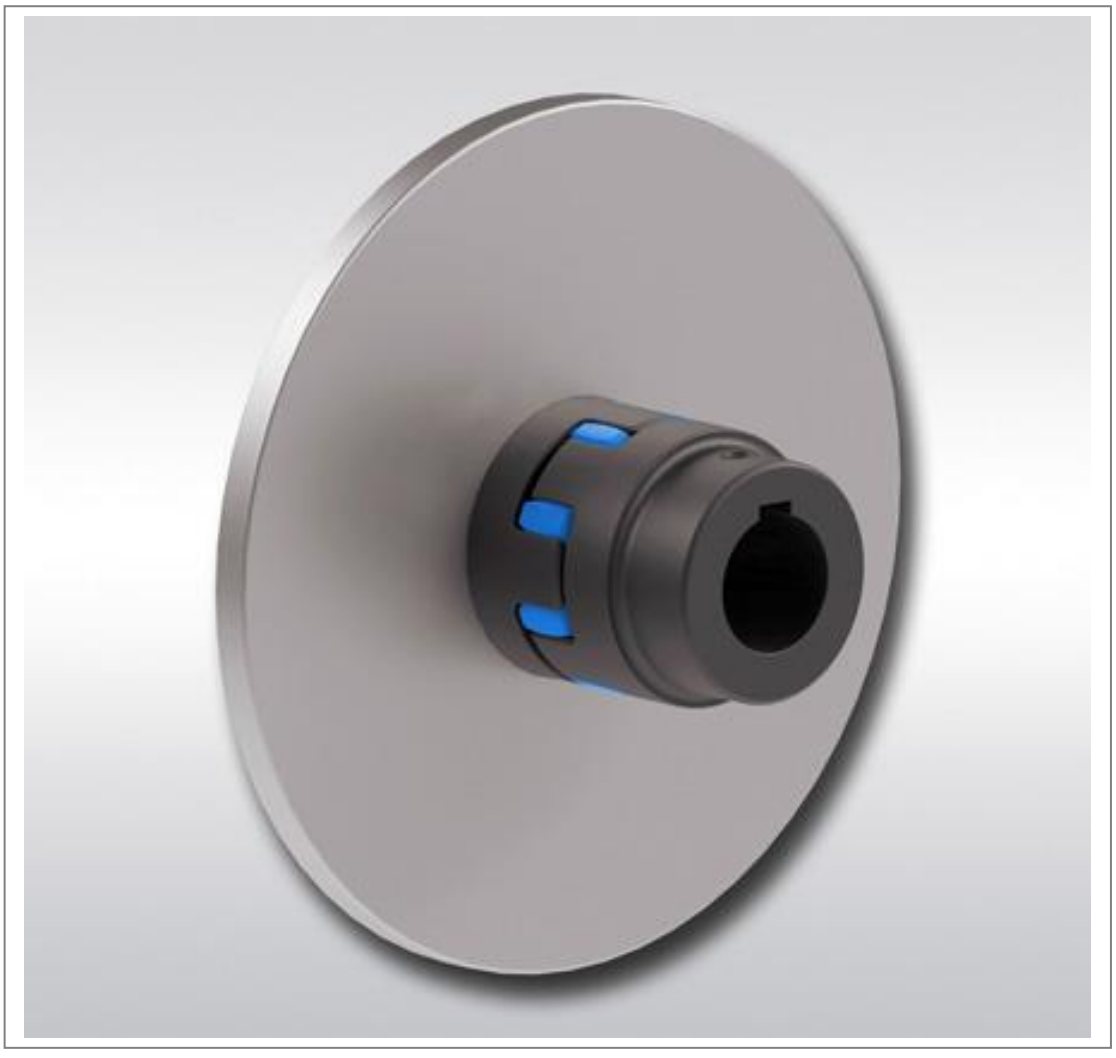
RINGSPANN®
Antriebskomponenten

Installation and operating instructions for elastic jaw coupling with brake disc REK … DCS

E 06.708



RINGSPANN GmbH

Schaberweg 30-38
61348 Bad Homburg
Germany

Telephone +49 6172 275 0
Fax +49 6172 275 275

www.ringspann.com
info@ringspann.com

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.

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.

