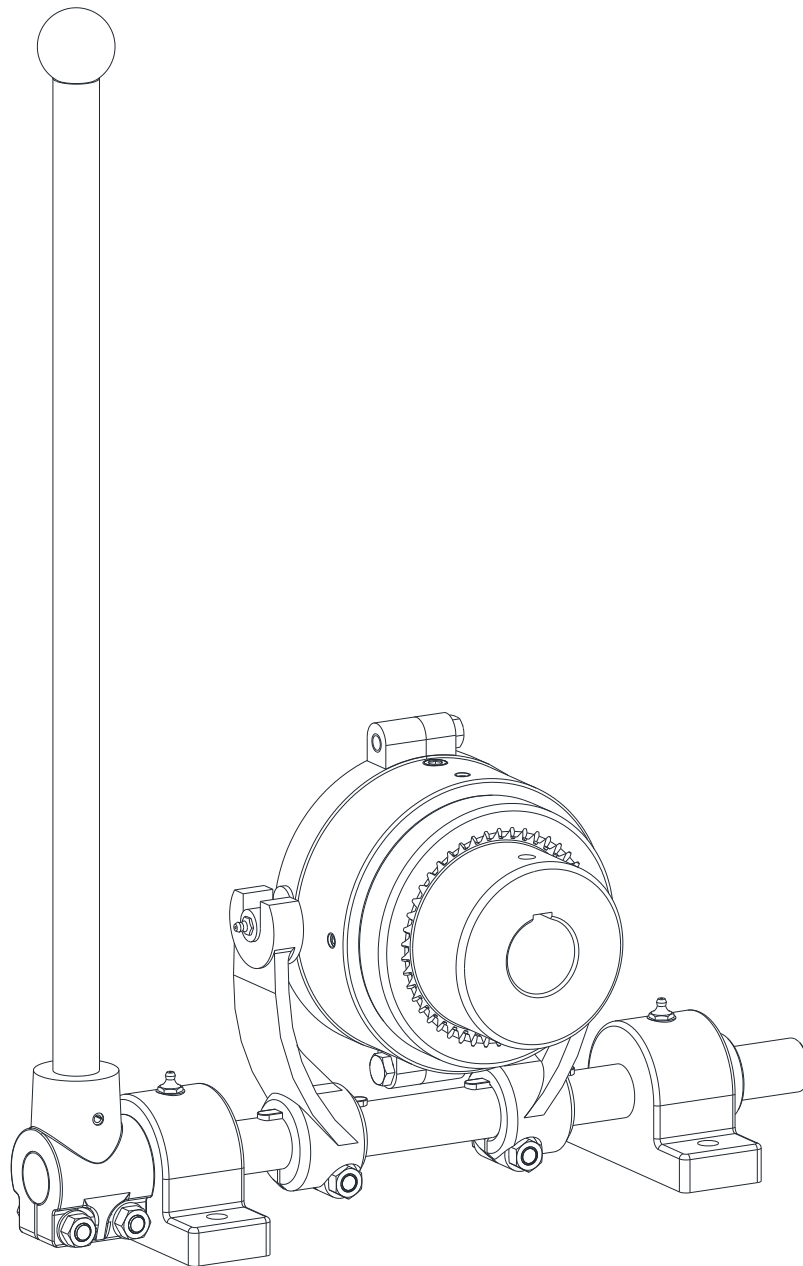




BoWex®

Non-failsafe curved-tooth gear couplings type
SD, SD-D, SD1, SD2 and their combinations





The **BoWex®** curved-tooth gear coupling is a flexible shaft connection. It is able to compensate for shaft misalignment, for example caused by manufacturing inaccuracies, thermal expansion, etc.

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1 Technical data

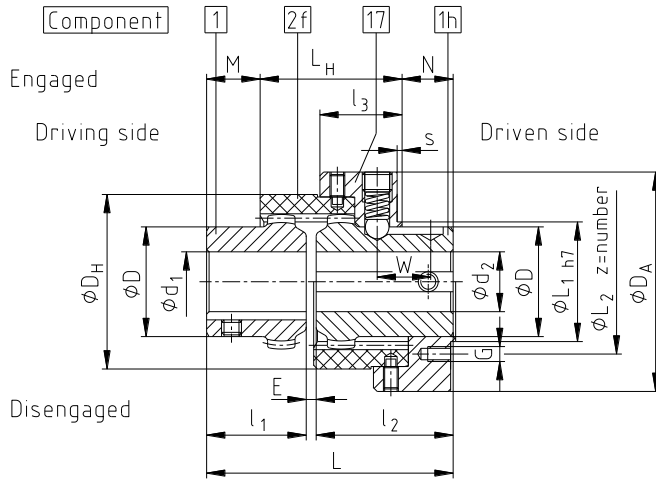


Illustration 1: BoWex® SD

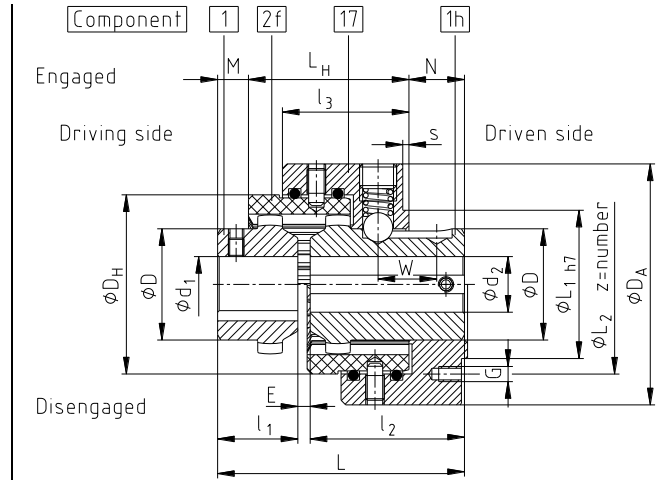


Illustration 2: BoWex® SD-D

Table 1: Dimensions and technical data - type SD and SD-D

Size	Pilot bore		Finish bore d ₁ , d ₂		Dimensions [mm]						
	Unbored	Pilot bored	d _{1 max.}	d _{2 max.}	E	l ₁	l ₂	L	L _H	l ₃	M
24 SD	x	-	24	24	4	26	50	80	52	31	10
28 SD	x	-	28	28	4	40	55	99	57	33	21.5
32 SD	x	-	32	32	4	40	55	99	58	33	20.5
45 SD	x	-	45	45	4	42	60	106	63	37	21.5
			48			50		114			29.5
65 SD	x	27 70 lg.	65	65	4	55	70	129	79	37	26
80 SD	-	25	80	80	6	90	90	186	96	47	56
100 SD	-	35	100	100	8	110	110	228	113	55	72
125 SD	-	45	125	125	10	140	140	290	149	70	89

