PRECISE AND COMPACT.

SERVOMAX®

ELASTOMER COUPLINGS

SERIES EK | 2 – 25,000 Nm

R+W®
COUPLING TECHNOLOGY

THE ULTIMATE COUPLING FROM 2 – 25,000 Nm

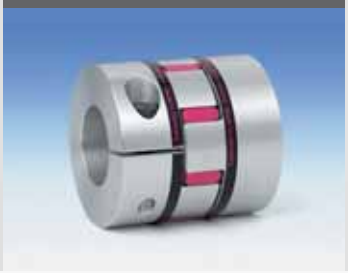
www.rw-america.com

optional stainless steel

BACKLASH FREE ELASTOMER COUPLINGS

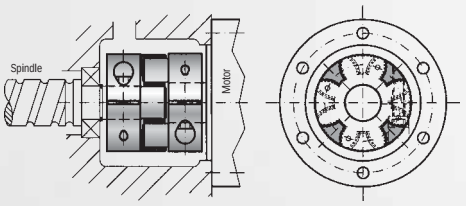
MODELS	PROPERTIES	APPLICATION EXAMPLES

EKL



with clamping hub,
from 0.5 - 2,200 Nm

- short compact design
- low inertia
- easy assembly

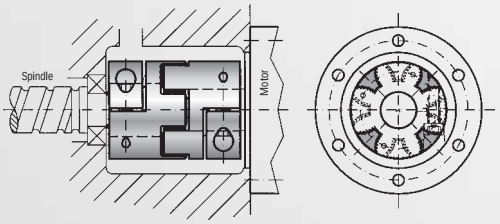


see page 6

EK2

with clamping hub
from 6 - 2,200 Nm

- very smooth running
- balanced type
- easy assembly

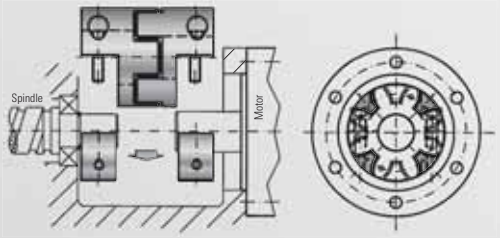


see page 7

EKH

with split clamping hubs
from 4 - 25,000 Nm

- easy assembly
- lateral mounting with split clamping hubs
- very quick and easy installation

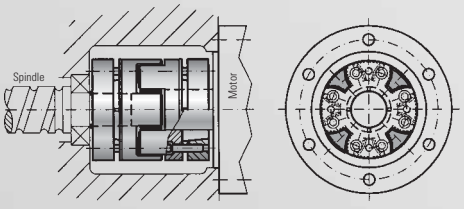


see page 8

EK6

with conical clamping ring
from 4 - 25,000 Nm

- very smooth running
- high clamping forces
- mounts axially
- no access holes for screw tightening necessary



see page 9

SERVOMAX®

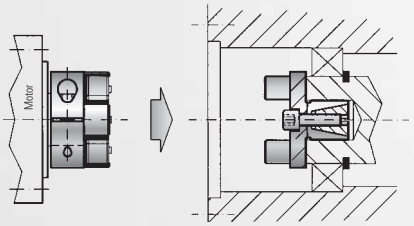
optional stainless steel

MODELS	PROPERTIES	APPLICATION EXAMPLES

EK7

with expanding shaft
from 2 - 2,200 Nm

- for hollow shaft mounting
- axial installation with expanding shaft
- very smooth running
- well suited to space restricted applications
- compact design

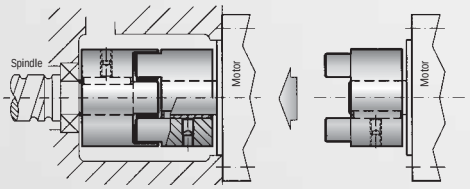


see page 10/11

EK1

with keyway mounting
from 0.5 - 25,000 Nm

- economical design
- easy to modify for customer requirements

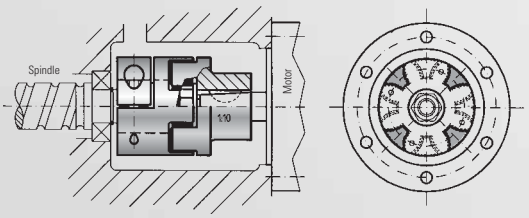


see page 12

EK4

for tapered shafts
from 6 - 400 Nm

- for tapered shafts such as Fanuc motors
- easy mounting
- axial installation onto tapered shaft

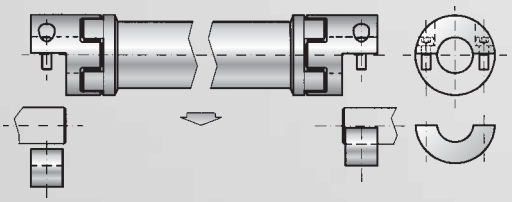


see page 13

EZ2

line shaft with split clamping hub
from 16 - 25,000 Nm

- lateral mounting with split clamping hubs
- no intermediate support bearing necessary
- lengths up to 4 meters



see page 14/15

optional stainless steel

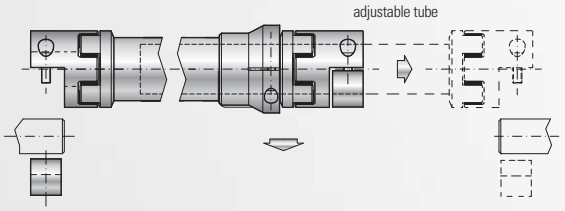
BACKLASH FREE ELASTOMER COUPLINGS

MODELS | **PROPERTIES** | **APPLICATION EXAMPLES**

EZV

adjustable length line shaft
from 16 - 1,200 Nm

- with split clamping hubs
- adjustable length and rotational orientation
- radial mounting due to split hubs
- no pillow block bearing necessary
- lengths up to 4 meters

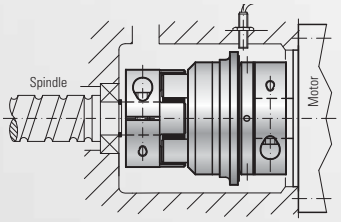


see page 16/17

ES2

torque limiter with clamping hub
from 1 - 1,800 Nm

- reliable torque overload protection
- backlash free due to patented R+W design
- easy to mount

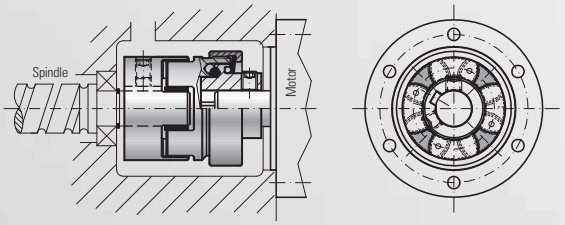


see page 18/19/20

ESL

“economy class” torque limiter
from 1 - 150 Nm

- economical design
- compact
- ratcheting multi position design



see page 21

EEx

for explosive atmospheres

- available for the full product range
- for use in hazardous zones 1/21 and 2/22, R+W SERVOMAX EEx couplings are registered according to the ATEX 95a directive

see page 23

optional stainless steel

SERVOMAX®

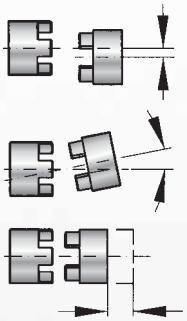
Areas of application:

- servo drives
- machine tools
- packaging machinery
- plant automation
- printing machinery
- industrial robots
- measurement and positioning units
- general mechanical engineering
- linking screw jacks, linear actuators, encoders

Properties of the product range:

- vibration damping
- electrically isolating (standard version)
- backlash free
- press fit design
- compensation for lateral, angular and axial misalignment

Misalignments:



Function

The equalizing element of EK couplings is the elastomer insert. It transmits torque without backlash or vibration. The elastomer insert defines the characteristics of the entire drive system.

The coupling is backlash free due to a pretension of the elastomer insert between the two coupling halves. SERVOMAX couplings compensate for lateral, angular and axial misalignment.

Series 2-800

Shore hardness 98 Sh A

Shore hardness 64 Sh D

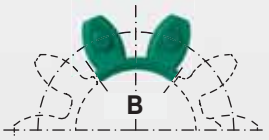
Shore hardness 80 Sh A

Shore hardness 65 Sh D

Series 2500 - 9500

coupling assembly includes 5 individual elastomer segments

Shore hardness 98 Sh A



Shore hardness 64 Sh D

Specifications of the elastomer inserts

Type	Shore hardness	Color	Material	Relative damping (ψ)	Temperature range	Features
A	98 Sh A	red	TPU	0.4 - 0.5	-30°C to +100°C	high damping
B	64 Sh D	green	TPU	0.3 - 0.45	-30°C to +120°C	high torsional stiffness
C	80 Sh A	yellow	TPU	0.3 - 0.4	-30°C to +100°C	very high damping
D*	65 Sh D	black	TPU	0.3 - 0.45	-10°C to + 70°C	electrically conductive*

* The electrically conductive properties of the insert allow for a continuation of the path to ground, preventing electrostatic loading of the coupling, and potential for sparks in explosive areas. Technical data is available.

The values of the relative damping were determined at 10 Hz and +20˚C.

Model series EK			Series																	
			2			5			10			20			60			150		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Static torsional stiffness	(Nm/rad)	C_T	50	115	17	150	350	53	260	600	90	1140	2500	520	3290	9750	1400	4970	10600	2000
Dynamic torsional stiffness	(Nm/rad)	C_{Tdyn}	100	230	35	300	700	106	541	1650	224	2540	4440	876	7940	11900	2072	13400	29300	3590
Lateral	(mm)	Max. values	0.08	0.06	0.2	0.08	0.06	0.2	0.1	0.08	0.22	0.1	0.08	0.25	0.12	0.1	0.25	0.15	0.12	0.3
Angular	(degree)		1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2
Axial	(mm)		±1			±1			±1			±2			±2			±2		

Model series EK			Series																	
			300			450			800			2500			4500			9500		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B		A	B		A	B	
Static torsional stiffness	(Nm/rad)	C_T	12400	18000	3000	15100	27000	4120	41300	66080	10320	87600	109000		167000	372000		590000	670000	
Dynamic torsional stiffness	(Nm/rad)	C_{Tdyn}	23700	40400	6090	55400	81200	11600	82600	180150	28600	175000	216000		337000	743000		1180000	1340000	
Lateral	(mm)	Max. values	0.18	0.14	0.35	0.2	0.18	0.35	0.25	0.2	0.4	0.5	0.3		0.5	0.3		0.6	0.4	
Angular	(degree)		1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1.5	1		1.5	1		1.5	1	
Axial	(mm)		±2			±2			±2			±3			±4			±5		

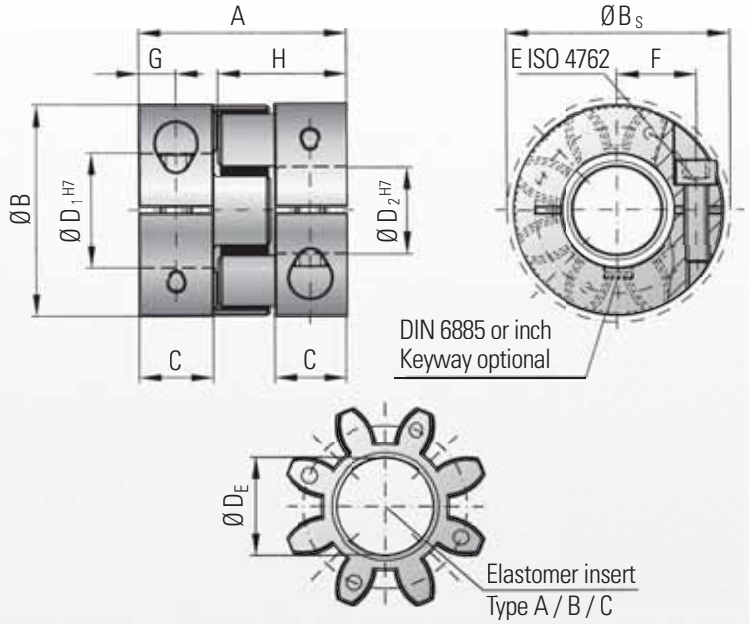
Static torsional stiffness at 50% T_{KN} Dynamic torsional stiffness at T_{KN} 1 Nm = 8.85 in lbs

optional stainless steel

MODEL **EKL**

BACKLASH FREE ELASTOMER COUPLINGS

Compact version with clamping hub



Properties:
- short compact design
- easy assembly
- vibration damping
- electrically isolating
- backlash free
- press fit design

