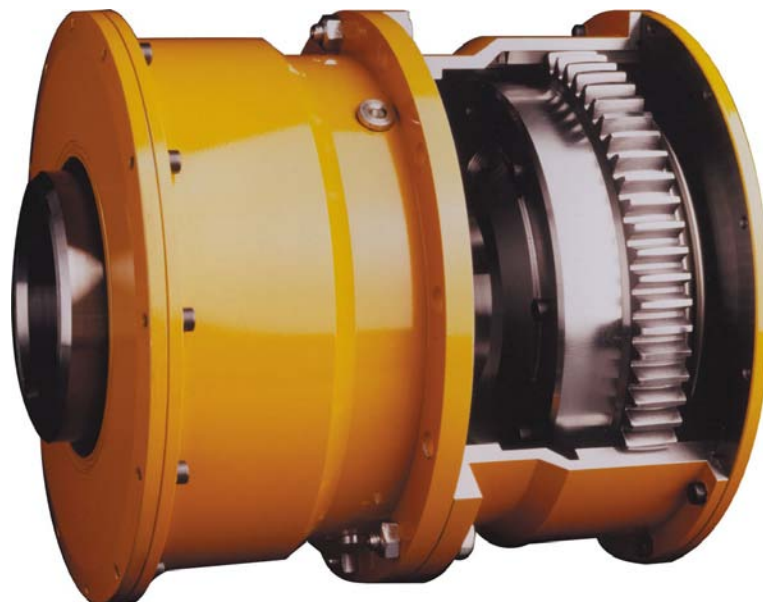


# Operation Manual

## Gear Couplings

according to  
**KWN 21006, KWN 21007 and KWN 21008**



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## Manufacturer's Declaration



Product: Gear coupling  
ZAKU according to KWN 21006, 21007, 21008

In accordance with the EU Machine Directive 98/37/EG, Appendix IIB

we

**KWD**  
**Kupplungswerk Dresden GmbH**  
**Löbtau Straße 45 - D – 01159 Dresden**  
**P.O. Box 270144 – D – 01172 Dresden**

hereby declare, that the

gear couplings according to  
KWN 21006  
KWN 21007  
KWN 21008

described in this operation manual are intended for installation in a machine. Commissioning of the machine is prohibited until it is established whether the machine, in which these components are fitted complies with the EU directive (original issue 89/392/EEG, including all subsequent amendments).

All harmonized standards published by the EU Commission in the Official Gazette of the European Union – insofar as they apply to this product – have been taken into consideration.

Date/ Manufacturer's signature

04.02.2005 signed C. Spensberger

## Safety and Information Symbols



**Caution!**

**Reference to explosion protection**



**Danger!**

**Danger of injury to personnel**



**Attention!**

**Follow instructions**

## 1. Specifications



The owner/operator must comply with the technical specifications established for the operation of the described coupling. The technical specifications are shown in the current specification leaflet, which at the same time represents the works standard of Kupplungswerk Dresden GmbH, as well as, in certain justified cases, available in form of a drawing.

**Couplings for operation under normal operating conditions are not delivered with special identification markings, in contrast to those for operation in a potentially explosive atmosphere in accordance with Directive 94/9/EU.**

## 2. General



This Operation Manual (OM) is a constituent part of the scope of delivery of the coupling, and it may also be viewed on the Internet website of the manufacturer (<http://www.kupplungswerk-dresden.de>).

This operation manual must always be kept available in the vicinity of the coupling. Only the observance of all instructions and information will guarantee trouble-free operation of the coupling within the specified parameters. The coupling must be used only under conditions specified in the specification sheets (specification leaflet). Any deviation from this requires prior consultation of the manufacturer as well as his approval. The described couplings correspond to the technical state-of-the-art at the time of printing of this OM.

We reserve the right to make changes to individual components and accessories in the course of advanced development, while maintaining essential characteristics, for the improvement of capabilities and safety.

## 3. Safety

The coupling has been designed and built in accordance with the current state-of-the-art and is delivered in operationally safe condition. The coupling may only be installed and operated as stipulated in the delivery contract and performance specifications as well as according to markings complying with the conditions of the Directive 94/9/EG.

**Identification markings of couplings for use in a potentially explosive atmosphere in accordance with Directive 94/9/EG:**

II 2 G IIB T3 ( $-30^{\circ}\text{C} = T_a = 50^{\circ}\text{C}$ )  
II 2 D 50°C



**Unauthorized modifications are prohibited. This also applies to protective devices installed as protection against accidental contact.**

The following general safety instructions must be observed at all times when working on the coupling:

- The coupling may only be serviced, repaired or operated by authorized and properly trained personnel.
- All work must be performed according to the principle "safety first".
- As a matter of principle, any work on the coupling may only be performed at a complete standstill. The motive power aggregate must be secured against accidental operation (for example, by interrupting energy supply). A warning sign must be affixed to the switch-on device when work is performed on the coupling.
- The motive power aggregate must be shut down immediately if changes are observed on the coupling during operation.
- The coupling must be secured against accidental contact by means of appropriate protective equipment.



