

**Installation and operating instructions for
elastic pin and bush coupling REB ... DCO/DCS**

E 06.698



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RINGSPANN	Installation and operating instructions for elastic pin and bush coupling REB...DCO			E 06.698	
As of: 07.04.2022	Version: 06	Signed: SCHW	Checked: EISF	Number of pages: 26	Page: 2

Important

Before installation and commissioning of the product takes place, these installation and operating instructions must be read carefully. Notes of caution and hazard warnings are to be paid particular attention to.

These installation and operating instructions apply on condition that the product meets the selection criteria for its proper use. The selection and dimensioning of the product are not the subject of these installation and operating instructions.

If these installation and operating instructions are not observed or are interpreted wrongly, this shall invalidate any product liability and warranty of RINGSPANN GmbH; the same also applies in the case that our product is taken apart or changed.

These installation and operating instructions are to be kept in a safe place and must, in the event of onward delivery of our product – be it individually or as part of a machine – be passed on along with the product so that the user has access to them.

Safety information

- The installation and commissioning of our product may only be carried out by trained personnel.
- Repair work may only be performed by the manufacturer or by authorised RINGSPANN agencies.
- If there is suspected malfunctioning, the product, or the machine into which it is built, must be taken out of operation immediately and RINGSPANN GmbH or an authorised RINGSPANN agency is to be informed.
- The power supply is to be switched off during work on electrical components.
- Rotating parts must be secured by the operator against unintentional touching.
- In the case of supplies made to a foreign country, the safety regulations applicable in that country are to be taken into consideration.

German original version!

If there should be any discrepancies between the German original and versions of these installation and operating instructions in other languages, the German version shall take precedence.

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1. General information

1.1. Function

The main task of the elastic pin and bush coupling consists in transferring the torque of one shaft end onto another element. Additionally, the coupling is designed to compensate angular, radial and axial misalignments and reduce the intensity of vibrations and shocks.

1.2. General safety instructions

Safety takes the highest priority for all works with and on the coupling.

To ensure this, the following safety instructions must be observed:

- During installation and maintenance work, the drive motor must be secured against unintended start-up and the load side against turning back.
- Accidental touching of the coupling during operation must be prevented with a suitable cover or protective device.
- Do not reach into the working area of the coupling during operation.

1.3. Other applicable provisions, standards etc.

The couplings are designed on the basis of DIN 740, part 2 (see RINGSPANN catalogue "shaft coupling"). If the operating conditions (e.g. output, speed) should change, the original design of the coupling must be reviewed along with the load-bearing capacity of the shafts and the used shaft-hub-connections.

The locking screws are in compliance with DIN EN ISO 4029.

1.4. Classification in accordance with EC Machinery Directive 2006/42/EC

Type REB ... DCO couplings are a machine element. Since machine elements do not fall under EC Machinery Directive 2006/42/EC, RINGSPANN does not draw up a declaration of incorporation. All important information with regards to the installation, commissioning and operation is explained in the following.

2. Design and function / parts list

2.1. Labelling

Depending on the coupling size, the parts are labelled as follows:

Hubs:

- RINGSPANN logo
- Abbreviated designation

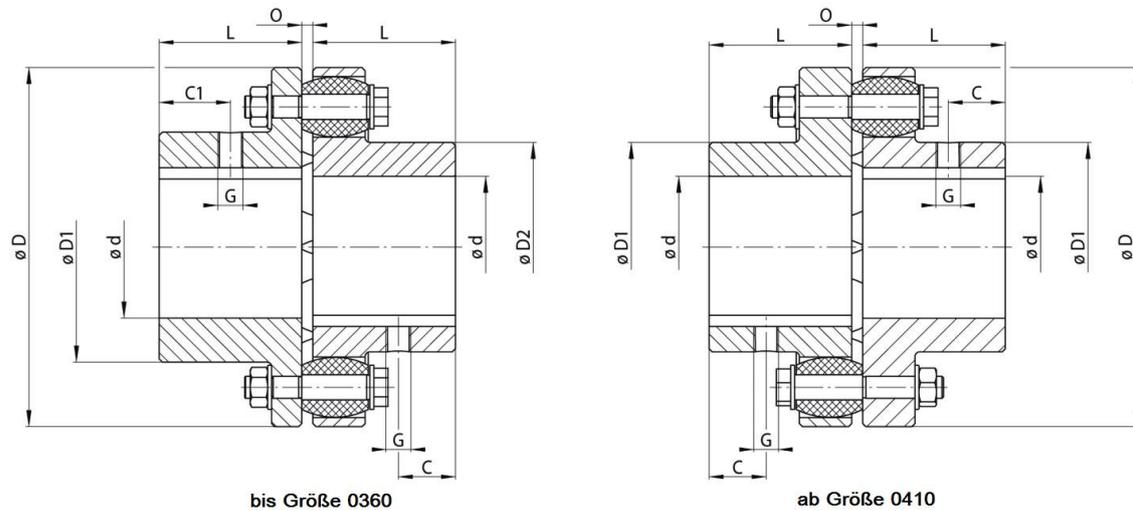
2.2. Dimensions


Figure 2.1: Drawing REB...DCO

Size	D [mm]	D1 [mm]	D2 [mm]	C [mm]	C1 [mm]	L [mm]	O [mm]
0105	105	50	48	12.5	22.5	45	2 - 6
0116	116	68	60	12.5	22.5	45	2 - 6
0125	125	78	68	15.0	25	50	2 - 6
0144	144	91	82	17.5	27.5	55	2 - 6
0162	162	100	89	17.5	30	60	2 - 6
0178	178	115	105	22.5	35	70	2 - 6
0198	198	135	124	27.5	40	80	2 - 6
0228	228	146	133	28.5	45	90	4 - 10
0252	252	167	156	33.5	50	100	4 - 10
0285	285	186	170	35.0	55	110	4 - 10
0320	320	212	196	42.5	62.5	125	4 - 10
0360	360	232	212	43	70	140	4 - 12
0410	410	230	-	57	-	160	4 - 12
0450	450	260	-	67	-	180	4 - 12
0500	500	290	-	77	-	200	4 - 12
0560	560	320	-	77	-	220	4 - 8
0630	630	355	-	87	-	240	4 - 8
0710	710	385	-	90	-	260	5 - 9
0800	800	420	-	105	-	290	5 - 9
0900	900	465	-	120	-	320	5 - 9
1000	1 000	515	-	130	-	350	5 - 10
1120	1 120	560	-	140	-	380	6 - 11
1250	1 250	610	-	160	-	420	6 - 11
1400	1 400	700	-	180	-	480	6 - 12
1600	1 600	770	-	210	-	540	6 - 12
1800	1 800	870	-	230	-	600	8 - 16
2000	2 000	960	-	260	-	660	8 - 16

Table 2.1: Dimensions



Attention!

