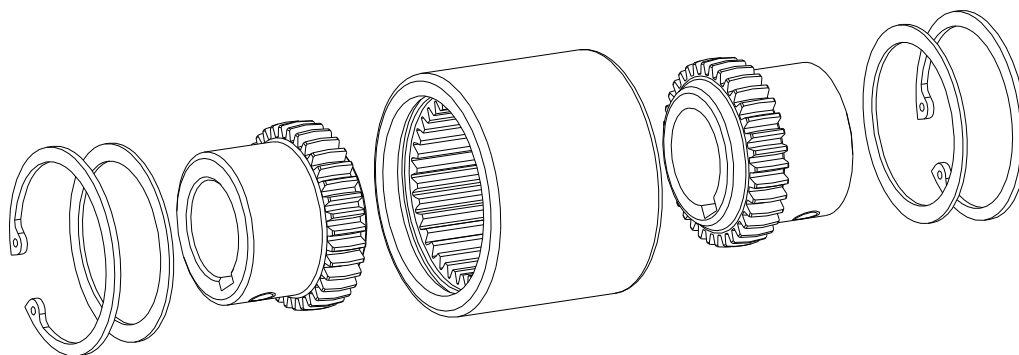


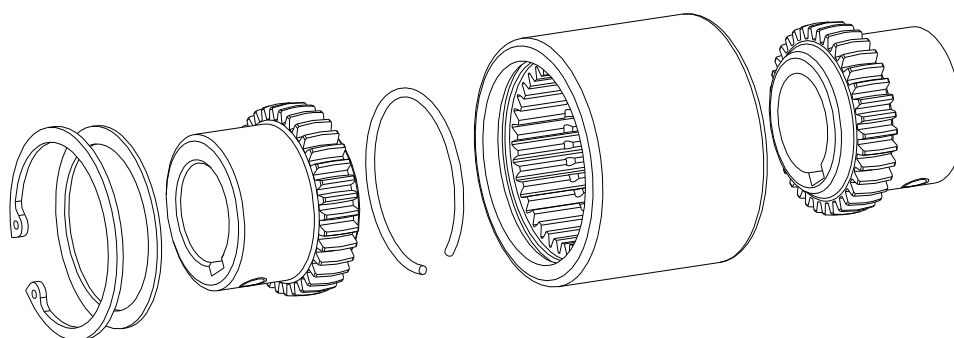


# BoWex®

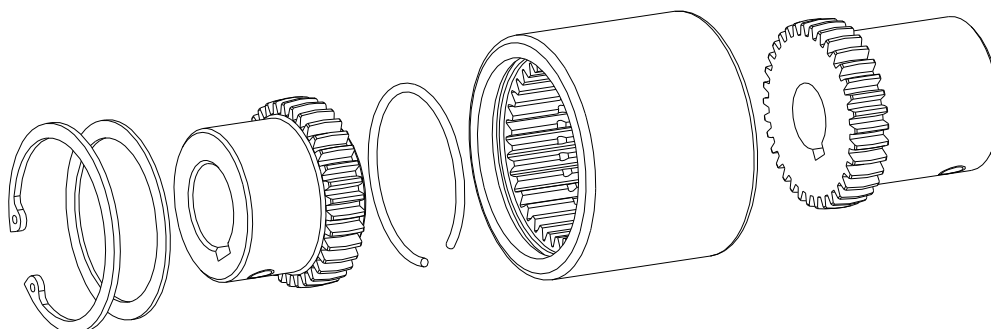
Shear type curved-tooth gear couplings® type  
AS, Spec.-I, Spec.-I/CD and their combinations



**Type AS**



**Type Spec.-I**



**Type Spec.-I/CD**

 <b>KTR-Group</b>	<b>BoWex®</b> <b>Operating/Assembly instructions</b> <b>Type AS, Spec.-I and Spec.-I/CD</b>	<b>KTR-N</b> 40115 EN <b>Sheet:</b> 2 of 15 <b>Edition:</b> 3
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**BoWex®** curved-tooth gear couplings are flexible shaft connections. It is able to compensate for shaft misalignment, for example caused by manufacturing inaccuracies, thermal expansion, etc.

