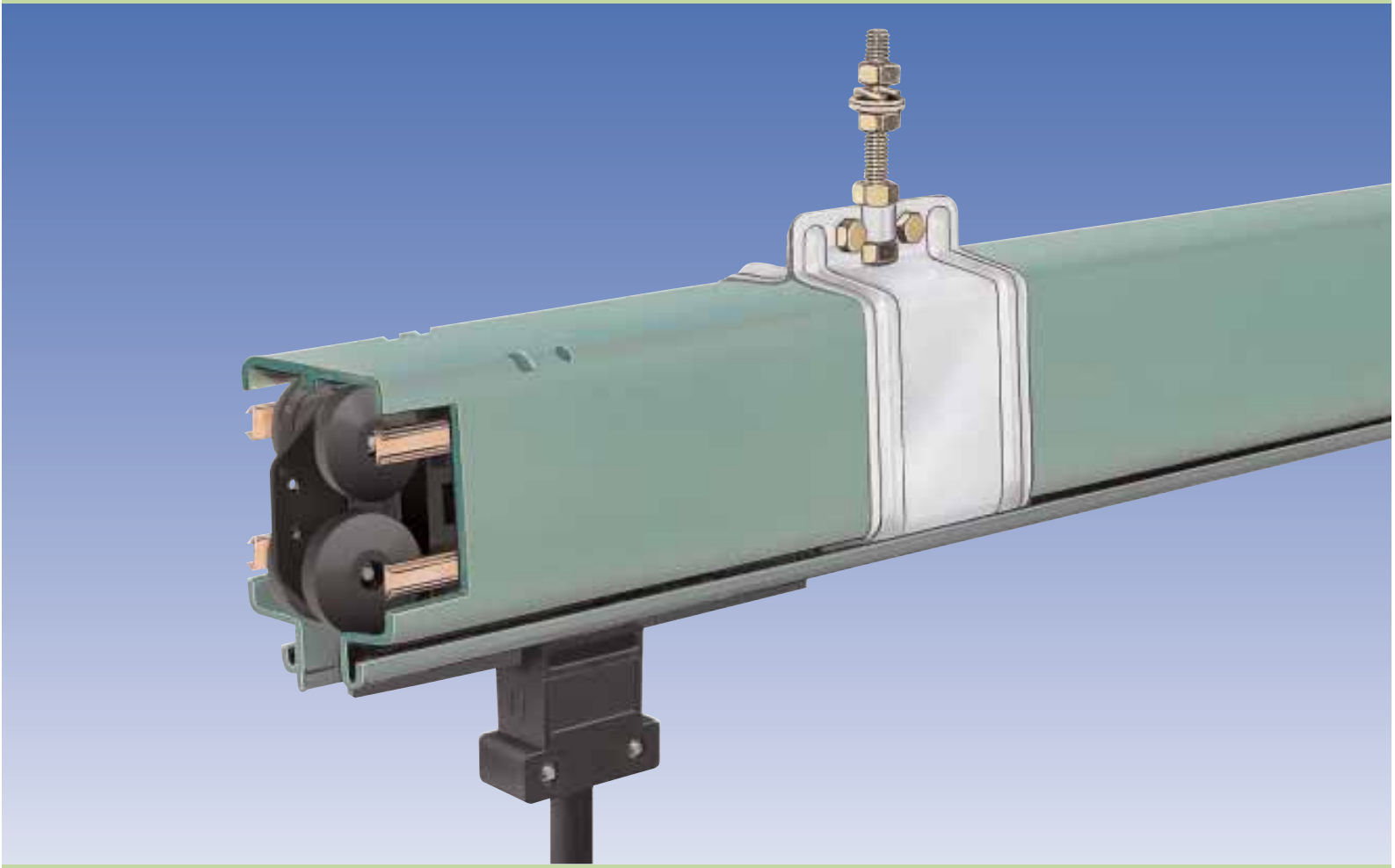


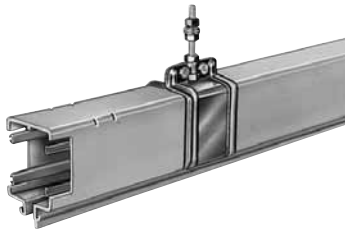
POWERAIL ENCLOSED CONDUCTOR SYSTEMS

KBSL • KSL • KSLT

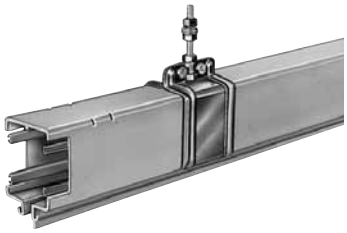
VAHLE 19 12
ELECTRIFICATION SYSTEMS

POWERAILS KBSL – KSL – KSLT

Powerail versions (drawings see page 5).

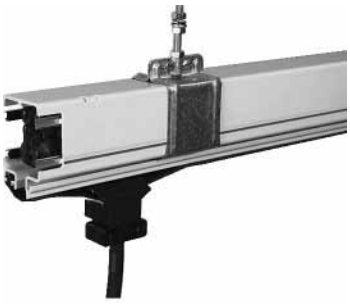


Type KBSL[1]
color: green



Type KSL
color: green

Type KSLT
color: gray



Type KSLT
with sealing strip „D“

Type KSLT
with plastic shielding „FP“

General

The Powerail types KBSL, KSL and KSLT are totally enclosed, touch-proof conductor systems for safe mobile power feeding of: Overhead Cranes, Monorail Systems, Electric Hoists, Automated Storage and Retrieval Systems, Electric Power Tools, Machine Tools, Assembly and Test Lines, Hanger Door Motors, Studio & Station Lighting Systems and many other applications.

These Powerail can be used for indoor and outdoor applications.

Because of the more favourable thermal properties we recommend to use a Powerail type with gray housing (KSLT/KSG) for outdoor applications.

Main characteristics are minimum space requirement, easy installation and resistance against corrosion.

VAHLE Powerails fully meet all VDE safety requirements.

Other combinations of cross sections, as shown on page 5, are possible. Regulation VDE 0100,part 430 has to be considered when using an N-conductor. Powerail KSLT can be equipped with sealing strip „D“ (IP 24) or with plstic shielding „FP“. Touch-proofness is then given with (EN 60529 (VDE 0470 part 1)). It is protected to IP 23 standards.

The touch-proofness is only guaranteed if the collectors are totally inserted into the Powerail system. If the Powerail is mounted within easy reach and the collectors can leave the system during operation, protection against manual contact must be provided. This is valid for tension above 25 V three phase current and 60 V alternate current.

(1) KBSL is w/o stiffener clamps.
KSL/KSLT will be equipped with stiffener clamps.

Apporovals
KSL: UL-approved.
KSL/KSLT: CSA-approved on request before placing the order.

Housing
The compact insulating housing holds from 4-5 pure copper conductors. KBSL preferably for indoors, all others for in- & outdoor use.
Standard sections are 1, 2, 3 or 4 m long.
Other sections and curves are available.
The ground conductor is identified by international color code. Long and short lip housing profiles (see page 6) and collector safety keys avoid phase reversing.
Any number of conductors can be accomplished by installing various Powerails side by side.

Couplings:
The KBSL, KSL and KSLT can be supplied from 40 - 100 A alternatively with bolted joints or plug-in joints. With 140 and 200 A bolted joints are always needed. The sections for plug-in and bolted joints are identically constructed.

Joint cover
The housing of the Powerail types KBSL, KSL and KSLT are connected by plastic joint covers.

Main power supply:
The Powerail systems can be fed either by line feeds or end feeds.

End caps:
The open ends of Powerail are closed by end caps.

Hangers:
Bracket at the crane track (see page 8).
Max. support distance with the following ambient temperatures of the conductor:

Indoor systems	< 35° C = 2,00 m
Indoor and Outdoor systems with and w/out heating.	> 35° C = 1,33 m

Expansion during temperature fluctuation:
The extensions can be compensated for the KBSL, KSL and KSLT by expansion joint sections (without electrical separation).

Anti-condensation sections:
These sections are used for transfer of the Powerail to outdoor areas to avoid condensation. The Powerail is not separated electrically.

Contact sections, turntables and switches:
Powerail for working areas and transfer applications see page 12.

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).

Available in air gap version, where the collector carbon bridges the gap, e.g. for mains.

Also available in insulating piece version. In this case the insulating piece is longer than the carbon and each Powerail section can be separated electrically, e.g. for control.

Collector:
The current collectors are made of re-inforced polyester, for high strength and light weight. Spring loaded carbon brushes maintain uniform contact. Connecting cables or terminal boxes and hinged or flexible towing arms included. Double collectors for transfer applications and higher amperage.

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

(Note: this might happen in case of several collector running in one system).

The connecting cables are sufficiently dimensioned for the indicated continuous current ratings.

Consider reduction factors for different kinds of installation as per VDE 0298-4.
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 29/30.

All steel parts and hardware of Powerails can be supplied in stainless steel version (version K)

Technical Data of Powerail KBSL · KSL · KSLT

Electrical properties:

Dielectric strength	IEC 60243-1-3	30–40 kV/mm
Specific resistance	IEC 60093	5 x 10^{15} Ohm/cm
Surface resistance	IEC 60093	10^{13} Ohm
Leakage resistance	IEC 60112	CTI 600–2,7
Permissible operating voltage	600 V	

Mechanical properties:

Flexible strength	75 N/mm² ± 10 %
Tensile strength	40 N/mm² ± 10 %
Temperature range (ambient):	– 30 °C to + 60 °C

Flame test proof:
no flaming particles, self extinguishing — DIN 41 02 – Class B 1 Part 1

Housing Resistance to chemicals: at + 45 °C

Gasoline	Sulphuric acid 50 %
Mineral Oil	Caustic soda 25 % & 50 %
Grease	Hydro-chloric acid, concentrated

Consider the voltage drop calculation to maintain the limits established by the motor manufacturers:

AC: $\Delta U = \sqrt{3} \times I \times l \times Z$

DC: $\Delta U_1 = 2l \times I \times R$

$$\Delta U_2 = \frac{\Delta U_1 \cdot 100}{V}$$

ΔU_1 = Voltage drop [V]
ΔU_2 = Voltage drop [%]
I = Ampere load [A]
R = Resistence [Ohm/m]
l = Power feed length [m]
L = System length [m]

Effective length:

l = L power feed located at the end of the system
l = L/2 power feed located at the mid-point of the system
l = L/4 power feed located at both ends of the system
l = L/6 power feed located at L/6 from each end of the system

Z = Impedance Ohm/1000 m
V = Voltage rating [V]

The total ampere load is determined from the nominal rated current of all motors working simultaneously on the same feed section of your electrification system. A diversity factor of 0.5 – 0.9 can be considered.
The conductor size and/or number of feed points should be increased or booster cables should be used in parallel in case the drop is exceeding the limitations.

POWERAIL TYPES, ENGINEERING DATA AND CAT.-NOS.

