VAHLE

ENCLOSED CONDUCTOR SYSTEM MKH

4C | EN 2019

ENCLOSED CONDUCTOR SYSTEM MKH

CONTENT

Enclosed conductor system MKH 2
Description of the conductor system 2
Technical data 3
Technicall data and standard sections 6
Types and order numbers 7
Sections and sealing strips 9
Hangers and end sections 10
Brackets 11
Jointing material and end feeds 12
Line feeds 13
Heating 17
Contact sections, Turntables and Switches 19
Entry funnel 20
Transfer guides 21
Removal sections 23
Maintenance sections 24
Anti-condensation sections 26
Expansion sections 27
Collectors 29
Tow arms 32
Flat copper and cable glands 33
Assembling tools 34
Example for ordering 35
Spare parts 36
Questionnaire 39

DESCRIPTION OF THE CONDUCTOR SYSTEM

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

Type MKHD 6-pole up to 10-pole conductor version, continuous copper strips from 63 to 160 A
(copper strips come as separate items as coils).

Type MKHF 6-pole up to 8-pole conductor version, with preassembled copper conductors and spring loaded connectors from 63 to 100 A.

Type MKHS 6-pole up to 8-pole conductor version, with preassembled copper conductors and bolted joints from 63 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. The conductor system with sealing strip 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 V AC or 60 V DC.

Other cross sections, as indicated on page 3, are possible. If a conductor is used as N: 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.

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 and 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.

TECHNICAL DATA

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.

KONTINUITÄT DES SCHUTZLEITERS

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.

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: ≤35 °C = 2.00 m
- Indoor and outdoor systems with and without heating: >35 °C = 1.33 m
- Cold and frozen storage warehouses: ≤ 0 °C = 1.33 m

It is necessary to provide at least one additional hanger on the sections of the feeds (line feeds), removing sections, anti-condensation sections and expansion sections (1 m sections). This prevents any sagging of the conductor conductor system.

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 19–22).

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 seperated 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.

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).

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 DIN EN 60204-1:2007-06 and DIN EN 60204-32:2009-03
- Transfers with switches and turntables
- Operational voltage below 50 V
- Transmission of data- and/or emergency stop signals
- frequency controlled drives
- high electrical loads

PLEASE NOTE

For use in galvanizing and pickling plants, under agressive conditions and low voltage applications we would appreciate receiving detailled 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 39.

In case of special environmental conditions the PVC – housing can be equipped with stainless steel conductors (refer to page 33).
Please send detailed information. For low voltage applications please consult our factory.

TECHNICAL DATA

CONDUCTOR SYSTEM VALUES: ELECTRICAL DATA

Max. continuous current	Nominal voltage (UL)	Dielectric strength	Spec. resistance	Surface resistance	Leakage resistance
200 A (with 80 % ED)	690 V (600 V)	IEC 60243 30–40 kV/mm	IEC 60093 5×10^{15} Ω/cm	IEC 60093 10^{13} Ω	EN 60112 CTI 400-2.7

CONDUCTOR SYSTEM VALUES: MECHANICAL DATA

Flexible strength	Tensile strength	Ambient temperature	Flammability	Resistance to chemicals (at 45 °C)
75 N/mm² ±10 %	40 N/mm² ±10 %	−30 °C up to +60 °C	flame retardant, self extinguishing, UL 94 V0	Gasoline, mineral oil, grease, acid sulfur up to 50 %, caustic soda up to 25 % and hydrochloric acid up to 50 %, concentrated

CORRECTION FACTOR ƒT

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

$I_{Dzul.UT} = I_{zul.} \times ƒT[A]$ mit $I_{Dzul.UT} > I_{DA}$

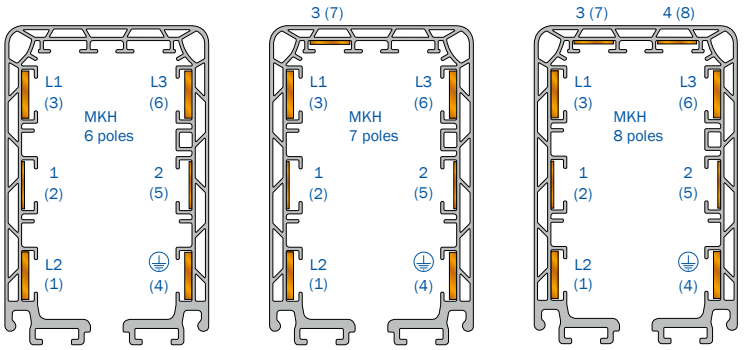
$I_{Dzul.UT}$ = permissible continuous currentat at ambient temperature
$I_{zul.}$ = permissible continuous currentat at 35 °C (catalogue value)[A]
ƒT = temperature correction factor

TECHNICAL DATA

MKHD/MKHF/MKHS

CROSS SECTIONS[1]

In case of using a neutral conductor copper pos. 1 will be taken. Layout of the system on request. (see page 5)



Type[2] (HS with PE / SS without PE)	No. of poles	Copper cross section mm²				Ampere rating with 35 °C in A, L1, L2, L3[5]			Nominal voltage V[4]	Impedance at 50 Hz 20 °C Ω/1000 m		Resistance at 20 °C Ω/1000 m		Leakage distance mm
		Phase L1, L2, L3	⏚	Control line		60 % ED	80 % ED	100 % ED		Phase L1, L2, L3	⏚	Phase L1, L2, L3	⏚	
MKH ... 6/63-HSC	6	3 x 10	10	2 x 10		81	70	**63**	690	1.731	1.731	1.717	1.717	30
MKH ... 6/63-SSD	6			6 x 10		81	70	**63**	690	1.731		1.717		30
MKH ... 6/80-HSC	6	3 x 17	17	2 x 10		103	89	**80**	690	1.078	1.078	1.057	1.057	30
MKH ... 6/100-HSC	6	3 x 26	26	2 x 10		129	112	**100**	690	0.717	0.717	0.687	0.687	30
MKH ... 6/140-HSC	6	3 x 33	26	2 x 10		161	**140**	125	690	0.586	0.717	0.549	0.687	30
MKH ... 6/160-HSC	6	3 x 42	26	2 x 10		184	**160**	143	690	0.473	0.717	0.429	0.687	30
MKH ... 6/200-HSC[3]	6	3 x 51	26	2 x 10		231	**200**	179	690	0.393	0.717	0.344	0.687	30
MKH ... 7/63-HSC	7	3 x 10	10	2 x 10	1 x 11	81	70	**63**	690	1.731	1.731	1.717	1.717	30
MKH ... 7/63-SSD	7			6 x 10	1 x 11	81	70	**63**	690	1.731		1.717		30
MKH ... 7/80-HSC	7	3 x 17	17	2 x 10	1 x 11	103	89	**80**	690	1.078	1.078	1.057	1.057	30
MKH ... 7/100-HSC	7	3 x 26	26	2 x 10	1 x 11	129	112	**100**	690	0.717	0.717	0.687	0.687	30
MKH ... 7/140-HSC	7	3 x 33	26	2 x 10	1 x 11	161	**140**	125	690	0.586	0.717	0.549	0.687	30
MKH ... 7/160-HSC	7	3 x 42	26	2 x 10	1 x 11	184	**160**	143	690	0.473	0.717	0.429	0.687	30
MKH ... 7/200-HSC[3]	7	3 x 51	26	2 x 10	1 x 11	231	**200**	179	690	0.393	0.717	0.344	0.687	30
MKH ... 8/63-HSC	8	3 x 10	10	2 x 10	2 x 11	81	70	**63**	690	1.731	1.731	1.717	1.717	30
MKH ... 8/63-SSD	8			6 x 10	2 x 11	81	70	**63**	690	1.731		1.717		30
MKH ... 8/80-HSC	8	3 x 17	17	2 x 10	2 x 11	103	89	**80**	690	1.078	1.078	1.057	1.057	30
MKH ... 8/100-HSC	8	3 x 26	26	2 x 10	2 x 11	129	112	**100**	690	0.717	0.717	0.687	0.687	30
MKH ... 8/140-HSC	8	3 x 33	26	2 x 10	2 x 11	161	**140**	125	690	0.586	0.717	0.549	0.687	30
MKH ... 8/160-HSC	8	3 x 42	26	2 x 10	2 x 11	184	**160**	143	690	0.473	0.717	0.429	0.687	30
MKH ... 8/200-HSC[3]	8	3 x 51	26	2 x 10	2 x 11	231	**200**	179	690	0.393	0.717	0.344	0.687	30

(1) Numbers in paranthesis apply to control line
(2) Complete types e.g. MKH ... 7/63HSC for 7 poles with bolted joints
(3) only for MKHS
(4) Nominal voltage UL = 600 V
(5) Power consumption UL on request

TECHNICAL DATA AND STANDARD SECTIONS

MKHD/MKHF/MKHS

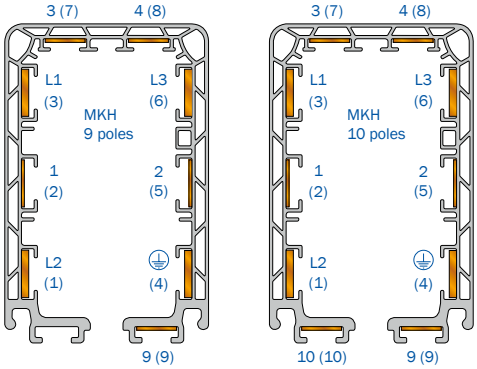
CROSS SECTIONS(1)

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

Layout of the system on request.

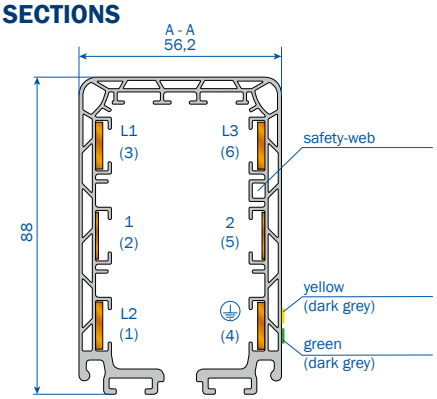
Pole 9 and 10 for max. 24 V

AC or 60 V DC.

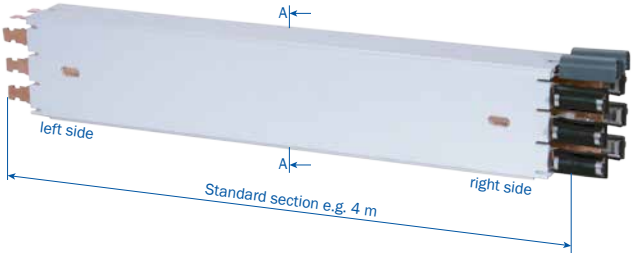


Type	No. of poles	Copper cross section mm²				Ampere rating with 35 °C in A, L1, L2, L3(3)			Nominal voltage V	Impedance at 50 Hz 20 °C Ω/1000 m		Resistance at 20 °C Ω/1000 m		Leakage distance mm
		Phase L1, L2, L3	⏚	Control line		60 % ED	80 % ED	100 % ED		Phase L1, L2, L3	⏚	Phase L1, L2, L3	⏚	
MKHD ... 9/63-HSC	9	3 x 10	10	2 x 10	3 x 11	81	70	**63**	690	1.731	1.731	1.717	1.717	30
MKHD ... 9/63-SSD	9			6 x 10	3 x 11	81	70	**63**	690	1.731		1.717		30
MKHD ... 9/80-HSC	9	3 x 17	17	2 x 10	3 x 11	103	89	**80**	690	1.078	1.078	1.057	1.057	30
MKHD ... 9/100-HSC	9	3 x 26	26	2 x 10	3 x 11	129	112	**100**	690	0.717	0.717	0.687	0.687	30
MKHD ... 9/140-HSC	9	3 x 33	26	2 x 10	3 x 11	161	**140**	125	690	0.586	0.717	0.549	0.687	30
MKHD ... 9/160-HSC	9	3 x 42	26	2 x 10	3 x 11	184	**160**	143	690	0.473	0.717	0.429	0.687	30
MKHD ... 10/63-HSC	10	3 x 10	10	2 x 10	4 x 11	81	70	**63**	690	1.731	1.731	1.717	1.717	30
MKHD ... 10/63-SSD	10			6 x 10	4 x 11	81	70	**63**	690	1.731		1.717		30
MKHD ... 10/63-HSC	10	3 x 17	17	2 x 10	4 x 11	103	89	**80**	690	1.078	1.078	1.057	1.057	30
MKHD ... 10/100-HSC	10	3 x 26	26	2 x 10	4 x 11	129	112	**100**	690	0.717	0.717	0.687	0.687	30
MKHD ... 10/140-HSC	10	3 x 33	26	2 x 10	4 x 11	161	**140**	125	690	0.586	0.717	0.549	0.687	30
MKHD ... 10/160-HSC	10	3 x 42	26	2 x 10	4 x 11	184	**160**	143	690	0.473	0.717	0.429	0.687	30

