

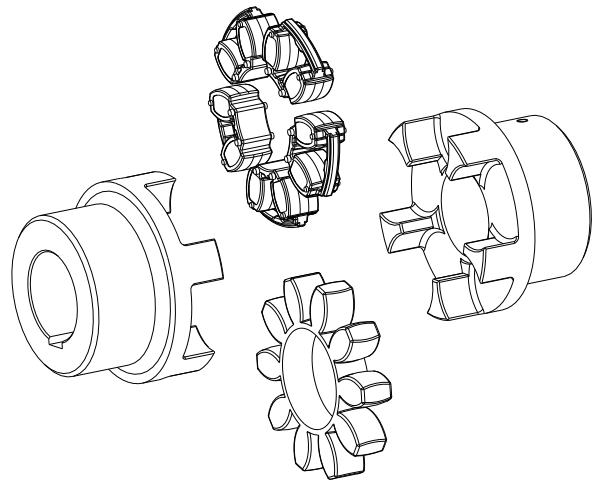


ROTEX®

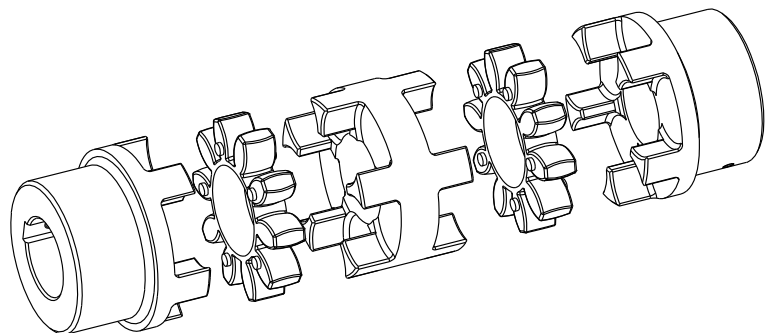
Torsionally flexible jaw-type couplings

No. 001 – shaft coupling,
No. 018 – DKM,
with taper clamping sleeve
and their combinations

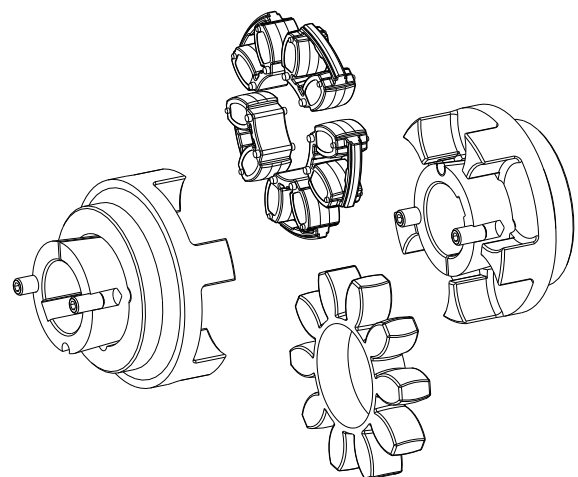
according to directive 2014/34/EU
for finish bored, pilot bored and
unbored couplings



Type No. 001 – shaft coupling



**Type No. 018 – DKM
double-cardanic coupling**



Type with taper clamping sleeve

ROTEX® is a torsionally flexible jaw coupling. It is able to compensate for shaft misalignment, for example caused by manufacturing inaccuracies, thermal expansion, etc.

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1 Technical data

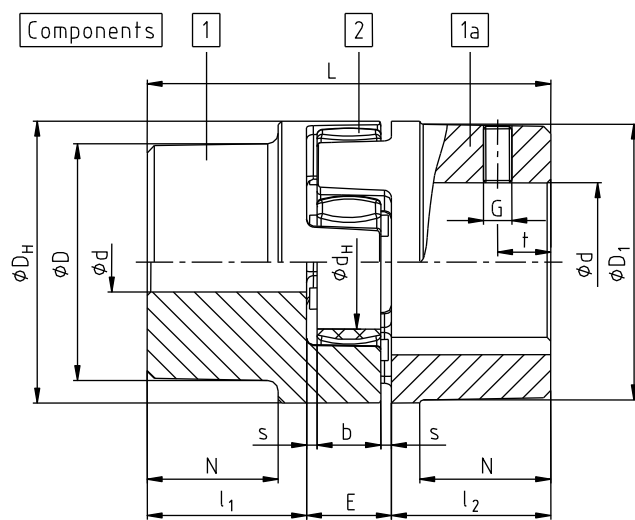


Illustration 1: ROTEX® (material: Al-D)

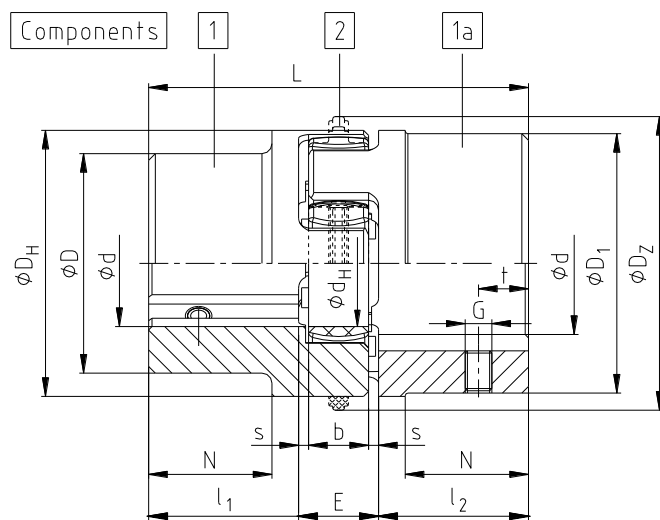


Illustration 2: ROTEX® (material: EN-GJL-250/EN-GJS-400-15)

