



VAHLE

**Enclosed conductor system
KBH**

SYSTEMS IN MOTION

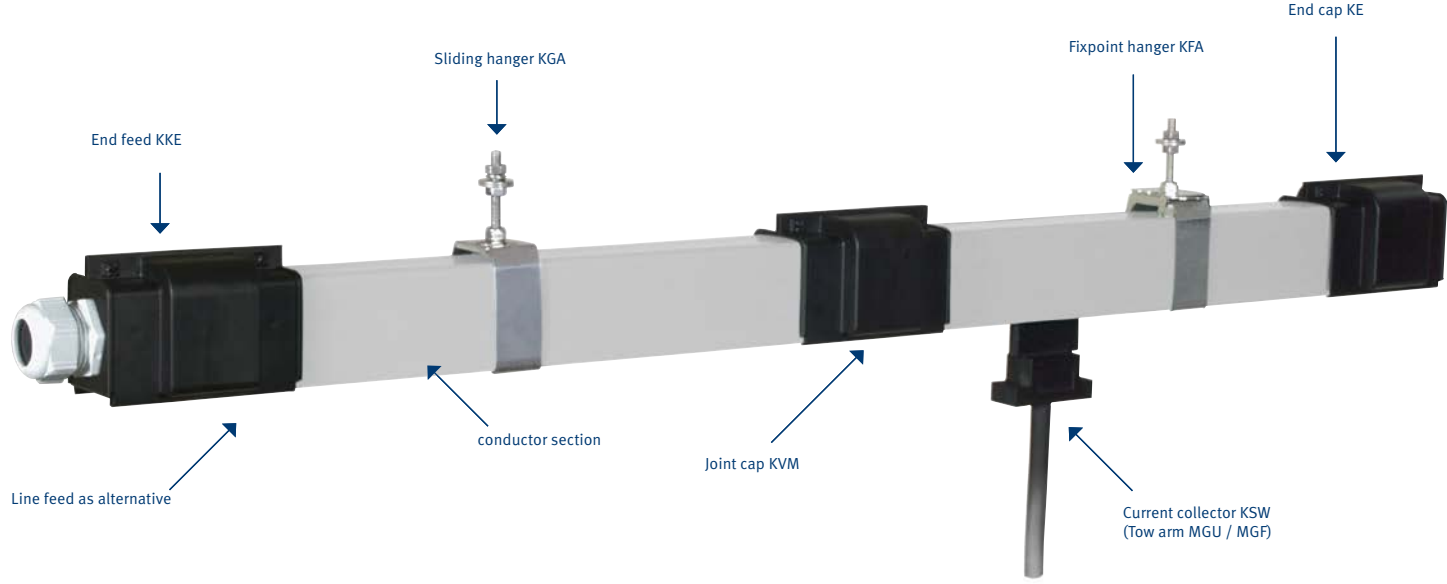


Enclosed conductor system KBH

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System photo



Description of the Conductor system

The Vahle-Powerail KBH is a shock hazard protected conductor system for indoor and outdoor installations. The plastic housing can accommodate different copper profiles.

Type KBHF: in 4- and 5-conductor version, with preassembled copper conductors and spring loaded connectors from 63 to 100 A.

Type KBHS: in 4- and 5-conductor version, with preassembled copper conductors and bolted joints from 63 to 200 A.

A compact design, corrosion resistance and an easy installation are the main characteristics. The KBH complies with VDE, european and international standards as well as accident prevention regulations. It is protected to IP 23 standards. The KBH can be supplied with sealing strip and heating system. The conductor system with sealing strip is protected to IP 24 standards and EN 60529 (0470, part 1) regulation.

Collectors are touch proof only when fully entered into the conductor system.

If there is the possibility to touch live parts by hand, ie. collectors that might leave the conductor system during operation, provide safety barrier or disconnect mains. This is valid only for a supply voltage exceeding 24 V AC or 60 VDC.

Other cross sections, as shown on page 7, are possible. The upper pole is used as N-conductor if required. The max. copper cross section of the conductor is 26 sqmm. If the cross section of the N-conductor is smaller than the cross section of the outer conductor adhere to regulation VDE 0100, part 430,.

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). Refer to regulation SELV or PELV (also DIN VDE 0100-410). A ground conductor is required for higher voltages

Technical description

Applications

For mobile power consumers like cranes, monorails, electric hoists, machine tools, automated storage and retrieval systems, lighting systems.

Approvals

UL-approved

Housing

Color grey, plastic housing for 4 or 5 conductors. Standard section 4 m. Other 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.

Feed Sets

Through line feeds or end feeds. When selecting the „overload“ protection devices, selection has to be made according to DIN VDE 0100 part 530.

End caps

The 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
roofed outdoor systems: $\leq 35^{\circ}\text{C} = 2,00\text{ m}$
- Indoor and outdoor systems
with and without heating: $> 35^{\circ}\text{C} = 1,33\text{ m}$
- Cold storage: $\leq 0^{\circ}\text{C} = 1,33\text{ m}$

Expansion during temperature fluctuation

The Expansion sections are required to compensate the different expansions between copper conductors and steel- or concrete structures, in varying temperatures without interrupting electrical power. The different expansions between the plastic housing and the copper conductors will be compensated in every joint.

Anti-condensation sections

These sections are used for transfer of the Powerail 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 page 17 and 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 insulating pieces (35 mm). 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 as per EN 60204.

Collectors

The current collectors are made of re-inforced polyester fiberglass, 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 if the added overload protection device is not designed for the load capacity of this cable. Refer also to regulation VDE 0100, part 430 and EN 60204-32. (Note: this occurs often with several collectors per system).

Continuity of ground conductor

The continuity of the ground conductor has to be guaranteed as per regulation EN60204-32 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.

With following system requirements double collectors have to be used:

- as proper measure to fulfil the continuity of the ground conductor system via carbon brushes. Refer to regulation EN 60204-1-2007-06 and EN 60204-32-2009-03.
- Transfers with switches and turntables
- Operational voltage below 50 V
- low voltages, frequency controlled drives
- Transmission of data- and/or emergency stop 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. By opening and closing the sliders at the bottom of the conductor housing the collector can be mounted and demounted easily. Before opening the removing section the conductor system has to be without voltage.

Safety advice

It must be ensured that the arrangement of the conductor system provides minimum distances (0,5 m) 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 28.

Technical data

Electrical values:

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 x 10 ¹⁵ Ω/cm	IEC 60093 10 ¹³ Ω	EN 60112 CTI 400-2,7

Mechanical properties:

Type	Flexible strength	Tensile strength	Temperature range (ambient):	Combustibility:	Resistance to chemicals: (at 45 °C)
KBH	75 N/mm ² ± 10%	40 N/mm ² ± 10%	-30 °C up to +60 °C	flame retardant DIN 4102 part 1 class B1; self extinguishing	Gasoline, Mineral Oil, Grease, acid sulfur up to 50%, caustic soda up to 50% and hydrochloric acid up to 25%, concentrated

Correction factor fT

Ambient temperature °C	35 °C	40 °C	45 °C	50 °C	55 °C	60 °C
Correction factor fT 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

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

For direct current

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

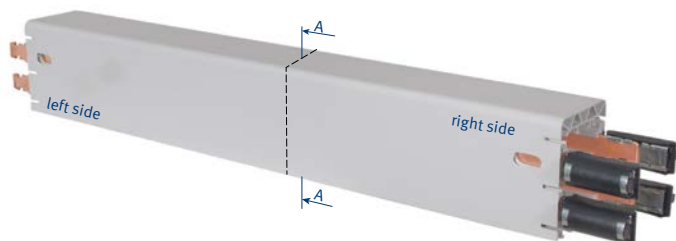
Z = impedance [Ω/km]
R = resistance [Ω/km]
I = feed length [km]
I_A = inrush current of installation in amperes

Permissible continuous current of the conductor

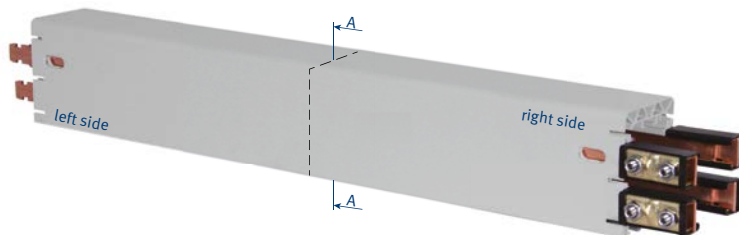
$$I_{Dzul,UT} = I_{zul} \times fT[A] \text{ with } I_{Dzul,UT} > I_{DA}$$

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

Technical Data



KBHF with spring loaded connectors



KBHS with bolted joints

Type ⁽¹⁾ HS with PE SS without PE	No.of conductors	Max.continuous current A at 35°C ⁽⁶⁾ L1 L2 L3			Copper cross section mm ²				Nominal voltage V ⁽⁴⁾
		6o % DC	8o % DC	1oo % DC	L1 L2 L3		N / 5 ⁽²⁾	control line	
KBHF									
KBHF4/63-....HSC	4	81	70	63	3 x 10	10	-	-	690
KBHF4/63-....SSD ⁽⁵⁾	4	81	70	63	-	-	-	4 x 10	690
KBHF4/80-....HSC	4	103	89	80	3 x 17	17	-	-	690
KBHF4/100-....HSC	4	129	112	100	3 x 26	26	-	-	690
KBHF5/63-....HSC	5	81	70	63	3 x 10	10	10	-	690
KBHF5/63-....SSD ⁽⁵⁾	5	81	70	63	-	-	-	5 x 10	690
KBHF5/80-....HSC	5	103	89	80	3 x 17	17	17	-	690
KBHF5/100-....HSC	5	129	112	100	3 x 26	26	26 ⁽³⁾	-	690
KBHS									
KBHS4/63-....HSC	4	81	70	63	3 x 10	10	-	-	690
KBHS4/63-....SSD ⁽⁵⁾	4	81	70	63	-	-	-	4 x 10	690
KBHS4/80-....HSC	4	103	89	80	3 x 17	17	-	-	690
KBHS4/100-....HSC	4	129	112	100	3 x 26	26	-	-	690
KBHS4/125-....HSC	4	161	140	125	3 x 33	26	-	-	690
KBHS4/160-....HSC	4	207	179	160	3 x 51	26	-	-	690
KBHS4/200-....HSC	4	258	224	200	3 x 70	42	-	-	690
KBHS5/63-....HSC	5	81	70	63	3 x 10	10	10	-	690
KBHS5/63-....SSD ⁽⁵⁾	5	81	70	63	-	-	-	5 x 10	690
KBHS5/80-....HSC	5	103	89	80	3 x 17	17	17	-	690
KBHS5/100-....HSC	5	129	112	100	3 x 26	26	26 ⁽³⁾	-	690
KBHS5/125-....HSC	5	161	140	125	3 x 33	26	26 ⁽³⁾	-	690
KBHS5/160-....HSC	5	207	179	160	3 x 51	26	26 ⁽³⁾	-	690
KBHS5/200-....HSC	5	258	224	200	3 x 70	42	26 ⁽³⁾	-	690

(1) ... Suffix types e.g. 2 m KBHF4/63-2000HSC, Best-Nr. 600 972, shorter lengths are made up from the next larger standard length.