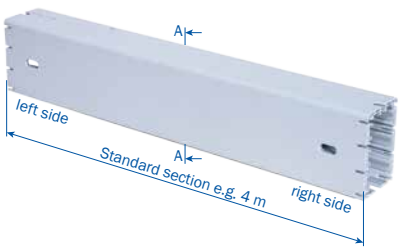
STANDARD SECTIONS



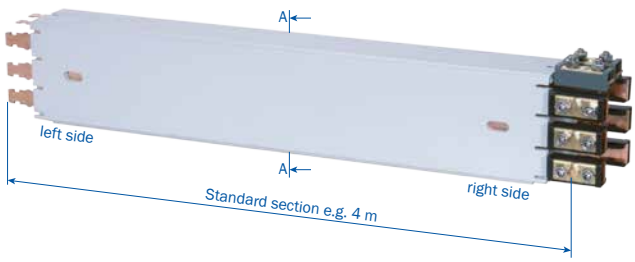
TYPE MKHF
WITH PLUG-IN JOINTS, FACTORY ASSEMBLED



TYPE MKHD FOR
CONTINUOUS COPPER STRIPS



TYPE MKHS
WITH BOLTED JOINTS, FACTORY ASSEMBLED



(1) Numbers in paranthesis apply to control line
(2) Nominal voltage UL = 600 V
(3) Power consumption UL on request

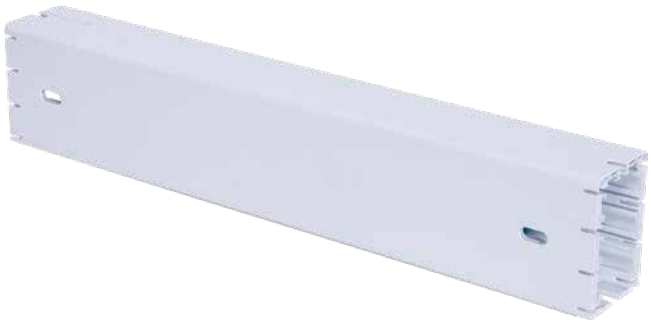
TYPES AND ORDER NUMBERS

MKHD/MKHF

TYPE MKHD

with continuous copper strips

(to be drawn in during installation)



Type[1]	Weight kg/m	Order No.
MKHD-….HSC	1.052	26250•
MKHD-….SSD	1.052	26251•

TYPE MKHF

with factory assembled copper strips

and plug-in joints (63 – 100 A)

Type[1]	Weight kg/m	Order No.
MKHF6/63-….HSC	1.638	26320•
MKHF6/63-….SSD	1.638	26322•
MKHF6/80-….HSC	1.839	26321•
MKHF6/100-….HSC	2.176	26205•
MKHF7/63-….HSC	1.748	26323•
MKHF7/63-….SSD	1.748	26325•
MKHF7/80-….HSC	1.949	26324•
MKHF7/100-….HSC	2.277	26209•
MKHF8/63-….HSC	1.858	26326•
MKHF8/63-….SSD	1.858	26328•
MKHF8/80-….HSC	2.059	26327•
MKHF8/100-….HSC	2.387	26213•

(1) Complete types e.g. MKHD-**4000**HSC for 4 m with PE Order No. 262504
MKHF8/63-**4000**HSC for 4 m with PE Order No. 263264
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.

TYPES AND ORDER NUMBERS

MKHS

TYP MKHS

with factory assembled copper strips and bolted joints

(63 – 200 A)

Type[1]	Weight kg/m	Order No.
MKHS6/63-....HSC	1.824	26329 •
MKHS6/63-....SSD	1.824	26331 •
MKHS6/80-....HSC	1.950	26330 •
MKHS6/100-....HSC	2.353	26220 •
MKHS6/140-....HSC	2.530	26221 •
MKHS6/160-....HSC	2.773	26222 •
MKHS6/200-....HSC	3.019	26223 •
MKHS7/63-....HSC	1.961	26332 •
MKHS7/63-....SSD	1.961	26334 •
MKHS7/80-....HSC	2.087	26333 •
MKHS7/100-....HSC	2.490	26227 •
MKHS7/140-....HSC	2.667	26228 •
MKHS7/160-....HSC	2.910	26229 •
MKHS7/200-....HSC	3.156	26230 •
MKHS8/63-....HSC	2.098	26335 •
MKHS8/63-....SSD	2.098	26337 •
MKHS8/80-....HSC	2.224	26336 •
MKHS8/100-....HSC	2.627	26234 •
MKHS8/140-....HSC	2.804	26235 •
MKHS8/160-....HSC	3.047	26236 •
MKHS8/200-....HSC	3.293	26237 •

1) Complete types e.g. MKHS8/63-**4000**HSC for 4 m with PE Order No. 263354
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 AND SEALING STRIPS

MKHD/MKHF/MKHS

CURVES

Min. bending radius, horizontal = 1000 mm

max. length L = 3600 mm

max. ∢ 120°

Smallest vertical radius = 2000 mm

HR for SI = Horizontal radius – Safety web inside

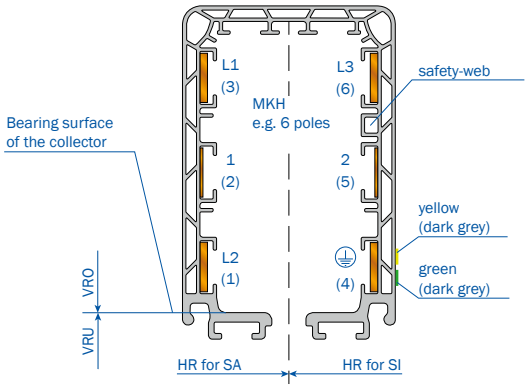
HR for SA = Horizontal radius – Safety web outside

VRO = Vertical radius upwards

VRU = Vertical radius downwards

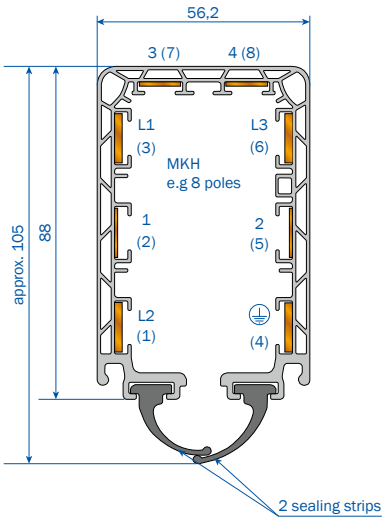
Safety web will be mounted in direction of track.

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.

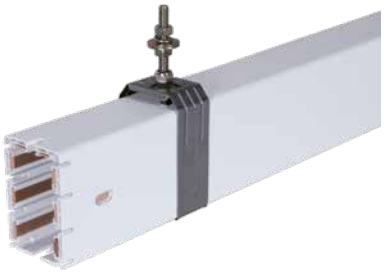


Type	Description	Order No.
DL-D-KBH-MKH-MKL-TDV10(1)	Sealing strip 10 m long	600551-10
DL-D-KBH-MKH-MKL-TDV20(1)	Sealing strip 20 m long	600551-20
DL-D-KBH-MKH-MKL-TDV40(1)	Sealing strip 40 m long	600551-40
DL-F-MKL/H	Fixing clamp for sealing strip (1 per end)	236105
DL-V-KSLT-KBH-MKL/H-LSV/G	Joint for coupling the sealing strip (2 per joint)	258300
DL-EZRD-MKL/H	Mounting glider for sealing strip EZRD	234552
SA-ZB-DG-MSWA-S	Sealing strip slide plate for collector MSWA	236625

(1) 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 AND END SECTIONS

MKHD/MKHF/MKHS

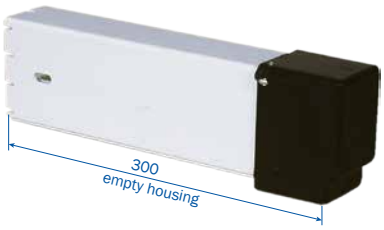


SLIDING HANGER

Type	Weight kg	Order No.
AH-MGH	0.134	262000
AH-MGH/K[1]	0.134	262003

FIXPOINT HANGER

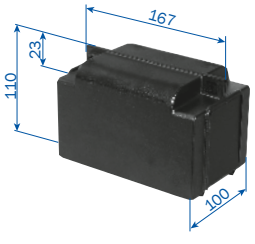
Type	Weight kg	Order No.
AH-MFH	0.182	262001
AH-MFH/K[1]	0.182	262002



END SECTION (MKHD)

with 0.3 m section

Type	Weight kg	Execution	Order No.
EK-MHED/L	0.401	left	262537
EK-MHED/R	0.401	right	262536



END CAP (MKHF / MKHS)

Type	Weight kg	Execution	Order No.
EK-MSES	0.308	left and right	235141

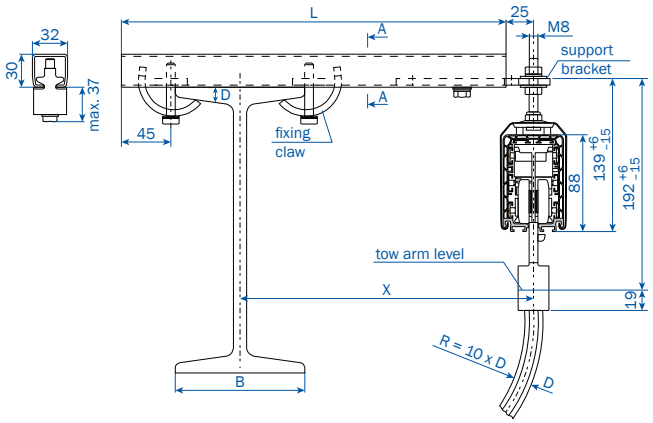
(1) stainless steel

BRACKETS

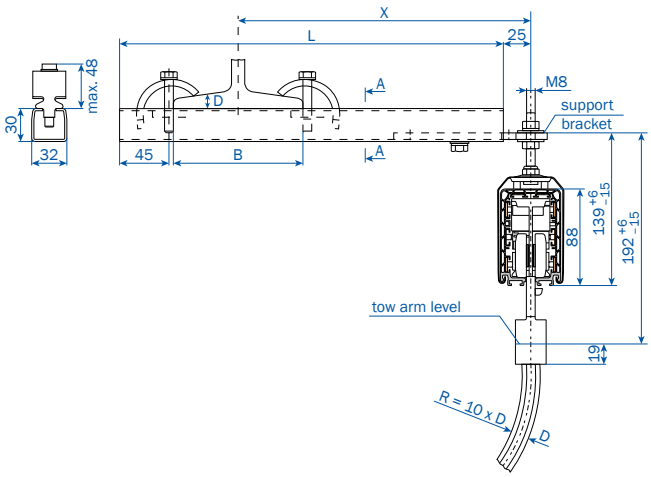
MKHD/MKHF/MKHS

VIEW WITHOUT I- BEAM

POSITION OF THE FIXING CLAW FOR D = 6 – 15 MM



POSITION OF THE FIXING CLAW FOR D = 15 – 25 MM

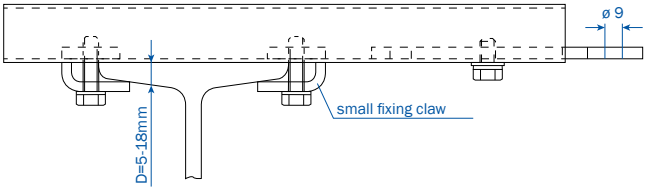


ARRANGEMENT EHK WITH SMALL FIXING CLAW

Attention! Make sure that hoist wheels have enough clearance!

