

RIGIFLEX®

Torsionally stiff steel lamina coupling types 01, 02, 03, 04, 05, 06 and their combinations

according to directive 2014/34/EU for finish bored, pilot bored and unbored couplings pilot bored/unbored couplings



Type: 01



Type: 02



Туре: 03



Type: 04



Type: 05



Type: 06

Please observe protection	Drawn:	2020-03-05 Wih/Pz	Replacing:	KTR-N dated 2017-01-02
note ISO 16016.	Verified:	2020-03-05 Wih	Replaced by:	



RIGIFLEX®-N is a backlash-free, torsionally stiff and maintenance-free steel lamina coupling. It is able to compensate for shaft misalignment, for example caused by thermal expansion, etc.

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1 Technical data



Illustration 1: RIGIFLEX® type 01



Illustration 3: RIGIFLEX® type 03



Illustration 5: RIGIFLEX® type 05



Illustration 2: RIGIFLEX® type 02



Illustration 4: RIGIFLEX® type 04



Illustration 6: RIGIFLEX® type 06

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1 Technical data



Illustration 7: RIGIFLEX® type 11



Illustration 8: RIGIFLEX® type 12







Illustration 9: RIGIFLEX® type 13



Illustration 11: RIGIFLEX® type 15



Illustration 12: RIGIFLEX® type 16

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1 Technical data

Table 1:

	May	finiah	horo	[]							Dime	ensions [mm]						
Size	iviax	. Imisn	bore	luuul								General							
	d ₁	d_2	d ₃	d_4	D	DA	D ₁	d ₅	l ₁	L ₁	l ₂	L ₂	l ₃	L ₃	4	L_4	l ₅	L_5	I ₆
32	32	22	42	50	60	95	145	39	60	78.5	11	29.5	8	55	50	68	70	78	80
48	48	38	55	65	80	135	190	65	70	76	11	30.5	8	70	70	75	80	98	100
60	60	50	75	90	90	170	225	80	80	87	15	40.5	12	85	80	85	90	122	125
65	65	55	80	100	100	190	250	90	90	96	16	42.5	12	92.5	90	90	95	132	135
75	75	60	85	120	110	210	265	100	95	101	16	43.5	12	98.5	95	95	100	137	140
80	80	65	100	130	125	230	300	105	110	115	22	56.5	18	140	135	103	105	146	150
90	90	70	110	140	140	245	315	115	110	115	23	58.5	19	155	150	108	110	150	155
100	100	80	120	160	155	270	340	135	125	132	25	62.5	21	155	150	118	120	160	165
110	110	90	140	175	165	300	365	150	130	138	27	73.5	23	165	160	127.5	130	180	185
120	120	105	150	190	185	325	390	160	130	138	30	81.5	26	170	160	137.5	140	200	205
130	130	115	160	200	210	350	430	180	145	153	31	85.5	27	178	165	142	145	205	210
140	140	125	170	215	225	370	450	190	155	164	33	89.5	29	186	180	152	155	220	225
150	150	130	185	230	230	395	470	200	170	179	37	100.5	33	215	210	157	160	235	240
160	160	140	190	250	255	415	495	220	190	199	37	100.5	33	235	230	172	175	250	255
180	180	145	210	260	260	450	530	230	195	204.5	44	117.5	40	275	270	182	185	260	265
190	190	155	220	270	280	470	565	240	220	227	44	119.5	39	290	285	192	195	280	285
200	200	170	240	290	305	500	595	260	255	265	46	127.5	40	330	325	207	210	300	305
210	210	190	255	325	340	550	665	290	275	285	51	137.5	46	335	330	227	230	340	345
230	230	210	280	350	370	590	705	320	305	315	52	141.5	46	340	335	247	250	365	370
260	260	245	310	405	420	650	770	360	310	325	55	151.5	49	340	335	267	270	425	430
280	280	265	325	440	450	690	810	400	360	375	58	159.5	52	380	375	297	300	460	465
300	300	285	350	475	480	750	900	430	375	390	61	168.5	53	435	430	317	320	515	520
350	350	300	390	-	560	810	990	500	375	390	52	141.5	46	465	460	355	360	-	-
390	390	330	430	-	620	880	1060	550	395	410	55	151.5	49	525	520	395	400	-	-
420	420	355	460	-	680	945	1150	580	440	455	58	159.5	52	555	550	425	430	-	-
460	460	360	500	-	720	1010	1240	600	460	475	61	168.5	53	585	580	455	460	-	-
530	530	500	610	-	810	1180	1370	850	530	545	58	159.5	50	535	530	555	560	-	-
580	580	550	660	-	890	1290	1480	930	580	595	61	168.5	53	585	580	595	600	-	-

For dimensions for the setscrews (dimension G and t) see table 2.