In the event of vertical installation, RINGSPANN must be consulted.

2.3. Parts list

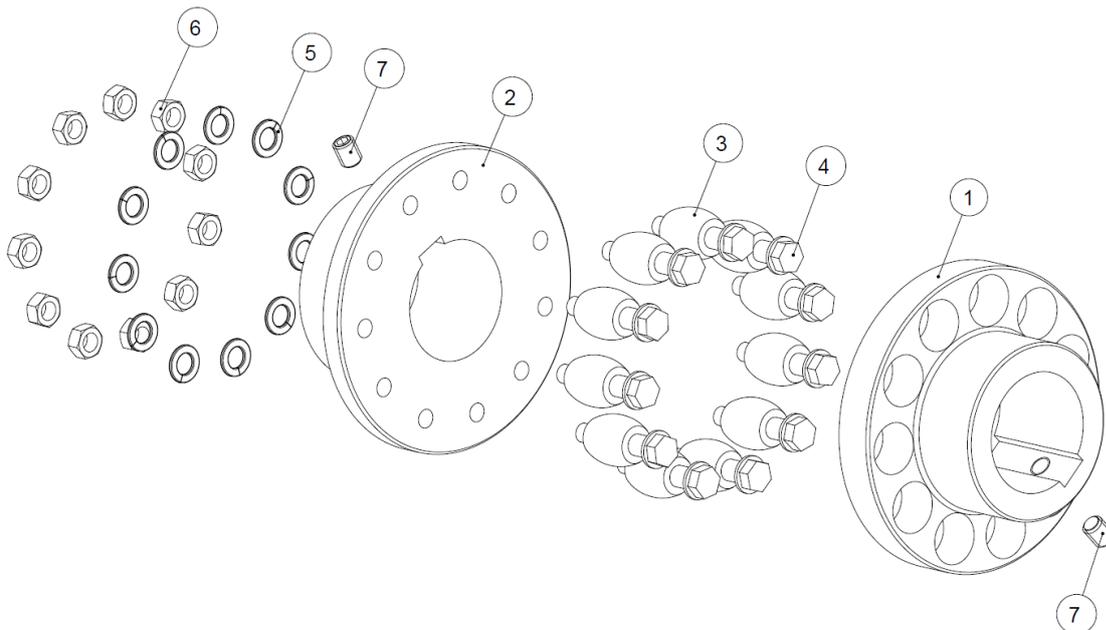


Figure 2.2: REB..DCO

Position	Quantity	Description
1	1	Hub type I
2	1	Hub type 0
3	Size dependent	Bushing
4	Size dependent	Bolts
5	Size dependent	Spring washer
6	Size dependent	Hexagon nut
7	2	Locking screw

Table 2.2: Parts list

3. Intended use

The coupling may only be installed, operated and serviced if

- the operating instructions have been read and understood,
- the executing person possesses the necessary qualifications,
- authorisation has been given by the company.

The coupling type Typ REB ... DCO may only be operated within the operating limits specified in section "7. Technical prerequisite for reliable operation".

RINGSPANN shall not assume any liability for damages that result from unauthorised constructional changes or an unintended use.

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4. Warning signs / impermissible use

An impermissible use is given if:

- the shaft-hub-connection was not designed correctly
- the coupling hubs have been thermally overloaded during assembly
- the fit pair for parts to be joined has not been coordinated correctly
- the parameters necessary for the selection of the coupling were not communicated
- the tightening torques of the screw connection do not correspond with the specifications
- the coupling is wrongly fitted
- parts from other manufacturers are used
- damaged coupling parts are used

The further operation of coupling type REB ... DCO is not permissible under the following conditions:

- if the permissible limits of use (torque, speed, permissible misalignments, ...) are exceeded
- exceeding or falling below the permissible temperature limits
- if the wear limit of the parts is reached
- changed running noises or the occurrence of vibrations

If the unit should be operated despite the aforementioned states, it can result in damages to the coupling and the drivetrain.

	<p>Attention! RINGSPANN shall not assume any liability for any damages that result in the event of any impermissible use.</p>
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5. Condition as delivered

Couplings are generally delivered ready-for-installation in individual parts. Upon customer request, pre-bored hubs are also available. If the hub bores are manufactured by the customer, the information in chapter 7.3 must be observed:

6. Storage

The coupling hubs can be stored for 6 - 9 months in a roofed, dry room. The corrosion protection must subsequently be refreshed.

Under the same storage conditions, the properties of the bushings remain unchanged for up to 5 years.

Optimum storage conditions for bushings:

- storage temperature 20 °C – 30 °C,
- storage rooms that have a roof and are dry,
- free of ozone-producing equipment,
- no contact with oil, fat or chemicals,
- relative humidity of less than 65%,
- free of condensation.

