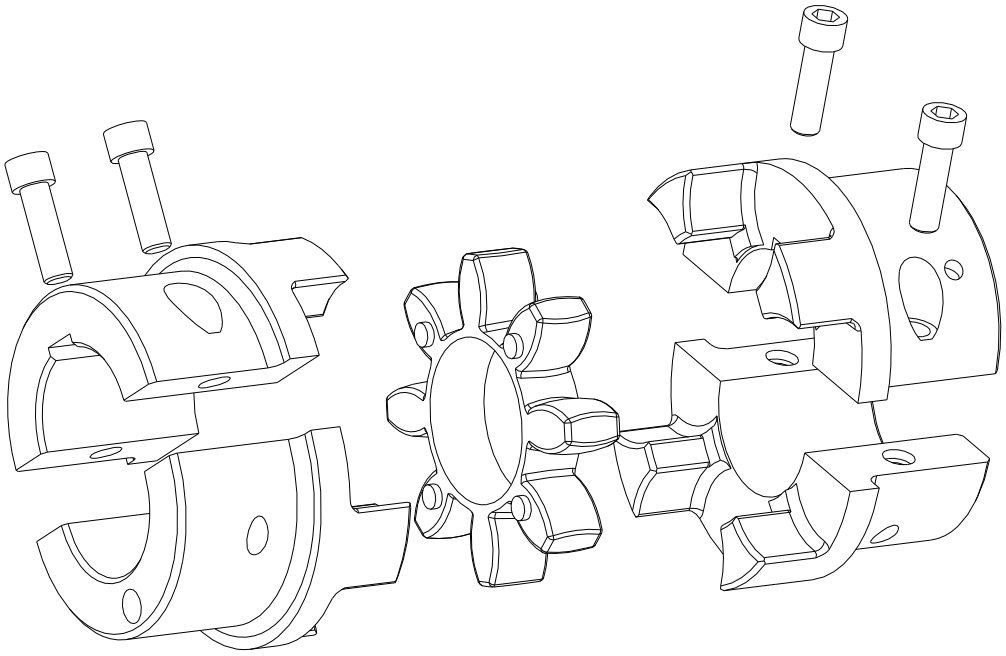
ROTEX®

Torsionally flexible jaw-type couplings type S-H
and their combinations

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



Type S-H

ROTEX® is a torsionally flexible jaw coupling. It is able to compensate for shaft misalignment, for example caused by manufacturing inaccuracies, thermal expansion, etc.
Type S-H allows to replace a spider/coupling without having to disassemble the driving or driven machine, respectively.

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1 Technical data

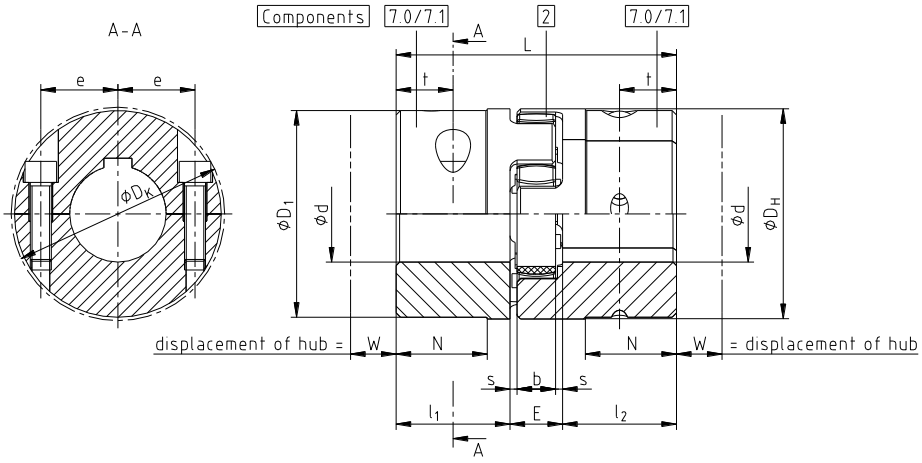


Illustration 1: ROTEX® type S-H, size 38 - 55 (material: EN-GJL-250)

