

ENCLOSED CONDUCTOR SYSTEMS

LSV and LSVG



ALUMINIUM ENCLOSED CONDUCTOR SYSTEMS

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Type LSV



Type LSV with Plastic shielding "FP"



Type LSVG



Type LSVG with sealing strip "D"

Technical Data

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

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

Temperature Resistance:

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

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

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

Formulas:

AC:

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

DC:

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

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

Effective length:

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

ΔU_1 = Voltage drop [V]

ΔU_2 = Voltage drop in %

I = Ampere load [A]

V = System Voltage

l = Power feed length [m]

L = System length [m]

Z= Impedance in Ohm/1000 m

R= Resistance in Ohm/1000 m

The total ampere load is determined from the nominal rated current of all motors working simultaneously on the same feed section of your electrification system.

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



General

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

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

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

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

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

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

Housing

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

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

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

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

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

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

End caps close the open powerail ends.

Couplings

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

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

Feed Sets

End feeds or line feeds are available.

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

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

Brackets & Hangers

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

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

Expansion Joint Sections

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

Telescope & Anti-condensation sections

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

Contact Sections, Turntables, Switches

Powerails for working areas and transfer applications see page 12.

Sectionalizing

Conductor dead sections are electrical interrupts of the conductor. Under normal operating conditions a cross over with collectors to switch the voltage off or on is only allowed with low power ratings (control current).

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

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

Collectors

The collectors are made of impact resistant pvc.

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

With following system requirements double collectors have to be used:

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

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

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

Safety notice

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

Note:

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

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



TYPES, ENGINEERING DATA AND CATALOG NUMBERS

LSV

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

LSVG

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

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

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

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

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

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

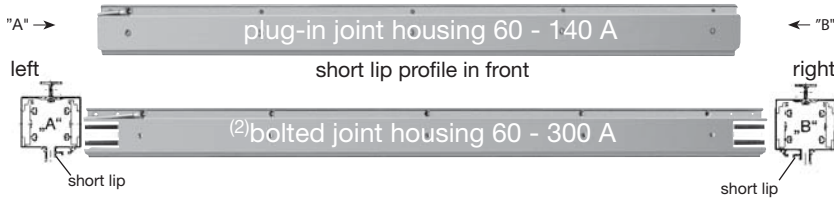
Numbers in parenthesis are used for control circuit applications.



STANDARD SECTION MAX. 4 M

CURVED SECTION

LSV

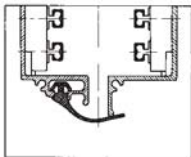


Extra finish of LSV; surcharge Order- No.

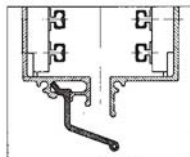
| Type | Index E | Index I | |
|------------|--------------------------------|--|---------------------|
| | anodized housing Order- No. | copper conductors with stainless steel cap Order- No. 60 A | Order- No. 200 A |
| LSV 4-pole | 190 660 | 194 754 | 194 755 |
| LSV 5-pole | 190 670 | 194 756 | 194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

Supplements for LSV:

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

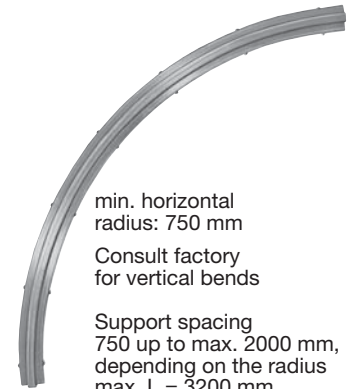


Neoprene sealing strip



Plastic shielding

Custom built



min. horizontal radius: 750 mm

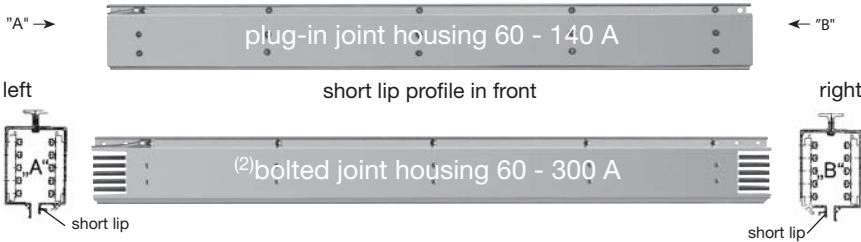
Consult factory for vertical bends

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

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

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

LSVG

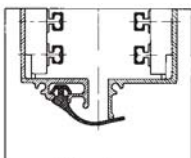


Extra finish of LSVG; surcharge Order- No.

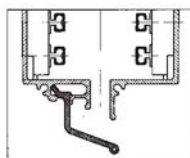
| Type | Index E | Index I | |
|--------------|--------------------------------|--|---------------------|
| | anodized housing Order- No. | copper conductors with stainless steel cap Order- No. 60 A | Order- No. 200 A |
| LSVG 6-pole | 180 250 | 183 871 | 183 872 |
| LSVG 7-pole | 180 260 | 183 873 |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

Supplements for LSVG:

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



Neoprene sealing strip



Plastic shielding

Custom built



min. horizontal radius: 1500 mm

Consult factory for vertical bends

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

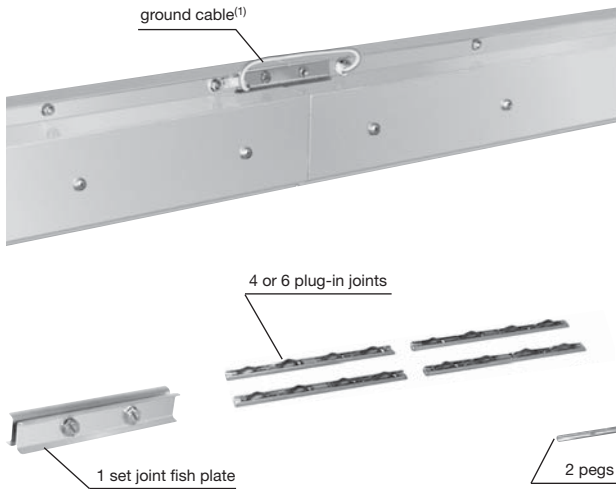
| surcharge | Order- No. |
|--|------------|
| horizontal curve L max. 1.8 m | 183 810 |
| horizontal curve L from 1.8 m to max. 3.2 m | 184 170 |

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

⁽¹⁾ Plastic shielding FP not for curves.

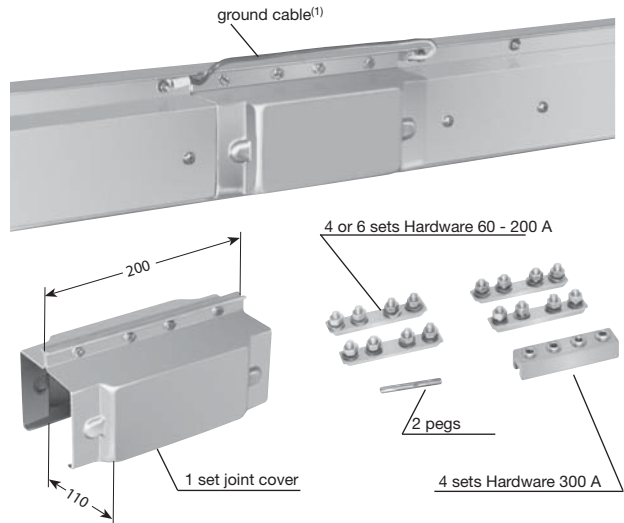
⁽²⁾ All other types are to be delivered with bolted joints w/o surcharge.

Plug-in joints 60-140 A



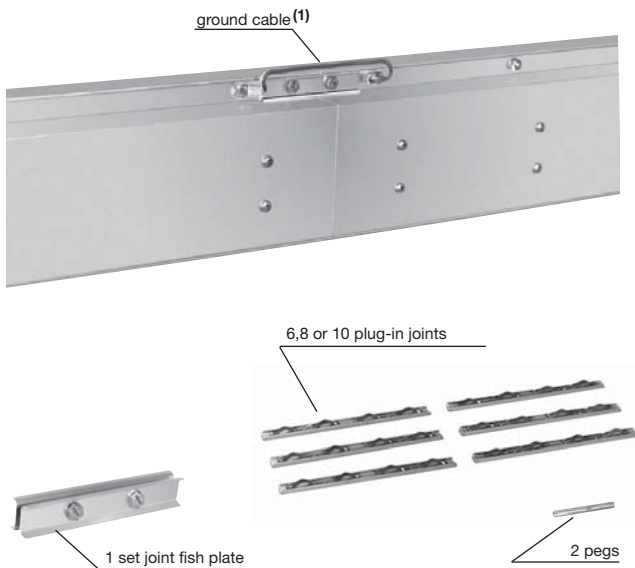
| Type | | Weight kg | Order- No. |
|----------------|-------------------|-----------|------------|
| VBL 4/5 | for 4- and 5-pole | 0,110 | 195 244 |
| VBL 6/7 | for 6- and 7-pole | 0,140 | 195 246 |