Table 1: Material AI-D

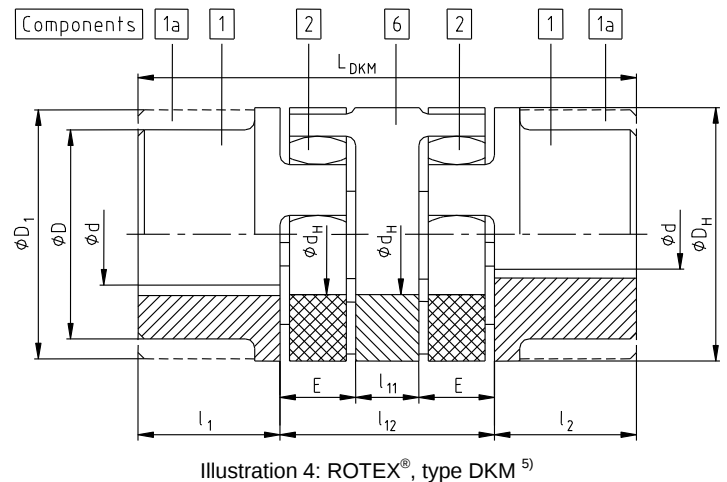
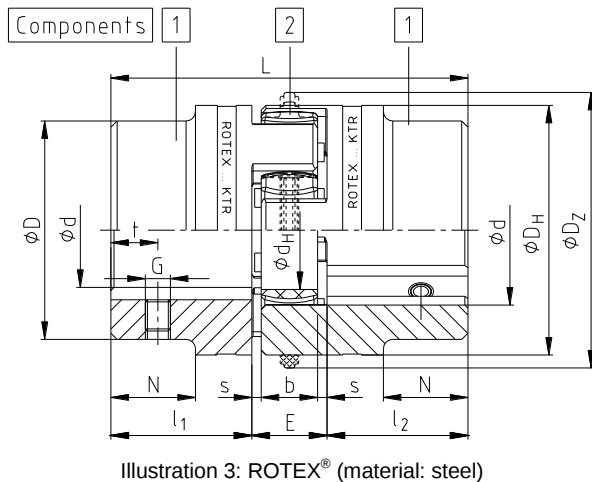
Size	Compo nent	Spider ¹⁾ (component 2) Rated torque [Nm]			Dimensions [mm] ³⁾												
					Finish bore ²⁾ d (min-max)	General											
		92 ShA	98 ShA	64 ShD		L	l ₁ ; l ₂	E	b	s	D _H	D _Z	D _{Z1} ⁴⁾	d _H	D ₇ D ₁	N	
14	1a	7.5	12.5	-	6 - 16	35	11	13	10	1.5	30	-	-	10	30	-	
19	1	10	17	-	6 - 19	66	25	16	12	2.0	41	-	-	18	32	20	
	1a				19 - 24										41		
24	1	35	60	-	9 - 24	78	30	18	14	2.0	56	-	-	27	40	24	
	1a				22 - 28										56		
28	1	95	160	-	10 - 28	90	35	20	15	2.5	67	-	-	30	48	28	
	1a				28 - 38										67		

Table 2: Material EN-GJL-250 (GG 25)/EN-GJS-400-15 (GGG 40)

Size	Compo nent	Spider ¹⁾ (component 2) Rated torque [Nm]			Finish bore ²⁾ d (min-max)	Dimensions [mm] ³⁾											
		92 ShA	98 ShA	64 ShD		General											
						L	l ₁ ; l ₂	E	b	s	D _H	D _Z	D _{Z1} ⁴⁾	d _H	D;D ₁	N	
Cast iron EN-GJL-250																	
38	1	190	325	405	12 - 40	114	45	24	18	3.0	80	-	-	38	66	37	
	1a				38 - 48										78		
	1b				12 - 48										70		62
42	1	265	450	560	14 - 45	126	50	26	20	3.0	95	-	-	46	75	40	
	1a				42 - 55										94		
	1b				14 - 55										75		65
48	1	310	525	655	15 - 52	140	56	28	21	3.5	105	-	-	51	85	45	
	1a				48 - 62										104		
	1b				15 - 62										188		80
55	1	410	685	825	20 - 60	160	65	30	22	4.0	120	-	-	60	98	52	
	1a				55 - 74										118		
65	1	625	940	1175	22 - 70	185	75	35	26	4.5	135	-	-	68	115	61	
75	1	1280	1920	2400	30 - 80	210	85	40	30	5.0	160	-	-	80	135	69	
90	1	2400	3600	4500	40 - 97	245	100	45	34	5.5	200	218	230	100	160	81	
Nodular iron EN-GJS-400-15																	
100	1	3300	4950	6185	50 - 115	270	110	50	38	6.0	225	246	260	113	180	89	
110	1	4800	7200	9000	60 - 125	295	120	55	42	6.5	255	276	290	127	200	96	
125	1	6650	10000	12500	60 - 145	340	140	60	46	7.0	290	315	330	147	230	112	
140	1	8550	12800	16000	60 - 160	375	155	65	50	7.5	320	345	360	165	255	124	
160	1	12800	19200	24000	80 - 185	425	175	75	57	9.0	370	400	415	190	290	140	
180	1	18650	28000	35000	85 - 200	475	185	85	64	10.5	420	450	465	220	325	150	

- 1) Maximum torque of the coupling $T_{Kmax.} = \text{rated torque of the coupling } T_{K \text{ rated}} \times 2$
- 2) Bores H7 with keyway to DIN 6885 sheet 1 [JS9] and thread for setscrew
- 3) For dimensions G and t see table 6; threads for setscrews are located opposite the keyway with material Al-D and on the keyway with material EN-GJL-250/EN-GJS-400-15
- 4) D_{Z1} = internal diameter of housing

Please observe protection note ISO 16016.	Drawn: 2017-09-06 Pz/Bru	Replacing: KTR-N dated 2017-01-02
	Verified: 2017-09-06 Pz	Replaced by:


1 Technical data

Table 3: Material steel

Size	Compo nent	Spider ¹⁾ (component 2) Rated torque [Nm]			Finish bore ²⁾ d (min-max)	Dimensions [mm] ³⁾										
		92 ShA	98 ShA	64 ShD		General										
						L	l ₁ ; l ₂	E	b	s	D _H	D _Z	D _{Z1} ⁴⁾	d _H	D	N
14	1a	7.5	12.5	16	0 - 16	35	11	13	10	1.5	30	-	-	10	30	-
	1b					50	18.5									
19	1a	10	17	21	0 - 25	66	25	16	12	2.0	40	-	-	18	40	-
	1b					90	37									
24	1a	35	60	75	0 - 35	78	30	18	14	2.0	55	-	-	27	55	-
	1b					118	50									
28	1a	95	160	200	0 - 40	90	35	20	15	2.5	65	-	-	30	65	-
	1b					140	60									
38	1	190	325	405	0 - 48	114	45	24	18	3.0	80	-	-	38	70	27
	1b					164	70								80	-
42	1	265	450	560	0 - 55	126	50	26	20	3.0	95	-	-	46	85	28
	1b					176	75								95	-
48	1	310	525	655	0 - 62	140	56	28	21	3.5	105	-	-	51	95	32
	1b					188	80								105	-
55	1	410	685	825	0 - 75	160	65	30	22	4.0	120	-	-	60	110	37
	1b					210	90								120	-
65	1	625	940	1175	0 - 80	185	75	35	26	4.5	135	-	-	68	115	47
	1b					235	100								135	-
75	1	1280	1920	2400	0 - 95	210	85	40	30	5.0	160	-	-	80	135	53
	1b					260	110								160	-
90	1	2400	3600	4500	0 - 110	245	100	45	34	5.5	200	218	230	100	160	62
	1b					295	125								200	-