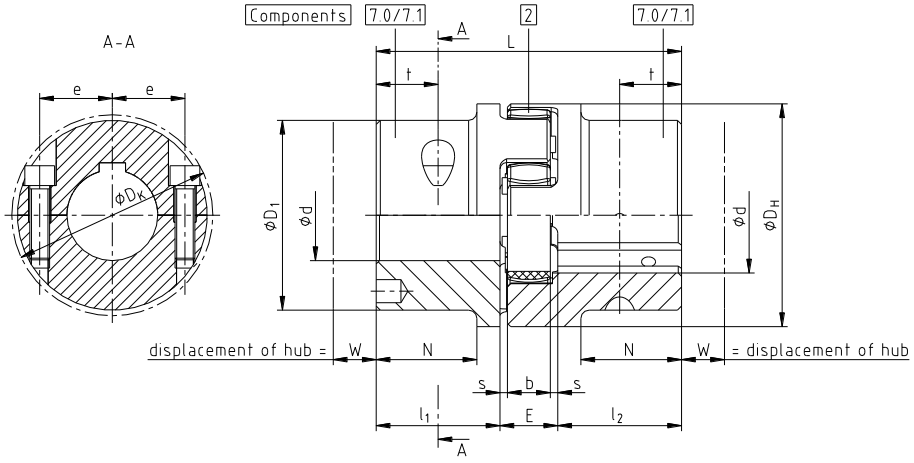


Illustration 2: ROTEX® type S-H, size 65 - 90 (material: EN-GJL-250)

Table 1: Dimensions

Size	Compo-nent	Spider [1] (component 2) Rated torque [Nm]			Dimensions [mm]										
					Max. finish bore [2]	General									
		92 ShA	98 ShA	64 ShD		L	l_1/l_2	E	b	s	D_H	D_1	d_H	N	W
38	7.0 7.1	190	325	405	Ø45	114	45	24	18	3.0	80	78	38	37	21.0
42	7.0 7.1	265	450	560	Ø55	126	50	26	20	3.0	95	94	46	40	23.0
48	7.0 7.1	310	525	655	Ø60	140	56	28	21	3.5	105	104	51	45	24.5
55	7.0 7.1	410	685	825	Ø70	160	65	30	22	4.0	120	118	60	52	26.0
65	7.0 7.1	625	940	1175	Ø70	185	75	35	26	4.5	135	115	68	61	30.5
75	7.0 7.1	1280	1920	2400	Ø80	210	85	40	30	5.0	160	135	80	69	35.0
90	7.0 7.1	2400	3600	4500	Ø90	245	100	45	34	5.5	200	160	100	81	39.5

1) Maximum torque of the coupling $T_{Kmax.}$ = rated torque of the coupling $T_{K\ rated}$ x 2
2) Bores H7 with keyway to DIN 6885 sheet 1 [JS9] and thread for setscrew

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

1 Technical data

With frictionally engaged connections the tolerance of the bore depends on the shaft. Respective fit pairs have to be calculated by KTR beforehand.