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**KTR-Group**

**BoWex®**  
**Operating/Assembly instructions**  
**Type AS, Spec.-I and Spec.-I/CD**

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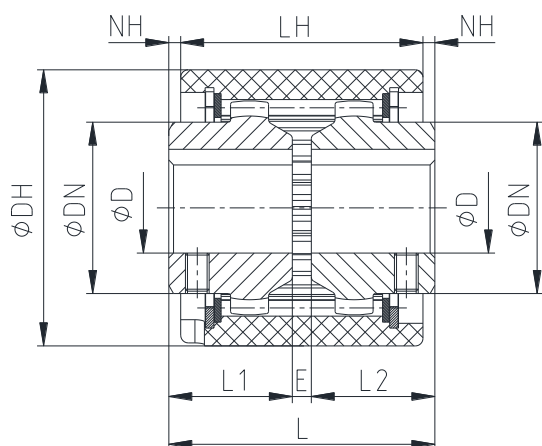
**1 Technical data**

Illustration 1: BoWex® type AS

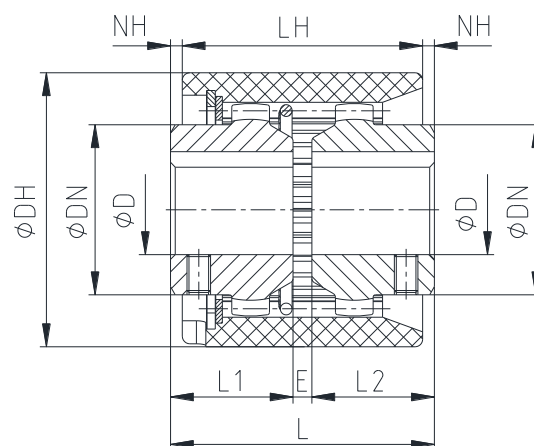


Illustration 2: BoWex® type Spez.-I

**Table 1: Dimensions type AS and Spec.-I**

Size	Pilot bore		Max. finish bore D	Dimensions in mm							
	Unbored	Pilot bored		L1, L2	E	L	LH	NH	DN	DH	Hub lengthened L1, L2 max.
24	x	-	24	26	4	56	51	2.5	36	58	50
28	x	-	28	40	4	84	56	14	44	70	55
32	x	-	32	40	4	84	58	13	50	84	55
45	x	-	45	42	4	88	60	14	65	100	60
65	x	21	65	55	4	114	84	15	96	140	70
80	-	31	80	90	6	186	93	46.5	124	175	-
100	-	38	100	110	8	228	102	63	152	210	-
125	-	45	125	140	10	290	134	78	192	270	-

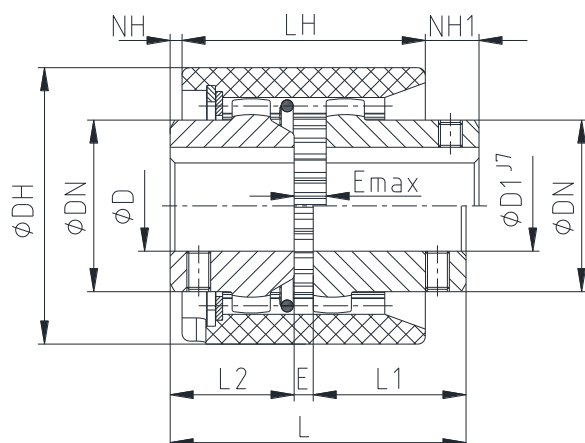


Illustration 3: BoWex® type Spec.-I/CD

**Table 2: Dimensions - type Spec.-I/CD**

Size	Pilot bore		Finish bore D, D1		Dimensions in mm										
	Unbored	Pilot bored	min.	Max.	L		LH	E		L1	L2	DH	DN	NH	NH1
					min.	Max.		min.	Max.						
24	x	-	10	24	70	73.5	51	4	7.5	40	26	58	36	2.5	20
28	x	-	10	28	94.5	98	56	4	8.5	50.5	40	70	44	14	28
32	x	-	12	32	94.5	-	58	4	8.5	50.5	40	84	50	13	27
45	x	-	20	45	101.5	-	60	4	8.5	55.5	42	100	65	14	32
65	x	26	30	65	123	-	84	4	10	64	55	140	96	15	28.5
80	-	31	35	80	179	-	93	6	13	83	90	175	124	46.5	44

Please observe protection  
note ISO 16016.

