

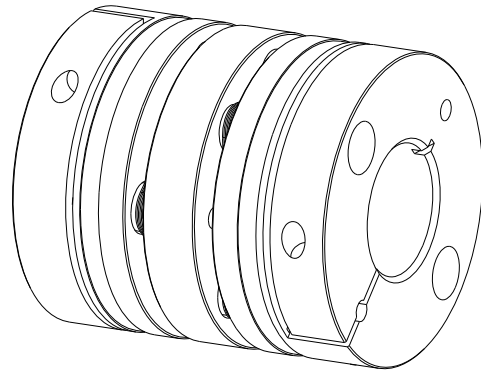


RADEX®-NC

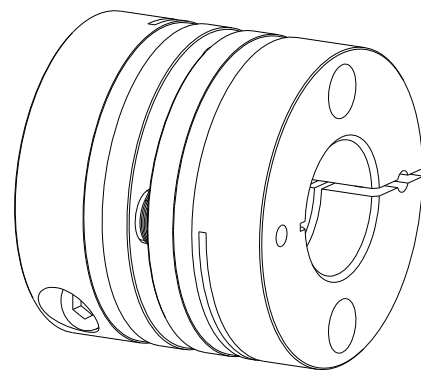
Backlash-free, torsionally stiff and
maintenance-free steel laminae
couplings

type DK and EK along with
combinations

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



Type DK



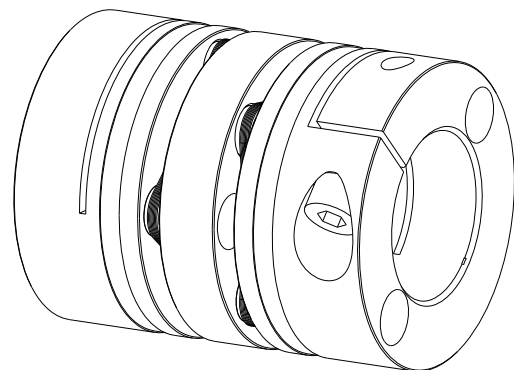
Type EK

RADEX®-NC HT

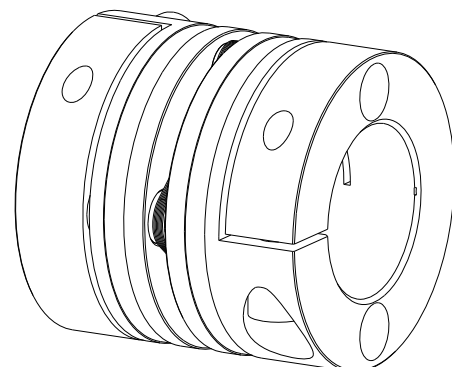
Backlash-free, torsionally stiff and
maintenance-free steel laminae
couplings

type DK and EK along with
combinations


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



Type DK



Type EK

 KTR-Group	RADEX®-NC RADEX®-NC HT Operating/Assembly instructions	KTR-N 47210 EN Sheet: 2 of 37 Edition: 11
---------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	----------------------------------------------------------------------

The **RADEX®-NC** and **RADEX®-NC HT** servo laminae coupling is a backlash-free, torsionally stiff and flexible steel laminae coupling. It was developed specifically for applications in servo technology to meet the demands for high torsional stiffness (e. g. with use on indexing tables, planetary and worm gears, ball spindles, etc.).

Table of contents





1	Technical data	4
1.1	Types of hubs	4
1.2	Coupling dimensions	5
2	Advice	13
2.1	General advice	13
2.2	Safety and advice symbols	13
2.3	General hazard warnings	13
2.4	Intended use	14
2.5	Coupling selection	14
2.6	Reference to EC Machinery Directive 2006/42/EC	14
3	Storage, transport and packaging	15
3.1	Storage	15
3.2	Transport and packaging	15
4	Assembly	16
4.1	Components of the couplings	16
4.2	Advice for finish bore	19
4.3	Assembly of the hubs (general)	19
4.4	Assembly of clamping hubs (hub type 2.5, 2.6, 3.5 and 3.6)	20
4.5	Assembly of clamping ring hubs (hub type 6.5)	21
4.6	Disassembly of clamping ring hubs (hub type 6.5)	21
4.7	Assembly of laminae sets	22
4.8	Displacements - alignment of the couplings	24
5	Start-up	25
6	Breakdowns, causes and elimination	27
7	Disposal	28
8	Maintenance and service	29
9	Spares inventory, customer service addresses	29

Please observe protection note ISO 16016.	Drawn: 2022-07-26 Pz/Wb Verified: 2022-08-08 Pz	Replacing: KTR-N dated 2020-02-14 Replaced by:
----------------------------------------------	----------------------------------------------------	---------------------------------------------------

 KTR-Group	RADEX®-NC RADEX®-NC HT Operating/Assembly instructions	KTR-N 47210 EN Sheet: 3 of 37 Edition: 11
---------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	-------------------------------------------------

Table of contents

10 Enclosure A

Advice and instructions regarding the use in	 potentially explosive atmospheres	30
10.1 Intended use in	 potentially explosive atmospheres	31
10.2 Inspection intervals for couplings in	 potentially explosive atmospheres	32
10.3 Visual inspection and measures		33
10.4  marking of coupling for potentially explosive atmospheres		34
10.5 EU Certificate of conformity		36
10.6 UK Declaration of conformity		37



1 Technical data

1.1 Types of hubs

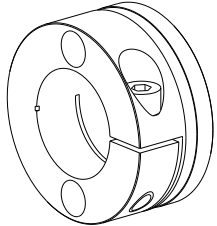
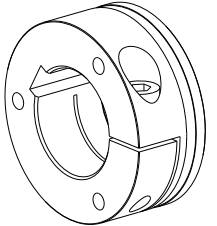
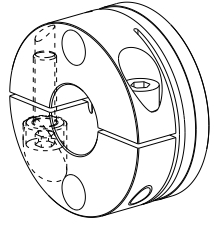
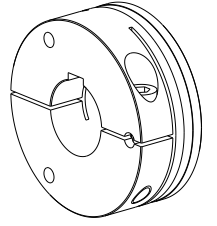
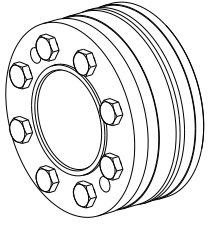
 <p><u>Type 2.5</u> ¹⁾ Clamping hub double slot without feather keyway</p>	 <p><u>Type 2.6</u> Clamping hub double slot with feather keyway</p>	 <p><u>Type 3.5</u> ¹⁾ Clamping hub triple slot without feather keyway (only available with RADEX®-NC HT)</p>	 <p><u>Type 3.6</u> Clamping hub triple slot with feather keyway (only available with RADEX®-NC HT)</p>	 <p><u>Type 6.5</u> Clamping ring hub (only available with RADEX®-NC HT)</p>
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------

Illustration 1: Types of hubs

- 1)  Hubs, clamping hubs or similar types without feather keyway may be used in category 3 only and are marked with category 3 accordingly.

**KTR-Group**

RADEX®-NC
RADEX®-NC HT
Operating/Assembly instructions

KTR-N 47210 EN
 Sheet: 5 of 37
 Edition: 11

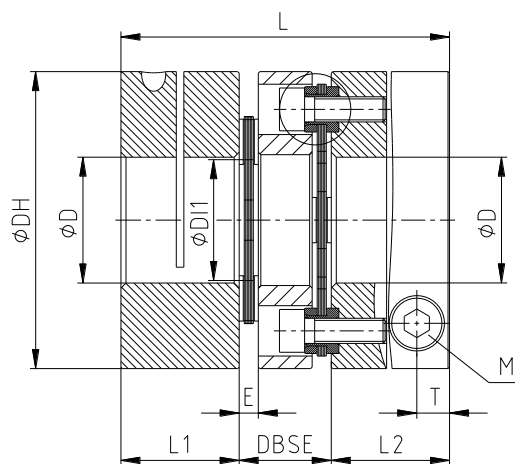
1 Technical data**1.2 Coupling dimensions****RADEX®-NC**

Illustration 2: RADEX®-NC type Dk

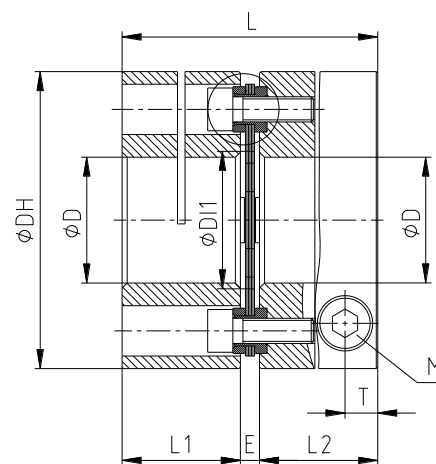
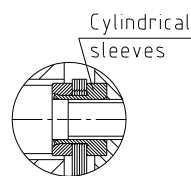


Illustration 3: RADEX®-NC type DK

Table 1: Dimensions - RADEX®-NC (hub type 2.5/2.6)

Size	Dimensions [mm]									Clamping screws DIN EN ISO 4762	
	Max. finish bore D	DH	L1, L2	L		DBSE	DI1	E	T	M	T _A [Nm]
				DK	EK						
5	12	26	12	34	26.5	10	12.0	2.5	3.5	M2.5	0.8
10	15	35	16	44	35.0	12	14.5	3.0	5.0	M4	3
15	20	47	21	55	45.0	13	19.5	3.0	6.8	M6	10
20	25	59	24	67	52.0	19	24.0	4.0	6.5	M6	10
25	35	70	32	88	69.0	24	30.0	5.0	9.0	M8	25
35	42	84	35	98	77.0	28	38.0	7.0	10.5	M10	49
42	55	104	40	116	91.0	36	48.0	11	10.5	M10	69

Table 2: Technical data - RADEX®-NC (hub type 2.5/2.6)

Size	Technical data						
	T _{KN} [Nm]	T _{K max} [Nm]	Max. speed [rpm]	Torsional stiffness [Nm/rad]		Mass moment of inertia [kgm ²]	
				DK	EK	DK	EK
5	2.5	5	18,300	1,200	2,400	0.000004	0.000003
10	7.5	15	13,600	2,800	5,600	0.000016	0.000012
15	20	40	10,100	6,000	12,000	0.000065	0.000053
20	30	60	8,050	15,000	30,000	0.000199	0.000154
25	60	120	6,800	30,000	60,000	0.000508	0.000393
35	100	200	5,650	36,000	72,000	0.001153	0.000911
42	300	600	4,550	120,000	240,000	0.007458	0.006153



RADEX®-NC 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.

