

COMPACT CONDUCTOR SYSTEMS

VKS 10



POWERRAIL ENCLOSED CONDUCTORS VKS 10

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General

VAHLE compact conductor system type VKS 10 are compact and shock hazard protected safety powerails. They consist of a flat-formed insulated housing with integrated copper conductors. These conductors are protected according to European standard EN 60529.

They comply with accident and VDE regulations in the context of electrical, mechanical and fire safety and are protected to IP 21 standards. Collectors are proof against touch only when fully entered into the powerail.

Powerail installations within reach of hand require a special protection on the part of the operator against accidental touch of current collectors which are leaving the powerail (e.g. locking or cut-off the power).

This is only applicable for voltages above 25 V AC respectively 60 V DC.

The insulated housing accommodates up to 10 conductors. No special finishing work to the rail ends is necessary. The compact design allows direct mounting in runway beams and Vahle support profiles.

The conductor rail is designed for indoor use only and for hanging and lateral arrangement in straight or curve systems.

UL-approval

Powerail electrical values:

VKS 10

max. continuous current	= 140 A ⁽²⁾
Permitted operating voltage (UL)	= 690 V (600 V)
Dielectric strength in accord. with DIN 53481	> 25 kV/mm
Specific resistance in acc. with IEC 60093	> 1 x 10 ¹⁶ Ohm x cm
Surface resistivity IEC 60093	2,1 x 10 ¹⁵ Ohm
Leakage resistance in acc. with IEC 60112	= CTI >400
Combustibility in acc. with DIN 4102, part 1: Class B1, flame retardant, self-extinguishing.	

Chemical resistance of the insulated housing

Petrol, mineral oil, greases	resistant
Caustic soda up to 50%	resistant
Hydrochloric acid, concentrated	resistant
Sulfuric acid up to 50 %	resistant
UV (Xenon test >1500)	resistant

Water absorption: max. at 20 °C = 0.06%

Ambient temperature:

from -30 °C to + 55 °C (Application area)
 Max. temperature differences: 50 °C (50 ≤ Δ T) ⁽³⁾
 from -10 °C to + 40 °C with supply length = 6 m
 from -30 °C bis + 20 °C with supply length = 4 m (deep freeze storage⁽³⁾)

Conductor material	Copper				Units
	16	25	30	35	
Cross section					mm ²
Impedance at 50 Hz ⁽⁴⁾	1,106	0,728	0,602	0,518	Ohm/1000 m
Resistance	1,102	0,723	0,595	0,510	Ohm
Ampacity	60	100	120	140 ⁽²⁾	Amp

Please note: When using extra-low voltages please submit detailed information with your inquiry, especially with regard to the ambient conditions. In order to process quotations and orders, we require drawings if the powerail system includes with curves or rail section isolation. Please use our questionnaire on pages 18 and 19

⁽¹⁾ Please submit with your inquiry!

⁽²⁾ 80% duty cycle

⁽³⁾ Cold store applications on request

⁽⁴⁾ By parallel circuit (doubling of cross section) is the impedance and the resistance halved.

VKS-10 Powerail

Area of application: Indoor installation

Sections:

The insulated housing accommodates up to max. 10 conductors and provides reliable insulation. The standard length is 6 m, shorter lengths can be supplied. The ground conductor rail is identified with continuous yellow marking. The asymmetric design eliminates the possibility of reversing the phases during installation. One fixpoint hanger is required for each powerail section.

Joints:

The insulated housing sections are connected with joint caps, the conductors are joined with copper plug-in connectors.

Feeds:

Feed units can be supplied as end or line feeds with plastic terminal boxes or as especially flat line feeds for direct single core cable connection. Both line feed types are supplied preassembled on a 1 m powerail section.

The end feeds are supplied loose and can only be used in conjunction with the VLS line feed.

Hangers:

The maximum distance between suspension points must not exceed 1.2 m. The hangers are available for the following mounting options:

- for assembly in VAHLE support profile (self-locking)
- for assembly in c-rail (bolted type)
- for assembly to plain surface (bolted type)

The powerail can move with the sliding hangers for longitudinal expansion. At the fixpoint it is locked by an additional screw. The distance between two fixpoints is max. 6 m.

Isolating sections:

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).

Conductor dead sections can be mounted at any position of the system. The plastic inserts are pushed into the copper profiles and ensure a smooth transfer of the collector brushes.

The length of the isolating section has to consider the total length of the carbon brush and whether the carbon brush must or must not bridge the isolation area.

Special attention is required for double collectors or collectors switched in parallel. Use double isolating sections where necessary.

Current collectors:

The current collectors are manufactured from impact resistant plastic and stainless steel parts. The current is transmitted by a carbon brush. According to the application, one or more current collectors are required per phase and ground conductor. The current collectors for the ground conductor can be identified by yellow color-coding and are equipped with different fixings to make them not-interchangeable with the phase current collectors. Springs in the current collectors ensure even pressure of the carbon brush against the conductor, thus maintaining reliable contact.

The current collectors must be mounted on base plates or rectangular brackets.

The length of the current collector cable should not exceed 3 m, if the connected overload protection is not according to the load of this connecting cable. See aswell DIN VDE 0100, part 430 and DIN EN 60204-32. (Note: The a.m. often occurs in systems with more collectors per system.)

The connection cables provided are adequately sized for the specified nominal currents. Reduction factors in accordance with DIN VDE 0298-4 are to be taken into account for various layout methods.

Electronic layout support:

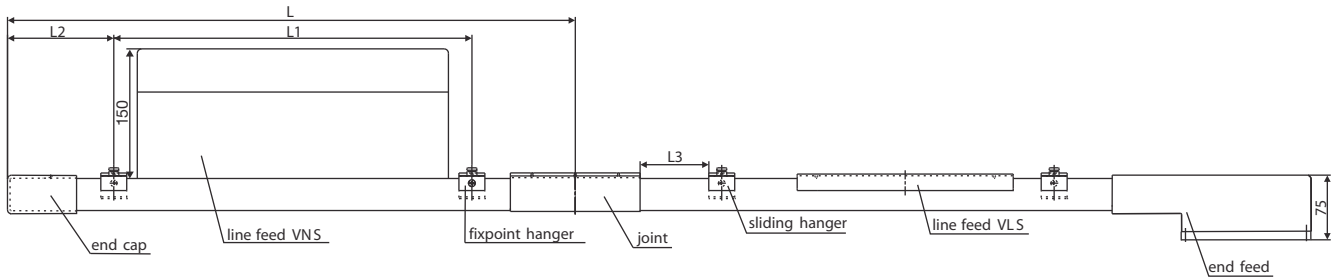
Please use our electronic layout software





PLANNING GUIDE VKS 10

1. System diagram



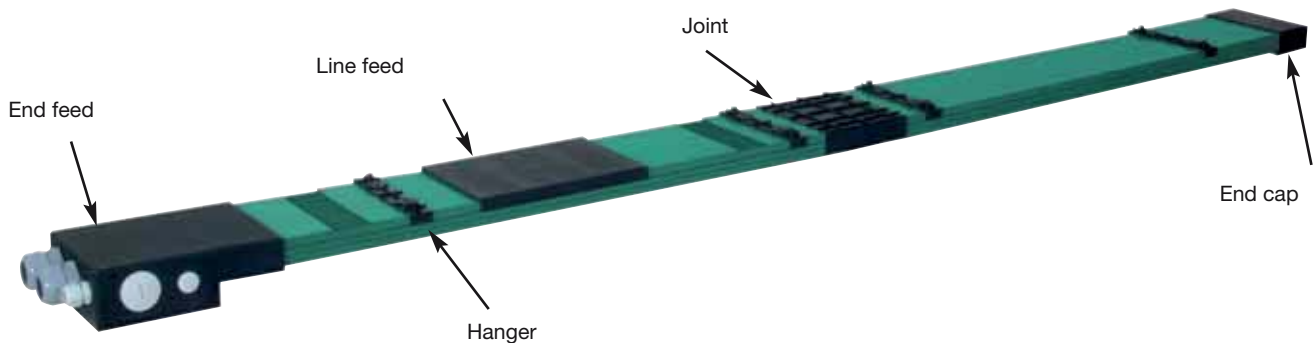
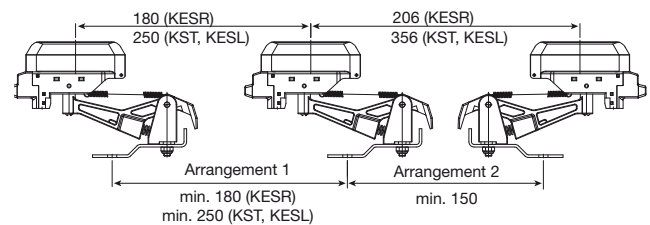
- L = length of powerail section (standard length: 1 m, 2 m, 3 m, 4 m, 5 m, 6 m respectively short length)
- L₁ = distance for straight runs: max. 1.2 m
in curves: max. 0.6 m
- L₂ = overhang (max. 300 mm)
- L₃ = distance, to be allowed for powerail expansion (min. 50 mm)

2. Symbols used in installation drawing

	VKS 10
	Runway
	Powerail
	Joint
	Fixpoint hanger
	Sliding hanger
	End cap
	End feed
	Line feed
	Section isolator
	Transfer funnel

3. Max. hanger distance

- a) Powerail VKS 10
 - in straight runs 1.2 m
 - in curves 0.6 m
 - Horizontal 0,6 m
- b) Support profile VTP 10
 - on rack uprights 4.5 m
 - on support posts 4.0 m
 - Horizontal arrangement 3,0 m
 - Attached to the wall 3,0 m



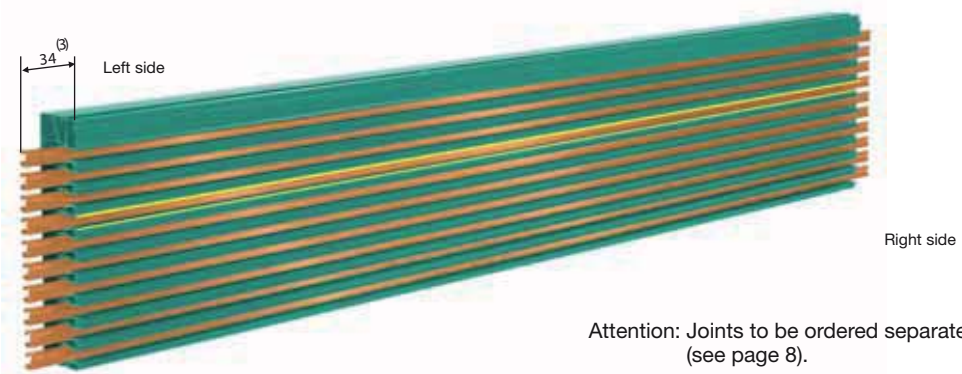




TECHNICAL DATA VKS 10

Sections

Standard lengths: 6 m
Cold stores: 4 m



HS= with ground (PE)

Attention: Joints to be ordered separately (see page 8).

