

POWERAIL ENCLOSED CONDUCTOR SYSTEMS

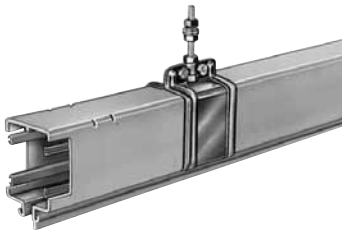
KBSL • KSL • KSLT • KSG



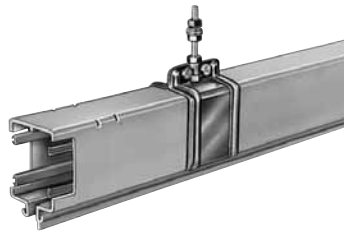
POWERRAILS KBSL – KSL – KSLT – KSG

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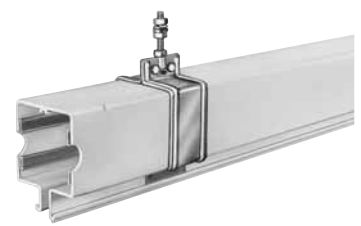
Powerail versions (drawings see page 5).



Type KBSL⁽¹⁾
color: green



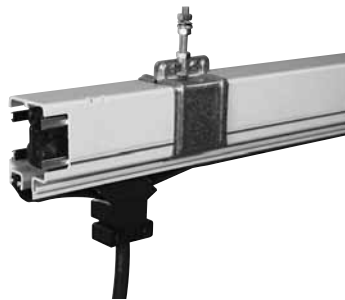
Type KSL
color: green



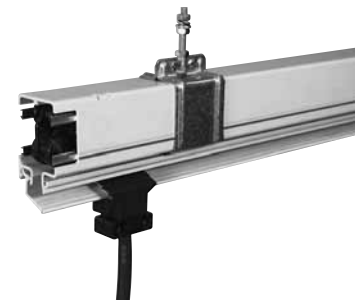
Type KSG
color: gray



Type KSLT
color: gray



Type KSLT
with sealing strip „D“



Type KSLT
with plastic shielding „FP“

General

The Powerail types KBSL, KSL, KSLT and KSG 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, Hangar Door Motors, Studio & Station Lighting Systems and many other applications.

These Powerails 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 plastic shielding «FP».

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 tensions above 25 V three-phase current and 60 V alternate current.

2 ⁽¹⁾ KBSL is w/o stiffener clamps.

KSL/KSLT and KSG will be equipped with stiffener clamps.

BASIC DESCRIPTION OF POWERAILS AND COMPONENTS



Approvals

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

Housing

Plastic with 4 or 5 copper conductors.
For indoor applications: KBSL and KSL in color green.
For indoor- and outdoor applications: KSLT and KSG in color gray.
Supply lengths 1 m, 2 m, 3 m, 4 m.
KBSL will be supplied without stiffener clamps; KSL, KSLT and KSG with preassembled stiffener clamps.
Short lengths 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.

Bolted joints or spring loaded joints are available for KBSL, KSL and KSLT 40 - 100 A.
For 140 and 200 A versions bolted joints are always required. The Powerail sections for spring-loaded and bolted joints are constructed in the same way.

Couplings

KBSL, KSL and KSLT are connected by plastic joint covers, KSG by galvanized joint plates.

Main power supply

The Powerail systems can be fed either by a line feed or an end feed.

End caps

The open ends of Powerail are closed by end caps.

Hangers

Standard brackets for Powerail attachment to crane girders are available (see page 8). Each 4 m Powerail section should have 2 support points. Maximum support spacing 2000 mm. Use sliding hangers, allowing expansion and contraction. Rigid hangers for anchor points in the center of each run or in curves.

Expansion during temperature fluctuation

Expansion can be compensated for all Powerails either by expansion sections (without electrical separation) or telescope sections (with 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. Alternatively telescope sections are available.

Contact sections, turntables and switches

Powerail for working areas and transfer applications see page 13.

Sectionalizing

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 aggressive conditions and low voltage applications we would appreciate receiving detailed information, especially of the environmental conditions. For quotations and order processing including Powerail systems with curves, dead sections, turntables, switches etc. we require your drawings or sketches. Please use our questionnaire, page 29/30.

All steel parts and hardware of Powerails can be supplied in stainless steel version.
Use KSL 200 A for several smaller capacity consumers and KSG 200 A for one heavy duty unit.

Technical Data of Powerail KBSL · KSL · KSLT · KSG					
Electrical properties:			Mechanical properties:		
Dielectric strength	DIN 53481	30–40 KV/mm	Flexible strength	75N/mm ² ± 10 %	
Specific resistance	DIN 53482	5 x 10 ¹⁵ Ohm/cm	Tensile strength	40 N/mm ² ± 10 %	
Surface resistance	DIN 53482	10 ¹³ Ohm	Temperature range (ambient):		
Leakage resistance	IEC 112/VDE 0303	CTI 600–2.7	– 30 °C up to + 60 °C		
Flame test proof:			Resistance to chemicals:	Gasoline	Sulphuric acid 50 %
no flaming particles,	DIN 41 02 –	Class B 1	at + 45 °C	Mineral Oil	Caustic soda 25 % & 50 %
self extinguishing	Part 1			Grease	Hydro-chloric acid, concentrated

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

Formulas:

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

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

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

ΔU_1 = Voltage drop [V]

ΔU_2 = Voltage drop [%]

I = Ampere load [A]

R = Resistance [Ohm/1000 m]

ℓ = Power feed length [m]

L = System length [m]

Effective length:

$\ell = L$ power feed located at the end of the system

$\ell = L/2$ power feed located at the mid-point of the system

$\ell = L/4$ power feed located at both ends of the system

$\ell = L/6$ 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.




POWERRAIL TYPES, ENGINEERING DATA AND CAT.-NOS.

KBSL
KSL
KSLT

Type ⁽¹⁾	HS c/w PE SS w/o PE	No. of Conductors	Ampere rating (per conductor) continuous A	Copper cross section mm ²			Max. Voltage rating V	Leakage distance mm	
				L1, L2, L3		N/5 ⁽³⁾			Control line
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
KBSL 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
KSG 4/120 ... HS		4	120	30	30	-	-	600	30
KSG 4/200 ... HS		4	200 ⁽²⁾	50	50	-	-	600	30
KSG 5/120 ... HS		5	120	30	30	30	-	600	30
KSG 5/200 ... HS		5	200 ⁽²⁾	50	50	50	-	600	30

KSG

4 For full Type designation add length suffix of Powerail Section, e.g. KSL 4/60 – 4 HS for Cat.-No. 250 004.
Other sections to coincide with your runway requirements are made up from the next larger standard length.
⁽¹⁾ KBSL is w/o stiffener clamps. KSL/KSLT and KSG are c/w stiffener clamps (see page 6).
For mounting configurations also see pages 8, 10, 11, 26, 28 ⁽²⁾ 80% intermittent.  Ground = PE

Impedance at 50 Hertz 20° C $\Omega / 1000 \text{ m}$	Resistance at 20° C $\Omega / 1000 \text{ m}$	Weight kg/m	Cat.-No.	Configurations	
1.81	1.80	1.643	252 96•	 KBSL 4pole, 40-200 A color green KSL 4pole, 40-200 A color green KBSL 5pole, 40-200 A color green KSL 5pole, 40-200 A color green	
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•	 KSLT 4pole, 60-200 A color gray KSLT 5pole, 60-200 A color gray	
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•	 KSLT 60-200 A with neoprene sealing strip "D" KSLT 60-200 A with plastic shielding "FP"	
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•		
0.65	0.59	4.300	260 00•		 KSG 4pole, 120 and 200 A color gray KSG 5pole, 120 and 200 A color gray Description in brackets for control use.
0.45	0.36	5.005	260 01•		
0.65	0.59	4.560	260 02•		
0.45	0.36	5.270	260 03•		

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

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

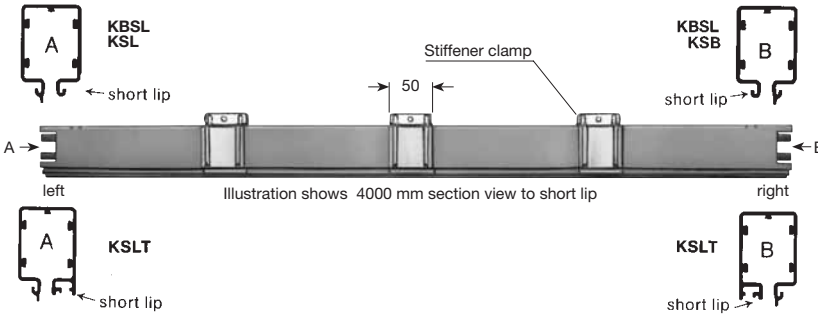


STANDARD SECTIONS 4 m⁽¹⁾

CURVES⁽²⁾

custom built

KBSL
KSL
KSLT



KBSL without stiffener clamps.

KSL & KSLT with stiffener clamps.

Sections for plug-in joints and bolted joints are equal.

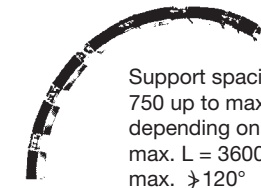
Extra finish of KBSL, KSL and KSLT, surcharge Cat.-No.:

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

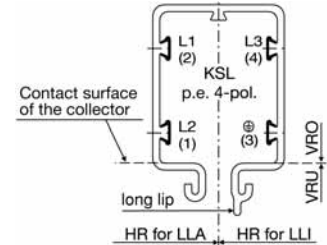
Index K: } for special environmental conditions
Index I: }

Supplements for KSLT

See pages 2 & 5	Type	Weight kg/m	Cat.-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. \curvearrowright 120°



Min. bending radius horizontal in mm

KSL

	60 A	100 A	140 A	200 A
4pole	500	500	900	900
5pole	750	750	900	900

KSLT: Minimum bending radius horizontal
1000 mm

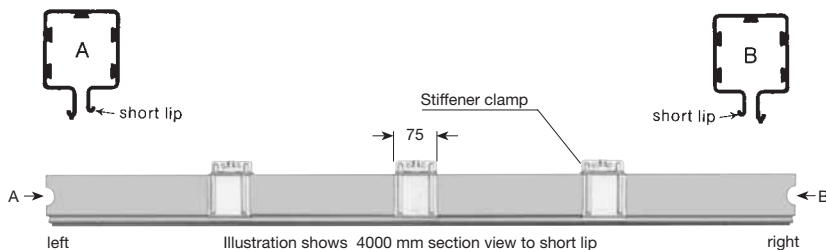
Minimum bending radius vertical for KSL
and KSLT = 1800 mm

Surcharge	Cat.-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.

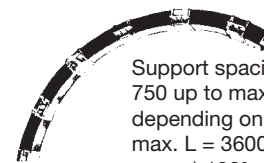
KSG



All section are supplied complete with stiffener clamps.