Table 4: Type DKM ⁵⁾

Size	Spider ¹⁾ (component 2) Rated torque [Nm]		Dimensions [mm] ³⁾									
	92 ShA	98 ShA	Dimensions d, D, D ₁	General								
				L _{DKM}	l ₁ ; l ₂	E	b	s	D _H	d _H	l ₁₁	l ₁₂
19	10	17	see table 1 to 3	92	25	16	12	2.0	40	18	10	42
24	35	60		112	30	18	14	2.0	55	27	16	52
28	95	160		128	35	20	15	2.5	65	30	18	58
38	190	325		158	45	24	18	3.0	80	38	20	68
42	265	450		174	50	26	20	3.0	95	46	22	74
48	310	525		192	56	28	21	3.5	105	51	24	80
55	410	685		218	65	30	22	4.0	120	60	28	88
65	625	940		252	75	35	26	4.5	135	68	32	102
75	1280	1920		286	85	40	30	5.0	160	80	36	116
90	2400	3600		330	100	45	34	5.5	200	100	40	130

 1) Maximum torque of the coupling T_{Kmax} = rated torque of the coupling $T_{Krated} \times 2$

2) Bores H7 with keyway to DIN 6885 sheet 1 [JS9] and thread for setscrew

3) For dimensions G and t see table 6; threads for setscrews are located opposite the keyway with material Al-D and on the keyway with material EN-GJL-250/EN-GJS-400-15

 4) D_{Z1} = internal diameter of housing

5) Type DKM not available with DZ elements.

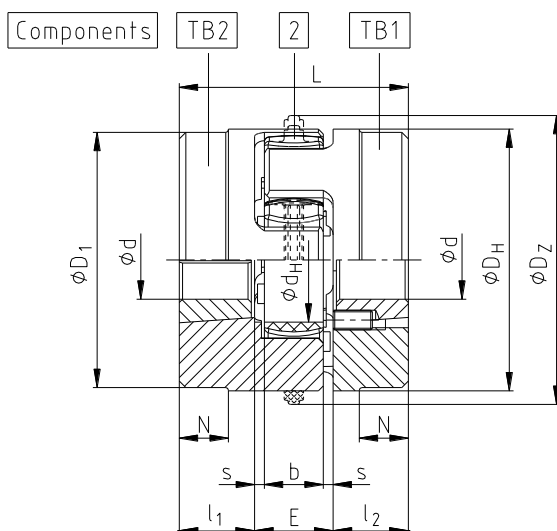

1 Technical data


Illustration 5: ROTEX®, type with taper clamping sleeve

Coupling design:

 TB1 Screwing on cam side
 TB2 Screwing on collar side

Different combinations of types TB1 and TB2 are possible.

Table 5: Type with taper clamping sleeve

Size	Compo nent	Spider ¹⁾ (component 2) Rated torque [Nm]		Finish bore d (min-max)	Dimensions [mm]												Taper clamping sleeve	
		92 ShA	98 ShA		General													
					L	l ₁ ; l ₂	E	b	s	D _H	D _Z	D _{Z1} 2)	d _H	D ₁	N			
24	1a	35	60	10 - 25	64	23	18	14	2.0	55	-	-	27	-	-	1008		
28	1a	95	160	10 - 25	66	23	20	15	2.5	65	-	-	30	-	-	1108		
38	1a	190	325	10 - 25	70	23	24	18	3.0	80	-	-	38	78	15	1108		
42	1a	265	450	14 - 25	78	26	26	20	3.0	95	-	-	46	94	16	1610		
48	1a	310	525	14 - 40	106	39	28	21	3.5	105	-	-	51	104	28	1615		
55	1a	410	685	14 - 50	96	33	30	22	4.0	120	-	-	60	118	20	2012		
65	1	625	940	14 - 50	101	33	35	26	4.5	135	-	-	68	115	5	2012		
75	1	1280	1920	16 - 60	144	52	40	30	5.0	160	-	-	80	158	36	2517		
				25 - 75												3020 ³⁾		
90	1	2400	3600	25 - 75	149	52	45	34	5.5	200	218	230	100	160	14	3020		
100	1	3300	4950	35 - 90	230	90	50	38	6.0	225	246	260	113	180	69	3535		
125	1	6650	10000	55 - 110	288	114	60	46	7.0	290	315	330	147	230	86	4545		

 1) Maximum torque of the coupling $T_{Kmax.}$ = rated torque of the coupling $T_{K rated} \times 2$

 2) D_{Z1} = internal diameter of housing

3) Available for type TB2 only



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

2 Advice
2.1 General advice

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



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

The 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.

 Please observe protection
 note ISO 16016.

 Drawn: 2017-09-06 Pz/Bru
 Verified: 2017-09-06 Pz

 Replacing: KTR-N dated 2017-01-02
 Replaced by:

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. Please make absolutely sure to read through and observe the following safety indications.

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

2.4 Intended use

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

- have carefully read through the operating/assembly instructions and understood them
- had technical training
- 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 **ROTEX®** described in here corresponds to the technical status at the time of printing of these operating/assembly instructions.

2 Advice

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 "ROTEX®").
 If the operating conditions (performance, speed, modifications on engine and machine) change, the coupling selection must be reviewed.
 Please make sure that the technical data regarding torque refer to the spider 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 please refer to the present operating/assembly instructions considering the warnings.

3 Storage, transport and packaging

3.1 Storage

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

The features of the coupling spiders (elastomers) remain unchanged for up to 5 years with favourable storage conditions.



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

3.2 Transport and packaging



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

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



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 ROTEX®, shaft coupling type No. 001

Component	Quantity	Description
1	2	Hub
2	1	Spider ¹⁾
3	5 ²⁾	DZ elements ¹⁾
4	2	Setscrews DIN EN ISO 4029

1) Optionally spider or DZ elements

2) With size 180 the quantity is 6.

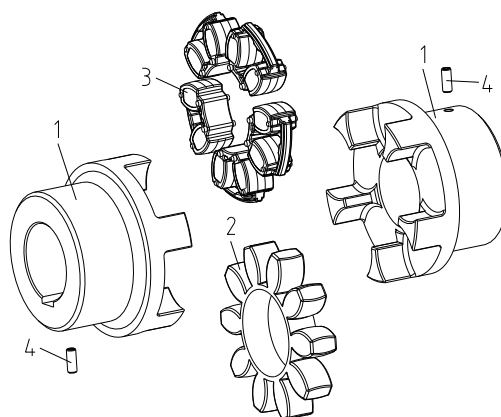


Illustration 6: ROTEX®

Components of ROTEX®, type DKM ¹⁾

Component	Quantity	Description
1	2	Hub
2	2	Spider
3	1	DKM spacer
4	2	Setscrews DIN EN ISO 4029

1) Type DKM not available with DZ elements.

