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**Explosion-Protected Crane Components**  
Operating and Maintenance Instructions

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↘ EN

⊕ II 3 G (ATEX) - Zone 2

**STAHL**  
CraneSystems



## ***Fundamental information***

You have purchased a product manufactured by STAHL CraneSystems GmbH. These crane components have been constructed in compliance with the applicable standards and regulations.

### **Inspect components for damage caused in transit immediately upon delivery.**

Report damage caused in transit and after consulting the manufacturer/supplier repair or have repaired before installation and commissioning. Do not install or commission damaged components!

- **Assembly**
- **installation**
- **commissioning**
- **testing**
- **maintenance and fault clearance**

**may only be carried out by an " Ex specialist "**

### **Terms employed**

#### **User**

Whoever uses and employs the wire rope hoist or has it operated by suitable trained personnel is considered to be the user (employer/company).

#### **Trained personnel**

Trained personnel are persons who have been instructed and trained in the duties with which they are entrusted and the risks which may arise from incorrect behaviour, have been advised on the necessary protective devices, precautions, applicable regulations, accident prevention regulations and prevailing conditions and have proven their ability.

#### **Skilled electrician**

A skilled electrician possesses knowledge and experience on electrical equipment arising from specialist training and, with knowledge of the applicable standards and regulations, is able to assess the work with which he is entrusted and detect and avoid possible risks.

#### **Definition of a qualified person (specialist):**

A qualified person is one with the necessary qualification, based on theoretical and practical knowledge of hoists, in particular with regard to explosion protection, for the required activities as listed in the operating instructions.

The person must be in a position to assess the safety of the installation in conjunction with the application.

Persons with the authority to undertake certain maintenance work on our explosion-protected products include the manufacturer's service engineers and trained fitters with the corresponding certification.

#### **Seminars:**

Comprehensive understanding of material handling products is a prerequisite for the correct use of equipment. Competent and practically oriented, we impart the specialist knowledge required for the correct use, monitoring and care of your installation. Please ask for our seminar programme.

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Subject to alterations

## 1.1 Symbols



### Safety at work

This symbol marks all information on safety at work where risks to life and limb are entailed.



### Explosion protection

The explosion-protected crane components are constructed according to European norms. Components bearing this symbol are explosion-protected (protection class Ex e: e.g. connection boxes and Ex d: panel boxes for electrical equipment, Ex "A" for motor and brake). Work on these components may only be carried out by skilled personnel that has been especially trained on explosion protection.



### Warning of suspended load

It is forbidden for persons to stand under suspended loads. This entails risks to life and limb!



### Warning of electrical voltage

Covers such as hoods and caps which are marked with this symbol may only be opened by "qualified or suitably instructed personnel" and after the equipment has been disconnected.



### Safety in operation

Information marked with this symbol must be observed to avoid possible damage.

In these operating instructions, these symbols mark particularly important information relating to risks and safety in operation.

## 1.2 Mechanical components

All mechanical sub-assemblies must be assessed from the point of view of "mechanical explosion protection".

In the case of an overhead travelling crane, this applies in particular to wheels.

These sub-assemblies have been manufactured in such a way with reference to the specific order that they do not present any risks when used for the intended purpose. To ensure lifetime safety, these sub-assemblies must be inspected and serviced carefully in accordance with these operating instructions.

## 1.3 Operating instructions

Follow the operating instructions! Operating instructions are required by the EC Machinery Directive and EC Directive 94/9.

The user is legally obliged to follow them by EC Directive 99/92.

## 1.4 Use for intended purpose

Crane components are intended for the construction of cranes and similar installations. They may only be used in accordance with their design principles.

## 1.5 Organisational safety precautions

- Only direct persons to operate the crane if they have been trained or instructed in its use. Observe the legal minimum age!
- At regular intervals, check that work is being carried out in a safety-conscious manner.
- Observe the intervals specified for periodic tests. File the test reports in the test logbook.
- Store the operating instructions within easy reach where the equipment is operated.

## 1.6 General regulations

- Safety and accident prevention regulations
- National regulations
- See also operating instructions of AS ex n, SH ex n wire rope hoist.

## 1.7 Installation, commissioning, maintenance and repairs

Installation, commissioning, maintenance and repairs may only be carried out by qualified personnel.

- Use only **original spare parts** for repairs, otherwise the guarantee will expire.
- Additional fitments must not prejudice safety.
- Electrical connection and the electrical performance test may only be carried out by a qualified electrician.
- Our After Sales Service will be pleased to advise you on correct and suitable use. Repairs will be carried out quickly and competently by our trained personnel.

## 1.8 Warranty

- The guarantee expires if these operating instructions are not observed for installation, operation, testing and maintenance.
- Repairs and elimination of faults within the scope of the warranty may only be performed by qualified personnel (see page 2) after the manufacturer/supplier has been consulted and has given his approval.  
The warranty will become invalid if the hoist is modified or original spare parts not used.

## 1.9 Periodic tests

Hoists and cranes must be inspected by qualified personnel at least once a year, possibly more frequently if so required by national regulations. The periodic tests must be adapted to the application of the hoist and crane. A high degree of use entails shorter maintenance intervals.

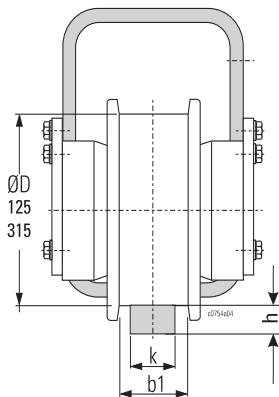


The components ensuring explosion protection must be checked after 3 years at the latest. As a rule, some of these are checked during the annual inspection (e.g. installation, attachment...) If the ambient conditions are severe, the maintenance intervals must be shortened as necessary. The results of the test must be recorded and filed in the test logbook.

**All tests must be initiated by the user** (see page 2).

### 2.1 Assembling endcarriage

The endcarriage is supplied as standard fitted with wheelsets, end buffers, travel drive and endcarriage connection plates.

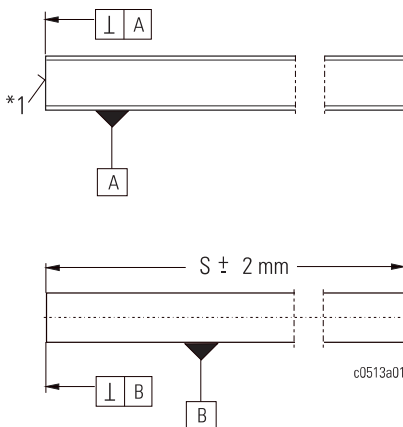


- Check that the capacity of the endcarriage is adequate for the intended application of the crane.
- Check that the wheel tread corresponds to the crane rail, see sketch and table.
- The running and guide surfaces of the rail joints must be flat; grind down if necessary.
- The crane must run over the whole distance without jamming or increased friction on the flanges. Increased friction on the flanges may lead to increased temperatures and wear. This must be avoided without fail.

ØD	k	b1	b2*2	h
[mm]				
125	40	50	50	≥ 30
	50	60	60	
160	40	52	52	≥ 30
	50	62	62	
200	40	54	54	≥ 30
	50	64	64	
315	60	74	74	≥ 30
	50	53	53	
500	60	63	63	≥ 40*3 ≥ 45
	70	73	73	
	100	103	100	

#### 2.1.1 On assembly

Perfect crane geometry is achieved by particularly careful assembly of endcarriage and crane girder. This guarantees smooth running of the crane causing little wear.



#### 2.1.2 Preparation of crane girder

- The ends of the crane girder must be cut off at right angles in both vertical and horizontal plane
- Length of crane girder  $S \pm 2$  mm
- Remove rust, dust, oil, paint and other impurities from the area to be welded
- Prepare welds as necessary.

\*1 Free of rust, dust, oil, paint and other impurities

\*2 With guide rollers (D125 - D315, optional)

\*3 Without stop plate (stop plate can be dispensed with if the clear dimension between bottom edge of guide roller and projecting edge below it is <15 mm over the whole length of the crane)

### 2.1 Assembling endcarriage

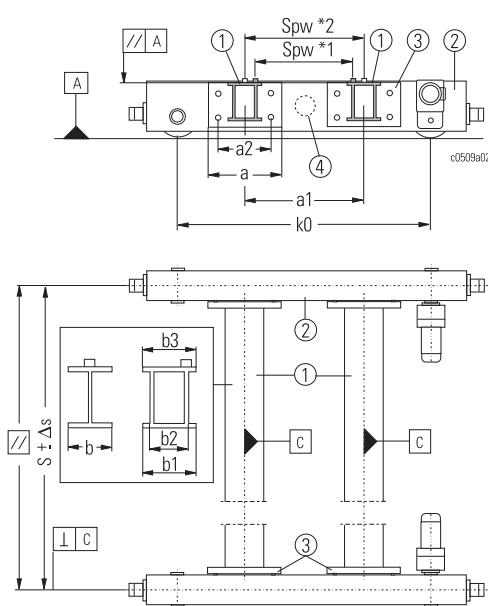
### 2.1.3 Connection "at side" - Ø 125 - 315

#### Welding connection plate

Please observe the dimensions and information given in our Product Information "Ex hoist and Crane components".

- Align crane girder (1) to endcarriage (2)
- Tack weld end of crane girder (1) to connection plate (3) bolted to endcarriage
- Remove covers (4) from handholes
- Remove connection plate(s) from endcarriage and weld to crane girder as specified.

KZL-...



Type				I		II			
	k 0	Spw	a	b ≤ 300 mm		b1 = 300 mm b2 ≥ 250 ≤ 266 mm b3 ≤ 340 mm		b1 = 500 mm b2 ≥ 450 ≤ 466 mm b3 ≤ 540 mm	
				a 1	a 2	a 1	a 2	a 1	a 2
KZL-...	[mm]								
KZL-S 160.2.20.04.140	2000	1250	490	1250	400	1250	400	-	-
KZL-S 160.2.25.04.140	2500	1250	490	1250	400	1250	400	-	-
KZL-S 160.2.25.04.540				-	-	1506			
KZL-S 160.2.31.05.140	3150	1400	490	1400	400	1400	400	-	-
KZL-S 160.2.31.05.540				-	-	1656			
KZL-S 200.2.20.04.136	2000	1250	460	1250	360	-	-	-	-
KZL-S 200.2.25.05.136	2500	1400	460	1400	360	1400	360	-	-
KZL-S 200.2.25.05.156			660	-	-	-	-	1400	560
KZL-S 200.2.25.05.536			460	-	-	1656	360	-	-
KZL-S 200.2.31.05.136	3150	1400	460	1400	360	1400	360	-	-
KZL-S 200.2.31.05.156			660	-	-	-	-	1400	560
KZL-S 200.2.31.05.536			460	-	-	1656	360	-	-
KZL-S 200.2.31.05.556			660	-	-	-	-	1856	560
KZL-S 200.2.40.10.136	4000	2240	460	2240	360	2240	360	-	-
KZL-S 200.2.40.10.156		2240	660	-	-	-	-	2240	560
KZL-S 200.2.40.10.536		2240	460	-	-	2496	360	-	-
KZL-S 200.2.40.10.556		2240	660	-	-	-	-	2696	560
KZL-S 200.2.40.12.136		2500	460	2500	360	2500	360	-	-
KZL-S 200.2.40.12.156		2500	660	-	-	-	-	2500	560
KZL-S 200.2.40.14.136		2800	460	2800	360	2800	360	-	-
KZL-S 200.2.40.14.156		2800	660	-	-	-	-	2800	560
KZL-S 315.3.25.05.136	2500	1400	460	1400	360	1400	360	-	-
KZL-S 315.3.25.05.156			660	-	-	-	-	1400	560
KZL-S 315.3.25.05.536			460	-	-	1656	360	-	-
KZL-S 315.3.31.05.136	3150	1400	460	1400	360	1400	360	-	-
KZL-S 315.3.31.05.156			660	-	-	-	-	1400	560
KZL-S 315.3.31.05.536			460	-	-	1656	360	-	-
KZL-S 315.3.31.05.556			660	-	-	-	-	1856	560
KZL-S 315.3.40.10.136	4000	2240	460	2240	360	2240	360	-	-
KZL-S 315.3.40.10.156		2240	660	-	-	-	-	2240	560
KZL-S 315.3.40.10.536		2240	460	-	-	2496	360	-	-
KZL-S 315.3.40.10.556		2240	660	-	-	-	-	2696	560
KZL-S 315.3.40.12.136		2500	460	2500	360	2500	360	-	-
KZL-S 315.3.40.12.156		2500	660	-	-	-	-	2500	560
KZL-S 315.3.40.14.136		2800	460	2800	360	2800	360	-	-
KZL-S 315.3.40.14.156		2800	660	-	-	-	-	2800	560
KZL-E 315.5.31.05.136	3150	1400	460	1400	360	-	-	-	-
KZL-E 315.5.31.05.556			660	-	-	-	-	1856	560
KZL-E 315.5.31.07.136		1800	460	1800	360	-	-	-	-
KZL-E 315.5.31.07.156			660	-	-	1800	560	-	-
KZL-E 315.5.40.10.156	4000	2240	660	-	-	2240	560	-	-
KZL-E 315.5.40.10.556			-	-	-	-	-	2696	560
KZL-E 315.5.40.12.556		2500	660	-	-	-	-	2956	560
KZL-E 315.5.40.14.156		2800	-	-	-	2800	560	-	-
KZL-E 315.5.42.14.556	4260	2800	-	-	-	-	-	3256	560
KZL-E 315.5.42.14.156		2800	-	-	-	2800	560	-	-
KZL-E 315.5.42.16.156		3150	-	-	-	3150	560	-	-
KZL-E 315.5.45.14.556	4560	2800	-	-	-	-	-	3256	560

- S ≤ 15 m: Δs = ±5 mm
- S ≤ 20 m: Δs = ±6 mm
- S ≤ 25 m: Δs = ±8 mm
- S ≤ 30 m: Δs = ±9 mm
- S ≤ 32,5 m: Δs = ±9,5 mm

\*1 Spw for KZL-S 160...540, KZL-S 200...536, KZL-S 200...556, KZL-S 315...536, KZL-S 315...556

\*2 Spw for KZL-S 160...140, KZL-S 200...136, KZL-S 200...156, KZL-S 315...136, KZL-S 315...156

### 2.1 Assembling endcarriage

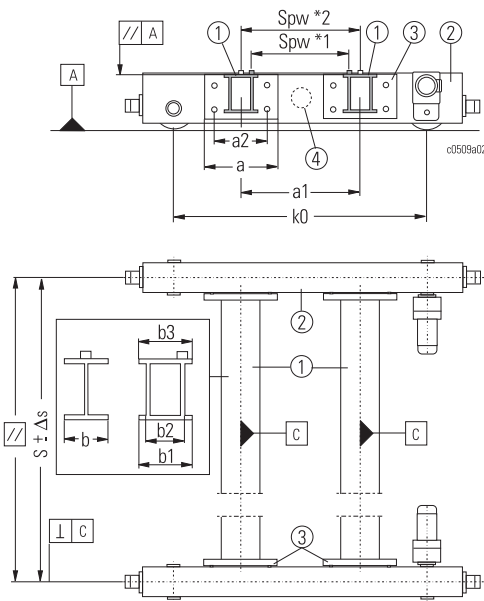
#### 2.1.3 Connection "at side" - Ø 500

##### Welding connection plate

Please observe the dimensions and information given in our Product Information "Ex hoist and Crane components".

