

Operating Instructions

WHEEL SET KG 125 SERIES

**RA/RN
160/250**



KARL GEORG

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Description

KARL GEORG maintenance-free wheel sets take over rail-born transport tasks in crane building, in conveyor technique and in machine building.

The assembly variant RA / RN is suitable for installation in steel constructions, the holding fixture boreholes in the carriage girder can be flame-cut or spindled out.

The drive shafts are available with tooth profile according to DIN 5480 or with feather keyway according to DIN 6885, suitable for hollow shaft gearboxes of your choice.

The middle track width can be corrected by + 6,5 mm for wheel set RA / RN 160 and by + 10 mm for wheel set RA / RN 250 by replaceable compensating discs between roller bearing and circlip.

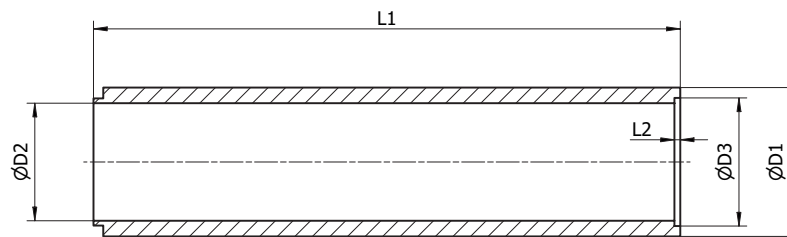
Delivery of the wheel sets RA / RN is effected in component parts.

ATTENTION:

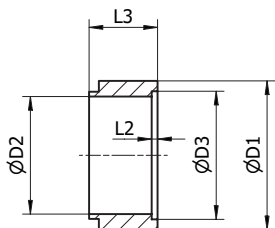
An assembly set is required for assembly and disassembly. Delivery of the wheel set RA / RN 160 / 250 does not include these instruments (see instructions page 6).

The assembly set consists of:

- 1 Assembly tube long for RA (40)
- 1 Assembly tube short for RN (40)
- 1 Hexagon head screw DIN 933 (41)¹⁾
- 1 Hexagon head nut DIN 934 (42)¹⁾



Assembly tube long for RA

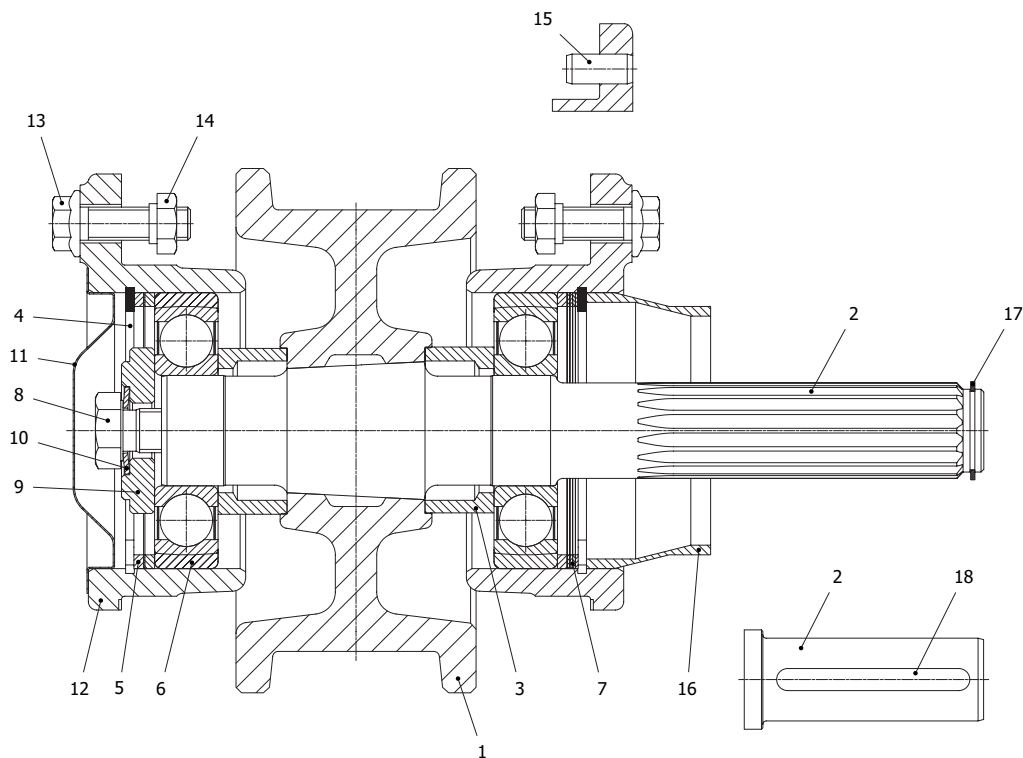


	L1	L2	L3	Ø D1	Ø D2	Ø D3
RA/RN 160	230	3	25	30.3	44.3	50
RA/RN 250	285	3	35	76.1	60.1	65

Assembly tube short for RN

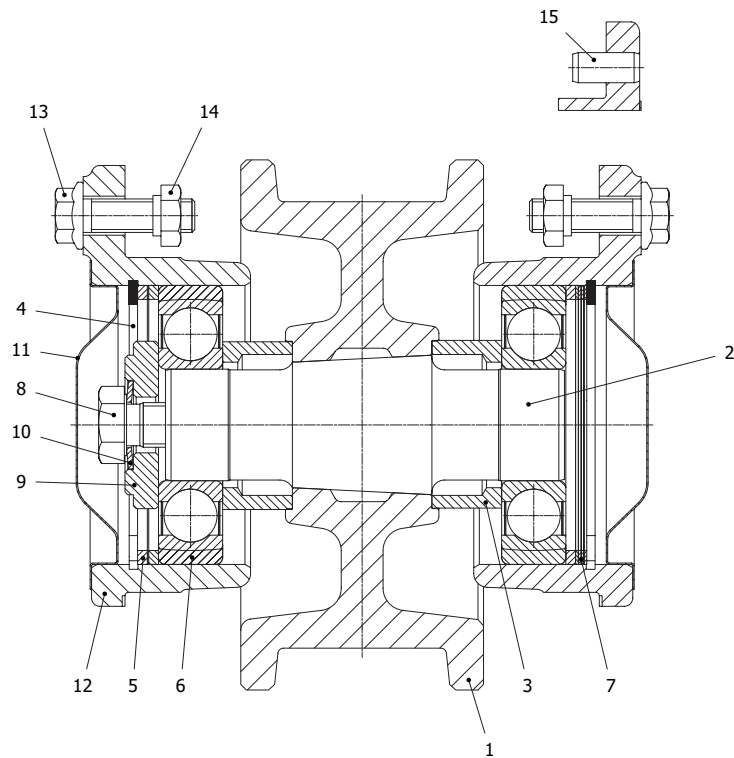
¹⁾ for further information see parts lists

