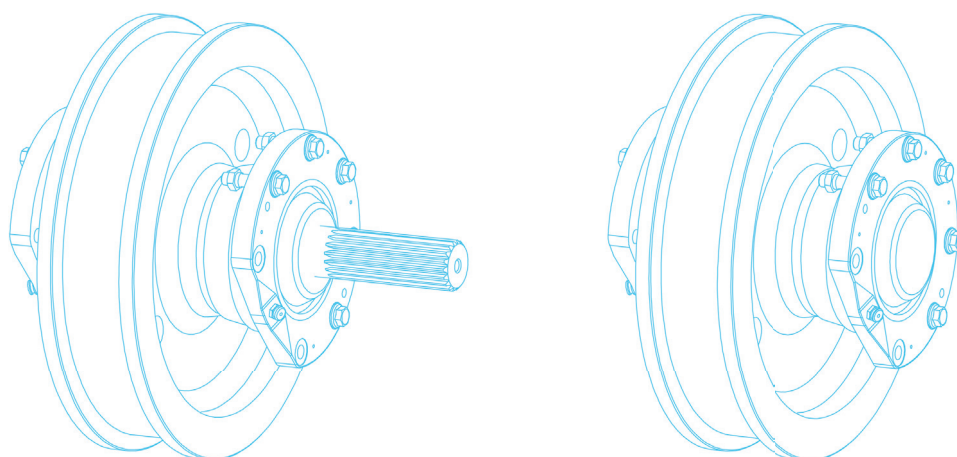


Installation and Maintenance Instructions

TITAN

WHEEL SET

SERIES KG 130



RAE/RNE 400, 500
RAEK/RNEK 400, 500
RAEKOF/RNEKOF 500



KARL GEORG

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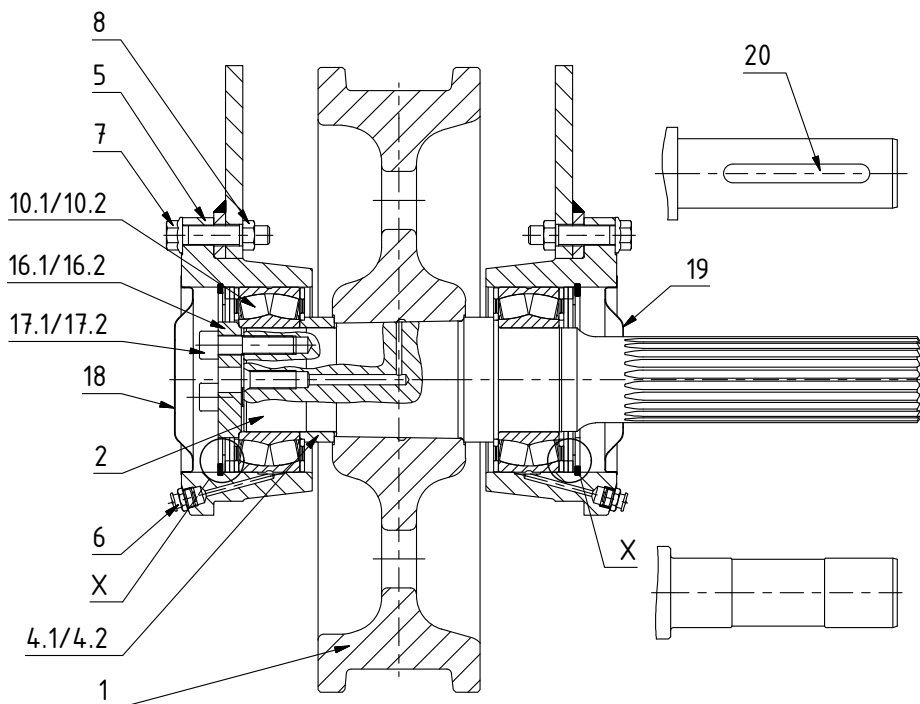
Before installing the wheel set and commissioning, read these Installation and Maintenance Instructions. Observe all directions and instructions. We accept no liability for damage and malfunctions caused as a result of non-observance of these instructions.

1. Technical construction RAE/RNE 400, 500

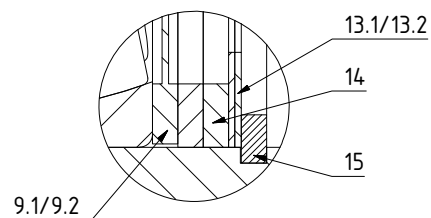
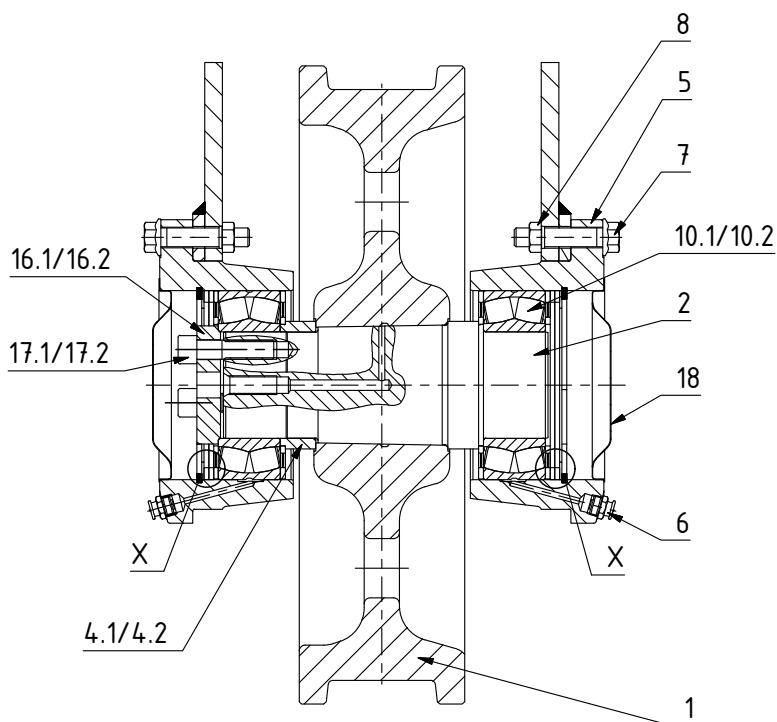
Installation version 1 and 2

Installation of corner bearing, delivered complete

**Wheel set RAE
driven**

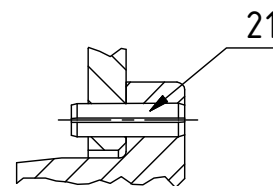


**Wheel set RNE
not driven**



Detail X

1x as shown and
1x arranged mirror-image



Fixing using locking pins
(only for version 2)

Parts list

Part	Number per wheel set		Designation
	RAE	RNE	
1	1	1	Crane wheel
2	1	1	Drive shaft/Idler shaft
3	-	-	
4.1	1	1	Spacer ring Ø92/75,1x16 (Ø 400)
4.2	1	1	Spacer ring Ø108/90,1x30 (Ø 500)
5	2	2	Flanged bearing housing
6	2	2	Flat grease nipple DIN 3404 - M1 - G3/8
7	10	10	Locking screw M16x75-10.9 ZT (SPERR RIPP)
8	10	10	Retained nut M16 - St
9.1	4	4	Seal disc Ø159/86x4 (Ø 400)
9.2	4	4	Seal disc Ø159/103x4 (Ø 500)
10.1	2	2	Self aligning roller bearing DIN 635 - 22315 (Ø 400)
10.2	2	2	Self aligning roller bearing DIN 635 - 23218 (Ø 500)
11	-	-	
12	-	-	
13.1	6	6	Adjusting washers DIN 988 - Ø130/160x1 (Ø 400)
13.2	4	4	Adjusting washers DIN 988 - Ø130/160x1 (Ø 500)
14	4	4	Compensating disc Ø160/140x4
15	2	2	Circlip DIN 472 - 160x4
16.1	1	1	Tension disc Ø85x20 (Ø 400)
16.2	1	1	Tension disc Ø100x20 (Ø 500)
17.1	3	3	Cylinder screw ISO 4762 - M16x60-10.9 ZT (Ø 400)
17.2	3	3	Cylinder screw ISO 4762 - M16x65-10.9 ZT (Ø 500)
18	1	2	Cover plate Ø 400 / 500
19	1	0	Cover plate mit Hole Ø 400 / 500
20	1	0	Feather key DIN 6885/1 (Design depending on the drive shaft)
21	8	8	Locking pin ISO 8752 - Ø21x50 (only for version 2)
22	-	-	
23	3	3	Adjusting washers DIN 988 - Ø130/160x0,5 (enclosed separate)

1.1 Installation dimensions and hole pattern for the steel construction

Installation version 1

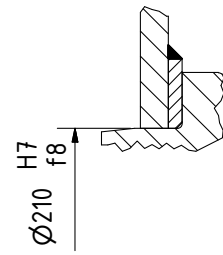
Installation of corner bearing, delivered complete
Flange centering mechanically machined

For this installation version, the locating holes for the flanged bearing housing in the steel construction are mechanically machined with the tolerances of fit $\varnothing 210$ H7.

Thus, this eliminates extensive alignment of the wheel set and pinning of the flanged bearing housing after installation.

The wheel sets are complete, i.e. supplied as a ready-to-install unit.

Preparation of the steel construction in accordance with the hole pattern (Figure 1) is possible as a quick, corner bearing installation using commercial tools.



