

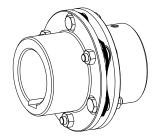
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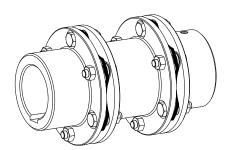
RADEX®-N

Steel laminae couplings types NN, NANA 1 to 4, NENA 1 and 2, NENE 1, NNZ, NNW

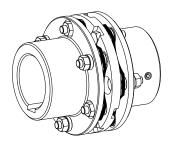
according to directive 2014/34/EU and UK directive SI 2016 No. 1107



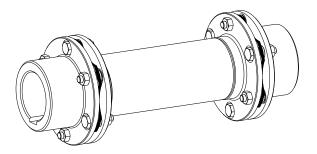
RADEX®-N type NN



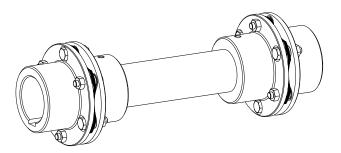
RADEX®-N type NANA 1



RADEX®-N type NNZ



RADEX®-N type NANA 4



RADEX®-N type NNW

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RADEX®-N is a torsionally stiff flexible steel laminae coupling. It is able to compensate for shaft misalignment, for example caused by thermal expansion, etc.

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Technical data

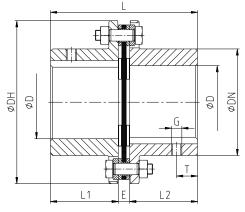


Illustration 1: RADEX®-N type NN

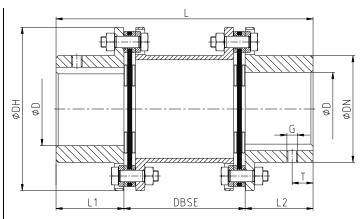


Illustration 2: RADEX®-N type NANA 1

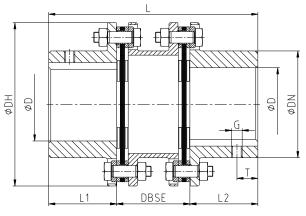


Illustration 3: RADEX®-N type NANA 2

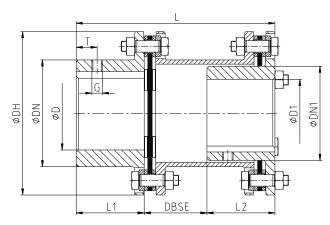


Illustration 4: RADEX®-N type NENA 1

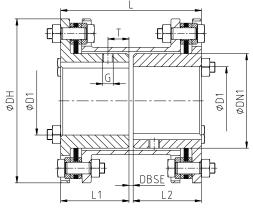


Illustration 5: RADEX®-N type NENE 1

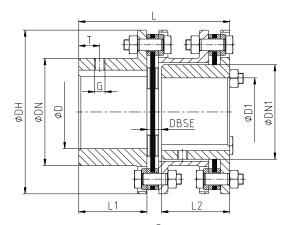


Illustration 6: RADEX®-N type NENA 2

Dimensions of couplings see table 1, sheet 4.

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Technical data

Table 1: Types NN - NANA 1 - NANA 2 - NENA 1 - NENE 1 - NENA 2

	Max.	finish							D	imensio	ons ¹⁾ [m	nm]						
Size	bore	[mm]								Ge	neral							
5126	D	D1	DN	DN1	DH	L1,			l	_					DB	SE		
	U	וט	DIN	DIVI	ווט	L2	NN	NANA1	NANA2	NENA1	NENE1	NENA2	NN	NANA1	NANA2	NENA1	NENE1	NENA2
20	20	-	32	-	56	20	45	100	-	-	-	-	5	60	-	-	-	-
25	25	-	40	-	68	25	56	110	-	-	-	-	6	60	-	-	-	-
35	38	-	54	-	82	40	86	150	-	-	-	-	6	70	-	-	-	-
38	42	-	58	-	94	45	98	170	-	-	-	-	8	80	-	-	-	-
42	50	-	68	-	104	45	100	170	-	-	-	-	10	80	-	-	-	-
50	55	-	78	-	126	55	121	206	-	-	-	-	11	96	-	-	-	-
60	65	55	88	77	138	55	121	206	170	160	114	124	11	96	60	50	4	14
70	75	65	102	90	156	65	141	246	200	190	134	144	11	116	70	60	4	14
80	85	75	117	104	179	75	164	286	233	220	154	167	14	136	83	70	4	17
85	90	80	123	112	191	80	175	300	246	232	164	178	15	140	86	72	4	18
90	100	85	132	119	210	80	175	300	251	233	166	184	15	140	91	73	6	24
105	110	90	147	128	225	90	200	340	281	263	186	204	20	160	101	83	6	24
115	120	100	163	145	265	100	223	370	309	288	206	227	23	170	109	88	6	27
135	135	115	184	160	305	135	297	520	-	-	-	-	27	250	-	-	-	-
136	135	-	180	-	300	135	293						23					
156	150	-	195	-	325	150	327						27					
166	170	-	225	-	350	165	361						31					
186	190	-	250	-	380	185	401						31					
206	210	-	275	-	420	200	437						37					
246	245	-	320	-	500	240	524						44					
286	290	-	383	-	567	280	612						52					
336	340	-	445	-	660	330	718		Accordi	ng to c	ustomei	r	58		Accordi	ng to c	ustome	r
138	135	-	180	-	300	135	293		sp	ecificati	ion		23		sp	ecificat	ion	
158	150	-	195	-	325	150	327						27					
168	170	-	225	-	350	165	361						31					
188	190	-	250	-	380	185	401						31					
208	210	-	275	-	420	200	437]					37]				
248	245	-	320	-	500	240	524					44]					
288	290	-	383	-	567	280	612	I			52							
338	340	-	445	-	660	330	718						58					

¹⁾ For dimensions of setscrews (dimension G and T) see table 4.



In case if a dimensional drawing was prepared for the coupling, the dimensions specified have to be primarily observed.

The operator of the machine should be provided with the dimensional drawing.

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1 Technical data

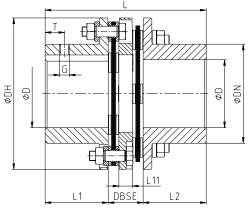
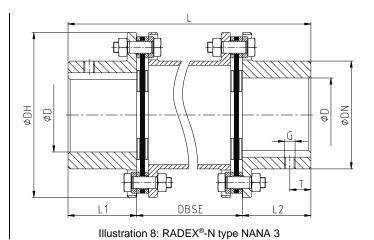


Illustration 7: RADEX®-N type NNZ



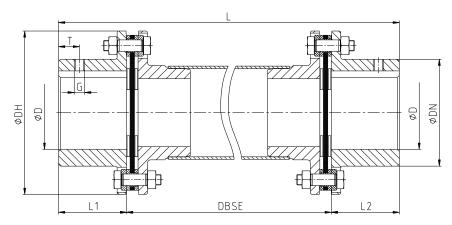


Illustration 9: RADEX®-N type NANA 4

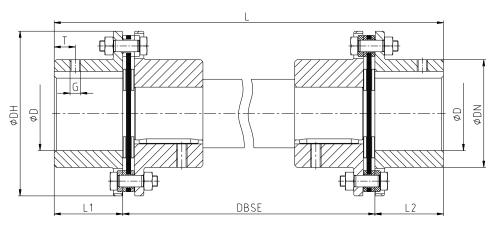


Illustration 10: RADEX®-N type NNW

Dimensions of couplings see table 2, sheet 6.