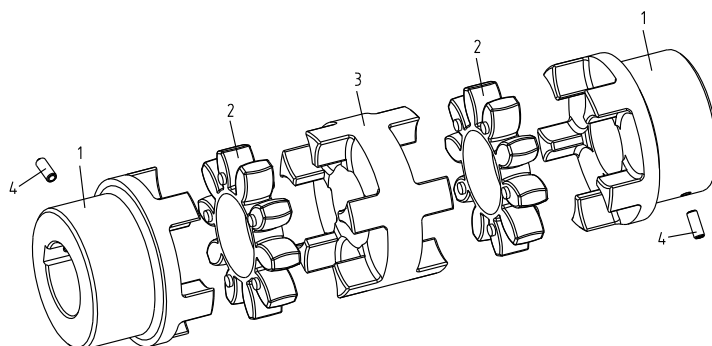


Illustration 7: ROTEX® DKM

Components of ROTEX®, type with taper clamping sleeve

Component	Quantity	Description
TB1/TB2	2	Hub for taper clamping sleeve
1	2	Taper clamping sleeve
2	1	Spider ¹⁾
3	5 ²⁾	DZ elements ¹⁾
4	4	Setscrews DIN EN ISO 4029

1) Optionally spider or DZ elements

2) With size 180 the quantity is 6.

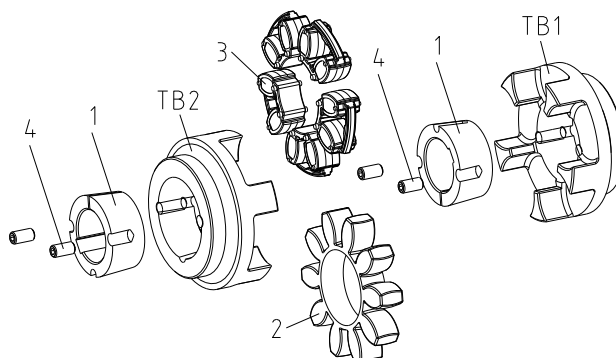


Illustration 8: ROTEX® type with taper clamping sleeve



4 Assembly

4.1 Components of the coupling

Features of standard spiders

Spider hardness (Shore)	92 Shore A		95/98 Shore A		64 Shore D	
	T-PUR® (orange)	PUR (yellow)	T-PUR® (purple)	PUR (red)	T-PUR® (light green)	PUR (natural white ¹⁾)
Marking (colour)						

1) Natural white with green marking of teeth

4.2 Advice for finish bore



The maximum permissible bore diameters d (see table 1 to 5 in chapter 1 - technical data) must not be exceeded. If these figures are disregarded, the coupling may tear. Rotating particles may cause danger to life.

- Hub bores machined by the customer have to observe concentricity or axial runout, respectively (see illustration 9).
- Please make absolutely sure to observe the figures for $\varnothing d_{\max}$.
- Carefully align the hubs when the finish bores are drilled.
- Please provide for a setscrew according to DIN EN ISO 4029 with a cup point or an end plate to fasten the hubs axially.

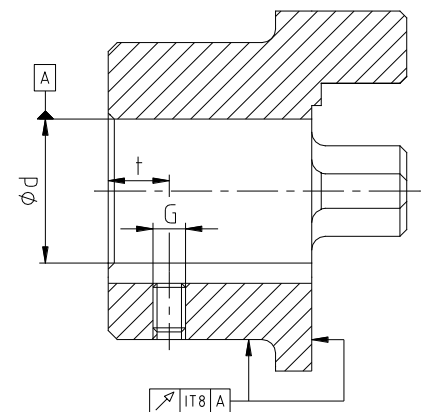


Illustration 9: Concentricity and axial runout



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 labelled with the symbol .

Table 6: Setscrews DIN EN ISO 4029

Size	14	19	24	28	38	42	48	55	65	75	90	100	110	125	140	160	180
Dimension G	M4	M5	M5	M8	M8	M8	M8	M10	M10	M10	M12	M12	M16	M16	M20	M20	M20
Dimension t	5	10	10	15	15	20	20	20	20	25	30	30	35	40	45	50	50
Tightening torque T_A [Nm]	1.5	2	2	10	10	10	10	17	17	17	40	40	80	80	140	140	140

4 Assembly

4.2 Advice for finish bore

Table 7: Recommended fit pairs acc. to DIN 748/1

Bore [mm]		Shaft tolerance	Bore tolerance
above	up to		
	50	k6	H7
50		m6	(KTR standard)

If a feather keyway is intended to be used in the hub, it should correspond to the tolerance ISO JS9 (KTR standard) with normal operating conditions or ISO P9 with difficult operating conditions (frequently alternating torsional direction, shock loads, etc.). The keyway should preferably be located between the cams. With axial fastening by setscrews the tapping should be located on the keyway with the exception of AI-D which should be located opposite to the keyway.

The transmittable torque of the shaft-hub-connection must be reviewed by the customer and is subject to his responsibility.

4.3 Assembly of the hubs



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



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



Please pay attention to the ignition risk in hazardous locations!



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



**With the assembly please make sure that the distance dimension E (see table 1 to 5) is observed to allow for axial clearance of the spider when in operation.
Disregarding this advice may cause damage to the coupling.**

- Mount the hubs on the shaft of driving and driven side (see illustration 10).
- Insert the spider or DZ elements into the cam section of the hub on the driving or driven side.
- Shift the power packs in axial direction until the distance dimension E is achieved (see illustration 11).
- If the power packs are already firmly assembled, shifting the hubs axially on the shafts allows for adjusting the distance dimension E.
- Fasten the hubs by tightening the setscrews DIN EN ISO 4029 with a cup point (tightening torques see table 6).



If the shaft diameters with inserted feather key are smaller than dimension d_H (see table 1 to 5) of the spider, one or two shaft ends may protude into the spider.



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

4 Assembly

4.3 Assembly of the hubs

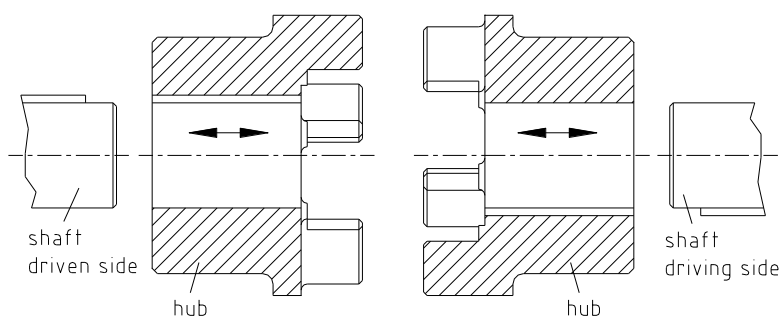


Illustration 10: Assembly of the hubs

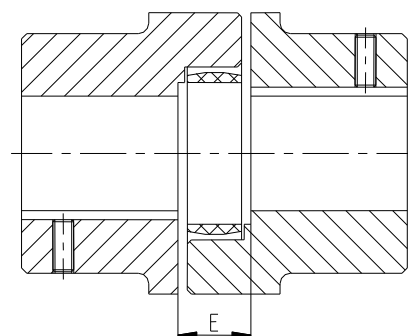


Illustration 11: Assembly of coupling

4.4 Assembly of taper clamping sleeve

Assembly of taper clamping sleeve:

Clean the contact surfaces of the taper clamping sleeves and of shaft and hub and afterwards apply thin fluid oil lightly (e. g. Ballistol Universal oil or Klüber Quietsch-Ex).