Radial forces are absorbed through the tolerance fit

Hole pattern representation corner bearing installation (Figure 1)

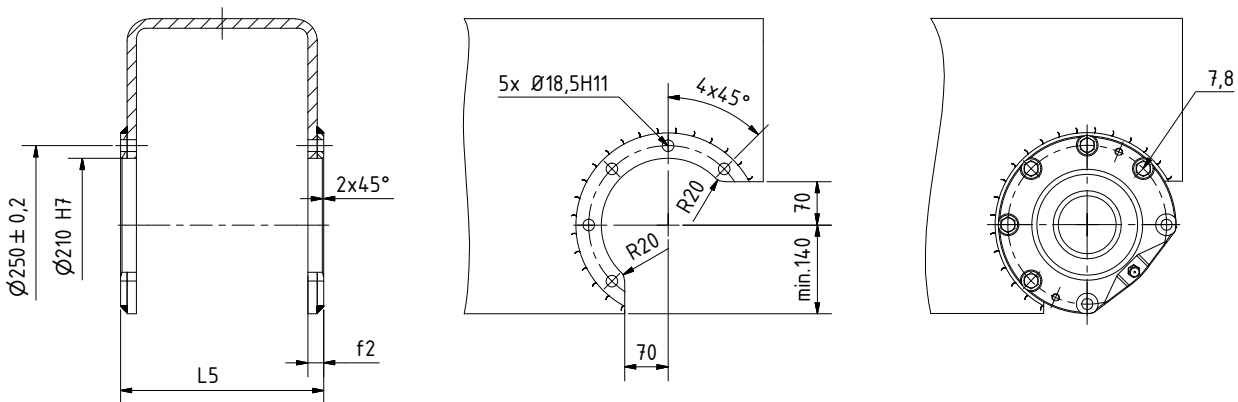


Table 1

Wheel set	L5 +1	f2	Number for each flanged bearing housing Locking screw with retained nut	Tightening torque
RAE/RNE 400	280	15-32	5 off M16x75	300 Nm
RAE/RNE 500	320	20-32	5 off M16x75	300 Nm

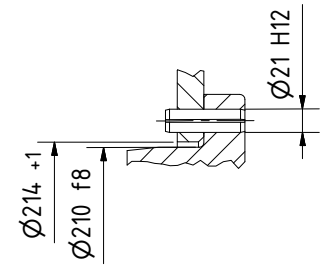
1.2 Installation dimensions and hole pattern for the steel construction

Installation version 2

Installation of corner bearing, delivered complete

Flange centering flame-cutting

For this installation version, the locating holes for the flanged bearing housing in the steel construction are flame-cutting to $\varnothing 214 + 1$ mm. However, in this case, precise alignment of the wheel sets is necessary by displacing the flanged bearing housing after installation. The wheel sets are complete, i.e. supplied as a ready-to-install unit. Preparation of the steel construction is carried out in accordance with the hole pattern (Figure 2). After alignment, the exact position of the flanged bearing housing is fixed using the locking pins.



Radial forces are absorbed through locking pins

Hole pattern representation corner bearing installation (Figure 2)

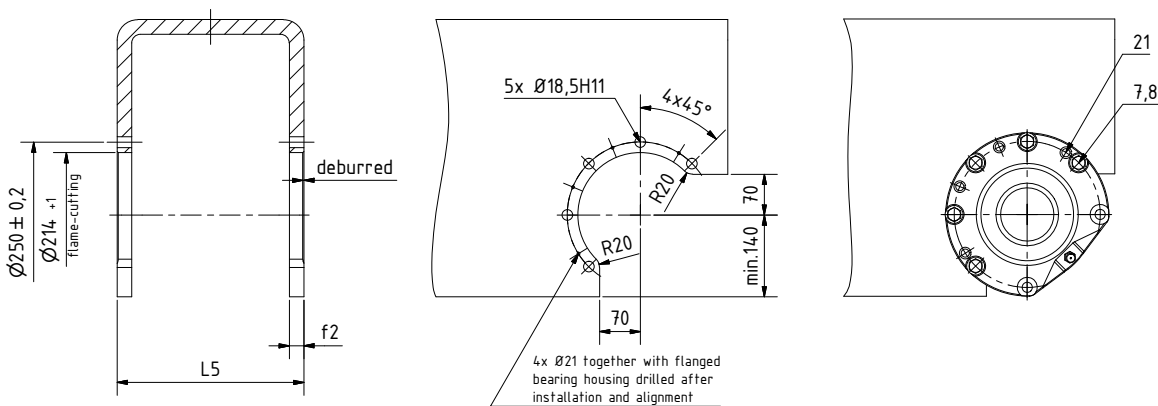


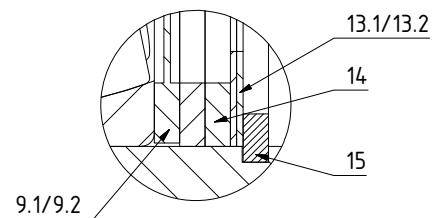
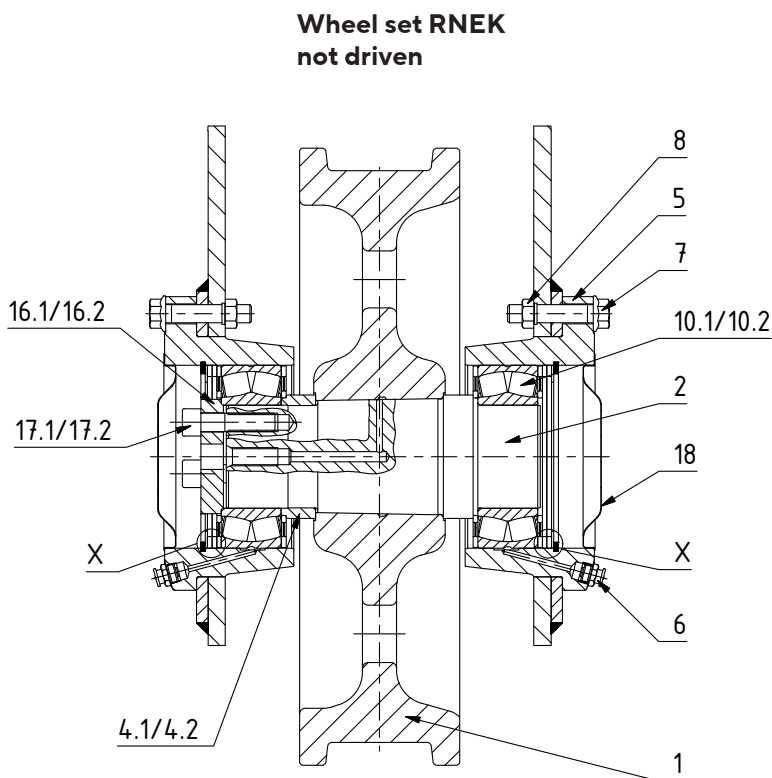
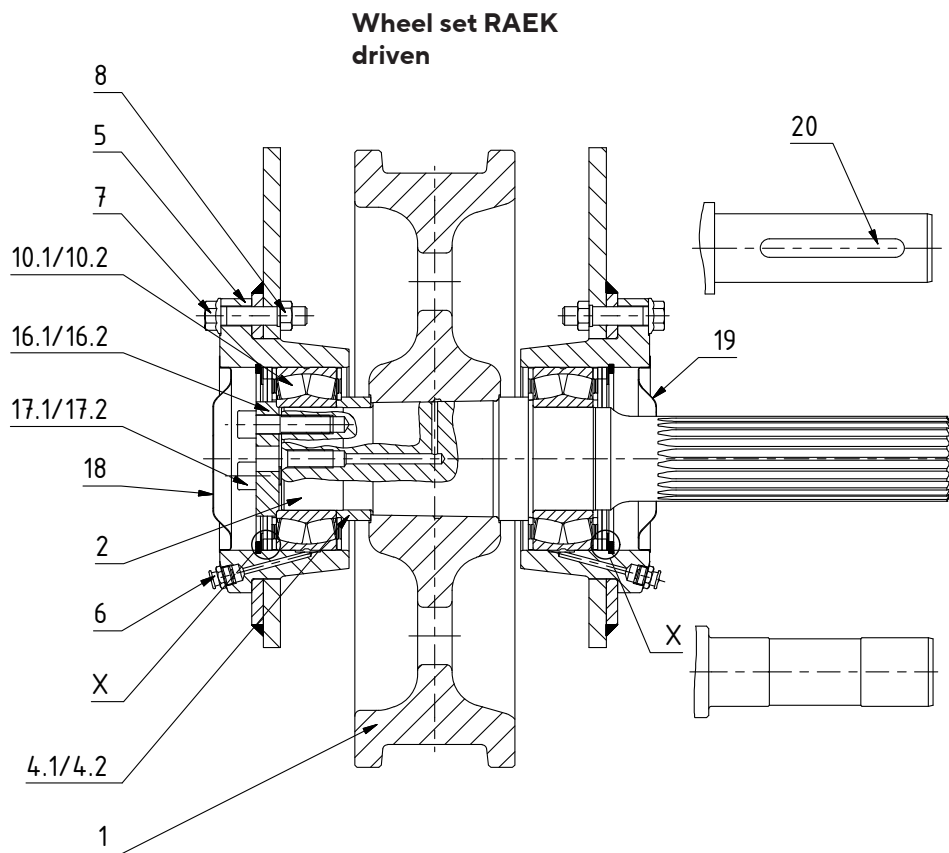
Table 2

Wheel set	L5 +1	f2	Number per flanged bearing housing		
			Locking pin	Locking screw with retained nut	Tightening torque
RAE/RNE 400	280	15-32	4 off 21x50	5 off M16x75	300 Nm
RAE/RNE 500	320	20-32	4 off 21x50	5 off M16x75	300 Nm

2. Technical construction RAEK/RNEK 400, 500

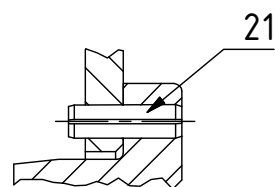
Installation version 3 and 4

Installation of box girder, supplied as individual parts



Detail X

1x as shown and
1x arranged mirror-image



Fixing using locking pins
(only for version 4)

Parts list

Part	Anzahl je Wheel set		Designation
	RAEK	RNEK	
1	1	1	Crane wheel
2	1	1	Drive shaft/Idler shaft
3	-	-	
4.1	1	1	Spacer ring Ø92/75,1x16 (Ø 400)
4.2	1	1	Spacer ring Ø108/90,1x30 (Ø 500)
5	2	2	Flanged bearing housing
6	2	2	Flat grease nipple DIN 3404 - M1 - G3/8
7	8	8	Locking screw M16x75-10.9 ZT (SPERR RIPP)
8	8	8	Retained nut M16 - St
9.1	4	4	Seal disc Ø159/86x4 (Ø 400)
9.2	4	4	Seal disc Ø159/103x4 (Ø 500)
10.1	2	2	Self aligning roller bearing DIN 635 - 22315 (Ø 400)
10.2	2	2	Self aligning roller bearing DIN 635 - 23218 (Ø 500)
11	-	-	
12	-	-	
13.1	6	6	Adjusting washers DIN 988 - Ø130/160x1 (Ø 400)
13.2	4	4	Adjusting washers DIN 988 - Ø130/160x1 (Ø 500)
14	4	4	Compensating disc Ø160/140x4
15	2	2	Circlip DIN 472 - 160x4
16.1	1	1	Tension disc Ø85x20 (Ø 400)
16.2	1	1	Tension disc Ø100x20 (Ø 500)
17.1	3	3	Cylinder screw ISO 4762 - M16x60-10.9 ZT (Ø 400)
17.2	3	3	Cylinder screw ISO 4762 - M16x65-10.9 ZT (Ø 500)
18	1	2	Cover plate Ø 400 / 500
19	1	0	Cover plate with hole Ø 400 / 500
20	1	0	Feather key DIN 6885/1 (Design depending on the drive shaft)
21	8	8	Locking pin ISO 8752 - Ø21x50 (only for version 4)
22	-	-	
23	3	3	Adjusting washers DIN 988 - Ø130/160x0,5 (enclosed separate)

2.1 Installation dimensions and hole pattern for the steel construction

Installation version 3

Box girder installation, delivered in individual parts

Flange centering mechanically machined

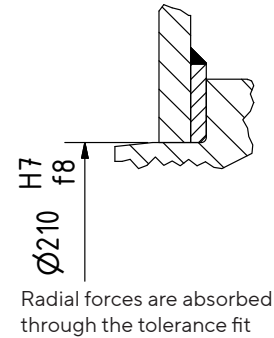
For this installation version, the locating holes for the flanged bearing housing in the steel construction are mechanically machined with the tolerances of fit $\varnothing 210$ H7.