- Align crane girder (1) to endcarriage (2)
- Tack weld end of crane girder (1) to connection plate (3) bolted to endcarriage
- Remove covers (4) from handholes
- Remove connection plate(s) from endcarriage and weld to crane girder as specified.

KZL- ...



Type				I		II					
	k 0	Spw	a	b ≤ 300 mm		b1 = 500 mm b2 ≥ 450 ≤ 466 mm b3 ≤ 540 mm	b1 = 700 mm b2 ≥ 650 ≤ 666 mm b3 ≤ 740 mm				
KZL- ...				a 1	a 2	a 1	a 2	a 1	a 2		
[mm]											
KZL-F 500.6.31.140	3150	1400	550	1400	400	-	-	-	-	-	-
KZL-F 500.6.31.158	3150	1400	730	-	-	1400	580	-	-	-	-
KZL-F 500.6.31.558	3150	1400	730	-	-	1856	580	-	-	-	-
KZL-F 500.6.40.158	4000	2240	730	-	-	2240	580	-	-	-	-
KZL-F 500.6.40.558	4000	2240	730	-	-	2696	580	-	-	-	-
KZL-F 500.6.42.158	4260	2500	730	-	-	2500	580	-	-	-	-
KZL-F 500.6.42.558	4260	2500	730	-	-	2956	580	-	-	-	-
KZL-F 500.6.44.578	4400	2240	930	-	-	-	-	2896	-780	-	-
KZL-F 500.6.45.158	4560	2800	730	-	-	2800	580	-	-	-	-
KZL-F 500.6.45.558	4560	2800	730	-	-	3256	580	-	-	-	-
KZL-F 500.6.46.578	4660	2500	930	-	-	-	-	3156	780	-	-
KZL-F 500.6.49.578	4960	2800	930	-	-	-	-	3156	780	-	-

- S ≤ 15 m: Δs = ±5 mm
- S ≤ 20 m: Δs = ±6 mm
- S ≤ 25 m: Δs = ±8 mm
- S ≤ 30 m: Δs = ±9 mm
- S ≤ 32,5 m: Δs = ±9,5 mm



### 2.1 Assembling endcarriage

### 2.1.3 Connection "at side" (cont'd.)

#### Assembly of endcarriage and crane girder

The contact surfaces between endcarriage and connection plates must be free of rust, dust, oil, grease, paint and other impurities. Remove surface rust with a wire brush.

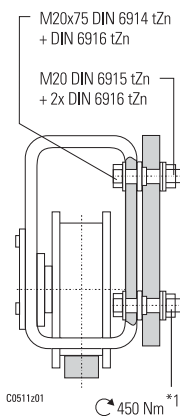
**Caution!** Impurities on the contact surfaces may cause the bolt connections to become loose. **This could cause a fatal accident!**

Use only original bolt connection parts!

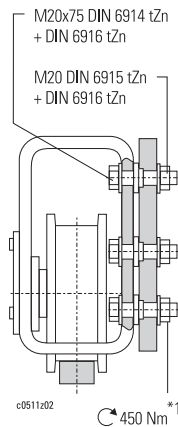
- Bolt crane girder with connection plate welded to it to endcarriage, see sketches
- Tighten bolt connection as specified
- Check that wheel camber is right-angled
- Check span
- Close handholes with covers.



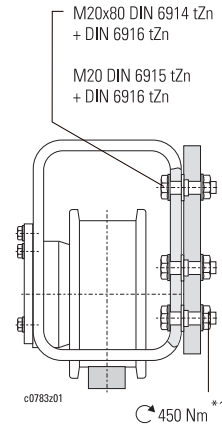
**KEL-S 125**



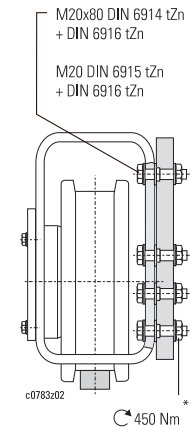
**KEL-S 160**



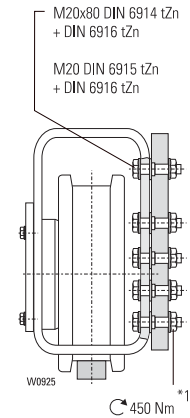
**KEL-S 200**



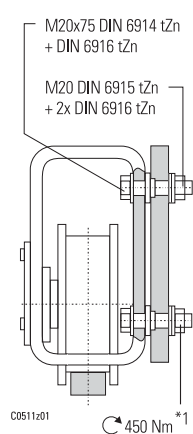
**KEL-S 315**



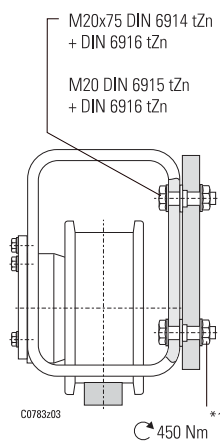
**KEL-E 315**



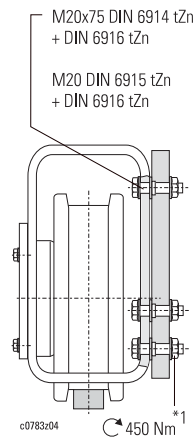
**KZL-S 160**



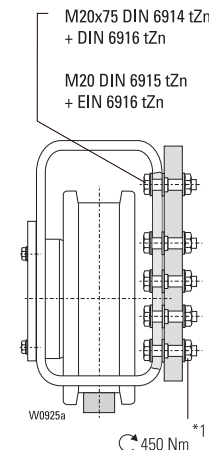
**KZL-S 200**



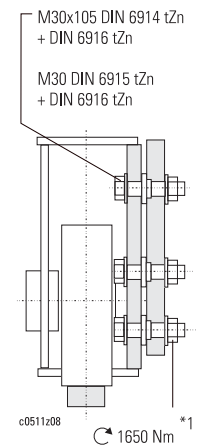
**KZL-S 315**



**KZL-E 315**

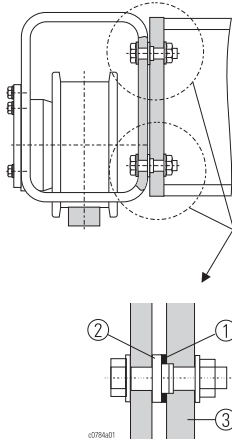


**KZL-F 500**



\*1 Values apply for original parts from the manufacturer, galvanised and greased with MoS2 (use only original parts)

### 2.1 Assembling endcarriage

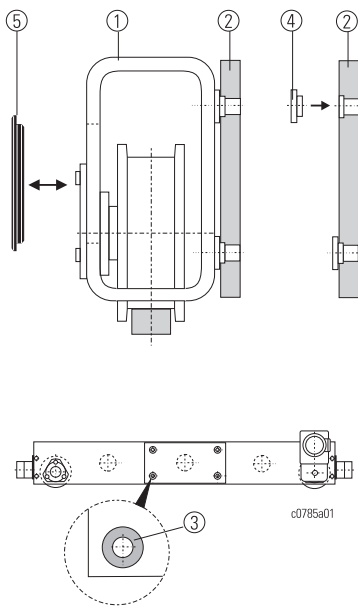


#### 2.1.3 Connection "at side" (cont'd.)

##### Correcting span

The span can be increased by up to 4 mm:

- Insert adjusting washers (1) between connection plate (3) and flanged bushing (2). (Max. 2 mm on each endcarriage, minimum thickness 0.5 mm).



##### Off-standard designs

If undrilled endcarriages with connection plates, flanged bushings and bolt connection parts supplied loose are used, the endcarriages must first be drilled and the connection plates then bolted to them.

- Position the connection plate as shown in the Product Information "Wire rope hoists and crane components"
- Drill endcarriage (1). (The ready-drilled connection plates can be used as a template. No countersinks are necessary on the endcarriage.)
- Remove paint, rust and other impurities from contact surfaces (3) on endcarriage for flanged bushings (4)
- Hammer flanged bushings (4) into countersinks of connection plate
- Remove covers (5) of handholes
- Bolt connection plate (2) to endcarriage (1) with bolt connection parts, see page 8.

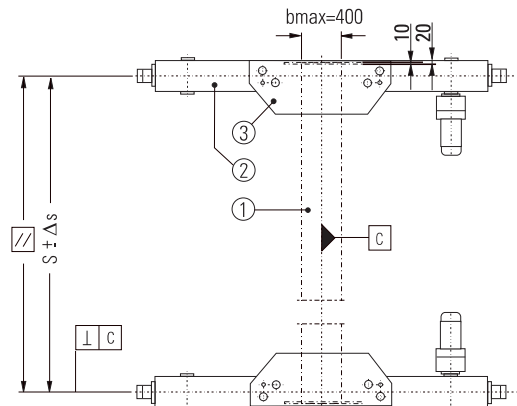
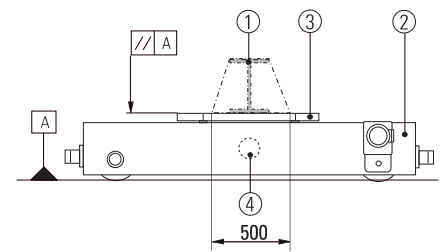
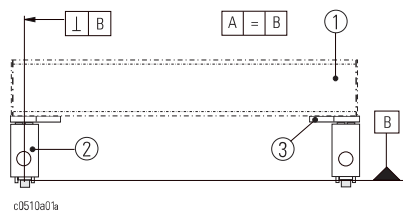
### 2.1 Assembling endcarriage

#### 2.1.4 Connection "at top"

##### Welding connection plate

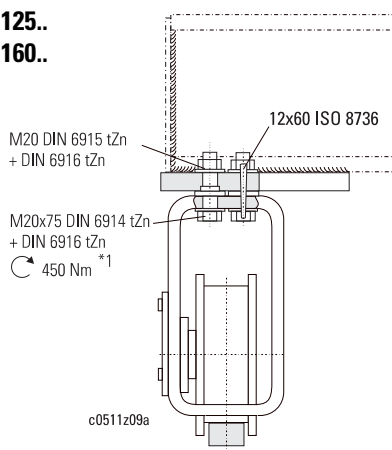
Please observe also dimensions and information given in our Product Information "Explosion-protected hoists and crane components".

- Align crane girder (1) with endcarriage (2)
- Tack-weld crane girder (1) to connection plate (3) bolted onto endcarriage
- Remove covers (4) from handholes
- Remove connection plate(s) from endcarriage and weld to crane girder as specified.

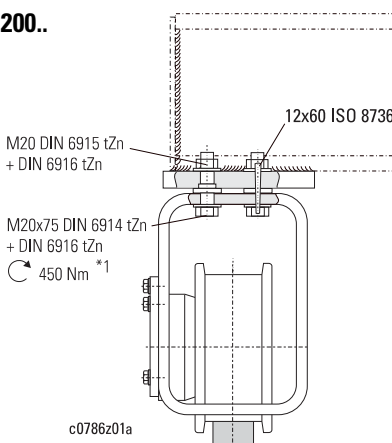


$S \leq 15 \text{ m: } \Delta s = \pm 5 \text{ mm}$   
 $S \leq 20 \text{ m: } \Delta s = \pm 6 \text{ mm}$

#### KEL-S 125.. KEL-S 160..



#### KEL-S 200..



##### Assembly of endcarriage and crane girder

The contact surfaces between endcarriage and connection plates must be free of rust, dust, oil, grease, paint and other impurities. Remove surface rust with a wire brush.



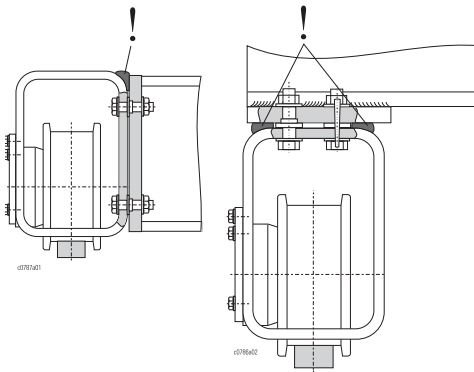
**Caution!** Impurities on the contact surfaces may cause the bolt connections to become loose. **This can cause a fatal accident!**

Use only original bolt connection parts!

- Bolt crane girder with connection plate welded to it to endcarriage, see sketches
- Tighten bolt connection as specified
- Check that wheel camber is right-angled
- Check span
- Use the holes (Ø12) in the connection plate as a template for the holes in the endcarriage profile (see sketch). Ream them with a taper reamer.
  - If the crane is to be transported fully assembled, insert the tapered pins (12x60) now.
  - If the crane is to be transported dismantled, insert the tapered pins (12x60) during final assembly on site.
- Tighten bolt connection as specified
- Close handholes with covers.

\*1 Values apply for original parts from the manufacturer, galvanised and greased with MoS2 (use only original parts)

### 2.1 Assembling endcarriage



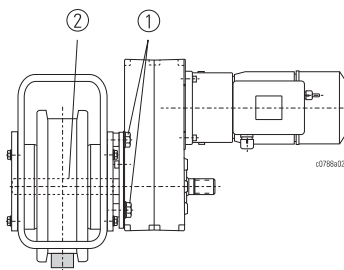
### 2.1.5 Outdoor applications

- For outdoor applications, seal gap between connection plate and endcarriage with sealant at top and sides, see sketch.

### 2.2 Assembling travel drive

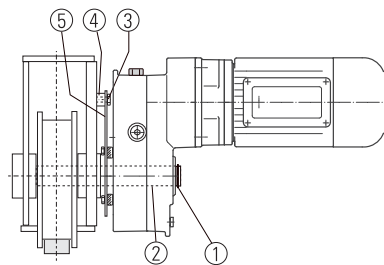
The travel drives are quality drives with smooth starting and braking characteristics as required in particular for material handling.

The endcarriages are supplied as standard with travel drives. If a different travel drive is to be fitted, the correct motor output must be checked. See Product Information "Ex wire rope hoists and crane components".