**Rotating drive components must be secured against accidental contact by means of appropriate protective equipment.**



**Prior to installation of a protective hood, a risk analysis should be performed in order to prevent the creation of ignition sources. This analysis is not part of the scope of delivery by the manufacturer of the coupling.**



**All add-on parts must meet the conditions of Directive 94/9/EG. Monitoring devices not complying with the directive must be operated with an isolating switch.**



**When installing the coupling in another machine or system, the manufacturer of this machine or system is obliged to integrate the instructions contained in this OM in the OM of his machine or system.**

**This coupling complies with the conditions of Directive 94/9/EG.**

**No explosive gas mixtures and dust concentrations must be present during installation or disassembly work.**

Depending on the operating conditions, the surfaces of the coupling may get extremely hot.

**Danger of burns!**

**Danger of scalding during lubricant change by emerging hot lubricant!**

**When changing the lubricant, there is a risk of scalding caused by spilled hot oil or grease!**

#### 4. Transport and Storage

The contents of the delivery are listed in the delivery papers. The delivery must be checked for completeness upon receipt. Possible transport damage and incomplete delivery must be reported immediately in writing. The coupling is delivered in individual components or subassemblies ready for installation, however, **without lubricant filling**.

During transport the couplings must be secured against impact, shock and contact damage. For transport or lifting of the coupling and for installation, non-metallic load suspension devices with a sufficient safety margin must be used exclusively.

The couplings must be stored indoors in enclosed and dust-free storerooms, with the exclusion of harmful influences, such as condensates, excessive humidity (< 70%) and ozone.



**In case of possible damage the coupling may not be put into operation.**

The couplings are delivered with temporary corrosion protection, allowing, under the above described conditions, storage of up to 6 months from the date of delivery.



**In case of subsequent painting, the accepted rules of explosion protection must be observed and complied with.**

#### 5. Technical Description



Gear couplings are non-disengagable, gearbox-driven couplings with self-centering gearing. They transmit the torque positively through axially intermeshing external and internal toothing with involute profiles of hubs (1) and sleeves (2).

Gear couplings are particularly well suited for the compensation of axial displacements of the connected shafts. In addition, by means of a correspondingly specified backlash and the



resulting angular play existing between hubs and sleeves, in case of one-side toothed couplings, angular shaft displacements of the same size and in case of both-sides toothed

couplings, radial displacements are also permissible within the limitations of the design concept.

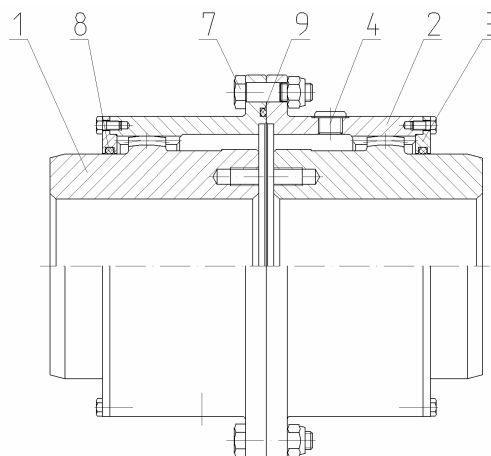
The radial and angular displacements to be compensated by the coupling are composed of installation and operation related displacements and in their sum must not exceed the values for  $x$  and  $a$  specified in the coupling specification leaflet.

In this way, relative movements, uneven load distribution and resulting wear are limited to a minimum and thus the service life of the coupling is increased.

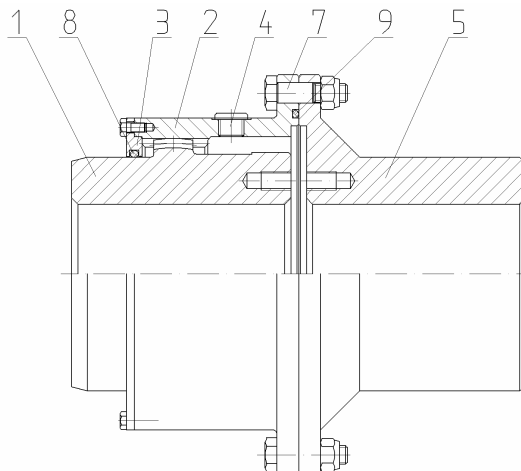
Gear couplings are not able to absorb any radial forces or bending moments.