Type[1] **HS** c/w PE **SS** w/o PE		No. of Conductors	Ampere rating(per conductor) continous A	Copper cross srction mm² L1 L2 L3	⏚	N/5[3]	Control line	Max. Voltage rating V	Leakage distance mm
KBSL 4/ 40 ... HS		4	40	10	10	-	-	600	30
KBSL 4/ 40 ... SS	control line	4	40	-	-	-	10	600	30
KBSL 4/ 60 ... HS		4	60	15	15	-	-	600	30
KSBL 4/ 60 ... SS	control line	4	60	-	-	-	15	600	30
KBSL 4/100 ... HS		4	100	25	25	-	-	600	30
KBSL 4/140 ... HS		4	140	35	35	-	-	600	30
KBSL 4/200 ... HS		4	200[2]	50	50	-	-	600	30
KBSL 5/ 40 ... HS		5	40	10	10	10	-	600	30
KBSL 5/ 40 ... SS	control line	5	40	-	-	-	10	600	30
KBSL 5/ 60 ... HS		5	60	15	15	15	-	600	30
KBSL 5/ 60 ... SS	control line	5	60	-	-	-	15	600	30
KBSL 5/100 ... HS		5	100	25	25	25	-	600	30
KBSL 5/140 ... HS		5	140	35	35	25	-	600	30
KBSL 5/200 ... HS		5	200[2]	50	50	25	-	600	30
KSL 4/ 40 ... HS		4	40	10	10	-	-	600	30
KSL 4/ 40 ... SS	control line	4	40	-	-	-	10	600	30
KSL 4/ 60 ... HS		4	60	15	15	-	-	600	30
KSL 4/ 60 ... SS	control line	4	60	-	-	-	15	600	30
KSL 4/100 ... HS		4	100	25	25	-	-	600	30
KSL 4/140 ... HS		4	140	35	35	-	-	600	30
KSL 4/200 ... HS		4	200[2]	50	50	-	-	600	30
KSL 5/ 40 ... HS		5	40	10	10	10	-	600	30
KSL 5/ 40 ... SS	control line	5	40	-	-	-	10	600	30
KSL 5/ 60 ... HS		5	60	15	15	15	-	600	30
KSL 5/ 60 ... SS	control line	5	60	-	-	-	15	600	30
KSL 5/100 ... HS		5	100	25	25	25	15	600	30
KSL 5/140 ... HS		5	140	35	35	25	-	600	30
KSL 5/200 ... HS		5	200[2]	50	50	25	-	600	30
KSLT 4/ 60 ... HS		4	60	15	15	-	-	600	30
KSLT 4/ 60 ... SS	control line	4	60	-	-	-	15	600	30
KSLT 4/100 ... HS		4	100	25	25	-	-	600	30
KSLT 4/140 ... HS		4	140	35	35	-	-	600	30
KSLT 4/200 ... HS		4	200[2]	50	50	-	-	600	30
KSLT 5/ 60 ... HS		5	60	15	15	15	-	600	30
KSLT 5/ 60 ... SS	control line	5	60	-	-	-	15	600	30
KSLT 5/100 ... HS		5	100	25	25	25	-	600	30
KSLT 5/140 ... HS		5	140	35	35	25	-	600	30
KSLT 5/200 ... HS		5	200[2]	50	50	25	-	600	30

... Suffix types e.g. 2 m KSL 4/60 with PE → KSL 4/60 - 2 HS Order. - No. 250 002, shorter lengths are made up from the next larger standart lengths.

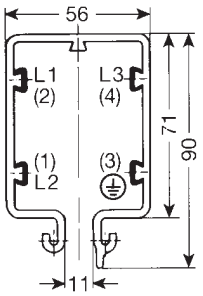
(1) KBSL is w/o stiffener clamps. KSL/KSLT and KSG are c/w stiffener clamps (see page 6).

(2) 80% intermittent. ⏚ Ground = PE

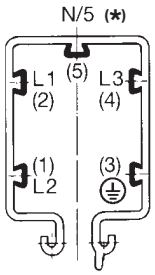
(3) Please refer to page 2 for use as N -conductor see page 2.

For mounting configurations alsö see pages 8, 10, 11,13, 14, 20, 23, 25

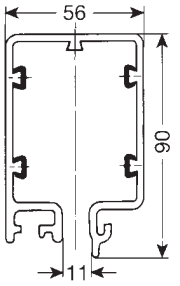
Impedance at 50 Hertz 20° C Ω / 1000 m	Resistance at 20° C Ω / 1000 m	Weight kg/m	Order-No.	Configurations
1,81	1,80	1,643	252 96•	
1,81	1,80	1,643	256 55•	
1,31	1,28	1,778	253 21•	
1,31	1,28	1,778	253 25•	
0,76	0,72	2,134	253 23•	
0,59	0,53	2,455	252 68•	
0,38	0,36	3,060	252 69•	
1,81	1,80	1,734	256 13•	
1,81	1,80	1,734	256 56•	
1,31	1,28	1,903	253 22•	
1,31	1,28	1,903	253 26•	
0,76	0,72	2,348	253 24•	
0,59	0,53	2,668	252 70•	
0,38	0,36	3,274	252 71•	
1,81	1,80	1,753	257 36•	
1,81	1,80	1,753	257 64•	
1,31	1,28	1,888	250 00•	
1,31	1,28	1,888	251 46•	
0,76	0,72	2,244	250 01•	
0,59	0,53	2,565	250 69•	
0,38	0,36	3,170	254 04•	
1,81	1,80	1,844	256 93•	
1,81	1,80	1,844	257 65•	
1,31	1,28	2,013	250 02•	
1,31	1,28	2,013	251 47•	
0,76	0,72	2,458	250 03•	
0,59	0,53	2,778	250 73•	
0,38	0,36	3,384	254 05•	
1,31	1,28	2,038	256 00•	
1,31	1,28	2,038	256 01•	
0,76	0,72	2,394	256 02•	
0,59	0,53	2,715	256 03•	
0,38	0,36	3,320	256 04•	
1,31	1,28	2,163	256 05•	
1,31	1,28	2,163	256 06•	
0,76	0,72	2,608	256 07•	
0,59	0,53	2,928	256 08•	
0,38	0,36	3,534	256 09•	



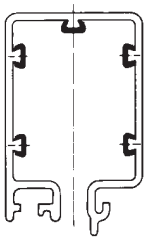
KBSL 4 pole, 40-200 A color green
KSL 4 pole, 40-200 A color green



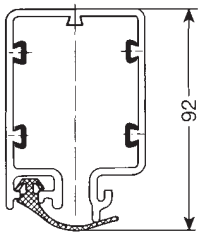
KBSL 5 pole, 40-200 A color green
KSL 5 pole, 40-200 A color green



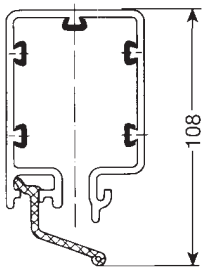
KSLT 4 pole, 60-200 A color gray



KSLT 5 pole, 60-200 A color gray



KSLT 60-200 A
with neoprene
sealing strip "D"



KSLT 60-200 A
with plastic shielding "FP"

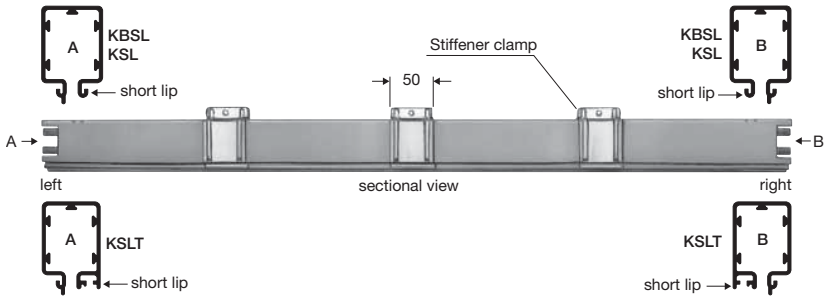
• Add last number (1, 2, 3, 4 length suffix) in accordance to bars requred.

Description in brackets for control.
(*) In case of using a conductor as N.

STANDARD SECTIONS 4 m(1)

CURVES(2)

custom built



KBSL without stiffener clamps.
KSL & KSLT with stiffener clamps.
Sections for plug-in joints and bolted joints are equal.

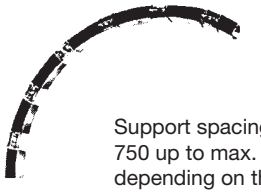
Extra finish of KBSL, KSL and KSLT, surcharge Cat.-No.:

Type	Index K stainless steel clamps & hardware		Index I (60 A) copper conductors with stainless steel cap	
	4 pole	5 pole	4 pole	5 pole
KSL	250 830		258 301	258 302
KSLT	254 755		258 303	258 304

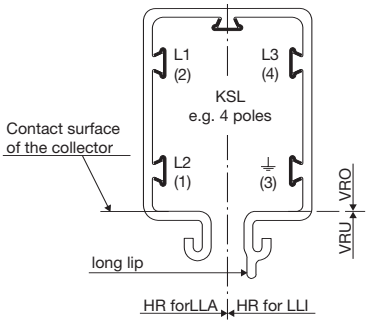
Index K:
Index I: } for special environmental conditions

Supplements for KSLT

See pages 2 & 5	Type	Weight kg/m	Order-No.
Neoprene sealing strip supply length max. 50 m	**D**	0,225	254 751
Coupling for sealing strip			258 300
Fastener for sealing strip			258 432
Mounting trolley for sealing strip			258 345
Plastic shielding including Peg	**FP**	0,260	254 752



Support spacing
750 up to max. 2000 mm,
depending on the radius
max. L = 3600 mm,
max. ⟩120°



Min. bending radius horizontal in mm
KSL

	60 A	100 A	140 A	200 A
4pole	600	600	900	900
5pole	750	750	900	900

KSLT: Minimum bending radius horizontal 1000 mm

Minimum bending radius vertical for KSL and KSLT = 1800 mm

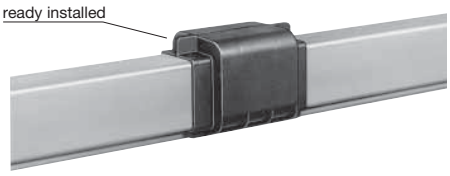
Surcharge	Order-No. KSL	KSLT
horizontal curve	251 500	257 270
vertical curve	251 490	257 260

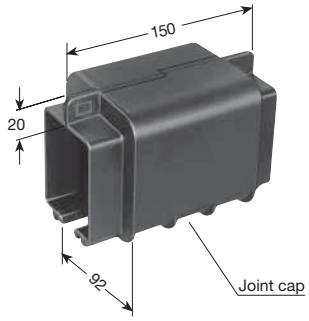
Curves with plastic shielding on request.

KBSL not to be used for curves.

(1) Shorter sections see page 4. and 5.
(2) Long lip side of Powerails should always be mounted facing the track (see page 8).
Notify exceptions for replacements and/or extensions and determine correct curves.

Plug-in joints 40-100 A





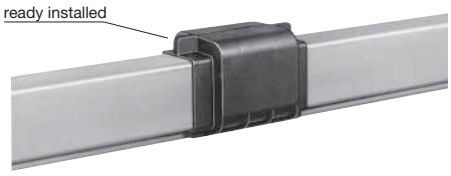
for KBSL & KSL 4 pole **for KSLT 4 pole**

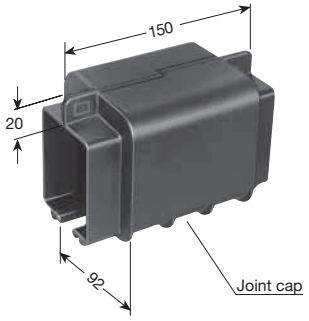
Type	Weight kg	Order-No.	Type	Weight kg	Order-No.
VBK 4	0,215	257 907	**VBKT 4**	0,205	257 913

for KBSL & KSL 5 pole **for KSLT 5 pole**

Type	Weight kg	Cat.- No.	Type	Weight kg	Order-No.
VBK 5	0,225	257 908	**VBKT 5**	0,215	257 914

Bolted joints 40-200 A





for KBSL & KSL 4 pole **for KSLT 4 pole**

Type	Weight kg	Order-No.	Type	Weight kg	Order-No.
VBS 4	0,285	258 818	**VBTS 4**	0,275	259 148

for KBSL & KSL 5 pole **for KSLT 5 pole**

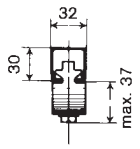
Type	Weight kg	Cat.- No.	Type	Weight kg	Order-No.
VBS 5	0,310	258 819	**VBTS 5**	0,300	259 149

(1) Identically constructed for main current and control line

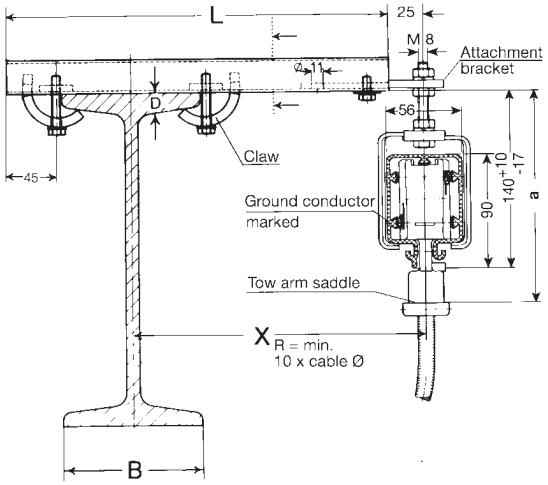
BRACKETS KBSL • KSL • KSLT

These brackets are easily bolted to any type of standard I-beam.

