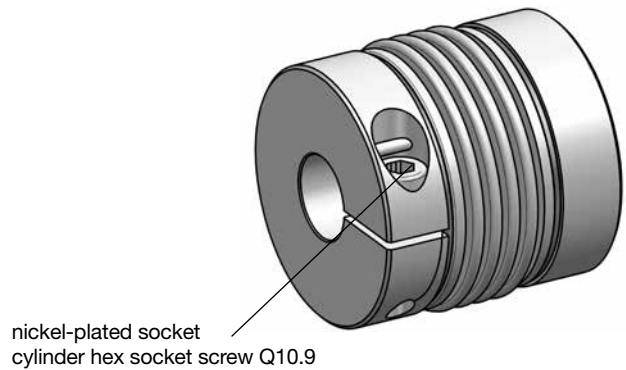


# Metal Bellows Servo Couplings | Technical Details

## 4. Radial Clamping Hub

### advantages:

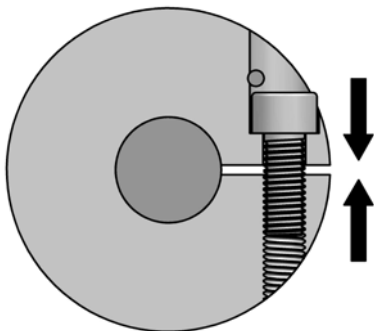
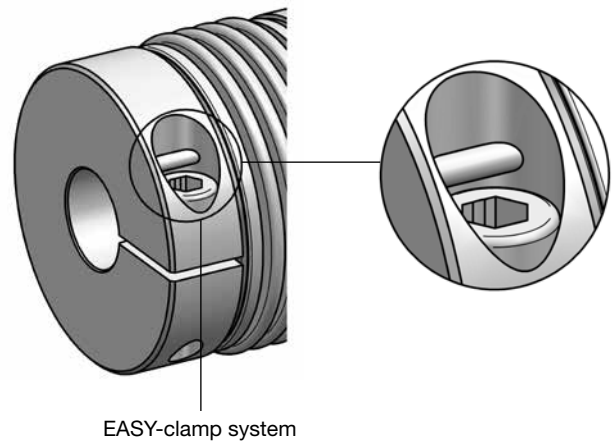
- /// clamping hub made from high-tensile aluminum
- /// simple radial fitting of shaft-hub-connection
- /// ensures the backlash-free, force-fitted transfer of the declared nominal torque value (no keyway necessary)
- /// minimized moment of inertia, low mass, stainless design
- /// short delivery time due to modularity system
- /// hub bores (D1/D2 standard tolerance G6); customization possible
- /// keyway possible on request



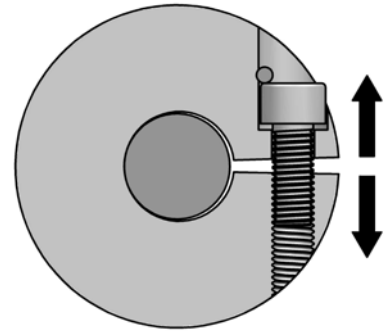
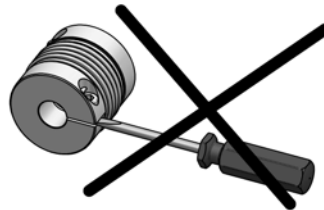
## 5. EASY-Clamp System

### advantages:

- /// revolution of coupling fitting
- /// no shortening or extension of bellows
- /// grave time saving, no reworking
- /// blind assembly possible, hole in bell housing is enough
- /// compensation of tolerance deviation of shaft-hub-fit
- /// no additional tools necessary
- /// no damage of hub bores and bellows at demounting of motor



The clamping hub is backlash-free and force-fitted with the shaft.

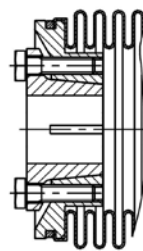


For assembly and disassembly, the hub has to be expanded elastically.

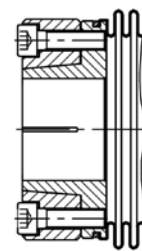
## 6. Conical Connection

### advantages:

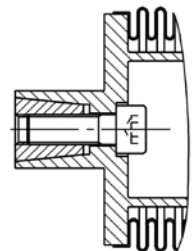
- /// through force amplification (wedge principal), a safe transmission of torque for smaller bore sizes (hub additionally sliced) can be guaranteed
- /// backlash- and maintenance-free, force-fitted
- /// no keyway necessary
- /// rotational symmetry, good balancing for high speed
- /// expanding conical hub for axial mounting in hollow shaft



conical clamping hub



conical ring hub



expanding conical hub

# Metal Bellows Coupling I Series KM

6-corrugation bellows simple installation with radial EASY-clamping hub low-cost standard series

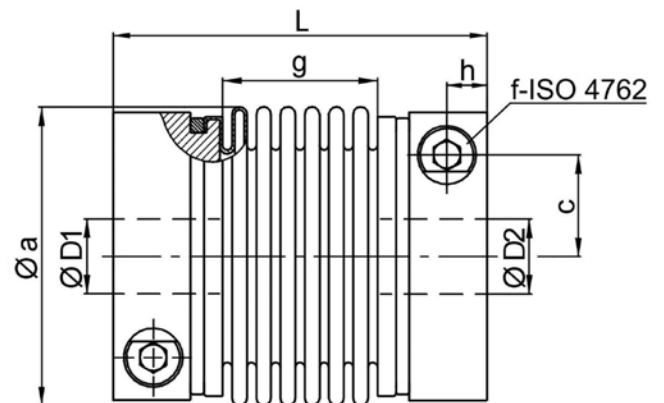
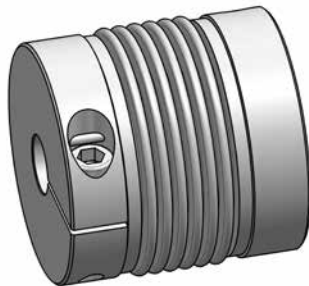
## technical data:

KM Size	T <sub>N</sub> [Nm]	moment of inertia [10 <sup>-3</sup> kgm <sup>2</sup> ]	torsional stiffness [Nm/arcmin]	max. shaft misalignment (mm)		axial spring rate [N/mm]	lateral spring rate [N/mm]	mass approx. [kg]	tightening torque of screws [Nm] (*)
smaller couplings from 0,4 Nm - 12 Nm see series MKM									
20	20	0,14	5,2	0,8	0,25	51	190	0,3	14
35	35	0,14	5,8	0,8	0,25	51	190	0,3	14
60	60	0,29	8,7	0,9	0,3	49	260	0,5	35 (30)*
80	80	0,79	14	1	0,3	45	280	0,8	65 (50)*
170	170	0,83	17	1	0,3	80	470	0,8	65 (50)*
270	270	2,2	32	1	0,3	70	450	1,4	115 (90)*
400	400	2,4	47	1	0,3	100	640	1,5	115 (90)*
600	600	5,3	67	1	0,3	100	980	2,4	180 (140)*
900	900	9	105	1	0,3	145	1000	3,3	180 (140)*
1300	1300	14	170	1	0,3	130	920	4,2	290 (240)*
1800	1800	15	260	1	0,3	250	1900	4,5	290 (240)*

(\*) note: reduced tightening torque for bigger hub bore diameter - see also Ø D 1/2max!

### material:

bellows: stainless steel  
hubs: high-tensile strength  
aluminum  
screws: ISO 4762 / 12.9  
temperature range: -40°C  
up to +300°C



Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

KM	Øa	c	f	g	h	L	L*	ØD1/2min	ØD1/2max
20	56	19	M 6	30	7,5	70	81	8	32 -
35	56	19	M 6	30	7,5	70	81	10	32 -
60	66	22	M 8	33	8,5	77	87	13	28 (35)
80	82	28,5	M 10	38	10,5	90	102	16	35 (43)
170	82	28,5	M 10	40	10,5	92	104	18	35 (43)
270	101	35	M 12	42	12	100	106	25	45 (55)
400	101	35	M 12	48	12	106	112	28	45 (55)
600	122	42	M 14	52	15	120	-	32	55 (68)
900	133	47	M 14	53	18,5	143	-	40	65 (75)
1300	157	54	M 16	55	19	145	-	48	70 (85)
1800	157	54	M 16	55	19	145	-	54	70 ()

note: L\* ≙ variable length with bigger clamping hub size (see order example)

order example: KM 170 - D1 = 30 G<sup>7</sup> D2 = 35 H<sup>6</sup>  
KM 170 | 104 - D1 = 28 G<sup>6</sup> D2 = 42 G<sup>6</sup>

# Metal Bellows Coupling I Series KP

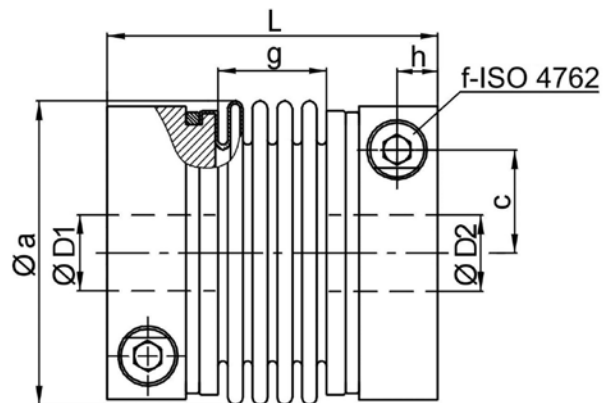
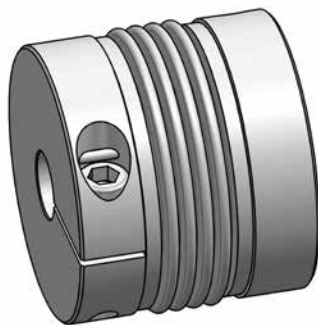
- /// 4-corrugation bellows // short design // high torsional stiffness
- /// simple installation with radial EASY-clamping hub

## technical data:

KP	T <sub>N</sub>	moment of inertia	torsional stiffness	max. shaft misalignment (mm)		axial spring rate	lateral spring rate	mass approx.	tightening torque of screws
Size	[Nm]	[10 <sup>-3</sup> kgm <sup>2</sup> ]	[Nm/arcmin]	axial ±	lateral	[N/mm]	[N/mm]	[kg]	[Nm] (*)
smaller couplings from 2 - 12 Nm see series MKP (page 37)									
25	25	0,064	4	0,5	0,15	36	180	0,18	8
35	35	0,13	9	0,5	0,2	70	450	0,3	14
60	60	0,27	14	0,6	0,2	70	650	0,4	35 (30)*
100	100	0,35	20	0,6	0,2	110	1200	0,5	35 (30)*
170	170	0,76	28	0,8	0,2	98	1000	0,8	65 (50)*
270	270	2	52	0,8	0,2	90	1300	1,3	115 (90)*
400	400	2,15	74	0,7	0,2	135	1500	1,4	115 (90)*
600	600	5,0	106	0,7	0,2	140	2800	2,3	180 (140)*
900	900	9,0	156	0,8	0,2	210	3050	3,5	180 (140)*

(\*) note: reduced tightening torque for bigger hub bore diameter - see also Ø D 1/2max!  
size KP 25 - with 5-corrugation bellow

**material:**  
bellows: stainless steel  
hubs: high-tensile strength aluminum  
screws: ISO 4762 / 12.9  
temperature range: -40°C up to +300°C



## Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

KP	Øa	c	f	g	h	L	L*	ØD1/2min	ØD1/2max
25	50	17	M 5	24	6	58	-	10	28
35	56	19	M 6	21	7,5	61	72	10	32
60	66	22	M 8	23	8,5	67	77	13	28 (35)
100	71	25	M 8	23	8,5	68	-	14	34 (38)
170	82	28,5	M 10	28	10,5	80	92	18	35 (43)
270	101	35	M 12	29	12	87	93	25	45 (55)
400	101	35	M 12	33	12	91	97	28	45 (55)
600	122	42	M 14	36	15	104	-	32	55 (68)
900	133	47	M 14	37	18,5	127	-	40	65 (75)

note: L\* ± variable length with bigger clamping hub size (see order example)

order example: KP 170 - D1 = Ø 28<sup>G6</sup> D2 = 35<sup>G6</sup>  
KP 170 | 92 - D1 = 32<sup>G6</sup> D2 = 42<sup>G6</sup>

# Metal Bellows Coupling I Series KR

- /// straight bellows // simple installation with radial EASY-clamping hub
- /// low restoring forces // high torsional stiffness // long design

## technical data:

KR	T <sub>N</sub>	moment of inertia	torsional stiffness	max. shaft misalignment (mm)		axial spring rate	lateral spring rate	mass approx.	tightening torque of screws
Size	[Nm]	[10 <sup>-3</sup> kgm <sup>2</sup> ]	[Nm/arcmin]	axial ±	lateral	[N/mm]	[N/mm]	[kg]	[Nm]
25	25	0,12	9	0,3	0,2	150	150	0,3	14 -
50	50	0,12	10	0,3	0,2	160	170	0,3	14 -
65	65	0,25	12	0,3	0,3	90	80	0,4	35 (30)*
100	100	0,7	23	0,5	0,4	100	95	0,75	65 (50)*
200	200	0,84	30	0,3	0,3	220	120	0,8	65 (50)*
300	300	2	53	0,4	0,3	210	160	1,3	115 (90)*
450	450	2,15	80	0,4	0,3	300	260	1,4	115 (90)*
550	550	4,7	98	0,5	0,5	300	360	2,2	180 (140)*
1500	1500	13	280	0,6	0,5	520	490	4,4	290 (240)*

(\*) note: reduced tightening torque for bigger hub bore diameter - see also Ø D 1/2max!

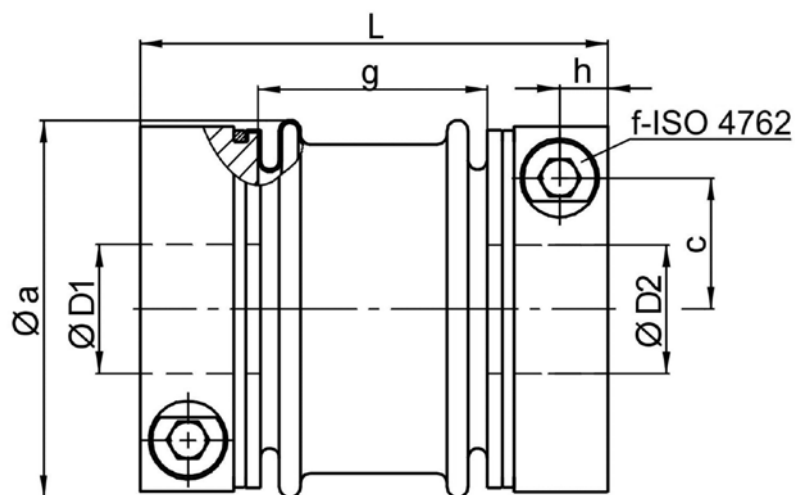
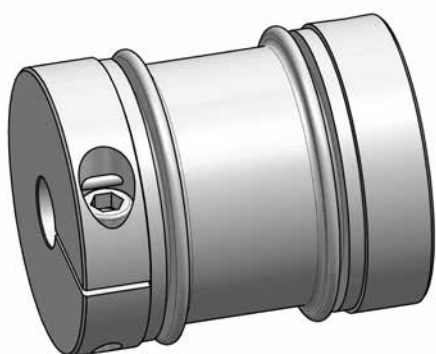
### material:

bellows: stainless steel

hubs: high-tensile strength aluminum

screws: ISO 4762 / 12.9

temperature range: -40°C up to +300°C



Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

KR	Øa	c	f	g	h	L	L*	ØD1/2min	ØD1/2max
25	56	19	M 6	33	7,5	73	84	8	32 -
50	56	19	M 6	33	7,5	73	84	10	32 -
65	66	22	M 8	41	8,5	85	95	13	28 (35)
100	82	28,5	M 10	50	10,5	102	114	16	35 (43)
200	82	28,5	M 10	56	10,5	108	120	18	35 (43)
300	101	35	M 12	65	12	123	129	28	45 (55)
450	101	35	M 12	65	12	123	129	35	45 (55)
550	122	42	M 14	72	15	140	-	32	55 (68)
1500	157	54	M 16	96	19	186	-	48	70 (89)

note: L\* ≙ variable length with bigger clamping hub size (see order example)

order example: KR 100 - D1 = 35<sup>G7</sup> D2 = 35<sup>G7</sup>  
 KR 200 | 120 - D1 = 32<sup>G6</sup> D2 = 42<sup>G6</sup>



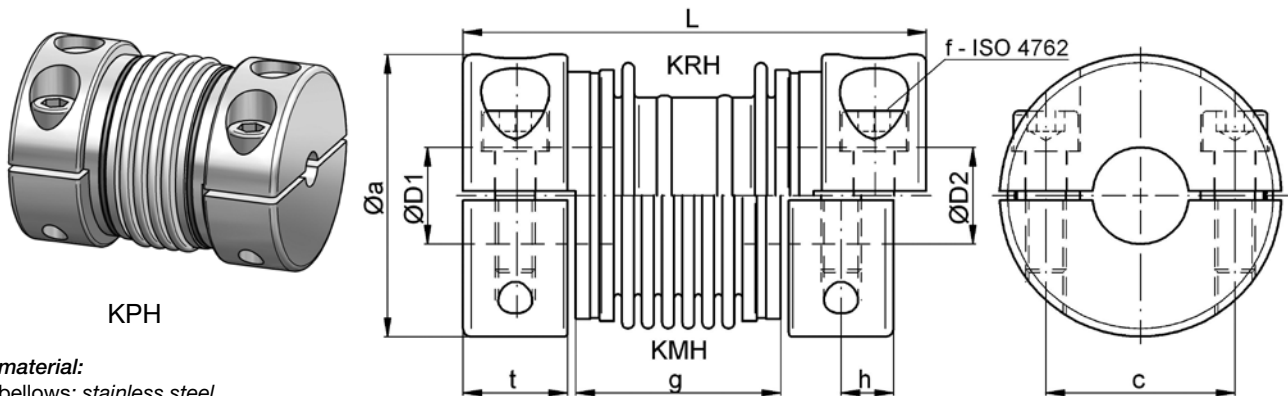
# Metal Bellows Coupling I Series KPH / KMH / KRH

- // simple installation // split-hub design
- // backlash-free // torsionally stiff // flexible
- // stainless design // variable length

## technical data:

Size	KPH nominal torque [Nm]	KMH moment of inertia [10 <sup>-3</sup> kgm <sup>2</sup> ]	torsional stiffness [Nm/arcmin]			max. lateral shaft misalignment [mm]			axial spring rate [N/mm]			lateral spring rate [N/mm]			mass approx. [kg]
			KPH	KMH	KRH	KPH	KMH	KRH	KPH	KMH	KRH	KPH	KMH	KRH	
10	10	0,02	1,7	1,1	-	0,15	0,25	-	70	45	-	60	224	-	0,1
40	40	0,2	9	5,8	10	0,2	0,25	0,2	70	51	170	190	450	170	0,5
80	80	0,5	14	8,7	12	0,2	0,3	0,3	70	49	95	260	650	80	0,8
200	200	1,2	25	17	30	0,2	0,3	0,3	98	80	120	470	1000	120	1,2
400	400	3,0	74	47	80	0,2	0,3	0,3	135	100	260	640	1500	260	2,0

- three types: type KPH with 4-corrugation bellows / type KMH mit 6-corrugation bellows / type KRH mit 2x 1-corrugation bellows.
- note: for coupling types in split-hub design for higher torques and shorter length see series KGH.



KPH

### material:

bellows: stainless steel

hubs: high-tensile strength aluminum

screws: ISO 4762 / 12.9

temperature range: -40°C up to 300°C

## Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

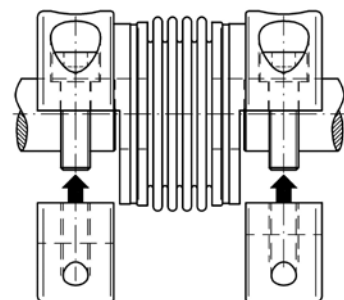
Size	Øa*	c	f	g KPH	g KMH	g KRH	h	L KPH	L KMH	L KRH	t	ØD1/2 min	ØD1/2 max
10	35	21	M5 - 8 Nm	33	43	-	9	73	83	-	18	6	15
40	58	36	M8 - 35 Nm	39	48	51	13	95	104	107	26	9	25
80	75	47	M10 - 65 Nm	41	51	59	13	97	107	115	26	12,5	35
200	89	56	M12 - 115 Nm	45,5	57,5	73	14	106	118	134	28	19	42
400	109	72	M14 - 180 Nm	52,5	67,5	84	15	117	132	149	30	24	55

\*the projecting edge of the screw head is taken into consideration for outer diameter 'a'

## Mounting Instructions:

The split-hub design allows for easy assembly. Further simplification during installation is provided because one half of the split hub can be put onto the shaft. The coupling can rest on the two shaft ends. The second half of the split-hub can then be mounted to the coupling by screwing it on from below with the specified tightening torque. This feature makes a "one man assembly" possible.

**Important:** the distance between the shafts must be bigger than 'g'!



order example: KPH 80 - D1 = 24<sup>G7</sup> D2 = 30<sup>G7</sup>  
KMH 400 - D1 = 38<sup>F6</sup> D2 = 48<sup>F6</sup>

# Metal Bellows Coupling I Series KPP

- /// plug-in design // simple installation // EASY-clamping hub
- /// high torsional stiffness // backlash-free, precise torque transmission
- /// sturdy whole metal version // temperatures up to 300°C

## technical data:

KPP size	$T_N$ [Nm]	moment of inertia [10 <sup>-3</sup> kgm <sup>2</sup> ]	torsional stiffness [Nm/arcmin]	max. shaft misalignment (mm)		axial spring rate [N/mm]	lateral spring rate [N/mm]	mass approx. [kg]	tightening torque of screws f   i [Nm]	axial preload force approx. [N]
10	10	0,033	2	0,6	0,15	20	93	0,15	8 -	30
20	20	0,17	4,6	0,5	0,2	70	480	0,38	14 -	110
35	35	0,17	5	0,5	0,2	70	480	0,38	14 -	110
60	60	0,34	8	0,6	0,2	70	650	0,60	35 (30)*	110
100	100	0,46	12	0,6	0,2	120	1200	0,66	35 (30)*	180
170	170	0,90	19	0,8	0,2	100	1000	0,95	65 (50)*	150
270	270	2,2	31	0,8	0,2	95	1350	1,6	115 (90)*	140
400	400	2,4	45	0,7	0,2	135	1500	1,7	115 (90)*	200
600	600	5,8	67	0,7	0,2	145	3000	2,7	180 (140)*	220

(\*) note: reduced tightening torque for bigger hub bore diameter - see also  $\varnothing D 1/2_{max}$ !

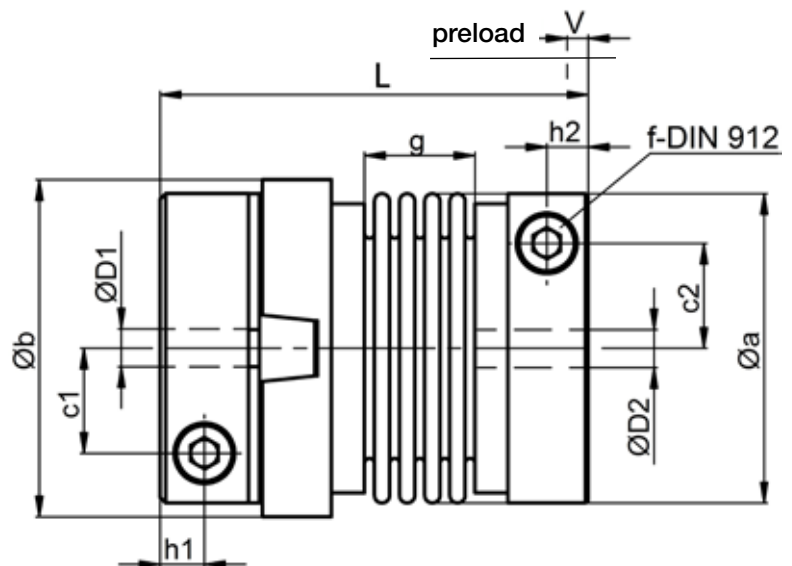
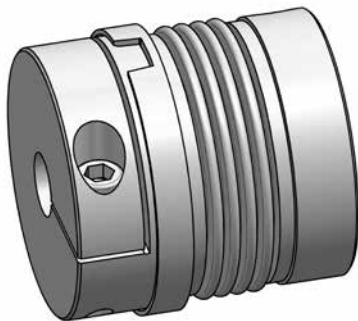
### material:

bellows: stainless steel

hubs: high-tensile strength aluminum

screws: ISO 4762 / 12.9

temperature range: -40°C up to +300°C



Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

KPP	$\varnothing a$	$\varnothing b$	c1/c2	f	g	h1/h2	V	L**	$\varnothing D1$ min-max	$\varnothing D2$ min-max
10	40	43	13 / 13	M 5	18	6 / 6	1-1,5	62	6-20	6-19
20	56	61	19 / 19	M 6	21	8 / 7,5	1-1,5	77,5	8-30	8-32
35	56	61	19 / 19	M 6	21	8 / 7,5	1-1,5	77,5	10-30	10-32
60	66	71	22 / 22	M 8	23	8,5 / 8,5	1-1,5	85,5	13-28 (34)*	13-28 (35)*
100	71	75	25 / 25	M 8	23,5	8,5 / 8,3	1-1,5	86	14-34 (38)*	14-34 (38)*
170	82	87	28,5 / 28,5	M 10	28	11 / 10,5	1-1,5	99,5	18-35 (43)*	18-35 (43)*
270	101	106	35 / 35	M 12	29	12 / 12	1-1,5	106,5	25-45 (55)*	25-45 (55)*
400	101	106	35 / 35	M 12	33	12 / 12	1-1,5	110,5	28-45 (55)*	28-45 (55)*
600	122	126	43,5 / 42	M 14	36	13,5 / 15	1-1,5	122,5	32-55 (70)*	32-55 (68)*

\* note: reduced tightening torque for bigger hub bore diameter - see also  $\varnothing D 1/2_{max}$ !

