WEAR- AND MAINTENANCE-FREE.

LINE SHAFTS

SERIES ZA / ZAE | 10 – 4,000 Nm
EZ2 / EZV | 10 – 25,000 Nm

R+W®
COUPLING TECHNOLOGY

THE ULTIMATE COUPLING FROM 10 – 25,000 Nm

www.rw-america.com

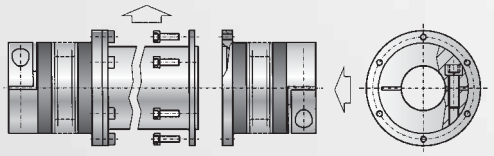
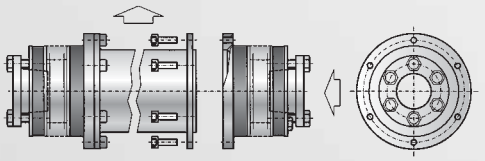
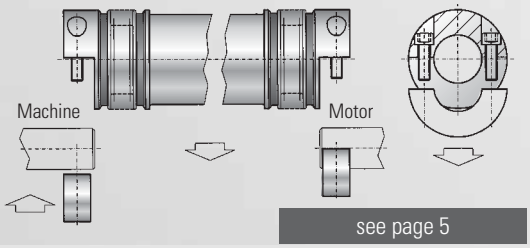
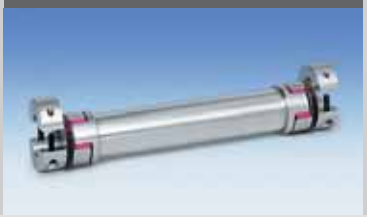
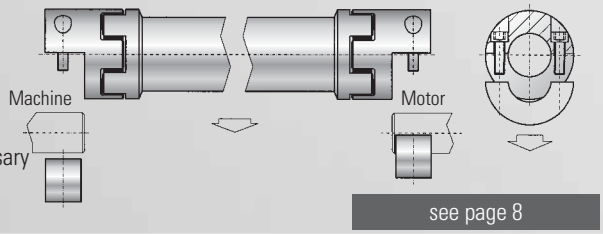
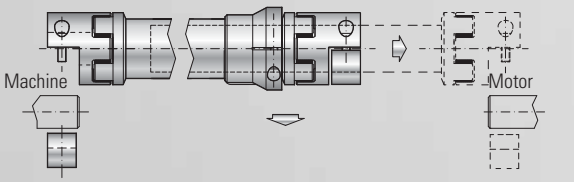
optional stainless steel

TORSION RESISTANT LINE SHAFTS

Application Examples:

Spanning of larger axial distances

- Palletizers
- Screw jack systems
- Multi-axis linear modules
- Printing machinery
- Pulp and paper machinery
- Packaging machinery
- Conveyor systems
- Textile machinery
- Crane gantry systems
- Automated assembly systems
- Woodworking machinery
- Food processing machinery

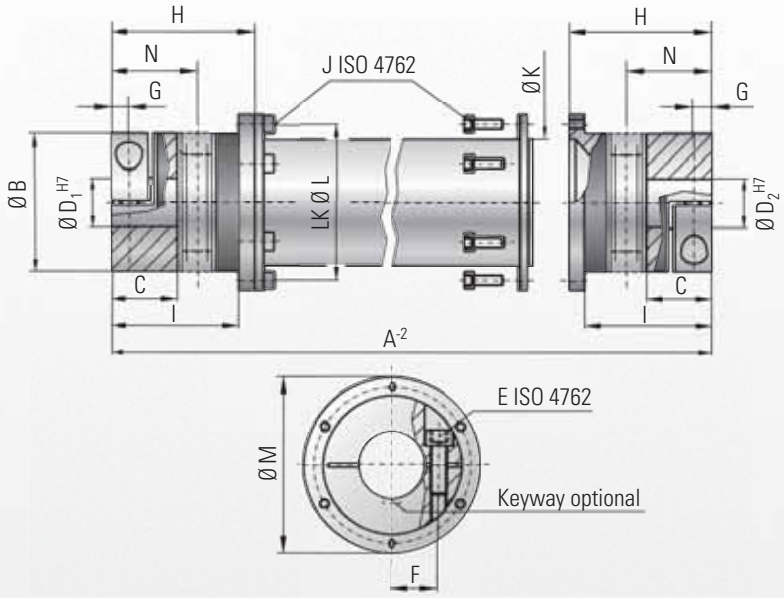
MODEL	PROPERTIES	APPLICATION EXAMPLES
ZA 	**from 10 – 800 Nm** ■ Mounting + dismounting without moving the aligned shafts ■ Standard lengths up to 6 m (19.68 ft.) ■ No intermediate support bearing required	 see page 3
ZA 	**from 1,500 – 4,000 Nm** ■ Mounting + dismounting without moving the aligned shafts ■ Standard lengths up to 6 m (19.68 ft.) ■ No intermediate support bearing required	 see page 4
ZAE 	**from 10 – 800 Nm** ■ Coupling radially removable ■ easy mounting and dismounting with split hubs ■ Standard lengths up to 6 m (19.68 ft.) ■ No intermediate support bearing required	 see page 5
EZ 2 	**from 10 – 25,000 Nm** ■ vibration damping ■ easy mounting and dismounting with split hubs ■ length up to 4 m (13.12 ft.) ■ no intermediate support bearing necessary ■ radial mounting due to split hubs	 see page 8
EZV 	**from 10 – 1,200 Nm** ■ continuously adjustable length ■ vibration damping ■ easy mounting and dismounting with split hubs ■ length up to 4 m (13.12 ft.) ■ no intermediate support bearing necessary ■ radial mounting due to split hubs	 see page 9