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

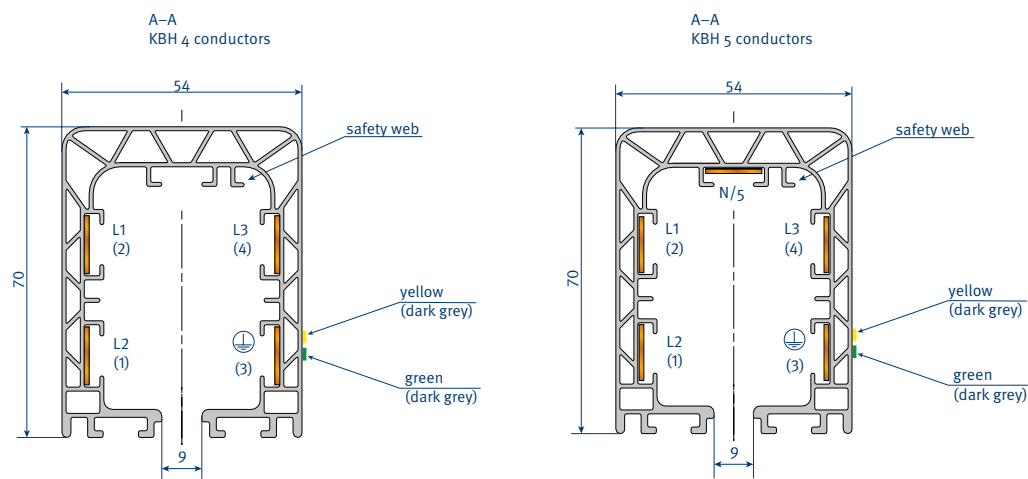
(3) 5th. Conductor max. 80 A at 100% DC.

(4) Nominal voltage UL= 600 V

(5) control line

(6) Power consumption UL on request

Technical Data



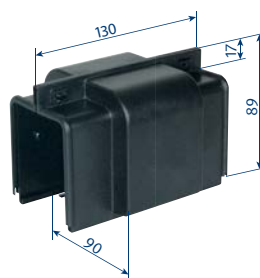
Numbers in paranthesis apply to control line

Leakage distance mm	Impedance at 50 Hertz and 20 °C $\Omega / 1000 \text{ m}$			Resistance at 20 °C $\Omega / 1000 \text{ M}$			Weight kg/m	Order-No. ⁽¹⁾
	Phase		N	Phase		N		
33	1,728	1,728	-	1,717	1,717	-	1,304	600 97•
33	1,728	-	-	1,717	-	-	1,304	600 99•
33	1,074	1,074	-	1,057	1,057	-	1,536	600 98•
33	0,712	0,712	-	0,687	0,687	-	1,864	600 02•
33	1,728	1,728	1,728	1,717	1,717	1,717	1,410	601 00•
33	1,728	-	1,728	1,717	-	1,717	1,410	601 02•
33	1,074	1,074	1,074	1,057	1,057	1,057	1,700	601 01•
33	0,712	0,712	0,712	0,687	0,687	0,687	2,110	600 12•
33	1,782	1,728	-	1,717	1,717	-	1,424	601 03•
33	1,728	-	-	1,717	-	-	1,424	601 05•
33	1,074	1,074	-	1,057	1,057	-	1,656	601 04•
33	0,712	0,712	-	0,687	0,687	-	1,984	600 06•
33	0,579	0,712	-	0,549	0,687	-	2,161	600 07•
30	0,383	0,712	-	0,344	0,687	-	2,699	600 08•
27	0,299	0,457	-	0,254	0,429	-	3,297	600 31•
33	1,728	1,728	1,728	1,717	1,717	1,717	1,560	601 06•
33	1,728	-	1,728	1,717	-	1,717	1,560	601 08•
33	1,074	1,074	1,074	1,057	1,057	1,057	1,850	601 07•
33	0,712	0,712	0,712	0,687	0,687	0,687	2,260	600 16•
33	0,579	0,712	0,712	0,549	0,687	0,687	2,437	600 17•
30	0,383	0,712	0,712	0,344	0,687	0,687	2,926	600 18•
27	0,299	0,457	0,457	0,254	0,429	0,687	3,573	600 32•

- The last number of the order specifies the section length. Please suffix the order number with 1, 2, 3, 4.

 Ground = PE

Joining material, Hangers & End caps



ready installed

Joint cap, self locking

Type	Weight kg	Order-No.
VM-KVM	0,116	600 005



Sliding hanger at conductor section

Sliding hanger

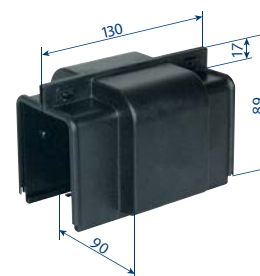
Type ⁽¹⁾	Weight kg	Order-No.
AH-KGA	0,129	600 000
AH-KGA/K	0,129	600 397



Fixpoint hanger at conductor section

Fixpoint hanger

Type ⁽¹⁾	Weight kg	Order-No.
AH-KFA	0,160	600 007
AH-KFA/K	0,177	600 398



End cap ready installed

End cap

left and right version

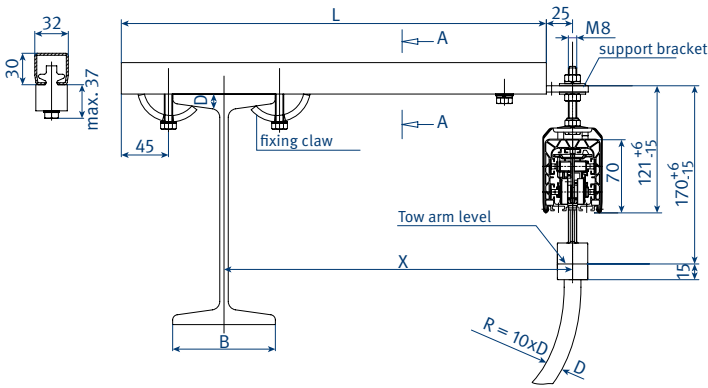
Type	Weight kg	Order-No.
EK-KE	0,150	600 008

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

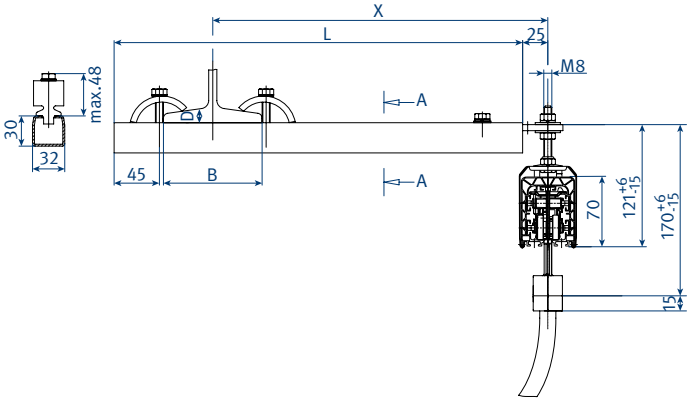
Brackets

view without I - beam

Fixing claw suitable for D = 6-15 mm

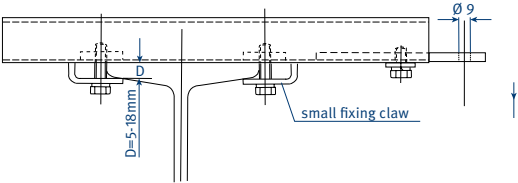


Fixing claw suitable for D = 15-25 mm



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 upto 300 mm
□-rail of EHK is identical to type S 1, Cat. 8 a



Type ⁽¹⁾	X mm	L mm	B max mm	Weight kg	Order-No.	
					standard version	small fixing claw ⁽¹⁾
HK-EHK250-NS	250	350	170	1,080	251 600	-
HK-EHK250-KS...					-	251 720-...
HK-EHK300-NS	300	400	170	1,128	251 610	-
HK-EHK300-KS...					-	251 730-...
HK-EHK400-NS	400	500	170	1,266	251 620	-
HK-EHK400-KS...					-	251 740-...
HK-EHK500-NS	500	600	170	1,394	251 630	-
HK-EHK500-KS...					-	251 750-...
HK-EHK600-NS	600	700	170	1,561	251 640	-
HK-EHK600-KS...					-	251 760-...
HK-EHK700-NS	700	800	170	1,761	251 650	-
HK-EHK700-KS...					-	251 770-...
HK-EHK750-NS	750	850	170	1,782	251 660	-
HK-EHK750-KS...					-	251 780-...
HK-EHK800-NS	800	900	170	1,936	251 670	-
HK-EHK800-KS...					-	251 790-...

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

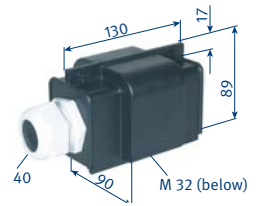
End feeds, Line feeds

End feed (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.



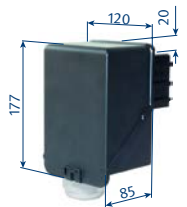
Type	Weight kg	Cable gland (Dimensions see page 13)	Order-No.
ES-KKE4/63-80HS	0,271	M 40	600 010
ES-KKE5/63-80HS	0,288	M 40	600 107
ES-KKE4/63SS	0,252	M 32	600 015
ES-KKE5/63SS	0,265	M 32	600 108

End feed (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.



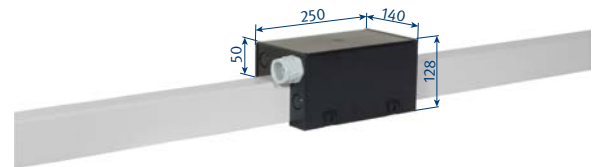
Type	Weight kg	Cable gland (Dimensions see page 13)	Order-No.
ES-KKE4/63-100HS	0,613	M 32 or M 50 ⁽¹⁾	600 422
ES-KKE5/63-100HS	0,646	M 32 or M 50 ⁽¹⁾	600 423

Line feed (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.



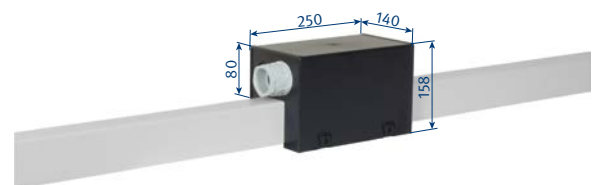
Type	Weight kg	Cable gland (Dimensions see page 13)	Order-No.
ES-KSE4/63HS-L	0,806	M 32	600 035
ES-KSE5/63HS-L	0,866	M 32	600 038
ES-KSE4/63SS-L	0,785	M 25	600 028
ES-KSE5/63SS-L	0,843	M 25	600 029

Line feed (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	Cable gland (Dimensions see page 13)	Order-No.
ES-KSE4/80-100HS-L	0,936	M 50	600 036
ES-KSE5/80-100HS-L	0,996	M 50	600 039

Feeds in the curve area on request.

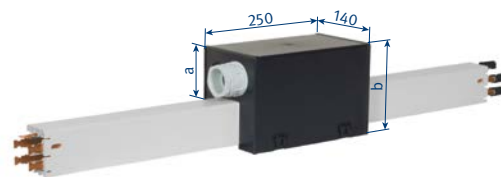
(1) Both cable glands are attached to the packing unit.

Line feeds

Line feed (incl. 1 m section, 63–100 A)

With spring loaded connector.

Electrical connection with customer supplied cable shoes to M6 terminals.

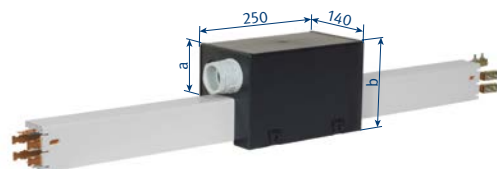


Type	Weight kg	Dimension		Cable gland (Dimensions see page 13)	Order-No.
		a	b		
ES-KEF4/63HSC-1000	2,066	50	128	M 32	600 975
ES-KEF4/80HSC-1000	2,428	80	158	M 50	600 976
ES-KEF5/63HSC-1000	2,232	50	128	M 32	600 977
ES-KEF5/80HSC-1000	2,652	80	158	M 50	600 978
ES-KEF4/100HSC-1000	2,756	80	158	M 50	600 201
ES-KEF5/100HSC-1000	3,062	80	158	M 50	600 209
ES-KEF4/63SSD-1000	2,046	50	128	M 32	600 979
ES-KEF5/63SSD-1000	2,210	50	128	M 32	600 980

Line feed (incl. 1 m section, 63–125 A)

With bolted joints.