Size	Dimensions [mm]					Weight with max. bore		Mass moment of inertia J with max. bore		Shifting force [N]
	W	N	D	D _H	D _A	Shifting hub with sleeve [kg]	Driving hub [kg]	Shifting hub with sleeve [kgcm ²]	Driving hub [kgcm ²]	
24 SD	19	18	36	58	78	1.08	0.14	8.23	0.36	140
28 SD	21.5	20.5	44	70	88	1.50	0.33	15.62	1.22	180
32 SD	21.5	20.5	50	84	100	1.85	0.43	22.87	2.17	180
45 SD	22.5	21.5	65	100	125	2.56	0.68	46.07	5.66	250
							0.79			
65 SD	25	24	95	140	156	5.07	2.30	158.99	43.96	350
80 SD	35	34	124	175	195	10.60	5.20	523.7	150.8	350
100 SD	43	43	152	210	235	18.87	9.37	1350	401.3	400
125 SD	52	52	192	270	298	40.40	9.44	4919	1362.3	450

1 Technical data

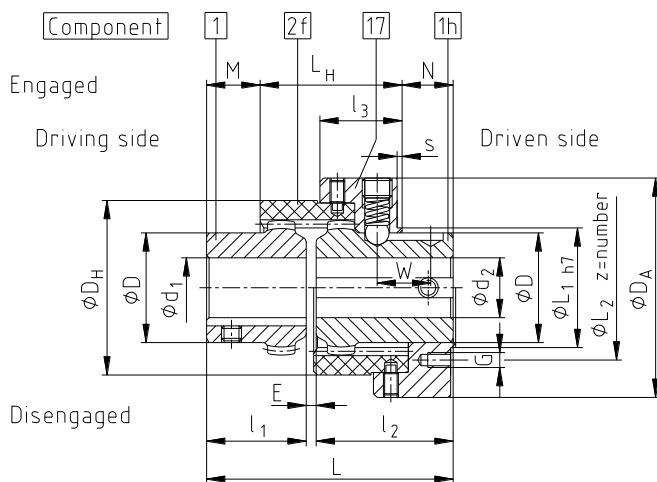


Illustration 1: BoWex® SD

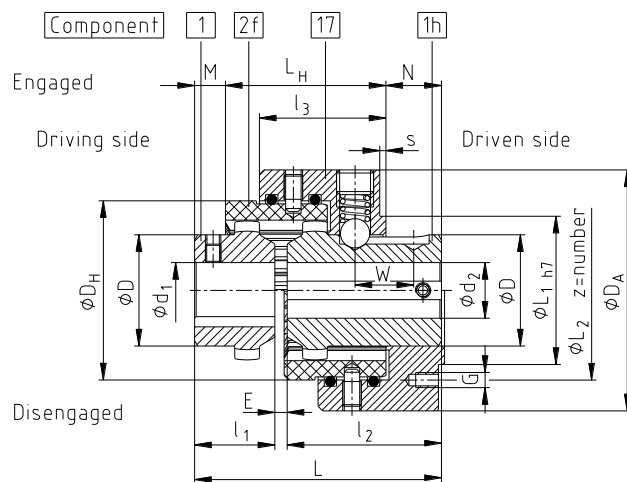


Illustration 2: BoWex® SD-D

Table 2: Dimensions - shifting ring (component 17) type SD

Connection dimensions of BoWex® SD shifting ring (component 17) for mounting of: slip ring SD1 - see table 5 shifting disk etc.									
Size	Dimensions [mm]				Size	Dimensions [mm]			
	L ₁	L ₂	z x G	s		L ₁	L ₂	z x G	s
24 SD	48	58	4 x M6	2	65 SD	100	114	4 x M8	2
28 SD	48	58	4 x M6	2	80 SD	130	145	4 x M8	3
32 SD	64	75	4 x M6	2	100 SD	180	196	6 x M10	4
45 SD	75	90	4 x M8	2	125 SD	220	236	6 x M10	4

Table 3: Power, torque and speed

Size	Power $\frac{P}{n} \left[\frac{\text{kW}}{1/\text{min}} \right]$		Torque [Nm]			Max. speed [rpm]
	Rated	Max.	T _{KN}	T _{Kmax}	T _{KW}	
24 SD	0.0021	0.0042	20	40	10	5000
28 SD	0.0047	0.0094	45	90	23	4400
32 SD	0.0063	0.013	60	120	30	3900
45 SD	0.015	0.029	140	280	70	3100
65 SD	0.040	0.080	380	760	190	2500
80 SD	0.073	0.15	700	1400	350	2000
100 SD	0.13	0.25	1200	2400	600	1650
125 SD	0.26	0.52	2500	5000	1250	1300



