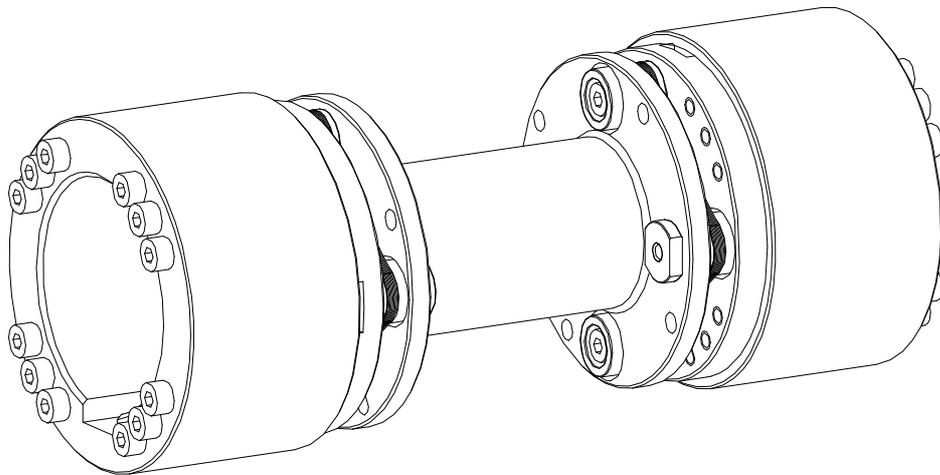




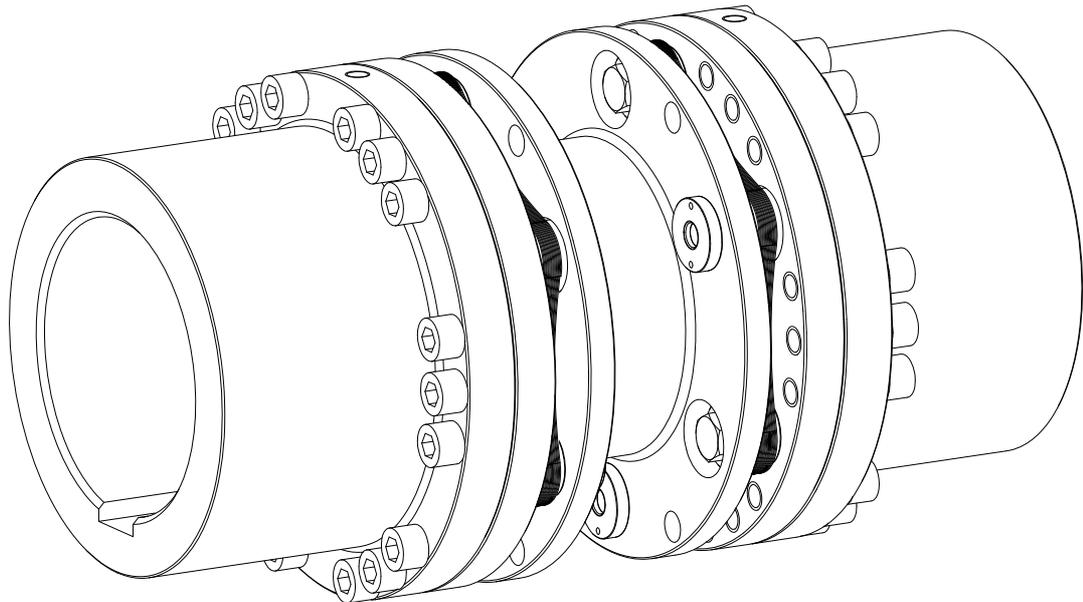
RIGIFLEX®-N

Torsionally stiff steel lamina coupling
type A

according to directive 94/9/EC (ATEX 95)
for finish bored, pilot
bored and unbored couplings



Size 35



Size 50 - 408



RIGIFLEX®-N is a torsionally stiff, flexible steel lamina coupling which is able to compensate for shaft displacement, for example caused by thermal expansion.