Table 2:

						Dimensio	ns [mm]					
Size					Gen	eral					Sets	crew
	M ¹⁾	E ¹⁾	L ₁₁	L ₁₂	L ₁₃	L_{14}	L ₁₅	L ₁₆	D_3	Z	G	t
32	63	100	220	171.0	171.0	133.5	239.0	249.0	120	4 x 11	M6	15
48	80	92	232	186.5	186.5	146.0	261.5	284.5	160	4 x 14	M8	20
60	100	114	274	227.5	227.5	172.0	312.5	349.5	200	8 x 12	M8	20
65	110	122	302	248.5	248.5	188.5	338.5	380.5	220	8 x 14	M10	20
75	130	142	332	274.5	274.5	199.5	369.5	411.5	240	8 x 14	M10	20
80	140	150	370	311.5	311.5	255	414.5	457.5	265	8 x 18	M10	20
90	160	170	390	333.5	333.5	270	441.5	483.5	280	8 x 18	M12	25
100	170	184	434	364.5	364.5	287	482.5	524.5	305	12 x 18	M12	30
110	180	196	456	391.5	391.5	303	519.0	571.5	330	12 x 18	M12	30
120	190	206	466	409.5	409.5	308	547.0	609.5	360	12 x 18	M12	30
130	200	216	506	438.5	438.5	331	580.5	643.5	395	12 x 22	M20	35
140	210	228	538	463.5	463.5	350	615.5	683.5	410	12 x 22	M20	35
150	225	243	583	504.5	504.5	394	661.5	739.5	435	12 x 22	M20	40
160	240	258	638	539.5	539.5	434	711.5	789.5	455	12 x 26	M20	40
180	253	272	662	575.5	575.5	479	757.5	835.5	490	12 x 26	M20	40
190	268	282	722	614.5	614.5	517	806.5	894.5	520	12 x 26	M20	50
200	280	300	810	672.5	672.5	595	879.5	972.5	550	12 x 26		
210	300	320	870	722.5	722.5	620	949.5	1062.5	610	12 x 33		
230	310	330	940	766.5	766.5	655	1013.5	1131.5	650	12 x 33		
260	330	360	980	806.5	806.5	665	1073.5	1231.5	710	12 x 33		
280	360	390	1110	894.5	894.5	755	1191.5	1354.5	750	12 x 39		
300	420	450	1200	978.5	978.5	825	1295.5	1493.5	825	12 x 39	As spec	cified by
350	400	430	1180	931.5	931.5	855	1286.5	-	900	18 x 39	the cu	stomer
390	440	470	1260	1001.5	1001.5	935	1396.5	-	980	18 x 45		
420	460	490	1370	1074.5	1074.5	1010	1499.5	-	1050	18 x 45		
460	500	530	1450	1143.5	1143.5	1060	1598.5	-	1130	18 x 52		
530	550	580	1640	1254.5	1254.5	1080	1809.5	-	1280	24 x 45		
580	600	630	1790	1363.5	1363.5	1180	1958.5	-	1390	24 x 45		

1) other spacer length on request

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1 Technical data

Table 3: Torque and speed

RIGIFLEX®	size	32	48	60	65	75	5 6	30	90	100	110	120
Torque	T _{KN}	200	320	1,000	1,600	2,00	00 2,	500	3,200	0 4,000	5,000	6,300
[Nm]	T _{Kmax.}	300	480	1,500	2,400	3,00	00 6,	250	8,000) 10,000	18,000	22,500
Max. speed r	ı [rpm]	20,000	14,000	11,200	10,000	9,00	00 8,	300	7,700	7,000	6,300	5,800
RIGIFLEX®	size	130	140	150	160)	180		190	200	210	230
Torque	T _{KN}	8,000	10,000	12,500	16,0	00	20,000	2	5,000	32,000	40,000	50,000
[Nm]	T _{Kmax.}	28,000	34,900	43,000	54,5	00	68,000	84	4,000	106,000	131,500	160,000
Max. speed r	n [rpm]	5,400	5,100	4,800	4,60	00	4,200	4	,000	3,800	3,400	3,200
RIGIFLEX®	size	260	280	300	350)	390		420	460	530	580

RIGIFLEX®	size	260	280	300	350	390	420	460	530	580
Torque	T _{KN}	63,000	80,000	100,000	125,000	160,000	200,000	250,000	320,000	400,000
[Nm]	T _{Kmax.}	205,000	254,000	314,000	376,000	490,000	606,000	750,000	870,000	1,145,000
Max. speed n	n [rpm]	2,900	2,700	2,500	2,350	2,170	2,020	1,890	1,600	1,480



RIGIFLEX[®] couplings with attachments that can generate heat, sparks and static charging (e. g. combinations with brake drums, brake disks, overload systems such as torque limiters, fan impellers etc.) are not permitted for the use in potentially explosive atmospheres.