Use small claw if necessary!

The ⊓-rail of EHK is identical to type S1 (catalog 8a).

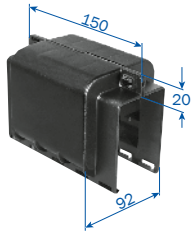


Type(1)	X mm	L mm	B max mm	Weight kg	Order No.	
					standard version	with small fixing claw(1)
HK-EHK250-NS	250	350	170	1.080	251600	–
HK-EHK250-KS...					–	251720-...
HK-EHK300-NS	300	400	170	1.128	251610	–
HK-EHK300-KS...					–	251730-...
HK-EHK400-NS	400	500	170	1.313	251620	–
HK-EHK400-KS...					–	251740-...
HK-EHK500-NS	500	600	170	1.510	251630	–
HK-EHK500-KS...					–	251750-...
HK-EHK600-NS	600	700	170	1.639	251640	–
HK-EHK600-KS...					–	251760-...
HK-EHK700-NS	700	800	170	1.804	251650	–
HK-EHK700-KS...					–	251770-...
HK-EHK750-NS	750	850	170	1.782	251660	–
HK-EHK750-KS...					–	251780-...
HK-EHK800-NS	800	900	170	2.026	251670	–
HK-EHK800-KS...					–	251790-...

(1) e.g. HK-EHK250-KS12 → Order No. 251720-12 for fixing claw with D = 12 mm
Select next larger size bracket when your -beam dimension B is more than 170 upto 300 mm.

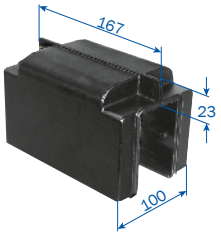
JOINTING MATERIAL AND END FEEDS

MKHD/MKHF/MKHS



JOINT CAP, SELF LOCKING (MKHD)

Type	Weight kg	Order No.
VM-MVMD	0.160	234678



JOINT CAP, SELF LOCKING (MKHF / MKHS)

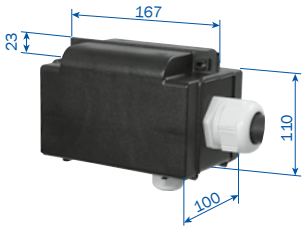
Type	Weight kg	Order No.
VM-MVMS	0.274	234585

END FEED (MKHD)

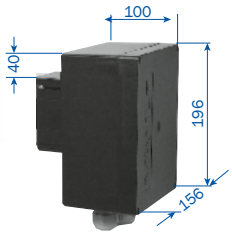
End feed comes loose without standard section.

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

Electrical connection with customer supplied cable shoes to M6 terminals



6- to 8-poles



9- to 10-poles

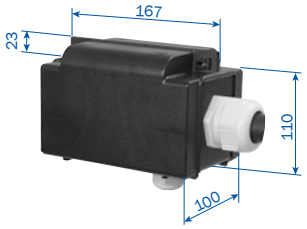
Type	Weight kg	Cable gland (dimensions see page 33)	Order No.
ES-MKED6-8/63-80HS	0.515	M 25 and M 40	235152
ES-MKED9-10/63-80HS	1.071	M 25 and M 40	262538
ES-MKED6-8/63SS	0.470	M 25	235157
ES-MKED9-10/63SS	1.020	M 25	262539

END FEED (MKHF / MKHS)

End feed comes loose without standard section.

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

Electrical connection with customer supplied cable shoes to M6 terminals

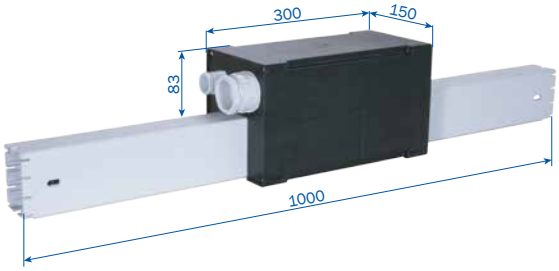


Type	Weight kg	Cable gland (dimensions see page 33)	Order No.
ES-MKES6-8/63-80HS	0.492	M 25 and M 40	235230
ES-MKES6-8/63SS	0.446	M 25	235233

LINE FEEDS

MKHD

Electrical connection with customer supplied cable shoes to M8 terminals



Type	Weight kg	M-Cable gland (dimensions see page 33)	Order No.
ES-MHGD6/63-100HSC-1000	2.445	M 50 and M 25	262545
ES-MHGD7/63-100HSC-1000	2.530	M 50 and M 25	262546
ES-MHGD8/63-100HSC-1000	2.615	M 50 and M 25	262547
ES-MHGD9/63-100HSC-1000	2.654	M 50 and M 25	262548
ES-MHGD10/63-100HSC-1000	2.693	M 50 and M 25	262549
ES-MHGD6/140-160HSC-1000	2.431	M 50 and M 25	262550
ES-MHGD7/140-160HSC-1000	2.516	M 50 and M 25	262551
ES-MHGD8/140-160HSC-1000	2.601	M 50 and M 25	262552
ES-MHGD9/140-160HSC-1000	2.640	M 50 and M 25	262553
ES-MHGD10/140-160HSC-1000	2.679	M 50 and M 25	262554
ES-MHGD6/63SSD-1000	2.385	M 25	262540
ES-MHGD7/63SSD-1000	2.460	M 25	262541
ES-MHGD8/63SSD-1000	2.545	M 25	262542
ES-MHGD9/63SSD-1000	2.584	M 25	262543
ES-MHGD10/63SSD-1000	2.623	M 25	262544

LINE FEEDS

MKHF/MKHS

Electrical connection with customer supplied cable shoes to M8 terminals

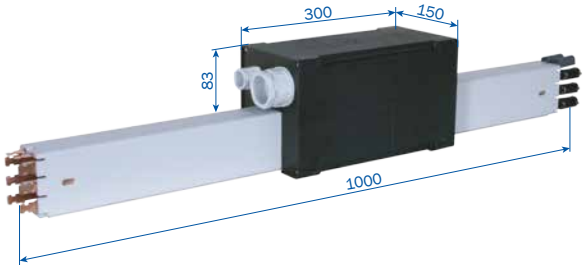


Photo shows MHGF

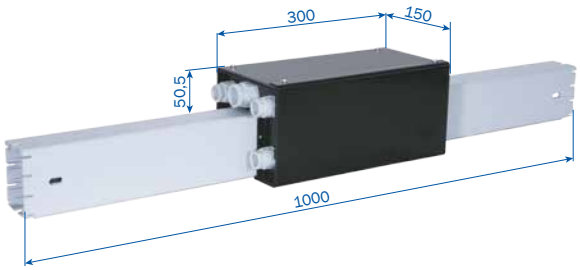
Type	Weight kg	M-Cable gland (dimensions see page 33)	Order No.
ES-MHGF6/63HSC-1000	3.056	M 50 and M 25	263205
ES-MHGF7/63HSC-1000	3.250	M 50 and M 25	263206
ES-MHGF8/63HSC-1000	3.444	M 50 and M 25	263207
ES-MHGF6/80HSC-1000	3.288	M 50 and M 25	263208
ES-MHGF7/80HSC-1000	3.482	M 50 and M 25	263209
ES-MHGF8/80HSC-1000	3.676	M 50 and M 25	263210
ES-MHGF6/100HSC-1000	3.616	M 50 and M 25	262498
ES-MHGF7/100HSC-1000	3.810	M 50 and M 25	262499
ES-MHGF8/100HSC-1000	4.004	M 50 and M 25	262500
ES-MHGF6/63SSD-1000	2.948	M 25	263215
ES-MHGF7/63SSD-1000	3.142	M 25	263216
ES-MHGF8/63SSD-1000	3.336	M 25	263217

Type	Weight kg	M-Cable gland (dimensions see page 33)	Order No.
ES-MHGS6/63HSC-1000	3.242	M 50 and M 25	263218
ES-MHGS7/63HSC-1000	3.463	M 50 and M 25	263219
ES-MHGS8/63HSC-1000	3.684	M 50 and M 25	263220
ES-MHGS6/80HSC-1000	3.474	M 50 and M 25	263225
ES-MHGS7/80HSC-1000	3.695	M 50 and M 25	263226
ES-MHGS8/80HSC-1000	3.916	M 50 and M 25	263227
ES-MHGS6/100HSC-1000	3.802	M 50 and M 25	262456
ES-MHGS7/100HSC-1000	4.023	M 50 and M 25	262457
ES-MHGS8/100HSC-1000	4.244	M 50 and M 25	262458
ES-MHGS6/140HSC-1000	3.965	M 50 and M 25	262459
ES-MHGS7/140HSC-1000	4.186	M 50 and M 25	262460
ES-MHGS8/140HSC-1000	4.407	M 50 and M 25	262461
ES-MHGS6/160HSC-1000	4.208	M 50 and M 25	262462
ES-MHGS7/160HSC-1000	4.429	M 50 and M 25	262463
ES-MHGS8/160HSC-1000	4.650	M 50 and M 25	262464
ES-MHGS6/200HSC-1000	4.454	M 50 and M 25	262465
ES-MHGS7/200HSC-1000	4.675	M 50 and M 25	262466
ES-MHGS8/200HSC-1000	4.896	M 50 and M 25	262467
ES-MHGS6/63SSD-1000	3.135	M 25	263228
ES-MHGS7/63SSD-1000	3.356	M 25	263229
ES-MHGS8/63SSD-1000	3.577	M 25	263230

LINE FEEDS

MKHD

Electrical connection with customer supplied cable shoes to M8 terminals



Type	Weight kg	M-Cable gland (dimensions see page 33)	Order No.
ES-MHLD6/63-100HSC-1000-0	2.565	M 25 for L1, L2, L3 M 25 for 1 – 4 M 20 for PE, 9/10	262560
ES-MHLD7/63-100HSC-1000-0	2.651		262561
ES-MHLD8/63-100HSC-1000-0	2.737		262562
ES-MHLD9/63-100HSC-1000-0	2.745		262563
ES-MHLD10/63-100HSC-1000-0	2.749		262564
ES-MHLD6/140-160HSC-1000-0	2.553	M 25 for L1, L2, L3 M 25 for 1 – 4 M 20 for PE, 9/10	262565
ES-MHLD7/140-160HSC-1000-0	2.639		262566
ES-MHLD8/140-160HSC-1000-0	2.725		262567
ES-MHLD9/140-160HSC-1000-0	2.733		262568
ES-MHLD10/140-160HSC-1000-0	2.737		262569
ES-MHLD6/63SSD-1000-0	2.517	1x M 25	262555
ES-MHLD7/63SSD-1000-0	2.593		262556
ES-MHLD8/63SSD-1000-0	2.679		262557
ES-MHLD9/63SSD-1000-0	2.687	2x M 25	262558
ES-MHLD10/63SSD-1000-0	2.691		262559

LINE FEEDS

MKHF/MKHS

Electrical connection with customer supplied cable shoes to M8 terminals

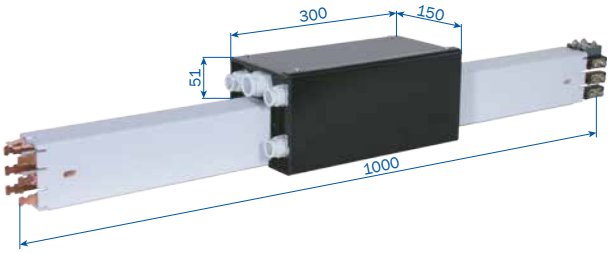


Photo shows MHLS

Type	Weight kg	M-Cable gland (dimensions see page 33)	Order No.
ES-MHLF6/63HSC-1000-0	3.170	M 25 for L1, L2, L3	263235
ES-MHLF7/63HSC-1000-0	3.364	M 25 for 1 – 4	263236
ES-MHLF8/63HSC-1000-0	3.558		263237
ES-MHLF6/80HSC-1000-0	3.402	M 20 for PE	263238
ES-MHLF7/80HSC-1000-0	3.596		263239
ES-MHLF8/80HSC-1000-0	3.790		263240
ES-MHLF6/100HSC-1000-0	3.730		262486
ES-MHLF7/100HSC-1000-0	3.924		262487
ES-MHLF8/100HSC-1000-0	4.118		262488
ES-MHLF6/63SSD-1000-0	3.075	M 25	263245
ES-MHLF7/63SSD-1000-0	3.269		263246
ES-MHLF8/63SSD-1000-0	3.463		263247