Please observe protection
note ISO 16016.

Drawn: 2022-07-26 Pz/Wb
 Verified: 2022-08-08 Pz

Replacing: KTR-N dated 2020-02-14
 Replaced by:

**KTR-Group**

RADEX®-NC
RADEX®-NC HT
Operating/Assembly instructions

KTR-N 47210 EN
 Sheet: 6 of 37
 Edition: 11

1 Technical data**1.2 Coupling dimensions****Table 3: Friction torques and surface pressure of RADEX®-NC clamping hubs (hub type 2.5)**

Size	5	10	15	20	25	35	42
Material - hub	Al-H	Al-H	Al-H	Al-H	Al-H	Al-H	Steel
Clamping screw M	M2.5	M4	M6	M6	M8	M10	M10
Tightening torque T_A [Nm]	0.8	3	10	10	25	49	69
Bore Ø	Transmittable friction torque T_R of clamping hub [Nm] Surface pressure [N/mm ²]						
Ø3	1.1 175						
Ø5	1.8 101	5 182					
Ø8	2.8 60	7.7 110					
Ø10	3.4 47	9.5 86	23 139				
Ø12	4 38	11.1 70	27 114	28 141			
Ø14		12.7 59	31 96	32 119			
Ø15		13.5 54	33 89	34 110	65 148		
Ø16			35 83	36 102	69 138		
Ø18			39 72	40 90	77 121		
Ø19			40 68	42 84	81 114	129 151	
Ø20			42 64	44 80	84 108	135 143	
Ø24				52 65	99 88	159 116	237 172
Ø25				53 62	103 84	165 111	246 164
Ø28					113 74	182 98	272 145
Ø30					120 68	194 91	289 134
Ø32					127 63	205 84	306 125
Ø35					137 57	221 76	331 113
Ø38						237 69	335 103
Ø40						247 65	371 97
Ø42						258 62	387 91
Ø45							411 84
Ø48							433 78
Ø50							449 75
Ø55							486 67



Clamping hubs without feather keyway may be used in category 3 only and are marked with category 3 accordingly.

Please observe protection
note ISO 16016.

Drawn: 2022-07-26 Pz/Wb
 Verified: 2022-08-08 Pz

Replacing: KTR-N dated 2020-02-14
 Replaced by:

**KTR-Group**

RADEX®-NC
RADEX®-NC HT
Operating/Assembly instructions

KTR-N 47210 EN
 Sheet: 7 of 37
 Edition: 11

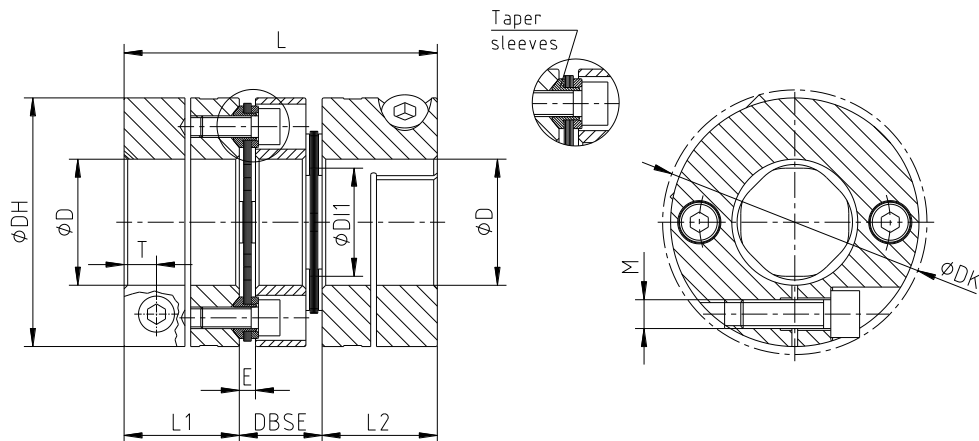
1 Technical data**1.2 Coupling dimensions****RADEX®-NC HT (hub type 2.5/2.6)**

Illustration 4:
 RADEX®-NC HT
 type DK

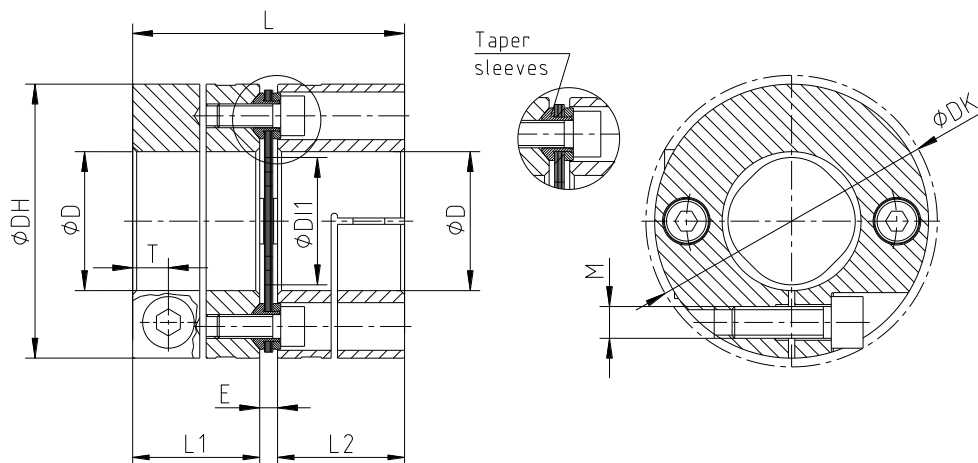


Illustration 5:
 RADEX®-NC HT
 type EK

Table 4: Dimensions - RADEX®-NC HT (hub type 2.5/2.6)

Size	Dimensions [mm]										Clamping screws DIN EN ISO 4762	
	Max. finish bore D	DH	DK	L1, L2	L		DBSE	DI1	E	T	M	T _A [Nm]
16	20	46	48.9	22	58.0	47.0	14.0	19.5	3.0	6.8	M6	10
21	30	58	59.2	25	68.0	53.5	19.0	24.0	3.5	6.8	M6	10
26	38	69	73.4	32	87.0	69.0	24.0	30.0	5.0	9.0	M8	25
36	45	84	86.8	35	93.6	74.8	23.6	48.0	4.8	10.5	M10	49

Table 5: Technical data - RADEX®-NC HT (hub type 2.5/2.6)

Size	T _{KN} [Nm]	T _{K max} [Nm]	Max. speed [rpm]	Torsional stiffness [Nm/rad]		Mass moment of inertia [kgm ²]	
				DK	EK	DK	EK
16	35	53	10,500	10,000	20,000	0.000063	0.00005
21	70	105	8,500	20,000	40,000	0.000180	0.00014
26	120	180	7,000	42,000	84,000	0.000460	0.00036
36	340	510	5,700	140,000	280,000	0.001100	0.00091



RADEX®-NC HT 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.

Please observe protection
 note ISO 16016.

Drawn: 2022-07-26 Pz/Wb
 Verified: 2022-08-08 Pz

Replacing: KTR-N dated 2020-02-14
 Replaced by:

**KTR-Group**

RADEX®-NC
RADEX®-NC HT
Operating/Assembly instructions

KTR-N 47210 EN
 Sheet: 8 of 37
 Edition: 11

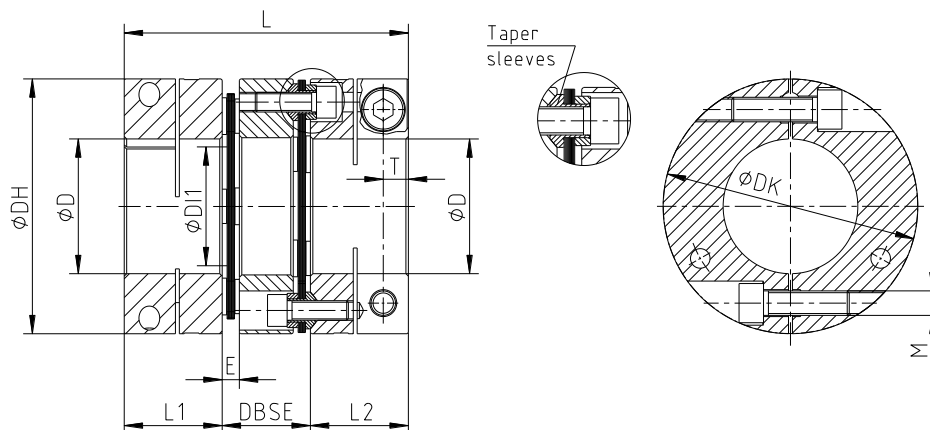
1 Technical data**1.2 Coupling dimensions****RADEX®-NC HT (hub type 3.5/3.6)**

Illustration 6:
 RADEX®-NC HT
 type DK

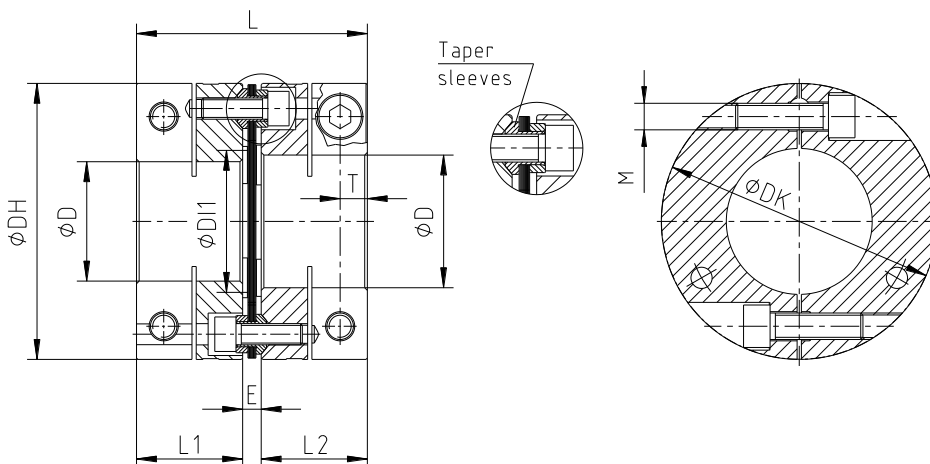


Illustration 7:
 RADEX®-NC HT
 type EK

Table 6: Dimensions - RADEX®-NC HT (hub type 3.5/3.6)