Contents

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. In addition, a braking torque can be transferred through the mounted brake disc. 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 or brake disc during operation must be prevented with a suitable cover or protective device.
- Do not reach into the working area of the coupling or brake disc 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 REK … DCS 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

Spiders:

- RINGSPANN logo
- Size designation

2.2. Dimensions

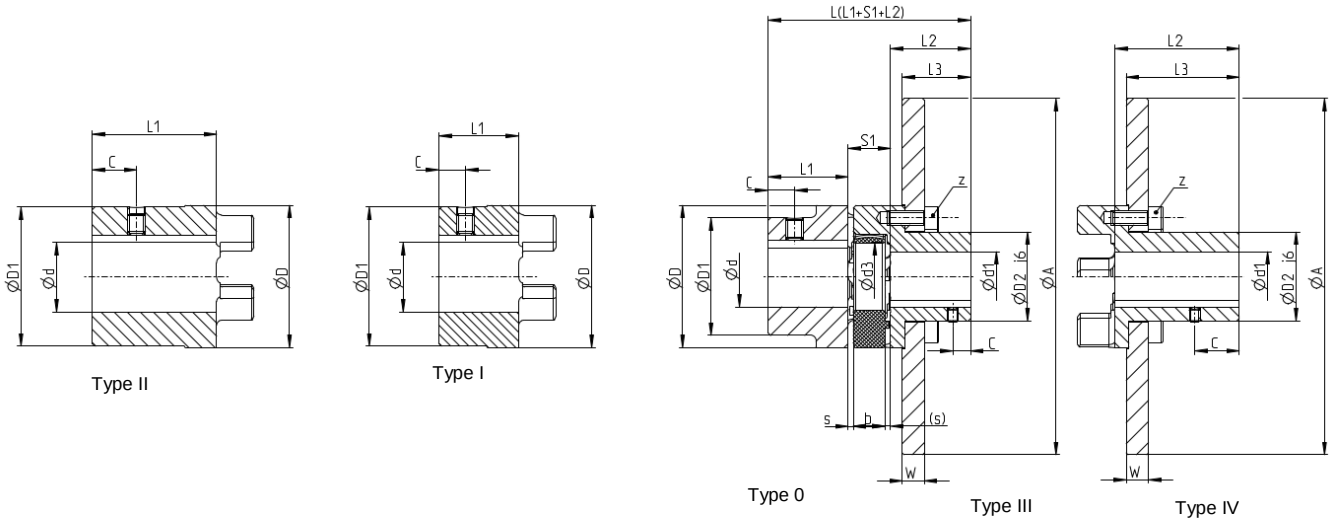


Figure 2.1: Drawing REK…DCS

Size	Dimensions [mm]									
	Max. speed n_{max} min^{-1}	d3	D	D1		D2	L1/ L2		L3	
				Hub type 0	Hub type I + II	Hub type III + IV	Hub type 0 + I + III	Hub type II + IV	Hub type III	Hub type IV
38	9500	38	80	66	78	50	45	70	39.5	64.5
42	8000	46	95	75	94	60	50	75	42.5	67.5
48	7200	51	105	85	104	68	56	80	47.5	71.5
55	6350	60	120	98	118	78	65	90	53.5	79.5
65	5650	68	135	115	133	92	75	100	62.5	87.5
75	4750	80	160	135	158	106	85	110	70.5	85.5
90	3800	100	200	160	198	140	100	125	82.5	107.5

Table 2.1: Coupling dimensions

Size	Dimensions [mm]						
	s	b	S1	z (number of screws)	M	T_A [Nm]	Quality
38	3	18	24	8	M8	36	10.9
42	3	20	26	12	M8	36	
48	3.5	21	28				
55	4	22	30	8	M10	71	
65	4.5	26	35	12			
75	5	30	40	15	M12	123	
90	5.5	34	45		M16	302	

Table 2.2: Screw connection

Dimensions [mm]									
Size	C			Possible thread on groove					min /max.
	Type 0	Type I	Type II	M5	M6	M10	M12	M16	bore Ød
0038	22.5	22.5	35	■	■	■			**12 / 48**
0042	25	25	37.5	■	■	■			**14 / 55**
0048	28	28	40	■	■	■	■		**15 / 62**
0055	32.5	32.5	45	■	■	■	■		**20 / 74**
0065	37.5	37.5	50	■	■	■	■	■	**22 / 80**
0075	42.5	42.5	55		■	■	■	■	**30 / 95**
0090	50	50	62.5		■	■	■	■	**40 / 110**