optional stainless steel

MODEL **ZA 10-800 Nm**

BACKLASH FREE LINE SHAFTS

with clamping hub



Properties:

- Compensation for misalignments
- Backlash-free and torsionally rigid
- Able to span long distances
- Standard lengths up to 6 m (19.68 ft.)
- No intermediate support bearing required
- Intermediate tube removable for easy mounting

Material:

Bellows made of flexible high grade stainless steel. Aluminum intermediate tube section through size 200, size 300 and up steel. **Optional composite CFK tube.** Clamping hubs through size 60 aluminum, size 150 and up steel.

Design:

Balanced clamping hubs with one radial screw per ISO 4762. Intermediate tube section supported by gimbals within the clamping hub. Mounting and dismounting accomplished through the removal of the intermediate tube section. Absolutely backlash-free due to frictionalclamp connection.

Temperature range:

-30 to +100° C (-22° F to 212° F)

Speed:

Depending on length A, please contact R+W

Service life:

These couplings have an infinite life and are maintenance-free if the technical ratings are not exceeded.

Fit tolerance:

Shaft/hub connection 0.01 to 0.05 mm

Ordering example

ZA / 10 / 1551 / 18 / 19.05 / XX

- Model
- Series/rated torque Nm
- Overall length mm
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non-Standard e.g. carbon tube

All data is subject to change without notice.

Model ZA 10 - 800 Nm			Series							
			10	30	60	150	200	300	500	800
Rated torque	(Nm)	T_{KN}	10	30	60	150	200	300	500	800
Overall length min. to max.	(mm)	A^{-2}	110 - 6000	140 - 6000	170 - 6000	190 - 6000	210 - 6000	250 - 6000	260 - 6000	260 - 6000
Outer diameter clamping hub	(mm)	B	40	55	66	81	90	110	123	134
Fit length	(mm)	C	16	27	31	35.5	40.5	43	50	48
Inner diamter from Ø to Ø H7	(mm)	$D_{1/2}$	5 - 20	10 - 28	12 - 32	19 - 42	22 - 45	30 - 60	35 - 60	40 - 72
With keyway max. Ø H7	(mm)	$D_{1/2}$	17	23	29	36	45	60	60	66
ISO 4762 clamping screw		E	M4	M6	M8	M10	M12	M12	M16	2x M16
Tightening torque	(Nm)		5	15	40	70	110	130	200	250
Distance between centers	(mm)	F	15	19	23	27	31	39	41	48
Distance	(mm)	G	5	7.5	9.5	11	12.5	13	17	18
Length bellows body	(mm)	H	44.5	57.5	71	78	86	94	110	101
Distance	(mm)	I	38.5	51	61	69	75.5	81	96	89
ISO 4762 screw		J	4x M4	6x M4	6x M5	8x M6	8x M6	8x M8	8x M8	10x M8
Tightening torque of the assembly screws	(Nm)		3	4	7	10	12	30	30	40
Outer diamter tube section	(mm)	K	35	50	60	76	90	100	110	120
Bolt hole circle Ø	(mm)	L	45	62.5	71.5	88	100	120	132	138
Outer diamter flange	(mm)	M	52	70	80	98	110	135	148	153
Shaft average value	(mm)	N	25	34	41	47	52	56	66	64

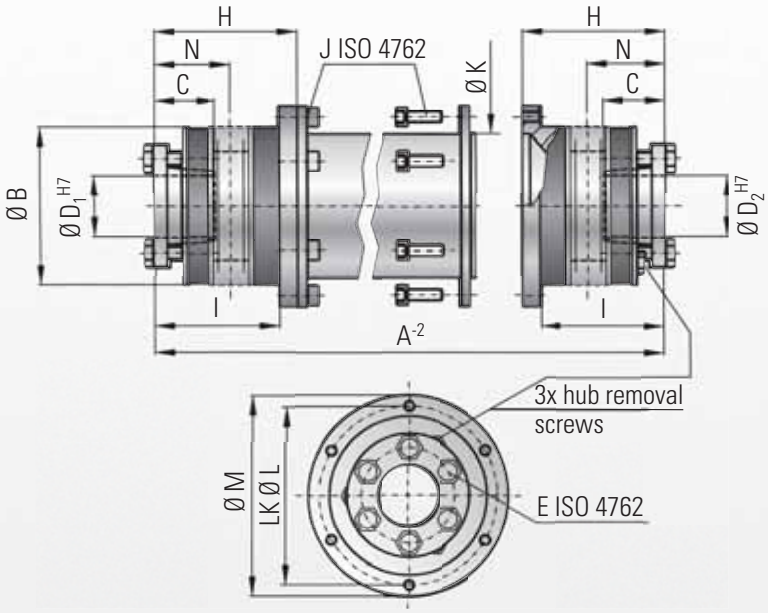
1Nm = 8.85 in lbs max. permissible misalignment page 6