Technical construction RA 160/250



- | | |
|-----------------------------------|----------------------------|
| 1 Crane wheel | 10 Disc spring |
| 2 Drive shaft | 11 Cover without borehole |
| 3 Shaft | 12 Flanged bearing housing |
| 4 Circlip | 13 Locking screw |
| 5 Compensating disc, 3,5 mm thick | 14 Retained nut |
| 6 Pivot grooved ball bearing | 15 Clamping sleeve |
| 7 Compensating disc, 1 mm thick | 16 Protecting bellow |
| 8 Hexagon head screw | 17 Circlip |
| 9 Tightening disc | 18 Feather key |

Technical construction RN 160/250



- | | |
|-----------------------------------|----------------------------|
| 1 Crane wheel | 10 Disc spring |
| 2 Idler shaft | 11 Cover, without borehole |
| 3 Spacer | 12 Flanged bearing housing |
| 4 Circlip | 13 Locking screw |
| 5 Compensating disc, 3,5 mm thick | 14 Retained nut |
| 6 Pivot grooved ball bearing | 15 Clamping sleeve |
| 7 Compensating disc, 1 mm thick | |
| 8 hexagon head screw | |
| 9 Tightening disc | |

Assembly and disassembly

General

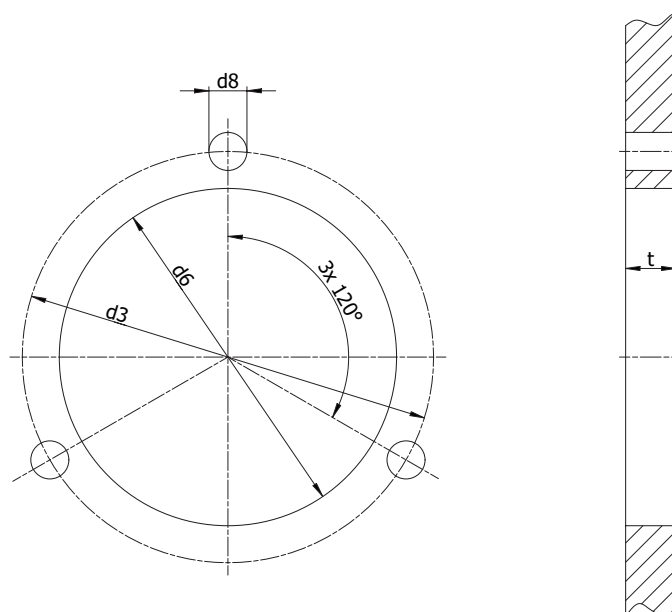
An assembly set (see page 3) is required for assembly respectively disassembly of the wheel sets RA/RN 160/250. Delivery does not include these instruments.

ATTENTION:

Some component parts have a high deadweight!
Hoists are to be used for assembly and the relevant safety regulations (UVV) are to be observed.

Installation and alignment of the wheel sets

Boreholes in the structural steelwork for the flanged bearing housings.



The structural steelwork of the carriage girders is ready. The holding fixture boreholes d6 for the flanged bearing housings (see table 1) are flame-cut respectively spindled out according to the given wheel bases. The fastening holes d8 for the retained nuts (14) are to be scribed and bored in their position to the centre d6.

	d3	d6 ¹ + 1,0	d6 ¹ + 1,0	d8	t
RA/RN 160	150	124	120	14.5	> 8
RA/RN 250	200	164	160	18.5	> 14

Tabelle 1: Ø of the holding fixture boreholes and fastening holes for the flanged bearing housings

Required sheet metal thickness for the flanged bearing housing connection

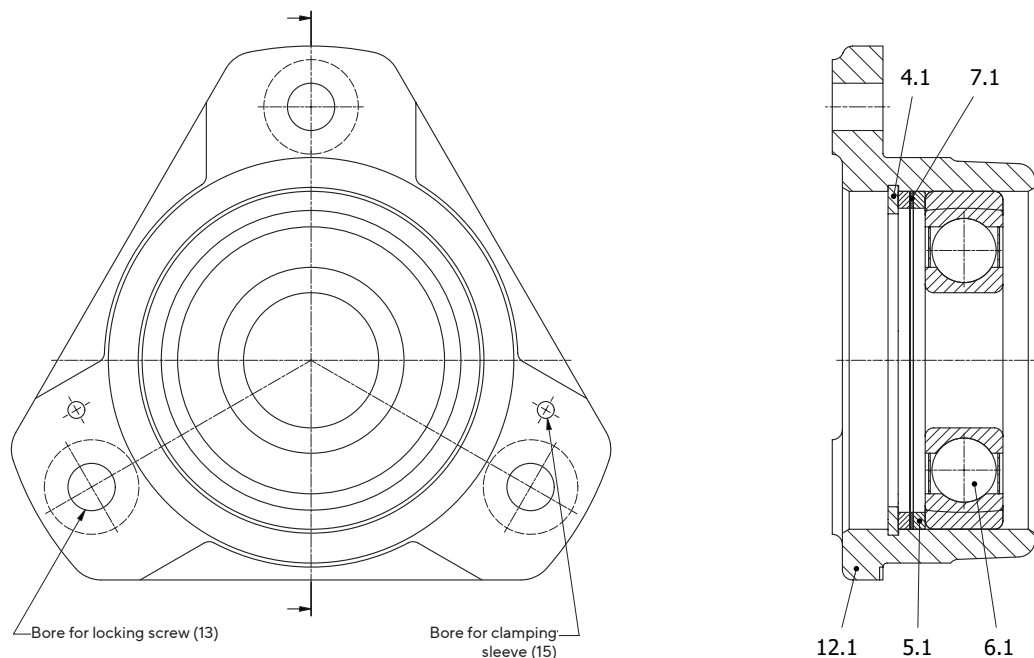
¹ flame cut

² spindled out

If the holding fixture boreholes for the flanged bearing housings are flame-cut, the flanged bearing housings are to be aligned in the carriage girder. The alignment of the flanges is made by levelling and optical-mechanical methods of measurement. The exact position of the flanges is fixed after alignment by clamping sleeves (15).