A separate analysis must be performed.

2 Advice

2.1 General advice

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



The **RIGIFLEX**[®] coupling is suitable and approved for the use in potentially explosive atmospheres. When using the coupling in potentially explosive atmospheres, observe the special advice and instructions regarding safety in enclosure A.

may result in death.

The operating/assembly instructions are part of your product. Please store them carefully and close to the coupling. The copyright for these operating/assembly instructions remains with KTR.

2.2 Safety and advice symbols



Warning of potentially explosive atmospheres



Warning of personal injury



Warning of product damages



General advice

Warning of hot surfaces

This symbol indicates notes which may contribute to preventing burns with hot surfaces resulting in light to serious bodily injuries.

This symbol indicates notes which may contribute to

preventing bodily injuries or serious bodily injuries that

may result in death caused by explosion.

preventing material or machine damage.

preventing adverse results or conditions.

preventing bodily injuries or serious bodily injuries that

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2 Advice

2.3 General hazard warnings



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 reach into the operating 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.

2.4 Intended use

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

- have carefully read through the operating/assembly instructions and understood them
- are technically qualified and specifically trained (e. g. safety, environment, logistics)
- are authorized by your company

The coupling may only be used in accordance with the technical data (see 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**[®] described in here corresponds to the technical status at the time of printing of these operating/assembly instructions.

2.5 Coupling selection



For a permanent and failure-free operation of the coupling it must be selected according to the selection instructions (according to DIN 740 part 2) for the particular application (see catalogue drive technology "RIGIFLEX[®]").

If the operating conditions (performance, speed, modifications on engine and machine) change, the coupling selection must be reviewed.

Please make sure 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.

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2 Advice

2.6 Reference to EC Machinery Directive 2006/42/EC

The couplings supplied by KTR should be considered as components, not machines or partly completed machines according to EC Machinery Directive 2006/42/EC. Consequently KTR does not have to issue a declaration of incorporation. For details about safe assembly, start-up and safe operation refer to the present operating/assembly instructions considering the warnings.

3 Storage, transport and packaging

3.1 Storage

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



The storage rooms must not include any ozone-generating devices like e. g. fluorescent light sources, mercury-vapour lamps or electrical high-voltage appliances. Humid storage rooms are not suitable. Please make sure that condensation is not generated. The best relative air humidity is less than 65 %.

3.2 Transport and packaging



In order to avoid any injuries and any kind of damage please always make use of proper transport and lifting equipment.

The couplings are packed differently each depending on size, number and kind of transport. Unless otherwise contractually agreed, packaging will follow the in-house packaging specifications of KTR.

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4 Assembly

The coupling is generally supplied in preassembled component assemblies (coupling halves). Hubs, lamina sets and flanges are assembled as a unit by the manufacturer. The spacers have to be assembled by the customer. Before assembly the coupling has to be inspected for completeness.

4.1 Components of the couplings

Type: 01

Component	Quantity	Description
1	1	Coupling hub
2	1	Coupling flange
3	1	Lamina set
4	1	Setscrew



Illustration 13: RIGIFLEX® type 01

Type: 02

Component	Quantity	Description
1	2	Coupling flange
2	1	Lamina set

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Illustration 14: RIGIFLEX® type 02

Type: 03

Component	Quantity	Description
1	1	Coupling flange
2	1	Coupling flange for 03
3	1	Lamina set



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RIGIFLEX® Operating/Assembly instructions

4 Assembly

4.1 Components of the couplings

Type: 04

Component	Quantity	Description
1	1	Reduced coupling hub
2	1	Coupling half
3	1	Lamina set
4	1	Setscrew



Illustration 16: RIGIFLEX® type 04

Type: 05

Component	Quantity	Description
1	1	Large coupling hub
2	2	Coupling flange
3	1	Lamina set
4	see table 4	Hexagon screws
5	see table 4	Spring washers
6	1	Setscrew



Illustration 17: RIGIFLEX® type 05

Type: 06

Component	Quantity	Description
1	1	Jumbo coupling hub
2	1	Coupling flange
3	1	Coupling flange for 03
4	1	Lamina set
5	see table 4	Cap screws
6	1	Setscrew



Illustration 18: RIGIFLEX® type 06

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RIGIFLEX® Operating/Assembly instructions



4 Assembly

4.1 Components of the couplings

Table 4:

Coupling size	32	48	60	65	75	80	90	100	110	120
Number of hexagon screws	4	4	8	8	8	8	8	12	12	12
Number of spring washers	4	4	8	8	8	8	8	12	12	12
Number of cap screws	4	4	8	8	8	8	8	12	12	12
Coupling size	130	140	150	160) 1	80	190	200	210	230
Number of hexagon screws	12	12	12	12		12	12	12	12	12
Number of spring washers	12	12	12	12		12	12	12	12	12
Number of cap screws	12	12	12	12		12	12	12	12	12
Coupling size	260	280	300	350) 3	90	420	460	530	580
Number of hexagon screws	12	12	12	18		18	18	18	24	24
Number of spring washers	12	12	12	18		18	18	18	24	24
Number of cap screws	12	12	12	18		18	18	18	24	24

Components of the RIGIFLEX® couplings

Tvi	oe:	11
• • •		

Component	Quantity	Description
1	2	Coupling half type 01
2	1	Spacer
3	see table 5	Hexagon screws
4	see table 5	Spring washers



Illustration 19: RIGIFLEX® type 11

Type: 12

Component	Quantity	Description
1	1	Coupling half type 01
2	1	Coupling half type 02
3	1	Spacer
4	see table 5	Hexagon screws
5	see table 5	Spring washers



Illustration 20: RIGIFLEX® type 12

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RIGIFLEX® Operating/Assembly instructions

4 Assembly

4.1 Components of the couplings

Type: 13

Component	Quantity	Description				
1	1	Coupling half type 01				
2	1	Coupling half type 03				
3	1	Spacer				
4	see table 5	Hexagon screws				
5	see table 5	Spring washers				



Illustration 21: RIGIFLEX® type 13

Type:	14
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Component	Quantity	Description
1	1	Coupling half type 01
2	1	Coupling half type 04
3	see table 5	Hexagon screws
4	see table 5	Spring washers



Illustration 22: RIGIFLEX® type 14

Type: 15

Component	Quantity	Description
1	1	Coupling half type 01
2	1	Coupling half type 05
3	1	Spacer
4	see table 5	Hexagon screws
5	see table 5	Spring washers



Illustration 23: RIGIFLEX® type 15

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4 Assembly

4.1 Components of the couplings

Components of the RIGIFLEX[®] couplings

Type: 16

Component	Quantity	Description
1	1	Coupling half type 01
2	1	Coupling half type 06
3	1	Spacer
4	see table 5	Hexagon screws
5	see table 5	Spring washers



Illustration 24: RIGIFLEX® type 16

Table 5:

Coupling size	32	48	60	65	75	80	90	100	110	120
Number of hexagon screws	8	8	16	16	16	16	16	24	24	24
Number of spring washers	8	8	16	16	16	16	16	24	24	24
Coupling size	130	140	150	160	18	80	190	200	210	230
Number of hexagon screws	24	24	24	24	2	4	24	24	24	24
Number of spring washers	24	24	24	24	24	4	24	24	24	24
Coupling size	260	280	300	350	39	90	420	460	530	580
Number of hexagon screws	24	24	24	36	3	6	36	36	48	48
Number of spring washers	24	24	24	36	3	6	36	36	48	48

4.2 Advice for finish bore



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.

- Hub bores machined by the customer have to observe concentricity or axial runout, respectively (see illustration 25).
- Please make absolutely sure to observe the figures for $\emptyset d_{\text{max}}$.
- Carefully align the clamping 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 flange hubs axially.



Illustration 25: Concentricity and axial runout

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4 Assembly

4.2 Advice for finish bore

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 remachining.



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

Reference to unbored resp. pilot bored coupling components with explosion protection marking:

Basically the company KTR supplies couplings resp. coupling hubs with explosion protection marking as an unbored or pilot bored type only on explicit request of the customer. The prerequisite is a declaration of exemption submitted by the customer assuming any responsibility and liability for remachining performed properly.

Table 6: Setscrew DIN EN ISO 4029

Coupling size	32	48	60	65	75	80	90	100	110	120
Dimension G [mm]	M6	M8	M8	M10	M10	M10	M12	M12	M12	M12
Tightening torque T _A [Nm]	4.8	10	10	17	17	17	40	40	40	40
Coupling size	130	140	150	16) 1	80	190	200	210	230
Dimension G [mm]	M20	M20	M20	M2	0 M	20	M20	A a a a a a a ifi	ad by the e	uotomor
Tightening torque T _A [Nm]	140	140	140	14() 1	40	140	As specified by the customer		
Coupling size	260	280	300	350) 3	90	420	460	530	580
Dimension G [mm]	As specified by the customer									

4.3 Assembly (general)

Tightening torque T_A [Nm]



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

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



Please pay attention to the ignition risk in potentially explosive atmospheres!



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



With the assembly please make sure that the dimension E_{DK} or dimension s (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.