#### 2.2.1 Assembling SF.. travel drive :

- Ensure correct assembly position
- Push travel drive into greased hub of wheel (2)
- Bolt travel drive with torque support to endcarriage with bolts (1) (M8 = 25 Nm, M12 = 87 Nm, M16 = 215 Nm)
- The contact surfaces of the torque support must be free of paint.
- Complete electrical connection according to circuit diagram (see sketch).



#### 2.2.2 Assembling SA-C .. travel drive:

- Remove circlip (1)
- Grease toothed profile (2) of wheel shaft. (Grease KP1K, e.g. Aralub PMD1)
- Push travel drive onto wheel shaft
- Bolt torque support (5) to endcarriage with bolts (3) and spacer part (4) (M12 = 87 Nm, M16 = 215 Nm)
- The contact surfaces of the torque support must be free of paint.
- Replace circlip (1)
- Complete electrical connection as per circuit diagram (see page 24).

### 2.3 Inspection and maintenance table



This section deals with the operational reliability, availability, and maintaining the value of your crane endcarriages. Although they are practically maintenance-free, the components subject to wear must be inspected regularly. This is required by the accident prevention regulations.

#### General information on inspection and maintenance

- Maintenance and repair work may only be carried out when the crane is not under load.
- Switch off and padlock main isolator.

Inspection and maintenance may only be performed by qualified personnel, see page 2.

Please also note the "Safety instructions" on page 5.  
Wearing parts, see page 35.

Item	Inspection on commissioning	Daily inspection when starting work	Periodic inspection every 12 months	Maintenance 12 months after commissioning	Periodic maintenance after 4000 operating hours or 48 months *1, *4	Maintenance after 10 years or general overhaul	Inspection and maintenance table (Classification: 1 Bm)	See page
1	•		•		•		Secure fit of bolt connections	
2	•		•		•		Attachment of / damage to buffers	
3	•		•		•		Check wheel for wear on circumference and flange. Check runway and buffers.. Replace wheel if dimension (f) between bottom edge of guide roller and top edge of crane runway or rail attachment is <2 mm.	15
4			•				Travel drive: attachment, torque support	18
5	•	•	•				Braking efficiency of travel drive	
6			•		•		Measure brake displacement	19
7	•			•	•	•	Gearing wheel shaft/wheel: wear, <b>lubrication</b> (Grease KP1K, e.g. Aralub PMD1)	18
8	•						Oil level	
9					•		Lubricate self-aligning roller bearings	20
10						•	Change gear oil/gear grease of travel drive	

\*1 By a fitter engaged by the manufacturer

\*2 By user

\*3 Periodic tests including maintenance every 12 months, possibly earlier if so specified by national regulations, to be performed by a fitter engaged by the manufacturer. Similarly, heavy-duty operations or adverse conditions (dirt, solvents, multi-shift operation, etc.) necessitate shortening the inspection and maintenance intervals.

\*4 The relubrication intervals must be reduced accordingly in the case of high ambient temperatures or danger of soiling.

\*5 In manufacturer's factory

### 2.4 Maintenance work

#### 4.2.1 Checking wheels, wheel drive and runway

- Visual inspection of wheels for wear. See table for wear limits.
- Visual inspection of wheel flanges for wear. A high degree of wear on the flanges indicates that the crane is canting or running heavily on one side. The cause must be ascertained and eliminated. The running characteristics can be improved by a guide system. This avoids wear and the flange play can be reduced.
- Check roller bearings in wheel for uneven running and abnormal noises. Move trolley and spin wheels if possible.
- Visual inspection of runway for wear.

The crane rails must be installed in parallel within the permissible tolerances (see page 23) to prevent the crane becoming jammed. Rail joints must be smooth to avoid jerks and deformation.

- Visual inspection of buffers and endstops.

The impact from the buffer must be absorbed by the centre of the stop components and the material qualities must be suitable (no rusty parts etc.)

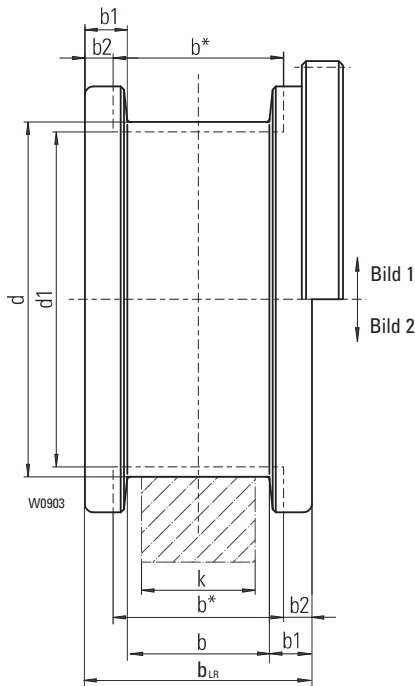


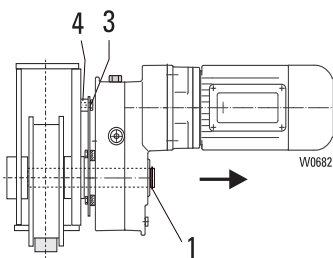
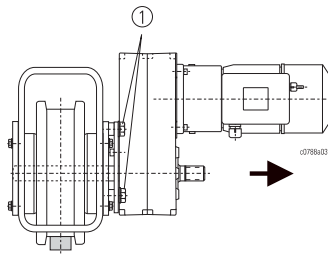
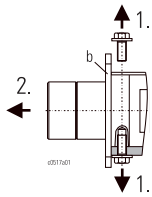
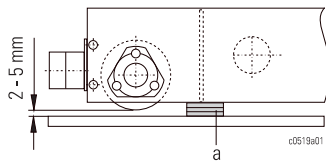
Fig.	d	bLR	Nominal value			Limit for wear					
			b	k		b1	d1	b2	max play=b*-k		
				min	max				kmin	kmax	
[mm]											
1	100	80	50	40	45	15	95	5,5	13	13	
		80	60	50	55	10		5,5	13	13	
2	125	80	50	40	45	15	118,75	7	13	13	
		80	60	50	55	10		7	13	11	
2	160	85	52	40	45	16,5	152	8	16	16	
		85	62	50	55	11,5		13,5	18	18	
2	200	100	54	40	45	23	190	10,5	18	18	
		100	64	50	55	18		10,5	18	18	
		100	74	60	65	13		10,5	18	14	
2	315	115	54	40	45	30,5 (29)	300	13,5	18	18	
		115	64	50	55	25,5 (24)		13,5	18	18	
		115	74	60	65	20,5 (19)		13,5	18	18	
		130	64	50	55	33		305	13,5	18	18
		130	74	60	65	28			13,5	18	18
		130	84	70	75	23			13,5	18	18
		130	94	80	85	18			13,5	18	18
	500	120					485	-	-	-	

The part must be replaced if any one of the wear limits d1, b2 (b\*-k) is reached.

( ) on machined faces

### 2.4 Maintenance work

#### 2.4.2 Dismantling wheels



Before dismantling:

- Jack endcarriage up until the flanges are free. Then secure endcarriage with shims (a).

- Unscrew and pull out buffer plate (b).

Removing SF ... travel drive:

Remove bolts (1) from torque support.

Pull travel drive from wheel shaft.

Removing SA.C ... travel drive:

Remove circlip (1), bolts (3) and spacer piece (4).

Pull travel drive from wheel shaft.

#### 2.4.2 Dismantling wheel (cont'd.) KEL-S 125.. and K.L-S 160..

- Unscrew bolts of bearing covers, Fig. 1
- Move wheel and bearing with puller until wheel rests against recess in endcarriage section (x1), Fig. 2
- Screw bolt of bearing cover (c) into threaded hole of endcarriage section until it rests against wheel (x2), Fig. 2
- Pull off wheel shaft, catching spacer ring, Fig. 3
- Roll wheel forwards out of endcarriage.

Fig. 1

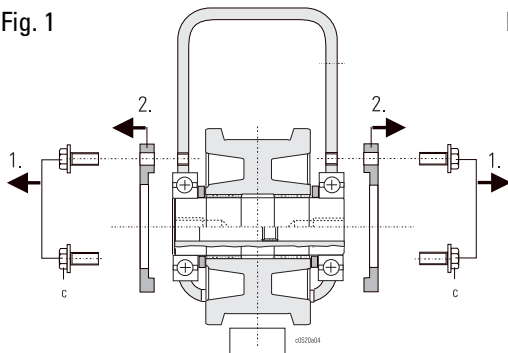


Fig. 2

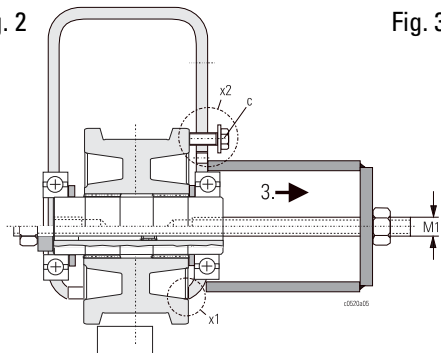
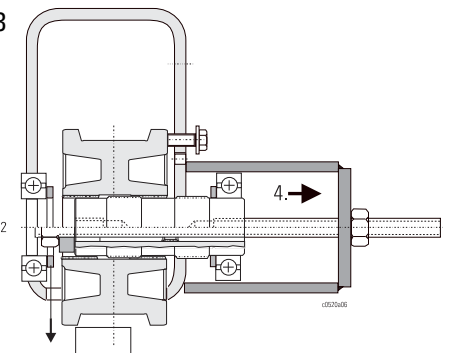


Fig. 3



### 2.4 Maintenance work (continued)

#### 2.4.2 Dismantling wheel K. L-S 200 and K. L-S 315

- Unscrew bolts of bearing covers, Fig. 4
- Press bearing covers off with 2 bolts, Fig. 5
- Roll wheel forwards out of endcarriage.

Fig. 4

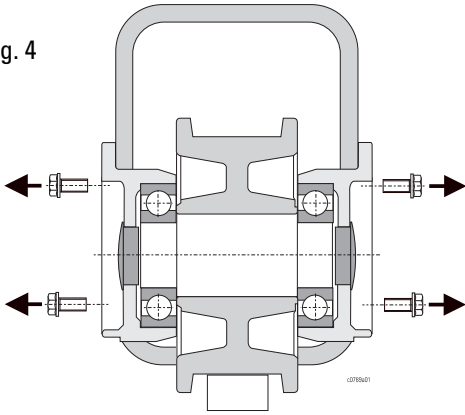
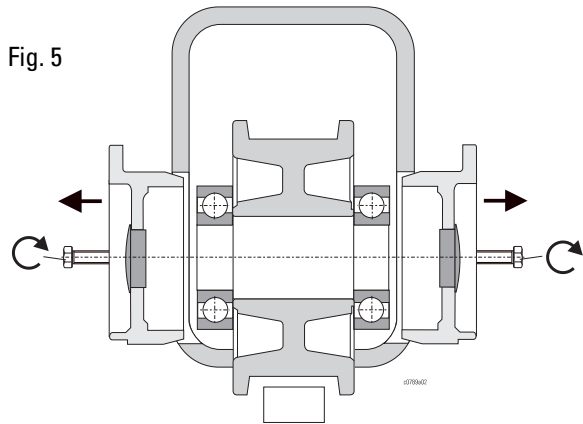


Fig. 5



#### 2.4.2 Dismantling wheel K.L-E 315

- Remove plastic cap and circlip from wheel shaft, Fig. 8 and 9.
- Pull wheel shaft out of wheel on drive side, Fig. 8 and 9
- Remove bolts of bearing flanges except for the top centre bolt on the crane girder side (to secure bolt), Fig. 6-9
- Press bearing flanges off with 2 screws, Fig. 7 and 9
- Roll wheel forwards out of endcarriage

Fig. 6

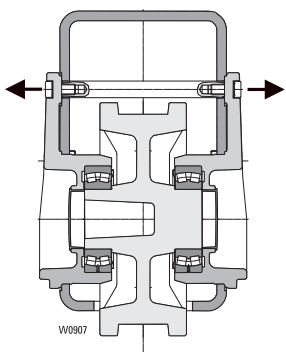


Fig. 7

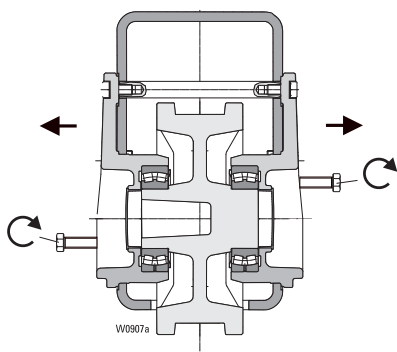


Fig. 8

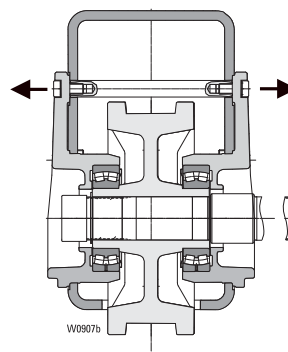
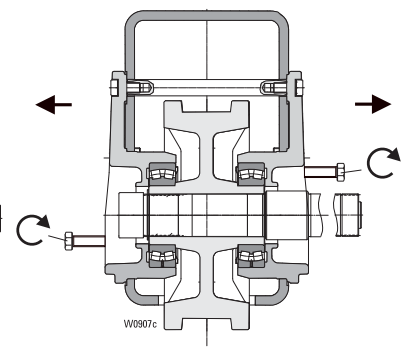


Fig. 9





### 2.4 Maintenance work (continued)

#### 2.4.2 Dismantling wheel

##### KZL-F 500

- Remove bearing covers and circlips, Fig. 10
- Remove wheel shaft off with puller, Fig. 11. **Caution:** The wheel axle can only be removed towards the side with the visible marking groove and the wheel shaft only towards the travel drive side.
- Roll wheel forwards out of endcarriage.

