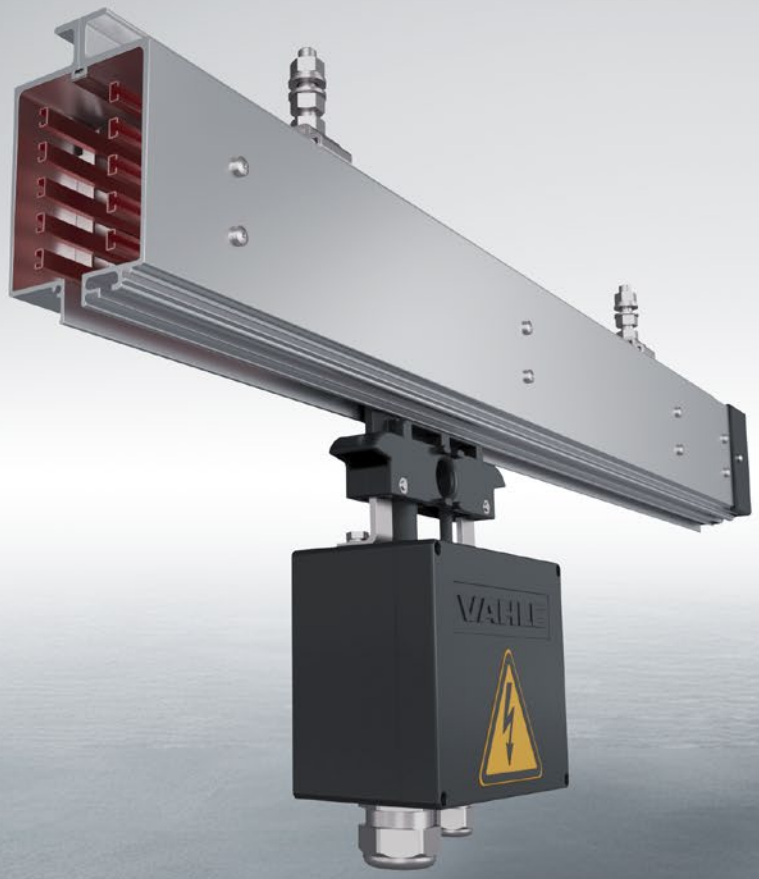
VAHLE

LSV | LSVG

ENCLOSED CONDUCTOR SYSTEMS



4D | EN 2010

INDEX

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	mm² 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	mm² 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.

(1) Consult factory for higher temperature applications.

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 agaist contact on site e.g. through barriers or disconnection. This is only necessary at voltages above 25 V AC or 60 V DC.
Other cross sections than shown on page 4 are possible. If the cross section of the neutral conductor is smaller than the outer conductor cross section, it is necessary to protect it against overcurrent and short-circuit, design according to IEC60364-4-43 (HD 60364-4-43).
The aluminium enclosed LSV 4-pole and the PVC enclosed KLS 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 transfered 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 exeed 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.

Safery 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 preperation 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 mm² 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

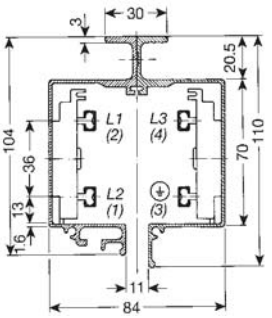
LSVG

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 mm² L1, L2, L3	⏚ (2)	N	Control-Line
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

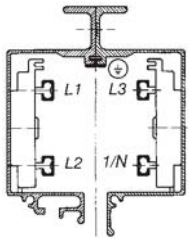
(1) With bolted joints only other types can be delivered with bolted joints without surcharge (on request).

(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.

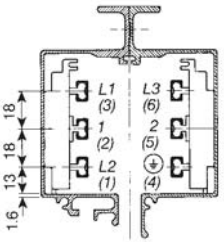
Nominal Voltage V	Leakage Path mm	Weight kg/m	Order- No.	Configurations
690	45	3,000	190 00 •	
690	45	3,000	190 10 •	
690	45	3,400	190 04 •	
690	45	3,700	190 08 •	
690	45	4,300	190 61 •	
690	35	5,000	190 60 •	
690	45	3,150	190 01 •	
690	45	3,550	190 03 •	
690	45	3,850	190 05 •	
690	45	4,450	190 62 •	
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 •	



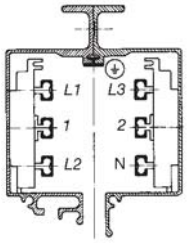
LSV 4-pole, 60-300 A



LSV 5-pole, 60-300 A

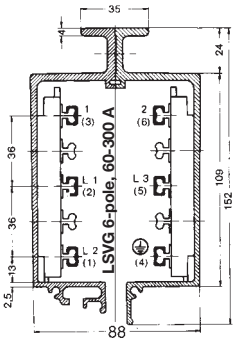


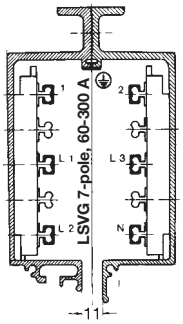
LSV 6-pole, 60-200 A

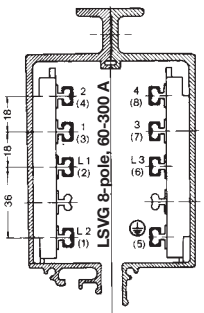


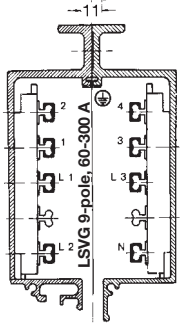
LSV 7-pole, 60-200 A

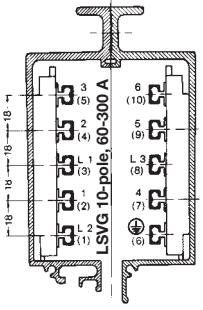
Nominal Voltage V	Leakage Path mm	Weight kg/m	Order- No.	Configurations
690	45	5,150	180 00 •	
690	45	5,150	180 22 •	
690	45	5,450	180 01 •	
690	45	5,750	180 02 •	
690	45	6,300	180 03 •	
690	35	7,250	180 04 •	
690	45	5,300	180 05 •	
690	45	5,700	180 06 •	
690	45	6,100	180 07 •	
690	45	6,700	180 08 •	
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 •	

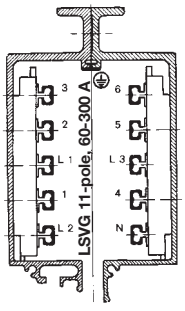












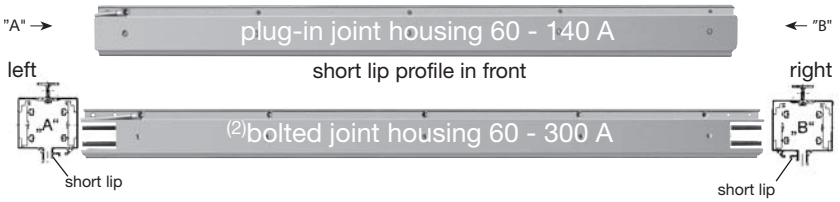
• Add last number (1, 2, 3, 4 m length suffix) in accordance to bars required.

Numbers in parenthesis are used for control circuit applications.

STANDARD SECTION MAX. 4 M

CURVED SECTION

LSV

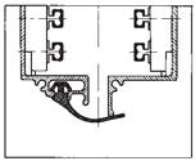


Extra finish of LSV; surcharge Order- No.

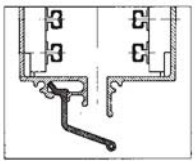
Type	Index E anodized housing Order- No.	Index I copper conductors with stainless steel cap Order- No. 60 A	Order- No. 200 A
LSV 4-pole	190 660	194 754	194 755
LSV 5-pole	190 670	194 756	194 757
LSV 6-pole	190 660	194 758	–
LSV 7-pole	190 670	194 760	–

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

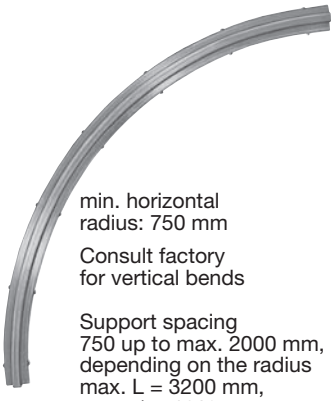


Neoprene sealing strip



Plastic shielding

Custom built



min. horizontal radius: 750 mm

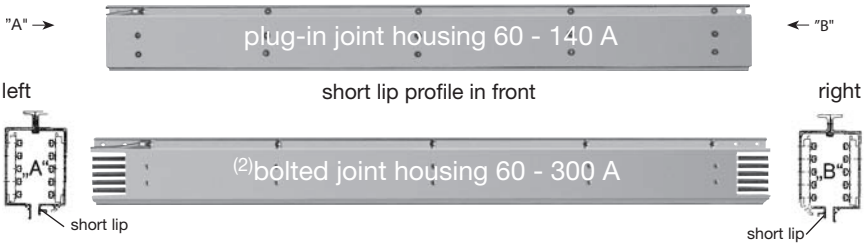
Consult factory for vertical bends

Support spacing 750 up to max. 2000 mm, depending on the radius max. L = 3200 mm, max. ⊀ = 120°

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

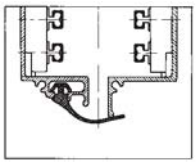


Extra finish of LSVG; surcharge Order- No.

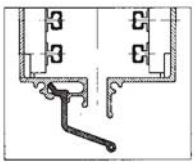
Type	Index E anodized housing Order- No.	Index I copper conductors with stainless steel cap Order- No. 60 A	Order- No. 200 A
LSVG 6-pole	180 250	183 871	183 872
LSVG 7-pole	180 260	183 873	183 874
LSVG 8-pole	180 250	183 875	–
LSVG 9-pole	180 260	183 877	–
LSVG 10-pole	180 250	183 879	–
LSVG 11-pole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

Supplements for 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			184 033
Plastic shielding(1) incl. locking pin for plastic shielding	**FP**	0,260	196 574

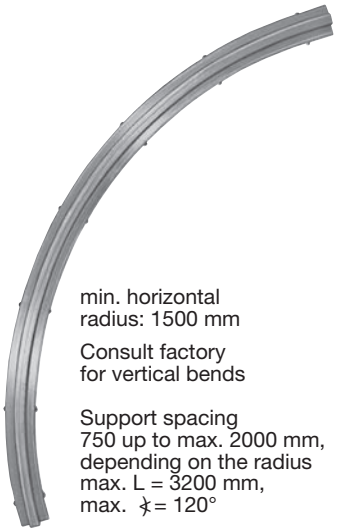


Neoprene sealing strip



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. ⊀ = 120°

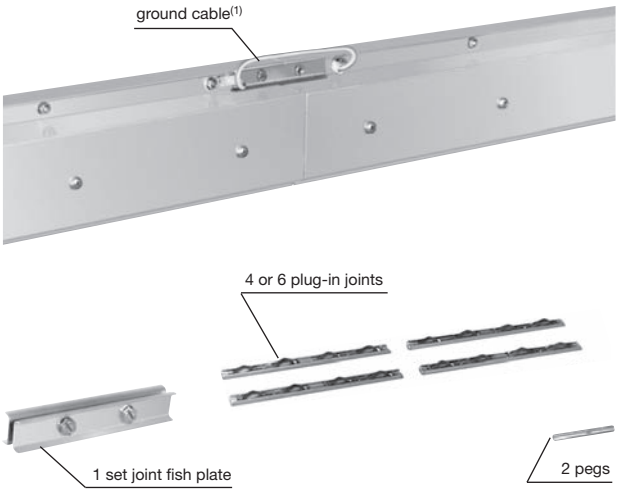
surcharge	Order- No.
horizontal curve L max. 1.8 m	183 810
horizontal curve L from 1.8 m to max. 3.2 m	184 170

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.

