

WEAR- AND MAINTENANCE-FREE.

LINE SHAFTS

SERIES	ZA / ZAE	 	10 – 4,000 Nm
	EZ2 / EZV	 	10 – 2,150 Nm



R+W[®]
COUPLING TECHNOLOGY

THE ULTIMATE COUPLING FROM 10 – 4,000 Nm

www.rwcouplings.com



TORSION RESISTANT LINE SHAFTS

Application Examples:

Spanning of larger axial distances

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

MODEL

PROPERTIES

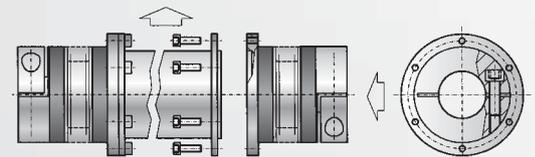
APPLICATION EXAMPLES

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



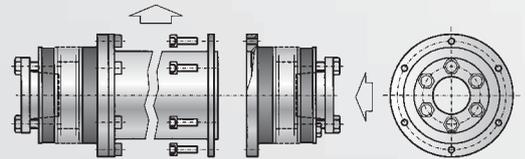
see page 3

ZA



from 1500 – 4000 Nm

- Mounting + dismounting without moving the aligned shafts
- Standard lengths up to 3 m (9.84 ft.)
- No intermediate support bearing required



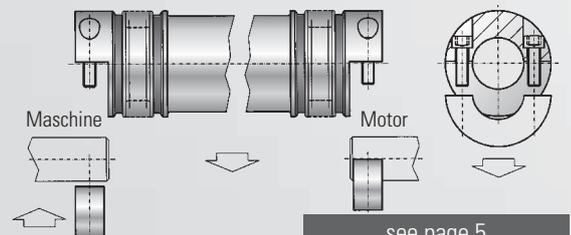
see page 4

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



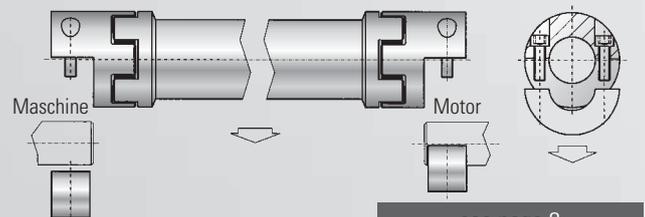
see page 5

EZ 2



line shaft with split clamping hub

- 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



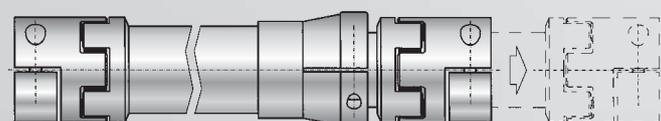
see page 8

EZV



from 10 – 800 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

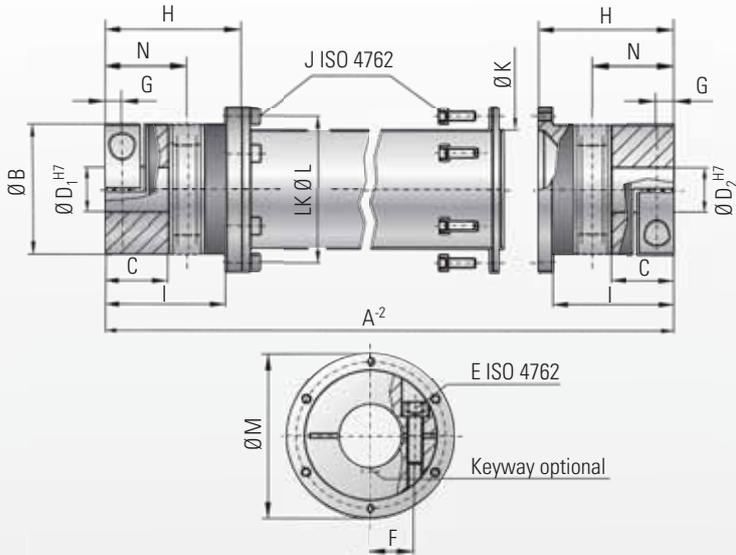


see page 9

optional
stainless
steel

MODEL ZA 10-800 Nm

BACKLASH FREE LINE SHAFTS



Ordering example

ZA / 10 / 1551 / 18/19.05/XX

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

All data is subject to change without notice.