Bolted joints 60-300 A



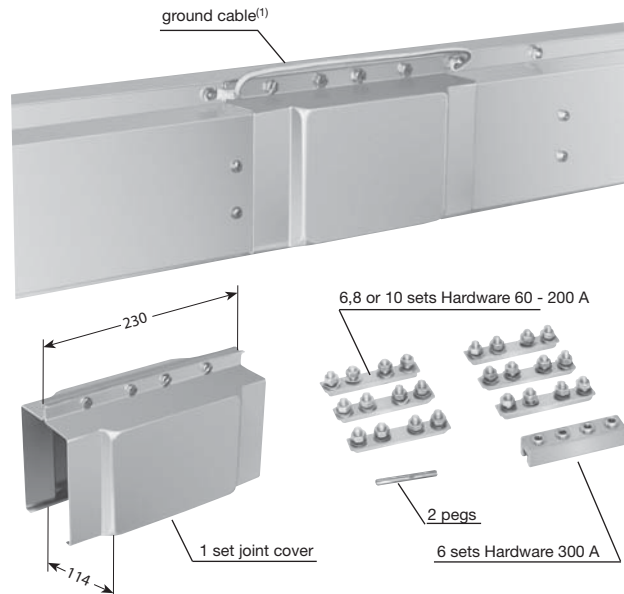
| Type | | Weight kg | Order- No. | Order- No. anodized |
|--------------------|-------------------|-----------|------------|---------------------|
| VBL 4/5 | for 4- and 5-pole | 0,450 | 195 248 | - |
| VBL/E 4/5 | 60-200 Amp. | 0,450 | - | 195 255 |
| VBL 6/7 | for 6- and 7-pole | 0,505 | 195 250 |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

Plug-in joints 60-140 A



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

Bolted joints 60-300 A



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

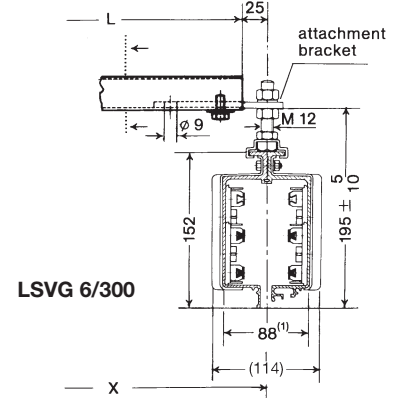
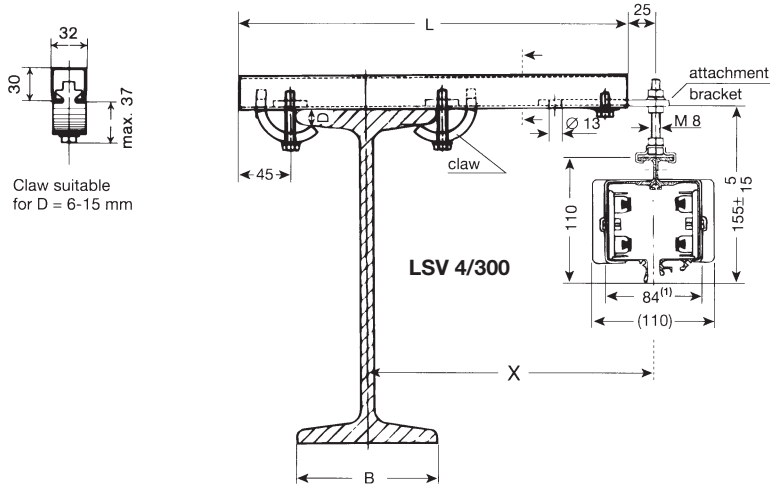
(1) Yellow/green ground cable factory pre-assembled.
 (2) No joints required for uninsulated top conductors 5, 7, 9 and 11.
 Equal for power line and control line.



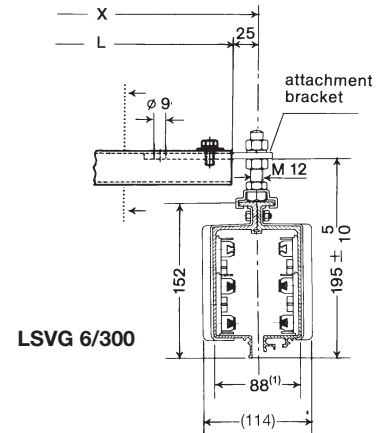
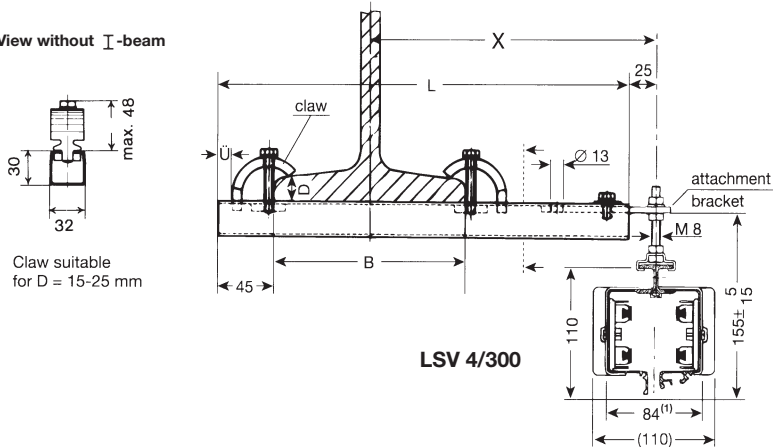
BRACKETS

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

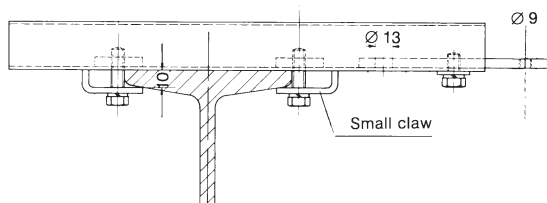
View without I-beam



View without I-beam



EHKL small claw version



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

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

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

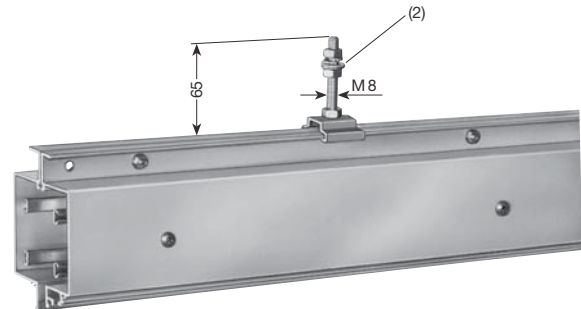
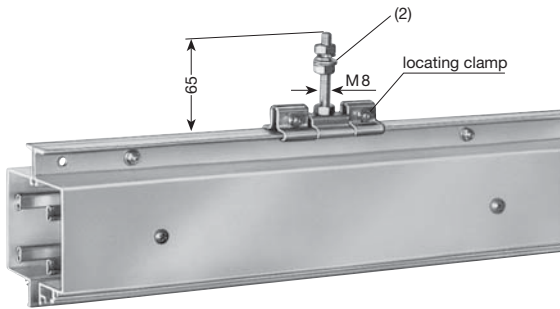
| | Type | X mm | L mm | B max. mm | Weight kg | Order- No. for std. brackets | Order- No. with small claw | |
|-----|------|---------|------|-----------|-----------|------------------------------|----------------------------|---------|
| LSV | LSVG | EHK 250 | 250 | 350 | 170 | 1,070 | 251 600 | 251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

FIXPOINT HANGER⁽¹⁾

SLIDING HANGER⁽¹⁾



LSV



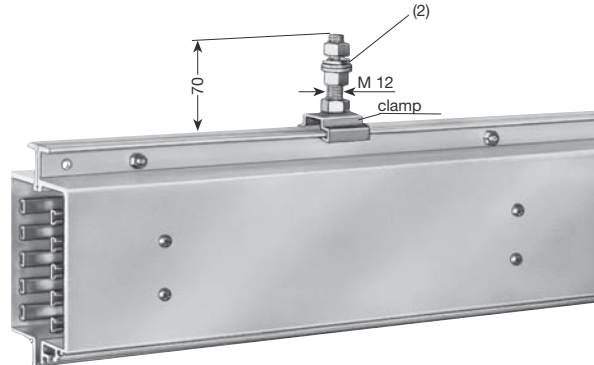
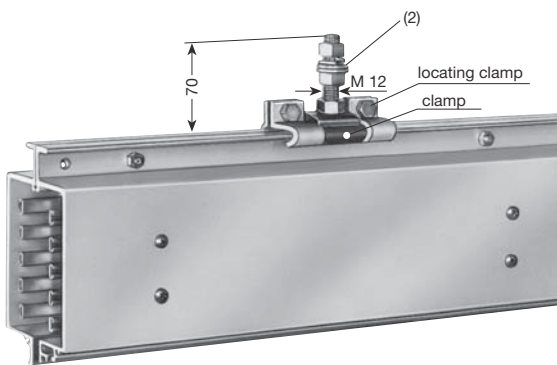
| Type | Weight kg | Order- No. |
|------------|-----------|------------|
| FAL | 0,150 | 190 120 |

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

All steel parts made of stainless steel.

All steel parts made of stainless steel.

LSVG



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

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

Steel parts galvanized, clamp made of stainless steel.

Steel parts galvanized, clamp made of stainless steel.

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



END CAP⁽¹⁾

END FEED⁽²⁾

c/w 1 m powerail

LSV



Plastic cap with plug-in joints

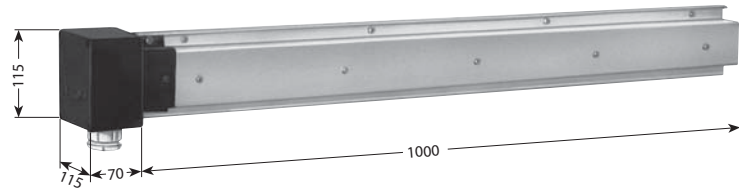
| Type | Weight kg | Order- No. |
|------------|-----------|------------|
| EKL | 0,080 | 190 220 |



Aluminium cap with bolted joints

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

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



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

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

LSVG



Plastic cap with plug-in joints

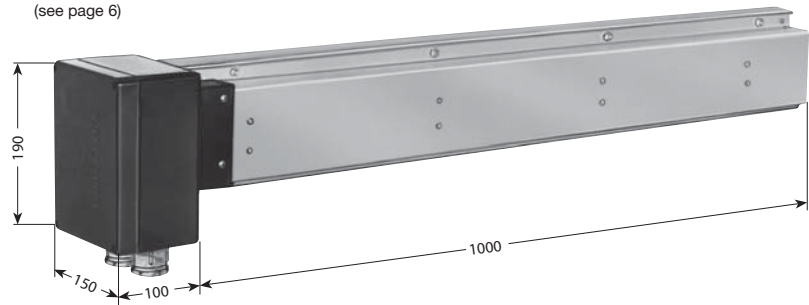
| Type | Weight kg | Order- No. |
|-------------|-----------|------------|
| EKLG | 0,120 | 180 320 |



Aluminium cap with bolted joints

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

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



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

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

⁽¹⁾ Illustration shows end cap with standard section.