1 Technical data

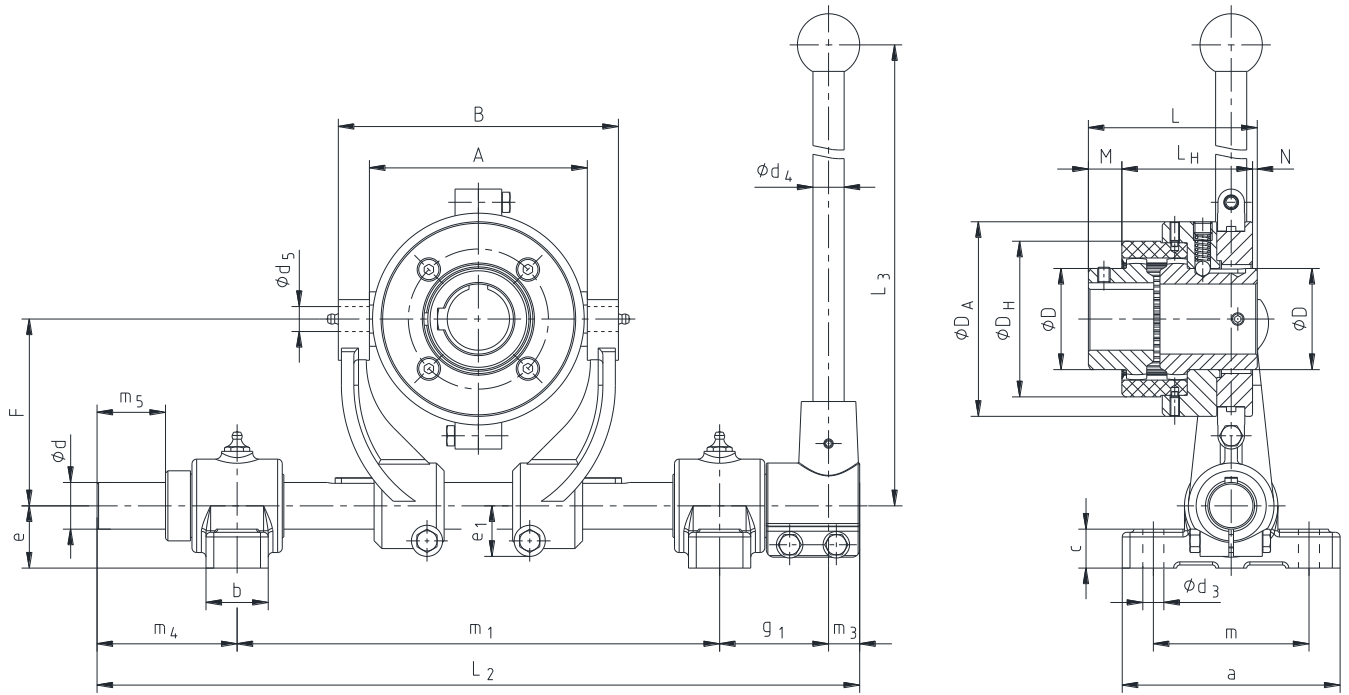


Illustration 3: BoWex® SD1 with shiftable linkage

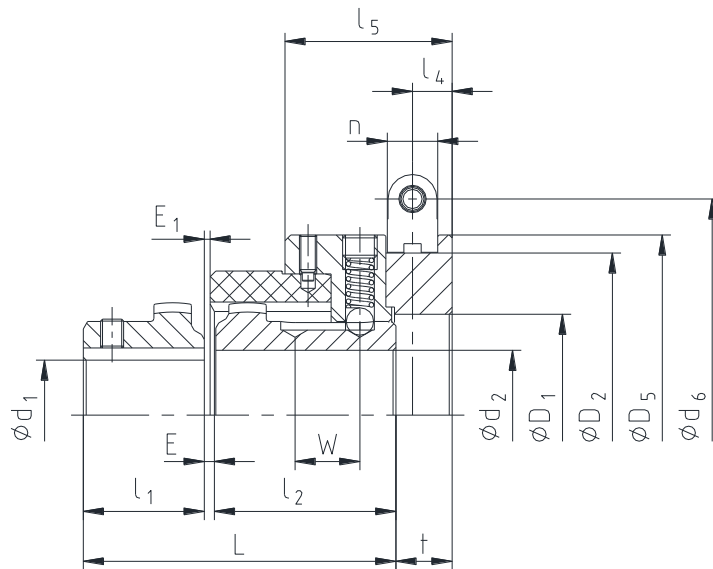


Illustration 4: BoWex® SD1



1 Technical data

Table 4: Dimensions - type SD1

Size	Finish bore ¹⁾ d ₁ , d ₂		Dimensions [mm]								
	Min.	Max.	E	E ₁	l ₁	l ₂	L	L _H	l ₄	l ₅	M
24 SD1	10	24	4	3	26	50	80	67	11	46	10
28 SD1	10	28	4	3	40	55	99	72	11	48	21.5
32 SD1	12	32	4	2	40	55	99	78	13.5	53	20.5
45 SD1	20	45	4	2	42	60	106	84	14	58	21.5
					50		114				29.5
65 SD1	25	65	4	-4 ²⁾	55 ²⁾	70	129	103	16	61	26
80 SD1	30	80	6	1	90	90	186	124	18.5	75	56
100 SD1	40	100	8	5	110	110	228	152	28	94	72
125 SD1	50	125	10	1	140	140	290	193	30.5	114	89

Size	Dimensions [mm]										Shifting force set [N]
	N	W	t	D	D _H	D _A	D ₁	D ₂ ±0.1 (keyway)	D ₅	n ±0.1 (keyway)	
24 SD1	3	19	16	36	58	78	45	70.5	78	12.5	140
28 SD1	5.5	21.5	16	44	70	88	45	70.5	78	12.5	180
32 SD1	0.5	21.5	21	50	84	100	60	89.5	100	17.5	180
45 SD1	0.5	22.5	22	65 ³⁾	100	125	70	112.5	125	18.0	250
65 SD1	0	25	25	96 / 95 ⁶⁾	140	156	96	130.5	145	20.5	350
80 SD1	6	35	29	124	175	195	125	164.5	182	25.5	350
100 SD1	4	43	39	152	210	235	174	210.5	230	30.5	400
125 SD1	8	52	44	192	270	298	214	250.5	275	35.5	450

Table 5: Dimensions of switch gear - type SD1

Size	Shiftable linkage size	Slip ring size	Dimensions [mm]									
			a	b	c	d	d ₃	d ₅	d ₆	e	e ₁	F
24 SD1	1	1.1	110	35	18	20	11	12	94	30	25	70
28 SD1	1	1.1	110	35	18	20	11	12	94	30	25	70
32 SD1	2	2.2	140	40	25	25	13.5	17	120	40	27	97.5
45 SD1	3	3.3	140	40	25	30	13.5	17	146	40	32.5	120
65 SD1	3	4.4	140	40	25	30	13.5	17	170	40	32.5	120
80 SD1	4	5.5	160	45	25	35	13.5	21	214	50	37.5	147.5
100 SD1	5	6.6	160	45	25	40	13.5	25	250	50 ⁵⁾	46	190
125 SD1	5	7.7	160	45	25	40	13.5	25	290	50 ⁵⁾	46	190

Size	Dimensions [mm]											
	g ₁ ⁴⁾	L ₂	L ₃	m	m ₁ ⁴⁾		A	B	Dimensions with m _{1 max.}			
					Min.	Max.			d ₄	m ₃	m ₄	m ₅
24 SD1	55	320	400	75	180	190	90	114	16	20	55	16
28 SD1	55	320	400	75	180	190	90	114	16	20	55	16
32 SD1	60	430	450	100	240	270	111	151	20	20	80	34
45 SD1	70	490	600	100	280	310	140	180	20	20	90	44
65 SD1	70	490	600	100	280	310	170	210	20	20	90	44
80 SD1	70	565	750	120	321	365	200	244	30	30	100	54
100 SD1	80	630	1068	120	365	410	250	300	30	30	110	62
125 SD1	80	630	1068	120	-	410	300	350	30	30	110	62

- 1) Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 [JS9]; standard - thread for setscrews on the keyway. With size 24 the thread for setscrews is located opposite the keyway.
- 2) For radial disassembly the hub collar must be reduced by 5 mm.
- 3) With size 45 hub component 1 with l₁ = 50 mm, ØD = 68 mm.
- 4) Dimension g₁ and m_{1 max.} = standard mounting dimensions
- 5) With a continuous base plate the dimension e with shiftable linkage size 5 has to be increased by 10 mm at the minimum and with shiftable linkage size 6 by 15 mm at the minimum. The brackets of the driving and driven side have to be adjusted accordingly.
- 6) ØD = x / y x = driving hub / y = driven hub
- 7) Only valid with dimension d₁.



