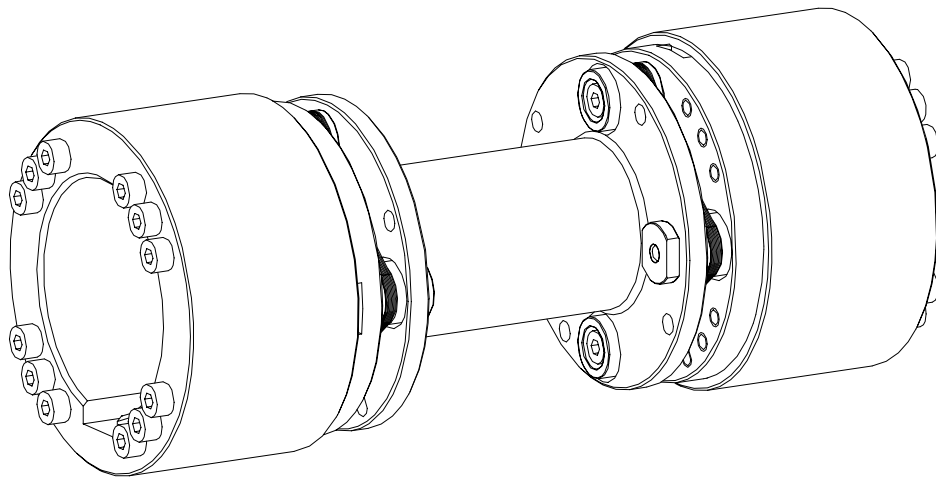




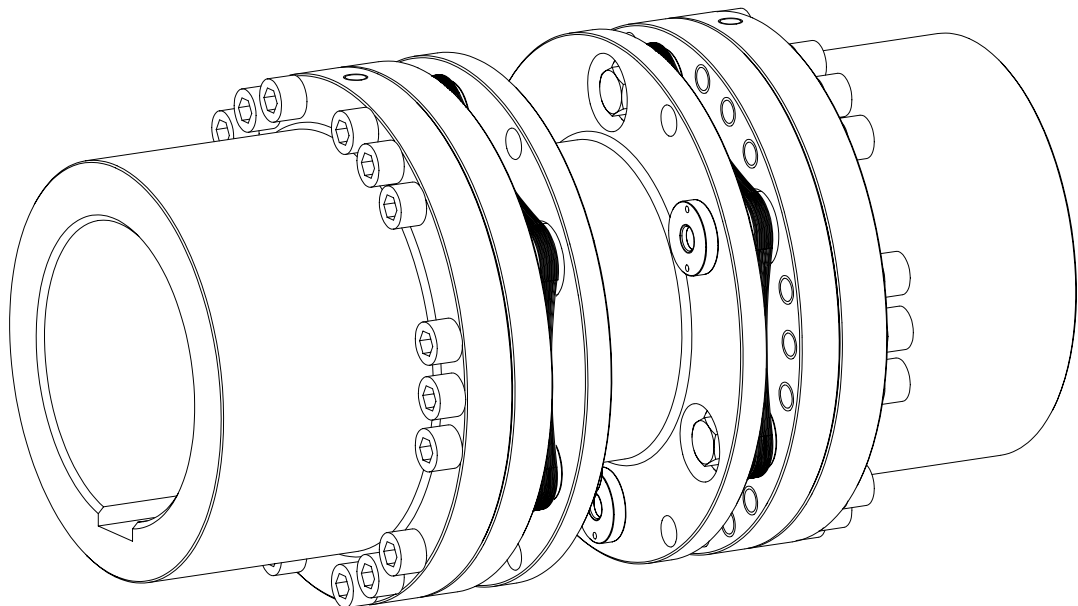
RIGIFLEX®-N

Torsionally stiff, steel laminae couplings
type A

according to Standard 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 laminae coupling which is able to compensate for shaft misalignment caused by, for example, thermal expansion.