\*\*delivery length ( $\pm 1$ mm) – without preload -> see function description. Further sizes and lengths available on request.

note: size KPP 1300 with conical clamping hub on request

order example: KPP 170 - D1 = 28<sup>G7</sup> D2 = 35<sup>H7</sup>

# Metal Bellows Coupling I Series KPP I Technical Details

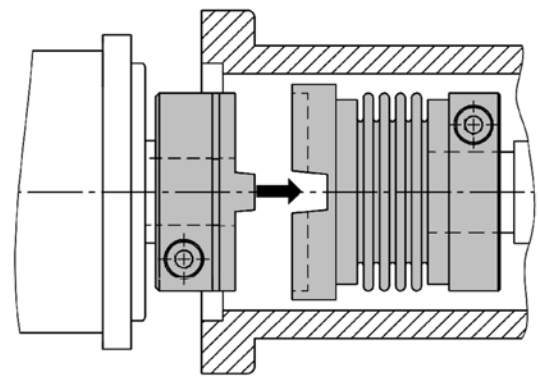
## General:

The pluggable, two-part metal bellows couplings are constructed for applications which are difficult to reach, applications without assembly boring for the clamping screws of the coupling hubs or where only blind fitting is possible. For such applications, the assembly is facilitated by the plug-in capability. Also, in case of service, the disassembly is much easier, because the drive unit can be pulled off without the difficult loosening of the hubs.

Product specific characteristics, which define the metal bellows couplings, apply to the KPP couplings as well. These are: absolutely no backlash, high torsional stiffness, low moment of inertia, compensation of misalignments, as well as high operating speeds and high operating temperatures. Depending on special operation parameters, plug-in elastomer couplings of series EKM & ESM provide a good alternative.

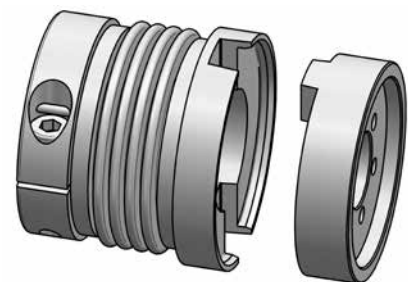
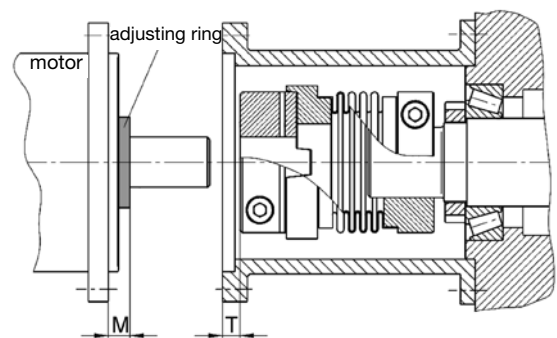
## Function:

The axial pluggability is achieved by a backlash-free keyway connection in whole metal version (aluminum anodized). For this, one part of the hub is delivered as a conical carrier, the counterpart with a congruent conical keyway. An additional centering element guarantees an exact alignment of both hub halves. To achieve the necessary axial preload of the plug-in connection, the spring tension of the metal bellows is used. For this, the bellow is compressed by 1-1.5 mm during assembly. This means that the unstressed coupling length 'L' (see measuring table) is reduced by the preload value 'V' after assembly. Because of the low preload, the operational values of the metal bellows are not reduced. The resulting residual forces usually have no negative influence on the shaft bearing.



## Assembly Notes:

To guarantee optimal performance of the plug-in connection, the preload value of 1-1.5 mm at the metal bellows must be given special care. In most cases, it is sufficient if the designer considers this. Another possibility for the mechanic is, to mount the whole coupling onto the drive shaft before fitting it to the motor (see drawing). With a depth gauge, the distance value 'T' from the bearing surface of the bell to the front-part of the plug-in hub can be measured. The mounting value 'M' on the motor shaft is given by adding the distance value 'T' to the preload value 'V'. In series application, the mounting can be facilitated by a great extent by using a corresponding adjustment ring. If the angular position of the carrier to the keyway does not fit during the plugging-in, the metal bellows may be compressed by some more millimeters (this bellows deformation is allowed in exceptional cases). By slow turning of the drive shaft, the carrier fits the keyway in synchronous position and the coupling is ready for use.



**application example:** KPP-flange type for direct gear extension

# Metal Bellows Coupling I Series KG

- /// all-metal version up to 350°C /// wear and maintenance free
- /// very short and variable design /// torsionally stiff
- /// simple installation with EASY-clamping hub

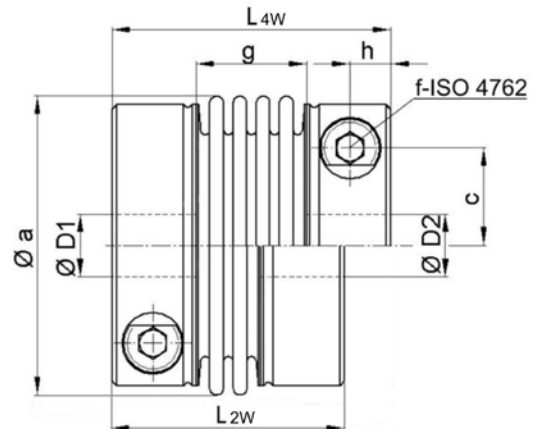
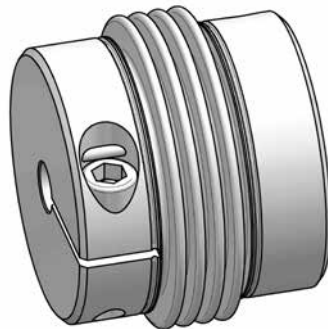
## technical data:

KG	T <sub>N</sub> [Nm]	moment of inertia [10 <sup>-3</sup> kgm <sup>2</sup> ]	torsional stiffness [Nm/arcmin]		max. shaft misalignment [mm]				axial spring rate [N/mm]		lateral spring rate [N/mm]		mass approx. [kg]
			2W	4W	axial±		lateral		2W	4W	2W	4W	
5	5	0,004	1,3	0,9	0,2	0,3	0,05	0,1	135	75	2500	400	0,06
10	10	0,019	3,3	2,1	0,3	0,4	0,1	0,15	150	85	2300	400	0,14
20	20	0,044	6	3,4	0,3	0,4	0,1	0,15	100	55	2100	360	0,22
40	40	0,18	16	9	0,3	0,6	0,1	0,2	130	70	2500	450	0,5
80	80	0,44	26	14	0,3	0,6	0,1	0,2	120	70	3500	600	0,9
140	140	0,74	32	20	0,3	0,6	0,1	0,2	210	110	7000	1200	1,1
220	220	1,22	50	28	0,4	0,7	0,1	0,2	170	95	5000	1000	1,5
350	350	2,6	93	52	0,4	0,8	0,1	0,2	170	90	7000	1300	2,4
700	700	5,4	190	106	0,4	0,8	0,1	0,2	260	140	15000	2800	3,4
1300	1300	24	400	225	0,4	0,7	0,1	0,2	310	160	13000	2100	8,5

temperature range: -40°C up to +350°C

### material:

bellows: stainless steel 1.4571  
hubs: steel St 52  
screws: ISO 4762 / 12.9



**notes:** connection between bellows and hub by plasma welding  
two standard versions with 4-corrugation bellows 4W or 2-corrugation bellows 2W

**Dimensions [mm]:** length dimensions according to DIN ISO 2768 cH

KG	Øa	c	f-TA	g		h	L		ØD1/2 min	ØD1/2 max
				2W	4W		2W	4W		
5	24	7,3	M3-2 Nm	6	10	4,5	25	29	6	11
10	34	10,5	M4-5 Nm	11	16	5	33	38	8	16
20	40	13	M5-10 Nm	12	17	6	38	43	10	20
40	56	18	M6-16 Nm	13	23	7,5	45	55	12	32
80	66	22,5	M8-40 Nm	16	24	9	53	61	14	35
140	71	27	M8-40 Nm	15	25	9	52	62	18	42
220	82	27,5	M10-80 Nm	18	28	11,5	63	73	20	42
350	101	32	M12-135 Nm	19	30	12,5	71	82	22	50
700	122	40	M12-135 Nm	22	37	11,5	70	85	42	64
1300	157	54	M16-300 Nm	24	40	17,5	95	111	50	90

- standard clamping hubs of sizes 5 / 10 / 20 without EASY-pin (EASY design optionally possible)
- alternative lengths and hub versions are possible on request

order example: KG 40 / 4W D1 = 16<sup>G7</sup> D2 = 24<sup>H7</sup>  
KG 350 / 2W D1 = 32<sup>G7</sup> D2 = 35<sup>G7</sup>

# Metal Bellows Coupling I Series KG-VA

- /// all-stainless steel version up to 350°C /// wear and maintenance free
- /// very short and variable design /// torsionally stiff
- /// simple installation with clamping hub

## technical data:

KG-VA size	T <sub>N</sub> [Nm]	moment of inertia [10 <sup>-3</sup> kgm <sup>2</sup> ]	torsional stiffness [Nm/arcmin]		max. shaft misalignment [mm]				axial spring rate [N/mm]		lateral spring rate [N/mm]		mass approx. [kg]
			2W	4W	axial±	lateral		2W	4W	2W	4W		
4	4	0,004	1,3	0,9	0,2	0,3	0,05	0,1	135	75	2500	400	0,06
8	8	0,019	3,3	2,1	0,3	0,4	0,1	0,15	150	85	2300	400	0,14
15	15	0,044	6	3,4	0,3	0,4	0,1	0,15	100	55	2100	360	0,22
30	30	0,18	16	9	0,3	0,6	0,1	0,2	130	70	2500	450	0,5
60	60	0,44	26	14	0,3	0,6	0,1	0,2	120	70	3500	600	0,9
100	100	0,74	32	20	0,3	0,6	0,1	0,2	210	110	7000	1200	1,1
180	180	1,22	50	28	0,4	0,7	0,1	0,2	170	95	5000	1000	1,5
280	280	2,6	93	52	0,4	0,8	0,1	0,2	170	90	7000	1300	2,4
500	500	6,0	190	106	0,4	0,8	0,1	0,2	260	140	15000	2800	3,8
1000	1000	24	400	225	0,4	0,7	0,1	0,2	310	160	13000	2100	8,5

temperature range: -40°C up to +350°C

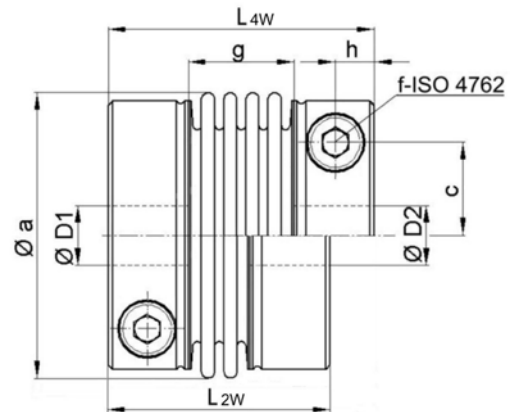
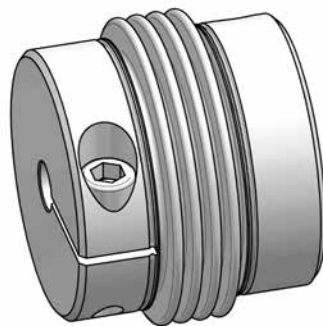
### material:

bellows: stainless steel 1.4571 / A4

hubs: 1.4301 / A2

screws: ISO 4762 stainless steel / A4-80

optional: ISO 4762 / 12.9



notes: connection between bellows and hub by plasma welding

two standard versions with 4-corrugation bellows 4W or 2-corrugation bellows 2W

Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

KG-VA	Øa	c	f-TA	g		h	L		ØD1/2 min	ØD1/2 max
				2W	4W		2W	4W		
4	24	7,3	M3-1(2)	6	10	4,5	25	29	8(5)	11
8	34	10,5	M4-2,5(4)	11	16	5	33	38	9(7)	16
15	40	13	M5-5(8)	12	17	6	38	43	11(8)	20
30	56	18,5	M6-9(14)	14	23	7,5	46	55	14(10)	28
60	66	22,5	M8-24(35)	16	24	9	53	61	16(11)	35
100	71	25	M8-24(35)	15	25	9	52	62	24(17)	40
180	82	27,5	M10-45(65)	18	28	11,5	63	73	28(20)	42
280	101	32	M12-80(115)	19	30	12,5	71	82	30(22)	50
500	122	39,5	M14-110(180)	22	37	15	82	97	42(28)	62
1000	157	54	M16-180(280)	23	40	17,5	94	111	54(42)	90

- clamping hubs generally with stainless steel screws A4-80 without EASY-pin - mind reduced actuation torques
- check transmission torques of hub-shaft connection for diameters below Dmin (further inquiry possible)
- optional: coated screws of property class 12.9 for higher clamping forces or torques see values in brackets
- alternative lengths or hub versions available on request

order example: KG-VA 180 / 4W  
KG-VA 15 / 2W

D1 = 32<sup>G7</sup>  
D1 = 16<sup>G7</sup>

D2 = 35<sup>G7</sup>  
D2 = 19<sup>G7</sup>

- stainless steel screws  
- screws - 12.9 - coated

# Metal Bellows Coupling I Series KGH

- /// simple installation - split-hub design
- /// backlash free - torsionally stiff // wear and maintenance free
- /// variable length // all-steel-version // up to 350°C

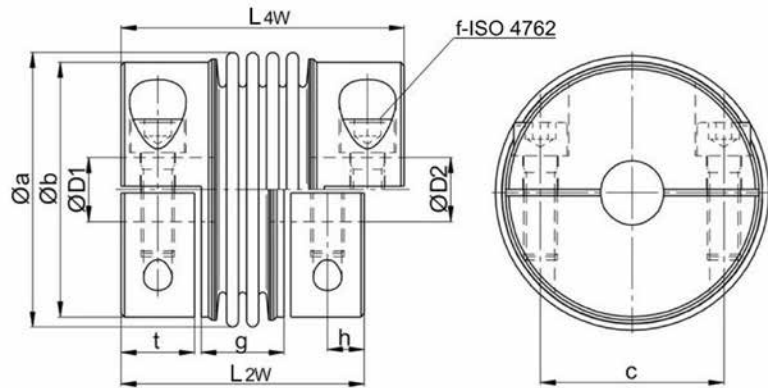
## technical data:

KGH size	T <sub>N</sub> [Nm]	moment of inertia [10 <sup>-3</sup> kgm <sup>2</sup> ]	torsional stiffness [Nm/arcmin]		max. shaft misalignment [mm]				axial spring rate [N/mm]		lateral spring rate [N/mm]		mass approx. [kg]
			2W	4W	axial±		lateral		2W	4W	2W	4W	
					2W	4W	2W	4W					
20	20	0,045	6	3,4	0,3	0,5	0,1	0,15	100	55	2100	360	0,25
40	40	0,2	9	16	0,3	0,6	0,1	0,2	130	70	2500	450	0,6
80	80	0,5	26	14	0,3	0,6	0,1	0,2	120	70	3500	600	0,9
140	140	0,8	32	20	0,3	0,6	0,1	0,2	110	210	1200	7000	1,25
220	220	1,4	50	28	0,4	0,7	0,1	0,2	170	95	5000	1000	1,8
350	350	3,0	93	52	0,4	0,8	0,1	0,2	170	90	7000	1300	2,8
700	700	7,3	190	106	0,4	0,8	0,1	0,2	260	140	15000	2800	4,6
1600	1600	46	-	225	-	0,7	-	0,2	-	160	-	2100	15

maximum temperature range: -40°C up to +350°C



**material:** bellows: stainless steel 1.4571  
hubs: steel St 52  
screws: ISO 4762 / 12.9



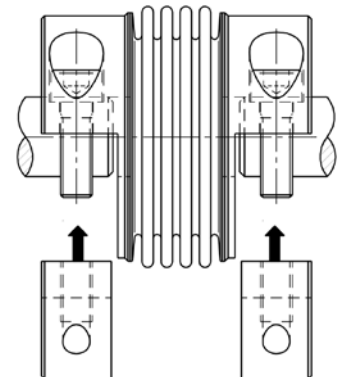
**note:** standard with 4-corrugation bellows (4W); alternative available with 2-corrugation bellows (2W; values in brackets). connection between bellows and hub by plasma welding

**Dimensions [mm]:** length dimensions according to DIN ISO 2768 cH

KGH	Øa	Øb	c	f	g	h	L-2w	L-4w	t	ØD1/2min	ØD1/2max
20	40	38	25,5	M 5 - 10 Nm	22 (17)	6	(45)	50	12	8	19
40	56	51	36	M 6 - 16 Nm	32 (22)	7,5	(56)	66	15	12	28
80	66	62	45	M 8 - 40 Nm	32 (24)	8	(60)	68	16	14	35
140	71	71	54	M8 - 40 Nm	33 (23)	8,5	(61)	71	17	14	42
220	82	76	55	M 10 - 80 Nm	37 (27)	11	(75)	85	22	20	42
350	101	89	64	M 12 - 135 Nm	40 (29)	13	(83)	94	24	22	48
700	122	108	78	M 14 - 200 Nm	47 (31)	15	(91)	107	27	35	62
1600	157	145	108	2x M 16 - 300 Nm	55 (-)	18 / 30	(-)	190	64	35	85

## Mounting Instructions:

The split-hub design allows for a easy assembly. Further simplification during installation is provided because one half of the split hub is put onto the shaft. This allows that the coupling can rest on the two shaft ends. The second half of the split hub can then be mounted to the coupling by screwing it on from below with the specified tightening torque. This feature makes "one man assembly" possible.



order example: KGH 220/4W - D1 = 24<sup>G7</sup> D2 = 30<sup>G7</sup>

# Metal Bellows Coupling I Series KSD

// 6-corrugation bellows // short design // conical bush on both sides  
 // cost-effective standard series

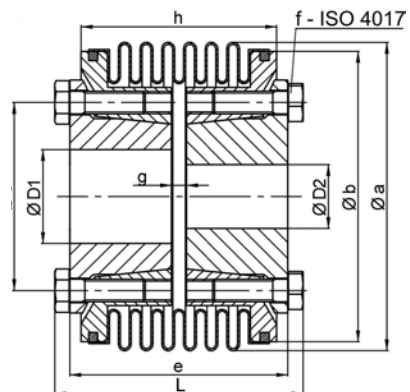
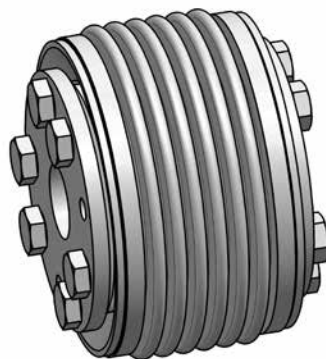
technical data:

KSD Size	$T_N$ [Nm]	moment of inertia [ $10^{-3} \text{kgm}^2$ ]	torsional stiffness [Nm/arcmin]	max. shaft misalignment (mm)		axial spring rate [N/mm]	lateral spring rate [N/mm]	mass approx. [kg]	tightening torque of screws [Nm]
				axial $\pm$	lateral				
10	10	0,03	2,1	0,6	0,15	20	93	0,22	3
20	20	0,1	5,5	0,8	0,25	51	190	0,4	4
35	35	0,1	6	0,8	0,25	51	190	0,4	4
60	60	0,3	9	0,9	0,3	49	260	0,8	14
80	80	0,9	14	1	0,3	48	220	1,3	14
170	170	0,9	18	1	0,3	80	400	1,3	14
270	270	2,5	32	1	0,3	70	450	2,4	35
400	400	2,8	47	1	0,3	100	640	2,5	35
600	600	5,5	67	1	0,3	100	980	3,6	65
900	900	10	105	1	0,3	145	1000	5,5	65
1300	1300	20	170	1	0,3	130	920	7,7	115
2500	2500	103	450	1	0,3	170	1350	22	290
4000	4000	110	700	3	1,2	480	5000	23	290

temperature range:  $-40^\circ\text{C}$  up to  $+300^\circ\text{C}$

note: KSD size 4000 with 4-corrugation-bellows and shrink disc clamping hub (up to  $D_{\text{max}} = \varnothing 130\text{mm}$ )

• for higher torques see series KXL



material:

bellows: stainless steel

hubs: heat treated steel

screws: ISO 4017 / 10.9

Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

KSD	$\varnothing a$	$\varnothing b$	$\varnothing c$	e	6 x f	g	h	L	$\varnothing D$ 1/2		prebored
									min.	max.	
10	40	34	27	45	M 4	7	33	51	6	16	5
20	56	52	30	48	M 4	12	44	54	10	19	8
35	56	52	30	48	M 4	12	44	54	10	19	8
60	66	62	36	53	M 6	5	47	61	12	24	11
80	82	78	50	58	M 6	4	52	66	18	35	17
170	82	78	50	60	M 6	6	54	68	18	35	17
270	101	96	62	68	M 8	2	58	79	28	42	25
400	101	96	62	74	M 8	8	64	85	30	42	25
600	122	112	70	78	M 10	6	68	91	35	50	28
900	132	127	83	94	M 10	6	76	107	40	60	34
1300	157	140	98	96	M 12	6	78	111	40	75	38
2500	203	194	144	147	M 16	8	97	167	50	102	49
4000	203	173	144	223	M 16	84	174	243	50	102	49

order example: KSD 270 -  $D1 = 42^{G6}$   $D2 = 30^{H7}$

# Metal Bellows Coupling I Series KSS

/// straight bellows /// conical bush on both sides /// low restoring forces /// high torsional stiffness

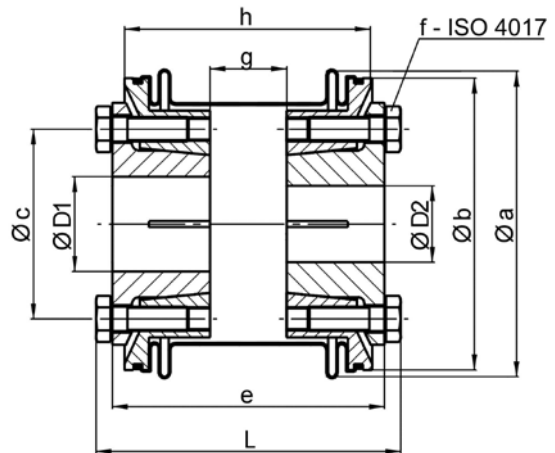
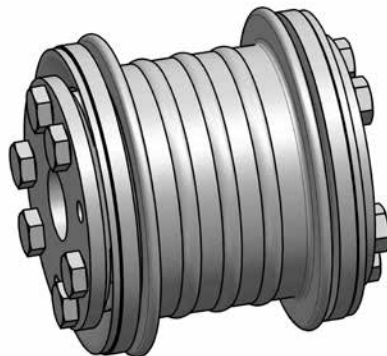
## technical data:

KSS Size	T <sub>N</sub> [Nm]	moment of inertia [10 <sup>-3</sup> kgm <sup>2</sup> ]	torsional stiffness [Nm/arcmin]	max. shaft misalignment (mm)		axial spring rate [N/mm]	lateral spring rate [N/mm]	mass approx. [kg]	tightening torque of screws [Nm]
				axial ±	lateral				
25	25	0,1	10	0,3	0,2	150	150	0,4	4
50	50	0,1	11	0,3	0,2	160	170	0,4	4
65	65	0,3	13	0,3	0,3	90	80	0,7	14
100	100	0,75	24	0,5	0,4	100	95	1,2	14
200	200	0,84	30	0,3	0,3	220	120	1,25	14
300	300	2,3	53	0,4	0,3	210	160	2,2	35
450	450	2,4	80	0,4	0,3	300	260	2,3	35
540	540	4,8	100	0,5	0,5	300	360	3,4	67
850	850	18	160	0,7	0,6	200	170	7,5	115
1500	1500	19	290	0,6	0,5	520	490	7,7	115
2500	2500	100	700	0,4	0,5	550	590	23	290

temperature range: -40°C up to +300°C  
for higher torques see series KXL

### material:

bellows: stainless steel  
hubs: heat treated steel  
screws: ISO 4017 / 10.9



Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

KSS	Ø a	Ø b	Ø c	e	6 x f	g	h	L	Ø D 1/2		prebored
									min.	max.	
25	56	52	30	51	M 4	15	47	57	10	19	8
50	56	52	30	51	M 4	15	47	57	10	19	8
65	66	62	36	61	M 6	13	55	69	12	24	11
100	82	78	50	70	M 6	16	64	78	18	35	17
200	82	78	50	76	M 6	22	70	84	18	35	17
300	101	96	62	89	M 8	25	81	101	28	42	25
450	101	96	62	89	M 8	25	81	101	28	42	25
540	122	112	70	98	M 10	26	88	111	35	48	28
850	157	140	98	137	M 12	44	119	152	40	70	38
1500	157	140	98	137	M 12	44	119	152	40	70	38
2500	203	194	138	211	M 16	72	161	231	50	102	49

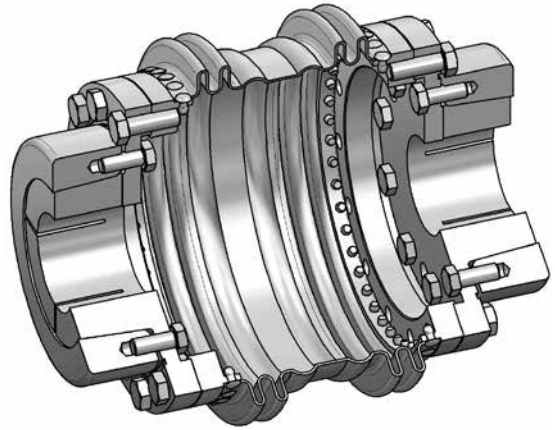
order example: KSS 450 - D1 = 28<sup>H7</sup> D2 = 35<sup>F6</sup>



# Metal Bellows Coupling I Series KXL

- /// for high torques up to 65.000 Nm // backlash-free, exact torque transfer
- /// high torsional stiffness // low moments of inertia // high tolerance of shaft misalignments
- /// three-part construction // easy to fit // variable in use

The metal bellows couplings of the series KXL are constructed for medium size to big drives of up to 65.000 Nm. Although this type of coupling has proven itself reliable for years, the series was completely redesigned in order to make it even more attractive regarding technical parameters as well as the aspect of costs. It is very special because of the three-part construction with a flexible intermediate piece (bellows). This intermediate piece can be disassembled. It consists of an optimal torsionally stiff stainless steel bellows with 2 bellows shafts on each side and an intermediate pipe which is variable in length. The connection with the two hubs is frictionally engaged (screws acc. to ISO 4017/10.9). Therefore, assembly is much easier, as in case of inspection or service, the heavy drive unit or the output unit need not be disassembled. The designer can choose between several hub variations (see selection table). The very good moment of inertia and the rotation symmetrical design ensure good dynamic operation characteristics. KXL couplings are most suitable for precise drives, such as those used in printing machines, cross cutters, main spindle drives, transfer axes or used in combination with gearboxes. Medium transport or a parallel drive chain through the coupling interior is possible.



