Metal bellows couplings

Product information / Design

Typical characteristics of metal bellows couplings

- Backlash-free transmission of torque
- High torsional stiffness, precision of transmission of rotational angle
- Different torsional stiffness
- Backlash-free shaft connection
- Small dimensions, low moment of inertia
- Compensation for radial, axial, and angular misalignment
- Free of wear, maintenance-free, no standstill period
- Not sensitive to temperatures between -30 °C and +100 °C, higher temperature ranges available on demand
- Simple and operationally safe assembly
- Economical and user-friendly due to modular system
- Nominal moments between 0.4 - 5000 Nm

Backlash-free, torsionally stiff metal bellows couplings are ready to install when delivered. The metal bellows are made of anti-corrosive steel, all other parts are manufactured from aluminum or steel and partly have an environmental friendly protective coating.

As a standard, the boreholes are equipped with a fitting in accordance with ISO-H7. For the shafts, we recommend an transition, e.g. H7/g6. When selecting other shaft fitting, the fitting should not exceed a maximum of 0.03 mm.

The power transmission between the coupling hub and the shaft occurs through compression and friction between the contact surfaces. Special attention must be paid to the tightening torque of the retaining screws as well as the perfect condition of the contact surfaces.

The contact surfaces must be free of oil and grease. Types with a keyway are available. The torques indicated in the lists of Technical Data can only be safely transferred if these points are complied with. Otherwise it would be necessary to make compromises.

The dimensioning in accordance with the torque

Metal bellows couplings are generally designed according to the nominal torque stated in the lists of the Technical Data below. The nominal torque must always be higher than the regularly transferred torque. This generally applies to the use of servo motors, whose acceleration moment in positive and negative directions is much higher than the nominal moment.

The use of metal bellows couplings which are put in controlled, high dynamic drives, the following dimensioning values have proven to be reliable in practice:

K = 1,5	for evenly shaped movements
K = 2	for unevenly shaped movements
K = 2,5 – 4	for jerky movements

For Servo drives within tool making machines, the values for K of 1.5-2 should be used.

In general, the following relationships apply:

$$T_{KN} \geq K \times T_{AS} \times \frac{J_{Mach}}{J_{Mot} + J_{Mach}} = [Nm]$$

Design

Design with consideration for dynamic torsional stiffness.

Although metal bellows couplings are backlash-free and torsion-rigid, it should not be overlocked that they link two rotating masses. In disadvantageous cases like torsion springs the couplings can effect a high stiffness. The hunting of the drives and the harmonic oscillation in the armature current of the motor, e.g. thyristor industrial drives with low pulse number must therefore never be within the range of the mechanical resonance frequency.

$$f_{res} = \frac{1}{2\pi} \sqrt{C_{T\,dyn} \times \frac{J_{Mot} + J_{Mach}}{J_{Mot} \times J_{Mach}}} = [Hz]$$

In practice the resonance frequency "f_{res}" must be twice as large as the excitation frequency of the drive.

For most normal drives, e.g. NC-machine tool, this will be between 150 and 350 Hz.

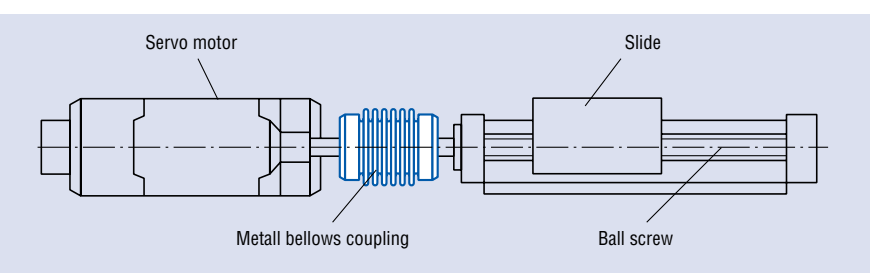
In the development of metal bellows couplings this factor was given special consideration. The dynamic torsional stiffness $C_{T\,dyn}$ was selected so that it would not be within the range of clearance diameter from most applications. Various levels of torsional stiffness are available as standard versions.

We would be pleased to design your metal bellows couplings for you. Feel free to use our experience and know-how for your success.

Speak to us.

Sample calculation

Application of a metal bellows coupling in a machine tool drive



Drive related data

Servo motor 1 FT 5104

Maximum torque T_{AS} = 160 Nm
Moment of inertia
J_{Mot} = 18.3 x 10^{-3} kgm²

Output-data

Machine tool

Moment of inertia of ball screw and slide J_{Mach} = 17 x 10^{-3} kgm²

The low moment of inertia of the metal bellows coupling is disregarded. K = Load factor, impulse factor selected for this drive K = 2

Design according to torque:

$$T_{KN} \geq K \times T_{AS} \times \frac{J_{Mach}}{J_{Mot} + J_{Mach}} = 2 \times 160\ Nm \times \frac{17 \times 10^{-3}\ Kgm^2}{(18{,}3 + 17) \times 10^{-3}\ Kgm^2} = 154\ Nm$$

Coupling selection: AKD 200, T_{KN} = 200 Nm, $C_{T\,dyn}$ = 116 x 10^3 Nm/rad.

The metal bellows coupling is sufficiently dimensioned, since 200 Nm ≥ 154 Nm.

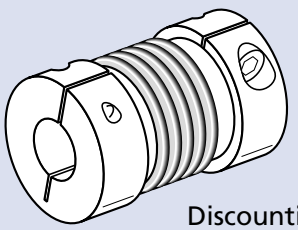
Design according to resonance frequency:

$$f_{res} = \frac{1}{2\pi} \times \sqrt{C_{T\,dyn} \times \frac{J_{Mot} + J_{Mach}}{J_{Mot} \times J_{Mach}}} = \frac{1}{2\pi} \times \sqrt{116000\ Nm/rad \times \frac{0{,}0183 + 0{,}017\ Kgm^2}{0{,}0183 \times 0{,}017\ Kgm^2}} = 578\ Hz$$

The arithmetic calculation is clearly much higher than the expected resonance frequency.

Summary of type series

Series DK – miniature



Discountinued model

To connect two shafts, backlash-free shaft-hub connection using collet clamps. For torques between 0.10 – 10 Nm.