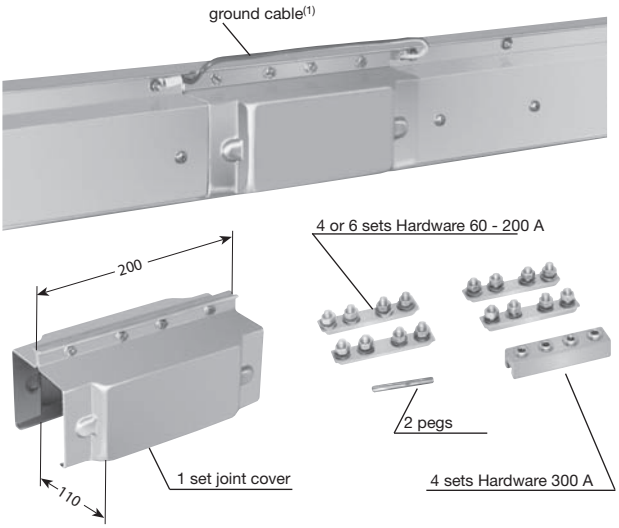
LSV

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

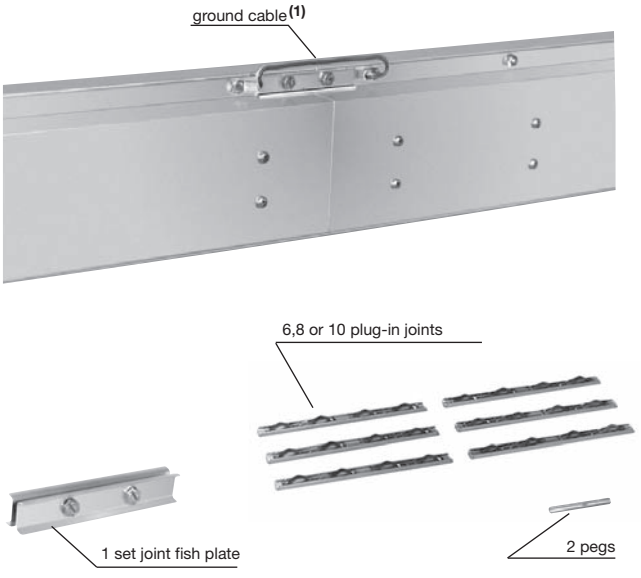
Bolted joints 60-300 A



Type		Weight kg	Order- No.	Order- No. anodized
VBLS 4/5	for 4- and 5-pole	0,450	195 248	–
VBLS/E 4/5	60-200 Amp.	0,450	–	195 255
VBLS 6/7	for 6- and 7-pole	0,505	195 250	–
VBLS/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

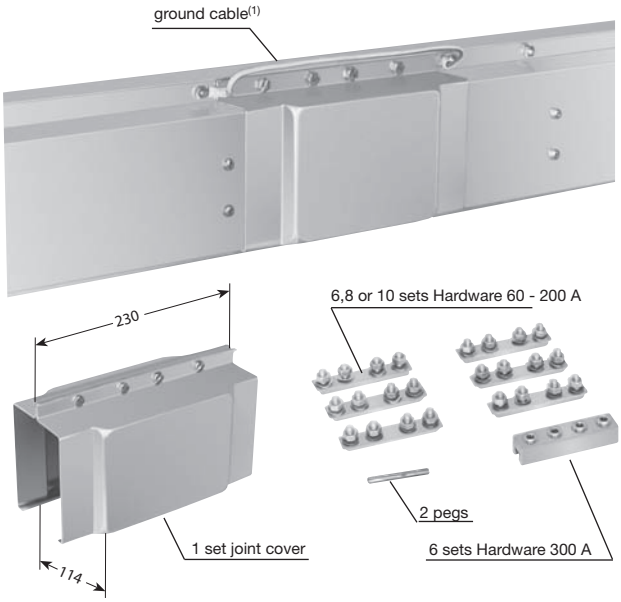
LSVG

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



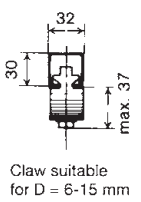
Type		Weight kg	Order- No.	Order- No. anodized
VLGS 6/7	for 6- and 7-pole	0,665	184 113	–
VLGS/E 6/7	60-200 Amp.	0,665	–	184 121
VLGS 8/9	for 8- and 9-pole	0,720	184 115	–
VLGS/E 8/9	60-200 Amp.	0,720	–	184 125
VLGS 10/11	for 10- and 11-pole	0,770	184 117	–
VLGS/E 10/11	60-200 Amp.	0,770	–	184 127
VLGSG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

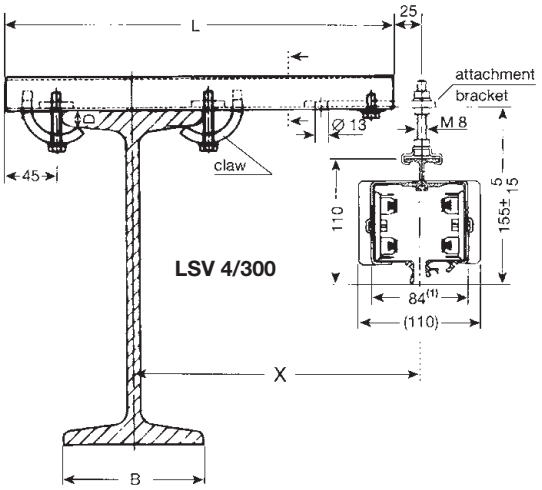
(1) Yellow/green ground cable factory pre-assembled.
(2) No joints required for uninsulated top conductors 5, 7, 9 and 11. Equel for power line and control line.

BRACKETS

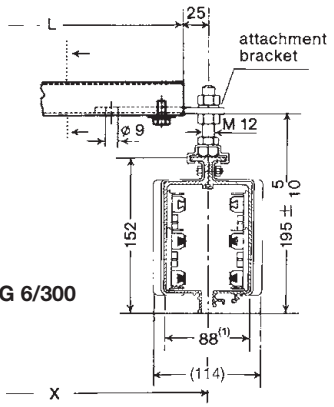
These brackets are easily bolted to any type of standard I-beam.

View without I-beam



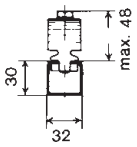


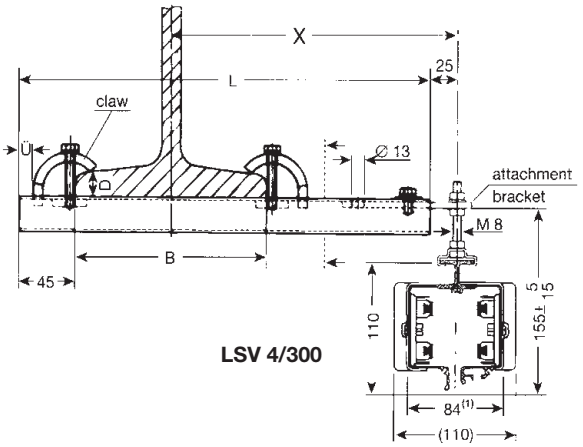
LSV 4/300



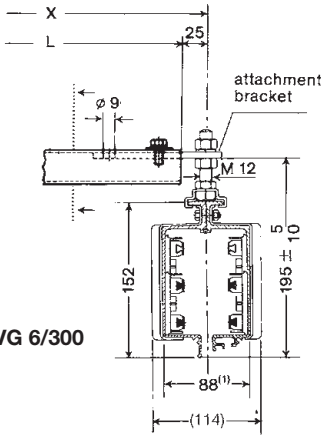
LSVG 6/300

View without I-beam



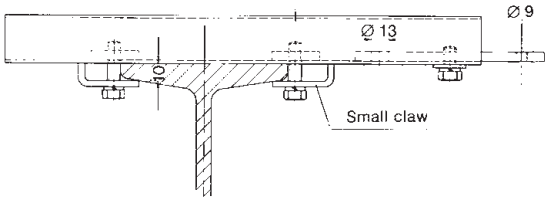


LSV 4/300



LSVG 6/300

EHKL small claw version



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

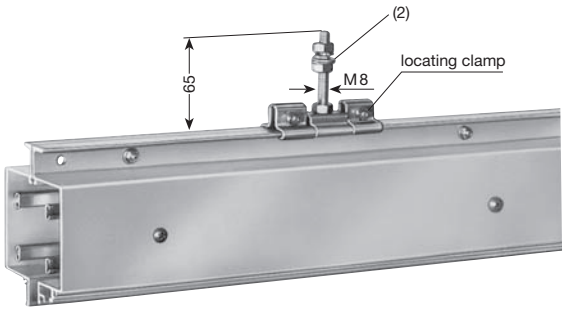
C-rail of EHKL is identical to type S 1, Order- No.

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 600	600	700	170	1,600	251 640	251 760
	X	**EHK 700**	700	800	170	1,750	251 650	251 770
	X	**EHK 750**	750	850	170	1,820	251 660	251 780
	X	**EHK 800**	800	900	170	1,900	251 670	251 790

(1) max. width 84 mm resp. 88 mm for plug-in joints w/o joint plates.
Dim. in parenthesis refer to bolted joints with joint plates (see illustration).

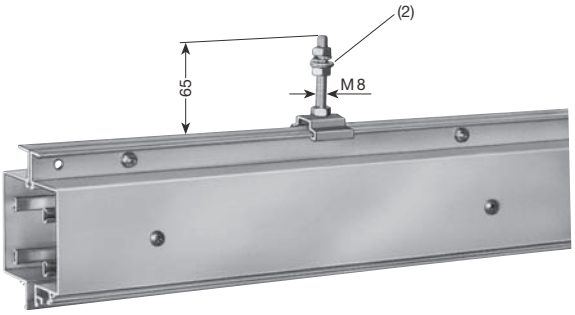
FIXPOINT HANGER[1]



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

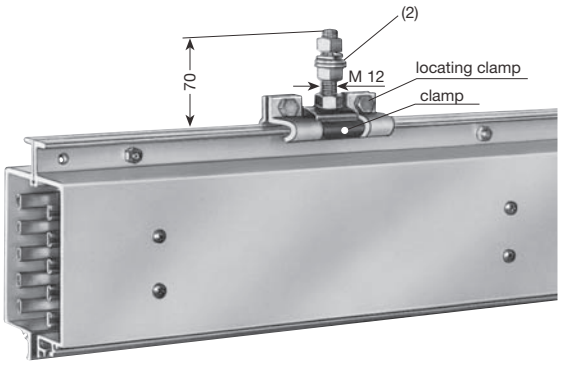
All steel parts made of stainless steel.

SLIDING HANGER[1]



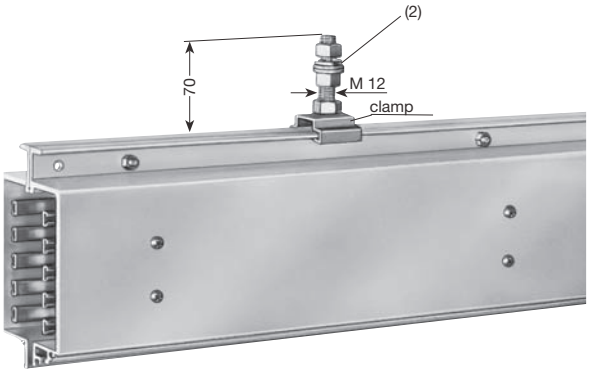
Type	Weight kg	Order- No.
GAL	0,080	190 130

All steel parts made of stainless steel.



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

Steel parts galvanized, clamp made of stainless steel.