1 Technical data

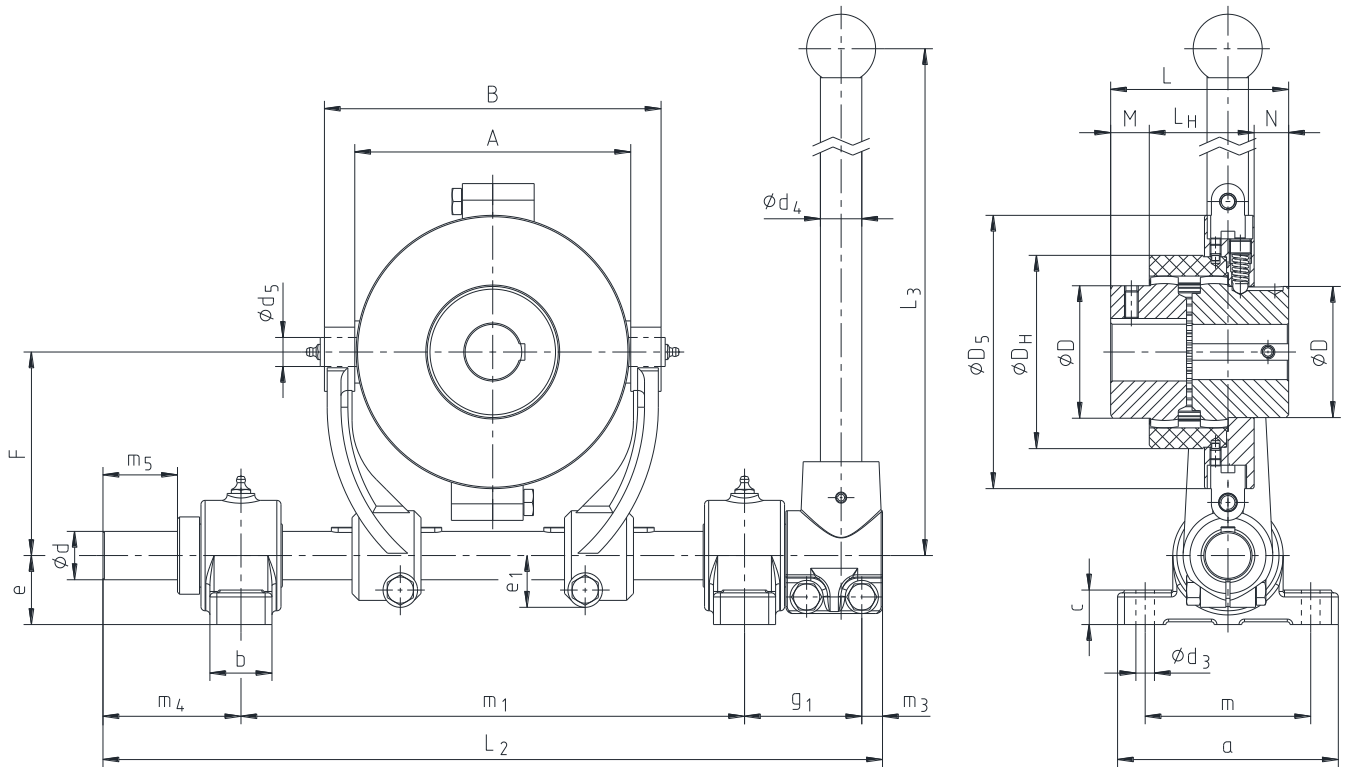


Illustration 5: BoWex® SD2 with shiftable linkage

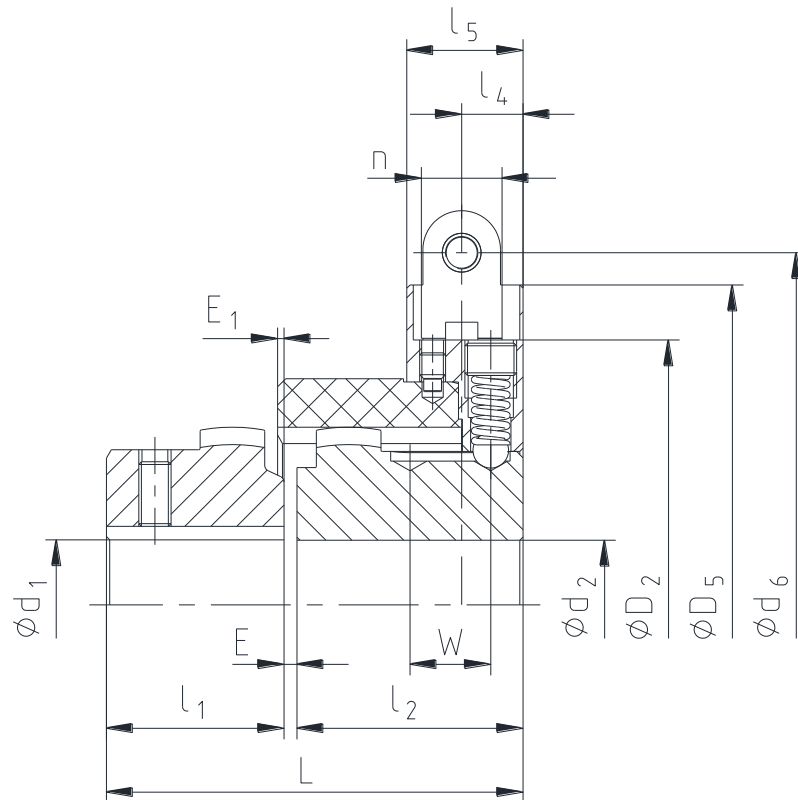


Illustration 6: BoWex® SD2

1 Technical data
Table 6: Dimensions - type SD2

Size	Finish bore ¹⁾ d ₁ , d ₂		Dimensions [mm]							
	Min.	Max.	E	E ₁	l ₁	l ₂	L	L _H	l ₄	l ₅
24 SD2	10	24	4	3	26	50	80	51	9.5	30
28 SD2	10	28	4	3	40	55	99	56	16	32
32 SD2	12	32	4	2	40	55	99	57	16	32
45 SD2	20	45	4	2	42	60	106	62	16	36
		48 ⁷⁾			50		114			
65 SD2	25	65	4	-4 ²⁾	55 ²⁾	70	129	78	18	36
80 SD2	30	80	6	1	90	90	186	95	23	46
100 SD2	40	100	8	5	110	110	228	113	28	55
125 SD2	50	125	10	1	140	140	290	149	30	70

Size	Dimensions [mm]								Shifting force set [N]
	M	N	W	D	D _H	D ₂ ±0.1 (keyway)	D ₅	n ±0.1 (keyway)	
24 SD2	10	19	19	36	58	70.5	88	12.5	140
28 SD2	21.5	21.5	21.5	44	70	89.5	113	17.5	180
32 SD2	20.5	21.5	21.5	50	84	112.5	136	18	180
45 SD2	21.5	22.5	22.5	65 ³⁾	100	130.5	154	20.5	250
	29.5								
65 SD2	26	25	25	96 / 95 ⁶⁾	140	164.5	198	25.5	350
80 SD2	56	35	35	124	175	210.5	250	30.5	350
100 SD2	72	43	43	152	210	250.5	295	35.5	400
125 SD2	89	52	52	192	270	300.5	355	38.5	450