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1 Technical data

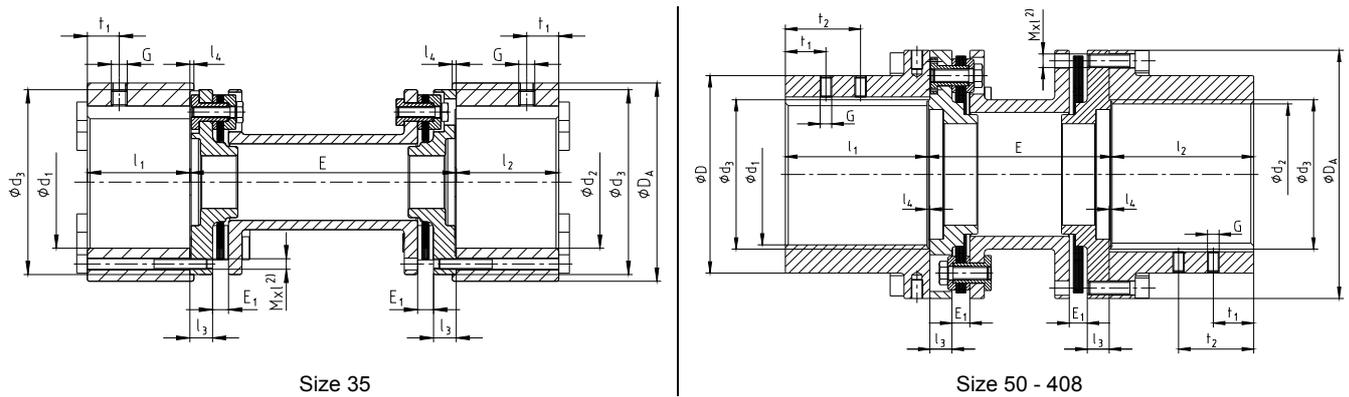


Illustration 1: RIGIFLEX®-N, type A

Table 1: Type A

RIGIFLEX®-N Size	Max. finish bore [mm] d ₁ , d ₂	Dimensions [mm]													Setscrew		
		General											E ¹⁾		G	t ₁	t ₂
		D	DA	d ₃	l ₁ , l ₂	l ₃	l ₄	E ₁									
35	50	-	75	70	38.5	8.5	1.5	6	100	140	-	-	-	M6	15	-	
50	50	70	95	55	50	12	1.0	9	100	140	-	-	-	M6	10	-	
65	65	100	126	75	62	12	2.0	10	100	140	180	-	-	M8	20	-	
75	75	105	138	85	62	12	2.5	10	100	140	180	-	-	M8	20	-	
85	85	120	156	95	72	15	2.5	12	-	140	180	200	250	M10	20	-	
110	110	152	191	120	87	18	3.0	12	-	140	180	200	250	M10	25	-	
120	120	165	213	130	102	20	3.0	12	-	-	180	200	250	M12	25	-	
140	140	200	265	160	126	25	4.0	15	-	-	-	200	250	M12	30	-	
160	160	230	305	170	145	31	5.0	15	-	-	-	-	250	M12	30	-	
166	160	230	305	184	155	31	2.0	17	According to customer specification					M16	30	70	
196	190	260	330	200	185	32	2.5	24						M16	40	90	
216	210	285	370	220	205	32	2.5	26						M20	50	110	
256	250	350	440	265	245	38	2.5	31						M20	70	130	
306	300	400	515	310	295	43	3.0	36						M24	70	130	
346	340	460	590	370	335	55	3.0	45						M24	95	175	
406	400	530	675	420	395	58.5	3.0	50						M24	95	175	
168	160	230	305	184	155	31	2.0	17						M16	30	70	
198	190	260	330	200	185	32	2.5	24						M16	40	90	
218	210	285	370	220	205	32	2.5	26						M20	50	110	
258	250	350	440	265	245	38	2.5	31						M20	70	130	
308	300	400	515	310	295	43	3.0	36						M24	70	130	
348	340	460	590	370	335	55	3.0	45						M24	95	175	
408	400	530	675	420	395	58.5	3.0	50						M24	95	175	

1. Other shaft distance dimensions available on request
2. For figures MxL see table 7



1 Technical data

Table 2: Torque and speed

RIGIFLEX®-N size		35	50	65	75	85	110	120	140	160
Torque [Nm]	T_{KN}	120	240	450	940	1700	2700	4500	9000	13000
	$T_{Kmax.}$	240	480	900	1880	3400	5400	9000	18000	26000
	T_{KW}	60	120	225	470	850	1350	2250	4500	6500
Max. speed n [rpm]		23000	18000	13600	12400	11000	9000	8000	6400	5600

RIGIFLEX®-N size		166	196	216	256	306	346	406
Torque [Nm]	T_{KN}	17500	22500	32000	52500	86000	135000	210000
	$T_{Kmax.}$	35000	45000	64000	105000	172000	270000	420000
	T_{KW}	8750	11250	16000	26250	43000	67500	105000
Max. speed n [rpm]		5600	5200	4600	3900	3300	2900	2500

RIGIFLEX®-N size		168	198	218	258	308	348	408
Torque [Nm]	T_{KN}	23000	30000	42500	70000	115000	180000	280000
	$T_{Kmax.}$	46000	60000	85000	140000	230000	360000	560000
	T_{KW}	11500	15000	21500	35000	57500	90000	140000
Max. speed n [rpm]		5600	5200	4600	3900	3300	2900	2500



RIGIFLEX®-N couplings with attachments that can generate heat, sparks and static charging (e. g. combinations with brake drums, brake disks, overload systems like torque limiters, fans etc.) are not permitted for the use in hazardous locations. A separate analysis must be performed.

2 Advice

2.1 Coupling selection



CAUTION!

For a long-lasting and failure-free operation of the coupling it must be selected according to the selection instructions for the particular application (see RIGIFLEX®-N catalogue). If the operating conditions (performance, speed, modifications on engine and machine) change, the coupling selection must be reviewed again. Please note that the technical data regarding torque refer to the lamina set only. The transmittable torque of the shaft/hub connection must be reviewed by the customer and is subject to his responsibility.

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

2.2 General advice

Please read through these assembly instructions carefully before you start up the coupling. Please pay special attention to the safety instructions!



The **RIGIFLEX®-N** coupling is suitable and approved for the use in hazardous locations. When using the coupling in hazardous locations please observe the special advice and instructions regarding safety in enclosure A.

The assembly instructions are part of your product. Please keep them carefully and close to the coupling. The copyright for these assembly instructions remains with **KTR Kupplungstechnik GmbH**.

Please observe protection note ISO 16016.	Drawn:	14.01.14 Kb/Sta	Replaced for:	KTR-N dated 28.05.13
	Verified:	16.01.14 Kb	Replaced by:	



2 Advice

2.3 Safety and advice symbols



DANGER!

Danger of injury to persons.



CAUTION!

Damages on the machine possible.



ATTENTION!

Pointing to important items.



WARNING!

Hints concerning explosion protection.

2.4 General hazard warnings



DANGER!

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

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

2.5 Intended use

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

- have carefully read through the assembly instructions and understood them
- had technical training
- are authorized by your company

The coupling may only be used in accordance with the technical data (see table 1 and 2 in chapter 1). Unauthorized modifications on the coupling design are not admissible. We will not assume liability for any damage that may arise. In the interest of further development we reserve the right for technical modifications.

The **RIGIFLEX®-N** described in here corresponds to the technical status at the time of printing of these assembly instructions.