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

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

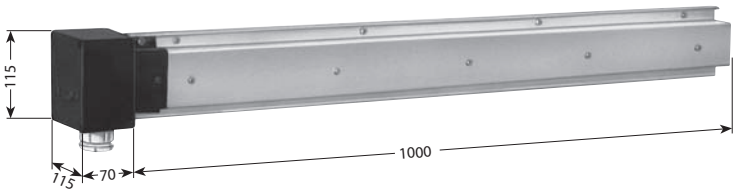
Plastic cap with plug-in joints

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

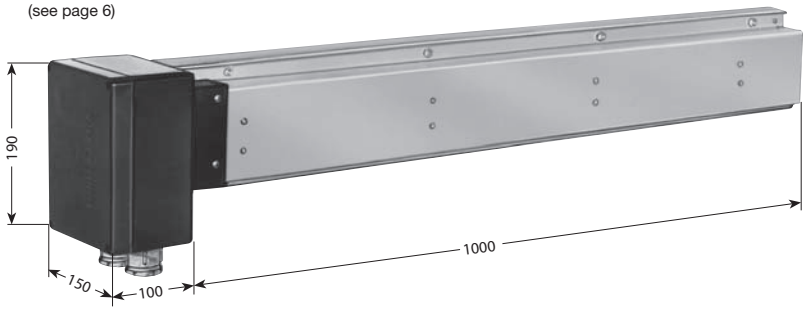
Plastic cap with plug-in joints

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)



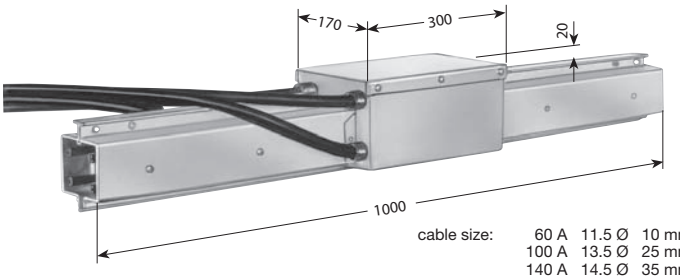
Cable glands (cable Ø see table page 28):
all types 1 x M 32
and 1 x M 25

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

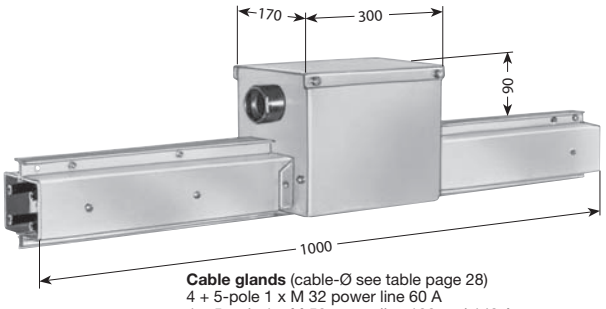


cable size:

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

LINE FEED[1]

c/w terminal box and 1 m powerail



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

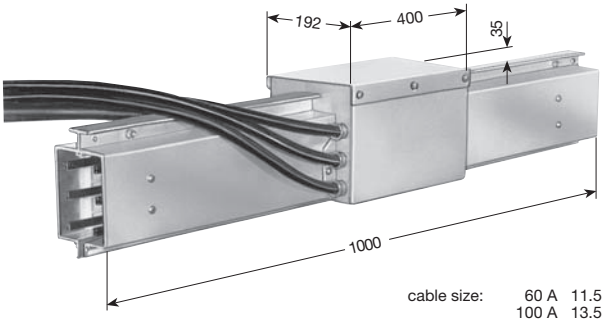
LSV

Type[2]	A	Weight kg	Order- No.
Power line **HS** with PE			
LAL 4/ 60	60	5,65	195 060
LAL 4/100	100	6,55	195 061
LAL 4/140	140	7,40	195 062
LAL 4/200	200	8,00	195 637
LAL 4/300	300	8,75	196 460
LAL 5/ 60	60	6,10	195 064
LAL 5/100	100	7,00	195 065
LAL 5/140	140	8,25	195 066
LAL 5/200	200	8,85	195 638
LAL 5/300	300	9,75	196 682
Control line **SS** without PE			
LAL 4/ 60	60	5,65	195 063
LAL 6/ 60	60	6,65	195 070

Type[2]	A	Weight kg	Order- No.
Power line **HS** with PE			
LAL 6/ 60	60	6,65	195 067
LAL 6/100	100	7,80	195 068
LAL 6/140	140	8,45	195 069
LAL 6/200	200	8,95	195 639
LAL 7/ 60	60	7,15	195 071
LAL 7/100	100	9,00	195 072
LAL 7/140	140	9,25	195 073
LAL 7/200	200	9,80	195 640

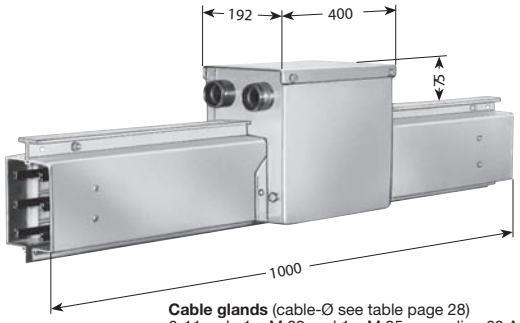
Type[2]	A	Weight kg	Order-No.
Power line **HS** with PE			
NKL 4/ 60	60	4,40	195 074
NKL 4/100	100	4,80	195 075
NKL 4/140	140	5,10	195 076
NKL 4/200	200	5,80	195 077
NKL 4/300	300	6,50	195 078
NKL 5/ 60	60	4,60	195 080
NKL 5/100	100	5,00	195 081
NKL 5/140	140	5,30	195 082
NKL 5/200	200	6,00	195 083
NKL 5/300	300	6,70	195 084

Type[2]	A	Weight kg	Order-No.
Power line **HS** with PE			
NKL 6/ 60	60	4,80	195 085
NKL 6/100	100	5,20	195 086
NKL 6/140	140	5,50	195 087
NKL 6/200	200	6,00	195 567
NKL 7/ 60	60	5,00	195 089
NKL 7/100	100	5,40	195 090
NKL 7/140	140	5,70	195 091
NKL 7/200	200	6,30	195 568
Control line **SS** without PE			
NKL 4/ 60	60	4,40	195 079
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

LSVG

Type[2]	A	Weight kg	Order-No.
Power line **HS** with PE			
LALG 6/ 60	60	8,60	183 949
LALG 6/100	100	9,40	183 950
LALG 6/140	140	10,30	183 951
LALG 6/200	200	10,80	184 661
LALG 6/300	300	11,95	185 713
LALG 7/ 60	60	9,10	183 953
LALG 7/100	100	10,10	183 954
LALG 7/140	140	11,10	183 955
LALG 7/200	200	11,65	184 662
LALG 7/300	300	12,85	185 714
LALG 8/ 60	60	9,60	183 956
LALG 8/100	100	10,45	183 957
LALG 8/140	140	11,30	183 958
LALG 8/200	200	11,80	184 663
Control line **SS** without PE			
LALG 6/60	60	8,60	183 952
LALG 8/60	60	9,60	183 959
LALG 10/60	60	10,65	183 966

Type[2]	A	Weight kg	Order-No.
Power line **HS** with PE			
LALG 9/ 60	60	10,15	183 960
LALG 9/100	100	11,05	183 961
LALG 9/140	140	12,15	183 962
LALG 9/200	200	12,70	184 664
LALG 10/ 60	60	10,65	183 963
LALG 10/100	100	11,45	183 964
LALG 10/140	140	12,30	183 965
LALG 10/200	200	12,80	184 665
LALG 11/ 60	60	11,15	183 967
LALG 11/100	100	12,10	183 968
LALG 11/140	140	13,15	183 969
LALG 11/200	200	13,70	184 666

Type[2]	A	Weight kg	Order-No.
Power line **HS** with PE			
NKLG 6/ 60	60	6,75	184 983
NKLG 6/100	100	7,05	184 985
NKLG 6/140	140	7,35	185 029
NKLG 6/200	200	7,90	185 031
NKLG 6/300	300	8,85	185 079
NKLG 7/ 60	60	6,95	185 033
NKLG 7/100	100	7,25	185 035
NKLG 7/140	140	7,55	185 037
NKLG 7/200	200	8,10	185 039
NKLG 7/300	300	9,05	185 081
NKLG 8/ 60	60	7,15	185 041
NKLG 8/100	100	7,45	185 043
NKLG 8/140	140	7,75	185 045
NKLG 8/200	200	8,25	185 047

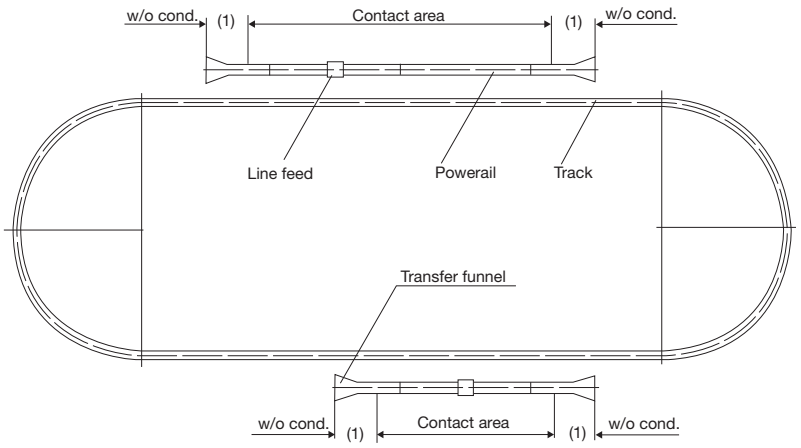
Type[2]	A	Weight kg	Order-No.
Power line **HS** with PE			
NKLG 9/ 60	60	7,35	185 049
NKLG 9/100	100	7,65	185 051
NKLG 9/140	140	7,95	185 053
NKLG 9/200	200	8,50	185 055
NKLG 10/ 60	60	7,55	185 057
NKLG 10/100	100	7,85	185 059
NKLG 10/140	140	8,15	185 061
NKLG 10/200	200	8,65	185 063
NKLG 11/ 60	60	7,75	185 065
NKLG 11/100	100	8,05	185 067
NKLG 11/140	140	8,35	185 069
NKLG 11/200	200	8,90	185 071
Control line **SS** without PE			
NKLG 6/ 60	60	6,75	185 073
NKLG 8/ 60	60	7,15	185 075
NKLG 10/ 60	60	7,55	185 077

[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).

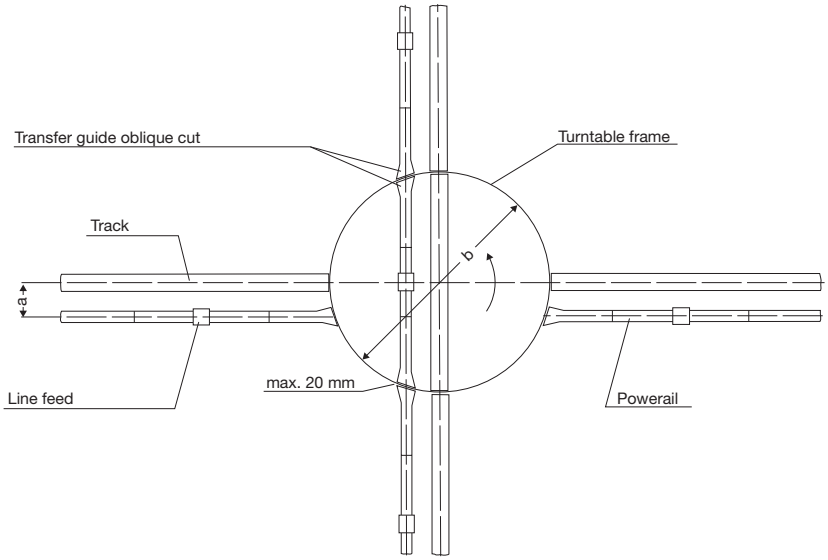
[2] Suffix types e.g. LAL 4/60 w/ PE → LAL 4/60 **HS** Order- No. 195 060.

