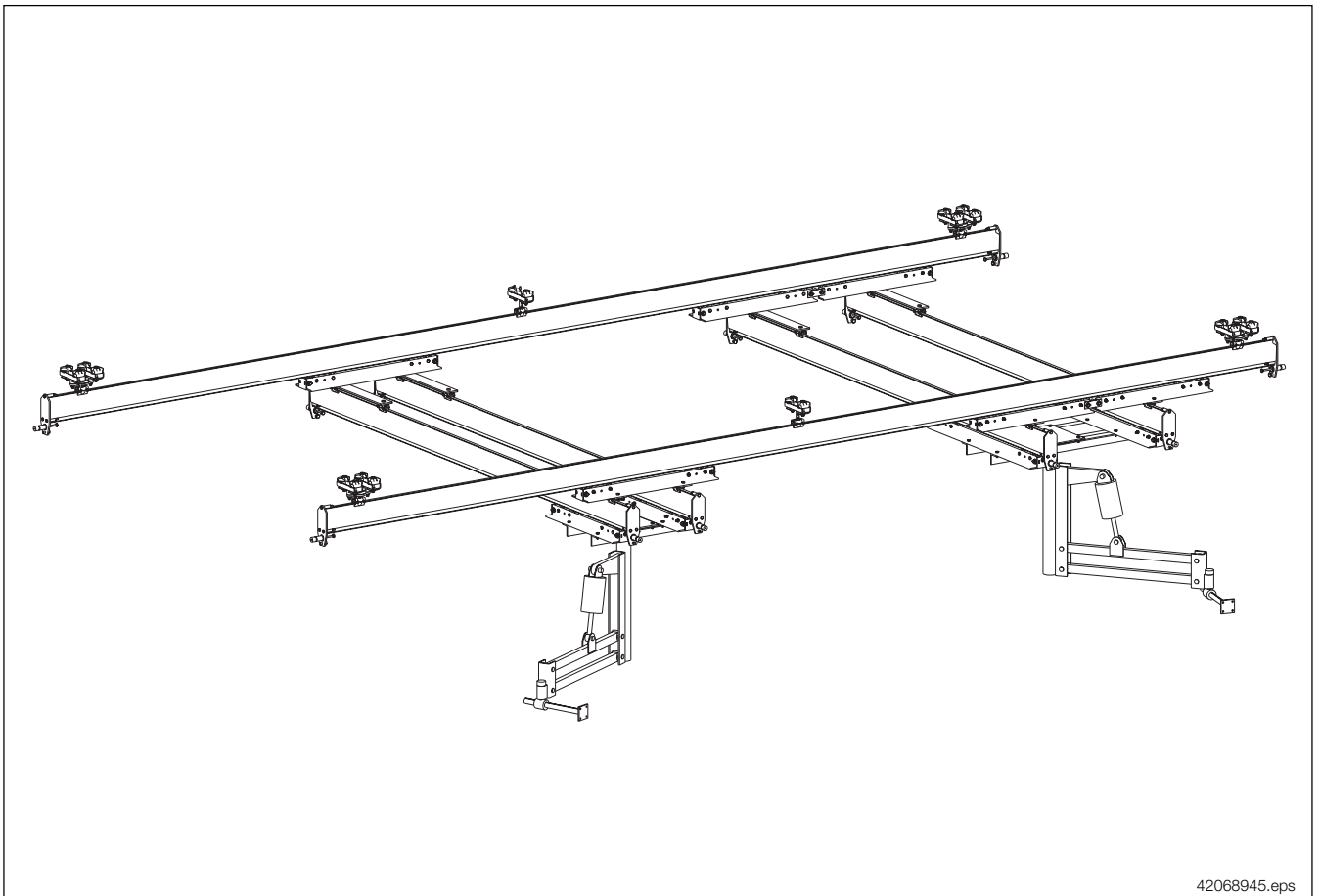




Operating instructions/component parts KBK ergo

KBK installations

Supplement to KBK installation operating instructions ident. no. 206 076 44



KBK ergo operating instructions

Accompanying documents

- Operating instructions for KBK installations 206 076 44
- KBK crane construction kit 202 976 44
- KBK ergo 203 309 44

These operating instructions are a supplement to the “Operating instructions/ component parts suspension cranes and monorails”, **ident. no. 206 076 44**. Any supplementary and non-standard data for the KBK ergo system are described in the corresponding sections.