Technical data and dimensions

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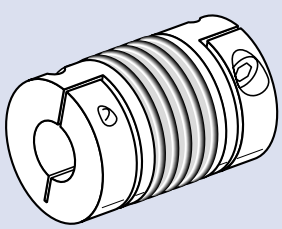
Series DKN – miniature



To connect two shafts, backlash-free shaft-hub connection using collet clamps. For torques between 0.40 – 10 Nm.

Technical data and dimensions

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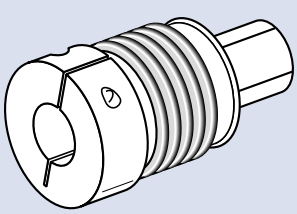
Series DK/S – miniature



To connect two shafts, backlash-free shaft-hub connection using a collet clamp and an expanding clamp.
For torques between 0.40 – 10 Nm.

Technical data and dimensions

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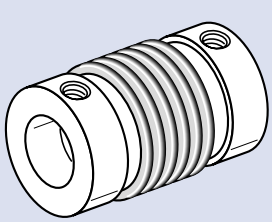
Series EK – miniature



To connect two shafts, backlash-free shaft-hub connection using set screws.
For torques between 0.10 – 10 Nm.

Technical data and dimensions

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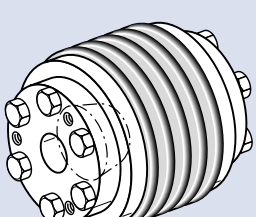
Series AK



Inner conical hub

To connect two shafts, backlash-free shaft-hub connection using conical hubs. For torques between 30 – 5000 Nm.

Technical data and dimensions

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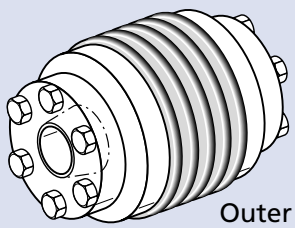
Summary of type series

Series AK/SB



Outer conical hub

To connect two shafts, backlash free shaft-hub connection using outer conical hubs, contracting disc, no releasing screw required, release during dismantling. For torques between 18 – 5000 Nm.

Technical data and dimensions

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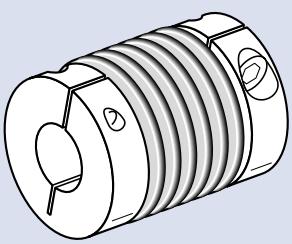
Series AKD



To connect two shafts, backlash free shaft-hub connection using collet clamps. For torques between 18 – 500 Nm.

Technical data and dimensions

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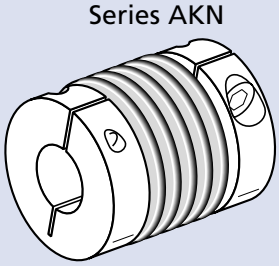
Series AKN



Same as Series AKD but with shorter length and higher torsional stiffness. For torques between 18 – 500 Nm.

Technical data and dimensions

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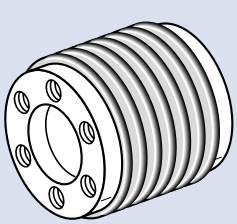
Series CK



Variable installation element for mounting of hubs, flanged shafts, flanges, etc. For torques between 18 – 5000 Nm.

Technical data and dimensions

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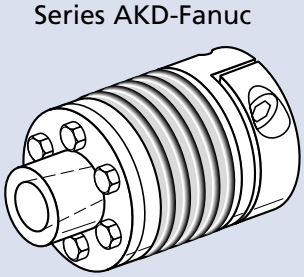
Series AKD-Fanuc



Appropriate coupling for Fanuc AC motors. Shorter installation models available. For torques between 18 – 60 Nm.

Technical data and dimensions

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User-friendly solutions

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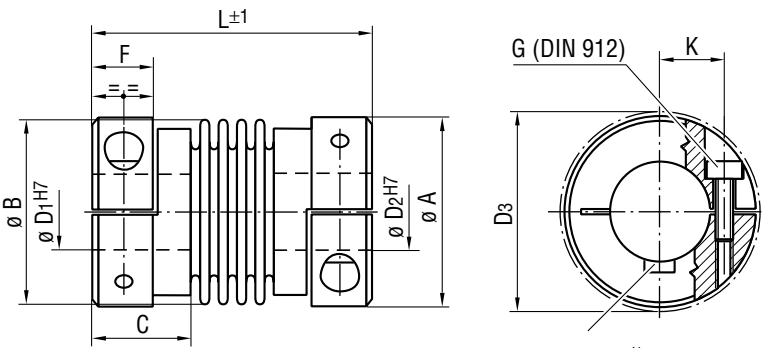
Metal bellows couplings

Series DK – miniature (discontinued model)