Fig. 1 - 3: Installation positions

KWN 21006



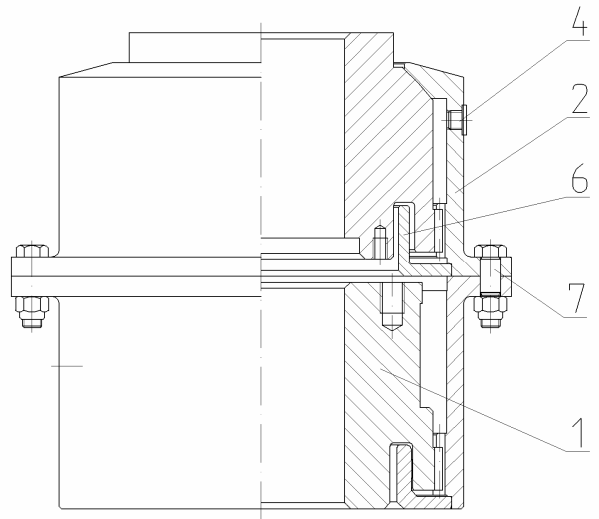
KWN 21007



## KWN 21008

(without oil seal)

- 1 Hub
- 2 Sleeve
- 3 Cover (disk)
- 4 Screw plug
- 5 Flange hub
- 6 Oil level ring
- 7 Hexagon dowel screw
- 8 Oil seal for disk
- 9 Oil seal for sleeve



## 6. Installation

The instructions in Section 3 „Safety“ must be observed!



**Specifications deviating from works standards must always be taken from the corresponding drawing and are binding!**



**A potentially explosive atmosphere must not be allowed to exist during installation of the coupling.**

The coupling must be installed with the utmost care by properly trained and authorized personnel. Damages as a consequence of inexpert installation result in the exclusion of manufacturer's liability. Care must be taken to ensure that a sufficient amount of space is provided around the coupling for subsequent service and repair work.



**The owner/operator must make certain that no foreign objects impair the function of the coupling (for example, falling objects, pouring, etc.).**

### 6.1. Mounting of coupling parts

1. Mark and fix in position the parts (flange hub and/or sleeve) in relation to each other.
2. Separate the flange connection of the coupling to be installed.
3. Remove preservation media and degrease sealing surfaces and hub bores with a suitable cleaning agent.



**A potentially explosive atmosphere must not be allowed to exist during cleaning of the coupling.**



**Provide sufficient ventilation. Avoid any kind of ignition sources! Always observe the instructions by the manufacturer of the cleaning agent when using solvents or cleaning agents.**

4. Prepare shaft ends for installation of the coupling.
5. Mount hubs with sleeves or flanged hubs by means of a mounting device or other suitable tool (in case of vertical installation, secure upper hub against sliding down). To make mounting easier, hubs may be heated evenly using a suitable heat source.



**Attention! Danger of burns!**



**The O-ring (8) must be protected from heating up to a temperature > 90°C during installation!**



**Attention!**  
**Driving the hubs or flanged hubs onto the shafts by force is not permissible!**

6. Push the machines or aggregates close together and align with each other to obtain distance  $e_1$  (see works standard) for coupling according to KWN 21006 and KWN 21007 (special design with intermediate shaft, distance L; Fig. 5)

$$L = L_w + e_1$$

L overall distance

$L_w$  length of intermediate shaft

Observing the permissible axis displacement  $a$ , the dimensions  $e_1$  and  $L$  are minimum distances. The maximum dimensions result under observance of the maximum possible axis displacement  $a_{\max}$  (see coupling specification leaflet).

Applicable for couplings according to KWN 21006:  $e_{1\max} = e_1 + (2 \cdot a)$

Applicable for couplings according to KWN 21007:  $L_{\max} = L + (2 \cdot a)$

Since the permissible axial displacement  $a$  lies positively as well as negatively to the nominal dimension  $e_1$ , the following minimum or maximum distances  $e_{1v\min}$  or  $e_{1v\max}$  of end faces result in gear couplings for vertical installation according to KWN 21008.

Table 1

Nominal size	25	40	63	100	160	250	400	630	1000	1600	2500
$e_{1v}$ nom. dim.	30			40		45		50		55	
$e_{1v}$ min	28.5			37		42		47		52	
$e_{1v}$ max	31.5			43		48		53		58	

7. Check distances  $e_{1min}$ ,  $e_{1max}$  or  $L_{min}$ ,  $L_{max}$ ; installation tolerance  $\pm 0.5$  mm.


**Attention!**

Please note that in case of all gear couplings (horizontal and vertical), the values shown in the tables for  $e_1$  and  $L$  are undercut or exceeded, even in case of operation related axial displacements, i.e. with aggregates running.

## 6.2. Alignment of coupling parts



The alignment accuracy of shaft axes to each other is essential for the service life of the couplings. The values for permissible displacements must be complied with (see works standard or Table 1).