Material:
Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design:
Two coupling hubs are concentrically machined with curved jaws

Speeds:
See table below
*Please contact R+W
ISO 2.5 balance grade available

Tolerance:
Overall clearance between shaft and hub 0.01 to 0.05 mm

Model EKL			Series																									
			2			5			10			20			60			150			300			450			800		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	2	2.4	0.5	9	12	2	12.5	16	4	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240
Max. torque**	(Nm)	T_{Kmax}	4	4.8	1	18	24	4	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
Overall length	(mm)	A	20			26			32			50			58			62			86			94			123		
Outside diameter	(mm)	B	16			25			32			42			56			66.5			82			102			136.5		
Outside diameter with screw head	(mm)	B_S	17			25			32			44.5			57			68			85			105			139		
Mounting length	(mm)	C	6			8			10.3			17			20			21			31			34			46		
Inside diameter range H7	(mm)	$D_{1/2}$	3 - 8			4 - 12.7			4 - 16			8 - 25			12 - 32			19 - 36			20 - 45			28 - 60			35 - 80		
Inside diameter of elastomer	(mm)	D_E	6.2			10.2			14.2			19.2			26.2			29.2			36.2			46.2			60.5		
Clamping screw (ISO 4762)		E	M2			M3			M4			M5			M6			M8			M10			M12			M16		
Tightening torque of the clamping screw	(Nm)		0.6			2			4			8			15			35			70			120			290		
Distance between centers	(mm)	F	5.5			8			10.5			15.5			21			24			29			38			50.5		
Distance	(mm)	G	3			4			5			8,5			10			11			15			17.5			23		
Hub length	(mm)	H	12			16.7			20.7			31			36			39			52			57			74		
Moment of inertia per Hub	(10^{-3} kgm²)	J_1/J_2	0.0003			0.002			0.003			0.01			0.04			0.08			0.3			0.66			8		
Approx. weight	(kg)		0.008			0.02			0.05			0.12			0.3			0.5			0.9			1.5			8.5		
Speed standard	(min^{-1})		15,000			15,000			13,000			12,500			11,000			10,000			9,000			8,000			4,000		
*Speed balanced	($10^3 min^{-1}$)		60	67	45	57	65	43	53	63	40	45	60	35	31	31	25	22	26	18	22	26	16	16	17	12	13	13	8

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 5

1 Nm = 8.85 in lbs

** Maximum transmittable torque depends on the bore diameter (overall clearance between shaft and hub 0.01 to 0.05 mm; shaft oiled)

Series	Ø 3	Ø 4	Ø 5	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35	Ø 45	Ø 50	Ø 55	Ø 60	Ø 65	Ø 70	Ø 75	Ø 80
2	0,2	0,8	1,5	2,5														
5		1,5	2	8														
10			4	12	32													
20				20	35	45	60											
60					50	80	100	110	120									
150						120	160	180	200	220								
300						200	230	300	350	380	420							
450								420	480	510	600	660	750	850				
800										700	750	800	835	865	900	925	950	1000

Higher torque through additional key possible.

Ordering example

EKL / 60 / A / 19.05 /24 / XX

- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. finely balanced

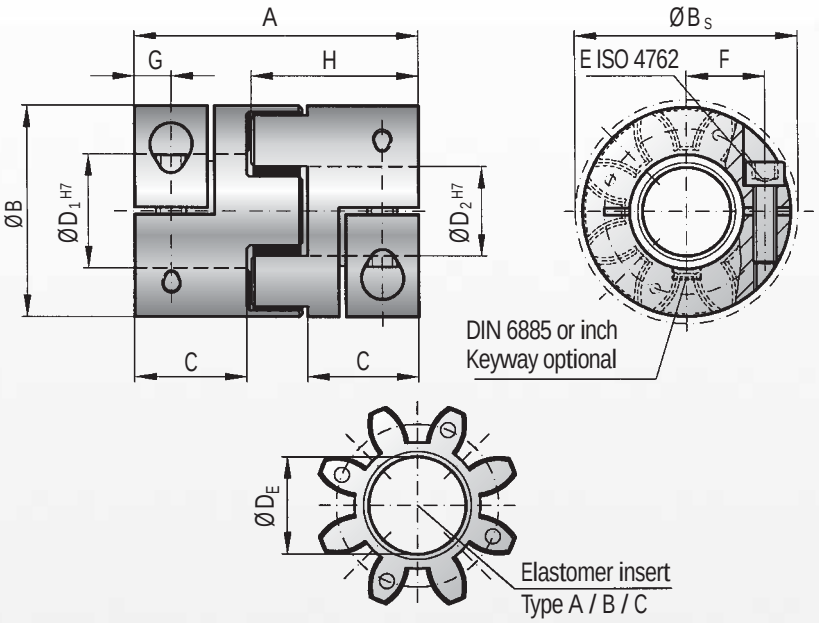
All data is subject to change without notice.

optional stainless steel

MODEL **EK2**

BACKLASH FREE ELASTOMER COUPLINGS

Standard version with clamping hubs



Properties:
- easy assembly
- concentrically machined hubs
- vibration damping
- electrically isolating
- backlash free
- press fit design

Material:
Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design:
Two coupling hubs are concentrically machined with curved jaws

Speeds:
See table below
***Please contact R+W**
ISO 2.5 balance grade available

Tolerance:
Overall clearance between shaft and hub 0.01 to 0.05 mm

Model EK 2			Series																	
			20			60			150			300			450			800		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240
Max. torque**	(Nm)	T_{Kmax}	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
Overall length	(mm)	A	66			78			90			114			126			162		
Outside diameter	(mm)	B	42			56			66.5			82			102			136.5		
Outside diameter with screw head	(mm)	B_S	44.5			57			68			85			105			139		
Mounting length	(mm)	C	25			30			35			45			50			65		
Inside diameter range H7	(mm)	$D_{1/2}$	8 - 25			12 - 32			19 - 36			20 - 45			28 - 60			35 - 80		
Inside diameter of elastomer	(mm)	D_E	19.2			26.2			29.2			36.2			46.2			60.5		
Clamping screw (ISO 4762)		E	M5			M6			M8			M10			M12			M16		
Tightening torque of the clamping screw	(Nm)		8			15			35			70			120			290		
Distance between centers	(mm)	F	15.5			21			24			29			38			50,5		
Distance	(mm)	G	8.5			10			12			15			17.5			23		
Hub length	(mm)	H	39			46			52.5			66			73			93.5		
Moment of inertia per Hub	(10^{-3} kgm^2)	J_1/J_2	0.016			0.05			0.13			0.4			0.9			9.5		
Approx. weight	(kg)		0.15			0.35			0.6			1.1			1.7			10		
Speed standard	(min^{-1})		12,500			11,000			10,000			9,000			8,000			4,000		
*Speed balanced	($10^3 min^{-1}$)		45	60	35	31	31	25	22	26	18	22	26	16	16	17	12	13	13	8

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 5

1 Nm = 8.85 in lbs

** Maximum transmittable torque depends on the bore diameter (overall clearance between shaft and hub 0.01 to 0.05 mm; shaft oiled)

Series	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35	Ø 45	Ø 50	Ø 55	Ø 60	Ø 65	Ø 70	Ø 75	Ø 80
20	20	35	45	60											
60		50	80	100	110	120									
150			120	160	180	200	220								
300			200	230	300	350	380	420							
450					420	480	510	600	660	750	850				
800							700	750	800	835	865	900	925	950	1000

Higher torque through additional key possible.

Ordering example

EK2 / 60 / A /19.05 / 24 / XX

- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. finely balanced

All data is subject to change without notice.

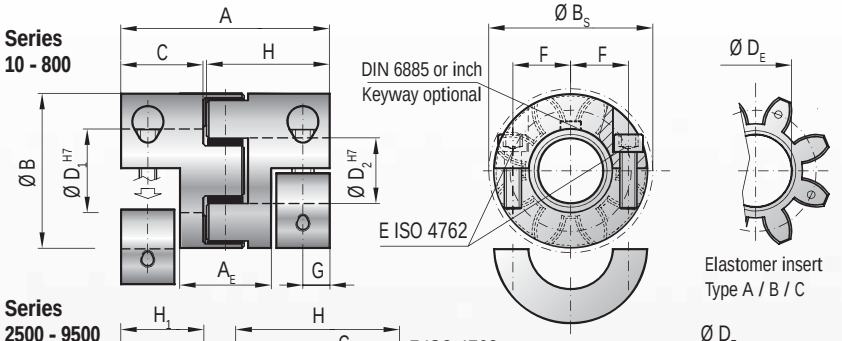
optional stainless steel

MODEL **EKH**

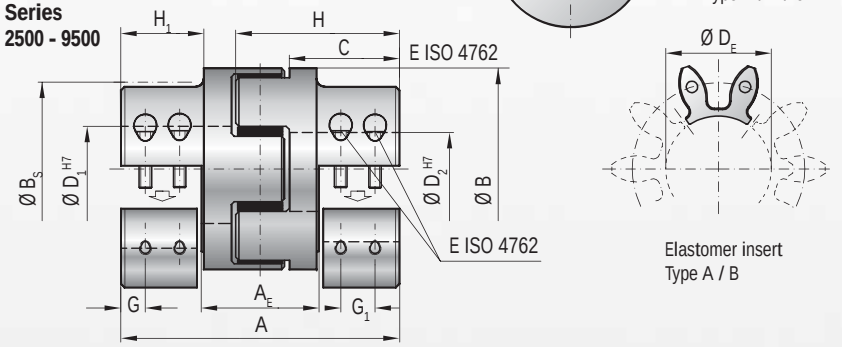
BACKLASH FREE ELASTOMER COUPLINGS

with split clamping hubs

Series 10 - 800



Series 2500 - 9500



Properties:
- lateral mounting possible
- concentrically machined hubs
- vibration damping
- electrically isolating
- easy mounting
- backlash free

Material:
Clamping hub: up to series 450 high strength aluminum, series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design:
Both clamping hubs are fully separable due to split hubs and ISO 4762 clamping screws