optional stainless steel

MODEL **ZA 1500-4000 Nm**

BACKLASH FREE LINE SHAFTS

with tapered conical sleeves



Properties:

- Compensation for misalignment
- Backlash-free and torsionally rigid
- Able to span longer distances
- Standard lengths up to 6 m (19.68 ft.)
- No intermediate support bearing required
- Intermediate tube removable for easy mounting

Material:
Bellows made of flexible high grade stainless steel. Intermediate tube section: steel, **optional composite CFK tube.** Clamping hubs: steel.

Design:
With tapered conical sleeves and captive jack screws. Intermediate tube section supported by gimbals within the clamping hub.
Lateral mounting and dismounting accomplished through the removal of the intermediate tube section. Absolutely backlash-free due to frictional clamp connection.

Temperature range:
-30 to +100° C (-22° F to 212° F)

Speed:
Depending on length A, please contact R+W

Service life:
These couplings have an infinite life and are maintenance-free if the technical ratings are not exceeded

Fit tolerance:
Shaft/hub connection 0.01 to 0.05 mm

Ordering example

ZA / 1500 / 2551 / 65 / 70 / XX

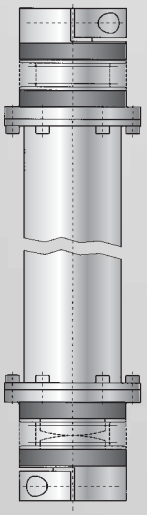
- Model
- Series/rated torque Nm
- Overall length mm
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non-Standard e.g. carbon tube

All data is subject to change without notice.

Model ZA 1500 - 4000 Nm			Series 1500	Series 4000
Rated torque	(Nm)	T_{KN}	1500	4000
Overall length min. to max.	(mm)	A^{-2}	280 - 6000	280 - 6000
Outer diameter	(mm)	B	157	200
Fit length	(mm)	C	61	80,5
Inner diameter from Ø to Ø H7	(mm)	$D_{1/2}$	35 - 70	40 - 100
ISO 4017 clamping screws	6x	E	M12	M16
Tightening torque	(Nm)		70	120
Length bellows body	(mm)	H	98	103,5
Distance	(mm)	I	82	84
ISO 4762 screw		J	10x M10	12x M12
Tightening torque of the assembly screws	(Nm)		70	120
Outer diameter tube section	(mm)	K	150	160
Bolt hole circle Ø	(mm)	L	168	193
Outer diameter flange	(mm)	M	184	213
Shaft average value	(mm)	N	56	61

max. permissible misalignments page 6

Vertical installation ZA/ZAE



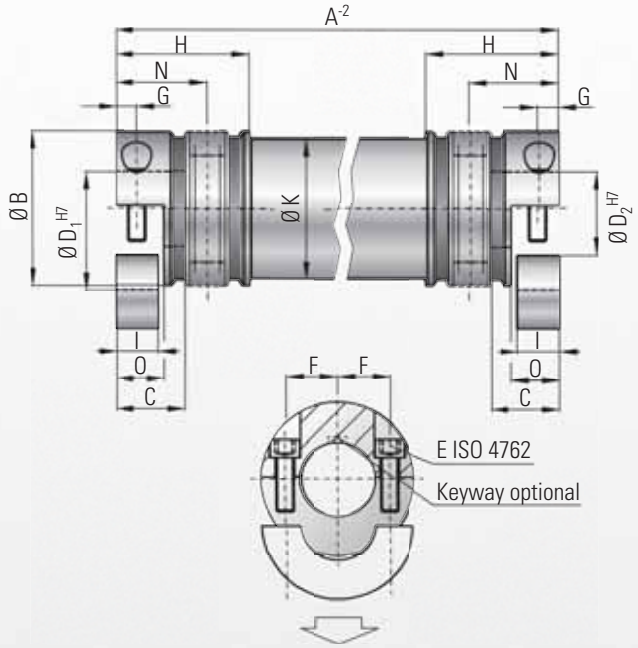
- When mounting vertically additional support of the lower bellows body is necessary.
- A special bellows body for vertical mounting is available upon request.
- Please note „vertical mounting" when ordering.

optional stainless steel

MODEL **ZAE 10-800 Nm**

BACKLASH FREE LINE SHAFTS

with split hub



Ordering example

ZAE / 10 / 1551 /18/19.05/XX

- Model
- Series/rated torque Nm
- Overall length mm
- Bore Ø D1 H7
- Bore Ø D2 H7
- Non-Standard e.g. carbon tube

All data is subject to change without notice.