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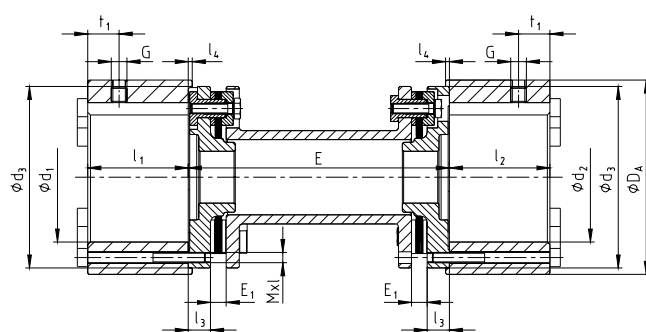
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Hints and Instructions Regarding the Use in Hazardous Areas

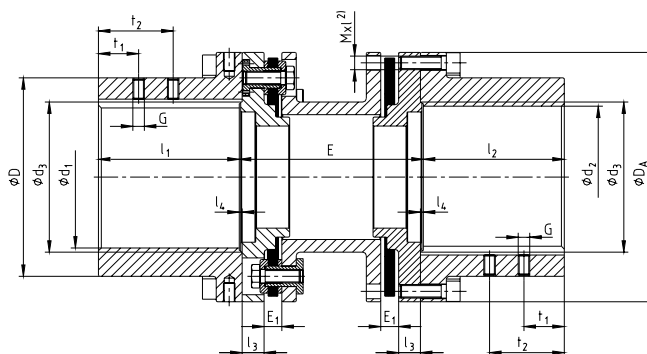
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1 Technical Data



size 35



size 50 - 408

illustration 1: RIGIFLEX®-N, type A

Table 1: type A

RIGIFLEX®-N Size	Max. finish bore [mm] d ₁ , d ₂	Dimensions [mm]														
		General												Thread for setscrews		
		D	D _A	d ₃	l ₁ , l ₂	l ₃	l ₄	E ₁	E ¹⁾					G	t ₁	t ₂
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	On request of customer					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 distances available on request

2) Values MxI see table 6



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
	$T_{K max.}$	240	480	900	1880	3400	5400	9000	18000	26000
	T_{KW}	30	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
	$T_{K max.}$	35000	45000	64000	105000	172000	270000	420000
	T_{KW}	8750	11250	16000	26250	43000	67500	105000
Max. speed n [rpm]		5600	5600	5200	4600	3900	3300	2900

RIGIFLEX®-N Size		168	198	218	258	308	348	408
Torque [Nm]	T_{KN}	23000	30000	42500	70000	115000	180000	280000
	$T_{K max.}$	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 attached parts that can generate heat, sparks and static charging (e. g. combinations with brake drums, brake disks, overload systems like torque limiters, impellers etc.) are not allowed for the use in hazardous areas. A separate checking must be made.

2 Hints

2.1 Coupling Selection



CAUTION!

For a continuous and troublefree operation of the coupling it must be designed according to the selection instructions for the particular application (see RIGIFLEX®-N catalogue). If the operating conditions (performance, speed, changes at engine and machine) change, the coupling selection must be checked again. Please make sure that the technical data regarding torque only refers to the laminae package. The transmissible torque of the shaft/hub connection must be checked by the orderer, and he is responsible for the same.

For drives with endangered torsional vibration (drives with periodical load on torsional vibration) it is necessary to make a torsional vibration calculation to ensure a perfect selection. Typical drives with endangered torsional vibration are e. g. drives with diesel engines, piston pumps, piston compressors etc. On request KTR makes the coupling selection and the torsional vibration calculation.

2.2 General Hints

Please read through these mounting instructions carefully before you set the coupling into operation. Please pay special attention to the safety instructions!



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

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

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2 Hints

2.3 Safety and Advice Hints



DANGER!

Danger of injury to persons.



CAUTION!

Damages on the machine possible.



ATTENTION!

Pointing to important items.



PRECAUTION!

Hints concerning explosion protection.

2.4 General Hints of Danger



DANGER!

With assembly, operation and maintenance of the coupling it has to be made sure that the entire drive train is protected against unintentional engagement. You can be seriously hurt by rotating parts. Please make absolutely sure to read through and observe the following safety instructions.

- All operations on and with the coupling have to be performed taking into account "safety first".
- Please make sure to disengage the power pack before you perform your work.
- Protect the power pack against unintentional engagement, e. g. by providing hints at the place of engagement or removing the fuse for current supply.
- Do not touch the operation area of the coupling as long as it is in operation.
- Please protect the coupling against unintentional touch. Please provide for the necessary protection devices and caps.

2.5 Proper Use

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

- carefully read through the mounting instructions and understood them
- had technical training
- are authorized to do so 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 do not take any warranty for resulting damages. To further develop the product 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 mounting instructions.

3 Storage

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



CAUTION!

Humid storage rooms are not suitable.

Please make sure that there is no condensation. The best relative air humidity is under 65%.