Keyway according to DIN 6885[1] on demand

Technical Data, Dimensions

TYPE	DIMENSIONS (mm)									TECHNICAL DATA					
	Ø A	Ø B	C	L (±1)	F	D_1/D_2 (H7) from/to	D_3 Clearance diameter	G (DIN 912) 8.8	K	Nominal-torque T_{KN} (Nm)	Misalignment (mm) radial ΔK_r	Misalignment (mm) axial ΔK_a	Torsional stiffness $C_{T\,dyn}$ (Nm/rad)	Moment of inertia J (g cm²)	Weight m (g)
DK 1/25	10	10	7	25	4.5	1 – 4	11	M1.6 (DIN 84)	3.4	0.1	0.12	0.2	65	0.7	5
DK 4/26	15.5	15	9	26	5.7	3 – 6.5	17.5	M2	5.6	0.4	0.1	0.2	254	2.6	9
DK 4/29	15.5	15	9	29	5.7	3 – 6.5	17.5	M2	5.6	0.4	0.15	0.3	190	2.6	9
DK 4/32	15.5	15	9	32	5.7	3 – 6.5	17.5	M2	5.6	0.4	0.2	0.4	152	2.6	9
DK 9/28	15.5	15	9	28	5.7	3 – 6.5	17.5	M2	5.6	0.9	0.1	0.2	507	2.6	9
DK 9/31	15.5	15	9	31	5.7	3 – 6.5	17.5	M2	5.6	0.9	0.15	0.3	380	2.9	10
DK 9/35	15.5	15	9	35	5.7	3 – 6.5	17.5	M2	5.6	0.9	0.2	0.4	305	3.2	11
DK15/33	20	19	12	33	7	3 – 10	21	M2.5	7	1.5	0.1	0.25	748	11	22
DK 15/37	20	19	12	37	7	3 – 10	21	M2.5	7	1.5	0.15	0.4	701	12	24
DK 20/37	25	24	13	37	8	3 – 12	27	M3	9	2	0.1	0.3	1530	25	36
DK 20/43	25	24	13	43	8	3 – 12	27	M3	9	2	0.2	0.4	1290	27	38
DK 20/47	25	24	13	47	8	3 – 12	27	M3	9	2	0.25	0.5	1030	28	40
DK 45/47	32	32	15.5	47	10	6 – 16	34	M4	11.5	4.5	0.1	0.3	6450	98	74
DK 45/55	32	32	15.5	55	10	6 – 16	34	M4	11.5	4.5	0.2	0.5	4030	103	78
DK 100/53	40	40	17	53	10	6 – 19	41.5	M4	15.5	10	0.15	0.4	8070	231	120
DK 100/64	40	40	17	64	10	6 – 19	41.5	M4	15.5	10	0.25	0.5	6720	250	130

Angular misalignment:

1.2° to 2°, depending on length

Hub bores:

Standard quality of fitting H7.
Custom bores on demand.

Standard bores:

DK 1	Ø 3H7
DK 4-15	Ø 6H7
DK 20	Ø 6H7 und 10H7
DK 45-100	Ø 10H7

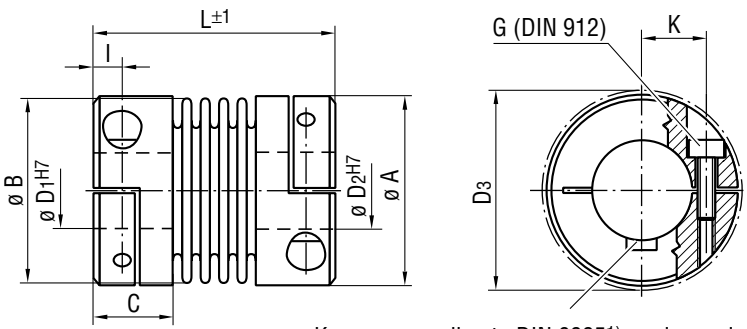
Tooling materials:

Hubs made of anodized aluminum, metal bellows made of stainless steel.
Stainless steel version also available.

1) Tolerance of keyway: Standard JS9.

Metal bellows couplings

Series DKN – miniature



Keyway according to DIN 6885[1)] on demand

Technical Data, Dimensions

TYPE	DIMENSIONS (mm)									TECHNICAL DATA					
	Ø A	Ø B	C	L (±1)	l	D_1/D_2 (H7) from/to	D_3 Clearance diameter	G (DIN 912) 8.8	K	Nominal-torque T_{KN} (Nm)	Misalignment (mm) radial ΔK_r	Misalignment (mm) axial ΔK_a	Torsional stiffness $C_{T\,dyn}$ (Nm/rad)	Moment of inertia J (g cm²)	Weight m (g)
DKN 4/21	15.5	15	7	21	2.4	3 – 6.5	17.5	M2	5.6	0.4	0.1	0.2	254	2.6	9
DKN 4/24	15.5	15	7	24	2.4	3 – 6.5	17.5	M2	5.6	0.4	0.15	0.3	190	2.6	9
DKN 4/28	15.5	15	7	27	2.4	3 – 6.5	17.5	M2	5.6	0.4	0.2	0.4	152	2.6	9
DKN 9/23	15.5	15	7	23	2.4	3 – 6.5	17.5	M2	5.6	0.9	0.1	0.2	507	2.6	9
DKN 9/26	15.5	15	7	26	2.4	3 – 6.5	17.5	M2	5.6	0.9	0.15	0.3	380	2.9	10
DKN 9/30	15.5	15	7	30	2.4	3 – 6.5	17.5	M2	5.6	0.9	0.2	0.4	305	3.2	11
DKN 15/26	20	19	9	26	3	3 – 10	21	M2.5	7	1.5	0.1	0.25	748	11	22
DKN 15/30	20	19	9	30	3	3 – 10	21	M2.5	7	1.5	0.15	0.4	701	12	24
DKN 20/32	25	24	12	32	3.5	3 – 12	27	M3	9	2	0.1	0.3	1530	25	36
DKN 20/38	25	24	12	38	3.5	3 – 12	27	M3	9	2	0.2	0.4	1290	27	38
DKN 20/42	25	24	12	42	3.5	3 – 12	27	M3	9	2	0.25	0.5	1030	28	40
DKN 45/41	32.5	32	14	41	4.5	6 – 16	34	M4	11.5	4.5	0.1	0.3	6450	98	74
DKN 45/50	32.5	32	14	50	4.5	6 – 16	34	M4	11.5	4.5	0.2	0.5	4030	103	78
DKN 100/47	40.5	40	14.5	47	5	6 – 19	41.5	M4	15.5	10	0.15	0.4	8070	231	120
DKN 100/57	40.5	40	14.5	57	5	6 – 19	41.5	M4	15.5	10	0.25	0.5	6720	250	130

Angular misalignment:

1.2° to 2°, depending on length

Hub bores:

Standard quality of fitting H7.
Custom bores on demand.