Please observe protection	Drawn:	2022-07-06 Pz/Wb	Replacing:	KTR-N dated 2021-05-04
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1 Technical data

Table 2: Types NNZ - NANA 3 - NANA 4 - NNW

	May finish have					Dimension	ns ¹⁾ [mm]				
Size	Max. finish bore					Gen	eral				
Size	[mm] D	DN	DH	L1, L2		L			DBSE		L11
	U	DIN	חט	LI, LZ	NNZ	NANA4	NNW	NNZ	NANA4	NNW	LII
20	20	32	56	20	58			18			8
25	25	40	68	25	70			20			8
35	38	54	82	40	102			22			10
38	42	58	94	45	118			28	o		12
42	50	68	104	45	124			34	ati		14
50	55	78	126	55	144			34	ific		12
60	65	88	138	55	144			34	၂		12
70	75	102	156	65	166			36	JS.	-	14
80	85	117	179	75	-			-	Jer		-
85	90	123	191	80	-			-	ğ		-
90	100	132	210	80	-			-	sns		-
105	110	147	225	90	-] ц	j	-] 0		-
115	120	163	265	100	-	l &	3	-	g t)	-
135	135	184	305	135	-] -)	-] iệ		-
136	135	180	300	135	-	+ C + C H C H C H	1	-	ģ		-
156	150	195	325	150	-		-	-	acc		-
166	170	225	350	165	-	<u> -</u>	;	-	L C		-
186	190	250	380	185	-		i	-	JSic		-
206	210	275	420	200	-	_	1	-	ner		-
246	245	320	500	240	-			-] je		-
286	290	383	567	280	-			-	aft		-
336	340	445	660	330	-			-	sha		-
138	135	180	300	135	-			-	te		-
158	150	195	325	150	-			-	dia		-
168	170	225	350	165	-			-	Je L		-
188	190	250	380	185	-			-	Intermediate shaft dimension according to customer specification		
208	210	275	420	200	-			-	<u>=</u>		-
248	245	320	500	240	-			-]		-
288	290	383	567	280	-			-]		-
338	340	445	660	330	-			-			-

¹⁾ For further dimensions of type NANA 3 (L and DBSE) see table 3. For dimensions of setscrews (dimension G and T) see table 4.

Table 3: Further dimensions of type NANA 3

Size	4	2		50			60		70			80			
L	190	230	210	250	290	210	250	290	230	270	310	250	290	330	400
DBSE	100	140	100	140	180	100	140	180	100	140	180	100	140	180	250

Size		8				90		105			11	135	
L	260	300	340	410	300	340	410	320	360	430	380	450	520
DBSE	100	140	180	250	140	180	250	140	180	250	180	250	250

I	Size	136	156	166	186	208	246	286	336	138	158	168	188	208	248	288	338
ſ	L							Ac one	oified by	, the our	otomor						
ľ	DBSE							As spe	ecified by	, the cus	storner						



In case if a dimensional drawing was prepared for the coupling, the dimensions specified have to be primarily observed.

The operator of the machine should be provided with the dimensional drawing.

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Technical data

Table 4: Dimensions of setscrews

Size	20	25	35	38	42	50	60	70	80	85	90	105	115
G	M5	M5	M6	M6	M8	M8	M8	M10	M10	M10	M12	M12	M12
Т	6	8	15	15	20	20	20	20	20	25	25	30	30
Number Z	1	1	1	1	1	1	1	1	1	1	1	1	1

Size	135	136	156	166	186	206	246	286	336	138	158	168	188	208	248	288	338
G	M20	M12	M12	M16	M16	M16	M20	M20	M24	M12	M12	M16	M16	M16	M20	M20	M24
Т		As specified by the customer															
Number Z	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Table 5: Torque and speed

Size		20	25	35	38	42	50	60	70	80	85
	T _{KN}	30	60	120	240	320	470	900	1300	1800	2600
Torque [Nm]	T _{K max}	60	120	240	480	640	940	1800	2600	3600	5200
	T_{KW}	15	30	60	120	160	235	450	650	900	1300
Max. speed r	[rpm]	20400	16800	13900	12000	11000	9000	8200	7300	6300	5900

Size		90	105	115	135	136	156	166	186	206	246
	T _{KN}	4600	5600	9900	13500	17500	25000	35000	42000	52500	90000
Torque [Nm]	T _{K max}	9200	11200	19800	27000	35000	50000	70000	84000	105000	180000
	T _{KW}	2300	2800	4950	6750	8750	12500	17500	21000	26250	45000
Max. speed r	rpm]	5400	5000	4300	3700	3800	3500	3300	3000	2800	2300

Size		286	336	138	158	168	188	208	248	288	338
	T_{KN}	150000	210000	23000	33000	45000	56000	70000	120000	200000	280000
Torque [Nm]	T _{K max}	300000	420000	46000	66000	90000	112000	140000	240000	400000	560000
	T _{KW}	75000	105000	11500	16500	22500	28000	35000	60000	100000	140000
Max. speed n	rpm]	2000	1800	3800	3500	3300	3000	2800	2300	2000	1800



RADEX®-N 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

General advice

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



The RADEX®-N 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.

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.

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2 Advice

2.2 Safety and advice symbols



Warning of potentially explosive atmospheres

This symbol indicates notes which may contribute to preventing bodily injuries or serious bodily injuries that may result in death caused by explosion.



Warning of personal injury

This symbol indicates notes which may contribute to preventing bodily injuries or serious bodily injuries that may result in death.



Warning of product damages

This symbol indicates notes which may contribute to preventing material or machine damage.



General advice

This symbol indicates notes which may contribute to preventing adverse results or conditions.



Warning of hot surfaces

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

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. 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".
- 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.
- Secure the coupling against accidental contact. 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 **RADEX**[®]-**N** described in here corresponds to the technical status at the time of printing of these operating/assembly instructions.

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2 Advice

2.5 Coupling selection



For a permanently 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 "RADEX®-N").

Please observe the critical whirling speed with types NANA 4 and NNW.

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

Make sure that the technical data regarding torque refer to the laminae set only. The transmittable torque of the shaft-hub-connection must be reviewed by the customer and is subject to his responsibility.