4 Assembly

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

4.1 Components of the Couplings

Components of RIGIFLEX®-N type A

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

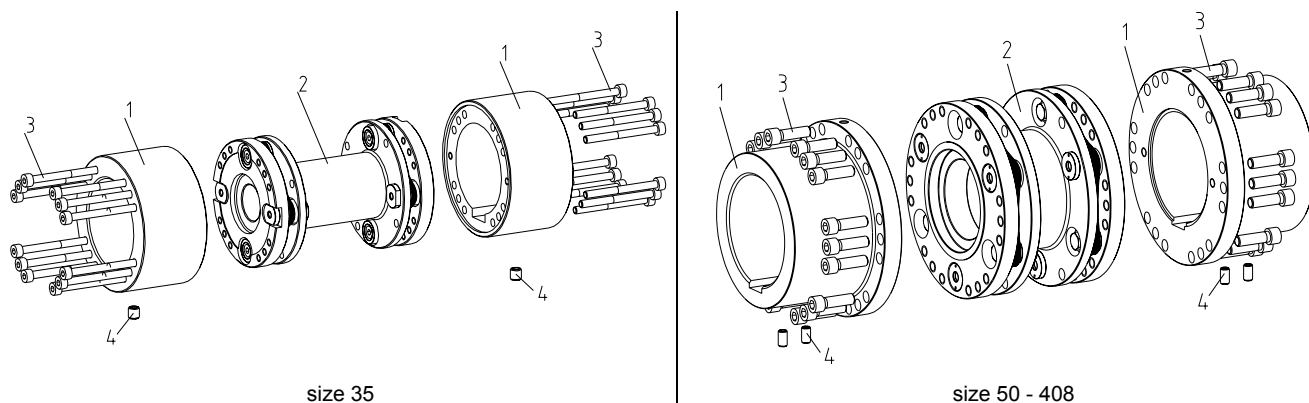


illustration 2: RIGIFLEX®-N, type A

Table 3:

RIGIFLEX®-N Size	35	50	65	75	85	110	120	140	160
Quantity of cap screws ¹⁾	24	16	24	24	36	36	36	36	36

RIGIFLEX®-N Size	166	196	216	256	306	346	406
Quantity of cap screws ¹⁾	24	24	36	36	36	36	36

RIGIFLEX®-N Size	168	198	218	258	308	348	408
Quantity of cap screws ¹⁾	32	32	48	48	48	48	48

1) quantity each coupling

Table 4:

RIGIFLEX®-N Size	35	50	65	75	85	110	120	140	160
Quantity of setscrews ¹⁾	2	2	2	2	2	2	2	2	2

RIGIFLEX®-N Size	166	196	216	256	306	346	406
Quantity of setscrews ¹⁾	4	4	4	4	4	4	4

RIGIFLEX®-N Size	168	198	218	258	308	348	408
Quantity of setscrews ¹⁾	4	4	4	4	4	4	4

1) quantity each coupling



4 Assembly

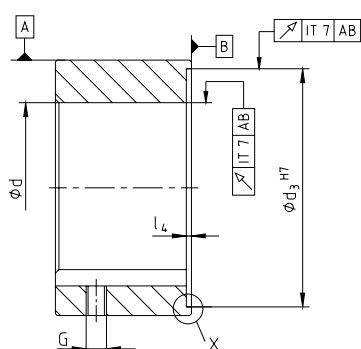
4.2 Hints Regarding the Finish Bore



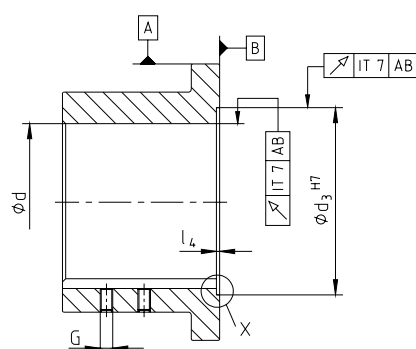
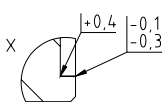
DANGER!

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 serious danger.

- Coupling hub bores machined by the customer have to observe concentric running or axial running, respectively (see illustration 3).
- Please make absolutely sure to observe the figures for d_{\max} .
- Carefully align the coupling hubs when the finish bores are brought in.
- Please use a setscrew according to DIN EN ISO 4029 with a cup point or an end plate to fasten the hubs axially.



size 35



size 50 - 408

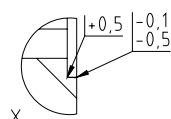


illustration 3: concentric running and axial running



CAUTION!

The orderer is responsible for all subsequently made machinings to unbored or pilot bored and to finish machined coupling parts and spare parts. KTR does not assume any warranty claims resulting from insufficient refinish.



PRECAUTION!