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7. Technical prerequisite for reliable operation

7.1. Technical specifications

Size	Max. speed [min ⁻¹]	Moment of inertia with max bore J _k [kgm ²]	Permissible max. misalignments				Bolts (item 4)		
			Axial [mm]	Radial [mm]	Angular		Quantity [pcs]	Thread	Tightening torque [Nm]
					[°]	Indicator value [mm]			
0105	7 200	0.003	2	0.3	1	1,8	3	M8	12
0116	6 100	0.005	2	0.3	1	2,0	4		
0125	5 500	0.007	2	0.4	1	2,2	4		
0144	4 900	0.012	2	0.4	1	2,5	6		
0162	4 500	0.030	2	0.4	1	2,8	6	M10	24
0178	3 800	0.040	2	0.5	1	3,1	6		
0198	3 400	0.062	2	0.5	1	3,5	10		
0228	3 000	0.10	3	0.6	1	4,0	11	M14	66
0252	2 700	0.17	3	0.6	1	4,4	12		
0285	2 400	0.31	3	0.7	1	5,0	11	M16	99
0320	2 100	0.53	3	0.7	1	5,6	12		
0360	1 900	1.02	4	0.9	1	6,3	11	M20	193
0410	1 700	1.70	4	1.1	1	7,2	10		
0450	1 500	2.90	4	1.1	0.5	3,9	12		
0500	1 350	4.70	4	1.1	0.4	3,5	14		
0560	1 200	10.7	2	1.5	0.3	3,0	10	M36	1128
0630	1 050	17.4	2	1.5	0.3	3,3	12		
0710	950	33.0	2	1.8	0.3	3,7	12	M42	1791
0800	850	53.0	2	1.8	0.3	4,2	14		
0900	750	86.0	2	1.8	0.3	4,7	16		
1000	680	142.8	2	2.0	0.1	1,8	18		
1120	600	231.0	2	2.2	0.1	2,0	18	-	-
1250	550	367.5	2	2.4	0.1	2,2	20	-	-
1400	490	693.0	2	2.7	0.1	2,4	20	-	-
1600	430	1 155	2	3.0	0.1	2,8	24	-	-
1800	380	2 205	2	3.4	0.1	3,1	22	-	-
2000	340	3 255	2	3.8	0.1	3,5	26	-	-

Table 7.1: Technical data

7.2. Permissible misalignments

The maximum permissible misalignment values (table 7.1) must be adhered to and may not occur at the same time. In the event of the simultaneous occurrence of radial and angular offset, misalignments need to be exploited differently percentage-wise (see figure 7.1). If not observed, damage to the coupling may result.

The figure 7.1 shows the relationship for radial (K_r) and angular misalignments (K_w) occurring at the same time:

The misalignment as a percentage is calculated as follows:

$$\Delta K[\%] = \frac{\Delta K}{\text{max. permissible misalignment}} * 100$$

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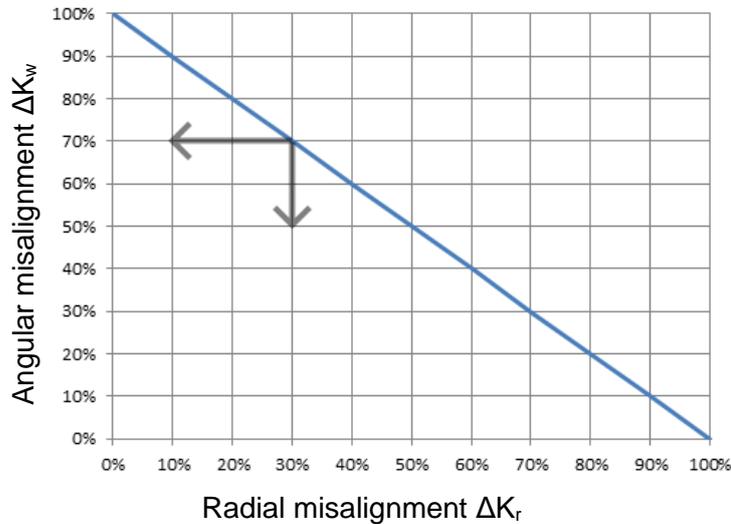


Figure 7.1: Misalignment combination

For simplification, the measurement methods to check the individual misalignments shall in the following be looked at separately. The alignment of the hubs should take place before assembly of the bushings.

7.2.1 Checking the radial misalignment

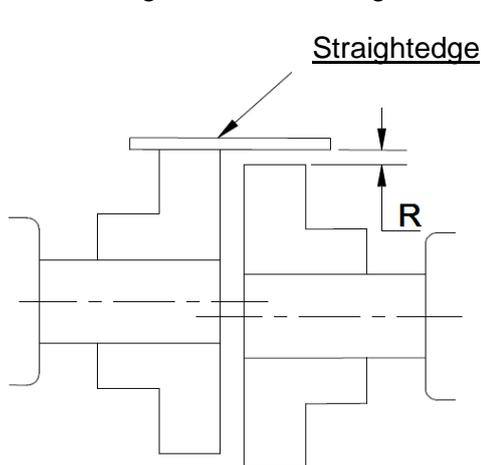


Figure 7.2: Measurement with a straightedge

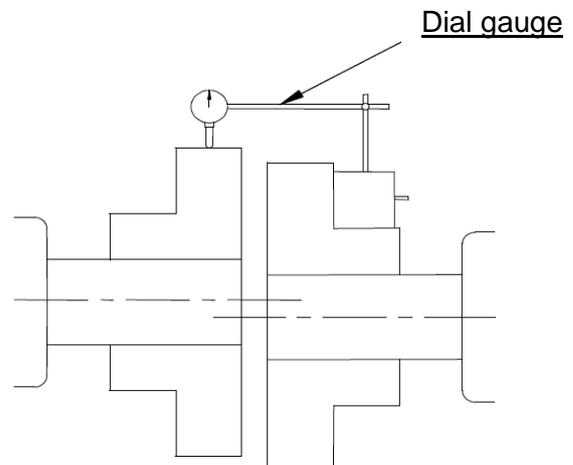


Figure 7.3: Measurement with a dial gauge

The following measurement methods can be used to check radial/parallel misalignment.

Take a straightedge and place it on the hub as shown in figure 7.2. Turn the other hub until distance $R = 0$ is set. Taking this point as a basis, measure at an approx. 90° offset with a feeler gauge distance "R". To be sure, distance R can be measured again at another approx. 180° . It can also be carried out in a similar manner with a depth gauge. The largest measured distance indicates the given radial misalignment.