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



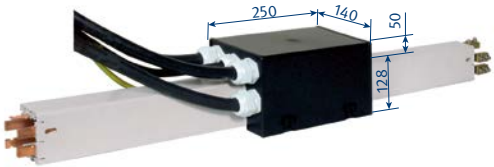
Type	Weight kg	Dimension		Cable gland (Dimensions see page 13)	Order-No.
		a	b		
ES-KES4/63HSC-1000	2,190	50	128	M 32	600 985
ES-KES4/80HSC-1000	2,552	80	158	M 50	600 986
ES-KES5/63HSC-1000	2,387	50	128	M 32	600 987
ES-KES5/80HSC-1000	2,807	80	158	M 50	600 988
ES-KES4/100HSC-1000	2,880	80	158	M 50	600 225
ES-KES4/125HSC-1000	3,222	80	158	M 50	600 045
ES-KES5/100HSC-1000	3,217	80	158	M 50	600 233
ES-KES5/125HSC-1000	3,621	80	158	M 50	600 049
ES-KES4/63SSD-1000	2,170	50	128	M 32	600 989
ES-KES5/63SSD-1000	2,365	50	128	M 32	600 990

Line feed & Terminal Box

Line feed

including 1m section (125 - 200 A) with 2m single cores

Electrical connection with customer supplied cable shoes to M 6 terminals. See below.



Type	Weight	Cable cross section in sqmm / Diam. in mm			Order-No.
		L1-L3	Ground	N / 5	
ES-KELS4/125HSC-1000-2	7,803	35 / 16	25 / 10	-	600 069
ES-KELS4/160HSC-1000-2	9,690	50 / 18	25 / 10	-	600 075
ES-KELS4/200HSC-1000-2	11,668	70 / 21	35 / 11	-	600 385
ES-KELS5/125HSC-1000-2	9,150	35 / 16	25 / 10	25 / 15	600 077
ES-KELS5/160HSC-1000-2	11,037	50 / 18	25 / 10	25 / 15	600 079
ES-KELS5/200HSC-1000-2	13,014	70 / 21	35 / 11	25 / 15	600 387

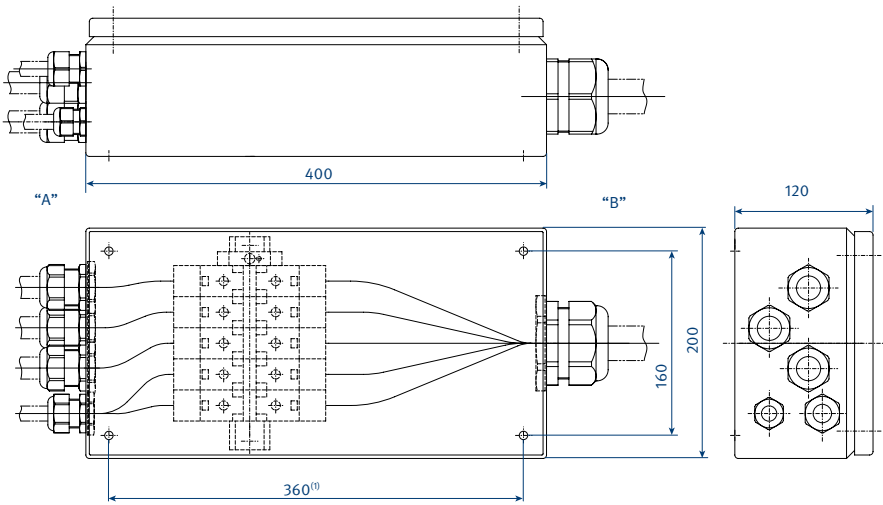
Terminal Box (for KELS, 125–200 A)

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 see page 13)



Type	Weight kg	for line feed	Order-No.
ES-ZK1	5,228	ES-KELS4/125HSC-1000-2	600 389
ES-ZK2	5,276	ES-KELS4/160HSC-1000-2 and ES-KELS4/200HSC-1000-2	600 390
ES-ZK3	5,595	ES-KELS5/125HSC-1000-2	600 391
ES-ZK4	5,645	ES-KELS5/160HSC-1000-2 and ES-KELS5/200HSC-1000-2	600 392

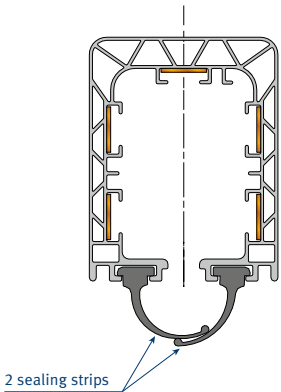
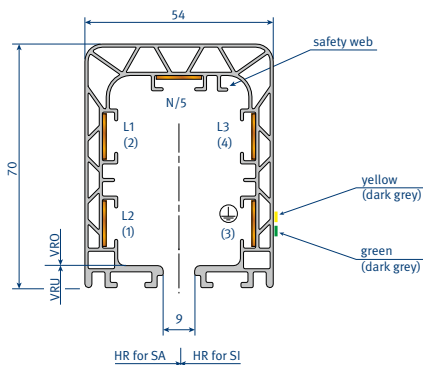
Feeds in the bow area on request.
(1) Fixing borings ø 7 mm at the bottom of the box.

Curves, Sealing strip & Cable glands for feeds

Curves

Production corresponding to customer drawing

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



Horizontal curve for SI and SA

SI = Safety-web inside
SA = Safety web outside

Vertical curve for VRO and VRU

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 strip (including accessories)

Type	Description	Order-No.
DL-D-KBH-MKH-MKL-TDV	Sealing strip ⁽¹⁾	600 551
DL-F-KBH	Fixing clamp for sealing strip (1 per end)	600 354
DL-V-KSLT-KBH-MKL/H-LSV/G	Coupling for sealing strip (2 for each joint)	258 300
DL-EZRD-KBH	Mounting glider for sealing strip	600 109
SA-ZB-DG-KSW-S	Sealing strip slide plate for collectors KSW	600 640

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... (Seite B)	M63	27–48	125 / 160 / 200 HS	12
BH-AKB-KBH...	M25	9–19	-	15

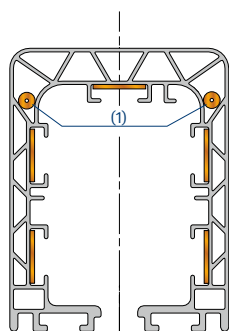
⁽¹⁾ The max. single length is 40 m long. For further distances are joint laces necessary.
For each meter system length have 2 m sealing strip to beordered. The delivery will be in pairs.

Heating

Heating cable

Type	Resistance ⁽¹⁾	Order-No.
HL-0,10-EYCEX-5203-PTFE-260-750	0,10 Ω/m	196 381
HL-0,15-EYCEX-5203-PTFE-260-750	0,15 Ω/m	196 382
HL-0,20-EYCEX-5203-PTFE-260-750	0,20 Ω/m	196 383
HL-0,32-EYCEX-5203-PTFE-260-750	0,32 Ω/m	196 384
HL-0,38-EYCEX-5203-PTFE-260-750	0,38 Ω/m	196 385
HL-0,48-EYCEX-5203-PTFE-260-750	0,48 Ω/m	196 386
HL-0,60-EYCEX-5203-PTFE-260-750	0,60 Ω/m	196 387
HL-0,81-EYCEX-5203-PTFE-260-750	0,81 Ω/m	196 389
HL-1,00-EYCEX-5203-PTFE-260-750	1,00 Ω/m	196 390
HL-1,44-EYCEX-5203-PTFE-260-750	1,44 Ω/m	196 391
HL-2,00-EYCEX-5203-PTFE-260-750	2,00 Ω/m	196 392
HL-3,00-EYCEX-5203-PTFE-260-750	3,00 Ω/m	196 393
HL-4,00-EYCEX-5203-PTFE-260-750	4,00 Ω/m	196 394
HL-4,40-EYCEX-5203-PTFE-260-750	4,40 Ω/m	196 395
HL-5,16-EYCEX-5203-PTFE-260-750	5,16 Ω/m	196 396
HL-5,60-EYCEX-5203-PTFE-260-750	5,60 Ω/m	196 397

(1) Tolerance ± 2,5 %



(2) Arrangement of the heating cables on both sides

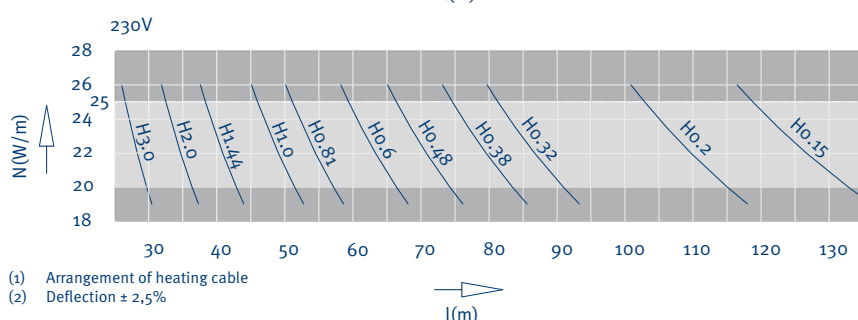
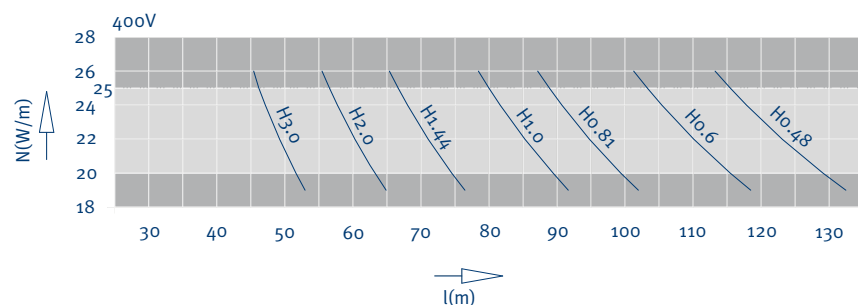
We recommend a heating system for outdoor installations and conductor systems in humid plants. The heating consists of two heating cables which are arranged according to the illustration beside.

Attention: Switch on heating system below + 5 °C 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.