⁽²⁾ Above sections come ready assembled on 1m section and are part of the system length (see examples for ordering pages 26 and 27).

⁽³⁾ Suffix types e.g. KEL 4/60 L w/ PE → KEL 4/60 L **HS** Order- No. 192 150.

LINE FEED⁽¹⁾

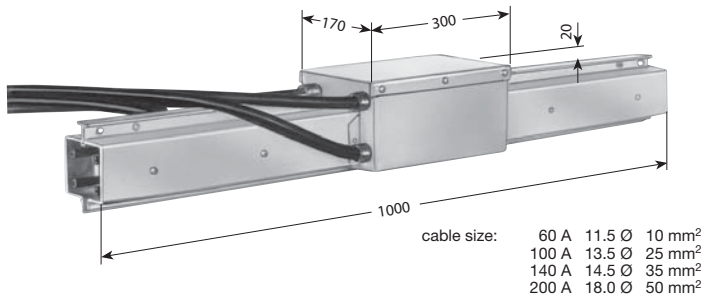
c/w 2 m feed-in cable and 1 m powerail

LINE FEED⁽¹⁾

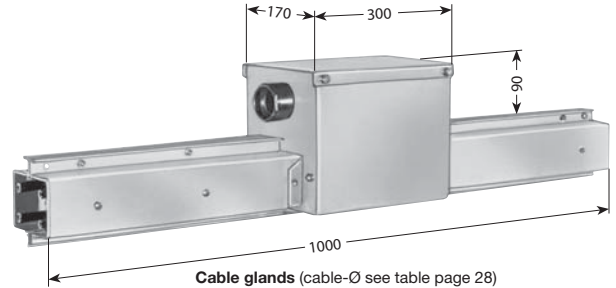
c/w terminal box and 1 m powerail



LSV

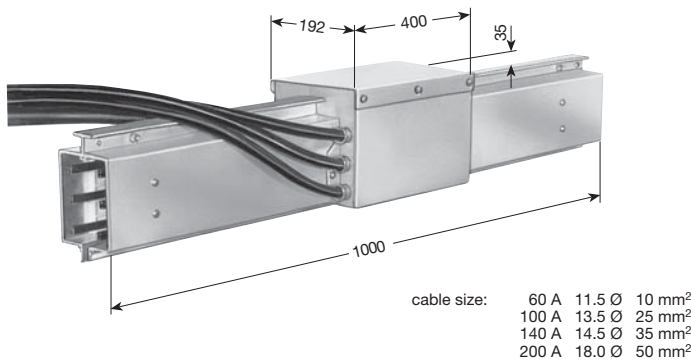


cable size: 60 A 11.5 Ø 10 mm²
100 A 13.5 Ø 25 mm²
140 A 14.5 Ø 35 mm²
200 A 18.0 Ø 50 mm²

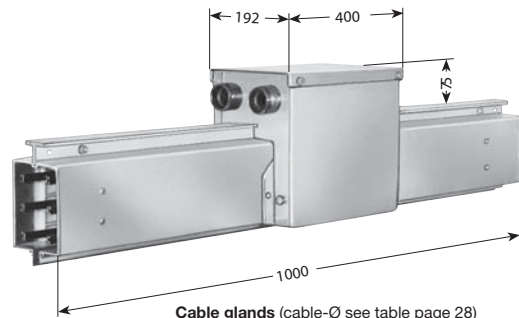


Cable glands (cable-Ø see table page 28)
4 + 5-pole 1 x M 32 power line 60 A
4 + 5-pole 1 x M 50 power line 100 und 140 A
4 + 5-pole 1 x M 50 power line 200 A
4 + 5-pole 1 x M 63 power line 300 A
6 + 7-pole 1 x M 32 and 1 x M 25 power line 60 A
6 + 7-pole 1 x M 50 and 1 x M 25 power line 100 und 140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

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



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



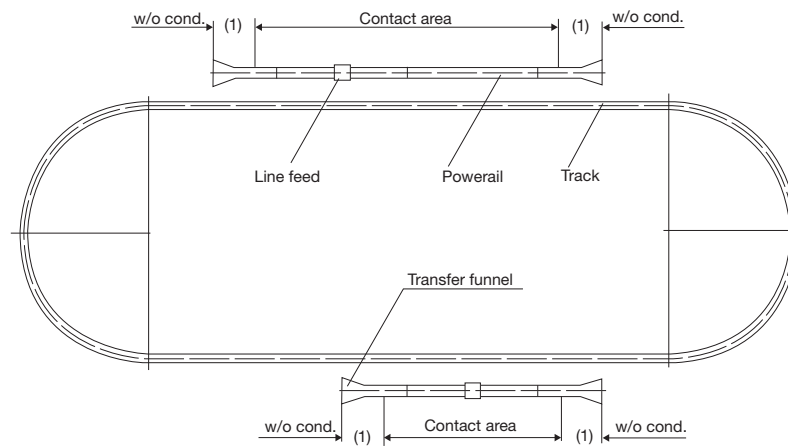
Cable glands (cable-Ø see table page 28)
6-11-pole 1 x M 32 and 1 x M 25 power line 60 A
6-11-pole 1 x M 50 and 1 x M 25 power line 100 und 140 A
6+ 7-pole 1 x M 50 and 1 x M 25 power line 200 A
6+ 7-pole 1 x M 63 and 1 x M 25 power line 300 A
6, 8 and 10-pole 2 x M 25 control line 60 A

LSVG

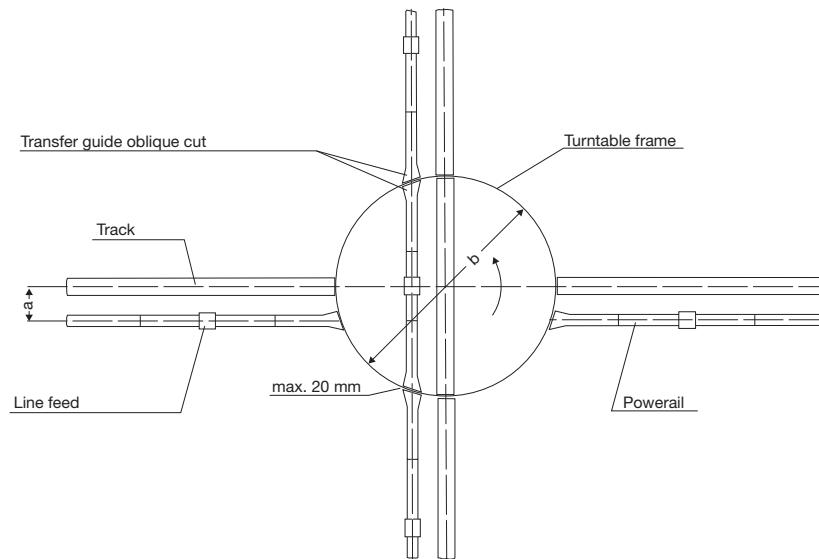
| Type ⁽²⁾ | A | Weight kg | Order-No. | Type ⁽²⁾ | A | Weight kg | Order-No. | Type ⁽²⁾ | A | Weight kg | Order-No. | Type ⁽²⁾ | A | Weight kg | Order-No. |
|-----------------------------------|-----|-----------|-----------|------------------------------|-----|-----------|-----------|------------------------------|-----|-----------|-----------|-----------------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

⁽¹⁾ Above sections come ready assembled on 1 m powerail section and are a part of the system length (see examples for ordering on pages 26 and 27).
⁽²⁾ Suffix types e.g. LAL 4/60 w/ PE → LAL 4/60 **HS** Order-No. 195 060.

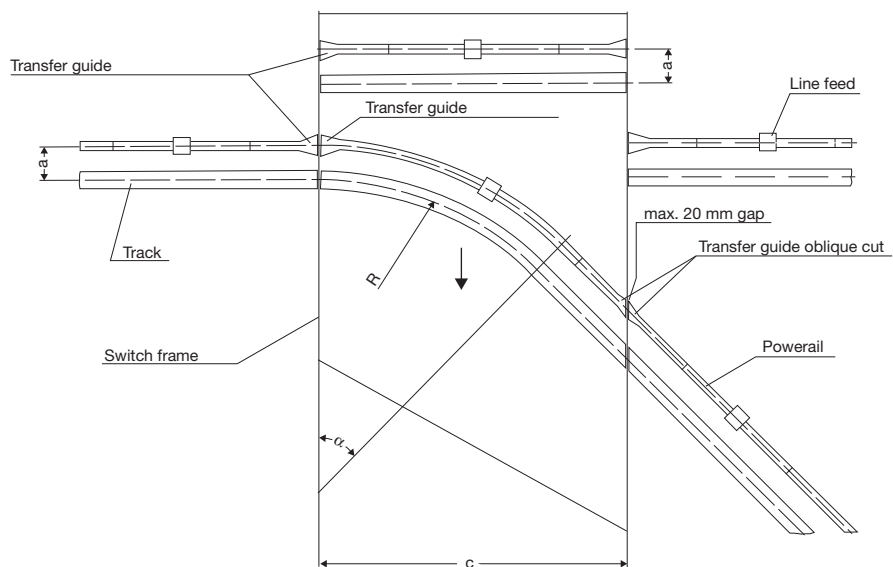
Contact section⁽¹⁾



Turntable



Sliding switch



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

TRANSFER FUNNEL(2) c/w 0.5 m powerail and joint material



LSV

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

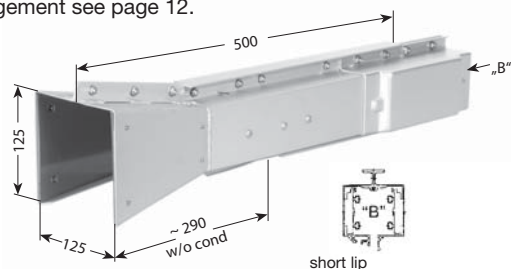


Illustration shows L. H. version
short lip in front
(see page 6)