2 Safety instructions

2.1 Appropriate use See operating instructions 206 076 44

2.2 Prohibited practices See operating instructions 206 076 44

2.3 Explanation of symbols See operating instructions 206 076 44

2.4 General safety information See operating instructions 206 076 44

2.5 Safety instructions for assembly and disassembly

The statement that the load is flexibly connected to the trolley as described in the “Operating instructions/components parts suspension cranes and monorails”, **ident. no. 206 076 44**, only applies to KBK classic trolleys. The load is always rigidly connected to KBK ergo trolleys.

Due to the design specifications of KBK ergo trolleys and KBK ergo suspensions, it is no longer necessary to always prevent the cranes or tracks from tilting.

If forces acting in the opposite direction to gravity are exerted on the trolleys, KBK ergo trolleys must always be used at the corresponding points.

If forces acting in the opposite direction to gravity exerted on the suspensions can be balanced by the deadweight of the rail, KBK classic suspensions might also be used, otherwise KBK ergo suspensions must be selected.

2.6 Safety instructions for putting into service for the first time See operating instructions 206 076 44

2.7 Safety instructions for operation

Further important operating information:

- In KBK ergo installations, the end carriages and crab frames must always be rigidly connected to the trolleys. The connection between load and load handling device may be rigid.

2.8 Safety instructions for maintenance See operating instructions 206 076 44

3 Technical data

Please refer to our KBK ergo publication, **203 309 44**, for all technical data such as dimensions, weights, permitted loads, temperature ranges.

Structural dimensions for cranes, suspension monorails and double-rail tracks as well as load capacities, span dimensions, drive outputs are specified in the approval drawing and in the test and inspection booklet.

4 Technical Description

The publications with a technical description of components and assemblies are listed below.

		Publication
4.1 Crabs		
4.1.1 Load handling devices	See annex as required	
4.1.2 Load lifting devices	See operating instructions of load lifting device	
4.1.3 Trolleys	KBK ergo crab frames	203 309 44
4.2 Crane bridge		
4.2.1 Main girder	See operating instructions	206 076 44
4.2.2 Crane end carriages	Single-girder crane end carriage	203 309 44
	Double-girder crane end carriage	203 309 44
	Tandem crane end carriage	203 309 44
	Buffers and shock absorbers	203 309 44
4.2.3 Extending cranes	KBK ergo A1/1 frame	203 309 44
	KBK ergo B2/1 frame	203 309 44
	KBK ergo B2/2 frame	203 309 44
4.3 Controls	If required, see annex for load lifting module, load orientation module and end effector module	
4.4 Safety devices	Internal buffer stop	202 976 44
	End caps	203 309 44
	Shock absorbing elements	203 309 44
4.5 Power supply	See catalogue	202 976 44
4.6 Crane runway	See operating instructions	206 076 44
4.7 Double-rail track	See operating instructions	206 076 44
4.8 Suspensions	See operating instructions	206 076 44