Standard bores:

DKN 4-15	Ø 6H7
DKN 20	Ø 6H7 und 10H7
DKN 45-100	Ø 10H7

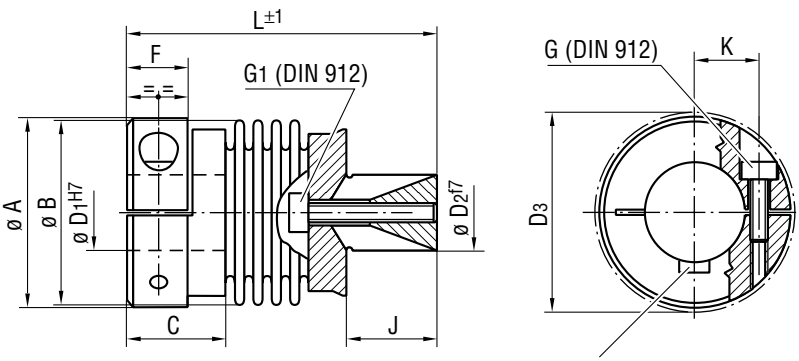
Tooling materials:

Hubs made of anodized aluminum, metal bellows made of stainless steel.

1) Tolerance of keyway: Standard JS9.

Metal bellows couplings

Series DK/S – miniature



Keyway according to DIN 6885[1] on demand

Technical Data, Dimensions

TYPE	DIMENSIONS (mm)												TECHNICAL DATA					
	Ø A	Ø B	C	L (±1)	F	D_1 (H7) from/to	D_2 (f7)	J	D_3 Clear-ance dia-meter	G (DIN 912)	K	G_1 (DIN 912)	Nominal-torque T_{KN} (Nm)	Misalignment (mm) radial ΔK_r	Misalignment (mm) axial ΔK_a	Torsio-nal stiffness $C_{T\,dyn}$ (Nm/rad)	Moment of inertia J (g cm²)	Weight m (g)
DK/S 4/29	15.5	15	9	29	5.7	3 – 6.5	8	8	17.5	M2	5.6	M3	0.4	0.1	0.2	254	3.0	10.9
DK/S 4/31	15.5	15	9	31	5.7	3 – 6.5	8	8	17.5	M2	5.6	M3	0.4	0.15	0.3	190	3.0	11.3
DK/S 4/35	15.5	15	9	35	5.7	3 – 6.5	8	8	17.5	M2	5.6	M3	0.4	0.2	0.4	152	3.0	11.4
DK/S 9/30	15.5	15	9	30	5.7	3 – 6.5	8	8	17.5	M2	5.6	M3	0.9	0.1	0.2	507	3.0	11.8
DK/S 9/33	15.5	15	9	33	5.7	3 – 6.5	8	8	17.5	M2	5.6	M3	0.9	0.15	0.3	380	3.0	12.7
DK/S 9/37	15.5	15	9	37	5.7	3 – 6.5	8	8	17.5	M2	5.6	M3	0.9	0.2	0.4	305	3.0	12.9
DK/S 15/37	20	19	12	37	7	3 – 10	10	12	21	M2.5	7	M4	1.5	0.1	0.25	748	11	23.6
DK/S 15/41	20	19	12	41	7	3 – 10	10	12	21	M2.5	7	M4	1.5	0.15	0.4	701	12	25.0
DK/S 20/41	25	24	13	41	8	3 – 12	10	12	27	M3	9	M4	2.0	0.1	0.3	1530	21	37.8
DK/S 20/47	25	24	13	47	8	3 – 12	10	12	27	M3	9	M4	2.0	0.2	0.4	1290	23	41.4
DK/S 20/51	25	24	13	51	8	3 – 12	10	12	27	M3	9	M4	2.0	0.25	0.5	1030	25	41.7
DK/S 45/52	32	32	16	52	10	6 – 16	14	16	34	M4	11.5	M5	4.5	0.1	0.3	6450	80	83.4
DK/S 45/61	32	32	16	61	10	6 – 16	14	16	34	M4	11.5	M5	4.5	0.2	0.5	4030	86	89.6
DK/S 100/61	40	40	16	61	10	6 – 19	16	20	41.5	M4	15.5	M6	10	0.15	0.4	8070	224	129.8
DK/S 100/71	40	40	16	71	10	6 – 19	16	20	41.5	M4	15.5	M6	10	0.25	0.5	6720	256	146.7

Angular misalignment:

1.2° to 2°, depending on length

Hub bores:

D_2: We recommend an H8 fitting for the share bore.

Standard bores:

DK/S 4-15	D_1 = 6H7
DK/S 20	D_1 = 6H7 und 10H7
DK/S 45-100	D_1 = 10H7

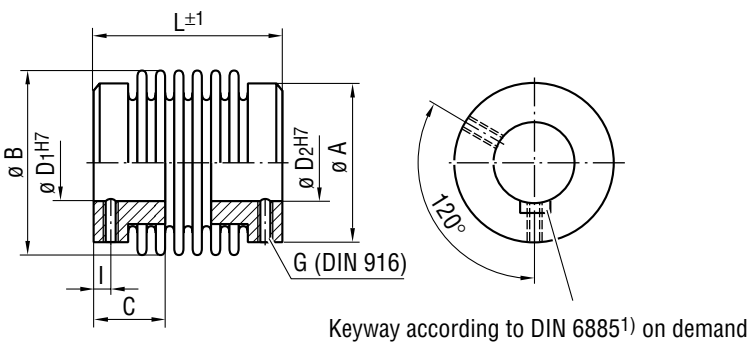
Tooling materials:

Hubs made of anodized aluminum, DK/S 4-9 expanding hubs made of brass, DK/15-100 expanding hubs made of steel, metal bellows made of stainless steel.
Stainless steel version also available.