Size	Dimensions [mm]										Clamping screws DIN EN ISO 4762	
	Max. finish bore D	DH	DK	L1, L2	L		DBSE	DI1	E	T	M	T _A [Nm]
43	55	104	104.0	40.5	115	89	34	61	8	10.5	M10	49
51	70	124	129.7	50.0	138	108	38	73	8	14.0	M14	135
61	80	144	148.5	54.0	150	118	42	88	10	16.0	M16	210
75	90	170	181.1	70.0	189	152	49	104	12	21.5	M20	610

Table 7: Technical data - RADEX®-NC HT (hub type 3.5/3.6)

Size	T _{KN} [Nm]	T _{K max} [Nm]	Max. speed [rpm]	Torsional stiffness [Nm/rad]		Mass moment of inertia [kgm ²]	
				DK	EK	DK	EK
43	600	900	8,100	255,000	510,000	0.0033	0.0025
51	1,300	1,950	6,700	460,000	920,000	0.0082	0.0060
61	2,000	3,000	6,100	750,000	1,500,000	0.0160	0.0120
75	3,200	4,800	5,100	1,050,000	2,100,000	0.0990	0.0770



RADEX®-NC HT 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.

Please observe protection
 note ISO 16016.

Drawn: 2022-07-26 Pz/Wb
 Verified: 2022-08-08 Pz

Replacing: KTR-N dated 2020-02-14
 Replaced by:

**KTR-Group**

RADEX®-NC
RADEX®-NC HT
Operating/Assembly instructions

KTR-N 47210 EN
 Sheet: 9 of 37
 Edition: 11

1 Technical data**1.2 Coupling dimensions****Table 8: Friction torques and surface pressure of RADEX®-NC HT clamping hubs**

Size	Hub type 2.5				Hub type 3.5			
	16	21	26	36	43	51	61	75
Material - hub	Al-H	Al-H	Al-H	Al-H	Al-H	Al-H	Al-H	Steel
Clamping screw M	M6	M6	M8	M10	M10	M14	M16	M20
Tightening torque T _A [Nm]	10	10	25	49	49	135	210	610
Bore Ø	Transmittable friction torque T _R of clamping hub [Nm] Surface pressure [N/mm ²]							
Ø10	23							
	151							
Ø12	27	28						
	123	131						
Ø14	31	32						
	104	111						
Ø15	33	34	66					
	96	103	144					
Ø16	35	36	70					
	89	96	134					
Ø18	39	40	77					
	78	84	118					
Ø19	41	42	81	129				
	73	79	111	153				
Ø20	43	44	85	135				
	69	74	105	145				
Ø22		48	92	147	218			
		67	94	130	114			
Ø24		52	100	159	238			
		60	85	118	104			
Ø25		54	103	165	248	495		
		58	81	113	100	150		
Ø28		59	114	182	278	554		
		51	72	99	89	134		
Ø30		63	121	194	297	594		
		47	66	92	83	125		
Ø32			127	205	317	633		
			61	85	78	117		
Ø35			137	221	347	693		
			55	77	72	107		
Ø38			147	237	377	752		
			50	70	66	99		
Ø40				247	397	792		
				66	63	94		
Ø42				258	416	831		
				62	60	89		
Ø45				273	446	891	1230	
				58	56	83	102	
Ø48					476	950	1312	
					52	78	96	
Ø50					496	990	1367	3129
					50	75	92	154
Ø55					545	1089	1503	3442
					46	68	84	140
Ø58						1148	1585	3630
						65	79	133
Ø60						1188	1640	3755
						63	77	129
Ø65						1286	1777	4068
						58	71	119
Ø70						1385	1913	4381
						54	66	110



Clamping hubs without feather keyway may be used in category 3 only and are marked with category 3 accordingly.

Please observe protection
note ISO 16016.

Drawn: 2022-07-26 Pz/Wb
 Verified: 2022-08-08 Pz

Replacing: KTR-N dated 2020-02-14
 Replaced by:

**KTR-Group**

RADEX®-NC
RADEX®-NC HT
Operating/Assembly instructions

KTR-N 47210 EN
 Sheet: 10 of 37
 Edition: 11

1 Technical data**1.2 Coupling dimensions****Table 8 continued: Friction torques and surface pressure of RADEX®-NC HT clamping hubs**

Size	Hub type 2.5				Hub type 3.5			
	16	21	26	36	43	51	61	75
Material - hub	Al-H	Al-H	Al-H	Al-H	Al-H	Al-H	Al-H	Steel
Clamping screw M	M6	M6	M8	M10	M10	M14	M16	M20
Tightening torque T_A [Nm]	10	10	25	49	49	135	210	610
Bore Ø	Transmittable friction torque T_R of clamping hub [Nm]							
	Surface pressure [N/mm ²]							
Ø75							2050	4694
							61	103
Ø80							2187	5006
							58	97
Ø85								5319
								91
Ø90								5632
								86



Clamping hubs without feather keyway may be used in category 3 only and are marked with category 3 accordingly.

**KTR-Group**

RADEX®-NC
RADEX®-NC HT
Operating/Assembly instructions

KTR-N 47210 EN
 Sheet: 11 of 37
 Edition: 11

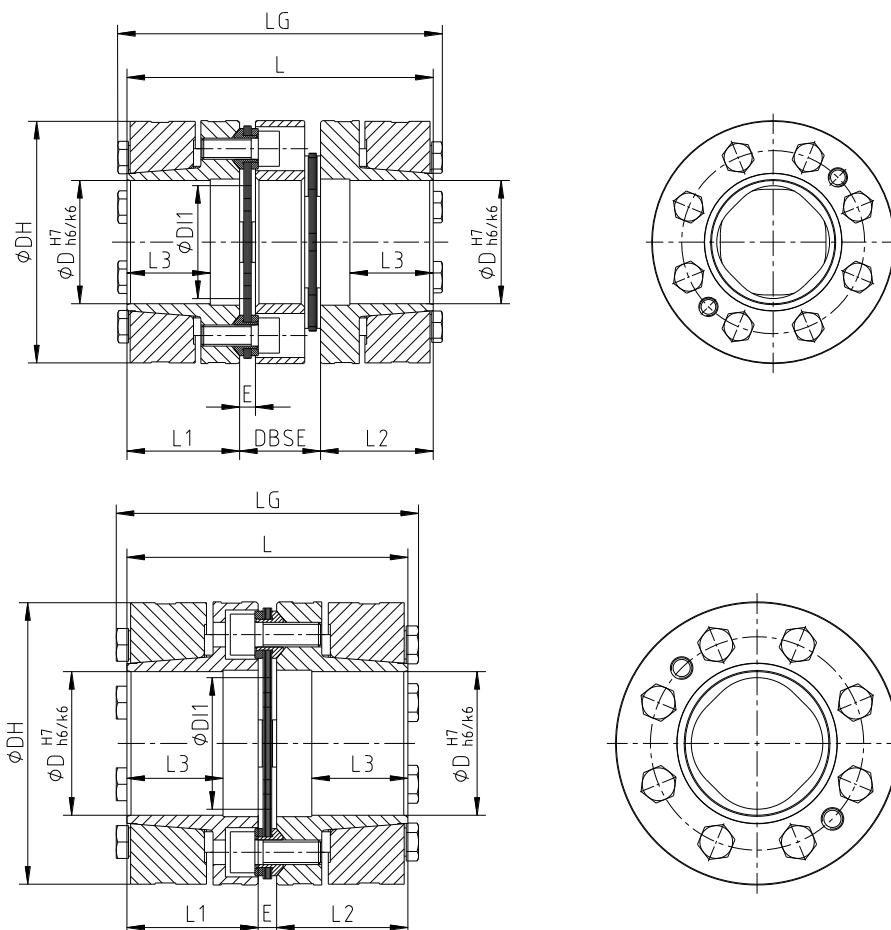
1 Technical data**1.2 Coupling dimensions****RADEX®-NC HT clamping ring hubs (hub type 6.5)**

Illustration 8:
 RADEX®-NC HT
 clamping ring hub
 type DK

Illustration 9:
 RADEX®-NC HT
 clamping ring hub
 type EK

Table 9: Dimensions - RADEX®-NC clamping ring hubs (hub type 6.5)

Size	Dimensions [mm]											Clamping screws DIN EN ISO 4017	
	Max. finish bore D	DH	L1, L2	L3	L		LG		DBSE	DI1	E	M	T _A [Nm]
					DK	EK	DK	EK					
16	20	46	24	18	62.0	51.0	68.0	57.0	14.0	19.5	3.0	M5	6
21	28	58	28	22	75.0	59.5	81.2	65.7	19.0	24.0	3.5	M6	10
26	35	69	36	28	96.0	77.0	100.8	81.8	24.0	30.0	5.0	M5	6
36	42	84	43	35	109.6	90.8	118.3	99.5	23.6	48.0	4.8	M8	25
43	60	104	46	35	126.0	100.0	135.9	109.9	34.0	61.0	8.0	M8	25
51	70	124	50	38	138.0	108.0	150.5	120.5	38.0	73.0	8.0	M10	49
61	80	144	55	43	152.0	120.0	165.5	133.5	42.0	88.0	10.0	M12	85

Table 10: Technical data - RADEX®-NC clamping ring hubs (hub type 6.5)

Size	T _{KN} [Nm]	T _{K max} [Nm]	Max. speed [rpm]	Torsional stiffness [Nm/rad]		Mass moment of inertia [kgm ²]	
				DK	EK	DK	EK
16	35	53	31,150	10,000	20,000	0.000075	0.000063
21	70	105	24,700	20,000	40,000	0.000218	0.000177
26	120	180	20,800	31,500	63,000	0.000565	0.000467
36	340	510	17,100	125,000	250,000	0.001581	0.001294
43	600	900	13,800	155,000	310,000	0.004051	0.003250
51	1,300	1,950	11,600	600,000	1,200,000	0.008981	0.007096
61	2,000	3,000	10,000	775,000	1,550,000	0.024188	0.020678

Please observe protection
 note ISO 16016.

