

ENCLOSED CONDUCTOR SYSTEMS

LSV and LSVG



ALUMINIUM ENCLOSED CONDUCTOR SYSTEMS

INDEX

	Page		Page
Powerail versions (Photos)	2	Transfer Guides, oblique cut	15
Technical Data	2	Heating System	16
Basic Description	3	Anti-condensation Sections	17
Powerail Cat.-Nos. and Weights	4	Telescope Sections	18
Engineering Data and Configurations	5	Expansion Joint Sections	19
Standard Sections & Curves	6	Collectors	20
Joint Material	7	Double Collectors	21
Brackets	8	Tow Arms	22
Hangers	9	Flexible Tow Arm Configurations	23
End Caps	10	Sectionalizing	24
End Feeds	10	Spare Parts	24
Line Feeds	11	Application Photos	25, 27
Transfer and switch Arrangements	12	Examples for ordering	26, 27
Transfer Funnels	13	Basic Dimensions	28
Transfer Guides, straight cut	14	Questionnaire	29, 30



Type LSV



Type LSV with Plastic shielding "FP"



Type LSVG



Type LSVG with sealing strip "D"

Technical Data

Max. continuous current: 300 A (with 80% duty cycle)
 Nominal voltage: 690 V
 Collector rating: 40 A up to 80 A
 min. Bending Radius: LSV 750 mm/ LSVG 1500 mm

Impedance:	16	25	35	50	70	mm ² copper
	1.17	0.72	0.53	0.38	0.28	Ohm/1000 m

Temperature Resistance:

Powerail – 40 °C up to + 100 °C (120 °C)⁽¹⁾
 Sealing strip "D" up to + 80 °C
 Plastic shielding "FP" up to + 55 °C
 Collector – 40 °C/+ 70 °C (120 °C)⁽¹⁾

Resistance:	16	25	35	50	70	mm ² copper
	1.16	0.71	0.51	0.36	0.26	Ohm/1000 m

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

Formulas:

AC:

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

DC:

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

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

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

ΔU_1 = Voltage drop [V]

ΔU_2 = Voltage drop in %

I = Ampere load [A]

V = System Voltage

l = Power feed length [m]

L = System length [m]

Z = Impedance in Ohm/1000 m

R = Resistance in Ohm/1000 m

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.

The number of feed points should be increased in case the drop is exceeding the limitations – or it may be necessary to provide booster cables.



General

The Vahle Aluminium enclosed powerails LSV and LSVG are compact and safe prefabricated Electrification Systems.

These systems are ideal for **indoor and outdoor** use, for all types of installations requiring a moving or movable source of electrical power: cranes, monorails, hoists, electric power tools, machine tools, storage and retrieval systems and many other mobile machinery applications. LSV and LSVG are especially well suited for higher ambient temperatures.

The principal advantages of these systems are maximum electrical and personnel safety, compactness, dependability and minimal maintenance expense. They fully meet all safety requirements; VDE 0470 part 1; Protection IP 23, with sealing strip IP 24 per EN 60529 applies.

In special cases the plastic shielding FP provides additional safety. For the collectors applies protection against contact only if the brushes are complete in the conductor rail.

Conductor rails in the hand area in which the collectors leave the powerail under normal service conditions, must have a protection against contact on site e.g. through barriers or disconnection. This is only necessary at voltages above 25 V AC or 60 V DC. Different cross section combinations, as shown on page 4 are possible. Please consider VDE 0100 part 430 in case of using a N-pole.

The aluminium enclosed LSV 4-pole and the PVC enclosed KSL 4-pole (see cat. 4a) can be combined by means of a transfer piece.

Housing

The system consists of two prefabricated, standardized aluminium profiles which are bolted together. The polarizing long and short lip profiles prevent accidental reversal and avoid phase reversing of collectors (see pages 5 & 6). The lateral arrangement of insulators and copper conductors allows 4-7 conductors in the LSV and 6-11 conductors in the LSVG housing.

The 5, 7, 9 and 11-pole systems use an uninsulated ground conductor (see page 5).

Curved track sections to contour to almost any job requirement can be furnished to order.

We do recommend the anodized version for installations in coastal areas, river valleys or other humid and aggressive environments. Heating systems for icing conditions are available.

All LSV and LSVG housings can be equipped with a Neoprene sealing strip or a Plastic shielding as shown on page 6 of this catalog.

Standard duct sections are 1, 2, 3 or 4 m long; other sections to coincide with your runway requirements are available.

End caps close the open powerail ends.

Couplings

The 60, 100 and 140 Amp. systems use side fish plates for joining adjacent sections;

The 200 and 300 Amp. systems exclusively use bolted joints (see mounting information).

Feed Sets

End feeds or line feeds are available.

End feed boxes 4-11-pole are designed for max. 60 Amperes; line feed boxes rate from 60 to 300 Amperes. Space-saving line feeds with 2 m connection cables are available.

The factory assembled 1 m feed-in tracks integrate in your system length.

Brackets & Hangers

We do recommend to use our standard supporting brackets, page 8 for monorail and hoist applications.

Standard support spacing is 2 m. Up to 3 m support spacing is possible when using joint covers for connecting the duct sections. Use one fix point hanger; all others are sliding hangers (see installation instructions).

Expansion Joint Sections

These expansion joints can compensate for expansion and contraction difference between aluminium housing and copper conductors. They do not interrupt electric current flow.

Telescope & Anti-condensation sections

The telescope devices serve for length-compensation in high temperature fluctuations, for runs exceeding 200 m. For combined indoor/outdoor applications use the anti-condensation section. A separate feeding on both sides of these units is required.

Contact Sections, Turntables, Switches

Powerails 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 as air gap version (5 mm), where the collector carbon bridges the gap, e.g. for mains.

Also available as insulating piece version (30 mm). In this case the insulating piece is longer than the carbon and each powerail section can be separated electrically, e.g. for control.

Collectors

The collectors are made of impact resistant pvc.

The power will be transferred through spring supported brushes. The connection takes place through connecting cables or connection boxes. The mechanical connection to the consumer are provided by towing arms.

With following system requirements double collectors have to be used:

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

The length of the connecting cable should not exceed 3 m, if the fuse is not laid out for this rating. See DIN VDE 0100, part 430 and DIN EN 60204-32.

(Note: A.m. appears often in systems with more than one collector.) The provided connecting cables are sufficient for the quoted nominal current. For the different layout systems have the reduction factor according to DIN VDE 0298-4 be considered.

Safety notice

Please ensure that the arrangement of the collectors (conductor rail) and collector arms made by the customer is according to the safety distance of min. 0.5 m to prevent the danger of crushing.

Note:

In case of use in galvanising plants, pickle shops, aggressive environments, installations in firedamp areas or underneath a drainage area and if low voltage is required we recommend to send us your enquiry with full details (see questionnaire on page 29/30).

For the preparation of quotes and orders we require drawings if the conductor has curves, dead sections, turntables or switches.



TYPES, ENGINEERING DATA AND CATALOG NUMBERS

LSV

Type	HS w PE SS w/o PE	No. of Poles	Ampacity at 80 % ED L1, L2, L3 A	No. of conductors x copper section mm ²			
				L1, L2, L3	⊕ ⁽²⁾	N	Control-Line
LSV 4/ 60 HS		4	60	3 x 16	1 x 16	-	-
LSV 4/ 60 SS	Control line	4	60	-	-	-	4 x 16
LSV 4/100 HS		4	100	3 x 25	1 x 16	-	-
LSV 4/140 HS		4	140	3 x 35	1 x 16	-	-
LSV 4/200 HS ⁽¹⁾		4	200	3 x 50	1 x 25	-	-
LSV 4/300 HS ⁽¹⁾		4	300	3 x 70	1 x 50	-	-
LSV 5/ 60 HS		5	60	3 x 16	1 x 16	1 x 16	-
LSV 5/100 HS		5	100	3 x 25	1 x 16	1 x 25	-
LSV 5/140 HS		5	140	3 x 35	1 x 16	1 x 35	-
LSV 5/200 HS ⁽¹⁾		5	200	3 x 50	1 x 16	1 x 50	-
LSV 5/300 HS ⁽¹⁾		5	300	3 x 70	1 x 16	1 x 70	-
LSV 6/ 60 HS		6	60	3 x 16	1 x 16	-	2 x 16
LSV 6/ 60 SS	Control line	6	60	-	-	-	6 x 16
LSV 6/100 HS		6	100	3 x 25	1 x 16	-	2 x 16
LSV 6/140 HS		6	140	3 x 35	1 x 16	-	2 x 16
LSV 6/200 HS ⁽¹⁾		6	200	3 x 50	1 x 25	-	2 x 16
LSV 7/ 60 HS		7	60	3 x 16	1 x 16	1 x 16	2 x 16
LSV 7/100 HS		7	100	3 x 25	1 x 16	1 x 25	2 x 16
LSV 7/140 HS		7	140	3 x 35	1 x 16	1 x 35	2 x 16
LSV 7/200 HS ⁽¹⁾		7	200	3 x 50	1 x 16	1 x 50	2 x 16

LSVG

LSVG 6/ 60 HS		6	60	3 x 16	1 x 16	-	2 x 16
LSVG 6/ 60 SS	Control line	6	60	-	-	-	6 x 16
LSVG 6/100 HS		6	100	3 x 25	1 x 16	-	2 x 16
LSVG 6/140 HS		6	140	3 x 35	1 x 16	-	2 x 16
LSVG 6/200 HS ⁽¹⁾		6	200	3 x 50	1 x 25	-	2 x 16
LSVG 6/300 HS ⁽¹⁾		6	300	3 x 70	1 x 50	-	2 x 20
LSVG 7/ 60 HS		7	60	3 x 16	1 x 16	1 x 16	2 x 16
LSVG 7/100 HS		7	100	3 x 25	1 x 16	1 x 25	2 x 16
LSVG 7/140 HS		7	140	3 x 35	1 x 16	1 x 35	2 x 16
LSVG 7/200 HS ⁽¹⁾		7	200	3 x 50	1 x 16	1 x 50	2 x 16
LSVG 7/300 HS ⁽¹⁾		7	300	3 x 70	1 x 16	1 x 70	2 x 20
LSVG 8/ 60 HS		8	60	3 x 16	1 x 16	-	4 x 16
LSVG 8/ 60 SS	Control line	8	60	-	-	-	8 x 16
LSVG 8/100 HS		8	100	3 x 25	1 x 16	-	4 x 16
LSVG 8/140 HS		8	140	3 x 35	1 x 16	-	4 x 16
LSVG 8/200 HS ⁽¹⁾		8	200	3 x 50	1 x 25	-	4 x 16
LSVG 9/ 60 HS		9	60	3 x 16	1 x 16	1 x 16	4 x 16
LSVG 9/100 HS		9	100	3 x 25	1 x 16	1 x 25	4 x 16
LSVG 9/140 HS		9	140	3 x 35	1 x 16	1 x 35	4 x 16
LSVG 9/200 HS ⁽¹⁾		9	200	3 x 50	1 x 16	1 x 50	4 x 16
LSVG 10/ 60 HS		10	60	3 x 16	1 x 16	-	6 x 16
LSVG 10/ 60 SS	Control line	10	60	-	-	-	10 x 16
LSVG 10/100 HS		10	100	3 x 25	1 x 16	-	6 x 16
LSVG 10/140 HS		10	140	3 x 35	1 x 16	-	6 x 16
LSVG 10/200 HS ⁽¹⁾		10	200	3 x 50	1 x 25	-	6 x 16
LSVG 11/ 60 HS		11	60	3 x 16	1 x 16	1 x 16	6 x 16
LSVG 11/100 HS		11	100	3 x 25	1 x 16	1 x 25	6 x 16
LSVG 11/140 HS		11	140	3 x 35	1 x 16	1 x 35	6 x 16
LSVG 11/200 HS ⁽¹⁾		11	200	3 x 50	1 x 16	1 x 50	6 x 16

4 ⁽¹⁾ With bolted joints only other types can be delivered with bolted joints without surcharge (on request).

⁽²⁾ The ground conductor ⊕ = PE is always connected to the powerail housing and marked accordingly. The ground bar is uninsulated in the case of 5-, 7-, 9- and 11-pole systems. Mounting configurations see pages 8, 11, 23, 28.

Nominal Voltage V	Leakage Path mm	Weight kg/m	Order- No.	Configurations
690	45	3,000	190 00 •	<p>LSV 4-pole, 60-300 A</p> <p>LSV 5-pole, 60-300 A</p> <p>LSV 6-pole, 60-200 A</p> <p>LSV 7-pole, 60-200 A</p>
690	45	3,000	190 10 •	
690	45	3,400	190 04 •	
690	45	3,700	190 08 •	
690	45	4,300	190 61 •	
690	35	5,000	190 60 •	
690	45	3,150	190 01 •	
690	45	3,550	190 03 •	
690	45	3,850	190 05 •	
690	45	4,450	190 62 •	
690	35	5,150	190 63 •	
690	45	3,300	190 02 •	
690	45	3,300	190 11 •	
690	45	3,700	190 06 •	
690	45	4,000	190 64 •	
690	45	4,480	195 52 •	
690	45	3,450	190 07 •	
690	45	3,850	190 09 •	
690	45	4,250	190 65 •	
690	45	4,730	195 60 •	

690	45	5,150	180 00 •	<p>LSVG 6-pole, 60-300 A</p> <p>LSVG 7-pole, 60-300 A</p> <p>LSVG 8-pole, 60-300 A</p> <p>LSVG 9-pole, 60-300 A</p> <p>LSVG 10-pole, 60-300 A</p> <p>LSVG 11-pole, 60-300 A</p>
690	45	5,150	180 22 •	
690	45	5,450	180 01 •	
690	45	5,750	180 02 •	
690	45	6,300	180 03 •	
690	35	7,250	180 04 •	
690	45	5,300	180 05 •	
690	45	5,700	180 06 •	
690	45	6,100	180 07 •	
690	45	6,700	180 08 •	
690	35	7,400	180 09 •	
690	45	5,450	180 10 •	
690	45	5,450	180 23 •	
690	45	5,750	180 11 •	
690	45	6,050	180 12 •	
690	45	6,530	184 58 •	
690	45	5,600	180 13 •	
690	45	6,000	180 14 •	
690	45	6,400	180 15 •	
690	45	6,940	184 59 •	
690	45	5,750	180 16 •	
690	45	5,750	180 24 •	
690	45	6,050	180 17 •	
690	45	6,350	180 18 •	
690	45	6,830	184 60 •	
690	45	5,900	180 19 •	
690	45	6,300	180 20 •	
690	45	6,700	180 21 •	
690	45	7,240	184 61 •	

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

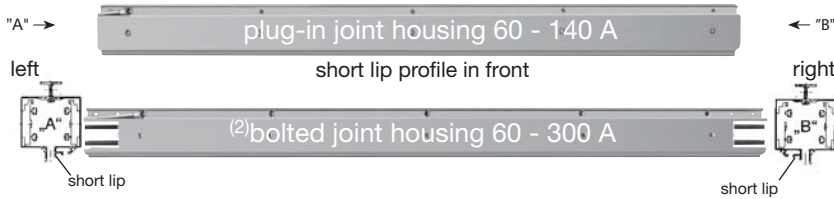
Numbers in parenthesis are used for control circuit applications.



STANDARD SECTION MAX. 4 M

CURVED SECTION

LSV

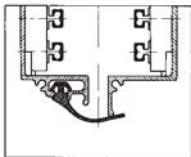


Extra finish of LSV; surcharge Order- No.

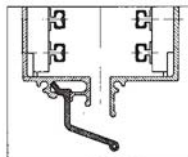
Type	Index E	Index I	
	anodized housing Order- No.	copper conductors with stainless steel cap Order- No. 60 A	Order- No. 200 A
LSV 4-pole	190 660	194 754	194 755
LSV 5-pole	190 670	194 756	194 757
LSV 6-pole	190 660	194 758	-
LSV 7-pole	190 670	194 760	-

Supplements for LSV:

Illustration see page 2	Type	Weight kg/m	Order- No.
Neoprene sealing strip	D	0,225	254 751
Fastener for sealing strip (pair)			258 432
Coupling for sealing strip for length exceeding 50 m			258 300
Mounting trolley for sealing strip			258 345
Plastic shielding ⁽¹⁾ incl. locking pin for plastic shielding	FP	0,260	196 574

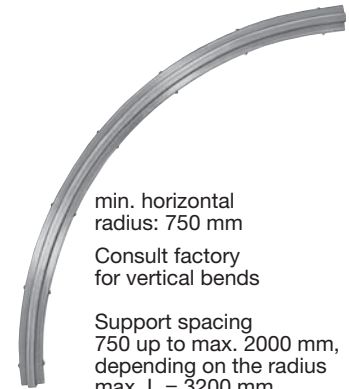


Neoprene sealing strip



Plastic shielding

Custom built



min. horizontal radius: 750 mm

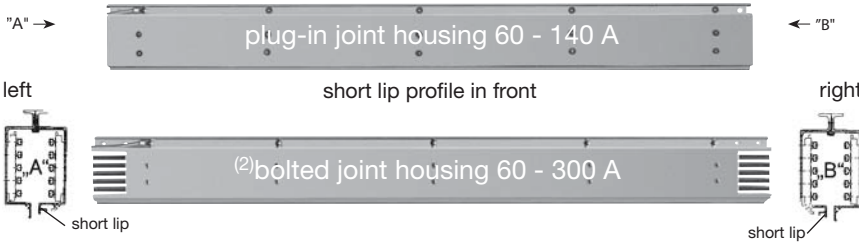
Consult factory for vertical bends

Support spacing 750 up to max. 2000 mm, depending on the radius max. L = 3200 mm, max. $\alpha = 120^\circ$

surcharge	Order- No.
horizontal curve L max. 1.8 m	194 420
horizontal curve L from 1.8 m to max. 3.2 m	195 285

Long lip side of powerail should always be mounted towards the track (see page 28). Notify exceptions for replacements and/or extensions and determine correct curves.