Alternatively, the radial misalignment can be measured with a dial gauge. The dial gauge holder is mounted on a hub. Afterwards, the volumetric flask is placed on the processed outer diameter of the second hub (see figure 7.3). Turn the hub by one revolution and read off the

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full deflection of the dial gauge. The radial misalignment amounts to half the full deflection.

Compare the maximum measured value with the permissible value of the initial misalignment in table 7.2. If the permissible value is exceeded, better alignment needs to be carried out.

7.2.2 Inspection of the angular misalignment

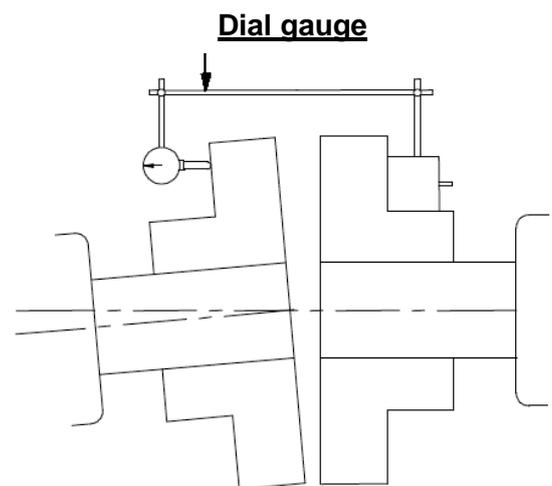
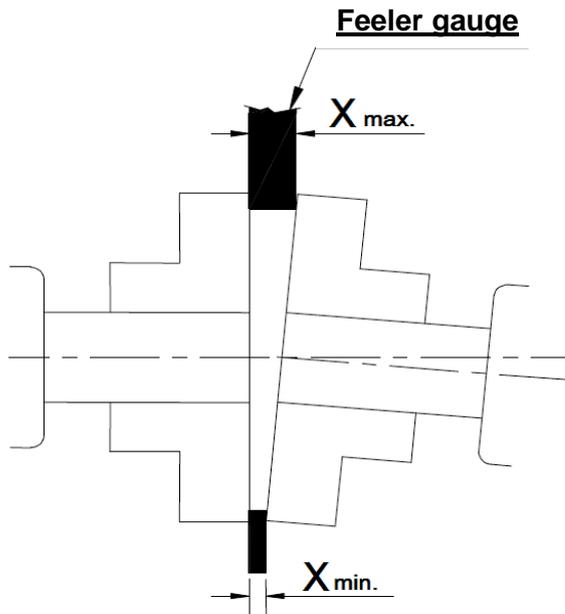


Figure 7.4: Measurement with a straightedge

Figure 7.5: Measurement with a dial gauge

Calculate the maximum ($X_{max.}$) and minimum ($X_{min.}$) distance between the hubs (see figure 7.4) using a feeler gauge. The difference between both values specifies the indicator value for the angular misalignment in mm. The respective indicator value for the respective angular misalignment can be found in table 7.2.

Alternatively, a measurement can be carried out using a dial gauge. For this, set the dial

gauge holder on a hub and the measuring pin on the plane surface of the other hub as displayed in figure 7.5. It should hereby be positioned as closely as possible to the outer diameter. Turn the hub one full revolution and note the full deflection value. The half of the full deflection provides the indicator value for the angular misalignment in mm.

Size	Axial misalignment ΔK_a [mm]	Radial misalignment ΔK_r [mm]	Angular misalignment	
			Angle ΔK_w [°]	Indicator value [mm]
0105	0.5	0.075	0.25	0.458
0116	0.5	0.075	0.25	0.506
0125	0.5	0.1	0.25	0.545
0144	0.5	0.1	0.25	0.628
0162	0.5	0.1	0.25	0.707
0178	0.5	0.125	0.25	0.777
0198	0.5	0.125	0.25	0.864
0228	0.75	0.15	0.25	0.995
0252	0.75	0.15	0.25	1.100
0285	0.75	0.175	0.25	1.244
0320	0.75	0.175	0.25	1.396
0360	1	0.225	0.25	1.571
0410	1	0.275	0.25	1.789
0450	1	0.275	0.125	0.982
0500	1	0.275	0.1	0.873
0560	0.5	0.375	0.075	0.733
0630	0.5	0.375	0.075	0.825
0710	0.5	0.45	0.075	0.929
0800	0.5	0.45	0.075	1.047
0900	0.5	0.45	0.075	1.178
1000	0.5	0.5	0.025	0.44
1120	0.5	0.55	0.025	0.49
1250	0.5	0.6	0.025	0.55
1400	0.5	0.675	0.025	0.61
1600	0.5	0.75	0.025	0.7
1800	0.5	0.85	0.025	0.79
2000	0.5	0.95	0.025	0.87

Table 7.2: Permissible initial misalignments

The remaining misalignments should generally be as small as possible. When commissioning, the actual misalignments should be no more than 25% of the max. permissible misalignment figures (Table 7.1). The remaining 75% of misalignments provide security against external influences that arise during operation, such as deformation in the machine and thermal expansion.

7.3. Manufacturing the hub bore



Life-threatening danger!

The max. permissible bore diameters specified in table 7.3 may not be exceeded. If the permissible values are exceeded, the hub could tear during operation. Here, there is life-threatening danger due to flying parts.

Size	Min. bore d1/d2 [mm]	Max. bore [mm]	
		d1	d2
0105	11	32	30
0116	12	42	39
0125	14	50	45
0144	18	60	50
0162	22	65	60
0178	24	75	70
0198	28	90	80
0228	28	100	90
0252	38	115	105
0285	48	125	115
0320	55	135	125
0360	65	150	135
0410	75	160	160
0450	85	180	180
0500	95	200	200
0560	95	225	225
0630	100	250	250
0710	100	260	260
0800	100	280	280
0900	100	305	305
1000	125	320	320
1120	135	350	350
1250	150	380	380
1400	175	440	440
1600	200	480	480
1800	225	540	540
2000	250	600	600

Table 7.3: Maximum permissible bore diameter

When manufacturing the hub bore, it must be ensured that:

- the hub is precisely aligned,
- the form and positional tolerances in accordance with DIN ISO 286 are adhered to (see figure 7.6).