Thus, this eliminates extensive alignment of the wheel set and pinning of the flanged bearing housing after installation.

The wheel sets are supplied as individual parts.

Preparation of the steel construction in accordance with the hole pattern

(Figure 3) is possible as a quick, box girder installation using commercial tools.



Hole pattern representation box girder installation (Figure 3)

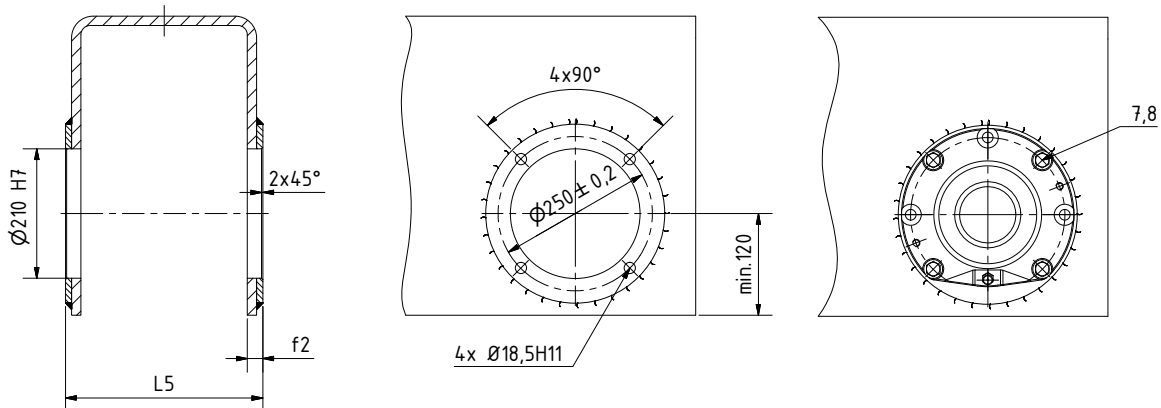


Table 3

Wheel set	L5 +1	f2	Number per each flanged bearing housing Locking screw with retained nut	Tightening torque
RAE/RNE 400	280	15-32	5 off M16x75	300 Nm
RAE/RNE 500	320	20-32	5 off M16x75	300 Nm

2.2 Installation dimensions and hole pattern for the steel construction

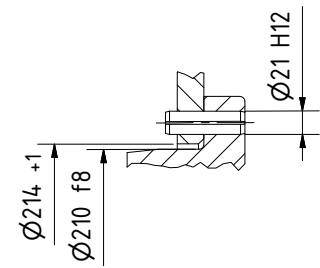
Installation version 4

Box girder installation, delivered in individual parts

Flange centering flame-cutting

For this installation version, the locating holes for the flanged bearing housing in the steel construction are flame-cutting to $\varnothing 214 - 1 \text{ mm}$. However, in this case, precise alignment of the wheel sets is necessary by displacing the flanged bearing housing after installation. The wheel sets are supplied as individual parts.

Preparation of the steel construction is carried out in accordance with the hole pattern (Figure 4). After alignment, the exact position of the flanged bearing housing is fixed using the locking pins.



Radial forces are absorbed through locking pins

Hole pattern representation box girder (Figure 4)

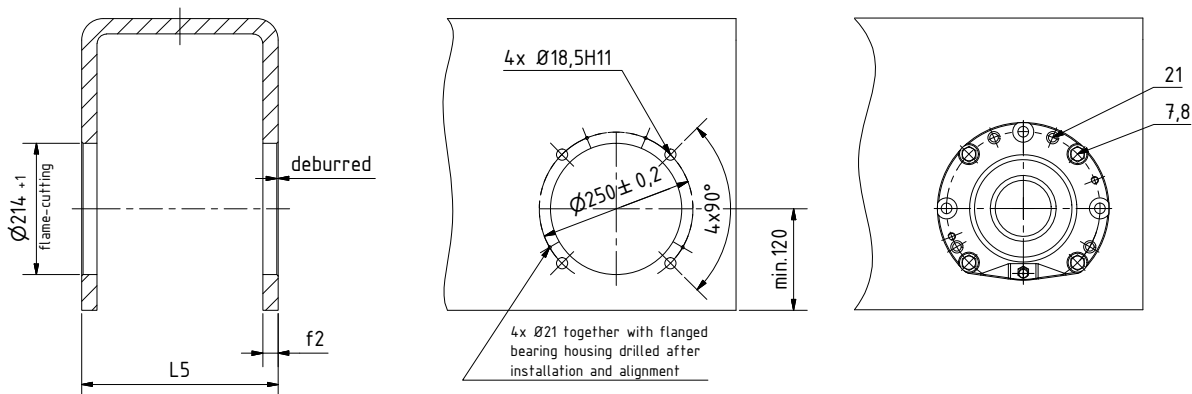


Table 4

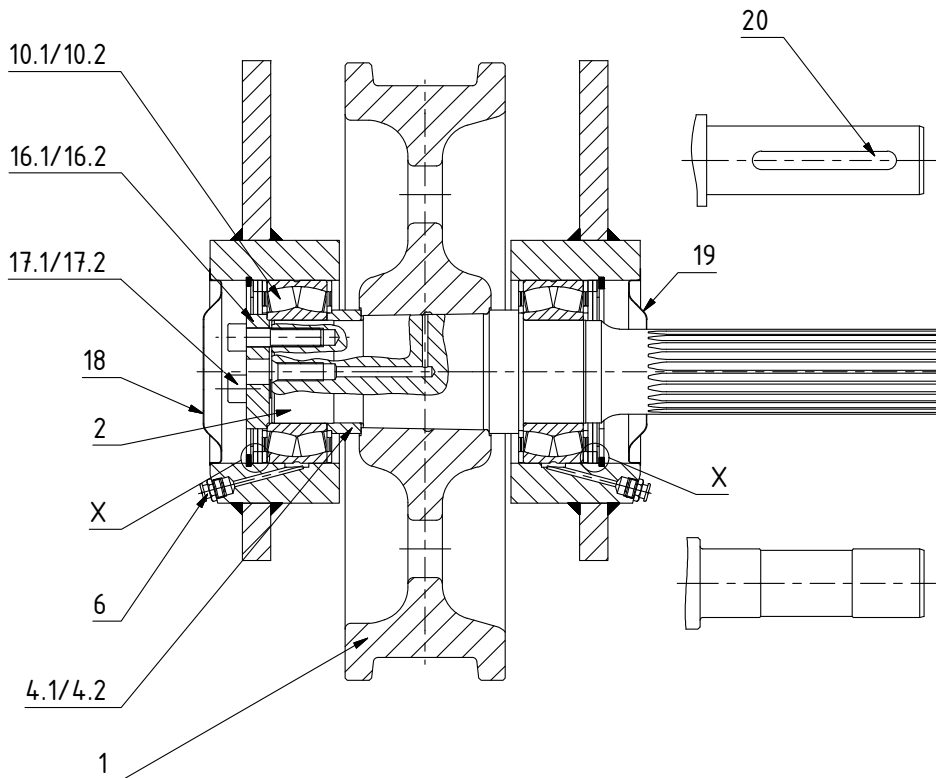
Wheel set	L5 +1	f2	Number per flanged bearing housing		
			Locking pin	Locking screw with retained nut	Tightening torque
RAE/RNE 400	280	15-32	4 off 21x50	5 off M16x75	300 Nm
RAE/RNE 500	320	20-32	4 off 21x50	5 off M16x75	300 Nm

3. Technical construction RAEKOF/RNEKOF 500

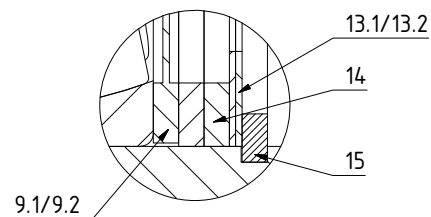
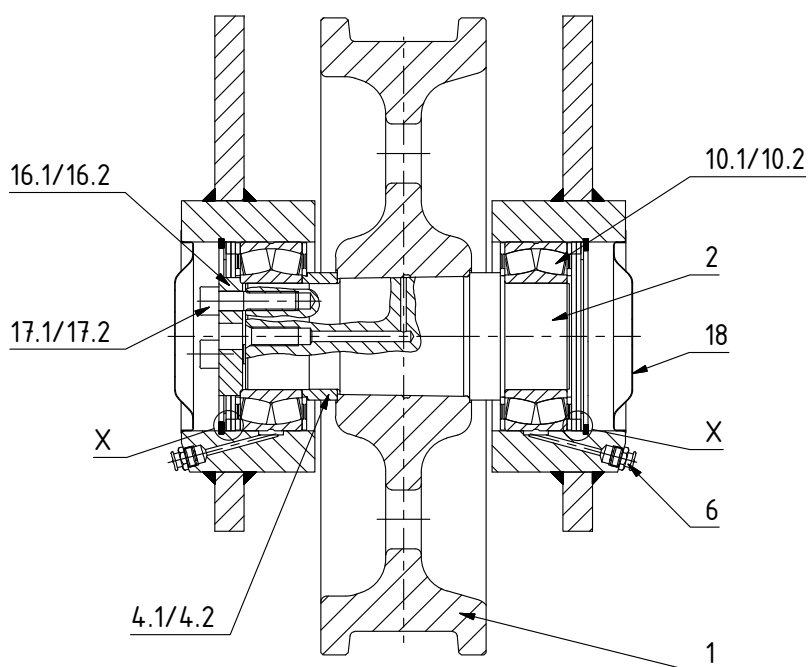
Installation version 5

Installation of box girder, without flanged bearing housing, supplied as individual parts