Table 2.3: Positon set screw

Brake discs steel St 52

Size	W	Max. speed	38	42	48	55	65	75	90
200	12.5	9100	S0AA						
250	12.5	7300	S0BA	S0BA	S0BA				
	20				S0BC*				
315	16	5700		S0DB	S0DB	S0DB	S0DB	S0DB	
	20					S0DC*			
355	30	5100					S0EE*		
400	16	4500			S0FB	S0FB	S0FB	S0FB	S0FB
	30						S0FE	S0FE	S0FE
450	30	4000						S0HE	S0HE
500	16	3600				S0IB	S0IB	S0IB	S0IB
	30							S0IE	S0IE
560	30	3200							S0KE*
630	20	2900					S0LC	S0LC	S0LC
710	20	2600					S0MC	S0MC	S0MC
800	25	2300							S0ND*

Table 2.4: Brake disc steel
*Brake disc size on request

Brake discs spheroidal graphite iron GGG 50

Size	W	Max. speed	38	42	48	55	65	75	90
200	12.5	9100	G0AA						
250	12.5	7300	G0BA	G0BA	G0BA				
300	12.5	6000		G0CA	G0CA	G0CA	G0CA		
355	12.5	5100		G0EA	G0EA	G0EA	G0EA	G0EA	
430	12.5	4200				G0GA	G0GA	G0GA	G0GA
520	12.5	3500				G0JA	G0JA	G0JA	G0JA
630	25	2900						G0LD	G0LD
710	25	2600						G0MD	G0MD
800	25	2300							G0ND

Table 2.5: Brake disc cast iron

Caution danger to life!
Under no circumstances should the brake disc be operated at a higher speed, otherwise there is a risk of excessive centrifugal force.

2.3. Parts list

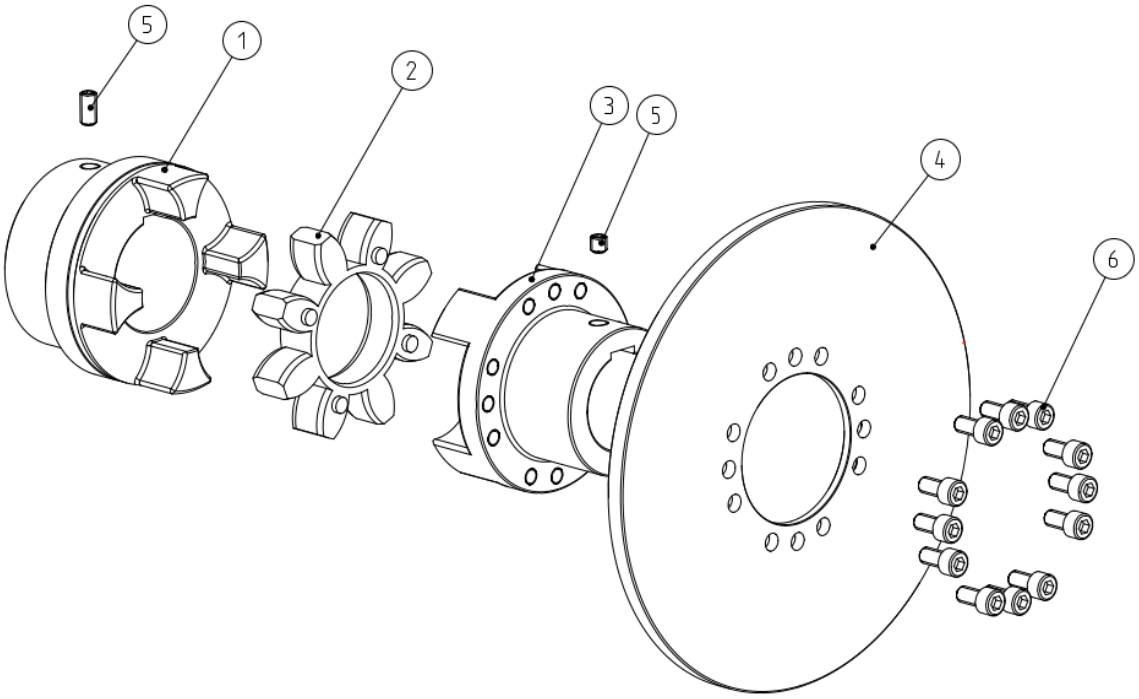


Figure 2.2: REK DCS

Position	Quantity	Description
1	1	Hub A
2	1	Spider
3	1	Hub B
4	1	Brake disc
5	2	Set screws DIN EN ISO 4029
6	(see table 2.2)	Screws DIN EN ISO 4762