Speeds:
See table below
*Please contact R+W
ISO 2.5 balance grade available

Tolerance:
Overall clearance between shaft and hub 0.01 to 0.05 mm

Model EKH			Series																									
			10			20			60			150			300			450			800			2500		4500		9500	
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	A	B	A	B
Rated torque	(Nm)	T_{KN}	12,6	16	4	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240	1950	2450	5000	6200	10000	12500
Max. torque**	(Nm)	T_{Kmax}	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400	3900	4900	10000	12400	20000	25000
Overall length	(mm)	A	53			66			78			90			114			126			162			213		272		341	
Length of center section	(mm)	A_E	20			28			33			37			49			51			65			78		104		131	
Outside diameter	(mm)	B	32			42			56			66.5			82			102			136.5			160		225		290	
Outside diameter with screw head	(mm)	B_S	32			44.5			57			68			85			105			139			155		190		243	
Mounting length	(mm)	C	20			25			30			35			45			50			65			85		110		140	
Inside diameter range H7	(mm)	$D_{1/2}$	6 - 16			8 - 25			12 - 32			19 - 36			20 - 45			28 - 60			35 - 80			35 - 90		40 - 120		50 - 140	
Inside diameter of elastomer	(mm)	D_E	14.2			19.2			26.2			29.2			36.2			46,2			60.5			79		113		145	
Clamping screw (ISO 4762)		E	4 x M4			4 x M5			4 x M6			4 x M8			4 x M10			4 x M12			4 x M16			4 x M16		8 x M16		8 x M24	
Tightening torque of the clamping screw	(Nm)		4			8			15			35			70			120			290			300		300		980	
Distance between centers	(mm)	F	10.5			15.5			21			24			29			38			50.5			57		72,5		90	
Distance	(mm)	G/G_1	7.5			8.5			10			12			15			17.5			23			36		24 / 56		28 / 74	
Hub length	(mm)	H/H_1	31			39			46			52.5			66			73			93.5			120 / 69		154 / 80		193 / 110	
Moment of inertia per Hub	(10^{-3} kgm²)	J_1/J_2	0.005			0.02			0.06			0.1			0.4			1			9.5			40		147		480	
Approx. weight	(kg)		0.08			0.15			0.35			0.6			1.1			1.7			10			125		25		53	
Speed standard	(min^{-1})		13,000			12,500			11,000			10,000			9,000			8,000			4,000			3,000		3,500		2,000	
*Speed balanced	($10^3 min^{-1}$)		53	63	40	45	60	35	31	31	25	22	26	18	22	26	16	16	17	12	13	13	8	10	10	8	8	6,5	6,5

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 5

1 Nm = 8.85 in lbs

** Maximum transmittable torque depends on the bore diameter (overall clearance between shaft and hub 0.01 to 0.05 mm; shaft oiled)

Series	Ø 6	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35	Ø 45	Ø 50	Ø 55	Ø 60	Ø 65	Ø 70	Ø 75	Ø 80	Ø 90	Ø 120	Ø 140
10	6	12	32																
20		30	40	50	65														
60			65	120	150	180	200												
150				180	240	270	300	330											
300				300	340	450	520	570	630										
450						630	720	770	900	1120	1180	1350							
800								1050	1125	1200	1300	1400	1450	1500	1550	1600			
2500								1900	2600	2900	3200	3500	3800	4000	4300	4600	5200		
4500									5300	5800	6300	7000	7600	8200	8800	9400	10600	14100	
9500										9200	10100	11100	11900	12800	13800	14800	16700	22000	25600

Higher torque through additional key possible.

Ordering example

EKH / 60 / A /19.05 / 24 / XX

- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. finely balanced

All data is subject to change without notice.

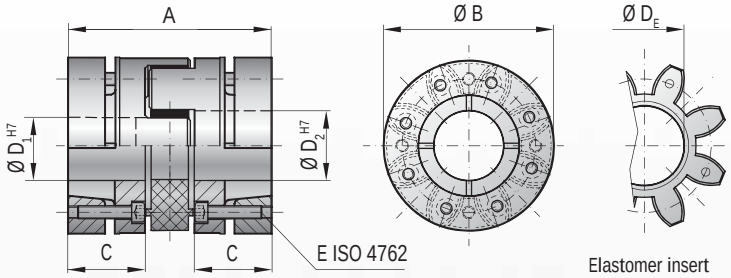
optional stainless steel

MODEL **EK6**

BACKLASH FREE ELASTOMER COUPLINGS

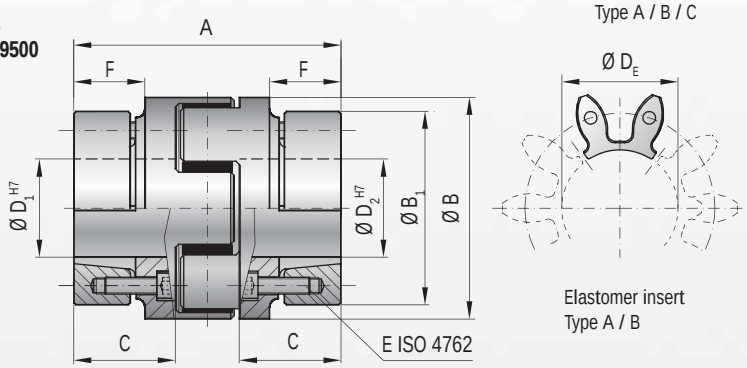
with conical clamping ring

Series 2 - 800



Elastomer insert
Type A / B / C

Series 2500 - 9500



Elastomer insert
Type A / B

Properties:

- high clamping forces
- concentrically machined hubs
- vibration damping
- electrically isolating
- backlash free
- press fit design
- axial mounting possible

Material:
Clamping hub and clamping ring: up to series 450 high strength aluminum, series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design:
Two coupling hubs are concentrically machined with curved jaws

Speeds: See table below
*Please contact R+W
ISO 2.5 balance grade available

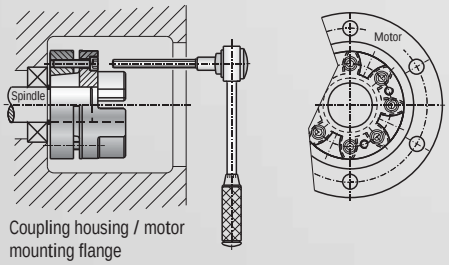
Tolerance:
Overall clearance between shaft and hub 0.01 to 0.05 mm

Model EK 6			Series																									
			10			20			60			150			300			450			800			2500		4500		9500	
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	A	B	A	B
Rated torque	(Nm)	T_{KN}	12,6	16	4	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240	1950	2450	5000	6200	10000	12500
Max. torque	(Nm)	T_{Kmax}	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400	3900	4900	10000	12400	20000	25000
Overall length	(mm)	A	42			56			64			76			96			110			138			177		227		282	
Outside diameter	(mm)	B/B_1	32			43			56			66			82			102			136.5			160 / 158		225 / 208		290	
Mounting length	(mm)	C	15			20			23			28			36			42			53			70		90		112	
Inside diameter range H7	(mm)	$D_{1/2}$	6 - 16			8 - 24			12 - 32			19 - 35			20 - 45			28 - 55			32 - 80			40 - 95		50 - 130		60 - 165	
Inside diameter of elastomer	(mm)	D_E	14.2			19.2			26.2			29.2			36.2			46.2			60.5			95		130		170	
Clamping screw (ISO 4762)		E	3x M3			6x M4			4x M5			8x M5			8x M6			8x M8			8x M10			10x M10		10x M12		10x M16	
Tightening torque of the clamping screw	(Nm)		2			3			6			7			12			35			55			60		100		160	
Distance	(mm)	F																						51		66		80	
Moment of inertia per Hub	(10^{-3} kgm^2)	J_1/J_2	0.004			0.015			0.05			0.1			0.3			0.85			9.2			31.7		135.7		469.2	
Approx. weight	(kg)		0.08			0.12			0.3			0.5			0.9			1.5			9.6			15		35		73	
Speed standard	(min^{-1})		20,000			19,000			14,000			13,000			10,000			9,000			4,000			3,500		3,000		2,000	
*Speed balanced	($10^3 min^{-1}$)		53	63	40	45	60	35	31	31	25	22	26	18	22	26	16	16	17	12	13	13	8	10	10	8	8	6.5	6.5

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 5

1 Nm = 8.85 in lbs

Lateral access holes for screw tightening are not necessary with EK6 couplings. The unique assembly screw design (shown at right) allows for easy axial mounting and dismounting of the coupling hub



Coupling housing / motor mounting flange

Ordering example

EK6 / 60 / A / 19.05 /24 / XX

- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. anodized

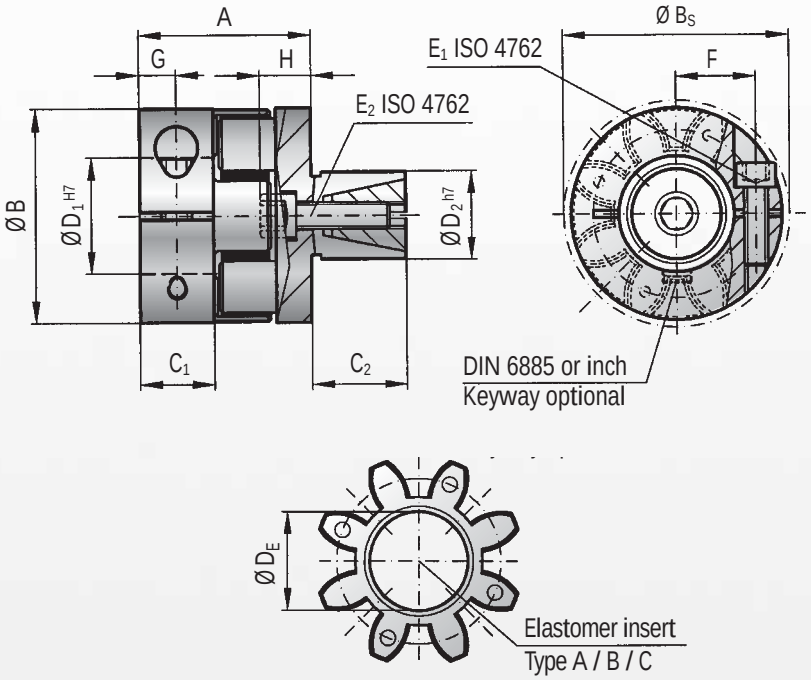
All data is subject to change without notice.

optional stainless steel

MODEL **EK7**

BACKLASH FREE ELASTOMER COUPLINGS

with expanding shaft



Properties:
- short compact design
- easy mounting
- concentrically machined hubs
- axial installation with expanding shaft
- backlash free
- electrically isolating

Material:
Clamping hub: up to series 450 high strength aluminum, from series 800 and up steel
Expanding shaft & cone: steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design:
Two coupling hubs are concentrically machined with curved jaws
One side with clamping hub and screw per ISO 4762
One side with expanding shaft and internally tapered clamping element

Speeds: See table below
*Please contact R+W
ISO 2.5 balance grade available

Tolerance:
Overall clearance between shaft and hub 0.01 to 0.05 mm
Suggested bore tolerance for expanding shaft ISO H7

Model EK7			Series																								
			5			10			20			60			150			300			450			800		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	9	12	2	12,5	16	4	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240
Max. torque**	(Nm)	T_{Kmax}	18	24	4	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
Overall length	(mm)	A	22			28			40			46			51			68			76			94		
Outside diameter	(mm)	B	25			32			42			56			66.5			82			102			136.5		
Outside diameter with screw head	(mm)	B_S	25			32			44.5			57			68			85			105			139		
Mounting length	(mm)	C_1	8			10.3			17			20			21			31			34			46		
Mounting length	(mm)	C_2	12			20			25			27			32			45			55			60		
Inside diameter range H7	(mm)	D_1	4 - 12.7			5 - 16			8 - 25			12 - 32			19 - 36			20 - 45			28 - 60			35 - 80		
Outside diameter range h7	(mm)	D_2	10 - 16			13 - 25			14 - 30			23 - 38			26 - 42			38 - 60			42 - 70			42 - 80		
Inside diameter of elastomer	(mm)	D_E	10.2			14.2			19.2			26.2			29.2			36.2			46.2			60.5		
Clamping screw (ISO 4762)		E_1	M3			M4			M5			M6			M8			M10			M12			M16		
Tightening torque	(Nm)		2			4			8			15			35			70			120			290		
Clamping screw (ISO 4762)		E_2	M4			M5			M6			M8			M10			M12			M16			M16		
Tightening torque	(Nm)		4			9			12			32			60			110			240			300		
Distance between centers	(mm)	F	8			10.5			15.5			21			24			29			38			50.5		
Distance	(mm)	G	4			5			8,5			10			11			15			17.5			23		
Length	(mm)	H	7			7			10			11			16			20			27			27		
Moment of inertia D_1	(10^{-3} kgm^2)	J_1	0.002			0.003			0.01			0.04			0.08			0.3			0.66			8		
Moment of inertia D_2	(10^{-3} kgm^2)	J_2	0.002			0.01			0.04			0.1			0.2			1			2.6			9		
Approx. weight	(kg)		0.04			0.05			0.12			0.3			0.5			0.9			1.5			7.6		
Speed standard	(min^{-1})		15,000			13,000			12,500			11,000			10,000			9,000			8,000			4,000		
*Speed balanced	($10^3 min^{-1}$)		57	65	43	53	63	40	45	60	35	31	31	25	22	26	18	22	26	16	16	17	12	13	13	8

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 5

1 Nm = 8.85 in lbs

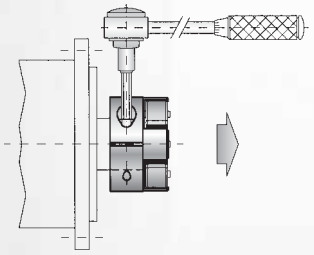
** Maximum transmittable torque depends on the bore diameter (overall clearance between shaft and hub 0.01 to 0.05 mm; shaft oiled)

optional stainless steel

TECHNICAL INFORMATION EK7

Mounting of the clamping hub:
Slide the coupling hub onto the shaft to the correct axial position. Tighten the clamping screw to the specified tightening torque E_1.