Fig. 10

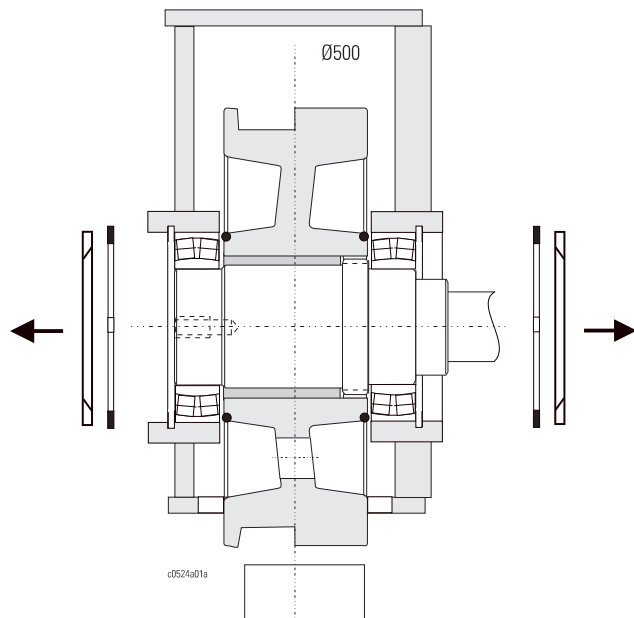
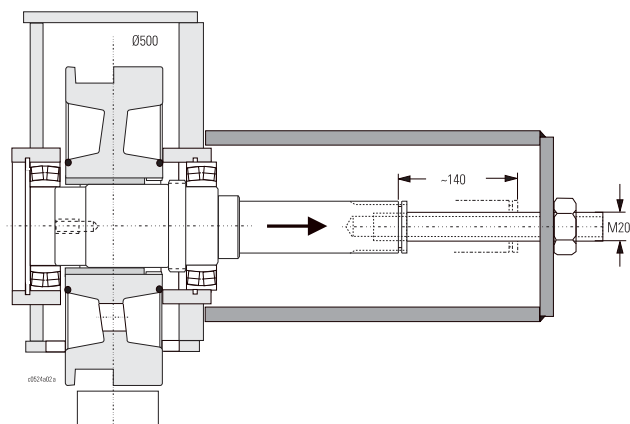


Fig. 11



### 2.4 Maintenance work (continued)

#### 2.4.3 Remounting wheel KEL-S 125.. and K.L-S 160.. after replacing bearing

- Grease bearing seats and gearing of wheel axle/shaft. (Grease KP1K, e.g. Aralub PMD1)
- Press spacer ring and bearing onto wheel axle/shaft as far as collar, Fig. 1
- Roll wheel into endcarriage from front
- Insert wheel axle/shaft with bearing and spacer ring into wheel until the gearing touches (!), Fig. 1
- Insert wheel axle/shaft into hole in wheel, Fig. 2
- Fit spacer ring and bearing to shaft, Fig. 3
- Fit bearing covers, Fig. 4
- Lower endcarriage onto crane runway

Fig. 1

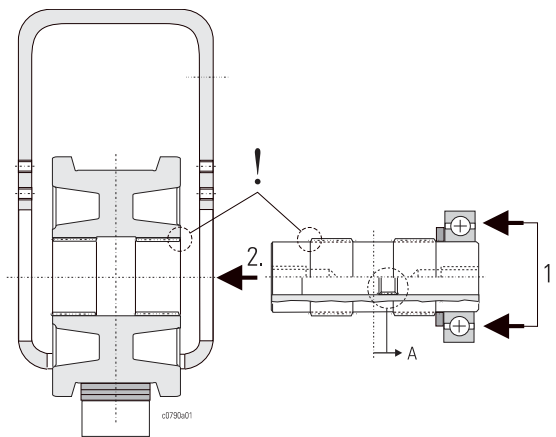


Fig. 2

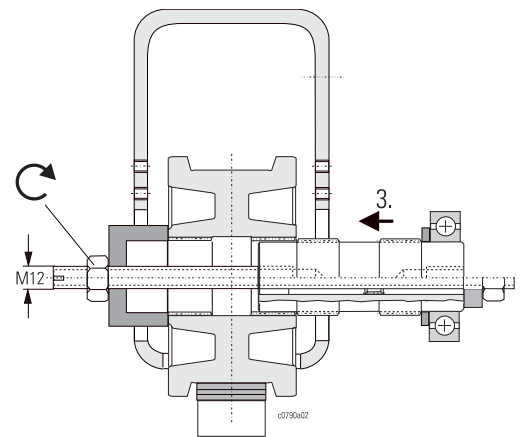


Fig. 3

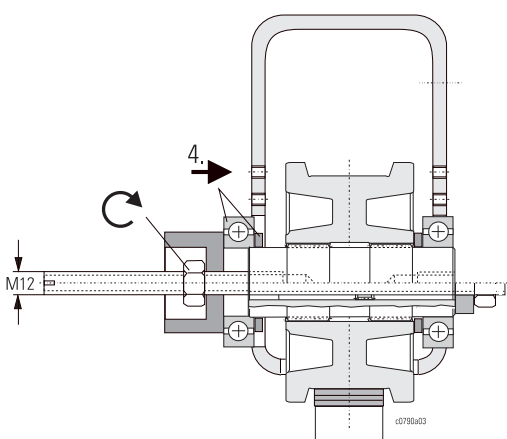
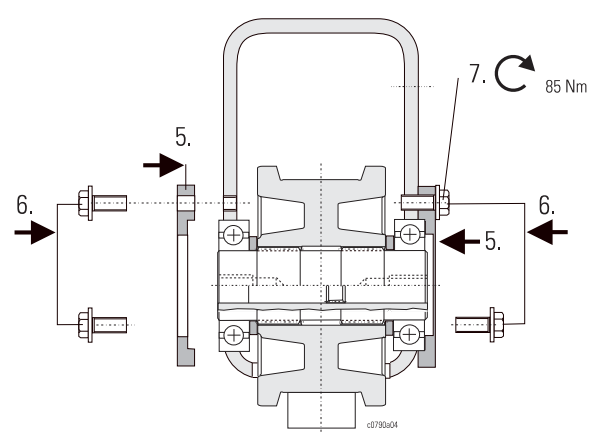


Fig. 4



### 2.4 Maintenance work (continued)

#### 2.4.3 Remounting wheel (cont'd.)

**K. L-S 200.. and K. L-S 315..**  
after replacing bearing

- Press bearing onto wheel axle/shaft as far as collar
- Roll wheel into endcarriage from the front
- Fit flange bearings, Fig. 5
- Fix flange bearings with bolts. The collars of the flange bearings must lie flat on the endcarriage, Fig. 6

Fig. 5

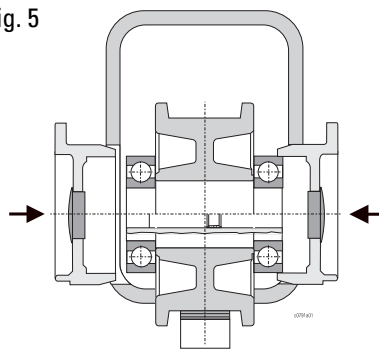
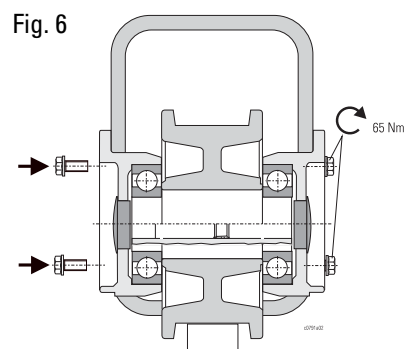


Fig. 6



#### 2.4.3 Remounting wheel

**K. L-E 315.. (non-driven)**

after replacing bearing

- Grease seat of bearing on shaft, Fig. 7. (Grease KFP 1K, e.g. Aralub PMD 1).
- Slip Nilos rings onto wheel and press self-aligning roller bearing over inside ring onto the wheel as far as collar. **Caution!** Do not tilt bearing to avoid damaging the Nilos rings.
- Roll wheel into endcarriage from the front.
- Fit bearing flanges, Fig. 7.
- Secure bearing flanges with screws. The eyes of the bearing flanges must lie flush in the countersinks on the endcarriage, Fig. 8.

Fig. 7

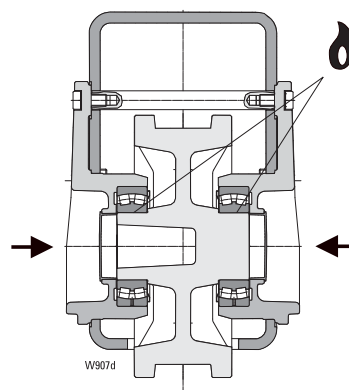
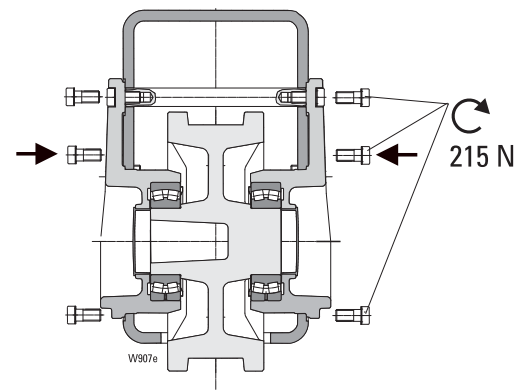


Fig. 8



### 2.4 Maintenance work (continued)

#### 2.4.3 Remounting wheel K. L-E 315.. (driven) after replacing bearing

- Grease seats of bearings and teeth of wheel and wheel shaft, Fig. 9. (Grease KFP 1K, e.g. Aralub PMD 1).
- Slip Nilos rings onto wheel and press self-aligning roller bearing over the inside ring onto wheel as far as collar. **Caution!** Do not tilt bearing to avoid damaging the Nilos rings.
- Roll wheel into endcarriage with the spline profile towards the outside of the endcarriage.
- Fit bearing flanges, Fig. 9.
- Secure bearing flanges with screws. The eyes of the bearing flanges must lie flush in the countersinks on the endcarriage, Fig. 10.
- Push shorter end of wheel shaft into wheel from the connection plate side as far as collar.
- On outside of endcarriage, fit circlip into groove on wheel shaft near bearing and fit plastic cap onto wheel shaft.

Fig. 9

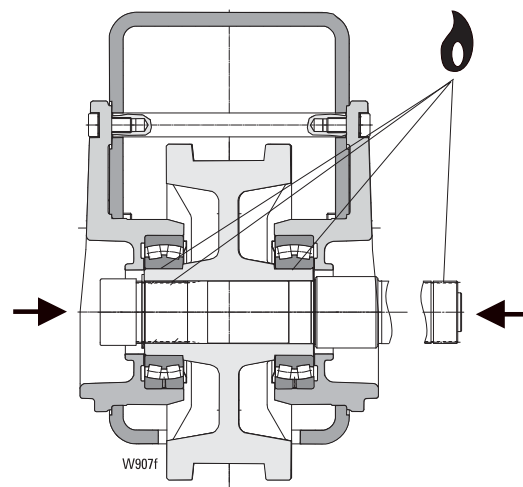
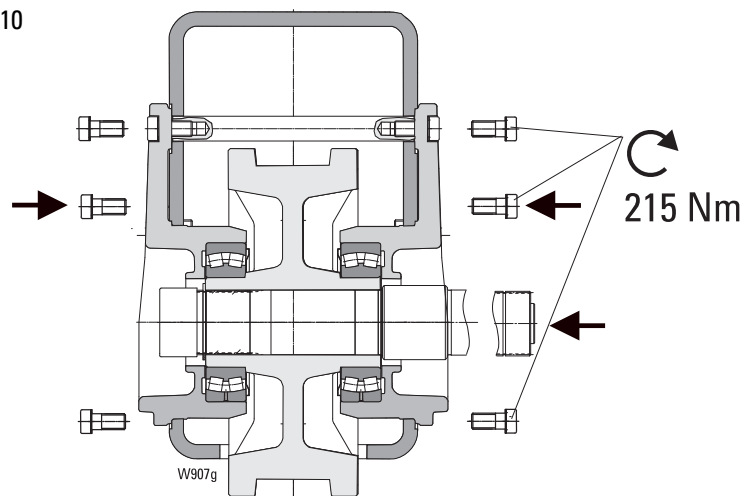


Fig. 10



### 2.4 Maintenance work (continued)

#### 2.4.3 Remounting wheel KZL-F 500..

after replacing bearing

Caution! When fitting, do not tilt the outer ring of the self-aligning roller bearing against the inside ring!

- If necessary, replace the two gaskets (d) on the wheel.
- Grease bearing seats and gearing of wheel axle/shaft (Grease KPF 1K, e.g. Aralub PMD1).
- Push bearing onto wheel axle/shaft up to collar (wheel axle - marking groove, wheel shaft on drive side), Fig. 11
- Insert bearing into bearing bushing of endcarriage, Fig. 11
- Roll wheel into endcarriage from the front
- Insert wheel axle/shaft into wheel until the gear profile touches (!), Fig. 11
- Insert wheel axle/shaft until the end is flush with the bearing (!), Fig. 12
- Fit circlips, Fig. 13
- Completely fill bearing and half-fill space with grease (type of grease see lubrication table)
- Replace bearing covers, Figs. 13 and 14
- Lower endcarriage onto crane runway.

Fig. 11

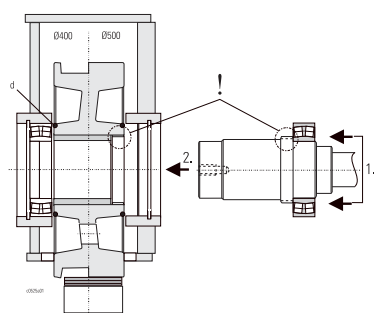


Fig. 12

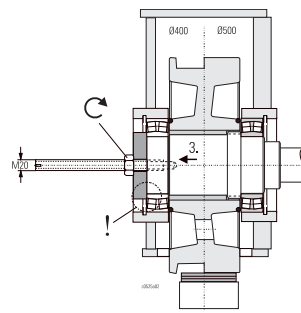


Fig. 13

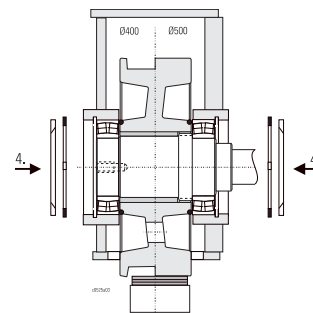
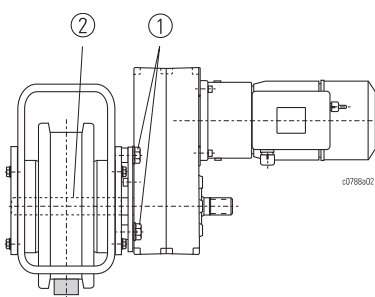
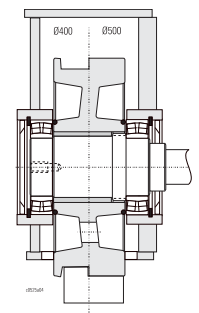
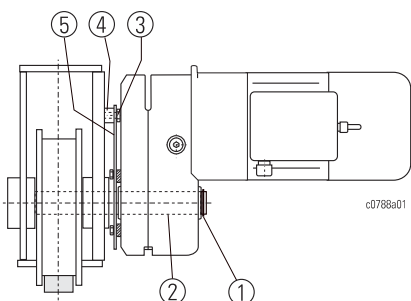


Fig. 14



#### 2.4.4 Remounting SF .. travel drive

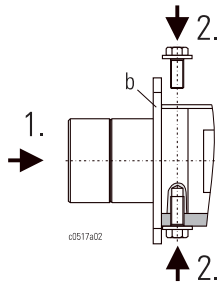
- Push travel drive into greased hub of wheel (2)
- Bolt travel drive with torque support to endcarriage with bolts (1), tightening torques: M8 = 25 Nm (SF 15...), M12 = 70 Nm (SF 25... + SF 35...)
- The contact surfaces of the torque support must be free of paint.