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

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4 Assembly

4.4 Assembly of coupling halves

For the axial alignment of the coupling the distance dimension E (see table 2) is decisive. In order to set the right dimension E you should proceed as follows:

- Mount the coupling halves onto the shaft of driving and driven side (see illustration 26).
- The internal sides of the coupling hubs must be flush with the front sides of the shafts.
- Shift the power packs in axial direction until the distance dimension E is achieved (see table 2).
- If the power packs are already firmly assembled, shifting the coupling halves axially on the shafts allows for setting the distance dimension E.
- Fasten the coupling halves by tightening the setscrews DIN EN ISO 4029 with a cup point (see table 6).



Illustration 26: Assembly of coupling halves



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

4.5 Assembly of spacer

The spacer can easier be inserted by means of the retracting screw with the coupling hub and coupling flange being pulled together.

Tighten the screws one after another and with several revolutions until all screws have reached the full tightening torque (see table 7).

Coupling size	32	48	60	65	75	80	90	100	110	120
Dimension M1 [mm]	M10	M12	M12	M12	M12	M16	M16	M16	M16	M16
Tightening torque T _A [Nm]	69	120	120	120	120	295	295	295	295	295
Coupling size	130	140	150	160) 1	80	190	200	210	230
Dimension M1 [mm]	M20	M20	M20	M2-	4 M	24	M30	M30	M30	M30
Tightening torque T _A [Nm]	580	580	580	100	0 10	000	2000	2000	2000	2000
Coupling size	260	280	300	350) 3	90	420	460	530	580
Dimension M1 [mm]	M30	M36	M42	M4:	2 M	42	M48	M48	M42	M42
Tightening torque T ₄ [Nm]	2000	3400	5500	550	0 55	500	8200	8200	5500	5500

Table 7: Tightening torques of the hexagon screws with spring washers



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

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4 Assembly

Displacements - alignment of the coupling 4.6

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



In order to ensure a long service life of the coupling and avoid dangers with the use in potentially explosive atmospheres, the shaft ends must be accurately aligned. Please absolutely observe the displacement figures specified (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 potentially explosive atmospheres for explosion group IIC, only half of the displacement figures (see table 8) are permissible.

Please note:

- The displacement figures specified 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 28).
- Please inspect with a dial gauge, ruler or feeler gauge whether the permissible displacement figures specified in table 8 can be observed.



Illustration 27: Displacements

Axial displacements

Examples of the combinations of displacement specified in illustration 28:

Example 1: $\Delta K_r = 10 \%$ $\Delta K_w = 80 \%$ $\Delta K_a = 10 \%$

Example 2: $\Delta K_r = 30 \%$ $\Delta K_w = 30 \%$ $\Delta K_a = 40 \%$



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

Illustration 28: Combinations of displacement

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4 Assembly

4.6 Displacements - alignment of the coupling

Table 8: Displacement figures

	Type of coupling holf	Type with	Type with	Type with
Size		spacer	spacer	spacer
	$\Delta \kappa_{a}$ [mm], (axial)	ΔK_a [mm], (axial)	ΔK_r [mm], (radial)	ΔK_w [°], (angular) ¹⁾
32	1.25	2.5	1.3	1.0
48	1.75	3.5	1.5	1.0
60	1.50	3.0	2.5	1.0
65	1.75	3.5	2.5	1.0
75	2.0	4.0	3.0	1.0
80	1.0	2.0	3.0	1.0
90	1.0	2.0	3.0	1.0
100	1.5	3.0	4.0	1.0
110	2.0	4.0	4.0	1.0
120	2.5	5.0	5.0	1.0
130	3.0	6.0	5.0	1.0
140	3.0	6.0	5.0	1.0
150	3.0	6.0	6.0	1.0
160	3.0	6.0	6.0	1.0
180	4.0	8.0	6.5	1.0
190	4.0	8.0	7.0	1.0
200	4.0	8.0	7.0	1.0
210	4.0	8.0	7.5	1.0
230	4.0	8.0	8.0	1.0
260	5.0	10.0	8.5	1.0
280	5.0	10.0	9.0	1.0
300	5.0	10.0	10.0	1.0
350	4.0	8.0	7.0	0.75
390	5.0	10.0	7.5	0.75
420	5.0	10.0	8.0	0.75
460	5.0	10.0	8.5	0.75
530	5.0	10.0	6.0	0.75
580	5.0	10.0	6.5	0.75

1) each lamina set

5 Start-up

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



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

Finally the coupling protection against accidental contact must be fitted. It is required in accordance with DIN EN ISO 12100 (Safety of Machinery) and directive 2014/34/EU and must protect against

- access with a little finger
- falling down of solid foreign objects.