If used in potentially explosive atmospheres clamping set connections and shrink fit connections (transverse interference fits) without feather key must be selected in that there is a minimum safety factor of s=2.0 between the peak torque of the machine including all operating parameters and the frictional locking torque of the shaft-hub-connection. The responsibility for the shaft-hub-connection is subject to the customer. Please review the connection carefully.

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.

2.6 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 couplings are supplied in preserved condition and can be stored in a dry and roofed place for 6 - 9 months.



Humid storage rooms are not suitable.

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 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 individual parts. Before assembly the coupling has to be inspected for completeness.

4.1 Components of the coupling

Components of RADEX®-N type NN

Component	Quantity	Description	Component	Quantity	Description
1	2	Flange hub 1)	5	see table 6	Spacer sleeve
2	1	Laminae set	6	see table 6	Washer
3	-	Spacer	7	see table 6	Hexagon nut/clamping nut
4	see table 6	Dowel screw	8	2	Setscrew DIN EN ISO 4029

1) Design as clamping ring hub (frictionally engaged shaft-hub-connection) on request

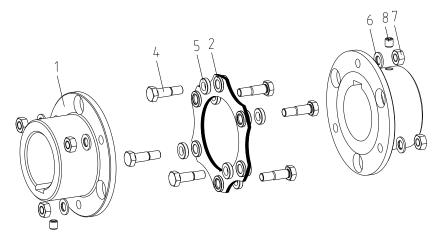


Illustration 11: RADEX®-N type NN

Components of RADEX®-N type NANA 1 to 3 - NENA 1 and 2 - NENE 1

Component	Quantity	Description	Component	Quantity	Description
1	2	Flange hub 1)	5	see table 6	Spacer sleeve
2	2	Laminae set	6	see table 6	Washer
3	1	Spacer	7	see table 6	Hexagon nut/clamping nut
4	see table 6	Dowel screw	8	2	Setscrew DIN EN ISO 4029

 ${\bf 1)} \quad {\bf Design} \ {\bf as} \ {\bf clamping} \ {\bf ring} \ {\bf hub} \ ({\bf frictionally} \ {\bf engaged} \ {\bf shaft-hub-connection}) \ {\bf on} \ {\bf request}$

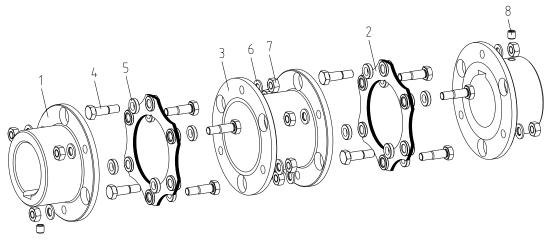


Illustration 12: RADEX®-N type NANA 1 (example)

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4 Assembly

4.1 Components of the coupling

Components of RADEX®-N type NNZ

Component	Quantity	Description	Component	Quantity	Description
1	2	Flange hub 1)	5	see table 6	Spacer sleeve
2	2	Laminae set	6	see table 6	Washer
3	1	Spacer	7	see table 6	Hexagon nut/clamping nut
4	see table 6	Dowel screw	8	2	Setscrew DIN EN ISO 4029

1) Design as clamping ring hub (frictionally engaged shaft-hub-connection) on request

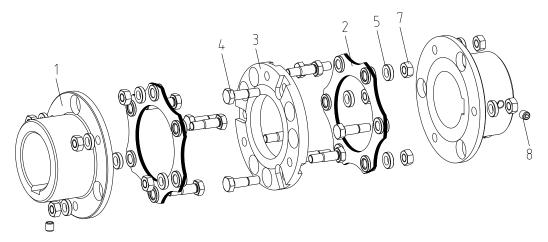


Illustration 13: RADEX®-N type NNZ

Components of RADEX®-N type NANA 4

Component	Quantity	Description	Component	Quantity	Description
1	2	Flange hub 1)	5	see table 6	Spacer sleeve
2	2	Laminae set	6	see table 6	Washer
2	1	Intermediate pipe with 2	7	see table 6	Hexagon nut/clamping nut
3	Į	flange hubs spec welded	8	2	Setscrew DIN EN ISO 4029
4	see table 6	Dowel screw			

1) Design as clamping ring hub (frictionally engaged shaft-hub-connection) on request

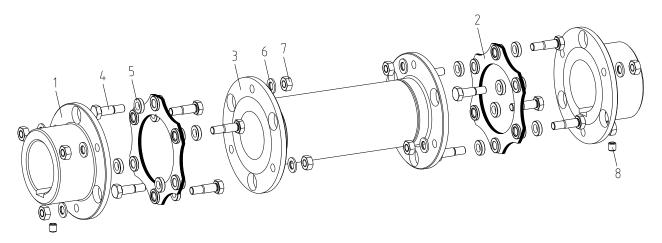


Illustration 14: RADEX®-N type NANA 4

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4 Assembly

4.1 Components of the coupling

Components of RADEX®-N type NNW

Component	Quantity	Description	Component	Quantity	Description
1	4	Flange hub 1)	5	see table 6	Spacer sleeve
2	2	Laminae set	6	see table 6	Washer
2	1	Intermediate shaft with 2	7	see table 6	Hexagon nut/clamping nut
3	I	feather keys	8	2	Setscrew DIN EN ISO 4029
4	see table 6	Dowel screw			

1) Design as clamping ring hub (frictionally engaged shaft-hub-connection) on request

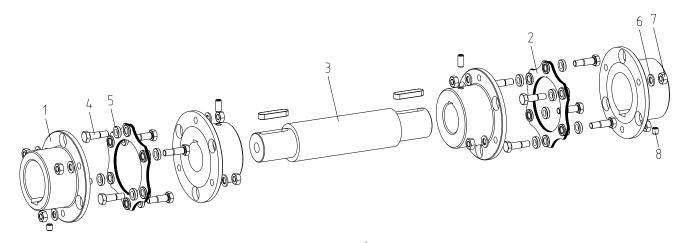


Illustration 15: RADEX®-N type NNW

Table 6: Number of single parts

Size	20	25	35	38	42	50	60	70	80	85
Dowel screw (item 4) 1)	4	4	4	4	4	4	6	6	6	6
Spacer sleeve (item 5) 1)	4	4	4	4	4	4	6	6	-	-
Washer (item 6) 1) 2)	-	-	-	-	-	-	-	-	6	6
Hexagon nut/Clamping nut (item 7) 1)	4	4	4	4	4	4	6	6	6	6

Size	90	105	115	135	136	156	166	186	206	246
Dowel screw (item 4) 1)	6	6	6	6	6	6	6	6	6	6
Spacer sleeve (item 5) 1)	-	-	-	-	-	-	-	-	-	-
Washer (item 6) 1) 2)	6	6	6	6	-	6	-	-	-	-
Hexagon nut/Clamping nut (item 7) 1)	6	6	6	6	6	6	6	6	6	6

Size	286	336	138	158	168	188	208	248	288	338
Dowel screw (item 4) 1)	6	6	8	8	8	8	8	8	8	8
Spacer sleeve (item 5) 1)	-	-	-	-	-	-	-	-	-	-
Washer (item 6) 1) 2)	-	-	-	8	-	-	•	-	-	-
Hexagon nut/Clamping nut (item 7) 1)	6	6	8	8	8	8	8	8	8	8

- 1) Number each laminae set
- 2) With size 156 and 158 washer below the screw head

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4 Assembly

4.2 Advice for finish bore



The maximum permissible bore diameters D (see 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 flange hubs machined by the customer have to observe concentricity resp. axial runout (see illustration 16).
- Make absolutely sure to observe the figures for ØD.
- · Carefully align the flange hubs when the finish bores are drilled.
- Provide for a setscrew according to DIN EN ISO 4029 with a cup point or an end plate to fasten the flange hubs axially.