#### 2.4.5 Remounting SA-C .. travel drive

- Remove circlip (1)
- Grease gearing (2) of wheel shaft. (Grease KPF 1K, e.g. Aralub PMD1)
- Push travel drive onto wheel shaft.
- Bolt torque support (5) to endcarriage with bolts (3) and spacer part (4). (M12=87 Nm, M16=215 Nm)
- The contact surfaces of the torque support must be free of paint.
- Refit circlip (1).

### 2.4 Maintenance work (continued)



#### 2.4.6 Mounting buffer plate

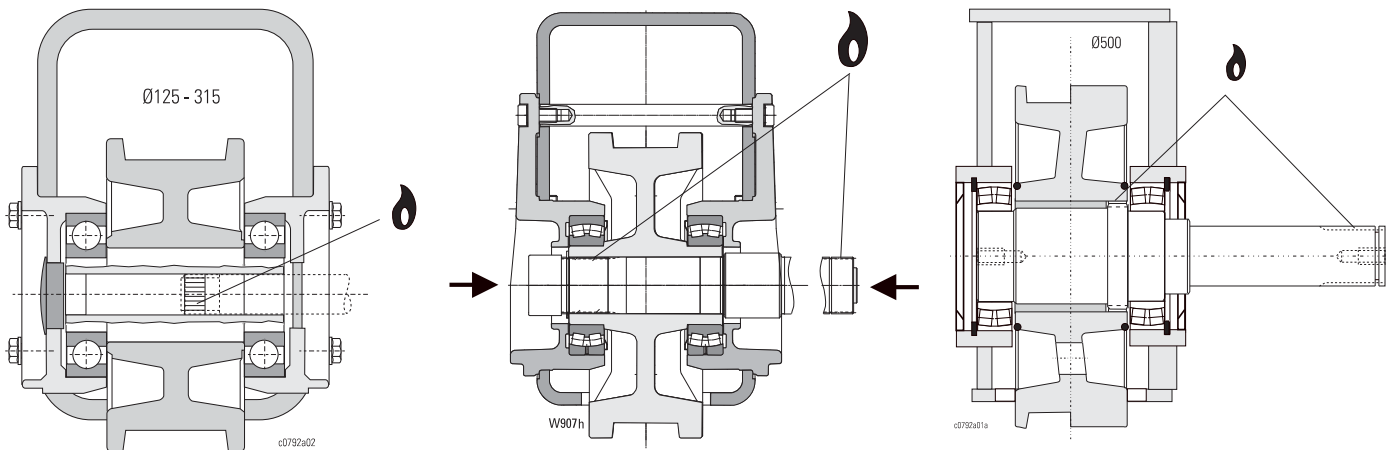
- Push buffer plate (b) into endcarriage section and bolt on, tightening torque 87 Nm (M12) or 740 Nm (M24).

#### 4.2.6 Lubrication

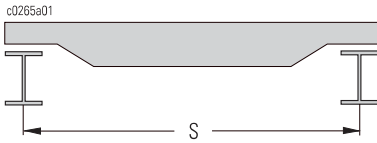
When replacing wheels and during a general overhaul, the gearing between wheel shaft, wheel and travel drive must be lubricated.

Lubricant: KPF 1K Aralub PMD1.

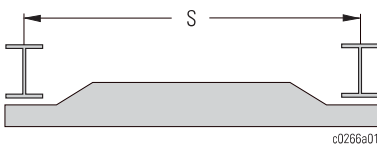
See "Travel drive" for lubrication of travel drive.



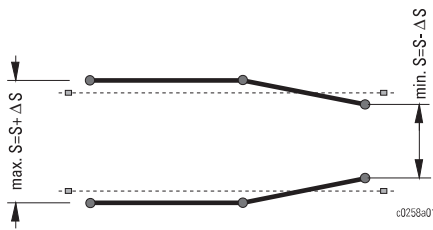
#### 3.1 Checking crane runway



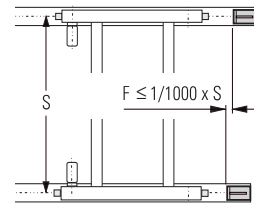
- $S \leq 15 \text{ m: } \Delta S = \pm 5 \text{ mm}$
- $S \leq 20 \text{ m: } \Delta S = \pm 6 \text{ mm}$
- $S \leq 25 \text{ m: } \Delta S = \pm 8 \text{ mm}$
- $S \leq 30 \text{ m: } \Delta S = \pm 9 \text{ mm}$
- $S \leq 32,5 \text{ m: } \Delta S = \pm 9,5 \text{ mm}$



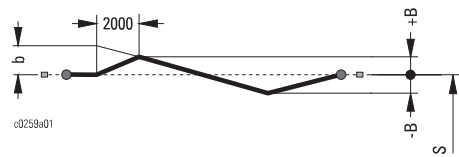
$\Delta S = \pm 3 \text{ mm}$



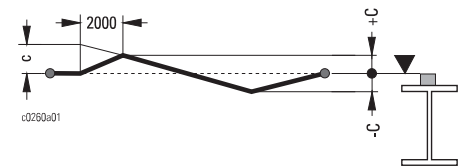
- Check crane runway for correct dimensions and clearance, see sketches.
- Compare width of crane rail or crane runway flange with the wheel tread/guide roller setting or flange width setting of the endcarriage, see adjustment tables.
- Stable end stops must be fitted to the ends of the crane runway. The faces of the pairs of end stops must be flush and at right-angles to the crane runway, see sketch.
- The running surfaces must be free of oil, grease, paint or other impurities.
- The joints in the crane rails must be flat; grind down if necessary.
- The crane runway must meet the requirements of DIN 4132.



max F = 20 mm

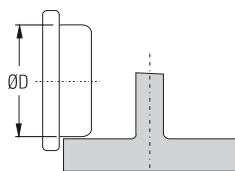
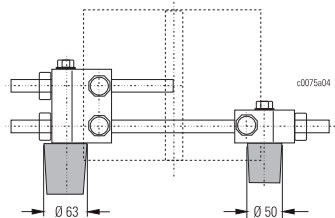
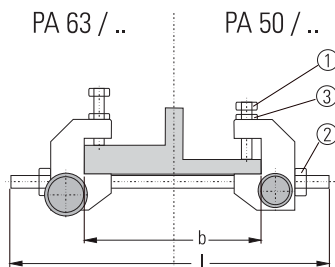


$B = \pm 10 \text{ mm}$   
 $b = \pm 1 \text{ mm}$




$C = \pm 10 \text{ mm}$   
 $c = \pm 1 \text{ mm}$

#### 3.4 Runway end stops



PA.. runway end stops can be adjusted to various girder sections:

- Place runway end stop on girder in correct position and at right-angles.
- Screw bolts (1) down loosely
- Screw bolts (2) down loosely
- Tighten bolts (1) with MA = 215 Nm
- Tighten bolts (2) with MA = 215 Nm
- Lock with nuts (3).

Type	b max.	l	 max.	E max. *3	mka trolley/crab *1	Ø D
	[mm]	[mm]	[kg]	[Nm]	[kg]	[mm]
PA 50/200	200	350	3200	200	700	100
PA 50/300	300	450				125
PA 50/500	500	650				125
PA 63/200	200	350	10000 (16000) *2	440	3200 (3600) *2	125
PA 63/300	300	450				160
PA 63/500	500	650				200

\*1 incl. counterweight

\*2 V max.: 20 m/min

\*3  $E = 0.1415 \cdot mka \cdot v^2 \cdot x$  (Nm)

mka (t), v (m/min)

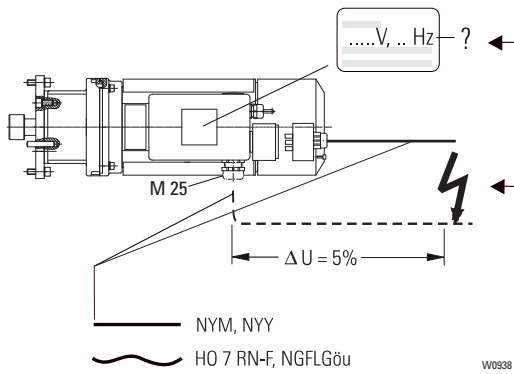
x = with travel limit switch: 0.72

x = without travel limit switch: 1.0

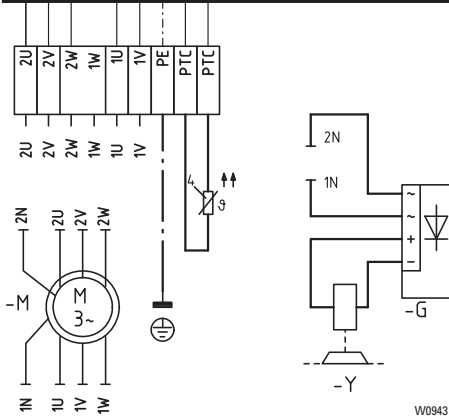
## 4.1 Assembly

The travel drives are high-quality drives with smooth starting and braking characteristics as is required in particular for material handling.

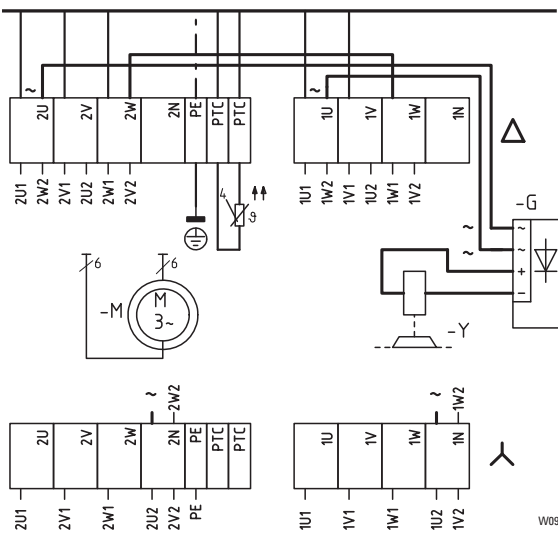
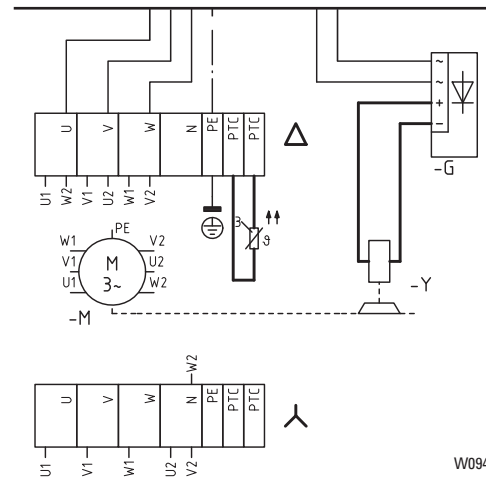
- Take note of mounting position. The gear vent plug must always be at the highest point of the gear
- Remove sticker from vent plug.
- Tighten fixing bolts with specified torque
- Check oil level before commissioning
- Make electrical connection as per wiring diagram (see sketches)



8/2 F.



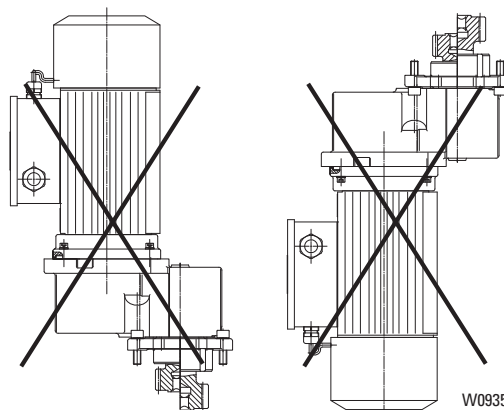
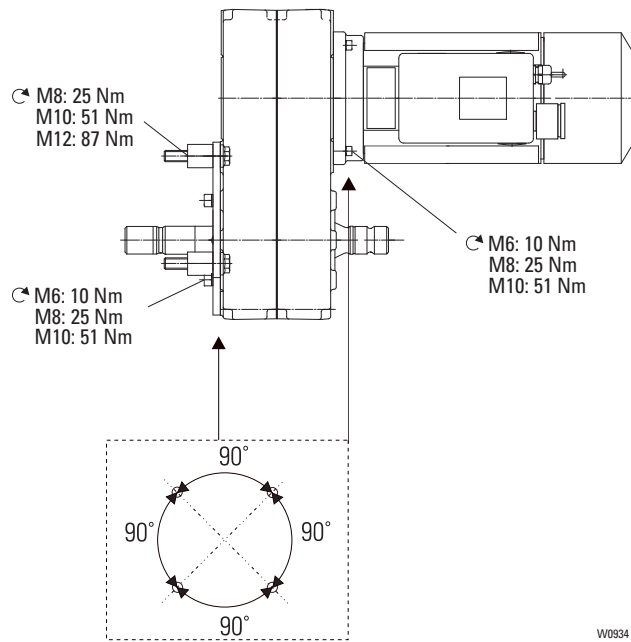
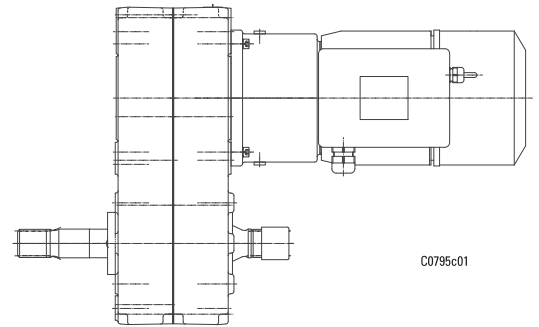
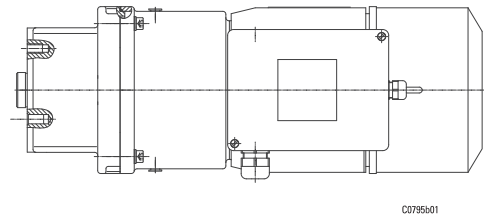
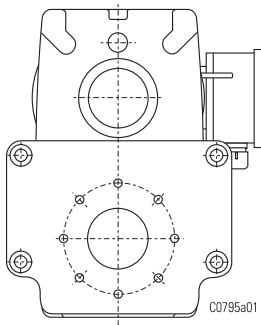
4 F.





