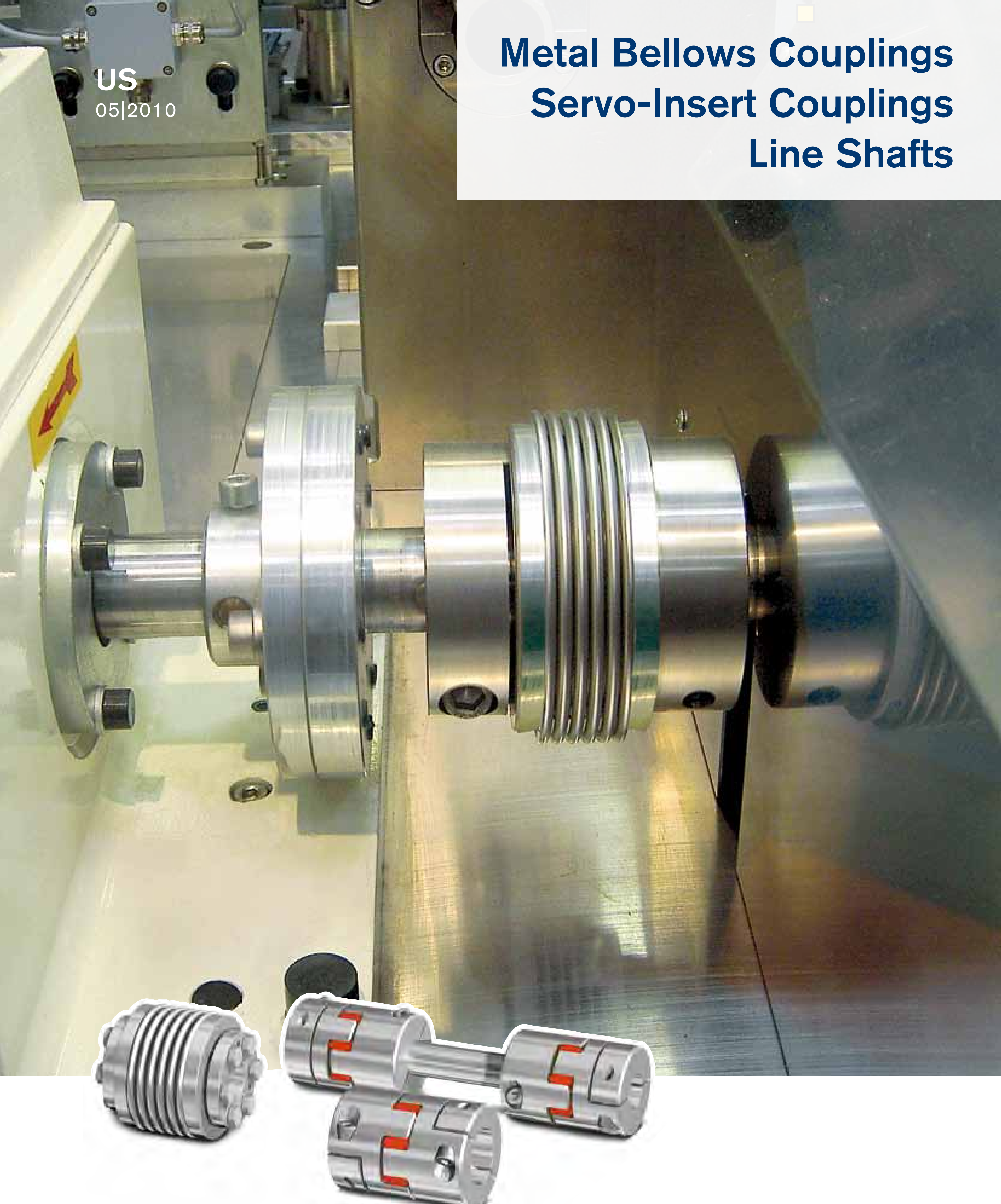
US
05|2010

Metal Bellows Couplings
Servo-Insert Couplings
Line Shafts



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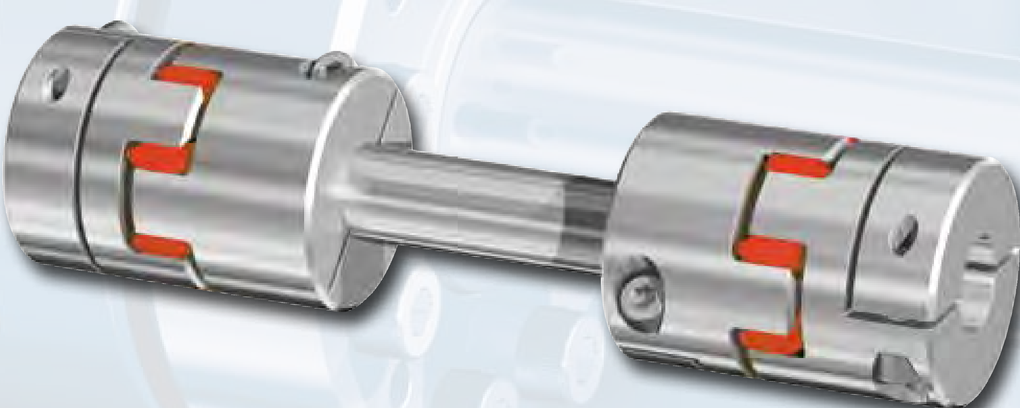
Overview

Metal Bellows Couplings

Servo-Insert Couplings



Line Shafts

Content

Metal Bellows Couplings Basics

Backlash-free Metal Bellows Couplings

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
- Metal bellows made of stainless steel
- Simple and safe assembly
- Compensation of radial, axial and angular misalignment
- Free of wear, maintenance-free, no downtimes
- Not sensitive to temperatures between -22 F° and 212 F°
- Nominal torques between 13.3 – 44000 lb-in

Metal Bellows Couplings Basics

Backlash-free Metal Bellows Couplings are used in applications where maintaining torsional rigidity between two shafts is critical.

- **Pumps with axial and vertical drives**
- **High dynamic portal drives**
- **Spindle lifting units**
- **Linear units**
- **Packaging machines**
- **Machine tools**
- **Special machines**

Design / Sample Calculation

Coupling Design/ General information

Backlash-free torsionally stiff Metal Bellows Couplings are installation ready when delivered. The metal bellows are made of stainless steel, other parts are made of aluminum or steel with some parts having an environmentally friendly protective coating. Bores are supplied with the ISO H7 tolerance standard, and we recommend that shafts have the g6 transition fit tolerance. Please see the chart below for conversion to the ANSI standard. The backlash for other fits may not exceed 0.0004 – 0.002.
Torque is generated between the coupling hub and the shaft by compression and friction on the contact surfaces. Special attention should be given to the correct tightening torque on the clamp screws as well as the condition of the shaft and hub bore surfaces. The contact surfaces must be free of oil and grease and the shaft must have a surface roughness ≤ RMS 63. Keyways can also be supplied upon request to metric or imperial standards.
Torque capacities published are based on strictly following our guidelines.

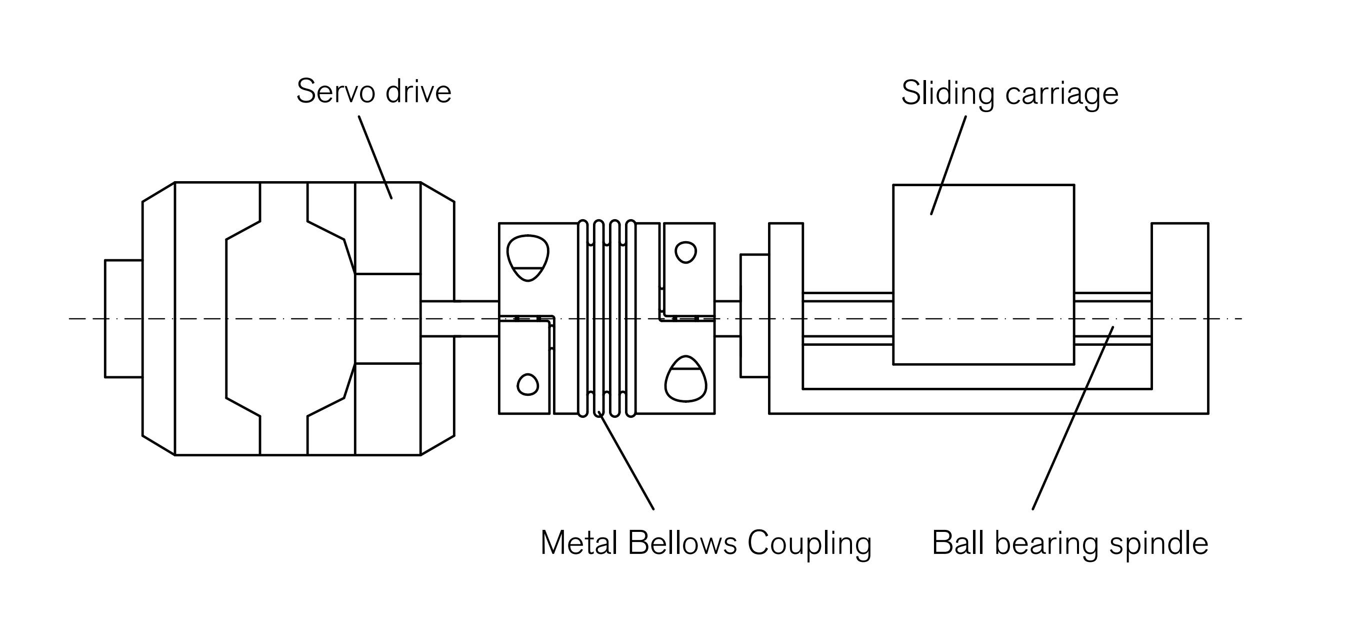
Coupling Selection

Metal Bellows couplings are generally selected based on nominal torque needed for the application, Tkn in our tables. The nominal torque must always be higher than the running torque. This generally applies for applications involving servo motors whose acceleration torque in both forward and reverse directions exceed the nominal torque. For applications involving controlled, highly dynamic drives, the following safety factors have proven to be reliable in practice:

K= 1.5 for steady torques
K=2.0 for intermittent torques
K=2.5-4 for oscillating torques
For servo drives in machine tools: k=1.5-2.0

We would be pleased to design your metal bellows coupling for you. Feel free to use our experience and know-how for your success. Give us a call!

$$T_{KN} \geq K \times T_{AS} \times \frac{J_{Mach}}{J_{Mtr} \times J_{Mach}} = [\text{lb-in}]$$



Design in consideration of dynamic torsional stiffness

Although metal bellows couplings are backlash-free and torsionally rigid, keep in mind that the coupling links two rotating masses. In adverse cases the coupling can act like a torsion spring with high stiffness. The regulating oscillation of the drives and the harmonic oscillation in the armature current of the motor therefore must never be within the range of the mechanical resonance frequency. In practice the resonance frequency "f_{res}" must be twice as high as the excitation frequency of the drive.

The dynamic torsional stiffness C_{Tdyn} was selected so that it would not be within the range of parasitic oscillation of 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. Give us a call !

Calculation for the application of a metal bellows coupling in a machine tool drive

Drive related data for servo motor/FT 5104: Peak torque T_{AS} = 1416 lb-in
Moment of inertia
$J_{Mtr} = 16.2 \times 10^{-2}$ lb-in-s²

Output data for machine tool: Moment of inertia of ball screw and slide: $J_{Mach} = 15 \times 10^{-2}$ lb-in-s²

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

$$f_{res} = \frac{1}{2\pi}\sqrt{C_{Tdyn} \times \frac{J_{Mtr} + J_{Mach}}{J_{Mtr} \times J_{Mach}}} = [\text{Hz}]$$

Design according to torque:

Coupling selection:
AKD 200, T_{KN} = 1770 lb-in, $C_{Tdyn} = 1027 \times 10^3$ lb-in/rad

The metal bellows coupling is selected sufficiently, since 1770 lb-in > 1363 lb-in

$$T_{KN} \geq K \times T_{AS} \times \frac{J_{Mach}}{J_{Mtr} + J_{Mach}} = 2 \times 1416 \text{ lb-in} \times \frac{15 \times 10^{-2} \text{ lb-in-s}^2}{(16.2 + 15) \times 10^{-2} \text{ lb-in-s}^2} = 1363 \text{ lb-in}$$

Design according to the resonance frequency:

The arithmetic calculation is clearly higher than the expected resonance frequency

$$f_{res} = \frac{1}{2\pi}\sqrt{C_{Tdyn} \times \frac{J_{Mtr} + J_{Mach}}{J_{Mtr} \times J_{Mach}}} = \frac{1}{2\pi} \times \sqrt{1027000 \text{ lb-in/rad} \times \frac{0.162 + 0.15 \text{ lb-in-s}^2}{0.162 \times 0.15 \text{ lb-in-s}^2}} = 580 \text{ Hz}$$

Conveyor

Overview Metal Bellows Couplings

Series
EKN

Metal Bellows Coupling with radial set-screws

Page 12

Series
DKN

Metal Bellows Coupling with clamping hubs

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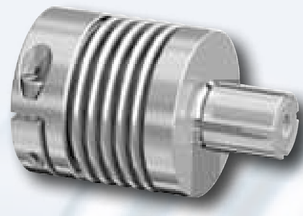

Series
DKN /S

Metal Bellows Coupling with clamping hubs and expanding clamps

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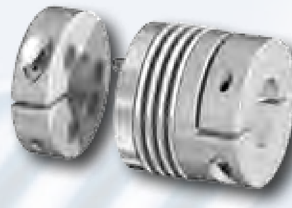

Series
PKN

Metal Bellows Coupling with detachable clamping hub for easier assembly

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Series
AKN

Metal Bellows Coupling with clamping hubs and short length

Page 20

Series
AKD

Metal Bellows Coupling with clamping hubs

Page 22

Series
AK

Metal Bellows Coupling with integral keyless lo-cking device

Page 24

Series
CKN

Metal Bellows Coupling with adaptor flange

Page 26

Series EKN

Dimensions

øA	=	Outer diameter
$øD_1$ H7	=	Bore diameter
$øD_2$ H7	=	Bore diameter
C	=	Guided length shaft bore
G	=	Camping screws
I	=	Clamping screw centerline
L+ -0.08	=	Total length
C_1	=	Bore tolerance for D_1
C_2	=	Bore tolerance for D_2

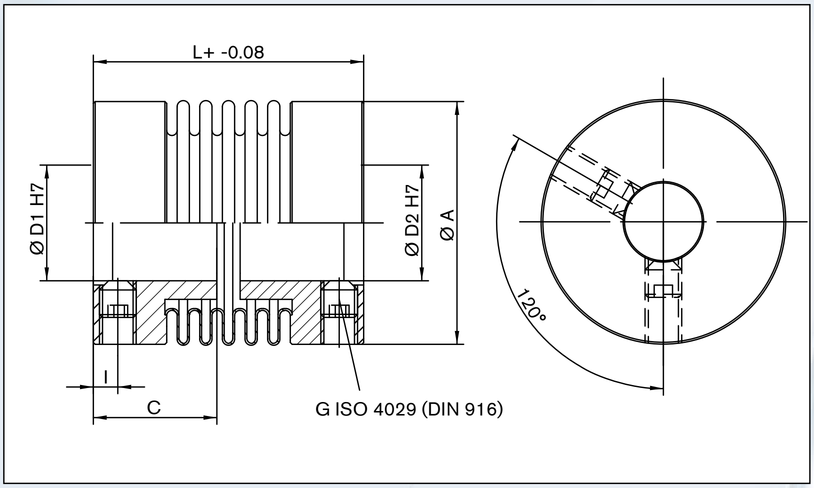
Dimensions

Size	L ±0.079	L ±2	Ø A	Ø D1^{H7}	C1	Ø D2^{H7}	C2	C	I	G
	Inch	mm	Inch							mm
4	0.79/0.91/1.02	20/23/26	0.63	0.12-0.31	-0 +0.001	0.12-0.31	-0 +0.001	0.24	0.08	M3
9	0.83/0.98/1.10	21/25/28	0.63	0.12-0.31		0.12-0.31		0.24	0.08	M3
15	0.98/1.18	25/30	0.79	0.12-0.39		0.12-0.39		0.39	0.12	2xM4
20	1.02/1.26/1.42	26/32/36	0.98	0.12-0.47		0.12-0.47		0.43	0.08	2xM3
45	1.54/1.89	39/48	1.30	0.24-0.63		0.24-0.63		0.63	0.16	2xM6
100	1.73/2.13	44/54	1.57	0.24-0.75		0.24-0.75		0.79	0.16	2xM6

Moment of inertia and weight (mass) are calculated with reference to the largest bore size.

Example:
EKN

Series Size Length	Bore- Ø D1	Bore- Ø D2	Further details*
EKN 20/26	0.250	0.375	XX



Sectional view

Technical Data

T_{KN}	=	Nominal torque
C_t	=	Dynamic torsional stiffness
ΔKr	=	Max. approved misalignment radial
ΔKa	=	Max. approved misalignment axial
ΔKw	=	Max. approved misalignment angular
J	=	Moment of inertia
M_A	=	Tightening torque of screws
n_{max}	=	Max. rotational speed

Technical Data

Size	T_{KN}	M_A	C_t	n_{max}	Δ Ka	Δ Kw	Δ Kr	Weight	J
	lb-in		10^3 lb-in/rad	rpm	± Inch	Degrees	Inch	lbs	10^{-3} lb-in²
4	4	4	2213/1682/1328	15000	0.008/0.012/0.016	1.2/2/2	0.004/0.006/0.008	0.013	0.68
9	8	4	4426/3364/2655	15000	0.008/0.012/0.016	1.2/2/2	0.004/0.006/0.008	0.013/0.015/0.018	0.68/0.79/0.89
15	13	13	6639/6196	15000	0.010/0.016	1.2/2	0.004/0.006	0.037/0.042	2.56/2.73
20	18	13	13277/11507/8852	15000	0.012/0.016/0.020	1.2/2/2	0.004/0.008/0.010	0.049/0.053/0.057	4.78/5.47/5.81
45	40	27	57536/35406	15000	0.012/0.020	1.2/2	0.004/0.008	0.119/0.128	23.2/24.9
100	89	27	71698/59306	15000	0.016/0.020	1.2/2	0.006/0.010	0.229/0.251	68.4/75.2

Fittings: Hubs: Standard fit H7
Keyways: Standard fit JS9

Materials: Hubs made of aluminium
Metal bellows made of stainless steel

Special designs : Coupling completely made of stainless steel (on request)
Keyway acc. to DIN 6885-1 or ANSI B17.1

Dimensions

øA	=	Outer diameter
øD1 H7	=	Bore diameter
øD2 H7	=	Bore diameter
øH	=	Clearance diameter
C	=	Guided length shaft bore
G	=	Clamping screws
I	=	Radius to clamp screw
K	=	Radius to clamp screw
L+ -0.08	=	Total length
C_1	=	Bore tolerance for D_1
C_2	=	Bore tolerance for D_2

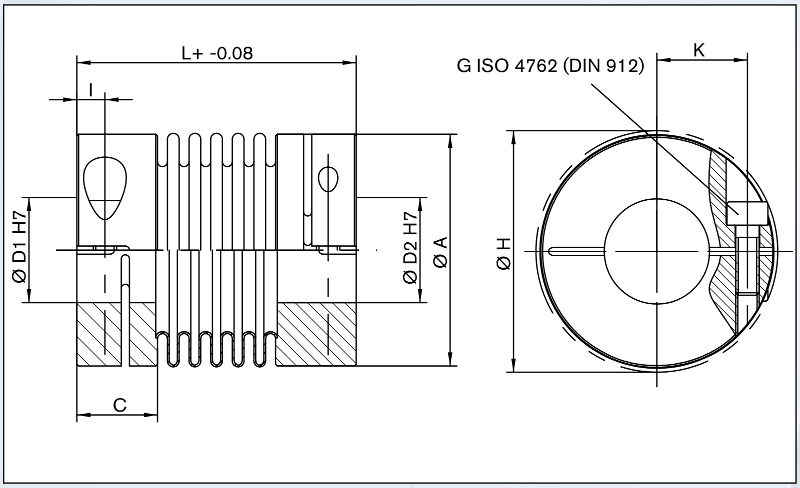
Dimensions

Size	L ±0.079	L ±2	Ø A	Ø H	Ø D1 H7	C1	Ø D2 H7	C2	C	K	I	G
	Inch	mm	Inch									mm
4	0.83/0.94/1.10	21/24/28	0.63	0.71	0.12-0.31	-0 +0.001	0.12-0.31	-0 +0.001	0.28	0.20	0.08	M2
9	0.91/1.02/1.18	23/26/30	0.63	0.71	0.12-0.31		0.12-0.31		0.28	0.20	0.08	M2
15	1.02/1.18	26/30	0.79	0.83	0.12-0.39		0.12-0.39		0.35	0.28	0.12	M2.5
20	1.26/1.50/1.65	32/38/42	0.98	1.06	0.12-0.47		0.12-0.47		0.43	0.35	0.16	M3
45	1.61/1.97	41/50	1.30	1.34	0.24-0.63		0.24-0.63		0.51	0.47	0.20	M4
100	1.85/2.24	47/57	1.57	1.65	0.24-0.75		0.24-0.75		0.55	0.63	0.20	M4

Moment of inertia and weight (mass) are calculated with reference to the largest bore size.