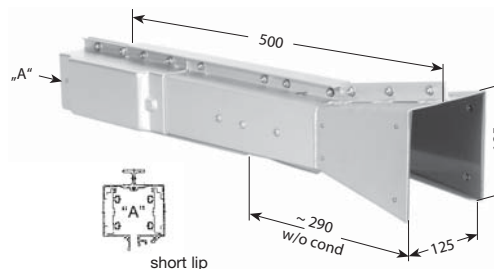


Illustration shows R. H. version
short lip in front
(see page 6)

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

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

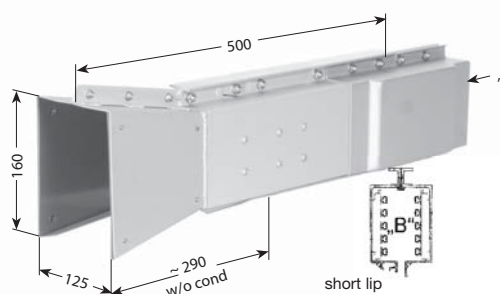


Illustration shows L. H. version
short lip in front
(see page 6)

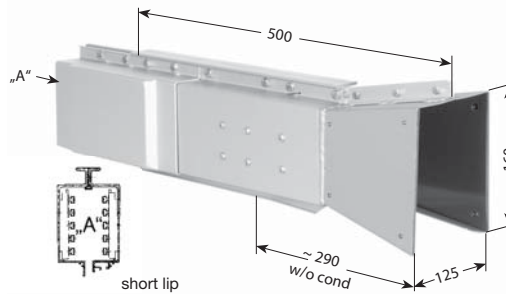


Illustration shows R. H. version
short lip in front
(see page 6)

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

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



TRANSFER GUIDE, STRAIGHT CUT⁽¹⁾

€/w 0.5 m powerail

for turntables, switches and spurlines,

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

applications see page 12

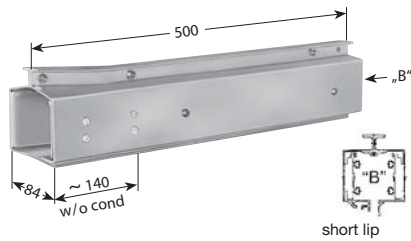


Illustration shows L. H. version
short lip in front
(see page 6)

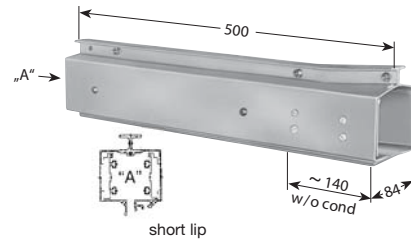


Illustration shows R. H. version
short lip in front
(see page 6)

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

for turntables, switches and spurlines,

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

applications see page 12

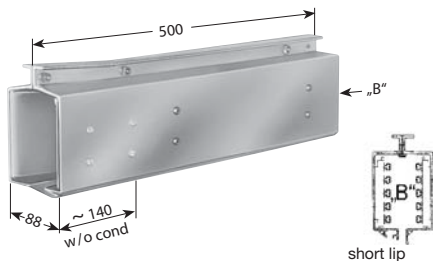


Illustration shows L. H. version
short lip in front
(see page 6)

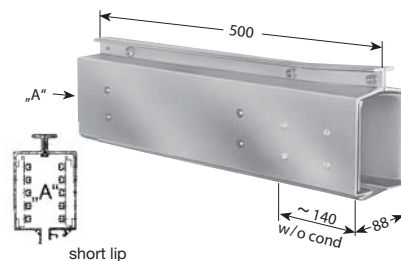


Illustration shows R. H. version
short lip in front
(see page 6)

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

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

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

TRANSFER GUIDE, OBLIQUE CUT⁽¹⁾

¢/w 0.5 m powerail



LSV

for turntables, switches and spurlines,

staggered arrangement of the transfer guides to each other: horizontal max. 5 mm, vertical max. 3 mm

Max. travel speed collector unit: 80m/min.

applications see page 12

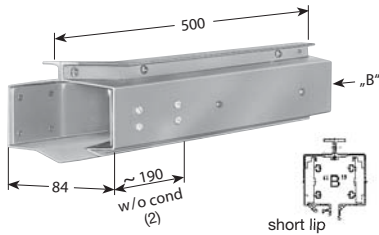


Illustration shows L. H. version
short lip in front
(see page 6)

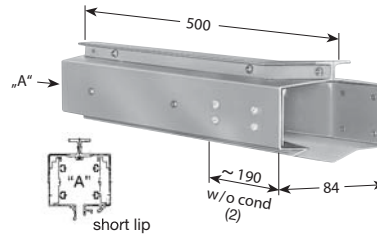


Illustration shows R. H. version
short lip in front
(see page 6)

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

for turntables, switches and spurlines,

staggered arrangement of the transfer guides to each other: horizontal max. 5 mm, vertical max. 3 mm

Max. travel speed collector unit: 80m/min.

applications see page 12

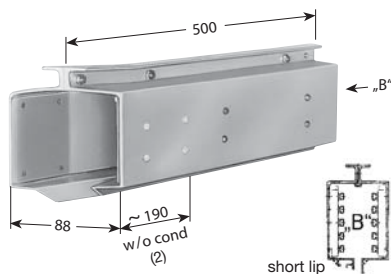


Illustration shows L. H. version
short lip in front
(see page 6)

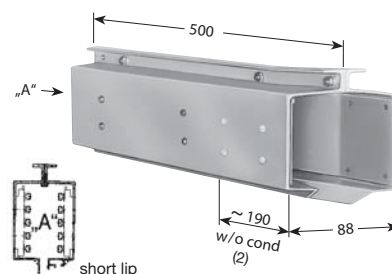


Illustration shows R. H. version
short lip in front
(see page 6)

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

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

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

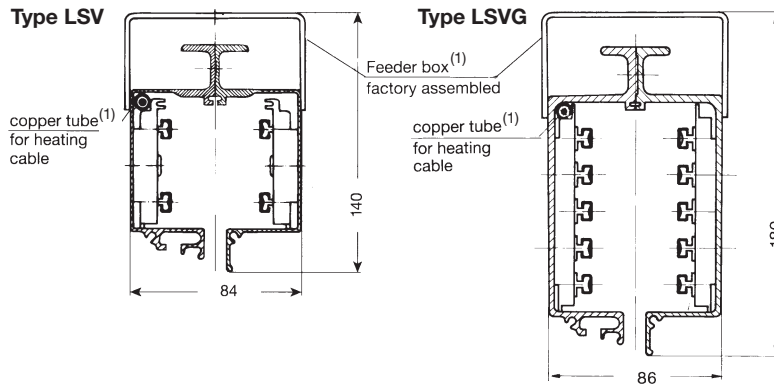
(3) Detailed drawings of switch, turntable etc. are required to manufacture oblique cut transfer guides and cut back conductors accordingly.

LSVG



HEATING SYSTEM

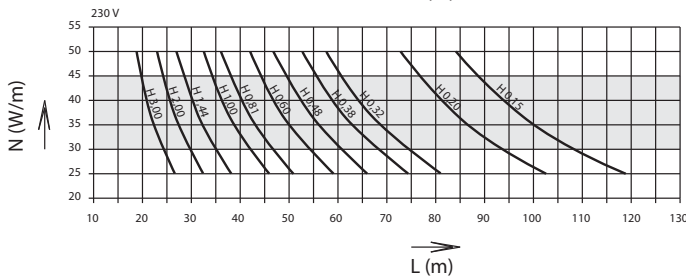
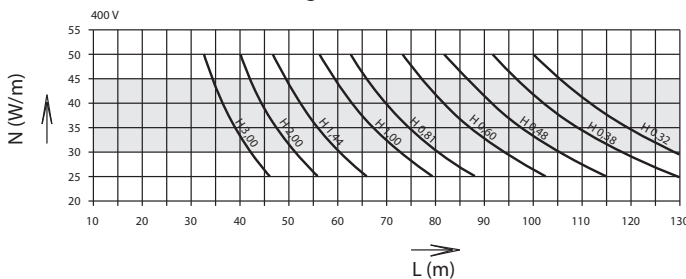
Arrangement of heating cables



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

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

Selection of the heating cable



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

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

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

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

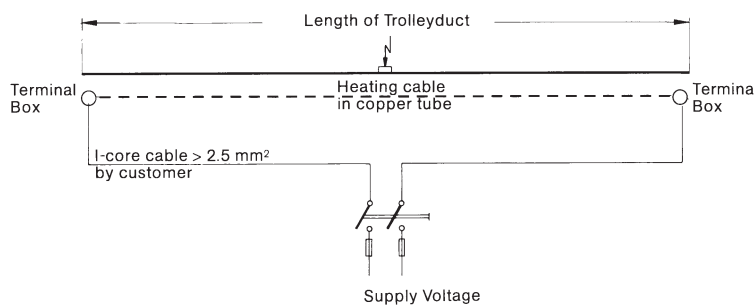
Composition of heating cable: Conductor: material resistor CrNi, stranded
Insulation: PTFE-(Teflon) tinned copper braid
Sheath: PTFE-insulation
OD: 3.7 mm - 4.3 mm Øm

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

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

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

Layout of one heating section with feeder boxes at both ends



Switchgears and temperature control units available on request.