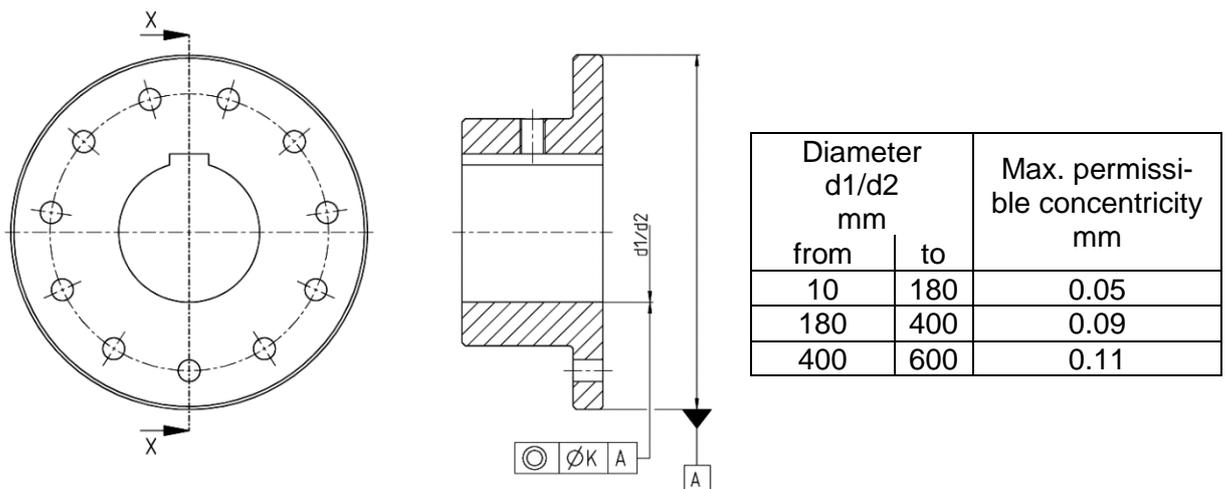


Figure 7.6: Form and positional tolerance of the bore and position of the keyway nut

If the hub is to be designed with a keyway, it is preferably to be introduced between the jaws as in figure 7.6. The design and inspection of the keyway connection falls to the operator and is his responsibility.

The following fit pair in accordance with DIN 748/1 is recommended:

Bore [mm]	Shaft tolerance	Bore tolerance
≤ 50	k6	H7
> 50	m6	

Table 7.4: Fit pairs



Note!

The operator bears the sole responsibility for damages that may occur as a result of defective rework on the unbored / pre-bored coupling parts .

Locking screws in accordance with DIN EN ISO 4029 should be used for axial securing. Here the following applies:

Bore d1/d2 [mm]	from	9	22	38	58	75	110	260
	to	22	38	58	75	110	260	500
Size locking screw		M5	M6	M10	M12	M16	M20	M24
Tightening torque [Nm]		2	4	17	40	80	140	220

Table 7.5: Size and tightening torques of the locking screws



Locking screws in accordance with DIN EN ISO 4029 should be used for axial securing. Here the following applies:

7.4. Bushings



Bushing NR 80 Shore-A

Material: Natural rubber
 Hardness: 80 ±5 Shore -A
 Deployment temperature: -45 °C to +70 °C
 Colour: black

Figure 7.7: NR 80 Shore-A

Size	Nominal torque T_{KN} [Nm]	Nominal power at 100 min ⁻¹ P_{K100} [kW]	Max. torque T_{Kmax} [Nm]	Alternating torque T_{KW} [Nm]	Torsional stiffness C_T dyn [Nm/rad x 10 ³]			Relative damping ψ at 0.5 T_{KN}
					1.0 T_{KN}	0.5 T_{KN}	0.25 T_{KN}	
0105	95	1,0	285	19	12	6	5	1.4
0116	146	1,5	438	29	21	11	8	
0125	166	1,7	498	33	27	14	10	
0144	318	3,3	954	64	59	32	22	
0162	520	5,5	1 570	105	88	47	33	
0178	640	6,7	1 920	129	126	70	37	
0198	1 240	13	3 740	250	279	155	82	
0228	2 050	21	6 100	410	406	225	119	
0252	3 060	32	9 200	614	689	382	202	
0285	4 550	48	13 600	910	1 052	547	272	
0320	6 000	64	18 200	1 220	1 573	818	407	
0360	8 900	93	26 700	1 780	2 066	1 075	535	
0410	12 000	126	36 100	2 410	2 485	1 293	643	
0450	18 600	195	55 500	3 720	4 317	2 246	1 117	
0500	25 800	270	77 000	5 160	6 670	3 470	1 726	
0560	31 000	325	93 000	6 201	7 972	4 148	2 063	
0630	41 900	440	125 500	8 400	9 274	4 825	2 400	
0710	75 000	785	225 000	15 000	14 368	7 475	3 718	
0800	100 000	1 047	300 000	20 000	21 608	11 242	5 591	
0900	154 500	1 623	464 500	31 000	37 467	19 493	9 694	
1000	194 500	2 042	584 500	38 999	54 012	28 101	13 975	
1120	269 500	2 827	809 500	53 999	70 060	36 450	18 127	
1250	344 500	3 613	1 034 500	68 999	99 239	51 631	25 677	
1400	529 500	5 550	1 589 500	106 000	152 753	79 473	39 523	
1600	749 500	7 854	2 249 500	149 999	242 743	126 292	62 807	
1800	974 500	10 210	2 924 500	194 999	318 993	165 963	82 536	
2000	1 299 500	13 614	3 899 500	259 999	472 441	245 798	122 239	

Table 7.6: NR 80 Shore-A



Bushing PU 92 Shore-A

Material: Polyurethane
 Hardness: 92±5 Shore-A
 Deployment temperature: -30°C to +80°C
 Colour: orange