If couplings are operated in a potentially explosive atmosphere, the values for maximum deflection must be halved in order to guarantee that the coupling components do not represent a source of ignition by colliding with each other.



Failure to follow this instruction may result in rupturing of the coupling, with consequential possible danger to life and limb of personnel.

In both-sides toothed couplings (KWN 21006, 21008), the shafts must be aligned by means of a measuring wedge and ruler.

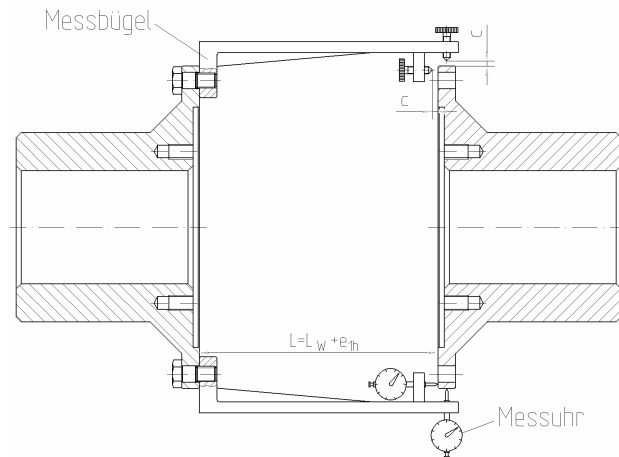


Fig. 4

This check must be performed in at least 4 places offset by 90°. In case of operating speeds  $> 0.7 \times n_{\max}$  ( $n_{\max}$  according to coupling specification leaflet), additional alignment by means of a dial gauge is recommended.

The radial displacement is determined by circumferential travel of the dial gauge around the alignment diameter of one hub, while the dial gauge is attached to the other hub. The difference between the largest and the smallest measured value represents the doubled dimension of the radial displacement of both hubs to each other.

In case of smoothly running machines it is recommended to measure the existing shaft displacement by simultaneous rotation of both coupling hubs, since in this method production related deviations of form and position do not influence the measuring result. For one-side toothed couplings according to KWN 21007, the two flanged hubs must be aligned radially as well as axially. The radial displacement is determined by circumferential travel of the dial gauge around the alignment diameter of one hub, while the dial gauge is attached to the other hub. The difference between the largest and the smallest measured value represents the doubled dimension of the existing radial displacement.

Proceed analog to the above in case of angular displacement (dial gauge travels around the end face of the flanged hub).

Should no dial gauge be available, it is also possible to determine the displacement by dimension (Fig. 5). In case of greater lengths  $L$  the system-related error of the measuring device itself must also be taken into account.