Type	Weight kg	M-Cable gland (dimensions see page 33)	Order No.
ES-MHLS6/63HSC-1000-0	3.356	M 25 for L1, L2, L3	263248
ES-MHLS7/63HSC-1000-0	3.577	M 25 for 1 – 4	263249
ES-MHLS8/63HSC-1000-0	3.798		263250
ES-MHLS6/80HSC-1000-0	3.588	M 20 for PE	263255
ES-MHLS7/80HSC-1000-0	3.809		263256
ES-MHLS8/80HSC-1000-0	4.030		263257
ES-MHLS6/100HSC-1000-0	3.916		262524
ES-MHLS7/100HSC-1000-0	4.137		262525
ES-MHLS8/100HSC-1000-0	4.358		262526
ES-MHLS6/140HSC-1000-0	4.081	M 25 for PE, L1, L2, L3	262527
ES-MHLS7/140HSC-1000-0	4.302	M 25 for 1 – 4	262528
ES-MHLS8/140HSC-1000-0	4.523		262529
ES-MHLS6/160HSC-1000-0	4.324		262530
ES-MHLS7/160HSC-1000-0	4.545		262531
ES-MHLS8/160HSC-1000-0	4.766		262532
ES-MHLS6/200HSC-1000-0	4.570		262533
ES-MHLS7/200HSC-1000-0	4.791		262534
ES-MHLS8/200HSC-1000-0	5.012		262535
ES-MHLS6/63SSD-1000-0	3.256	M 25	263258
ES-MHLS7/63SSD-1000-0	3.477		263259
ES-MHLS8/63SSD-1000-0	3.698		263260

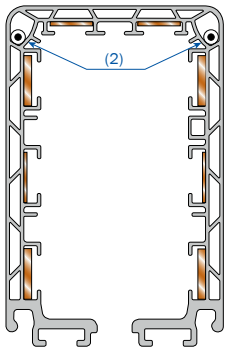
HEATING

MKHD/MKHF/MKHS

HEATING CABLE

Type	Resistance[1]	Order No.
HL-0,10-EYCEX-5203-PTFE-260-750	0.10 Ω/m	196381
HL-0,15-EYCEX-5203-PTFE-260-750	0.15 Ω/m	196382
HL-0,20-EYCEX-5203-PTFE-260-750	0.20 Ω/m	196383
HL-0,32-EYCEX-5203-PTFE-260-750	0.32 Ω/m	196384
HL-0,38-EYCEX-5203-PTFE-260-750	0.38 Ω/m	196385
HL-0,48-EYCEX-5203-PTFE-260-750	0.48 Ω/m	196386
HL-0,60-EYCEX-5203-PTFE-260-750	0.60 Ω/m	196387
HL-0,81-EYCEX-5203-PTFE-260-750	0.81 Ω/m	196389
HL-1,00-EYCEX-5203-PTFE-260-750	1.00 Ω/m	196390
HL-1,44-EYCEX-5203-PTFE-260-750	1.44 Ω/m	196391
HL-2,00-EYCEX-5203-PTFE-260-750	2.00 Ω/m	196392
HL-3,00-EYCEX-5203-PTFE-260-750	3.00 Ω/m	196393
HL-4,00-EYCEX-5203-PTFE-260-750	4.00 Ω/m	196394
HL-4,40-EYCEX-5203-PTFE-260-750	4.40 Ω/m	196395
HL-5,16-EYCEX-5203-PTFE-260-750	5.16 Ω/m	196396
HL-5,60-EYCEX-5203-PTFE-260-750	5.60 Ω/m	196397

[1] Divergences ±2.5 %

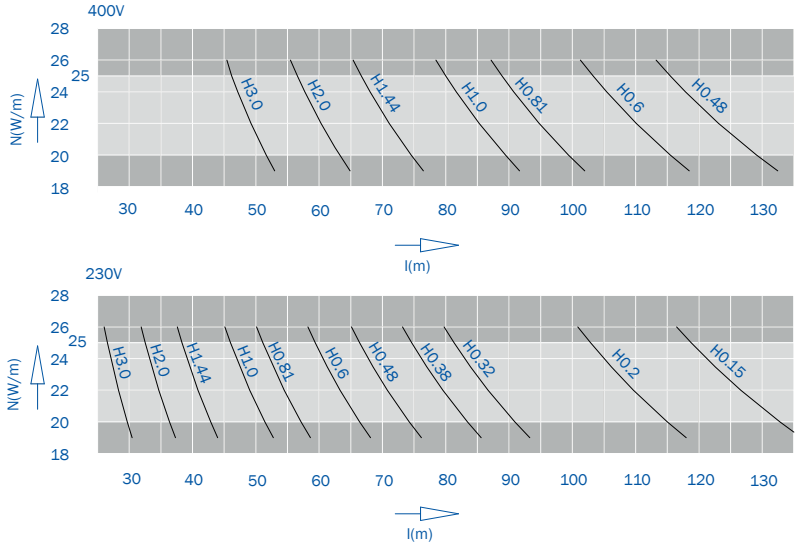


[2] Arrangement of heating cable

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 devided into several heating sections.
For short heating distances to feed with lower secondary voltage via transformer.



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

U = Supply voltage (Volt)

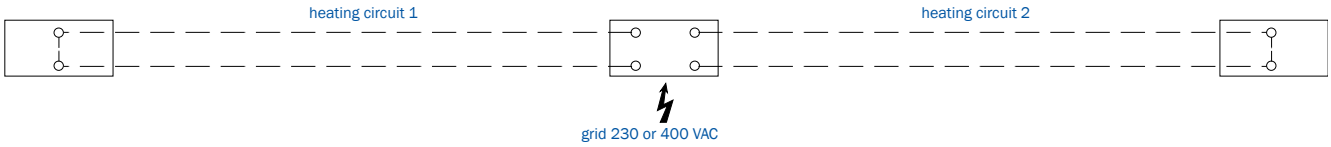
R = Resistance of heating cable (Ohm/m)

L = Lenght of heating section (m)

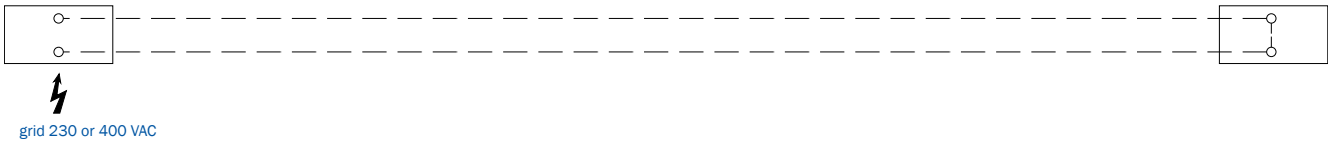
HEATING

SWITCHING EXAMPLES (DEPENDING ON THE PLANT SITUATION) MKHD/MKHF/MKHS

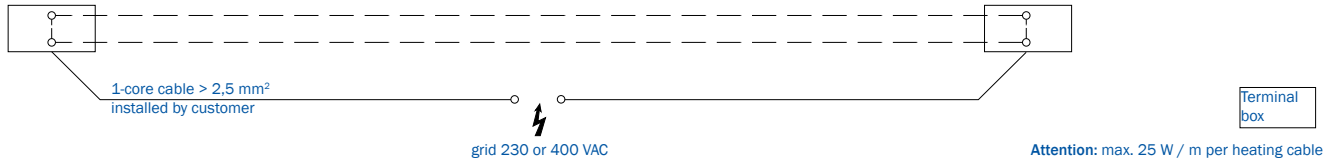
a) 2 heating circuits



b) 1 heating circuit



c) 2 heating circuits



CONNECTING BOXES FOR HEATING

Type	Execution	Cable gland (dimensions see page 13)	Order No.
BH-AKB-MKH-L	left end	M 20	262037
BH-AKB-MKH-R	right end	M 20	262038
BH-AKB-MKH-M	line feed	2 x M 20	262039
BH-MA-KBH-MKL/H-LSV/G	1 set material for connecting clamps		195291

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

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

Order for 60 m conductor system example c)

1) 122 m heating cable type H 2.0 (2 x 60 m and 2 x 1 m additional)
   Voltage 400 V, 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

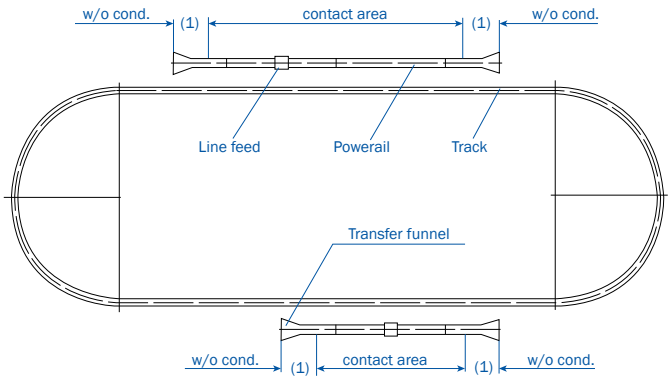
3) 4x sets of material for connection ends.

Switch gear assembly and temperature control unit as per customer's inquiry.

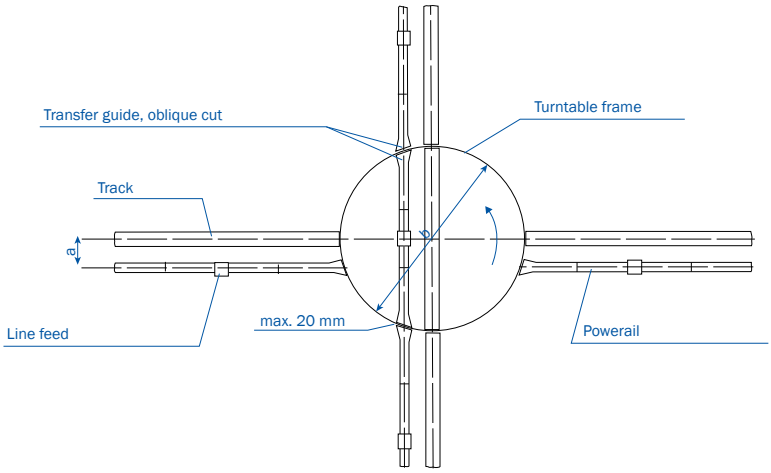
Fuses, cables etc. have to be provided by the customer.

CONTACT SECTIONS, TURNTABLES AND SWITCHES

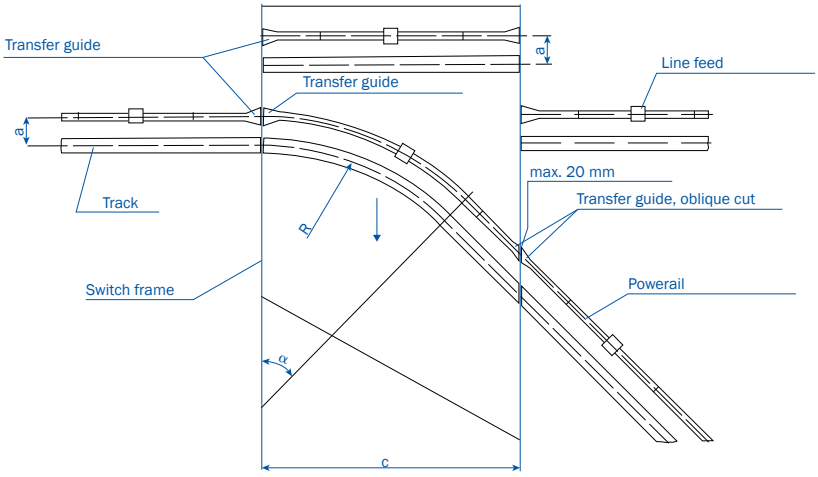
MKHD/MKHF/MKHS CONTACT SECTION(1)



TURNTABLE



SLIDING SWITCH



Specify dimensions a, b, c,

R and angle α.

α = 50° max.