Drawn: 2022-07-26 Pz/Wb
 Verified: 2022-08-08 Pz

Replacing: KTR-N dated 2020-02-14
 Replaced by:

**KTR-Group**

RADEX®-NC
RADEX®-NC HT
Operating/Assembly instructions

KTR-N 47210 EN
 Sheet: 12 of 37
 Edition: 11

1 Technical data**1.2 Coupling dimensions****Table 11: Friction torques and surface pressure of RADEX®-NC HT clamping ring hubs**

Size		16		21		26		36		43		51		61	
Material - hub and clamping ring		Al-H		Al-H		Al-H		Al-H		Al-H		Al-H		Al-H	
Clamping screw M		M5		M6		M5		M8		M8		M10		M12	
Number z (for each clamping ring hub)		4		4		8		6		6		6		6	
Tightening torque T _A [Nm]		6		10		6		25		25		49		85	
Bore Ø		Transmittable friction torque T _R of clamping ring hub [Nm] / surface pressure [N/mm ²]													
		Nm	N/mm ²	Nm	N/mm ²	Nm	N/mm ²	Nm	N/mm ²	Nm	N/mm ²	Nm	N/mm ²	Nm	N/mm ²
Ø10	H7/h6	29	162	27	165										
	H7/k6	34	183	36	197										
Ø12	H7/h6	33	149	45	165										
	H7/k6	42	173	56	190										
Ø15	H7/h6	70	146	91	161	104	171								
	H7/k6	76	156	99	172	124	193								
Ø16	H7/h6	50	120	79	148	126	170								
	H7/k6	62	139	93	166	145	189								
Ø19	H7/h6	83	119	125	145	194	166								
	H7/k6	96	131	139	158	214	180								
Ø20	H7/h6	97	118	145	144	169	151	241	161						
	H7/k6	109	127	157	153	200	171	284	181						
Ø24	H7/h6			127	118	279	148	395	157						
	H7/k6			169	129	305	159	430	169						
Ø25	H7/h6			144	117	311	147	438	156						
	H7/k6			187	126	334	156	471	166						
Ø28	H7/h6			201	115	338	134	521	147	595	168				
	H7/k6			245	119	382	142	558	156	684	177				
Ø30	H7/h6					404	132	616	145	705	166	750	171		
	H7/k6					444	138	646	151	789	172	822	182		
Ø32	H7/h6					273	112	523	132	647	159	818	169		
	H7/k6					355	122	640	142	784	169	927	180		
Ø35	H7/h6					357	110	664	130	814	156	1020	166	880	128
	H7/k6					441	116	779	136	961	162	1117	173	951	137
Ø38	H7/h6							647	113	946	146	1085	160	1074	126
	H7/k6							778	120	1096	153	1254	167	1131	132
Ø40	H7/h6							741	112	1073	144	1228	158	1211	124
	H7/k6							875	118	1219	150	1392	164	1258	128
Ø42	H7/h6							841	111	980	133	1166	151	1264	121
	H7/k6							974	115	1144	140	1348	158	1333	127
Ø45	H7/h6									1163	131	1377	149	1480	119
	H7/k6									1332	136	1568	154	1534	123
Ø48	H7/h6									1360	129	1605	146	1597	115
	H7/k6									1564	132	1803	149	1668	120
Ø50	H7/h6									1200	114	1450	136	1750	114
	H7/k6									1376	119	1652	141	1810	117
Ø55	G7/h6									1072	96	1607	131	1911	105
	G7/m6									1370	103	1960	136	2032	111
Ø60	G7/h6									1372	95	2283	118	2097	97
	G7/m6									1669	99	2387	123	2239	103
Ø65	G7/h6											2255	103	2542	96
	G7/m6											2447	109	2635	99
Ø70	G7/h6											2704	102	2669	88
	G7/m6											2842	105	2785	91
Ø75	G7/h6													2718	79
	G7/m6													2855	83
Ø80	G7/h6													3168	78
	G7/m6													3252	80

The transmittable friction torques of the clamping connection consider the max. clearance with shaft tolerance h6 resp. k6/bore H7, from Ø55 G7/m6 resp. G7/h6. The friction torque is reduced with bigger clearance (see chapter 4.5).

The surface pressure of the clamping connection specified considers the minimum clearance with shaft fit k6/bore H7, from Ø55 G7/m6.




A calculation of the hollow shaft strength is necessary if hollow shafts are used (see chapter 4.6)!

Please observe protection note ISO 16016.

Drawn: 2022-07-26 Pz/Wb
 Verified: 2022-08-08 Pz

Replacing: KTR-N dated 2020-02-14
 Replaced by:

 KTR-Group	RADEX®-NC RADEX®-NC HT Operating/Assembly instructions	KTR-N 47210 EN Sheet: 13 of 37 Edition: 11
---------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	-----------------------------------------------------------------------

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 **RADEX®-NC** and **RADEX®-NC HT** 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.

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.

Please observe protection note ISO 16016.	Drawn: 2022-07-26 Pz/Wb Verified: 2022-08-08 Pz	Replacing: KTR-N dated 2020-02-14 Replaced by:
-------------------------------------------	----------------------------------------------------	---------------------------------------------------

 KTR-Group	RADEX®-NC RADEX®-NC HT Operating/Assembly instructions	KTR-N 47210 EN Sheet: 14 of 37 Edition: 11
---------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	--------------------------------------------------

2 Advice

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®-NC** and **RADEX®-NC HT** described in here corresponds to the state of the art 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 "RADEX®-NC").

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.

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.

Please observe protection note ISO 16016.	Drawn: 2022-07-26 Pz/Wb Verified: 2022-08-08 Pz	Replacing: KTR-N dated 2020-02-14 Replaced by:
-------------------------------------------	----------------------------------------------------	---------------------------------------------------

 KTR-Group	RADEX®-NC RADEX®-NC HT Operating/Assembly instructions	KTR-N 47210 EN Sheet: 15 of 37 Edition: 11
---------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	--------------------------------------------------

3 Storage, transport and packaging

3.1 Storage

The coupling hubs are supplied in preserved condition and can be stored in 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.
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.

Please observe protection note ISO 16016.	Drawn: 2022-07-26 Pz/Wb Verified: 2022-08-08 Pz	Replacing: KTR-N dated 2020-02-14 Replaced by:
----------------------------------------------	----------------------------------------------------	---------------------------------------------------



4 Assembly

Generally the coupling is supplied in mounted condition. Before assembly the coupling has to be inspected for completeness.

4.1 Components of the couplings

Components of RADEX®-NC type DK

Component	Quantity	Component assembly
1	2	Clamping hub
2	2	Laminae set (cylindrical sleeve type)
3	1	Spacer
4	see table 12	Cap screw DIN EN ISO 4762
5	2	Cap screw DIN EN ISO 4762

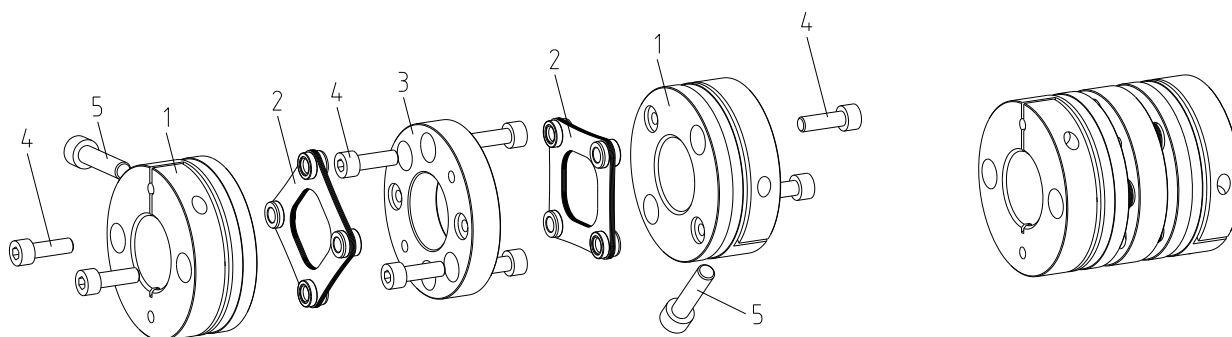


Illustration 10: RADEX®-NC type DK (example: hub type 2.5)

Components of RADEX®-NC type EK

Component	Quantity	Component assembly
1	2	Clamping hub
2	1	Laminae set (cylindrical sleeve type)
4	see table 12	Cap screw DIN EN ISO 4762
5	2	Cap screw DIN EN ISO 4762

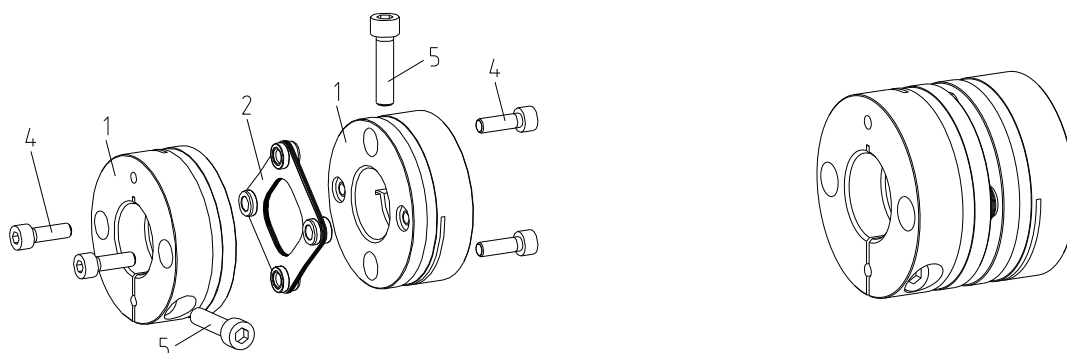


Illustration 11: RADEX®-NC type EK (example: hub type 2.5)