Stiffener clamps and hardware of stainless steel
are available: Index K - Surcharge

Cat.-No. 260 980



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

Min. bending radius horizontal in mm

	120 A	200 A
4pole	1000	1000
5pole	1500	1500

Minimum bending radius vertical for all
types = 3500 mm

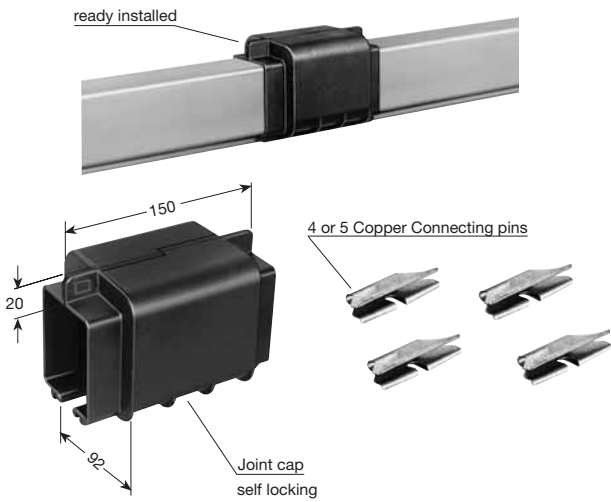
Surcharge	Cat.-No.
horizontal curve	261 290
vertical curve	261 280

⁽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.



with Plug-in joints 40-100 A



for KBSL & KSL 4 pole

for KSLT 4 pole

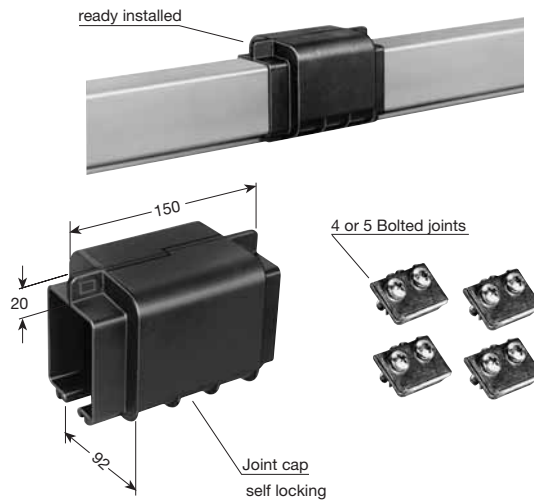
Type	Weight kg	Cat.-No.	Type	Weight kg	Cat.-No.
VBK 4	0.215	257 907	VBKT 4	0.205	257 913

for KBSL & KSL 5 pole

for KSLT 5 pole

Type	Weight kg	Cat.-No.	Type	Weight kg	Cat.-No.
VBK 5	0.225	257 908	VBKT 5	0.215	257 914

with Bolted joints 140 and 200 A



for KBSL & KSL 4 pole

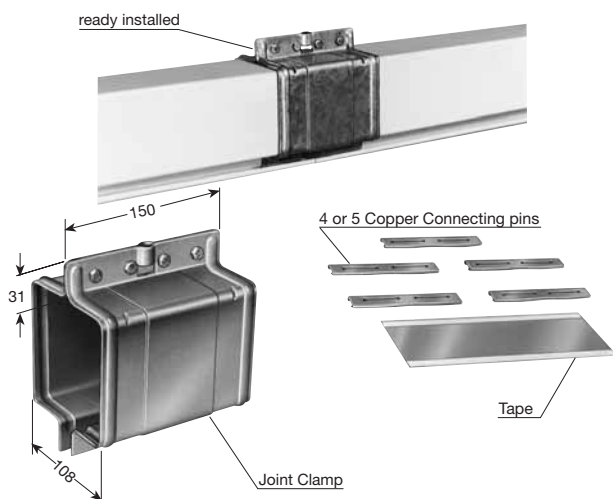
for KSLT 4 pole

Type	Weight kg	Cat.-No.	Type	Weight kg	Cat.-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	Cat.-No.
VBS 5	0.310	258 819	VBTS 5	0.300	259 149



with Plug-in joints 120-200 A

4 pole

Type	Weight kg	Cat.-No.	Type ⁽²⁾	Weight kg	Cat.-No.
VBG 4	0.890	261 701	VBG/K 4	0.890	261 703

5 pole

Type	Weight kg	Cat.-No.	Type ⁽²⁾	Weight kg	Cat.-No.
VBG 5	0.910	261 702	VBG/K 5	0.910	261 704

⁽¹⁾ equal for power and control lines

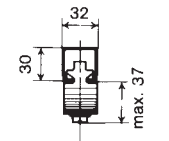
⁽²⁾ stainless steel version



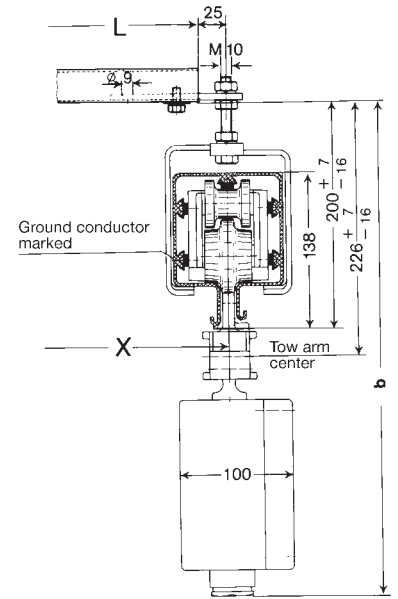
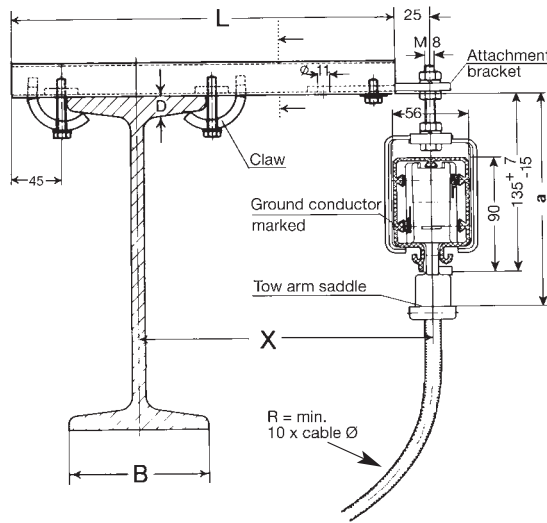
BRACKETS KBSL • KSL • KSLT • KSG

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

View without I-beam



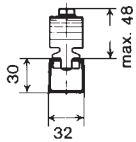
Claw suitable for D = 6-15 mm



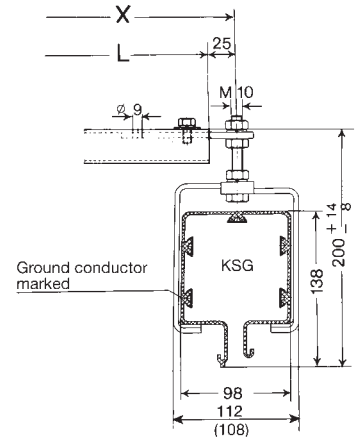
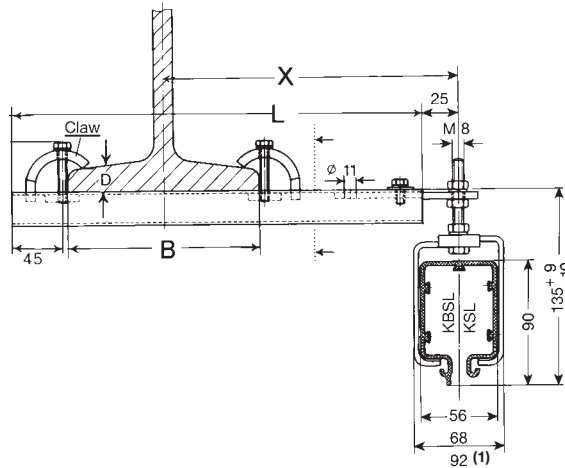
Powerail Type	KBSL - KSL - KSLT			KSG	
Collector	SKR	SKN	SKNT	KWG	DKWG
Dim. a	161 ± 7 / 15	165 ± 7 / 15	175 ± 7 / 15	226 ± 7 / 16	256 ± 7 / 16
Dim. b	-	-	-	450 ± 7 / 16	510 ± 7 / 16

Types KBSL, KSL & KSLT dimension "a" also for double collectors.

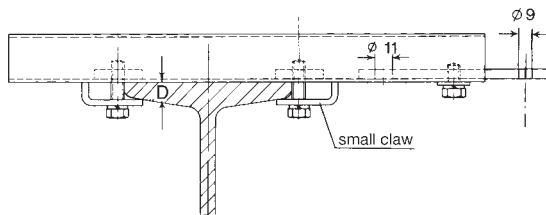
View without I-beam



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 I-beam dimension D.

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

Type	X mm	L mm	B max mm	Weight kg	Cat.-No. for std. brackets	Cat.-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

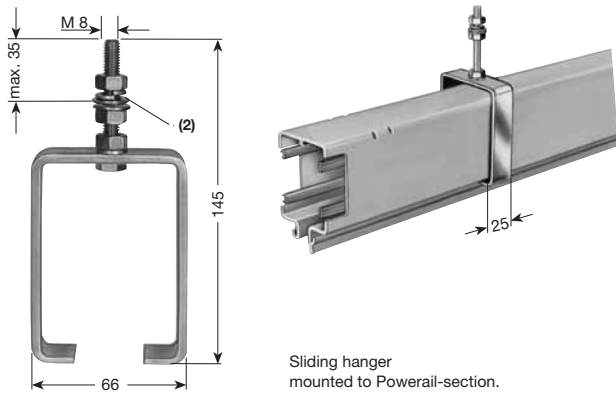
Select next larger size bracket when your I-beam dimension B is more than 170 mm.

SLIDING HANGERS

FIXPOINT HANGERS



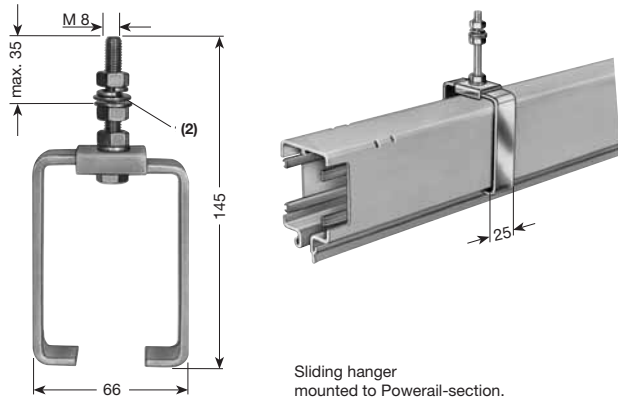
KBSL
KSL
KSLT



Sliding hanger mounted to Powerail-section.

for KBSL only

Type	Weight. kg	Cat.-No.
KGB	0.225	259 001

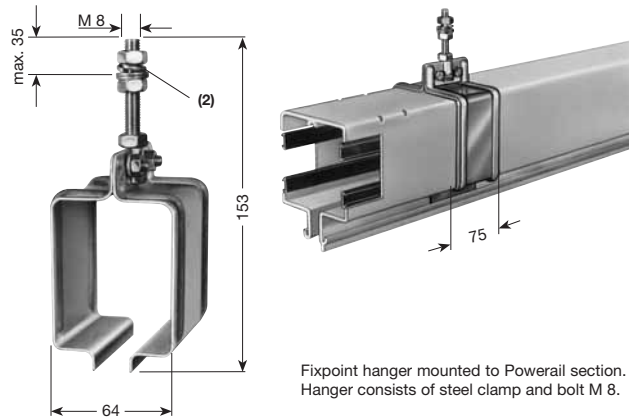


Sliding hanger mounted to Powerail-section.

for KBSL & KSL

for KSLT

Type	Weight kg	Cat.-No.	Type	Weight kg	Cat.-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

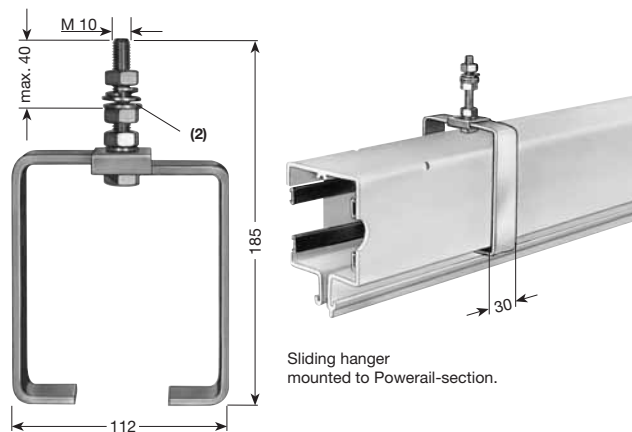


Fixpoint hanger mounted to Powerail section. Hanger consists of steel clamp and bolt M 8.

for KBSL & KSL

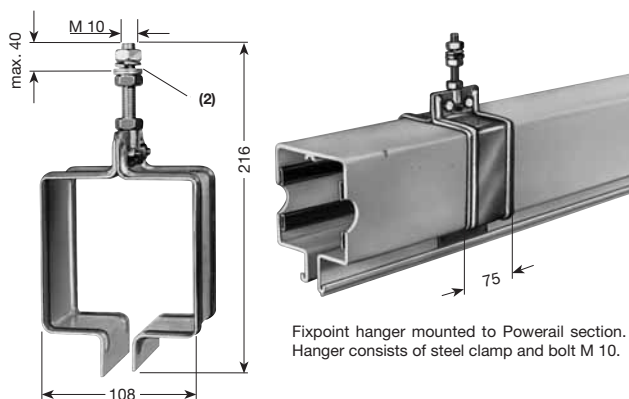
for KSLT

Type	Weight kg	Cat.-No.	Type	Weight kg	Cat.-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



Sliding hanger mounted to Powerail-section.