5 Assembly

5.1 Safety instructions for assembly

See operating instructions

206 076 44

5.2 Tightening torques for KBK installations

See operating instructions

206 076 44

M10: 45 Nm KBK I ergo trolley mounting elements

M12: 130 Nm KBK II ergo trolley mounting elements

M16: 120-150 Nm KBK ergo suspensions

5.3 Assembling a monorail, double-rail track, crane runway

See operating instructions

206 076 44

5.3.1 Track suspension fittings

KBK classic suspensions

See operating instructions 206 076 44

KBK ergo suspensions

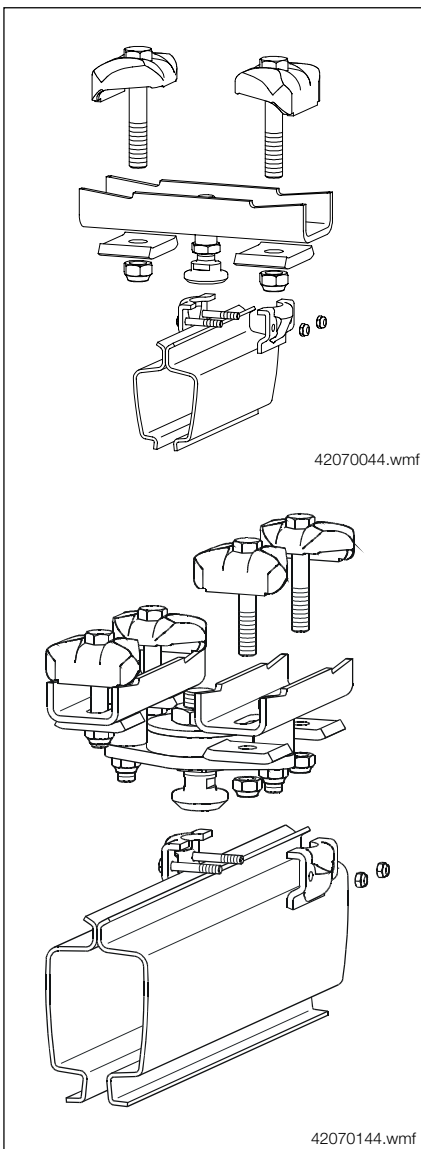
KBK ergo suspensions are pre-assembled. For erection, fit the upper suspension clamps to the superstructure and the rails to the track suspension clamp.

For KBK I, the suspension height is 95 ± 4 mm and for KBK II, 140 ± 7 mm.

For adjusting the height, loosen the counter nut on the threaded pin. Loosen nuts on the suspension clamp so that the pin can be turned in the suspension clamp. The pin can be adjusted in height by means of a wrench, span 22. Height adjustment is limited by a spring ring which must not be removed for safety reasons. After adjusting the height, re-tighten the counter nut and the nuts of the suspension clamp with the required torque. If height adjustment is not necessary, check tight fit of the counter nut.

KBK ergo suspensions can be used in combination with height-adjustable short KBK classic suspensions. The superstructure must be provided in accordance with the suspension height and upper suspension bracket sizes A or B. For KBK I, ensure that the KBK I ergo suspension is fitted with a KBK II upper suspension bracket type A.

It is also possible to fit clamp screws from below.



Permissible load

Type	K_{max} /[kg]	V_{max} /[kg]	H_{max} /[kg]
KBK I ergo	750	100	100
KBK II ergo	1400/1700 1)	200	

1) 1400 for KBK II-L, 1700 for KBK II

5.3.2 KBK II/M10 suspension fitting

Not relevant for KBK ergo

5.3.3 Lateral stiffeners of the track

Additional stiffeners are not required for KBK ergo suspensions since they can take up lateral forces by means of rubber elements.

5.3.4 Connecting the track sections

See operating instructions 206 076 44

5.3.5 End cap with buffer, internal buffer stop, shock absorber

On KBK I profile sections, KBK classic end caps can be used also when KBK ergo trolleys are used.

On KBK II profile sections, depending on the application, KBK ergo end caps with rubber buffers, cellular foam buffers or shock absorbers are fitted when KBK ergo trolleys are used.

Rubber buffer (1) is vulcanised on a threaded rod which is inserted into the relevant bore hole and countered with the hexagon nut (2).

Cellular foam buffer (3) is fitted to the end cap with hexagon screw (4) and hexagon nut (2) included in the supply.

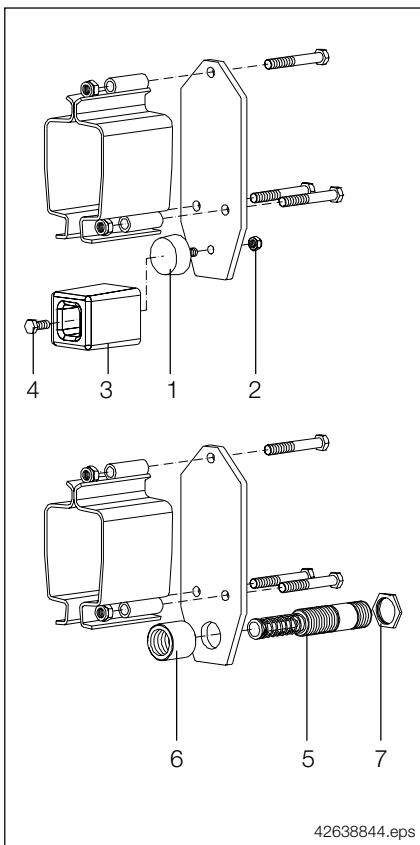
Shock absorber (5) is pushed into the relevant hole from the outside.

