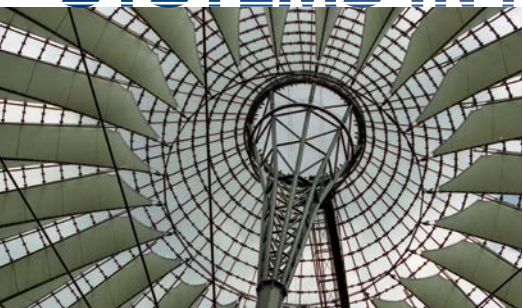




VAHLE

Enclosed Conductor System MKH

SYSTEMS IN MOTION



Enclosed conductor system MKH

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Description of the conductor system

The MKH... is a totally enclosed conductor system for indoor and outdoor use. The insulated housing can accommodate different copper sections.

Type MKHD in 6 to 10 conductor version, continuous copper strips 40 - 160 A (copper strips come as separate items as coils).

Type MKHF in 6- and 8-conductor version, with preassembled copper conductors and spring loaded connectors from 40 to 100 A.

Type MKHS in 6- and 8-conductor version, with preassembled copper conductors and bolted joints from 40 to 200 A.

A compact design, corrosion resistance and easy installation are the main characteristics.

The MKH complies with VDE, european and international standards as well as accident prevention regulations. It is protected to IP 23 standards.

The MKH can be supplied with sealing strip and heating system. With sealing strip it is protected to IP 24 standards and EN 60529 (0470, part 1) regulation.

Collectors are safe against touch 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 powerail during operation, provide safety barrier or disconnect mains. This is valid only for a supply voltage exceeding 24 VAC or 60 VDC.

If a conductor is used as N please note VDE 0100 part 430.

Applications

Mobile power feeding of overhead cranes, monorail systems, electric hoists, electric power tools, machine tools, automated storage and retrieval systems, assembly and test lines, hangar doors, studio & station lighting systems and many others.

Approvals

UL-approved

Housing

Color grey, plastic housing for 6 to 10 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 sections

End section incl. end cap for MKHD and end caps for MKHF and MKHS.

Hangers

The brackets are installed to the crane track (see page 11).

The conductor rails are located in sliding and fixpoint hangers.

Max. support distance with the following ambient temperatures:

- Indoor systems and covered 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 and Frozen storage warehouses: $\leq 0^{\circ}\text{C} = 1,33\text{ m}$

Expansion during temperature fluctuation

Housing-expansion section without electrical isolation for MKHD. Expansion section (Housing and Cu) without electrical isolation for MKHF and MKHS.

Anti-condensation sections

For combined indoor/outdoor applications use anti-condensation sections. They do not interrupt electric conductors.

Contact sections, turntables, switches

Conductor systems with entry funnels or transfer guides see pages 20 and 21.

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 rail section can be separated electrically, e.g. for control.

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.

With following system requirements double collectors have to be used:

- Transfers with switches and turntables
- low voltages, frequency controlled drives
- transmission of data- and/or emergency stop signals
- high electrical loads

The length of the collector cable may not exceed 3 m if the added overcurrent protection device is not designed for the load capacity of this cable. Please refer also to regulations VDE 0100, part 430 and EN 60204-32.

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 Powerail systems with curves, dead sections, turntables, switches etc. we require your drawings or sketches. Please use our questionnaire, page 35.

Electrical properties

Max. continuous current	Nominal voltage (UL)	Dielectric strength	Spec. resistance	Surface resistance	Leakage resistance
200 A (with 80% duty cycle)	690V (600V)	IEC 60243 30-40 KV/mm	IEC 60093 $5 \times 10^{15} \Omega/\text{cm}$	IEC 60093 $10^{13} \Omega$	EN 60112 CTI 400-2,7

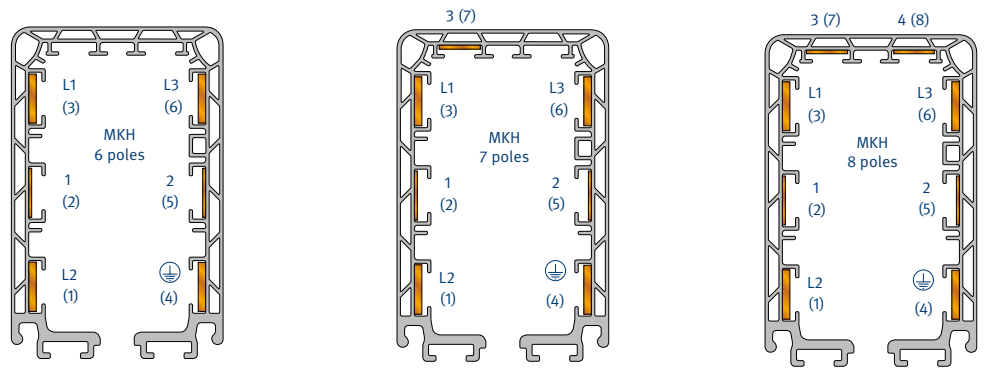
Mechanical properties


Flexible strength	Tensile strength	Temperature range (ambient):	Combustibility	Resistance to chemicals (at + 45 °C)
75 N/mm ² ± 10 %	40 N/mm ² ± 10	- 30 °C bis + 60 °C	flame retardant DIN 41 02 - Klasse B 1; self extinguishing	Gasoline, Mineral Oil, Grease, Sulphuric acid 50 %, Caustic soda 25 % and 50 % Hydro-chloric acid, concentrated

Technical Data

Cross sections:⁽¹⁾

In case of using a neutral conductor copper pos.1 will be taken.
Layout of the system on request.



Type ⁽²⁾ (HS with PE SS without PE)	No. of con- ductors	Copper cross section mm ²				Ampere rating with 35 °C in A, L1, L2, L3			No- minal volta- ge V	Impedance at 50 Hz 20 °C Ω/1000 m	Resis- tance at 20 °C Ω/1000 m	Leakage distance mm
		Phase L1, L2, L3		Control-line	60 % DC	80 % DC	100 % DC					
MKH...6/40-HSC	6	3 x 10	10	2 x 10	-	52	45	40	690	1,731	1,717	30
MKH...6/40-SSD	6	-	-	6 x 10	-	52	45	40	690	1,731	1,717	30
MKH...6/63-HSC	6	3 x 14	14	2 x 10	-	81	70	63	690	1,267	1,249	30
MKH...6/100-HSC	6	3 x 26	26	2 x 10	-	129	112	100	690	0,717	0,687	30
MKH...6/140-HSC	6	3 x 33	26	2 x 10	-	161	140	125	690	0,586	0,549	30
MKH...6/160-HSC	6	3 x 42	26	2 x 10	-	184	160	143	690	0,473	0,429	30
MKH...6/200-HSC ⁽³⁾	6	3 x 51	26	2 x 10	-	231	200	179	690	0,393	0,344	30
MKH...7/40-HSC	7	3 x 10	10	2 x 10	1 x 11	52	45	40	690	1,731	1,717	30
MKH...7/40-SSD	7	-	-	6 x 10	1 x 11	52	45	40	690	1,731	1,717	30
MKH...7/63-HSC	7	3 x 14	14	2 x 10	1 x 11	81	70	63	690	1,267	1,249	30
MKH...7/100-HSC	7	3 x 26	26	2 x 10	1 x 11	129	112	100	690	0,717	0,687	30
MKH...7/140-HSC	7	3 x 33	26	2 x 10	1 x 11	161	140	125	690	0,586	0,549	30
MKH...7/160-HSC	7	3 x 42	26	2 x 10	1 x 11	184	160	143	690	0,473	0,429	30
MKH...7/200-HSC ⁽³⁾	7	3 x 51	26	2 x 10	1 x 11	231	200	179	690	0,393	0,344	30
MKH...8/40-HSC	8	3 x 10	10	2 x 10	2 x 11	52	45	40	690	1,731	1,717	30
MKH...8/40-SSD	8	-	-	6 x 10	2 x 11	52	45	40	690	1,731	1,717	30
MKH...8/63-HSC	8	3 x 14	14	2 x 10	2 x 11	81	70	63	690	1,26	1,25	30
MKH...8/100-HSC	8	3 x 26	26	2 x 10	2 x 11	129	112	100	690	0,71	0,69	30
MKH...8/140-HSC	8	3 x 33	26	2 x 10	2 x 11	161	140	125	690	0,57	0,55	30
MKH...8/160-HSC	8	3 x 42	26	2 x 10	2 x 11	184	160	143	690	0,46	0,43	30
MKH...8/200-HSC ⁽⁴⁾	8	3 x 51	26	2 x 10	2 x 11	231	200	179	690	0,38	0,35	30

(1) Numbers in paranthesis apply to control line

(2) Complete types e.g. MKHS 7/63 HS for 7 poles with bolted joints

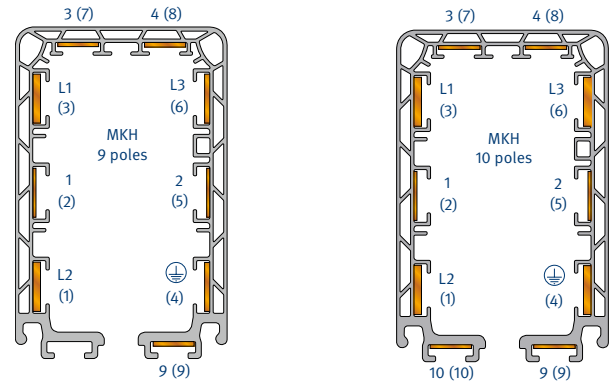
(3) only for MKHS

Technical data & standard sections

Cross sections:⁽¹⁾

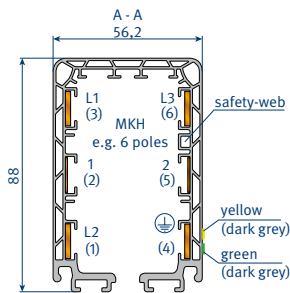
In case of using a neutral conductor copper pos.1 will be taken.

Layout of the system on request.

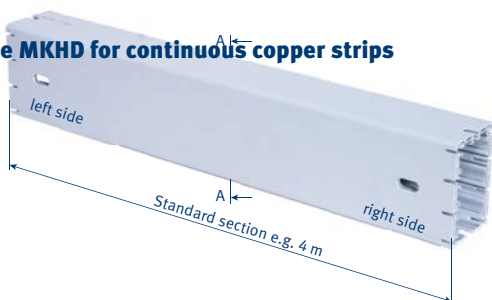


Type ⁽²⁾ (HS with PE SS without PE)	No. of con- ductors	Copper cross section mm ²		Ampere rating with 35 °C in A, L1, L2, L3			No- minal vol- tage V	Impedance at 50 Hz 20 °C Ω/1000 m	Resis- tance at 20 °C Ω/1000 m	Leakage distance mm		
		Phase L1, L2, L3		Control-line	60 % DC	80 % DC					100 % DC	
MKHD...9/40-HSC	9	3 x 10	10	2 x 10	3 x 11	52	45	40	690	1,731	1,717	30
MKHD...9/40-SSD	9			6 x 10	3 x 11	52	45	40	690	1,731	1,717	30
MKHD...9/63-HSC	9	3 x 14	14	2 x 10	3 x 11	81	70	63	690	1,267	1,249	30
MKHD...9/100-HSC	9	3 x 26	26	2 x 10	3 x 11	129	112	100	690	0,717	0,687	30
MKHD...9/140-HSC	9	3 x 33	26	2 x 10	3 x 11	161	140	125	690	0,586	0,549	30
MKHD...9/160-HSC	9	3 x 42	26	2 x 10	3 x 11	184	160	143	690	0,473	0,429	30
MKHD...10/40-HSC	10	3 x 10	10	2 x 10	4 x 11	52	45	40	690	1,731	1,717	30
MKHD...10/40-SSD	10			6 x 10	4 x 11	52	45	40	690	1,731	1,717	30
MKHD...10/63-HSC	10	3 x 14	14	2 x 10	4 x 11	81	70	63	690	1,267	1,249	30
MKHD...10/100-HSC	10	3 x 26	26	2 x 10	4 x 11	129	112	100	690	0,717	0,687	30
MKHD...10/140-HSC	10	3 x 33	26	2 x 10	4 x 11	161	140	125	690	0,586	0,549	30
MKHD...10/160-HSC	10	3 x 42	26	2 x 10	4 x 11	184	160	143	690	0,473	0,429	30