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

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.

Backlash:

Absolutely backlash-free due to frictional clamp connection

Fit tolerance:

Shaft/hub connection 0.01 to 0.05 mm

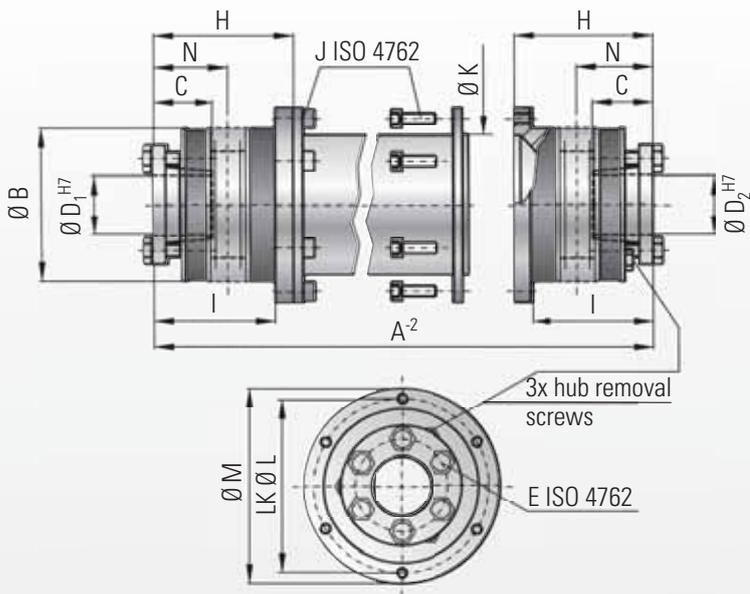
Model ZA 10 - 800 Nm			Series							
			10	30	60	150	200	300	500	800
Rated torque (Nm)	T _{KN}		10	30	60	150	200	300	500	800
Overall length min. to max. (mm)	A		110 to 6000	140 to 6000	170 to 6000	190 to 6000	210 to 6000	250 to 6000	260 to 6000	260 to 6000
Outer diameter clamping hub (mm)	B		40	55	66	81	90	110	123	134
Fit length (mm)	C		16	27	31	35.5	40.5	43	50	48
Inner diameter from Ø to Ø H7 (mm)	D _{1/2}		5 to 20	10 to 28	12 to 32	19 to 42	22 to 45	30 to 60	35 to 60	40 to 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)	E		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)	J		3	4	7	10	12	30	30	40
Outer diameter 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 diameter 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



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 3 m (9.84 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.

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

Backlash:

Absolutely backlash-free due to frictional clamp connection

Fit tolerance:

Shaft/hub connection 0.01 to 0.05 mm

Ordering example

ZA / 1500 / 2551 / 65 / 70 / XX

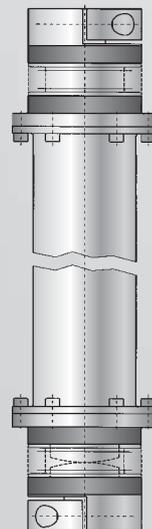
Model
Series/rated torque
Overall length
Ø D1 H7
Ø D2 H7
Non-Standard e.g. carbon tube

All data is subject to change without notice.

Model ZA 1500 - 4000 Nm			Series	
			1500	4000
rated torque (Nm)	T _{KN}	1500	4000	
Overall length min. to max. (mm)	A	240 to 6000	280 to 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 to 70	40 to 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		10x M10	12x M12	
Tightening torque of the assembly screws (Nm)	J	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