Screw on shock absorber protection sleeve (6). Ensure that the shock absorber is not compressed to the end position. Secure the setting with locknut (7).

Assembly of the ergo end caps is identical with the KBK classic end caps with 3 screws and locknuts.

KBK classic internal buffer stops are used as track buffers in the rail section.

Buffering for KBK II ergo is always effected via buffer plates on the end carriages, never directly on the trolley.



5.4 Complex parts for suspension monorails

KBK ergo components are not intended for operation in curve sections, track switches, turntables and drop stations.

KBK ergo trolleys are intended for operation in straight sections and must be rigidly connected to end carriages. KBK ergo trolleys must not be used as single trolleys.

5.5 Assembling KBK II-R

See operating instructions 206 076 44

5.6 DEL single-conductor line on KBK III

At present, not relevant for KBK ergo

5.7 Assembling suspension cranes

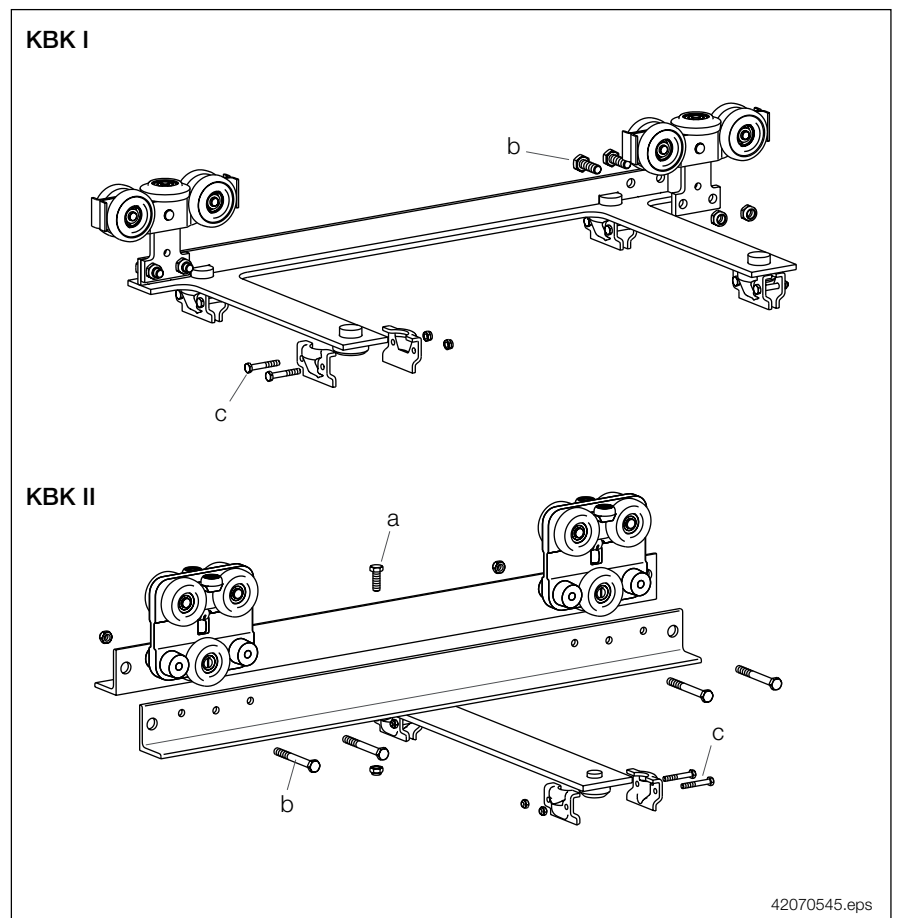
Crane tracks are assembled as described in chapter 5, sections 2 to 5. All crane runways must be at the same height and level. Check the level of the superstructure, since for rigid suspensions of KBK I ergo, the suspension height is 95 ± 4 mm and for KBK II ergo, 140 ± 7 mm.