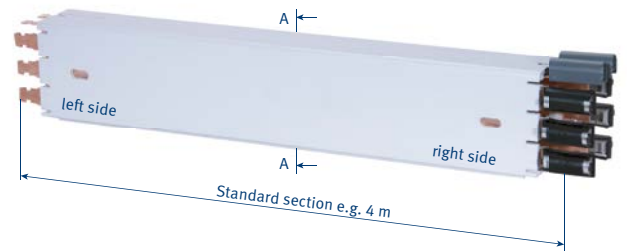
Standard sections



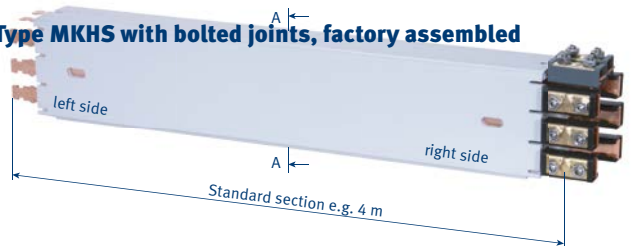
Type MKHD for continuous copper strips



Type MKHF with plug-in joints, factory assembled



Type MKHS with bolted joints, factory assembled



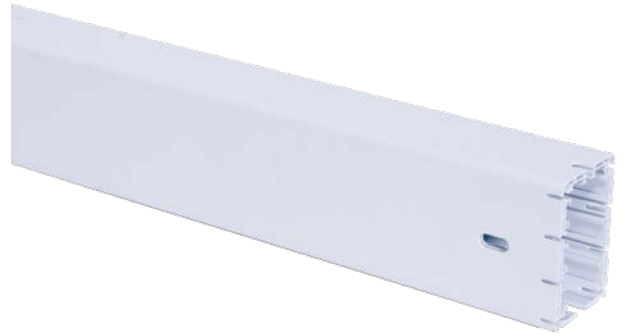
(1) Numbers in paranthesis apply to control line

(2) 80 % duty cycle

Types & order numbers

Type MKHD

with continuous copper strips,
to be drawn in during installation.



Type ⁽¹⁾	Weight kg/m	Order-No.
MKHD-....HSC	1,052	262 50•
MKHD-....SSD	1,052	262 51•

Type MKHF

with factory assembled copper strips
and plug-in joints (40 – 100 A)



Type ⁽¹⁾	Weight kg/m	Order-No.
MKHF6/40-....HSC	1,638	262 03•
MKHF6/40-....SSD	1,638	262 02•
MKHF6/63-....HSC	1,770	262 04•
MKHF6/100-....HSC	2,198	262 05•
MKHF7/40-....HSC	1,748	262 07•
MKHF7/40-....SSD	1,748	262 06•
MKHF7/63-....HSC	1,880	262 08•
MKHF7/100-....HSC	2,308	262 09•
MKHF8/40-....HSC	1,858	262 11•
MKHF8/40-....SSD	1,858	262 10•
MKHF8/63-....HSC	1,990	262 12•
MKHF8/100-....HSC	2,418	262 13•

(1) Complete types e.g. MKHD-4000HSC for 4 m with PE, Order-No. 262 504

MKHF8/40-4000HS for 4 m with PE, Order-No. 262 114

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

Type MKHS

with factory assembled copper strips
and bolted joints (40 - 200A)



Type ⁽¹⁾	Weight kg/m	Order - No.
MKHS6/40-....HSC	1,818	262 18•
MKHS6/40-....SSD	1,818	262 17•
MKHS6/63-....HSC	1,950	262 19•
MKHS6/100-....HSC	2,378	262 20•
MKHS6/140-....HSC	2,555	262 21•
MKHS6/160-....HSC	2,798	262 22•
MKHS6/200-....HSC	3,042	262 23•
MKHS7/40-....HSC	1,955	262 25•
MKHS7/40-....SSD	1,955	262 24•
MKHS7/63-....HSC	2,087	262 26•
MKHS7/100-....HSC	2,515	262 27•
MKHS7/140-....HSC	2,692	262 28•
MKHS7/160-....HSC	2,935	262 29•
MKHS7/200-....HSC	3,181	262 30•
MKHS8/40-....HSC	2,092	262 32•
MKHS8/40-....SSD	2,092	262 31•
MKHS8/63-....HSC	2,224	262 33•
MKHS8/100-....HSC	2,652	262 34•
MKHS8/140-....HSC	2,829	262 35•
MKHS8/160-....HSC	3,072	262 36•
MKHS8/200-....HSC	3,318	262 37•

(1) Complete types e.g. MKHS8/40-4000HSC for 4 m with PE, Order-No. 262 324

The 4-digit number (in bold) in the type indicates the length of the section in mm.

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

Sections & Sealing strips

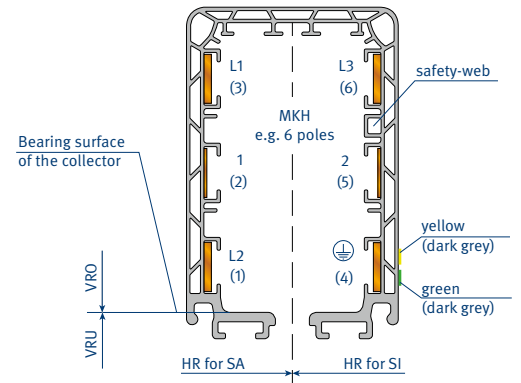
Curves

Min. bending radius, horizontal = 1000 mm
 max. length L = 3600 mm
 max. \curvearrowright 120 °
 Smallest vertical radius = on request

HR for SI = Horizontal radius - Safety web inside
 HR for SA = Horizontal radius - Safety web outside

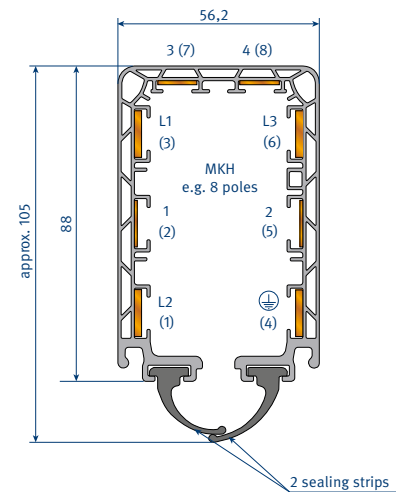
VRO = Vertical radius upwards
 VRU = Vertical radius downwards

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

The sealing strip is available in lengths of 10 m, 20 m and 40 m.



Sealing strip including accessories

Type	Description	Order - No.
DL-D-KBH-MKH-MKL-TDV10 ⁽¹⁾	Sealing strip 10 m long	600 551-10
DL-D-KBH-MKH-MKL-TDV20 ⁽¹⁾	Sealing strip 20 m long	600 551-20
DL-D-KBH-MKH-MKL-TDV40 ⁽¹⁾	Sealing strip 40 m long	600 551-40
DL-F-MKL/H	Fixing clamp for sealing strip (1 per end)	236 105
DL-V-KSLT-KBH-MKL/H-LSV/G	Joint for coupling the sealing strip (2 per joint)	258 300
DL-EZRD-MKL/H	Mounting glider for sealing strip	234 552
SA-ZB-DG-MSWA-S	Sealing strip slide plate for collector MSWA	236 625

(3) The max. single length is 40 m long. For longer distances joint laces are necessary.
 For each meter system length 2 m sealing strip to be ordered.
 Not available for 9- and 10-pole systems.

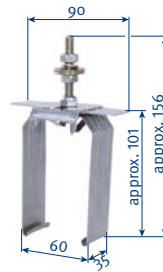
Hangers & end sections

Sliding hanger



Type	Weight kg	Order - No.
AH-MGH	0,118	262 000
AH-MGH/K ⁽¹⁾	0,118	262 003

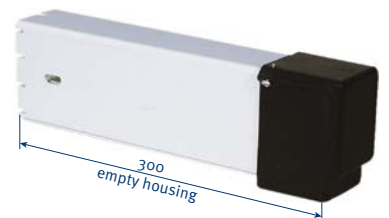
Fixpoint hanger



Type	Weight kg	Order - No.
AH-MFH	0,162	262 001
AH-MFH/K ⁽¹⁾	0,162	262 002

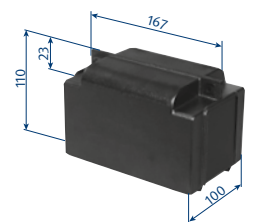
End section (MKHD)

0,3 m long



Type	Weight kg	Execution	Order - No.
EK-MHED/L	0,401	left	262 537
EK-MHED/R	0,401	right	262 536

End cap (MKHF / MKHS)



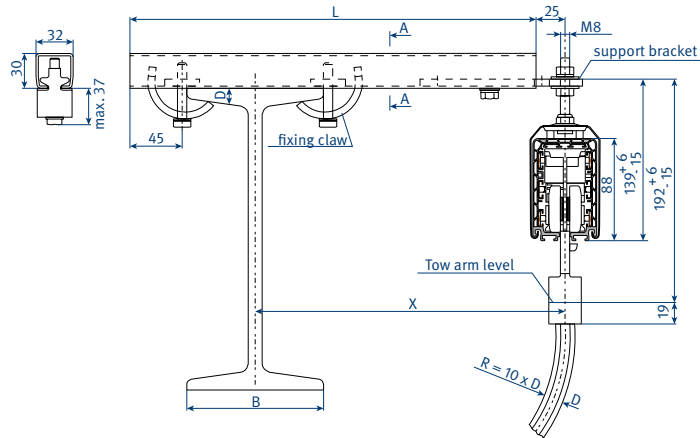
Type	Weight kg	Execution	Order - No.
EK-MSES	0,290	left and right	235 141

(1) stainless steel

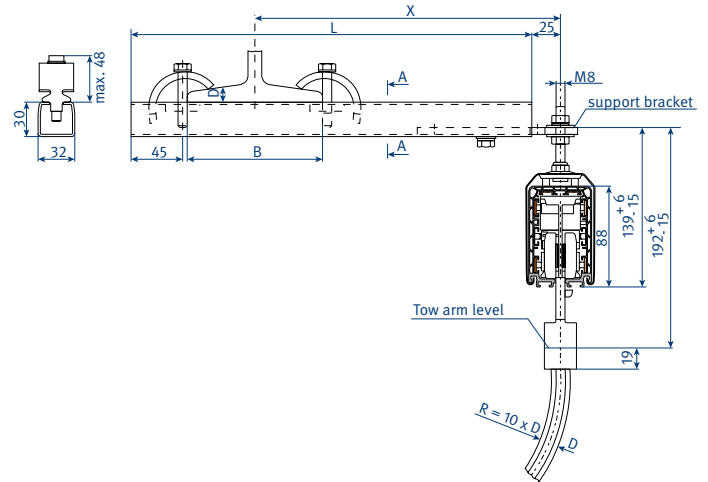
Brackets

view without I - beam

Position of the fixing claw for D = 6-15 mm



Position of the fixing claw for D = 15-25 mm



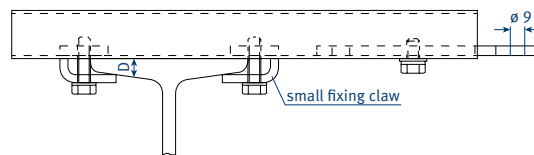
Arrangement EHK with small fixing claw

Attention!

Make sure that hoist wheels have enough clearance.

Use small claw if necessary.

□ - rail of EHK is identical to type S1, Cat. 8 a



Type ⁽¹⁾	X mm	L mm	B max mm	Weight kg	Order - No.	
					Standard version	with small fixing claw
HK-EHK250-NS	250	350	170	1,070	251 600	-
HK-EHK250-KS...					-	251 720-...
HK-EHK300-NS	300	400	170	1,150	251 610	-
HK-EHK300-KS...					-	251 730-...
HK-EHK400-NS	400	500	170	1,300	251 620	-
HK-EHK400-KS...					-	251 740-...
HK-EHK500-NS	500	600	170	1,450	251 630	-
HK-EHK500-KS...					-	251 750-...
HK-EHK600-NS	600	700	170	1,600	251 640	-
HK-EHK600-KS...					-	251 760-...
HK-EHK700-NS	700	800	170	1,750	251 650	-
HK-EHK700-KS...					-	251 770-...
HK-EHK750-NS	750	850	170	1,820	251 660	-
HK-EHK750-KS...					-	251 780-...
HK-EHK800-NS	800	900	170	1,900	251 670	-
HK-EHK800-KS...					-	251 790-...