Table 2: Torques with frictionally engaged connections

Size	38	42	48	55	65	75	90
Bore Ø	Transmittable torque [1] of hub [Nm]						
Ø24	141.4	225.6	328.0	328.0			
Ø26	153.2	244.4	355.3	355.3			
Ø28	164.9	263.2	382.6	382.6			
Ø30	176.7	282.0	410.0	410.0			
Ø32	188.5	300.8	437.3	437.3			
Ø34	200.3	319.6	464.6	464.6			
Ø36	212.1	338.4	492.0	492.0			
Ø38	223.8	357.2	519.3	519.3			
Ø40	235.6	376.0	546.6	546.6	546.6	1036.7	
Ø42	247.4	394.9	574.0	574.0	574.0	1088.6	
Ø44	259.2	413.7	601.3	601.3	601.3	1140.4	
Ø45	265.1	423.1	615.0	615.0	615.0	1166.3	
Ø48		451.3	656.0	656.0	656.0	1244.1	
Ø50		470.1	683.3	683.3	683.3	1295.9	2014.5
Ø52		488.9	710.6	710.6	710.6	1347.7	2095.1
Ø54		507.7	738.0	738.0	738.0	1399.6	2175.7
Ø55		517.1	751.6	751.6	751.6	1425.5	2216.0
Ø56			765.3	765.3	765.3	1451.4	2256.3
Ø58			792.6	792.6	792.6	1503.3	2336.9
Ø60			820.0	820.0	820.0	1555.1	2417.5
Ø62				847.3	847.3	1606.9	2498.0
Ø64				874.6	874.6	1658.8	2578.6
Ø65				888.3	888.3	1684.7	2618.9
Ø66				902.0	902.0	1710.6	2659.2
Ø68				929.3	929.3	1762.4	2739.8
Ø70				956.6	956.6	1814.3	2820.4
Ø72					983.9	1866.1	2900.9
Ø74					1011.3	1917.9	2981.5
Ø75					1024.9	1943.9	3021.8
Ø76					1038.6	1969.8	3062.1
Ø78					1065.9	2021.6	3142.7
Ø80					1093.3	2073.5	3223.3
Ø82						2125.3	3303.9
Ø84						2177.1	3384.4
Ø85						2203.0	3424.7
Ø86						2229.0	3465.0
Ø88						2280.8	3545.6
Ø90						2332.6	3626.2
Ø92							3706.8
Ø94							3787.3
Ø95							3827.6

1) The transmittable torques of the frictionally engaged connection take into account the fit clearance with shaft tolerances h6/bore U7.

Clamping hubs (SPLIT hubs) without feather keyway may be used in category 3 only.

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 potentially explosive atmospheres, 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.

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 operating area of the coupling as long as it is in operation.
- Please secure the coupling against accidental contact. Please provide for the necessary protection devices and covers.

2 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
- 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.

2.5 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® type S-H

Component	Quantity	Description
1	2	SPLIT hub
2	1	Spider
3	2 1)	Cap screws DIN EN ISO 4762
4	1 1)	Setscrews DIN EN ISO 4029

1) each SPLIT hub

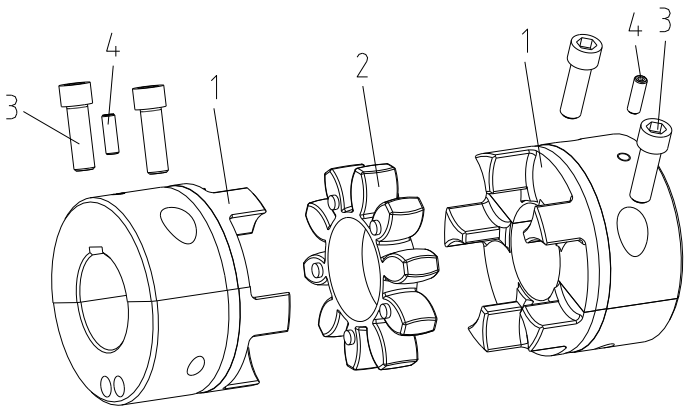


Illustration 3: ROTEX® type S-H

Clamping hubs (SPLIT hubs) without feather keyway may be used in category 3 only.

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 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 Ø 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.

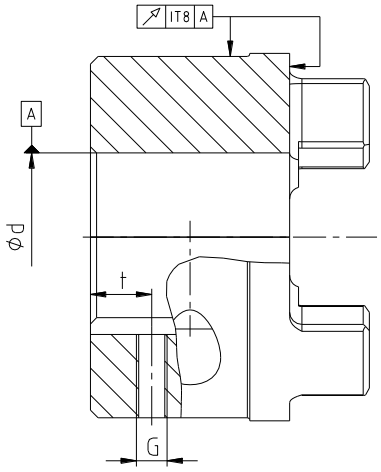


Illustration 9: Concentricity and axial runout

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 3: Setscrews DIN EN ISO 4029

Size	38	42	48	55	65	75	90
Dimension G	M8	M8	M8	M10	M10	M10	M12
Dimension t	15	20	20	20	20	25	30
Tightening torque T_A [Nm]	10	10	10	17	17	17	40

4 Assembly

4.3 Assembly of the coupling (general)

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

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

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

4.4 Assembly of the hubs (axial assembly)

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

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

- Mount the hubs on the shaft of driving and driven side (see illustration 5).
- Insert the spider 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 has been achieved (see illustration 6).
- If the power packs are already firmly assembled, shifting the hubs axially on the shafts allows for setting the distance dimension E.
- Tighten the cap screws of the SPLIT hubs reciprocally by means of a suitable torque key to the tightening torques T_A mentioned in table 4.
- Fasten the hubs by tightening the setscrews DIN EN ISO 4029 with a cup point (tightening torque see table 3).