Example for ordering heating system for 60 m trolleyduct

- 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
- 60 m copper protection tube 8 x 1 mm factory assembled
- 2 terminal boxes for heating system
- 2 sets of connecting material

All switches, fuses, cable etc. by others!

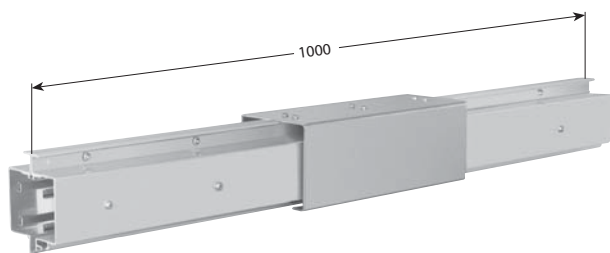
⁽¹⁾ Factory assembled on powerail.
⁽²⁾ Deflection ± 2,5 %

ANTI-CONDENSATION SECTIONS⁽¹⁾

c/w 1 m powerail



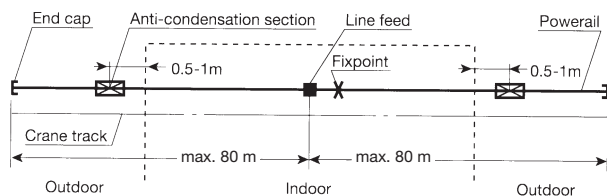
LSV



Application of Anti-condensation section

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

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



Feeding

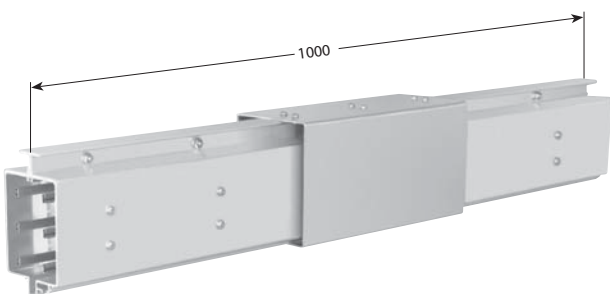
No extra feeds required as the powerail is not interrupted.

Collectors

No extra collectors required.

Installation

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



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

LSVG

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

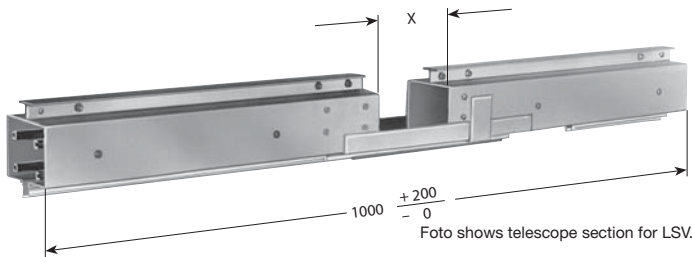
⁽¹⁾ Above sections come ready assembled on 1 m powerail and are a part of the system length (see example for ordering page 27).

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



TELESCOPE SECTIONS⁽¹⁾

c/w 1 m powerail



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

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

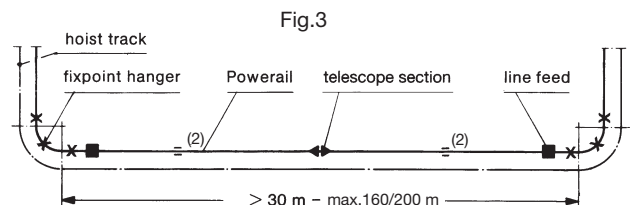
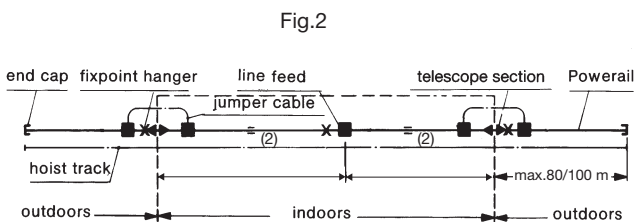
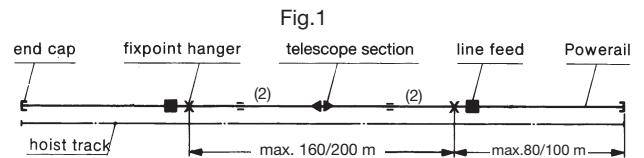
| LSV | | | | LSVG | | | | | |
|------------------------------|-----------|-----------------------------------|-----------|------------------------------|-----------|------------------------------|-----------|-----------------------------------|-----------|
| Type ● | Order-No. | Type ● | Order-No. |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

Application of Telescope section

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

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

- For passing the powerail from indoor to outdoor, thus preventing the icing of the outside mounted powerail, as the warm air can escape and does not condensate in the powerail (see Fig. 2). – Alternative solution: Anti-condensation section (see page 17). We recommend a heating system for the outdoor section for extreme winter conditions (see page 16).
- If the powerail length between two curves is more than 20 m and the temperature fluctuates considerably (see Fig. 3).



Feeding

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

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

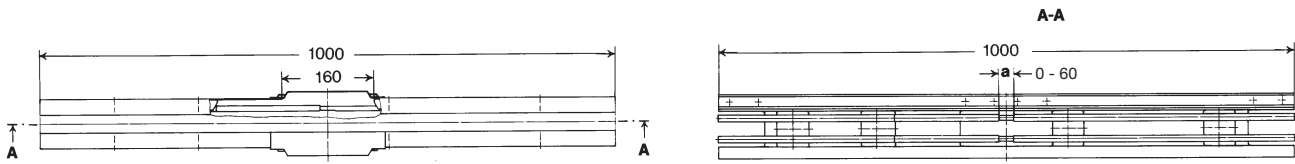
Collectors

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

(1) Above sections come ready assembled on 1 m powerail and are a part of the system length.
 (2) DSL/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 | DSL G 6/ 60 | 183 560 | DSL G 8/ 60 | 183 660 | DSL G 11/ 60 | 183 750 |
| DSL 4/100 | 195 108 | DSL 6/100 | 195 112 | DSL G 6/100 | 184 017 | DSL G 8/100 | 184 021 | DSL G 11/100 | 184 024 |
| DSL 4/140 | 195 056 | DSL 6/140 | 195 058 | DSL G 6/140 | 183 943 | DSL G 8/140 | 183 945 | DSL G 11/140 | 183 948 |
| DSL 4/200 | 195 109 | DSL 6/200 | 195 626 | DSL G 6/200 | 184 018 | DSL G 8/200 | 184 652 | DSL G 11/200 | 184 655 |
| DSL 4/300 | 194 060 | DSL 7/ 60 | 194 150 | DSL G 6/300 | 183 600 | DSL G 9/ 60 | 183 690 | Control line SS without PE | |
| DSL 5/ 60 | 194 070 | DSL 7/100 | 195 113 | DSL G 7/ 60 | 183 610 | DSL G 9/100 | 184 022 | DSL G 6/ 60 | 183 780 |
| DSL 5/100 | 195 110 | DSL 7/140 | 195 059 | DSL G 7/100 | 184 019 | DSL G 9/140 | 183 946 | DSL G 8/ 60 | 183 790 |
| DSL 5/140 | 195 057 | DSL 7/200 | 195 627 | DSL G 7/140 | 183 944 | DSL G 9/200 | 184 653 | DSL G 10/ 60 | 183 800 |
| DSL 5/200 | 195 111 | Control line SS without PE | | DSL G 7/200 | 184 020 | DSL G 10/ 60 | 183 720 | | |
| DSL 5/300 | 194 110 | DSL 4/ 60 | 194 180 | DSL G 7/300 | 183 650 | DSL G 10/100 | 184 023 | | |
| | | DSL 6/ 60 | 194 190 | | | DSL G 10/140 | 183 947 | | |
| | | | | | | DSL G 10/200 | 184 654 | | |

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

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

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

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

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

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

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

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

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

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

In the expansion section are the copper conductors electrically bridged.

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

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

Fig. 1

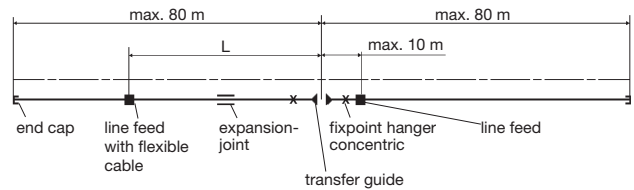
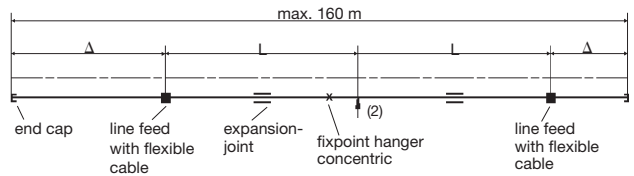


Fig. 2



Δ Excessive length

Max. length „L“:

80 m at temperature up to **60 °C**

60 m at temperature up to **80 °C**

40 m at temperature up to **100 °C**

All valves apply from - 40 °C

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

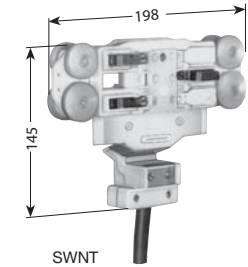
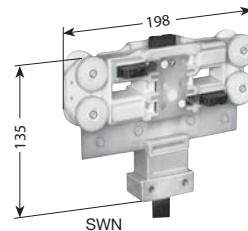
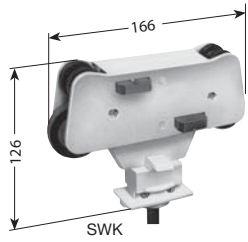
For spare please advise rail type and possible special version.