The taper clamping sleeves have axially parallel, cylindrical and smooth blind holes. Only half of these holes are located in the material of the sleeve. The other half located in the hub has threads.

Fit the coupling element and the taper clamping sleeve into each other, make sure that the bores cover each other and tighten the setscrews lightly. Fit the coupling element along with the taper clamping sleeve on the shaft and tighten the setscrews at the tightening torque specified in table 8.

During the process of screwing the hub is mounted onto the taper sleeve and thus the sleeve is pressed onto the shaft. By light blows of the hammer the taper clamping sleeve must be pushed further into the taper bore by means of a suitable sleeve. Afterwards please re-tighten the setscrews at the tightening torque indicated in table 8. This process must be performed at least once.

After the drive has operated under load for a short while please inspect if the setscrews have unscrewed.

An axial fixing of the Taper Lock hub (coupling hub with taper clamping sleeve) is obtained by proper assembly only.



If used in hazardous locations the setscrews to fix the taper clamping sleeves have to be secured against working loose additionally, e. g. conglomerating with Loctite (average strength).



The use of taper clamping sleeves without a feather key is not permitted in hazardous locations.



Oils and greases with molybdenum disulphide or high-pressure additives, additives of Teflon and silicone as well as internal lubricants reducing the coefficient of friction significantly must not be used.

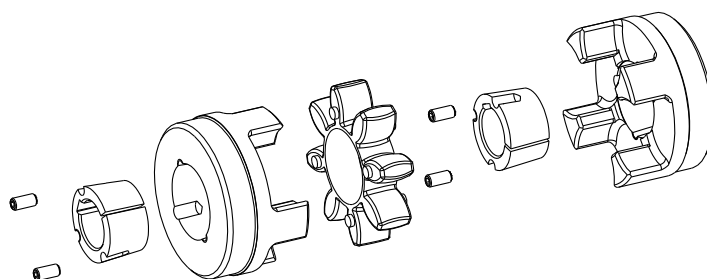


Illustration 12: ROTEX®, type with taper clamping sleeve



4 Assembly

4.4 Assembly of taper clamping sleeve

Disassembly of taper clamping sleeve:

The taper clamping sleeve is released by removing the setscrews. Afterwards one of the setscrews used as forcing screw is screwed in the thread of the sleeve and tightened. The coupling hub detached in this way can be manually removed from the shaft with the taper clamping sleeve.

Table 8:

Taper clamping sleeve	Screw dimensions				Quantity
	G [inch]	L [inch]	SW [mm]	T _A [Nm]	
1008	1/4	1/2	3	5.7	2
1108	1/4	1/2	3	5.7	2
1610	3/8	5/8	5	20	2
1615	3/8	5/8	5	20	2
2012	7/16	7/8	6	31	2
2517	1/2	7/8	6	49	2
3020	5/8	1 1/4	8	92	2
3535	1/2	1 1/2	10	115	3
4545	3/4	1 3/4	12	170	3

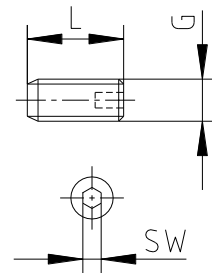


Illustration 13: Withworth setscrew (BSW)

4.5 Displacements - alignment of the couplings

The displacement figures shown in tables 9 to 11 provide for sufficient safety to compensate for external influences like, for example, heat expansion or foundation settling.



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

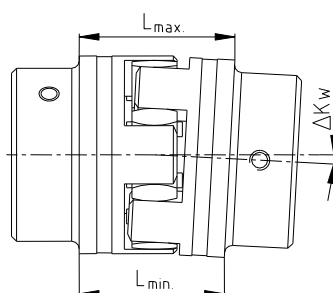
Please absolutely observe the displacement figures indicated (see table 9 to 11). If the figures are exceeded, the coupling will be damaged.

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

If used in hazardous locations for the explosion group IIC (marking II 2GD c IIC T X), only half of the displacement figures (see table 9 to 11) are permissible.

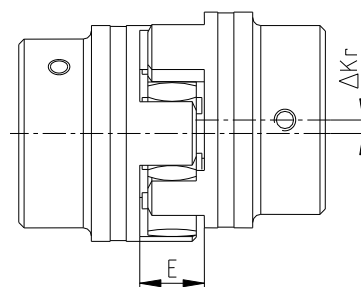
Please note:

- The displacement figures specified in table 9 to 11 are maximum figures which must not arise in parallel. If radial and angular displacements arise at the same time, the permissible displacement values may only be used proportionally (see illustration 15).
- Please inspect with a dial gauge, ruler or feeler whether the permissible displacement figures of tables 9 to 11 can be observed.

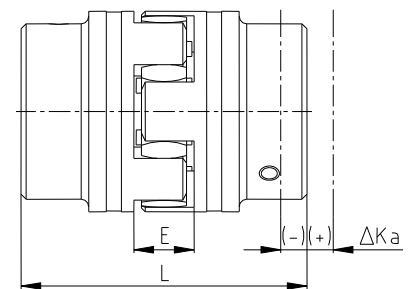


Angular displacements

$$\Delta K_w = L_{1\max.} - L_{1\min.} \quad [\text{mm}]$$



Radial displacements



Axial displacements

$$L_{\max} = L + \Delta K_a \quad [\text{mm}]$$

Illustration 14: Displacements



4 Assembly

4.5 Displacements - alignment of the couplings

Examples of the displacement combinations specified in illustration 15:

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 15:
Combinations of displacement