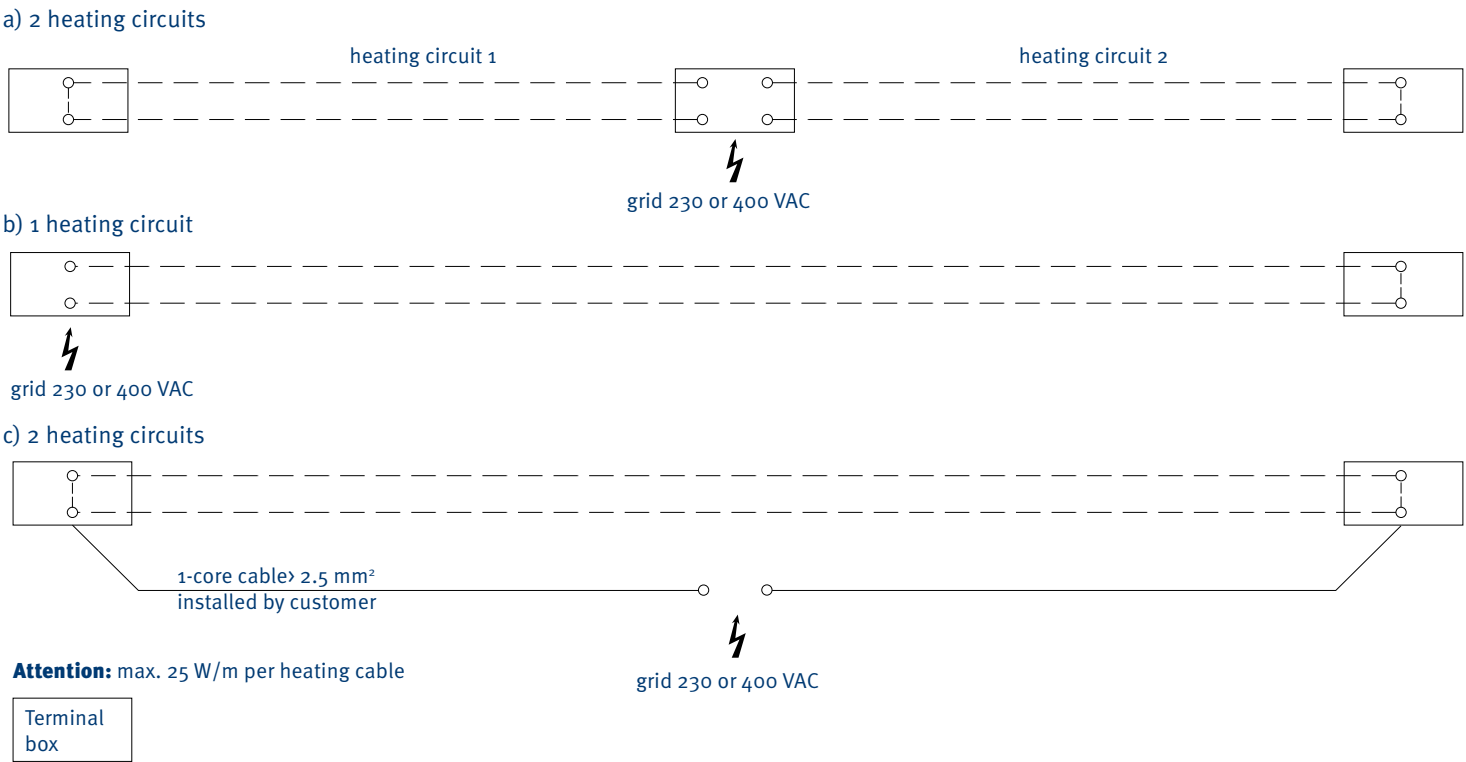
(1) Arrangement of heating cable
(2) Deflection ± 2,5%

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

U = Supply voltage (Volt)
R = Resistance of heating cable (Ohm/m)
L = Length of heating section (m)

Heating

Layout examples (depending on system situation)

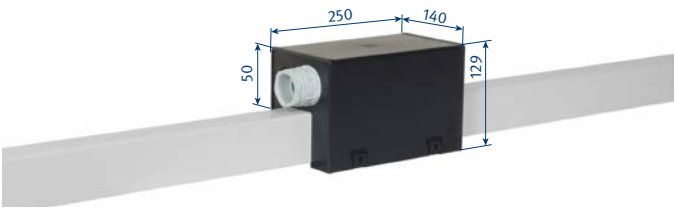


Terminal boxes for heating

Type	Version	Cable gland Measurements see page 13	Order-No.
BH-AKB-KBH-L	left end	M25	600 155
BH-AKB-KBH-R	right end	M25	600 156
BH-AKB-KBH-M	line feed	2 x M25	600 065
BH-MA-KBH-MKL/H-LSV/G	1 set material for connecting clamps		195 291

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.

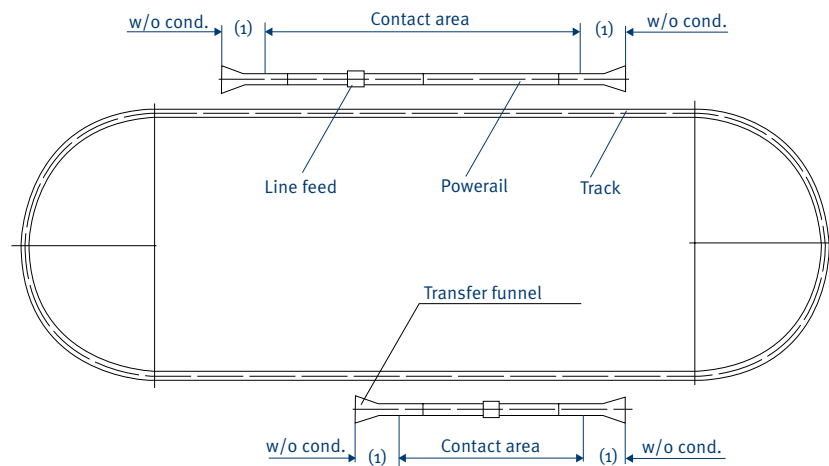
- Order for 60 m powerail - example c)
- 122 m heating cable type H 2,0
(2 x 60 m and 2 x 1 m additional)
Voltage 400 V, two heating circles parallel
heating capacity as per above mentioned diagramm
2 x 22 W/m at 60 m 2 x 22 W/m ~2640 W = 2,64 kW.
 - 1x Junction box left end
1x Junction box right end
 - 4x sets of material for connection ends.



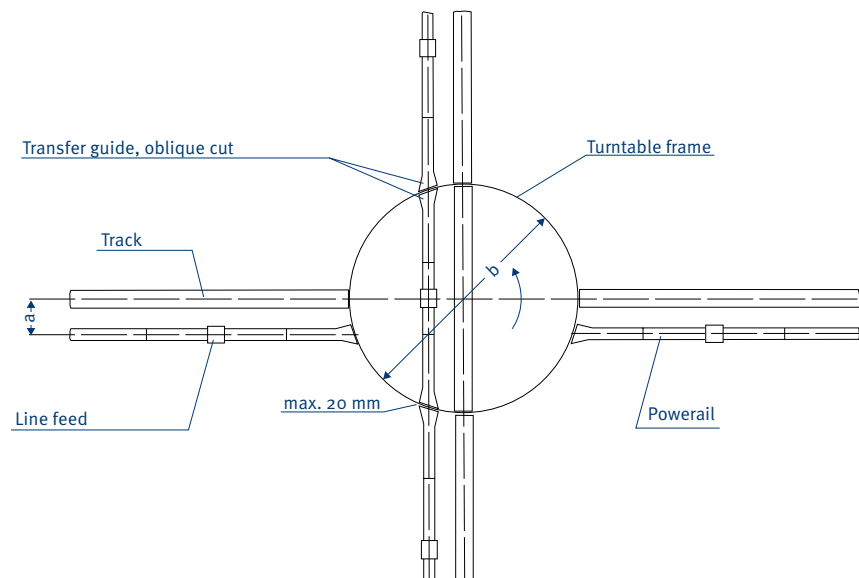
Switch gear assembly and temperature control unit as per customers inquiry.
Fuses, cables etc. have to be provided by the customer.

Contact sections, turntables & switches

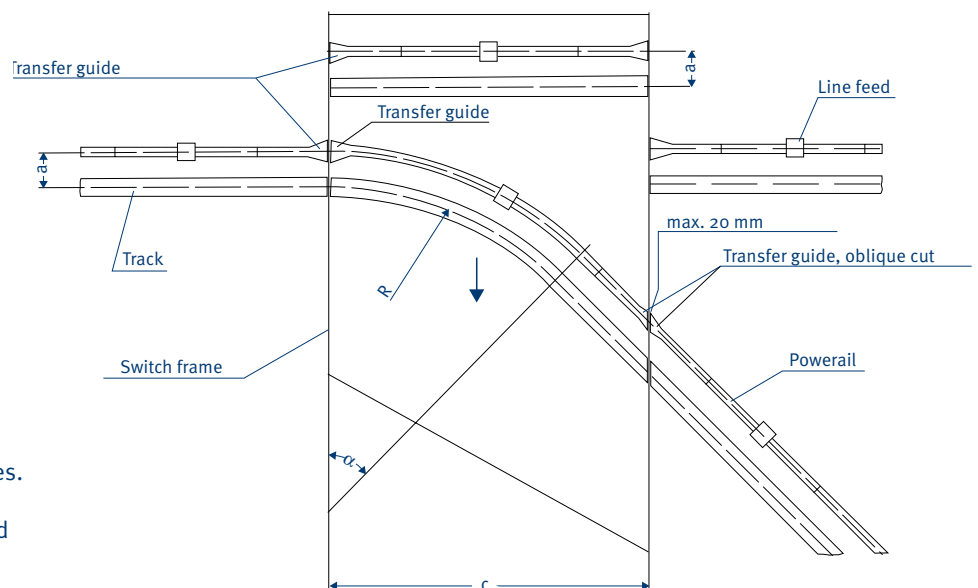
Contact section⁽¹⁾



Turntable



Switch



Please submit drawings of transfer applications.

Specify dimensions a, b, c, R and angle α ($\alpha = \max. 50^\circ$)

Max. 20 mm 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

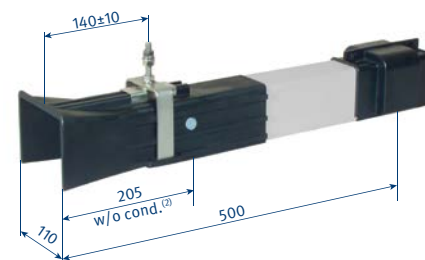
Transfer funnel

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

Offset: max. 10 mm horizontal
max. 10 mm vertical

Max. speed for crossover of the current collector 60 m/min.

Hints for dimensioning the left-and right hand version refer to page 6 and 7.



Type ⁽¹⁾	Weight kg	Order-No.	
		left version	right version
ET-KET4/63-125-L-HSC-500 ⁽²⁾	1,552	600 285	-
ET-KET4/63-125-R-HSC-500 ⁽²⁾	1,493	-	600 279
ET-KET4/160-L-HSC-500	1,636	600 286	-
ET-KET4/160-R-HSC-500	1,562	-	600 280
ET-KET4/200-L-HSC-500	1,786	600 305	-
ET-KET4/200-R-HSC-500	1,688	-	600 303
ET-KET5/63-125-L-HSC-500 ⁽²⁾	1,702	600 288	-
ET-KET5/63-125-R-HSC-500 ⁽²⁾	1,632	-	600 282
ET-KET5/160-L-HSC-500	1,784	600 289	-
ET-KET5/160-R-HSC-500	1,701	-	600 283
ET-KET5/200-L-HSC-500	1,934	600 306	-
ET-KET5/200-R-HSC-500	1,823	-	600 304
ET-KET4/63-L-SSD-500 ⁽²⁾	1,524	600 287	-
ET-KET4/63-R-SSD-500 ⁽²⁾	1,524	-	600 281
ET-KET5/63-L-SSD-500 ⁽²⁾	1,524	600 290	-
ET-KET5/63-R-SSD-500 ⁽²⁾	1,524	-	600 284

(1) Corresponding to the center of collector

(2) Also suitable for former 40 A-version

Transfer guides

Transfer guides, straight

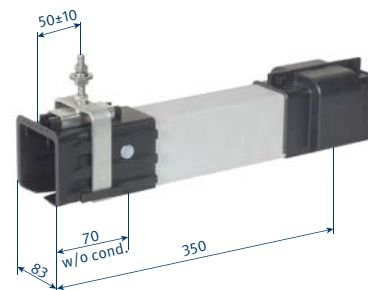
Necessary with all types of double collectors or 2 single collectors.

Staggered arrangement of the transfer guides to each other:

- max. 5 mm horizontal
- max. 3 mm vertical

Max. speed for crossover of the current collector 80 m/min.

Hints for dimensioning the left-and right hand version refer to page 6 and 7.