Any mechanical rework to couplings that are used in hazardous areas require an explicit release by KTR.

The orderer must send a drawing to KTR acc. to which the manufacture must be made. KTR checks this drawing and returns it to the orderer with approval.

KTR supplies unbored or pilot bored coupling parts and spare parts on explicit customer's request. 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	M20
Tightening torque T_A [Nm]	4,8	4,8	10	10	17	17	40	40	140

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	140	140	140

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	140	140	140

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4 Assembly

4.3 Assembly of the Coupling Hubs



ATTENTION!

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

Heating the coupling hubs slightly (approx. 80 °C) allows for an easier installation onto the shaft.



PRECAUTION!

Please pay attention to the danger of ignition in hazardous areas.



DANGER!

Touching the heated coupling hubs causes burns.
We would recommend to wear safety gloves.



CAUTION!

During the assembly please make sure that the E dimension (see table 1) is observed, so that the coupling parts do not contact each other during the operation.
Disregarding this hint may cause damage on the coupling.

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

- Push the coupling hubs onto the shaft of the drive and driven side.
- The inner sides of the coupling hubs must end flushly with the front sides of the shafts (illustration 4).
- Move the power pack in axial direction until you have reached dimension E (see table 1).
- Secure the coupling hubs by tightening the setscrews DIN EN ISO 4029 with cup point (see table 5).

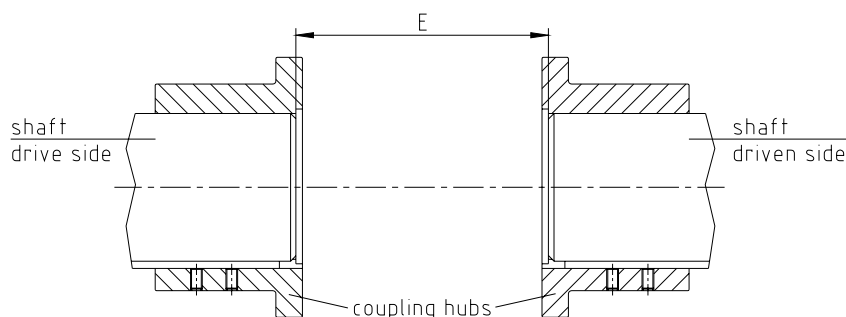


illustration 4: assembly of the coupling hubs



ATTENTION!

For the applications in hazardous areas the setscrews to fasten the hubs as well as all screw connections have to be secured against self-slackening additionally, e. g. by glueing with Loctite (medium-tight).

Disassembly:



DANGER!

Falling parts can lead to personal injury or damage to the machine.
Secure the driving parts during disassembly.

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



4 Assembly

4.4 Assembly of the Spacer

- Align the coupling hubs so that the through holes from the coupling hubs line up.
- Clean and degrease the centrings and contact surfaces at the spacer and at the coupling hubs.
- Pull up the flanges of „spacer complete“ closer to the spacer at the maximum value R (table 6) in each case by means of the return screws (illustration 5).
- Insert the spacer between the hubs.
- Centre the spacer in the coupling hubs by unscrewing the return screws.

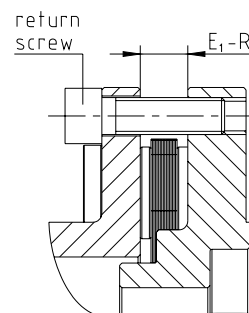


illustration 5



CAUTION!

The return screws have to be removed for the further assembly and the operation.

- Assemble the spacer to the coupling hubs with the cap screws hand tight (illustration 6).
- Tighten the cap screws one after another and with several revolutions until they all cap screws have the full tightening torque (see table 7).

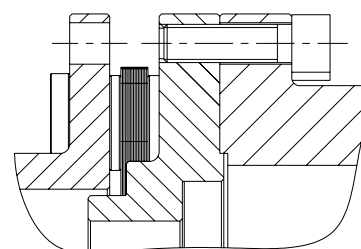


illustration 6

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	3900



CAUTION!

Having set the coupling into operation, the tightening torque of the cap screws has to be investigated at regular maintenance intervals.

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

- Before mounting the spacer, remove the screws and discs of the axial limitation.
- Having mounted the spacer completely, please re-assemble the screws and discs of the axial limitation (illustration 7). Please note the axial backlash S as per dimension sheet.
- Secure the screws against untightening by means of adhesive (e. g. Loctite).