**4 Assembly****4.1 Components of the couplings****Components of RADEX®-NC HT type DK**

Component	Quantity	Component assembly
1	2	Clamping hub
2	2	Laminae set (taper sleeve type)
3	1	Spacer
4	see table 13	Cap screw DIN EN ISO 4762
5	2	Cap screw DIN EN ISO 4762

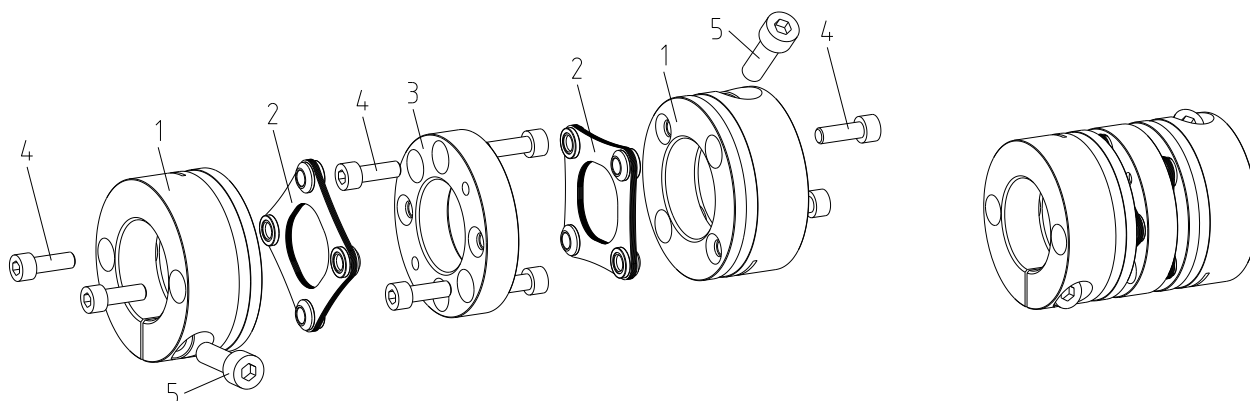


Illustration 12: RADEX®-NC HT type DK (example: hub type 2.5)

Components of RADEX®-NC HT type EK

Component	Quantity	Component assembly
1	2	Clamping hub
2	1	Laminae set (taper sleeve type)
4	see table 13	Cap screw DIN EN ISO 4762
5	2	Cap screw DIN EN ISO 4762

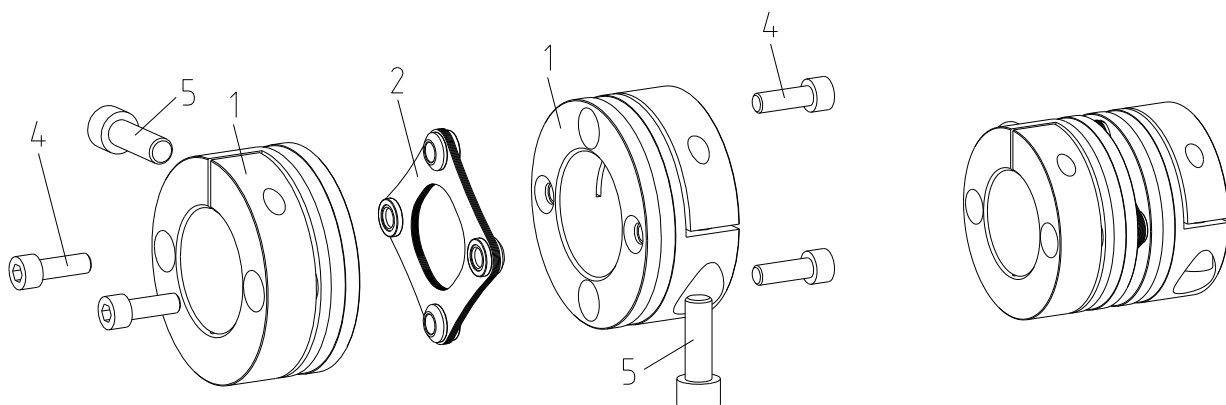


Illustration 13: RADEX®-NC HT type EK (example: hub type 2.5)



4 Assembly

4.1 Components of the couplings

Components of RADEX®-NC HT clamping ring hub type DK

Component	Quantity	Component assembly
1.1	2	Clamping ring hub
1.2	2	Clamping ring
2	2	Laminae set (taper sleeve type)
3	1	Spacer
4	see table 13	Cap screw DIN EN ISO 4762
6	see table 11	Hexagon screw DIN EN ISO 4017

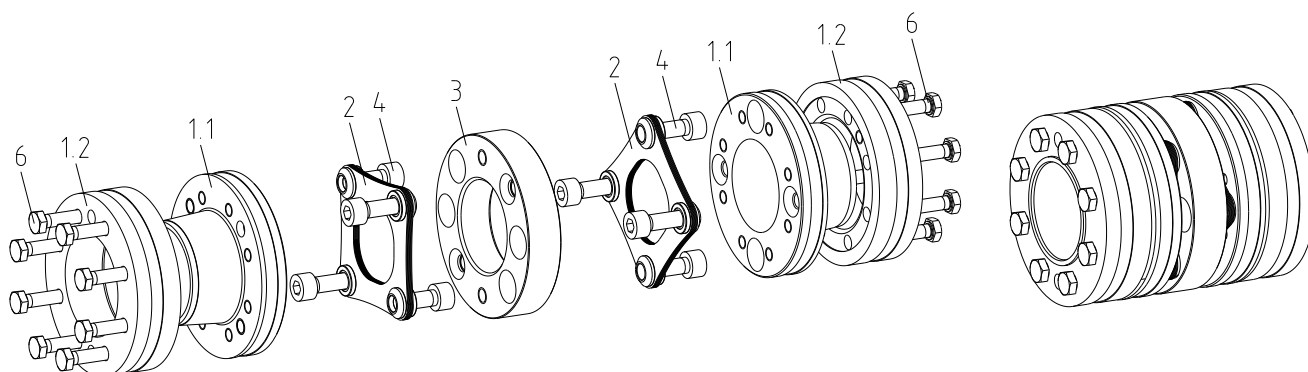


Illustration 14: RADEX®-NC HT clamping ring hub type DK (hub type 6.5)

Components of RADEX®-NC HT clamping ring hub type EK

Component	Quantity	Component assembly
1.1	2	Clamping ring hub
1.2	2	Clamping ring
2	1	Laminae set (taper sleeve type)
4	see table 13	Cap screw DIN EN ISO 4762
6	see table 11	Hexagon screw DIN EN ISO 4017

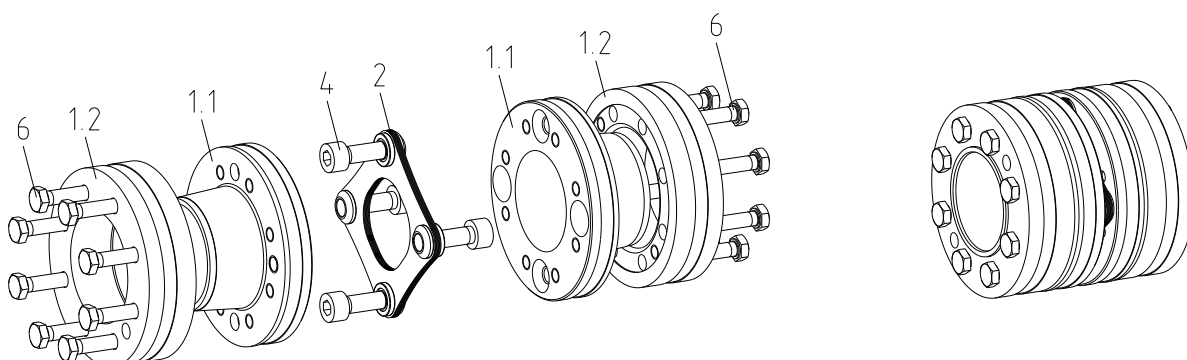


Illustration 15: RADEX®-NC HT clamping ring hub type EK (hub type 6.5)



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.

- Hub bores machined by the customer have to observe concentricity resp. axial runout (see illustration 16).
- Make absolutely sure to observe the figures for $\varnothing D$.
- Carefully align the clamping hubs or clamping ring hubs when the finish bores are drilled.

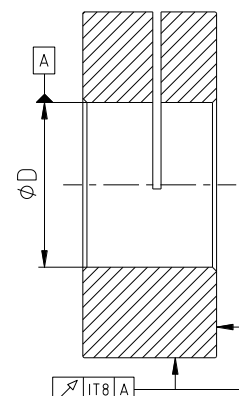


Illustration 16: Concentricity and axial runout



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

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.

4.3 Assembly of the hubs (general)



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



Pay attention to the ignition risk in potentially explosive atmospheres!



With the assembly make sure that the dimension DBSE resp. dimension E (see chapter 1.2) 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 all screw connections must be secured against working loose additionally, e. g. conglomerating with Loctite (average strength).



4 Assembly

4.4 Assembly of clamping hubs (hub type 2.5, 2.6, 3.5 and 3.6)

The power transmission of the coupling is made frictionally engaged via clamping hubs.

- Clean and degrease hub bores and shafts.
- Lightly unscrew the clamping screws (component 5) (see illustration 17).
- Push the shaft ends of driving and driven side into the clamping hubs of the coupling. Please observe dimension L1 or L2 (see chapter 1.2).
- Shift the power packs in axial direction until the distance dimension DBSE or E is achieved. If the power packs are already firmly assembled, shifting the clamping hubs axially on the shafts allows for adjusting the distance dimension DBSE resp. E.



With the assembly make sure that the dimension DBSE resp. E (see chapter 1.2) is observed so that the coupling is installed free from distortion in axial direction. Disregarding this advice may cause damage to the coupling.