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

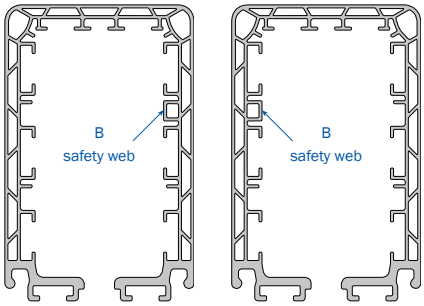
MKHD/MKHF/MKHS

Powerail should not be activated before the collector carbons have complete contact with the conductors. The use of flexible tow arm is required for all types.

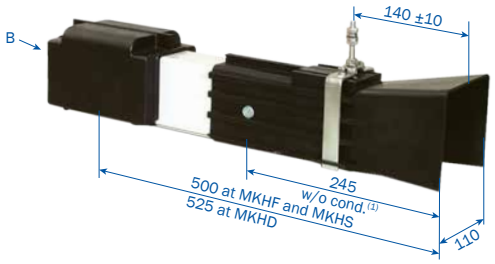
Offset of the funnel/guide to the collector:

- max. 15 mm horizontal
- max. 10 mm vertical

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



Left version Right version



Type	Weight kg	Order No. Version	
		left	right
ET-MTH6/63-100-L-HSC-500(525)(2)	2.018	262375	–
ET-MTH6/63-100-R-HSC-500(525)(2)	2.049	–	262387
ET-MTH7/63-100-L-HSC-500(525)(2)	2.089	262376	–
ET-MTH7/63-100-R-HSC-500(525)(2)	2.120	–	262388
ET-MTH8/63-100-L-HSC-500(525)(2)	2.160	262377	–
ET-MTH8/63-100-R-HSC-500(525)(2)	2.191	–	262389
ET-MTH6/140-160-L-HSC-500(525)	2.029	262378	–
ET-MTH6/140-160-R-HSC-500(525)	2.060	–	262390
ET-MTH7/140-160-L-HSC-500(525)	2.100	262379	–
ET-MTH7/140-160-R-HSC-500(525)	2.131	–	262391
ET-MTH8/140-160-L-HSC-500(525)	2.171	262380	–
ET-MTH8/140-160-R-HSC-500(525)	2.202	–	262392
ET-MTH6/200-L-HSC-500(525)	2.082	262384	–
ET-MTH6/200-R-HSC-500(525)	2.121	–	262396
ET-MTH7/200-L-HSC-500(525)	2.153	262385	–
ET-MTH7/200-R-HSC-500(525)	2.192	–	262397
ET-MTH8/200-L-HSC-500(525)	2.224	262386	–
ET-MTH8/200-R-HSC-500(525)	2.263	–	262398
ET-MTH6/63-L-SSD-500(525)(2)	2.006	262381	–
ET-MTH6/63-R-SSD-500(525)(2)	2.006	–	262393
ET-MTH7/63-L-SSD-500(525)(2)	2.075	262382	–
ET-MTH7/63-R-SSD-500(525)(2)	2.075	–	262394
ET-MTH8/63-L-SSD-500(525)(2)	2.144	262383	–
ET-MTH8/63-R-SSD-500(525)(2)	2.144	–	262395

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

TRANSFER GUIDES

MKHD/MKHF/MKHS

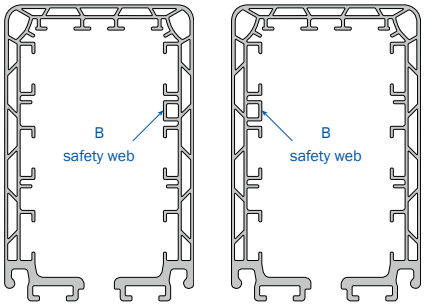
TRANSFER GUIDES, STRAIGHT

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

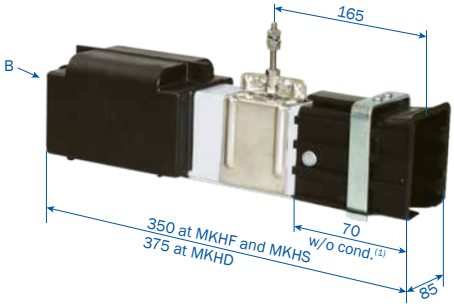
Staggered arrangement of the transfer guides to each other:

- max. 4 mm horizontal
- max. 3 mm vertical

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



Left version Right version



Type(1)	Weight kg	Order No. Version	
		left	right
UE-MUH6/63-100-L-HSC-350(375)(2)	2.005	262399	–
UE-MUH6/63-100-R-HSC-350(375)(2)	2.005	–	262408
UE-MUH7/63-100-L-HSC-350(375)(2)	2.077	262400	–
UE-MUH7/63-100-R-HSC-350(375)(2)	2.077	–	262409
UE-MUH8/63-100-L-HSC-350(375)(2)	2.119	262401	–
UE-MUH8/63-100-R-HSC-350(375)(2)	2.119	–	262410
UE-MUH6/140-160-L-HSC-350(375)	2.020	262402	–
UE-MUH6/140-160-R-HSC-350(375)	2.020	–	262411
UE-MUH7/140-160-L-HSC-350(375)	2.092	262403	–
UE-MUH7/140-160-R-HSC-350(375)	2.092	–	262412
UE-MUH8/140-160-L-HSC-350(375)	2.134	262404	–
UE-MUH8/140-160-R-HSC-350(375)	2.134	–	262413
UE-MUH6/200-L-HSC-350(375)	2.092	262417	–
UE-MUH6/200-R-HSC-350(375)	2.092	–	262420
UE-MUH7/200-L-HSC-350(375)	2.164	262418	–
UE-MUH7/200-R-HSC-350(375)	2.164	–	262421
UE-MUH8/200-L-HSC-350(375)	2.236	262419	–
UE-MUH8/200-R-HSC-350(375)	2.236	–	262422
UE-MUH6/63-L-SSD-350(375)(2)	1.986	262405	–
UE-MUH6/63-R-SSD-350(375)(2)	1.986	–	262414
UE-MUH7/63-L-SSD-350(375)(2)	2.055	262406	–
UE-MUH7/63-R-SSD-350(375)(2)	2.055	–	262415
UE-MUH8/63-L-SSD-350(375)(2)	2.124	262407	–
UE-MUH8/63-R-SSD-350(375)(2)	2.124	–	262416

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

TRANSFER GUIDES, OBLIQUE(1)

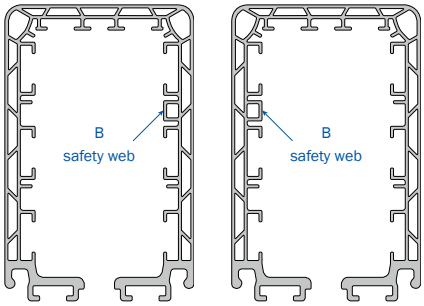
MKHD/MKHF/MKHS

Necessary with all types are 2 single collectors.

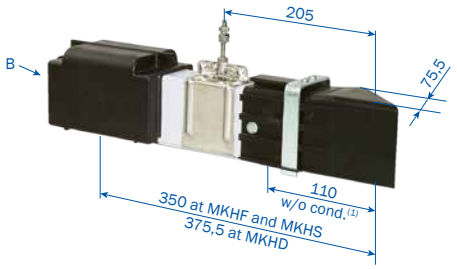
Staggered arrangement of the transfer guides to each other:

- max. 4 mm horizontal
- max. 3 mm vertical

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



Left version Right version



Type	Weight kg	Order No. Version	
		left	right
UE-MUHS6/63-100-L-HSC-350(375)(2)	2.017	262423	–
UE-MUHS6/63-100-L-HSC-350(375)(2)	2.017	–	262432
UE-MUHS7/63-100-L-HSC-350(375)(2)	2.082	262424	–
UE-MUHS7/63-100-R-HSC-350(375)(2)	2.082	–	262433
UE-MUHS8/63-100-L-HSC-350(375)(2)	2.147	262425	–
UE-MUHS8/63-100-R-HSC-350(375)(2)	2.147	–	262434
UE-MUHS6/140-160-L-HSC-350(375)	2.032	262426	–
UE-MUHS6/140-160-R-HSC-350(375)	2.032	–	262435
UE-MUHS7/140-160-L-HSC-350(375)	2.097	262427	–
UE-MUHS7/140-160-R-HSC-350(375)	2.097	–	262436
UE-MUHS8/140-160-L-HSC-350(375)	2.162	262428	–
UE-MUHS8/140-160-R-HSC-350(375)	2.162	–	262437
UE-MUHS6/200-L-HSC-350(375)	2.050	262441	–
UE-MUHS6/200-R-HSC-350(375)	2.050	–	262444
UE-MUHS7/200-L-HSC-350(375)	2.115	262442	–
UE-MUHS7/200-R-HSC-350(375)	2.115	–	262445
UE-MUHS8/200-L-HSC-350(375)	2.180	262443	–
UE-MUHS8/200-R-HSC-350(375)	2.180	–	262446
UE-MUHS6/63-L-SSD-350(375)(2)	2.020	262429	–
UE-MUHS6/63-R-SSD-350(375)(2)	2.020	–	262438
UE-MUHS7/63-L-SSD-350(375)(2)	2.085	262430	–
UE-MUHS7/63-R-SSD-350(375)(2)	2.085	–	262439
UE-MUHS8/63-L-SSD-350(375)(2)	2.150	262431	–
UE-MUHS8/63-R-SSD-350(375)(2)	2.150	–	262440

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

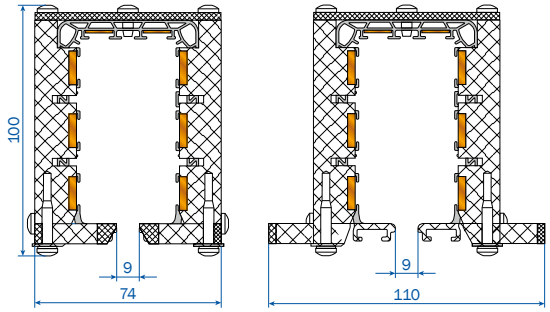
REMOVAL SECTIONS

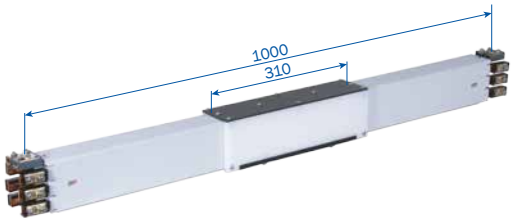
MKHD/MKHF/MKHS

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-MATH6/63-100HSC-1000(1)	4.392	262147
AT-MATH7/63-100HSC-1000(1)	4.568	262148
AT-MATH8/63-100HSC-1000(1)	4.744	262149
AT-MATH 6/140-160HSC-1000	4.422	262150
AT-MATH7/140-160HSC-1000	4.598	262151
AT-MATH8/140-160HSC-1000	4.774	262152
AT-MATH6/200HSC-1000	4.652	262156
AT-MATH7/200HSC-1000	4.828	262157
AT-MATH8/200HSC-1000	5.004	262158
AT-MATH6/63SSD-1000(1)	4.404	262153
AT-MATH7/63SSD-1000(1)	4.580	262154
AT-MATH8/63SSD-1000(1)	4.756	262155

FOR DOUBLE COLLECTORS

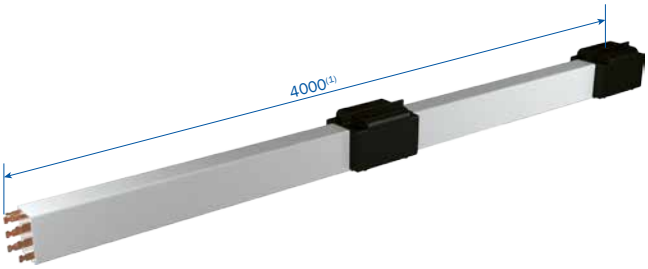
Type	Weight kg	Order No.
AT-MATHD6/63-100HSC-1000(1)	5.108	262159
AT-MATHD7/63-100HSC-1000(1)	5.284	262160
AT-MATHD8/63-100HSC-1000(1)	5.460	262161
AT-MATHD6/140-160HSC-1000	5.138	262162
AT-MATHD7/140-160HSC-1000	5.314	262163
AT-MATHD8/140-160HSC-1000	5.490	262164
AT-MATHD6/200HSC-1000	5.352	262168
AT-MATHD7/200HSC-1000	5.528	262169
AT-MATHD8/200HSC-1000	5.704	262170
AT-MATHD6/63SSD-1000(1)	5.116	262165
AT-MATHD7/63SSD-1000(1)	5.291	262166
AT-MATHD8/63SSD-1000(1)	5.468	262167