**Wheel set RAEKOF
driven**



**Wheel set RNEKOF
not driven**



Detail X

1x as shown and
1x arranged mirror-image

Parts list

Part	Anzahl je Wheel set		Designation
	RAEKOF	RNEKOF	
1	1	1	Crane wheel
2	1	1	Drive shaft/Idler shaft
3	-	-	
4.1	1	1	Spacer ring Ø92/75,1x16 (Ø 400)
4.2	1	1	Spacer ring Ø108/90,1x30 (Ø 500)
5	-	-	
6	-	-	
7	-	-	
8	-	-	
9.1	4	4	Seal disc Ø159/86x4 (Ø 400)
9.2	4	4	Seal disc Ø159/103x4 (Ø 500)
10.1	2	2	Self aligning roller bearing DIN 635 - 22315 (Ø 400)
10.2	2	2	Self aligning roller bearing DIN 635 - 23218 (Ø 500)
11	-	-	
12	-	-	
13.1	6	6	Adjusting washers DIN 988 - Ø130/160x1 (Ø 400)
13.2	4	4	Adjusting washers DIN 988 - Ø130/160x1 (Ø 500)
14	4	4	Compensating disc Ø160/140x4
15	2	2	Circlip DIN 472 - 160x4
16.1	1	1	Tension disc Ø85x20 (Ø 400)
16.2	1	1	Tension disc Ø100x20 (Ø 500)
17.1	3	3	Cylinder screw ISO 4762 - M16x60-10.9 ZT (Ø 400)
17.2	3	3	Cylinder screw ISO 4762 - M16x65-10.9 ZT (Ø 500)
18	1	2	Cover plate Ø 400 / 500
19	1	0	Cover plate mit Hole Ø 400 / 500
20	1	0	Feather key DIN 6885/1 (Design depending on the drive shaft)
21	-	-	
22	-	-	
23	3	3	Adjusting washers DIN 988 - Ø130/160x0,5 (enclosed separate)

3.1 Installation dimensions for the steel construction

Installation version 5

Installation of box girder, without flanged bearing housing, supplied as individual parts Bearing bushes welded and mechanically machined

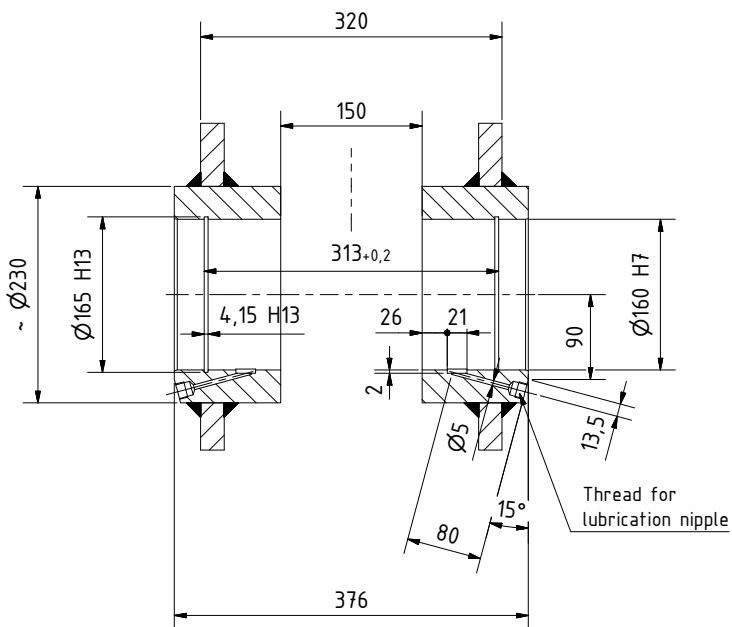
For this installation version, the bearing bushes are welded into the steel construction and mechanically machined.

In this case, extensive alignment of the wheel sets is not required after installation.

The wheel sets are supplied as individual parts.

Preparation of the steel construction is carried out in accordance with the hole pattern (Figure 5).

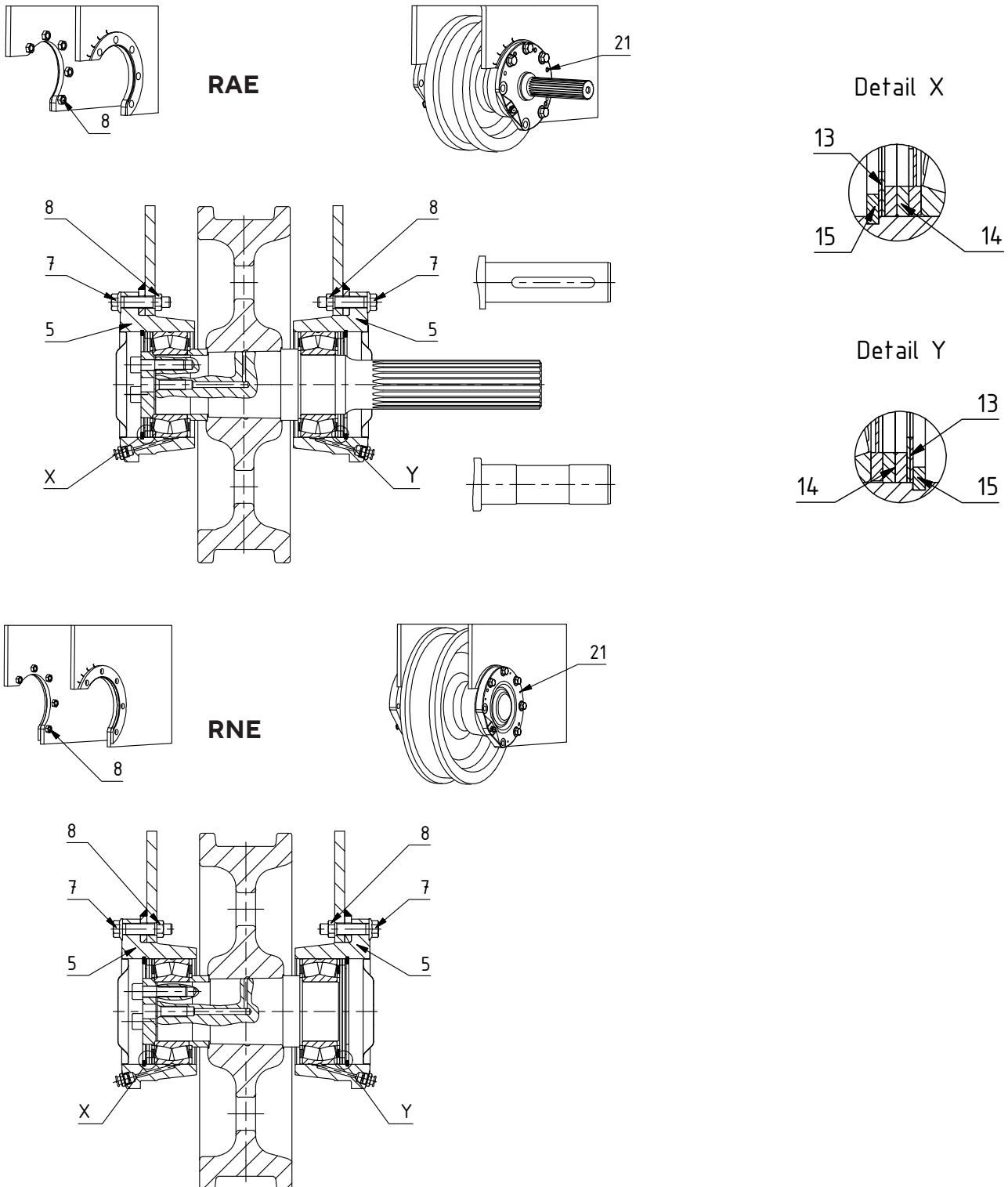
Hole pattern representation box girder (Figure 5)



4. Installation of the wheel sets RAE/RNE 400, 500

Installation version 1 and 2

Installation of corner bearing, delivered complete



Using interchangeable compensating discs (13) and adjusting washers (14) the position of the wheel to the rail and thus the average track dimension can be changed.

Table 5


Wheel set	Number per flanged bearing housing Thickness of and adjusting washer/compensating disc	max. adjustment option
RAE/RNE 400	2 x 4 mm + 3 x 1 mm	± 10 mm
RAE/RNE 500	2 x 4 mm + 2 x 1 mm	± 10 mm


4.1 Installation procedure, installation version 1

Installation of corner bearing, delivered complete

Flange centering mechanically machined

1. Manufacture the steel construction in accordance with 1.1 (refer to Page 6).
2. From the inside, install retained nuts M 16 (8) in the prefabricated holes \varnothing 18.5 mm in the steel construction.
3. Insert the complete wheel set into the steel construction.
4. Use the locking screws (7) and attach both flanged bearing housings (5) to the steel construction, tightening torque 300 Nm (in accordance with Table 1 on Page 6)
5. Relubricate both roller bearings

 However, this simple installation procedure is only applicable if the dimension of the steel construction (clearance of the flanged bearing housing) has been manufactured exactly as given in Figure 1 on Page 6 (L5 +1 mm). If the installation dimension is exceeded by more than 1 mm, the difference must be compensated by installing the corresponding compensating discs (23). Thereby, there is less axial play.


 If the installation dimension (L5 +1 mm) has been manufactured smaller, before installation it is **mandatory** to remove the appropriate adjusting washers and compensating discs (13, 14) from the flanged bearing housing. Only thus can constraining forces on the self-aligning roller bearings be prevented and thus, damage caused by the forces. After assembly, both flanged bearing housings must rest on the steel construction. The wheel set should then have a minimum axial play of 0.1 mm.

4.2 Installation procedure, installation version 2

Installation of corner bearing, delivered complete

Flange centering flame-cutting

1. Manufacture the steel construction in accordance with 1.2 (refer to Page 7).
2. From the inside, install retained nuts M 16 (8) in the prefabricated holes \varnothing 18.5 mm in the steel construction.
3. Insert the complete wheel set into the steel construction
4. Use the locking screws (7) to attach both flanged bearing housing (5) to the steel construction, thereby, only hand tighten the screws.
5. Using suitable measurement tools, accurately align all wheel sets of the system by moving the flanged bearing housing.
6. After aligning, tighten the locking screws (7) to a tightening torque of 300 Nm (in accordance with Table 2 on Page 7).
7. Open up the predrilled holes \varnothing 5 mm in all flanged bearing housings together with the steel construction to \varnothing 21 mm (in accordance with Figure 2 on Page 7).
Subsequently, tap in the locking pins (21). Thereby, the flanged bearing housing can be released at any time and accurately installed again.
8. Relubricate both roller bearings

 If the dimension of the steel construction (L5 +1 mm) has not been manufactured accurately in accordance with Figure 2 on Page 7, the appropriate adjusting washers and compensating discs (13, 14) must be removed from the flanged bearing housing or adjusting washers (23) installed, in accordance with 4.1. To prevent constraining forces acting on the self-aligning roller bearings, make sure that there is small axial play.