View without I-beam



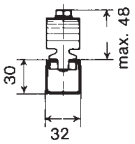
Claw suitable
for D = 6-15 mm



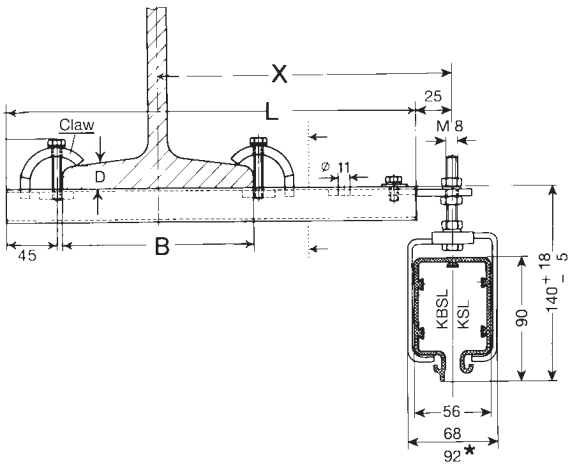
Powerail Type	KBSL – KSL – KSLT		
Collector	SKR	SKN	SKNT
Dim.a	161^{+7}_{-15}	165^{+7}_{-15}	175^{+7}_{-15}

For KBSL, KSL and KSLT dimensions "a" also for double collectors.

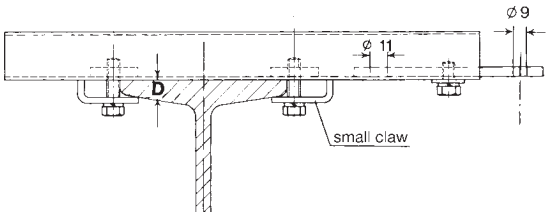
View without I-beam



Claw suitable
for D = 15-25 mm



EHK small claw version



Attention:
Make sure that hoist wheels have enough clearance. Use small claw if necessary. Check -beam dimension D.

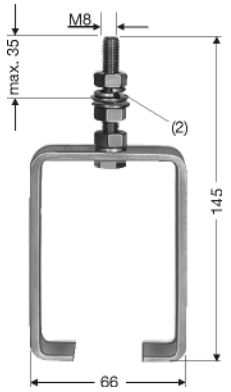
rail of EHK is identical to type S 1, Cat. 8a.

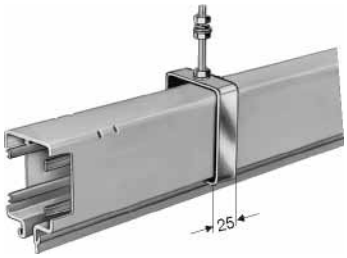
Type	X mm	L mm	B max mm	Weight kg	Order-No. for std.-brackets	Order-No. with small claw
EHK 250	250	350	170	1,070	251 600	251 720
EHK 300	300	400	170	1,150	251 610	251 730
EHK 400	400	500	170	1,300	251 620	251 740
EHK 500	500	600	170	1,450	251 630	251 750
EHK 600	600	700	170	1,600	251 640	251 760
EHK 700	700	800	170	1,750	251 650	251 770
EHK 750	750	850	170	1,820	251 660	251 780
EHK 800	800	900	170	1,900	251 670	251 790

Select next larger size bracket when I-beam dimension B is more than 170 mm.

* Max. width at joint caps with KSL & KSLT, see page 7.

SLIDING HANGERS

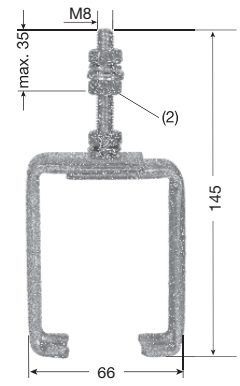


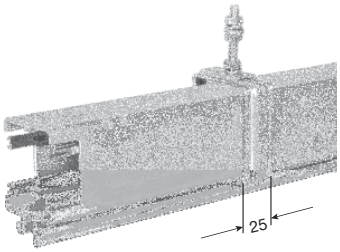


Sliding hanger
mounted to Powerail-section.

for KBSL only (one-piece bracket)

Type	Weight kg	Order-No.
KGB	0,225	259 001



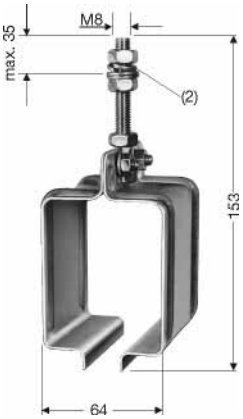


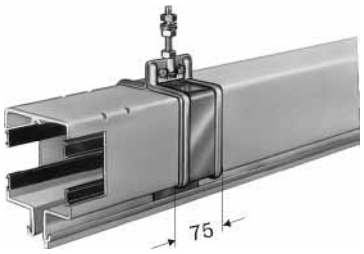
Sliding hanger
mounted to Powerail-section.

for KBSL & KSL **for KSLT**

Type	Weight kg	Order-No.	Type	Weight kg	Order-No.
KSH	0,251	252 894	**KSHT**	0,230	252 895
KSH/K(1)	0,220	250 660	**KSHT/K(1)**	0,230	254 757

FIXPOINT HANGERS





Fixpoint hanger mounted to Powerail section.
Hanger consists of steel clamp and bolt M 8.

for KBSL & KSL **for KSLT**

Type	Weight kg	Order-No.	Type	Weight kg	Order-No.
KF	0,215	258 806	**KFT**	0,210	258 810
KF/K(1)	0,215	258 807	**KFT/K(1)**	0,210	258 811

(1) stainless steel
(2) Flat washers only be used in slotted holes.

End feeds

without powerail section

Cable gland M 32,
Cable-Ø 17 - 26 mm
for cable cross section max. 10 mm²

End feed comes loose without Powerail. It will be mounted at either end.

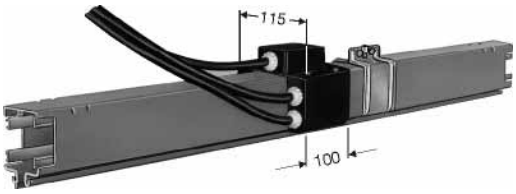
for KBSL, KSL & KSLT

Type[2]	A	Weight kg	Order-No. Power line **HS** c/w PE	Order-No. Control line **SS** w/o PE
KEK 4/40-60	40-60	0,400	258 421	258 423
KEK 5/40-60	40-60	0,420	258 422	258 424

Line feeds[1]

with 2 m cables incl. 1 m section

A	Cable-Ø mm	Cable cross section mm²
40	9,5	6
60	11,5	10
100	13,5	25
140	14,5	35



Terminal box
32 mm over Powerail

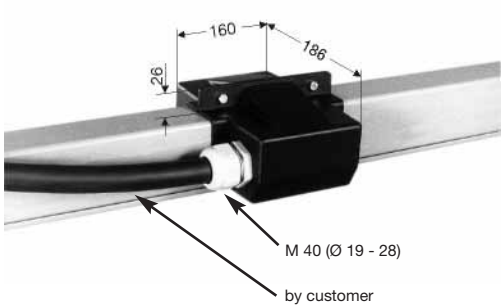
for KBSL & KSL

Type[2]	A	Weight kg	Order-No. Power line **HS** c/w PE	Order-No. Control line **SS** w/o PE
KNKL 4/ 40	40	4,000	259 209	259 205
KNKL 4/ 60	60	4,100	259 211	259 207
KNKL 4/100	100	6,300	259 213	–
KNKL 4/140	140	8,200	259 215	–
KNKL 5/ 40	40	4,400	259 221	259 217
KNKL 5/ 60	60	4,700	259 223	259 219
KNKL 5/100	100	7,400	259 225	–
KNKL 5/140	140	9,950	259 227	–

for KSLT

Type[2]	A	Weight kg	Order-No. Power line **HS** c/w PE	Order-No. Control line **SS** w/o PE
KNKLT 4/ 60	60	4,200	259 240	259 236
KNKLT 4/100	100	6,400	259 242	–
KNKLT 4/140	140	8,300	259 244	–
KNKLT 5/ 60	60	4,800	259 252	259 248
KNKLT 5/100	100	7,500	259 254	–
KNKLT 5/140	140	10,050	259 256	–

Joint feed



The joint feed KNS is without powerail.
It can only be used with KBSL and KSL 4 pole

Type[2]	A	Weight kg	Order-No. Power line **HS** c/w PE	Order-No. Control line **SS** w/o PE
KNS 4/40-60	40-60	0,560	258 001	258 002

(1) The powerail section is part of the system length (see example of ordering page 21 & 22).
(2) For full type designation add suffix of Powerail section, e.g. KEK 4/60 w/ PE → KEK 4/60 **HS** Order-No. 258 421.

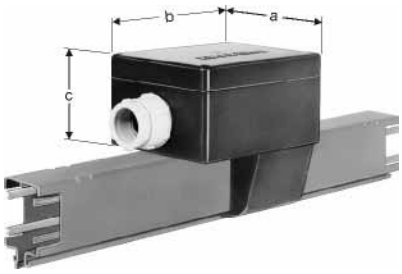
Line feed[1]

with terminal box incl. 1 m powerail section

Cable connections type HS

A	M	Cable-Ø mm	Nom.-connection-dia. mm^2	Cable connection at
40	25	9 - 18	6	M8 (Type KNK/KNKT: M6)
60	32	17 - 26	10	M8 (Type KNK/KNKT: M6)
100	50	23 - 34	25	M8
140	50	23 - 34	35	M8
200	50	29 - 40	50	M10

All SS-types with PG 25



	KNK KNKT 40-60 A	KNKS KNKST 40-140 A	KNKS KNKST 200 A
a	115	156	206
b	115	196	286
c	70	100	140

for KBSL & KSL

Type[2]	A	Weight kg	Order-No. Power line **HS** c/w PE	Order-No. Control line **SS** w/o PE
KNK 4/ 40	40	2,464	258 254	258 256
KNK 4/ 60	60	2,600	258 258	258 260
KNK 5/ 40	40	2,631	258 262	258 264
KNK 5/ 60	60	2,800	258 250	258 252
KNKS 4/ 40	40	3,314	258 266	–
KNKS 4/ 60	60	3,450	258 268	–
KNKS 4/100	100	3,800	258 270	–
KNKS 4/140	140	4,100	258 272	–
KNKS 4/200	200	5,400	258 612	–
KNKS 5/ 40	40	3,581	258 274	–
KNKS 5/ 60	60	3,750	258 276	–
KNKS 5/100	100	4,150	258 278	–
KNKS 5/140	140	4,450	258 280	–
KNKS 5/200	200	5,800	258 616	–

for KSLT

Type[2]	A	Weight kg	Order-No. Power line **HS** c/w PE	Order-No. Control line **SS** w/o PE
–	–	–	–	–
KNKT 4/ 60	60	2,700	259 161	259 163
–	–	–	–	–
KNKT 5/ 60	60	2,900	259 165	259 167
–	–	–	–	–
KNKST 4/ 60	60	3,550	259 169	–
KNKST 4/100	100	3,900	259 171	–
KNKST 4/140	140	4,200	259 173	–
KNKST 4/200	200	5,500	258 624	–
–	–	–	–	–
KNKST 5/ 60	60	3,850	259 175	–
KNKST 5/100	100	4,250	259 177	–
KNKST 5/140	140	4,550	259 179	–
KNKST 5/200	200	5,900	258 628	–

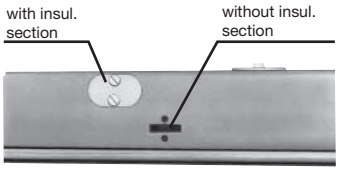
End caps

End cap assembled on Powerail

for KBSL, KSL & KSLT

Type	Weight kg	Order-No.
MEK	0,086	256 527

Conductor dead sections



It is to be indicated, which copper rails are to be separated and which type of current collector is used (see page 5).

Installation factory-assembled.

for KBSL, KSL & KSLT

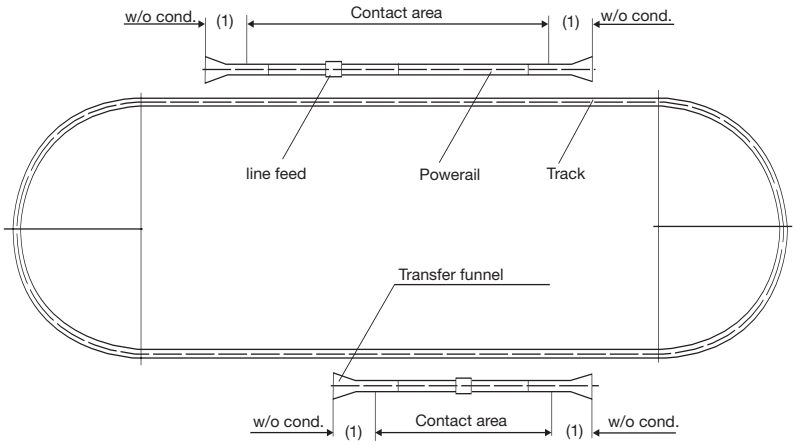
Type	with air gap 5 mm Order-No.	Type	with insul. section 30 mm Order-No.
STLA 1	251 860	**STLI 1**	250 220
STLA 2	251 870	**STLI 2**	250 590
STLA 3	251 880	**STLI 3**	250 600
STLA 4	251 890	**STLI 4**	250 610
STLA 5	251 900	**STLI 5**	250 620

[1] Above sections come factory assembled on a 1 m Powerail section (Please refer to ordering example on page 21).