Table 7: Dimensions of shift gear - type SD2

Size	Shiftable linkage size	Slip ring size	Dimensions [mm]									
			a	b	c	d	d ₃	d ₅	d ₆	e	e ₁	F
24 SD2	1	1.1	110	35	18	20	11	12	94	30	25	70
28 SD2	2	2.2	140	40	25	25	13.5	17	120	40	27	97.5
32 SD2	3	3.3	140	40	25	30	13.5	17	146	40	32.5	120
45 SD2	3	4.4	140	40	25	30	13.5	17	170	40	32.5	120
65 SD2	4	5.5	160	45	25	35	13.5	21	214	50	37.5	147.5
80 SD2	5	6.6	160	45	25	40	13.5	25	250	50 ⁵⁾	46	190
100 SD2	5	7.7	160	45	25	40	13.5	25	290	50 ⁵⁾	46	190
125 SD2	6	8.8	160	45	25	40	13.5	35	360	50 ⁵⁾	56	265

Size	Dimensions [mm]											
	g ₁ ⁴⁾	L ₂	L ₃	m	m ₁ ⁴⁾		A	B	Dimensions with m _{1 max.}			
					Min.	Max.			d ₄	m ₃	m ₄	m ₅
24 SD2	55	320	400	75	180	190	90	114	16	20	55	16
28 SD2	60	430	450	100	240	270	111	151	20	20	80	34
32 SD2	70	490	600	100	280	310	140	180	20	20	90	44
45 SD2	70	490	600	100	280	310	170	210	20	20	90	44
65 SD2	70	565	750	120	321	365	200	244	30	30	100	54
80 SD2	80	630	1068	120	365	410	250	300	30	30	110	62
100 SD2	80	630	1068	120	-	410	300	350	30	30	110	62
125 SD2	80	760	1068	120	-	540	360	420	30	30	110	62

- 1) Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 [JS9]; standard - thread for setscrews on the keyway. With size 24 the thread for setscrews is located opposite the keyway.
- 2) For radial disassembly the hub collar must be reduced by 5 mm.
- 3) With size 45 hub component 1 with l₁ = 50 mm, ØD = 68 mm.
- 4) Dimension g₁ and m_{1 max.} = standard mounting dimensions
- 5) With a continuous base plate the dimension e with shiftable linkage size 5 has to be increased by 10 mm at the minimum and with shiftable linkage size 6 by 15 mm at the minimum. The brackets of the driving and driven side have to be adjusted accordingly.
- 6) ØD = x / y x = driving hub / y = driven hub
- 7) Only valid with dimension d₁.

Please observe protection note ISO 16016.	Drawn:	2021-01-14 Pz	Replacing:	KTR-N dated 2008-09-30
	Verified:	2021-01-21 Pz	Replaced by:	

**2 Advice****2.1 General advice**

Please read through these operating/assembly instructions carefully before you start up the coupling.

Please pay special attention to the safety instructions!

The operating/assembly instructions are part of your product. Please store them carefully and close to the coupling. The copyright for these operating/assembly instructions remains with KTR.

2.2 Safety and advice symbols**Warning of personal injury**

This symbol indicates notes which may contribute to preventing bodily injuries or serious bodily injuries that may result in death.

**Warning of product damages**

This symbol indicates notes which may contribute to preventing material or machine damage.

**General advice**

This symbol indicates notes which may contribute to preventing adverse results or conditions.

**Warning of hot surfaces**

This symbol indicates notes which may contribute to preventing burns with hot surfaces resulting in light to serious bodily injuries.

2.3 General hazard warnings

With assembly, operation and maintenance of the coupling it has to be made sure that the entire drive train is secured against accidental switch-on. You may be seriously hurt by rotating parts. Please make absolutely sure to read through and observe the following safety indications.

- All operations on and with the coupling have to be performed taking into account "safety first".
- Please make sure to switch off the power pack before you perform your work on the coupling.
- Secure the power pack against accidental switch-on, e. g. by providing warning signs at the place of switch-on or removing the fuse for current supply.
- Do not reach into the operating area of the coupling as long as it is in operation.
- Please secure the coupling against accidental contact. Please provide for the necessary protection devices and covers.

2 Advice**2.4 Intended use**

You may only assemble, operate and maintain the coupling if you

- have carefully read through the operating/assembly instructions and understood them
- are technically qualified and specifically trained (e. g. safety, environment, logistics)
- are authorized by your company

The coupling may only be used in accordance with the technical data (see chapter 1). Unauthorized modifications on the coupling design are not admissible. We will not assume liability for any damage that may arise. In the interest of further development we reserve the right for technical modifications.

The **BoWex®** described in here corresponds to the technical status at the time of printing of these operating/assembly instructions.

2.5 Coupling selection

For a long-lasting and failure-free operation of the coupling it must be selected according to the selection instructions (according to DIN 740 part 2) for the particular application (see catalogue drive technology „BoWex®“).

If the operating conditions (performance, speed, modifications on engine and machine) change, the coupling selection must be reviewed.

Please make sure that the technical data regarding torque refer to the sleeve only. The transmittable torque of the shaft-hub-connection must be reviewed by the customer and is subject to his responsibility.

For drives subjected to torsional vibrations (drives with cyclic stress due to torsional vibrations) it is necessary to perform a torsional vibration calculation to ensure a reliable selection. Typical drives subjected to torsional vibrations are e. g. drives with diesel engines, piston pumps, piston compressors etc. If requested, KTR will perform the coupling selection and the torsional vibration calculation.

2.6 Reference to EC Machinery Directive 2006/42/EC

The couplings supplied by KTR should be considered as components, not machines or partly completed machines according to EC Machinery Directive 2006/42/EC. Consequently KTR does not have to issue a declaration of incorporation. For details about safe assembly, start-up and safe operation refer to the present operating/assembly instructions considering the warnings.

3 Storage, transport and packaging**3.1 Storage**

The coupling hubs are supplied in preserved condition and can be stored in a dry and roofed place for 6 - 9 months.

The features of the coupling sleeves remain unchanged for up to 5 years with favourable storage conditions.



The storage rooms must not include any ozone-generating devices like e. g. fluorescent light sources, mercury-vapour lamps or electrical high-voltage appliances.

Humid storage rooms are not suitable.

Please make sure that condensation is not generated. The best relative air humidity is less than 65 %.



3 Storage, transport and packaging

3.2 Transport and packaging



In order to avoid any injuries and any kind of damage please always make use of proper transport and lifting equipment.

The couplings are packed differently each depending on size, number and kind of transport. Unless otherwise contractually agreed, packaging will follow the in-house packaging specifications of KTR.

4 Assembly

The coupling is generally supplied with the shifting force set (see table 1, 4 and 6). Before assembly the coupling has to be inspected for completeness.

