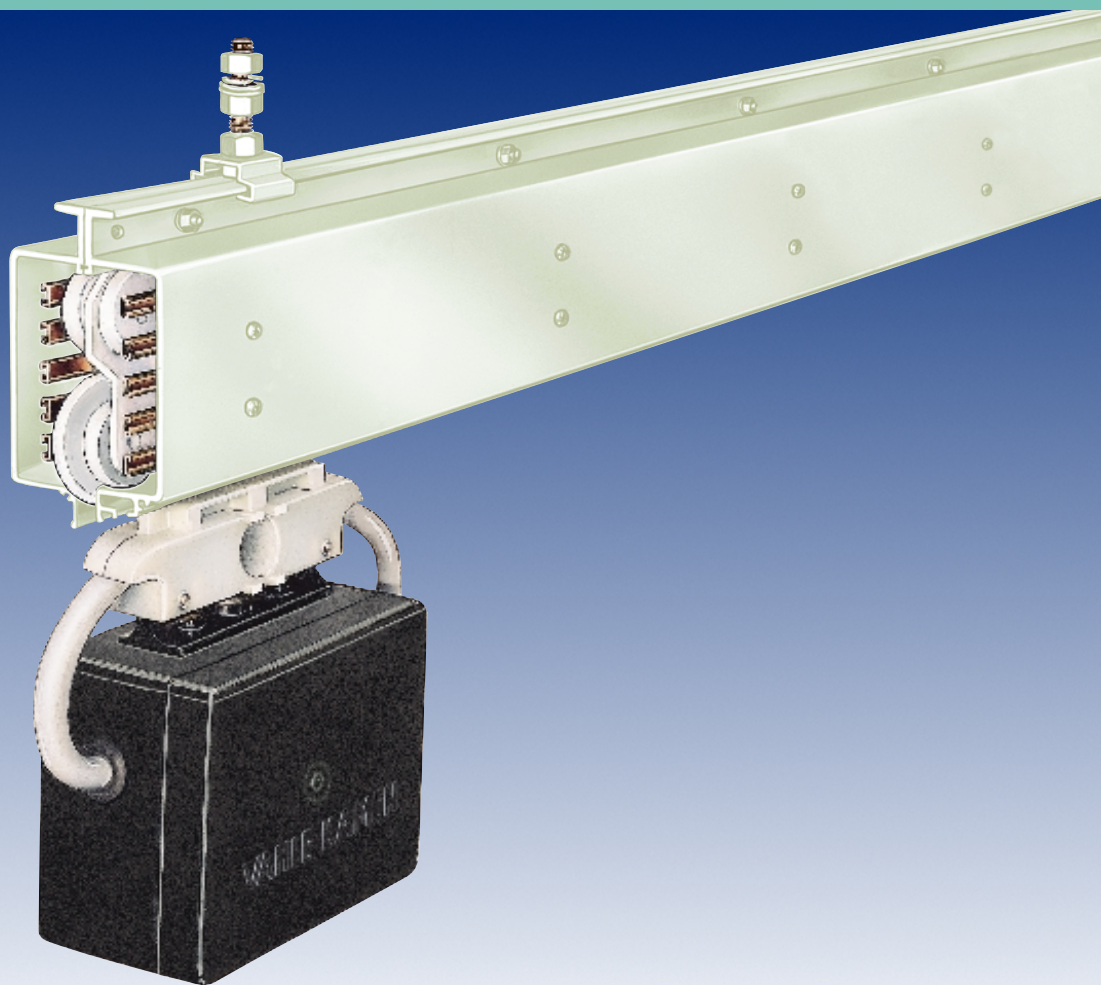




# **ALUMINIUM ENCLOSED CONDUCTOR SYSTEMS**

LSV and LSVG



# ALUMINIUM ENCLOSED CONDUCTOR SYSTEMS

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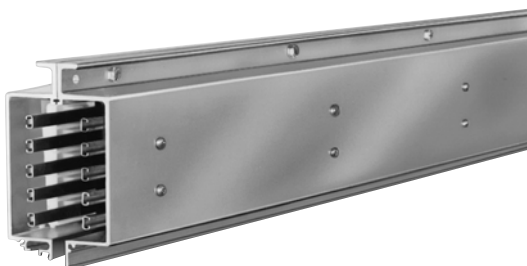
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**Type LSV**