Assembly instructions

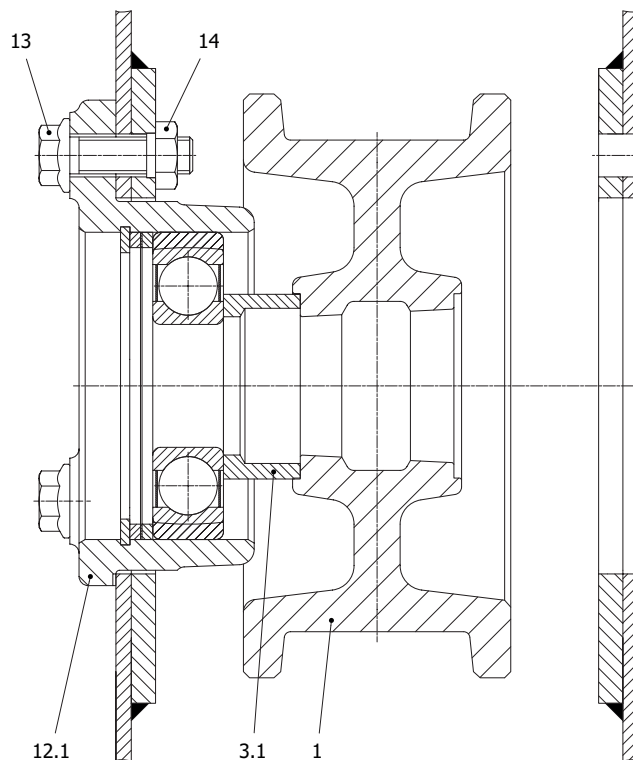
The following steps are to be made for assembly:



1. Insert the pivot grooved ball bearing (6.1) and the compensating discs (5.1, 7.1) (see table 2) into the flanged bearing housing (12.1) and assemble the circlip (4.1).

	5.1	5.2	7.1	7.2
RA/RN 160	2 x 3.5 mm thick	1 x 3.5 mm thick	1 x 1 mm thick	4 x 1 mm thick
RA/RN 250	3 x 3.5 mm thick	2 x 3.5 mm thick	2 x 1 mm thick	5 x 1 mm thick

Table 2: Number and thickness of the compensating discs



2. Screw the outer flanged bearing housing (12.1) in the carriage girder with 3 locking screws (13) and 3 retained nuts (14). Screw the locking screws by a torque wrench to the prescribed torque (see table 3). Repeat this process until the required torque is achieved at all locking screws.

	Locking screw	Torque
RA/RN 160	6xM12x40	115 Nm
RA/RN 250	6xM16x50	300 Nm

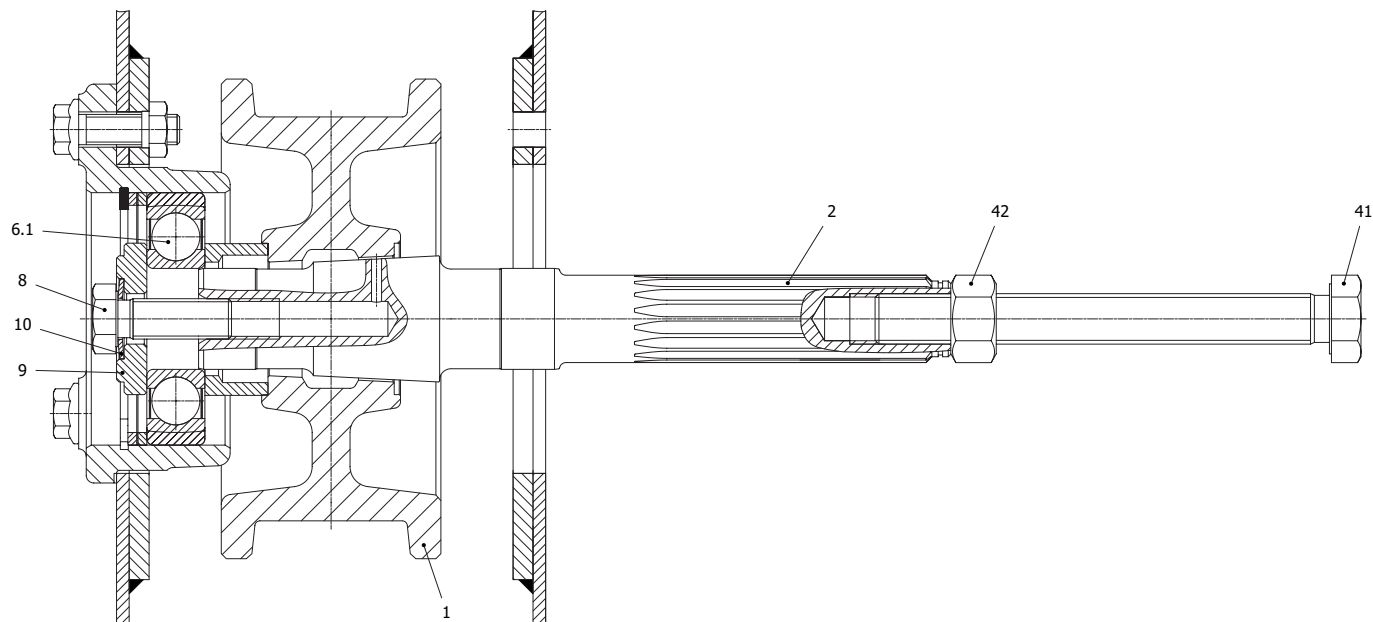
Table 3: Torque of the locking screws

3. Bore the holes for the clamping sleeves to the required diameter d1 (see table 4) and pin the flanged bearing housing (12.1) with 2 clamping sleeves (15).

	Clamping sleeve	d1
RA/RN 160	10x24	10 mm
RA/RN 250	12x30	12 mm

Table 4: Clamping sleeves

4. Roll the crane wheel (1) with the spacer (3.1) into the carriage.



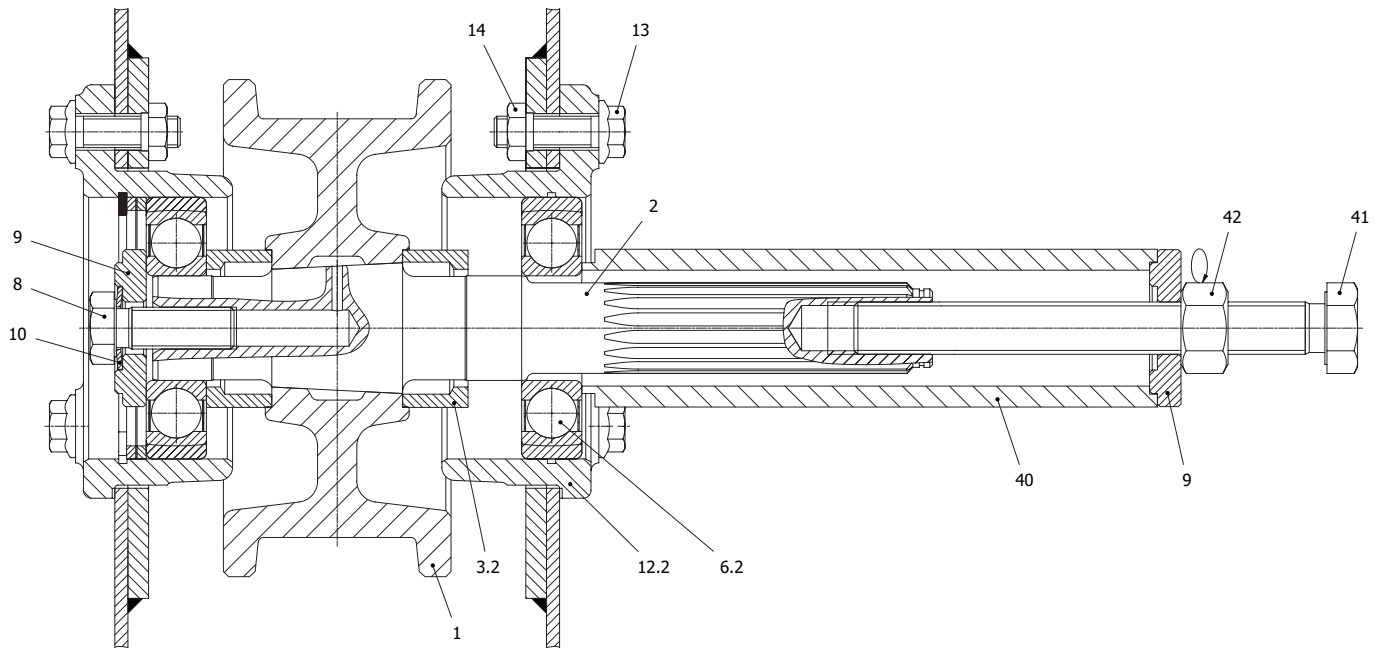
5. Push the crane wheel shaft (2) into the crane wheel (1).

ATTENTION:

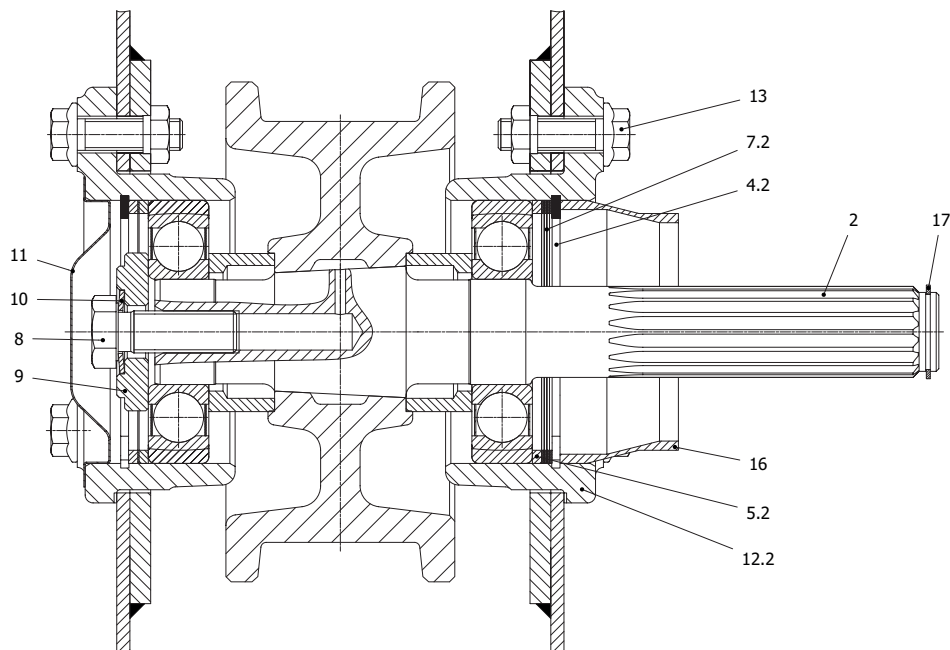
The crane wheel cone and the crane wheel shaft are specially coated. Attention is to be paid that the coating is not damaged when assembling the crane wheel shaft. In case of damage the coating is to be renewed. (Coating with Molykote sliding varnish 321 R. The instructions of the manufacturer are to be observed!).

Crane wheel cone and shaft cone should not get into contact with oil or grease.

6. Insert the tightening disc (9) and the disc spring (10) and tighten the shaft (2) by the hexagon head screw (8) into the bearing (6.1). For counteracting, screw the hexagon head screw (41) on the opposite side into the shaft (2) and lock it with the hexagon head nut (42). Tighten the hexagon head screw (8) by a torque wrench to 290 Nm.



7. If the crane wheel is tightly at the stop of the shaft, the hexagon head screw (8) is to be detached again and is to be removed together with the tightening disc (9) and the disc spring (10).
8. Insert inner flanged bearing housing (12.2) into the carriage girder and screw it solid with 3 locking screws (13) and 3 retained nuts (14).
9. Insert spacer (3.2) as well as the pivot grooved ball bearing (6.2). The pivot grooved ball bearing (6.2) is to be pressed on the crane wheel shaft (2) to the stop at the spacer (3.2) by assembly tube (40), tightening disc (9), hexagon head screw (41) and hexagon head nut (42).
10. Remove the assembly tube (40), tightening disc (9) and hexagon head screw (41) with hexagon head nut (42).
11. Insert the tightening disc (9) and the disc spring (10) and screw the hexagon head screw (8).
12. Tighten the hexagon head screw (8) by a torque wrench to 290 Nm.
13. Install all 4 wheels according to point 1 - 12.
14. Alignment of the wheel sets by optical-mechanical methods of measurement. Examination of the wheel bases and the height dimensions as well as axial parallel in plan view and in elevation.



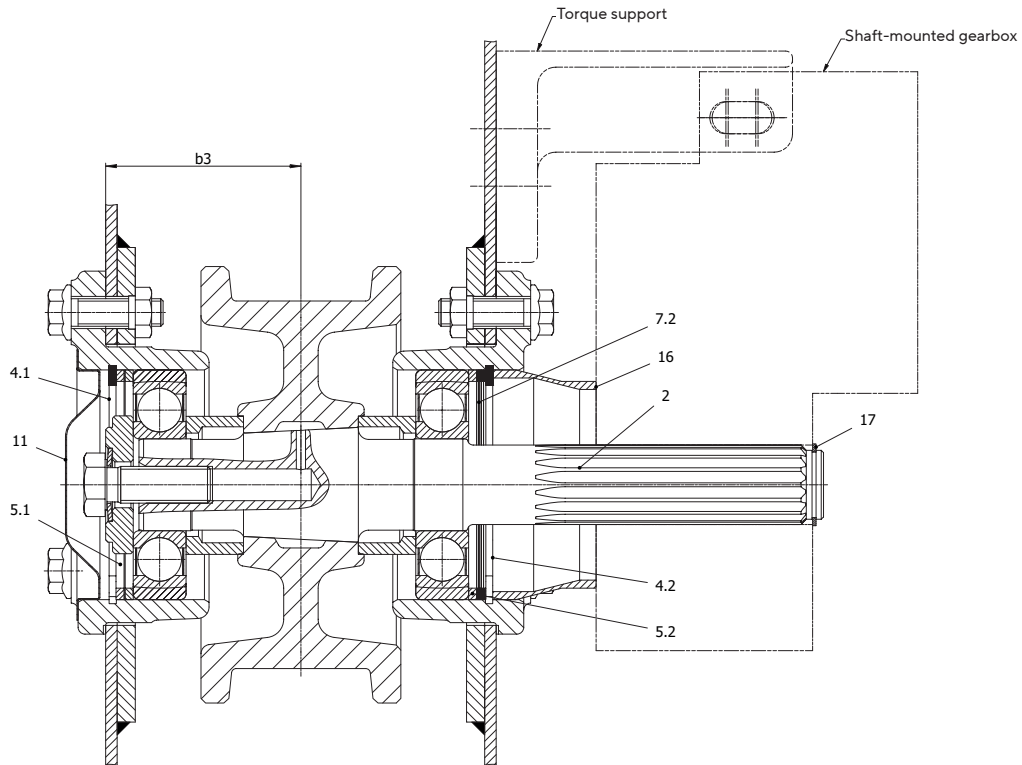
15. Tighten the locking screws of the inner flanged bearing housing (12.2) one after another to the prescribed torque (see table 3). Repeat this procedure until the required torque is achieved at all locking screws (13). Bore the holes for the clamping sleeves (see table 4) and drive the clamping sleeves (15).
16. Insert the remaining compensating discs (5.2, 7.2) (see table 2) until the hollow-space between pivot grooved ball bearing (6.2) and circlip groove is filled up. Assemble the circlip (4.2). Assemble the cover (11) by light hammer blows on the centre edge. Insert the protective bellow (16).
17. Push the drive on the drive shaft (2), assemble the circlip (17) and fasten the drive at the torque support according to manufacturer's instructions.

ATTENTION::

Pay attention to greatest possible cleanliness when assembling. The cone borehole of the crane wheel and the taper of the shaft have to be free from contamination. The roller bearings as well are to be preserved from any dirt and dust.

Proceed analogous for assembly of the wheel set RN, but use a shorter assembly tube.