Properties:

- Compensation for misalignment
- Backlash-free and torsionally rigid
- Able to span longer distances
- Standard lengths up to 6 m (19.68 ft)
- No intermediate support bearing required
- Split hubs for easy mounting and dismounting

Material:
Bellows made of flexible high grade stainless steel. Aluminum intermediate tube section through size 150, size 300 and up steel **optional composite CFK tube**. Clamping hubs through size 60 aluminum, size 150 and up steel.

Design:
Balanced split clamping hubs with two radial clamping screws ISO 4762.
Intermediate tube section supported by gimbals within the bellows.
Lateral mounting and dismounting accomplished due to split hubs. Absolutely backlash-free through frictional clamp connection.

Temperaturerange:
-30 to +100° C (-22° F to 212° F)

Speed:
Depending on length A, please contact R+W

Service life:
These couplings have an infinite life and are maintenance-free if the technical ratings are not exceeded.

Fit tolerance:
Shaft/hub connection 0.01 to 0.05 mm

Model ZAE 10 - 800 Nm			Series						
			10	30	60	150	300	500	800
Rated torque	(Nm)	T_{KN}	10	30	60	150	300	500	800
Overall length min. to max.	(mm)	A^{-2}	100 - 6000	130 - 6000	160 - 6000	180 - 6000	240 - 6000	250 - 6000	250 - 6000
Outer diameter clamping hub	(mm)	B	40	55	66	81	110	123	133
Fit length	(mm)	C	16	27	31	34.5	42	50	47
Inner diamter from Ø to Ø H7	(mm)	$D_{1/2}$	5 - 20	10 - 28	12 - 32	19 - 42	30 - 60	35 - 60	40 - 72
Max.inner diameter clamping hub	(mm)	D_{max}	24	30	32	42	60	60	75
with keyway - max Ø H7	(mm)	$D_{1/2}$	17	23	29	36	60	60	66
ISO 4762 clamping screws		E	M4	M6	M8	M10	M12	M16	M16
Tightening torque	(Nm)		5	15	40	70	130	200	250
Distance between centers	(mm)	F	15	19	23	27	39	41	48
Distance	(mm)	G	5	7.5	9.5	12	14	17	19
Length bellows body	(mm)	H	39.5	52	64	72	83	96	95
Clamping length	(mm)	I	10	15	19	22	28	33.5	37.5
Outer diameter tube section	(mm)	K	35	50	60	76	100	110	120
Length	(mm)	O	11.5	17	21	24	30	35	40
Shaft average value	(mm)	N	25	34	41	47	56	66	65

1Nm = 8.85 in lbs

max. permissible misalignments page 6

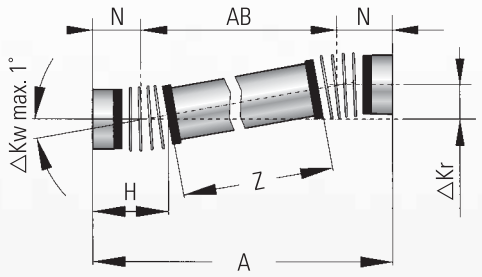
optional stainless steel

NOTES

SELECTION PROCESS FOR LINE SHAFTS MODELS ZA / ZAE

Series T_{KN} (Nm)	Torsional stiffness of both bellows bodies combined C_T^B (Nm/rad)	Torsional stiffness per 1m tube C_T^{ZWR} (Nm²/rad)	Length of bellows body ZA H (mm)	Length of bellows body ZAE H (mm)	Distance between center lines N (mm)	max. axial misalignment △ Ka (mm)
10	4,525	1,530	44.5	39.5	25	2
30	19,500	6,632	57.5	52	34	2
60	38,000	11,810	71	64	41	3
150	87,500	20,230	78	72	47	4
200	95,500	65,340	86	–	52	4
300	250,500	222,700	94	83	56	4
500	255,000	292,800	110	96	66	5
800	475,000	392,800	101	89	64	6
1500	1,400,000	728,800	92	–	56	4
4000	4,850,000	1,171,000	102	–	61	4

Table 1



A	Overall length ZA	mm
AB	AB = (A – 2xN)	mm
Z	Tube length Z = (A – 2xH)	mm
H	Length of the bellows body	mm
N	Distance between center lines	mm
M_{max}	Max. torque	Nm
φ	Angle of twist	degree
C_T^B	Torsional stiffness of both bellows bodys	Nm/rad
C_T^{ZWR}	Torsional stiffness of tube per meter	Nm/rad
C_T^{ZA}	Torsional stiffness of entire coupling	Nm/rad