1) Tolerance of keyway: Standard JS9

Metal bellows couplings

Series EK – miniature



Keyway according to DIN 6885[1)] on demand

Technical Data, Dimensions

TYPE	DIMENSIONS (mm)							TECHNICAL DATA					
	Ø A	Ø B	C	L (±1)	D_1/D_2 (H7) from/to	G (DIN 916)	l (mm)	Nominal-torque T_{KN} (Nm)	Misalignment (mm) radial ΔK_r	Misalignment (mm) axial ΔK_a	Torsio-nal stiffness $C_{T\,dyn}$ (Nm/rad)	Moment of inertia J (g cm²)	Weight m (g)
EK 1/22	10	10	6	22	1 – 4	M3	2	0.1	0.12	0.2	65	0.7	5
EK 4/20	13	15	6	20	3 – 8	M3	2	0.4	0.1	0.2	254	2.0	6
EK 4/23	13	15	6	23	3 – 8	M3	2	0.4	0.15	0.3	190	2.0	6
EK 4/26	13	15	6	26	3 – 8	M3	2	0.4	0.2	0.4	152	2.0	6
EK 9/21	13	15	6	21	3 – 8	M3	2	0.9	0.1	0.2	507	2.0	6
EK 9/25	13	15	6	25	3 – 8	M3	2	0.9	0.15	0.3	380	2.3	7
EK 9/28	13	15	6	28	3 – 8	M3	2	0.9	0.2	0.4	305	2.6	8
EK 15/25	19	19	12	25	3 – 10	2 x M4	3	1.5	0.1	0.25	748	7.5	17
EK 15/30	19	19	12	30	3 – 10	2 x M4	3	1.5	0.15	0.4	701	8	19
EK 20/23	21	24	12	23	3 – 12	2 x M4	3	2	0.1	0.3	1530	14	22
EK 20/29	21	24	12	29	3 – 12	2 x M4	3	2	0.2	0.4	1290	16	24
EK 20/33	21	24	12	33	3 – 12	2 x M4	3	2	0.25	0.5	1030	17	26
EK 45/39	29	32	16	39	6 – 15	2 x M6	4	4.5	0.1	0.3	6450	68	54
EK 45/48	29	32	16	48	6 – 15	2 x M6	4	4.5	0.2	0.5	4030	73	58
EK 100/44	36	40	20	44	6 – 19	2 x M6	4	10	0.15	0.4	8070	200	104
EK 100/54	36	40	20	54	6 – 19	2 x M6	4	10	0.25	0.5	6720	220	114

Angular misalignment:

1.2° to 2°, depending on length

Hub bores:

Standard quality of fitting H7.
Custom bores on demand.

Standard bores:

EK 1	Ø 3H7
EK 4-15	Ø 6H7
EK 20	Ø 6H7 und 10H7
EK 45-100	Ø 10H7

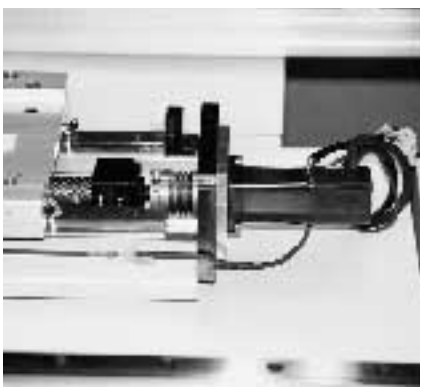
Tooling materials:

Hubs made of anodized aluminum, metal bellows made of stainless steel.
Stainless steel version also available.

1) Tolerance of keyway: Standard JS9

Metal bellows couplings

Sample applications

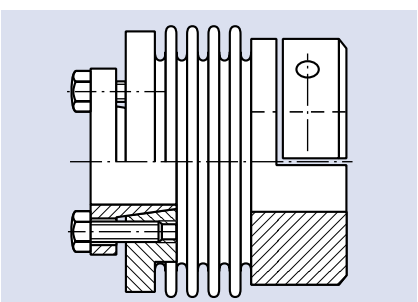


Series DKN
Application – Linear actuator

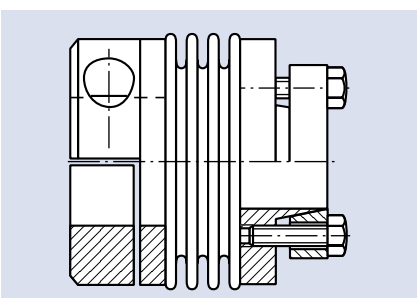
Series AK
Application – Gantry robot

Series AKN
Application – servo-drive / milling machine

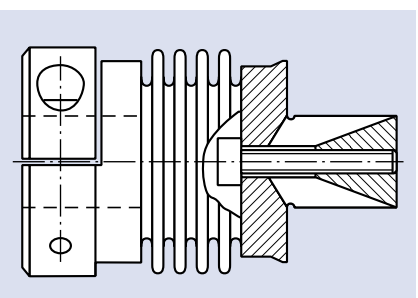
Variable Series



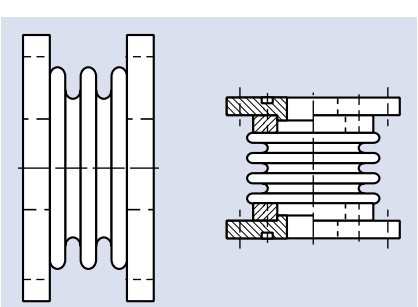
Series AK/AKD
Model with collet clamp and inner conical hub



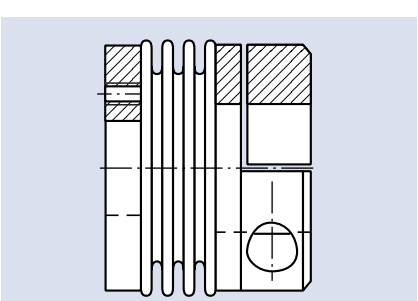
Series AKD/AK/SB
Model with collet clamp and outer conical hub



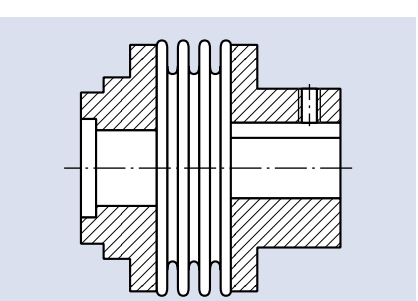
Series AKN/S
Model with collet and expanding clamps



Series CK
With special flange



Series AKD/CK
Model with collet clamp and flange



Series AKN-XX
Model with special hub on both sides

Metal bellows couplings

Assembly instructions

Assembly

Clean shaft ends and bores in hubs, degrease and check the tolerances.

Insert both shaft trunks into the hubs of the metal bellows coupling, and firmly tighten the screws, after examining the axial installation dimensions.

The tightening torque of the screws and the maximum approved misalignment should not be exceeded (refer to list of Technical Data).

Alignment

Figure 10 illustrates the individual types of misalignment.

The fitted metal bellows coupling must now be aligned. Please check the values indicated in the lists of Technical Data.

If several types of misalignment appear simultaneously, then each of the individual values should not be exceeded. Moreover, they should be aligned.