LSVG

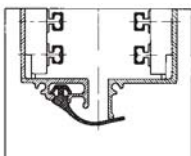


Extra finish of LSVG; surcharge Order- No.

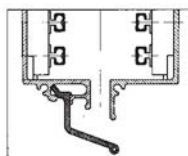
Type	Index E	Index I	
	anodized housing Order- No.	copper conductors with stainless steel cap Order- No. 60 A	Order- No. 200 A
LSVG 6-pole	180 250	183 871	183 872
LSVG 7-pole	180 260	183 873	183 874
LSVG 8-pole	180 250	183 875	-
LSVG 9-pole	180 260	183 877	-
LSVG 10-pole	180 250	183 879	-
LSVG 11-pole	180 260	183 881	-

Supplements for LSVG:

Illustration see page 2	Type	Weight kg/m	Order- No.
Neoprene sealing strip	D	0,225	254 751
Fastener for sealing strip (pair)			258 432
Coupling for sealing strip for length exceeding 50 m			258 300
Mounting trolley for sealing strip			184 033
Plastic shielding ⁽¹⁾ incl. locking pin for plastic shielding	FP	0,260	196 574



Neoprene sealing strip



Plastic shielding

Custom built



min. horizontal radius: 1500 mm

Consult factory for vertical bends

Support spacing 750 up to max. 2000 mm, depending on the radius max. L = 3200 mm, max. $\alpha = 120^\circ$

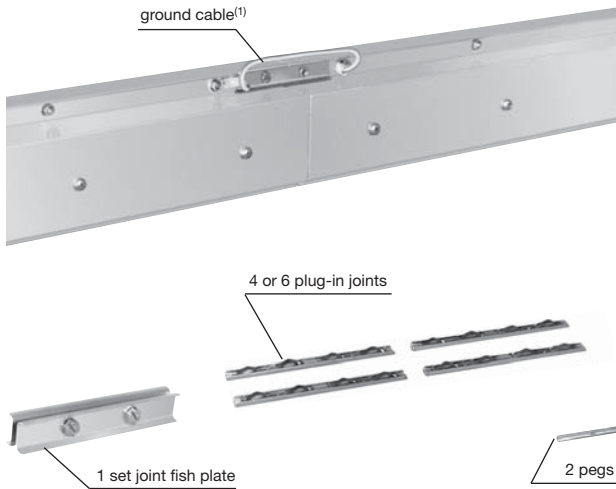
surcharge	Order- No.
horizontal curve L max. 1.8 m	183 810
horizontal curve L from 1.8 m to max. 3.2 m	184 170

Long lip side of powerail should always be mounted towards the track (see page 28). Notify exceptions for replacements and/or extensions and determine correct curves.

⁽¹⁾ Plastic shielding FP not for curves.

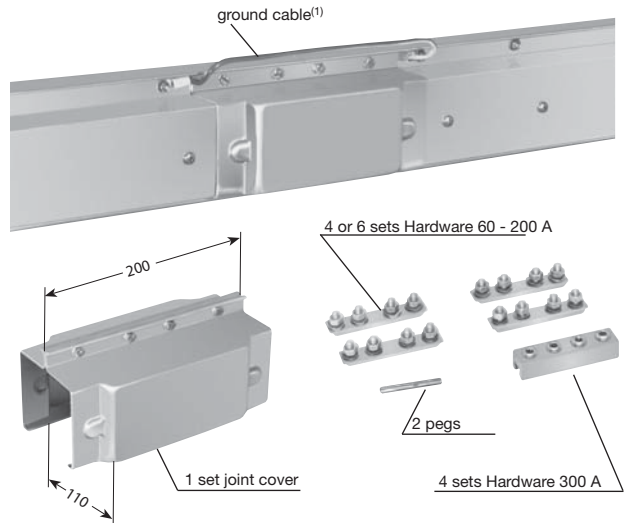
⁽²⁾ All other types are to be delivered with bolted joints w/o surcharge.

Plug-in joints 60-140 A



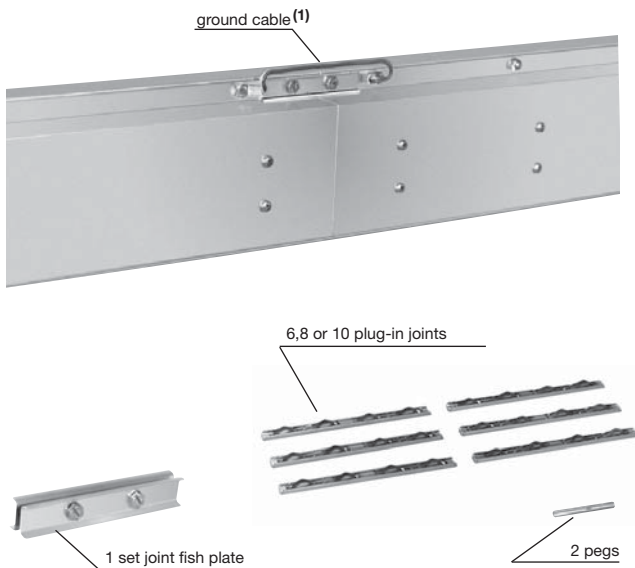
Type		Weight kg	Order- No.
VBL 4/5	for 4- and 5-pole	0,110	195 244
VBL 6/7	for 6- and 7-pole	0,140	195 246

Bolted joints 60-300 A



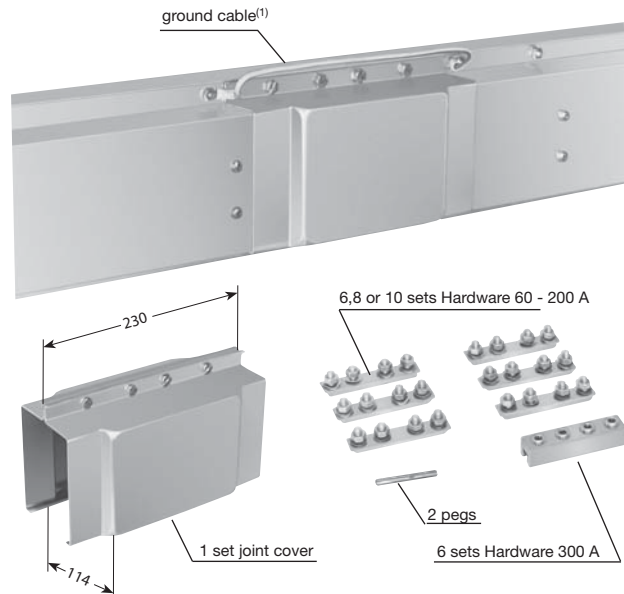
Type		Weight kg	Order- No.	Order- No. anodized
VBL 4/5	for 4- and 5-pole	0,450	195 248	-
VBL/E 4/5	60-200 Amp.	0,450	-	195 255
VBL 6/7	for 6- and 7-pole	0,505	195 250	-
VBL/E 6/7	60-200 Amp.	0,505	-	195 259
VBLSG 4/5	for 4- and 5-pole	0,605	195 252	-
VBLSG/E 4/5	300 Amp.	0,605	-	195 256

Plug-in joints 60-140 A



Type		Weight kg	Order- No.
VLG 6/7	for 6- and 7-pole	0,135	184 107
VLG 8/9	for 8- and 9-pole	0,165	184 109
VLG 10/11	for 10- and 11-pole	0,195	184 111

Bolted joints 60-300 A



Type		Weight kg	Order- No.	Order- No. anodized
VLGS 6/7	for 6- and 7-pole	0,665	184 113	-
VLGS/E 6/7	60-200 Amp.	0,665	-	184 121
VLGS 8/9	for 8- and 9-pole	0,720	184 115	-
VLGS/E 8/9	60-200 Amp.	0,720	-	184 125
VLGS 10/11	for 10- and 11-pole	0,770	184 117	-
VLGS/E 10/11	60-200 Amp.	0,770	-	184 127
VLGSG 6/7	for 6- and 7-pole	0,890	184 119	-
VLGSG/E 6/7	300 Amp.	0,890	-	184 122

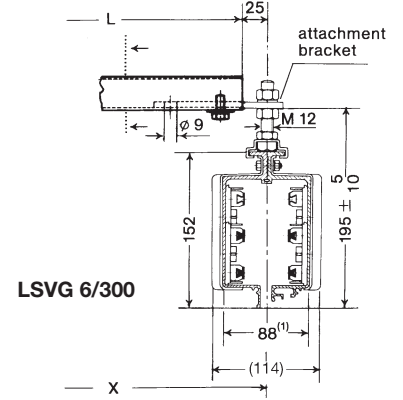
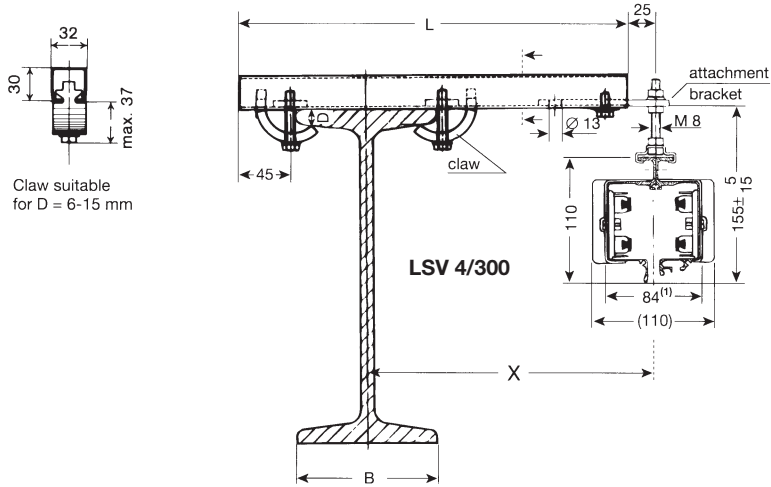
(1) Yellow/green ground cable factory pre-assembled.
 (2) No joints required for uninsulated top conductors 5, 7, 9 and 11. Equal for power line and control line.



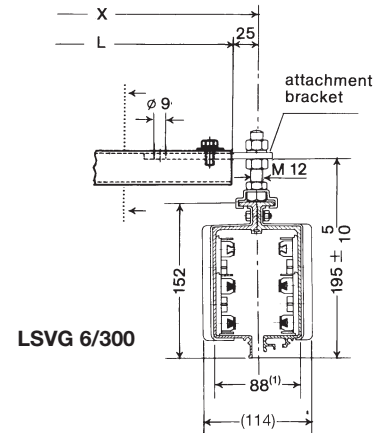
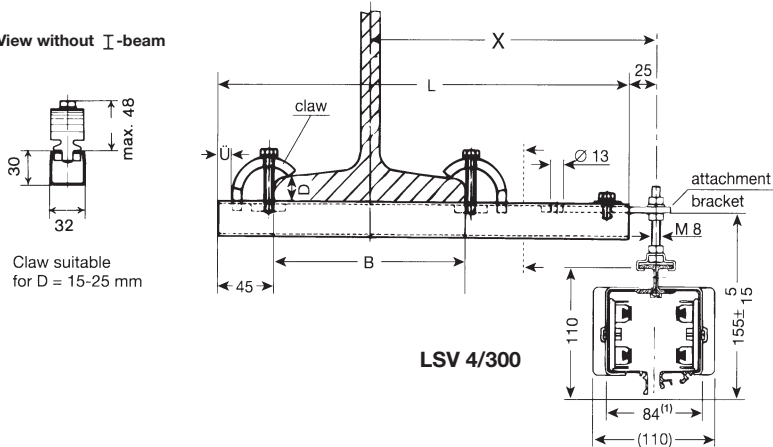
BRACKETS

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

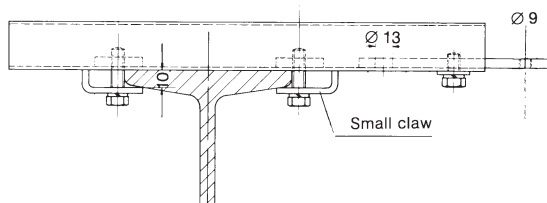
View without I-beam



View without I-beam



EHKL small claw version



Attention:
Make sure that hoist wheels have enough clearance.
Use small claw if necessary!

□ -rail of EHKL is identical to type S 1, Order- No.

Select next larger size bracket when your I-beam dimension B is more than 170 mm and up to 300 mm.

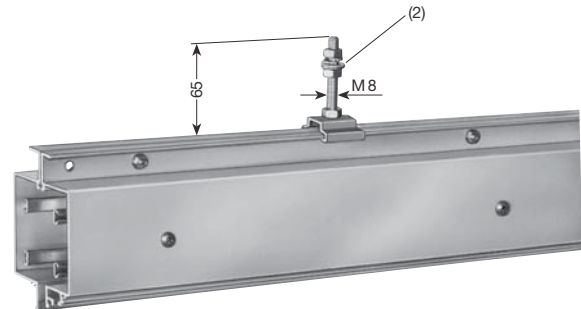
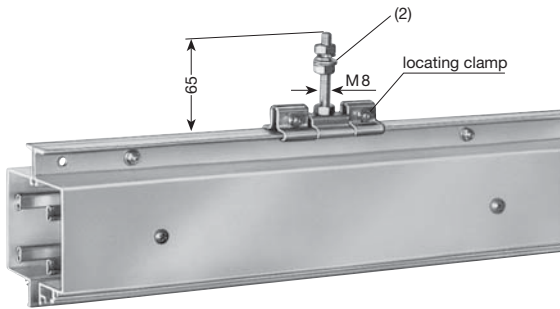
	Type	X mm	L mm	B max. mm	Weight kg	Order- No. for std. brackets	Order- No. with small claw	
LSV	LSVG	EHK 250	250	350	170	1,070	251 600	251 720
		EHK 300	300	400	170	1,150	251 610	251 730
		EHK 400	400	500	170	1,300	251 620	251 740
		EHK 500	500	600	170	1,450	251 630	251 750
	EHK	EHK 600	600	700	170	1,600	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

FIXPOINT HANGER⁽¹⁾

SLIDING HANGER⁽¹⁾



LSV



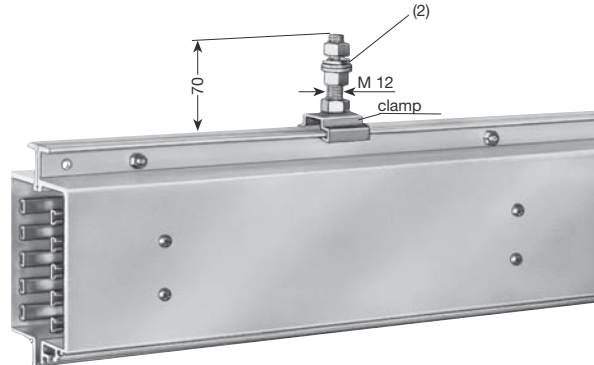
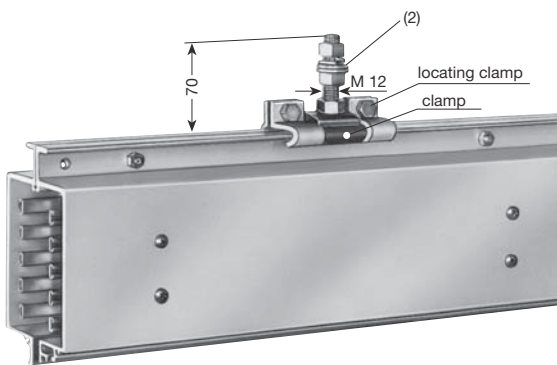
Type	Weight kg	Order- No.
FAL	0,150	190 120

Type	Weight kg	Order- No.
GAL	0,080	190 130

All steel parts made of stainless steel.

All steel parts made of stainless steel.

LSVG



Type	Weight kg	Order- No.
SAFG	0,410	180 310

Type	Weight kg	Order- No.
SAS	0,175	200 160

Steel parts galvanized, clamp made of stainless steel.

Steel parts galvanized, clamp made of stainless steel.

⁽¹⁾ Illustrations show hangers mounted to powerail.
⁽²⁾ Flat washers only to be used in slotted holes.