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## 2 Advice

### 2.1 General advice

Please read through these operating/assembly instructions carefully before you start up the coupling.

Pay special attention to the safety instructions!

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 personal injury**

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



**Warning of product damages**

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



**General advice**

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



**Warning of hot surfaces**

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

### 2.3 General hazard warnings



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

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

Please observe protection note ISO 16016.	<b>Drawn:</b> 2024-03-07 Ka <b>Verified:</b> 2024-03-07 Ka	<b>Replacing:</b> KTR-N dated 2016-09-14 <b>Replaced by:</b>
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## 2 Advice

### 2.4 Intended use

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

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

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

The **BoWex®** described in here corresponds to the state of the art at the time of printing of these operating/assembly instructions.

### 2.5 Coupling selection



**For a long-lasting 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 „BoWex®“).**

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

**Make sure that the technical data regarding torque refer to the sleeve 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.

### 2.6 Reference to EC Machinery Directive 2006/42/EC

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

Please observe protection note ISO 16016.	Drawn: 2024-03-07 Ka Verified: 2024-03-07 Ka	Replacing: KTR-N dated 2016-09-14 Replaced by:
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### 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 coupling sleeves 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.

### 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 couplings

##### Components of BoWex® type AS

Component	Quantity	Description
1	2	Hub
2	1	AS sleeve
3	2	Stop ring
4	2	Circlip DIN 472
6	2	Setscrew DIN EN ISO 4029

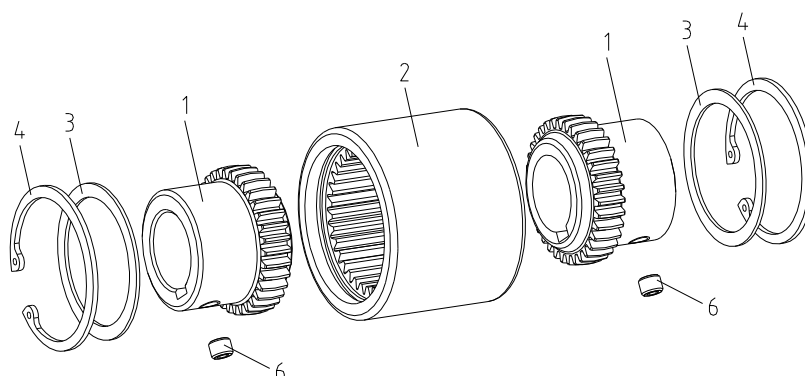


Illustration 4: BoWex® type AS

**4 Assembly****4.1 Components of the couplings****Components of BoWex® type- Spez.-I**

Component	Quantity	Description
1	2	Hub
2	1	Spec. I sleeve
3	1	Stop ring
4	1	Circlip DIN 472
5	1	snap ring DIN 7993 / circlip DIN 472
6	2	Setscrews DIN EN ISO 4029

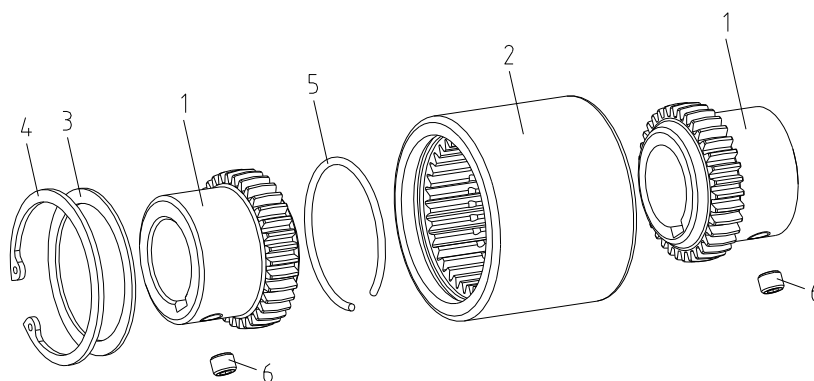


Illustration 5: BoWex® type Spez.-I

**Components of BoWex® type- Spec.-I/CD**

Component	Quantity	Description
1	1	Hub
1e	1	CD-Nabe
2	1	Spec. I sleeve
3	1	Stop ring
4	1	Circlip DIN 472
5	1	snap ring DIN 7993 / circlip DIN 472
6	3	Setscrew DIN EN ISO 4029