5. Installation of the wheel sets RAEK/RNEK 400, 500

Installation version 3 and 4

Installation of box girder, supplied as individual parts

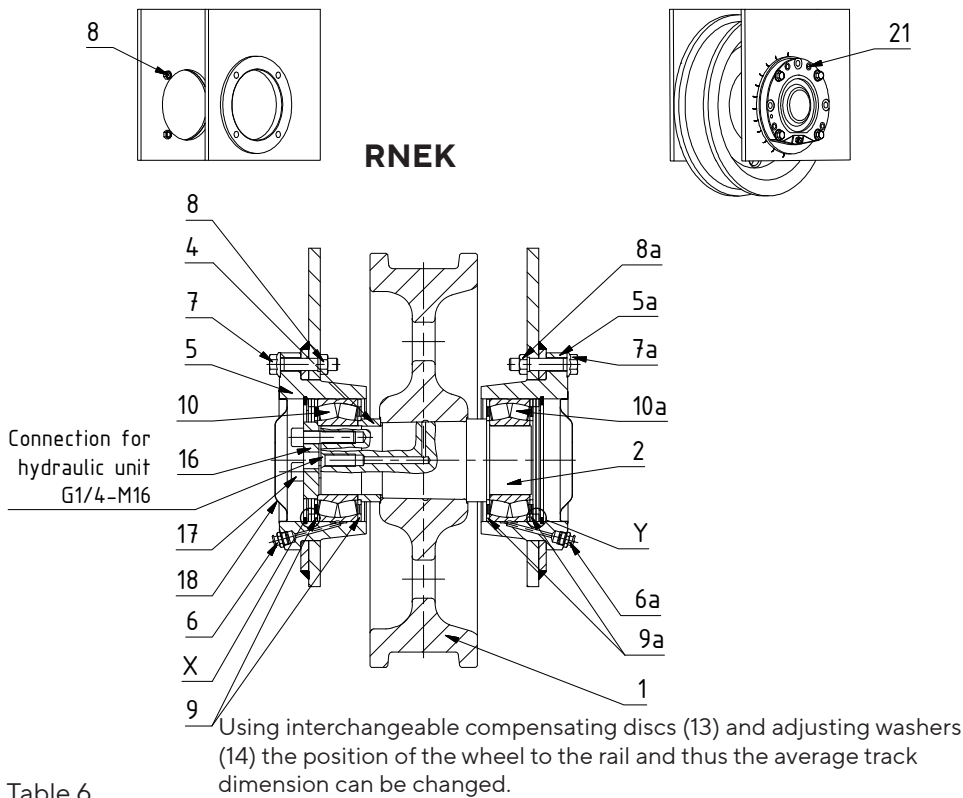
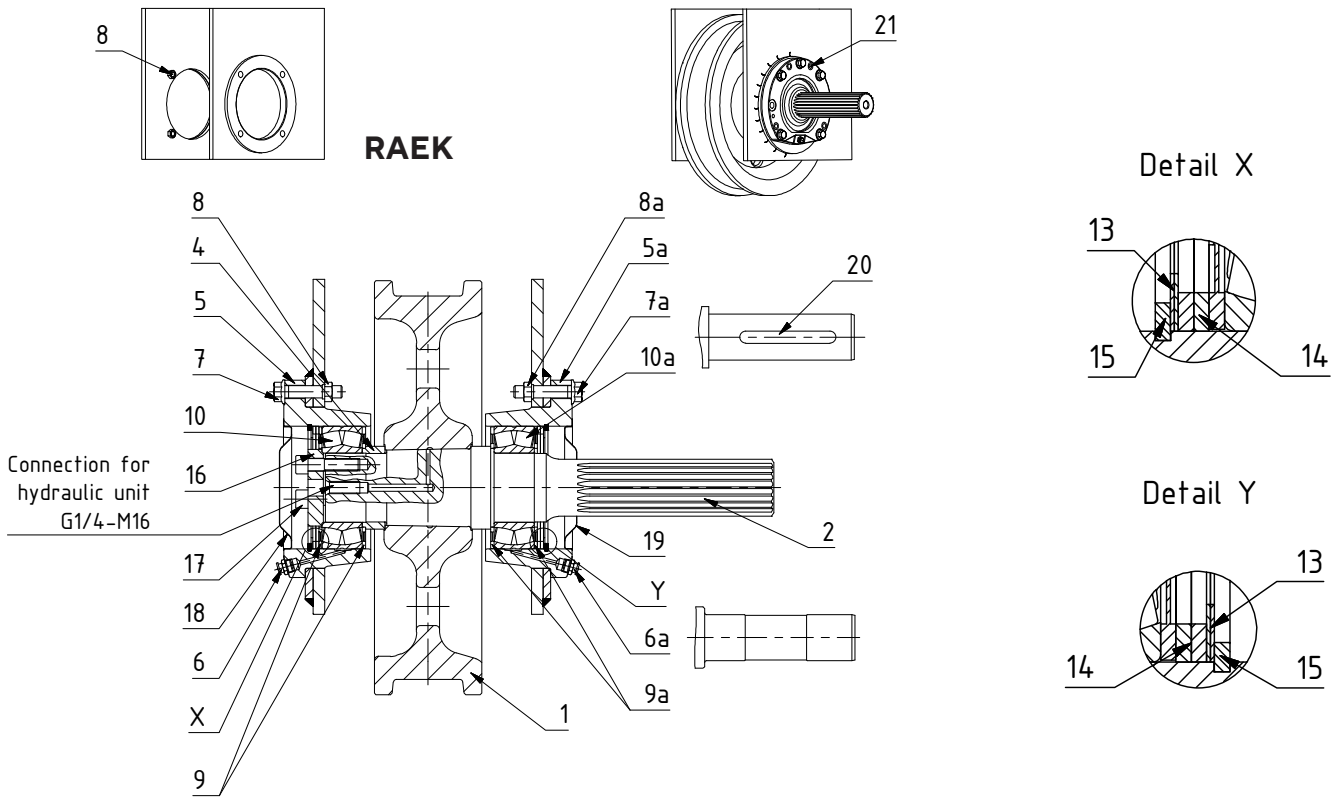


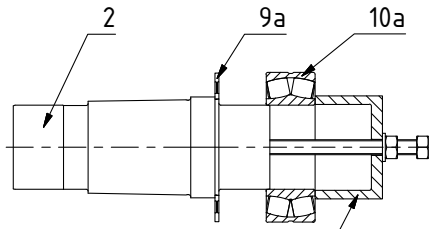
Table 6

Wheel set	Number per flanged bearing housing Thickness of and adjusting washer/compensating disc	max. adjustment option
RAE/RNE 400	2 x 4 mm + 3 x 1 mm	± 10 mm
RAE/RNE 500	2 x 4 mm + 2 x 1 mm	± 10 mm

5.1 Installation procedure, installation version 3

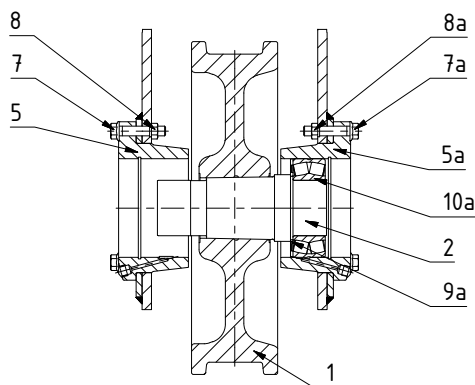
Box girder installation, delivered in individual parts

Flange centering mechanically machined

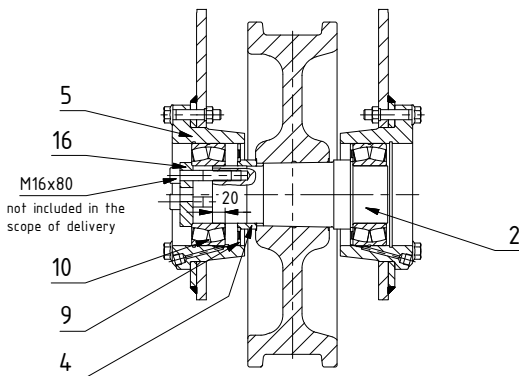


Installation kit
not included in the scope of delivery

1. Manufacture the steel construction in accordance with 2.1 (refer to Page 10).
2. From the inside, install retained nuts (8/8a) in the prefabricated holes $\varnothing 18.5$ mm in the steel construction.
3. Install seal disc (9a) and self-aligning roller bearing (10a) on the collar side of the drive and idler shaft (2), (refer to note for installation kit) - bearing must rest flush with the drive and idler shaft!

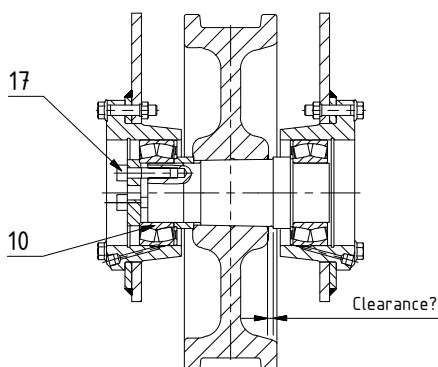


4. Use the locking screws (7a) and retained nuts (8a) and attach the flanged bearing housing (5a) to the box girder.
5. Roll the crane wheel (1) into the box girder
6. Use the locking screws (7) and retained nuts (8) and attach the flanged bearing housing (5) to the box girder.
7. Push in the preassembled drive and idler shaft (2) until it rests against the tapered face in the crane wheel (1).

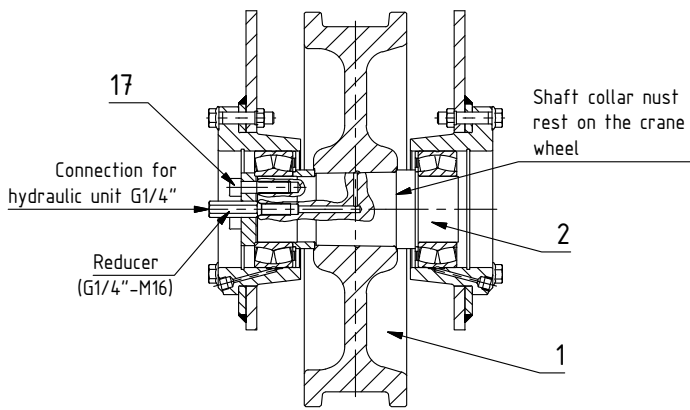


M16x80
not included in the
scope of delivery

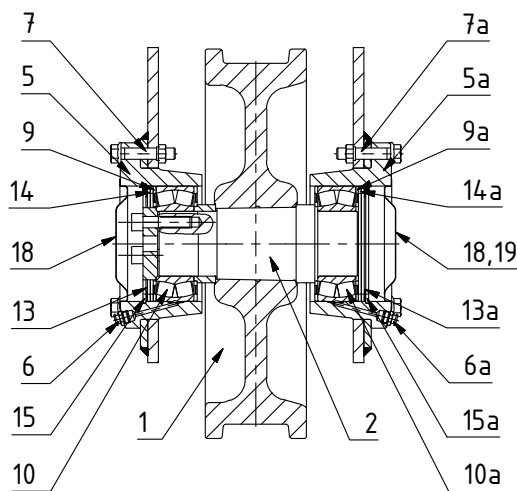
8. Push the spacer ring (4) and seal disc (9) onto the drive and idler shaft (2)
9. Install the self-aligning roller bearing (10) into the flanged bearing housing (5) and use the tension disc (16) and three screws M16x80 (not included in the scope of delivery) onto the shaft by approx. 20 mm.