3 Storage

The couplings are supplied in preserved condition and can be stored at a dry and covered place for 6 - 9 months.



CAUTION!

Humid storage rooms are not suitable.

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

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	Verified:	16.01.14 Kb	Replaced by:	



4 Assembly

The spacer is supplied fully assembled. Before assembly the coupling has to be inspected for completeness.

4.1 Components of the couplings

Components of RIGIFLEX®-N type A

Component	Quantity	Description	Component	Quantity	Description
1	2	Coupling hub	4	see table 4	Setscrews DIN EN ISO 4029
2	1	Spacer complete			
3	see table 3	Cap screws			

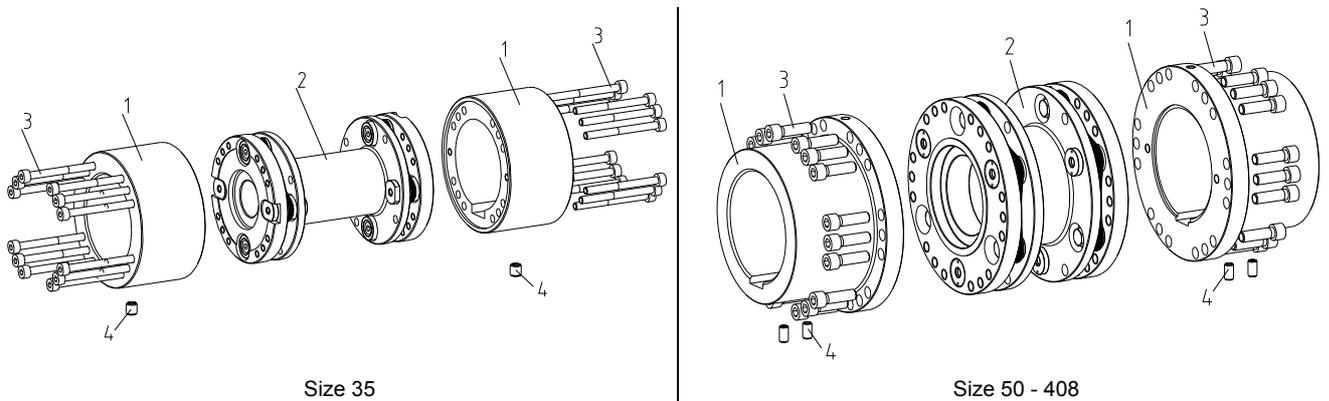


Illustration 2: RIGIFLEX®-N, type A

Table 3:

RIGIFLEX®-N size	35	50	65	75	85	110	120	140	160
Number of cap screws ¹⁾	24	16	24	24	36	36	36	36	36
RIGIFLEX®-N size	166	196	216	256	306	346	406		
Number of cap screws ¹⁾	24	24	36	36	36	36	36		
RIGIFLEX®-N size	168	198	218	258	308	348	408		
Number of cap screws ¹⁾	32	32	48	48	48	48	48		

1) Number per coupling

Table 4:

RIGIFLEX®-N size	35	50	65	75	85	110	120	140	160
Number of setscrews ¹⁾	2	2	2	2	2	2	2	2	2
RIGIFLEX®-N size	166	196	216	256	306	346	406		
Number of setscrews ¹⁾	4	4	4	4	4	4	4		
RIGIFLEX®-N size	168	198	218	258	308	348	408		
Number of setscrews ¹⁾	4	4	4	4	4	4	4		

1) Number per coupling

Please observe protection note ISO 16016.	Drawn:	14.01.14 Kb/Sta	Replaced for:	KTR-N dated 28.05.13
	Verified:	16.01.14 Kb	Replaced by:	



4 Assembly

4.2 Advice for finish bore



DANGER!

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

- Bores of coupling hubs machined by the customer have to observe concentricity or axial runout, respectively (see illustration 3).
- Please make absolutely sure to observe the figures for $\varnothing d_{max}$.
- Carefully align the coupling hubs when the finish bores are drilled.
- Please provide for a setscrew according to DIN EN ISO 4029 with a cup point or an end plate to fasten the coupling hubs axially.



CAUTION!

A centering is not available with pilot bored or unbored hubs, respectively. It has to be drilled according to illustration 3. Size and depth of the centering are shown in table 1.

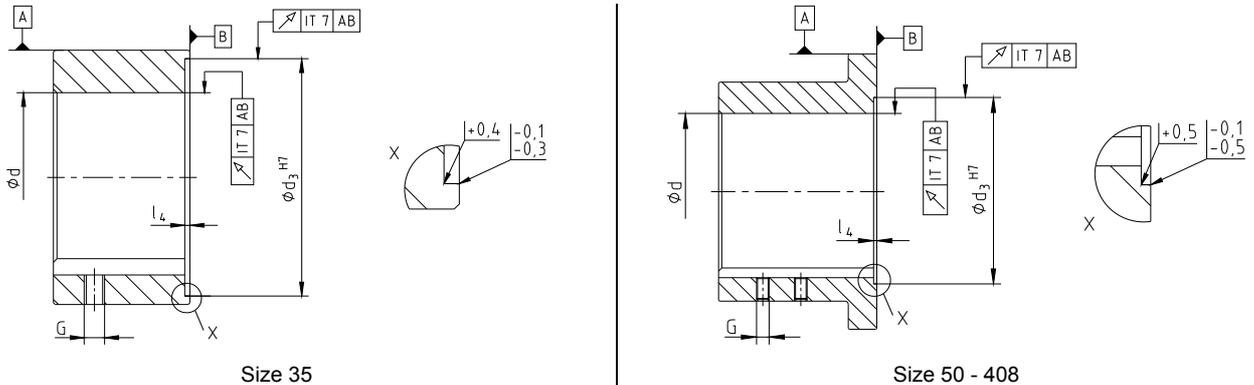


Illustration 3: Concentricity and axial runout



CAUTION!