**material:**  
 bellows: stainless steel  
 flange: heat-treated steel - burnished  
 hubs: heat-treated steel - burnished

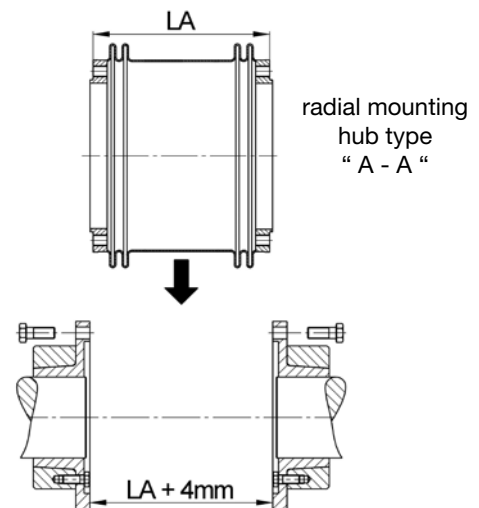
## technical data:

KXL Size	torques		torsional stiffness CT [Nm/arcmin]	spring rate		max. shaft misalignment		
	nominal torque T <sub>N</sub> [Nm]	maximum torque T <sub>max</sub> [Nm]		axial C <sub>a</sub> [N/mm]	angular C <sub>w</sub> [N/°]	axial ±	angular	radial
						d <sub>a</sub> [mm]	d <sub>w</sub> [°]	d <sub>r</sub> [mm]
4	4.000	6.000	610	480	35	3	1,4	1,2
6,5	6.500	9.000	1000	550	55	3	1,3	1,4
9	9.000	13.000	1.700	650	115	3	1,3	1,5
12	12.000	17.000	2.200	490	85	3,5	1,4	2,0
18	18.000	25.000	3.200	500	125	3,5	1,3	2,3
28	28.000	38.000	5.700	460	180	4	1,2	2,3
50	50.000	65.000	11.000	570	225	4	1,2	2,5

maximum temperature range: -40°C up to +300°C

KXL Size	mass			moments of inertia		
	per hub A/B	per hub F/G	bellows	per hub A/B	per hub F/G	bellows
	m <sub>A</sub> /m <sub>B</sub> [kg]	m <sub>F</sub> /m <sub>G</sub> [kg]	m <sub>BP</sub> [kg]	J <sub>A</sub> /J <sub>B</sub> [kgm <sup>2</sup> ]	J <sub>F</sub> /J <sub>G</sub> [kgm <sup>2</sup> ]	J <sub>BP</sub> [kgm <sup>2</sup> ]
4	8	3	5,7	0,04	0,02	0,04
6,5	12	5	8,0	0,07	0,04	0,08
9	16	6,5	10,5	0,12	0,07	0,14
12	21	8	14	0,17	0,08	0,24
18	31	11	20	0,37	0,18	0,47
28	52	20	30	0,94	0,53	1,12
50	95	30	45	2,5	1,4	2,65

note: The technical data corresponds to bellows with standard length 'L16' or 'LA'. Different lengths are available on request



# Metal Bellows Coupling I Series KXL

Dimensions [mm]:

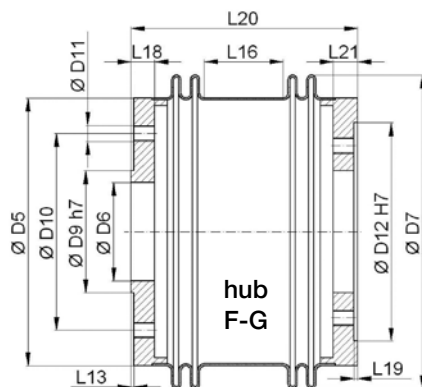
length dimensions according to DIN ISO 2768 cH

Size	4	6,5	9	12	18	28	50
D1 min	70	75	80	90	110	130	150
D2 max	90	100	108	130	150	170	220
D3	157	168	190	205	247	296	380
D5	167	198	256	273	322	406	505
D7	203	236	259	319	372	460	561
D8	152	183	193	208	250	325	416
L1	62	70	77	85	91	105	120
L2	53,5	60,5	66	74	79	93	108
L3	46	50	54	62	66	78	88
L4**	286	321	351	399	442	497	537
L5	-	20	23	23	25	27	30
L6	-	7,5	8,8	10	11,5	12,5	12,5
L7	-	43	48,8	55	62	68	72,5
L8	-	38	48,8	44	55	55	66,5
L9	-	68	75	83	89	103	118
L10**	-	217	239	271	306	337	357
L12**	-	267	293	333	372	415	447
L16*	41	50	59	80	100	110	120
LA ±2	158	177	193	225	256	283	297
L18	21	24	25	25	30	30	34
L20**	164	188	200	232	266	288	304
L21	21	24	25	25	30	30	34
f	12 x M10	12 x M12	12 x M14	14 x M16	12 x M18	12 x M20	16 x M20
i	10 x M10	9 x M12	8 x M14	9 x M14	8 x M16	10 x M16	12 x M18
DT***	4 x M10	3 x M14	4 x M16	3 x M20x1,5	4 x M20x1,5	4 x M20x1,5	6 x M20x1,5
TA-f [Nm]	65	115	180	250	350	500	500
TA-i [Nm]	65	115	180	180	250	250	350

\*standard length - intermediate part

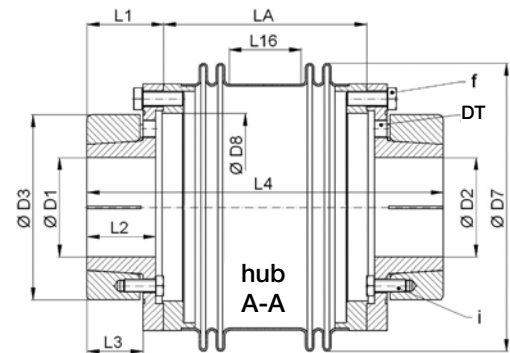
\*\*overall length for standard length L16

\*\*\*draw-off thread



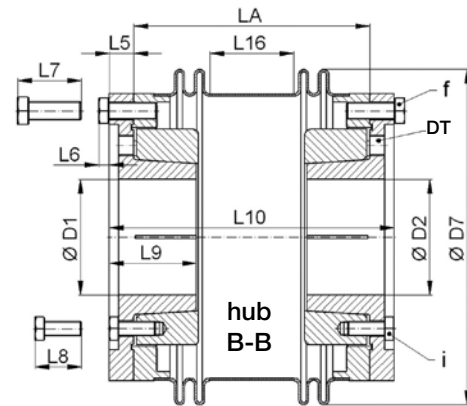
hub type F/G:

attached flange acc. to ISO 9409 or customer requirements - center outside or inside. Dimensions of flange hub types F and G of L13, L19 and D6, D9, D10, D11, D12 customized



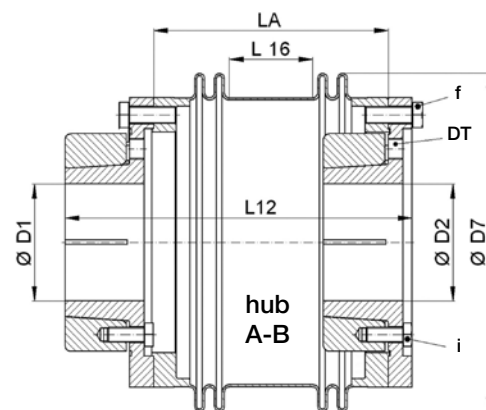
hub type A:

frictional, backlash-free conical clamping ring connection, external free radial disassembly of the bellows part. The elongation of total length "L4" of the intermediate piece of 4 mm at mounting is already taken into consideration (see mounting picture)



hub type B:

frictional, backlash-free conical clamping ring connection, internal free radial disassembly of the bellows part is NOT possible



hub type A/B:

frictional, backlash-free conical clamping ring connection - external - internal - free radial disassembly of the bellows part is NOT possible

order example:

KXL 6,5 - AA / L4 = 318 / D1 = 80<sup>H7</sup> / D2 = 90<sup>H7</sup>

KXL 13,5 - BG / L16 = 200 / D1 = 120<sup>G6</sup> / D2 = customer specific

# Metal Bellows Coupling I Series KPS

- /// 4-corrugation bellows // short design // simple installation with radial EASY-clamping hub
- /// expanding cone hub for direct mounting // internal axial stop

## technical data:

KPS size	$T_N$ [Nm]	moment of inertia [ $10^{-9} \text{kgm}^2$ ]	torsional stiffness [Nm/arcmin]	max. shaft misalignment (mm)		axial spring rate [N/mm]	lateral spring rate [N/mm]	mass approx. [kg]	tightening torque of screws f / i [Nm]
2	2	0,01	0,4	0,25	0,1	32	100	0,03	2 / 2
8	8	0,02	1,9	0,5	0,15	20	90	0,1	8 / 8
20	20	0,13	7	0,5	0,2	70	480	0,3	14 / 14
60	60	0,28	13	0,6	0,2	70	650	0,4	35 (30) / 35
170	170	0,94	27	0,8	0,2	100	1000	0,8	65 (50) / 65
400	400	1,95	64	0,7	0,2	135	1500	1,4	115 (90) / 115
600	600	4,2	107	0,7	0,2	145	3000	2,7	180 (140) / 115

(\*) note: reduced tightening torque for bigger hub bore diameter - see also  $\text{Ø} D 1_{\text{max}}$ !

### material:

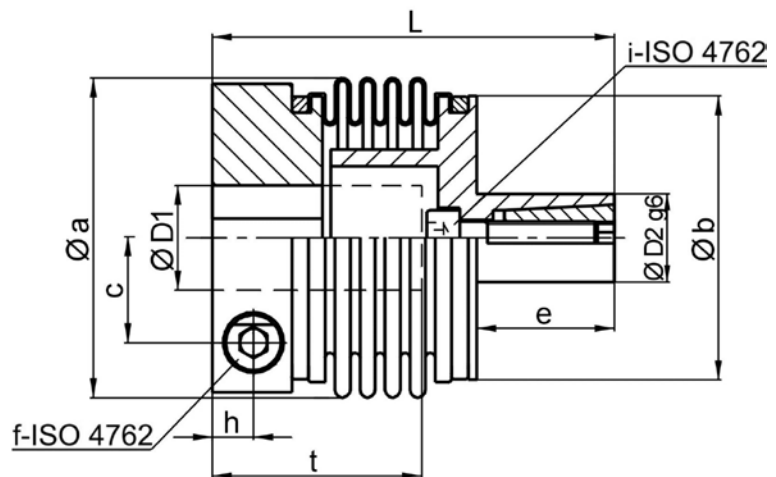
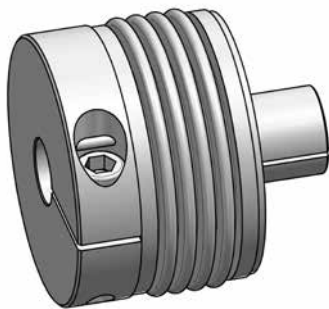
bellows: stainless steel

hubs: high-tensile aluminum

expanding cone: heat-treated steel

screws: ISO 4762 / 12.9

temperature range:  $-40^\circ\text{C}$  up to  $+300^\circ\text{C}$



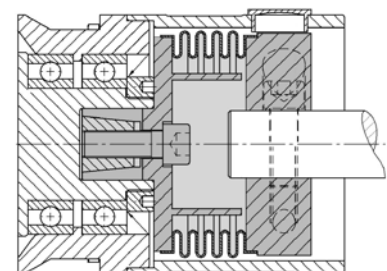
Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

KPS	$\text{Ø}a$	$\text{Ø}b$	c	e	f / i	h	L	$t_{\text{min}}$	$t_{\text{max}}$	$\text{Ø}D1$		$\text{Ø}D2$	
										min	max	min	max
2	24,5 [27,5]	22	7,5	10	M 3	4,5	38	11	20 (14)	3	10 [14]	8	12
8	40 [44,5]	35	13	20	M 5	6	61	15,5	33	6	19 [21]	13	18
20	56	51	19	23	M 6	7,5	71	19	38	8	32	15	20
60	66	61	22	23	M 8	8,5	75	21	40	13	28 (35)	20	28
170	82	77	28,5	30	M 10	10,5	92	25	48	18	35 (43)	24	32
400	101	95	35	32	M 12	12	102	28	56	28	48 (55)	30	38
600	122	110	42	42	M14/M12	15	120	31	63	32	55 (68)	35	48

note: the bore sizes for the expanding cone  $> \text{Ø}D2 \text{ g6} <$  with tolerance H7 sizes KPS 2 and KPS 8 without EASY-clamp, available in two diameters (see squared brackets).

application example: compact and integrated attachment of a KPS

order example: KPS 20 -  $D1 = 15 \text{ H7}$  -  $D2 = 20 \text{ g6}$



# Metal Bellows Coupling I Series KHS

- /// "high-speed" version // speeds up to 30.000 min<sup>-1</sup> // high balance quality
- /// rotational symmetry // low moment of inertia // stainless steel design

## technical data:

KHS size	T <sub>N</sub> [Nm]	moment of inertia [10 <sup>-3</sup> kgm <sup>2</sup> ]	torsional stiffness [Nm/arcmin]	max. shaft misalignment (mm)		axial spring load [N/mm]	lateral spring load [N/mm]	mass approx. [kg]	tightening torque of screw [Nm]
				axial ±	lateral				
15	15	0,03	2	0,5	0,1	20	90	0,15	3
40	40	0,13	9	0,5	0,1	70	480	0,30	4
100	100	0,37	20	0,6	0,1	120	1200	0,55	8
200	200	0,86	28	0,7	0,1	100	1000	0,83	12
400	400	2,5	70	0,7	0,1	135	1500	1,6	30
600	600	5,3	100	0,7	0,1	145	3000	2,5	45

temperature range: -40°C up to +300°C

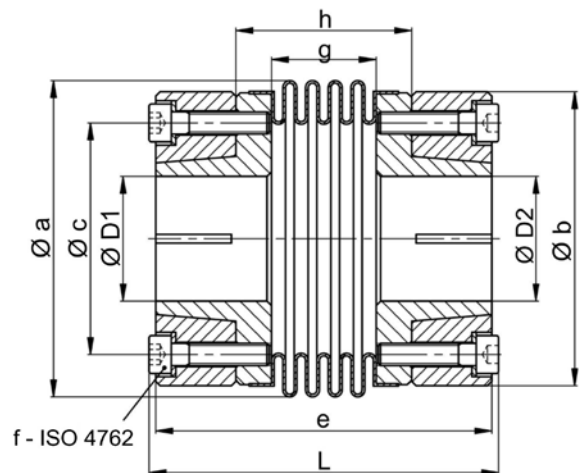
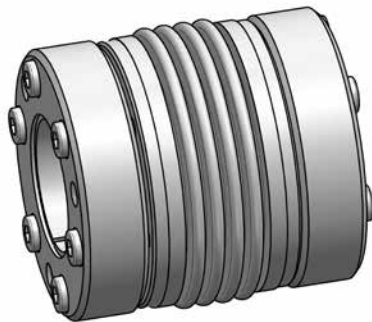
### material:

bellows: stainless steel

conical ring: high-tensile aluminum

conical hub: high-tensile aluminum

screws: ISO 4762 / 12.9



Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

KHS	Ø a	Ø b	Ø c	e	6 x f	g	h	L	Ø D 1/2		prebored
									min	max	
15	40	38	27	61	M 4	18	32	67	6	15	5
40	56	53	40	67	M 4	21	35	71	14	22	8
100	71	66	52	77,5	M 5	23	39	80,5	17	32	12
200	82	78	62	89	M 6	28	46	94	22	40	15
400	101	98	78	106	M 8	33	55	112	26	50	18
600	122	113	91	125	M 10	36	62	130	30	60	22

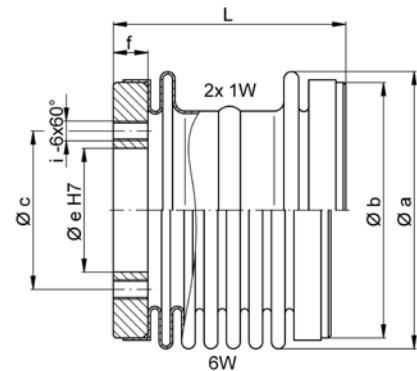
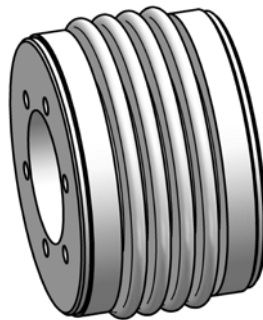
**note:** A special conical clamping hub will be used for the force-fit shaft-hub-connection. At specified tightening torques, the conical ring is pulled against the conical hub at the 'block-stop position.' The clearance width is reduced to zero. Jamming or overload of the conical ring (taper ring) is impossible.

order example: KHS 400 - D1 = 28<sup>H7</sup> D2 = 40<sup>G6</sup>

# Metal Bellows Couplings I Further Series

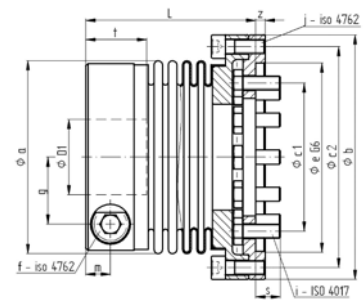
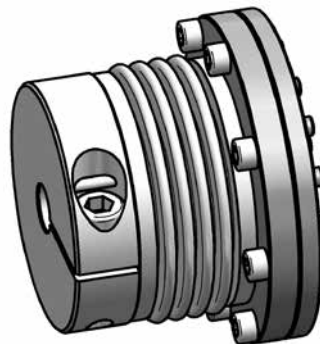
## Series KE with flange hubs

- // available in three standard lengths
- // radial mounting possible
- // variable connection through flange hubs



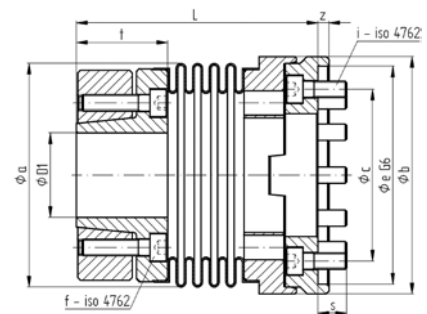
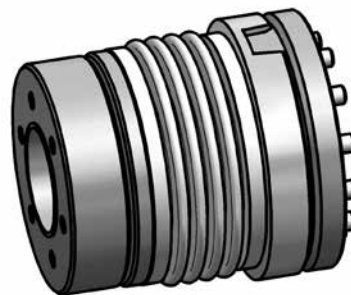
## Series KPE with flange hub

- // for standardized flange connection  
DIN - EN - ISO 9409 - 1
- // two-part connection flange
- // compact design
- // sturdy whole metal version
- // temperatures up to 300°C



## Series KPP-F with flange hub

- // for standardized flange connection  
DIN - EN - ISO 9409 - 1
- // plug in design - blind mounting possible
- // conical clamping hub on output side  
mounting from inside
- // temperatures up to 300°C



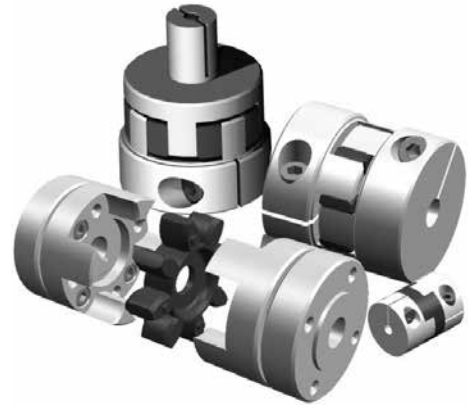
# Elastomer Couplings



# Elastomer Couplings | General

## Definition – Elastomer Couplings:

Elastomer couplings can be plugged in, are backlash-free, flexible shaft couplings for small to medium torques. An elastomer spider serves as connection and compensating element with involute teeth and a high shore hardness. This is inserted in form-fit, with slight preload between two high-precision machined hubs with involutely shaped jaws. The elastomer spider can compensate slight shaft misalignments, is electrically insulating and has good oscillation dampening characteristics. Two variations with backlash-free, frictional shaft-hub connection are available as standard which ensure safe torque transfer even without keyways.



## Characteristics – JAKOB Elastomer Couplings:

- /// plug-in // backlash-free // flexible // compact
- /// oscillation dampening // different shore hardnesses
- /// low moment of inertia // high speeds
- /// electrically insulating // temperatures up to 120°C

## Coupling dimensioning:

The main layout criteria are the required drive torque, the necessary torsional stiffness, the running speeds, the dampening characteristics of the coupling, and the moment of inertia. Additionally, the minimum or maximum possible shaft diameter, the admissible temperature range, operating factors, and the existing shaft misalignment (particularly the radial misalignment) must be taken into consideration.

## Approximation of required torque:

Roughly, the required coupling torque  $T_K$  can be calculated as for the following formula:

$$T_K = T_A \cdot f_D \cdot f_T \cdot f_B < T_{KN}$$

$T_A$  = drive torque [Nm]  
 $f_D$  = torsional stiffness factor  
 $f_T$  = temperature factor  
 $f_B$  = operating factor

The calculated coupling torque  $T_K$  should not exceed the nominal torque of the selected coupling size. Short term overload up to twice the value of the nominal torque is admissible. The drive torque results from product information of drive motor or can be calculated via motor output  $P_A$ .

$$T_A = \frac{9550 \cdot P_A}{n_B}$$

$T_A$  = drive torque [Nm]  
 $P_A$  = motor output [KW]  
 $n_B$  = motor speed [ $\text{min}^{-1}$ ]

## Temperature factor $f_T$ :

Admissible temperature range for continuous operation  
 PUR 98 Sh - A: -30°C up to +90°C  
 PUR 72 Sh - D: -20°C up to +120°C

operating temperature	+30°C	+50°C	+70°C	+90°C	+110°C
factor $f_T$	1	1,3	1,6	1,8	2

## Torsional stiffness factor $f_D$ :

If an exact, accurate transfer of the torque is required, as for instance with servo drives or measuring systems, a high torsional stiffness is absolutely necessary. Here the required drive torque should be multiplied with a operating factor of at least 3 to 10 when selecting the size, or a torsionally stiff metal bellows coupling selected from the extensive coupling range in this catalogue.