**Type LSV with Plastic shielding "FP"**



**Type LSVG**



**Type LSVG with sealing strip "D"**

## TECHNICAL DATA

Ampacity : 300 A max.  
Voltage : 600 V max.  
Collector rating : 40 A & multiple  
min. Bending Radius : LSV 1000 mm/ LSVG 1500 mm

### Temperature Resistance:

Powerail : - 40° C/+100° C  
Sealing strip "D" up to : + 80° C  
Plastic shielding "FP" up to : + 55° C  
Collector : - 40° C/+ 70° C \*

|             |      |      |      |      |      |                        |
|-------------|------|------|------|------|------|------------------------|
| Impedance:  | 16   | 25   | 35   | 50   | 70   | mm <sup>2</sup> copper |
|             | 1.17 | 0.72 | 0.53 | 0.38 | 0.28 | Ohm/1000 m             |
| Resistance: | 16   | 25   | 35   | 50   | 70   | mm <sup>2</sup> copper |
|             | 1.16 | 0.71 | 0.51 | 0.36 | 0.26 | Ohm/1000 m             |

## 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 § 3; Protection IP 23, with sealing strip IP 24 per DIN 40050 applies.

The aluminium enclosed LSV 4- and 5pole and the PVC enclosed KSL 4- and 5pole (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. 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 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. Sizes and all bolted conductor joint versions have joint covers (see page 6 and 7).

The lower portion of the housing serves as a smooth, rigid runway for the collector trolleys and is aligned by grooved push pegs.

Conductor rails on the 60, 100 and 140 Amp. sizes are spliced by connectors being pushed inside the hollow conductors. Bolted joints are also available for these sizes.

The 200 and 300 Amp. systems exclusively use bolted joints.

## 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

Factory assembled conductor dead sections are available in the air gap and the insulating piece version for control circuits.

## Collectors

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

**To speed up quotations and order processing, we would appreciate receiving your drawings or sketches for Powerail systems with curves, dead sections, turntables, switches, etc.  
Please use our questionnaire, page 29 and 30.**

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

### Formulas:

|      |                                                       |                                               |
|------|-------------------------------------------------------|-----------------------------------------------|
| A C: | $\Delta U_1 = \sqrt{3} \times I \times \ell \times Z$ | $\Delta U_2 = \frac{\Delta U_1 \cdot 100}{V}$ |
| D C: | $\Delta U_1 = 2 \times I \times R$                    |                                               |

$\Delta U_1$  = Voltage drop [V]  
 $\Delta U_2$  = Voltage drop in %  
 $I$  = Ampere load [A]

$V$  = System Voltage  
 $\ell$  = Power feed length [m]  
 $L$  = System length [m]

### Effective length:

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

$Z$  = Impedance 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.**



# TYPES AND CATALOG NUMBERS

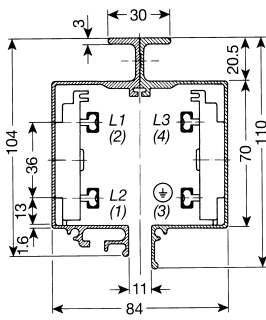
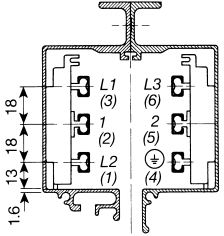
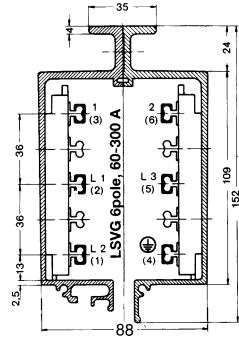
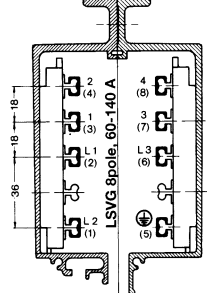
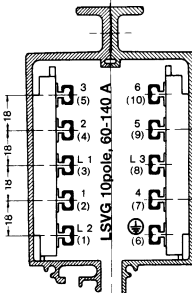
## LSV