Pre-assemble the crane on the floor. Pay attention to the specified values for the crane span and overhangs during assembly.

1. Place the crane girder/s in an upright position on the floor.
2. Place the crane end carriages pre-assembled in the factory in position on the crane girders corresponding to the crane span. Tighten the suspension clamp bolts by hand.
3. For cranes with tandem end carriages, both rails are assembled like single-girder cranes and then connected with the spacer bar to form a crane with tandem end carriages.
4. Slide the crane with the end carriages into the crane runways.
5. Tighten the bolts on the suspension clamps with the correct tightening torque.

KBK I suspension clamp bolted connections	10 Nm
KBK II suspension clamp bolted connections	25 Nm

The crane end carriages are pre-assembled. When assembling non-pre-assembled end carriages, proceed as follows:

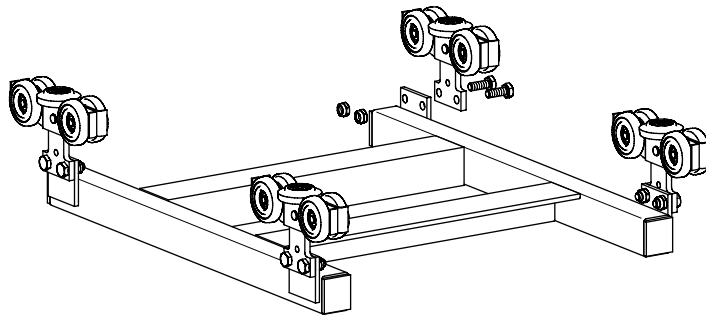


1. Place the crane girder rails in an upright position on the floor.
2. Place the L-shaped steel crossbars of the end carriages onto the stiffener plate and tighten screws (a) by hand (only KBK II).

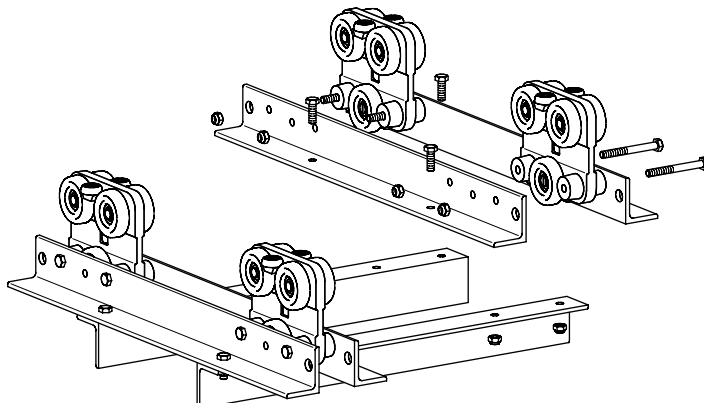
1. Bolt the KBK I ergo trolleys from the inside to the crane end carriages (b) by hand or place the KBK II ergo trolleys between the L-shaped steel crossbars of the end carriages and tighten screws (b) by hand.
2. Place the crane end carriages in position on the crane girders corresponding to the crane span. Tighten the bolts of the suspension clamps (c) by hand.
3. Slide the crane with the end carriages into the crane runways.
4. Tighten all bolted connections **with the correct tightening torque**.
Observe the specified sequence.

1) KBK I (b) trolley – end carriage	45 Nm
KBK II (b) trolley – end carriage	130 Nm
2) KBK I (c) suspension clamps	10 Nm
KBK II (c) suspension clamps	25 Nm
3) KBK II (a) end carriage – stiffener plate	80 Nm
5. For cranes with tandem end carriages, both rails are assembled like single-girder cranes and then connected with the spacer bar to form a crane with tandem end carriages.
6. Set the counter-pressure rollers of KBK II ergo trolleys in the slot of the eccentric shaft by means of a screwdriver. It must be possible to easily move the end carriages and the trolley frames along the entire track. Adjust the counter-pressure rollers as closely as possible to the lower side of the rail, however without contact. Max. distance approx. 0,5 mm.
Secure counter-pressure rollers in the correct position by tightening the grub screw located in the trolley side cheek vertically below the eccentric shaft.