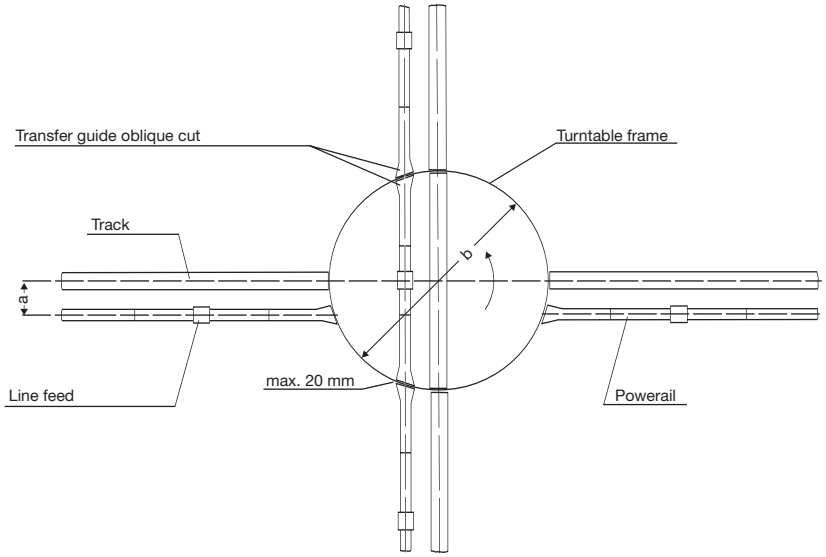
[2] Suffix types e.g.. KNK 4/60 w/ PE → KNK 4/60 **HS** Order-No. 258 258.

CONTACT SECTIONS, TURNTABLES AND SWITCHES

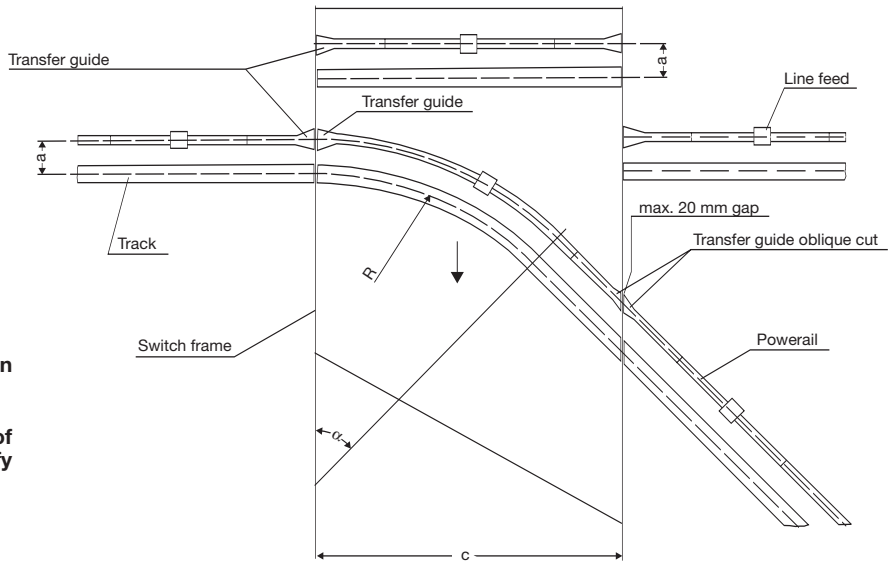
Contact section[1]



Turntable



Sliding switch



Max. 20 mm air gap between transfer guides.

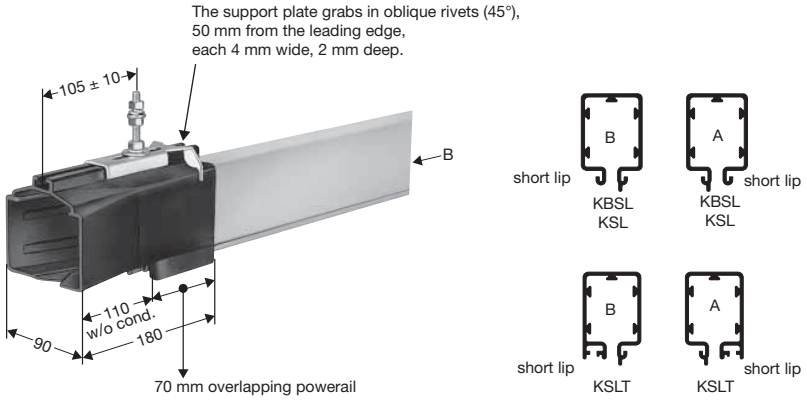
Please submit drawings of transfer applications. Specify dimensions a, b, c, R and angle α (α = max. 50°)

Please submit drawings for all transfer applications.

[1] Contact sections must not be activated before collectors are fully engaged.

Transfer guides LH straight
incl. Fixpoint hanger

Left hand version (for AUN)
incl. fixpoint hanger



4- & 5poles, 40 to 200 A

Sketch shows left hand version (page 6) with Powerail section

Staggered arrangement of the transfer guides to each other:
horizontal max. 8 mm, vertical max. 3 mm

for KBSL & KSL

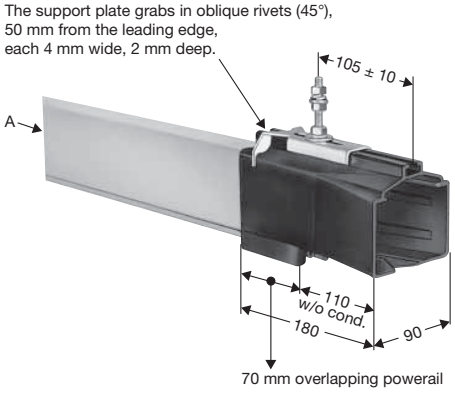
Type[1]	Weight kg	Order-No.
AUN	0,340	257 455

for KSLT

Type[1]	Weight kg	Order-No.
AUNT/L	0,340	257 456

RH
incl. Fixpoint hanger

Right hand version (for AUN)
incl. fixpoint hanger



4- & 5poles, 40 to 200 A

Sketch shows right hand version (page 6) with Powerail section

Staggered arrangement of the transfer guides to each other:
horizontal max. 8 mm, vertical max. 3 mm

for KBSL & KSL

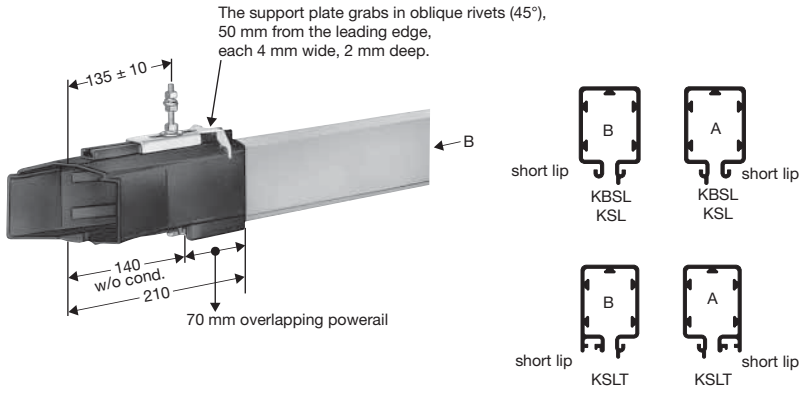
Type[1]	Weight kg	Order-No.
AUN	0,340	257 455

for KSLT

Type[1]	Weight kg	Order-No.
AUNT/R	0,340	257 457

Transfer guides LH oblique
incl. Fixpoint hanger

Left hand version (für AUN)
incl. fixpoint hanger



4- & 5poles, 40 to 200 A

Sketch shows left hand version (page 6) with Powerail section

Staggered arrangement of the transfer guides to each other:
horizontal max. 8 mm, vertical max. 3 mm

for KBSL & KSL

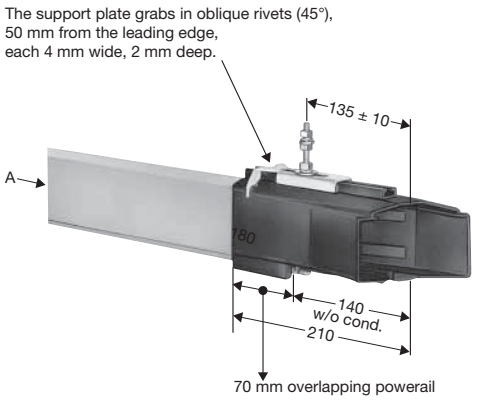
Type[1]	Weight kg	Order-No.
AUNS	0,380	257 459

for KSLT

Type[1]	Weight kg	Order-No.
AUNST/L	0,380	257 460

RH
incl. Fixpoint hanger

Right hand version (für AUN)
incl. fixpoint hanger



4- & 5poles, 40 to 200 A

Sketch shows right hand version (page 6) with Powerail section

Staggered arrangement of the transfer guides to each other:
horizontal max. 8 mm, vertical max. 3 mm

for KBSL & KSL

Type[1]	Weight kg	Order-No.
AUNS	0,380	257 459

for KSLT

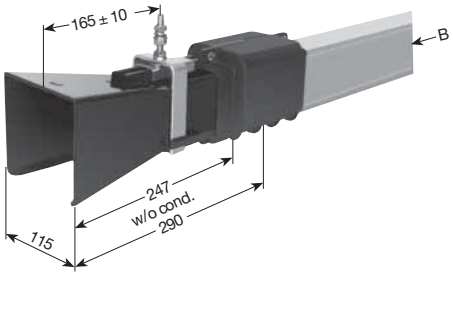
Type[1]	Weight kg	Order-No.
AUNST/R	0,380	257 461

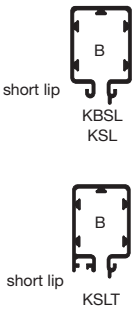
[1] With KBSL and KSL left and right execution, as well as control line are identically constructed. With KSLT HS-and SS-versions are identically constructed.
Always use double collectors or two collectors for transfer applications (see page 18 and 19).

TRANSFER FUNNELS(1)

LH

Offset:
horizontal max. 15 mm
vertical max. 10 mm





Sketch shows left hand version (page 6)

for KBSL & KSL

Type	Weight kg	Order-No. Power line **HS** c/w PE	Order-No. Control line **SS** w/o PE
ESTN 4 L	0,795	256 164	256 166
ESTN 5 L	0,800	256 172	256 174

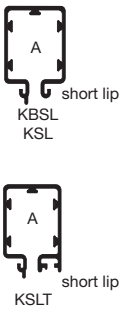
Flexible support tow arms KFML are essential (see page 20).

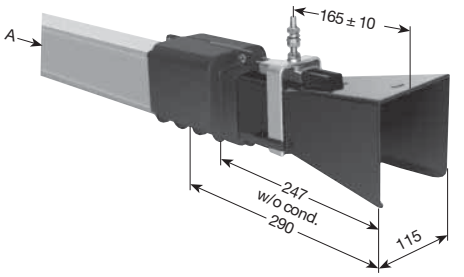
for KSLT

Type	Weight kg	Order-No. Power line **HS** c/w PE	Order-No. Control line **SS** w/o PE
ESTTN 4 L	0,825	256 168	256 170
ESTTN 5 L	0,830	256 176	256 178

Flexible support tow arms KFML are essential (see page 20).