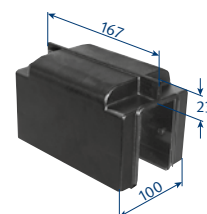
(1) e.g. HK-EHK250-KS12 → Order-No. 251720-12 for fixing claw with D=12mm
Select next larger size bracket when your -beam dimension B is more than 170 mm.

Joining material & End feeds



Joint cap, self locking (MKHD)

Type	Weight kg	Order - No.
VM-MVMD	0,160	234 678



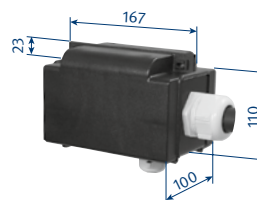
Joint cap, self locking (MKHF / MKHS)

Type	Weight kg	Order - No.
VM-MVMS	0,240	234 585

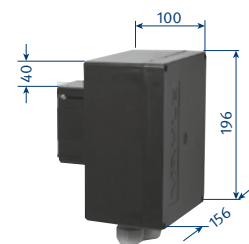
End feed (MKHD)

End feed comes loose without powerail section. It can be mounted at the left or right hand side.

Electrical connection with customer supplied cable shoes to M6 terminals.



6 - 8 poles



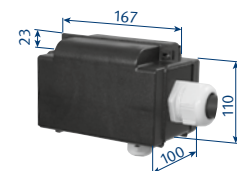
9 - 10 poles

Type	Weight kg	Cable gland (Dimensions see p. 33)	Order - No.
ES-MKED6-8/40-63HS	0,521	M 25 and M 40	235 152
ES-MKED9-10/40-63HS	1,097	M 25 and M 40	262 538
ES-MKED6-8/40SS	0,476	M 25	235 157
ES-MKED9-10/40SS	1,046	M 25	262 539

End feed (MKHF / MKHS)

End feed comes loose without powerail section. It can be mounted at the left or right hand side.

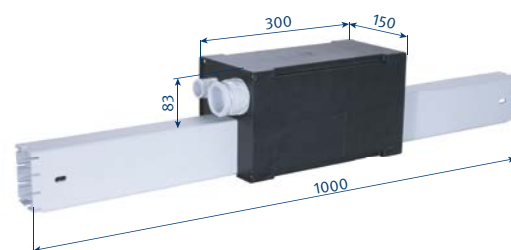
Electrical connection with customer supplied cable shoes to M6 terminals.



Type	Weight kg	Cable gland (Dimensions see p. 33)	Order - No.
ES-MKES6-8/40-63HS	0,492	M 25 and M 40	235 230
ES-MKES6-8/40SS	0,446	M 25	235 233

Line feeds

Electrical connection with customer supplied cable shoes to M8 terminals.



Type	Weight kg	Cable gland (Dimensions see p. 33)	Order - No.
ES-MHGD6/40-100HSC-1000	2,445	M 50 and M 25	262 545
ES-MHGD7/40-100HSC-1000	2,530	M 50 and M 25	262 546
ES-MHGD8/40-100HSC-1000	2,615	M 50 and M 25	262 547
ES-MHGD9/40-100HSC-1000	2,654	M 50 and M 25	262 548
ES-MHGD10/40-100HSC-1000	2,693	M 50 and M 25	262 549
ES-MHGD6/140-160HSC-1000	2,431	M 50 and M 25	262 550
ES-MHGD7/140-160HSC-1000	2,516	M 50 and M 25	262 551
ES-MHGD8/140-160HSC-1000	2,601	M 50 and M 25	262 552
ES-MHGD9/140-160HSC-1000	2,640	M 50 and M 25	262 553
ES-MHGD10/140-160HSC-1000	2,679	M 50 and M 25	262 554
ES-MHGD6/40SSD-1000	2,385	M 25	262 540
ES-MHGD7/40SSD-1000	2,460	M 25	262 541
ES-MHGD8/40SSD-1000	2,545	M 25	262 542
ES-MHGD9/40SSD-1000	2,584	M 25	262 543
ES-MHGD10/40SSD-1000	2,623	M 25	262 544

Line feeds

Electrical connection with customer supplied cable shoes to M8 terminals.

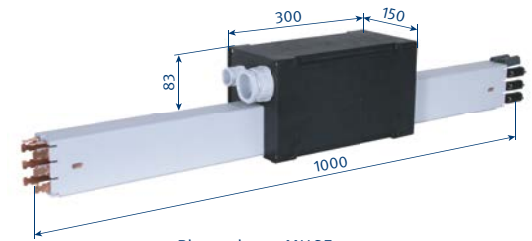


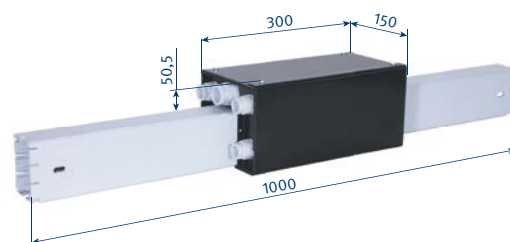
Photo shows MHGF

Type	Weight kg	Cable gland (Dimensions see p. 33)	Order - No.
ES-MHGF6/40HSC-1000	3,018	M 50 and M 25	262 492
ES-MHGF7/40HSC-1000	3,213	M 50 and M 25	262 493
ES-MHGF8/40HSC-1000	3,407	M 50 and M 25	262 494
ES-MHGF6/63HSC-1000	3,151	M 50 and M 25	262 495
ES-MHGF7/63HSC-1000	3,345	M 50 and M 25	262 496
ES-MHGF8/63HSC-1000	3,538	M 50 and M 25	262 497
ES-MHGF6/100HSC-1000	3,578	M 50 and M 25	262 498
ES-MHGF7/100HSC-1000	3,773	M 50 and M 25	262 499
ES-MHGF8/100HSC-1000	3,967	M 50 and M 25	262 500
ES-MHGF6/40SSD-1000	2,948	M 25	262 489
ES-MHGF7/40SSD-1000	3,142	M 25	262 490
ES-MHGF8/40SSD-1000	3,336	M 25	262 491

Type	Weight kg	Cable gland (Dimensions see p. 33)	Order - No.
ES-MHGS6/40HSC-1000	3,199	M 50 and M 25	262 450
ES-MHGS7/40HSC-1000	3,420	M 50 and M 25	262 451
ES-MHGS8/40HSC-1000	3,641	M 50 and M 25	262 452
ES-MHGS6/63HSC-1000	3,331	M 50 and M 25	262 453
ES-MHGS7/63HSC-1000	3,552	M 50 and M 25	262 454
ES-MHGS8/63HSC-1000	3,773	M 50 and M 25	262 455
ES-MHGS6/100HSC-1000	3,759	M 50 and M 25	262 456
ES-MHGS7/100HSC-1000	3,980	M 50 and M 25	262 457
ES-MHGS8/100HSC-1000	4,201	M 50 and M 25	262 458
ES-MHGS6/140HSC-1000	3,922	M 50 and M 25	262 459
ES-MHGS7/140HSC-1000	4,143	M 50 and M 25	262 460
ES-MHGS8/140HSC-1000	4,364	M 50 and M 25	262 461
ES-MHGS6/160HSC-1000	4,165	M 50 and M 25	262 462
ES-MHGS7/160HSC-1000	4,386	M 50 and M 25	262 463
ES-MHGS8/160HSC-1000	4,607	M 50 and M 25	262 464
ES-MHGS6/200HSC-1000	4,411	M 50 and M 25	262 465
ES-MHGS7/200HSC-1000	4,632	M 50 and M 25	262 466
ES-MHGS8/200HSC-1000	4,853	M 50 and M 25	262 467
ES-MHGS6/40SSD-1000	3,128	M 25	262 447
ES-MHGS7/40SSD-1000	3,349	M 25	262 448
ES-MHGS8/40SSD-1000	3,570	M 25	262 449

Line feeds

Electrical connection with customer supplied cable shoes to M8 terminals.



Type	Weight kg	Cable gland (Dimensions see p. 33)	Order - No.
ES-MHLD6/40-100HSC-1000-0	2,490	M 25 for L1, L2, L3	262 560
ES-MHLD7/40-100HSC-1000-0	2,575	M 25 for 1 - 4	262 561
ES-MHLD8/40-100HSC-1000-0	2,660	M 20 for PE, 9/10	262 562
ES-MHLD9/40-100HSC-1000-0	2,710		262 563
ES-MHLD10/40-100HSC-1000-0	2,749		262 564
ES-MHLD6/140-160HSC-1000-0	2,478	M 25 for L1, L2, L3	262 565
ES-MHLD7/140-160HSC-1000-0	2,563	M 25 for 1 - 4	262 566
ES-MHLD8/140-160HSC-1000-0	2,648	M 20 for PE, 9/10	262 567
ES-MHLD9/140-160HSC-1000-0	2,698		262 568
ES-MHLD10/140-160HSC-1000-0	2,737		262 569
ES-MHLD6/40SSD-1000-0	2,442	1 x M 25	262 555
ES-MHLD7/40SSD-1000-0	2,517		262 556
ES-MHLD8/40SSD-1000-0	2,602		262 557
ES-MHLD9/40SSD-1000-0	2,652	2 x M 25	262 558
ES-MHLD10/40SSD-1000-0	2,691		262 559

Line feeds

Electrical connection with customer supplied cable shoes to M8 terminals.

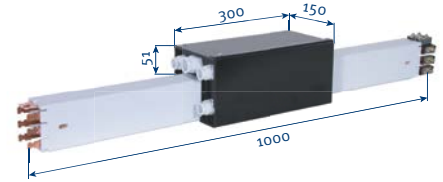


Photo shows MHLS

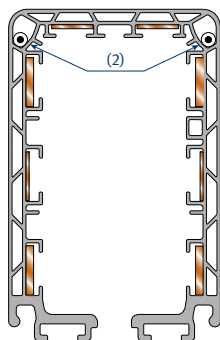
Type	Weight kg	Cable gland (Dimensions see p. 33)	Order - No.
ES-MHLF6/40HSC-1000-0	3,064	M 25 for L1, L2, L3	262 480
ES-MHLF7/40HSC-1000-0	3,258	M 25 for 1 - 4	262 481
ES-MHLF8/40HSC-1000-0	3,452	M 20 for PE	262 482
ES-MHLF6/63HSC-1000-0	3,196		262 483
ES-MHLF7/63HSC-1000-0	3,390		262 484
ES-MHLF8/63HSC-1000-0	3,584		262 485
ES-MHLF6/100HSC-1000-0	3,624		262 486
ES-MHLF7/100HSC-1000-0	3,818		262 487
ES-MHLF8/100HSC-1000-0	4,012		262 488
ES-MHLF6/40SSD-1000-0	3,005	M 25	262 477
ES-MHLF7/40SSD-1000-0	3,199		262 478
ES-MHLF8/40SSD-1000-0	3,393		262 479

Type	Weight kg	Cable gland (Dimensions see p. 33)	Order - No.
ES-MHLS6/40HSC-1000-0	3,244	M 25 for L1, L2, L3	262 518
ES-MHLS7/40HSC-1000-0	3,465	M 25 for 1 - 4	262 519
ES-MHLS8/40HSC-1000-0	3,686	M 20 for PE	262 520
ES-MHLS6/63HSC-1000-0	3,376		262 521
ES-MHLS7/63HSC-1000-0	3,597		262 522
ES-MHLS8/63HSC-1000-0	3,818		262 523
ES-MHLS6/100HSC-1000-0	3,804		262 524
ES-MHLS7/100HSC-1000-0	4,025		262 525
ES-MHLS8/100HSC-1000-0	4,246		262 526
ES-MHLS6/140HSC-1000-0	3,969	M 25 for PE, L1, L2, L3	262 527
ES-MHLS7/140HSC-1000-0	4,190	M 25 for 1 - 4	262 528
ES-MHLS8/140HSC-1000-0	4,411		262 529
ES-MHLS6/160HSC-1000-0	4,212		262 530
ES-MHLS7/160HSC-1000-0	4,433		262 531
ES-MHLS8/160HSC-1000-0	4,654		262 532
ES-MHLS6/200HSC-1000-0	4,458		262 533
ES-MHLS7/200HSC-1000-0	4,679		262 534
ES-MHLS8/200HSC-1000-0	4,900		262 535
ES-MHLS6/40SSD-1000-0	3,180	M 25	262 515
ES-MHLS7/40SSD-1000-0	3,401		262 516
ES-MHLS8/40SSD-1000-0	3,622		262 517

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



(2) Arrange heating cable

ment of

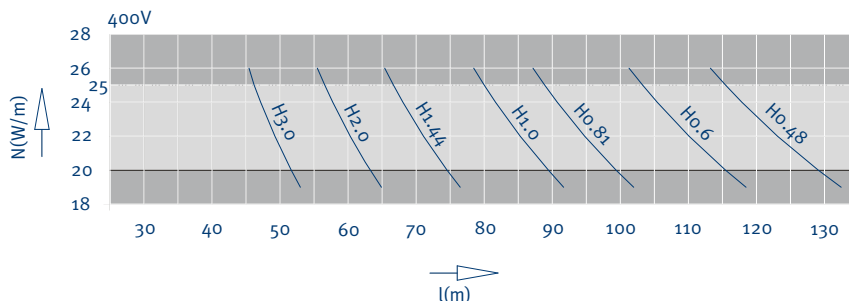
We recommend a heating system for outdoor installations and installations in humid plants. The heating consists of arrangement two heating cables as per drawing.