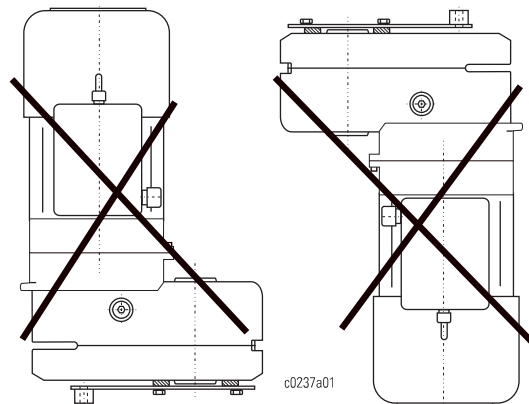
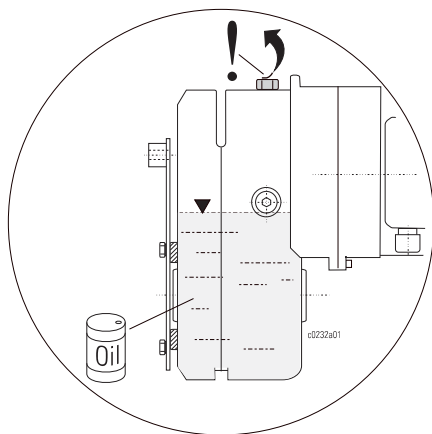
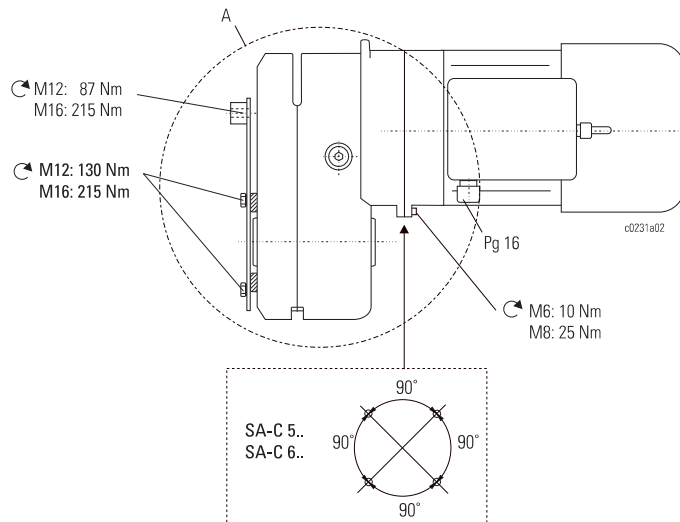
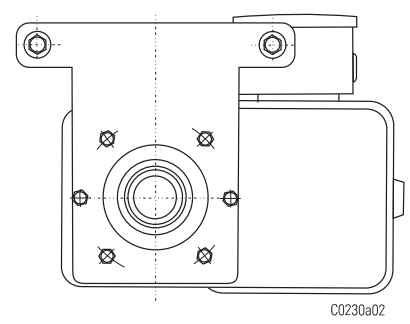
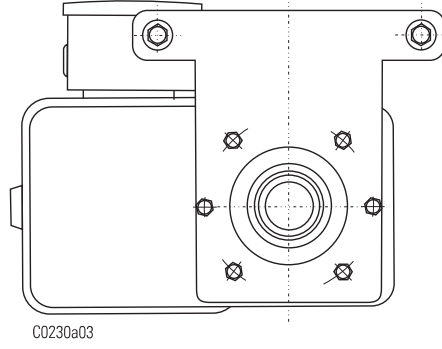
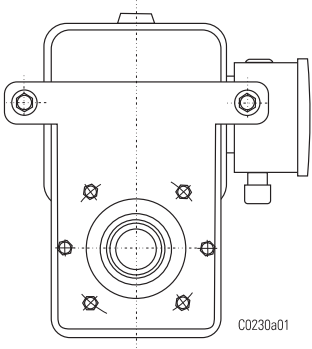
4.1 Assembly (continued)

SF..



4.1 Assembly (continued)

SA-C..



**4.2 Inspection and maintenance table**



This section deals with the operational reliability, availability, and maintaining the value of your travel drives. Although they are practically maintenance-free, the components subject to wear must be inspected regularly. This is required by the accident prevention regulations. The inspections must be performed by **qualified personnel**, see page 2.

**General information on inspection and maintenance**

- Maintenance and repair work may only be carried out when the crane is not under load.
- Switch off and padlock main isolator.
- Follow the accident prevention regulations.

Please also note the "Safety instructions" on page 5.  
Wearing parts, see page 35.

No.	Inspection on commissioning*1	Daily inspection on starting work *2	Periodic inspections every 12 months *3	Periodic maintenance every 12 months *2	Maintenance after 10 years or general overhaul *4	<b>Inspection and maintenance table</b> (Classification: 1 Bm)	See page
1	•		•	•		Firmness of screw connections	30
2			•			Travel drive: attachment, torque support	30
3	•	•	•			Check braking efficiency of travel drive	28
4	•					Oil level	26
5					•	Change gear oil/gear grease of travel drive	26

\*1 By a fitter engaged by the manufacturer

\*2 By user

\*3 Periodic tests including maintenance every 12 months, possibly earlier if so specified by national regulations, to be performed by a fitter engaged by the manufacturer. Similarly, heavy-duty operations or adverse conditions (dirt, solvents, multi-shift operation, etc.) necessitate shortening the inspection and maintenance intervals.

\*4 In manufacturer's factory

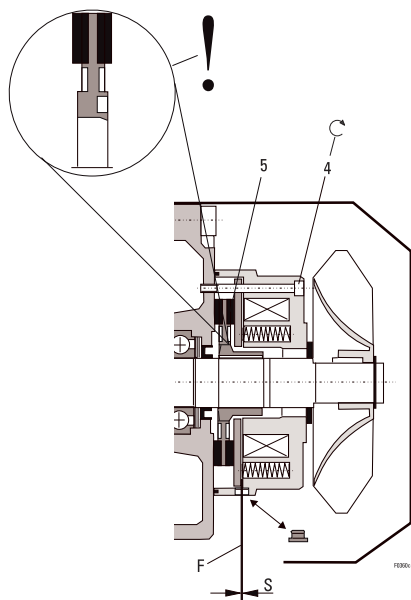
4.2 Maintenance work


4.2.1 Travel motor brake


SF./ SA-C ...

- The travel motor brake does not require adjusting.
- Replace the brake rotor if the max. value of S is reached.

SF .. / SA-C ...



	Motor	Braking torque [Nm]	Type of travel brake	S max. [mm]	4	 [Nm]
SF xx xxx 123	8/2F12/2xx.223	1,3	FDW 08	0,2...2,0	3xM4	3
SF xx xxx 133	8/2F13/2xx.233	2,5	FDW 08	0,2...1,2	3xM4	3
SF xx xxx 184	4F18/2xx.233	2,5	FDW 08	0,2...1,2	3xM4	3
SF xx xxx 313	8/2F31/2xx.423	5	FDW 13	0,3...2,0	3xM6	10
SF xx xxx 384	4F38/2xx.423	8	FDW 13	0,3...2,0	3xM6	10
SF xx xxx 423	8/2F42/2xx.433	8	FDW 13	0,3...2,0	3xM6	10
SF xx xxx 484	4F48/2xx.523	13	FDW 15	0,3...2,0	3xM6	10
SF xx xxx 523	8/2F52/2xx.523	13	FDW 15	0,3...2,0	3xM6	10

	Motor	Braking torque [Nm]	Type of travel brake	S max. [mm]	4	 [Nm]
SA-C ... 133	8/2F13/2xx.233	2,5	FDW 08	0,2...1,2	3xM4	3
SA-C ... 184	4F18/2xx.233					
SA-C ... 313	8/2F31/2xx.423	5	FDW 13	0,3...2,0	3xM6	10
SA-C ... 384	4F38/2xx.423	8	FDW 13	0,3...2,0	3xM6	10
SA-C ... 423	8/2F42/2xx.433					
SA-C ... 484	4F48/2xx.443					
SA-C ... 523	8/2F52/2xx.523	13	FDW 15	0,3...2,0	3xM6	10



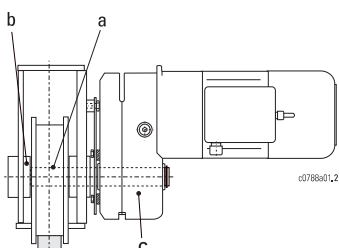
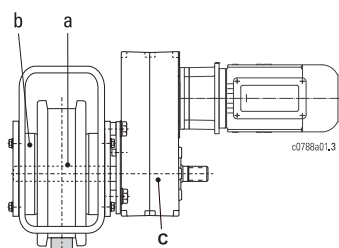
**Caution!** If the value for max. permissible wear is not observed, an impermissible temperature rise may occur in the brake. Explosion protection is then no longer guaranteed.

If the crane is subjected to excessive wear, the maintenance intervals must be adapted accordingly.

An air gap ( $S_{min}$ ) which is too small may also cause a temperature rise due to the brake linings rubbing.

Have replacement and repairs performed by qualified personnel only.

4.2 Maintenance work



4.2.2 Gear

The gear is long-life. All bearings are roller bearings. The gears are hardened and hard-machined and have high safety factors.

- During annual maintenance, check whether any oil has escaped (pool of oil under gear, oil drips on gear). If any oil has been lost, the oil must be changed and repairs scheduled if necessary.
- Take note of gear noises when crane is operated with or without load. Uneven, noisy operation, banging noises indicate faults. If any faults are detected, repairs must be scheduled. If there is any uncertainty, a fresh diagnosis can be made after consulting experts, e.g. from the manufacturer.

4.2.3 Changing oil/grease of travel drive

4.2.11 Lubricating wheel gear hub

The SF 1 .. travel drives have gear with grease lubrication, the SF 25.., SF 35.. and SA-C travel drives have gears with oil lubrication. The gear hub (a) is lubricated with grease. (See table).

Types of grease and oil and quantities required can be seen from the table.

Position der Schmierstelle		Schmierstoffart	Kennzeichnung	Schmierstoffmenge	Charakteristik, Fabrikat	Bestell-Nr.
a	Wheel gear hub	Grease	KP 1K	50 gr	Soap base: Lithium + MoS2 Dripping point: approx. 185°C (180°C) Penetration: 310-340 (310-340) Operating temp.: -20°to +120°C (-50° to +150°C), e.g.: Aral Grease P 64037*, Aralub PMD1, BP Multi-purpose Grease L21M, Esso Multi-purpose Grease M, Mobil Grease Special, Shell Retimax AM *1, Texaco Molytex Grease EP2, Fuchs Renolit FLM2, (Fuchs Renolit FLM2)	
b	Wheel bearing	Grease	KP 2 N-20 (KP 1 G-30)		Soap base: Lithium Dripping point: approx. +260°C (+170°C) Penetration: 265-295 (310-340) Operating temperature: -20° to +140°C (-30° to+140°C) e.g.: Klüberlub BE 41-542* (LGWM1)	
c	SU-A 1.4.1. SU-A 1.4.2.	Grease	KPF 0K	200 gr	Soap base: Lithium + MoS2 Dripping point: approx. +180°C Penetration: 355-385 Operating temp.: -30°to +130°C e.g.: Aral Grease P64037*, Aralub PMD0, Tribol Molub-Aloy Multi-purpose Grease	32 250 09 65 0 (0.75 kg)
	SF 1. 1.. SF 1. 2..	Grease	KPF 0K-20	100 gr 200 gr	Soap base: Lithium + MoS2 Dripping point: approx. +180°C Penetration: 355-385 Operating temp.: -30°to +130°C e.g.: Aral Grease P64037*, Aralub PMD0, Tribol Molub-Aloy Multi-purpose Grease	32 250 09 65 0 (0.75 kg)
	SF 25.. gear SF 35.. gear SA- 5.. gear SA- 6.. gear	Oil	CLP 460	1000 ml 1500 ml 1000 ml 3000 ml	Viscosity 460 cSt/40°C (240 cSt/40°C) Pourpoint: -20°C (-40°) Flash point +265°C (+270°C) e.g.: Fuchs Renep Compound 110*, Aral Degol BG 460, BP Energol GR-XP 460, Esso Spartan EP 460, Mobil Gear 634, Shell Omala Oel 460, Texaco Meropa 460, (Shell Tivela Oil 82)	32 250 07 65 0 (1 kg)

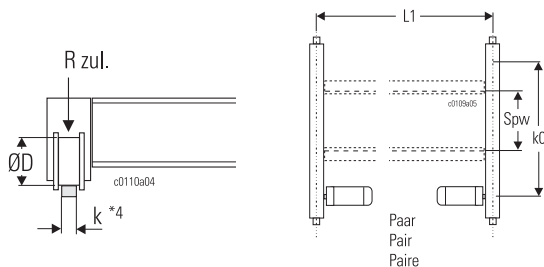
**5.1 Tightening torques for screw connections**

The following table summarises the most important screw connections and the torques required for secure connection.