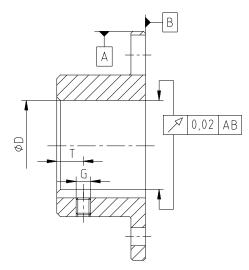


Illustration 16: Concentricity and axial runout



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 ①.

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

Basically the company KTR Systems GmbH 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 respective remachining performed on the product of KTR Systems GmbH.

Table 7: Setscrew DIN EN ISO 4029

Size	20	25	35	38	42	50	60	70	80	85	90	105	115
G	M5	M5	M6	M6	M8	M8	M8	M10	M10	M10	M12	M12	M12
Т	6	8	15	15	20	20	20	20	20	25	25	30	30
Number Z	1	1	1	1	1	1	1	1	1	1	1	1	1
Tightening torque T _A [Nm]	2	2	4.8	4.8	10	10	10	17	17	17	40	40	40

Size	135	136	156	166	186	206	246	286	336	138	158	168	188	208	248	288	338
G	M20	M12	M12	M16	M16	M16	M20	M20	M24	M12	M12	M16	M16	M16	M20	M20	M24
Т							As s	specifie	d by th	e custo	mer						
Number Z	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Tightening torque T _A [Nm]	140	40	40	80	80	80	140	140	240	40	40	80	80	80	140	140	240

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4 Assembly

4.3 Assembly/disassembly of flange hubs



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



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



Pay attention to the ignition risk in potentially explosive atmospheres!



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

Please wear safety gloves.



With the assembly please make sure that the distance dimension DBSE (see table 1 to 3) 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).

For the axial alignment of the coupling the distance dimension DBSE (see table 1 to 3) is decisive. In order to set the right DBSE dimension you should proceed as follows:

- Mount the flange hubs on the shaft of driving and driven side (see illustration 17).
- The internal sides of the flange hubs must be flush with the front sides of the shafts (see illustration 17).
- Shift the power packs in axial direction until the distance dimension DBSE is achieved (see table 1 to 3).
- Fasten the flange hubs by tightening the setscrews DIN EN ISO 4029 with a cup point (tightening torque see table 7).

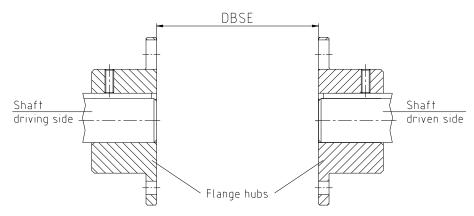


Illustration 17: Assembly of flange hubs

Disassembly:



Driving components falling down may cause injury to persons or damage on the machine. Secure the driving components before disassembly.

- Release the setscrew in the hub and unscrew it by 2 3 pitches.
- Pull the hub from the shaft.

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Assembly

Assembly/disassembly of clamping ring hubs



The stiffness and dimensions of the shafts (here specifically hollow shafts) have to be designed in a way that sufficient safety against plastic deformation is provided for (if necessary, consult with company KTR).



We recommend to inspect bores and shafts for dimensional accuracy before assembly.



With the assembly please make sure that the distance dimension DBSE (see table 1 to 3) 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).

For the axial alignment of the coupling the distance dimension DBSE (see table 1 to 3) is decisive. In order to set the right DBSE dimension you should proceed as follows:

Clean and degrease the hub bores and shafts, afterwards lubricate with a thin oil (e. g. Castrol 4 in 1 or Klüber Quietsch-Ex).



Oils and greases containing molybdenum disulfide or other high-pressure additives as well as internal lubricants must not be used.

- Lightly unscrew the clamping screws and pull the clamping ring from the clamping ring hub only marginally to make sure the clamping ring is fitted loosely.
- Mount the clamping ring hubs on the shaft of driving and driven side (see illustration 18).
- The internal sides of the clamping ring hubs must be flush with the front sides of the shafts (see illustration 18).
- Shift the power packs in axial direction until the distance dimension DBSE is achieved (see table 1 to 3).
- Tighten the clamping screws evenly crosswise first with 1/3 and afterwards 2/3 of the full tightening torque (see table 8). Afterwards tighten the clamping screws crosswise at the full tightening torque. The process needs to be repeated until the tightening torque has been achieved with all screws.

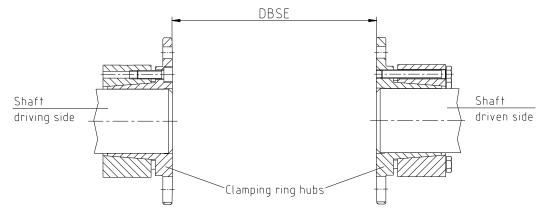


Illustration 18: Assembly of clamping ring hubs

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4 Assembly

4.4 Assembly/disassembly of clamping ring hubs

Table 8: Tightening torques of clamping screws

Size	35	38	42	50	60	70	80	85	90	105	115	135
Clamping screws	M5	M6	M6	M8	M8	M8	M10	M12	M12	M12	M12	M16
Tightening torque T _A [Nm]	8.5	14	14	35	35	35	69	120	120	120	120	295



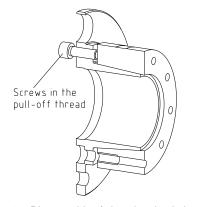
Having started up the coupling, the coupling has to be inspected for damages at regular maintenance intervals and it has to be replaced, if necessary.

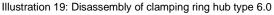
Disassembly:



Driving components falling down may cause injury to persons or damage on the machine. Secure the driving components before disassembly.

- Unscrew the clamping screws evenly one after another. During each revolution every screw may only be unscrewed by half a turn. Unscrew all clamping screws by 3 4 pitches.
- Remove the screws located next to the extraction threads and screw them into the intended extraction threads until they fit.
- The clamping ring is released by tightening the screws in the extraction threads evenly gradually and crosswise.