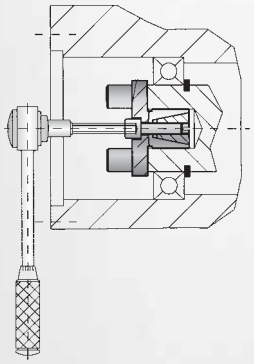
See page 10/collumn E_1.



Dismounting of the clamping hub:
Loosen the clamping screw E_1.

Mounting of the expanding shaft:
Push the shaft hub into the bore, at the right axial position thighten the mounting screw to the specified tightening torque E_2.

See page 10/collumn E_2

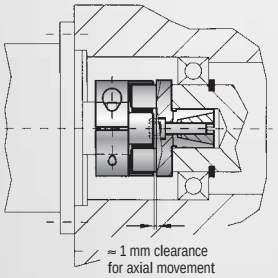


Dismounting of the expanding shaft:
Loosen the fastening screw E_2 a few turns.

Apply axial pressure to the screw head, sliding the cone out of its sleeve.

The shaft is now loose and can be dismounted.

Advantage:
Lateral access holes for screw tightening are not necessary with EK7 couplings. The unique assembly screw design (shown at right) allows for easy axial mounting and dismounting of the coupling hub.



CAUTION:
The elastomer insert must have clearance to slide axially for the compensation of axial misalignment.

Maximum transmittable torque of the clamping hub depends on the bore diameter

Series	Ø 3	Ø 4	Ø 5	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35	Ø 45	Ø 50	Ø 55	Ø 60	Ø 65	Ø 70	Ø 75	Ø 80
5		1,5	2	8														
10			4	12	32													
20				20	35	45	60											
60					50	80	100	110	120									
150						120	160	180	200	220								
300						200	230	300	350	380	420							
450								420	480	510	600	660	750	850				
800										700	750	800	835	865	900	925	950	1000

Higher torque through additional keyway possible.

Ordering example

EK7 / 20 / A / 24 / 19.05 / XX

- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Shaft Ø D2 h7
- Non standard e.g. finely balanced

All data is subject to change without notice.

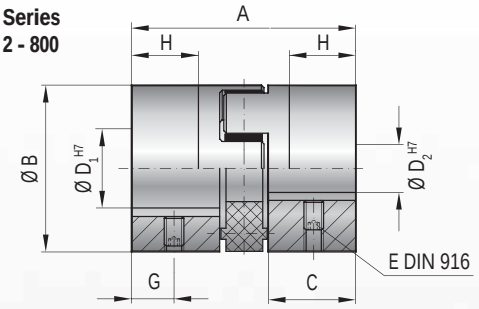
optional stainless steel

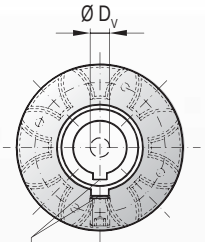
MODEL **EK1**

BACKLASH FREE ELASTOMER COUPLINGS

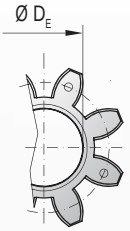
with keyway connection

Series 2 - 800



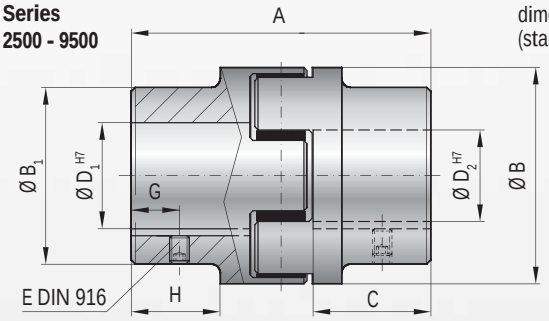


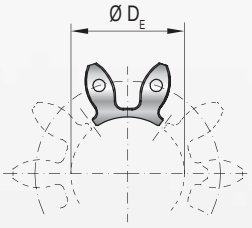
Keyway per DIN 6885 or ANSI dimensions (standard)



Elastomer insert Type A / B / C

Series 2500 - 9500





Elastomer insert Type A / B

Properties:
- economical design
- concentrically machined
- vibration damping
- electrically isolating
- press fit design
- low backlash, due to keyway connection

Material:
Coupling hub: up to series 450 high strength aluminum, series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design:
Two coupling hubs are concentrically machined with curved jaws
Bore tolerance H7 + keyway + set screw per DIN 916
Optional pilot bore (D_V)

Speeds:
See table below
*Please contact R+W
ISO 2.5 balance grade available

Tolerance:
Overall clearance between shaft and hub 0.01 to 0.05 mm

Model EK 1		Series																															
		2			5			10			20			60			150			300			450			800			2500		4500		9500	
Type (Elastomer insert)		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	A	B	A	B
Rated torque	(Nm) T_{KN}	2	2.4	0.5	9	12	2	12.5	16	4	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240	1950	2450	5000	6200	10000	12500
Max. torque	(Nm) T_{Kmax}	4	4.8	1	18	24	4	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400	3900	4900	10000	12400	20000	25000
Overall length	(mm) A	20			34			35			66			78			90			114			126			162			213		272		341	
Outside diameter	(mm) B/B_1	15			25			32			42			56			66.5			82			102			136.5			160 / 155		225 / 190		290 / 240	
Mounting length	(mm) C	6.5			12			12			25			30			35			45			50			65			88		113		142	
Inside diameter (pilot bored)	(mm) D_V	3			4			6			7			9			14			18			22			29			30		40		50	
Inside diameter range H7	(mm) $D_{1/2}$	3 - 9			6 - 15			6 - 18			8 - 25			12 - 32			19 - 38			20 - 45			28 - 60			32 - 80			30 - 95		40 - 130		50 - 170	
Inside diameter of elastomer	(mm) D_E	6,2			10,2			14,2			19,2			26.2			29,2			36.2			46,2			60,5			79		113		145	
Set screws (DIN 916)	E	see table (depending on bore Ø)**																															
Distance	(mm) G	3			5			6			9			11			12			15			17			30			25		30		40	
Possible shortening length	(mm) H	4			6			6			19			22			26			32			37			43			69		89		110	
Moment of inertia per Hub	(10^{-3} kgm²) J_1/J_2	0.0001			0.001			0.003			0.02			0.06			0.1			0.4			1.1			12			40		147		480	
Approx. weight	(kg)	0.008			0.03			0.08			0.15			0.35			0.6			1.1			1.7			11			12.5		25		53	
Speed standard	(min^{-1})	15,000			15,000			13,000			12,500			11,000			10,000			9,000			8,000			4,000			3,500		3,000		2,000	
*Speed balanced	($10^3 min^{-1}$)	60	67	45	57	65	43	53	63	40	45	60	35	31	31	25	22	26	18	22	26	16	16	17	12	13	13	8	10	10	8	8	6.5	6.5

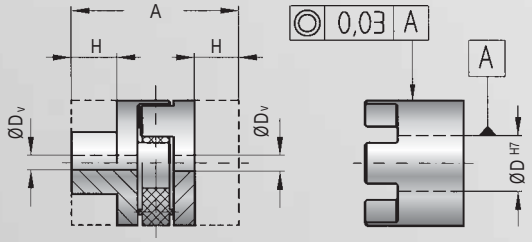
Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 5

1 Nm = 8.85 in lbs

** Set screws	
D_1/D_2	E
- Ø 10	M3
Ø 10.1 - 12	M4
Ø 12.1 - 30	M5
Ø 30.1 - 58	M8
Ø 58.1 - 95	M10
Ø 95.1 - 130	M12
Ø 130.1 - 170	M16

Hubs with bore diameter <6mm delivered without keyway.

Details of pilot bored coupling hubs (D_V)



It´s critical that modifications of the hub are machined concentrically and perpendicular to the through bore.

EK1 hubs can be modified to customer specifications.

The coupling hub may be shortened by dimension H.

Ordering example

EK1 / 60 / A / 19 / 24 / XX

- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. anodized

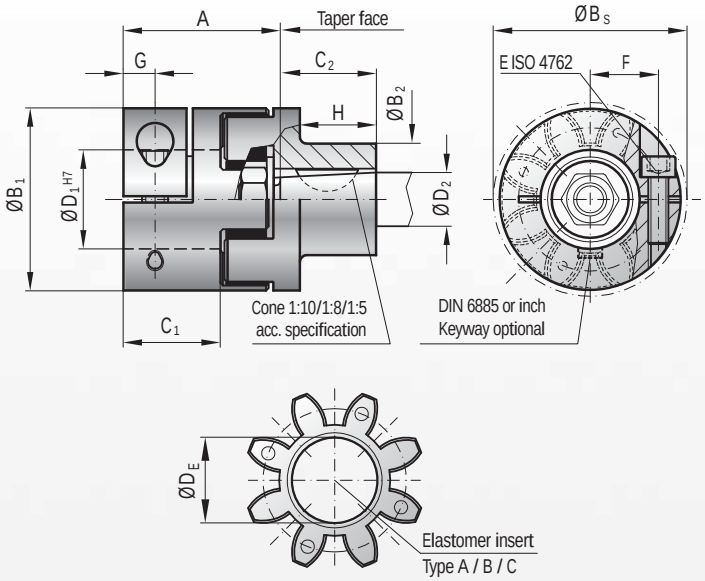
All data is subject to change without notice.

optional stainless steel

MODEL **EK4**

BACKLASH FREE ELASTOMER COUPLINGS

for conical shaft ends



Properties:
- for tapered shafts
- short compact design
- easy assembly
- concentrically machined hubs
- backlash free
- electrically isolating

Material:
Clamping hubs D_1: high strength aluminum
Conical hub D_2: steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design:
Two coupling hubs are concentrically machined with curved jaws
One side with clamping hub and screw per ISO 4762
One side with tapered bore and keyway per customer specifications

Speed: See table below
**Please contact R+W
ISO 2.5 balance grade available

Tolerance:
Overall clearance between shaft and hub 0.01 to 0.05 mm

Model EK 4			Series								
			20			60			150		
Type (Elastomer insert)			A	B	C	A	B	C	A	B	C
Rated torque	(Nm)	T_{KN}	17	21	6	60	75	20	160	200	42
Max. torque*	(Nm)	T_{Kmax}	34	42	12	120	150	35	320	400	85
Overall length	(mm)	A	42			50			57		
Outside diameter of clamping hub	(mm)	B_1	42			56			66,5		
Outside diameter of tapered bore hub	(mm)	B_2	variable			variable			variable		
Outside diameter with screw head	(mm)	B_S	44.5			57			68		
Mounting length	(mm)	C_1	25			30			35		
Mounting length	(mm)	C_2	variable			variable			variable		
Inside diameter range H7	(mm)	D_1	8-25			12-32			19-36		
Possible tapered bore diameter	(mm)	D_2	Acc. to customer requirement***								
Inside diameter of elastomer	(mm)	D_E	19.2			26.2			29.2		
Clamping screw (ISO 4762)		E	M5			M6			M8		
Tightening torque of the clamping screw	(Nm)		8			15			35		
Distance between centers	(mm)	F	15.5			21			24		
Distance	(mm)	G	8.5			10			12		
Length	(mm)	H	variable			variable			variable		
speed standard	(min^{-1})		12,500			11,000			10,000		
**speed balanced	($10^3 min^{-1}$)		45	60	35	31	31	25	22	26	18

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 5

1 Nm = 8.85 in lbs

* Maximum transmittable torque depends on the bore diameter (overall clearance between shaft and hub 0.01 to 0.05 mm; shaft oiled)
*** Caution: Dimensions C2, H and B2 depend on the final design of the tapered shaft.