Figure 7.8: PU 92 Shore-A

Size	Nominal torque T_{KN} [Nm]	Nominal power at 100 min ⁻¹ P_{K100} [kW]	Max. torque T_{Kmax} [Nm]	Alternating torque T_{KW} [Nm]	Torsional stiffness C_T^{dyn} [Nm/rad x 10 ³]			Relative damping ψ at 0.5 T_{KN}
					1.0 T_{KN}	0.5 T_{KN}	0.25 T_{KN}	
0105	143	1,5	429	29	11	9	6	0.5
0116	220	2,3	660	44	20	16	10	
0125	248	2,6	740	50	25	20	13	
0144	478	5,0	1 430	96	55	44	30	
0162	790	8,3	2 370	159	82	65	45	
0178	960	10,1	2 890	193	105	85	62	
0198	1 860	19,5	5 500	372	230	186	136	
0228	3 000	31,5	9 000	602	326	264	193	
0252	4 580	48,0	13 700	917	562	455	333	
0285	6 800	72,0	20 600	1 375	893	721	559	
0320	9 100	96,0	27 500	1 834	1 335	1 078	836	
0360	13 300	139,5	39 900	2 664	1 754	1 416	1 098	
0410	18 000	189,0	54 000	3 610	2 110	1 703	1 321	
0450	27 900	292,5	83 500	5 587	3 666	2 959	2 295	
0500	38 600	405,0	116 000	7 736	5 664	4 572	3 546	
0560	46 500	487,5	139 500	9 311	6 770	5 464	4 238	
0630	63 000	660,0	189 000	12 606	7 876	6 356	4 930	
0710	112 000	1 177,5	337 000	22 490	12 202	9 847	7 638	
0800	149 500	1 570,5	449 500	29 997	18 350	14 809	11 487	
0900	232 000	2 434,5	697 000	46 499	31 818	25 678	19 918	
1000	292 500	3 063,0	877 500	58 503	45 868	37 017	28 713	

Table 7.7: PU 92 Shore-A



Bushing HT rans

Material: Polyurethane
 Hardness: 55±2 Shore -D
 Deployment temperature: -30 °C to +120 °C
 Colour: white

Figure 7.9: HTrans

Size	Nominal torque T_{KN} [Nm]	Nominal power at 100 min ⁻¹ P_{K100} [kW]	Max. torque $T_{K max}$ [Nm]	Alternating torque T_{KW} [Nm]	Torsional stiffness $C_{T dyn}$ [Nm/rad x 10 ³]			Relative damping ψ at 0.5 T_{KN}
					1.0 T_{KN}	0.5 T_{KN}	0.25 T_{KN}	
0105	287	3	860	57	28	25	20	0.43
0116	382	4	1 140	76	43	38	31	
0125	382	4	1 140	76	48	42	34	
0144	760	8	2 290	153	110	96	79	
0162	1 330	14	4 010	267	172	150	123	
0178	1 620	17	4 870	325	213	186	151	
0198	3 150	33	9 400	630	471	411	335	
0228	5 000	53	15 100	1 012	668	583	475	
0252	7 600	80	22 900	1 528	1 143	997	813	
0285	11 400	120	34 300	2 292	1 444	1 197	952	
0320	15 200	160	45 800	3 056	2 159	1 790	1 424	
0360	22 200	233	66 500	4 450	2 836	2 351	1 871	

Table 7.8: Technical data NR 80 Shore-A

8. Assembly

8.1. General assembly instructions

Before beginning with assembly, check for the completeness of the delivery (see chapter 2.3 Parts list) and the dimensional accuracy of the bores, the shaft, the feather key and the keyway (see 7. Technical prerequisite for reliable operation). Remove preservative agent from the hubs.

8.2. Assembly description

1. Mount the hub on the input and output shafts so that the shaft ends are flush with the inner plane surfaces.
 → facilitated sliding onto the shaft by heating up the hub (approx. 80°C)

	<p>Attention! Use suitable means of protection when working with the heated hubs. Touching the heated hubs without safety gloves causes burns .</p>
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2. Slide the units in axial direction until the O measure is achieved (see table 2.1)
 - if the units are already mounted, the O measure can be adjusted by sliding the hubs onto the shaft. Here, a sufficiently supporting length of the keyway must be ensured.
 - if O is not adhered to, the coupling may be damaged.
3. Tighten the set screws with the respective tightening torque (see table 7.5 Manufacturing the hub bore),
4. Align the two coupling halves in accordance with the methods described in chapter 7.2 until the permissible initial misalignments have been achieved.
5. Mount the bushings over bolts and tighten the nuts with the tightening torque specified in table 7.1.
 - it is recommended to secure the nuts with Loctite 243 thread locking.



Information

Measure O is only achieved if the angular and axial misalignments equal zero.

9. Start-up

Before putting it into operation for the first time, the following parameters need to be checked:

- the tightening torque of all screws,
- the tightness of the set screws,
- the alignment of the coupling,
- the clearance O.

The operator has the task of attaching a suitable coupling protection to prevent the unintended touching of the coupling during operation. It may only be removed when the machine is at a standstill.

During commissioning, attention must be paid to vibrations and running noises. If any vibrations or unusual running noises should occur, the drive unit must be immediately switched off.

10. Operational disturbances

The possible operational disturbances are listed in the following table. In order to remedy them, **first bring the unit to a standstill** and then follow the further instructions in the column "Remedy". This table only provides a starting point for the search for the cause. All neighbouring components should also be subjected to an examination.