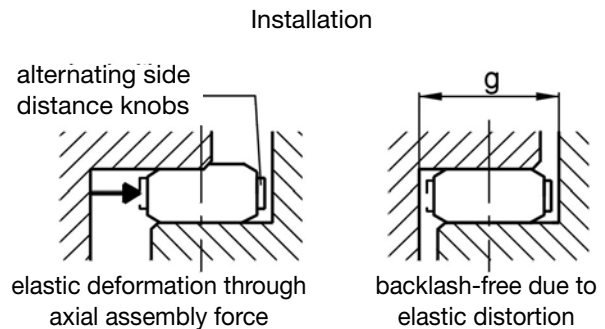
## Operating factor $f_B$ :

Due to operating factor  $f_B$  application specific peculiarities, such as shock loading, are taken into consideration.

# Elastomer Couplings I Installation Instructions

## Installation:

The design of the ESM-A couplings requires mounting of the two hub halves on the shaft ends before the actual plug-in assembly. It is important that the mounting screws are tightened crosswise to prevent surface distortion of the conical clamping ring. Couplings of the EKM series on the other hand, can be assembled completely before hub mounting. For mounting the EKM hub, only a radially arranged clamping screw must be tightened. Chamfered edges at the face enable the blind assembly with both versions. Due to the obligatory preclamping of the elastomer, an axial assembly force must be applied while sliding together the coupling spider and the jaws. This assembly force can be minimized by slight oiling the spider. For disassembly of the ESM conical hub, draw-off threads are provided for releasing the clamping ring. The relevant tightening torques of the retaining screws can be found in the technical data sheets. The fit between shaft and hub is to be selected as transitional fit (e.g. bore 28G6 / shaft 28k6).



**tolerable seat clearance shaft / hub:** Series ESM-A: max 0,02 mm    Series EKM: min 0,01 mm / max 0,04 mm  
(see installation instructions page 4)

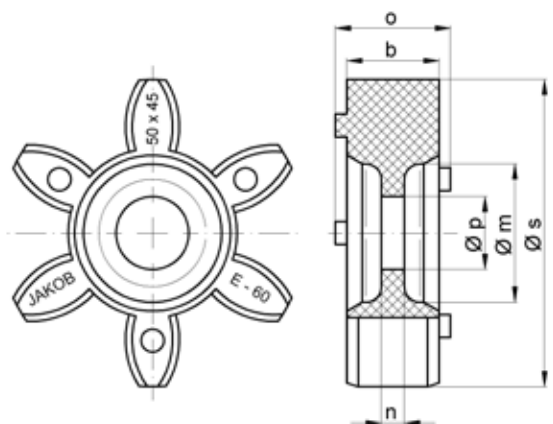
**materials:** hubs EKM / ESM-A: high-tensile aluminum  
conical ring / taper ring ESM-A / expanding cone EKZ: tempered steel  
elastomer spider: polyurethane (98 Shore A / 72 Shore D / others available on request)

## Notes:

- ✓ The dampening capability of the elastomer spider protects the drive to a high extent from dynamic overload. Both coupling halves are always forced to move (min.  $3 \times T_N$ ) because of the jaw construction, even if the spider should break down entirely.
- ✓ Because of the deformation of the elastomer spider under operation conditions, the housing (bell) should be approximately 5 % bigger than the outer diameter of the coupling itself.
- ✓ To ensure satisfactory function, dimension 'g' should be complied with as exactly as possible. The distance of the two shaft ends can be smaller than 'g' under consideration of measurements 'm' and 'n' of the spider.
- ✓ If required by the application or requested by the customer, diameter 'p' of the spider can be expanded up to  $\varnothing m - 2\text{mm}$
- ✓ For smaller shaft diameters, the conical hub of ESM-couplings is slotted additionally.

## Dimensions - elastomer spider [mm]:

Size	$\varnothing s$	$\varnothing m$	n	b	o	$\varnothing p^{+0,5}$
8/10	32	10,5	2	10	13	8,5
15/17/20/25	40	18	3	12	15	9,5
30/43/45/50	50	27	3	14	17	12,5
60/90	55	27	3	14	17	12,5
150/200	65	30	4	18	18	16,5
300/320/400	80	38	4	18	22	16,5
500	100	47	5	22	26	20,5
700/1000	120	58	6	25	30	22,5
2000	160	77	7	32	38	60





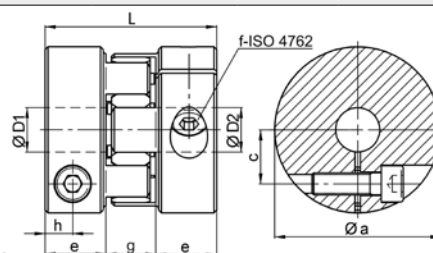
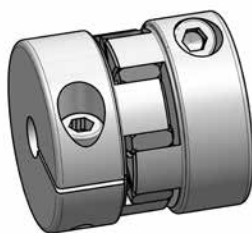
# Elastomer Coupling I Series EKM

// with clamping hub on both sides // plug-in // backlash-free  
 // cost-effective standard series

technical data:

EKM	T <sub>N</sub>	hardness	moment of inertia	torsional stiffness	max. shaft misalignment (mm)		radial spring rate	mass approx.	hubs Ø D 1/2 prebored
size	[Nm]	[shore]	[10 <sup>-3</sup> kgm <sup>2</sup> ]	(stat. 0,5 x T <sub>N</sub> ) [Nm/arcmin]	axial ±	lateral	[N/mm]	[kg]	
8	8	98 Sh-A	0,01	0,09	0,5	0,10	600	0,06	Ø 5
15	15	98 Sh-A	0,03	0,24	0,5	0,10	2100	0,12	Ø 6,1
20	20	72 Sh-D	0,03	0,46	0,5	0,10	2900	0,12	Ø 6,1
30	30	98 Sh-A	0,09	0,41	0,5	0,10	2500	0,21	Ø 8,5
45	45	72 Sh-D	0,09	0,75	0,5	0,10	3600	0,21	Ø 8,5
60	60	98 Sh-A	0,18	1,0	0,5	0,10	2600	0,32	Ø 12
90	90	72 Sh-D	0,18	2,0	0,5	0,10	3700	0,32	Ø 12
150	150	98 Sh-A	0,38	1,2	1	0,10	3300	0,52	Ø 15
200	200	72 Sh-D	0,38	2,3	1	0,07	4600	0,52	Ø 15
300	300	98 Sh-A	1,0	3,6	1	0,12	4500	0,9	Ø 18
400	400	72 Sh-D	1,0	7,0	1	0,10	6500	0,9	Ø 18
500	500	98 Sh-A	2,2	4,5	1	0,15	5900	1,5	Ø 20
700	700	98 Sh-A	5,2	8,0	1	0,15	7000	2,5	Ø 24
1000	1000	72 Sh-D	5,2	12	1	0,10	9600	2,5	Ø 24
2000	2000	98 Sh-A	50	21	1	0,15	9000	14	Ø 30

material:  
 elastomer spider: polyurethane  
 hubs: high-tensile strength aluminum  
 (size 2000: tempered steel)  
 screws: ISO 4762 / 12.9



Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

EKM	Ø a	c / c**	e	h	L	f	Ø D 1/2 min / max	f**	Ø D 1/2 max f**
8	32	10,5	13,5	6	40	M 4 - 4 Nm	8 / 15	-	-
15	40	13	17	8	50	M 5 - 8 Nm	8 / 20	-	-
20	40	13	17	8	50	M 5 - 8 Nm	10 / 20	-	-
30	50	16,5 / 18	20	9	58	M6 - 14 Nm	10 / 25	M5 - 8 Nm	Ø 30
45	50	16,5 / 18	20	9	58	M6 - 14 Nm	15 / 25	M5 - 8 Nm	Ø 30
60	60	19,5 / 20	22	10	62	M 8 - 35 Nm	13 / 28	M6 - 14 Nm	Ø 32
90	60	19,5 / 20	22	10	62	M 8 - 35 Nm	16 / 28	M6 - 14 Nm	Ø 32
150	70	23 / 25	26,5	12	73	M 10 - 65 (50)* Nm	18 / 27 (32)*	M8 - 35 Nm	Ø 38
200	70	23 / 25	26,5	12	73	M 10 - 65 (50)* Nm	20 / 27 (32)*	M8 - 35 Nm	Ø 38
300	85	29 / 30	31	14	86	M 12 - 115 (90)* Nm	20 / 34 (40)*	M10 - 65 Nm	Ø 48
400	85	29 / 30	31	14	86	M 12 - 115 (90)* Nm	24 / 34 (40)*	M10 - 65 Nm	Ø 48
500	100	36	33	16	94	M 12 - 115 (90)* Nm	28 / 48 (56)*	-	-
700	120	44	38	18	109	M 14 - 180 (140)* Nm	32 / 60 (70)*	-	-
1000	120	44	38	18	109	M 14 - 180 (140)* Nm	42 / 60 (70)*	-	-
2000	160	55,5	42	21	124	M 16 - 290 Nm	50 / 90	-	-

note:

(\*) reduced tightening torque for bigger hub bore diameter - see also Ø D 1/2max f!

\*state alternate values separately while ordering (for larger shaft diameters). Also notice smaller bore diameter and reduced tightening torques

order example: EKM 90 D1 = 24<sup>G7</sup> D2 = 28<sup>G6</sup>  
 EKM 150 M8 / M8 - D1 = 35<sup>G7</sup> D2 = 38<sup>H6</sup>

# Elastomer Coupling I Series ESM-A

- /// with conical hub and clamping ring // plug-in // backlash-free
- /// rotational symmetry // high speeds

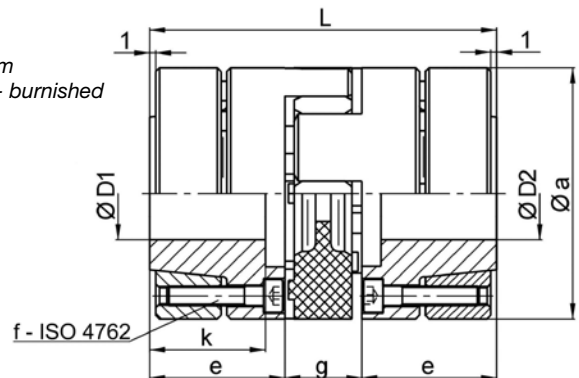
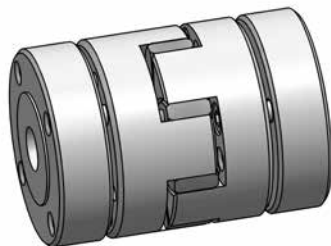
technical data:

ESM-A size	T <sub>N</sub> [Nm]	hardness [Shore]	moment of inertia [10 <sup>-3</sup> kgm <sup>2</sup> ]	torsional stiffness (stat. at 0,5 x T <sub>N</sub> ) [Nm/arcmin]	max shaft misalignment (mm) axial ± lateral	radial spring rate [N/mm]	mass approx. [kg]	tightening torque of screws [Nm]	max. speed [min <sup>-1</sup> ]
10	10	98Sh-A	0,015	0,09	0,5 0,1	600	0,11	2	30.000
17	17	98Sh-A	0,05	0,24	0,5 0,1	2100	0,28	4	24.000
25	25	72Sh-D	0,06	0,46	0,5 0,07	2900	0,28	4	24.000
43	43	98Sh-A	0,19	0,41	0,5 0,1	2500	0,4	8	19.000
50	50	72Sh-D	0,19	0,75	0,5 0,07	3600	0,4	8	19.000
60	60	98Sh-A	0,28	1,0	0,5 0,1	2600	0,6	8	17.500
90	90	72Sh-D	0,28	2,0	0,5 0,07	3700	0,6	8	17.500
150	150	98Sh-A	0,65	1,20	1 0,1	3300	0,9	8	15.000
200	200	72Sh-D	0,65	2,30	1 0,07	4600	0,9	8	15.000
320	320	98Sh-A	2,0	3,6	1 0,12	4500	1,9	35	12000
400	400	72Sh-D	2,0	7,0	1 0,1	6500	1,9	35	12.000
500	500	98Sh-A	5,6	4,5	1 0,15	5900	4,5	65	9.500
700	700	98Sh-A	13,0	8,0	1 0,15	7000	7,0	115	8.000
1000	1000	72Sh-D	13,0	12	1 0,10	9600	7,0	115	8.000
2000	2000	98Sh-A	75	21	1 0,15	9000	20,4	115	6.000

material:

elastomer spider: polyurethane  
(size 2000: tempered steel)  
screws: ISO 4762 / 12.9

conical hub: high-tensile aluminum  
clamping ring: heat treated steel - burnished



Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

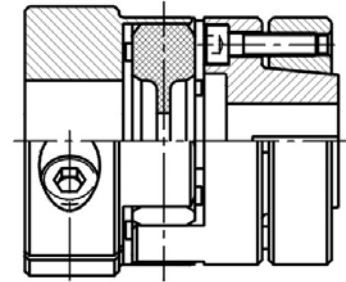
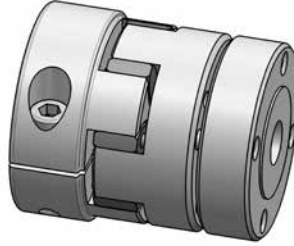
ESM-A	Ø a	e	f	g	k	L	Ø D 1/2 min.	Ø D 1/2 max.	Ø D 1/2 prebored
10	32	18,5	4x M 3	13	15,5	50	6	14	5
17	40	25	6x M 4	16	21	66	9	19	9
25	40	25	6x M 4	16	21	66	10	19	9
43	50	30	4x M 5	18	25	78	12	24	10
50	50	30	4x M 5	18	25	78	15	24	10
60	55	30	4x M 5	18	25	78	13	26	12
90	55	30	4x M 5	18	25	78	16	26	12
150	65	35	8x M 5	20	30	90	17	36	12
200	65	35	8x M 5	20	30	90	19	36	12
320	80	45	4x M 8	24	40	114	20	40	18
400	80	45	4x M 8	24	40	114	25	40	18
500	100	55	4x M 10	28	49	138	22	48	20
700	120	61	4x M 12	33	54	155	25	60	24
1000	120	61	4x M 12	33	54	155	25	60	24
2000	160	73	8x M 12	40	66	186	35	85	34

order example: ESM-A 150 - D1 = 17<sup>G7</sup> D2 = 22<sup>H6</sup>

# Elastomer Couplings I Further Series

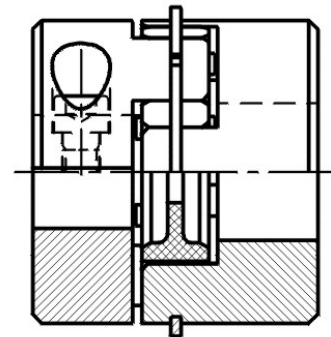
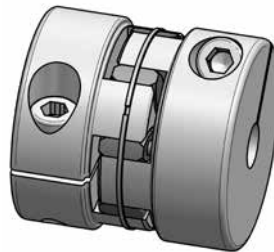
## Combination EKM – ESM

- ✓ for connection of shafts with huge differences between diameters
- ✓ facilitates the assembly of shaft-hub-connections:
  - 1.) ESM-hub from inside
  - 2.) plug-in assembly - elastomer spider
  - 3.) EKM-hub radially from outside
- ✓ to achieve fitting of intermediate length



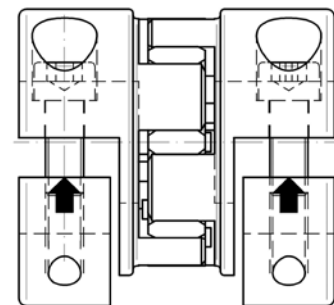
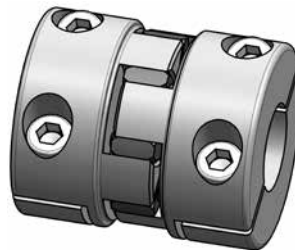
## Axial stop design

- ✓ by additional snap ring at the periphery
- ✓ for taking up and supporting large axial forces
- ✓ nevertheless compensation of parallel and angular misalignment
- ✓ may also be used for easier mounting



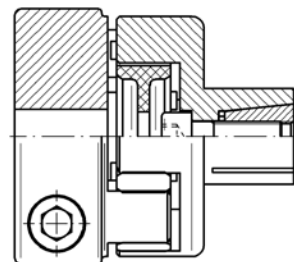
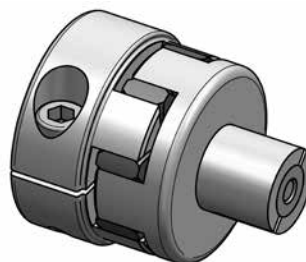
## Series EKH

- ✓ simple installation due to split-hub design
- ✓ can be combined with EKM - hub or ESM-A - hub
- ✓ mountable without disassembly of motor



## Series EKS with expanding cone

- ✓ short design for hollow - shaft - assembly
- ✓ 7 sizes from 8 - 700 Nm
- ✓ variable conical shaft diameter
- ✓ data sheet on request or see [www.jakobantriebstechnik.de](http://www.jakobantriebstechnik.de)



# Miniature Couplings



# Miniature Metal Bellows Coupling I Series MKM

standard series with radial clamping hub

## technical data:

MKM size	T <sub>N</sub> [Nm]	max. speed [min <sup>-1</sup> ]	moment of inertia [10 <sup>-6</sup> kgm <sup>2</sup> ]	torsional stiffness [10 <sup>-3</sup> Nm/arcmin]	max. shaft misalignment (mm)		spring rate [N/mm]		mass approx. [g]	tightening torque of screws [Nm]
					axial ±	lateral	axial	lateral		
0,4	0,4	20.000	0,3	50	0,35	0,2	10	15	10	1
0,9	0,9	20.000	0,4	90	0,3	0,2	21	26	12	1
2	2	12.000	3,0	230	0,5	0,2	15	15	30	2
4	4	12.000	3,0	460	0,4	0,2	35	65	40	2
7	7	12.000	14	1100	0,6	0,25	45	60	80	4
8	8	12.000	26	1350	0,8	0,30	16	24	130	8
12	12	12.000	30	2050	0,7	0,25	40	70	140	8

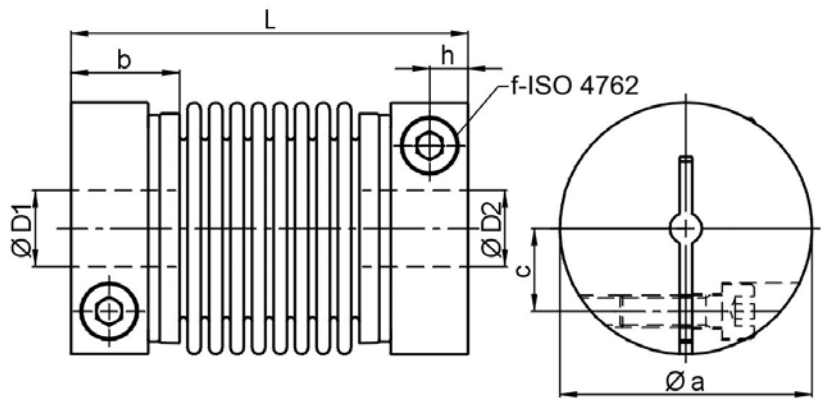
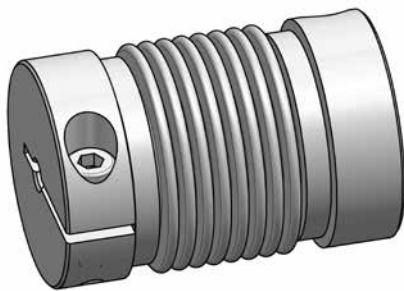
temperature range: -40°C up to +300°C

### material:

bellows: stainless steel

hubs: high-tensile strength aluminum

screws: ISO 4762 / 12.9



Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

MKM	Øa	b	c	f	h	L ±0,5	ØD1/2min	ØD1/2max
0,4	16,5	9	4,6	M 2,5	3,3	30	3	6,35
0,9	16,5	9	4,6	M 2,5	3,3	31,5	3	6,35
2	24,5 (27,5)	13	7,5 (9,6)	M 3	4,4	42	3	10 (14)
4	24,5 (27,5)	13	7,5 (9,6)	M 3	4,4	43,5	5	10 (14)
7	34	14	11	M 4	5	57	6	17
8	40 (44,5)	16,5	13 (15,5)	M 5	6	60	6	19 (24)
12	40 (44,5)	16,5	13 (15,5)	M 5	6	62	6	19 (24)

on request, couplings from size 2-12 are available with EASY-clamp (see page 7)

### stock bores D1/D2 (G7)

MKM	Ø3	Ø4	Ø5	Ø6	Ø6,35	Ø8	Ø9,53	Ø10	Ø12	Ø15	Ø16	Ø19
0,4/0,9	•	•	•	•	•							
2/4		•	•	•	•	•	•	•				
7				•	•	•	•	•	•	•	•	
8/12				•	•	•	•	•	•	•	•	•

note: further bore sizes possible on request

order example: MKM 0,9 - D1 = 4<sup>H7</sup> D2 = 5<sup>G7</sup>

# Miniature Metal Bellows Coupling I Series MKP

short design with radial clamping hub

technical data:

MKP size	T <sub>N</sub> [Nm]	max. speed [min <sup>-1</sup> ]	moment of inertia [10 <sup>-6</sup> kgm <sup>2</sup> ]	torsional stiffness [10 <sup>-3</sup> Nm/arcmin]	max. shaft misalignment (mm)		spring rate [N/mm]		mass approx. [g]	tightening torque of screws [Nm]
					axial ±	lateral	axial	lateral		
2	2	12.000	2,5	400	0,3	0,1	32	100	30	2
5	5	12.000	2,8	800	0,3	0,1	70	400	40	2
7	7	12.000	12	1700	0,4	0,15	70	220	80	4
8	8	12.000	25	2100	0,5	0,15	20	90	125	8
12	12	12.000	28	2600	0,4	0,15	45	190	130	8

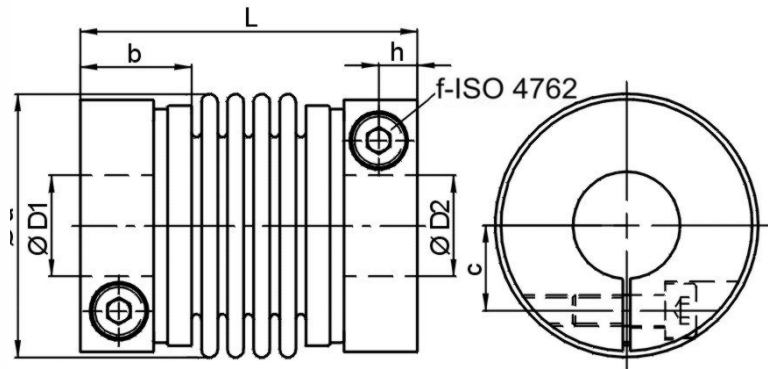
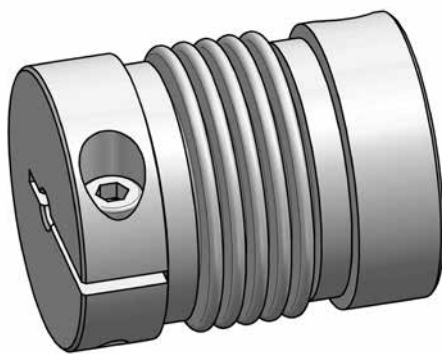
temperature range: -40°C up to +300°C

material:

bellows: stainless steel

hubs: high-tensile strength aluminum

screws: ISO 4762 / 12.9



Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

MKP	Øa	b	c	f	h	L ±0,5	ØD1/2min	ØD1/2max
2	24,5 (27,5)	13	7,5 (9,6)	M 3	4,4	35	3	10 (14)
5	24,5 (27,5)	13	7,5 (9,6)	M 3	4,4	36	6	10 (14)
7	34	14	11	M 4	5	47	6	17
8	40 (44,5)	16,5	13 (15,5)	M 5	6	51	6	19 (24)
12	40 (44,5)	16,5	13 (15,5)	M 5	6	51	6	19 (24)

on request, all couplings are available with EASY-clamp (see page 7)

stock bores D1/D2 (G7)