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



COLLECTORS

LSV

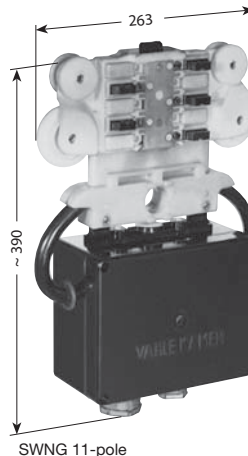
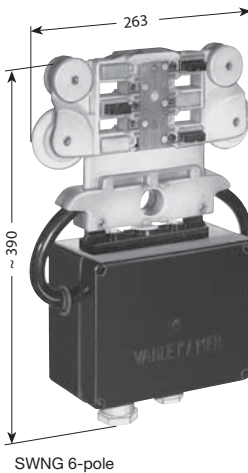


| | Type ⁽²⁾ | A ⁽¹⁾ | Order- No. | Type ⁽²⁾ | A ⁽¹⁾ | Order- No. | Poles | Weight kg | max. speed m/min. | | General |
|-----------------|-----------------------------|------------------|------------|----------------------------------|------------------|------------|-------|-----------|-------------------|--------|---|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

Trolley connecting cable 1 m long (longer cable available); copper cross section 2.5 mm² per core for 25 A and 4 mm² per core for 40 A.

Cleaning trolleys and trolleys for higher speed on request.

LSVG



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

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

Collectors and terminal boxes are wired.

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

Cleaning trolleys on request.

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

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

HS for Order- No. 250 230

ST for Order- No. 183 884.

DOUBLE COLLECTORS



LSV

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

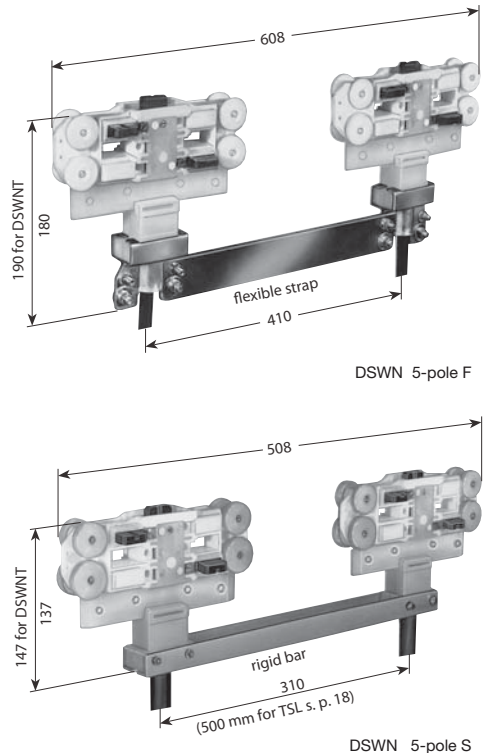
| Type ⁽²⁾ | A ⁽¹⁾ | Order- No. | Type ⁽²⁾ | A ⁽¹⁾ | Order- No. | Poles | Weight kg |
|-----------------------------|------------------|------------|----------------------------------|------------------|------------|-------|-----------|
| for Power HS with PE | | | for Control ST without PE | | | | |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

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

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

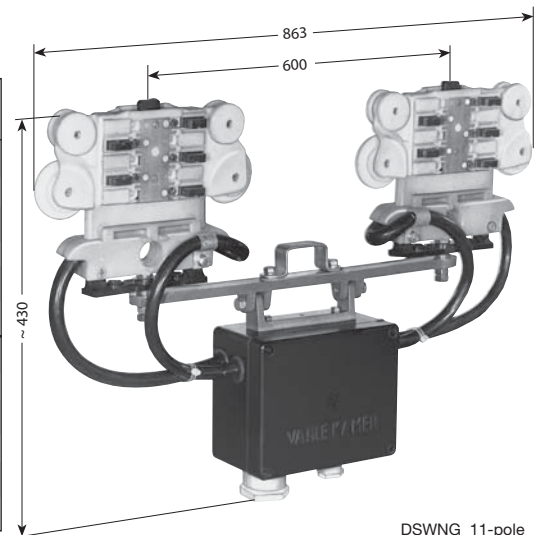
Connecting cable 1 m long, longer cable available.

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



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 |



Double collectors come with terminal boxes.

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

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

Collectors and terminal boxes are wired.

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

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

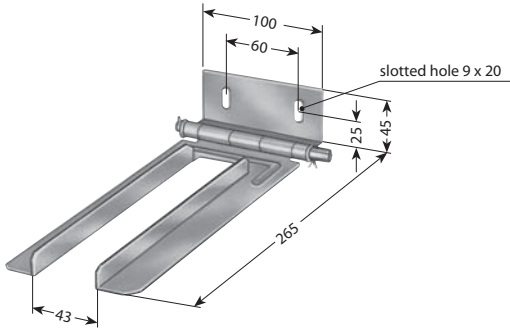
⁽²⁾ For full Type designation add Power or Control, suffix e.g. DSWK 4/50 F-1 **HS** for Order- No. 250 320
DSWNG 6/50 **ST** for Order- No. 183 911.



TOW ARMS

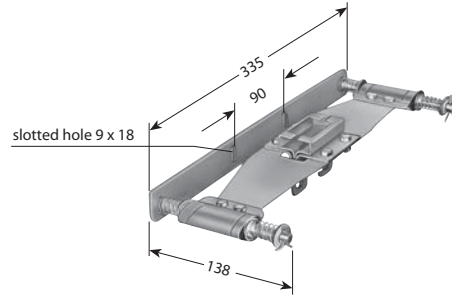
LSV

for single and double collector



| Type | Weight kg | Order- No. |
|----------------------------|-----------|------------|
| KWS | 0,480 | 250 380 |
| KWS/K⁽¹⁾ | 0,480 | 252 340 |

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

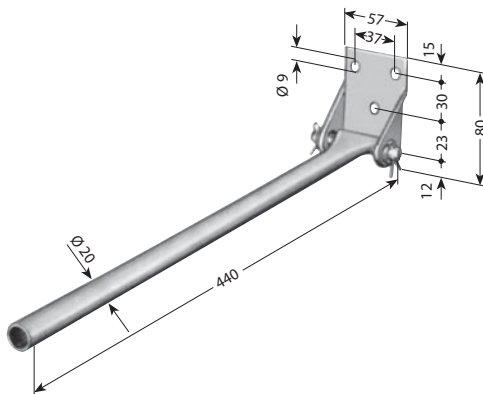


If you are going to use the flexible towing arm in system with curves please contact us.

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

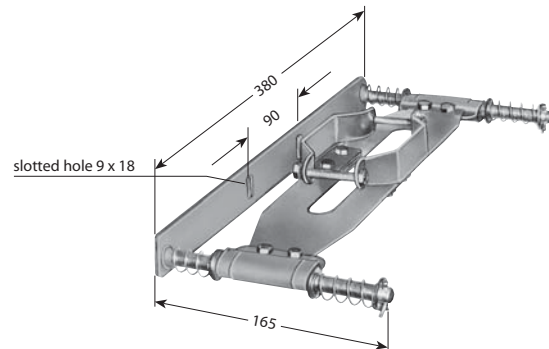
LSVG

for single and double collector



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

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



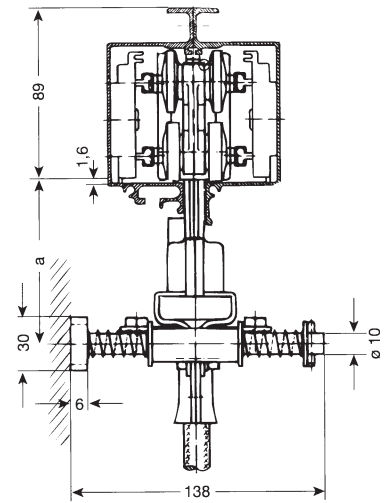
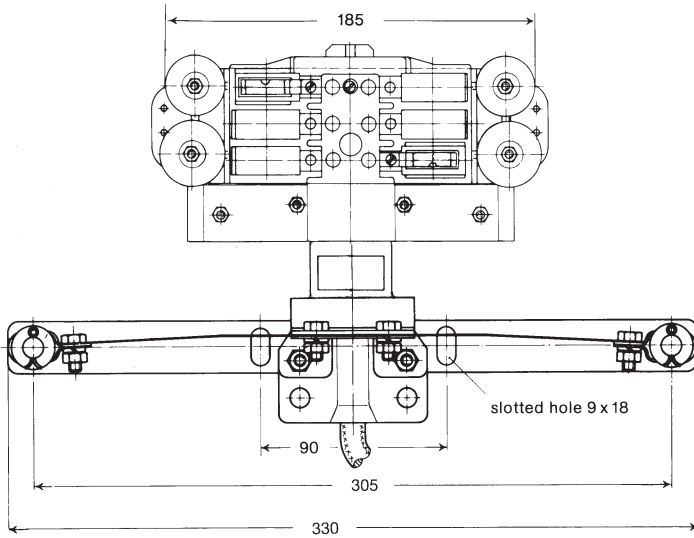
| Type | Weight kg | Order- No. |
|---------------------------|-----------|------------|
| GFM for SWNG/FM | 1,300 | 260 360 |