END CAP⁽¹⁾

END FEED⁽²⁾

c/w 1 m powerail

LSV



Plastic cap with plug-in joints

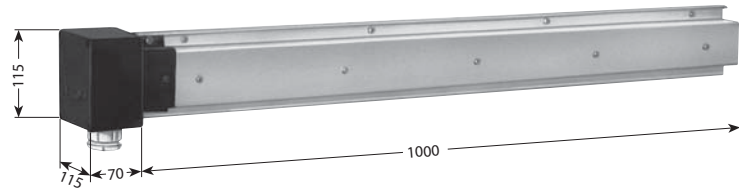
Type	Weight kg	Order- No.
EKL	0,080	190 220



Aluminium cap with bolted joints

Type	Weight kg	Order- No.
EKLS	0,300	195 149
EKLS/E	0,300	195 303

L = LH version, R = RH version
(see page 6)



Cable glands (cable Ø see table page 28):
4 & 5-pole 1 x M 32
6 & 7-pole 1 x M 32
and 1 x M 255

Type ⁽³⁾	Order- No.	Type ⁽³⁾	A	Weight kg	Order- No.
Power line HS with PE		Power line HS with PE			
KEL 4/60 L	192 150	KEL 4/60 R	60	3.35	190 140
KEL 5/60 L	192 160	KEL 5/60 R	60	3.55	190 150
KEL 6/60 L	192 170	KEL 6/60 R	60	3.75	190 160
KEL 7/60 L	192 180	KEL 7/60 R	60	3.95	190 170
Control line SS without PE		Control line SS without PE			
KEL 4/60 L	190 240	KEL 4/60 R	60	3.35	190 250
KEL 6/60 L	190 260	KEL 6/60 R	60	3.75	190 390

LSVG



Plastic cap with plug-in joints

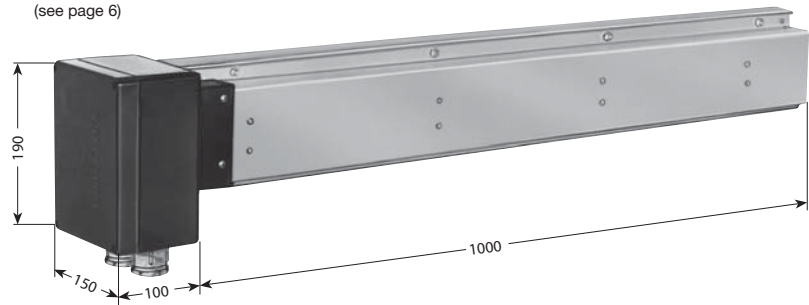
Type	Weight kg	Order- No.
EKLG	0,120	180 320



Aluminium cap with bolted joints

Type	Weight kg	Order- No.
EKLGS	0,450	184 100
EKLGS/E	0,450	184 177

L = LH version ⁽¹⁾, R = RH version
(see page 6)



Cable glands (cable Ø see table page 28):
all types 1 x M 32
and 1 x M 25

Type ⁽³⁾	Order- No.	Type ⁽³⁾	A	Weight kg	Order- No.
Power line HS with PE		Power line HS with PE			
KELG 6/60 L	180 330	KELG 6/60 R	60	6.05	180 340
KELG 7/60 L	180 350	KELG 7/60 R	60	6.25	180 360
KELG 8/60 L	180 370	KELG 8/60 R	60	6.40	180 380
KELG 9/60 L	180 430	KELG 9/60 R	60	6.60	180 440
KELG 10/60 L	180 450	KELG 10/60 R	60	6.80	180 460
KELG 11/60 L	180 470	KELG 11/60 R	60	7.00	180 480
Control line SS without PE		Control line SS without PE			
KELG 6/60 L	180 390	KELG 6/60 R	60	6.05	180 400
KELG 8/60 L	180 410	KELG 8/60 R	60	6.40	180 420
KELG 10/60 L	180 490	KELG 10/60 R	60	6.80	180 500

(1) Illustration shows end cap with standard section.
 (2) Above sections come ready assembled on 1m section and are part of the system length (see examples for ordering pages 26 and 27).
 (3) Suffix types e.g. KEL 4/60 L w/ PE → KEL 4/60 L **HS** Order- No. 192 150.

LINE FEED⁽¹⁾

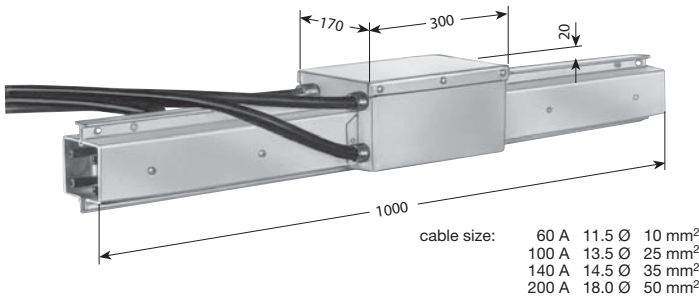
c/w 2 m feed-in cable and 1 m powerail

LINE FEED⁽¹⁾

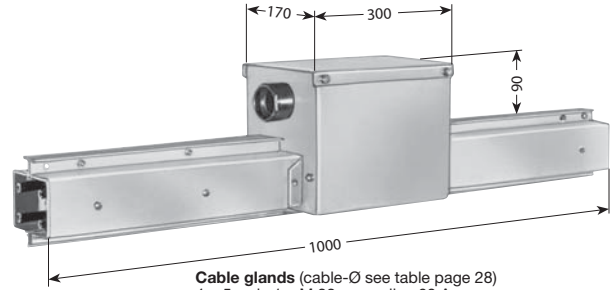
c/w terminal box and 1 m powerail



LSV

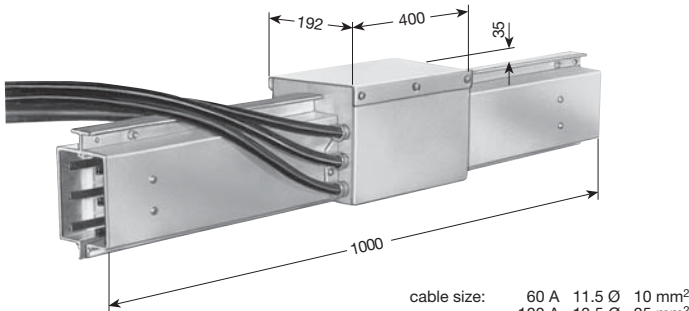


cable size: 60 A 11.5 Ø 10 mm²
100 A 13.5 Ø 25 mm²
140 A 14.5 Ø 35 mm²
200 A 18.0 Ø 50 mm²

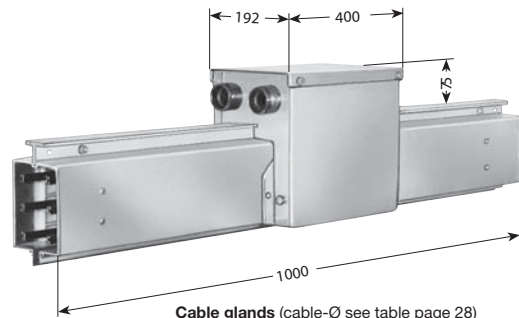


Cable glands (cable-Ø see table page 28)
4 + 5-pole 1 x M 32 power line 60 A
4 + 5-pole 1 x M 50 power line 100 und 140 A
4 + 5-pole 1 x M 50 power line 200 A
4 + 5-pole 1 x M 63 power line 300 A
6 + 7-pole 1 x M 32 and 1 x M 25 power line 60 A
6 + 7-pole 1 x M 50 and 1 x M 25 power line 100 und 140 A
6 + 7-pole 1 x M 50 and 1 x M 25 power line 200 A
4 + 6-pole 1 x M 32 control line 60 A

Type ⁽²⁾	A	Weight kg	Order-No.	Type ⁽²⁾	A	Weight kg	Order-No.	Type ⁽²⁾	A	Weight kg	Order-No.	Type ⁽²⁾	A	Weight kg	Order-No.
Power line HS with PE				Power line HS with PE				Power line HS with PE				Power line HS with PE			
LAL 4/ 60	60	5,65	195 060	LAL 6/ 60	60	6,65	195 067	NKL 4/ 60	60	4,40	195 074	NKL 6/ 60	60	4,80	195 085
LAL 4/100	100	6,55	195 061	LAL 6/100	100	7,80	195 068	NKL 4/100	100	4,80	195 075	NKL 6/100	100	5,20	195 086
LAL 4/140	140	7,40	195 062	LAL 6/140	140	8,45	195 069	NKL 4/140	140	5,10	195 076	NKL 6/140	140	5,50	195 087
LAL 4/200	200	8,00	195 637	LAL 6/200	200	8,95	195 639	NKL 4/200	200	5,80	195 077	NKL 6/200	200	6,00	195 567
LAL 4/300	300	8,75	196 460					NKL 4/300	300	6,50	195 078	NKL 7/ 60	60	5,00	195 089
LAL 5/ 60	60	6,10	195 064	LAL 7/ 60	60	7,15	195 071	NKL 5/ 60	60	4,60	195 080	NKL 7/100	100	5,40	195 090
LAL 5/100	100	7,00	195 065	LAL 7/100	100	9,00	195 072	NKL 5/100	100	5,00	195 081	NKL 7/140	140	5,70	195 091
LAL 5/140	140	8,25	195 066	LAL 7/140	140	9,25	195 073	NKL 5/140	140	5,30	195 082	NKL 7/200	200	6,30	195 568
LAL 5/200	200	8,85	195 638	LAL 7/200	200	9,80	195 640	NKL 5/200	200	6,00	195 083				
LAL 5/300	300	9,75	196 682					NKL 5/300	300	6,70	195 084				
Control line SS without PE												Control line SS without PE			
LAL 4/ 60	60	5,65	195 063									NKL 4/ 60	60	4,40	195 079
LAL 6/ 60	60	6,65	195 070									NKL 6/ 60	60	4,80	195 088



cable size: 60 A 11.5 Ø 10 mm²
100 A 13.5 Ø 25 mm²
140 A 14.5 Ø 35 mm²
200 A 18.0 Ø 50 mm²



Cable glands (cable-Ø see table page 28)
6-11-pole 1 x M 32 and 1 x M 25 power line 60 A
6-11-pole 1 x M 50 and 1 x M 25 power line 100 und 140 A
6+ 7-pole 1 x M 50 and 1 x M 25 power line 200 A
6+ 7-pole 1 x M 63 and 1 x M 25 power line 300 A
6, 8 and 10-pole 2 x M 25 control line 60 A

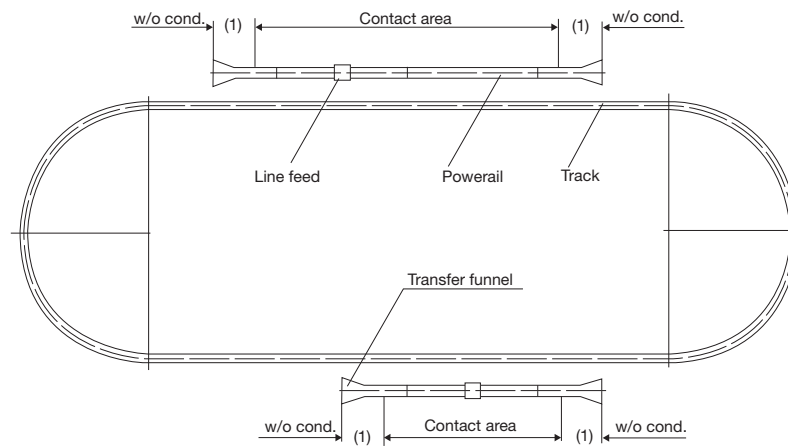
Type ⁽²⁾	A	Weight kg	Order-No.	Type ⁽²⁾	A	Weight kg	Order-No.	Type ⁽²⁾	A	Weight kg	Order-No.	Type ⁽²⁾	A	Weight kg	Order-No.
Power line HS with PE				Power line HS with PE				Power line HS with PE				Power line HS with PE			
LALG 6/ 60	60	8,60	183 949	LALG 9/ 60	60	10,15	183 960	NKLG 6/ 60	60	6,75	184 983	NKLG 9/ 60	60	7,35	185 049
LALG 6/100	100	9,40	183 950	LALG 9/100	100	11,05	183 961	NKLG 6/100	100	7,05	184 985	NKLG 9/100	100	7,65	185 051
LALG 6/140	140	10,30	183 951	LALG 9/140	140	12,15	183 962	NKLG 6/140	140	7,35	185 029	NKLG 9/140	140	7,95	185 053
LALG 6/200	200	10,80	184 661	LALG 9/200	200	12,70	184 664	NKLG 6/200	200	7,90	185 031	NKLG 9/200	200	8,50	185 055
LALG 6/300	300	11,95	185 713					NKLG 6/300	300	8,85	185 079	NKLG 10/ 60	60	7,55	185 057
LALG 7/ 60	60	9,10	183 953	LALG 10/ 60	60	10,65	183 963	NKLG 7/ 60	60	6,95	185 033	NKLG 10/100	100	7,85	185 059
LALG 7/100	100	10,10	183 954	LALG 10/100	100	11,45	183 964	NKLG 7/100	100	7,25	185 035	NKLG 10/140	140	8,15	185 061
LALG 7/140	140	11,10	183 955	LALG 10/140	140	12,30	183 965	NKLG 7/140	140	7,55	185 037	NKLG 10/200	200	8,65	185 063
LALG 7/200	200	11,65	184 662	LALG 10/200	200	12,80	184 665	NKLG 7/200	200	8,10	185 039	NKLG 11/ 60	60	7,75	185 065
LALG 7/300	300	12,85	185 714					NKLG 7/300	300	9,05	185 081	NKLG 11/100	100	8,05	185 067
LALG 8/ 60	60	9,60	183 956	LALG 11/ 60	60	11,15	183 967	NKLG 8/ 60	60	7,15	185 041	NKLG 11/140	140	8,35	185 069
LALG 8/100	100	10,45	183 957	LALG 11/100	100	12,10	183 968	NKLG 8/100	100	7,45	185 043	NKLG 11/200	200	8,90	185 071
LALG 8/140	140	11,30	183 958	LALG 11/140	140	13,15	183 969	NKLG 8/140	140	7,75	185 045				
LALG 8/200	200	11,80	184 663	LALG 11/200	200	13,70	184 666	NKLG 8/200	200	8,25	185 047				
Control line SS without PE												Control line SS without PE			
LALG 6/60	60	8,60	183 952									NKLG 6/ 60	60	6,75	185 073
LALG 8/60	60	9,60	183 959									NKLG 8/ 60	60	7,15	185 075
LALG 10/60	60	10,65	183 966									NKLG 10/ 60	60	7,55	185 077

LSVG

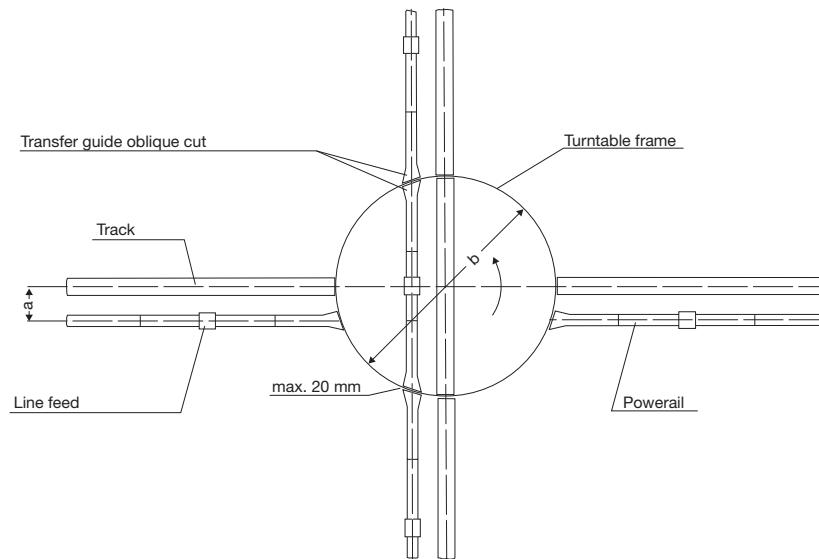
⁽¹⁾ Above sections come ready assembled on 1 m powerail section and are a part of the system length (see examples for ordering on pages 26 and 27).

⁽²⁾ Suffix types e.g. LAL 4/60 w/ PE → LAL 4/60 **HS** Order-No. 195 060.

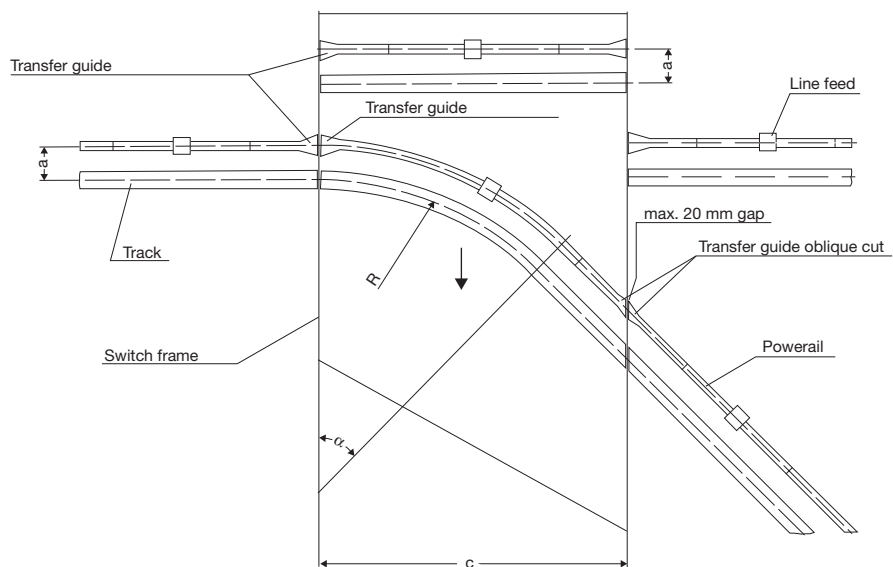
Contact section⁽¹⁾



Turntable



Sliding switch



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

TRANSFER FUNNEL(2)

c/w 0.5 m powerail and joint material



LSV

Towing arms KFM or KFML (see page 22) required. Lateral tolerance upto max. 15 mm, vertical tolerance upto max. 10 mm.
 Max. entry speed collector unit: 60 m/min.
 Connect the conductor to mains only if all carbons of the collector have full contact to the conductor rail.
 Arrangement see page 12.