Example:
DKN

Series Size Length	Bore- Ø D1	Bore- Ø D2	Further details*
DKN 20/42	0.250	0.375	XX



Sectional view

Technical Data

T_{KN}	=	Nominal torque
C_t	=	Dynamic torsional stiffness
ΔKr	=	Max. approved misalignment radial
ΔKa	=	Max. approved misalignment axial
ΔKw	=	Max. approved misalignment angular
J	=	Moment of inertia
M_A	=	Tightening torque of screws
n_{max}	=	Max. rotational speed

Technical Data

Size	T_{KN}	M_A	C_t	n_{max}	Δ Ka	Δ Kw	Δ Kr	Weight	J
	lb-in		103 lb-in/rad	rpm	± Inch	Degrees	Inch	lbs	10^{-3} lb-in²
4	4	3	2213/1682/1328	15000	0.008/0.012/0.016	1.2/2/2	0.004/0.006/0.008	0.1	0.89
9	8	3	4426/3364/2655	15000	0.008/0.012/0.016	1.2/2/2	0.004/0.006/0.008	0.1/0.2/0.2	0.89/0.99/1.09
15	13	7	6639/6196	15000	0.010/0.016	1.2/2	0.004/0.006	0.4/0.5	3.76/4.10
20	18	9	13277/11507/8852	15000	0.012/0.016/0.020	1.2/2/2	0.004/0.008/0.010	0.7/0.8/0.8	8.54/9.23/9.57
45	40	27	57536/35406	15000	0.012/0.020	1.2/2	0.004/0.008	1.6/1.7	33.49/35.20
100	89	27	71698/59306	15000	0.016/0.020	1.2/2	0.006/0.010	2.6/2.8	79/85

Fittings: Hubs: Standard fit H7
Keyways: Standard fit JS9

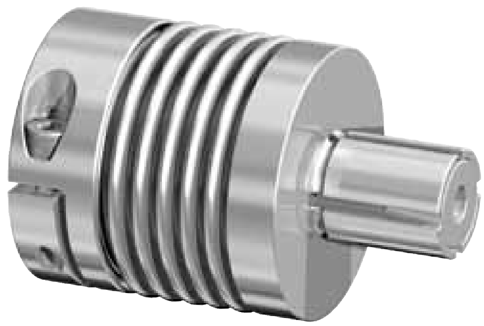
Materials: Hubs made of aluminium
Metal bellows made of stainless steel

Special designs : Coupling completely made of stainless steel (on request)
Keyway acc. to DIN 6885-1 or ANSI B17.1

Series DKN/S

Dimensions

øA	=	Outer diameter
øD1 H7	=	Bore diameter
øD2 f7	=	Clamp diameter
øH	=	Clearance diameter
C	=	Guided length shaft bore
G	=	Clamping screws
G1	=	Clamping screw
I	=	Radius to clamp screw
J	=	Clamp length
K	=	Radius to clamp screw
L ± 0.08	=	Total length
C_1	=	Bore tolerance for D_1
C_2	=	Bore tolerance for D_2



Dimensions

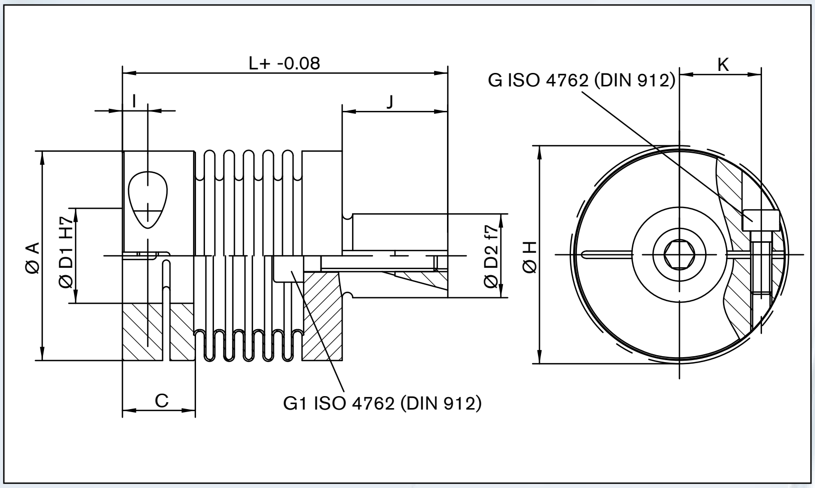
Size	L ±0.079	L ±2	C	J	Ø A	Ø H	Ø D1^{H7}	C1	Ø D2^{H7}	C2	K	I	G	G1
	Inch	mm	Inch										mm	
4	1.14/1.22/1.38	29/31/35	0.28	0.31	0.63	0.71	0.12-0.31		0.31		0.20	0.08	M2	M3
9	1.18/1.30/1.46	30/33/37	0.28	0.31	0.63	0.71	0.12-0.31		0.31		0.20	0.08	M2	M3
15	1.46/1.61	37/41	0.35	0.47	0.79	0.83	0.12-0.39	-0 +0.001	0.39	-0 +0.001	0.28	0.12	M2.5	M4
20	1.61/1.85/2.01	41/47/51	0.43	0.47	0.98	1.06	0.12-0.47		0.39		0.35	0.16	M3	M4
45	2.05/2.40	52/61	0.51	0.63	1.30	1.34	0.24-0.63		0.55		0.47	0.20	M4	M5
100	2.40/2.80	61/71	0.55	0.79	1.57	1.65	0.24-0.75		0.63		0.63	0.20	M4	M6

Moment of inertia and weight (mass) are calculated with reference to the largest bore size.

Example:
DKN/S

Series Size Length	Bore- Ø D1	Further details*
DKN/S 20/30	0.375	XX

In this version, the expandable adaptor shaft, (length J and diameter D2) can be expanded to clamp internally inside the mating component. Simply by tightening the socket head cap screw G1 the expandable sleeve clamps inside the component, thereby transmitting torque backlash-free from one shaft to the other.



Sectional view

Technical Data

T_{KN} = Nominal torque
C_t = Dynamic torsional stiffness
ΔKr = Max. approved misalignment radial
ΔKa = Max. approved misalignment axial
ΔKw = Max. approved misalignment angular
J = Moment of inertia
M_A = Tightening torque of screws
n_{max} = Max. rotational speed

Technical Data

Size	T_{KN}	M_A	C_t	n_{max}	Δ Ka	Δ Kw	Δ Kr	Weight	J
	lb-in		10^3 lb-in/rad	rpm	± Inch	Degrees	Inch	lbs	10^{-3} lb-in²
4	4	3	2213/1682/1328	15000	0.008/0.012/0.016	1.2/2/2	0.004/0.006/0.008	0.2	1.03
9	8	3	4426/3364/2655	15000	0.008/0.012/0.016	1.2/2/2	0.004/0.006/0.008	0.2/0.2/0.2	1.03
15	13	7	6639/6196	15000	0.010/0.016	1.2/2	0.004/0.006	0.5/0.5	3.76/4.10
20	18	9	13277/11507/8852	15000	0.012/0.016/0.020	1.2/2/2	0.004/0.008/0.010	0.8/0.9/0.9	7.18/7.86/8.54
45	40	27	57536/35406	15000	0.012/0.020	1.2/2	0.004/0.008	1.8/1.9	27.34/29.39
100	89	27	71698/59306	15000	0.016/0.020	1.2/2	0.006/0.010	2.8/3.2	78.27/87.49

Fittings:
Hubs: Standard fit H7
Expanding
Clamps: Standard fit f7
Keyways: Standard fit JS9

Materials:
Hubs made of aluminium
Metal bellows made of stainless steel

Special designs:
Coupling completely made of stainless steel (on request)
Keyway acc. to DIN 6885-1 or ANSI B17.1

Dimensions

øA	=	Outer diameter
øD1 H7	=	Bore diameter
øD2 H7	=	Bore diameter
øH	=	Clearance diameter
C	=	Guided length shaft bore
G	=	Clamping screws
I	=	Radius to clamp screw
K	=	Radius to clamp screw
L ± 0.08	=	Total length
N	=	Basic dimension
C_1	=	Bore tolerance for D_1
C_2	=	Bore tolerance for D_2

Dimensions

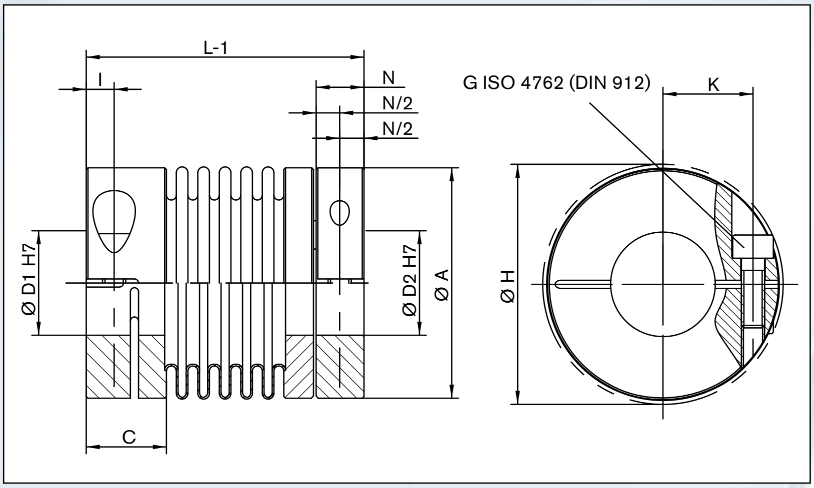
Size	L ±0.079	N	Ø A	Ø H	Ø D1^{H7}	C1	Ø D2^{H7}	C2	C	K	I	G
	Inch	Inch										mm
2	1.50	0.35	0.98	1.10	0.12/0.47		0.12/0.35		0.43	0.35	0.16	M3
4.5	1.85	0.35	1.30	1.38	0.24/0.63		0.24/0.63		0.51	0.47	0.20	M4
10	2.09	0.35	1.57	1.65	0.24/0.75		0.24/0.75		0.55	0.63	0.20	M4
18	2.74	0.43	1.77	1.89	0.39/0.98	-0 +0.001	0.39/0.75	-0 +0.001	0.79	0.71	0.24	M5
30	2.80	0.59	2.17	2.20	0.39/0.98		0.39/0.87		0.98	0.79	0.31	M6
60	3.44	0.79	2.60	2.64	0.55/1.38		0.55/0.98		1.14	0.94	0.39	M8
80	4.00	0.87	3.15	3.35	0.79/1.57		0.79/1.50		1.34	1.10	0.47	M10
150	4.00	0.87	3.15	3.35	0.79/1.57		0.79/1.50		1.34	1.10	0.47	M10

Moment of inertia and weight (mass) are calculated with reference to the largest bore size.

Example:
PKN

Series Size	Bore- Ø D1	Bore- Ø D2	Further details*
PKN 150	1.125	1.375	XX

One split clamping hub can be separated from the coupling for easier assembly such as when two components need to be connected in a blind hole. Simply mount one side of the coupling on one shaft and the other side of the couple on the opposite shaft and slide them together.



Sectional view

Technical Data

T_{KN}	=	Nominal torque
C_t	=	Dynamic torsional stiffness
ΔKr	=	Max. approved misalignment radial
ΔKa	=	Max. approved misalignment axial
ΔKw	=	Max. approved misalignment **angular**
J	=	Moment of inertia
M_A	=	Tightening torque of screws
n_{max}	=	Max. rotational speed

Technical Data

Size	T_{KN}	M_A	C_t	n_{max}	Δ Ka	Δ Kw	Δ Kr	Weight	J
	lb-in		10^3 lb-in/rad	rpm	± Inch	Degrees	Inch	lbs	10^{-3} lb-in²
2	18	9	8.59	22900	0.016	1.2	0.008	0.1	0.007
4.5	40	27	42.5	17600	0.012	1.2	0.004	0.2	0.010
10	89	27	53.1	14100	0.016	1.2	0.006	0.2	0.014
18	159	53	53.1	12700	0.020	1.5	0.008	0.4	0.018
30	266	106	230	10200	0.016	1	0.004	0.6	0.042
60	531	266	496	8600	0.016	1	0.004	1.1	0.111
80	708	531	859	6800	0.016	1	0.008	2.2	0.302
150	1328	752	991	6800	0.016	1	0.008	2.2	0.302

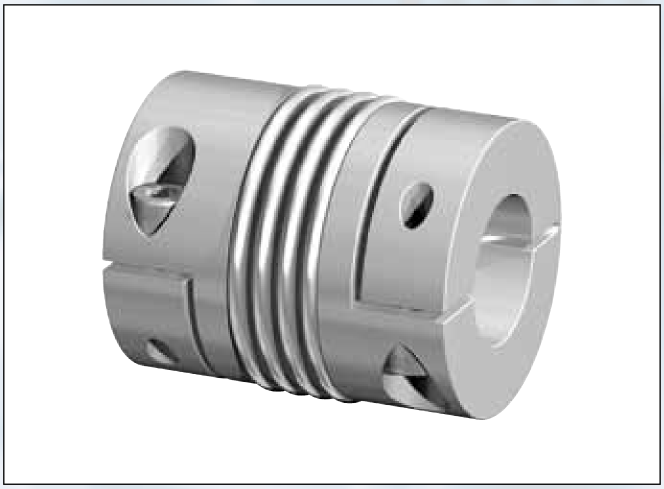
Fittings: Hubs: Standard fit H7
Keyways: Standard fit JS9

Materials: Hubs made of aluminium
Metal bellows made of stainless steel

Special designs : Coupling completely made of stainless steel (on request)
Keyway acc. to DIN 6885-1

Dimensions

øA = Outer diameter
øD1 H7 = Bore diameter
øD2 H7 = Bore diameter
øH = Clearance diameter
C = Guided length shaft bore
G = Clamping screws
I = Radius to clamp screw
K = Radius to clamp screw
L ± 0.08 = Total length
C_1 = Bore tolerance for D_1
C_2 = Bore tolerance for D_2



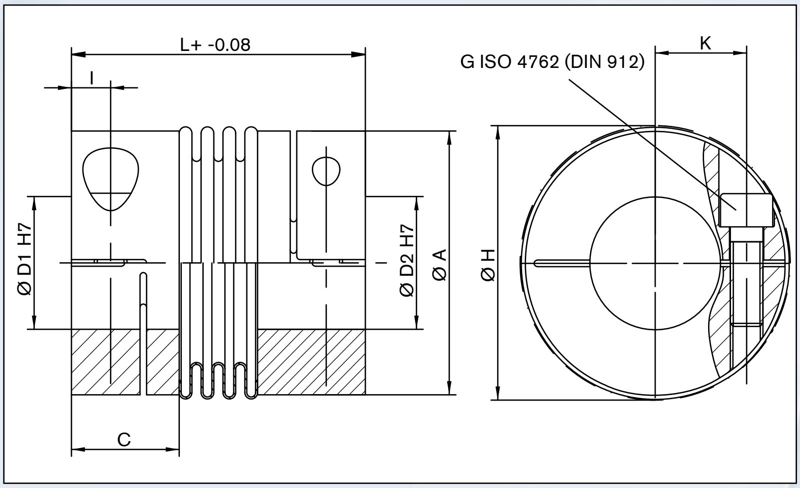
Dimensions

Size	L ±0.079	Ø A	Ø H	Ø $D1^{H7}$	C1	Ø $D2^{H7}$	C2	C	K	I	G	T_{KN}
	Inch	Inch										lb-in
18	2.48	1.77	1.89	0.39-0.98		0.39-0.98		0.79	0.71	0.24	M5	159
30	2.56	2.17	2.20	0.39-0.98		0.39-0.98		0.98	0.79	0.31	M6	266
60	3.07	2.52	2.64	0.55-1.26		0.55-1.26		1.14	0.94	0.39	M8	531
80	3.54	3.15	3.31	0.79-1.57	-0 +0.001	0.79-1.57	-0 +0.001	1.30	1.10	0.47	M10	708
150	3.54	3.15	3.31	0.79-1.57		0.79-1.57		1.30	1.10	0.47	M10	1328
200	3.90	3.54	3.66	0.98-1.73		0.98-1.73		1.50	1.22	0.51	M12	1770
300	4.09	4.33	4.33	1.26-1.97		1.26-1.97		1.50	1.54	0.51	M12	2655
500	4.37	4.69	4.80	1.57-2.36		1.57-2.36		1.61	1.69	0.59	M14	4426

Moment of inertia and weight (mass) are calculated with reference to the largest bore size.