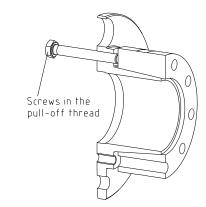


Illustration 20: Disassembly of clamping ring hub type 6.5

 Before re-assembly the hub bores and shafts have to be cleaned and afterwards lubricated with a thin oil (e. g. Castrol 4 in 1 or Klüber Quietsch-Ex). The same applies for the taper surfaces of clamping ring hub and clamping ring.



If these hints are not observed, the operation of the clamping ring hub may be affected.

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4 Assembly

4.5 General advice for assembly of spacer

If the coupling is supplied with a transportation lock (optionally), the following has to be observed:



The spacer sleeves (steel) have to be removed for further assembly and operation (see illustration 21).

• Disassemble the transport screws and spacer sleeves.

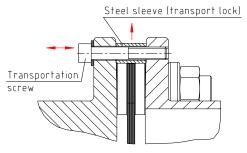


Illustration 21: Transport lock

If the coupling is supplied with limitation for axial clearance (optionally), the following has to be observed:

- Before mounting the spacer, remove the screws and sleeves for limitation of axial clearance.
- Having mounted the spacer completely, re-assemble the screws and sleeves for limitation of axial clearance (see illustration 22).
 Please observe the axial clearance S as per dimension sheet.
- Secure the screws against working loose by means of a highstrength adhesive (e. g. omniFIT 230M or Loctite 2701).

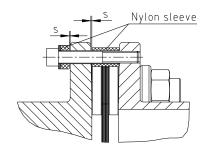


Illustration 22: Limitation of axial clearance



Please consider whether a limitation for axial clearance with two nylon sleeves per screw or one transport lock with one steel sleeve per screw was installed (see illustration 21 and 22).

Marking of balancing (optional)

• With the assembly of the spacer observe correct alignment of the marking for balancing. The marking for balancing X (Y) of the hub, as an example, must be flush with the marking for balancing X (Y) of the spacer (see illustration 23).

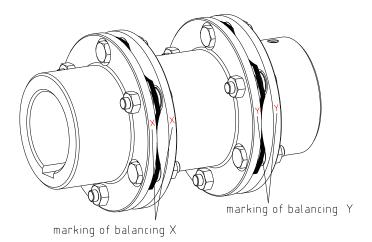


Illustration 23: Alignment of spacer

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4 Assembly

4.6 Vertical assembly/disassembly



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).

For vertical alignment of the coupling the distance dimension DBSE (see table 1 to 3) is decisive. In order to set the right DBSE dimension you should proceed as follows:

- Mount the flange hubs on the shaft of driving and driven side. Make sure the flange hub with the disk for vertical support is at the bottom (see illustration 24 and 25 as an alternative).
- The internal side of the flange hub on top or centering surface of the flange hub at the bottom must be flush with the front sides of the shafts (see illustration 24 and 25 as an alternative).
- Shift the power packs in axial direction until the distance dimension DBSE is achieved (see table 1 to 3).
- Fasten the flange hubs by tightening the setscrews DIN EN ISO 4029 with a cup point (tightening torque see table 7).



With the assembly of a spacer make sure the flange hub with the disk for vertical support is at the bottom.

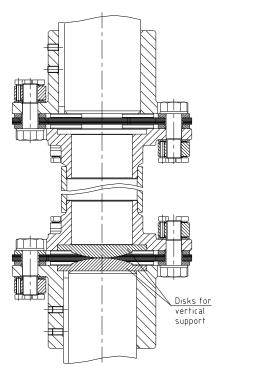


Illustration 24: Vertical assembly (preferred assembly version)

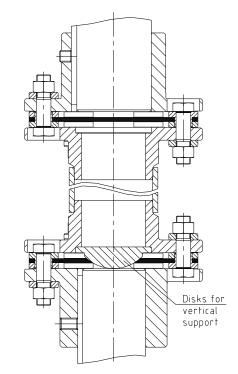


Illustration 25: Vertical assembly (as an alternative)

Disassembly:



Driving components falling down may cause injury to persons or damage on the machine. Secure the driving components before disassembly.

- Release the setscrew in the hub and unscrew it by 2 3 pitches.
- · Pull the hub from the shaft.

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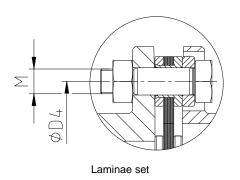
4 Assembly

4.7 Assembly/disassembly of laminae sets, RADEX®-N size 20 - 135



With the assembly make sure that the laminae sets are installed free from distortion in axial direction. Disregarding this advice may cause damage to the coupling.

- Clean and degrease the contact surfaces of screw connections on the flange hub, laminae set and spacer.
- Assemble the laminae sets and the spacer (see illustration 26 respectively 27). With type NN only 1 laminae set is used (no spacer).
- Hand-tighten the components for the time being, the dowel screws to be assembled reciprocally (see illustration 26 resprectively 27).
- Tighten the hexagon nuts one after the other and with several revolutions to the tightening torque specified in table 11. Protect the dowel screw from rotating.



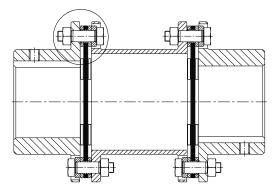
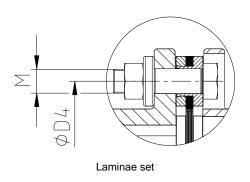


Illustration 26: Assembly of laminae sets, RADEX®-N size 20 - 70



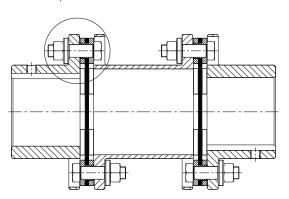


Illustration 27: Assembly of laminae sets, RADEX®-N size 80 - 135

Table 9:

Size	20	25	35	38	42	50	60	70	80	85	90	105	115	135
Pitch circle ØD4	44	53	67	75	85	100	112	128	148	158	170	185	214	240

Disassembly:



Driving components falling down may cause injury to persons or damage on the machine. Secure the driving components before disassembly.

- Unscrew the hexagon nuts and remove along with the dowel screws and disks.
- · Take out the laminae sets.

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4 Assembly

4.8 Assembly/disassembly of laminae sets, RADEX®-N size 136 - 336 and 138 - 338



With the assembly make sure that the laminae sets are installed free from distortion in axial direction. Disregarding this advice may cause damage to the coupling.

- Clean and degrease the contact surfaces of screw connections on the flange hub, laminae set and spacer as well as the threads of the clamping nut and dowel screw.
- Insert the laminae sets and the spacer (see illustration 28). With type NN only 1 laminae set is used (no spacer).
- Hand-tighten the components for the time being, the dowel screws to be assembled reciprocally (see illustration 28). With size 156 and 158 use a washer under the screw head.
- The pressure screws in the clamping nut must not protrude on the pressure side (see illustration 29).



All components must be superimposed without any gap.