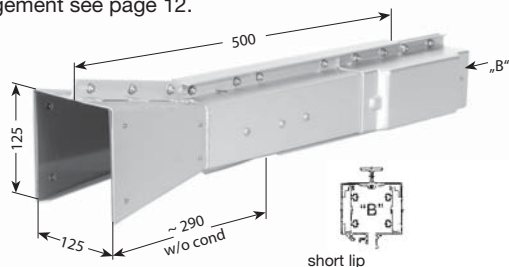


Illustration shows L. H. version
 short lip in front
 (see page 6)

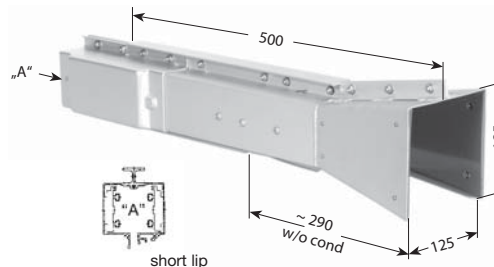


Illustration shows R. H. version
 short lip in front
 (see page 6)

Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.
Power line HS with PE			Power line HS with PE			Power line HS with PE			Power line HS with PE		
ETL 4/ 60 L	1,450	192 890	ETL 6/ 60 L	1,500	192 990	ETL 4/ 60 R	1,450	193 070	ETL 6/ 60 R	1,500	193 170
ETL 4/100 L	1,500	192 900	ETL 6/100 L	1,600	193 000	ETL 4/100 R	1,500	193 080	ETL 6/100 R	1,600	193 180
ETL 4/140 L	1,600	192 910	ETL 6/140 L	1,650	193 010	ETL 4/140 R	1,600	193 090	ETL 6/140 R	1,650	193 190
ETL 4/200 L	1,700	192 920	ETL 6/200 L	1,750	195 610	ETL 4/200 R	1,700	193 100	ETL 6/200 R	1,750	195 611
ETL 4/300 L	1,800	192 930	ETL 7/ 60 L	1,550	193 020	ETL 4/300 R	1,800	193 110	ETL 7/ 60 R	1,550	193 200
ETL 5/ 60 L	1,500	192 940	ETL 7/100 L	1,600	193 030	ETL 5/ 60 R	1,500	193 120	ETL 7/100 R	1,600	193 210
ETL 5/100 L	1,550	192 950	ETL 7/140 L	1,700	193 040	ETL 5/100 R	1,550	193 130	ETL 7/140 R	1,700	193 220
ETL 5/140 L	1,650	192 960	ETL 7/200 L	1,820	195 612	ETL 5/140 R	1,650	193 140	ETL 7/200 R	1,820	195 613
ETL 5/200 L	1,750	192 970	Control line SS without PE			ETL 5/200 R	1,750	193 150	Control line SS without PE		
ETL 5/300 L	1,900	192 980	ETL 4/ 60 L	1,450	193 050	ETL 5/300 R	1,900	193 160	ETL 4/ 60 R	1,450	193 230
			ETL 6/ 60 L	1,500	193 060				ETL 6/ 60 R	1,500	193 240

Towing arms KFM or KFML (see page 22) required. Lateral tolerance upto max. 15 mm, vertical tolerance upto max. 10 mm.
 Max. entry speed collector unit: 60 m/min.
 Connect the conductor to mains only if all carbons of the collector have full contact to the conductor rail.
 Arrangement see page 12.

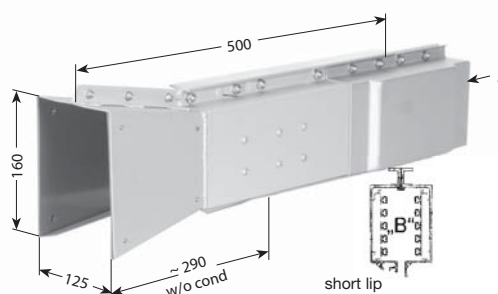


Illustration shows L. H. version
 short lip in front
 (see page 6)

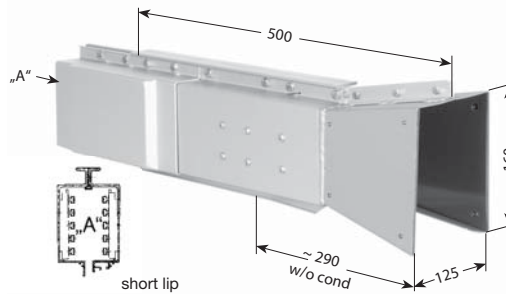


Illustration shows R. H. version
 short lip in front
 (see page 6)

Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.
Power line HS with PE			Power line HS with PE			Power line HS with PE			Power line HS with PE		
ETLG 6/ 60 L	2,500	181 970	ETLG 9/ 60 L	2,600	182 230	ETLG 6/ 60 R	2,500	181 980	ETLG 9/ 60 R	2,600	182 240
ETLG 6/100 L	2,550	181 990	ETLG 9/100 L	2,700	182 250	ETLG 6/100 R	2,550	182 000	ETLG 9/100 R	2,700	182 260
ETLG 6/140 L	2,650	182 010	ETLG 9/140 L	2,750	182 270	ETLG 6/140 R	2,650	182 020	ETLG 9/140 R	2,750	182 280
ETLG 6/200 L	2,750	182 030	ETLG 9/200 L	2,870	184 621	ETLG 6/200 R	2,750	182 040	ETLG 9/200 R	2,870	184 625
ETLG 6/300 L	2,950	182 050	ETLG 10/ 60 L	2,650	182 290	ETLG 6/300 R	2,950	182 060	ETLG 10/ 60 R	2,650	182 300
ETLG 7/ 60 L	2,550	182 070	ETLG 10/100 L	2,700	182 310	ETLG 7/ 60 R	2,550	182 080	ETLG 10/100 R	2,700	182 320
ETLG 7/100 L	2,600	182 090	ETLG 10/140 L	2,750	182 330	ETLG 7/100 R	2,600	182 100	ETLG 10/140 R	2,750	182 340
ETLG 7/140 L	2,700	182 110	ETLG 10/200 L	2,850	184 622	ETLG 7/140 R	2,700	182 120	ETLG 10/200 R	2,850	184 626
ETLG 7/200 L	2,800	182 130	ETLG 11/ 60 L	2,650	182 350	ETLG 7/200 R	2,800	182 140	ETLG 11/ 60 R	2,650	182 360
ETLG 7/300 L	2,950	182 150	ETLG 11/100 L	2,750	182 370	ETLG 7/300 R	2,950	182 160	ETLG 11/100 R	2,750	182 380
ETLG 8/ 60 L	2,600	182 170	ETLG 11/140 L	2,800	182 390	ETLG 8/ 60 R	2,600	182 180	ETLG 11/140 R	2,800	182 400
ETLG 8/100 L	2,650	182 190	ETLG 11/200 L	2,920	184 623	ETLG 8/100 R	2,650	182 200	ETLG 11/200 R	2,920	184 627
ETLG 8/140 L	2,700	182 210	Control line SS without PE			ETLG 8/140 R	2,700	182 220	Control line SS without PE		
ETLG 8/200 L	2,800	184 620	ETLG 6/ 60 L	2,500	182 410	ETLG 8/200 R	2,800	184 624	ETLG 6/ 60 R	2,500	182 420
			ETLG 8/ 60 L	2,600	182 430				ETLG 8/ 60 R	2,600	182 440
			ETLG 10/ 60 L	2,650	182 450				ETLG 10/ 60 R	2,650	182 460

(1) All transfer funnels are 0.5 m long and are a part of the system length.
 (2) Suffix types e.g. ETL 4/60 w/ PE → ETL 4/60 HS Order- No. 192 890.



TRANSFER GUIDE, STRAIGHT CUT⁽¹⁾

€/w 0.5 m powerail

LSV

for turntables, switches and spurlines,

staggered arrangement of the transfer guides to each other: horizontal max. 5 mm, vertical max. 3 mm
Max. travel speed collector unit: 80m/min.

applications see page 12

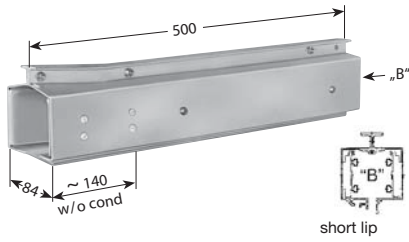


Illustration shows L. H. version
short lip in front
(see page 6)

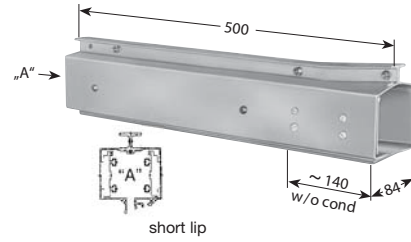


Illustration shows R. H. version
short lip in front
(see page 6)

Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.
Power line HS with PE			Power line HS with PE			Power line HS with PE			Power line HS with PE		
AÜL 4/ 60 L	1,400	192 190	AÜL 6/ 60 L	1,500	192 390	AÜL 4/ 60 R	1,400	192 200	AÜL 6/ 60 R	1,500	192 400
AÜL 4/100 L	1,550	192 210	AÜL 6/100 L	1,650	192 410	AÜL 4/100 R	1,550	192 220	AÜL 6/100 R	1,650	192 420
AÜL 4/140 L	1,650	192 230	AÜL 6/140 L	1,750	192 430	AÜL 4/140 R	1,650	192 240	AÜL 6/140 R	1,750	192 440
AÜL 4/200 L	1,800	192 250	AÜL 6/200 L	1,900	195 614	AÜL 4/200 R	1,800	192 260	AÜL 6/200 R	1,900	195 615
AÜL 4/300 L	2,050	192 270	AÜL 7/ 60 L	1,550	192 450	AÜL 4/300 R	2,050	192 280	AÜL 7/ 60 R	1,550	192 460
AÜL 5/ 60 L	1,450	192 290	AÜL 7/100 L	1,700	192 470	AÜL 5/ 60 R	1,450	192 300	AÜL 7/100 R	1,700	192 480
AÜL 5/100 L	1,600	192 310	AÜL 7/140 L	1,850	192 490	AÜL 5/100 R	1,600	192 320	AÜL 7/140 R	1,850	192 500
AÜL 5/140 L	1,750	192 330	AÜL 7/200 L	2,020	195 616	AÜL 5/140 R	1,750	192 340	AÜL 7/200 R	2,020	195 617
AÜL 5/200 L	1,950	192 350	Control line SS without PE			AÜL 5/200 R	1,950	192 360	Control line SS without PE		
AÜL 5/300 L	2,150	192 370	AÜL 4/ 60 L	1,400	192 510	AÜL 5/300 R	2,150	192 380	AÜL 4/ 60 R	1,400	192 520
			AÜL 6/ 60 L	1,500	192 530				AÜL 6/ 60 R	1,500	192 540

LSVG

for turntables, switches and spurlines,

staggered arrangement of the transfer guides to each other: horizontal max. 5 mm, vertical max. 3 mm
Max. travel speed collector unit: 80m/min.

applications see page 12

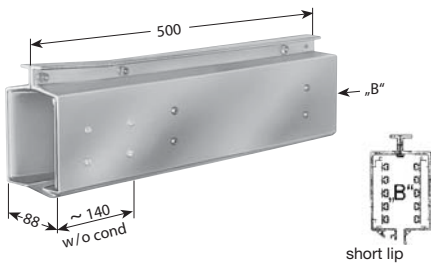


Illustration shows L. H. version
short lip in front
(see page 6)

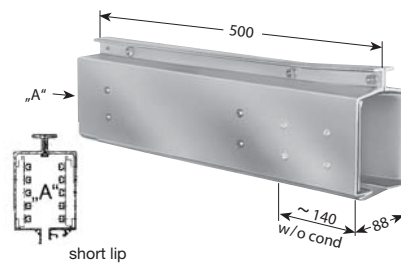


Illustration shows R. H. version
short lip in front
(see page 6)

Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.
Power line HS with PE			Power line HS with PE			Power line HS with PE			Power line HS with PE		
AÜLG 6/ 60 L	2,500	180 970	AÜLG 9/ 60 L	2,700	181 230	AÜLG 6/ 60 R	2,500	180 980	AÜLG 9/ 60 R	2,700	181 240
AÜLG 6/100 L	2,600	180 990	AÜLG 9/100 L	2,800	181 250	AÜLG 6/100 R	2,600	181 000	AÜLG 9/100 R	2,800	181 260
AÜLG 6/140 L	2,700	181 010	AÜLG 9/140 L	2,950	181 270	AÜLG 6/140 R	2,700	181 020	AÜLG 9/140 R	2,950	181 280
AÜLG 6/200 L	2,900	181 030	AÜLG 9/200 L	3,120	184 629	AÜLG 6/200 R	2,900	181 040	AÜLG 9/200 R	3,120	184 633
AÜLG 6/300 L	3,250	181 050	AÜLG 10/ 60 L	2,750	181 290	AÜLG 6/300 R	3,250	181 060	AÜLG 10/ 60 R	2,750	181 300
AÜLG 7/ 60 L	2,550	181 070	AÜLG 10/100 L	2,850	181 310	AÜLG 7/ 60 R	2,550	181 080	AÜLG 10/100 R	2,850	181 320
AÜLG 7/100 L	2,700	181 090	AÜLG 10/140 L	2,950	181 330	AÜLG 7/100 R	2,700	181 100	AÜLG 10/140 R	2,950	181 340
AÜLG 7/140 L	2,850	181 110	AÜLG 10/200 L	3,100	184 630	AÜLG 7/140 R	2,850	181 120	AÜLG 10/200 R	3,100	184 634
AÜLG 7/200 L	3,050	181 130	AÜLG 11/ 60 L	2,800	181 350	AÜLG 7/200 R	3,050	181 140	AÜLG 11/ 60 R	2,800	181 360
AÜLG 7/300 L	3,300	181 150	AÜLG 11/100 L	2,900	181 370	AÜLG 7/300 R	3,300	181 160	AÜLG 11/100 R	2,900	181 380
AÜLG 8/ 60 L	2,600	181 170	AÜLG 11/140 L	3,050	181 390	AÜLG 8/ 60 R	2,600	181 180	AÜLG 11/140 R	3,050	181 400
AÜLG 8/100 L	2,700	181 190	AÜLG 11/200 L	3,220	184 631	AÜLG 8/100 R	2,700	181 200	AÜLG 11/200 R	3,220	184 635
AÜLG 8/140 L	2,850	181 210	Control line SS without PE			AÜLG 8/140 R	2,850	181 220	Control line SS without PE		
AÜLG 8/200 L	3,000	184 628	AÜLG 6/ 60 L	2,500	181 410	AÜLG 8/200 R	3,000	184 632	AÜLG 6/ 60 R	2,500	181 420
			AÜLG 8/ 60 L	2,600	181 430				AÜLG 8/ 60 R	2,600	181 440
			AÜLG 10/ 60 L	2,750	181 450				AÜLG 10/ 60 R	2,750	181 460

⁽¹⁾ All transfer guides are 0.5 m long and are a part of the system length (see examples for ordering pages 26 and 27).
Double collector or 2 single collectors required (see page 21).

⁽²⁾ Suffix types e.g. AÜL 4/60 L w/ PE → AÜL 4/60 L HS Order- No. 192 190.