Type	No. of Conductors	Max. continuous current A at 35 °C	Nominal Voltage ⁽⁵⁾ V	Conductor cross section mm ²			Conductor material	Weight kg/m	Order-No.
				L1-L3	Ground	5-10 ⁽⁴⁾			
VKS 10-4/ 60-6 HS	4	60	690	3 x 16	1 x 16	-	Cu	2.31	780 99•
VKS 10-4/100-6 HS	4	100	690	3 x 25	1 x 16	-	Cu	2,54	780 71•
VKS 10-4/120-6 HS	4	120	690	3 x 30	1 x 16	-	Cu	2,66	780 90•
VKS 10-4/140-6 HS	4	140 ⁽¹⁾	690	3 x 35	1 x 16	-	Cu	2,79	780 68•
VKS 10-5/ 60-6 HS	5	60	690	3 x 16	1 x 16	1 x 16	Cu	2,45	780 61•
VKS 10-5/100-6 HS	5	100	690	3 x 25	1 x 16	1 x 16	Cu	2,69	780 70•
VKS 10-5/120-6 HS	5	120	690	3 x 30	1 x 16	1 x 16	Cu	2,81	780 62•
VKS 10-5/140-6 HS	5	140 ⁽¹⁾	690	3 x 35	1 x 16	1 x 16	Cu	2,94	780 28•
VKS 10-6/ 60-6 HS	6	60	690	3 x 16	1 x 16	2 x 16	Cu	2.30	780 04•
VKS 10-6/100-6 HS	6	100	690	3 x 25	1 x 16	2 x 16	Cu	2.54	780 05•
VKS 10-6/120-6 HS	6	120	690	3 x 30	1 x 16	2 x 16	Cu	2.64	780 06•
VKS 10-6/140-6 HS	6	140 ⁽¹⁾	690	3 x 35	1 x 16	2 x 16	Cu	2.81	780 07•
VKS 10-7/ 60-6 HS	7	60	690	3 x 16	1 x 16	3 x 16	Cu	2.45	780 03•
VKS 10-7/100-6 HS	7	100	690	3 x 25	1 x 16	3 x 16	Cu	2.68	780 08•
VKS 10-7/120-6 HS	7	120	690	3 x 30	1 x 16	3 x 16	Cu	2.81	780 09•
VKS 10-7/140-6 HS	7	140 ⁽¹⁾	690	3 x 35	1 x 16	3 x 16	Cu	2.95	780 01•
VKS 10-8/ 60-6 HS	8	60	690	3 x 16	1 x 16	4 x 16	Cu	2.59	780 21•
VKS 10-8/100-6 HS	8	100	690	3 x 25	1 x 16	4 x 16	Cu	2.83	780 22•
VKS 10-8/120-6 HS	8	120	690	3 x 30	1 x 16	4 x 16	Cu	2.96	780 23•
VKS 10-8/140-6 HS	8	140 ⁽¹⁾	690	3 x 35	1 x 16	4 x 16	Cu	3.09	780 24•
VKS 10-9/ 60-6 HS	9	60	690	3 x 16	1 x 16	5 x 16	Cu	2.74	780 25•
VKS 10-9/100-6 HS	9	100	690	3 x 25	1 x 16	5 x 16	Cu	2.97	780 26•
VKS 10-9/120-6 HS	9	120	690	3 x 30	1 x 16	5 x 16	Cu	3.11	780 27•
VKS 10-9/140-6 HS	9	140 ⁽¹⁾	690	3 x 35	1 x 16	5 x 16	Cu	3.24	780 28•
VKS 10-9/200-6 HS	9	200 ⁽²⁾	690	6 x 25	1 x 25	2 x 16	Cu	3.28	780 14•
VKS 10-9/240-6 HS	9	240 ⁽²⁾	690	6 x 30	1 x 30	2 x 16	Cu	3.60	780 13•
VKS 10-9/280-6 HS	9	280 ⁽¹⁾⁽²⁾	690	6 x 35	1 x 35	2 x 16	Cu	3.91	780 12•
VKS 10-10/ 60-6 HS	10	60	690	3 x 16	1 x 16	6 x 16	Cu	2.88	780 29•
VKS 10-10/100-6 HS	10	100	690	3 x 25	1 x 16	6 x 16	Cu	3.11	780 20•
VKS 10-10/120-6 HS	10	120	690	3 x 30	1 x 16	6 x 16	Cu	3.25	780 30•
VKS 10-10/140-6 HS	10	140 ⁽¹⁾	690	3 x 35	1 x 16	6 x 16	Cu	3.38	780 31•
VKS 10-10/200-6 HS	10	200 ⁽²⁾	690	6 x 25	1 x 25	3 x 16	Cu	3.43	780 10•
VKS 10-10/240-6 HS	10	240 ⁽²⁾	690	6 x 30	1 x 30	3 x 16	Cu	3.74	780 11•
VKS 10-10/280-6 HS	10	280 ⁽¹⁾⁽²⁾	690	6 x 35	1 x 35	3 x 16	Cu	4.05	780 02•

⁽¹⁾ At 80% duty cycle

⁽²⁾ 2 conductors per phase.

⁽³⁾ Powerail projecting length 34 mm at 20 °C ambient.

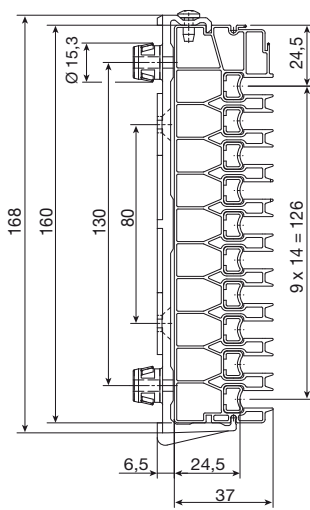
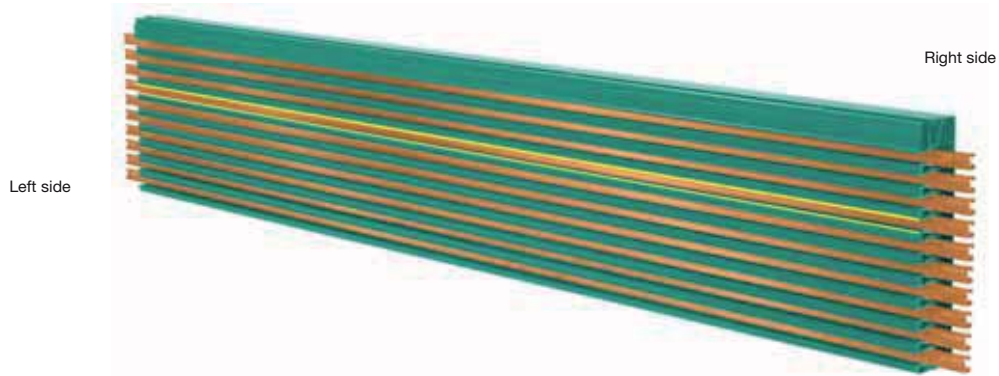
⁽⁴⁾ Consult factory in case of circuits incl. N conductors.

⁽⁵⁾ Not with UL-approval; U_{UL}= 600 V

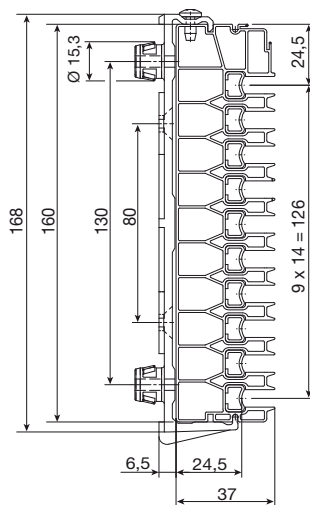
• Supplement type designations, e.g. 2 m VKS 10-6/60 with PE (ground) → VKS 10-6/60 - 2 HS Order-No. 780042.

Short lengths will be produced out of the next larger rail section.