Table 2.6: 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 REK … DCS 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 brake disc has 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 REK … DCS 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 7.2 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 coupling spiders 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.

-

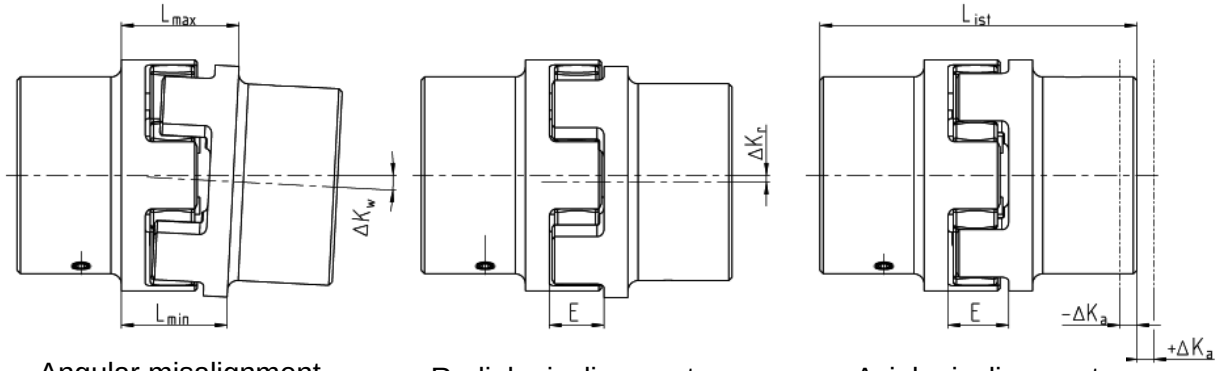
7. Technical prerequisite for reliable operation

7.1. Permissible misalignments

Size	Max. permissible misalignments		
	Axial ΔK_a [mm]	Radial ΔK_r [mm]	Angular ΔK_w [°]
0038	± 2.2	0.25	0.9
0042	± 2.3	0.30	0.9
0048	± 3.0	0.35	1.0
0055	± 3.0	0.35	1.0
0065	± 3.5	0.40	1.0
0075	± 3.5	0.45	1.1
0090	± 4.5	0.50	1.1

Table 7.1: Maximum permissible misalignments in operation

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.



Angular misalignment

$\Delta K_w = L_{max.} - L_{min.}$

Radial misalignment

Axial misalignment

$L-\Delta K_a \leq L_{ist} \leq L+\Delta K_a$

Figure 7.1: Misalignment types

The figure 7.2 shows the relationship for radial (K_r) and angular misalignments (K_w) occurring at the same time:

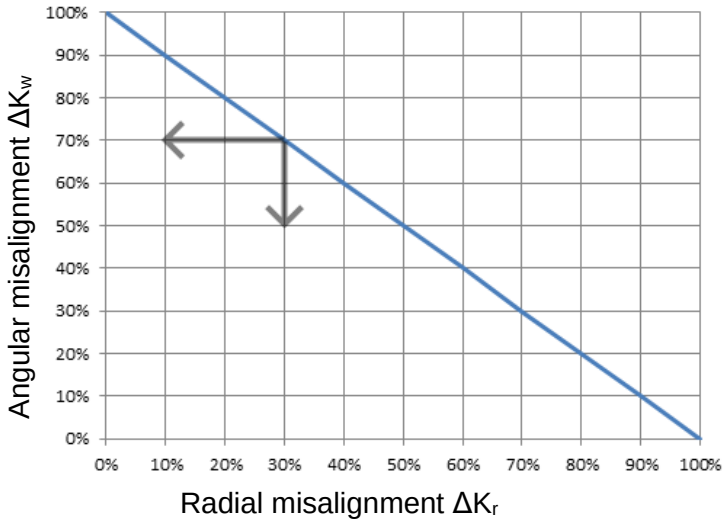


Figure 7.2: Misalignment combination

The misalignment as a percentage is calculated as follows:

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

More information on the measurement method can be found in chapter 8.2 Assembly.

7.2. 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	Bore d1/d2 [mm]					
	Hub type 0		Hub type I		Hub type II	
	min.	max.	min.	max.	min.	max.
0038	12	40	12	48	12	48
0042	14	45	14	55	14	55
0048	15	52	15	62	15	62
0055	20	60	20	74	20	74
0065	22	70	22	80	22	80
0075	30	80	30	95	30	95
0090	40	97	40	110	40	110

Table 7.3: 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 7.3).

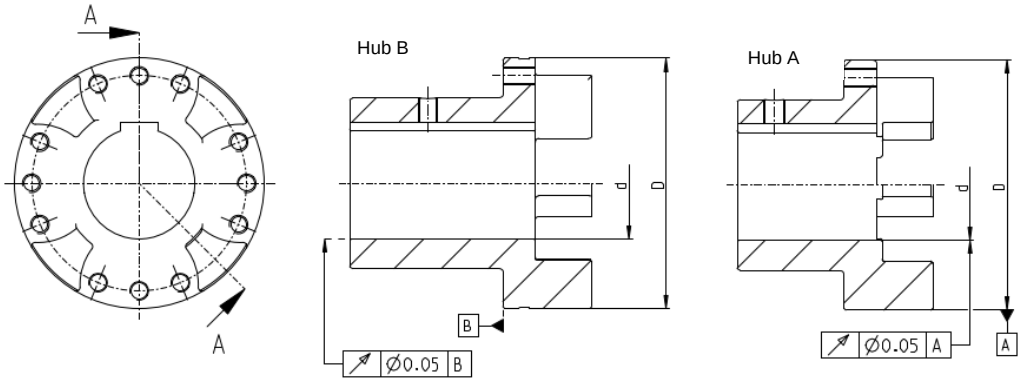


Figure 7.3: Specifications for the form and positional tolerance of the bore and position of the keyway nut

If the hub is to be designed with a keyway nut, it is preferably to be introduced between the cams as in figure 7.3. 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 part .

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
	to	22	38	58	75	110
Size locking screw		M5	M6	M10	M12	M16
Tightening torque [Nm]		2	4	17	40	80
Position		(see table 2.3)				

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 operato .

7.3. Spider

Figure 7.4: TU 92 Shore-A

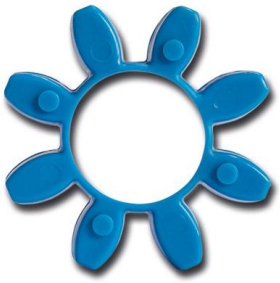


Figure 7.5: TU 98 Shore-A

Elastomer element TU 92 Shore-A

Material:	Polyurethane
Hardness:	92 ±2 Shore-A
Deployment temperature:	-30°C to 120°C
Colour:	gray

Size	Nominal torque T_{KN} [Nm]	Max. torque T_{KMAX} [Nm]
0038	181	372
0042	253	519
0048	296	608
0055	392	804
0065	597	1225
0075	1220	2509
0090	2292	4704

Table 7.6: Technical specifications TU 92

Elastomer element TU 98 Shore-A

Material:	Polyurethane
Hardness:	98 ±2 Shore-A
Deployment temperature:	-30°C to 120°C
Colour:	blue

Size	Nominal torque T_{KN} [Nm]	Max. torque T_{KMAX} [Nm]
0038	332	664
0042	477	954
0048	525	1050
0055	694	1388
0065	973	1946
0075	1980	3960
0090	3523	7046

Table 7.7: Technical specifications TU 98

Figure 7.6: TU 65 Shore

Elastomer element TU 65 Shore-D

Material:	Polyurethane
Hardness:	65 ±2 Shore-D
Deployment temperature:	-30°C to 120°C
Colour:	White