| Type                          | 1 m Section  |              | 2 m Section  |              | 3 m Section  |              | 4 m Section  |              |
|-------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                               | Weight<br>kg | Cat.-<br>No. | Weight<br>kg | Cat.-<br>No. | Weight<br>kg | Cat.-<br>No. | Weight<br>kg | Cat.-<br>No. |
| LSV 4/ 60 ... HS              | 3.000        | 190 001      | 6.000        | 190 002      | 9.000        | 190 003      | 12.000       | 190 004      |
| LSV 4/ 60 ... SS Control line | 3.000        | 190 101      | 6.000        | 190 102      | 9.000        | 190 103      | 12.000       | 190 104      |
| LSV 4/100 ... HS              | 3.400        | 190 041      | 6.800        | 190 042      | 10.200       | 190 043      | 13.600       | 190 044      |
| LSV 4/140 ... HS              | 3.700        | 190 081      | 7.400        | 190 082      | 11.100       | 190 083      | 14.800       | 190 084      |
| LSV 4/200 ... HS *            | 4.300        | 190 611      | 8.600        | 190 612      | 12.900       | 190 613      | 17.200       | 190 614      |
| LSV 4/300 ... HS *            | 5.000        | 190 601      | 10.000       | 190 602      | 15.000       | 190 603      | 20.000       | 190 604      |
| LSV 5/ 60 ... HS              | 3.150        | 190 011      | 6.300        | 190 012      | 9.450        | 190 013      | 12.600       | 190 014      |
| LSV 5/100 ... HS              | 3.550        | 190 031      | 7.100        | 190 032      | 10.650       | 190 033      | 14.200       | 190 034      |
| LSV 5/140 ... HS              | 3.850        | 190 051      | 7.700        | 190 052      | 11.550       | 190 053      | 15.400       | 190 054      |
| LSV 5/200 ... HS *            | 4.450        | 190 621      | 8.900        | 190 622      | 13.350       | 190 623      | 17.800       | 190 624      |
| LSV 5/300 ... HS *            | 5.150        | 190 631      | 10.300       | 190 632      | 15.450       | 190 633      | 20.600       | 190 634      |
| LSV 6/ 60 ... HS              | 3.300        | 190 021      | 6.600        | 190 022      | 9.900        | 190 023      | 13.200       | 190 024      |
| LSV 6/ 60 ... SS Control line | 3.300        | 190 111      | 6.600        | 190 112      | 9.900        | 190 113      | 13.200       | 190 114      |
| LSV 6/100 ... HS              | 3.700        | 190 061      | 7.400        | 190 062      | 11.100       | 190 063      | 14.800       | 190 064      |
| LSV 6/140 ... HS              | 4.000        | 190 641      | 8.000        | 190 642      | 12.000       | 190 643      | 16.000       | 190 644      |
| LSV 6/200 ... HS *            | 4.480        | 195 521      | 8.960        | 195 522      | 13.450       | 195 523      | 17.930       | 195 524      |
| LSV 7/ 60 ... HS              | 3.450        | 190 071      | 6.900        | 190 072      | 10.350       | 190 073      | 13.800       | 190 074      |
| LSV 7/100 ... HS              | 3.850        | 190 091      | 7.700        | 190 092      | 11.550       | 190 093      | 15.400       | 190 094      |
| LSV 7/140 ... HS              | 4.250        | 190 651      | 8.500        | 190 652      | 12.750       | 190 653      | 17.000       | 190 654      |
| LSV 7/200 ... HS *            | 4.730        | 195 601      | 9.570        | 195 602      | 14.360       | 195 603      | 19.140       | 195 604      |