TRANSFER AND SWITCH ARRANGEMENTS

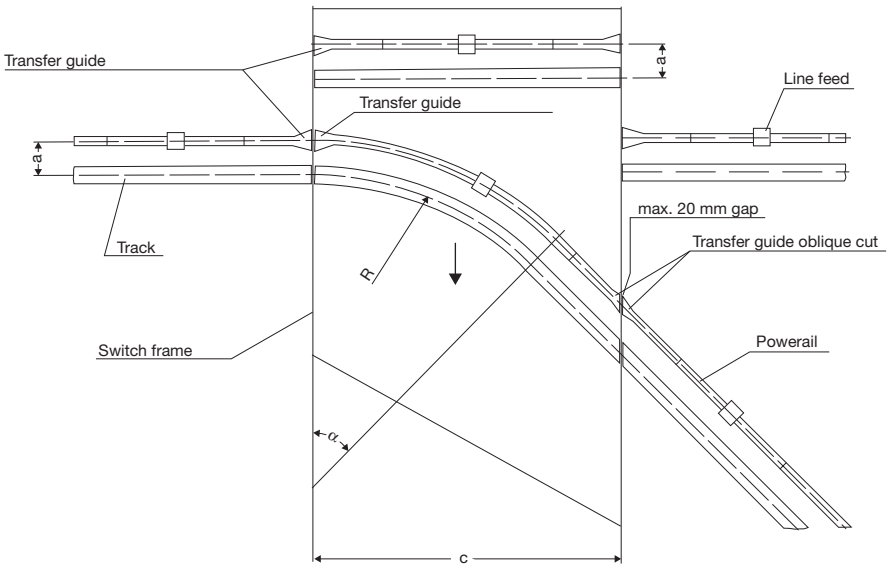
Contact section[1]



Turntable



Sliding switch



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

[1] Transfer funnels 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 FUNNEL[2]

c/w 0.5 m powerail and joint material

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.

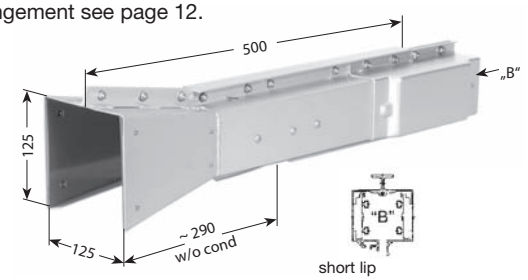


Illustration shows L. H. version
short lip in front
(see page 6)

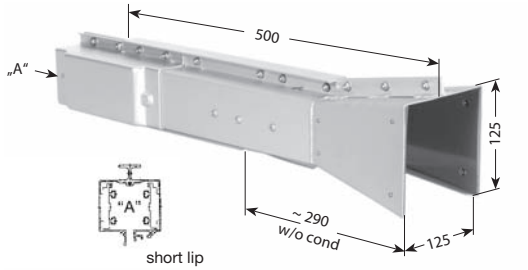


Illustration shows R. H. version
short lip in front
(see page 6)

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 7/100 L	1,600	193 030				**ETL 7/100 R**	1,600	193 210
ETL 5/ 60 L	1,500	192 940	**ETL 7/140 L**	1,700	193 040	**ETL 5/ 60 R**	1,500	193 120	**ETL 7/140 R**	1,700	193 220
ETL 5/100 L	1,550	192 950	**ETL 7/200 L**	1,820	195 612	**ETL 5/100 R**	1,550	193 130	**ETL 7/200 R**	1,820	195 613
ETL 5/140 L	1,650	192 960	Control line **SS** without PE			**ETL 5/140 R**	1,650	193 140	Control line **SS** without PE		
ETL 5/200 L	1,750	192 970	**ETL 4/ 60 L**	1,450	193 050	**ETL 5/200 R**	1,750	193 150	**ETL 4/ 60 R**	1,450	193 230
ETL 5/300 L	1,900	192 980	**ETL 6/ 60 L**	1,500	193 060	**ETL 5/300 R**	1,900	193 160	**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.

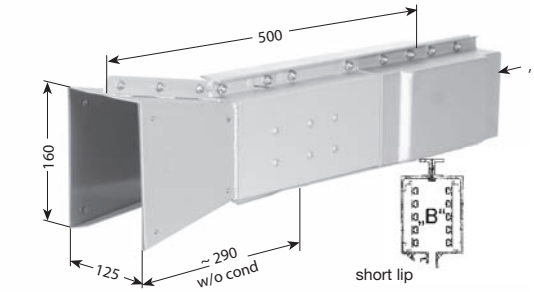


Illustration shows L. H. version
short lip in front
(see page 6)

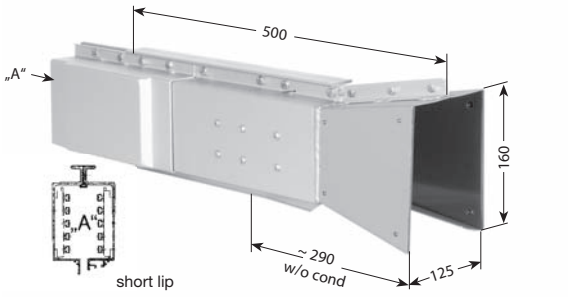


Illustration shows R. H. version
short lip in front
(see page 6)

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** witht 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 10/100 L	2,700	182 310				**ETLG 10/100 R**	2,700	182 320
ETLG 7/ 60 L	2,550	182 070	**ETLG 10/140 L**	2,750	182 330	**ETLG 7/ 60 R**	2,550	182 080	**ETLG 10/140 R**	2,750	182 340
ETLG 7/100 L	2,600	182 090	**ETLG 10/200 L**	2,850	184 622	**ETLG 7/100 R**	2,600	182 100	**ETLG 10/200 R**	2,850	184 626
ETLG 7/140 L	2,700	182 110	**ETLG 11/ 60 L**	2,650	182 350	**ETLG 7/140 R**	2,700	182 120	**ETLG 11/ 60 R**	2,650	182 360
ETLG 7/200 L	2,800	182 130	**ETLG 11/100 L**	2,750	182 370	**ETLG 7/200 R**	2,800	182 140	**ETLG 11/100 R**	2,750	182 380
ETLG 7/300 L	2,950	182 150	**ETLG 11/140 L**	2,800	182 390	**ETLG 7/300 R**	2,950	182 160	**ETLG 11/140 R**	2,800	182 400
			ETLG 11/200 L	2,920	184 623				**ETLG 11/200 R**	2,920	184 627
ETLG 8/ 60 L	2,600	182 170	Control line **SS** without PE			**ETLG 8/ 60 R**	2,600	182 180	Control line **SS** without PE		
ETLG 8/100 L	2,650	182 190	**ETLG 6/ 60 L**	2,500	182 410	**ETLG 8/100 R**	2,650	182 200	**ETLG 6/ 60 R**	2,500	182 420
ETLG 8/140 L	2,700	182 210	**ETLG 8/ 60 L**	2,600	182 430	**ETLG 8/140 R**	2,700	182 220	**ETLG 8/ 60 R**	2,600	182 440
ETLG 8/200 L	2,800	184 620	**ETLG 10/ 60 L**	2,650	182 450	**ETLG 8/200 R**	2,800	184 624	**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]

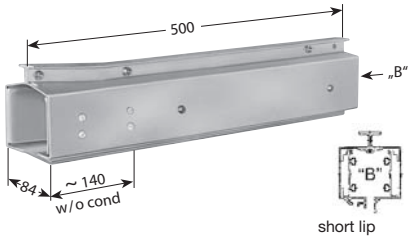
c/w 0.5 m powerail

LSV

for turntables, switches and spurlines,

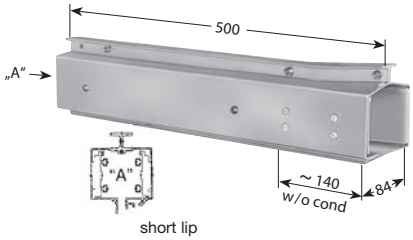
staggered arrangement of the transfer guides to each other: horizontal max. 5 mm, vertical max. 3 mm
Max. travel speed collector unit: 80m/min.

applications see page 12



short lip

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



short lip

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

Type[2]	Weight kg	Order- No.	Type[2]	Weight kg	Order- No.
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 4/100 L	1,550	192 210	**AÜL 6/100** L	1,650	192 410
AÜL 4/140 L	1,650	192 230	**AÜL 6/140 L**	1,750	192 430
AÜL 4/200 L	1,800	192 250	**AÜL 6/200 L**	1,900	195 614
AÜL 4/300 L	2,050	192 270	**AÜL 7/ 60 L**	1,550	192 450
			AÜL 7/100 L	1,700	192 470
AÜL 5/ 60 L	1,450	192 290	**AÜL 7/140 L**	1,850	192 490
AÜL 5/100 L	1,600	192 310	**AÜL 7/200 L**	2,020	195 616
AÜL 5/140 L	1,750	192 330	Control line **SS** without PE		
AÜL 5/200 L	1,950	192 350	**AÜL 4/ 60 L**	1,400	192 510
AÜL 5/300 L	2,150	192 370	**AÜL 6/ 60 L**	1,500	192 530

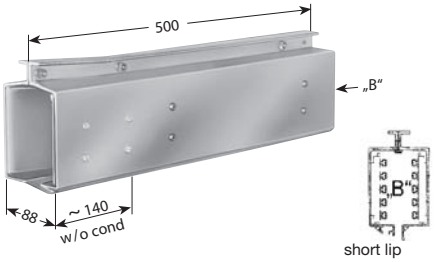
Type[2]	Weight kg	Order- No.	Type[2]	Weight kg	Order- No.
Power line **HS** with PE			Power line **HS** with PE		
AÜL 4/ 60 R	1,400	192 200	**AÜL 6/ 60 R**	1,500	192 400
AÜL 4/100 R	1,550	192 220	**AÜL 6/100 R**	1,650	192 420
AÜL 4/140 R	1,650	192 240	**AÜL 6/140 R**	1,750	192 440
AÜL 4/200 R	1,800	192 260	**AÜL 6/200 R**	1,900	195 615
AÜL 4/300 R	2,050	192 280	**AÜL 7/ 60 R**	1,550	192 460
			AÜL 7/100 R	1,700	192 480
AÜL 5/ 60 R	1,450	192 300	**AÜL 7/140 R**	1,850	192 500
AÜL 5/100 R	1,600	192 320	**AÜL 7/200 R**	2,020	195 617
AÜL 5/140 R	1,750	192 340	Control line **SS** without PE		
AÜL 5/200 R	1,950	192 360	**AÜL 4/ 60 R**	1,400	192 520
AÜL 5/300 R	2,150	192 380	**AÜL 6/ 60 R**	1,500	192 540

LSVG

for turntables, switches and spurlines,

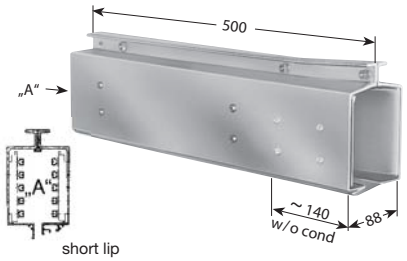
staggered arrangement of the transfer guides to each other: horizontal max. 5 mm, vertical max. 3 mm
Max. travel speed collector unit: 80m/min.