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

Clamping hubs (SPLIT hubs) without feather keyway may be used in category 3 <u>only</u>.

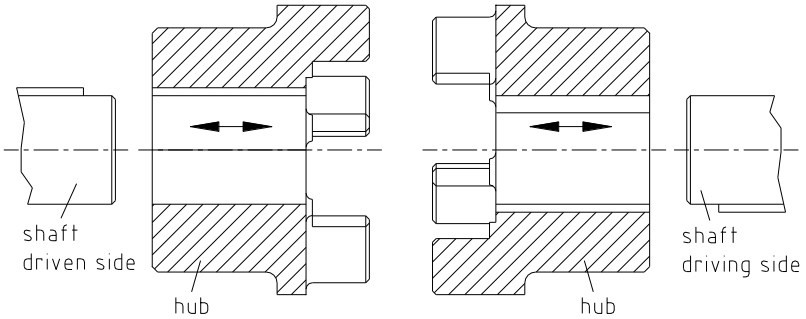


Illustration 5: Assembly of the hubs

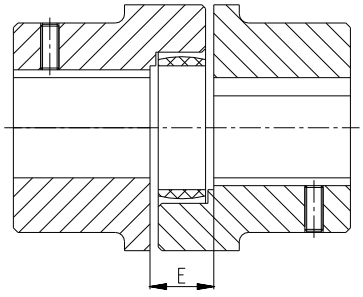


Illustration 6: Assembly of coupling

Table 4: Cap screws DIN EN ISO 4762

Size	38	42	48	55	65	75	90
Dimension M	M8	M10	M12	M12	M12	M16	M20
Tightening torque T_A [Nm]	34	67	115	115	115	290	560

4 Assembly

4.5 Assembly of the hubs (radial assembly)

- Remove the cap screws from the hubs.

☞ **If the shells cannot be separated, the separation process should be initiated via a suitable tool (mounting hammer).**

- Put the upper shell of the first SPLIT hub with the cap screws installed on the shaft (see illustration 7).
- Align the lower shell of the first SPLIT hub with the upper shell under the shaft (see illustration 8). Screw the cap screws in for several pitches.
- Align the upper and lower shell based on the outer outline so that the fracture surfaces fit exactly.

⚠ **The shell pairs of the two SPLIT hubs must not be interchanged, since the fracture surfaces of the respective hubs only fit exactly.**

- Hand-tighten the cap screws.
- Repeat the assembly described in here for the first SPLIT hub with the second SPLIT hub.
- Insert the spider 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 has been achieved (see illustration 9).
- Tighten the cap screws of the SPLIT hubs reciprocally by means of a suitable torque key to the tightening torques T_A mentioned in table 4.
- Fasten the hubs by tightening the setscrews DIN EN ISO 4029 with a cup point (tightening torque see table 3).

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

Ex **Clamping hubs (SPLIT hubs) without feather keyway may be used in category 3 only.**