STANDARD SECTIONS VKS 10



VKS 10-4/ 60-140	VKS 10-5/ 60-140	VKS 10-6/ 60-140	VKS 10-7/ 60-140	VKS 10-8/ 60-140
L1	L1	L1	L1	L1
L2	L2	L2	L2	L2
L3	L3	L3	L3	L3
PE (ground)	PE (ground)	PE (ground)	PE (ground)	PE (ground)
Free	5	5	5	5
Free	Free	6	6	6
Free	Free	Free	7	7
Free	Free	Free	Free	8
Free	Free	Free	Free	Free
Free	Free	Free	Free	Free



VKS 10-9/ 60-140	VKS 10-9/200-280	VKS 10-10/ 60-140	VKS 10-10/200-280
L1	L1	L1	L1
L2	L2	L2	L2
L3	L3	L3	L3
PE (ground)	PE (ground)	PE (ground)	PE (ground)
5	L1	5	L1
6	L2	6	L2
7	L3	7	L3
8	8	8	8
9	9	9	9
Free	Free	10	10

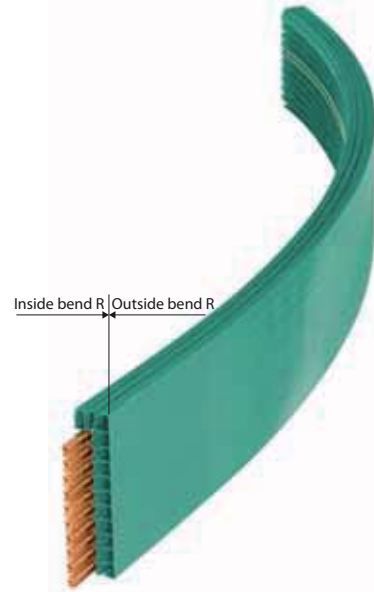


CURVED SECTIONS AND JOINTS VKS 10

Curved sections

vertical in accordance with your design drawings
Copper cross section min. 25 mm²

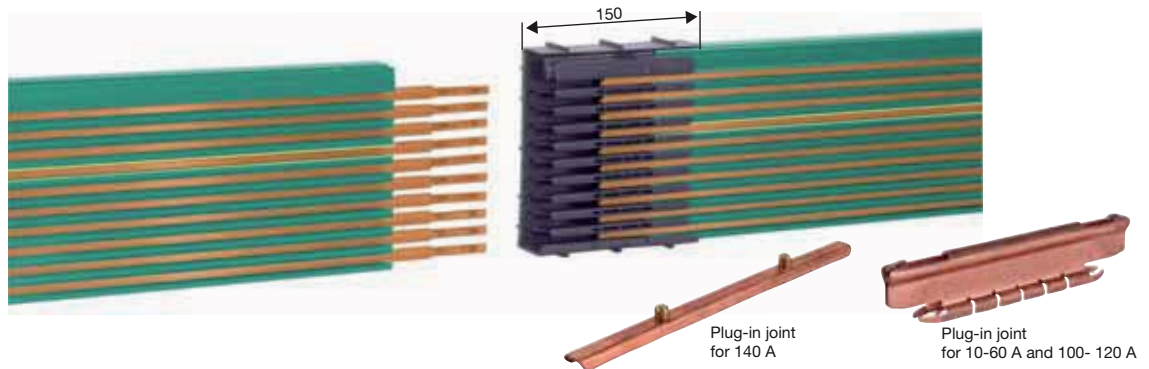
Max. length of bend = 5.3 m
Hanger distance ≈ 0.6 m
Max. angle = 180°
Inside bend = conductors inside
Outside bend = conductors outside (not shown)



Bends are supplied with straight ends, each 250 mm long.

Type	R mm ⁽²⁾	Order-No.
Inside bend (as shown)	≥ 1000	780 344
Outside bend	≥ 1500	780 345

Joints⁽³⁾



Type	No. of poles	Weight kg	Order-No.
SV 10- 4/ 60	4	0,165	781 321
SV 10- 4/100-120	4	0,165	781 322
SV 10- 4/140	4	0,344	781 323
SV 10- 5/ 60	5	0,385	781 315
SV 10- 5/100-120	5	0,385	781 320
SV 10- 5/140	5	0,366	781 277
SV 10- 6/ 60	6	0,407	781 150
SV 10- 6/100-120	6	0,407	781 151
SV 10- 6/140	6	0,388	781 152
SV 10- 7/ 60	7	0,429	781 153
SV 10- 7/100-120	7	0,429	781 154
SV 10- 7/140	7	0,410	781 155
SV 10- 8/ 60	8	0,451	781 156
SV 10- 8/100-120	8	0,451	781 157
SV 10- 8/140	8	0,432	781 158
SV 10- 9/ 60	9	0,473	781 159
SV 10- 9/100-120	9	0,473	781 160
SV 10- 9/140	9	0,454	781 161
SV 10- 9/200-240 ⁽¹⁾	9	0,473	781 162
SV 10- 9/280 ⁽¹⁾	9	0,423	781 163
SV 10-10/ 60	10	0,495	781 164
SV 10-10/100-120	10	0,495	781 165
SV 10-10/140	10	0,476	781 166
SV 10-10/200-240 ⁽¹⁾	10	0,495	781 167
SV 10- 10/280 ⁽¹⁾	10	0,450	781 168

⁽¹⁾ Conductor rails connected in parallel

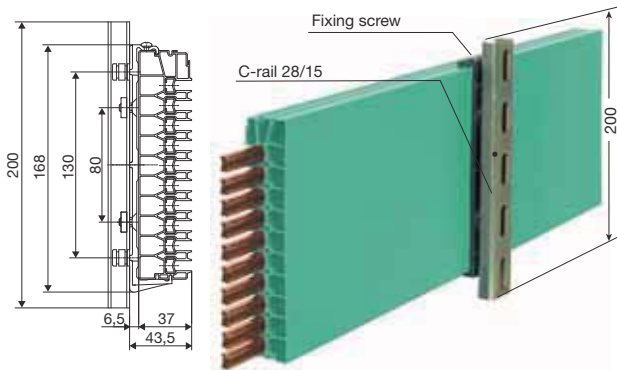
⁽²⁾ Smaller radius on request

⁽³⁾ In case of hall expansion joints please consider expansion sections (on request).

FIXPOINT HANGERS, SLIDING HANGERS, END CAPS, END FEEDS VKS 10



Fixpoint hanger on C-rail
consisting of hanger clamp and fixing screw and C-rail



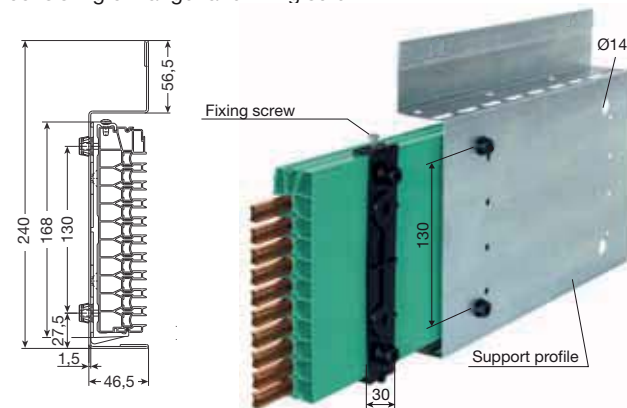
Type	Weight kg	Order-No.
VEPS 10-H	0.224	780 007

Sliding hanger on C-rail
consisting of hanger clamp and C-rail



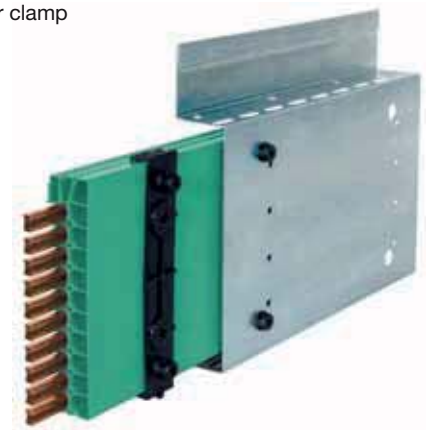
Type	Weight kg	Order-No.
VAS 10-H	0.223	780 008

Fixpoint hanger for support profile VTP 10
consisting of hanger and fixing screw



Type	Weight kg	Order-No.
VEPS 10-VTP	0.033	780 009

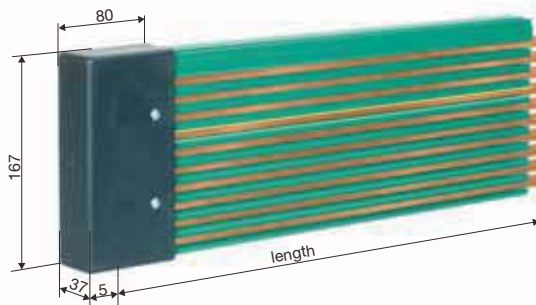
Sliding hanger for support profile VTP 10
consisting of hanger clamp



Type	Weight kg	Order-No.
VAS 10-VTP	0.032	780 010

End cap

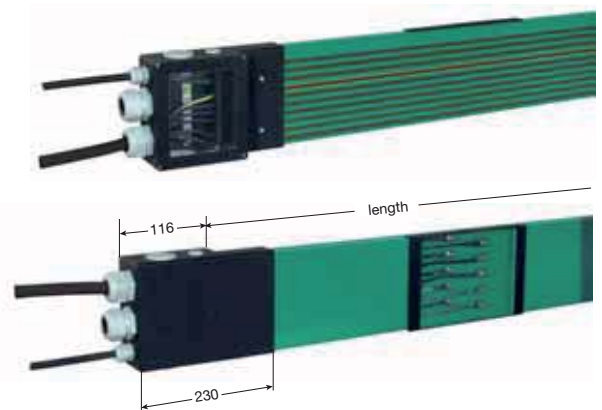
Can be used right or left handed.
Supplied loose as individual part with fixing screws.



Type	Weight kg	Order-No.
VES 10 L	0.210	780 004

End feed⁽¹⁾

Terminal box supplied loose,
only in conjunction with line feed VLS⁽²⁾



Type	Weight kg	Order-No.
VEKS 10-10/ 60-280	0.664	780 018

⁽¹⁾ Cable glands, 2 x ST-M 40 x 1.5 for D = 19-28 mm
1 x ST-M 20 x 1.5 for D = 7-13 mm

⁽²⁾ Please order VLS line feed separately.



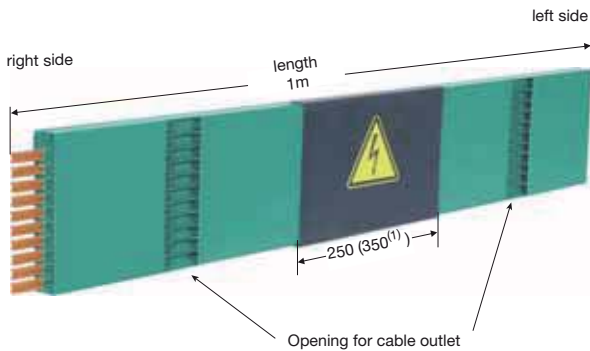
LINE FEED VKS 10

Line feed VLS

for direct connection of single core cables

M6 terminal with special cable shoe for single core cables;
 35 mm² (up to cable Ø 8.5 mm) for 140 A,
 25 mm² (up to cable Ø 8.2 mm) for 100 A - 120 A,
 or feed bolts for 60 A powerail

1 m section to be ordered separately.