The total of the real misalignments in percentage of the maximum value should not exceed 100%. Figure 9 shows how to regulate.

The more precise the alignment, the more reserves are available to handle additional misalignments for operation. This will have an advantageous effect on the service life, balance quality, and the accuracy of transmission.

If several types of misalignment occur at once, then the values must be lower than each of the maximum values.

Dismantling

After loosening the backlash-free shaft-hub connections, the drive can be pulled apart and the metal bellows coupling can be removed.

Conical bushings for Series AK are forced off with a hexagonal socket screw.

Please ask for our detailed assembly instructions.

Figure 9: Compensating for misalignment

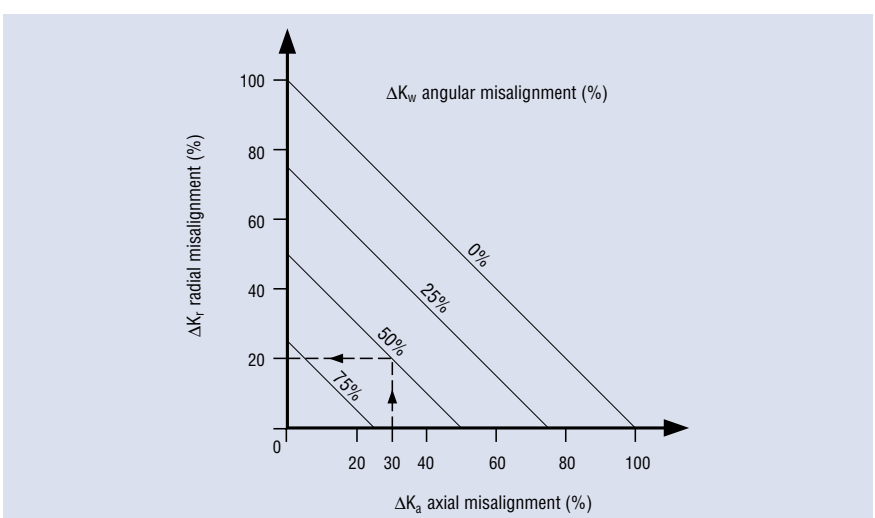
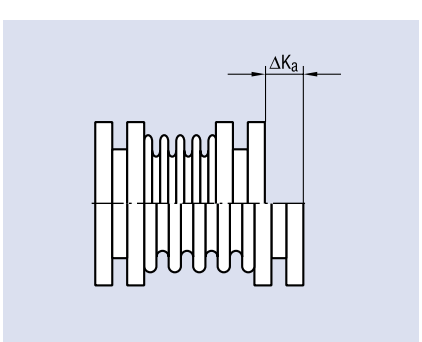
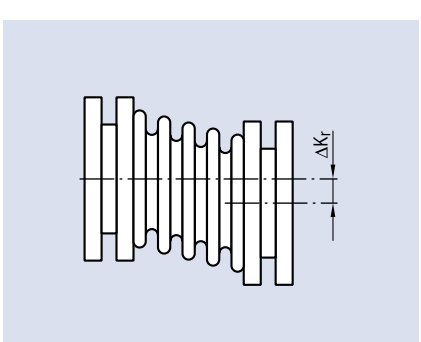


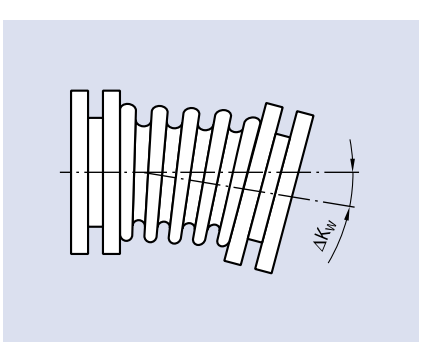
Figure 10: Types of misalignment



axial



radial



angular

Backlash-free Servo-insert Couplings Product Range

Special Features
- Backlash free
- Simple, plug-in mounting
- Vibration damping
- Compensation of radial, axial and angular misalignment
- Transmission of torque values between 0.5 and 650 Nm

Common Applications
- Encoder
- Precision drives
- Feed drives
- Grinding and milling spindles
- Machine tools
- Packaging Machines
- Industrial robots
- Transfer lines
- Multi-spindle heads
- Wood processing equipment
- Textile machinery
- Conveying equipment
- Linear motion
- Measuring equipment and controls
- Test rigs...

Miniature Servo-insert Coupling with set screw style hubs

Servo-insert Coupling with clamping style hubs and single slit

Servo-insert Coupling with clamping style hubs and dual slits

Servo-insert Coupling – interchangeable with competitor's

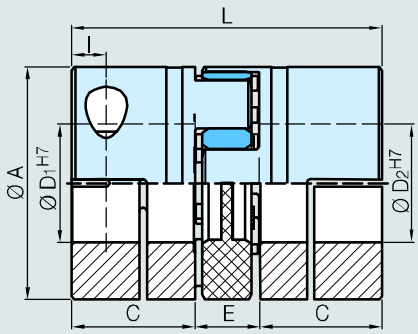
Servo-insert Coupling with shrink disc style hubs

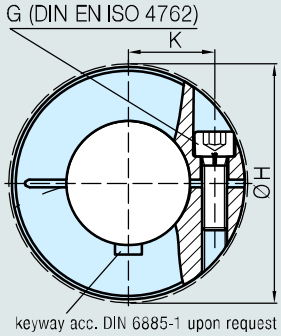
High Speed Servo-insert Coupling with shrink disc style hubs for short spindles acc. to DIN 69002

Combination Servo-insert Coupling and zero backlash torque limiter

Combination Servo-insert Coupling and zero backlash ball detent torque limiter

Backlash-free Servo-insert Coupling Type ADS





Technical data Type ADS

Type			14	19	24	28	38	42	48
Nominal torque	(Nm)	$T_{KN\ (92ShA)}$	12,5	17	60	160	325	450	525
Moment of inertia of coupling	(10^{-6} kgm^2)	J[1)]	0,0057	0,036	0,15	0,33	1,04	6,1	14,6
Tightening torque of screws	(Nm)	M_A	5	10	18	43	84	84	145
Weight per hub	(app. kg)	m	0,018	0,07	0,15	0,24	0,45	2,06	2,6
Max. Speed	(rpm)	n_{max}	13000	10000	7000	6000	5000	4000	3600
Standard shore hardness			98 SH A (red)						