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



WARNING!

KTR supplies unbored or pilot bored coupling components and spare parts only upon explicit request of the customer. These parts are additionally labelled with the symbol

Table 5: Setscrews DIN EN ISO 4029

RIGIFLEX®-N size	35	50	65	75	85	110	120	140	160
Dimension G [mm]	M6	M6	M8	M8	M10	M10	M12	M12	M12
Tightening torque T_A [Nm]	4.8	4.8	10	10	17	17	40	40	40
RIGIFLEX®-N size	166	196	216	256	306	346	406		
Dimension G [mm]	M16	M16	M20	M20	M24	M24	M24		
Tightening torque T_A [Nm]	80	80	140	140	240	240	240		
RIGIFLEX®-N size	168	198	218	258	308	348	408		
Dimension G [mm]	M16	M16	M20	M20	M24	M24	M24		
Tightening torque T_A [Nm]	80	80	140	140	240	240	240		

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4 Assembly

4.3 Assembly of the coupling hubs



ATTENTION!

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

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



WARNING!

Please pay attention to the ignition risk in hazardous locations!



DANGER!

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



CAUTION!

With the assembly please make sure that the distance dimension E (see table 1) is observed so that the coupling components are not in contact with each other during the operation. Disregarding this advice may cause damage to the coupling.

For the axial alignment of the coupling the distance dimension E (see table 1) is decisive. In order to adjust the right dimension E you should proceed as follows:

- Shift the coupling hubs on the shaft of the driving and driven side.
- The internal sides of the coupling hubs must be flush with the front sides of the shafts (illustration 4).
- Align the power pack in axial direction until the distance dimension E is achieved (see table 1).
- Fasten the coupling hubs by tightening the setscrews DIN EN ISO 4029 with a cup point (see table 5).

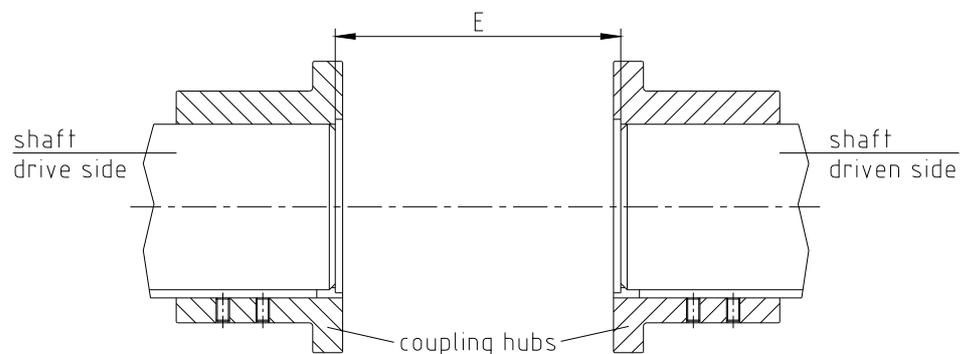


Illustration 4: Assembly of the coupling hubs



WARNING!

If used in hazardous locations the setscrews to fasten the hubs as well as all screw connections must be secured against working loose additionally, e. g. conglomerating with Loctite (average strength).

Disassembly:



DANGER!

Components falling down may lead to personal injury or damage on the machine.
Secure the driving components during disassembly.

- Untighten the setscrew in the hub and unscrew it by 2 – 3 convolutions.
- Pull the hub from the shaft.

Please observe protection note ISO 16016.	Drawn:	14.01.14 Kb/Sta	Replaced for:	KTR-N dated 28.05.13
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4 Assembly

4.4 Assembly of the spacer

- The coupling hubs have to be aligned such that the through holes of the coupling hubs line up.
- Clean and degrease the centerings and contact surfaces on the spacer and coupling hubs.
- Pull up the flanges of „spacer complete“ closer to the spacer each at the maximum value R (table 6) by means of the retaining screws (illustration 5).
- Insert the spacer between the hubs.
- Centre the spacer in the coupling hubs by unscrewing and removing the retaining screws.

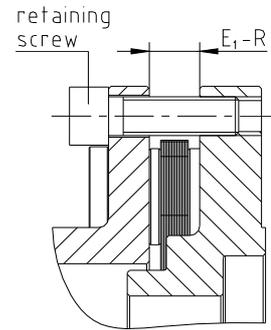


Illustration 5



CAUTION!
The retaining screws have to be removed for the further assembly and the operation.

- Hand-screw the spacer to the coupling hubs via the cap screws (illustration 6).
- Tighten the cap screws one after another and with several revolutions until all cap screws have reached the full tightening torque (see table 7).

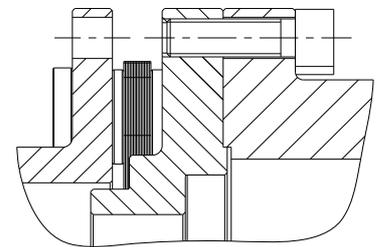


Illustration 6

Table 6:

RIGIFLEX®-N size	35	50	65	75	85	110	120	140	160
Value R [mm]	1.7	1.2	1.2	1.7	1.7	2.2	2.2	3.2	4.2

RIGIFLEX®-N size	166 / 168	196 / 198	216 / 218	256 / 258	306 / 308	346 / 348	406 / 408
Value R [mm]	2.2	2.7	2.7	2.7	3.2	3.2	3.2

Table 7: Tightening torques of the cap screws

RIGIFLEX®-N size	35	50	65	75	85	110	120	140	160
Dimension MxL [mm]	M4x45	M6x22	M6x25	M8x30	M8x30	M10x35	M12x40	M16x50	M16x55
Tightening torque T _A [Nm]	4.1	14	14	35	35	69	120	295	295

RIGIFLEX®-N size	166 / 168	196 / 198	216 / 218	256 / 258	306 / 308	346 / 348	406 / 408
Dimension MxL [mm]	M20x50	M20x50	M20x65	M24x80	M27x100	M30x110	M36x130
Tightening torque T _A [Nm]	560	560	560	970	1450	1950	3300



CAUTION!
Having started up the coupling, the tightening torque of the cap screws has to be inspected at regular maintenance intervals.