Type	No. of conductors	Current capacity A	Weight kg	Order-No.
VLS 10- 4/ 60	4	60	0,217	781 445
VLS 10- 4/100-120	4	100-120	0,382	781 479
VLS 10- 4/140	4	140	0,574	781 478
VLS 10- 5/ 60	5	60	0,230	780 610
VLS 10- 5/100-120	5	100-120	0,426	780 759
VLS 10- 5/140	5	140	0,630	780 745
VLS 10- 6/ 60	6	60	0,217	780 047
VLS 10- 6/100-120	6	100-120	0,382	780 060
VLS 10- 6/140	6	140	0,574	780 187
VLS 10- 7/ 60	7	60	0,230	780 049
VLS 10- 7/100-120	7	100-120	0,426	780 188
VLS 10- 7/140	7	140	0,630	780 189
VLS 10- 8/ 60	8	60	0,243	780 050
VLS 10- 8/100-120	8	100-120	0,470	780 196
VLS 10- 8/140	8	140	0,686	780 198
VLS 10- 9/ 60	9	60	0,256	780 058
VLS 10- 9/100-120	9	100-120	0,514	780 199
VLS 10- 9/140	9	140	0,742	780 191
VLS 10- 9/200-240 ⁽¹⁾	9	200-240	0,744	780 322
VLS 10- 9/280 ⁽¹⁾	9	280	0,828	780 321
VLS 10-10/ 60	10	60	0,269	780 059
VLS 10-10/100-120	10	100-120	0,558	780 192
VLS 10-10/140	10	140	0,798	780 208
VLS 10-10/200-240 ⁽¹⁾	10	200-240	0,757	780 318
VLS 10-10/280 ⁽¹⁾	10	280	0,815	780 317

Cable outlet double-sided

Line feed VNS

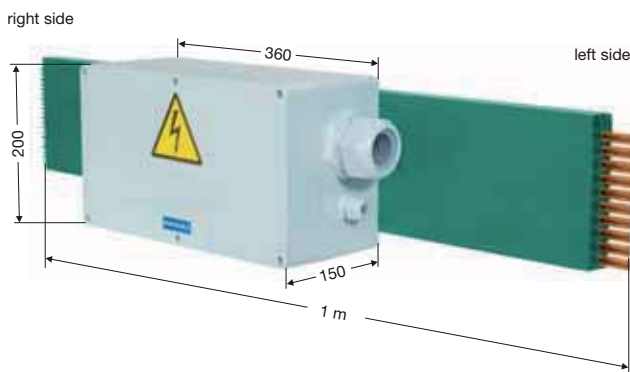
with terminal box

Cable gland: STR - M 63 x 1,5 for Ø = 28-45
 STR - M 20 x 1,5 for Ø = 5-13

Connection cable to be supplied by customer

Cable connection: Main current: M10
 Control current: M 5

1 m section to be ordered separately.



Type	No. of poles	Current capacity A	Weight kg	Order-No.
VNS 10- 4/ 60-140	4	60-140	2,354	780 527
VNS 10- 5/ 60-140	5	60-140	2,580	780 537
VNS 10- 6/ 60-140	6	60-140	2,766	780 327
VNS 10- 7/ 60-140	7	60-140	2,952	780 328
VNS 10- 8/ 60-140	8	60-140	3,138	780 329
VNS 10- 9/ 60-140	9	60-140	3,324	780 330
VNS 10- 9/200-280	9	200-280	2,840	780 334
VNS 10-10/ 60-140	10	60-140	3,510	780 331
VNS 10-10/200-280	10	200-280	2,865	780 332

Cable payout left, standard



Transfer funnel ⁽¹⁾ for current collector KESL 32-63/14

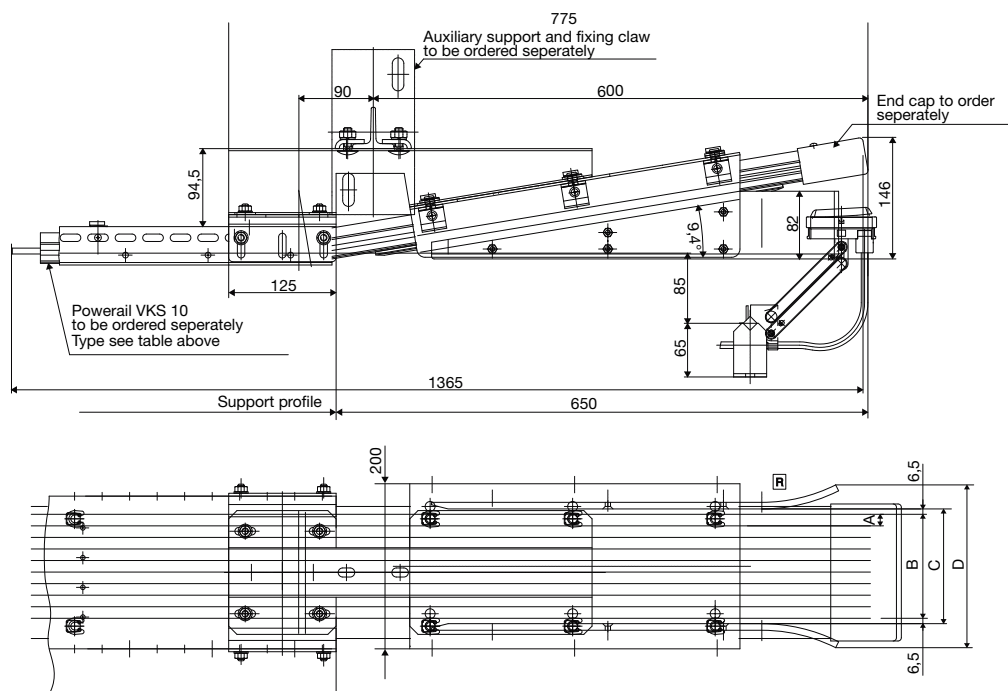
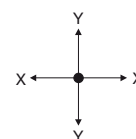
max. speed v= 100 m/min.

Conductor rails for funnels (all cross sections 25 mm², length 1365 mm)

Type	Order-No.
No. of conductors 4	781 442
No. of conductors 5	780 743
No. of conductors 6	780 247
No. of conductors 7	780 248
No. of conductors 8	780 249
No. of conductors 9	780 250
No. of conductors 10	780 257



Tolerances:
x = ± 10 mm
y = ± 10 mm



Type	No. of conductors	A mm	B mm	C mm	D mm	Weight kg	Order-No.
EFTV 10- 4-KSTU 30/63 -14 L	4	14	42	55	109	7,594	781 441
EFTV 10- 4-KSTU 30/63 -14 R	4	14	42	55	109	7,594	781 440
EFTV 10- 5-KSTU 30/63 -14 L	5	14	56	69	123	7,584	780 746
EFTV 10- 5-KSTU 30/63 -14 R	5	14	56	69	123	7,584	780 747
EFTV 10- 6-KSTU 30/63 -14 L	6	14	70	83	137	7,574	780 350
EFTV 10- 6-KSTU 30/63 -14 R	6	14	70	83	137	7,574	780 173
EFTV 10- 7-KSTU 30/63 -14 L	7	14	84	97	151	7,564	780 349
EFTV 10- 7-KSTU 30/63 -14 R	7	14	84	97	151	7,564	780 172
EFTV 10- 8-KSTU 30/63 -14 L	8	14	98	111	165	7,554	780 348
EFTV 10- 8-KSTU 30/63 -14 R	8	14	98	111	165	7,554	780 171
EFTV 10- 9-KSTU 30/63 -14 L	9	14	112	125	179	7,544	780 347
EFTV 10- 9-KSTU 30/63 -14 R	9	14	112	125	179	7,544	780 170
EFTV 10-10-KSTU 30/63 -14 L	10	14	126	139	193	7,534	780 346
EFTV 10-10-KSTU 30/63 -14 R	10	14	126	139	193	7,534	780 169

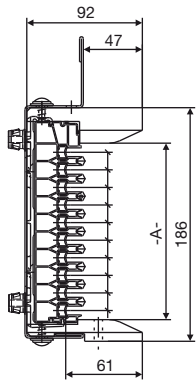
⁽¹⁾ Transfer funnel only in combination with powerail section. Higher speeds on request.



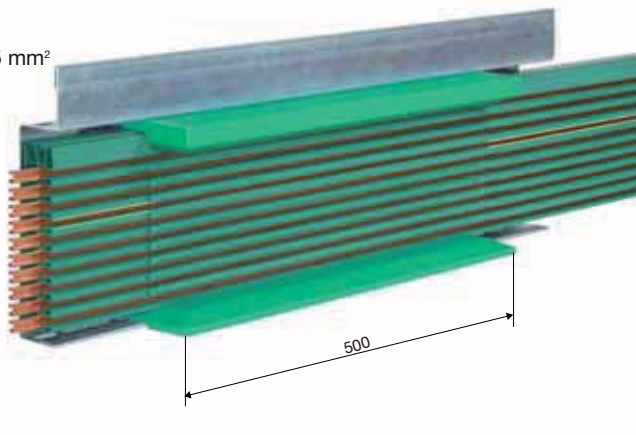
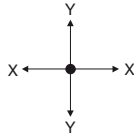
TANGENTIAL ENTRY FUNNEL, POWERRAIL SECTION ISOLATION VKS 10