- Afterwards turn back the clamping nut until there is a gap of 1 2 mm (see illustration 29).
- Hand-tighten the pressure screws marked in illustration 31.
- Tighten these screws (see illustration 31) at half the tightening torque according to table 11 and afterwards at the full tightening torque according to table 11.
- Now tighten all pressure screws one after another and with several revolutions until all screws have achieved the full tightening torque (see illustration 32).



The pressure screws must not bear on the heads after assembly (see illustration 30).

All clamping nuts have to be mounted as per the aforementioned process.

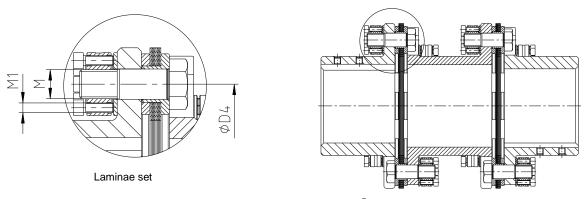
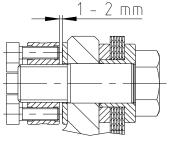


Illustration 28: Assembly of the laminae sets, RADEX®-N size 136 - 336 and 138 - 338





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Assembly

4.8 Assembly/disassembly of laminae sets, RADEX®-N size 136 - 336 and 138 - 338

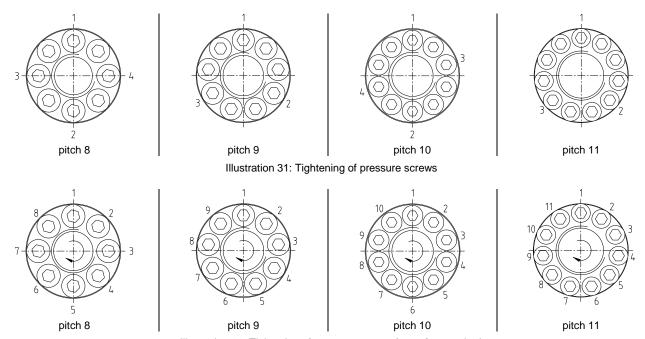


Illustration 32: Tightening of pressure screws (one after another)

Table 10:

Size	136 / 138	156 / 158	166 / 168	186 / 188	206 / 208	246 / 248	286 / 288	336 / 338
Pitch circle ØD4	240	260	290	320	350	410	480	550

Disassembly:



Driving components falling down may cause injury to persons or damage on the machine. Secure the driving components before disassembly.

• Untighten the pressure screws of the clamping nut with several revolutions each by a quarter revolution until all screws are released from tension.



Do not relieve and unscrew individual pressure screws completely in any case.

- Unscrew the clamping nuts and remove the washers.
- Take out the laminae sets.

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4 Assembly

4.9 Tightening torques of screw connections on the laminae set

Table 11: Tightening torque of screw connections on the laminae set

Size	20	25	35	38	42	50	60
Dimension M [mm]	M5	M6	M6	M8	M8	M10	M8
Tightening torque T _A [Nm]	8.5	14	14	35	35	69	33

	Size	70	80	85	90	105	115	135
	Dimension M1 [mm]	M10	M10	M12	M16	M16	M20	M24
ſ	Tightening torque T _A [Nm]	65	65	115	280	280	550	900

Size	136 / 138	156 / 158	166 / 168	186 / 188	206 / 208	246 / 248	286 / 288	336 / 338
Dimension M [mm]	M24	M27	M27	M27	M30	M36	M42	M48
Dimension M1 [mm]	8 x M8	9 x M8	9 x M8	9 x M8	8 x M10	8 x M12	10 x M12	11 x M12
Pressure screw M1 Tightening torque T _A [Nm]	30	30	30	30	60	105	105	105



Having started up the coupling, the coupling has to be inspected for damages at regular maintenance intervals and it has to be replaced, if necessary.

4.10 Displacements - alignment of the coupling

The displacement figures specified in table 12 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 hazards with the use in potentially explosive atmospheres, the shaft ends must be accurately aligned. Please absolutely observe the displacement figures specified (see table 12). 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 12) are permissible.

Please note:

- The displacement figures specified in table 12 are maximum figures which must not arise in parallel. If axial, radial and angular displacement arises at the same time, these values must be reduced (see illustration 34).
- Please inspect with a dial gauge, ruler or feeler gauge whether the permissible displacement figures specified in table 12 can be observed.

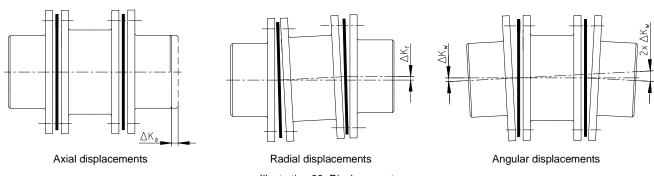


Illustration 33: Displacements

Please observe protection	Drawn:	2022-07-06 Pz/Wb	Replacing:	KTR-N dated 2021-05-04
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4 Assembly

4.10 Displacements - alignment of the couplings

Examples of the displacement combinations specified in illustration 34:

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 34: Combinations of displacement

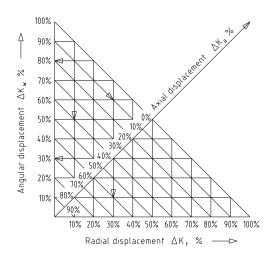


Table 12: Displacement figures

Size		placement [mm]		Radial displacemen ΔK_r [mm]	t	Angular displacement ΔK_w [degree]
Size	Type NN	Type NANA1, NANA2	Type NN	Type NANA1	Type NANA2	Type NN, NANA1, NANA2
20	0.60	1.2	-	1.0	0.2	1.0
25	0.80	1.6	=	1.0	0.2	1.0
35	1.00	2.0	=	1.1	0.3	1.0
38	1.20	2.4	=	1.2	0.3	1.0
42	1.40	2.8	=	1.2	0.4	1.0
50	1.60	3.2	=	1.5	0.4	1.0
60	1.00	2.0	-	1.5	0.8	1.0
70	1.10	2.2	-	1.8	1.0	1.0
80	1.30	2.6	-	2.1	1.2	1.0
85	1.30	2.6	-	2.2	1.2	1.0
90	1.00	2.0	-	2.2	1.1	1.0
105	1.20	2.4	-	2.4	1.4	1.0
115	1.40	2.8	-	2.5	1.5	1.0
135	1.75	3.5	-	3.8	-	1.0
136	1.85	3.7	-			0.7
156	2.10	4.2	-			0.7
166	2.25	4.5	-			0.7
186	2.40	4.8	-			0.7
206	2.60	5.2	=	E ₁)	- E ₁)	0.7
246	3.00	6.0	=	- 6	ا ب	0.7
286	3.35	6.7	=		Ш	0.7
336	3.75	7.5	=	×	×	0.7
138	1.30	2.6	-] \	 	0.5
158	1.40	2.8	=	= tan∆K _w x (E ₂	än	0.5
168	1.50	3.0	-]		0.5
188	1.60	3.2	-	Å	∆K, = tan∆K _w x (E₃	0.5
208	1.75	3.5	-	1		0.5
248	2.00	4.0	-	1		0.5
288	2.25	4.5	-	1		0.5
338	2.50	5.0	-	1		0.5

¹⁾ each laminae set

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5 Start-up



Before start-up make absolutely sure that the transport lock (see illustration 21) has been removed.