Series	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35
20	20	35	45	60			
60		50	80	100	110	120	
150			120	160	180	200	220

Higher torque through additional key possible.

Ordering example

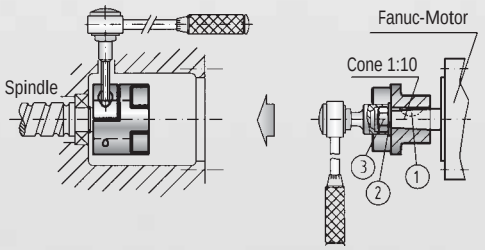
EK4 / 20 / A / 24 / 1:10 Ø11 / XX

- Model
- Series
- Type Elastomer insert
- Bore Ø D1 H7
- Cone/ Ø D2
- Non standard e.g. finely balanced

All data is subject to change without notice.

Installation instruction

Mounting of the clamping hub: Slide the coupling onto the shaft. At the correct axial position tighten the clamping screw to the specified tightening torque as shown in the table (column E).



Mounting of the tapered bore hub: After inserting the key into the key seat of the motor shaft, slide the coupling hub onto the shaft. Check to ensure a proper seat of the hub onto the shaft. Tighten the nut (3) on the motor shaft, using the exact tightening torque specified by the motor manufacturer.

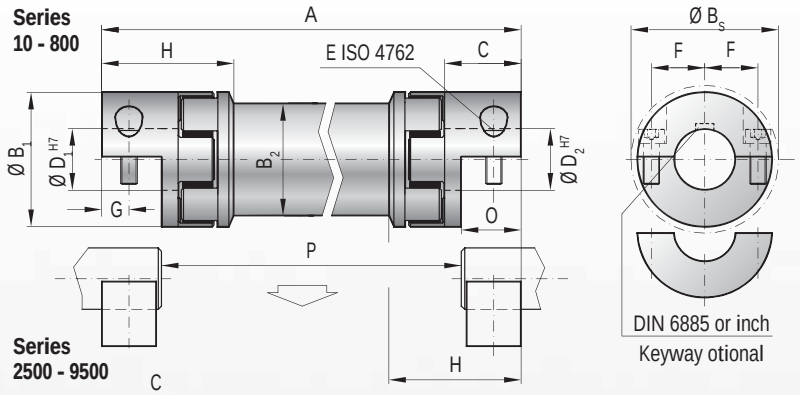
optional stainless steel

MODEL **EZ2**

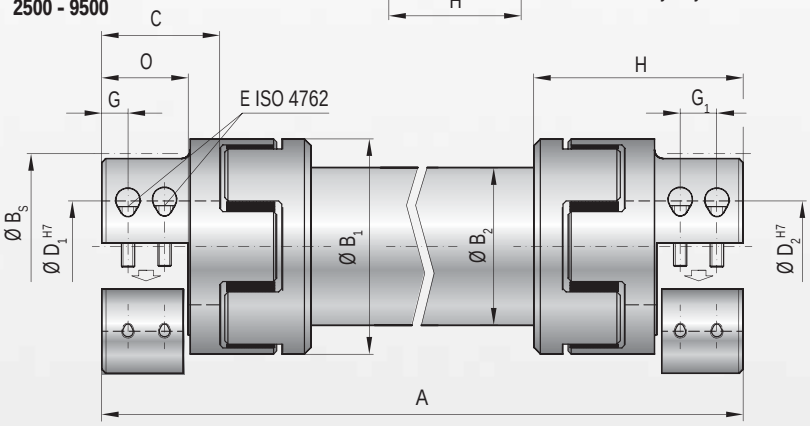
BACKLASH FREE LINE SHAFTS

with split clamping hubs

Series 10 - 800



Series 2500 - 9500



Properties:

- lateral mounting with split clamping hubs
- lengths up to 4 meters
- no intermediate support bearing required
- low moment of inertia
- vibration damping
- press fit design
- backlash free

Material:

Clamping hub: up to series 450 high strength aluminum, series 800 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer
Intermediate tube: up to series 450 precision machined aluminum tube; series 800 and up steel, composite tubes are also available

Design:

Two coupling hubs are concentrically machined with curved jaws
Elastomer inserts are available in type A or B
The two coupling elements are connected with a precise and concentrically machined aluminum tube

Speed:

Please advise the application speed when ordering or inquiring about EZ Line shafts

Tolerance:

Overall clearance between shaft and hub 0.01 to 0.05 mm

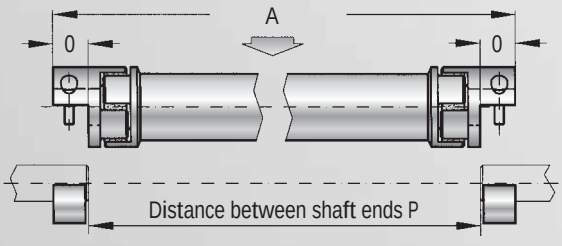
Ordering example

EZ2 / 020 / 1200 / A / 24 / 19.05 / XX

- Model
- Series
- Overall length
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. finely balanced

All data is subject to change without notice.

Assembly instructions



The total length of the axis is defined by the distance P + 2x0.

R+W calculation program

With specially developed sofware R+W can calculate the critical resonant speeds for each application.

Results of a calculation are shown below.

The critical speed can be altered by changing the tube material and/or other parameters.

Critical resonant speed	n_{kb}	=	rpm
Maximum speed	n_B	=	rpm
Torsional deflection	φ	=	Degree-Min-Sec
Total stiffness EZ 2	C_{Tdyn}^{EZ}	=	Nm/rad
Permissible lateral misalignment	Δ Kr	=	mm
Weight of total axis	m	=	kg
Mass moment of inertia	J	=	kgm²

optional stainless steel

MODEL **EZ2**

BACKLASH FREE LINE SHAFTS

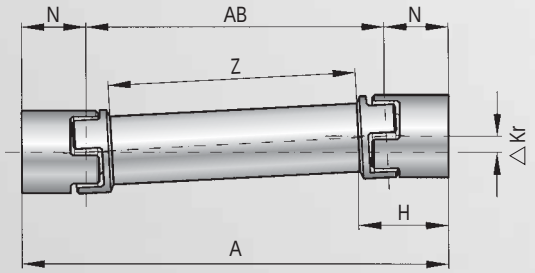
Model EZ 2			Series																			
			10		20		60		150		300		450		800		2500		4500		9500	
Type (Elastomer insert)			A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Rated torque	(Nm)	T_{KN}	12.5	16	17	21	60	75	160	200	325	405	530	660	950	1100	1950	2450	5000	6200	10000	12500
Max. torque*	(Nm)	T_{Kmax}	25	32	34	42	120	150	320	400	650	810	1060	1350	1900	2150	3900	4900	10000	12400	20000	25000
Overall length	(mm)	A	95 - 4000		130 - 4000		175 - 4000		200 - 4000		245 - 4000		280 - 4000		320 - 4000		460 - 4000		580 - 4000		710 - 4000	
Outside diameter of clamping hub	(mm)	B_1	32		42		56		66,5		82		102		136,5		160		225		290	
Outside diameter of tube	(mm)	B_2	28		35		50		60		76		90		120		150		175		220	
Outside diameter with screw head	(mm)	B_S	32		44,5		57		68		85		105		139		155		190		243	
Fit length	(mm)	C	20		25		40		47		55		65		79		85		110		140	
Inside diameter range H7	(mm)	$D_{1/2}$	5 - 16		8 - 25		14 - 32		19 - 36		19 - 45		24 - 60		35 - 80		35 - 90		40 - 120		50 - 140	
Claming screw (ISO 4762)		E	4 x M4		4 x M5		4 x M6		4 x M8		4 x M10		4 x M12		4 x M16		4 x M16		8 x M16		8 x M24	
Tightening torque of the clamping screw	(Nm)		4		8		15		35		70		120		290		290		290		980	
Distance between centers	(mm)	F	10.5		15.5		21		24		29		38		50,5		57		72,5		90	
Distance	(mm)	G/G_1	7.5		8.5		15		17.5		20		25		30		36		24 / 56		28 / 74	
Length of the couplings	(mm)	H	34		46		63		73		86		99		125		147		186		233	
Moment of inertia per coupling hub	(10^{-3} kgm²)	J_1/J_2	0.01		0.02		0.5		0.21		1.02		2.3		17		30		140		450	
Inertia of tube per meter	(10^{-3} kgm²)	J_3	0.075		0.183		0.66		1.18		2.48		10.6		38		360		750		1,800	
Combined dynamic torsional stiffness of the inserts	(Nm/rad)	C_{Tdyn}^{E}	270	825	1,270	2,220	3,970	5,950	6,700	14,650	11,850	20,200	27,700	40,600	41,300	90,000	87,500	108,000	168,500	371,500	590,000	670,000
Torsional stiffness of tube per meter	(Nm/rad)	C_T^{ZWR}	321		1,530		6,632		11,810		20,230		65,340		392,800		1,000,000		2,500,000		5,000,000	
Distance between centers	(mm)	N	26		33		49		57		67		78		94		108		137		171	
Mounting length	(mm)	O	16.6		18.6		32		37		42		52		62		67		84		105	

* Max. transmittable torque of the clamping hub depends on the bore diameter; see EKH (page 8)

1 Nm = 8.85 in lbs

Selection process for servo insert couplings, EZ2 / EZV

A	Overall length	m	C_{Tdyn}^{E}	Combined dynamic torsional stiffness of the inserts	Nm/rad	H	Length of the coupling	mm
AB	Length AB = (A – 2xN)	m	C_T^{ZWR}	Torsional stiffness of tube per meter	Nm/rad	N	Distance to center of flexible element	mm
Z	Tube length Z = (A – 2xH)	m	C_{Tdyn}^{EZ}	Torsional stiffness of the entire coupling assembly	Nm/rad	TK_{max}	Max. torque	Nm
						φ	Angle of twist	degree



According to torsional stiffness

$$C_{Tdyn}^{EZ} = \frac{C_{Tdyn}^{E} \times (C_T^{ZWR}/Z)}{C_{Tdyn}^{E} + (C_T^{ZWR}/Z)} \quad \text{(Nm/rad)}$$

According to angle of twist

$$\varphi = \frac{180 \times TK_{max}}{\pi \times C_{Tdyn}^{EZ}} \quad \text{(degree)}$$

Max. possible misalignments

Lateral misalignment Δ Kr

$$\Delta Kr_{max} = \tan \Delta \frac{Kw}{2} \cdot AB$$
$$AB = A - 2xN$$

Angular misalignment Δ Kw

$$\Delta Kw_{max} = \text{ca. } 2^{\circ}$$

Axial misalignment Δ Ka

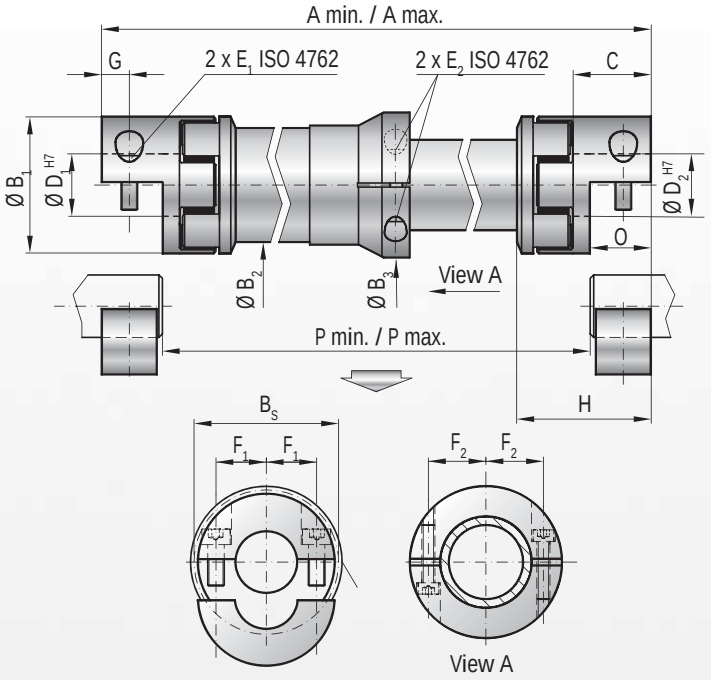
$$\Delta Ka_{max} = \text{ca. } \pm 2$$

optional stainless steel

MODEL **EZV**

BACKLASH FREE LINE SHAFTS

variable length



Properties:

- lateral mounting with split clamping hubs
- lengths up to 4 meters
- adjustable in length
- low moment of inertia
- vibration damping
- press fit designs
- backlash free

Material:

Clamping hub: high strength aluminum. Elastomer insert: precision molded wear resistant, and thermally stable polymer. Intermediate tubes: precision machined aluminum tube, steel or composite tube are upon request available.