KBK I



KBK II



The crab frame is pre-assembled. When assembling non-pre-assembled crab frames, ensure parallel alignment of the trolleys on both crab frame sides. For assembly of the crab frame proceed as for the end carriages. Instead of the stiffener plate, the L-shaped steel crossbars for fitting the mast are bolted to the end carriages.

5.8 Track and crane alignment

See operating instructions 206 076 44

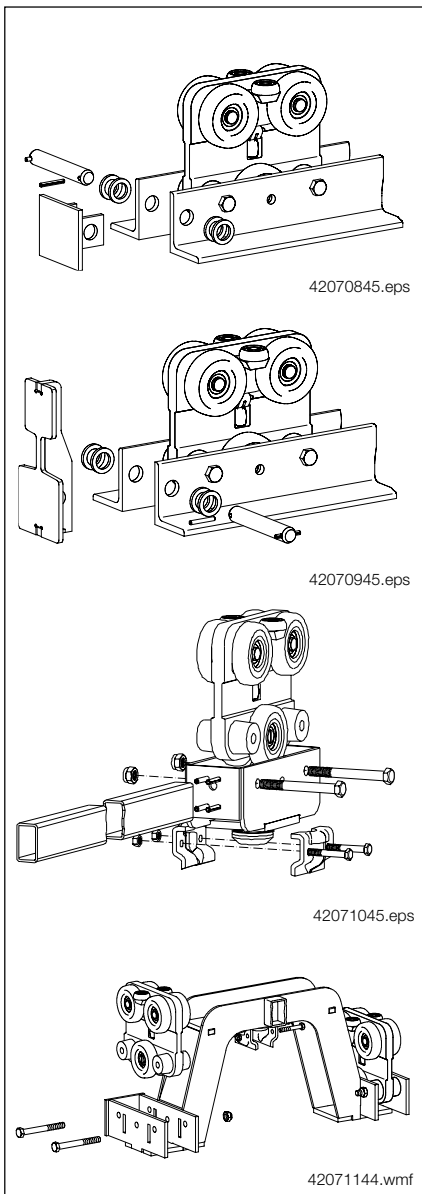
Any deviations from the specified crane span dimension must be smaller for KBK ergo than for KBK classic (perm. ± 6 mm).

For adjusting the height of the rigid suspension, turn the threaded pin. Height differences of ± 4 mm (KBK I) and ± 7 mm (KBK II) can be compensated.

After adjusting the height, secure the threaded pin in position by means of the counter nut.

After alignment, it must be possible to easily move crane and crab by hand.

5.9 Trolley



KBK ergo trolleys are provided with bore holes for connecting the end carriages and the crab frames. They are always tightly bolted together with these sub-assemblies.

For KBK II ergo, the L-shaped steel crossbars of the end carriages and the crab frames are provided with connection bore holes. Buffer plates, spacer bars, drive units etc. can be connected by means of pins to the connection bore holes of the end carriages. The pins are secured in position by means of two washers and a split sleeve per side.

Assemble tandem crane end carriages from two single-girder crane end carriages and one spacer bar.

Permissible load

Trolley type	$K_{m,ax}$ /[kg]	$V_{m,ax}$ /[kg]	$H_{m,ax}$ /[kg]
KBK I ergo	300	100	50
KBK II ergo	600	200	100

KBK I ergo trolleys may run directly against buffers and limit stops.

KBK II ergo trolleys are only buffered indirectly via end carriages and buffer plates.

Travelling against the buffers and end caps in normal operation is not permissible.

Extending cranes

The extending frames are pre-assembled complete with trolleys. Before fitting an extending frame, first adjust the counter-pressure rollers of the trolleys separately to the crane girder rails. Loosen the trolleys from the frame.

Adjust as described on page 8, item 6. For assembly, proceed as specified:

For extending frame A1/1 (fig. 420 710 45):

1. Bolt trolley mounting elements to the single trolleys and tighten by hand (a).
2. Connect trolley mounting elements with spacer tube.
3. Bolt trolley mounting elements with the suspension clamps to the extending rail and tighten by hand (b). Pay attention to the crab frame size l_{R1} and the overhangs of the extending rail during assembly.
4. Slide the extending frame into the crane girder.
5. Tighten all bolted connections with the correct **tightening torque**.
Observe the specified sequence.