RH





Sketch shows right hand version (page 6)

for KBSL & KSL

Type	Weight kg	Order-No. Power line **HS** c/w PE	Order-No. Control line **SS** w/o PE
ESTN 4 R	0,795	256 163	256 165
ESTN 5 R	0,800	256 171	256 173

for KSLT

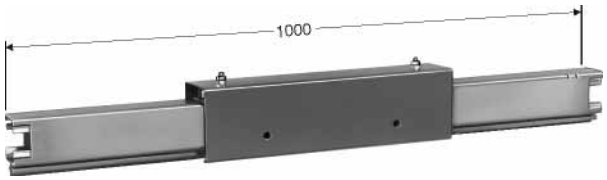
Type	Weight kg	Order-No. Power line **HS** c/w PE	Order-No. Control line **SS** w/o PE
ESTTN 4 R	0,825	256 167	256 169
ESTTN 5 R	0,830	256 175	256 177

Flexible support tow arms KFML are essential (see page 20).

(1) Funnels must not be activated before collectors are fully engaged.
Suffix types e.g. ESTN 4 L with earth - > ESTN 4 L ref.no. 256 164.

ANTI-CONDENSATION SECTIONS[1]

incl. 1 m section



This anti-condensation-section consists of 1 m Powerail with openings covered by
a protection hood. The anti-condensation section does not disconnect the powerail electrically.

Application of Anti-Condensation Section:

The anti-condensation section will be used where Powerails are passing from indoor to outdoor, preventing condensation of the outside mounted Powerail. The warm air from indoors can escape through the anti condensation section.

Feeding

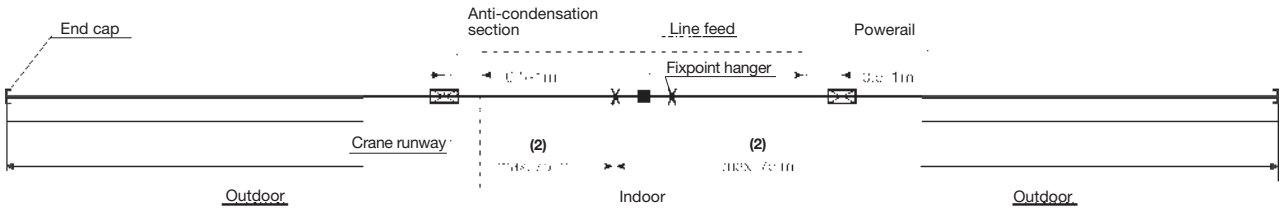
No extra feeds required as the Powerail is not interrupted.

Collectors

No extra collectors required.

Installation

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



for KBSL and KSL

Type[3]	Order-No. Power line **HS** c/w PE	Order-No. Control line **SS** w/o PE
BTK 4/ 40	257 679	257 681
BTK 4/ 60	258 652	258 725
BTK 4/100	258 653	–
BTK 4/140	258 654	–
BTK 4/200	258 655	–
BTK 5/ 40	257 680	257 682
BTK 5/ 60	258 656	258 726
BTK 5/100	258 657	–
BTK 5/140	258 658	–
BTK 5/200	258 659	–

for KSLT

Type[3]	Order-No. Power line **HS** c/w PE	Order-No. Control line **SS** w/o PE
–	–	–
BTKT 4/ 60	258 660	258 727
BTKT 4/100	258 661	–
BTKT 4/140	258 662	–
BTKT 4/200	258 663	–
–	–	–
BTKT 5/ 60	258 664	258 728
BTKT 5/100	258 665	–
BTKT 5/140	258 666	–
BTKT 5/200	258 667	–

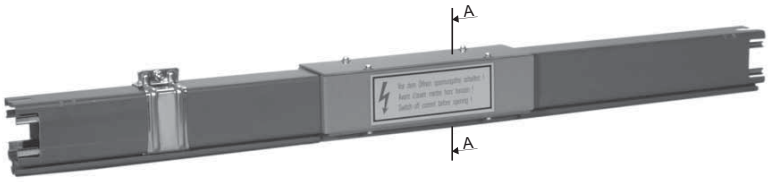
[1] Above sections come ready assembled on 1 m Powerail and are a part of the system length.

[2] For longer runs use Expansion joint section (see page 17).

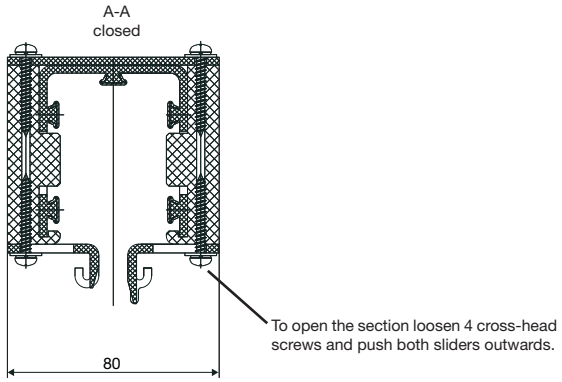
[3] Suffix types e.g. BTK 4/60 w/ PE → BTK 4 /60 **HS** Order-No. 258 652

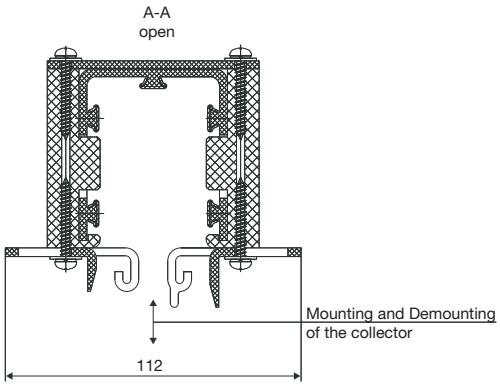
REMOVING SECTIONS[1]

incl. 1 m section



Assembly and disassembly of the collector is possible at the end of the track as well as at the removing section.
With plants with frequent maintenance procedures or several current collectors in a system (e.g. test plants)removing sections are to be planned.





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

Before opening disconnect mains.

The removing section does not disconnect the powerail electrically.

For single collectors

KBSL / KSL		KSLT	
Type[2]	Order-No. Power line **HS** c/w PE	Type[2]	Order-No. Power line **HS** c/w PE
ATK 4/ 40	257 988	**ATKT 4/ 40**	258 117
ATK 4/ 60	252 811	**ATKT 4/ 60**	252 821
ATK 4/100	252 812	**ATKT 4/100**	252 822
ATK 4/140	252 813	**ATKT 4/140**	252 823
ATK 4/200	252 814	**ATKT 4/200**	252824
ATK 5/ 40	257 990	**ATKT 5/ 40**	258 119
ATK 5/ 60	252 816	**ATKT 5/ 60**	252 826
ATK 5/100	252 817	**ATKT 5/100**	252 827
ATK 5/140	252 818	**ATKT 5/140**	252 828
ATK 5/200	252 819	**ATKT 5/200**	252 829
Type[2]	Order-No. Control line **SS** w/o PE	Type[2]	Order-No. Control line **SS** w/o PE
ATK 4/ 40	257 989	**ATKT 4/ 40**	258 118
ATK 4/ 60	252 815	**ATKT 4/ 60**	252 825
ATK 5/ 40	257 991	**ATKT 5/ 40**	258 120
ATK 5/ 60	252 820	**ATKT 5/ 60**	252 830

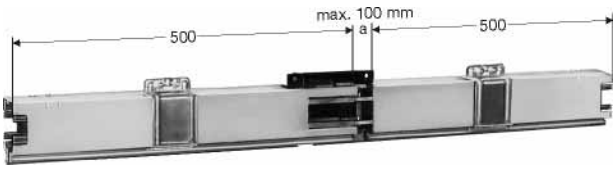
For double collectors

KBSL / KSL		KSLT	
Type[2]	Order-No. Power line **HS** mit PE	Type[2]	Order-No. Power line **HS** mit PE
ATKD 4/ 40	257 992	**ATKTD 4/ 40**	258 121
ATKD 4/ 60	252 831	**ATKTD 4/ 60**	252 841
ATKD 4/100	252 832	**ATKTD 4/100**	252 842
ATKD 4/140	252 833	**ATKTD 4/140**	252 843
ATKD 4/200	252 834	**ATKTD 4/200**	252 844
ATKD 5/ 40	257 994	**ATKTD 5/ 40**	258 123
ATKD 5/ 60	252 836	**ATKTD 5/ 60**	252 846
ATKD 5/100	252 837	**ATKTD 5/100**	252 847
ATKD 5/140	252 838	**ATKTD 5/140**	252 848
ATKD 5/200	252 839	**ATKTD 5/200**	252 849
Type[2]	Order-No. Control line **SS** w/o PE	Type[2]	Order-No. Control line **SS** w/o PE
ATKD 4/ 40	257 993	**ATKTD 4/ 40**	258 122
ATKD 4/ 60	252 835	**ATKTD 4/ 60**	252 845
ATKD 5/ 40	257 995	**ATKTD 5/ 40**	258 124
ATKD 5/ 60	252 840	**ATKTD 5/ 60**	252 850

[1] Above sections come ready assembled on 1 m Powerail and are a part
[2] Suffix types e.g. ATK 4/40 w/ PE → ATK 4 /40 **HS** Order-No. 257 988.

EXPANSION JOINT SECTIONS[1]

incl. 1 m section



KBSL / KSL		KSLT	
Type[2]	Order-No. Power line **HS** c/w PE	Type[2]	Order-No. Power line **HS** c/w PE
DVK 4/ 40	257 054	–	–
DVK 4/ 60	252 430	**DVKT 4/ 60**	254 851
DVK 4/100	252 440	**DVKT 4/100**	254 852
DVK 4/140	252 450	**DVKT 4/140**	254 853
DVK 4/200	250 249	**DVKT 4/200**	250 336
DVK 5/ 40	257 687		– –
DVK 5/ 60	252 470	**DVKT 5/ 60**	254 854
DVK 5/100	252 480	**DVKT 5/100**	254 855
DVK 5/140	252 490	**DVKT 5/140**	254 856
DVK 5/200	250 250	**DVKT 5/200**	250 337
Type[2]	Order-No. Control line **SS** w/o PE	Type[2]	Order-No. Control line **SS** w/o PE
DVK 4/ 40	257 688	–	–
DVK 4/ 60	252 460	**DVKT 4/ 60**	254 857
DVK 5/ 40	257 689		– –
DVK 5/ 60	252 500	**DVKT 5/ 60**	254 858

Expansion joint sections are required to compensate for expansion and contraction of KSL Powerail in varying termperatures without interrupting electrical power.

Sealing strip “D” and plastic shield “FP” of the KSLT are interrupted within the range of the expansion joint section.

The expansion joints are used if the Powerail length between two curves, switches or other fix points is exceeding 20 meters, or corresponding to a temperature difference (t) of

Δ t 20° C = 100 m
Δ t 30° C = 68 m
Δ t 40° C = 50 m
Δ t 60° C = 34 m
Δ t 80° C = 25 m

Adjacent sketches, Fig. 1 and Fig. 2 show this type of application. Longer runs or a higher difference in temperature require several expansion joints or the telescope section as explained on page no. 18 of this catalog. When in doubt please consult the factory.
For arrangements of the fixpoints refer to sketch 1-3.
The rest of the Powerail is mounted in sliding hangers.
.

Fig. 1

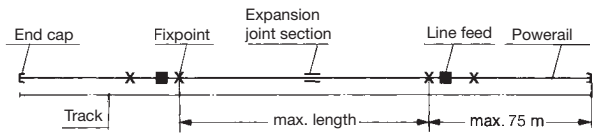
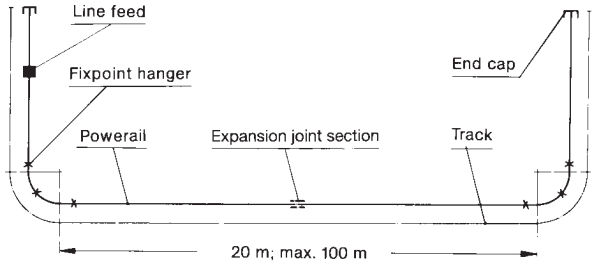


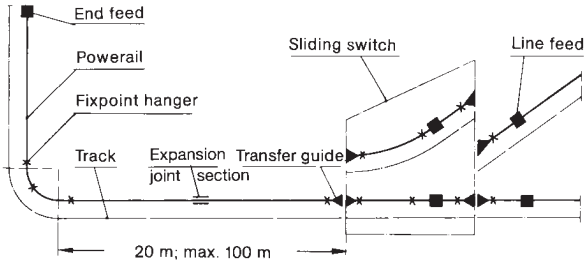
Fig. 2



Feeding

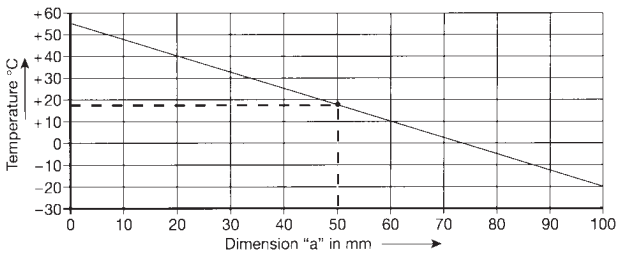
Expansion joints do not interrupt electrical power, so there is no need for an extra feeding. Expansion joints do not influence the voltage drop of a system.