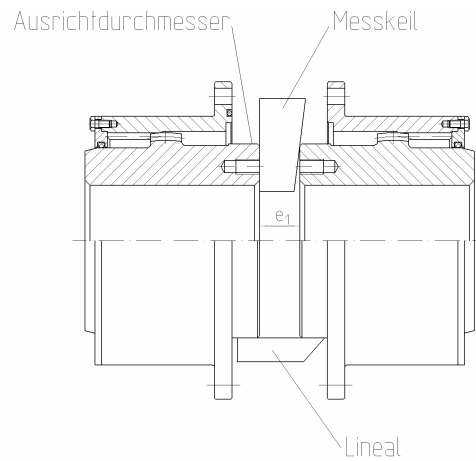


Fig. 5

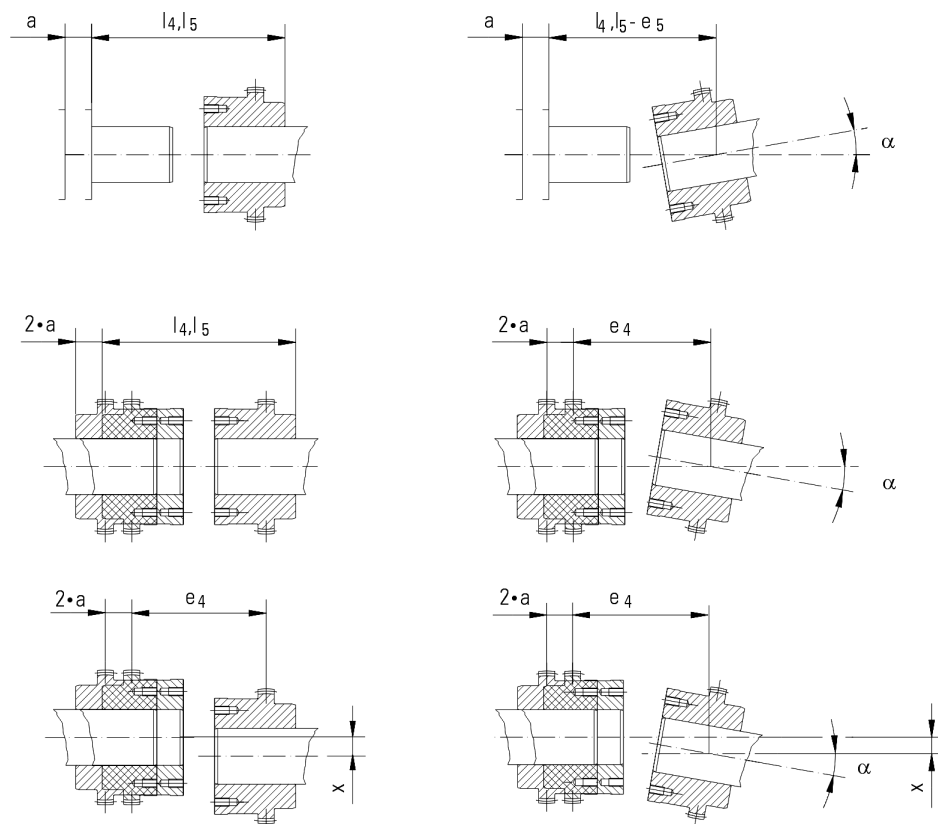


Fig. 6: Displacements



To improve the effectiveness of lubrication, the aim should be a minimal angular displacement of  $0.1^\circ$  per joint plane.

Calculations are made with the size-related bearing span (Table 1) and taking into account the radial displacement to be obtained.

$$x_{\min} = \tan 0.1^\circ \cdot e_4$$

Table 2

Permissible displacements							
Nominal size	x at $n \leq 0.6 n_{\max}$	x at $n > 0.6 n_{\max}$ $n \leq 0.8 n_{\max}$	x at $n > 0.8 n_{\max}$ $n \leq 1.0 n_{\max}$	a	a <sub>max</sub>	e <sub>4</sub>	e <sub>5</sub>
25	1,2	0,6	0,12	1	for $n \leq 0,6 n_{\max} = 0,0218 \text{ rad}$ , for $n > 0,6 n_{\max}$ and $n \leq 0,8 n_{\max} = 0,0109 \text{ rad}$ ,	55	48
40	1,6	0,8	0,16	2		75	48
63	1,8	0,9	0,18	2		85	52
100	1,8	0,9	0,18	3		85	63
160	2,2	1,1	0,22	3		100	50
250	2,2	1,1	0,22	3		100	60
400	2,6	1,3	0,26	5		120	55
630	3,5	1,75	0,35	5		160	65
1000	3,5	1,75	0,35	5		205	65
1600	4,5	2,2	0,45	5		205	72
2500	5,5	2,7	0,55	5		255	88
4000	5,5	2,7	0,55	5		250	90
6300	6,1	3,0	0,61	5		280	115
10000	7,0	3,5	0,70	5		320	115
16000	8,0	4,0	0,80	5		370	120
25000	9,6	4,8	0,96	5		440	140
40000	11,3	5,6	1,13	5		520	160
63000	13,50	6,7	1,35	5		620	170



Specifications deviating from works standards must always be taken from the corresponding drawing and are binding!

- After completed alignment the aggregates are locked in their final position.



Loosening screws represent a high ignition risk, therefore they must be tightened up to the specified torque values.

2. In couplings with grease lubrication, fill the gaps between the teeth with grease (see Section 7.1.1.)
3. When joining the two coupling sleeves (according to KWN 21008), fit the oil level ring (6) evenly and without jamming into the centering of the sleeves.
4. Join the two sleeves or flanged hub with sleeve by installing the screws, observing the location markings and tightening to the required torque as specified in Table 2. In case of couplings according to KWN 21007, the screw head must be located on the sleeve side. Make certain that the seals (O-rings) are firmly seated in the grooves of the hub of disk. For couplings according to KWN 21008, it is recommended to apply a coat of sealing compound to the sealing surfaces of the sleeves.

Table 3

Nominal size	Torque (Nm)	
	Dowel screw	Cover screw
25	46	5.5
40	46	5.5
63	46	5.5
100	46	5.5
160	46	5.5
250	46	5.5
400	46	5.5
630	80	9.5
1000	80	23.1
1600	80	23.1
2500	80	23.1
4000	673	46
6300	673	80
10000	1450	80
16000	1450	80
25000	2530	80
40000	2530	80
63000	2530	194



5. In couplings with oil lubrication, fill in the required volume of oil (Section 5.3) prior to operating the coupling. The oil volume for gear couplings according to KWN 21008 is calculated to allow an overflow of the oil at the oil level ring (6) into the lower half of the coupling.
6. After the coupling is filled with oil, reinstall the screw plug and the seal.
7. Prior to operation, the coupling must be equipped with appropriate protection against accidental contact.