Example:
AKN

Series Size Length	Bore- Ø D1	Bore- Ø D2	Further details*
AKN 150	1.125	1.375	XX



Sectional view

Technical Data

T_{KN}	=	Nominal torque
C_t	=	Dynamic torsional stiffness
Cr	=	Radial spring stiffness
Ca	=	Axial spring stiffness
ΔKr	=	Max. approved misalignment radial
ΔKa	=	Max. approved misalignment axial
ΔKw	=	Max. approved misalignment angular
J	=	Moment of inertia
M_A	=	Tightening torque of screws
n_{max}	=	Max. rotational speed

Technical Data

Size	M_A	C_t	Cr	Ca	n_{max}	Δ Ka	Δ Kw	Δ Kr	Weight	J
	lb-in	10^3 lb-in/rad	10^3 lb-in/rad		rpm	± Inch	Degrees	Inch	lbs	lb-in²
18	53	71	1770	443	12700	0.020	1.5	0.008	0.4	0.17
30	106	310	6373	443	10200	0.016	1	0.004	0.6	0.38
60	266	664	9737	797	8600	0.016	1	0.004	1.0	0.99
80	531	1151	10622	708	6800	0.016	1	0.008	2.2	2.97
150	752	1328	17703	1328	6800	0.016	1	0.008	2.2	2.97
200	885	1505	22129	1328	6300	0.016	1	0.008	2.6	4.92
300	1062	4426	55765	2478	5900	0.016	1	0.008	3.0	10.3
500	1682	6019	77894	885	4900	0.020	1	0.008	3.8	16.1

Fittings: Hubs: Standard fit H7
Keyways: Standard fit JS9

Materials: Hubs made of aluminium
Metal bellows made of stainless steel

Special designs : Coupling completely made of stainless steel (on request)
Keyway acc. to DIN 6885-1

Series AKD

Dimensions

øA = Outer diameter total coupling
øD1 H7 = Bore diameter
øD2 H7 = Bore diameter
øH = Clearance diameter
C = Guided length shaft bore
G = Clamping screws
I = Radius to clamp screw
K = Radius to clamp screw
L ± 0.08 = Total length
C_1 = Bore tolerance for D_1
C_2 = Bore tolerance for D_2

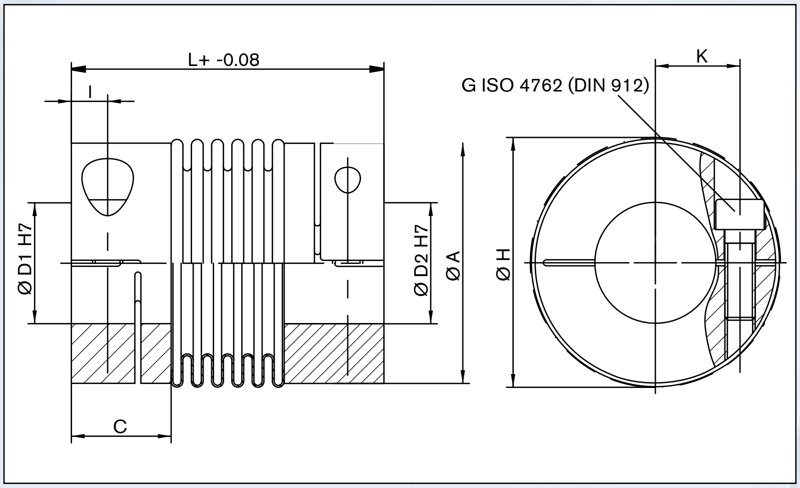
Dimensions

Size	L ±0.079	Ø A	Ø H	Ø D1^{H7}	C1	Ø D2^{H7}	C2	C	K	I	G
	Inch	Inch									
18	2.80	1.77	1.85	0.39-0.98	-0 +0.001	0.39-0.98	-0 +0.001	0.79	0.71	0.24	M5
30	2.87	2.17	2.20	0.39-0.98		0.39-0.98		0.98	0.79	0.31	M6
60	3.50	2.52	2.64	0.55-1.26		0.55-1.26		1.14	0.94	0.39	M8
80	4.06	3.15	3.31	0.79-1.57		0.79-1.57		1.34	1.10	0.47	M10
150	4.06	3.15	3.31	0.79-1.57		0.79-1.57		1.34	1.10	0.47	M10
200	4.45	3.54	3.66	0.98-1.73		0.98-1.73		1.50	1.22	0.51	M12
300	4.53	4.29	4.33	1.26-1.97		1.26-1.97		1.50	1.54	0.51	M12
500	4.80	4.69	4.80	1.57-2.36		1.57-2.36		1.61	1.69	0.59	M14

Moment of inertia and weight (mass) are calculated with reference to the largest bore size.

Example:
AKD

Series Size	Bore-Ø D1	Bore-Ø D2	Further details*
AKD 150	1.125	1.375	XX



Sectional view

Technical Data

T_{KN}	=	Nominal torque
C_t	=	Dynamic torsional stiffness
Cr	=	Radial spring stiffness
Ca	=	Axial spring stiffness
ΔKr	=	Max. approved misalignment radial
ΔKa	=	Max. approved misalignment axial
ΔKw	=	Max. approved misalignment angular
J	=	Moment of inertia
M_A	=	Tightening torque of screws
n_{max}	=	Max. rotational speed

Technical Data

Size	T_{KN}	M_A	C_t	Cr	Ca	n_{max}	Δ Ka	Δ Kw	Δ Kr	Weight	J
	lb-in		10^3 lb-in/rad	10^3 lb-in/rad		rpm	± Inch	Degrees	Inch	lbs	lb-in²
18	159	53	53	752	354	12700	0.02	1.5	0.008	0.4	0.21
30	266	106	221	1947	266	10200	0.02	1.5	0.008	0.6	0.34
60	531	266	443	2921	487	8600	0.02	1.5	0.008	1.0	1.03
80	708	531	664	3541	487	6800	0.02	1.5	0.008	2.2	3.08
150	1328	752	885	5311	752	6800	0.02	1.5	0.008	2.2	3.08
200	1770	885	1062	3983	752	6300	0.02	1.5	0.008	2.6	5.13
300	2655	1062	2478	13277	1328	5900	0.02	1.5	0.008	3.1	10.9
500	4426	1682	2744	8852	752	4900	0.04	1.5	0.008	4.0	16.7

Fittings: Hubs: Standard fit H7
Keyways: Standard fit JS9

Materials: Hubs made of aluminium
Metal bellows made of stainless steel

Special designs: Coupling completely made of stainless steel (on request)
Keyway acc. to DIN 6885-1

Series AK

Dimensions

øA	=	Outer diameter total coupling
øB	=	Outer diameter Hub
øD1 H7	=	Bore diameter
øD2 H7	=	Bore diameter
øT	=	Pitch circle diameter
E	=	Overall length - relaxed condiotion
G	=	Screws
J	=	Coupling Body length - relaxed condition
L ± 0.08	=	Total length
C_1	=	Bore tolerance for D_1
C_2	=	Bore tolerance for D_2

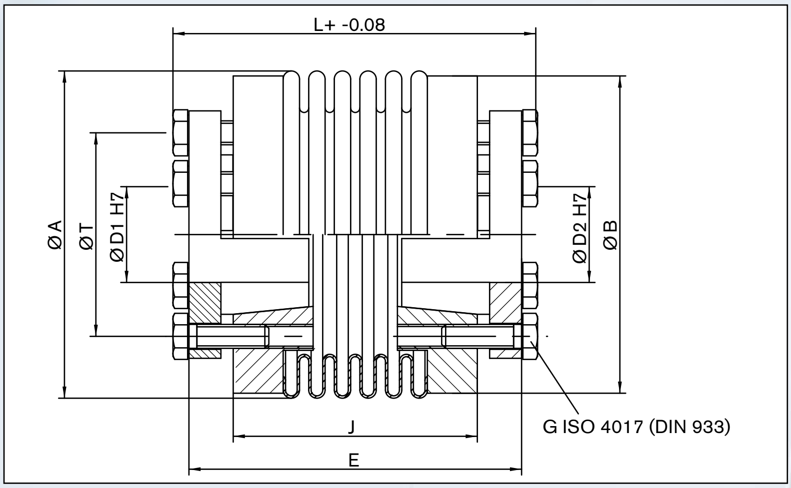
Dimensions

Size	L ±0.079	L ±2	Ø A	ØB	Ø T	Ø D1^{H7}	Ø D2^{H7}	E	J	G
	Inch	mm				Inch				mm
30	2.05/2.36	52/60	2.20	2.17	1.22/1.22	0.47-0.79	0.47-0.79	1.77/2.09	1.18/1.50	6xM4
60	2.48/2.87	63/73	2.60	2.52	1.46/1.46	0.59-0.98	0.59-0.98	2.17/2.56	1.38/1.81	6xM6
80	3.11/3.58	79/91	3.23	3.15	2.01/2.01	0.94-1.38	0.94-1.38	2.83/3.27	1.93/2.40	6xM6
150	3.11/3.58	79/91	3.23	3.15	2.01/2.01	0.94-1.38	0.94-1.38	2.83/3.31	1.93/2.40	6xM6
200	3.15/3.66	80/93	3.54	3.54	2.01/2.20	0.94-1.57	0.94-1.57	2.83/3.35	1.97/2.48	6xM6
300	3.66/4.09	93/104	4.33	4.29	2.44/2.95	0.98-1.97	0.98-1.97	3.15/3.66	2.20/2.64	6xM8
500	4.02/4.45	102/113	4.80	4.69	3.15/3.15	1.57-2.17	1.57-2.17	3.70/4.13	2.40/2.83	6xM8
800	6.69	170	6.18	5.51	3.62/3.94	1.97-2.76	1.97-2.76	5.91	4.33	6xM16
1400	6.69	170	6.18	5.51	3.62/3.94	1.97-2.76	1.97-2.76	5.91	4.33	6xM16
3000	8.11	206	6.18	5.51	4.53	2.76-3.15	2.76-3.15	7.48	5.91	6xM12
5000	8.11	206	8.19	6.85	3.94/4.92	2.36-3.35	2.36-3.35	7.32	5.75	6xM16

Moment of inertia and weight (mass) are calculated with reference to the largest bore size.

Example:
AK

Series Size Length	Bore- Ø D1	Bore- Ø D2	Further details*
AK 150/80	1.125	1.375	XX



Sectional view

Technical Data

T_{KN}	=	Nominal torque
C_t	=	Dynamic torsional stiffness
Cr	=	Radial spring stiffness
Ca	=	Axial spring stiffness
ΔKr	=	Max. approved misalignment radial
ΔKa	=	Max. approved misalignment axial
ΔKw	=	Max. approved misalignment angular
J	=	Moment of inertia
M_A	=	Tightening torque of screws
n_{max}	=	Max. rotational speed

Technical Data

Size	T_{KN}	M_A	C_t	Cr	Ca	n_{max}	Δ Ka	Δ Kw	Δ Kr	Weight	J
	lb-in		10^3 lb-in/rad	10^3 lb-in/rad		rpm	± Inch	Degrees	Imch	lbs	lb-in²
30	266	27	310/221	6373/1947	443/266	11000	0.016/0.020	1/1.5	0.004/0.008	0.9	0.51
60	531	75	664/443	9736779/2921034	797/443	9100	0.016/0.020	1/1.5	0.004/0.008	1.8	0.82
80	708	89	1151/664	10622/3541	708/443	7000	0.016/0.020	1/1.5	0.008/0.008	2.9	2.22
150	1328	124	1328/885	17703/5311	1328/752	7000	0.016/0.020	1/1.5	0.008/0.008	2.9	2.22
200	1770	124	1505/1062	22129/3983	1328/752	6700	0.016/0.020	1/1.5	0.008/0.008	3.5	2.97
300	2655	159	4426/2478	55765/13277	2478/1328	5200	0.016/0.020	1/1.5	0.008/0.008	7.5	7.96
500	4426	230	6019/2744	77894/8852	885/752	4600	0.020/0.039	1/1.5	0.008/0.008	10	19.6
800	7081	398	6727	4514	1682	3700	0.039	1.5	0.008	22	89
1400	12392	708	11507	6285	2478	3700	0.039	1.5	0.008	22	89
3000	26555	752	24785	26112	2744	2800	0.039	1.5	0.008	33	164
5000	44258	1859	42488	43550	4514	2800	0.039	1.5	0.008	46	212

Fittings: **Hubs: Standard fit H7**

Materials: **Hubs made of aluminium (Size 30 – 500)**
Hubs made of steel (Size 800 – 5000)
Metal bellows made of stainless steel
Locking device made of steel

Special designs : **Coupling completely made of stainless steel (on request)**

Series CKN

Dimensions

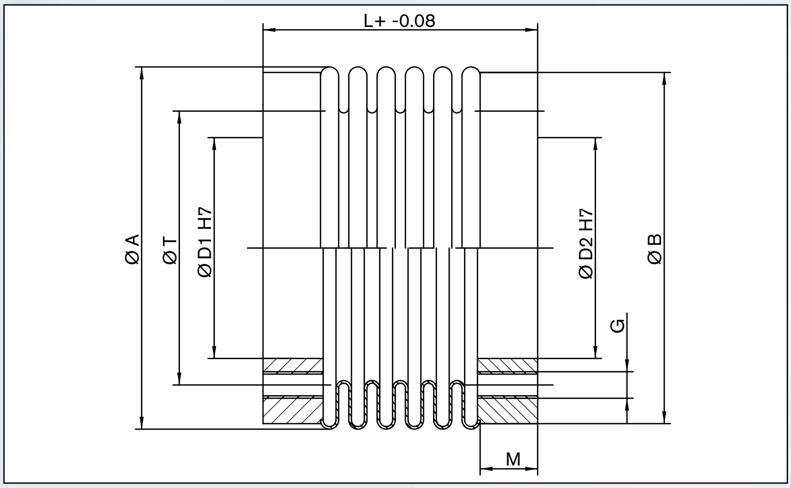
øA	=	Outer diameter total coupling
øB	=	Outer diameter Hub
øD1 H7	=	Bore diameter
øD2 H7	=	Bore diameter
øT	=	Pitch circle diameter
M	=	Max. screw-in depth
G	=	Fixing bore
L ± 0.08	=	Total length

Dimensions

Size	L ±0.079	L ±2	Ø A	Ø B	ØT	Ø D1 H7; Ø D2 H7	M	G
	Inch	mm			Inch			mm
18	1.42/1.73	36/44	1.81	1.81	1.22	0.87	0.24	6xM5
30	1.18/1.50	30/38	2.20	2.17	1.46	1.10	0.28	6xM5
60	1.61/2.01	41/51	2.60	2.52	1.81	1.50	0.39	6xM6
80	2.05/2.44	52/62	3.23	3.15	2.44	1.97	0.51	6xM6
150	2.05/2.44	52/62	3.23	3.15	2.44	1.97	0.51	6xM6
200	2.01/2.48	51/63	3.54	3.54	2.44	1.97	0.51	6xM6
300	2.17/2.60	55/66	4.33	4.29	3.15	2.56	0.51	6xM8
500	2.40	61	4.80	4.69	3.70	2.76	0.63	6xM8
800	5.12	130	6.18	5.98	4.33	3.35	0.71	6xM16
1400	5.12	130	6.18	5.98	4.33	3.35	0.71	6xM16
3000	5.31	135	6.18	5.98	4.33	3.35	0.87	6xM16
5000	5.71	145	8.19	8.19	5.12	3.94	0.98	6xM16

Example:
CKN

Series Size Length	Bore- Ø D1	Bore- Ø D2	Further details*
CKN 150/52	1.97	1.97	XX



Sectional view

Technical Data

T_{KN}	=	Nominal torque
C_t	=	Dynamic torsional stiffness
Cr	=	Radial spring stiffness
Ca	=	Axial spring stiffness
ΔKr	=	Max. approved misalignment radial
ΔKa	=	Max. approved misalignment axial
ΔKw	=	Max. approved misalignment angular
J	=	Moment of inertia
n_{max}	=	Max. rotational speed

Technical Data

Size	T_{KN}	C_t	Cr	Ca	n_{max}	Δ Ka	Δ Kw	Δ Kr	Weight	J
	lb-in	10^3 lb-in/rad	lb-in		rpm	± Inch	Degrees	Inch	lbs	lb-in²
18	159	70.8/53.1	1142/485	286/228	13900	0.020	1.5	0.008	0.3	0.17
30	266	310/221	4112/1256	286/171	11000	0.016/0.020	1/1.5	0.004/0.008	0.4	0.31
60	531	664/443	6281/1884	514/314	9000	0.016/0.020	1/1.5	0.004/0.008	0.6	0.55
80	708	1151/664	6853/2284	457/314	7100	0.016/0.020	1/1.5	0.008/0.008	1.0	1.47
150	1328	1505/885	11421/3426	857/485	7100	0.016/0.020	1/1.5	0.008/0.008	1.0	1.47
200	1770	1328/1062	14276/2570	857/485	6600	0.016/0.020	1/1.5	0.008/0.008	1.3	2.73
300	2655	4426/2478	35976/8566	280/150	5200	0.016/0.020	1/1.5	0.008/0.008	1.7	5.81
500	4426	2744	5710	485	4600	0.039	1.5	0.008	2.4	7.86
800	7081	6727	2912	1085	3700	0.039	1.5	0.008	8.2	37.6
1400	12392	11507	4054	1599	3700	0.039	1.5	0.008	8.2	37.6
3000	26555	24785	16846	1770	3700	0.039	1.5	0.008	8.6	37.6
5000	44258	42488	28095	2912	3000	0.039	1.5	0.008	24.7	120

Fittings: Hubs: Standard fit H7

Materials: Hubs made of aluminium (Size 18 – 500)
Hubs made of steel (Size 800 – 5000)
Metal bellows made of stainless steel

Special designs : Coupling completely made of stainless steel (on request)

Servo-Insert Couplings Basics

Backlash-free Servo-Insert Couplings

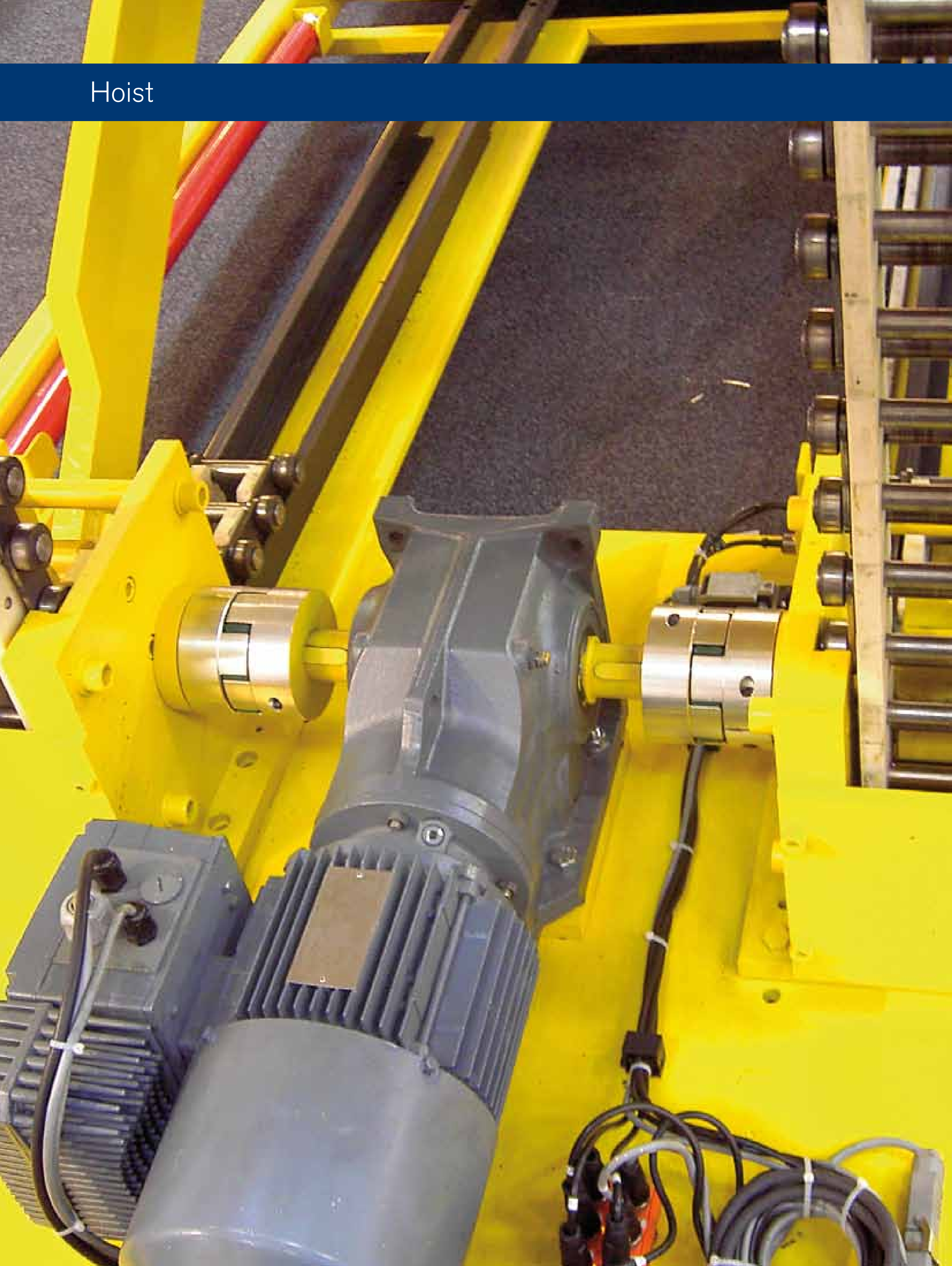
Backlash-free Servo Insert Couplings are used in mechanical engineering, where shock absorption is requested and pluggable coupling solutions are applied.