4.1 Components of the couplings

Components of BoWex® type SD

Component	Quantity	Description
1	1	Hub
2	1	Shifting part
3	2	Setscrews DIN EN ISO 4029

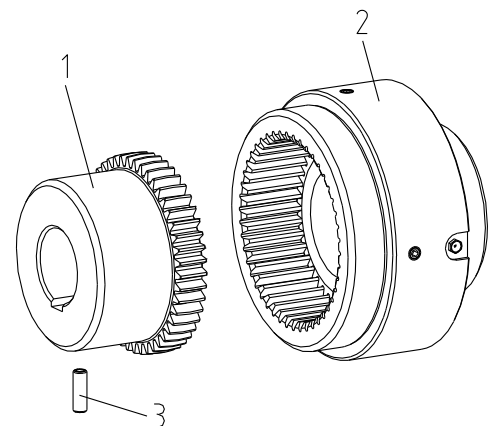


Illustration 7: BoWex® SD

Components of the BoWex® SD1 with shiftable linkage

Component	Quantity	Description
1	1	Hub
2	1	Shifting part
3	1	Shiftable linkage
4	1	Slip ring
5	2	Setscrews DIN EN ISO 4029

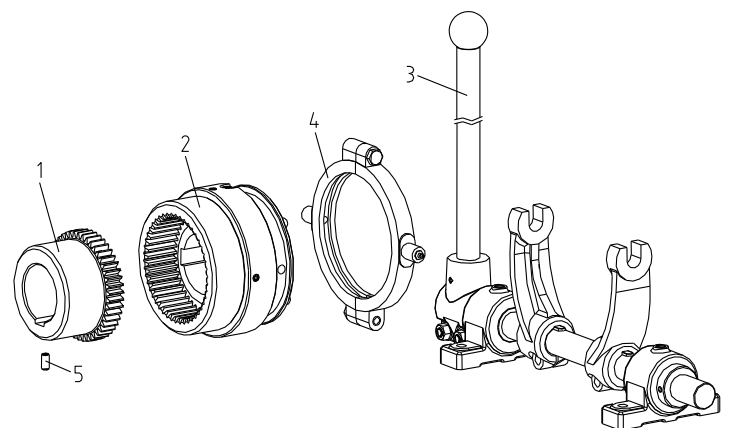


Illustration 8: BoWex® SD1 with shiftable linkage

**4 Assembly****4.2 Advice for finish bore**

The maximum permissible bore diameters d (see chapter 1 - technical data) must not be exceeded. If these figures are disregarded, the coupling may tear. Rotating particles may cause danger to life.

- Hub bores (steel hubs) machined by the customer have to observe concentricity or axial runout, respectively (see illustration 9).
- Please make absolutely sure to observe the figures for $\varnothing d_{max}$.
- Carefully align the hubs when the finish bores are drilled.
- Please provide for a setscrew according to DIN EN ISO 4029 with a cup point or an end plate to fasten the hubs axially.

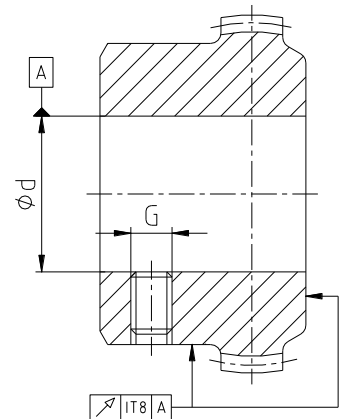


Illustration 9: Concentricity and axial runout



The customer bears the sole responsibility for all machining processes performed subsequently on unbored or pilot bored as well as finish machined coupling components and spare parts. KTR does not assume any warranty claims resulting from insufficient remachining.

Table 8: Setscrews

Size	24	28	32	45	65	80	100	125
Dimension G	M5	M8	M8	M8	M10	M10	M12	M16
Tightening torque T_A [Nm]	2	10	10	10	17	17	40	80

Table 9: Recommended fit pairs acc. to DIN 748/1

Bore [mm]		Shaft tolerance	Bore tolerance
above	up to		
	50	k6	H7 (KTR standard)
50		m6	

If a feather keyway is intended to be used in the hub, it should correspond to the tolerance ISO JS9 (KTR standard) with standard operating conditions or ISO P9 with sophisticated operating conditions (frequently alternating torsional direction, shock loads, etc.).

The transmittable torque of the shaft-hub-connection must be reviewed by the customer and is subject to his responsibility.

4.3 Advice on shifting force

Before delivery the shifting force is set and the screw plug is marked with marking lacquer.

4 Assembly

4.4 Assembly of the hubs



We recommend to inspect bores, shaft, keyway and feather key for dimensional accuracy before assembly.



Heating the hubs lightly (approx. 80 °C) allows for an easier mounting on the shaft.



Touching the heated hubs causes burns.
Please wear safety gloves.



With the assembly please make sure that the distance dimension E (see table 1, 4 and 6) is observed to allow for axial clearance of the sleeve while being in operation.
Disregarding this advice may cause damage to the coupling.

- Mount the hubs on the shaft of the driving side and the shifting part on the shaft of the driven side.
- Shift the power packs in axial direction until the distance dimension E is achieved.
- If the power packs are already firmly assembled, shifting the hubs axially on the shafts allows for setting the distance dimension E.
- Fasten the hubs by tightening the setscrews DIN EN ISO 4029 with a cup point (tightening torque see table 8).

4.5 Displacements - alignment of the couplings

The displacement figures specified in table 10 provide for sufficient safety to compensate for external influences like, for example, thermal expansion or foundation settling.



**In order to ensure a long service life of the coupling, the shaft ends have to be accurately aligned.
Please absolutely observe the displacement figures specified (see table 10). If the figures are exceeded, the coupling will be damaged.**

Please note:

- The displacement figures specified in table 10 are maximum figures which must not arise in parallel. If radial and angular displacement arise at the same time, the permissible radial displacements of the coupling halves have to be reduced as follows:

$$\Delta K_{r_{zul}} = \Delta K_r - \frac{\Delta K_r}{2\Delta K_w} \cdot \Delta W_w$$

ΔW_w = angular shaft displacement

- The displacement figures mentioned are general standard figures that apply up to an ambient temperature of 80 °C, ensuring a sufficient service life of the **BoWex®** coupling.
- Please inspect with a dial gauge, ruler or feeler gauge whether the permissible displacement figures specified in table 10 can be observed.