applications see page 12



short lip

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



short lip

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

Type[2]	Weight kg	Order- No.	Type[2]	Weight kg	Order- No.
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 6/100 L	2,600	180 990	**AÜLG 9/100 L**	2,800	181 250
AÜLG 6/140 L	2,700	181 010	**AÜLG 9/140 L**	2,950	181 270
AÜLG 6/200 L	2,900	181 030	**AÜLG 9/200 L**	3,120	184 629
AÜLG 6/300 L	3,250	181 050	**AÜLG 10/ 60 L**	2,750	181 290
			AÜLG 10/100 L	2,850	181 310
AÜLG 7/ 60 L	2,550	181 070	**AÜLG 10/140 L**	2,950	181 330
AÜLG 7/100 L	2,700	181 090	**AÜLG 10/200 L**	3,100	184 630
AÜLG 7/140 L	2,850	181 110	**AÜLG 11/ 60 L**	2,800	181 350
AÜLG 7/200 L	3,050	181 130	**AÜLG 11/100 L**	2,900	181 370
AÜLG 7/300 L	3,300	181 150	**AÜLG 11/140 L**	3,050	181 390
			AÜLG 11/200 L	3,220	184 631
AÜLG 8/ 60 L	2,600	181 170	Control line **SS** without PE		
AÜLG 8/100 L	2,700	181 190	**AÜLG 6/ 60 L**	2,500	181 410
AÜLG 8/140 L	2,850	181 210	**AÜLG 8/ 60 L**	2,600	181 430
AÜLG 8/200 L	3,000	184 628	**AÜLG 10/ 60 L**	2,750	181 450

Type[2]	Weight kg	Order- No.	Type[2]	Weight kg	Order- No.
Power line **HS** with PE			Power line **HS** with PE		
AÜLG 6/ 60 R	2,500	180 980	**AÜLG 9/ 60 R**	2,700	181 240
AÜLG 6/100 R	2,600	181 000	**AÜLG 9/100 R**	2,800	181 260
AÜLG 6/140 R	2,700	181 020	**AÜLG 9/140 R**	2,950	181 280
AÜLG 6/200 R	2,900	181 040	**AÜLG 9/200 R**	3,120	184 633
AÜLG 6/300 R	3,250	181 060	**AÜLG 10/ 60 R**	2,750	181 300
			AÜLG 10/100 R	2,850	181 320
AÜLG 7/ 60 R	2,550	181 080	**AÜLG 10/140 R**	2,950	181 340
AÜLG 7/100 R	2,700	181 100	**AÜLG 10/200 R**	3,100	184 634
AÜLG 7/140 R	2,850	181 120	**AÜLG 11/ 60 R**	2,800	181 360
AÜLG 7/200 R	3,050	181 140	**AÜLG 11/100 R**	2,900	181 380
AÜLG 7/300 R	3,300	181 160	**AÜLG 11/140 R**	3,050	181 400
			AÜLG 11/200 R	3,220	184 635
AÜLG 8/ 60 R	2,600	181 180	Control line **SS** without PE		
AÜLG 8/100 R	2,700	181 200	**AÜLG 6/ 60 R**	2,500	181 420
AÜLG 8/140 R	2,850	181 220	**AÜLG 8/ 60 R**	2,600	181 440
AÜLG 8/200 R	3,000	184 632	**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)

c/w 0.5 m powerail

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

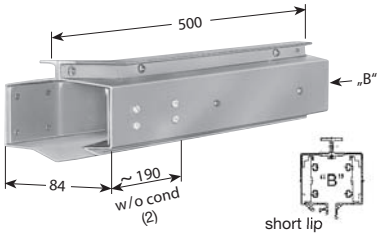


Illustration shows L. H. version
short lip in front
(see page 6)

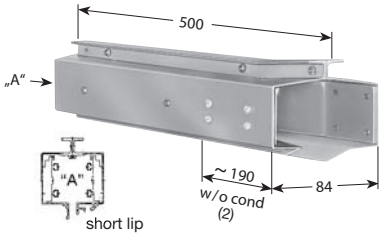


Illustration shows R. H. version
short lip in front
(see page 6)

Type(2)	Weight kg	Order- No.	Type(2)	Weight kg	Order- No.
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 4/100 L	1,550	192 570	**AÜLS 6/100 L**	1,650	192 770
AÜLS 4/140 L	1,650	192 590	**AÜLS 6/140 L**	1,750	193 420
AÜLS 4/200 L	1,800	192 610	**AÜLS 6/200 L**	1,900	195 618
AÜLS 4/300 L	2,050	192 630	**AÜLS 7/ 60 L**	1,550	192 790
			AÜLS 7/100 L	1,700	192 810
AÜLS 5/ 60 L	1,450	192 650	**AÜLS 7/140 L**	1,850	192 830
AÜLS 5/100 L	1,600	192 670	**AÜLS 7/200 L**	2,020	195 620
AÜLS 5/140 L	1,750	192 690	Control line **SS** without PE		
AÜLS 5/200 L	1,950	192 710	**AÜLS 4/ 60 L**	1,400	192 850
AÜLS 5/300 L	2,150	192 730	**AÜLS 6/ 60 L**	1,500	192 870

Type(2)	Weight kg	Order- No.	Type(2)	Weight kg	Order- No.
Power line **HS** with PE			Power line **HS** with PE		
AÜLS 4/ 60 R	1,400	192 560	**AÜLS 6/ 60 R**	1,500	192 760
AÜLS 4/100 R	1,550	192 580	**AÜLS 6/100 R**	1,650	192 780
AÜLS 4/140 R	1,650	192 600	**AÜLS 6/140 R**	1,750	193 430
AÜLS 4/200 R	1,800	192 620	**AÜLS 6/200 R**	1,900	195 619
AÜLS 4/300 R	2,050	192 640	**AÜLS 7/ 60 R**	1,550	192 800
			AÜLS 7/100 R	1,700	192 820
AÜLS 5/ 60 R	1,450	192 660	**AÜLS 7/140 R**	1,850	192 840
AÜLS 5/100 R	1,600	192 680	**AÜLS 7/200 R**	2,020	195 621
AÜLS 5/140 R	1,750	192 700	Control line **SS** without PE		
AÜLS 5/200 R	1,950	192 720	**AÜLS 4/ 60 R**	1,400	192 860
AÜLS 5/300 R	2,150	192 740	**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

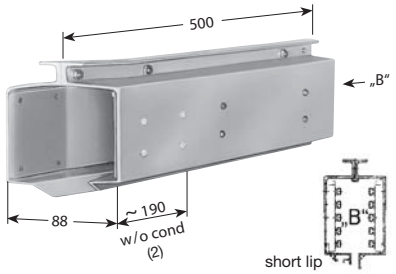


Illustration shows L. H. version
short lip in front
(see page 6)

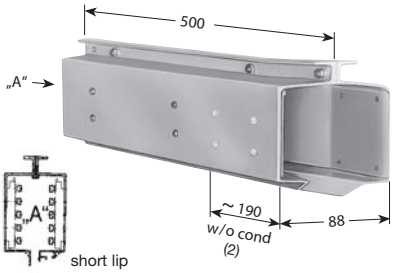


Illustration shows R. H. version
short lip in front
(see page 6)

Type(2)	Weight kg	Order- No.	Type(2)	Weight kg	Order- No.
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 6/100 L	2,600	181 490	**AÜLSG 9/100 L**	2,800	181 750
AÜLSG 6/140 L	2,700	181 510	**AÜLSG 9/140 L**	2,950	181 770
AÜLSG 6/200 L	2,900	181 530	**AÜLSG 9/200 L**	3,120	184 637
AÜLSG 6/300 L	3,250	181 550	**AÜLSG 10/ 60 L**	2,750	181 790
			AÜLSG 10/100 L	2,850	181 810
AÜLSG 7/ 60 L	2,550	181 570	**AÜLSG 10/140 L**	2,950	181 830
AÜLSG 7/100 L	2,700	181 590	**AÜLSG 10/200 L**	3,100	184 638
AÜLSG 7/140 L	2,850	181 610	**AÜLSG 11/ 60 L**	2,800	181 850
AÜLSG 7/200 L	3,050	181 630	**AÜLSG 11/100 L**	2,900	181 870
AÜLSG 7/300 L	3,300	181 650	**AÜLSG 11/140 L**	3,050	181 890
			AÜLSG 11/200 L	3,220	184 639
AÜLSG 8/ 60 L	2,600	181 670	Control line **SS** without PE		
AÜLSG 8/100 L	2,700	181 690	**AÜLSG 6/ 60 L**	2,500	181 910
AÜLSG 8/140 L	2,850	181 710	**AÜLSG 8/ 60 L**	2,600	181 930
AÜLSG 8/200 L	3,000	184 636	**AÜLSG 10/ 60 L**	2,750	181 950

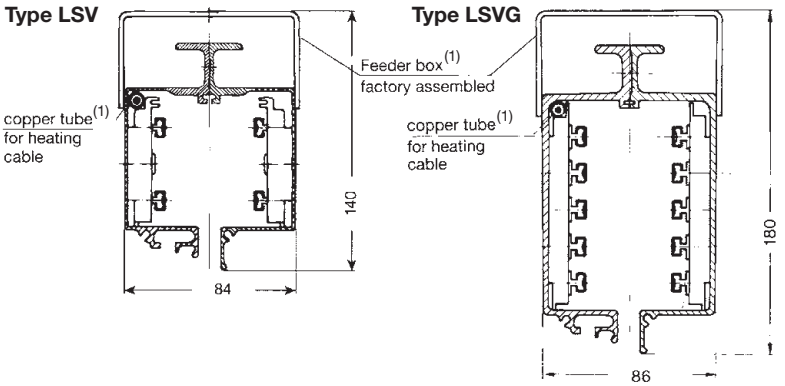
Type(2)	Weight kg	Order- No.	Type(2)	Weight kg	Order- No.
Power line **HS** with PE			Power line **HS** with PE		
AÜLSG 6/ 60 R	2,500	181 480	**AÜLSG 9/ 60 R**	2,700	181 740
AÜLSG 6/100 R	2,600	181 500	**AÜLSG 9/100 R**	2,800	181 760
AÜLSG 6/140 R	2,700	181 520	**AÜLSG 9/140 R**	2,950	181 780
AÜLSG 6/200 R	2,900	181 540	**AÜLSG 9/200 R**	3,120	184 641
AÜLSG 6/300 R	3,250	181 560	**AÜLSG 10/ 60 R**	2,750	181 800
			AÜLSG 10/100 R	2,850	181 820
AÜLSG 7/ 60 R	2,550	181 580	**AÜLSG 10/140 R**	2,950	181 840
AÜLSG 7/100 R	2,700	181 600	**AÜLSG 10/200 R**	3,100	184 642
AÜLSG 7/140 R	2,850	181 620	**AÜLSG 11/ 60 R**	2,800	181 860
AÜLSG 7/200 R	3,050	181 640	**AÜLSG 11/100 R**	2,900	181 880
AÜLSG 7/300 R	3,300	181 660	**AÜLSG 11/140 R**	3,050	181 900
			AÜLSG 11/200 R	3,220	184 643
AÜLSG 8/ 60 R	2,600	181 680	Control line **SS** without PE		
AÜLSG 8/100 R	2,700	181 700	**AÜLSG 6/ 60 R**	2,500	181 920
AÜLSG 8/140 R	2,850	181 720	**AÜLSG 8/ 60 R**	2,600	181 940
AÜLSG 8/200 R	3,000	184 640	**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.

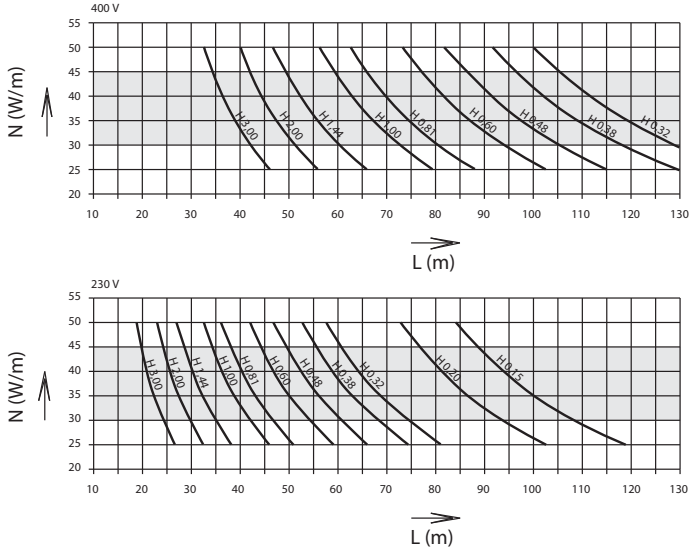
Arrangement of heating cables



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 powerail housing as shown in the adjacent drawings.