(1) Also suitable for former version with 40 A

MAINTENANCE SECTIONS

MKHS

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-MRT6/63-4000HSC	7.104	263265
RVT-MRT7/63-4000HSC	7.539	263266
RVT-MRT8/63-4000HSC	7.974	263267
RVT-MRT6/80-4000HSC	8.032	263268
RVT-MRT7/80-4000HSC	8.467	263269
RVT-MRT8/80-4000HSC	8.902	263270
RVT-MRT6/100-4000HSC	9.339	263014
RVT-MRT7/100-4000HSC	9.774	263015
RVT-MRT8/100-4000HSC	10.209	263016
RVT-MRT6/140-4000HSC	10.047	263017
RVT-MRT7/140-4000HSC	10.482	263018
RVT-MRT8/140-4000HSC	10.917	263019
RVT-MRT6/160-4000HSC	11.019	263020
RVT-MRT7/160-4000HSC	11.454	263021
RVT-MRT8/160-4000HSC	11.889	263022
RVT-MRT6/200-4000HSC	12.003	263023
RVT-MRT7/200-4000HSC	12.430	263024
RVT-MRT8/200-4000HSC	12.873	263025
RVT-MRT6/63-4000SSD	7.104	263275
RVT-MRT7/63-4000SSD	7.539	263276
RVT-MRT8/63-4000SSD	7.974	263277

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

CONDUCTOR DEAD SECTIONS

MKHD/MKHF/MKHS

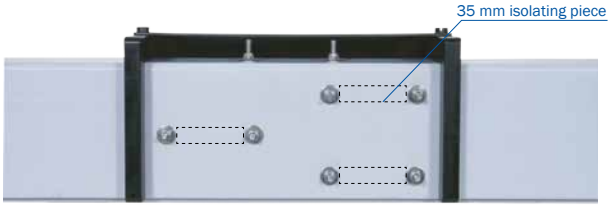


Photo shows isolating piece

5 MM AIR GAP

Type(1)	Weight kg	Order No.
ST-MHTL1 ...	0.238	262578
ST-MHTL2 ...	0.246	262579
ST-MHTL3 ...	0.254	262580
ST-MHTL4 ...	0.262	262581
ST-MHTL5 ...	0.270	262582
ST-MHTL6 ...	0.278	262583
ST-MHTL7 ...	0.286	262584
ST-MHTL8 ...	0.294	262585

35 MM ISOLATING PIECE

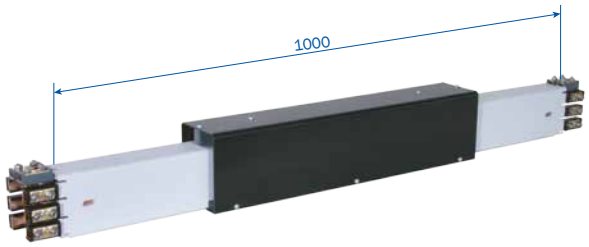
Type(1)	Weight kg	Order No.
ST-MHTI1 ...	0.274	262586
ST-MHTI2 ...	0.294	262587
ST-MHTI3 ...	0.309	262588
ST-MHTI4 ...	0.324	262589
ST-MHTI5 ...	0.339	262590
ST-MHTI6 ...	0.354	262591
ST-MHTI7 ...	0.369	262592
ST-MHTI8 ...	0.384	262593
ST-MHTI9 ...	0.387	262594
ST-MHTI10 ...	0.390	262595

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 isolation piece with seperation of conductors L1, L2, L3 und 2 for the current collector MSWA
→ Order No.: 262589

ANTI-CONDENSATION SECTIONS

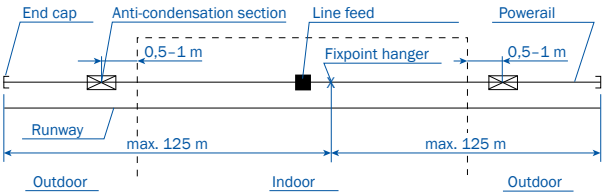
MKHD/MKHF/MKHS

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 an 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 approximately 0.5 m to max. 1 m to the transition point.

FOR MKHD

Type	Weight kg	Order No.
BT-MBHD6-10HSC-1000	2.081	262570
BT-MBHD6-10SSD-1000	2.081	262571

FOR MKHF/S

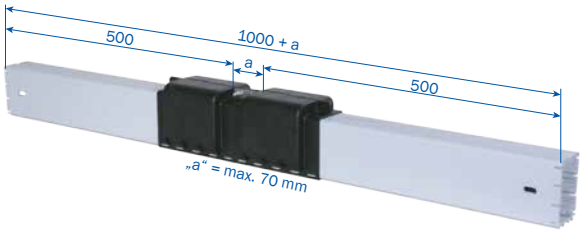
Type	Weight kg	Order No.
BT-MBHS6/63-100HSC-1000(1)	4.678	262135
BT-MBHS7/63-100HSC-1000(1)	4.854	262136
BT-MBHS8/63-100HSC-1000(1)	5.030	262137
BT-MBHS6/140-160HSC-1000	4.708	262138
BT-MBHS7/140-160HSC-1000	4.884	262139
BT-MBHS8/140-160HSC-1000	5.060	262140
BT-MBHS6/200HSC-1000	4.954	262144
BT-MBHS7/200HSC-1000	5.130	262145
BT-MBHS8/200HSC-1000	5.306	262146
BT-MBHS6/63SSD-1000(1)	4.730	262141
BT-MBHS7/63SSD-1000(1)	4.906	262142
BT-MBHS8/63SSD-1000(1)	5.082	262143

(1) Also suitable for former version with 40 A

EXPANSION SECTIONS

MKHD

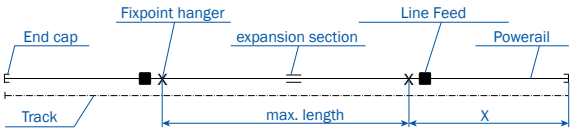
Expansion sections are required to compensate for the different expansions between copper conductors and steel- or concrete structures, in varying temperatures without interrupting electrical power: Expansion joints are used when the Powerail length between feeds, curves, switches or other fix points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



Max. length during differences in temperature:

Δt 20 °C = 70 m Δt 40 °C = 35 m Δt 80 °C = 17 m

Δt 30 °C = 45 m Δt 60 °C = 23 m



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

X = max. 55 m for outdoor systems

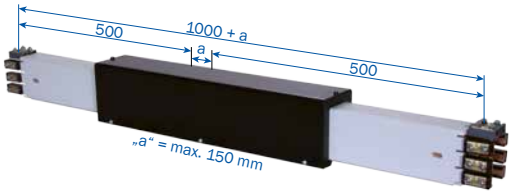
X = max. 100 m for indoor systems

Type	Weight kg	Order No.
DT-MDHD6-8HSC-1000	1.424	262572
DT-MDHD9HSC-1000	1.418	262573
DT-MDHD10HSC-1000	1.412	262574
DT-MDHD6-8SSD-1000	1.424	262575
DT-MDHD9SSD-1000	1.418	262576
DT-MDHD10SSD-1000	1.412	262577

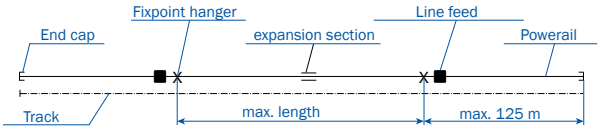
EXPANSION SECTIONS

MKHF/MKHS

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.

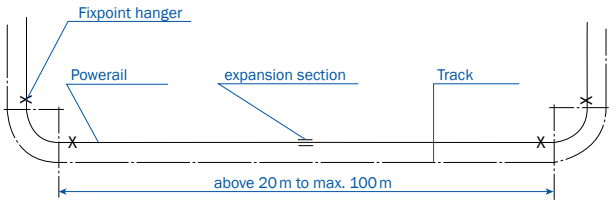


Max. length during differences in temperature:
Δ t 90 °C (–30 °C bis +60 °C) one expansion joint per 100 m.
An additional expansion joint every 100 m.



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 during installation.
Valid for an ambient temperature of –10 °C to +35 °C during installation.

Type	Weight kg	Order No.
DT-MDHS6/63-100HSC-1000(1)	6.354	262004
DT-MDHS7/63-100HSC-1000(1)	6.619	262005
DT-MDHS8/63-100HSC-1000(1)	6.884	262006
DT-MDHS6/140-160HSC-1000	6.384	262007
DT-MDHS7/140-160HSC-1000	6.649	262008
DT-MDHS8/140-160HSC-1000	6.914	262009
DT-MDHS6/200HSC-1000	6.564	262013
DT-MDHS7/200HSC-1000	6.829	262014
DT-MDHS8/200HSC-1000	7.094	262015
DT-MDHS6/63SSD-1000(1)	6.368	262010
DT-MDHS7/63SSD-1000(1)	6.633	262011
DT-MDHS8/63SSD-1000(1)	6.898	262012

(1) Also suitable for former version with 40 A

COLLECTORS

MKHD/MKHF/MKHS

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)

Example of ordering double collectors with 2 m cable

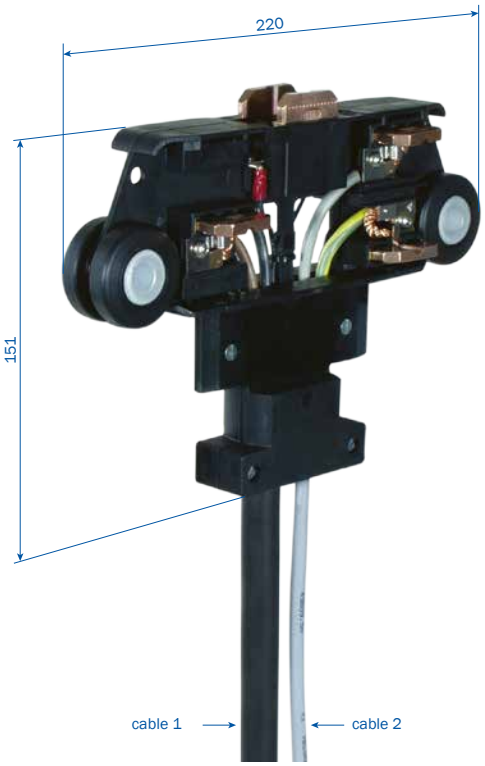
Order No. 236177-2

for collector SA-MSWA6/50-2HS28-60

Cleaning trolleys on request

For curves use single collectors only.

Connecting cable 1 m, longer cable available.



Type	Weight kg	No of Poles	Power rating at 60 % ED in A	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	236177
SA-MSWA7/50-1HS28-60	1.307	7	50	≈ 17.0	≈ 7.5	236178
SA-MSWA8/50-1HS28-60	1.369	8	50	≈ 17.0	≈ 8.0	236179
SA-MSWA9/50-1HS28-60	1.484	9	50	≈ 17.0	≈ 9.0	236180
SA-MSWA10/50-1HS28-60	1.592	10	50	≈ 17.0	≈ 9.5	236181
SA-MSWA6/25-1SS28-60	0.922	6	25	≈ 11.5	–	236182
SA-MSWA7/25-1SS28-60	0.958	7	25	≈ 11.5	–	236183
SA-MSWA8/25-1SS28-60	1.030	8	25	≈ 10.0	≈ 10.0	236184
SA-MSWA9/25-1SS28-60	1.158	9	25	≈ 11.0	≈ 10.0	236185
SA-MSWA10/25-1SS28-60	1.347	10	25	≈ 11.5	≈ 10.0	236186

COLLECTORS

MKHD/MKHF/MKHS

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)

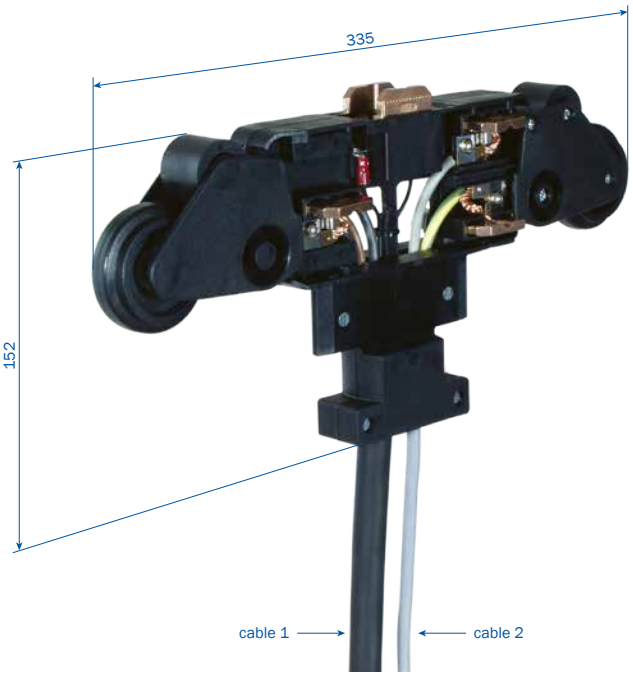
Example of ordering collector with 2 m cable

Order No. 236200-2

for collector SA-MSWAS6/50-2HS28-60

For curves use single collectors only.