For spacers with axial limitation (as an option) please note the following:

- Before mounting the spacer, remove the screws and disks for axial limitation.
- Having mounted the spacer completely, please re-assemble the screws and disks of the axial limitation (illustration 7). Please observe the axial backlash S as per dimension sheet.
- Secure the screws against working loose by means of an adhesive (Loctite).

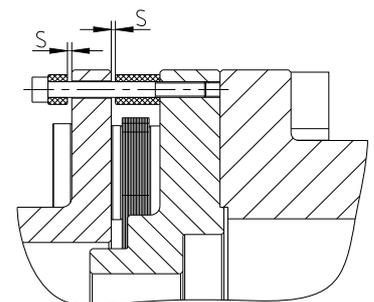


Illustration 7

Please observe protection note ISO 16016.	Drawn:	14.01.14 Kb/Sta	Replaced for:	KTR-N dated 28.05.13
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4 Assembly

4.5 Displacements - alignment of the coupling

The displacement figures shown in table 8 provide for sufficient safety to compensate for external influences like, for example, thermal expansion or foundation settling.



CAUTION!

In order to ensure a long service life of the coupling and avoid dangers with the use in hazardous locations, the shaft ends must be accurately aligned.



Please absolutely observe the displacement figures indicated (see table 8). If the figures are exceeded, the coupling will be damaged.

The more accurate the alignment of the coupling, the longer is its service life.

If used in hazardous locations for the explosion group IIC (marking II 2GD c IIC T X), only half of the displacement figures (see table 8) are permissible.

Please note:

- The displacement figures mentioned in table 8 are maximum figures which must not arise in parallel. If radial, axial and angular displacement arises at the same time, these values must be reduced (see illustration 9).
- Please inspect with a dial gauge, ruler or feeler whether the permissible displacement figures of table 8 can be observed.

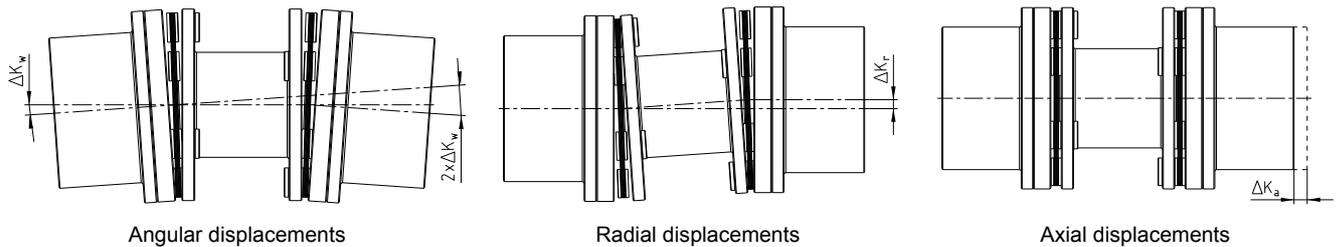


Illustration 8: Displacements

Examples for the displacement combinations given in illustration 9:

Example 1:

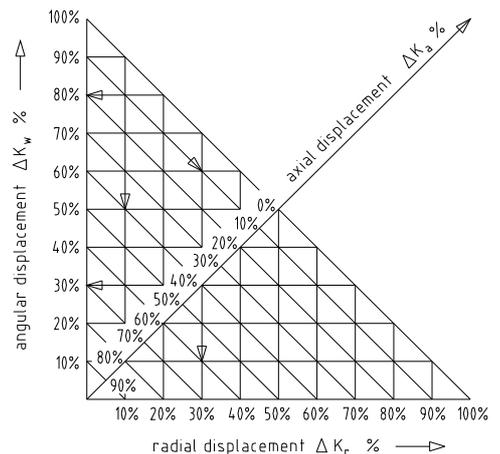
- $\Delta K_r = 10\%$
- $\Delta K_w = 80\%$
- $\Delta K_a = 10\%$

Example 2:

- $\Delta K_r = 30\%$
- $\Delta K_w = 30\%$
- $\Delta K_a = 40\%$

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

Illustration 9:
Combinations of displacement





4 Assembly

4.5 Displacements - alignment of the coupling

Table 8: Displacement figures

RIGIFLEX®-N size	Angular displacement * ΔK_w [°]	Axial displacement ΔK_a [mm]	Radial displacement ΔK_r [mm]						
			E=100	E=140	E=180	E=200	E=250		
35	0.7	1.2	0.90	1.40	-	-	-		
50	0.7	1.4	0.77	1.26	-	-	-		
65	0.7	1.5	0.75	1.23	1.72	-	-		
75	0.7	1.8	0.73	1.22	1.71	-	-		
85	0.7	2.1	-	1.14	1.62	1.87	2.48		
110	0.7	2.4	-	1.05	1.54	1.78	2.39		
120	0.7	2.6	-	1.00	1.49	1.73	2.35		
140	0.7	3.3	-	-	-	1.55	2.16		
160	0.7	3.8	-	-	-	-	1.99		
166	0.7	3.7	Mounting dimension E as indicated by the customer						
196	0.7	4.2							
216	0.7	4.5							
256	0.7	5.2							
306	0.7	6.0							
346	0.7	6.7							
406	0.7	7.5							
168	0.5	2.6							
198	0.5	2.6							
218	0.5	2.9							
258	0.5	3.5							
308	0.5	4.2							
348	0.5	4.8							
408	0.5	5.0							

* each lamina set

4.6 Spares inventory, customer service addresses

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

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



ATTENTION!