Type	Weight kg	Cat.-No.	Type	Weight kg	Cat.-No.
KGH	0.580	260 050	KGH/K⁽¹⁾	0.390	260 580



Fixpoint hanger mounted to Powerail section. Hanger consists of steel clamp and bolt M 10.

Type	Weight kg	Cat.-No.	Type	Weight kg	Cat.-No.
GKF	0.515	261 693	GKF/K⁽¹⁾	0.515	261 694

KSG

(1) of stainless steel

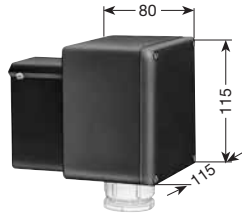
(2) Flat washers only be used in slotted holes.



END FEEDS ⁽¹⁾

LINE FEEDS ⁽¹⁾ with 2 m cables incl. 1 m section

KBSL
KSL
KSLT



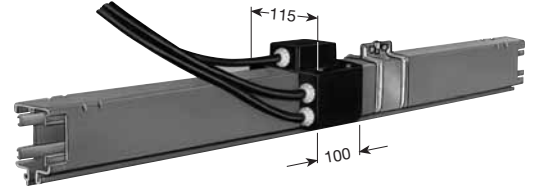
Cable gland M 32
Cable Ø 17 - 26 mm
for cable cross section max. 10 mm²

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

for KBSL, KSL & KSLT

Type ⁽²⁾	A	Weight kg	Cat.-No. Power line HS c/w PE	Cat.-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

A	Cable-Ø mm	Cable cross section mm ²
40	9.5	6
60	11.5	10
100	13.5	25
140	14.5	35



Terminal box
32 mm over Powerail

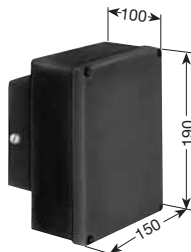
for KBSL & KSL

Type ⁽²⁾	A	Weight kg	Cat.-No. Power line HS c/w PE	Cat.-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	Cat.-No. Power line HS c/w PE	Cat.-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	–

KSG

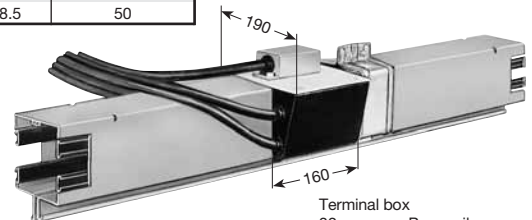


Cable gland M 50
for cable cross section
max. 35 mm²

The end feed comes ready assembled on 1 m Powerail section. Declare RH or LH use.⁽¹⁾

Type ⁽²⁾	A	Weight kg	Cat.-No. Power line HS c/w PE
GEA 4/120 L	120	5.300	261 340
GEA 5/120 L	120	5.450	261 350
GEA 4/120 R	120	5.300	260 100
GEA 5/120 R	120	5.450	260 110

A	Cable-Ø mm	Cable cross section mm ²
120	13.5	25
200	18.5	50



Terminal box
32 mm over Powerail

Type ⁽²⁾	A	Weight kg	Cat.-No. Power line HS c/w PE
GNKL 4/120	120	8.500	261 641
GNKL 5/120	120	9.800	261 643
GNKL 4/200	200	12.800	261 642
GNKL 5/200	200	15.200	261 644

⁽¹⁾ The powerail section is part of the system length (see example of ordering pages 24 & 25).

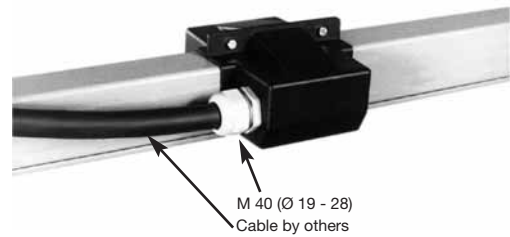
⁽²⁾ For full type designation add suffix of Powerail section, e.g. KEK 4/40-60 w/ PE → KEK 4/40-60 HS Cat.-No. 258 421.

LINE FEEDS⁽¹⁾ with terminal box incl. 1 m section



**KBSL
KSL
KSLT**

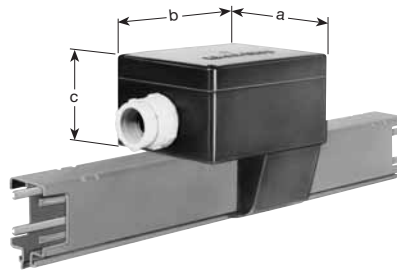
Type ⁽²⁾	A	Weight kg	Cat.-No. Power line HS c/w PE	Cat.-No. Control line SS w/o PE
KNS 4/40-60	40-60	0.560	258 001	258 002



The line feed KNS 4/40-60 is without Powerail.
(Joint feed)

Cable connections type HS

A	M	Cable-Ø mm	Nom.- connection- dia. mm ²	Cable connection at
40	25	9 - 18	6	M 8 (Type KNK/KNKT: M 6)
60	32	17 - 26	10	M 8 (Type KNK/KNKT: M 6)
100	50	23 - 34	25	M 8
140	50	23 - 34	35	M 8
200	50	29 - 40	50	M 10



	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

All SS-types with M 25

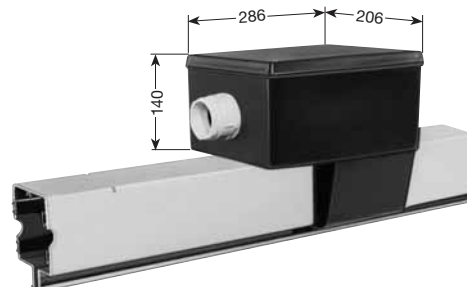
for KBSL & KSL

for KSLT

Type ⁽²⁾	A	Weight kg	Cat.-No. Power line HS c/w PE	Cat.-No. Control line SS w/o PE	Type ⁽²⁾	A	Weight kg	Cat.-No. Power line HS c/w PE	Cat.-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	KNKT 4/ 60	60	2.700	259 161	259 163
KNK 5/ 40	40	2.631	258 262	258 264	–	–	–	–	–
KNK 5/ 60	60	2.800	258 250	258 252	KNKT 5/ 60	60	2.900	259 165	259 167
KNKS 4/ 40	40	3.314	258 266	–	–	–	–	–	–
KNKS 4/ 60	60	3.450	258 268	–	KNKST 4/ 60	60	3.550	259 169	–
KNKS 4/100	100	3.800	258 270	–	KNKST 4/100	100	3.900	259 171	–
KNKS 4/140	140	4.100	258 272	–	KNKST 4/140	100	4.200	259 173	–
KNKS 4/200	200	5.400	258 612	–	KNKST 4/200	200	5.500	259 624	–
KNKS 5/ 40	40	3.581	258 274	–	–	–	–	–	–
KNKS 5/ 60	60	3.750	258 276	–	KNKST 5/ 60	60	3.850	259 175	–
KNKS 5/100	100	4.150	258 278	–	KNKST 5/100	100	4.250	259 177	–
KNKS 5/140	140	4.450	258 280	–	KNKST 5/140	140	4.550	259 179	–
KNKS 5/200	200	5.800	258 616	–	KNKST 5/200	200	5.900	259 628	–

Cable connections

A	M	Cable-Ø mm	Nom. connection dia. mm ²	Cable connection at
120	50	23 - 34	35	M 10
200	50	29 - 40	50	M 10



Type ⁽²⁾	A	Weight kg	Cat.-No. Power line HS c/w PE	Type ⁽²⁾	A	Weight kg	Cat.-No. Power line HS c/w PE
GNKS 4/120	120	6.200	261 645	GNKS 5/120	120	6.550	261 647
GNKS 4/200	200	7.200	261 646	GNKS 5/200	200	7.600	261 648

KSG

⁽¹⁾ The powerail section is part of the system length (see example of ordering page 24).

⁽²⁾ For full type designation add suffix of Powerail section, e.g. KNK 4/60 w/ PE → KNK 4/60 HS Cat.-No. 258 258.



END CAPS

SECTIONALIZING⁽¹⁾

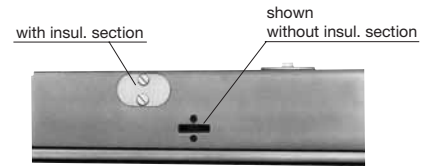
KBSL
KSL
KSLT



End cap assembled on Powerail

for KBSL, KSL & KSLT

Type	Weight kg	Cat.-No.
MEK	0.086	256 527

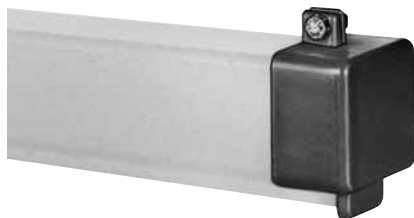


Conductor dead section
Factory assembled

for KBSL, KSL & KSLT

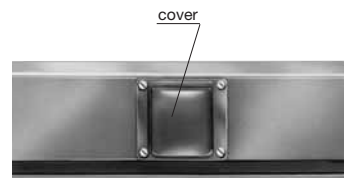
Type	with air gap 5 mm Cat.-No.	Type	with insul. section 30 mm Cat.-No.
STLA 1	251 860	STLI 1	250 220
STLA 2	251 870	STLI 2	250 590
STLA 3	251 880	STLI 3	250 600
STLA 4	251 890	STLI 4	250 610
STLA 5	251 900	STLI 5	250 620

KSG



End cap assembled on Powerail

Type	Weight kg	Cat.-No.
GEK	0.100	260 090

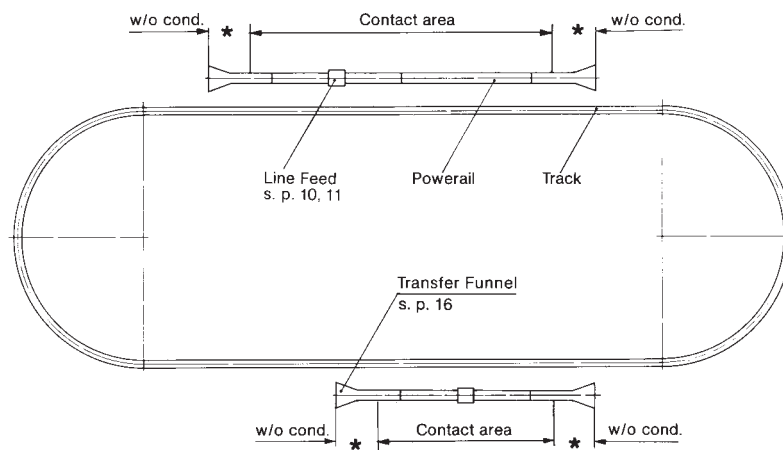


Conductor dead section
Factory assembled

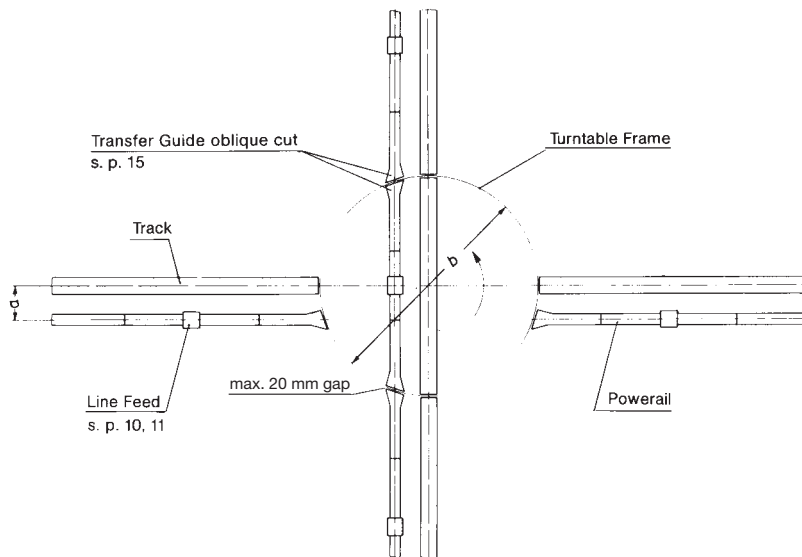
Type	with air gap 5 mm Cat.-No.
STG 1	260 220
STG 2	260 530
STG 3	260 540
STG 4	260 550
STG 5	260 560

⁽¹⁾ Please indicate which conductors are to be interrupted (see page 5).