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5 Start-up

The cover may provide for openings intended for necessary heat dissipation. These openings have to comply with DIN EN ISO 13857.

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



If the couplings are used in locations subject to dust explosion and in mining the user must make sure that there is no accumulation of dust <u>in a dangerous volume</u> 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 must 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 with use as equipment of equipment group II.

During operation of the coupling, please pay attention to

- different operating noise
- vibrations occurring.



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 specified by means of the table "Breakdowns" and, if possible, be eliminated according to the proposals. The potential breakdowns specified can be hints only. To find out the cause all operating factors and machine components must be considered.

Coating of coupling:



If coated (priming, paintings, etc.) couplings are used in potentially explosive atmospheres, the requirements on conductibility and coating thickness must be considered. With paintings up to 200 μ m electrostatic load does not have to be expected. Paintings and coatings exceeding a thickness of 200 μ m are generally impermissible for potentially explosive atmospheres. It also applies for multiple coatings exceeding an overall thickness of 200 μ m. Make sure with painting or coating that the coupling components are conductively connected with the device/devices to be connected so that the equipotential bonding is not impeded by the paint or coat applied. In addition, make sure that the marking of the coupling remains legible. Painting or coating of the lamina set is generally not admitted.

6 Breakdowns, causes and elimination

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



If used other than intended the coupling can become a source of ignition. EU directive 2014/34/EU requires special care by the manufacturer and the user.

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6 Breakdowns, causes and elimination

General failures with use other than intended:

- Important data for the coupling selection are not forwarded.
- The calculation of the shaft-hub-connection is 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 one another.
- Tightening torques have been fallen below/exceeded.
- Components are mixed up by mistake/assembled incorrectly.
- A wrong or no lamina set is inserted in the coupling.
- No original KTR components (purchased parts) are used.
- Maintenance intervals are not observed.

Breakdowns	Causes	Hazard notes for potentially explosive atmospheres	Elimination
	Misalignment	none	 Set the unit out of operation Eliminate the reason for the misalignment (e. g. loose foundation bolts, breaking of the engine mount, heat expansion of unit components, modification of the installation dimension E of the coupling) For inspection of wear see chapter 10.2
Different operating noise and/or vibrations occuring	Dowel screws working loose, low micro friction under the screw head and on the steel lamina set	Danger of ignition due to hot surfaces	 Set the unit out of operation Inspect coupling components and replace coupling components that are damaged Tighten the dowel screws to the tightening torque specified Inspect alignment, adjust if necessary
	Screws for axial fastening of flange hubs working loose	none	 Set the unit out of operation Inspect alignment of coupling Tighten the screws to fasten the flange hubs and secure against working loose For inspection of wear see chapter 10.2
	Breaking of steel lamina set due to high impact energy/overload		 Set the unit out of operation Disassemble the coupling and remove remainders of the steel lamina sets Inspect coupling components and replace coupling components that are damaged Insert steel lamina sets, assemble coupling components Find out the reason for overload Set the unit out of operation
Breaking of steel lamina set	Operating parameters do not meet with the performance of the coupling	Ignition risk due to sparking	 Set the unit out of operation Review the operating parameters and select a bigger coupling (consider mounting space) Assemble new coupling size Inspect alignment
	Operating error of the unit		 Set the unit out of operation Disassemble the coupling and remove remainders of the steel lamina sets Inspect coupling components and replace coupling components that are damaged Insert steel lamina sets, assemble coupling components Instruct and train the service staff

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6 Breakdowns, causes and elimination

Breakdowns	Causes	Hazard notes for potentially explosive atmospheres	Elimination
			 Set the unit out of operation Disassemble the coupling and remove
			remainders of the steel lamina sets
Cracks in / fracture of the steel lamina set /	Vibrations of drive		 Inspect coupling components and replace coupling components that are damaged
fastening screws			 Insert steel lamina sets, assemble coupling components
			 Inspect alignment, adjust if necessary Eind out the reason for vibrations



When operating with a faulty lamina set (see chapter 10.2) proper operation is not assured.



In respect of environmental protection we would ask you to dispose of the packaging or products on termination of their service life in accordance with the legal regulations and standards that apply, respectively.

Metal

Any metal components have to be cleaned and disposed of by scrap metal.

8 Maintenance and service

Monitoring of the general condition of the coupling can be done both at standstill and during operation. If the coupling is tested during operation, the operator must ensure an appropriate and proven test procedure (e. g. stroboscopic lamp, high-speed camera, etc.) which is definitely comparable to testing at standstill. If any distinctive features occur, an inspection must be made with the machine stopped.

RIGIFLEX[®] is a low-maintenance coupling. We recommend to perform a visual inspection on the coupling **at least once a year**. Please pay special attention to the condition of the lamina sets, alignment and screw connection of the coupling.