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

Selection of the heating cable



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.

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.

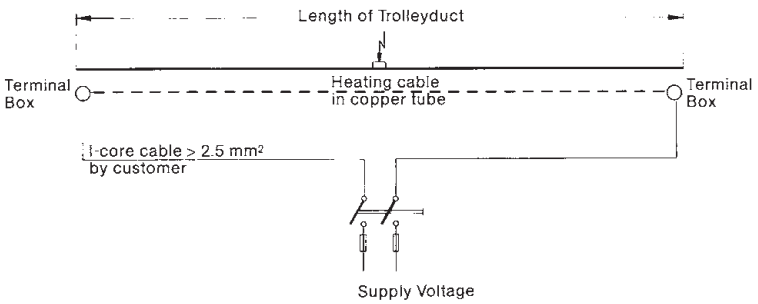
Heating capacity [Watt/m]: N' = $\frac{U^2}{R \cdot L^2}$

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

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 (1 set per connecting box)	195 291

Layout of one heating section with feeder boxes at both endsn



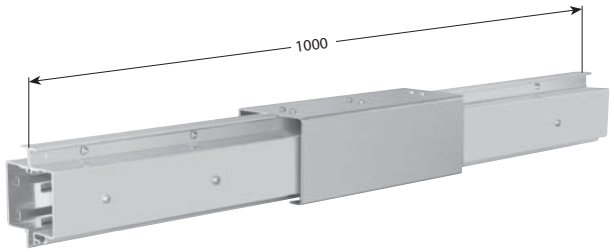
Switchgears and temperature control units available on request.

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!

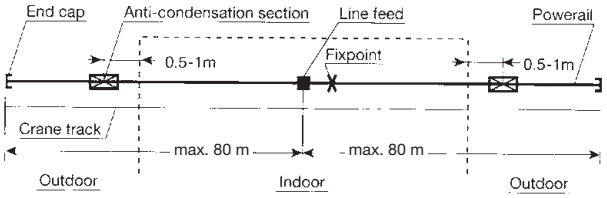
(1) Factory assembled on powerail.
(2) Deflection ± 2,5 %



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.

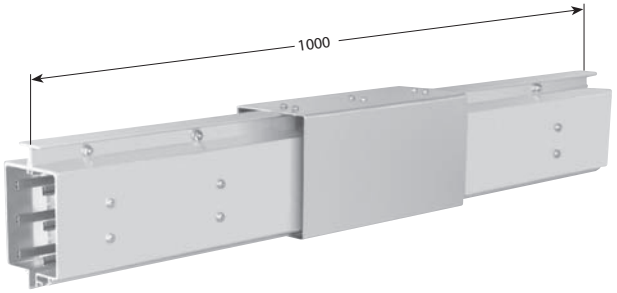
Collectors

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	–



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

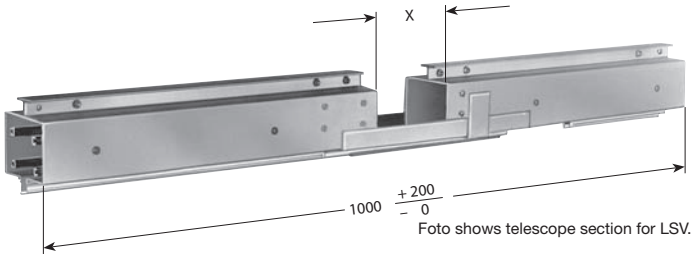


Foto shows telescope section for LSV.

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 curret collector. The telescope section separats the track electrically. For spare parts please aovise 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		
TSL 5/ 60	193 890	**TSL 7/100**	195 106	**TSLG 7/ 60**	183 360	**TSLG 9/140**	184 012	**TSLG 6/ 60**	183 530
TSL 5/100	195 100	**TSL 7/140**	195 107	**TSLG 7/100**	184 005	**TSLG 9/200**	184 649	**TSLG 8/ 60**	183 540
TSL 5/140	195 101	**TSL 7/200**	195 625	**TSLG 7/140**	184 006	**TSLG 10/ 60**	183 470	**TSLG 10/ 60**	183 550
TSL 5/200	195 102	Control line **SS** without PE		**TSLG 7/200**	184 007	**TSLG 10/100**	184 013		
TSL 5/300	195 103	**TSL 4/ 60**	194 000	**TSLG 7/300**	184 008	**TSLG 10/140**	184 014		
		TSL 6/ 60	194 010			**TSLG 10/200**	184 650		

Application of Telescope section

1. 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)

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

Fig.1

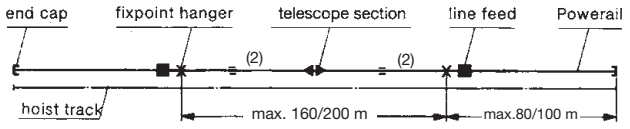


Fig.2

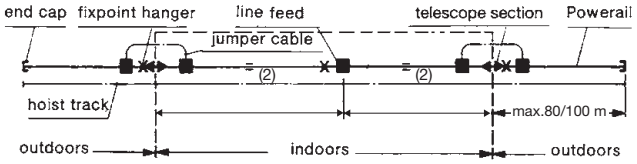
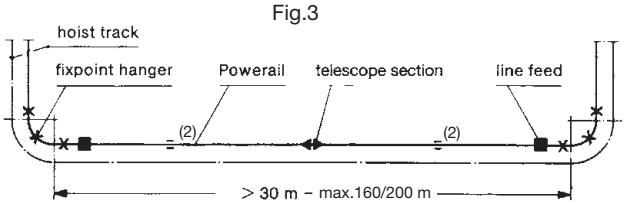


Fig.3



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.

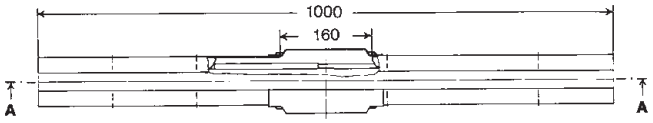
(1) Above sections come ready assembled on 1 m powerail and are a part of the system length.

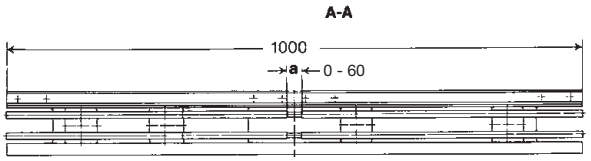
(2) DSL/DSLG with bolted joints only see page 19.

● 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	**DSLG 6/ 60**	183 560	**DSLG 8/ 60**	183 660	**DSLG 11/ 60**	183 750
DSL 4/100	195 108	**DSL 6/100**	195 112	**DSLG 6/100**	184 017	**DSLG 8/100**	184 021	**DSLG 11/100**	184 024
DSL 4/140	195 056	**DSL 6/140**	195 058	**DSLG 6/140**	183 943	**DSLG 8/140**	183 945	**DSLG 11/140**	183 948
DSL 4/200	195 109	**DSL 6/200**	195 626	**DSLG 6/200**	184 018	**DSLG 8/200**	184 652	**DSLG 11/200**	184 655
DSL 4/300	194 060	**DSL 7/ 60**	194 150	**DSLG 6/300**	183 600	**DSLG 9/ 60**	183 690	Control line **SS** without PE	
		DSL 7/100	195 113			**DSLG 9/100**	184 022		
DSL 5/ 60	194 070	**DSL 7/140**	195 059	**DSLG 7/ 60**	183 610	**DSLG 9/140**	183 946	**DSLG 6/ 60**	183 780
DSL 5/100	195 110	**DSL 7/200**	195 627	**DSLG 7/100**	184 019	**DSLG 9/200**	184 653	**DSLG 8/ 60**	183 790
DSL 5/140	195 057	Control line **SS** without PE		**DSLG 7/140**	183 944	**DSLG 10/ 60**	183 720	**DSLG 10/ 60**	183 800
DSL 5/200	195 111			**DSLG 7/200**	184 020	**DSLG 10/100**	184 023		
DSL 5/300	194 110	**DSL 4/ 60**	194 180	**DSLG 7/300**	183 650	**DSLG 10/140**	183 947		
		DSL 6/ 60	194 190			**DSLG 10/200**	184 654		

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

Epansion 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 ancholed 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.

Fig. 1

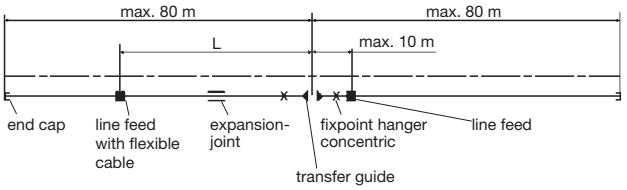
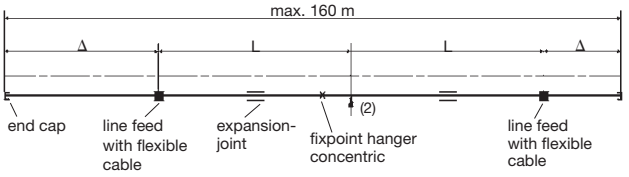


Fig. 2



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 sent 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)

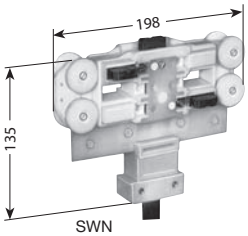
LSV			LSVG		
Type	No. of cond.	Order- No.	Typ	No. of cond.	Order- No.
FPL/Cu	4 & 5	194 530	**FPLG/Cu**	6 & 7	183 830
FPL/Cu	6 & 7	194 540	**FPLG/Cu**	8 & 9	183 840
			FPLG/Cu	10 & 11	183 850

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

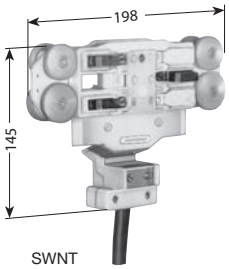
● Suffix types e.g. DSL 4/60 w/ PE → DSL 4/60 L **HS** Order- No. 194 020.

LSV

SWK



SWN



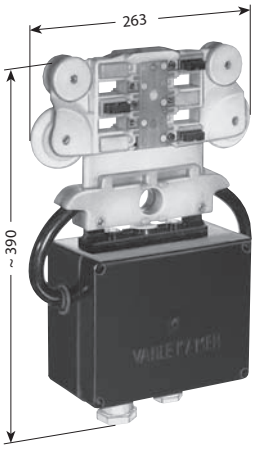
SWNT

	Type[2]	A[1]	Order- No.	Type[2]	A[1]	Order- No.	Poles	Weight kg	max. speed m/min. nor- mal	max. speed m/min. trans- fer	General
	for Power **HS** with PE			for Control **ST** without PE							
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
LSV	**SWK 4/40-1**	40	257 394	–	–	–	4	0,860	80	60	for straight runs and curves R > 2.5 m for LSV 4/60 and LSV 4/100
LSV	**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
LSV	**SWN 5/40-1**	40	194 693				5	0,950	180	80	for straight runs and curves R > 1.5 m with ball bearing wheels
LSV	**SWN 6/40-1**	40	194 694	**SWN 6/25-1**	25	194 695	6	1,200	180	80	for straight runs and curves R > 1.5 m with ball bearing wheels
LSV	**SWN 7/40-1**	40	194 696				7	1,300	180	80	for straight runs and curves R > 1.5 m with ball bearing wheels
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
LSV with Kurven	**SWN 5/40 K-1**	40	195 196				5	0,930	180	80	for curves R 0.75 – 1.5 m ball bearing wheels
LSV with Kurven	**SWN 6/40 K-1**	40	196 171	**SWN 6/25 K-1**	25	195 195	6	1,180	180	80	for curves R 0.75 – 1.5 m ball bearing wheels
LSV with Kurven	**SWN 7/40 K-1**	40	195 987				7	1,280	180	80	for curves R 0.75 – 1.5 m ball bearing wheels
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
LSV+D or FP	**SWNT 5/40-1**	40	194 774				5	0,950	100	60	for straight runs and curves R > 1.0 m with ball bearing wheels
LSV+D or FP	**SWNT 6/40-1**	40	194 775	**SWNT 6/25-1**	25	194 776	6	1,200	100	60	for straight runs and curves R > 1.0 m with ball bearing wheels
LSV+D or FP	**SWNT 7/40-1**	40	194 777				7	1,300	100	60	for straight runs and curves R > 1.0 m with ball bearing wheels

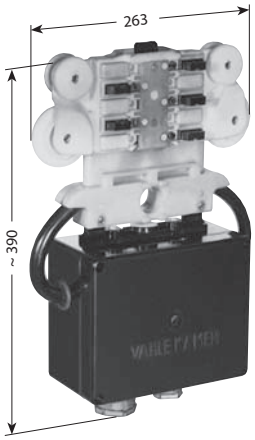
Trolley connecting cable 1 m long (longer cable available); copper cross section 2.5 mm^2 per core for 25 A and 4 mm^2 per core for 40 A.