10. Subsequently, replace the screws M16x80 by the cylinder screws M16 (17) and tighten them alternately until the self-aligning roller bearing (10) is tight and the tightening torque of 300 Nm is attained.
11. Because there is still clearance between the shaft collar and wheel hub and the shaft does is not tight fitting, the shaft must be further pulled in over the pressure oil interference fit.



12. Connect the hydraulic unit, with high-pressure pipe and reducer (G 1/4 - M16) (not included in the scope of delivery) to the central bore of the drive and idler shaft (2) and expand the tapered connection of the crane wheel/shaft. Thereby, alternately tighten the cylinder screws (17) and keep the oil pressure constant by pumping. Pull in the drive and idler shaft (2) up to the stop on the shaft collar.
13. Tighten the cylinder screws (17) to the nominal torque of 300 Nm.
14. Dissipate the oil pressure and remove the hydraulic unit and reducer.
15. Insert the seal discs (9, 9a) into the flanged bearing housing (5, 5a) and install the adjusting washers (14, 14a) as well as the compensating discs (13, 13a) in accordance with Table 6 (Page 18) and the circlips (15, 15a).



The number of discs must be selected so that the wheel set is installed with practically no axial play.

If the play is in excess of 1 mm, install additional compensating discs (23).

16. Torque tighten the locking screws (7, 7a) to 300 Nm (Table 3 on Page 10) and insert the cover plate (18, 19) in both flanged bearing housings (5, 5a).
17. Install the lubrication nipples (6, 6a) into the two flanged bearing housings (5, 5a) and use suitable roller-bearing grease to lubricate the selfaligning roller bearings (10, 10a) until the lubricant escapes from the seals (refer to Chapter 7).



However, this installation procedure is only applicable if the dimension of the steel construction (clearance of the flanged bearing housing) has been manufactured exactly as given in Figure 3 on Page 10 (L5 +1 mm)

If the installation dimension is exceeded by more than 1 mm, the difference must be compensated by installing the corresponding compensating discs (23). Thereby, there is less axial play.



If the installation dimension (L5 +1 mm) has been manufactured smaller, it is **mandatory** to remove the appropriate adjusting washers (14) and compensating discs (13). Only thus can constraining forces on the self-aligning roller bearings be prevented and thus, damage caused by the forces. After assembly, both flanged bearing housings must rest on the steel construction. The wheel set should then have a minimum axial play of 0.1 mm.

Installation kit:

There is a threaded hole on both ends of the shafts to make it easier to pull the drive and idler shaft into the crane wheel and draw the self-aligning roller bearing onto the drive and idler shaft.

An installation kit with spacer tubes, discs, bolts, nuts etc. is not included in the scope of delivery and, depending on the design and length of the drive shafts, must be manufactured by the customer.

Hydraulic unit:

For the installation and removal of the wheel sets delivered in parts (installation versions 3, 4 and 5), an hydraulic unit is required to expand the wheel hub.

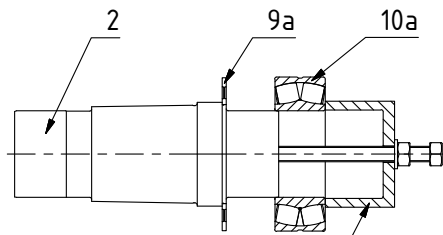
The high-pressure pump presses the oil through the crane wheel shaft into the taper interference fit at a pressure of 300-400 MPa (3000-4000 bar) and, thus, makes it possible to connect or disconnect the crane wheel/shaft. Each crane wheel shaft has an oil duct.

The hydraulic unit, with pump, high-pressure pipe and adapter, are not included in the scope of delivery and can be purchased from specialist retailers (e.g. from SKF).

5.2 Installation procedure, Installation version 4

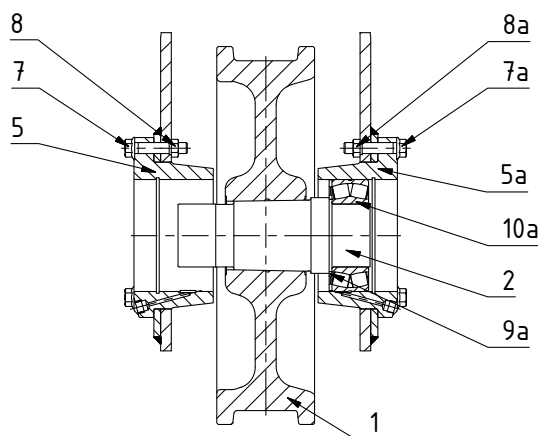
Box girder installation, delivered in individual parts

Flange centering flame-cutting

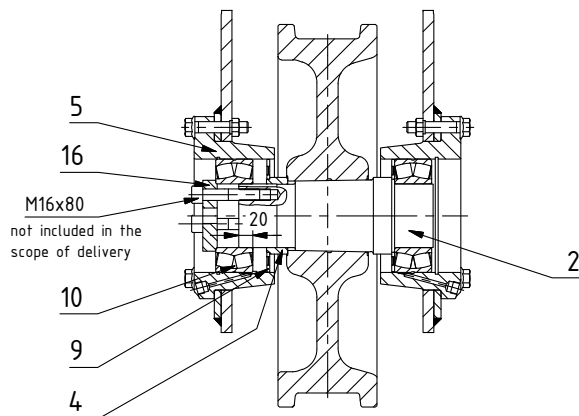


Installation kit
not included in the scope of delivery

1. Manufacture the steel construction in accordance with 2.2 (refer to Page 11).
2. From the inside, install retained nuts (8/8a) in the prefabricated holes $\varnothing 18.5$ mm in the steel construction.
3. Install seal disc (9a) and self-aligning roller bearing (10a) on the drive and idler shaft (2) (refer to note for installation kit) - bearing must rest flush with the drive and idler shaft!

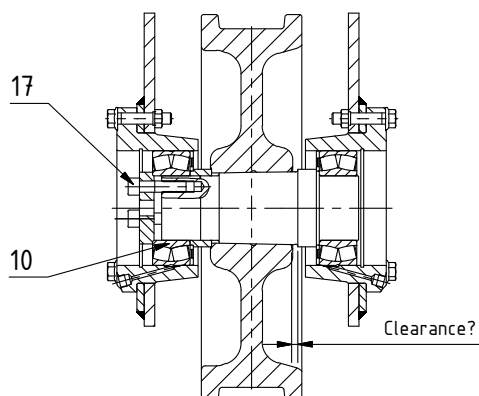


4. Use the locking screws (7a) and retained nuts (8a) and attach the flanged bearing housing (5a) to the box girder, thereby, only hand tighten the screws.
5. Roll the crane wheel (1) into the box girder
6. Use the locking screws (7) and retained nuts (8) and attach the flanged bearing housing (5) to the box girder, thereby, only hand tighten the screws.
7. Push in the preassembled drive and idler shaft (2) until it rests against the tapered face in the crane wheel (1).

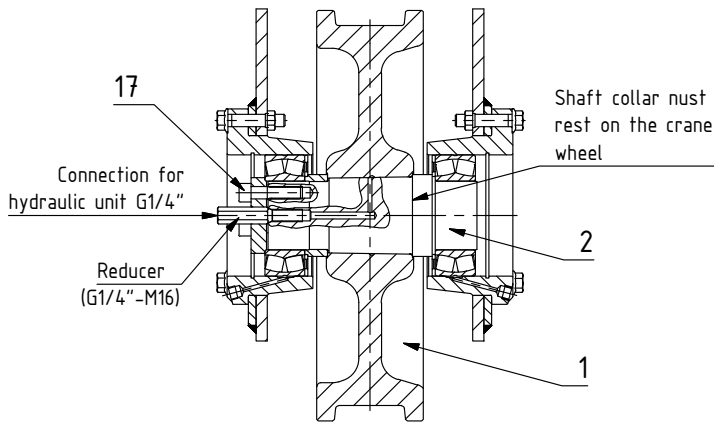


M16x80
not included in the
scope of delivery

8. Push the spacer ring (4) and seal disc (9) onto the drive and idler shaft (2)
9. Install the self-aligning roller bearing (10) into the flanged bearing housing (5) and use the tension disc (16) and three screws M16x80 (not included in the scope of delivery) onto the shaft by approx. 20 mm.



10. Subsequently, replace the screws M16x80 by the cylinder screws M16 (17) and tighten them alternately until the self-aligning roller bearing (10) is tight and the tightening torque of 300 Nm is attained.
11. Because there is still clearance between the shaft collar and wheel hub and the shaft does is not tight fitting, the shaft must be further pulled in over the pressure oil interference fit.




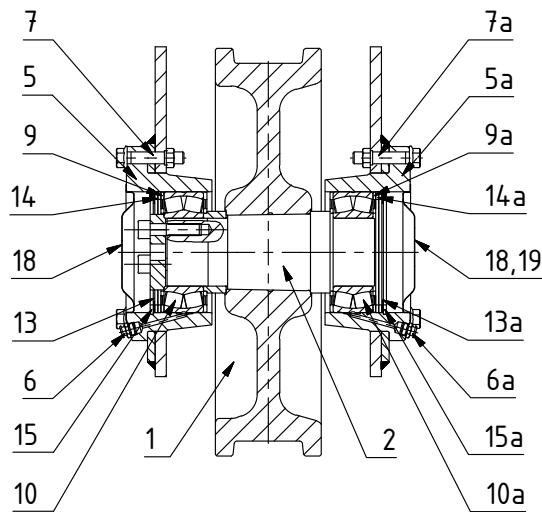
12. Connect the hydraulic unit, with high-pressure pipe and reducer (G 1/4 - M16) (not included in the scope of delivery) to the central bore of the drive and idler shaft (2) and expand the tapered connection of the crane wheel/shaft. Thereby, alternately tighten the cylinder screws (17) and keep the oil pressure constant by pumping. Pull in the drive and idler shaft up to the stop on the shaft collar.