Special Features

- **Backlash-free**
- **Plug-in type**
- **Vibration damping**
- **Torques from 4.4 - 5800 lb-in**
- **Compensation of radial, axial and angular misalignment**
- **Electrically isolating**

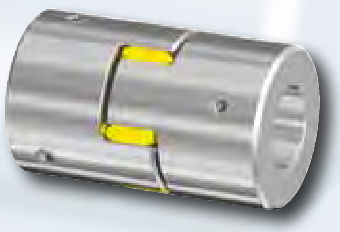
Common Applications:

- **Encoder**
- **Precision drives**
- **Feed drives**
- **Grinding and milling spindles**
- **Machine tools**
- **Packing machines**
- **Robotics**
- **Transfer lines**
- **Multi-spindle heads**
- **Wood processing equipment**
- **Textile machinery**
- **Conveying equipment**
- **Linear motion**
- **Measuring equipment and control technology**
- **Test rigs**



Automation

Overview Servo-Insert Couplings



Series
EK/GS

Miniature Servo-Insert Coupling with set-screw style hubs

Page 32

Series
DK/GS

Servo-Insert Coupling with clamping style hubs and single slit

Page 34

Series
ADS

Servo-Insert Coupling with clamping style hubs and dual slits

Page 36

Series
ADS/R

Servo-Insert Coupling interchangeable with competitive brands

Page 38

Series
ASS/A

Servo-Insert Coupling with External Shrink Disc®

Page 40

Series EK/GS

Dimensions

øA	=	Outer diameter
øD1 H7	=	Bore diameter
øD2 H7	=	Bore diameter
C	=	Guided length shaft bore
E	=	Mounting dimension for elastomeric spider
I	=	Clamp srew centerline
L ± 0.08	=	Total length
G	=	Clamping screws
C_1	=	Bore tolerance for D_1
C_2	=	Bore tolerance for D_2

Dimensions / Technical Data

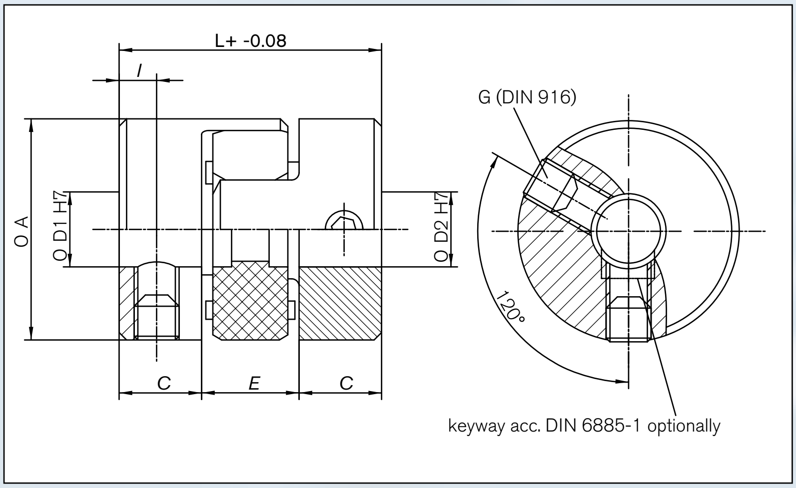
Size	L ±0.079 (Inch)	Ø A	E	Ø D1^H7	C1	Ø D2^H7	C2	C	I	G	T_{KN} (lb-in)	M_A (lb-in)	n_{max} (rpm)	J (10^{-6} lb-in²)	Weight (lbs)
5	0.59	0.39	0.20	0.08-0.20	-0 +0.001	0.08-0.20	-0 +0.001	0.20	0.10	1xM3	4	12	47500	116	0.004
7	0.87	0.55	0.31	0.12-0.28		0.12-0.28		0.28	0.10	1xM3	11	12	34000	670	0.012
9	1.18	0.79	0.39	0.16-0.43		0.16-0.43		0.39	0.20	2xM4	27	27	24000	3692	0.037
14	1.38	1.18	0.51	0.16-0.63		0.16-0.63		0.43	0.20	2xM6	66	53	16000	19483	0.090
19	2.60	1.57	0.63	0.24-0.94		0.24-0.94		0.98	0.39	2xM6	89	53	12000	123051	0.326
24	3.07	2.17	0.71	0.31-1.10		0.31-1.10		1.18	0.39	2xM6	310	53	8500	553731	0.754

Columns L through G are in Inch.

Moment of inertia and weight (mass) are calculated with reference to the largest bore size.

Example:
EK/GS

Series Size	Bore- Ø D1	Bore- Ø D2	Further details*
EK/GS 14	0.375	0.500	XXXXX



Sectional view

Technical Data

TKN	=	Nominal torque
J	=	Moment of inertia
MA	=	Tightening torque of screws
m	=	Weight per hub
nmax	=	Max. rotational speed

Torque values based on metric shaft diameters

Size	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	Ø 9	Ø 10	Ø 11	Ø 12	Ø 13	Ø 14	Ø 15	Ø 16	Ø 17	Ø 18	Ø 20	Ø 24	Ø 28
5	1	4	4	4																
7		4	9	11	11	11														
9			9	18	27	27	27	27	27	27										
14			9	18	32	53	66	66	66	66	66	66	66	66	66					
19					32	53	80	89	89	89	89	89	89	89	89	89	89	89	89	
24							80	106	150	195	257	310	310	310	310	310	310	310	310	310

Bore range D1/D2 and corresponding transmissible torque values (lb-ins) of the coupling

Characteristics

- **Compact design**
- **Economically priced**
- **Axial assembly**
- **Vibration damping**
- **Electrically isolating**

Series DK/GS

Dimensions

- **øA** = Outer diameter
- **øD1 H7** = Bore diameter
- **øD2 H7** = Bore diameter
- **øH** = Clearance diameter
- **C** = Guided length shaft bore
- **E** = Mounting dimension for elastomeric spider
- **I** = Radius to clamp screw
- **K** = Radius to clamp screw
- **L ± 0.08** = Total length
- **G** = Clamping screw
- **C_1** = Bore tolerance for D_1
- **C_2** = Bore tolerance for D_2

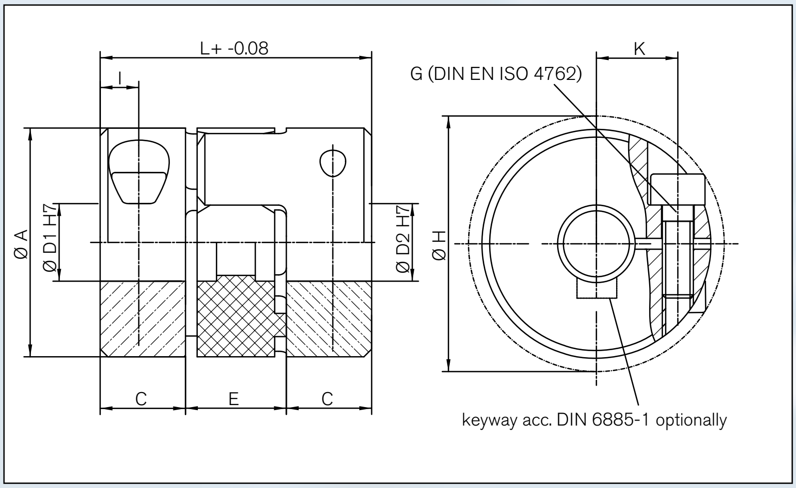
Dimensions / Technical Data

Size	L ±0.079	Ø A	K	Ø H	E	Ø D1 H7	C1	Ø D2 H7	C2	C	I	G	T_{KN}	M_A	n_{max}	J	Weight
	Inch	Inch										mm	lb-in	lb-in	rpm	10-6 lb-in²	lbs
5	0.59	0.39	0.13	0.45	0.20	0.08-	-0 +0.001	0.08-	-0 +0.001	0.20	0.10	M1.6	4.4	2.2	38000	116	0.004
7	0.87	0.55	0.20	0.65	0.31	0.12-		0.12-		0.28	0.14	M2	10.6	3.1	27000	670	0.012
9	1.18	0.79	0.29	0.93	0.39	0.16-		0.16-		0.39	0.20	M2.5	26.6	6.6	19000	3692	0.037

Moment of inertia and weight (mass) are calculated with reference to the largest bore size.

Example:
DK/GS

Series Size	Bore-Ø D1	Bore-Ø D2	Further details*
DK/GS 9	0.187	0.375	XXXXX



Sectional view

Technical Data

T_{KN}	=	Nominal torque
J	=	Moment of inertia
M_A	=	Tightening torque of screws
n_{max}	=	Max. rotational speed

Torque values based on metric shaft diameters

Size	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	Ø 9	Ø 10	Ø 11
5	0.9	3.5	4.4							
7		3.5	8.0	8.4	8.9	9.7				
9			8.9	18	20	21	22	23	24	25

Bore range D1/D2 and corresponding transmissible torque values (lb-ins) of the coupling

Characteristics

- **Economical clamping hub**
- **Easy to install**
- **Electrically isolating**
- **Vibration damping**
- **Fail-safe design**
- **Plug-in type - axial installation**

Backlash-free Servo-Insert Coupling

Series ADS

Dimensions

øA	=	Outer diameter
øD1 H7	=	Bore diameter
øD2 H7	=	Bore diameter
øH	=	Clearance diameter
C	=	Guided length shaft bore
E	=	Mounting dimension for elastomeric spider
I	=	Radius to clamp screw
K	=	Radius to clamp screw
L ± 0.08	=	Total length
G	=	Clamping screw
C_1	=	Bore tolerance for D_1
C_2	=	Bore tolerance for D_2

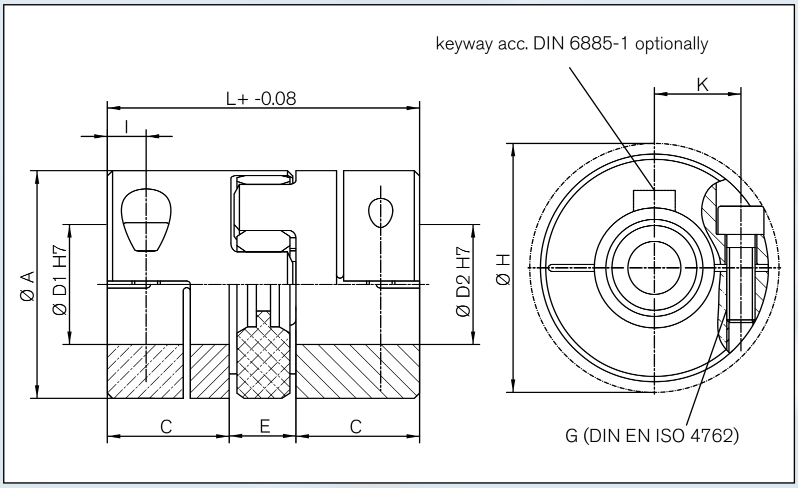
Dimensions / Technical Data

Size	L ±0.079	Ø A	K	Ø H	E	Ø D1^{H7}	C1	Ø D2^{H7}	C2	C	I	G	T_{KN}	M_A	n_{max}	J	Weight
	Inch	Inch											lb-ft		rpm	10^{-6} lb-in²	10^{-3} lbs
14	1.38	1.18	0.41	1.34	0.51	0.39-	-0 +0.001	0.39-	-0 +0.001	0.43	0.20	M4	9.2	3.7	13000	0.02	0.1
19	2.60	1.57	0.59	1.77	0.63	0.39-		0.39-		0.98	0.24	M5	13	7.4	10000	0.12	0.3
24	3.07	2.17	0.79	2.24	0.71	0.79-		0.79-		1.18	0.39	M6	44	13	7000	0.51	0.7
28	3.54	2.56	0.94	2.76	0.79	0.95-		0.95-		1.38	0.43	M8	118	32	6000	1.13	1.1
38	4.49	3.15	1.18	3.50	0.94	1.26-		1.26-		1.77	0.51	M10	240	62	5000	3.55	2.1
42	4.96	3.74	1.38	3.78	1.02	1.38-		1.38-		1.97	0.55	M10	332	62	4000	20.9	9.3
48	5.51	4.13	1.57	4.33	1.10	1.58-		1.58-		2.20	0.59	M12	387	107	3600	49.9	11.7

Moment of inertia and weight (mass) are calculated with reference to the largest bore size.

Example:
ADS

Series Size	Bore- Ø D1	Bore- Ø D2	Further details*
ADS 42	1.50	1.75	XX



Sectional view

Technical Data

T_{KN}	=	Nominal torque
J	=	Moment of inertia
M_A	=	Tightening torque of screws
n_{max}	=	Max. rotational speed

Torque values based on metric shaft diameters

Size	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	111	111	111	111																	
19	150	150	150	150	150	150	150	150													
24								531	531	531	531										
28									1416	1416	1416	1416	1416	1416	1416						
38													2877	2877	2877	2877	2877	2877			
42														3673	3780	3850	3921	3983	3983	3983	
48																4647	4647	4647	4647	4647	4647

Bore range D1/D2 and corresponding transmissible torque values (lb-ins) of the coupling

Characteristics

- **Clamping hub for higher torque**
- **Simple assembly**
- **Vibration damping**
- **Electrically isolating**

Dimensions

øA	=	Outer diameter
øD1 H7	=	Bore diameter
øD2 H7	=	Bore diameter
øH	=	Clearance diameter
C	=	Guided length shaft bore
E	=	Mounting dimension for elastomeric spider
I	=	Radius to clamp screw
K	=	Radius to clamp screw
L ± 0.08	=	Total length
G	=	Clamping screw
C_1	=	Bore tolerance for D_1
C_2	=	Bore tolerance for D_2

Dimensions / Technical Data

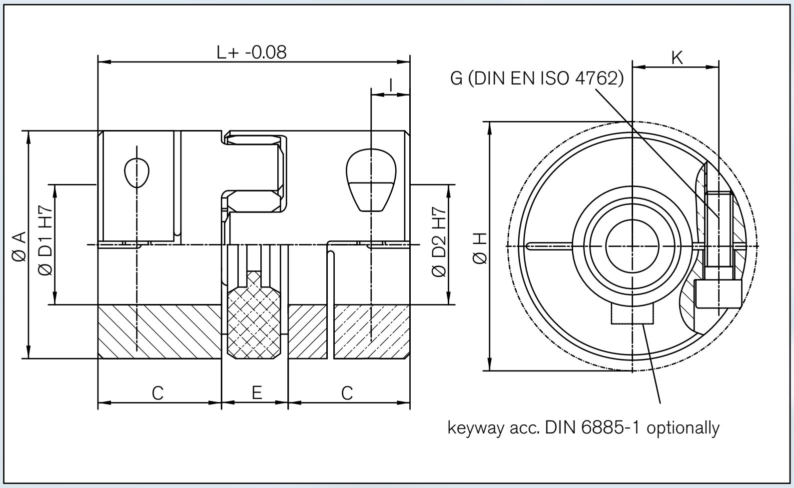
Size	L ±0.079	B	K	Ø A	Ø H	E	Ø $D1^{H7}$	C1	Ø $D2^{H7}$	C2	C	I	G	T_{KN}	M_A	n_{max}	J	Weight
	Inch						Inch						lb-in	lb-in		rpm	10^{-6} lb-in²	lbs
14	1.38		0.43	1.18	1.27	0.51	0.20-0.63		0.20-0.63		0.43	0.20	M3	111	13	13000	37.6	0.09
19	2.60		0.57	1.57	1.81	0.63	0.32-0.79		0.32-0.79		0.98	0.47	M6	150	97	10000	85	0.33
24	3.07		0.79	2.17	2.24	0.71	0.39-1.10		0.39-1.10		1.18	0.41	M6	531	97	7000	103	0.71
28	3.54		0.96	2.56	2.80	0.79	0.55-1.50	-0 +0.001	0.55-1.50	-0 +0.001	1.38	0.45	M8	1416	221	6000	120	1.1
38	4.49		1.18	3.15	3.27	0.94	0.59-1.77		0.59-1.77		1.77	0.61	M8	2877	221	5000	154	2.1
42	4.96	3.35	1.28	3.74	3.58	1.02	0.79-1.89		0.79-1.89		1.97	0.71	M10	3983	611	4000	171	9.3
48	5.51	3.74	1.42	4.13	4.11	1.10	0.98-2.17		0.98-2.17		2.20	0.83	M12	4647	1062	3600	191	12

Moment of inertia and weight (mass) are calculated with reference to the largest bore size.

Hub design; up to size 19 single slit, from size 24 with dual slit.

Example:
ADS/R

Series Size	Bore- Ø D1	Bore- Ø D2	Further details*
ADS/R 42	0.875	1.00	XX



Sectional view

Technical Data

T_{KN}	=	Nominal torque
J	=	Moment of inertia
M_A	=	Tightening torque of screws
n_{max}	=	Max. rotational speed

Torque values based on metric shaft diameters

Size	Ø 11	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 45	Ø 48	Ø 50	Ø 55
14	50	54	58																
19	150	150	150	150	150	150													
24	195	398	416	434	443	451	478	487	505										
28		407	602	859	867	885	929	947	983	1009	1036	1071	1115						
38			602	876	1009	1027	1071	1089	1124	1151	1177	1213	1248	1275	1301	1345			
42						1186	2036	2310	2664	2726	2779	2868	2948	3010	3063	3151	3240		
48								2310	3240	3983	4373	4497	4621	4647	4647	4647	4647	4647	4647

Bore range D1/D2 and corresponding transmissible torque values (lb-ins) of the coupling

Characteristics

- **Dimensionally equivalent to competitive versions**

Series ASS/A

Dimensions

øA = Outer diameter
øD1 H7 = Bore diameter
øD2 H7 = Bore diameter
C = Guided length shaft bore
E = Mounting dimension for elastomeric spider
G = Screw
L ± 0.08 = Total length
M = Clamp collar width - relaxed condition
C_1 = Bore tolerance for D_1
C_2 = Bore tolerance for D_2

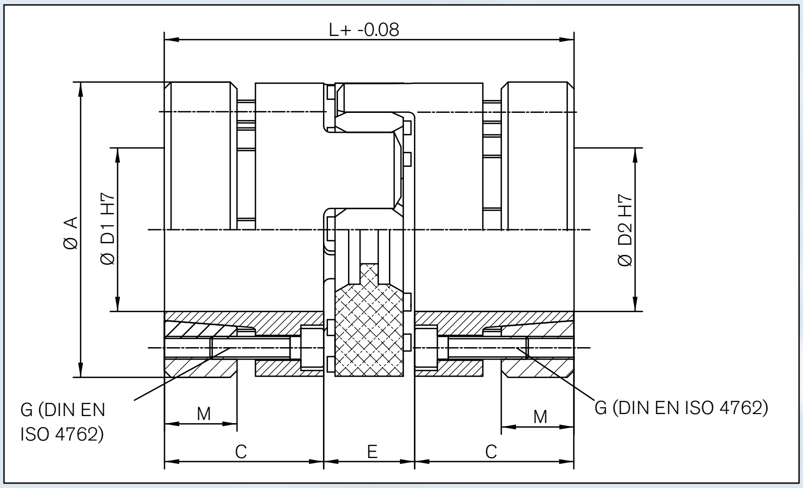
Dimensions / Technical Data

Size	L ±0.079	M	Ø A	E	Ø D1 H7	C1	Ø D2 H7	C2	C	G	T_{KN}	M_A	n_{max}	J	Weight
	Inch	Inch								mm	lb-in		rpm	lb-in²	lbs
14	1.97	0.31	1.26	0.51	0.24-0.55	-0 +0.001	0.24-0.55	-0 +0.001	0.73	M3	111	16	25400	0.05	0.2
19	2.60	0.39	1.57	0.63	0.39-0.79		0.39-0.79		0.98	M4	150	27	19000	0.22	0.5
24	3.07	0.51	2.17	0.71	0.43-0.98		0.43-0.98		1.18	M5	531	53	13800	0.9	1.3
28	3.54	0.63	2.56	0.79	0.59-1.42		0.59-1.42		1.38	M5	1416	53	11700	2.2	2.1
38	4.49	0.87	3.15	0.94	0.79-1.61		0.79-1.61		1.77	M6	2877	89	9550	6.7	4.3
42	4.96	0.98	3.74	1.02	1.06-1.97		1.06-1.97		1.97	M8	3983	310	8050	22	10
48	5.51	1.10	4.13	1.10	1.18-2.17		1.18-2.17		2.20	M10	4647	611	7200	36	14

Moment of inertia and weight (mass) are calculated with reference to the largest bore size.