Cleaning trolleys and trolleys for higher speed on request.

LSVG



SWNG 6-pole



SWNG 11-pole

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

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 mm^2
collector 40 A – 4 mm^2

Cleaning trolleys on request.

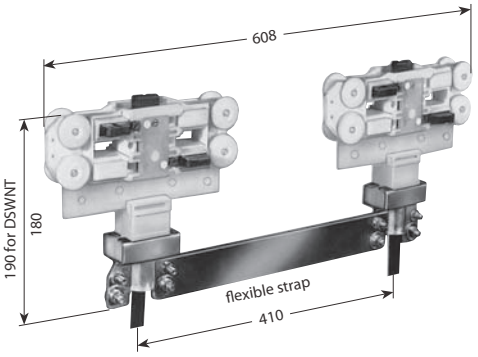
(1) All ampere data for 60 % intermittent duty.

(2) For full Type designation add Power or Control, suffix e.g. SWK 4/25-1 w/ PE **HS** for Order- No. 250 230
SWNG 6/25 w/o PE **ST** for Order- No. 183 884.

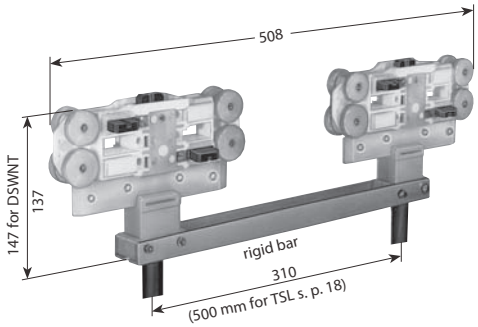
LSV

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



DSWN 5-pole F



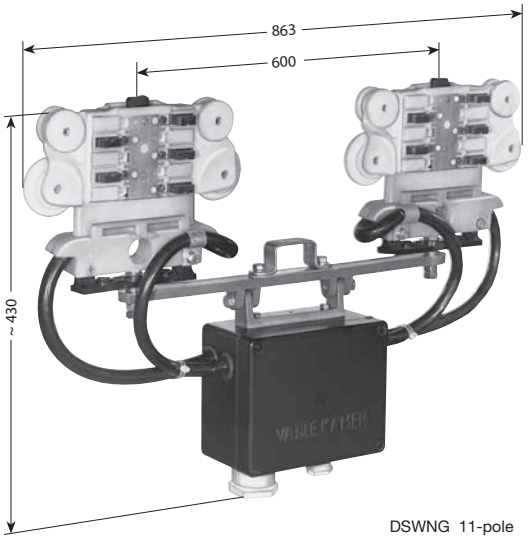
DSWN 5-pole S

Double collector for 50 A with cross section 2 x 2,5 mm^2.
Double collector for 80 A with cross section 2 x 4 mm^2.
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.

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

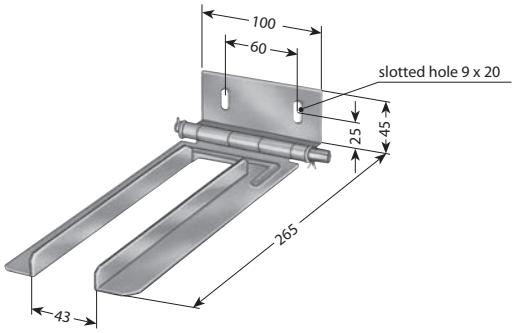
Collectors and ternminal boxes are wired.

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

[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.

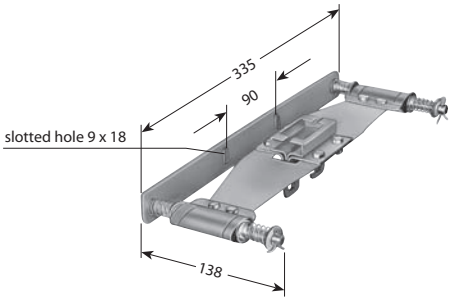
LSV

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 tranfer funnel ETL; see pages 13 & 23

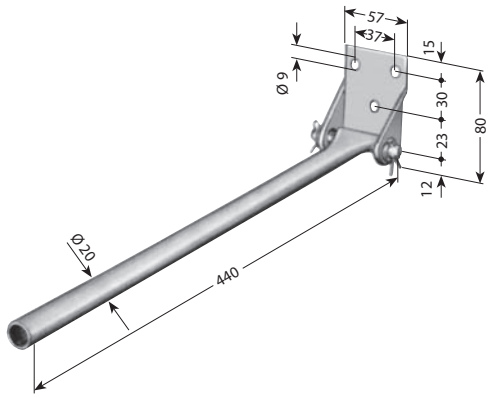


If you are going to use the flexible towing arm in system with curves please contact us.

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

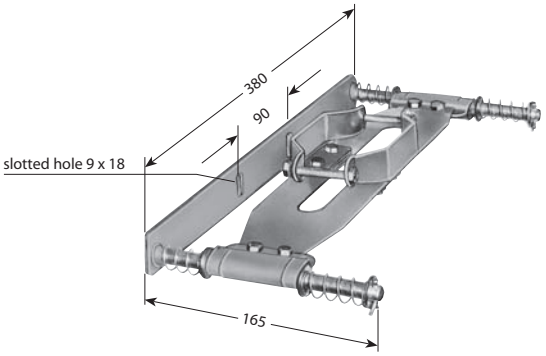
LSVG

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 tranfer funnel ETLG; see pages 13 & 23

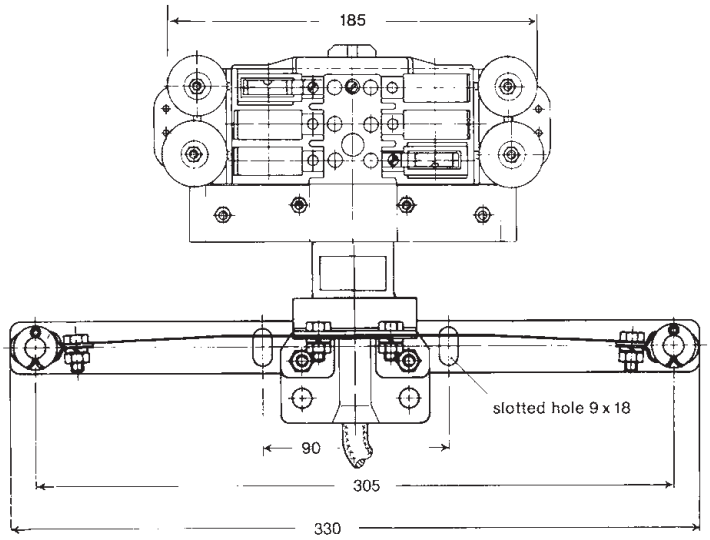


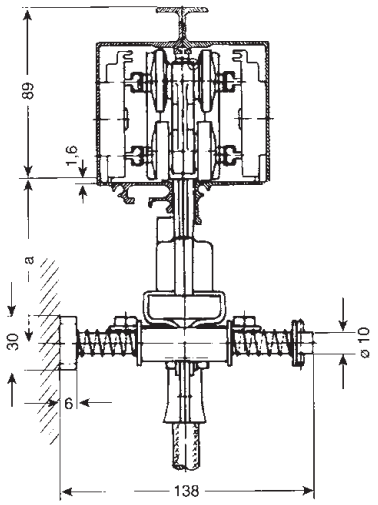
Type	Weight kg	Order- No.
GFM for SWNG/FM	1,300	260 360

(1) stainless steel

LSV

SWN 5/40 collector and KFML tow arm



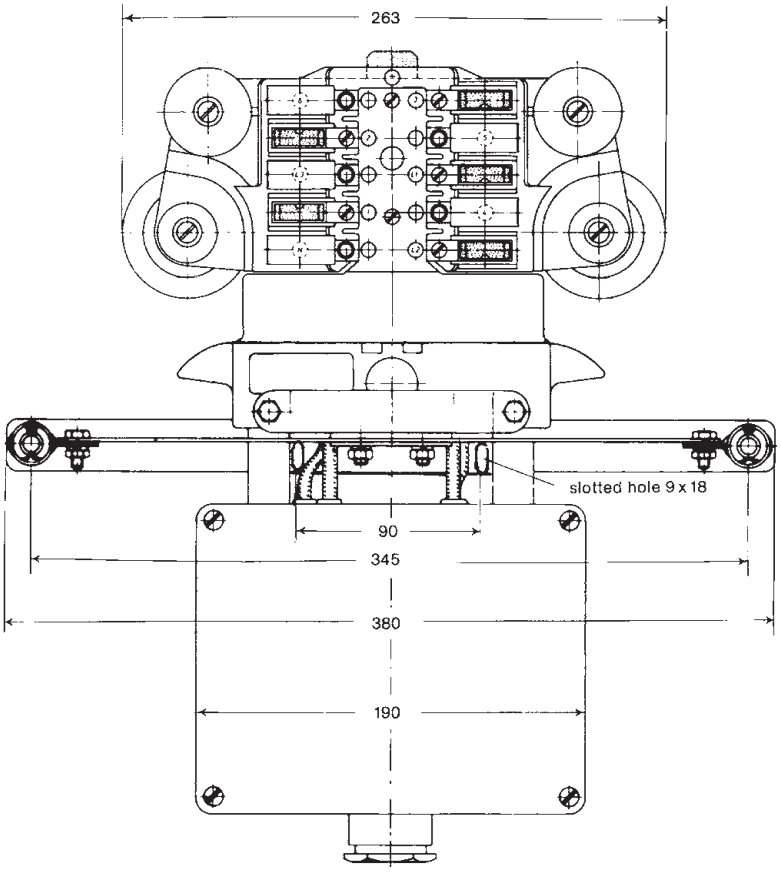


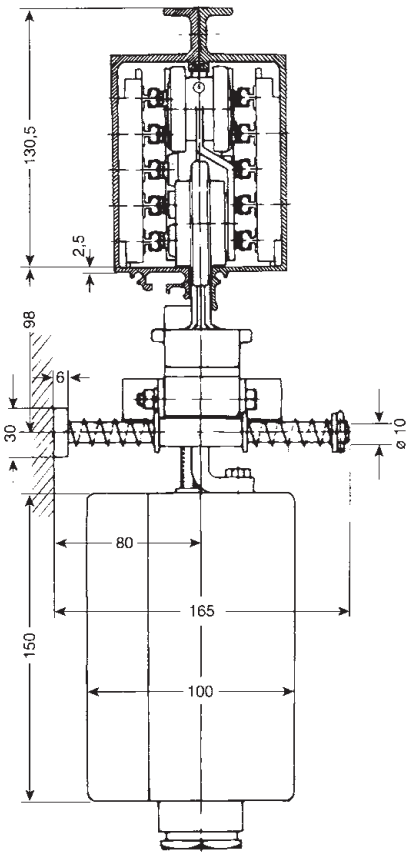
max. horizontal offset 15 mm
max. vertical offset 10 mm