MKP	Ø4	Ø5	Ø6	Ø6,35	Ø8	Ø9,53	Ø10	Ø12	Ø15	Ø16	Ø19	Ø24
2/5	•	•	•	•	•	•	•					
7			•	•	•	•	•	•	•	•		
8/12			•	•	•	•	•	•	•	•	•	

note: further bore sizes possible on request

order example: MKP 5 - D1 = 4 G7 D2 = 12 G7

# Miniature Metal Bellows Coupling I Series MKA

✓ cost-effective version with set screws

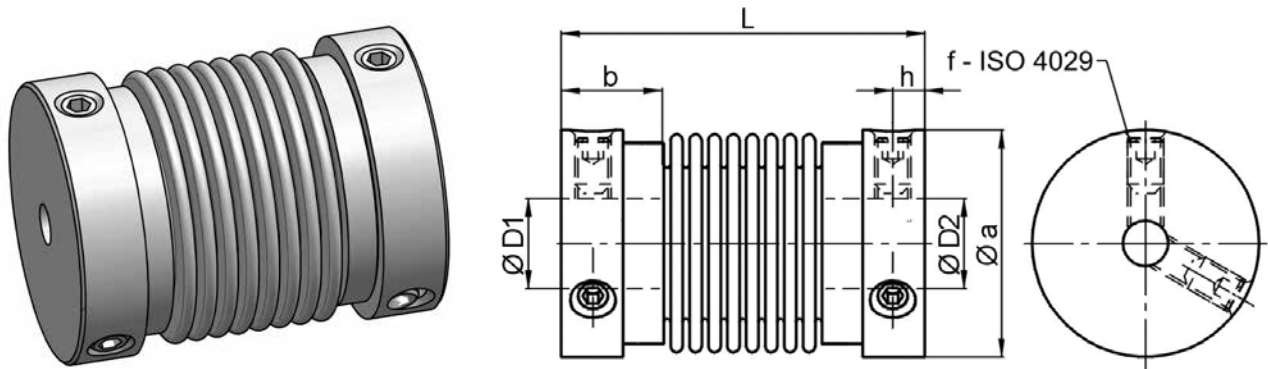
technical data:

MKA size	$T_N$ [Nm]	max. speed [min <sup>-1</sup> ]	moment of inertia [10 <sup>-6</sup> kgm <sup>2</sup> ]	torsional stiffness [10 <sup>-3</sup> Nm/arcmin]	max. shaft misalignment (mm)		spring rate [N/mm]		mass approx. [g]	tightening torque of screws [Nm]
					axial ±	lateral	axial	lateral		
0,4	0,4	20.000	0,19	50	0,2	0,1	10	15	8	1
0,9	0,9	20.000	0,19	90	0,2	0,1	21	26	10	1
2	2	12.000	2,9	230	0,2	0,1	15	15	32	4
4	4	12.000	3,2	460	0,2	0,1	35	65	37	4
6	6	12.000	16	1.100	0,25	0,25	45	60	85	8
8	8	12.000	28	1.300	0,3	0,25	16	24	120	10

temperature range: -20°C up to +90°C

material:

bellows: stainless steel      hubs: high-tensile strength aluminum      set screws: ISO 4029



Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

MKA	Øa	b	f	h	L ±0,5	ØD1/2min	ØD1/2max
0,4	16	7	2x M 3	2,3	26	3	8
0,9	16	7	2x M 3	2,3	27,5	3	8
2	25	11	2x M 4	3,5	38	5	15
4	25	11	2x M 4	3,5	39,5	5	15
6	35	12,5	2x M 5	4,3	54	6	20
8	41	14	2x M 6	5	54,5	6	26

stock bores D1/D2 (G7)

MKA	Ø3	Ø4	Ø5	Ø6	Ø6,35	Ø8	Ø9,53	Ø10	Ø12	Ø15	Ø16	Ø19	Ø24
0,4/0,9	•	•	•	•	•	•							
2/4			•	•	•	•	•	•	•	•			
6				•		•		•	•	•	•		
8				•		•		•	•	•	•	•	•

note: further bore sizes possible on request  
for easier disassembly, we recommend to have end faces on the shaft

order example: MKA 2 - D1 = 6<sup>G7</sup> D2 = 8<sup>G7</sup>

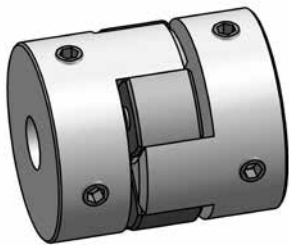
# Miniature Elastomer Coupling I Series MJT/MJT-C

// MJT-C: standard series with radial clamping hub // MJT: cost-effective version with set screws  
 // plug in // oscillation dampening

technical data:

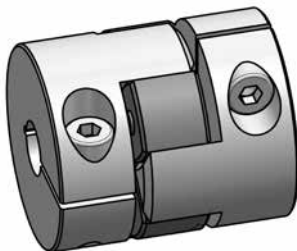
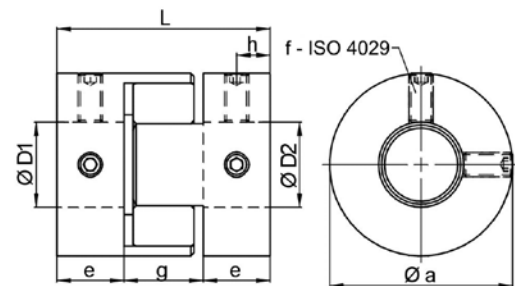
MJT/ MJT-C size	T <sub>N</sub> [Nm]	max. speed [min <sup>-1</sup> ]		moment of inertia [10 <sup>-6</sup> kgm <sup>2</sup> ]		torsional stiffness [10 <sup>-3</sup> Nm/arcmin]	max. shaft misalignment (mm)		mass approx. [g]	tightening torque of screws [Nm]	
		MJT	MJT-C	MJT	MJT-C		axial ±	lateral		f	i
14-B	0,7	27.000	11.000	0,21	0,16	3	0,6	0,15	7	0,7	0,5
20-B	1,8	20.000	7.500	1,0	1,1	5	0,8	0,20	18	0,7	1
30-B	4	13.000	5000	5,9	6,2	13	1,0	0,20	48	1,7	2,5
14-R	2	27.000	11.000	0,21	0,16	7	0,6	0,10	7	0,7	0,5
20-R	5	20.000	7.500	1,0	1,1	16	0,8	0,10	18	0,7	1
30-R	12,5	13.000	5.000	5,9	6,2	38	1,0	0,10	48	1,7	2,5

temperature range: -20°C up to +70°C

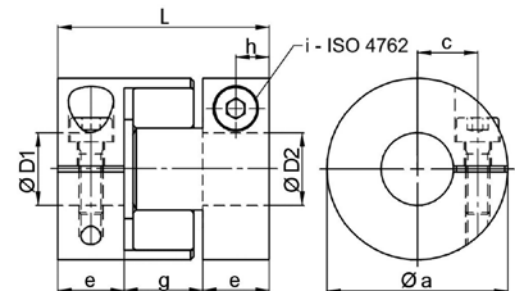


## Series MJT

**material:**  
 hubs: aluminum  
 elastomer spider: polyurethane  
 B 80-Sh-A (blue), R 98-Sh-A (red)



## Series MJT-C



Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

MJT/MJT-C	Øa	c	e	g	h	L	f	i
14	14	4	7	8	3,5	22	2x M 3	M 2
20	20	6,5	10	10	5	30	2x M 3	M 2,5
30	30	10	11	13	5,5	35	2x M 4	M 4

stock bores D1/D2 (G7)

• MJT ◊ MJT-C

MJT/MJT-C	Ø3	Ø4	Ø5	Ø6	Ø6,35	Ø8	Ø9,53	Ø10	Ø12	Ø14
14	• ◊	• ◊	• ◊	•						
20		◊	• ◊	• ◊	• ◊	• ◊	•	•		
30						• ◊	• ◊	• ◊	• ◊	•

note: further bore sizes possible on request  
 for easier disassembly of the MJT series, we recommend to have end faces on the shaft

temperature correction for nominal torques

-20°C up to +30°C	+50°C	+70°C
100%	75%	60%

order example: MJT-B30 - D1 = 8 <sup>H8</sup> D2 = 10 <sup>H8</sup> MJT-C-R 20 - D1 = 5 <sup>H8</sup> D2 = 6 <sup>H8</sup>



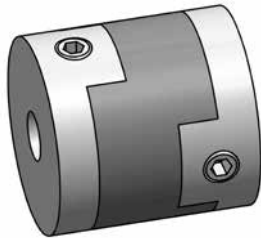
# Miniature Oldham-type Coupling I Series MOH/MOH-C

- compensation of big radial shaft misalignments / plug-in
- MOH-C: standard series with radial clamping hub / MOH: cost-effective version with set screws

technical data:

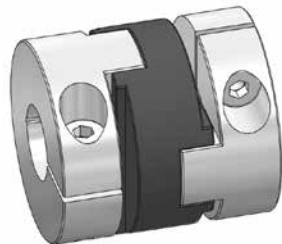
MOH/ MOH-C size	T <sub>N</sub> [Nm]	max. speed [min <sup>-1</sup> ]	moment of inertia [10 <sup>-6</sup> kgm <sup>2</sup> ]		torsional stiffness [10 <sup>-3</sup> Nm/arcmin]	max. misalignment		mass approx. [g]		tightening torque of screws [Nm]	
			MOH	MOH-C		radial [mm]	angular [°]	MOH	MOH-C	f	i
16	1	8.000	0,24	0,32	19	1	2	7	10	1	1
20	1,5	7.000	0,81	0,82	35	1,5	2	14	16	1,7	1
25	2,5	6.000	1,8	2,6	58	2	2	20	34	1,7	1,5
32	7	4.800	6,7	8,3	180	2,5	2	48	80	4	2,5
43	15	4.000	39	20	340	3	2	160	160	4	5

temperature range: -20°C up to +100°C

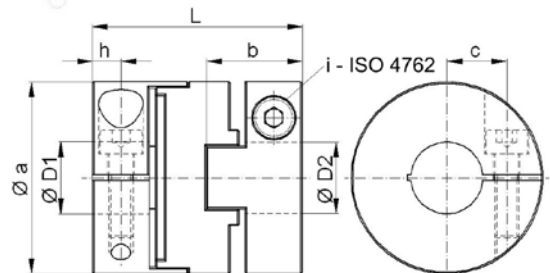
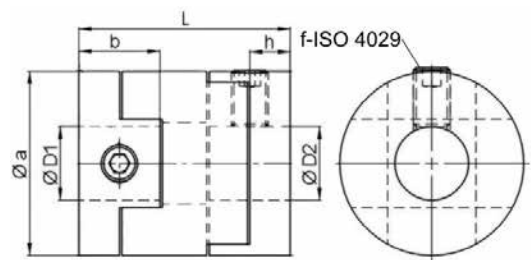


Series MOH

material:  
hub: aluminum - alloy  
spacer: polyacetal



Series MOH-C



temperature correction for nominal torques

-20°C up to +30°C	+40°C	+60°C	+100°C
100%	80%	60%	50%

Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

MOH/ MOH-C	Øa	b		c	h		L		f	i
		MOH	MOH-C		MOH	MOH-C	MOH	MOH-C		
16	16	8	9,5	5	2,3	3	18	21	1 x M 3	M 2,6
20	20	9	10	6,5	3,3	3	20	22,5	1 x M 4	M 2,6
25	25	11,5	12	8	3	4	25,5	26,5	2 x M 4	M 3
32	32	14,5	16	11	4	5	32	35	2 x M 5	M 4
43	43	24	21,5	15	7	7	52	47	2 x M 5	M 5

stock bores D1/D2 (H8)

MOH/MOH-C	Ø3	Ø4	Ø5	Ø6	Ø6,35	Ø8	Ø9,53	Ø10	Ø12	Ø14	Ø15	Ø16	Ø19
16	•	•	•	•									
20		•	•	•	•	•							
25			•	•	•	•	•	•					
32				•	•	•	•	•	•	•	•		
43				•	•	•	•	•	•	•	•	•	•

note: further bore sizes possible on request

order example: MOH 25 - D1 = 8<sup>H8</sup> D2 = 10<sup>H8</sup>

MOH-C 32 - D1 = 10<sup>H8</sup> D2 = 12<sup>H8</sup>

# Distance Couplings

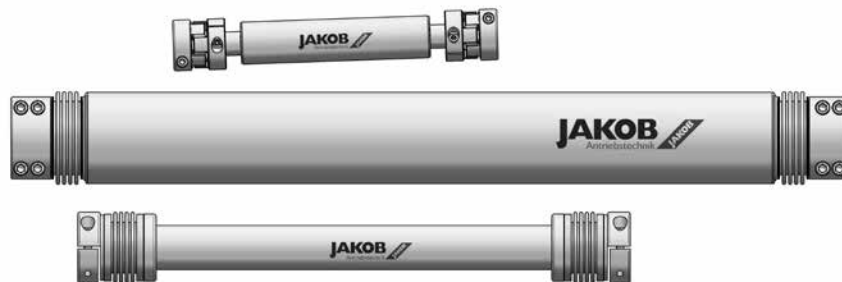


# Distance Couplings | General

## Definition - Distance Couplings:

This category is comprised of several coupling series which can cover axial distances of up to 6 m of length. The common main feature of all types is an intermediate part, which is variable in length and can precisely fit the required specifications of the customer. In many cases, they can be used as connecting shaft (synchronizing shaft) and can substitute for conventional constructions of connecting shafts with complicated additional intermediate bearings.

Misalignments, especially parallel misalignments, can be compensated to a higher extent. Furthermore, the stainless material and the easy assembly of all series are valuable assets. A secure, frictional connection with easy operation is assured because of the design in split-hub version (series WDS, WDE) or with sliding hub (series EKZ).



## Characteristics – JAKOB Distance Couplings:

- ✓ as connecting shaft without additional intermediate bearing
- ✓ up to 6 m axial distance
- ✓ high torsional stiffness ✓ backlash-free, precise torque transfer
- ✓ compensation of misalignments
- ✓ very easy to fit ✓ stainless design ✓ maintenance free
- ✓ high-speed

The customer can choose from three standard series with aluminum intermediate pipe:

### Series EKZ

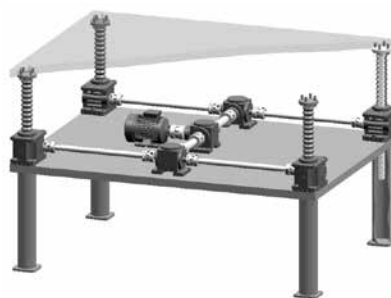
- ✓ length L = 0,2 - 3 m
- ✓ 6 sizes up to 700 Nm
- ✓ T max = 100°C
- ✓ elastomer spider
- ✓ plug-in sliding hub
- ✓ oscillation dampening
- ✓ cost-effective type for medium speeds

### Series WDE

- ✓ length L = 0,2 - 3 m
- ✓ 5 sizes up to 500 Nm
- ✓ T max = 100°C
- ✓ metal bellows
- ✓ integrated gimbal / cardan support
- ✓ cost-effective type with reduced operating parameters

### Series WDS

- ✓ length L = 0,2 - 6 m
- ✓ 7 sizes up to 1600 Nm
- ✓ T max = 300°C
- ✓ metal bellows
- ✓ integrated gimbal / cardan support
- ✓ big pipe diameter for max. speeds
- ✓ high torsional stiffness
- ✓ pipe connection detachable  
-> in-house production of the pipe is possible



EKZ - coupling for lifting table drive



WDS - coupling for multi-axis linear module

# Distance Couplings I Installation

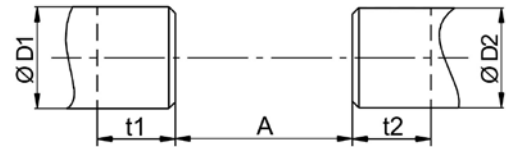
## Installation:

The split-hub, or the sliding hub design allows for easy assembly. Further simplification during installation is provided because one half of the split hub is screwed onto the pipe. This allows resting the coupling on the two shaft ends. The second half of the split-hub can then be mounted to the coupling by screwing it on from below with the specified tightening torque. This feature makes a "one man assembly" possible even with extremely long couplings. During maintenance, EKZ/WDS/WDE couplings can be exchanged without disassembling the drive or output units.

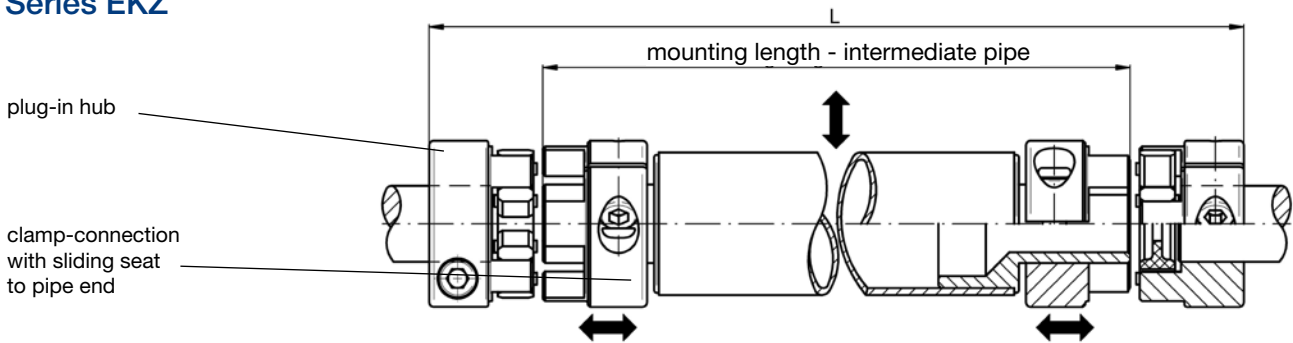
## Formula for length determination:

$$L = A + t_1 + t_2 \quad [\text{mm}]$$

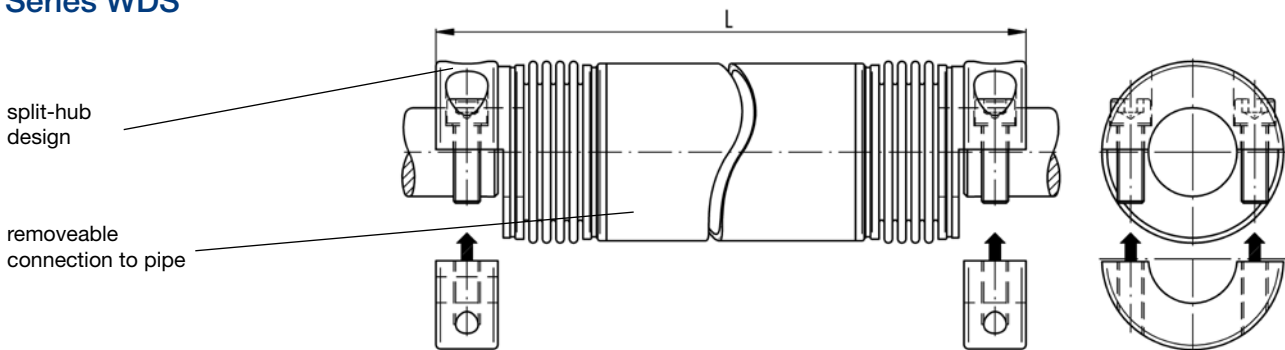
$A$  = shaft separation  $\pm 1$   
 $t$  = plug in depth  $\pm 1$   
 (see data sheets)



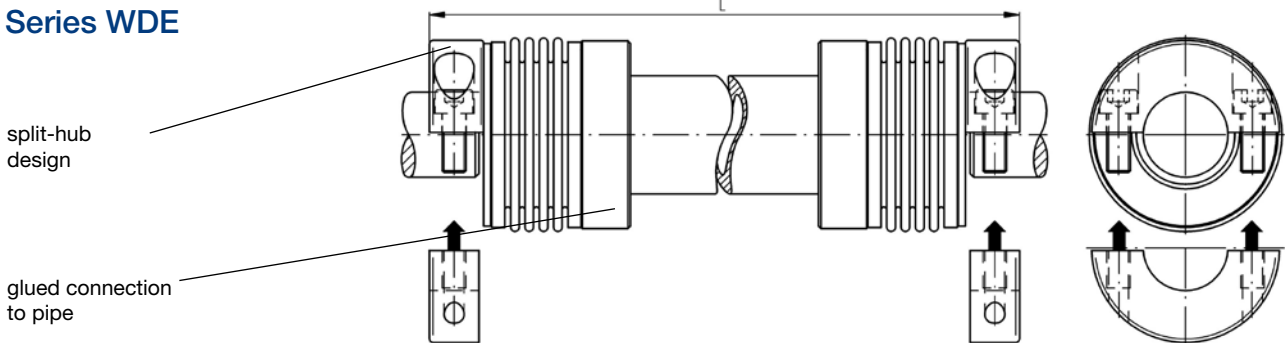
### Series EKZ



### Series WDS



### Series WDE



**Note:** The intermediate pipe can be delivered in different materials and section thicknesses, as well as in straightened and balanced quality for high speeds. At high speeds and concurrent long pipe length, a customized and optimized intermediate pipe made from CFC will be used (see picture to the left).

# Metal Bellows Coupling with Intermediate Pipe I Series WDS

- /// variable length: 0,2 up to 6 m // simple installation // split-hub design
- /// backlash-free, precise torque transfer // no additional intermediate bearing
- /// high-speed // low moment of inertia

## technical data:

WDS	T <sub>N</sub> [Nm]	torsional stiffness [Nm/arcmin]				moment of inertia [10 <sup>-3</sup> kgm <sup>2</sup> ]				max. speed approx. [min <sup>-1</sup> ]				mass approx. [kg]			
		1m	2m	3m	4m	1m	2m	3m	4m	1m	2m	3m	4m	1m	2m	3m	4m
15	15	0,4	0,2	0,15	-	0,2	0,4	0,6	-	3900	880	370	-	0,9	1,5	2,3	-
50	50	1,5	0,8	0,6	0,5	0,9	1,6	2,2	2,9	6000	1300	550	300	1,8	3	4,3	5,5
100	100	2,6	1,5	1,0	0,8	1,8	2,9	4,1	5,3	7300	1600	670	360	2,5	4	5,5	7
200	200	5,9	3,5	2,5	1,9	5,3	9,1	13	17	8000	2100	900	500	3,8	6	8	10
400	400	17	10	7,5	6	12	21	31	40	8000	2700	1100	600	7	11	15	19
800	800	26	16	11	9	32	48	64	80	8000	3400	1400	760	15	20	25	30
1600	1600	61	37	27	21	116	150	190	230	8000	4800	2000	1100	31	38	44	51

maximum temperature range: -40°C up to +300°C

maximum axial shaft misalignment:  $\Delta A = \pm 1,5 \text{ mm}$

maximum angular shaft misalignment:  $\alpha = 1^\circ$

maximum lateral shaft misalignment:  $\Delta R = \tan \alpha \cdot L_x$  with  $L_x = L - (2 \cdot L_1) / \tan 1^\circ = 0,0174$

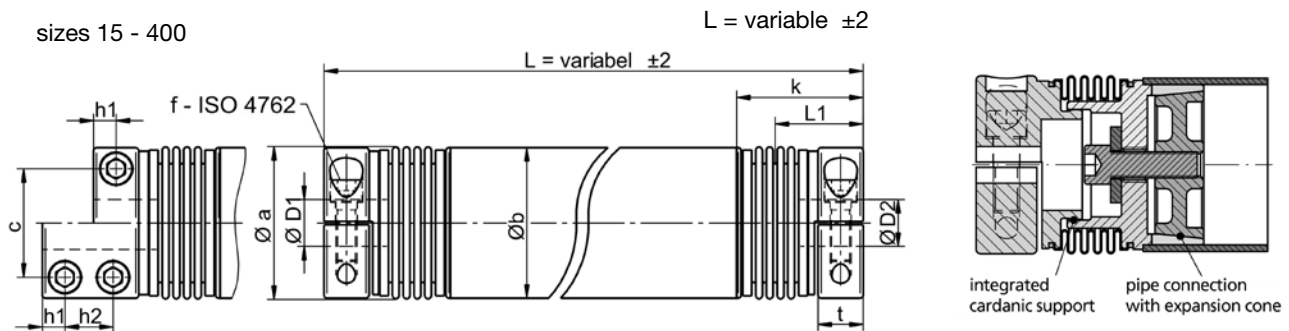
### calculation example:

WDS 200 / L = 1200 mm ->  $\Delta R = \tan \alpha \cdot L_x$

with  $L_x = 1200 - (2 \cdot 53) = 1094 \text{ mm}$

$\Delta R = \tan 1^\circ \cdot 1094 \text{ mm} \approx 20 \text{ mm}$

**note:** lengths of over 4 m and in-house production of intermediate pipe are possible on request



sizes 800 - 1600

**material:** bellows: stainless steel

hubs: sizes 15 - 400: high-tensile aluminum / sizes 800-1600: steel - oxidized

intermediate pipe: aluminum - optional: steel, stainless steel, CFC

## Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

WDS size	Øa	c	f-tightening-torque*	h1	h2	L1	k	t	L <sub>min</sub>	ØD1/2 min	ØD1/2 max(*)
15	36	21	2x M5 - 8Nm	9	-	37	54	18	108	6	15
50	58	36	2x M8 - 35Nm	13	-	48	67	26	132	9	25
100	75	47	2x M10 - 65Nm (50)	13	-	48	69	26	136	12,5	35 (31)
200	89	56	2x M12 - 115Nm (80)	14	-	53	77	28	152	19	42 (34)
400	109	72	2x M14 - 180Nm (140)	15	-	58	84	30	165	24	55 (48)
800	123	80	4x M12 - 115Nm	13	22	74	101	45	200	24	65
1600	158	108	4x M16 - 290Nm	18	30	95	125	64	250	35	85

Øa: interfering edge - bolt head

(\*) note: reduced tightening torque (see brackets) for bigger hub bore diameter - see also Ø D 1/2max!