TRANSFER GUIDE, OBLIQUE CUT⁽¹⁾

¢/w 0.5 m powerail



LSV

for turntables, switches and spurlines,
staggered arrangement of the transfer guides to each other: horizontal max. 5 mm, vertical max. 3 mm
Max. travel speed collector unit: 80m/min.
applications see page 12

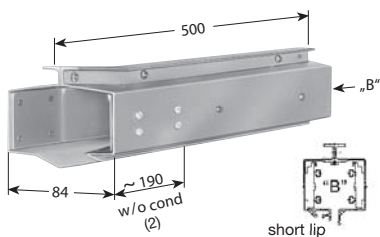


Illustration shows L. H. version
short lip in front
(see page 6)

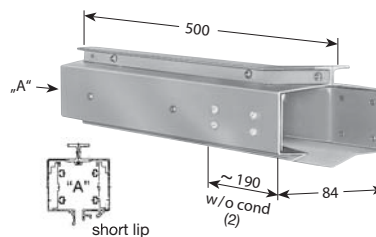


Illustration shows R. H. version
short lip in front
(see page 6)

Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.
Power line HS with PE			Power line HS with PE			Power line HS with PE			Power line HS with PE		
AÜLS 4/ 60 L	1,400	192 550	AÜLS 6/ 60 L	1,500	192 750	AÜLS 4/ 60 R	1,400	192 560	AÜLS 6/ 60 R	1,500	192 760
AÜLS 4/100 L	1,550	192 570	AÜLS 6/100 L	1,650	192 770	AÜLS 4/100 R	1,550	192 580	AÜLS 6/100 R	1,650	192 780
AÜLS 4/140 L	1,650	192 590	AÜLS 6/140 L	1,750	193 420	AÜLS 4/140 R	1,650	192 600	AÜLS 6/140 R	1,750	193 430
AÜLS 4/200 L	1,800	192 610	AÜLS 6/200 L	1,900	195 618	AÜLS 4/200 R	1,800	192 620	AÜLS 6/200 R	1,900	195 619
AÜLS 4/300 L	2,050	192 630	AÜLS 7/ 60 L	1,550	192 790	AÜLS 4/300 R	2,050	192 640	AÜLS 7/ 60 R	1,550	192 800
AÜLS 5/ 60 L	1,450	192 650	AÜLS 7/100 L	1,700	192 810	AÜLS 5/ 60 R	1,450	192 660	AÜLS 7/100 R	1,700	192 820
AÜLS 5/100 L	1,600	192 670	AÜLS 7/140 L	1,850	192 830	AÜLS 5/100 R	1,600	192 680	AÜLS 7/140 R	1,850	192 840
AÜLS 5/140 L	1,750	192 690	AÜLS 7/200 L	2,020	195 620	AÜLS 5/140 R	1,750	192 700	AÜLS 7/200 R	2,020	195 621
AÜLS 5/200 L	1,950	192 710	Control line SS without PE			AÜLS 5/200 R	1,950	192 720	Control line SS without PE		
AÜLS 5/300 L	2,150	192 730	AÜLS 4/ 60 L	1,400	192 850	AÜLS 5/300 R	2,150	192 740	AÜLS 4/ 60 R	1,400	192 860
			AÜLS 6/ 60 L	1,500	192 870				AÜLS 6/ 60 R	1,500	192 880

for turntables, switches and spurlines,
staggered arrangement of the transfer guides to each other: horizontal max. 5 mm, vertical max. 3 mm
Max. travel speed collector unit: 80m/min.
applications see page 12

LSVG

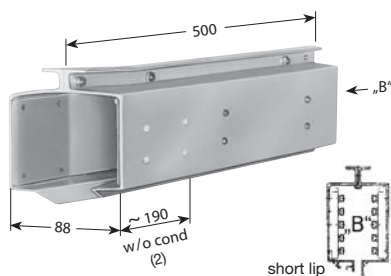


Illustration shows L. H. version
short lip in front
(see page 6)

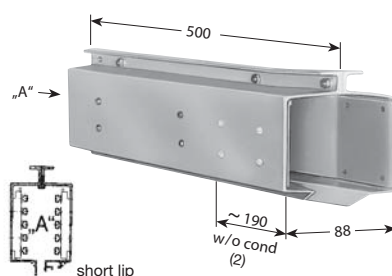


Illustration shows R. H. version
short lip in front
(see page 6)

Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.	Type ⁽²⁾	Weight kg	Order- No.
Power line HS with PE			Power line HS with PE			Power line HS with PE			Power line HS with PE		
AÜLSG 6/ 60 L	2,500	181 470	AÜLSG 9/ 60 L	2,700	181 730	AÜLSG 6/ 60 R	2,500	181 480	AÜLSG 9/ 60 R	2,700	181 740
AÜLSG 6/100 L	2,600	181 490	AÜLSG 9/100 L	2,800	181 750	AÜLSG 6/100 R	2,600	181 500	AÜLSG 9/100 R	2,800	181 760
AÜLSG 6/140 L	2,700	181 510	AÜLSG 9/140 L	2,950	181 770	AÜLSG 6/140 R	2,700	181 520	AÜLSG 9/140 R	2,950	181 780
AÜLSG 6/200 L	2,900	181 530	AÜLSG 9/200 L	3,120	184 637	AÜLSG 6/200 R	2,900	181 540	AÜLSG 9/200 R	3,120	184 641
AÜLSG 6/300 L	3,250	181 550	AÜLSG 10/ 60 L	2,750	181 790	AÜLSG 6/300 R	3,250	181 560	AÜLSG 10/ 60 R	2,750	181 800
AÜLSG 7/ 60 L	2,550	181 570	AÜLSG 10/100 L	2,850	181 810	AÜLSG 7/ 60 R	2,550	181 580	AÜLSG 10/100 R	2,850	181 820
AÜLSG 7/100 L	2,700	181 590	AÜLSG 10/140 L	2,950	181 830	AÜLSG 7/100 R	2,700	181 600	AÜLSG 10/140 R	2,950	181 840
AÜLSG 7/140 L	2,850	181 610	AÜLSG 10/200 L	3,100	184 638	AÜLSG 7/140 R	2,850	181 620	AÜLSG 10/200 R	3,100	184 642
AÜLSG 7/200 L	3,050	181 630	AÜLSG 11/ 60 L	2,800	181 850	AÜLSG 7/200 R	3,050	181 640	AÜLSG 11/ 60 R	2,800	181 860
AÜLSG 7/300 L	3,300	181 650	AÜLSG 11/100 L	2,900	181 870	AÜLSG 7/300 R	3,300	181 660	AÜLSG 11/100 R	2,900	181 880
AÜLSG 8/ 60 L	2,600	181 670	AÜLSG 11/140 L	3,050	181 890	AÜLSG 8/ 60 R	2,600	181 680	AÜLSG 11/140 R	3,050	181 900
AÜLSG 8/100 L	2,700	181 690	AÜLSG 11/200 L	3,220	184 639	AÜLSG 8/100 R	2,700	181 700	AÜLSG 11/200 R	3,220	184 643
AÜLSG 8/140 L	2,850	181 710	Control line SS without PE			AÜLSG 8/140 R	2,850	181 720	Control line SS without PE		
AÜLSG 8/200 L	3,000	184 636	AÜLSG 6/ 60 L	2,500	181 910	AÜLSG 8/200 R	3,000	184 640	AÜLSG 6/ 60 R	2,500	181 920
			AÜLSG 8/ 60 L	2,600	181 930				AÜLSG 8/ 60 R	2,600	181 940
			AÜLSG 10/ 60 L	2,750	181 950				AÜLSG 10/ 60 R	2,750	181 960

(1) All transfer guides are 0.5 m long and are a part of the system length (see examples for ordering pages 26 and 27).
2 single collectors required (see page 21).

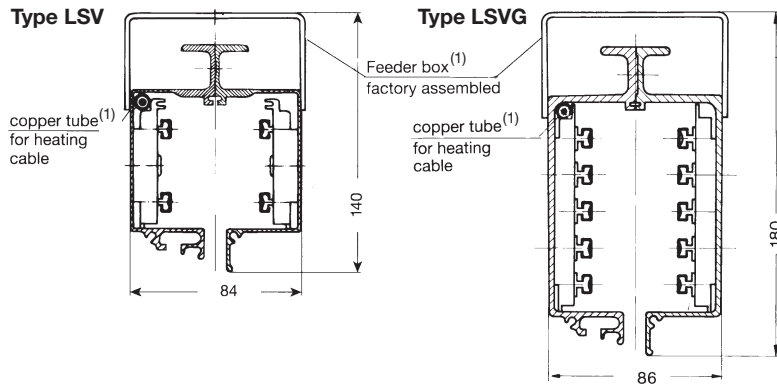
(2) Suffix types e.g. AÜLS 4/60 L w/ PE → AÜLS 4/60 L HS Order- No. 192 550.

(3) Detailed drawings of switch, turntable etc. are required to manufacture oblique cut transfer guides and cut back conductors accordingly.



HEATING SYSTEM

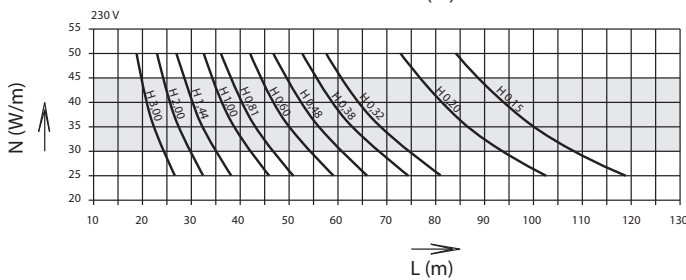
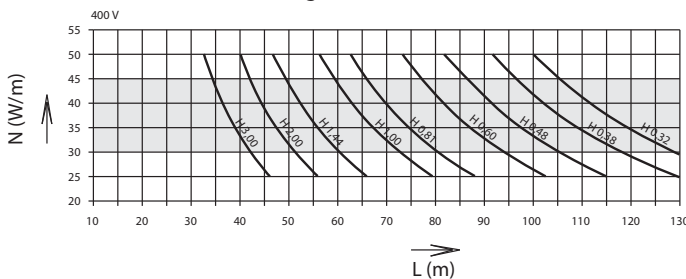
Arrangement of heating cables



Heating systems are recommended for outdoor powerail installations with icing conditions and for extremely humid environments. The heating is accomplished by heating conductors being arranged inside the power-rail housing as shown in the adjacent drawings.

The heating cables are pulled through the factory assembled copper tubes and connected to the terminal boxes during the installation process at site.

Selection of the heating cable



With shorter heating lengths please feed over a transformer with appropriate low secondary voltage or 2 copper protective pipes shall be provided and the heating lengths have to be connected in series.

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

U = supply voltage [Volt]
R = resistance of heating cable [Ohm/m]
L = length of heating section [m]

Type	Resistor ⁽²⁾	Order- No.
heating cable: H 0,15	0,15 Ohm/m	196 382
heating cable: H 0,20	0,20 Ohm/m	196 383
heating cable: H 0,32	0,32 Ohm/m	196 384
heating cable: H 0,38	0,38 Ohm/m	196 385
heating cable: H 0,48	0,48 Ohm/m	196 386
heating cable: H 0,60	0,60 Ohm/m	196 387
heating cable: H 0,81	0,81 Ohm/m	196 389
heating cable: H 1,00	1,00 Ohm/m	196 390
heating cable: H 1,44	1,44 Ohm/m	196 391
heating cable: H 2,00	2,00 Ohm/m	196 392
heating cable: H 3,00	3,00 Ohm/m	196 393

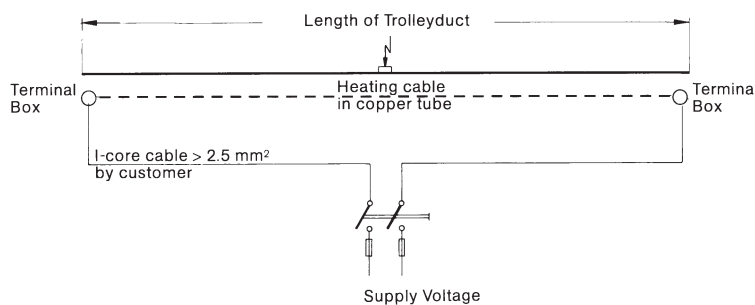
Composition of heating cable: Conductor: material resistor CrNi, stranded
Insulation: PTFE-(Teflon) tinned copper braid
Sheath: PTFE-insulation
OD: 3.7 mm - 4.3 mm Øm

Determine a heating cable of 30-45 watt/m capacity.

For longer runs, not covered by the adjacent diagrams, divide the length of the system into two or more heating sections.

Type	Order- No.
Copper Pipe 8 x 1 mm	
- for 40 - 200 A	195 289
- for 300 A	195 557
Connecting box for heating	
- for LSV	195 119
- for LSVG	184 027
Connecting material for heating system	195 291
(1 set per connecting box)	

Layout of one heating section with feeder boxes at both ends



Switchgears and temperature control units available on request.

Example for ordering heating system for 60 m trolleyduct

- 1) 61 m heating cable type H 1.0 (60 m + 1 m safety length)
Supply voltage 400 V, 1 heating section
Heating capacity per above diagram approx. 40 W/m
with 60 m x 40 W/m approx. 2400 W = 2.40 kW
- 2) 60 m copper protection tube 8 x 1 mm factory assembled
- 3) 2 terminal boxes for heating system
- 4) 2 sets of connecting material

All switches, fuses, cable etc. by others!

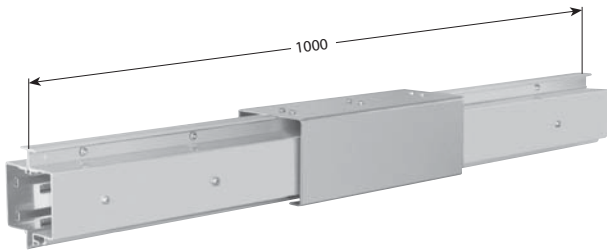
⁽¹⁾ Factory assembled on powerail.
⁽²⁾ Deflection ± 2,5 %

ANTI-CONDENSATION SECTIONS⁽¹⁾

c/w 1 m powerail



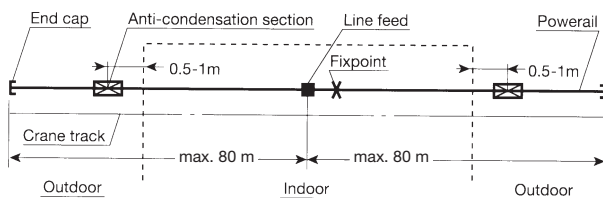
LSV



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

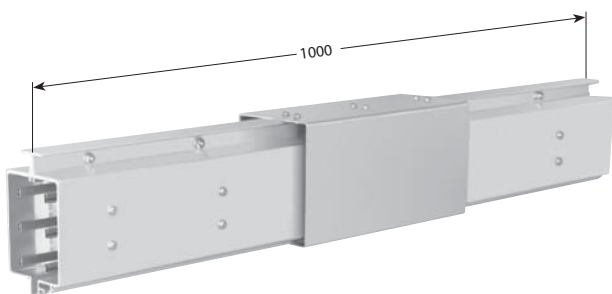
No extra feeds required as the powerail is not interrupted.

Collectors

No extra collectors required.

Installation

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



Type ⁽²⁾	Order- No. Power line HS with PE	Order- No. Control line SS without PE
BTL 4/ 60	195 154	195 159
BTL 4/100	195 155	-
BTL 4/140	195 156	-
BTL 4/200	195 157	-
BTL 4/300	195 158	-
BTL 5/ 60	195 160	-
BTL 5/100	195 161	-
BTL 5/140	195 162	-
BTL 5/200	195 163	-
BTL 5/300	195 164	-
BTL 6/ 60	195 165	195 168
BTL 6/100	195 166	-
BTL 6/140	195 167	-
BTL 6/200	195 622	-
BTL 7/ 60	195 169	-
BTL 7/100	195 170	-
BTL 7/140	195 171	-
BTL 7/200	195 623	-

LSVG

Type ⁽²⁾	Order- No. Power line HS with PE	Order- No. Control line SS without PE
BTLG 6/ 60	184 049	184 073
BTLG 6/100	184 050	-
BTLG 6/140	184 051	-
BTLG 6/200	184 052	-
BTLG 6/300	184 053	-
BTLG 7/ 60	184 054	-
BTLG 7/100	184 055	-
BTLG 7/140	184 056	-
BTLG 7/200	184 057	-
BTLG 7/300	184 058	-
BTLG 8/ 60	184 059	184 062
BTLG 8/100	184 060	-
BTLG 8/140	184 061	-
BTLG 8/200	184 644	-
BTLG 9/ 60	184 063	-
BTLG 9/100	184 064	-
BTLG 9/140	184 065	-
BTLG 9/200	184 645	-
BTLG 10/ 60	184 066	184 069
BTLG 10/100	184 067	-
BTLG 10/140	184 068	-
BTLG 10/200	184 646	-
BTLG 11/ 60	184 070	-
BTLG 11/100	184 071	-
BTLG 11/140	184 072	-
BTLG 11/200	184 647	-

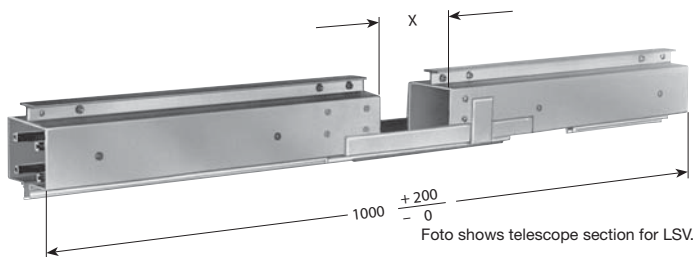
⁽¹⁾ Above sections come ready assembled on 1 m powerail and are a part of the system length (see example for ordering page 27).

⁽²⁾ Suffix types e.g. BTL 4/60 w/ PE → BTL 4/60 L **HS** Order- No. 195 154.



TELESCOPE SECTIONS⁽¹⁾

c/w 1 m powerail



The 1 m telescope sections of the Aluminium enclosed conductor rails LSV and LSVG cover the expansion of the housing in temperature fluctuation.

They consist of two transfer guides, which are aligned through two profiles. The connecting profile pieces serve as running and guiding track for the current collector. The telescope section separates the track electrically. For spare parts please advise type of rail and possible special versions.