Clamping screw

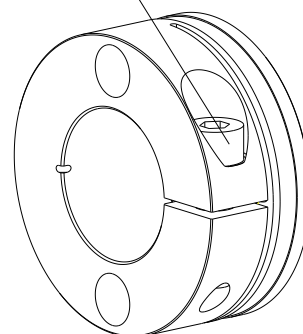


Illustration 17: Assembly of clamping hub

- Tighten the clamping screws (component 5) at the tightening torque specified in table 1, 4 resp. 6. With hub types 3.5 resp. 3.6 the clamping screws have to be tightened alternately in equal steps at the tightening torques specified in table 6.



If used in potentially explosive atmospheres all screw connections must be secured against working loose additionally, e. g. conglomerating with Loctite (average strength).



The transmittable friction torques of the clamping hubs depend on the bore diameter (see table 3 resp. 8).



Clamping hubs without feather keyway may be used in category 3 only and are marked with category 3 accordingly.



If the clamping screws are not tightened at the correct tightening torque, there is the risk of
a) a fracture of the hub and plastic deformation with a too high tightening torque T_A
b) early slipping, untightening of the screws with a too low tightening torque T_A



4 Assembly

4.5 Assembly of clamping ring hubs (hub type 6.5)

The power transmission of the clamping hubs is made frictionally engaged. The necessary surface pressure is transmitted via the clamping ring with internal taper to the taper hub and consequently to the shaft. The friction torques specified in table 11 consider a fit pair H7/h6 resp. H7/k6, from Ø55 G7/h6 resp. G7/k6. With a bigger fit clearance the friction torques specified in table 11 decrease.

The strength and dimensions of the shafts (specifically hollow shafts) have to be defined such that sufficient safety against plastic deformation is ensured. For a detailed calculation please contact KTR.

- Clean the hub bores and the shafts and inspect for dimensional accuracy, afterwards lubricate with a thin oil (e. g. Castrol 4 in 1, Klüber Quietsch-Ex or WD-40).



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

- Lightly untighten the clamping screw (component 6) and pull the clamping ring (component 1.2) from the hub only marginally to make sure that the clamping ring fits loosely (see illustration 18).
- Push the shaft ends of driving and driven side into the clamping ring hubs (component 1.1) of the coupling. Dimension L3 should be observed at the minimum (see table 9).
- Tighten the clamping screws (component 6) evenly gradually and crosswise at 1/3 resp. 2/3 the tightening torque T_A (see table 9) until the clamping ring gets in contact. Afterwards tighten the clamping screws at the tightening torque specified in table 9 one after another.

Clamping screws

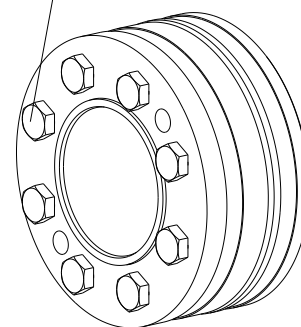


Illustration 18: Assembly of clamping ring hub with clamping ring



If the clamping screws are not tightened at the correct tightening torque, there is the risk of
 a) a fracture of the hub and plastic deformation with a too high tightening torque T_A
 b) early slipping, untightening of the screws with a too low tightening torque T_A

4.6 Disassembly of clamping ring hubs (hub type 6.5)

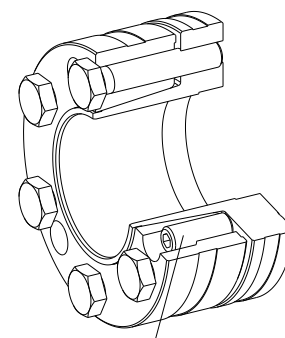
Unscrew the clamping screws evenly one after another. During each revolution every screw may only be unscrewed by half a turn. Unscrew all clamping screws by 3 - 4 pitches.

Unscrew the setscrews bonded in the extraction threads and screw in further until contact.

The clamping ring is released by tightening the setscrews in the extraction threads evenly gradually and crosswise.




If these hints are not observed, the operation of the coupling may be affected.



Setscrew in the extraction thread

Illustration 19: Disassembly of clamping ring hub with clamping ring

 KTR-Group	RADEX®-NC RADEX®-NC HT Operating/Assembly instructions	KTR-N 47210 EN Sheet: 22 of 37 Edition: 11
---------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	--------------------------------------------------

4 Assembly

4.6 Disassembly of clamping ring hubs (hub type 6.5)



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



With reassembly the taper surfaces, bores of the hub and the shaft have to be cleaned. The bore of the hub and shaft have to be lubricated with thin oil (e. g. Castrol 4 in 1, Klüber Quietsch-Ex or WD-40). Lightly paint the taper surfaces of the clamping ring hub or clamping ring with the grease Gleitmo 800, afterwards twist the components against one another by one revolution in order to spread the grease evenly.

All setscrews must be completely unscrewed. Afterwards apply Loctite (medium strength) on the setscrews and screw in flush with the front face of the clamping ring.



If used in potentially explosive atmospheres all screw connections must be secured against working loose additionally, e. g. conglomerating with Loctite (average strength).

4.7 Assembly of laminae sets



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 hubs, laminae set and spacer.
- Insert the laminae set in the hub resp. spacer as shown in illustration 21 resp. 23.
- **Applies with RADEX®-NC HT only:**
The laminae set always has to be aligned such that the taper sleeve is inserted in the taper indentation of the hub resp. spacer (see illustration 22).



Make absolutely sure that the laminae sets are mounted as shown in illustration 21 or 23.

- Hand-tighten the laminae set first. Afterwards tighten the cap screws gradually and crosswise to the tightening torque specified in table 12 resp. 13. Repeat this process until all screws have achieved the full tightening torque (see table 12 resp. 13).

Please observe protection note ISO 16016.	Drawn: 2022-07-26 Pz/Wb Verified: 2022-08-08 Pz	Replacing: KTR-N dated 2020-02-14 Replaced by:
----------------------------------------------	----------------------------------------------------	---------------------------------------------------



4 Assembly

4.7 Assembly of laminae sets

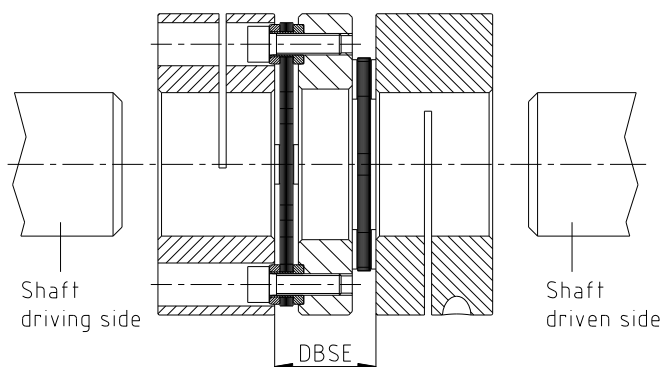


Illustration 20: Assembly of RADEX®-NC (cylindrical type of sleeve)

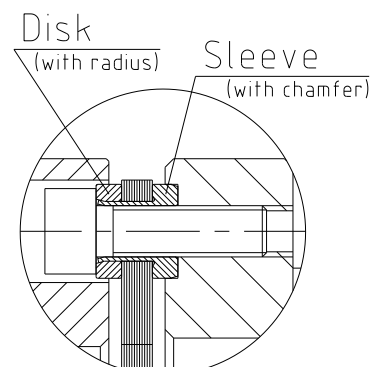


Illustration 21: Assembly of laminae sets (cylindrical sleeves)

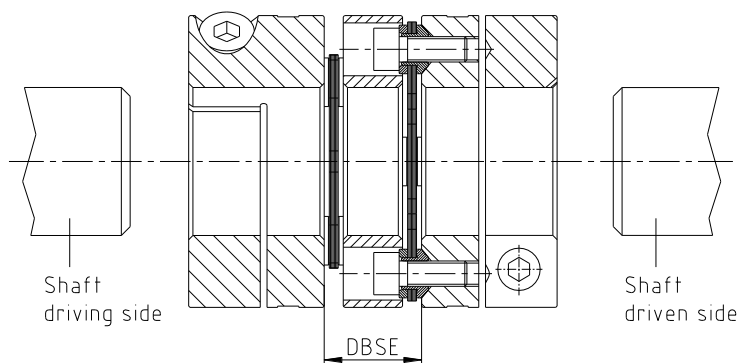


Illustration 22: Assembly of RADEX®-NC HT (taper type of sleeve)

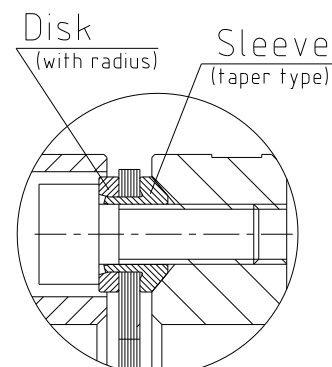


Illustration 23: Assembly of laminae sets (taper sleeves)

Table 12: Tightening torques of the screws - Laminae set RADEX®-NC

Size	5	10	15	20	25	35	42
Number of screws ¹⁾	4	4	4	4	4	4	4
Screw size	M2.5	M3	M4	M5	M6	M6	M8
Tightening torque T_A [Nm]	1.1	1.9	4.1	8.5	14	14	35

1) Number of screws per laminae set. With type DK two laminae sets are mounted (number of screws doubled).

Table 13: Tightening torques of screws - Laminae set RADEX®-NC HT

Size	16	21	26	36	43	51	61	75
Number of screws ¹⁾	4	4	4	6	6	6	6	6
Screw size	M4	M5	M6	M6	M8	M10	M10	M12
Tightening torque T_A [Nm]	4.1	8.5	14	14	35	69	69	120

1) Number of screws per laminae set. With type DK two laminae sets are mounted (number of screws doubled).



4 Assembly

4.8 Displacements - alignment of the couplings

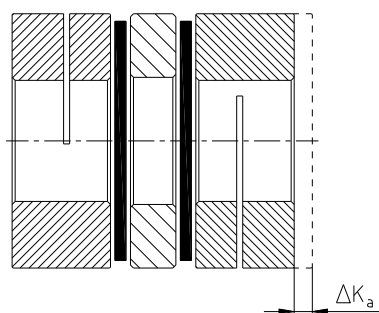
The displacement figures specified in table 14 and 15 provide for sufficient safety to compensate for external influences like, for example, thermal expansion or foundation settling.