Tangential entry funnel for collector KSTU 30 - 55

max. entry speed $v = 100$ m/min. Copper cross section min. 25 mm^2

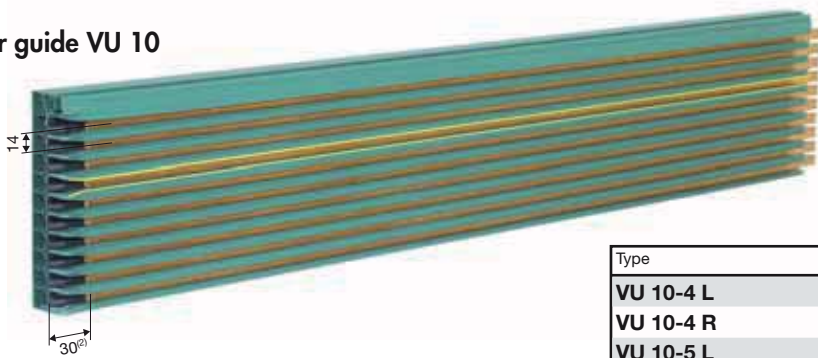


Tolerances:
 $x = \pm 10 \text{ mm}$
 $y = +8 \text{ mm}, -7 \text{ mm}$



Type	No. of poles	A	Weight kg	Order-No.
DSEV 10- 4 KSTU 30-63	4	56,5	1,888	781 453
DSEV 10- 5 KSTU 30-63	5	70,5	1,884	781 452
DSEV 10- 6 KSTU 30-63	6	84,5	1,880	780 168
DSEV 10- 7 KSTU 30-63	7	98,5	1,876	780 167
DSEV 10- 8 KSTU 30-63	8	112,5	1,872	780 166
DSEV 10- 9 KSTU 30-63	9	126,5	1,868	780 165
DSEV 10-10 KSTU 30-63	10	140,5	1,575	780 164

Transfer guide VU 10



For cross travel and terminal lines
 max. height- and lateral off-set: $\pm 2 \text{ mm}$

max. air gap between the transfer guides: 5 mm

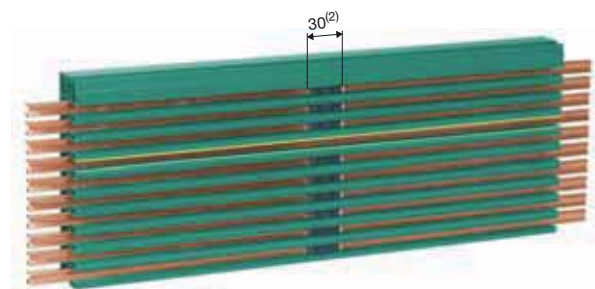
Type	Assignment from top	Order-No.
VU 10-4 L	Schiene 1- 4	781 456
VU 10-4 R	Schiene 1- 4	781 457
VU 10-5 L	Schiene 1- 5	781 458
VU 10-5 R	Schiene 1- 5	781 459
VU 10-6 L	rail 1- 6	780 287
VU 10-6 R	rail 1- 6	780 288
VU 10-7 L	rail 1- 7	780 227
VU 10-7 R	rail 1- 7	780 228
VU 10-8 L	rail 1- 8	780 229
VU 10-8 R	rail 1- 8	780 230
VU 10-9 L	rail 1- 9	780 289
VU 10-9 R	rail 1- 9	780 290
VU 10-10 L	rail 1-10	780 269
VU 10-10 R	rail 1-10	780 270

Powerail isolating section⁽¹⁾

The position of the isolating sections are to be identified in the order.

Type	Weight kg	Order-No.
VSTS 1/10-60 M	0,004	156 933
VSTS 1/ 100 M	0,004	150 150
VSTS 1/ 120 M	0,004	151 674
VSTS 1/ 140 M	0,004	156 335

M = factory assembled; L = supplied loose



⁽¹⁾ For specification of the powerail profile see page 6

⁽²⁾ Length of the conductor dead section (longer dead sections on request).



Compact current collector KESR 32/55 for reverse run

Distance between conductors: 14 mm

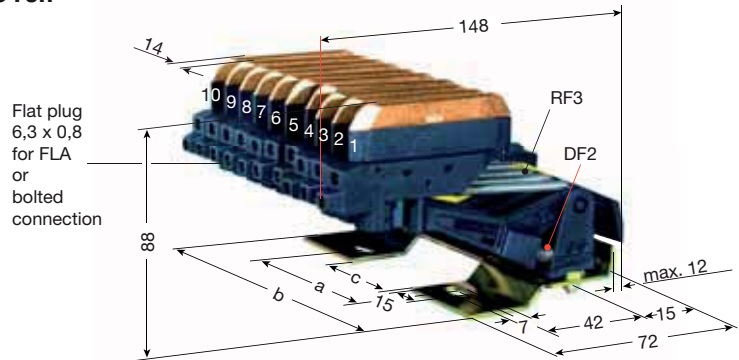
max. current	flat plug	bolted connection
32 A	FLA 2,5	AEA 2,5
40 A	FLA 4,0	AEA 4,0
55 A	FLA 6,0	AEA 6,0

Lift and swivel ± 15 mm

Contact pressure: approx. 3.5 N per carbon brush

PE (ground) on No. 4, other combinations possible

The ground collector always moves first when entering the powerail.



KESR-F

for connecting cables with flat plug see table 1 page 16

Type	No. of poles	a mm	b mm	c mm	Weight kg	Baseplate	Order-No.	
KESR 32-55 F 4-14 HS	4	28	62	-	0,480	4-pole	143 170	
KESR 32-55 F 5-14 HS	5	56	90	-	0,540	6-pole	143 373	
KESR 32-55 F 6-14 HS	6	56	90	-	0,600	6 pole	143 113	
KESR 32-55 F 7-14 HS	7	80	118	53	0,660	8 pole (no. 8= free)	143 114	
KESR 32-55 F 8-14 HS	8	80	118	53	0,720	8 pole	143 115	
KESR 32-55 F 9-14 HS	9	80	146	53	0,780	10 pole (no. 10= free)	143 116	
KESR 32-55 F 10-14 HS	10	80	146	53	0,840	10 pole	143 117	
Single collector:							Phase	PE (ground)
Current collector KESR 32-55 F 14					0,060		143 111	143 112

KESR-S

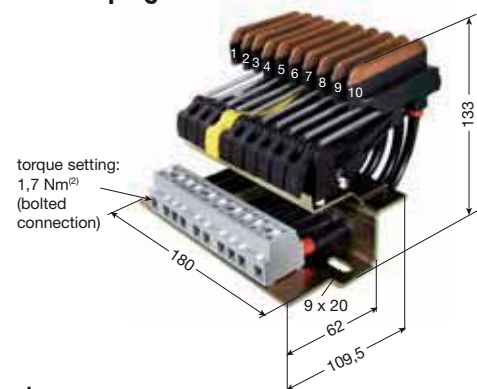
for connecting cables with bolted connection see table 2 page 16

Type	No. of poles	a mm	b mm	c mm	Weight kg	Baseplate	Order-No.	
KESR 32-55 S 4-14 HS	4	28	62	-	0,504	4-pole	142 937	
KESR 32-55 S 5-14 HS	5	56	90	-	0,570	6-pole	142 938	
KESR 32-55 S 6-14 HS	6	56	90	-	0,636	6 pole	142 939	
KESR 32-55 S 7-14 HS	7	80	118	53	0,702	8 pole (no. 8= free)	142 940	
KESR 32-55 S 8-14 HS	8	80	118	53	0,768	8 pole	142 941	
KESR 32-55 S 9-14 HS	9	80	146	53	0,834	10 pole (no. 10= free)	142 942	
KESR 32-55 S 10-14 HS	10	80	146	53	0,890	10 pole	142 943	
Single collector:							Phase	PE (ground)
Current collector KESR 32-63 S/14 ⁽¹⁾					0,066		143 120	143 121

Compact current collector KESR 63 S for reverse run with adapter plate and clamping block.

Spare parts

Type	Order-No.
Carbon MK 63 S/14.28	780 921
Current collector KESR 32-63 S/14 PE	143 121
Current collector KESR 32-63 S/14 PH	143 120



Left hand version

Ground on No.4

Type	No. of poles	Configuration	Order-No.
KESR 63 S- 4-14 HS- KBL	4	1- 4	781 089
KESR 63 S- 5-14 HS- KBL	5	1- 6	781 088
KESR 63 S- 6-14 HS- KBL	6	1- 6	781 087
KESR 63 S- 7-14 HS- KBL	7	1- 7	781 086
KESR 63 S- 8-14 HS- KBL	8	1- 8	781 085
KESR 63 S- 9-14 HS- KBL	9	1- 9	781 084
KESR 63 S-10-14 HS- KBL	10	1-10	781 083

Right hand version

Ground on No. 7

Type	No. of poles	Configuration	Order-No.
KESR 63 S- 4-14 HS- KBR	4	7-10	781 096
KESR 63 S- 5-14 HS- KBR	5	6-10	781 095
KESR 63 S- 6-14 HS- KBR	6	5-10	781 094
KESR 63 S- 7-14 HS- KBR	7	4-10	781 093
KESR 63 S- 8-14 HS- KBR	8	3-10	781 092
KESR 63 S- 9-14 HS- KBR	9	2-10	781 091
KESR 63 S-10-14 HS- KBR	10	1-10	781 090

⁽¹⁾ Only in combination with clamping block and 10 mm² connecting cable.

⁽²⁾ Max. cross section of connecting cable 16 mm² (UL = 10 mm²).



CURRENT COLLECTOR VKS 10

Compact current collector KESL 32-63 for reverse run

Distance between conductors: 14 mm

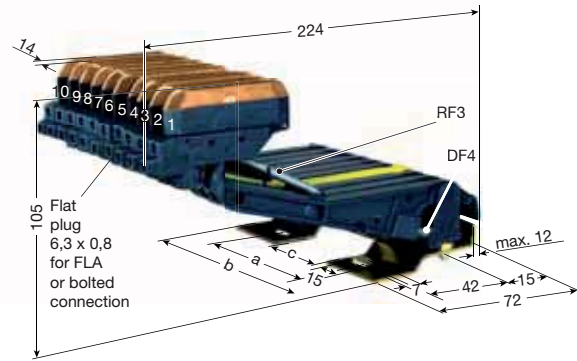
max. current	flat plug	bolted connection
32 A	FLA 2,5	AEA 2,5
40 A	FLA 4,0	AEA 4,0
55 A	FLA 6,0	AEA 6,0
63 A	-	AEA 10,0

Lift and swivel ± 30 mm

Contact pressure: approx. 7 N per carbon brush

PE (ground) on no. 4, other combinations possible

The ground collector always moves first when entering the powerail.