1) Trolley – trolley mounting element bolted connections	130 Nm
2) Suspension clamp bolted connections	25 Nm
3) Trolley mounting element – suspension plate bolted connections	80 Nm

For extending frames B2/1 (fig. 420 711 44) and B2/2:

1. Bolt trolleys to the extending frame and tighten by hand.
2. Bolt extending rail with suspension clamps to the extending frame and tighten by hand (observe overhangs of the extending rail).
3. Slide extending frame with trolleys into the crane girder.
4. Tighten all bolted connections with the correct **tightening torque**. Observe the specified sequence.

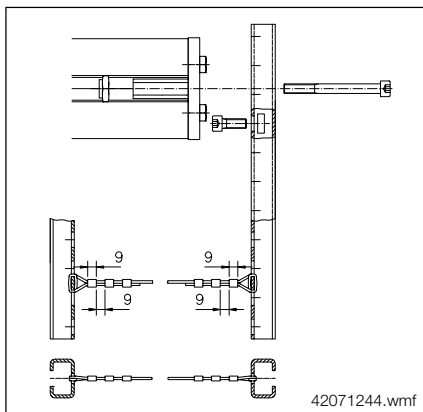
1) Trolley – extending frame bolted connections	130 Nm
2) Suspension clamp bolted connections	25 Nm

5.10 Power supply

Electrical power can be supplied via trailing cables fitted inside the crane and the track section and also to a KBK 25 section arranged on the side. **Cables and compressed air hose** can be fitted inside a protective hose to ensure collision-free power supply. The component parts and arrangement of this power supply system are described in document 202 976 44.

If **only electrical power** is required, the proven KBK classic power supply system is used.

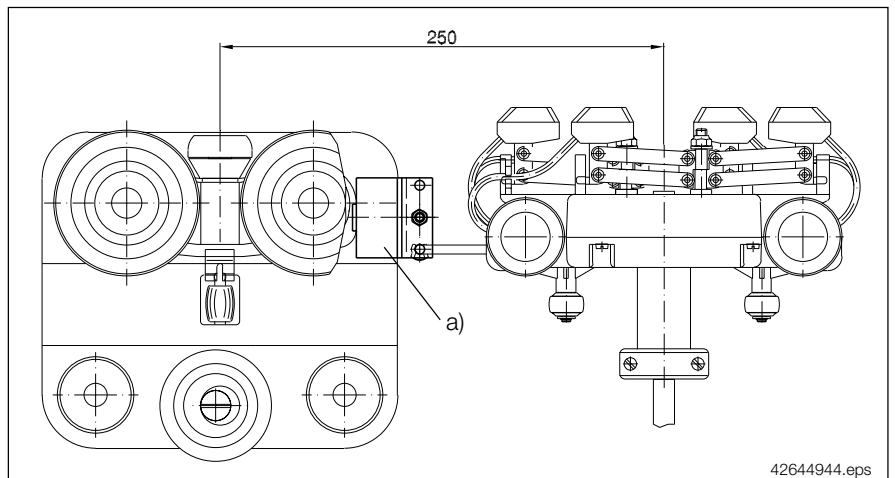
Assembly as described in section 5.10.1 of operating instructions 206 076 44 and technical data 202 617 44.



Compressed air can be supplied via a spiral hose which is supported by a wire cord stretched alongside the rail section. For push travel cranes and trolleys, the travel distance is limited to max. 4 m. The wire cord must be stretched tightly between two C-rails which are fitted to the upper bolt of the end cap. Wind the wire cord around the web of the C-rail once on each side as shown in the diagram.

For fitting the C-rail, remove the upper bolt of the end cap and replace it by a socket head screw. Bolt a second socket head screw with a sliding nut to the C-rail to prevent the C-rail from tilting.

KBK II-R current collectors are attached to towing arm fitting (a). The towing arm fitting must be attached to the KBK II ergo trolley first.



5.11 Suspending the handling equipment

Depending on model and size, the handling equipment is fitted to a mounting plate which is bolted to the crab frame. This work is possible when the crab is mounted and prior to mounting it. For tightening torques, see section 5.2.