## LSVG

|                                 |       |         |        |         |        |         |        |         |
|---------------------------------|-------|---------|--------|---------|--------|---------|--------|---------|
| LSVG 6/ 60 ... HS               | 5.150 | 180 001 | 10.300 | 180 002 | 15.450 | 180 003 | 20.600 | 180 004 |
| LSVG 6/ 60 ... SS Control line  | 5.150 | 180 221 | 10.300 | 180 222 | 15.450 | 180 223 | 20.600 | 180 224 |
| LSVG 6/100 ... HS               | 5.450 | 180 011 | 10.900 | 180 012 | 16.350 | 180 013 | 21.800 | 180 014 |
| LSVG 6/140 ... HS               | 5.750 | 180 021 | 11.500 | 180 022 | 17.250 | 180 023 | 23.000 | 180 024 |
| LSVG 6/200 ... HS *             | 6.300 | 180 031 | 12.600 | 180 032 | 18.900 | 180 033 | 25.200 | 180 034 |
| LSVG 6/300 ... HS *             | 7.250 | 180 041 | 14.500 | 180 042 | 21.750 | 180 043 | 29.000 | 180 044 |
| LSVG 7/ 60 ... HS               | 5.300 | 180 051 | 10.600 | 180 052 | 15.900 | 180 053 | 21.200 | 180 054 |
| LSVG 7/100 ... HS               | 5.700 | 180 061 | 11.400 | 180 062 | 17.100 | 180 063 | 22.800 | 180 064 |
| LSVG 7/140 ... HS               | 6.100 | 180 071 | 12.200 | 180 072 | 18.300 | 180 073 | 24.400 | 180 074 |
| LSVG 7/200 ... HS *             | 6.700 | 180 081 | 13.400 | 180 082 | 20.100 | 180 083 | 26.800 | 180 084 |
| LSVG 7/300 ... HS *             | 7.400 | 180 091 | 14.800 | 180 092 | 22.200 | 180 093 | 29.600 | 180 094 |
| LSVG 8/ 60 ... HS               | 5.450 | 180 101 | 10.900 | 180 102 | 16.350 | 180 103 | 21.800 | 180 104 |
| LSVG 8/ 60 ... SS Control line  | 5.450 | 180 231 | 10.900 | 180 232 | 16.350 | 180 233 | 21.800 | 180 234 |
| LSVG 8/100 ... HS               | 5.750 | 180 111 | 11.500 | 180 112 | 17.250 | 180 113 | 23.000 | 180 114 |
| LSVG 8/140 ... HS               | 6.050 | 180 121 | 12.100 | 180 122 | 18.150 | 180 123 | 24.200 | 180 124 |
| LSVG 8/200 ... HS *             | 6.530 | 184 581 | 13.060 | 184 582 | 19.600 | 184 583 | 26.130 | 184 584 |
| LSVG 9/ 60 ... HS               | 5.600 | 180 131 | 11.200 | 180 132 | 16.800 | 180 133 | 22.400 | 180 134 |
| LSVG 9/100 ... HS               | 6.000 | 180 141 | 12.000 | 180 142 | 18.000 | 180 143 | 24.000 | 180 144 |
| LSVG 9/140 ... HS               | 6.400 | 180 151 | 12.800 | 180 152 | 19.200 | 180 153 | 25.600 | 180 154 |
| LSVG 9/200 ... HS *             | 6.940 | 184 591 | 13.870 | 184 592 | 20.810 | 184 593 | 26.130 | 184 584 |
| LSVG 10/ 60 ... HS              | 5.750 | 180 161 | 11.500 | 180 162 | 17.250 | 180 163 | 23.000 | 180 164 |
| LSVG 10/ 60 ... SS Control line | 5.750 | 180 241 | 11.500 | 180 242 | 17.250 | 180 243 | 23.000 | 180 244 |
| LSVG 10/100 ... HS              | 6.050 | 180 171 | 12.100 | 180 172 | 18.150 | 180 173 | 24.200 | 180 174 |
| LSVG 10/140 ... HS              | 6.350 | 180 181 | 12.700 | 180 182 | 19.050 | 180 183 | 25.400 | 180 184 |
| LSVG 10/200 ... HS *            | 6.830 | 184 601 | 13.660 | 184 602 | 20.500 | 184 603 | 27.330 | 184 604 |
| LSVG 11/ 60 ... HS              | 5.900 | 180 191 | 11.800 | 180 192 | 17.700 | 180 193 | 23.600 | 180 194 |
| LSVG 11/100 ... HS              | 6.300 | 180 201 | 12.600 | 180 202 | 18.900 | 180 203 | 25.200 | 180 204 |
| LSVG 11/140 ... HS              | 6.700 | 180 211 | 13.400 | 180 212 | 20.100 | 180 213 | 26.800 | 180 214 |
| LSVG 11/200 ... HS *            | 7.240 | 184 611 | 14.470 | 184 612 | 21.710 | 184 613 | 28.940 | 184 614 |