No.	Position of screw connection		Type	Screw connection		
	Connection part 1	Connection part 2		Thread	Grade	Tightening torque [Nm]
1	Endcarriage	Bearing cover	KEL-S 125	M10	100	85
			K.L-S 160			
			K.L-S 200			
2	Endcarriage	Buffer plate	K.L-S 315	M12	100	85
			K-L-E 315	M16	8.8	215
			KZL-F 500	M24		740
3	Endcarriage	Guide roller support/ anti-derail device	K.L-S ...	M12	8.8	87
			K-L-E 315	M16		215
			KZL-F 500	M24	8.8	740
4	Endcarriage	Bearing plate	K.L-S ...	M20	10.9	450
			K-L-E 315	M20		450
			KZL-F 500	M30		1650
5	Crane buffer	Buffer plate Guide roller support-buffer bracket/ anti-derail device	K.L-S ...	M12	8.8	32
			K-L-E 315	M16	8.8	215
			KZL-F 500	M24	8.8	740
6	Guide roller support/anti-derail device	Support	KEL-S 125	M12	100	130
			K.L-S 160			
			K.L-S 200	M16	100	330
7	Guide roller support	Guide roller/wheel	KEL-S 125	M8	8.8	25
			K.L-S 160			
			K.L-S 200	M10	8.8	51
8	Travel drive torque support	Endcarriage	SF 15..	M8	8.8	25
			SF 25..	M12	8.8	70
			SF 35..	M12		70
			SA-C ..	M12		87
			SA-C ..	M16		215
9	Travel drive torque support	Travel drive gear housing	SF 15..	M8	8.8	25
			SF 25..	M10	8.8	51
			SF 35..	M10		51
			SA-C ..	M12		87
			SA-C ..	M16		215
10	All other screw connections		M6		8.8	10
			M8			25
			M10			51
			M12			87
			M16			215
			M20	8.8		430
			M24			740
M30			1500			
M36			2600			

5.2 Endcarriages for single girder overhead travelling cranes

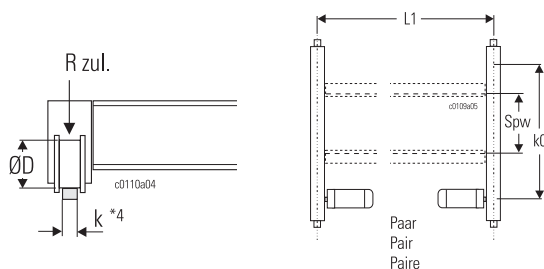
Endcarriage (pair)											Travel drive (pair)							
Ø D	R <sub>zul</sub> *	k 0	L 1 zul	Type	xxx	kg	R <sub>id zul</sub> at travel speed				50 Hz		60 Hz		mF <sub>zul</sub>	Type	kg	
	(H2/B3)						k=40 *3	k=50 *3	k=60 *3	k=70 *3	↔	↔	*4	2x .....				4
mm	kg	mm	m			kg	m/min	kg			m/min	kW *1	m/min		kW *1	kg		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
125	3640	1250	9.5	KEL-S 125.1.12.	xxx	224	...50	2880	3220			10/40	2x0.09/0.37	12.5/50	2x0.11/0.44	7200	SF 15220123ex n	50
	3640	1600	12	KEL-S 125.1.16.	xxx	256	...40	3060	3470			5/20	2x0.13/0.55	6.3/25	2x0.16/0.66	11000	SF 15220133ex n	54
	3640	2000	15	KEL-S 125.1.20.	xxx	296	...25	3370	3640	-	-	5/20	2x0.09/0.37	6.3/25	2x0.11/0.44	16300	SF 15226123ex n	50
160	3640	2500	18.5	KEL-S 125.1.25.	xxx	344	...20	3520	3640									
	5510	1600	12	KEL-S 160.2.16.	xxx	366	...50	3940	4930			10/40	2x0.13/0.55	12.5/50	2x0.16/0.66	11900	SF 25222133ex n	78
	5510	2000	15	KEL-S 160.2.20.	xxx	416	...40	4180	5230			5/20	2x0.32/1.25	6.3/25	2x0.36/1.50	23200	SF 25222313ex n	102
	5510	2500	18.5	KEL-S 160.2.25.	xxx	482	...25	4520	5510	-	-	5/20	2x0.09/0.37	6.3/25	2x0.11/0.44	17400	SF 25228123ex n	74
200	4370	3150	23.5	KEL-S 160.2.31.	xxx	570	...20	4660	5510									
	8520	2000	15	KEL-S 200.2.20.	xxx	447	...50	5230	6540	7770		10/40	2x0.13/0.55	12.5/50	2x0.16/0.66	13200	SF 25224133ex n	78
	7740	2500	8.5	KEL-S 200.2.25.	xxx	746	...40	5450	6820	8100		5/20	2x0.32/1.25	6.3/25	2x0.36/1.50	25700	SF 25224313ex n	102
	6320	3150	23.5	KEL-S 200.2.31.	xxx	875	...25	5830	7290	8520	-	5/20	2x0.09/0.37	6.3/25	2x0.11/0.44	19700	SF 25230123ex n	74
	6320	3150	23.5	KEL-S 200.2.31.	xxx	875	...25	5830	7290	8520	-	5/20	2x0.13/0.55	6.3/25	2x0.16/0.66	24100	SF 25830133ex n	96
315	4300	4000	30	KEL-S 200.2.40.	xxx	939	...20	6000	7500	8520								
	12610	2000	15	KEL-S 315.3.20.	xxx	934	...50	8870	11090	13190		10/40	2x0.32/1.25	12.5/50	2x0.36/1.50	28900	SF 35228313ex n	154
	11040	2500	8.5	KEL-S 315.3.25.	xxx	1047	...40	9160	11450	13710		5/20	2x0.50/2.00	6.3/25	2x0.60/2.40	43500	SF 35228423ex n	166
	9120	3150	23.5	KEL-S 315.3.31.	xxx	140	...25	9730	12160	13710	-	5/20	2x0.13/0.55	6.3/25	2x0.16/0.66	27800	SF 35834133ex n	150
	6700	4000	30	KEL-S 315.3.40.	xxx	140	...20	10010	12540	13710		5/20	2x0.32/1.25	6.3/25	2x0.36/1.50	57300	SF 35834313ex n	174
315	13500	2500	18.5	KEL-E 315.5.25.	xxx	1352	...50	-	-	-		10/40	2x0.32/1.25	12.5/50	2x0.36/1.50	30200	SA-C 5728313ex n	146
	12000	3150	23.5	KEL-E 315.5.31.	xxx	1544	...40	-	-	-		5/20	2x0.50/2.00	6.3/25	2x0.60/2.40	45500	SA-C 5728423ex n	166
	10500	4000	30	KEL-E 315.5.40.	xxx	1796	...25	-	-	-		5/20	2x0.80/3.20	6.3/25	2x0.90/3.80	74600	SA-C 5728523ex n	185
							...20	-	-	-		5/20	2x0.13/0.55	6.3/25	2x0.16/0.66	34700	SA-C 5734133ex n	126
						...20	-	-	-		5/20	2x0.32/1.25	6.3/25	2x0.36/1.50	67400	SA-C 5734313ex n	146	
															80000			



- \* Rough estimation:  
Centre load on endcarriage  
= 2 x R<sub>zul</sub>  
rail material min. ST52-3/S355
- \*1 20/40 % DC, see page 33 for further motor data
- \*2 with flanged wheels
- \*3 Rid zul for flat rails
- \*4 for 1 pair
- \*5 xxx = 140: connection "at side"  
xxx = 259: connection "at top"

5.3 Endcarriages for double girder overhead travelling cranes

Kopfräger (Paar)													Fahrantriebe (Paar)								
ØD	R <sub>zul</sub> *	k0	Spw	L1 zul.	Typ Type	kg	R <sub>id</sub> zul at travel speed					50 Hz		60 Hz		mF <sub>zul</sub>	Type	kg			
							*4	k=40 *3	k=50 *3	k=60 *3	k=70 *3	k=80 k=100	m/min	kW *1	m/min				kW *1	*4	2x .....
mm	kg	mm	mm	m	*2	*5	kg	m/min	kg				m/min	kW *1	m/min	kW *1	kg		kg		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
160	5510	2000	1250	15	KZL-S 160.2.20.04.140	458	...50	3940	4930	-	-	-	10/40	2x0.13/0.55	12.5/50	2x0.16/0.66	11900	SF 25222133ex n	78		
		2500	1250	18.5	KZL-S 160.2.25.04.140	524	...40	4180	5230	-	-	-		2x0.32/1.25		2x0.36/1.50	23200	SF 25222313ex n	102		
		2500	1250	18.5	KZL-S 160.2.25.04.540	524	...25	4520	5510	-	-	-									
		3150	1400	23.5	KZL-S 160.2.31.05.140	612	...20	4660	5510	-	-	-	5/20	2x0.09/0.37	6.3/25	2x0.11/0.44	17400	SF 25228123ex n	74		
		3150	1400	23.5	KZL-S 160.2.31.05.540	612															
200	8520	2000	1250	15	KZL-S 200.2.20.04.136	652							10/40	2x0.13/0.55	12.5/50	2x0.16/0.66	13200	SF 25224133ex n	78		
		2500	1400	18.5	KZL-S 200.2.25.05.136	731								2x0.32/1.25		2x0.36/1.50	25700	SF 25224313ex n	102		
		2500	1400	18.5	KZL-S 200.2.25.05.156	731															
		2500	1400	18.5	KZL-S 200.2.25.05.536	731	...50	5230	6540	7770	-	-	5/20	2x0.09/0.37	6.3/25	2x0.11/0.44	19700	SF 25230123ex n	74 98		
		3150	1400	23.5	KZL-S 200.2.31.05.xxx	907	...40	5450	6820	8100	-	-		2x0.13/0.55		2x0.16/0.66	24100	SF 25830133ex n			
		4000	2240	30	KZL-S 200.2.40.10.xxx	1000	...25	5830	7290	8520	-	-									
		4000	2500	30	KZL-S 200.2.40.12.136	1000	...20	6000	7500	8520	-	-									
		4000	2500	30	KZL-S 200.2.40.12.156	1000															
		4000	2800	30	KZL-S 200.2.40.14.136	1000															
		4000	2800	30	KZL-S 200.2.40.14.156	1000															
315	13680	2500	1400	18.5	KZL-S 315.3.25.05.136	1043							10/40	2x0.32/1.25	12.5/50	2x0.36/1.50	28900	SF 35228313ex n	154		
		2500	1400	18.5	KZL-S 315.3.25.05.156	1043	...50	8870	10480	13190	-	-		2x0.50/2.00		2x0.60/2.40	43500	SF 35228423ex n	166		
		2500	1400	18.5	KZL-S 315.3.25.05.536	1043	...40	9160	11290	13710	-	-	5/20	2x0.13/0.55	6.3/25	2x0.16/0.66	27800	SF 35834133ex n	150		
		3150	1400	23.5	KZL-S 315.3.31.05.xxx	1249	...25	9730	12160	13710	-	-		2x0.32/1.25		2x0.36/1.50	57300	SF 35834313ex n	174		
		4000	2240	30	KZL-S 315.3.40.10.xxx	1434	...20	10010	12510	13710	-	-									
		4000	2500	30	KZL-S 315.3.40.12.136	1434															
		4000	2500	30	KZL-S 315.3.40.12.156	1434															
		4000	2800	30	KZL-S 315.3.40.14.136	1434															
		4000	2800	30	KZL-S 315.3.40.14.156	1434															
		22000	3150	1400	23.5	KZL-E 315.5.31.05.136	1606								10/40	2x0.32/1.25	12.5/50	2x0.36/1.50	30200	SA-C 5728313ex n	146
	1400			23.5	KZL-E 315.5.31.05.556	1675									2x0.50/2.00		2x0.60/2.40	45500	n	166	
	1400			23.5	KZL-E 315.5.31.05.156	1675									2x0.80/3.20		2x0.90/3.80	74600	SA-C 5728423ex n	185	
	1800			23.5	KZL-E 315.5.31.07.136	1606									5/20	2x0.13/0.55	6.3/25	2x0.16/0.66	34700	SA-C 5728523ex n	126
	1800			23.5	KZL-E 315.5.31.07.156	1675	...50	-	-	-	-	-	-		2x0.32/1.25		2x0.36/1.50	80000	n	146	
	4000	2240	30	KZL-E 315.5.40.10.156	1926	...40	-	-	-	-	-										
4000	2240	30	KZL-E 315.5.40.10.556	1926	...25	-	-	-	-	-											
4000	2500	30	KZL-E 315.5.40.12.556	1926	...20	-	-	-	-	-											
4000	2800	30	KZL-E 315.5.40.14.156	1926																	
4260	2800	32	KZL-E 315.5.42.14.556	2003																	
4260	2800	32	KZL-E 315.5.42.14.156	2003																	
4260	3150	32	KZL-E 315.5.42.16.156	2003																	
4560	2800	34	KZL-E 315.5.45.14.556	2092																	
500	29600	3150	1400	26	KZL-F 500.6.31.140	2490							10/40	2x0.50/2.00	12.5/50	2x0.60/2.40	47900	SA-C 6732423ex n	288		
		3150	1400	26	KZL-F 500.6.31.yyy	2490								2x0.80/3.20		2x0.90/3.80	77900	n	306		
		4000	2240	32	KZL-F 500.6.40.yyy	2822	...50	-	18740	22490	26240	29600									
		4260	2500	34	KZL-F 500.6.42.yyy	2858	...40	-	19290	23150	27010	29600	5/20	2x0.32/1.25	6.3/25	2x0.36/1.50	78200	SA-C 6732523ex n	268		
		4400	2240	35	KZL-F 500.6.44.578	2958	...25	-	20460	24550	28640	29600		2x0.50/2.00		2x0.60/2.40	116600	n	288		
		4560	2800	36	KZL-F 500.6.45.yyy	3248	...20	-	20790	24950	29110	29600									
		4660	2500	37	KZL-F 500.6.46.578	3336															
		4960	2800	39	KZL-F 500.6.49.578	3436															



- \* Rail material min. ST52-3/S355
- \*1 20/40% further motor data see page 33
- \*2 KZL-S./KZL-E. with flanged wheels
- KZL-F. :see sketch
- L: with guide rollers
- R: without guide rollers
- \*3 Rid zul for flat rails
- \*4 for 1 pair
- \*5 connection plate:  
xxx = .136; .156; .536; .556  
yyy = .158; .558"



5.4 Travel drives

<b>SF .. /SA..ex n</b>	<b>50 Hz</b>
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Code	Type	P	n1	TN	TA	TH	TB	Jrot	Jschw	cos φ N	cos φ K	DC	Ac	Wmax	PB
		[kW]	[1/min]	[Nm]	[Nm]	[Nm]	[Nm]	[kgm <sup>2</sup> ]	[kgm <sup>2</sup> ]			[%]	[(1/h)s]	[J/br]	[W]
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
123	8/2F12/220.223	0.09/0.37	590/2420	1.46	3.8/3.6	2.3/2.3	1.3	0.0005	0.0053	0.55/0.83	0.77/0.93	20/40	800	3000	54
133	8/2F13/220.233	0.13/0.55	600/2540	2.07	5.1/5.1	3.5/3.5	2.5	0.0007	0.0078	0.55/0.82	0.72/0.92	20/40	500	3000	54
313	8/2F31/210.423	0.32/1.25	660/2550	4.68	7.6/10.5	6.4/6.8	5.0	0.0032	0.0133	0.69/0.86	0.89/0.90	20/40	600	12000	84
423	8/2F42/210.433	0.50/2.00	665/2680	7.13	12.0/17.4	9.2/10.4	8.0	0.0057	0.0230	0.74/0.95	0.87/0.90	20/40	360	12000	84
523	8/2F52/210.523	0.80/3.20	610/2550	11.96	21.0/24.0	18.0/18.0	13.0	0.0104	0.0353	0.74/0.96	0.83/0.82	20/40	300	25000	100