Disturbances	Causes	Remedy	Danger notice for areas with potentially explosive atmosphere
Changes in sounds or vibrations	Alignment error	1) Eliminate the cause of the alignment error 2) Carry out wear inspection	Increased temperature on the surface of the bushings, ignition risk as a result
	Wear of the bushings	1) Disassemble coupling, remove sleeve residues 2) Check coupling parts, replace damaged parts 3) Install new bushings, as	Ignition risk due to formation of sparks

		well as bolts and nuts. 4) Check alignment, correct if necessary	
	Screws for axial hub securing are loose	1) Check alignment 2) Tighten screws for hub securing, secure against repeated loosening 3) Carry out wear inspection	Ignition risk due to hot surfaces and spark formation
Hub break	Operating error of the facility	1) Replace entire coupling 2) Check alignment 3) Train operating staff	Ignition risk due to spark formation
	Overload	1) Replace entire coupling 2) Check alignment 3) Determine reason for overload	
Premature wear of the bushings	Physical changes due e.g. to too low/high ambient temperature, contact with aggressive liquids	1) Disassemble coupling, remove sleeve residues 2) Check coupling parts, replace damaged parts 3) Install new bushings, including new bolts and nuts, mount coupling parts 4) Check alignment, correct if necessary 5) Ensure that all triggers for the physical changes have been eliminated	Ignition danger due to spark formation for metallic contact of the cams
	Impermissible ambient, contact temperatures	1) Disassemble coupling, remove sleeve residues 2) Check coupling parts, replace damaged parts 3) Install new bushings, including new bolts and nuts, mount coupling parts 4) Check alignment, correct if necessary 5) Check and regulate temperatures, possibly select different Bushing material	
	Drive vibrations	1) Disassemble coupling, remove sleeve residues 2) Check coupling parts, replace damaged parts 3) Install new bushings, including new bolts and nuts, mount coupling parts 4) Check alignment, correct if necessary 5) Determine cause of vibrations, possibly select Bushing with smaller/higher shore hardness	

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Table 10.1: Operational disturbances

To ensure that the coupling can be operated safely, the specified wear values may not be exceeded. The wear of the coupling is detected by the measurement of the torsional backlash.

Size	from	105	285	360	400	560	710	1120
	to	252	320		500	630	1000	2000
Maximum permissible torsional backlash X_{max} . [mm]		2	3	4	6	8	10	upon request

Table 10.2: Maximum permissible torsional backlash

To measure the torsional backlash, one of the hubs must be clamped so that it can no longer be turned. Turn the second hub without torque in one direction until stop. Make markings on both hubs in this position as shown in figure 10.1 a). Then turn the same hub without torque in the opposite direction until stop. The markings move apart. The distance X_{max} (figure 10.1 b) and c)) between the markings indicates the given torsional backlash. Compare the measured value with the threshold value in table 10.2. If the value of maximum permissible play is exceeded, all bushings, bolts and nuts must be replaced.

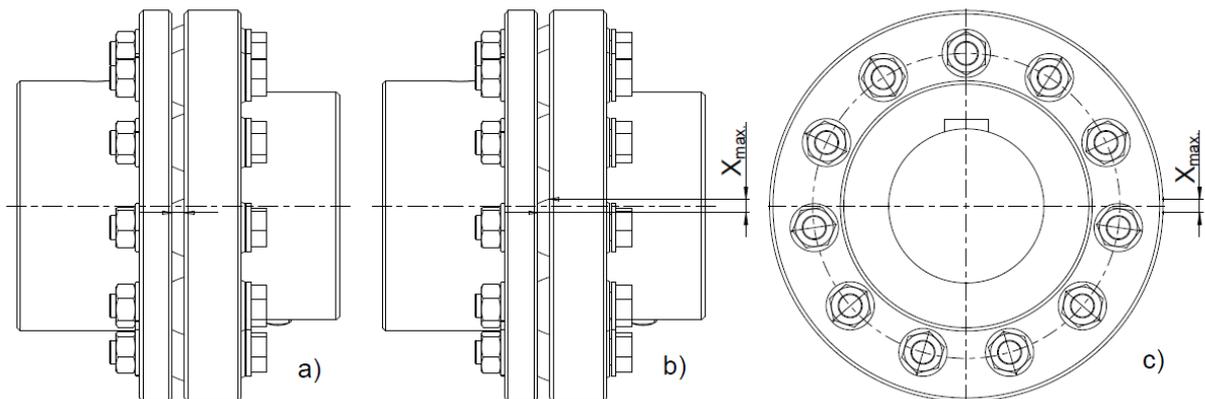


Figure 10.1: Check the torsional backlash

11. Maintenance and repair

Even if the REB ... DCO ranks among the maintenance-free couplings, it should be subject to a visual inspection at least once a year. This includes:

- examining the coupling alignment,
- examining the coupling for damages,
- examining the bolt connection,
- examining the bushings for wear.

If the bushings should exhibit any signs of wear (deep indentations, tears or swelling), they must be replaced immediately.

The tightening torques of the nuts must be examined at regular intervals.

12. Spare part stockpiling

In order to keep disturbances in operation to a minimum, it is advisable to keep a stock of spare parts directly at the deployment site in order to be able to guarantee optimal operational capability.

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Attention! RINGSPANN shall not assume any liability for any occurring damages if spare parts from other manufacturers are used .

13. Disposal

At the end of its operating life:

- plastics must be disposed of via a disposal company,
- metals must be cleaned and disposed of properly with other scrap metal.

Please also properly dispose of the packaging.

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14. Supplement for operation of REB ... DCO in areas with potentially explosive atmosphere

If the elastic shaft coupling REB ... DCO is operated in or in connection with potentially explosive atmosphere, the following supplemental information must also be observed.

14.1 Normal operation

The coupling REB ... DCO is a device in the sense of Directive 2014/34/EU and may only be used in or in connection with explosive atmosphere under observation of the following information.

14.1.1 Explosive atmosphere

Surrounding pressure p_U	0.8 to 1.1	bar
Oxygen content r_{O_2}	approx. 21	Vol-%

The permissible ambient temperature T_a depends on the bushing material used, see section 7.4.

The use in potentially explosive atmosphere due to explosive dusts or instable substances is excluded.