Type ⁽¹⁾	Weight kg	Order-No.	
		left version	right version
UE-KÜ4/63-125-L-HSC-350 ⁽²⁾	1,276	600 261	-
UE-KÜ4/63-125-R-HSC-350 ⁽²⁾	1,276	-	600 255
UE-KÜ4/160-L-HSC-350	1,351	600 262	-
UE-KÜ4/160-R-HSC-350	1,351	-	600 256
UE-KÜ4/200-L-HSC-350	1,490	600 309	-
UE-KÜ4/200-R-HSC-350	1,490	-	600 307
UE-KÜ5/63-125-L-HSC-350 ⁽²⁾	1,434	600 264	-
UE-KÜ5/63-125-R-HSC-350 ⁽²⁾	1,434	-	600 258
UE-KÜ5/160-L-HSC-350	1,509	600 265	-
UE-KÜ5/160-R-HSC-350	1,509	-	600 259
UE-KÜ5/200-L-HSC-350	1,648	600 310	-
UE-KÜ5/200-R-HSC-350	1,648	-	600 308
UE-KÜ4/63-L-SSD-350 ⁽²⁾	1,276	600 263	-
UE-KÜ4/63-R-SSD-350 ⁽²⁾	1,276	-	600 257
UE-KÜ5/63-L-SSD-350 ⁽²⁾	1,427	600 266	-
UE-KÜ5/63-R-SSD-350 ⁽²⁾	1,427	-	600 260

(1) Corresponding to the center of collector

(2) Also suitable for former 40 A-version

Transfer guides & Conductor dead section

Transfer guides, oblique

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

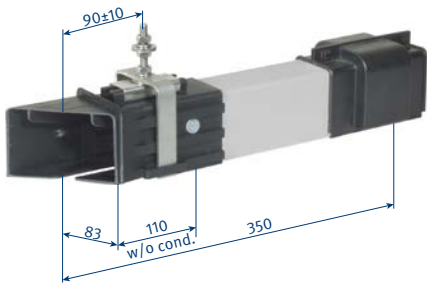
Staggered arrangement of the transfer guides to each other:

- max. 5 mm horizontal
- max. 3 mm vertical

Measurements (oblique) and angle to be specified by customer

Max. speed for crossover of the current collector 80 m/min.

Hints for dimensioning the left-and right hand version refer to page 6 and 7.

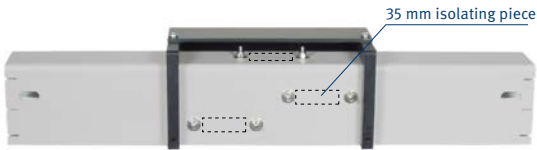


Type ⁽¹⁾	Weight kg	Order-No.	
		left version	right version
UE-KÜS4/63-125-L-HSC-350 ⁽²⁾	1,243	600 273	-
UE-KÜS4/63-125-R-HSC-350 ⁽²⁾	1,243	-	600 267
UE-KÜS4/160-L-HSC-350	1,324	600 274	-
UE-KÜS4/160-R-HSC-350	1,324	-	600 268
UE-KÜS4/200-L-HSC-350	1,517	600 317	-
UE-KÜS4/200-R-HSC-350	1,517	-	600 315
UE-KÜS5/63-125-L-HSC-350 ⁽²⁾	1,381	600 276	-
UE-KÜS5/63-125-R-HSC-350 ⁽²⁾	1,381	-	600 270
UE-KÜS5/160-L-HSC-350	1,447	600 277	-
UE-KÜS5/160-R-HSC-350	1,447	-	600 271
UE-KÜS5/200-L-HSC-350	1,668	600 318	-
UE-KÜS5/200-R-HSC-350	1,668	-	600 316
UE-KÜS4/63-L-SSD-350 ⁽²⁾	1,243	600 275	-
UE-KÜS4/63-R-SSD-350 ⁽²⁾	1,243	-	600 269
UE-KÜS5/63-L-SSD-350 ⁽²⁾	1,379	600 278	-
UE-KÜS5/63-R-SSD-350 ⁽²⁾	1,379	-	600 272

Conductor dead section

Please advise us which conductors should be disconnected (see Page 6 and 7).

The dead section comes factory assembled.



Picture shows a isolating piece.

Air gap 5 mm		Isolating piece 35 mm	
Type ⁽³⁾	Order-No.	Type	Order-No.
ST-KTL1...	600 298	ST-KTI1...	600 293
ST-KTL2...	600 299	ST-KTI2...	600 294
ST-KTL3...	600 300	ST-KTI3...	600 295
ST-KTL4...	600 301	ST-KTI4...	600 296
ST-KTL5...	600 302	ST-KTI5...	600 297

(1) Corresponding to the center of collector

(2) Also suitable for former 40 A-version

(3) 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 KSW → Order-No.: 600 295

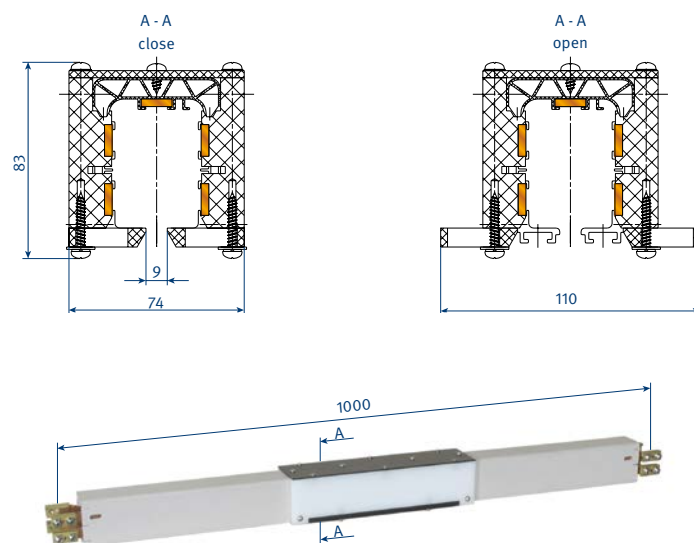
Removing section

Removing section (incl. 1m 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 housing the collector can be mounted and demounted easily.

Before opening disconnect mains.

The removing section does not disconnect the conductor system electrically.



For single collectors

Type	Weight kg	Order-No.
AT-KAT4/63-125HSC-1000 ⁽¹⁾	3,507	600 165
AT-KAT4/160HSC-1000	3,763	600 166
AT-KAT4/200HSC-1000	4,260	600 327
AT-KAT5/63-125HSC-1000 ⁽¹⁾	3,957	600 167
AT-KAT5/160HSC-1000	4,213	600 168
AT-KAT5/200HSC-1000	4,710	600 328
AT-KAT4/63SSD-1000 ⁽¹⁾	3,449	600 169
AT-KAT5/63SSD-1000 ⁽¹⁾	3,899	600 170

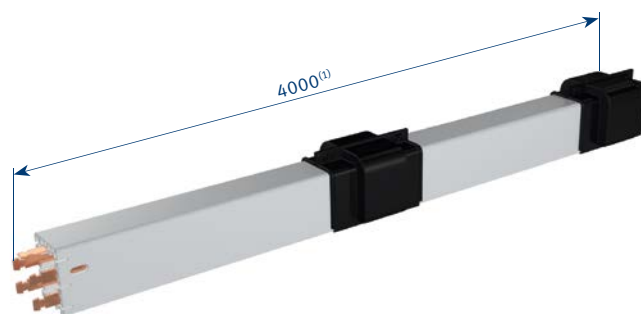
For double collectors

Type	Weight kg	Order-No.
AT-KATD4/63-125HSC-1000 ⁽¹⁾	4,330	600 175
AT-KATD4/160HSC-1000	4,566	600 176
AT-KATD4/200HSC-1000	5,050	600 329
AT-KATD5/63-125HSC-1000 ⁽¹⁾	4,780	600 177
AT-KATD5/160HSC-1000	5,015	600 178
AT-KATD5/200HSC-1000	5,501	600 330
AT-KATD4/63SSD-1000 ⁽¹⁾	4,312	600 179
AT-KATD5/63SSD-1000 ⁽¹⁾	4,762	600 180

⁽¹⁾ Also suitable for former 40 A-version

Maintenance Sections

For maintenance work with KBH systems, collector removal and conductor bar replacement can be easily and quickly achieved with a maintenance section. Maintenance sections conveniently drop out or reinstall at existing runway installations. To obtain best possible accessibility at longer runways we recommend installing several maintenance repair sections at convenient intervals or locations.



Type	Weight kg	Order-No.
RVT-KRT4/63-4000HSC	5,534	601 005
RVT-KRT5/63-4000HSC	5,953	601 007
RVT-KRT4/80-4000HSC	6,462	601 006
RVT-KRT5/80-4000HSC	7,113	601 008
RVT-KRT4/100-4000HSC	7,774	600 811
RVT-KRT5/100-4000HSC	8,753	600 812
RVT-KRT4/125-4000HSC	8,482	600 813
RVT-KRT5/125-4000HSC	9,461	600 814
RVT-KRT4/160-4000HSC	10,438	600 816
RVT-KRT5/160-4000HSC	11,417	600 817
RVT-KRT4/200-4000HSC	13,016	600 801
RVT-KRT5/200-4000HSC	13,994	600 802
RVT-KRT4/63-4000SSD	5,534	601 009
RVT-KRT5/63-4000SSD	5,953	601 010

(1) Standardlänge = 4000 mm; jede andere Länge und auch Revisionssteilstücke im Bogen ($R_{\min} = 1000 \text{ mm}$ / $L_{\min} = 1000 \text{ mm}$) auf Anfrage.

Anti-Condensation section

Anti-condensation section

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

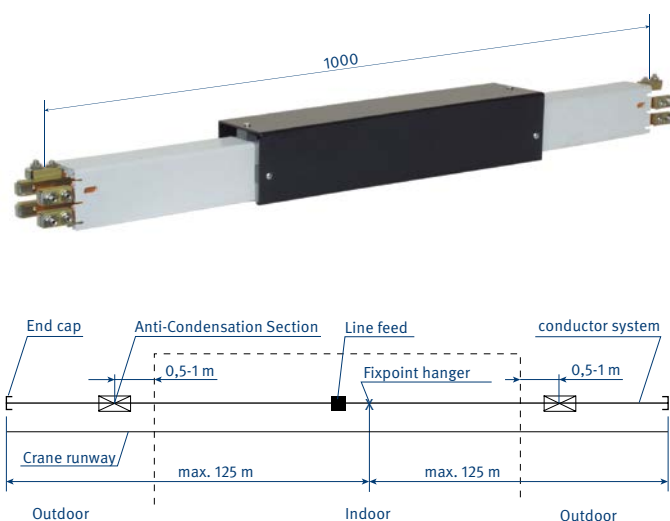
Application of Anti-condensation section

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

The anti-condensation section is to be placed directly (0,5m - 1m max.) at the transfer point from indoor to outdoor. See sketch.



Type	Weight kg	Order-No.
BT-KBT4/63-125HSC-1000 ⁽¹⁾	3,573	600 185
BT-KBT4/160HSC-1000	3,843	600 186
BT-KBT4/200HSC-1000	4,358	600 319
BT-KBT5/63-125HSC-1000 ⁽¹⁾	3,805	600 188
BT-KBT5/160HSC-1000	4,075	600 189
BT-KBT5/200HSC-1000	4,590	600 320
BT-KBT4/63SSD-1000 ⁽¹⁾	3,573	600 187
BT-KBT5/63SSD-1000 ⁽¹⁾	3,805	600 190

⁽¹⁾ Also suitable for former 40 A-version

Expansion section

Expansion section

The Expansion sections are required to compensate the different expansions 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 is exceeding 20 m.

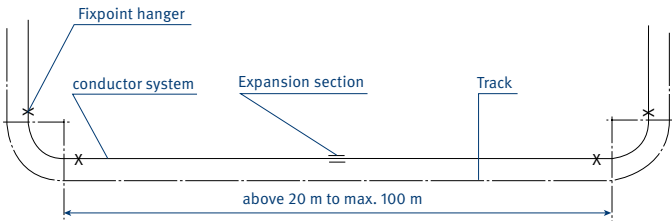
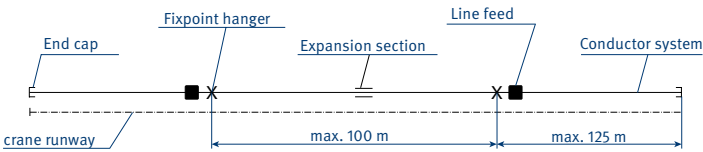
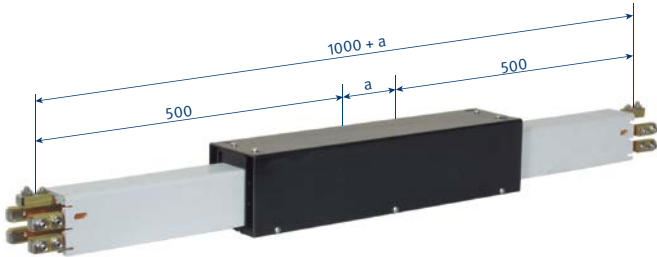
Max. length during differences in temperature:
 $\Delta t \ 90\text{ }^{\circ}\text{C}$ ($-30\text{ }^{\circ}\text{C}$ bis $+60\text{ }^{\circ}\text{C}$)
install one expansion joint per 100 m.
An additional expansion joint every 100 m.