Fig. 3



Current collector

No special or extra collector required.



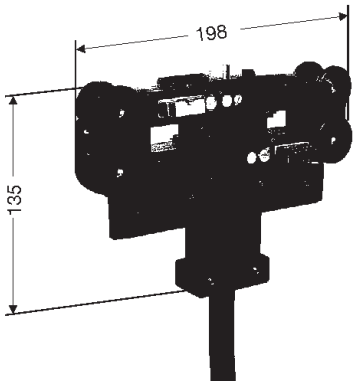
Mounting

The expansion joint section is installed on sliding hangers in the center between two fix points.
The gap dimensions «a» depends on the ambient temperature during installation. See adjacent diagram and example.

Example: Temperature18° C
«a» = 50 mm

[1] Above sections come ready assembled on 1 m Powerail and are a part of the system length.
[2] Suffix types e.g. DVK 4/60 w/ PE → DVK 4 /60 **HS** Order-No. 252 430.

SKR, 5pole



SKN, 5pole

Type[2]	A[1]	Order-No. Power line **HS** c/w PE	Type[2]	A[1]	Order-No. Control line **ST** w/o PE	Poles	Weight kg	Max.speed m/min. Normal	Max.speed m/min. Transfer	General
KBSL, KSL & KSLT w/o sealing strip «D» or shielding «FP»										
SKR 4/25-1	25	256 773	**SKR 4/25-1**	25	255 928	4	0,485	100	–	for straight runs and curves R > 0.6 m/with ball bearing wheels **Not** to be used for transfer guides and transfer funnels
SKR 5/25-1	25	257 690	**SKR 5/25-1**	25	255 931	5	0,572	100	–	
SKR 4/40-1	40	255 926	–	–	–	–	0,665	100	–	
SKR 5/40-1	40	255 929	–	–	–	–	0,795	100	–	
SKN 4/40-1	40	257 130	**SKN 4/25-1**	25	257 170	4	0,915	180	80	for straight runs and curves R > 1.2 m/with ball wearing wheels
SKN 5/40-1	40	257 140	**SKN 5/25-1**	25	257 180	5	1,045	180	80	
SKN 4/40 K-1	40	257 150	**SKN 4/25 K-1**	25	257 190	4	0,885	180	80	for curved runs R 0.6-1.2 m/with ball bearing wheels
SKN 5/40 K-1	40	257 160	**SKN 5/25 K-1**	25	257 200	5	1,035	180	80	

SKNT, 4pole

Type[2]	A[1]	Order-No. Power line **HS** c/w PE	Type[2]	A[1]	Order-No. Control line **ST** w/o PE	Poles	Weight kg	Max. speed m/min. Normal	Max. speed m/min. Transfer	General
KSLT with sealing strip «D» or shielding «FP»										
SKNT4/40-1	40	254 861	**SKNT 4/25-1**	25	254 867	4	0,935	100	60	for straight runs and curves R > 1.0 m/with ball bearing wheels
SKNT5/40-1	40	254 862	**SKNT 5/25-1**	25	254 868	5	1,090	100	60	

Trolley connecting cable 1 m long. Longer cable available. Copper cross section 2.5 mm² per core for 25 A and 4 mm² for 40 A. Longer cable available.
Collectors for higher speed and cleaning trolleys on request.

(1) All ampere data for 60%intermittent duty. For the Powerail types KBSL/KSL/KSLT with CU-Inox conductors consider half of the electrical ampere load.
(2) For full Type designation add Power or Control, suffix e.g. SKR 4/25-1 w/ PE → SKR 4/25-1 **HS** Order-No. 256 773
SKR 4/25-1 w/o PE → SKR 4/25-1 **ST** Order-No. 255 928.

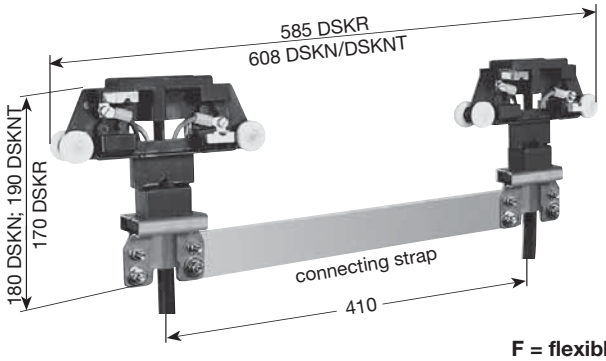


Illustration shows DSKR, 5pole, type F

F = flexible strap connection for curves(2)
S = rigid bar connection for straight runs

Type(3)	A(1)	Order-No. Power line **HS** c/w PE	Type(3)	A(1)	Order-No. Control line **ST** w/o PE	Poles	Weight kg
KBSL/KSL and KSLT							
DSKR 4/50 F-1	50	257 691	**DSKR 4/50 F-1**	50	256 485	4	1,430
DSKR 5/50 F-1	50	257 692	**DSKR 5/50 F-1**	50	256 491	5	1,600
DSKR 4/50 S-1	50	257 693	**DSKR 4/50 S-1**	50	256 371	4	1,210
DSKR 5/50 S-1	50	257 694	**DSKR 5/50 S-1**	50	256 372	5	1,384
DSKR 4/80 F-1	80	256 473	–	–	–	4	1,790
DSKR 5/80 F-1	80	256 479	–	–	–	5	2,050
DSKR 4/80 S-1	80	255 944	–	–	–	4	1,570
DSKR 5/80 S-1	80	256 370	–	–	–	5	1,830
DSKN 4/80 F-1	80	257 780	**DSKN 4/50 F-1**	50	257 880	4	2,230
DSKN 5/80 F-1	80	257 790	**DSKN 5/50 F-1**	50	257 890	5	2,550
DSKN 4/80 S-1	80	258 385	**DSKN 4/50 S-1**	50	258 386	4	1,900
DSKN 5/80 S-1	80	258 387	**DSKN 5/50 S-1**	50	258 388	5	2,200

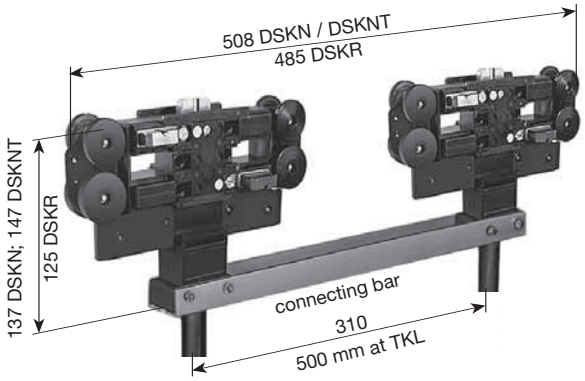


Illustration shows DSKN, 5pole, type S

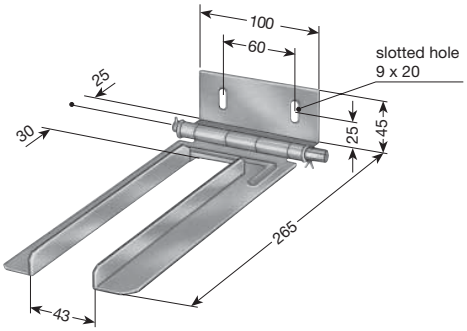
F = flexible strap connection for curves(2)
S = rigid bar connection for straight runs

Type(3)	A(1)	Order-No. Power line **HS** c/w PE	Type(3)	A(1)	Order-No. Control line **ST** w/o PE	Poles	Weight kg
KSLT with sealing strip «D» or shielding «FP»							
DSKNT 4/80 F-1	80	254 873	**DSKNT 4/50 F-1**	50	254 879	4	2,330
DSKNT 5/80 F-1	80	254 874	**DSKNT 5/50 F-1**	50	254 880	5	2,640
DSKNT 4/80 S-1	80	258 397	**DSKNT 4/50 S-1**	50	258 398	4	2,000
DSKNT 5/80 S-1	80	258 399	**DSKNT 5/50 S-1**	50	258 400	5	2,320

Double collector for 50 A with 2 connecting cables 2,5 mm² per core.
Double collector for 80 A with 2 connecting cables 4 mm² per core.
Trolley connecting cable 1 m long; longer cable available.

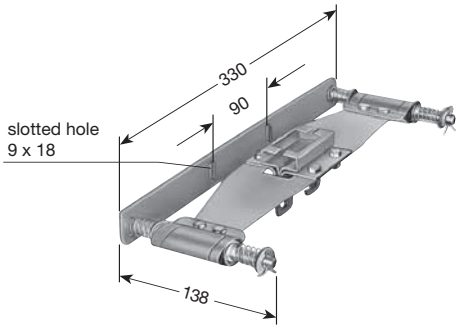
(1) All ampere data for 60%intermittent duty. For the Powerail types KBSL/KSL/KSLT with CU-Inox conductors consider half of the electrical ampere load.
(2) Do not use double collectors, but 2 singles for curves with less than 1.2 m radius and for transfer guides more than 45° oblique cut.(see page 12).
(3) For full Type designation add Power or Control, suffix e.g. DSKR 4/80 S-1 w/ PE → DSKR 4/80 S-1 **HS** Order-No. 255 944
DSKR 4/50 S-1 w/o PE → DSKR 4/50 S-1 **ST** Order-No. 256 371.

for single & double collector[2]
Mounting dimensions see page 8



Type	Weight kg	Order-No.
KWS	0,480	250 380
KWS/K[1]	0,480	252 340

flexible support type, with single collector
for transfer funnels (see page 14)
Mounting dimensions see page 25



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

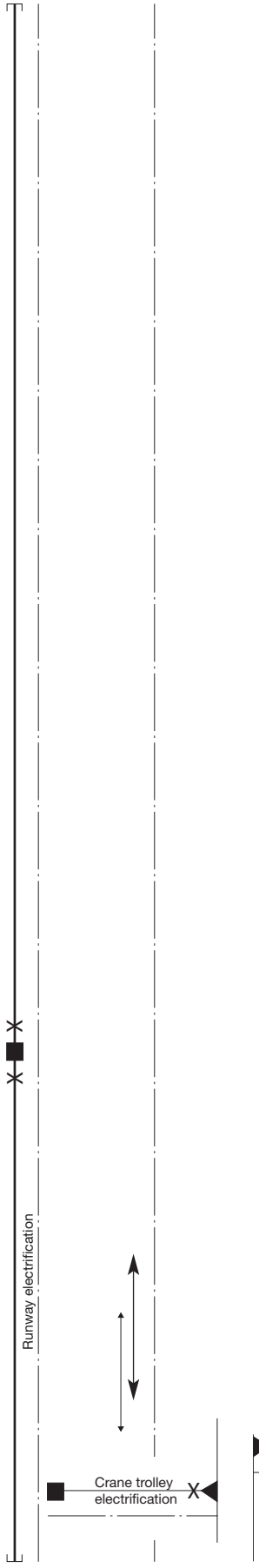
Type	Weight kg	Order-No. for all types
KFML für SKN u. SKNT	1,170	252 970

Spare parts

Powerail **Type**	**KBSL**	**KSL**	**KSLT**
	Order-No.	Order-No.	Order-No.
Joint cap, 150 mm for plug-in joint and bolted joint	257 921	257 921	257 922
Stiffener clamp, 50 mm	–	258 797	258 798
Stiffener clamp of stainless steel	–	258 812	258 813
Bolted joint splice w/hardware plug in joint, max. 100 A	259 274	259 274	259 274
Bolted joint 40 - 200 A	258 796	258 796	258 796
Coupling for sealing strip D	–	-	258 300
Fastener for sealing strip D	–	-	258 432
Peg for plastic shielding FP	–	-	280 500
Adapter for new/old style Powerail (bei alter KSL/KSLT)	258 822	258 822	258 822
Mounting trolley for sealing strip D	–	–	258 345

Collector **Type**	**KBSL, KSL und KSLT** **SKR**	**SKN(K)**	**KSLT with „D“ or „FP“ SKNT**
	Order-No.	Order-No.	Order-No.
Carbon brush phase, incl. brush holder (lateral)	257 600	254 890	254 890
Carbon brush upper fifth pole, incl. brush holder	257 600	254 891	254 891
Carbon brush ground , incl. brush holder (lateral)	257 601	254 892	254 892
Carbon pressure spring, standard (ca. 5 N)	258 758	258 757	258 757
Carbon pressure spring, reinforced (ca. 8,5 N)	258 761	258 760	258 760
Throat part, straigth runs (SKN)	–	254 893	–
Throat part, for curves (SKN/K)	–	254 894	254 898
Glider plate	–	–	258 370
Trolley wheel (below)	–	254 895	254 895
Guide roller (above)	–	254 903	254 903
Connecting strap for double collectors	258 379	258 379	258 379
Connecting bar for double colectors	258 430	258 431	258 431
Attachment clamp KWZL	–	254 897	254 897
Attachment clamp KWZ	250 310	–	–
Cleaning brushes complet set (2 pieces)	–	252 851	252 851

[1] Stainless steel
[2] In case of installing 2 Powerail systems in parallel use one towing arm each per collector unit.