**A Loosening screw plug represents a high ignition risk, therefore it must be tightened up to the specified torque values.**



**Rotating drive components must be secured against accidental contact by means of appropriate protective equipment.**

**Prior to installation of a protective hood, a risk analysis should be performed in order to prevent the creation of ignition sources. This analysis is not part of the scope of delivery by the manufacturer of the coupling.**



**All ad-on parts must comply with Directive 94/9/EG.**

## 7. Commissioning



**Improper use and modifications of the coupling that have not been approved by KWD will render the manufacturer's warranty null and void. This also applies to the use of spare parts other than original spare parts by KWD.**



**Original KWD spare parts must be used exclusively.**

Check and, if required, retighten all screw connections prior to putting the coupling into operation.



**The tightening torque values for the screws are shown in Table 2 or the corresponding drawing and are binding!**

In addition, check the alignment of the coupling again. Finally, install the required protection devices against accidental contact. Should unusual noises or vibrations occur during the operation of the coupling, the machine in which the coupling is installed must be shut down immediately and the cause of the noise or vibrations must be eliminated.



**If no cause of the noise or vibration is found, consult the customer service of the manufacturer!**

The following visual checks must be performed during commissioning:



**Check for existence of Ex markings**



- Check oil level
- Check the hub seal for leaks
- Check that rotating parts do not contact anything
- Check for unusual noise
- Check for possible lubricant leaks from the housing and hub seals
- Refer to Section 10 Trouble Shooting for instructions on how to eliminate the causes of possible operating trouble.

## 7.1. Lubrication

An essential prerequisite for the operation of the coupling is well-matched and sufficient lubrication of the toothing suitable for the prevailing operating conditions, in particular ambient temperature. The couplings can be lubricated with grease as well as oil.



**Make certain that there are no lubricant leaks or spills!**

### 7.1.1. Lubrication with grease

Lubrication with grease requires a minimum of maintenance and to a large extent precludes the possibility of leaks. However, the following limitations with regard to ambient temperature and speed of the coupling should be noted:

Ambient temperature:

-20°C to +80°C

Speed:

$n < 3000 \text{ min}^{-1}$

but not greater than 65% of the maximum speed specified in the works standard

In addition, the following condition must be met:  $n \times x = f$

n stands for:

X stands for:

f stands for:

max, operating speed of the coupling in  $\text{min}^{-1}$   
 greatest radial displacement under operating conditions  
 factor = 1900

### Types of grease

Recommended types of grease:

Lubricating grease GP 0, (00),  
 labeled according to DIN 51502,  
 consistency in NLGI classes according to  
 DIN 51818  
 (EP alloyed lithium or soda grease)

#### 7.1.2. Lubrication with oil



**Make certain that there are no lubricant leaks or spills!**

Oil lubrication is recommended, if

- radial shaft displacements are  $x > 50\%$  and
- speed is  $n = 65\%$

of the maximum values specified in the applicable standards.

The same applies to the use of the coupling at ambient temperatures =  $-20^{\circ}\text{C}$ .

To prevent leakage of oil through the groove of the feather key, the faces of the shaft ends and the hubs of the gear couplings must be sealed (e.g. by means of cover disks).

### Types of oil

Recommended types of oil:

Table 4

Temperature range ( $^{\circ}\text{C}$ ) from to	Lubricant type DIN 51502	Minimum requirement	Viscosity class DIN 51519 (ISO classification 3448)
40 90	CLP	DIN 51517 Part 3	ISO VG 680
0 80	CLP	DIN 51517 Part 3	ISO VG 460 to 150
-20 40	CLP	DIN 51517 Part 3	ISO VG 100
-35 20	HLP	DIN 51524 Part 2	ISO VG 22



**Specifications deviating from works standards must always be taken from the corresponding drawing and are binding!**

## 7.2. Filling volumes

The volume of lubricants to be filled into the coupling depends on the nominal size of the coupling and is shown in Table 5.

For gear couplings according to KWN 21008, the specified filling volume must be divided equally between the upper and lower half of the coupling. Topping up of the lubricant in these couplings is possible only at the time of routine maintenance or when the coupling is disassembled.

Table 5

Nominal Size	KWN 21006		KWN 21007		KWN 21008	
	Grease (kg)	Oil (l)	Grease (kg)	Oil (l)	Grease (kg)	Oil (l)
25	0.05	0.03	0.025	0.015	0.110	0.10
40	0.06	0.05	0.030	0.025	0.135	0.12
63	0.07	0.06	0.035	0.030	0.165	0.15
100	0.13	0.08	0.065	0.040	0.220	0.20
160	0.20	0.14	0.100	0.070	0.260	0.25
250	0.25	0.16	0.125	0.080	0.350	0.35
400	0.30	0.22	0.150	0.110	0.450	0.40
630	0.60	0.25	0.300	0.125	0.650	0.50
1000	0.80	0.45	0.400	0.225	0.900	0.65
1600	1.20	0.60	0.600	0.300	1.30	0.85
2500	1.50	1.20	0.750	0.600	1.80	1.25
4000	2.50	1.20	1.30	0.60	-	-
6300	4.00	1.50	2.00	0.75	-	-
10000	6.50	2.20	3.30	1.10	-	-
16000	11.50	3.20	6.00	1.60	-	-
25000	18.00	4.50	9.00	2.25	-	-
40000	29.00	6.00	15.00	3.00	-	-
63000	45.00	8.00	23.00	4.00	-	-