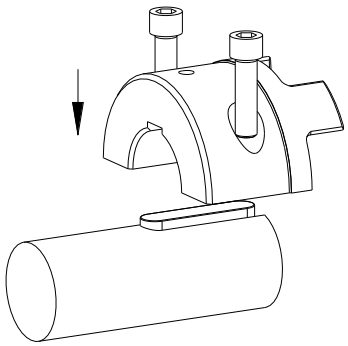


Illustration 7

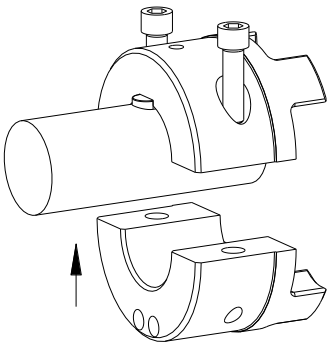


Illustration 8

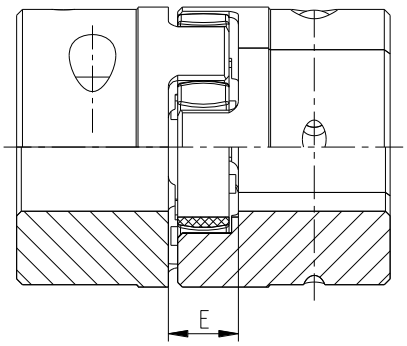


Illustration 9: Assembly of coupling

4 Assembly

4.6 Disassembly of the hubs

- Unscrew the cap screws of the first SPLIT hub by about 1 - 2 revolutions.

☞ **If the shells cannot be separated, the separation process should be initiated via a suitable tool (mounting hammer).**

- Shift the unscrewed hub out of the spider axially.
- Remove the cap screws and afterwards the shells.
- Remove the spider from the second SPLIT hub.
- Repeat the disassembly described in here for the first SPLIT hub with the second SPLIT hub.

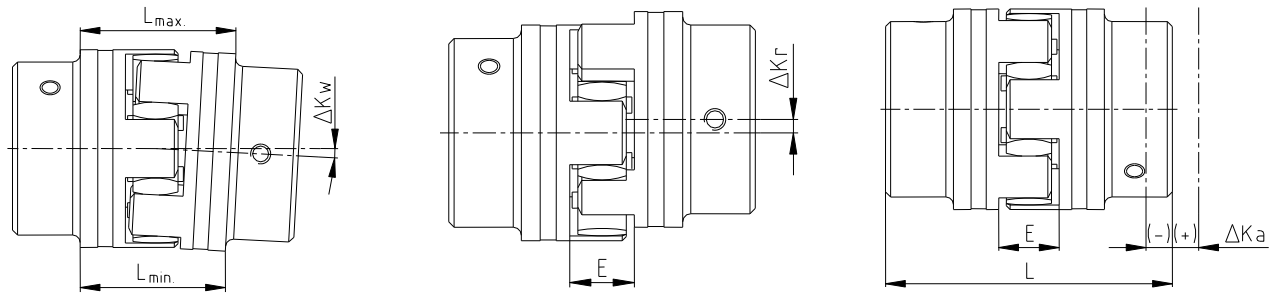
4.7 Displacements - alignment of the coupling

The displacement figures specified in tables 5 and 6 provide for sufficient safety to compensate for external influences like, for example, thermal expansion or foundation settling.

In order to ensure a long service life of the coupling and avoid dangers with the use in potentially explosive atmospheres, the shaft ends must be accurately aligned.
Please absolutely observe the displacement figures specified (see tables 5 and 6). 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 areas for the explosion group IIC (marking II 2GD c IIC T X), only half of the displacement figures (see tables 5 and 6) are permissible.

Please note:

- The displacement figures specified in tables 5 and 6 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 11).
- Please inspect with a dial gauge, ruler or feeler whether the permissible displacement figures of tables 5 and 6 can be observed.



Angular displacements | Radial displacements | Axial displacements

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

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

Illustration 10: Displacements

4 Assembly

4.7 Displacements - alignment of the coupling

Examples of the displacement combinations specified in illustration 11:

Example 1:
ΔK_r = 30 %
ΔK_w = 70 %

Example 2:
ΔK_r = 60 %
ΔK_w = 40 %

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

Illustration 11:
Combinations of displacement

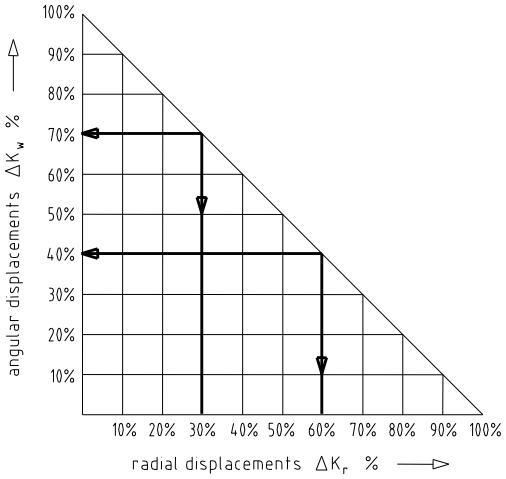


Table 5: Displacement figures for 92 and 95/98 Shore A

Size		38	42	48	55	65	75	90
Max. axial displacement ΔKa [mm]		-0.7	-1.0	-1.0	-1.0	-1.0	-1.5	-1.5
		+1.8	+2.0	+2.1	+2.2	+2.6	+3.0	+3.4
Max. radial displacement ΔKr [mm] with	1500 rpm	0.28	0.32	0.36	0.38	0.42	0.48	0.50
	3000 rpm	0.19	0.21	0.25	0.26	0.28	0.32	0.34
ΔKw [degree] max. angular displacement with n=1500 rpm ΔKw [mm]		1.0	1.0	1.1	1.1	1.2	1.2	1.2
		1.35	1.70	2.00	2.30	2.70	3.30	4.30
ΔKw [degree] max. angular displacement with n=3000 rpm ΔKw [mm]		0.9	0.9	1.0	1.0	1.1	1.1	1.1
		1.10	1.40	1.60	2.00	2.30	2.90	3.80

Table 6: Displacement figures for 64 Shore D

Size		38	42	48	55	65	75	90
Max. axial displacement ΔKa [mm]		-0.7	-1.0	-1.0	-1.0	-1.0	-1.5	-1.5
		+1.8	+2.0	+2.1	+2.2	+2.6	+3.0	+3.4
Max. radial displacement ΔKr [mm] with	1500 rpm	0.21	0.23	0.25	0.27	0.30	0.34	0.36
	3000 rpm	0.15	0.16	0.18	0.19	0.21	0.24	0.25
ΔKw [degree] max. angular displacement with n=1500 rpm ΔKw [mm]		0.9	0.9	1.0	1.0	1.1	1.1	1.1
		1.25	1.40	1.80	2.00	2.50	3.00	3.80
ΔKw [degree] max. angular displacement with n=3000 rpm ΔKw [mm]		0.8	0.8	0.9	0.9	1.0	1.0	1.0
		1.00	1.30	1.60	1.80	2.20	2.70	3.50

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

Finally the coupling protection against accidental contact must be fitted. It is required in accordance with DIN EN ISO 12100 (Safety of Machinery) and directive 2014/14/EU and must protect against

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

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 conductibility 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 failures specified below 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 potentially explosive atmospheres and does not correspond to EU directive 2014/34/EU, respectively.
- Maintenance intervals are not observed.

Breakdowns	Causes	Hazard notes for potentially explosive atmospheres	Elimination
Different operating noise and/or vibrations occuring	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 have been 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 potentially explosive atmospheres	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 have been 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 have been 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 have been 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 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 components 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 potentially explosive atmospheres please observe chapter 10.2 *Inspection intervals for couplings in potentially explosive atmospheres*.

9 Spares inventory, customer service addresses

A basic requirement to ensure the readiness for use 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 potentially explosive atmospheres

Type	Hub design	Sizes	Material
S-H	7.0, 7.1	38 - 90	Cast iron (GJL)

Clamping hubs (SPLIT hubs) without feather keyway may be used in category 3 only.

10.1 Intended use in potentially explosive atmospheres

Conditions of operation in potentially explosive atmospheres

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.

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 Enclosure A

Advice and instructions regarding the use in potentially explosive atmospheres

10.2 Inspection intervals for couplings in potentially explosive atmospheres

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®: $\Delta T = 20$ K
II 2G c IIB T4, T5, T6	An inspection of the torsional backlash and a visual inspection of the flexible spider 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 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, please find out the cause according to the table „Breakdowns“, if possible. The maintenance intervals must be adapted to the modified operating parameters without fail.
II 2G c IIC T4, T5, T6	An inspection of the torsional backlash and a visual inspection of the flexible spider 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 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, please find out the cause according to the table „Breakdowns“, if possible. The maintenance intervals must be adapted to the modified operating parameters without fail.