- Since the flexible machine bearings of the driving and driven side settle during the course of load, inspect the alignment of the coupling and re-align the coupling, if necessary.
- If some individual laminas are broken, the lamina sets of the coupling have to be replaced. The coupling components have to be inspected for damages.
- The screw connections have to be inspected visually.



After start-up of the coupling the tightening torques of the screws of the lamina sets have to be inspected during usual maintenance intervals.



With the use in potentially explosive atmospheres observe chapter 10.2 "Inspection intervals for couplings in 🗟 potentially explosive atmospheres".

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9 Spares inventory, customer service addresses

We recommend to store major spare parts on site to ensure the readiness for use of the machine in case if a coupling fails.

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



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.

10 Enclosure A

Advice and instructions regarding the use in very potentially explosive atmospheres

- Type 01:Coupling hub/lamina set/coupling flange
- Type 02:Coupling flange/lamina set/coupling flange
- Type 03:Coupling flange/lamina set/coupling flange for 03
- Type 04: Reduced coupling hub/lamina set/coupling half
- Type 05: Large coupling hub/coupling flange/lamina set/coupling flange
- Type 06: Jumbo coupling hub/coupling flange for 03/lamina set/coupling flange
- Type 11: Type 01/spacer/type 01
- Type 12:Type 01/spacer/type 02
- Type 13: Type 01/spacer/type 03
- Type 14: Type 01/type 04
- Type 15: Type 01/spacer/type 05
- Type 16: Type 01/spacer/type 06

RIGIFLEX[®] steel lamina coupling for horizontal mounting only

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RIGIFLEX[®] couplings are suitable for the use according to EU directive 2014/34/EU.

The couplings may only be used if their materials are resistant to mechanical and/or chemical influences with 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 <u>not</u> approved/<u>not</u> suitable for equipment group 1)
- Substance group G (gases, fogs, vapours), zone 1 and 2 (coupling is not approved/not suitable for zone 0)
- Substance group D (*dusts*), zone 21 and 22 (*coupling is <u>not</u> approved/<u>not</u> suitable for zone 20*)
- Explosion group IIC (gases, fogs, vapours) (explosion group IIA and IIB are included in IIC) and explosion group IIIC (dusts) (explosion group IIIA and IIIB are included in IIIC)

Temperature class:

Temperature class	Ambient or operating temperature Ta ¹⁾	Max. surface temperature ²⁾
T2	-40 °C to +230 °C	+250 °C
Т3	-40 °C to +175 °C	+195 °C
Τ4	-40 °C to +110 °C	+130 °C
T5	-40 °C to +75 °C	+95 °C
Т6	-40 °C to +60 °C	+80 °C

Explanation:

The maximum surface temperatures each result from the maximum permissible ambient or operating temperature T_a plus the maximum temperature increase ΔT of 20 K to be considered. For the temperature classes T6 to T3 (\leq 200 °C) a safety margin subject to standard of 5 K and from temperature class T3 (\geq 200 °C) a safety margin subject to standard of 10 K is added.

- 1) The ambient or operating temperature T_a is limited to +250 °C due to the permissible permanent operating temperature (surface temperature).
- The maximum surface temperature of +230 °C applies for the use in locations which are potentially subject to dust explosion.

In potentially explosive atmospheres

- the ignition temperature of dusts generated must at least be 1.5 times the surface temperature to be considered
- the glow temperature must at least be the surface temperature to be considered plus a safety distance of 75 K.
- the gases and vapours generated must amount to the temperature class specified.

2. Mining

Equipment group I of category M2 (*coupling is <u>not</u> approved/<u>not</u> suitable for equipment group M1*). Permissible ambient temperature -40 °C to +130 °C.

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Enclosure A 10

Advice and instructions regarding the use in

10.2 Inspection intervals for couplings in

Inspection intervals Equipment category For couplings operated in zone 2 or zone 22 the inspection and maintenance intervals of the usual operating/assembly instructions for standard operation apply. During the 3G standard operation which has to be taken as a basis of the ignition risk analysis the 3D couplings are free from any ignition source. For gases, vapours and dusts generated the permissible glow and ignition temperatures specified in chapter 10.1 have to be considered and observed. An inspection of the torsional backlash and a visual inspection of the lamina sets must be performed after 3,000 operating hours for the first time, at the latest 6 months after startup of the coupling. If you note insignificant or no wear on the lamina sets upon this initial inspection, further M2 2G inspections can each be performed after 6,000 operating hours or at the latest after 18 months, provided that the operating parameters remain the same. 2D No gases and vapours of If you note significant wear during the initial inspection so that it would be recommendable to replace the lamina sets, find out the cause according to the table explosion group IIC "Breakdowns", if possible. The maintenance intervals must be adjusted to the modified operating parameters without fail. An inspection of the torsional backlash and a visual inspection of the lamina sets must be performed after 2,000 operating hours for the first time, at the latest 3 months after startup of the coupling. If you note insignificant or no wear on the lamina sets upon this initial inspection, further 2G inspections can each be performed after 4,000 operating hours or at the latest after 12 2D months, provided that the operating parameters remain the same. Gases and vapours of If you note significant wear during the initial inspection so that it would be explosion group IIC recommendable to replace the lamina sets, 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 29: RIGIFLEX®