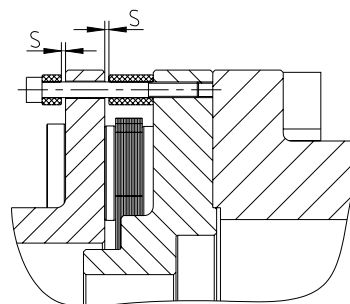


illustration 7

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4 Assembly

4.5 Displacements - Alignment of the Couplings

The displacement figures shown in table 8 offer sufficient safety to compensate for environmental influences like, for example, heat expansion or lowering of foundation.



CAUTION!

In order to ensure a long lifetime of the coupling and to avoid dangers regarding the use in hazardous areas, the shaft ends must be accurately aligned.



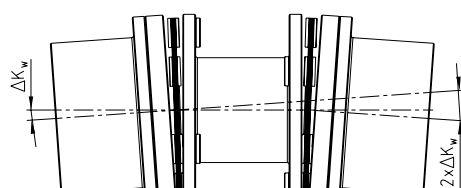
Please absolutely observe the displacement figures indicated (see table 8). If the figures are exceeded, the coupling is damaged.

The exacter the alignment of the coupling, the higher is its lifetime.

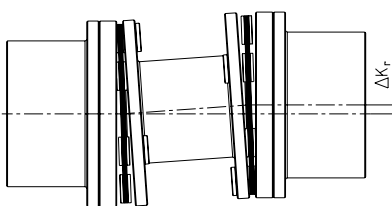
In case of a use in hazardous areas for the explosion group IIC (marking II 2GD c IIC T X), only the half displacement figures (see table 8) are permissible.

Please note:

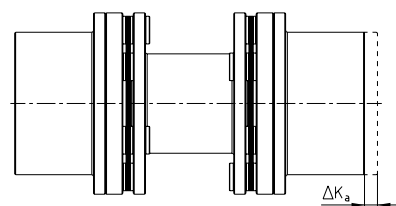
- The displacement figures mentioned in table 8 are maximum figures which must not arise in parallel. In case of a simultaneous radial, axial and angular displacement, these values must be reduced (see illustration 9).
- Please check with a dial gauge, ruler or feeler whether the permissible displacement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



angular displacements



radial displacements



axial displacements

illustration 8: displacements

Example for the misalignment combinations given in illustration 9:

Example 1:

$$\Delta K_r = 10\%$$

$$\Delta K_w = 80\%$$

$$\Delta K_a = 10\%$$

Example 2:

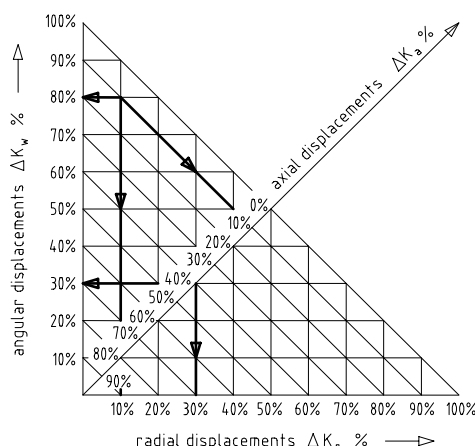
$$\Delta K_r = 30\%$$

$$\Delta K_w = 30\%$$

$$\Delta K_a = 40\%$$

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

illustration 9:
combinations of
displacement





4 Assembly

4.5 Displacements - Alignment of the Couplings

Table 8: displacement figures

RIGIFLEX®-N Size	Angular * displacements $\Delta K_w [^\circ]$	Axial displacements $\Delta K_a [mm]$	Radial displacement $\Delta K_r [mm]$				
			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 laminae package

4.6 Spares Inventory, Customer Service Addresses

A basic requirement to guarantee 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 under www.ktr.com.



5 Enclosure A

Hints and Instructions Regarding the Use in Hazardous Areas

Type A: coupling hub / coupling flange / laminae package / spacer / laminae package / coupling flange / coupling hub

RIGIFLEX®-N only with spacer made from steel.

5.1 Selection of the Coupling Size

If the coupling is used in explosion proof areas, the size must be selected in a way that there is a minimum safety of $s = 2,0$ from the unit torque to the nominal torque of the coupling.

5.2 Use in Hazardous Areas According to the Regulations

Conditions of operation in hazardous locations

RIGIFLEX®-N couplings are suitable for the use according to EC standard 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)

- device class II of category 2 and 3 (*coupling is not approved for device class 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 class 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

Device class I of category M2 (coupling is not approved for device category M1).
Permissible ambient temperature - 30 °C to + 140 °C.

