

Installation and operating instructions for elastic jaw couplings REK ... DGO/...DHO/...DGZ

E 06.700e



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RINGSPANN	Installation and operating instructions for elastic jaw couplings REK...DGO / ...DHO / ...DGZ	E 06.700e			
Issue: 17.12.2019	Version: 03	Drawn: SCHW	Checked: EISF	Pages: 24	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 buyer 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.

This is a translation of the German original version!

In case of inconsistencies between the German and English version of this installation and operating instruction, the German version shall prevail.

RINGSPANN	Installation and operating instructions for elastic jaw couplings REK...DGO / ...DHO / ...DGZ			E 06.700e	
Issue: 17.12.2019	Version: 03	Drawn: SCHW	Checked: EISF	Pages: 24	Page: 3

Contents

1. General information

- 1.1. Function
- 1.2. General safety instructions
- 1.3. Other applicable provisions, standards etc.
- 1.4. Classification in accordance with EC Machinery Directive 2006/42/EC

2. Design and function / parts list

- 2.1. Labelling
- 2.2. Dimensions
- 2.3. Parts list

3. Intended use

4. Warning signs / Impermissible use

5. Condition as delivered

6. Storage

7. Technical prerequisite for reliable operation

- 7.1. Technical specifications
- 7.2. Permissible misalignments
 - 7.2.1. Inspection of the radial misalignment
 - 7.2.2. Inspection of the angular misalignment
- 7.3. Manufacturing the hub bore
- 7.4. Elastomer elements

8. Assembly

- 8.1. General assembly instructions
- 8.2. Assembly of the couplings REK...DGO and REK...DHO
- 8.3. Assembly of the couplings REK...DGZ

9. Start-up

10. Operational disturbances

11. Maintenance and repair

12. Spare part stockpiling

13. Disposal

14. Supplement for operation in areas with potentially explosive atmosphere

- 14.1. Normal operation
 - 14.1.1. Explosive atmosphere
 - 14.1.2. Instructions for use
- 14.2. Instructions on occupational health and safety
- 14.3. Setup and assembly
- 14.4. Control, inspection and repair
- 14.5. Testing

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

RINGSPANN	Installation and operating instructions for elastic jaw couplings REK...DGO / ...DHO / ...DGZ			E 06.700e	
Issue: 17.12.2019	Version: 03	Drawn: SCHW	Checked: EISF	Pages: 24	Page: 4

1. General information

1.1. Function

The main task of the elastic jaw 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

The couplings type REK ... DGO/...DHO/...DGZ 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

Elastomer elements:

- RINGSPANN logo
- Size designation

Spacer and driver

- RINGSPANN logo
- Abbreviated designation
- Marks for mounting position

2.2. Dimensions

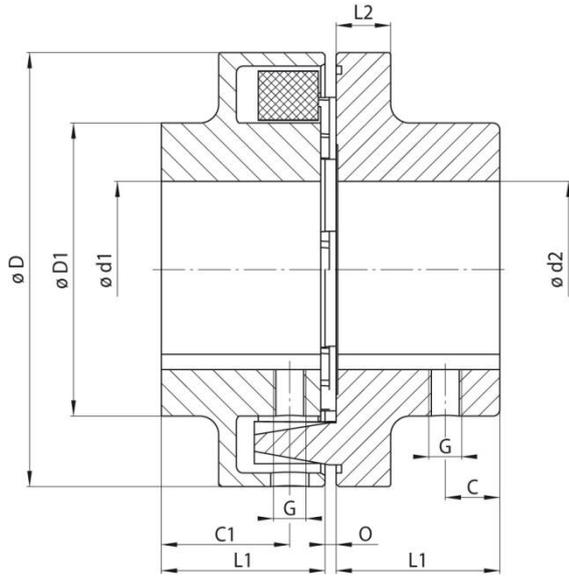


Figure 2.1: Drawing REK...DGO

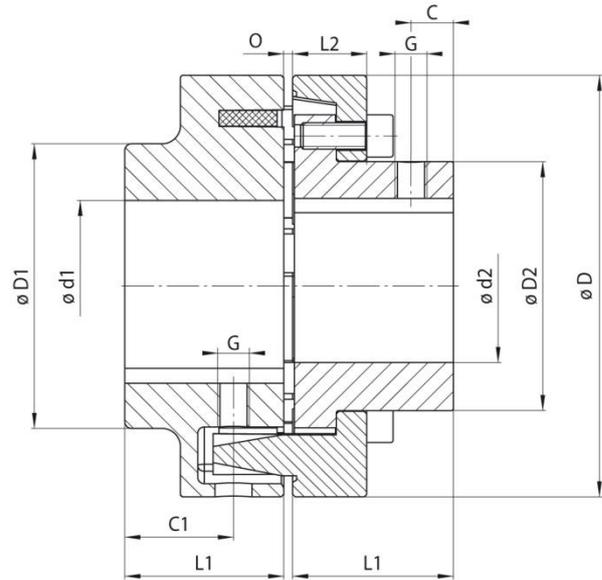


Figure 2.2: Drawing REK...DHO

Size	REK...DGO							REK...DHO							
	ØD mm	ØD1 mm	L1 mm	L2 mm	C mm	C1 mm	O mm	ØD mm	ØD1 mm	ØD2 mm	L1 mm	L2 mm	C mm	C1 mm	O mm
0024	68	46	20	8	8	10	2 - 4	-	-	-	-	-	-	-	-
0028	80	68	30	10	12	18	2 - 4	-	-	-	-	-	-	-	-
0042	95	76	35	12	15	21	2 - 4	-	-	-	-	-	-	-	-
0048	110	86	40	14	16	25	2 - 4	110	86	62	40	20	10	25	2 - 4
0055	125	100	50	18	22	33	2 - 4	125	100	75	50	23	14	33	2 - 4
0060	140	100	55	20	20	38	2 - 4	140	100	82	55	28	14	38	2 - 4
0065	160	108	60	20	25	39	2 - 6	160	108	95	60	28	16	39	2 - 6
0075	180	125	70	20	33	48	2 - 6	180	125	108	70	30	20	48	2 - 6
0080	200	140	80	24	38	57	2 - 6	200	140	122	80	32	24	57	2 - 6
0090	225	150	90	18	48	65	2 - 6	225	150	138	90	38	26	65	2 - 6
0100	250	165	100	18	58	70	3 - 8	250	165	155	100	42	29	70	3 - 8

Table 2.1: Dimensions REK...DGO and REK...DHO

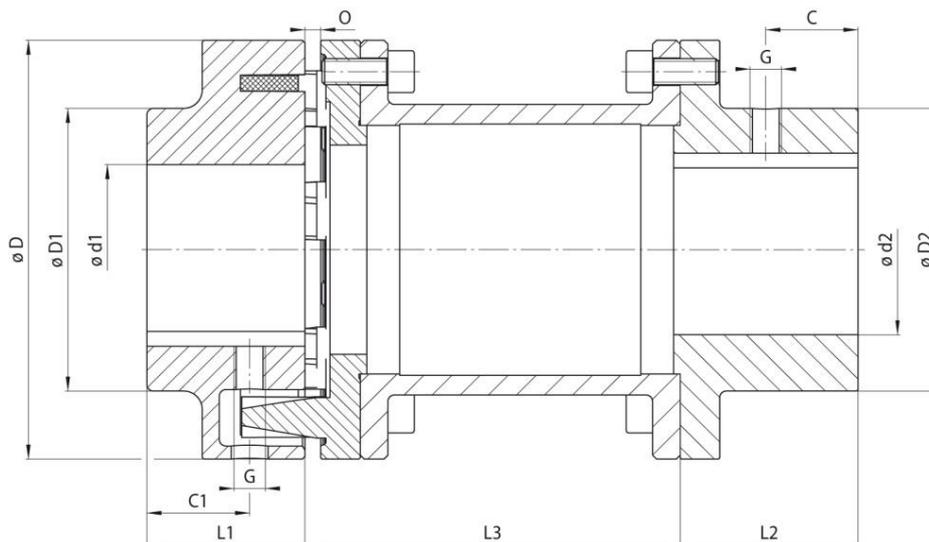
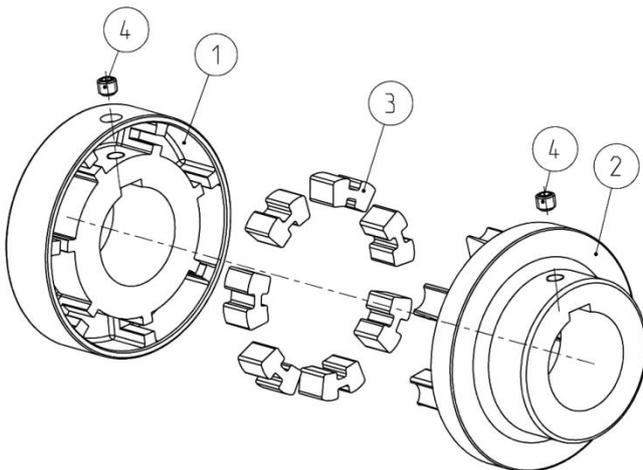


Figure 2.3: Drawing REK...DGZ

Size	REK...DGZ								
	ØD mm	ØD1 mm	ØD2 mm	L1 mm	L2 mm	L3 mm	C mm	C1 mm	O mm
0028	80	68	55	30	45	100 / 140	12	20	5
0042	95	76	70	35	45	100 / 140	15	20	5
0048	110	86	80	40	50	100 / 140 / 180	16	25	5
0055	125	100	90	50	50	100 / 140 / 180	22	25	5
0060	140	100	100	55	65	140 / 180	20	33	5
0065	160	108	108	60	70	140 / 180	25	35	6
0075	180	125	125	70	80	140 / 180	33	40	6
0080	200	140	140	80	90	180 / 200 / 250	38	45	6
0090	225	150	150	90	100	180 / 200 / 250	48	55	6
0100	250	165	165	100	110	200 / 250	58	61	8

Table 2.2: Dimensions REK...DGZ

2.3. Parts list



Pos.	Quantity	Description
1	1	Hub type 0
2	1	Hub type I / II
3	Size dependent	Elastome relements
4	2	Locking screw
5	1	Driver
6	Size dependent	Screws

Figure 2.4: REK...DGO

Table 2.3: Parts list REK...DGO and REK...DHO

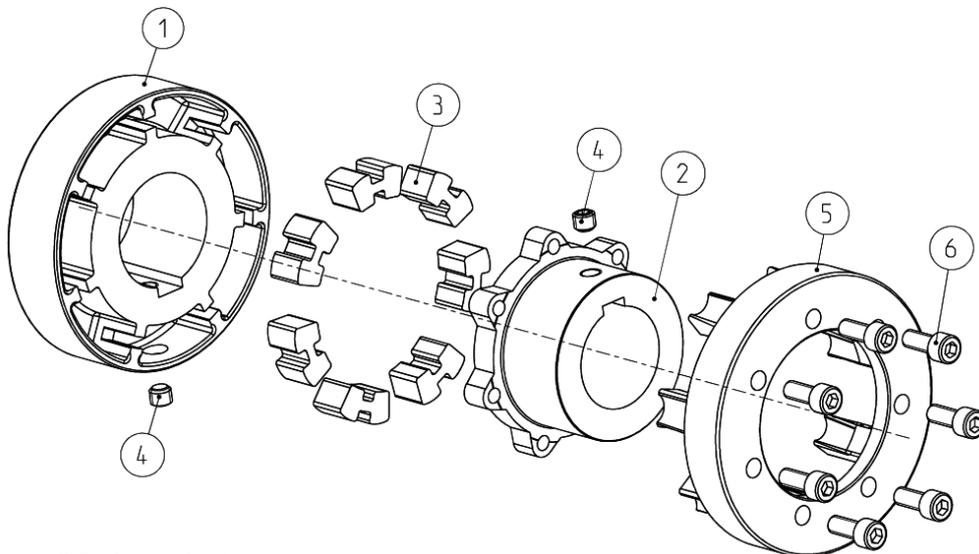


Figure 2.5: REK...DHO

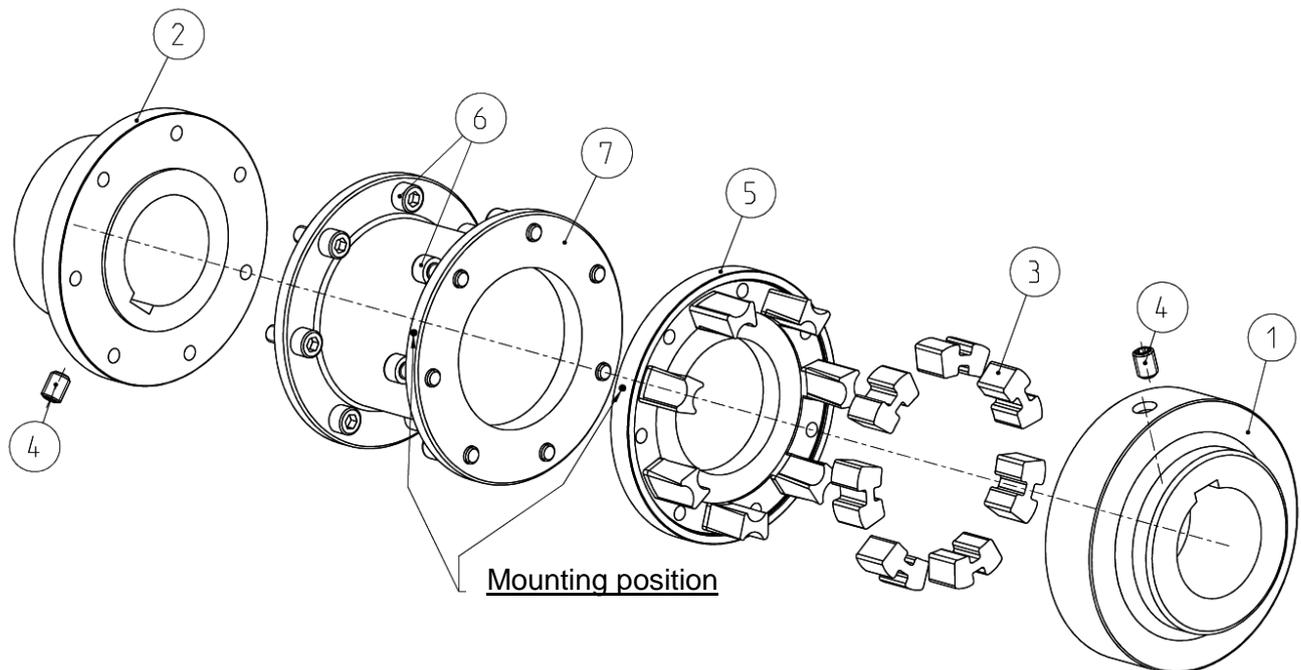


Figure 2.6: REK..DGZ

Pos.	Quantity	Description
1	1	Hub type 0
2	1	Hub type I / II / III
3	Size dependent	Elastomer elements
4	2	Locking screw
5	1	Driver
6	Size dependent	Screws
7	1	Spacer

Table 2.4: Parts list REK...DGZ

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 couplings type REK ... DGO / ...DHO / ...DGZ 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.

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

RINGSPANN	Installation and operating instructions for elastic jaw couplings REK...DGO / ...DHO / ...DGZ			E 06.700e	
Issue: 17.12.2019	Version: 03	Drawn: SCHW	Checked: EISF	Pages: 24	Page: 8

- damaged coupling parts are used

The further operation of couplings type Typ REK ... DGO / ...DHO / ...DGZ 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.



Attention!

RINGSPANN shall not assume any liability for any damages that result in the event of any impermissible use .

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.

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

Storage rooms must:

- have a roof and be dry,
- be free of ozone-producing equipment,
- have a relative humidity of less than 65%,
- be free of condensation.

7. Technical prerequisite for reliable operation

7.1. Technical specifications

Size	REK...DGO		REK...DHO		REK...DGZ			Max. permissible misalignments REK...DGO / REK...DHO / REK...DGZ			
	n_{max} [min ⁻¹]	Mo- ment of iner- tia J_k kgm ²	n_{max} [min ⁻¹]	Mo- ment of iner- tia J_k kgm ²	n_{max} [min ⁻¹]	Mo- ment of iner- tia J_k kgm ²	L3 [mm]	Axial [mm]	Radial [mm]	Angular [°]	Indicator value [mm]
024	7000	0.0003	-	-	-	-	-	±1.5	0.4	1	1.2
028	6000	0.0012	-	-	6000	0.0014 0.0015	100 140				1.4
042	5500	0.0027	-	-	5500	0.0028 0.0031	100 140				1.66
048	5300	0.0055	5300	0.0047	5300	0.0056 0.0060 0.0064	100 140 180				1.92
055	5100	0.0107	5100	0.0095	5100	0.0099 0.01 0.011	100 140 180				2.18
060	4900	0.0140	4900	0.0150	4900	0.019 0.020	140 180				2.44
065	4250	0.0250	4250	0.0280	4250	0.032 0.034	140 180				2.79
075	3800	0.0450	3800	0.0490	3800	0.054 0.058	140 180				3.14
080	3400	0.0800	3400	0.0850	3400	0.100 0.105 0.110	180 200 250				3.49
090	3000	0.1350	3000	0.1500	3000	0.160 0.170 0.180	180 200 250				3.93
100	2750	0.2300	2750	0.2500	2750	0.280 0.300	200 250				4.36

Table 7.1: Technical specifications REK...DGO / ...DHO / ...DGZ

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 7.2). If not observed, damage to the coupling may result.

The misalignment as a percentage is calculated as follows:

$$\Delta K[\%] = \frac{\Delta K}{\text{max. permissible displacement}}$$

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

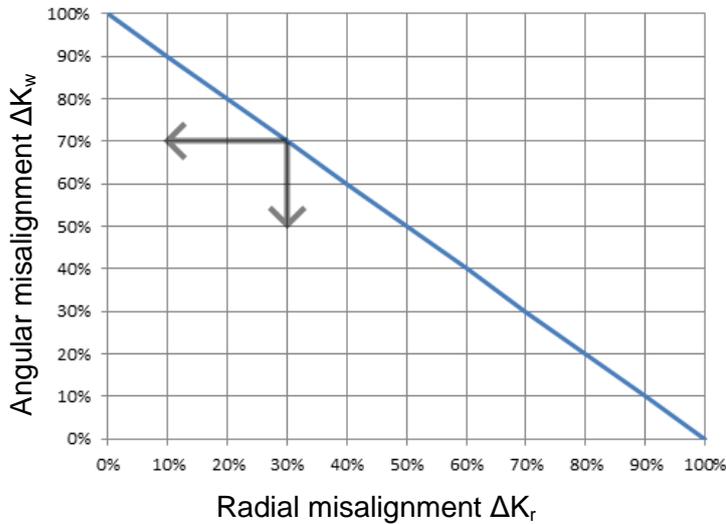


Figure 7.1: Misalignment combination

Size			Max. initial misalignments			
REK... DGO	REK... DHO	REK... DGZ	Axial [mm]	Radial [mm]	Angular	
					[°]	Indicator value [mm]
024	-	-	±0.375	±0.1	0.25°	0.3
028	-	028				0.35
042	-	042				0.42
048	048	048				0.48
055	055	055				0.55
060	060	060				0.61
065	065	065				0.70
075	075	075				0.79
080	080	080				0.87
090	090	090				0.98
100	100	100				1.09

Table 7.2: Maximal initial misalignments

7.2.1 Inspection of the radial misalignment

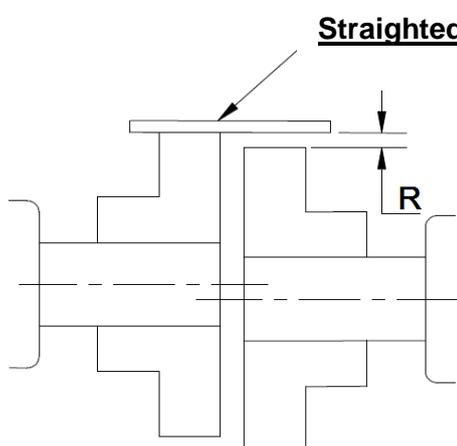


Figure 7.2: Measurement with a straightedge

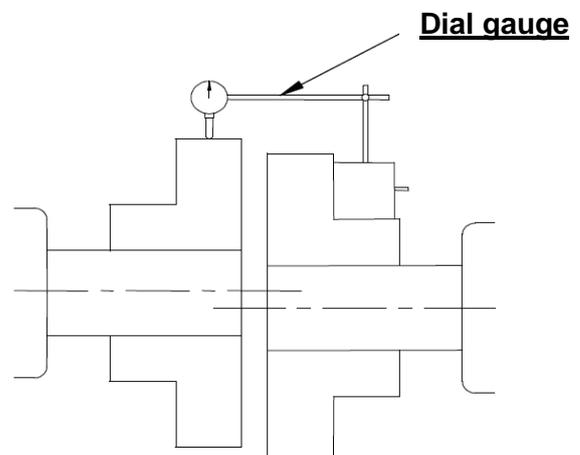


Figure 7.3: Measurement with a dial gauge

RINGSPANN	Installation and operating instructions for elastic jaw couplings REK...DGO / ...DHO / ...DGZ			E 06.700e	
	Issue: 17.12.2019	Version: 03	Drawn: SCHW	Checked: EISF	Pages: 24 Page: 11

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

Take a straightedge and place it onto the hub (item 1) as displayed in figure 7.2. With couplings REK...DHO and REK...DGZ, turn the other hub (item 2) until distance $R = 0$ is achieved. With coupling REK..DGO, the position where $R=0$ needs to be found through multiple application of the straightedge. 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 the help of a dial gauge. The dial gauge holder is mounted on a hub (item 1). Afterwards, place the volumetric flask on the processed outer diameter of the second hub (item 2) (see figure 7.3). With couplings REK...DHO and REK...DGZ, turn the hub one revolution and read off the full deflection of the dial gauge. The radial misalignment amounts to half the full deflection.

If the rotation of the second hub (item 2) as with coupling REK...DGO is not possible, the dial gauge must be placed multiple times at the perimeter. Note the highest and lowest value. The difference between the values divided by 2 gives you the radial misalignment of the coupling.

Compare the maximum measured value with the permissible value of the initial misalignment in table 7.1. If the permissible value is exceeded, better alignment needs to be carried out.

7.2.2 Inspection of the angular misalignment

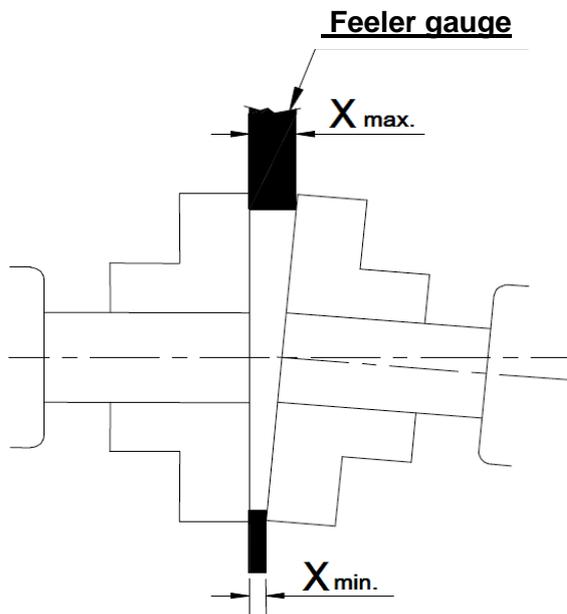


Figure 7.4: Measurement with a feeler gauge

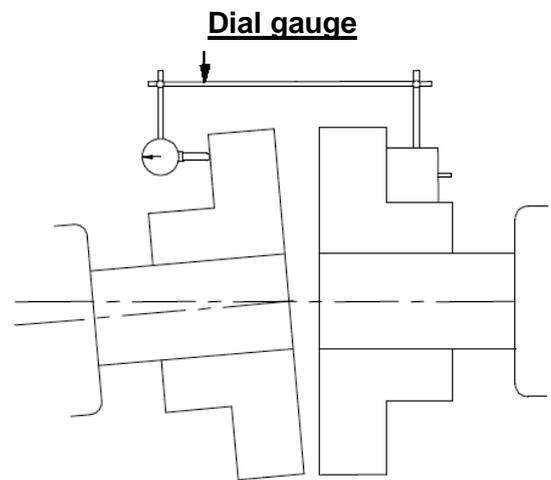


Figure 7.5: Measurement with a dial gauge

Calculate the maximum ($X_{max.}$) and minimum ($X_{min.}$) distance between the hubs (see figure 7.4) using a feeler gauge. With coupling REK...DGZ, the distance can be measured with a caliper. 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 with the dial gauge. To do so, place the dial gauge holder on a hub (item 1) and the volumetric flask onto the processed plane surface of

the other hub (item 2) as displayed in figure 7.5. It should hereby be placed as closely to the outer diameter as possible. With couplings REK...DHO and REK DGZ, turn the hub one full revolution and record the full deflection. With coupling REK...DGO, the dial gauge must be placed at the perimeter multiple times until the maximum value has been found. The deflection provides the indicator value for the angular misalignment in mm.

7.3. Manufacturing the hub bore

	<p>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.</p>
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Size	Bore d1 Hub type 0 REK...DGO / ...DHO / ...DGZ [mm]		Bore d2 Hub type I REK...DGO [mm]		Bore d2 Hub type II REK...DHO [mm]		Bore d2 Hub type III REK...DGZ [mm]	
	min.	max.	min.	max.	min.	max.	min.	max.
024	8	24	8	24	-	-	-	-
028	13	30	8	30	-	-	8	32
042	13	42	13	42	-	-	13	42
048	13	48	13	48	13	38	13	48
055	13	55	13	55	13	45	13	55
060	13	60	13	60	13	50	13	60
065	13	65	13	65	13	58	13	65
075	23	75	13	75	23	65	23	75
080	25	85	25	85	25	75	25	85
090	35	90	35	90	35	85	35	90
100	44	100	44	100	44	95	44	100

Table 7.3: Permissible bore diameter

All individual parts are supplied balanced in accordance with DIN ISO 1940 in balance quality G 6.3.

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 7.3).

If the hub is to be designed with a keyway nut, it is to be brought in between the cams as displayed in figure 7.3 or between bores for hub types 2 and 3. The design and inspection of the keyway connection falls to the operator and is his responsibility.

The decision on the necessity of retroactive balancing lies with the operator.

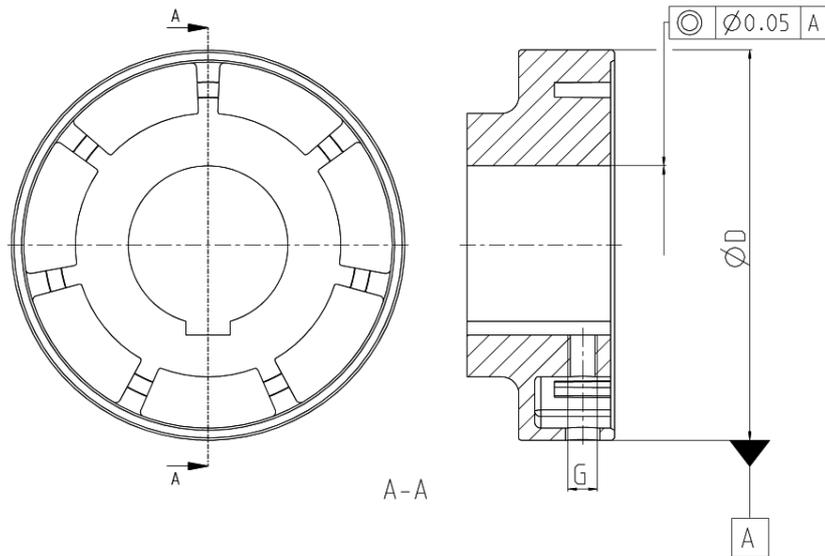


Figure 7.3: Specifications for the form and positional tolerance of the bore and position of the keyway nut

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	8	22	38	58	75
	to	22	38	58	75	110
Size locking screw G		M5	M6	M10	M12	M16
Tightening torque [Nm]		2	4	17	40	80

Table 7.5: Size and tightening torques of the locking screws



Attention!
RINGSPANN shall not assume any liability for any resulting damages that arise from work carried out by the operator.

7.4. Elastomer elements



Elastomer element: NBR 75 Shore-A
 Material: Nitrile rubber
 Hardness: 75±5 Shore-A
 Temperature range: -40°C to +100°C
 Colour: black

Figure 7.4: NBR 75 Shore-A

Size	Nominal torque T _{kN} Nm	Max. torque T _{KMAX} Nm	Alternating torque T _{kW} Nm	Torsional stiffness C _T dyn Nm/rad x 10 ³		
				1.0 T _{kN}	0.5 T _{kN}	0.25 T _{kN}
0024	34	102	5	3.0	1.1	0.4
0028	60	180	9	8.0	2.7	1.1
0042	100	300	15	12.0	4.1	1.7
0048	160	480	24	19.0	6.8	2.7
0055	240	720	36	28.8	10.4	4.2
0060	360	1 080	54	42.0	15.0	6.0
0065	560	1 680	84	77.0	28.0	11.0
0075	880	2 640	132	145.5	58.1	26.9
0080	1 340	4 020	201	228.0	91.0	42.0
0090	2 000	6 000	300	341.8	122.0	63.0
0100	2 800	8 400	420	472.0	169.0	87.0

Table 7.6: Technical specifications PU 92 Shore-A



Elastomer element: PU 92 Shore-A
 Material: Polyurethane
 Hardness: 92±5 Shore-A
 Temperature range: -30°C to +80°C
 Colour: orange

Figure 7.5: PU 92 Shore-A

Size	Nominal torque TkN Nm	Max. torque T _{KMAX} Nm	Alternating torque TkW Nm	Torsional stiffness CT dyn Nm/rad x 10 ³		
				1.0	0.5	0.25
				TkN	TkN	TkN
0024	51	153	8	2.0	1.6	1.4
0028	90	270	14	5.0	4.0	3.4
0042	150	450	23	7.0	6.1	5.2
0048	240	720	36	12.0	10.0	8.6
0055	360	1080	54	18.3	15.3	13.2
0060	540	1620	81	27.0	22.0	19.0
0065	840	2520	126	50.0	41.0	35.0
0075	1320	3960	198	99.2	71.5	54.0
0080	2010	6030	302	155	112.0	84.0
0090	3000	9000	450	230.4	182.1	134.4
0100	4200	12600	630	318.0	252.0	186.0

Table 7.6: Technical specifications PU 92 Shore-A



Elastomer element: HTrans
 Material: Polyurethane
 Hardness: 55±5 Shore-D
 Temperature range: -30°C to +120°C
 Colour: white

Figure 7.6: HTrans

Size	Nominal torque TkN Nm	Max. torque T _{KMAX} Nm	Alternating torque TkW Nm	Torsional stiffness CT dyn Nm/rad x 10 ³		
				1.0	0.5	0.25
				TkN	TkN	TkN
0024	85	255	13	5	7.8	2.676
0028	150	450	23	12	18.9	6.478
0042	250	750	38	19	29.0	9.925
0048	400	1 200	60	31	47.4	16.244
0055	600	1 800	90	47	49.7	45.314
0060	900	2 700	135	69	73.0	25.000
0065	1 400	4 200	210	127	133.6	66.560
0075	2 200	6 600	330	248	167.0	130.000
0080	3 350	10 050	503	388	261.0	203.000
0090	5 000	15 000	750	591	472.0	355.000
0100	7 000	21 000	1050	817	652.0	491.000

Table 7.7: Technical specifications HTrans

RINGSPANN	Installation and operating instructions for elastic jaw couplings REK...DGO / ...DHO / ...DGZ			E 06.700e	
Issue: 17.12.2019	Version: 03	Drawn: SCHW	Checked: EISF	Pages: 24	Page: 16

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 nut and the keyway (see 7. Technical prerequisite for reliable operation). The parts are to be cleaned of preservative agents.

8.2. Assembly of the couplings REK...DGO and REK...DHO

1. Mount the hubs onto the input and output shafts

- the driver (item 5) does not need to be disassembled (REK...DHO)
- in the event of disassembly, the position of the driver (item 5) on the hub (item 2) is to be marked and observed during assembly
- facilitated sliding onto the shaft by heating up the hubs (approx. 80°C)
- if necessary, the shafts can protrude out of the hub or remain inside. A sufficient supporting length of the keyway nut must be ensured.



Attention!

Use suitable means of protection when working with the heated hubs. Touching the heated hubs without safety gloves causes burns.

2. Slide the units in axial direction until the O measure is achieved (see chapter 2.2 Dimensions)
 - if the units have already been securely installed, the O measure can be adjusted by sliding the hubs onto the shaft. A sufficient supporting length of the keyway nut must be ensured.
 - measure O must be adhered to and may deviate within the permissible axial initial misalignment
 - if the permissible value is exceeded, the coupling may be damaged.
3. Tighten the set screws (item 4) with the respective tightening torque (see table 7.5 Manufacturing the hub bore)
4. Check the alignment, see chapter 7.2

The given misalignments should be measured with suitable measuring equipment, e.g. dial gauge, straightedge, feeler gauge or depth gauge.



Information

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 (see chapter 7.2 Permissible misalignments). The remaining 75% of misalignments provide security against external influences that arise during operation, such as deformation in the machine and thermal expansion.

8.3. Assembly of the couplings REK...DGZ

1. Mount the hubs (items 1 and 2) onto the input and output shaft

- facilitated sliding onto the shaft by heating up the hubs (approx. 80°C)



Attention!

Use suitable means of protection when working with the heated hubs. Touching the heated hubs without safety gloves causes burns .

2. Slide the units in axial direction until the L3 measure is achieved (see chapter 2.2 Dimensions)
 - if the units have already been securely installed, the L3 measure can be adjusted by sliding the hubs onto the shaft. A sufficient supporting length of the keyway nut must be ensured.
 - Measure L3 must be adhered to and may deviate within the permissible axial initial misalignment
 - If the permissible value is exceeded, the coupling may be damaged.
3. Take apart the transmission group consisting of items 7 + 5.
4. Slide the cams from the driver (item 5) between the elastomer elements of the hub (item 1) until stop
5. Mount the spacer (item 7) between hub (item 2) and driver (item 5).
 - Observe the marks for the mounting position of the spacer (items 7 and 5)
6. Tighten the screws (item 6) with the specified tightening torque in table 8.1.
7. Check measure O according to table 2.2
8. Tighten the set screws (item 4) with the respective tightening torque (see table 7.5)
9. Check the alignment, see chapter 7.2

Size	Thread	Tightening torque Nm
0028	M6	12.8
0042	M6	12.8
0048	M8	31.2
0055	M8	31.2
0060	M10	61.6
0065	M10	61.6
0075	M10	61.6
0080	M12	150
0090	M12	150
0100	M16	250

Table 8.1: Tightening torques of the screws

9. Start-up

Before start-up, 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	<ol style="list-style-type: none"> 1) Eliminate the cause of the alignment error 2) Carry out wear inspection 	Increased temperature on the elastomer surface, ignition risk as a result
	Wear of elastomer elements → transfer torque via metal contact	<ol style="list-style-type: none"> 1) Disassemble coupling, remove residues of elastomer elements 2) Check coupling parts, replace damaged parts 3) Insert elastomer elements, install coupling parts 4) Check alignment, correct if necessary 	Ignition risk due to formation of sparks
	Screws for axial hub securing are loose	<ol style="list-style-type: none"> 1) Check alignment 2) Tighten screws for axial hub securing, secure against repeated loosening 3) Carry out wear inspection 	Ignition risk due to hot surfaces and spark formation
Cam break	Wear of elastomer elements → transfer torque via metal contact	<ol style="list-style-type: none"> 1) Replace entire coupling 2) Check alignment 	Ignition risk due to spark formation
	Overload	<ol style="list-style-type: none"> 1) Replace entire coupling 2) Check alignment 3) Determine reason for overload 	
	Operating parameters do not correspond to the coupling output	<ol style="list-style-type: none"> 1) Check operating parameters, select larger coupling if necessary 2) Install new coupling 3) Check alignment 	
	Operating error	<ol style="list-style-type: none"> 1) Replace entire coupling 2) Check alignment 3) Instruct and train operating staff 	
Premature wear of the elastomer elements	Alignment error	<ol style="list-style-type: none"> 1) Eliminate the reason for the alignment error 2) Carry out wear inspection 	Increased temperature on the elastomer surface, ignition risk as a result
	Physical changes due e.g. to too low/high ambient	<ol style="list-style-type: none"> 1) Disassemble coupling, remove residues of elastomer elements 	

	temperature, contact with aggressive liquids	<ol style="list-style-type: none"> 2) Check coupling parts, replace damaged parts 3) Insert elastomer elements, install coupling parts 4) Check alignment, correct if necessary 5) Ensure that all triggers for the physical changes have been eliminated 	
	Impermissible ambient, contact temperatures	<ol style="list-style-type: none"> 1) Disassemble coupling, remove residues of elastomer elements 2) Check coupling parts, replace damaged parts 3) Insert elastomer elements, install coupling parts 4) Check alignment, correct if necessary 5) Check and regulate temperature, select elastomer elements from other material if necessary 	
Premature wear of the elastomer elements due to liquefaction on the inside	Drive vibrations	<ol style="list-style-type: none"> 1) Disassemble coupling, remove residues of elastomer elements 2) Check coupling parts, replace damaged parts 3) Insert elastomer elements, install coupling parts 4) Check alignment, correct if necessary 5) Determine cause of vibrations, select elastomer elements with smaller/higher shore hardness if necessary 	Ignition danger due to spark formation for metallic contact of the cams

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	0024	0028	0042	0048	0055	0060	0065	0075	0080	0090	0100
Wear limit S_{max} [mm]	5.5	5.0	6.0	7.0	8.0	8.0	8.0	8.0	8.5	9.0	10.0

Tabelle 10.2: Wear limits

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.

RINGSPANN	Installation and operating instructions for elastic jaw couplings REK...DGO / ...DHO / ...DGZ			E 06.700e	
	Issue: 17.12.2019	Version: 03	Drawn: SCHW	Checked: EISF	Pages: 24 Page: 20

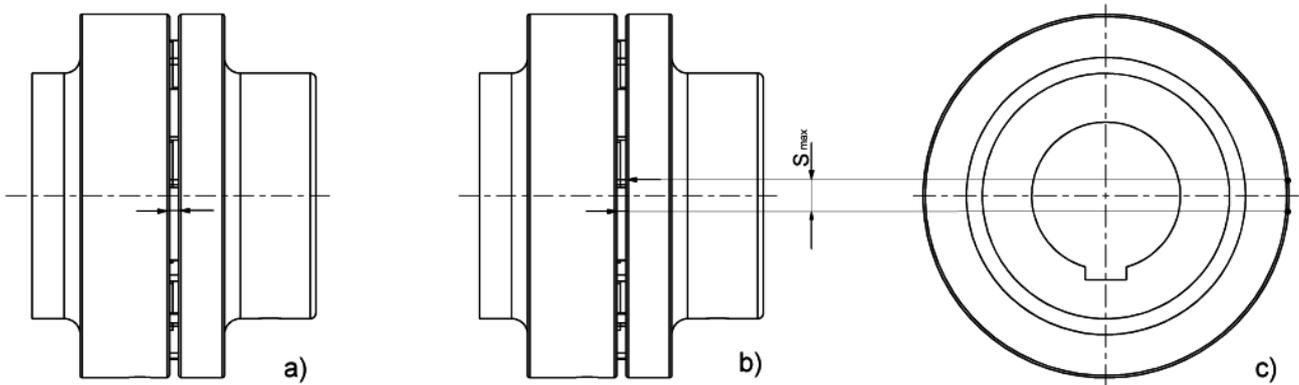


Figure 10.1: Check the wear limit

11. Maintenance and repair

Even if REK ... DGO/ ...DHO/ ...DGZ ranks among the more low-maintenance 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 screw connections,
- Check the wear limit of the elastomer elements.

The tightening torques of the screws 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.



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.

14. Supplement for operation in areas with potentially explosive atmosphere

If the elastic shaft couplings REK ... DGO / ...DHO / ...DGZ are operated in or in connection with potentially explosive atmosphere, the following supplemental information must also be observed.

RINGSPANN	Installation and operating instructions for elastic jaw couplings REK...DGO / ...DHO / ...DGZ			E 06.700e	
	Issue: 17.12.2019	Version: 03	Drawn: SCHW	Checked: EISF	Pages: 24 Page: 21

14.1 Normal operation

The couplings REK ... DGO / ...DHO / ...DGZ are devices 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 elastomer element material used, see section 14.1.2.

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

14.1.2 Instructions for use

Couplings REK ... DGO / ...DHO / ...DGZ are designed ignition source-free according to the respective category pursuant to DIN EN ISO 80079-36. The use of couplings REK ... DGO / ...DHO / ...DGZ in connection with explosive atmosphere are dependent on the used material and the frame size of the elastomer element. The following approvals apply:

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

CE  I M2 Ex h Mb X
 T_a in accordance with the operating instructions

In equipment group II, category 2G and 2D or EPL Gb and Db in all frame sizes with the label:

CE  II 2G Ex h IIC TX Gb
CE  II 2D Ex h IIIC TX Db
 T_a and TX in accordance with the operating instructions

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 elastomer element:

The minimum ambient temperature amounts to:

Colour Elastomer element material	Ambient- temperature
black	$-40^{\circ}\text{C} \leq T_a$
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 Elastomer element	Ambient temperature	Temperature class	max. surface temperature
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RINGSPANN	Installation and operating instructions for elastic jaw couplings REK...DGO / ...DHO / ...DGZ			E 06.700e	
Issue: 17.12.2019	Version: 03	Drawn: SCHW	Checked: EISF	Pages: 24	Page: 22

material

black	$T_a \leq 55^\circ\text{C}$	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 couplings 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 couplings REK...DGO / ...DHO / ...DGZ are used as components 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 couplings REK...DGO / ...DHO / ...DGZ are 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 couplings REK...DGO / ...DHO / ...DGZ are suitable for operation in the actual given explosive atmosphere based on the instructions for use.

Couplings REK...DGO / ...DHO / ...DGZ 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.

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.

RINGSPANN	Installation and operating instructions for elastic jaw couplings REK...DGO / ...DHO / ...DGZ			E 06.700e	
Issue: 17.12.2019	Version: 03	Drawn: SCHW	Checked: EISF	Pages: 24	Page: 23

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 play "O".

All screws must be tightened with the specified torque.

The elastomer elements are 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 elastomer elements 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 elastomer elements must be replaced.

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

14.6 Testing



Couplings REK...DGO / ...DHO / ...DGZ are 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.

Couplings REK...DGO / ...DHO / ...DGZ 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.

RINGSPANN	Installation and operating instructions for elastic jaw couplings REK...DGO / ...DHO / ...DGZ			E 06.700e	
Issue: 17.12.2019	Version: 03	Drawn: SCHW	Checked: EISF	Pages: 24	Page: 24

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 REK...DGO / ...DHO / ...DGZ

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