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.

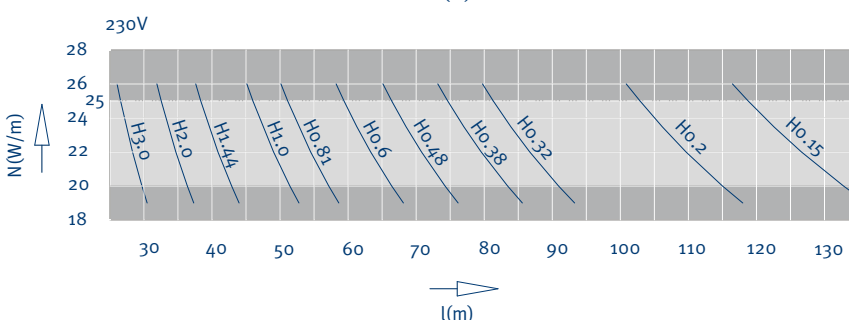
For longer heating distances the total length has to be divided into several heating sections.

For short heating distances to feed with lower secondary voltage via transformer.

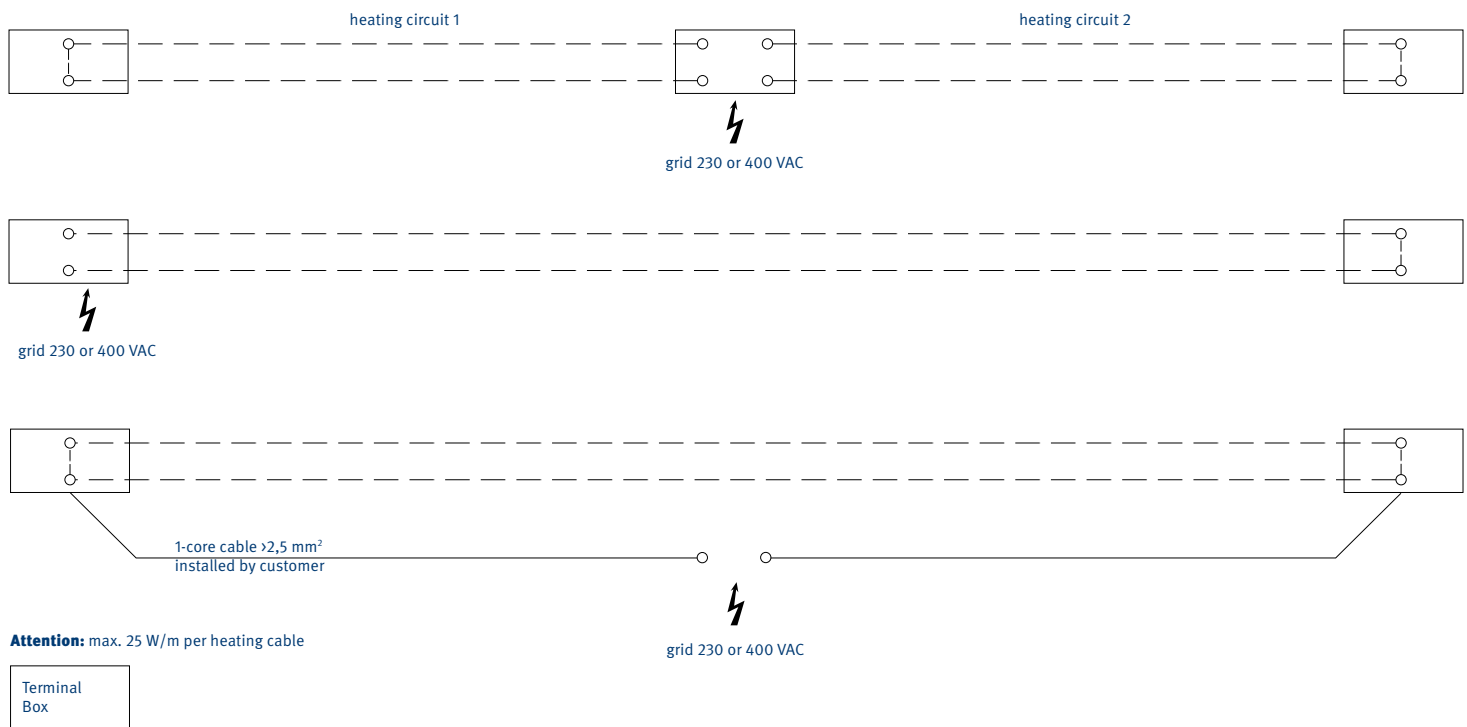


$$\text{Heating capacity [Watt/m]: } N' = \frac{U^2}{R \cdot L^2}$$

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



Heating



Type	Design	Cable gland (Dimensions see p. 33)	Order - No.
BH-AKB-MKH-L	left end	M 20	262 037
BH-AKB-MKH-R	right end	M 20	262 038
BH-AKB-MKH-M	line feed	2 x M 20	262 039
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.

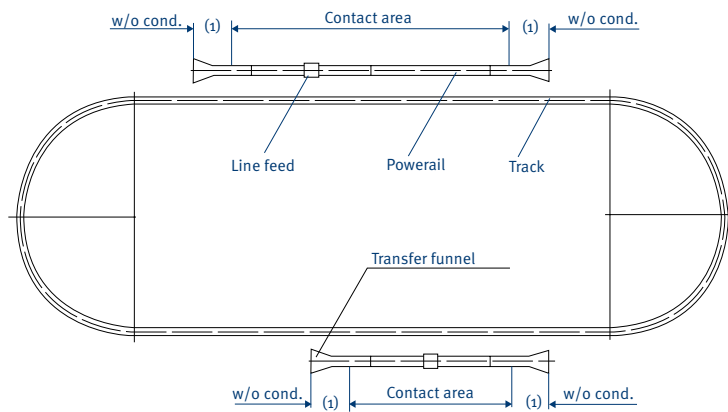
Order for 60 m conductor system (example)

- 1) 122 m heating cable type H 2,0
(2 x 60 m and 2 x 1 m additional)
Voltage 400V, two heating circuits in 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.
- 2) 1x Junction box left end
1x Junction box right end
- 3) 4x sets of material for connection ends.

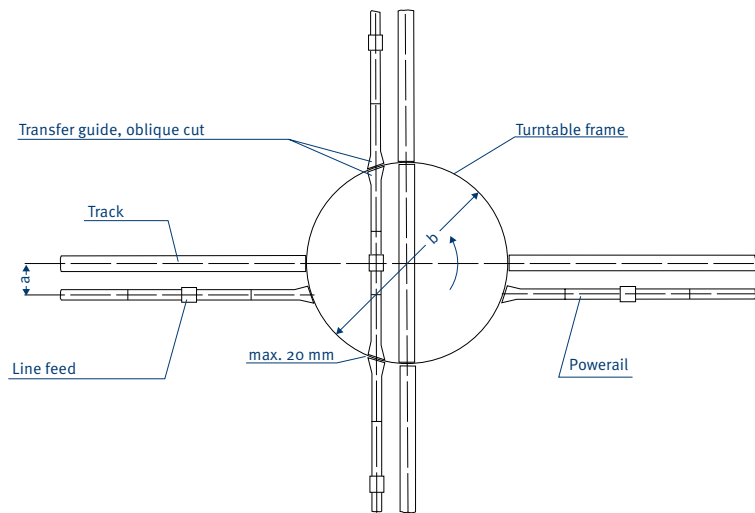
Switch gear assembly and temperature control unit as per customer's inquiry. Fuses, cables etc. have to be provided by the customer.

Contact sections, Turntables and Switches

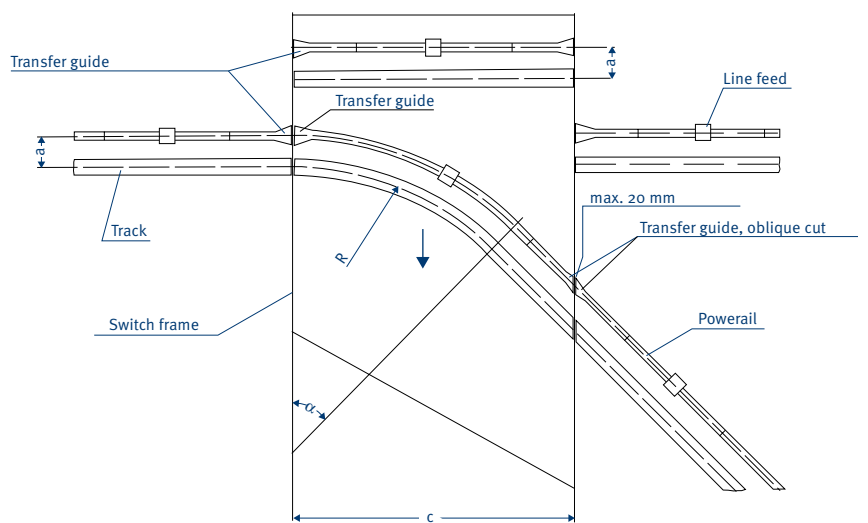
Contact section⁽¹⁾



Turntable



Sliding switch



Please submit drawings of transfer applications.
Specify dimensions a, b, c, R
and angle α ($\alpha = \text{max. } 50^\circ$)
Max. 20 mm air gap between transfer guides.

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

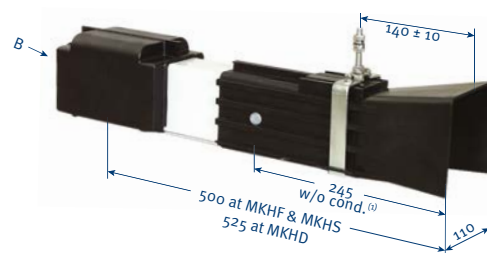
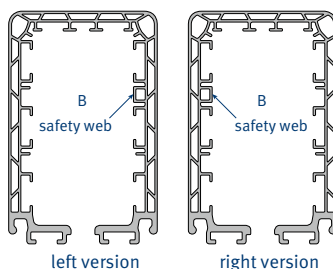
(1) Contact sections must not be activated before collectors are fully engaged.

Entry funnel

Powerail should not be activated before the collector carbons have complete contact with the conductors.

