

PRODUCT CATALOGUE

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 50 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.

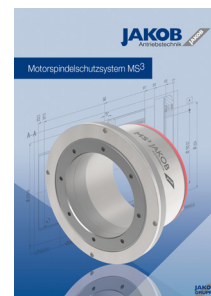
Highly trained engineers and technicians at our facility in Kleinwallstadt are always ready with a solution to best meet your requirements.



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.



Safety Couplings I Contents

Safety Couplings – indirect drives



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



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



- SKR-K/** • SKR-K series with cone clamping bush
SKR-N • Reihe SKR-N mit Paßfedernut – Verbindung



- SKVA-N** • SKVA-N series with keyway connection
SKVA-K • SKVA-N series with clamping ring hub

Safety Couplings – direct drives



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



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



- SKVA-KG**
- Stainless steel version
 - metal bellows coupling attachment
 - Clamping or clamping ring hub



- SKVA-EK**
- Stainless steel version
 - Elastomer coupling attachment
 - easy-to-assemble clamping hub

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.

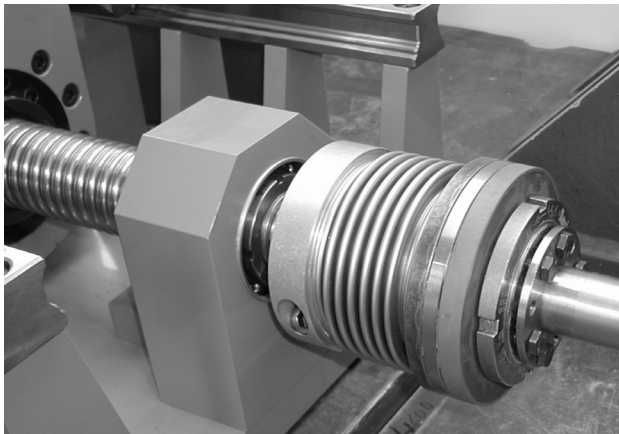
JAKOB safety couplings are the result of decades of continuous research and development as well as the experience gained from numerous different applications worldwide.

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.

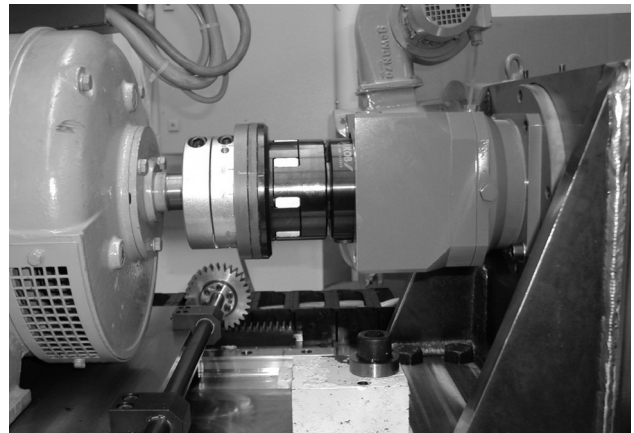
Performance Characteristics – JAKOB Safety Couplings:

- optimal overload and collision protection to minimize damage
- 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-KP with bellows attachment



Safety coupling series SKB-EK 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^2]

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

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 $1 \text{ rad} = 57,3^\circ = 3438 \text{ arcmin}$.

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. 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 “ αT ” 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

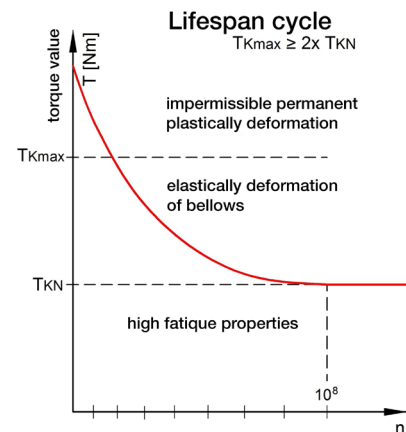
c) according to shaft diameter:

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.

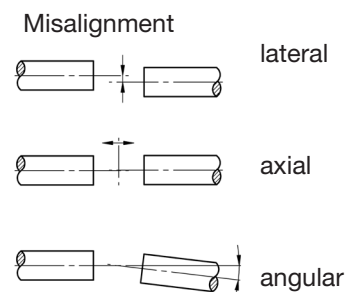


e) max. load:

In special cases, couplings can be overloaded for a short time with twice the nominal torque ($2 \times T_{KN}$). This applies unless otherwise stated on the data sheet for the respective series. 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. Series with aluminum clamping hubs can be used without restriction from -40°C to $+150^\circ\text{C}$, short-term up to $+200^\circ\text{C}$. For models with welded steel or stainless steel hubs, the application temperature is a maximum of 350°C . The temperature limits of the elastomer spider are at 90°C (98 Sh-A) and 120°C (72 Sh-D).

h) speeds:

Due to precision machining, the rotation symmetry, and the additional balance pin, the compensating couplings are generally suitable for high speeds 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 min⁻¹ (please contact us for further information). The low moment of inertia also has a positive effect. The type-specific maximum speeds are specified in the data sheets. For very high operating speeds and sensitive drives, we recommend an additional balancing process (optional)

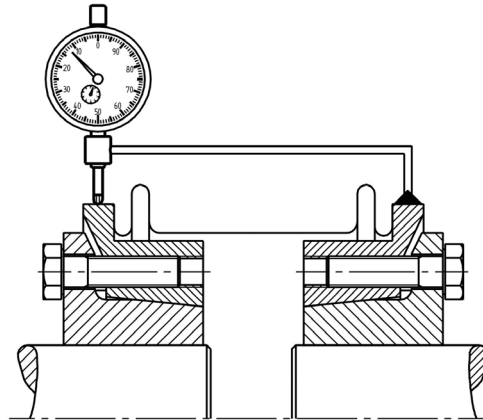
i) maintenance and wear:

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) lateral clamping hub

Admissible seat clearance shaft hub: **min. 0,01mm / max. 0,04mm**. Very simple fitting by tightening only one laterally 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). The exception is the KG-HS series with two clamping screws arranged in mirror symmetry.

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 lateral 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 lateral clamping hub: see EASY-clamp System page 7!

