Technical data
Project engineering
Components

Crane construction kit
Classic/Ergo system

DEMAG

Manufacturer:

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The metric system is used in this document and all figures are shown with a comma as the decimal separator.

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	KBK pillar and wall-mounted slewing jib cranes	208 755 44
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	KBK stacker trolley	206 846 44
	KBK latching device	206 850 44
	KBK disengaging device	206 854 44
	KDC low-headroom travelling hoist	211 017 44
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	E11-E34 DC travel drive (I)	214 810 44
	E11-E34 DC travel drive (II) (circuit diagrams)	211 229 44
	KBK track switch	214 979 44
	KBK turntable	214 983 44
Log book	KBK installations (only in German)	On application

The documents can be ordered from the relevant Demag office.

2 KBK crane construction kit, general

2.1 General

The KBK crane construction kit is the efficient and reliable solution for the construction of suspension monorails and suspension cranes.

The construction kit consists of standardised mechanical and control components. This facilitates planning, erection and maintenance. Installations can be altered and extended at any time. Straight and curved sections and assemblies such as track switches, turntables, latching devices and drop sections can be combined to provide a wide range of materials handling solutions.

Installations can range from a straight connection between two workplaces with only a few metres of track, to complex monorail networks, and from simple manual control to automatic systems with computer-controlled integration of the various system areas. KBK installations can be easily adapted to new material handling requirements.

KBK crane installations utilise the free space above working and production areas. Valuable production floor space is not sacrificed for materials handling tasks.

Regulations

KBK installations are dimensioned on the basis of DIN 15018, H1 B3.

Relevant industrial safety regulations and codes of practice as stipulated in DGUV Regulation 52 crane accident prevention regulations must be observed for planning, project engineering and operating KBK installations.

KBK cranes and suspension monorails designed in accordance with the project planning instructions contained in this document are manufactured in accordance with generally accepted engineering standards and comply with relevant codes of practice concerning the safeguarding of machinery and prevention of accidents, including German technical equipment legislation, accident prevention (UVV) and DIN VDE regulations, and the EC Machinery Directive.

Manufacturer's and conformity declarations and KBK log books for suspension cranes and monorail hoists are supplied.

Instructions in the operating and assembly instructions must be complied with.

Spare parts

We urgently recommend that only spare parts and accessories approved by us be used. Only then can we ensure the safety and normal service life of the equipment.

Spare parts not approved by us can cause damage, malfunctions or complete failure of the installation.

The use of unauthorised spare parts may render null and void any claims for warranty, service, damages or liability against the manufacturer or his appointed personnel, dealers and representatives.

Inspection

KBK suspension monorails and KBK suspension cranes require little maintenance. However, 1-2 months after an installation is put into operation, all bolted connections of suspension fittings, track sections and end caps, the pins/bolts connecting hoists to trolleys, and crane girders to runway and track trolleys should be checked and retightened or secured as necessary. This check should be repeated at least once a year.

For further information, see the "Suspension monorail and suspension crane operating instructions (KBK)" document; refer to the table on page 7.

Information

It is important that all members of staff responsible for erection, safe operation and maintenance of KBK installations receive the KBK operating instructions and all relevant literature.

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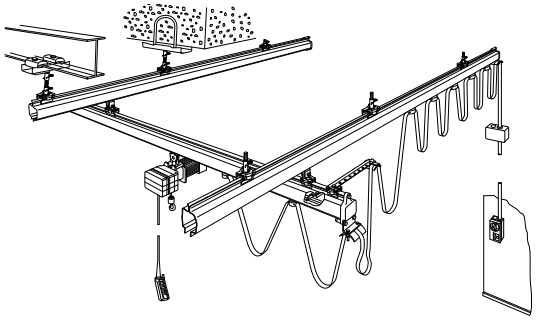
Single-girder suspension crane



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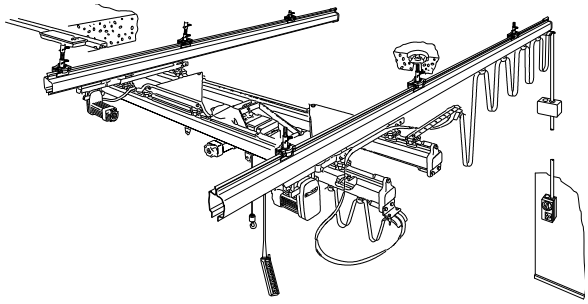
Double-girder suspension crane



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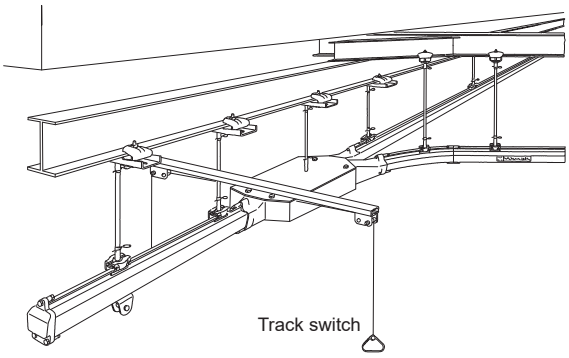
Suspension monorail



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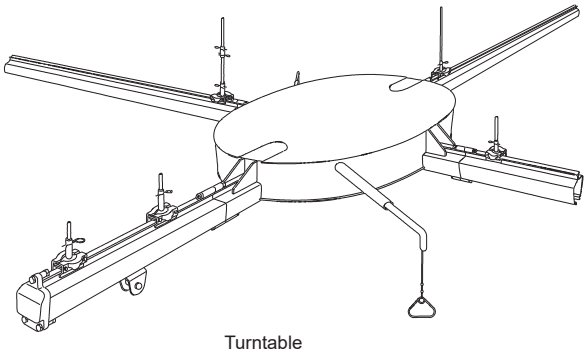

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2.2 Structure of the crane construction kit

General

KBK installations are of modular design. The basic construction kit consists of simple, well engineered components. Standardised connection dimensions ensure rapid erection and allow existing installations to be easily modified or extended.

Order-specific special functions can be accommodated with special components and modules by our experienced team of engineers.

The modular construction kit is designed for normal operating conditions.

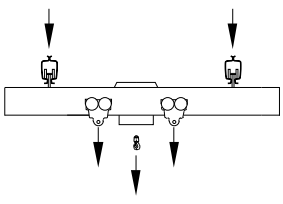
KBK Classic

The modular construction kit is designed for suspended loads with centric load transmission.

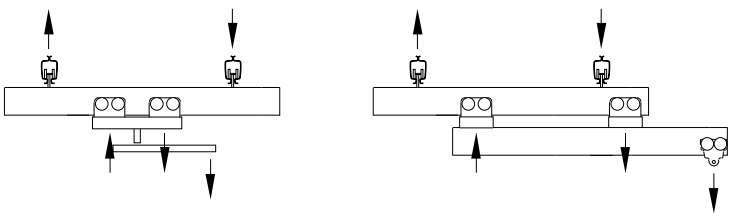
KBK Ergo

Additional KBK Ergo components have been developed to accommodate load moments and forces in the opposite direction to the load (kick-up forces).

KBK Classic



KBK Ergo



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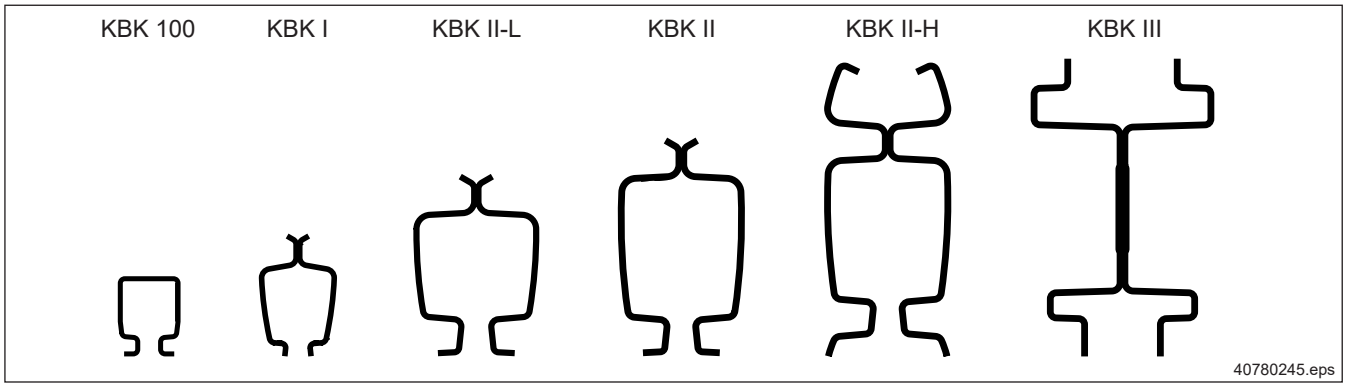
2.3 Design principles

- Project planning/engineering based on reliable static analysis
- Series-produced standard components which have been thoroughly tried and tested
- Tailored installations designed for full compliance with safety regulations and standards
- Low-maintenance systems
- Simple, fast erection
- Detailed technical documentation

Profile sections

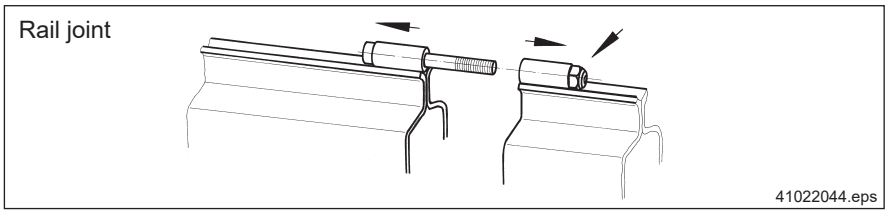
The basic elements of the KBK crane construction kit are cold-rolled special track sections made of steel that have a smooth surface finish, high rigidity and low deadweight. Special guide surfaces and slightly inclined running surfaces guarantee smooth trolley travel. The rails in the lower and medium load capacity range are of inside-running design to protect trolleys and internal (enclosed) busbars. In the upper load capacity range and especially in the case of automatic installations, the outside-running design ensures easy accessibility to trolleys and busbars.



Rail joint

All components of each size (straight and curved sections, track switches, turntables, etc.) have the same connection dimensions and are easily assembled with bolted connections.

- Positive and non-positive connections
- Adjustable (within the coupling tube/screw tolerance range)
- Torque transmission via the rail joint



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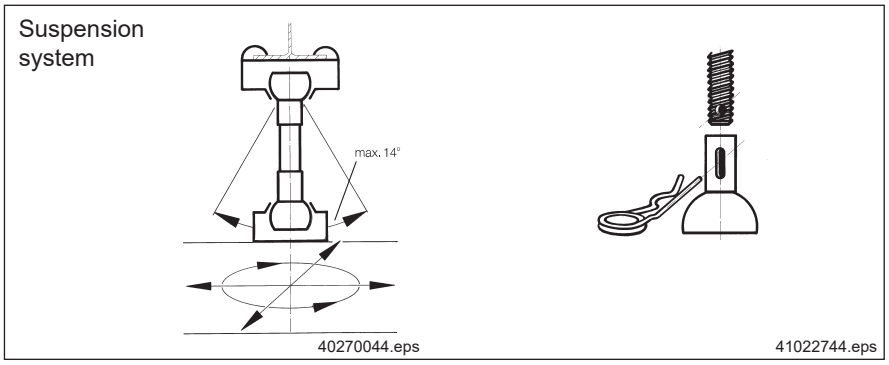
Suspension system KBK Classic

- Flexible track suspension (minimum lateral forces transmitted to the track system)
- Ball-and-socket universal joint suspension (minimum torque transmission to roof and ceiling superstructures)
- Low-maintenance ball-and-socket joints with plastic sockets
- Any angle possible between superstructure and rail
- Threaded connections for height adjustment
- Spring clip through cross hole locks connection
- Slotted holes for height adjustability
- Universal suspension fittings for virtually any superstructure – provided as standard
- High suspension load-bearing capacities adapted to the rail system
- Low headroom dimension possible with short suspension fittings



Horizontal forces

Only minimum horizontal forces are transmitted to the support superstructure thanks to the articulated suspension design.

For cranes, this does not exceed 10% of trolley load K. For single and double-rail tracks, the value amounts to 5% of K.

Suspension system KBK Ergo

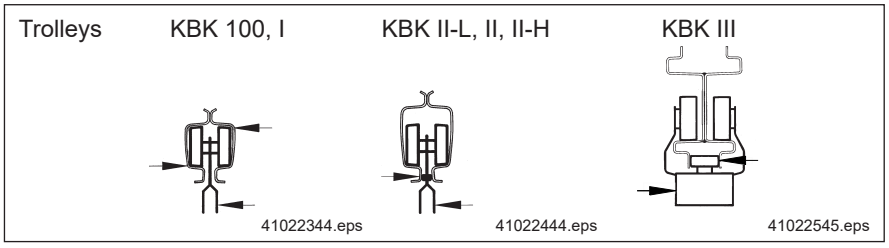
- KBK Ergo suspension to accommodate loads resulting from counter-forces (from handling devices and cranes with large overhang) with rigid suspensions, featuring rubber buffers.
- Threaded connections for height adjustment
- Low headroom dimension

Trolleys General

- Quiet, smooth operation with plastic travel wheels mounted on anti-friction bearings
- High vertical load-bearing capacity
- Long service life
- Horizontally guided in the track profile

Trolleys KBK Classic

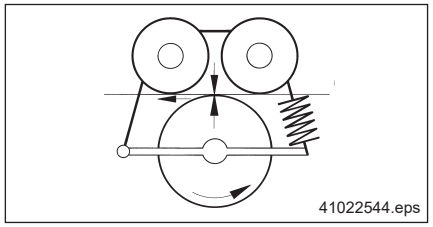
- Flexible and torque-free load connection via pin
- Horizontal load-bearing capacity up to 10% of the suspended vertical load
- KBK III trolleys can be removed from any point along the track



Trolleys KBK Ergo

- Rigid load connection via KBK Ergo load plate
- Suitable for accommodating vertical forces resulting from counter-pressure rollers

Travel drives



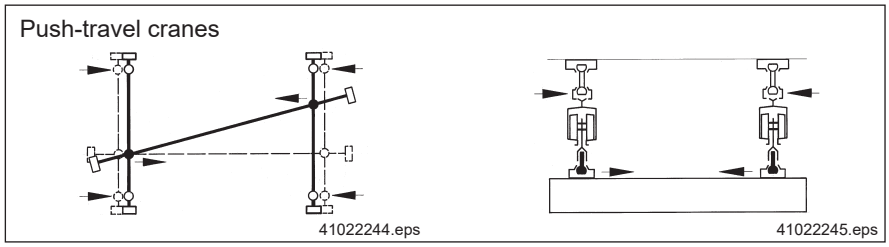
Quiet-running fiction wheels with a high friction coefficient ensure reliable transmission of the drive torque. Used in KBK II-L, II, II-H, III systems with special trolleys. Pressure applied by springs.

Combined crane installations

Cranes and crane runways made of different section types can be combined.

Push-travel cranes

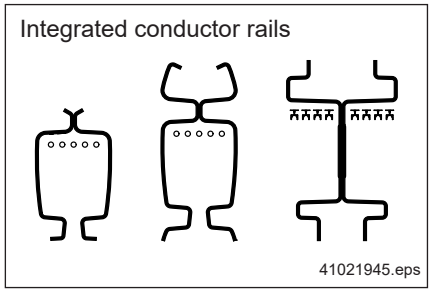
No skewing forces and flexibility of the tracks on ball-and-socket universal joint suspensions.



Electric travel cranes

Single-girder and double-girder designs with rigid crane trolleys or as braced double-girder cranes.

Power supply



Flat cable power lines run on cable sliders or cable trolleys in the same track section in KBK 100, I, II-L, II, and II-H installations; KBK 25 is used with KBK III.

Integrated 5-pole busbar for KBK II and KBK II-H, and up to 10 poles for KBK III. Protected against accidental contact. Current collector trolleys with double pantograph arms.

Electric and control equipment

- Standard controls for push-travel and electric-travel trolleys and cranes with hoists
- Special controls

Complex components

Track switches and turntables for branch sections in monorail tracks. Drop sections and step sections for vertical load movements in the case of trolleys with no hoist unit, gate sections to pass through doors or fire-protection doors Latching devices on cranes for transfer of trolleys from the crane in monorail track systems and double-rail tracks.

Mechanical safety devices and positive interlocks ensure that the load is secure.

Corrosion protection

KBK components are protected against corrosion as standard. Corrosion protection meets at least category C2-M requirements.

Suspension components are galvanized, standard series-produced track sections are powder-coated, other components are provided with a painted finish; special coating is possible.

Ambient conditions

KBK installations are designed for operation indoors and for temperatures ranging from -20 °C to +70 °C. Special measures must be implemented in the case of extreme temperatures, outdoor applications and exposure to aggressive atmospheres.

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3 KBK Classic – planning and project drafting

The following sections provide an overview of the applications for which KBK profile sections can be used:

- Suspension monorail
- Suspension crane of single and double-girder design.

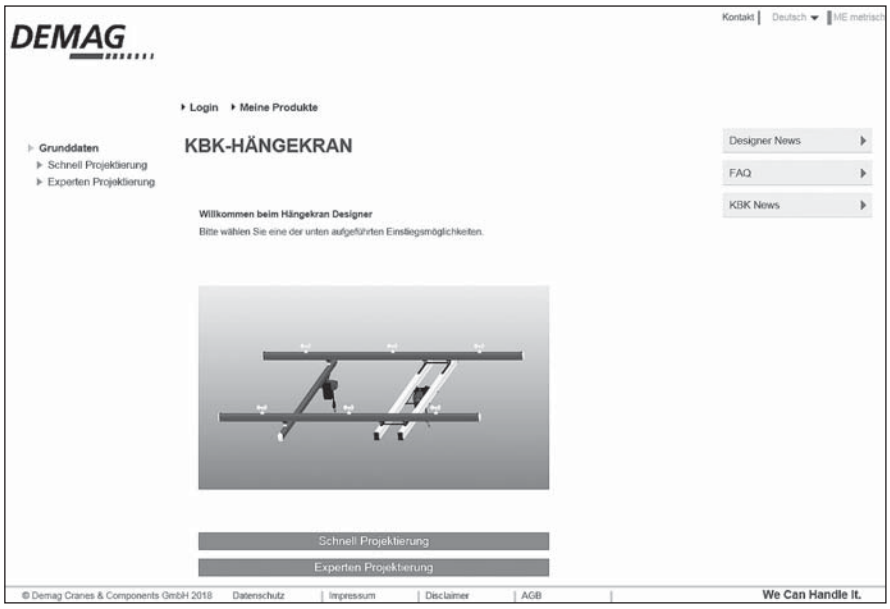
3.1 Project engineering suspension crane and suspension monorail installations

All information and data necessary for project engineering must be collected for planning KBK installation projects. The project drafting sheet in section 3.4 should be used for this purpose.

As a basis for planning, a sketch or drawing should be provided showing a scale representation of the track layout, position of the suspensions and joints and the number of carriers or cranes, branch sections, etc.; see the example in section 3.3.

All installations must be dimensioned in such a way that the end caps and internal buffer stops are not approached during normal operation.

3.2 KBK Designer



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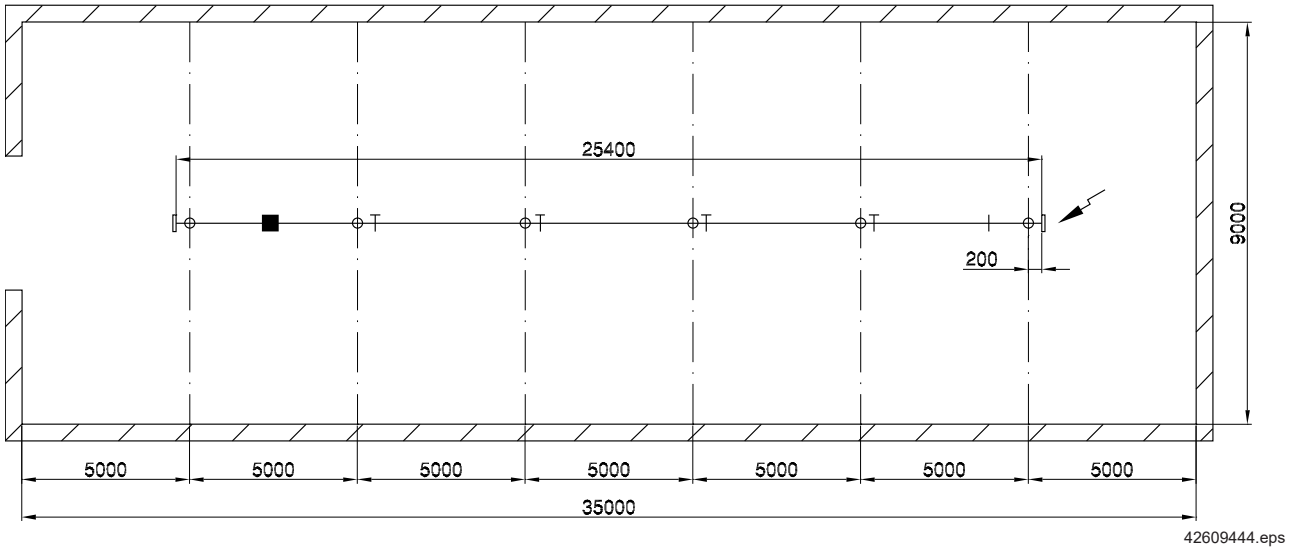
We recommend you use the KBK Designer tool for project engineering KBK suspension crane installations. Please refer to our homepage

www.demagcranes.com

3.3 Examples and symbols

Suspension monorail



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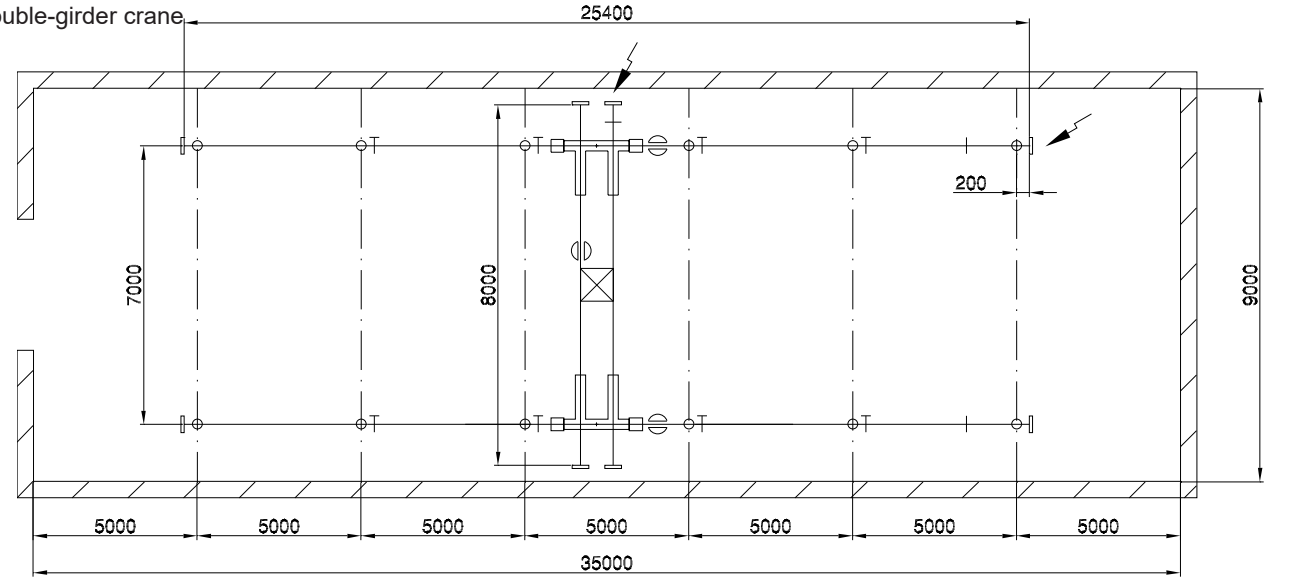
Double-girder crane



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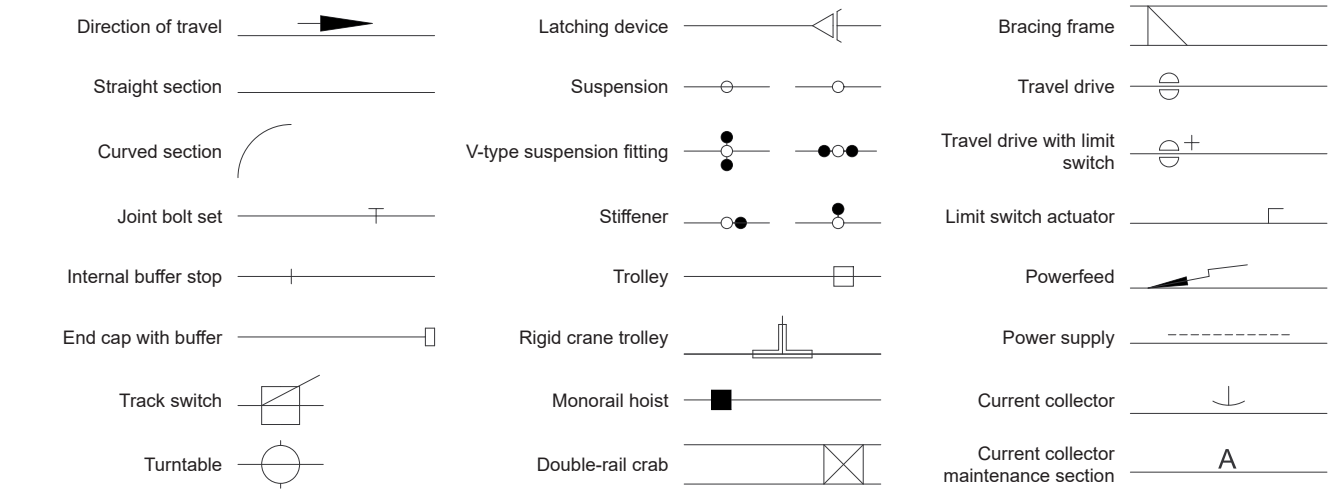
Symbols for use in drawings



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3.4 Project planning sheet for KBK installations

Please enclose a sketch.

Please send to your nearest Demag Cranes & Components sales office or direct to Demag Cranes & Components GmbH.

Customer

Project no.
Customer no.
Customer
Person responsible Date
Dept./Sales office

Stage of customer's planning
Financial planning for investments

☐ Tech. ☐ Prelim. ☐ Detailed planning

Implementation expected _____

☐ Invitation to tender

☐ Order soon to be placed _____

Scope of required quotation

☐ Budget offer

☐ excl. ☐ incl. sketch

☐ Detailed quotation

☐ with steelwork ☐ with erection

Quotation deadline _____ Delivery deadline _____

Type of installation

☐ Suspension monorail ☐ Double-rail track KBK track section _____

☐ Single-girder crane ☐ with latching device KBK crane section _____ KBK track section _____

☐ Double-girder crane ☐ More than 2 crane runways KBK crane section _____ KBK track section _____

Technical data

SWL	_____	kg	Average operating time	_____	Hours/day
Track length	_____	m			
Crane length	_____	m	Crane span dimension	_____	m
Number of trolleys on one track	_____		Load hook distance for several loads	_____	m
Number of cranes on one track	_____		Highest hook position above floor	_____	m

Installation site _____

Type of superstructure/suspension methods/flange _____

Clear height from floor to bottom edge of superstructure _____

Hoist unit

Electric chain hoist type _____ Lifting speed v _____ / _____ m/min

Hook path _____ m

Travel speeds

Travelling hoist ☐ Manual ☐ Electric, v = _____ / _____ m/min

Crane ☐ Manual ☐ Electric, v = _____ / _____ m/min

Power supply

On the crane ☐ Trailing cable ☐ Integrated conductor line ☐ External conductor line

On the track ☐ Trailing cable ☐ Integrated conductor line ☐ External conductor line

Current type

Operating voltage _____ V, _____ Hz

Type of control

☐ From trolley ☐ From crane ☐ Mobile ☐ Wireless

Additional information (e.g. special ambient conditions)

Special commercial conditions

3.5 Profile load capacities according to the diagram

The diagram showing the load capacity of the profile sections provides the basis for determining the profile section sizes for cranes and tracks, crane span dimensions l_{Kr} and distances between suspensions l_w.

The crane span dimension and distances between suspensions which are permitted for the individual crane and track sections can be read off for a given load.

Ensure compliance with the permissible length of overhang, distances of joints from suspension assemblies, and maximum loads on suspension assemblies and trolleys.

(Curves apply if hoists are used with lifting speeds up to 16 m/min.

For higher speeds, see section 3.10 Hoists with KBK.)

Selecting the section

Determining the distance between suspensions or crane span dimension:

1. Determine load K_{Ges} according to sections 3.6 to 3.8.
2. Determine the maximum value for l_w and l_{Kr} in the diagram (where it intersects the limit curve)
3. Select the most suitable profile section

Push travel

All profile section sizes

Suitable for electric travel

KBK II-L, KBK II, KBK II-H and KBK III

Technical values

KBK profile section	KBK 100	KBK I	KBK II-L	KBK II	KBK II-H	KBK III
Moment of inertia	26 cm^4	80 cm^4	345 cm^4	660 cm^4	1647 cm^4	1785 cm^4
Neutral axis	35 mm from lower edge	Approx. profile centre				
Material	S235				S355	S235

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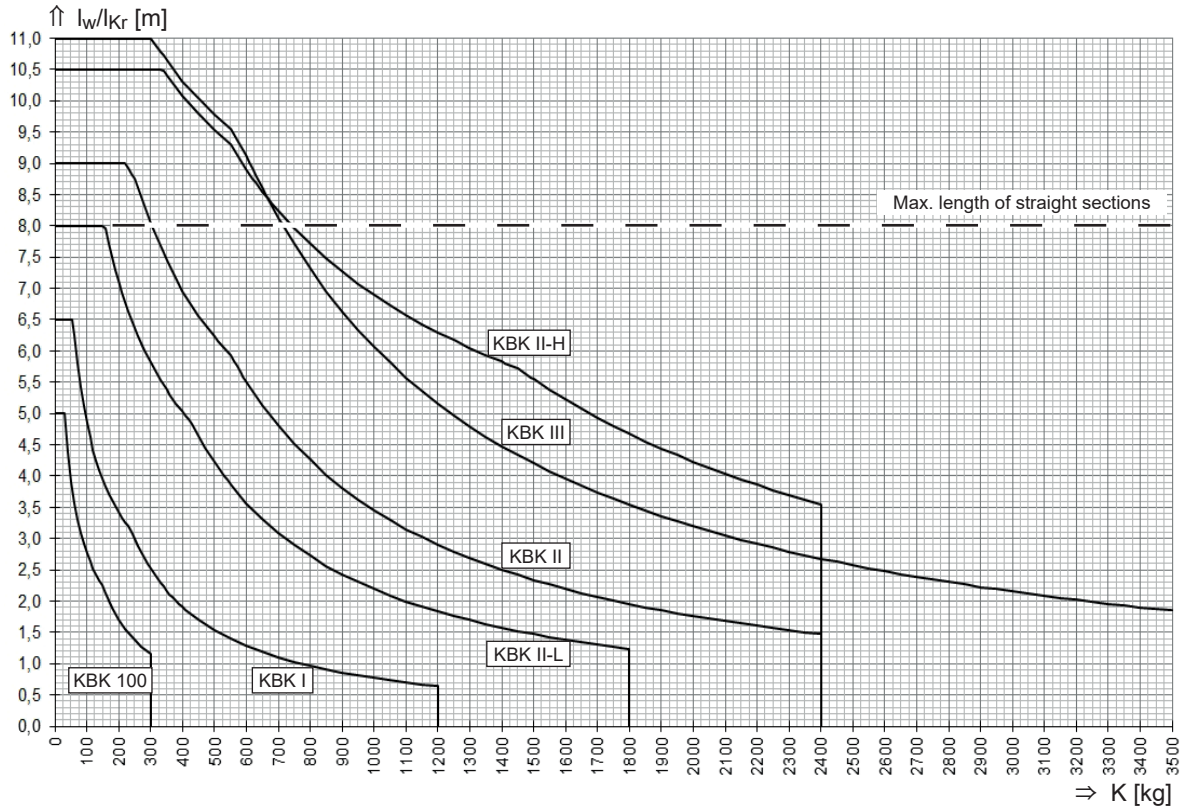

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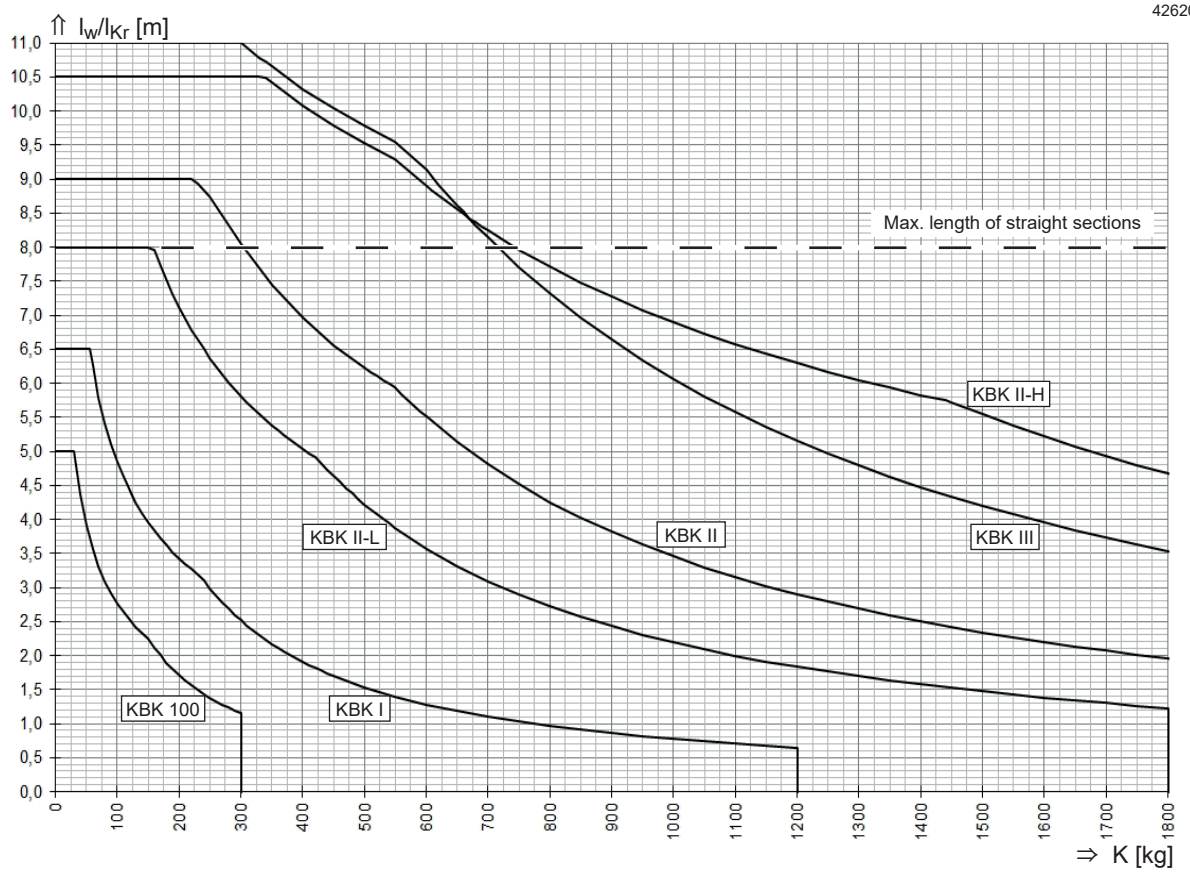

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Important: - - - Limit curves for maximum length of straight sections. Pay attention to the distance between supports and distances of joints (see section 3.8).

Lifted load coefficient ψ and dead load coefficient φ to DIN 15018 for crane group H1, B3 as well as the dead load of each loaded girder are already considered in the calculation diagrams.

K = Load on the profile section
l_w = Distance between suspensions
l_{Kr} = Crane span dimension

3.6 Steps for project drafting and technical specification

Calculating load K

Monorail track and single-girder crane	$K = G_H + G_3$
Double-girder crane	
The girder with the least favourable load and RF friction-wheel drive unit is considered in the following:	$K = 0{,}5\ (G_H + G_3 + G_{RFK})$
Crane runway	
Load does not travel on overhung portion of crane girder	$K = G_H + G_3 + 0{,}50\ (G_1 + G_2)$
Load travels on overhung portion of crane girder	$K = G_H + G_3 + 0{,}80\ (G_1 + G_2)$
Crane travels on more than two crane runway tracks (centre track)	$K = G_H + G_3 + 0{,}65\ (G_1 + G_2)$

Where:

G_H = SWL including load handling attachment
G_1 = Crane girder dead load including fittings
G_2 = Dead load of crane trolleys including fittings (both ends together)
G_3 = Dead load of trolley including hoist, cross-travel drive and fittings
G_{RFK} = Dead load of cross-travel drive and fittings

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3.7 Reading off from the diagram

A distinction is made between a concentrated load, two identical loads or more than two identical loads in one panel.

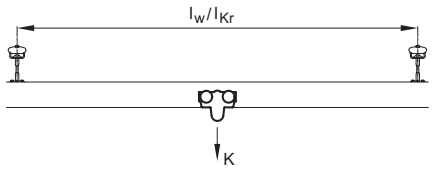
Crane span dimension l_{Kr}
Distance between suspensions l_w
(Monorail track and crane runway)

e_{Ka} = Distance between cross-travel trolleys or wheel axles
e_{KT} = Distance between crane trolleys or wheel axles

Concentrated load

For the (concentrated) load K in the panel between supports, the permissible limit for l_w or l_{Kr} can be read off direct from the diagram.

Concentrated load



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Several loads

For two or more loads at a maintained distance in one panel, the max. l_w or l_{Kr} must never exceed the permissible limit for one of the individual loads.

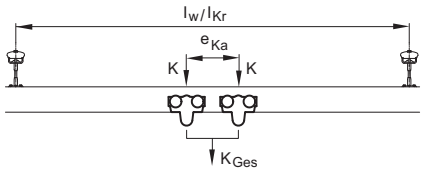
Two identical loads or load bar

By adding both loads, a total load K_{Ges} is obtained for which the limits $l_{w(KGes)}$ or $l_{Kr(KGes)}$ are taken from the diagram. This limit can be increased using the following formula:

max. $l_w = l_{w(KGes)} + 0{,}9 \times e_{Ka}$ (or e_{KT})

max. $l_{Kr} = l_{Kr(KGes)} + 0{,}9 \times e_{Ka}$ (or e_{KT})

Two identical loads or trolley load bar



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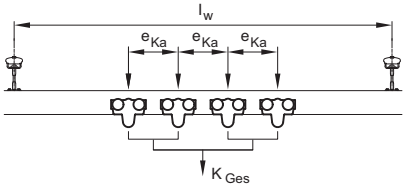
More than two identical loads at equal distances

The loads in one panel between supports are added up and a total load K_{Ges} is obtained, for which the limit $l_{w(KGes)}$ is taken from the diagram. This limit can be increased using the following formula:

$$\text{max. } l_w = l_{w(KGes)} + \frac{n}{2} \times e_{Ka} \text{ (or } e_{KT}\text{)}; \qquad n = \text{number of loads K}$$

More than two identical loads



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3.8 Calculating load G_{AB} on one suspension fitting

The suspension fitting with the worst-case load is considered in the following.

Max. permissible load G_{AB} on one suspension fitting

max. G_{AB}	KBK 100	KBK I	KBK II/M10	KBK II-L	KBK II	KBK II-H/M16	KBK III/M16	KBK II-H/M20	KBK III/M20
[kg]	400	750	750	1400	1700	1700	1700	2600	2600

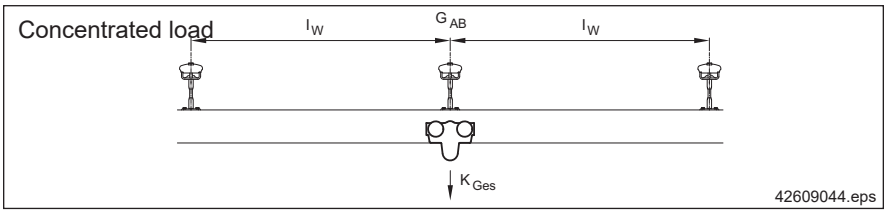
Concentrated load

The load on one suspension is calculated from value K for monorail or suspension crane tracks and from the proportional track girder dead load.

Proportional track girder dead load = max. distance between suspensions x track girder weight/m x 1,25

G_B = Track girder weight/m; l_w = max. distance between suspension fittings

$G_{AB} = K_{Ges} + G_B \times l_w \times 1,25$

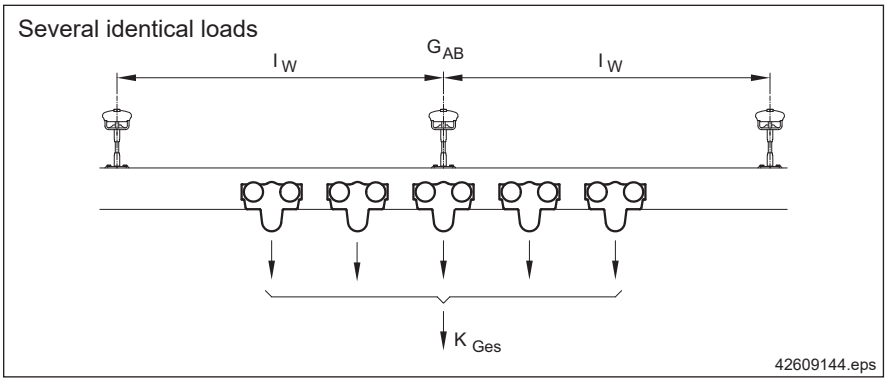


Two or more loads in one of the two panels between suspensions

The load on one suspension is determined from the sum total of all concentrated loads in two panels and from the proportional track dead load. If the load on one suspension determined according to this formula exceeds the permissible limit, one or both of the following measures are required:

- Reduce the distance between suspensions by providing additional suspensions
- Distribute the load by spacing loads at a safe distance

$G_{AB} = K_{Ges} + G_B \times l_w \times 1,25$

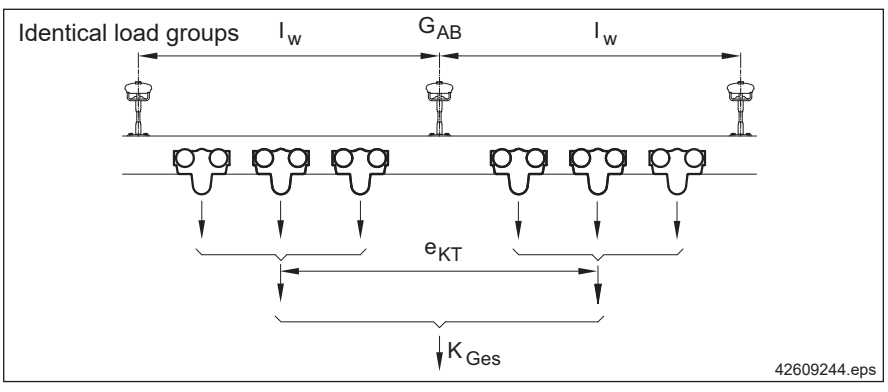


Two loads or groups of loads at a distance e_{KT}

$e_{KT} = 0,5 \times l_w$: $G_{AB} = 0,9K_{Ges} + G_B \times l_w \times 1,25$

$e_{KT} = lw$: $G_{AB} = 0,7K_{Ges} + G_B \times l_w \times 1,25$ (load distance = distance between suspensions)

$e_{KT} = 1,5 \times l_w$: $G_{AB} = 0,5K_{Ges} + G_B \times l_w \times 1,25$



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3.9 System dimensions and system limits

Overhang

		KBK 100	KBK I	KBK II-L KBK II	KBK II-H	KBK III
Shortest possible overhang	u_{min} [mm]	65	70	120	60 [1]	155
Project planning values for overhang	u [mm]	100	200	300	300	200

1) For crane suspension 858 560 44 umin = 140 mm

The stability of the track section should be checked for short tracks and crane girders. (Multiply load on overhang by a factor of 1,2, crane girder forms counter-torque).

KBK tracks or cranes must not be lifted (e.g. where the load is on the overhang).

If the girder is unstable (girder is lifted, suspension is relieved of load), the suspension is subjected to impact loading which causes wear and can lead to premature failure of the connection.

Premature failure of the connection can be prevented by using KBK Ergo components.

Crane overhang

The maximum and minimum lengths of overhang for cranes can be found in the crane selection table. They are directly related to the crane girder length.

The length of overhang u can be increased for

- flat cable supply lines by the length of the accumulated cable carriers at the end of the track where they accumulate,
- unloaded spacer trolleys – by the corresponding overall dimension.

The overhang at either end of the crane applicable to double-girder cranes running on more than two crane runway tracks is that shown in the selection table for cranes with the same load capacity and comparable span.

Track overhang

Refer to the crane selection tables for the maximum lengths of overhang u (for single-girder cranes).

Approach dimension

Approach dimension l_{an} (load hook centre to girder end) is derived from the dimensions of the individual components.

Permissible distance of joint from suspension st

Except for KBK II-H, a suspension must be fitted close to every joint. The load capacity of the rail joint can only be ensured by using genuine profile sections.

				KBK 100	KBK I	KBK II-L	KBK II	KBK II-H	KBK III
Minimum distance	**[mm]**	st_{min}	$l_w \le 5$ m	65	70	120	120	50 [1]	155
			$l_w > 5$ m	0,05 x l_w					0,1 x l_w
Maximum permissible distance	**[mm]**	st_{max}		0,1 x l_w				any for tracks	0,2 x l_w
								0,25 x span dimension l_{Kr} for cranes	

Crane girder lengths	KBK 100	KBK I	KBK II-L	KBK II	KBK II-H	KBK III
Articulated single-girder cranes, push travel [2]	1 - 4 m	1 - 6 m	1 - 8 m		1 - 14 m	1 - 9 m
Rigid single-girder cranes, push [2] or electric travel	-		1,8 - 6 m		2 - 8 m	2 - 9 m
Double-girder crane, braced, push [2] or electric travel	3 - 5 m (push travel only)	3 - 9 m	3 - 10 m	3 - 12 m	2 - 14 m	
Rigid double-girder cranes, push [2] or electric travel	-				3 - 14	2,35 - 14 m

1) The track suspension clamp must be fully located on one of the two connected profile sections.
2) The push-travel capability of larger cranes is limited.

KBK 100, I, II-L, II single-girder cranes must only be made of one rail section without any joint in the girder. Refer to the corresponding table on the next page for cranes that have girders made up of more than one section.

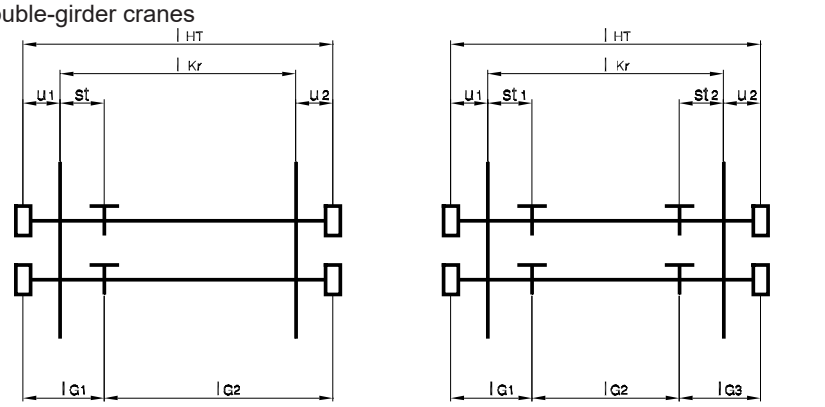
Double-girder cranes with rail joint

Construction of double-girder cranes with assembled girders

In the case of double-girder cranes, the individual girders of which consist of several straight sections due to the length of crane required, the permissible distance of joint from suspension fitting must be taken into consideration.

These cranes must be assembled as indicated in the table below. Double-girder cranes running on more than two tracks should be selected from the diagram. **Single-girder cranes are constructed without a rail joint owing to lateral forces and the buffer joint; KBK II-H and KBK III are an exception to this rule.**

Double-girder cranes



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Examples for assembled cranes

	KBK I				KBK II-L, II				KBK II-H				KBK III			
Crane girder length	Track gauge	Straight track sections			Track gauge	Straight track sections			Track gauge	Straight track sections			Track gauge	Straight track sections		
l_{HT}	l_{Kr}	l_{G1}	l_{G2}	l_{G3}	l_{Kr}	l_{G1}	l_{G2}	l_{G3}	l_{Kr}	l_{G1}	l_{G2}	l_{G3}	l_{Kr}	l_{G1}	l_{G2}	l_{G3}
7	4,00 - 4,20	1,25	5,75	-	-				-				-			
	4,20 - 4,85	1,00	6,00													
	4,85 - 5,60	1,25	5,75													
	5,60 - 6,20	1,00	6,00													
	6,20 - 6,60	0,75	6,25													
8	5,30 - 5,60	1,75	6,25	-	-				-				-			
	5,60 - 6,20	1,50	6,50													
	6,20 - 6,60	1,25	6,75													
9	-				5,00 - 5,60	2,25	6,75	-	5,00 - 5,50	3,00	6,00	-	6,20 - 8,70	2,00	7,00	-
					5,60 - 6,20	2,00	7,00		5,50 - 8,85	2,00	7,00		-			
					6,20 - 6,70	1,75	7,25		-							
					6,70 - 7,60	1,50	7,50									
					7,60 - 8,75	1,00	8,00									
10	-				6,00 - 6,20	2,50	7,50	-	5,50 - 6,70	3,00	7,00	-	6,80 - 7,50	2,50	7,50	-
					6,20 - 6,70	2,25	7,75		6,70 - 9,85	2,00	8,00		7,50 - 8,15	2,00	8,00	
					6,70 - 7,50	2,00	8,00		-				-			
					7,50 - 7,80	1,75	6,50	1,75								
					7,80 - 8,80	1,50	7,00	1,50								
					8,80 - 9,00	1,00	8,00	1,00								
11	-				7,00 - 7,25	1,50	8,00	1,50	6,50 - 8,00	3,00	8,00	-	7,85 - 8,20	3,00	8,00	-
					7,25 - 7,80	2,25	6,50	2,25	8,00 - 10,50	2,00	7,00	2,00	-			
					7,80 - 8,80	2,00	7,00	2,00	-							
					8,80 - 9,00	1,50	8,00	1,50								
12	-				8,00 - 8,70	2,50	7,00	2,50	7,50 - 9,00	3,00	6,00	3,00	-			
					8,70 - 9,00	2,25	7,50	2,25	9,00 - 10,50	2,00	8,00	2,00				
13	-				-				8,60 - 10,50	3,00	7,00	3,00	-			
14	-				-				9,85 - 10,50	3,00	8,00	3,00	-			

X = recommended
(X) = possible, not recommended
\- = not possible

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Possible combinations of sections for crane and crane runway

Track \ Crane	KBK 100	KBK I	KBK II-L	KBK II	KBK II-H	KBK III
KBK 100	X	X	(X)	(X)	(X)	-
KBK I			X			
KBK II-L	(X)			X	X	(X)
KBK II						X
KBK II-H						
KBK III	-	-	(X)		-	

Drives

Cranes with a girder length of 6 m or more must be fitted with electric long-travel drives if long travel is to be possible with the trolley in a position outside the central third of the crane girder length. It also is advisable for crabs and cranes with a load capacity greater than 1000 kg to be fitted with electric travel drives.

Travel speeds: 5 to 40 m/min.

Deflection

Under live loading, the deflection of cranes in accordance with the diagram or selection table is always below 1/350 of the span. If the maximum spacing between supports/crane span is selected from the middle load range in the selection diagram, the deflection ratio ranges up to 1/500. Monorail tracks and crane runways that have more than 2 panels between suspensions have deflection ratios of less than 1/450. Deflection of cranes and tracks can be reduced by using larger KBK profile sections.

3.10 Hoists with KBK

The layout diagram shown in section 3.5 is valid for Demag chain hoists with lifting speeds up to max. 16 m/min.

Higher lifting speeds

The use of other chain hoists can in result in an overload of the crane installation in borderline cases. Higher lifting speeds and weights can be considered by means of the following factor using the diagrams:

$G_{Hnew} = G_H \times (0{,}97 + 0{,}002 \times v_H)$

v_H = lifting speed in m/min

Use of balancers with KBK

The following must be considered when rope balancers are used on KBK:

- Rope balancers operate at higher speeds and have higher acceleration rates than chain hoists. This increases the lifted load coefficient. The air cushion reduces the negative effect of the high acceleration.
- In load handling applications, smaller deflections and vibrations are often required than those in classic crane applications.

Pneumatic rope balancers with lifting speeds up to max. 60 m/min may be used if

- a factor of at least 1,1 is used to calculate load K by means of the diagrams ⇒ $K = G_H \times 1{,}1 + G_3$
  (this factor can be increased to avoid high deflections and unwanted vibrations).

Electric rope balancers with lifting speeds up to max. 35 m/min can be used if

- a factor of at least 1,15 is used to calculate load K by means of the diagrams ⇒ $K = G_H \times 1{,}15 + G3$
- use the next highest load capacity for simplified use of the crane selection table (section 3.12).

  Example: Use the selection table for a load capacity of 125 kg for D-BE units with a rated load capacity of 80 kg.

3.11 Selection table for KBK monorail tracks

Classification to DIN 15018, H1 B3

G_H = Lifted load (load including dead load of load handling attachment)
$K_{(1)}$ = Total load (live load + trolley dead weight)
$K_{(2)}$ = Total load with electric drive
e_{Ka} = Distance between trolley axles (axle centres)
l_w = Distance between suspensions for one trolley
G_{AB} = Max. suspension load for one trolley

Selection basis: 1 load on the monorail track

In individual cases, exact static analysis calculations may lead to different results. Enquire about details for higher or multiple loads on one track.

	KBK 100				KBK I				KBK II-L				KBK II				KBK II-H				KBK III			
G_H [kg]	$K_{(1)}$ / $K_{(2)}$ [kg]	e_{ka} [m]	l_w [m]	G_{AB} [kg]	$K_{(1)}$ / $K_{(2)}$ [kg]	e_{ka} [m]	l_w [m]	G_{AB} [kg]	$K_{(1)}$ / $K_{(2)}$ [kg]	e_{ka} [m]	l_w [m]	G_{AB} [kg]	$K_{(1)}$ / $K_{(2)}$ [kg]	e_{ka} [m]	l_w [m]	G_{AB} [kg]	$K_{(1)}$ / $K_{(2)}$ [kg]	e_{ka} [m]	l_w [m]	G_{AB} [kg]	$K_{(1)}$ / $K_{(2)}$ [kg]	e_{ka} [m]	l_w [m]	G_{AB} [kg]
50	85	0,065	3,00	100	85	0,065	5,25	130	85	0,085	8,00	220	85	0,085	9,00	290	85	0,085	10,50	415	-			
	-				-				115	0,085	8,00	250	115	0,085	9,00	320	115	0,085	10,50	445				
80	115	0,065	2,55	130	115	0,065	4,50	155	115	0,085	8,00	250	115	0,085	9,00	320	115	0,085	10,50	445	-			
	-				-				145	0,085	8,00	280	145	0,085	9,00	350	145	0,085	10,50	475				
125	160	0,210	2,30	170	160	0,065	3,80	190	160	0,085	7,95	295	160	0,085	9,00	365	160	0,085	10,50	490	-			
	-				-				190	0,085	7,30	315	190	0,085	9,00	395	190	0,085	10,50	520				
160	200	0,210	1,85	210	200	0,065	3,40	230	200	0,085	7,10	320	200	0,085	9,00	405	200	0,085	10,50	530	-			
	-				-				230	0,085	6,60	345	230	0,085	8,95	435	230	0,085	10,50	560				
200	-				240	0,065	3,10	265	240	0,085	6,45	350	240	0,085	8,70	445	240	0,085	10,50	570	-			
					-				270	0,085	6,10	375	270	0,085	8,45	470	270	0,085	10,50	600				
250	-				290	0,065	2,55	310	290	0,085	5,90	390	290	0,085	8,15	480	290	0,085	10,50	620	-			
					-				320	0,085	5,60	415	320	0,085	7,75	500	320	0,085	10,50	650				
315	-				380	0,210	2,20	400	375	0,085	5,15	460	375	0,085	7,15	540	375	0,085	10,20	700	-			
					-				405	0,085	5,00	490	405	0,085	6,90	565	405	0,085	10,00	720				
400	-				465	0,385	1,95	480	460	0,085	4,50	535	460	0,085	6,45	610	460	0,085	9,60	765	-			
					-				490	0,085	4,30	565	490	0,085	6,35	635	490	0,085	9,40	790				
500	-				585	0,385	1,65	590	580	0,085	3,70	645	580	0,085	5,65	710	580	0,085	8,90	865	-			
					-				610	0,085	3,50	670	610	0,085	5,40	735	610	0,085	8,75	890				
630	-				-				715	0,250	3,25	765	715	0,250	4,90	830	715	0,250	8,40	980	-			
									745	0,250	3,10	795	745	0,250	4,75	855	745	0,250	8,25	1005				
800	-				-				885	0,250	2,70	925	885	0,250	4,10	980	885	0,250	7,60	1125	-			
									915	0,250	2,60	955	915	0,250	3,95	1005	915	0,250	7,45	1150				
1000	-				-				1095	0,250	2,20	1130	1095	0,250	3,40	1170	1095	0,250	6,85	1310	-			
									1125	0,250	2,15	1160	1125	0,250	3,30	1200	1125	0,250	6,75	1335				
1250	-				-				-				1405	1,000	3,40	1440	1405	1,000	6,75	1605	1415	0,500 [1]	4,90	1570
													1435	1,000	3,35	1470	1435	1,000	6,70	1630	1455	0,500 [1]	4,80	1605
1600	-				-				-				1755	1,000	2,35	1700	1755	1,000	5,70	1915	1765	0,500 [1]	4,05	1890
													1785	1,000	2,15	1700	1785	1,000	5,65	1940	1805	0,500 [1]	4,00	1925
2000	-				-				-				2155	1,000	1,20	1700	2155	1,000	4,90	2280	2165	0,500 [1]	3,45	2260
													2185	1,000	1,15	1700	2185	1,000	4,85	2310	2205	0,500 [1]	3,40	2295
2500	-				-				-				-				-				-			
																					2705	0,500 [1]	1,25	2600
3200	-				-				-				-				-				-			
																					3500	1,000	1,05	2600

1) For travel through track switches e_{Ka} = 0,8 m

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3.12 Selection table for KBK single and double-girder cranes

The following selection tables show a few of the many possible combinations for building crane installations with KBK. Use KBK Designer for precise specification of installations.

l_W data apply to <u>one crane</u> on the crane runway.
Crane girder overhangs are always the same on both sides of the crane.
Deflection limits: cranes, tracks: 1/350,
Frequency ≥ 2,8 Hz

Where there are several cranes on the same crane runway, the end carriages of single-girder cranes must always be designed as double or quadruple trolleys.
Distances between suspensions l_W must then be calculated separately.
Intermediate lengths for crane girders are possible. Data calculated on the basis of cranes of standard design for standard components and without special fittings.

Check suspension loads.

Classification to DIN 15018, H1 B3

l_{HT} = Crane girder length
l_{Kr} = Crane span dimension
l_W = Distance between track suspensions
Suspension loads on request
All dimensions in m

Load capacity: 50 kg, hoist weight: 30 kg, lifting speed: 30 m/min

Crane girder section, crane girder length	Profile	l_{HT}	Single-girder crane l_{Kr} min	l_{Kr} max	l_W KBK100	KBK I	KBK II-L	KBK II	Double-girder crane l_{Kr} min	l_{Kr} max	l_W KBK100	KBK I	KBK II-L	KBK II
	KBK 100	1	0,80	0,85	3,00	5,25	8,00	9,00		-	-	-	-	-
		2	1,70	1,85	2,95	5,15	8,00	9,00	1,50	1,85	2,55	4,40	8,00	9,00
		3	2,55	2,85	2,90	5,05	8,00	9,00	1,70	2,85	2,50	4,25	8,00	9,00
		4		-	-	-	-	-	2,30	3,85	2,45	4,15	8,00	9,00
		5		-	-	-	-	-	3,05	4,10	2,40	4,10	8,00	9,00
	KBK I	1	0,80	0,85	2,95	5,20	8,00	9,00		-	-	-	-	-
		2	1,65	1,85	2,85	5,00	8,00	9,00	1,50	1,85	2,55	4,30	8,00	9,00
		3	2,40	2,85	2,80	4,85	8,00	9,00	1,55	2,85	2,40	4,10	8,00	9,00
		4	3,05	3,85	2,70 [1]	4,75	8,00	9,00	2,10	3,85	2,30	3,95	7,95	9,00
		5	3,65	4,85	2,60 [1]	4,60	8,00	9,00	2,55	4,85	2,25	3,80	7,65	9,00
		6	4,75	5,35	2,65 [1]	4,60	8,00	9,00	3,00	5,85	2,20	3,70	7,45	9,00
		7		-	-	-	-	-	4,05	6,50	2,20	3,75	7,50	9,00
		8		-	-	-	-	-	5,40	6,50	2,20	3,75	7,55	9,00
	KBK II-L	2	1,50	1,75	2,65 [1]	4,70	8,00	9,00	1,50	1,75	2,40	4,05	8,00	9,00
		3	2,00	2,75	2,55 [1]	4,45	8,00	9,00	1,50	2,75	2,20	3,70	7,45	9,00
		4	2,50	3,75	2,40 [1]	4,25	8,00	9,00	2,00	3,75	2,05 [3]	3,50	7,05	9,00
		5	2,90	4,75	2,30 [1]	4,05	8,00	9,00	2,50	4,75	2,00 [3]	3,35	6,75	9,00
		6	3,25	5,75	2,25 [1]	3,90	8,00	9,00	3,00	5,75	1,95 [3]	3,25	6,50	9,00
		7	4,00	6,75	2,20 [1]	3,85	7,95	9,00	3,60	6,75	1,90 [3]	3,15	6,35	8,75
		8	5,00	7,75	2,20 [1]	3,85	7,90	9,00	4,60	7,75	1,85 [3]	3,15	6,30	8,65
		9		-	-	-	-	-	5,60	8,00	1,85 [3]	3,10	6,15	8,50
		10		-	-	-	-	-	6,60	8,00	1,80 [3]	3,05	6,05	8,35
	KBK II	2	1,50	1,75	-	4,55	8,00	9,00	1,50	1,75	-	3,95	7,95	9,00
		3	1,85	2,75	-	4,25	8,00	9,00	1,50	2,75	-	3,60	7,25	9,00
		4	2,25	3,75	-	4,05	8,00	9,00	2,00	3,75	-	3,40	6,80	9,00
		5	2,60	4,75	-	3,85	7,85	9,00	2,50	4,75	-	3,25	6,45	8,95
		6	3,00	5,75	-	3,70	7,60	9,00	3,00	5,75	-	3,10	6,20	8,60
		7	4,00	6,75	-	3,70	7,60	9,00	3,50	6,75	-	3,00	6,00	8,30
		8	5,00	7,75	-	3,70	7,55	9,00	4,00	7,75	-	2,90	5,80	8,00
		9		-	-	-	-	-	5,00	8,75	-	2,85	5,70	7,90
		10		-	-	-	-	-	6,00	9,00	-	2,80	5,60	7,75
		11		-	-	-	-	-	7,00	9,00	-	2,75	5,50	7,60
		12		-	-	-	-	-	8,00	9,00	-	2,70	5,40	7,45

1) Two trolleys on each end of crane
2) Double trolley unit
3) Quadruple trolley end carriages on each end of crane
4) Quadruple trolley unit

Load capacity: 80 kg, hoist weight: 30 kg, lifting speed: 30 m/min

Crane girder section, crane girder length

Profile	l_{HT}	Single-girder crane l_{Kr} min	Single-girder crane l_{Kr} max	Single-girder crane l_w KBK100	Single-girder crane l_w KBK I	Single-girder crane l_w KBK II-L	Single-girder crane l_w KBK II	Double-girder crane l_{Kr} min	Double-girder crane l_{Kr} max	Double-girder crane l_w KBK100	Double-girder crane l_w KBK I	Double-girder crane l_w KBK II-L	Double-girder crane l_w KBK II
KBK 100	1	0,75	0,85 2)	2,70 1)	4,70	8,00	9,00		-	-	-	-	-
	2	1,55	1,85 2)	2,50 1)	4,40	8,00	9,00	1,50	1,85	2,35	3,95	7,95	9,00
	3	2,40	2,60 2)	2,50 1)	4,35	8,00	9,00	1,80	2,85	2,30	3,85	7,80	9,00
	4		-	-	-	-	-	2,50	3,55	2,25	3,80	7,60	9,00
	5		-	-	-	-	-	3,30	3,55	2,20	3,75	7,55	9,00
KBK I	1	0,80	0,85	2,55 1)	4,50	8,00	9,00		-	-	-	-	-
	2	1,70	1,85	2,50 1)	4,35	8,00	9,00	1,50	1,85	2,25	3,85	7,75	9,00
	3	2,50	2,85	2,45 1)	4,25	8,00	9,00	1,70	2,85	2,20	3,75	7,50	9,00
	4	3,25	3,85	2,40 1)	4,20	8,00	9,00	2,30	3,85	2,15	3,60	7,30	9,00
	5	3,90	4,55	2,35 1)	4,10	8,00	9,00	2,80	4,85	2,10 3)	3,50	7,05	9,00
	6		-	-	-	-	-	3,30	5,85	2,05 3)	3,40	6,85	9,00
	7		-	-	-	-	-	4,55	6,20	2,05 3)	3,50	7,00	9,00
	8		-	-	-	-	-	5,80	6,20	2,05 3)	3,50	7,00	9,00
KBK II-L	2	1,55	1,75	2,35 1)	4,15	8,00	9,00	1,50	1,75	2,20	3,70	7,45	9,00
	3	2,20	2,75	2,25 1)	3,95	8,00	9,00	1,50	2,75	2,00 3)	3,40	6,85	9,00
	4	2,75	3,75	2,20 1)	3,80	7,85	9,00	2,00	3,75	1,90 3)	3,25	6,50	8,95
	5	3,25	4,75	2,10 1)	3,70	7,55	9,00	2,50	4,75	1,85 3)	3,10	6,25	8,60
	6	3,70	5,75	2,05 1)	3,55	7,30	9,00	3,00	5,75	1,80 3)	3,00	6,05	8,35
	7	4,05	6,75	2,00 1)	3,45	7,10	9,00	3,60	6,75	1,75 3)	2,95	5,90	8,15
	8	5,25	7,75	2,00 1)	3,50	7,15	9,00	4,60	7,75	1,75 3)	2,95	5,85	8,10
	9		-	-	-	-	-	5,60	8,00	1,75 3)	2,90	5,80	8,00
	10		-	-	-	-	-	6,60	8,00	1,70 3)	2,85	5,70	7,90
KBK II	2	1,50	1,75	-	4,05	8,00	9,00	1,50	1,75	-	3,65	7,30	9,00
	3	2,05	2,75	-	3,85	7,90	9,00	1,50	2,75	-	3,30	6,65	9,00
	4	2,55	3,75	-	3,65	7,55	9,00	2,00	3,75	-	3,15	6,30	8,65
	5	2,95	4,75	-	3,50	7,20	9,00	2,50	4,75	-	3,00	6,00	8,30
	6	3,30	5,75	-	3,40	6,95	9,00	3,00	5,75	-	2,90	5,80	8,00
	7	4,00	6,75	-	3,35	6,85	9,00	3,50	6,75	-	2,80	5,60	7,75
	8	5,00	7,75	-	3,35	6,85	9,00	4,00	7,75	-	2,75	5,45	7,50
	9		-	-	-	-	-	5,00	8,75	-	2,70	5,40	7,45
	10		-	-	-	-	-	6,00	9,00	-	2,65	5,30	7,35
	11		-	-	-	-	-	7,00	9,00	-	2,60	5,20	7,20
	12		-	-	-	-	-	8,00	9,00	-	2,55	5,15	7,10

Load capacity: 125 kg, hoist weight: 30 kg, lifting speed: 30 m/min

Crane girder section, crane girder length

Profile	l_{HT}	Single-girder crane l_{Kr} min	Single-girder crane l_{Kr} max	Single-girder crane l_w KBK100	Single-girder crane l_w KBK I	Single-girder crane l_w KBK II-L	Single-girder crane l_w KBK II	Double-girder crane l_{Kr} min	Double-girder crane l_{Kr} max	Double-girder crane l_w KBK100	Double-girder crane l_w KBK I	Double-girder crane l_w KBK II-L	Double-girder crane l_w KBK II
KBK 100	1	0,75	0,85 2)	2,30 1)	4,00	8,00	9,00		-	-	-	-	-
	2	1,55	1,85 2)	2,15 1)	3,75	7,75	9,00	1,50	1,85	2,05	3,50	7,05	9,00
	3		-	-	-	-	-	1,95	2,85	2,05 3)	3,45	6,90	9,00
	4		-	-	-	-	-	2,70	3,05	2,00 3)	3,40	6,80	9,00
KBK I	1	0,80	0,85	2,20 1)	3,80	7,85	9,00		-	-	-	-	-
	2	1,75	1,85	2,15 1)	3,75	7,70	9,00	1,50	1,85	2,05 3)	3,45	6,90	9,00
	3	2,60	2,85	2,10 1)	3,70	7,55	9,00	1,85	2,85	2,00 3)	3,35	6,70	9,00
	4	3,40	3,85	2,10 1)	3,60	7,45	9,00	2,50	3,85	1,95 3)	3,25	6,55	9,00
	5		-	-	-	-	-	3,10	4,85	1,90 3)	3,20	6,40	8,85
	6		-	-	-	-	-	3,70	5,30	1,85 3)	3,15	6,30	8,65
	7		-	-	-	-	-	4,95	5,30	1,90 3)	3,15	6,35	8,80
KBK II-L	2	1,60	1,75	2,05 1)	3,60	7,40	9,00	1,50	1,75	2,00 3)	3,35	6,70	9,00
	3	2,35	2,75	2,00 1)	3,50	7,15	9,00	1,50	2,75	1,85 3)	3,05	6,15	8,45
	4	3,00	3,75	-	3,40	6,95	9,00	2,00	3,75	1,75 3)	2,90	5,85	8,05
	5	3,60	4,75	-	3,30	6,75	9,00	2,50	4,75	1,70 3)	2,80	5,65	7,80
	6	4,10	5,75	-	3,20	6,55	9,00	3,00	5,75	1,65 3)	2,75	5,50	7,55
	7	4,70	6,75	-	3,15	6,45	8,90	3,60	6,75	1,65 3)	2,70	5,35	7,40
	8	6,05	7,75	-	3,20	6,50	9,00	4,60	7,75	1,65 3)	2,70	5,40	7,40
	9		-	-	-	-	-	5,60	8,00	1,65 3)	2,70	5,35	7,35
	10		-	-	-	-	-	6,60	8,00	1,60 3)	2,65	5,30	7,30
KBK II	2	1,55	1,75	-	3,55	7,25	9,00	1,50	1,75	-	3,25	6,55	9,00
	3	2,25	2,75	-	3,40	6,95	9,00	1,50	2,75	-	3,00	6,00	8,30
	4	2,80	3,75	-	3,30	6,70	9,00	2,00	3,75	-	2,85	5,70	7,85
	5	3,35	4,75	-	3,15	6,50	9,00	2,50	4,75	-	2,75	5,45	7,55
	6	3,80	5,75	-	3,05	6,30	8,70	3,00	5,75	-	2,65	5,30	7,30
	7	4,20	6,75	-	3,00	6,10	8,45	3,50	6,75	-	2,60	5,15	7,10
	8	5,00	7,75	-	2,95	6,05	8,40	4,00	7,75	-	2,70	5,00	6,90
	9		-	-	-	-	-	5,00	8,75	-	2,65	5,00	6,90
	10		-	-	-	-	-	6,00	9,00	-	2,65	4,95	6,80
	11		-	-	-	-	-	7,00	9,00	-	2,60	4,90	6,75
	12		-	-	-	-	-	8,00	9,00	-	2,60	4,80	6,65

1) Two trolleys on each end of crane
2) Double trolley unit
3) Quadruple trolley end carriages on each end of crane
4) Quadruple trolley unit

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Load capacity: 160 kg, hoist weight: 35 kg, lifting speed: 20 m/min

Crane girder section, crane girder length Profile	l_{HT}	Single-girder crane l_{Kr} min	l_{Kr} max	l_w KBK100	KBK I	KBK II-L	KBK II	Double-girder crane l_{Kr} min	l_{Kr} max	l_w KBK100	KBK I	KBK II-L	KBK II
KBK 100	1	0,75	0,85 [2]	2,05 [1]	3,60	7,35	9,00		-	-	-	-	-
	2	1,60	1,85 [2]	-	3,40	6,95	9,00	1,50	1,85	1,90 [3]	3,20	6,45	8,90
	3		-	-	-	-	-	2,00	2,75	1,90 [3]	3,15	6,35	8,75
	4		-	-	-	-	-		- -	-	-	-	-
KBK I	1		-	-	-	-	-		-	-	-	-	-
	2	1,75	1,85	-	3,35	6,90	9,00	1,50	1,85	1,90 [3]	3,15	6,35	8,75
	3	2,65	2,85	-	3,30	6,80	9,00	1,90	2,85	1,85 [3]	3,10	6,20	8,55
	4		-	-	-	-	-	2,55	3,85	1,80 [3]	3,05	6,05	8,35
	5		-	-	-	-	-	3,20	4,75	1,80 [3]	2,95	5,95	8,20
	6		-	-	-	-	-	3,90	4,75	1,75 [3]	2,95	5,85	8,10
KBK II-L	2	1,65	1,75	-	3,25	6,70	9,00	1,50	1,75	1,85 [3]	3,05	6,15	8,50
	3	2,45	2,75	-	3,20	6,50	9,00	1,50	2,75	1,70 [3]	2,85	5,65	7,80
	4	3,15	3,75	-	3,10	6,35	8,80	2,10	3,75	1,65 [3]	2,75	5,45	7,55
	5	3,80	4,75	-	3,00	6,20	8,60	2,60	4,75	1,60 [3]	2,65	5,30	7,30
	6	4,35	5,75	-	2,85	6,05	8,40	3,05	5,75	1,55 [3]	2,55	5,10	7,05
	7	5,15	6,75	-	2,80	6,00	8,30	3,60	6,75	-	2,65	5,00	6,90
	8	6,40	7,15	-	2,85	6,05	8,35	4,60	7,75	-	2,70	5,05	6,95
	9		-	-	-	-	-	5,60	8,00	-	2,65	5,00	6,90
	10		-	-	-	-	-	6,60	8,00	-	2,65	4,95	6,85
KBK II	2	1,60	1,75	-	3,20	6,60	9,00	1,50	1,75	-	3,05	6,05	8,35
	3	2,35	2,75	-	3,10	6,40	8,85	1,50	2,75	-	2,80	5,55	7,65
	4	3,00	3,75	-	2,95	6,20	8,55	2,00	3,75	-	2,65	5,30	7,30
	5	3,55	4,75	-	2,80	6,00	8,30	2,50	4,75	-	2,55	5,10	7,05
	6	4,10	5,75	-	2,65	5,85	8,10	3,00	5,75	-	2,65	4,95	6,80
	7	4,55	6,75	-	2,70 [1]	5,70	7,90	3,50	6,75	-	2,60	4,80	6,65
	8	5,00	7,75	-	2,60 [1]	5,55	7,70	4,00	7,75	-	2,55	4,70	6,50
	9		-	-	-	-	-	5,00	8,75	-	2,55	4,70	6,50
	10		-	-	-	-	-	6,00	9,00	-	2,55	4,70	6,45
	11		-	-	-	-	-	7,00	9,00	-	2,50	4,60	6,40
	12		-	-	-	-	-	8,00	9,00	-	2,50	4,55	6,30

Load capacity: 200 kg, hoist weight: 35 kg, lifting speed: 20 m/min

Crane girder section Profile	l_{HT}	Single-girder crane l_{Kr} min	l_{Kr} max	l_w KBK I	KBK II-L	KBK II	KBK II-H	Double-girder crane l_{Kr} min	l_{Kr} max	l_w KBK I	KBK II-L	KBK II	KBK II-H
KBK II-L	2	1,75	1,85	3,10	6,35	8,75	10,50	1,50	1,85	2,95	5,90	8,15	10,50
	3	2,65	2,85	3,05	6,25	8,65	10,50	1,95	2,85	2,90	5,80	7,95	10,50
	4		-	-	-	-	-	2,70	3,85	2,85	5,65	7,80	10,50
	5		-	-	-	-	-	3,40	4,35	2,80	5,55	7,70	10,50
	6		-	-	-	-	-	4,15	4,35	2,75	5,50	7,60	10,50
	2	1,70	1,75	2,95	6,15	8,55	10,50	1,50	1,75	2,85	5,75	7,90	10,50
	3	2,50	2,75	2,85	6,05	8,35	10,50	1,60	2,75	2,70	5,35	7,35	10,50
	4	3,25	3,75	2,70	5,90	8,15	10,50	2,20	3,75	2,60	5,15	7,15	10,50
	5	3,95	4,75	2,60	5,80	8,00	10,50	2,75	4,75	2,65	5,00	6,90	10,50
	6	4,55	5,75	2,70 [1]	5,65	7,85	10,50	3,25	5,75	2,60	4,85	6,70	10,50
	7	5,45	6,50	2,65 [1]	5,65	7,80	10,50	3,70	6,75	2,55	4,75	6,55	10,30
	8		-	-	-	-	-	4,60	7,75	2,55	4,75	6,55	10,30
	9		-	-	-	-	-	5,60	8,00	2,55	4,75	6,55	10,30
	10		-	-	-	-	-	6,65	8,00	2,55	4,70	6,50	10,25
KBK II	2	1,65	1,75	2,90	6,10	8,40	10,50	1,50	1,75	2,85	5,65	7,80	10,50
	3	2,40	2,75	2,75	5,90	8,20	10,50	1,50	2,75	2,60	5,20	7,15	10,50
	4	3,10	3,75	2,60	5,75	8,00	10,50	2,05	3,75	2,65	5,00	6,90	10,50
	5	3,70	4,75	2,65 [1]	5,60	7,80	10,50	2,50	4,75	2,60	4,80	6,65	10,45
	6	4,30	5,75	2,55 [1]	5,50	7,60	10,50	3,00	5,75	2,50	4,65	6,40	10,15
	7	4,80	6,75	2,45 [1]	5,35	7,40	10,50	3,50	6,75	2,45	4,55	6,25	9,90
	8	5,50	7,75	2,40 [1]	5,30	7,30	10,50	4,00	7,75	2,40	4,45	6,15	9,70
	9		-	-	-	-	-	5,00	8,75	2,40	4,45	6,15	9,70
	10		-	-	-	-	-	6,00	9,00	2,40	4,45	6,15	9,65
	11		-	-	-	-	-	7,00	9,00	2,40	4,40	6,05	9,60
	12		-	-	-	-	-	8,00	9,00	2,35	4,35	6,00	9,50

1) Two trolleys on each end of crane
2) Double trolley unit
3) Quadruple trolley end carriages on each end of crane
4) Quadruple trolley unit

Load capacity: 250 kg, hoist weight: 35 kg, lifting speed: 20 m/min

Crane girder section, crane girder length	Profile	l_{HT}	Single-girder crane l_{Kr} min	l_{Kr} max	l_w KBK I	KBK II-L	KBK II	KBK II-H	Double-girder crane l_{Kr} min	l_{Kr} max	l_w KBK I	KBK II-L	KBK II	KBK II-H
KBK II	KBK II-L	2	1,80	1,85	2,60	5,80	8,00	10,50	1,50	1,85	2,75	5,45	7,50	10,50
		3	-		-	-	-	-	2,00	2,85	2,70	5,35	7,40	10,50
		4	-		-	-	-	-	2,80	3,85	2,65	5,25	7,25	10,50
		5	-		-	-	-	-	3,55	4,00	2,60	5,20	7,15	10,50
		2	1,65	1,75	2,70 1)	5,65	7,80	10,50	1,50	1,75	2,65	5,30	7,35	10,50
		3	2,45	2,75	2,60 1)	5,55	7,70	10,50	1,65	2,75	- 2,65	5,00	6,90	10,50
		4	3,20	3,75	2,50 1)	5,45	7,55	10,50	2,30	3,75	- 2,60	4,85	6,70	10,50
		5	3,90	4,75	2,45 1)	5,35	7,40	10,50	2,90	4,75	- 2,55	4,75	6,55	10,30
		6	4,50	5,75	2,35 1)	5,25	7,30	10,50	3,45	5,75	- 2,50	4,60	6,35	10,05
		7	5,10	6,75	2,35 1)	5,25	7,25	10,50	3,95	6,75	- 2,45	4,50	6,20	9,80
		8	5,95	7,75	2,30	5,00	6,90	10,50	4,60	7,75	- 2,40	4,45	6,15	9,65
		9	-		-	-	-	-	5,70	8,00	- 2,40	4,45	6,15	9,70
		10	-		-	-	-	-	7,00	8,00	- 2,45	4,50	6,20	9,75
	KBK II	2	1,65	1,75	2,65 1)	5,60	7,75	10,50	1,50	1,75	2,65	5,25	7,25	10,50
		3	2,45	2,75	2,55 1)	5,45	7,55	10,50	1,55	2,75	2,60	4,90	6,70	10,50
		4	3,20	3,75	2,45 1)	5,35	7,40	10,50	2,20	3,75	2,55	4,70	6,50	10,25
		5	3,90	4,75	2,35 1)	5,20	7,25	10,50	2,70	4,75	2,50	4,55	6,30	9,90
		6	4,50	5,75	2,25 1)	5,10	7,10	10,50	3,20	5,75	2,40	4,40	6,10	9,60
		7	5,10	6,75	2,20 1)	5,00	6,95	10,50	3,65	6,75	2,30	4,30	5,90	9,35
		8	5,95	7,75	2,30 3)	5,00	6,90	10,50	4,00	7,75	1,90 3)	4,20	5,75	9,10
		9	-		-	-	-	-	5,00	8,75	2,25	4,20	5,80	9,15
		10	-		-	-	-	-	6,00	9,00	2,25	4,20	5,80	9,15
		11	-		-	-	-	-	7,00	9,00	1,90 3)	4,20	5,75	9,05
		12	-		-	-	-	-	8,05	9,00	1,90 3)	4,15	5,70	9,00

Load capacity: 315 kg, hoist weight: 55 kg, lifting speed: 15 m/min

Crane girder section	Profile	l_{HT}	Single-girder crane l_{Kr} min	l_{Kr} max	l_w KBK I	KBK II-L	KBK II	KBK II-H	Double-girder crane l_{Kr} min	l_{Kr} max	l_w KBK I	KBK II-L	KBK II	KBK II-H
KBK I	KBK I	1	0,75	0,85 2)	2,45 1)	5,40	7,45	10,50		-	-	-	-	-
		2	1,60	1,85 2)	2,25 1)	5,10	7,05	10,50	1,50	1,85	2,60	4,90	6,75	10,50
		3	-		-	-	-	-	2,05	2,85	2,60	4,80	6,65	10,45
		4	-		-	-	-	-	2,90	3,55	2,55	4,75	6,55	10,35
KBK II	KBK II-L	2	-		-	-	-	-	1,50	1,75	2,45	4,55	6,30	9,90
		3	2,60	2,75	2,25 3)	4,95	6,85	10,50	1,70	2,75	2,40	4,45	6,15	9,65
		4	3,45	3,75	2,20 3)	4,85	6,75	10,50	2,45	3,75	2,35	4,35	6,00	9,45
		5	4,20	4,75	2,15 3)	4,80	6,65	10,50	3,10	4,75	2,30	4,25	5,85	9,25
		6	4,95	5,20	2,10 3)	4,75	6,55	10,35	3,70	5,75	2,00 3)	4,25	5,85	9,20
		7	-		-	-	-	-	4,25	6,75	1,90 3)	4,15	5,75	9,05
		8	-		-	-	-	-	4,90	7,15	1,85 3)	4,10	5,65	8,90
		9	-		-	-	-	-	6,15	7,15	1,90 3)	4,15	5,70	9,00
	KBK II	2	1,70	1,75	2,30 3)	4,95	6,90	10,50	1,50	1,75	2,55	4,75	6,55	10,30
		3	2,55	2,75	2,20 3)	4,85	6,75	10,50	1,65	2,75	2,40	4,45	6,15	9,70
		4	3,35	3,75	2,15 3)	4,80	6,65	10,50	2,30	3,75	2,35	4,35	5,95	9,40
		5	4,05	4,75	2,10 3)	4,70	6,50	10,30	2,95	4,75	2,25	4,20	5,80	9,15
		6	4,75	5,75	2,05 3)	4,55	6,40	10,10	3,45	5,75	1,85 3)	4,10	5,65	8,90
		7	5,40	6,75	2,00 3)	4,45	6,30	9,95	3,95	6,75	1,80 3)	3,95	5,50	8,70
		8	6,40	7,20	2,00 3)	4,40	6,30	9,95	4,40	7,75	1,75 3)	3,80	5,40	8,50
		9	-		-	-	-	-	5,00	8,75	1,70 3)	3,70	5,30	8,35
		10	-		-	-	-	-	6,05	9,00	1,70 3)	3,70	5,35	8,40
		11	-		-	-	-	-	7,40	9,00	1,70 3)	3,75	5,35	8,45
		12	-		-	-	-	-	8,65	9,00	1,70 3)	3,75	5,35	8,45

1) Two trolleys on each end of crane
2) Double trolley unit
3) Quadruple trolley end carriages on each end of crane
4) Quadruple trolley unit

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Load capacity: 400 kg, hoist weight: 55 kg, lifting speed: 15 m/min

Crane girder section, crane girder length

Profile	l_{HT}	Single-girder crane l_{Kr} min	Single-girder crane l_{Kr} max	Single-girder crane l_w KBK I	Single-girder crane l_w KBK II-L	Single-girder crane l_w KBK II	Single-girder crane l_w KBK II-H	Double-girder crane l_{Kr} min	Double-girder crane l_{Kr} max	Double-girder crane l_w KBK I	Double-girder crane l_w KBK II-L	Double-girder crane l_w KBK II	Double-girder crane l_w KBK II-H
KBK II-L	2	-	-	-	-	-	-	1,50	1,85	2,40	4,45	6,15	9,70
	3		-	-	-	-	-	2,10	2,85	2,40	4,40	6,10	9,60
	4		-	-	-	-	-	2,95	3,20	2,35	4,35	6,00	9,50
	2		-	-	-	-	-	1,50	1,75	2,35	4,40	6,05	9,50
	3	2,65	2,75	1,95 3)	4,35	6,20	9,85	1,75	2,75	2,25	4,20	5,80	9,15
	4	3,50	3,75	1,95 3)	4,25	6,15	9,70	2,55	3,75	1,85 3)	4,10	5,70	8,95
	5	4,30	4,55	1,90 3)	4,15	6,05	9,60	3,25	4,75	1,80 3)	4,00	5,55	8,80
	6		-	-	-	-	-	3,90	5,75	1,75 3)	3,85	5,45	8,60
	7		-	-	-	-	-	4,50	6,50	1,70 3)	3,75	5,35	8,45
	8		-	-	-	-	-	5,20	6,50	1,70 3)	3,70	5,30	8,35
	9		-	-	-	-	-	6,45	6,50	1,70 3)	3,75	5,35	8,45
KBK II	2		-	-	-	-	-	1,50	1,75	2,35	4,35	6,00	9,45
	3	2,60	2,75	1,95 3)	4,25	6,15	9,75	1,70	2,75	1,85 3)	4,15	5,70	9,00
	4	3,40	3,75	1,90 3)	4,15	6,05	9,60	2,45	3,75	1,80 3)	3,95	5,55	8,75
	5	4,20	4,75	1,85 3)	4,05	5,95	9,45	3,10	4,75	1,75 3)	3,80	5,40	8,55
	6	4,90	5,75	1,80 3)	3,95	5,90	9,30	3,65	5,75	1,70 3)	3,70	5,30	8,35
	7	5,60	6,50	1,75 3)	3,85	5,80	9,20	4,20	6,75	1,65 3)	3,55	5,20	8,15
	8		-	-	-	-	-	4,70	7,75	1,60 3)	3,45	5,05	8,00
	9		-	-	-	-	-	5,20	8,75	1,35 3)	3,30	4,90	7,85
	10		-	-	-	-	-	6,55	8,95	1,60 3)	3,40	5,00	7,95
	11		-	-	-	-	-	7,80	8,95	1,60 3)	3,40	5,05	8,00

Load capacity: 500 kg, hoist weight: 75 kg, lifting speed: 15 m/min

Crane girder section, crane girder length

Profile	l_{HT}	Single-girder crane l_{Kr} min	Single-girder crane l_{Kr} max	Single-girder crane l_w KBK II-L	Single-girder crane l_w KBK II	Single-girder crane l_w KBK II-H	Double-girder crane l_{Kr} min	Double-girder crane l_{Kr} max	Double-girder crane l_w KBK II-L	Double-girder crane l_w KBK II	Double-girder crane l_w KBK II-H
KBK II-L	2		-	-	-	-	1,50	1,75	3,95	5,55	8,75
	3	2,70	2,75	3,65 1)	5,65	8,95	1,80	2,75	3,75	5,35	8,45
	4	3,55	3,75	3,60 1)	5,55	8,90	2,60	3,75	3,65	5,25	8,30
	5		-	-	-	-	3,35	4,75	3,55	5,20	8,15
	6		-	-	-	-	4,05	5,75	3,45	5,10	8,00
	7		-	-	-	-	4,70	5,95	3,35	4,95	7,90
	8		-	-	-	-	5,55	5,95	3,30	4,90	7,85
KBK II	2		-	-	-	-	1,50	1,75	3,90	5,50	8,65
	3	2,65	2,75	3,60	5,55	8,90	1,75	2,75	3,65	5,30	8,30
	4	3,50	3,75	3,50	5,45	8,80	2,50	3,75	3,50	5,15	8,15
	5	4,30	4,75	3,45	5,30	8,65	3,20	4,75	3,40	5,05	7,95
	6	5,05	5,75	3,35	5,20	8,55	3,85	5,75	3,30	4,85	7,80
	7	5,80	5,85	3,30	5,10	8,45	4,45	6,75	3,20	4,70	7,65
	8		-	-	-	-	5,00	7,75	3,10	4,60	7,50
	9		-	-	-	-	5,65	8,15	3,05	4,50	7,40
	10		-	-	-	-	6,95	8,15	3,10	4,55	7,50
KBK II-H	2		-	-	-	-	1,50	1,70		5,20	8,20
	3	2,55	2,70	3,50	5,40	8,75	1,70	2,70		4,85	7,70
	4	3,35	3,70	3,40	5,25	8,60	2,35	3,70		4,65	7,50
	5	4,10	4,70	3,30	5,10	8,45	3,00	4,70		4,45	7,30
	6	4,80	5,70	3,20	4,95	8,35	3,55	5,70		4,25	7,10
	7	5,50	6,70	3,10	4,80	8,20	4,05	6,70		4,10	6,95
	8	6,10	7,70	3,00	4,70	8,10	4,50	7,70		3,95	6,80
	9	6,70	8,70	2,95 7)	4,55 7)	7,95 7)	4,95	8,70		3,80	6,65
	10	7,95	9,30	2,95 7)	4,60 7)	8,00 7)	5,50	9,70		3,70	6,50
	11	9,15	9,30	3,20 1)	4,85 1)	8,00 1)	6,50	10,50		3,65	6,45
	12		-	-	-	-	7,50	10,50		3,65	6,45
	13		-	-	-	-	8,50	10,50		3,70	6,50
	14		-	-	-	-	9,75	10,50		3,70	6,55

1) Two trolleys on each end of crane
2) Double trolley unit
3) Quadruple trolley end carriages on each end of crane
4) Quadruple trolley unit

Load capacity: 630 kg, hoist weight: 75 kg, lifting speed: 15 m/min

Crane girder section, crane girder length

Profile	l_{HT}	Single-girder crane l_{Kr} min	l_{Kr} max	l_w KBK II-L	l_w KBK II	l_w KBK II-H	Double-girder crane l_{Kr} min	l_{Kr} max	l_w KBK II-L	l_w KBK II	l_w KBK II-H
KBK II-L	2	-	-	-	-	-	1,50	1,75	3,30	4,90	7,85
	3	2,70	2,75	2,95	4,60	8,00	1,85	2,75	3,20	4,70	7,65
	4		-	-	-	-	2,70	3,75	3,10	4,60	7,55
	5		-	-	-	-	3,45	4,75	3,05	4,50	7,45
	6		-	-	-	-	4,20	5,30	2,90	4,30	7,25
	7		-	-	-	-	4,95	5,30	2,85	4,20	7,15
KBK II	2		-	2,90	4,55	7,95	1,50	1,75	3,30	4,85	7,80
	3	2,65	2,75 [2]	2,85	4,50	7,85	1,80	2,75	3,10	4,60	7,55
	4	3,55	3,75 [2]	2,80	4,40	7,80	2,60	3,75	3,05	4,45	7,40
	5	4,40	4,75 [2]	-	-	-	3,35	4,75	2,95	4,35	7,30
	6		-	-	-	-	4,05	5,75	2,80	4,15	7,05
	7		-	-	-	-	4,70	6,75	2,75	4,05	6,95
	8		-	-	-	-	5,30	7,30	2,70	3,95	6,85
	9		-	-	-	-	6,10	7,30	2,65	3,90	6,80
KBK II-H	2	-	-				1,50	1,70	3,25	4,80	7,70
	3	2,60	2,70	2,85	4,45	7,85	1,75	2,70	3,00	4,45	7,35
	4	3,45	3,70	2,80	4,35	7,75	2,50	3,70	2,90	4,25	7,20
	5	4,25	4,70	2,70	4,25	7,65	3,15	4,70	2,80	4,10	7,05
	6	5,00	5,70	2,65	4,15	7,55	3,75	5,70	2,65	3,90	6,80
	7	5,70	6,70	2,55	4,05	7,45	4,35	6,70	2,55	3,75	6,65
	8	6,40	7,70	2,50	3,95	7,35	4,90	7,70	2,50	3,65	6,55
	9	7,15	8,25	2,45 [7]	3,90 [7]	7,30 [7]	5,35	8,70	2,40	3,50	6,40
	10	-	-	-	-	-	5,85	9,70	2,35	3,40	6,30
	11		-	-	-	-	6,50	10,50	2,30	3,40	6,25
	12		-	-	-	-	7,85	10,50	2,35	3,45	6,30
	13		-	-	-	-	9,15	10,50	2,35	3,45	6,35
	14		-	-	-	-	10,35	10,50	2,35	3,45	6,35

Load capacity: 800 kg, hoist weight: 75 kg, lifting speed: 15 m/min

Crane girder section, crane girder length

Profile	l_{HT}	Single-girder crane l_{Kr} min	l_{Kr} max	l_w KBK II-L	l_w KBK II	l_w KBK II-H	Double-girder crane l_{Kr} min	l_{Kr} max	l_w KBK II-L	l_w KBK II	l_w KBK II-H
KBK II-L	2		-	-	-	-	1,50	1,75	2,85	4,15	7,10
	3		-	-	-	-	1,90	2,75	2,75	4,05	6,95
	4		-	-	-	-	2,75	3,75	2,70	3,95	6,90
	5		-	-	-	-	3,55	4,75	2,65	3,90	6,80
	6		-	-	-	-	4,35	4,80	2,55	3,75	6,65
KBK II	2		-	-	-	-	1,50	1,75	3,30	4,90	7,70
	3	2,70	2,75	2,40	3,80	7,20	1,85	2,75	2,75	4,05	6,85
	4	3,60	3,75	2,35	3,70	7,15	2,70	3,75	2,80	4,15	7,05
	5		-	-	-	-	3,45	4,75	2,70	3,95	6,90
	6		-	-	-	-	4,20	5,75	2,65	3,85	6,80
	7		-	-	-	-	4,90	6,60	2,55	3,75	6,70
	8		-	-	-	-	5,60	6,60	2,50	3,65	6,55
	9		-	-	-	-	6,40	6,60	2,40	3,55	6,45
KBK II-H	2		-	-	-	-	1,50	1,70	2,75	4,10	7,00
	3	2,65	2,70	2,35	3,70	7,10	1,80	2,70	2,60	3,85	6,75
	4	3,50	3,70	2,30	3,65	7,05	2,55	3,70	2,55	3,70	6,65
	5	4,35	4,70	2,25	3,55	6,95	3,30	4,70	2,45	3,60	6,50
	6	5,15	5,70	2,20	3,50	6,90	3,95	5,70	2,35	3,45	6,30
	7	5,90	6,70	2,15	3,40	6,80	4,60	6,70	2,30	3,35	6,20
	8	6,65	7,40	2,10	3,35	6,75	5,20	7,70	2,25	3,25	6,10
	9		-	-	-	-	5,75	8,70	2,15	3,15	6,00
	10		-	-	-	-	6,25	9,70	2,05	3,10	5,90
	11		-	-	-	-	7,15	10,00	1,00	3,05	5,90
	12		-	-	-	-	8,40	10,00	2,15	3,10	5,95
	13		-	-	-	-	9,65	10,00	2,15	3,10	5,95

1) Two trolleys on each end of crane
2) Double trolley unit
3) Quadruple trolley end carriages on each end of crane
4) Quadruple trolley unit

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Load capacity: 1000 kg, hoist weight: 85 kg, lifting speed: 15 m/min

Crane girder section, crane girder length

Profile	l_{HT}	Single-girder crane l_{Kr} min	l_{Kr} max	l_w KBK II-L	l_w KBK II	l_w KBK II-H	Double-girder crane l_{Kr} min	l_{Kr} max	l_w KBK II-L	l_w KBK II	l_w KBK II-H
KBK II-L	2	-		-	-	-	1,50	1,75	2,35	3,45	6,35
	3	-		-	-	-	1,90	2,75	2,30	3,35	6,25
	4	-		-	-	-	2,80	3,75	2,25	3,30	6,20
	5	-		-	-	-	3,65	4,30	2,25	3,25	6,15
KBK II	2	-		-	-	-	1,50	1,75	2,35	3,40	6,30
	3	2,70	2,75	1,95	3,10	6,45	1,90	2,75	2,25	3,30	6,20
	4	-		-	-	-	2,75	3,75	2,25	3,25	6,10
	5	-		-	-	-	3,55	4,75	2,20	3,20	6,05
	6	-		-	-	-	4,35	5,75	2,15	3,15	5,95
	7	-		-	-	-	5,10	5,90	2,00	3,05	5,90
	8	-		-	-	-	5,80	5,90	1,60	3,00	5,85
KBK II-H	2	-		-	-	-	1,50	1,70	2,30	3,40	6,25
	3	-		-	-	-	1,85	2,70	2,20	3,25	6,10
	4	3,55	3,70	1,90	3,00	6,35	2,65	3,70	2,15	3,15	6,00
	5	4,45	4,70	2,75 3)	3,80 3)	6,25 1)	3,40	4,70	2,00	3,05	5,90
	6	5,25	5,70	2,70 3)	3,75 3)	6,20 1)	4,15	5,70	1,45	3,00	5,80
	7	6,05	6,60	2,65 3)	3,70 3)	6,15 1)	4,80	6,70	1,15	2,90	5,75
	8	-		-	-	-	5,45	7,70	1,00	2,85	5,65
	9	-		-	-	-	6,05	8,70	0,90	2,80	5,55
	10	-		-	-	-	6,65	9,25	0,80	2,70	5,50
	11	-		-	-	-	7,70	9,25	0,80	2,75	5,50
	12	-		-	-	-	8,90	9,25	0,85	2,75	5,50

Load capacity: 1250 kg, hoist weight: 115 kg, lifting speed: 10 m/min

Crane girder section, crane girder length

Profile	l_{HT}	Single-girder crane l_{Kr} min	l_{Kr} max	l_w KBK II	l_w KBK II-H	l_w KBK III	Double-girder crane l_{Kr} min	l_{Kr} max	l_w KBK II	l_w KBK II-H	l_w KBK III
KBK II	2	-		-	-	-	1,50	1,75	2,95	5,65	4,70
	3	-		-	-	-	2,00	2,75	2,90	5,60	4,65
	4	-		-	-	-	2,90	3,75	2,85	5,55	4,55
	5	-		-	-	-	3,75	4,75	2,80	5,50	4,50
	6	-		-	-	-	4,55	5,25	2,75	5,45	4,45
KBK II-H	2	1,50	1,70 2)	-	5,80 1)	-	1,50	1,70	2,90	5,60	-
	3	2,40	2,70 2)	-	5,75 1)	-	1,95	2,70	2,85	5,55	-
	4	3,35	3,70 2)	-	5,70 1)	-	2,80	3,70	2,80	5,45	-
	5	4,20	4,70 2)	-	5,65 1)	-	3,60	4,70	2,40	5,40	-
	6	5,10	5,70 2)	-	5,60 1)	-	4,35	5,70	1,80	5,35	-
	7	-		-	-	-	5,10	6,70	1,50	5,25	-
	8	-		-	-	-	5,80	7,70	1,30	5,20	-
	9	-		-	-	-	6,45	8,25	1,15	5,15	-
	10	-		-	-	-	7,10	8,25	1,05	5,10	-
KBK III	2	1,50	1,65 2)	-	5,70 1)	4,70 1)	1,50	1,65	2,95 3)	5,70 3)	4,70
	3	2,05	2,65 2)	-	5,65 1)	4,60 1)	1,75	2,65	2,25 3)	5,40 3)	4,35
	4	2,95	3,65 2)	-	5,60 1)	4,55 1)	2,60	3,65	1,75 3)	5,30 3)	4,25
	5	3,85	4,65 2)	-	5,55 1)	4,50 1)	3,40	4,65	1,45 3)	5,25 3)	4,15
	6	4,70	4,85 2)		5,50 1)	4,45 1)	4,15	5,65	1,30 3)	5,15 3)	4,05
	7	-		-	-	-	4,85	6,65	1,15 3)	5,10 3)	4,00
	8	-		-	-	-	5,55	7,65	1,05 3)	5,05 3)	3,90
	9	-		-	-	-	6,20	8,10	0,95 3)	5,00 3)	3,80
	10	-		-	-	-	6,85	8,15	0,90 3)	4,95 3)	3,75
	11	-		-	-	-	7,85	8,20	0,90 3)	4,95 3)	3,75

1) Two trolleys on each end of crane
2) Double trolley unit
3) Quadruple trolley end carriages on each end of crane
4) Quadruple trolley unit

Load capacity: 1600 kg, hoist weight: 115 kg, lifting speed: 10 m/min

Crane girder section, crane girder length Profile	l_{HT}	Single-girder crane l_{Kr} min	l_{Kr} max	l_w KBK II	l_w KBK II-H	l_w KBK III	Double-girder crane l_{Kr} min	l_{Kr} max	l_w KBK II	l_w KBK II-H	l_w KBK III
KBK II	2	-		-	-	-	1,50	1,75	1,10	5,10	4,00
	3	-		-	-	-	2,00	2,75	1,05	5,10	3,95
	4	-		-	-	-	2,90	3,75	1,00	5,05	3,90
	5	-		-	-	-	3,80	4,45	0,95	5,00	3,85
KBK II-H	2	1,50	1,70 2)	-	5,20 1)	-	1,50	1,70	1,05	5,10	3,95
	3	2,45	2,70 2)	-	5,15 1)	-	2,00	2,70	0,95	5,00	3,90
	4	3,35	3,70 2)	-	5,10 1)	-	2,85	3,70	0,90	4,95	3,80
	5	4,30	4,70 2)	-	5,10 1)	-	3,70	4,70	0,85	4,90	3,75
	6	5,15	5,25 2)	-	5,05 1)	-	4,50	5,70	0,80	4,85	3,70
	7	-		-	-	-	5,25	6,70	0,80	4,80	3,65
	8	-		-	-	-	6,00	7,40	0,75	4,75	3,55
	9	-		-	-	-	6,75	7,40	0,75	4,70	3,50
KBK III	2	1,50	1,65 2)		5,10 1)	3,95 1)	1,50	1,65	1,25 3)	5,15 3)	4,05
	3	2,05	2,65 2)	-	5,05 1)	3,90 1)	1,80	2,65	0,90 3)	4,90 3)	3,75
	4	3,00	3,65 2)	-	5,05 1)	3,85 1)	2,65	3,65	0,85 3)	4,85 3)	3,65
	5	3,90	4,05 2)	-	5,00 1)	3,80 1)	3,50	4,65	0,80 3)	4,80 3)	3,60
	6	-		-	-	-	4,25	5,65	0,80 3)	4,75 3)	3,55
	7	-		-	-	-	5,05	6,65	0,75 3)	4,70 3)	3,50
	8	-		-	-	-	5,75	6,95	0,70 3)	4,65 3)	3,40
	9	-		-	-	-	6,50	7,00	0,70 3)	4,60 3)	3,35

Load capacity: 2000 kg, hoist weight: 115 kg, lifting speed: 5 m/min

Crane girder section, crane girder length Profile	l_{HT}	Single-girder crane l_{Kr} min	l_{Kr} max	l_w KBK II	l_w KBK II-H	l_w KBK III	Double-girder crane l_{Kr} min	l_{Kr} max	l_w KBK II	l_w KBK II-H	l_w KBK III
KBK II	2	-		-	-	-	1,50	1,75	0,70	4,65	3,45
	3	-		-	-	-	2,05	2,75	0,60	4,60	3,40
	4	-		-	-	-	2,95	3,75	0,65	4,60	3,35
KBK II-H	2	1,50	1,70 2)	-	-	4,55 1)	1,50	1,70	1,00 3)	5,00 3)	-
	3	2,45	2,70 2)	-	-	4,50 1)	2,00	2,70	0,70 3)	4,55 3)	-
	4	3,40	3,70 2)	-	-	4,50 1)	2,90	3,70	0,65 3)	4,55 3)	-
	5	4,30	4,65 2)	-	-	4,45 1)	3,75	4,70	0,65 3)	4,50 3)	-
	6	-		-	-	-	4,60	5,70	0,65 3)	4,50 3)	-
	7	-		-	-	-	5,40	6,70	0,65 3)	4,50 3)	-
	8			-	-	-	6,20	6,70			
KBK III	2	1,50	1,65 2	-	4,50 1)	3,35 1)	1,50	1,65	0,75 3)	4,70 3)	3,50
	3	2,05	2,65 2)	--	4,40 1)	3,30 1)	1,80	2,65	-	-	3,25
	4	3,00	3,45 2)	-	4,40 1)	3,30 1)	2,70	3,65	-	-	2,90
	5	-	-	-	-	-	3,55	4,65	-	-	2,30
	6	-	-	-	-	-	4,40	5,65	-	-	1,90
		-	-	-	-	-	5,20	6,05	-	-	2,10 3)
		-	-	-	-	-	5,95	6,10	-	-	1,95 3)

Load capacity: 2500 kg, hoist weight: 115 kg, lifting speed: 5 m/min

Profile	l_{HT}	Single-girder crane l_{Kr}	Double-girder crane l_{Kr} min	l_{Kr} max	l_w KBK III
KBK III	3		1,85	2,65	1,50 3)
	4		2,75	3,65	1,45 3)
	5		3,65	4,65	1,40 3)
	6		4,50	5,25	1,35 3)

Load capacity: 3200 kg, hoist weight: 115 kg, lifting speed: 5 m/min

Profile	l_{HT}	Single-girder crane	Double-girder crane l_{Kr} min	l_{Kr} max	l_w KBK III
KBK III	3		1,65	2,65	1,20 3)
	4		2,55	3,65	1,20 3)
	5		3,50	4,45	1,15 3)
	6		4,35	4,50	1,15 3)

1) Two trolleys on each end of crane
2) Double trolley unit
3) Quadruple trolley end carriages on each end of crane
4) Quadruple trolley unit

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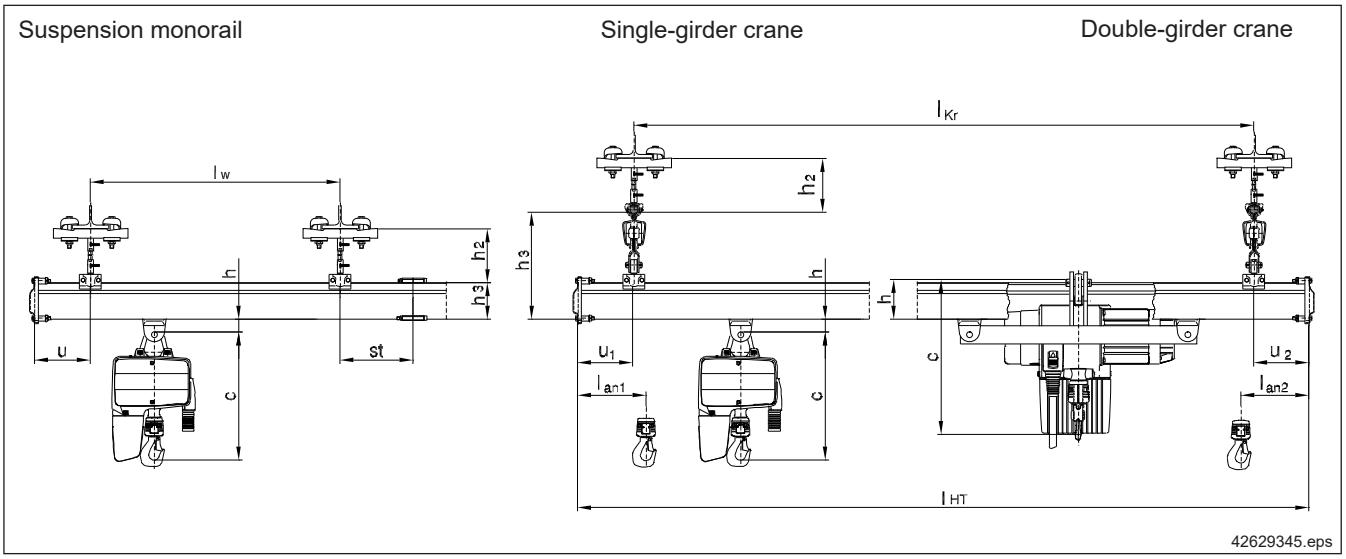
3.13 Structural dimensions for monorail tracks and cranes



Dimension h_2 [mm] (suspension from I-beam superstructures with upper suspension bracket)

	Short suspension fitting		Length of suspension rod for spring clip					
	without height adjustment	with height adjustment	80	100	300	600	1000	3000
KBK 100	65	100	155	-	375	675	1075	-
KBK I	60	95	150		370	670	1070	
KBK II, II-L	110	140	-	220	420	720	1120	3120
KBK II-H	75	107		185	385	685	1085	3085
KBK III	-	120		200	400	700	1100	3100
KBK II-H/M20		107		185	385	685	1085	-
KBK III/M20		-		200	400	700	1100	

Dimension h_3 [mm] 1)

Cranes

KBK crane runway		100			I				II-L				II						II-H					III		
KBK crane girder		100	I	II-L	100	I	II-L	II	100	I	II-L	II	100	I	II-L	II	II-H	III	I	II-L	II	II-H	III	II-L	II	III
Track trolleys	Single	242	272	337	272	302	367	397	320	350	415	445	350	380	445 3)	475 3)	508	541 4)	433	492	522	555	588	511 4)	541 4)	612 4)
	Double	252	282	347	282	312	377	407	335	365	430	460	365	395	460 3)	490 3)	523	556	448	507	537	570	603	2)		
	Quadruple	-			-	375	440	470	-				-					2)	-					2)		

Suspension monorails

KBK crane runway		100	I	II-L	II	II-H	III
Track trolleys	Single	65	100	150	180	243	246
	Double						
	Quadruple						

Dimension h [mm] (to top edge of pin) 1)

Cranes and suspension monorails

KBK		100	I	II-L	II	II, DC	II-H	II-H, DC	III, DC	III, 3200 kg
Crab trolleys	Single	41	38	35		-	19	-	-	-
	Double	51	48	50			34			
	Quadruple	-	100	-			-			
	Crab frame	-100	-105	-150	-190	-180	-206	-196	-230	-212

1) This table does not consider values for dimension h3 for single trolley 1200 kg (858 670 44) and double trolley 2400 kg (858 650 44) combinations.
2) Calculation based on individual component parts necessary
3) This also applies to rigid crane end carriages
4) Rigid crane end carriages +20

The lifting height of double-girder cranes is higher than that of single-girder cranes, since the hoist is mounted between the two crane girders.

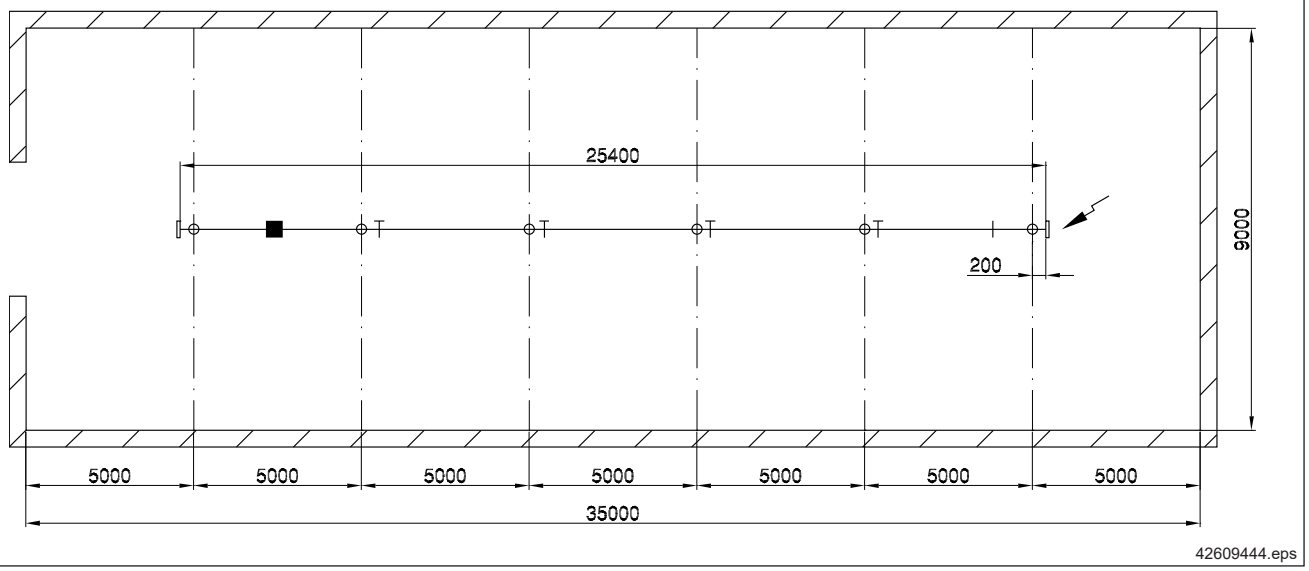
Dimension c = hoist headroom dimension

For l_w, l_{Kr}, l_{HT}, see diagram (section 3.5) and selection tables (see section 3.11/3.12)

u, st, l_{an} according to specification and individual dimensions of components.

3.14 Project examples

Suspension monorail



Project

A monorail track, lifting a load weighing 1000 kg, is to be fitted into the building layout shown above.

The track can be suspended from the IPE 300 superstructure. The beams are spaced 5 m apart and at a height of 6 m (from lower edge of beam to floor). Special requirements include a lifting height of 5 m. The control pendant is suspended from the trolley, load to be lifted electrically.

Solution

1.1 Load K on the track girder

Weight on hook including load handling attachment	1000 kg
Weight of DC-Pro 10 hoist	48 kg
Weight of trolley including DRF 200 (KBK III)	44,2 kg
	K_{Ges} = 1092,2 kg

1.2 Distance between suspensions l_w as per diagram

For the value of K_{Ges} = 1092,2 kg, the diagram for distances between suspensions shows a distance between suspensions of l_w = 5,7 m for the KBK III track section.
Selected: l_w = 5 m = Distance between roof trusses

1.3 Permissible distance of joint from suspension st

st min. = 155 mm; st max. = 0,2 x 5 m = 1 m; selected 0,2 m

1.4 Length of track overhang u

For KBK III:

Minimum track overhang	=	155 mm
Maximum track overhang	=	200 mm
Selected u	=	200 mm

1.5 Load G_{AB} on one suspension fitting

G_{AB} = K_{Ges} + G_B x l_w x 1,25
= 1092,2 kg + 28,4 kg/m x 5 m x 1,25 = 1269,7 kg < 1700 kg

1.6 Suspension

LE girder to floor dimension	6000 mm
– Required hook path	– 5000 mm
– Dimension c for DC-Pro 10	– 505 mm
– Dimension h + h_3 = 35 + 246 =	– 281 mm
	h_2 = 214 mm

100 mm suspension rod selected: h_2 = 200 mm
This results in a hook path of 5014 mm; a chain hoist with a hook path of 5 m must be ordered.

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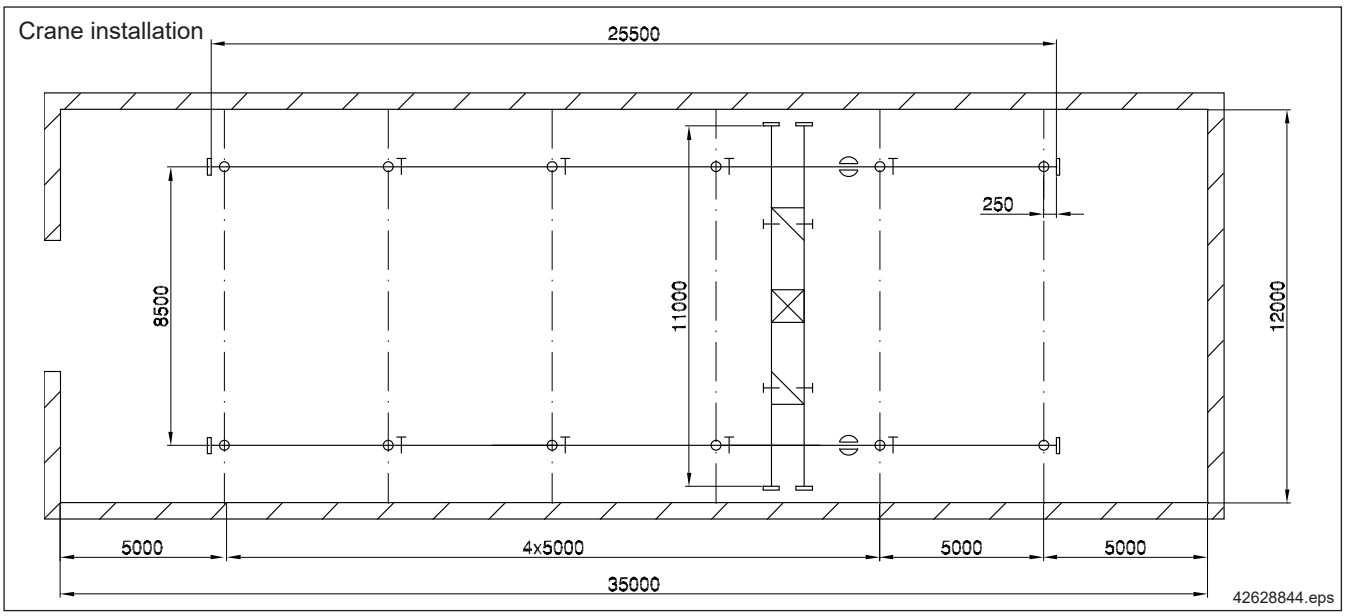


Project

A crane installation for a load capacity of 250 kg is to be fitted inside a building that utilises the entire floor area as effectively as possible.

The other conditions are practically the same as those in the monorail track example.

Solution

Crane according to the selection table for KBK single and double-girder cranes. Electric travel drives are required for the crane girder. Push travel trolley. KBK II double-girder crane girder length 11 m.

Span l_{Kr} = 8 – 8,8 m, selected 8,5 m
Distance between suspensions l_w = Distance between roof trusses = 5 m
Load on suspension $G_{AB} = K_{Ges} + G_B \times l_w \times 1{,}25$;

where $K_{Ges} = G_H + G_3 + 0{,}8\ (G_1 + G_2)$

G_H =	Lifted load	250 kg
G_1 =	2 x straight sections of 7 m	238 kg
	4 x straight sections of 2 m	136 kg
	2 x internal buffer stops	0,4 kg
	4 x end caps with buffers	2,4 kg
	2 x bracing frames 22 kg	
	4 x joint bolt sets 1,6 kg	
		400,4 kg
G_3 =	1 x DC-Pro 2 hoist	22 kg
	1 x crab frame	19,6 kg
	4 x trolleys	8 kg
		49,6 kg
G_2 =	2 x trolley combinations	21,4 kg
	2 x friction-wheel travel drives	57 kg
	4 x crane suspension fittings	4,8 kg
	Electric equipment	Approx. 10 kg
		93,2 kg

K_{Ges} = 250 kg + 49,6 kg + 0,8 (400,4 kg + 93,2 kg) = 694,48 kg
Thus
G_{AB} = 694,48 kg + 17 kg/m x 5 m x 1,25 = 800,73 kg < 1700 kg

Available hook path

LE girder to floor dimension	5800 mm
Dimension c for DC-Pro 2	– 364 mm
Dimension h	+ 190 mm
Dimension h_3	– 475 mm
Dimension h_2 with 100 mm suspension rod	– 220 mm
	4931 mm

The chain hoist can be ordered with a hook path of 5 m.

4 KBK Ergo – Planning and project engineering

The following pages provide an overview of applications for which KBK profile sections can be used:

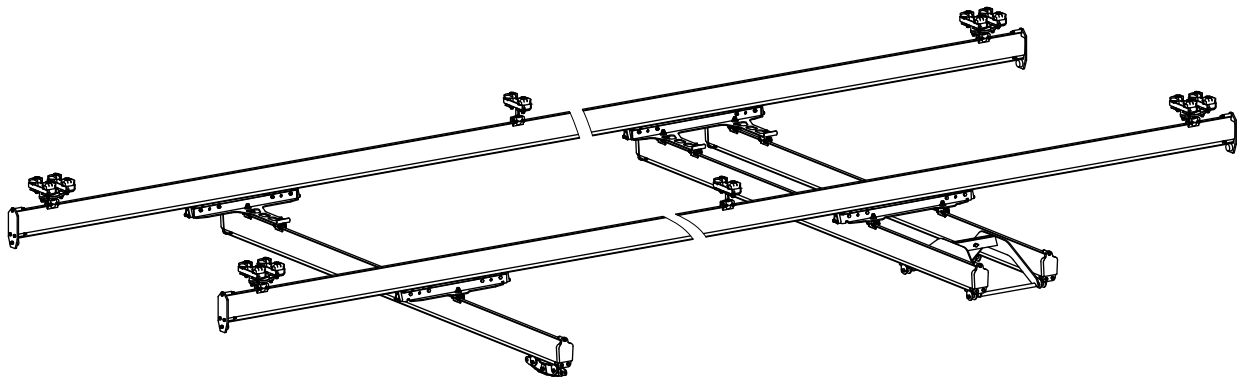
- Cranes with a large overhang
- Cranes for handling equipment

Rigid Ergo trolleys integrated into special end carriages and trolley frames, together with rigid suspensions accommodate load torques and forces acting in the opposite direction to the load. Ergo trolleys can accommodate horizontal forces resulting from handling devices.

4.1 Cranes with a large overhang

Single-girder crane with a large overhang

Double-girder crane with a large overhang



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Single-girder crane		
Assemblies	**Components**	**See chapter/section**
Rail elements	Rail, joint bolt set, end cap, buffer, internal buffer stop, shock absorber, information plates	4
Suspension	Short suspension, Ergo suspension	7
Trolley combination	Trolley, Ergo crane trolley, Ergo crab trolley	8
Travel drive	RF 100, RF 125 und DRF 200	12
Coupling elements	Trolley link, link bar, spacer bar	14
Accessories	Buffers on crabs and cranes	15
Elec. power supply	Cable slider, cable trolley, trailing cable, conductor line	17.1
Control system		18

Design: rigid track suspensions and crane end carriages

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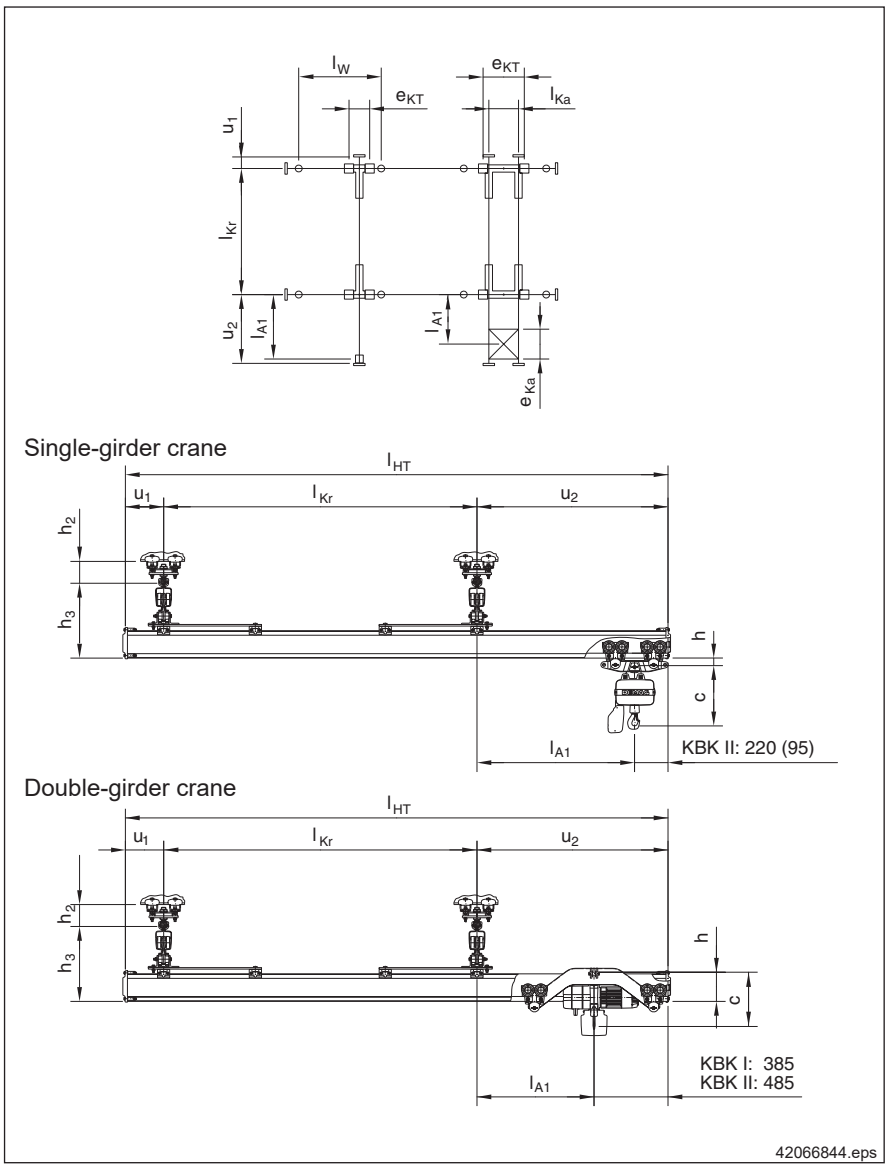


Crane girders may have overhang u_2 on both sides if crane length l_{HT} is increased accordingly and crane span dimension l_{KR} is maintained.

A KBK double trolley with an articulated frame is used as the crab for single-girder cranes that have a large overhang. (A single trolley is sufficient for the crab for cranes up to l_{HT} = 3 meters.)

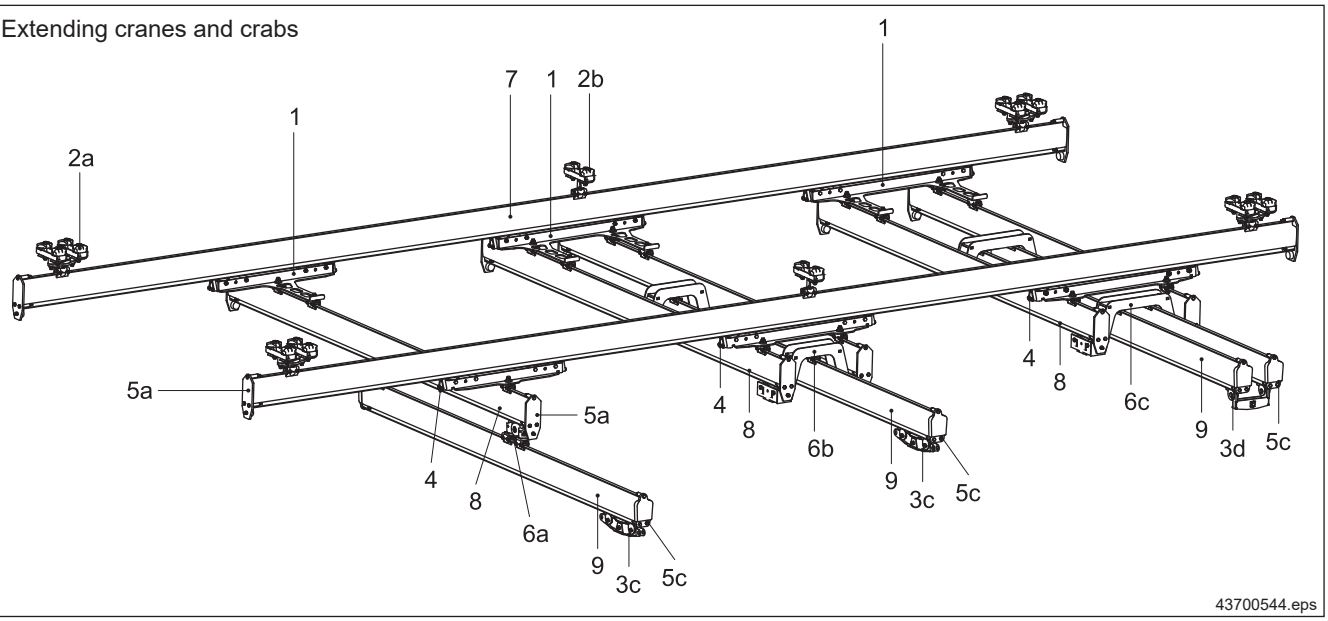
A KBK crab frame is used as the crab for double-girder cranes. KBK end caps with rubber buffers are used at the ends of the track and at the ends of the crane girders.

The hoist/load connection is articulated.

l_{Kr}	=	Crane span dimension	u_1	=	Overhang
l_{HT}	=	Crane girder length	u_2	=	Overhang
l_{Ka}	=	Crab track gauge	h	=	LE of rail to pin top edge
e_{KT}	=	Distance between crane trolleys	h_2	=	Bottom edge of I-beam to top edge of track girder
e_{Ka}	=	Distance between crab axles	h_3	=	Top edge of track girder to bottom edge of crane girder
l_{A1}	=	Permissible overhang dimension	c	=	Hoist headroom dimension

4.2 Extending cranes

Extending cranes and crabs



Item		Designation	Item		Designation	Item		Designation
1		KBK Ergo crane end carriage	4		Buffer plate	7		KBK crane runway
2		Suspension	5		End cap	8		KBK crane girder
	a	KBK Ergo		a	KBK Ergo with rubber or cellular plastic buffers	9		KBK extending rail
	b	KBK Classic		b	KBK Ergo with shock absorbers	10		Drives
3		Travelling hoist		c	KBK Classic		a	Electric
	a	KBK Ergo crab frame	6		KBK Ergo extending frame		b	Pneumatic
	b	KBK Classic crab frame		a	Type A1/1	11		Power supply
	c	KBK Classic single or double trolleys		b	Type B2/1		a	Electric
	d	Trolley load bar for extending crane B2/2		c	Type B2/2		b	Pneumatic

Extending cranes are used for transferring loads between adjacent crane areas, for depositing loads between building columns and for extending the crane operating range. These cranes consist of a crane bridge and an extending frame with a single-girder or double-girder extending rail attached to it. This lateral extending rail with the load-carrying trolley has a large lateral projection over the frame and can thus be extended sideways.

The extending rail can be adjusted in the frame in such a way that the entire projection can extend either on one side or distributed over both sides.

Type A (extending rail below the crane girder) is not designed to be used with double-girder cranes due to the unfavourable headroom dimension. For type B, the extending rails move between the crane girder rails.

Crane types:

- Single-girder crane: extending frame type A1/1
- Double-girder crane: extending frame types B2/1 and B2/2

KBK Classic trolleys are used as crabs in the extending rail. Double trolleys with an articulated frame are used for extending types A1/1 and B2/1. (A single trolley is sufficient for the crab for cranes up to l_{HT} = 3 meters.) Trolley load bar 220 is used for type B2/2 (see section 10.3).

The extending rails are the same length as the crane girders. Shorter extending rails are available on request.

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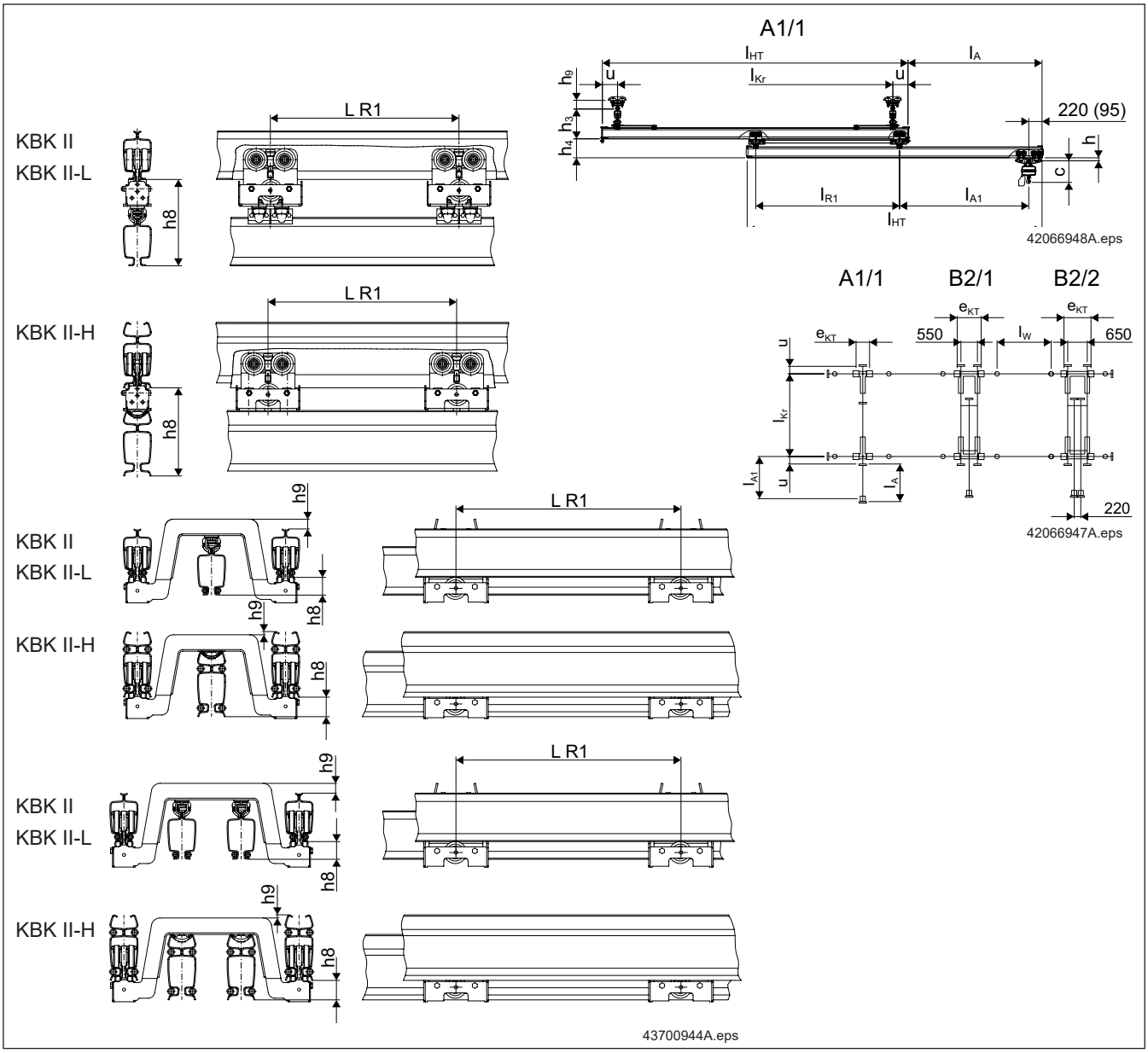
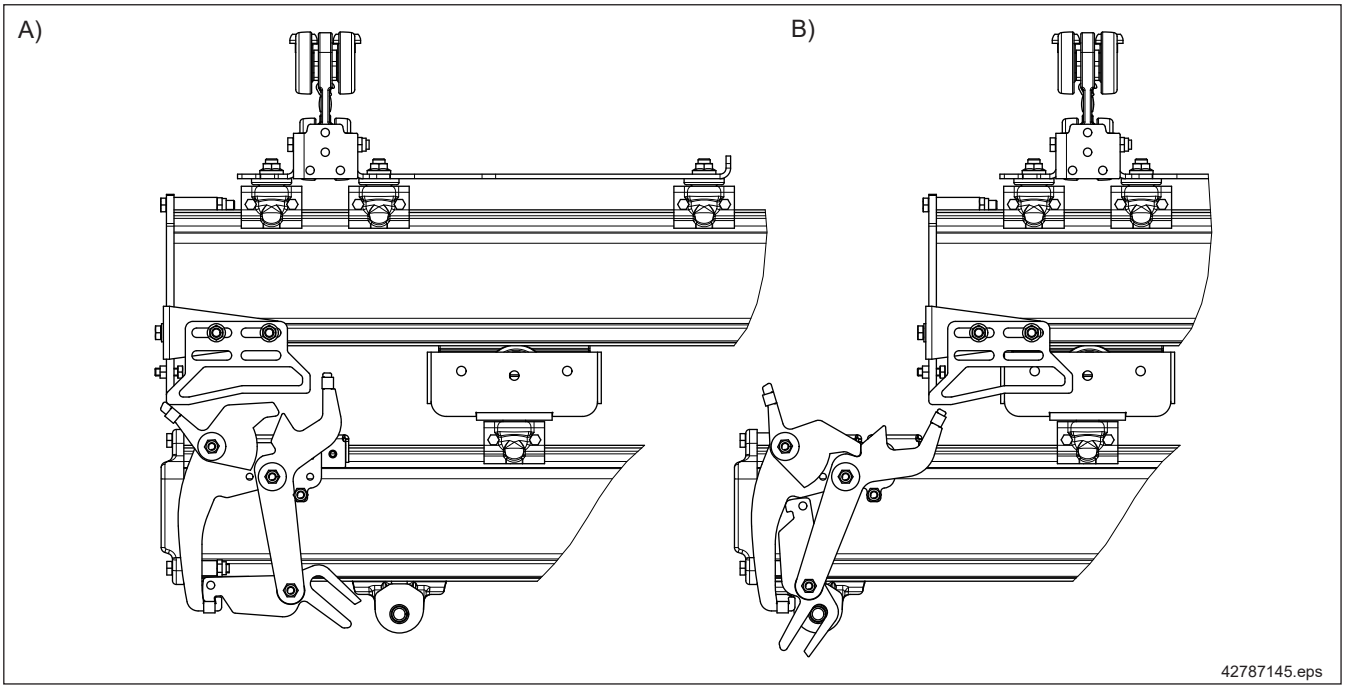


Type	Extending rail	Advantage		KBK I	Crane girder section						Weight	Part no.
					KBK II-L		KBK II		KBK II-H			
		Weight	Height	h8	h8	h9	h8	h9	h8	h9		
				[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]	
A 1/1	I			142							4,17	715 521 46
	II-L				291	-	291	-	275	-	17,30	715 436 46
	II				321	-	321	-	305	-	17,30	715 436 46
	II-H				343	-	342	-	327	-	15,38	715 437 46
B2/1	II-L	x			75	-27	75	3	60	51	42,80	715 439 46
			x		-	-	36	-37	20	11	45,00	715 440 46
	II				105	-27	-	-	-	-	42,80	715 439 46
					-	-	66	-37	50	11	45,00	715 440 46
	II-H				127	-27	-	-	-	-	42,60	715 471 46
					-	-	88	-37	72	11	43,40	715 441 46
B2/2	II-L	x			75	-30	75	3	60	51	50,80	715 443 46
			x		-	-	36	-37	20	11	51,40	715 444 46
	II				105	-30	-	-	-	-	50,80	715 443 46
					-	-	66	-37	50	11	51,40	715 444 46
	II-H				127	-27	-	-	-	-	47,30	715 472 46
					-	-	88	-37	72	11	48,00	715 445 46

4.3 Extension locking device



Item	Designation		
153	Extension locking device	Weight [kg]	6,15
		Part no.	851 545 44

Extension locking devices are suitable for all combinations of KBK II-L/II cranes and KBK II-L/II extending rails on type A1/1 cranes that only extend on one side.

A) The locking device prevents unintended extension of the lower rail when it is retracted.

B) The trolley is held when it enters the locking device; this enables the arrangement to be extended. When the arrangement is retracted, the rail is first pushed back and the trolley is not released until the end.

The special pin for the trolley is included in the scope of delivery for the extension locking device.

Finish: galvanized

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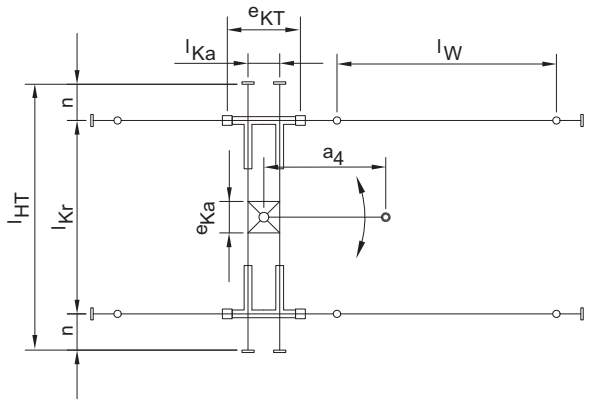
4.4 Cranes for handling equipment



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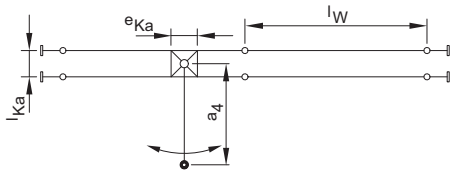

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Single-girder crane		
Assemblies	**Components**	**See chapter/section**
Rail elements	Rail, joint bolt set, end cap, buffer, internal buffer stop, shock absorber, information plates	4
Suspension	Short suspension, Ergo suspension	7
Trolley combination	Trolley, Ergo crane trolley, Ergo crab trolley	8
Travel drive	RF 100, RF 125 und DRF 200	12
Coupling elements	Trolley link, link bar, spacer bar	14
Accessories	Buffers on crabs and cranes	15
Elec. power supply	Cable slider, cable trolley, trailing cable, conductor line	17.1
Control system		18

Design: rigid track and crane suspensions

Project engineering for handling devices

Offset loads and the associated moments on manipulators and handling devices result in special loads on crane installations.

If forces acting in the opposite direction to gravity are exerted on the trolleys and suspensions, KBK Ergo components must be used at the points concerned.

Otherwise, KBK Classic components can be used.

Manipulators and handling devices are bolted to a crab frame. The manipulator crab runs in a double-rail track or on a double-girder crane.

End caps with shock absorbers are used as end caps. For total weights of less than 300 kg and vertical loads, end caps with cellular foam rubber or rubber buffers can be used.

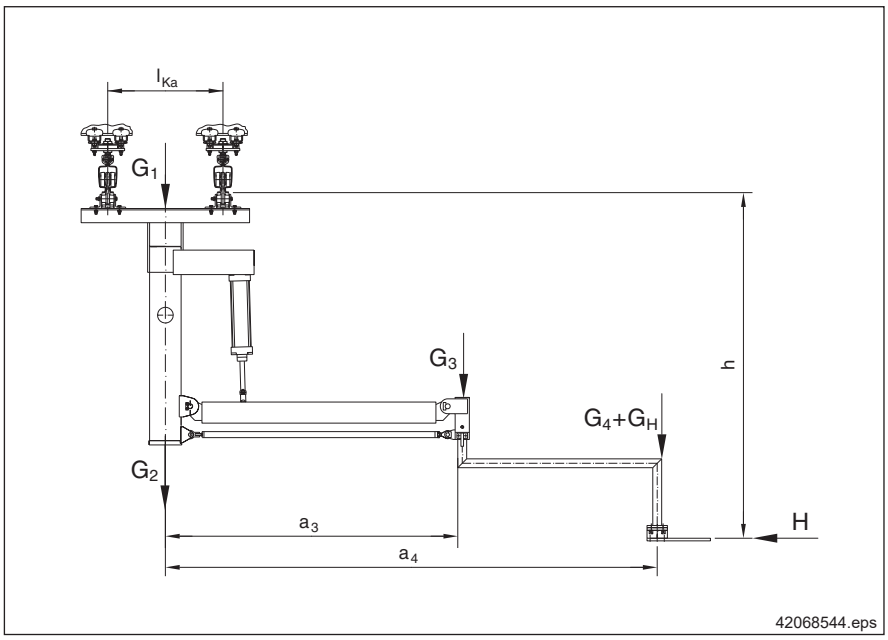
The dead loads of the crane and crab are included in the total weight.

Determining the device geometry, weights and moments is particularly important for specifying the crab frame size and the double-rail track.

Values required for project engineering

Example:

Loads		
Crab frame:	G_1 =	75 kg
Mast:	G_2 =	28 kg
Arm:	G_3 =	122 kg
Device:	G_4 =	10 kg
Load:	G_H =	30 kg
Total:	G_{Ges} =	265 kg
Manual force:	H =	5 kg
Distances:		
Arm:	a_3 =	0,94 m
Device:	a_4 =	2,60 m
Manual force:	h =	3,00 m
Moments:		
Arm:	$G_3 \times a_3$ =	114,7 kgm
Device, load:	$(G_4+G_H) \times a_4$ =	104,0 kgm
Manual force:	H x h =	15,0 kgm
Total:	M_{Ges} =	233,7 kgm



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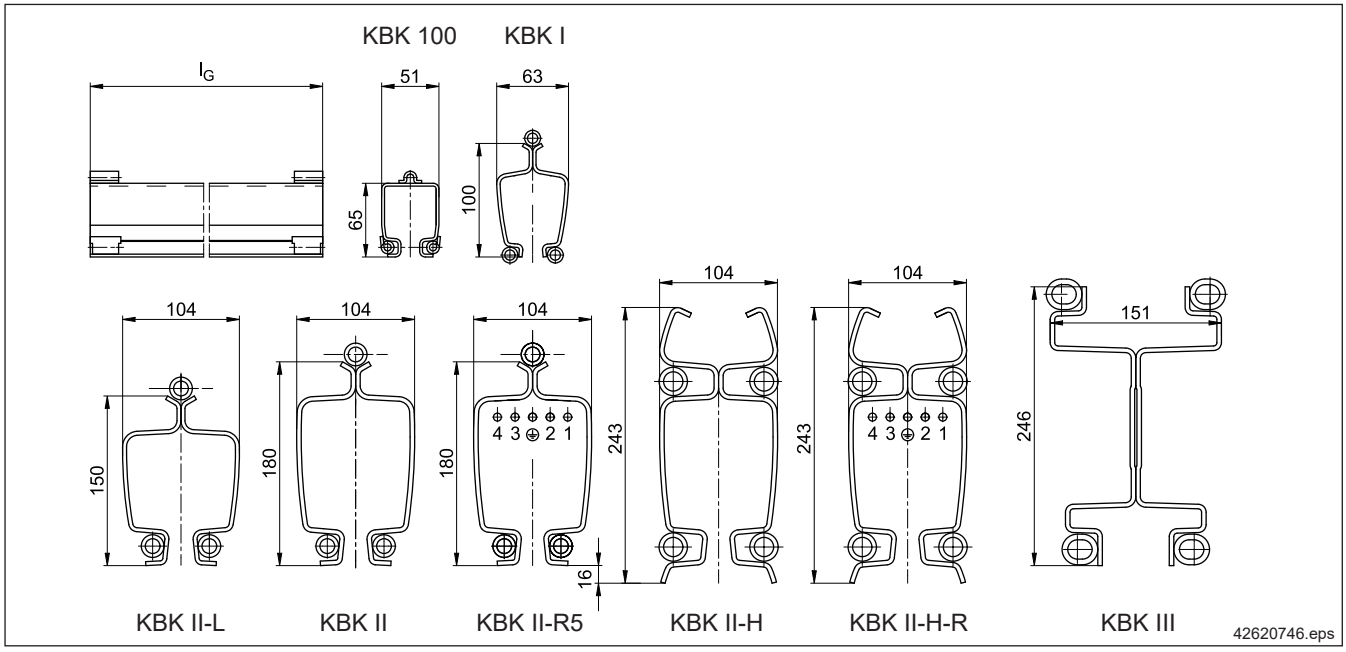
5 Basic components for monorail track, crane runway, crane girder

5.1 Crane and track elements

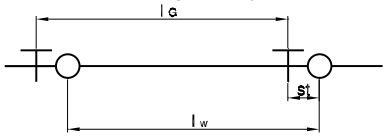
5.1.1 Straight sections

(Item 1)



Item	Length l_G		KBK 100	KBK I	KBK II-L	KBK II	KBK II-R	KBK II-H	KBK II-H-R	KBK III
1	1000 mm	Weight [kg]	4,10	6,40	13,20	17,00	18,20	25,00	26,22	28,40
		Part no.	984 701 44	980 224 44	984 201 44	982 224 44	873 551 44	858 201 44	858 951 44	850 211 44
	2000 mm	Weight [kg]	8,20	12,80	26,40	34,00	36,40	48,70	51,14	54,10
		Part no.	984 702 44	980 226 44	984 202 44	982 226 44	873 552 44	858 202 44	858 952 44	850 212 44
	3000 mm	Weight [kg]	12,30	19,20	39,60	51,00	54,60	72,40	76,06	79,80
		Part no.	984 703 44	980 228 44	984 203 44	982 228 44	873 553 44	858 203 44	858 953 44	850 213 44
	4000 mm	Weight [kg]	16,40	25,60	52,80	68,00	72,80	96,10	100,97	105,50
		Part no.	984 704 44	980 230 44	984 204 44	982 230 44	873 554 44	858 204 44	858 954 44	850 214 44
	5000 mm	Weight [kg]	20,50	32,00	66,00	85,00	91,00	119,80	125,89	131,20
		Part no.	984 705 44	980 232 44	984 205 44	982 232 44	873 555 44	858 205 44	858 955 44	850 215 44
	6000 mm	Weight [kg]	24,60	37,80	79,20	102,00	109,20	143,50	150,80	156,90
		Part no.	984 706 44	980 286 44	984 206 44	982 234 44	873 556 44	858 206 44	858 956 44	850 216 44
	7000 mm	Weight [kg]	-	-	92,40	119,00	127,40	167,20	175,68	182,60
		Part no.			984 207 44	982 236 44	873 557 44	858 207 44	858 957 44	850 217 44
	8000 mm	Weight [kg]			105,60	132,00	145,60	190,90	200,58	208,30
		Part no.			984 322 44	982 235 44	873 558 44	858 208 44	858 958 44	850 218 44
	Special length l_G	min. [mm]	120	150	300	300	300	400	400	400
		max. [mm]	6000	6000	8000	8000	8000	8000	8000	8000

Suspension fittings and joints



The ends of KBK straight track sections, made of special cold-rolled profiles, are fitted with three or four tube sections for bolting the individual track sections together or for fitting the end cap with buffer.

See section 3.9 for distance between suspensions lw and distance of joint from suspension fitting st.

For KBK II-L and KBK II-H monorail tracks, the curved sections, track switches, turntables, drop sections and latching devices are of KBK II design, see adapter in section 5.2.

Integrated conductor line

1 = L 1	3 = L 3	4 = control conductor
2 = L 2	⏚ = PE	5 - 7 (9) = KBK III control conductor

KBK II-R and KBK II-H-R straight track sections are fitted with five internal busbars (10 mm^2 cross-section, up to 60 A, 500 V) which are enclosed over their entire length.

If no control functions or zero have to be transmitted, only 4 conductors are connected.

KBK III sections can be fitted with a maximum of 5 DEL conductor rails on each side, see section 17.1.6.

KBK straight sections without protective earth conductor on application.

In the KBK II-R model, the centrally arranged, green-yellow rail is the protective earth conductor. In the KBK III version, the protective earth conductor is always on one side.

For monorail installations and installations including isolating sections or power pick-up guides, the busbar arrangement must be shown in the drawing.

Type of enclosure

IP 23 to DIN 40050.

Finish: powder-coated, red (RAL 2002)

Special designs, e.g. for outdoor operation, on application

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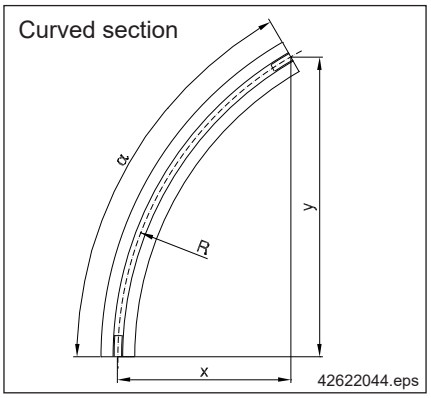
5.1.2 Curved sections (Item 4)



Curved sections are built up in the same manner as straight track sections. KBK II curved sections are used for KBK II-L and KBK II-H installations.
For adapter, see section 5.2.

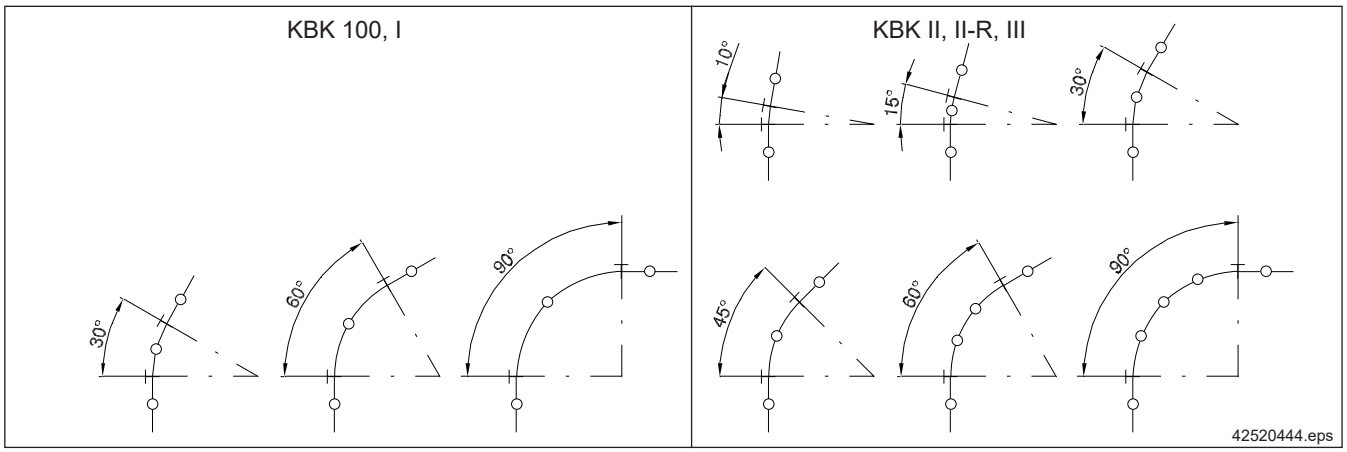
Item	Designation	Profile section size	Radius R [1] [mm]	Angle α [2]	Dim. x [mm]	Dim. y [mm]	Weight [kg]	Part no.
4	Curved section	KBK 100	650	30°	85	325	1,40	984 671 44
				60°	325	565	2,80	984 672 44
				90°	650	650	4,20	984 673 44
		KBK I	750	30°	100	375	2,50	980 233 44
				60°	375	650	5,00	980 235 44
				90°	750	750	7,50	980 237 44
			1000	30°	135	500	3,50	980 391 44
				60°	500	865	6,70	980 392 44
				90°	1000	1000	10,00	980 393 44
		KBK II	1500	10°	25	260	4,90	982 380 44
				15°	50	390	7,10	982 384 44
				30°	200	750	13,70	982 388 44
				45°	440	1060	20,30	982 392 44
				60°	750	1300	26,90	982 396 44
				90°	1500	1500	40,50	982 400 44
		KBK II-R	1500	10°	25	260	5,20	873 580 44
				15°	50	390	7,60	873 584 44
				30°	200	750	14,60	873 588 44
				45°	440	1060	21,70	873 592 44
				60°	750	1300	28,80	873 596 44
				90°	1500	1500	43,50	873 578 44
		KBK III	1500	30°	200	750	21,50	850 388 44
				45°	440	1060	31,50	850 392 44
				60°	750	1300	41,50	850 396 44

Finish: powder-coated, red (RAL 2002)

1) Special radii, larger than the standard radius, are obtained by approximation using curved and straight track sections (polygon formation).
2) Special angles, intermediate sizes available on application.

How to support curved track sections

Curved sections must be supported in the centre by one suspension fitting; one further suspension fitting must be arranged close to each bolted connection.



5.1.3 Coupling tube

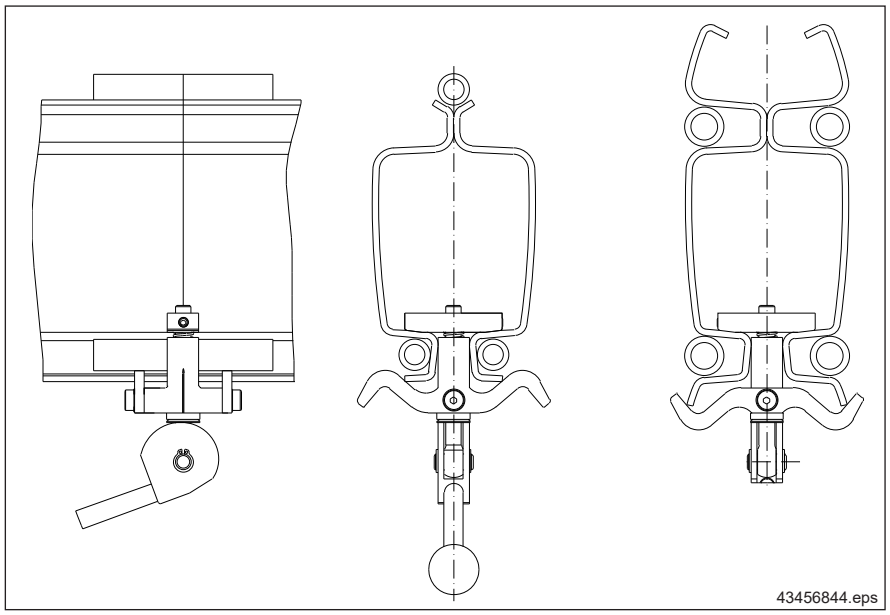
Item	Designation		KBK 100	KBK I	KBK II-L, II, II-R	KBK II-H, II-H-R	KBK III
1a	Coupling tube	Quantity	30	30	30	16	8
		Weight [kg]	0,40	0,63	2,38	2,58	1,88
		Part no.	984 725 44	980 814 44	851 396 44	858 890 44	850 374 44

The full load capacity of the rail joint is not available if coupling tubes are welded on at a later date.

Shortened rail sections should be located at the end of the track.

The end cap can be attached with a profile end section, see section 5.5.

5.1.4 Aligning device



Item	Designation		KBK II-L, II, II-H
180	Aligning device	Weight [kg]	0,83
		Part no.	858 420 44

This device simplifies alignment of the profile sections with each other when tracks are joined together.

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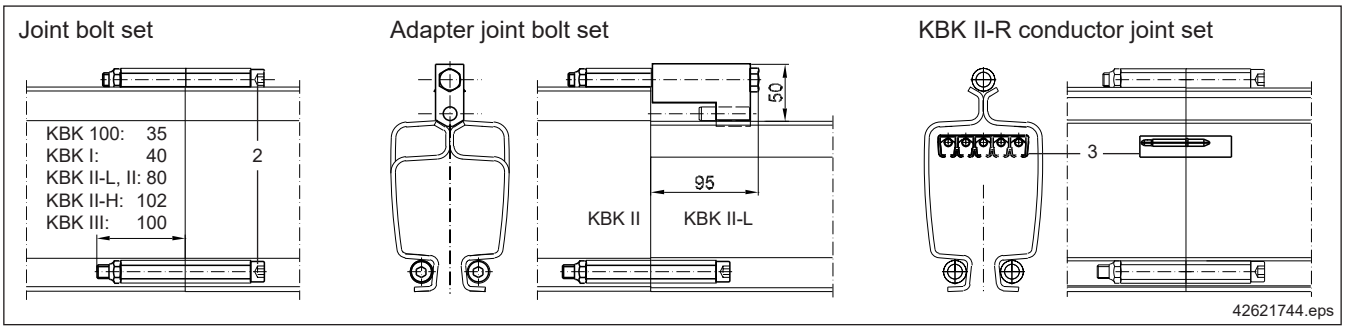
5.2 Joint bolt set

Joint bolt set (item 2)

Conductor joint set (item 3)



Item	Designation		KBK 100	KBK I	KBK II-L	KBK II	KBK II-R	KBK II-H	KBK II-H-R	KBK III
2	Joint bolt set	Weight [kg]	0,05	0,12	0,44			1,42		
		Part no.	984 558 44	980 273 44	982 273 44			858 258 44		
	Adapter joint bolt set	Weight [kg]	-	-	1,06	-	-	-	-	-
		Part no.			984 258 44					
3	Conductor joint set	Weight [kg]					0,07	-	0,07	
		Part no.					873 649 44		873 649 44	

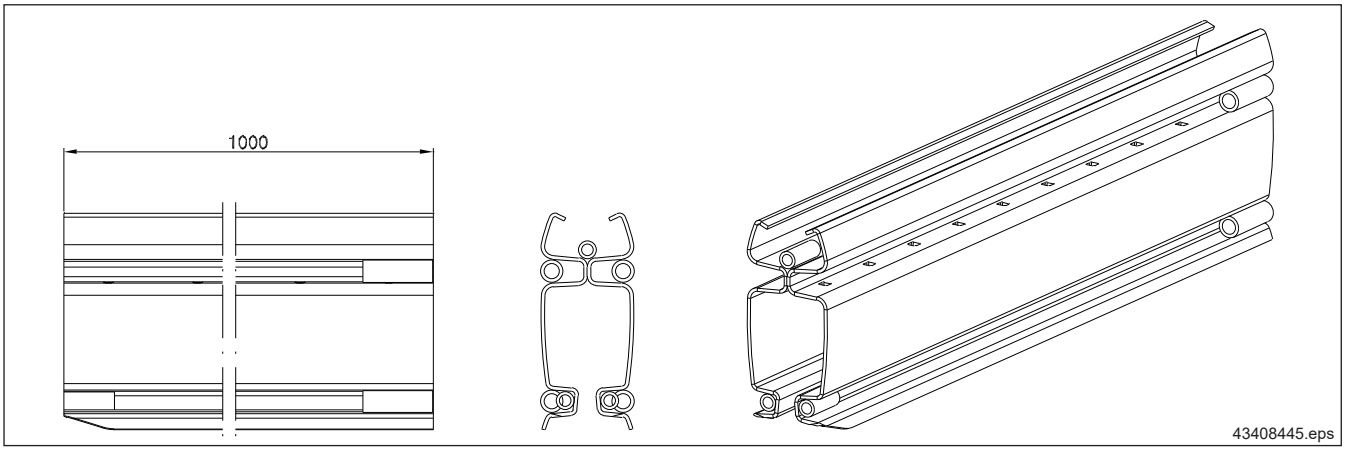
The joint bolt set for a track joint consists of nuts and bolts. An adapter joint bolt set is used for connecting KBK II-L straight sections with KBK II track sections.

For KBK II-R sections, a busbar joint set is required in addition to the bolted connection at each track joint. The set consists of five conductor rail connectors which are pressure-fitted to establish electric contact, and one plastic connector ensuring the mechanical connection of the conductor rail system.

Finish: galvanized joint bolt set, red adapter (RAL 2002)

KBK II/II-H adapter

(Item 2a)



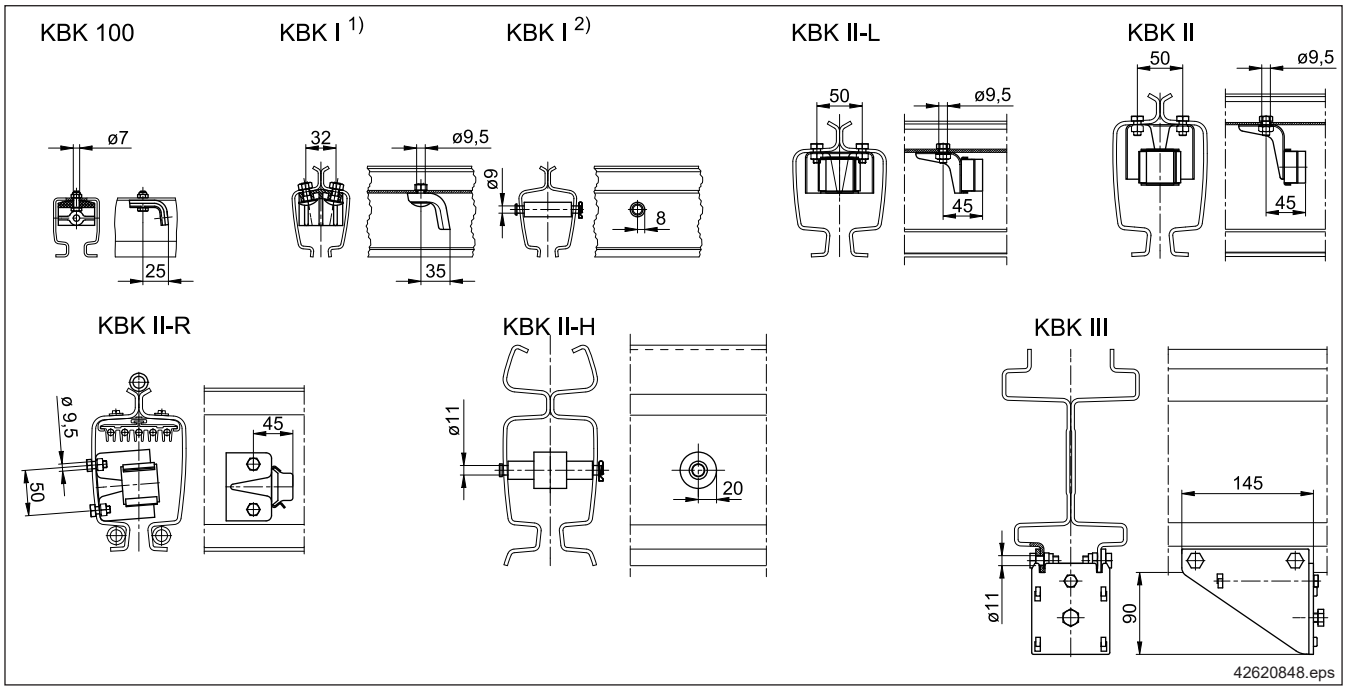
Item	Designation		KBK II-H	KBK II-H-R
2a	KBK II/II-H adapter, 1000 mm	Weight [kg]	24,80	26,02
		Part no.	858 220 44	858 970 44

The adapter makes it possible to connect KBK II-H with KBK II profile sections. A suspension must be fitted close to the joint on the KBK II side. The specified minimum distance of the joint from the suspension fitting must be maintained.

Finish: powder-coated, red (RAL 2002)

5.3 Internal buffer stop

(Item 6)



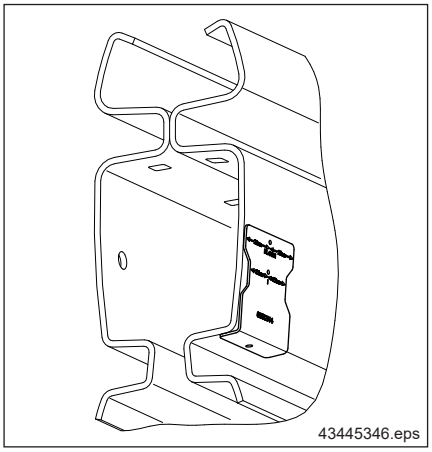
Item	Designation		KBK 100	KBK I 1)	KBK I 2)	KBK II-L	KBK II, II-R	KBK II-H, II-H-R	KBK III
6	Internal buffer stop	Weight [kg]	0,04	0,05	0,09	0,20	0,20	0,28	1,20
		Part no.	984 545 44	980 130 44	980 928 44	984 355 44	982 120 44	858 120 44	850 360 44

1) Attached/drilled at the top
2) Attached/drilled on the side

An internal buffer stop is fitted as collision protection for accumulated cable sliders, and in the case of KBK II-L/II/II-H for accumulated cable trolleys or for limiting crane or hoist trolley travel. Drill holes in the top or side of the track section to secure the internal buffer stop.
A buffer must fitted in both rails of double-rail systems and double-girder cranes.
KBK II-H internal buffer stops can also be used for KBK II-L, KBK II and KBK II-R.

A stop must be installed if an internal buffer stop is used with a KBK II Ergo end carriage (see section 15.3).

Finish:
KBK 100, KBK I: plastic, black
KBK II-L, KBK II, KBK II-H steel, galvanized
KBK III: steel, galvanized, without buffer element (see chapter 15)



Item	Designation		KBK II-L, II, II-H
175	Drilling template	Weight [kg]	0,06
		Part no.	858 121 44

The drilling template is suitable for the use of buffer part no. 858 120 44 or 980 928 44 or for profile end section (item 170).

Finish: galvanized

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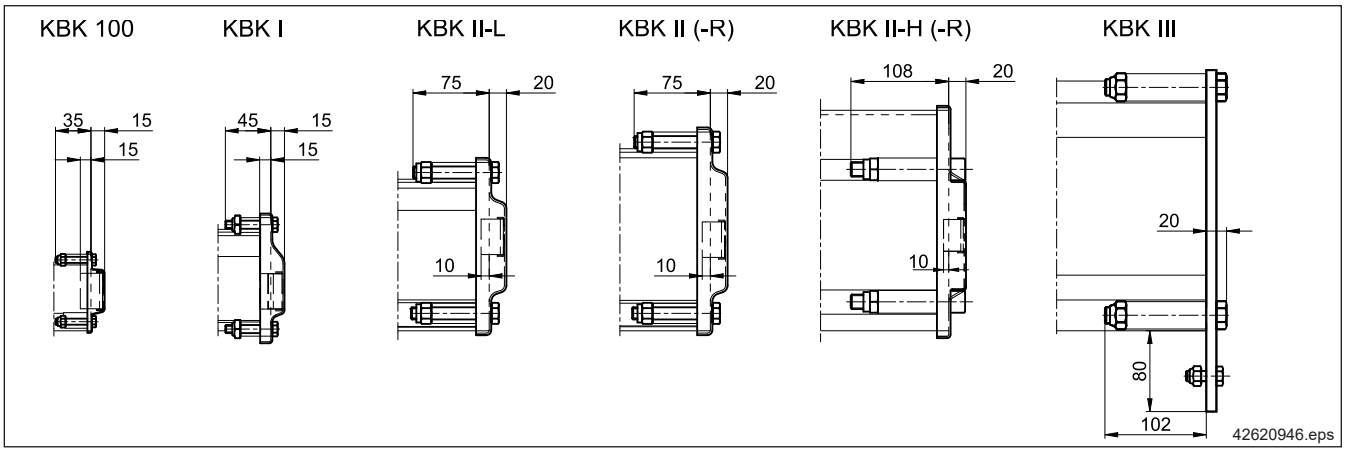
5.4 End cap with buffer

(Item 7)



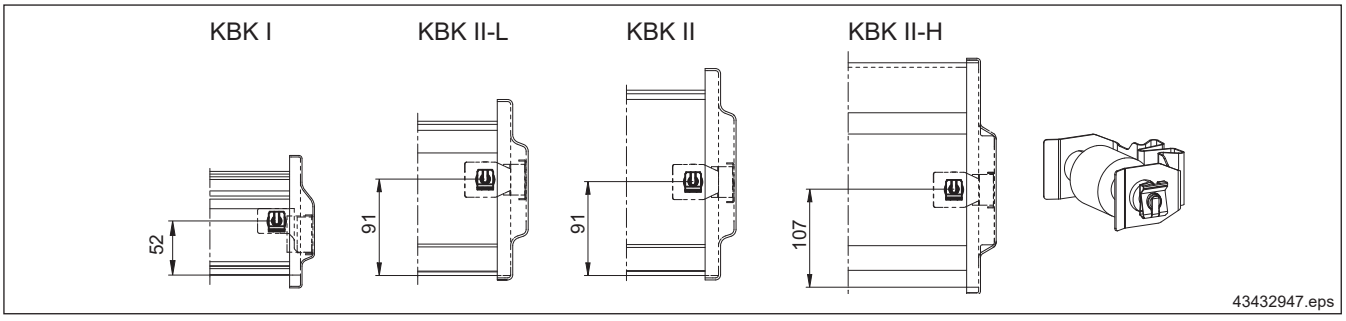
Item	Designation		KBK 100	KBK I	KBK II-L	KBK II	KBK II-R	KBK II-H	KBK II-H-R	KBK III
7	End cap with buffer	Weight [kg]	0,10	0,27	0,62	0,60	0,73	1,74	1,77	4,53
		Part no.	984 540 44	980 126 44	984 126 44	982 126 44	873 611 44	858 126 44	858 920 44	850 126 44

An end cap with buffer must be fitted at the ends of tracks and crane girders. The KBK II-R end cap with buffer is fitted with an additional end cap for the busbars. End caps must not be approached in normal operation.

Finish:
KBK 100, I, II-L, II, steel, galvanized
KBK III: steel, red (RAL 2002); without buffer elements (see chapter 15)

5.5 Profile end section

(Item 170)

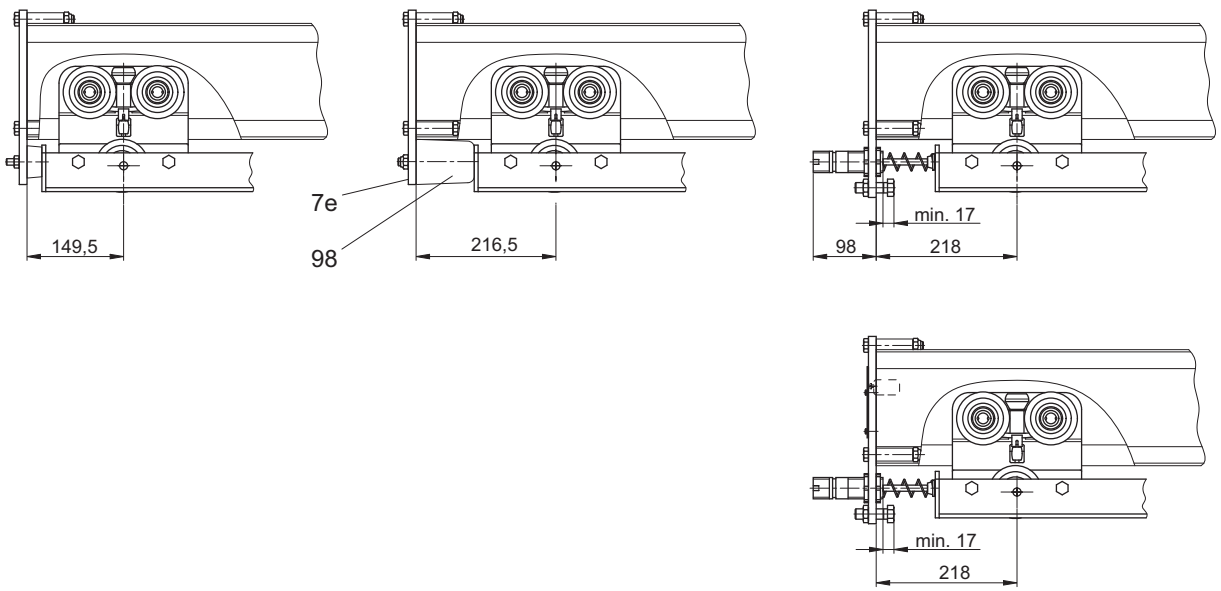


Item	Designation		KBK I	KBK II-L, II, II-R, II-H, II-H-R
170	Profile end section	Weight [kg]	0,14	0,35
		Part no.	980 924 44	858 124 44

The profile end section is a combination of internal buffer stop and an end cap. After a profile section has been shortened, this assembly can be used to create a safe and reliable end for the profile section without the need to weld the coupling tubes on again. Remove the rubber stop from the end cap and clip the spring element of the profile end section into place.
The end cap must be ordered separately. For the drilling template, see section 5.3.

Finish: galvanized, stainless steel

5.6 Ergo end cap



Item	Designation		KBK I	KBK II-L	KBK II	KBK II-R	KBK II-H	KBK II-H-R
7e	KBK Ergo end cap without buffer	Weight [kg]	-	2,80	3,00	2,00	3,40	3,20
		Part no.		984 455 44	984 451 44	851 008 44	858 451 44	858 908 44
	KBK Ergo end cap with shock absorber	Weight [kg]	-	3,40	3,60	2,70	4,20	4,20
		Part no.		984 457 44	984 453 44	851 016 44	858 453 44	858 916 44
98	Rubber buffer	Weight [kg]	0,10					
		Part no.	978 206 44					
	Cellular plastic buffer	Weight [kg]	0,26					
		Part no.	939 666 44					

KBK Classic end caps must be used for KBK I.

The type of end caps selected for KBK II depends on the suspensions and trolleys used.

KBK Ergo end caps must be used if KBK Ergo end carriages are used.

In the case of the KBK Ergo end caps, the following shock-absorbing elements can be used in the end caps for the specified applications:

	Crane runway	Crane girder	Extending rail
Overhung crane	Cellular plastic buffer	KBK Classic	-
Extending crane	Rubber buffer	Rubber buffer	KBK Classic

Track buffers may be used for swaying loads. If KBK Ergo end carriages are able to approach the track buffer, the end carriages must be equipped with a stop to suit the track buffers.

All installations must be amply dimensioned so that the end caps and track buffers are not approached during operation.

Buffers must be ordered separately.

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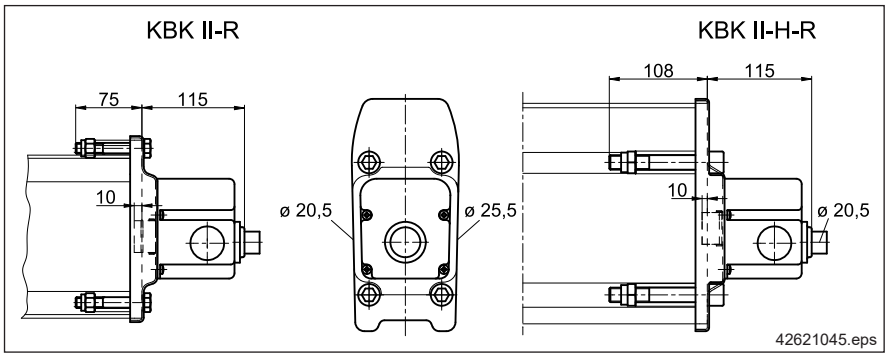
5.7 KBK II-R components

Powerfeed end cap
(Item 8)



Item	Designation		KBK II-R	KBK II-H-R
8	Powerfeed end cap	Weight [kg]	0,80	2,00
		Part no.	873 605 44	858 926 44

The powerfeed end cap is used for power supply to the end of a KBK rail. It consists of an end cap with buffer and a terminal box.

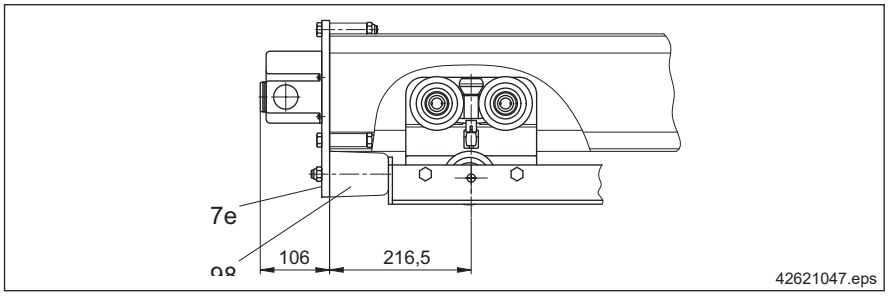
The terminal box includes an M20 union on its end face. Prepared openings of 20,5 mm and 25,5 mm in diameter are provided on the side (max. connection cross-section 10 mm²).

The powerfeed end cap is supplied pre-assembled with attached plug connectors and connecting cables. Powerfeed end caps without protective earth conductor available on application.

The powerfeed end cap has CSA approval.

Finish: galvanized cap, black plastic terminal box

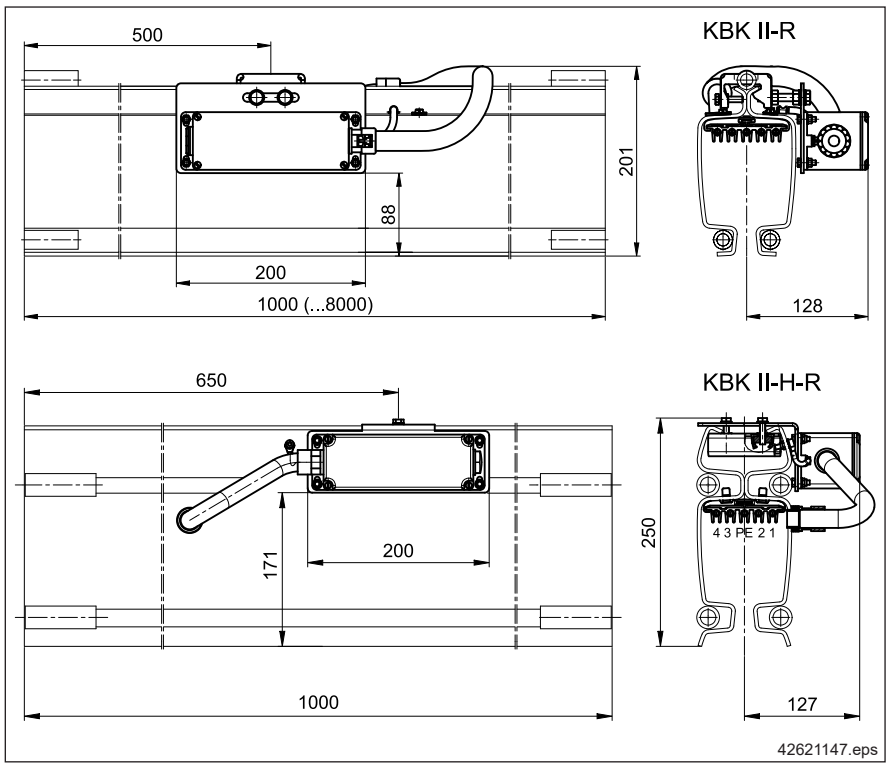
Ergo powerfeed end cap
(Item 8)



Item	Designation		KBK II-R	KBK II-H-R
7e	KBK Ergo powerfeed end cap without buffer	Weight [kg]	2,50	3,00
		Part no.	851 005 44	858 905 44
	KBK Ergo powerfeed end cap with shock absorber	Weight [kg]	3,20	3,10
		Part no.	851 015 44	858 915 44
98	Rubber buffer	Weight [kg]	0,10	
		Part no.	978 206 44	
	Cellular plastic buffer	Weight [kg]	0,26	
		Part no.	939 666 44	

KBK II-R Ergo powerfeed end caps can be used to supply power to KBK II-R. KBK Ergo powerfeed end caps can be equipped with the same shock-absorbing elements as KBK Ergo end caps. A KBK II-R Ergo end cap must be used to close the other end of the KBK II-R Ergo rail.

Line powerfeed
(Item 9)



Item	Designation			KBK II-R	KBK II-H-R	
9	Line powerfeed	L = 1000 mm	Weight [kg]	20,10	29,60	
			Part no.	873 615 44	858 615 44	
		L_{max} = 8000 mm	Weight [kg]	1,9+18,2 kg/m	-	
			Part no.	517 870 46		
	Line powerfeed for raised cranes		Weight [kg]	1,67+18,2 kg/m	1,50+26,22 kg/m	
			Part no.	715 285 46	715 295 46	715 942 46
			Orientation	LH and RH	LH	RH

The line powerfeed section is a straight section, 1000 mm in length, fitted with five busbars and a ready-wired terminal box (max. connecting cable conductor cross-section 10 mm^2). This component can be used to supply power to closed-circuit tracks or as an additional powerfeed point on long tracks to avoid excessive voltage drop.

KBK II-R is available in straight sections up a maximum length of 8 m. The line powerfeed is 500 mm from one end. The total length must be specified in the order.

Line powerfeed sections for raised cranes have shortened conductor rails at each end and cannot be installed in tracks.

Line powerfeed as a curved section on application.

The line powerfeed has CSA approval.

Finish: red (RAL 2002)

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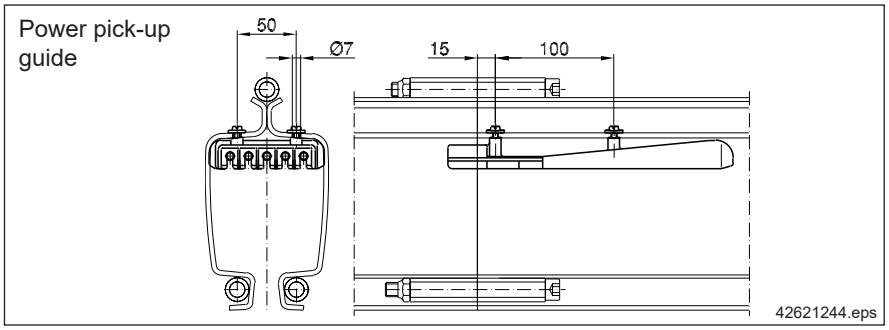
Power pick-up guide (Item 10)

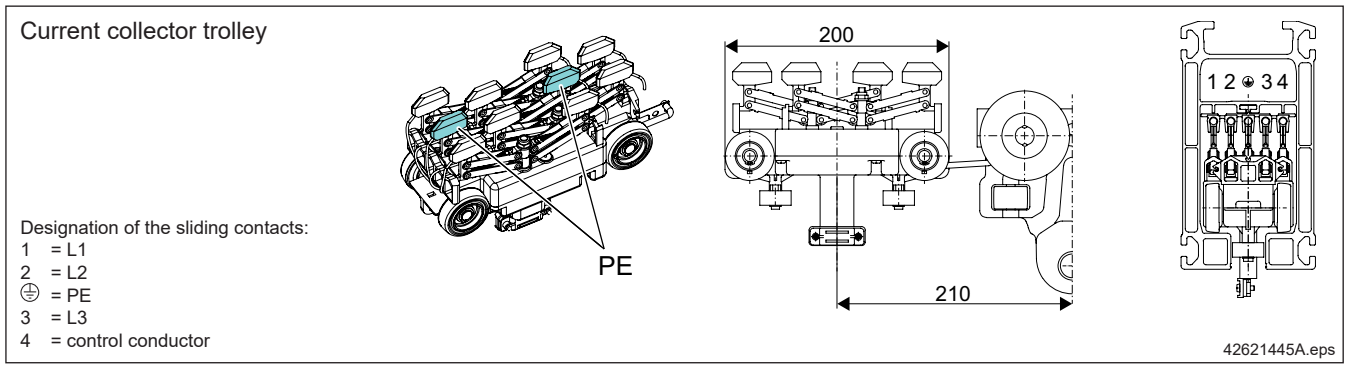


Item	Designation		KBK II-R
10	Power pick-up guide	Weight [kg]	0,10
		Part no.	873 650 44

Where, with push-travel trolleys, electrification is required only for the operation of electric hoists in certain parts of the KBK installation, power pick-up guides can be fitted to the appropriate track sections for easy transfer of current collector trolleys from KBK II to KBK II-R (or vice versa). Power pick-up guides can only be installed straight track sections. Consider the position on the protective earth contacts of the current collector trolley (item 12) when planning the electric equipment. Isolating sections may need to be included in L1 to L3. KBK II or KBK II-R straight sections with ready-mounted power pick-up guide and busbars are available on application.

Finish: black plastic

Current collector trolley (Item 12)



Item	Designation		KBK II-R, II-H-R	
			4-pole	5-pole
12	Current collector trolley	Weight [kg]	1,50	1,50
		Part no.	873 684 44	873 685 44
	Current collector trolley with CSA approval	Weight [kg]	1,50	1,50
		Part no.	873 977 44	873 978 44

For reliable current collection, the 5-pole KBK II-R current collector is fitted with two sliding contacts mounted on individually spring-loaded double pantographs for each conductor rail. The connecting cable is 2 m long.

Maximum load: 16 A at 100% cyclic duty factor.

The current collector trolley is guided by two support rollers in the track section and runs on four plastic wheels mounted on anti-friction bearings which are lubricated for life. The traction resistance is approx. 0,5-1 kg. A coupling can be used for connection to a KBK II load trolley.

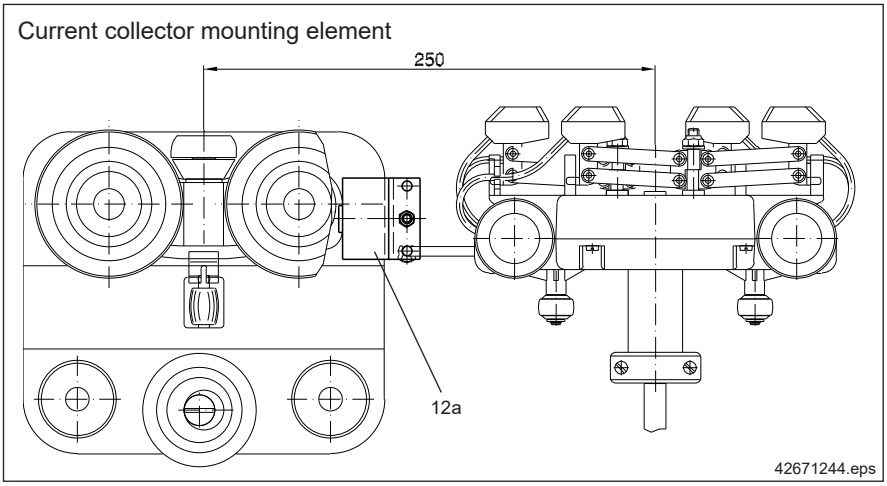
The 4-pole current collector trolley may only be used in 4-pole (old) installations.

Current collector trolleys must always be arranged to run between two trolleys. These are used to protect against collisions.

Current collector trolleys without protective earth conductor available on application.

Finish: black

KBK II Ergo current collector mounting element
(Item 12a)



Item	Designation		KBK II-R, II-H-R
12a	Current collector mounting element	Weight [kg]	0,04
		Part no.	851 125 44

The current collector mounting element is used to connect the current collector trolley to KBK II Ergo trolleys.

Finish: galvanized

DFL bracket
(Item 210)

Item	Designation		KBK II-H-R
210	DFL bracket for KBK II-H-R (20 off + 5 bolts)	Weight [kg]	0,15
		Part no.	858 912 44

These brackets can be used to equip KBK II-H straight sections with conductor lines at a later date.

$$\text{Brackets needed for each straight section} = \frac{\text{Straight section length [m]}}{0{,}7} + 1$$

The DFL conductor line must be ordered separately.

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5.8 Maintenance sections

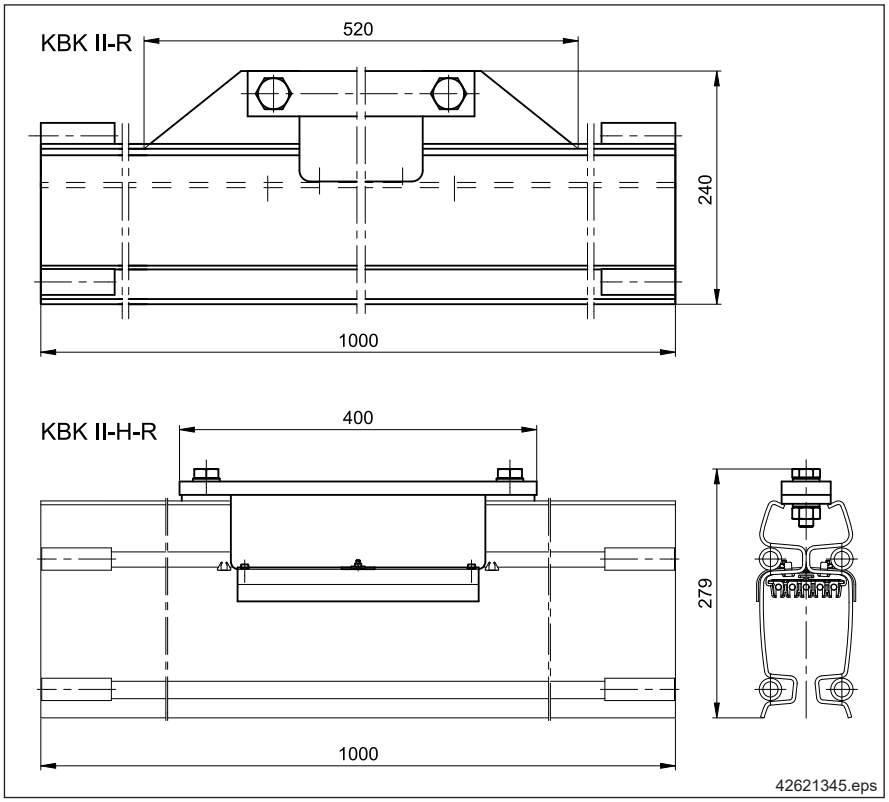
General

A maintenance section is recommended for the fitting, removal and maintenance of trolleys and current collector trolleys; it should be incorporated in monorail tracks of considerable length or of closed-circuit layout, and in crane runways for more than two electrically powered cranes.

Monorails with several travelling hoists should be provided with a maintenance branch track, incorporating a maintenance section, connected to the main track via this track switch.

Maintenance sections have CSA approval.

Current collector trolley maintenance section (Item 11)



Item	Designation			KBK II-R	KBK II-H-R
11	Current collector trolley maintenance section	L = 1000 mm	Weight [kg]	19,10	28,00
			Part no.	873 665 44	858 665 44
		L_{max} = 8000 mm	Weight [kg]	0,9+18,2 kg/m	-
			Part no.	517 840 46	

The 1000 mm long straight track section fitted with five busbars features a stiffener bar and transparent cover that can be removed to provide access through an installation opening in the track. This makes it possible to replace **collector trolleys**.

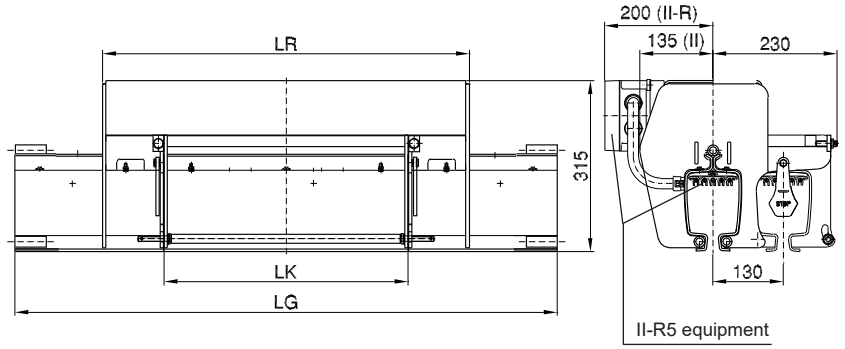
KBK II-R is available in straight sections up a maximum length of 8 m. The installation opening is 500 mm from one end. The total length must be specified in the order.

Finish: red (RAL 2002)

Maintenance rail with pull-out section

(Item 11)

Maintenance rail with pull-out section



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Item	Designation	Dimensions in mm					KBK II	KBK II-R
		LG	LK	LR	Max. trolley length			
11	Maintenance rail with pull-out section	1000	450	676	420	Weight [kg]	45,20	51,00
						Part no.	851 370 44	851 380 44
		2000	800	1026	770	Weight [kg]	72,50	80,00
						Part no.	851 371 44	851 381 44

Maintenance sections are used to install and remove travel units. The sliding section releases rail ends on both sides which can be used as installation openings. **Remove the load and disconnect the installation from the power supply.** Maintenance sections can bear loads when closed.

Suitable for: KBK II; II-L with adapter; II-R

Fitting and suspension:

Maintenance sections are fitted in the same way as normal track sections. Suspensions can be fitted on either side of the sliding section – suspension dimension h_2 min. 140 mm.

The superstructure must be in line with the rail if short, adjustable suspensions are used.

Raised, rigid crane end carriages (Item 67) collide with this maintenance section, therefore this combination is not possible.

Equipment:

KBK II without conductor rails

KBK II-R with conductor rails and terminal box - can be used for powerfeed

Finish: red (RAL 2002)

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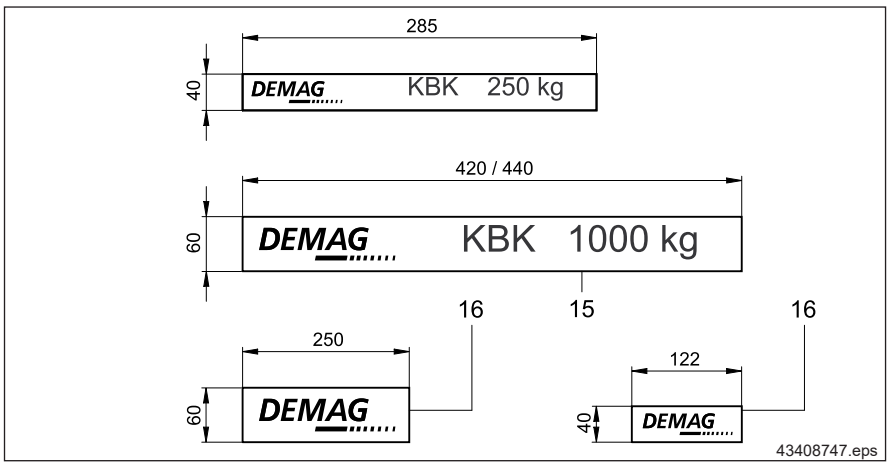
5.9 Information plates

Capacity plate (item 15)

Demag name plate (item 16)



Item	Designation	Load capacity	KBK 100/KBK I h = 40 mm	KBK II-L/KBK II/ KBK II-H/KBK III h = 60 mm
		[kg]	Part no.	Part no.
15	Capacity plate	**50**	980 861 44	-
		80	980 862 44	-
		100	980 863 44	-
		125	980 864 44	851 864 44
		160	980 865 44	-
		200	980 866 44	-
		250	980 867 44	851 491 44
		315	980 868 44	-
		400	980 869 44	-
		500	980 870 44	851 492 44
		630	-	851 493 44
		800	-	851 494 44
		1000	-	851 495 44
		1250	-	851 496 44
		1600	-	851 497 44
		2000	-	851 498 44
		2500	-	851 499 44
	Special capacity plate	**10 - 500**	715 540 46	-
		100 - 3200	-	715 560 46
16	Name plate	**-**	851 159 44	850 150 44

Capacity plates must be fitted to both sides of all crane bridges. Such plates must be fitted to monorail tracks at suitable distances and in such a manner that operators can see the permissible load capacity from any operating position. The load capacity stated on the hoist and on the crane or suspension monorail must be identical.

Capacity plates measuring 60 mm in height should be used for KBK II-L section sizes and larger.

Finish:

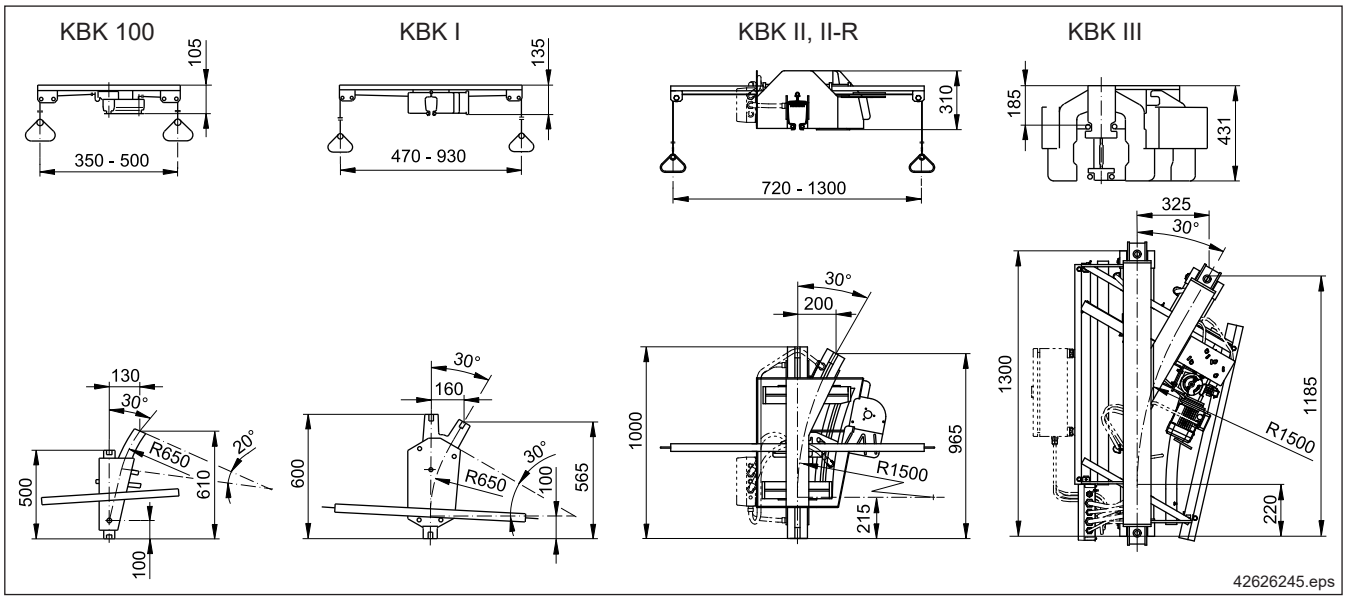
Self-adhesive foil

6 Assemblies for suspension monorails

6.1 Track switch

(Item 20)

6.1.1 Dimensions and notes



Item	Designation	Design	Position		KBK 100	KBK I	KBK II	KBK II-R	KBK III
20	Track switch	Manually operated via pull cord (VDE, CSA)	Right	Weight [kg]	15,00	33,00	97,00	103,00	-
				Part no.	984 620 44	980 480 44	984 470 44	873 952 44	
			Left	Weight [kg]	15,00	33,00	97,00	103,00	
				Part no.	984 630 44	980 490 44	984 475 44	873 953 44	
		Electrically actuated w/o control elements (VDE)	Right	Weight [kg]	-	-	100,00	106,00	280,00 Section 6.1.2
				Part no.			984 460 44	873 950 44	
			Left	Weight [kg]			100,00	106,00	
				Part no.			984 465 44	873 951 44	
		Electrically actuated w/o control elements (CSA)	Right	Weight [kg]			100,00	106,00	
				Part no.			984 319 44	873 973 44	
			Left	Weight [kg]			100,00	106,00	
				Part no.			984 340 44	873 974 44	

All tracks switches are checked and supplied ready for operation.

All track switches are mechanically safeguarded to prevent loads from dropping.

Control elements and control cable must be ordered separately (see section 6.1.4).

KBK II track switches are used for KBK II-L and KBK II-H installations. These require adapter joint bolt sets and adapters, respectively.

Assembling track switch to track switch: for KBK II and KBK III, special joint bolt sets and special suspension brackets are available on application.

Due to the high operating forces, the KBK III track switch is only available as an electrically operated unit.

Pay attention to the load capacity of the track switch blade if several loads are present in one installation.

Maximum load on track switches		KBK 100	KBK I	KBK II, II-R	KBK III
Maximum load	[kg]	200	400	1200	2600
Distributed to 2 trolleys with a min. distance of	[mm]	210	210	250	800

Finish: red (RAL 2002)

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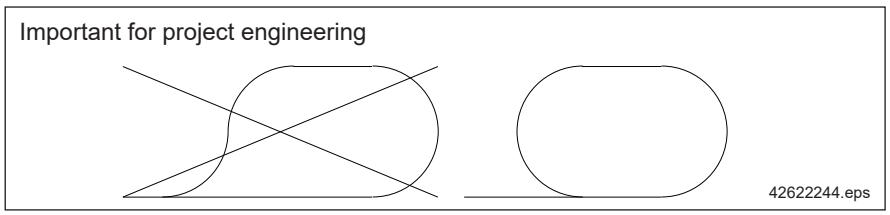
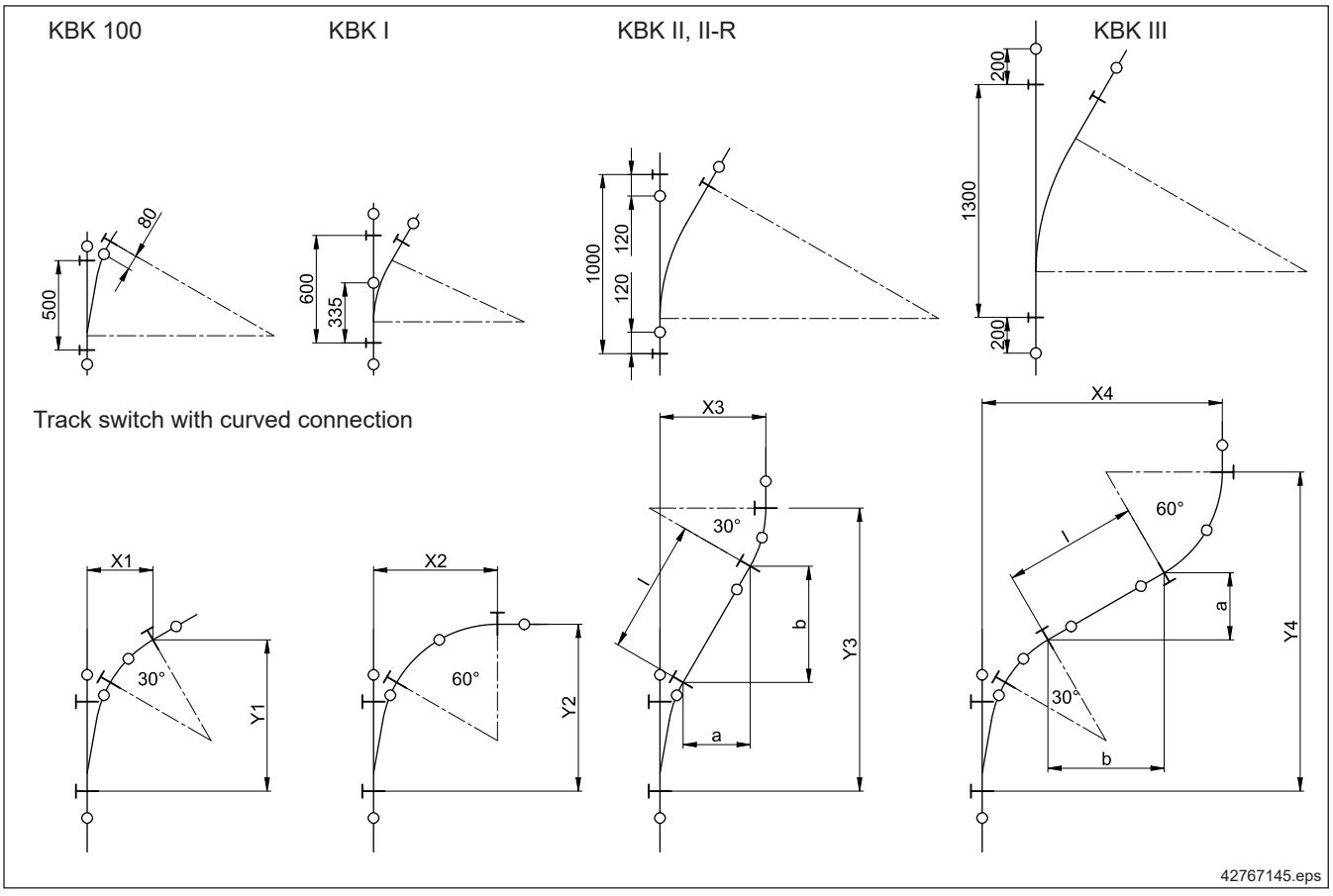
Important for project engineering



When drafting projects for KBK II-R and KBK III DEL track systems, continuity of the L1, L2, L3 and control conductors must be ensured.

Suspensions and dimensions

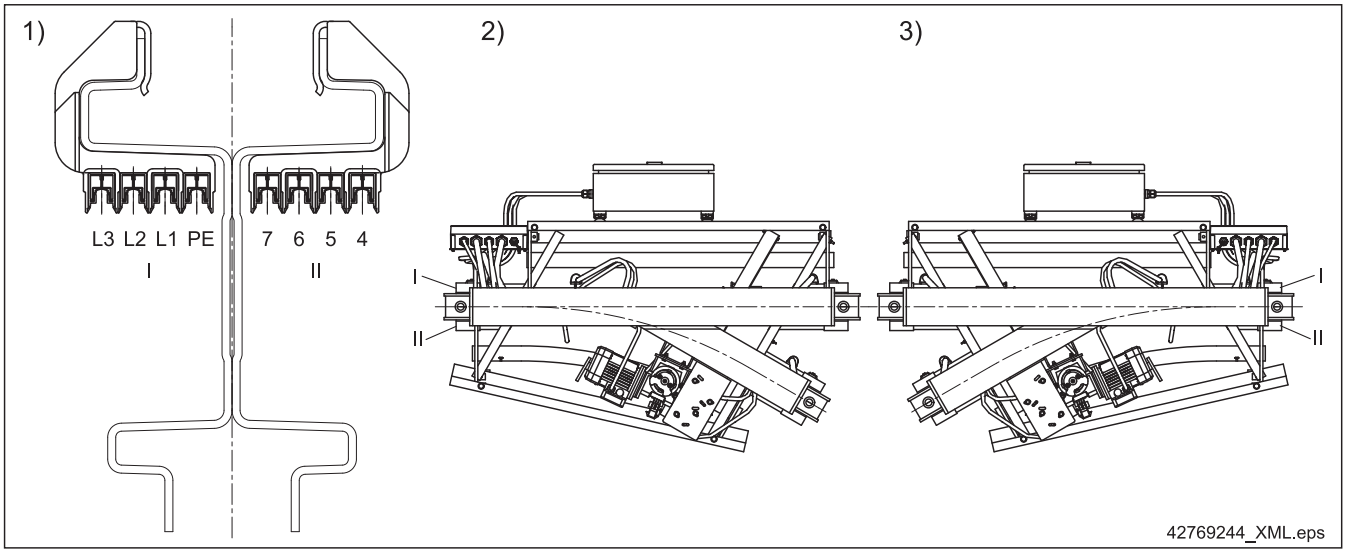


Track switch	Curved connection radius	a	b	X1	Y1	X2	Y2	X3	Y3	X4	Y4
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
KBK 100	650	l x 0,5	l x 0,866	367	846	692	933	216+a	933+b	692+c	1408+d
KBK I	750			436	837	811	937	262+a	942+b	811+c	1491+d
	1000			536	928	1026	1062	296+a	1067+b	1028+c	1797+d

KBK I track switches are suspended by means of the attached ball-head suspension rod with spring clip. For KBK 100, KBK II and KBK II-R track switches, suspension fittings are required as for track sections. The suspension rod lengths necessary for track switch suspension are identical to those for the other track sections.

Short suspension fittings cannot be used.

6.1.2 KBK II-R, KBK III-DEL integrated conductor line



1) KBK III power supply line
2) KBK III, track switch right
3) KBK III, track switch left

Designation		No. of poles	PE position	Part no.
Right-hand track switch with DEL	Electrically operated	4	I	878 700 44
			II	878 705 44
		8	I	878 710 44
			II	878 715 44
Left-hand track switch with DEL		4	I	878 720 44
			II	878 725 44
		8	I	878 730 44
			II	878 735 44

KBK II-R and KBK III-DEL track switches can be used to supply outgoing tracks with power. They are fitted with a terminal box to provide the operating voltage.

KBK III-DEL track switches can be fitted with up to 2 x 4 conductors.

KBK III type:

- 4 or 8 conductors
- 25 mm² conductor rail cross-section
- Position of PE rail in I or II

6.1.3 KBK II, II-R, III drive

Geared motor, end position cut-off by limit switches.

Switching time: 3 seconds, CDF = 50%

Other voltages and pneumatic operation available on request.

Drive technical data		
Worm geared motor		
Part no.	851 208 44	
Voltage	380 - 415 V, 50 Hz	440 - 480 V, 60 Hz
Rated motor current	0.51 A	
cos φ	0,72	
Drive output	0,12 kW	0,14 kW
Type of enclosure	IP 55	
Insulation class	ISO F	
Lubricated for life with oil filling		

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6.1.4 KBK II, II-R, III controls

Track switch type	Design	Control system	Remark
KBK II KBK II-R5 KBK III KBK III-DEL	Motion by means of selector and pushbutton switch without electric track switch monitoring device (two-handed operation) with retaining feature	Contactor control	Preferably used for push-travel trolleys.
	Motion by means of selector and pushbutton switch with electric track switch monitoring device with retaining feature		Only possible for electrically driven travel units and at least 5-pole conductor line for KBK II and 6-pole conductor line for KBK III along the entire track length. Special controls are required for track switches that are arranged close together.

Without electric track switch monitoring device

Controller can only be actuated using two hands:

To change the track switch position, turn one switch to the right or left and then press the pushbutton. The track switch then turns automatically until it is switched off at the limit position.

With electric track switch monitoring device

Single-handed operation on a controller:

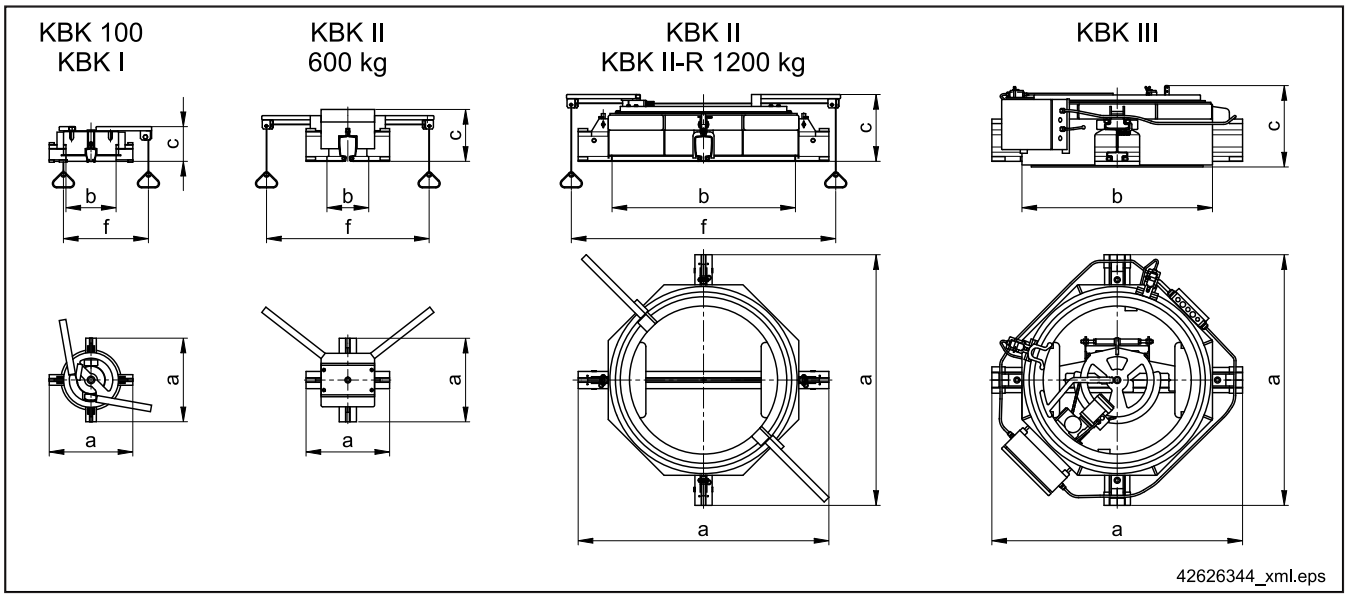
To change the track switch position, turn one switch to the right or left. The electric track switch monitoring device prevents the track switch from moving while a monorail hoist or trolley is located within the track switch zone (prerequisite: electrically driven trolley, 5-pole (KBK II) or 6-pole (KBK III) conductor line, contactor control).

Isolating sections must be provided in one (KBK II) or two (KBK III) control conductors of the outgoing track sections for electric monitoring of the track switch.

6.2 Turntable

(Item 21)

6.2.1 Dimensions and notes



	For max. travelling hoist length [mm]	Trolley combinations as in section 8.2	Max. load [kg]	a [mm]	b [mm]	c [mm]	f (adjustable) [mm]	Actuation	Weight [kg]	Part no.	Suspension as shown (next page)
KBK 100	140	1	100	350	180	125	300 - 680	Manual	15	On application	1
	140	1	300	500	300	225	400 - 1100	Manual	21	On application	1
KBK I	350	2	400	750	500	175	600 - 1300	Manual	26	On application	1
	890	4	600	1500	1000	340	-	Electric	125	517 884 46	2
	170	1	600	500	250	310	600 - 1050	Manual	45	982 650 44	3
KBK II	890	2, 12	1200	1500	1100	405	1300 - 2200	Manual	275	982 902 44	4
	890	2, 12	1200	1500	1100	390	-	Electric	300	982 901 44	4
	890	2, 12	1200	1500	1100	405	1300 - 2200	Manual	280	873 740 44	4
KBK II-R	890	2, 12	1200	1500	1100	390	-	Electric	305	873 735 44	4
	1390	14 [1)]	1600	2000	1500	400	-	Electric	500	715 151 46	5
KBK III	750	1, 11	1200	1500	1050	460	-	Electric	450	715 020 46 (4-pole) 715 022 46 (8-pole)	4
	1550	2, 12	2600	2500	1800	545	-	Electric	1200	On application	6
Turntable with CSA approval											
KBK II	890	2, 12	1200	1500	1100	390	-	Electric	300	873 984 44	4
KBK II-R	890	2, 12	1200	1500	1100	405	1300 - 2200	Manual	280	873 740 44	4
	890	2, 12	1200	1500	1100	390	-	Electric	305	873 985 44	4

1) Item 58, load bar type C with e_{Ka} = 500 mm

The turntable comprises a short track section which rotates 90°. All turntables are mechanically safeguarded to prevent loads from dropping. Integrated mechanical track safety stops prevent trolleys from entering and leaving the turntable unintentionally during turning operations.

Any unused branches and dead ends must be closed by fitting end cap with buffer (see section 5.4). Operation is effected either manually by adjustable pull cords, or electrically. For electric operation, the slewing motion takes approx. 9 seconds, up to 15 seconds for the largest types.

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Control system and control cable must be ordered separately.

KBK II turntables are used for KBK II-L and KBK II-H installations. In such cases, adapter joint bolt sets are required (see section 5.2).

KBK II-R turntables are fitted with five busbars and can be used as powerfeed points for the adjoining track sections.

The turntable is completely wired and fitted with a terminal box for connection to the power supply.

KBK III turntables can be fitted with 4 or 8 DEL conductors.

The length of the travelling hoist/trolley combination must be specified before selecting a turntable.

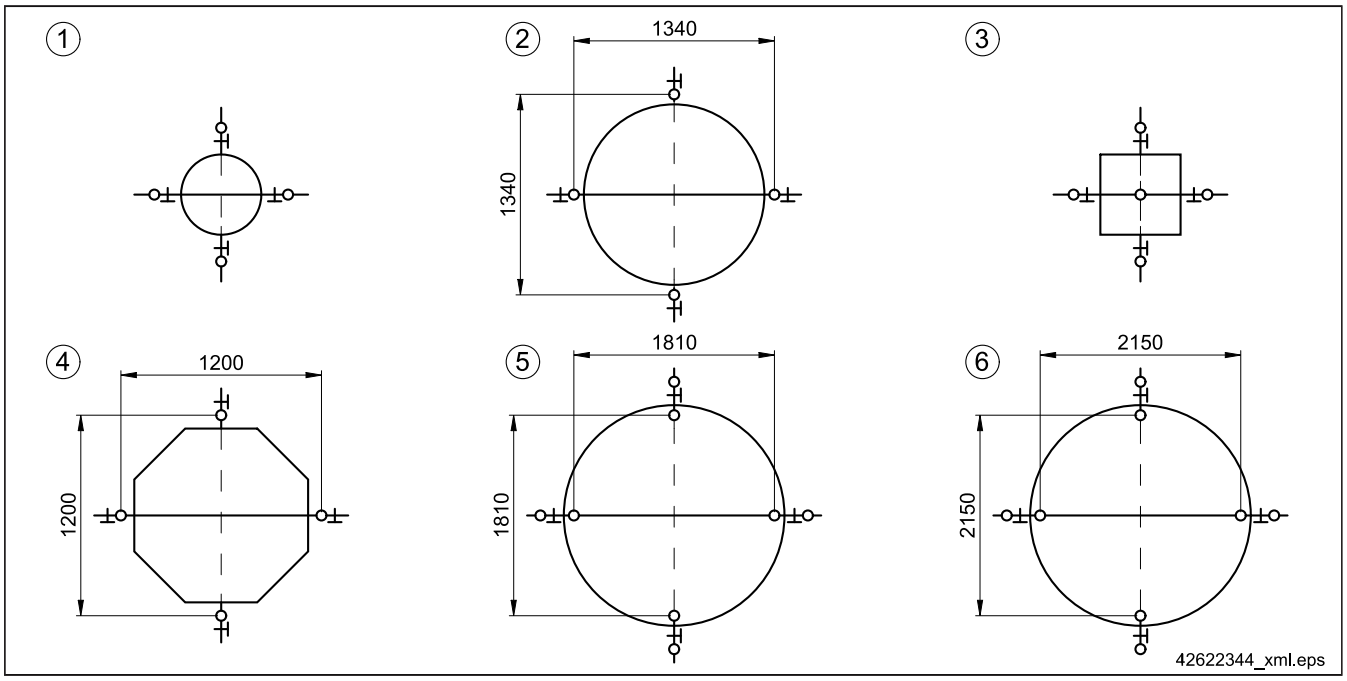
Finish:

Red (RAL 2002), internal part yellow (RAL 1007)

Important for project engineering

When drafting projects for KBK II-R and KBK III DEL systems, turntables must be incorporated in the track installations in such a way that cross-phasing of collector trolleys is not possible when the turntable is rotated (continuity of L1, L2 and L3 conductors).

Turntables must be fitted in such a way that conductor cross-phasing is not possible when they turn.



KBK 100 **KBK I**	Fig. 1	Suspension on the adjoining track sections close to the bolted joints. [1]
KBK I	Fig. 2	Suspension of the incoming and outgoing tracks of the turntable as for track sections.
KBK II **KBK II-R**	Fig. 3	Suspension from the ready-fitted ball-head suspension rod and from the adjoining track sections close to the bolted joints. [1]
	Fig. 4	Suspension from ready-fitted ball-head suspension rods.
	Fig. 5	Suspension from the ready-fitted hinged end pieces and at the adjoining track sections close to the bolted joints. [1]
KBK III	Fig. 4	Suspension from ready-fitted ball-head suspension rods.
	Fig. 6	Suspension from ready-fitted ball-head suspension rods and from the adjoining track sections close to the bolted joints. [1]

1) For permissible distance of joint from suspension “st”, see section 3.9.

Turntable suspension

The same suspension rods as those used for the other track sections are required for turntable suspension. Reduce suspension rod length by 25 mm each for KBK II/ II-R turntables according to figs. 4 and 5.

All suspension assemblies must bear uniform loads.

Short suspension fittings cannot be used.

6.2.2 KBK II, II-R, III drive

Geared motor, end position cut-off by limit switches.

Switching time: approx. 9-15 seconds depending on size, CDF = 50%

Other voltages and pneumatic operation available on request.

Drive technical data		
Worm geared motor		
Part no.	851 208 44	
Voltage	380 - 415 V, 50 Hz	440 - 480 V, 60 Hz
Rated motor current	0.51 A	
cos φ	0,72	
Drive output	0,12 kW	0,14 kW
Type of enclosure	IP 55	
Insulation class	ISO F	
Lubricated for life with oil filling		

6.2.3 KBK II, II-R, III controls, basic control types

Control system	**Design**	**Remark**
Contactor control	Motion by means of selector and pushbutton switch without electric turntable monitoring device (two-handed operation) with retaining feature.	Preferably used for push-travel trolleys.
	Motion by means of selector and pushbutton switch with electric turntable monitoring device with retaining feature.	Only possible for electrically driven travel units and at least 5-pole conductor line for KBK II and 6-pole conductor line for KBK III along the entire track length. Special controls are required for turntables that are arranged close together.

Without electric turntable monitoring device

Controller can only be actuated using two hands:

To change the turntable position, turn one switch to the right or left and then press the pushbutton. The track switch then turns automatically until it is switched off at the limit position.

With electric turntable monitoring device

The electric turntable monitoring device enables turntable operation only if the trolley is either at a safe distance from the turntable or at the centre of the turntable. Requirements:

- The trolley is an electric-travel trolley.
- The trolley is fitted with a corresponding switching vane to identify its position.
- The track is fitted with a 5-pole conductor line for KBK II or 6-pole conductor line for KBK III along the entire track length and isolating sections in a control conductor of the adjacent tracks.

Single-handed operation on a controller:

To change the turntable position, turn one switch to the right or left. The electric turntable monitoring device prevents the turntable from being turned while a trolley is located within the transfer zone.

Other contactor controls

Other contactor control systems can be provided, on request, e.g.:

- Initiation of the turning motion from the trolley on the track,
- Trolley travel cut-off on block section tracks unless the turntable has been set for the trolley to travel straight through.

Example for ordering: 1 x turntable, part no. 982 901 44,
Control system with monitoring, with 6 m control cable,
Operating voltage: 400 V, 50 Hz

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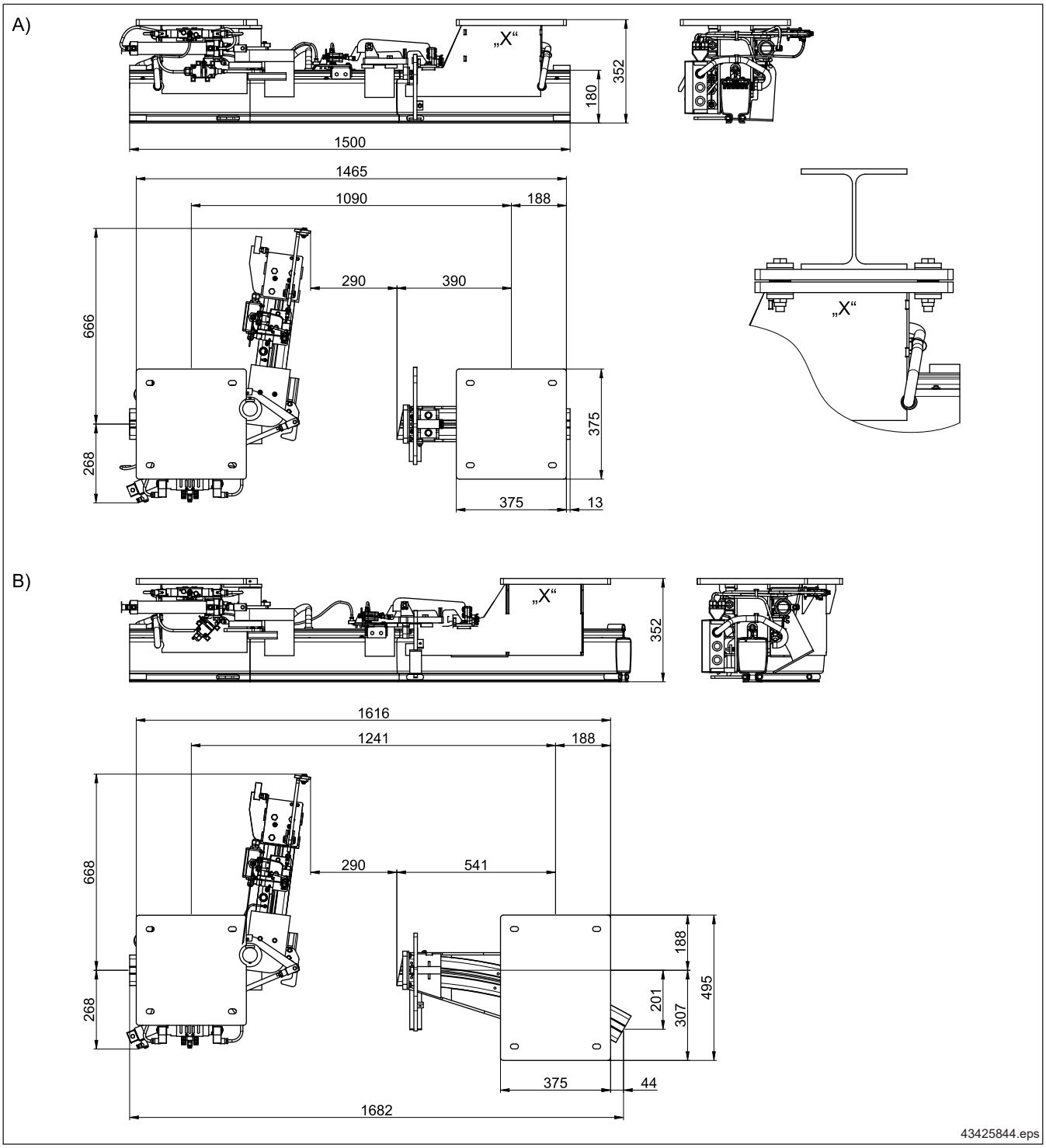
6.3 Gate section

(Item 24)

6.3.1 Dimensions and notes



Item	Designation		Straight travel (A)	Travel on curved track (B)
24	KBK II-R gate section	Weight [kg]	130,00	-
		Part no.	715 400 46	On application

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Gate sections are used to split a KBK track, e.g. to allow it to pass through a door opening. The opening and closing motions are provided by a pneumatic cylinder.

The gate section cannot be opened by a door that is closing (fire door). However, this can be offered as a special design, on request.

The gate section is mechanically locked and a loaded trolley can travel through it when the section is closed.

The ends of the track are mechanically protected to prevent trolleys from accidently leaving the section when it is open.

There must be no trolley in the section that opens when it is actuated.

KBK II-R gate sections are fitted with five busbars and can be used as powerfeed points for the adjoining track sections.

Gate sections are completely wired and fitted with terminal boxes (one on each end) for connection to the power supply.

Finish: red (RAL 2002)

Suspension of gate sections:

KBK II/II-R gate sections are suspended by bolting the connecting plate to the counter-plates on the steel superstructure.

Steel superstructure counter-plates and fastening material is available as an option.

Steel superstructure counter-plates	Part no.: 715 417 46
Fastening material	Part no.: 715 370 46

Any possible tolerances in the steel superstructure must be compensated during installation.

6.3.2 Drive

Gate sections are operated by means of a pneumatic cylinder:

- cut-off at the end positions via limit switches,
- operating pressure 6-10 bar,
- switching time approx. 3-5 seconds, CDF = 50%.

Drive technical data:

- double-action cylinder with self-adjusting travel limit damping,
- control via magnetic impulse valve,
- control voltage 24 V, 50 Hz/60 Hz,
- type of enclosure IP 55.

6.3.3 Controls

- No electric gate section protection;
- With electric gate section protection;
- Electric gate section protection only allows the section to be opened or closed if the trolley is located at a safe distance to the gate section.

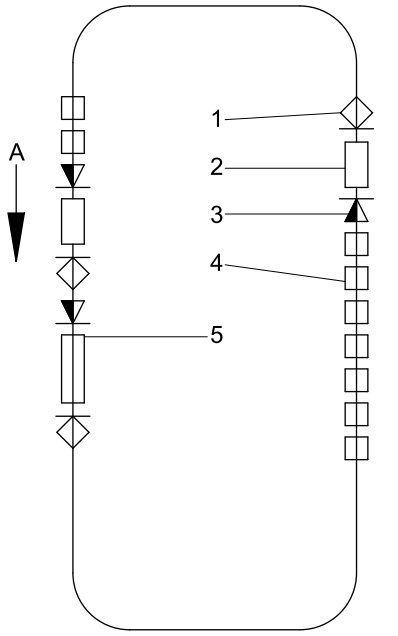
  Requirement:

  - The trolley is of the electric travel type.
  - The track is fitted with a 5-pole conductor line and isolating sections in a control conductor of the adjacent tracks.
  - Special controls are required for gate sections that are arranged close together.

In both cases, the rail is moved by means of a signal from a control unit with two buttons and an emergency stop.

6.4 Drop section
(Item 22)

Track diagram



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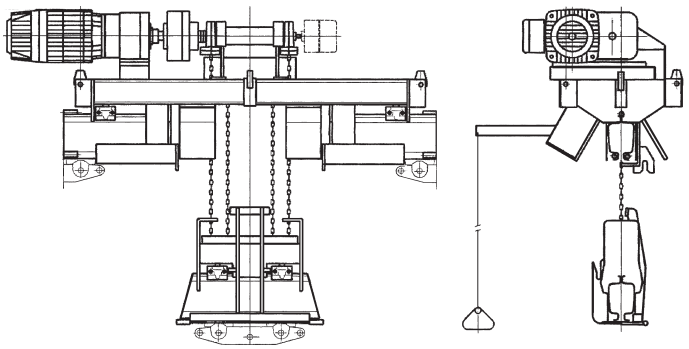
1 Non-return stop
2 Drop section
3 Stop station (separating station)
4 Trolley unit
5 Inclined track or step station
A Direction of circulation

Drop section



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Drop sections are used where a large number of trolley units travel units that are not equipped with their own hoists have to travel to a small number of load deposit or load pick-up points in monorail installations. The trolley on the drop section is fixed in a position at the centre of the drop section track. A track section (drop section) is lowered from the drop station. The open ends of the adjacent track sections are automatically locked. A trolley held in this section can be released by pulling a cord only when the drop section is locked in its top position.

Drop sections are selected on the basis of the load to be lifted and the trolley and/or load dimensions. Ensure that all travel unit/load dimensions are identical and that the loads are uniformly spaced.

Control is effected by means of direct control.

For further information, see “KBK drop section technical data”, refer to the document table on page 7.

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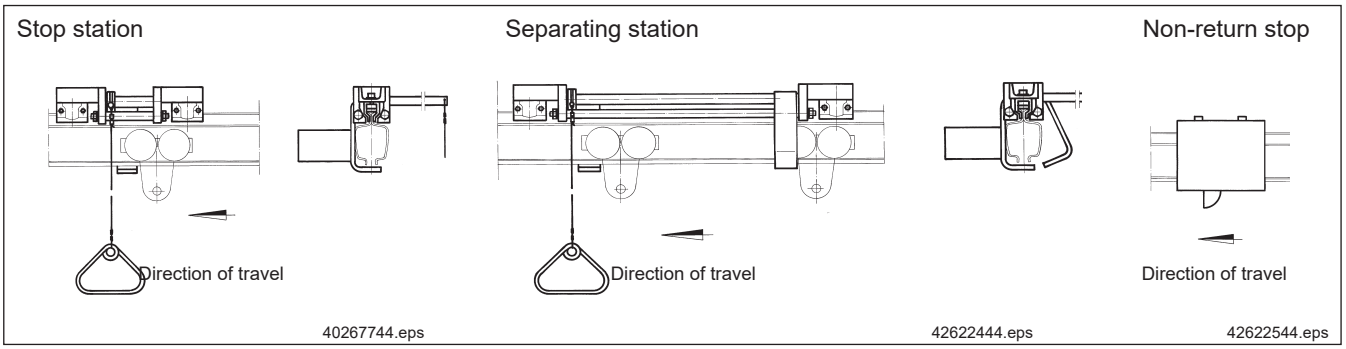
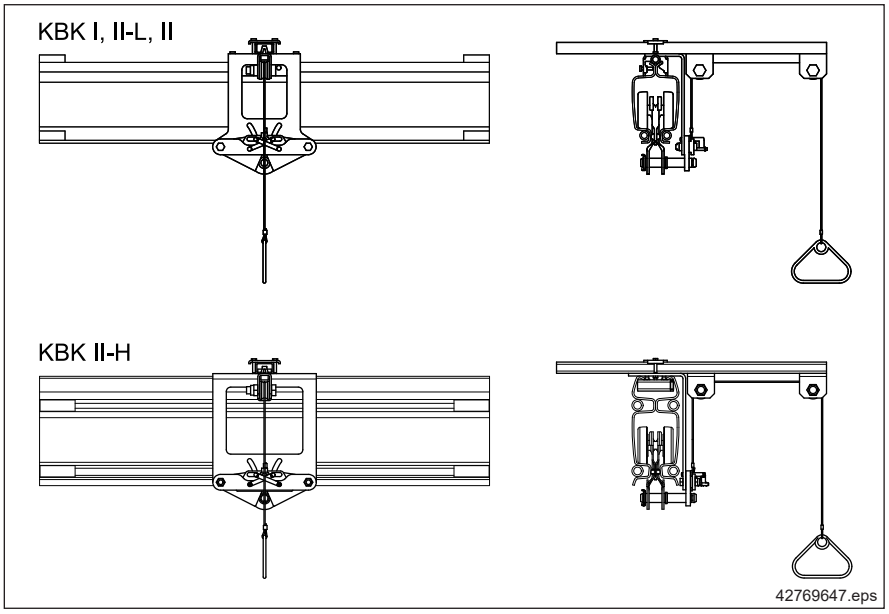
6.5 Additional components

6.5.1 Stop station and separating station



Stop stations must be incorporated in tracks where intermittent trolley travel is required, and separating stations where trolleys are accumulated. When actuated, the separating station releases one trolley at a time and retains the following trolleys. The trolleys are prevented from running backwards by non-return stops. A slope of 2 to 3% should be provided for empty trolleys, and 1,5 to 2% for loaded trolleys when required to run from standstill. Intermediate stop stations are recommended for descending tracks longer than 10 m. Max. load/trolley in inclined section approx. 200 kg.

6.5.2 Trolley locking device (Item 155)



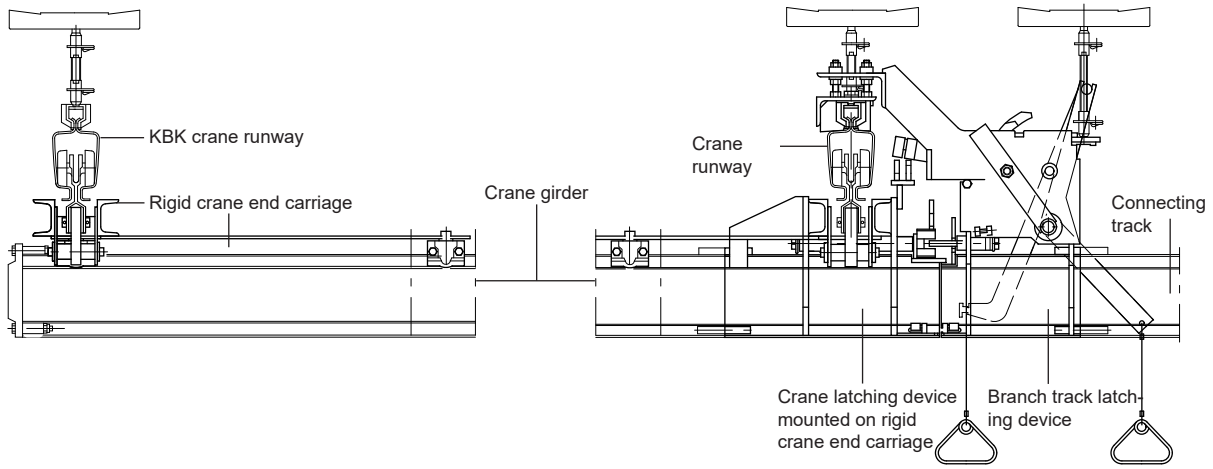
Item	Designation		KBK I	KBK II-L	KBK II	KBK II-H
155	Trolley locking device	Weight [kg]	6,00	6,34	6,42	7,30
		Part no.	715 195 46	715 205 46	715 210 46	715 345 46
156	Pin for trolley locking device	Weight [kg]	-	0,30		
		Part no.		851 417 44		

The locking device engages the trolley pin. The extended pin required for this is included in the scope of supply. Additional pins must be ordered for further trolleys.

Finish: galvanized

6.6 Latching device for single-girder cranes

Example: KBK II single-girder crane latching device, manually operated, with main latching device (actuation) on the connecting track



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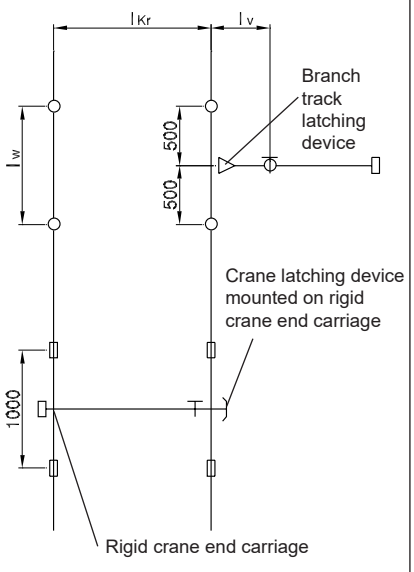
Latching device for single-girder cranes



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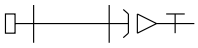
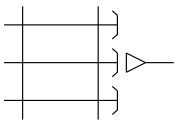
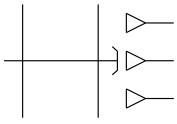
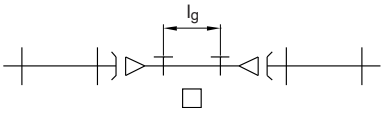
Possible latching arrangements		
		
Crane girder with latching device on one side	Main latching device on the track	
	Main latching device on the crane	
Crane girder with latching device on both sides for opposite or offset branch tracks		
Transfer section with two latching devices for connecting two crane girders on different crane runways (direct latching of crane girders to each other is not possible, straight section with length l_g can be omitted).		

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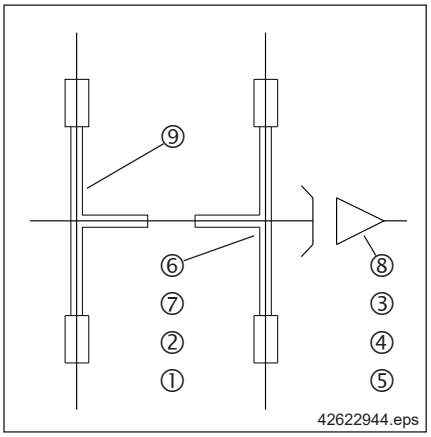
Latching device selection table		Latching device with actuation						KBK II		KBK II-R		KBK III	
		on crane girder			on connecting track			Weight	Part no.	Weight	Part no.	Weight	Part no.
		manually operated		electrically operated	manually operated		electrically operated	[kg]		[kg]		[kg]	
①	Crane main latching device with manual operation [2]	O	-	-	-	-	-	82,70	715 480 46	84,50	715 500 46	-	-
②	Crane main latching device with manual operation and limit switch fitting [2]	-	O	-	-	-	-	92,50	715 481 46	94,30	715 501 46		
③	Track main latching device, manually operated	-	-	-	O	-	-	67,06	715 490 46	68,76	715 510 46		
④	Track main latching device with manual operation and limit switch fitting 4)	-	-	-	-	O	-	76,56	715 491 46	78,16	715 511 46		
⑤	Track main latching device with electric operation and limit switch fittings [4]	-	-	-	-	-	O	77,06	715 492 46	78,66	715 512 46		On application
⑥	Crane connecting latching device	-	-	-	O	O	O	52,90	715 485 46	55,30	715 505 46		
⑦	Crane main latching device with electric operation and limit switch fitting [1] [2]	-	-	O	-	-	-	92,30	715 482 46	94,50	715 502 46	-	To drawing
⑧	Track connecting latching device	O	O	O	-	-	-	53,76	715 495 46	55,46	715 515 46		
⑨	Rigid crane end carriage E [2]	O	O	O	O	O	O	32,00	715 324 46	46,00	715 324 46		
⑩	Control system for latching device, crane and hoist trolley [3]	-	O	O	-	O	O	On application					
	Long travel h = manual	h	-	q	h	-	q	q = either h or e					
	Long travel e = electric	-	e	q	-	e	q						
	Cross travel	manually or electrically											

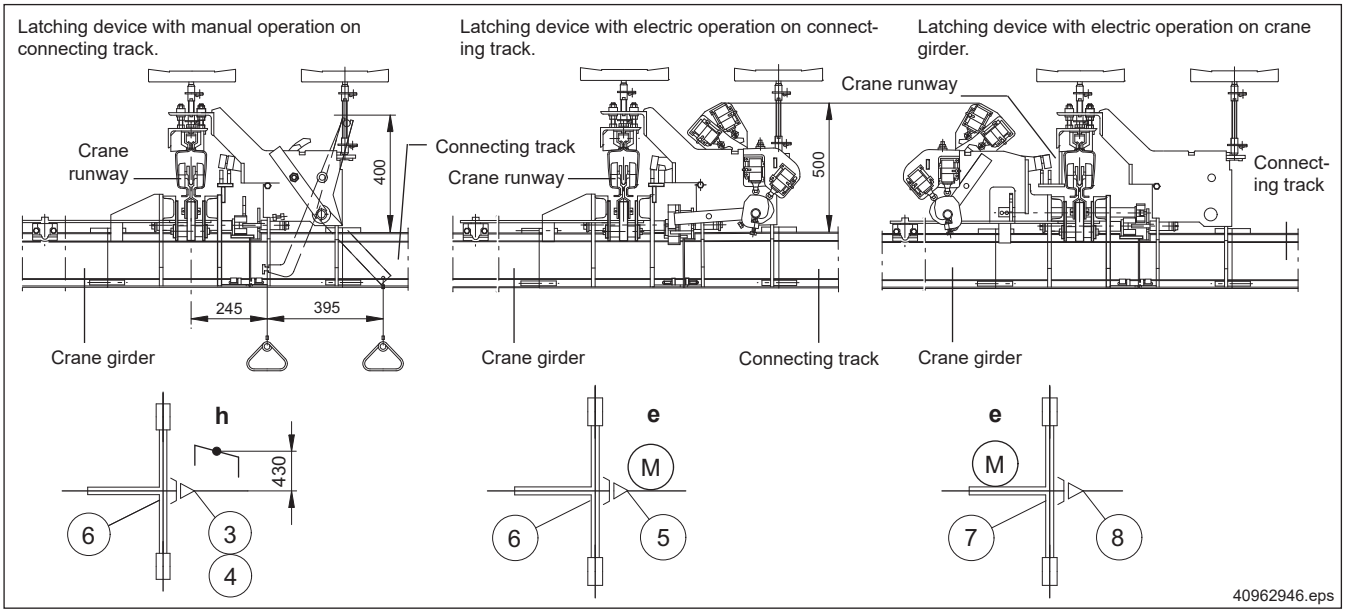


1) On the opposite side of the crane to the latching device; not applicable in systems with crane latching devices on both sides.
2) If latching cranes run on three crane runways, additional rigid crane end carriages are needed for the middle crane runway. If KBK II double trolley units are used, rigid crane end carriages, part no. 984 380 44 must also be ordered. The crane latching device is fitted with suspension plates D, part no. 984 022 44.
3) Additional control details necessary (e.g. type and design: control from hoist trolley, from crane or stationary). Control system for latching device, crane and hoist trolley on application.
4) Avoid if possible – increased equipment cost for data exchange.

Together with the assemblies of a latching device, the following must be ordered for the crane girder:

- Crane girder straight section
- Joint bolt set, conductor joint set
- End cap with buffer, powerfeed end cap
- Trolleys per crane runway
- Current collector trolley
- Drives
- Engaging rope for push-travel crane girder

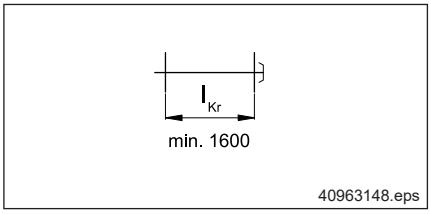
Example: KBK II



Crane span dimensions

Distance between crane runway suspension points

(Guide values)



Load capacity	KBK II/II-R		KBK III	
[kg]	l_{Kr} [m]	l_w [m]	l_{Kr} [m]	l_w [m]
250	7,0	7,0	8,0	7,0
315	7,0	7,0	8,0	7,0
400	6,0	6,0	8,0	7,0
500	5,7	6,0	8,0	7,0
630	4,0	4,0	7,0	6,0
800	3,5	3,5	6,5	6,0
1000	3,0	3,0	5,6	5,4
1250	-		4,5	4,5
1600			4,0	4,0
2000			3,4	3,5

KBK single-girder crane latching devices enable monorail hoists to transfer from crane girders to connecting tracks.

Assemblies of a latching device

- Crane latching device mounted on rigid crane end carriage
- Branch track latching device
- Rigid crane end carriage
- Control system

Description

Different profile sections cannot be combined, i.e. the same profile section sizes must be selected for the crane runway, crane girder and connecting track profiles. Exception: crane runway made of KBK II-H with crane girder made of KBK II/II-R is possible.

Latching cranes can be easily moved with push-travel trolleys or electric-travel drives.

For push-travel latching cranes, an engaging rope, for example, must be provided for the crane girder if the crane also needs to travel without the hoist.

Latching cranes have rigid crane end carriages. They are fitted direct to the end carriages without any crane suspensions. The two travel units for each rigid crane end carriage must be ordered separately.

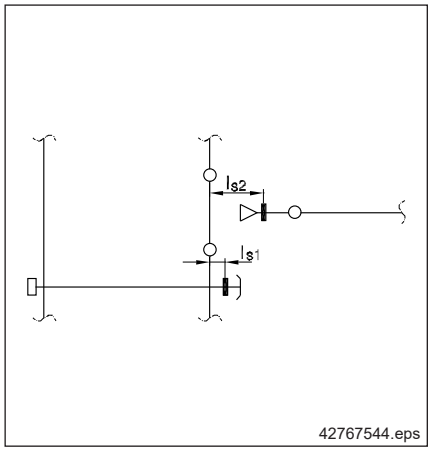
It is possible to fit link bars, spacer bars or buffer fittings.

If several latching cranes run on a common crane runway, the rigid crane end carriages must be fitted with buffers.

For electric-travel latching cranes, a creep speed not exceeding 7 m/min must be provided for travel into the latching device. Push-travel latching cranes must approach at a correspondingly lower speed. On the latching device side, the motor of the friction-wheel travel drive must face the centre of the crane girder.

When the crane and track are not latched, both transfer sections are closed by means of mechanical locks. The locking system of the latching device is a safety system and must not be approached in normal operation.

Positions of the mechanical locks



	l_{S1} [mm]	l_{S2} [mm]
KBK II	130	235
KBK III	60	300

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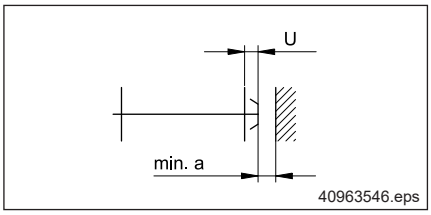
Latching device operating principle

The crane girder travels past the branch tracks without any contact. The travelling hoist is secured against leaving the crane girder or branch track by means of automatic, mechanical locks.

If the unit is to be latched, the latching device is actuated once (ready for latching). The crane girder travels into the latching device at reduced speed and is held. Transfer of the travelling hoist is still blocked by the safety locks (positioned).

When the positioning process has been completed, the latching drive is further actuated beyond the Positioned setting, which positively opens the safety locks. The trolley can transfer to the adjacent track.

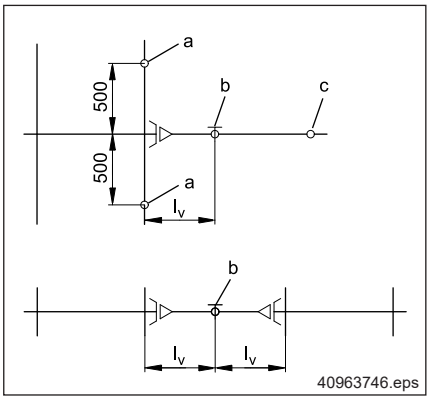
Overhang



Maintain clearance (min. 100 mm) outside the latching area.

	a [mm]	U [mm]
KBK II	100	220
KBK III	250	154

Suspension of the latching device



On the latching device side, track suspension fittings (a) must be provided for the crane runway at two points 500 mm to the left and right of the centre of the branch track. Further suspension fittings must be provided at the permitted distance between suspensions. Minimum suspension rod length 100 mm.

The crane runway suspension fittings in latching area (a) and the first suspension of branch track (b) must be located on the same superstructure level (clearance for latching device actuation).

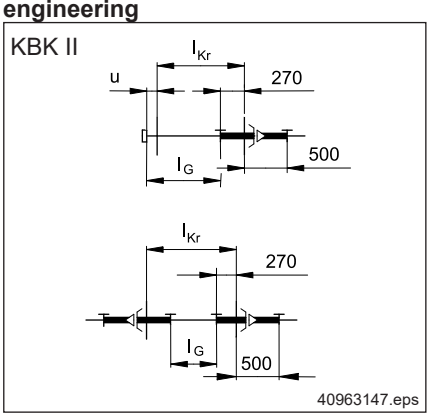
The first suspension fitting of the branch track must be attached to the ball socket that is already fitted to track latching device (b) with suspension rod length $h_{1(b)}$. The other track suspensions for branch track (c) must be fitted at the permitted distance between suspensions. If the support superstructure is at the same level, the suspension rod length = $h_{1(c)}$.

Only one track latching device suspension fitting (b) is required if two track latching devices are bolted together. The short suspension fitting cannot be used.

	l_v [mm]	$h_{1(b)}$	$h_{1(c)}$
KBK II	500	h_1 + 80 [1)]	h_1 + 295 [1)]
KBK III	350	h_1 [1)]	h_1 + 390 [1)]

1) Suspension rod length h_1 of the crane runway

Further information for project engineering



KBK II

KBK II latching device components already include short straight sections, see sketch. Pay attention to the lengths and the additional joints.

KBK II double-girder crane latching device on request.

KBK III

KBK III latching device components are clamped to the profile sections.

Only the combination of track main latching device and latching device on the crane with electric actuation is available for KBK III.

Long and cross travel is possible as push travel or electric travel.

A double trolley with dimension e_{Ka} = 800 mm must be used for load capacities ≥ 1250 kg.

7 Track suspension

7.1 Notes and overview

The examples of track suspensions shown on the following pages are only some of the many combinations possible by using standard series-manufactured track suspension components.

Supporting structure

The owner is responsible for verification of superstructure/support structure.

Short suspension fitting

Particularly low suspension heights can be achieved by using short suspension arrangements.

Sloping steel superstructure

Suspension from sloping superstructures is also possible.

KBK II-L, II-H monorail tracks

The length difference resulting from the different profile section heights must be considered when calculating the suspension rod length for KBK II-L and KBK II-H installations fitted with KBK II curved track sections, track switches, turntables, drop sections and latching devices.

Stiffeners

On long suspension arrangements, with suspension rod lengths from approx. 600 mm upwards, undesirable pendulation of the track may occur. (This can already occur in small installations and when electric drives are used with short suspensions). This can be limited by fitting longitudinal and lateral stiffeners.

Stiffeners are also necessary for gravity tracks ahead of curves, for stop stations and drop sections, on tracks connected to track switches and turntables and specially in installations where electric drives are used.

Transverse stiffeners should be fitted approx. every 15 m for KBK 100, I and approx. every 20 m for KBK II-L, II, III for monorails and crane runway tracks. One stiffener is usually sufficient in the longitudinal direction. All crane runways must be provided with stiffeners.

Transverse and longitudinal stiffeners are of V-type stiffener design. In individual cases (see Stiffeners section), single lateral stiffeners are sufficient to restrict undesirable track swing. Pairs of stiffeners have to be fitted on one side to avoid pressure in the sloping stiffener.

V-type suspension fittings

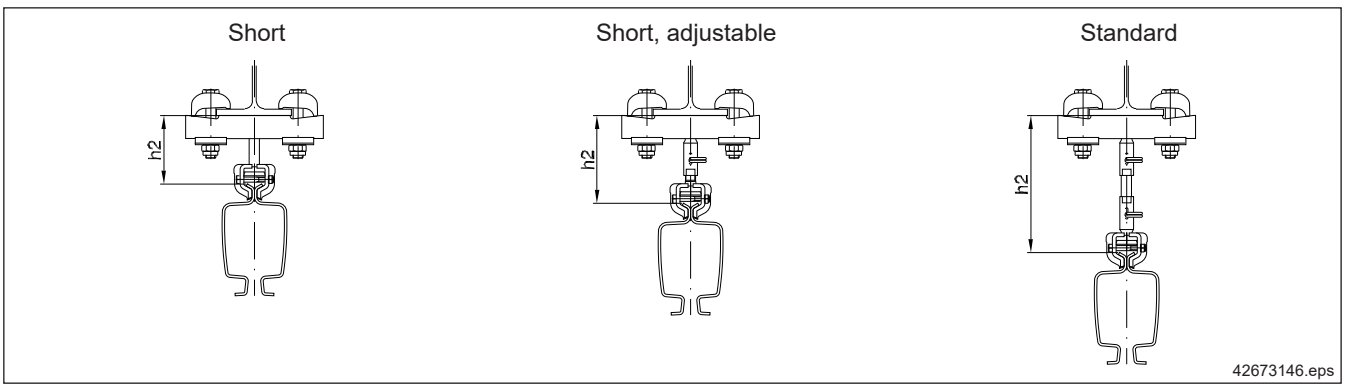
V-type suspension fittings may also replace missing suspension points in vertical suspension arrangements. Max. vertical dimension as for vertical suspension arrangements.

Load capacity, dimensions for suspension from I-beam superstructures, height compensation

Profile			KBK 100	KBK I	KBK II/ M10	KBK II-L	KBK II	KBK II-H/ M16	KBK III/ M16	KBK II-H/ M20	KBK III/ M20
Thread			M10			M16 x 1,5				M20 x 1,5	
Load capacity [1]		[kg]	400	750		1400	1700			2600	
Suspension dimension h_2	Suspension with suspension rod 80/100	[mm]	155 ±9	150 ±9	165 ±9	220 ± 14	220 ± 14	185 ± 14	200 ± 14	185 ± 14	200 ± 14
	Short suspension arrangement with height adjustment	[mm]	100 ±4	95 ±4	105 ±4	140 ±7	140 ±7	107 ±7	120 ±7	107 ±7	-
	Short suspension arrangement without height adjustment	[mm]	65	60	-	110	110	75	-	-	-
h_1	Max. suspension rod length	[m]	1	2	2	3	3	3	3	1	1

1) Static or alternating load

Examples



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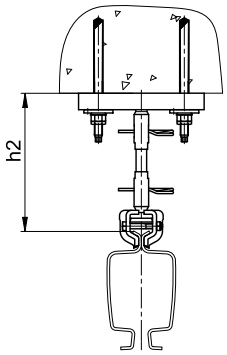
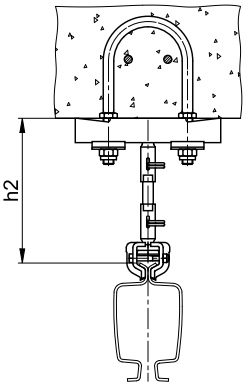
Examples

On anchor bolts



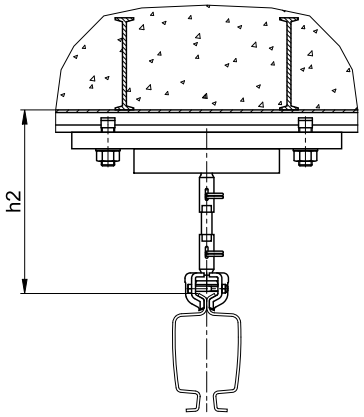
With floor plate

From U-bolt

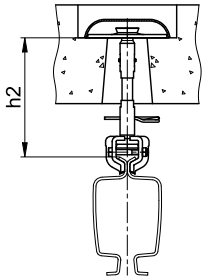


Drilled

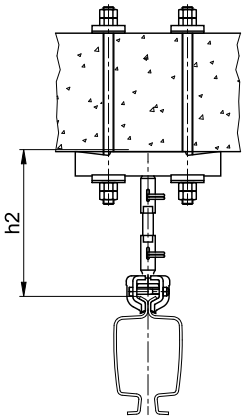
For Halfen rail



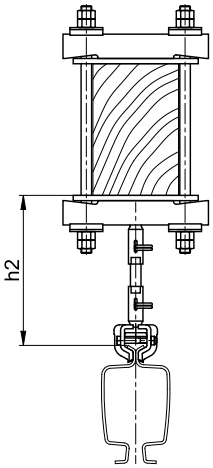
On wooden beam



V-type suspension



Sloping V-type suspension



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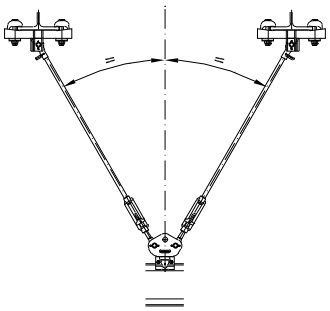
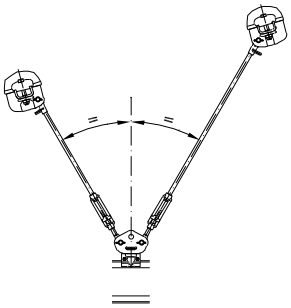
Sloping suspension

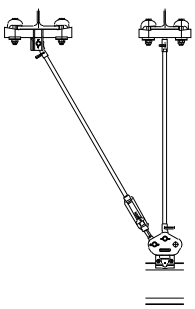


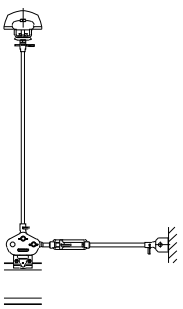
Lateral stiffener

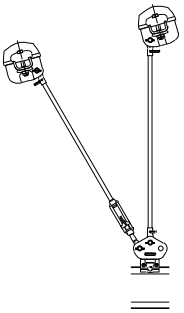


Lateral stiffener

Sloping stiffener







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7.2 Vertical suspension on I-beams

7.2.1 I-beam profile assignment

Section category		Suitable for profile sections		
		I	IPE	HE-B (IPB)
KBK 100, I, II/M10	Upper suspension bracket A	140 - 260	120 - 270	100 - 140
	Upper suspension bracket B	-	220 - 450	120 - 200
KBK II-L, II, II-H, III	Upper suspension bracket A	140 - 320	140 - 270	100 - 120
	Upper suspension bracket B	220 - 450	180 - 500	100 - 200
KBK II-H/M20, III/M20	Suspension plate B	220 - 450	180 - 500	100 - 200

Upper suspension bracket A can be used on roof structures and steel profile sections; upper suspension bracket B (ends project beyond bearing surface) is only suitable for steel profile sections.

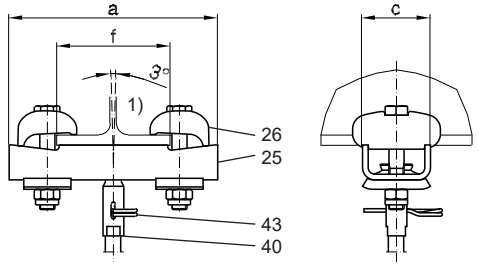
The special design of the upper suspension clamp ensures that the bolt of the clamp is always vertical regardless of the beam flange thickness.

Higher flange bending stresses may occur, for example, when used on HE-A beams.
For further information on upper suspension bracket S and upper suspension clamp S for steel sections with larger flange widths for various flange thicknesses, see "Technical data for KBK suspensions, upper suspension bracket H, S, upper suspension clamp S, V"; refer to the document table on page 7.

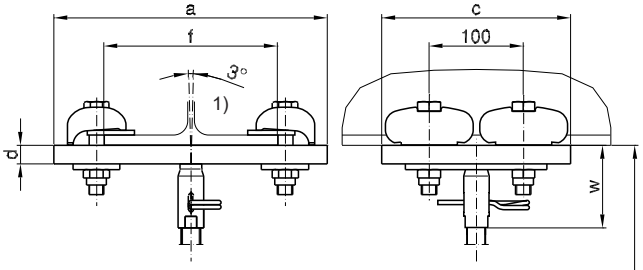
7.2.2 Suspension with suspension rod

Attachment to steel profile section

KBK 100, I, II-L, II, II-H /M16, III/M16

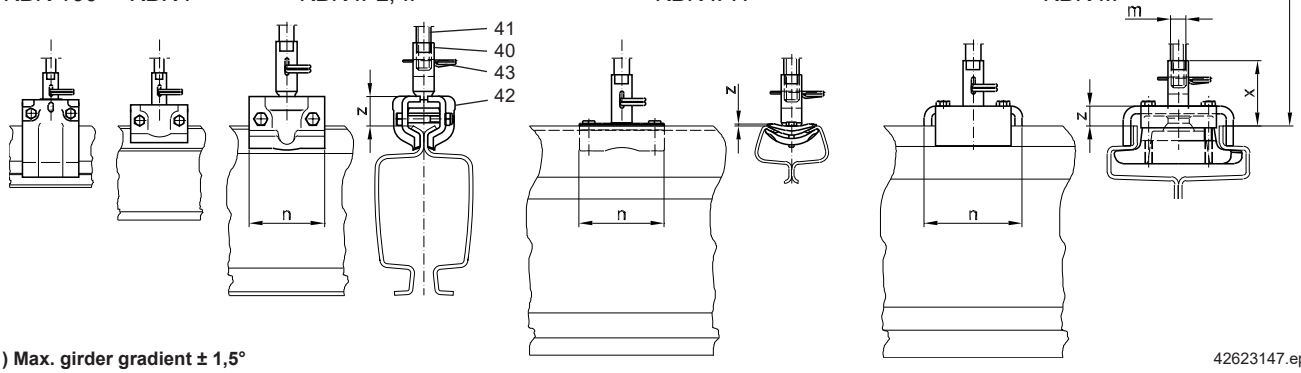


KBK II-H /M20, III /M20



Attachment on the track

KBK 100 KBK I KBK II-L, II KBK II-H KBK III



1) Max. girder gradient ± 1,5°

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Section category							Upper suspension bracket A				Upper suspension bracket/ suspension plate B			
	h_2	m	n	w	x	z	a	f	c	d	a	f	c	d
KBK 100	75 + h1 ±9	M10	60	60	65	25	205	66 - 142	70	27	270	110 - 210	70	23
KBK I	70 + h1 ±9	M10	60	60	60	20								
KBK II/M10	85 + h1 ±9	M10	80	60	65	30								
KBK II-L	120 + h1 ±14	M16 x 1,5	80	95	90	30	221	71 - 139	72	37	290	100 - 208	76	36
KBK II	120 + h1 ±14	M16 x 1,5	80	95	90	30								
KBK II-H/M16	85 + h1 ±14	M16 x 1,5	90	95	55	6								
KBK III/M16	100 + h1 ±14	M16 x 1,5	105	95	70	25								
KBK II-H/M20	85 + h1 ±14	M20 x 1,5	90	90	65	6	-				290	96 - 208	200	20
KBK III/M20	100 + h1 ±14	M20 x 1,5	105	90	75	25								

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Complete suspension fittings, pre-assembled

Item	Designation		Upper suspension bracket		KBK 100	KBK I	KBK II-L	KBK II	KBK II-H/ M16	KBK III/ M16	KBK II-H/ M20	KBK III/ M20
					Max. load on suspension							
			Type		400 kg	750 kg	1400 kg	1700 kg			2600 kg	
30	Complete suspension with suspension rod length h_1 [mm]	80	A	Weight [kg]	2,50	2,06	-	-	-	-	-	-
				Part no.	984 641 44	980 497 44						
			B	Weight [kg]	2,70	2,27						
				Part no.	517 687 46	980 800 44						
		100	A	Weight [kg]	-	-	4,09		4,12	6,21	-	-
				Part no.			851 147 44		858 147 44	517 710 46		
			B	Weight [kg]			4,89		4,92	7,01	12,98	15,17
				Part no.			851 149 44		858 149 44	517 711 46	858 264 44	850 364 44
		300	A	Weight [kg]	2,61	2,17	4,37		4,40	6,49	-	-
				Part no.	517 688 46	980 498 44	851 148 44		858 148 44	517 712 46		
			B	Weight [kg]	2,81	2,38	5,17		5,20	7,29	13,39	15,59
				Part no.	517 689 46	980 801 44	851 151 44		858 151 44	517 713 46	715 721 46	517 721 46
		600	A	Weight [kg]	2,76	2,32	4,79		4,82	6,91	-	-
				Part no.	517 690 46	517 698 46	517 704 46		715 320 46	517 714 46		
			B	Weight [kg]	2,96	2,53	5,59		5,62	7,71	14,02	16,21
				Part no.	517 691 46	517 699 46	517 705 46		715 322 46	517 715 46	715 723 46	517 723 46
		1000	A	Weight [kg]	2,96	2,52	5,35		5,38	7,47	-	-
				Part no.	517 692 46	517 700 46	517 706 46		715 321 46	517 716 46		
			B	Weight [kg]	3,16	2,73	6,15		6,18	8,27	14,85	17,05
				Part no.	517 693 46	517 701 46	517 707 46		715 323 46	517 717 46	715 725 46	517 725 46

Suspension fitting component parts

Item	Designation		Qty/ susp.		KBK 100	KBK I	KBK II-L	KBK II	KBK II-H/ M16	KBK III/ M16	KBK II-H/ M20	KBK III/ M20
					Max. load on suspension							
					400 kg	750 kg	1400 kg	1700 kg			2600 kg	
25	Upper suspension bracket A		1	Weight [kg]	0,76		1,20				-	-
				Part no.	980 302 44		982 302 44					
	Upper suspension bracket B/suspension plate B			Weight [kg]	0,96		2,00				11,50	
				Part no.	980 304 44		982 304 44				858 304 44	
26	Upper suspension clamp		2	Weight [kg]	0,42		0,85				4 off incl.	
				Part no.	980 326 44		982 326 44					
40	Ball-head suspension rod		2	Weight [kg]	0,08		0,16				0,27	
				Part no.	980 333 44		982 333 44				858 343 44	
41	Suspension rod length h_1 [mm]	80	1	Weight [kg]	0,04		-	-	-	-	-	-
				Part no.	980 346 44							
		100		Weight [kg]	-	-	0,14				0,21	
				Part no.			982 446 44				850 346 44	
		300		Weight [kg]	0,15		0,42				0,62	
				Part no.	980 347 44		982 447 44				850 347 44	
		600		Weight [kg]	0,30		0,84				1,25	
				Part no.	980 348 44		982 448 44				850 348 44	
		1000		Weight [kg]	0,50		1,40				2,08	
				Part no.	980 349 44		982 449 44				850 349 44	
		3000		Weight [kg]	-	-	4,20				-	-
				Part no.			982 445 44					
42	Track suspension clamp		1	Weight [kg]	0,68	0,25	0,69		0,72	2,81	0,66	2,86
				Part no.	984 550 44	980 260 44	982 260 44		858 260 44	850 260 44	858 198 44	850 198 44
43	Spring clip		2	Weight [kg]	0,01		0,02				0,04	
				Part no.	342 200 99		342 201 99				342 202 99	

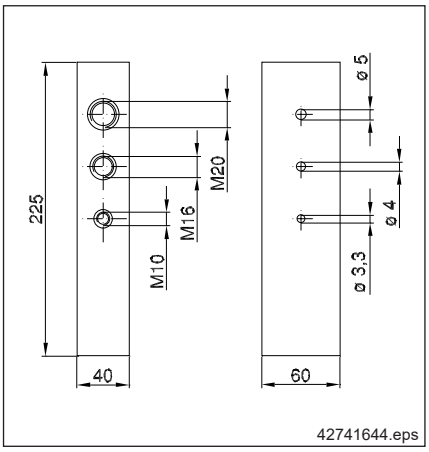
The ball-head suspension rod (item 40) and suspension rod coupling (item 50) are provided with slotted holes. The threaded rod (item 41) has a cross-hole at both ends. If standard threaded suspension rods have to be shortened, a new transverse hole must be drilled at the end of the threaded rod.

Finish: galvanized

Wearing parts

Item	Designation		KBK 100, I	KBK II/III (M16)	KBK II/III (M20)
42d	Sliding shell for ball-head suspension rod/ball-head bolt (25 off)	Weight [kg]	0,02	0,05	-
		Part no.	980 815 44	851 394 44	
	Sliding shell for ball-head suspension rod/ball-head bolt (1 off)	Weight [kg]	-	-	0,025
		Part no.			850 342 44

Drilling jig
(Item 38)



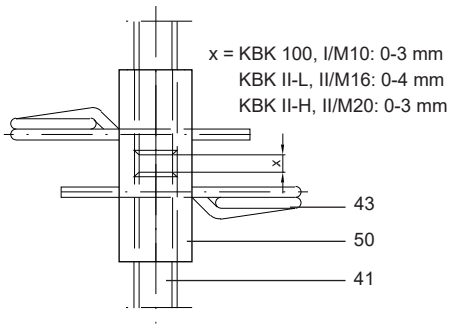
The drilling jig facilitates drilling transverse holes in suspension rods after they have been shortened on site. This ensures that the distance to the end of the rod is reliably maintained.

Item	Designation		
38	Drilling jig for suspension rods	Weight [kg]	3,92
		Part no.	982 017 44

Finish: galvanized

7.2.3 Coupling for suspension rod (Item 50)

Coupling for suspension rod



Item	Designation		KBK 100, I/M10	KBK II-L, II, II-H/M16, III/M16	KBK II-H/M20, III/M20
50	Coupling for suspension rod	Weight [kg]	0,06	0,15	0,16
		Part no.	980 277 44	982 277 44	858 277 44
43	Spring clip	Weight [kg]	0,01	0,02	0,04
		Part no.	342 200 99	342 201 99	342 202 99

Use couplings to connect several suspension rods.

Finish: galvanized

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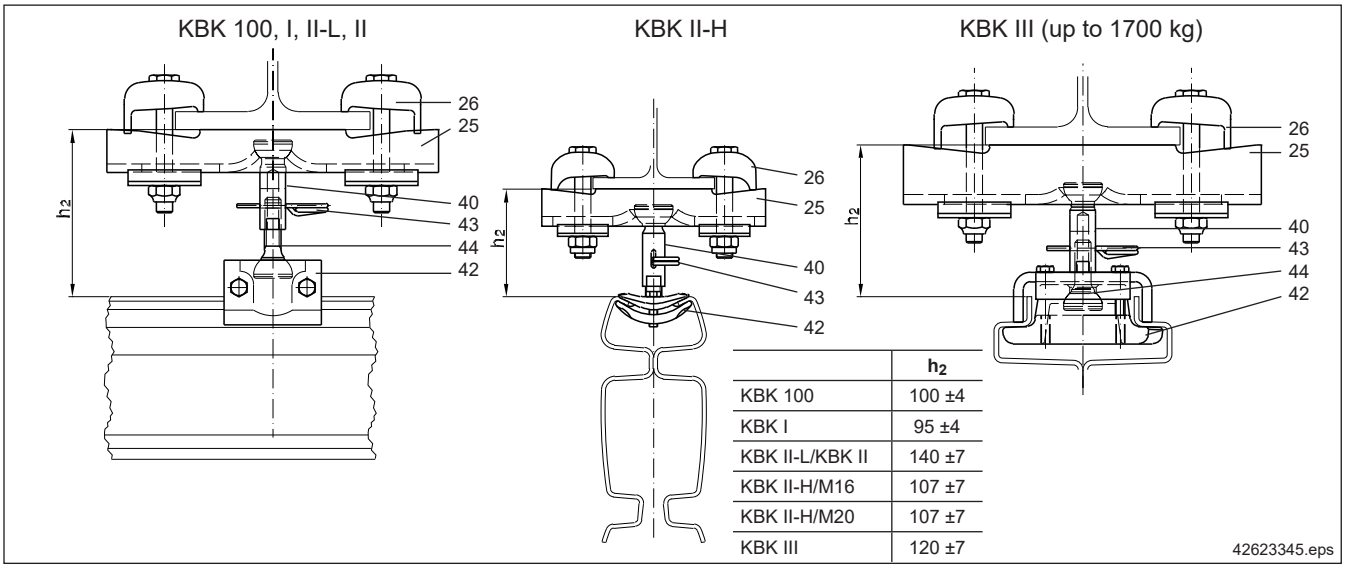
7.2.4 Short suspension arrangement with height adjustment (Item 31)



	h_2
KBK 100	100 ±4
KBK I	95 ±4
KBK II-L/KBK II	140 ±7
KBK II-H/M16	107 ±7
KBK II-H/M20	107 ±7
KBK III	120 ±7

Complete suspension fittings, pre-assembled

Item	Designation	Upper suspension bracket		KBK 100	KBK I	KBK II-L	KBK II	KBK II-H/ M16	KBK III/ M16	KBK II-H/ M20	KBK III/ M20
				Max. load on suspension							
		Type		400 kg	750 kg	1400 kg	1700 kg			2600 kg	
31	Complete suspension fitting Short suspension arrangement with height adjustment	A	Weight [kg]	2,43	1,99	3,91		3,81	6,03	-	
			Part no.	984 640 44	980 700 44	851 365 44		858 145 44	517 708 46		
		B	Weight [kg]	2,63	2,20	4,71		4,72	6,83	12,71	-
			Part no.	517 685 46	980 701 44	851 366 44		858 146 44	517 709 46	858 345 44	

Suspension fitting component parts

Item	Designation	Qty/ susp.		KBK 100	KBK I	KBK II-L	KBK II	KBK II-H/ M16	KBK III/ M16	KBK II-H/ M20	KBK III/ M20
				Max. load on suspension							
				400 kg	750 kg	1400 kg	1700 kg			2600 kg	
25	Upper suspension bracket A	1	Weight [kg]	0,76		1,20				-	-
			Part no.	980 302 44		982 302 44					
	Upper suspension bracket B/suspension plate B		Weight [kg]	0,96		2,00				11,50	
			Part no.	980 304 44		982 304 44				858 304 44	
26	Upper suspension clamp	2	Weight [kg]	0,42		0,85				4 off incl.	
			Part no.	980 326 44		982 326 44					
40	Ball-head suspension rod	1	Weight [kg]	0,08		0,16				0,27	
			Part no.	980 333 44		982 333 44				858 343 44	
42	Track suspension clamp	1	Weight [kg]	0,68	0,25	0,25		0,72	2,81	0,40	2,86
			Part no.	984 550 44	980 260 44	982 260 44		858 260 44	850 260 44	858 198 44	850 198 44
43	Spring clip	1	Weight [kg]	0,01		0,02				0,04	
			Part no.	342 200 99		342 201 99				342 202 99	
44	Ball-head bolt	1	Weight [kg]	0,06		0,14				0,25	
			Part no.	980 283 44		982 283 44				858 283 44	

A particularly low suspension height can be achieved using the ball-head bolt/ ball-head suspension rod connection arrangement with spring clip. Slotted holes facilitate height adjustment.

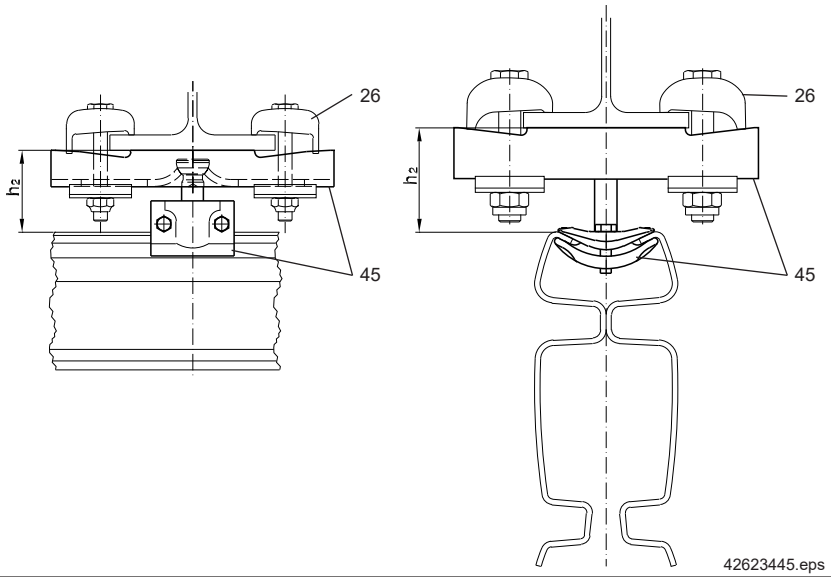
Finish: galvanized

Wearing parts

Item	Designation		KBK 100, I	KBK II/III (M16)	KBK II/III (M20)
42d	Sliding shell for ball-head suspension rod/ball-head bolt (25 off)	Weight [kg]	0,02	0,05	-
		Part no.	980 815 44	851 394 44	
	Sliding shell for ball-head suspension rod/ball-head bolt (1 off)	Weight [kg]	-	-	0,025
		Part no.			850 342 44

7.2.5 Short suspension arrangement without height adjustment (Item 45)

Short suspension fitting
(without height adjustment)



	h_2
KBK 100	65
KBK I	60
KBK II-L, II	110
KBK II-H	75

Suspension fitting component parts

Item	Designation	Upper suspension bracket Type		KBK 100	KBK I	KBK II-L	KBK II	KBK II-H
				Max. load on suspension				
				400 kg	750 kg	1400 kg	1700 kg	
26	Upper suspension clamp (2 off/susp.)		Weight [kg]	0,42		0,85		
			Part no.	980 326 44		982 326 44		
45	Short suspension arrangement without height adjustment	A	Weight [kg]	On application	1,15	2,11		2,07
			Part no.		980 370 44	982 370 44		858 370 44
		B	Weight [kg]	On application	1,35	2,92		2,95
			Part no.		980 371 44	982 371 44		858 371 44

Particularly low suspension heights can be achieved by using a short suspension arrangement. **The height of the track cannot be compensated, which means the superstructure must be perfectly level.**

The upper suspension clamps (26) must be ordered separately.

The minimum flange width when using short suspension fittings is 75 mm.

The short suspension fitting cannot be used for track switches, turntables and drop sections. The upper suspension bracket and track suspension clamp are permanently connected to each other before leaving the factory.

Finish: galvanized

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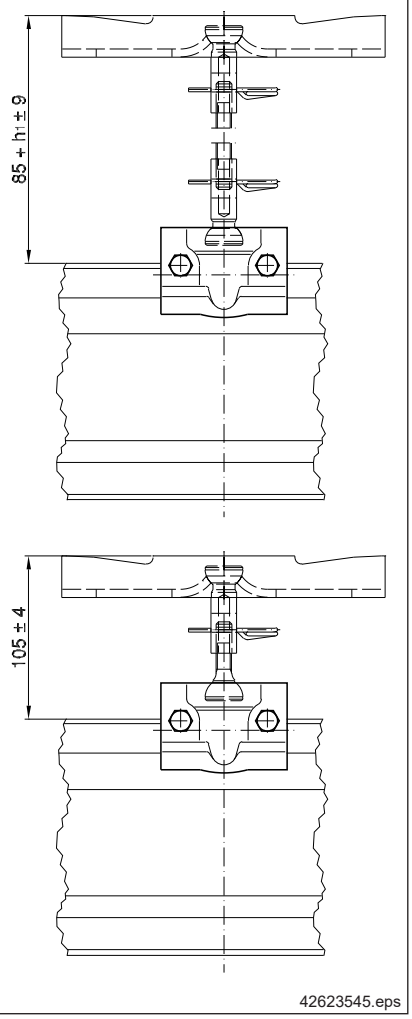
7.2.6 KBK II/M10 suspension clamp (Item 52)

KBK II/M10 suspension fitting



Item	Designation		KBK II-L, II
52	KBK II/M10 track suspension clamp	Weight [kg]	0,70
		Part no.	980 250 44

In addition to standard KBK II track suspensions with a load capacity of 1700 kg, KBK II/M 10 track suspensions are also available for installations for low loads. These suspension arrangements consist of KBK I components and a special KBK II track suspension clamp to accommodate KBK I ball-head suspension rods.

Maximum permissible load per KBK II/M 10 suspension: 750 kg

Possible applications

KBK crane and track installations with suspension loads less than 750 kg according to special calculation and verification with the formulae from section 3.

Overloading of the suspension must be avoided; particular attention must be paid to any changes in the installation.

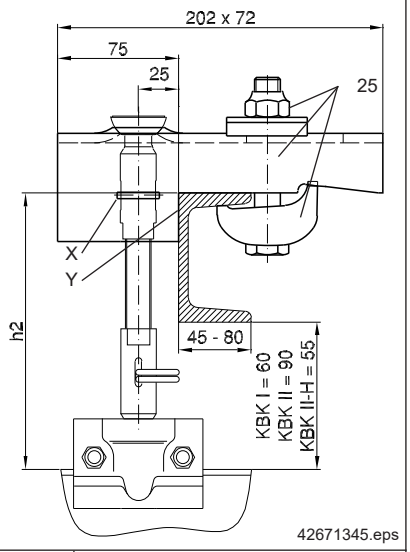
KBK II track suspension clamps (982 260 44) must not be combined with KBK I suspension elements.

The use of KBK II/M10 suspensions must be clearly indicated in drawings and in the log book.

Finish: galvanized, black ball socket

7.3 Vertical suspension from U-sections

Vertical suspension from U-sections



	h_2	
KBK I	20 + h1 ± 9	> track section height + 60
KBK II	50 + h1 ± 14	> track section height + 90
KBK II-H	15 + h1 ± 14	> track section height + 55

U-type upper suspension brackets can be used on U-shaped steel profile sections (DIN 1026).

The max. suspension load must be observed as specified in the table:

Item	Profile	Weight [kg]	Part no.	Max. suspension load G_{AB} [kg]	Girder section
25	KBK I	2	980 377 44	750	U 80 - U 220
	KBK II-L KBK II KBK II-H/M16	3,49	984 377 44	750	U 80 - U 100
				1000	U 120 - U 140
				1250	U 160
				1400	U 180
				1500	U 200 - U 220

The free swing angle of the suspension fitting may be limited by the steel girder profile. Use stiffeners, as required, to avoid any collision during operation.

Secure the connection between the ball-head suspension rod and the suspension rod with the enclosed spring pin (see “X”)

Edge “Y” of the upper suspension bracket must be in close contact with the profile section.

The ball-head suspension rod, spring clip and suspension clamp must be ordered separately.

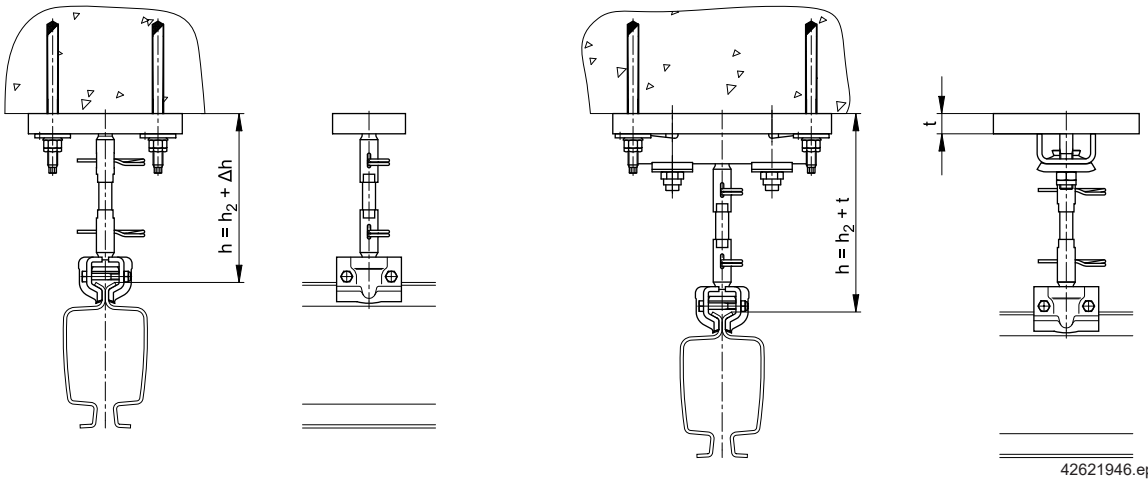
Finish: galvanized

The loads specified for individual profile sections must not be exceeded. The owner is responsible for verification of U-sections.

7.4 Ceiling attachment

7.4.1 Suspension with anchor bolt connection

Anchor bolt connection D DV



KBK equipment can be attached to concrete superstructures by anchor bolts. Anchor bolts must be used that are approved for use with dynamic loads. They must be installed by trained personnel and an installation report must be compiled.

For further information, see “KBK anchor bolt connection technical data”, refer to the document table on page 7.

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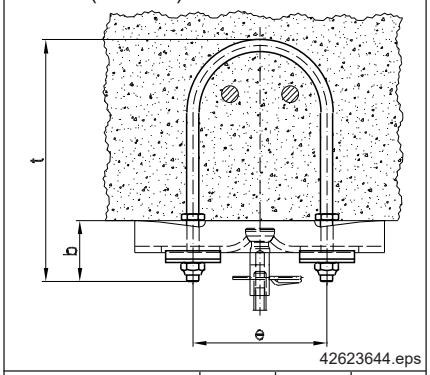
7.4.2 Suspension from U-bolt with upper suspension bracket A

U-bolt (item 27)



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	b	e	t
KBK 100, I	50	110	200
KBK II-L, II, II-H, III	70	120	225

Item	Designation	Qty/ susp.		KBK 100, I	KBK II-L, II, II-H/M16 KBK III/M16
27	U-bolt (complete)	1	Weight [kg]	0,67	1,43
			Part no.	980 330 44	982 330 44

For new buildings, U-bolts can be cast in reinforced ceilings at the KBK track suspension points while the building is still undergoing construction. This must be discussed with the structural engineer. U-bolts are used to secure upper suspension bracket A.

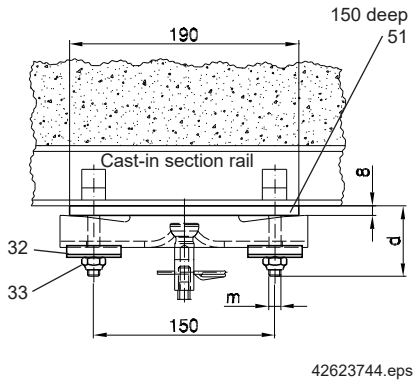
To make it possible to align the track, the U-bolts should be cast in at right angles to the direction of the track.

Two U-bolts should be arranged at a distance of 100 mm to secure KBK III/M20 suspensions.

Finish: galvanized

7.4.3 Suspension from ceiling section rails with upper suspension bracket A

Packing plate (item 32),
locknut (item 33),
packing plate for upper suspension bracket (item 51)



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1) Or as indicated for cast-in section rail for upper suspension bracket H.
See data referring to cast-in section rail for tightening torque.

	d	m 1)
KBK 100, I	70	M10
KBK II-L, II, II-H/M16 KBK III/M16	80	M16

Item	Designation	Qty/ susp.		KBK 100, I	KBK II-L, II, II-H/M16 KBK III/M16
32	Packing plate	2	Weight [kg]	0,18	0,26
			Part no.	980 429 44	984 329 44
33	Locknut	2	Weight [kg]	-	-
			Part no.	334 610 44	334 614 44
51	Packing plate for upper suspension bracket	1	Weight [kg]	1,75	
			Part no.	984 088 44	

Suspension may only be from cast-in section rails that are approved for **dynamic loads**.

A-type upper suspension brackets are secured to ceiling section rails using a packing plate and two special bolts with nuts and tab washers. The M10 special bolts for KBK 100, I and M16 special bolts for KBK II-L, II, III should be provided by the customer or can be supplied on application (specify section rail type).

This KBK suspension fitting must be regarded as a concentrated load on the section rail.

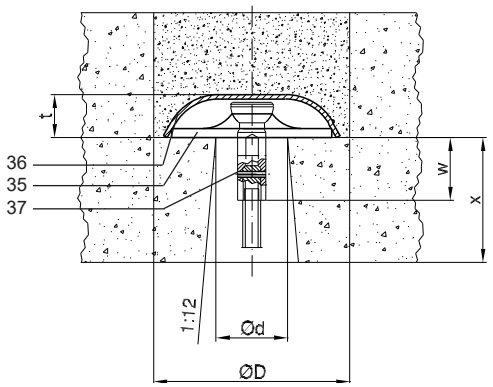
Pay attention to the load capacity and the correct length of the special bolts.

Upper suspension brackets H with bore hole spacing ≥ 250 mm count as dual load suspensions. See “Technical data for KBK suspensions, upper suspension bracket H, S, upper suspension clamp S, V”, refer to the document table on page 7.

Finish: galvanized

7.4.4 Suspension with floor fixture plate and cover

Floor fixture plate (item 35),
cover for floor fixture plate (item 36),
spring pin (item 37)



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	d	D	t	w
KBK 100, I	40	110	25	35
KBK II-L, II, II-H/M16, III/M16	60	150	28	60

Item	Designation		KBK 100, I	KBK II-L, II, II-H/M16, III/M16
35	Floor fixture plate	Weight [kg]	0,25	0,42
		Part no.	980 336 44	982 336 44
36	Cover	Weight [kg]	0,20	0,35
		Part no.	980 338 44	982 338 44
37	3 x 18 spring pin	Weight [kg]	-	-
		Part no.	345 095 99	-
	4 x 26 spring pin	Weight [kg]	-	-
		Part no.	-	345 008 99

In existing concrete buildings it is impossible to install a steel superstructure without losing headroom. In such cases it is possible to make a hole in the ceiling at the suspension point and to use a floor fixture plate for the ball-head suspension rod with the cover for the floor fixture plate. The connection between the suspension rod and the ball-head suspension rod is often no longer accessible for maintenance and the two rods must be secured relative to each other by a spring pin instead of a spring clip. Arrangement of these suspension fittings, the loads to which they are subjected and dimension X should be agreed with the structural engineer responsible.

Finish: galvanized

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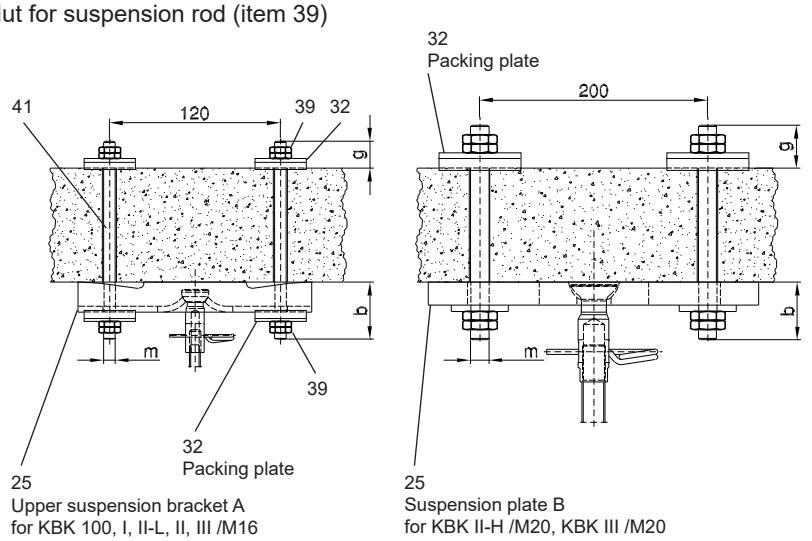
7.4.5 Suspension with upper suspension bracket A or suspension plate B and suspension rods

Nut for suspension rod (item 39)



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	b	g	m
KBK 100, I	60	35	M10
KBK II-L, II, II-H/M16, III/M16, II-H/M20, III/M20	85	50	M16 x 1,5

Item	Designation		Qty/ susp.		KBK 100, I	KBK II-L, II, II-H/M16, III/M16	KBK II-H/M20, III/M20
25	Upper suspension bracket A		1	Weight [kg]	0,76	1,15	-
				Part no.	980 302 44	982 302 44	-
	Upper suspension plate B without upper suspension clamp		1	Weight [kg]	-	-	8,71
				Part no.	-	-	858 306 44
32	Packing plate		4	Weight [kg]	0,18	0,26	
				Part no.	980 429 44	984 329 44	
39	Nut for suspension rod		8	Weight [kg]	-	-	-
				Part no.	150 509 99	150 678 99	-
			16	Weight [kg]	-	-	-
				Part no.	-	-	150 678 99
41	Suspension rod length h_1 [mm]	80	1	Weight [kg]	0,04	-	
				Part no.	980 346 44		
		100		Weight [kg]	-	0,14	
				Part no.		982 446 44	
		300		Weight [kg]	0,15	0,42	
				Part no.	980 347 44	982 447 44	
		600		Weight [kg]	0,30	0,84	
				Part no.	980 348 44	982 448 44	
		1000		Weight [kg]	0,50	1,40	
				Part no.	980 349 44	982 449 44	
		3000		Weight [kg]	-	4,20	
				Part no.		982 445 44	

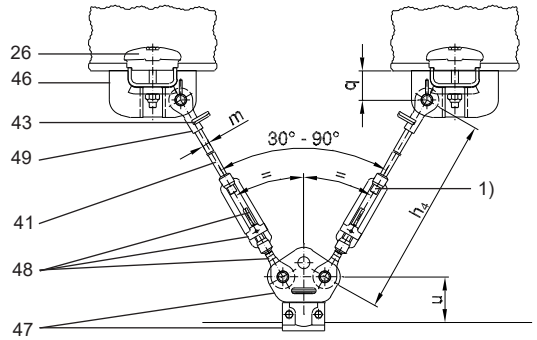
A-type upper suspension brackets can also be secured to solid ceilings by using suspension rods with counter-plates. The transmission of forces to the concrete ceiling must be agreed with the structural engineer.

The distance between suspension rods for M20 suspensions (M16 x 1,5) measures: 200 x 100 mm.

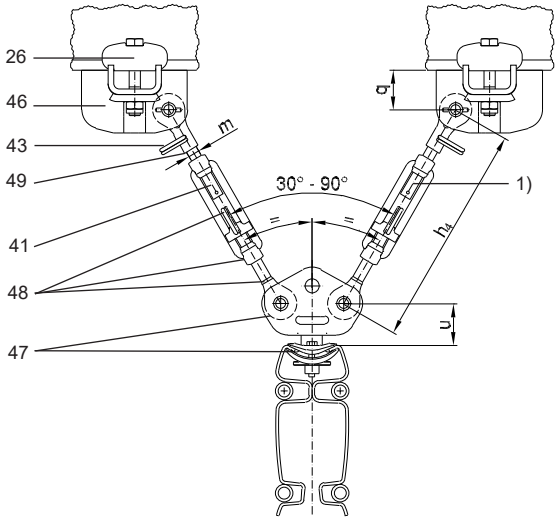
7.5 V-type suspension fitting

KBK 100, I, II-L, II

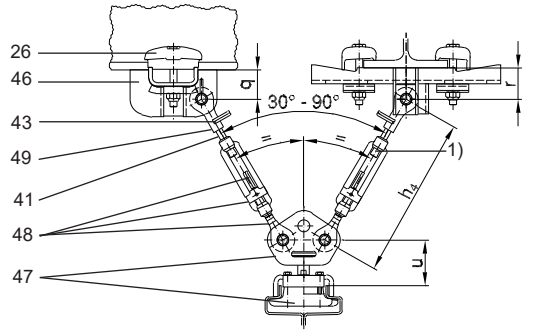
(see section 7.1 for load capacity)



KBK II-H (up to 1700 kg)



KBK III (up to 1700 kg)



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h1 = Suspension rod length

1) No spring clip fitted here

	h_4	m	q	r	u
KBK 100	h_1 + 155 ± 30	M10	40	45	65
KBK I					60
KBK II-L, II	h_1 + 220 ± 40	M16 x 1,5	55	65	75
KBK II-H					60
KBK III					85

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Item	Designation		Qty/ susp.		KBK 100	KBK I	KBK II-L	KBK II	KBK II-H	KBK III
					Max. load on suspension					
					400 kg	750 kg	1400 kg	1700 kg		
26	Upper suspension clamp		4	Weight [kg]	0,43		0,85			
				Part no.	980 326 44		982 326 44			
41	Suspension rod length h_1 [mm]	80	2	Weight [kg]	0,04		-	-	-	-
				Part no.	980 346 44					
		100		Weight [kg]	-	-	0,14			
				Part no.			982 446 44			
		300		Weight [kg]	0,15		0,42			
				Part no.	980 347 44		982 447 44			
		600		Weight [kg]	0,30		0,84			
				Part no.	980 348 44		982 448 44			
		1000		Weight [kg]	0,50		1,40			
				Part no.	980 349 44		982 449 44			
		3000		Weight [kg]	-	-	4,20			
				Part no.			982 445 44			
43	Spring clip		2	Weight [kg]	0,01		0,02			
				Part no.	342 200 99		342 201 99			
46	V-type upper suspension bracket B		2	Weight [kg]	1,48		3,03			
				Part no.	980 360 44		984 075 44			
47	V-type suspension clamp		1	Weight [kg]	1,02	0,86	2,11		2,45	4,92
				Part no.	984 549 44	980 395 44	984 080 44		858 080 44	850 080 44
48	Suspension rod strainer		2	Weight [kg]	0,25		0,79			
				Part no.	980 310 44		984 085 44			
49	Hinged end piece		2	Weight [kg]	0,10		0,30			
				Part no.	980 315 44		984 083 44			
54	Pin with BoClip for third hinged end piece			Weight [kg]	0,08		0,16			
				Part no.	851 305 44		851 317 44			

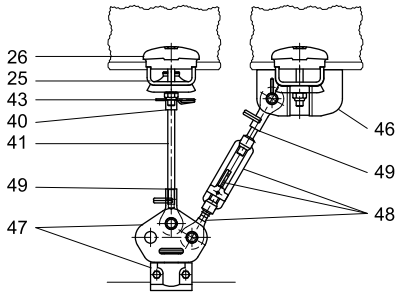
The maximum permissible loads correspond to those for vertical suspension arrangements.

V-type suspensions are fitted as shown in the diagrams. V-type hinged suspension clamp (item 47) and V-type upper suspension bracket (item 46) are connected to each other by suspension rod strainer (item 48), suspension rod (item 41) and hinged end piece (item 49). Each bolted connection with a hinged end piece must be secured with a spring clip (item 43).

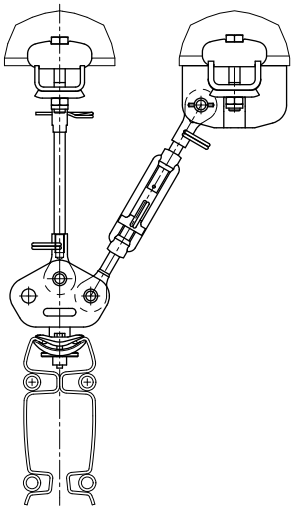
Finish: galvanized

7.6 Stiffeners

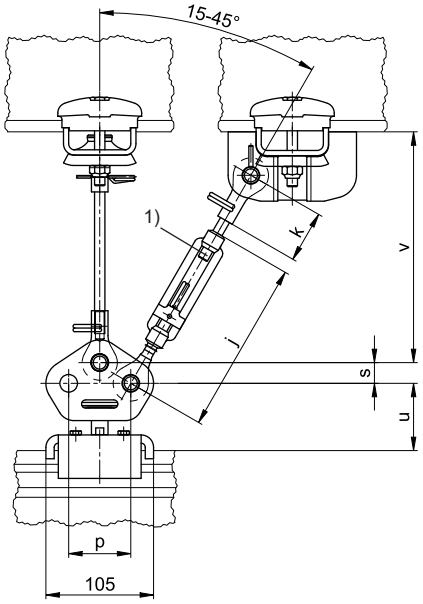
KBK 100, I, II-L, II



KBK II-H



KBK III (up to 1700 kg)



1) No spring clip fitted here

	j	k	p	s	u	v
KBK 100	165±15	50	60	20	65	h_1+65±4
KBK I					60	
KBK II-L, II	235±20	65	90	25	75	h_1+100±7
KBK II-H					60	
KBK III					85	

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Item	Designation		Qty/susp.		KBK 100	KBK I	KBK II-L	KBK II	KBK II-H	KBK III/ M16
					Max. load on suspension					
					400 kg	750 kg	1400 kg	1700 kg		
25	Upper suspension bracket A		1	Weight [kg]	0,65		1,20			
				Part no.	980 302 44		982 302 44			
	Upper suspension bracket B/suspension plate B			Weight [kg]	0,85		2,40			
				Part no.	980 304 44		982 304 44			
26	Upper suspension clamp		4	Weight [kg]	0,45		1,00			
				Part no.	980 326 44		982 326 44			
40	Ball-head suspension rod		1	Weight [kg]	0,80		0,15			
				Part no.	980 333 44		982 333 44			
41	Suspension rod length h_1 [mm]	80	1+1	Weight [kg]	0,04		-	-	-	-
				Part no.	980 346 44					
		100		Weight [kg]	-	-	0,14			
				Part no.			982 446 44			
		300		Weight [kg]	0,15		0,42			
				Part no.	980 347 44		982 447 44			
		600		Weight [kg]	0,30		0,84			
				Part no.	980 348 44		982 448 44			
		1000		Weight [kg]	0,50		1,40			
				Part no.	980 349 44		982 449 44			
		3000		Weight [kg]	-	-	4,20			
				Part no.			982 445 44			
43	Spring clip		3	Weight [kg]	0,01		0,02			
				Part no.	342 200 99		342 201 99			
46	V-type upper suspension bracket B		1	Weight [kg]	1,39		3,20			
				Part no.	980 360 44		984 075 44			
47	V-type suspension clamp		1	Weight [kg]	1,10	1,00	2,20		2,45	4,70
				Part no.	984 549 44	980 395 44	984 080 44		858 080 44	850 080 44
48	Suspension rod strainer		1	Weight [kg]	0,29		0,85			
				Part no.	980 310 44		984 085 44			
49	Hinged end piece		2	Weight [kg]	0,10		0,30			
				Part no.	980 315 44		984 083 44			
54	Pin with BoClip for third hinged end piece			Weight [kg]	0,08		0,16			
				Part no.	851 305 44		851 317 44			

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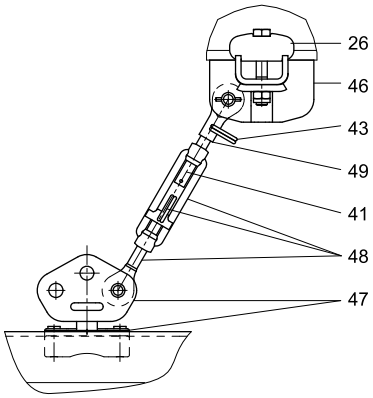
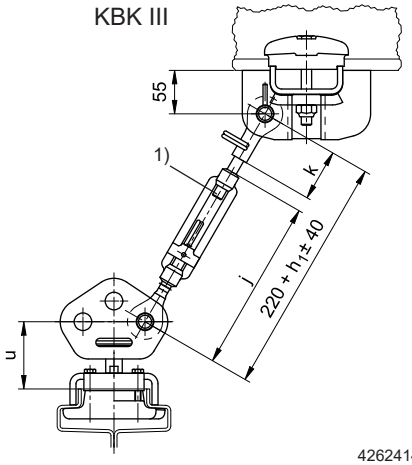
Sloping stiffener, in combination with M20

KBK II-H



KBK III



1) No spring clip fitted here

	j	k	p	s	u	v
KBK II-H	235±20	65	90	25	60	h_1+100±7
KBK III					85	

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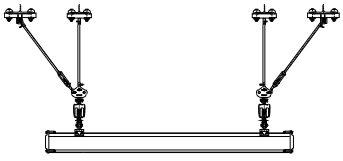
Item	Designation		Qty/susp.		KBK II-H	KBK III
26	Upper suspension clamp		2	Weight [kg]	0,45	
				Part no.	982 326 44	
41	Suspension rod length h_1 [mm]	100	1	Weight [kg]	0,16	
				Part no.	982 446 44	
		300		Weight [kg]	0,47	
				Part no.	982 447 44	
		600		Weight [kg]	0,80	
				Part no.	982 448 44	
		1000		Weight [kg]	1,40	
				Part no.	982 449 44	
43	Spring clip		1	Weight [kg]	0,02	
				Part no.	342 201 99	
46	V-type upper suspension bracket B		1	Weight [kg]	3,20	
				Part no.	984 075 44	
47	V-type suspension clamp		1	Weight [kg]	2,45	4,70
				Part no.	858 080 44	850 080 44
47a	Filler plates for sloping surface		1	Weight [kg]	-	0,60
				Part no.		516 833 46
48	Suspension rod strainer		1	Weight [kg]	0,85	
				Part no.	984 085 44	
49	Hinged end piece		1	Weight [kg]	0,30	
				Part no.	984 083 44	

Stiffener on one side only, not a load-bearing suspension

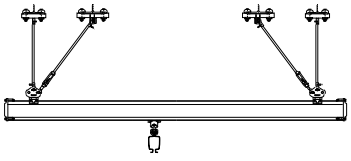
Stiffeners are fitted as shown in the diagrams. V-type hinged suspension clamp (item 47) and V-type upper suspension bracket (item 46) are connected to each other by suspension rod strainer (item 48), suspension rod (item 41) and hinged end piece (item 49). Each bolted connection with a hinged end piece must be secured with a spring clip (item 43). See section 7.7.5 for wall fixture

Finish: galvanized

Crane runway stiffener, perpendicular direction

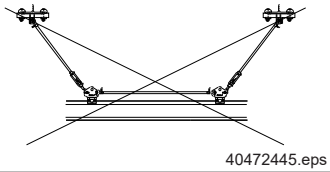


Track stiffener, longitudinal direction



Only for
KBK II-H/M20
KBK III/M20

Not permitted for any profile sections



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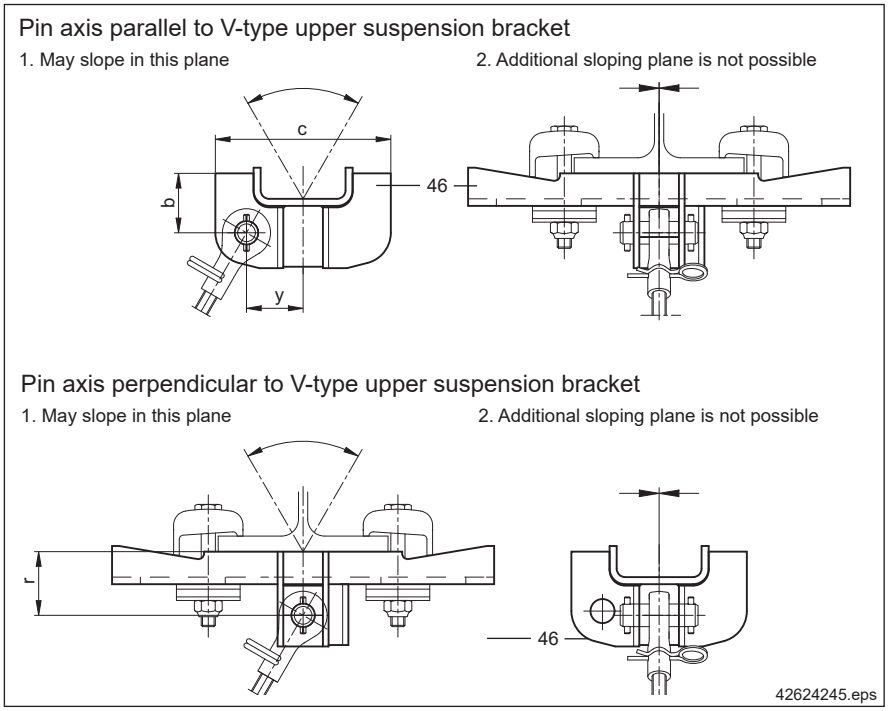
7.7 Component parts for V-type suspension/ stiffener arrangement

7.7.1 V-type upper suspension bracket (Item 46)



	c	q	r	y
KBK 100, I	125	40	45	40
KBK II-L, II, II-H, III	150	55	65	50

Item	Designation		KBK 100	KBK I	KBK II-L	KBK II, II-H, III
			Max. load on suspension			
			400 kg	750 kg	1400 kg	1700 kg
46	V-type upper suspension bracket B	Weight [kg]	1,48		3,03	
		Part no.	980 360 44		984 075 44	

V-type upper suspension brackets have a pin with spring pins (no hinged end piece).

Possible mounting configurations

Fit V-type upper suspension brackets to the superstructure in the same way as vertical suspension arrangements (e.g. with upper suspension clamps).

V-type upper suspension brackets are the same size as upper suspension bracket B (the ends are higher).

Upper suspension bracket A is not used for stiffeners/V-type suspensions because the girders which fit upper suspension bracket A do not always absorb the lateral and torsion forces. For smaller girders: adapters available on request.

The V-type upper suspension bracket is designed for connecting **one** suspension rod by means of a hinged end piece (item 49) (pin axis either parallel or perpendicular to V-type upper suspension bracket). If two or more connections are fitted, a corresponding number of V-type upper suspension brackets must be fitted next to each other.

The pin axis of the V-type upper suspension bracket must always be horizontal and parallel to the pin axis of the V-type hinged suspension clamp (item 47) and perpendicular to the suspension rod axis. V-type upper suspension brackets on sloping superstructures must be anchored against movement. If a V-type upper suspension bracket is not fitted to steel sections, the packing plate (item 51) must be used.

For further information, see "Technical data for KBK suspensions, upper suspension bracket H, S, upper suspension clamp S, V"; refer to the document table on page 7.

Finish: galvanized

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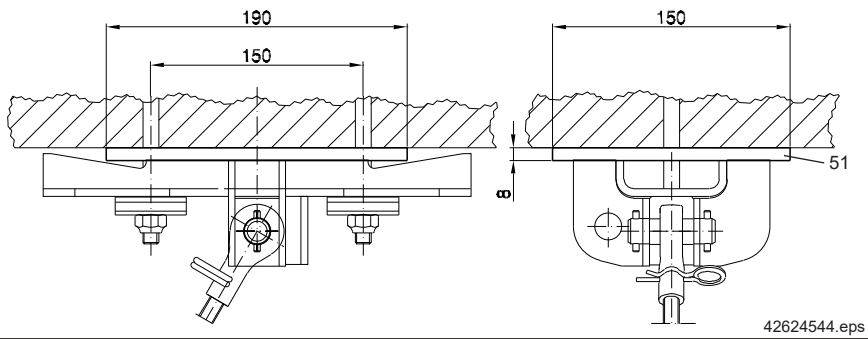
7.7.2 Packing plate for upper suspension bracket (Item 51)

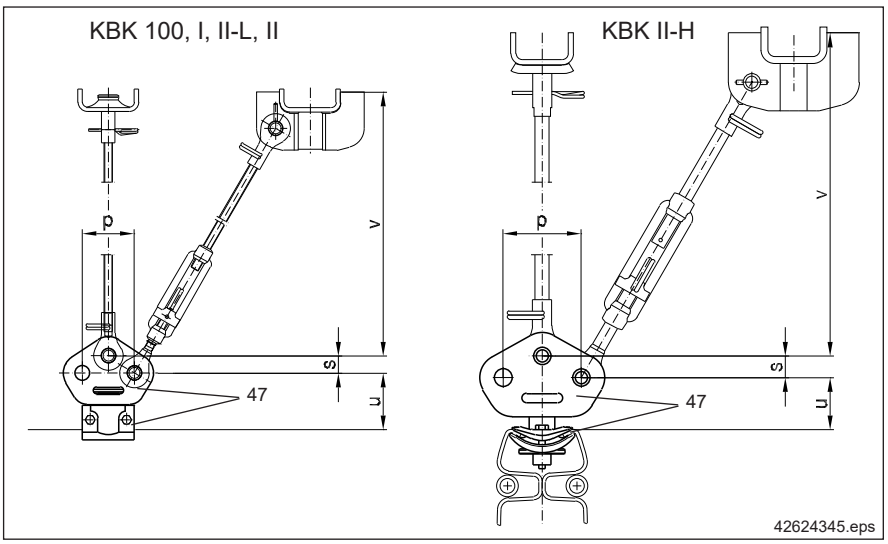
Packing plate for upper suspension bracket KBK 100, I, II-L, II, II-H, III (1700 kg)



Item	Designation		KBK 100, I, II-L, II, II-H, III/M16
51	Packing plate for upper suspension bracket	Weight [kg]	1,75
		Part no.	984 088 44

If the V-type upper suspension bracket is not fitted to steel sections, packing plate (item 51) must be used. This is to ensure that the V-type upper suspension bracket is properly fitted to solid ceilings, ceiling section rails, etc. Connections with U-bolt on request.

7.7.3 V-type hinged suspension clamp (Item 47)



h_1 = suspension rod length

	p	s	u	v
KBK 100	60	20	65	h_1 + 65 ± 4
KBK I			60	
KBK II-L, II	90	25	75	h_1 + 100 ± 7
KBK II-H			60	
KBK III			85	

Item	Designation		KBK 100	KBK I	KBK II-L	KBK II	KBK II-H	KBK III
			Max. load on suspension					
			400 kg	750 kg	1400 kg	1700 kg		
47	V-type suspension clamp	Weight [kg]	1,02	0,86	2,11		2,45	4,92
		Part no.	984 549 44	980 395 44	984 080 44		858 080 44	850 080 44
54	Pin with BoClip for third hinged end piece	Weight [kg]	0,08		0,16			
		Part no.	851 305 44		851 317 44			

The V-type hinged suspension clamp (item 47) consists of a suspension clamp, V-type hinge and two pins with spring pins.

Possible mounting configurations

The V-type hinged suspension clamp is designed for a maximum of three suspension rod connections (suspension rod strainer or hinged end piece). On a V-type suspension arrangement, the rods are fitted to the outer holes, on a lateral stiffener to the centre and one outer hole.

The V-type hinge can be adjusted in the suspension clamp to any angle in relation to the track, however, the pin axis must always be perpendicular to the suspension rod axis. Where three hinged end pieces are used, one additional pin with a BoClip must be ordered.

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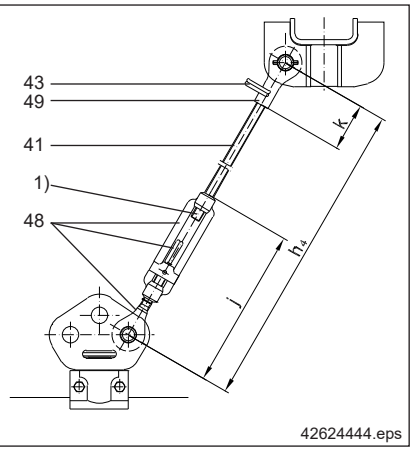
7.7.4 Spring clip (Item 43)
Suspension rod strainer (Item 48)
Hinged end piece (Item 49)



h1 = Suspension rod length

1) No spring clip fitted here

	h_4	j	k
KBK 100, I	h_1 + 155 ± 30	165 ± 15	60
KBK II-L, II, II-H, III	h_1 + 220 ± 40	235 ± 20	65

Item	Designation	Qty/ susp.		KBK 100	KBK I	KBK II-L	KBK II, II-H, III
43	Spring clip	2	Weight [kg]	0,01		0,02	
			Part no.	342 200 99		342 201 99	
48	Suspension rod strainer		Weight [kg]	0,25		0,79	
			Part no.	980 310 44		984 085 44	
49	Hinged end piece		Weight [kg]	0,10		0,30	
			Part no.	980 315 44		984 083 44	

Suspension rod strainer (item 48) and hinged end piece (item 49) together with one suspension rod connect the upper and lower parts of the V-type suspension fitting/suspension fitting with stiffener/sloping suspension fitting. The suspension rod strainer consists of a strainer nut, hinged end piece with left-hand thread, retaining cap and a spring clip.

Possible mounting configurations

If the length of the suspension rods can be determined exactly, the track can also be suspended without a suspension rod strainer. In this case, a hinged end piece (item 49) is used at the top and bottom, and the V-type upper suspension brackets can be pulled apart to level the track.

Length of the suspension rod thread in the hinged end piece:

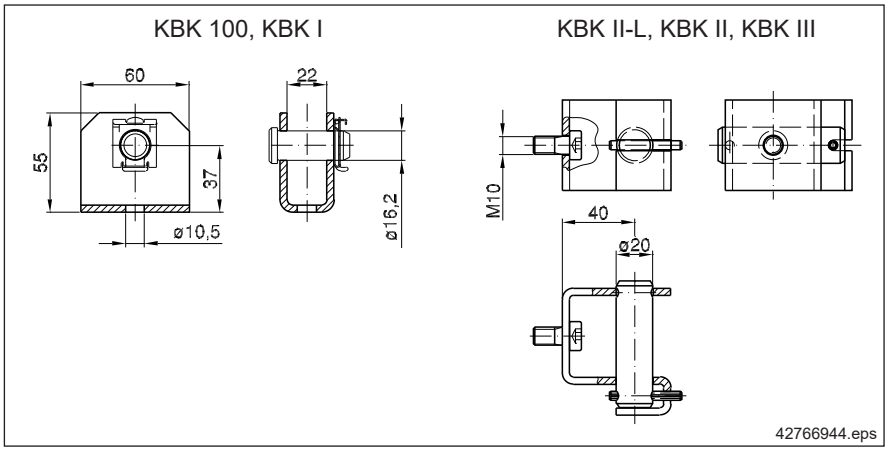
KBK 100, I: 20 mm KBK II-L, II, III: 25 mm

Length of the left-hand thread of the hinged end piece and of the suspension rod thread in the strainer nut:

KBK 100, I: 45 mm KBK II-L, II, III: 60 mm at full ± adjustment.

One spring clip (item 43) is required for every connection between a hinged end piece (item 49) and suspension rod (item 41). Only the connection between the strainer nut and suspension rod does not feature a spring clip.

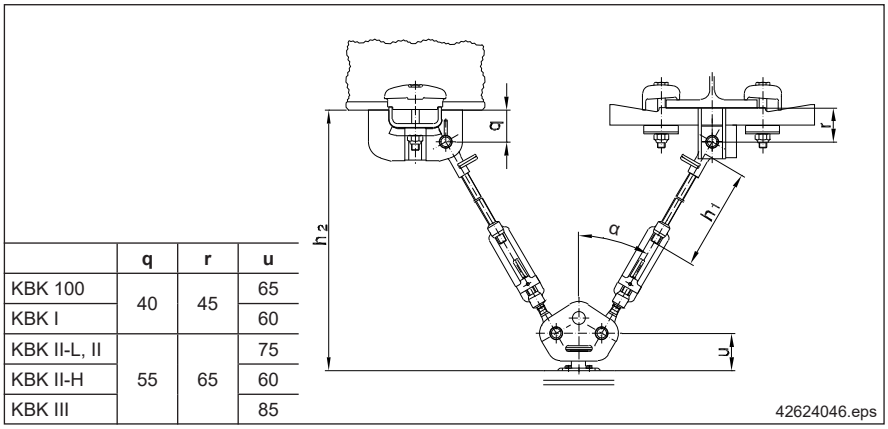
7.7.5 Wall fixture



Item	Designation		KBK 100, I	KBK II-L, II, II-H, III
34	Connector section/connection block	Weight [kg]	0,21	0,46
		Part no.	980 272 44	850 399 44
54	Pin with BoClip	Weight [kg]	0,08	-
		Part no.	851 305 44	-

The connector section/connection block can be used as a wall anchorage for a stiffener arrangement, see also section 7.6.

7.8 Determining suspension rod length h_1 for V-type suspensions and stiffeners



	q	r	u
KBK 100	40	45	65
KBK I			60
KBK II-L, II	55	65	75
KBK II-H			60
KBK III			85

Suspension rod length h_1 can be determined depending on:

- KBK profile section,
- Steel superstructure alignment,
- Distance between lower edge of steel superstructure and upper edge of KBK section (dimension h_2),
- Opening angle α.

The following simplified formulas can be used, since the suspension rod strainer offers a wide range of adjustment.

KBK 100, KBK I → $h_1 = \frac{h_2 - 105}{\cos \alpha} - 155$

KBK II, KBK III/M16 → $h_1 = \frac{h_2 - 140}{\cos \alpha} - 220$

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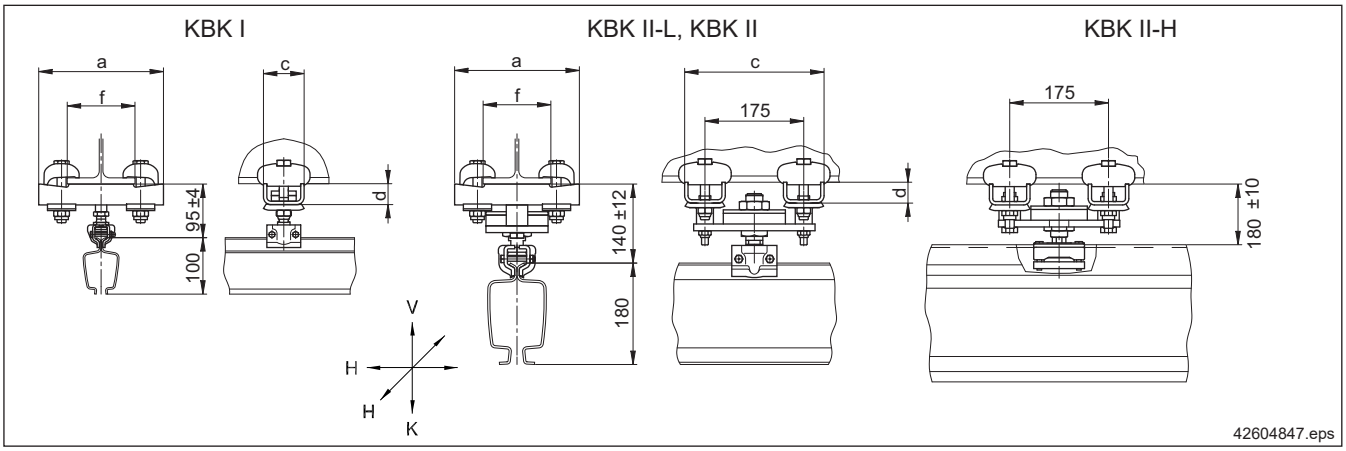
7.9 Ergo suspension

(Item 31e) with upper suspension bracket A or B on steel profile sections



Profile	Upper suspension bracket	a [mm]	f [mm]	c [mm]	d [mm]
KBK I	Upper suspension bracket A	221	71 - 139	72	37
KBK II-L, II, II-H/M16	Upper suspension bracket A	221	71 - 139	247	37
	Upper suspension bracket B	290	100 - 208	251	36

Item	Designation		Upper suspension bracket		KBK I	KBK II-L	KBK II	KBK II-H/ M16
31e	Ergo adjustable suspensions	Type	A	Weight [kg]	5,30	10,20		10,18
				Part no.	980 090 44	851 590 44		858 590 44
			B	Weight [kg]	-	10,95		10,95
				Part no.	-	851 591 44		858 591 44
	Load capacity	Load K			750 kg	1400 kg	1700 kg	
		Load V			100 Kg	200 kg	200 kg	
		Load H			100 kg	200 kg	200 kg	

KBK Ergo suspensions are complete suspension fittings, i.e. they already include upper suspension bracket(s), upper suspension clamps and track suspension clamps.

Ergo suspension fittings can accommodate loads resulting from the use of handling equipment and cranes that have a large overhang.

The use of a rubber element allows the suspension fitting to accommodate forces acting in all directions and to adapt to deflection in the track. In addition, the rubber element provides additional protection from impacts for the superstructure and the KBK installation.

Upper suspension bracket A can be used on roof structures and steel profile sections, upper suspension bracket B (ends project beyond bearing surface) is only suitable for steel profile sections.

Higher flange bending stresses can occur, for example, when used on HE-A beams.

The KBK Ergo suspension fitting headroom dimension corresponds to the short Classic suspension fitting. Larger suspension heights must be adapted to suit the steel superstructure.

Short Classic suspension fittings and Ergo suspension fittings can be used alternately.

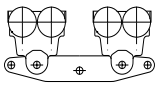
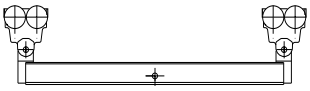
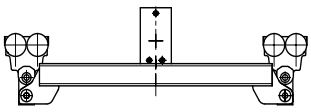
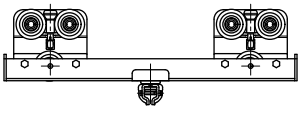
Ergo suspension fittings must be used at track ends.

Finish: galvanized

8 Trolleys and trolley combinations

8.1 Possible applications

X Can be used
O Can be used in special cases
- Cannot be used

Item	Designation	Illustration	Connected by	Profile section [1]	Suitable for monorail		Long-travel unit		
					Straight track	With curves	Single-girder crane		Double-girder crane
							Push travel	Electric travel	
55	Classic single trolley	 42673241.eps	1 pin	100, I, II, III	X	X	X	-	X
55e	Ergo single trolley			I, II	-	-	-	-	-
64	Light-duty trolley, steel			100, I, II	X	X	-	-	-
65	Light-duty trolley, plastic			100, I, II	X	X	-	-	-
56 57	Double trolley with articulated frame	 42673242.eps		100, I, II, III	X	X	X	-	X
58	Load bar for curve	 42673243.eps	1 pin	I	X	X	X	-	o
	Load bar for curve, type C			I, II	X	X	X	-	o
59	Load bar 600	 42673244.eps	1 pin	II	X	-	X	-	o
60	Type A load bars			I, II, III	X	-	X	-	o
66	Type B load bars	 42673246.eps	2 pins	I, II, III	X	-	-	X	X
62	Rigid crane end carriage	 42673248.eps	Rigid	II, III	-	-	X	X	X
67	Raised crane end carriage	 42673249.eps		II, III	-	-	X	X	X
62e	Ergo crane end carriage	 43700745.eps		I, II	-	-	X	X	X

1) II stands for II-L, II, II-R, II-H, II-H-R

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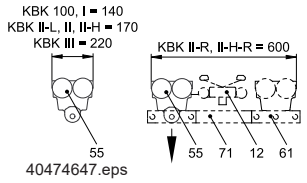
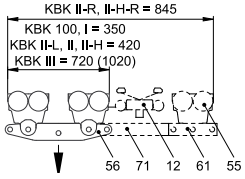
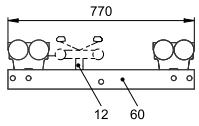
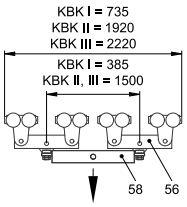
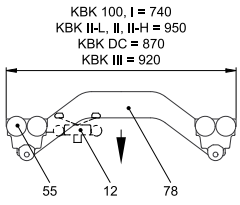
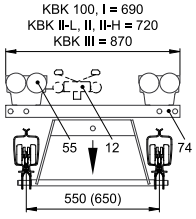
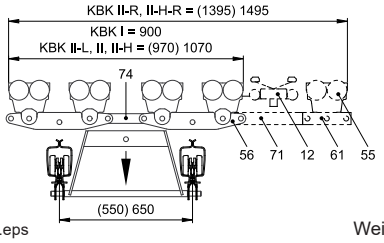
8.2 Trolley combinations

The following criteria must be considered when selecting a trolley or a combination of trolleys:

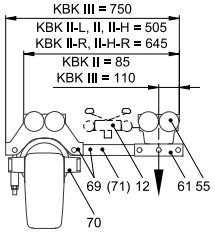
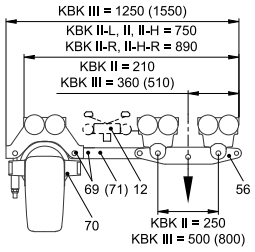
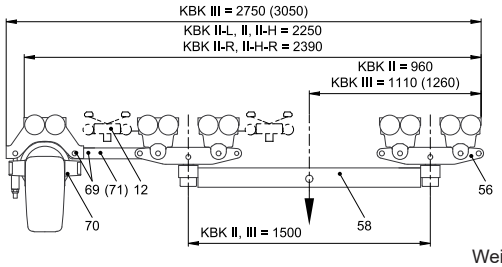
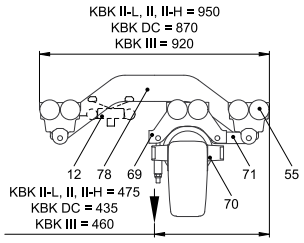
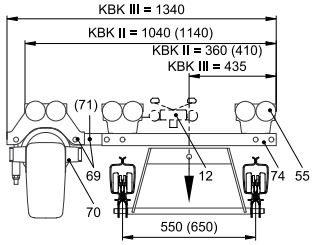
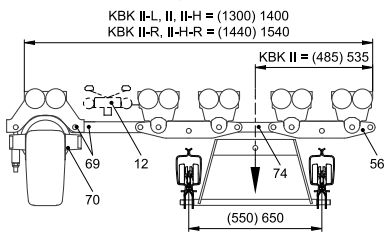
1. Load on the trolley or combination of trolleys
2. Type of load attached (e.g. single or double-girder crane or crab)
3. Push or electric travel
4. Type of power supply system
5. If fittings are attached to the trolley, ensure that full system flexibility is maintained. The load handling attachment and load must be flexibly suspended from the trolleys.
6. Buffers must be provided if a number of monorail hoists or cranes travel on the same crane runway (see section 15).

Item	Trolley combinations [1]	KBK 100 Qty	KBK 100 Item	KBK 100 Part no.	KBK I Qty	KBK I Item	KBK I Part no.	KBK II-L, II, II-H Qty	KBK II-L, II, II-H Item	KBK II-L, II, II-H Part no.	KBK II-R, II-H-R Qty	KBK II-R, II-H-R Item	KBK II-R, II-H-R Part no.	KBK III Qty	KBK III Item	KBK III Part no.
1	Trolley	1	55	984 530 44	1	55	980 610 44	1	55	982 110 44	2	55	982 110 44	1	55	850 610 44
	 40474647.eps										2	61	982 505 44			
											1	71	982 345 44			
											1	12	873 68 . 44			
	40783546.eps Weight			0,70 kg			0,75 kg			1,90 kg			7,64 kg			12,0 kg
2	Double trolley	2	55	984 530 44	1	56	980 322 44	1	56	851 132 44	1	55	982 110 44	1	56	850 370 44
		1	57	980 305 44							1	56	851 132 44			
											1	61	982 505 44			
											1	71	982 345 44			
											1	12	873 68 . 44			
	40783547.eps Weight			2,40 kg			2,50 kg			5,68 kg			10,62 kg			42,00 kg
3								1	60	858 605 44	1	60	858 605 44			
											1	12	873 68. 44			
	40783548.eps Weight									9,17 kg			10,67 kg			
4	Quadruple trolley				2	56	980 322 44	2	56	851 132 44	1	55	982 110 44	2	56	850 370 44
					1	58	980 115 44	1	58	n. drawing	2	56	851 132 44	1	58	n. drawing
											1	58	n. drawing			
											1	61	982 505 44			
											1	71	982 345 44			
											1	12	873 68 . 44			
	40783549.eps Weight						8,12 kg									
5	Double-rail crab	4	55	984 530 44	4	55	980 610 44	4	55	982 110 44	4	55	982 110 44	4	55	850 610 44
		1	78	980 600 44	1	78	980 600 44	1	78		1	78		1	78	
											1	12	873 68 . 44			
	40783645.eps Weight			15,83 kg			15,38 kg									
6	Trolley for double-girder crane	2	55	984 530 44	2	55	980 610 44	2	55	982 110 44	2	55	982 110 44	2	55	850 610 44
		1	74	980 595 44	1	74	980 595 44	1	74	982 595 44	1	74	982 595 44	1	74	850 332 44
											1	12	873 68 . 44			
	41026845.eps Weight			3,40 kg			3,50 kg			7,50 kg			9,00 kg			26,70 kg
7	Double trolley for double-girder crane				2	56	980 322 44	2	56	851 132 44	1	55	982 110 44			On application
					1	74	980 590 44	1	74	982 591 44	2	56	851 132 44			
										(982 440 44)	1	61	982 505 44			
											1	71	982 345 44			
											1	74	982 591 44			
													(982 440 44)			
											1	12	873 68. 44			
	40474646.eps Weight						6,00 kg			12,56 kg			17,50 kg			

1) The table does not consider single trolley 1200 kg (858 670 44) and double trolley 2400 kg (858 650 44) combinations.

Separate calculations based on the individual component parts must be carried out for trolley combinations with load bars. See the following pages for details.

1) Weight indicated does not include friction-wheel travel drive

Item	Trolley combination	KBK II-L, II, II-H			KBK II-R, II-H-R			KBK III		
		Qty	Item	Part no.	Qty	Item	Part no.	Qty	Item	Part no.
11	Trolley with travel drive  41026945.eps	1	55	982 110 44	1	55	982 110 44	1	55	850 610 44
		1	61	982 505 44	1	61	982 505 44	1	71	850 340 44
		1	69	858 480 44	1	69	858 490 44	1	69	850 171 44
		1	70	Travel drive	1	70	Travel drive	1	70	Travel drive
					1	12	873 68 . 44			
	Weight 1)			6,65 kg			8,50 kg			25,40 kg
12	Double trolley with travel drive  40275245.eps	1	56	851 132 44	1	56	851 132 44	1	56	850 370 44
		1	69	858 480 44	1	69	858 490 44	1	69	850 171 44
		1	70	Travel drive	1	70	Travel drive	1	70	Travel drive
					1	12	873 68 . 44	1	71	850 340 44
	Weight 1)			9,63 kg			11,48 kg			55,40 kg
14	Quadruple trolley with travel drive  42684645.eps	2	56	851 132 44	1	55	982 110 44	2	56	850 370 44
		1	58	n. drawing	2	56	851 132 44	1	58	n. drawing
		1	69	858 480 44	1	58	n. drawing	1	69	850 171 44
		1	70	Travel drive	1	69	858 490 44	1	70	Travel drive
					1	70	Travel drive	1	71	850 340 44
					1	12	873 68. 44			
	Weight 1)									
15	Double-rail crab with travel drive  40275346.eps	4	55	982 110 44	4	55	982 110 44	4	55	850 610 44
		1	69	858 480 44	1	69	858 480 44	1	69	850 171 44
		1	70	Travel drive	1	70	Travel drive	1	70	Travel drive
		1	78		1	78		1	78	
		1	71	(855 574 44) s. 10.1	1	71	(855 574 44) s. 10.1	1	71	850 330 44
					1	12	873 68. 44			
	Weight 1)									
16	Trolley with travel drive for double-girder crane  40474746.eps	2	55	982 110 44	2	55	982 110 44	2	55	850 610 44
		1	69	858 480 44	1	69	858 480 44	1	69	850 171 44
		1	70	Travel drive	1	70	Travel drive	1	70	Travel drive
		1	74	982 595 44	1	74	982 595 44	1	74	850 332 44
					1	12	873 68. 44	1	71	850 330 44
	Weight 1)			11,45 kg			12,95 kg			40,10 kg
17	Double trolley with travel drive for double-girder crane  40474747.eps	2	56	851 132 44	2	56	851 132 44			On application
		1	69	858 480 44	1	69	858 490 44			
		1	70	Travel drive	1	70	Travel drive			
		1	74	982 591 44	1	74	982 591 44			
				(982 440 44)			(982 440 44)			
					1	12	873 68. 44			
	Weight 1)			16,51 kg			18,36 kg			

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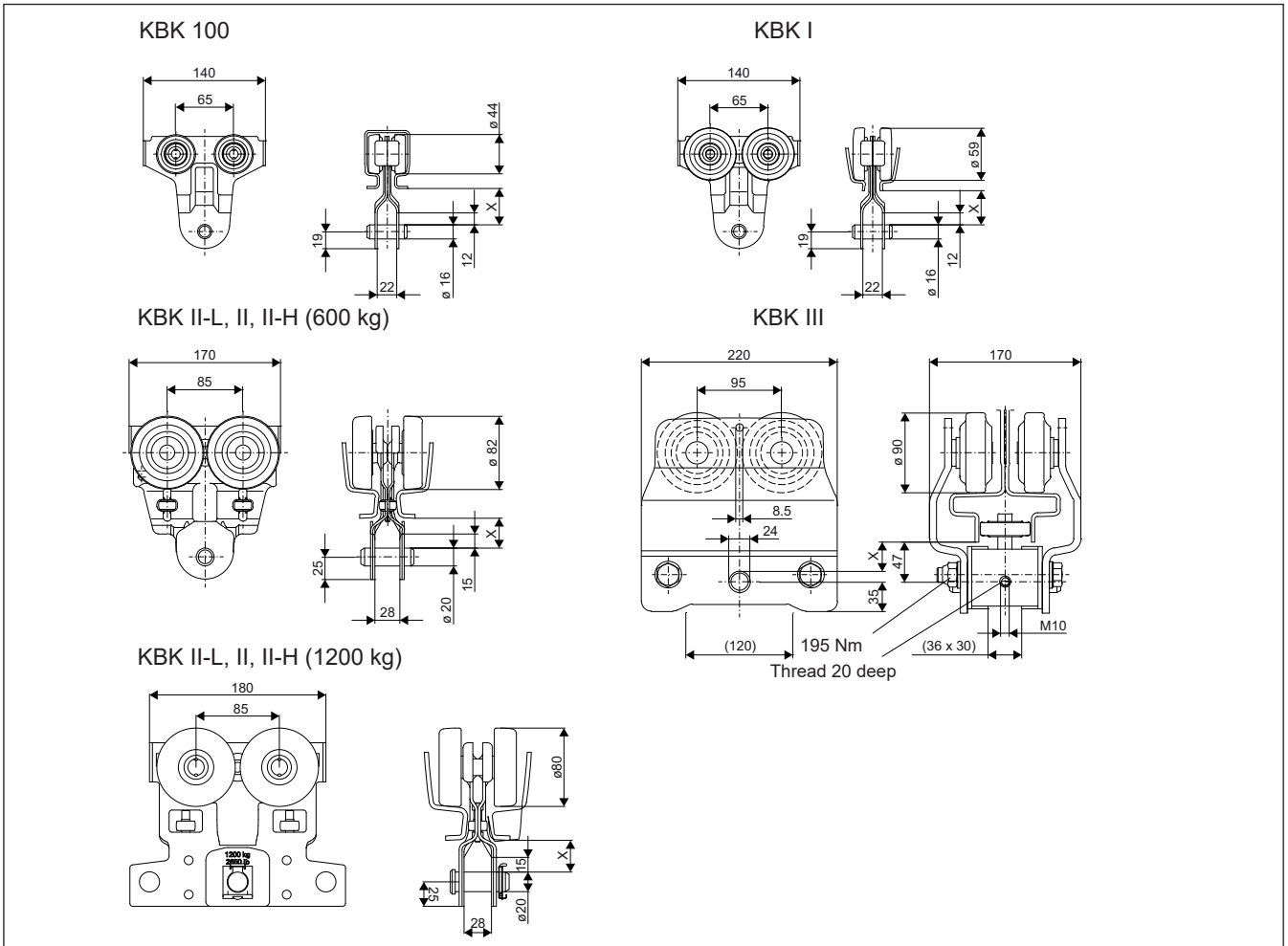
8.3 Single trolleys

8.3.1 Classic trolleys (Item 55)



	KBK 100	KBK I	KBK II-L, II		KBK II-H		KBK III
			600 kg	1200 kg	600 kg	1200 kg	
X [mm]	41	38	35	35	19	19	35

Item	Designation		KBK 100	KBK I	KBK II-L, II, II-H		KBK III
		Max. load	100 kg	300 kg	600 kg	1200 kg	1300 kg
55	Single trolley	Weight [kg]	0,70	0,75	1,90	2,52	12,00
		Part no.	984 530 44	980 610 44	982 110 44	858 670 44	850 610 44

The permissible load on trolleys is reduced for:

Continuous temperature [°C]	Poss. load [%]
-20	50
-15	80
–10 to +40	100
+50	90
+60	75
+70	50

DC and DKUN hoists with short suspension eye can be used on the single trolley for KBK 100, I, II-L, II.

The load handling attachment and load must be flexibly suspended.

Quiet-running KBK trolleys are fitted with 4 plastic travel wheels mounted in permanently lubricated anti-friction bearings.

For trolleys with steel travel rollers, see “Technical data for KBK cranes and tracks in explosion hazard areas”; refer to the document table on page 7.

KBK II-L, KBK II and KBK III trolleys have two additional horizontal guide rollers. The trolley side cheek protrudes beyond the travel wheels in the direction of travel as protection against collision damage.

Connection option for link bars, etc.

KBK 100, KBK I, KBK II: link bar (item 61); KBK III: M10 on both sides

The **start-up traction resistance** of a loaded trolley is approx. 1 – 1,5% of the attached load. Approx. 0,5% with steady motion.

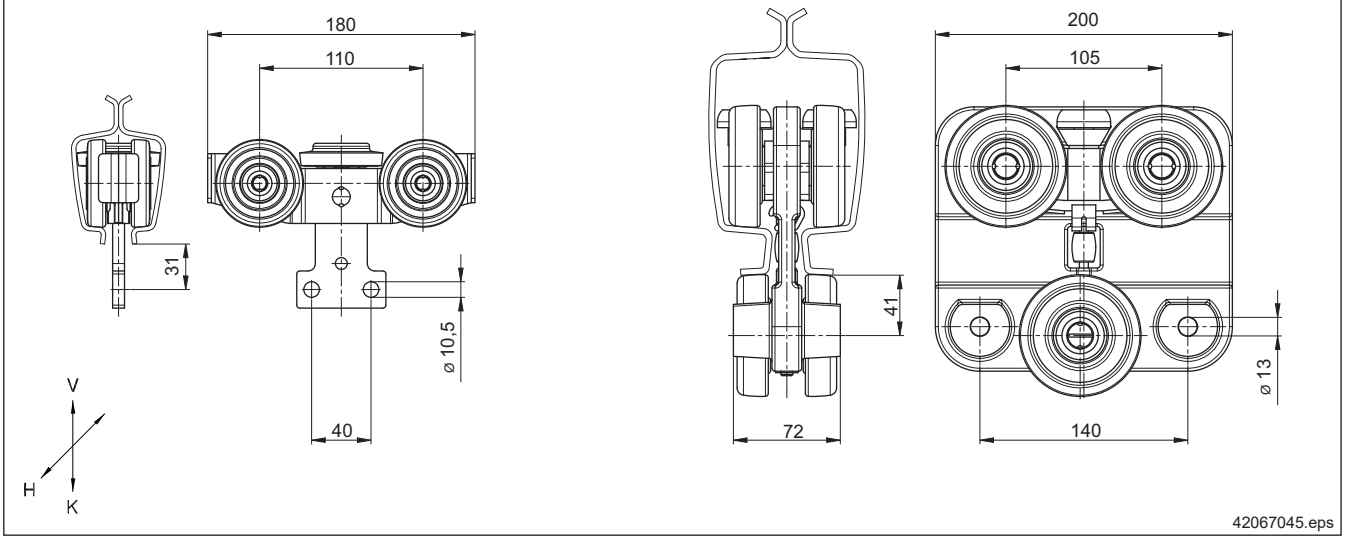
The side guide rollers of KBK II trolleys and all pins can be replaced.

Finish: KBK 100, I, II-L, II: black (RAL 9005); KBK III: red (RAL 2002)

Wearing parts

Item	Designation		KBK 100, I	KBK II-L, II, II-H
	Side guide rollers (20 off), spring pins (20 off), sealing rings (45 off)	Weight [kg]	-	0,34
		Part no.		851 395 44
54	Pin with BoClip	Weight [kg]	0,08	0,16
		Part no.	851 305 44	851 317 44

8.3.2 Ergo trolleys (Item 55)



Item	Designation	KBK I Ergo					KBK II Ergo				
		Load K [kg]	Vert. load V [kg]	Hor. load H [kg]	Weight [kg]	Part no.	Load K [kg]	Vert. load V [kg]	Hor. load H [kg]	Weight [kg]	Part no.
55e	Ergo trolley	300	100	50	1,60	980 570 44	600	200	100	3,50	984360 44

Ergo trolleys can accommodate forces in all axes.

Forces acting against gravity are accommodated by counter-pressure rollers, horizontal forces are accommodated via the lateral guide rollers.

Ergo trolleys are rigidly bolted to end carriages or crab frames.

Travel resistance is approx. 1–2% of the load (approx. 0,5% with steady motion).

Buffer forces must not be transmitted direct to KBK II Ergo trolleys. The crab frames and end carriages are buffered to transmit any forces.

KBK Ergo trolleys cannot negotiate curves.

Finish:	KBK I	Black (RAL 9005)
	KBK II	Aluminium

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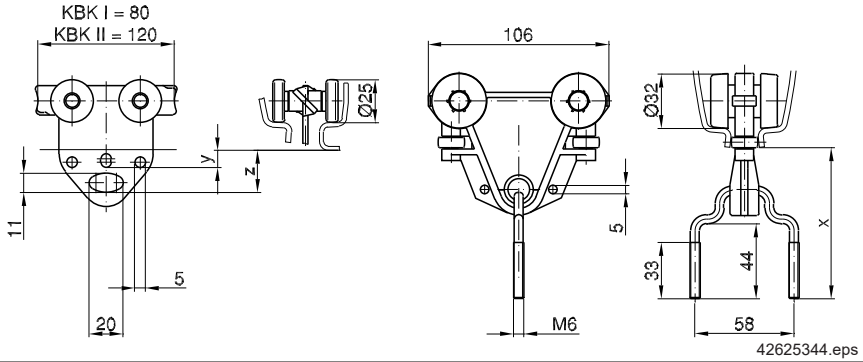
8.3.3 Special trolleys for small loads

Light-duty trolley (steel)
KBK 100, I, II-L, II, II-H
(Item 64)

Light-duty trolley (plastic)
KBK 100, I, II-L, II, II-H
(Item 65)



	x	y	z
KBK 100	85	10	25
KBK I	90	15	30
KBK II-L, II	70	5	20
KBK II-H	55	-11	4

Item	Designation	Max. load		KBK 100, I	KBK II-L, II, II-H
64	Light-duty trolley (steel)	40 kg	Weight [kg]	0,20	0,50
			Part no.	984 607 44	855 085 44
65	Light-duty trolley (plastic)	25 kg	Weight [kg]	0,20	0,20
			Part no.	980 461 44	982 471 44

Steel version

Light-duty trollies are intended for carrying light-weight mobile tools or other small loads. The steel wheels are mounted on anti-friction bearings.

Finish: galvanized

Plastic version

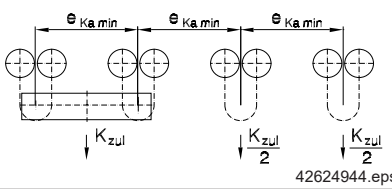
The axles of the plastic travel wheels are mounted on anti-friction bearings. The trolleys have two special horizontal guide rollers. The stirrup to attach the load is fitted to a plastic ball-and-socket joint. The plastic side cheek protrudes beyond the travel wheels in the direction of travel as a buffer to protect against collisions.

Finish: black, galvanized stirrup

8.3.4 Minimum trolley spacing

The minimum permissible spacing dimensions between single or multiple trolleys at maximum load are determined by the trolley centre distances of the articulated frames and load bars.

Pay attention to permissible distances between suspensions and loads.

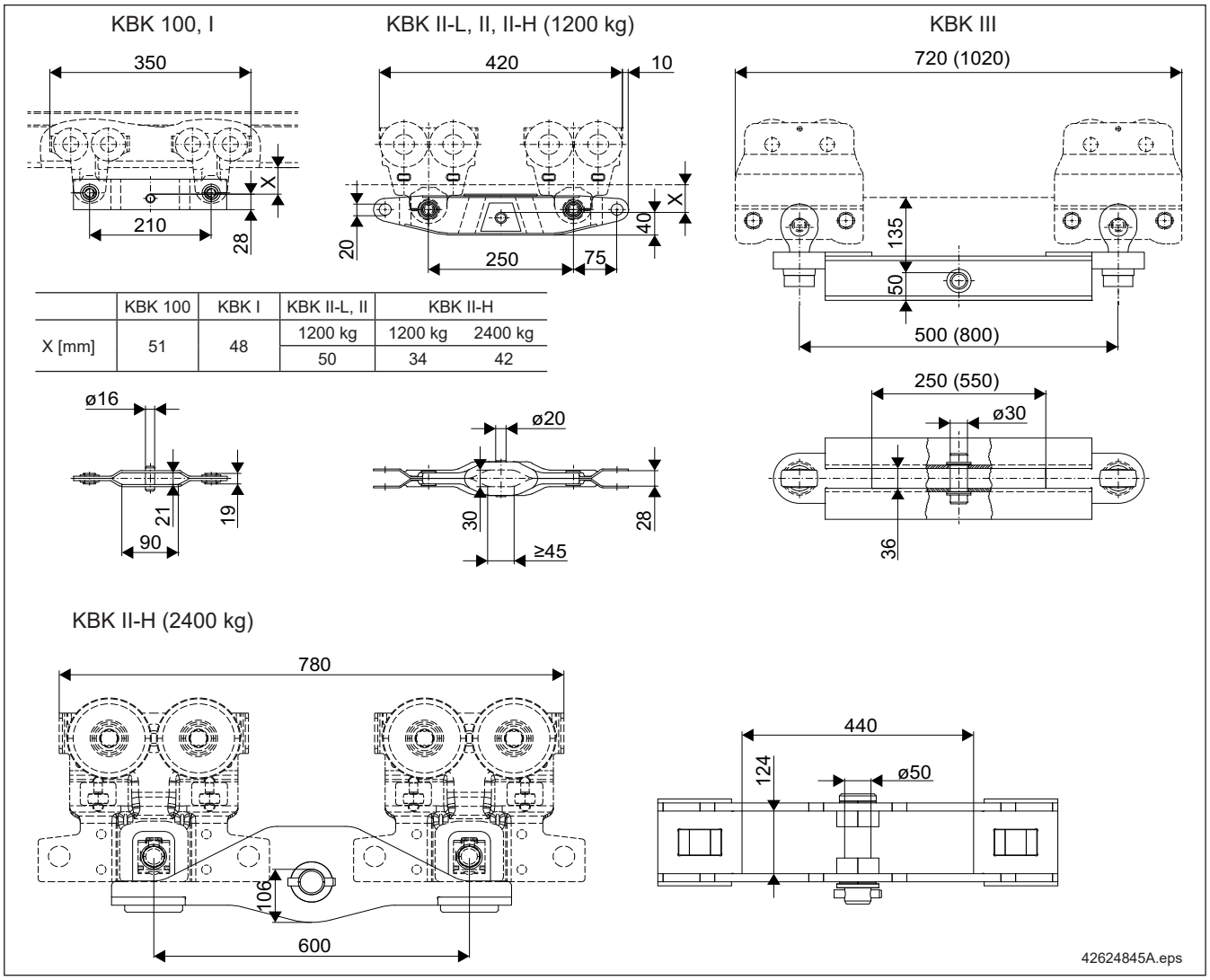


	Min. trolley spacing [mm]	Max. load on single trolley [kg]
KBK 100	210	100
KBK I	200	200
	400	300
KBK II-L, II	250	600
KBK II-H	600	1200
KBK III	500 (800) 1)	1200

1) For travel through track switches

8.4 Articulated frame

(Items 56, 57)



	KBK 100	KBK I	KBK II-L, II	KBK II-H	
			1200 kg	1200 kg	2400 kg
X [mm]	51	48	50	34	42

Item	Designation		KBK 100	KBK I	KBK II-L, II, II-H	KBK II-H	KBK III
		Max. load	**200 kg**	**400 kg**	**1200 kg**	**2400 kg**	**2600 kg**
56	Double trolley, completed (articulated frame + 2 trolleys)	Weight [kg]	2,40	2,50	5,68	9,87	42,00
		Part no.	On application	980 322 44	851 132 44	858 650 44	850 370 44
57	Articulated frame	Weight [kg]	1,00	1,00	1,88	4,83	18,00
		Part no.	980 305 44		982 305 44	858 285 44	517 535 46

A double trolley for travel on straight tracks and on curved tracks is created by joining two trolleys using an articulated frame. Holes drilled in the ends of KBK II-L, II articulated frames are provided for fitting spacer bars and link bars (see section 14), they are not designed for connecting loads. Trolleys are connected by means of the M10 threaded hole for KBK III.

KBK III articulated frames are 500 mm long; however, they must be at least 800 mm long for applications involving track switches.

Use the long suspension eye for DC and DK hoists.

Finish: KBK 100, I, II-L, II, KBK II-H: black (RAL 9005); KBK III: red (RAL 2002)

Wearing parts

Item	Designation		KBK 100, I	KBK II-L, II, II-H
	Side guide rollers (20 off), spring pins (20 off), sealing rings (45 off)	Weight [kg]	-	0,34
		Part no.		851 395 44
54	Pin with BoClip	Weight [kg]	0,08	0,16
		Part no.	851 305 44	851 317 44
185	Box BoClip D=16 mm (16 off)	Weight [kg]	0,12	-
		Part no.	980 559 44	-
	Box BoClip D=20 mm (12 off)	Weight [kg]	-	0,14
		Part no.	-	851 559 44

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8.5 Load bars for travel on curved track

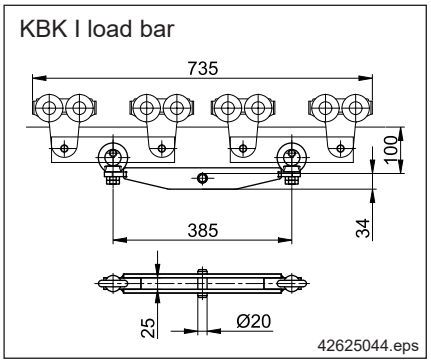
Monorail trolleys, and single and double-girder cranes can be fitted with load bars to distribute the load. This enables larger distances between suspension fittings to be achieved, or heavier loads to be transported for a given suspension fitting interval.

Load bar length e_{Ka} for the monorail travelling hoist or e_{KT} for the crane trolley and the distances between suspension fittings must be specified for project engineering as described in section 3.

The deadweight of the spacer bar must be included in load K when selecting the monorail or crane runway. The number of trolleys (single, double or quadruple trolleys) must be determined according to load K.

When special trolley load bars are provided for trolleys running on curved tracks, the maximum possible distance between the trolleys (e_{Ka}) is the length of the radius of the curve.

8.5.1 KBK I load bar (Item 58)

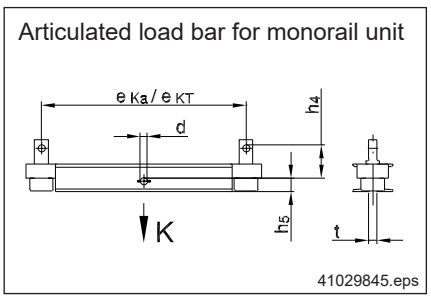


Item	Designation		KBK I
			Max. load
			600 kg
58	KBK I load bar, suitable for curves 1)	Weight [kg]	2,78
		Part no.	980 115 44

1) not for DK 10, DC 10

Finish: black (RAL 9005)

8.5.2 Load bar type C (Item 58)



Item	Track	e_{KT} [mm]	K_{max} [kg]	h5 [mm]	h4 [mm]	d [mm]	t [mm]	Weight [kg]	Part no.
58	KBK II-L, KBK II, KBK II-H	700	1300	40	81	20	25 1)	16,56	715 860 46
		1000						20,82	715 861 46
		1200						23,66	715 862 46
		1500			96			32,63	715 863 46
		700	2360	50	86	30 2)	30	22,55	715 870 46
		1000			106			28,88	715 871 46
		1200	2350					33,10	715 872 46
		1500	2340		126			47,82	715 873 46

DC and DK hoists with long suspension eye,

1) not for DK 10, DC 10

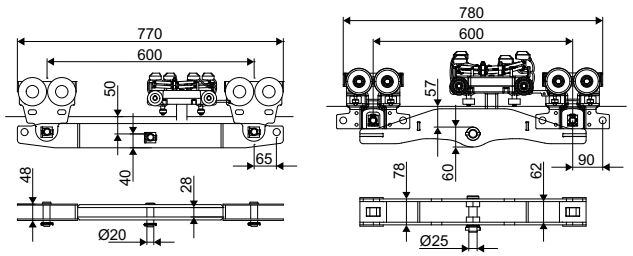
2) not for crane suspensions

Finish: black (RAL 9005)

8.6 Load bars for travel on straight tracks for trolleys and cranes with one supporting pin

8.6.1 KBK II load bar, size 600 (Items 59, 60)

Load bar 600



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Load bar 600 for use in crane installations and straight monorails as trolley and single-girder crane trolley load bar. If a current collector trolley is used, it can be positioned between the trolleys.

The KBK II-R current collector trolley is protected against collisions between the trolleys.

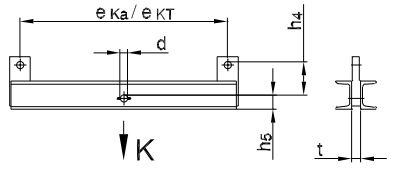
Item	Designation		KBK II-L, II, II-H	KBK II-H
		Max. load	**1200 kg**	**2400 kg**
60	Load bar 600, completed	Weight [kg]	9,17	13,90
		Part no.	858 605 44	858 660 44
59	Load bar 600	Weight [kg]	5,37	8,86
		Part no.	858 600 44	858 290 44

Finish: black (RAL 9005)

8.6.2 Load bar type A (Item 59)

See also section 8.5

Load bar for monorail trolleys and crane trolleys (EHK)



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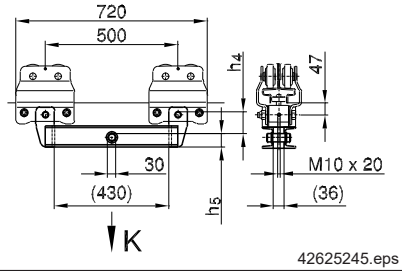
KBK III load bar



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Item	Track	e_{KT} [mm]	K_{max} [kg]	h5 [mm]	h4 [mm]	d [mm]	t [mm]	Weight [kg]	Part no.
59	KBK I	600	780	35	65	20	25 1)	6,43	715 800 46
		1000	770					15,82	715 801 46
		1200						18,66	715 802 46
		1600	760					24,32	715 803 46
		2000						29,99	715 804 46
	KBK II-L, KBK II, KBK II-H	1000	1300	40	72	20	25 1)	16,13	715 821 46
		1200						18,96	715 822 46
		1600			87			29,65	715 823 46
		2000			107			44,24	715 824 46
		1000	2360	50	97	30 2)	30	23,72	715 831 46
		1200						27,94	715 832 46
		1600	2340		117			45,28	715 833 46
		2000	2320		137			66,59	715 834 46
	KBK III	500	2570	50	83	30 2)	36	13,70	715 525 46

DC and DK hoists with long suspension eye,
1) not for DK 10, DC 10
2) not for crane suspensions

Finish:

KBK I, II-L, II, II-H: black (RAL 9005); KBK III: red (RAL 2002)

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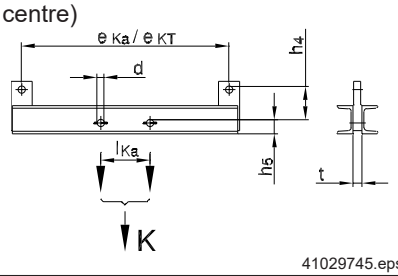
8.7 Load bars for travel on straight tracks for trolleys and cranes with two supporting pins

8.7.1 Load bar type B (Item 66)

Load bar for crane trolleys (ZHK) and for monorail trolley (2 loads arranged symmetrically with reference to the centre)



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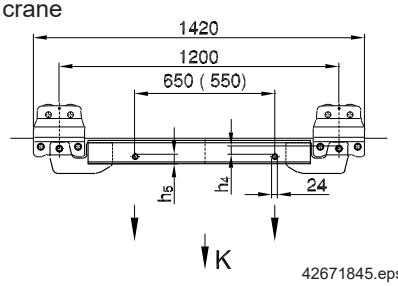
KBK III load bar for double-girder crane



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Item	Track	e_{KT} [mm]	l_{Ka} [mm]	K_{max} [kg]	h5 [mm]	h4 [mm]	d [mm]	t [mm]	Weight [kg]	Part no.
66	KBK I	1000	550	780	35	65	20	25 1)	9,87	715 811 46
		1200							11,50	715 812 46
		1600		760					24,38	715 813 46
		2000							30,04	715 814 46
	KBK II-L, KBK II, KBK II-H	1000	550	2370	40	72	20	25 1)	16,18	715 841 46
			650							715 851 46
		1200	550						19,02	715 842 46
			650							715 852 46
		1600	550	2350		107			35,81	715 843 46
			650							715 853 46
		2000	550	2330		127			55,34	715 844 46
			650							715 854 46
	KBK III	1200	550	2550	42	-	24	36	35,00	204 999 46
			650							

DC and DK hoists with long suspension eye,
1) not for DK 10, DC 10

Data required for ordering KBK III:

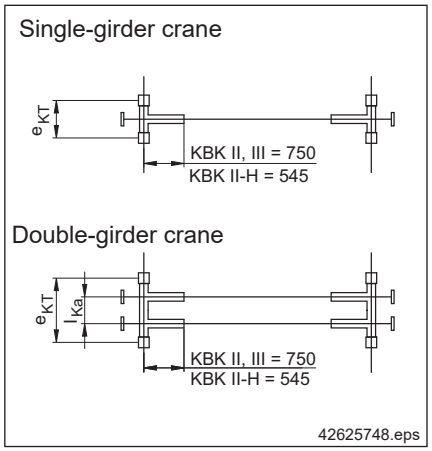
Part no. and l_{Ka} in mm.

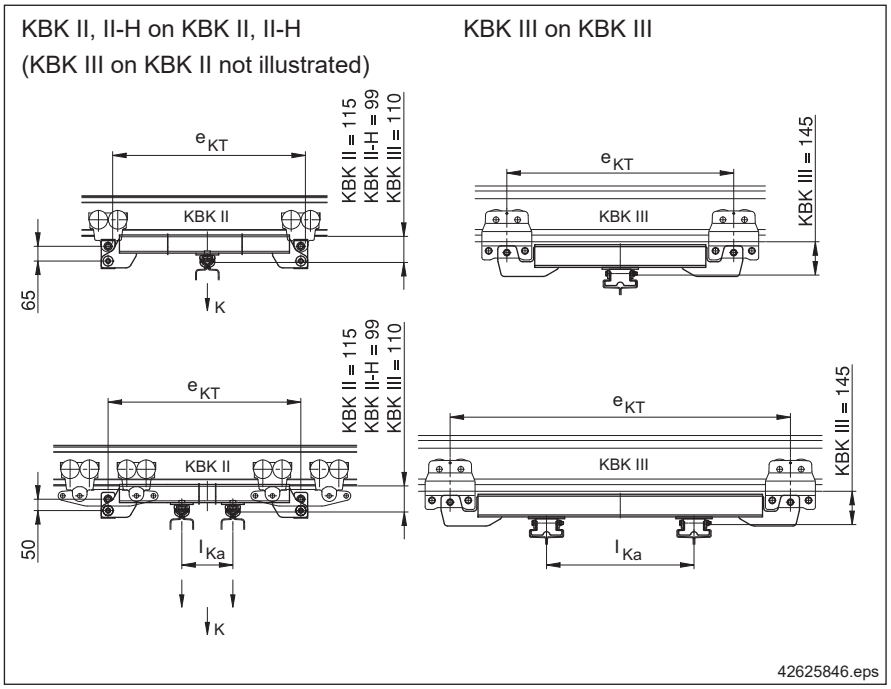
Finish:

KBK I, II-L, II, II-H: black (RAL 9005); KBK III: red (RAL 2002)

8.8 Rigid crane end carriages, KBK Classic

8.8.1 Crane end carriage, rigid (standard headroom) (Item 62)





Rigid crane trolleys make it possible to build parallel-running single and double-girder cranes. Rigid single-girder cranes can be fitted with electric travel drives, as can rigid double-girder cranes. Two crane end carriages are needed for each crane to make up the crane trolleys; trolleys and articulated frames must be ordered separately. Crane suspensions, spacer bars and bracing frames for double-girder cranes are not required.

Cranes should be designed according to the crane selection table. Shorter suspension plates D can be employed when double trolleys are used. The RF friction wheel travel drive link, link bars, spacer bars or buffer attachments can be fitted using the single-trolley link, part no. 982 505 44 or using the articulated frame.

Maximum crane girder length for single-girder cranes:

- KBK II = 6 m
- KBK II-H = 8 m
- KBK III = 9 m

Distance of joint from suspension (st) on the crane must be 150–450 mm or more than 850 mm.

Finish: red (RAL 2002)

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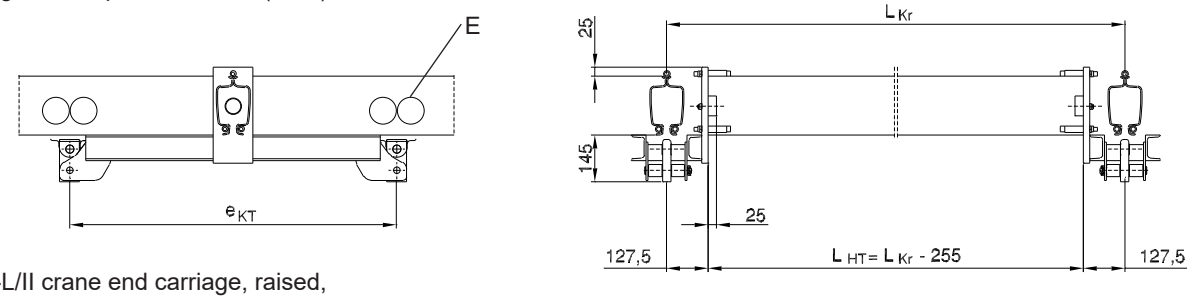
Item	Designation	Track	e_{KT} [mm]	Trolley type [1]	K_{max} [kg]		Crane girder		
							KBK II-H		
62	Single-girder crane end carriages, rigid	KBK II-L, II, II-H	600	E*	2400	Weight [kg]	20,41		
						Part no.	716 382 46		
			1000	E*		Weight [kg]	32,31		
						Part no.	716 384 46		
			1200	E*		Weight [kg]	36,53		
						Part no.	716 386 46		
			1600	E*		Weight [kg]	54,98		
						Part no.	716 388 46		
			2000	E*		Weight [kg]	74,01		
						Part no.	716 390 46		
							KBK II	KBK II-H	KBK III
		KBK II-L, II, II-H	1000	E	1150	Weight [kg]	32,00	28,65	40,75
						Part no.	715 324 46	715 549 46	715 396 46
			1200	E		Weight [kg]	35,40	32,10	44,20
						Part no.	715 327 46	715 557 46	715 396 46
			1600	E		Weight [kg]	42,30	39,00	51,11
						Part no.	715 327 46	715 557 46	715 396 46
			2000	E		Weight [kg]	49,20	45,90	58,02
						Part no.	715 327 46	715 557 46	715 396 46
			1000	E	1300	Weight [kg]	31,70	28,40	-
						Part no.	715 326 46	715 550 46	
					2300	Weight [kg]	-	-	40,44
						Part no.			715 397 46
			1200	E	1300	Weight [kg]	35,10	31,90	-
						Part no.	715 329 46	715 558 46	
					1970	Weight [kg]	-	-	43,89
						Part no.			715 397 46
			1600	E	1300	Weight [kg]	42,00	38,80	-
						Part no.	715 329 46	715 558 46	
					1470	Weight [kg]	-	-	50,81
						Part no.			715 397 46
			2000	E	1170	Weight [kg]	48,90	45,70	-
						Part no.	715 329 46	715 558 46	
					1170	Weight [kg]	-	-	57,72
						Part no.			715 397 46
	Single-girder crane end carriages, rigid	KBK III	1000	E	2500	Weight [kg]	-	-	47,00
						Part no.			204 971 46
	Double-girder crane end carriages, rigid l_{Ka} = 550 mm	KBK II-L, II, II-H	1200	D	1140	Weight [kg]	43,20	37,50	-
						Part no.	715 330 46	715 561 46	
			1600	D		Weight [kg]	50,20	44,40	
						Part no.	715 330 46	715 561 46	
			2000	D		Weight [kg]	57,00	51,30	
						Part no.	715 330 46	715 561 46	
			1200	D	2340	Weight [kg]	42,90	37,30	
						Part no.	715 332 46	715 562 46	
			1600	D	2250	Weight [kg]	49,80	44,20	
						Part no.	715 332 46	715 562 46	
			2000	D	1620	Weight [kg]	56,70	51,10	
						Part no.	715 332 46	715 562 46	
	Double-girder crane end carriages, rigid l_{Ka} = 650 mm		1300	D	2350	Weight [kg]	44,60	39,10	
						Part no.	715 333 46	715 564 46	
			1600	D		Weight [kg]	49,80	44,20	
						Part no.	715 333 46	715 564 46	
			2000	D	1740	Weight [kg]	56,70	51,10	
						Part no.	715 333 46	715 564 46	
	Double-girder crane end carriages, rigid l_{Ka} = 550 mm	KBK III	1500	D	2300	Weight [kg]	74,00	-	
						Part no.	517 550 46		
	Double-girder crane end carriages, rigid l_{Ka} = 650 mm		1500	D	2500	Weight [kg]	74,00	-	74,00
						Part no.	517 551 46		204 978 46
			1000	D	3500	Weight [kg]	-	-	58,00
						Part no.			715 775 46
	Double-girder crane end carriages, rigid l_{Ka} = 800 mm		1200	D	3500	Weight [kg]	-	-	62,10
						Part no.			715 778 46

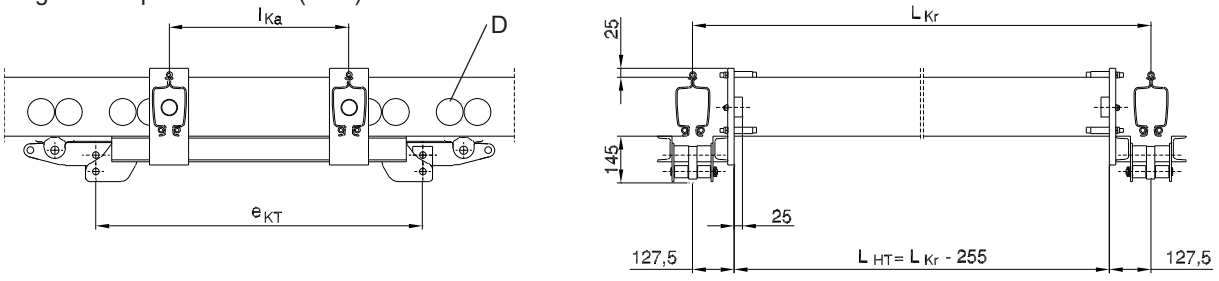
1) E* = Single trolley 858 670 44
E = Single trolley/2 trolleys on each end of the crane
D = Double trolley/4 trolleys on each end of the crane

8.8.2 Crane end carriage, rigid, raised (Item 67)

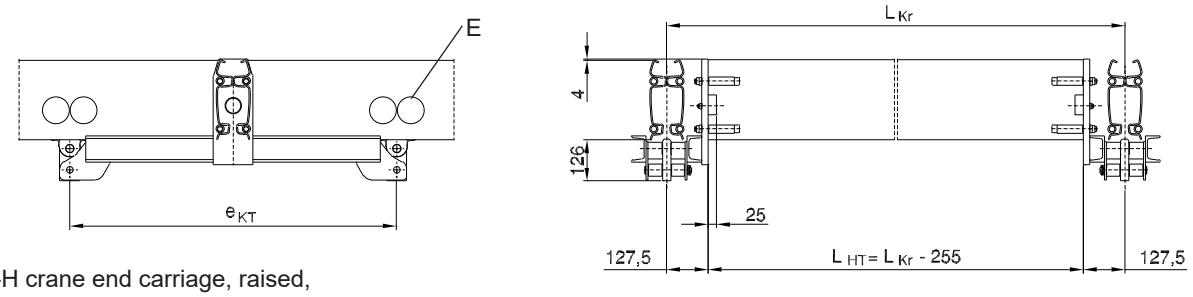
KBK II-L/II crane end carriage, raised,
Single-girder suspension crane (EHK)



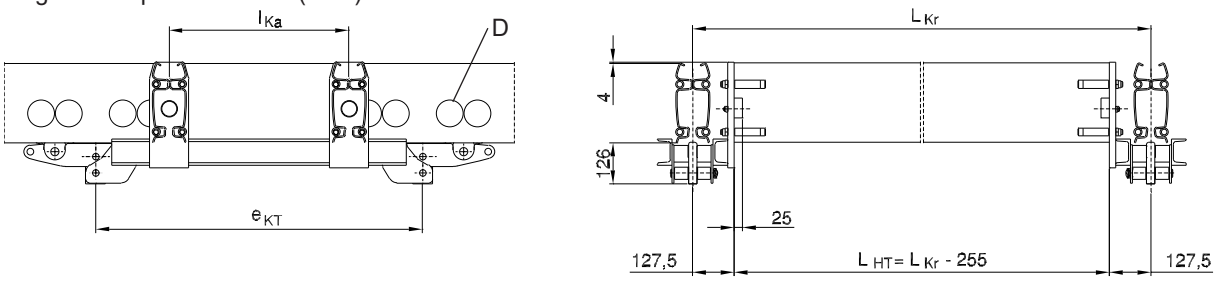
KBK II-L/II crane end carriage, raised,
Double-girder suspension crane (ZHK)



KBK II-H crane end carriage, raised,
Single-girder suspension crane (EHK)



KBK II-H crane end carriage, raised,
Double-girder suspension crane (ZHK)



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Max. crane girder length selection table

Load capacity [kg]	KBK II-L				KBK II				KBK II-H							
	Single-girder crane 1)		Double-girder crane		Single-girder crane 1)		Double-girder crane		Single-girder crane		Double-girder crane					
	l_{HT} [m]	l_{Kr} [m]	l_{HT} [m]	l_{Kr} [m]	l_{HT} [m]	l_{Kr} [m]	l_{HT} [m]	l_{Kr} [m]	l_{HT} [m]	l_{Kr} [m]	l_{HT} [m]	l_{Kr} [m]	l_{HT} [m]	l_{Kr} [m]	l_{HT} [m]	l_{Kr} [m]
160	5,00	5,255	6,00	6,255	6,00	6,255	7,00	7,255	8,00	8,255	8,00	8,255	8,00	8,255	8,00	8,255
200	5,00	5,255	6,00	6,255	6,00	6,255	7,00	7,255	8,00	8,255	8,00	8,255	8,00	8,255	8,00	8,255
250	5,00	5,255	6,00	6,255	6,00	6,255	7,00	7,255	8,00	8,255	8,00	8,255	8,00	8,255	8,00	8,255
315	4,00	4,255	6,00	6,255	6,00	6,255	7,00	7,255	8,00	8,255	8,00	8,255	8,00	8,255	8,00	8,255
400	3,50	3,755	6,00	6,255	6,00	6,255	7,00	7,255	8,00	8,255	8,00	8,255	8,00	8,255	8,00	8,255
500	3,00	3,255	5,50	5,755	5,50	5,755	7,00	7,255	8,00	8,255	8,00	8,255	8,00	8,255	8,00	8,255
630	2,50	2,755	5,00	5,255	4,30	4,555	7,00	7,255	8,00	8,255	8,00	8,255	8,00	8,255	8,00	8,255
800	2,00	2,255	4,20	4,455	3,30	3,555	6,50	6,755	7,00	7,255	8,00	8,255	8,00	8,255	8,00	8,255
1000			3,80	4,055			5,50	5,755	5,60	5,855	6,00	6,255	8,00	8,255	8,00	8,255
1250															7,50	7,755
1600															6,60	6,855
2000															6,00	6,255
e_{KT} [mm]	1000		1000		1000		1000		1000		1000		1000		1200	
l_{Ka} [mm]			550				550				550		550		650	
Weight [kg]	31,00		36,70		31,60		37,80		34,08		41,36		39,50		47,10	
Part no.	715 336 46		715 340 46		715 338 46		715 342 46 3)		715 386 46		715 388 46		715 390 46		715 392 46	
Trolley 2)	E		E		E		E		E		E		D		D	

1) Only for push travel
2) E = Single trolley
   2 trolleys on each side of crane
   D = Double trolley
   4 trolleys on each side of crane
3) Alternatively for trolley type “D”: 715 344 46

KBK cranes with raised girders of single or double-girder design can be used where height is very limited, e.g. in low rooms. The crane runway must be made of KBK II-L, II or II-H sections.

The crane girders are arranged at the same height between the crane runways using raised crane end carriages.

If KBK II-R is used for the crane girders, the KBK II-R sections must be ordered complete with a line powerfeed arrangement and conductor rails shortened by 20 mm at each end, see section 5.7.

The crane end buffers are already included in the crane end carriages.

An internal buffer stop should be fitted to protect the accumulated cable sliders and cable trolleys.

Cranes fitted with raised crane end carriages are rigid, which means that **KBK II-H single-girder cranes and KBK II and KBK II-H double-girder cranes can also be fitted** with electric travel drives.

The travel drives are connected in the same way as for rigid cranes.

Crane suspensions, spacer bars for double-girder cranes and bracing frames are not required.

The trolleys must be ordered separately.

There must be no track joints in the crane girder.

Finish: red crane end carriages (RAL 2002)

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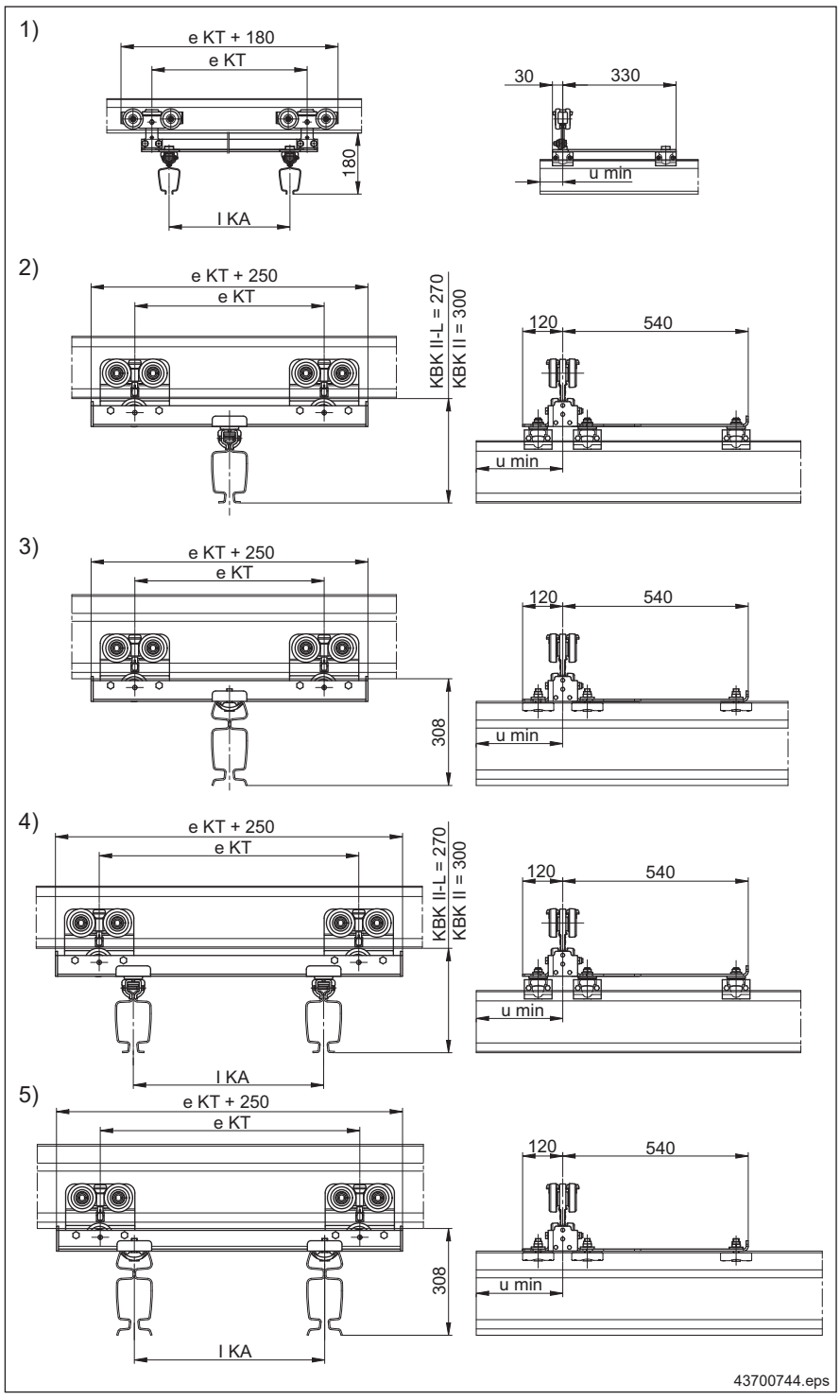
8.9 Ergo crane end carriages

(Item 62e)



1) KBK I Ergo double-girder crane end carriage
2) KBK II-L/II Ergo single-girder crane end carriage
3) KBK II-H Ergo single-girder crane end carriage
4) KBK II-L/II Ergo double-girder crane end carriage
5) KBK II-H Ergo double-girder crane end carriage

Minimum overhang u_{min} when Ergo crane end carriages are used:

		KBK I	KBK II-L, II	KBK II-H
Minimum overhang	u_{min} [mm]	70	200	140

The end carriage length required depends on the crane span dimension and the load. Wheel base e_{KT} of the end carriage should not be less than 1/8 of crane span dimension l_{Kr}.

Longer end carriages should be used to achieve larger distances between suspensions and to reduce suspension loads.

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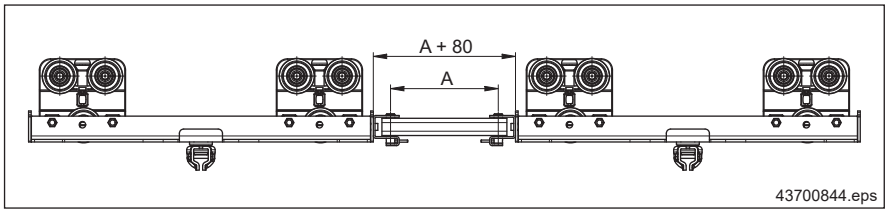
Item	Designation	Track	K	eKT	lKa		KBK I	KBK II-L, II	KBK II-H
62e	Ergo single-girder crane end carriage	KBK I	-200 to +600	450	-	Weight [kg]	7,72	-	-
				650	-		8,72		
					Part no.		715 840 46	-	-
		KBK II-L KBK II KBK II-H	-400 to +1200	450	-		-	18,82	18,15
				550	-			19,82	19,15
				650	-			21,82	21,15
				800	-	Weight [kg]		23,72	23,05
				900	-			25,02	24,35
				1050	-			29,82	29,15
				1250	-			32,32	31,65
					Part no.		-	715 611 46	715 612 46
	Ergo double-girder crane end carriage	KBK I	-200 to +600	550	550		9,04	-	-
				610	610		9,32		
				650	650		9,50		
				762	762	Weight [kg]	10,02		
				800	800		10,19		
				915	915		10,72		
					Part no.		715 850 46	-	-
	Ergo double-girder crane end carriage	KBK II-L KBK II KBK II-H	-400 to +1200	750	550		-	27,50	25,30
				810	610			28,10	25,90
				850	650			28,40	26,20
				962	762	Weight [kg]		29,50	27,30
				1000	800			29,90	27,70
				1115	915			30,90	28,70
				1200	1000			31,70	29,50
					Part no.		-	715 621 46	715 622 46

Ergo tandem crane end carriages



Tandem crane end carriages are made up of Ergo single-girder crane end carriages in connection with a spacer bar. They are used when the load limit of a double-girder crane end carriage is exceeded.

In this way, trolley track gauges that differ from those of double-girder crane end carriage can also be achieved.

The maximum permissible loads on the single-girder crane end carriages determine the maximum load on the end carriages. The given loads apply only for vertical forces transmitted free of any moments.

For offset loads or if moments are transmitted, a maximum permissible load of -400 kg to 1200 kg must not be exceeded on the individual single-girder crane end carriages.

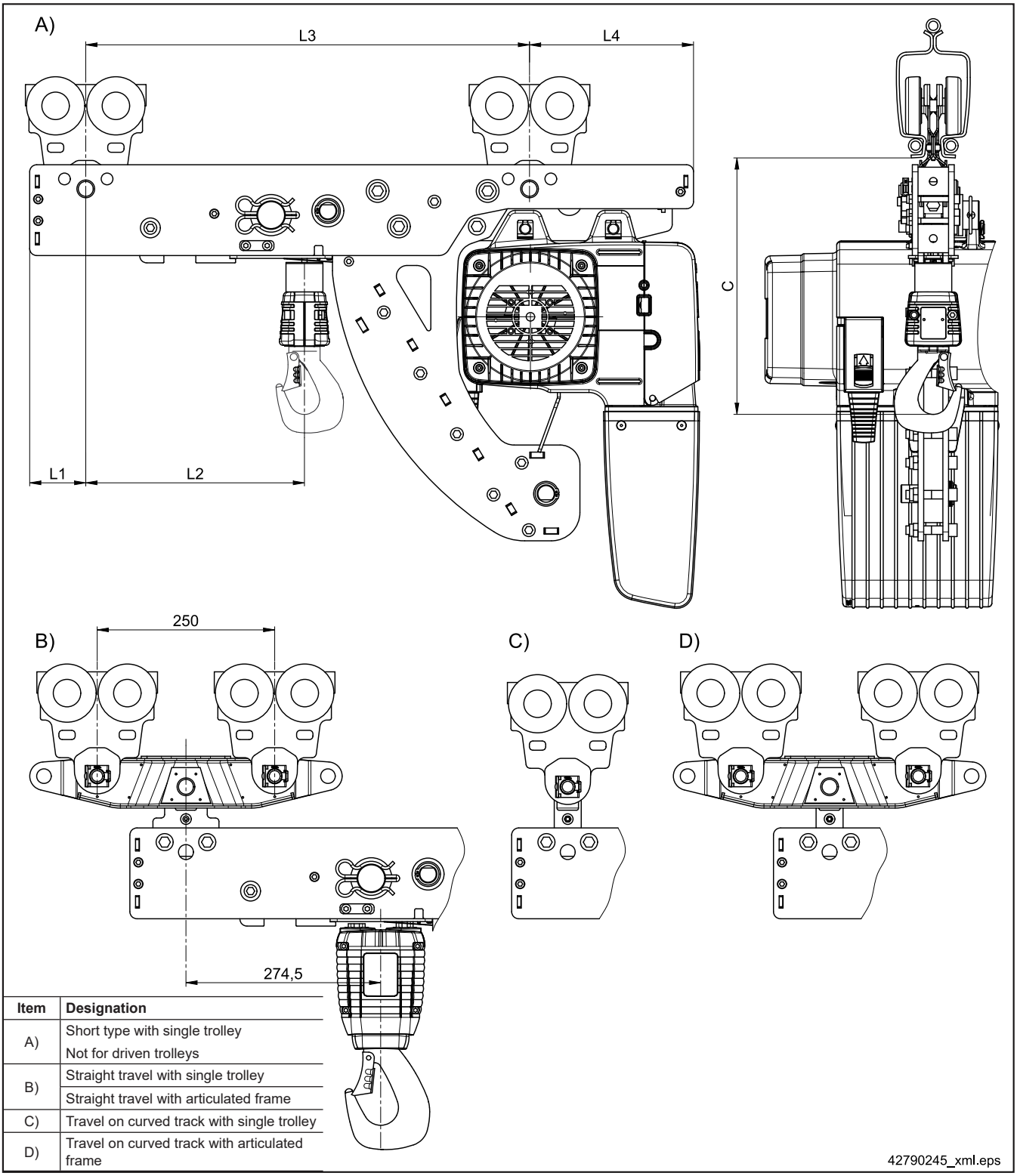
Finish: red (RAL 2002)

9 Monorail trolley for special hoists

9.1 Low-headroom frame for KBK I and KBK II monorail hoists for straight and curved track

Longer hook paths can be obtained for a given rail height by using the low-headroom frame for monorail hoists.

For further information, see “KDC low-headroom monorail hoist assembly instructions” and “Demag DC-Pro 1 - 25 chain hoist technical data”; refer to the document table on page 7 and on request.



Item	Designation
A)	Short type with single trolley Not for driven trolleys
B)	Straight travel with single trolley Straight travel with articulated frame
C)	Travel on curved track with single trolley
D)	Travel on curved track with articulated frame

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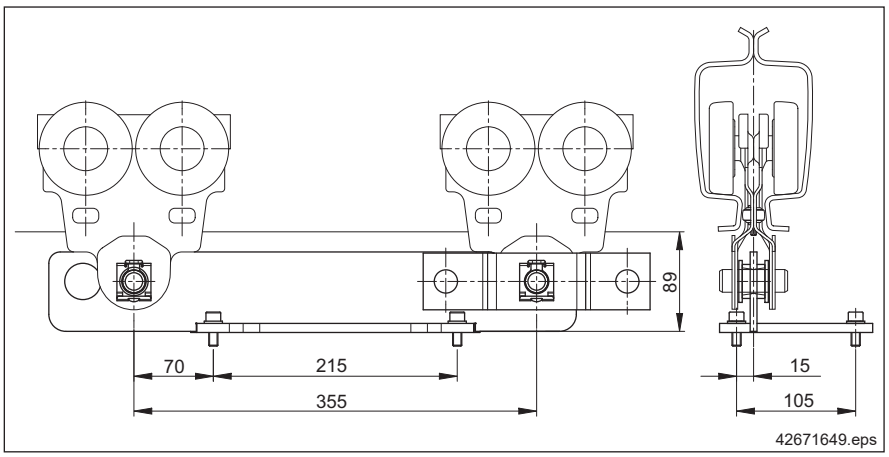
Load capacity [kg]	Chain hoist size	Reeving	C dimension from lower edge of KBK II-L, II					L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]
			A) [mm]	B) [mm]	[mm]	C) [mm]	D) [mm]				
≤ 500	KDC5	1/1	285	366		366		73	369	684	104
≤ 1000		2/1	in development								
≤ 2000	KDC10	1/1	361	453	-	453	-	79	308	625	231
		2/1	-	-	536	-	536				

9.2 Load bar for DS 1 rope winch, D-SH SpeedHoist and D-BE rope balancer



Item	Designation		KBK 100, I, II
	Load bar for DS 1 rope winch, D-SH SpeedHoist and D-BE rope balancer	Weight [kg]	2,20
		Part no.	851 470 44

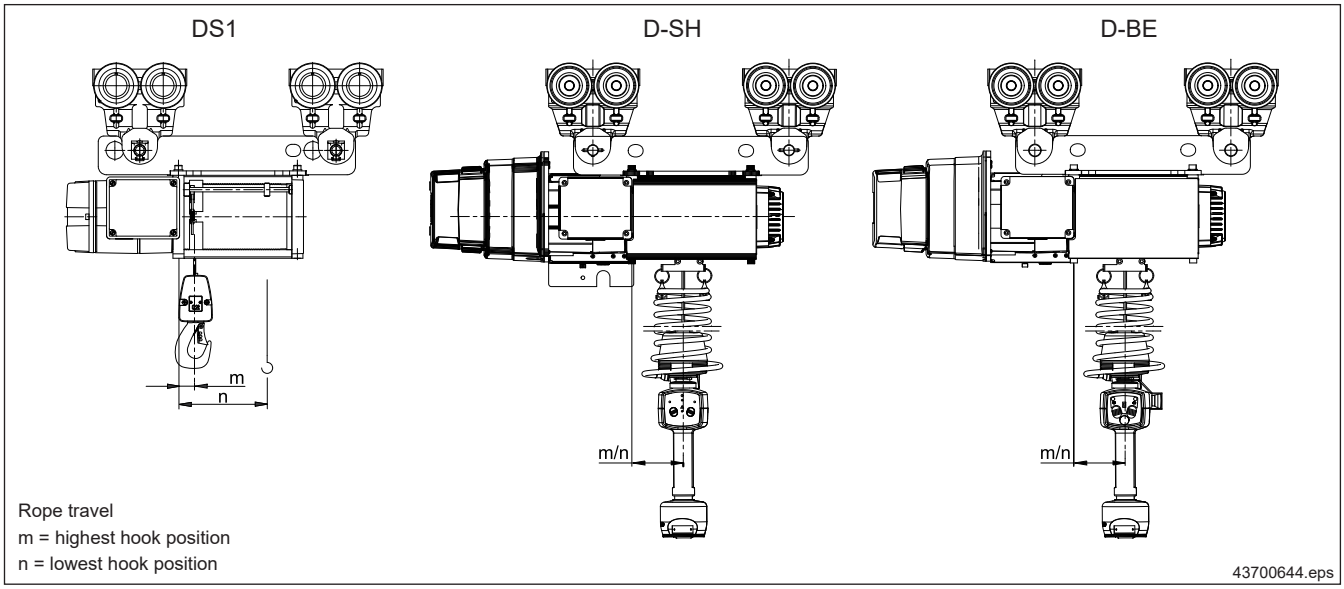
The load bar is used to attach DS 1 rope winch, D-SH SpeedHoist and D-BE rope balancer lifting appliances.

The single-trolley link can be fitted.

Load bar suitable for trolley: KBK 100, KBK I, KBK II

Travel on straight track (travel on curved track possible for KBK II)

Finish: black load bar (RAL 9005)



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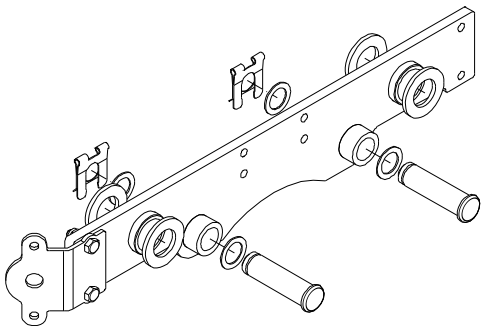
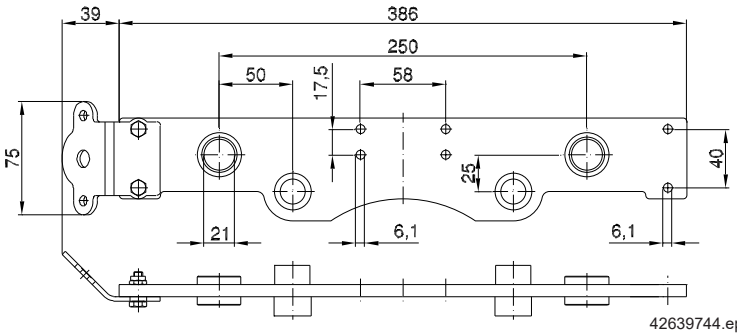
9.3 Load bar for D-BP 110 rope balancer

The washers are only required for KBK II.





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Item	Designation		
59	Load bar for D-BP 110 rope balancer black (RAL9005)	Weight [kg]	1,82
		Part no.	984 685 44

In KBK applications, rope balancers are flexibly connected to trolleys using a load bar.

The load bar is symmetrical and is supplied with an anchorage point for the power supply on the left as standard. The anchorage point can be arranged on the opposite side, if required. The anchorage point is used to attach hose clip set 2.

Load bar suitable for trolley: KBK 100, KBK I, KBK II

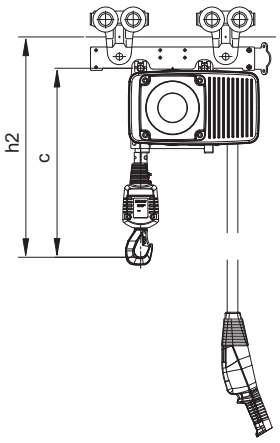
Travel on straight track (travel on curved track possible for KBK II)

Use the following values to specify the track and crane:

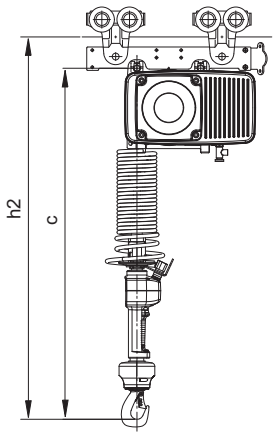
D-BP 110: K = 160 kg

Finish: black load bar (RAL 9005), galvanized pin and washers

Up/down control

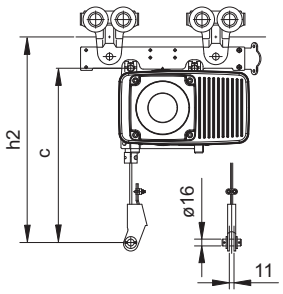


Manual-force control



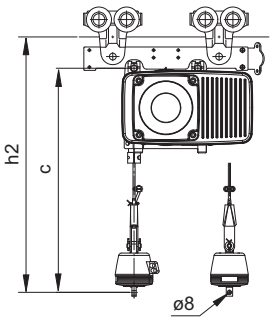
Single-load balance control system

Double-load balance control system



Single-load balance control system incl. swivel unit

Double-load balance control system incl. swivel unit



Swivel unit
(Part. no.: 773 260 44)
Consisting of:
Rope wedge connection and swivel unit mounted on bearings

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Installation dimensions

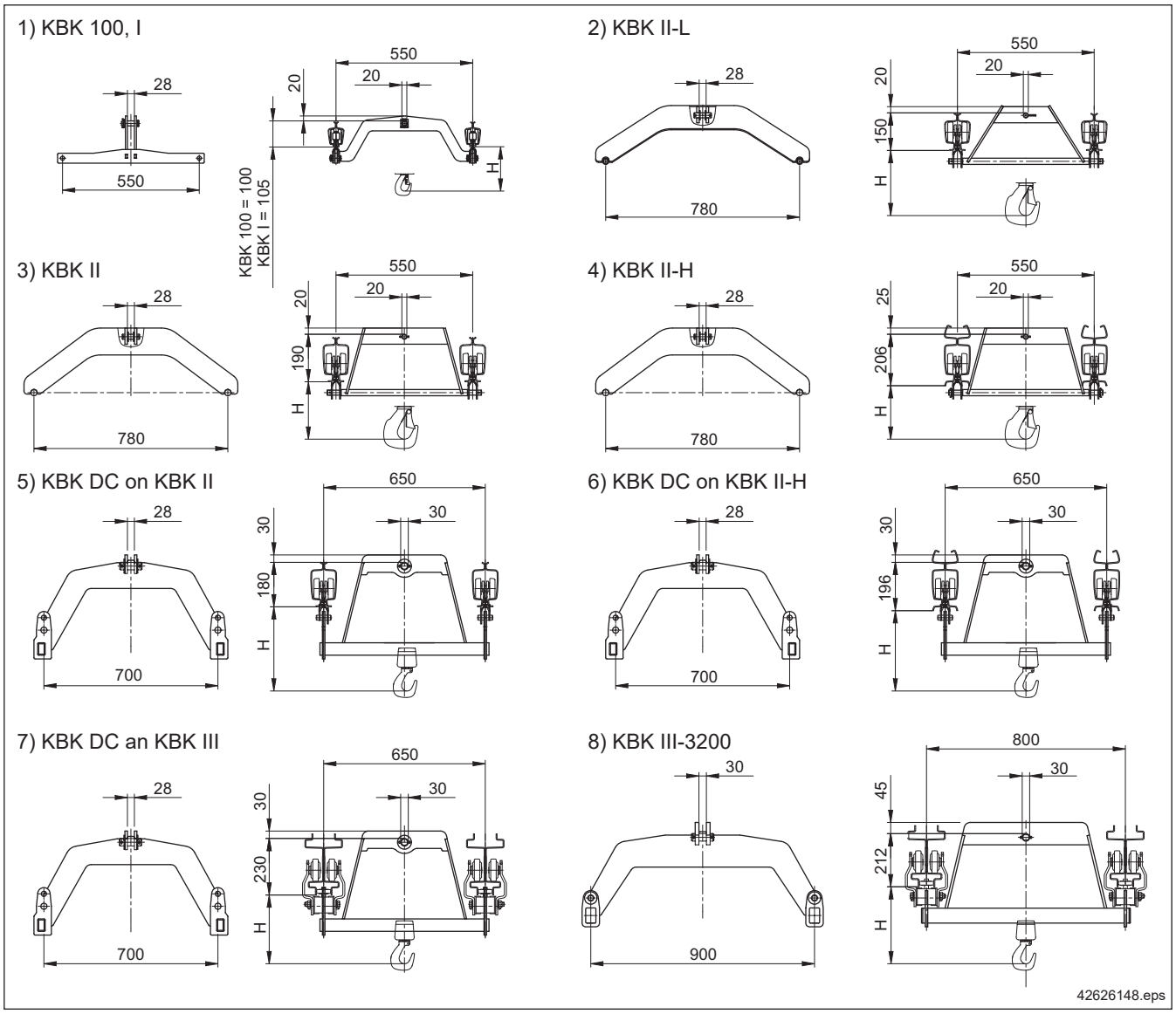
Profile: KBK 100, KBK I, (KBK II = -3 mm)

	Up/down control c/h2	Manual-force control c/h2	Single-load (double-load) Balancer control c/h2	Single-load (double-load) Balance control incl. swivel unit c/h2
D-BP 110	465/540	845/920	430/505	545/620

10 Double-rail crab

10.1 Crab frame

(Item 78)



Item	Dimension H	DCM 1	DCM 2	DCM 5	DC 1	DC 2	DC 5	DC 10 1/1	DC 10 2/1	DC 15 1/1	DC 15 2/1
1	**KBK 100**	594	-	-	264	-	-	-	-	-	-
	KBK I	589	589	641	259	259	311				
2	**KBK II-L**	544	544	596	214	214	266	355			
3	**KBK II**	504	504	556	174	174	226	315			
4	**KBK II-H**	-	-	540	-	-	210	299	391		
5	**KBK DC on KBK II**			566			236	325	417		
6	**KBK DC on KBK II-H**			550			220	309	401		
7	**KBK DC on KBK III**			516			186	275	367		
8	**KBK III-3200**			-			-	293	385	404	496

If a KBK installation is to be equipped with a crab frame and a DC-Pro 15 chain hoist, suspension bracket for KBK III up to 3200 kg (part no. 721 870 45) must also be ordered.

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Item	Designation		KBK 100	KBK I	KBK II-L	KBK II	KBK II, II-H	KBK III	
			Max. load						
			200 kg	600 kg	1200 kg	1200 kg	2370 kg	2600 kg	3300 kg
		Finish	Black			Red			
		Dimension l_{Ka} [mm]	550				650	650	800
78	Crab frame	Weight [kg]	8,90	8,90	17,64	19,30	25,24	25,24	39,00
		Part no.	980 602 44 1)	980 602 44	858 110 44	858 310 44	851 275 44	850 300 44	517 850 46
	Lowered arrangement	Weight [kg]	0,65	-					
		Part no.	517 865 46						

1) The standard crab frame cannot pass under the crane runway, pay attention to approach dimensions.

Crab frames fitted with four trolleys and the hoist form a double-rail crab for double-girder cranes.

The crab frame can pass under bracing frames, spacer bars or crane end carriages. The KBK II crab frame can also be used for KBK II-L (unable to pass under the crane runway).

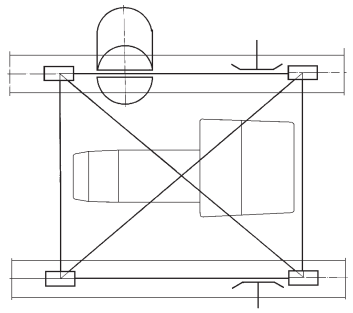
It is not possible to pass under KBK 100 as standard. If this is necessary, a suspension arrangement is required.

All hoists must be used with the long suspension eye.

Electric travel drives and current collectors (KBK II-R, DEL) can be fitted both inside and outside the crab frame.

Electric travel drive connection inside the crab frame:

RF trolley in crab frame



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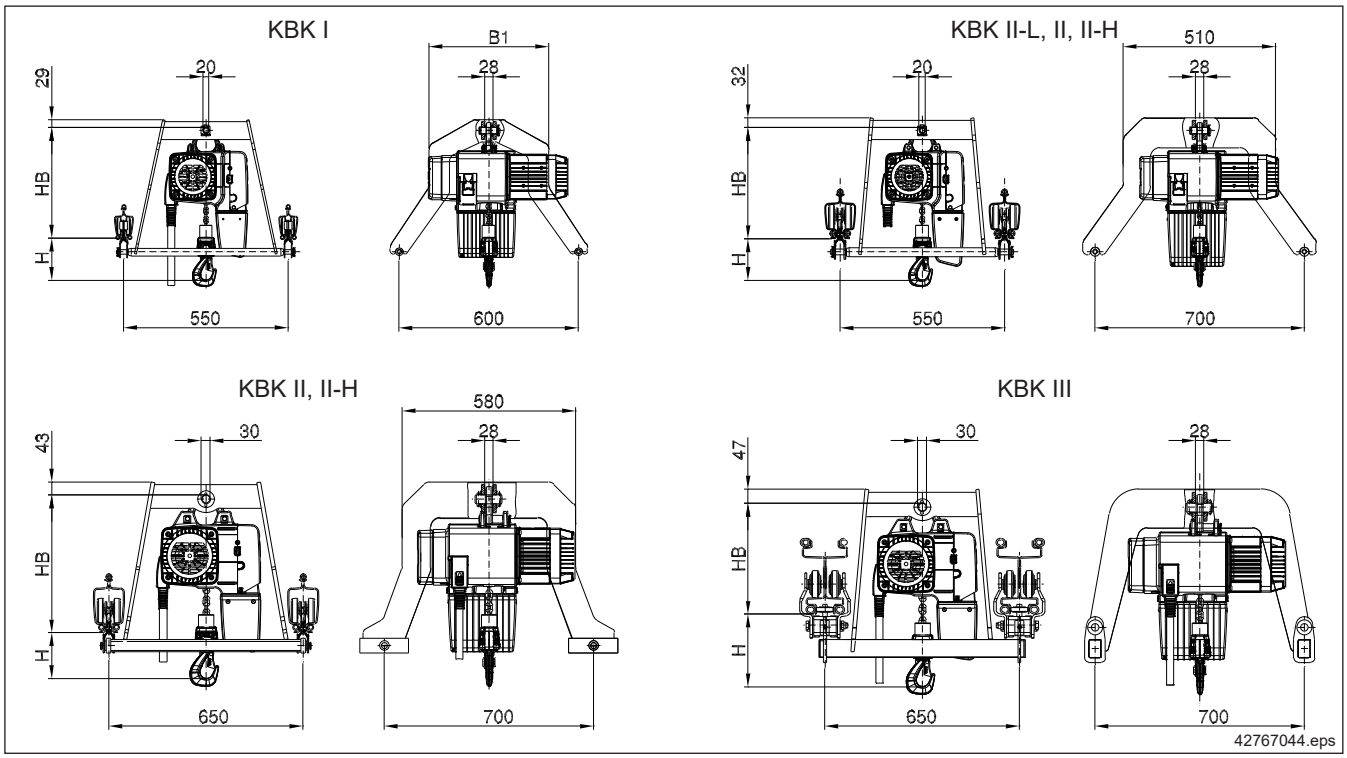
Profile	Crab frame	with	Part no.
KBK II-L	858 110 44	Trolley with short link bar	858 480 44
KBK II	858 310 44		
	851 275 44	Trolley with short link bar and coupling 125	858 480 44 + 855 574 44
KBK III	850 300 44	Trolley for travel drive and short link bar	850 171 44 + 850 330 44
	517 850 46		

Wearing parts

Item	Designation		KBK 100, I	KBK II-L, II, II-H 20 mm dia.
54	Pin with BoClip	Weight [kg]	0,18	
		Part no.	851 318 44	

10.2 Raised crab frame

(Item 77)



Crab frame	Design	Dimension l_{Ka} [mm]	Max. load [kg]	for Hoist unit	alternative [1]	Dimension HB [2] [mm]	Dimension H [2] DC 1/2 [mm]	DC 5 [mm]	DC 10 1/1 [mm]	DC 10 2/1 [mm]	Dimension B1 [mm]	Weight [kg]	Part no.
KBK 100	Black	550	200	DC 1/2	-	315	49	-	-	-	370	15,7	517 890 46
KBK I			600		DC 5	318	46	98					
				DC 5	-	370	-	46				16,7	517 900 46
KBK II-L, II, II-H			1200	DC 1/2	DC 5/10	320	44	96	185		400	26,7	517 910 46
				DC 5	DC 10	372	-	44	133		-	28,7	517 920 46
				DC 10	-	461		-	44			30,9	517 930 46
KBK II, II-H	Red	650	2100	DC 5	DC 10	372		44	133	225		44,3	517 940 46
				DC 10 1/1	DC 10 2/1	461		-	44	136		47,9	517 950 46
				DC 10 2/1	-	530			-	67		50,7	517 960 46
KBK III			2600	DC 5	DC 10	284		132	221	313		40,6	517 970 46
				DC 10 1/1	DC 10 2/1	373		-	132	224		43,5	517 980 46
				DC 10 2/1	-	442			-	155		45,9	517 990 46

1) If the unit cannot be raised to the maximum position

2) KBK II-H: Dimension HB =+ 16 mm
Dimension H =- 16 mm

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Raised crab frames utilise the space between the crane girders of double-girder cranes and make it possible to achieve a minimum dimension H. However, the crab frame cannot pass under the bracing frames, crane runway, spacer bars or crane end carriages.

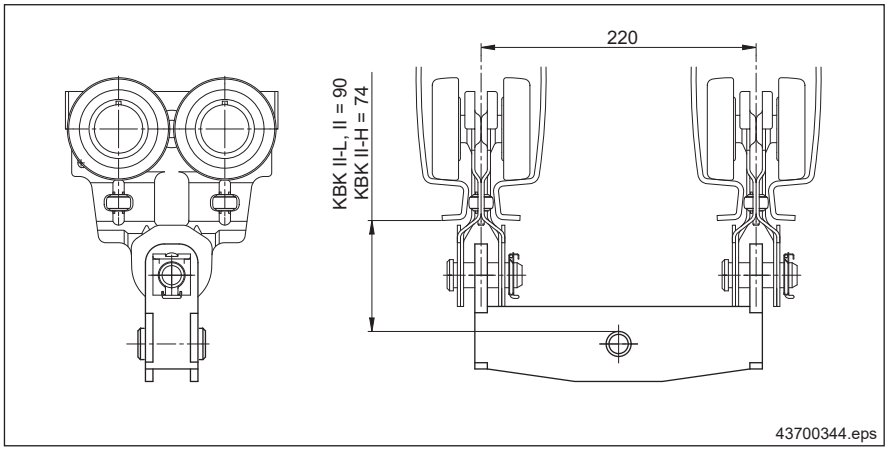
A solution is available with the maximum possible height for every chain hoist type and application (profile section, load). If this is not possible due to obstacles on site, there are alternatives for DC 5/10 with a low headroom dimension.

All hoists must be used with the long suspension eye.

Electric travel drives and current collectors (KBK II-R, DEL) can be fitted inside the crab frame.

Profile	Crab frame	with	Part no.
KBK II-L, KBK II	517 910 46 517 920 46 517 930 46	Trolley with short link bar	858 480 44
KBK II	517 940 46 517 950 46 517 960 46	Trolley with short link bar and coupling 125	858 480 44 + 855 574 44
KBK III	517 970 46 517 980 46 517 990 46	Trolley for travel drive and short link bar	850 171 44 + 850 330 44

10.3 Trolley load bar 220



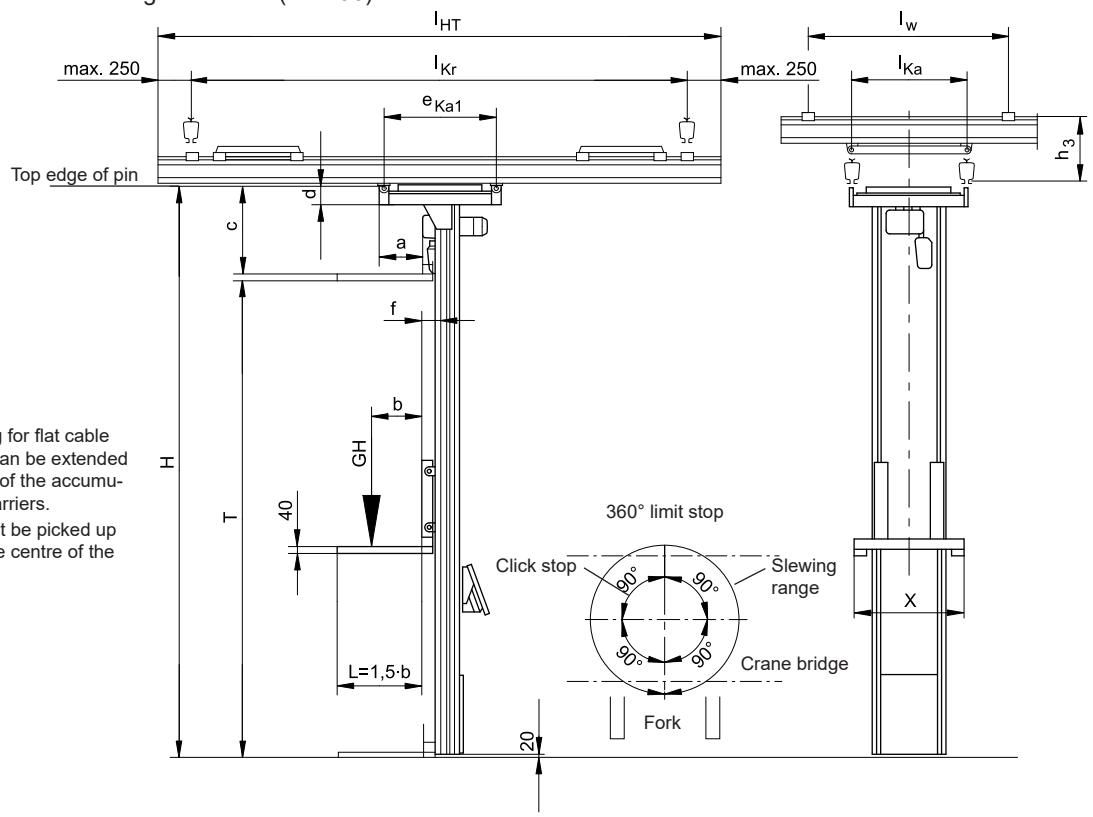
Item	Designation		KBK II-L, II, KBK II-H
	Load bar 220	Weight [kg]	1,80
		Part no.	851 520 44

Trolley load bar 220 is used as a load trolley in extending frame B2/2.

Finish: black (RAL 9005)

10.4 Stacker crabs

Stacker crab for double-girder crane (item 96)



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The overhang for flat cable supply lines can be extended by the length of the accumulated cable carriers.

The load must be picked up in line with the centre of the stacker mast.

Double-rail crab

Stacker cranes, which are double-girder cranes fitted with stacker trolleys, can be used wherever loads weighing up to 500 kg (unit loads, small loads in containers or on pallets, etc.) need to be transported, sorted, stored and picked. Stacker trolleys can be easily moved and turned by hand, the lifting motion is electrically powered. Electric travel motions are not included in the design. Select cranes and tracks according to the stacker crab selection table. The values in the crane selection table do not apply.

A double-girder crane with two diagonal bracing frames is used for the crane bridge. The stacker crab hoist mechanism is controlled by means of a control button on one of the handles, power is supplied by means of a trailing cable or conductor line system. Adjust the height of the trailing cable loop so that the load does not snag.

Stacker crab component parts

Stacker mast with

- Electric chain hoist,
- Handle with integrated control button,
- Lifting carriage with 2 fork blades (standard design),

Other lifting carriage designs on request.

Additional sub-assemblies

- Set-down cut-off (reduced lifting height),
- Lifting carriage height display, mechanical by means of tape with marking.

The crab trolleys, spacer bars and diagonal bracing frames belong to the crane and must be ordered separately (pay attention to crab span dimension l_{Ka}).

Finish: red stacker mast red (RAL 2002); yellow lifting carriage (RAL 1007)

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Stacker trolley selection table					Crane data for stacker crab				
SWL	Load centre distance	Size	Unit height	Fork lifting height	Crane girder section	Crane girder length	Crane span dimension	Distance between suspensions for crane runway l_W	
G_H	b (max.)		H (max.)	T (max.)	KBK	l_{HT}	l_{Kr} (max.)	KBK II-L	KBK II
up to ... kg	[mm]		[mm]	[mm]		[mm]	[mm]	[mm]	[mm]
80	900	2	4080	3425	II-L	5000	4500	4000	6000
					II	6000	5500	3500	6000
	1200	3	5105	4450	II-L	5000	4500	3000	5000
					II	6000	5500	3000	5000
100	800	2	4080	3425	II-L	5000	4500	3500	6000
					II	6000	5500	3500	5500
	1000	3	5105	4450	II-L	5000	4500	3000	5000
					II	6000	5500	3000	4500
125	700	2	4080	3425	II-L	5000	4500	3500	5500
					II	6000	5500	3500	5500
	900	3	5105	4450	II-L	5000	4500	3000	4500
					II	6000	5500	3000	4500
160	550	2	4080	3425	II-L	5000	4500	3000	5000
					II	6000	5500	3000	5000
	800	3	5105	4450	II-L	5000	4500	2500	4000
					II	6000	5500	2500	4000
200	480	2	4080	3425	II-L	5000	4500	2500	4500
					II	6000	5500	2500	4500
	650	3	5105	4450	II-L	5000	4500	2000	4000
					II	6000	5500	2000	4000
250	400	2	4080	3425	II-L	5000	4500	2500	4500
					II	6000	5500	2500	4000
	600	3	5105	4450	II-L	5000	4500	2000	4000
					II	6000	5500	2000	3500
315	370	2	4080	3140	II-L	4500	4000	2000	4000
					II	5000	4500	2000	3500
	600	3	5105	4165	II-L	4500	4000	1500	4000
					II	5500	5000	1500	3500
400	350	2	4080	3140	II-L	4500	4000	1500 [1]	4000 [1]
					II	5000	4500	1500 [1]	3500 [1]
	600	3	5105	4165	II-L	4000	3500	1500 [1]	3500 [1]
					II	5000	4500	1500 [1]	3000 [1]
500	300	2	4080	3140	II-L	3500	3000	—	3500 [1]
					II	4500	4000		3500 [1]
	600	3	5105	4165	II	4500	4000		3000 [1]

1) 2 x double trolley at each end of the crane for $l_{HT} > l_{Kr} + 240$ mm. Height h_3 increases by + 15 mm.

Stacker crab dimensions

Size	Crab span	Dimensions					Max. lifting speed	Weight for max. H	Part no.
	l_{Ka} and dimension e_{Ka1}	X (max.)	a	c	d	f [2]			
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[m/min]	[kg]	
2	800	1000	350	615	125	135	8	300	204 839 46
3	1000	1000	500	900	60	85		400	204 840 46

2) Dimension f for pivot centre.

Example for ordering

1 off stacker crab for KBK II crane girder profile,
Lifted load G_H = 125 kg, size 2; Load centre distance b = 700 mm
Unit height H = 3800 mm, Fork lifting height T = 3110 mm
Distance between fork prongs X = 600 mm; Fork length L = 1050 mm
400 V, 50 Hz.

To be ordered with the crane:
2 off diagonal bracing frame for l_{Ka} = 800 mm; part no. 204 826 46;
2 off spacer bar for l_{Ka} = 800 mm; part no. 715 121 46.

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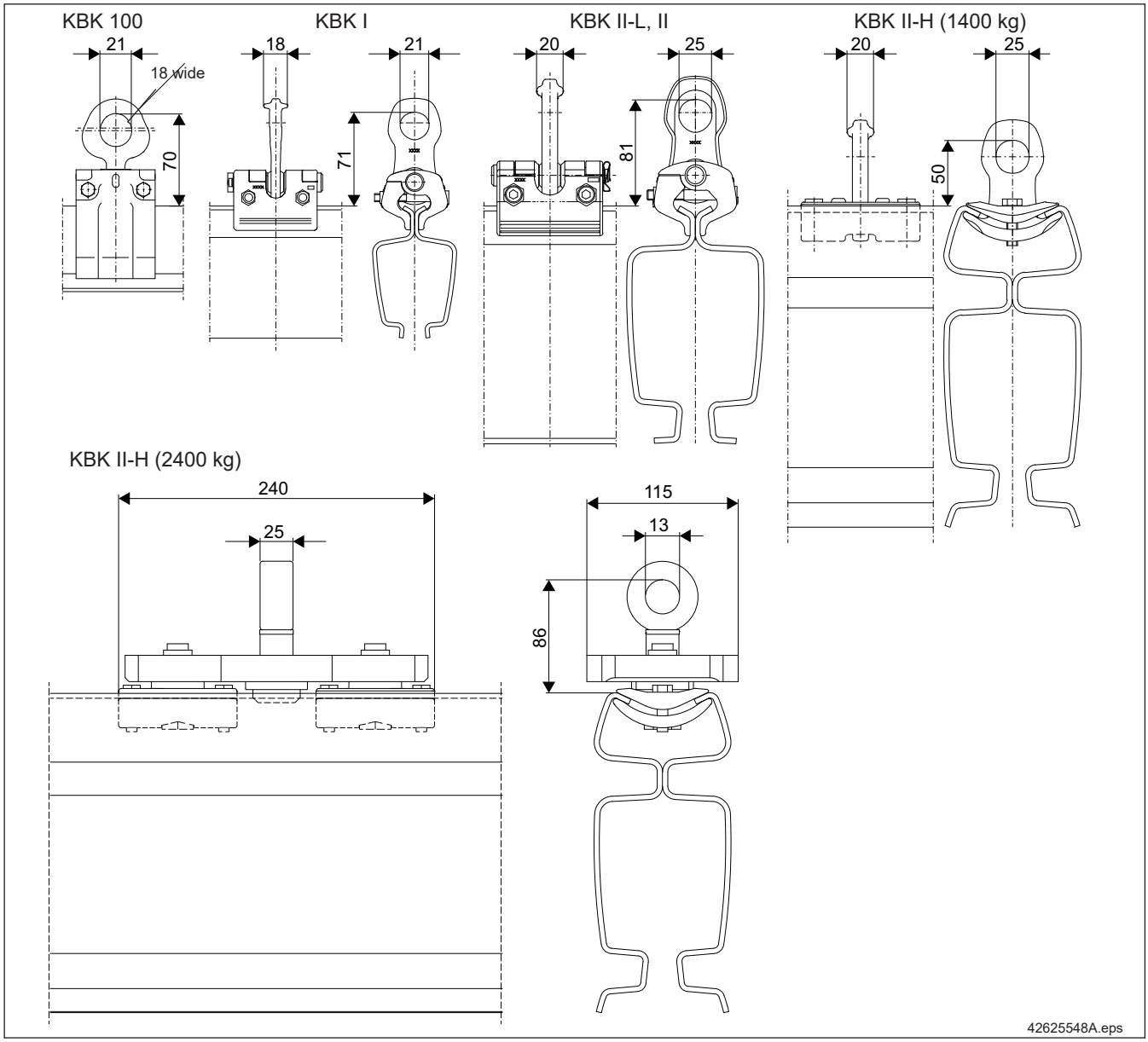
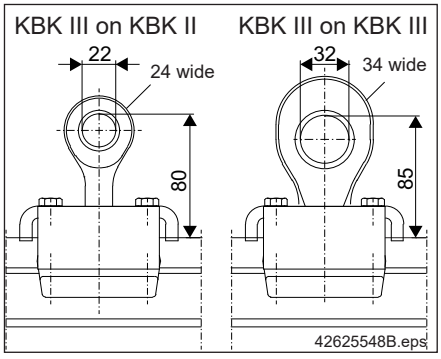
11 Parts for building cranes

11.1 Crane suspension eye

(Item 75)

11.1.1 Crane suspension eye - standard





Crane suspension eyes connect crane girders with single or multiple trolleys running on crane runways. Maintenance-free pivot bearings are fitted in the lower pivot point on KBK I and KBK II. The swivel joint must be used for use on curved crane runways. KBK single-girder cranes can adopt a diagonal position due to the ball-and-socket type connection on the suspension eye for KBK 100 and KBK III. This enables them to travel also on curved or converging crane runways. The suspension eye and track suspension clamp are permanently connected to each other before leaving the factory. The unit should not be used as a swivel joint (exception: KBK III on KBK III).

Finish: galvanized, black

Item	Designation		KBK 100	KBK I	KBK II-L, II	KBK II-H		KBK III on KBK II	KBK III
		Max. load	400 kg	600 kg	1400 kg	1400 kg	2400 kg	1300 kg	2600 kg
75	Crane suspension eye	Weight [kg]	0,60	0,66	1,24	1,00	5,61	3,30	4,60
		Part no.	984 535 44	980 555 44	851 555 44	858 555 44	858 560 44	984 350 44	850 350 44

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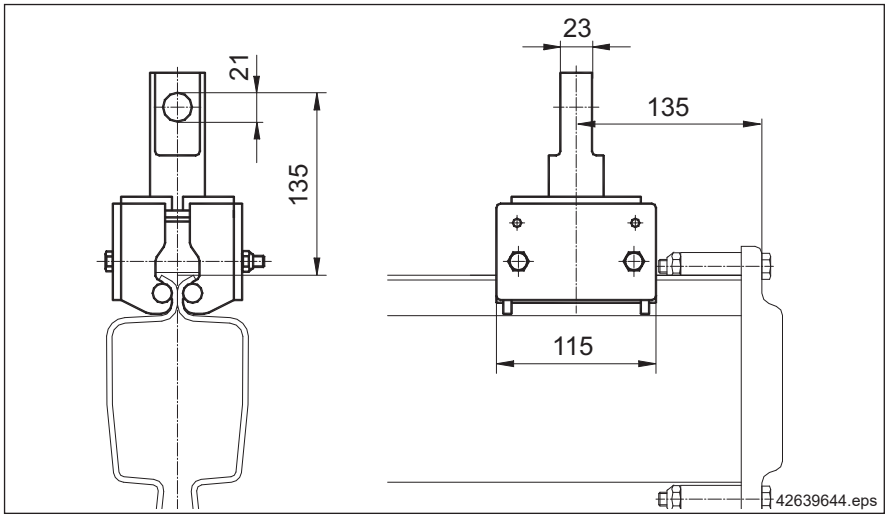
11.1.2 KBK II HD crane suspension eye

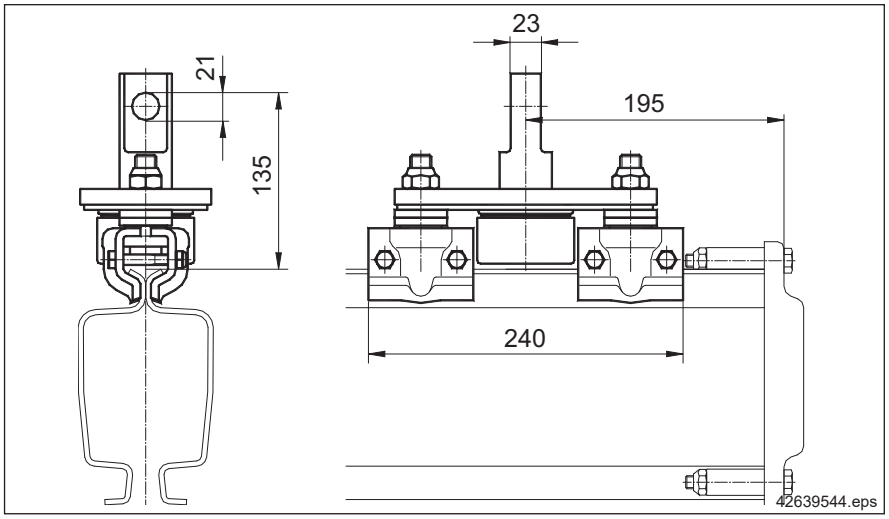
Type 1

Min. overhang 135



Type 2

Min. overhang 195



Designation	Min. overhang [mm]	Loading [kg]	Weight [kg]	Part no.
HD crane suspension	135	1400	4,10	Standard drawing 1)
	195	1400	4,32	

1) Solutions for other profile section sizes on request

HD crane suspensions are used wherever higher loads are to be expected due to special operation with a high number of cycles and heavy duty. They can also be used as swivel joints.

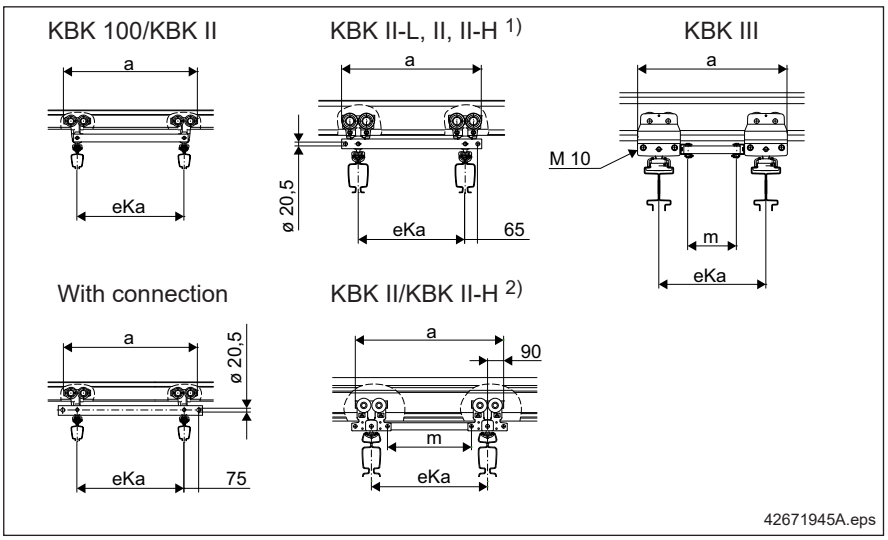
Two variants are available.

For selection purposes, the minimum overhang that can be achieved must be observed.

Finish: white Aluminium (RAL 9006)

11.2 Spacer bar for crane trolleys
(Item 74)

For single trolley



e_{Ka}	KBK 100/KBK I	KBK II/KBK II-H 1)/ KBK II-L	KBK II/KBK II-H 2)		KBK III	
	a	a	a	m	a	m
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
550	690	720	730	370	770	250
650	-	820	830	470	870	350
800	-	970	980	670	1020	500
1000	-	1170	1180	820	1220	700

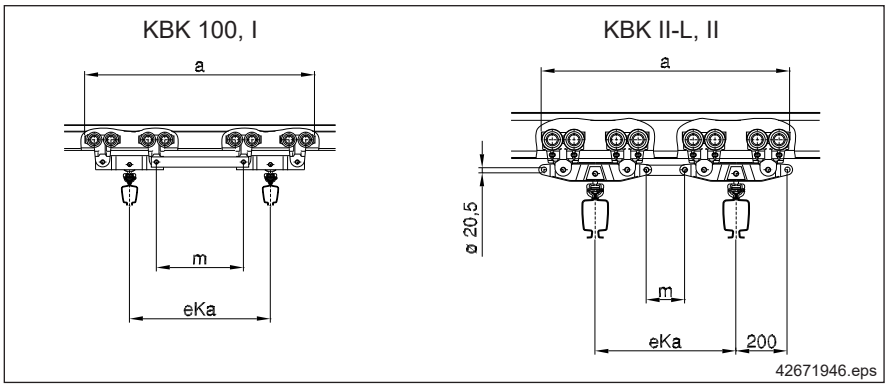
Item	Designation	eKa	Connection possible 3)		KBK 100 KBK I	KBK II/KBK II-H 1)/KBK II-L	KBK II/KBK II-H 2)	KBK III
74	Spacer bar for single trolleys	550	No	Weight [kg]	2,00	-	-	-
				Part no.	980 595 44			
		550	Yes	Weight [kg]	1,86	3,70	1,47	2,40
				Part no.	855 068 44	982 595 44	858 675 44	850 331 44
		650	Yes	Weight [kg]	-	4,09	1,73	2,70
				Part no.		517 861 46	858 677 44	850 332 44
		800	Yes	Weight [kg]		4,80	2,1	3,45
				Part no.		715 121 46	716 031 46	715 129 46
		1000	Yes	Weight [kg]		5,74	2,6	4,39
				Part no.		715 123 46	716 033 46	715 131 46

1) To be used with trolley 982 110 44

2) To be used with trolley 858 670 44

3) = e.g. buffer, spacer trolley

For double trolley



e_{Ka}	KBK 100, I		KBK II-L, II, II-H	
	a	m	a	m
[mm]	[mm]	[mm]	[mm]	[mm]
550	900	340	970	150
650	-	-	1070	250
800			1220	400
1000			1420	600

Item	Designation	eKa	Connection possible 1)		KBK 100, I	KBK II-L, II, II-H	KBK III
74	Spacer bar for double trolleys	550	No	Weight [kg]	1,00	-	-
				Part no.	980 590 44		
		550	Yes	Weight [kg]	-	1,30	
				Part no.		982 591 44	
		650	Yes	Weight [kg]		1,20	
				Part no.		982 440 44	
		800	Yes	Weight [kg]		1,55	
				Part no.		715 125 46	
		1000	Yes	Weight [kg]		2,05	
				Part no.		715 127 46	

Finish: black (RAL 9005)

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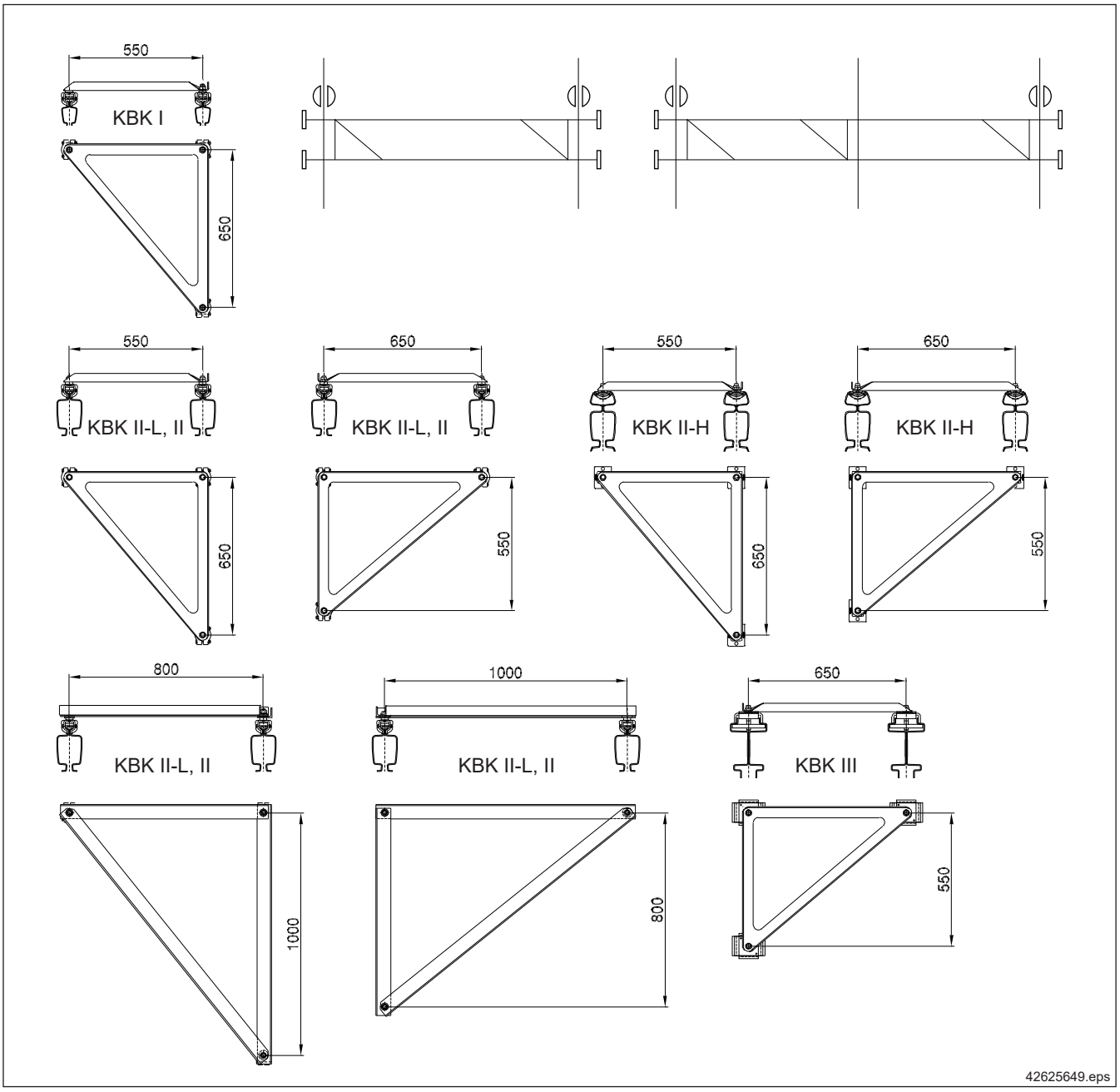
11.3 Bracing frame

(Item 79)



Item	Designation		KBK 100	KBK I, II-L, II	KBK II-H	KBK III
79	Bracing frame 550/650	Weight [kg]	6,73	7,13	7,78	12,48
		Part no.	517 864 46	982 435 44	858 435 44	850 435 44
	Bracing frame 800/1000	Weight [kg]	-	16,40	-	-
		Part no.		204 826 46		

Bracing frames must be fitted close to the crane runway on the crane girders of flexibly connected double-girder cranes to reduce their tendency to skew. Bracing frames should be fitted at the ends and near the centre of the crane girders on double-girder cranes that travel on three tracks.

Bracing frames in special sizes on application.

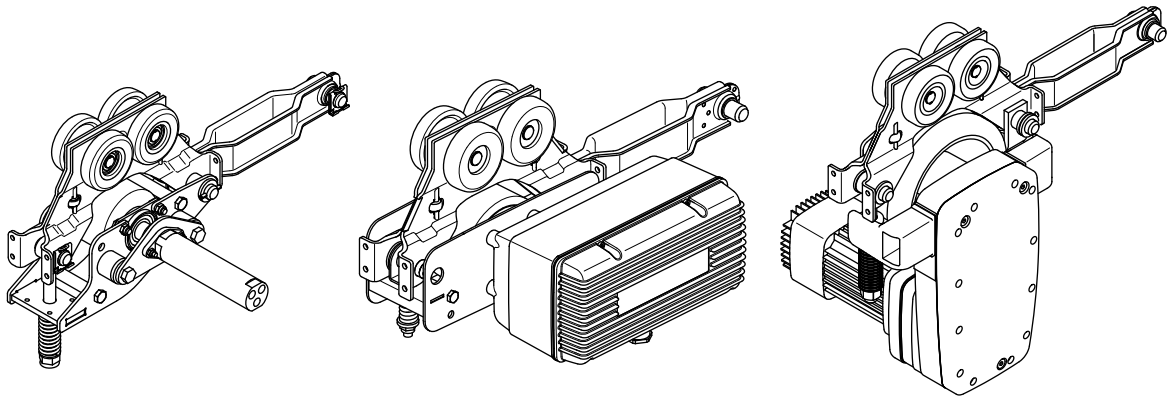
Finish: red (RAL 2002)

12 Travel drives for crabs and cranes

RF 100 travel drive
Pneumatically driven
KBK II-L, KBK II, KBK II-H

Travel drive
Electrically driven
KBK II-L, KBK II, KBK II-H

DRF 200 travel drive
Electrically driven
KBK II-L, KBK II, KBK II-H, KBK III



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12.1 RF 100 PN friction-wheel travel drive

(Item 70)

The RF 100 PN friction wheel travel drive is a pneumatic drive unit specially developed for handling equipment duty and loads up to 500 kg. The output of the pneumatic travel motor is transmitted to the bottom flange of the rails by means of a friction wheel.

The drive is controlled pneumatically or electrically and is mainly intended to be used as a starting help.

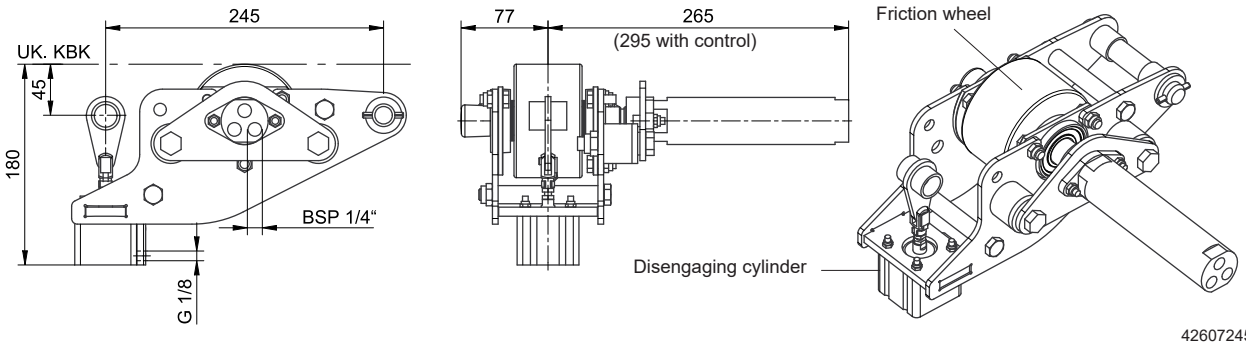
Technical data

Reversible oil-free air motor							
Travel speed	Rated speed	Output	Operating pressure	Recommended operating pressure	Air demand at 4 bar	CDF	Max. displaceable load
[m/min]	[m/min]	[W]	[bar]	[bar]	[l/s]	[%]	[kg]
approx. 10 - 50 1)	20	80	3 - 6	approx. 4	4,5	50	500

1) The travel speed should not exceed 10 m/min for travel through curves.

12.1.1 Travel drive with disengaging cylinder

(Item 70)



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Item	Designation		KBK II-L, II, II-H
70	RF 100 PN with disengaging cylinder	Weight [kg]	7,30
		Part no.	858 078 44

The friction wheel is pressed against the bottom flange of the rail by means of a pneumatic cylinder only when the motor is also supplied with compressed air. This enables the connected trolley to be moved by hand when no pressure is applied.

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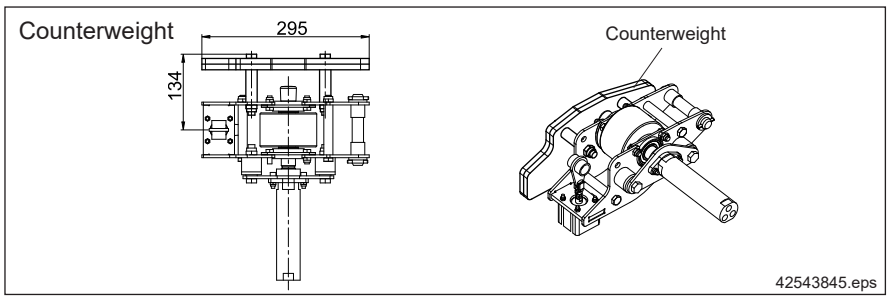
12.1.2 Counterweight (Item 70a)

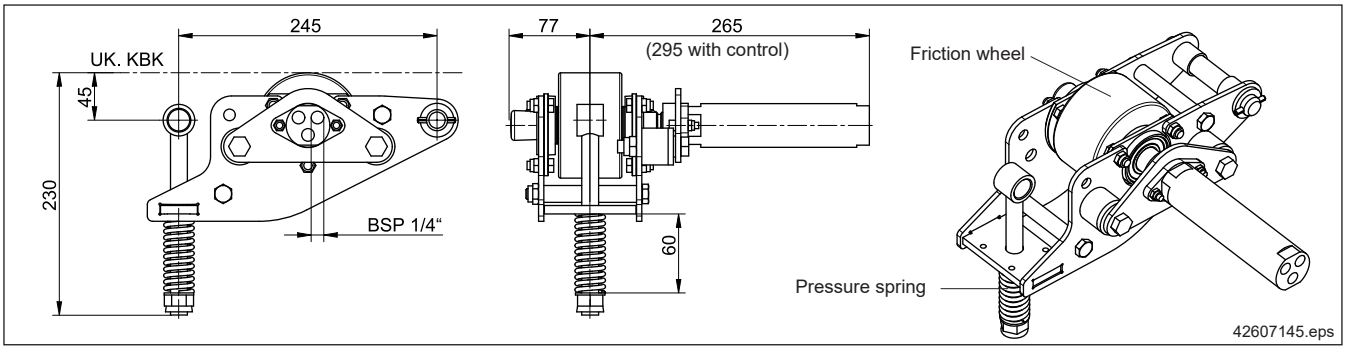


Item	Designation		KBK II-L, II, II-H
70a	Counterweight	Weight [kg]	4,50
		Part no.	851 205 44

RF travel drives with a disengaging cylinder must be fitted with a counterweight if an articulated link bar is used.

Finish: black (RAL 9005)

12.1.3 Travel drive with pressure spring (Item 70)

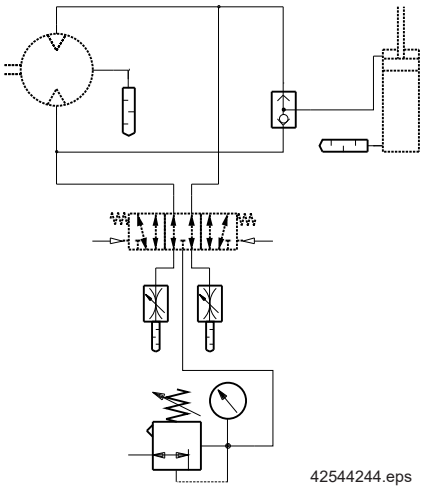


Item	Designation		KBK II-L, II, II-H
70	RF 100 PN with pressure spring	Weight [kg]	7,20
		Part no.	858 079 44

The friction wheel is permanently pressed against the bottom flange of the rail by means of a pressure spring. The crane or trolley can be moved within certain limits by pushing the load.

12.1.4 RF 100 PN controls

RF pneumatic equipment base block (Item 113)



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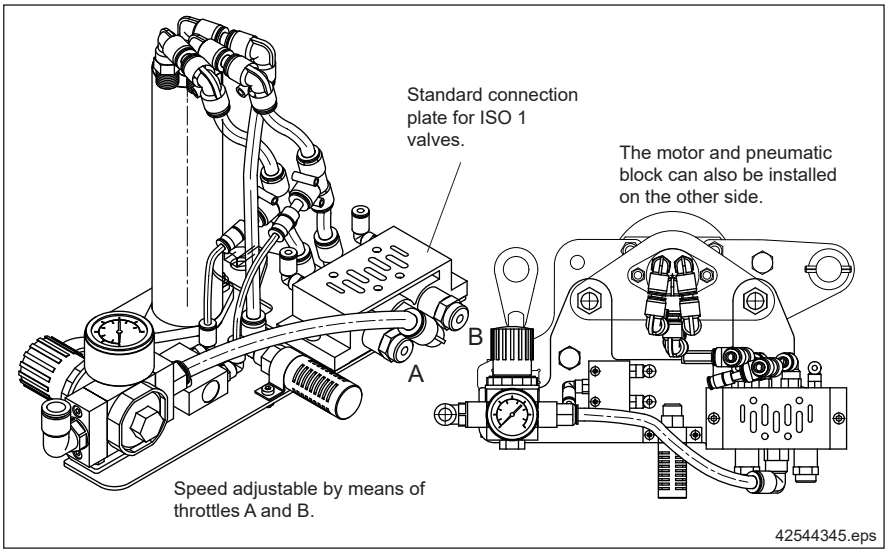

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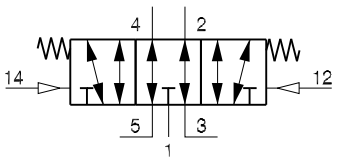
Item	Designation		KBK II-L, II, II-H
113	RF pneumatic equipment base block	Weight [kg]	1,55
		Part no.	851 201 44

The pneumatic elements are fitted and connected to the hoses on the same mounting panel.

The compressed air is supplied via a hose that has a diameter of 10 mm.

Pneumatic control, pneumatic valve (Item 114)



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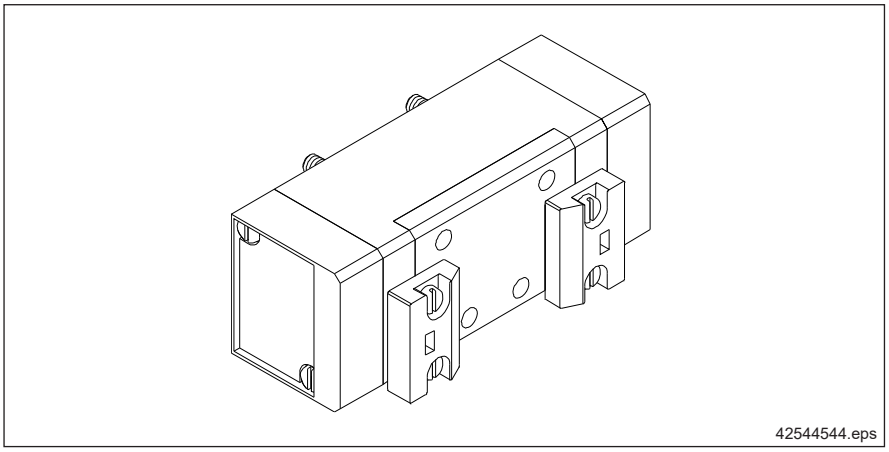

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Item	Designation		KBK II-L, II, II-H
114	Pneumatic valve	Weight [kg]	0,39
		Part no.	343 791 44

The directional control valve is used to close, open or divert compressed air pipes. The 5/3 way-function comprises five connections and three switch positions. Connection 1 is the input for compressed air. Connections 2 and 4 are the compressed air outputs and connections 3 and 5 are used for venting.

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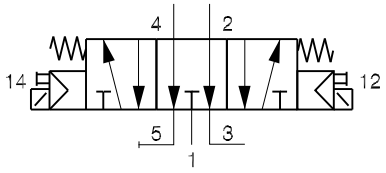
Electric control (Item 115)



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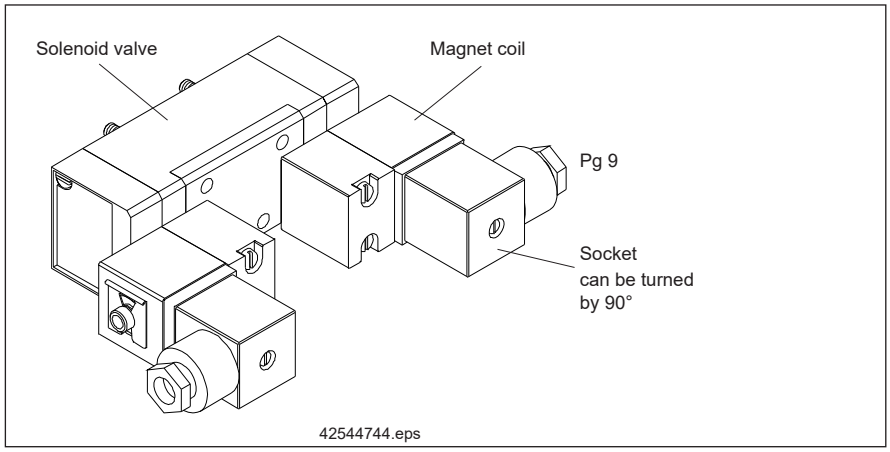

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Item	Designation	Rated voltage		KBK II-L, II, II-H
115	Electric control	24 V DC	Weight [kg]	0,62
			Part no.	851 203 44
		230 V AC	Weight [kg]	0,62
			Part no.	851 204 44

The unit consists of:

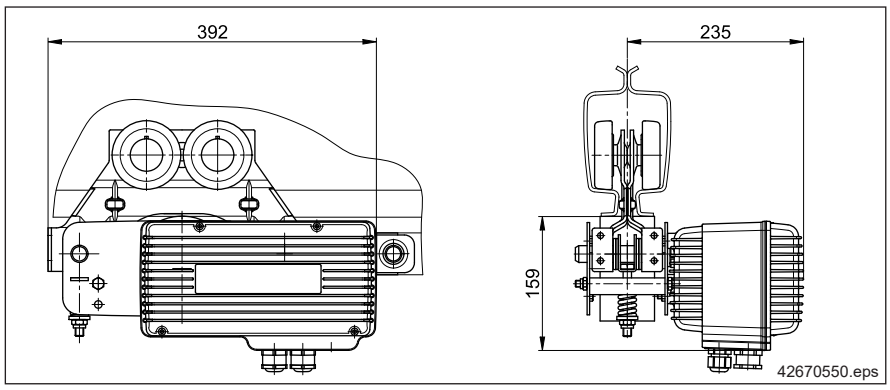
- Solenoid valve
- Magnet coil 24 V_{DC} or 230 V_{AC} (2 off)
- Standard socket (2 off)

Example for ordering

Designation	Part no.
Trolley with link bar 270	858 490 44
Counterweight	851 205 44
RF 100 PN	858 078 44
base block	851 201 44
Pneumatic valve	343 791 44

RF 100 PN travel drive with disengaging cylinder, suitable for fitting to a crane end carriage with RF pneumatic equipment base block as well as pneumatic valve with 5/3-way function.

12.2 RF 125 friction-wheel travel drive
(Item 70)



Technical data

1) By programming the parameters can be changed to:
   - max. 8/33 m/min with partial load
   - min. 3/16 m/min
2) The travel speed should not exceed 10 m/min for travel through curves.

E22-C DC motor with worm gearbox

Travel speed	Output	CDF	Voltage	Frequency	Max. displaceable lifted load incl. dead load	Weight	Part no.
[m/min]	[W]	[%]	[V]	[Hz]	[kg]	[kg]	
7/27 1) 2)	50/200	20/40	3 ~ 220-480	50/60	2400	6,9	716 901 45

The RF 125 friction-wheel travel drive is a drive unit specially developed for crane requirements with regulated acceleration and braking for loads up to 2000 kg and inclines up to 1%.

Finish: blue (RAL 5009)

12.2.1 Drive data

The output of the pneumatic travel motor is transmitted to the bottom flange of the rail by means of a friction wheel. The friction wheel is pressed against the bottom flange of the rail by means of a pressure spring.

A permanent-field DC worm geared motor serves as the drive motor.

The speed of DC motors can be controlled very well, enabling smooth acceleration and braking of the drive to be achieved. This facilitates travel with little sway.

The worm geared motor is of self-braking design, which eliminates the need for a holding brake.

12.2.2 Control system

The control board features a wide voltage range input (220 - 480 V/50/60 Hz). The line voltage supplies a regulated link. The motor is supplied from the link by a PWM power module. Ramps are output for start-up and braking. The moving motor is braked with electric control and stopped by a short circuit of the armature winding.

The control system includes the following features as standard:

- Plug connections for all inputs and outputs;
- Line voltage relayed to the chain hoist;
- Limit switch inputs;
- Fast-to-slow limit switch inputs;
- 7-segment display visible through a window from the outside for operating status, error messages, parameter programming;
- Programmable parameters for speed, acceleration, etc.;
- Temperature monitoring and cut-off on overheating;
- Control with tri-state signals (half-wave evaluation) or with PWM signals
- Optimum long travel characteristics thanks to master/slave operation with up to 3 drives (1 master, 2 slaves)
- Simple parameter programming by controller or by separately available keypad terminal.

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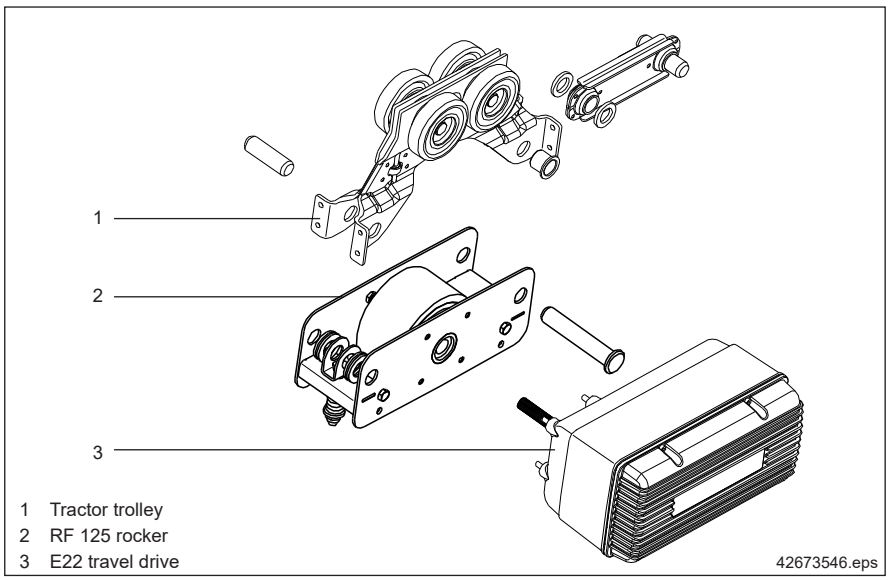
12.2.3 RF 125 rocker, KBK II-L, II, II-H (Item 135)

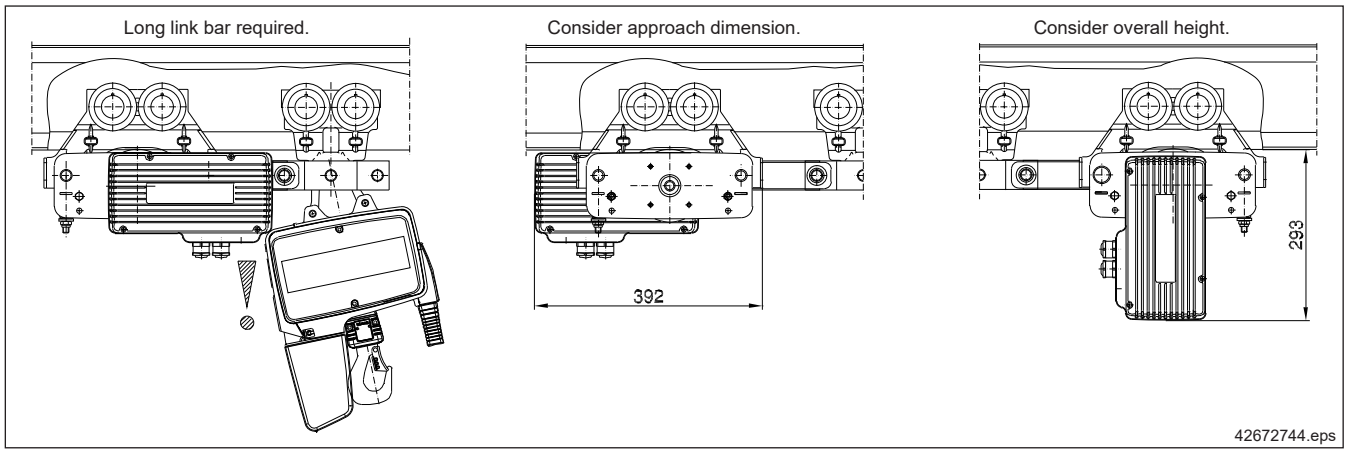


Item	Designation		KBK II-L, II, II-H
135	RF 125 rocker	Weight [kg]	4,40
		Part no.	858 245 44

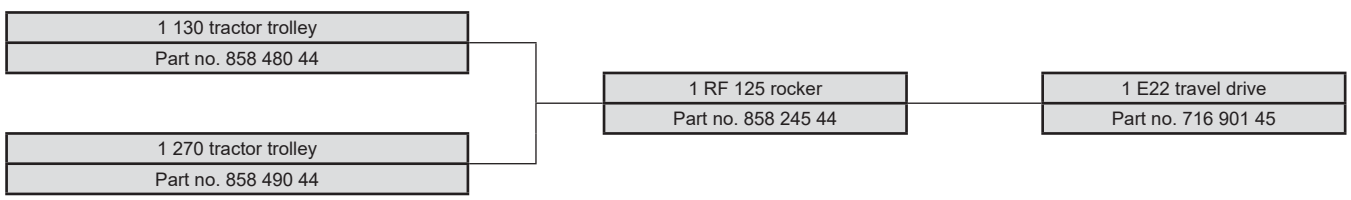
Finish: black (RAL 9005); galvanized

12.2.4 Possible arrangements

RF 125 friction-wheel travel drives can be fitted in various ways, whereby the following must be considered (see also example for ordering):



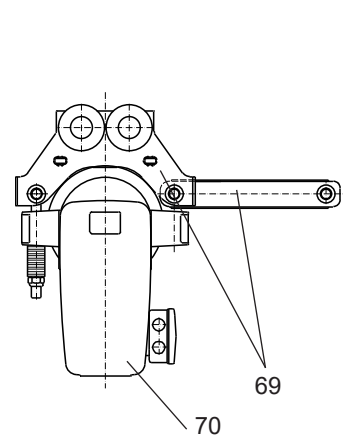
Example for ordering RF 125:

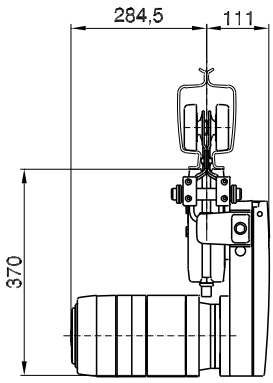


12.3 DRF 200 friction-wheel travel drive

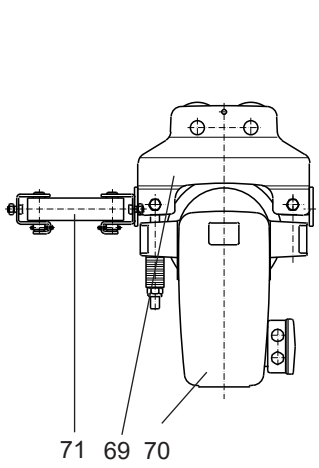
(Item 70)

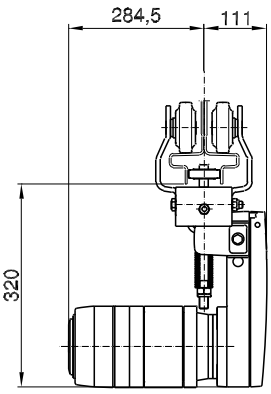
KBK II-L, KBK II, KBK II-H





KBK III





Buffer on KBK II-R attached to side of section.

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Technical data: ZBF 63 and 71 travel motors for DRF 200 (motor size assignment) [1]

Travel speed [3] [m/min]	Output [kW]		CDF [%]	Max. displaceable weight in kg [2] 1000	1500	2000	2500	3000	3500
10	0,13		100	ZBF 63 A4 B003					3500 -
12,5				ZBF 63 A4 B003				3000 -	
16				ZBF 63 A4 B003		2300 -			
20	0,26			ZBF 63 A2 B003					3500 -
25				ZBF 63 A2 B003				3000 -	
31,5				ZBF 63 A2 B003		2300 -			
40				ZBF 63 A2 B003	1800 -				
5/20	0,06/0,25	0,09/0,34	40	ZBF 63 A8/2 B003				3000	ZBF 71 A8/2 B003
6,3/25				ZBF 63 A8/2 B003			2500	ZBF 71 A8/2 B003	3400 -
8/31,5				ZBF 63 A8/2 B003		2000	ZBF 71 A8/2 B003	2800 -	
10/40				ZBF 63 A8/2 B003	1500	ZBF 71 A8/2 B003 2200	-		

1) Use of ZBF 71 B and KM 80 motors only with special requirements on application; not suitable for KBK II-L and II, or Aluline.
2) Dry, horizontal track. Operation on inclined tracks on request.
3) The travel speed should not exceed 10 m/min for travel through curves.

Item	Designation		KBK II-L, II, II-H	KBK III
70	DRF 200 friction-wheel travel drive with wide friction wheel (73 mm)	Weight [kg]	25,00	
		Part no.	Technical data	
	DRF 200 friction-wheel travel drive with narrow friction wheel (35 mm)	Weight [kg]	-	25,00
		Part no.		Technical data

DRF 200 friction-wheel travel drives transmit the output of the travel motor, which is specially developed for crane duty, via a spring-mounted friction wheel to the bottom flange of KBK rails. The wide friction wheel should be used for KBK II, and the narrow friction wheel for KBK III. DRF 200 mounting components can be relocated to vary the position of the spring assembly and motor as required. Control can be effected direct or via contactors. Contactor control and timed mechanical braking, or timed mechanical braking elements in the controller are required if pole-changing travel drives are used.

Finish: blue (RAL 5009)

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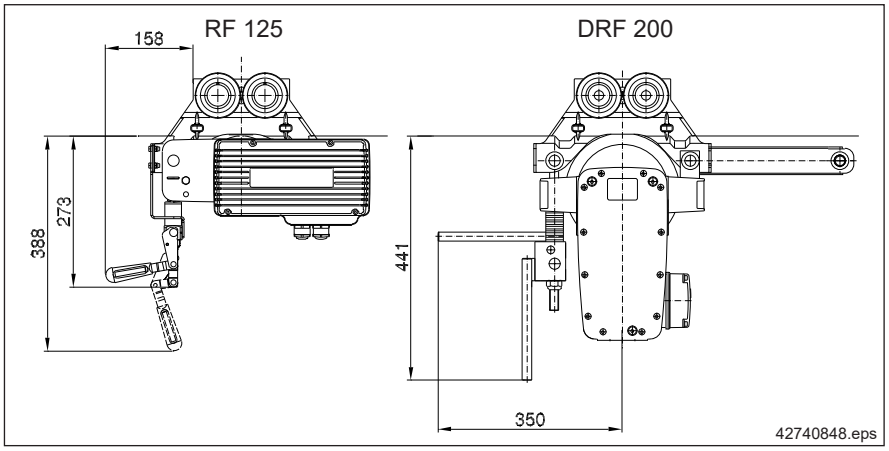
12.4 Disengaging devices

When the friction wheel pressure springs are released, the travel drive is lowered and disconnected from the rail.

The use of a disengaging device is recommended in the following cases, for example:

- manual travel of an electrically driven unit along a certain section,
- towing an electrically driven unit by a conveyor belt along certain sections of a monorail system,
- depositing loads from an electrically driven unit onto a conveyor belt running at a different speed,
- routing electrically driven units out of a system for maintenance purposes.

12.4.1 RF 125/DRF 200 manually actuated disengaging devices (Item 137)

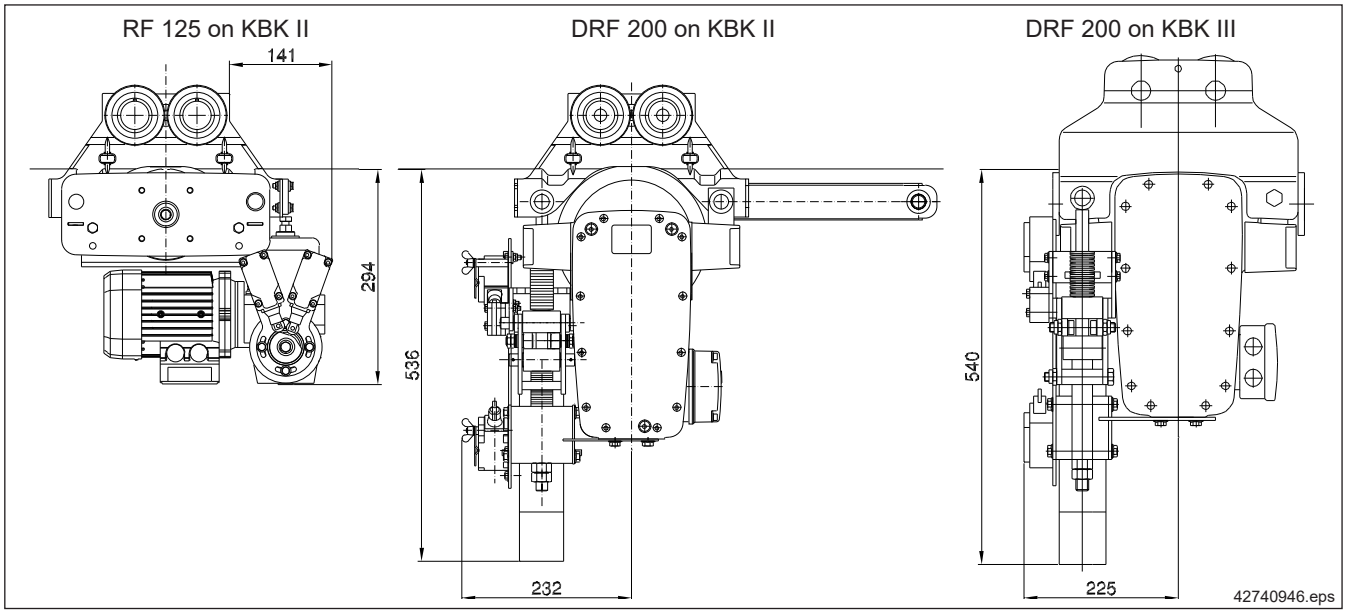


Item	Designation		KBK II-L, II, II-H
137	RF 125 manual disengaging device	Weight [kg]	1,10
		Part no.	858 340 44
	DRF 200 manual disengaging device	Weight [kg]	2,00
		Part no.	841 150 44

Manually actuated disengaging devices are actuated by turning a lever approximately 90°.

The diagrams show the engaged (with wheel contact) state.

12.4.2 RF 125/DRF 200 electrically actuated disengaging devices (Item 138)



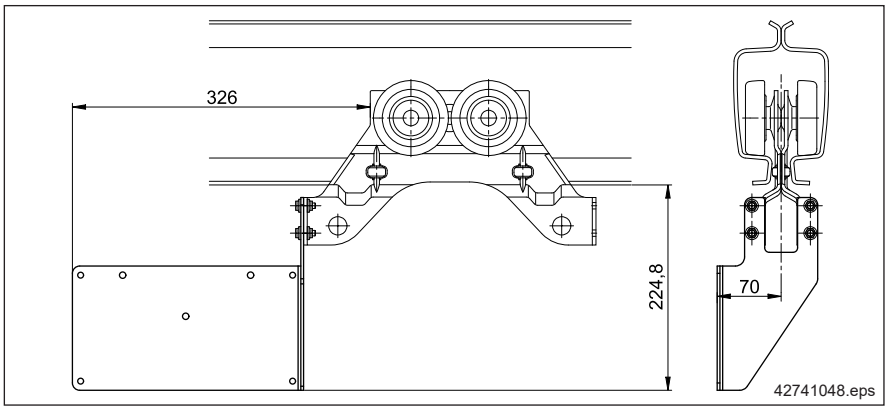
Item	Designation	Disengaging time [s]	CDF [%]	Voltage [V]	Frequency [Hz]	Output [W]		KBK II-L, II, II-H
138	RF 125 electrically actuated disengaging device	1	50	380 - 415	50	120	Weight [kg]	9,30
				440 - 480	60	140	Part no.	858 350 44
	DRF 200 electrically actuated disengaging device	3	10	230	50	30	Weight [kg]	5,00
							Part no.	On application

Electrically actuated disengaging devices consist of a mechanical fitting, a drive and two limit switches for the limit positions.

Control system

Disengaging devices are usually actuated either by a special button or in combination with the travel command. The friction wheel is always engaged before the travel motion begins. A control system must be separately provided for the given application.

12.4.3 Angle bracket for housing (Item 92)



Item	Designation		
92	Angle bracket	Weight [kg]	1,11
		Part no.	715 503 46

Angle brackets can be used to attach a housing to a tractor trolley when an RF 125 travel drive is also installed together with an electrically actuated disengaging device.

The control system for the disengaging device can be located in the housing.

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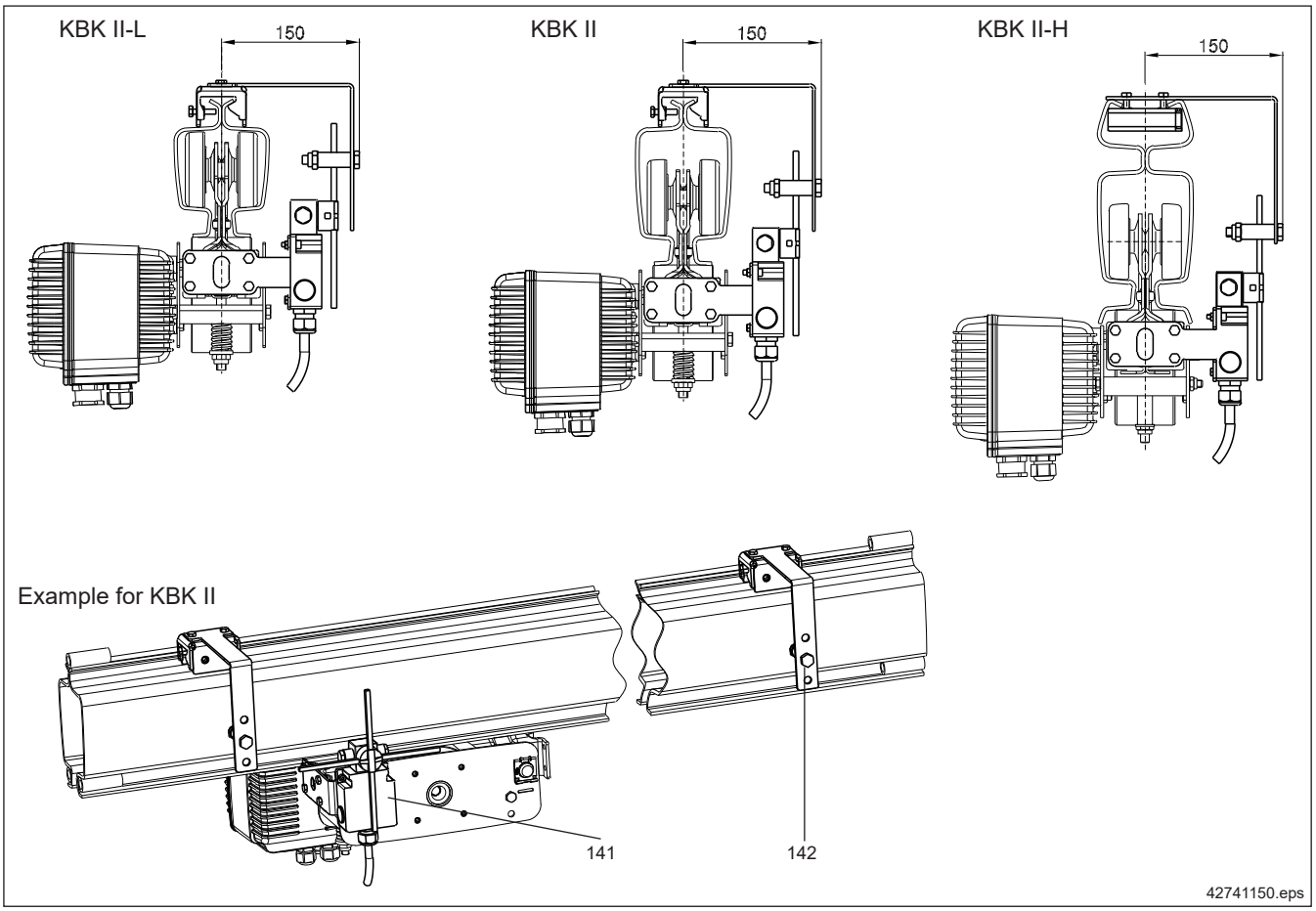
12.5 Travel limit switches

RF 125 limit switch fitting
(Items 141, 142)



Item	Designation		KBK II-L, II	KBK II-H
141	Limit switch (set)	Weight [kg]	0,85	
		Part no.	858 351 44	
142	Switching vane (2 off)	Weight [kg]	0,60	0,66
		Part no.	851 352 44	858 352 44

Limit switch fittings are designed to be used with RF 125 travel drives on KBK II-L, KBK II and KBK II-H. They can be used for reliable switch-over from fast to slow travel, or from slow travel to the stop function (requires two switching vanes for two-stage cut-off).

This is utilised when travel against the limit stops needs to be avoided. The limit switch cannot be used for travelling through track switches, turntables or latching devices.

Contents

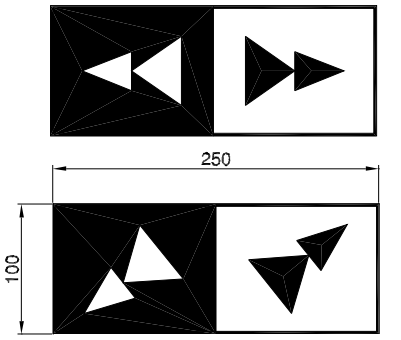
The limit switch cpl. includes the switch, the trolley fitting and the pre-assembled electric cable to the drive.

The switching vane cpl. includes **two** switching vanes to actuate the switch including the fittings for attachment to the rail.

Finish: galvanized

12.6 Additional components for wireless control systems

12.6.1 Travel direction plates (Item 146)



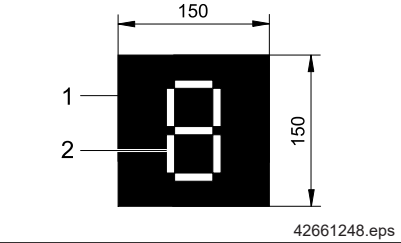
Item	Designation	Use for		
146	Travel direction plates	Cross travel, 2 speeds, variable	Weight [kg]	0,03
			Part no.	851 525 44
		Long travel, 2 speeds, variable	Weight [kg]	0,03
			Part no.	851 526 44

Travel direction plates must be fitted to the crane for clear assignment of the control buttons to the travel direction when wireless control systems are used.

The adhesive plates shown can be fitted direct to the profile section or to the small attachment bracket (item 93).

Finish: foil, printed yellow/black

12.6.2 Identification signs for the installation



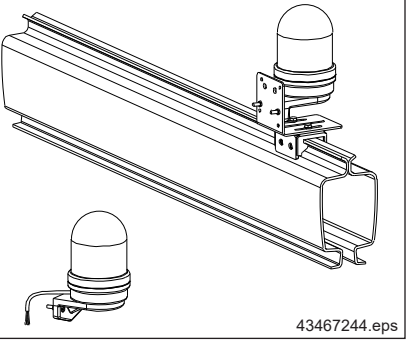
Item	Designation		
	Black background foil	Weight [kg]	-
		Part no.	895 639 44
	Yellow segment	Weight [kg]	-
		Part no.	895 640 44

Every crane that is operated with wireless control must be identified by means of an easily visible crane ID.

The coding labels are used to show the crane identification on the crab or the crane. The crane identification shown by the coding labels must be identical to the crane identification shown on the DRC-DC 6 or DRC-DC 10 hand-held transmitter display.

Travel direction symbols on the crane and the crab must match the directions of movement for the travel motions shown by the buttons on the hand-held control unit.

12.6.3 Warning lamp, set (Item 148)



Item	Designation		
148	Warning lamp, set	Weight [kg]	0,11
		Part no.	730 496 45

For cranes that have wireless controls, a red warning lamp indicates the crane's state of readiness for operation. The warning lamp set consists of the lamp with base and cable (3 m) prepared for connection to the crane switch contactor in the crane bridge enclosure. The mounting bracket for switches and terminal boxes (item 92) to match the relevant KBK profile section must also be provided.

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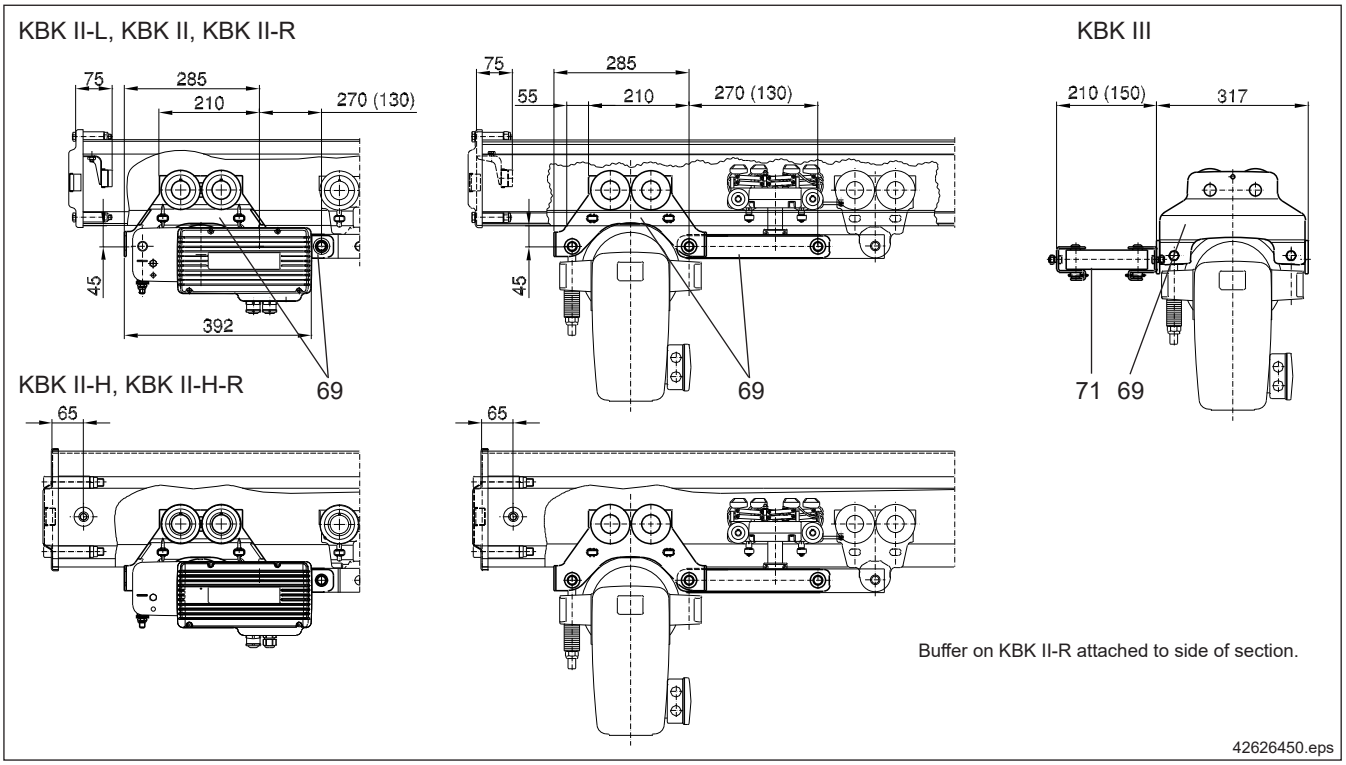
13 Trolleys for travel drives

RF and DRF trolley (item 69)
Link bar (item 71)
Coupling (item 71a)



Item	Designation		KBK II-L, II, II-H	KBK III
69	Trolley for travel drive	Weight [kg]	-	12,0
		Part no.		850 171 44
	Tractor trolley with short link bar 130	Weight [kg]	3,95	-
		Part no.	858 480 44	
	Tractor trolley with long link bar 270	Weight [kg]	4,30	
		Part no.	858 490 44	
71	Link bar, short [1]	Weight [kg]	-	1,40
		Part no.		850 330 44
	Link bar, long	Weight [kg]	-	1,00
		Part no.		850 340 44
71a	125 trolley coupling	Weight [kg]	0,25	-
		Part no.	984 307 44	

1) Not for curved track

Trolley for KBK profile section	KBK II-L	KBK II	KBK II-H	KBK III
RF 100	X	X	X	
RF 125	X	X	X	
DRF 200	X	X	X	X

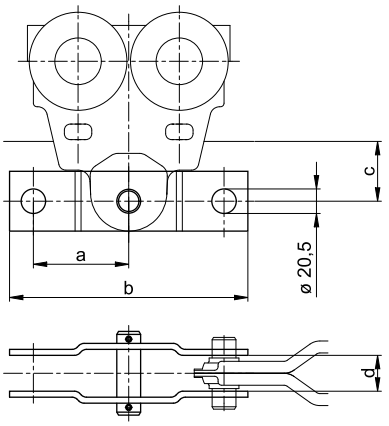
Finish: KBK II: black (RAL 9005)
KBK III: red (RAL 2002)

14 Coupling elements and spacer bars

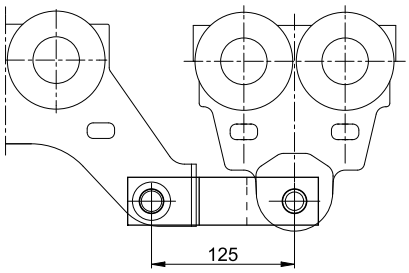
14.1 Single-trolley link

Single-trolley link
(Item 61)
125 trolley coupling
(Item 71a)

KBK single-trolley link



Trolley coupling 125 II-L, II, II-H



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	a	b	c	d
KBK I	72	184	46	27
KBK II	80	200	45	28
KBK II-H			29	

Item	Designation		KBK 100, I [1]	KBK II-L, II, II-H
61	Single-trolley link	Weight [kg]	0,70	0,80
		Part no.	855 070 44	982 505 44 [2]
71a	125 trolley coupling	Weight [kg]	-	0,25
		Part no.		855 574 44

1) KBK II link bars can be connected.
2) Link bar 982 505 44 cannot be used and is not needed with single trolley 858 670 44.

The link bar provides an additional means for connecting the various trolley combinations for single trolleys. The 125 trolley coupling (item 71a) is used to connect the friction-wheel travel drive in the crab frame.

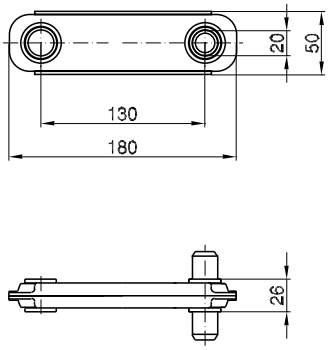
Finish:

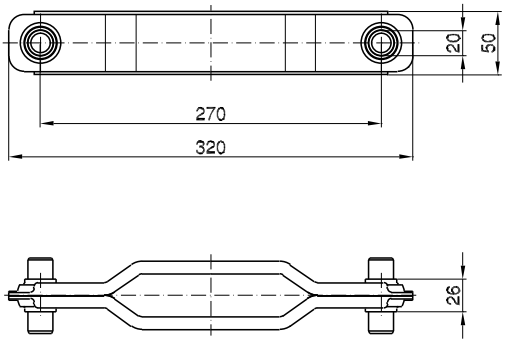
Black metal parts (RAL 9005); galvanized pins

14.2 Link bar

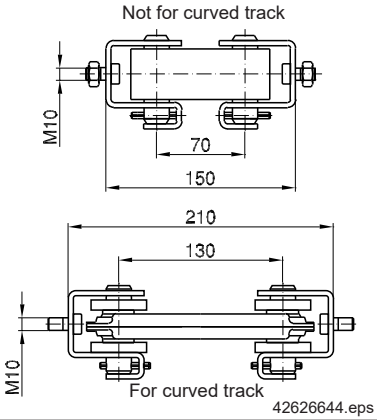
(Item 71)

KBK I, II-L, II, II-H link bar





KBK III link bar, complete



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Item	Designation		KBK I, II-L, II, II-H	KBK III
71	Link bar, short	Weight [kg]	0,56	1,40
		Part no.	982 340 44	850 330 44 [1]
	Link bar, long	Weight [kg]	0,74	1,00
		Part no.	982 345 44	850 340 44

1) Not for curved track

KBK II-L, II, KBK II-H and KBK III link bars for travel on curved tracks can be used for any trolley combinations and special applications. The articulation bearings consist of universal joint plastic bushes. The longer link bar can be used for combinations with current collector trolleys.

Finish:

Black metal parts (RAL 9005); galvanized pins

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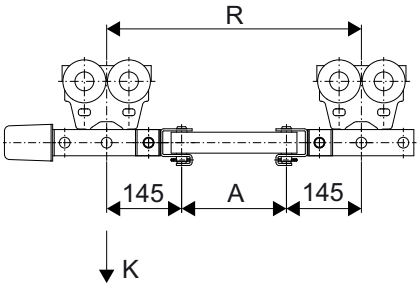
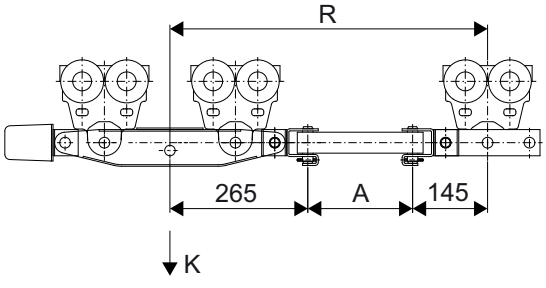
14.3 Spacer bar with hinged blocks, suitable for curved track

(Item 73) **Examples**

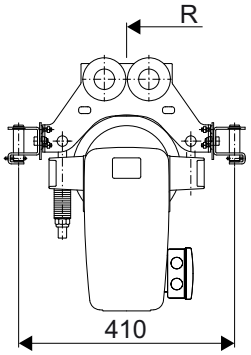
Spacer bar on single trolley
(600 kg) KBK II-L, II, II-H



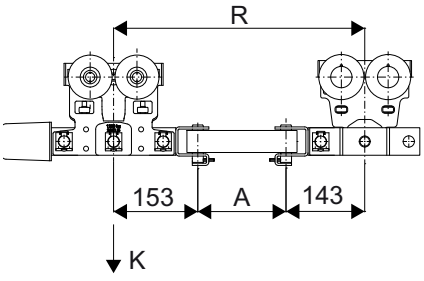
On double trolley
(1200 kg) KBK II-L, II, II-H



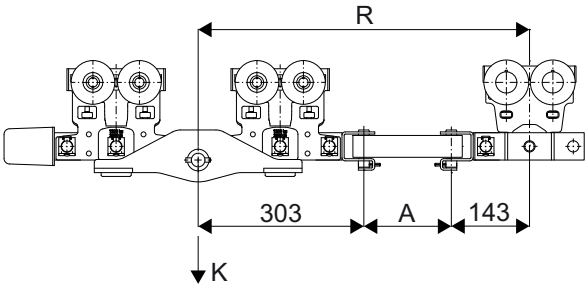
On trolley for RF
(on one or both sides)
KBK II-L, II, II-H



Spacer bar on single trolley
(1200 kg) KBK II-L, II, II-H



On double trolley
(2400 kg) KBK II-L, II, II-H



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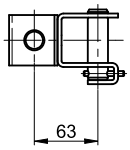
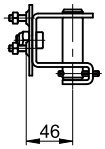
Components

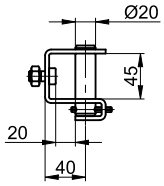
Hinged block
KBK II-L, II, II-H



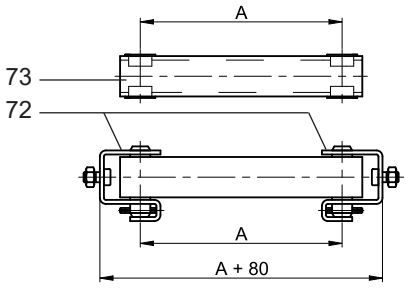
RF hinged block
KBK II-L, II, II-H



Connector section
KBK III



Spacer bar for hinged blocks
KBK II-L, II, III



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Item	Designation	Length A min.	Length A max.		KBK II-L, II, II-H	KBK III
72	Hinged block			Weight [kg]	0,75	-
				Part no.	982 402 44	
	RF hinged block			Weight [kg]	0,65	
				Part no.	858 399 44	
	Connector section			Weight [kg]	-	0,46
				Part no.		850 399 44
73	Spacer bar for hinged blocks	200	1200	Weight [kg]	5,1 [kg/m]	
				Part no.	204 800 46	

Spacer bars are used to distribute loads safely by separating several monorail hoist trolleys running on the same track. Specify the spacer bar length according to the information given in sections 3.5-3.8. The deadweight of the spacer bar must be included in load K when selecting the monorail. Current collectors or RF travel drives must always be connected to the load trolley.

For spacer bars provided for trolleys running on curved tracks, distance R between the trolleys may be up to the curve radius length.

Finish: black metal parts (RAL 9005); galvanized pins, nuts and bolts

Example for ordering

For an articulated spacer bar for a single trolley:

2 off hinged block, part no. 982 402 44

1 off spacer bar for hinged blocks, part no. 204 800 46, A = 700 mm

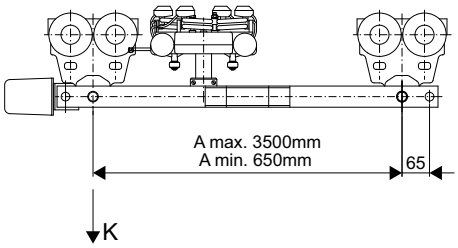
14.4 Spacer bar for straight track KBK II-L, II, II-H, III

(KBK 100, KBK I on application)

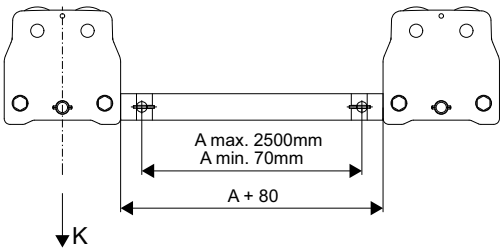
(Item 76)

Examples

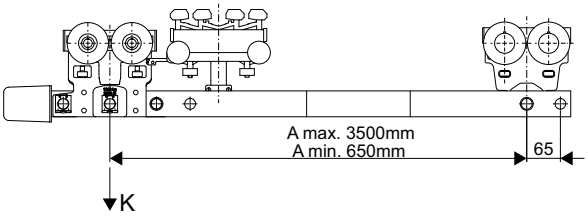
Spacer bar with two open ends, not for curved track, on single trolley



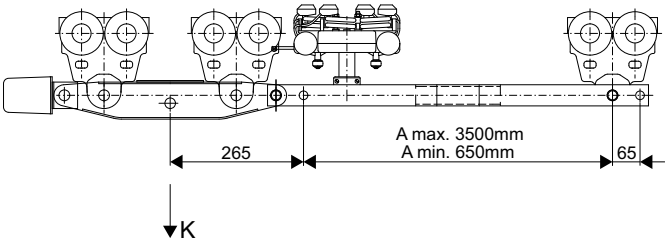
Spacer bar with connector sections on both ends, not for curved track on KBK III



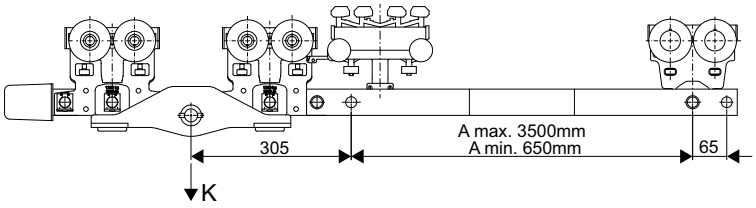
Spacer bar with two open ends, not for curved track, on single trolley (1200 kg)



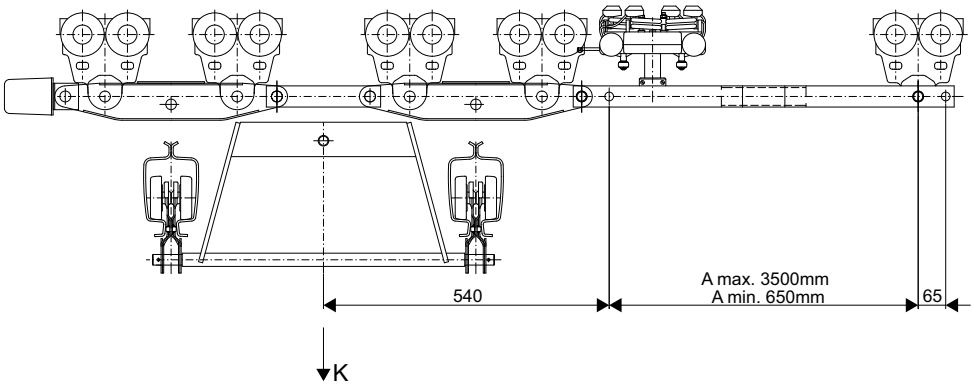
Spacer bar with two open ends, not for curved track, on double trolley



Spacer bar with two open ends, not for curved track, on double trolley (2400 kg)



Spacer bar with two open ends, not for curved track, on double trolley for double-girder crane



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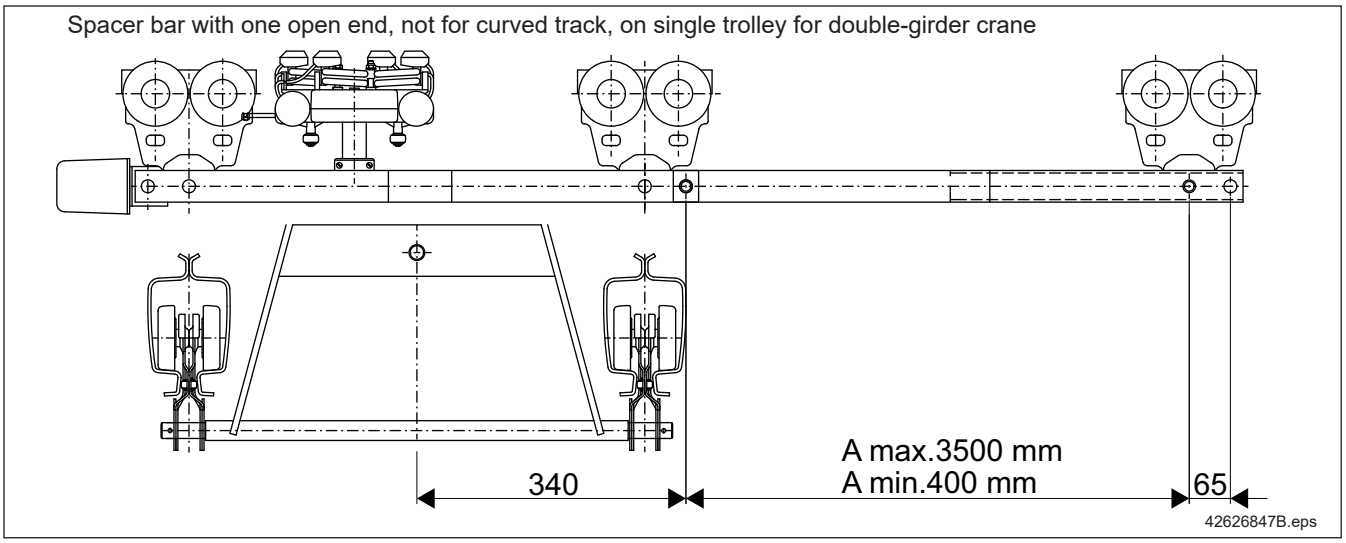
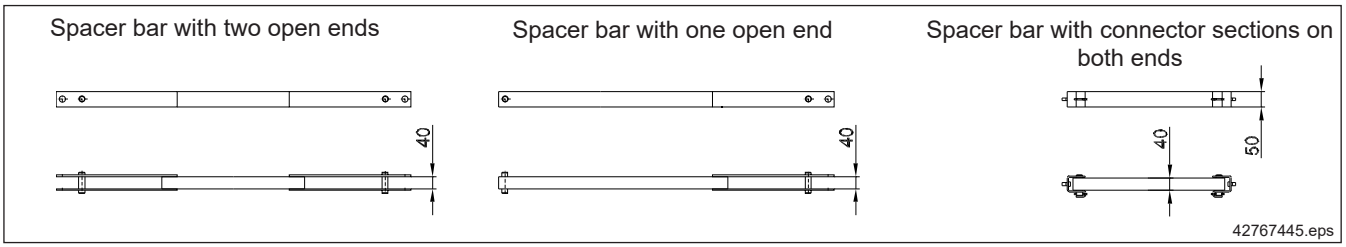


Components



Item	Designation	Length [mm]	Length A [1] [mm]			KBK II-L, II, II-H	KBK III
		fixed	min.	max.			
76	Spacer bar with one open end	-	400	3500	Weight [kg]	5,2 [kg/m]	-
					Part no.	204 802 46	
	Spacer bar with two open ends	-	650	3500	Weight [kg]	5,2 [kg/m]	
					Part no.	204 801 46	
	KBK III spacer bar with connector sections on both ends	-	70	2500	Weight [kg]	-	6,9 (+4,8) [kg/m]
					Part no.		850 338 44
		70	-	-	Weight [kg]	-	1,40
					Part no.		850 330 44
		250	-	-	Weight [kg]	-	2,40
					Part no.		850 331 44
		350	-	-	Weight [kg]	-	2,90
					Part no.		850 332 44
		500	-	-	Weight [kg]	-	3,45
					Part no.		715 192 46
		700	-	-	Weight [kg]	-	4,39
					Part no.		715 131 46

1) Specify length A

Spacer bars are used to distribute loads safely by separating several monorail hoist trolleys and single or double-girder cranes running on the same crane runway. The deadweight of the spacer bar must be included in load K when selecting the crane runway. Current collector trolleys or RF travel drives must always be connected to the load trolley.

Finish:

KBK II metal parts black (RAL 9005),
KBK III metal parts red (RAL 2002),
Pins, nuts and bolts galvanized.

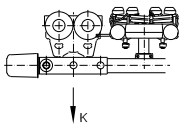
15 Buffers and end stops

15.1 KBK I, II-L, II, II-H buffers

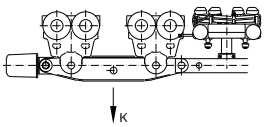
(Item 98)

Examples

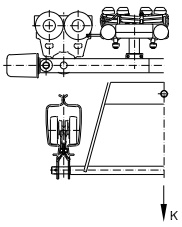
Fitted to single-trolley link



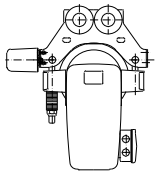
Fitted to articulated frame



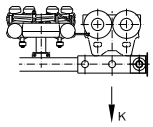
Spacer bar for double-girder crane, special spacer bar



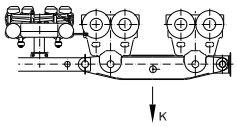
Fitted to trolley unit for RF



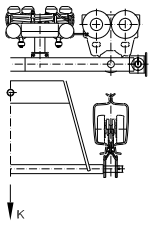
Fitted to single-trolley link



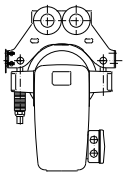
Fitted to articulated frame



Spacer bar for double-girder crane, special spacer bar

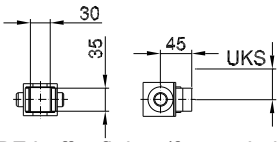


Fitted to trolley unit for RF

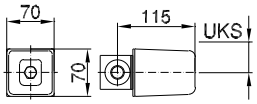


Components

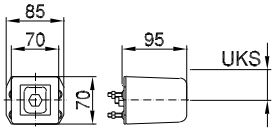
Rubber end stop



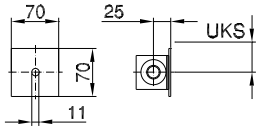
Buffer fitting (foamed plastic)



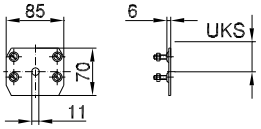
RF buffer fitting (foamed plastic)



Buffer plate



RF buffer plate



UKS = lower edge of profile section rail
KBK I = 46 mm
KBK II = 45 mm
KBK II-H = 29 mm

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Item	Designation		KBK II-L, II, II-H
98	Rubber end stop	Weight [kg]	0,39
		Part no.	982 395 44
	Buffer fitting (foamed plastic)	Weight [kg]	0,49
		Part no.	982 378 44
	RF buffer fitting (foamed plastic)	Weight [kg]	0,45
		Part no.	858 375 44
	Buffer plate	Weight [kg]	0,43
		Part no.	982 377 44
	RF buffer plate	Weight [kg]	0,16
		Part no.	858 374 44

Limit stops with rubber buffers can be fitted into the track section to limit long and cross-travel motions in KBK II installations (end cap with buffer, internal buffer stop). End stops must be additionally provided in KBK III installations (see end cap).

The impact energy resulting from running against limit stops is absorbed by sway of the crane installation (crane girder and track suspension) and the friction occurring in the joints.

To lessen the impact forces of several monorail hoists or cranes on the same crane runway and/or to reduce the noise of impact, buffers should be provided between the trolleys or cranes.

For push-travel hoist trolleys and cranes, rubber stops can be used for normal operating conditions, and cellular plastic buffers for a high degree of impact absorption (buffer against buffer plate).

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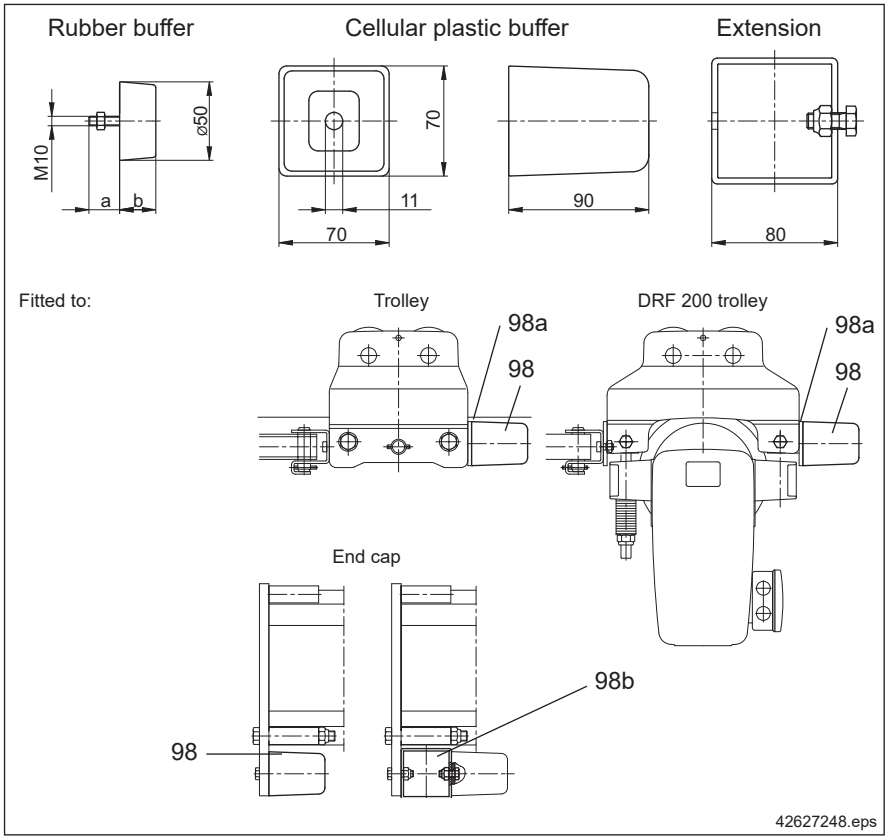
Electrically driven travelling hoists and cranes can be fitted with cellular plastic buffers (cellular plastic buffer against buffer plate). Where travel speeds exceed 21 m/min, the ends facing each other must be fitted with identical buffers (cellular plastic buffer against cellular plastic buffer). KBK 100, KBK I buffers on application.

Finish:
Black metal parts (RAL 9005); galvanized pins, nuts and bolts

15.2 KBK III buffer

(Item 98)



1) Buffer 855 062 44 can be used for installation on end caps, buffer stops and trolleys.

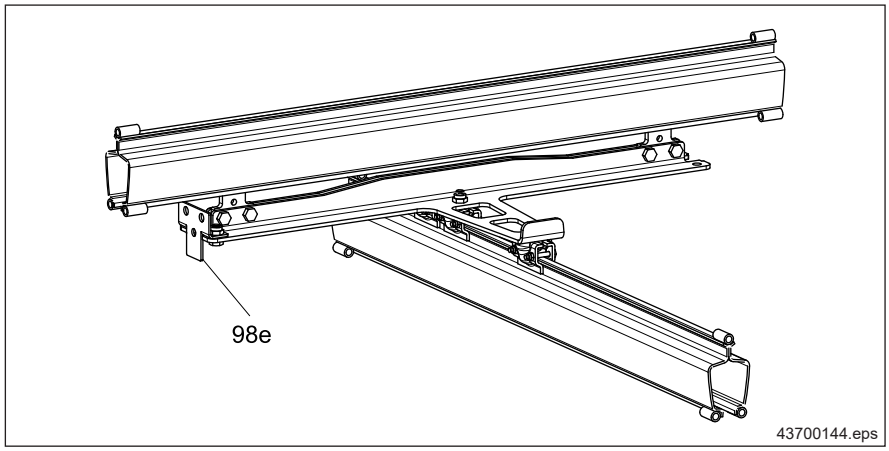
Item	Designation		KBK III
98	Rubber buffer [1] (a = 20; b = 25)	Weight [kg]	0,10
		Part no.	855 062 44
	Rubber buffer [1] (a = 32; b = 23)	Weight [kg]	0,10
		Part no.	978 206 44
	Cellular plastic buffer	Weight [kg]	0,26
		Part no.	939 666 44
98a	M10x16 hex. bolt	Weight [kg]	-
		Part no.	150 446 99
98b	Buffer extension	Weight [kg]	0,90
		Part no.	850 118 44

A buffer extension is necessary, for example, to protect the current collector from collisions if DEL current collectors are arranged in such a way that they face the end cap.

15.3 KBK Ergo end stops

(Item 98e)

KBK I Ergo stop plate

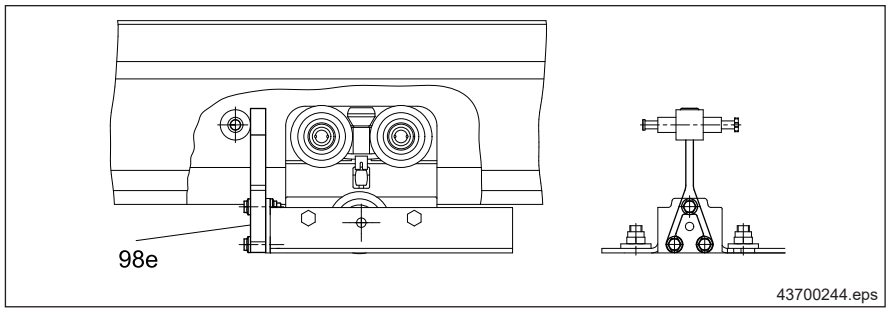


Item	Designation		KBK I
98e	Stop plate	Weight [kg]	0,19
		Part no.	855 343 44

The following components can be attached to KBK I Ergo end carriages by using a stop plate:

- Buffers,
- Rail end clamps,
- Travel drives.

KBK II Ergo end stop



Item	Designation		KBK II-L, II, II-R, II-H, II-H-R
98e	End stop cpl.	Weight [kg]	0,68
		Part no.	851 519 44

KBK II Ergo end stops can be used together with an internal buffer stop to limit the travel motion.

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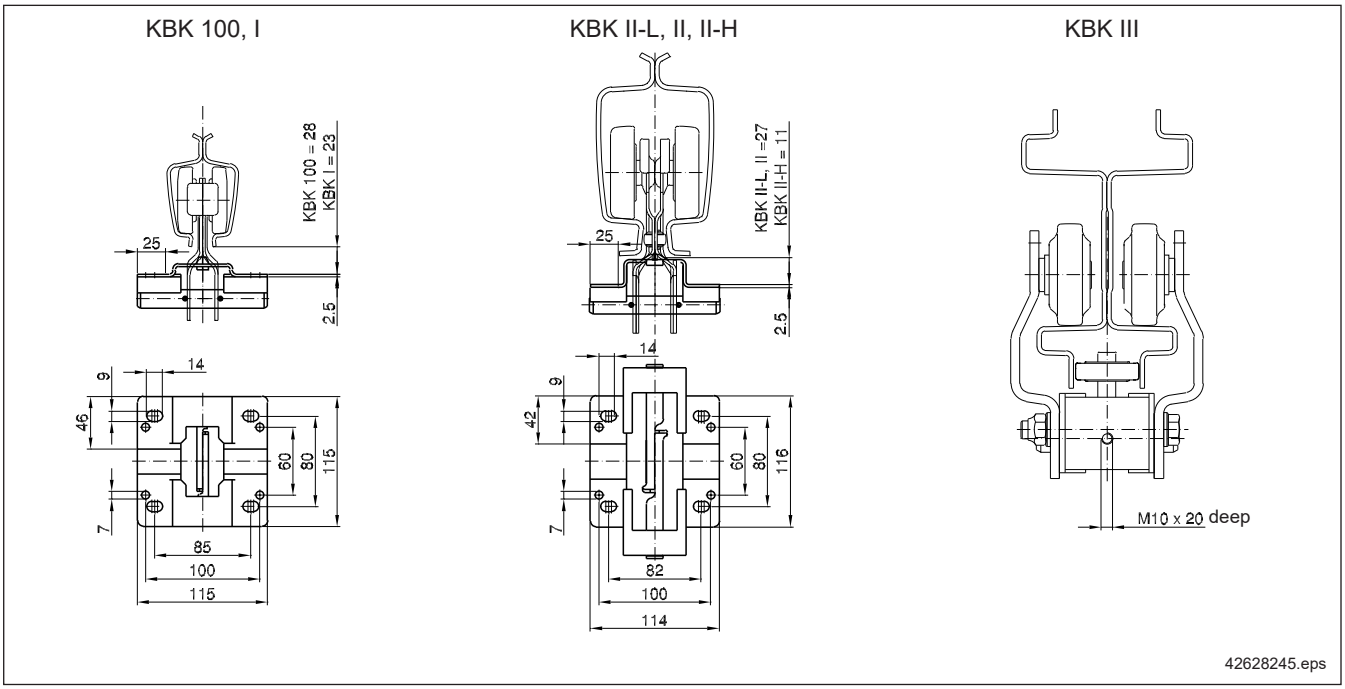
16 Fittings

16.1 Trolley fittings



1) Complete with mounting plate, pin, washers and spring pins.

Item	Designation		KBK 100, I	KBK II-L, II, II-H
	Trolley attachment bracket with pin [1]	Weight [kg]	0,48	0,66
		Part no.	980 041 44	982 041 44

Trolley attachment brackets with pins make it possible to attach towing arms, current collectors, switches, small terminal boxes, counterweights and similar parts. Offset fittings must be sufficiently balanced by counterweights or by loading the trolley to prevent it from tilting. Fittings can be attached to KBK III trolleys and RF trolleys by means of the M10 threaded bore holes on the end faces.

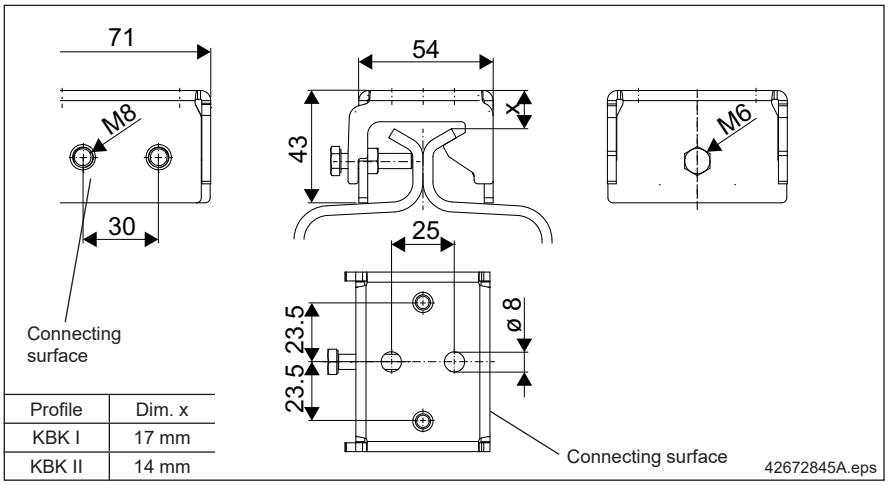
Finish: black (RAL 9005)

16.2 Rail attachment

The brackets shown here must not be used as load-supporting parts (suspensions).

They can be attached to profile sections at any position except in the area of the bolted connection.

16.2.1 Bolted bracket (Item 89)



Profile	Dim. x
KBK I	17 mm
KBK II	14 mm

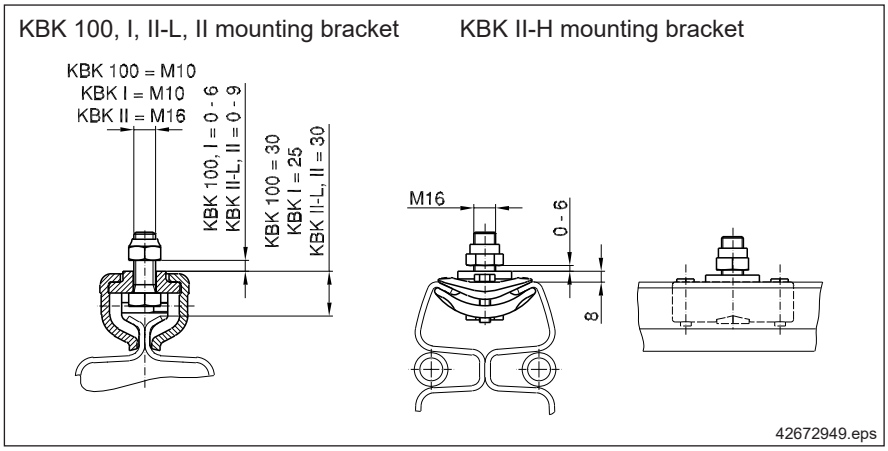
Item	Designation		KBK I, II-L, II
89	Bolted bracket	Weight [kg]	0,35
		Part no.	984 690 44

Bolted brackets are suitable for attachment to the following KBK profile sections: KBK I, KBK II-L, KBK II.

The flat connecting surfaces facilitate a variety of mounting arrangements.

Finish: galvanized

16.2.2 Mounting bracket (Item 89)



Item	Designation		KBK 100	KBK I	KBK II-L, II	KBK II-H
89	Mounting bracket	Weight [kg]	0,42	0,30	0,90	1,00
		Part no.	984 556 44	980 365 44	982 365 44	858 365 44

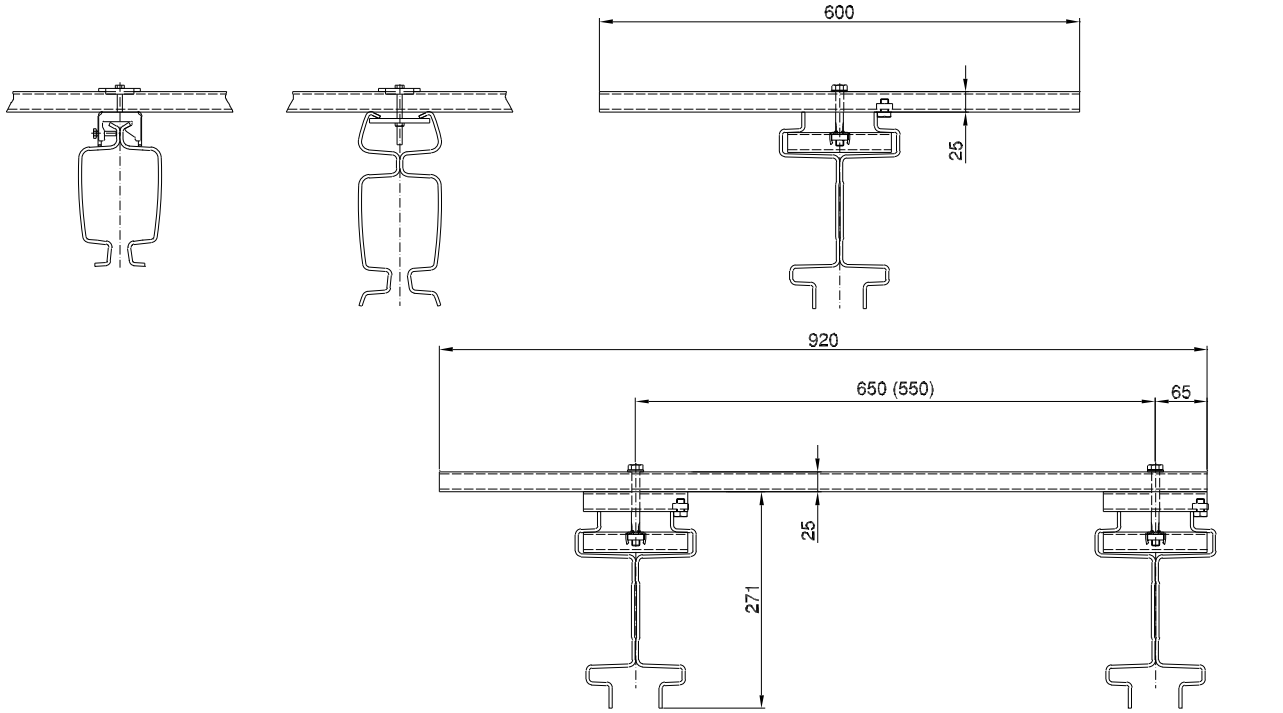
Mounting brackets can be used for attaching mounting plates, counterweights and similar parts.

Finish: galvanized

16.2.3 C-rail brackets

Attachment examples:

KBK II KBK II-H KBK III



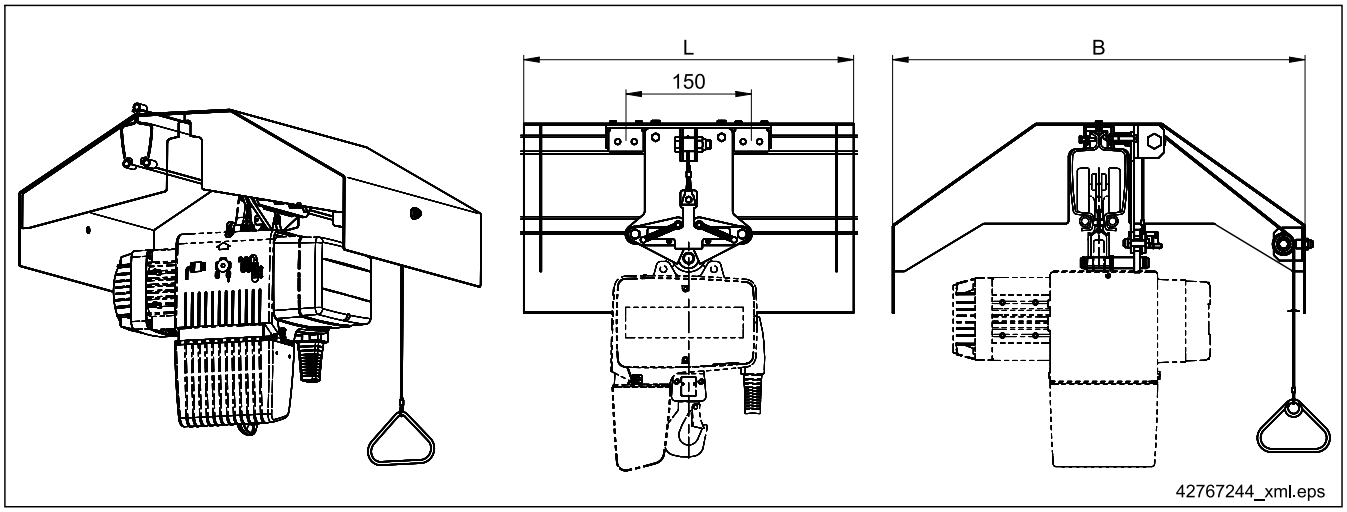
Designation	KBK I, II-L, II	KBK II-H	KBK III
C-rail bracket	984 690 44 + 855 021 44 + M6 bolts	858 690 44	850 032 44
Bracket for double-girder crane	-	-	517 881 46

KBK I, II-L, II: Bolt lengths must be specified depending on the size of the C-rail used (height of the C-rail +15 mm). C-rail not included in the scope of delivery.

KBK II-H: The bracket includes bolts to clamp 40x25 C-rails and 40x40 C-rails. C-rail not included in the scope of delivery.

KBK III: The bracket is supplied with C-rail as shown.

16.3 Canopy



Item	Designation	Chain hoists		KBK I	KBK II-L	KBK II	KBK II-H
150	Canopy (L x W = 600 x 650 mm)	DC 1-5 DK 1-5	Weight [kg]	15,50	16,00	17,30	19,90
			Part no.	715 045 46	715 046 46	715 048 46	715 347 46
	Canopy (L x W = 650 x 750 mm)	DC 10 DK 10	Weight [kg]	-	19,90	21,30	22,20
			Part no.		715 047 46	715 049 46	715 348 46

The canopy is recommended for outdoor operation. As an option, it can be fitted with a locking device for the trolley. In this case, the necessary extended connecting rod for the trolley is included in the scope of delivery of the locking device.

The canopy is secured by the two bolted brackets fitted to the canopy.

RF 125 and DRF 200 friction-wheel travel drives can also travel under the canopy. A second canopy may have to be fitted depending on the selected trolley combination and its length.

Finish: RAL 1007/RAL 2002 (2-part single-coat paint) or galvanized,
Locking device and mounting parts galvanized

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17 Power supply to crabs and cranes

17.1 Electric power supply

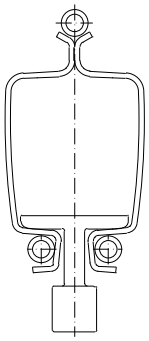
17.1.1 Trailing cable, general information

A cable running on cable sliders and larger or several cables running on cable trolleys in the KBK section is the most economical power supply system.

Alterative: cable trolleys running in KBK 0 or KBK 25 rail, fitted to the side of the KBK section.

KBK 100, I, II-L, II, II-H trailing cable

with cable slider



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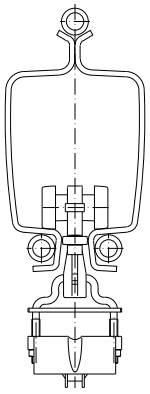
with cable trolley



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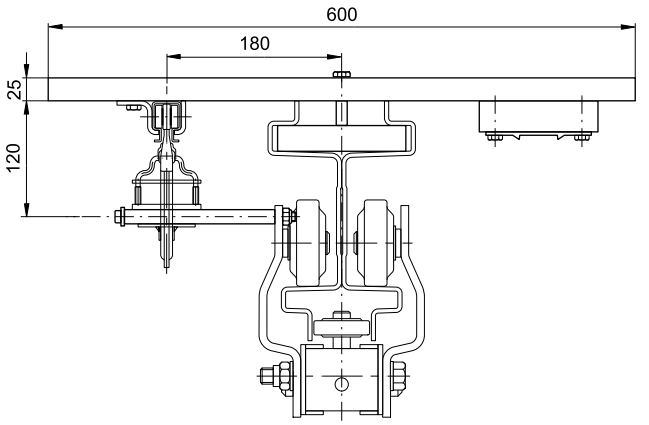
KBK 25 power supply arrangement on KBK III



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Long tracks, curves

Cable sliders are used for one cable on tracks with simple electric power supplies to the trolley or to the crane.

Cable trolleys should be used for longer tracks, gentle curves, electric long and cross-travel drives and when flat cables with outside dimensions greater than 8 mm x 22 mm or when several flat cables are used.

Cable length

Calculate the required cable length as follows:

Track and crane girder length (m) x 1,2 + supply cable length (m)

Number of cable sliders or cable trolleys

The quantity of cable sliders or cable trolleys required for a crane or track must be calculated taking into consideration cable sag and track or crane girder length. Cable sliders must only be used on straight tracks and only up to track lengths of approx. 30 m for KBK 100, I or 40 m for KBK II-L, II and for 4x1,5 mm^2 or 4x2,5 mm^2 flat cable (max. 8 mm x 22 mm external dimensions).

Max. trailing cable length with cable sliders: 40 m (push travel)

Max. trailing cable length with cable trolleys: 50 m (push travel)

Max. trailing cable length with cable trolleys: 70 m (electric travel)

Required quantity of cable carriers n:

$$n = \frac{\text{Track or crane girder length [m]}}{\text{Cable sag [m] x 2}} - 1$$

Approach dimension

The approach dimension of the crane or travelling hoist is increased by the distance required for close accumulation of cable sliders and cable trolleys. Install an internal buffer stop to protect the accumulated cable carriers. For KBK III installations fitted with KBK 25, the approach dimension can be reduced by arranging the cable trolley accumulating section next to the crane or travelling hoist, or by extending the KBK 25 rail beyond the end of the track.

Two trolleys or cranes on one track

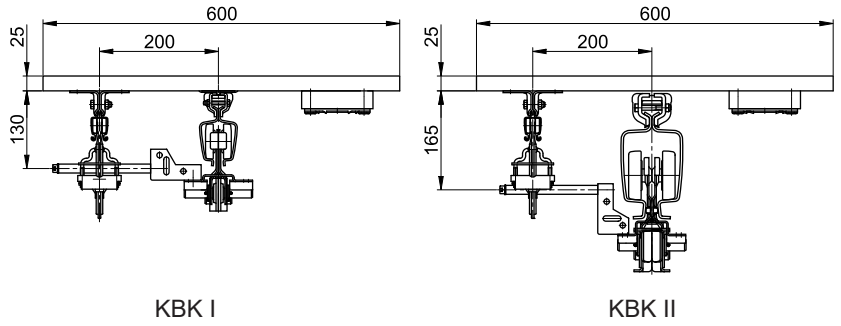
If two travelling hoists operate on one monorail track or two crane girders on one crane runway, power supply can be provided via one flat cable for each of them from opposite ends of the track.

More than two trolleys or cranes on one track

Power supply by flat cable is not provided as standard if more than two travelling hoists or two crane girders operate on one runway and in track systems with turntables or track switches. In these cases, power must be supplied via a conductor line.

External trailing cable power supply KBK 0/KBK 25

KBK 0 trailing cable power supply

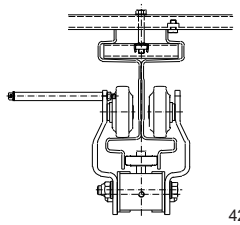


A trailing cable power supply system arranged at the side of the KBK rail can reduce the approach dimension and the section required to accumulate the cable trolleys can extend beyond the end of the track.

For maximum attachment distance of the C-rail fitting, selection table for KBK 25 parts and further information, see "KBK 0, 25, 100 trailing cable" technical data; refer to the document table on page 7.

KBK III towing arm (Item 160)

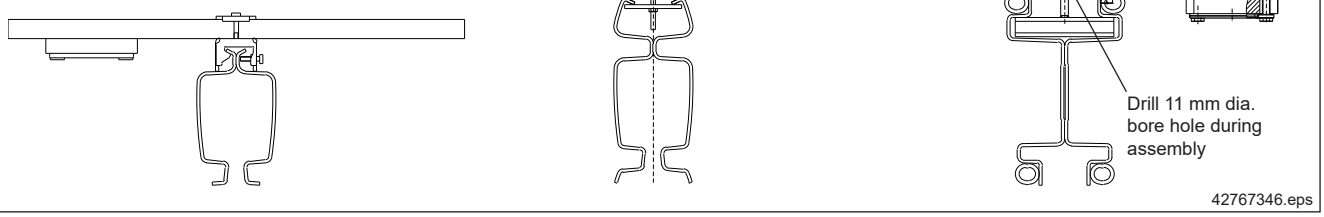
KBK III towing arm for towing trolley



Item	Designation		KBK III
160	Towing arm	Weight [kg]	0,26
		Part no.	850 368 44

C-rail fitting with counterweight (Item 161)

C-rail fitting with counterweight
KBK I, KBK II-L, II, II-H



Item	Designation		KBK I, II	KBK II-H	KBK III
161	C-rail fitting with counterweight	Weight [kg]	3,84	4,07	4,00
		Part no.	851 441 44	858 441 44	715 084 46

The C-rail fitting includes a sliding counterweight of 2 kg.

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17.1.2 External conductor line

If flat cables cannot be used with KBK I and KBK II-L track sections, or if the 5 integrated busbars of the KBK II-R section are insufficient, a compact conductor line must be attached to the KBK section.

Conductor lines offer good protection against moisture and mechanical damage.

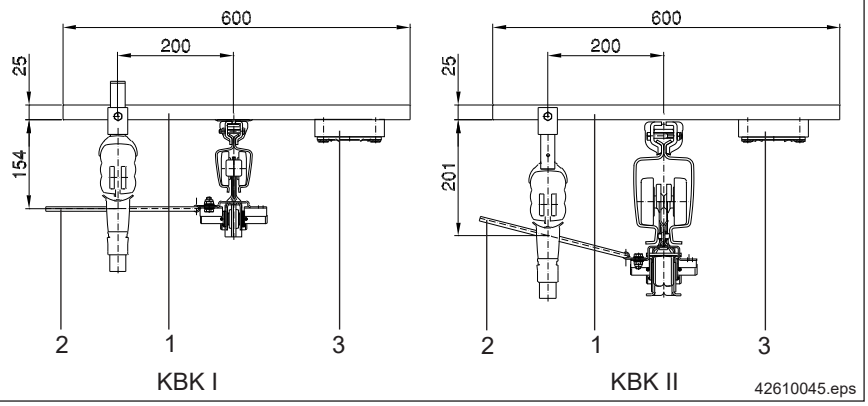
Type of enclosure: IP 23,

Permissible voltage: DCL-Pro = 690 V; temperature range: -30 °C to +70 °C,
DKK = 500 V; temperature range: -30 °C to +100 °C,

An external conductor line can be fitted on all profile sections and track layouts without any branch elements (track switches, turntable). Special attachments are, however, required. Free trolley entry sections and contact sections can be provided using the DCL-Pro/DKK system. If the DCL-Pro/DKK is provided in a low-level arrangement (current collector below the track), contact sections may also be provided in track systems which include branch elements. Trolley entry sections must only be fitted along straight track runs.

DCL-Pro conductor line

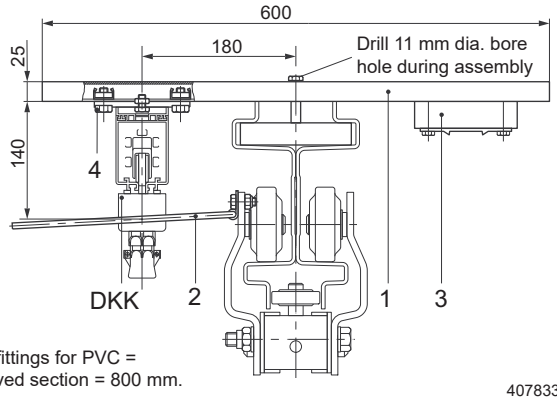
DCL-Pro conductor line



For details and further information, see “DCL-Pro conductor line technical data” and “DCL arrangement on KBK technical data”; refer to the document table on page 7.

DKK compact conductor line

DKK power supply busbar on KBK III arrangement



Max. distance between C-rail fittings for PVC = 2000 mm; AL = 3000 mm; curved section = 800 mm.

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For further information, see “DKK conductor line technical data”, “DKK arrangement for KBK cranes and tracks technical data” and “Towing arm fitting for DKK current collector trolleys on KBK trolleys technical data”; refer to the document table on page 7.

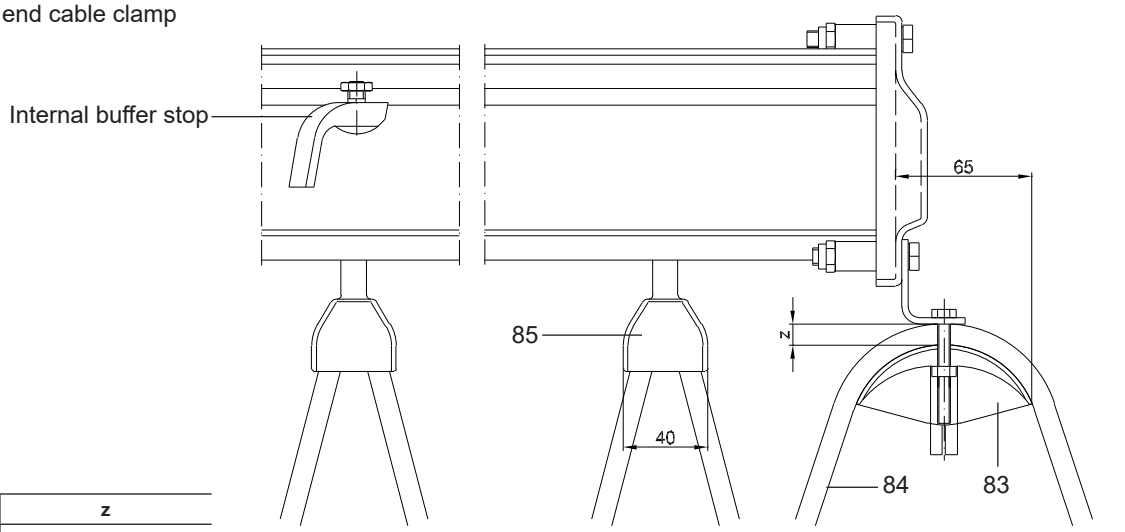
17.1.3 Trailing cable components and fittings

Rail end cable clamp (item 83)

Flat cable (item 84)

Cable slider (item 85)

Flat cable with rail end cable clamp and cable slider



	z
KBK 100, I, II-L, II, II-H	max. 23 x 50 wide

Item	Designation	No. of conductors x rated cross-section [mm²]	External dimensions [mm]		KBK 100, I	KBK II-L, II	KBK II-H
83	Rail end clamp			Weight [kg]	0,15		0,21
				Part no.	982 114 44		858 114 44
84	Flat cable with PE	4 x 1,5	19 x 8	Weight [kg]	0,21 [kg/m]		
				Part no.	471 352 44		
		4 x 2,5	21 x 8	Weight [kg]	0,26 [kg/m]		
				Part no.	504 208 44		
		8 x 1,5	33 x 8	Weight [kg]	0,34 [kg/m]		
				Part no.	504 226 44		
		13 x 1,5	31 x 12	Weight [kg]	0,55 [kg/m]		
				Part no.	895 171 44		
85	Cable slider for 4x1,5 mm² and 4x2,5 mm² flat cable			Weight [kg]	0,03	0,04	
				Part no.	980 759 44	851 690 44	

Rail end cable clamps are bolted to the end cap with buffer. This provides strain relief of the flat cable to the terminal box and a favourable fixing point for the cable between the crane girder and track girder.

Finish: galvanized

The plastic-sheathed flat cable (cold-resistant) can be used in buildings with a dry or humid atmosphere, or in the open. Flat cable is flexible in one plane. Temperature range from –20 °C to +70 °C.

Cable sliders are suitable for one flat cable with maximum external dimensions of 8 mm x 22 mm. They are made of temperature-resistant plastic. Temperature range from –20 °C to +70 °C.

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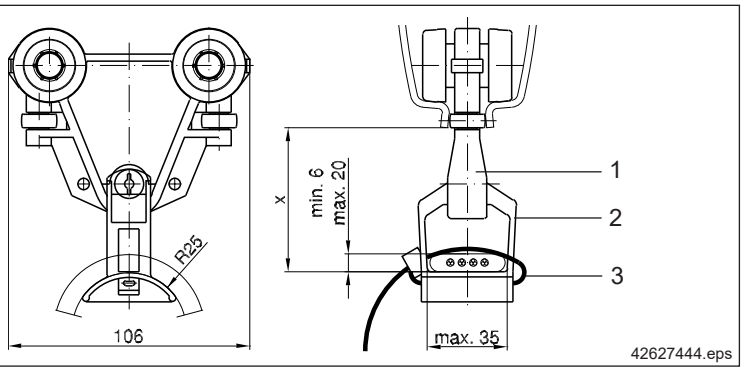
Flat cable trolley with snap connector (item 86)

Flat cable trolley with snap connector

	x
KBK 100	60
KBK I	65
KBK II-L, II	45
KBK II-H	29

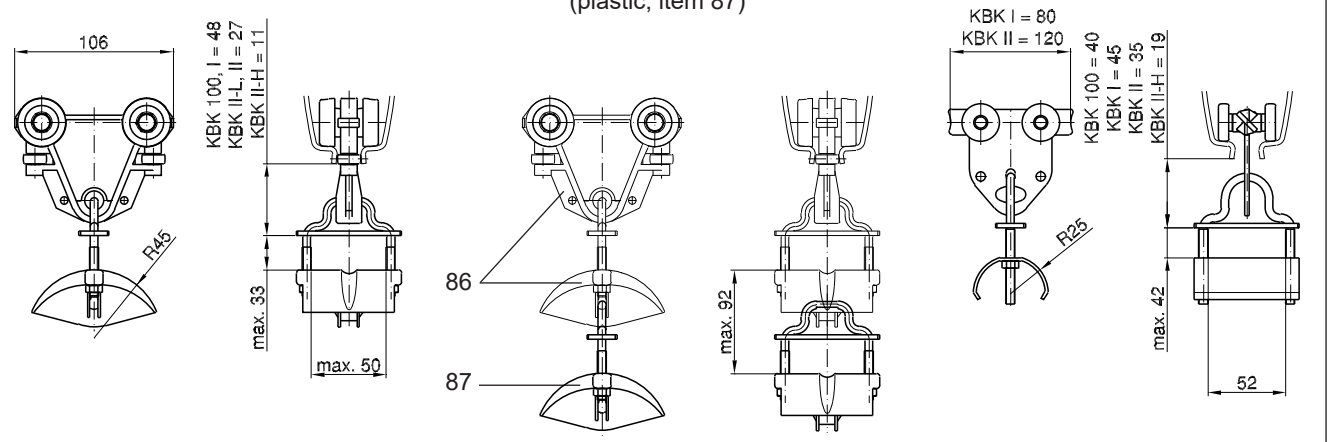


Item	Designation	Max. load [kg]		KBK 100, I	KBK II-L, II, II-H
86	Trolley for cable carrier	-	Weight [kg]	0,17	0,18
			Part no.	980 045 44	982 045 44
	Cable carrier with snap connector	3	Weight [kg]	0,01	
			Part no.	981 018 44	
	340 x 8 cable strap for cable carrier	-	Weight [kg]	-	
			Part no.	981 019 44	

This flat cable trolley is designed for light duty. It is not suitable for round cables. For a flat cable trolley with snap connector, the following must be ordered separately:

1. Trolley for cable carrier
2. Cable carrier with snap connector
3. 340 x 8 cable strap for cable carrier, (Finish: black)

Cable trolley (item 86)
Stirrup with clamping plate (item 87)



Item	Designation	Max. load [kg]		KBK 100, I	KBK II-L, II, II-H
86	Cable trolley (steel, galvanized)	40	Weight [kg]	0,30	0,50
			Part no.	984 605 44	855 085 44
	Cable trolley (plastic)	25	Weight [kg]	0,25	0,22
			Part no.	980 460 44	982 470 44
87	Stirrup with clamping plate (45 mm radius)	1)	Weight [kg]	0,10	
			Part no.	980 470 44	

1) Only for plastic cable trolley. Several hangers can be arranged below each other. However, the total load of the additional hangers must not exceed 5 kg.

The basic element of the cable trolley is the light-duty trolley (see section 8.3). Cables, compressed air or water hoses can be supported. The cable trolley has bore holes for strain relief cords.

Finish:
Plastic, black; axle with ball bearing: steel,
Travel wheels: plain plastic
Temperature range –20 °C to +70 °C.

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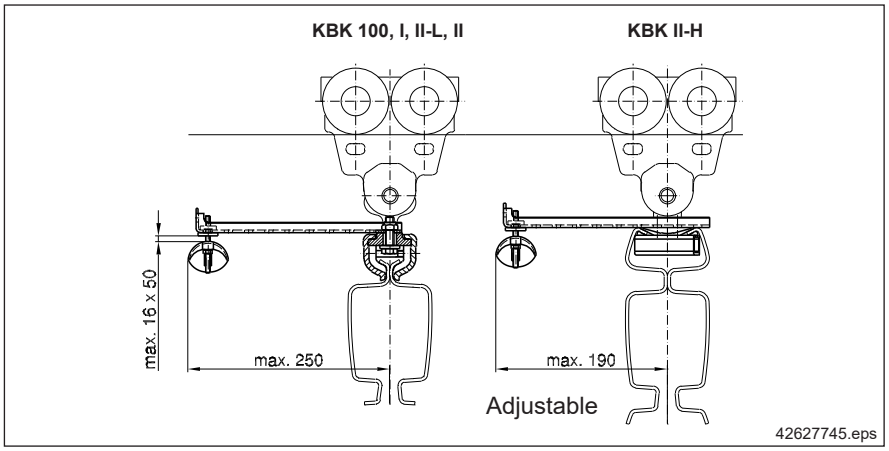
Crane girder cable clamp (Item 80)

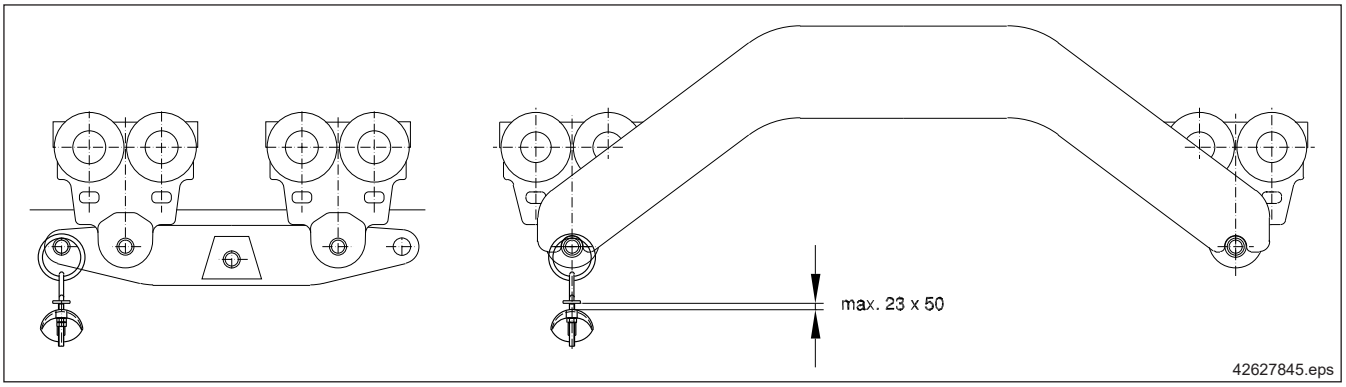


Item	Designation		KBK 100	KBK I, II-L, II	KBK II-H
80	Crane girder cable clamp	Weight [kg]	0,70	1,20	0,83
		Part no.	984 680 44	980 680 44	858 680 44

Crane girder cable clamps can be used for KBK 100, I, II-L, II, II-H push-travel single/double-girder cranes to prevent the flat cable running from the crane runway to the crane girder from being subjected to side pull.

Crab frame cable clamp (Item 81)

Examples

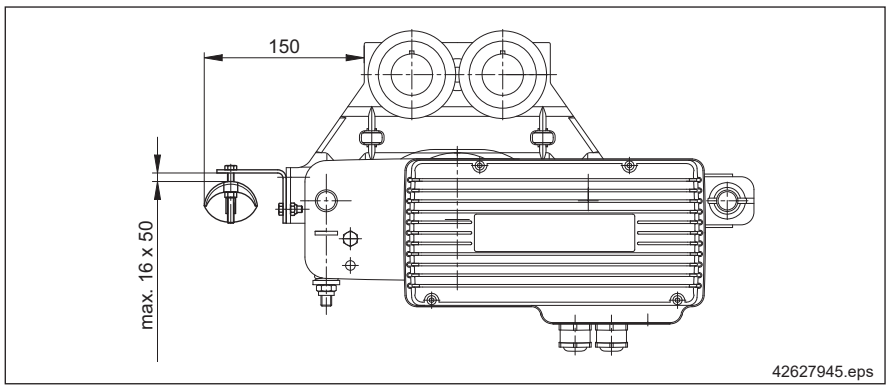


Item	Designation		KBK 100, I, II-L, II
81	Crab frame cable clamp	Weight [kg]	0,10
		Part no.	982 577 44

Crab frame cable clamps can be suspended from the trolleys of KBK 100, I, II-L, II push-travel double-rail crabs to relieve the strain on the hoist terminals.

The cable clamp can also be used on other trolleys with an additional pin, as an option (see examples).

RF trolley cable clamp
(Item 82)

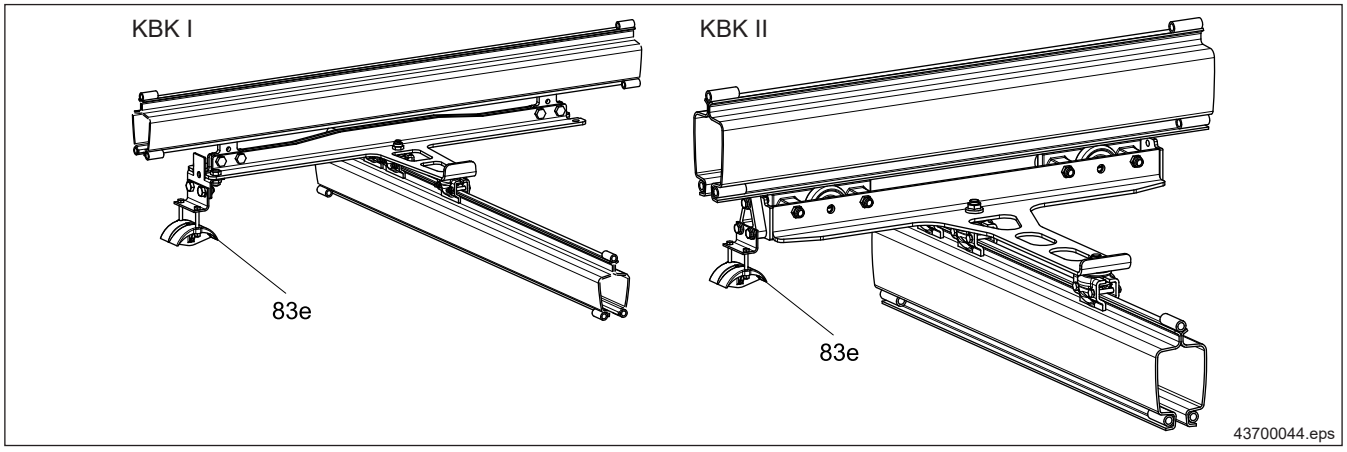


Item	Designation		KBK II-L, II, II-H
82	RF trolley cable clamp	Weight [kg]	0,26
		Part no.	858 578 44

RF trolley cable clamps can be fitted to electric-travel crabs/KBK II-L, II cranes to relieve the strain on the terminals.

Finish: galvanized

Ergo end carriage cable clamp
(Item 83e)



Item	Designation		KBK I	KBK II-L, II , KBK II-H
83e	Ergo end carriage cable clamp	Weight [kg]	0,4	0,15
		Part no.	855 345 44	982 114 44

Ergo end carriage cable clamps can be used as an alternative to crane girder cable clamps where trailing cables transfer from the track to the crane girder.

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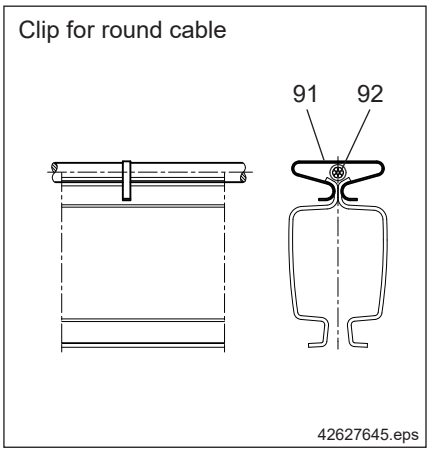
17.1.4 Round cable and crane drive connection

Clip for round cable (item 91)

Round cable (item 92)



Item	Designation		KBK I, II-L, II
91	Clip for round cable on KBK I, II-L, II	Weight [kg]	—
		Part no.	982 124 44
92	3x0,5 mm² round cable	Weight [kg]	0,042
		Part no.	894 725 44
	4x1,5 mm² round cable, 1 kV	Weight [kg]	0,109
		Part no.	471 954 44
	5x1,5 mm² round cable, 500 V	Weight [kg]	0,150
		Part no.	504 932 44
	7x1,5 mm² round cable, 1 kV	Weight [kg]	0,178
		Part no.	471 957 44
	8x1,5 mm² round cable, 500 V	Weight [kg]	0,250
		Part no.	894 136 44
	10x1,5 mm² round cable, 1 kV	Weight [kg]	0,388
		Part no.	471 960 44

A round cable has to be laid along the crane girder to complete the electric connection between the two travel drives on the track girder for electric-travel cranes.

If an RF 125 is used with E22-C:

- To connect the crane bridge enclosure with the (master) drive:
  - one 8x1,5 mm^2 round cable
- To connect both drives (master/slave):
  - one 4x1,5 mm^2 round cable and one 3x0,5 mm^2 round cable

If a DRF 200 is used:

- To connect the crane bridge enclosure with the (master) drive and to connect the two drives:
  - one 7x1,5 mm^2 round cable

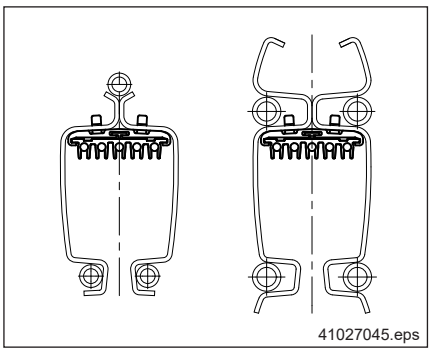
Required cable length to connect the two drives:

Crane span dimension l_{Kr} + 2,5 m.

The round cable is clipped to the crane girder at intervals of 0,5 m for KBK I, II-L, II (l_{Kr} x 2 + 1) and placed in the upper part of the profile section without any clips for KBK II-H and KBK III.

Two 5x1,5 mm^2 round cables are needed to connect a KRBG with the powerfeed of the conductor line on the crane girder.

17.1.5 KBK II-R, KBK II-H-R integrated conductor line



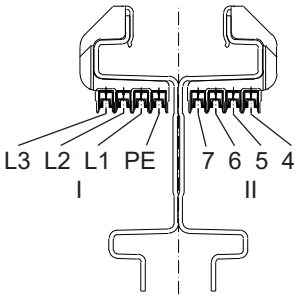
KBK II-R and KBK II-H-R profile sections are fitted with five internal conductors. Power can be supplied via powerfeed end caps or line powerfeeds. If track switches or turntables are used in R-type systems, the powerfeed can also be arranged at the track switch or turntable for downshop rails. For this purpose, the current collector trolley provides four or five sprung double sliding contacts.

The track system should be provided with a maintenance section (item 11) for better maintenance of the current collector trolleys (to check or replace the sliding contacts or replace the complete current collector trolley).

See section 4 for components.

17.1.6 Integrated DEL single-conductor line and components for KBK III

DEL single-conductor busbar



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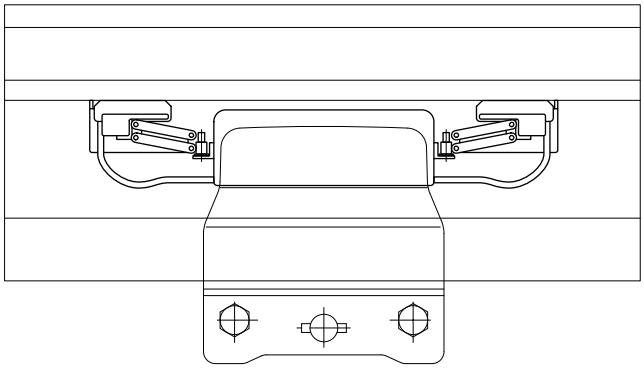
KBK III-DEL current collector



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Up to eight conductor rails can be integrated in the KBK III track section, more conductors can also be fitted in track layouts that do not have any branch sections. IP 23 enclosure; DEL 25/50 mm^2, 100/200 A. Maximum conductor cross-section at the DEL powerfeed point is 10 mm^2.

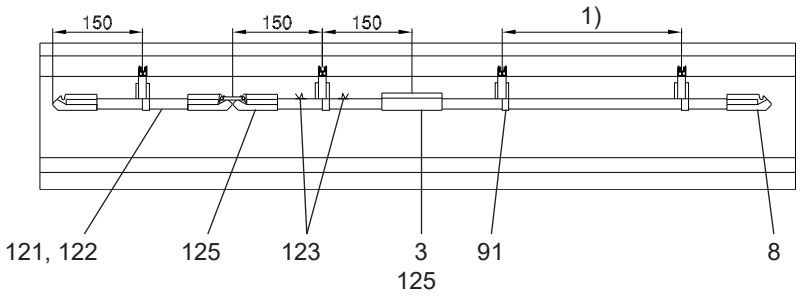
The DEL single-conductor system features a compact design and provides for simple project engineering and maintenance. All parts are accessible for visual inspection and maintenance. Snap-on connections make it easy to replace or fit parts at a later date, e.g. block sections or powerfeeds.

Cable anchor points must be created at the powerfeed points by means of terminal boxes (e.g. terminal box fastened to the end cap or with brackets for isolating switches.

KBK III installations can be easily fitted with DEL at a later date.

Component part overview

DEL conductor line



1) 750 (straight)
500 (curved)

15325147.eps

Item	Designation
121	DEL straight section
122	DEL curved section
123	Stop plate
3	Conductor connector 100 A
	Conductor connector 100 A with powerfeed
	Conductor connector 200 A with powerfeed
125	Isolating section
	Air-gap isolating section
8	End cap with powerfeed/ramp section
91	DEL bracket

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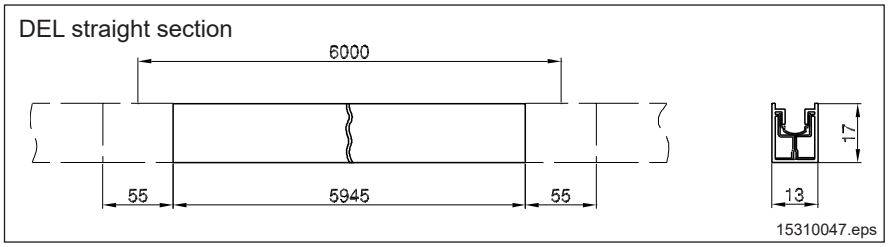
DEL straight section (Item 121)



Item	Designation		KBK III
121	DEL 1- 25 - PVC PH straight section	Weight [kg]	1,78
		Part no.	876 206 44
	DEL 1- 25 - PVC PE straight section	Weight [kg]	1,78
		Part no.	876 216 44
	DEL 1- 50 - PVC PH straight section	Weight [kg]	2,97
		Part no.	876 096 44
	DEL 1- 50 - PVC PE straight section	Weight [kg]	2,97
		Part no.	876 106 44
123	Stop plate	Weight [kg]	0,01
		Part no.	876 109 44

Conductor cross-section	25 mm²	50 mm²
Continuous current at 100% CDF	100 A	200 A
Conductor material	Copper	
Operating temperature	max. -30° to +60° C	
Type of enclosure	IP 23	

Straight sections are a maximum of 5945 mm in length. Shorter lengths can be obtained by cutting them straight across. The protective earth conductor (PE) marked green/yellow must be attached to the girder web.

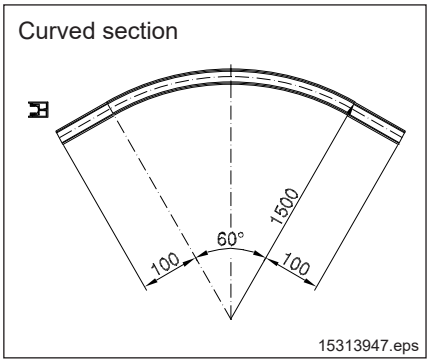
The max. distance between brackets is 750 mm. 150 mm at conductor rail connections, isolating section and end cap.

Each straight section of track must be fitted with 2 stop plates for each conductor rail to prevent any displacement along the track.

Finish:

Grey plastic insulation, green/yellow PE conductor rail, copper conductor material

DEL curved section (Item 122)



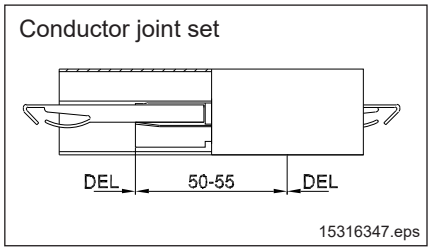
Item	Designation		KBK III
122	DEL 25 mm² PH curved section	Weight [kg]	0,54
		Part no.	876 230 44
	DEL 25 mm² PE curved section	Weight [kg]	0,50
		Part no.	876 231 44

Curved sections are supplied with a radius of 1500 mm (60°) and must be adapted to the relevant curved section on site. They are supplied with 100 mm-long straight end sections for connection to straight track sections. The straight end sections must be removed if they are not required.

The max. distance between brackets is 500 mm. 150 mm at conductor rail connections, isolating section and end cap.

Powerfeed conductor connector (Item 3)

Item	Designation		
3	Conductor connector 100 A (24 off)	Weight [kg]	1,00
		Part no.	876 240 44
	Conductor connector 100 A with powerfeed (12 off)	Weight [kg]	0,58
		Part no.	876 242 44
	Conductor connector 200 A with powerfeed (4 off)	Weight [kg]	0,22
		Part no.	876 245 44

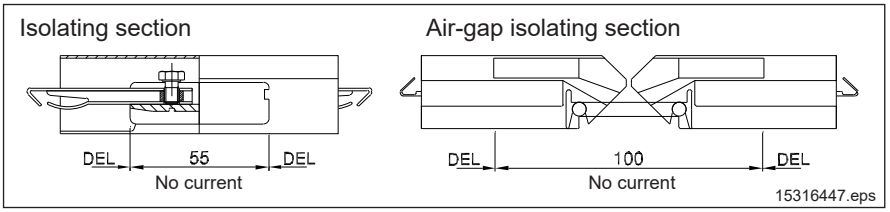


Conductor joint set	25 mm²	50 mm²
Continuous current at 100% CDF	100 A	200 A
Cyclic duration factor	100% CDF	
Expansion compensation	+/- 2,5 mm	

Conductor connector with powerfeed	
Connection cross-section	Max. 10 mm²
Conductor diameter	Max. 7,5 mm

Conductor connectors are inserted into the conductor rails. Conductor connectors with a powerfeed arrangement must also be provided with an M5 connecting bolt to attach cable lugs.

Isolating section (Item 125)

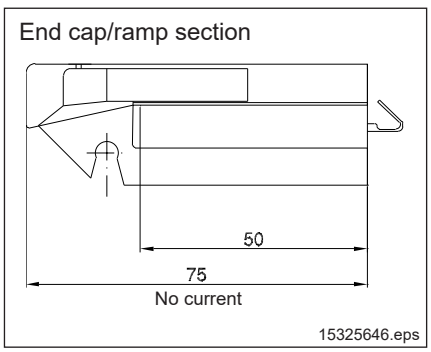


Item	Designation		KBK III
125	Isolating section (12 off)	Weight [kg]	0,43
		Part no.	876 250 44
	Air-gap isolating section (1 off)	Weight [kg]	0,04
		Part no.	876 055 44

Isolating and air-gap isolating sections are available. Air-gap isolating sections must be used for increased requirements and arduous operating conditions.

The connecting parts are interchangeable. Isolating sections have the same dimensions as conductor connectors. Isolating sections feature one and air-gap interrupt sections two M5 powerfeed screws (see also conductor connectors).

End cap
Ramp section
Powerfeed end cap (Item 8)



Item	Designation		KBK II-R, II-H-R
8	End cap/ramp section	Weight [kg]	0,02
		Part no.	876 065 44

The end cap serves as a track end and as a straight ramp section. It can be used as an end powerfeed arrangement for up to 10 mm² connection cross-sections.

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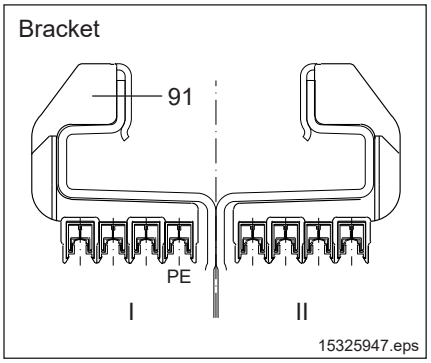
Bracket
(Item 91)



Item	Designation		
91	Bracket DEL 4	Weight [kg]	0,06
		Part no.	878 510 44

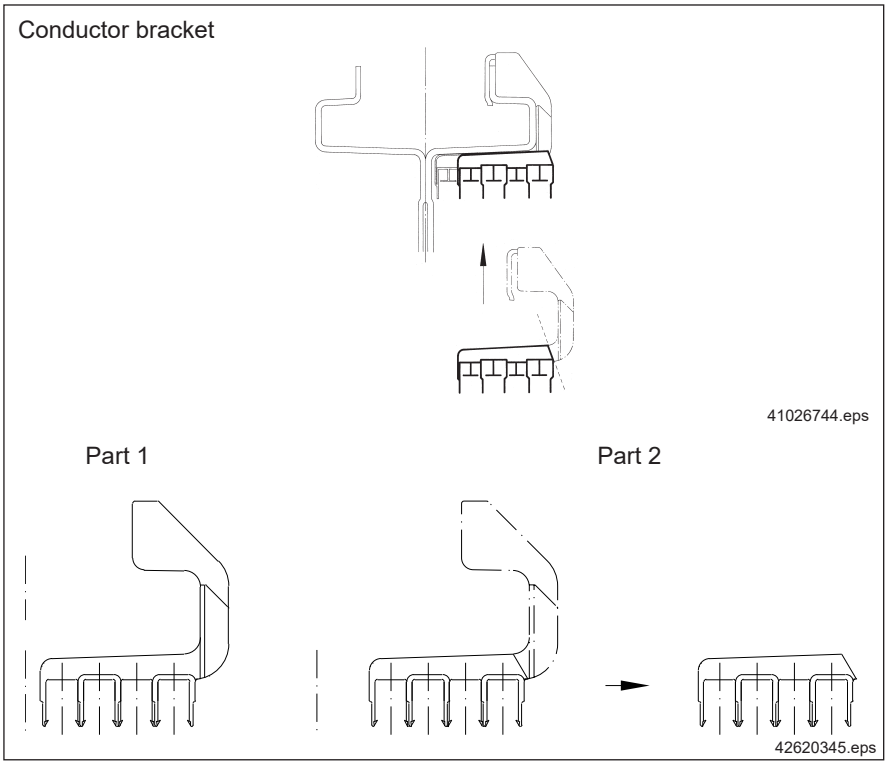
The max. 4-pole brackets are fitted to the left and right of the KBK III profile section by means of an integrated clamping device. In each case, the first bracket must be attached 150 mm from the start of the track and conductor joint, all others at a max. distance of 750 mm (500 mm in curved sections).

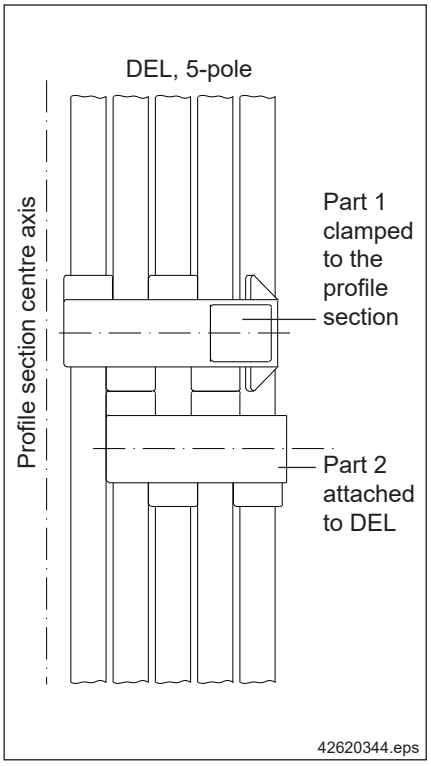
Finish:

Red plastic DEL bracket, galvanised steel clip

Attachment of more than eight DEL conductor rails to KBK III profile sections

Example: 10 DEL conductor rails





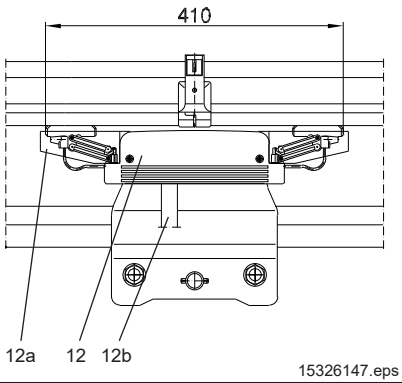
Twice the number of brackets must be used for project engineering.

1. The retaining arm must be removed from every second bracket (2) during assembly.
2. The bracket must be moved to the outside (by a max. of 2 conductors) and fitted direct next to complete bracket (1) in such a way that it is supported by the conductor rails.

The 5-pole design is shown without the KBK III profile section.

Either 2 x 4 and 1 x 2 conductors or 2 x 5 conductors, each on the outside of the profile sections, must be provided on double-girder cranes.

Current collector
(Item 12)



Item	Designation			KBK III
12	Current collector enclosure 4 (5) SSD with PE	4-pole	Weight [kg]	0,60
			Part no.	878 546 44
		5-pole	Weight [kg]	0,90
			Part no.	878 556 44
	Current collector enclosure 4 (5) SSD without PE	4-pole	Weight [kg]	0,60
			Part no.	878 547 44
		5-pole	Weight [kg]	1,50
			Part no.	878 557 44
12a	Protective frame 4-pole		Weight [kg]	0,03
			Part no.	878 542 44
12b	Flat cable 4 x 2,5 cold-resistant		Weight [kg]	0,26[kg/m]
			Part no.	504 208 44

Current collector pantograph [1]		SSD
Continuous current at	100% CDF	50 A
Continuous current at	60% CDF	60 A
Continuous current at	30% CDF	60 A
Flat cable union (standard)		30 x 10 mm
Round cable union [2]		23 mm dia./PG 16
Connection cross-section		Max. 6 mm²
Travel resistance 4-pole approx.		10 N

Current collector pantograph type:
SSD = double current collector pantograph
1) Continuous current details for bronze sliding contact
2) A PG16 ⇒ M25 reducer is needed if metric union glands are used.

Enclosures (item 12) with integrated terminal box and current collector carriers for double current collector pantographs (SSD) are used with KBK III load trolleys. The terminal box is suitable for connecting 2,5 mm² flat (max. 30 x 10 mm) or round cable (max. dia. 23 mm/PG 16).

Double current collectors are always fitted to ensure reliable contact. Current collector pantographs with graphite sliding contacts must be used for applications under arduous operating conditions. (Current collectors with graphite sliding contacts on request). The enclosures are fitted with prepared openings for a flat and a round cable. The current collectors are additionally provided with a protective frame in straight track sections and in areas within arm's reach.

Finish: red plastic enclosure

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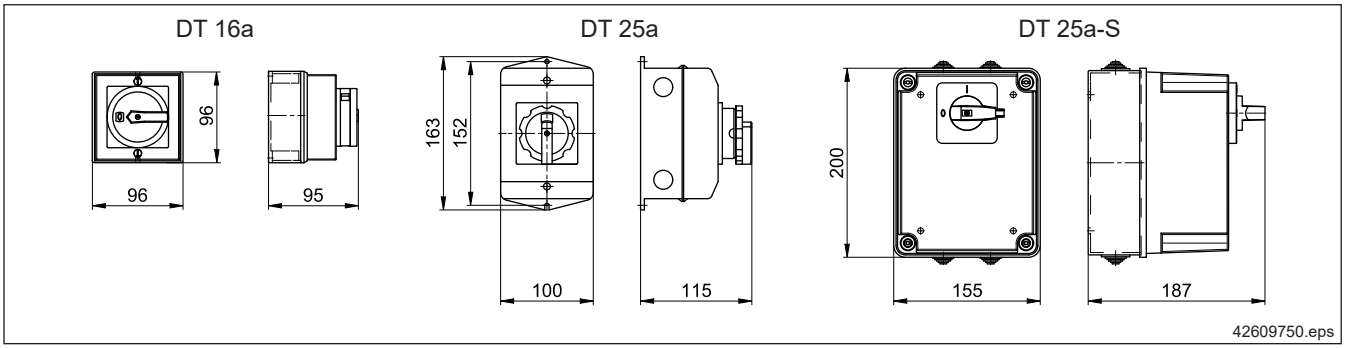
17.1.7 Mains connection switch/ isolating switch (Item 88)



Item	Designation	Size	Voltage [V]	Current [A]		
88	Load isolating switch	DT 16a	≤ 500	Max. 20	Weight [kg]	0,32
					Part no.	575 479 44
		DT 25a	≤ 690	Max. 25	Weight [kg]	0,40
					Part no.	575 480 44
		DT 25a-S			Weight [kg]	1,41
					Part no.	473 037 44

Fuse links and inserts for DT 25a-S

Rated current	D fuse link, delayed action	D screw-in adapter for fuse insert
[A]	Part no.	Part no.
6	451 663 99	504 905 99
10	451 643 99	504 906 99
16	451 644 99	504 907 99
20	451 645 99	504 908 99
25	451 646 99	504 909 99

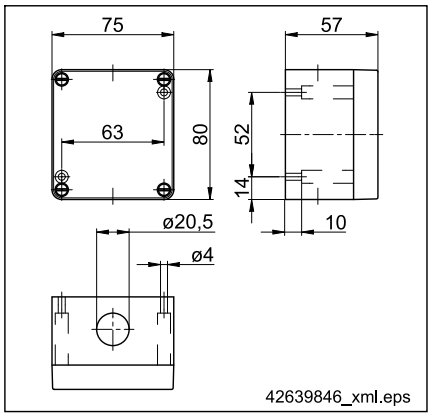
Switch-isolators are suitable for use as mains connection or isolating switches.
Mains connection switch: Stationary switch-isolator for a crane installation with one or more cranes/travelling hoists.
Isolating switch: On-board switch-isolator on cranes or travelling hoists on a common power supply line (conductor line).
Switch-isolators can be locked in the OFF (0) position against unauthorised restoration of the power supply by up to three padlocks.
Two M20 x 1,5 cable entries are available. IP 55 enclosure.

DT 16a switch-isolator without fuses,

DT 25a switch-isolator without fuses,

DT 25a-S switch-isolator with fuse base for 3 fuses.

17.1.8 Terminal box (Item 94)



Item	Designation		
94	Terminal box	Weight [kg]	0,40
		Part no.	504 650 44

A terminal box must be provided as the junction with the fixed round-section cable when flat cables are used to supply power to KBK installations.

See section 18.3 for cable sets.

Finish: Aluminium housing with 6 modular spring-loaded terminals (grey) (up to 2,5 mm²) fitted on mounting rail, light grey (RAL 7035)

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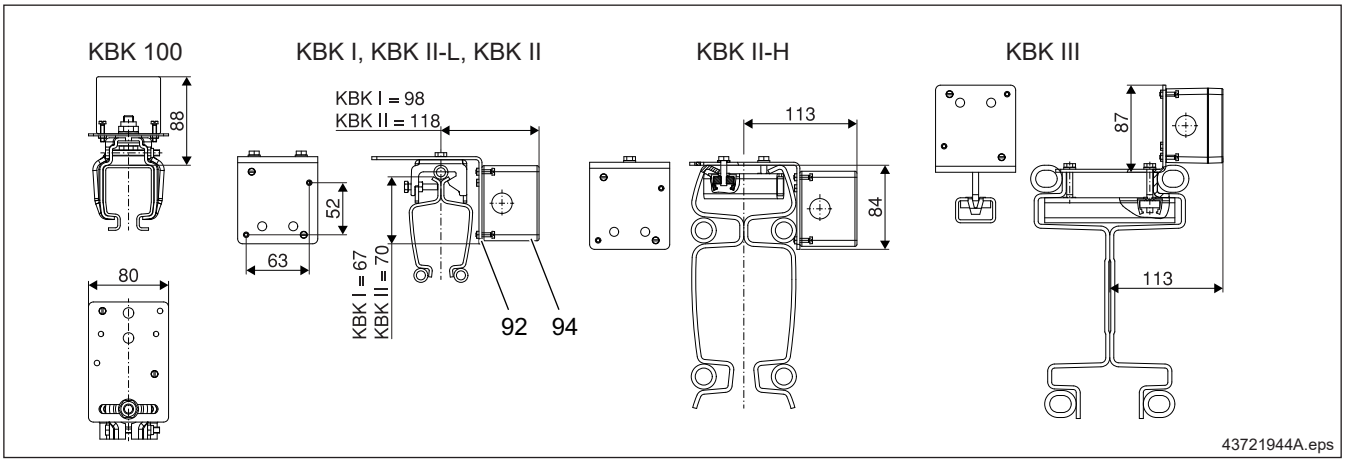
17.1.9 Mounting brackets for switches and terminal boxes

Mounting bracket for terminal box (Item 92)

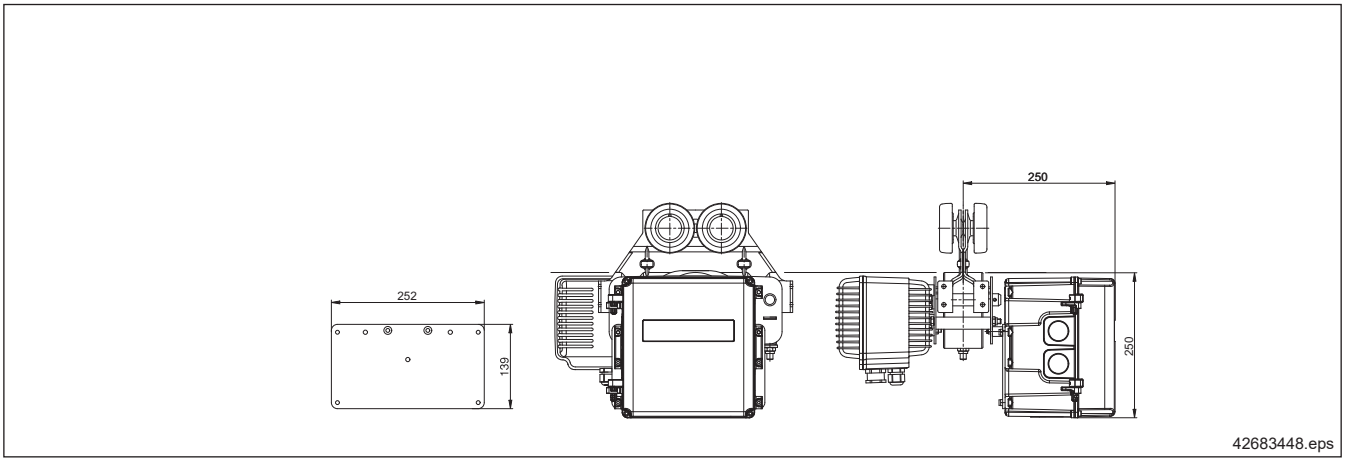


Item	Designation		KBK 100	KBK I, II-L, II	KBK II-H	KBK III
92	Mounting bracket for terminal box	Weight [kg]	0,57	0,51	0,57	0,69
		Part no.	984 371 44	984 695 44	858 695 44	850 695 44

Mounting bracket (92) can be used to attach terminal box (94), part no. 504 650 44 and the warning lamp for wireless controls.

Finish: galvanized

Mounting bracket for enclosure on RF 125 (Item 92)

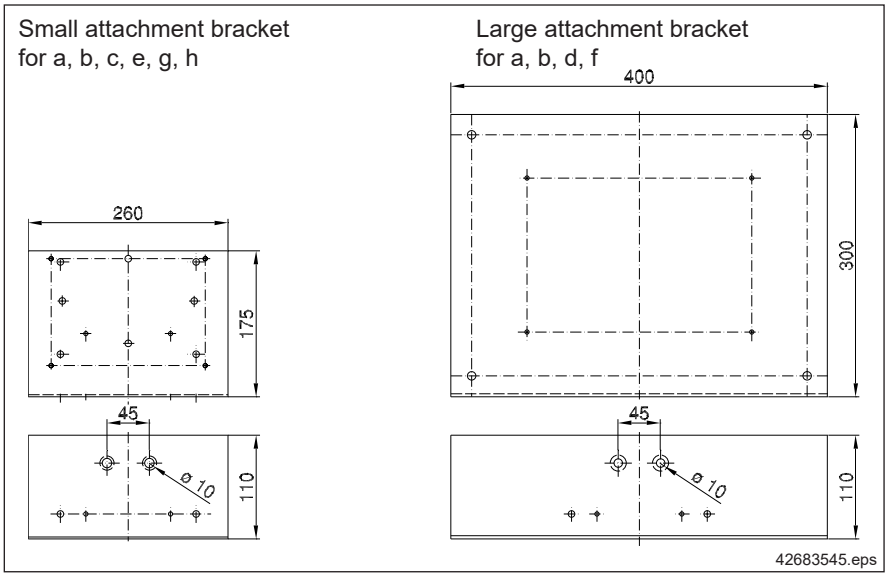


Item	Designation		KBK II-L, II, II-H
92	RF 125 enclosure mounting bracket	Weight [kg]	0,50
		Part no.	851 533 44

The mounting bracket can be used to attach the crane bridge enclosure.

Finish: black

Attachment bracket
(Item 93)

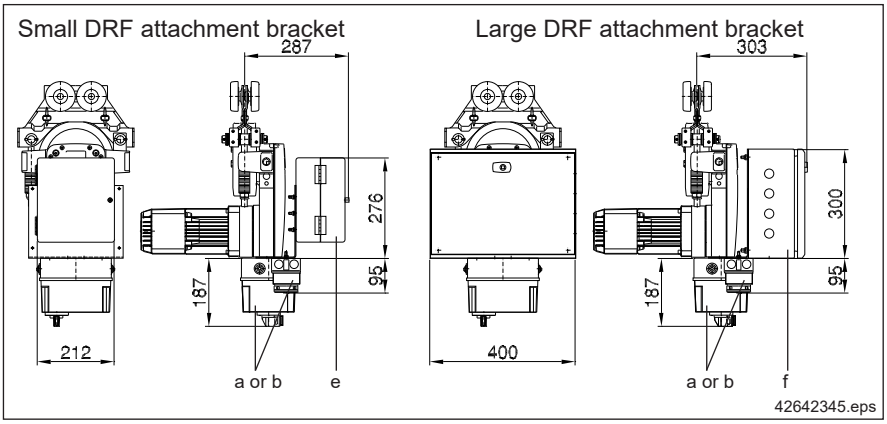


Item	Designation		
93	Small attachment bracket	Weight [kg]	0,70
		Part no.	851 222 44
	Large attachment bracket	Weight [kg]	3,90
		Part no.	851 220 44

Item	Designation			Part no.
a	Mains connection/isolating switch		DT 16 a	575 479 44
b			DT 25 a	575 480 44
			DT 25 a-S	473 037 44
c	Terminal box		180 x 130 x 75	575 351 44
d			255 x 180 x 75	575 352 44
e	Crane bridge enclosure 1		232 x 257 x 126	772 400 45
	Crane bridge enclosure 2			772 410 45
f	Housing		400 x 300 x 155	575 382 44
g	Receiver		DRC-MP	773 432 44
h	Terminal box, electric equipment box 185 x 163 x 102	Universal electric equipment box		772 167 45
		Terminal box	3T3	772 174 45
			Manual crab	772 175 45
			DC/diode	772 165 45
		Polu-Box		772 280 45
		Signal converter	3TK	772 176 45
			KT3	772 177 45
			DT3	772 166 45

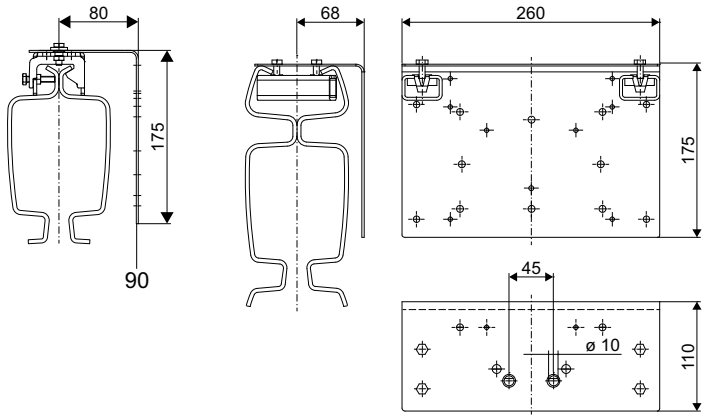
Finish: galvanized

Example: fitted to DRF

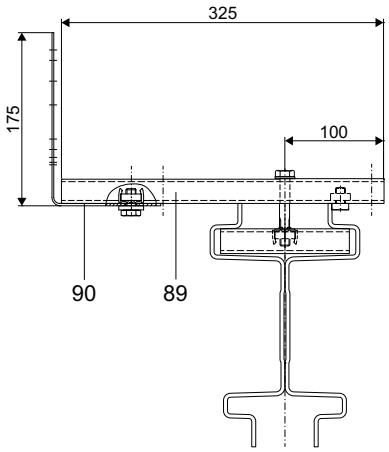


Bracket for isolating switch/Terminal box with mounting bracket, small (Item 90)

Bracket for isolating switch/terminal box
KBK 100, I, II-L, KBK II-H



KBK III mounting bracket with attachment bracket



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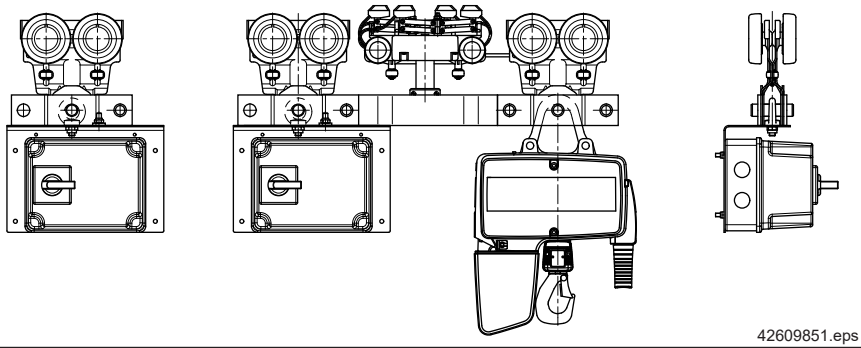
Item	Designation		KBK 100	KBK I, II-L, II	KBK II-H	KBK III
90	Bracket for isolating switch	Weight [kg]	On application	1,40	1,64	2,30
		Part no.		851 224 44	858 224 44	850 032 44 + 850 152 44

Brackets can be used for mounting switches, small terminal boxes, counterweights and similar parts. Mounting bracket, fastening bolts and nuts for switch included.

Finish: galvanized

Switch and terminal box mounting with mounting bracket, small (item 88)

Switch and terminal box mounting brackets on push-travel monorail hoists



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Item	Designation		
88	Switch bracket	Weight [kg]	1,32
		Part no.	851 223 44

A mounting bracket consists of a mounting plate, eye with nut for suspension, and fastening material for the enclosure/switch. It may be necessary to drill additional holes for the enclosure when it is fitted to the mounting plate.

- Switch brackets for DT 16a/DT 25a-S switches are required when several push-travel monorail trolleys are used with a common power supply on one track.
- To attach terminal boxes to monorail trolleys; load trolley either as single trolley or double trolley.

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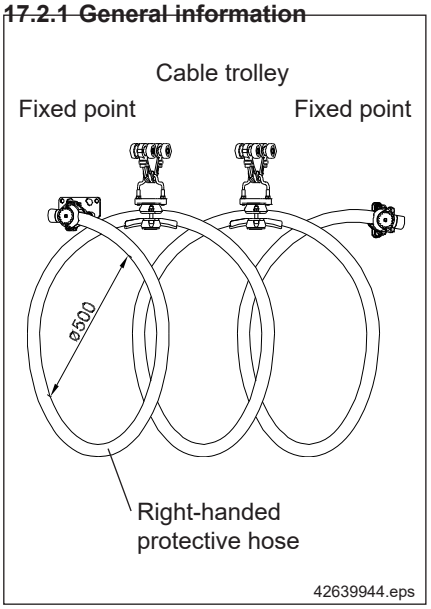
17.2 Pneumatic power supply

17.2.1 General information



Special power supply lines are required for pneumatic load lifting modules such as D-BP rope balancers.

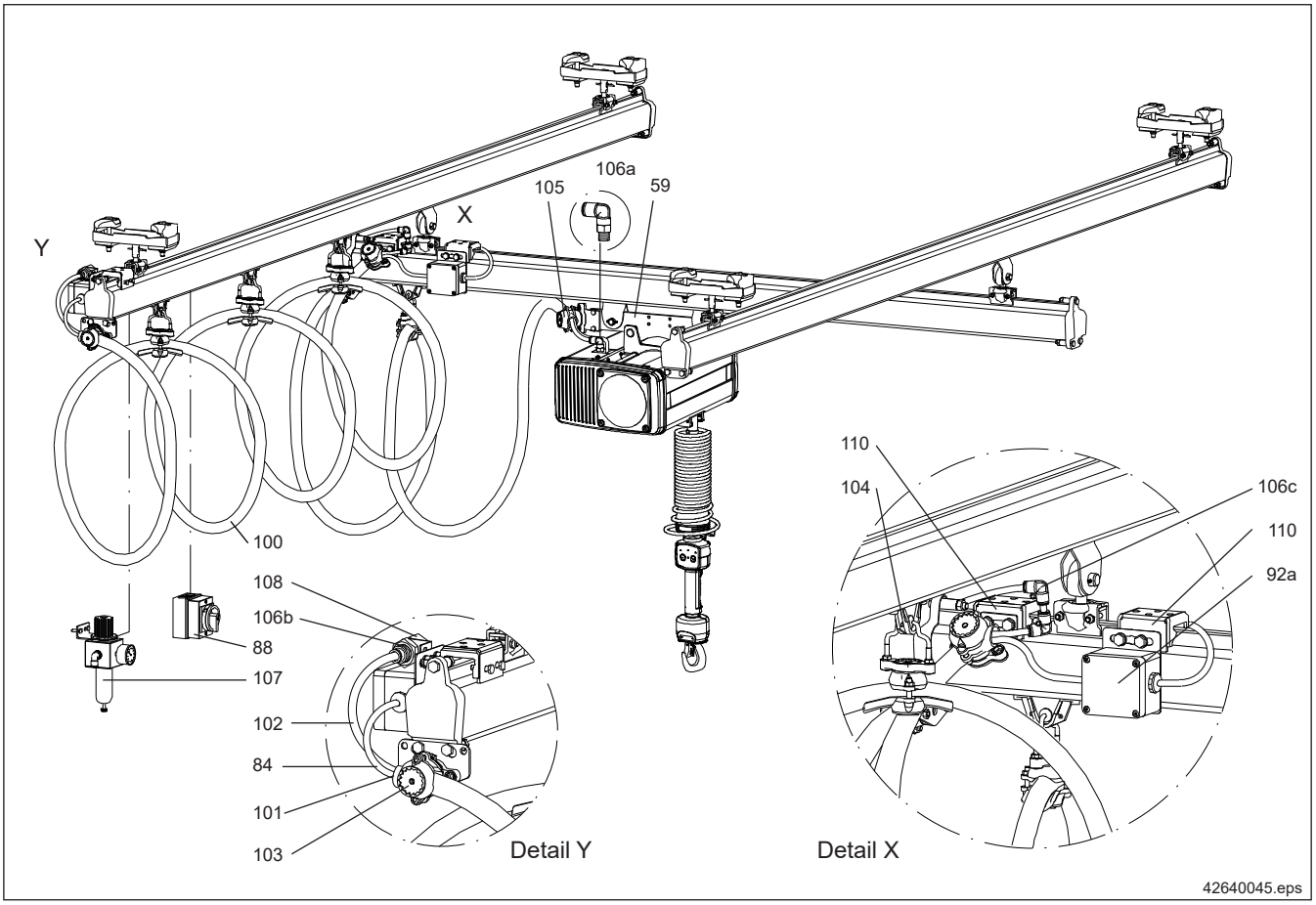
In some applications, electric power is required in addition to pneumatic energy on the crab (e.g. for manual-force control of the rope balancer).

The supply lines are laid in a protective hose and attached to special fixed points on the crane runway and to the crane girder as well as to cable trolleys. The helical protective hose is always right-handed and has a sag of approx. 500 mm.

Length of protective hose	= Travel path [m] x 1,3 + connecting length on both sides [m]
Quantity of cable trolleys	= Length of travel path (rounded off to full meters) -1
Length of cable accumulating section	= (Quantity of cable trolleys + reserve) x length of cable trolley

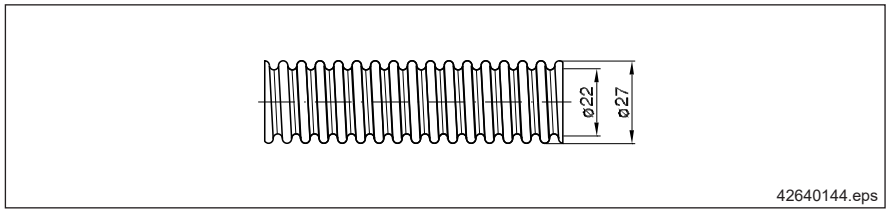
Example:
Single-girder crane

Power supply separated:	Transfer point → crane bridge/crane runway (Detail X)
Power supply interface:	End of crane runway (Detail Y)



17.2.2 Components

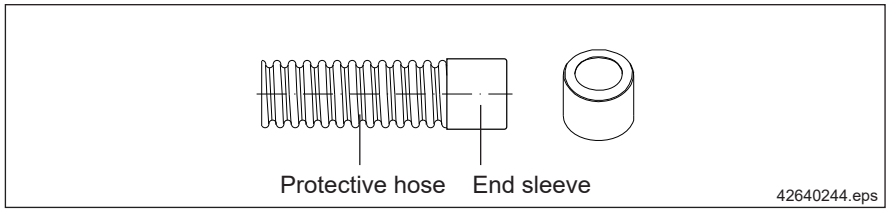
Protective hose
(Item 100)



Item	Designation		
100	Protective hose	Weight [kg]	0,29 kg/m
		Part no.	343 836 44

Finish: Outer sheath: PVC (grey)
Internal spiral:PVC-coated spring steel wire

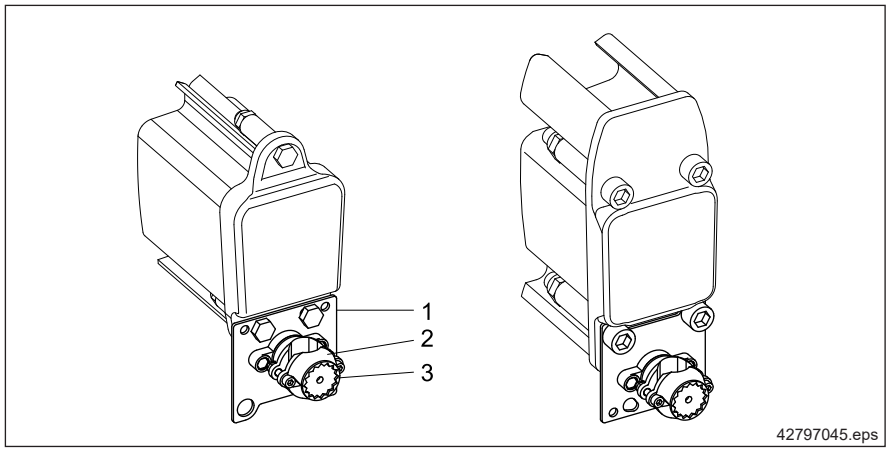
End sleeve for protective hose
(Item 101)



Item	Designation		
101	End sleeve for protective hose	Weight [kg]	0,03
		Part no.	343 837 44

Finish: plastic (grey)

Mounting bracket with hose clip
(Item 103)



1 Retaining plate
2 Hose clip set 2
3 22,5° interval

Item	Designation		KBK 100, I, II-L, II, II-H
103	Mounting bracket with hose clip	Weight [kg]	0,33
		Part no.	858 115 44

The mounting bracket with hose clip is used as an anchorage to fit the protective hose at the end of the track. The mounting bracket is fitted to the track end or bridge end together with the end cap. Protective hoses with a diameter of 18 mm to 36 mm can be used. The position of the hose can be changed by adjusting the angle (at 22,5° intervals).

Finish: Retaining plate: Galvanized
Hose clip set 2: Black plastic

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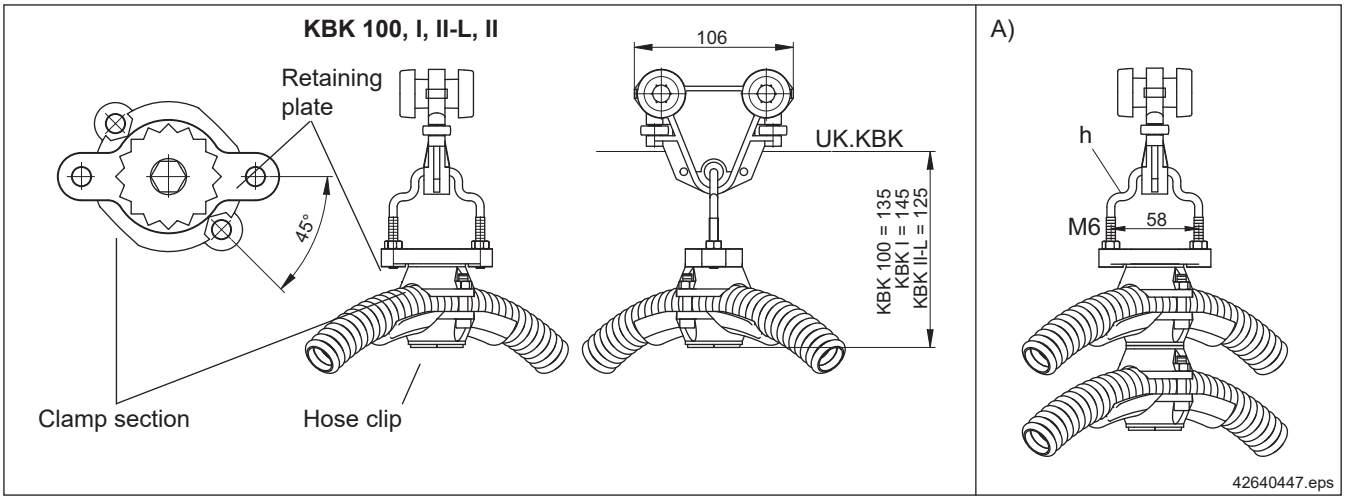
Cable trolley with hose clip
(Item 104)



Item	Designation		KBK 100, I	KBK II-L, II, II-H
104	Cable trolley with hose clip	Weight [kg]	0,37	0,37
		Part no.	980 958 44	855 148 44

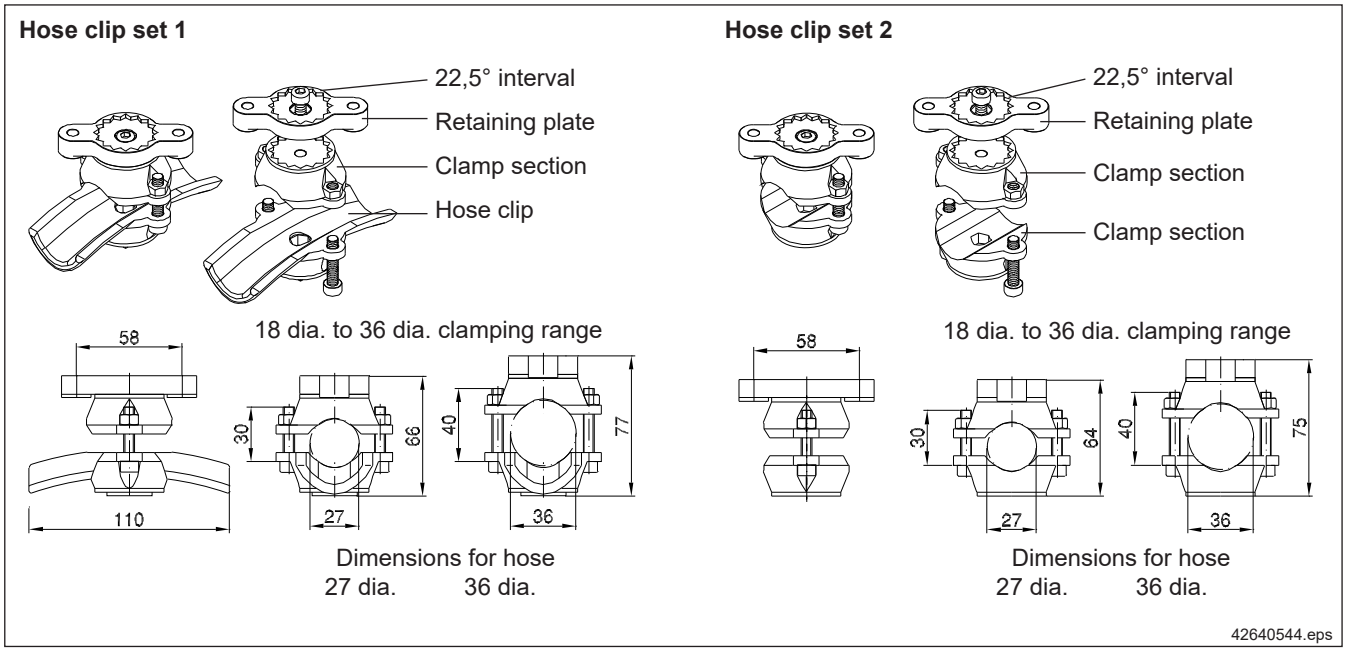
Cable trolleys are suitable for protective hoses with an external diameter of 18 mm to 36 mm. The retaining plate and clamp section on cable trolleys are pre-assembled at an angle of 45° to the direction of travel. Adjustment of the angle is possible at intervals of 22,5°. The protective hose is fitted by bolting the clamp section with the hose clip from below.

It can be combined with an additional hose clip set 1 (A).

Temperature range: -20 °C to + 70 °C
Max. load: 25 kg

Finish:
Trolley: Black plastic
Axle with ball bearings: Steel
Travel wheels: Plain plastic
Hose clip: Black plastic

Hose clip set
(Item 105)

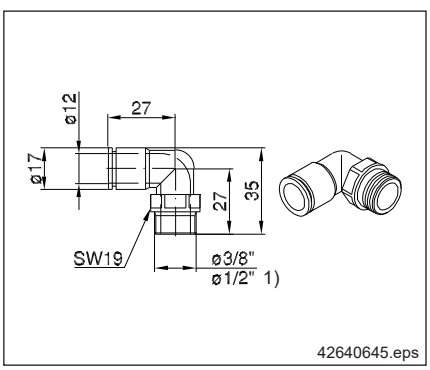


Item	Designation		
105	Hose clip set 1	Weight [kg]	0,16
		Part no.	855 135 44
	Hose clip set 2	Weight [kg]	0,14
		Part no.	855 145 44

If power is supplied via hoses, the components listed can be used to fit the hose to retaining plates and walls as well as to KBK cable trolleys.
Adjustment is possible at intervals of 22,5° if retaining plates are used.

Finish: black plastic

Angle connector for balancer
(Item 106a)



Item	Designation		
106a	3/8" angle connector for balancer	Weight [kg]	0,06
		Part no.	343 777 44
106a	1/2" angle connector for balancer	Weight [kg]	0,06
		Part no.	343 778 44

Finish: nickel-plated brass

1) Only for manual-force control of the balancer, included in the scope of delivery.

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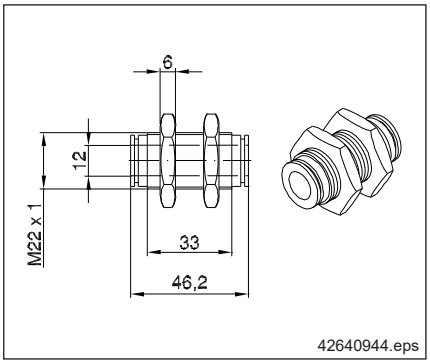
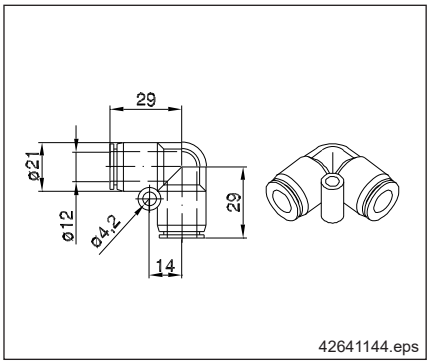
Bulkhead gland
(Item 106b)



Item	Designation		
106b	Bulkhead gland	Weight [kg]	0,09
		Part no.	343 786 44

Finish: nickel-plated brass

Angle connector
(Item 106c)

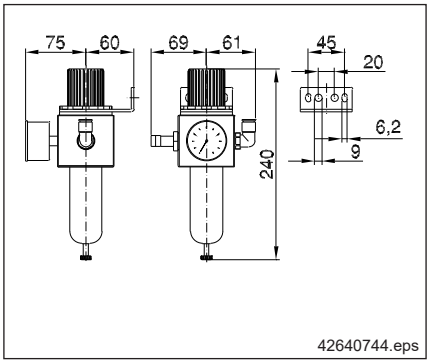


Item	Designation		
106c	Angle connector	Weight [kg]	0,05
		Part no.	343 835 44

Two hose ends (nominal size 12) can be connected to each other.

Finish: black plastic

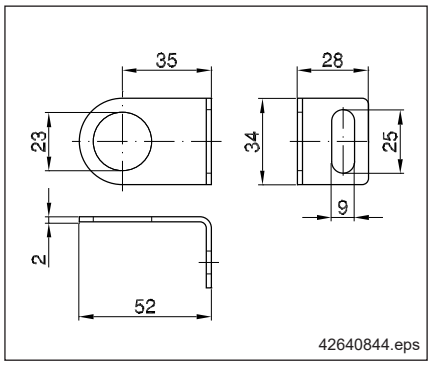
Maintenance unit
(Item 107)



Item	Designation		
107	Maintenance unit	Weight [kg]	1,35
		Part no.	851 199 44

Input pressure:	0 to max. 16 bar
Pressure regulating range:	0,5-10 bar
Filter element:	5 µm
Condensed water drainage:	Manual
Input:	Sleeve suitable for hose with 13 mm internal diameter
Output:	Angle connector for plastic hose with 12 mm external diameter

Angle for bulkhead gland
(Item 108)

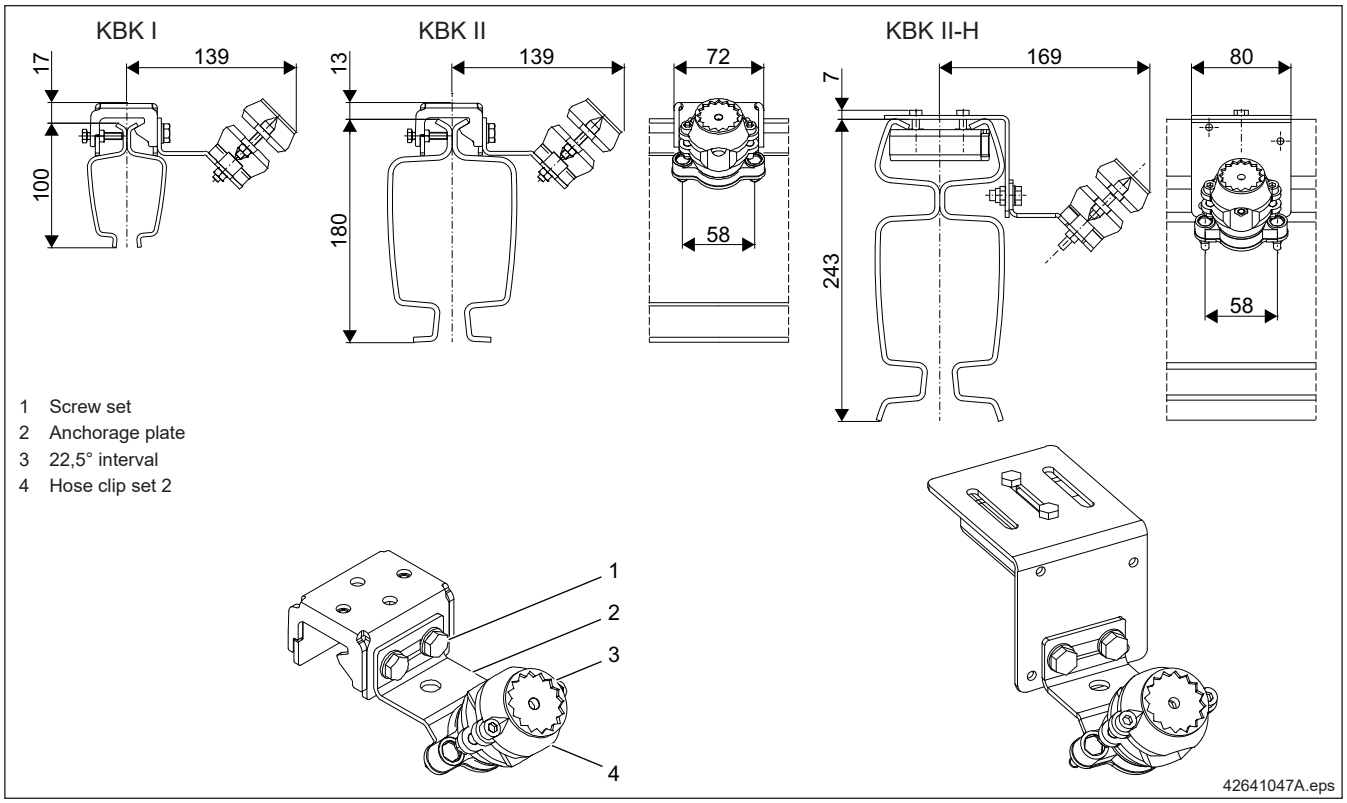


Item	Designation		
108	Angle for bulkhead gland	Weight [kg]	0,03
		Part no.	984 696 44

Attached with screw set (item 89)

Finish: galvanized

Steel anchorage bracket
(Item 110)



Item	Designation		KBK I, II	KBK II-H
110	Anchorage bracket	Weight [kg]	0,63	0,80
		Part no.	984 693 44	858 693 44

The bracket is used for transfer between a crane bridge and crane runway and is fitted on top of the profile of the crane bridge. The position of the protective hose can be changed by adjusting the angle (at 22,5° intervals) of hose clip set 2.

Protective hoses with a diameter of 18 mm to 36 mm can be used.

Finish: Anchorage plate: galvanized steel
Hose clip set 2: black plastic

Other components for pneumatic power supply

Item	Designation		Weight	Part no.
59	Load bar for D-BP 110 rope balancer black (RAL9005)		1,85 [kg]	984 685 44
84	Highly flexible round cable 3Gx1,5 mm²		0,09 [kg/m]	343 838 44
	Highly flexible round cable 5Gx1,5 mm²		0,14 [kg/m]	343 839 44
	4 x 1,5 flat cable with PE		0,21 [kg/m]	471 352 44
	4 x 2,5 flat cable with PE		0,26 [kg/m]	504 208 44
	8 x 1,5 flat cable with PE		0,35 [kg/m]	504 226 44
	13 x 1,5 flat cable with PE		0,55 [kg/m]	895 171 44
88	Mains connection switch	DT16a	0,32 [kg]	895 167 44
		DT 25a	0,40 [kg]	575 480 44
		DT 25a-S	1,60 [kg]	473 037 44
89	M8x20 screw set		0,02 [kg]	712 325 47
102	Plastic hose, silver in colour, 12 mm external diameter, 8 mm internal diameter		0,08 [kg/m]	343 840 44

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18 KBK standard electric equipment

18.1 General

KBK installations that are equipped with DC chain hoists are controlled through contactors.

Contactor control
Special DSC/DSK/DSE/DST pendant controllers are used for controlling all drive motors through contactors. The control circuits are operated with control transformers, which are connected to earth on one side. DC chain hoists have 24 V control voltage.

Conversion
Systems can be converted to wireless controls, IR or radio remote, in connection with contactor control.

Electromagnetic compatibility (EMC)
KBK installations comply in full with the provisions of the EC EMC Directives.

Special protection
Special safety measures are available for KBK installations used at locations and in rooms requiring measures exceeding normal standards.
Such measures may be required in:

- Explosion hazard atmospheres,
- Pickling plants,
- Galvanizing plants,
- Outdoors.

Regulations

All Demag component parts and assemblies fully comply with relevant rules and regulations. All relevant national or local regulations must be taken into account when planning electric equipment.

Important requirements from the standards

1. It must be possible to cut off all phases of the main power supply line by means of one mains connection switch. This switch must be protected against unauthorised restoration of the power supply.
2. An isolator which can be locked should be provided for each hoist if several of these, operating on one track, are fed through one and the same power supply line.
3. Each hoist must be fitted with an emergency-stop device which brings the motion drives to a standstill and interrupts the power supply to these drives.
4. A crane switch is required for
   - electrically powered cranes,
   - cross-travel drives with an output greater than 500 W.
5. Installation of a protective earth conductor, marked green/yellow over its entire length, is obligatory. It must not be possible for earth conductor current collectors to be swapped for phase collectors. Electric chain hoists are connected to the protective earth circuit of the installation. Protection of the KBK rails and the trailing cable power supply lines is achieved by the use of safety class II equipment or equivalent insulation. Therefore, a connection to the protective earth circuit is not necessary.

Power supply

The required power supply system should be selected and ordered separately according to the KBK standard electric equipment table.

When specifying the power supply line, the total length of the supply lines along the crane runway and crane bridge must be added and checked to ensure that it is within the maximum permissible voltage drop according to section 18.5.

The “Cable union sets” section lists the small parts sets required for assembly and installation.

18.2 KBK standard electric equipment with DC

Selection table for installations with 2-stage DC-Pro/DC-Com chain hoist and RF 125							KBK item with	Required cable(s) on the crane bridge					Required cable(s) on the crab		
Type of control	Controller	Travel motion	Power supply on the crane bridge	Lifting/lowering 2 speeds	Cross travel 2 speeds	Long travel 2 speeds	DC-Pro 1-10 DC-Com 1-10	Showing EB, EHK, ZHK see section 18.4	4 x 1,5 flat cable Part no. 471 352 44	13 x 1,5 flat cable Part no. 895 171 44	3 x 0,5 round cable Part no. 894 725 44	4 x 1,5 round cable Part no. 471 954 44	DC power cable → E22 Part no. 720 072 45	DC control cable → E22 Part no. 720 070 45	Required number of poles on the crane bridge (PE = protective earth)
Contactor control	DSC	Manual	Trailing cable	O			x	1	1						3+PE
	DSE-C	Electric		O	O		x	2	1				1	1	3+PE
		Electric with crane switch contactor		O	O		E20	3	1				1	1	3+PE
				O		O	E28	7		1	1	1			8+PE
			Conductor line	O		O	E28L				1	1			8+PE
			Trailing cable	O	O	O	E32	6		1	1	1	1	1	8+PE
			Conductor line	O	O	O	E32L				1	1	1	1	8+PE

x = no KBK item required (see DC-Pro/DC-Com documents)

Selection table for installations with variable-speed DCS-Pro chain hoist and RF 125							KBK item with	Required cable(s) on the crane bridge					Required cable(s) on the crab		
Type of control	Controller	Travel motion	Power supply on the crane bridge	Lifting/lowering Variable	Cross travel Variable	Long travel Variable	DCS-Pro 1-10	Showing EB, EHK, ZHK see section 18.4	4 x 1,5 flat cable Part no. 471 352 44	13 x 1,5 flat cable Part no. 895 171 44	3 x 0,5 round cable Part no. 894 725 44	4 x 1,5 round cable Part no. 471 954 44	DC power cable → E22 Part no. 720 072 45	DC control cable → E22 Part no. 720 070 45	Required number of poles on the crane bridge (PE = protective earth)
Contactor control	DSC-S	Manual	Trailing cable	O			x	1	1						3+PE
	DSE-10CS	Electric		O	O		x	2	1				1	1	3+PE
		Electric with crane switch contactor		O	O		E20	3	1				1	1	3+PE
				O		O	1)	7		1	1	1			8+PE
			Conductor line	O		O					1	1			8+PE
			Trailing cable	O	O	O		6		1	1	1	1	1	8+PE
			Conductor line	O	O	O					1	1	1	1	8+PE

x = no KBK item required (see DCS-Pro documents)

1) On application

Contents

Contents	Designation	Part no.
E20	Crane bridge enclosure	772 278 45
E32	RF 125 enclosure mounting bracket	851 270 44
E32L	Circuit diagram	
E28 E28L	Manual travelling hoist terminal box	772 175 45
	Crane bridge enclosure	772 278 45
	RF 125 enclosure mounting bracket	851 270 44
	Circuit diagram	

The cables listed in the selection tables are not included in the electric items and must therefore be ordered separately.

Flat and round cables are supplied by the metre, whereas the cables for the travelling hoist are prepared in suitable lengths.

Technical data, installation diagrams and components for electric travel motions for KBK installations with DC chain hoists and conventional drives such as DRF 200, for example, on request.

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18.3 Cable union sets

(Items 190, 191)

Item	Designation			KBK II-H, II-H-R
190	Flat cable set	4 x 1,5 mm^2	Weight [kg]	0,11
			Part no.	873 989 44
		4 x 2,5 mm^2	Weight [kg]	0,15
			Part no.	873 990 44
		13 x 1,5 mm^2	Weight [kg]	0,10
			Part no.	873 991 44
191	Round-section cable set	5 x 1,5 mm^2	Weight [kg]	0,11
			Part no.	873 992 44

The cable sets include all small parts needed for the cabling and wiring of KBK installations when series components are used.

Assignment of the sets for the given application is described below.

Contents of the cable sets:

873 989 44: 2 x M20 flat cable twist-type entry glands, M20 counter-nut, M25-M20 reducer, M25 counter-nut, M20 union

873 990 44: 2 x M25 flat cable twist-type entry glands, 2 x M20 counter-nuts, 2 x M20-M25 adapters, M20 union

873 991 44: 2 x M25 flat cable twist-type entry glands

873 992 44: 2 x M25 counter-nuts, 2 x M20 counter-nuts, 1 x M25-M20 reducer, 2 x M25 unions, 2 x M20 unions

Assignment of cable sets:

- Power supply to monorail track or crane runway:
  - 4 x 1,5 mm^2 trailing cable: 1 x 873 989 44 per powerfeed point
  - 4 x 2,5 mm^2 trailing cable: 1 x 873 990 44 per powerfeed point
  - Conductor line: no cable set required
- Crane power supply (see table below)

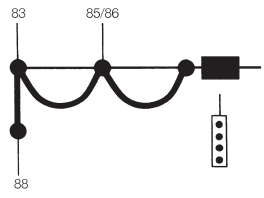
Electric motion			Isolating switch on the crane	Crane power supply (per crane):				
				Conductor line	Trailing cable			
					1,5 mm^2 cross-section		2,5 mm^2 cross-section	
Lifting	Cross travel	Long travel			4 x 1,5 mm^2	13 x 1,5 mm^2	4 x 2,5 mm^2	4 x 2,5 mm^2 + 8 x 1,5 mm^2
O								
O			O	1 x 873 992 992 44	1 x 873 989 989 44		1 x 873 990 990 44	
O	O							
O	O		O	1 x 873 992 992 44	1 x 873 989 989 44		1 x 873 990 990 44	
O		O		2 x 873 992 992 44		1 x 873 991 991 44		1 x 873 990 44
O		O	O	3 x 873 992 992 44		1 x 873 991 991 44 1 x 873 992 992 44		1 x 873 990 990 44 1 x 873 992 992 44
O	O	O		2 x 873 992 992 44		1 x 873 991 991 44		1 x 873 990 44
O	O	O	O	3 x 873 992 992 44		1 x 873 991 991 44 1 x 873 992 992 44		1 x 873 990 990 44 1 x 873 992 992 44

18.4 Schematic diagrams of cable arrangements and cable clamps

Key to symbols	Item	Designation	Section
Cable clamp	80	Crane girder cable clamp	17.1.3
Round cable (item 92), rigidly mounted on the crane bridge	81	Crab frame cable clamp	17.1.3
Flat cable (item 84), freely suspended	82	RF trolley cable clamp	17.1.3
Monorail hoist with cable entry on the hoist unit	83	Rail end clamp	17.1.3
Double-rail crab with cable entry on the hoist unit	85	Cable slider	17.1.3
RF (friction-wheel travel drive)	88	Mains connection switch	17.1.6
Control element	91	Clip for round cable	17.1.3

Suspen. monorail

EB 1



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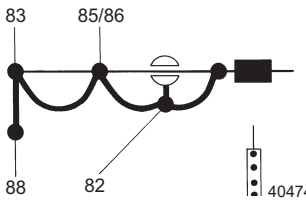
EB 2



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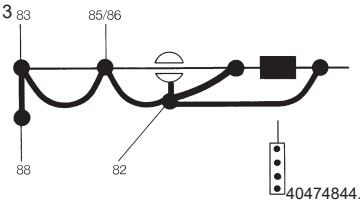
EB 3



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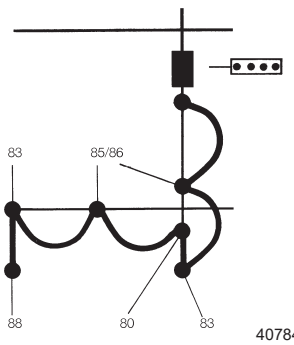
Single-girder crane

EHK 1



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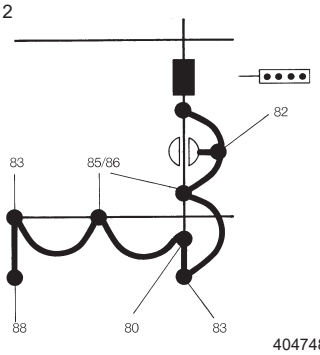
EHK 2



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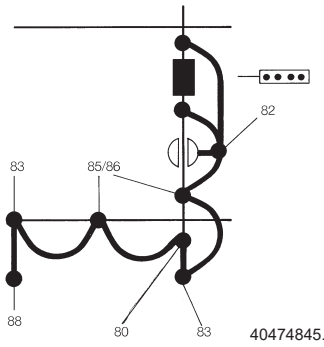
EHK 3



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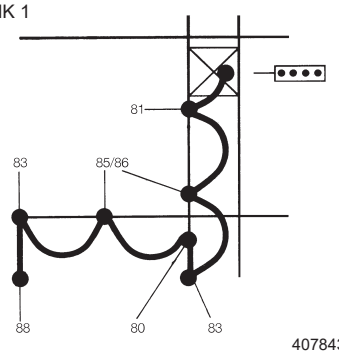
Single-girder crane, rigid/double-girder crane

ZHK 1



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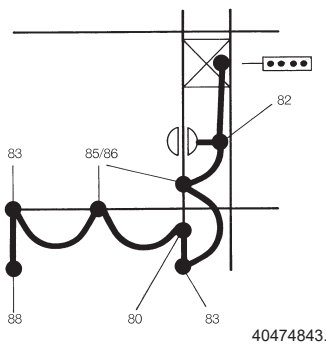
ZHK 2



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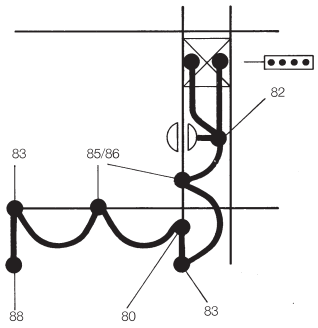
ZHK 3



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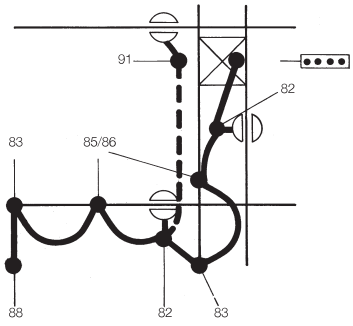
ZHK 6



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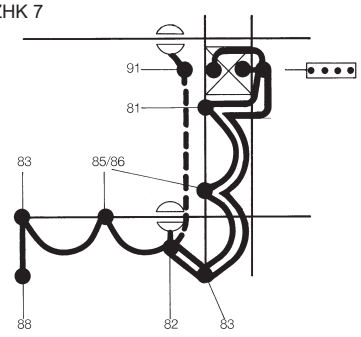
ZHK 7



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Std. elec. equip.

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18.5 Electric specifications for DC-Pro, DC-Com, DCS-Pro, DCMS-Pro, DCRS-Pro

DC-Pro chain hoist – mains connection delay fuse link

Voltage		220-240 V	380-415 V	500-525 V	220-240 V	380-400 V	440-480 V	575 V
Frequency		50 Hz			60 Hz			
Size	Motor size	[A]	[A]	[A]	[A]	[A]	[A]	[A]
DC-Pro 1	ZNK 71 A 8/2	6	6	6	6	6	6	6
	ZNK 71 B 8/2							
DC-Pro 2	ZNK 71 B 8/2							
DC-Pro 5	ZNK 80 B 8/2	10			10			
DC-Pro 10	ZNK 100 A 8/2							
	ZNK 100 B 8/2	-	10	10	-	16	10	
DC-Pro 15	ZNK 100 B 8/2		16			15	15	10

DC-Pro chain hoist – Supply lines [1] for 5% voltage drop ΔU and start-up current I_A

Voltage		220-240 V		380-415 V		500-525 V		220-240 V		380-400 V		440-480 V		575 V	
Frequency		50 Hz						60 Hz							
Size	Motor size	[mm²]	[m]	[mm²]	[m]	[mm²]	[m]	[mm²]	[m]	[mm²]	[m]	[mm²]	[m]	[mm²]	[m]
DC-Pro 1	ZNK 71 A 8/2	1,5	89	1,5	100	1,5	100	1,5	76	1,5	100	1,5	100	1,5	100
	ZNK 71 B 8/2														
DC-Pro 2	ZNK 71 B 8/2														
DC-Pro 5	ZNK 80 B 8/2		31		94				26		75				
DC-Pro 10	ZNK 100 A 8/2		34						29		78				
	ZNK 100 B 8/2	-	-		38		61	-	-	2,5	45		43		78
DC-Pro 15	ZNK 100 B 8/2				46		73			1,5	36		52		90

DC-Com chain hoist – mains connection delay fuse link

Voltage		220-240 V	380-415 V	500-525 V	220-240 V	380-400 V	440-480 V	575 V
Frequency		50 Hz			60 Hz			
Size	Motor size	[A]	[A]	[A]	[A]	[A]	[A]	[A]
DC-Com 1	ZNK 71 A 8/2	6	6	6	6	6	6	6
	ZNK 71 B 8/2							
DC-Com 2	ZNK 71 B 8/4							
DC-Com 5	ZNK 80 A 8/4	10			10			
DC-Com 10	ZNK 100 A 8/2							
	ZNK 100 B 8/2	-	10	10	-	16	10	

DC-Com chain hoist – Supply lines [1] for 5% voltage drop ΔU and start-up current I_A

Voltage		220-240 V		380-415 V		500-525 V		220-240 V		380-400 V		440-480 V		575 V	
Frequency		50 Hz						60 Hz							
Size	Motor size	[mm²]	[m]	[mm²]	[m]	[mm²]	[m]	[mm²]	[m]	[mm²]	[m]	[mm²]	[m]	[mm²]	[m]
DC-Com 1	ZNK 71 A 8/2	1,5	89	1,5	100	1,5	100	1,5	76	1,5	100	1,5	100	1,5	100
	ZNK 71 B 8/2														
DC-Com 2	ZNK 71 B 8/4														
DC-Com 5	ZNK 80 A 8/4		67						56						
DC-Com 10	ZNK 100 A 8/2		34						29		80				
	ZNK 100 B 8/2	-	-		38		61	-	-		26		43		59

DCS-Pro, DCMS-Pro, DCRS-Pro chain hoist

		Mains connection delay fuse link	Supply lines [1] for 5% voltage drop ΔU and start-up current I_A	
Voltage		380-480 V, 3 ~		
Frequency		50/60 Hz		
Size	Motor size	[A]	[mm²]	[m]
DCS-Pro 1, DCS-Pro 2 DCMS-Pro 1, DCMS-Pro 2 DCRS-Pro 1, DCRS-Pro 2	ZNK 71 B 4	6	1,5	100
DCS-Pro 5	ZNK 80 A 4			
DCS-Pro 10	ZNK 100 A 4	10		40

1) The cable lengths are calculated on the basis of an earth-loop impedance of 200 mΩ.

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