Example:
ASS/A

Series Size	Bore-Ø D1	Bore-Ø D2	Further details*
ASS/A 42	1.25	1.62	XX



Sectional view

Technical Data

T_{KN}	=	Nominal torque
J	=	Moment of inertia
M_A	=	Tightening torque of screws
n_{max}	=	Max. rotational speed

Torque values based on metric shaft diameters

Size	Ø 6	Ø 10	Ø 11	Ø 13	Ø 14	Ø 15	Ø 17	Ø 19	Ø 20	Ø 24	Ø 25	Ø 27	Ø 30	Ø 32	Ø 36	Ø 38	Ø 41	Ø 42	Ø 44	Ø 48	Ø 50	Ø 55
14	32	111	111	111	111																	
19		150	150	150	150	150	150	150	150													
24			195	328	407	496	531	531	531	531	531											
28						496	602	1009	1186	1416	1416	1416	1416	1416	1416							
38									1186	2036	2310	2877	2877	2877	2877	2877	2877					
42												2912	3983	3983	3983	3983	3983	3983	3983	3983	3983	
48													3983	4647	4647	4647	4647	4647	4647	4647	4647	4647

Bore range D1/D2 and corresponding transmissible torque values (lb-ins) of the coupling

Characteristics

- **High torque transmission**
- **Optimal concentricity**
- **Vibration damping**
- **Easy to install**
- **Electrically isolating**

Technical Information Servo-Insert-Couplings

Backlash-free Servo-insert Coupling
Technical Description

The couplings can be fine-tuned to the specific application requirements in terms of torsional stiffness and vibration behavior by selecting from various color coded elastomeric spiders having different grades of shore hardness.

Technical terms for the coupling design

Pre-Compression:
The elastic pre-compression varies depending on the shore hardness of spiders, the size of the coupling and the machining tolerances. From this the axial insertion force results : From light (as a push fit with torsionally soft spider) to heavy (with high pre-compression with torsionally stiff spider)

T_{kN} – Nominal Torque of coupling (lb-in):
Continuous torque which can be transmitted throughout the entire speed range, taking into consideration operational factors such as ambient temperatures and torsional stiffness.

T_{kmax} – Maximum Torque of coupling (lb-in):
Torque to be transmitted 1×10^5 times as a peak load or 5×10^4 times as an alternating load during the entire life of the coupling taking into consideration factors such as temperatures, torsional stiffness and shock loading.

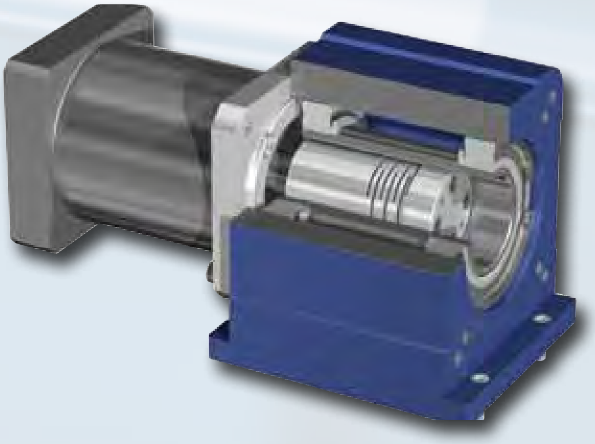
Spider durometer (shore hardness)	color	Material	Allowable temperarure range F°		Available for Size	Typical applications
			continous temperature	max. temp. short term		
80 SH A	blue	polyurethane	-58 to +176	-76 to +248	5-19	Drives in electronic measuring systems; backlash free when pre compressed
92 SH A	yellow	polyurethane	-40 to +194	-58 to +248	5-48	Main spindle drives, backlash free when pre-compressed
98 SH A	red	polyurethane	-22 to +194	-40 to +248	5-48	Positioning drives, backlash free when pre-compressed
64 SH D-H	green	hytrel	-58 to +248	-76 to +302	7-38	Machine tool spindles, control drives, lead units, planetary gearboxes, heavy loads, torsionally stiff, high ambient temperature, water proof
64 SH D	green	polyurethane	-4 to +230	-22 to +248	42-48	

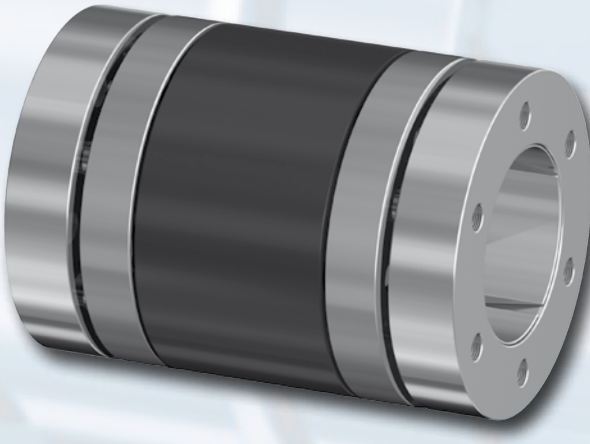
Technical Information Servo-Insert-Couplings

Technical Information - Spiders

Size	Spider	Shore	Max. speed (rpm) for Type			torque lb-in		static torsional stiffness	dynamic torsional stiffness	radial stiffness
		Scale	DK/GS; ADS; ADS/R	EK/GS	ASS/A	TkN	Tkmax	lb-in/rad	lb-in/rad	lb-in/Inch
5	80	A	38000	47500		3	5	28	89	29
	92	A				4	9	46	142	54
	98	A				8	15	73	221	103
7	80	A	27000	34000		6	12	76	230	40
	92	A				11	21	127	381	76
	98	A				18	35	204	611	147
	64	H				21	42	301	912	220
9	80	A	19000	24000		16	32	150	460	44
	92	A				27	53	274	841	91
	98	A				44	89	451	1372	181
	64	H				53	106	655	1983	268
14	80	A	13000	16000	25400	35	71	531	1593	53
	92	A				66	133	1018	3045	117
	98	A				111	221	1522	4541	228
	64	H				142	283	2071	6214	298
19	80	A	10000	12000	19000	44	89	3010	9117	203
	92	A				89	177	5045	15225	390
	98	A				150	301	7612	22837	700
	64	H				186	372	10976	32928	1021
24	92	A	7000	8500	13800	310	620	12658	38027	516
	98	A				531	1062	18234	54783	892
	64	D				664	1328	26378	79080	1288
28	92	A	6000		11700	841	1682	20270	60864	620
	98	A				1416	2833	30450	91296	1115
	64	H				1770	3541	38505	115514	1515
38	92	A	5000		9550	1682	3364	40540	121727	819
	98	A				2877	5754	63378	190186	1533
	64	H				3585	7170	93296	279888	2256
42	92	A	4000		8050	2346	4691	55765	21509	847
	98	A				3983	7966	169951	49304	1941
	64	D				4957	9914	244128	63466	2534
48	92	A	3600		7200	2744	5488	69485	22837	899
	98	A				4647	9294	198011	52490	2067
	64	D				5798	11596	320429	73238	2883

Preview





Backlash free compensating coupling Series ICL

Customer: Linear units manufacturer
Field of application: Direct drive of mounted hollow shafts

Task:
The usual use of metal bellows couplings as a connection device required extensive use of additional components, making the overall system quite cumbersome. By eliminating any misalignment compensating devices and substituting only rigid connection methods (i.e. Locking Assemblies) the axial loads due to thermal expansion and radial misalignments led to increased bearing loads and , therefore, premature bearing wear.

The GERWAH solution:
The combination of a locking assembly connection with a shaft coupling allows the space saving assembly of the drive directly at the hollow shaft. A metal bellows balances radial and axial misalignments and reduces the bearing load. Numerous components and their related misalignment sources can be eliminated due to the direct connection of the drive shaft and the supported hollow shaft. The installation of the coupling is possible with a minimal expenditure of time as it is mounted pre-assembled. Optimizing the initial load position relieves the loading on the ball bearings.

Further fields of application:

- **Automation industry**
- **Linear units**
- **Attachment drives**
- **Materials handling technology**
- **Robotics**

Backlash free compensating coupling Series SMC

Customer: Machine tool manufacturer
Field of application: Main spindle drive with high rotational speeds, machines for drilling and milling

Difficulty:
Customary plug-in type couplings feature a limited torsional stiffness. When using a PU-spider often wear problems occur due to the loads during operation. The result is a premature wear.

Our solution:
Utilization of an all metal coupling with single side or double adaptor flange.

The all metal coupling system was developed to be a highly dynamic, torsionally rigid coupling, allowing for high rotational speeds with minimum unbalance and runout.

The application:
The developed coupling is used in the main spindle drive of a machining center with a speed range of 12000-15000 rpm.

Due to the special construction, highest rotational speeds can be transmitted without vibration. The failure rate and maintenance intervals can be dramatically reduced.

Line Shafts Basics

Backlash-free Line Shafts Series

Torsionally stiff and flexible line shafts are used in applications where torque and rotational motion combined with the highest possible angular precision should be transmitted or considerable distances between shafts need to be bridged. The application range of line shafts covers almost all technical areas, where mechanical power transmission and stiffness are important:

Torsionally flexible line shafts with elastomeric spider

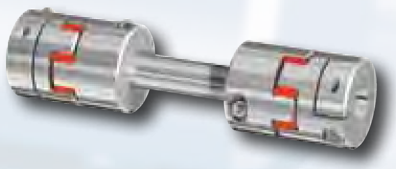
- **Absolutely backlash-free**
- **Installation length up to 20 feet possible**
- **Compensation of axial, radial and angular misalignment**
- **Cost-effective, simple assembly**
- **Maintenance free**
- **Variable length of the intermediate (or line) steel or aluminum tube**
- **Backlash free elastomeric spider**
- **Excellent transmission of torque and compensation of misalignment**
- **High transmission accuracy**
- **Temperature range -22 F° to + 248 F°**

Torsionally stiff line shafts with metal bellows

- **Absolutely backlash-free**
- **Installation length up to 20 feet possible**
- **Compensation of axial, radial and angular misalignment**
- **Aluminium lightweight construction up to size 200**
- **Optional with CFK-tube**
- **Maintenance free, no wear**
- **Universal joint tube version available**
- **Special stainless steel bellows**
- **Excellent power transmission**
- **High torsional stiffness and misalignment compensation**
- **Optimal moment of inertia**
- **Additional balancing holes for better concentricity**
- **Temperature range -22 F° to 212 F°.**
- **Excellent torsional rigidity**

Packaging Machine

Overview Line Shafts



Series
ADS-ZW

Servo-Insert Coupling with clamping style hubs

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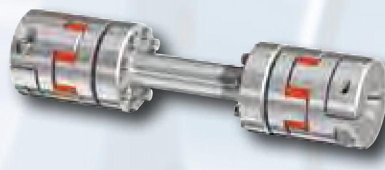

Series
ADS/B-ZW

Servo-Insert Coupling with clamping style hubs and Shrink Disc®

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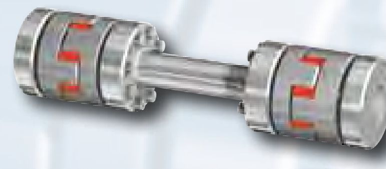

Series
ASS/A-ZW

Servo-Insert Coupling with clamping Shrink Disc®

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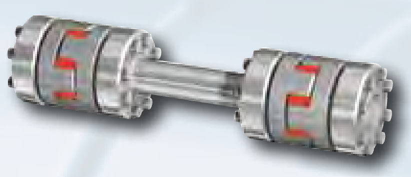

Series
ASS/B-ZW

Servo-Insert Coupling with Shrink Disc®, outside mounting

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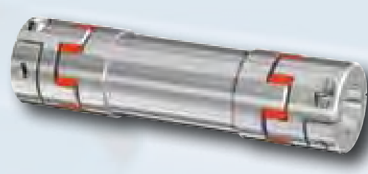

Series
ADS/H-ZW

Servo-Insert Coupling with clamping style hubs in half shell construction

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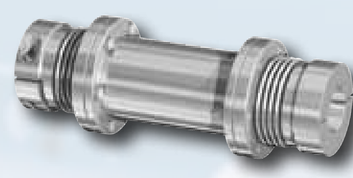

Series
AKN-ZW

Metal Bellows Coupling with clamping style hubs in flange construction

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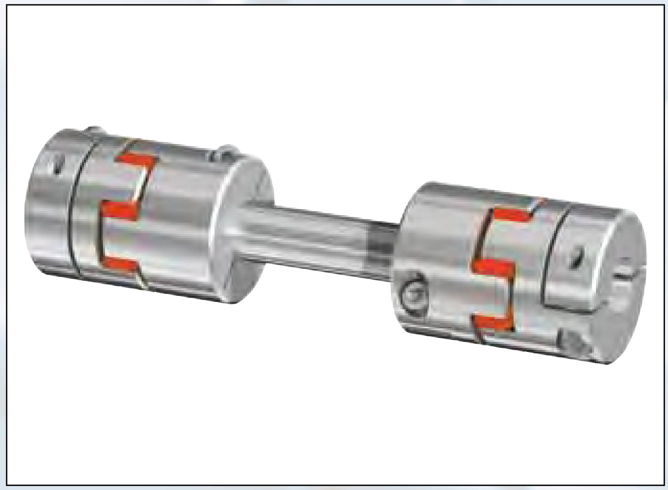
Series ADS-ZW

Dimensions

øA	=	Outer diameter
øD1 H7/øD2 H7	=	Bore diameter
øH	=	Clearance diameter
øR	=	Tube diameter
C	=	Guided length shaft bore
E	=	Mounting dimension for elastomeric spider
I/K	=	Radius to clamp screw
L ± 0.08	=	Total length
L1	=	Coupling length
G/G1	=	Clamping screw
X	=	Distance between shaft ends
C_1	=	Bore tolerance for D_1
C_2	=	Bore tolerance for D_2



Dimensions

Size	L ±0.079 (Inch)	L_1 ±0.079 (Inch)	K (Inch)	Ø A	Ø H	E	Ø R	Ø D1^{H7}	C1	Ø D2^{H7}	C2	C	I	G (mm)	G_1 (mm)
14	118	1.38	0.41	1.18	1.34	0.51	0.39	0.39-0.55	-0 +0.001	0.39-0.55	-0 +0.001	0.43	0.20	M4	M4
19	118	2.60	0.59	1.57	1.77	0.63	0.47	0.39-0.79		0.39-0.79		0.98	0.24	M5	M5
24	118	3.07	0.79	2.17	2.24	0.71	0.79	0.79-1.10		0.79-1.10		1.18	0.39	M6	M6
28	118	3.54	0.94	2.56	2.76	0.79	0.98	0.95-1.38		0.95-1.38		1.38	0.43	M8	M8
38	118	4.49	1.18	3.15	3.50	0.94	1.26	1.26-1.73		1.26-1.73		1.77	0.51	M10	M10
42	118	4.96	1.38	3.74	3.78	1.02	1.57	1.38-1.97		1.38-1.97		1.97	0.55	M10	M10
48	118	5.51	1.57	4.13	4.33	1.10	1.77	1.58-2.36		1.58-2.36		2.20	0.59	M12	M12

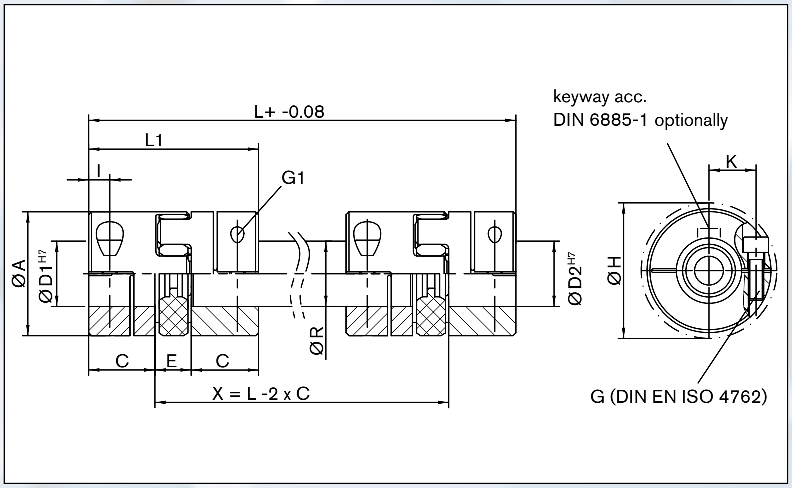
(Units: L, L_1 in Inch; K through I in Inch; G, G_1 in mm. C1 and C2 values "-0 +0.001" apply to all sizes.)