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

Please observe protection note ISO 16016.	Drawn:	14.01.14 Kb/Sta	Replaced for:	KTR-N dated 28.05.13
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5 Enclosure A

Advice and instructions regarding the use in  hazardous locations

Type A: coupling hub / coupling flange / lamina set / spacer / lamina set / coupling flange / coupling hub
RIGIFLEX®-N with spacer made of steel only

5.1 Selection of the coupling size

If the coupling is used in hazardous locations, the size must be selected in a way that there is a minimum safety of $s = 2.0$ between the torque of the machine and the rated torque of the coupling.

5.2 Intended use in hazardous locations

Conditions of operation in hazardous locations

RIGIFLEX®-N couplings are suitable for the use according to EC directive 94/9/EC.

The couplings may only be used if their materials are resistant to mechanical and/or chemical influences with the different operating conditions in a way that the explosion protection is not affected.

1. Industry (with the exception of mining)

- Equipment group II of category 2 and 3 (*coupling is not approved for equipment group 1*)
- Media class G (*gases, fogs, steams*), zone 1 and 2 (*coupling is not approved for zone 0*)
- Media class D (*dusts*), zone 21 and 22 (*coupling is not approved for zone 20*)
- Explosion group IIC (*explosion class IIA and IIB are included in IIC*)

Temperature class:

Temperature class	Ambient temperature	Max. surface temperature ¹⁾
T2, T1	- 30 °C to + 250 °C	250 °C
T3	- 30 °C to + 190 °C	200 °C
T4	- 30 °C to + 125 °C	135 °C
T5	- 30 °C to + 90 °C	100 °C
T6	- 30 °C to + 75 °C	85 °C

Explanation:

The maximum surface temperatures result from each the maximum permissible ambient or operating temperature T_a plus the maximum temperature increase ΔT of 10 K which has to be taken into account.

1) The ambient or operating temperature T_a is limited to + 250 °C due to the permissible permanent operating temperature.

2. Mining

Equipment group I of category M2 (*coupling is not approved for equipment group M1*).
Permissible ambient temperature - 30 °C to + 140 °C.

Please observe protection note ISO 16016.	Drawn:	14.01.14 Kb/Sta	Replaced for:	KTR-N dated 28.05.13
	Verified:	16.01.14 Kb	Replaced by:	



5 Enclosure A

Advice and instructions regarding the use in  hazardous locations

5.3 Inspection intervals for couplings in  hazardous locations

Explosion group	Inspection intervals
3G 3D	For couplings which are classified in category 3G or 3D the operating and assembly instructions that are usual for standard operation apply. During the standard operation which has to be subject to the ignition risk analysis the couplings are free from any ignition source. Merely the temperature increase produced by self-heating and depending on the coupling type has to be considered: for RIGIFLEX®-N: $\Delta T = 10 \text{ K}$
II 2GD c IIB T1, T2, T3, T4, T5, T6	An inspection of the torsional backlash and a visual inspection of the lamina set must be performed after 3000 operating hours for the first time, at the latest after 6 months after start-up of the coupling. If you note insignificant or no wear on the lamina set upon this initial inspection, further inspections can each be performed after 6000 operating hours or at the latest after 18 months, provided that the operating parameters remain the same. If you note significant wear during the initial inspection so that it would be recommendable to replace the lamina sets, please find out the cause according to the table „Breakdowns“, if possible. The maintenance intervals must be adjusted to the modified operating parameters without fail.
II 2GD c IIC T1, T2, T3, T4, T5, T6	An inspection of the torsional backlash and a visual inspection of the lamina set must be performed after 2000 operating hours for the first time, at the latest after 3 months after start-up of the coupling. If you note insignificant or no wear on the lamina set upon this initial inspection, further inspections can each be performed after 4000 operating hours or at the latest after 12 months, provided that the operating parameters remain the same. If you note significant wear during the initial inspection so that it would be recommendable to replace the lamina sets, please find out the cause according to the table „Breakdowns“, if possible. The maintenance intervals must be adjusted to the modified operating parameters without fail.

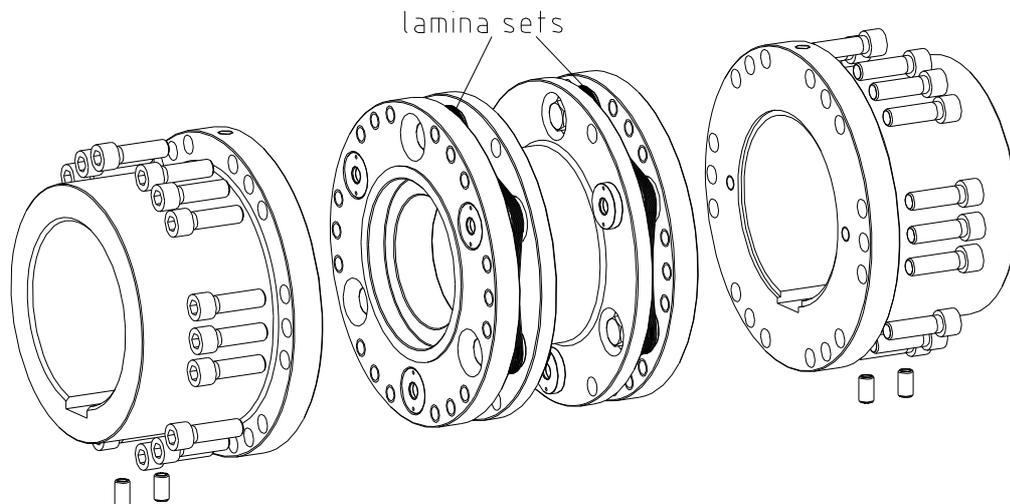


Illustration 10: RIGIFLEX®-N, type A

Please observe protection note ISO 16016.	Drawn:	14.01.14 Kb/Sta	Replaced for:	KTR-N dated 28.05.13
	Verified:	16.01.14 Kb	Replaced by:	



5 Enclosure A

Advice and instructions regarding the use in  hazardous locations

5.4 Visual inspection and measures

During the visual inspection the lamina sets must be inspected for cracks and cap screws working loose. Cap screws working loose must be tightened at the screw tightening torque indicated (see table 7). Regardless of the inspection intervals those lamina sets having fissures have to be replaced by a new „fully assembled spacer“ immediately.