4 Assembly

4.5 Displacements - alignment of the couplings

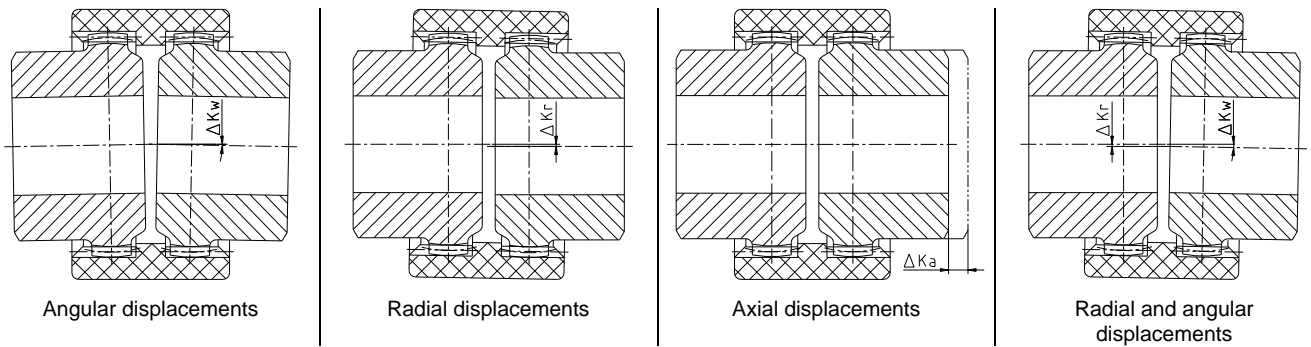


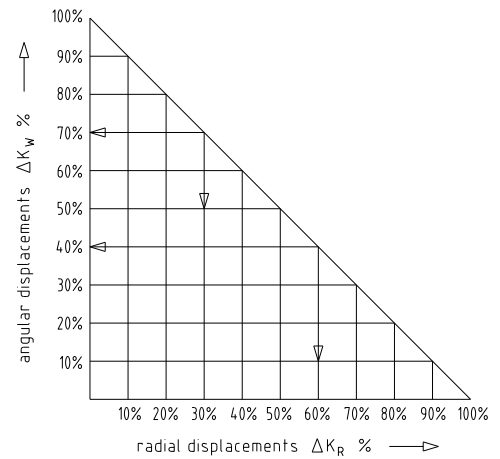
Illustration 10: Displacements

Examples of the displacement combinations specified in illustration 11:

Example 1:
 $\Delta K_r = 30\%$
 $\Delta K_w = 70\%$

Example 2:
 $\Delta K_r = 60\%$
 $\Delta K_w = 40\%$

Illustration 11:
Combinations of displacement



$$\Delta K_{total} = \Delta K_r + \Delta K_w \leq 100\%$$

Table 10: Displacement figures

Size	24	28	32	45	65	80	100	125
Max. axial displacement ΔK_a [mm]	±1	±1	±1	±1	±1	±1	±1	±1
Max. radial displacement with n=1500 rpm ΔK_r [mm]	0.2	0.2	0.25	0.25	0.3	0.3	0.3	0.3
ΔK_w [degree] max. angular displacement with n=1500 rpm	1	1	1	1	1	1	1	1

4.6 Assembly of the slip ring for BoWex® SD1 and SD2

- Before assembly please inspect the slip ring (component 1, picture 12) to see whether a lubricating nipple/Stauffer lubricator or any damages exist.
- Before separating the slip ring halves mark the position of the slip ring halves screwed by the manufacturer.
- Insert the untightened slip ring halves into the shifting keyway of the coupling.



With the assembly pay attention to the position of the slip ring halves marked.

**4 Assembly****4.6 Assembly of the slip ring for BoWex® SD1 and SD2**

- Tighten the connection screws with a dynamometric screwdriver. For tightening torques see table 11.



After assembly the slip ring must rotate manually.

Table 11:

Slip ring size	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8
Screw DIN EN ISO 4017 - 8.8	M6	M8	M8	M10	M12	M16	M16	M16
Tightening torque T _A [Nm]	10	25	25	49	86	210	210	210
Max. perm. speed rpm	3200	2500	2100	1700	1300	1200	1000	850

- Grease the slip ring through the lubricating nipple/Stauffer lubricator with a heat resistant bearing grease while rotating the slip ring manually several times.
Slip ring - max. permissible speeds see table 11.

4.7 Maintenance intervals for BoWex® SD1 and SD2**Shifting hub:**

- Within the framework of the machine inspection periods the fit of the shifting hub has to be cleaned and lubricated (e. g. with Molykote MoS₂, copper paste).
- With a high shifting frequency of the coupling we recommend one visual inspection and lubrication of the shifting hub monthly.
- In case of operation with dust and granular material as well as high air humidity one visual inspection and lubrication per month and an operational inspection every three months has to be performed (engagement/disengagement of the coupling at standstill).

Slip ring:

- Before every lubrication the slip ring has to be inspected for damages (visual inspection).
- The shifting hub part must be able to be manually rotated freely in the slip ring.
- The lubrication of the slip ring depends on the speed and the operating periods of the machine (see table 12).
- The intervals for inspection and lubrication specified apply for drives with standard load.



For drives with high load, e. g. permanent operation during 3 shifts, hot operation, etc., please consult with us.

Table 12:

Max. perm. speed [rpm] of the slip rings	3200 to 2100		1700 to 1000		850 to 700	
Daily operating period of machines (h)	8	16	8	16	8	16
Visual inspection and lubrication intervals	1/2 month		1 month	1/2 month	1 1/2 months	1 month



For certain applications, e. g. operation with dust and granulated materials, high air humidity, high ambient temperatures, outdoor operations, etc., the intervals of visual inspections and lubrication have to be reduced.

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4 Assembly
4.8 Assembly of the shiftable linkage for BoWex® SD1 and SD2

Before starting the assembly the coupling/shiftable linkage has to be inspected for completeness.

Component	Quantity	Description
1	1	Slip ring with lubricating nipple
2	2	Shifting fork
3	1	Shift lever with clamp
4	2	Eye type bearing DIN 504 with lubricating nipple
5	1	Shifting shaft
6	1	Clamping ring
7	2	Clamping screws of shifting forks
8	2	Clamping screws of shift lever

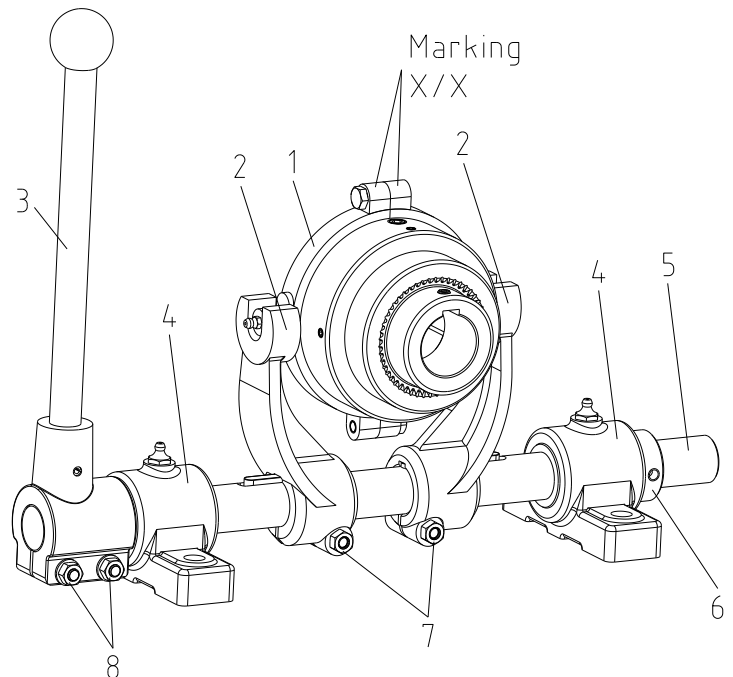


Illustration 12: BoWex® SD with shiftable linkage

- Insert the shifting pin/slip ring into the shifting forks (component 2, illustration 12).
- Assemble the shifting forks, shifting shaft and eye type bearings to be flush with the slip ring. The dimensions F and A have to be observed (see table 5 and 7). Please make sure that the shifting forks fit with the shifting pins evenly.