Characteristics

- **Cost-efficient design**
- **Easy to install**
- **Electrically isolating, damping**
- **Backlash-free**
- **Fail-safe design**

Example:
ADS-ZW

Series Size Length	Bore- Ø D1	Bore- Ø D2	Further details*
ADS-ZW 14/3.125	0.437	0.50	XX



Sectional view

Technical Data

T_{KN} = Nominal torque
M_A = Tightening torque of screws
Ct = Torsional stiffness per meter
n_{max} = Max. rotational speed

Technical Data

Size	C_t lb-in/rad	T_{KN} lb-in	M_A lb-in	Hubs Material
14	620	111	44	Al
19	1151	150	89	Al
24	8409	531	159	Al
28	15933	1416	381	Al
38	46028	2877	744	Al
42	104449	3983	744	St
48	154903	4647	1283	St

Torque values based on metric shaft diameters

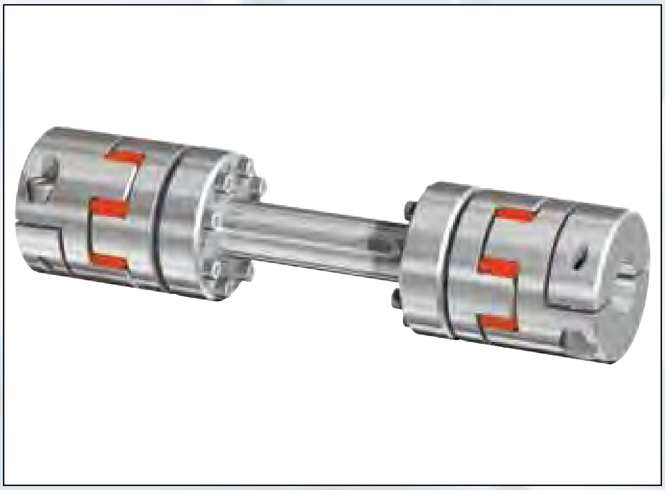
Size	Ø 10	Ø 11	Ø 13	Ø 14	Ø 16	Ø 18	Ø 19	Ø 20	Ø 24	Ø 25	Ø 28	Ø 30	Ø 32	Ø 35	Ø 38	Ø 40	Ø 42	Ø 44	Ø 48	Ø 50	Ø 60
14	111	111	111	111	111																
19	150	150	150	150	150	150	150	150													
24								531	531	531	531										
28									1416	1416	1416	1416	1416	1416	1416						
38													2877	2877	2877	2877	2877	2877			
42														3673	3780	3850	3921	3983	3983	3983	
48																4647	4647	4647	4647	4647	4647

Bore range D1/D2 and corresponding transmissible torque values (lb-ins) of the coupling

Series ADS/B-ZW

Dimensions

øA	=	Outer diameter
øD1 H7/øD2 H7	=	Bore diameter
øH	=	Clearance diameter
øR	=	Tube diameter
C	=	Guided length shaft bore
E	=	Mounting dimension for elastomeric spider
I/K	=	Radius to clamp screw
L ± 0.08	=	Total length
L1	=	Coupling length
G/G1	=	Clamping screw
X	=	Distance between shaft ends
C_1	=	Bore tolerance for D_1
C_2	=	Bore tolerance for D_2



Dimensions

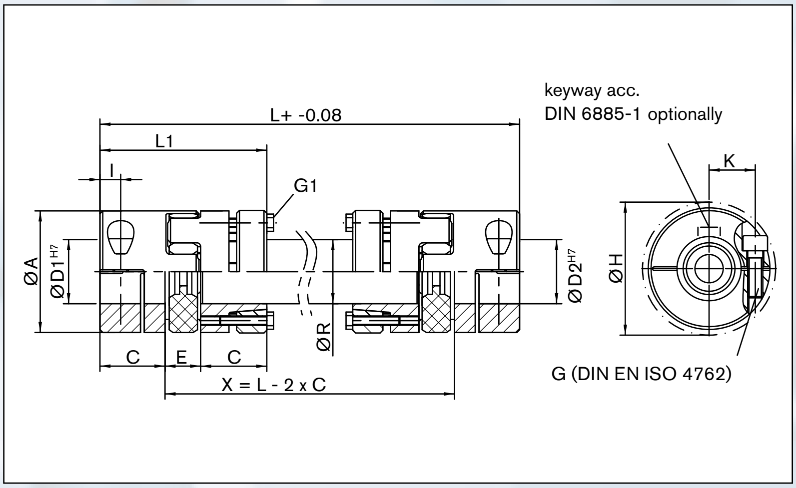
Size	L ±0.079	L_1 ±0.079	K	Ø A	Ø H	E	Ø R	Ø $D1^{H7}$	C1	Ø $D2^{H7}$	C2	C	I	G	G_1
	Inch		Inch											mm	
14	118	1.38	0.41	1.18	1.34	0.51	0.39	0.39-0.55	-0 +0.001	0.39-0.55	-0 +0.001	0.43	0.20	M4	M3
19	118	2.60	0.59	1.57	1.77	0.63	0.47	0.39-0.79		0.39-0.79		0.98	0.24	M5	M4
24	118	3.07	0.79	2.17	2.24	0.71	0.79	0.79-1.10		0.79-1.10		1.18	0.39	M6	M5
28	118	3.54	0.94	2.56	2.76	0.79	0.98	0.95-1.38		0.95-1.38		1.38	0.43	M8	M5
38	118	4.49	1.18	3.15	3.50	0.94	1.26	1.26-1.73		1.26-1.73		1.77	0.51	M10	M6
42	118	4.96	1.38	3.74	3.78	1.02	1.57	1.38-1.97		1.38-1.97		1.97	0.55	M10	M8
48	118	5.51	1.57	4.13	4.33	1.10	1.77	1.58-2.36		1.58-2.36		2.20	0.59	M12	M10

Characteristics

- **Cost-efficient design**
- **Easy to install**
- **Electrically isolating, damping**
- **Backlash-free, fail-safe design**
- **For higher torques**

Example:
ADS/B-ZW

Series Size Length	Bore-Ø D1	Bore-Ø D2	Further details*
ADS/B-ZW 14/3.125	0.437	0.50	XX



Sectional view

Technical Data

T_{KN} = Nominal torque
M_A = Tightening torque of screws
C_t = Torsional stiffness per meter
n_{max} = Max. rotational *speed*

Technical Data

Size	C_t lb-in/RAD	T_{KN} lb-in	M_A (G) lb-in	M_A (G1) lb-in	n_{max} rpm	Hub/circlip Material
14	620	111	44	16	1500	Al/St
19	1151	150	89	27	1500	Al/St
24	8409	531	159	53	1500	Al/St
28	15933	1416	381	53	1500	Al/St
38	46028	2877	744	89	1500	Al/St
42	104449	3983	744	310	1500	St/St
48	154903	4647	1283	611	1500	St/sSt

Torque values based on metric shaft diameters

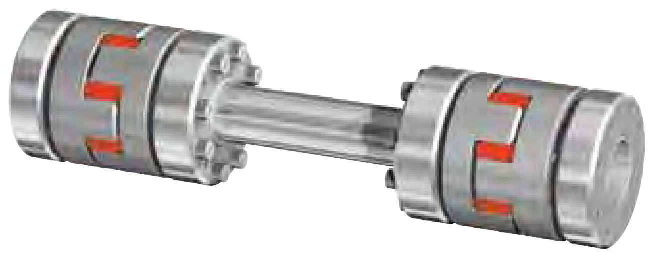
Size	Ø 10	Ø 11	Ø 13	Ø 14	Ø 16	Ø 18	Ø 19	Ø 20	Ø 24	Ø 25	Ø 28	Ø 30	Ø 32	Ø 35	Ø 38	Ø 40	Ø 42	Ø 44	Ø 48	Ø 50	Ø 60
14	111	111	111	111	111																
19	150	150	150	150	150	150	150	150													
24								531	531	531	531										
28									1416	1416	1416	1416	1416	1416	1416						
38													2877	2877	2877	2877	2877	2877			
42														3673	3780	3850	3921	3983	3983	3983	
48																4647	4647	4647	4647	4647	4647

Bore range D1/D2 and corresponding transmissible torque values (lb-ins) of the coupling

Series ASS/A-ZW

Dimensions

øA	=	Outer diameter
øD1 H7/øD2 H7	=	Bore diameter
øR	=	Tube diameter
C	=	Guided length shaft bore
E	=	Mounting dimension for elastomeric spider
L ± 0.08	=	Total length
L1	=	Coupling length
G	=	Clamping screws
G1	=	Clamping screws
X	=	Distance between shaft ends
C_1	=	Bore tolerance for D_1
C_2	=	Bore tolerance for D_2



Dimensions

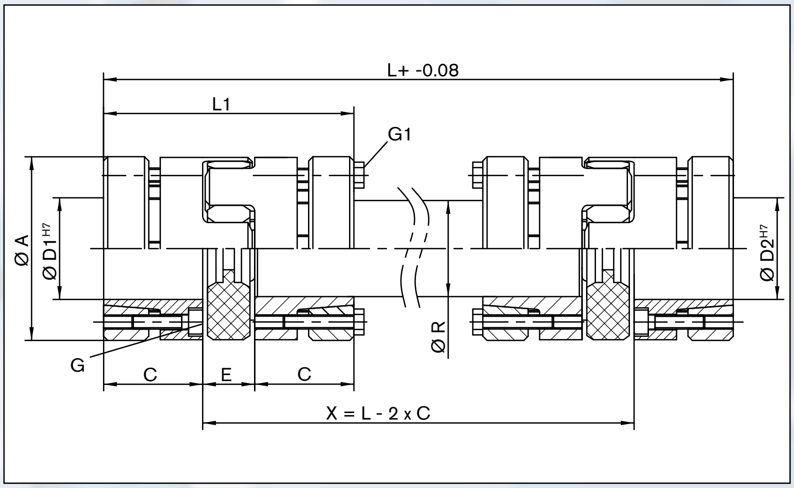
Size	L ±0.079	L_1 ±0.079	Ø A	E	Ø R	Ø $D1^{H7}$	C1	Ø $D2^{H7}$	C2	C	G	G_1
	Inch		Inch								mm	
14	118	1.97	1.26	0.51	0.39	0.24-0.55		0.24-0.55		0.73	M3	M3
19	118	2.60	1.57	0.63	0.47	0.39-0.79		0.39-0.79		0.98	M4	M4
24	118	3.07	2.17	0.71	0.79	0.43-0.98		0.43-0.98		1.18	M5	M5
28	118	3.54	2.56	0.79	0.98	0.59-1.42	-0 +0.001	0.59-1.42	-0 +0.001	1.38	M5	M5
38	118	4.49	3.15	0.94	1.38	0.79-1.61		0.79-1.61		1.77	M6	M6
42	118	4.96	3.74	1.02	1.57	1.06-1.97		1.06-1.97		1.97	M8	M8
48	118	5.51	4.13	1.10	1.77	1.18-2.17		1.18-2.17		2.20	M10	M10

Characteristics

- **For higher torques**
- **Optimal concentricity**
- **Electrically isolating, damping**
- **Backlash-free**
- **Fail-safe design**

Example:
ASS/A-ZW

Series Size Length	Bore-Ø D1	Bore-Ø D2	Further details*
ASS/A-ZW 14/3.125	0.250	0.50	XX



Sectional view

Technical Data

T_{KN}	=	Nominal torque
M_A	=	Tightening torque of screws
C_t	=	Torsional stiffness (tube)
n_{max}	=	Max. rotational speed

Technical Data

Size	C_t lb-in / rad	T_{KN} lb-in	$M_{A (G)}$ lb-in	$M_{A (G1)}$ lb-in	n_{max} rpm	Hubs Material
14	620	111	16	16	1500	Al
19	1151	150	27	27	1500	Al
24	8409	531	53	53	1500	Al
28	15933	1416	53	53	1500	Al
38	46028	2877	89	89	1500	Al
42	104449	3983	310	310	1500	St
48	154903	4647	611	611	1500	St

Torque values based on metric shaft diameters

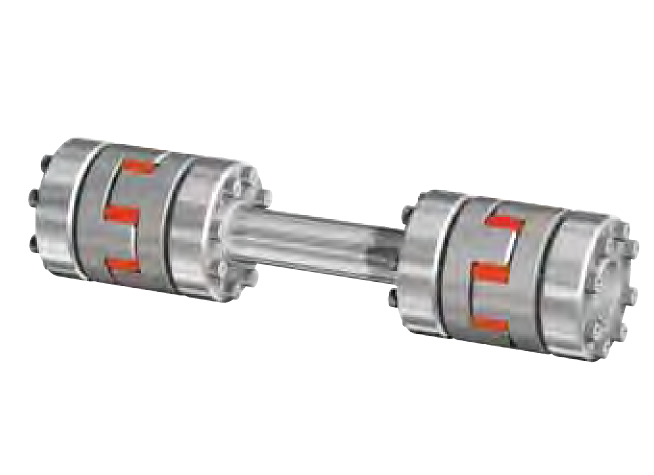
Size	Ø 6	Ø 10	Ø 11	Ø 13	Ø 14	Ø 15	Ø 17	Ø 19	Ø 20	Ø 24	Ø 25	Ø 27	Ø 30	Ø 32	Ø 36	Ø 38	Ø 41	Ø 42	Ø 44	Ø 48	Ø 50	Ø 55
14	32	111	111	111	111																	
19		150	150	150	150	150	150	150	150													
24			195	328	407	496	531	531	531	531	531											
28						496	602	1009	1186	1416	1416	1416	1416	1416	1416							
38									1186	2036	2310	2877	2877	2877	2877	2877	2877					
42												2912	3983	3983	3983	3983	4063	3983	3983	3983	3983	
48													3983	4647	4647	4647	4647	4647	4647	4647	4647	4647

Bore range D1/D2 and corresponding transmissible torque values (lb-ins) of the coupling

Series ASS/B-ZW

Dimensions

øA	=	Outer diameter
øD1 H7/øD2 H7	=	Bore diameter
øR	=	Tube diameter
C	=	Guided length shaft bore
E	=	Mounting dimension for elastomeric spider
L ± 0.08	=	Total length
L1	=	Coupling length
G	=	Clamping screws
G1	=	Clamping screws
X	=	Distance between shaft ends
C_1	=	Bore tolerance for D_1
C_2	=	Bore tolerance for D_2



Dimensions

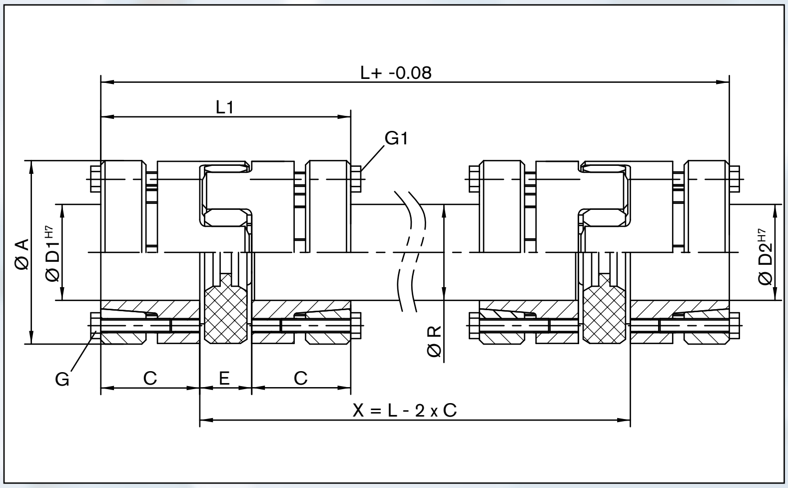
Size	L ±0.079 (Inch)	L_1 ±0.079 (Inch)	Ø A (Inch)	E (Inch)	Ø R (Inch)	Ø D1^{H7} (Inch)	C1 (Inch)	Ø D2^{H7} (Inch)	C2 (Inch)	C (Inch)	G (mm)	G_1 (mm)
14	118	1.97	1.26	0.51	0.39	0.24-0.55	-0 +0.001	0.24-0.55	-0 +0.001	0,73	M3	M3
19	118	2.60	1.57	0.63	0.47	0.39-0.79		0.39-0.79		0,98	M4	M4
24	118	3.07	2.17	0.71	0.79	0.43-0.98		0.43-0.98		1,18	M5	M5
28	118	3.54	2.56	0.79	0.98	0.59-1.42		0.59-1.42		1,38	M5	M5
38	118	4.49	3.15	0.94	1.26	0.79-1.61		0.79-1.61		1,77	M6	M6
42	118	4.96	3.74	1.02	1.57	1.06-1.97		1.06-1.97		1,97	M8	M8
48	118	5.51	4.13	1.10	1.77	1.18-2.17		1.18-2.17		2,20	M10	M10

Characteristics

- **For higher torques**
- **Optimal concentricity**
- **Electrically isolating, damping**
- **Backlash-free**
- **Fail-safe design**

Example:
ASS/B-ZW

Series Size Length	Bore- Ø D1	Bore- Ø D2	Further details*
ASS/B-ZW 14/3.125	0.250	0.50	XX



Sectional view

Technical Data

T_{KN} = Nominal torque
M_A = Tightening torque of screws
C_t = Torsional stiffness (tube)
n_{max} = Max. rotational speed

Technical Data

Size	C_t lb-in/rad	T_{KN} lb-in	$M_{A\,(G)}$ lb-in	$M_{A\,(G1)}$ lb-in	n_{max} rpm	Hubs Material
14	620	111	16	16	1500	Al
19	1151	150	27	27	1500	Al
24	8409	531	53	53	1500	Al
28	15933	1416	53	53	1500	Al
38	46028	2877	89	89	1500	Al
42	104449	3983	310	310	1500	St
48	154903	4647	611	611	1500	St

Torque values based on metric shaft diameters

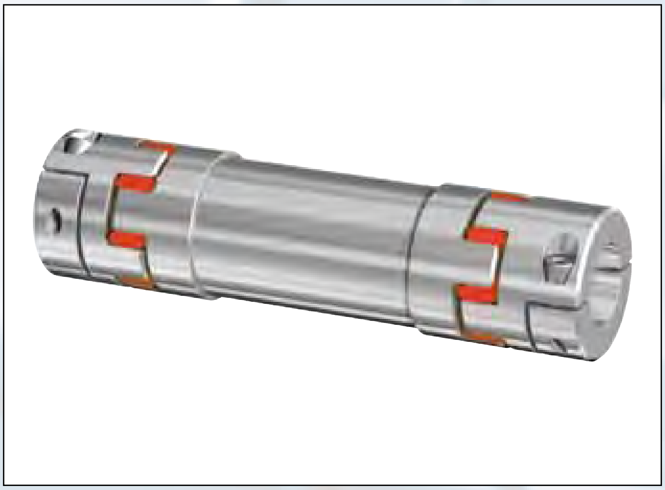
Size	Ø 6	Ø 10	Ø 11	Ø 13	Ø 14	Ø 15	Ø 17	Ø 19	Ø 20	Ø 24	Ø 25	Ø 27	Ø 30	Ø 32	Ø 36	Ø 38	Ø 41	Ø 42	Ø 44	Ø 48	Ø 50	Ø 55
14	32	111	111	111	111																	
19		150	150	150	150	150	150	150	150													
24			195	328	407	496	531	531	531	531	531											
28						496	602	1009	1186	1416	1416	1416	1416	1416	1416							
38									1186	2036	2310	2877	2877	2877	2877	2877	2877					
42												2912	3983	3983	3983	3983	4063	3983	3983	3983	3983	
48													3983	4647	4647	4647	4647	4647	4647	4647	4647	4647

Bore range D1/D2 and corresponding transmissible torque values (lb-ins) of the coupling

Series ADS/H-ZW

Dimensions

øA	=	Outer diameter
øD1 H7/øD2 H7	=	Bore diameter
øH	=	Clearance diameter
øR	=	Tube diameter
C	=	Guided length shaft bore
E	=	Mounting dimension for elastomeric spider
I/K	=	Basic dimension
L ± 0.08	=	Total length
G	=	Clamping screws
X	=	Distance shafts
C1	=	Clamp collar width
C2	=	Bore tolerance for D1
C3	=	Bore tolerance for D2



Dimensions

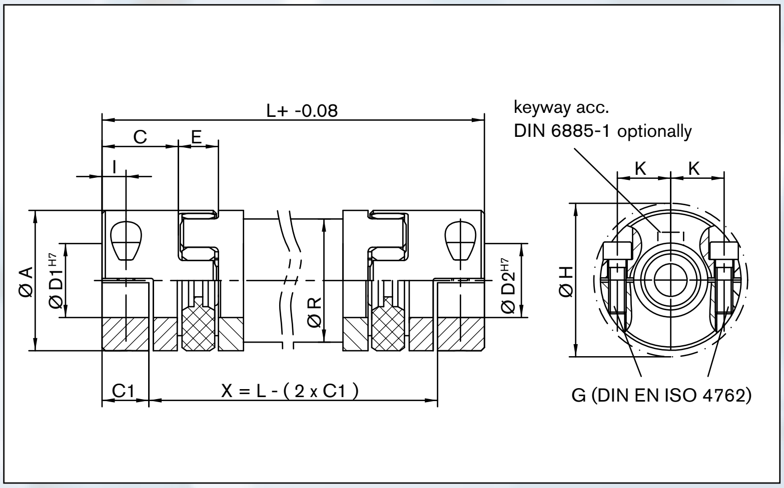
Size	L ±0.079	K	Ø A	Ø H	E	Ø R	Ø D1 H7	C2	Ø D2 H7	C3	C	C_1	I	G
	Inch	Inch												mm
14	118	0.41	1.18	1.34	0.51	1.18	0.39-0.55	-0 +0.001	0.39-0.55	-0 +0.001	0.43	0.31	0.20	M4
19	118	0.59	1.57	1.77	0.63	1.57	0.39-0.79		0.39-0.79		1.00	0.45	0.24	M5
24	118	0.79	2.17	2.24	0.71	1.97	0.79-1.10		0.79-1.10		1.18	0.77	0.39	M6
28	118	0.94	2.56	2.76	0.79	2.44	0.95-1.38		0.95-1.38		1.38	0.85	0.43	M8
38	118	1.18	3.15	3.50	0.94	2.95	1.26-1.73		1.26-1.73		1.77	1.00	0.51	M10
42	118	1.38	3.74	3.78	1.02	3.54	1.38-1.97		1.38-1.97		1.97	1.00	0.55	M10
48	118	1.57	4.13	4.33	1.10	3.94	1.58-2.36		1.58-2.36		2.26	1.16	0.59	M12