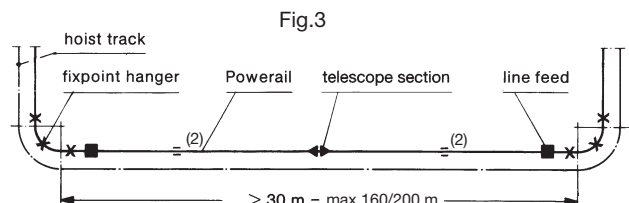
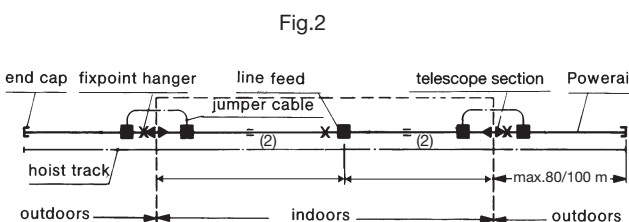
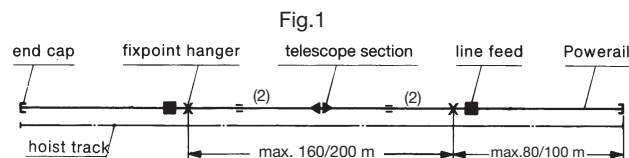
LSV				LSVG					
Type ●	Order-No.	Type ●	Order-No.	Type ●	Order-No.	Type ●	Order-No.	Type ●	Order-No.
Power line HS with PE		Power line HS with PE		Power line HS with PE		Power line HS with PE		Power line HS with PE	
TSL 4/ 60	193 840	TSL 6/ 60	193 940	TSLG 6/ 60	183 310	TSLG 8/ 60	183 410	TSLG 11/ 60	183 500
TSL 4/100	195 096	TSL 6/100	195 104	TSLG 6/100	184 001	TSLG 8/100	184 009	TSLG 11/100	184 015
TSL 4/140	195 097	TSL 6/140	195 105	TSLG 6/140	184 002	TSLG 8/140	184 010	TSLG 11/140	184 016
TSL 4/200	195 098	TSL 6/200	195 624	TSLG 6/200	184 003	TSLG 8/200	184 648	TSLG 11/200	184 651
TSL 4/300	195 099			TSLG 6/300	184 004	TSLG 9/ 60	183 440	Control line SS without PE	
		TSL 7/ 60	193 970			TSLG 9/100	184 011	TSLG 6/ 60	183 530
TSL 5/ 60	193 890	TSL 7/100	195 106	TSLG 7/ 60	183 360	TSLG 9/140	184 012	TSLG 8/ 60	183 540
TSL 5/100	195 100	TSL 7/140	195 107	TSLG 7/100	184 005	TSLG 9/200	184 649	TSLG 10/ 60	184 013
TSL 5/140	195 101	TSL 7/200	195 625	TSLG 7/140	184 006	TSLG 10/ 60	183 470	TSLG 10/100	184 014
TSL 5/200	195 102	Control line SS without PE		TSLG 7/200	184 007	TSLG 10/140	184 014	TSLG 10/200	184 650
TSL 5/300	195 103	TSL 4/ 60	194 000	TSLG 7/300	184 008				
		TSL 6/ 60	194 010						

Application of Telescope section

- With following max. system lengths:
 - Systems with low temperature differences (e.g. indoor) = 200 m
 - Systems with high temperature differences (e.g. outdoor) = 160 m

The measurement between the fixpoints with the centered assembled telescope sections should not be bigger as 160/200 m. (see Fig. 1)

- 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). – Alternative solution: Anti-condensation section (see page 17). We recommend a heating system for the outdoor section for extreme winter conditions (see page 16).
- If the powerail length between two curves is more than 20 m and the temperature fluctuates considerably (see Fig. 3).



Feeding

The powerail is electrically separated into two parts by the telescope section. Each of these parts has to have a separate power feed.

In case of transfers to outdoor the main feed can be inside. In this case will be connecting boxes on the left and right hand side of the telescope section installed. This boxes are connected by flexible cables. (see fig. 2).

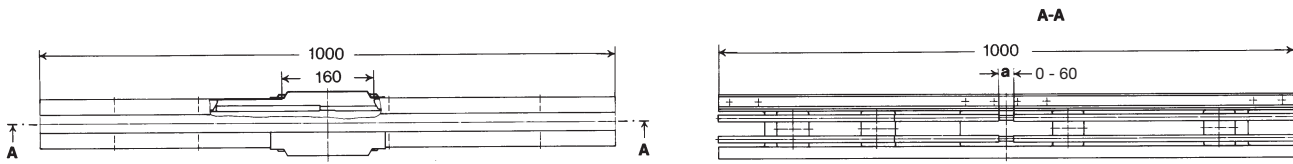
Collectors

One double collector, installed at least 500 mm apart, must be used to ensure continuous electrical contact while passing through the telescope section; use two double collectors arranged in the same manner when higher ampacity is required.

(1) Above sections come ready assembled on 1 m powerail and are a part of the system length.
 (2) DSL/DSLГ with bolted joints only see page 19.
 ● Suffix types e.g. TSL 4/60 w/ PE → TSL 4/60 **HS** Order- No. 193 840.

EXPANSION JOINT SECTIONS⁽¹⁾

c/w 1 m powerail



Drawings show expansion joint section for LSV

LSV				LSVG					
Type ●	Order- No.	Type ●	Order- No.	Type ●	Order- No.	Type ●	Order- No.	Type ●	Order- No.
Power line HS with PE		Power line HS with PE		Power line HS with PE		Power line HS with PE		Power line HS with PE	
DSL 4/ 60	194 020	DSL 6/ 60	194 120	DSL G 6/ 60	183 560	DSL G 8/ 60	183 660	DSL G 11/ 60	183 750
DSL 4/100	195 108	DSL 6/100	195 112	DSL G 6/100	184 017	DSL G 8/100	184 021	DSL G 11/100	184 024
DSL 4/140	195 056	DSL 6/140	195 058	DSL G 6/140	183 943	DSL G 8/140	183 945	DSL G 11/140	183 948
DSL 4/200	195 109	DSL 6/200	195 626	DSL G 6/200	184 018	DSL G 8/200	184 652	DSL G 11/200	184 655
DSL 4/300	194 060	DSL 7/ 60	194 150	DSL G 6/300	183 600	DSL G 9/ 60	183 690	Control line SS without PE	
DSL 5/ 60	194 070	DSL 7/100	195 113	DSL G 7/ 60	183 610	DSL G 9/100	184 022	DSL G 6/ 60	183 780
DSL 5/100	195 110	DSL 7/140	195 059	DSL G 7/100	184 019	DSL G 9/140	183 946	DSL G 8/ 60	183 790
DSL 5/140	195 057	DSL 7/200	195 627	DSL G 7/140	183 944	DSL G 9/200	184 653	DSL G 10/ 60	183 800
DSL 5/200	195 111	Control line SS without PE		DSL G 7/200	184 020	DSL G 10/ 60	183 720		
DSL 5/300	194 110	DSL 4/ 60	194 180	DSL G 7/300	183 650	DSL G 10/100	184 023		
		DSL 6/ 60	194 190			DSL G 10/140	183 947		
						DSL G 10/200	184 654		

The expansion joints of the VAHLE aluminium enclosed conductor systems LSV and LSVG serve to compensate for the different expansion and contraction of the aluminium housing and the copper conductors in varying temperatures.

Expansion joints are only required for LSV and LSVG-systems using bolted joints.

Systems using **plug-in type connections** (Standard 60-140 A) are sliding inside the hollow conductors and automatically take care of this. The copper conductors are being anchored in each standard powerail section.

Expansion joints will be installed between **two fixpoints** of the **copper conductors** with a distance >10 m. The max. length "L" mm has to be considered accordingly.

Design fixpoints are feedings, dead sections, transfer guides, transfer funnels and telescope sections (see fig. 1).

Additional fixpoints for copper conductors will be installed if the lengths between design fixpoints exceed the max. length "L". Then are two or more expansion joints necessary. (see fig. 2 and example on page 27).

The expansion of the aluminium housing will not be affected through the fixpoints of the copper conductors.

The fixpoint hangers of the aluminium housing will be installed in the middle of the system or close to the feed point. Transfer guide and transfer funnel.

The remaining conductor sections **have to be** arranged in sliding hangers.

In special cases the connecting cables at the line feeds have to be arranged flexible. Or the types LAL and or LALG (see page 11) have to be used not to interfere the expansion of the housing.

In the expansion section are the copper conductors electrically bridged.

⁽¹⁾ Above sections come ready assembled on 1 m powerail and are a part of the system length (see example for ordering page 27).

● Suffix types e.g. DSL 4/60 w/ PE → DSL 4/60 L **HS** Order- No. 194 020.

Fig. 1

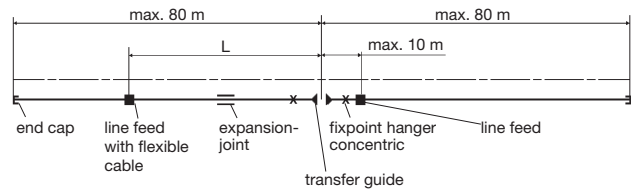
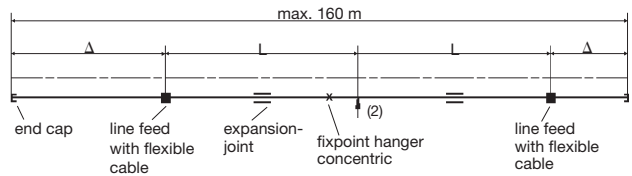


Fig. 2



Δ Excessive length

Max. length „L“:

80 m at temperature up to **60 °C**

60 m at temperature up to **80 °C**

40 m at temperature up to **100 °C**

All valves apply from - 40 °C

Please send us the filled in Questionnaire from pages 29 and 30 and you will receive a layout drawing.

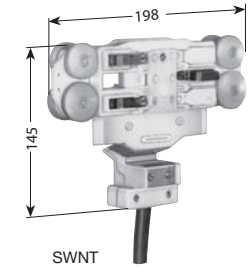
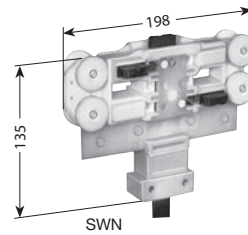
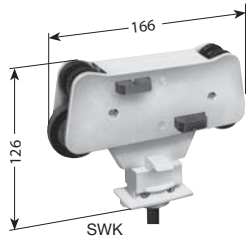
For spare please advise rail type and possible special version.

Anchor points for copper conductors ⁽²⁾					
LSV			LSVG		
Type	No. of cond.	Order- No.	Typ	No. of cond.	Order- No.
FPL/Cu	4 & 5	194 530	FPLG/Cu	6 & 7	183 830
FPL/Cu	6 & 7	194 540	FPLG/Cu	8 & 9	183 840
			FPLG/Cu	10 & 11	183 850



COLLECTORS

LSV

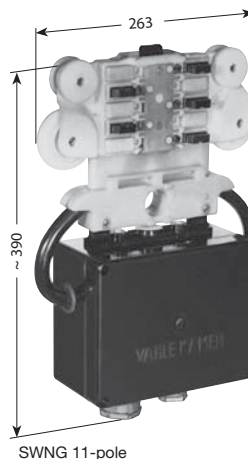
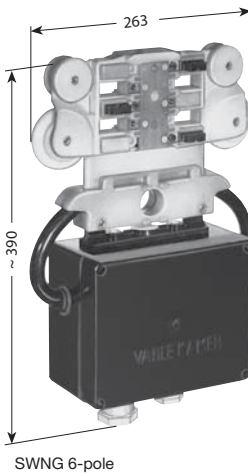


	Type ⁽²⁾	A ⁽¹⁾	Order- No.	Type ⁽²⁾	A ⁽¹⁾	Order- No.	Poles	Weight kg	max. speed m/min.		General
	for Power HS with PE			for Control ST without PE					nor-	trans-	
LSV	SWK 4/25-1	25	250 230	SWK 4/25-1	25	250 240	4	0,760	80	60	for straight runs and curves R > 2.5 m for LSV 4/60 and LSV 4/100
	SWK 4/40-1	40	257 394	–	–	–	4	0,860	80	60	
	SWN 4/40-1	40	194 691	SWN 4/25-1	25	194 692	4	0,850	180	80	for straight runs and curves R > 1.5 m with ball bearing wheels
	SWN 5/40-1	40	194 693				5	0,950	180	80	
	SWN 6/40-1	40	194 694	SWN 6/25-1	25	194 695	6	1,200	180	80	
	SWN 7/40-1	40	194 696				7	1,300	180	80	
LSV with Kurven	SWN 4/40 K-1	40	195 197	SWN 4/25 K-1	25	195 194	4	0,830	180	80	for curves R 0.75 – 1.5 m ball bearing wheels
	SWN 5/40 K-1	40	195 196				5	0,930	180	80	
	SWN 6/40 K-1	40	196 171	SWN 6/25 K-1	25	195 195	6	1,180	180	80	
	SWN 7/40 K-1	40	195 987				7	1,280	180	80	
LSV-D or FP	SWNT 4/40-1	40	194 772	SWNT 4/25-1	25	194 773	4	0,850	100	60	for straight runs and curves R > 1.0 m with ball bearing wheels
	SWNT 5/40-1	40	194 774				5	0,950	100	60	
	SWNT 6/40-1	40	194 775	SWNT 6/25-1	25	194 776	6	1,200	100	60	
	SWNT 7/40-1	40	194 777				7	1,300	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 per core for 40 A.

Cleaning trolleys and trolleys for higher speed on request.

LSVG



	Type ⁽²⁾	A ⁽¹⁾	Order- No.	Type ⁽²⁾	A ⁽¹⁾	Order- No.	Poles	Weight kg	max. speed m/min.		General
	Hauptstrom HS mit PE			Steuerstrom ST ohne PE					nor-	trans-	
LSVG	SWNG 6/40	40	183 883	SWNG 6/25	25	183 884	6	2,100	200	100	for straight runs and curves with ball bearing wheels and guide rollers
	SWNG 7/40	40	183 885				7	2,150	200	100	
	SWNG 8/40	40	183 886	SWNG 8/25	25	183 887	8	2,200	200	100	
	SWNG 9/40	40	183 888				9	2,250	200	100	
	SWNG 10/40	40	183 889	SWNG 10/25	25	183 890	10	2,300	200	100	
	SWNG 11/40	40	183 891				11	2,350	200	100	
LSVG	SWNG 6/40 FM	40	183 901	SWNG 6/25 FM	25	183 902	6	2,100	200	80	like above however, for transfer applications
	SWNG 7/40 FM	40	183 903				7	2,150	200	80	
	SWNG 8/40 FM	40	183 904	SWNG 8/25 FM	25	183 905	8	2,200	200	80	
	SWNG 9/40 FM	40	183 906				9	2,250	200	80	
	SWNG 10/40 FM	40	183 907	SWNG 10/25 FM	25	183 908	10	2,300	200	80	
	SWNG 11/40 FM	40	183 909				11	2,350	200	80	
LSVG mit D+FP	SWNGT 6/40	40	183 892	SWNGT 6/25	25	183 893	6	2,100	100	60	for straight runs and curves with ball bearing wheels and guide rollers
	SWNGT 7/40	40	183 894				7	2,150	100	60	
	SWNGT 8/40	40	183 895	SWNGT 8/25	25	183 896	8	2,200	100	60	
	SWNGT 9/40	40	183 897				9	2,250	100	60	
	SWNGT 10/40	40	183 898	SWNGT 10/25	25	183 899	10	2,300	100	60	
	SWNGT 11/40	40	183 900				11	2,350	100	60	

Collectors come with terminal box and each with 1 x M 32 and 1 x M 25.

Collectors and terminal boxes are wired.

Cross section: collector 25 A – 2,5 mm²
collector 40 A – 4 mm²

Cleaning trolleys on request.

⁽¹⁾ All ampere data for 60 % intermittent duty.

⁽²⁾ For full Type designation add Power or Control, suffix e.g. SWK 4/25-1 w/ PE
SWNG 6/25 w/o PE

HS for Order- No. 250 230

ST for Order- No. 183 884.

DOUBLE COLLECTORS



LSV

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

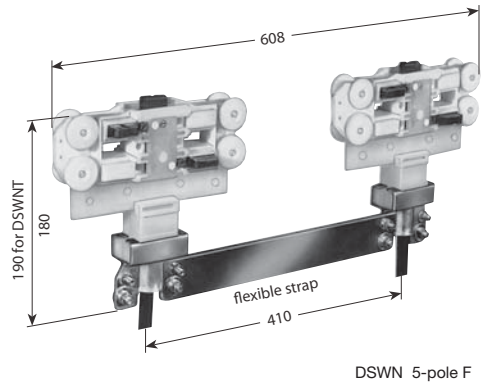
Type ⁽²⁾	A ⁽¹⁾	Order- No.	Type ⁽²⁾	A ⁽¹⁾	Order- No.	Poles	Weight kg
for Power HS with PE			for Control ST without PE				
LSV							
DSWK 4/50 F-1	50	250 320	DSWK 4/50 F-1	50	250 330	4	1,900
DSWK 4/80 F-1	80	252 580	–	–	–	4	2,100
DSWK 4/50 S-1	50	258 383	DSWK 4/50 S-1	50	258 384	4	1,900
DSWK 4/80 S-1	80	252 590	–	–	–	4	2,100
DSWN 4/80 F-1	80	194 703	DSWN 4/50 F-1	50	194 704	4	2,150
DSWN 5/80 F-1	80	194 705	–	–	–	5	2,350
DSWN 6/80 F-1	80	194 706	DSWN 6/50 F-1	50	194 707	6	3,000
DSWN 7/80 F-1	80	194 708	–	–	–	7	3,250
DSWN 4/80 S-1	80	194 808	DSWN 4/50 S-1	50	194 809	4	2,150
DSWN 5/80 S-1	80	194 810	–	–	–	5	2,350
DSWN 6/80 S-1	80	194 811	DSWN 6/50 S-1	50	194 812	6	3,000
DSWN 7/80 S-1	80	194 813	–	–	–	7	3,250
LSV + D or FP							
DSWNT 4/80 F-1	80	194 778	DSWNT 4/50 F-1	50	194 779	4	2,150
DSWNT 5/80 F-1	80	194 780	–	–	–	5	2,350
DSWNT 6/80 F-1	80	194 781	DSWNT 6/50 F-1	50	194 782	6	3,000
DSWNT 7/80 F-1	80	194 783	–	–	–	7	3,250
DSWNT 4/80 S-1	80	194 814	DSWNT 4/50 S-1	50	194 815	4	2,150
DSWNT 5/80 S-1	80	194 816	–	–	–	5	2,350
DSWNT 6/80 S-1	80	194 817	DSWNT 6/50 S-1	50	194 818	6	3,000
DSWNT 7/80 S-1	80	194 819	–	–	–	7	3,250

Double collector for 50 A with cross section 2 x 2,5 mm².

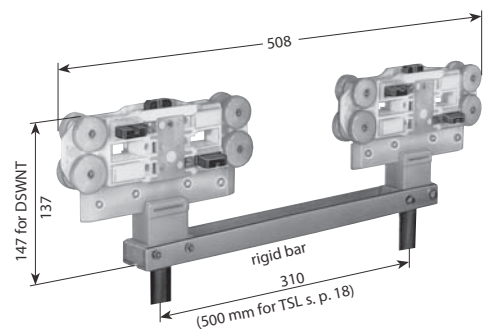
Double collector for 80 A with cross section 2 x 4 mm².

Connecting cable 1 m long, longer cable available.

Don't use double collectors, but 2 singles for curves with less than 1.5 m radius and for transfer guides more than 45 degr. oblique cut.



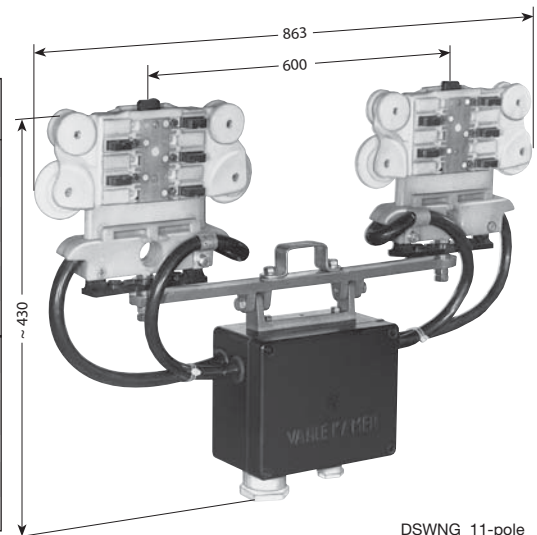
DSWN 5-pole F



DSWN 5-pole S

LSVG

	Type ⁽²⁾	A ⁽¹⁾	Order- No.	Type ⁽²⁾	A ⁽¹⁾	Order- No.	Poles	Weight kg
	for Power HS with PE			for Control ST without PE				
LSVG	DSWNG 6/80	80	183 910	DSWNG 6/50	50	183 911	6	4,150
	DSWNG 7/80	80	183 912				7	4,250
	DSWNG 8/80	80	183 913	DSWNG 8/50	50	183 914	8	4,350
	DSWNG 9/80	80	183 915				9	4,450
	DSWNG 10/80	80	183 916	DSWNG 10/50	50	183 917	10	4,550
	DSWNG 11/80	80	183 918				11	4,650
LSVG with D + FP	DSWNGT 6/80	80	183 919	DSWNGT 6/50	50	183 920	6	4,150
	DSWNGT 7/80	80	183 921				7	4,250
	DSWNGT 8/80	80	183 922	DSWNGT 8/50	50	183 923	8	4,350
	DSWNGT 9/80	80	183 924				9	4,450
	DSWNGT 10/80	80	183 925	DSWNGT 10/50	50	183 926	10	4,550
	DSWNGT 11/80	80	183 927				11	4,650



DSWNG 11-pole

Double collectors come with terminal boxes.

Power line: je 1 x M 50 and 1 x M 25

Control line: je 1 x M 32 and 1 x M 25

Collectors and terminal boxes are wired.

Cross section: double collector 50 A – 2 x 2,5 mm²
double collector 80 A – 2 x 4 mm²

⁽¹⁾ All ampere data for 60 % intermittent duty.

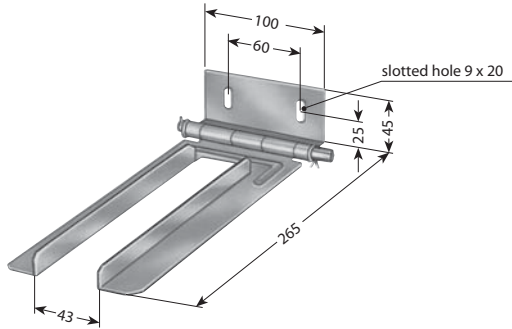
⁽²⁾ For full Type designation add Power or Control, suffix e.g. DSWK 4/50 F-1 **HS** for Order- No. 250 320
DSWNG 6/50 **ST** for Order- No. 183 911.



TOW ARMS

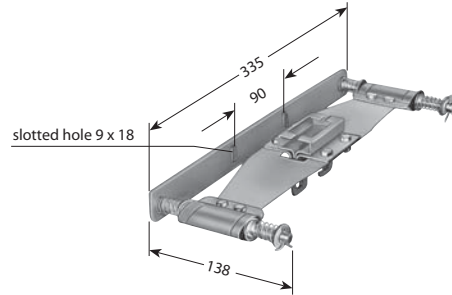
LSV

for single and double collector



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 funnel ETL; see pages 13 & 23

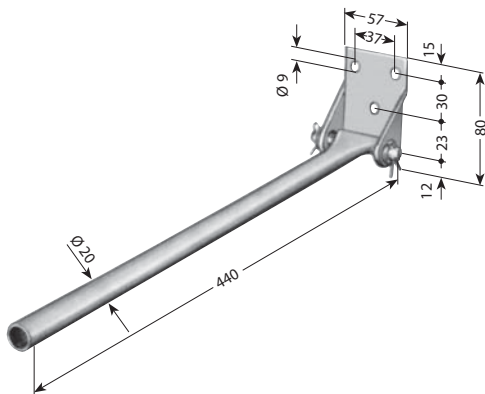


If you are going to use the flexible towing arm in system with curves please contact us.

Type	Weight kg	Order- No.
KFMN for SWK	1,160	250 390
KFML for SWN and SWNT	1,170	252 970

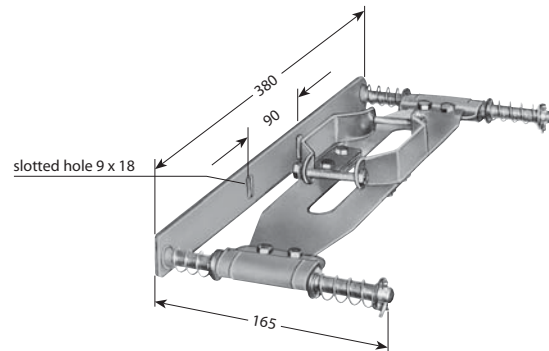
LSVG

for single and double collector



Type	Weight kg	Order- No.
GKM	0,620	260 350
GKM/K⁽¹⁾	0,620	261 560

flexible support type with single collector
for transfer funnel ETLG; see pages 13 & 23



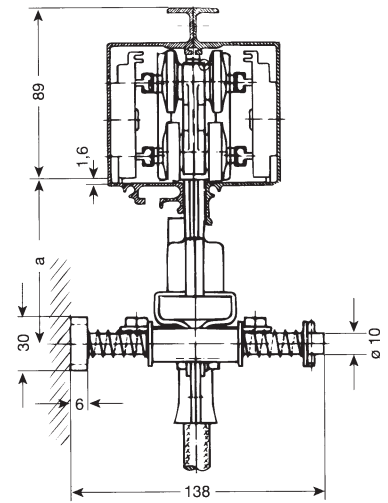
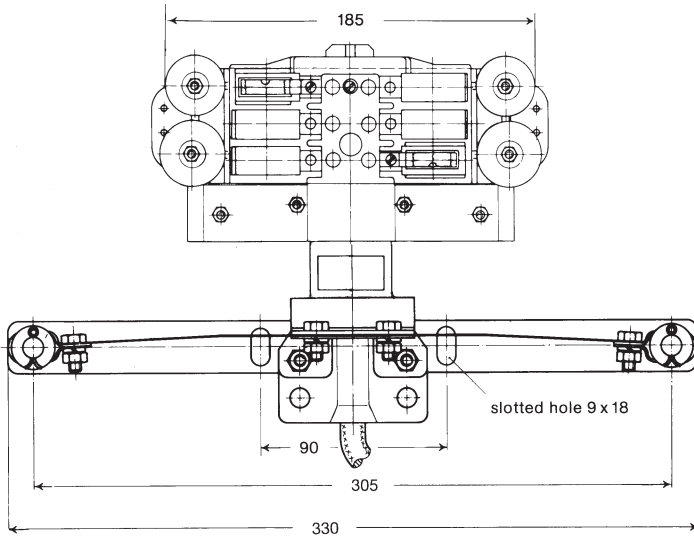
Type	Weight kg	Order- No.
GFM for SWNG/FM	1,300	260 360

FLEXIBLE TOW ARM CONFIGURATIONS



LSV

SWN 5/40 collector and KFML tow arm

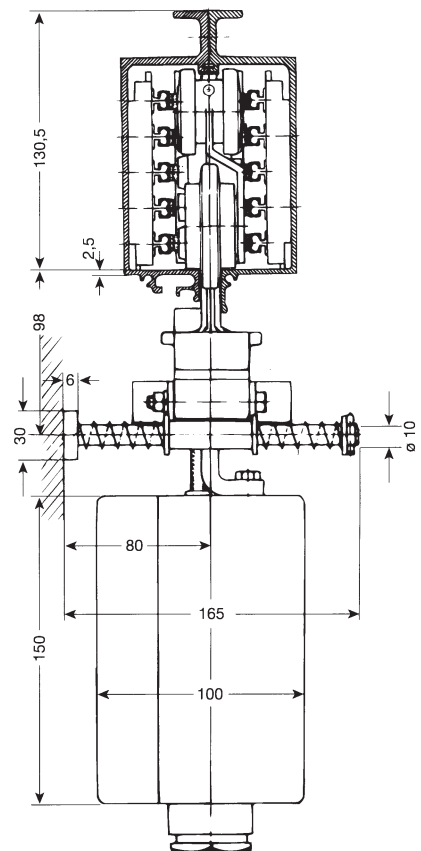
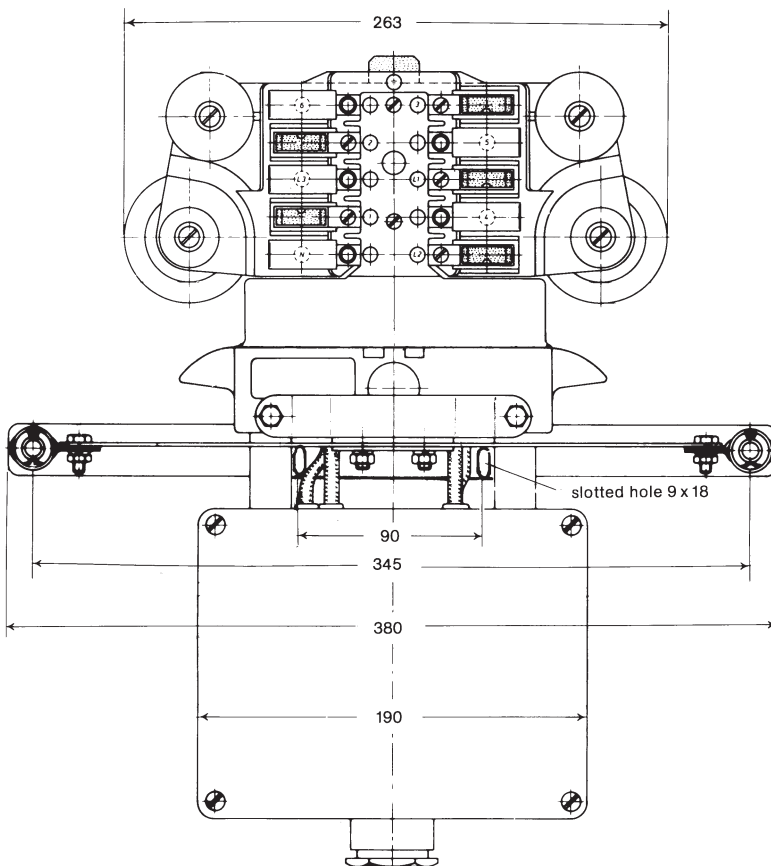


max. horizontal offset 15 mm
max. vertical offset 10 mm

with collector	SWK	SWN	SWNT
Dim. a/mm	85	95	105

SWNG 11/40 FM collector and GFM tow arm

LSVG



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

(1) adjust during installation



LSV

	Order-No.
for powerail	
joint fish plate (stainless), pair	191 830
joint cover, pair	191 840
joint cover anodized, pair	190 470
peg to fix housing	190 510
copper conductor 16 mm ² , 5th and 7th pole (top)	195 190
copper conductor rail 16 mm ² (lateral)	191 880
copper conductor rail 25 mm ² (lateral)	191 900
copper conductor rail 35 mm ² (lateral)	191 910
copper conductor rail 50 mm ² (lateral)	191 920
copper conductor rail 50 mm ² (lateral for ground 300 A only)	201 170
copper conductor rail 70 mm ² (lateral for Phase 300 A only)	191 930
2-pole insulator for 60-200 A systems	195 699
2-pole insulator for 300 A systems	195 700
3-pole insulator for 60-200 A systems	195 701
plug-in connector for 60-140 A systems	191 800
bolted joint connector for 60-200 A systems (for 200 A only)	191 810
bolted joint connector for 300 A systems	201 120
locking pin for plastic shielding	280 500
coupling for sealing strip	258 300
fastener for sealing strip	258 432
mounting trolley for sealing strip	258 345

for Collectors	Type	SWK ⁽¹⁾	SWN	SWNT
		Order- No.	Order- No.	Order- No.
carbon brush phase, incl. brush holder (lateral)		250 470	254 890	254 890
carbon brush ground 5th and 7th pole (top), incl. brush holder		-	254 891	254 891
carbon brush ground, incl. brush holder (lateral)		250 480	254 892	254 892
carbon pressure spring		250 490	258 757	258 757
carbon pressure spring, reinforced		258 759	258 760	258 760
collector neck (pair)		-	254 893	254 898
glider plate for sealing strip		-	-	258 370
wheel (bottom)		251 690	254 895	254 895
guide roller (top)		251 700	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 KWZ		250 310	-	-
attachment clamp KWZ/K, stainless		252 639	-	-
attachment clamp KWZL		-	254 897	254 897

Conductor dead section⁽²⁾

factory assembled
(300 Amp. systems with air gap only)



Illustration shows STA 3

Type	with air gap 5 mm Order- No.	Type	with insul. section 30 mm Order- No.
STA 1	193 440	STI 1	193 500
STA 2	193 450	STI 2	193 510
STA 3	193 460	STI 3	193 520
STA 4	193 470	STI 4	193 530
STA 5	193 480	STI 5	193 540
STA 6	193 490	STI 6	193 550

LSVG

	Order- No.
for powerail	
joint fish plate (stainless), pair	183 060
joint cover, pair	183 080
joint cover anodized, pair	183 090
peg to fix housing	190 510
copper conductor rail 16 mm ² (lateral)	191 880
copper conductor 16 mm ² , 7th, 9th and 11th pole (top)	195 190
copper conductor rail 25 mm ² (lateral)	191 900
copper conductor rail 35 mm ² (lateral)	191 910
copper conductor rail 50 mm ² (lateral)	191 920
copper conductor rail 50 mm ² (lateral for PE 300 A only)	201 170
copper conductor rail 70 mm ² (lateral)	191 930
5-pole insulator for 60-200 A systems	184 812
2-pole insulator for 300 A systems	195 700
plug-in connector for 60-140 A systems	191 800
bolted joint connector for 60-200 A systems	191 810
bolted joint connector for 300 A systems	201 210
locking pin for plastic shielding	280 500
coupling for sealing strip	258 300
fastener for sealing strip	258 432
mounting trolley for sealing strip	184 033

for Collectors	Typ	SWNG	SWNGT
		Order- No.	Order- No.
carbon brush phase, incl. brush holder (lateral)		254 890	254 890
carbon brush ground 7th, 9th and 11th pole (top)		254 891	254 891
carbon brush ground, incl. brush holder (lateral)		254 892	254 892
carbon pressure spring		258 757	258 757
carbon pressure spring, reinforced		258 760	258 760
collector neck (pair)		183 280	183 865
wheel (bottom)		183 290	183 290
guide roller (top)		183 300	183 300

Conductor dead section⁽²⁾

factory assembled
(300 Amp. systems with air gap only)

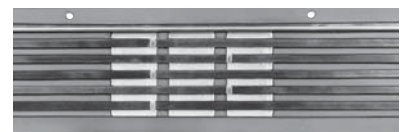


Illustration shows STAG 5

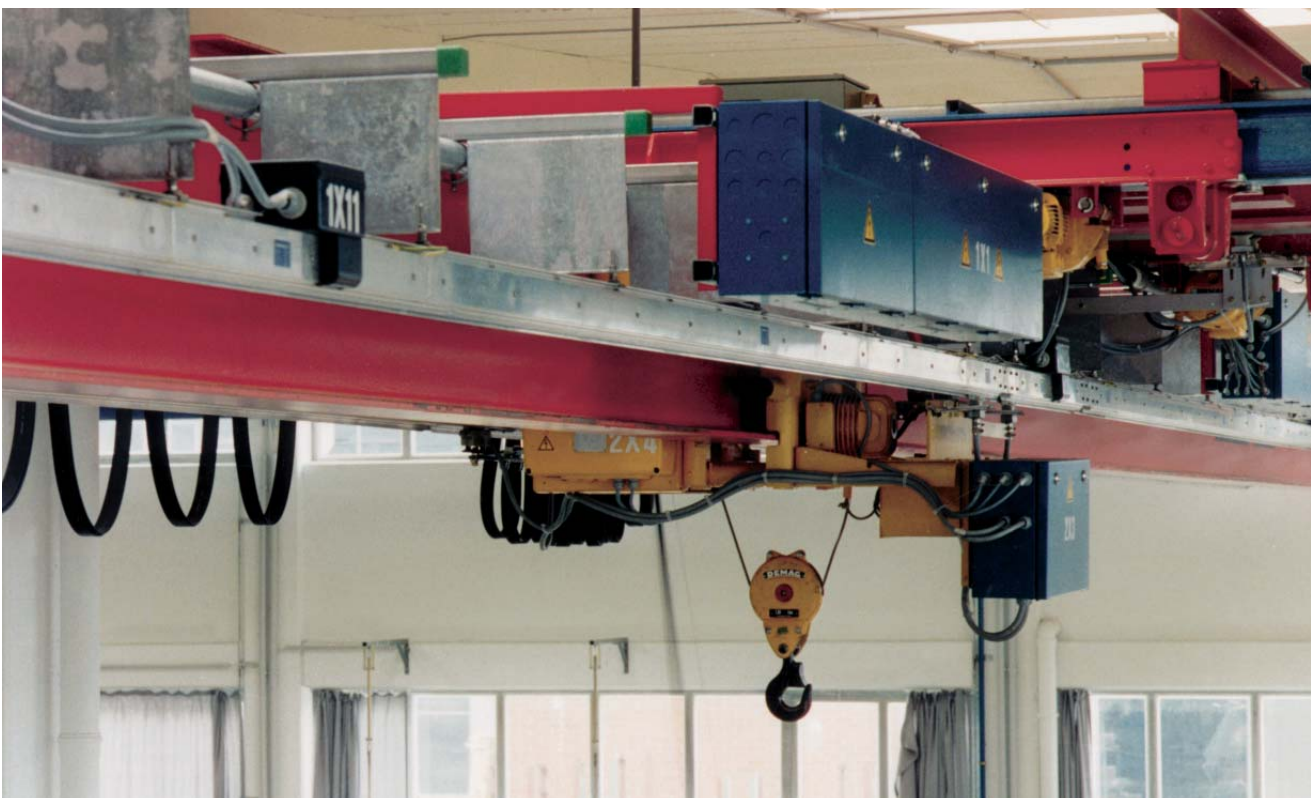
Type	with air gap 5 mm Order- No.	Type	with insul. section 30 mm Order- No.
STAG 1	182 860	STIG 1	182 960
STAG 2	182 870	STIG 2	182 970
STAG 3	182 880	STIG 3	182 980
STAG 4	182 890	STIG 4	182 990
STAG 5	182 900	STIG 5	183 000
STAG 6	182 910	STIG 6	183 010
STAG 7	182 920	STIG 7	183 020
STAG 8	182 930	STIG 8	183 030
STAG 9	182 940	STIG 9	183 040
STAG 10	182 950	STIG 10	183 050

⁽¹⁾ SWK carbon brush without brush holder.