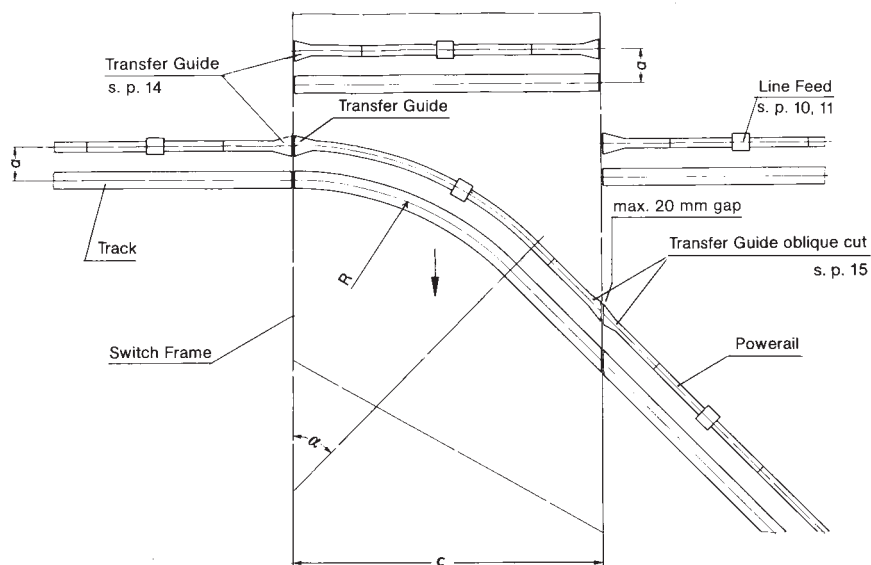
Contact section*



Turntable



Sliding switch



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

* Contact sections must not be activated before collectors are fully engaged.
Flexible support type tow arms (see page 22) for collectors are essential with contact sections.

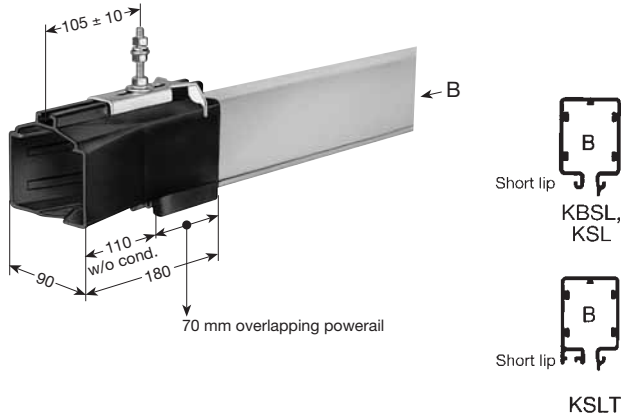


TRANSFER GUIDES, STRAIGHT

for turntables, switches and splines

KBSL
KSL
KSLT

LH incl. Fixpoint hanger



4- & 5poles, 40 to 200 A

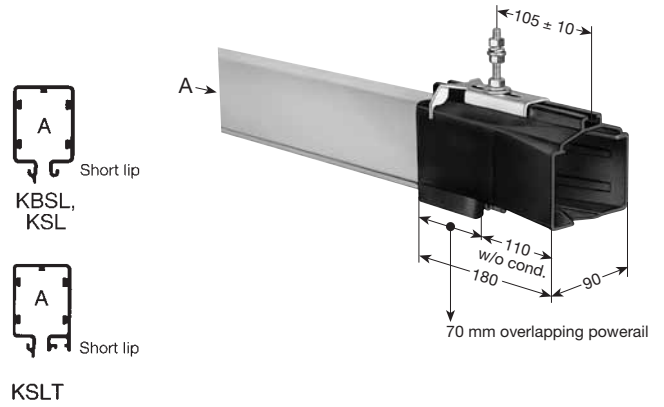
Offset: horizontal ± 8 mm; vertical ± 3 mm

for KBSL & KSL

for KSLT

Type ⁽¹⁾	Weight kg	Cat.-No.	Type ⁽¹⁾	Weight kg	Cat.-No.
AUN	0.340	257 455	AUNT/L	0.340	257 456

RH incl. Fixpoint hanger



4- & 5poles, 40 to 200 A

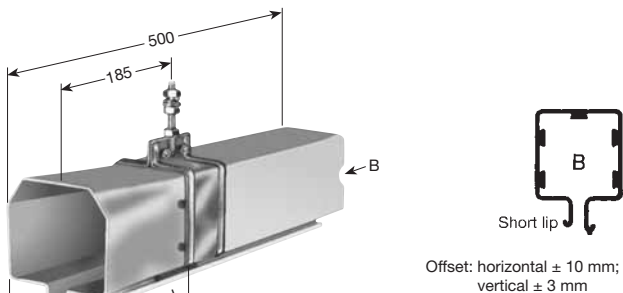
Offset: horizontal ± 8 mm; vertical ± 3 mm

for KBSL & KSL

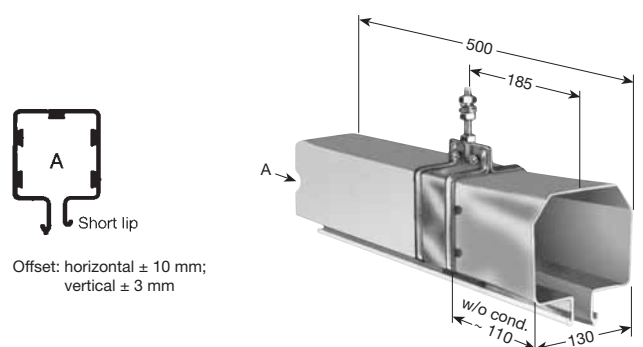
for KSLT

Type ⁽¹⁾	Weight kg	Cat.-No.	Type ⁽¹⁾	Weight kg	Cat.-No.
AUN	0.340	257 455	AUNT/R	0.340	257 457

KSG



Type ⁽²⁾	A	Weight kg	Cat.-No. Power line HS c/w PE
KGU 4/120 L	120	2.350	261 360
KGU 4/200 L	200	2.600	261 370
KGU 5/120 L	120	2.550	261 380
KGU 5/200 L	200	2.800	261 390



Type ⁽²⁾	A	Weight kg	Cat.-No. Power line HS c/w PE
KGU 4/120 R	120	2.350	260 140
KGU 4/200 R	200	2.600	260 150
KGU 5/120 R	120	2.550	260 160
KGU 5/200 R	200	2.800	260 170

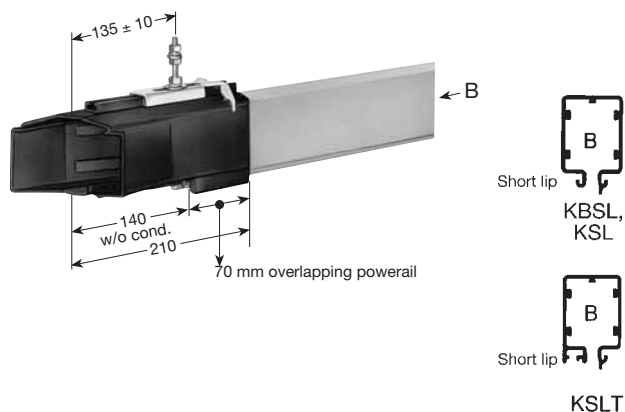
⁽¹⁾ Same transfer guide for LH and RH use.

⁽²⁾ All transfer guides for KSG are 0.5 m long and are part of the system length. For full type designation add suffix of Powerail section e.g. KGU 4/120 L w/PE → KGU 4/120 L HS Cat.-No. 261 360. Always use double collectors or two collectors for transfer applications (see page 21).



KBSL
KSL
KSLT

LH incl. Fixpoint hanger



4- & 5poles, 40 to 200 A

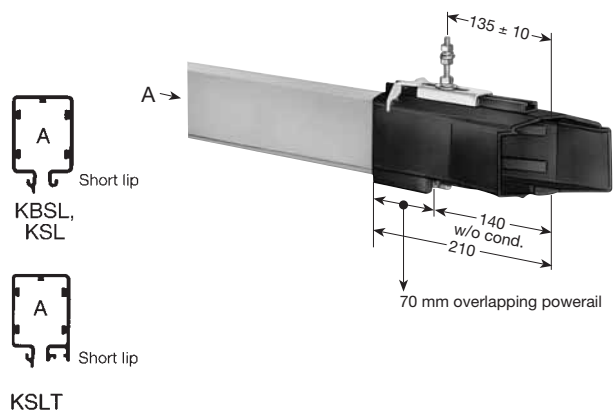
Offset: horizontal ± 8 mm; vertical ± 3 mm

for KBSL & KSL

for KSLT

Type ⁽¹⁾	Weight kg	Cat.-No.	Type ⁽¹⁾	Weight kg	Cat.-No.
AUNS	0.380	257 459	AUNST/L	0.380	257 460

RH incl. Fixpoint hanger



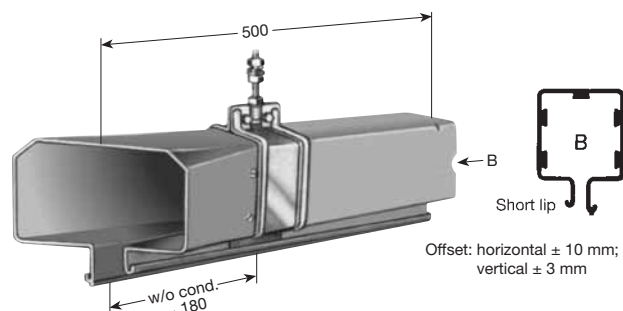
4- & 5poles, 40 to 200 A

Offset: horizontal ± 8 mm; vertical ± 3 mm

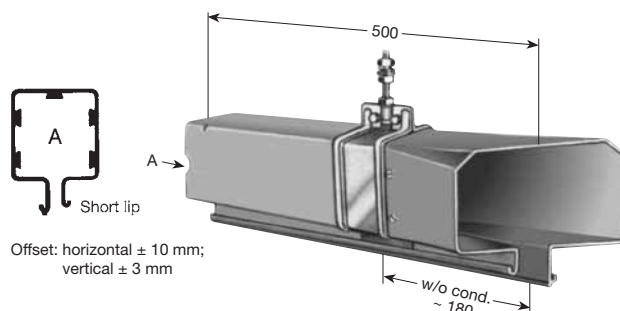
for KBSL & KSL

for KSLT

Type ⁽¹⁾	Weight kg	Cat.-No.	Type ⁽¹⁾	Weight kg	Cat.-No.
AUNS	0.380	257 459	AUNST/R	0.380	257 461



Type ⁽²⁾	A	Weight kg	Cat.-No. Power line HS c/w PE
KGUS 4/120 L	120	2.350	261 400
KGUS 4/200 L	200	2.600	261 410
KGUS 5/120 L	120	2.550	261 420
KGUS 5/200 L	200	2.800	261 430



Type ⁽²⁾	A	Weight kg	Cat.-No. Power line HS c/w PE
KGUS 4/120 R	120	2.350	260 180
KGUS 4/200 R	200	2.600	260 190
KGUS 5/120 R	120	2.550	260 200
KGUS 5/200 R	200	2.800	260 210

KSG

⁽¹⁾ Same transfer guide for LH and RH use, however oblique cut in accordance to your system layout.

⁽²⁾ All transfer guides for KSG are 0.5 m long and are part of the system length. For full type designation add length suffix of Powerail section e.g. KGUS 4/120 R w/PE → KGUS 4/120 R HS Cat.-No. 260 180.
Always use double collectors or two collectors for transfer applications (see page 21).

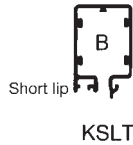
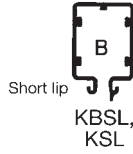
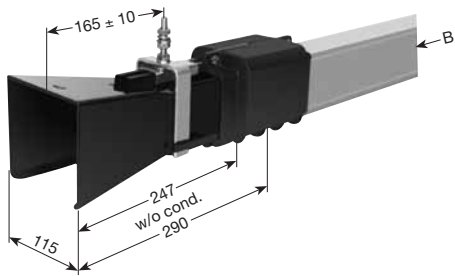


TRANSFER FUNNELS (1)

**KBSL
KSL
KSLT**

LH

Offset:
horizontal ± 15 mm
vertical ± 10 mm



for KBSL & KSL

Type (3)	Weight kg	Cat.-No. Power line HS c/w PE	Cat.-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 22).