Design:

Two split clamping hubs on each end are concentrically machined with curved jaws. Both coupling bodies are solidly joined to the tubes with a high level of concentricity. Loosening the intermediate clamp allows for a variation of length and rotational orientation. Elastomer inserts are available in type A or B.

Speed:

To control the critical resonant speed please advise the application speed when ordering or inquiring about EZ Line Shafts.

Tolerance:

Overall clearance between shaft and hub 0.01 to 0.05 mm

Ordering example

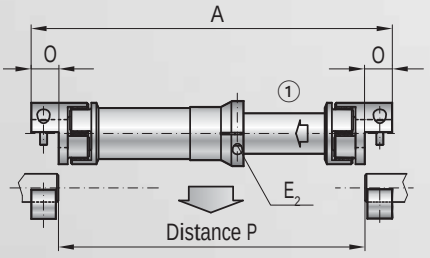
EZV / 20 / 1200 / A / 24 / 19 / XX

- Model
- Series
- Minimum length of selected range
- Type Elastomer insert
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non standard e.g. finely balanced

All data is subject to change without notice.

Assembly instructions

After loosening the clamping screws E2, slide and / or rotate the tube sections to the desired positions. Once positioned, tighten the screws to the appropriate tightening torque, whereby guaranteeing a high level of concentricity for the line shaft assembly.



R+W calculation program

With specially developed sofware R+W can calculate the critical resonant speeds for each application.

Results of a calculation are shown below.

The critical speed can be altered by changing the tube material and/or other parameters.

Critical resonant speed	n_{kb}	=	rpm
Maximum speed	n_B	=	rpm
Torsional deflection	φ	=	Degree-Min-Sec
Total stiffness EZ 2	C_{Tdyn}^{EZ}	=	Nm/rad
Permissible lateral misalignment	Δ Kr	=	mm
Weight of total axis	m	=	kg
Mass moment of inertia	J	=	kgm²

optional stainless steel

MODEL **EZV**

BACKLASH FREE LINE SHAFTS

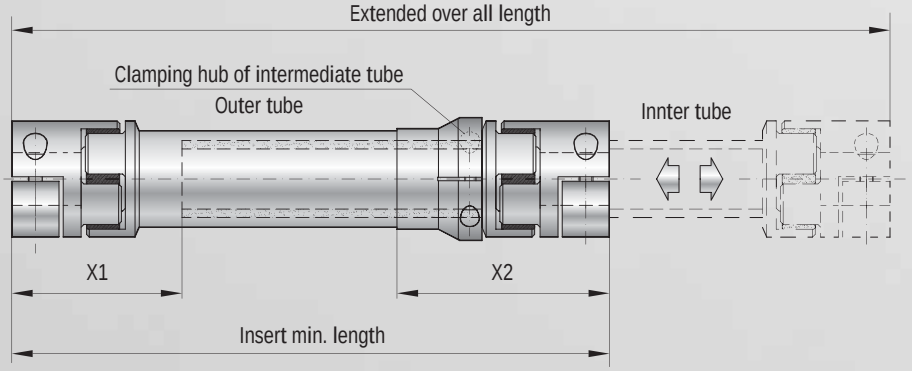
Model EZV			Series											
			10		20		60		150		300		450	
Type (Elastomer insert)			A	B	A	B	A	B	A	B	A	B	A	B
Rated torque	(Nm)	T_{KN}	12.5	16	17	21	60	75	160	200	325	405	530	660
Max. torque*	(Nm)	T_{Kmax}	25	32	34	42	120	150	320	400	650	810	1060	1200
Range of possible minimum lengths (collapsed)	(mm)	A_{min}	150 to 2055		200 to 2075		250 to 2095		300 to 2115		350 to 2130		400 to 2150	
Range of possible maximum lengths (extended)	(mm)	A_{max}	190 to 4000		250 to 4000		310 to 4000		370 to 4000		440 to 4000		500 to 4000	
Measurement	(mm)	X1+X2	115		156		197		240		280		312	
Outside diameter of clamping hub	(mm)	B_1	32		42		56		66,5		82		102	
Outside diameter of tube	(mm)	B_2	28		35		50		60		80		90	
Outside diameter of center hub	(mm)	B_3	41,5		47		67		77		102		115	
Outside diameter with screw head	(mm)	B_S	32		44,5		57		68		85		105	
Fit length	(mm)	C	20		25		40		47		55		65	
Inside diameter range H7	(mm)	$D_{1/2}$	5 to 16		8 to 25		14 to 32		19 to 35		19 to 45		24 to 60	
Clamping screw (ISO 4762)		E_1	M4		M5		M6		M8		M10		M12	
Tightening torque of the clamping screw	(Nm)		4		8		15		35		70		120	
Clamping screw (ISO 4762)		E_2	M4		M4		M5		M6		M8		M10	
Tightening torque of the clamping screw	(Nm)		4		4,5		8		18		35		70	
Distance between centers	(mm)	F_1	10,5		15,5		21		24		29		38	
Distance between centers	(mm)	F_2	15		18		26		31		41		45	
Distance	(mm)	G	7,5		8,5		15		17,5		20		25	
Mounting length	(mm)	O	16,6		18,6		32		37		42		52	
Moment of inertia coupling half	(10^{-3} kgm^2)	J_1/J_2	0,01		0,02		0,15		0,21		1,02		2,3	
Inertia of tube per meter	(10^{-3} kgm^2)	J_3	0,075		0,183		0,66		1,18		2,48		10,6	
Combined dynamic torsional stiffness of the inserts	(Nm/rad)	C_{Tdyn}^{E}	270	825	1,270	2,220	3,970	5,950	6,700	14,650	11,850	20,200	27,700	40,600
Torsional stiffness of tube per meter	(Nm/rad)	C_T^{ZWR}	321		1,530		6,632		11,810		20,230		65,340	
Distance between centers	(mm)	N	26		33		49		57		67		78	
Length of the couplings	(mm)	H	34		46		63		73		86		99	

Max. transmittable torque of the clamping hub depends on the bore diameter; see EKH (page 8)

1 Nm = 8.85 in lbs

Function

Extended all over length = (Inserted min. length x 2) - Measurement (X1 + X2)



Inserted min. length = $\frac{\text{Extended all over length + Measurement (X1+ X2)}}{2}$

The collapsed and extended overall length values are related, becoming increasingly flexible with greater length. Length ranges can be calculated using the two formulas shown at left. For information regarding selection according to axial, angular and lateral misalignment, as well as torsional stiffness of the EZV, refer to page 15.

optional stainless steel

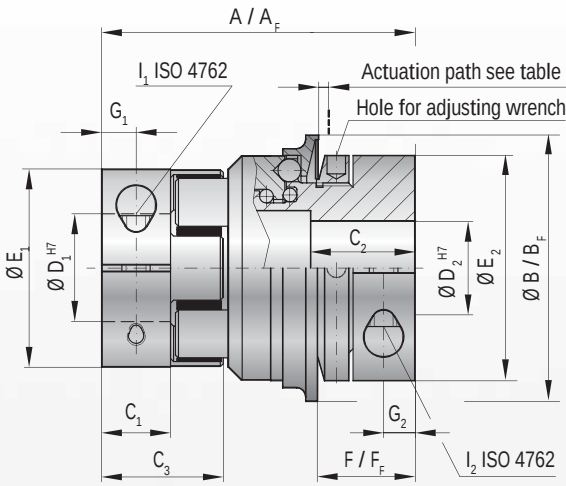
single-position
multi-position
load holding
full disengagement

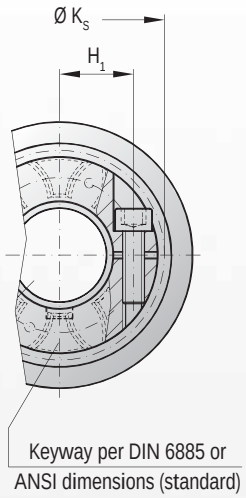
Production monitored Type Tested

MODEL **ES2**

BACKLASH FREE TORQUE LIMITERS

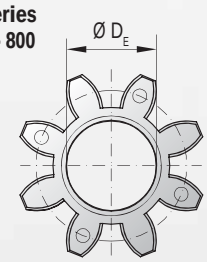
with clamping hubs





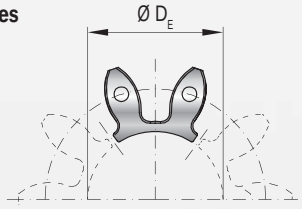
Keyway per DIN 6885 or ANSI dimensions (standard)

Series 5 - 800



Elastomer insert Type A / B

Series 1500



Elastomer insert consists of 5 individual segments A / B

Properties:
- reliable torque overload protection
- short compact design
- backlash free due to patented R+W design
- disengagement within msecs.
- large actuatuion path when disengaging
- electrically isolating
- press fit design

Material:
Torque limiter: high strength hardened steel with rust protected surface (oxidized)
Clamping hub D_1: up to series 450 high strength aluminum, series 800 and up steel
Clamping hub D_2: up to series 60 high strength aluminum, from series 150 and up steel
Elastomer insert: precision molded, wear resistant, and thermally stable polymer

Design:
Two coupling hubs are concentrically machined with curved jaws, one side with an integral torque limiter The torque limiter is available in single position, multi position, load holding or full-disengagement versions.

Tolerance:
Overall clearance between shaft and hub 0.01 to 0.05 mm

W = Single position re-engagement
- After the overload has been eliminated, the coupling will automatically reengage precisely 360° from the original disengagement position
- Highly precise synchronous engagement made possible by R+W patented preload design
- Signal at overload with mechanical switch or proximity sensor

D = Multi position re-engagement
- Coupling re-engages at multiple set angular intervals.
- Immediate availability of the machine as soon as the overload has been eliminated.
- Signal at overload with mechanical switch or proximity sensor
- Standard engagement every 60°
- Engagement at 30, 45, 90 and 120 degrees are optional.

G = Load holding version
- Mechanical overload detection device
- In the event of a torque overload the driving and driven ends are not fully separated, and allow only for enough free rotation to trigger the actuation ring. Full torque is then transmittable once again.
- Guaranteed to hold the load and signal an overload.
- Automatic engagement after the torque level has dropped.
- Signal at overload to detect with mechanical switch or proximity sensor.