**Specifications deviating from works standards must always be taken from the corresponding drawing and are binding!**

## 8. Maintenance and Repair

The instructions in Section 2 „Safety“ and Section 10 „Trouble Shooting“ must be followed. Maintenance and repair work must be performed with the utmost care by properly trained and authorized personnel.

Essentially, maintenance work consists of:

- |                             |   |                        |
|-----------------------------|---|------------------------|
| checking the lubricant      | – | lubricant change       |
| checking sealing elements   | – | replacement of O-rings |
| checking shaft displacement | – | re-alignment           |



**If a technical drawing exists for the coupling, the specifications shown in the drawing are binding!**



**The coupling must be protected against falling objects.**



**Check protective devices of rotating parts for proper seating and function. Any contact with rotating parts is not permissible.**

### 8.1. Lubricant change



**Make certain that there are no lubricant leaks or spills!**

Lubricant change intervals depend to a large extent on the operating conditions of the coupling (load, speed, shaft displacement, ambient temperature, hours of operation). The following reference values are recommended:

#### Oil lubrication

- Check oil approx. after every 1000 hours of operation, at least every 6 months.
- If necessary, top up oil through oil filler opening.
- Change oil approx. after every 3000 hours of operation, at least every 2 years.

#### Grease lubrication

- Re-grease approx. after every 1000 hours of operation with 10% of the grease volume specified in Table 5, at least every 6 months.
- Change the grease approx. every 8000 hours of operation, at least every 3 years.
- The grease must always be filled in when the coupling is disassembled or the sleeve is slid back (see Disassembly).



In case of couplings operated in a potentially explosive atmosphere, significantly shorter maintenance intervals are required! Couplings must be checked approx. after every 200 hours of operation or at least once a month!



For operation under other operating conditions please consult the manufacturer of the couplings.

## 8.2. Disassembly

Disassembly of the coupling is required for changing the oil seals, as well as a partial disassembly for the purpose of changing the grease filling. In couplings with oil lubrication, the oil must be drained prior to disassembly.

**Disassembly:** (part numbers see Fig. 1 – 3)

- Undo dowel screws (7), separate sleeves (2) at the flange.
- Loosen and remove the cover (3).
- If necessary, push coupled machinery parts further apart.
- Mark toothing of the sleeves and hubs in relation to each other.
- Slide the sleeves (2) back in axial direction.
- Clean the coupling.
- Check toothing, replace any damaged parts.
- In case of grease lubrication, fill toothing and sleeves with grease.
- If required, pull hubs off shafts using suitable devices.
- Note instructions in Sections 6 and 7 for reassembly.



### Attention!

On no account may the sleeve be used to pulling off the hubs!



### Note on change of oil seals:

1. The oil seals of the sleeve (9) may be changed prior to reassembly.
2. It may be necessary to pull the hubs (1) off the shafts for the purpose of changing the oil seal of the cover disk (8).

### 8.3. Cleaning of coupling parts



**A potentially explosive atmosphere must not be allowed to exist during cleaning of the coupling.**



**Provide sufficient ventilation. Avoid any kind of ignition sources! Always observe the instructions by the manufacturer of the cleaning agent when using solvents or cleaning agents.**

After disassembly, the coupling parts should be thoroughly cleaned. This applies especially to the toothing area, where in particular residue of old lubricant and abrasion particles must be removed.

### 8.4. Replacement of coupling

Should the coupling exhibit excessive wear of the toothing, which is evident by a large amount of circumferential backlash within the coupling, the entire coupling must be replaced.



**The components of the hub and sleeve must always be replaced in pairs for each half of the coupling!**

After undoing all screw connections, removal of the intermediate shaft (couplings according to KWN 21007), pull the hubs or flanged hubs off the shafts, using the threaded holes provided for the puller or using an appropriate all-purpose puller.

Note instructions in Sections 6 and 7 for reassembly.

## 9. Spare Parts

Original spare parts are described by indicating their article number and associated item number and are available from the manufacturer.

## 10. Trouble Shooting



**If a technical drawing exists for the coupling, the specifications shown in the drawing are binding!**

### 10.1. General

The operating trouble described in Section 10.2. are merely intended as clues the purpose of trouble shooting. If the coupling is installed in a complex machine and system, these must be included in locating the source of trouble.