Code	Type	In			Ik		
		220...240 V	380...415 V	480...525 V	220...240 V	380...415 V	480...525 V
		[A]	[A]	[A]	[A]	[A]	[A]
1	2	17	18	19	20	21	22
123	8/2F12/220.223	1.7/2.3	1.0/1.3	0.8/1.0	2.4/5.6	1.4/3.2	1.1/2.6
133	8/2F13/220.233	2.1/2.8	1.2/1.6	1.0/1.3	2.8/7.6	1.6/4.5	1.3/3.6
313	8/2F31/210.423	2.4/5.2	1.4/3.0	1.1/2.4	5.0/16.0	2.9/9.2	2.3/7.4
423	8/2F42/210.433	3.1/7.0	1.8/4.0	1.4/3.2	7.7/28.0	4.4/16.0	3.5/13.0
523	8/2F52/210.523	4.7/12.7	2.7/7.3	2.2/5.6	10.6/43.0	6.1/25.0	4.9/20.0

<b>SF .. /SA..ex n</b>	<b>60 Hz</b>
------------------------	--------------

Code	Type	P	n1	TN	TA	TH	TB	Jrot	Jschw	cos φ N	cos φ K	DC	Ac	Wmax	PB
		[kW]	[1/min]	[Nm]	[Nm]	[Nm]	[Nm]	[kgm <sup>2</sup> ]	[kgm <sup>2</sup> ]			[%]	[(1/h)s]	[J/br]	[W]
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
123	8/2F12/210.223	0.11/0.44	710/2900	1.46	3.8/3.6	2.3/2.3	1.3	0.0005	0.0053	0.55/0.83	0.77/0.89	20/40	800	3000	54
133	8/2F13/210.233	0.16/0.66	720/3050	2.07	5.1/5.1	3.5/3.5	2.5	0.0007	0.0078	0.55/0.82	0.72/0.92	20/40	500	3000	54
313	8/2F31/200.423	0.36/1.50	790/3060	4.68	7.6/10.5	6.4/6.8	5.0	0.0032	0.0133	0.69/0.86	0.89/0.90	20/40	600	12000	84
423	8/2F42/200.433	0.60/2.40	800/3220	7.13	12.0/17.4	9.2/10.4	8.0	0.0057	0.0230	0.74/0.95	0.87/0.90	20/40	360	12000	84
523	8/2F52/210.523	0.90/3.80	730/3060	11.96	21.0/24.0	18.0/18.0	13.0	0.0104	0.0353	0.74/0.96	0.83/0.82	20/40	300	25000	100

Code	Type	In			Ik		
		380...415 V	440...460 V	550...600 V	380...415 V	460...480 V	550...600 V
		[A]	[A]	[A]	[A]	[A]	[A]
1	2	17	18	19	20	21	22
123	8/2F12/220.223	1.2/1.5	1.0/1.3	0.8/1.0	1.6/3.7	1.4/3.2	1.1/2.6
133	8/2F13/220.233	1.4/1.8	1.2/1.6	1.0/1.3	1.8/5.2	1.6/4.5	1.3/3.6
313	8/2F31/210.423	1.6/3.5	1.4/3.0	1.1/2.4	3.3/10.6	2.9/9.2	2.3/7.4
423	8/2F42/210.433	2.1/4.6	1.8/4.0	1.4/3.2	5.1/19.0	4.4/16.0	3.5/13.0
523	8/2F52/210.523	3.1/8.4	2.7/7.3	2.2/5.8	7.0/28.0	6.1/25.0	4.1/16.7

- Ac [(1/h) s] Switching frequency factor
- c [1/h] Switching operations per hour
- cos φ K Power factor (short circuit)
- cos φ N Power factor (rated)
- DC [%] Duty cycle
- IK [A] Short circuit current
- IN [A] Rated current
- Jrot [kgm<sup>2</sup>] Moment of inertia, rotor
- Jschw [kgm<sup>2</sup>] Moment of inertia, centrifugal mass
  
- n1 [1/min] Motor speed
- PB [W] Coil output (brake)
- P [kW] Motor output
- TA [Nm] Motor starting torque
- TB [Nm] Braking torque (motor shaft)
- TH [Nm] Run-up torque (motor shaft)
- TN [Nm] Rated motor torque
- Wmax [J/Br] Max. permissible friction energy (brake)

### 5.5 Conditions of use

The components are designed for use in industry and for the ambient conditions usual in industry in non-hazardous areas.


Special measures must be taken for particular applications such as e.g. high degree of chemical pollution, outdoor use, offshore application, etc.


The manufacturer will be pleased to advise you.

#### **Equipment classification**

Equipment group II  
Category 3G

#### **Explosion protection**

 II 3 G Ex nA IIB T3 (T4)

 II 3 G ck T4

#### **Protection against dust and moisture to EN 60 529**

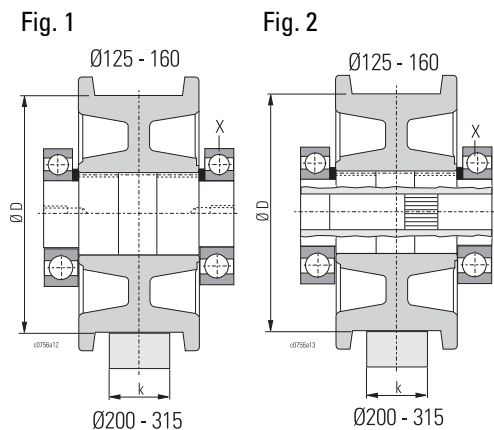
IP 54 (IP 66)

#### **Permissible ambient temperatures**

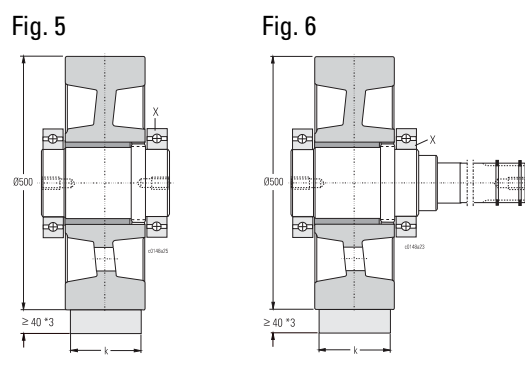
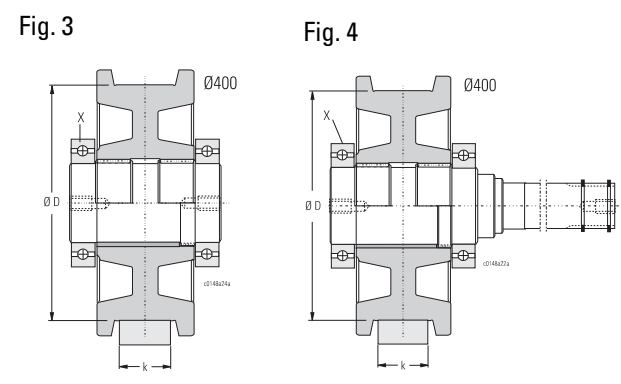
-20°C ... +40°C (option +60°)

6.1 Wheels

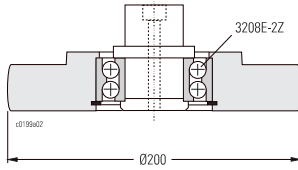
Wheels for K.L- endcarriages for overhead travelling cranes



ØD [mm]	Fig.	Order no.	Endcarriage	k *1 [mm]	
125	1 + 2	24 254 10 01 0	KEL-S125	40	
	1 + 2	24 254 11 01 0		50	
160	1 + 2	24 254 20 01 0	K.L-S160	40	
	1 + 2	24 254 21 01 0		50	
200	1	07 257 00 05 0	K.L-S200	40	
	1	07 257 01 05 0		50	
	1	07 257 02 05 0		60	
	2	07 257 04 01 0		40	
	2	07 257 05 01 0		50	
	2	07 257 06 01 0		60	
	5	07 257 03 05 0		-	
	6	07 257 08 01 0		-	
315	1	09 257 00 05 0	-	40	
	1	09 257 01 05 0	K.L-S315	50	
	1	09 257 02 05 0		60	
	2	09 257 06 01 0		40	
	2	09 257 07 01 0		50	
	2	09 257 08 01 0		60	
315	5	09 257 03 05 0		-	
315	6	09 257 09 01 0	-		
315	1	09 257 15 05 0	K.L-E315	50	
	1	09 257 16 05 0		60	
	1	09 257 17 05 0		70	
	1	09 257 18 05 0		80	
	2	09 257 15 01 0		50	
	2	09 257 16 01 0		60	
	2	09 257 17 01 0		70	
	2	09 257 18 01 0		80	
	315	5		09 257 19 05 0	-
	315	6		09 257 19 01 0	-
500	5 + 6	24 254 70 01 0	KZL-F500	50 ..100	



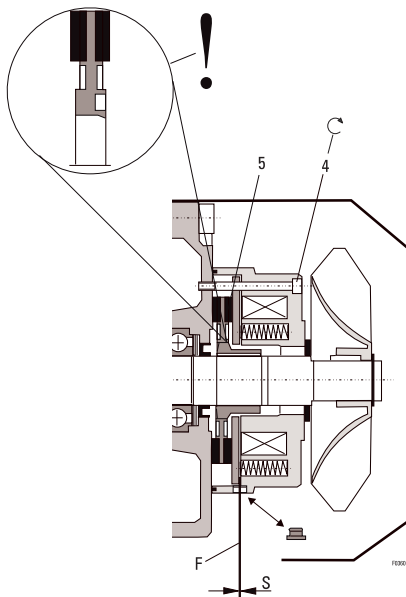
## 6.2 Guide rollers



ØD [mm]	Order no.	Endcarriage
62	573 000 0	KEL-S125
62	573 000 0	K.L-S160
125	27 710 00 58 0	K.L-S200
125	27 710 00 58 0	K.L-S315
200	39 710 00 58 0	K.L-E315
200	30 712 00 93 0	KZL-F500

## 6.3 Brake discs / brake rotors for travel drives

S.-C .. / SF ..



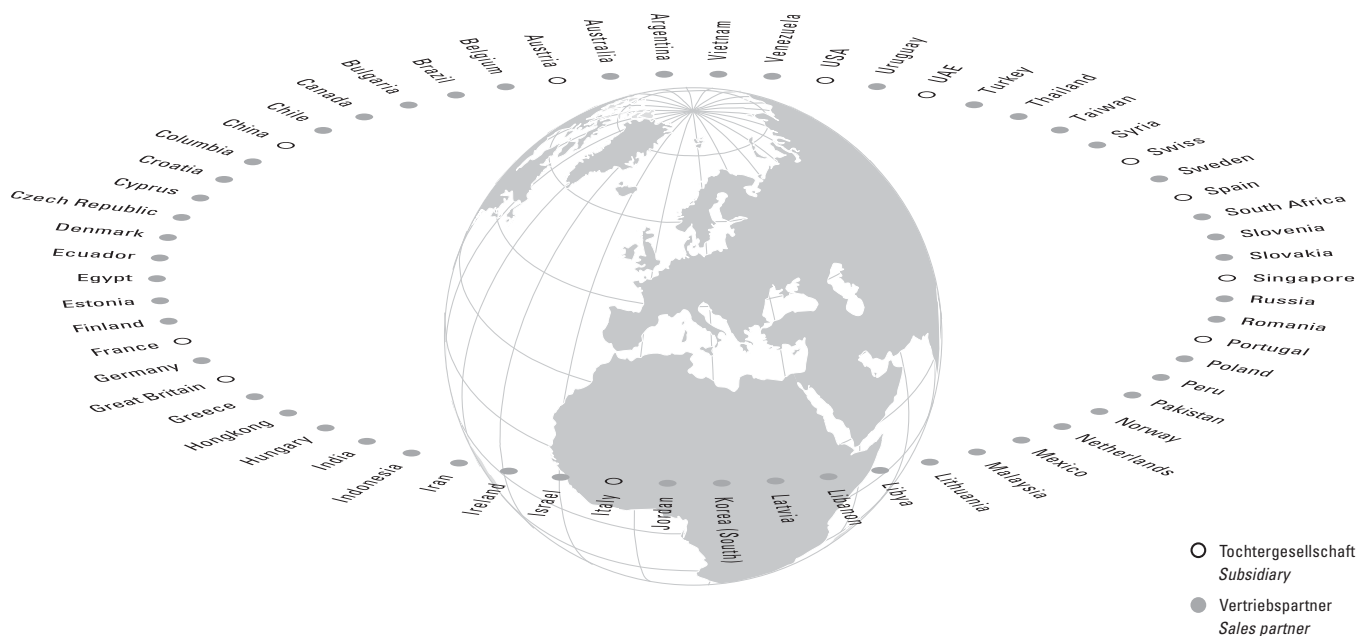
	Motor	Braking torque [Nm]	Brake type	S max. [mm]	4	⌚ [Nm]	Order no. brake disc
SF xx xxx 123	8/2F12/2xx.223	1,3	FDW 08	0,2...2,0	3xM4	3	567 100 0
SF xx xxx 133	8/2F13/2xx.233	2,5	FDW 08	0,2...1,2	3xM4	3	567 100 0
SF xx xxx 184	4F18/2xx.233	2,5	FDW 08	0,2...1,2	3xM4	3	567 100 0
SF xx xxx 313	8/2F31/2xx.423	5	FDW 13	0,3...2,0	3xM6	10	21 270 00 64 0
SF xx xxx 384	4F38/2xx.423	8	FDW 13	0,3...2,0	3xM6	10	21 270 00 64 0
SF xx xxx 423	8/2F42/2xx.433	8	FDW 13	0,3...2,0	3xM6	10	21 270 00 64 0
SF xx xxx 484	4F48/2xx.523	13	FDW 15	0,3...2,0	3xM6	10	567 151 0
SF xx xxx 523	8/2F52/2xx.523	13	FDW 15	0,3...2,0	3xM6	10	567 151 0

	Motor	Braking torque [Nm]	Brake type	S max. [mm]	4	⌚ [Nm]	Order no. brake disc
SA-C ... 133	8/2F13/2xx.233	2,5	FDW 08	0,2...1,2	3xM4	3	567 100 0
SA-C ... 184	4F18/2xx.233	2,5	FDW 08	0,2...1,2	3xM4	3	567 100 0
SA-C ... 313	8/2F31/2xx.423	5	FDW 13	0,3...2,0	3xM6	10	21 270 00 64 0
SA-C ... 384	4F38/2xx.423	8	FDW 13	0,3...2,0	3xM6	10	21 270 00 64 0
SA-C ... 423	8/2F42/2xx.433	8	FDW 13	0,3...2,0	3xM6	10	21 270 00 64 0
SA-C ... 484	4F48/2xx.443	13	FDW 15	0,3...2,0	3xM6	10	567 151 0
SA-C ... 523	8/2F52/2xx.523	13	FDW 15	0,3...2,0	3xM6	10	567 151 0









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