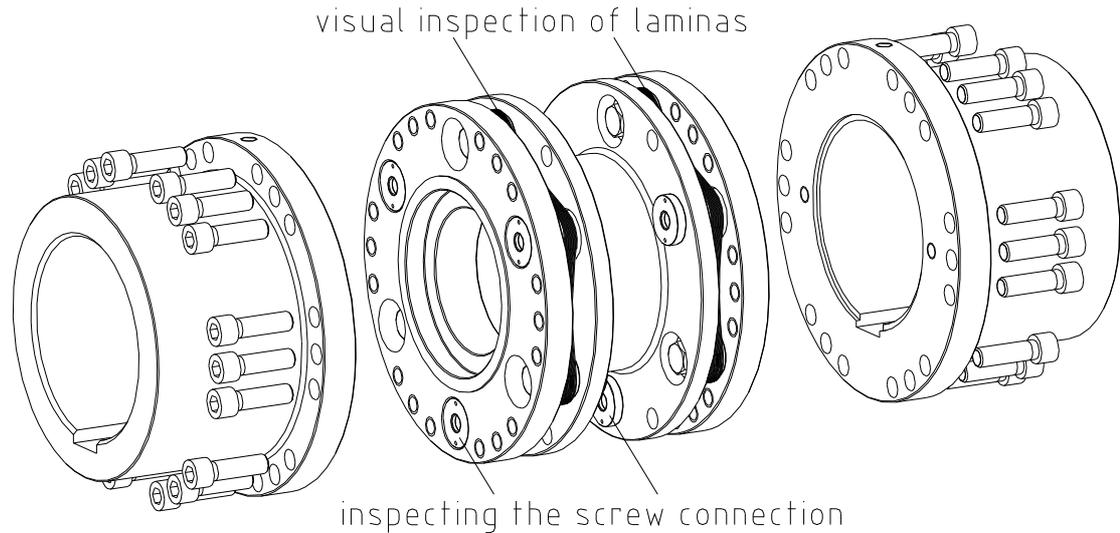


Illustration 11: RIGIFLEX®-N, type A



CAUTION!

In order to ensure a long service life of the coupling and avoid dangers with the use in hazardous locations, the shaft ends must be accurately aligned. Please absolutely observe the displacement figures indicated (see table 8). If the figures are exceeded, the coupling will be damaged. Faulty components have to be replaced.

5.5 Permissible coupling materials in hazardous locations

In the explosion groups IIA, IIB and IIC the following materials may be combined:

steel - steel
stainless steel - stainless steel

Semifinished products made of aluminium with a magnesium share of up to 7.5°% and a yield point of $R_{p0.2} \geq 250 \text{ N/mm}^2$ are permitted for the use in hazardous locations.

Aluminium diecast is generally excluded for hazardous locations.



5 Enclosure A

Advice and instructions regarding the use in  hazardous locations

5.6 marking of coupling for hazardous locations

Couplings for the use in hazardous locations are provided on at least one component with a short or complete marking and on the other components by an  label on the outside diameter of the hub or on the front side each with the operating conditions permitted. The lamina sets are not marked.

Short labelling:
(standard)



II 2GD c IIC T X/I M2 c X

Complete labelling:



II 2G c IIC T6, T5, T4, T3 resp. T2 - $30\text{ °C} \leq T_a \leq +75\text{ °C}$, +90 °C, +125 °C, +190 °C resp. +250 °C
II 2D c T 110 °C - $30\text{ °C} \leq T_a \leq +100\text{ °C}$ / I M2 c - $30\text{ °C} \leq T_a \leq +140\text{ °C}$

The labelling with explosion group IIC includes the explosion groups IIA and IIB.

If the symbol  was stamped in addition to , the coupling component was supplied in an unbored or pilot bored design by KTR.

5.7 Start-up

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



If used in hazardous locations the setscrews to fasten the coupling hubs as well as all screw connections must be secured against working loose additionally, e. g. conglomerating with Loctite (average strength).

Finally, the coupling protection against accidental contact must be fitted.

The cover must be electrically conductive and included in the equipotential bonding. Bellhousings (magnesium share below 7.5 %) made of aluminium and damping rings (NBR) can be used as connecting element between pump and electric motor. The cover may only be taken off after having stopped the unit.

During operation of the coupling, please pay attention to

- different operating noise
- vibrations occurring.

If the couplings are used in locations subject to dust explosion and in mining the operator must make sure that there is no accumulation of dust in a dangerous volume between the cover and the coupling. The coupling must not operate in an accumulation of dust.

For covers with unlocked openings on the top face no light metals may be used if the couplings are used as equipment of equipment group II (*if possible, from stainless steel*).

If the couplings are used in mining (equipment group I M2), the cover must not be made of light metal. In addition, it must be resistant to higher mechanical loads than if it is used as equipment of equipment group II.