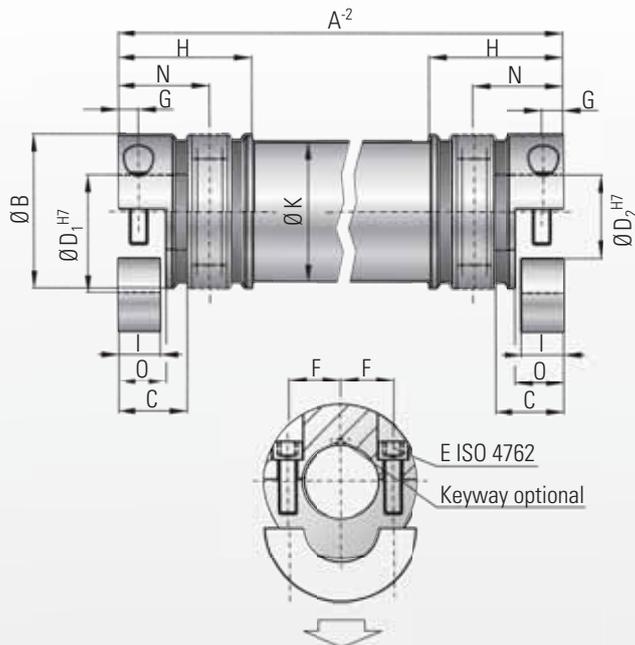


- When mounting vertically additional support of the lower bellows body is necessary.
- A special bellows body for vertical mounting is available upon request.
- Please note „vertical mounting“ when ordering.



MODEL ZAE 10-800 Nm

BACKLASH FREE LINE SHAFTS



with split hub

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

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.

Backlash:

Absolutely backlash-free through frictional clamp connection

Fit tolerance:

Shaft/hub connection 0.01 to 0.05 mm

Ordering example

ZAE / 10 / 1551 / 18/19.05/XX

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

All data is subject to change without notice.

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	100 to 6000	130 to 6000	160 to 6000	180 to 6000	240 to 6000	250 to 6000	250 to 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 diameter from Ø to Ø H7 (mm)	D _{1/2}	5 to 20	10 to 28	12 to 32	19 to 42	30 to 60	35 to 60	40 to 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)	E	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

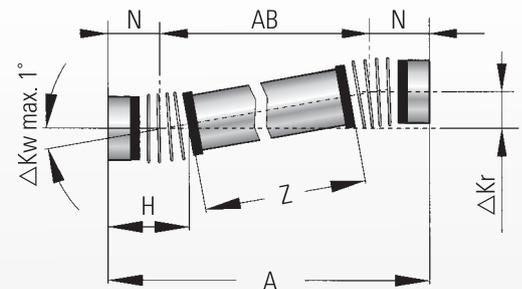


NOTES

SELECTION PROCESS FOR LINE SHAFTS MODELS ZA / ZAE

Series	Torsional stiffness of both bellows bodies combined		Length of bellows body ZA	Length of bellows body ZAE	Distance between center lines	max. axial misalignment
	T_{KN} (Nm)	C_T^B (Nm/rad)				
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 mm
 $Z = (A - 2xH)$
- 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 bodies 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 = $A - (2xH) = 1.344$ m

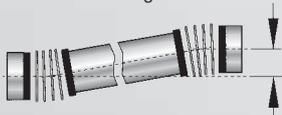
$$(C_T^{ZA}) = \frac{87500 \text{ Nm/rad} \times (20230 \text{ Nm/rad} / 1.344 \text{ m})}{87500 \text{ Nm/rad} + (20230 \text{ Nm/rad} / 1.344 \text{ m})} = 12842.8 \text{ [Nm/rad]}$$

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

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

Max. possible misalignment

Lateral misalignment ΔKr



$$\Delta Kr = \tan \times AB$$

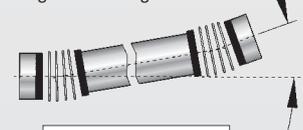
$$AB = A - 2 \times N$$

Axial misalignment ΔKa



see Table 1

Angular misalignment ΔKw



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

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 $n_k = 1/\text{min.}$
- Torsional stiffness tube ZA/ZAE $C_T^{ZWR} = \text{Nm/rad}$
- Total stiffness ZA/ZAE $C_T^{ZA} = \text{Nm/rad}$
- Angle of twist $\varphi = \text{degree-min-sec}$
- Weight of total axes $m = \text{kg}$
- Mass moment of inertia $J = \text{kgm}^2$
- Permissible lateral misalignment $\Delta Kr = \text{mm}$