13. Tighten the cylinder screws (17) to the nominal torque of 300 Nm.

14. Dissipate the oil pressure and remove the hydraulic unit and reducer.

15. Insert the seal discs (9, 9a) into the flanged bearing housing (5, 5a) and install the adjusting washers (14, 14a) as well as the compensating discs (13, 13a) in accordance with Table 6 (Page 18) and the circlips (15, 15a).

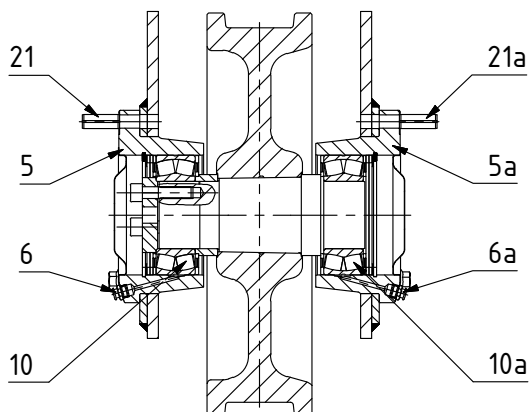
 The number of discs must be selected so that the wheel set is installed with practically no axial play. If the play is in excess of 1 mm, install additional compensating discs (23).



16. Using suitable measurement tools, accurately align all wheel sets of the system by moving the flanged bearing housing.

17. Once alignment is complete, fully tighten all locking screws (7, 7a) on all flange bearing housings to the tightening torque of 300 Nm (in accordance with Table 4 on Page 11).

18. Insert the cover plates (18, 19) in both flanged bearing housings (5, 5a) and install the lubrication nipples (6, 6a) in both flanged bearing housings (5, 5a).



19. Open up the predrilled holes \varnothing 5 mm in all flanged bearing housings (5, 5a) together with the steel construction to \varnothing 21 mm (in accordance with Figure 4 on Page 11). Subsequently, tap in the locking pins (21, 21a). Thereby, the flanged bearing housing can be released at any time and accurately installed again.

20. Using suitable roller-bearing grease, lubricate the self-aligning roller bearings (10, 10a) through the lubrication nipples (6, 6a) until the lubricant escapes from the seals (refer to Chapter 7).



However, this installation procedure is only applicable if the dimension of the steel construction (clearance of the flanged bearing housing) has been manufactured exactly as given in Figure 4 on Page 11 (L5 +1 mm)

If the installation dimension is exceeded by more than 1 mm, the difference must be compensated by installing the corresponding compensating discs (23). Thereby, there is less axial play.



If the installation dimension (L5 +1 mm) has been manufactured smaller, it is **mandatory** to remove the appropriate adjusting washers (14) and compensating discs (13). Only thus can constraining forces on the self-aligning roller bearings be prevented and thus, damage caused by the forces. After assembly, both flanged bearing housings must rest on the steel construction. The wheel set should then have a minimum axial play of 0.1 mm.

Installation kit:

There is a threaded hole on both ends of the shafts to make it easier to pull the drive and idler shaft into the crane wheel and draw the self-aligning roller bearing onto the drive and idler shaft.

An installation kit with spacer tubes, discs, bolts, nuts etc. is not included in the scope of delivery and, depending on the design and length of the drive shafts, must be manufactured by the customer.

Hydraulic unit:

For the installation and removal of the wheel sets delivered in parts (installation versions 3, 4 and 5), an hydraulic unit is required to expand the wheel hub.

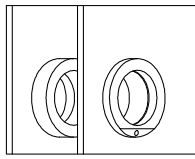
The high-pressure pump presses the oil through the crane wheel shaft into the taper interference fit at a pressure of 300-400 MPa (3000-4000 bar) and, thus, makes it possible to connect or disconnect the crane wheel/shaft. Each crane wheel shaft has an oil duct.

The hydraulic unit, with pump, high-pressure pipe and adapter, are not included in the scope of delivery and can be purchased from specialist retailers (e.g. from SKF).

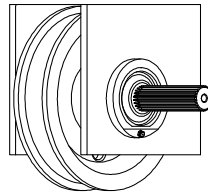
6. Installation of the wheel sets RAEKOF/RNEKOF 500

Installation version 5

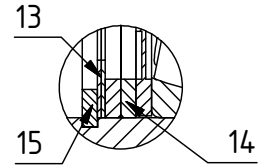
Installation of box girder, without flanged bearing housing, supplied as individual parts



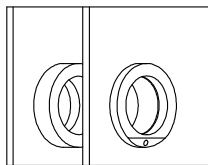
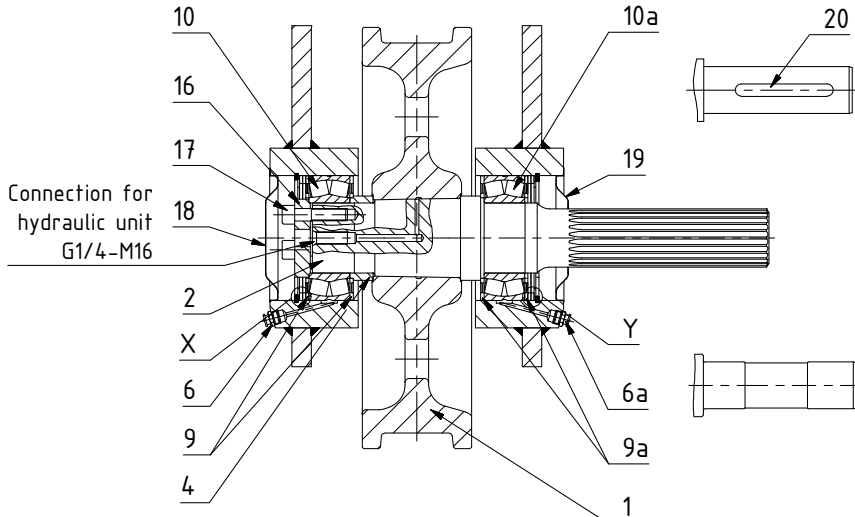
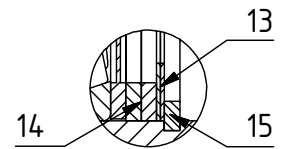
RAEKOF



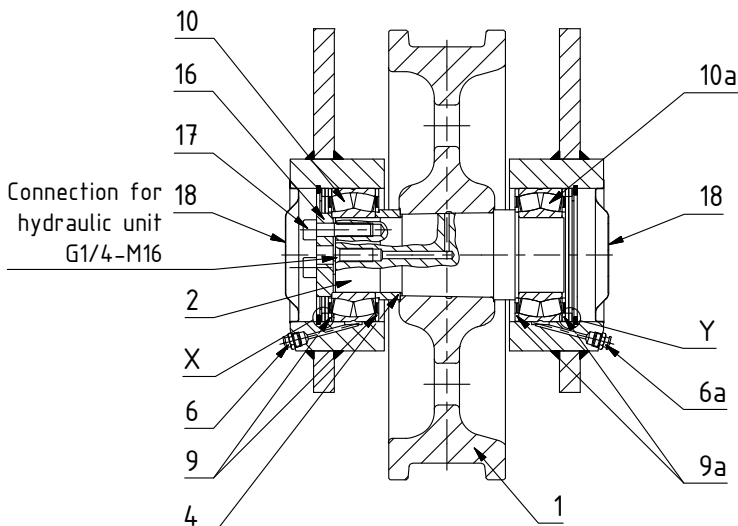
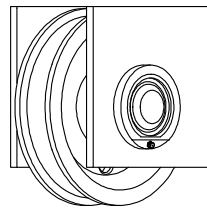
Detail X



Detail Y



RNEKOF



Using interchangeable compensating discs (13) and adjusting washers (14) the position of the wheel to the rail and thus the average track dimension can be changed.

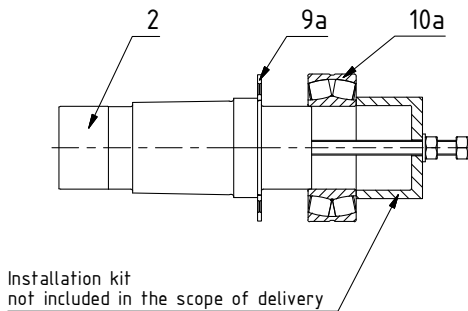
Table 7

Wheel set	Number per flanged bearing housing Thickness of adjusting washer and compensating disc	max. adjustment option
RAE/RNE 400	2 x 4 mm + 3 x 1 mm	± 10 mm
RAE/RNE 500	2 x 4 mm + 2 x 1 mm	± 10 mm

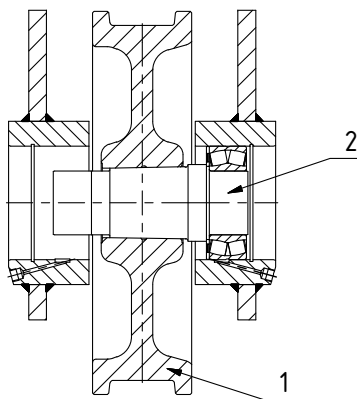
6.1 Installation procedure, installation version 5

Installation of box girder, without flanged bearing housing, supplied as individual parts

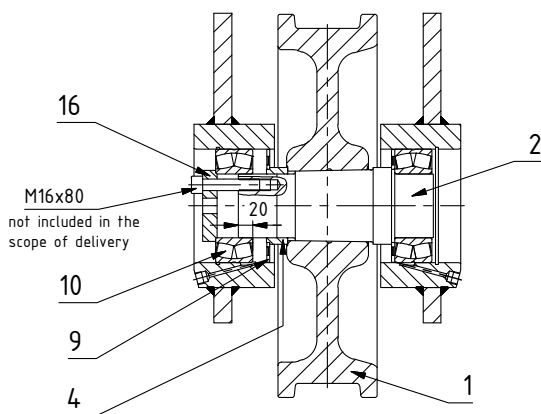
Bearing bushes welded and mechanically machined



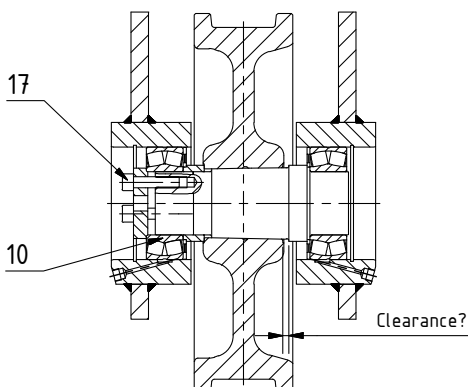
1. Manufacture the steel construction in accordance with 3.1 (refer to Page 14).
2. Install seal disc (9a) and self-aligning roller bearing (10a) on the drive and idler shaft (2) (refer to note for installation kit) - bearing must rest flush with the drive and idler shaft!