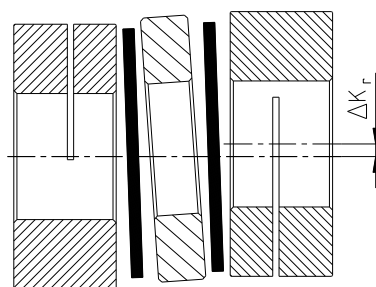
In order to ensure a long service life of the coupling and avoid hazards with the use in potentially explosive atmospheres, the shaft ends must be accurately aligned. Please absolutely observe the displacement figures specified (see tables 14 and 15). If the figures are exceeded, the coupling will be 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 tables 14 and 15) is permissible.

Please note:

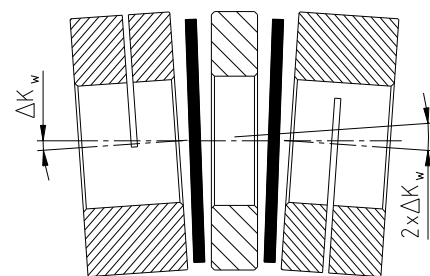
- The displacement figures specified in table 14 and 15 are maximum figures which must not arise in parallel. If radial and angular displacements arise simultaneously, the permissible displacement figures may only be used proportionally (see illustration 25).
- Inspect with a dial gauge, ruler or feeler whether the permissible displacement figures of tables 14 and 15 can be observed.



Axial displacements



Radial displacements



Angular displacements

Illustration 24: Displacements

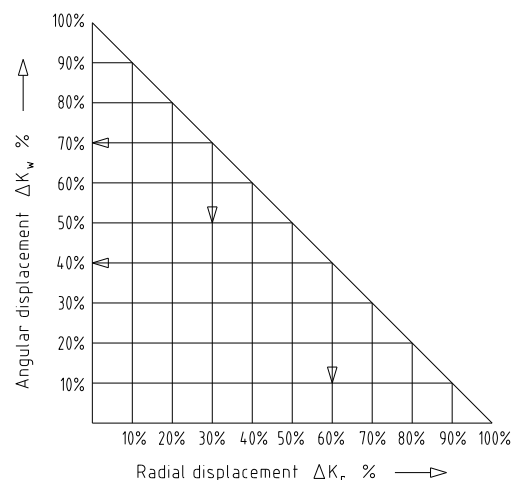
Examples of the displacement combinations specified in illustration 25:


Example 1:
 $\Delta K_r = 30 \%$
 $\Delta K_w = 70 \%$

Example 2:
 $\Delta K_r = 60 \%$
 $\Delta K_w = 40 \%$

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

Illustration 25:
Combinations of displacement



 KTR-Group	RADEX®-NC RADEX®-NC HT Operating/Assembly instructions	KTR-N 47210 EN Sheet: 25 of 37 Edition: 11
---------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	-----------------------------------------------------------------------

4 Assembly

4.8 Displacements - alignment of the couplings

Table 14: Displacement figures - RADEX®-NC

Size	Type DK			Type EK		
	Max. axial displacement ΔK_a [mm]	Max. radial displacement ΔK_r [mm]	Max. angular displacement ΔK_w ¹⁾ [degree]	Max. axial displacement ΔK_a [mm]	Max. radial displacement ΔK_r [mm]	Max. angular displacement ΔK_w ¹⁾ [degree]
5	0.4	0.13	1	0.2	-	1
10	0.8	0.16	1	0.4	-	1
15	1.0	0.17	1	0.5	-	1
20	1.2	0.26	1	0.6	-	1
25	1.6	0.33	1	0.8	-	1
35	2.0	0.36	1	1.0	-	1
42	2.8	0.43	1	1.4	-	1

1) each laminae set

Table 15: Displacement figures - RADEX®-NC HT

Size	Type DK			Type EK		
	Max. axial displacement ΔK_a [mm]	Max. radial displacement ΔK_r [mm]	Max. angular displacement ΔK_w ¹⁾ [degree]	Max. axial displacement ΔK_a [mm]	Max. radial displacement ΔK_r [mm]	Max. angular displacement ΔK_w ¹⁾ [degree]
16	1.0	0.19	1	0.50	-	1
21	1.2	0.27	1	0.60	-	1
26	1.6	0.33	1	0.80	-	1
36	2.0	0.32	1	1.00	-	1
43	2.2	0.45	1	1.10	-	1
51	2.5	0.52	1	1.25	-	1
61	2.6	0.62	1	1.30	-	1
75	2.9	0.64	1	1.45	-	1

1) each laminae set

5 Start-up

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



If used in potentially explosive atmospheres all screw connections must be secured against working loose additionally, e. g. conglomerating with Loctite (average strength).

Finally the coupling protection against accidental contact must be fitted. 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. Depending on the outside diameter DH of the coupling, we recommend the following minimum distance:

ØDH to 50 mm = 6 mm, ØDH 50 mm to 120 mm = 10 mm, ØDH from 120 mm = 15 mm.

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.

Please observe protection note ISO 16016.	Drawn: 2022-07-26 Pz/Wb	Replacing: KTR-N dated 2020-02-14
	Verified: 2022-08-08 Pz	Replaced by:

 KTR-Group	RADEX®-NC RADEX®-NC HT Operating/Assembly instructions	KTR-N 47210 EN Sheet: 26 of 37 Edition: 11
---------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	--------------------------------------------------

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 aluminium 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 in a dangerous volume between the cover and the coupling. The coupling must not operate in an accumulation of dust.

For covers with unlocked openings on the top face no light metals 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 conductivity 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 µm. 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.

Please observe protection note ISO 16016.	Drawn: 2022-07-26 Pz/Wb Verified: 2022-08-08 Pz	Replacing: KTR-N dated 2020-02-14 Replaced by:
-------------------------------------------	----------------------------------------------------	---------------------------------------------------

 KTR-Group	RADEX®-NC RADEX®-NC HT Operating/Assembly instructions	KTR-N 47210 EN Sheet: 27 of 37 Edition: 11
---------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	-----------------------------------------------------------------------

6 Breakdowns, causes and elimination

The below-mentioned failures can result in improper use of the **RADEX®-NC** and **RADEX®-NC HT** 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 with 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 improper use:

- 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 laminae 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
Different operating noise and/or vibrations occurring	Misalignment	none	1) Set the unit out of operation 2) Eliminate the reason for the misalignment (e. g. loose foundation bolts, fracture of the engine mount, thermal expansion of unit components, modification of the installation dimension E of the coupling) 3) For inspection of wear see chapter 10.2
	Dowel screws working loose, low micro friction under the screw head and on the steel laminae set	Danger of ignition due to hot surfaces	1) Set the unit out of operation 2) Inspect coupling components and replace coupling components that are damaged 3) Tighten the dowel screws to the tightening torque specified 4) Inspect alignment, adjust if necessary
	Screws for axial fastening of flange hubs working loose	none	1) Set the unit out of operation 2) Inspect alignment of coupling 3) Tighten the screws to fasten the flange hubs and secure against working loose 4) For inspection of wear see chapter 10.2
Fracture of steel laminae set	Fracture of steel laminae set due to high impact energy/overload	Ignition risk due to sparking	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the steel laminae sets 3) Inspect coupling components and replace coupling components that are damaged 4) Insert steel laminae sets, assemble coupling components 5) Find out the reason for overload
	Operating parameters do not meet with the performance of the coupling		1) Set the unit out of operation 2) Review the operating parameters and select a bigger coupling (consider mounting space) 3) Assemble new coupling size 4) Inspect alignment

Please observe protection note ISO 16016.	Drawn: 2022-07-26 Pz/Wb	Replacing: KTR-N dated 2020-02-14
	Verified: 2022-08-08 Pz	Replaced by:

6 Breakdowns, causes and elimination

Breakdowns	Causes	Hazard notes for potentially explosive atmospheres	Elimination
Fracture of steel laminae set	Operating error of the unit	Ignition risk due to sparking	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the steel laminae sets 3) Inspect coupling components and replace coupling components that are damaged 4) Insert steel laminae sets, assemble coupling components 5) Instruct and train the service staff
Cracks in / fracture of the steel laminae set / fastening screws	Vibrations of drive	Ignition risk due to sparking	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the steel laminae sets 3) Inspect coupling components and replace coupling components that are damaged 4) Insert steel laminae sets, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Find out the reason for vibrations




When operating with a faulty laminae set (see chapter 10.3) proper operation is not assured.

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.

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

 KTR-Group	RADEX®-NC RADEX®-NC HT Operating/Assembly instructions	KTR-N 47210 EN Sheet: 29 of 37 Edition: 11
---------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	-----------------------------------------------------------------------

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®-NC and RADEX®-NC HT 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 laminae 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  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

Please observe protection note ISO 16016.	Drawn: 2022-07-26 Pz/Wb Verified: 2022-08-08 Pz	Replacing: KTR-N dated 2020-02-14 Replaced by:
-------------------------------------------	----------------------------------------------------	---------------------------------------------------

 KTR-Group	RADEX®-NC RADEX®-NC HT Operating/Assembly instructions	KTR-N 47210 EN Sheet: 30 of 37 Edition: 11
---------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	-----------------------------------------------------------------------

10 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

Applicable hub designs/types:

**a) Hubs that may be used in group II, category 2 and 3:
(hubs with feather keyway and clamping ring hubs)**

- 2.6 Clamping hub double slot with feather keyway
- 3.6 Clamping hub triple slot with feather keyway
- 6.5 Clamping ring hub
- Type DK and EK with hubs corresponding to the aforementioned details

**b) Hubs which may be used in group II, category 3 only:
(hubs without feather keyway)**

- 2.5 Clamping hub double slot without feather keyway
- 3.5 Clamping hub triple slot without feather keyway
- Type DK and EK with hubs corresponding to the aforementioned details



Hubs, clamping hubs or similar types without feather keyway may be used in category 3 only and are marked with category 3 accordingly.