Dimensions (mm) Type ADS

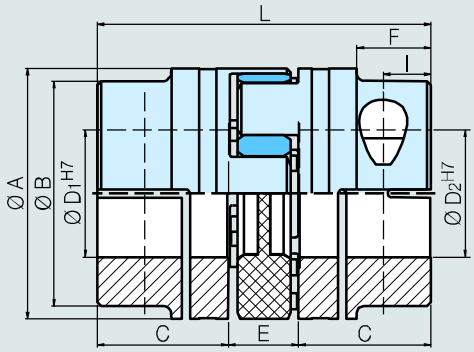
Type		14	19	24	28	38	42	48
L		35	66	78	90	114	126	140
A		30	40	55	65	80	95	105
C		11	25	30	35	45	50	56
Ø D_1^{H7} / Ø D_2^{H7}	min. - max.	10-14	10-20	20-28	24-35	32-44	35-50	40-60
K		10,5	15	20	24	30	35	40
E		13	16	18	20	24	26	28
l		5	6	10	11	13	14	15
G (DIN EN ISO 4762)		M4	M5	M6	M8	M10	M10	M12
H (clearance diameter)		34	45	57	70	89	96	110
Hub material		aluminium alloy					steel	

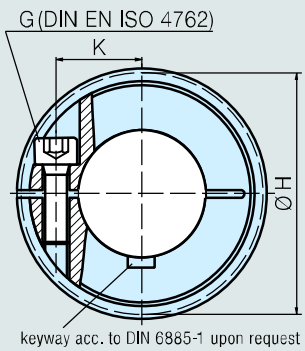
Bore range D1/D2 and corresponding transmissible torque values (Nm) of the coupling

Type	Ø 10	Ø 11	Ø 13	Ø 14	Ø 16	Ø 18	Ø 19	Ø 20	Ø 24	Ø 25	Ø 28	Ø 30	Ø 32	Ø 35	Ø 38	Ø 40	Ø 42	Ø 44	Ø 48	Ø 50	Ø 60
14	12,5	12,5	12,5	12,5																	
19	17	17	17	17	17	17	17	17													
24								60	60	60	60										
28									160	160	160	160	160	160	160						
38													325	325	325	325	325	325			
42														415	427	435	443	450	450	450	
48																525	525	525	525	525	525

[1)] The moment of inertia and the weight (mass) are calculated with reference to the largest bore size.

Backlash-free Servo-insert Coupling Type ADS/R





Technical data Type ADS/R

Type			14	19	24	28	38	42	48
Nominal torque	(Nm)	$T_{KN\ (92ShA)}$	12,5	17	60	160	325	450	525
Moment of inertia of coupling	(10^{-6} kgm^2)	J [1]	0,0057	0,036	0,15	0,33	0,96	4,92	8,26
Tightening torque of screws	(Nm)	M_A	1,5	11	11	25	25	69	120
Weight per hub	(app. kg)	m	0,018	0,07	0,15	0,22	0,45	1,78	2,4
Max. speed	(rpm)	n_{max}	13000	10000	7000	6000	5000	4000	3600
Standard shore hardness			98 SH A (red)						

Dimensions (mm) Type ADS/R

Type		14	19	24	28	38	42	48
L		35	66	78	90	114	126	140
A		30	40	55	65	80	95	105
B		only for sizes 42 and 48					85	95
C		11	25	30	35	45	50	56
Ø D_1^{H7} / Ø D_2^{H7}	min. - max.	5-16	8-20	10-28	14-38	15-45	20-48	25-55
F		only for sizes 42 and 48					28	32
K		11	14,5	20	24,5	30	32,5	36
E		13	16	18	20	24	26	28
I		5	12	10,5	11,5	15,5	18	21
G (DIN EN ISO 4762)		M3	M6	M6	M8	M8	M10	M12
H (clearance diameter)		32,2	46	57	71	83	91	104,5
Hub material		aluminium alloy					steel	

Bore range D1/D2 and corresponding transmissible torque values (Nm) of the coupling

Type	Ø11	Ø14	Ø16	Ø18	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø48	Ø50	Ø55
14	5,6	6,1	6,5																
19	17	17	17	17	17	17													
24	22	45	47	49	50	51	54	55	57										
28		46	68	97	98	100	105	107	111	114	117	121	126						
38			68	99	114	116	121	123	127	130	133	137	141	144	147	152			
42						134	230	261	301	308	314	324	333	340	346	356	366		
48								261	366	450	494	508	522	525	525	525	525	525	525

1) Moment of inertia and weight (mass) are calculated with reference to the largest bore size.
Hub design: up to size 19 one slit, from size 24 up two slits.

Backlash-free Servo-insert Coupling Assembly Instructions

Installation

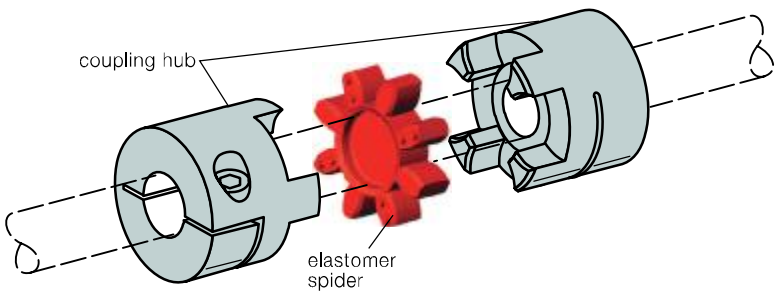
Clean and degrease both shaft surface and coupling hub bores. Re-check shaft diameters and coupling bores for proper tolerances.