For setting unscrew the clamping screws of the shifting forks, if necessary.



The shifting forks have to be arranged vertically to the base plate.



Getting stuck and jamming of the slip ring during operation.

- Tighten the clamping screws of the shifting forks as per table 13.
- Fasten the eye type bearing to the base plate.



With a continuous base plate the dimension e (see table 5 and 7) with shiftable linkage size 5 has to be increased by 10 mm at the minimum and with shiftable linkage size 6 by 15 mm at the minimum.

The brackets of the driving and driven side have to be adjusted accordingly.

**4 Assembly****4.8 Assembly of the shiftable linkage for BoWex® SD1 and SD2**

- Fasten the shift lever to the shifting shaft.
- When the coupling is engaged, the shifting lever has to be installed vertically.



When the coupling hub is in operation the slip ring has to be disengaged. Support or fasten the shifting lever in vertical position.



Getting stuck and jamming of the slip ring during operation.

- Tighten the clamping screws of the shift lever as per table 13.
- Fasten the shifting shaft via clamping element, shift lever and clamping ring (component 6, illustration 12) axially.
- Having finished the assembly lubricate the eye type bearing with bearing grease.

Table 13:

Shiftable linkage size	1	2	3	4	5	6
Shifting fork Clamping screw (component 7, illustration 12)	M6	M8	M8	M12	M12	M12
Tightening torque T_A [Nm]	10	25	25	86	86	86
Shift lever Clamping screw (component 8, illustration 12)	M6	M6	M8	M12	M12	M12
Tightening torque T_A [Nm]	10	10	25	86	86	86

5 Start-up

Before start-up of the coupling, inspect the tightening of the setscrews in the flange hubs, the alignment and the distance dimension E and adjust, if necessary, and also inspect all screw connections for the tightening torques specified.

Finally the coupling protection against accidental contact must be fitted. It is required in accordance with DIN EN ISO 12100 (Safety of Machinery) and directive 2014/14/EU and must protect against

- access with a little finger
- falling down of solid foreign objects.

The cover may provide for openings intended for necessary heat dissipation. These openings have to comply with DIN EN ISO 13857.

During operation of the coupling, please pay attention to

- different operating noise
- vibrations occurring.



If you note any irregularities with the coupling during operation, the drive unit must be switched off immediately. The cause of the breakdown must be specified by means of the table „Breakdowns“ and, if possible, be eliminated according to the proposals. The potential breakdowns specified can be hints only. To find out the cause all operating factors and machine components must be considered.

6 Breakdowns, causes and elimination

The below-mentioned failures can result in a use of the **BoWex®** coupling other than intended. In addition to the specifications given in these operating/assembly instructions make sure to avoid such failures. The errors listed can only be clues to search for the failures. When searching for the failures the adjacent components must generally be considered.

General failures with use other than intended:

- Important data for the coupling selection were not forwarded.
- The calculation of the shaft-hub-connection was not considered.
- Coupling components with damage occurred during transport are assembled.
- If the heated hubs are assembled, the permissible temperature is exceeded.
- The clearance of the components to be assembled is not coordinated with one another.
- Tightening torques have been fallen below/exceeded.
- Components are mixed up by mistake/assembled incorrectly.
- No original **KTR** components (purchased parts) are used.
- Old/already worn out sleeves or sleeves stored for too long are used.
- Maintenance intervals are not observed.

Breakdowns	Causes	Elimination
Different operating noise and/or vibrations occurring	Micro friction by faulty alignment on the spline of the nylon sleeve	<ol style="list-style-type: none"> 1) Set the unit out of operation 2) Eliminate the reason of misalignment (e. g. loose foundation bolts, breaking of the engine mount, heat expansion of unit components, modification of the installation dimension E of the coupling) 3) For inspection of wear see item inspection
	Screws for axial fastening of hubs working loose	<ol style="list-style-type: none"> 1) Set the unit out of operation 2) Inspect alignment of coupling 3) Tighten the screws to fasten the hubs and secure against working loose 4) For inspection of wear see item inspection
Breaking of the nylon sleeve/spline	Breaking of the nylon sleeve/spline due to high shock energy/overload	<ol style="list-style-type: none"> 1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the nylon sleeve 3) Inspect coupling components and replace coupling components that have been damaged 4) Insert nylon sleeve, assemble coupling components 5) Find out the reason for overload
	Operating parameters do not meet with the performance of the coupling	<ol style="list-style-type: none"> 1) Set the unit out of operation 2) Review the operating parameters and select a bigger coupling (consider mounting space) 3) Assemble new coupling size 4) Inspect alignment
	Operating error of the unit	<ol style="list-style-type: none"> 1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the nylon sleeve 3) Inspect coupling components and replace coupling components that have been damaged 4) Insert nylon sleeve, assemble coupling components 5) Instruct and train the service staff
Excessive wear on the spline of sleeve	Vibrations of drive	<ol style="list-style-type: none"> 1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the nylon sleeve 3) Inspect coupling components and replace coupling components that have been damaged 4) Insert nylon sleeve, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Find out the reason for vibrations
	e. g. contact with aggressive liquids/oils, ozone influence, too high/low ambient temperatures etc. causing a physical modification of the nylon sleeve	<ol style="list-style-type: none"> 1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the nylon sleeve 3) Inspect coupling components and replace coupling components that have been damaged 4) Insert nylon sleeve, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Make sure that further physical modifications of the sleeve are excluded



7 Disposal

In respect of environmental protection we would ask you to dispose of the packaging or products on termination of their service life in accordance with the legal regulations and standards that apply, respectively.

- **Metal**
Any metal components have to be cleaned and disposed of by scrap metal.
- **Nylon materials**
Nylon materials have to be collected and disposed of by a waste disposal company.

8 Spares inventory, customer service addresses

A basic requirement to ensure the readiness for use of the coupling is a stock of the most important spare parts on site.

Contact addresses of the KTR partners for spare parts and orders can be obtained from the KTR homepage at www.ktr.com.



KTR does not assume any liability or warranty for the use of spare parts and accessories which are not provided by KTR and for the damages which may incur as a result.

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