14.1.2 Instructions for use

Coupling REB...DCO is designed ignition source-free according to the respective category pursuant to DIN EN ISO 80079-36. The use of coupling REB...DCO in connection with explosive atmosphere is dependent on the used material and the frame size of the Bushing. The following approvals apply:

In equipment group I, category M2 or EPL Mb in all frame sizes from 0105 to 0630 with the label:

CE  I M2 Ex h Mb X
 T_a according operating instruction

In equipment group II, category 2G and 2D respectively EPL Gb and Db:

Gas group IIC: all frame sizes up to 0320 with the label:

CE  II 2G Ex h IIC TX Gb
 T_a and TX according operating instruction

Gas group IIB: all frame sizes up to 0630 with the label:

CE  II 2G Ex h IIB TX Gb
 T_a and TX according operating instruction

Dust group IIIC: all frame sizes:

CE  II 2D Ex h IIIC TX Db
 T_a and TX according operating instruction

The permissible ambient temperature T_a and the temperature class (for gases) / max. surface temperature (for dusts) are as follows according to the colour of the Bushing material:

The minimum ambient temperature amounts to:

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Colour Bushing	Ambient temperature
black	$-45^{\circ}\text{C} \leq T_a$
orange	$-30^{\circ}\text{C} \leq T_a$
white	$-30^{\circ}\text{C} \leq T_a$

The maximum ambient temperature, the temperature class and the maximum surface temperature amount to:

Colour Bushing	Ambient temperature	Temperature class	max surface temperature
black	$T_a \leq 45^{\circ}\text{C}$	T6	T70°C
orange	$T_a \leq 55^{\circ}\text{C}$	T6	T80°C
white	$T_a \leq 95^{\circ}\text{C}$	T5	T120°C

The design limits in accordance with RINGSPANN catalogue "shaft coupling" must be observed. The permissible misalignment values in accordance with the installation and operating instructions may not be exceeded. The coupling may not be operated in the area of natural oscillations.

The coupling materials used may not be chemically influenced by the ambient atmosphere.

To prevent mechanical ignition sources, metallic contact with the turning coupling must be prevented. This can, for example, be ensured using suitable coupling protection (fixed separating protection device). Openings or gaps in/with the separating protective equipment must be designed at least in IP 2X in accordance with IEC 60529. In group I, the coupling protection must be able to withstand the difficult operating conditions.

14.2 Instructions on occupational health and safety



If coupling REB ... DCO is used as a component of a device or an assembly group in the sense of Directive 2014/34/EU, the device manufacturer must establish and confirm the compliance of this device or assembly group with the specified directive before commissioning.

If coupling REB ... DCO is used as a part of a facility, the operator of the facility must adhere to the requirements of Directive 1999/92/EC and if necessary national requirements that go beyond it.

It is the operator's responsibility to review whether coupling REB ... DCO is suitable for operation in the actual given explosive atmosphere based on the instructions for use.

Coupling REB ... DCO does not exhibit any effective ignition sources in disturbance-free operation. Disturbance-free operation must be ensured by the operator through inspection, maintenance and repair in accordance with the information in the installation and operating instructions.

An improperly functioning coupling must be brought to a standstill by the operator. The coupling may only put back into operation after repair.

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No burning, welding or cutting works are required for maintenance and repair.

When working in an explosive atmosphere, the operator must take protective measures in accordance with Directive 1999/92/EC, e.g. in accordance with DIN EN 1127-1 appendix A. Smoking, fire and naked flames must be prohibited.

14.3 Setup and assembly



The coupling halves are to be secured against axial misalignment. If the coupling halves are not threaded up against a shaft shoulder, they must be secured with a locking screw. The locking screw is to be secured with an adhesive, Loctite 243 or equivalent, against becoming loose.

To guarantee preventing metallic contact, the coupling halves must be installed with the specified gap "S₁".

All screws must be tightened with the specified torque.

The Bushing is made of an insulating material and prevents a direct potential equalisation between the coupling halves. The potential equalisation between the coupling halves must be secured by the unit.

14.4 Control, inspection and repair



To prevent and recognise disturbances, the following instructions must be observed in addition to the inspection instructions in the installation and operating instructions.

Disturbances must be eliminated immediately under observation of the repair information.

In daily inspections, attention must be paid to changes in running noises or any vibrations that should arise.

The Bushing may be worn due to friction, meaning that the coupling halves touch and ignitable impact sparks can form. The wear must therefore be regularly examined in accordance with the installation and operating instructions. In the event of impermissible wear, the Bushing must be replaced.

To preserve the explosion protection concept, only spare parts specified by the manufacturer may be used.

14.6 Testing

Coupling REB ... DCO is to be examined in accordance with Directive 1999/92/EC before commissioning for correct assembly and proper function by a specialist or by RINGSPANN or an authorised RINGSPANN representative. This test must be documented.

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Coupling REB ... DCO must at the latest every 3 years be checked for proper function by a specialist or by RINGSPANN or an authorised RINGSPANN representative in accordance with Directive 1999/92/EC. This test must be documented.

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15. Declaration of Conformity according to Directive 2014/34/EU

EU Declaration of Conformity

in the sense of the explosion protection directive 2014/34/EU

Hereby declared: RINGSPANN GmbH
Schaberweg 30-38
61348 Bad Homburg

that the operating instructions described in the operating instructions are complied with.

Device: Coupling REB...DCO

complies with the essential health and safety requirements of Directive 2014/34/EC, Annex II. The application possibilities result from the marking and the instructions for use in chapter "14. Supplement for operation in areas with potentially explosive atmosphere" of the operating instructions.

The following harmonized standards and/or normative documents have been taken into account, in whole or in part, in the design and manufacture of this equipment:

European standards	National standards / normative documents
DIN EN 1127-1 :2008 DIN EN 15198 :2007 DIN EN ISO 80079-36 :2016 DIN EN ISO 80079-38 :2017 DIN EN ISO 80079-37 :2017	

The special operating instructions in chapter "14. Supplement for operation in areas with potentially explosive atmosphere " of the Operating Instructions must be observed.

The technical documentation in accordance with Annex VIII, No. 3 has been prepared and deposited with the notified body 0044. The deposit number is 35256895.

Martin Schneeweis, Product Manager Shaft Couplings
Bad Homburg, 16.12.2019