Arrangement of fixpoints according to sketches.

The remaining conductor sections have to 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 and is valid for an ambient temperature of $-10\text{ }^{\circ}\text{C}$ to $+35\text{ }^{\circ}\text{C}$ during installation.



Type	Weight kg	Order-No.
DT-KD4/63-125HSC-1000 ⁽¹⁾	4,540	600 135
DT-KD4/160HSC-1000	4,752	600 136
DT-KD4/200HSC-1000	5,034	600 325
DT-KD5/63-125HSC-1000 ⁽¹⁾	5,014	600 138
DT-KD5/160HSC-1000	5,218	600 139
DT-KD5/200HSC-1000	5,508	600 326
DT-KD4/63SSD-1000 ⁽¹⁾	4,540	600 137
DT-KD5/63SSD-1000 ⁽¹⁾	5,014	600 140

⁽¹⁾ Also suitable for former 40 A-version

Single Current collector

Collector KSW

max. speed 150 m/min.

For conductor systems with sealing strip up to 100 m/min.

Connecting cable:

for 25 A with 2,5 mm²/core

for 40 A with 4,0 mm²/core

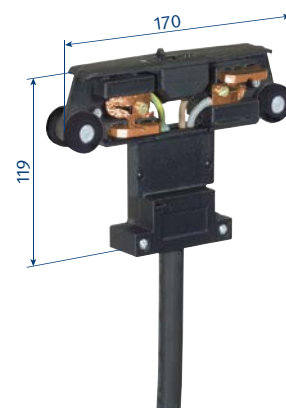
for 60 A with 6,0 mm²/core

1 m long, longer cables on request.

Cleaning collector on request.

Order example for a 2 m long cable

Order-No. 600 096-2 for collector SA-KSW4/40-2HS28-60



Type	Weight kg	No. of conductors	Power rating at 60 % DC in A	approx. diam. of connecting-cables in mm	Order-No.
SA-KSW4/25-1HS28-60	0,552	4	25	13,0	600 095
SA-KSW4/40-1HS28-60	0,656	4	40	15,0	600 096
SA-KSW4/60-1HS28-40	0,797	4	60 ⁽¹⁾	17,0	600 066
SA-KSW5/25-1HS28-60	0,634	5	25	14,0	600 098
SA-KSW5/40-1HS28-60	0,771	5	40	17,0	600 099
SA-KSW5/60-1HS28-40	0,945	5	60 ⁽¹⁾	19,0	600 413
SA-KSW4/25-1SS28-60	0,472	4	25	11,0	600 097
SA-KSW5/25-1SS28-60	0,534	5	25	12,0	600 100

Collector KSW5

max. speed 250 m/min.

For conductor systems with sealing strip up to 100 m/min.

Connecting cable:

for 25 A with 2,5 mm²/core

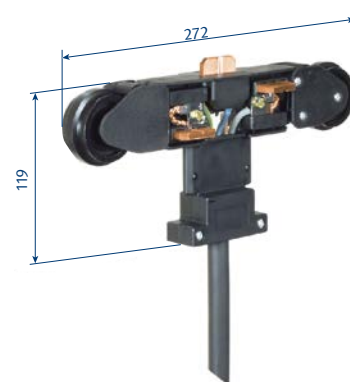
for 40 A with 4,0 mm²/core

for 60 A with 6,0 mm²/core

1 m long, longer cables on request.

Order example for a 2 m long cable

Order-No. 600 149-2 for collector SA-KSW5/40-2HS28-60



Type	Weight kg	No. of conductors	Power rating at 60 % DC in A	approx. diam. of connecting-cables in mm	Order-No.
SA-KSW54/25-1HS28-60	0,664	4	25	13,0	600 145
SA-KSW54/40-1HS28-60	0,768	4	40	15,0	600 146
SA-KSW54/60-1HS28-40	0,942	4	60 ⁽¹⁾	17,0	600 416
SA-KSW55/25-1HS28-60	0,724	5	25	13,5	600 148
SA-KSW55/40-1HS28-60	0,861	5	40	16,0	600 149
SA-KSW55/60-1HS28-40	1,035	5	60 ⁽¹⁾	19,0	600 417
SA-KSW54/25-1SS28-60	0,584	4	25	11,0	600 147
SA-KSW55/25-1SS28-60	0,624	5	25	12,0	600 150

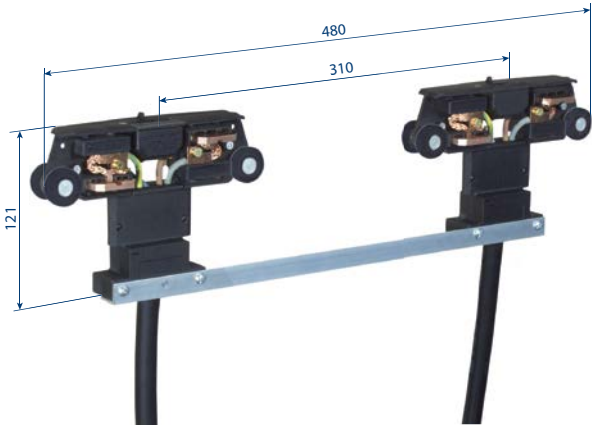
(1) at 40% DC

Double collector & Tow arms

Double collector DKSW (max. speed 150 m/min.)
Also for conductor systems with sealing strip up to 100 m/min.
The double collectors are supplied as an assembly kit consisting of 2 collectors (KSW) and a connecting bar with mounting material.
For the collector KSWs there are no double collectors available 2 single collectors must be used instead.

Connecting cable:
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
1 m long, longer cables on request.

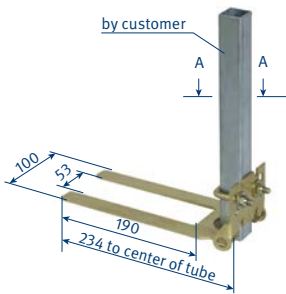
Order example for 2 m long cables
Order-No. 600 119-2 for collector SA-DKS5/80-2HS28-60
For curves use single collectors only.



Type	Weight kg	No. of conductors	Power rating at 60 % DC in A	approx. diam. of connecting-cables in mm	Order-No.
SA-DKS4/50-1HS28-60	1,215	4	50	12,5	600 115
SA-DKS4/80-1HS28-60	1,423	4	80	14,5	600 116
SA-DKS4/120-1HS28-40	1,705	4	120 ⁽¹⁾	17,0	600 414
SA-DKS5/50-1HS28-60	1,379	5	50	13,5	600 118
SA-DKS5/80-1HS28-60	1,653	5	80	16,0	600 119
SA-DKS5/120-1HS28-40	2,001	5	120 ⁽¹⁾	19,0	600 415
SA-DKS4/50-1SS28-60	1,055	4	50	11,0	600 117
SA-DKS5/50-1SS28-60	1,179	5	50	12,0	600 120

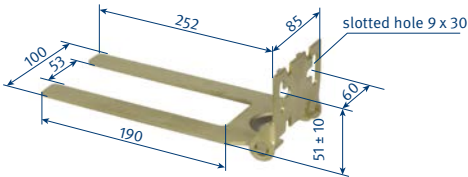
Tow arm
Installation options of 30 mm square-, hollow profile or tube with 30–34 mm

Type	Weight kg	Order-No.
MN-MGU	0,632	600 334
MN-MGU/K ⁽³⁾	0,550	600 336



Tow arm
Installation option for plane surface

Type	Weight kg	Order-No.
MN-MGF	0,524	600 335
MN-MGF/K ⁽³⁾	0,442	600 337

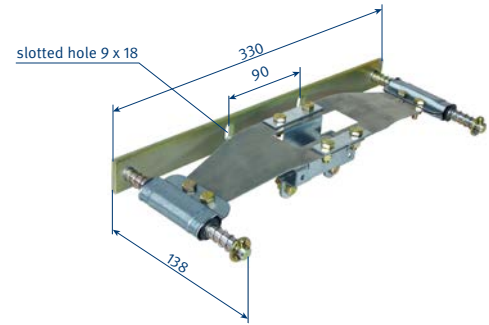


(1) At 40% DC
(2) For assembly use enclosed adapter plate
(3) Stainless steel

Flexible tow arm

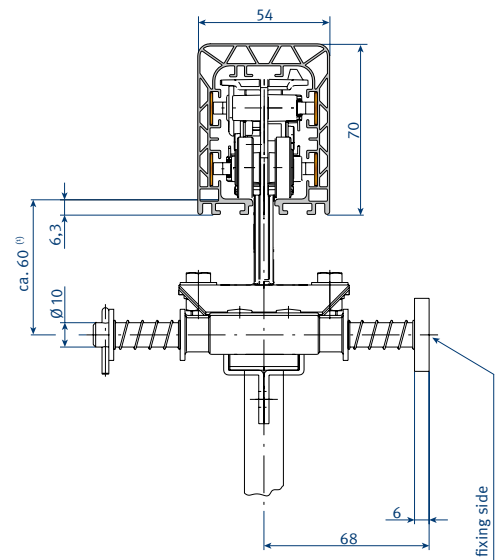
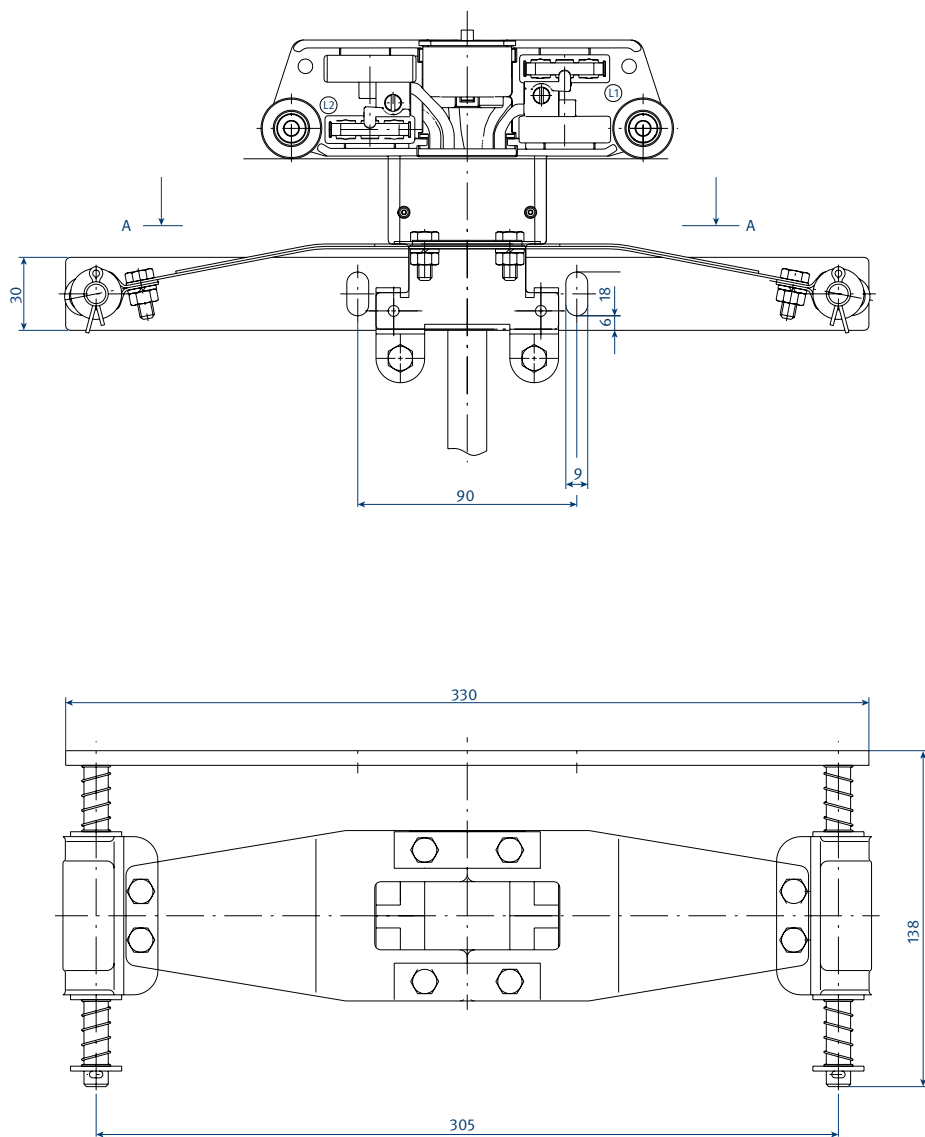
Flexible tow arm
Feixble support type for single collector for installations with transfer funnels type KET (see page 17). Measurements for installation see below. If you are going to use the flexible towing arm in system with curves please contact us.