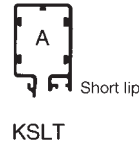
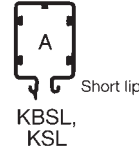
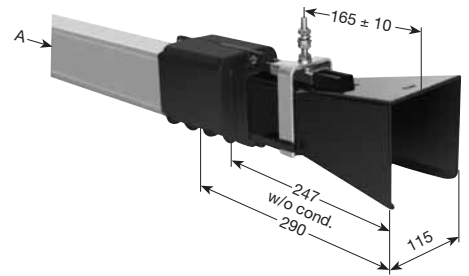
for KSLT

Type (3)	Weight kg	Cat.-No. Power line HS c/w PE	Cat.-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 22).

RH

Offset:
horizontal ± 15 mm
vertical ± 10 mm



for KBSL & KSL

Type (3)	Weight kg	Cat.-No. Power line HS c/w PE	Cat.-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

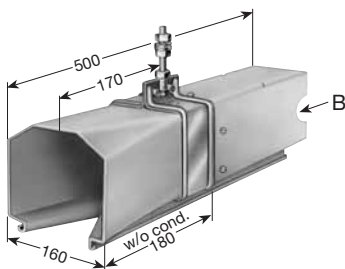
Flexible support tow arms KFML are essential (see page 22).

for KSLT

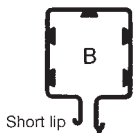
Type (3)	Weight kg	Cat.-No. Power line HS c/w PE	Cat.-No. Control line SS w/o PE
ESTTN 4 R	0.825	256 167	256 169
ESTTN 5 R	0.830	256 175	256 177

Flexible support tow arms KFML are essential (see page 22).

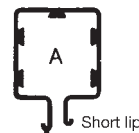
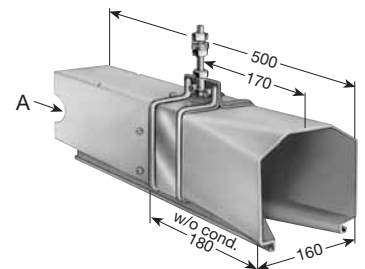
KSG



Offset:
horizontal ± 15 mm
vertical ± 10 mm



Offset:
horizontal ± 15 mm
vertical ± 10 mm



Type (2)	A	Weight kg	Cat.-No. Power line HS c/w PE
KGT 4/120 L	120	2.350	261 490
KGT 4/200 L	200	2.600	261 510
KGT 5/120 L	120	2.550	261 530
KGT 5/200 L	200	2.800	261 550

Flexible support tow arms GFM are essential (see page 22).

Type (2)	A	Weight kg	Cat.-No. Power line HS c/w PE
KGT 4/120 R	120	2.350	261 480
KGT 4/200 R	200	2.600	261 500
KGT 5/120 R	120	2.550	261 520
KGT 5/200 R	200	2.800	261 540

Flexible support tow arms GFM are essential (see page 22).

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

(2) All transfer funnels for KSG are 0.5 m long and are part of the system length.

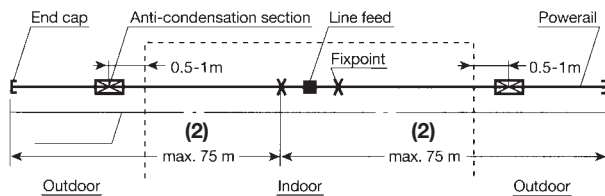
(3) For full type designation add length suffix of Powerail section e.g. ESTN 4 L w/ PE → ESTN 4 L HS Cat.-No. 256 164



Application of Anti-condensation section

This section consists of 1 m Powerail with openings covered by a protection hood.

The anti-condensation section will be used where Powerails are passing from indoor to outdoor, preventing the icing of the outside mounted Powerail as the warm air can escape and does not condensate in the Powerail.



Feeding

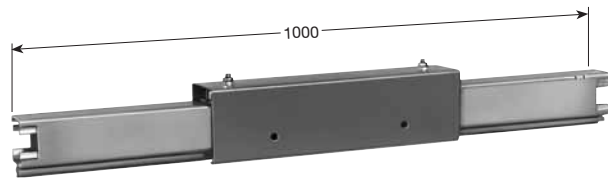
No extra feeds required as the Powerail is not interrupted.

Collectors

No extra collectors required.

Installation

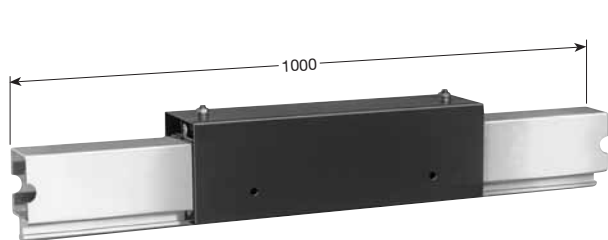
The anti-condensation section will be placed directly at the transfer point from indoor to outdoor service.



for KBSL & KSL

for KSLT

Type ⁽³⁾	Cat.-No. Power line HS c/w PE	Cat.-No. Control line SS w/o PE	Type ⁽³⁾	Cat.-No. Power line HS c/w PE	Cat.-No. Control line SS w/o PE
BTK 4/ 40	257 679	257 681	–	–	–
BTK 4/ 60	258 652	258 725	BTKT 4/ 60	258 660	258 727
BTK 4/100	258 653	–	BTKT 4/100	258 661	–
BTK 4/140	258 654	–	BTKT 4/140	258 662	–
BTK 4/200	258 655	–	BTKT 4/200	258 663	–
BTK 5/ 40	257 680	257 682	–	–	–
BTK 5/ 60	258 656	258 726	BTKT 5/ 60	258 664	258 728
BTK 5/100	258 657	–	BTKT 5/100	258 665	–
BTK 5/140	258 658	–	BTKT 5/140	258 666	–
BTK 5/200	258 659	–	BTKT 5/200	258 667	–



Type ⁽³⁾	Cat.-No. Power line HS c/w PE
BTK 4/120	261 683
BTK 4/200	261 684
BTK 5/120	261 685
BTK 5/200	261 686

⁽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 19).

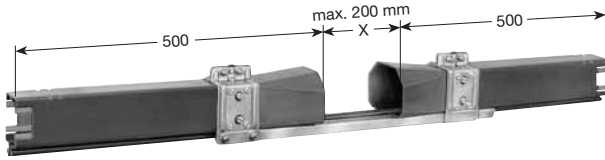
⁽³⁾ Suffix types e.g. BTK 4/60 w/ PE → BTK 4 /60 **HS** Cat.-No. 258 652.



TELESCOPE SECTIONS⁽¹⁾

incl. 1 m section

KBSL
KSL
KSLT
KSG



The telescope section is assembled on a 1 m Powerail section and compensates the expansion during temperature fluctuation.

The section consists of two transfer guides. The connecting profiles serve as running and guiding track for the current collectors. The Powerail is electrically separated. Sealing strip and slot guiding of the KSLT are interrupted in the area of the telescope section (chamfer ends as per installation instruction)

The telescope sections are used in the following cases:

1. For Powerail lengths exceeding 150 m. The maximum measure between two fixpoints with the telescope section placed in the center is 70 m (see fig. 1).
2. For passing the Powerail from indoor to outdoor, thus preventing the icing of the outside mounted Powerail, as the warm air can escape and does not condensate in the Powerail (see fig. 2). – Alternate solution: Anti-condensation section (see page 17).
3. If the Powerail length between 2 curves is more than 20 m (see fig. 3).

During intense temperature fluctuation it might be necessary to decrease a.m. measures. Please consult our factory in these cases. Alternatively expansion sections can be used (page 19).

Feeding

The Powerail is electrically separated into 2 parts by the telescope section. Provide each of these sections with a separate feeding.

When passing the Powerail into the outdoor area the main feed point can be placed indoor. In this case install a terminal box on the left and right hand side of the telescope section and connect them by a flexible cable (see fig.2).

Collectors

In order not to interrupt the electrical contact when passing the telescope section, two current collectors of an adequate capacity must be provided with a center distance of at least 500 mm. If in case of higher power consumption double collectors must be used consider two sets accordingly.

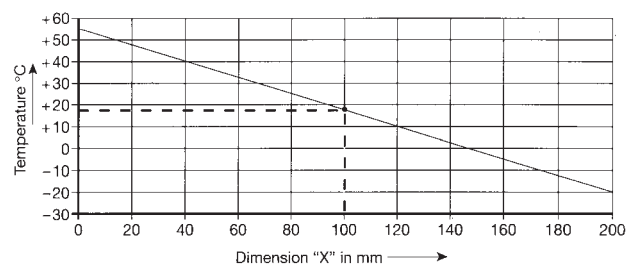
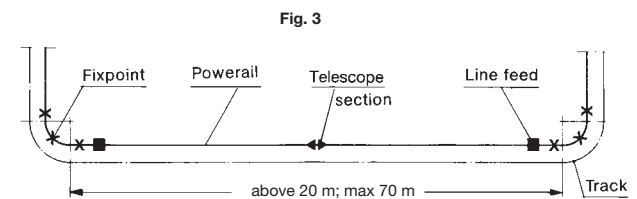
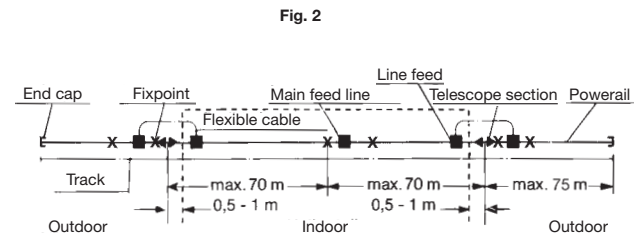
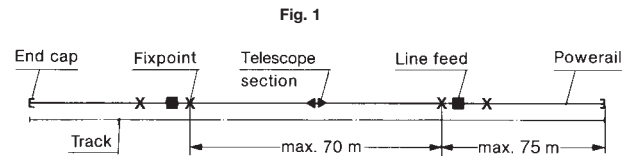
Mounting

The telescope section is installed in the center between two fixpoint hangers. The Powerail is installed with sliding hangers according to mounting instructions.

The gap dimension «X» between the transfer guides depends on the ambient temperature when mounting the Powerail (see adjacent diagram). The diagram is based on a Powerail length of 70 m between the fixpoints.

Example: Mounting temperature 18° C, «X» = 100 mm

KBSL / KSL		KSLT		KSG	
Type (2)	Cat.-No. Power line HS c/w PE	Type (2)	Cat.-No. Power line HS c/w PE	Type (2)	Cat.-No. Power line HS c/w PE
TKL 4/ 40	257 683	–	–	–	–
TKL 4/ 60	250 850	TKLT 4/ 60	254 843	TKG 4/120	260 640
TKL 4/100	250 780	TKLT 4/100	254 844	TKG 4/200	260 650
TKL 4/140	250 790	TKLT 4/140	254 845	–	–
TKL 4/200	254 200	TKLT 4/200	254 859	–	–
TKL 5/ 40	257 684	–	–	–	–
TKL 5/ 60	250 820	TKLT 5/ 60	254 846	TKG 5/120	260 660
TKL 5/100	250 800	TKLT 5/100	254 847	TKG 5/200	260 670
TKL 5/140	250 810	TKLT 5/140	254 848	–	–
TKL 5/200	254 210	TKLT 5/200	254 860	–	–
Type (2)	Cat.-No. Control line SS w/o PE	Type (2)	Cat.-No. Control line SS w/o PE		
TKL 4/ 40	257 685	–	–	–	–
TKL 4/ 60	250 970	TKLT 4/ 60	254 849	–	–
TKL 5/ 40	257 686	–	–	–	–
TKL 5/ 60	250 980	TKLT 5/ 60	254 850	–	–



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

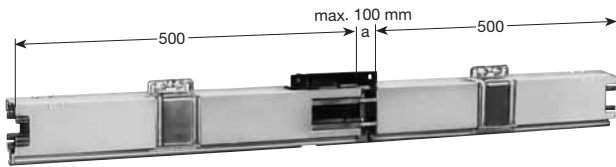
⁽²⁾ Suffix types e.g. TKL 4/60 w/ PE → TKL 4 /60 HS Cat.-No. 250 850.