KESL-F

for connecting cables with flat plug see table 1 page 16

Type	No. of poles	a mm	b mm	c mm	Weight kg	Baseplate	Order-No.
KESL 32-55 F 4-14 HS	4	28	62	-	0,536	4-pole	143 152
KESL 32-55 F 5-14 HS	5	56	90	-	0,612	6-pole	781 257
KESL 32-55 F 6-14 HS	6	56	90	-	0,688	6 pole	142 883
KESL 32-55 F 7-14 HS	7	80	118	53	0,764	8 pole (no. 8= free)	142 884
KESL 32-55 F 8-14 HS	8	80	118	53	0,840	8 pole	142 885
KESL 32-55 F 9-14 HS	9	80	146	53	0,916	10 pole (no. 10= free)	142 886
KESL 32-55 F 10-14 HS	10	80	146	53	0,992	10 pole	142 887
Single collector:						Phase	PE (ground)
Current collector KESL 32-55 F/14						0,076	142 881 142 882

KESL-S

for connecting cables with bolted connection see table 2 page 16

Type	No. of poles	a mm	b mm	c mm	Weight kg	Baseplate	Order-No.
KESL 32-63 S 4-14 HS	4	28	62	-	0,553	4-pole	143 539
KESL 32-63 S 5-14 HS	5	56	90	-	0,637	6-pole	143 354
KESL 32-63 S 6-14 HS	6	56	90	-	0,721	6 pole	142 888
KESL 32-63 S 7-14 HS	7	80	118	53	0,803	8 pole (no. 8= free)	142 889
KESL 32-63 S 8-14 HS	8	80	118	53	0,885	8 pole	142 890
KESL 32-63 S 9-14 HS	9	80	146	53	0,967	10 pole (no. 10= free)	142 891
KESL 32-63 S 10-14 HS	10	80	146	53	1,049	10 pole	142 892
Single collector:						Phase	PE (ground)
Current collector KESL 32-63 S/14						0,084	168 395 142 880

Compact current collector KESL 63 S for reverse run with adapter plate and clamping block.

Spare parts

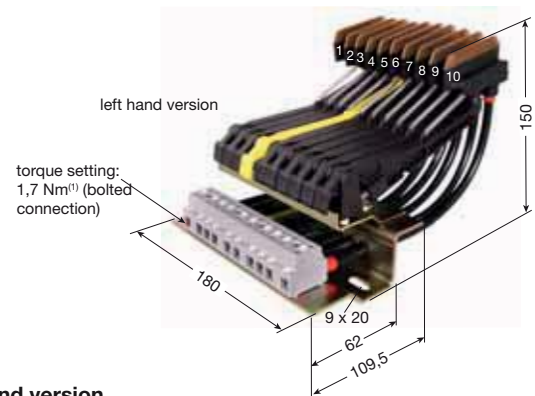
Type	Order-No.
Carbon MK 63 S/14.28	780 921
Current collector KESL 32-63 S/14 PE	142 880
Current collector KESL 32-63 S/14 PH	168 395

Left hand version Ground on No.4

Type	No. of poles	Configuration	Order-No.
KESL 63 S- 4-14 HS- KBL	4	1- 4	781 075
KESL 63 S- 5-14 HS- KBL	5	1- 5	781 074
KESL 63 S- 6-14 HS- KBL	6	1- 6	781 073
KESL 63 S- 7-14 HS- KBL	7	1- 7	781 072
KESL 63 S- 8-14 HS- KBL	8	1- 8	781 071
KESL 63 S- 9-14 HS- KBL	9	1- 9	781 070
KESL 63 S-10-14 HS- KBL	10	1-10	781 069

Right hand version Ground on No. 7

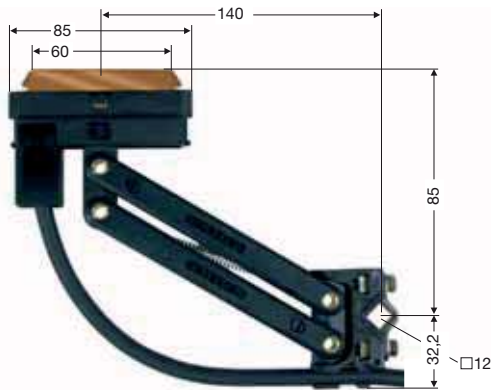
Type	No. of poles	Configuration	Order-No.
KESL 63 S- 4-14 HS- KBR	4	3-10	781 082
KESL 63 S- 5-14 HS- KBR	5	4-10	781 081
KESL 63 S- 6-14 HS- KBR	6	5-10	781 080
KESL 63 S- 7-14 HS- KBR	7	4-10	781 079
KESL 63 S- 8-14 HS- KBR	8	3-10	781 078
KESL 63 S- 9-14 HS- KBR	9	2-10	781 077
KESL 63 S-10-14 HS- KBR	10	1-10	781 076



CURRENT COLLECTOR VKS 10, CONNECTING CABLES



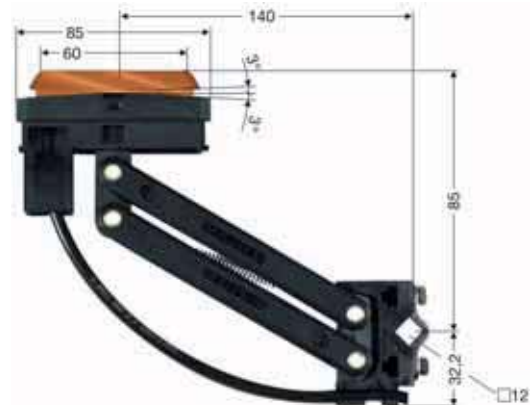
Current collector KST



With 2 m connecting cables
Lift and swivel: see following table
Contact pressure: approx. 5 N

Current collector KSTU

for funnels and tangential entry funnels (multi systems)



With 2 m connecting cables
Lift and swivel see Table
(in funnels ± 10 mm to all sides)
Contact pressure: approx. 5 N

Type	Current capacity A	Connection cable A/mm ²	cable d max./mm	Lift+swivel mm	Weight kg	Order-No.		Type	Current capacity A	Connection cable A/mm ²	cable d max./mm	Lift + swivel mm	Weight kg	Order-No.	
						Phase black	(ground) yellow							Phase black	(ground) yellow
KST 30	30	2,50	5	± 20	0,240	152 085	152 086	KSTU 30/14	30	2,50	5	± 20	0,240	168 363	168 364
KST 55	55	6,00	11	± 20	0,368	154 438	154 439	KSTU 55/14	55	6,00	11	± 20	0,368	168 361	168 362
KST 63	63	10,00	9	± 20	0,394	156 791	156 792	KSTU 63/14	63	10,00	9	± 20	0,394	148 018	148 019

Connecting cable FLA⁽¹⁾, highly flexible, for current collectors.
(For allocation to current collectors see page 13 and 14)



Length = 1 m with flat plug 6,3 x 0,8
Longer connecting length available.

Connecting cable AEA⁽¹⁾, highly flexible for current collectors



Length: 1 m
Longer connecting length available.

Table 1

Type	Cross section mm ²	Outside \varnothing mm	Weight kg	Order-No.	
				Phase black	PE green/yellow
FLA 2,5	2,50	4,00	0,080	165 049	165 050
FLA 4	4,00	6,00	0,100	165 051	165 052
FLA 6	6,00	7,00	0,150	166 368	166 369

Table 2

Type	Cross section mm ²	Outside \varnothing mm	Weight kg	Order-No.	
				Phase black	PE green/yellow
AEA 2,5	2,50	4,00	0,038	143 080	143 079
AEA 4,0	4,00	5,50	0,063	143 078	143 077
AEA 6,0	6,00	6,00	0,085	143 076	143 075
AEA 10,0	10,00	8,50	0,160	143 074	143 073

Flat plug, single

Type	for cable cross section mm ²	Order-No.
FH 2,5	2,50	165 120
FH 4-6	4,00 + 6,00	165 121



FH 2,5



FH 4,0-6,0

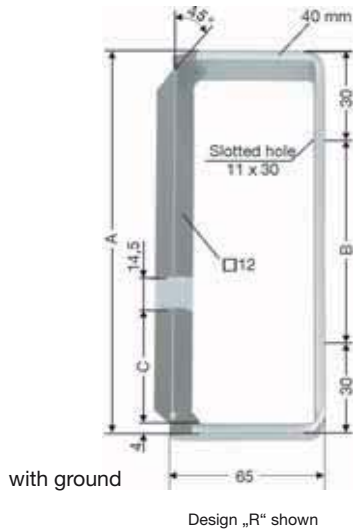
⁽¹⁾ Application area: -15 °C to + 70 °C.