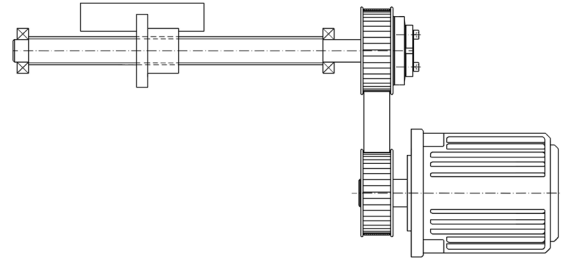
e) special notes

- 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

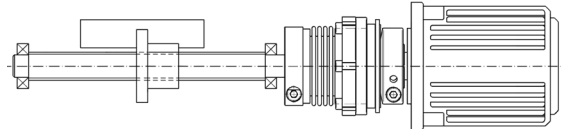
Safety Couplings I Modular System

The safety coupling modular system, consisting of three standard assemblies and several special variants, enables a solution for almost every application. Depending on the application, various add-on elements can be attached to the release mechanism to be attached. For indirect drives, belt pulleys, gear wheels or corresponding connecting parts are flanged on. In the case of direct drives, the release mechanism is supplemented with metal bellows or an elastomer coupling part to compensate for any shaft misalignments. The main selection and design criteria are the torque to be transmitted, the required torsional rigidity, the existing shaft diameter, the installation conditions and other operating parameters such as temperature, shaft offset and operating speed.

indirect drives



direct drives

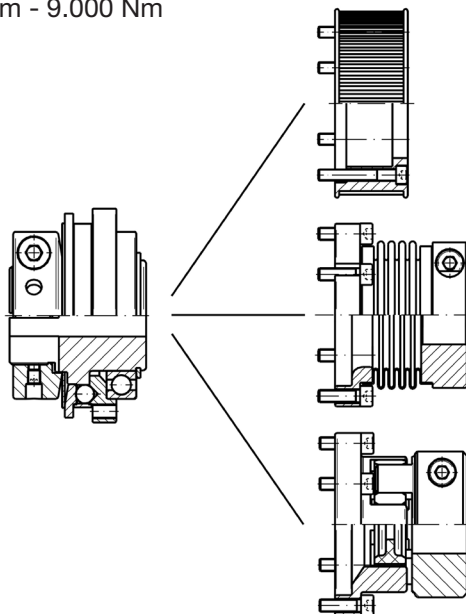


Overview:

safety mechanism

1 Nm - 9.000 Nm

attachments



- pulleys
- gears
- flanges

SK

series

SKW
SKR

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

SKB-KP

SKW-KP

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

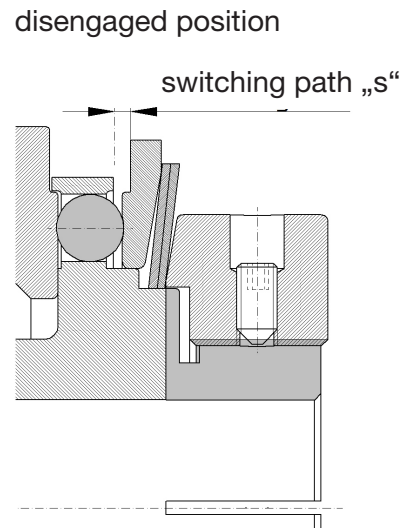
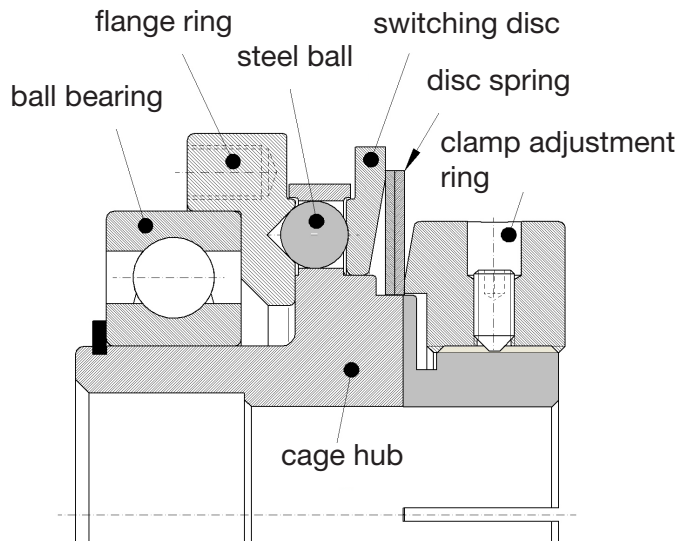
SKB-EK

SKW-EK

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 $4,000 \text{ min}^{-1}$ as well as safety couplings with release mechanism 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 separate datasheets.

Couplings I Technical Information



The axial stroke of the switching disc is immediately stopped by means of a non-contact or mechanical limit switch (emergency stop) of the drive.

JAKOB safety couplings are designed as predetermined separation points, collision protection or overload limitation in a direct or indirect drive train. The heart of the safety clutch is a high-precision, robust release mechanism with steel balls as a spring-loaded form-fit body. The torque is introduced into the centrally located hub via a non-positive and backlash-free clamp or cone connection. The hub is designed as a ball cage and is used to hold the flange ring, the switching disc with disc spring and the adjusting nut. Special disc springs press the balls into hardened countersinks via a pressure or switching disc bores (calottes) of the flange ring. In normal operation, this means that the drive torque is transmitted backlash-free to the flange ring. A compensating element (metal bellows, elastomer star), a toothed wheel or belt wheel or another connecting part is optionally attached to the flange ring. If the set release torque is exceeded, the flange ring twists relative to the cage hub and the balls are suddenly pushed out of the calottes, interrupting the drive train. The residual torque is a maximum of 10% of the set release torque.

The play-free ball detent mechanism

A backlash-free torque transmission with high torsional rigidity is guaranteed by a specially designed tensioning of the hardened and polished steel balls between the ball cage of the hub and the spherical caps of the flange ring. In reversing operation, the mechanics work equally for both directions of rotation.

The dynamic release behavior

JAKOB safety clutches are characterized by excellent dynamic release behavior. The reason for this is the degressive spring characteristic as well as the

minimized masses (ball and switching disc), which have to be accelerated axially when disengaging. This guarantees that the drive train is interrupted within a few milliseconds in the event of a collision. This results in a very low mass force that has to be added to the spring force. With many other safety clutch types, the dynamic release torque and the switching time can increase significantly due to the large switching masses and linear standard springs. The maximum operating speed should not exceed 4000 rpm (from size 1000Nm - 3000 rpm).

The re-entry – fixed-point switching

The balls or the cage bores and calottes are distributed asymmetrically around the circumference, so that only one angle-synchronous detent position is possible per 360°. The balls ratchet over once per revolution with little residual torque until they come to a standstill. The repetition accuracy of the set release torque is max. $\pm 5\%$. Special versions of the locking mechanism (6x60° or 8x45° locking) are available on request. After the cause of the failure has been rectified, the clutch automatically re-engages in the synchronous position when operated at low speed (< 30 rpm) and is ready for operation.

Sicherheitskupplungen - Drehzahlinformation

In general, when using safety clutches, the operating speed should be a maximum of 4000 rpm - for sizes from 1000 Nm a maximum of 3000 rpm. Rotationally symmetrical hub variants, as well as types with an elastomer coupling attachment, are for high speeds most suitable. Balancing is optionally possible.

Couplings I Technical Information

The degressive spring characteristic

The function of the JAKOB safety couplings is significantly influenced by the disk springs specially developed for this application. Due to the design in the degressive characteristic curve area, the spring force decreases with increasing spring deflection (switching travel), which means that the torque drops immediately when it responds. With usual Spring-loaded overload clutches, on the other hand, increase the spring force and the release torque, e.g. T. significantly. This results in an undefined functional behavior between response and disengagement, as well as a significantly higher residual torque.