F = Full disengagement
- Complete separation of the drive and driven ends in the event of a torque overload
- No residual friction
- Signal at overload
- Rotating elements slow down freely
- Coupling can be re-engaged manually (Engagement every 60°)

Ordering example

ES2 / 10 / A / W / 14 / 12 / 8 /4-12 / XX

- Model
- Series
- Type Elastomer insert
- Function system
- Bore Ø D1 H7
- Bore Ø D2 H7
- Disengagement torque
- Adjustable range
- Non standard (e.g. stainless steel)

All data is subject to change without notice.

The selection of torque limiters

In general the torque limiters are sized according to the necessary disengagement torque. This torque must exceed the torque required to accelerate and decelerate the machine drive during normal operation.

For more information see page 22.

optional stainless steel

MODEL **ES2**

BACKLASH FREE TORQUE LIMITERS

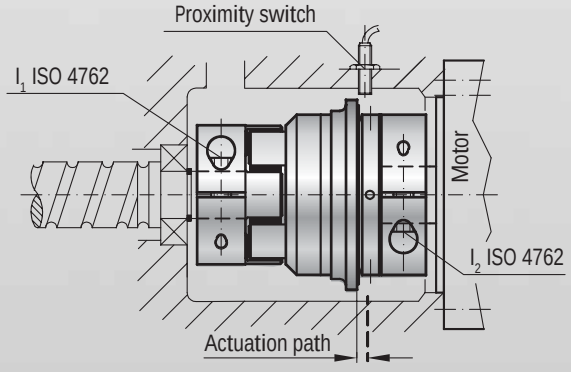
Model ES 2		Series																	
		5		10		20		60		150		300		450		800		1500	
Type (Elastomer insert)		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Rated torque (Nm)	T_{KN}	9	12	12,5	16	17	21	60	75	160	200	325	405	530	660	950	1100	1950	2450
Max. torque* (Nm)	T_{Kmax}	18	24	25	32	34	42	120	150	320	400	650	810	1060	1350	1900	2150	3900	4900
Available torque adjustment ranges (approx. values) (Nm)	T_{KN}	1-3 or 3-6		2 - 6 or 4 - 12		10 - 25 or 20 - 40		10 - 30 or 25 - 80		20 - 70 45 - 150 80 - 180		100 - 200 150 - 240 200 - 320		80 - 200 200 - 350 300 - 500		400 - 650 500 - 800 600 - 900		600 - 850 700 - 1200 1000 - 1800	
Available torque adjustment ranges (approx. values) full disengagement version (Nm)	T_{KN}^{F}	2.5 - 4.5		2 - 5 or 5 - 10		8 - 20 or 16 - 30		20 - 40 or 30 - 60		20 - 60 40 - 80 80 - 150		120 - 180 or 180 - 300		60 - 150 100 - 300 250 - 500		200 - 400 or 450 - 800		1000 - 1250 or 1250 - 1500	
Overall length (mm)	A	50		60		86		96		106		140		164		179		245	
Overall length (full disengagement version) (mm)	A_F	50		60		86		96		108		143		168		190		257	
Outside diameter of actuation ring (mm)	B	35		45		65		73		92		120		135		152		174	
Outside diameter of actuation ring (full disengagement version) (mm)	B_F	42		51.5		70		83		98		132		155		177		187	
Fit Length (mm)	C_1	8		10.3		17		20		21		31		34		46		88	
Fit Length (mm)	C_2	14		16		27		31		35		42		51		45		86	
Length of hub (mm)	C_3	16.7		20.7		31		36		39		52		57		74		120	
Inside diameter range H7 (mm)	D_1	4 - 12.7		5 - 16		8 - 25		12 - 32		19 - 36		20 - 45		28 - 60		35 - 80		35 - 90	
Inside diameter range H7 (mm)	D_2	6 - 14		6 - 20		12 - 30		15 - 32		19 - 42		30 - 60		35 - 60		40 - 75		50 - 80	
Inside diameter of elastomer (mm)	D_E	10.2		14.2		19.2		26.2		29.2		36.2		46.2		60.5		79	
Diameter of the hub (mm)	E_1	25		32		42		56		66.5		82		102		136.5		160	
Diameter of the hub (mm)	E_2	19		40		55		66		81		110		123		132		157	
Distance (mm)	F	15		17		24		28		31		35		45		50		63	
Distance (full disengagement version) (mm)	F_F	14		16		22		29		30		35		43		54		61	
Distance (mm)	G_1	4		5		8.5		10		11		15		17.5		23		36	
Distance (mm)	G_2	5		5		7.5		9.5		11		13		17		18		22.5	
Distance between centers (mm)	H_1	8		10.5		15		21		24		29		38		50.5		2x 57	
Clamping screw (ISO 4762)	I_1	M3		M4		M5		M6		M8		M10		M12		M16		2x M16	
Tightening torque of the clamping screw(Nm)		2		4.5		8		15		35		70		120		290		290	
Distance between centers D2 side (mm)	H_2	10		15		19		23		27		39		41		48		2x 55	
Clamping screw (ISO 4762)	I_2	M4		M4		M6		M8		M10		M12		M16		2x M16		2x M20	
Tightening torque of the clamping screw (Nm)		4		4.5		15		40		70		130		200		250		470	
Diameter with screwhead (mm)	K_S	25		32		44.5		57		68		85		105		139		155	
Approx. weight (kg)		0.2		0.3		0.6		1.0		2.4		5.8		9.3		14.3		26	
Moment of inertia (10^{-3} kgm²)	J_{ges}	0.02		0.06		0.25		0.7		2.3		11		22		33.5		185	
Actuation path (mm)		0.8		1.2		1.5		1.7		1.9		2.2		2.2		2.2		3.0	

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 5

1 Nm = 8.85 in lbs

* Maximum transmittable torque depends on the bore diameter (overall clearance between shaft and hub 0.01 to 0.05 mm; shaft oiled) see page 6

Mounting instructions



Mounting: Slide the coupling onto the respective shafts to the desired axial position. Using a torque wrench, tighten the clamp screws to the correct tightening torque as indicated in the table.

CAUTION! Both clamping hubs have different screws and different tightening torques.

Dismounting: Simply loosen the clamp screw I1, I2 and remove the safety coupling.

Emergency cut off: Emergency cut off: The axial movement of the actuation ring activates the mechanical switch or proximity sensor.

CAUTION! A 100% test of the function of the cut off switch is necessary.

optional stainless steel

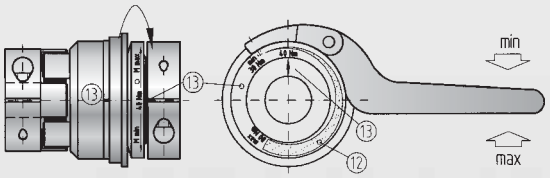
FUNCTION SYSTEMS **ES2**

BACKLASH FREE TORQUE LIMITERS

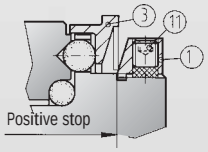
R+W torque limiting couplings are ball detent style overload couplings. They protect drive and driven mechanical components from damage associated with torque overloads.

- Backlash free torque transmission is accomplished by a series of steel balls (4) nested in hardened detents (5).
- Disc springs push against an actuation ring (3) keeping the balls nested.
- The disengagement torque is adjustable by means of a spanner nut (1).
- In the event of an overload, the actuation ring (3) is moved axially by the balls exiting their detents, separating the driving and driven ends.
- The movement of the actuation ring (3) can be sensed by means of a mechanical switch or proximity sensor (6) triggering the drive to shut down.

Disengagement torque setting



On ES 2 couplings, the slot of the clamping hub serves as a reference point (13).

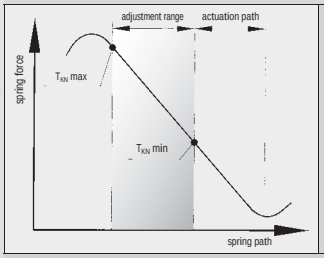


1 adjustment nut
11 locking screw
3 steel actuation ring
12 adjustment range
13 marking

R+W torque limiters are factory set to the customer specified disengagement torque, which is marked on the coupling. The adjustment range (min/max) is also marked on the adjustment nut (1).
The customer can adjust the disengagement torque as long as it is in the range (12) indicated on the adjustment nut.

The adjustment range must not be exited while re-adjusting.

To adjust the disengagement torque, loosen the locking screws (11) and rotate the adjustment ring using a spanner wrench to the desired new setting. Tighten the 3 locking screws (11) and test the coupling.

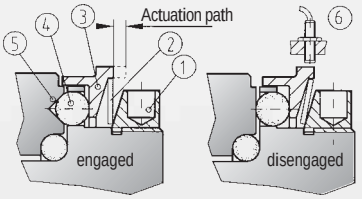


CAUTION!

R+W torque limiters incorporate disc springs that exhibit a special characteristic. It is important to stay within the operating adjustment range indicated on the adjustment nut.

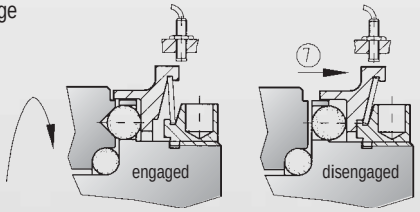
Single Position / Multi Position

In the case of the standard single position version and the optional multi position version, the spring disengages, allowing the balls to exit their detents, and separating the driving and driven ends of the coupling. A very slight spring pressure remains so that the balls are able to drop back into their detents and re-engage the torque limiter once the torque is reduced below the set disengagement torque.



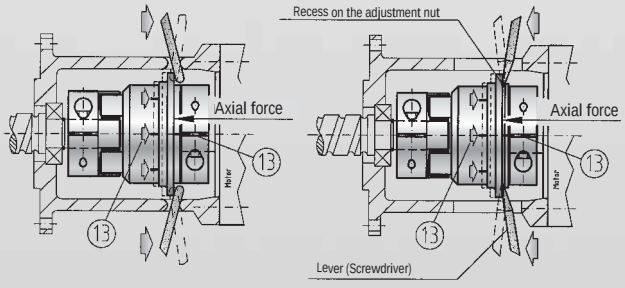
Full Disengage

In the case of the optional full disengage version, the spring disengages and completely flips over center, placing zero residual spring pressure on the actuation ring.
The driving and driven ends of the coupling are completely separated.



Re-engagement of the coupling is not automatic and must be performed manually (Picture 3a, 3b).

CAUTION: Re-engagement should only be performed when the coupling is at a stand still, and is not rotating!



Picture 3a **Picture 3b**

The R+W full disengage torque limiting coupling can be re-engaged in six different rotational orientations (every 60°) with only a small axial force (E). Marks on the actuation ring and the body (13) of the coupling must be aligned to indicate a re-engagement point.

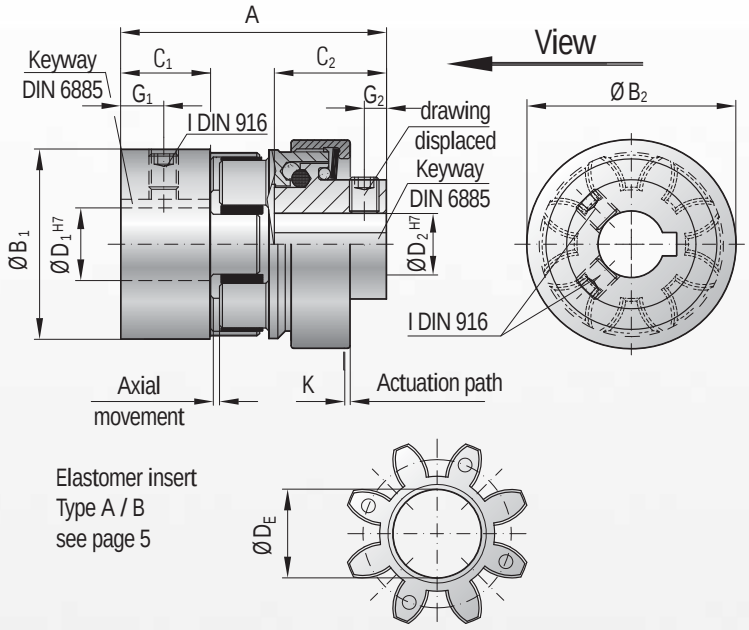
For size 60 and up, recesses are included on the torque adjustment nut to support re-engagement with 2 levers (picture 3b). Screwdrivers are an acceptable means by which to perform this re-engagement.

optional stainless steel

MODEL **ESL**

LOW BACKLASH TORQUE LIMITERS

„Economy Class“



Elastomer insert
Type A / B
see page 5

Properties:
- reliable torque overload protection
- compact simple design
- multi position engagement
- low wear
- economical design

Material:
Torque limiter: high strength steel.
Detent balls made of hardened steel.
Clamping hubs: high strength aluminum.
Elastomer insert: precision molded, wear resistant and thermally stable polymer.