Type	Weight kg	Order-No.
MN-KFMHN	1,067	600 558



Arrangement of a flexible tow arm

KFMHN with collector type KSW



max. horizontal offset 10 mm
max. vertical offset 10 mm

(1) To be fixed during installation.

Examples for ordering

Installation length of 64 m KBH... (configuration see page 6 and 7)

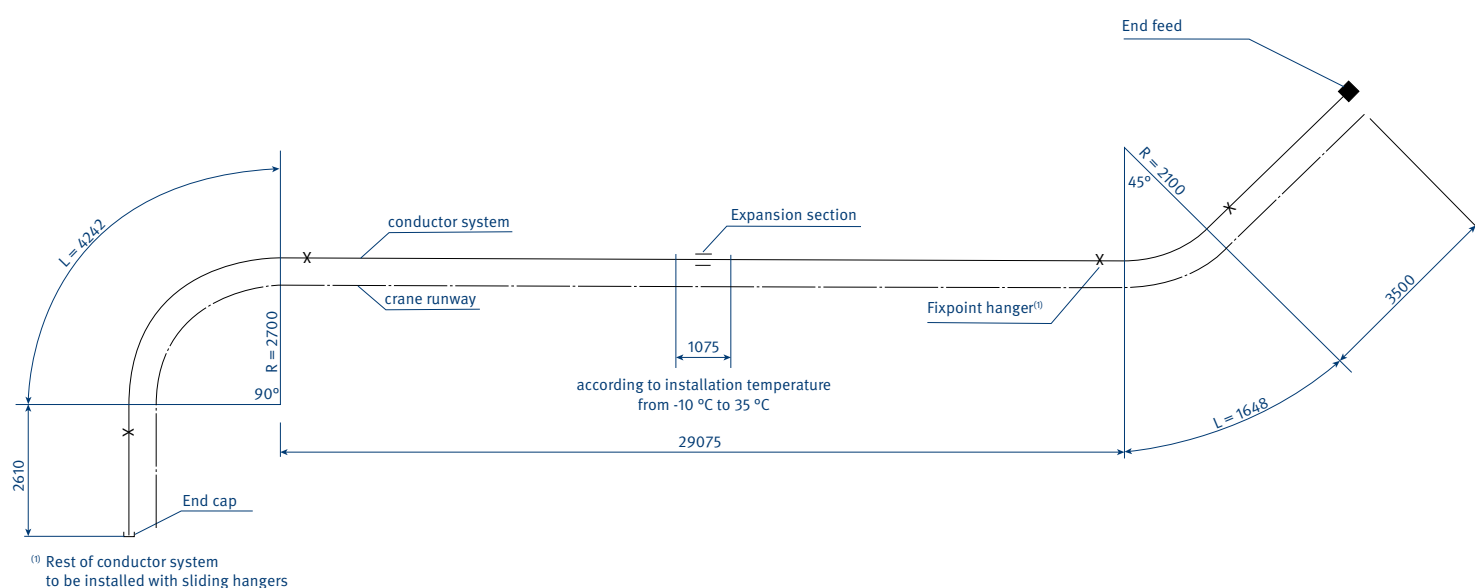
Quantity	Article	KBHF4/80-....HSC with end feed		KBHF5/100-....HSC with line feed		KBHS5/160-....HSC with line feed incl. 1m conductor section	
		Type	Order-No.	Type	Order-No.	Type	Order-No.
16	conductor section, 4 m long	KBHF4/80-4000HSC	600 984	KBHF5/100-4000HSC	600 124	-	-
15	conductor section, 4 m long	-	-	-	-	KBHS5/160-4000HSC	600 184
1	conductor section, 3 m long	-	-	-	-	KBHS5/160-3000HSC	600 183
1	End feed	ES-KKE4/63-80HS	600 010	-	-	-	-
1	Line feed	-	-	ES-KSE5/100HS-L	600 039	-	-
1	Line feed 1m long	-	-	-	-	ES-KELS5/160HSC-1000-2	600 079
1	End cap	EK-KE	600 008	-	-	-	-
2	End cap	-	-	EK-KE	600 008	EK-KE	600 008
15	Joint cap	VM-KVM	600 005	-	-	-	-
14	Joint cap	-	-	VM-KVM	600 005	-	-
16	Joint cap	-	-	-	-	VM-KVM	600 005
1	Fixpoint hanger	AH-KFA	600 007	AH-KFA	600 007	AH-KFA	600 007
32	Sliding hanger	AH-KGA	600 000	AH-KGA	600 000	AH-KGA	600 000
1	Current collector	SA-KSW4/40-1HS28-60	600 096	SA-KSW5/40-1HS28-60	600 099	SA-KSW5/40-1HS28-60	600 099
1	Tow arm	MN-MGU	600 334	MN-MGU	600 334	MN-MGU	600 334

Examples for ordering

Installations with curves as per customer drawing

41,075 m conductor system

Quantity	Article	KBHF4/80-....HSC		KBHS5/80-....HSC	
		Type	Order-No.	Type	Order-No.
7	Conductor system, 4m long	KBHF4/80-4000HSC	600 984	KBHS5/80-4000HSC	601 074
1	Conductor system, 4 m long for 1 x 3500 mm short length	KBHF4/80-4000HSC	600 984	KBHS5/80-4000HSC	601 074
1	Conductor system, 3 m long for 1 x 2610 mm short length	KBHF4/80-3000HSC	600 983	KBHS5/80-2000HSC	601 073
1	Conductor system, 2 m long for horizontal curve 45°, R = 2100 mm, L = 1648 mm, SA	KBHF4/80-2000HSC	600 982	KBHS4/125-2000HSC	601 072
2	Conductor system, 3 m long for horizontal curve 2 x 45°, R = 2700 mm, L = 2121 mm, SI	KBHF4/80-3000HSC	600 983	KBHS5/80-3000HSC	601 073
1	End feed	ES-KKE4/63-80HS	600 010	ES-KKE5/63-80HS	600 107
1	Expansion section	DT-KD4/63-125HSC-1000	600 135	DT-KD5/63-125HSC-1000	600 138
11	Joint cap	VM-KVM	600 005	VM-KVM	600 005
4	Fixpoint hanger	AH-KFA	600 007	AH-KFA	600 007
24	Sliding hanger	AH-KGA	600 000	AH-KGA	600 000
1	End cap	EK-KE	600 008	EK-KE	600 008
1	Current collector	SA-KSW4/40-1HS28-60	600 096	SA-KSW5/40-1HS28-60	600 099
1	Tow arm	MN-MGF	600 335	MN-MGF	600 335



Spare part list

Spare part list for conductor system

Type		KBHF	KBHS
		Order-No.	Order-No.
VM-KVM	Joint cap (pair)	600 005	600 005
VM-STV13/63-100A-KBHF/MKHF ⁽¹⁾	Spring loaded connector 63–100A	600 483	-
VM-SCHV13/63-200A-KBHS/MKHS/MKLS ⁽¹⁾	Bolted joints 63–160A	-	262 018
VM-SCHV13/200A-KBHS	Bolted joints 200A	-	600 712
DL-D-KBH-MKH-MKL-TDV	Neoprene sealing strip, in pairs (max. length 40m each)	600 551	600 551
DL-V-KSLT-KBH-MKL/H-LSV/G	Coupling for sealing strip, in pairs (for lengths < 40m each)	258 300	258 300
DL-F-KBH	Fixing clamp for sealing strip (1 per end)	600 354	600 354
DL-EZRD-KBH	Mounting glider for sealing strip (> 10m system length)	600 109	600 109
AK-KKE-MKE13/63-80-SO ⁽¹⁾	Feed terminal for end feed (63/80A)	600 006	600 006
AK-KSE-KEF-KES13/63-100A-S-70,2	Feed terminal for line feed (lateral)	600 017	600 017
AK-KSE-KEF-KES13/63-100A-O-67,2	Feed terminal for line feed (on top, 5th conductor)	600 016	600 016

Spare part list for current collector

Typ		KSW / DKSW	KSWS
		Order-No.	Order-No.
SK-KSW-MSWA-PH/SU-28	Carbon brush phase (lateral)	600 088	600 088
SK-KSW-PH/O-28	Carbon brush 5th conductor (top)	600 089	600 089
SK-KSW-MSWA-PE/S-28	Carbon brush ground (lateral PE)	600 090	600 090
SA-KF-KSW-MSWA-SP	Carbon pressure spring (standard), suitable for all carbon brushes	600 338	600 338
TR-DKSW-SB310	Connecting bar for double collector DKSW	600 105	-
SA-ZB-AS-KSW-P-250	Assembly kit KSWS	-	600 106
SA-ZB-DG-KSW-S	Sealing strip slide plate for collectors KSW	600 640	600 640