**order example:** WDS 400 - D1 = 28<sup>G7</sup> D2 = 38<sup>G7</sup> L = 1250

# Metal Bellows Coupling with Intermediate Pipe I Series WDE

- /// cost-effective version with reduced operational parameters
- /// variable length up to 3 m // simple installation // split-hub design
- /// backlash-free, precise torque transfer // no additional intermediate bearing

## technical data:

WDE	$T_N$	$T_{max}$	torsional stiffness [Nm/arcmin]			moment of inertia [ $10^{-3}kgm^2$ ]			max. speed approx. [ $min^{-1}$ ]			mass approx. [kg]		
			Größe	[Nm]	[Nm]	1m	2m	3m	1m	2m	3m	1m	2m	3m
40	40	80	0,46	0,23	0,15	0,4	0,6	0,8	2.900	700	300	1,1	1,8	2,5
80	80	160	1,1	0,5	0,4	1,2	1,6	2,0	3.000	900	400	1,7	2,6	3,5
160	160	320	2,0	1,0	0,6	2,0	2,7	3,4	3.000	1.100	500	2,3	3,4	4,6
250	250	500	4,9	2,4	1,6	4,8	6,7	8,7	3.000	1.500	650	3,6	5,4	7,1
500	500	1000	10,5	5,2	3,5	10,5	14,5	18,5	3.000	1.900	850	5,3	7,5	9,7

maximum temperature range:  $-40^{\circ}C$  up to  $+90^{\circ}C$

maximum axial shaft misalignment:  $\Delta A = \pm 1,5 \text{ mm}$

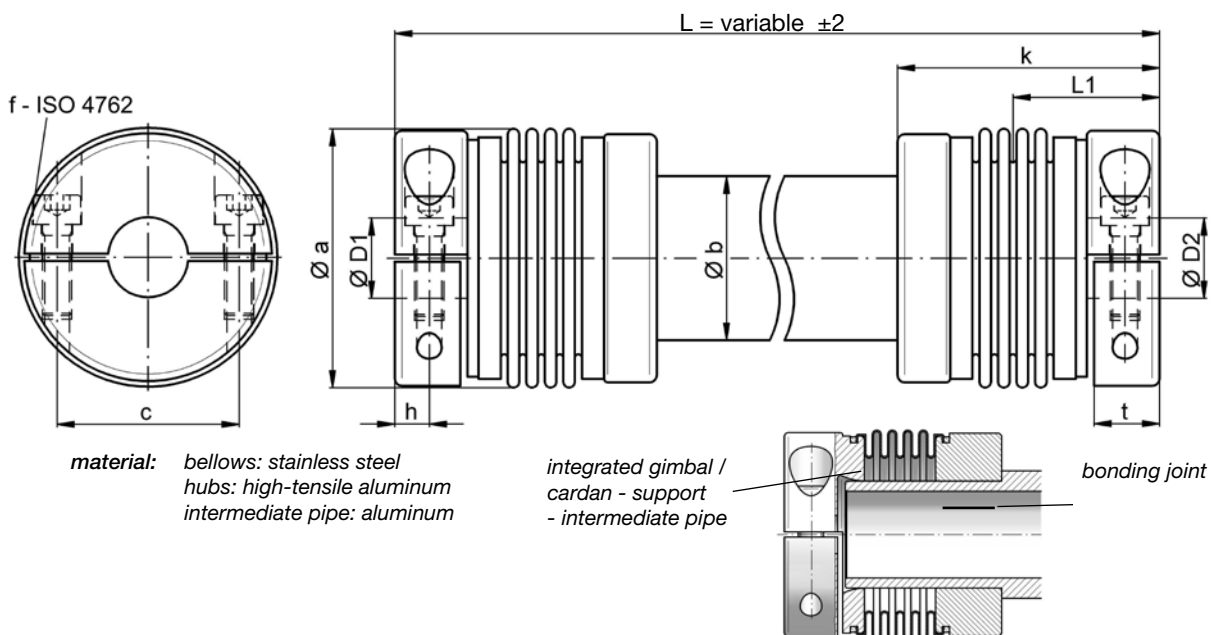
maximum angular shaft misalignment:  $\alpha = 1^{\circ}$

maximum lateral shaft misalignment:  $\Delta R = \tan \alpha \cdot L_x = L - (2 \cdot L_1) / \tan 1^{\circ} = 0,0174$

## calculation example:

WDE 80 /  $L = 900 \text{ mm} \rightarrow \Delta R = \tan \alpha \cdot L_x$

with  $L_x = 900 - (2 \cdot 40) = 820 \text{ mm}$ ;  $\alpha = 1^{\circ}$       $\Delta R = \tan 1^{\circ} \cdot 820 \text{ mm} \approx 14 \text{ mm}$



**material:** bellows: stainless steel  
hubs: high-tensile aluminum  
intermediate pipe: aluminum

integrated gimbal /  
cardan - support  
- intermediate pipe

bonding joint

## Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

WDE	Øa	Øb	c	f-tightening torque*	h	L1	k	t	$L_{min}$	ØD1/2 min	ØD1/2 max(*)
40	57	35	38	2x M6 - 14Nm	8	37	62	16	112	14	30
80	72	45	50	2x M8 - 35Nm (30)	9,5	40	72	18	124	22	38 (31)
160	83	55	57	2x M10 - 65Nm (50)	10,5	45	84,5	21	144	22	43 (37)
250	103	70	70	2x M12 - 115Nm (90)	12,5	49	92,5	24	155	25	55 (44)
500	123	90	87	2x M14 - 180Nm (140)	15	61	109	30	190	32	70 (54)

(\*) note: reduced tightening torque (see brackets) for bigger hub bore diameter - see also Ø D 1/2max!

order example: WDE 250 - D1 = 28<sup>G7</sup> D2 = 38<sup>G7</sup> L = 980

# Elastomer Coupling with Intermediate Pipe I Series EKZ

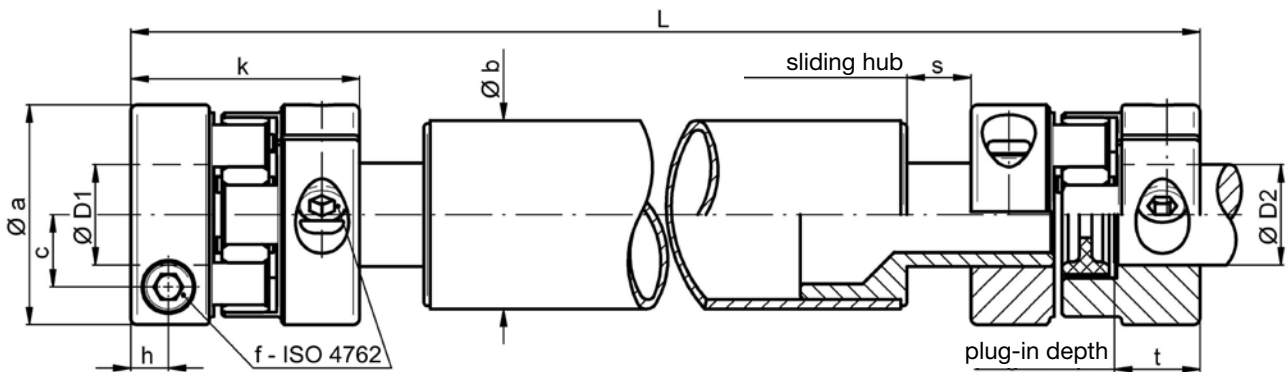
- /// variable length of up to 3 m // plug-in // backlash-free // oscillation dampening
- /// cost-effective solution // rust-proofed version
- /// clamping hub on both sides // simple installation

## technical data:

EKZ	T <sub>N</sub> [Nm]	torsional stiffness (stat. at 0,5xT <sub>N</sub> ) [Nm/arcmin]				moment of inertia [10 <sup>-3</sup> kgm <sup>2</sup> ]				max. speed approx. [min <sup>-1</sup> ]				mass approx. [kg]			
		0,5m	1m	2m	3m	0,5m	1m	2m	3m	0,5m	1m	2m	3m	0,5m	1m	2m	3m
20	20	0,15	0,13	0,11	-	0,14	0,23	0,42	-	3.500	2.700	680	-	0,6	0,9	1,6	-
45	45	0,28	0,26	0,23	0,2	0,44	0,79	1,5	2,2	3.500	3.500	990	440	1,0	1,6	2,9	4,1
90	90	0,42	0,38	0,31	0,27	0,64	1,0	1,7	2,4	3.500	3.500	990	440	1,2	1,8	3,0	4,3
200	200	0,7	0,63	0,53	0,46	1,2	1,8	3,0	4,2	3.500	3.500	1.600	720	1,8	2,5	4,0	5,5
400	400	1,4	1,3	1,1	1,0	3,2	5,1	8,9	12,7	3.500	3.500	1.600	720	2,8	3,8	5,8	7,8
700	700	5,7	5,1	4,3	3,7	12,6	17	26	35	3.500	3.500	2.000	880	6,3	8,3	12	16
1500	1500	7,5	8,5	7,0	6,0	95	100	115	130	3.500	3.500	2.000	890	26	26	31	36

maximum axial shaft misalignment ± 1 mm                      maximum lateral shaft misalignment 5 mm per meter

maximum temperature range: -30°C up to +90°C



**material:** hubs: high-tensile aluminum (size 1500: steel)  
intermediate pipe: aluminum precision pipe (optional: steel/stainless steel)  
elastomer spider: PUR-72 Sh-D (size 1500: 98 Sh-A)  
screws: ISO 4762 / 12.9

## Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

EKZ	Øa	Øb	c	f-tightening torque	h	k	L <sub>min</sub>	s	tmin	tmax	ØD1/2min	ØD1/2max
20	40	35	13	M 5 - 8 Nm	8	50	132	16	16	20	10	20
45	50	50	16,5	M 6 - 14 Nm	9	58	152	18	18	25	13	26
90	60	50	19,5	M 8 - 35 Nm	10	62	160	18	20	26	15	29
200	70	60	23	M 10 - 65 Nm	12	73	186	20	23	30	22	33
400	85	80	29	M 12 - 115 Nm	14	86	220	24	28	35	30	42
700	120	100	44	M 14 - 180 Nm	18	109	284	33	35	42	40	70
1500	160	120	56	M 16 - 290 Nm	21	124	330	40	35	45	50	90

**note:** sliding hub of size EKZ 400 with clamping screw M 10 - T<sub>A</sub> = 65 Nm

order example: EKZ 200 - D1 = 32<sup>H7</sup> D2 = 28<sup>G6</sup> L = 660

**JAKOB**  
Antriebstechnik

**JAKOB**

# Safety couplings



**JAKOB**  
**GRUPPE**

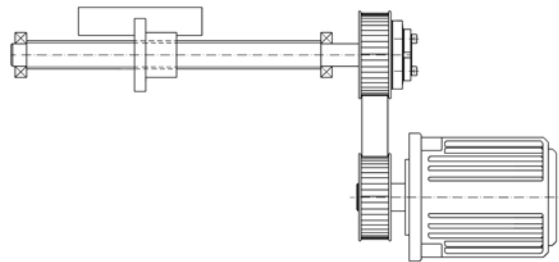


# Safety Couplings I Modular System

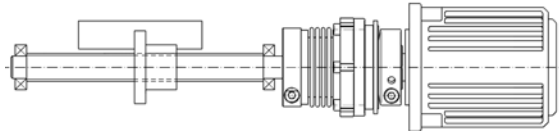
The safety coupling modular system consists of three standard series, as well as several special solutions for nearly every conceivable application. Various attachments can be fit to the safety mechanism, depending on the application.

For indirect drives, pulley, gear, or flange connection is available. For direct drives, the safety mechanism is connected to a metal bellows or elastomer coupling. The most important criteria for selection are the required disengagement torque, torsional stiffness, shaft diameters, assembly conditions, and shaft misalignment.

indirect drives



direct drives

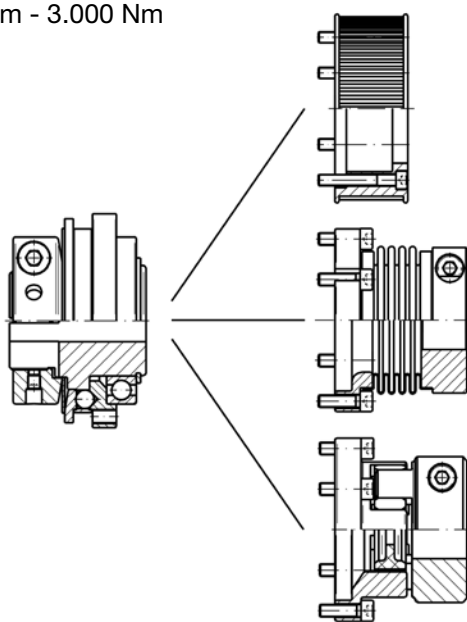


## Overview:

### safety mechanism

2 Nm - 3.000 Nm

### attachments



- /// pulleys
- /// gears
- /// flanges

- /// metal bellows
  - torsionally stiff
  - all-steel-version
  - high operating temperatures
  - variable length

- /// elastomer spider
  - oscillation dampening
  - plug-in, electrically insulating
  - $T_{max} \leq 120^{\circ}C$

### series

SK

SKB-K  
SKY-K

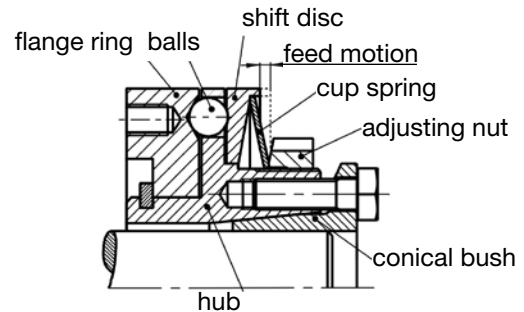
SKB-E  
SKY-E

## Note:

- /// To reduce wear on the safety coupling mechanism the drive should be stopped as soon as possible after disengagement. The signal of the limit switch can be used for this purpose (emergency-OFF signal)
- /// In vertical drive axes, the slide or the table can drop upon disengagement of the safety coupling due to its own weight and the low residual torque of the safety coupling. To counter this effect, it is suggested that either a compensating weight or an additional brake be provided.
- /// During the coupling selection, the linear measuring system (positioning) must also be considered. When fitting an encoder to the drive motor, a torsionally stiff coupling should be used to get the best results.
- /// For high speed applications, please select types SKY or SKY-ES because of their rotational symmetry. Nominal speed up to  $4,000 \text{ min}^{-1}$  are possible on request.
- /// The safety coupling is maintenance free under normal operating conditions.
- /// For mounting instructions and explanations about the shaft - hub - connection, please see pages 1-4.

# Safety Couplings I Technical Information

JAKOB safety couplings are designed as nominal break points or as overload protection in a direct or indirect drive train. The heart of the safety coupling is a highly precise, sturdy disengagement mechanism with steel balls as spring loaded positive locking elements. The drive torque is guided into the centrally arranged hub via a frictional, backlash-free radial clamping hub or conical bush connection. The hub is designed as a ball cage and serves for fitting the flange ring and the shift disc. Special cup springs press the balls over the shift disc into hardened countersunk holes (calotte) of the flange ring. In normal operation, the drive torque is transferred without backlash into the flange ring. For further transfer of the torque and speed, a choice of compensation elements (metal bellows, elastomer spider), a gear or pulley or an appropriate connection flange is fit to the flange ring. If the set disengagement torque is exceeded in the case of crash or collision, the flange ring turns in relation to the cage hub and the balls are abruptly pushed out of the holes. The drive train is cut-off within a few milliseconds.



The axial stroke of the shift disc can be used with a proximity or mechanical limit switch for the immediate stop (emergency-OFF) of the drive.

## The backlash-free ball locking mechanism

The **preload** of the hardened and polished steel balls between the ball cage, the hub, and the detents of the flange ring ensures a **backlash-free torque** and angular motion transfer with high torsional stiffness. The mechanism is effective **in reverse direction** as well (for clockwise or counter-clockwise operation).

## The degressive spring characteristic

The function of the safety coupling is influenced substantially by the cup springs, developed specifically for this application. Due to its operation in the **degressive range**, the spring force drops with increasing spring travel (shifting path), whereby **the torque drops immediately** on response. With conventional spring loaded torque limiters on the other hand, springs are stressed even further and the spring force as well the disengagement torque increase considerably before the actual disengagement takes place, leading to additional damage. This results in an undefined function between response and disengagement.

## Dynamic disengagement characteristics

JAKOB safety couplings are distinguished by their excellent dynamic disengagement characteristics. The reason for this is the **degressive spring characteristic**, as well as the **minimized mass** (ball and indexing plate) which must be accelerated axially during disengagement. The product of mass and acceleration ( $F = m \times a$ ) results in a force which must be added to the spring force. In conventional couplings where large masses have to be moved, the static disengagement torque and the reaction time can increase manifold.

## The re-engaging

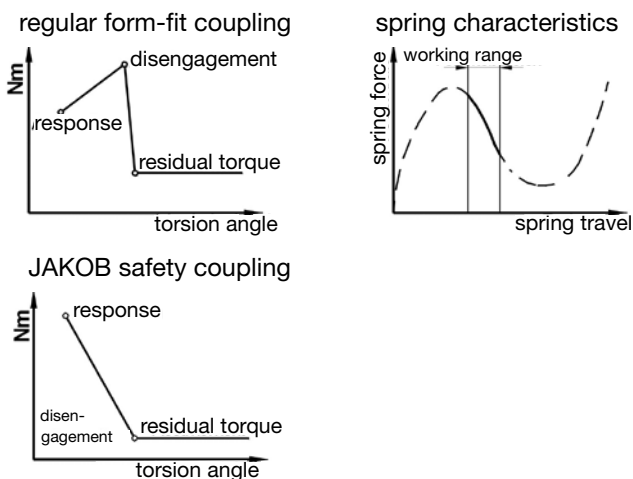
The balls, the cage bores and holes are distributed asymmetrically on the circumference, so that only one **synchronized location** is possible every 360°. Until then, the balls slip over with a low **residual torque** he repeat accuracy of the configured disengagement torque is  $\max \pm 5\%$ . After elimination of the breakdown cause, the coupling re-engages at low speeds (below 30 r.p.m) into the **synchronized position** automatically and is ready for function. The relocation time for the reference point location is reduced considerably due to the synchronous reengagement.

## The release mechanism

JAKOB offers various solutions for applications with high speeds and long stopping times. The ball-locking mechanism may have to be replaced by a mechanism which will not reengage until the drive is reversed at low speeds.

## The labyrinth seal

In the SKB, SKY, SKX-L, and SKW series the locking mechanism is protected against penetration with dirt and washing out of lubricants by a special labyrinth seal.



## Safety Couplings I Adjusting the Disengagement Torque

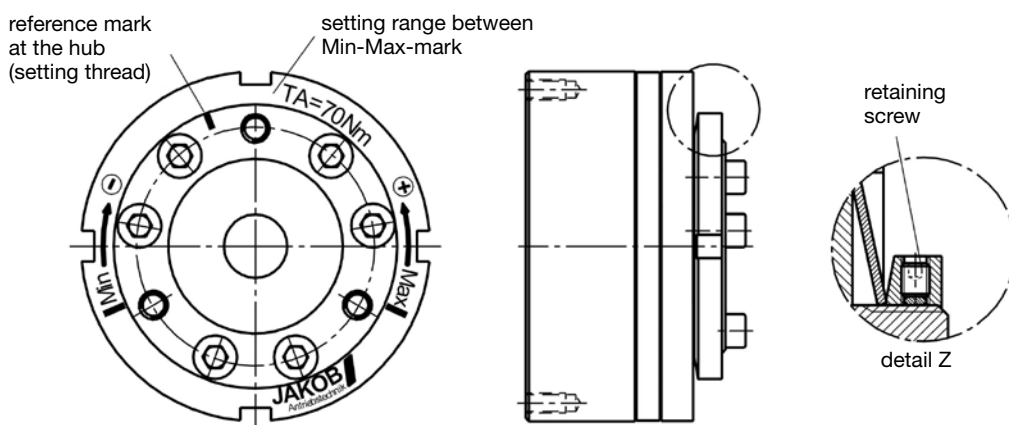
The disengagement torque generally is between 40% and 100% of the nominal torque of the coupling and is adjustable steplessly. If the customer does not specify a setting value, it is set **at the maximum torque** (nominal torque). The set, static disengagement torque can be adjusted (on the machine) at a later date by turning the adjusting nut with a pin wrench if needed. Adjusting nuts are provided with a user friendly scale: the disengagement torque, and the reference marks for T<sub>min</sub> and T<sub>max</sub> are engraved on the face side of the adjusting nut to facilitate setting. Disengagement torques greater than T<sub>max</sub> are possible (on request), but this results in a stronger wear of the disengagement mechanic.

### Caution:

Due to the degressive spring characteristics, turning back (counter-clockwise) the adjusting nut means an increase, or a turning in clockwise direction means a reduction of the disengagement torque (see direction arrow at clamping nut)!

### Series SKG/SKY/SKW

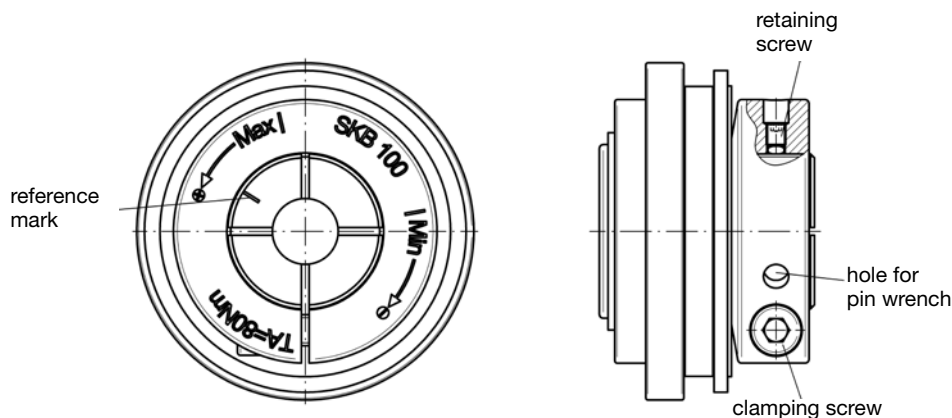
Setting of disengagement torque:



Unscrew retaining screw (see detail Z) completely; turn adjusting nut with pin wrench; after adjustment, secure the adjustment nut against turning by drilling and tightening the retaining screw.

### Series SKB/SKX-L

Setting scale of disengagement torque:



Release retaining screw. Turn adjusting nut with pin wrench (note reference mark). Tighten retaining screw on hub after setting the required disengagement torque. Setting can be done by turning the hub with scale till the required torque value is in line with the reference mark. In mounted state, the clamping screw must be released, and after setting the disengagement torque, it has to be fastened again.

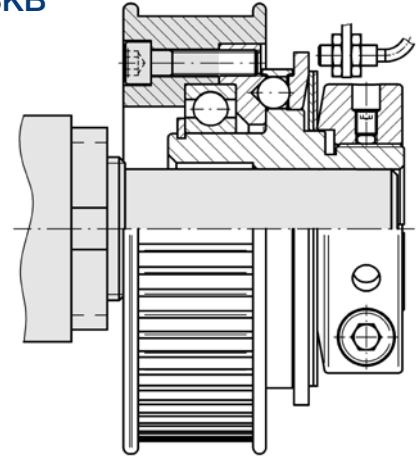
# Safety Couplings I *for indirect drives*

- ✓ for the attachment of toothed belt pulleys, gear wheels, chain wheels, flanges, and so on
- ✓ with integrated ball bearing or sliding bearing - for optimal constructional adjustment
- ✓ frictional shaft-hub-connection with conical clamping bush or conical clamping ring

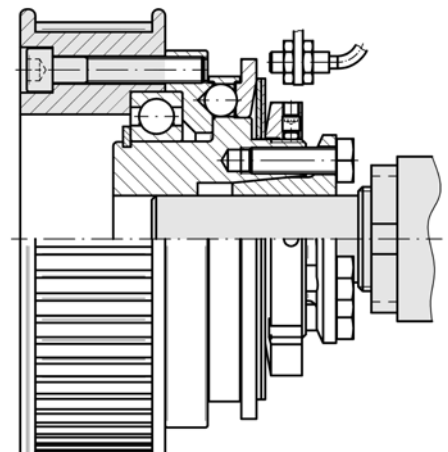
For overload protection or as collision protection for indirect drives, JAKOB's standard program presents series SKB, SKY, SKW and SKG with integrated ball bearing, as well as series SKX-L with integrated sliding bearing. The flange rings can be attached to gear wheels or other units with an axial run-out accuracy of a few hundredths of a millimeter. During normal operation, the bearings must take up the radial and axial forces and transfer them to the drive or output shaft. Only during uncoupling, there is a relative rotational movement between flange ring and hub for a short time. The torque is transferred without backlash and frictionally from the shaft to the coupling hub by a conical clamping ring or a conical clamping bush.