Runway Electrification – 40 m

Qty.	Description	Type	Order-No.	Type	Order-No.
9	Powerail, 4 m	KBSL 4/60-4 **HS**	253 214	KSL 4/60-4 **HS**	250 004
1	Powerail, 3 m	KBSL 4/60-3 **HS**	253 213	KSL 4/60-3 **HS**	225 003
1	Line Feed, 1 m	KNKS 4/60 **HS**	258 268	KNKS 4/60 **HS**	258 268
10	Joint Kits	VBK 4	257 907	VBK 4	257 907
2	Fixpoint Hangers	KF	258 806	KF	258 806
19	Sliding Hangers	KGB	259 001	KSH	250 050
2	End Caps	MEK	256 527	MEK	256 527
1	Double Collector	DSKN 4/80 S-1 **HS**	258 385	DSKN 4/80 S-1 **HS**	258 385
1	Tow arm	K/WS	250 380	KWS	250 380

Crane Trolley Electrification – 12 m

Qty.	Description	Type	Order-No.	Type	Order-No.
2	Powerail, 4 m	KBSL 4/60-4 **HS**	253 214	KSL 4/60-4 **HS**	250 004
1	Powerail, 4 m to make up 1 x 3,890 m	KBSL 4/60-4 **HS**	253 214	KSL 4/60-4 **HS**	250 004
1	End Feed	KEK 4/40-60 **HS**	258 421	KEK 4/40-60 **HS**	258 421
1	Transfer Guide 0,110 m long	AUN	257 455	AUN	257 455
2	Joint Kitsl	VBK 4	257 907	VBK 4	257 907
1	Fixpoint Hanger	KF	258 806	KF	258 806
5	Sliding Hangers	KGB	259 001	KSH	252 844
1	Double collector	DSKN 4/80 S-1 **HS**	258 385	DSKN 4/80 S-1 **HS**	258 385
1	Tow arm	KWS	250 380	KWS	250 380

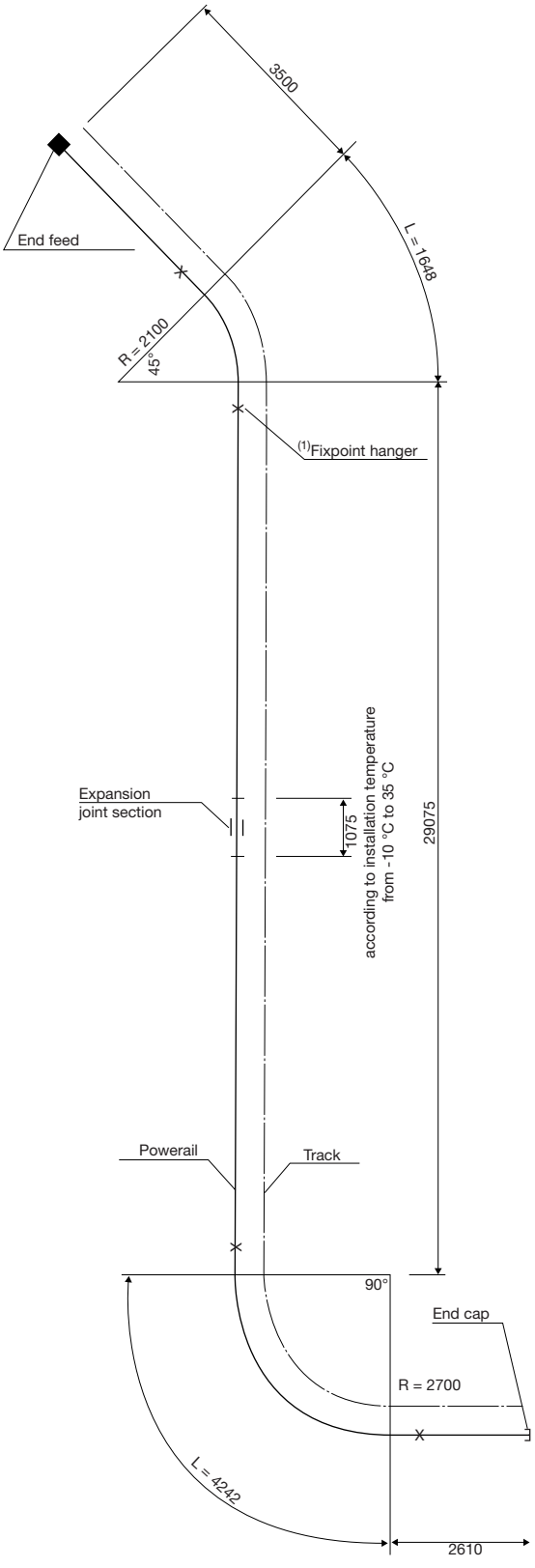
Spur Rail Electrification – 30 m

Qty.	Description	Type	Order-No.	Type	Order-No.
7	Powerail, 4 m	KBSL 4/60-4 **HS**	253 214	KSL 4/60-4 **HS**	250 004
1	Powerail, 1 m to make up 1 x 0,890 m	KBSL 4/60-1 **HS**	253 211	KSL 4/60-1 **HS**	250 001
1	Line Feed, 1 m incl. 1 m Powerail	KNK 4/60 **HS**	258 258	KNK 4/60 **HS**	258 258
1	Transfer Guide 0,110 m lang	AUN	257 455	AUN	257 455
8	Joint Kits	VBK 4	257 907	VBK 4	257 907
1	Fixpoint Hanger	KF	258 806	KF	258 806
14	Sliding Hangers	KGB	259 001	KSH	252 894
1	End Cap	MEK	256 527	MEK	256 527

X = Fixpoint suspension; rest sliding hangers.
Sealing strip or plastic shielding for KSLT is to be ordered separatly.

EXAMPLES FOR ORDERING

Hoist Electrification in curves, per customer's drawing



(1) Rest of powerail
to be installed with sliding hangers

47,5 m powerail KBSL 4/60 consisting of:

Qty.	Description	Type	Order-No.
8	Powerail, 4 m	KBSL 4/60-4 **HS**	253 214
1	Powerail, 4 m to make up 1 x 3500 mm	KBSL 4/60-4 **HS**	253 214
2	Powerail. 3 m to make up 1 x 2610 mm and 1 x 2500 mm	KBSL 4/60-3 **HS**	253 213
1	Powerail, 2 m for horizontal curve 45°, R = 2100 mm, L = 1648 mm, LLA with 100 mm straight powerail left and right	KSL 4/60-2 **HS**	250 002
2	Powerail. 3 m for horizontal curve 2 x 45°, R = 2700 mm, L = 2121 mm, LLI	KSL 4/60-3 **HS**	250 003
3	Surcharge for bending, horizontal		251 500
1	End Feed	KEK 4/40-60 **HS**	258 421
1	Expansion Joint	DVK 4/60 **HS**	252 430
14	Joint Kits	VBK 4	257 907
4	Fixpoint Hangers	KF	258 806
24	Sliding Hangers	KGB	259 001
1	End Cap	MEK	256 527
1	Collector	SKR 4/40-1 **HS**	255 926
1	Tow arm	KWS	250 380

47,5 m Powerail KSL 5/60 consisting of:

Qty.	Description	Type	Order-No.
8	Powerail, 4 m	KSL 5/60-4 **HS**	250 024
1	Powerail, 4 m to make up 1 x 3500 mm	KSL 5/60-4 **HS**	250 024
2	Powerail. 3 m to make up 1 x 2610 mm and. 1 x 2500 mm	KSL 5/60-3 **HS**	250 023
1	Powerail, 2 m for horizontal curve 45°, R = 2100 mm, L = 1648 mm, LLA with 100 mm straight Powerail left and right	KSL 5/60-2 **HS**	250 022
2	Power.. 3 m to make up horizontal curve 2 x 45°, R = 2700 mm, L = 2121 mm, LLI	KSL 5/60-3 **HS**	250 023
3	Surcharge for bending, horizontal		251 500
1	End Feed	KEK 5/40-60 **HS**	258 422
1	Expansion Joint	DVK 5/60 **HS**	252 470
14	Joint Kits	VBK 5	257 908
4	Fixpoint Hangers	KF	258 806
24	Sliding Hangers	KSH	252 894
1	End Cap	MEK	256 527
1	Collector	SKN 5/40-1 **HS**	257 140
1	Tow arm	KWS	250 380

Power supply with support rail for moving machinery

like drilling machines, grinders, screw drivers etc. along assembly lines or above work benches in any type of plant.

No power cables on the floor to cause accidents and no obstruction to personnel by trailing cables.

Containers or baskets carrying bolts and nuts or other hardware for the assembling work can also be supported from and pushed along the carrier rail.

General

The KTW-System consists of a galvanized C-track taking the carrier trolleys or other hook-up elements and the Enclosed Powerail for power supply.
The support carrier is supplied with an attachment plate. Electrical plugs, fuses etc. can be fixed to the plate as per customers` requirements.The carrier is mecanically connected to the collector by a hinge and moved manually. C-track and Powerail are fixed to a support angle.

Powerail

Types KBSL or KSLT (40-200A) are used as power supply with appropriate collector (max. 40 A).

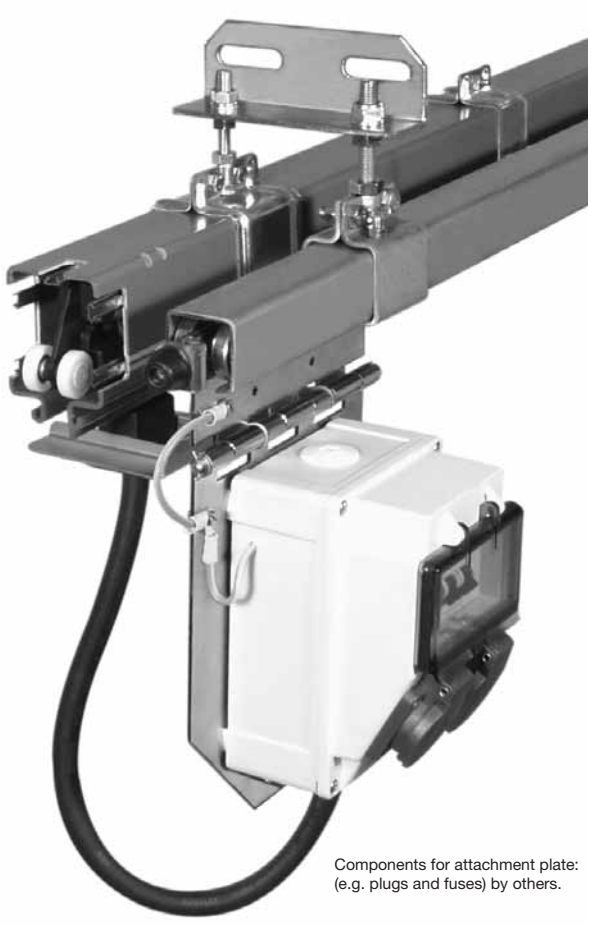
Support rail

corresponds to C-track, cat. 8a, page 2, galvanized.

Support distance

depends on mecanical stress. The max. support distance is 2 m considering a load capacity of 50 kg between hangers. For higher loads the support distance must be reduced correspondingly.

Other combinations are possible, refer to cat. 3a (LSV) or 4b (VKL).



Components for attachment plate:
(e.g. plugs and fuses) by others.

Engineering Data:

Powerail KBSL–KSLT

40 A	(100% DF) copper conductor 10 mm²
60 A	(100% DF) copper conductor 15 mm²
100 A	(100% DF) copper conductor 25 mm²
140 A	(100% DF) copper conductor 35 mm²
200 A	(80% DF) copper conductor 50 mm²

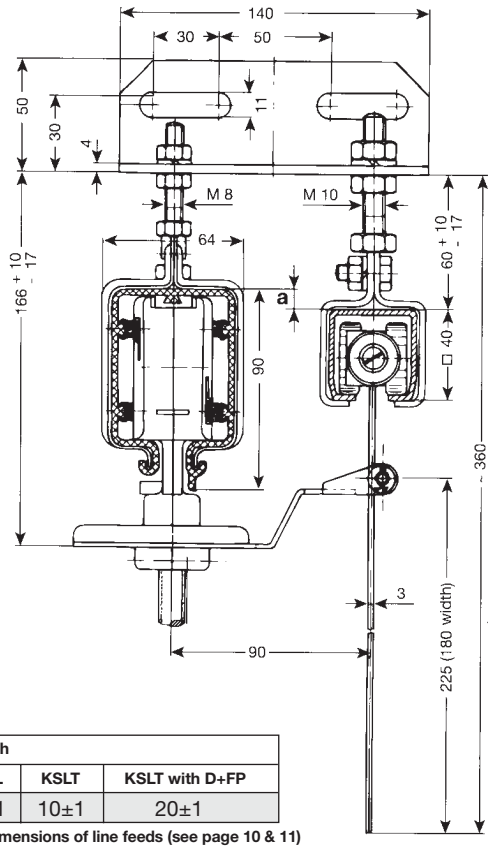
Voltage rating:	up to 600 V
No. of conductors:	4 & 5
Std. sections:	4 m
Support distance:	variable up to 2 m
Temperature resistance:	–30° C/+60° C
Collector rating:	40 A & multiple (60% DF)
Weight:	1.65 up to 3.35 kgs/m (see page 4)

C-track ⊓ S 2

Section modulus Wx:	3.1 cm³
Moment of inertia:	6.7 cm⁴
Material:	Galvanized steel
Std. sections:	4 m
Support distance:	variable up to 2 m
Weight:	2.5 kgs/m

Carrrier Trolley

Carrying capacity:	up to 50 kgs
Weight:	approx. 1.5 kgs



KTW-Systems with			
	KBSL	KSLT	KSLT with D+FP
Dim a	10±1	10±1	20±1

Please consider dimensions of line feeds (see page 10 & 11)

KTW-SYSTEM WITH KBSL OR KSLT

Bill of Material

Ampere capacity A	KTW Systems with Powerail - HS c/w PE											
	KBSL 4			KBSL 5			KSLT 4			KSLT 5		
	Type[2]	Weight kg/m	Order-No.	Type[2]	Weight kg/m	Order-No.	Type[2]	Weight kg/m	Order-No.	Type[2]	Weight kg/m	Order-No.
	KTW-Systems						**KTWT-Systems**					
40	**KTW 4/ 40**	4,926	270 607	**KTW 5/ 40**	5,050	270 608	–	–	–	–	–	–
60	**KTW 4/ 60**	4,960	270 000	**KTW 5/ 60**	5,090	270 020	**KTWT 4/ 60**	4,990	270 300	**KTWT 5/ 60**	5,120	270 304
100	**KTW 4/100**	5,350	270 010	**KTW 5/100**	5,580	270 030	**KTWT 4/100**	5,380	270 301	**KTWT 5/100**	5,610	270 305
140	**KTW 4/140**	5,640	270 040	**KTW 5/140**	5,860	270 280	**KTWT 4/140**	5,670	270 302	**KTWT 5/140**	5,890	270 306
200	**KTW 4/200**	6,240	270 050	**KTW 5/200**	6,460	270 070	**KTWT 4/200**	6,270	270 303	**KTWT 5/200**	6,490	270 307
	End feed						**End feed**					
40-60	**KEK4/40-60**	0,400	258 421	**KEK5/40-60**	0,400	258 422	**KEK 4/40-60**	0,400	258 421	**KEK 5/40-60**	0,400	258 422
	Line Feeds[1]						**Line Feeds[1]**					
40	**KNK 4/ 40**	2,464	258 255	**KNK 5/ 40**	2,631	258 263	–	–	–	–	–	–
60	**KNK 4/ 60**	2,600	258 259	**KNK 5/ 60**	2,800	258 251	**KNKT 4/ 60**	2,700	259 162	**KNKT 5/ 60**	2,900	259 166
100	**KNKS4/100**	3,800	258 271	**KNKS 5/100**	4,150	258 279	**KNKST4/100**	3,900	259 172	**KNKST5/100**	4,250	259 178
140	**KNKS4/140**	4,100	258 273	**KNKS 5/140**	4,450	259 130	**KNKST4/140**	4,200	259 174	**KNKST5/140**	4,550	259 180
200	**KNKS4/200**	5,400	254 080	**KNKS 5/200**	5,800	254 090	**KNKST4/200**	5,500	254 787	**KNKST5/200**	5,900	254 791
	Collector SKR with carrier trolley & tow arm						**For Powerail with neoprene sealing strip or plastic shielding: Collector SKNT with carrier trolley & tow arm.**					
40	**STW 4/40**	2,380	270 080	**STW 5/40**	2,480	270 100	**STWT 4/40**	2,520	270 614	**STWT 5/40**	2,680	270 615
40	**STWL 4/40**	2,480	270 610	**STWL 5/40**	2,540	270 611	**STWTL 4/40**	2,620	270 616	**STWTL 5/40**	2,780	270 617

STW and STWL can be used for KSLT without sealing strip and shielding.
Both types specially suitable for systems with side pull.

Supplement for KSLT Powerail

see pages 2, 5, 6	Type	Weight kg/m	Order-No.
Neprene sealing strip	D	0,225	254 751
Plastic shielding	FP	0,260	254 752

Spare Parts List

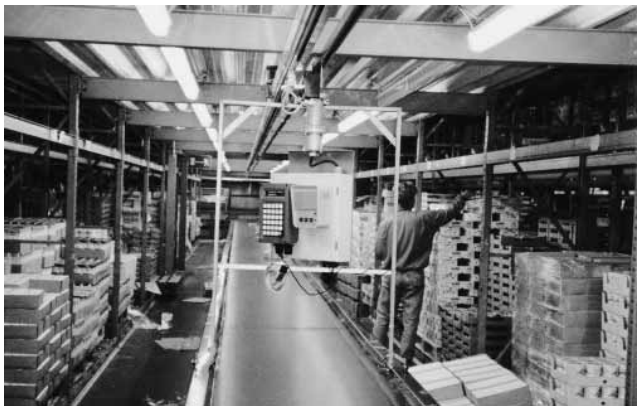
Description	Type	Weight kg/m	Order-No.	Description	Type	Weight kg/m	Order-No.
C-track	**S 2**	2,490	316 634	Fixpoint for C-track (2 pieces)	**FBS 2**	0,380	315 150
Joint	**VS 2**	0,680	315 050	Sliding Hanger for C-track	**ABS 2**	0,370	315 140
End cap for track	**K 40**	0,009	316 449	Carrier trolley w/attachment plate (short)	**TW**	1,700	270 190
Bumper	**PS 2**	0,150	317 000	Carrier trolley w/attachment plate (long)	**TWL**	1,800	270 609
Mounting bracket	**TK**	0,350	270 130	Tow arm for STW/STWTL	**TMN**	0,180	270 313

Spare parts list for Powerail KBSL and KSLT see page 20.
TWL specially suited for systems with side pull.

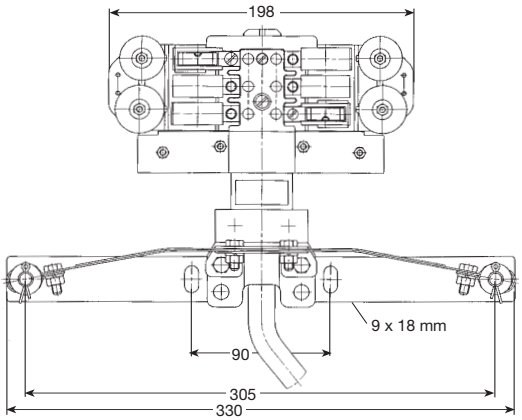
Example for Ordering

	Type	Order-No.
100 m KTW-System 4pole	**KTW 4/100 HS**	270 010
1 Line Feed 4pole	**KNKS 4/100 HS**	258 271
20 Collectors c/w carrier trolleys	**STW 4/ 40 HS**	270 080

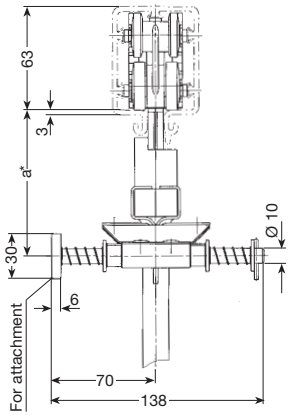

KTW-System in production line


KTW-System for storage/retrieval installations

(1) The Powerail section for the line feed ist part of the system lenght.
(2) For full type designation add suffix of powerail section see example for ording.



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



Flexible tow arm KFML with collector SKN

for Collector	SKN	SKNT
Dim. a(1)	95	105

Powerail for the current supply of a hangar crane.

(1) Adjust standard gauge during installation.

QUESTIONNAIRE

Company: _____ Date: _____

_____ _____

Tel: _____ Fax: _____

E-Mail: _____ Internet: (URL) _____

1. Number of powerail installations: _____
2. Type of equipment to be powered: _____
3. Operating voltage: _____ Volts, Phases: _____, Frequency: _____ Hz
   Three phase voltage: ☐ AC voltage: ☐ DC voltage: ☐
4. Track length: _____
5. Number of powerails: _____ (neutral: _____ control rails: _____ ground rail: _____)
6. Mounted position of powerail:

   ☐ Powerail pendant, collector cable facing to the bottom
   ☐ Support distance _____ m (max. 2 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. Position and number of feeding points and isolating sections[1]: _____
12. Position and number of isolating sections (e.g. for maintenance): _____
13. Brackets required: yes ☐ no ☐ c/c distance beam /Powerail
14. How are the rails laid out? (Please provide sketch): _____
15. Travel speed: _____
16. Power consumption of the individual consumer loads: _____
    (Please consult table on reverse side)
17. Max. Voltage drop from the powerail feed point to the consumer considering starting current:
    3% ☐ or _____ % ☐ referring to nominal voltage

Remarks: _____

_____

[1] For curved tracks, powerail with isolating sections etc., we require sketches to enable us to prepare a quotation. pto!

Please copy and fill in the questionnaire.

Paul Vahle GmbH & Co. KG
D 59172 Kamen
Fax: 0 23 07 / 70 44 44
E-Mail: info@vahle.de
Internet: www.vahle.de

Date:

Motor data	Crane 1							Crane 2						
	Power kW	Nominal current A	Nominal current cos φ_N	Nominal current % ED	Starting current A	Starting current cos φ_A	Type of Motos[1]	Power KW	Nominal current A	Nominal current cos φ_N	Nominal current % ED	Starting current A	Starting current cos φ_A	Type of Motos[1]
Hoist motors														
Auxiliary hoist														
Long travel														
Cross travel														

Motor data	Crane 3							Crane 4						
	Power kW	Nominal current A	Nominal current cos φ_N	Nominal current % ED	Starting current A	Starting current cos φ_A	Type of Motos [1]	Power KW	Nominal current A	Nominal current cos φ_N	Nominal current % ED	Starting current A	Starting current cos φ_A	Type of Motos[1]
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.

[1]Use:
K for squirrel cage motor
S for slipring motor
F for frequency controlled motor

Further remarks: _____

_____

_____

_____

Signature: _____

Catalog Nr. 4a/E 2008

MANAGEMENTSYSTEM

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OHSAS 18001 (Reg. no. 003140 QM OH)

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ELECTRIFICATION SYSTEMS

PAUL VAHLE GMBH & CO. KG • Westicker Str. 52 • D 59174 KAMEN/GERMANY • TEL. (+49) 23 07/70 40
Internet: www.vahle.de • E-Mail: info@vahle.de • FAX (+49) 23 07/70 44 44