

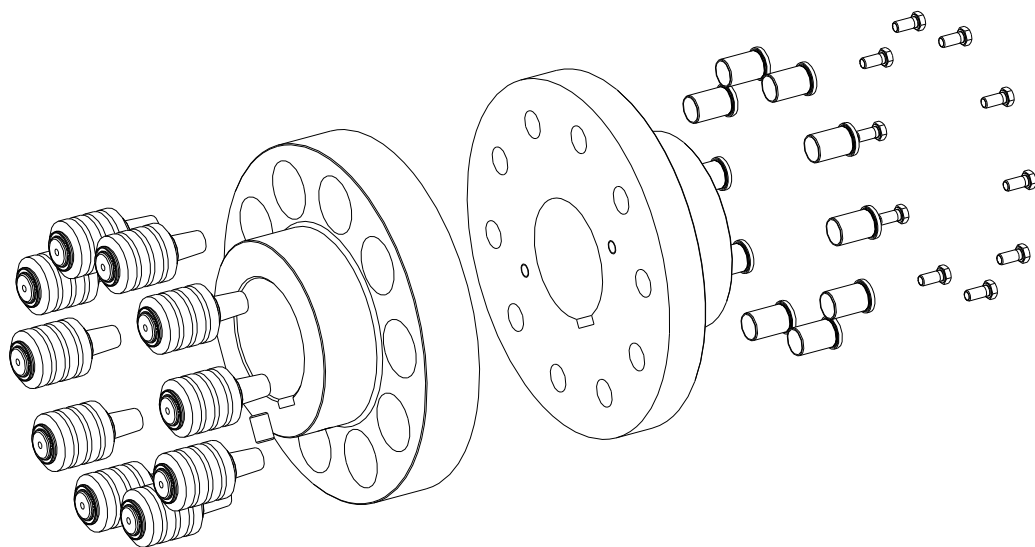


REVOLEX® KX / KX-D

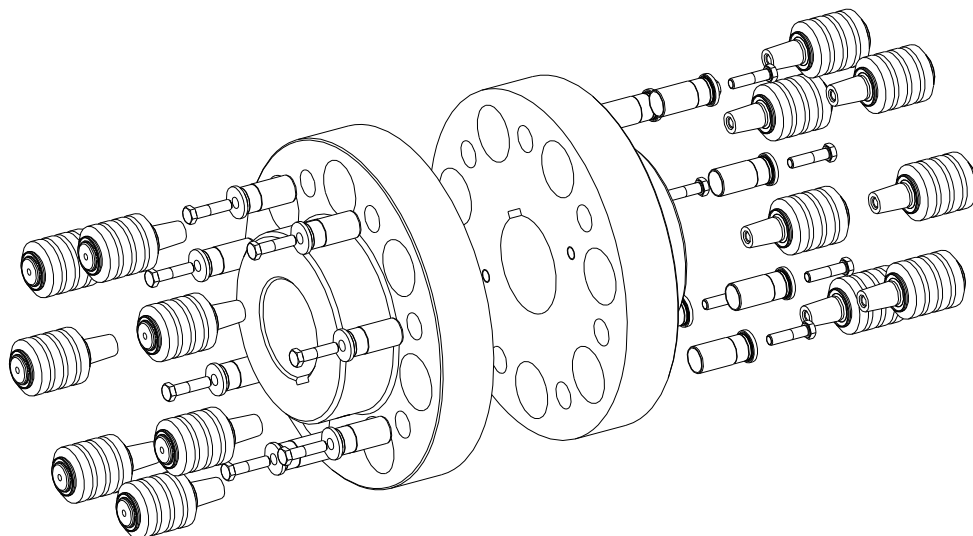
Pin & bush coupling

Flexible bolt & bush couplings types
KX and KX-D and their combinations

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



Type KX (taper bolt design B)



Type KX-D (taper bolt design B)

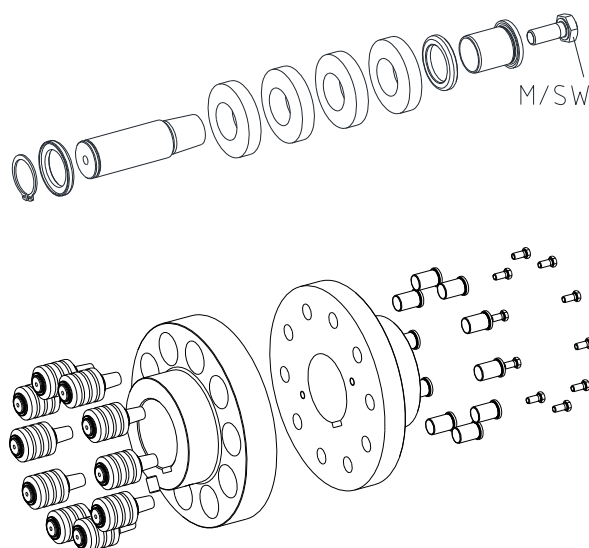
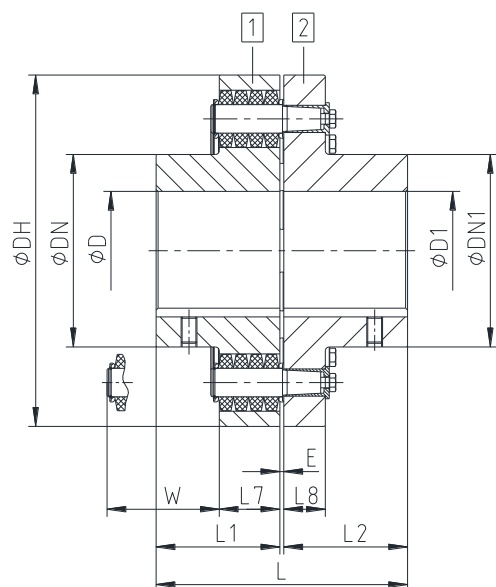
 KTR-Group	REVOLEX® KX / KX-D Operating/Assembly instructions	KTR-N 49410 EN Sheet: 2 of 30 Edition: 16
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REVOLEX® KX / KX-D is a torsionally flexible pin & bush coupling. It is able to compensate for shaft misalignment, for example caused by manufacturing inaccuracies, thermal expansion, etc.

Table of contents

1	Technical data	3
2	Advice	5
2.1	General advice	5
2.2	Safety and advice symbols	5
2.3	General hazard warnings	6
2.4	Intended use	6
2.5	Coupling selection	6
2.6	Reference to EC Machinery Directive 2006/42/EG	7
3	Storage, transport and packaging	7
3.1	Storage	7
3.2	Transport and packaging	7
4	Assembly	8
4.1	Components of the couplings	8
4.2	Components of the pins	10
4.3	Advice for finish bore	11
4.4	Assembly of the coupling (general)	12
4.5	Assembly of type KX	13
4.6	Assembly of type KX-D	14
4.7	Replacement of elastomer rings	15
4.8	Displacements - alignment of the couplings	16
5	Start-up	18
6	Breakdowns, causes and elimination	19
7	Disposal	21
8	Maintenance and service	21
9	Spares inventory, customer service addresses	22
10	Enclosure A Advice and instructions regarding the use in  potentially explosive atmospheres	22
10.1	Intended use in  potentially explosive atmospheres	23
10.2	Inspection intervals for couplings in  potentially explosive atmospheres	24
10.3	Standard values of wear	25
10.4	 marking of coupling for potentially explosive atmospheres	26
10.5	Rating of danger of ignition	28
10.6	EU Declaration of conformity	29
10.7	UK Declaration of conformity	30

Please observe protection note ISO 16016.	Drawn: 2022-11-04 Ka Verified: 2025-07-04 Ka	Replacing: KTR-N dated 2022-07-26 Replaced by:
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1 Technical data

Illustration 1: REVOLEX® type KX (taper bolt design B)
Table 1: Torques and dimensions - type KX (taper bolt design B)

REVOLEX® KX														
Size	Torque ¹⁾ in Nm		Cast iron		steel		Dimensions in mm							
			Max. speed ²⁾ in rpm	Max. finish bore ³⁾ D, D1	Max. speed ²⁾ in rpm	Max. finish bore ³⁾ D, D1	General							
	T _{KN}	T _{K max.}					L	L1, L2	E	DH	DN, DN1	L7	L8	W*
75	3440	6880	-	-	4500	100/110	193	95	3	255	136	56	30	76
85	4580	9160	-	-	4175	110/120	213	105	3	274	152	56	30	76
95	5140	10280	-	-	3825	125/140	227	112	3	298	168	56	30	76
105	7050	14100	2000	110/125	3475	130	237	117	3	330	180	56	30	76
120	10855	21710	1800	125/145	3100	150	270	132	6	370	206	76	46	100
135	15000	30000	1600	140/150	2725	170	300	147	6	419	230	76	46	100
150	19440	38880	1450	160	2500	185	336	165	6	457	256	76	46	100
170	29285	58570	1250	180	2150	220	382	188	6	533	292	92	63	130
190	40500	81000	1100	205	1900	245	428	211	6	597	330	92	63	130
215	52500	105000	1000	230	1725	275	480	237	6	660	368	92	63	130
240	70000	140000	900	250	1550	310	534	264	6	737	407	122	76	170
265	100500	201000	800	285	1375	350	590	292	6	826	457	122	76	170

1) Standard material NBR (Perbunan) 80 ± 5 Shore A

* Drop-out center dimension required

2) Dynamic balancing required

3) Bores H7 with keyway according to DIN 6885 sheet 1 [JS9] and setscrew on the keyway (see table 7)

Table 2: Pins - type KX (taper bolt design B)

Size	75	85	95	105	120	135	150	170	190	215	240	265
Pin size	3				4			5			6	
M in mm	M10				M12			M16			M24	
SW in mm	17				19			24			36	
Tightening torque T _A in Nm	67				115			290			970	

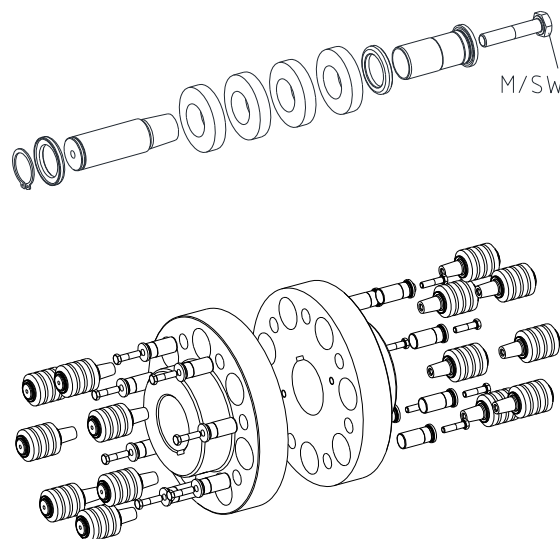
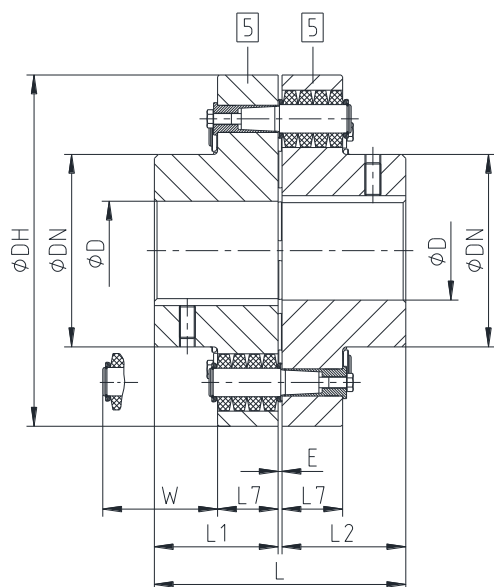

1 Technical data


Illustration 2: REVOLEX® type KX-D (taper pin design B)

Table 3: Torques and dimensions - type KX-D (taper pin design B)

REVOLEX® KX-D													
Size	Torque ¹⁾ in Nm		Cast iron		steel		Dimensions in mm						
			Max. speed ²⁾ in rpm	max. finish bore ³⁾ D	Max. speed ²⁾ in rpm	max. finish bore ³⁾ D	General						
	T _{KN}	T _{K max.}					L	L1, L2	E	DH	DN	L7	W*
75	4300	8600	-	-	4500	100	193	95	3	255	136	56	76
85	5500	11000	-	-	4175	110	213	105	3	274	152	56	76
95	7200	14400	-	-	3825	125	227	112	3	298	168	56	76
105	9400	18800	2000	110	3475	130	237	117	3	330	180	56	76
120	15200	30400	1800	125	3100	150	270	132	6	370	206	76	100
135	20000	40000	1600	140	2725	170	300	147	6	419	230	76	100
150	25000	50000	1450	160	2500	190	336	165	6	457	256	76	100
170	41000	82000	1250	180	2150	220	382	188	6	533	292	92	130
190	54000	108000	1100	205	1900	245	428	211	6	597	330	92	130
215	67500	135000	1000	230	1725	275	480	237	6	660	368	92	130
240	98000	196000	900	250	1550	310	534	264	6	737	407	122	170
265	134000	268000	800	285	1375	350	590	292	6	826	457	122	170
280	170000	340000	720	315	1225	385	628	311	6	927	508	122	170
305	205000	410000	675	330	1150	405	654	324	6	991	533	122	170
330	265000	530000	625	355	1075	435	666	330	6	1067	572	122	170
355	350000	700000	575	380	975	450	721	356	9	1156	610	164	220
370	430000	860000	535	450	900	530	773	382	9	1250	720	164	220
470	520000	1040000	-	-	855	520	969	480	9	1340	705	164	220
520	810000	1620000	-	-	740	560	1092	540	12	1540	780	220	300
590	1000000	2000000	-	-	680	630	1212	600	12	1735	885	220	300
650	1350000	2700000	-	-	590	700	1332	660	12	1935	975	220	300

1) Standard material NBR (Perbunan) 80 ± 5 Shore A

* Drop-out center dimension required

2) Dynamic balancing required

3) Bores H7 with keyway according to DIN 6885 sheet 1 [JS9] and setscrew on the keyway (see table 7)



1 Technical data

Table 4: Pins - type KX-D (taper pin design B)

Size	75	85	95	105	120	135	150	170	190	215
Pin size	3				4				5	
M in mm	M10				M12				M16	
SW in mm	17				19				24	
Tightening torque T_A in Nm	67				115				290	

Size	240	265	280	305	330	355	370	470	520	590	650
Pin size	6					7			8		
M in mm	M24					M30			M36		
SW in mm	36					46			55		
Tightening torque T_A in Nm	970					1350			2250		

2 Advice

2.1 General advice

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



The **REVOLEX® KX / KX-D** 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.

 KTR-Group	REVOLEX® KX / KX-D Operating/Assembly instructions	KTR-N 49410 EN Sheet: 6 of 30 Edition: 16
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2 Advice

2.3 General hazard warnings



With assembly, operation and maintenance of the coupling it has to be made sure that the entire drive train is secured against accidental switch-on. You may be seriously hurt by rotating parts. Make absolutely sure to read through and observe the following safety indications.

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

2.4 Intended use

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

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

The coupling may only be used in accordance with the technical data (see chapter 1). Unauthorized modifications on the coupling design are not admissible. We will not assume liability for any damage that may arise. In the interest of further development we reserve the right for technical modifications.

The **REVOLEX® KX / KX-D** 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 "REVOLEX® KX").

We recommend balancing from a circumferential speed of 30 m/s.

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

Please note that the technical data regarding torque refer to the elastomers only. The transmittable torque of the shaft-hub-connection must be reviewed by the customer and is subject to his responsibility.

For drives subjected 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 subjected to torsional vibrations are e. g. drives with diesel engines, piston pumps, piston compressors etc. If requested, KTR will perform the coupling selection and the torsional vibration calculation.

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 KTR-Group	REVOLEX® KX / KX-D Operating/Assembly instructions	KTR-N 49410 EN Sheet: 7 of 30 Edition: 16
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2 Advice

2.6 Reference to EC Machinery Directive 2006/42/EG

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

3 Storage, transport and packaging

3.1 Storage

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

The features of the elastomer rings 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.**

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: 2022-11-04 Ka Verified: 2025-07-04 Ka	Replacing: KTR-N dated 2022-07-26 Replaced by:
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4 Assembly

The coupling is generally supplied in individual parts. Before assembly the coupling must be inspected for completeness.

4.1 Components of the couplings

Components of REVOLEX® type KX (taper pin design B)

Component	Quantity	Description
1 ¹⁾	1	Hub part 1
2 ¹⁾	1	Hub part 2
3a	see table 5	Pins KX complete (design B)
4	see table 5	KX bush
7 ²⁾		Setscrew DIN EN ISO 4029

1) Material and balancing condition as specified by the customer

2) Axial fastening of the hub and tolerances of the shaft-hub-connections as specified by the customer

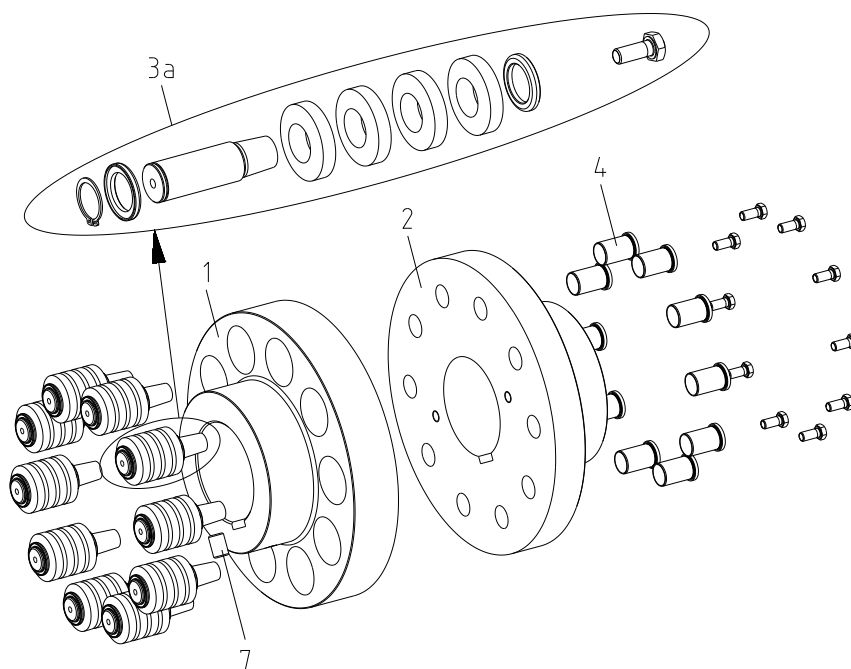


Illustration 3: REVOLEX® type KX (taper bolt design B)

Table 5:

Number Z of components	Size					
	75	85	95	105	120	135
3a, 4	8	10	10	12	10	12

Number Z of components	Size					
	150	170	190	215	240	265
3a, 4	14	10	12	14	10	12



4 Assembly

4.1 Components of the couplings

Components of REVOLEX® type KX-D (taper bolt design B)

Component	Quantity	Description
3c	see table 6	Pin KX-D complete (design B)
5 ¹⁾	2	Hub part 5
6	see table 6	KX-D sleeve
7 ²⁾		Setscrew DIN EN ISO 4029

1) Material and balancing condition as specified by the customer

2) Axial fastening of the hub and tolerances of the shaft-hub-connections as specified by the customer

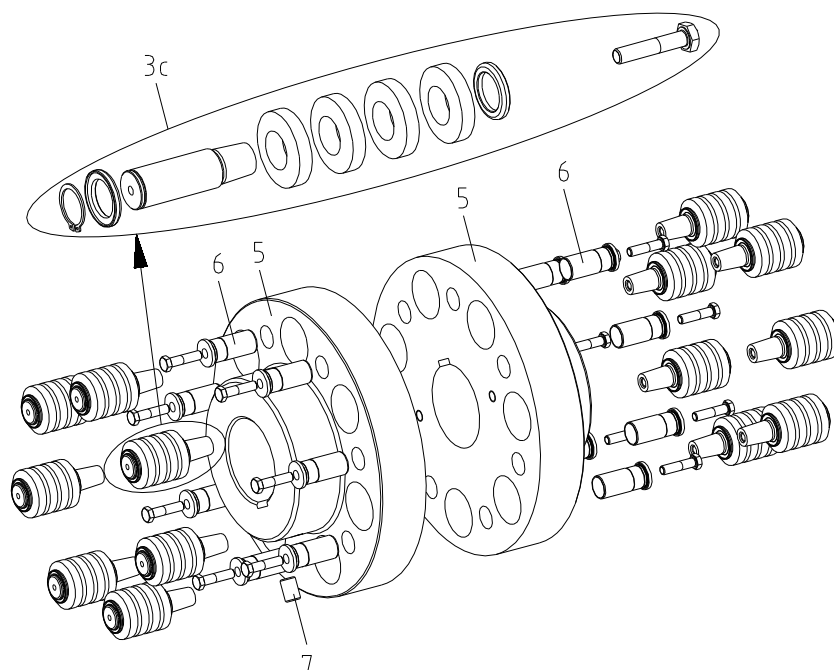


Illustration 4: REVOLEX® type KX-D (taper pin design B)

Table 6:

Number Z of components	Size									
	75	85	95	105	120	135	150	170	190	215
3c, 6	10	12	14	16	14	16	18	14	16	18

Number Z of components	Size										
	240	265	280	305	330	355	370	470	520	590	650
3c, 6	14	16	18	20	24	16	20	22	18	20	24

**4 Assembly****4.2 Components of the pins****Components of complete pin KX (design B) - component 3a**

Component	Quantity	Description
3.1b	1	Pin KX (design B)
3.2	4	Elastomer ring
3.3b	2	Disk
3.4a	1	Hexagon screw DIN EN ISO 4014/4017
3.5	1	Circlip DIN 471

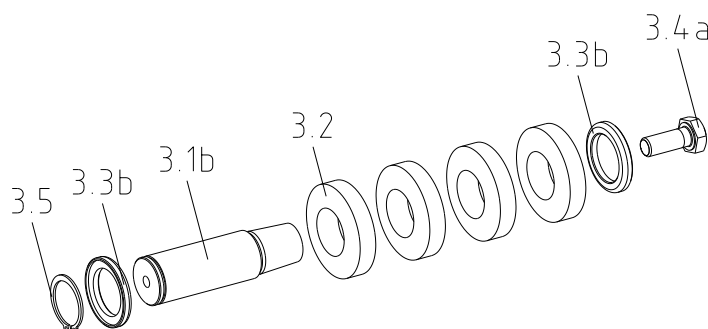


Illustration 5: Pin KX complete (design B)

Components of pin KX-D complete (design B) - component 3c

Component	Quantity	Description
3.1b	1	Pin KX-D (design B)
3.2	4	Elastomer ring
3.3b	2	Disk
3.4c	1	Hexagon screw DIN EN ISO 4014/4017
3.5	1	Circlip DIN 471

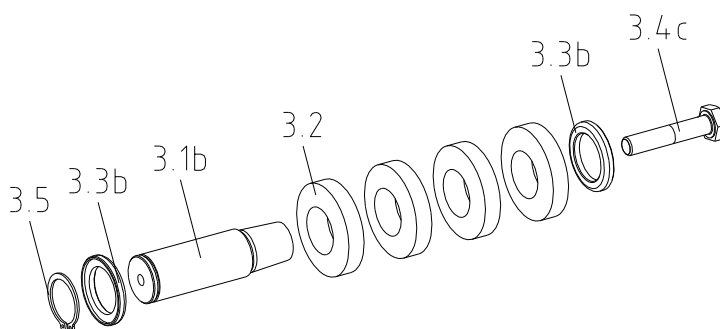


Illustration 6: Pin KX-D complete (type B)



4 Assembly

4.3 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 7).
- Make absolutely sure to observe the figures for $\varnothing D$.
- Carefully align the hubs when the finish bores are drilled.
- The bore tolerance should preferably be selected as per table 8.
- Provide for a setscrew according to DIN EN ISO 4029 with a cup point or an end plate to fasten the hubs axially.

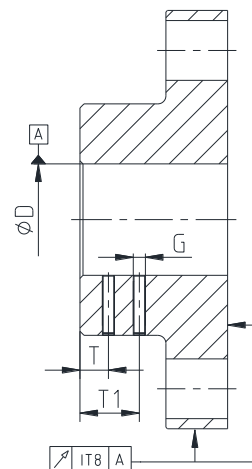


Illustration 7: Concentricity and axial runout



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.

Table 7: Setscrew DIN EN ISO 4029

Size	75	85	95	105	120	135	150	170	190	215
Dimension G in mm	M16	M16	M20	M20	M24	M24	M24	M24	M24	M24
Dimension T in mm	25	25	30	40	30	45	45	50	50	50
Dimension T1 in mm	-	-	-	-	-	-	-	-	-	110
Tightening torque T_A in Nm	80	80	140	140	220	220	220	220	220	220

Size	240	265	280	305	330	355	370	470	520	590	650
Dimension G in mm	M24	M24	M24	M24	M24	M24	M24	M24	M24	M24	M24
Dimension T in mm	50	60	70	70	70	80	80	125	125	150	150
Dimension T1 in mm	110	120	140	150	150	160	160	225	225	250	250
Tightening torque T_A in Nm	220	220	220	220	220	220	220	220	220	220	220

Table 8: Recommended fit pairs acc. to DIN 748/1

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



4 Assembly

4.3 Advice for finish bore

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 sophisticated operating conditions (frequently alternating torsional direction, shock loads, etc.). In this case the keyway should be flush with one of the locating bores for the pins. With axial fastening by the setscrew the tapped hole should be located on the keyway.

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

Unbored/pilot bored hubs are supplied without balancing. If balancing is necessary subject to the application, it should be made on completion of the finish bore. The balancing bores have to be made in the positions marked in illustration 8.



The balancing bores have to be made between the pin bores in every case.

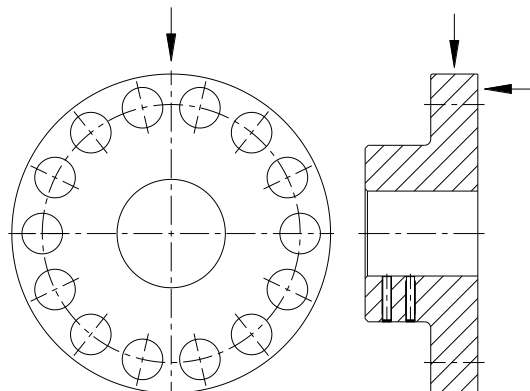


Illustration 8

4.4 Assembly of the coupling (general)



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.



Pay attention to the ignition risk in potentially explosive atmospheres!



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



With the assembly make sure that the distance dimension E (see table 1 and 3) is observed so that the coupling components are not in contact with each other during the operation. Disregarding this advice may cause damage to the coupling.



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



In order to avoid any injuries always make use of proper lifting equipment.

There are tapped holes on the face and outside diameter of the coupling serving for using proper sling gears resp. lifting equipment. If proper sling gears are used they should be dismantled after assembly of the coupling.


4 Assembly
4.5 Assembly of type KX

- Drive the sleeves (component 4) into the bores of the hub part 2 (component 2) by blows of a soft face hammer and/or cool the sleeves in the fridge or with nitrogen before assembly (see illustration 9).

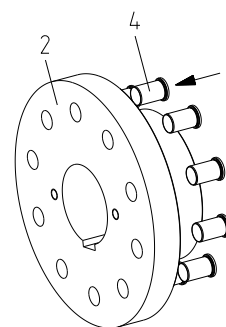


Illustration 9

- Please assemble the hubs onto the shafts of the driving and driven side in a way that the flat faces of the coupling hubs are flush with the faces of the shafts (see illustration 10).

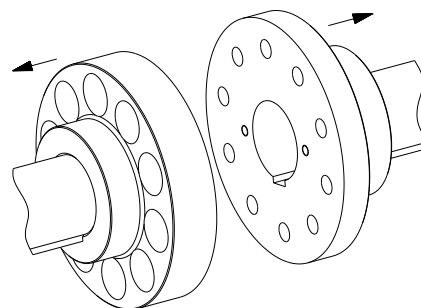


Illustration 10

- Shift the power packs in axial direction until the distance dimension E has been achieved (see illustration 11).
- If the power packs are already firmly assembled, shifting the hubs axially on the shafts allows for setting the distance dimension E.
- Fasten the hubs by tightening the setscrews DIN EN ISO 4029 with a cup point (tightening torque see table 7).
- Align the coupling hubs in that the bores for the pins are flush.

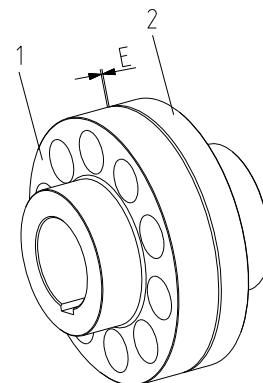


Illustration 11



Consider permissible shaft displacements of chapter 4.8!

- Insert the pins (component 3a) in the hub part 1 (component 1) (see illustration 12).
- Screw up the pins to the hexagon screws (component 3.4a) and tighten them evenly to the tightening torques mentioned in table 2 by means of a torque key (see illustration 12).



The screws have to be secured against working loose, e. g. by conglomerating with Loctite (average strength).

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

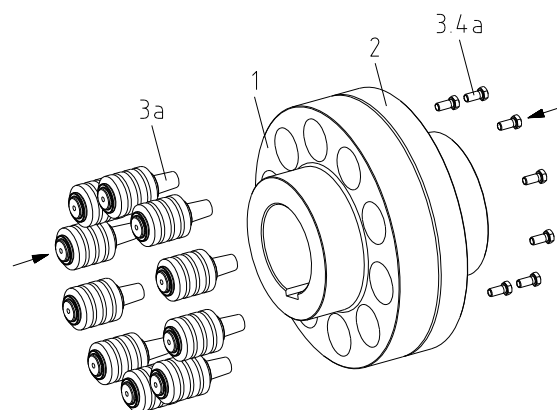


Illustration 12

4 Assembly

4.6 Assembly of type KX-D

- Drive the sleeves (component 6) into the smaller bores of the hub (component 5) by blows of a soft face hammer and/or cool the sleeves in the fridge or with nitrogen before assembly (see illustration 13).

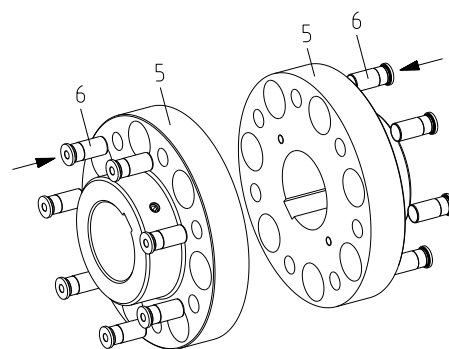


Illustration 13

- Please assemble the hubs onto the shafts of the driving and driven side in a way that the flat faces of the coupling hubs are flush with the faces of the shafts (see illustration 14).

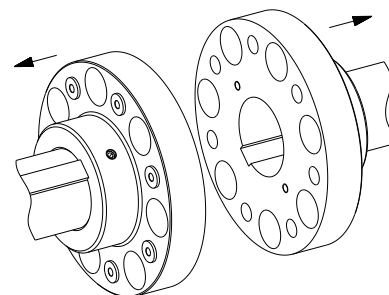


Illustration 14

- Shift the power packs in axial direction until the distance dimension E has been achieved (see illustration 15).
- If the power packs are already firmly assembled, shifting the hubs axially on the shafts allows for setting the distance dimension E.
- Fasten the hubs by tightening the setscrews DIN EN ISO 4029 with a cup point (tightening torque see table 7).
- Align the coupling hubs in that the bores for the pins are flush.

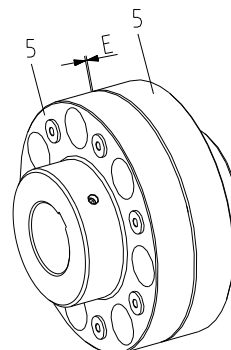


Illustration 15



Consider permissible shaft displacements of chapter 4.8!

- Insert the pins (component 3c) in the larger holes of the hub part 5 (see illustration 16).
- Screw up the bolts to the hexagon screws (component 3.4c) and tighten them evenly to the tightening torques mentioned in table 4 by means of a torque key (see illustration 16).



The screws have to be secured against working loose, e. g. by conglomerating with Loctite (average strength).

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

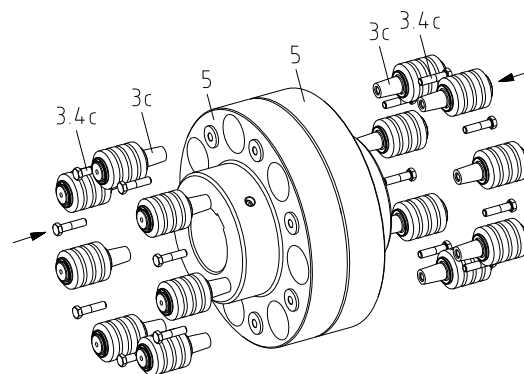


Illustration 16



4 Assembly

4.7 Replacement of elastomer rings

Option 1: Replacement of elastomer rings without dismounting the pins:

- Pull the driving and driven side far apart so that the coupling is separated or switch the coupling free from load.
- Remove the circlip (component 3.5) and the disk (component 3.3b).
- Disassemble the elastomers (component 3.2).
- Replace the elastomer rings in sets only.



Elastomer rings of the same size only may be used.

- The new elastomer rings are mounted in reverse order.

Option 2: Replacement of pins resp. elastomer rings by dismounting the pins:

- Pull the driving and driven side far apart so that the coupling is separated or switch the coupling free from load.
- Disassemble the screw (illustration 17; component 3.4a or 3.4c). Afterwards clean the tapping and the thread of the screw.

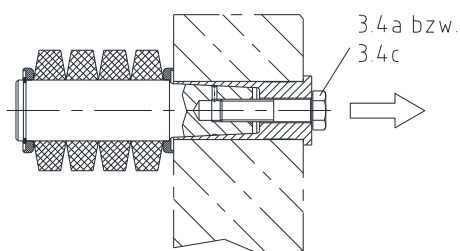


Illustration 17: Disassembly of hexagon screw

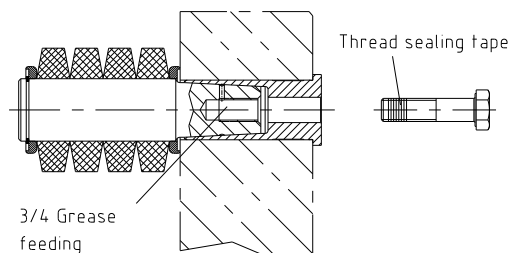


Illustration 18: Cleaning the tapping



Wear safety glasses.

- Fill the tapped holes of the pin (component 3.1b) with standard grease by three quarters.
- Wrap a thread sealing tape Loctite 55 around the screw. Leave out the first 2 to 3 threads to make sure that the screw can be screwed in properly (see illustration 18).
- Screw the screw manually into the pin by 2 to 3 threads.

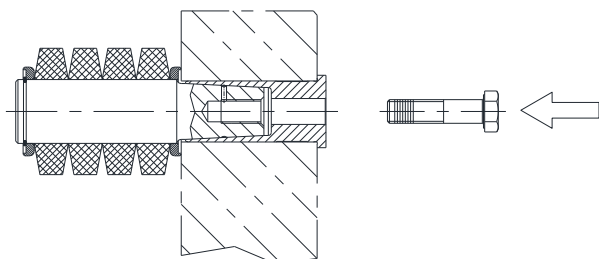


Illustration 19: Assembly of hexagon screw

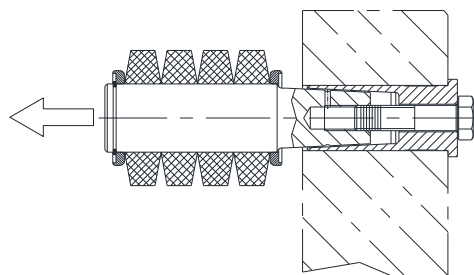


Illustration 20: Unscrewing the pin

 KTR-Group	REVOLEX® KX / KX-D Operating/Assembly instructions	KTR-N 49410 EN Sheet: 16 of 30 Edition: 16
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4 Assembly

4.7 Replacement of elastomer rings



Abrupt movement of the screw (component 3.4a or 3.4c) or sudden unscrewing of the pin (component 3.1b) results in the risk of getting jammed.

Sudden movement of the pin can be realized by loud noise.

- Screw the screw slowly deeper into the pin via a spanner. The grease flows through the cross hole of the pin pressing between pin and sleeve (illustration 20; component 4 or 6).
- If feasible resistance is not generated, it may be necessary to refill the grease or vent the system.



If grease escapes from the tapped hole, the screw needs to be re-sealed with thread sealing tape Loctite 55.

- As soon as the pin has come off the taper seat of the sleeve, the extraction process is completed.
- Press all pins out of their seats one after another following the process described above.
- Replace the elastomer rings on the pins as per chapter 4.7 of option 1 described.



If the pins are re-used they have to be cleaned from grease free from any residues.

- The pins are mounted as per chapter 4.5 or 4.6.

4.8 Displacements - alignment of the couplings

The **REVOLEX® KX / KX-D** compensates for displacements generated by the shafts to be combined as specified in table 9. Excessive misalignment may be generated by inaccurate alignment, production tolerances, thermal expansion, shaft deflection, twisting of machine frames, etc.



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.



Absolutely observe the displacement figures specified (see table 9). If the figures are exceeded, the coupling will be damaged.

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

If used in potentially explosive atmospheres for explosion group IIC, only half of the displacement figures (see table 9) are permissible.

Please note:

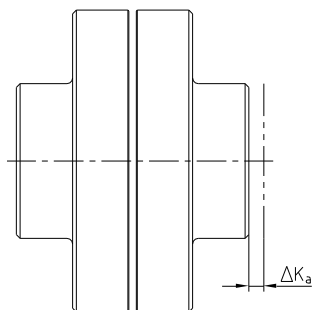
- The displacement figures specified in table 9 are maximum figures which must not arise in parallel. If radial and angular displacement occur at the same time, the sum of the displacement figures must not exceed ΔK_r or ΔK_w (see illustration 22).
- Inspect with a dial gauge, ruler, feeler or laser measuring device whether the permissible displacement figures of table 9 can be observed.

Please observe protection note ISO 16016.	Drawn: 2022-11-04 Ka Verified: 2025-07-04 Ka	Replacing: KTR-N dated 2022-07-26 Replaced by:
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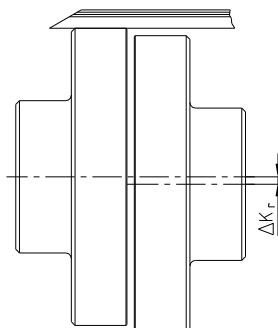


4 Assembly

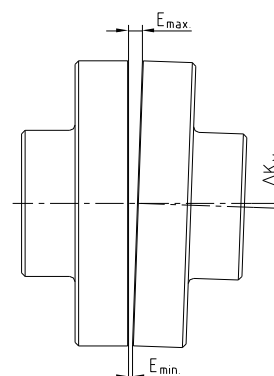
4.8 Displacements - alignment of the couplings



Axial displacements



Radial displacements



Angular displacements

$$L_{adm.} = L + \Delta K_a \text{ in mm}$$

$$\Delta K_w = E_{max.} - E_{min.} \text{ in mm}$$

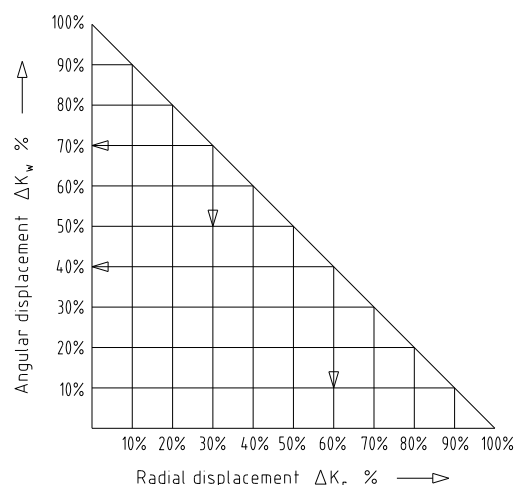
Illustration 21: Displacements

Examples of the displacement combinations specified in illustration 22:

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

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

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

Illustration 22:
Combinations of displacement
Table 9: Displacement figures

Size	75	85	95	105	120	135	150	170	190	215
Max. axial displacement ΔK_a in mm	±1.5	±1.5	±1.5	±2	±2	±2	±2	±2.5	±2.5	±2.5
Max. radial displacement ΔK_r in mm or max. angular displacement ΔK_w in mm with speed n in rpm	250	0.95	1.10	1.10	1.2	1.3	1.4	1.5	1.7	2.0
	500	0.70	0.80	0.80	0.9	0.9	1.0	1.1	1.2	1.4
	750	0.60	0.65	0.65	0.7	0.8	0.8	0.9	1.0	1.2
	1000	0.50	0.55	0.55	0.6	0.7	0.7	0.8	0.9	1.0
	1500	0.40	0.45	0.45	0.5	0.5	0.6	0.6	0.7	0.8
	2000	0.35	0.40	0.40	0.4	0.5	0.5	0.5	0.6	0.7
	3000	0.30	0.35	0.35	0.4	0.4	-	-	-	-

Size	240	265	280	305	330	355	370	470	520	590	650
Max. axial displacement ΔK_a in mm	±2.5	±2.5	±2.5	±2.5	±4	±4	±4	±4	±4	±4	±4
Max. radial displacement ΔK_r in mm or max. angular displacement ΔK_w in mm with speed n in rpm	250	2.2	2.5	2.7	2.9	3.1	3.3	3.5	3.8	4.4	5.4
	500	1.6	1.7	1.9	2.0	2.2	2.3	2.5	2.8	3.1	3.8
	750	1.3	1.4	1.6	1.7	1.8	1.9	2.0	2.2	2.4	-
	1000	1.1	1.2	1.4	1.4	1.5	1.7	1.8	-	-	-
	1500	0.9	1.0	-	-	-	-	-	-	-	-
	2000	-	-	-	-	-	-	-	-	-	-
	3000	-	-	-	-	-	-	-	-	-	-

 KTR-Group	REVOLEX® KX / KX-D Operating/Assembly instructions	KTR-N 49410 EN Sheet: 18 of 30 Edition: 16
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5 Start-up

Before start-up of the coupling, 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.



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

Finally the coupling protection against accidental contact must be fitted. It is required in accordance with DIN EN ISO 12100 (Safety of Machinery) and directives 2014/34/EU and SI 2016 No. 1107 and must protect against

- access with a 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 safely avoid contact. 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 whether a proper enclosure (ignition protection, coupling protection, contact protection) has been mounted and the operation of the coupling is not affected by the enclosure. The same applies for test runs and rotational direction inspections.

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

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



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, pay attention to

- different operating noise
- vibrations occurring.



If you note any irregularities with the coupling during operation, the drive unit must be switched off immediately. The cause of the breakdown must be specified by means of the table „Breakdowns“ and, if possible, be eliminated according to the proposals. The potential breakdowns specified can be hints only. To find out the cause all operating factors and machine components must be considered.