The SKB coupling can be used for big pulleys and pinions because of the reference diameter of the fastening threads, the SKX-L series is made for longer attachment parts with small diameters. The series SKG with its integrated ball bearing provides a good alternative for very compact solutions. To achieve this, the coupling body can almost be completely fit into the pulley with the result, that the forces can be led almost centrally into the bearing. Furthermore, the clamping ring is located on the inside, at the side of the shaft, and therefore a subsequent mounting (modification) is possible, even when available space is limited. Other safety coupling series for indirect drives, such as series SKM with separate sliding bearing or series SKD with blocking mechanism can be delivered upon special request.

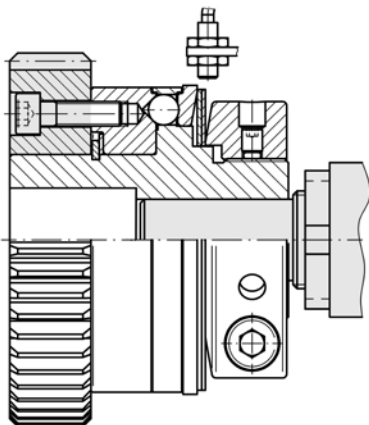
Series SKB



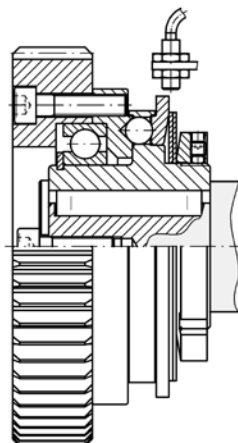
Series SKY



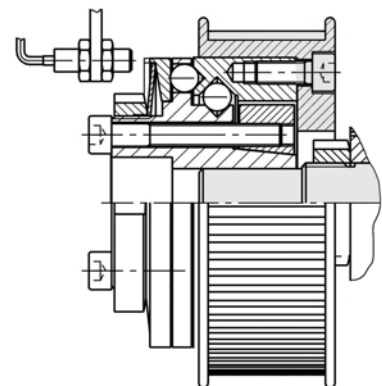
Series SKX-L



Series SKW



Series SKG



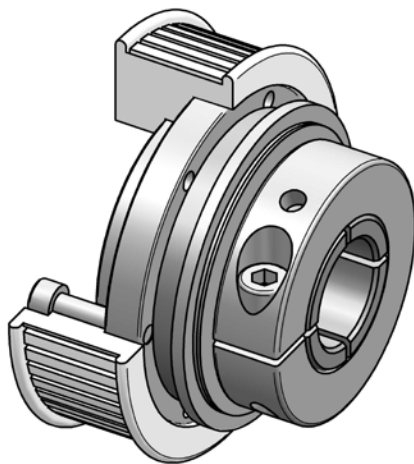
# Safety Coupling I Series SKB for indirect drives

- /// simple installation with clamping ring hub // with integral ball bearing
- /// for high axial and radial loads // excellent run-out accuracy
- /// alternative in corrosion-resistant design

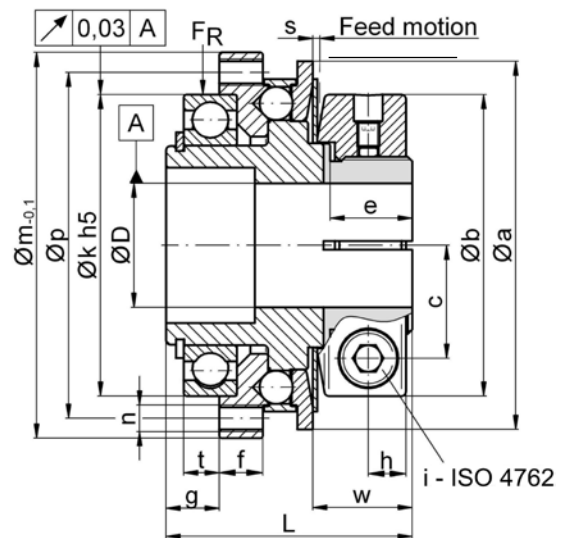
## technical data:

SKB size	setting range disengagement torque $T_{KA}$ [Nm]	moment of inertia $[10^{-3} \text{kgm}^2]$	mass approx. [kg]	tightening torque of screw 'i' [Nm]	max. radial load $F_R$ [N]	bore diameters $\varnothing D$ prebored min max
6	2 - 6					6 16
12	6 - 12	0,09	0,36	M 5 - [10]	5.000	6 8 16
15	8 - 15					10 25,4
30	13 - 30	0,36	0,80	M 6 - [18]	8.000	10 12 25,4
45	22 - 45					14 25,4
60	25 - 60					18 35
100	40 - 100	1,10	1,50	M 8 - [40]	9.500	17 18 35
150	60 - 150					24 35
230	80 - 230	4,2	3,3	M 10 - [80]	23.000	21 24 44
330	130 - 330					32 44
500	200 - 500	12,2	6,2	M 14 - [220]	30.000	27 28 58
800	350 - 800					40 58
1000	500 - 1000	76	20	2x M 16 - [290]	50.000	42 48 100
2000	800 - 2000					

note: for higher torques, see series SKY



material:  
heat-treated steel  
temperature range: -30°C up to +200°C



## Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

SKB	$\varnothing a$	$(\varnothing a^*)$	$\varnothing b$	c	e	f	g	h	$\varnothing k^{h5}$	$\varnothing m$	$\varnothing p$	L	n	s	t	w
6/12	48	(42)	38,5	13,5	13	8	9,8	6	42	52	47	41	6xM 3	0,9	7	15,8
15/30/45	66	(60)	53	19,5	15	9	11,5	7,5	55	69	62	48	6xM 4	1,2	8	18,5
60/100/150	83	(76)	68	25,5	18,5	9	12	8,5	68	87	78	55,5	6xM 6	1,6	8	22,4
230/330	109	(104)	87	32	21	14	16,5	10,5	90	113	102	71,5	6xM 8	1,8	12	25,6
500/800	132	-	115	42	30	15	17	13,5	110	136	124	87,5	8xM 8	2,5	12	37
1000/2000	185	-	172	69	76	16	28	17/30	140	181	165	142±2	12xM10	3,7	22,5	77

\*note: smaller outer diameters of the thrust plate are possible (see values in brackets)

order example: SKB 30 -  $D = 24^{H7}$  -  $T_{KA} = 25 \text{ Nm}$   
SKB 230 - corrosion resistant -  $D = 35^{G6}$  -  $T_{KA} = 200 \text{ Nm}$

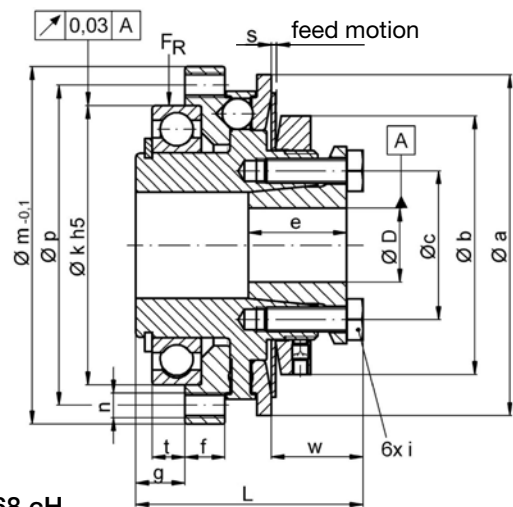
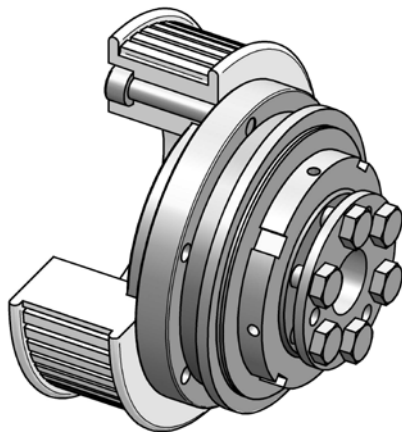
# Safety Coupling I Series SKY for indirect drives

- /// with conical clamping hub // with integral ball bearing
- /// for high axial and radial loads // excellent run-out accuracy
- /// alternative in corrosion-resistant design

## technical data:

SKY size	setting range disengagement torque $T_{KA}$ [Nm]		moment of inertia $[10^{-3} \text{kgm}^2]$	mass approx. [kg]	tightening torque of screws 6x i [Nm]	max. radial load $F_R$ [N]	bore diameters $\varnothing D$		
	min	max					prebored	min	max
6	2	- 6	0,08	0,30	M 3 - ISO 4762 - [2]	5.000	-	5	11,5
12	6	- 12					5	11,5	
15	8	- 15	0,31	0,65	M 4 - ISO 4762 - [4]	8.000	8	9	17
30	13	- 30						9	17
45	22	- 45	0,95	1,3	M 6 - ISO 4017 - [14]	9.500	11	10	17
60	25	- 60						12	24
100	40	- 100	3,8	2,9	M 6 - ISO 4017 - [14]	23.000	17	12	24
150	60	- 150						14	24
230	80	- 230	10	5,1	M 8 - ISO 4017 - [35]	30.000	25	18	35
330	130	- 330						22	35
500	200	- 500	53	14	M 12 - ISO 4017 - [115]	50.000	38	28	42
800	350	- 800						30	42
1000	500	- 1000	160	26	10x M 12 - ISO 4017 - [115]	65.000	49	40	65
2000	800	- 2000						42	65
3000	1500	- 3000	50	80	65.000	49	50	50	80
6000	3000	- 6000						50	80
9000	6000	- 9000	50	80					

**material:**  
heat-treated steel  
temperature range:  
-30°C up to +200°C



Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

SKY	Øa	(Øa*)	Øb	Øc	e	f	g	Øk <sup>h5</sup>	Øm	Øp	L	n	s	t	w
6/12	48	(42)	33	19	15	8	9,8	42	52	47	39	6x M3	0,9	7	13,8
15/30/45	66	(60)	45	27	18	9	11,5	55	69	62	47,5	6x M4	1,2	8	18,1
60/100/150	83	(76)	63	36,2	24	9	12	68	87	78	55,5	6x M6	1,6	8	22,4
230/330	109	(104)	84	50	27	14	16,5	90	113	102	70	6x M8	1,8	12	24
500/800	132	-	105	62	32	15	17	110	136	124	84	8x M8	2,5	12	33,4
1000/2000	185	-	168	90	45	16	28	140	181	165	130	12xM10	3,7	22,5	64,5
3000-9000	236	-	197	110	53	18/14	21	180	243	200/225	136	12xM10	3,0	14	62

\*note: smaller outer diameters of the shift disc are possible (see values in brackets)

\*\* sizes 3000-9000 with shrink disc for bigger bore diameters up to Ø120

order example: SKY 60 - D = 22<sup>G6</sup> -  $T_{KA} = 40 \text{ Nm}$   
SKY 150 - corrosion resistant - D = 22<sup>G6</sup> -  $T_{KA} = 120 \text{ Nm}$

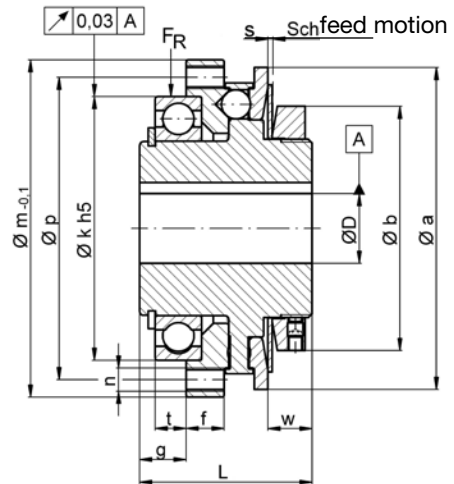
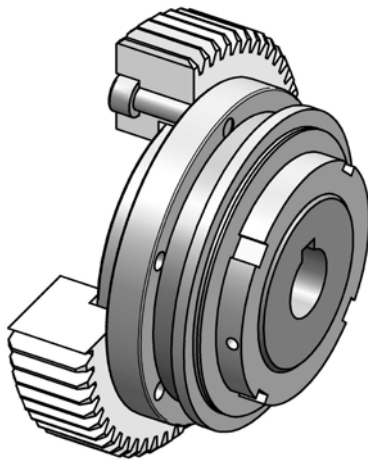
# Safety Coupling I Series SKW for indirect drives

- ✓ cost-effective type ✓ easy keyway connection
- ✓ with integrated ball bearing for high axial and radial load

technical data:

SKW Size	setting range disengagement torque $T_{KA}$ [Nm]		moment of inertia [ $10^{-3} \text{kgm}^2$ ]	mass approx. [kg]	max. radial load $F_R$ [N]	n	bore diameters $\varnothing D$	
	min	max					min	max
6	2	- 6	0,08	0,28	5.000	6 x M 3	6	12
12	6	- 12					6	12
15	8	- 15	0,3	0,63	8.000	6 x M 4	8	22
30	13	- 30					10	22
45	22	- 45					10	22
60	25	- 60	0,91	1,25	9.500	6 x M 6	11	32
100	40	- 100					13	32
150	60	- 150					16	32
230	80	- 230					18	38
330	130	- 330	3,70	2,80	23.000	6 x M 8	21	38
500	200	- 500					26	55
800	350	- 800	9,25	4,80	30.000	8 x M 8	38	55
1000	500	- 1000					39	90
2000	800	- 2000	52	15,5	50.000	12 x M 10	52	90
3000	1500	- 3000					50	110
6000	3000	- 6000	160	25	65.000	12 x M 10	50	110
9000	6000	- 9000					50	110

material:  
heat-treated steel  
temperature range:  
-30°C up to +200°C



Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

SKW	$\varnothing a$	( $\varnothing a^*$ )	$\varnothing b$	f	g	$\varnothing k h^5$	$\varnothing m$	$\varnothing p$	$L^*$	s	t	w
6/12	48	(42)	33	8	9,8	42	52	47	31	0,9	7	5,8
15/30/45	66	(60)	45	9	11,5	55	69	62	38	1,2	8	8,6
60/100/150	83	(76)	63	9	12	68	87	78	44,5	1,6	8	11,4
230/330	109	(104)	84	14	16,5	90	113	102	59,5	1,8	12	13,7
500/800	132	-	105	15	17	110	136	124	68,5	2,5	12	18,1
1000/2000	185	-	168	19	28	140	181	165	106	3,7	22,5	40,4
3000-9000	236	-	197	18/14	21	180	243	200/225	127	3,0	14	53

\*note: smaller outer diameters of the shift disc are possible (see values in brackets)  
with zero clearance conical-hub-connection ( $D_{max} = \varnothing 120$ ) see series SKY

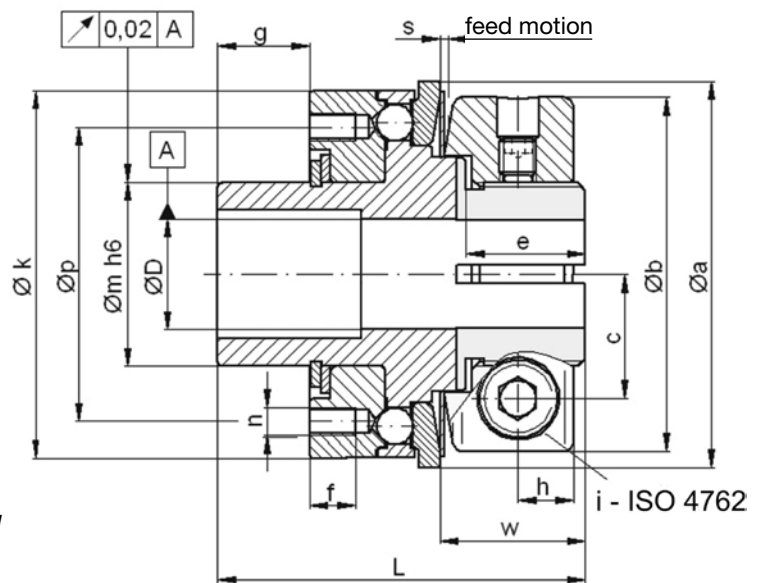
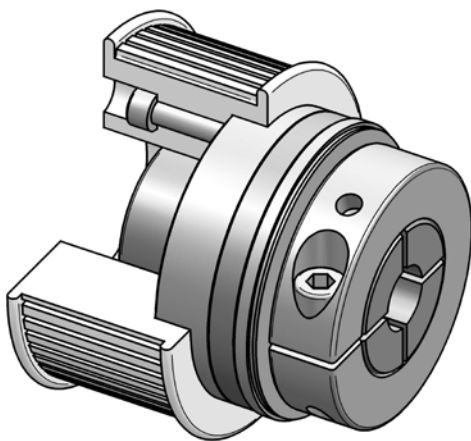
order example: SKW 500 -  $D = 44^{G6}$  - PFN 12 P9 x 3,3 -  $T_{KA} = 450 \text{ Nm}$

# Safety Coupling I Series SKX-L *for indirect drives*

- with longer bearing journal for integrated slide bearing
- simple installation with clamping ring hub
- with small centric diameter of small size pulleys or gear wheels

technical data:

SKX-L size	setting range disengagement torque $T_{KA}$ [Nm]		moment of inertia [ $10^{-3}$ kgm <sup>2</sup> ]	mass approx. [kg]	tightening torque of screws i [Nm]		prebored	bore diameters $\varnothing D$	
	-	-			-	-		min	max
6	2	- 6	0,05	0,25	M 5	- [10]	6	6	16
12	6	- 12			8	16			
15	8	- 15	0,25	0,65	M 6	- [18]	10	10	25,4
30	13	- 30						12	25,4
45	22	- 45						14	25,4
60	25	- 60	0,95	1,5	M 8	- [40]	17	18	35
100	40	- 100						18	35
150	60	- 150						24	35
230	80	- 230	3,34	3	M 10	- [80]	21	24	42
330	130	- 330						32	42
500	200	- 500	10,70	6	M 14	- [220]	27	28	58
800	350	- 800						40	58



**material:**  
 heat-treated steel bearing seat: nitro carburized  
 temperature range: -30°C up to +200°C

Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

SKX-L	$\varnothing a$	( $\varnothing a^*$ )	$\varnothing b$	c	e	f	g	h	$\varnothing k$	$\varnothing m^{h6}$	$\varnothing p$	L	6xn	s	w
6/12	42	(48)	38,5	13,5	13	5	10	6	40	20	32	46	M 3	0,9	15,8
15/30/45	60	(66)	53	19,5	15	7	15	7,5	58	30	46	52	M 4	1,2	18,6
60/100/150	76	(83)	68	25,5	18,5	9	20	8,5	75	42	62	69	M 6	1,6	22,4
230/330	104	(109)	87	32	21	12	25	10,5	98	50	74	84	M 8	1,8	26,7
500/800	132	-	115	42	30	14	30	13,5	120	65	92	104	M 10	2,5	37

**note:** \*bigger outer diameters of the shift disc are possible (see values in brackets)

\*\*alternative bearing length 'g' is possible on request; please check if a plain bearing bush is required

order example: SKX-L 150 -  $D = 28^{H7}$  -  $T_{KA} = 120$  Nm

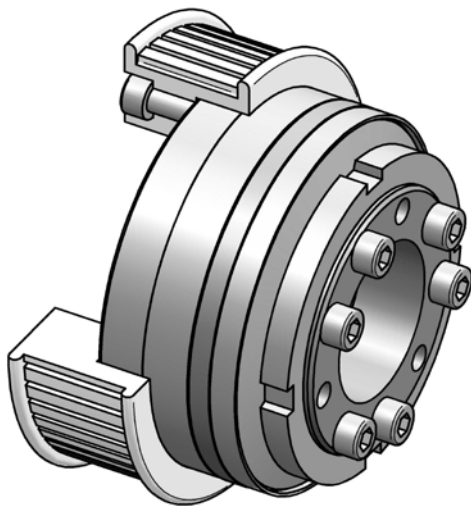


# Safety Coupling I Series SKG *for indirect drives*

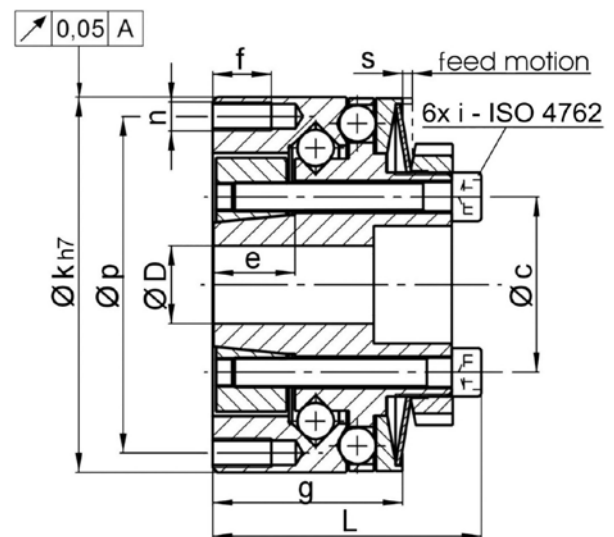
- /// with integral ball bearing // with conical clamping hub
- /// compact attachment - optimal system integration

technical data:

SKG size	setting range disengagement torque $T_{KA}$ [Nm]		moment of inertia [ $10^{-3}$ kgm <sup>2</sup> ]	mass approx. [kg]	tightening torque of screws i [Nm]	bore diameters $\varnothing D$	
	min	max				min	max
4	2	- 4	0,2	0,5	M 4 - [4]	12	18
9	4	- 9	0,2	0,5			
18	9	- 18	0,2	0,5			
23	9	- 23	0,7	1,1	M 5 - [8]	18	25,5
35	18	- 35	0,7	1,1			
75	25	- 75	0,7	1,1			
100	50	- 100	1,8	1,9	M 6 - [12]	22	39
170	65	- 170	3	2,4			
270	100	- 270	10,4	5			
550	200	- 550	10,7	5,3	M 8 - [35]	29	44



material:  
heat-treated steel  
temperature range: -30°C up to +200°C



Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

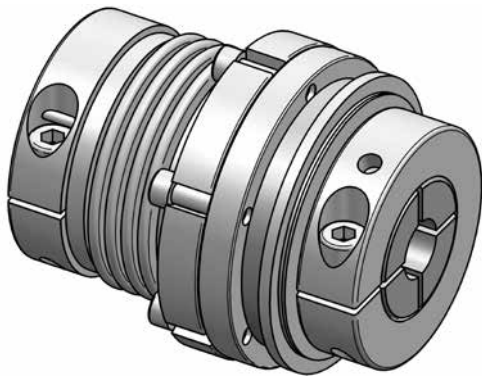
SKG	$\varnothing c$	e	f	g	$\varnothing k_{h7}$	L	n	$\varnothing p$	s
4	27	11	8	27,3	60	40	4x M 4	53	1
9	27	11	8	27,3	60	40	4x M 4	53	1
18	27	11	8	27,9	60	40	4x M 4	53	1
23	37	17	12	39	77	54	4x M 6	69	1,4
35	37	17	12	39	77	54	4x M 6	69	1,4
75	37	17	12	39	77	54	4x M 6	69	1,4
100	54	17	10	36,5	92	55	4x M 6	83	1,4
170	54	17	12	51	105	66	4x M 6	94	1,7
270	66	26	15	63,5	135	85	6x M 8	120	2,2
550	66	26	15	63,5	135	85	6x M 8	120	2,2

order example: SKG 170 - 28<sup>H7</sup> -  $T_A = 140$  Nm

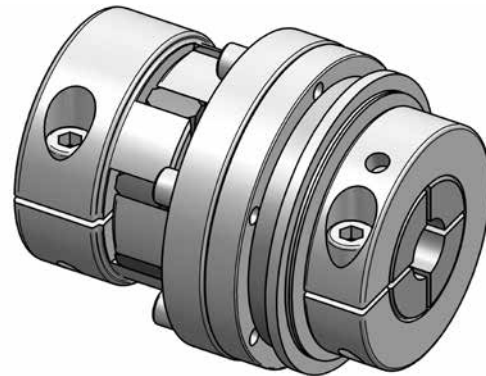
## Safety Couplings I *for direct drives*

- ✓ optimum overload and crash protection for direct drives
- ✓ with coupling attachment ✓ modular system with numerous variants
- ✓ simple installation ✓ frictional shaft-hub connection
- ✓ compact design ✓ low moment of inertia

### Series SKB-KP / SKY-KS with bellows attachment



### Series SKB-EK / SKY-ES with elastomer attachment

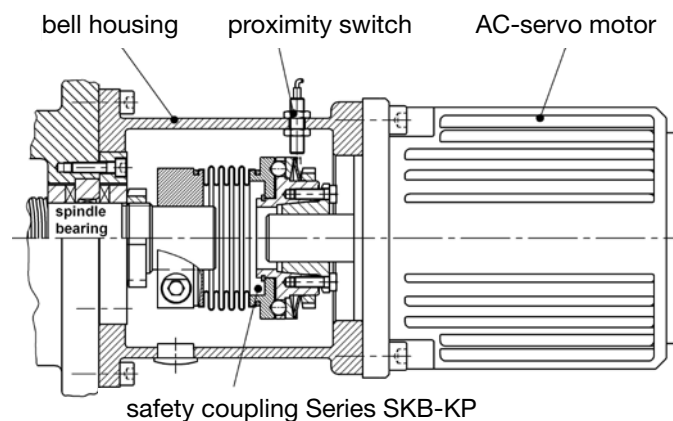


The safety couplings series SKB-K and SKB-E from JAKOB are combinations of the well-tried disengagement function with coupling elements for balancing misalignments between drive and output shaft. From a large program of diverse types, metal bellows or elastomer attachments can be selected. While the main features of metal bellows are very high torsional stiffness and low restoring forces, elastomer couplings feature robustness, excellent oscillation dampening and the possibility of plug-in fitting. Due to the screw connection between coupling element and safety part, a replacement of the coupling attachment is possible at all times, in case of damage or a change of operational parameters.