ACCESSORIES FOR CURRENT COLLECTORS VKS 10

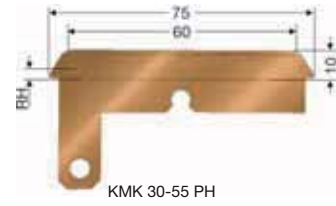
Collector bracket

for current collectors
KST 30-55 see page 15

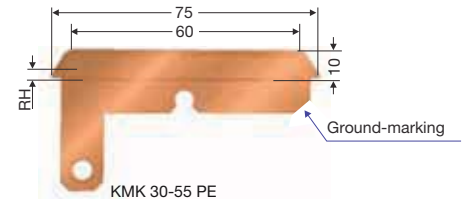


Type	A mm	B mm	C mm	Weight kg	Order-No.
UMA 12 HS-B- 4-14 L	80	20	50	0,33	781 444
UMA 12 HS-B- 4-14 R	80	20	50	0,33	781 443
UMA 12 HS-B- 5-14 L	94	34	50	0,36	780 186
UMA 12 HS-B- 5-14 R	94	34	50	0,36	780 185
UMA 12 HS-B- 6-14 L	108	48	50	0,39	780 184
UMA 12 HS-B- 6-14 R	108	48	50	0,39	780 183
UMA 12 HS-B- 7-14	122	62	50	0,42	780 181
UMA 12 HS-B- 8-14 L	136	76	50	0,46	780 180
UMA 12 HS-B- 8-14 R	136	76	50	0,46	780 179
UMA 12 HS-B- 9-14 L	150	90	50	0,49	780 178
UMA 12 HS-B- 9-14 R	150	90	50	0,49	780 177
UMA 12 HS-B-10-14 L	164	104	50	0,52	780 176
UMA 12 HS-B-10-14 R	164	104	50	0,52	780 175

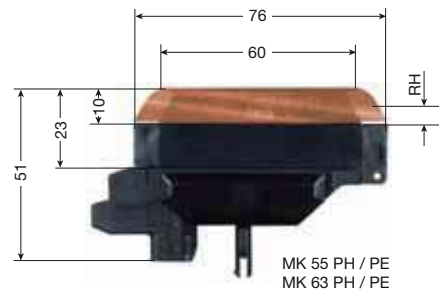
Carbon brushes



KMK 30-55 PH



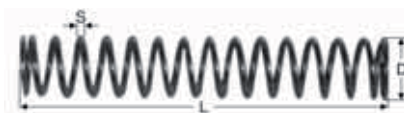
KMK 30-55 PE



MK 55 PH / PE
MK 63 PH / PE

Type	For current collector	Carbon brush thickness	RH mm	Weight kg	Order-No.
KMK 30-55 PH	KST 30 - KST 63 and KSTU 30 - 63	4,40 mm	4,00	0,031	154 440
KMK 30-55 PE	KST 30 - KST 63 and KSTU 30 - 63	4,40 mm	4,00	0,031	154 453
MK 55 F/14.28	KESR 32 - 55F KESL 32 - 55F	4,20 mm	3,50	0,040	780 920
MK 63 S/14.28	KESR 32 - 63S KESL 32 - 63S	4,20 mm	3,50	0,046	780 921

Springs



Pressure spring DF



Tension spring RF

Type	For current collector	S mm	D mm	L mm	Order-No.
DF 2	KESR 32-55	0,90	7,70	43,00	153 848
RF 3	KESR 32-55	0,40	4,40	31,00	153 849
DF 4	KESL 32-63	1,10	6,40	41,00	157 312

SUPPORT PROFILE FOR HIGH BAY STORAGE VKS 10

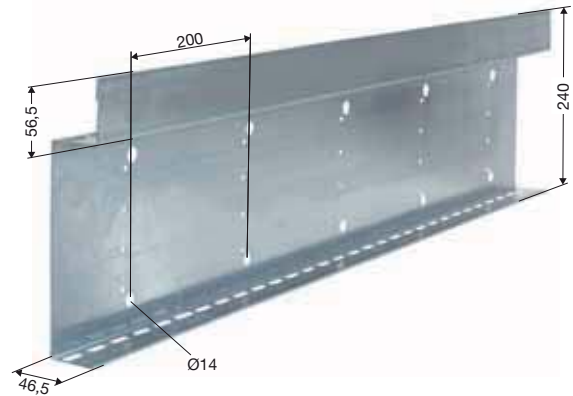


Accessories VKS 10

Type	Order-No.
Connector cap	780 137
Plug-in joint VKS 10/ 10- 60A	780 807
Plug-in joint VKS 10/ 100-120 A	780 808
Plug-in joint VKS 10/ 140 A	780 028
Connection bolts, complete for VLS 10/ 60 + 200-280	780 138
Connection bolts, complete for VLS 10/100-140	780 130
Connection bolts, complete for VNS 10/ 60-280	780 139
Plastik glue for tangential funnel DSEV 10	780 280

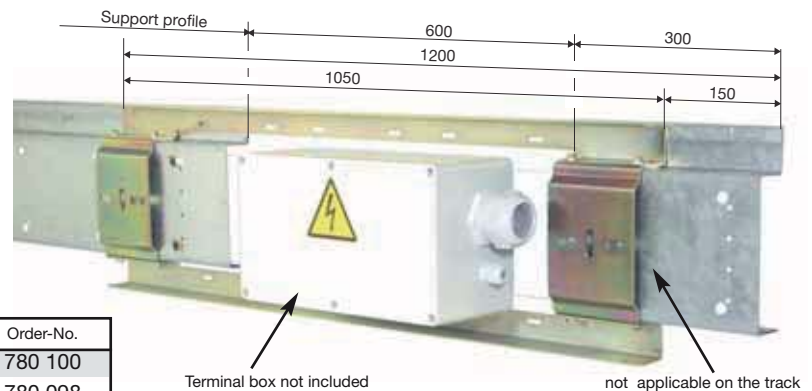
Support profile

Length: 6 m



Type	Weight kg/m	Order-No.
VTP 10	4,300	781 006

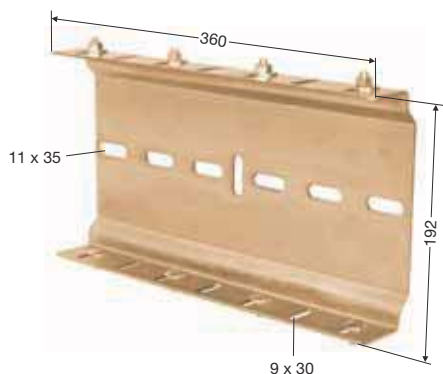
Support profile VTP 10 for feed VNS 10, VLS 10



Type	Order-No.
Version for initial / end section	780 100
Version on the track	780 098

Connector

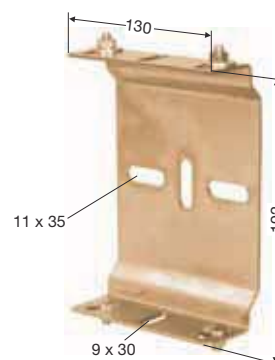
Only as single component otherwise included in the attachment material of the support profile (see page 18).



Type	Weight kg	Order-No.
VTPV 10	2.398	781 000

Hanger

Only as single component otherwise included in the attachment material of the support profile (see page 18).

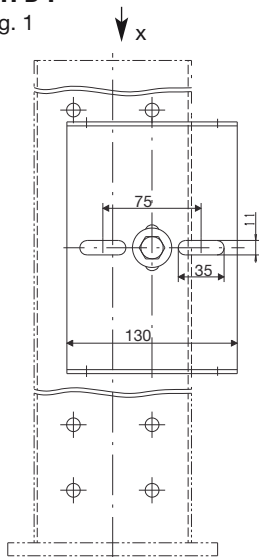


Type	Weight kg	Order-No.
VTPA 10	0.878	781 007

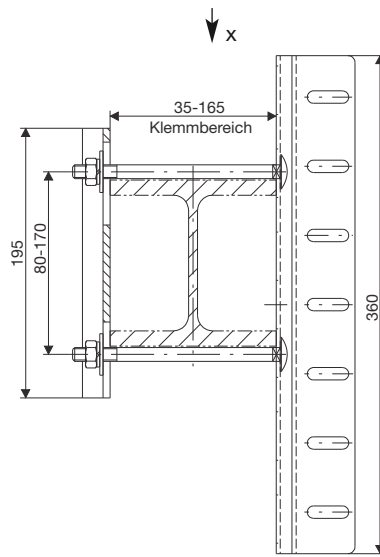


SUPPORT PROFILE ATTACHMENTS VKS 10

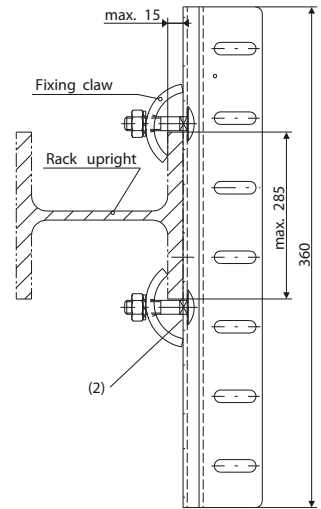
VTPB-P
Fig. 1



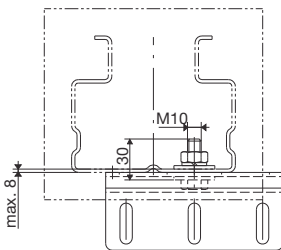
VTPB
Fig. 4



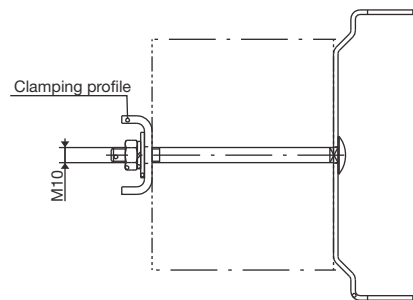
VTPB-SPR
Fig. 2



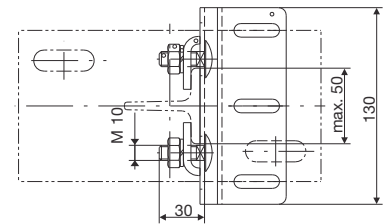
View x



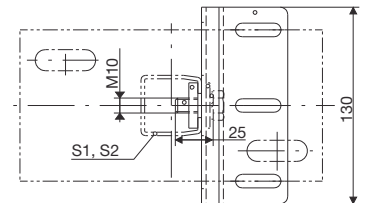
View y



VTPB-SPW Fig. 3



VTPB-S 1/2 Fig. 5



Type ⁽¹⁾	Fig.	Clamping range	Weight kg	Order-No.
VTPB-P	1	max. 8	0,938	780 147
VTPB-SPR	2	max. 15	2,674	780 149
VTPB 130-SPW	3	max. 15	1,066	780 148
VTPB 35 - 45	4	35 - 45	3,054	780 150
VTPB 45 - 55	4	45 - 55	3,062	780 151
VTPB 55 - 65	4	55 - 65	3,076	780 152
VTPB 65 - 75	4	65 - 75	3,084	780 153
VTPB 75 - 85	4	75 - 85	3,096	780 154
VTPB 85 - 95	4	85 - 95	3,102	780 155
VTPB 90 - 105	4	90 - 105	3,110	780 156
VTPB 100 - 115	4	100 - 115	3,118	780 157
VTPB 110 - 125	4	110 - 125	3,132	780 158
VTPB 120 - 135	4	120 - 135	3,144	780 159
VTPB 130 - 145	4	130 - 145	3,152	780 160
VTPB 140 - 155	4	140 - 155	3,164	780 161
VTPB 150 - 165	4	150 - 165	3,172	780 162
VTPB S 1/2	5	max.8	0,944	780 163

⁽¹⁾ Bigger clamping range on request.