FLEXIBLE TOW ARM CONFIGURATIONS



LSV

SWN 5/40 collector and KFML tow arm

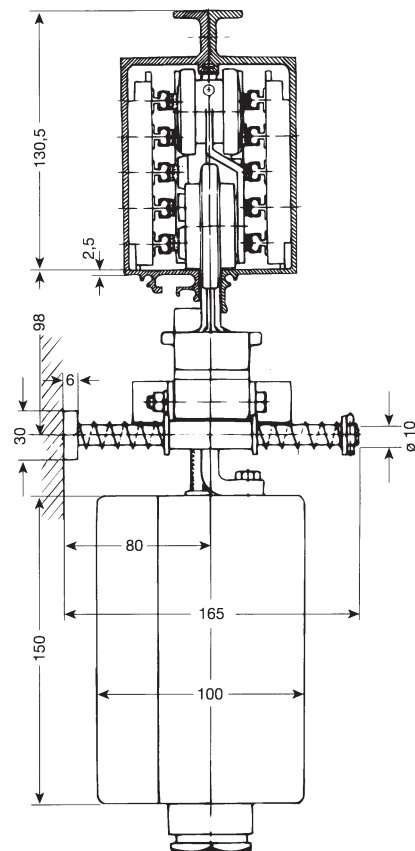
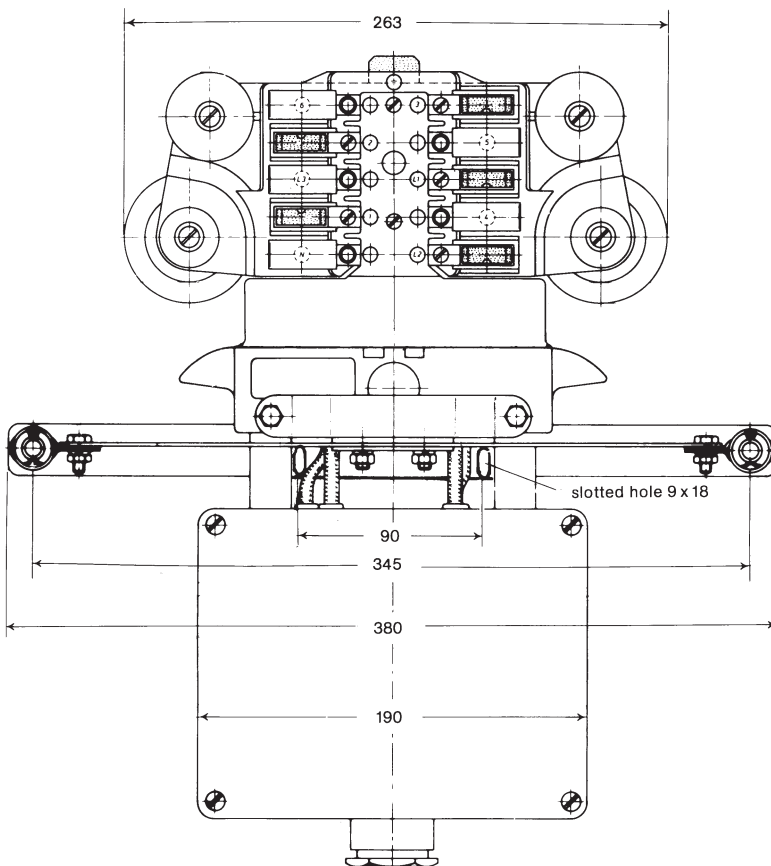


max. horizontal offset 15 mm
max. vertical offset 10 mm

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

SWNG 11/40 FM collector and GFM tow arm

LSVG



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

(1) adjust during installation



LSV

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

| for Collectors | Type | SWK ⁽¹⁾ | SWN | SWNT |
|--|------|--------------------|------------|------------|
| | | Order- No. | Order- No. | Order- No. |
| carbon brush phase, incl. brush holder (lateral) | | 250 470 | 254 890 | 254 890 |
| carbon brush ground 5th and 7th pole (top), incl. brush holder | | - | 254 891 | 254 891 |
| carbon brush ground, incl. brush holder (lateral) | | 250 480 | 254 892 | 254 892 |
| carbon pressure spring | | 250 490 | 258 757 | 258 757 |
| carbon pressure spring, reinforced | | 258 759 | 258 760 | 258 760 |
| collector neck (pair) | | - | 254 893 | 254 898 |
| glider plate for sealing strip | | - | - | 258 370 |
| wheel (bottom) | | 251 690 | 254 895 | 254 895 |
| guide roller (top) | | 251 700 | 254 903 | 254 903 |
| connecting strap for double collectors | | 258 379 | 258 379 | 258 379 |
| connecting bar for double collectors | | 258 430 | 258 431 | 258 431 |
| attachment clamp KWZ | | 250 310 | - | - |
| attachment clamp KWZ/K, stainless | | 252 639 | - | - |
| attachment clamp KWZL | | - | 254 897 | 254 897 |

Conductor dead section⁽²⁾

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



Illustration shows STA 3

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

LSVG

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

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

Conductor dead section⁽²⁾

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

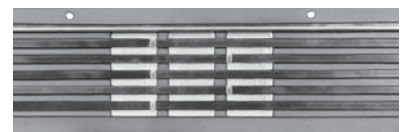


Illustration shows STAG 5

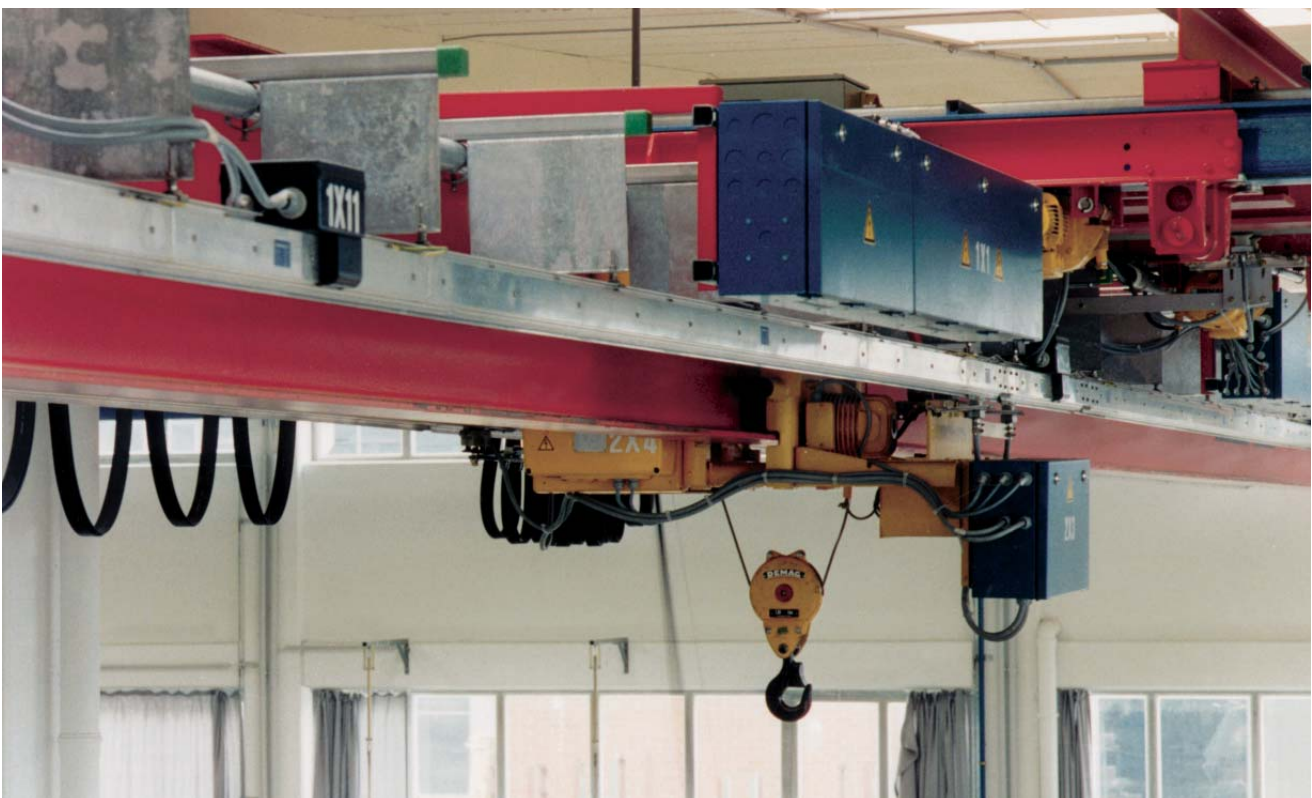
| Type | with air gap 5 mm Order- No. | Type | with insul. section 30 mm Order- No. |
|---------|------------------------------|---------|--------------------------------------|
| STAG 1 | 182 860 | STIG 1 | 182 960 |
| STAG 2 | 182 870 | STIG 2 | 182 970 |
| STAG 3 | 182 880 | STIG 3 | 182 980 |
| STAG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

⁽¹⁾ SWK carbon brush without brush holder.

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



Aluminium enclosed conductor system for crane electrifications.

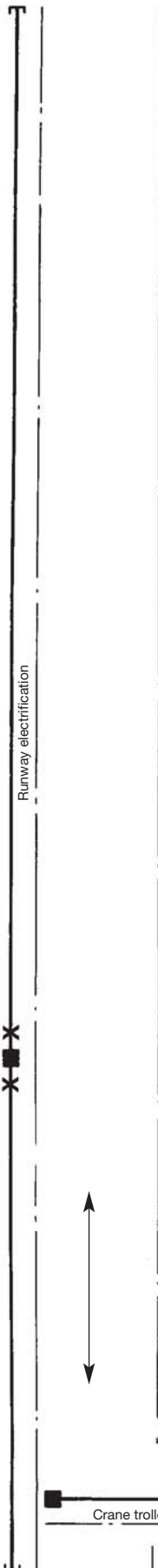


Aluminium enclosed conductor system LSVG on crane bridge.