During the visual inspection the lamina sets must be inspected for cracks and screws working loose. During the visual inspection the lamina sets must be inspected for cracks and screws working loose. Screws working loose have to be tightened at the screw tightening torque specified (see table 7). Lamina sets and screws showing cracks must be replaced immediately, irrespective of the inspection intervals.

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potentially explosive atmospheres

potentially explosive atmospheres

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10 Enclosure A					
Advice and instruct	tions reacting th	$\frac{1}{2}$		a a a b a r a a	
Advice and instruc	ctions regarding the	e use in 🖵 potentially exp	DIOSIVE ath	nospheres	
10.3 Permissible coupl	ing materials in	potentially explosive atmo	ospheres		
The ATEX marking of the R The lamina sets are not ma	RIGIFLEX [®] coupling is a rked.	applied on the outer sheath or on t	the front side	е.	
For the complete marking r	efer to the operating/as	ssembly instructions and/or the de	livery note/p	backage.	
Marking is as follows:					
RIGIFLEX [®] <year></year>		I M2 Ex h I II 2G Ex h IIC T6 T2	Mb - Gb	40 °C ≤ T _a ≤ +130 °C	
		II 2D Ex h IIIC T80 °C T250 -40 °C $\leq T_a \leq +60$ °C +230) °C Db) °C		
KTR Systems GmbH, Carl-Zeiss-Straße 25, D-48432 Rheine					
Short marking:					
RIGIFLEX®					
<year></year>		KTR			
Deviating marking applies	s until 31st October 2	<u>019:</u>			
Short marking:					
Ğ		II 2GD C IIC T X/I M2 C X			
Complete marking:		II 2G c IIC T6, T5, T4, T3 resp. T2 -	$30 \ ^{\circ}C \leq T_{a} \leq$	+75 °C, +90 °C,	
		+125 °C, +190 °C resp. +250 °C II 2D c T 110 °C -30 °C \leq T _a \leq +100) °C /I M2 c -3	80 °C ≤ Ta ≤	
		+140 °C			

<u>Substance group - gases, fogs and vapours:</u> The marking with explosion group IIC includes the explosion groups IIA and IIB.

Substance group - dusts:

The marking with explosion group IIIC includes the explosion groups IIIA and IIIB.

If the symbol 🐵 was punched in addition to marking 🔍, the coupling component was supplied by KTR as an unbored or pilot bored version (see chapter 4.2 of the present operating/assembly instructions).

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10 Enclosure A

Advice and instructions regarding the use in potentially explosive atmospheres

10.4 EU Certificate of conformity

according t and to the l	to EU directive 20 legal regulations	14/34/EU dated February 26,	<u>2014</u>
The manuf	acturer - KTR Sys	tems GmbH, D-48432 Rheine	e - states that the
		RIGIFLEX [®] Steel Lamin	a Couplings
in an explo correspond requiremer	sion-proof design ling to article 2, 1. hts according to e	described in these operating/ of directive 2014/34/EU and on aclosure II of directive 2014/34	assembly instructions are devices comply with the general safety and health 4/EU.
The couplir	ng described in he	ere complies with the specifica	tions of the following standards/rules:
		DIN EN ISO 8007 DIN EN ISO 8007 DIN EN ISO 8007 IEC/TS 60079-32-	9-36 9-37 9-38 1
The RIGIFI	LEX [®] is in accorda	ance with the specifications of	directive 2014/34/EU.
According the notified	to article 13 (1) b) I body (type exam	ii) of directive 2014/34/EU the ination certificate IBExU04AT	e technical documentation is deposited with EXB012 X):
		IBExU Institut für Sicherheitstec Identification number: 06 Fuchsmühlenweg 7	chnik GmbH 337
		09599 Freiberg	
Rheine, Place	2020-03-05 Date	i. V. Reinhard Wibbeling	i. V. D. Bo

Please observe protection	Drawn:	2020-03-05 Wih/Pz	Replacing:	KTR-N dated 2017-01-02
note ISO 16016.	Verified:	2020-03-05 Wih	Replaced by:	