Mechanics with backstop

An additional freewheel, which serves as a backstop, prevents disengagement in the opposite direction. Irrespective of the set release torque, this ensures permanent forced driving with the nominal torque. (Upon request)

The unlock mechanic

In applications with high operating speeds (test benches) or long run-on times (immediate stop not possible), it may be necessary to supplement the locking mechanism with a release mechanism. For this purpose, JAKOB has several proven functional variants available, which prevent it from re-engaging until it comes to a standstill.

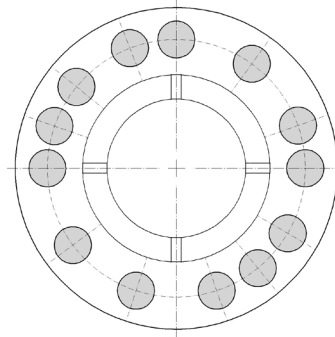
The Labyrinth Seal

In the SKB and SKW series, the locking mechanism is protected by a labyrinth seal against the ingress of coarse dirt particles or heavy leaching of the lubricant. If required, a complete encapsulation of the release mechanism is also possible (on request).

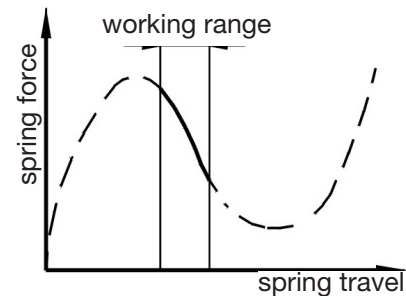
corrosion protection

Most of the series are optionally available in a corrosion-protected material version. A special surface coating of the steel components ensures excellent rust resistance - ball bearings, locking balls, etc. are made of stainless steel and the disc springs are nickel-plated. Safety couplings made entirely of stainless steel, e.g. for the food industry, can also be offered on request.

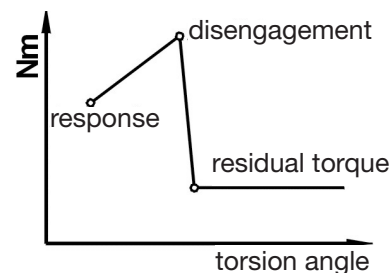
Fixed point switching - asymmetric ball position



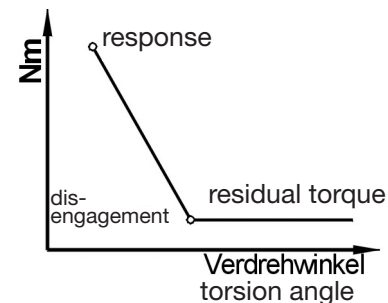
Spring characteristics



Regular form-fit coupling



JAKOB Safety coupling



Couplings I Technical Information

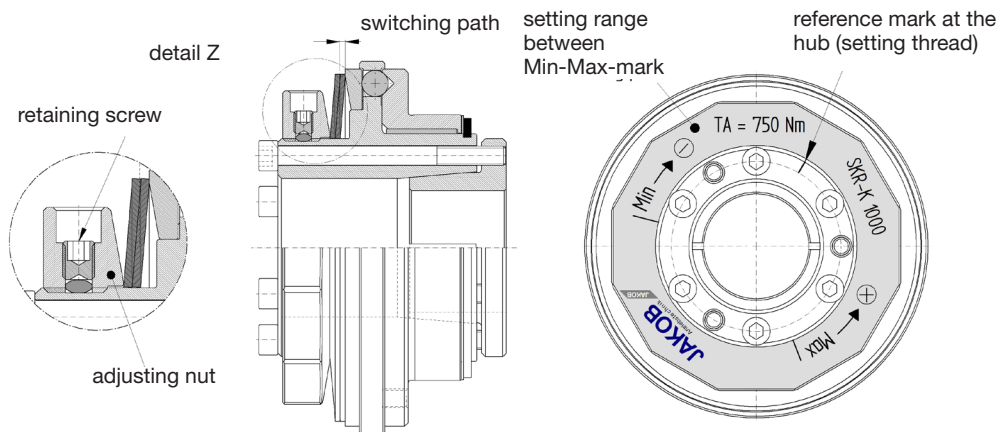
The disengagement torque is generally steplessly adjustable between about 40% and 100% of the nominal clutch torque. If no setting is specified by the customer, the maximum torque (nominal torque) is set. The set, static disengagement torque can easily be readjusted by turning the adjusting nut or the adjusting ring on the machine using a hook wrench. For this purpose, the setting rings of all series are provided with a user-friendly label and the set release torque as well as a marking for the minimum and maximum release torque (T_{min} , T_{max}) are engraved. Additional scaling is possible on request. Higher disengaging torques greater than T_{max} are generally possible, but this results in greater wear on the locking mechanism.

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)!

Reihe SKW/SKR/SKY

Einstellvorgang für das Ausrückmoment:

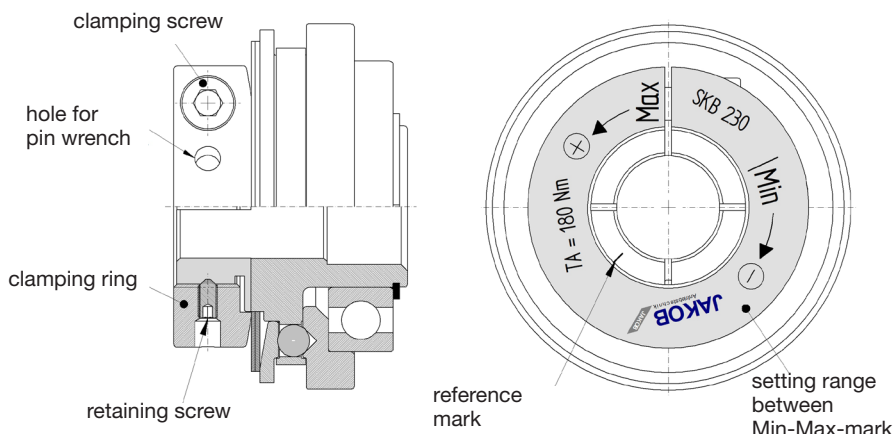


Setting procedure for the release torque:

Completely loosen the locking screws (see Detail Z). Turn the adjusting nut in the minus or plus direction with a hook wrench! Observe the reference mark and min-max mark. After the adjustment, secure the adjustment ring by screwing in the locking screws. Factory setting of the release torque, see ring engraving.

Series SKB

Setting of disengagement torque:



Setting procedure for the release torque:

Loosen the locking screw. When installed, the clamping screw of the clamping ring hub must also be loosened. Then turn the clamping ring in the minus or plus direction - note the reference line and the MIN and MAX markings. The drive shaft should be locked here. Finally, tighten the clamping screw with the specified TS value and screw in the locking screw. Factory setting of TA see ring engraving.