⁽²⁾ Please indicate which conductors are to be interrupted.



Aluminium enclosed conductor system for crane electrifications.

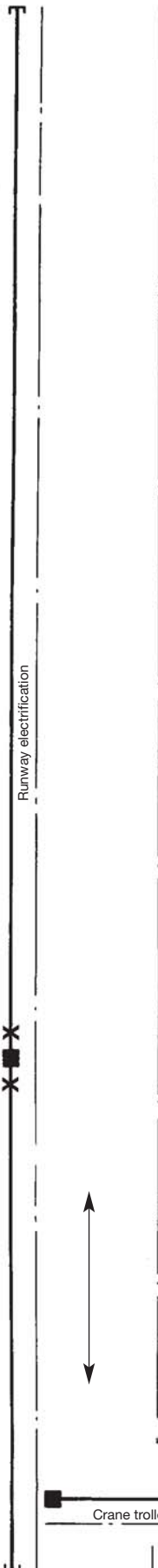


Aluminium enclosed conductor system LSVG on crane bridge.



EXAMPLES FOR ORDERING

with Plug-in joints



Runway electrification · 40 m

Qty		Type	Order- No.	Type	Order- No.
9	Powerails, 4 m long	LSV 4/60-4 HS	190 004	LSVG 10/60-4 HS	180 164
1	Powerail, 3 m long	LSV 4/60-3 HS	190 003	LSVG 10/60-3 HS	180 163
1	Line feed, 1 m long	NKL 4/60 HS	195 074	NKLG 10/60 HS	185 057
10	Joint materials	VBL 4/5	195 244	VLG 10/11	184 111
19	Sliding hangers	GAL	190 130	SAS	200 160
1	Fixpoint hanger	FAL	190 120	SAFG	180 310
2	End caps	EKL	190 220	EKLG	180 320
1	Double collector	DSWN 4/80 S-1 HS	194 808	DSWNG 10/80 HS	183 916
1	Tow arm	KWS	250 380	GKM	260 350

Crane trolley electrification · 12 m

2	Powerails, 4 m long	LSV 7/60-4 HS	190 074	LSVG 11/60-4 HS	180 194
1	Powerail, 3 m long (cut in 2.5 m)	LSV 7/60-3 HS	190 073	LSVG 11/60-3 HS	180 193
1	End feed, 1 m long	KEL 7/60 R HS	190 170	KELG 11/60 R HS	180 480
4	Joint materials	VBL 6/7	195 246	VLG 10/11	184 111
5	Sliding hangers	GAL	190 130	SAS	200 160
1	Fixpoint hanger	FAL	190 120	SAFG	180 310
1	Transfer guide, 0.5 m long	AÜL 7/60 L HS	192 450	AÜLG 11/60 L HS	181 350
1	Double collector	DSWN 7/80 S-1 HS	194 813	DSWNG 11/80 HS	183 918
1	Tow arm	KWS	250 380	GKM	260 350

Spur rail electrification · 30 m

7	Powerails, 4 m long	LSV 7/60-4 HS	190 074	LSVG 11/60-4 HS	180 194
1	Powerail, 1 m long (cut in 0.5 m)	LSV 7/60-1 HS	190 071	LSVG 11/60-1 HS	180 191
9	Joint materials	VBL 6/7	195 246	VLG 10/11	184 111
14	Sliding hangers	GAL	190 130	SAS	200 160
1	Fixpoint hanger	FAL	190 120	SAFG	180 310
1	Line feed, 1 m long	NKL 7/60 HS	195 089	NKLG 11/60 HS	183 992
1	Transfer guide, 0.5 m long	AÜL 7/60 R HS	192 460	AÜLG 11/60 R HS	181 360
1	End cap	EKL	190 220	EKLG	180 320

X = Fixpoint hanger; all other support points are sliding hangers.

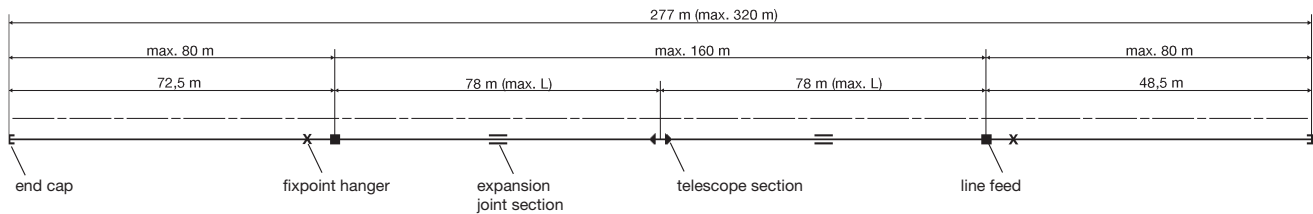
Sealing strip "D" and plastic shielding "FP" have to be ordered separately with the corresponding collectors (see pages 6 and 20). Heating system may be provided. (see page 16).



Straight track electrification · 277 m · with Line feed and Bolted joints

Anticipated max. temperature 60° C, L = max. 80 m;
277m total length of the system consisting of:

Qty		Type	Order- No.	Type	Order- No.
68	Powerrails, 4 m long	LSV 4/200-4 HS	190 614	LSVG 6/200-4 HS	180 034
1	Line feed, 1 m long	NKL 4/200 HS	195 077	NKLG 6/200 HS	185 031
2	Expansion joint sections, 1 m long	DSL 4/200 HS	195 109	DSL6 6/200 HS	184 018
1	Telescope section	TSL 4/200 HS	195 098	TSLG 6/200 HS	184 003
72	Joint materials	VBLS 4/5	195 248	VLGS 6/7	184 113
1	Fixpoint hanger	FAL	190 120	SAFG	180 310
139	Sliding hangers	GAL	190 130	SAS	200 160
2	End caps	EKLS	195 149	EKLS	184 100
2	Double collectors	DSWN 4/80 S-1 HS	194 808	DSWNG 6/80 HS	183 910
2	Tow arms	KWS	250 380	GKM	260 350



All other support points are sliding hangers, sealing strip „D“ and plastic shielding „FP“ have to be ordered separately with the corresponding collectors (see pages 6 and 20).
Heating system may be provided. (see page 16).

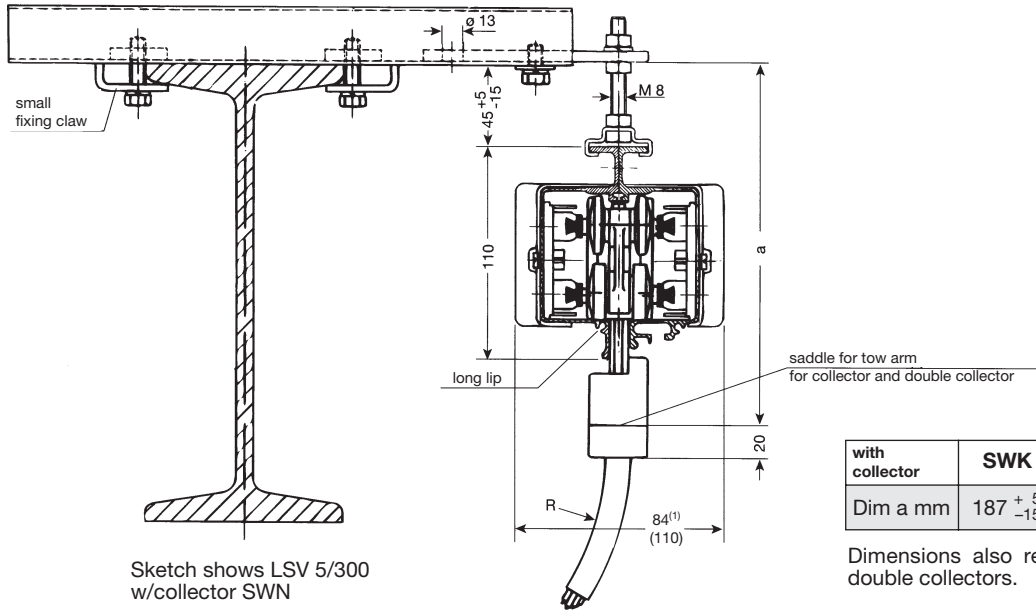


Aluminium enclosed conductor system on crane bridge.



BASIC DIMENSIONS

LSV

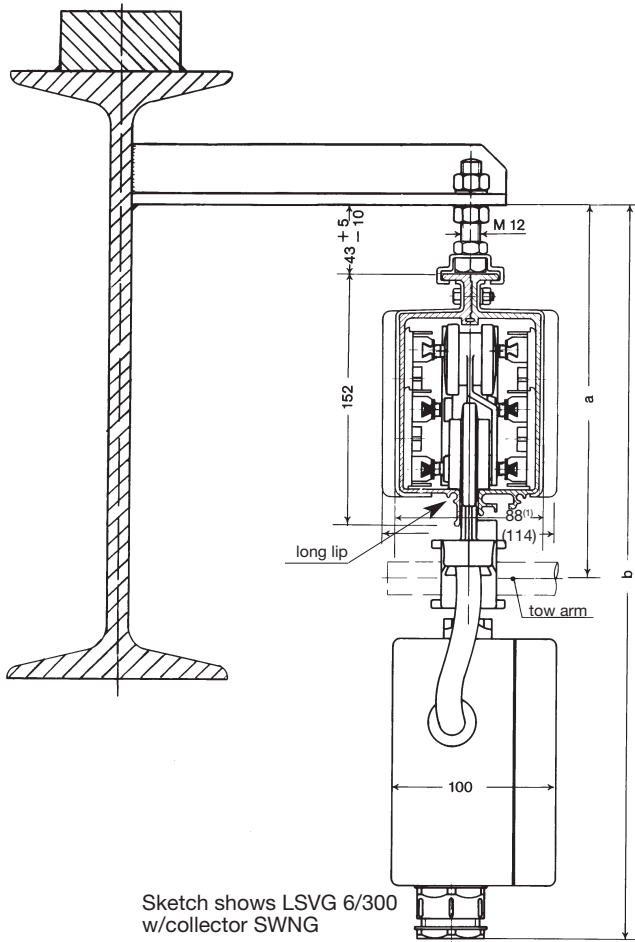


with collector	SWK	SWN	SWNT
Dim a mm	187 $^{+5}_{-15}$	187 $^{+5}_{-15}$	197 $^{+5}_{-15}$

Dimensions also refer to corresponding double collectors.

Sketch shows LSV 5/300 w/collector SWN

LSVG



with collector	SWNG	DSWNG	SWNGT	DSWNGT
Dim a mm	225 $^{+5}_{-10}$	255 $^{+5}_{-10}$	243 $^{+5}_{-10}$	268 $^{+5}_{-10}$
Dim b mm	455 $^{+5}_{-10}$	495 $^{+5}_{-10}$	460 $^{+5}_{-10}$	500 $^{+5}_{-10}$

Sketch shows LSVG 6/300 w/collector SWNG

LSV
LSVG

Cable glands for Feeds (see pages 10 and 11)

cable gland	for cable-Ø mm	ampacity A
M 25	9 - 19	60
M 32	17 - 27	60
M 50	23 - 33	100 + 140
M 50	29 - 39	200
M 63	35 - 64	300

⁽¹⁾ For max. width see also pages 10 & 11 feed set configurations.

Max. width 84 or 88 mm at plug-in joints w/o bonded blanks.

Dimensions in parenthesis at bolted joints are with bonded blanks (see illustration).



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 conductors: _____ (Neutral: _____ control: _____ ground: _____)

6. Mounted position of powerail:

- Powerail pendant, collector cable facing to the bottom
- Powerail pendant, collector cable lateral payout ⁽¹⁾
- Support distance _____ m (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⁽¹⁾: _____

12. How will the conductor system be arranged?⁽¹⁾ _____

13. Brackets required: yes no c/c distance beam / powerail _____
 Flange width of beam _____

14. Position and number of isolating sections (e.g. for maintenance): _____

15. Travel speed: _____ in curves: _____ at transfers: _____

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!



QUESTIONNAIRE LSV-LSVG

To the nearest local VAHLE agency:

Date:

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

Motor data	Crane 3						Crane 4						
	Power kW	Nominal current		Starting current		Type of Motos ⁽¹⁾	Power kW	Nominal current		Starting current		Type of Motos ⁽¹⁾	
		A	cos φ _N	% ED	A	cos φ _A		A	cos φ _N	% ED	A	cos φ _A	
Hoist motors													
Auxiliary hoist													
Long travel													
Cross travel													

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

⁽¹⁾Use: K for squirrel cage motor
 S for slipring motor
 F for frequency controlled motor

Further remarks: _____

Signature: _____



Products and Service

Catalog No.

1 Open conductor systems

Open conductor systems

1a

2 Insulated conductor systems

U 10

2a

FABA 100

2b

U 15 - U 25 - U 35

2c

U 20 - U 30 - U 40

2d

3 Compact conductor systems

VKS 10

3a

VKS - VKL

3b

4 Enclosed conductor systems

KBSL - KSL

4a

KBH

4b

MKLD - MKLF - MKLS

4c

LSV - LSVG

4d

5 Contactless power supply

Contactless power supply (CPS®)

5a

6 Data transmission

VAHLE Powercom®

6a

Slotted Microwave Guide (SMG)

6b

7 Positioning systems

VAHLE APOS®

7a

8 Festoon systems and cables

Festoon systems for □- tracks

8a

Festoon systems for flat cables on I- tracks

8b

Festoon systems for round flat cables on I- tracks

8c

Festoon systems for ◇- tracks

8d

Cables

8e

9 Reels

Spring operated cable reels

9a

Motor powered cable reels

9b

10 Others

Battery charging systems

10a

Heavy enclosed conductor systems

10b

Tender

10c

Contact wire

10d

Assemblies/Commissioning

Spare parts/Maintenance service



VAHLE 
ELECTRIFICATION SYSTEMS

Products and Service

Catalog No.

1 Open conductor systems

Open conductor systems 1a

2 Insulated conductor systems

U 10 2a

FABA 100 2b

U 15 - U 25 - U 35 2c

U 20 - U 30 - U 40 2d

3 Compact conductor systems

VKS 10 3a

VKS - VKL 3b

4 Enclosed conductor systems

KBSL - KSL 4a

KBH 4b

MKLD - MKLF - MKLS 4c

LSV - LSVG 4d

5 Contactless power supply

Contactless power supply (CPS®) 5a

6 Data transmission

VAHLE Powercom® 6a

Slotted Microwave Guide (SMG) 6b

7 Positioning systems

VAHLE APOS® 7a

8 Festoon systems and cables

Festoon systems for □- tracks 8a

Festoon systems for flat cables on I- tracks 8b

Festoon systems for round flat cables on I- tracks 8c

Festoon systems for ◇- tracks 8d

Cables 8e

9 Reels

Spring operated cable reels 9a

Motor powered cable reels 9b

10 Others

Battery charging systems 10a

Heavy enclosed conductor systems 10b

Tender 10c

Contact wire 10d

Assemblies/Commissioning

Spare parts/Maintenance service



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