Torsional stiffness:

$$(C_T^{ZA}) = \frac{C_T^B \times (C_T^{ZWR}/Z)}{C_T^B + (C_T^{ZWR}/Z)} \text{ [Nm/rad]}$$

Torsional deflection (twist)

$$\varphi = \frac{180 \times T_{AS}}{\pi \times C_T^{ZA}} \text{ [degree]}$$

Example: Line shaft ZA 150 T_{KN} = 150 Nm
Wanted: Deflection at max. rated torque T_{KN}

Length (A) of the shaft = 1.5 m
Length (Z) of the tube = A – (2xH) = 1.344m

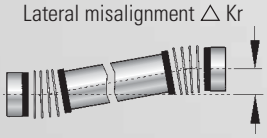
$$(C_T^{ZA}) = \frac{87500 \text{ Nm/rad} \times (20230 \text{ Nm/rad} / 1.344 \text{ m})}{87500 \text{ Nm/rad} + (20230 \text{ Nm/rad} / 1.344 \text{ m})} = 12842.8 \text{ [Nm/rad]}$$

$$\varphi = \frac{180 \times 150 \text{ Nm}}{\pi \times 12842.8 \text{ Nm/rad}} = 0.669°$$

The result with a max. torque of 150 Nm is an angle of twist of 0.669°.

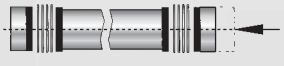
Max. possible misalignment

Lateral misalignment △ Kr



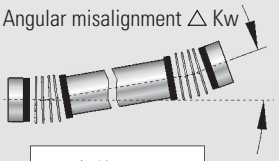
△ Kr = tan x AB
AB = A – 2 x N

Axial misalignment △ Ka



see Table 1

Angular misalignment △ Kw



△ Kw = 2° max.

R+W calculation programm for critical resonant speeds

With specially developed software R+W can calculate the critical resonant speeds for each application. The critical speed can be altered by changing the tube material and/or other parameters.
Results of a calculation are shown on the right.

Critical resonant speed	n_k	=	1/min.
Torsional stiffness tube ZA/ZAE	C_T^{ZWR}	=	Nm/rad
Total stiffness ZA/ZAE	C_T^{ZA}	=	Nm/rad
Angle of twist	φ	=	degree-min-sec
Weight of total axes	m	=	kg
Mass moment of inertia	J	=	kgm²
Permissible lateral misalignment	△ Kr	=	mm

optional stainless steel

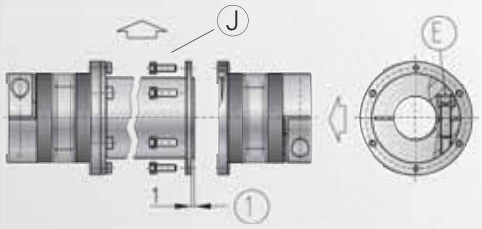
ASSEMBLY INSTRUCTIONS

Alignment

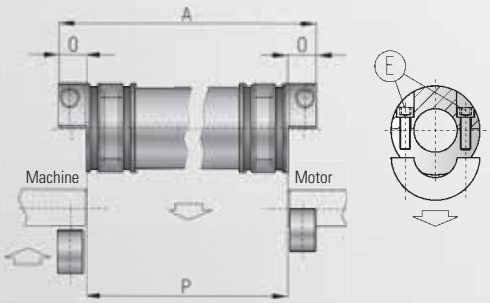
R+W ZA and ZAE line shaft couplings are available in lengths up to 6 meters (19.7 feet) without intermediate support bearings. To ensure maximum life proper alignment is necessary. We recommend laser alignment whenever possible. Other alignment techniques are also appropriate as long as the maximum permissible misalignment values listed on page 6 are not exceeded.

Clamping hub

- **Model ZA (series 10 - 800 Nm)**



- **Model ZAE (series 10 - 800 Nm)**



Mounting: Loosen Screw E and slide the metal bellows coupling segments onto each shaft end. Now insert the intermediate tube and assemble onto both metal bellows coupling segments using the assembly screws J. Tighten the assembly screws J to the correct torque indicated in the specification table. Center the entire line shaft coupling onto the shaft ends and tighten screw E by using a torque wrench to ensure the correct torque as indicated in the specification table.

Dismounting: Loosen Screw E on one end of the line shaft coupling. Remove assembly screws J on both ends of the line shaft and remove the intermediate tube. Be sure to support the intermediate tube during removal. Depending on length this may require two people. Loosen Screw E on the second metal bellows couling segment and slide both segments off.

Mounting: First ensure that the distance between shaft ends exceeds the dimension P.

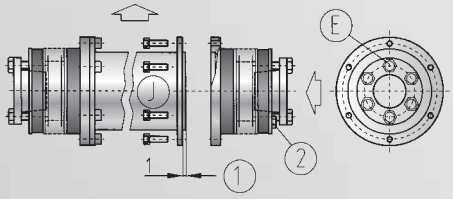
Length P = length A - 2 x 0 [mm]

Insert the line shaft coupling and assemble the split hubs with assembly scews E. Using a torque wrench to tighten screws E to the correct torque indicated in the specification table.