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5 Enclosure A

Hints and Instructions Regarding the Use in Hazardous Areas

5.3 Control Intervals for Couplings in Hazardous Areas

Explosion group	Control 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 analysis of danger of ignition the couplings are free from any ignition source. Merely the temperature increase produced by proper 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	A checking of the circumferential backlash and a visual check of the laminae package must be effected after 3,000 operating hours for the first time, after 6 months at the latest. If you note an unconsiderable or no wear at the laminae package after this first inspection, the further inspections can be effected, in case of the same operating parameters, respectively after 6,000 operating hours or after 18 months at the latest. If you note a considerable wear during the first inspection, so that a change of the laminae package would be recommended, please find out the cause according to the table „Breakdowns“, as far as possible. The maintenance intervals must be adjusted according to the changed operating parameters.
II 2GD c IIC T1, T2, T3, T4, T5, T6	A checking of the circumferential backlash and a visual check of the laminae package must be effected after 2,000 operating hours for the first time, after 3 months at the latest. If you note an unconsiderable or no wear at the laminae package after this first inspection, the further inspections can be effected, in case of the same operating parameters, respectively after 4,000 operating hours or after 12 months at the latest. If you note a considerable wear during the first inspection, so that a change of the laminae package would be recommended, please find out the cause according to the table „Breakdowns“, as far as possible. The maintenance intervals must be adjusted according to the changed operating parameters.

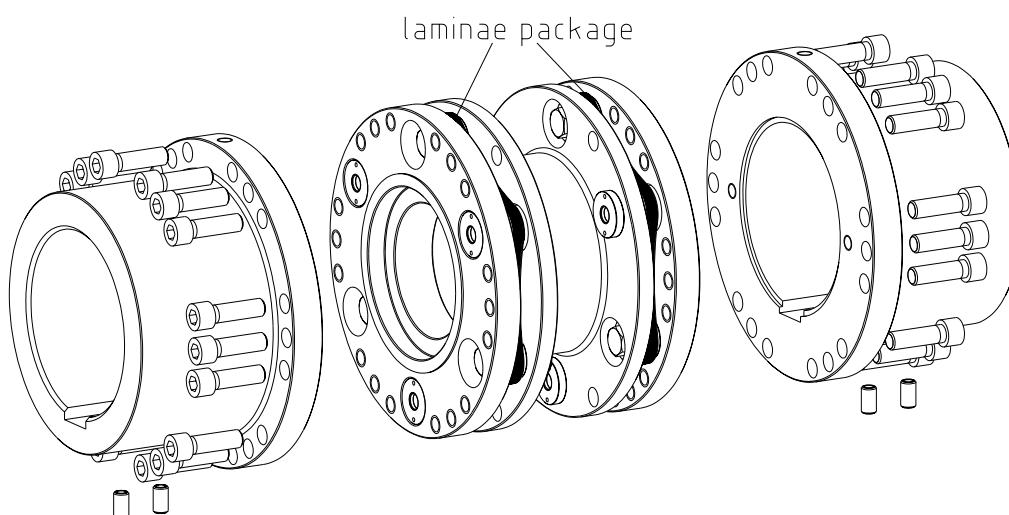


illustration 10: RIGIFLEX®-N, type A



5 Enclosure A

Hints and Instructions Regarding the Use in Hazardous Areas

5.4 Visual Check and Measures

During the visual control the laminae packages must be checked concerning cracks and detached cap screws. Detached cap screws must be tightened with the screw tightening torque to be observed (see table 7). Regardless of the inspection intervals those laminae packages having fissures have to be replaced by a new „fully assembled spacer“ immediately.