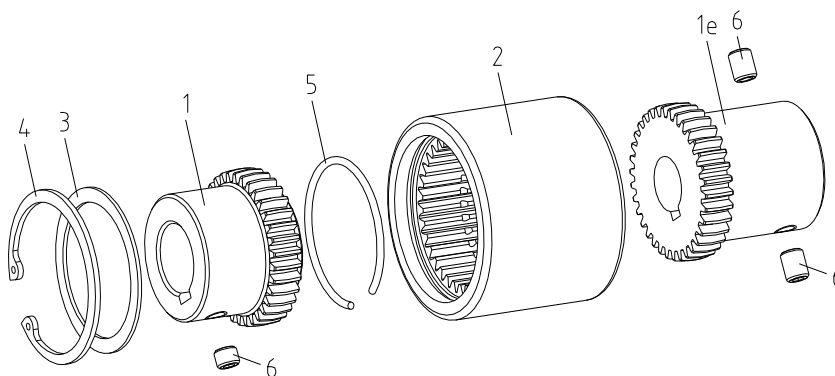


Illustration 6: BoWex® type Spec.-I/CD



## 4 Assembly

### 4.2 Advice for finish bore



The maximum permissible bore diameters  $d$  (see table 1 and 2 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 (steel hubs) machined by the customer have to observe concentricity resp. axial runout (see illustration 7).
- Please make absolutely sure to observe the figures for  $\varnothing D_{\max}$ .
- Carefully align the hubs when the finish bores are drilled.
- Provide for a setscrew according to DIN EN ISO 4029 with a cup point or an end plate to fasten the hubs axially.

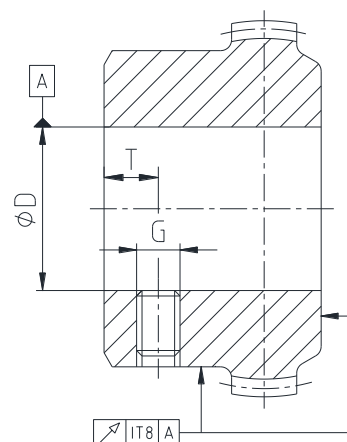


Illustration 7: Concentricity and axial runout



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.

Table 3: Setscrews DIN EN ISO 4029

Size	24	28	32	45	65	80	100	125
Dimension G in mm	M5	M8	M8	M8	M10	M10	M12	M16
Dimension T in mm	6	10	10	10	15	20	30	40
Tightening torque $T_A$ in Nm	2	10	10	10	17	17	40	80

### 4.3 Assembly of hub



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.



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



With the assembly make sure that the distance dimension E (see table 1 and 2) is observed to allow for axial clearance of the sleeve while in operation. Disregarding this advice may cause damage to the coupling.

- Mount the hubs on the shaft of driving and driven side.
- Put the sleeve on the spline of the hub on the driving or driven side.
- Shift the power packs in axial direction until the distance dimension E is achieved.
- 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 3).



**4 Assembly****4.4 Assembly of type AS**

- Push the hubs with stop ring and circlip onto the shafts of the driving side and the driven side (see illustration 8).
- Fasten the hubs by tightening the setscrews DIN EN ISO 4029 with a cup point or an end plate.
- Put the coupling sleeve onto the toothing of a coupling hub (see illustration 9).
- Shift the power packs in axial direction until the distance dimension E is achieved (see illustration 10).
- If the power packs are already firmly assembled, shifting the hubs axially on the shafts allows for adjusting the distance dimension E.
- Put the circlips in the keyways of the coupling sleeves in order to protect the sleeve against axial displacement (see illustration 11).