5.12 Maker's plate and load capacity plate

See operating instructions 206 076 44

The description for hoist units also applies to manipulators.

The load capacity plate must be fitted clearly visible to the operator.

6 Putting into operation for the first time	See operating instructions 206 076 44
7 Operation	See operating instructions 206 076 44
7.1 Safety instructions for operation	See operating instructions 206 076 44
7.2 Safety measures before commencing work	See operating instructions 206 076 44
7.2.1 Control devices	See operating instructions 206 076 44
7.2.2 Limit switches	See operating instructions 206 076 44
7.2.3 Brakes	See operating instructions 206 076 44
7.2.4 Safety devices	See operating instructions 206 076 44
7.2.5 Control unit (pendant control – wireless control)	See operating instructions 206 076 44
7.2.6 Buffers and shock absorbers	The buffers and shock absorbers must not be approached in normal operation.
7.3 Further important operating information	See operating instructions 206 076 44
7.4 Attaching the load	See operating instructions 206 076 44
7.5 Finishing operation	See operating instructions 206 076 44

8 Taking out of service

- 8.1 For emergency-stop** See operating instructions 206 076 44
- 8.2 At the end of the shift** See operating instructions 206 076 44
- 8.3 For maintenance purposes** See operating instructions 206 076 44

9 Maintenance

- 9.1 Safety instructions** See operating instructions 206 076 44

9.2 Inspection

- Bolted connections between trolley and end carriage

KBK I	Tightening torque	45 Nm
KBK II	Tightening torque	130 Nm
- Bolted connections between end carriage and stiffener plate

Tightening torque	80 Nm
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- Bolted connections between end carriage and L-shaped steel crossbar for fitting the mast

Tightening torque	80 Nm
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- Suspension clamp bolted connections

KBK I	Tightening torque	10 Nm
KBK II	Tightening torque	25 Nm
- Bolted connections on clamps of the suspension

KBK I	Tightening torque	150 Nm
KBK II	Tightening torque	150 Nm

- 9.3 Repairs** See operating instructions 206 076 44

- 9.4 Inspection intervals** For additional instructions regarding inspection intervals, **refer to publication 206 076 44.**

Item no.	Equipment	Checked by (M = maint. eng.)	Details to be checked	Inspection interval
2.1	KBK ergo track suspension	M	Bolted connections on superstructure (e.g. clamps)	12 months
	Crane suspension		Bolted connections between trolley and end carriage Bolted connections between end carriage and stiffener plate	
2.3	Shock absorber		Secure fit, wear, replace when worn	
5.1	Crab		Bolted connections between trolley and end carriage Bolted connections between end carriage and L-shaped steel crossbar for fitting mast	
			Bolted connections on L-shaped steel crossbars	
8	Compressed air hose		Wear of compressed air hose Fastening and tension of guide rope	

10 Spare parts supply and service

10.1 Trolley

Replace the trolley as a complete unit.

Locknut M 10	Ident. no. 334 610 44
Hexagon screw M10 x 30	Ident. no. 150 450 99
KBK I ergo trolley	Ident. no. 980 570 44
Locknut M 12	Ident. no. 334 612 44
Hexagon screw M12 x 110	Ident. no. 150 497 99
KBK II ergo trolley	Ident. no. 984 360 44

10.2 Suspension

For KBK ergo suspensions, the rubber element can be replaced.

Suspension bracket with rubber element for KBK I	Ident. no. 980 089 44
Rubber element for KBK II	Ident. no. 984 393 44

After replacing the rubber element for KBK II, bolt the upper suspension brackets together with the rubber element and tighten with a tightening torque of 150 Nm.

10.3 Buffers

Rubber buffer	Ident. no. 978 206 44
Cellular foam buffer	Ident. no. 939 666 44
Shock absorber	Ident. no. 343 583 44

11 Safety measures necessary for achieving safe working periods

See operating instructions 206 076 44

12 Disassembly, disposal

See operating instructions 206 076 44

Demag Cranes & Components GmbH

P.O. Box 67 · D-58286 Wetter

Telephone (+49/2335) 92-0 · Telefax (+49/2335) 927676

www.demagcranes.com