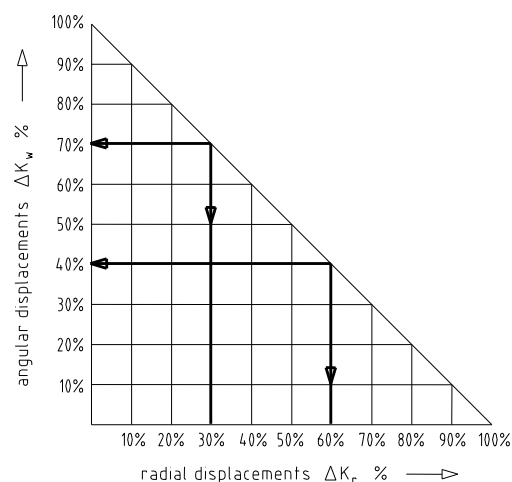


Table 9: Displacement figures for 92 and 95/98 Shore A

Size	14	19	24	28	38	42	48	55	65	75	90	100	110	125	140	160	180
Max. axial displacement ΔK_a [mm]	-0.5 +1.0	-0.5 +1.2	-0.5 +1.4	-0.7 +1.5	-0.7 +1.8	-1.0 +2.0	-1.0 +2.1	-1.0 +2.2	-1.0 +2.6	-1.5 +3.0	-1.5 +3.4	-1.5 +3.8	-2.0 +4.2	-2.0 +4.6	-2.0 +5.0	-2.5 +5.7	-3.0 +6.4
Max. radial displacement ΔK_r [mm] with																	
1500 rpm	0.17	0.20	0.22	0.25	0.28	0.32	0.36	0.38	0.42	0.48	0.50	0.52	0.55	0.60	0.62	0.64	0.68
3000 rpm	0.11	0.13	0.15	0.17	0.19	0.21	0.25	0.26	0.28	0.32	0.34	0.36	0.38	-	-	-	-
ΔK_w [degree]																	
max. angular displacement with n=1500 rpm	1.2	1.2	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.2	1.3	1.3	1.2	1.2	1.2
ΔK_w [mm]	0.67	0.82	0.85	1.05	1.35	1.70	2.00	2.30	2.70	3.30	4.30	4.80	5.60	6.50	6.60	7.60	9.00
ΔK_w [degree]																	
max. angular displacement with n=3000 rpm	1.1	1.1	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.1	1.1	1.2	-	-	-	-
ΔK_w [mm]	0.60	0.70	0.75	0.85	1.10	1.40	1.60	2.00	2.30	2.90	3.80	4.20	5.00	-	-	-	-

Table 10: Displacement figures for 64 Shore D

Size	14	19	24	28	38	42	48	55	65	75	90	100	110	125	140	160	180
Max. axial displacement ΔK_a [mm]	-0.5 +1.0	-0.5 +1.2	-0.5 +1.4	-0.7 +1.5	-0.7 +1.8	-1.0 +2.0	-1.0 +2.1	-1.0 +2.2	-1.0 +2.6	-1.5 +3.0	-1.5 +3.4	-1.5 +3.8	-2.0 +4.2	-2.0 +4.6	-2.0 +5.0	-2.5 +5.7	-3.0 +6.4
Max. radial displacement ΔK_r [mm] with																	
1500 rpm	0.11	0.13	0.15	0.18	0.21	0.23	0.25	0.27	0.30	0.34	0.36	0.37	0.40	0.43	0.45	0.46	0.49
3000 rpm	0.08	0.09	0.10	0.13	0.15	0.16	0.18	0.19	0.21	0.24	0.25	0.26	0.28	-	-	-	-
ΔK_w [degree]																	
max. angular displacement with n=1500 rpm	1.1	1.1	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.2	1.1	1.1	1.1
ΔK_w [mm]	0.57	0.77	0.77	0.90	1.25	1.40	1.80	2.00	2.50	3.00	3.80	4.30	5.30	6.00	6.10	7.10	8.00
ΔK_w [degree]																	
max. angular displacement with n=3000 rpm	1.0	1.0	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.0	1.0	1.0	1.1	-	-	-	-
ΔK_w [mm]	0.52	0.70	0.67	0.80	1.00	1.30	1.60	1.80	2.20	2.70	3.50	4.00	4.90	-	-	-	-

Table 11: Displacement figures for type DKM only

Size	19	24	28	38	42	48	55	65	75	90
Max. axial displacement ΔK_a [mm]	+1.2 -1.0	+1.4 -1.0	+1.5 -1.4	+1.8 -1.4	+2.0 -2.0	+2.1 -2.0	+2.2 -2.0	+2.6 -2.0	+3.0 -3.0	+3.4 -3.0
Max. radial displacement ΔK_r [mm] with n =										
1500 rpm	0.45	0.59	0.66	0.77	0.84	0.91	1.01	1.17	1.33	1.48
3000 rpm	0.40	0.53	0.60	0.70	0.75	0.82	0.81	1.05	1.19	1.33
ΔK_w [degree] max. angular displacement with n =										
1500 rpm	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3000 rpm	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9

5 Start-up

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



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

Finally the coupling protection against accidental contact must be fitted.

The cover must be electrically conductive and included in the equipotential bonding. Bell housings (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.

During operation of the coupling, please pay attention to

- different operating noise
- vibrations occurring.



If the couplings are used in locations subject to dust explosion and in mining the 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 if it is used as equipment of equipment group II.

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

If the protective device is used as cover, regular openings can be arranged from the point of view explosion protection that must not exceed the following dimensions:

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



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 mentioned 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 hazardous locations, the requirements on conductivity and coating thickness must be considered. In case of paintings up to 200 µm electrostatic load does not have to be expected. Multiple coatings exceeding 200 µm are prohibited for explosion group IIC.

6 Breakdowns, causes and elimination

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



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

General failures with use other than intended:

- Important data for the coupling selection were not forwarded.
- The calculation of the shaft-hub-connection was not considered.
- Coupling components with damage occurred during transport are assembled.
- If the heated hubs are assembled, the permissible temperature is exceeded.
- The clearance of the components to be assembled is not coordinated with one another.
- Tightening torques have been fallen below/exceeded.
- Components are mixed up by mistake/assembled incorrectly.
- A wrong or no spider/DZ elements are inserted in the coupling.
- No original **KTR** components (purchased parts) are used.
- Old/ spiders/DZ elements already worn off or spiders/DZ elements stored for too long are used.
- : The coupling used/the coupling protection used is not suitable for the operation in hazardous locations and does not correspond to EU directive 2014/34/EU, respectively.
- Maintenance intervals are not observed.

Breakdowns	Causes	Hazard notes for hazardous locations	Elimination
Different operating noise and/or vibrations occurring	Misalignment	Increased temperature on the spider surface; ignition risk by hot surfaces	1) Set the unit out of operation 2) Eliminate the reason for the misalignment (e. g. loose foundation bolts, breaking of the engine mount, heat expansion of unit components, modification of the installation dimension E of the coupling) 3) For inspection of wear see item inspection
	Wear of spider, short-term torque transmission due to metal contact	Ignition risk due to sparking	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the spider 3) Inspect coupling components and replace coupling components that are damaged 4) Insert spider, assemble coupling components 5) Inspect alignment, adjust if necessary
	Screws for axial fastening of hubs working loose	Ignition risk due to hot surfaces and sparking	1) Set the unit out of operation 2) Inspect alignment of coupling 3) Tighten the screws to fasten the hubs and secure against working loose 4) For inspection of wear see item inspection
Breaking of cams	Wear of spider, torque transmission due to metal contact	Ignition risk due to sparking	1) Set the unit out of operation 2) Replace complete coupling 3) Inspect alignment
	Breaking of the cams due to high impact energy/overload		1) Set the unit out of operation 2) Replace complete coupling 3) Inspect alignment 4) Find out the reason for overload