Offset of the funnel/guide to the collector.:
 max. 10 mm horizontal
 max. 10 mm vertical

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



Type	Weight kg	Order - No. / Version	
		left	right
ET-MTH6/40-100-L-HSC-500(525)	2,018	262 375	-
ET-MTH6/40-100-R-HSC-500(525)	2,049	-	262 387
ET-MTH7/40-100-L-HSC-500(525)	2,089	262 376	-
ET-MTH7/40-100-R-HSC-500(525)	2,120	-	262 388
ET-MTH8/40-100-L-HSC-500(525)	2,160	262 377	-
ET-MTH8/40-100-R-HSC-500(525)	2,191	-	262 389
ET-MTH6/140-160-L-HSC-500(525)	2,030	262 378	-
ET-MTH6/140-160-R-HSC-500(525)	2,061	-	262 390
ET-MTH7/140-160-L-HSC-500(525)	2,101	262 379	-
ET-MTH7/140-160-R-HSC-500(525)	2,132	-	262 391
ET-MTH8/140-160-L-HSC-500(525)	2,172	262 380	-
ET-MTH8/140-160-R-HSC-500(525)	2,203	-	262 392
ET-MTH6/200-L-HSC-500(525)	2,083	262 384	-
ET-MTH6/200-R-HSC-500(525)	2,122	-	262 396
ET-MTH7/200-L-HSC-500(525)	2,154	262 385	-
ET-MTH7/200-R-HSC-500(525)	2,193	-	262 397
ET-MTH8/200-L-HSC-500(525)	2,225	262 386	-
ET-MTH8/200-R-HSC-500(525)	2,264	-	262 398
ET-MTH6/40-L-SSD-500(525)	2,015	262 381	-
ET-MTH6/40-R-SSD-500(525)	2,015	-	262 393
ET-MTH7/40-L-SSD-500(525)	2,086	262 382	-
ET-MTH7/40-R-SSD-500(525)	2,086	-	262 394
ET-MTH8/40-L-SSD-500(525)	2,157	262 383	-
ET-MTH8/40-R-SSD-500(525)	2,157	-	262 395

(1) corresponding to the center of collector

Transfer guides

Transfer guides, straight

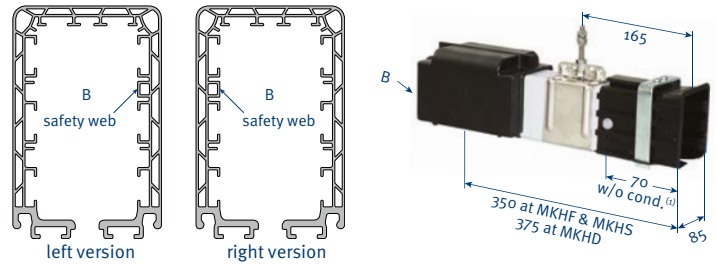
Necessary with all types of double collectors or 2 single collectors.

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.



Type	Weight kg	Order - No. / Version	
		left	right
UE-MUH6/40-100-L-HSC-350(375)	2,005	262 399	-
UE-MUH6/40-100-R-HSC-350(375)	2,005	-	262 408
UE-MUH7/40-100-L-HSC-350(375)	2,077	262 400	-
UE-MUH7/40-100-R-HSC-350(375)	2,077	-	262 409
UE-MUH8/40-100-L-HSC-350(375)	2,149	262 401	-
UE-MUH8/40-100-R-HSC-350(375)	2,149	-	262 410
UE-MUH6/140-160-L-HSC-350(375)	2,017	262 402	-
UE-MUH6/140-160-R-HSC-350(375)	2,017	-	262 411
UE-MUH7/140-160-L-HSC-350(375)	2,089	262 403	-
UE-MUH7/140-160-R-HSC-350(375)	2,089	-	262 412
UE-MUH8/140-160-L-HSC-350(375)	2,161	262 404	-
UE-MUH8/140-160-R-HSC-350(375)	2,161	-	262 413
UE-MUH6/200-L-HSC-350(375)	2,089	262 417	-
UE-MUH6/200-R-HSC-350(375)	2,089	-	262 420
UE-MUH7/200-L-HSC-350(375)	2,161	262 418	-
UE-MUH7/200-R-HSC-350(375)	2,161	-	262 421
UE-MUH8/200-L-HSC-350(375)	2,233	262 419	-
UE-MUH8/200-R-HSC-350(375)	2,233	-	262 422
UE-MUH6/40-L-SSD-350(375)	2,005	262 405	-
UE-MUH6/40-R-SSD-350(375)	2,005	-	262 414
UE-MUH7/40-L-SSD-350(375)	2,077	262 406	-
UE-MUH7/40-R-SSD-350(375)	2,077	-	262 415
UE-MUH8/40-L-SSD-350(375)	2,149	262 407	-
UE-MUH8/40-R-SSD-350(375)	2,149	-	262 416

(1) corresponding to the center of collector

Transfer guides, oblique⁽¹⁾

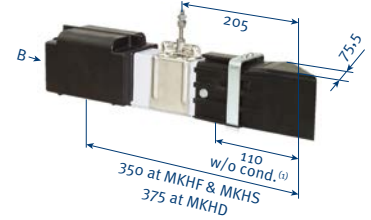
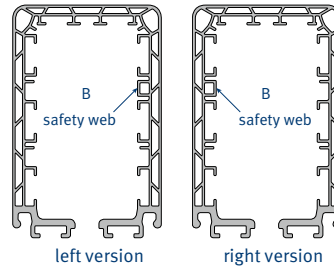
Necessary with all types of double collectors or 2 single collectors.

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.



Type ⁽¹⁾	Weight kg	Order - No. / Version	
		left	right
UE-MUHS6/40-100-L-HSC-350(375)	1,957	262 423	-
UE-MUHS6/40-100-L-HSC-350(375)	1,957	-	262 432
UE-MUHS7/40-100-L-HSC-350(375)	2,025	262 424	-
UE-MUHS7/40-100-R-HSC-350(375)	2,025	-	262 433
UE-MUHS8/40-100-L-HSC-350(375)	2,093	262 425	-
UE-MUHS8/40-100-R-HSC-350(375)	2,093	-	262 434
UE-MUHS6/140-160-L-HSC-350(375)	1,969	262 426	-
UE-MUHS6/140-160-R-HSC-350(375)	1,969	-	262 435
UE-MUHS7/140-160-L-HSC-350(375)	2,037	262 427	-
UE-MUHS7/140-160-R-HSC-350(375)	2,037	-	262 436
UE-MUHS8/140-160-L-HSC-350(375)	2,105	262 428	-
UE-MUHS8/140-160-R-HSC-350(375)	2,105	-	262 437
UE-MUHS6/200-L-HSC-350(375)	2,029	262 441	-
UE-MUHS6/200-R-HSC-350(375)	2,029	-	262 444
UE-MUHS7/200-L-HSC-350(375)	2,097	262 442	-
UE-MUHS7/200-R-HSC-350(375)	2,097	-	262 445
UE-MUHS8/200-L-HSC-350(375)	2,165	262 443	-
UE-MUHS8/200-R-HSC-350(375)	2,165	-	262 446
UE-MUHS6/40-L-SSD-350(375)	1,957	262 429	-
UE-MUHS6/40-R-SSD-350(375)	1,957	-	262 438
UE-MUHS7/40-L-SSD-350(375)	2,025	262 430	-
UE-MUHS7/40-R-SSD-350(375)	2,025	-	262 439
UE-MUHS8/40-L-SSD-350(375)	2,093	262 431	-
UE-MUHS8/40-R-SSD-350(375)	2,093	-	262 440

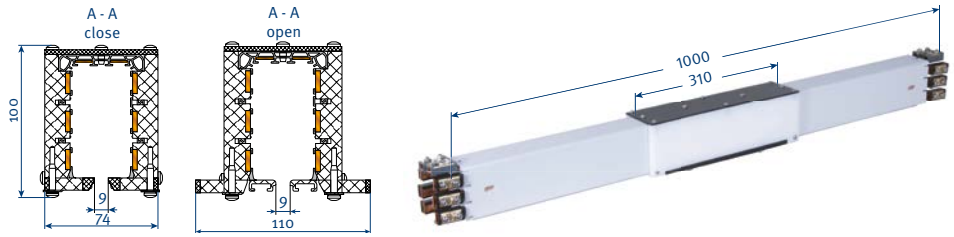
(1) corresponding to the center of collector

Removal sections

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

By opening and closing the sliders at the bottom of the conductor housing the collector can be mounted and removed easily. Before opening disconnect mains.

The removal section does not disconnect the powerail electrically.



For single collectors

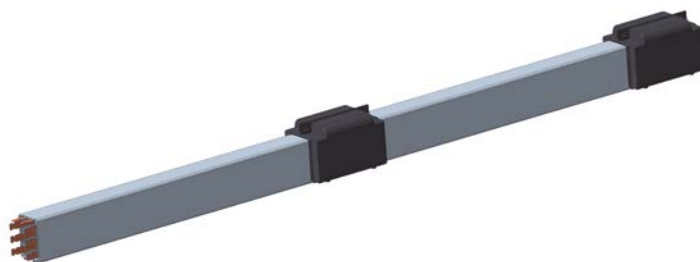
Type	Weight kg	Order - No.
AT-MATH6/40-100HSC-1000	4,400	262 147
AT-MATH7/40-100HSC-1000	4,576	262 148
AT-MATH8/40-100HSC-1000	4,752	262 149
AT-MATH 6/140-160HSC-1000	4,424	262 150
AT-MATH7/140-160HSC-1000	4,600	262 151
AT-MATH8/140-160HSC-1000	4,776	262 152
AT-MATH6/200HSC-1000	4,654	262 156
AT-MATH7/200HSC-1000	4,830	262 157
AT-MATH8/200HS-1000	5,006	262 158
AT-MATH6/40SSD-1000	4,400	262 153
AT-MATH7/40SSD-1000	4,576	262 154
AT-MATH8/40SSD-1000	4,752	262 155

For double collectors

Type	Weight kg	Order - No.
AT-MATHD6/40-100HSC-1000	5,124	262 159
AT-MATHD7/40-100HSC-1000	5,300	262 160
AT-MATHD8/40-100HSC-1000	5,475	262 161
AT-MATHD6/140-160HSC-1000	5,148	262 162
AT-MATHD7/140-160HSC-1000	5,324	262 163
AT-MATHD8/140-160HSC-1000	5,500	262 164
AT-MATHD6/200HSC-1000	5,362	262 168
AT-MATHD7/200HSC-1000	5,538	262 169
AT-MATHD8/200HSC-1000	5,714	262 170
AT-MATHD6/40SSD-1000	5,124	262 165
AT-MATHD7/40SSD-1000	5,299	262 166
AT-MATHD8/40SSD-1000	5,476	262 167

Maintenance Sections

For maintenance work with MKH 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.



For Single collectors

Type	Weight kg	Order-No.
RVT-MRT6/40-4000SSD	7,087	263 005
RVT-MRT7/40-4000SSD	7,522	263 006
RVT-MRT8/40-4000SSD	7,957	263 007
RVT-MRT6/40-4000HSC	7,087	263 008
RVT-MRT7/40-4000HSC	7,522	263 009
RVT-MRT8/40-4000HSC	7,957	263 010
RVT-MRT6/63-4000HSC	7,615	263 011
RVT-MRT7/63-4000HSC	8,050	263 012
RVT-MRT8/63-4000HSC	8,485	263 013
RVT-MRT6/100-4000HSC	9,327	263 014
RVT-MRT7/100-4000HSC	9,762	263 015
RVT-MRT8/100-4000HSC	10,197	263 016
RVT-MRT6/140-4000HSC	10,035	263 017
RVT-MRT7/140-4000HSC	10,470	263 018
RVT-MRT8/140-4000HSC	10,905	263 019
RVT-MRT6/160-4000HSC	11,007	263 020
RVT-MRT7/160-4000HSC	11,442	263 021
RVT-MRT8/160-4000HSC	11,877	263 022
RVT-MRT6/200-4000HSC	11,991	263 023
RVT-MRT7/200-4000HSC	12,426	263 024
RVT-MRT8/200-4000HSC	12,861	263 025

Conductor dead sections

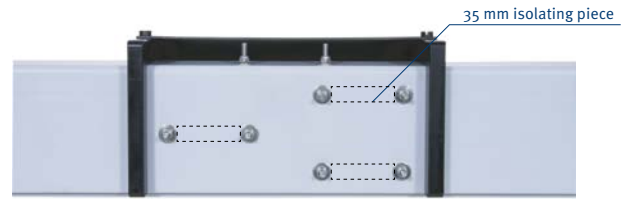


photo shows isolating piece

5 mm air gap

Type ⁽¹⁾	Weight kg	Order-No.
ST-MHTL1...	0,242	262 578
ST-MHTL2...	0,254	262 579
ST-MHTL3...	0,266	262 580
ST-MHTL4...	0,278	262 581
ST-MHTL5...	0,290	262 582
ST-MHTL6...	0,302	262 583
ST-MHTL7...	0,314	262 584
ST-MHTL8...	0,326	262 585

35 mm isolating piece

Type ⁽¹⁾	Weight kg	Order-No.
ST-MHTI1...	0,274	262 586
ST-MHTI2...	0,294	262 587
ST-MHTI3...	0,309	262 588
ST-MHTI4...	0,324	262 589
ST-MHTI5...	0,339	262 590
ST-MHTI6...	0,354	262 591
ST-MHTI7...	0,369	262 592
ST-MHTI8...	0,384	262 593
ST-MHTI9...	0,387	262 594
ST-MHTI10...	0,390	262 595

Please advise us which conductors should be disconnected (see Pages 24 and 25). The dead section comes factory assembled.