Before start-up of the coupling, inspect the tightening of the setscrews in the flange hubs, the alignment and the distance dimension DBSE 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 flange 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 directives 2014/34/EU and SI 2016 No. 1107 and must protect against

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

The coupling protection is not part of KTR's scope of delivery and is the customer's responsibility. It must have sufficient distance to the rotating components to avoid contact safely. We recommend a minimum distance of 15 mm from the outside diameter DH of the coupling.

Please check if a proper enclosure (ignition protection, coupling protection, contact protection) has been mounted and the operation of the coupling is not affected by the enclosure. The same applies for test runs and rotational direction inspections.

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.

Please observe protection	Drawn:	2022-07-06 Pz/Wb	Replacing:	KTR-N dated 2021-05-04
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5 Start-up

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 µm electrostatic load does not have to be expected. If thicker paintings resp. coatings up to a layer thickness of a maximum of 2.0 mm are applied, the couplings are not permissible for gases and vapours of category IIC in potentially explosive areas, but only for gases and vapours of category IIA and IIB.

This 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. Basically painting of the laminae set is not admitted to ensure an equipotential bonding.

In addition, make sure that the marking of the coupling remains legible.

6 Breakdowns, causes and elimination

The below-mentioned failures can result in improper use of the **RADEX®-N** coupling. 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.



The coupling can become a source of ignition by improper use. Directive 2014/34/EU and UK directive SI 2016 No. 1107 require special care by the manufacturer and the user.

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.
- When 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 laminae set is inserted in the coupling.
- No original KTR components (purchased parts) are used.
- Maintenance intervals are not observed.



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6 Breakdowns, causes and elimination

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, fracture 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 laminae set	lgnition risk due to sparking	Set the unit out of operation Inspect coupling components and replace coupling components that have been damaged Tighten the dowel screws until the specified tightening torque is reached 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
Fracture of steel laminae set	Fracture of steel laminae set due to high impact energy/overload Operating parameters do not meet with the performance of the coupling Operating error of the unit	Ignition risk due to sparking	 Set the unit out of operation Disassemble the coupling and remove remainders of the steel laminae sets Inspect coupling components and replace coupling components that have been damaged Insert steel laminae sets, assemble coupling components Find out the reason for overload Set the unit out of operation Review the operating parameters and select a bigger coupling (consider mounting space) Assemble new coupling size Inspect alignment Set the unit out of operation Disassemble the coupling and remove remainders of the steel laminae sets Inspect coupling components and replace coupling components that have been damaged Insert steel laminae sets, assemble coupling components Instruct and train the service staff
Cracks in/fracture of the steel laminae sets/fastening screws	Vibrations of drive		Set the unit out of operation Disassemble the coupling and remove remainders of the steel laminae sets Inspect coupling components and replace coupling components that have been damaged Insert steel laminae sets, assemble coupling components Inspect alignment, adjust if necessary Find out the reason for vibrations



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

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7 Disposal

In respect of environmental protection we would ask you to dispose of the packaging resp. products on termination of their service life in accordance with the legal regulations resp. standards that apply. All coupling components consist of 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.

RADEX[®]-**N** is a low-maintenance coupling. We recommend to perform a visual inspection on the coupling **at least once a year**. Pay special attention to the condition of the laminae 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 laminae 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.



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

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.

KTR Systems GmbH

Carl-Zeiss-Str. 25 D-48432 Rheine

Phone: +49 5971 798-0 E-mail: mail@ktr.com

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10 Enclosure A

Advice and instructions regarding the use in



potentially explosive atmospheres

Types available:

NN, NANA 1 to 4, NENA 1 and 2, NENE 1, NNZ, NNW and MK each with flange hubs and each with laminae sets type with 8 pins and closed circular laminae as well as assembly with KTR clamping nuts.



Conditions of operation in potentially explosive atmospheres

The RADEX®-N couplings are suitable for the use according to directives 2014/34/EU and SI 2016 No. 1107.

- Protection against hazards arising from lightning must follow the lightning protection concept of the machine or plant. The relevant regulations and policy for lightning protection must be observed.
- The equipotential bonding of the couplings is made by metal contact between coupling hub and shaft. This equipotential bonding must not be affected.

1. Industry (with the exception of mining)

- Equipment group II of category 2 and 3 (coupling is not approved/not 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 not approved/not suitable for zone 20)
- Explosion group IIC (gases, fogs, vapours) (explosion groups IIA and IIB are included in IIC) and explosion group IIIC (dusts) (explosion groups IIIA and IIIB are included in IIIC)

Temperature class:

Temperature class	Ambient or operating temperature T _a 1)	Max. surface temperature 2)
T2	-40 °C to +230 °C	+250 °C
Т3	-40 °C to +175 °C	+195 °C
T4	-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).
- 2) 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 approved/not</u> suitable for equipment group M1*). Permissible ambient temperature -40 °C to +130 °C.

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10 Enclosure A

Advice and instructions regarding the use in



potentially explosive atmospheres

10.2 Inspection intervals for couplings in potentially explosive atmospheres

Equipment category	Inspection intervals
3G 3D	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 standard operation which has to be taken as a basis of the ignition risk analysis the 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.
M2 2G 2D No gases and vapours of explosion group IIC	An inspection of the torsional backlash and a visual inspection of the laminae sets must be performed after 3,000 operating hours for the first time, at the latest 6 months after start-up of the coupling. If you note insignificant or no wear on the lamina sets upon this initial inspection, further 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. If you note significant wear during the initial inspection so that it would be recommendable to replace the laminae 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.
2G 2D Gases and vapours of explosion group IIC	An inspection of the torsional backlash and a visual inspection of the laminae sets must be performed after 2,000 operating hours for the first time, at the latest 3 months after start-up of the coupling. If you note insignificant or no wear on the lamina sets upon this initial inspection, further inspections can each be performed after 4,000 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 laminae 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.

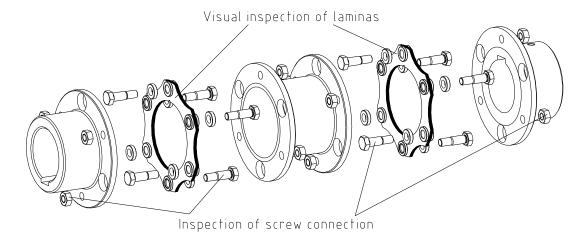


Illustration 35: RADEX®-N type NANA 1

During the visual inspection the laminae sets must be inspected for cracks and screws working loose. Screws working loose must be tightened at the screw tightening torque indicated (see chapter 4.9). Regardless of the inspection intervals those laminae sets having cracks have to be replaced by a new laminae set immediately.