Dismounting: Remove the split hubs by removing the assembly screws E. Lift the line shaft coupling off the shaft ends.

Conical sleeve

- **Model ZA (series 1500 - 4000 Nm)**



Mounting: Loosen Screws E (Do not remove!) and slide the metal bellows coupling segments onto each shaft end. Now insert the intermediate tube and assemble onto both metal bellows coupling segments by using the assembly screws J. Tighten the assembly screws J to the correct torque which is indicated in the specification table. Center the entire line shaft coupling onto the shaft ends and evenly tighten screws E while using a torque wrench. Ensure the correct torque is applied as indicated in the specification table. Even tightening of screws E is critical to ensure that the shaft and metal bellows coupling segment are parallel.

CAUTION! An over tightening of the screws E may destroy the tapered bushing connection. Do not exceed the tightening torque as specified in the specification table.

Dismounting: Loosen the scews E on one side of the line shaft coupling. Using the three jack screws 2 to loosen the tapered segment so that it slides freely on the shaft. Remove the assembly screws J from both sides of the coupling and remove the intermediate tube. Be careful to support the tube during removal. Depending on the length of the tube this may require two people. Repeat the earlier procedure to remove the second metal bellows coupling segment.

CAUTION! Be sure to lower the jack screws 2 before reassembly.

Maintenence

R+W line shafts are maintenance free. During routine inspections the line shafts should be visibly inspected.

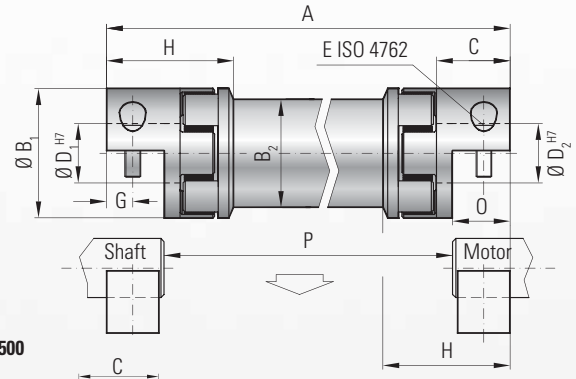
optional stainless steel

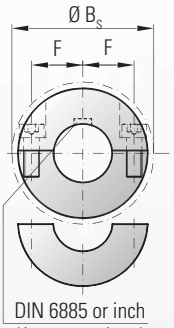
MODEL **EZ2**

BACKLASH FREE LINE SHAFTS

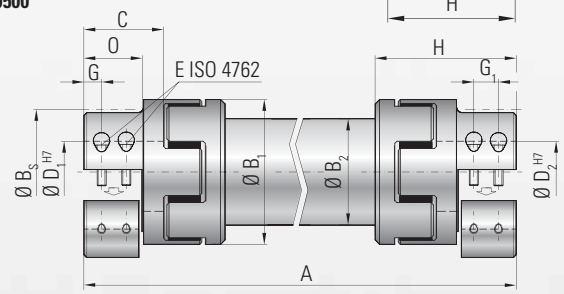
with split clamping hubs

Series 10 - 800





Series 2500 - 9500



Ordering example

EZ2 / 20 / 1200 / A / 24 / 19 / XX

- Model
- Series
- Overall length mm
- 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.

Properties:

- Radial mounting possible with split hubs
- Spans distances of up to 4 m (13.12 ft)
- No intermediate support bearing required
- Low moment of inertia
- Damps vibrations
- Press-fit design
- Backlash-free

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.
Intermediate tube: precision machined aluminum tube; steel and composite tubes are also available.

Design:
Two coupling hubs are concentrically machined with concave driving 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:
On the hub/shaft connection 0.01 to 0.05 mm

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	
Outer diameter hub (mm)	B_1	32		42		56		66.5		82		102		136.5		160		225		290	
Outer diameter tube (mm)	B_2	28		35		50		60		76		90		120		150		175		220	
Outer diameter with screwhead (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	
Inner diameter range from Ø to Ø 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	
Mounting 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 mounting 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		15		17.5		20		25		30		36		24 / 34		30 / 48	
Mounting length (mm)	O	16.6		18.6		32		37		42		52		62		67		85		105	
Moment of inertia per Hub half (10^{-3} kgm²)	J_1/J_2	0.01		0.02		0.15		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		1800	

* Max. transmittable torque of the clamping hub see table 3 (page 10)