EXAMPLES FOR ORDERING

with Plug-in joints



Runway electrification · 40 m

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

Crane trolley electrification · 12 m

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

Spur rail electrification · 30 m

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

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

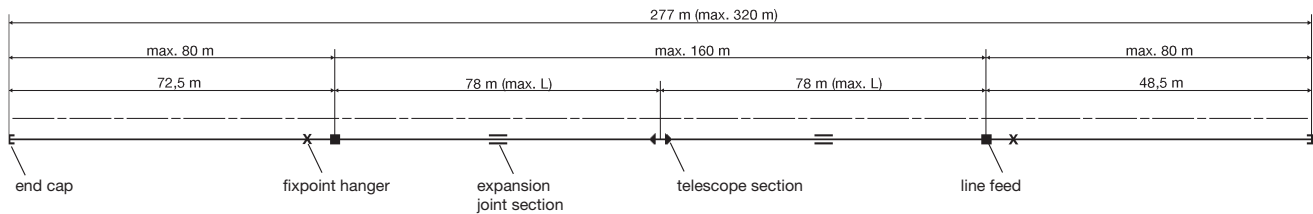
Sealing strip "D" and plastic shielding "FP" have to be ordered separately with the corresponding collectors (see pages 6 and 20). Heating system may be provided. (see page 16).



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

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

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



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

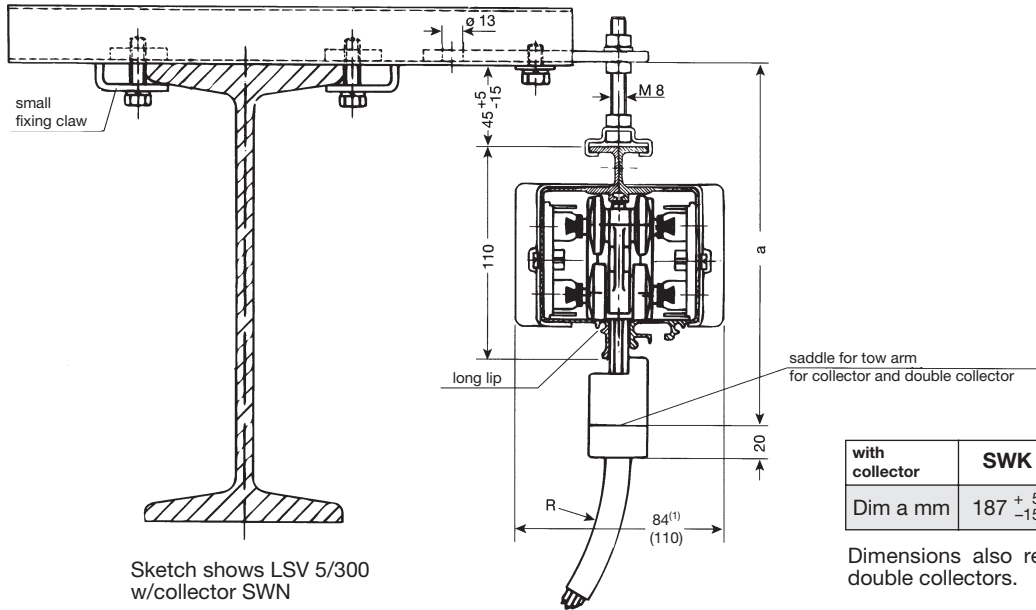


Aluminium enclosed conductor system on crane bridge.



BASIC DIMENSIONS

LSV

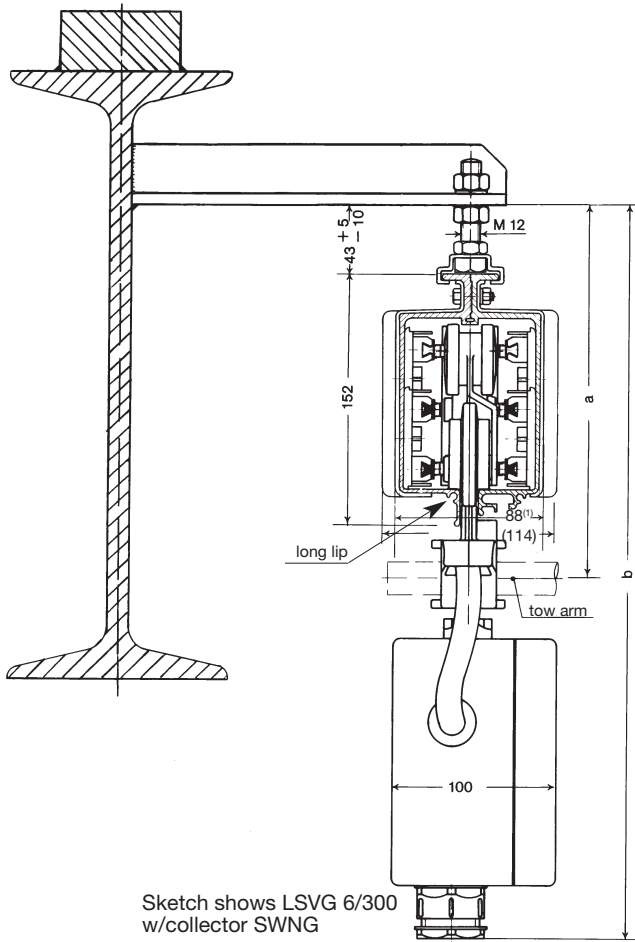


| with collector | SWK | SWN | SWNT |
|----------------|-------------------|-------------------|-------------------|
| Dim a mm | 187 $^{+5}_{-15}$ | 187 $^{+5}_{-15}$ | 197 $^{+5}_{-15}$ |

Dimensions also refer to corresponding double collectors.

Sketch shows LSV 5/300 w/collector SWN

LSVG



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

Sketch shows LSVG 6/300 w/collector SWNG

LSV
LSVG

Cable glands for Feeds (see pages 10 and 11)

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

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

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

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



Company: _____ Date: _____

Tel: _____ Fax: _____

E-Mail: _____ Internet: (URL) _____

1. Number of powerail installations: _____

2. Type of equipment to be powered: _____

3. Operating voltage: _____ Volts, Phases: _____, Frequency: _____ Hz
Three phase voltage: AC voltage: DC voltage:

4. Track length: _____

5. Number of conductors: _____ (Neutral: _____ control: _____ ground: _____)

6. Mounted position of powerail:

- Powerail pendant, collector cable facing to the bottom
- Powerail pendant, collector cable lateral payout ⁽¹⁾
- Support distance _____ m (max. 2 m)
- Other: _____

7. Number of consumers per system: _____

8. Indoor: Outdoor:

9. Other operating conditions (humidity, dust, chemical influence etc.)

10. Ambient temperature: _____ °C min. _____ °C max.

11. Position and number of feeding points⁽¹⁾: _____

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

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

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

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

16. Power consumption of the individual consumer loads: _____
(Please consult table on reverse side)

17. Max. Voltage drop from the powerail feed point to the consumer considering starting current:
3% or _____ % referring to nominal voltage

Remarks: _____

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



QUESTIONNAIRE LSV-LSVG

To the nearest local VAHLE agency:

Date:

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

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

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

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

Further remarks: _____

Signature: _____



Products and Service

Catalog No.

1 Open conductor systems

Open conductor systems

1a

2 Insulated conductor systems

U 10

2a

FABA 100

2b

U 15 - U 25 - U 35

2c

U 20 - U 30 - U 40

2d

3 Compact conductor systems

VKS 10

3a

VKS - VKL

3b

4 Enclosed conductor systems

KBSL - KSL

4a

KBH

4b

MKLD - MKLF - MKLS

4c

LSV - LSVG

4d

5 Contactless power supply

Contactless power supply (CPS®)

5a

6 Data transmission

VAHLE Powercom®

6a

Slotted Microwave Guide (SMG)

6b

7 Positioning systems

VAHLE APOS®

7a

8 Festoon systems and cables

Festoon systems for □- tracks

8a

Festoon systems for flat cables on I- tracks

8b

Festoon systems for round flat cables on I- tracks

8c

Festoon systems for ◇- tracks

8d

Cables

8e

9 Reels

Spring operated cable reels

9a

Motor powered cable reels

9b

10 Others

Battery charging systems

10a

Heavy enclosed conductor systems

10b

Tender

10c

Contact wire

10d

Assemblies/Commissioning

Spare parts/Maintenance service



VAHLE 
ELECTRIFICATION SYSTEMS

| Products and Service | Catalog No. |
|--|--------------------|
| 1 Open conductor systems | |
| Open conductor systems | 1a |
| 2 Insulated conductor systems | |
| U 10 | 2a |
| FABA 100 | 2b |
| U 15 - U 25 - U 35 | 2c |
| U 20 - U 30 - U 40 | 2d |
| 3 Compact conductor systems | |
| VKS 10 | 3a |
| VKS - VKL | 3b |
| 4 Enclosed conductor systems | |
| KBSL - KSL | 4a |
| KBH | 4b |
| MKLD - MKLF - MKLS | 4c |
| LSV - LSVG | 4d |
| 5 Contactless power supply | |
| Contactless power supply (CPS®) | 5a |
| 6 Data transmission | |
| VAHLE Powercom® | 6a |
| Slotted Microwave Guide (SMG) | 6b |
| 7 Positioning systems | |
| VAHLE APOS® | 7a |
| 8 Festoon systems and cables | |
| Festoon systems for □- tracks | 8a |
| Festoon systems for flat cables on I- tracks | 8b |
| Festoon systems for round flat cables on I- tracks | 8c |
| Festoon systems for ◇- tracks | 8d |
| Cables | 8e |
| 9 Reels | |
| Spring operated cable reels | 9a |
| Motor powered cable reels | 9b |
| 10 Others | |
| Battery charging systems | 10a |
| Heavy enclosed conductor systems | 10b |
| Tender | 10c |
| Contact wire | 10d |

Assemblies/Commissioning

Spare parts/Maintenance service



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Powerail Ltd. High Road, Finchley, London, N12 8PT,
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 E-mail: enquiries@powerailtd.com