6 Breakdowns, causes and elimination

Breakdowns	Causes	Hazard notes for hazardous locations	Elimination
Breaking of cams	Operating parameters do not meet with the performance of the coupling	Ignition risk due to sparking	1) Set the unit out of operation 2) Review the operating parameters and select a bigger coupling (consider mounting space) 3) Assemble new coupling size 4) Inspect alignment
	Operating error of the unit		1) Set the unit out of operation 2) Replace complete coupling 3) Inspect alignment 4) Instruct and train the service staff
Early wear of spider	Misalignment	Increased temperature on the spider surface; ignition risk by hot surfaces	1) Set the unit out of operation 2) Eliminate the reason for the misalignment (e. g. loose foundation bolts, breaking of the engine mount, heat expansion of unit components, modification of the installation dimension E of the coupling) 3) For inspection of wear see item inspection
	e. g. contact with aggressive liquids/oils, ozone influence, too high/low ambient temperatures etc. causing physical modification of the spider	Ignition risk due to sparking with metallic contact of the cams	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the spider 3) Inspect coupling components and replace coupling components that are damaged 4) Insert spider, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Make sure that further physical modifications of the spider are excluded
	Ambient/contact temperatures which are too high for the spider, max. permissible e. g. with T-PUR® T4 = - 50 °C/ + 120 °C		1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the spider 3) Inspect coupling components and replace coupling components that are damaged 4) Insert spider, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Inspect and adjust ambient/contact temperature (possibly corrective by using different spider materials)
Early wear of spider (liquefaction of material inside the spider cam)	Vibrations of drive		1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the spider 3) Inspect coupling components and replace coupling components that are damaged 4) Insert spider, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Find out the reason for the vibrations (possibly corrective by spider with lower or higher Shore hardness)



If you operate with a worn spider/DZ elements (see item 10.3) and with the subsequent contact of metal parts a proper operation meeting the explosion protection requirements and acc. to directive 2014/34/EU is not ensured.

7 Disposal

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

- **Metal**
Any metal components have to be cleaned and disposed of by scrap metal.
- **Nylon materials**
Nylon materials have to be collected and disposed of by a waste disposal company.

8 Maintenance and service

ROTEX® is a low-maintenance coupling. We recommend to perform a visual inspection on the coupling **at least once a year**. Please pay special attention to the condition of the spider of the coupling.

- Since the flexible machine bearings of the driving and driven side settle during the course of load, please inspect the alignment of the coupling and re-align the coupling, if necessary.
- The coupling parts have to be inspected for damages.
- The screw connections have to be inspected visually.



Having started up the coupling the tightening torques of the screws have to be inspected during the usual inspection intervals.



With the use in hazardous locations please observe chapter 10.2 *Inspection intervals for couplings in Ex-hazardous locations*.

9 Spares inventory, customer service addresses

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

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



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

10 Enclosure A

Advice and instructions regarding the use in  hazardous locations

Type	Hub design	Sizes	Material
001	Standard	1.0, 1.1, 1.3	Cast iron (GJL)
		1a (large hub)	Nodular iron (GJS)
		clamping set 4.1, 4.2, 4.3	
	Clamping sleeve	Taper clamping sleeve	
019	Clamping ring hub	6.0, 6.5	Steel
	Clamping hub	2.0, 2.1, 2.3	
018	DKM	1.0, 1.1 spacers for drop-out center lengths 10 to 40 mm	

ROTEX® DKM and ROTEX® ZS-DKM only with spacer made of steel or aluminium semi-finished products with a yield point of $R_{p0.2} \geq 250 \text{ N/mm}^2$.



Hubs, clamping hubs or similar types without feather keyways may be used in category 3 only.

10.1 Intended use in hazardous locations

Conditions of operation in  hazardous locations

ROTEX® couplings are suitable for the use according to EU directive 2014/34/EU.

1. Industry (with the exception of mining)

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

Temperature class:

T-PUR®			PUR		
Temperature class	Ambient or operating temperature T_a	Max. surface temperature	Temperature class	Ambient or operating temperature T_a	Max. surface temperature
T3, T2, T1	- 50 °C to + 120 °C ¹⁾	+ 140 °C ²⁾	T4, T3, T2, T1	- 30 °C to + 90 °C ¹⁾	+ 110 °C ²⁾
T4	- 50 °C to + 115 °C	+ 135 °C	T5	- 30 °C to + 80 °C	+ 100 °C
T5	- 50 °C to + 80 °C	+ 100 °C	T6	- 30 °C to + 65 °C	+ 85 °C
T6	- 50 °C to + 65 °C	+ 85 °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 which has to be taken into account.

- 1) The ambient or operating temperature T_a is limited to + 90 °C (valid for T-PUR® only: + 120 °C) due to the permissible permanent operating temperature of the elastomers used.
- 2) The maximum surface temperature of + 110 °C (valid for T-PUR® only: + 140 °C) applies for the use in locations which are potentially subject to dust explosion, too.

**10 Enclosure A**
Advice and instructions regarding the use in  hazardous locations
10.1 Intended use in hazardous locations**2. Mining**

Equipment group I of category M2 (coupling is not approved for equipment group M1).
Permissible ambient temperature - 30 °C to + 90 °C (valid for T-PUR® only: - 50 °C to + 120 °C).

10.2 Inspection intervals for couplings in hazardous locations

Explosion group	Inspection intervals
3G 3D	For couplings which are classified in category 3G or 3D the operating and assembly instructions that are usual for standard operation apply. During the standard operation which has to be subject to the ignition risk analysis the couplings are free from any ignition source. Merely the temperature increase produced by self-heating and depending on the coupling type has to be considered: for ROTEX®: $\Delta T = 20 \text{ K}$
II 2GD c IIB T4, T5, T6	An inspection of the torsional backlash and a visual inspection of the flexible spider/DZ elements must be performed after 3,000 operating hours for the first time, at the latest after 6 months after start-up of the coupling. If you note insignificant or no wear on the spider/DZ elements 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 spider/DZ elements, please find out the cause according to the table „Breakdowns“, if possible. The maintenance intervals must be adjusted to the modified operating parameters without fail.
II 2GD c IIC T4, T5, T6	An inspection of the torsional backlash and a visual inspection of the flexible spider/DZ elements must be performed after 2,000 operating hours for the first time, at the latest after 3 months after start-up of the coupling. If you note insignificant or no wear on the spider/DZ elements 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 spider/DZ elements, please find out the cause according to the table „Breakdowns“, if possible. The maintenance intervals must be adjusted to the modified operating parameters without fail.



Hubs, clamping hubs or similar types without feather keyways may be used in category 3 only.