optional
stainless
steel

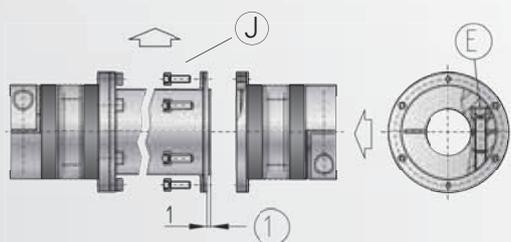
ASSEMBLY INSTRUCTIONS

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

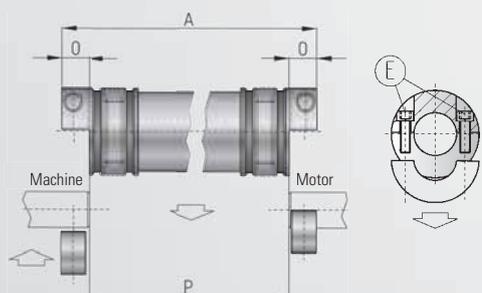
■ Model ZA (series 10 - 800 Nm)



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 coupling segment and slide both segments off.

■ Model ZAE (series 10 - 800 Nm)



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

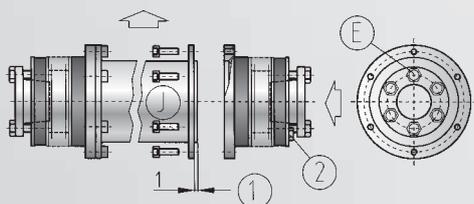
$$\text{Length P} = \text{length A} - 2 \times 0 \text{ [mm]}$$

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.

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 screws E on one side of the line shaft coupling. Using the three jack screws F 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 F before reassembly.

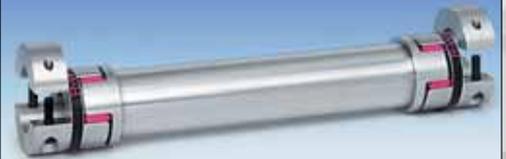
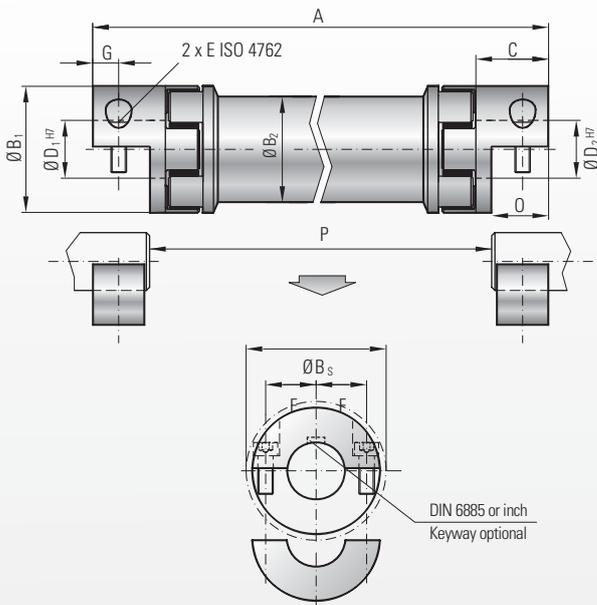
Maintenance

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



MODEL EZ2

BACKLASH FREE LINE SHAFTS



with split clamping hubs

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

Torsional stiffness:

To optimize the application different elastomer inserts with different shore hardnesses are available

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.

Model EZ 2		Series													
		10		20		60		150		300		450		800	
Type (Elastomer insert)		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
Max. torque** (Nm)	T_{Kmax}	25	32	34	42	120	150	320	400	650	810	1060	1350	1900	2150
Overall length (mm)	A	95 - 4000		130 - 4000		175 - 4000		200 - 4000		245 - 4000		280 - 4000		320 - 4000	
Outer diameter hub (mm)	B_1	32		42		56		66.5		82		102		136.5	
Outer diameter tube (mm)	B_2	28		35		50		60		76		90		120	
Outer diameter with screwhead (mm)	B_s	32		44.5		57		68		85		105		139	
Fit length (mm)	C	20		25		40		47		55		65		79	
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	
Mounting screw (ISO 4762/12.9)	E	M4		M5		M6		M8		M10		M12		M16	
Tightening torque of the mounting screw (Nm)	E	4		8		15		35		70		120		290	
Distance between centers (mm)	F	10.5		15.5		21		24		29		38		50.5	
Distance (mm)	G	7.5		8.5		15		17.5		20		25		30	
Mounting length (mm)	O	16.6		18.6		32		37		42		52		62	
Moment of inertia per Hub half (10^{-3} kgm ²)	J_1/J_2	0.01		0.02		0.15		0.21		1.02		2.3		17	
Inertia of tube per meter (10^{-3} kgm ²)	J_3	0.075		0.183		0.66		1.18		2.48		10.6		38	

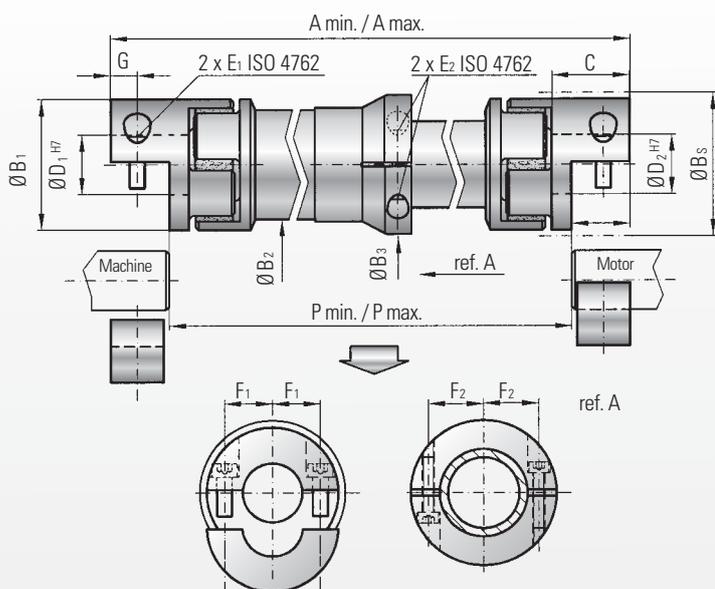
optional
stainless steel

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, steel or composite tube are upon request available.

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 EZ Line Shafts.

Tolerance:

On the hub/shaft connection 0.01 to 0.05 mm.

Torsional stiffness:

To optimize the application different elastomer inserts with different shore values are available

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 to 2055		200 to 2075		250 to 2095		300 to 2115		350 to 2130		400 to 2150	
Extended over all length from - to (mm)	A_{max}	190 to 4000		250 to 4000		310 to 4000		370 to 4000		440 to 4000		500 to 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 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 to 16		8 to 25		14 to 32		19 to 35		19 to 45		24 to 60	
Screw (ISO 4762/12.9)	E_1	M4		M5		M6		M8		M10		M12	
Tighting torque of the mounting screw(Nm)	E_1	4		8		15		35		70		120	
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	
Measurement (mm)	X1+X2	110		150		190		230		270		300	

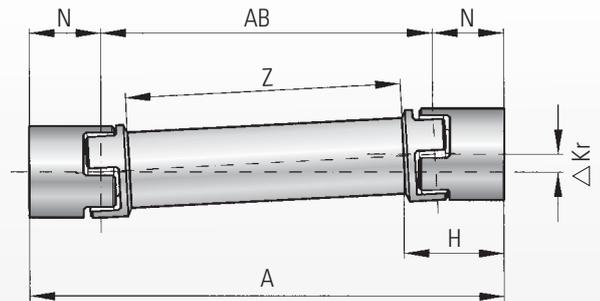


NOTES

TECHNICAL SPECIFICATIONS

Series	Torsional stiffness of both coupling parts elastomer insert A	Torsional stiffness of both coupling parts elastomer insert B	Torsional stiffness per 1 m tube	Length of the coupling EZ	Distance between center lines	Max. axial misalignment
T_{KN} (Nm)	C_T^A (Nm/rad)	C_T^B (Nm/rad)	C_T^{ZWR} (Nm/rad)	H (mm)	N (mm)	ΔKa (mm)
10	270	825	321	34	26	2
20	1270	2220	1530	46	33	4
60	3970	5950	6632	63	49	4
150	6700	14650	11810	73	57	4
300	11850	20200	20230	86	67	4
450	27700	40600	65340	99	78	4
800	41300	90000	392800	125	94	4