Connecting cable 1 m, longer cable available.



Type	Weight kg	No of Poles	Power rating at 60 % ED in A	Ø of connecting-cables in mm		Order No.
				cables 1	cables 2	
SA-MSWAS6/50-1HS28-60	1.354	6	50	≈ 17.0	≈ 7.0	236200
SA-MSWAS7/50-1HS28-60	1.407	7	50	≈ 17.0	≈ 7.5	236201
SA-MSWAS8/50-1HS28-60	1.469	8	50	≈ 17.0	≈ 8.0	236202
SA-MSWAS9/50-1HS28-60	1.584	9	50	≈ 17.0	≈ 9.0	236203
SA-MSWAS10/50-1HS28-60	1.692	10	50	≈ 17.0	≈ 9.5	236204
SA-MSWAS6/25-1SS28-60	1.022	6	25	≈ 11.5	–	236205
SA-MSWAS7/25-1SS28-60	1.058	7	25	≈ 11.5	–	236206
SA-MSWAS8/25-1SS28-60	1.130	8	25	≈ 10.0	≈ 10.0	236207
SA-MSWAS9/25-1SS28-60	1.258	9	25	≈ 11.0	≈ 10.0	236208
SA-MSWAS10/25-1SS28-60	1.447	10	25	≈ 11.5	≈ 10.0	236209

COLLECTORS

MKHD/MKHF/MKHS

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)

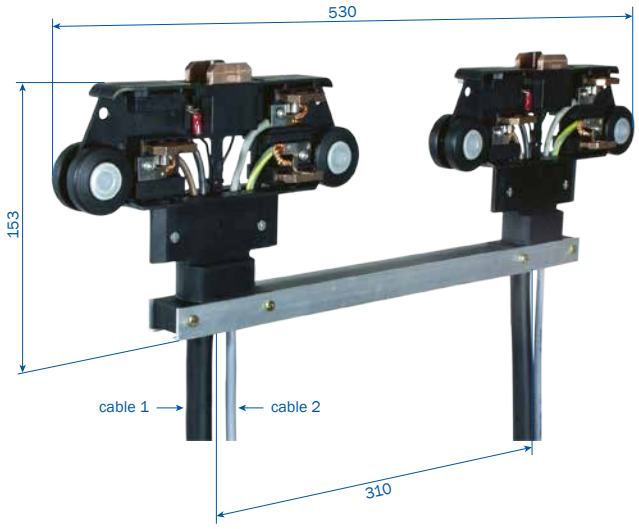
Example of ordering collector with 2 m cable

Order No. 236315-2

for collector SA-DMSWA6/100S-2HS28-60

For curves use single collectors only.

Connecting cable 1 m, longer cable available.



Type	Weight kg	No of Poles	Power rating at 60 % ED in A	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	236315
SA-DMSWA7/100S-1HS28-60	2.776	7	100	≈ 17.0	≈ 7.5	236316
SA-DMSWA8/100S-1HS28-60	2.900	8	100	≈ 17.0	≈ 8.0	236317
SA-DMSWA9/100S-1HS28-60	3.130	9	100	≈ 17.0	≈ 9.0	236318
SA-DMSWA10/100S-1HS28-60	3.346	10	100	≈ 17.0	≈ 9.5	236319
SA-DMSWA6/50S-1SS28-60	2.006	6	50	≈ 11.5	–	236320
SA-DMSWA7/50S-1SS28-60	2.078	7	50	≈ 11.5	–	236321
SA-DMSWA8/50S-1SS28-60	2.222	8	50	≈ 10.0	≈ 10.0	236322
SA-DMSWA9/50S-1SS28-60	2.478	9	50	≈ 11.0	≈ 10.0	236323
SA-DMSWA10/50S-1SS28-60	2.856	10	50	≈ 11.5	≈ 10.0	236324

TOW ARMS

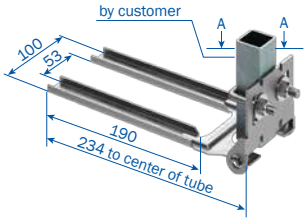
MKHD/MKHF/MKHS

TOW ARM

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

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

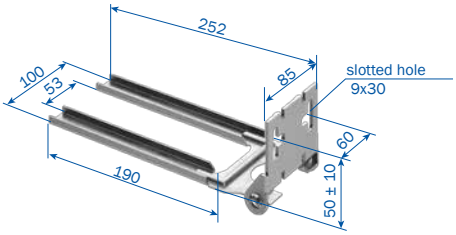
A - A
Version with tube(1)



Type	Weight kg	Order No.
MN-MGUN	0.436	600887
MN-MGU/K(3)	0.550	600336

TOW ARM

for plane surface



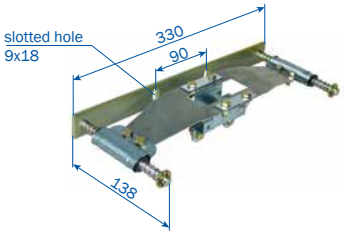
Type	Weight kg	Order No.
MN-MGFN	0.328	600888
MN-MGF/K(2)	0.442	600337

FLEXIBLE TOW ARM

For single collectors

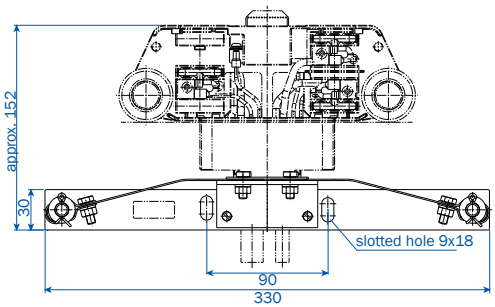
for systems with transfer funnels MTH

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

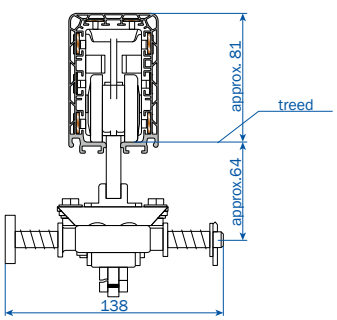


Type	Weight kg	Order No.
MN-MFMN	1.021	236460

FLEXIBLE TOW ARM CONFIGURATION



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

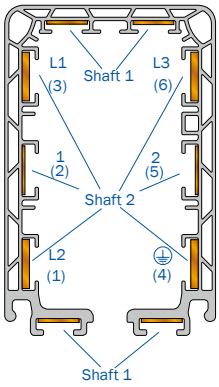


(1) For assembly use enclosed adapter plate (Prisma).
(2) ... / K Stainless steel

FLAT COPPER AND CABLE GLANDS

MKHD/MKHF/MKHS

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 mm² 11 x 1 mm (40 A)	0.10	90	260	300	234198	–
SS-INOX40A/11-11 x 1-E	11 mm² 11 x 1 mm	0.09	90	260	300	–	234384

MAX. LENGTH OF 13 MM WIDE STRIPS (FOR SHAFT 2)

Type	Description	Weight kg/m	Type of cassette			Order No. (Cu)	Order No. (Inox)
			A	B	C		
SS-FLCU63A/10-13X0,8-E	10 mm² 13 x 0.8 mm (63 A)	0.09	115	300	–	234197	–
SS-FLCU80A/17-13X1,3-E	17 mm² 13 x 1.3 mm (80 A)	0.15	65	200	300	234199	–
SS-INOX40A/17-13 x 1,3-E	17 mm² 13 x 1.3 mm	0.14	65	200	300	–	234383
SS-FLCU100A/26-13X2-E	26 mm² 13 x 2 mm (100 A)(2)	0.23	45	130	200	234200	–
SS-FLCU140A/33-13X2,5-E	33 mm² 13 x 2.5 mm (140 A)(2)	0.29	35	100	160	234201	–
SS-FLCU160A/42-13X3,2-E	42 mm² 13 x 3.2 mm (160 A)(2)	0.37	25	80(1)	120(1)	234202	–

CABLE GLANDS

Cable glands	for cable-Ø in mm	Capacity in A (execution: D/F/S)	Page
M 25 and M 40	11 – 17 and 19 – 28	63 – 80 HS	P. 12, 13
M 25	11 – 17	63 SS	P. 12, 13
M 25 and M 50	9 – 19 and 23 – 34	63 – 100 HS	P. 13, 14
M 25 and M 50	9 – 19 and 29 – 40	163 – 200 HS	P. 13, 14
M 25	9 – 19	63 SS	P. 13, 14
M 25 for L1/L2/L3	9 – 19	63 – 200 HS	P. 15, 16
M 25 for 1 – 4 and 9/10	6 – 15	63 – 200 HS	P. 15, 16
M 25 6 to 10 - poles	9 – 19	63 SS	P. 15, 16
M 20	6 – 13	63 – 200 SS/HS	P. 15, 16, 18

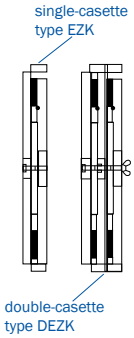
(1) Values for installation through VAHLE-engineers (with help device possible). Use bolted joints and possibly expansion sections for bigger lengths than shown in the table. In this case installation by Vahle experts is recommended, especially for copper cross section of 42 mm2 and 51 mm2. Consult factory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

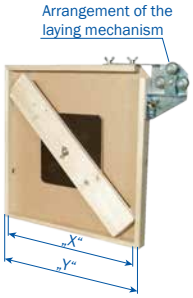
(2) With straightening tool (see page 34).

ASSEMBLING TOOLS

MKHD/MKHF/MKHS

COPPER CASSETTES





Type	Weight kg	Dim „X“	Dim „Y“	Type of cassette	Order No.
MZ-EZK1-MKL/H	2.364	462	500	A	234219
MZ-EZK2-MKL/H	3.890	662	700	B	234220
MZ-EZK3-MKL/H	5.648	862	900	C	234250
MZ-DEZK1-MKL/H	4.831	462	500	A	234221
MZ-DEZK2-MKL/H	7.883	662	700	B	234222
MZ-DEZK3-MKL/H	11.387	862	900	C	234251

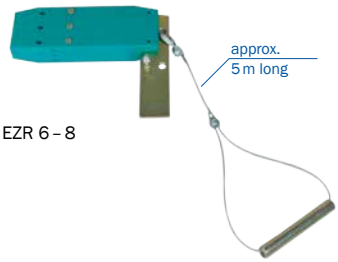
Type of copper cassette depends on copper cross section and system length (see page 33)

STRAIGHTENING TOOL

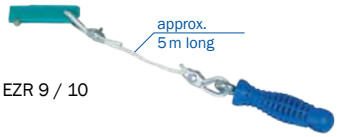
required from strip sections 26 mm² Cu. upwards

Type	Weight kg	Order No.
MZ-RV-MKL/H	0.952	234218

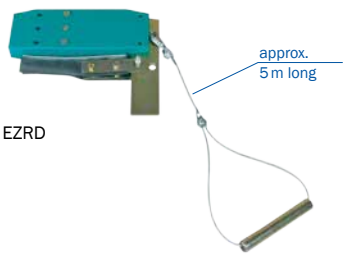
CONDUCTOR THREADING TOOL



EZR 6 – 8



EZR 9 / 10



EZRD

Type	Weight kg	Description	Order No.
MZ-EZR6-8-MKL/H	0.991	(for conductors inside housing, shafts 1 und 2)	234204
MZ-EZR9/10-MKL/H	0.182	(for conductors outside housing, shafts 1)	234730
DL-EZRD-MKL/H	1.197	(for sealing strip and for conductors inside housing 1 and 2)	234552

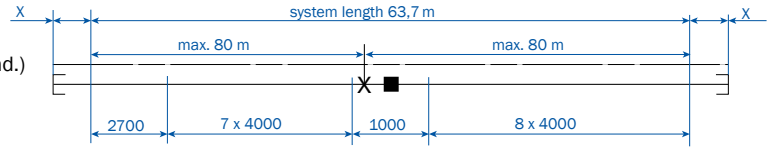
EXAMPLE FOR ORDERING

MKHD/MKHF/MKHS

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

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

Not for MKHF and MKHS.