Cleaning accessories on request

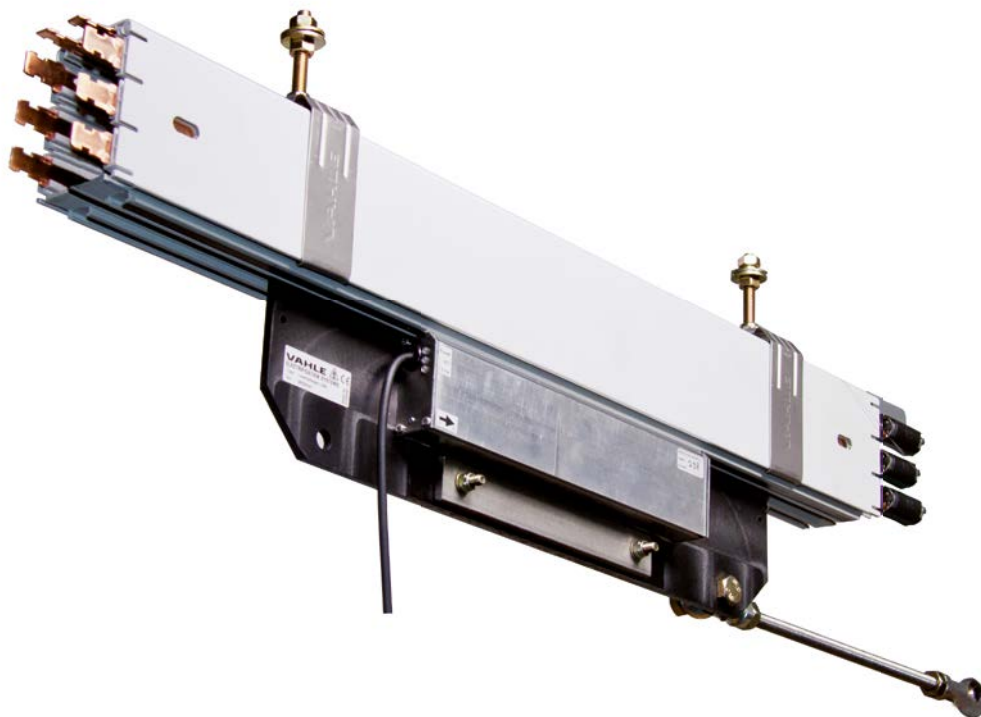
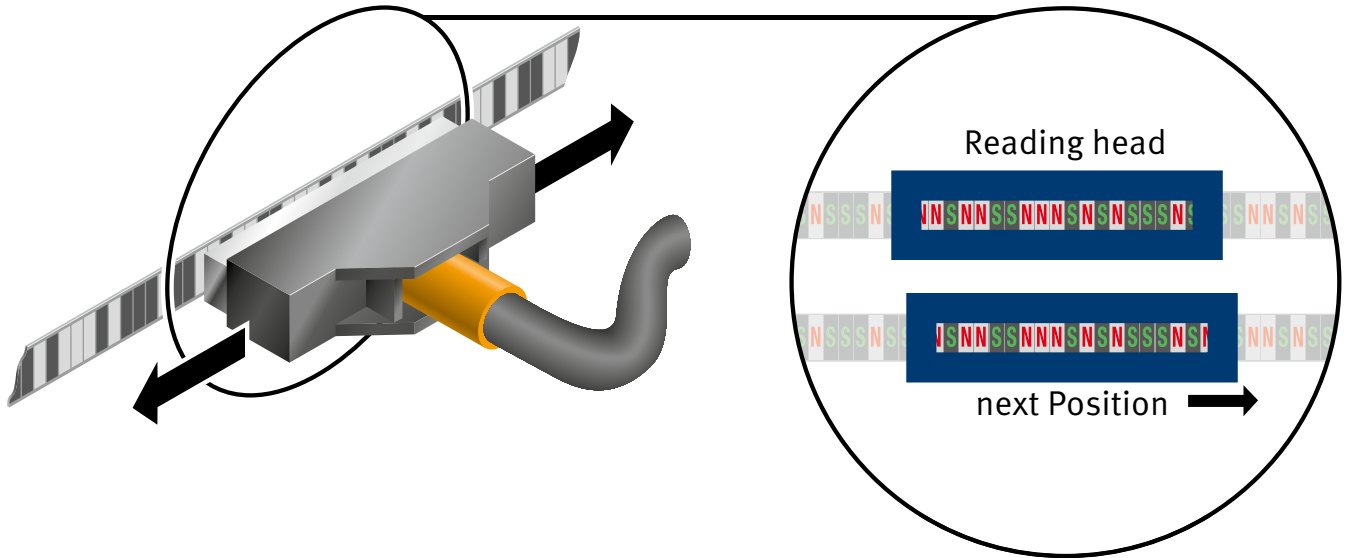
⁽¹⁾ Also suitable for former 40 A-version

APOS Positioning system

were developed for automated handling systems in material flow technology.

The control system can constantly query the absolute position of the mobile consumer.

The APOS Positioning System can be used in connection with the VAHLE Powercom® Data Transmission System.



Features

- absolute position determination up to and 262 m
- Systems for exceeded lengths on request
- Space-saving solutions for integration into the powerail system or for installation in parallel to the runway
- retrofittable
- absolute position immediately available when switching on or after a power failure
- reliable position detection even in humid or dusty environments
- trouble-free functionality even in poor lighting conditions
- travel speed up to 250 m/min
- no wear (contactless)

For more information see our catalog VAHLE APOS® (7a)

VAHLE Powercom®

VAHLE Powercom®-Data transmission systems in conjunction with VAHLE conductor bars or sliprings were developed for automated handling systems in material flow technology. They enable the uninterrupted and cost effective data transfer between the central control system and the accompanying automation devices on the conveying vehicles. The VAHLE Powercom® data transmission system can be used in connection with the VAHLE Powercom® Data Transmission System.



VAHLE Powercom® 485

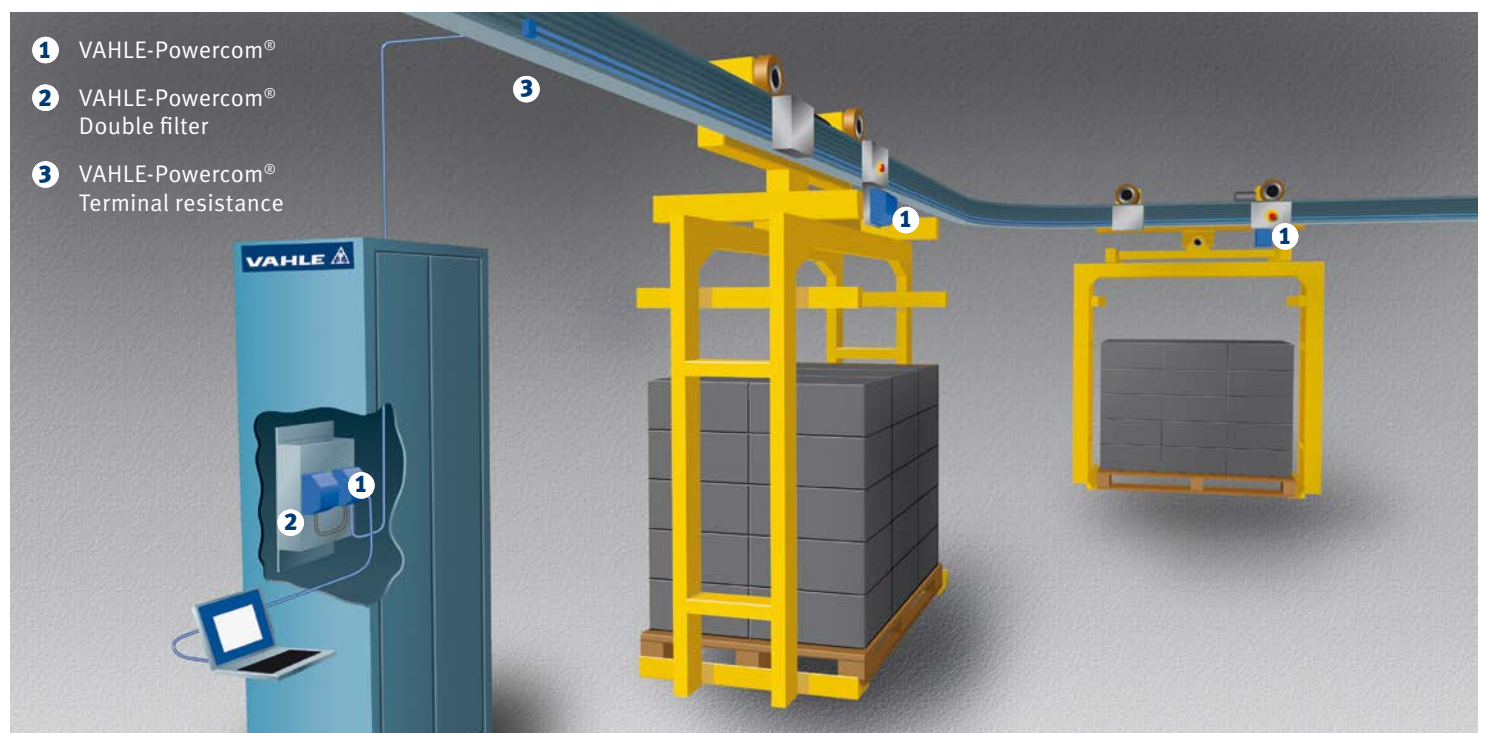
- RS 485 Interface (transparent protocol)
- to be used in various BUS-Systems.
- Transfer rate 19.2 kbps

For more information see our catalog VAHLE POWERCOM® (6a)

VAHLE Powercom® 485-HD

- SRS 485 Interface (transparent protocol)
- to be used in various BUS-Systems
- Transfer rate from 28,8 upto 187,5 kbps

Example of use



Questionnaire

Company: _____ Date: _____

Fon: _____ Fax: _____

eMail: _____ Internet: _____

1. Number of conductor system installations: _____

2. Type of equipment to be powered: _____

3. Operating voltage: _____ Volt Frequency: _____ Hz

Three phase voltage: ☐

AC voltage: ☐

DC voltage: ☐

4. Track length: _____

5. Number of conductors: _____ neutral: _____ control: _____ ground: _____

6. Mounted position of conductor system:

☐ Conductor system pendant, collector cable facing to the bottom

☐ Conductor system pendant, lateral payout of conductor cable⁽¹⁾

☐ Support distance _____ m (max. 2m)

☐ other: _____

7. Number of consumers per system: _____

8. Indoor: ☐

Outdoor: ☐

9. Other operating conditions (humidity, dust, chemical influence, etc.) _____

10. Ambient temperature: _____ °C min. _____ °C max.

11. Hall expansion joints: _____ pieces expansion min.: _____ expansion max.: _____

12. Position and number of feeding points⁽¹⁾: _____

13. Position and number of isolating sections (e.g. for maintenance)⁽¹⁾: _____

14. How will the conductor be arranged?⁽¹⁾: _____

15 Brackets required: yes ☐ no ☐ c/c distance beam/conductor system: _____

16. Travel speed: _____ m/min. in curves: _____ m/min. at transfers: _____ m/min.

17. Max. voltage drop from the conductor system feed point to the consumer considering starting current.

18. Power consumption of the individual consumer loads: _____

Motor data	Crane 1							Crane 2						
	Power kW	Nominal current			Starting current		Type of Motors ⁽²⁾	Power kW	Nominal current			Starting current		Type of Motors ⁽²⁾
		A	cos ϕ_N	% DC	A	cos ϕ_A			A	cos ϕ_N	% DC	A	cos ϕ_A	
Hoist motors														
Auxiliary hoist														
Long travel														
Cross travel														

Mark with * those motors which can run simultaneously.

Mark with those motors which can start up simultaneously.

Further remarks: _____

⁽¹⁾ For curved tracks, powerail with isolating sections etc., we require sketches to enable us to prepare a quotation

⁽²⁾ Use: K for squirrel cage motor, S for slipring motor, F for frequency controlled motor

We reserve all rights to make alterations in the interests of further development

Please copy and fill in the questionnaire

Signature _____

Pictures of plants



Notes

Notes

Handwriting practice area with dotted lines for tracing and writing.

Scope of delivery and services

Catalog no.

1 Open conductor systems	
Open conductor systems	1a
2 Insulated conductor systems	
U10	2a
FABA 100	2b
U15, U25, U35	2c
U20, U30, U40	2d
3 Compact conductor systems	
VKS 10	3a
VKS - VKL	3b
VMT	3c
4 Enclosed conductor systems	
KBSL - KSL	4a
KBH	4b
MKH	4c
LSV - LSVG	4d
5 Contactless power supply	
Contactless power supply (CPS®)	5a
6 Data transmission	
VAHLE Powercom®	6a
Slotted Microwave Guide (SMG)	6b
7 Positioning systems	
VAHLE APOS®	7a
VAHLE APOS® Optic	7b
8 Festoon systems and cables	
Festoon systems for □-tracks	8a
Festoon systems for flatform cables on I-tracks	8b
Festoon systems for round cables on I-tracks	8c
Festoon systems for ◇-tracks	8d
Cables	8e
9 Reels	
Spring-operated cable reels	9a
Motor-powered cable reels	9b
10 Other	
Battery charging systems	10a
Heavy enclosed conductor systems	10b
Tender	10c
Contact wire	10d
11 Automotive Handling	
Control systems	11a
BOK	11b
Assemblies / Commissioning	
Spare parts / Maintenance service	



DQS certified in accordance with DIN EN ISO 9001:2008
OHSAS 18001 (Reg.No. 003140 QM OH)