The coupling must run noiselessly and vibration free under all operating conditions.



**Improper use and modifications of the coupling that have not been approved by KWD will render the manufacturer's warranty null and void. This also applies to the use of spare parts other than original spare parts by KWD.**



**Original KWD spare parts must be used exclusively.**



**The coupling must always be shut down for the purpose of trouble shooting. The motive power aggregate must be secured against accidental restarting and a sign must be affixed to the main switch indicating that work is in progress on the coupling.**



## 10.2. Elimination of possible trouble

Symptom	Probable cause	Indication of danger in explosive atmosphere	Corrective action
<ul style="list-style-type: none"> <li>- Vibrations</li> <li>- Changed or unusual running noise</li> </ul>	<ul style="list-style-type: none"> <li>- Permissible displacement values exceeded</li> <li>- Coupling is not being operated under specified operating conditions</li> <li>- Lack of lubricant</li> </ul>	<ul style="list-style-type: none"> <li>- Hot surfaces and sparking lead to risk of ignition</li> <li>- Risk of ignition by sparking caused by metal to metal contact of toothing</li> <li>- Risk of ignition by sparking caused by metal to metal contact at the coupling cover</li> </ul>	<ul style="list-style-type: none"> <li>- Shut down the machine or system</li> <li>- Check and, if required, correct alignment and installation dimension of the coupling</li> <li>- Shut down the machine or system</li> <li>- Check toothed components</li> <li>- Change lubricant and check and, if required, replace seals</li> </ul>
<ul style="list-style-type: none"> <li>- Increased operating temperature</li> </ul>	<ul style="list-style-type: none"> <li>- Lubricant level too high or too low</li> <li>- Coupling is not operated under specified operating conditions</li> <li>- Permissible displacement values are exceeded</li> <li>- Lubricant too old</li> </ul>	<ul style="list-style-type: none"> <li>- Hot surfaces and sparking lead to risk of ignition</li> <li>- Risk of ignition by sparking caused by metal to metal contact of toothing</li> </ul>	<ul style="list-style-type: none"> <li>- Shut down machine or system</li> <li>- Check toothed components</li> <li>- Change lubricant and check and, if required, replace seals</li> <li>- Determine date of last lubricant change and change lubricant</li> </ul>
<ul style="list-style-type: none"> <li>- Fractured toothing</li> </ul>	<ul style="list-style-type: none"> <li>- Coupling is not being operated under specified operating conditions</li> <li>- Permissible displacement values are exceeded</li> <li>- Lack of lubricant</li> </ul>	<ul style="list-style-type: none"> <li>- Hot surfaces and sparking lead to risk of ignition</li> <li>- Risk of ignition by sparking caused by metal to metal contact of toothing</li> </ul>	<ul style="list-style-type: none"> <li>- Shut down machine or system</li> <li>- Replace coupling or repair using only original KWD spare parts</li> <li>- Assemble according to OM</li> </ul>
<ul style="list-style-type: none"> <li>- Excessive wear of toothing</li> </ul>	<ul style="list-style-type: none"> <li>- Coupling is not being operated under specified operating conditions</li> <li>- Permissible displacement values are exceeded</li> <li>- Lack of lubricant</li> </ul>	<ul style="list-style-type: none"> <li>- Hot surfaces and sparking lead to risk of ignition</li> <li>- Risk of ignition by sparking caused by metal to metal contact of toothing</li> </ul>	<ul style="list-style-type: none"> <li>- Shut down the machine or system</li> <li>- Check and, if required, correct alignment and installation dimension of the coupling</li> <li>- Check toothed components</li> <li>- Change lubricant and check and, if required, replace seals</li> </ul>

## 11. Concluding Remarks

Special custom designs of gear coupling available upon request.



## Declaration of Conformity

according to EU Directive 94/9/EC of 23. March 1994  
as well as legal regulations issued for their implementation.

The manufacturer, KWD Kupplungswerk Dresden GmbH  
Löbtauer St. 45  
D-01159 Dresden, Germany,

hereby declares, that the

ZAKU gear coupling with crowned toothing  
of the types according to KWN 21006, 21007 and 21008

described in this Operation Manual are devices in the sense of Article 1 (3) as well as Article 8, Paragraph (1) c) of the Directive 94/9/EC and are in compliance with the provisions of Directive 94/9/EC as well as the standards EN 1127-1: 1997, DIN EN 13463-1:2001, DIN EN 13463-5/-8 2003.

The described couplings are protected against explosion within the conditions

II 2 G IIB T3 ( $-30^{\circ}\text{C} = T_a = 50^{\circ}\text{C}$ )  
II 2 D 50°C.

signed: Dr.-Ing. C. Spensberger  
Managing Director  
Engineering

signed: Dipl.-Ing. F. Jerosch  
Manager  
Quality System