| Type                        | No. of conductors | No. of conductors x copper section mm <sup>2</sup> |        |        |              | Ampacity at 80 % duty factor A | max. Voltage V | Leakage Path mm | Configurations                                                                                                |
|-----------------------------|-------------------|----------------------------------------------------|--------|--------|--------------|--------------------------------|----------------|-----------------|---------------------------------------------------------------------------------------------------------------|
|                             |                   | L1, L2, L3                                         | ⊕      | N      | Control-Line |                                |                |                 |                                                                                                               |
| HS with PE<br>SS without PE |                   |                                                    |        |        |              |                                |                |                 |                                                                                                               |
| LSV 4/ 60 HS                | 4                 | 3 x 16                                             | 1 x 16 | —      | —            | 60                             | 600            | 45              | <br>LSV 4pole, 60-300 A     |
| LSV 4/ 60 SS                | 4                 | —                                                  | —      | —      | 4 x 16       | 60                             | 600            | 45              |                                                                                                               |
| LSV 4/100 HS                | 4                 | 3 x 25                                             | 1 x 16 | —      | —            | 100                            | 600            | 45              |                                                                                                               |
| LSV 4/140 HS                | 4                 | 3 x 35                                             | 1 x 16 | —      | —            | 140                            | 600            | 45              |                                                                                                               |
| LSV 4/200 HS                | 4                 | 3 x 50                                             | 1 x 25 | —      | —            | 200                            | 600            | 45              |                                                                                                               |
| LSV 4/300 HS                | 4                 | 3 x 70                                             | 1 x 50 | —      | —            | 300                            | 600            | 35              |                                                                                                               |
| LSV 5/ 60 HS                | 5                 | 3 x 16                                             | 1 x 16 | 1 x 16 | —            | 60                             | 600            | 45              |                                                                                                               |
| LSV 5/100 HS                | 5                 | 3 x 25                                             | 1 x 16 | 1 x 25 | —            | 100                            | 600            | 45              |                                                                                                               |
| LSV 5/140 HS                | 5                 | 3 x 35                                             | 1 x 16 | 1 x 35 | —            | 140                            | 600            | 45              |                                                                                                               |
| LSV 5/200 HS                | 5                 | 3 x 50                                             | 1 x 16 | 1 x 50 | —            | 200                            | 600            | 45              |                                                                                                               |
| LSV 5/300 HS                | 5                 | 3 x 70                                             | 1 x 16 | 1 x 70 | —            | 300                            | 600            | 35              |                                                                                                               |
| LSV 6/ 60 HS                | 6                 | 3 x 16                                             | 1 x 16 | —      | 2 x 16       | 60                             | 600            | 45              | <br>LSV 6pole, 60-140 A     |
| LSV 6/ 60 SS                | 6                 | —                                                  | —      | —      | 6 x 16       | 60                             | 600            | 45              |                                                                                                               |
| LSV 6/100 HS                | 6                 | 3 x 25                                             | 1 x 16 | —      | 2 x 16       | 100                            | 600            | 45              |                                                                                                               |
| LSV 6/140 HS                | 6                 | 3 x 35                                             | 1 x 16 | —      | 2 x 16       | 140                            | 600            | 45              |                                                                                                               |
| LSV 6/200 HS                | 6                 | 3 x 50                                             | 1 x 25 | —      | 2 x 16       | 200                            | 600            | 45              |                                                                                                               |
| LSV 7/ 60 HS                | 7                 | 3 x 16                                             | 1 x 16 | 1 x 16 | 2 x 16       | 60                             | 600            | 45              |                                                                                                               |
| LSV 7/100 HS                | 7                 | 3 x 25                                             | 1 x 16 | 1 x 25 | 2 x 16       | 100                            | 600            | 45              |                                                                                                               |
| LSV 7/140 HS                | 7                 | 3 x 35                                             | 1 x 16 | 1 x 35 | 2 x 16       | 140                            | 600            | 45              |                                                                                                               |
| LSV 7/200 HS                | 7                 | 3 x 50                                             | 1 x 16 | 1 x 50 | 2 x 16       | 200                            | 600            | 45              |                                                                                                               |