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

LSVG

SWNG 11/40 FM collector and GFM tow arm





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

(1) adjust during installation

LSV

for powerail		Order-No.
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 mm², 5th and 7th pole (top)		195 190
copper conductor rail 16 mm² (lateral)		191 880
copper conductor rail 25 mm² (lateral)		191 900
copper conductor rail 35 mm² (lateral)		191 910
copper conductor rail 50 mm² (lateral)		191 920
copper conductor rail 50 mm² (lateral for ground 300 A only)		201 170
copper conductor rail 70 mm² (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

for powerail		Order- No.
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 mm² (lateral)		191 880
copper conductor 16 mm², 7th, 9th and 11th pole (top)		195 190
copper conductor rail 25 mm² (lateral)		191 900
copper conductor rail 35 mm² (lateral)		191 910
copper conductor rail 50 mm² (lateral)		191 920
copper conductor rail 50 mm² (lateral for PE 300 A only)		201 170
copper conductor rail 70 mm² (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)

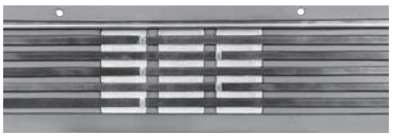


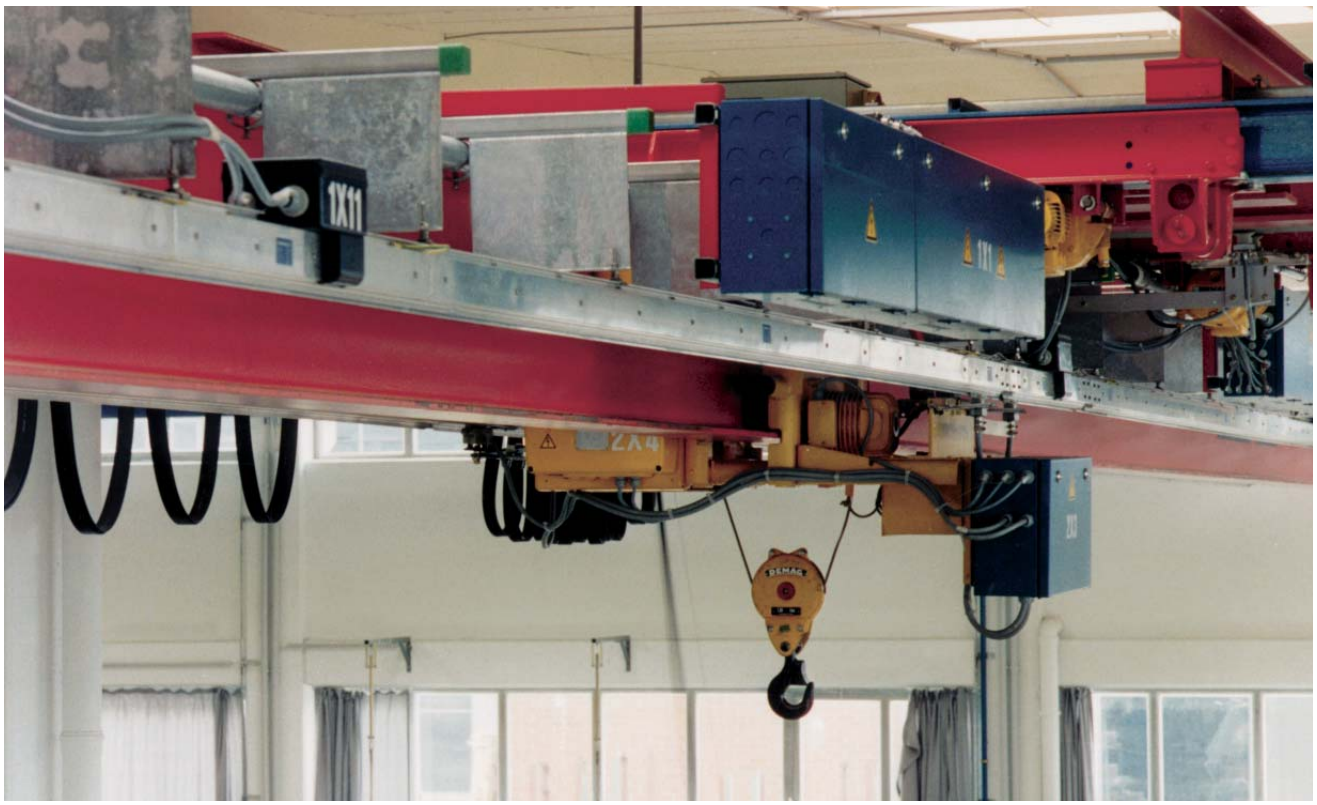
Illustration shows STAG 5

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.

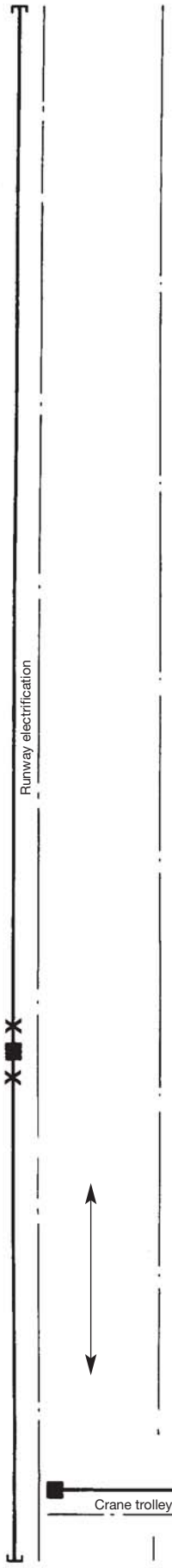
Aluminium enclosed conductor system for crane electrifications.



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**.**

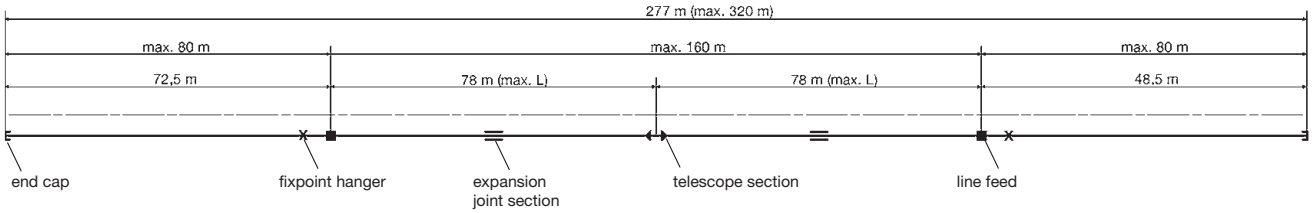
Sealing strip “D” and plastic shielding “FP” have to be ordered separately with the corresponding collectors (see pages 6 and 20). Heating system may be provided. (see page 16).

Consider supplements (p. 6 & 16) if required.

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	Powerails, 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	DSLG 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	EKLGS	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

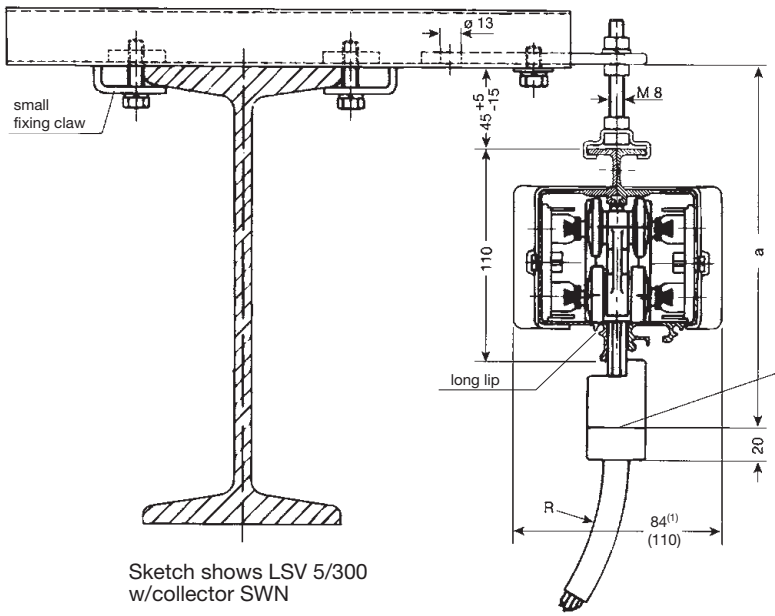


All other support points are sliding hangers, sealing strip „D“ and plastic shielding „FP“ have to be ordered separately with the corresponding collectors (see pages 6 and 20).
Heating system may be provided. (see page 16).

Aluminium enclosed conductor system on crane bridge.

BASIC DIMENSIONS

LSV

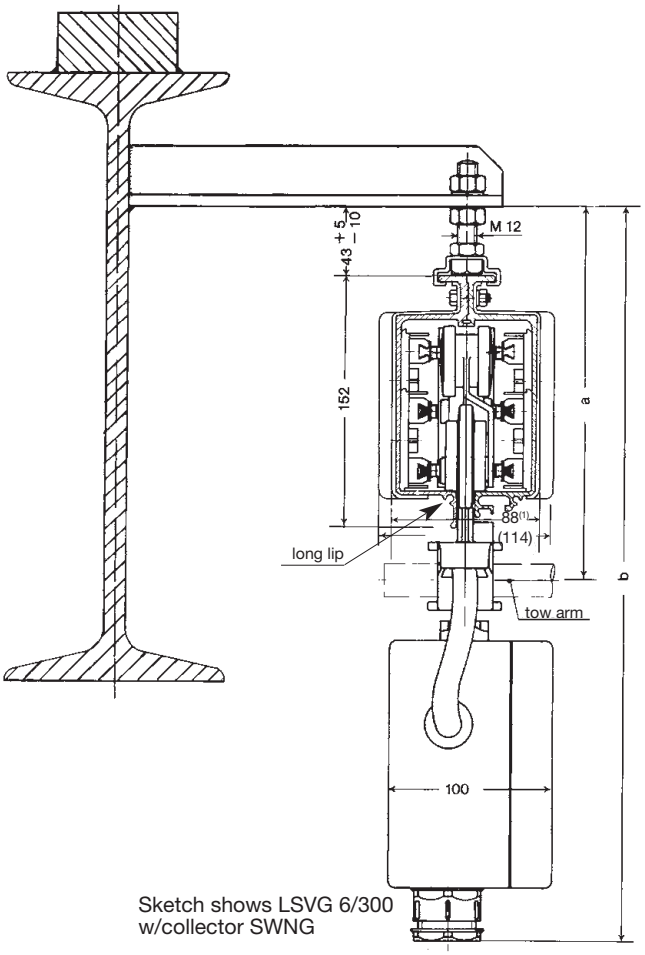


Sketch shows LSV 5/300
w/collector SWN

with collector	SWK	SWN	SWNT
Dim a mm	187 +5 –15	187 +5 –15	197 +5 –15

Dimensions also refer to corresponding double collectors.

LSVG



Sketch shows LSVG 6/300
w/collector SWNG

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

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

Motor data	Crane 3							Crane 4						
	Power kW	Nominal current A	Nominal current cos φ_N	Nominal current % ED	Starting current A	Starting current cos φ_A	Type of Motos [1]	Power KW	Nominal current A	Nominal current cos φ_N	Nominal current % ED	Starting current A	Starting current cos φ_A	Type of Motos[1]
Hoist motors														
Auxiliary hoist														
Long travel														
Cross travel														

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

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

Further remarks: _____

_____

_____

_____

Signature: _____

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