EXPANSION JOINT SECTIONS ⁽¹⁾

incl. 1 m section



KBSL
KSL
KSLT
KSG



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

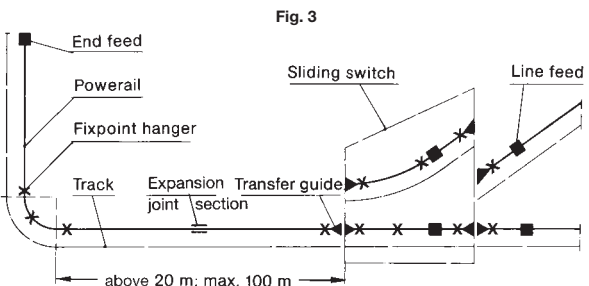
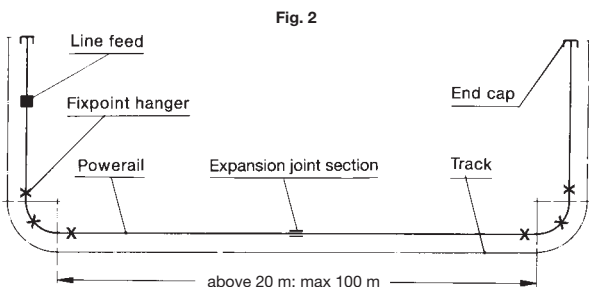
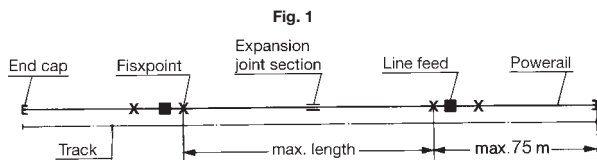
The expansion joints are used if the Powerail length between two curves, switches or other fix points is exceeding 20 meters, or corresponding to a temperature difference (t) of

- $\Delta t \ 20^\circ \text{C} = 100 \text{ m}$
- $\Delta t \ 30^\circ \text{C} = 68 \text{ m}$
- $\Delta t \ 40^\circ \text{C} = 50 \text{ m}$
- $\Delta t \ 60^\circ \text{C} = 34 \text{ m}$
- $\Delta t \ 80^\circ \text{C} = 25 \text{ m}$

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.

KBSL / KSL		KSLT		KSG	
Type ⁽²⁾	Cat.-No. Power line HS c/w PE	Type ⁽²⁾	Cat.-No. Power line HS c/w PE	Type ⁽²⁾	Cat.-No. Power line HS c/w PE
DVK 4/ 40	257 054	–	–	–	–
DVK 4/ 60	252 430	DVKT 4/ 60	254 851	DVG 4/120	261 631
DVK 4/100	252 440	DVKT 4/100	254 852	DVG 4/200	261 632
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	DVG 5/120	261 633
DVK 5/100	252 480	DVKT 5/100	254 855	DVG 5/200	261 634
DVK 5/140	252 490	DVKT 5/140	254 856	–	–
DVK 5/200	250 250	DVKT 5/200	250 337	–	–
Type ⁽²⁾	Cat.-No. Control line SS w/o PE	Type ⁽²⁾	Cat.-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	–	–



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.

Current collector

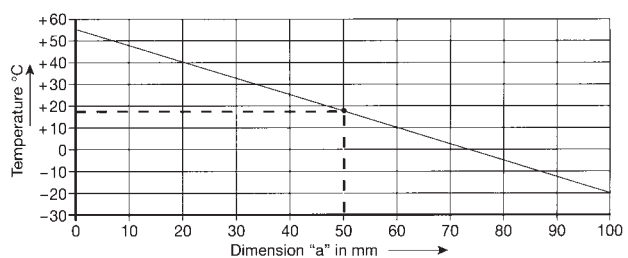
No special or extra collector required.

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: Temperature 18° C
«a» = 50 mm



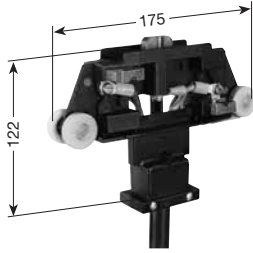
⁽¹⁾ Above sections come ready assembled on 1 m Powerail and are a part of the system length.

⁽²⁾ Suffix types e.g. DVK 4/60 w/ PE → DVK 4 /60 HS Cat.-No. 252 430.



COLLECTORS

**KBSL
KSL
KSLT**



SKR, 5pole



SKN, 5pole



SKNT, 4pole

Type (2)	A (1)	Cat.-No. Power line HS c/w PE	Type (2)	A (1)	Cat.-No. Control line ST w/o PE	Poles	Weight kg	Max. speed m/min.		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 bearing 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	

Type (2)	A (1)	Cat.-No. Power line HS c/w PE	Type (2)	A (1)	Cat.-No. Control line ST w/o PE	Poles	Weight kg	Max. speed m/min.		General
KSLT with sealing strip «D» or shielding «FP»										
SKNT 4/40-1	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
SKNT 5/40-1	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.

Collectors for higher speed and cleaning trolleys on request.

KSG



Type (2)	Poles	A (1)	Weight kg	Cat.-No. Power line HS c/w PE	Max. speed m/min.		General
					Normal	Transfer	
KWG/g 4/70	4	70	2.656	260 770	200	100	for straight runs with ball bearing wheels and guide rollers. FM for flexible support tow arms see page 22.
KWG/g 5/70	5	70	2.868	260 800	200	100	
KWG/g 4/70 FM	4	70	2.656	260 970	200	100	
KWG/g 5/70 FM	5	70	2.868	260 960	200	100	
KWG/n 4/70	4	70	2.638	260 250	200	100	for curved runs with ball bearing wheels and guide rollers. FM for flexible support tow arms see page 22.
KWG/n 5/70	5	70	2.886	260 280	200	100	
KWG/n 4/70 FM	4	70	2.638	260 950	200	100	
KWG/n 5/70 FM	5	70	2.886	260 940	200	100	

Wiring from the carbons to the terminal box with 10 mm² single cores.

Cable gland at terminal box 1 x M 50.

Cleaning trolleys and collectors for control line on request.

DOUBLE COLLECTORS



**KBSL
KSL
KSLT**

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

Type ⁽³⁾	A ⁽¹⁾	Cat.-No. Power line HS c/w PE	Type ⁽³⁾	A ⁽¹⁾	Cat.-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

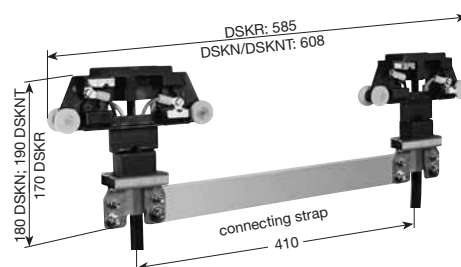


Illustration shows DSKR, 5pole, type F

Type ⁽³⁾	A ⁽¹⁾	Cat.-No. Power line HS c/w PE	Type ⁽³⁾	A ⁽¹⁾	Cat.-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

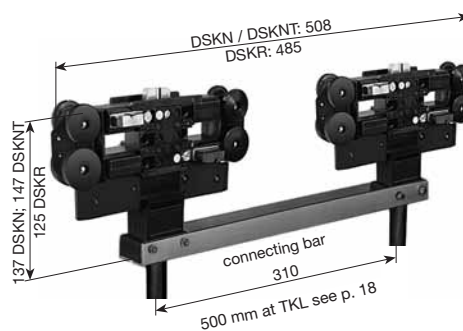
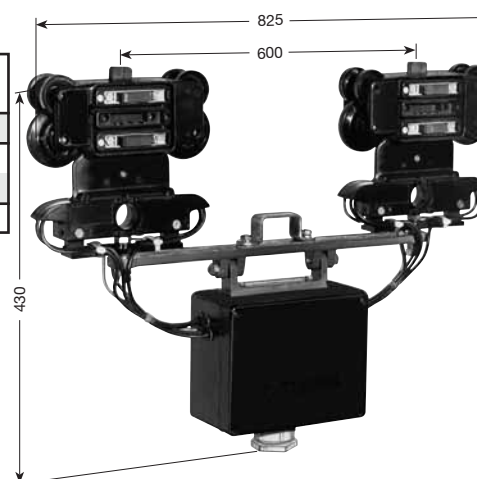


Illustration shows DSKN, 5pole, type S

Trolley connecting cable 1 m long; longer cable available.
 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.

Type ⁽³⁾	Poles	A ⁽¹⁾	Weight kg	Cat.-No. Power line HS c/w PE
DKWG/g 4/140	4	140	6.680	260 830
DKWG/g 5/140	5	140	7.190	260 860
DKWG/n 4/140	4	140	6.680	260 310
DKWG/n 5/140	5	140	7.190	260 340



KSG

Wiring from the carbons to the terminal box with 10 mm² single cores.
 Cable gland at terminal box 1 x M 50.
 As well for transfer sections, oblique cut, and telescope sections (page 15 and 18).

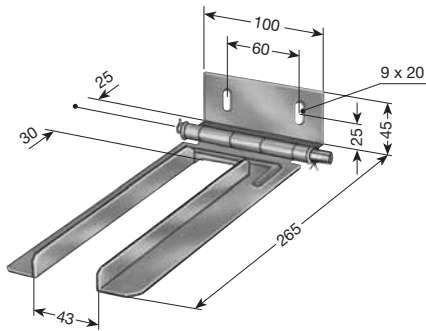
⁽¹⁾ All ampere data for 60% intermittent duty. For the Powerail types KBSL, KSL/KSLT with Cu-Inox conductors consider half of the electrical ampere load.
⁽²⁾ Do not use double collectors, but 2 singles for curves with less than 1.2 m radius and for transfer guides more than 45° oblique cut (see page 13).
⁽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 Cat.-No. 255 944
 DSKR 4/50 S-1 w/o PE → DSKR 4/50 S-1 ST Cat.-No. 256 371.



TOW ARMS

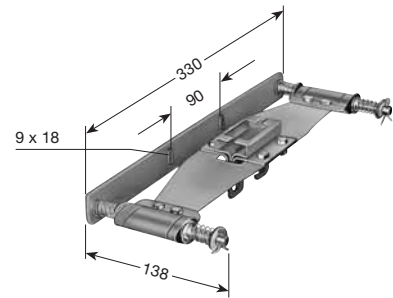
KBSL
KSL
KSLT

for single & double collector ⁽²⁾
Mounting dimensions see page 8



Type	Weight kg	Cat.-No.
KWS	0.480	250 380
KWS/K⁽¹⁾	0.480	252 340

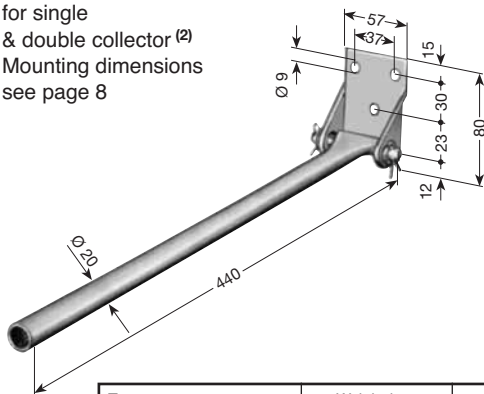
flexible support type, with single collector
for transfer funnels (see page 16)
Mounting dimensions see page 28



Type	Weight kg	Cat.-No. for all types
KFML for SKN u. SKNT	1.170	252 970

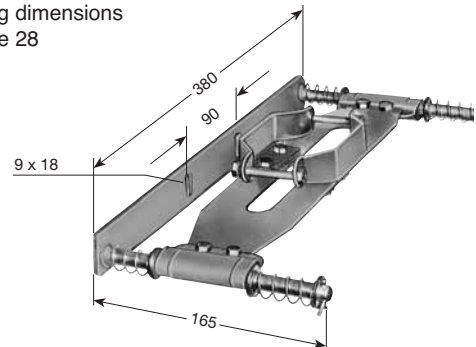
KSG

for single & double collector ⁽²⁾
Mounting dimensions see page 8



Type	Weight kg	Cat.-No.
GKM	0.620	260 350
GKM/K⁽¹⁾	0.620	261 560

flexible support type, with single collector
for transfer funnels (see page 16)
Mounting dimensions see page 28



Type	Weight kg	Cat.-No.
GFM	1.300	260 360

⁽¹⁾ stainless steel

⁽²⁾ If conductors are installed in parallel one towing arm per collector unit have to be considered.