(1) Complete types e.g. ST-MHTI4HS-L1/L2/L3/2-MSWA for a 35 mm Isolating piece with separation of conductors L1, L2, L3 and 2 for the current collector MSWA → Order-No.: 262583

Anti-condensation sections

The anti-condensation section consists of 1 m conductor with air circulation holes, covered by a protection hood.
The anti-condensation section doesn't separate the conductor.

Use of the anti-condensation section

At transition areas where the system transitions from indoor to outdoor.

Thereby a icing of the outside conductor will be avoided, as the warm air leaks out of the anticondensation section and will not condensate in the housing (see sketch).

Feeding

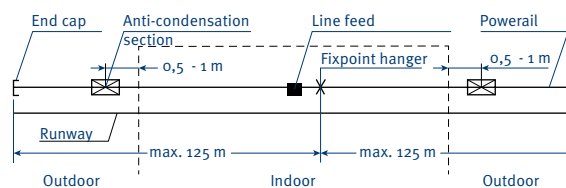
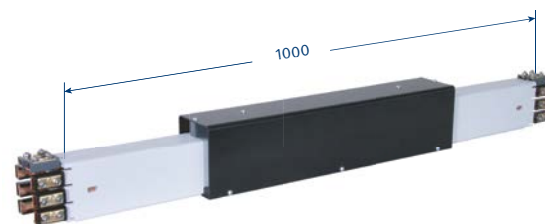
No extra feeds required as the Powerail is not interrupted

Collectors

No extra collectors required

Installation

The anti-condensation section is to be placed outdoors, close to the transition point.



Type	Weight kg	Order - No.
BT-MBHD6-10HSC-1000	2,081	262 570
BT-MBHD6-10SSD-1000	2,081	262 571

Type	Weight kg	Order - No.
BT-MBHS6/40-100HSC-1000	4,678	262 135
BT-MBHS7/40-100HSC-1000	4,854	262 136
BT-MBHS8/40-100HSC-1000	5,030	262 137
BT-MBHS6/140-160HSC-1000	4,702	262 138
BT-MBHS7/140-160HSC-1000	4,878	262 139
BT-MBHS8/140-160HSC-1000	5,054	262 140
BT-MBHS6/200HSC-1000	4,948	262 144
BT-MBHS7/200HSC-1000	5,124	262 145
BT-MBHS8/200HSC-1000	5,300	262 146
BT-MBHS6/40SSD-1000	4,678	262 141
BT-MBHS7/40SSD-1000	4,854	262 142
BT-MBHS8/40SSD-1000	5,030	262 143

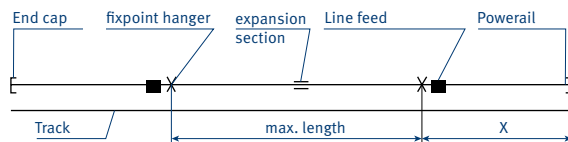
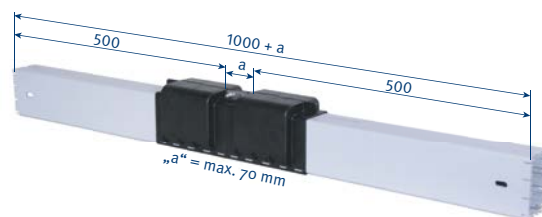
Expansion Sections

Expansion sections are required to compensate for the different expansions between copper conductors and steel- or concrete structures, in varying temperatures without interrupting electrical power. Expansion joints are used when the Powerail length between feeds, curves, switches or other fix points is exceeding 10 m.

Max. length during differences in temperature:
 $\Delta t \ 20^{\circ}\text{C} = 70 \text{ m}$ $\Delta t \ 40^{\circ}\text{C} = 35 \text{ m}$ $\Delta t \ 80^{\circ}\text{C} = 17 \text{ m}$
 $\Delta t \ 30^{\circ}\text{C} = 45 \text{ m}$ $\Delta t \ 60^{\circ}\text{C} = 23 \text{ m}$

Longer runs or higher differences in temperature require more expansion joints.

X = max. 55 m for outdoor systems
 X = max. 100 m for indoor systems



Type	Weight kg	Order - No.
DT-MDHD6-8HSC-1000	1,424	262 572
DT-MDHD9HSC-1000	1,418	262 573
DT-MDHD10HSC-1000	1,412	262 574
DT-MDHD6-8SSD-1000	1,424	262 575
DT-MDHD9SSD-1000	1,418	262 576
DT-MDHD10SSD-1000	1,412	262 577

Expansion Sections

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

Expansion joints are used when the Powerail length between feeds, curves, switches or other fix points is exceeding 20 m.

Max. length during differences in temperature:

Δt 90 °C (-30 °C to +60 °C) install one expansion joint per 100 m.

An additional expansion joint every 100 m.

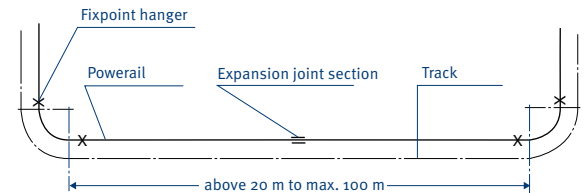
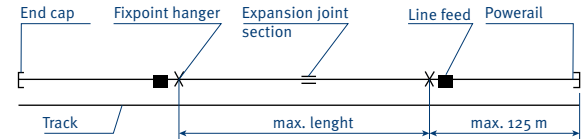
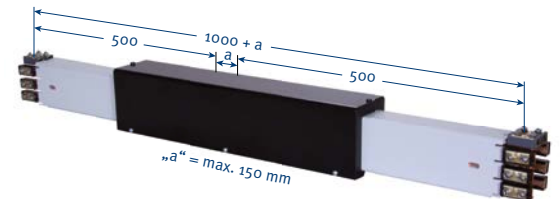
Arrangement of fixpoints according to sketches.

The remaining conductor sections have to be installed with 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 °C to +35 °C during installation.



Type	Weight kg	Order - No.
DT-MDHS6/40-100HSC-1000	6,036	262 004
DT-MDHS7/40-100HSC-1000	6,256	262 005
DT-MDHS8/40-100HSC-1000	6,476	262 006
DT-MDHS6/140-160HSC-1000	6,060	262 007
DT-MDHS7/140-160HSC-1000	6,280	262 008
DT-MDHS8/140-160HSC-1000	6,500	262 009
DT-MDHS6/200HSC-1000	6,276	262 013
DT-MDHS7/200HSC-1000	6,496	262 014
DT-MDHS8/200HSC-1000	6,716	262 015
DT-MDHS6/40SSD-1000	6,036	262 010
DT-MDHS7/40SSD-1000	6,256	262 011
DT-MDHS8/40SSD-1000	6,476	262 012

Collectors

Single collector MSWA

upto max. 180 m/min.

In conductor rails with sealing strip upto 100 m/min.

Connecting cables:

for power line: cable 1 → 4 x 6 mm²
cable 2 → ... x 1,5 mm²

for control line: cable 1 → ... x 2,5 mm²
(two cables for 8-pole and more)

For curves use single collectors only.

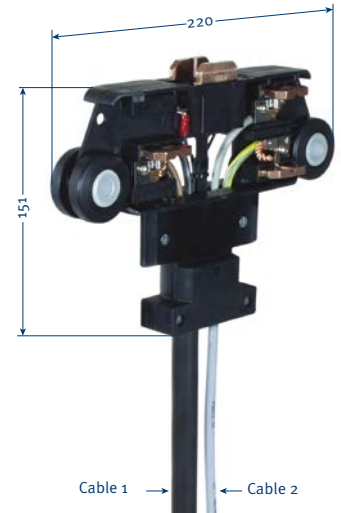
Connecting cable 1 m, longer cable available

Example of ordering double collectors with 2 m cable

Oder - No. 236 177-2

for collector SA-MSWA6/50-1HS28-60

Cleaning trolleys on request



Type	Weight kg	No. of conductors	Power rating at 60% DC	ø of connecting-cables in mm		Order - No.
				Cable 1	Cable 2	
SA-MSWA6/50-1HS28-60	1,254	6	50	≈ 17,0	≈ 7,0	236 177
SA-MSWA7/50-1HS28-60	1,307	7	50	≈ 17,0	≈ 7,5	236 178
SA-MSWA8/50-1HS28-60	1,369	8	50	≈ 17,0	≈ 8,0	236 179
SA-MSWA9/50-1HS28-60	1,484	9	50	≈ 17,0	≈ 9,0	236 180
SA-MSWA10/50-1HS28-60	1,592	10	50	≈ 17,0	≈ 9,5	236 181
SA-MSWA6/25-1SS28-60	0,922	6	25	≈ 11,5	-	236 182
SA-MSWA7/25-1SS28-60	0,958	7	25	≈ 11,5	-	236 183
SA-MSWA8/25-1SS28-60	1,030	8	25	≈ 10,0	≈ 10,0	236 184
SA-MSWA9/25-1SS28-60	1,158	9	25	≈ 11,0	≈ 10,0	236 185
SA-MSWA10/25-1SS28-60	1,347	10	25	≈ 11,5	≈ 10,0	236 186

Collectors

Single collector MSWAS

upto max. 250 m/min.

In conductor rails with sealing strip upto 100 m/min.

Connecting cables:

for power line: cable 1 → 4 x 6 mm²
 cable 2 → ... x 1,5 mm²
 for control line: cable 1 → ... x 2,5 mm²
 (two cables for 8-pole and more)

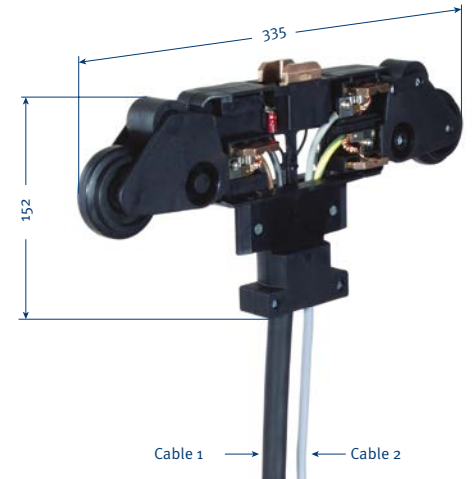
For curves use single collectors only.

Connecting cable 1 m, longer cable available

Example of ordering double collectors with 2 m cable

Oder - No. 236 000-2

for collector SA-MSWAS6/50-1HS28-60



Type	Weight kg	No. of conductors	Power rating at 60% DC	Ø of connecting-cables in mm		Order - No.
				Cable 1	Cable 2	
SA-MSWAS6/50-1HS28-60	1,354	6	50	≈ 17,0	≈ 7,0	236 200
SA-MSWAS7/50-1HS28-60	1,407	7	50	≈ 17,0	≈ 7,5	236 201
SA-MSWAS8/50-1HS28-60	1,469	8	50	≈ 17,0	≈ 8,0	236 202
SA-MSWAS9/50-1HS28-60	1,584	9	50	≈ 17,0	≈ 9,0	236 203
SA-MSWAS10/50-1HS28-60	1,692	10	50	≈ 17,0	≈ 9,5	236 204
SA-MSWAS6/25-1SS28-60	1,022	6	25	≈ 11,5	-	236 205
SA-MSWAS7/25-1SS28-60	1,058	7	25	≈ 11,5	-	236 206
SA-MSWAS8/25-1SS28-60	1,130	8	25	≈ 10,0	≈ 10,0	236 207
SA-MSWAS9/25-1SS28-60	1,258	9	25	≈ 11,0	≈ 10,0	236 208
SA-MSWAS10/25-1SS28-60	1,447	10	25	≈ 11,5	≈ 10,0	236 209

Collectors

Double collector DMSWA

upto max. 180 m/min.

In conductor rails with sealing strip upto 100 m/min.