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 or keyway

For overload limitation or as collision protection for indirect drives, JAKOB offers the SKB, SKW and SKR series with integrated ball bearings or with integrated slide bearings in the standard range. Toothed belt pulleys, gears or other attachments with a concentricity or axial runout accuracy of a few hundredths of a millimeter can be attached to the respective coupling flange rings. In normal operation, the bearings have the task of absorbing the lateral and axial forces and passing them on to the input or output shaft. By means of a conical clamping ring (SKR-K) or a clamping ring hub (SKB), the set torque is transmitted from the shaft to the clutch hub absolutely backlash-free and friction-locked. If a feather key connection between shaft and hub is sufficient, the inexpensive type SKW can be used. While the SKB and SKW couplings are suitable for normal and large discs and pinions due to the pitch circle diameter of the fastening threads, the SKR series is designed for add-on elements with a large width or small diameter. With the SKR series, extremely compact design solutions are possible thanks to the integrated plain bearing, and the forces are introduced almost centrically to the bearing. Since the clamping ring clamping was also arranged on the inside towards the shaft, the SKR coupling is ideal even in very tight spaces with minimized bearing loads on the motor or transmission. Drive shaft.

Comparison of bearing forces for SKR and SKB

Significant reduction in the tilting moment and thus in the bearing load due to the optimized rear arrangement of the shaft-hub connection. The force support of the pulley pre-tensioning force is almost central to the conical bush clamp on the drive shaft. This allows for a very compact structural integration of the pulley.

Calculation of the bearing load of the engine bearing (A-side) due to the tilting moment - belt tensioning force

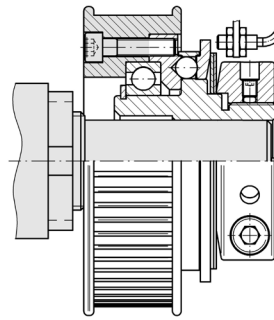
$$Y \approx 2 \cdot X$$

$$\textcircled{1} \quad MK1 = FR \cdot X$$

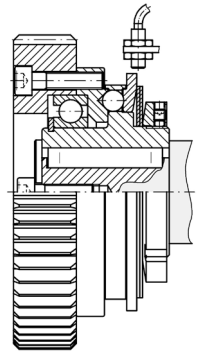
$$\textcircled{2} \quad MK2 = FR \cdot Y$$

$$MK2 \approx 2 \cdot MK1$$

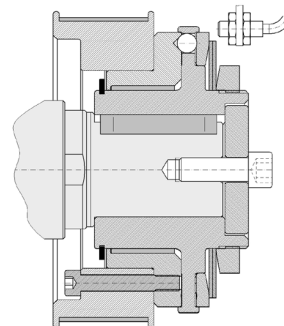
Series SKB



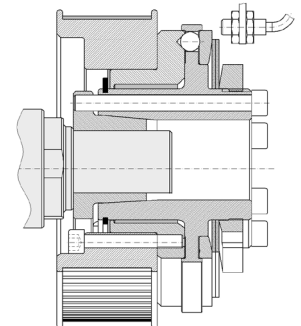
Series SKW



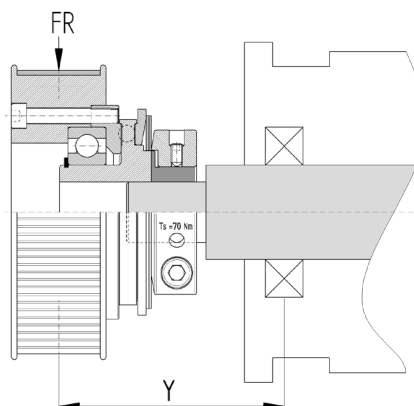
Series SKR-N



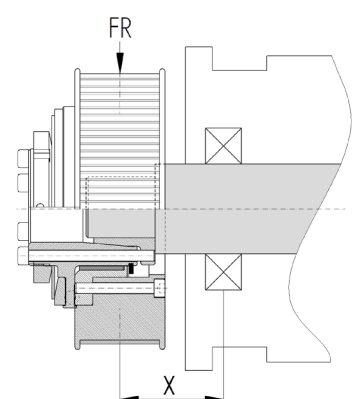
Series SKR-K



① Bearing load indirect attachment SKB



② Bearing load indirect attachment SKR



Safety Couplings I Series SKB for indirect drives

- simple installation with clamping ring hub
- with integral ball bearing
- for high axial and lateral loads
- excellent run-out accuracy

technical data:

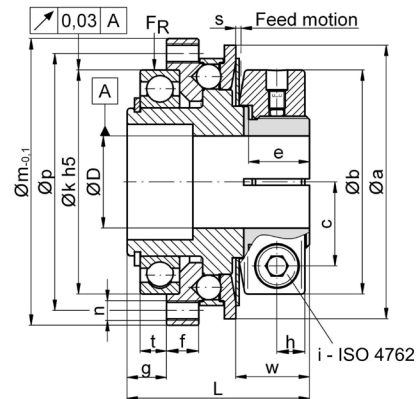
SKB size	setting range disengagement torque T_{KA} [Nm]	moment of inertia [10 ⁻³ kgm ²]	mass approx. [kg]	tightening torque of screws f [Nm] i [Nm]		max. lateral load F_R [N]	bore diameters $\varnothing D$		
							min	max	max. bore- \varnothing PFN-6885
1,5 3	0,3 - 1,5 1 - 3	0,009	0,07	M3 - [2]		750	6 6	12,7 12,7	10
6 12	2 - 6 6 - 12	0,09	0,36	M5 - [8]		5000	6 8	16 16	12
15 30 45	8 - 15 13 - 30 22 - 45	0,36	0,8	M6 - [16]		8000	10 12 14	25,4 25,4 25,4	20
60 100 150	25 - 60 40 - 100 60 - 150	1,1	1,5	M8 - [35]		9500	18 18 24	35 35 35	32
230 330	80 - 230 130 - 330	4,2	3,3	M10 - [70]		23000	24 32	44 44	38
500 800	200 - 500 350 - 800	12,2	6,2	M14 - [200]		30000	28 40	58 58	50
1000 2000	500 - 1000 800 - 2000	76	20	2xM16 - [250]		50000	42 48	100 100	90
3000 6000 9000	1500 - 3000 3000 - 6000 3000 - 9000	240	34	10xM10 - [50]		65000	50	120	Optional

temperature range: -30°C up to +200°C

material:

heat-treated steel

optional in stainless version



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

SKB	Øa	(Øa*)	Øb	c	e	f	g	h	Øk	Øm	Øp	L	n	s	t	w
1,5/3	32	-	28,5	10,1	8	4	5	4	24	32	28,5	26,5	4xM2,5	0,5	2,5	12,4
6/12	48	(42)*	38,5	13,5	13	8	9,8	6	42	52	47	41	6xM3	0,9	7	15,8
15/30/45	66	(60)*	53	19,5	15	9	11,5	7,5	55	69	62	48	6xM4	1,2	8	18,5
60/100/150	83	(76)*	68	25,5	18,5	9	12	8,5	68	87	78	55,5	6xM6	1,6	8	22,4
230/330	109	(104)	87	32	21	14	16,5	10,5	90	113	102	71,5	6xM8	1,8	12	25,6
500/800	132	-	115	42	30	15	17	13,5	110	136	124	87,5	8xM8	2,5	12	37
1000/2000	185	-	172	69	76	16	28	17/30	140	181	165	142±2	12xM10	3,7	21,5	77
3000/9000	236	-	215	Ø160	82	18/14	22	-	180	243	200/225	166	12xM10	3,0	14	87

For size 3000 - 9000 shrink disk clamping instead of clamping ring design

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

order example:

SKB 30 -

D = 24 ^{H7} - $T_{KA} = 25 \text{ Nm}$

Safety Couplings I Series SKW for indirect drives

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

technical data:

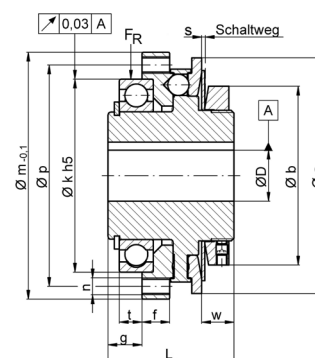
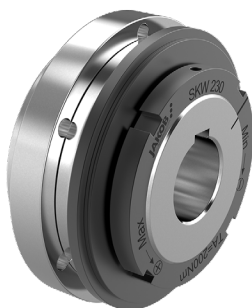
SKW Size	setting range disengagement torque T _{KAL} [Nm]	moment of inertia [10 ⁻³ kgm ²]	mass approx. [kg]	max. lateral- load F _R [N]	n	bore diameters øD min - max
1,5	0,3 - 1,5	0,008	0,07	750	4 x M 2,5	6 - 10
3	1 - 3					
6	2 - 6	0,08	0,28	5.000	6 x M3	6 - 12
12	6 - 12					
15	8 - 15	0,3	0,63	8.000	6 x M4	8 - 22
30	13 - 30					10 - 22
45	22 - 45					
60	25 - 60	0,91	1,25	9.500	6 x M6	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 M8	21 - 38
500	200 - 500					26 - 55
800	350 - 800	9,25	4,80	30.000	8 x M8	30 - 55
1000	500 - 1000					
2000	800 - 2000	52	15,5	50.000	12 x M10	40 - 90
3000	1500 - 3000					
6000	3000 - 6000	160	25	65.000	12 x M10	50 - 110
9000	6000 - 9000					

material:

heat-treated steel

temperature range:

-30°C up to +200°C



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

SKW	Øa	(Øa*)	Øb	f	g	Øk ^{h5}	Øm	Øp	L	s	t	w
1,5/3	32	-	27,5	4	5	24	32	28,5	18,5	0,6	2,5	4,4
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	22	180	243	200/225	128	3,0	14	60,6

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

with zero clearance conical-hub-connection (Dmax = Ø120) see series SKY

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

Safety Couplings I Series SKR for indirect drives

- Series SKR-K with cone clamping bush
- Series SKR-N with keyway connection
- robust slide bearing for high bearing forces and best concentricity
- compact attachment and optimum pane integration

technical data:

SKR Size	setting range disengagement torque T_{KA} [Nm]	moment of inertia [10 ⁻³ kgm ²]	mass. approx. [kg]	tightening torque of screws 6x i - ISO 4762 [Nm]	max. lateral load F_R [kN]	bore diameters øD	
						DK from-to	DN from-to
25	10 - 25					8 - 22	8 - 30
40	16 - 40	0,5	0,8	M4 - (3)	40	10 - 22	10 - 30
80	30 - 80					14 - 22	12 - 30
105	50 - 105					12 - 38	12 - 50
180	80 - 180	3	2,5	M6 - (12)	90	14 - 38	16 - 50
380	160 - 380					22 - 38	20 - 50
650	300 - 650	11	5,5	M8 - (30)	150	22 - 48	22 - 65
950	350 - 950					22 - 48	30 - 65
1100	500 - 1100					28 - 70	30 - 95
2200	1000 - 2200	55	14	M10 - (60)	250	42 - 70	45 - 95
3200	1500 - 3200					55 - 70	52 - 95

material:

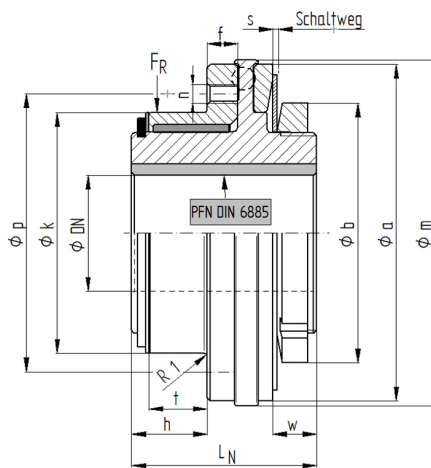
heat-treated steel. temperature range: -30°C up to +200°C



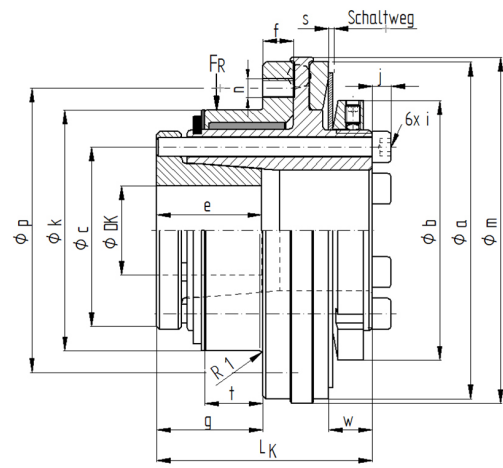
SKR-N



SKR-K



SKR-N



SKR-K

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

SKR	Øa	Øb	Øc	e	f	g	h	j	Øk ^{h7}	Øm	Øp	L _K	L _N	n	s	t	w
25/40/80	73,5	52	33	23	7	24	17,2	4	50	77	59	50	43	8xM4	1,2	12,5	10,3
105/180/380	109	84	54	34	10	34,5	24,5	6	78	112	90	70x	60	8xM6	1,6	19	14,2
650/950	139	105	66	37	14	42,5	30	8	100	145	115	90,5	78	8xM8	1,9	24	20
1100/2200/3200	188	170	97	51	14	51,5	36	10	140	196	160	120,5	105	12xM10	3,0	28	35,6

order example: SKR-K 105 - D = 22^{G6} - release torque - TKA = 75 Nm

Safety Couplings I Series SKVA for indirect drives

- SKVA-N series with keyway connection • SKVA-K series with clamping ring hub
- material design completely in stainless steel
- with integral ball bearing for high radial load

stainless
steel

technical data:

SKVA-K SKVA-N Size	setting range disengagement torque T_{KA} [Nm]	moment of inertia [kgm ²]	mass approx. [kg]	max. lateral load F_R [kN]	tightening torque of screws f [Nm] i [Nm]	D_K min	bore diameter ϕD [mm] D_N max	D_K min	D_K max
12	5 - 12	0,0002	0,6	5	M6 - [9]	10	22	22	24
25	11 - 25					15	22	22	24
38	20 - 38					19	22	22	24
70	22 - 70	0,0035	3	15	M10 - [45]	20	38	38	42
150	55 - 150					24	38	38	42
220	90 - 220					30	38	38	42
400	180 - 400	0,013	6	30	M14 - [110]	28	58	58	65
900	350 - 900					32	58	58	65