Please observe protection note ISO 16016.	Drawn: 2022-07-26 Pz/Wb Verified: 2022-08-08 Pz	Replacing: KTR-N dated 2020-02-14 Replaced by:
----------------------------------------------	------------------------------------------------------------------	-----------------------------------------------------------------



10 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

10.1 Intended use in potentially explosive atmospheres

Conditions of operation in potentially explosive atmospheres

The **RADEX®-NC** and **RADEX®-NC HT** 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⁾
T3	-30 °C to +175 °C	+195 °C
T4	-30 °C to +110 °C	+130 °C
T5	-30 °C to +75 °C	+95 °C
T6	-30 °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 class a safety margin subject to standard of 5 K is added.

1) The ambient or operating temperature T_a is limited to +175 °C due to the permissible permanent operating temperature.

2) The maximum surface temperature of +195 °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 not approved/not suitable for equipment group M1*).

Permissible ambient temperature -30 °C to +130 °C.

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.
M2 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.



Hubs, clamping hubs or similar types without feather keyway may be used in category 3 only and are marked with category 3 accordingly.

RADEX®-NC coupling

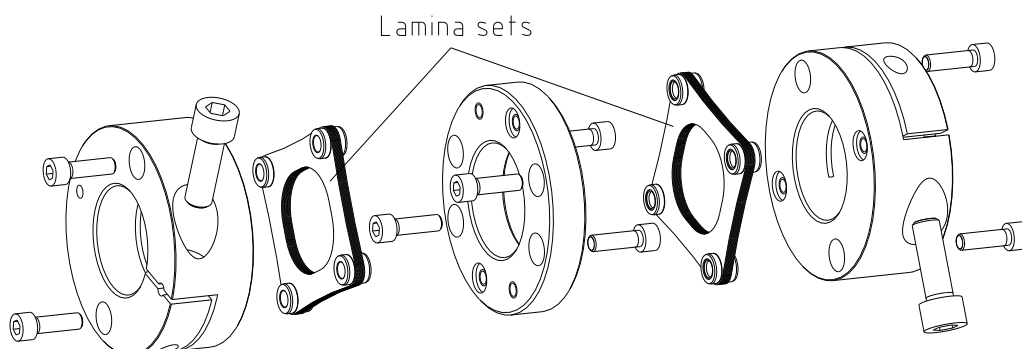



Illustration 26: Example of RADEX®-NC type DK (hub type 2.5)

**10 Enclosure A**Advice and instructions regarding the use in  potentially explosive atmospheres**10.3 Visual inspection and measures**

During the visual inspection the laminae sets must be inspected for cracks and cap screws working loose. Cap screws working loose must be tightened at the screw tightening torque specified (see table 10). Laminae sets and screws showing cracks must be replaced immediately, irrespective of the inspection intervals.

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.



If used in potentially explosive atmospheres all screw connections must be secured against working loose additionally, e. g. conglomerating with Loctite (average strength).

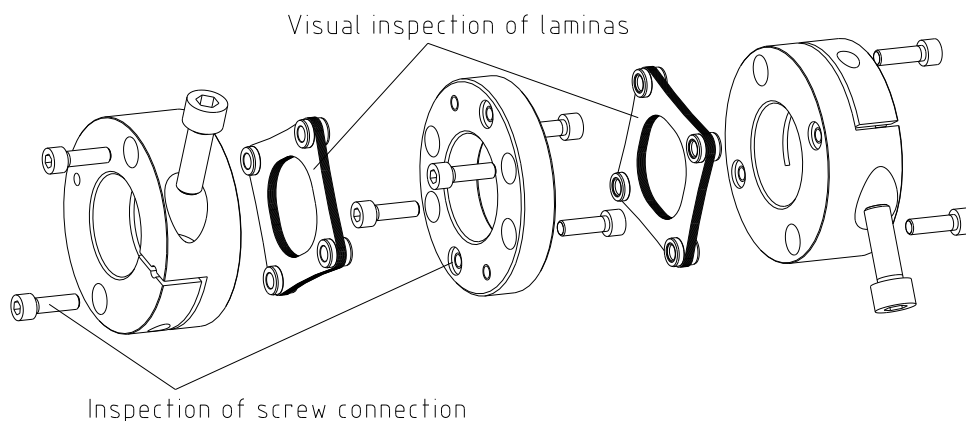


Illustration 27: Example of RADEX®-NC type DK (hub type 2.5)




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 11). If the figures are exceeded, the coupling will be damaged. Faulty components have to be replaced.

**KTR-Group**

RADEX®-NC
RADEX®-NC HT
Operating/Assembly instructions

KTR-N 47210 EN
 Sheet: 34 of 37
 Edition: 11

10 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres



10.4  marking of coupling for potentially explosive atmospheres

The explosion protection marking of the RADEX®-NC and RADEX®-NC HT coupling is applied on the outer sheath or on the front side. The spacer is not marked.

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



The following marking applies for the products:

- Type without aluminium, with feather keyway and/or clamping ring hub (Category 2)

 	I M2	Ex h	I				Mb	X	-30 °C ≤ T _a ≤ +130 °C
	II 2G	Ex h	IIC	T6	...	T3	Gb	X	
	II 2D	Ex h	IIIC	T80 °C	...	T195 °C	Db	X	
<Year>				-30 °C ≤ T _a ≤ +60 °C	...	+175 °C			



KTR Systems GmbH, Carl-Zeiss-Str. 25, D-48432 Rheine

- Type without aluminium, without feather keyway (Category 3)

 	I M2	Ex h	I				Mb	X	-30 °C ≤ T _a ≤ +130 °C
	II 3G	Ex h	IIC	T6	...	T3	Gc	X	
	II 3D	Ex h	IIIC	T80 °C	...	T195 °C	Dc	X	
<Year>				-30 °C ≤ T _a ≤ +60 °C	...	+175 °C			



KTR Systems GmbH, Carl-Zeiss-Str. 25, D-48432 Rheine

- Type with aluminium, with feather keyway and/or clamping ring hub (Category 2)

 	II 2G	Ex h	IIC	T6	...	T3	Gb	X
	II 2D	Ex h	IIIC	T80 °C	...	T195 °C	Db	X
	<Year>			-30 °C ≤ T _a ≤ +60 °C	...	+175 °C		

KTR Systems GmbH, Carl-Zeiss-Str. 25, D-48432 Rheine

- Type with aluminium, without feather keyway (Category 3)

 	II 3G	Ex h	IIC	T6	...	T3	Gc	X
	II 3D	Ex h	IIIC	T80 °C	...	T195 °C	Dc	X
	<Year>			-30 °C ≤ T _a ≤ +60 °C	...	+175 °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®-NC
 RADEX®-NC HT
 <Year>




**KTR-Group**

RADEX®-NC
RADEX®-NC HT
Operating/Assembly instructions

KTR-N 47210 EN
 Sheet: 35 of 37
 Edition: 11

10 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

10.4  marking of coupling for potentially explosive atmospheres**Deviating marking applied until 31st October 2019:**

Short marking:



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



Complete marking:



II 2G c IIC T6, T5, T4, T3 resp. $T_2 -30\text{ °C} \leq T_a \leq +75\text{ °C}$, $+90\text{ °C}$,
 $+125\text{ °C}$, $+190\text{ °C}$ resp. $+200\text{ °C}$
 II 2D c T 110 °C $-30\text{ °C} \leq T_a \leq +100\text{ °C}$ /I M2 c $-30\text{ °C} \leq T_a \leq +140\text{ °C}$

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 3G	Equipment ensuring a normal level of safety, suitable for zone 2
Equipment category 2D	Equipment ensuring a high level of safety, suitable for zone 21
Equipment category 3D	Equipment ensuring a normal level of safety, suitable for zone 22
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
IIC	Gases and vapours of class IIC (including IIA and IIB)
IIIC	Electrically conductive dusts of class IIIC (including IIIA and IIIB)
T6 ... T3	Temperature class to be considered, depending on the ambient temperature
$T_{80}\text{ °C} \dots T_{195}\text{ °C}$	Maximum surface temperature to be considered, depending on the ambient temperature
$-30\text{ °C} \leq T_a \leq +60\text{ °C} \dots +175\text{ °C}$ or $-30\text{ °C} \leq T_a \leq +175\text{ °C}$	Permissible ambient temperature from -30 °C to $+60\text{ °C}$ resp. -30 °C to $+175\text{ °C}$
Gb, Db, Mb	Equipment protection level, high level of safety, analogous to the equipment category
Gc, Dc	Equipment protection level, normal level of safety, analogous to the equipment category
X	For a safe use of the couplings particular conditions apply

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).

Please observe protection
note ISO 16016.

Drawn: 2022-07-26 Pz/Wb
 Verified: 2022-08-08 Pz


Replacing: KTR-N dated 2020-02-14
 Replaced by:

**KTR-Group**

RADEX®-NC
RADEX®-NC HT
Operating/Assembly instructions

KTR-N 47210 EN
Sheet: 36 of 37
Edition: 11

10 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

10.5 EU Certificate 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®-NC servo laminae couplings
RADEX®-NC HT servo 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®-NC or RADEX®-NC HT 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 IBExU05ATEXB002 X):

IBExU
Institut für Sicherheitstechnik GmbH
Identification number: 0637
Fuchsmühlenweg 7

09599 Freiberg

Rheine,
Place

2022-07-26
Date

i. V. 
Reinhard Wibbeling
Engineering/R&D

i. V. 
Johannes Deister
Product Manager

Please observe protection
note ISO 16016.

Drawn: 2022-07-26 Pz/Wb
Verified: 2022-08-08 Pz


Replacing: KTR-N dated 2020-02-14
Replaced by:

**KTR-Group**

**RADEX®-NC
RADEX®-NC HT
Operating/Assembly instructions**

KTR-N 47210 EN
Sheet: 37 of 37
Edition: 11

10 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

10.6 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®-NC servo laminae couplings RADEX®-NC HT servo 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®-NC or RADEX®-NC HT 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,
Place

2022-07-26
Date

i. V. 
Reinhard Wibbeling
Engineering/R&D

i. V. 
Johannes Deister
Product Manager

Please observe protection
note ISO 16016.

Drawn: 2022-07-26 Pz/Wb
Verified: 2022-08-08 Pz

Replacing: KTR-N dated 2020-02-14
Replaced by: