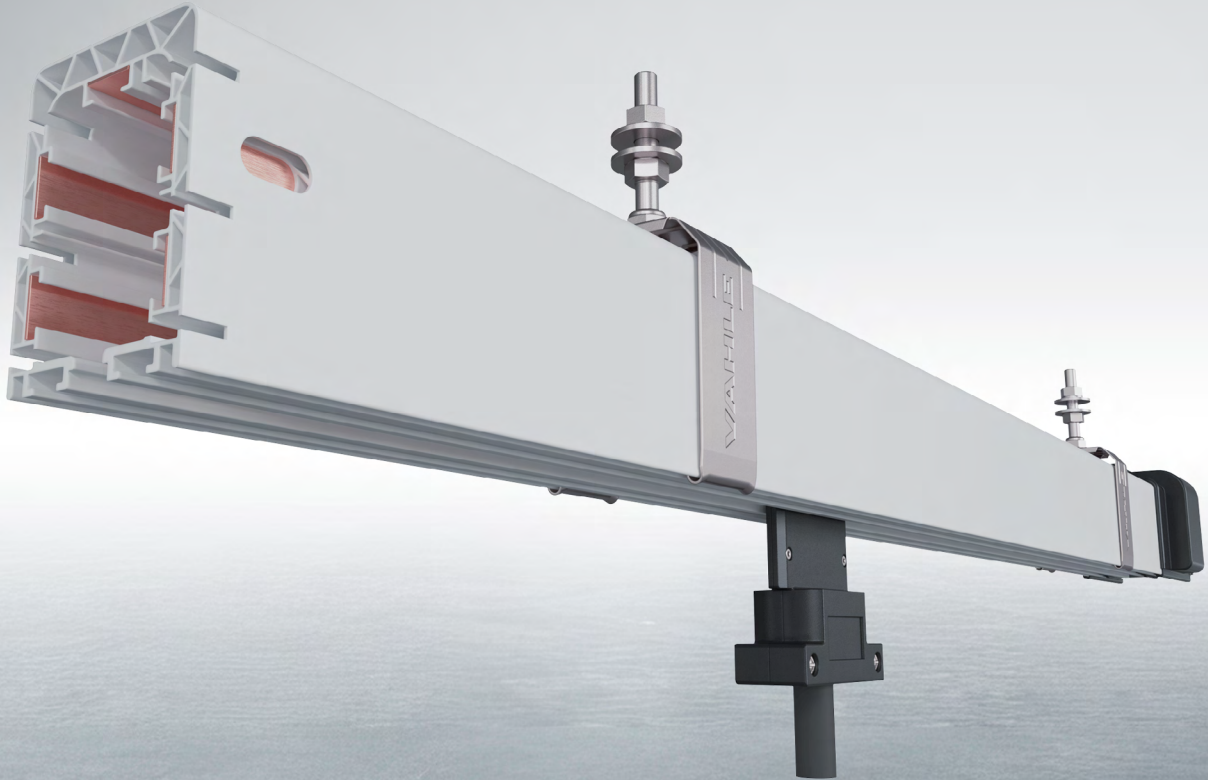


KBHF | KBHS

ENCLOSED CONDUCTOR SYSTEM



APPLICATION EXAMPLE: SEMI-AUTOMATED CRANE

POWER FEED, POSITIONING, AND DATA COMMUNICATION

Enclosed conductor systems KBHF and KBHS may be used for power feed or in combination with other VAHLE products.

On the photo the overhead traveling crane is equipped with VAHLE enclosed conductor system KBHF with embedded APOS Magnetic positioning system, and SMGX (Slotted Microwave Guide) protected data communication system.

APPLICATIONS:

- **Cranes (OTC, gantry cranes, workstation cranes)**
- **Monorails**
- **Electric hoists (including curves and loops)**
- **Machine tools**
- **Automated storage and retrieval systems (AS/RS)**
- **Lighting systems**
- **Hangar doors**

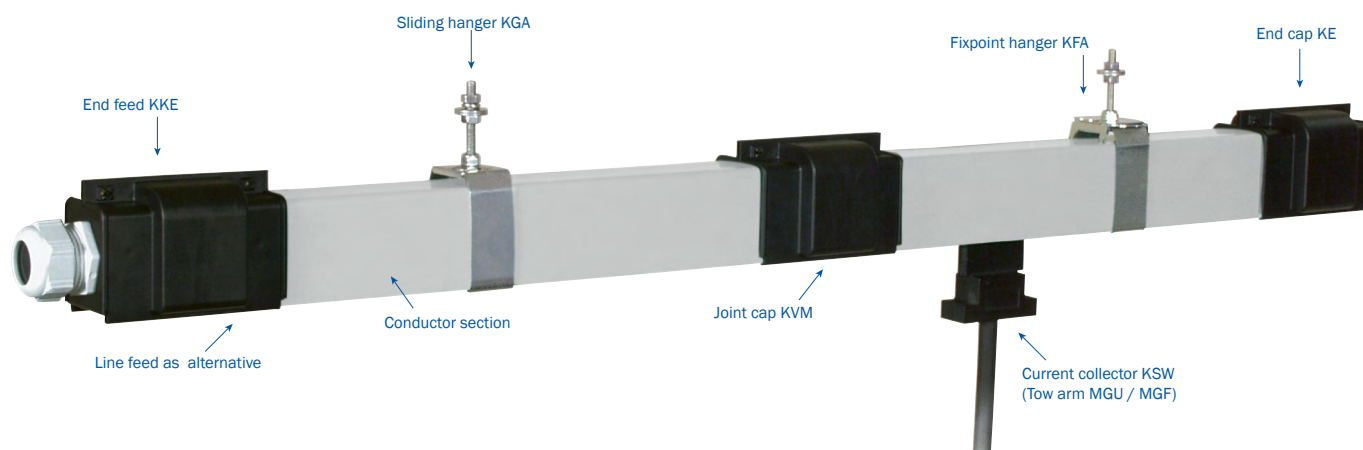


VAHLE KBHF system is used for main travel and for cross travel of the festoonless crane. Embedded VAHLE APOS Magnetic system is used for absolute positioning. VAHLE SMGX protected communication system is used for data transmission.

ENCLOSED CONDUCTOR SYSTEM KBH

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Description of the conductor system

The VAHLE conductor system KBH is a contact-protected system (IP23) for indoor and outdoor installations. KBH features a compact design, corrosion resistance and is easy to install. It is compliant with European and American standards. The plastic housing can accommodate different copper cross sections for nominal currents ranging from 63 – 200 amps (A). Two styles are available:

KBHF

- 4- and 5-conductor versions available
- Preassembled copper conductors
- **Spring-loaded connectors**
- Suitable for 63 – 100 A

KBHS

- 4- and 5-conductor versions available
- Preassembled copper conductors
- **Bolted joints**
- Suitable for 63 – 200 A

⚠ Collectors are touch-proof only when fully entered into the conductor system. In the event that live parts may be touched by hand, e.g. if a collector leaves the conductor system during operation, safe practices require operators to provide a safety barrier and/or disconnect mains. Please note, this is only valid for a supply voltage that exceeds 24 volts (V) AC or 60 V DC.

Additional cross sections are also available. The upper pole is used as N-conductor if required. The max. copper cross section of the conductor is 26 mm². See page 7.

Low voltages of max. 50 V AC or 120 V DC are valid if the conductor system is only used as control line (type...SSD). A ground conductor is required for higher voltages.

Custom-designed sealing strips and heating systems are also available for KBH. When used with the sealing strip, the conductor system is protected to IP 24 standards.



TECHNICAL DATA

Housing

Color grey, plastic housing for 4 or 5 conductors. Standard section 4 m (13 ft 1.48 in). Shorter sections are available.

The ground conductor is identified by international color code. Phase reversing prevented by design of the collector and housing. Higher number of conductors possible by combination of several conductor systems.

Couplings

Through plastic joint caps. Spring-loaded connectors (KBHF) or bolted joints (KBHS) are preassembled on sections.

Feed sets

Through end feeds, joint feeds or line feeds. Line feeds are pre-installed on 1m (3 ft 3.37 in) sections.

End caps

Open ends of the conductor system are closed by end caps for KBHF and KBHS.

Hangers

Support bracket at the crane track (see page 9).

Max. **support distance** of the conductor at following ambient temperatures:

- Indoor systems and $\leq 35^{\circ}\text{C} = 2\text{ m}$
 roofed outdoor systems: $(\leq 95^{\circ}\text{F} = 6\text{ ft } 6.74\text{ in})$
- Indoor and outdoor systems $> 35^{\circ}\text{C} = 1.33\text{ m}$
 with and without heating: $(> 95^{\circ}\text{F} = 4\text{ ft } 4.36\text{ in})$
- Cold storage $\leq 0^{\circ}\text{C} = 1.33\text{ m } (\leq 32^{\circ}\text{F} = 4\text{ ft } 4.36\text{ in})$

It is necessary to provide at least one additional hanger on the any sections 1 m section. This prevents any sagging of the conductor system.

Expansion during temperature fluctuation

Expansion sections are not typically needed for straight installations up to 250m (<820 ft). Expansion sections are used to compensate the different expansions between copper conductors and steel- or concrete structures, in varying temperatures without interrupting electrical power.

Anti-condensation sections

These sections are used for transfer of the Power rail to outdoor areas to avoid condensation. The conductor system is not separated electrically.

Contact sections, turntables and switches

Conductor sections for working areas and transfer applications see pages 17 - 19.

Sectionalizing

Conductor dead sections are electrical interrupts of the conductor. Under normal operating conditions a cross over with collectors to switch the voltage off or on is only allowed with low power ratings (control current). The conductors can be separated through air gaps (5 mm or 0.02 in) or insulating pieces (35 mm or 1.38 in). With the air gap the collector carbon bridges the gap, e.g. for mains. The insulating piece is longer than the carbon and each conductor section can be separated electrically, e.g. for control. Double isolating sections are recommended to guarantee safely separated conductor sections.

Collectors

The current collectors are made of re-inforced polyester fiber-glass, for high strength and light weight. Spring loaded carbon brushes maintain uniform contact. Connecting cables and hinged or flexible towing arms included.

The length of the connecting cable may not exceed 3 m (9 ft 10.11 in) if the added overload protection device is not designed for the load capacity of this cable.

Continuity of ground conductor

The continuity of the ground conductor has to be guaranteed for conductor rails.

Runways of lifting devices may not be used as ground conductor, only an additional connection is permissible. Therefore a continuous ground conductor is required.

Double (tandem) collectors

- as proper measure to fulfil the continuity of the ground conductor system via carbon brushes.
- Transfers with switches and turntables
- Operational voltage below 50 V
- Frequency controlled drives
- Transmission of signals
- High electrical loads

Removing section for collectors

Assembly and disassembly of the collector is possible at the end of the track as well as at the removing section. Disconnect the mains before opening!

TECHNICAL DATA

Safety instructions

It must be ensured that the arrangement of the conductor system provides minimum distances 0.5 m (1 ft 7.69 in) between fixed and mobile plant parts (i.e. between conductor rails, collector trolleys and towing arms) so as to avoid the risk of pinching.

PLEASE NOTE

For use in galvanizing and pickling plants, under aggressive conditions and low voltage applications we would appreciate receiving detailed information, especially of the environmental conditions.

For quotations and order processing including conductor systems with curves, dead sections, turntables, switches etc. we require your drawings or sketches. Please use our questionnaire, page 31.

Conductor system values: electrical data

Type	Max. continuous current	Nominal voltage (UL)	Dielectric strength	Spec. resistance	Surface resistivity	Leakage resistance
KBH	200 A (at 100% DC)	690 V (600 V)	IEC 60243-1-3 30–40 kV/mm	IEC 60093 $5 \times 10^{15} \Omega/\text{cm}$	IEC 60093 $10^{13} \Omega$	EN 60112 CTI 400-2.7

Conductor system values: mechanical data

Type	Flexible strength	Tensile strength	Ambient temperature	Flammability	Resistance to chemicals at 45 °C (113 °F)
KBH	75 N/mm ² ±10 %	40 N/mm ² ±10 %	–30 °C up to +60 °C	flame retardant, self extinguishing, UL 94 V0	Gasoline, mineral oil, grease, acid sulfur up to 50 %, caustic soda up to 50 % and hydrochloric acid up to 25 %, concentrated

Temperature correction factor f_T

Ambient temp.	35 °C (95 °F)	40 °C (104 °F)	45 °C (113 °F)	50 °C (122 °F)	55 °C (131 °F)	60 °C (140 °F)
Correction factor f_T Standard shrouding	1	0.95	0.89	0.84	0.77	0.71

Voltage drop for the conductor

For three-phase current

$$\Delta U = \sqrt{3} \cdot I \cdot I_A \cdot Z$$

For alternating current

$$\Delta U = 2 \cdot I \cdot I_A \cdot Z$$

$$\Delta U = 2 \cdot I \cdot I_A \cdot R$$

Z = Impedance [Ω/km]

R = Resistance [Ω/km]

I = Feed length [km]

I_A = Inrush current of installation in amperes

Permissible continuous current of the conductor

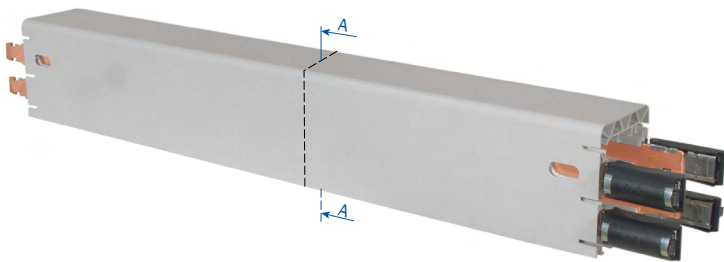
$$I_{Dzul,UT} = I_{zul} \times f_T[A] \text{ with } I_{Dzul,UT} > I_{DA}$$

$I_{Dzul,UT}$ = Permissible continuous current of the conductor at ambient temperature

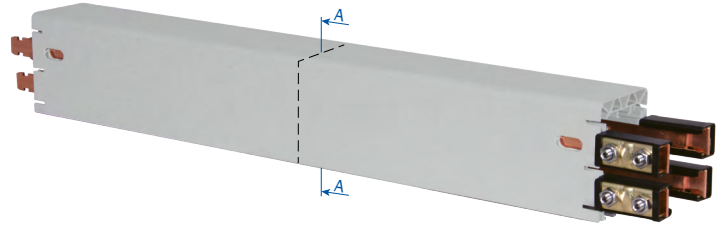
I_{zul} = Permissible continuous current of the conductor at 35 °C (catalogue value) [A]

f_T = Correction factor

TECHNICAL DATA



KBHF with spring loaded connectors



KBHS with bolted joints

Type ⁽¹⁾ HS with PE (Earth) SS without PE (Earth)	Num- ber of poles	Continuous current A at 35 °C (95 °F) ⁽⁶⁾ L1 L2 L3			Copper cross section mm ²				Nominal voltage V ⁽⁴⁾
		60 % DC	80 % DC	100 % DC	L1 L2 L3		N/5 ⁽²⁾	Control line	
KBHF									
KBHF4/63-....HSC	4	81	70	63	3x10	10	-	-	690
KBHF4/63-....SSD ⁽⁵⁾	4	81	70	63	-	-	-	4x10	690
KBHF4/80-....HSC	4	103	89	80	3x17	17	-	-	690
KBHF4/100-....HSC	4	129	112	100	3x26	26	-	-	690
KBHF5/63-....HSC	5	81	70	63	3x10	10	10	-	690
KBHF5/63-....SSD ⁽⁵⁾	5	81	70	63	-	-	-	5x10	690
KBHF5/80-....HSC	5	103	89	80	3x17	17	17	-	690
KBHF5/100-....HSC	5	129	112	100	3x26	26	26 ⁽³⁾	-	690
KBHS									
KBHS4/63-....HSC	4	81	70	63	3x10	10	-	-	690
KBHS4/63-....SSD ⁽⁵⁾	4	81	70	63	-	-	-	4x10	690
KBHS4/80-....HSC	4	103	89	80	3x17	17	-	-	690
KBHS4/100-....HSC	4	129	112	100	3x26	26	-	-	690
KBHS4/125-....HSC	4	161	140	125	3x33	26	-	-	690
KBHS4/160-....HSC	4	207	179	160	3x51	26	-	-	690
KBHS4/200-....HSC	4	258	224	200	3x70	42	-	-	690
KBHS5/63-....HSC	5	81	70	63	3x10	10	10	-	690
KBHS5/63-....SSD ⁽⁵⁾	5	81	70	63	-	-	-	5x10	690
KBHS5/80-....HSC	5	103	89	80	3x17	17	17	-	690
KBHS5/100-....HSC	5	129	112	100	3x26	26	26 ⁽³⁾	-	690
KBHS5/125-....HSC	5	161	140	125	3x33	26	26 ⁽³⁾	-	690
KBHS5/160-....HSC	5	207	179	160	3x51	26	26 ⁽³⁾	-	690
KBHS5/200-....HSC	5	258	224	200	3x70	42	26 ⁽³⁾	-	690

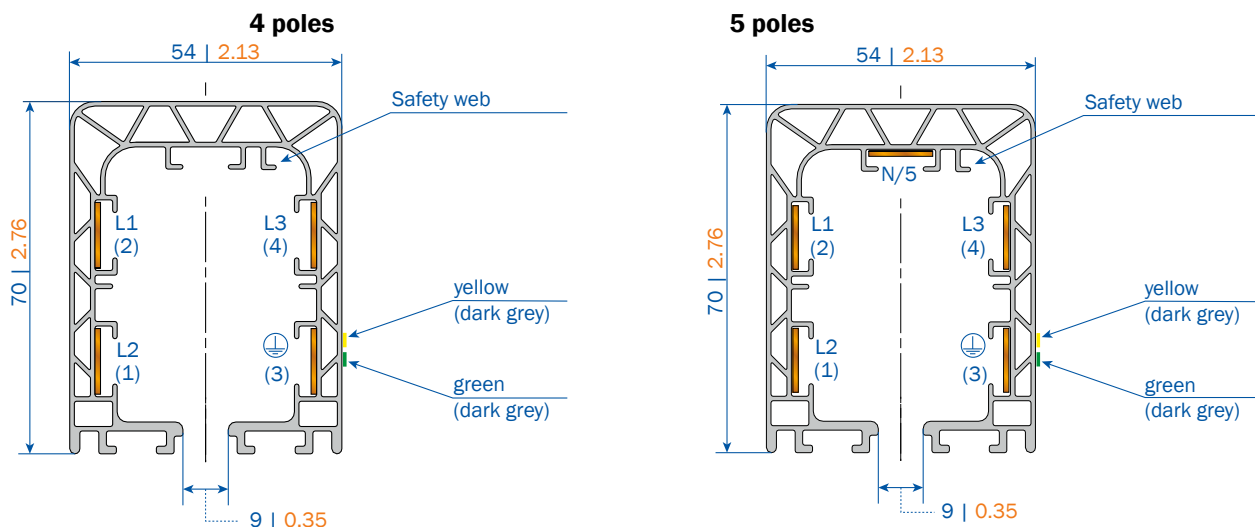
(1)... e.g. **1594 mm**, type **KBHF4/63-1594HSC**, Order No. **600972** (or **0600972/00**), shorter lengths are made up from the next larger standard length.

(2) In case of using a conductor as N, see page 3.

(3) 5th. Conductor max. 80 A at 100 % DC.

(4) Nominal voltage UL= 600 V

TECHNICAL DATA



Numbers in parantheses apply to control line. **Orange text** on diagrams indicates US Customary measurements/conversions.

Type ⁽¹⁾ HS with PE (Earth) SS without PE (Earth)	Leakage distance mm	Impedance at 50 Hertz and 20 °C Ω / 1000 m			Resistance at 20 °C (68 ° F) Ω / 1000 m			Weight kg / m (lb / ft)	Order No. ⁽¹⁾
		Phase		N	Phase		N		
KBHF									
KBHF4/63-....HSC	33	1.728	1.728	-	1.717	1.717	-	1.304 (0.87)	600974 •
KBHF4/63-....SSD ⁽⁵⁾	33	1.728	-	-	1.717	-	-	1.304 (0.87)	600994 •
KBHF4/80-....HSC	33	1.074	1.074	-	1.057	1.057	-	1.536 (1.03)	600984 •
KBHF4/100-....HSC	33	0.712	0.712	-	0.687	0.687	-	1.864 (1.25)	600024 •
KBHF5/63-....HSC	33	1.728	1.728	1.728	1.717	1.717	1.717	1.410 (0.95)	601004 •
KBHF5/63-....SSD ⁽⁵⁾	33	1.728	-	1.728	1.717	-	1.717	1.410 (0.95)	601024 •
KBHF5/80-....HSC	33	1.074	1.074	1.074	1.057	1.057	1.057	1.700 (1.14)	601014 •
KBHF5/100-....HSC	33	0.712	0.712	0.712	0.687	0.687	0.687	2.110 (1.42)	600124 •
KBHS									
KBHS4/63-....HSC	33	1.782	1.728	-	1.717	1.717	-	1.424 (0.95)	601034 •
KBHS4/63-....SSD ⁽⁵⁾	33	1.728	-	-	1.717	-	-	1.424 (0.95)	601054 •
KBHS4/80-....HSC	33	1.074	1.074	-	1.057	1.057	-	1.656 (1.11)	601044 •
KBHS4/100-....HSC	33	0.712	0.712	-	0.687	0.687	-	1.984 (1.33)	600064 •
KBHS4/125-....HSC	33	0.579	0.712	-	0.549	0.687	-	2.161 (1.45)	600074 •
KBHS4/160-....HSC	30	0.383	0.712	-	0.344	0.687	-	2.699 (1.81)	600084 •
KBHS4/200-....HSC	27	0.299	0.457	-	0.254	0.429	-	3.297 (2.21)	600314 •
KBHS5/63-....HSC	33	1.728	1.728	1.728	1.717	1.717	1.717	1.560 (1.04)	601064 •
KBHS5/63-....SSD ⁽⁵⁾	33	1.728	-	1.728	1.717	-	1.717	1.560 (1.04)	601084 •
KBHS5/80-....HSC	33	1.074	1.074	1.074	1.057	1.057	1.057	1.850 (1.24)	601074 •
KBHS5/100-....HSC	33	0.712	0.712	0.712	0.687	0.687	0.687	2.260 (1.52)	600164 •
KBHS5/125-....HSC	33	0.579	0.712	0.712	0.549	0.687	0.687	2.437 (1.63)	600174 •
KBHS5/160-....HSC	30	0.383	0.712	0.712	0.344	0.687	0.687	2.926 (1.96)	600184 •
KBHS5/200-....HSC	27	0.299	0.457	0.457	0.254	0.429	0.687	3.573 (2.40)	600324 •

• The last digit of the order number specifies the section length in meters. Standard length is 4m (13 ft 1.48 in),
For short sections, Please change the suffix 4 to 1, 2, 3.

⊕ Earth/Ground = PE

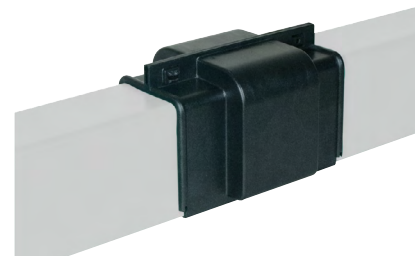
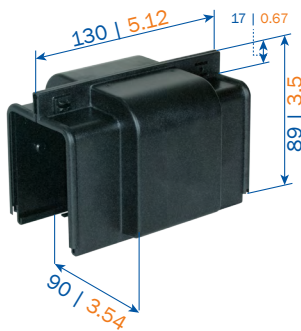
Types, marked **BOLD** are typically stocked in the USA for a quick delivery

JOINTING MATERIAL, HANGERS AND END CAPS

Joint cap, self locking KVM

Type	Weight kg (lb)	Order No.
VM-KVM	0.116 (0.26)	600005

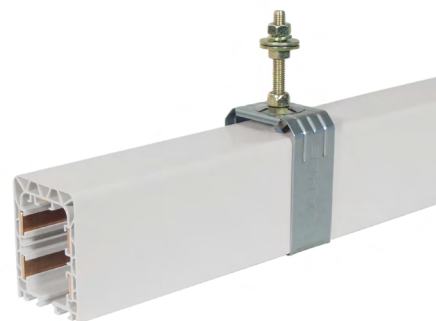
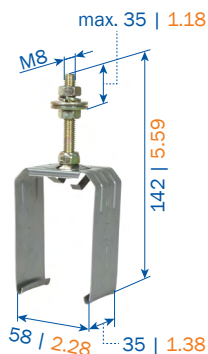
Joints (connectors) are pre-assembled on conductor sections.



Installed joint cap

Sliding hanger KGA

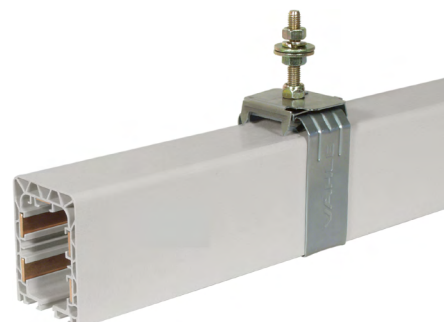
Type ⁽¹⁾	Weight kg (lb)	Order No.
AH-KGA	0.129 (0.28)	600000
AH-KGA/K	0.129 (0.28)	600397



Sliding hanger at conductor section

Fixpoint hanger KFA

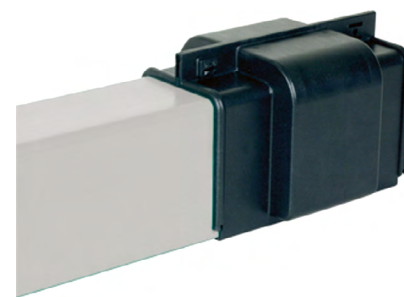
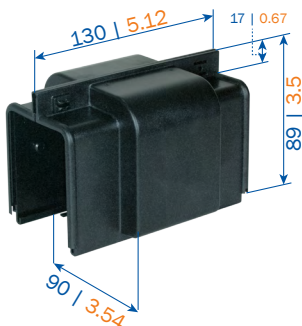
Type ⁽¹⁾	Weight kg (lb)	Order No.
AH-KFA	0.160 (0.35)	600007
AH-KFA/K	0.177 (0.39)	600398



Fixpoint hanger at conductor section

End cap KE – left and right version

Type	Weight kg (lb)	Order No.
EK-KE	0.150 (0.33)	600008



Installed end cap

(1)... /K with stainless-steel screws. All steel metal components

END FEEDS, LINE FEEDS AT JOINT

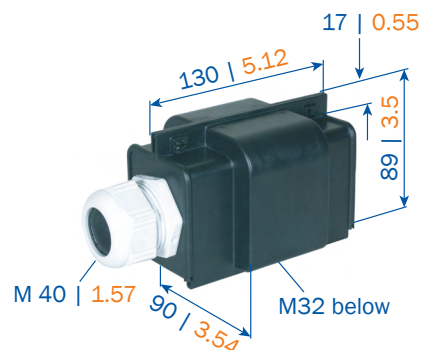
End feed KKE (up to 80 A)

End feed comes loose without conductor section.

It can be mounted at the left or right hand side.

Electrical connection with customer supplied cable shoes to M6 terminals.

Type	Weight kg	Cable gland*	Order No.
ES-KKE4/63-80HS	0.271 (0.60)	M 40	600010
ES-KKE5/63-80HS	0.288 (0.63)	M 40	600107
ES-KKE4/63SS	0.252 (0.56)	M 25	600015
ES-KKE5/63SS	0.265 (0.58)	M 25	600108



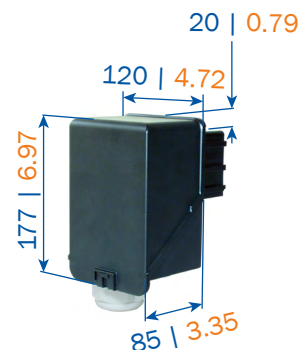
End feed KKE (up to 100 A)

End feed comes loose without conductor section.

It can be mounted at the left or right hand side.

Electrical connection with customer supplied cable shoes to M6 terminals.

Type	Weight kg (lb)	Cable gland*	Order No.
ES-KKE4/63-100HS	0.613 (1.35)	M 32 or M 50⁽¹⁾	600422
ES-KKE5/63-100HS	0.646 (1.42)	M 32 or M 50 ⁽¹⁾	600423



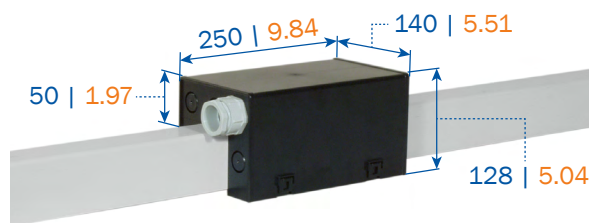
Line feed KSE (at joint, 63 A)

KSE type comes loose without conductor section.

It can be mounted at any joint.

Electrical connection with customer supplied cable shoes to M6 terminals.

Type	Weight kg (lb)	Cable gland *	Order No.
ES-KSE4/63HS-L	0.806 (1.78)	M 32	600035
ES-KSE5/63HS-L	0.866 (1.91)	M 32	600038
ES-KSE4/63SS-L	0.785 (1.73)	M 25	600028
ES-KSE5/63SS-L	0.843 (1.86)	M 25	600029



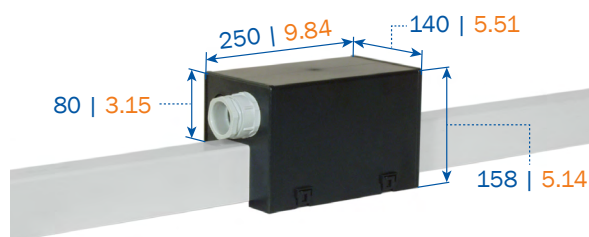
Line feed KSE (at joint, 80–100 A)

KSE type comes loose without conductor section.

It can be mounted at any joint.

Electrical connection with customer supplied cable shoes to M6 terminals.

Type	Weight kg (lb)	Cable gland *	Order No.
ES-KSE4/80-100HS-L	0.936 (2.06)	M 50	600036
ES-KSE5/80-100HS-L	0.996 (2.20)	M 50	600039



Feeds in the curve area on request.

(1) Both cable glands are attached to the packing unit.

* Cable Gland Dimensions see on page 21

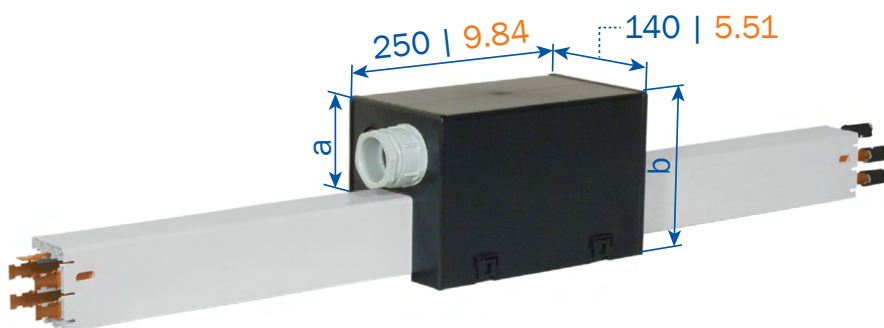
LINE FEEDS INCL. 1M SECTION

Line feed KEF

including 1m section (3 ft 3.37 in), 63–100 A

With spring loaded connectors.

Electrical connection with customer supplied cable shoes to M6 terminals.



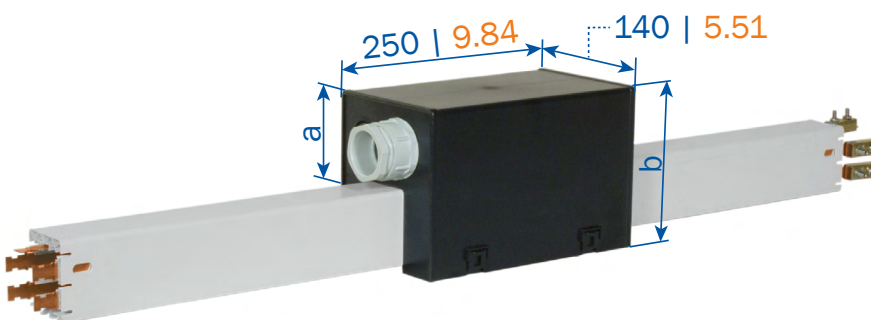
Type	Weight kg (lb)	Dimension		Cable gland*	Order No.
		a	b		
ES-KEF4/63HSC-1000	2.066 (4.55)	50	128	M 32	600975
ES-KEF4/80HSC-1000	2.428 (5.35)	80	158	M 50	600976
ES-KEF5/63HSC-1000	2.232 (4.92)	50	128	M 32	600977
ES-KEF5/80HSC-1000	2.652 (5.85)	80	158	M 50	600978
ES-KEF4/100HSC-1000	2.756 (6.08)	80	158	M 50	600201
ES-KEF5/100HSC-1000	3.062 (6.75)	80	158	M 50	600209
ES-KEF4/63SSD-1000	2.046 (4.51)	50	128	M 25	600979
ES-KEF5/63SSD-1000	2.210 (4.87)	50	128	M 25	600980

Line feed KES

including 1m section (3 ft 3.37 in), 63–125 A

With bolted joints.

Electrical connection with customer supplied cable shoes M6 terminals to 100 A, with M8 terminals to 125 A.



Type	Weight kg (lb)	Dimension		Cable gland*	Order No.
		a	b		
ES-KES4/63HSC-1000	2.190 (4.83)	50	128	M 32	600985
ES-KES4/80HSC-1000	2.552 (5.63)	80	158	M 50	600986
ES-KES5/63HSC-1000	2.387 (5.26)	50	128	M 32	600987
ES-KES5/80HSC-1000	2.807 (6.19)	80	158	M 50	600988
ES-KES4/100HSC-1000	2.880 (6.35)	80	158	M 50	600225
ES-KES4/125HSC-1000	3.222 (7.10)	80	158	M 50	600045
ES-KES5/100HSC-1000	3.217 (7.09)	80	158	M 50	600233
ES-KES5/125HSC-1000	3.621 (7.98)	80	158	M 50	600049
ES-KES4/63SSD-1000	2.170 (4.78)	50	128	M 25	600989
ES-KES5/63SSD-1000	2.365 (5.21)	50	128	M 25	600990

Feeds in the curve area on request.

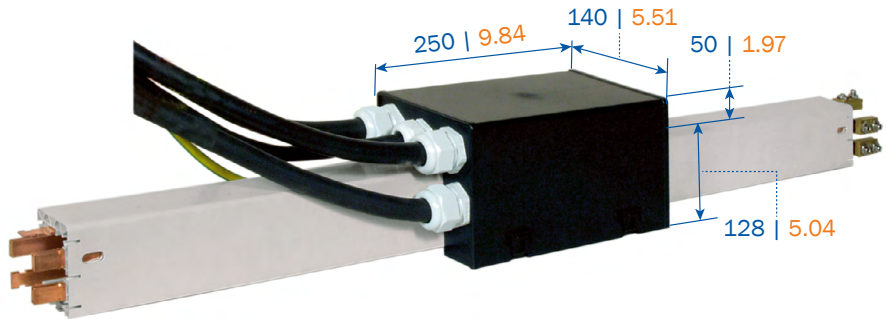
* Cable Gland Dimensions see on page 13

LINE FEED AND TERMINAL BOX

Line feed KELS (125 – 200 A)

Including 1 m (3 ft 3.37 in) section
with 2 m (6 ft 6.74 in) single cores

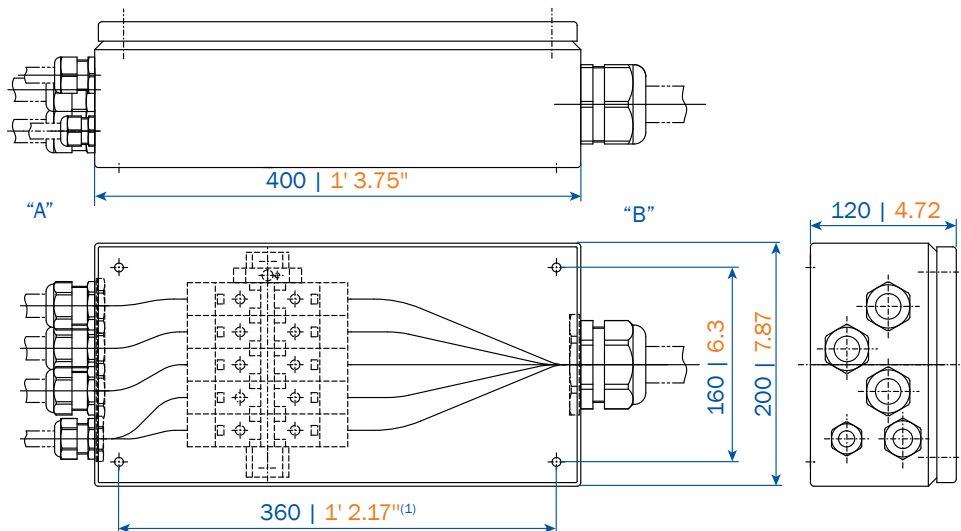
Electrical connection with customer supplied
cable shoes to M6 terminals.



Type	Weight kg (lb)	Cable cross section in mm ² / Ø in mm			Order No.
		L1-L3	Ground	N / 5	
ES-KELS4/125HSC-1000-2	7.803 (17.20)	35 / 16	25 / 10	-	600069
ES-KELS4/160HSC-1000-2	9.690 (21.36)	50 / 18	25 / 10	-	600075
ES-KELS4/200HSC-1000-2	11.668 (25.72)	70 / 21	35 / 11	-	600385
ES-KELS5/125HSC-1000-2	9.150 (20.17)	35 / 16	25 / 10	25 / 15	600077
ES-KELS5/160HSC-1000-2	11.037 (24.33)	50 / 18	25 / 10	25 / 15	600079
ES-KELS5/200HSC-1000-2	13.014 (28.69)	70 / 21	35 / 11	25 / 15	600387

Terminal box ZK (for KELS, 125–200 A)

Electrical connection with customer supplied cable shoes. Clamping range 16 – 95 mm². View “A” Input of the single cores of the KELS (a. m.) View “B” with M 63 (Dimensions of cable glands see on page 21)



Type	Weight kg (lb)	For feed line	Order No.
ES-ZK1	5.228 (11.53)	ES-KELS4/125HSC-1000-2	600389
ES-ZK2	5.276 (11.63)	ES-KELS4/160HSC-1000-2 and ES-KELS4/200HSC-1000-2	600390
ES-ZK3	5.595 (12.33)	ES-KELS5/125HSC-1000-2	600391
ES-ZK4	5.645 (12.44)	ES-KELS5/160HSC-1000-2 and ES-KELS5/200HSC-1000-2	600392

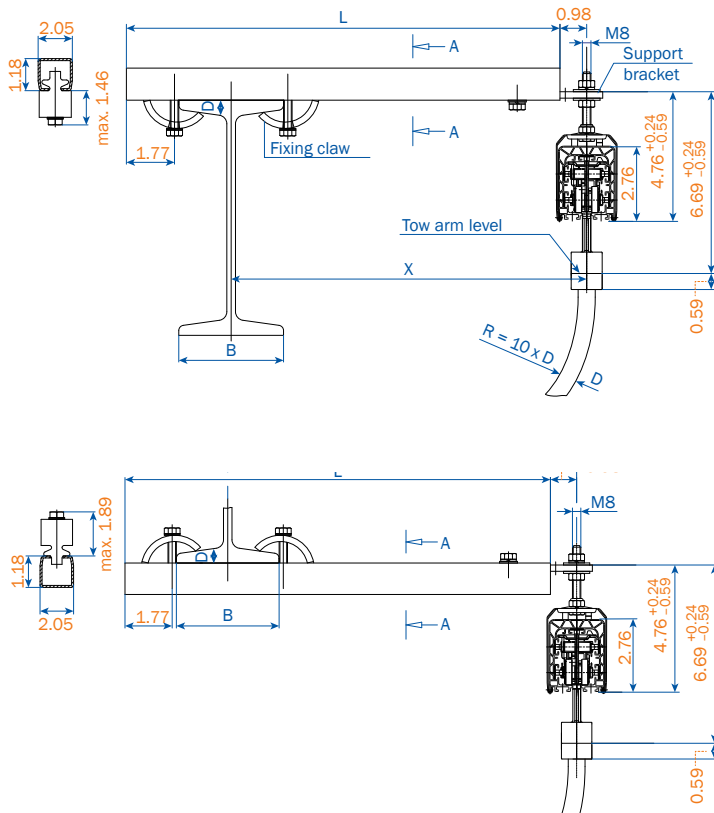
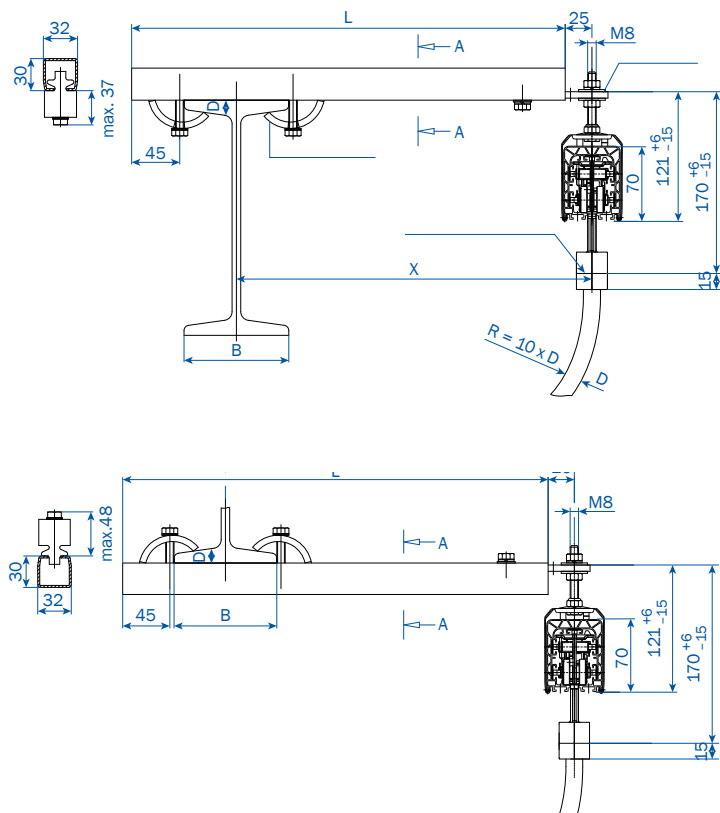
Feeds in the bow area on request.

(1) Fixing borings ø 7 mm (0.28 in) at the bottom of the box.

MOUNTING BRACKETS

Mounting brackets for I- beam EHKxx0-NS

Adjustable brackets which can be installed on top side or on bottom side of the I- beams of different types.



Type ⁽¹⁾	X mm (ft in)	L mm (ft in)	B max mm (ft in)	Weight kg (lb)	Order No. standard version	small fixing claw ⁽¹⁾
HK-EHK250-NS	250 (0' 9.84")	350 (1' 1.78")	170 (0' 6.69")	1.080 (2.38)	251600	-
HK-EHK250-KS ...					-	251720- ...
HK-EHK300-NS	300 (0' 11.81")	400 (1' 3.75")	170 (0' 6.69")	1.128 (2.49)	251610	-
HK-EHK300-KS ...					-	251730- ...
HK-EHK400-NS	400 (1' 3.75")	500 (1' 7.69")	170 (0' 6.69")	1.266 (2.79)	251620	-
HK-EHK400-KS ...					-	251740- ...
HK-EHK500-NS	500 (1' 7.69")	600 (1' 11.62")	170 (0' 6.69")	1.394 (3.07)	251630	-
HK-EHK500-KS ...					-	251750- ...
HK-EHK600-NS	600 (1' 11.62")	700 (2' 3.56")	170 (0' 6.69")	1.561 (3.44)	251640	-
HK-EHK600-KS ...					-	251760- ...
HK-EHK700-NS	700 (2' 3.56")	800 (2' 7.50")	170 (0' 6.69")	1.761 (3.88)	251650	-
HK-EHK700-KS ...					-	251770- ...
HK-EHK750-NS	750 (2' 5.53")	850 (2' 9.46")	170 (0' 6.69")	1.782 (3.93)	251660	-
HK-EHK750-KS ...					-	251780- ...
HK-EHK800-NS	800 (2' 7.50")	900 (2' 11.43")	170 (0' 6.69")	1.936 (4.27)	251670	-
HK-EHK800-KS ...					-	251790- ...

(1) e.g. HK-EHK250-KS12 → Order No. 251720-12 for fixing claw with D = 12 mm
Select next larger size bracket when your I-beam dimension B is more than 170 mm.

Mounting brackets for I-beam with small fixing claw EHKxx0-KS

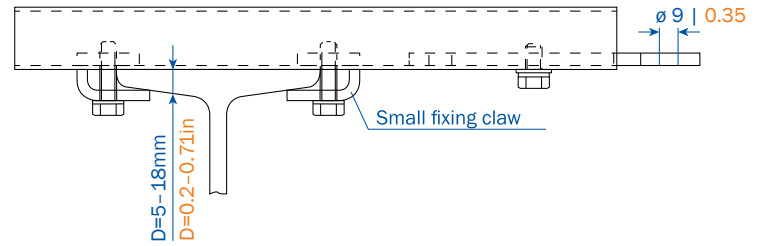
Arrangement EHK with small fixing claw

Attention! Make sure that hoist wheels have enough clearance.

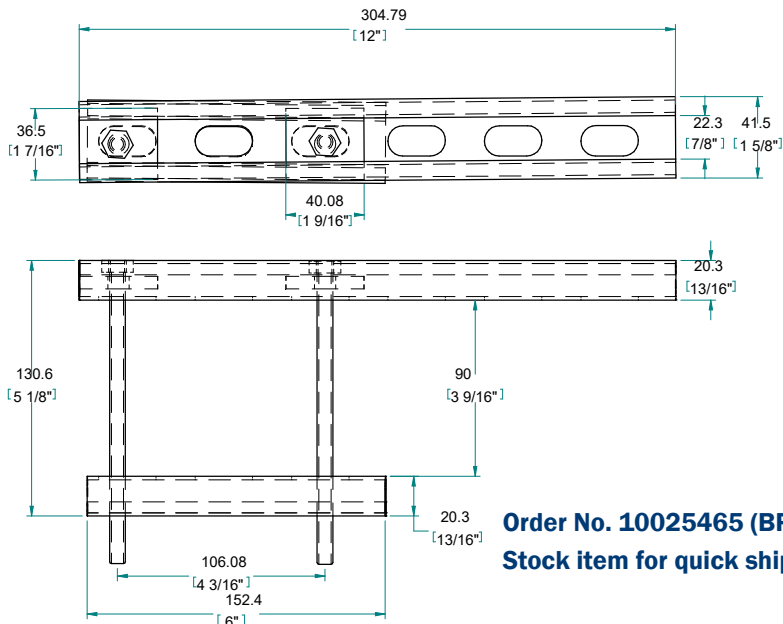
Use small claw if necessary.

Select next larger size bracket when your I-beam dimension B is more than 170 up to 300 mm (11.81 in)

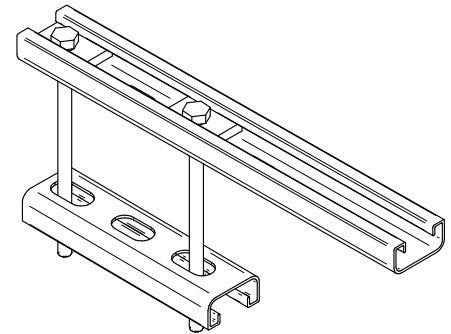
□-rail of EHK is identical to type S1, Cat. 8a (festoons for C-track)



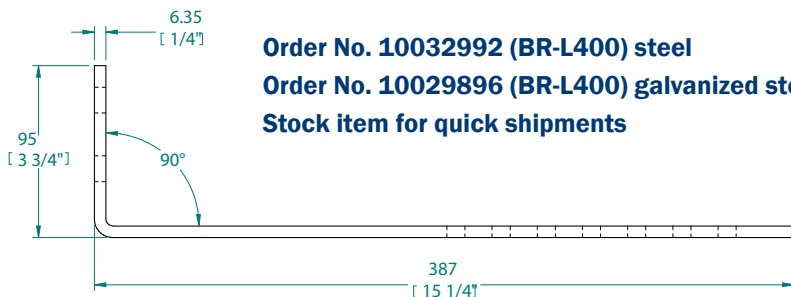
Mounting brackets for workstation cranes - no welding or drilling



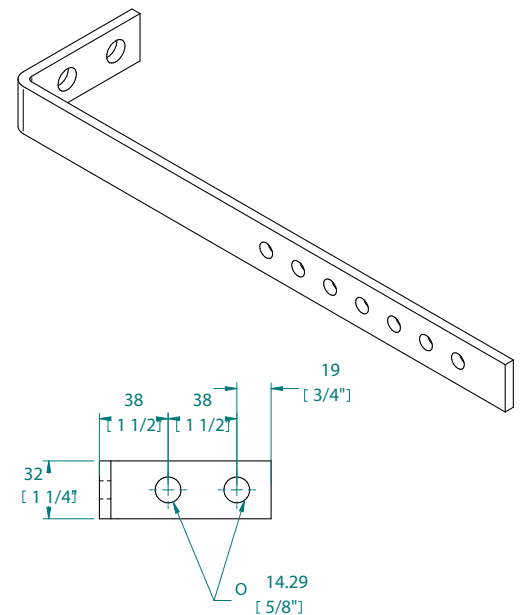
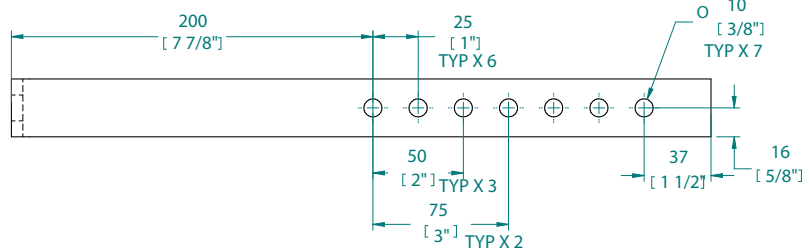
Order No. 10025465 (BR-G305)
Stock item for quick shipments



Web mounted brackets for bolted or welded connection



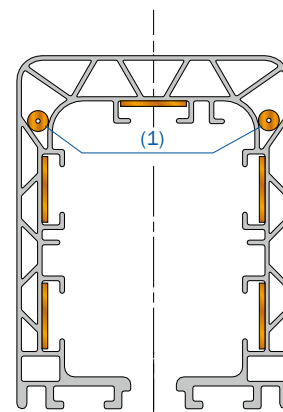
Order No. 10032992 (BR-L400) steel
Order No. 10029896 (BR-L400) galvanized steel
Stock item for quick shipments



HEATING

Heating cable

Type	Resistance ⁽¹⁾	Order No.
HL-0.10-EYCEX-5203-PTFE-260-750	0.10 Ω/m	196381
HL-0.15-EYCEX-5203-PTFE-260-750	0.15 Ω/m	196382
HL-0.20-EYCEX-5203-PTFE-260-750	0.20 Ω/m	196383
HL-0.32-EYCEX-5203-PTFE-260-750	0.32 Ω/m	196384
HL-0.38-EYCEX-5203-PTFE-260-750	0.38 Ω/m	196385
HL-0.48-EYCEX-5203-PTFE-260-750	0.48 Ω/m	196386
HL-0.60-EYCEX-5203-PTFE-260-750	0.60 Ω/m	196387
HL-0.81-EYCEX-5203-PTFE-260-750	0.81 Ω/m	196389
HL-1.00-EYCEX-5203-PTFE-260-750	1.00 Ω/m	196390
HL-1.44-EYCEX-5203-PTFE-260-750	1.44 Ω/m	196391
HL-2.00-EYCEX-5203-PTFE-260-750	2.00 Ω/m	196392
HL-3.00-EYCEX-5203-PTFE-260-750	3.00 Ω/m	196393
HL-4.00-EYCEX-5203-PTFE-260-750	4.00 Ω/m	196394
HL-4.40-EYCEX-5203-PTFE-260-750	4.40 Ω/m	196395
HL-5.16-EYCEX-5203-PTFE-260-750	5.16 Ω/m	196396
HL-5.60-EYCEX-5203-PTFE-260-750	5.60 Ω/m	196397



(2) Arrangement of the heating cables on both sides.

$$\text{Heating capacity Watt/m: } N' = \frac{U^2}{R \cdot L^2}$$

U = Supply voltage (Volt)

R = Resistance of heating cable (Ohm/m)

L = Length of heating section (m)

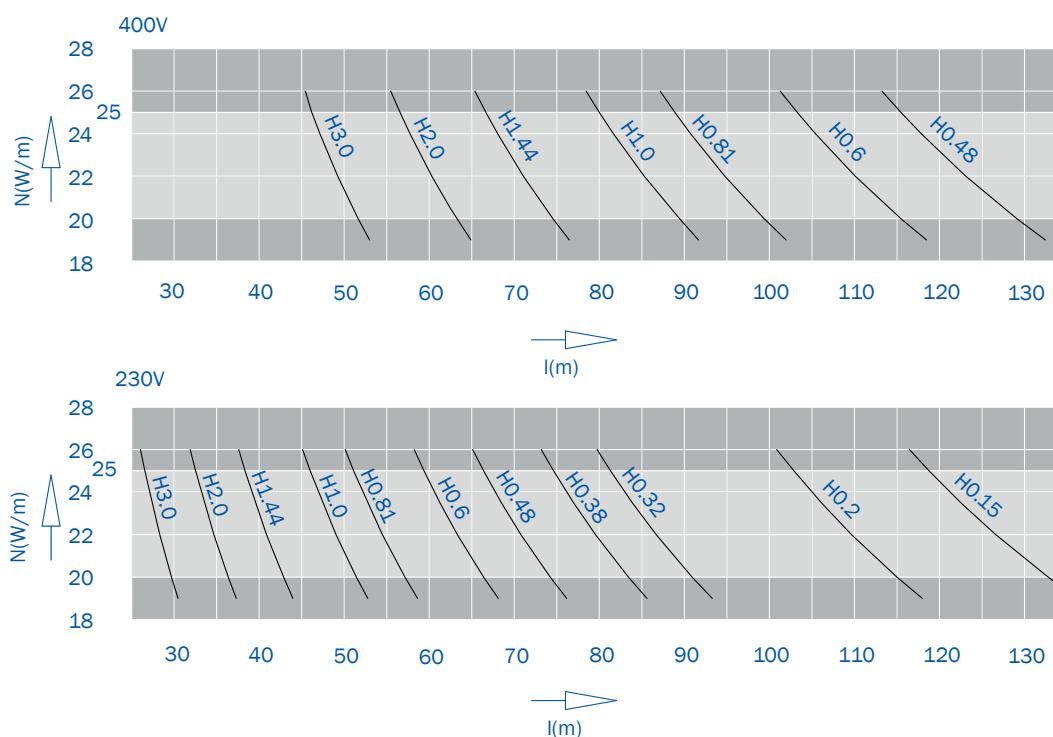
We recommend a heating system for outdoor installations and conductor systems in humid plants.

The heating consists of two heating cables which are arranged according to the illustration beside.

Attention: Switch on heating system below +5 °C (41 °F) ambient temperature.

The type of heating cable has to be calculated: heat output per heating cable between 20 – 25 W/m.

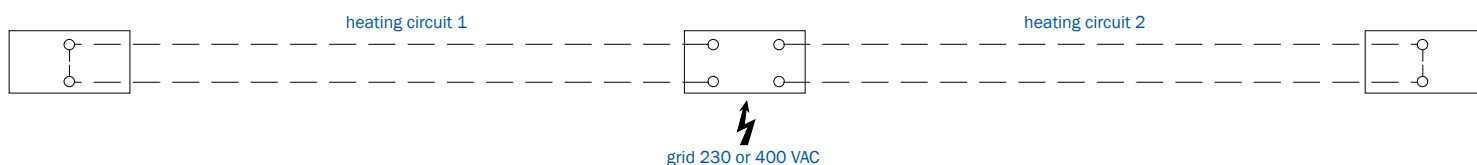
For longer heating distances the total length has to be divided into different heating sections. For shorter heating distances to feed with lower secondary voltage via transformer.



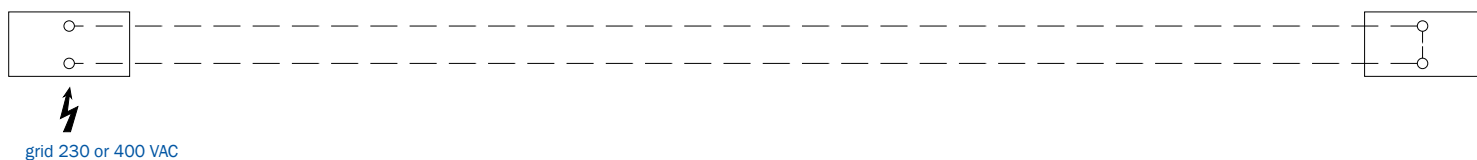
HEATING

Layout examples (depending on system situation)

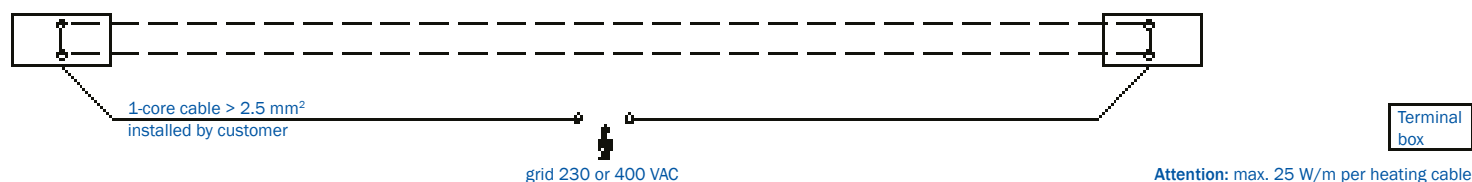
a) 2 heating circuits



b) 1 heating circuit



c) 2 heating circuits



Terminal boxes for heating

Type	Version	Cable gland Measurements see page 13	Order No.
BH-AKB-KBH-L	left end	M25	600155
BH-AKB-KBH-R	right end	M25	600156
BH-AKB-KBH-M	line feed	2 x M25	600065
BH-MA-KBH-MKL/H-LSV/G	1 set material for connecting clamps		195291

For each end feed box 2 sets of material for connecting ends are required.

For line feed you need 4 sets of material for connection ends.

Order for 60 m (196 ft 3.15 in) Power rail – example c)

1) 122 m heating cable type H 2.0 (2x 60 m and 2x 1 m additional)

Voltage 400V, two heating circles parallel

heating capacity as per above mentioned diagram

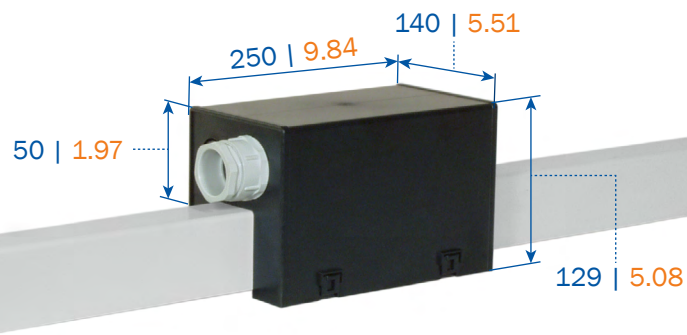
2x 22 W/m at 60 m 2x 22 W/m ~2640 W = 2,64 kW.

2) 1x junction box left end, 1x junction box right end

3) 4x sets of material for connection ends.

Switch gear assembly and temperature control unit as per customers inquiry.

Fuses, cables etc. have to be provided by the customer.



CURVES, SEALING STRIPS

Vertical and horizontal curves

Production corresponding to customer drawing

Min. horizontal bending radius 63–125 A	= 600 mm
160 A	= 1000 mm
200 A	= on request
max. $\nless 120^\circ$	
min. bending radius, vertical	= 2000 mm
max. curved length	= 3600 mm

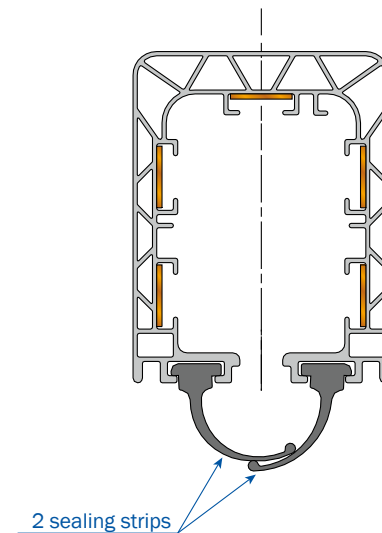
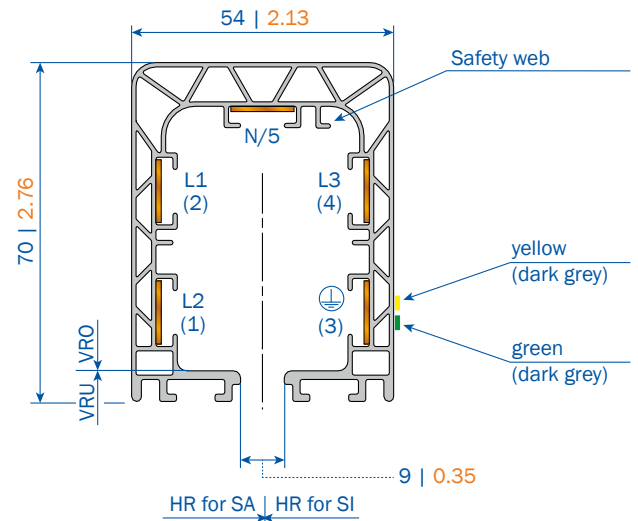
Horizontal curve

SI = Safety web inside
SA = Safety web outside

Vertical curve

VRO = Vertical radius upwards
VRU = Vertical radius downwards

Safety web will be mounted in direction of track.
Changes in measurements of curves have to be mentioned for replacement orders.



Sealing strips (including accessories)

The sealing strip is installed in pairs. When placing an order, be sure to order 2x the system length for installation. The maximum length is 40 m (131 ft 2.8 in), with cuts of 10 m (32 ft 9.7 in) and 20 m (65 ft 7.4 in) available.

Type	Description	Order No.
DL-D-KBH-MKH-MKL-TDV	Sealing strip ⁽¹⁾	600551
DL-F-KBH	Fixing clamp for sealing strip (1 per end)	600354
DL-V-KSLT-KBH-MKL/H-LSV/G	Coupling for sealing strip (2 for each joint)	258300
DL-EZRD-KBH	Mounting glider for sealing strip	600109
SA-ZB-DG-KSW-S	Sealing strip slide plate for collectors KSW	600640



600551



600354



258300



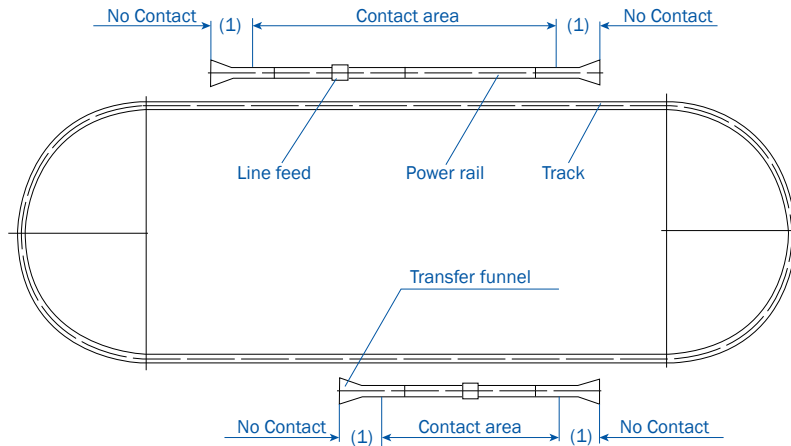
600109



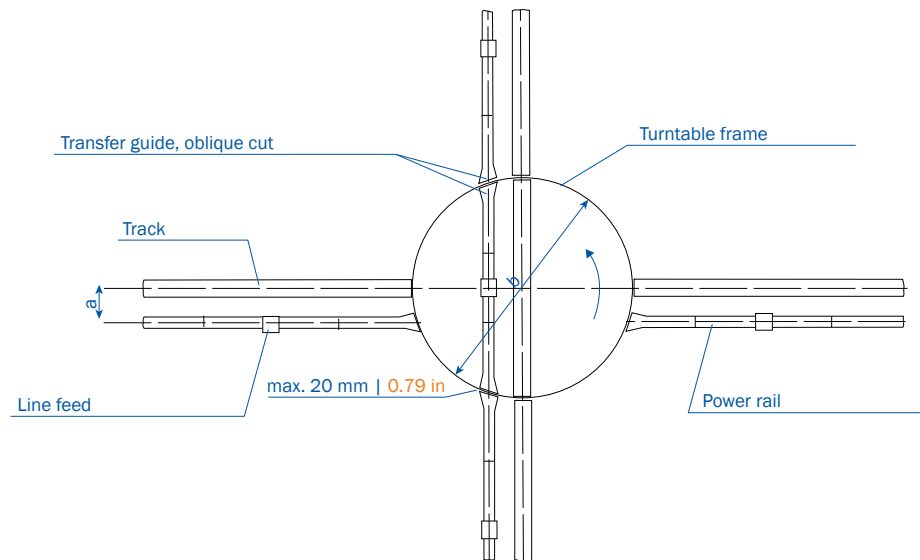
600640

CONTACT SECTIONS, TURNTABLES AND SWITCHES

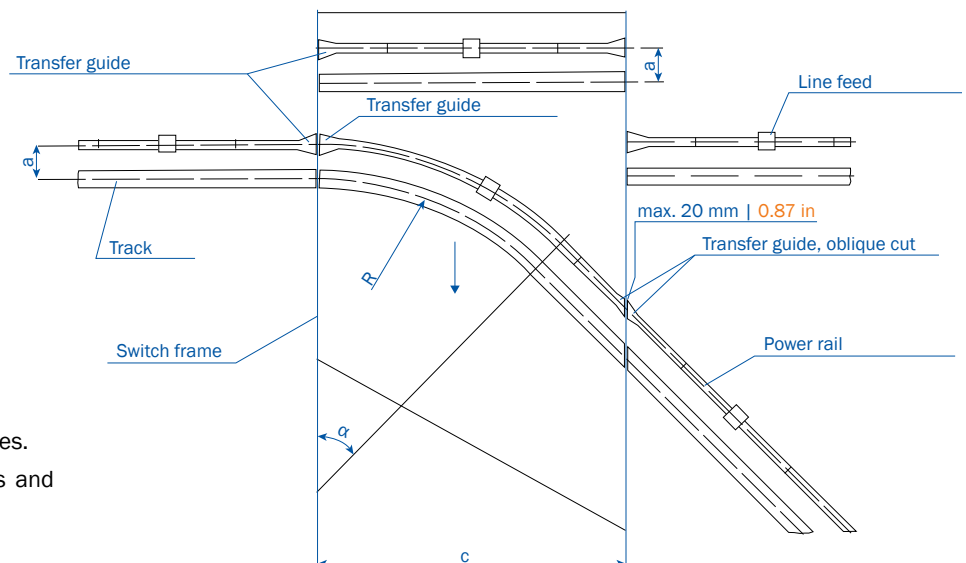
Contact section⁽¹⁾



Turntable



Switch



Please submit drawings!

Specify dimensions a, b, c, R and angle α .

$\alpha = 50^\circ$

Max. 20 mm (0.79 in) air gap between transfer guides.

To create all parts for contact sections, turntables and switches we require detailed construction drawings.

(1) Contact sections must not be activated before collectors are fully engaged.

TRANSFER FUNNELS KET

Transfer funnel

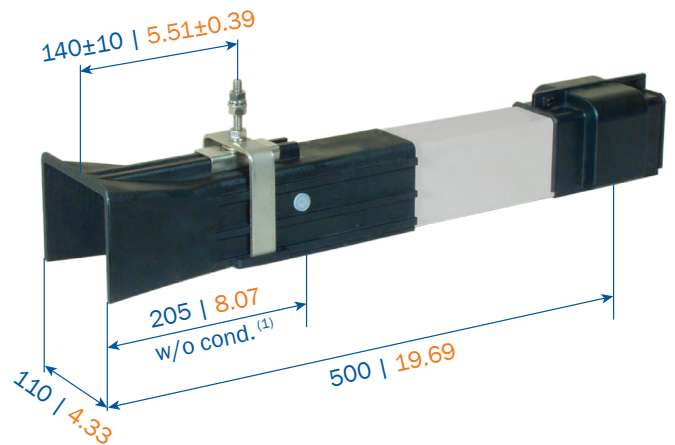
Conductor system should not be activated before the collectors carbons have complete contact with the conductors.

Offset:

- max. 10 mm (0.39 in) horizontal
- max. 10 mm (0.39 in) vertical

Max. speed for crossover of the current collector 60 m/min (approx. 196 ft/min).

See pages 6 – 7 for illustration showing maximum allowable offsets during installation.



Type	Weight kg (lb)	Order No.	
		Left version	Right version
ET-KET4/63-125-L-HSC-500 ⁽²⁾	1.552 (3.42)	600285	-
ET-KET4/63-125-R-HSC-500 ⁽²⁾	1.493 (3.29)	-	600279
ET-KET4/160-L-HSC-500	1.636 (3.61)	600286	-
ET-KET4/160-R-HSC-500	1.562 (3.44)	-	600280
ET-KET4/200-L-HSC-500	1.786 (3.94)	600305	-
ET-KET4/200-R-HSC-500	1.688 (3.72)	-	600303
ET-KET5/63-125-L-HSC-500 ⁽²⁾	1.702 (3.75)	600288	-
ET-KET5/63-125-R-HSC-500 ⁽²⁾	1.632 (3.60)	-	600282
ET-KET5/160-L-HSC-500	1.784 (3.93)	600289	-
ET-KET5/160-R-HSC-500	1.701 (3.75)	-	600283
ET-KET5/200-L-HSC-500	1.934 (4.26)	600306	-
ET-KET5/200-R-HSC-500	1.823 (4.02)	-	600304

TRANSFER GUIDES KU

Transfer guides, straight

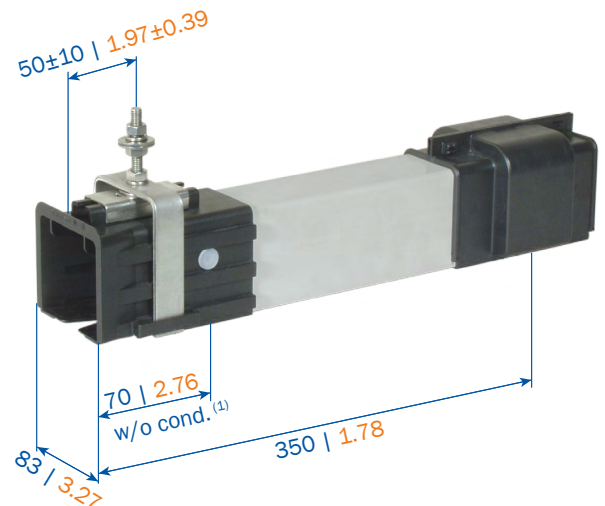
Necessary with all types of double collectors or 2 single collectors.

Staggered arrangement of the transfer guides to each other:

- max. 5 mm (0.2 in) horizontal
- max. 3 mm (0.12 in) vertical

Max. speed for crossover of the current collector 80 m/min (approx. 262 ft/min).

See pages 6 – 7 for illustration showing maximum allowable offsets during installation.



(1)Corresponding to the center of collector
(2)Also suitable for former 40A-version

Transfer guides KU - Continuation

Type	Weight kg (lb)	Order No.	
		Left version	Right version
UE-KU4/63-125-L-HSC-350 ⁽²⁾	1.276 (2.81)	600261	-
UE-KU4/63-125-R-HSC-350 ⁽²⁾	1.276 (2.81)	-	600255
UE-KU4/160-L-HSC-350	1.351 (2.98)	600262	-
UE-KU4/160-R-HSC-350	1.351 (2.98)	-	600256
UE-KU4/200-L-HSC-350	1.490 (3.28)	600309	-
UE-KU4/200-R-HSC-350	1.490 (3.28)	-	600307
UE-KU5/63-125-L-HSC-350 ⁽²⁾	1.434 (3.16)	600264	-
UE-KU5/63-125-R-HSC-350 ⁽²⁾	1.434 (3.16)	-	600258
UE-KU5/160-L-HSC-350	1.509 (3.33)	600265	-
UE-KU5/160-R-HSC-350	1.509 (3.33)	-	600259
UE-KU5/200-L-HSC-350	1.648 (3.63)	600310	-
UE-KU5/200-R-HSC-350	1.648 (3.63)	-	600308

TRANSFER GUIDES KUS

Transfer guides, oblique

Necessary with all types of double collectors or 2 single collectors.

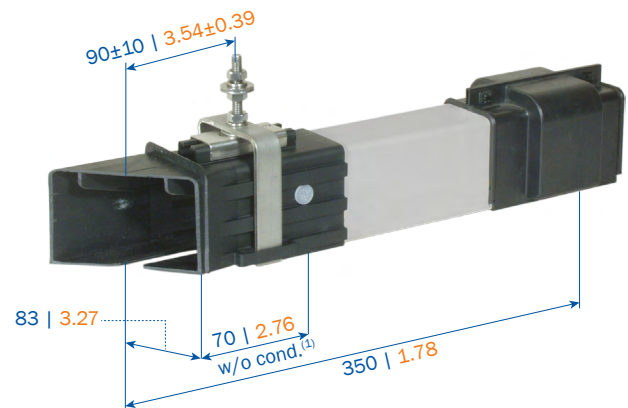
Staggered arrangement of the transfer guides to each other:

- max. 5 mm (0.2 in) horizontal
- max. 3 mm (0.12 in) vertical

Measurements (oblique) and angle to be specified by customer

Max. speed for crossover of the current collector 80 m/min (approx. 262 ft/min).

See pages 6 – 7 for illustration showing maximum allowable offsets during installation.



Type ⁽¹⁾	Weight kg (lb)	Order No.	
		Left version	Right version
UE-KUS4/63-125-L-HSC-350 ⁽²⁾	1.243 (2.74)	600273	-
UE-KUS4/63-125-R-HSC-350 ⁽²⁾	1.243 (2.74)	-	600267
UE-KUS4/160-L-HSC-350	1.324 (2.92)	600274	-
UE-KUS4/160-R-HSC-350	1.324 (2.92)	-	600268
UE-KUS4/200-L-HSC-350	1.517 (3.34)	600317	-
UE-KUS4/200-R-HSC-350	1.517 (3.34)	-	600315
UE-KUS5/63-125-L-HSC-350 ⁽²⁾	1.381 (3.04)	600276	-
UE-KUS5/63-125-R-HSC-350 ⁽²⁾	1.381 (3.04)	-	600270
UE-KUS5/160-L-HSC-350	1.447 (3.19)	600277	-
UE-KUS5/160-R-HSC-350	1.447 (3.19)	-	600271
UE-KUS5/200-L-HSC-350	1.668 (3.68)	600318	-
UE-KUS5/200-R-HSC-350	1.668 (3.68)	-	600316

(1)Corresponding to the center of collector

(2)Also suitable for former 40A-version

EXPANSION SECTION KD

Expansion section

Expansion sections are required to compensate for the difference between copper conductors and steel or concrete structures in varying temperatures without interrupting electrical power.

Expansion joints are used when the conductor length between feeds, curves, switches or other fix points exceeds 20 m (65 ft 7.4 in).

Max. length during differences in temperature:

Δt 90°C (−30°C up to +60°C)

Δt 194°F (−22°F up to 140°F)

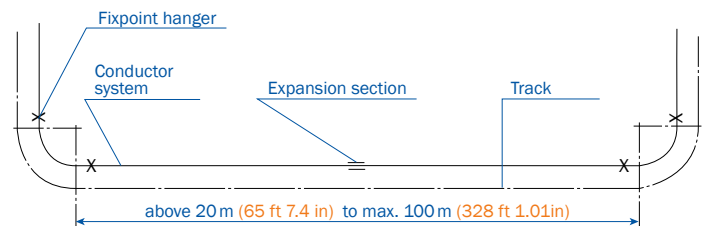
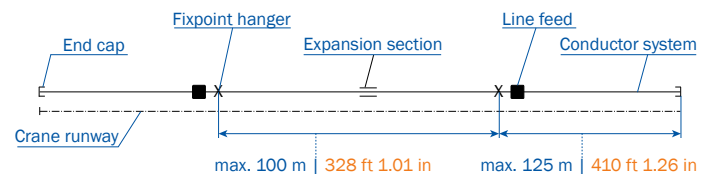
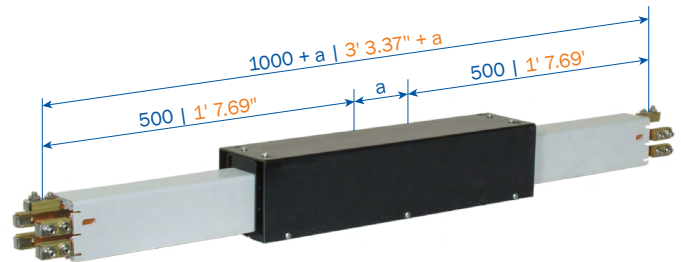
Short installation with curves may need expansion sections if there are straight segments fixed between 2 curves.

- Straight installation up to 250 m (820 ft) do not require expansion sections. For each additional length up to 100 m (328 ft 1.01 in), install one expansion section.
- For example, the installation of 300 m (984 ft 3.02 in) requires one expansion section. The installation of 440 m (1443 ft 6.83 in) requires 2 expansion sections.

The remaining conductor sections must be arranged in sliding hangers. Additional feeds or current collectors are not required as the expansion sections do not interrupt electrical power.

Assembly

The gap dimension “a” is 75 mm (2.95 in) and is valid for an ambient temperature of −10°C (14°F) to +35°C (95°F) during installation.



Type	Weight kg (lb)	Order No.
DT-KD4/63-125HSC-1000 ⁽¹⁾	4.540 (10.01)	600135
DT-KD4/160HSC-1000	4.752 (10.48)	600136
DT-KD4/200HSC-1000	5.034 (11.10)	600325
DT-KD5/63-125HSC-1000 ⁽¹⁾	5.014 (11.05)	600138
DT-KD5/160HSC-1000	5.218 (11.50)	600139
DT-KD5/200HSC-1000	5.508 (12.14)	600326
DT-KD4/63SSD-1000 ⁽¹⁾	4.540 (10.01)	600137
DT-KD5/63SSD-1000 ⁽¹⁾	5.014 (11.05)	600140

(1) Also suitable for former 40A-version

ANTI-CONDENSATION SECTION KBT

Anti-condensation section

with special bolted joints for KBHF and KBHS at both ends.

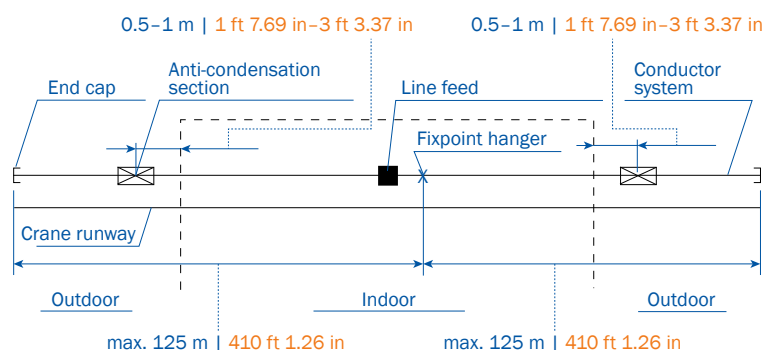
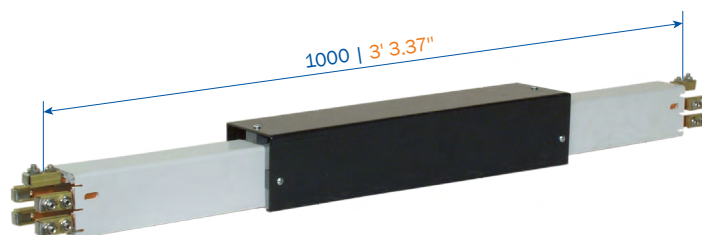
Application of anti-condensation section

The anti-condensation section will be used where conductor systems are passing from indoor to outdoor, preventing condensation of the outside mounted conductor section. The warm air from indoors can escape through the anti condensation section (see sketch). The anti-condensation section does not interrupt the conductor system electrically.

Additional feeds are not required.

Assembly

Type	Weight kg (lb)	Order No.
BT-KBT4/63-125HSC-1000 ⁽¹⁾	3.573 (7.88)	600185
BT-KBT4/160HSC-1000	3.843 (8.47)	600186
BT-KBT4/200HSC-1000	4.358 (9.61)	600319
BT-KBT5/63-125HSC-1000 ⁽¹⁾	3.805 (8.39)	600188
BT-KBT5/160HSC-1000	4.075 (8.98)	600189
BT-KBT5/200HSC-1000	4.590 (10.12)	600320
BT-KBT4/63SSD-1000 ⁽¹⁾	3.573 (7.88)	600187
BT-KBT5/63SSD-1000 ⁽¹⁾	3.805 (8.39)	600190



CABLE GLANDS FOR FEEDS

For Type	Cable gland	For cable diam. in mm	Power rating in A	Page
ES-KKE...	M50	27-35	63-100 HS	10
ES-KKE...	M40	17-28	63/80 HS	10
ES-KKE...	M32	15-21	63 SS	10
ES-KSE/KEF/KES...	M32	17-26	63 HS	10 and 11
ES-KSE/KEF/KES...	M50	23-34	80-100 HS	10 and 11
ES-KES...	M50	29-40	125 HS	11
ES-ZK1-4... (Page B)	M63	27-48	125/160/200 HS	12
BH-AKB-KBH...	M25	9-19	-	15
ES-KKE/KSE/KEF/KES...	M25	9-19	63SS	10 and 11

(1) Also suitable for former 40A-version

COLLECTOR REMOVING SECTION KAT(D)

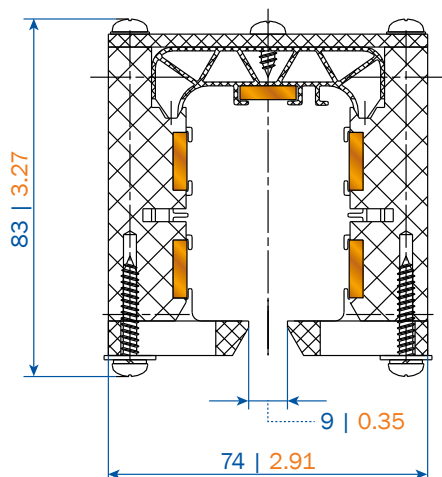
Removing section incl. 1 m (3 ft 3.37 in conductor section)

With special bolted joints for KBHF and KBHS on both ends.

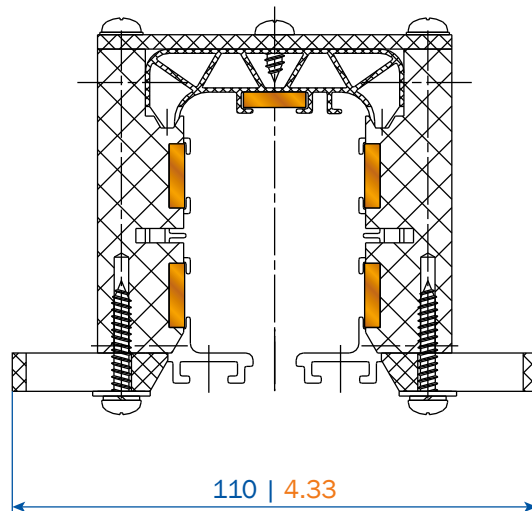
Assembly and disassembly of the collector is possible at the end of the track as well as at the removing section.

By opening and closing the sliders at the bottom of the removing section the collector can be mounted and demounted easily.

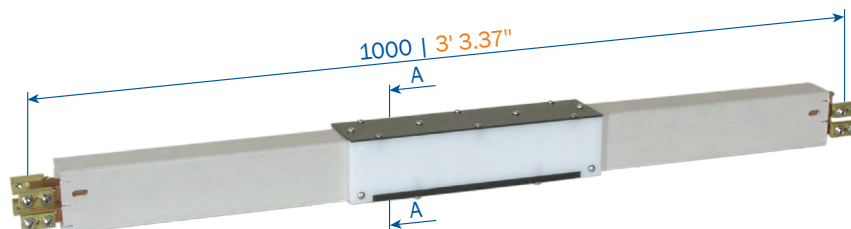
Before opening disconnect mains. The removing section does not disconnect the conductor system electrically.



A-A close



A-A open



For single collectors

Type	Weight kg (lb)	Order No.
AT-KAT4/63-125HSC-1000 ⁽¹⁾	3.507 (7.73)	600165
AT-KAT4/160HSC-1000	3.763 (8.30)	600166
AT-KAT4/200HSC-1000	4.260 (9.39)	600327
AT-KAT5/63-125HSC-1000 ⁽¹⁾	3.957 (8.72)	600167
AT-KAT5/160HSC-1000	4.213 (9.29)	600168
AT-KAT5/200HSC-1000	4.710 (10.38)	600328
AT-KAT4/63SSD-1000 ⁽¹⁾	3.449 (7.60)	600169
AT-KAT5/63SSD-1000 ⁽¹⁾	3.899 (8.60)	600170

For double collectors

Type	Weight kg (lb)	Order No.
AT-KATD4/63-125HSC-1000 ⁽¹⁾	4.330 (9.55)	600175
AT-KATD4/160HSC-1000	4.566 (10.07)	600176
AT-KATD4/200HSC-1000	5.050 (11.13)	600329
AT-KATD5/63-125HSC-1000 ⁽¹⁾	4.780 (10.54)	600177
AT-KATD5/160HSC-1000	5.015 (11.06)	600178
AT-KATD5/200HSC-1000	5.501 (12.13)	600330
AT-KATD4/63SSD-1000 ⁽¹⁾	4.312 (9.51)	600179
AT-KATD5/63SSD-1000 ⁽¹⁾	4.762 (10.50)	600180

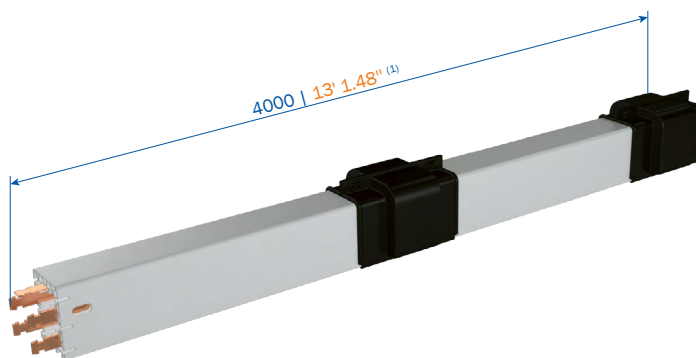
(1) Also suitable for former 40A-version

MAINTENANCE SECTIONS RVT-KRT

Type	Weight kg (lb)	Order No.
RVT-KRT4/63-2000HSC	2.77 (6.10)	10031772
RVT-KRT4/63-4000HSC	5.534 (12.20)	601005
RVT-KRT5/63-4000HSC	5.953 (13.12)	601007
RVT-KRT4/80-4000HSC	6.462 (14.25)	601006
RVT-KRT5/80-4000HSC	7.113 (15.68)	601008
RVT-KRT4/100-2000HSC	3.88 (8.50)	10031760
RVT-KRT4/100-4000HSC	7.774 (17.14)	600811
RVT-KRT5/100-4000HSC	8.753 (19.30)	600812
RVT-KRT4/125-4000HSC	8.482 (18.70)	600813
RVT-KRT5/125-4000HSC	9.461 (20.86)	600814
RVT-KRT4/160-4000HSC	10.438 (23.01)	600816
RVT-KRT5/160-4000HSC	11.417 (25.17)	600817
RVT-KRT4/200-2000HSC	6.50 (14.30)	10031761
RVT-KRT4/200-4000HSC	13.016 (28.70)	600801
RVT-KRT5/200-4000HSC	13.994 (30.85)	600802
RVT-KRT4/63-4000SSD	5.534 (12.20)	601009
RVT-KRT5/63-4000SSD	5.953 (13.12)	601010

May be used as a less expensive collector removal solution.

We stock 2000mm (6 ft 6.74 in) sections with 2 joint caps in the USA. Consult with our sales department.



Maintenance sections are designed to make collector removal and conductor bar replacement quick and easy for KBH. For convenience, maintenance section drop out or reinstall at existing runway installations. For longer runways, installing maintenance repair sections at convenient intervals and locations is recommended to allow for more access points.

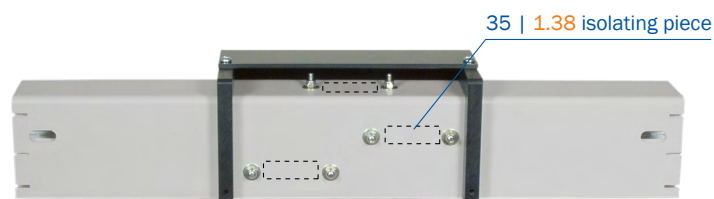
The standard lengths are 4000mm (13 ft 1.48 in) and 2000mm (6 ft 6.74 in). Additional lengths and curved maintenance sections that follow $R_{min} = 1000 \text{ mm}$ / $L_{min} = 1000 \text{ mm}$ ($R_{min} = 3 \text{ ft } 3.37 \text{ in}$ / $L_{min} = 3 \text{ ft } 3.37 \text{ in}$) are available upon request.

CONDUCTOR DEAD SECTION KTL / KTI

Conductor dead section - for sectioning and repair zones

Please advise us which conductors should be disconnected (see page 6 and 7). Earth/Ground conductor is usually not disconnected for safety reasons.

The dead section comes factory assembled on a section..



Isolating pieces installed on conductor section

Air gap 5 mm (0.2 in)		Isolating piece 35 mm (1.38 in)	
Type ⁽²⁾	Order No.	Type	Order No.
ST-KTL1 ...	600298	ST-KTI1 ...	600293
ST-KTL2 ...	600299	ST-KTI2 ...	600294
ST-KTL3 ...	600300	ST-KTI3 ...	600295
ST-KTL4 ...	600301	ST-KTI4 ...	600296
ST-KTL5 ...	600302	ST-KTI5 ...	600297

(1) Standard length = 4000 mm; other lengths and also maintenance sections in curves ($R_{min} = 1000 \text{ mm}$ / $L_{min} = 1000 \text{ mm}$) on request.

(2) Complete types e.g. ST-KTI3HS-L1/L2/L3-KSW for a 35 mm isolating piece with separation of conductors L1, L2, L3 and 2 for the current collector

SINGLE CURRENT COLLECTOR KSW

Collector KSW

Max. speed is 150 m/min (492 ft/min). For conductor systems with sealing strips up to 100 m/min (328 ft/min).

Connecting cable (preinstalled)

for 25 A with 2.5 mm² / core

for 40 A with 4.0 mm² / core

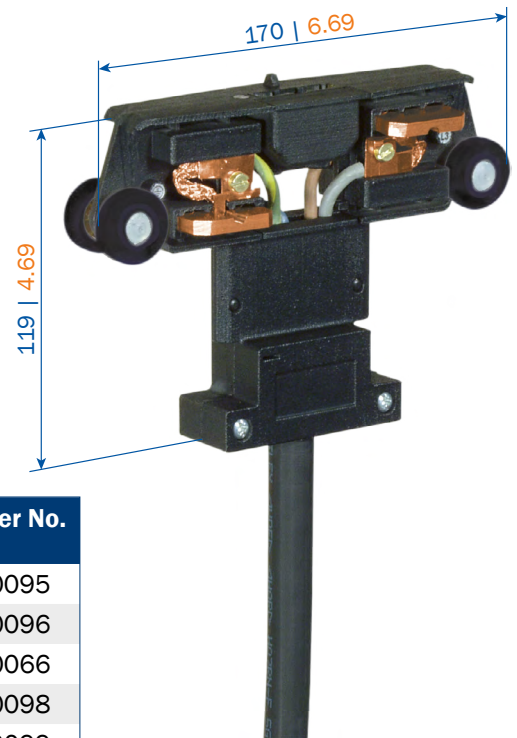
for 60 A with 6.0 mm² / core (stock position)

Standard cable length 1 m (3 ft 3.37 in) long, longer cables upon request.

Order example for a **2 m** (6 ft 6.74 in) long cable:

Order No. 600096-**2** for collector SA-KSW4/40-2HS28-60

Type	Weight kg (lb)	Number of poles	Power rating at 60 % DC in A	Cable D, mm ⁽²⁾	Order No.
SA-KSW4/25-1HS28-60	0.552 (1.22)	4	25	13.0	600095
SA-KSW4/40-1HS28-60	0.656 (1.45)	4	40	15.0	600096
SA-KSW4/60-1HS28-40	0.797 (1.76)	4	60 ⁽¹⁾	17.0	600066
SA-KSW5/25-1HS28-60	0.634 (1.40)	5	25	14.0	600098
SA-KSW5/40-1HS28-60	0.771 (1.70)	5	40	17.0	600099
SA-KSW5/60-1HS28-40	0.945 (2.08)	5	60 ⁽¹⁾	19.0	600413
SA-KSW4/25-1SS28-60	0.472 (1.04)	4	25	11.0	600097
SA-KSW5/25-1SS28-60	0.534 (1.18)	5	25	12.0	600100



Collector KSWS

Max. speed 250 m/min (820 ft/min). For conductor systems with sealing strips up to 100 m/min (328 ft/min).

Connecting cable (preinstalled)

for 25 A with 2.5 mm² / core

for 40 A with 4.0 mm² / core

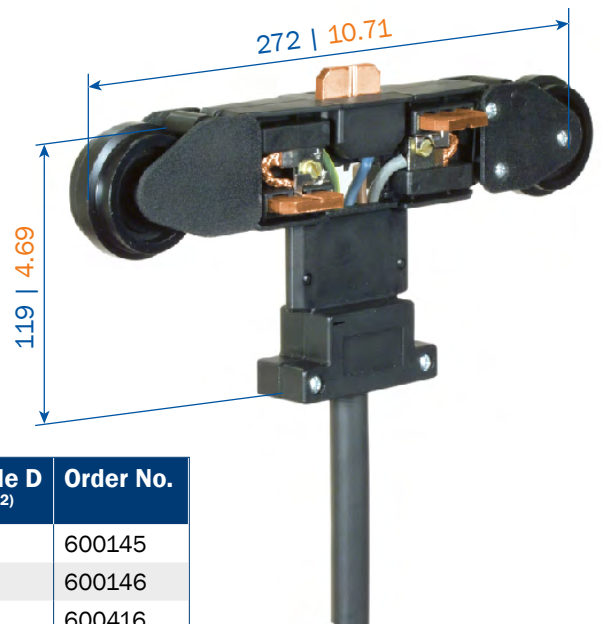
for 60 A with 6.0 mm² / core

Standard cable length 1 m (3 ft 3.37 in) long, longer cables upon request.

Order example for a **2 m** (6 ft 6.74 in) long cable:

Order No. 600149-**2** for collector SA-KSWS5/40-2HS28-60

Type	Weight kg (lb)	Number of poles	Power rating at 60 % DC in A	Cable D mm ⁽²⁾	Order No.
SA-KSWS4/25-1HS28-60	0.664 (1.46)	4	25	13.0	600145
SA-KSWS4/40-1HS28-60	0.768 (1.69)	4	40	15.0	600146
SA-KSWS4/60-1HS28-40	0.942 (2.08)	4	60 ⁽¹⁾	17.0	600416
SA-KSWS5/25-1HS28-60	0.724 (1.60)	5	25	13.5	600148
SA-KSWS5/40-1HS28-60	0.861 (1.90)	5	40	16.0	600149
SA-KSWS5/60-1HS28-40	1.035 (2.28)	5	60 ⁽¹⁾	19.0	600417
SA-KSWS4/25-1SS28-60	0.584 (1.29)	4	25	11.0	600147
SA-KSWS5/25-1SS28-60	0.624 (1.38)	5	25	12.0	600150



There are no double collectors available for KSWS, please use 2 single collectors instead.

(1) At 40 % DC (duty cycle)

(2) Approx. diameter of connecting cables in mm

DOUBLE COLLECTOR AND TOW ARMS

Double collector DKSW

Maximum speed 150 m/min (492 ft/min). For conductor systems with sealing strips up to 100 m/min (328 ft/min).

The DKSW double collectors are available as an assembly kit, consisting of 2 KSW collectors and a connecting bar with mounting material. DKSW are designed for straight sections only. For curves use single collectors.

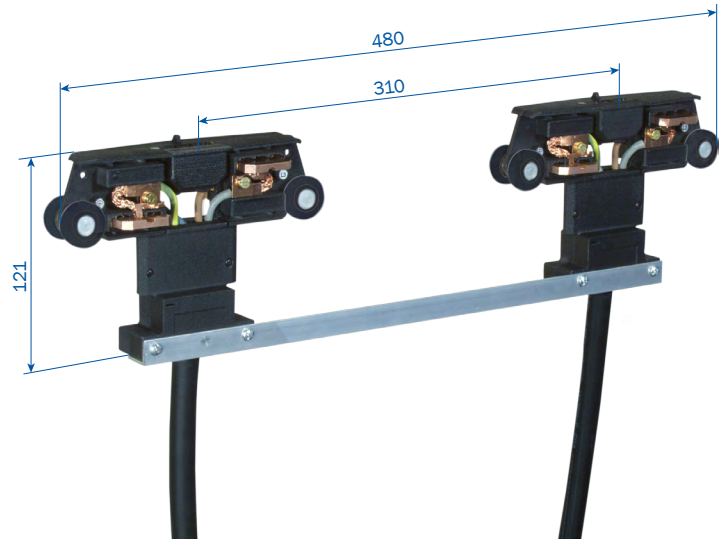
Connecting cables

for 50 A with (2x) 2.5 mm² / core

for 80 A with (2x) 4.0 mm² / core

for 120 A with (2x) 6.0 mm² / core (stock position)

Standard cable length 1 m (3 ft 3.37 in) long, longer cables upon request.



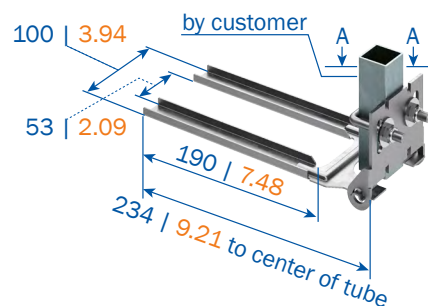
Type	Weight kg (lb)	Number of poles	Power rating at 60 % DC in A	Cable D mm ⁽²⁾	Order No.
SA-DKSW-4/50-1HS28-60	1.215	4	50	12.5	600115
SA-DKSW4/80-1HS28-60	1.423	4	80	14.5	600116
SA-DKSW4/120-1HS28-40	1.705	4	120 ⁽¹⁾	17.0	600414
SA-DKSW5/50-1HS28-60	1.379	5	50	13.5	600118
SA-DKSW5/80-1HS28-60	1.653	5	80	16.0	600119
SA-DKSW5/120-1HS28-40	2.001	5	120 ⁽¹⁾	19.0	600415
SA-DKSW4/50-1SS28-60	1.055	4	50	11.0	600117
SA-DKSW5/50-1SS28-60	1.179	5	50	12.0	600120

Order example for **5 m** cables
Order No. 600119-**5**
type SA-DKSW5/80-**5**HS28-60

Tow arm MGU(N)

Installation options of 30 mm² (0.04 in²), hollow profile or tube with 30 – 34 mm (1.18 in – 1.34 in).

Type	Weight kg (lb)	Order No.
MN-MGUN	0.436 (0.96)	600887
MN-MGU/K ⁽⁴⁾	0.550 (1.21)	600336



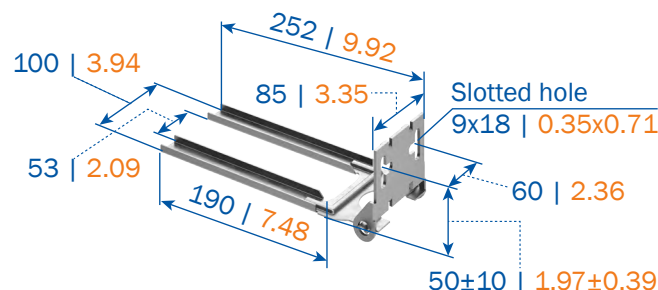
A-A
Version with square hollow profile
(without adapter plate)



A-A
Version with tube⁽³⁾

Tow arm MGF(N)

Type	Weight kg (lb)	Order No.
MN-MGFN	0.328 (0.72)	600888
MN-MGF/K ⁽⁴⁾	0.442 (0.97)	600337



(1) At 40 % DC

(2) Approx. diameter of connecting cables in mm

(3) For assembly use enclosed adapter plate

(4) /K for Stainless steel

FLEXIBLE TOW ARM

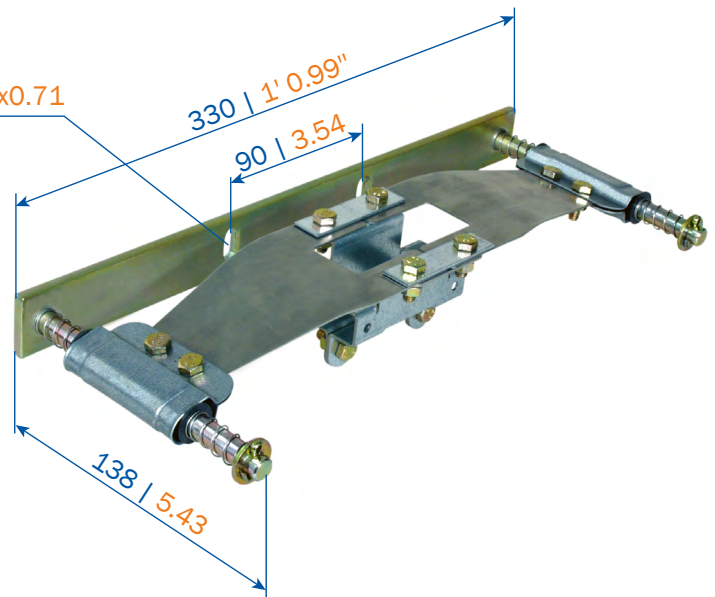
Flexible tow arm KFMHN

Flexible support type for single collector for installations with transfer funnels type KET (see page 17).

Measurements for installation see below.

If you are going to use the flexible towing arm in system with curves please contact us.

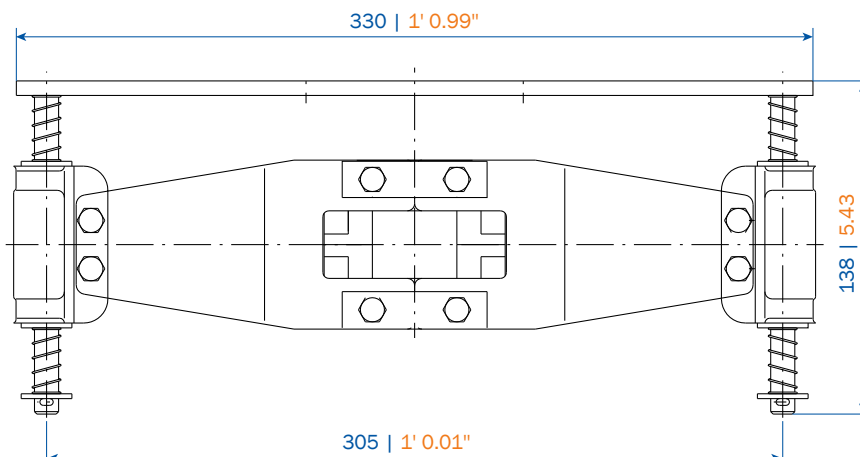
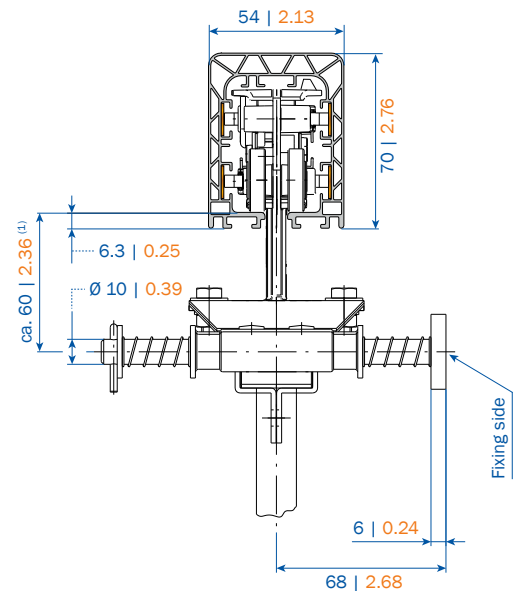
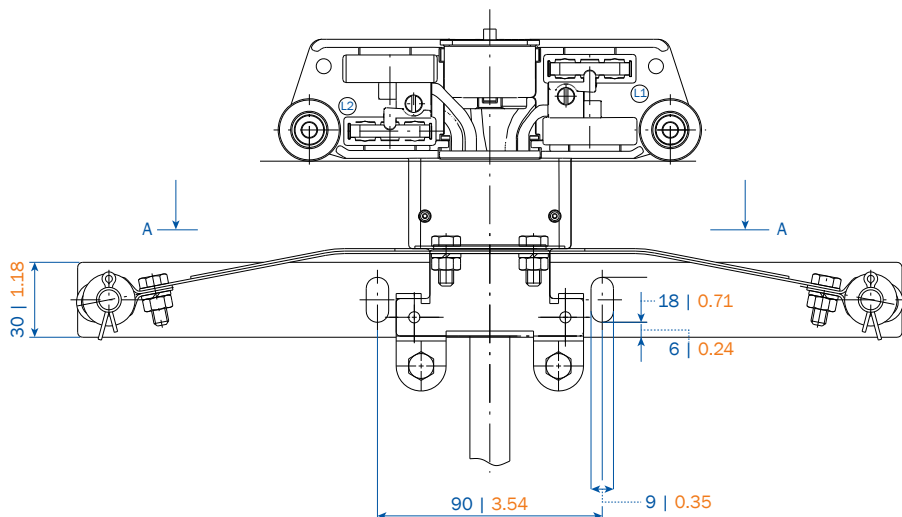
Slotted hole 9x18 | 0.35x0.71



Type	Weight kg (lb)	Order No.
MN-KFMHN	1.067	600558

Arrangement of a flexible tow arm

KFMHN with collector type KSW



max. horizontal offset 10 mm (0.39 in)
max. vertical offset 10 mm (0.39 in)

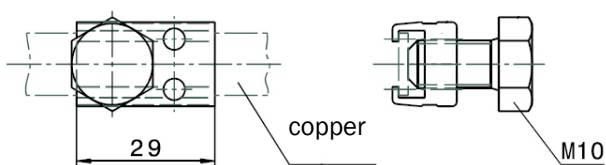
(1) To be fixed during installation.

SHORT SECTIONS

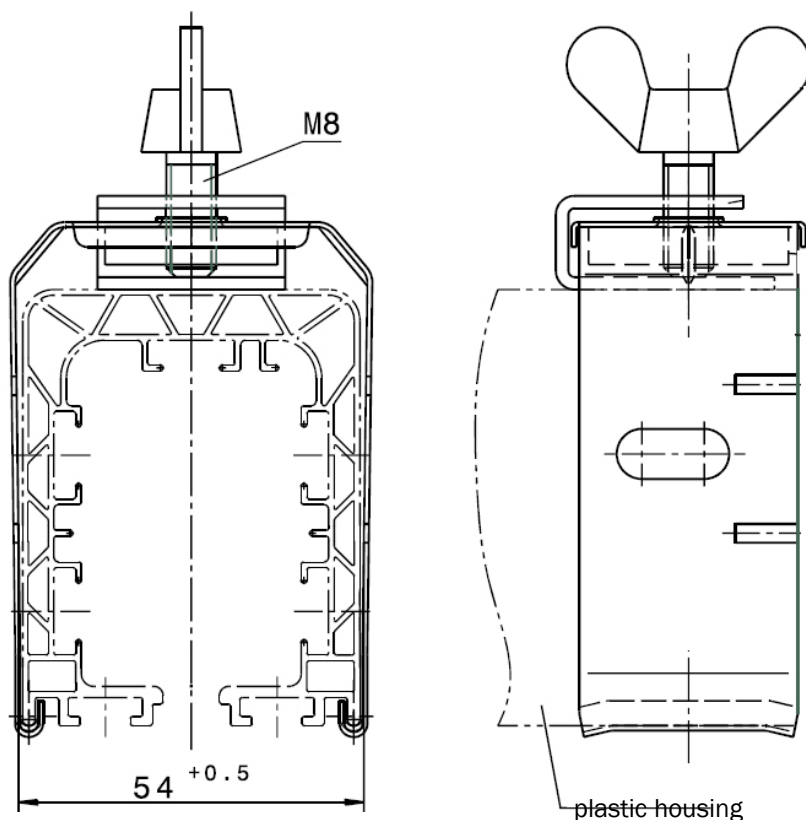
Auxiliary tool for cutting short lengths

Short sections are usually tailored at our production site in Katy, Texas, according to your drawings. If you regularly perform installations, for instance, as a service company, you might be interested in purchasing additional tools and templates for making short sections on-site.