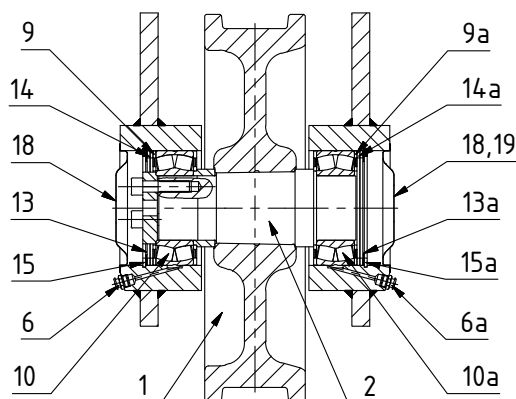
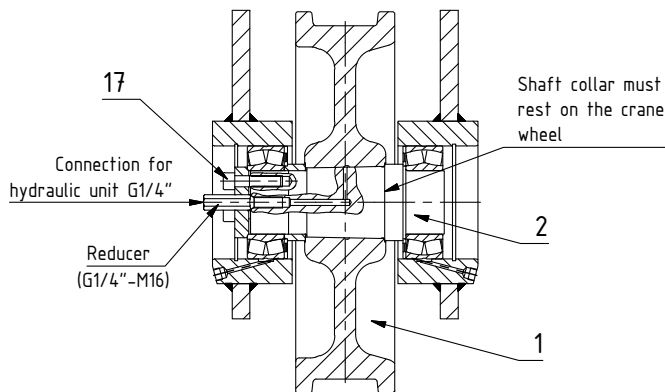
3. Roll the crane wheel (1) into the box girder
4. Push in the preassembled drive and idler shaft (2) until it rests against the tapered face in the crane wheel (1).



5. Push the spacer ring (4) and seal disc (9) onto the drive and idler shaft (2)
6. Install the self-aligning roller bearing (10) into the flanged bearing housing and use the tension disc (16) and three screws M16x80 (not included in the scope of delivery) onto the shaft by approx. 20 mm.



7. Subsequently, replace the screws M16x80 by the cylinder screws M16 (17) and tighten them alternately until the self-aligning roller bearing (10) is tight and the tightening torque of 300 Nm is attained.
8. Because there is still clearance between the shaft collar and wheel hub and the shaft does not fit tightly, the shaft must be further pulled in over the pressure oil interference fit.



9. Connect the hydraulic unit, with high-pressure pipe and reducer (G 1/4 - M16) (not included in the scope of delivery) to the central bore of the drive and idler shaft (2) and expand the tapered connection of the crane wheel/shaft. Thereby, alternately tighten the cylinder screws (17) and keep the oil pressure constant by pumping. Pull in the drive and idler shaft up to the stop on the shaft collar.
10. Tighten the cylinder screws (7) to the nominal torque of 300 Nm.
11. Dissipate the oil pressure and remove the hydraulic unit and reducer.
12. Insert the seal discs (9, 9a) into the bearing bushes and install the adjusting washers (14, 14a) as well as the compensating discs (13, 13a) in accordance with Table 7 (Page 25) and the circlips (15, 15a).

The number of discs must be selected so that the wheel set is installed with practically no axial play. If the play is in excess of 1 mm, install additional compensating discs (23).

13. Insert the cover plates (18, 19) in both bearing bushes.
14. Install the lubrication nipples (6, 6a) into both bearing bushes and use suitable roller-bearing grease to lubricate the self-aligning roller bearings (10, 10a) through the lubrication nipples (6, 6a) until the lubricant escapes from the seals (refer to Chapter 7).



However, this installation procedure is only applicable if the dimension of the circlip grooves has been manufactured exactly as given in Figure 5 on Page 14. If the installation dimension is exceeded by more than 1 mm, the difference must be compensated by installing the corresponding compensating discs (23). Thereby, there is less axial play.



If the installation dimension (313 +0.2 mm) has been manufactured smaller, it is **mandatory** to remove the appropriate adjusting washers (14) and compensating discs (13). Only thus can constraining forces on the self-aligning roller bearings be prevented and thus, damage caused by the forces. The wheel set should then have a minimum axial play of 0.1 mm.

Installation kit:

There is a threaded hole on both ends of the shafts to make it easier to pull the drive and idler shaft into the crane wheel and draw the self-aligning roller bearing onto the drive and idler shaft.

An installation kit with spacer tubes, discs, bolts, nuts etc. is not included in the scope of delivery and, depending on the design and length of the drive shafts, must be manufactured by the customer.

Hydraulic unit:

For the installation and removal of the wheel sets delivered in parts (installation versions 3, 4 and 5), an hydraulic unit is required to expand the wheel hub.

The high-pressure pump presses the oil through the crane wheel shaft into the taper interference fit at a pressure of 300-400 MPa (3000-4000 bar) and, thus, makes it possible to connect or disconnect the crane wheel/shaft. Each crane wheel shaft has an oil duct.

The hydraulic unit, with pump, high-pressure pipe and adapter, are not included in the scope of delivery and can be purchased from specialist retailers (e.g. from SKF).

7. Commissioning, Maintenance and Servicing

Recurring check

in accordance with UVV (Accident Prevention Regulations) cranes BGV D6 § 26 Para. 1 (VGB 9) and the basic principles for specialist examinations (ZH 1/27)

Lubrication and maintenance



The wheel sets RAE/RNE are supplied as complete units. The self-aligning roller bearings are filled with roller-bearing grease Multifak EP 2 (Texaco).

The wheel sets RAEK/RNEK and RAEKOF/RNEKOF are supplied as individual parts.

The self-aligning roller bearings **must** be filled with grease after installation.

Type of lubrication: lubricating using grease

Lubricant: Multifak EP 2 (Texaco) or equivalent roller bearing grease from another manufacturer (suitable for use at temperatures of -30 °C to +90 °C)

For using in temperatures to -50 °C, we recommend the roller-bearing grease Renolit Unitemp 2 (Fuchs) or an equivalent, frost-resistant grease from another manufacturer.

For temperatures of more than 90 °C, use appropriate temperature-resistant seals and suitable high-temperature lubricants.

Re-lubrication: After every 2000 operating hours, through the lubrication nipple through the flanged bearing housing and bearing bushes

Change lubricant: Annually

Before attaching the gear motor, apply a layer of suitable assembly grease to the drive shafts with gearing or feather key.

Servicing

Replace damaged seal discs.

Running surfaces and flange wear of the crane wheel:
Inspection every 3 months.

If there is wear on the running surfaces of more than 8 mm and at a wheel flange width of less than 10 mm, replace the crane wheel.

Use a torque wrench and check the specified tightening torques of all locking screws after 3 months operating time.
Subsequently, annually within the framework of the recurring check.

The maintenance intervals given are reference values that must be adapted in extreme operating conditions.

EG-Einbauerklärung *Declaration of Incorporation*

im Sinne der EG-Richtlinie 2006/42/EG, Anhang II B für unvollständige Maschinen
according to EC directive 2006/42/EC, Annex II B, in respect of incomplete machinery

Name und Anschrift des Herstellers / *Name and address of the manufacturer:*

Karl Georg GmbH
Karl-Georg-Straße 3
D - 57612 Ingelbach-Bahnhof

Hiermit erklären wir, dass die nachstehend beschriebene unvollständige Maschine:
Herewith we declare, that the partly completed machinery described below:

Produktbezeichnung/ product denomination : **Titan Radsatz KG130**
Titan Wheelset KG 130

Serien- / Typenbezeichnung / model / type : **RAEKOF / RNEKOF 500 - 630**

Baujahr/ Year of manufacture : **2024**

alle grundlegenden Anforderungen der Maschinenrichtlinie 2006/42/EG erfüllt, soweit es im Rahmen des Lieferumfangs möglich ist. Ferner erklären wir, dass die speziellen technischen Unterlagen gemäß Anhang VII Teil B dieser Richtlinie erstellt wurden.

is complying with all essential requirements of the Machinery Directive 2006/42/EC, as far as the scope of delivery allows. Additional we declare that the relevant technical documentation is compiled in accordance with part B of Annex VII.

Folgende harmonisierte Normen sind angewandt / the following harmonized standards have been applied:

- DIN EN ISO 12100, Sicherheit von Maschinen/ *Safety of Machinery*
- DIN EN 13001 Teil 1...3-8, Krane - Konstruktion allgemein/ *Cranes - general design*
- DIN EN 13135, Krane - Sicherheit/ *Safety of cranes*

Der Hersteller verpflichtet sich die technische Dokumentation zur unvollständigen Maschine einzelstaatlichen Stellen auf begründetes Verlangen in PDF-Form zu übermitteln.

The manufacturer undertakes to submit the technical documentation relating to the incomplete machine to the relevant national authorities in PDF format on request.

Bevollmächtigter für die Zusammenstellung der relevanten technischen Unterlagen (EU-Adresse):

The person authorised to compile the relevant technical documentation (must be established within EU):

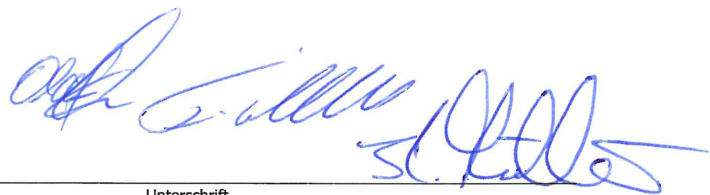
Herr (Mr.) Michael Kubalski, QM (*Quality Department*)

Die unvollständige Maschine darf erst dann in Betrieb genommen werden, wenn festgestellt wurde, dass die Maschine oder Anlage, in welche die unvollständige Maschine eingebaut werden soll, den Bestimmungen der Richtlinie 2006/42/EG über Maschinen entspricht und die EG-Konformitätserklärung gemäß Anhang II A ausgestellt ist.

The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of Directive 2006/42/EC on Machinery, where appropriate, and until the EC Declaration of Conformity according to Annex II A is issued.

D-57612 Ingelbach/Bhf., 04.01.2024

Hees, Olaf, GF
Winkel, Tim, GF
Müller, Kevin, GF



Ort, Datum
Place, Date

Name, Vorname, Funktion
surname, first name, function

Unterschrift
Signature

Notes:



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www.karl-georg.de

Subject to alterations by the manufacturer for the purposes of further technical development!

No claims can be derived from the information, figures and descriptions given in these operating instructions.

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