10 Enclosure A

Advice and instructions regarding the use in  hazardous locations10.2 Inspection intervals for couplings in hazardous locations

ROTEX® coupling

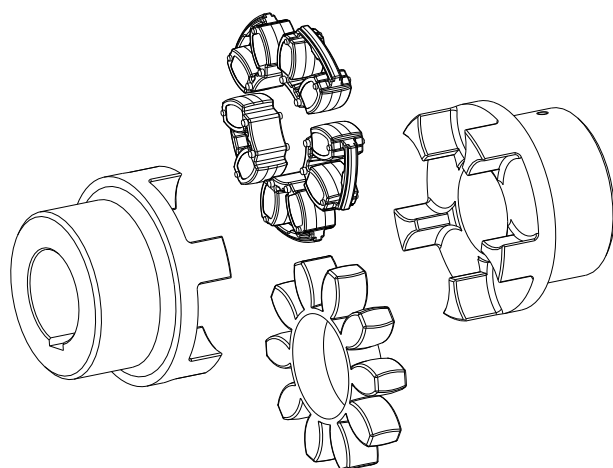
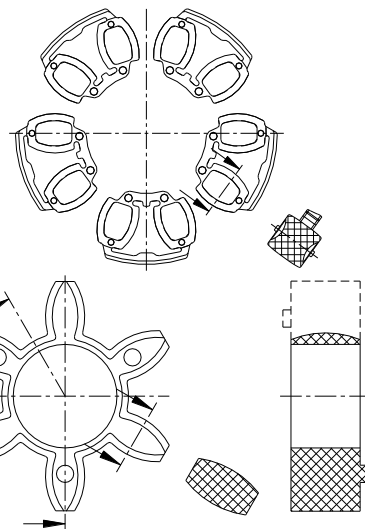
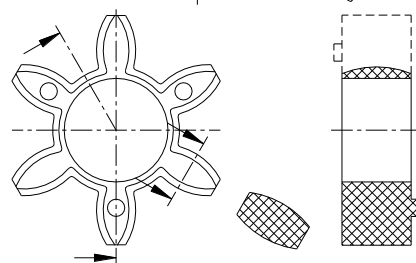


Illustration 16: ROTEX® coupling

Illustration 17.1:
ROTEX® DZ
elementsIllustration 17.2:
ROTEX® spider

Here the backlash between the cams of the coupling and the flexible spider/DZ element must be inspected by means of a feeler gauge.

When reaching the wear limit **maximum friction**, the spider/DZ element must be replaced immediately, irrespective of the inspection intervals.

10.3 Standard values of wear

In case of backlash > X mm, the flexible spider/DZ elements must be replaced.

Reaching the limits for replacing depends on the operating conditions and the existing operating parameters.



In order to ensure a long service life of the coupling and avoid dangers with the use in hazardous locations, the shaft ends must be accurately aligned. Please absolutely observe the displacement figures indicated (see table 9 to 11). If the figures are exceeded, the coupling will be damaged.

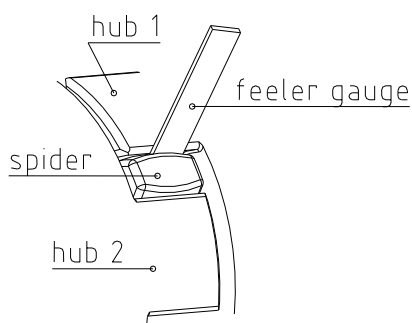


Illustration 18: Inspection of the limit of wear

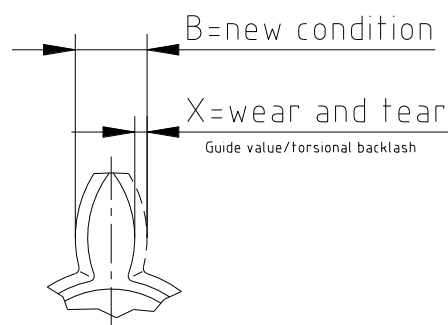


Illustration 19: Wear of spider



10 Enclosure A

Advice and instructions regarding the use in  hazardous locations

10.3 Standard values of wear

Table 12:

Size	Limits of wear (friction)	Size	Limits of wear (friction)
	X _{max.} [mm]		X _{max.} [mm]
9	2	65	5
14	2	75	6
19	3	90	8
24	3	100	9
28	3	110	9
38	3	125	10
42	4	140	12
48	4	160	14
55	5	180	14

10.4 Permissible coupling materials in hazardous locations

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

EN-GJL-250 (GG 25)
EN-GJS-400-15 (GGG 40)
Steel
Stainless steel

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

Aluminium diecast is generally excluded for hazardous locations.

10.5 marking of coupling for hazardous locations

Couplings for the use in hazardous locations are marked on at least one component completely and on the remaining components by an  label on the outside diameter of the hub or on the front side each for the operating conditions permitted. The flexible spider or DZ element is excluded. For reason of limited space only the symbol  is stamped up to size 19.

Short labelling:
(standard)



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

Complete labelling:
(valid for T-PUR® only)



II 2G c IIC T6, T5, T4 resp. T3 - $50^\circ\text{C} \leq T_a \leq +65^\circ\text{C}$, $+80^\circ\text{C}$,
 $+115^\circ\text{C}$ resp. $+120^\circ\text{C}$
II 2D c T 140°C /I M2 c - $50^\circ\text{C} \leq T_a \leq +120^\circ\text{C}$

Complete labelling:
(valid for PUR only)



II 2G c IIC T6, T5 resp. T4 - $30^\circ\text{C} \leq T_a \leq +65^\circ\text{C}$, $+80^\circ\text{C}$ resp.
 $+90^\circ\text{C}$
II 2D c T 110°C /I M2 c - $30^\circ\text{C} \leq T_a \leq +90^\circ\text{C}$

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

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



10 Enclosure A

Advice and instructions regarding the use in  hazardous locations

10.6 EU Certificate of conformity

EU Certificate of conformity

corresponding to EU directive 2014/34/EU dated 26 February 2014
and to the legal regulations

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

flexible ROTEX® couplings

in an explosion-proof design described in these operating/assembly instructions are devices corresponding to article 2, 1. of directive 2014/34/EU and comply with the general safety and health requirements according to enclosure II of directive 2014/34/EU.

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

DIN EN 1127-1
DIN EN 1127-2
DIN EN 13463-1
DIN EN 13463-5
CLC/TR 50404

The ROTEX® is in accordance with the specifications of the directive 2014/34/EU. One or several directives mentioned in the corresponding type examination certificate IBExU13ATEXB016 X were in part replaced by updated versions.

KTR Systems GmbH being the manufacturer confirms that the product mentioned above is in accordance with the specifications of the new directives, too.

According to article 13 (1) b) ii) of directive 2014/34/EU the technical documentation is deposited with the institution:

IBExU
Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7

09599 Freiberg

Rheine,
Place

2017-01-02
Date

i. V.
Reinhard Wibbeling
Engineering/R&D

i. V.
Michael Brüning
Product Manager