Size	Nominal torque T_{KN} [Nm]	Max. torque T_{KMAX} [Nm]
0038	402	804
0042	560	1120
0048	667	1334
0055	834	1668
0065	1155	2310
0075	2380	4760
0090	4514	9028

Table 7.8: Technical specifications TU65

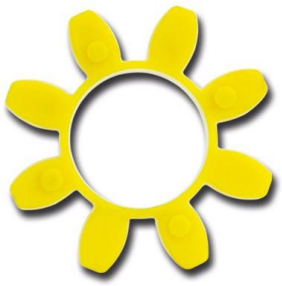


Figure 7.7: PU 92 Shore-A

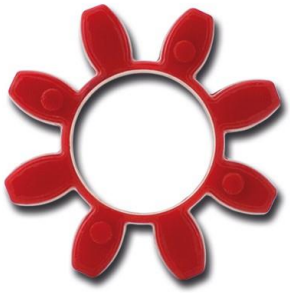


Figure 7.8: PU 95 Shore-A

Elastomer element PU 92 Shore-A

Material:	Polyurethane
Hardness:	92±2 Shore-A
Deployment temperature:	-30 °C to 80 °C
Colour:	yellow

Elastomer element PU 95 Shore-A

Material:	Polyurethane
Hardness:	95±2 Shore-A
Deployment temperature:	-30 °C to 90 °C
Colour:	red

Size	Nominal torque T_{KN} [Nm]	Max. torque T_{KMAX} [Nm]
0019	9,6	19
0024	33	69
0028	91	186
0038	181	372
0042	253	510
0048	296	600
0055	392	800
0065	590	1220
0075	1220	2500
0090	2290	4700

Table 7.9: Technical specifications PU 92

Size	Nominal torque T_{KN} [Nm]	Max. torque T_{KMAX} [Nm]
0019	16	32
0024	57	114
0028	153	304
0038	310	610
0042	430	850
0048	500	990
0055	650	1300
0065	890	1780
0075	1830	3640
0090	3430	6800

Table 7.10: Technical specifications PU 95

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).

8.2. Assembly description

1. Fit the brake disc to hub B. The parts are first screwed hand-tight with the enclosed screws.
2. Tighten the screws with a torque wrench to the specified tightening torque T_A (see Table 2.2).
   Secure the screws against loosening by means of a liquid screw lock (e.g. Loctite 243).
3. Fit hub A and hub B with the mounted brake disc on the shaft of the input and output side. Hub B should be placed on the end of the shaft where the greater mass moment of inertia will act.
   (The assembly can be facilitated by heating the hubs to approx. 80°C.)

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

4. Insert the spider seated in the cam area of the input-sided or output-sided hub.
5. Slide the units in axial direction until the S1 measure is achieved (see chapter 2.2 Dimensions)
   → if the units are already mounted, the S1 measure can be adjusted by sliding the hubs onto the shaft. Here, a sufficient supporting length of the keyway must be ensured.
   → if S1 is not adhered to, the coupling may be damaged
6. Tighten the set screws with the respective tightening torque (see table 7.5 Manufacturing the hub bore),
7. Measurement of the misalignments:

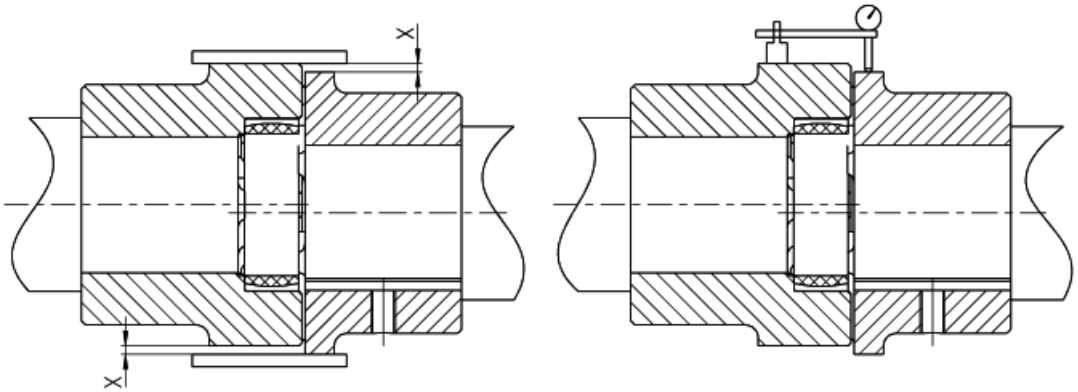


Figure 8.1: Measuring the misalignments

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

Information

If the d_3 measure of the spider is greater than the shaft diameter with the inserted keyway, one or two shaft ends may protrude into the spider.

The remaining misalignments should generally be as small as possible after alignment. 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.

Note: the permissible lateral runout of the brake disc may not exceed 0.2 mm when installed. A larger runout can cause rattling and shaking of the entire coupling unit.

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 alignment of the brake disc,
- the clearance S1.

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 spider surface, ignition risk as a result
	Spider wear → transfer torque via metal contact	1) Disassemble coupling, remove spider residues 2) Check coupling parts, replace damaged parts 3) Insert spider, mount coupling parts 4) Check alignment, correct if necessary	Ignition risk due to formation of sparks
	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
Cam break	Spider wear → transfer torque through metal contact	1) Replace entire coupling 2) Check alignment	Ignition risk due to spark formation
	Overload	1) Replace entire coupling 2) Check alignment 3) Determine reason for overload	
	Operating parameters do not correspond to the coupling output	1) Check operating parameters, select larger coupling if necessary 2) Install new coupling 3) Check alignment	
	Operating error	1) Replace the entire coupling 2) Check alignment 3) Instruct and train operating staff	

Premature spider wear	Alignment error	1) Eliminate the reason for the alignment error 2) Carry out wear inspection	Increased temperature on the spider surface, ignition risk as a result
	Physical changes due e.g. to too low/high ambient temperature, contact with aggressive liquids	1) Disassemble coupling, remove spider residues 2) Check coupling parts, replace damaged parts 3) Insert spider, install 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 spider residues 2) Check coupling parts, replace damaged parts 3) Insert spider, install coupling parts 4) Check alignment, correct if necessary Check and regulate temperatures, possibly select different spider material	
Premature spider wear due to liquefaction on the inside of the spider cams	Drive vibrations	1) Disassemble coupling, remove spider residues 2) Check coupling parts, replace damaged parts 3) Insert spider, install coupling parts 4) Check alignment, correct if necessary 5) Determine cause of vibrations, possibly select spider with smaller/higher shore hardness	

Table 10.1: Operational disturbances

To ensure that the coupling can be operated safely, the specified wear values may not be exceeded.

Size	Wear limit	Tooth width
	X_{max} [mm]	B_{new} [mm]
0038	3	14
0042	4	16
0048	4	18
0055	5	20
0065	5	23
0075	6	26
0090	8	33

Table 10.2: Wear limits

Check these wear values as follows:

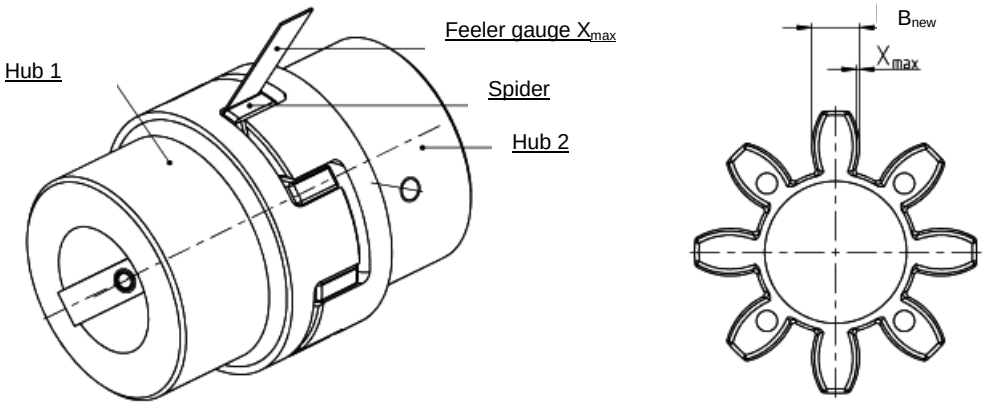


Figure 10.1: Check the wear limit

11. Maintenance and repair

Even if REK … DCS 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,
- examining the brake disc wear,
- examining the spider wear.

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 use .

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.