Correction of the middle track width

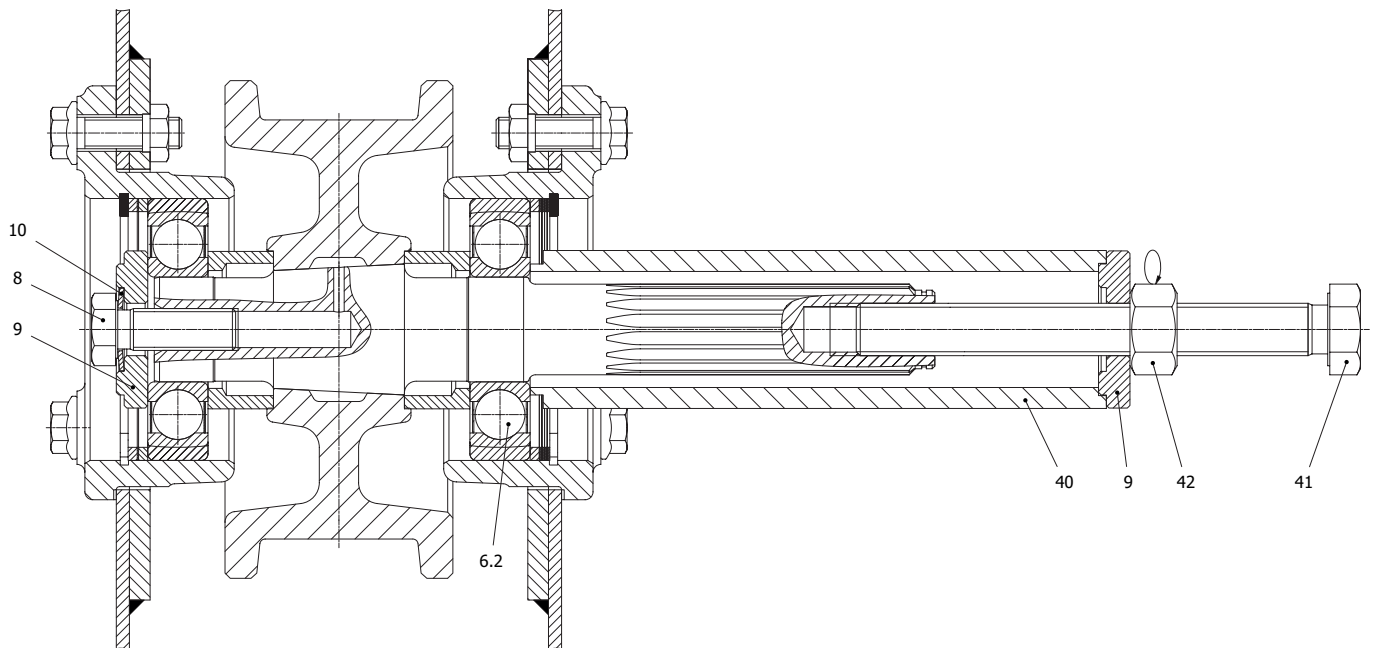


1. Detach the hollow-shaft gearbox at the torque support, remove the circlip (17) and draw the drive off the drive shaft (2).
2. Jack up the crane to relieve the crane wheels.
3. Kran aufbocken, um Laufräder zu entlasten.
4. Remove the circlips (4.1, 4.2) and take out the required number of compensating discs (5.1, 7.1, 5.2, 7.2). Move the entire driving unit by the required dimension to the right (R) or to the left (L). Maximum traversing possibility:

RA/RN 160: $85 \pm 6.5 \text{ mm}$
RA/RN 250: $110 \pm 10 \text{ mm}$
5. Fill up the hollow-space between pivot grooved ball bearing and circlip grooves with compensating discs (5.1, 7.1, 5.2, 7.2) according to the traversing way and assemble the circlips (4.1, 4.2).
6. Insert the cover (11) and the protective bellow (16).
7. Push the drive on the drive shaft (2), assemble the circlip (17) and screw the hollow shaft gearbox at the torque support.

Disassembly instructions

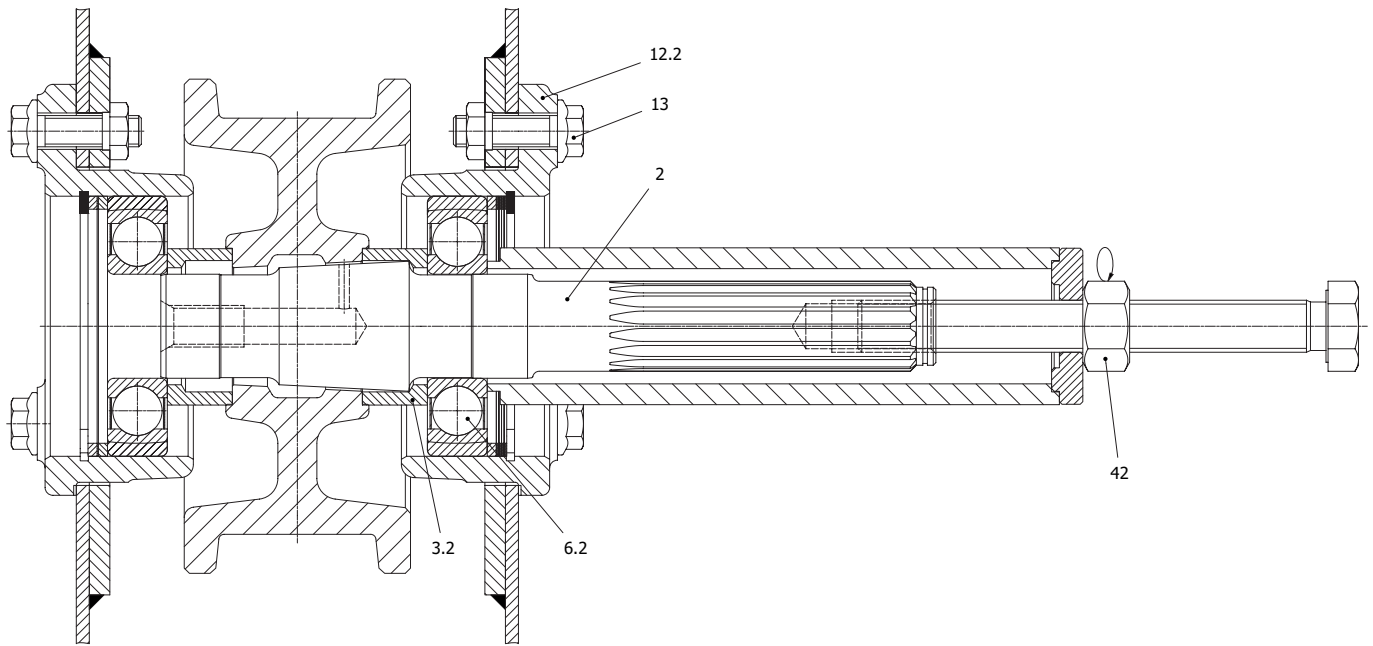
- 1 Detach the hollow-shaft gearbox at the torque support, remove the circlip (17) and draw the drive off the drive shaft (2).
2. Remove the cover (11) and the protective bellow (16).
3. Jack up the crane to relieve the crane wheels.



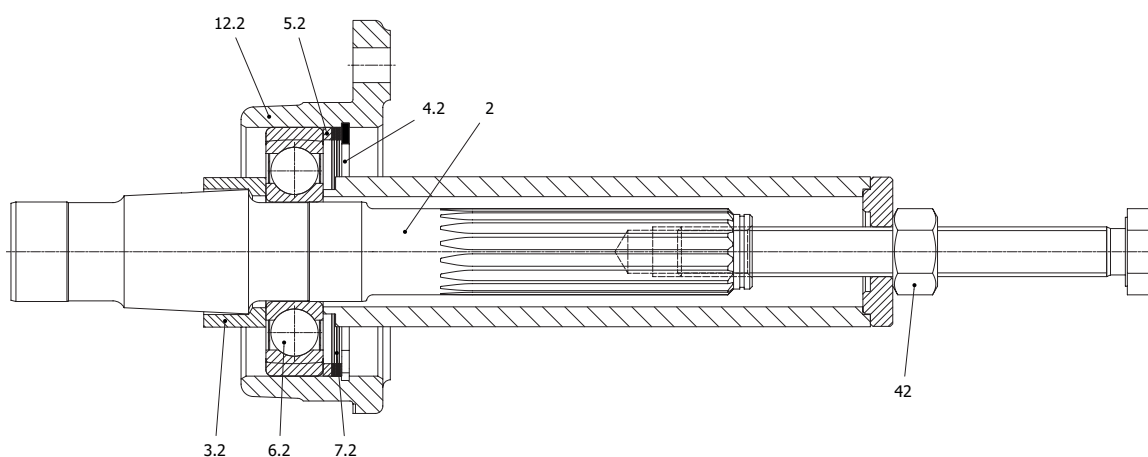
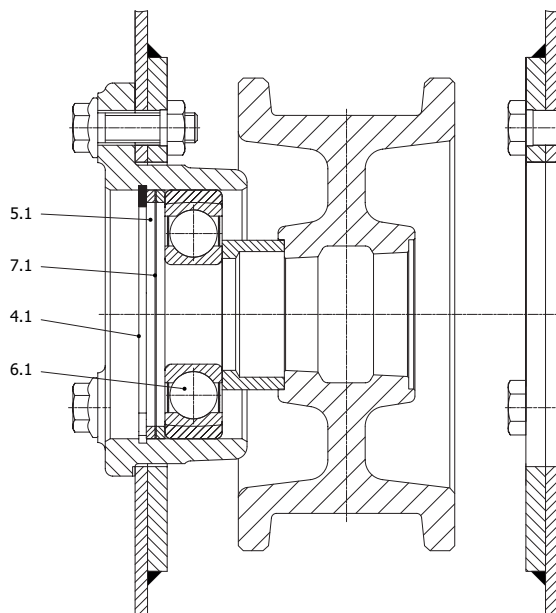
4. Detach the hexagon head screw (8) and remove it with disc spring (10) and tightening disc (9).
5. Fasten the assembly tube (40) and the tightening disc (9) by the hexagon head screw (41) and the hexagon head nut (42) against the pivot grooved ball bearing (6.2).
The stressing in the connection can be detached by hammer blows on the running surface of the crane wheel.
Detaching of the taper pressure connection crane wheel - shaft can also be effected hydraulically by the hydraulic pressure connection of the shaft.

ATTENTION:

For safety reasons the circlips (4.1, 4.2) and the compensating discs (5.1, 7.1, 5.2, 7.2) have to remain installed when detaching the taper pressure connection.



6. Draw the crane wheel shaft (2) by tightening the hexagon head nut (42) until the crane wheel shaft (2) stops at the spacer (3.2).
7. Screw out the hexagon head screws (13).
8. Press the clamping sleeves (15) out of the flanged bearing housing (12.2).



9. Draw the crane wheel shaft (2) with the complete flanged bearing housing (12.2) entirely out of the crane wheel (1).

10. Roll the crane wheel (1) with the spacer (3.1) out of the carriage girder.

If a replacement of the pivot grooved ball bearing (6.1) is necessary, detach circlip (4.1) first and after that remove compensating discs (5.1, 7.1). The pivot grooved ball bearing (6.1) can be pressed out to the inside now.

For replacing the pivot grooved ball bearing (6.2) remove circlip (4.2) and compensating discs (5.2, 7.2). Disassemble the flanged bearing housing (12.2). Draw the pivot grooved ball bearing (6.2) by a withdrawing tool off the crane wheel shaft (2).

Proceed analogous for disassembly of the wheel set RN, but use a shorter assembly tube.

Maintenance

Roller bearings

The pivot grooved ball bearings are greased for service life and therefore they are maintenance-free.

Crane wheel

The running surface and the wheel flanges are to be examined for wear quarterly. If the wear of the wheel flanges and the running surface diameter is more than 10 mm, the corresponding crane wheel is to be replaced.

Screwing

The prescribed torque of the hexagon head screw (8) (290 Nm) and of the 6 locking screws (17) (torque see table 3) is to be examined after 2 - 3 months, after that yearly within the scope of the recurrent inspection according to UVV - cranes § 26 I (VBG 9) and the principles for expert inspections (ZH1/27).

Expert inspections (ZH1/27).

Torsion angle $< 60^\circ \rightarrow$ screw is all right

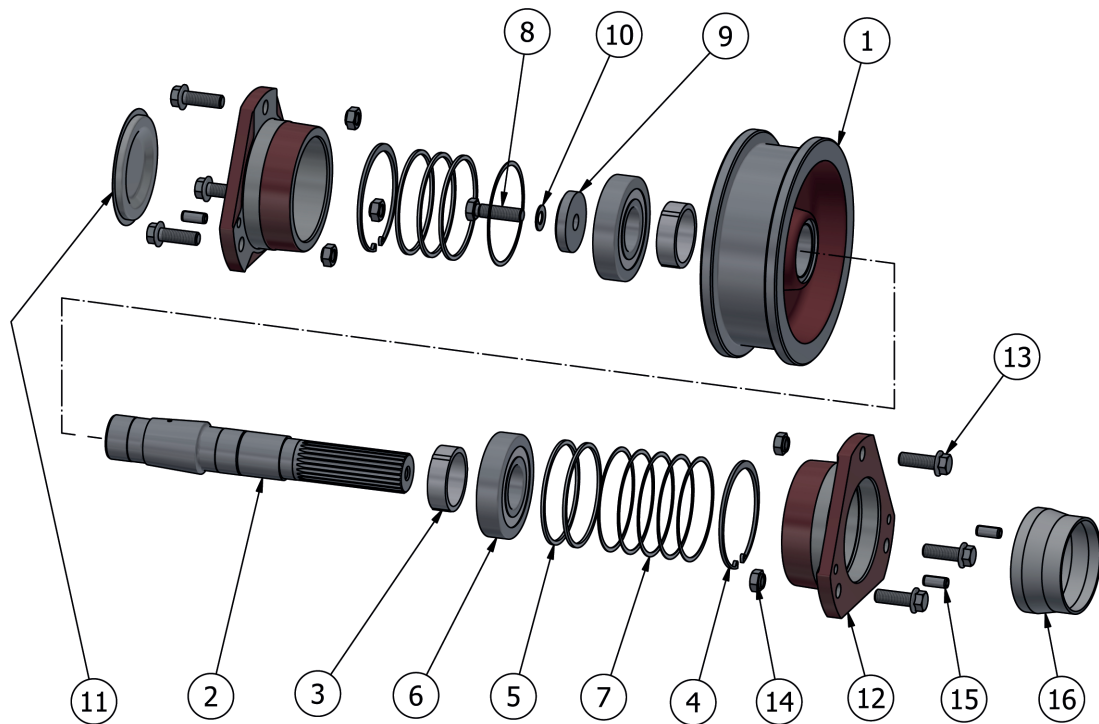
Torsion angle $> 60^\circ \rightarrow$ screw is to be replaced

Reference standards and guidelines

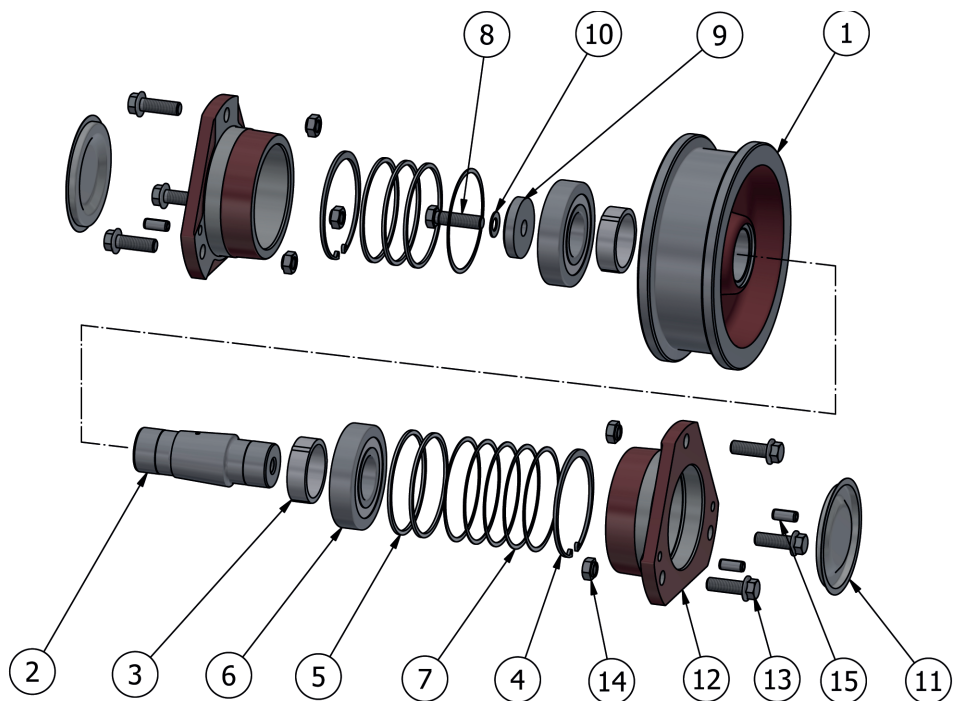
DIN 7168	Generally applicable tolerance limits (free-size tolerances), linear and angular measures
DIN 8570	Free-size tolerances for welded structures
Sheet 1	Linear measures and angles
Sheet 3	Form and position
VDI 3571	Manufacturing tolerances for bridge cranes
VDI 3576	Rails for crane installations, rail connections, rail clamps, tolerance limits

Component parts

RA 160/250



RN 160/250



Parts list RA / RN 160

Part no.	Number of pieces for			
	RA	RN		
1	1	1	Crane wheel Ø 160 x b1	GGG - 70
2	1	-	Drive shaft	C 45
2	-	1	Idler shaft	C 45
3	2	2	Spacer	
4	2	2	Circlip I 100	DIN 472
5	3	3	Compensating disc 100/90 x 3.5	
6	2	2	Pivot grooved ball bearing SX 08 A 24 LLB	
7	5	5	Compensating disc 100/90 x 1	
8	1	1	Hexagon head screw M16 x 45	DIN 933 - 10.9
9	1	1	Tightening disc	
10	1	1	Disc spring A 31.5 x 16.3 x 1.75	DIN 2093
11	1	2	Cover 100, without borehole	
12	2	2	Flanged bearing housing	GGG - 50
13	6	6	Locking screw M12 x 40	Verbus-Ripp 10.9
14	6	6	Retained nut M12	
15	4	4	Clamping sleeve 10 x 24	DIN 1481
16	1	-	Protective bellow	
17	1	-	Circlip	DIN 983
18	1	-	Feather key	DIN 6885
19	1	-	Disc	DIN 125
20	1	-	Inner hexagon head screw	DIN 6912 - 8.8
1)				
41	1	1	Hexagon head screw M16 x 160 (Drive shaft)	DIN 933
			or hexagon head screw M20 x 160 (drive shaft or idler shaft)	DIN 933
42	1	1	Hexagon head nut M16	DIN 934
			or hexagon head nut M20	DIN 934

Part list RA / RN 250

Part no.	Number of pieces for			
	RA	RN		
1	1	1	crane wheel Ø 250 x b1	GGG-70
2	1	-	drive shaft	C 45
2	-	1	Idler shaft	C 45
3	2	2	Spacer	
4	2	2	Circlip 1130	DIN 472
5	5	5	Compensating disc 130/120 x 3.5	
6	2	2	Pivot grooved ball bearing SX 1170 LLB	
7	7	7	Compensating disc 130/120 x 1	
8	1	1	Hexagon head screw M16 x 60	DIN 933 - 10.9
9	1	1	Tightening disc	
10	1	1	Disc spring A 31.5 x 16.3 x 1.75	DIN 2093
11	1	2	Cover 130, without borehole	
12	2	2	Flanged bearing housing	GGG - 50
13	6	6	Locking screw M16 x 50	Verbus-Ripp 10.9
14	6	6	Retained nut M16	
15	4	4	Clamping sleeve 12 x 30	DIN 1481
16	1	-	Protective below	
17	1	-	Circlip	DIN 983
18	1	-	Feather key	
1)				
41	1	1	Hexagon head screw M16 x 200 (Drive shaft)	DIN 933
			or hexagon head screw M20 x 200 (drive shaft or idler shaft)	DIN 933
42	1	1	Hexagon head nut M16	DIN 934
			or hexagon head nut M20	DIN 934



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

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

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