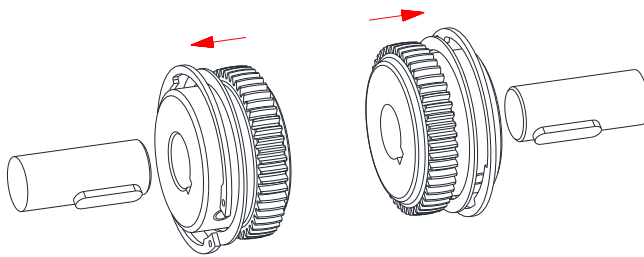


Illustration 8

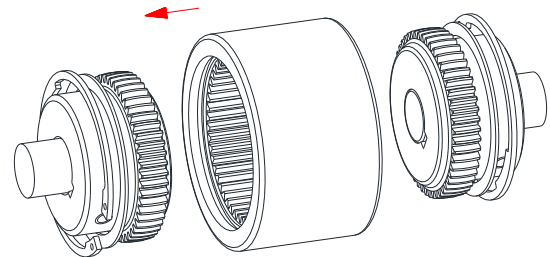


Illustration 9

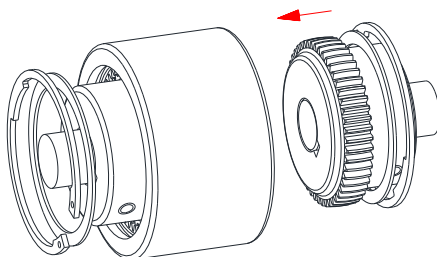


Illustration 10

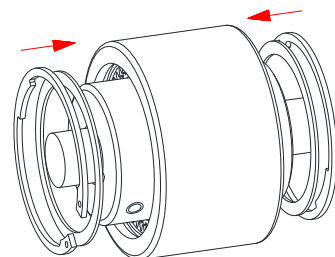


Illustration 11

**4 Assembly****4.5 Assembly of type Spec.-I und Spec.-I/CD**

- Push one hub and one hub with stop ring and circlips onto the shafts of the driving side and the driven side (see illustration 12).
- Fasten the hubs by tightening the setscrews DIN EN ISO 4029 with a cup point or an end plate.
- Insert the snap ring or circlip (component 5) into the sleeve (see illustration 13).
- Put the coupling sleeve onto the toothing of the coupling hub with the circlip and the stop ring pushed onto the hub collar (see illustration 14).
- Protect the coupling sleeve against axial displacement by inserting the circlips into the ring keyways of the coupling sleeves (see illustration 15).
- Shift the power packs in axial direction until the distance dimension E is achieved (see illustration 16).
- If the power packs are already firmly assembled, shifting the hubs axially on the shafts allows for setting the distance dimension E.

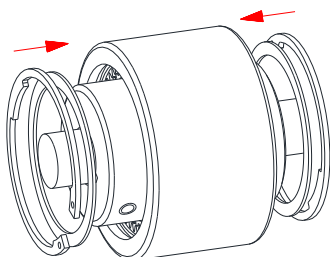


Illustration 12

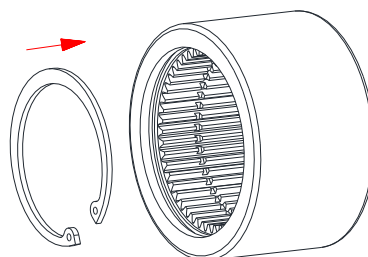


Illustration 13

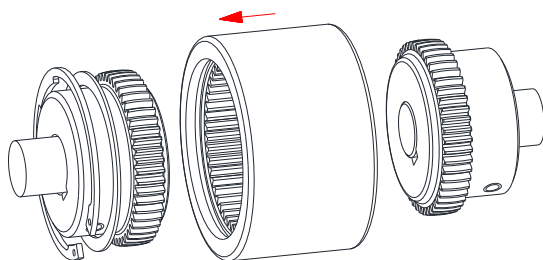


Illustration 14

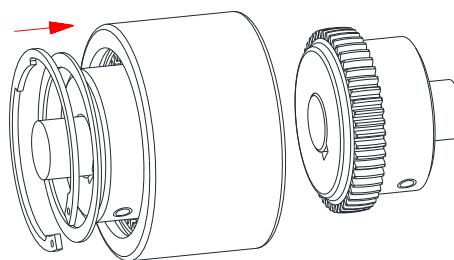


Illustration 15

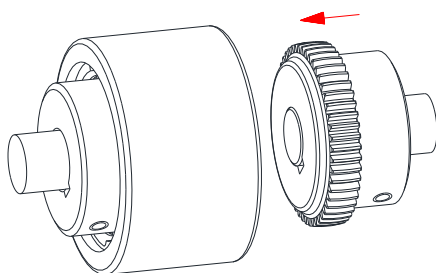


Illustration 16



## 4 Assembly

### 4.6 Displacements - alignment of the couplings

The displacement figures specified in table 4 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, the shaft ends have to be accurately aligned. Please absolutely observe the displacement figures specified (see table 4). If the figures are exceeded, the coupling will be damaged.**  
**The more accurate the alignment of the coupling, the longer is its service life.**

#### Please note:

- The displacement figures specified in table 4 are maximum figures which must not arise in parallel. If radial and angular displacement arises at the same time, the permissible radial displacements of the coupling halves have to be reduced as follows:

$$\Delta K_{r \text{ zul}} = \Delta K_r - \frac{\Delta K_r}{2 \Delta K_w} \cdot \Delta Ww$$

$\Delta Ww$  = angular shaft displacement

- The displacement figures specified are general standard figures that apply up to an ambient temperature of 80 °C, ensuring a sufficient service life of the **BoWex®** coupling. Displacement figures between the speeds specified have to be interpolated accordingly. If necessary, ask about the displacement for the corresponding coupling type.
- Inspect with a dial gauge, ruler or feeler gauge whether the permissible displacement figures specified in table 4 can be observed.

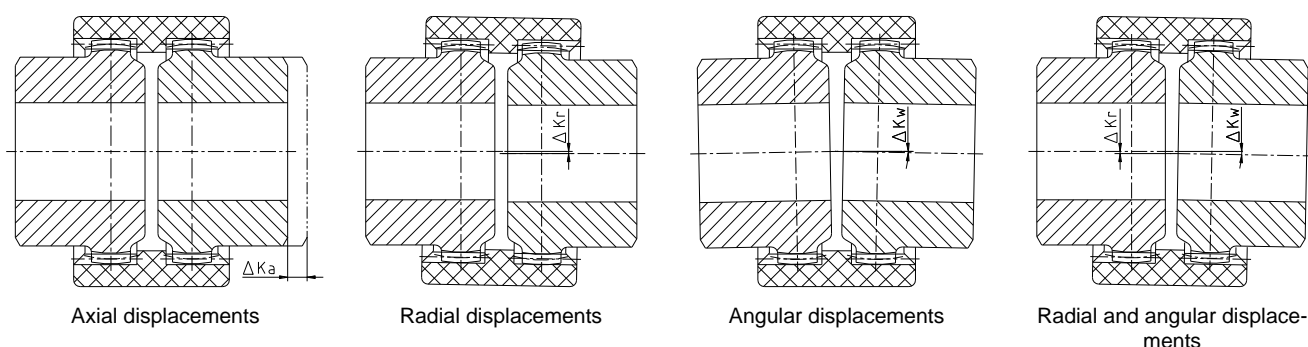


Illustration 17: Displacements

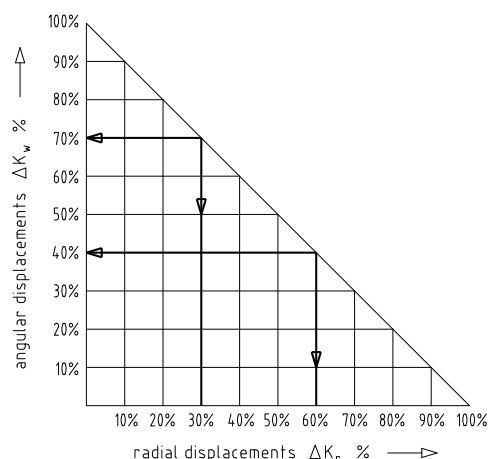
Examples of the displacement combinations specified in illustration 18:

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

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

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

Illustration 18:  
 Combinations of displacement





## 4 Assembly

### 4.6 Displacements - alignment of the couplings

**Table 4: Displacement figures**

Size	24	28	32	45	65	80	100	125
max. axial displacement $\Delta K_a$ in mm	$\pm 1$	$\pm 1$	$\pm 1$	$\pm 1$	$\pm 1$	$\pm 1$	$\pm 1$	$\pm 1$
max. radial displacement with n=1500 rpm $\Delta K_r$ in mm	0.35	0.35	0.35	0.40	0.45	0.45	0.45	0.45
max. radial displacement with n=3000 rpm $\Delta K_r$ in mm	0.23	0.23	0.23	0.25	0.28	0.28	0.28	0.28
max. angular displacement with n=1500 rpm $\Delta K_w$ in degree	0.9	0.9	0.9	0.9	0.7	0.6	0.6	0.4
max. angular displacement with n=3000 rpm $\Delta K_w$ in degree	0.6	0.6	0.6	0.6	0.5	0.4	0.4	0.3

## 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 - depending on the type of coupling for the tightening torques specified.

Finally the coupling protection against accidental contact must be fitted.

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.

During operation of the coupling, please pay attention to

- different operating noise
- vibrations occurring.

If the couplings are used in locations subject to dust explosion and in mining the user must make sure that there is no accumulation of dust in a dangerous volume between the cover and the coupling. The coupling must not operate in an accumulation of dust.

For covers with unlocked openings on the top face no light metals must be used if the couplings are used as equipment of equipment group II (*if possible, from stainless steel*).

If the couplings are used in mining (equipment group I M2), the cover must not be made of light metal. In addition, it must be resistant to higher mechanical loads than with use as equipment of equipment group II.

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

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

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

## 5 Start-up



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.

## 6 Breakdowns, causes and elimination

The below-mentioned failures can result in an improper use of the **BoWex®** coupling. In addition to the specifications given in these operating/assembly instructions make sure to avoid such failures.

The errors listed can only be clues to search for the failures. When searching for the failure the adjacent components must generally be considered.

### General failures with improper use:

- Important data for the coupling selection were not forwarded.
- The calculation of the shaft-hub-connection was disregarded.
- 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.
- No original **KTR** components (purchased parts) are used.
- Old/already worn out sleeves or sleeves stored for too long are used.
- Maintenance intervals are not observed.

Breakdowns	Causes	Hazard notes for potentially explosive atmospheres	Elimination
Different operating noise and/or vibrations occurring	Micro friction by faulty alignment on the spline of the nylon sleeve	Ignition risk due to 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
	Screws for axial fastening of hubs working loose		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
Fracture of the nylon sleeve / spline	Fracture of the nylon sleeve / spline due to high shock energy / overload	none	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the nylon sleeve 3) Inspect coupling components and replace coupling components that have been damaged 4) Insert nylon sleeve, assemble coupling components 5) Find out the reason for overload

## 6 Breakdowns, causes and elimination

Breakdowns	Causes	Hazard notes for potentially explosive atmospheres	Elimination
Fracture of the nylon sleeve / spline	Operating parameters do not meet with the performance of the coupling	none	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) Disassemble the coupling and remove remainders of the nylon sleeve 3) Inspect coupling components and replace coupling components that have been damaged 4) Insert nylon sleeve, assemble coupling components 5) Instruct and train the service staff
Excessive wear on the spline of sleeve	Vibrations of drive	Ignition risk due to hot surfaces	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the nylon sleeve 3) Inspect coupling components and replace coupling components that have been damaged 4) Insert nylon sleeve, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Find out the reason for vibrations
	ambient/contact temperatures which are too high for the spider, max. permissible e. g. T4 = - 30 °C/100 °C		1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the nylon sleeve 3) Inspect coupling components and replace coupling components that have been damaged 4) Insert nylon sleeve, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Inspect and adjust ambient/contact temperature
	E. g. contact with aggressive liquids/oils, ozone influence, too high/low ambient temperature etc. causing physical modification of the nylon sleeve	none	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the nylon sleeve 3) replace coupling components 4) Insert nylon sleeve, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Make sure that further physical modifications of the sleeve are excluded.

## 7 Disposal

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

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

 <b>KTR-Group</b>	<b>BoWex®</b> <b>Operating/Assembly instructions</b> <b>Type AS, Spec.-I and Spec.-I/CD</b>	KTR-N 40115 EN Sheet: 15 of 15 Edition: 3
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## 8 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](http://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.**

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