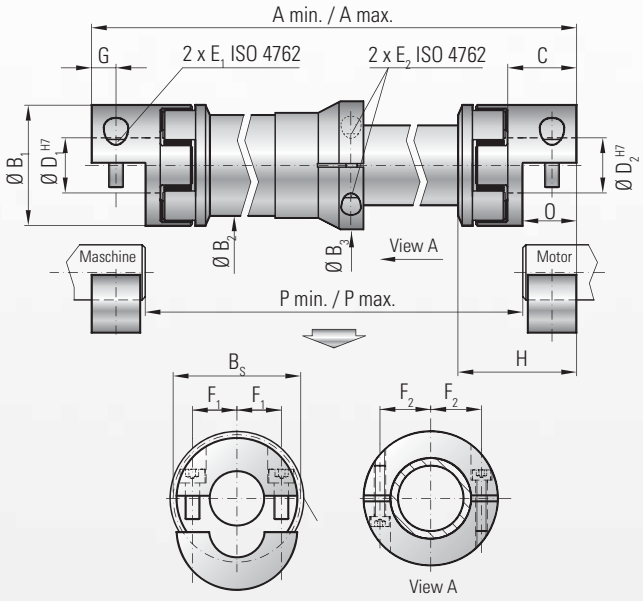
Further infomation EK broschure page 14/15

optional stainless steel

MODEL **EZV**

BACKLASH FREE LINE SHAFTS

variable length



Properties:

- Lateral mounting due to split hubs
- Spans distances of up to 4 m (13.12 ft)
- Low moment of inertia
- Vibration damping
- Press fit designs
- Backlash free Line Shaft

Material:

Clamping hub: high strength aluminum.
Elastomer insert: precision molded wear resistant, and thermally stable polymer. Intermediate tubes: precision machined aluminum tube.

Design:

Two split coupling hubs are concentrically machined with concave driving jaws. Both coupling bodies are rigidly mounted to tubes with high concentricity. While loosening the tube clamping, a length variation is possible within the given range. 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 EZV Line Shafts.

Tolerance:

On the hub/shaft connection 0.01 to 0.05 mm.

Ordering example

EZV / 020 / 1200 / A / 24 / 19 / XX

- Model
- Series
- Inserted min. 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.

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
Inserted min. length from - to	(mm)	A_{min}	150 - 2055		200 - 2075		250 - 2095		300 - 2115		350 - 2130		400 - 2150	
Extended over all length from - to	(mm)	A_{max}	190 - 4000		250 - 4000		310 - 4000		370 - 4000		440 - 4000		500 - 4000	
Outer diameter hub	(mm)	B_1	32		42		56		66.5		82		102	
Outer diameter tube	(mm)	B_2	28		35		50		60		80		90	
Outer diameter tube hub	(mm)	B_3	41.5		47		67		77		102		115	
Outer diameter with screwhead	(mm)	B_S	32		44.5		57		68		85		105	
Fit length	(mm)	C	20		25		40		47		55		65	
Inner diameter possible from Ø to Ø H7	(mm)	$D_{1/2}$	5 - 16		8 - 25		14 - 32		19 - 35		19 - 45		24 - 60	
Screw ISO 4762		E_1	M4		M5		M6		M8		M10		M12	
Tighting torque of the mounting screw	(Nm)		4		8		15		35		70		120	
Distance between centers	(mm)	F_1	10.5		15.5		21		24		29		38	
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	
Measurement	(mm)	X1+X2	110		150		190		230		270		300	

* Max. transmittable torque of the clamping hub see table 3 (page 10)

Further infomation EK broschure page 16/17

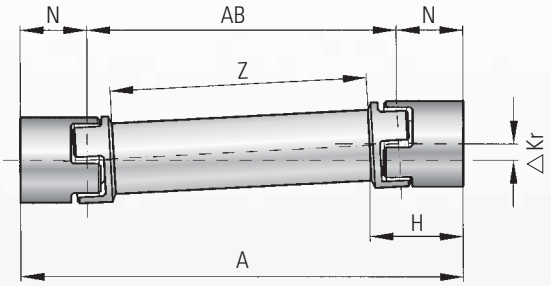
optional stainless steel

NOTES

TECHNICAL SPECIFICATIONS

Series T_{KN} (Nm)	Torsional stiffness of both coupling parts elastomer insert A C_T^B (Nm/rad)	Torsional stiffness of both coupling parts elastomer insert B C_T^B (Nm/rad)	Torsional stiffness per 1 m tube C_T^{ZWR} (Nm/rad)	Length of the coupling EZ H (mm)	Distance between center lines N (mm)	Max. axial misalignment △ Ka (mm)
10	270	825	321	34	26	2
20	1,270	2,220	1,530	46	33	4
60	3,970	5,950	6,632	63	49	4
150	6,700	14,650	11,810	73	57	4
300	11,850	20,200	20,230	86	67	4
450	27,700	40,600	65,340	99	78	4
800	41,300	90,000	392,800	125	94	4
2500	87,500	108,000	1,000,000	142	108	5
4500	168,500	371,500	2,500,000	181	137	5
9500	590,000	670,000	5,000,000	229	171	6