Table 2



- A Overall length m
- AB Length AB = (A - 2xN) m
- Z Tube length m
- Z = (A - 2xH)
- 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

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

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

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

Max. possible misalignment

Lateral misalignment ΔKr



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

$$AB = A - 2xN$$

Angular misalignment ΔKw



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

Axial misalignment ΔKa total



See table 2

Series	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	
10	4	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

Table 3

Temperature factor S in ° Celsius

Temperature (v)	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

Table 4

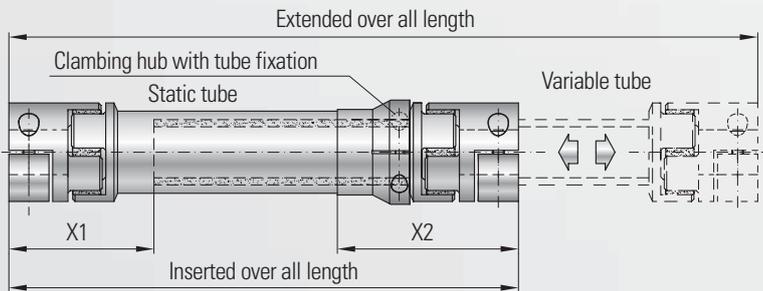
Please note for every design (see brochure EK).
1° C = 33,8° F

optional
stainless
steel

ASSEMBLY INSTRUCTIONS

Function

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



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

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.

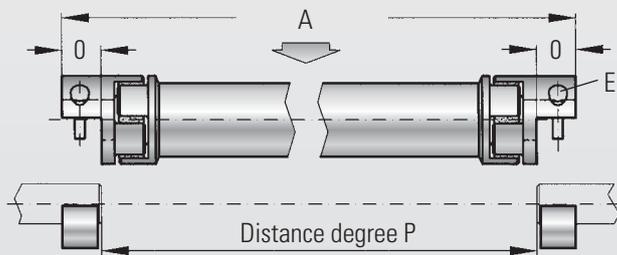
Specification of the elastomer inserts

Type	Shore hardness	Color	Material	Relative damping (ψ)	Temperature range	Features
A	98 Sh A	rot	TPU	0,4 - 0,5	-30°C bis +100°C	high damping
B	64 Sh D	grün	TPU	0,3 - 0,45	-30°C bis +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.

$$\text{Distance degree P} = \text{Length A} - 2 \times 0 \text{ [mm]}$$

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.

**Experience and
Know-how
for your special
requirements.**

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**QUALITY
MANAGEMENT**

We are certified
according to ISO 9001-2008



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The information mentioned in this document is based on our present knowledge and experiences and does not exclude the manufacturer's own substantial testing of the equipment. So this is no obligatory assurance even with regard to protection rights of Third Parties. The sale of our products is subject to our General Conditions of Sale and Delivery.

THE R+W-PRODUCT RANGE



TORQUE LIMITERS Series SK/ST

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



BELLOWS COUPLINGS Series BK

From 2 – 10,000 Nm
Bore diameters 10 – 180 mm
Single piece or press-fit design



LINE SHAFTS Series ZA/ZAE

From 10 – 4,000 Nm
Bore diameters 10 – 100 mm
Available up to 6 mtr. length



MINIATURE BELLOWS COUPLINGS Series MK

From 0.05 – 10 Nm
Bore diameters 1 – 28 mm
Single piece or press-fit design



SERVOMAX[®] ELASTOMER COUPLINGS Series EK

From 2 – 2,000 Nm, Shaft diameters 3 – 80 mm
backlash-free, press-fit design



ECOLIGHT[®] ELASTOMER COUPLINGS Series TX 1

From 2 – 810 Nm
Shaft diameters 3 – 45 mm



LINEAR COUPLINGS Series LK

From 70 – 2,000 N
Thread M5 – M16



POLYAMID COUPLINGS MICROFLEX Series FK 1

Rated torque 1 Ncm
Bore diameters 1 – 1.5 mm