Connecting cables:

for power line: cable 1 → 4 x 6 mm²
cable 2 → ... x 1,5 mm²

for control line: cable 1 → ... x 2,5 mm²
(two cables for 8-pole and more)

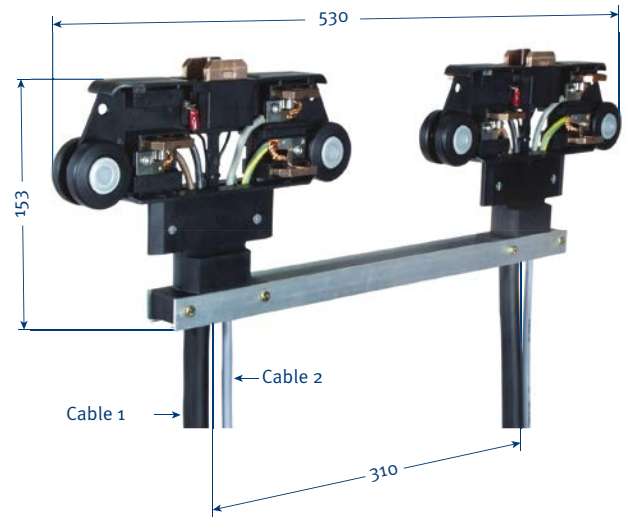
For curves use single collectors only.

Connecting cable 1 m, longer cable available

Example of ordering collector with 2 m cable

Order - No. 236 315-2

for collector SA-DMSWA6/100S-1HS28-60



Type	Weight kg	No. of conductors	Power rating at 60% DC	ø of connecting-cables in mm		Order - No.
				Cable 1	Cable 2	
SA-DMSWA6/100S-1HS28-60	2,670	6	100	≈ 17,0	≈ 7,0	236 315
SA-DMSWA7/100S-1HS28-60	2,776	7	100	≈ 17,0	≈ 7,5	236 316
SA-DMSWA8/100S-1HS28-60	2,900	8	100	≈ 17,0	≈ 8,0	236 317
SA-DMSWA9/100S-1HS28-60	3,130	9	100	≈ 17,0	≈ 9,0	236 318
SA-DMSWA10/100S-1HS28-60	3,346	10	100	≈ 17,0	≈ 9,5	236 319
SA-DMSWA6/50S-1SS28-60	2,006	6	50	≈ 11,5	-	236 320
SA-DMSWA7/50S-1SS28-60	2,078	7	50	≈ 11,5	-	236 321
SA-DMSWA8/50S-1SS28-60	2,222	8	50	≈ 10,0	≈ 10,0	236 322
SA-DMSWA9/50S-1SS28-60	2,478	9	50	≈ 11,0	≈ 10,0	236 323
SA-DMSWA10/50S-1SS28-60	2,856	10	50	≈ 11,5	≈ 10,0	236 324

Tow arms

Tow arm

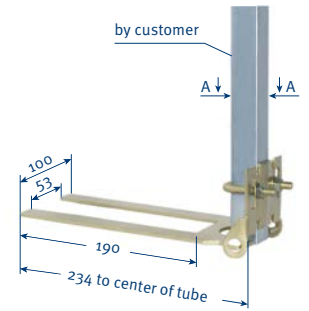
Installation options of 30 mm square-, hollow profile or tube with 30 - 34 mm

Type	Weight kg	Order - No.
MN-MGU	0,632	600 334
MN-MGU/K ⁽²⁾	0,550	600 336

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



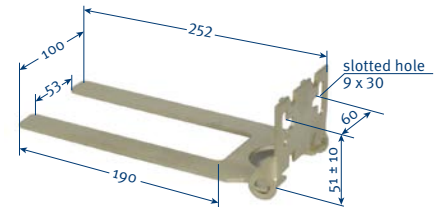
A - A
version with tube(2)



Tow arm

for plane surface

Type	Weight kg	Order - No.
MN-MGF	0,524	600 335
MN-MGF/K ⁽²⁾	0,442	600 337

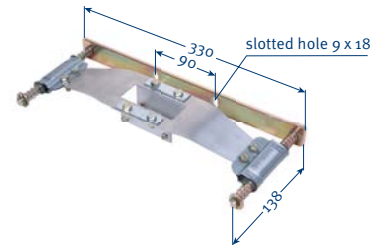


Flexible tow arm

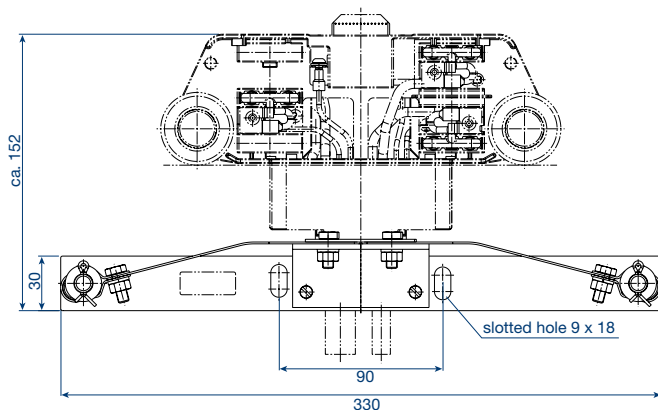
For single collectors – flexible support type for systems with transfer funnels MTH

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

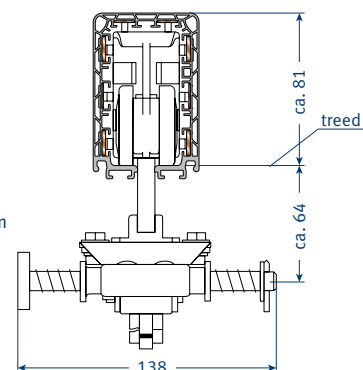
Type	Weight kg	Order - No.
MN-MFMN	0,983	236 460



Flexible tow arm configuration

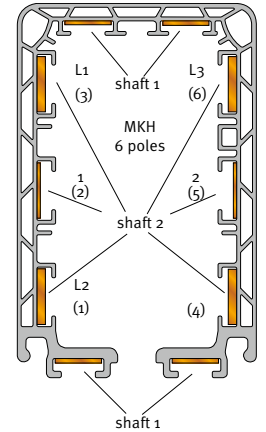


max. horizontal offset 15 mm
max. vertical offset 10 mm



(1) For assembly use enclosed adapter plate.
(2) Stainless steel.

Flat copper



Flat copper (MKHD)

Max. length of 11 mm wide strip (for shaft 1)

Type	Description	Weight kg/m	Type of cassette			Order - No. (Cu)	Order - No. (Inox)
			A	B	C		
SS-FLCU40A/11-11X1-E	11 mm ² 11 x 1 mm (40 A)	0,10	90	260	300	234 198	–
SS-INOX40A/11-11x1-E	11 mm ² 11 x 1 mm	0,09	90	260	300	–	234 384

Flat copper (MKHD)

Max. length of 13 mm wide strips

Type	Description	Weight kg/m	Type of cassette			Order - No. (Cu)	Order - No. (Inox)
			A	B	C		
SS-FLCU40A/10-13X0,8-E	10 mm ² 13 x 0,8 mm (40 A)	0,09	115	300	-	234 197	–
SS-FLCU63A/14-13X1,1-E	14 mm ² 13 x 1,1 mm (63 A)	0,13	65	200	300	236 006	–
SS-INOX40A/13-13x1,3-E	17 mm ² 13 x 1,3 mm	0,14	65	200	300	–	234 383
SS-FLCU100A/26-13X2-E	26 mm ² 13 x 2 mm (100 A) ⁽²⁾	0,23	45	130	200	234 200	–
SS-FLCU140A/33-13X2,5-E	33 mm ² 13 x 2,5 mm (140 A) ⁽²⁾	0,29	35	100	160	234 201	–
SS-FLCU160A/42-13X3,2-E	42 mm ² 13 x 3,2 mm (160 A) ⁽²⁾	0,37	25	80 ⁽¹⁾	120 ⁽¹⁾	234 202	–

Cable glands

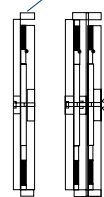
Cable glands	for cable-Ø in mm	capacity A (execution: D/F/S)	Page
M 25 and M 40	11 - 17 and 19 - 28	40 - 60 HS	12, 13
M 25	11 - 17	40 SS	12, 13
M 25 and M 50	9 - 19 and 23 - 34	40 - 100 HS	13, 14
M 25 and M 50	9 - 19 and 29 - 40	140 - 200 HS	13, 14
M 25	9 - 19	40 SS	13, 14
M 25 for L1/L2/L3	9 - 19	40 - 200 HS	15, 16
M 25 for 1 - 4 and 9/10	6 - 15	40 - 200 HS	15, 16
M 25 6 to 10 - poles	9 - 19	40 SS	15, 16
M 20	6 - 13	40 - 200 SS / HS	15, 16, 18

(1) Values for installation through VAHLE-engineers (with help device possible). Use bolted joints and possibly expansion sections for bigger lengths than shown in the table. In this case installation by Vahle experts is recommended, especially for copper cross section of 42 mm² and 51 mm². Consult factory for proper layout.

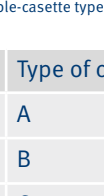
(2) With straightening tool (see page 34).

Assembling tools

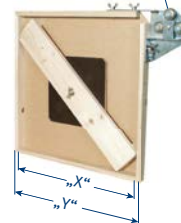
Single-cassette type EZK



Double-cassette type DEZK



Arrangement of the laying mechanism



Copper cassettes

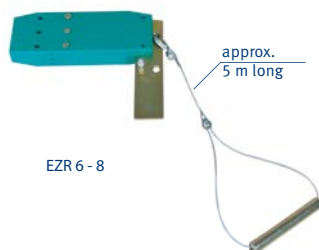
Type	Weight kg	Dim. » X «	Dim. » Y «	Type of cassette	Order - No.
MZ-EZK1-MKL/H	2,364	462	500	A	234 219
MZ-EZK2-MKL/H	3,890	662	700	B	234 220
MZ-EZK3-MKL/H	5,648	862	900	C	234 250
MZ-DEZK1-MKL/H	4,831	462	500	A	234 221
MZ-DEZK2-MKL/H	7,883	662	700	B	234 222
MZ-DEZK3-MKL/H	11,387	862	900	C	234 251

Type of copper cassette depends on copper cross section and system length (see page 33).

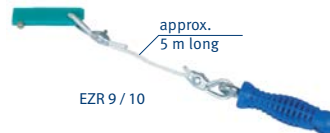
Straightening tool

required from strip sections 26 mm² upwards

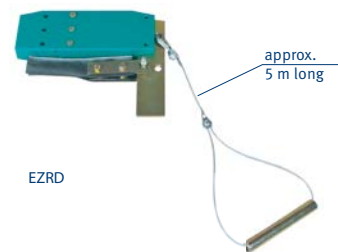
Type	Weight kg	Order - No.
MZ-RV-MKL/H	0,865	234 218



EZR 6 - 8



EZR 9 / 10



EZRD

Conductor threading tool

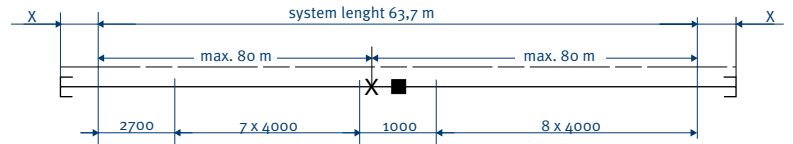
Type	Weight kg	Description	Order - No.
MZ-EZR6-8-MKL/H	0,978	(for conductors inside housing, shafts 1 & 2)	234 204
MZ-EZR9/10-MKL/H	0,182	(for conductors outside housing, shafts 1)	234 730
DL-EZRD-MKL/H	1,187	(for sealing strip and for conductors inside housing 1 & 2)	234 552

Example for ordering

MKH ...8/100....HSC (see pages 5 & 6)

X = 300 mm end section for copper conductor MKHD (w/o cond.)

Not for MKHF & MKHS.