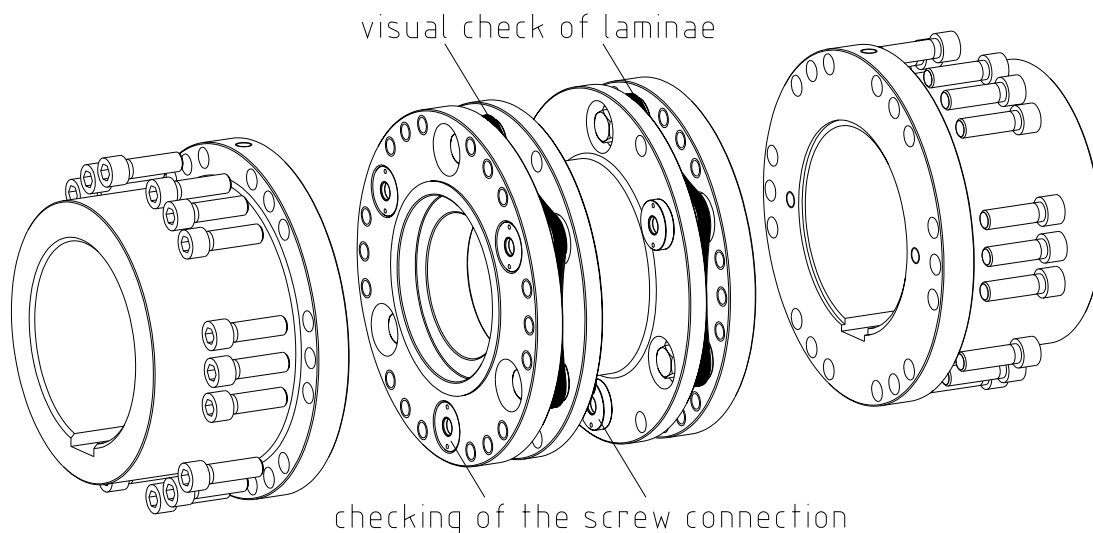


illustration 11: RIGIFLEX®-N, type A



CAUTION!

In order to ensure a long lifetime of the coupling and to avoid dangers regarding the use in hazardous areas, the shaft ends must be accurately aligned. Please absolutely observe the displacement figures indicated (see table 8). If the figures are exceeded, the coupling is damaged. Defect parts have to be replaced.

5.5 Permissible Coupling Materials in the Hazardous Area

In the Explosion Groups **IIA**, **IIB** and **IIC** the following materials may be combined:

- steel - steel
- stainless steel - stainless steel

Semifinished products from aluminium with a magnesium part 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 areas.


Aluminium diecast is generally excluded for hazardous areas.



5 Enclosure A

Hints and Instructions Regarding the Use in Hazardous Areas

5.6 Marking of Coupling for the Hazardous Area

Couplings for the use in hazardous areas are marked on at least one component short or completely and on the remaining components at the outside diameter of the hub or on the front side with an  label for the respectively permitted conditions of use. The laminae package is excluded.

Complete labelling:



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

Short labelling:



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

The labelling with Explosion Group IIC includes the Explosion Groups IIA and IIB.

If the coupling part is labelled with  in addition to , KTR supplied it unbored or pilot bored.



CAUTION!

Any mechanical rework to couplings that are used in hazardous areas require an explicit release by KTR.

The orderer must send a drawing to KTR acc. to which the manufacture must be made. KTR checks this drawing and returns it to the orderer with approval.

5.7 Starting

Before putting the coupling into operation, check the tightness of the setscrews in the coupling hubs, the alignment and the distance dimension E and correct, if necessary, and also check all screw connections regarding the stipulated tightening torques dependent on the type of coupling.



If used in hazardous areas the grub screws to fix the coupling hub as well as all screw connections must be additionally secured against self-loosening, e. g. glue with Loctite (medium strength).

Last but not least, the coupling protection against unintended contact must be fixed.

The cover must be electrically conductive and be included in the equipotential bonding. Bellhousings (magnesium part below 7,5 %) made from aluminium and damping rings (NBR) can be used as connecting element between pump and electro motor. The cover may only be taken off after having stopped the unit.

During operation, please pay attention to

- strange running noises
- occurring vibrations.

If the couplings are used in dust explosive areas and in mining the user must make sure that there is no accumulation of dust in a critical quantity between the cover and the coupling. The coupling must not operate in an accumulation of dust.



5 Enclosure A

Hints and Instructions Regarding the Use in Hazardous Areas

5.7 Starting

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

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

The minimum distance „Sr“ of the protection device to 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 parts	Distance „Sr“
Circular - max. diameter	4	8	≥ 10
Rectangular - max. lateral length	4	8	≥ 10
Straight or curved slot - max. lateral length/height	prohibited	8	≥ 20



CAUTION!

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

Coupling layer:



If coated (priming, painting etc.) couplings are used in hazardous areas, the requirements to conductability and layer thickness must be considered. In case of paintings up to 200 µm no electrostatic load can 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 errors can lead to an incorrect use of the **RIGIFLEX®-N** coupling. In addition to the stipulations in these operating and mounting instructions please make sure to avoid these errors. The errors listed can only be clues to search for the errors. When searching for the error the adjacent components must be generally included.



Due to incorrect use the coupling can become a source of ignition. EC Standard 94/9/EC requires a special care from the manufacturer and the user.

General errors incorrect use:

- Important data for the coupling selection was not forwarded.
- The calculation of the shaft/hub connection was not considered.
- Coupling parts with damage occurred during transport are assembled.
- If the heated hubs are assembled, the permissible temperature is exceeded.
- The fits of the parts to be assembled are not coordinated with each other.
- Tightening torques are below/exceeded.
- Components are exchanged by mistake/put together incorrectly.