Design:
The R+W SERVOMAX elastomer coupling with integral multi position torque limiter.

Speed:
Negligible abrasion with disengagement speeds of up to 200 rpm.
Higher speeds upon request.

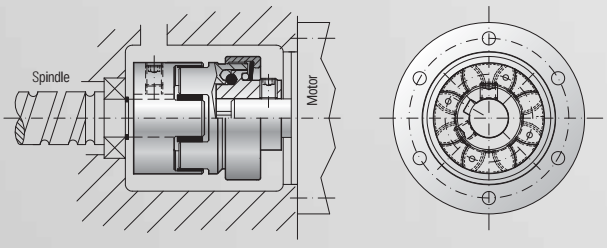
Tolerance:
Overall clearance between shaft and hub 0.01 to 0.05 mm.

Model ESL			Series									
			5		10		20		60		150	
Type (Elastomer insert)			A	B	A	B	A	B	A	B	A	B
Rated torque	(Nm)	T_{kn}	9	12	12.5	16	17	21	60	75	160	200
Preset torque range	(Nm)	Nm	1-6		1-12		3-19		5-60		20-150	
Overall length	(mm)	A	34		45		64		80		90	
Diameter of the hub	(mm)	B_1	25		32		42		56		66.5	
Diameter of the hub	(mm)	B_2	29		32		46		59		75	
Fit length	(mm)	C_1	12.5		12		25		30		35	
Fit length	(mm)	C_2	11.5		20		22		31		35	
Inside diameter range H7	(mm)	D_1	6-15		6-18		8-25		12-32		19-38	
Inside diameter range H7	(mm)	D_2	6-10		6-12		8-19		12-24		19-32	
Inside diameter of elastomer	(mm)	D_E	10.5		14.2		19.2		26.2		29.2	
Distance	(mm)	G	5		6		9		11		12	
Distance	(mm)	G_2	2.5		3.5		4		4		4	
Screews DIN 916		I	depending on bore diameter see page 12									
Approx. weight	(kg)		0.05		0.15		0.2		0.5		1	
Moment of inertia	(10^{-3} kgm^2)	J_1/J_2	0.01		0.02		0.08		0.15		0.5	
Actuation path	(mm)	K	0.6		1		0.6		1.2		1.2	

Information about static and dynamic torsional stiffness as well as max. possible misalignment see page 5

* Disengagement torque is preset by R+W, and is not adjustable

Installation instruction



Ordering example

ESL / 10 / A / 14 / 12.7 / 10 / XX

- Model
- Series
- Type elastomer insert
- Bore Ø D1 H7 with keyway
- Bore Ø D2 H7 with keyway
- Disengagement torque Nm
- Non standard e.g. stainless steel

All data is subject to change without notice.

optional stainless steel

FACTORS AND SIZING CALCULATIONS

BACKLASH FREE ELASTOMER COUPLINGS

Temperature factor S_υ

Temperature (υ)	A Sh 98 A	B Sh 64 D	C Sh 80 A
> -30°C to -10°C	1.5	1.7	1.4
> -10°C to +30°C	1.0	1.0	1.0
> +30°C to +40°C	1.2	1.1	1.3
> +40°C to +60°C	1.4	1.3	1.5
> +60°C to +80°C	1.7	1.5	1.8
> +80°C to +100°C	2.0	1.8	2.1
> +100°C to +120°C	–	2.4	–

Start factor S_Z

Z_h	up to 120	120 - 240	above 240
S_Z	1.0	1.3	on request

Shock and load factor S_A

Uniform load	$S_A = 1.0$
Non-uniform load	$S_A = 1.8$
High dynamics, frequent reversing loads	$S_A = 2.5$

T_{KN}	=	Rated torque of the coupling	(Nm)
T_{Kmax}	=	Max. torque of the coupling	(Nm)
T_S	=	Peak torque of the application	(Nm)
T_{AS}	=	Peak torque rating of the driving component	(Nm)
T_{AN}	=	Nominal torque rating of the driving component	(Nm)
T_{LN}	=	Rated torque of the driven component	(Nm)
P_{LN}	=	Rated power of the driven component	(KW)
n	=	Speed	(rpm)
J_A	=	Motor´s moment of inertia	(kgm^2)
J_L	=	Load inertia (e.g. spindle + slide + work piece)	(kgm^2)
J_1	=	Moment of inertia of the coupling half on the driving component	(kgm^2)
J_2	=	Moment of inertia of the coupling half on the driven component	(kgm^2)
m	=	Ratio of the moments of inerta driving to driven element	
υ	=	Temperature of the area around the coupling (observe radiant heat)	
S_υ	=	Temperature factor	
S_A	=	Shock or load factor	
S_Z	=	Start factor (factor for the number of starts/hour)	
Z_h	=	Duty cycle	(1/h)

Sizing of a Servomax® Elastomer Coupling

1. Calculation example without shock or reversing loads

The rated torque of the coupling (T_{KN}) needs to be higher than the rated torque of the driven element (T_{LN}) times the temperature factor S_υ at the coupling for the application. If T_{LN} is not known, T_{AN} can be used for the calculation instead.

Condition: $T_{KN} > T_{LN} \times S_\upsilon$

Auxiliary calculation: $T_{LN} = \dfrac{9550 \times P_{LN}}{n}$

Calculation example: (No loads and shocks)

Driving component
T_{AN} = **119 Nm**

Coupling conditons:
υ = **70°** C
S_υ = 1.7 (for 70°/Type A)

Driven component
T_{LN} = **85 Nm**

Condition: $T_{KN} > T_{LN} \times S_\upsilon$
$T_{KN} > 85$ Nm x 1.7
$T_{KN} > \underline{144.5 \text{ Nm}}$ → **Result:** A coupling type **EK 2/150/A** (T_{KN} = 160 Nm) is selected.

2. Calculation example with shock loads

In all cases the maximum rated torque (T_{Kmax}). of the coupling can not be exceeded. First calculate the rated torque (T_{KN}) of the coupling same as above. Compare this result to the peak torque (T_S) times the start factor (S_Z) times the temperature factor (S_υ) for the application. The greater of the two values must be less than (TKmax) of the coupling.

Condition: $T_{KN} > T_{LN} \times S_\upsilon$

Auxiliary calculation: $T_{LN} = \dfrac{9550 \times P_{LN}}{n}$

Condition: $T_{Kmax} > T_S \times S_Z \times S_\upsilon$

Auxiliary calculation: $T_S = \dfrac{T_{AS} \times S_A}{m + 1}$

$m = \dfrac{J_A + J_1}{J_L + J_2}$

optional stainless steel

MODEL **ATEX**

FOR USE IN HAZARDOUS AREAS AND EXPLOSIVE ATMOSPHERE

AT mosphere EX plosible

ATEX 95a is regulated by the new European directive. Generally the explosive atmosphere is classified in 3 different zones.

Zone 0:
A place in which an explosive atmosphere consists out of a mixture of air and flammable substances in the form of gas, vapor or mist, and **is present frequently, continuously** or for **extended periods**.
Zone 20:
Is relevant for an explosive atmosphere in the form of clouds of combustible dust in air under the same conditions as above.

Zone 1:
Described as a place in which an explosive atmosphere consists of a mixture of air and flammable substances in the form of gas, vapor or mist, and is **likely to occur** in normal operation occasionally.
Zone 21:
Is relevant for an explosive atmosphere in the form of clouds of combustible dust in air under the same conditions as above.

Zone 2:
A place in which an explosive atmosphere consists out of mixtureof air with flammable substances in the form of gas, vapor or mist, and is **not likely to occur** in normal operation but, if it does occur, it will persist **for a short period only.**
Zone 22:
Relevant for an explosive atmosphere in the form of a cloud of combustible dust in air under the same conditions as above.

For the classified zones 1/21 and 2/22 the Servomax couplings EK-EEx do have an accreditation according to ATEX 95/a

Design of the Servomax EEx:
No dimensional change from the EK standard series, only the material of the inserts will change.

Elastomer insert:
A special elastomer insert **Type D (Sh65D)** with electrically conductive properties is used, preventing the possibility of electrostatic loading, and preventing electric current from making an arc across the hubs.

Sizing:
All misalignment and torque ratings must be reduced by 30%. Technical data is available upon request.

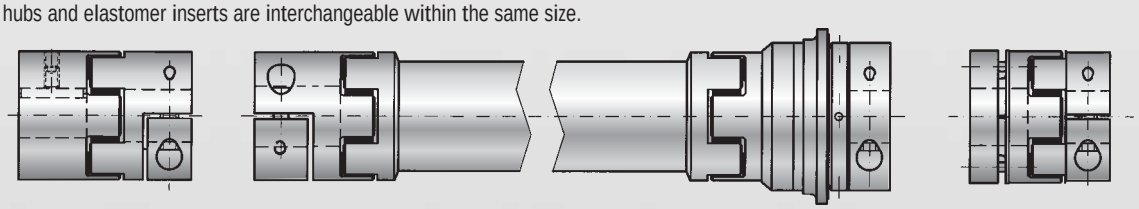
Maintanance:
A routine inspection of the coupling must be performed.

Mounting manuals:
Mounting and maintanance manuals are provided with every EEx coupling.

R+W solutions with standard components

All standard hubs and elastomer inserts are interchangeable within the same size.

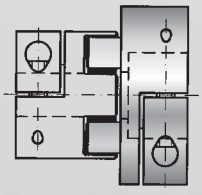
Example:



EK 1 **EK 2** **EZ-Coupling half** **ES-Coupling half** **EK 6** **EKL**

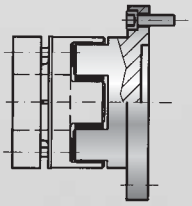
R+W non standard solutions with special hubs

EK 2 Non standard hub



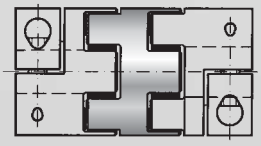
Non standard hubs for larger bores

EK 6 Non standard hub



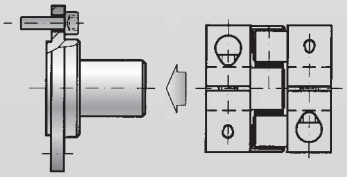
Non-standard hubs with flange

EK 2 EK 2
Non standard hub



Intermediate piece for higher lateral misalignment

EKL



Adapter flange for planetery gearboxes acc. to ISO 9409

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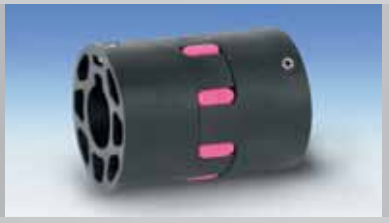
From 2 – 25,000 Nm
Shaft diameters 3 – 170 mm
backlash free, press fit design



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Shaft diameters 3 – 45 mm

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Thread M5 – M16

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Rated torque 1 Ncm
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A055/12/10/1.000