Table 2



A	Overall length	m
AB	Length AB = (A – 2xN)	m
Z	Tube length Z = (A – 2xH)	m
H	Length of the coupling	mm
N	Distance between center lines	mm
T_{AS}	Max. torque	Nm
φ	Angle of twist	degree
C_{Tdyn}^{E}	Torsional stiffness of both elastomer inserts	Nm/rad
C_T^{ZWR}	Torsional stiffness of tube per meter	Nm/rad
C_{Tdyn}^{EZ}	Torsional stiffness of entire coupling	Nm/rad

Torsional stiffness

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

Angle of twist

$$\varphi = \frac{180 \times T_{AS}}{\pi \times C_{Tdyn}{}^{EZ}} \text{ [degree]}$$

Example: Line shaft EZ2, series 150 T_{AS} = 160 Nm
To search: Angel of twist at maximal rated torque T_{AS}

Length (A) of the shaft = 1.5 m
Length (Z) of the tube = A – (2xH) = 1.354 m

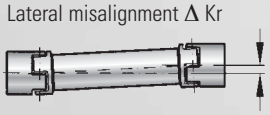
$$(C_{Tdyn}{}^{EZ}) = \frac{6700 \text{ Nm/rad} \times (11810 \text{ Nm/rad} / 1.354 \text{ m})}{6700 \text{ Nm/rad} + (11810 \text{ Nm/rad} / 1.354 \text{ m})} = 3789 \text{ [Nm/rad]}$$

$$\varphi = \frac{180 \times 160 \text{ Nm}}{\pi \times 3789 \text{ Nm/rad}} = 2.42°$$

The result with a max. torque of 160 Nm in an angel of twist of 2.42°

Max. possible misalignment

Lateral misalignment Δ Kr



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

Angular misalignment Δ Kw

$$\Delta Kw_{max} = \text{ca. } 2°$$

Axial misalignment Δ Ka total

See table 2

Max. transmittable torque depends on the bore diameter (Nm)

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!

Table 3

Temperature factor S in ° Celsius

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

Please note for every design (see brochure EK). 1° C = 33,8° F

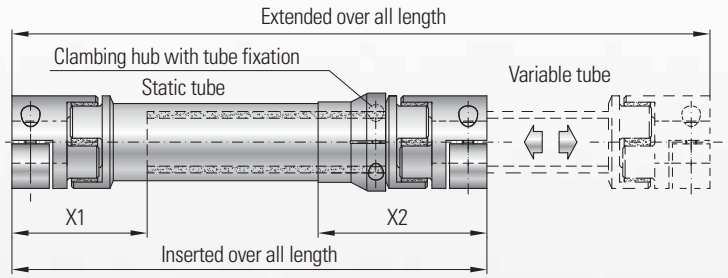
Table 4

optional stainless steel

ASSEMBLY INSTRUCTIONS

Function

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



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

The extended over all length and the inserted over all length are related. Depending on the requirements, the coupling length can be calculated using the two formulas shown here to receive the extended or the inserted over all length.

Alignment

To ensure maximum life proper alignment is necessary. We recommend laser alignment whenever possible. Other alignment techniques are also appropriate as long as the maximum permissible misalignment values listed on table 2 (page 10) are not exceeded.

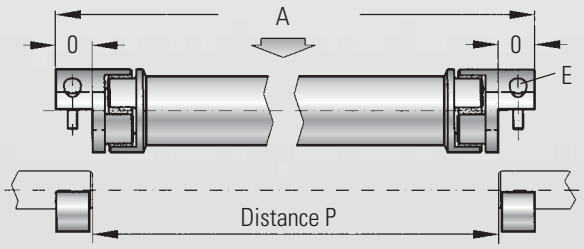
Specification of the elastomer inserts

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

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

Clamping hub

■ **Model EZ2 / EZV**



The total length of the axis is defined by the distance P + 2 x 0.

Mounting: First ensure that the distance between shaft ends exceeds the dimension P.

Distance degree P = Length A - 2 x 0 [mm]

Insert the line shaft coupling and assemble the split hubs with assembly screws E. Using a torque wrench to tighten screws E to the correct torque indicated in the specification table.

Dismounting: Remove the split hubs by removing the assembly screws E.

Lift the line shaft coupling off the shaft ends.

Maintenance

R+W line shafts are maintenance free. During routine inspections the line shafts should be visibly controlled.

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From 0.1 – 160,000 Nm, Bore diameters 3 – 290 mm
Available as a single position, multi-position,
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Single piece or press-fit design

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Available up to 6 m length

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Single piece or press-fit design

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ELASTOMER COUPLINGS
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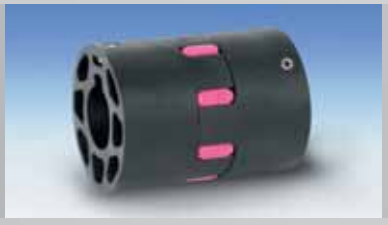
backlash-free, press-fit design



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Bore diameters 1 – 1.5 mm

A059/03/11/1.000