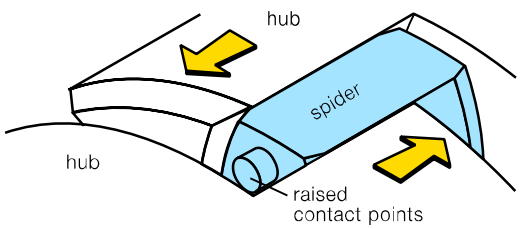
Slide a coupling hub onto each shaft and proceed to torque the screws of one clamp ring or shrink disc after checking axial dimensions. Refer to the technical data to assure correct screw tightening torque.

Firmly press elastomer spider into one of the two hubs. Because of the interference fit, the force necessary to install the spider may be quite high, therefore a PU tolerant grease such as Vaseline may be applied to ease assembly. The edges of the spider and the jaws of the coupling hubs are both chamfered to ease assembly.

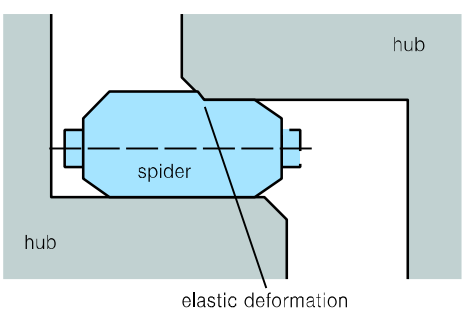
Raised contact points visible on the front and back side of the elastomer spider help maintain proper spacing between the two hubs assuring electrical isolation and full angular misalignment capabilities.

Carefully push the coupling hubs together while maintaining the necessary spacing, tighten the screws of the remaining clamp ring or shrink disc to the recommended torque. The function of the gap is to prevent the coupling hubs from restraining theaxial movement of the spider. This ensures optimum life of the coupling and spider.

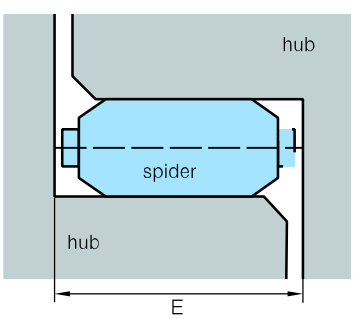




While mounting

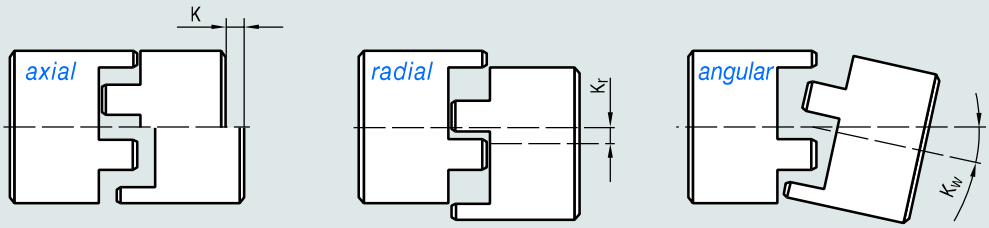


Backlash free after final assembly preloaded



Backlash-free Servo-insert Coupling Assembly Instructions

Types of misalignment



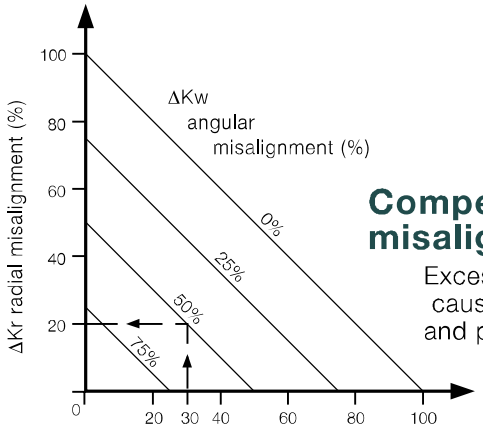
Alignment

The picture above shows the (3) types of misalignment. The mounted coupling needs to be aligned. The more accurate the initial alignment, the better the coupling can absorb additional misalignment during operation, thereby assuring optimum lifetime and quiet running conditions. If all (3) types of misalignment occur simultaneously, each type must not reach the maximum allowable value.
The combined impact of the actual misalignment types, expressed as a percentage of the maximum allowable value, must not exceed 100%. The diagram below shows the combined misalignment.

Removal

Remove the locking screws, e.g. on the motor. Pull the drive unit, including the jaw coupling apart. Inspect the spider for wear and if necessary, insert a new spider or one with a different shore hardness.
After loosening the keyless clamp ring or shrink disc, the hubs can be removed.

Please contact us for detailed installation and removal instructions.



Compensation of misalignment

Excessive misalignment will cause accelerated wear and premature failure.

Misalignments

Typ	elast. Spider	Shore-scale	Misalignment type mm axial ΔKa[1)]	mm radial ΔKr	scale angular ΔKw
5	80	A	+0,4 -0,2	0,12	1,1°
	92	A		0,06	1,0°
	98	A		0,04	0,9°
7	80	A	+0,6 -0,3	0,15	1,1°
	92	A		0,10	1,0°
	98	A		0,06	0,9°
	64	D		0,04	0,8°
9	80	A	+0,8 -0,4	0,19	1,1°
	92	A		0,13	1,0°
	98	A		0,08	0,9°
	64	D		0,05	0,8°
14	80	A	+1,0 -0,5	0,21	1,1°
	92	A		0,15	1,0°
	98	A		0,09	0,9°
	64	D		0,06	0,8°
19	80	A	+1,2 -0,5	0,15	1,1°
	92	A		0,10	1,0°
	98	A		0,06	0,9°
	64	D		0,04	0,8°
24	92	A	+1,4 -0,5	0,14	1,0°
	98	A		0,10	0,9°
	64	D		0,07	0,8°
28	92	A	+1,5 -0,7	0,15	1,0°
	98	A		0,11	0,9°
	64	D		0,08	0,8°
38	92	A	+1,8 -0,7	0,17	1,0°
	98	A		0,12	0,9°
	64	D		0,09	0,8°
42	92	A	+2,0 -1,0	0,19	1,0°
	98	A		0,14	0,9°
	64	D		0,10	0,8°
48	92	A	+2,1 -1,0	0,23	1,0°
	98	A		0,16	0,9°
	64	D		0,11	0,8°

[1)] The Ka values need to be added to the dimension L of the coupling selected