The simple template that allows you to manage the housing and copper conductor ends after cutting is available with **order number 600341**.



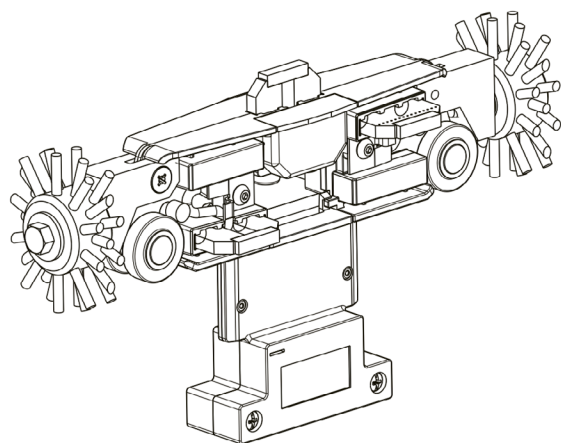
Drilling device for the copper rails 63A - 200A



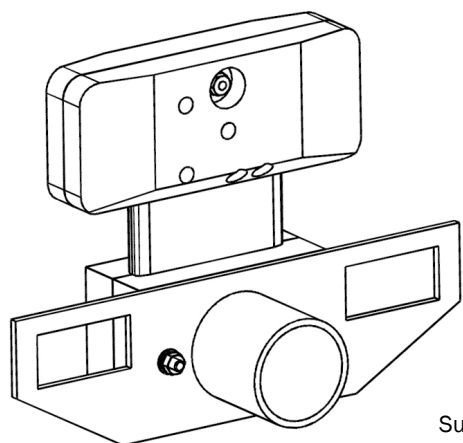
CLEANING ACCESSORIES

Type	Description	Order No.
RW-KSW4BSC	Complete cleaning trolley 4-pole	600445
RW-KSW5BSC	Complete cleaning trolley 5-pole	600446
Bristle brushes	Kit for attaching to standard collector KSW	600350
	Suction Trolley	600947

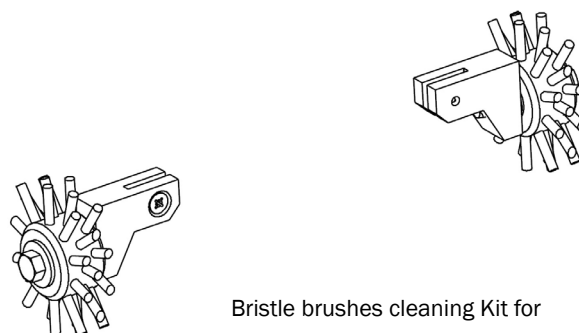
Cleaning trolleys can be used on a regular basis **or run continuously** in dirty or harsh environments. More cleaning options available upon request.



Cleaning trolley KSW 5 BSC with bristle brushes and cleaning equipment with Scotch Brite.



Suction Trolley



Bristle brushes cleaning Kit for a standard collector KSW

EXAMPLES FOR ORDERING

Example 1. Simple order - Runway 100 ft⁽¹⁾ (30 480 mm), 63 Amps, 1 crane/consumer, end feed, Web mounted brackets

Article	Type	QTY	Order No.
Conductor section, 4 m (4000mm) long	KBHF 4/63-4000HSC	7	600974
3 Meter Busbar CUT to 2480mm (8 ft 1.64 in)	KBHF 4/63-3000HSC	1	600973
End feed	ES-KKE4/63-80HS	1	600010
End cap	EK-KE	1	600008
Joint cap	VM-KVM	7	600005
Sliding hanger	AH-KGA	14	600000
Fixpoint hanger	AH-KFA	1	600007
Double collector	SA-DKSW 4/120-1 HS	1	600414
Tow arm	MN-MGFN	1	600888
Web Mounting bracket - optional (page 13)	BR-L400 galvanized	15	10029896

⁽¹⁾ Since section lengths are measured in meters, **try to round system lengths to whole meters whenever possible.**

This will allow the use of standard sections, which is more economical and faster to deliver.

For systems requiring specialty sections and/or curves, please contact your sales rep for assistance.

Example 2. Installation length of 64 m (209' 11.69") 3 different nominals and 3 types of feed

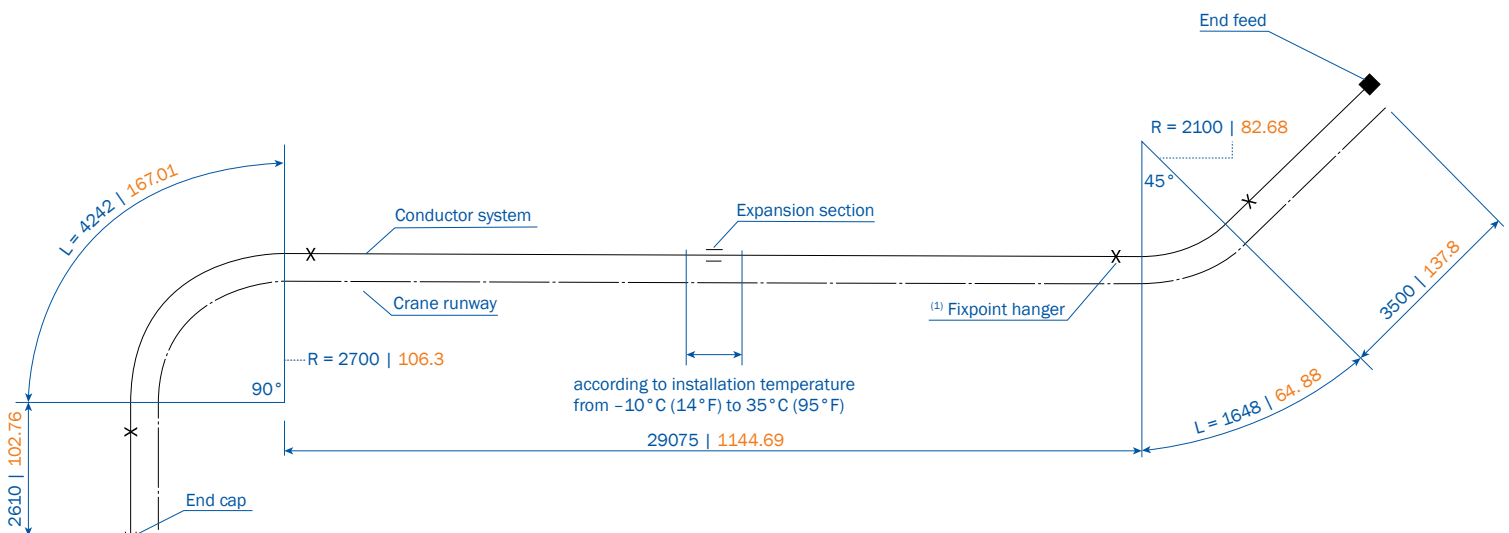
Article	KBHF 4/80-...HSC with end feed			KBHF 5/100-...HSC with line feed			KBHS 4/160-...HSC with line feed incl. 1 m conductor section		
	Type	QTY	Order No.	Type	QTY	Order No.	Type	QTY	Order No.
conductor section, 4 m long	KBHF 4/80-4000HSC	16	600984	KBHF 5/100-4000HSC	16	600124	KBHS 4/160-4000HSC	15	600084
conductor section, 3 m long	-	-	-	-	-	-	KBHS 4/160-3000HSC	1	600083
End feed	ES-KKE 4/63-80HS	1	600010	-	-	-	-	-	-
Line feed on joint	-	-	-	ES-KSE 5/100HS-L	1	600039	-	-	-
Line feed, 1 m long	-	-	-	-	-	-	ES-KELS 4/160HSC-1000-2	1	600075
End cap	EK-KE	1	600008	EK-KE	2	600008	EK-KE	2	600008
Joint cap	VM-KVM	15	600005	VM-KVM	14	600005	VM-KVM	16	600005
Fixpoint hanger	AH-KFA	1	600007	AH-KFA	1	600007	AH-KFA	1	600007
Sliding hanger	AH-KGA	32	600000	AH-KGA	32	600000	AH-KGA	32	600000
Double collector	SA-DKSW 4/120-1 HS	1	600414	SA-KSW 5/40-1HS28-60	1	600099	SA-DKSW 4/120-1 HS	2	600414
Tow arm	MN-MGFN	1	600888	MN-MGFN	1	600888	MN-MGFN	2	600888

EXAMPLES FOR ORDERING

Example 3. Complex order. Installations with curves per customer drawing

Total length of conductor system 41.075 m (134 ft 9.13 in). 80A KBHF 4 poles with spring joints and KBHS 5 poles with bolted joints.

QTY	Article	KBHF 4/80-....HSC		KBHS 5/80-....HSC	
		Type	Order No.	Type	Order No.
7	Conductor system, 4 m long	KBHF4/80-4000HSC	600984	KBHS5/80-4000HSC	601074
1	Conductor system, 4 m long for 1x3500 mm short length	KBHF4/80-4000HSC	600984	KBHS5/80-4000HSC	601074
1	Conductor system, 3 m long for 1x2610 mm short length	KBHF4/80-3000HSC	600983	KBHS5/80-2000HSC	601073
1	Conductor system, 2 m long for horizontal curve 45°, R = 2100 mm, L = 1648 mm, SA	KBHF4/80-2000HSC	600982	KBHS4/125-2000HSC	601072
2	Conductor system, 3 m long for horizontal curve 2x45°, R = 2700 mm, L = 2121 mm, SI	KBHF4/80-3000HSC	600983	KBHS5/80-3000HSC	601073
1	End feed	ES-KKE4/63-80HS	600010	ES-KKE5/63-80HS	600107
1	Expansion section	DT-KD4/63-125HSC-1000	600135	DT-KD5/63-125HSC-1000	600138
11	Joint cap	VM-KVM	600005	VM-KVM	600005
4	Fixpoint hanger	AH-KFA	600007	AH-KFA	600007
24	Sliding hanger	AH-KGA	600000	AH-KGA	600000
1	End cap	EK-KE	600008	EK-KE	600008
1	Current collector	SA-KSW4/40-1HS28-60	600096	SA-KSW5/40-1HS28-60	600099
1	Tow arm	MN-MGF	600335	MN-MGF	600335



Try VAHLE CUSTOMER HUB for calculation,
quoting and ordering! Request access today!

<https://customerhub.vahle.de/>



(1) The curved system on the drawing has 4 fixpoint hangers. Straight installations usually have 1 fixpoint hanger in the middle of the run. The rest of conductor system is to be installed with sliding hangers. See details about recommended installation steps on page 4.

SPARE PART LIST

Spare part list for conductor system

Type		KBHF Order No.	KBHS Order No.
VM-KVM	Joint cap (pair)	600005	600005
VM-STV13/63-100 A-KBHF/MKHF ⁽¹⁾	Spring loaded connector 63–100 A	600483	-
VM-SCHV13/63-200 A-KBHS/MKHS/MKLS ⁽¹⁾	Bolted joints 63–160 A	-	262018
VM-SCHV13/200 A-KBHS	Bolted joints 200 A	-	600712
DL-D-KBH-MKH-MKL-TDV	Neoprene sealing strip, in pairs (max. length 40 m each)	600551	600551
DL-V-KSLT-KBH-MKL/H-LSV/G	Coupling for sealing strip, in pairs (for lengths <40 m each)	258300	258300
DL-F-KBH	Fixing clamp for sealing strip (1 per end)	600354	600354
DL-EZRD-KBH	Mounting glider for sealing strip (>10 m system length)	600109	600109
AK-KKE-MKE13/63-80-SO ⁽¹⁾	Feed terminal for end feed (63/80 A)	600006	600006
AK-KSE-KEF-KES13/63-100 A-S-70.2	Feed terminal for line feed (lateral)	600017	600017
AK-KSE-KEF-KES13/63-100 A-O-67.2	Feed terminal for line feed (on top, 5th conductor)	600016	600016

Spare part list for current collector

Type		KSW / DKSW Order No.	KSWs Order No.
SK-KSW-MSWA-PH/SU-28	Carbon brush phase (lateral) with pressure spring	600088	600088
SK-KSW-MSWA-PE/S-28	Carbon brush ground (lateral PE) with pressure spring	600090	600090
SK-KSW-PH/O-28	Carbon brush 5th conductor (top) with pressure spring	600089	600089
SA-KF-KSW-MSWA-SP	Carbon pressure spring (standard), suitable for all carbon brushes	600338	600338
TR-DKSW-SB310	Connecting bar for double collector DKSW	600105	-
SA-ZB-AS-KSW-P-250	Assembly kit KSWs	-	600106
SA-ZB-DG-KSW-S	Sealing strip slide plate for collectors KSW (to protect collector's neck)	600640	600640

Cleaning accessories (see details on page 27)

Type	Description	Order No.
RW-KSW4BSC	Complete cleaning trolley 4-pole	600445
RW-KSW5BSC	Complete cleaning trolley 5-pole	600446
Bristle brushes	Kit for attaching to standard collector KSW	600350
	Suction Trolley	600947

Cleaning trolleys can be used on a regular basis or run continuously in dirty or harsh environments. More cleaning options available upon request.

Download operation manuals and more at
<https://www.vahle.com/en/download>



(1) Also suitable for former 40 A-version

QUESTIONNAIRE

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Please fill out the following questionnaire in order to determine which conductor bar system is right for your application. Save as PDF or print this page and send it to your VAHLE experts. For curved tracks, Power rail with isolating sections etc., we require sketches to enable us to prepare a quotation.

Contact Information

Company Name		Contact Person
Address		Email Address
State	ZIP	Phone Number

System Information

New Application		Replacement	Add on existing system
Application Type (i.e. cranes) details are helpful: i.e. load 20 tons		Desired Hanger Spacing	
Total System Length		m	ft
Total Number of Conductors		System Layout (Straight / Curved / Loop / Other)	
Will one be a ground conductor?	Yes	No	please provide sketches or drawings when applicable

Power Requirements

Operating voltage	Volt	Hz	AC/DC
Total system amperage (example 150A at 40% duty cycle)		Max. voltage drop allowed (typically 3% - 5%)	%
Power Feed(s) Location (end feed, center feed, several feeds)		Duty Cycle % (DC, ED)	%
No. of Cranes /Consumers in the system		Power consumption of each crane	hp, A, kW
Max. Travel Speed	m/min	ft/min	Type of motors (usually frequency controlled)

Environment

Install Location indoor / outdoor / booth			
Ambient Temperature	min.	max.	°C °F
Interested in VAHLE certified installation?	Yes	No	
Additional Comments: dirt, dust, salty air, corrosive, or locations such as water treatment plant, paper mill, etc.			

If detailed motor information is available, please specify below
For the calculation, it is important to consider engines that can operate simultaneously. This helps to calculate and quote the optimal system.

Crane type 1. Information about motors kW, Amperes or hp.

Motor name	Motor power	hp, Amp, kW	Type of Motors
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1
2
3

example: Motor 1 main load, motor 2 main travel, motor 3 cross travel

Crane type 2. Information about motors kW, Amperes or hp.

Motor name	Motor power	hp, Amp, kW	Type of Motors
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1
2
3

Once filled out, the form can be saved as PDF or printed. Choose 'Current Page' in printer settings.

Please send us the form after it is filled out to receive a free quote.



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