Please observe protection note ISO 16016.	Drawn:	14.01.14 Kb/Sta	Replaced for:	KTR-N dated 28.05.13
	Verified:	16.01.14 Kb	Replaced by:	



5 Enclosure A

Advice and instructions regarding the use in  hazardous locations

5.7 Start-up

The minimum distance „Sr“ between the protection device and the rotating parts must at least correspond to the figures mentioned below.

If the protection device is used as cover, regular openings complying with the explosion protection demands can be made that must not exceed the following dimensions:

Openings	Cover [mm]		
	Top side	Lateral components	Distance „Sr“
Circular - max. diameter	4	8	≥ 10
Rectangular - max. lateral length	4	8	≥ 10
Straight or curved slot - max. lateral length/height	not permissible	8	≥ 20



CAUTION!

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

Coupling coating:



If coated (priming, painting etc.) couplings are used in hazardous locations, the requirements on conductivity and coating thickness must be considered. In case of paintings up to 200 µm electrostatic load does not have to be expected. Multiple coatings that are thicker than 200 µm are prohibited for explosion group IIC.

5.8 Breakdowns, causes and elimination

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



If used other than intended the coupling can become a source of ignition. EC directive 94/9/EC requires special care from the manufacturer and the user.

General failures with use other than intended:

- Important data for the coupling selection were not forwarded.
- The calculation of the shaft/hub connection was not considered.
- Coupling components with damage occurred during transport are assembled.
- If the heated hubs are assembled, the permissible temperature is exceeded.
- The clearance of the components to be assembled is not coordinated with each other.
- Tightening torques have been fallen below/exceeded.
- Components are exchanged by mistake/assembled incorrectly.
- A wrong or no lamina set is inserted in the coupling.
- No original KTR parts (purchased parts) are used.

Please observe protection note ISO 16016.	Drawn:	14.01.14 Kb/Sta	Replaced for:	KTR-N dated 28.05.13
	Verified:	16.01.14 Kb	Replaced by:	



5 Enclosure A

Advice and instructions regarding the use in  hazardous locations

5.8 Breakdowns, causes and elimination

Continuation:

- The coupling used/the coupling protection used is not suitable for the operation in hazardous areas and does not correspond to EC directive 94/9/EC, respectively.
- Maintenance intervals are not observed.

Breakdowns	Causes	Hazard notes for hazardous locations	Elimination
Different operating noise and/or vibrations occurring	Misalignment	none	1) Set the unit out of operation 2) Eliminate the reason for the misalignment (e. g. loose foundation bolts, breaking of the engine mount, heat expansion of unit components, modification of the mounting dimension E of the coupling) 3) Inspection of wear see item inspection
	Cap screws working loose, low micro friction under the screw head and on the steel lamina set	Danger of ignition due to hot surfaces	1) Set the unit out of operation 2) Inspect coupling components and replace coupling components that are damaged 3) Tighten the cap screws until the permissible tightening torque is reached 4) Inspect alignment, adjust if necessary
	Screws for axial fastening of coupling hubs working loose	none	1) Set the unit out of operation 2) Inspect alignment of coupling 3) Tighten the screws to lock the coupling hubs and secure against working loose 4) Inspection of wear see item inspection
Breaking of the steel lamina set	Breaking of the steel lamina set due to high impact energy/overload	Ignition risk due to sparking	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the steel lamina sets 3) Inspect coupling components and replace coupling components that are damaged 4) Insert spacer, mount coupling components 5) Find out the reason for overload
	Operating parameters do not correspond to the performance of the coupling	Ignition risk due to sparking	1) Set the unit out of operation 2) Review the operating parameters and select a bigger coupling (consider mounting space) 3) Assemble new coupling size 4) Inspect alignment



5 Enclosure A

Advice and instructions regarding the use in  hazardous locations

5.8 Breakdowns, causes and elimination

Breakdowns	Causes	Hazard notes for hazardous locations	Elimination
Breaking of the steel lamina set	Operating error of the unit	Ignition risk due to sparking	<ol style="list-style-type: none"> 1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the spacer 3) Inspect coupling components and replace coupling components that are damaged 4) Insert spacer, mount coupling components 5) Instruct and train the service staff
Cracks in / fracture of the steel lamina set / locking screws	Vibrations of drive	Ignition risk due to sparking	<ol style="list-style-type: none"> 1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the spacer 3) Inspect coupling components and replace coupling components that are damaged 4) Insert spacer, mount coupling components 5) Inspect alignment, adjust if necessary 6) Find out the reason for the vibrations



If you operate with a faulty lamina set (see item 5.3) and with the subsequent contact of metal parts a proper operation meeting the explosion protection requirements and acc. to directive 94/9/EC is not ensured.



5 Enclosure A

Advice and instructions regarding the use in  hazardous locations

5.9 EC Certificate of conformity

EC Certificate of conformity

according to the EC directive 94/9/EC dated March 23, 1994
and to the legal regulations

The manufacturer - KTR Kupplungstechnik GmbH, D-48432 Rheine - states that the

RIGIFLEX®-N Steel Lamina Couplings

in an explosion-proof design described in these assembly instructions correspond to article 1 (3) b) of directive 94/9/EC and comply with the general safety and health requirements according to enclosure II of directive 94/9/EC.

The RIGIFLEX®-N steel lamina coupling is in accordance with the specifications of directive 94/9/EC. One or several directives mentioned in the corresponding EC type examination certificate IBExU07ATEXB004 X were in part replaced by updated versions. KTR Kupplungstechnik GmbH being the manufacturer confirms that the product mentioned above is in accordance with the specifications of the new directives, too.

According to article 8 (1) of directive 94/9/EC the technical documentation is deposited with the institution:

IBExU
Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7

09599 Freiberg

Rheine,
Place

21.01.13
Date

i. V. 
Reinhard Wibbeling
Head of Engineering

i. A. 
Reiner Banemann
Product Manager