Quantity	Type	MKHD		MKHF		MKHS	
		Type	Order No.	Type	Order No.	Type	Order No.
15	Profile section, 4 m	MKHD-4000HSC	262504	–	–	–	–
1	Profile section, 3 m for 2.7 m short length	MKHD-3000HSC	262503	–	–	–	–
15	Conductor system 4 m	–	–	MKH 8/100-4000HSC	262134	MKHS8/100-4000HSC	262344
1	Conductor system 3 m for 2.7 m short length	–	–	MKH 8/100-3000HSC	262133	MKHS8/100-3000HSC	262343
1	Line feed	ES-MHG 8/63-100HSC-1000	262547	ES-MHGF8/100HSC-1000	262500	ES-MHGS6/100HSC-1000	262456
1	End section, left 0.3 m long	EK-MHED/L	262537	–	–	–	–
1	End section, right, 0.3 m long	EK-MHED/R	262536	–	–	–	–
2	End cap	–	–	EK-MSES	235141	EK-MSES	235141
18	Joint caps	VM-MVMD	234678	–	–	–	–
16	Joint caps	–		VM-MVMS	234585	VM-MVMS	234585
1	Fixpoint hanger	AH-MFH	262001	AH-MFH	262001	AH-MFH	262001
32	Sliding hangers	AH-MGH	262000	AH-MGH	262000	AH-MGH	262000
260 m	Flat copper strip 4 coils à 65 m, 26 mm²	SS-FLCU100 A/26-13X2-E	234200	–	–	–	–
130 m	Flat copper strip 2 coils à 65 m, 10 mm²	SS-FLCU40 A/10-13X0,8-E	234197	–	–	–	–
130 m	Flat copper strip 2 coils à 65 m, 11 mm²	SS-FLCU40 A/11-11X1-E	234198	–	–	–	–
1	Single collector	SA-MSWA8/50-1HS28-60	236179	SA-MSWA8/50-1HS28-60	236179	SA-MSWA8/50-1HS28-60	236179
1	Tow arm	MN-MGU	600334	MN-MGU	600334	MN-MGU	600334
1	Copper cassette	MZ-EZK2-MKL/H	234220	–	–	–	–
1	Laying mechanism	MZ-RV-MKL/H	234218	–	–	–	–
1	Conductor threading tool	MZ-EZR6-8-MKL/H	234204	–	–	–	–

SPARE PARTS

MKHD/MKHF/MKHS

FOR ENCLOSED CONDUCTOR SYSTEM

Type	Description	Order No.
VM-STV11/40 A-MKHF	Plug-in joint for MKHF (11 mm Cu; 40 A)	262020
VM-STV13/63-100 A-KBHF/MKHF(1)	Plug-in joint for MKHF (13 mm Cu; 63–100 A)	600483
VM-SCHV11/40 A-MKHS/MKLS	Bolted joint for MKHS (11 mm Cu; 40 A)	262019
VM-SCHV13/63-200 A-KBHS/MKHS/MKLS(1)	Bolted joint for MKHS (13 mm Cu; 63–200 A)	262018
VM-MVMT-MT-MU/S-9/10POL	Joint cap for transfer guide and transfer funnel, pair (MKHD, MKHF and MKHS)	234779
DL-D-KBH-MKH-MKL-TDV	Sealing strip (max. length each 40 m)	600551
DL-V-KSLT-KBH-MKL/H-LSV/G	Coupling for sealing strip, in pairs (2 per joint)	258300
DL-F-MKL/H	Fixing clamp for sealing strip (1 per end)	236105

FOR COLLECTOR MSWA

Type	Description	Order No.
SK-KSW-MSWA-PH/SU-28	Carbon phase (lateral, 9. and 10. pole)	600088
SK-KSW-MSWA-PE/S-28	Carbon ground (lateral, PE)	600090
SK-MSWA-PH/O-28	Carbon top (7. and 8. pole)	236187
SA-KF-KSW-MSWA-SP	Carbon spring standard (for all carbons, pair)	600338
TR-DMSW/A-SF310	Rigid bar for DMSW and DMSWA	234515
SA-ZB-AS-MSWA-P-250	High speed set for collector MSWAS	236199
SA-ZB-DG-MSWA-S	Sealing strip slide plate for collectors MSWA	236625

CLEANING ACCESSORIES ON REQUEST

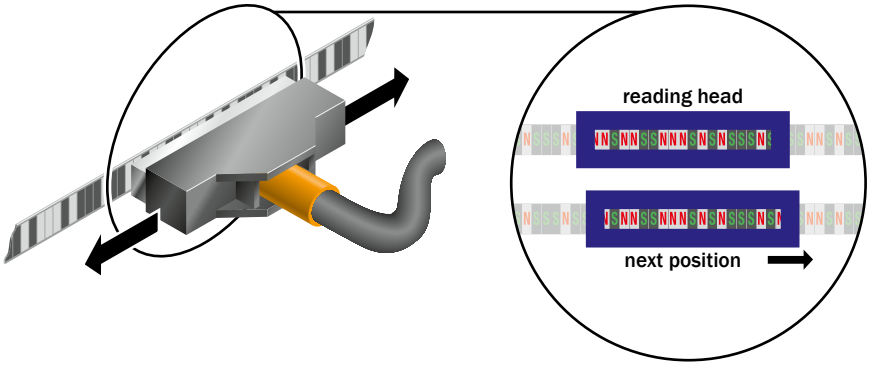
(1) Also suitable for former version with 40 A

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.

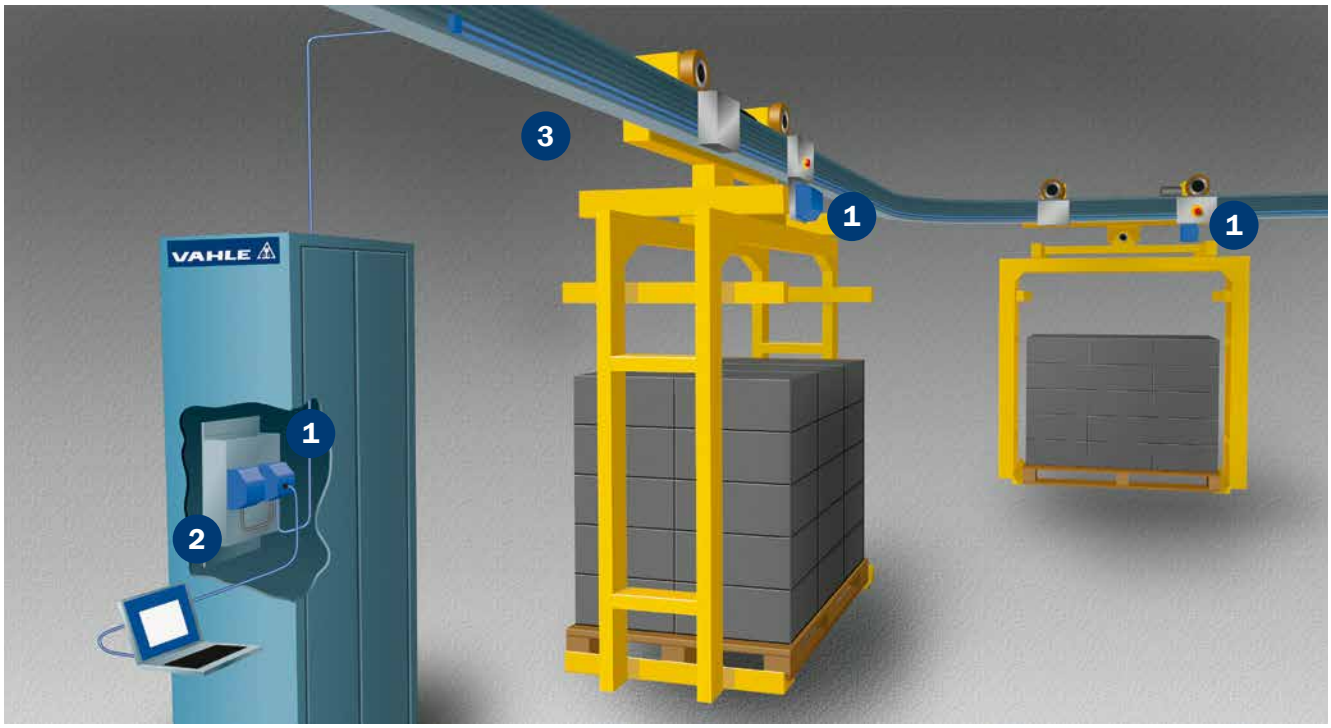
19.2 kbps

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)

EXAMPLE OF USE



1 VAHLE Powercom®
2 VAHLE Powercom® Double filter
3 VAHLE Powercom® Terminal resistance

QUESTIONNAIRE

Company: _____ Date: _____

Tel: _____ Fax: _____

E-mail: _____ Internet: _____

1. Number of wiper line systems: _____
2. Type of crane or device to be fed: _____
3. Operating voltage: _____ volt Phases: _____ frequency: _____ Hz

   ☐ Three-phase voltage ☐ AC voltage ☐ DC voltage
4. Line length: _____
5. Number of phase rails: _____ N-rails: _____ Control rails: _____ Ground conductor: _____
6. Installation position of the wiper line:

   ☐ Hanging wiper line / current collector cable downwards

   ☐ Hanging wiper line / current collector cable lateral entry (1)

   ☐ Hanging distance _____ m (max. 2 m) ☐ Other: _____
7. Number of cranes or devices in a wiper line system: _____
8. ☐ Indoor system ☐ Outdoor system
9. Special operating conditions (moisture, dust, chemical influences, etc) _____
10. Ambient temperature: _____ °C min. _____ °C max.
11. Hall expansion joints _____ pieces _____ expansion max.
12. Position and number of feeds (1): _____
13. Position and number of disconnecting points (e. g. for repair zones) (1): _____
14. Where is the wiper line to be positioned? (1): _____
15. Screw consoles to be supplied: ☐ yes ☐ no Distance middle of carrier – middle of wiper line _____

    Flange width of carrier: _____
16. Travel speed for longitudinal travel: _____ in bends: _____ at transfers: _____
17. Current consumption of the individual electricity consumers: _____
    (Please use the table below.)
18. Max. voltage drop from conductor rail feed to the current collectors and considering the start-up currents:

    3 % ☐ or _____ % in relation to nominal current.

Motor data	Crane/device 1							Crane/device 2						
	Power kW	Nominal current			Start-up current		Drive type (2)	Power kW	Nominal current			Start-up current		Drive type (2)
		A	cos φN	% duty	A	cos φA			A	cos φN	% duty	A	cos φA	
Lifting device														
Auxiliary lifting device														
Carriage														
Trolley traveling winch														

Mark motors that can be switched on at the same time with an *.

Mark motors that can start up at the same time with Δ.

Further information: _____

_____

Signature:

(1) Outline drawing required for offer preparation
(2) Enter drive type: K for squirrel-cage rotor, S for slip ring rotor, F for frequency-controlled motor
We reserve the right to make changes due to further technical development.

Paul Vahle GmbH & Co. KG
Westicker Str. 52
59174 Kamen
Germany

Tel.: +49 2307 704-0
Fax: +49 2307 704-444
info@vahle.de

www.vahle.com

W1017546/00/en | 0 | Rev.02 | 11/19 | Irrtümer und technische Änderungen vorbehalten.