⁽²⁾ Locking torque of the round-head screw M 10, MA= 18 Nm

Operating principle

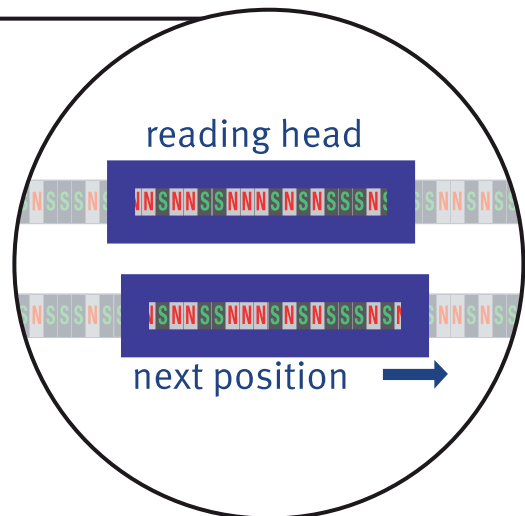
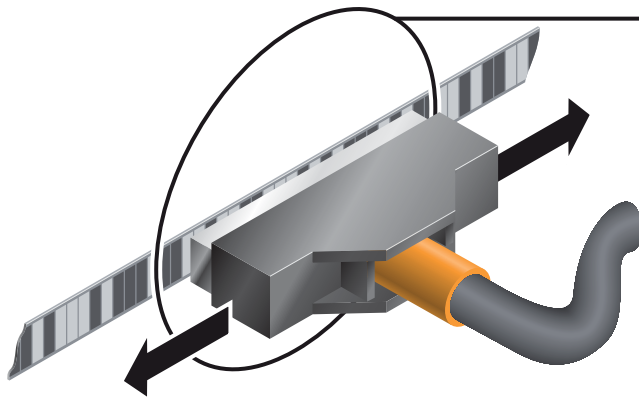
VAHLE-APOS® consists of a code strip with magnetic length coding and a reading head with integrated logic, which transmits the position to the control system via interface. The intelligent reading head determines the position from the code strip and evaluates it for downstream control systems for processing.



VAHLE-APOS®
in VKS 10 - 10. pole



VAHLE-APOS®
in VKS 10 - 11. pole



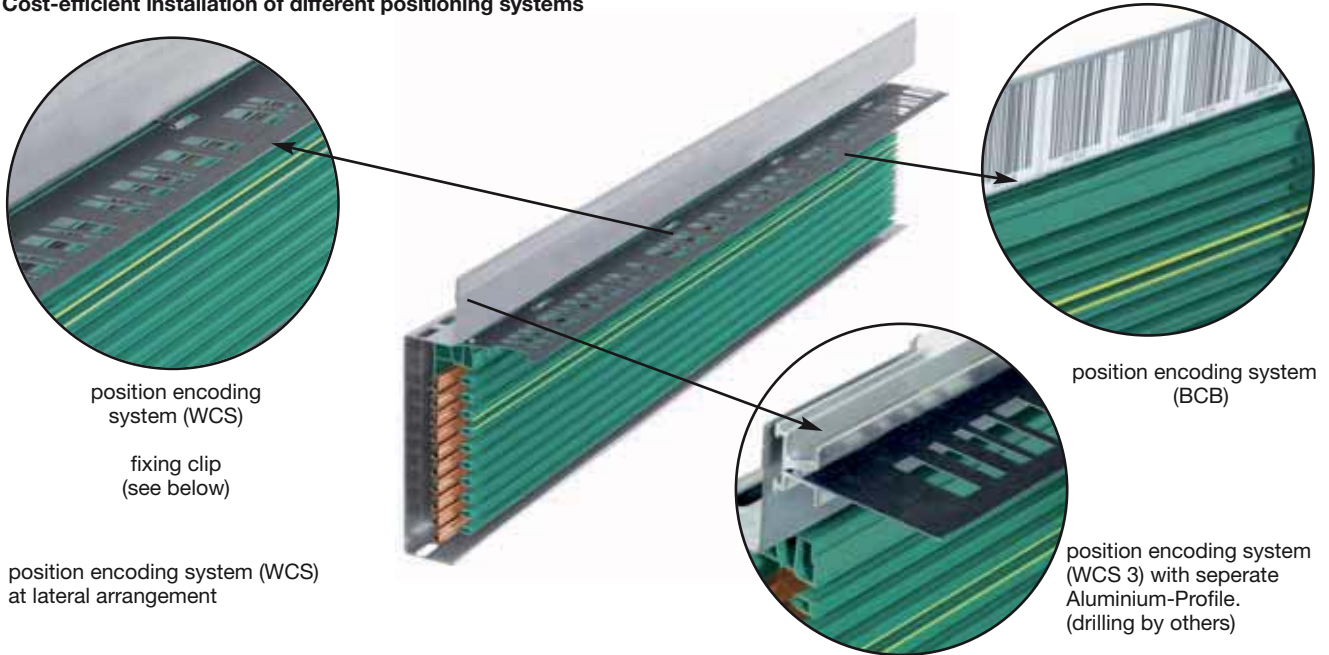
- absolute positioning identification upto 524 m
- retrofit
- absolute position at engaging or after a outage directly available
- safe position identification aswell with wetness or dust
- travel speed upto 6 m/s

For further details please refer to VAHLE-APOS® catalog (7a)



POSITIONING SYSTEM

Cost-efficient installation of different positioning systems



Earthing of the code rail:

Connect the WCS code rail at least every 30 m to the potential of the system of low resistance.
(Part-No.: E- WCS 3/VTP 10/ 302 160).

Fixing clip

for laminate band



Fixing distance 0.2 m

Type	Weight kg	Order-No.
Fixing clip for plastic laminate band	0,002	780 193

Position encoding band

encoding band



Type	Weight kg/m	Order-No.
Plastic laminate band with special perforation (WCS 3)	0,040	302 106
Screws for fixation	0,001	780 140
Barcode band (BCB)	0,015	302 107

Installation tool

For use with support profile



Type	Weight kg	Order-No.
Joint cap assembly tool	0,350	780 070

Installation tool

For use with support profile



Type	Weight kg	Order-No.
Copper connector mounting lever	1,50	780 090

Installation comb

Type	Weight kg	Order-No.
Installation comb, set for VKS 10	0,230	781 112



To adjust the air gap at the joint

⁽¹⁾ Max.travel length 327 m.

⁽²⁾ Max.travel length 10.000 m.



Company: _____
 Tel: _____
 E-Mail: _____

Date: _____
 Fax: _____
 Internet: _____

1. Number of powerail systems: _____
2. Type of equipment to be powered: _____
3. Operating voltage: _____ Volts, Frequency: _____ Hz
 Three phase voltage: AC voltage: DC voltage:
4. Track length: _____
5. Number of conductors: _____ (Neutral: _____ control: _____ ground: _____)
6. Mounted position of powerail:
 Powerail pendant, collector cable facing to the bottom
 Powerail pendant, collector cable lateral payout ⁽¹⁾
 Support distance m Other: _____
7. Number of consumers per system: _____
8. Indoor: Outdoor:
9. Other operating conditions (humidity, dust, chemical influence etc.) _____
10. Ambient temperature: _____ °C min. _____ °C max.
11. Hall expansion gaps: _____ pc. _____ max. expansion
12. Position and number of feed points⁽¹⁾: _____
13. Position and number of dead sections (e.g. maintenance bays)⁽¹⁾ _____
14. How will the conductor system be arranged?⁽¹⁾: _____
15. Brackets required: yes no c/c distance beam / powerail _____
 Flange width of beam _____
16. Travel speed (long travel): _____ in curves: _____ at transfers: _____
17. Power consumption of the individual consumers: _____
18. Max. Voltage drop from the powerail feed point to the consumer considering starting current:
 3% or _____ % referring to nominal voltage.

Motor data	Crane 1					Crane 2							
	Power kW	Nominal current		Starting current		Type of-Motors ⁽²⁾	Power kW	Nominal current		Starting current		Type of-Motors ⁽²⁾	
		A	cos φ _N	% ED	A	cos φ _A		A	cos φ _N	% ED	A	cos φ _A	
Hoist motors													
Auxiliary hoist													
Long travel													
Cross travel													

Mark with * those motors which can run simultaneously.
 Mark with Δ those motors which can start up simultaneously.

Further remarks: _____

Signature: _____

⁽¹⁾ Sketch required
⁽²⁾ Note type of Motor: K for Squirrel cage motor, S for slipring motor, F for frequency controlled motor.
 We reserve the right for technical changes due to further developments.
 Please copy and fax this questionnaire.



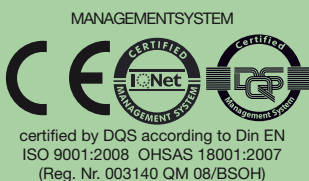
NOTES



Products and Service	Catalog No.
1 Open conductor systems	
Open conductor systems	1a
2 Insulated conductor systems	
U 10	2a
FABA 100	2b
U 15 - U 25 - U 35	2c
U 20 - U 30 - U 40	2d
3 Compact conductor systems	
VKS 10	3a
VKS - VKL	3b
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
8 Festoon systems and cables	
Festoon systems for □ - tracks	8a
Festoon systems for flat cables on I- tracks	8b
Festoon systems for round flat cables on I- tracks	8c
Festoon systems for ◇ - tracks	8d
Cables	8e
9 Reels	
Spring operated cable reels	9a
Motor powered cable reels	9b
10 Others	
Battery charging systems	10a
Heavy enclosed conductor systems	10b
Tender	10c
Contact wire	10d

Assemblies/Commissioning

Spare parts/Maintenance service



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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)



Powerail Ltd. High Road, Finchley, London, N12 8PT,
 Phone 020 8446 0350/1246 • Fax 020 8446 7054
 E-mail: enquiries@powerailtd.com