Quantity	Type	MKHD		MKHF		MKHS	
		Type	Order - No.	Type	Order - No.	Type	Order - No.
15	Profile section 4 m	MKHD-4000HSC	262 504	-	-	-	-
1	Profile section 3 m for short length 2.7 m	MKHD-3000HSC	262 503	-	-	-	-
15	Conductor system 4 m	-	-	MKHF8/100-4000HSC	262 134	MKHS8/100-4000HSC	262 344
1	Conductor system 3 m for short length 2.7 m	-	-	MKHF8/100-3000HSC	262 133	MKHS8/100-3000HSC	262 343
1	Line feed	ES-MHGD8/40-100HSC-1000	262 547	ES-MHGF8/100HSC-1000	262 500	ES-MHGS6/100HSC-1000	262 456
1	End section, left 0,3 m long	EK-MHED/L	262 537	-	-	-	-
1	End section, right 0,3 m long	EK-MHED/R	262 536	-	-	-	-
2	End caps	-	-	EK-MSES	235 141	EK-MSES	235 141
18	Joint caps	VM-MVMD	234 678	-	-	-	-
16	Joint caps	-	-	VM-MVMS	234 585	VM-MVMS	234 585
1	Fixpoint hanger	AH-MFH	262 001	AH-MFH	262 001	AH-MFH	262 001
32	Sliding hangers	AH-MGH	262 000	AH-MGH	262 000	AH-MGH	262 000
195 m	Flat copper strip, 3 coils à 65 m, 26 mm ²	SS-FLCU100A/26-13X2-E	234 200	-	-	-	-
65 m	Flat copper strip, 1 coil à 65 m, 14 mm ²	SS-FLCU63A/14-13X1,1-E	236 006	-	-	-	-
130 m	Flat copper strip, 2 coils à 65 m, 10 mm ²	SS-FLCU40A/10-13X0,8-E	234 197	-	-	-	-
130 m	Flat copper strip, 2 coils à 65 m, 11 mm ²	SS-FLCU40A/11-11X1-E	234 198	-	-	-	-
1	Single collector	SA-MSWA8/50-1HS28-60	236 179	SA-MSWA8/50-1HS28-60	236 179	SA-MSWA8/50-1HS28-60	236 179
1	Tow arm	MN-MGU	600 334	MN-MGU	600 334	MN-MGU	600 334
1	Copper cassette	MZ-EZK2-MKL/H	234 220	-	-	-	-
1	Laying mechanism	MZ-RV-MKL/H	234 218	-	-	-	-
1	Conductor threading tool	MZ-EZR6-8-MKL/H	234 204	-	-	-	-

Spare parts

for enclosed conductor system

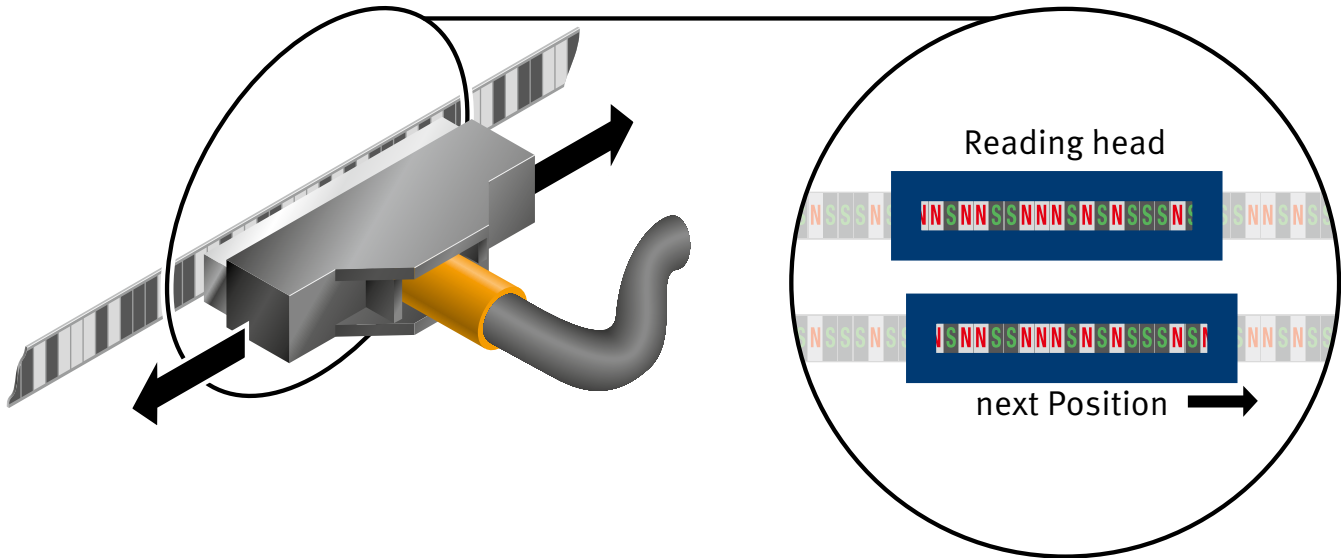
Type	Description	Order - No.
VM-STV11/40A-MKHF	Plug-in joint for MKHF (11 mm Cu; 40 A)	262 020
VM-STV13/40-100A-KBHF/MKHF	Plug-in joint for MKHF (13 mm Cu; 40–100 A)	600 483
VM-SCHV11/40A-MKHS/MKLS	Bolted joint for MKHS (11 mm Cu; 40 A)	262 019
VM-SCHV13/40-200A-KBHS/MKHS/MKLS	Bolted joint for MKHS (13 mm Cu; 40–200 A)	262 018
VM-MVMT-MT-MU/S-9/10POL	Joint Cap for transfer guide and transfer funnel, pair (MKHD, MKHF und MKHS)	234 779
DL-D-KBH-MKH-MKL-TDV	Sealing strip (max. length each 40 m)	600 551
DL-V-KSLT-KBH-MKL/H-LSV/G	Coupling for sealing strip, in pairs (2 per joint)	258 300
DL-F-MKL/H	Fixing clamp for sealing strip (1 per end)	236 105

for collector MSWA

Type	Description	Order - No.
SK-KSW-MSWA-PH/SU-28	Carbon Phase (lateral, 9th and 10th pole)	600 088
SK-KSW-MSWA-PE/S-28	Carbon Ground (lateral, PE)	600 090
SK-MSWA-PH/O-28	Carbon top (7th and 8th pole)	236 187
SA-KF-KSW-MSWA-SP	Carbon spring standard (for all carbons, pair)	600 338
TR-DMSW/A-SF310	Rigid bar for DMSW & DMSWA	234 515
SA-ZB-AS-MSWA-P-250	High speed set for collector MSWAS	236 199
SA-ZB-DG-MSWA-S	Sealing strip slide plate for collectors MSWA	236 625

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.



Features

- absolute position determination up to and 262 m
- 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 slirpings 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.



VAHLE Powercom® 485

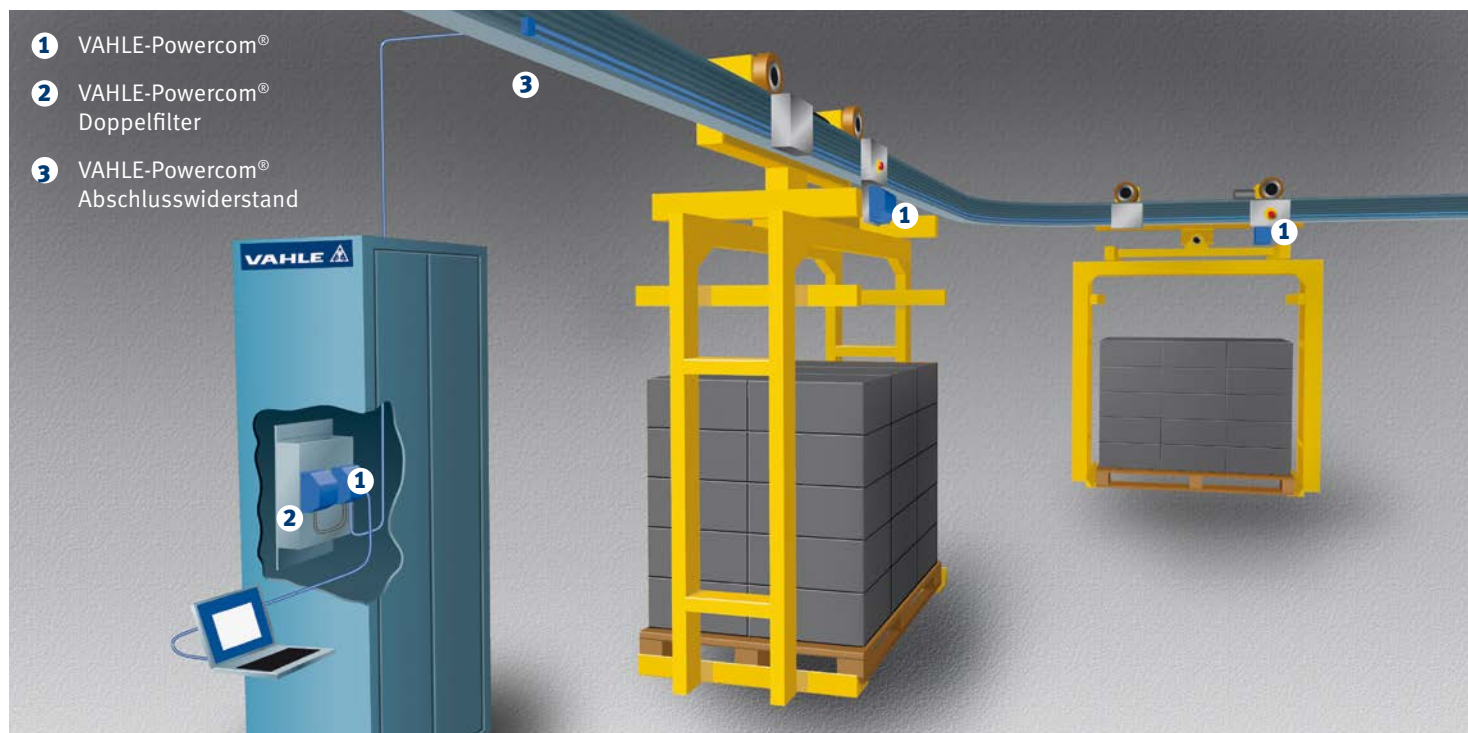
RS 485 Interface (transparent protocol)
to be used in various BUS-Systems.
Transfer rate 19.2 kbps

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

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

Example of use



Questionnaire

Company: _____

Date: _____

Fon: _____

Fax: _____

email: _____

Internet: _____

1. Number of conductor system installations: _____
2. Type of equipment to be powered: _____
3. Operatin voltage: _____ Volt Frequency: _____ Hz
 Three phase voltage: AC voltage: DC voltage:
4. Track lenght: _____
5. Number of conductors: _____ neutral: _____ control: _____ ground: _____
6. Mounted position of conductor system:
 Conductor pendant / collector cable facing to the bottom Conductor pendant / collector cable lateral payout⁽¹⁾
 Support distance m (max. 2 m) Other: _____
7. Number of consumers per system:
8. Indoor: Outdoor:
9. Special operating conditions (humidity, dust, chemical influences etc.) _____
10. Ambient temperature: _____ °C min. _____ °C max.
11. Hall expansion joints: _____ pieces. min. _____ max. _____ expansion.
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 system be arranged?⁽¹⁾: _____
15. Brackets required: yes ; no c/c distance beam / conductor system _____
 Flange width of beam: _____
16. Travel speed: _____ in curves: _____ at transfers: _____
17. Max. voltage drop from the conductor feed point to the cosumer considering starting current:
 3% oder _____ % referring to the nominal voltage.
18. Power consumption of the individual consumer loads: _____

Motordaten	Kran/Gerät 1						Kran/Gerät 2							
	Leis- tung kW	Nennstrom			Anlaufstrom		An- triebs- art ⁽²⁾	Leis- tung kW	Nennstrom			Anlaufstrom		An- triebs- art ⁽²⁾
		A	cos φ _N	% ED	A	cos φ _A			A	cos φ _N	% ED	A	cos φ _A	
Hubwerk														
Hilfshub														
Fahrwerk														
Katzfahrwerk														

Mark with * those motors which can run simutnaneously

Mark with Δ those motors which can start up simultaneously

Further remarks: _____

(1) Sketches required for 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 interest of further development.

Please copy and fill in the questionnaire.

Signature _____

Products and Service

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 flat cables on I-track	8b
Festoon systems for round cables on I-track	8c
Festoon systems for ◇ -track	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
Assemblies / Commissioning	
Spare parts / Maintenance service	



certified by DQS according to Din EN
ISO 9001:2008 OHSAS 18001:2007
(Reg. Nr. 003140 QM 08/BSOH)

 **VAHLE**
ELECTRIFICATION SYSTEMS