Powerail	Type	KBSL	KSL	KSLT
		Cat.-No.	Cat.-No.	Cat.-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		257 905	257 905	257 905
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		–	–	258 500
Adapter for new/old style Powerail		258 822	258 822	258 822
Mounting trolley for sealing strip D		–	–	258 345

Collector	Type	KBSL, KSL and KSLT		KSLT with
		SKR	SKN(K)	«D» or «FP»
		Cat.-No.	Cat.-No.	SKNT
Carbon brush phase, incl. brush holder (lateral)		257 600	254 890	254 890
Carbon brush upper fifth pole, incl. brush holder (above)		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, straight 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 collectors		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

Powerail	Cat.-No.
Tape	260 720
Joint clamp, 150 mm with hardware	260 390
Joint clamp of stainless steel	260 620
Stiffener clamp, 75 mm with hardware	260 400
Stiffener clamp of stainless steel	260 630
Copper connecting pin	260 410

Collector	Cat.-No.
Carbon brush, 70 amp. phase	260 450
Carbon brush, 70 amp. ground (4 pole), lateral	260 460
Carbon brush, 70 amp. ground (5 th pole), above	260 470
Brass carbon holder phase, lateral	260 590
Brass carbon holder ground, lateral	260 600
Brass carbon holder ground (5 pole), above	260 610
Trolley wheel, for all types	260 480
Guide roller, for all types	260 490
Connecting bar for DKWG/n and DKWG/g compl.	261 705



EXAMPLES FOR ORDERING

Runway Electrification – 40 m

Qty.	Description	Type	Cat.-No.	Type	Cat.-No.	Type	Cat.-No.
9	Powerail, 4 m	KBSL 4/60-4 HS	253 214	KSL 4/60-4 HS	250 004	KSG 4/120-4 HS	260 004
1	Powerail, 3 m	KBSL 4/60-3 HS	253 213	KSL 4/60-3 HS	225 003	KSG 4/120-3 HS	260 003
1	Line Feed, 1 m	KNKS 4/60 HS	258 609	KNKS 4/60 HS	258 609	GNKS 4/120 HS	261 645
10	Joint Kits	VBK 4	257 907	VBK 4	257 907	VBG 4	261 701
2	Fixpoint Hangers	KF	258 806	KF	258 806	GKF	261 693
19	Sliding Hangers	KGB	259 001	KSH	250 050	KGH	260 050
2	End Caps	MEK	256 527	MEK	256 527	GEK	260 090
1	Double Collector	DSKN 4/80 S-1 HS	258 385	DSKN 4/80 S-1 HS	258 385	DKWG/g 4/140 HS	260 830
1	Tow arm	KWS	250 380	KWS	250 380	GKM	260 350

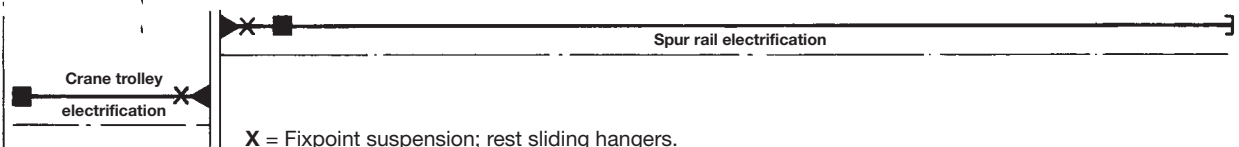
Crane Trolley Electrification – 12 m

2	Powerail, 4 m	KBSL 4/60-4 HS	253 214	KSL 4/60-4 HS	250 004	KSG 4/120-4 HS	260 004
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	Powerail, 3 m to make up 1 x 2.500 m	-	-	-	-	KSG 4/120-3 HS	260 003
1	End Feed	KEK 4/40-60 HS	258 421	KEK 4/40-60 HS	258 421	-	-
1	End Feed incl. 1 m Powerail	-	-	-	-	GEA 4/120 R	260 100
1	Transfer Guide 0.110 m	AUN	257 455	AUN	257 455	-	-
1	Transfer Guide 0,500 m	-	-	-	-	KGU 4/120 L HS	261 360
2	Joint Kits	VBK 4	257 907	VBK 4	257 907	-	-
4	Joint Kits	-	-	-	-	VBG 4	261 701
1	Fixpoint Hanger	KF	258 806	KF	258 806	GKF	261 693
5	Sliding Hangers	KGB	259 001	KSH	252 844	KGH	260 050
1	Double collector	DSKN 4/80 S-1 HS	258 385	DSKN 4/80 S-1 HS	258 385	DKWG/g 4/140 HS	260 830
1	Tow arm	KWS	250 380	KWS	250 380	GKM	260 350

Spur Rail Electrification – 30 m

7	Powerail, 4 m	KBSL 4/60-4 HS	253 214	KSL 4/60-4 HS	250 004	KSG 4/120-4 HS	260 004
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	Powerail, 1 m to make up 1 x 0.500 m	-	-	-	-	KSG 4/120-1 HS	260 001
1	Line Feed, 1 m incl. 1 m Powerail	KNK 4/60 HS	258 617	KNK 4/60 HS	258 617	GNKS 4/120 HS	261 645
1	Transfer Guide 0.110 m	AUN	257 455	AUN	257 455	-	-
1	Transfer Guide 0.500 m	-	-	-	-	KGU 4/120 R HS	260 140
8	Joint Kits	VBK 4	257 907	VBK 4	257 907	-	-
9	Joint Kits	-	-	-	-	VBG 4	261 701
1	Fixpoint Hanger	KF	258 806	KF	258 806	GKF	261 693
14	Sliding Hangers	KGB	259 001	KSH	252 894	KGH	260 050
1	End Cap	MEK	256 527	MEK	256 527	GEK	260 090

Runway electrification



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

Hoist Electrification in curves, per customer's drawing

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

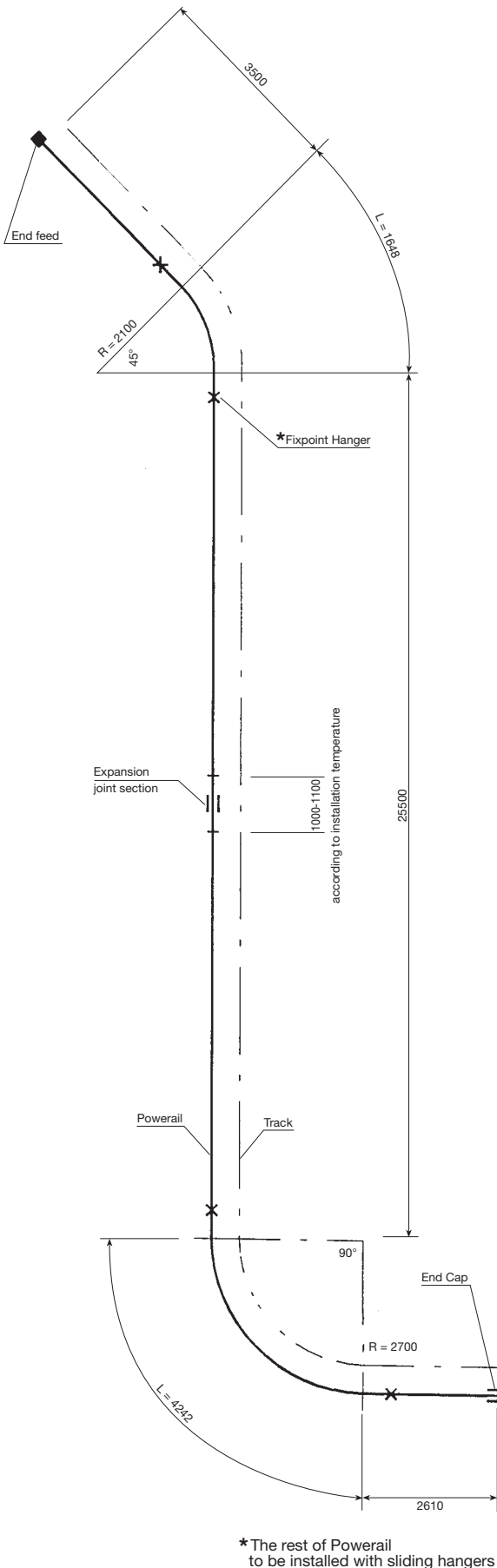
Qty.	Description	Type	Cat.-No.
8	Powerail, 4 m	KBSL 4/60-4 HS	253 214
1	Powerail, 4 m to make up 1 x 3500 mm	KBSL 4/60-4 HS	253 214
2	Powerail, 3 m to make up 1 x 2610 mm and 1 x 2500 mm	KBSL 4/60-3 HS	253 213
1	Powerail, 2 m for horizontal curve 45°, R = 2100 mm, L = 1648 mm, LLA with 100 mm straight 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	Cat.-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	Powerail, 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

47,5 m Powerail KSG 4/120 consisting of:

Qty.	Description	Type	Cat.-No.
8	Powerail, 4 m	KSG 4/120-4 HS	260 004
1	Powerail, 3 m to make up 1 x 2500 mm	KSG 4/120-3 HS	260 003
2	Powerail, 3 m to make up 1 x 2610 mm and 1 x 2500 mm	KSG 4/120-3 HS	260 003
1	Powerail, 2 m to make up horizontal curve 45°, R = 2100 mm, L = 1648 mm, LLA with 100 mm straight Powerail left and right	KSG 4/120-2 HS	260 002
2	Powerail, 3 m to make up horizontal curve 2 x 45°, R = 2700 mm, L = 2121 mm, LLI	KSG 4/120-3 HS	260 003
3	Surcharge for bending, horizontal		261 290
1	End feed, incl. 1 m Powerail	GEA 4/120 L HS	261 340
1	Expansion Joint	DVG 4/120 HS	261 631
15	Joint Kits	VBG 5	261 702
4	Fixpoint Hangers	GKF	261 693
24	Sliding Hangers	KGH	260 050
1	End Cap	GEK	260 090
1	Collector	KWG/g 4/70 HS	260 770
1	Tow arm	GKM	260 350





KTW-SYSTEM WITH KBSL OR KSLT

These systems are unique to feed electrical tools, such as drilling machines, grinders, screw drivers etc. along assembly lines or above work benches in any type of plant.

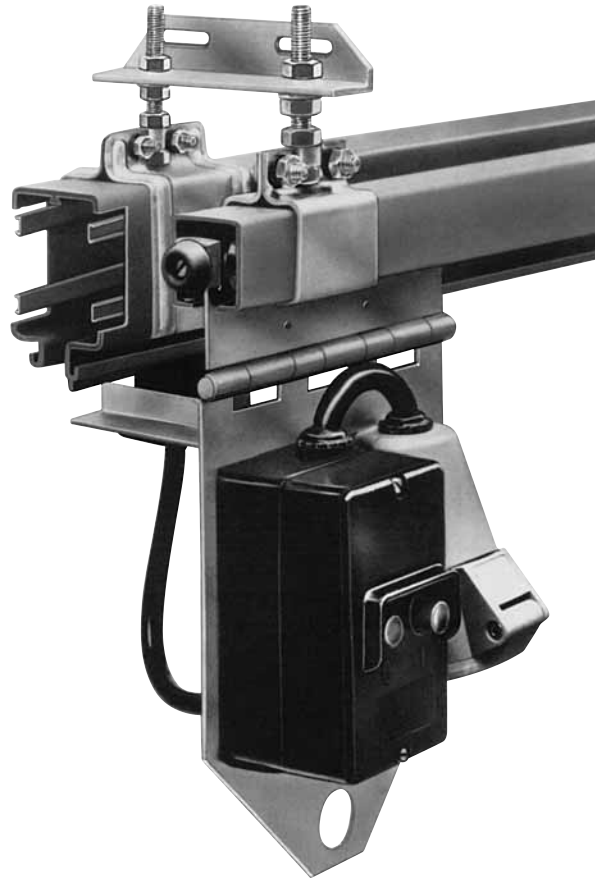
No power cables on the floor to cause accidents and no obstruction to personnel by trailing cables.

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.

The KTW-Systems comprise a galvanized C-track taking the carrier trolleys or other hook-up elements, and the Enclosed Powerail with 4 or 5 conductors of 40 to 200 Amp. capacity.