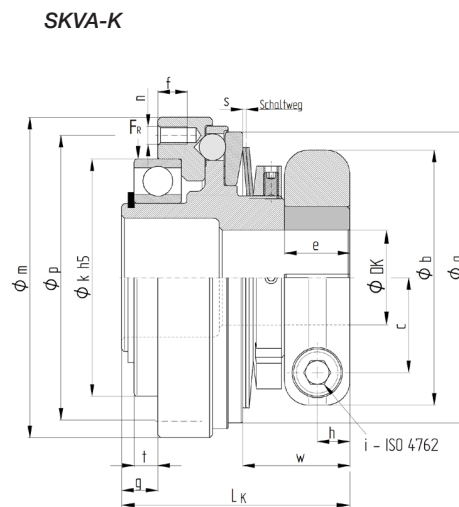
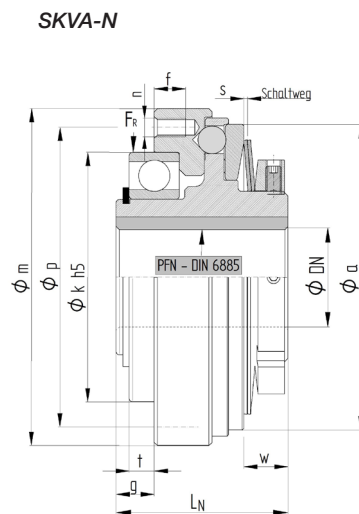
temperature range: -50°C up to +150°C



SKVA-N



SKVA-K



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

SKVA	ϕa	ϕb	c	e	f	g	h	$\phi k h5$	ϕm	ϕp	L_N	L_K	n	s	t	w
12	52	52	19	14	8	8	7	47	62	55	30	44	6x M4	1,2	5	22
25	52	52	19	14	8	8	7	47	62	55	30	44	6x M4	1,2	5	22
38	52	52	19	14	8	8	7	47	62	55	30	44	6x M4	1,2	5	22
70	98	86	32	22	10	12	11	80	108	96	55	77	6x M6	1,7	8	36
150	98	86	32	22	10	12	11	80	108	96	55	77	6x M6	1,7	8	36
220	98	86	32	22	10	12	11	80	108	96	55	77	6x M6	1,7	8	36
400	129	118	45	28	12	16	14	115	143	132	66	94	8x M6	2,5	11	46
900	129	118	45	28	12	16	14	115	143	132	66	94	8x M6	2,5	11	46

order example: SKVA-K 150 - $D = \phi 32^{G7}$ - $T_{KA} = 120 \text{ Nm}$

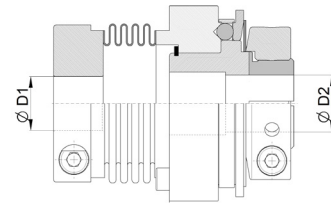
Safety Couplings I *for direct drives*

- Large selection of safety coupling types with coupling attachment for shaft-shaft connection

The JAKOB safety couplings for direct drives are a combination of the release mechanism that has been tried and tested and optimized for decades with a coupling element to compensate for misalignments between the input and output shaft. Various versions from an extensive modular system of metal bellows or elastomer couplings can be selected. While the main specific feature of the Metal bellows is the very high torsional rigidity with low restoring forces, the elastomer couplings are characterized by their robustness, excellent damping properties and the possibility of plug-in assembly. Due to the screw connection between the coupling element and the safety part, in the event of damage or Changing the technical operating parameters means replacing the coupling attachment or the safety part anytime possible.

The following series are available as standard:

- | | | |
|-------------------|----|--|
| Series SKB | -> | with clamping ring hub $\varnothing D2$ |
| Series SKY | -> | with cone clamping bush $\varnothing D2$ |
| Series SKW | -> | with feather key connection $\varnothing D2$ |



Series SKB - KP

with metal bellows 4W + clamping hub



Series SKB - EK

with elastomer star + clamping hub



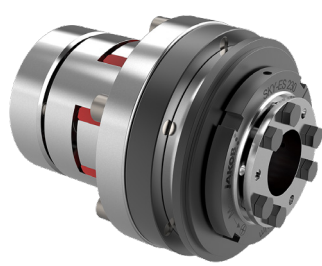
Series SKY - KS

with metal bellows 4W + conical clamping bush



Series SKY - ES

with elastomer spider + cone clamping ring hub



Series SKW - KP

with metal bellows 4W + clamping hub
(optionally with keyway)



Series SKW - EK

with elastomer spider + clamping hub
(optionally with keyway)



Further attachment combinations or hub variants with metal bellows or elastomer star, as well as customer-specific designs are possible on request.

Safety Couplings I Series SKB-KP for direct drives

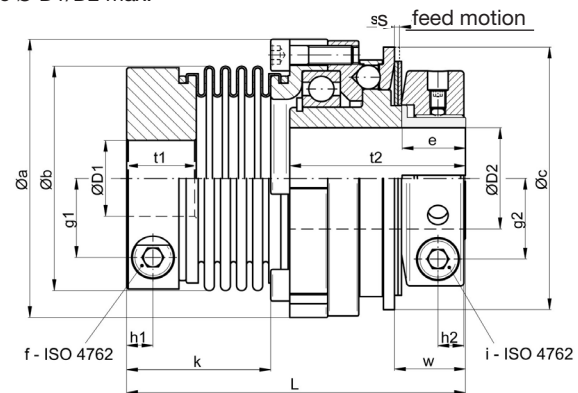
- with bellows attachment • with lateral clamping hub on both sides
- EASY-clamping hub on bellows side • compensation of misalignments • low restoring forces

technical data:

SKB-KP size	setting range disengagement torque T_{KA} [Nm]	moment of inertia [10 ⁻³ kgm ²]	mass approx. [kg]	torsional stiffness [Nm/arcmin]	max. shaft misalignment [mm] axial± lateral	tightening torque of screws f [Nm] i [Nm]	Ø D1 min max	Ø D2 min max	Ø D2 max. PFN 6885
1,5	0,3 - 1,5	0,015	0,14	0,9	0,3 0,1	M3-[2]	5 11	6 12,7	10
3	1 - 3						5 11	6 12,7	
6	2 - 6	0,13	0,45	2,1	0,5 0,15	M5-[8]	6 24	6 16	12
12	6 - 12						8 24	8 16	
15	8 - 15	0,5	1,0	9	0,5 0,2	M6-[14]	8 32	10 25,4	20
30	13 - 30						10 32	12 25,4	
45	22 - 45						12 32	14 25,4	
60	25 - 60	1,5	1,9	20	0,6 0,2	M8-[30]	13 38	18 35	32
100	40 - 100						14 38	18 35	
150	60 - 150						21 38	24 35	
230	80 - 230	5,5	3,8	28	0,8 0,2	M10-[50]	24 43	24 44	38
330	130 - 330						32 43	32 44	
500	200 - 500	14,0	6,8	52	0,8 0,2	M12-[90]	35 55	28 58	50
800	350 - 800	17,2	8,3	106	0,7 0,2	M14-[140]	42 68	40 58	
1000	500 - 1000	80	20	150	0,8 0,2	M14-[140]	45 75	42 100	90
2000	800 - 2000	95	23	250	1,5 0,3	M20-[450]	45 90	45 100	
3000	1500 - 3000			600	1,2		50 130	50 120	
6000	3000 - 6000	380	50	1000	3 1,4	10xM12[70]	60 130	60 120	Opt.
9000	6000 - 9000			1000	1,4		80 130	80 120	