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Enclosure A 10

Advice and instructions regarding the use in



potentially explosive atmospheres



marking of coupling for potentially explosive atmospheres

The explosion protection marking of the RADEX®-N coupling is applied on the outer sheath or on the front side. The laminae sets are not marked.

For the complete marking refer to the operating/assembly instructions and/or the delivery note/package.

Marking is as follows:

Marking for unpainted res. coated or painted couplings with a layer thickness < 200 µm

```
-40 °C ≤ T_a ≤ +130 °C
            I M2
                    Ex h
                                                              Mb
                             IIC
                                              ... T2
            II 2G
                                   T6
                    Ex h
                                                              Gb
                                              ... T250 °C Db
                            IIIC T80 °C
                    Ex h
<Year>
                    -40 \,^{\circ}\text{C} \le T_a \le +60 \,^{\circ}\text{C}
                                               ... +230 °C
KTR Systems GmbH, Carl-Zeiss-Str. 25, D-48432 Rheine
```

Marking for painted couplings with a layer thickness of 0.2 mm to max. 2.0 mm

```
Ex h
                                                                               -40 °C ≤ T<sub>a</sub> ≤ +130 °C
            I M2
                                                               Mb
                            IIB T6
            II 2G
                   Ex h
                                               ... T2
                                                               Gb
                                             ... T250 °C
                            IIIC T80 °C
                    Ex h
                                                                     Χ
                    -40 \, ^{\circ}\text{C} \le T_a \le +60 \, ^{\circ}\text{C}
                                               ... +230 °C
KTR Systems GmbH, Carl-Zeiss-Str. 25, D-48432 Rheine
```

Short marking:

(A short marking is only made if not possible differently for reason of space or functioning.)

RADEX®-N <Year>









Short marking:





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

Complete marking:





II 2G c IIC T6, T5, T4, T3 resp. T2 -30 °C \leq Ta \leq +75 °C, +90 °C, +125 °C, +190 °C resp. +280 °C II 2D c T 110 °C -30 °C \leq T_a \leq +100 °C/I M2 c -30 °C \leq T_a \leq +140 °C



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10 Enclosure A

Advice and instructions regarding the use in



potentially explosive atmospheres



marking of coupling for potentially explosive atmospheres

Comments on marking

Equipment group I	Mining
Equipment group II	Non-mining
Equipment category 2G	Equipment ensuring a high level of safety, suitable for zone 1
Equipment category 2D	Equipment ensuring a high level of safety, suitable for zone 21
Equipment category M2	Equipment ensuring a high level of safety must be able to be switched off
	when an explosive atmosphere occurs
D	Dust
G	Gases and vapours
Ex h	Nonelectrical explosion protection
IIB	Gases and vapours of class IIB (including IIA)
IIC	Gases and vapours of class IIC (including IIA and IIB)
IIIC	Electrically conductive dusts of class IIIC (including IIIA and IIIB)
T6 T2	Temperature class to be considered, depending on the ambient temperature
T80 °C T250 °C	Maximum surface temperature to be considered, depending on the ambient
	temperature
$-40 ^{\circ}\text{C} \le T_a \le +60 ^{\circ}\text{C} \dots +230 ^{\circ}\text{C},$	Permissible ambient temperature from -40 °C to +60 °C resp.
-40 °C ≤ T _a ≤ $+230$ °C or	-40 °C to +230 °C or -40 °C to +130 °C
-40 °C ≤ T _a ≤ +130 °C	
Gb, Db, Mb	Equipment protection level, analogous to the equipment category
X	For a safe use of the couplings particular conditions apply

If the symbol a was punched in addition to marking a, 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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Enclosure A

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10.4 EU Declaration of conformity

EU Declaration of Conformity resp. Certificate of Conformity

corresponding to EU directive 2014/34/EU dated 26 February 2014 and to the legal regulations adopted for its implementation

The manufacturer - KTR Systems GmbH, Carl-Zeiss-Str. 25, D-48432 Rheine - states that the

RADEX®-N Steel Laminae Couplings

in an explosion-proof design described in these assembly instructions are equipment resp. components corresponding to article 2, 1, of directive 2014/34/EU and comply with the general safety and health specifications according to enclosure II of directive 2014/34/EU. This declaration of conformity is issued under the sole responsibility of the manufacturers KTR Systems GmbH.

The coupling described in here complies with the specifications of the following standards/rules:

EN ISO 80079-36:2016-12 EN ISO 80079-37:2016-12 EN ISO/IEC 80079-38:2017-10 IEC/TS 60079-32-1:2020-01-24

The RADEX®-N is in accordance with the specifications of the directive 2014/34/EU.

According to article 13 (1) b) ii) of directive 2014/34/EU the technical documentation is deposited with the notified body (type examination certificate IBExU02ATEXB004_05 X):

IBExU

Institut für Sicherheitstechnik GmbH Identification number: 0637

Fuchsmühlenweg 7

09599 Freiberg

Rheine,

2022-07-06

Place Date Reinhard Wibbeling

Engineering/R&D

Reiner Banemann **Product Manager**

Please observe protection	Drawn:	2022-07-06 Pz/Wb	Replacing:	KTR-N dated 2021-05-04
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10 Enclosure A

Advice and instructions regarding the use in



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10.5 UK Declaration of conformity

UK Declaration of Conformity resp. Certificate of Conformity

corresponding to UK directive SI 2016 No. 1107 dated 26 February 2014 and to the legal provisions adopted for its implementation

The manufacturer - KTR Systems GmbH, Carl-Zeiss-Str. 25, D-48432 Rheine - states that the

RADEX®-N Steel Laminae Couplings

in an explosion-proof design described in these assembly instructions are equipment resp. components corresponding to directive SI 2016 No. 1107 and comply with the general safety and health requirements according to directive SI 2016 No. 1107.

This declaration of conformity resp. certificate of conformity is issued under the sole responsibility of the manufacturer KTR Systems GmbH.

The coupling described in here complies with the specifications of the following standards/rules:

EN ISO 80079-36:2016-12 EN ISO 80079-37:2016-12 EN ISO/IEC 80079-38:2017-10 IEC/TS 60079-32-1:2020-01-24

The RADEX®-N is in accordance with the specifications respectively the applicable specifications of directive SI 2016 No. 1107.

According to directive SI 2016 No. 1107 the technical documentation is deposited with the notified body:

Eurofins CML

Identification number: 2503

Rheine,

2022-07-06

Place Date

Reinhard Wibbeling

Engineering/R&D

Reiner Banemann Product Manager

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note ISO 16016.	Verified:	2022-08-08 Pz	Replaced by:	