Schutzvermerk ISO 16016 beachten.	Gezeichnet: 02.02.12 Kb/Sta	Ersatz für: KTR-N vom 15.11.10
	Geprüft: 09.02.12 Kb	Ersetzt durch:



5 Enclosure A

Hints and Instructions Regarding the Use in Hazardous Areas

5.8 Breakdowns, Causes and Elimination

Continuation:

- A wrong or no laminae package is inserted into the coupling.
- No original KTR parts (purchased parts) are used.
- The coupling used/the coupling protection used is not suitable for the operation in hazardous areas and does not correspond to EC Standard 94/9/EC, respectively.
- Maintenance intervals are not observed.

Breakdowns	Causes	Danger hints for hazardous areas	Elimination
Change of the running noises and / or occurring vibrations	Misalignment	---	1) The unit out of operation 2) Eliminate the reason for the misalignment (e. g. loose foundation bolts, break of the engine fixing, heat expansion of unit components, change of the assembly dimension E of the coupling) 3) Checking of wear see under point Control
	Loose cap screws, low micro friction under the screw head and at the steel laminae package	Danger of ignition due to hot surfaces	1) Put the unit out of operation 2) Check coupling parts and exchange damaged coupling parts 3) Tighten the cap screws until reaching the permissible tightening torque 4) Check alignment, correct if necessary
	Loose screws for axial securement of coupling hubs	---	1) Put the unit out of operation 2) Check alignment of coupling 3) Tighten the screws to secure the coupling hubs and secure against self-loosening 4) Checking of wear see under point Control
Break of the steel laminae package	Break of the steel laminae package due to high shock energy / overload	Danger of ignition due to sparking	1) Put the unit out of operation 2) Disassemble the coupling and remove the rests of the steel laminae packages 3) Check coupling parts and exchange damaged coupling parts 4) Insert spacer, assemble coupling parts 5) Find out the reason of overload
	Operating parameters do not correspond to the performance of the coupling	Danger of ignition due to sparking	1) Put the unit out of operation 2) Check the operating parameters and select a larger coupling (consider installation space) 3) Assemble new coupling size 4) Check alignment



5 Enclosure A

Hints and Instructions Regarding the Use in  Hazardous Areas

5.8 Breakdowns, Causes and Elimination

Breakdowns	Causes	Danger hints for hazardous areas	Elimination
Break of the steel laminae package	Mistake in service of the unit	Danger of ignition due to sparking	1) Put the unit out of operation 2) Disassemble the coupling and remove the rests of the steel laminae packages 3) Check coupling parts and exchange damaged coupling parts 4) Insert spacer, assemble coupling parts 5) Instruct and train the service staff
Cracks in / break of the steel laminae packages / fixing screws	Drive vibrations	Danger of ignition due to sparking	1) Put the unit out of operation 2) Disassemble the coupling and remove the rests of the steel laminae packages 3) Check coupling parts and exchange damaged coupling parts 4) Insert spacer, assemble coupling parts 5) Check alignment, correct if necessary 6) Find out the reason for the vibrations



If you operate with defect laminae package (see item 5.3) and the subsequent contact of metal parts a due operation meeting the explosion protection requirements and acc. to Standard 94/9/EC is not ensured.



ATTENTION!

KTR does not assume any liabilities or guarantees regarding the use of spare parts and accessories which are not provided by KTR and for the damages resulting here from.




KTR Kupplungstechnik
GmbH
D-48407 Rheine

RIGIFLEX®-N
Operating-/Assembly Instructions

KTR-N 47410 EN
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5 Enclosure A

Hints and Instructions Regarding the Use in  Hazardous Areas

5.9 EC Certificate of Conformity

EC Certificate of Conformity

corresponding to EC Standard 94/9/EC dated 23 March 1994
and to the legal regulations

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

RIGIFLEX®-N Steel Laminae Couplings

described in these mounting instructions and explosion-proof designed correspond to Article 1 (3) b) of Standard 94/9/EC and comply with the general Safety and Health Requirements according to enclosure II of Standard 94/9/EC.

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

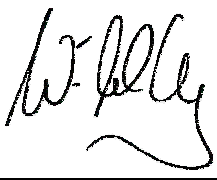
IBExU
Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7

09599 Freiberg


Rheine,

03.06.08
Date

i. V.


Reinhard Wibbeling
Engineering Manager

i. A.


Reiner Banemann
Product Manager