### The following safety couplings series for direct drives are available:

- Series SKB-KP** -> with 4-corrugation metal bellows / on bellows side with easy-to-fit radial clamping hub
- Series SKY-KS** -> with 4-corrugation bellows / on bellows side with conical bushing for small shaft diameters
- Series SKB-EK** -> with elastomer spider - 98 Shore A / on coupling side with plug-in, radial clamping hub
- Series SKY-ES** -> with elastomer spider - 98 Shore A / on coupling side with plug-in, conical hub

**note:** safety couplings series SKB with clamping hub - series SKY with conical bush



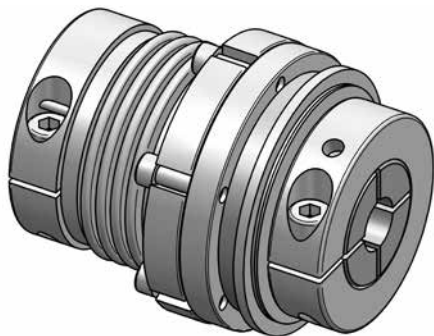
# Safety Coupling I Series SKB-KP *for direct drives*

- /// with bellows attachment // with radial clamping hub on both sides
- /// EASY-clamping hub on bellows side // compensation of misalignments // low restoring forces

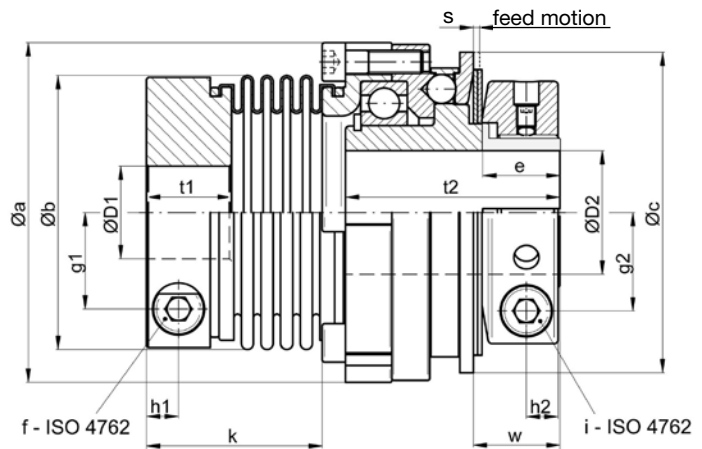
## technical data:

SKB-KP size	setting range disengagement torque $T_{KA}$ [Nm]	moment of inertia $[10^{-3} \text{kgm}^2]$	mass approx. [kg]	torsional stiffness [Nm/arcmin]	max. shaft misalignment [mm]		tightening torque of screws		$\varnothing D1$		$\varnothing D2$	
					axial $\pm$	lateral	f [Nm]	i [Nm]	min	max	min	max
6	2 - 6	0,13	0,45	2,1	0,5	0,15	M5-8	M5-10	6	19(24)	6	16
12	6 - 12								8	19(24)	8	16
15	8 - 15	0,5	1,0	9	0,5	0,2	M6-14	M6-18	8	32	10	25,4
30	13 - 30								10	32	12	25,4
45	22 - 45	1,5	1,9	20	0,6	0,2	*M8-35 (30)	M8-40	12	32	14	25,4
60	25 - 60								13	34(38)	18	35
100	40 - 100	5,5	3,8	28	0,8	0,2	*M10-65 (50)	M10-80	14	34(38)	18	35
150	60 - 150								21	34(38)	24	35
230	80 - 230	14,0	6,8	52	0,8	0,2	*M12-115 (90)	M14-220	24	35(43)	24	44
330	130 - 330								32	35(43)	32	44
500	200 - 500	17,2	8,3	106	0,7	0,2	*M14-180 (140)	M14-220	35	45(55)	28	58
800	350 - 800								42	55(68)	40	58
1000	500 - 1000	80	20	150	0,8	0,2	*M14-180 (140)	2xM16-290	45	65(75)	42	100
2000	800 - 2000								88	21	140	1

(\*) note: reduced tightening torque for bigger hub bore diameter - see also  $\varnothing D1/D2$  max!



**material:** safety part: heat-treated steel  
 clamping hub: high-tensile aluminum  
 bellows: stainless steel  
 screws: ISO 4762 / 12.9  
 temperature range: -30°C up to +200°C



## Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

SKB-KP	$\varnothing a$	$\varnothing b$	$\varnothing c$	e	g1	g2	h1	h2	k*	L $\pm$ 1	s	t1	t2	w
6/12	52,5	40 (45)	48	14	13	13,5	6	6	36,6	81	0,9	16,5	41	16
15/30/45	69	56	66	16	19	19,5	7,5	7,5	43	94,5	1,2	20	48	18,5
60/100/150	88	71	83	20	25	25,5	8,5	8,5	45,5	107	1,6	22	55,5	22
230/330	115	82	109	23	28,5	32	10,5	10,5	52	132	1,8	26	72	26
500	137	101	132	32	35	42	12	13,5	60	156	2,5	29	87,5	37
800	137	122	132	32	42	42	15	13,5	74,5	170	2,5	34	87,5	37
1000	181	133	185	74	47	69	18,5	17/30	87,5	220 $\pm$ 2	3,7	45	124	74
2000	181	157	185	74	54	69	19	17/30	105,5	239 $\pm$ 2	3,7	45	124	74

\*note: alternative lengths of bellows are possible on request; bellows side with conical hub: see series SKB-KS setting range up to 9000Nm see series SKY-KS

order example: SKB-KP 30 -  $D1 = 28^{G6}$  -  $D1 = 24^{H7}$  -  $T_{KA} = 25 \text{ Nm}$

# Safety Coupling I Series SKY-KS for direct drives

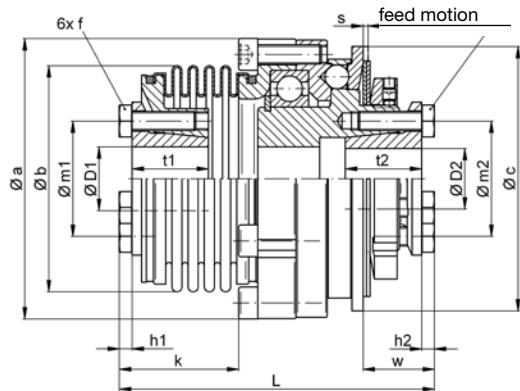
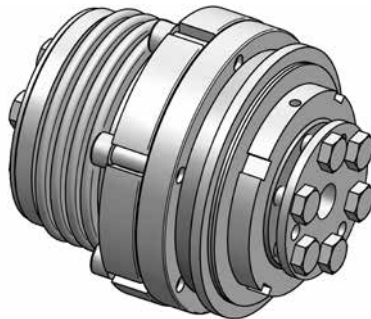
- /// with bellows attachment // with conical clamping hub on both sides
- /// low restoring forces // compensation of misalignments

## technical data:

SKY-KS size	setting range disengagement torque $T_{KA}$ [Nm]	moment of inertia $[10^{-3}kgm^2]$	mass approx. [kg]	torsional stiffness [Nm/arcmin]	max. shaft misalignment [mm]		tightening torque of screws		$\varnothing D1$		$\varnothing D2$	
					axial $\pm$	lateral	f [Nm]	i [Nm]	min	max	min	max
1	0,5 - 1								3	10[14]	4	12
2	1 - 2	0,05	0,25	0,8	0,3	0,1	1xM3[2]**	M3[2]	3	10[14]	4	12
6	2 - 6								6	16	5	12
12	6 - 12	0,12	0,5	2,1	0,5	0,15	M4[3]	M3[2]	6	16	5	12
15	8 - 15								9	19	9	17
30	13 - 30	0,44	0,98	9	0,5	0,2	M4[4]	M4[4]	9	19	9	17
45	22 - 45								10	19	10	17
60	25 - 60								12	24	12	24
100	40 - 100	1,4	1,9	20	0,6	0,2	M6[14]	M6[14]	12	24	12	24
150	60 - 150								14	24	14	24
230	80 - 230								18	35	18	35
330	130 - 330	5,1	3,9	28	0,8	0,2	M6[14]	M6[14]	22	35	22	35
500	200 - 500	12,5	6,7	52	0,8	0,2	M8[34]	M8[34]	28	42	28	42
800	350 - 800	14,6	7,7	106	0,7	0,2	M10[65]	M8[34]	30	48	30	42
1000	500 - 1000	58	16	150	0,8	0,2	M10[65]	M12[115]	40	60	42	65
2000	800 - 2000	69	18,5	140	1	0,3	M12[115]	M12[115]	42	70	42	65
3000	1500 - 3000			600	3	1,2			50	130	50	120
6000	3000 - 6000	400	50	1000	3	1,4	10xM12[70]	10xM10[50]	50	130	50	120
9000	6000 - 9000			1000	3	1,4			50	130	50	120

### material:

safety part: heat-treated steel  
 conical hub: heat-treated steel  
 bellows: stainless steel  
 screws: ISO 4762 / 12.9  
 temperature range:  
 -30°C up to +200°C



### Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

SKY-KS	$\varnothing a$	$\varnothing b$	$\varnothing c$	h1	h2	k*	L $\pm 1$	$\varnothing m1$	$\varnothing m2$	s	t1	t2	w
1/2	42	25	43	-	3	25	61,5	-	19	0,7	8	15	14
6/12	52,5	39,5	48	2,8	3	37,5	80	27	19	0,9	19	15	14
15/30/45	69	56	66	2,8	4	34,8	86	30	27	1,2	18	18	18
60/100/150	88	71	83	4	4	37,5	99	36	36	1,6	24	24	22
230/330	115	82	109	4	4	40	117	50	50	1,8	27	27	24
500	137	101	132	5,3	5,3	50	143	62	62	2,5	32,5	32	33
800	137	122	132	6,4	5,3	60	152	70	62	2,5	36	32	33
1000	181	132	185	6,4	7,5	69,5	192	83	90	3,7	44	45	64
2000	181	157	185	7,5	7,5	88,5	211	98	90	3,7	45	45	64
3000-9000	243	236	236	7,5	6,4	174	335	175	160	3,0	74	54	105

**note:** \*alternative lengths possible on request

\*\*sizes 1/2 with radial clamping hub type MKP on bellows side (D1)

sizes 3000-9000 with shrink disc on both sides - further details and options on request

order example: SKY-KS 500 - D1 = 38<sup>H7</sup> - D1 = 32<sup>H7</sup> -  $T_{KA} = 400$  Nm

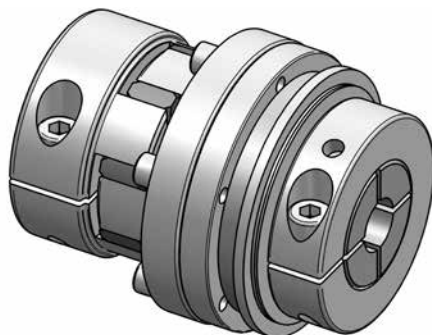
# Safety Coupling I Series SKB-EK for direct drives

// with elastomer attachment // with radial clamping hub on both sides  
 // plug-in // flexible // backlash-free // oscillation dampening

## technical data:

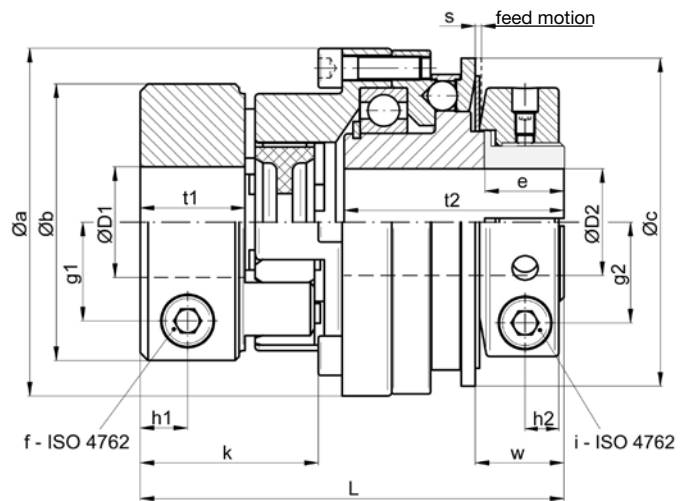
SKB-EK size	setting range disengagement torque $T_{KA}$ [Nm]	moment of inertia $[10^{-3} \text{kgm}^2]$	mass approx. [kg]	torsional stiffness [Nm/arcmin]	max. shaft mis-alignment [mm]		tightening torque of screws		$\varnothing D1$		$\varnothing D2$	
					axial±	lateral	f [Nm]	i [Nm]	min	max	min	max
6	2 - 6	0,13	0,44	0,25	0,5	0,1	M5-8	M5-10	8	20	6	16
12	6 - 12								8	20	8	16
15	8 - 15	0,5	1	1	0,5	0,1	M6-14	M6-18	12	32	10	25,4
30	13 - 30								12	32	12	25,4
45	22 - 45								14	32	14	25,4
60	25 - 60	1,5	2	1,2	1	0,1	M8-35	M8-40	16	38	18	35
100	40 - 100								19	38	18	35
150	60 - 150								22	38	24	35
230	80 - 230	5,6	4,2	3,6	1	0,12	*M12-115(90)	M10-80	20	35(43)	24	42
330	130 - 330								24	35(43)	32	42
500	200 - 500	17	8,6	8	1	0,15	*M14-180(140)	M14-220	30	60(70)	28	58
800	350 - 800								40	60(70)	40	58
1000	500 - 1000	79	19,5	12	1	0,10	*M14-180(140)	M16-290	42	60(70)	42	100
2000	800 - 2000	116	27,9	21	1	0,15	M16-290	M16-290	50	90	42	100

(\*) note: reduced tightening torque for bigger hub bore diameter - see also  $\varnothing D1$  max!



### material:

safety part: heat treated steel  
 clamping hub: high-tensile aluminum  
 (size 2000: tempered steel)  
 elastomer spider: polyurethane – 98 Shore A  
 screws: ISO 4762 / 12.9  
 temperature range: -30°C up to +90°C



## Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

SKB-EK	$\varnothing a$	$\varnothing b$	$\varnothing c$	e	g1	g2	h1	h2	k*	L±1	s	t1	t2	w
6/12	52,5	40	48	14	13	13,5	8	6	33	77	0,9	17	41	16
15/30/45	69	55	66	16	20	19,5	10	7,5	39	91,5	1,2	21	48	18,5
60/100/150	88	70	83	20	25	25,5	12	8,5	45	107	1,6	26,5	55,5	22
230/330	115	85	109	23	29	32	14	10,5	54	134	1,8	31	72	26,5
500/800	137	120	132	32	44	42	18	13,5	71	167,5	2,5	38	87,5	37
1000	181	120	185	74	44	69	18	17/30	72	204	3,7	38	89	74
2000	181	160	185	76	55,5	69	21	17/30	84	219	3,7	42	89	77

\*note: other shore hardnesses of elastomer spider are possible on request  
coupling side with conical hub: see series SKB-ES

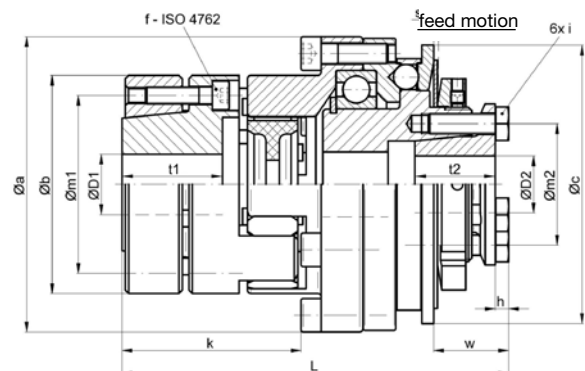
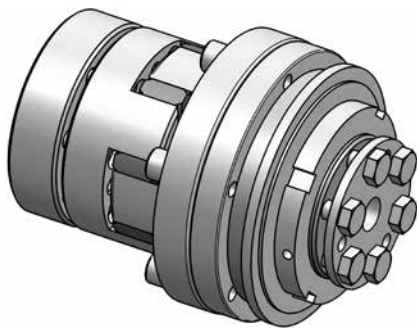
order example: SKB-EK 45 -  $D1 = 28^{G7}$  -  $D2 = 24^{H7}$  -  $T_{KA} = 35 \text{ Nm}$

# Safety Coupling I Series SKY-ES for direct drives

// with elastomer attachment for direct drives // with conical clamping hub  
 // plug-in // backlash-free // flexible // robust // oscillation dampening

## technical data:

SKY -ES size	setting range		moment of inertia [10 <sup>-3</sup> kgm <sup>2</sup> ]	mass approx. [kg]	torsional stiffness [Nm/arcmin]	max. shaft alignment [mm]		tightening torque of screws		ø D1		ø D2	
	disengagement torque	T <sub>KA</sub> [Nm]				axial ±	lateral	„f“ [Nm]	„i“ [Nm]	min	max	min	max
6	2	- 6	0,13	0,5	0,25	0,5	0,1	6xM4[4]	M3[2]	9	19	5	11,5
12	6	- 12								9	19	5	11,5
15	8	- 15	0,5	1,0	1,0	0,5	0,1	4xM5[8]	M4[4]	12	26	9	17
30	13	- 30								12	26	9	17
45	22	- 45	1,4	1,9	1,2	1	0,1	8xM5[8]	M6[14]	12	26	10	17
60	25	- 60								12	36	12	24
100	40	- 100	5,5	4,3	3,6	1	0,12	4xM8[35]	M6[14]	12	36	12	24
150	60	- 150								14	36	14	24
230	80	- 230	18,5	8,8	8	1	0,15	4xM12[115]	M8[35]	19	40	18	35
330	130	- 330								19	40	22	35
500	200	- 500	57	16	12	1	0,1	4xM12[115]	M12[60]	25	60	28	42
800	350	- 800								28	60	30	42
1000	500	- 1000	102	25,6	21	1	0,15	8xM12[115]	M12[115]	35	60	40	65
2000	800	- 2000								35	85	40	65



**material:** safety part: heat-treated steel  
 hub: high-tensile aluminum  
 (size 2000: tempered steel)  
 clamping ring: heat treated steel

elastomer spider: polyurethane – 98 Shore A  
 screws: ISO 4762 / 12.9  
 temperature range: -30°C up to +90°C

## Dimensions [mm]: length dimensions according to DIN ISO 2768 cH

SKY-ES	Øa	Øb	Øc	h	k	L±1	Øm1	Øm2	s	t1	t2	w
6/12	52,5	40	48	3	41	83	31	19	0,9	21	15	14
15/30/45	69	55	66	4	48	100	43	27	1,2	25	18	18
60/100/150	88	65	83	4	53,5	115,5	53	36	1,6	30	24	22
230/330	115	80	109	4	68	145,5	64	50	1,8	40	27	24
500/800	137	120	132	5,3	94	187	96	62	2,5	54	32	33
1000	181	120	185	7,5	95	218	96	98	3,7	54	45	64,5
2000	181	160	185	7,5	114	236,5	130	98	3,7	66	45	64,5

**Note:** elastomer spider optionally available with alternative shore hardness  
 coupling side with radial clamping hub, see series SKY-EK

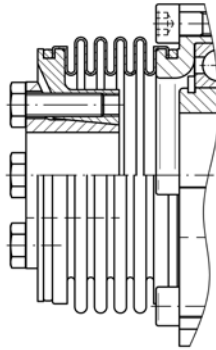
order example: SKY-ES 230 - D1 = 33<sup>H7</sup> - D2 = 28<sup>H7</sup> - T<sub>KA</sub> = 200 Nm

# Safety Couplings I Additional Series

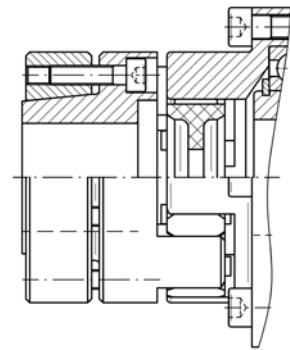
## Series

- /// high clamping forces
- /// for smaller shaft diameters
- /// however: more difficult assembly
- /// with ES-hub: blind fitting possible
- /// dimensions on request  
or see homepage:  
[www.jakobantriebstechnik.de](http://www.jakobantriebstechnik.de)

## SKB-KS with conical clamping hub

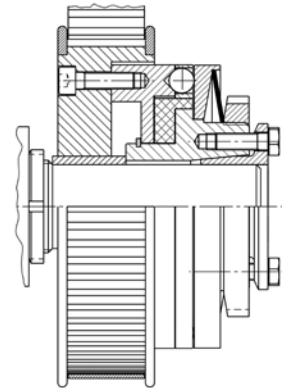
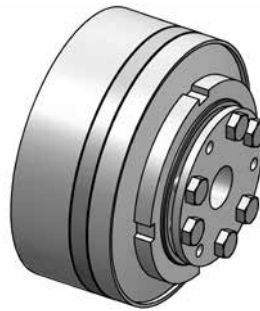


## SKB-ES with conical clamping hub



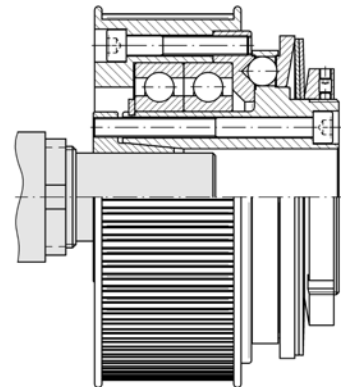
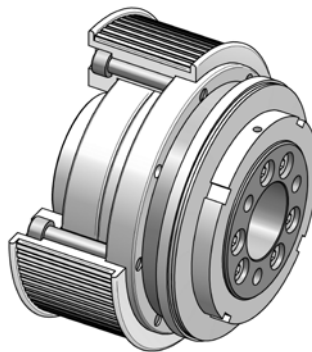
## Series SKD/SBE/SK-F with special mechanism

- /// minimal residual torque
- /// re-engaging only by reverse rotation
- /// with separate sliding bearing (series SKD)  
or with bellows attachment (series SBE)
- /// 10 sizes from 4 to 1.500 Nm



## Series SKY with conical bush at bearing side with bearing tandem

- /// for very wide toothed belts or  
gear wheels
- /// for highest radial loads
- /// compact mounting onto short shaft
- /// dimensions on request



## Special series

- /// customized hub versions  
and dimensions
- /// operating speeds up to 8.000 rpm
- /// special or stainless steel design
- /// special re-engaging functions  
(e.g. for vertical drive axis)

-> please feel free to contact us

# Product Overview | JAKOB Clamping Technology

## Power Clamping Nut Series MCA

- /// 4 sizes up to 200 kN
- /// blind hole thread up to M64
- /// thread protected
- /// centered operation
- /// compact design



## Power Clamping Nut Series MDA

- /// 2 sizes up to 150 kN
- /// through hole thread up to M48
- /// for variable clamping edges
- /// unlimited clamping stroke



## Hydraulic Clamping Nut Series HM

- /// maximum clamping forces over 2,000 kN
- /// threads larger than Ø 500 possible
- /// multi-hub system with spring feedback and oil return
- /// high hydraulic pressure (800 bar) without loss of medium



## Power Clamping Screw Series SC

- /// 5 sizes up to 250 kN
- /// wedge clamping mechanism
- /// high clamping forces
- /// low tightening torques
- /// maximum operational safety



## Spring Clamping Cylinder Series ZSF / ZDF

- /// numerous sizes up to 350 kN
- /// mechanical clamping
- /// hydraulic relasing
- /// high operational safety
- /// leak-proof, robust, economical
- /// temperature range: -30°C to +100°C
- /// fitting position in any direction



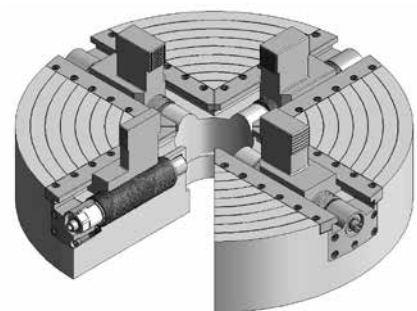
spring clamping cylinder Series ZSF (pulling)



spring clamping cylinder Series ZDF (pushing)

## Power Clamping Screws mechanical type: Series MSP/MSPD hydraulic type: Series HSP

- /// nominal clamping forces up to 1,200 kN
- /// maximum operational safety
- /// large power clamping stroke
- /// simple operation and fitting
- /// very large clamping forces at low tightening torques



➔ please ask for our clamping elements catalog



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