Characteristics

- **For higher torques**
- **Optimal concentricity**
- **Electrically isolating, damping**
- **Backlash-free**
- **Fail-safe design**

Example:
ADS/H-ZW

Series Size Length	Bore-Ø D1	Bore-Ø D2	Further details*
ADS/H-ZW 14/3.125	0.437	0.50	XX



Sectional view

Technical Data

T_{KN} = Nominal torque
M_A = Tightening torque of screws
C_t = Torsional stiffness (tube)
n_{max} = Max. rotational speed

Technical Data

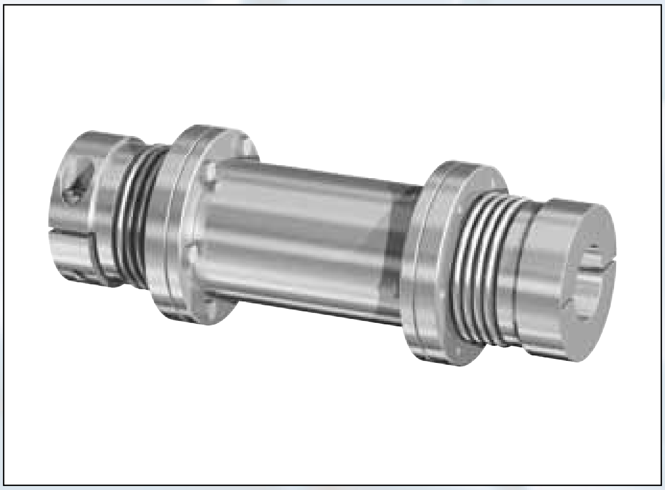
Size	M_A lb-in	C_t lb-in/rad	T_{KN} lb-in	n_{max} rpm	Hubs Material
14	44	6196	111	1500	Al
19	89	14251	150	1500	Al
24	159	63024	531	1500	Al
28	381	112416	1416	1500	Al
38	744	197834	2877	1500	Al
42	744	646168	3983	1500	St
48	1283	2221756	4647	1500	St

Torque values based on metric shaft diameters

Size	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	111	111	111	111	111																
19	150	150	150	150	150	150	150	150													
24								531	531	531	531										
28									1416	1416	1416	1416	1416	1416	1416						
38													2877	2877	2877	2877	2877	2877			
42														3673	3780	3850	3921	3983	3983	3983	
48																4647	4647	4647	4647	4647	4647

Bore range D1/D2 and corresponding transmissible torque values (lb-ins) of the coupling

Series AKN-ZW



Dimensions

øA	=	outer diameter
øB	=	basic dimension
øD1 H7/øD2 H7	=	Bore diameter
øE	=	pitch circle diameter
øR	=	tube diameter
C	=	max. shaft rack length
I	=	Radius to clamp screw
K	=	Radius to clamp screw
L ± 0.08	=	total length
L1	=	Coupling length
L2	=	Basic dimension
G	=	Screw
G1	=	Screws
X	=	distance shafts
C_1	=	Bore tolerance for D_1
C_2	=	Bore tolerance for D_2

Dimensions

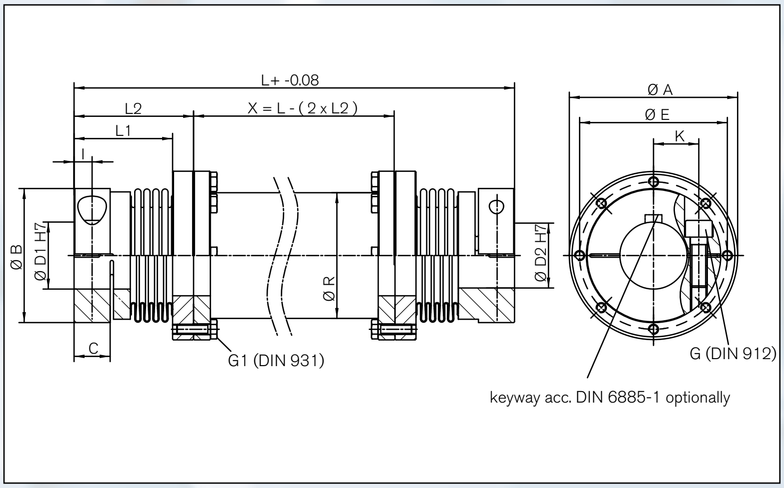
Size	L ±0.079	Ø B	Ø E	Ø A	L2	K	Ø R	Ø D1^{H7}	C1	Ø D2^{H7}	C2	C	I	L1	G	G_1
	Inch	Inch													mm	
18	118	1.77	1.77	2.05	1.75	0.69	1.57	0.39-	-0 +0.001	0.39-	-0 +0.001	0.47	0.20	1.54	M5	4xM4
30	118	2.20	2.44	2.76	2.26	0.79	1.97	0.79-		0.79-		0.59	0.30	2.01	M6	6xM4
60	118	2.60	2.83	3.15	2.80	0.94	2.44	0.91-		0.91-		0.77	0.37	2.40	M8	6xM5
150	118	3.15	3.46	3.86	3.07	1.06	2.95	1.10-		1.10-		0.85	0.43	2.72	M10	8xM6
200	118	3.54	3.94	4.33	3.39	1.22	3.54	1.26-		1.26-		1.00	0.49	2.99	M12	8xM6
300	118	3.78	4.72	5.31	3.70	1.38	3.94	1.57-		1.57-		1.02	0.51	3.19	M12	8xM8
500	118	4.33	5.20	5.83	4.33	1.57	4.33	1.57-		1.57-		1.16	0.67	3.78	M12	8xM8

Characteristics

- **Absolutely backlash-free and torsional stiff**
- **Installation lengths up to 20 feet**
- **Simplest assembly**
- **Drive shaft tube CFK (optional)**

Example:
AKN-ZW

Series Size Length	Bore- Ø D1	Bore- Ø D2	Further details*
AKN-ZW 18/20.0	0.437	1.00	XX



Sectional view

Technical Data

T_{KN} = nominal torque
M_A = tightening torque of screws
C_t = torsional stiffness (tube)
n_{max} = max. rotational speed
ΔKr = radial max. approved misalignment radial
ΔKa = max. approved misalignment axial
ΔKw = max. approved misalignment angular

Technical Data

Size	M_A (G)	M_A (G1)	C_t	T_{KN}	n_{max}	Tube/Hub
	lb-in	lb-in	10^3 lb-in/rad	lb-in	rpm	Material
18	53	27	14.25	159	1500	Al/ Al
30	133	35	63.02	266	1500	Al/ Al
60	266	62	112.42	531	1500	Al/ Al
150	620	89	197.83	1328	1500	Al/ St
200	708	106	637.3	1770	1500	Al/ St
300	797	266	2222	2655	1500	St/ St
500	1283	266	2983	4426	1500	St/ St

Size	Misalignments		
	Inch radial Δ Kr	Inch axial Δ Ka	Degree angular Δ Kw
18	0.20 Inch	0.04 Inch	3 °
30	0.20 Inch	0.03 Inch	2 °
60	0.20 Inch	0.03 Inch	2 °
150	0.20 Inch	0.03 Inch	2 °
200	0.20 Inch	0.03 Inch	2 °
300	0.20 Inch	0.03 Inch	2 °
500	0.20 Inch	0.04 Inch	2 °

ΔKr* Misalignment values refer radial per mtr./tube.
ΔKw* Angular misalignment values refer to the total angular misalignment between the shafts to connect.

Backlash-free Metal Bellows Couplings · Assembly Instructions

Assembly

Clean and degrease shaft ends and bores in hubs and check the tolerances. Insert both shaft ends into the hubs of the Metal Bellows Coupling. 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 the appropriate technical data table).

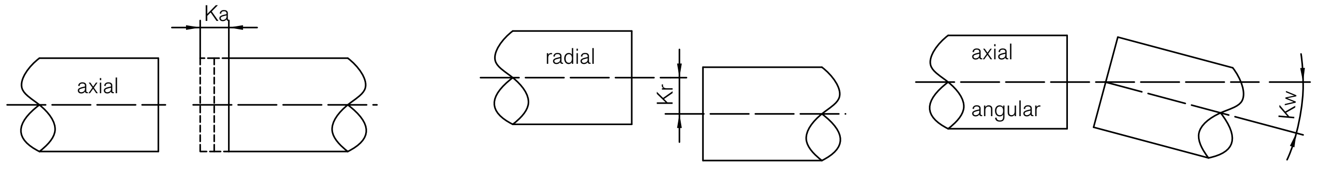
Disassembly

After loosening the backlash-free shaft hub connections, the drive can be pulled apart and the metal bellows coupling can be removed. Keyless bushings of series AK are forced off with a socket head cap screw.

Alignment

If several types of misalignment occur simultaneously, none of them must reach the maximal value but must be adjusted. The sum of all actual misalignments must not exceed 100 % (percentage of the maximum value). The diagram below shows how to adjust. The more precise the alignment, the more reserves are available to handle additional misalignments during the operation. This will have an advantageous effect on the durability, quietness and the accuracy of transmission.

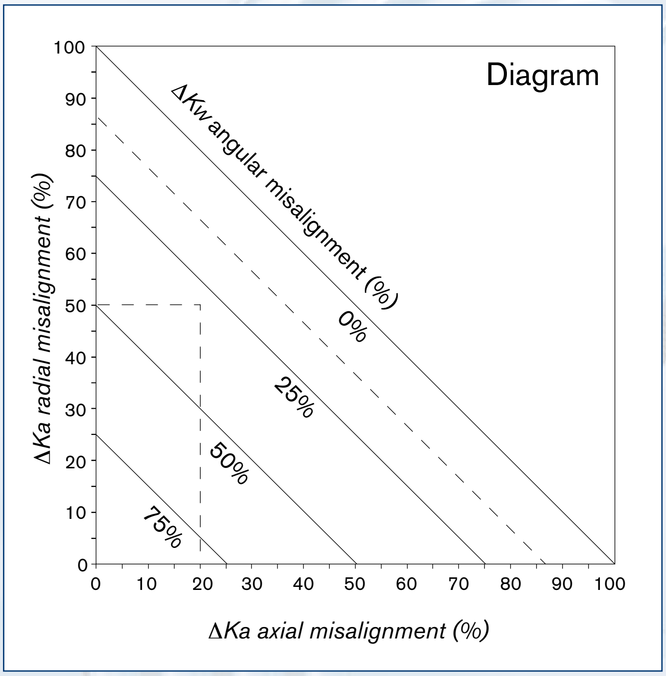
Please ask for our detailed assembly instructions.



Application:

A bellows coupling CKN 80/61 has to be installed. The following misalignment values result from the installation situation:
ΔKr = 0.004 in.
ΔKa = 0.004 in.
ΔKw = 0.2°
Are the misalignment values for the CKN 80/61 acceptable?

Selection:
The tolerable misalignment values are: (cp. data sheet Series CKN):
ΔKrn = 0.008 in.
ΔKan = 0.020 in.
ΔKwn = 1.5°
The allowable radial misalignment ΔKr = 0.004 in. corresponds to 50% of the max. allowable value.
The value ΔKa = 0.004 in. corresponds to 20% of the max. allowable axial misalignment.
The angular misalignment with ΔKw = 0.2° corresponds to 13% of the overall view.



Interpretation by means of the diagram:
Enter the calculated values in the diagram on the right side (dashed line). The combination of the different misalignment values is within the tolerable area.

Interpretation by means of the empirical formula:
50% + 20% + 13% < 100%.
The coupling can be installed.

Empirical formula:

$$\frac{\Delta K_r}{\Delta K_{rm}} \times 100\ \% + \frac{\Delta K_a}{\Delta K_{an}} \times 100\ \% + \frac{\Delta K_w}{\Delta K_{wn}} \times 100\ \% < 100\ \%$$

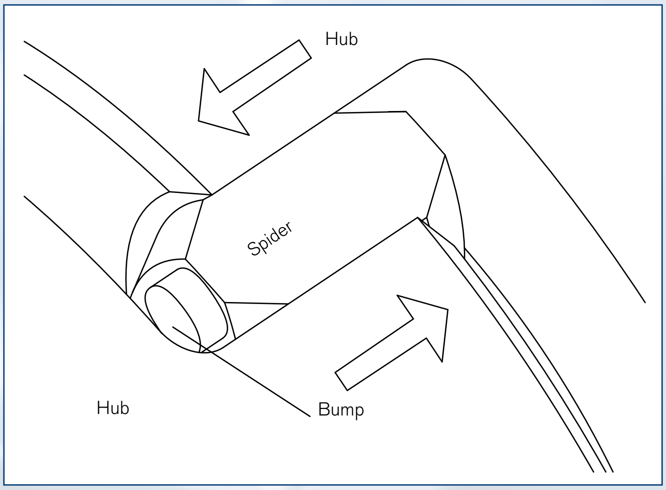
Backlash-free Servo-insert Coupling · Assembly Instructions

Assembly

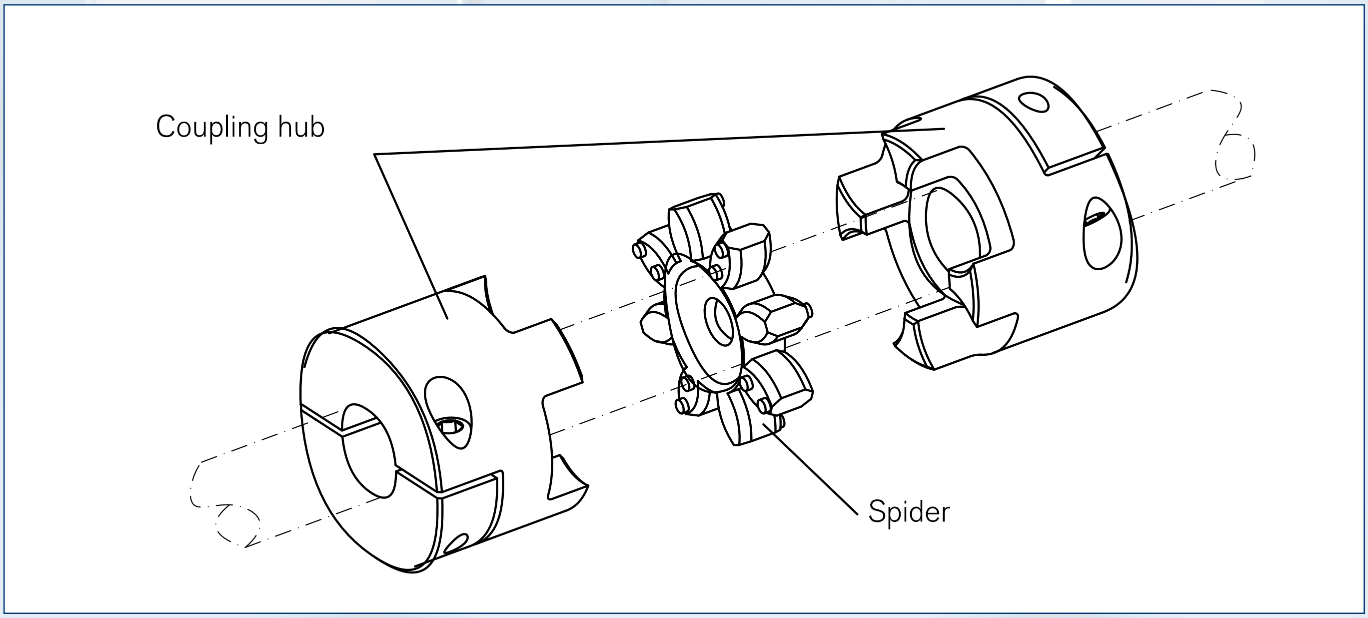
Clean and degrease both shaft surface and hub bores and check the tolerances. As a standard, the bores are equipped with a fit ISO-H7.

For the shafts, we recommend a transition fit, e.g. H7/g6 (see table below). When selecting other shaft fittings, the backlash should not exceed a maximum of 0.0004 – 0.002 Inch.

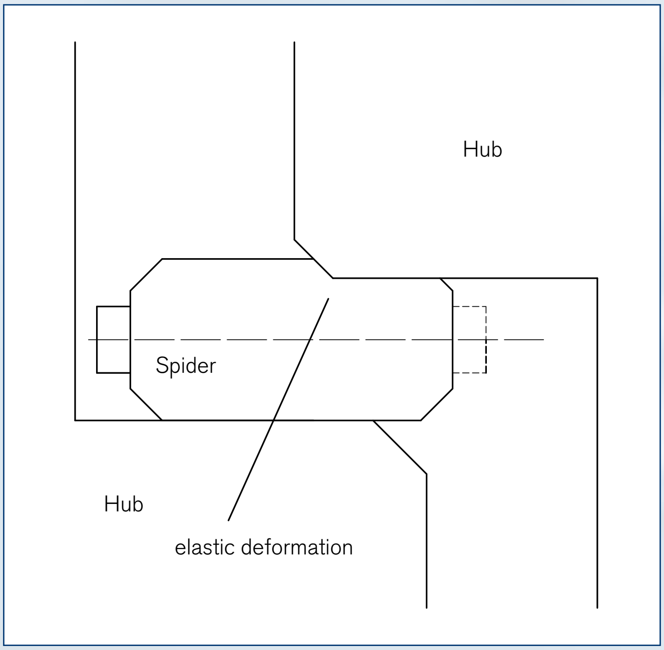
Slide a coupling hub onto each shaft end and tighten the screws after checking the axial dimensions. Refer to the appropriate technical table for the correct screw tightening torque.



Tolerance (Inch)			
D1 & D2 (Inch)		Bore	Shaft
above	up to	H6	g6
0.118	0.236	-0 / +0.0003	-0.0002 / -0.0005
0.236	0.394	-0 / +0.0004	-0.0002 / -0.0006
0.394	0.709	-0 / +0.0004	-0.0002 / -0.0007
0.709	1.181	-0 / +0.0005	-0.0003 / -0.0008
1.181	1.969	-0 / +0.0006	-0.0004 / -0.0010
1.969	3.150	-0 / +0.0007	-0.0004 / -0.0011
3.150	3.937	-0 / +0.0009	-0.0005 / -0.0013

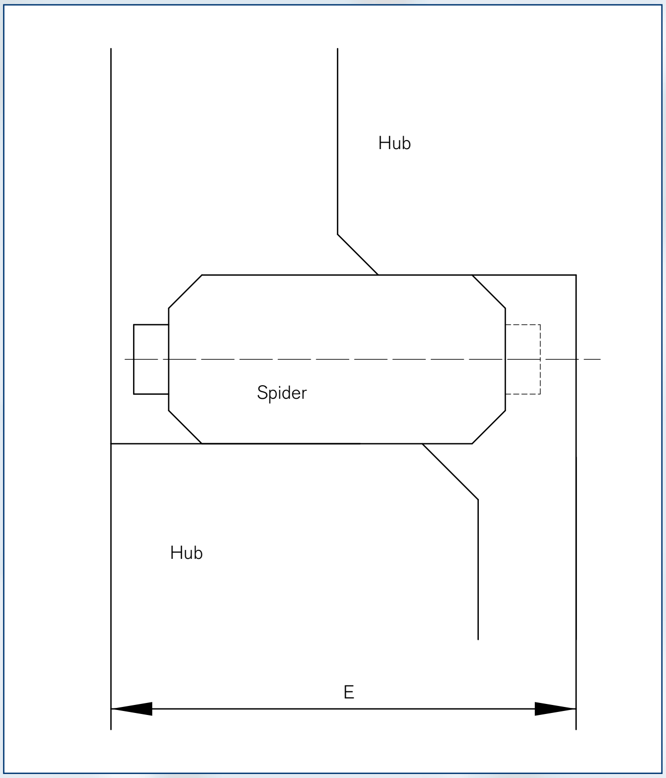


Firmly press the elastomer spider into one of the two hubs. A PU compatible grease such as Vaseline may be applied to ease assembly. The edges of the spider and the jaws of the coupling hubs are both chamfered for an easier or – if applicable - blind assembly. The burls, located alternately on the teeth, ease the assembly and prevent the installation from being too tight. Now push in the second hub. Always keep within the clearance, so that the elastomer spider will not be preloaded, thereby insuring longer durability and electrical isolation.