ROTEX® coupling

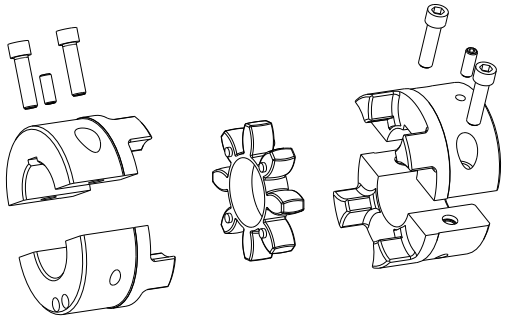


Illustration 12: ROTEX® type S-H

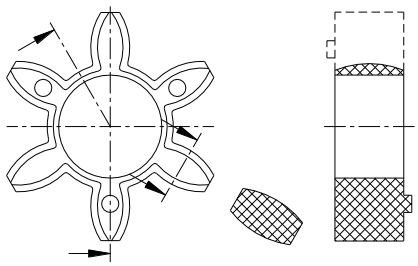


Illustration 13: ROTEX® spider

Here the backlash between the cams of the coupling and the flexible spider must be inspected by means of a feeler gauge.
When reaching the wear limit ***maximum friction***, the spider must be replaced immediately, irrespective of the inspection intervals.

10 Enclosure A

Advice and instructions regarding the use in potentially explosive atmospheres

10.3 Standard values of wear

In case of a backlash > X mm, the flexible spider 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 potentially explosive atmospheres, the shaft ends must be accurately aligned. Please absolutely observe the displacement figures specified (see tables 5 and 6). If the figures are exceeded, the coupling will be damaged.

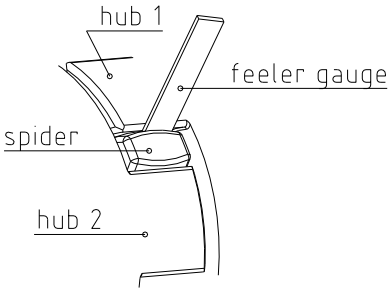


Illustration 14: Inspection of the limit of wear

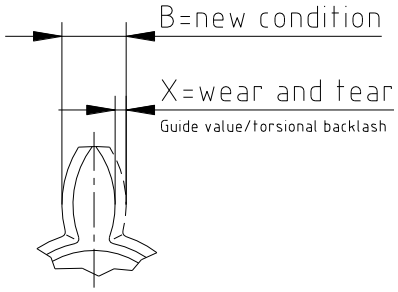


Illustration 15: Wear of spider

Table 7:

ROTEX® size	Limits of wear (friction) $X_{max.}$ [mm]	ROTEX® size	Limits of wear (friction) $X_{max.}$ [mm]
38	3	65	5
42	4	75	6
48	4	90	8
55	5		

10.4 Permissible coupling materials in potentially explosive atmospheres

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

Semifinished products made of aluminium with a magnesium share of up to 7.5°% and a yield point of $R_{p0.2} \geq 250$ N/mm^2 are permitted for the use in potentially explosive atmospheres.
Aluminium diecast is generally excluded for potentially explosive atmospheres.

10 Enclosure A

Advice and instructions regarding the use in potentially explosive atmospheres

10.5 marking of couplings for potentially explosive atmospheres

Couplings for the use in potentially explosive atmospheres 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 is excluded.

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 °C ≤ T_a ≤ + 65 °C, + 80 °C, + 115 °C resp. + 120 °C II 2D c T 140 °C/I M2 c - 50 °C ≤ T_a ≤ + 120 °C
Complete labelling: (valid for PUR only)	II 2G c IIC T6, T5 resp. T4 - 30 °C ≤ T_a ≤ + 65 °C, + 80 °C resp. + 90 °C II 2D c T 110 °C/I M2 c - 30 °C ≤ T_a ≤ + 90 °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 potentially explosive atmospheres

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 standards specified 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 specified 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,	2017-02-06	i. V.	i. V.
Place	Date	Reinhard Wibbeling Engineering/R&D	Michael Brüning Product Manager