(*) note: reduced tightening torque for bigger hub bore diameter - see also Ø D1/D2 max!
temperature range: -30°C up to +200°C

material:
safety part:
heat-treated steel
clamping hub:
high-tensile aluminum
hub 2000-9000: steel
bellows: stainless steel
screws: ISO 4762 / 12.9



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

SKB-KP	Øa	Øb	Øc	e	g1	g2	h1	h2	k	L±1	s	t1	t2	w
1,5/3	33	24	32	8	7,3	10,1	4,5	4	20,5	48,5	0,5	9,5	26,5	12,4
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	8	7,5	43	94,5	1,2	20	48	18,5
60/100/150	88	71	83	20	25	25,5	9	8,5	45,5	107	1,6	22	55,5	22
230/330	115	82	109	23	28,5	32	11,5	10,5	52	132	1,8	26	72	26
500	137	101	132	32	35	42	13	13,5	60	156	2,5	29	87,5	37
800	137	122	132	32	42	42	16	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±2	3,7	45	89	74
2000	181	157	185	74	58	69	22	17/30	112	241	3,7	45	89	74
3000-9000	243	236	236	54	Ø175	Ø160	-	-	-	336	3,0	74	81	87

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 Nm

Safety Couplings I Series SKB-EK for direct drives

- with elastomer attachment • with lateral 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 kgm ²]	mass approx. [kg]	torsional stiffness [Nm/arcmin]	max. shaft misalignment [mm]		tightening torque of screws		\varnothing D1 min max		\varnothing D2 min max		\varnothing D2 max PFN 6885
1,5	0,3 - 1,5	0,015	0,15	0,016	0,8	0,1	M2,5-[1]	M3-[2]	5	10	6	12,7	10
3	1 - 3								5	10	6	12,7	
6	2 - 6	0,13	0,44	0,25	0,5	0,1	M5-[8]	M5-[8]	7	20	6	16	12
12	6 - 12								7	20	8	16	
15	8 - 15	0,5	1	1	0,5	0,1	M6-[14]	M6-[14]	13	32	10	25,4	
30	13 - 30								13	32	12	25,4	20
45	22 - 45								13	32	14	25,4	
60	25 - 60	1,5	2	1,2	1	0,1	M8-[35]	M8-[35]	16	38	18	35	
100	40 - 100								19	38	18	35	32
150	60 - 150	5,6	4,2	3,6	1	0,12	M12-[90]	M10-[70]	22	38	24	35	
230	80 - 230								20	42	24	42	38
330	130 - 330								20	42	32	42	
500	200 - 500	17	8,6	8	1	0,15	M14-[140]	M14-[200]	25	70	28	58	50
800	350 - 800								32	70	40	58	
1000	500 - 1000	79	19,5	12	1	0,10	M14-[140]	M16-[250]	40	70	42	100	90
2000	800 - 2000	116	27,9	21	1	0,15	M16-[290]	M16-[250]	48	90	42	100	90

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

material:

safety part: heat treated steel

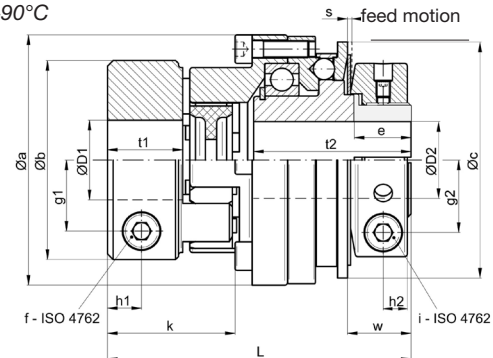
clamping hub: high-tensile aluminum

(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-KP	Øa	Øb	Øc	e	g1	g2	h1	h2	k	L±1	s	t1	t2	w
1,5/3	33	21,5	32	8	6,5	10,1	5	4	30,5	58,5	0,5	10	26,5	12,4
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
2000	181	157	185	74	58	69	22	17/30	112	241	3,7	45	89	74

*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 Nm

Safety Couplings I Series SKVA-KG for direct drives

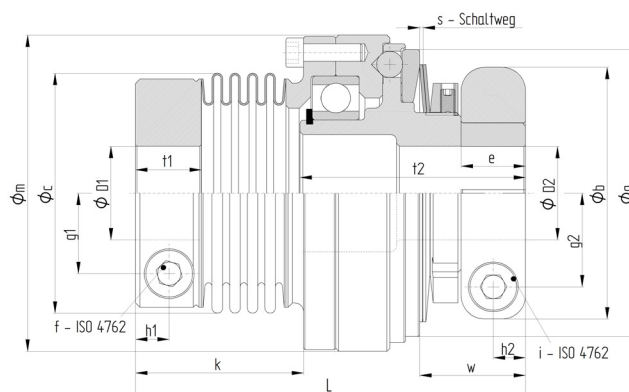
- with metal bellows coupling attachment for direct drives
- all components made entirely of stainless steel
- with easy-to-assemble clamping hub or clamping ring hub

**stainless
steel**

technical data:

SKVA-KG Size	setting range disengagement torque T_{KA} [Nm]	moment of inertia [kgm ²]	mass approx. [kg]	torsional stiffness [Nm/arcmin]	max. shaft mis- alignment [mm] axial ± lateral		tightening torque of screws f [Nm] i [Nm]		bore diameter			
									ø D1	ø D2	min	max.
12	5 - 12	0,0003	0,7	3,4	0,5	0,15	M5-5	M6-9	8	20	10	24
25	11 - 25	0,0004	0,9	9	0,6	0,2	M6-9	M6-9	10	28	15	24
38	20 - 38	0,0004	0,9	9	0,6	0,2	M6-9	M6-9	10	28	20	24
70	22 - 70	0,004	3,5	20	0,6	0,2	M8-24	M10-45	19	40	20	42
150	55 - 150	0,005	4	28	0,7	0,2	M10-45	M10-45	24	42	24	42
220	90 - 220	0,005	4	28	0,7	0,2	M10-45	M10-45	28	42	30	42
400	180 - 400	0,02	7,5	52	0,8	0,2	M12-80	M14-110	32	50	30	65
900	350 - 800	0,02	8	106	0,8	0,2	M14-110	M14-110	48	62	55	65

temperature range: -50°C up to +150°C



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

SKVA-KG	Øa	Øb	Øc	e	g1	g2	h1	h2	k	L ±1	Øm	s	t1	t2	w
12	52	52	40	14	13	19	6	7	36	80	62	1,2	13	44	22
25	52	52	56	14	18,5	19	7,5	7	52	96	62	1,2	16	44	22
38	52	52	56	14	18,5	19	7,5	7	52	96	62	1,2	16	44	22
70	98	86	71	22	25	32	9	11	55	126	108	1,7	19	77	36
150	98	86	82	22	27,5	32	11	11	57,5	133	108	1,7	23	77	36
220	98	86	82	22	27,5	32	11	11	57,5	133	108	1,7	23	77	36
400	129	118	101	28	33	45	12	14	72	160	143	2,5	26	93	46
900	129	118	122	28	40	45	15	14	81	169	143	2,5	30	93	46

notes:

- alternative lengths and hub designs available upon request (see SKVA-N)
- hub-shaft connection with shaft diameters smaller than Dmin - optionally with additional key
- clamping hubs generally with A4-80 stainless steel screws - optionally coated screws FKL 12.9 for higher clamping forces or higher torques or for shaft diameters smaller than Dmin.

order example: SKVA-KG 220 - D1 = Ø 35^{G7} - D2 = Ø 38^{G7} - T_{KA} = 160 Nm

Safety Couplings I Series SKVA-EK for direct drives

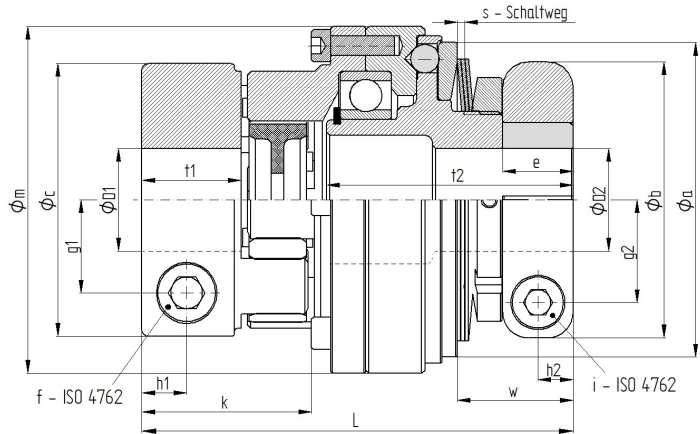
- with elastomer coupling attachment for direct drives
- all components made entirely of stainless steel - elastomer spider PUR-98 Shore A
- with easy-to-install clamping hub design

**stainless
steel**

technical data:

SKVA-EK Size	setting range disengagement torque T_{KA} [Nm]	moment of inertia [kgm ²]	mass approx [kg]	torsional stiffness [Nm/arcmin]	max. shaft mis- alignment [mm] axial ± lateral		tightening torque of screws f [Nm] i [Nm]		bore diameter			
									ø D1		ø D2	
									min	max	min	max.
12	5 - 12	0,0004	0,8	0,24	0,5	0,1	M5-5	M6-9	8	20	10	24
25	11 - 25	0,0006	1,1	1	0,5	0,1	M8-24	M6-9	13	30	15	24
38	20 - 38	0,0006	1,1	1	0,5	0,1	M8-24	M6-9	13	30	20	24
70	22 - 70	0,005	4	1,2	1	0,1	M10-50	M10-50	16	32	20	42
150	55 - 150	0,006	5	3,6	1	0,12	M12-80	M10-50	19	42	24	42
220	90 - 220	0,006	5	3,6	1	0,12	M12-80	M10-50	19	42	30	42
400	180 - 400	0,02	9	4,5	1	0,15	M14-110	M14-110	24	55	30	65
900	350 - 900	0,026	10	8	1	0,15	M14-110	M14-110	50	70	55	65

temperature range: -50°C up to +150°C



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

SKVA-EK	Øa	Øb	Øc	e	g1	g2	h1	h2	k	L ±1	Øm	s	t1	t2	w
12	52	52	40	14	12	19	8	7	31	79	62	1,2	17	44	22
25	52	52	60	14	20,5	19	10	7	40	87	62	1,2	22	44	22
38	52	52	60	14	20,5	19	10	7	40	87	62	1,2	22	44	22
70	98	86	70	22	23	32	12	11	45	127	108	1,7	25	77	36
150	98	86	85	22	29	32	14	11	53	135	108	1,7	29	77	36
220	98	85	85	22	29	32	14	11	53	135	108	1,7	29	77	36
400	129	118	105	28	33	45	17	14	70	163	143	2,5	35	94	46
900	129	118	120	28	33	45	18	14	74	170	143	2,5	38	94	46

notes:

- optionally with elastomer star - Shore hardness 72Sh-D with higher torsional rigidity and $T_{max} = 120^{\circ}\text{C}$
- clamping hubs generally with A4-80 stainless steel screws - optionally with coated screws of strength class 12.9 for higher clamping forces or higher torques
- shaft-hub connection optionally with key for shaft diameters smaller than D_{min} (see also SKVA-N)
- alternative hub design D1 available upon request

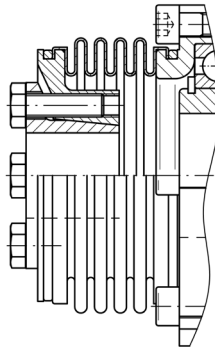
order example: SKVA-EK 38 - D1 = Ø 19^{G7} - D2 = Ø 22^{G7} - $T_{KA} = 30 \text{ Nm}$

Safety Couplings I Additional Series

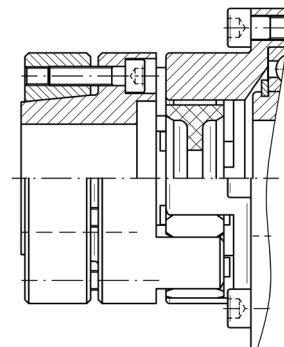
Series

- 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

SKB-KS with conical clamping hub

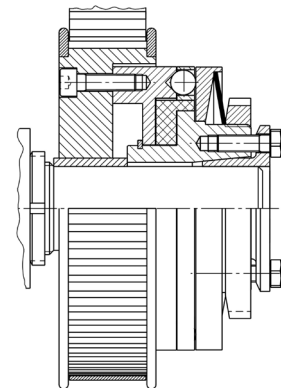


SKB-ES with conical clamping hub



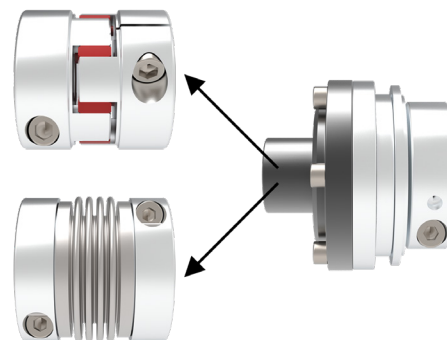
Series SKD/SBE/SK-F with special mechanism

- for long run-out times
- minimal residual torque
- re-engaging only by reverse rotation



Series SKB-WA

- Standard SKB type with adapter shaft
- for the universal attachment of metal bellows, Elastomer and spacer couplings



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 180 kN
- through hole thread up to M48
- for variable clamping edges
- unlimited clamping stroke



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)*

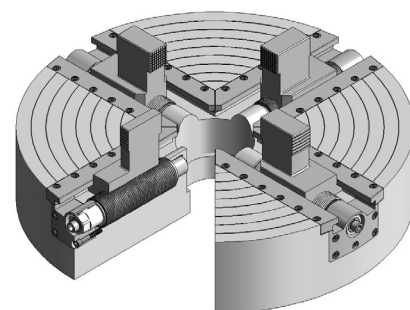
Power Clamping Screw Series SC

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



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
- imple operation and fitting
- very large clamping forces at low tightening torques



please ask for our clamping elements catalog

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