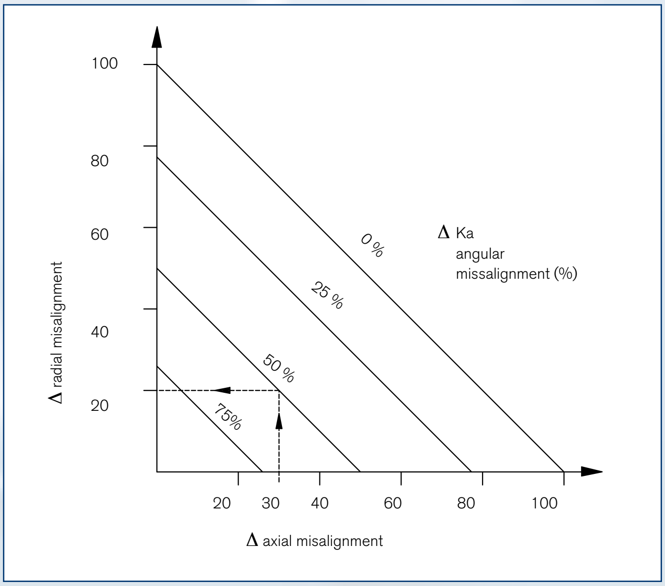
IMPORTANT: For application with high dynamic loading

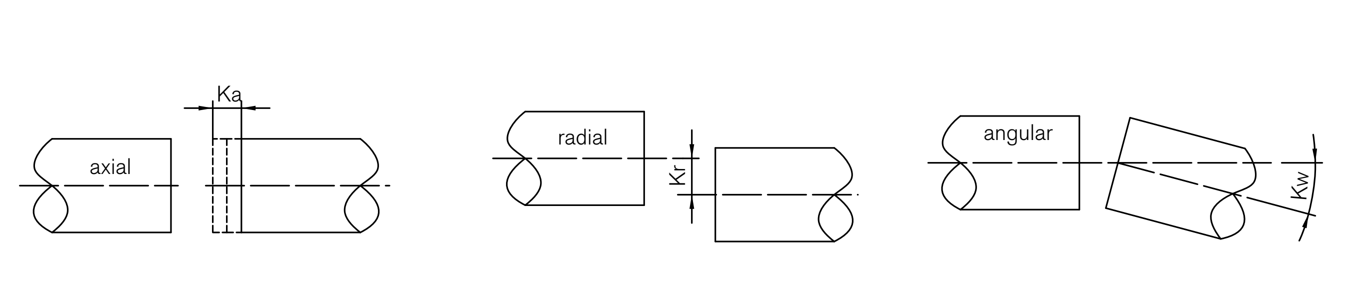
For application with high dynamic loading (frequent acceleration and reverse rotation) or high impact load (applications like presses and shredder) we recommend to use the support of the GERWAH team in doing the dimensioning and choosing the appropriate coupling.



Alignment

The picture below shows the three types of misalignments. The mounted coupling needs to be aligned. The more accurate the initial alignment, the better the coupling can absorb additional misalignments during operation. Durability and quietness are favorably influenced. If all three types of misalignment occur simultaneously, each type must not reach the maximum allowable value, but must be adjusted.
The total amount of the actual misalignment types, expressed as a percentage of the maximum allowable value, must not exceed 100%. The diagram on the right side shows such an adjustment.





Removal

Remove the fastening screws, e.g. on the motor. Pull the drive unit, including the Servo Insert Coupling apart. A new spider or a spider with a different shore hardness can now be installed. After loosening the backlash-free shaft-hub-connection the hubs can be disassembled.

Please ask for a detailed instruction sheet.

Technical Information Spiders

Size	Spider	Shore scale	Misalignments axial Ka[1]	radial Kr	angular Kw
			Inch	Inch	Degree
5	80	A	+0.016 to -0.008	0.005	1.1°
	92	A		0.002	1.0°
	98	A		0.002	0.9°
7	80	A	+0.024 to -0.012	0.006	1.1°
	92	A		0.004	1.0°
	98	A		0.002	0.9°
	64	D		0.002	0.8°
9	80	A	+0.031 to -0.016	0.007	1.1°
	92	A		0.005	1.0°
	98	A		0.003	0.9°
	64	D		0.002	0.8°
14	80	A	+0.039 to -0.020	0.008	1.1°
	92	A		0.006	1.0°
	98	A		0.004	0.9°
	64	D		0.002	0.8°
19	80	A	+0.047 to -0.020	0.006	1.1°
	92	A		0.004	1.0°
	98	A		0.002	0.9°
	64	D		0.002	0.8°
24	92	A	+0.055 to -0.020	0.006	1.0°
	98	A		0.004	0.9°
	64	D		0.003	0.8°
28	92	A	+0.059 to -0.028	0.006	1.0°
	98	A		0.004	0.9°
	64	D		0.003	0.8°
38	92	A	+0.071 to -0.028	0.007	1.0°
	98	A		0.005	0.9°
	64	D		0.004	0.8°
42	92	A	+0.079 to -0.039	0.007	1.0°
	98	A		0.006	0.9°
	64	D		0.004	0.8°
48	92	A	+0.083 to -0.039	0.009	1.0°
	98	A		0.006	0.9°
	64	D		0.004	0.8°

[1] The Ka-values have to be added to the length of the size

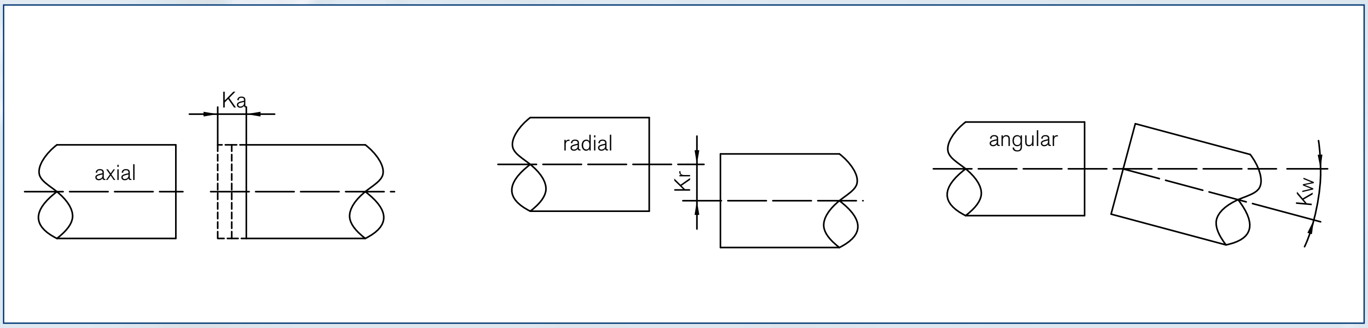
GERWAH Line Shafts · Assembly Instructions

Alignment of the shafts:

The picture shows the several types of misalignment. It is necessary to adjust the shafts before assembly. The more accurate the initial alignment, the better the shaft can absorb additional misalignments during operation. Durability of the line shafts and quietness of the drive are favourably influenced.
In case all three types of misalignment occur simultaneously, each type must not reach the maximum allowable value, but have to be aligned. GERWAH can assist you with the correct adjustment of the combined misalignment.

Installation:

Clean and degrease the hubs of the line shafts and check the tolerances according to the respective design.
The maximal diametrical clearance between hub and shaft must not exceed 0.03 mm or 0.001 in. (not valid for sliding fits).
According to the principle of construction, slide a coupling hub onto each shaft end and tighten the screws of the shaft-hub-connection after checking axial dimensions. Refer to the technical data to assure the correct wrench torque for the screws.
The dimension of the shaft distance X should be maintained.



Removal:

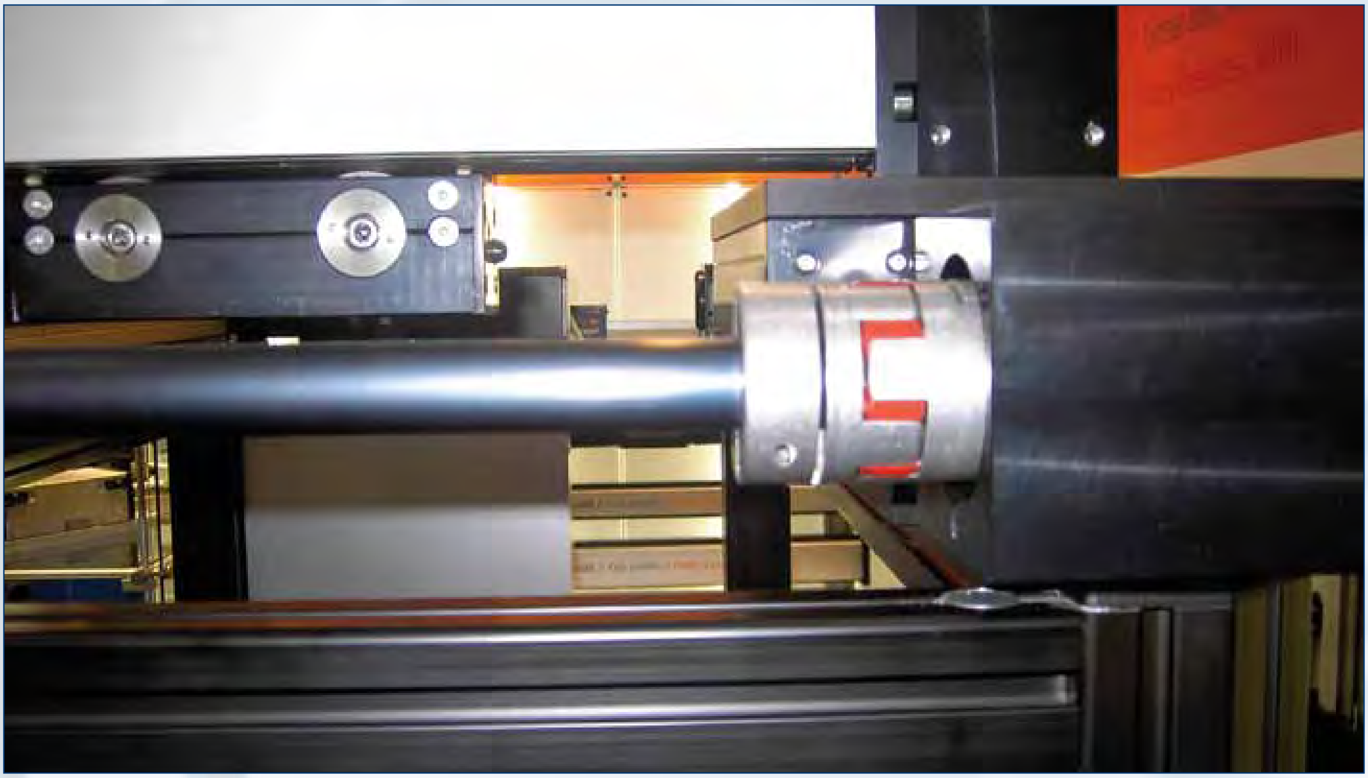
Remove the locking screws of the hubs. If necessary, the push-off threads can be used to remove the backlash-free line shaft connections. In case the hub connection doesn't come off automatically, the connection can be removed by lightly applying a rubber hammer.

Please ask for detailed assembly instructions or find information on www.ringfeder.com!

Misalignments Servo Insert Line Shafts

Size	shafting		
	Inch radial Δ Kr	Inch axial Δ Ka	Degree angular Δ Kw
14	0.03 Inches per ft	± 0.0016 Inch	1.5°
19	0.03 Inches per ft	± 0.0016 Inch	1.5°
24	0.03 Inches per ft	± 0.0016 Inch	1.5°
28	0.03 Inches per ft	± 0.0016 Inch	1.5°
38	0.03 Inches per ft	± 0.0016 Inch	1.5°
42	0.03 Inches per ft	± 0.0016 Inch	1.5°
48	0.03 Inches per ft	± 0.0016 Inch	1.5°

Radial/parallel misalignment depends on the length of the tube.



Fax Inquiry Couplings

On this page please explain the planned application of a coupling and we will propose our solution.
Please send this page to:

RINGFEDER POWER TRANSMISSION USA CORPORATION · Fax +1 201 664 6053

1. Application

Planned use of the coupling (machine, machine group or plant):

2. Type of attachment (please tick/check)

- Clamping hub
- Internal keyless device
- Expanding hub
- Hub with set screw
- Flange mount
- Shrink Disc®
- Fanuc
- Acc. customer request

3. Dimensions

- Length (Inches)
- Bore D_1 (Inches)
- Keyway
- Outer diameter (Inches)
- Bore D_2 (Inches)
- Keyway

4. Shaft Misalignment

- Axial (Inches)
- Radial (Inches)
- Angular (Degree)

5. Drive

Drive power **P =** ____ **HP**

Nominal torque of the drive **Mt_{nom} =** ____ **lb-in**

Input speed **n =** ____ **rpm**

Peak torque of the drive **Mt_{max} =** ____ **lb-in**

6. Mass moment of inertia

On the drive side **J_A =** ____ **lb-in²**

On the driven side **J_L =** ____ **lb-in²**

7. Environmental influences

Temperature in the area of the coupling **Temp =** ____ **F°**

Special materials (e.g. stainless steel)

Are there any impacts on the load side? No / Slight / Medium / Heavy

Other, special influences

8. Estimated demand

- Production quantity
- Project
- Repair
- Number of items/p.a.

9. Target Price

____ **$**/Each

Please send your offer to:

Company

Attention

Address

Phone

Fax

E-mail

Fax Inquiry Line-Shafts

On this page please explain the planned application of a coupling and we will propose our solution.
Please send this page to:

RINGFEDER POWER TRANSMISSION USA CORPORATION · Fax +1 201 664 6053

1. Application

Planned use of the coupling (machine, machine group or plant):

2. Type of attachment (please tick/check)

☐ Clamping hub ☐ Cone hub ☐ Expanding hub ☐ Hub with set screw

☐ Flange mount ☐ Acc. customer request

3. Dimensions

☐ Length (Inches) ☐ Bore D_1 (Inches) ☐ Keyway

☐ Outer diameter (Inches) ☐ Bore D_2 (Inches) ☐ Keyway

4. Shaft Displacement

☐ Axial (Inches) ☐ Radial (Inches) ☐ Angular (Degree)

5. Drive

Drive power **P =** ☐ **HP**

Input speed **n =** ☐ **rpm**

Nominal torque of the drive **Mt_{nom} =** ☐ **lb-in**

Peak torque of the drive **Mt_{max} =** ☐ **lb-in**

6. Mass moment of inertia

On the drive side **J_A =** ☐ **lb-in²**

On the driven side **J_L =** ☐ **lb-in²**

7. Environmental influences

Temperature in the area of the coupling **Temp =** ☐ **F°**

Special materials (e.g. stainless steel) ☐

Are there any impacts on the load side? ☐ No ☐ Slight ☐ Medium ☐ Heavy

Other, special influences

8. Estimated demand

☐ Production quantity ☐ Project ☐ Repair ☐ Number of items/p.a.

9. Target Price

☐ **$**/Each

Please send your offer to:

Company | Attention

Address

Phone | Fax

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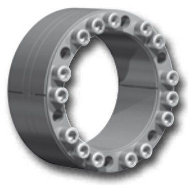
Notes

Delivery Program

RINGFEDER

Locking Devices


Locking Assemblies


Locking Elements


Shrink Discs


Smart-Lock

Damping Technology


Friction Springs


DEFORM plus®
DEFORM plus® R


Fluid Elastomeric Damper

Special Solutions


Shaft Couplings


Locking Assemblies


Flange Couplings

GERWAH®

Couplings

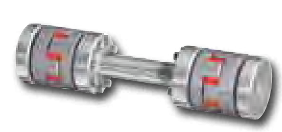

Magnetic Couplings

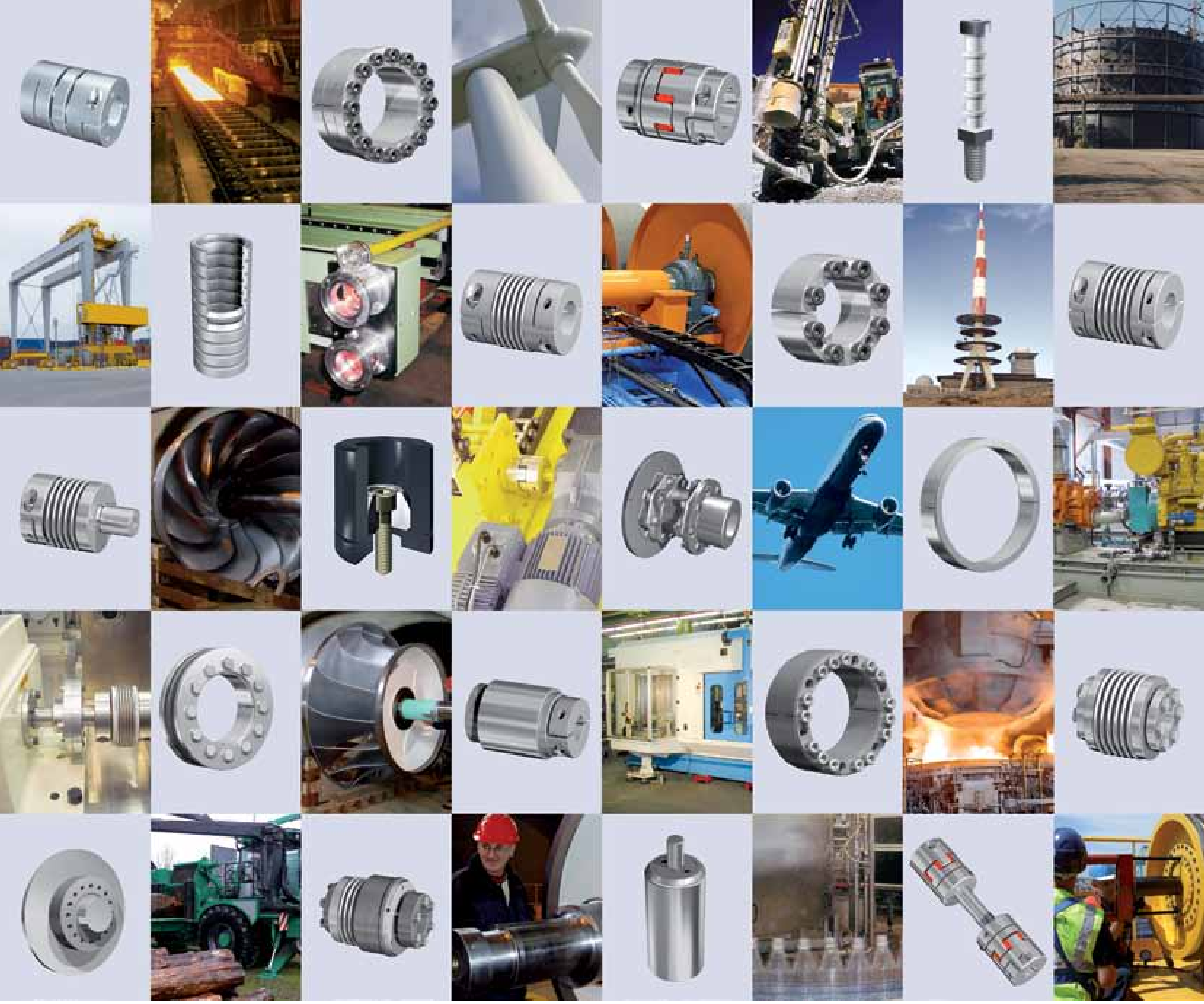

Metal Bellows Couplings


Servo-Insert Couplings


RING-flex® – torsionally rigid Disc Couplings


Safety Couplings


Line Shafts



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