Carrier rail and Powerails are fixed to common brackets which serve as suspension structure.

The Collector has a mechanical towing arm connection to the Carrier Trolley and the collector cable feeds into a plug and socket system or circuit breaker unit. These units as per customer's choice are mounted to the attachment plate of the carrier trolley. These optional elements can be factory assembled or field mounted (see adjacent photo).



Engineering Data:

Powerail KBSL-KSLT

40 A (100% DF) copper conductor	10 mm ²
60 A (100% DF) copper conductor	15 mm ²
100 A (100% DF) copper conductor	25 mm ²
140 A (100% DF) copper conductor	35 mm ²
200 A (80% DF) copper conductor	50 mm ²

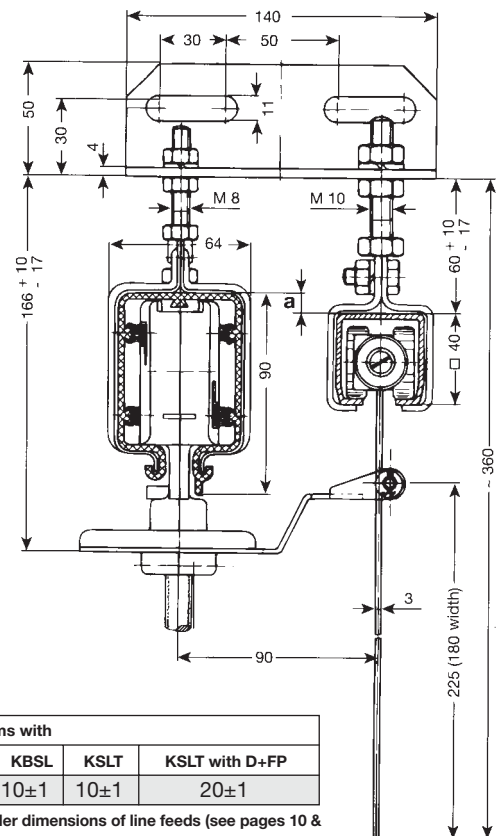
Voltage rating:	up to 600 V
No. of conductors:	4 & 5
Std. sections:	4 m, other sections available
Support distance:	variable up to 2 m
Temperature resistance:	-30° C/+60° C
Collector rating:	40 A & multiple (60% DF)
Weight:	1.650 up to 3.355 kgs/m (see page 4)

C-track □ S 2

Section modulus Wx:	3.1 cm ³
Moment of inertia:	6.7 cm ⁴
Material:	Galvanized steel
Std. sections:	4 m, other sections available
Support distance:	variable up to 2 m
Weight:	2.5 kgs/m

Carrier 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 pages 10 & 11)

Bill of Material

Ampere capacity	KTW Systems with Powerail - HS c/w PE											
	KBSL 4			KBSL 5			KSLT 4			KSLT 5		
Type (2)	Weight kg/m	Cat.-No.	Type (2)	Weight kg/m	Cat.-No.	Type (2)	Weight kg/m	Cat.-No.	Type (2)	Weight kg/m	Cat.-No.	
KTW-Systems						KTWT-Systems						
40 A	KTW 4/ 40	4.926	270 607	KTW 5/ 40	5.050	270 608	-	-	-	-	-	
60 A	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 A	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 A	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 A	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
40-60A	End feed						End feed					
	KEK 4/40-60	0.400	258 421	KEK 5/40-60	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 A	KNK 4/ 40	3.416	257 675	KNK 5/ 40	3.710	257 676	-	-	-	-	-	
60 A	KNK 4/ 60	3.450	250 890	KNK 5/ 60	3.750	250 900	KNKT 4/ 60	3.550	254 782	KNKT 5/ 60	3.850	254 783
100 A	KNKS 4/100	3.800	250 630	KNKS 5/100	4.150	250 640	KNKST 4/100	3.900	254 785	KNKST 5/100	4.250	254 789
140 A	KNKS 4/140	4.100	250 700	KNKS 5/140	4.450	250 740	KNKST 4/140	4.200	254 786	KNKST 5/140	4.550	254 790
200 A	KNKS 4/200	5.400	254 080	KNKS 5/200	5.800	254 090	KNKST 4/200	5.500	254 787	KNKST 5/200	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 A	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 A	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

STWL & STWTL specially suited for systems with side pull.

Supplement for KSLT Powerail

see pages 2, 5, 6	Type	Weight kg/m	Cat.-No.
Neoprene sealing strip	D	0.225	254 751
Plastic shielding	FP	0.260	254 752

Spare Parts List

Description	Type	Weight kg/m	Cat.-No.	Description	Type	Weight kg/m	Cat.-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	315 170	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 23.

TWL specially suited for systems with side pull.

Example for Ordering

	Type	Cat.-No.
100 m KTW-System 4pole	KTW 4/100 HS	270 010
1 Line Feed 4pole	KNKS 4/100 HS	250 630
20 Collectors c/w carrier trolleys	STW 4/ 40 HS	270 080



KTW-System in production line



KTW-System for storage/retrieval installations

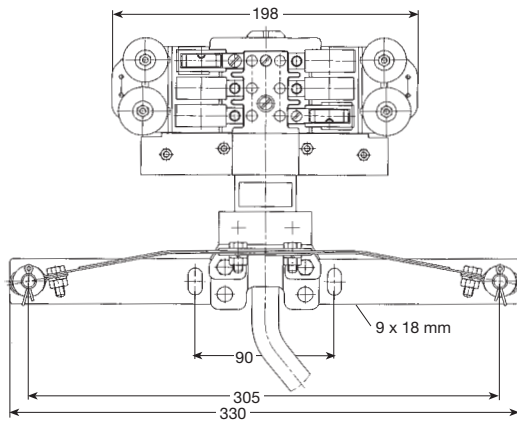
(1) The Powerail section for the line feed ist part of the system length.

(2) For full type designation add suffix of powerail section see example for ordering.

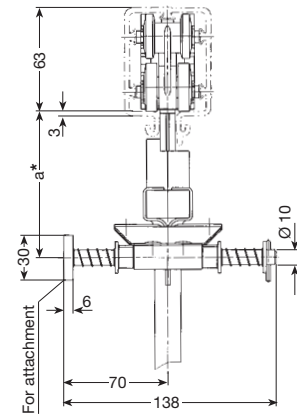


FLEXIBLE TOW ARM CONFIGURATIONS

KBSL
KSL
KSLT



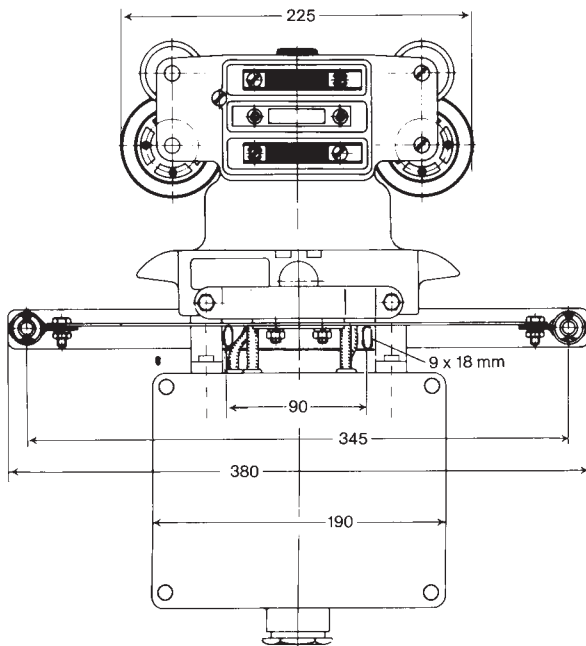
max. horizontal offset ± 15 mm
max. vertical offset ± 10 mm



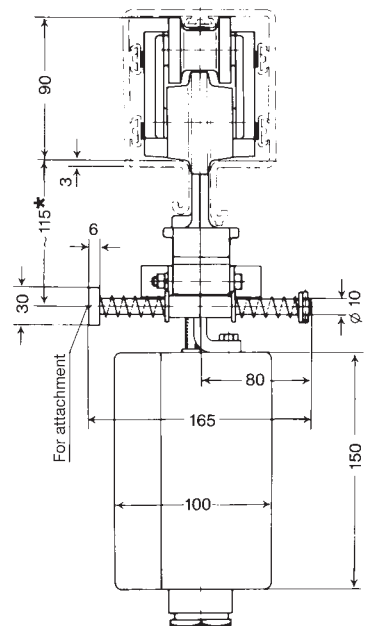
for Collector	SKN	SKNT
Dim. a ⁽¹⁾	95	105

Flexible tow arm KFML with collector SKN

KSG



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



Flexible tow arm GFM with collector KWG/n



CUSTOMER _____ ATTENTION OF _____

ADDRESS _____

TELEPHONE _____ TELEFAX _____

E-MAIL _____ INTERNET _____

1. Type of crane/machine to be electrified _____

2. Voltage _____ Volts- / =: _____ Phases, _____ c/s

3. Length of conductor system _____

4. Number of power conductors: _____ control lines: _____ ground: _____ neutral: _____

5. Indoor Outdoor

6. Special site conditions (humidity, dust, chemical influences etc.) _____

7. Temperature conditions _____ °C min. _____ °C max.

8. Number of cranes/machines supplied by the one system _____

9. Ampere load of each crane/machine _____
(use table on page 30)

10. Permissible voltage drop _____

11. Number and position of feed points* _____

12. Number and position of isolating sections* _____

13. Installation position envisaged* _____

14. Brackets required (see page 8) yes no c/c distance beam/Powerail: _____

15. Max. travelling speed of machinery _____

16. Other important data: _____

* Please submit prints or sketches, also for curved tracks.



QUESTIONNAIRE

To the nearest local VAHLE agency:

Date:

Motordata	Crane 1						Crane 2							
	Power kW	Nominal current			Starting current		Type of motor ⁽¹⁾	Power kW	Nominal current			Starting current		Type of motor ⁽¹⁾
		A	cos φ_N	% ED	A	cos φ_A			A	cos φ_N	% ED	A	cos φ_A	
Hoist motor														
Auxiliary hoist														
Long travel														
Cross travel														

Motordata	Crane 3						Crane 4							
	Power kW	Nominal current			Starting current		Type of motor ⁽¹⁾	Power kW	Nominal current			Starting current		Type of motor ⁽¹⁾
		A	cos φ_N	% ED	A	cos φ_A			A	cos φ_N	% ED	A	cos φ_A	
Hoist motor														
Auxiliary hoist														
Long travel														
Cross travel														

Mark motors* which can operate simultaneously.

Mark motors Δ which can start simultaneously.

⁽¹⁾ Use K for squirrel cage motor

S for slipring motor

F for frequency controlled motor

Further remarks: _____

Signature: _____



for downshop electrification.



for stacker crane electrification.



DQS certified in accordance with DIN EN ISO 9001:2000
OHSAS 18001 (Reg. no. 003140 QM OH)

Catalog No.

Copperhead Conductor Systems	1 a
Battery Charging Systems	1 b
Insulated Conductor Systems U 10	2 a
Insulated Conductor Systems U 20 – U 30 – U 40	2 b
Insulated Conductor Systems U 15 – U 25 – U 35	2 c
Aluminium Enclosed Conductor Systems LSV – LSVG	3 a
Powerail Enclosed Conductor Systems KBSL – KSL – KSLT	4 a
Powerail Enclosed Conductor Systems VKS – VKL	4 b
Powerail Enclosed Conductor System MKLD – MKLF – MKLS	4 c
Powerail Enclosed Conductor System KS-10	4 d
Powerail Enclosed Conductor System KBH	4 e
Heavy Enclosed Conductor Systems	5
Trolley Wire and Accessories	6
Cable Tenders	7
Cable Carriers for □-tracks	8 a
Cable Carriers for Flatform Cable on I-beams	8 bF
Cable Carriers for Round Cable on I-beams	8 bR
Cable Carriers for ◇-tracks	8 c
Conductor Cables and Fittings	8 L
Spring Operated Cable Reels	9 a
VAHLE POWERCOM® – Data Transmission Systems	9 c
CPS® – Contactless Power Supply	9 d
SMG – Slotted Microwave Guide	9 e
WCS – Position Encoding System	9 f
Motor Powered Cable Reels	10