Please observe protection note ISO 16016.	Drawn: 2022-11-04 Ka Verified: 2025-07-04 Ka	Replacing: KTR-N dated 2022-07-26 Replaced by:
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 KTR-Group	REVOLEX® KX / KX-D Operating/Assembly instructions	KTR-N 49410 EN Sheet: 19 of 30 Edition: 16
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5 Start-up

Coating of coupling:



If coated (priming, paintings, etc.) couplings are used in potentially explosive atmospheres, the requirements on 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 elastomer rings is not admitted to ensure an equipotential bonding.

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

6 Breakdowns, causes and elimination

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



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 are fallen below/exceeded.
- Components are mixed up by mistake/assembled incorrectly.
- A wrong or no pin/elastomer ring is inserted in the coupling.
- No original **KTR** components (purchased parts) are used.
- Old/already worn out elastomer rings or elastomer rings stored for too long are used.
- Maintenance intervals are not observed.

Please observe protection note ISO 16016.	Drawn: 2022-11-04 Ka Verified: 2025-07-04 Ka	Replacing: KTR-N dated 2022-07-26 Replaced by:
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6 Breakdowns, causes and elimination

Breakdowns	Causes	Hazard notes for potentially explosive atmospheres	Elimination
Different operating noise and/or vibrations occurring	Misalignment	Increased temperature on the elastomer ring 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, fracture of the engine mount, heat expansion of unit components, modification of the installation dimension E of the coupling) 3) For inspection of wear see chapter 10.2
	Wear of elastomers	Ignition risk due to sparking	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer rings/pins 3) Inspect coupling components and replace coupling hubs that are damaged 4) Generally assemble new elastomer rings with new pins 5) Assemble coupling components 6) 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 chapter 10.2
Fracture of hub	Fracture of hub due to high impact energy/overload	Ignition risk due to sparking	1) Set the unit out of operation 2) Replace complete coupling 3) Find out the reason for overload 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 elastomers	e. g. contact with aggressive liquids/oils, ozone influence, too high/low ambient temperatures etc. causing a physical modification of the elastomer rings	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 elastomer rings/pins 3) Inspect coupling components and replace coupling hubs that are damaged 4) Generally assemble new elastomer rings with new pins 5) Assemble coupling components 6) Inspect alignment, adjust if necessary 7) Make sure that further physical modifications of the pins are excluded
	Ambient/contact temperatures which are too high for the elastomer ring, max. permissible -30 °C/+75 °C		1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer rings/pins 3) Inspect coupling components and replace coupling hubs that are damaged 4) Generally assemble new elastomer rings with new pins 5) Assemble coupling components 6) Inspect alignment, adjust if necessary 7) Inspect and adjust ambient/contact temperature

6 Breakdowns, causes and elimination

Breakdowns	Causes	Hazard notes for potentially explosive atmospheres	Elimination
Early wear of pins (hardening/embrittlement of the pin elastomer)	Vibrations of drive	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 elastomer rings/pins 3) Find out the reason for vibrations 4) Inspect coupling components and replace coupling hubs that are damaged 5) Generally assemble new elastomer rings with new pins 6) Assemble coupling components 7) Inspect alignment, adjust if necessary



If you operate with worn elastomer rings (see chapter 10.3) proper operation is not ensured.

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 and standards that apply.

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

8 Maintenance and service

REVOLEX® KX / KX-D 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 pins of the coupling.

- Since the flexible machine bearings of the driving and driven side settle with increasing load time, inspect the alignment of the coupling and re-align the coupling, if necessary.
- The coupling components must be inspected for damages.
- The screw connections must be visually inspected.



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

 KTR-Group	REVOLEX® KX / KX-D Operating/Assembly instructions	KTR-N 49410 EN Sheet: 22 of 30 Edition: 16
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9 Spares inventory, customer service addresses

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

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



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

KTR Systems GmbH
Carl-Zeiss-Str. 25
D-48432 Rheine
Phone: +49 5971 798-0
E-mail: mail@ktr.com

10 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

Types available:

KX and KX-D

Please observe protection note ISO 16016.	Drawn: 2022-11-04 Ka Verified: 2025-07-04 Ka	Replacing: KTR-N dated 2022-07-26 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 **REVOLEX® KX / KX-D** 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.

The couplings may only be used if their materials are resistant to mechanical and/or chemical influences with different operating conditions in a way that the explosion protection is not affected.

1. Industry (with the exception of mining)

- Equipment group II of category 2 and 3 (*coupling is 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⁾
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 +75 °C due to the permissible permanent operating temperature of the elastomers used.
- 2) The maximum surface temperature of +95 °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 +75 °C.

In addition the current national mining instructions which each apply for the application have to be respected for the use in mining.

Please observe protection note ISO 16016.	Drawn:	2022-11-04 Ka	Replacing:	KTR-N dated 2022-07-26
	Verified:	2025-07-04 Ka	Replaced by:	

**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
M2 2G 2D No gases and vapours of explosion group IIC	An inspection of the torsional backlash and a visual inspection of the elastomer rings 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 elastomer ring 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 elastomer ring, please specify the cause according to the table „Breakdowns“, if possible. The maintenance intervals must be adjusted to the modified operating parameters without fail.
2G 2D Gases and vapours of explosion group IIC	An inspection of the torsional backlash and a visual inspection of the elastomer rings 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 elastomer ring 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 elastomer ring, please specify the cause according to the table „Breakdowns“, if possible. The maintenance intervals must be adjusted to the modified operating parameters without fail.


10 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

10.3 Standard values of wear

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

With a twisting backlash $\geq \Delta s_{\max.}$ in mm or a wall thickness $X_{\min.}$ in mm the elastomer rings need to be replaced.



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. Absolutely observe the displacement figures specified (see table 9). If the figures are exceeded, the coupling will be damaged.

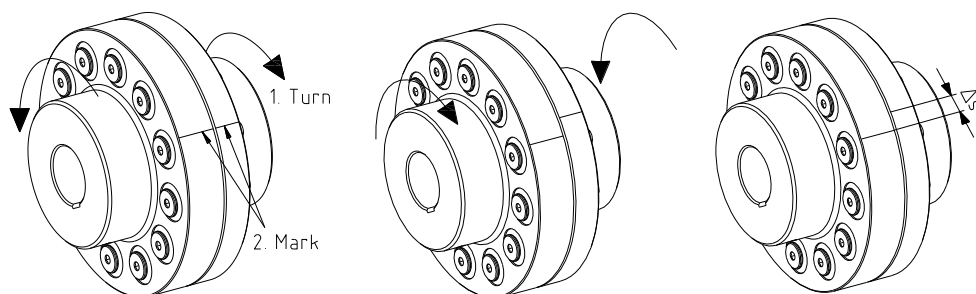


Illustration 23: Inspection of the limit of wear

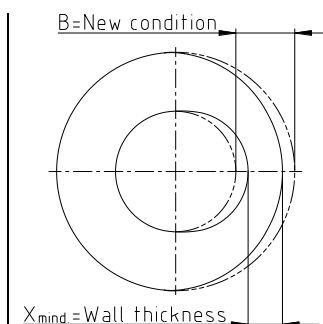


Illustration 24: Wear of elastomer ring

Table 10:

Size	Limits of wear in mm				Size	Limits of wear in mm			
	Diameter of elastomer	New condition B	Wall thickness $X_{\min.}$	Torsional backlash $\Delta s_{\max.}$		Diameter of elastomer	New condition B	Wall thickness $X_{\min.}$	Torsional backlash $\Delta s_{\max.}$
75	50.0	12.25	8.60	5	265	113.7	27.65	19.40	16
85	50.0	12.25	8.60	5	280	113.7	27.65	19.40	16
95	50.0	12.25	8.60	5	305	113.7	27.65	19.40	16
105	50.0	12.25	8.60	5	330	113.7	27.65	19.40	16
120	63.0	16.15	11.30	6	355	150.0	37.50	26.25	20
135	63.0	16.15	11.30	6	370	150.0	37.50	26.25	20
150	63.0	16.15	11.30	6	470	150.0	37.50	26.25	20
170	85.5	21.15	14.80	9	520	200.0	52.50	36.75	30
190	85.5	21.15	14.80	9	590	200.0	52.50	36.75	30
215	85.5	21.15	14.80	9	650	200.0	52.50	36.75	30
240	113.7	27.65	19.40	16					

**KTR-Group****REVOLEX® KX / KX-D**
Operating/Assembly instructionsKTR-N 49410 EN
Sheet: 26 of 30
Edition: 16**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 REVOLEX® KX / KX-D coupling is applied on the outer sheath or on the front side.

The pins along with elastomer rings are not marked.

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

Marking is as follows:

		I M2 Ex h I	Mb	X
		II 2G Ex h IIC T6 ... T5	Gb	X
		II 2D Ex h IIIC T80 °C ... T95 °C	Db	X
<Year>		-30 °C ≤ T _a ≤ +60 °C ... +75 °C		

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

Short marking:

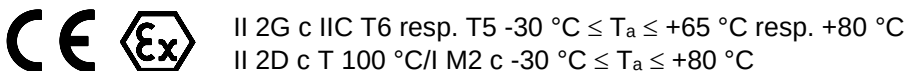
(A short marking is only made if not possible differently for reason of space or functioning.)

REVOLEX® KX / KX-D
<Year>**Deviating marking applied until 31st October 2019:**

Short marking:



Complete marking:



**10 Enclosure A**

Advice and instructions regarding the use in  potentially explosive atmospheres

10.4 marking of coupling for potentially explosive atmospheres**Comments on marking**

Equipment group I	Mining
Equipment group II	Non-mining
Equipment category 2G	Equipment ensuring a high level of safety, suitable for zone 1
Equipment category 2D	Equipment ensuring a high level of safety, suitable for zone 21
Equipment category M2	Equipment ensuring a high level of safety must be able to be switched off when an explosive atmosphere occurs
D	Dust
G	Gases and vapours
Ex h	Nonelectrical explosion protection
IIC	Gases and vapours of class IIC (including IIA and IIB)
IIIC	Electrically conductive dusts of class IIIC (including IIIA and IIIB)
T6 ... T5	Temperature class to be considered, depending on the ambient temperature
T80 °C ... T95 °C	Maximum surface temperature to be considered, depending on the ambient temperature
-30 °C ≤ T _a ≤ +60 °C ... +75 °C or -30 °C ≤ T _a ≤ +75 °C	Permissible ambient temperature from -30 °C to +60 °C resp. -30 °C to +75 °C
Gb, Db, Mb	Equipment protection level, high 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).

**10 Enclosure A**

Advice and instructions regarding the use in  potentially explosive atmospheres

10.5 Rating of danger of ignition

Source of danger	Elimination
Inaccurate coupling assembly	With a rough error in assembly the two coupling flanges being opposite to each other might touch (e. g. with angular displacements exceeding the permissible tolerances by far) or the elastomers might be compressed exceeding their load limit (e. g. with impermissible radial displacement), but which may be avoided by a test run.
Hubs are working loose on the shafts	The fixed connection of the shaft-hub-connection should be inspected in regular intervals by the operator and re-arranged, if necessary.
Friction of foreign substances on the coupling	The couplings need to be protected against contact by suitable protective devices (e. g. solid covers) in order to exclude friction of foreign substances on the couplings as a failure anticipated. The minimum distance between the protective device and rotating parts has to be defined in a way that even if the protection against contact is damaged (e. g. indentation), no friction is generated on the rotating coupling. Moreover, when defining the distance deflections caused by vibrations of the shaft need to be considered. For the use of couplings in mining the protective device needs to be particularly solid to make sure that the damage which must not be excluded with rough operating conditions (e. g. by impressing) does not generate trailing/friction on the coupling. Moreover, the protective devices in mining must not consist of light-weight metals. <i>The protective device for mining has to pass the shock test as per EN 13463-1:2009, section 8.4.1, table 10 according to the degree of mechanical danger "high" (impact energy 20 J). This fact needs to be observed by the user (e. g. mechanical engineer) or the operator of the couplings.</i>
Contact/impact of foreign substances on the coupling	If the coupling gets in contact with objects, mechanical sparks may be produced each depending on the material and the energy of impact by swinging and striking against other objects (e. g. objects made of light-weight metal or rusty iron). Since the couplings have to be provided with protective devices by the user which may have openings (see rules for protection against contact by rotating parts) for a better heat dissipation by convection, the contact or striking of dangerous objects on or against the couplings may be excluded as an anticipated failure. For the protective device a material has to be used excluding the production of ignitable mechanical sparks as far as possible.
Dust deposit on couplings which are not dustproof all over	In order to ensure a troublefree normal operation even in an explosive dust atmosphere it has to be made sure that the couplings are inspected in regular intervals to be free from critical dust deposits (e. g. free from coating) and are not running in a dust accumulation. This needs to be observed particularly if the couplings are provided with non-dustproof protective devices against contact. Moreover, in places of work which are subject to dust explosion as well as in mining a higher amount of wear of the elastomer rings has to be considered. The elastomer rings must not be worn off in a way that the pins slide brightly in the holes. The source of ignition „self-ignition and glowing of dust deposits“ cannot be assumed as an anticipated failure with a proper maintenance of the coupling. Here corresponding maintenance means that the couplings need to be inspected in regular intervals to make sure that they are free from dangerous dust deposits and are not running in a dust accumulation. The corresponding inspection and cleaning rules have to be determined by the operator. The interval has to be determined depending on the operating conditions and safety specifications of dust like temperature of self-ignition and glowing at one's own responsibility.



10 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

10.6 EU Declaration of conformity

EU Declaration of Conformity resp. Certificate of Conformity

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

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

REVOLEX® KX / KX-D 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
CLC/TR 60079-32-1:2019-01

The REVOLEX® KX / KX-D 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 (Project No.: IB-20-2-0145, IB-18-2-0020, IB-06-4-007):

IBExU
Institut für Sicherheitstechnik GmbH
Identification number: 0637
Fuchsmühlenweg 7

09599 Freiberg

Rheine,
Place

2025-07-02
Date

ppa. 
Dr. Norbert Partmann
Head of Engineering and R&D

i. V. 
Michael Brüning
Product Manager



10 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

10.7 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

REVOLEX® KX / KX-D 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
CLC/TR 60079-32-1:2019-01

The REVOLEX® KX / KX-D 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

2025-07-02
Date

ppa. 
Dr. Norbert Partmann
Head of Engineering and R&D

i. V. 
Michael Brüning
Product Manager