| LSV 7/300 HS                | 7                 | 3 x 70                                             | 1 x 16 | 1 x 70 | 2 x 16       | 300                            | 600            | 35              |                                                                                                               |
| LSVG 6/ 60 HS               | 6                 | 3 x 16                                             | 1 x 16 | —      | 2 x 16       | 60                             | 600            | 45              | <br>LSVG 6pole, 60-300 A  |
| LSVG 6/ 60 SS               | 6                 | —                                                  | —      | —      | 6 x 16       | 60                             | 600            | 45              |                                                                                                               |
| LSVG 6/100 HS               | 6                 | 3 x 25                                             | 1 x 16 | —      | 2 x 16       | 100                            | 600            | 45              |                                                                                                               |
| LSVG 6/140 HS               | 6                 | 3 x 35                                             | 1 x 16 | —      | 2 x 16       | 140                            | 600            | 45              |                                                                                                               |
| LSVG 6/200 HS               | 6                 | 3 x 50                                             | 1 x 25 | —      | 2 x 16       | 200                            | 600            | 45              |                                                                                                               |
| LSVG 6/300 HS               | 6                 | 3 x 70                                             | 1 x 50 | —      | 2 x 20       | 300                            | 600            | 35              |                                                                                                               |
| LSVG 7/ 60 HS               | 7                 | 3 x 16                                             | 1 x 16 | 1 x 16 | 2 x 16       | 60                             | 600            | 45              |                                                                                                               |
| LSVG 7/100 HS               | 7                 | 3 x 25                                             | 1 x 16 | 1 x 25 | 2 x 16       | 100                            | 600            | 45              |                                                                                                               |
| LSVG 7/140 HS               | 7                 | 3 x 35                                             | 1 x 16 | 1 x 35 | 2 x 16       | 140                            | 600            | 45              |                                                                                                               |
| LSVG 7/200 HS               | 7                 | 3 x 50                                             | 1 x 16 | 1 x 50 | 2 x 16       | 200                            | 600            | 45              |                                                                                                               |
| LSVG 7/300 HS               | 7                 | 3 x 70                                             | 1 x 16 | 1 x 70 | 2 x 20       | 300                            | 600            | 35              |                                                                                                               |
| LSVG 8/ 60 HS               | 8                 | 3 x 16                                             | 1 x 16 | —      | 4 x 16       | 60                             | 600            | 45              | <br>LSVG 8pole, 60-140 A  |
| LSVG 8/ 60 SS               | 8                 | —                                                  | —      | —      | 8 x 16       | 60                             | 600            | 45              |                                                                                                               |
| LSVG 8/100 HS               | 8                 | 3 x 25                                             | 1 x 16 | —      | 4 x 16       | 100                            | 600            | 45              |                                                                                                               |
| LSVG 8/140 HS               | 8                 | 3 x 35                                             | 1 x 16 | —      | 4 x 16       | 140                            | 600            | 45              |                                                                                                               |
| LSVG 8/200 HS               | 8                 | 3 x 50                                             | 1 x 25 | —      | 4 x 16       | 200                            | 600            | 45              |                                                                                                               |
| LSVG 9/ 60 HS               | 9                 | 3 x 16                                             | 1 x 16 | 1 x 16 | 4 x 16       | 60                             | 600            | 45              |                                                                                                               |
| LSVG 9/100 HS               | 9                 | 3 x 25                                             | 1 x 16 | 1 x 25 | 4 x 16       | 100                            | 600            | 45              |                                                                                                               |
| LSVG 9/140 HS               | 9                 | 3 x 35                                             | 1 x 16 | 1 x 35 | 4 x 16       | 140                            | 600            | 45              |                                                                                                               |
| LSVG 9/200 HS               | 9                 | 3 x 50                                             | 1 x 16 | 1 x 50 | 4 x 16       | 200                            | 600            | 45              |                                                                                                               |
| LSVG 9/300 HS               | 9                 | 3 x 70                                             | 1 x 16 | 1 x 70 | 4 x 16       | 300                            | 600            | 35              |                                                                                                               |
| LSVG 10/ 60 HS              | 10                | 3 x 16                                             | 1 x 16 | —      | 6 x 16       | 60                             | 600            | 45              | <br>LSVG 10pole, 60-140 A |
| LSVG 10/ 60 SS              | 10                | —                                                  | —      | —      | 10 x 16      | 60                             | 600            | 45              |                                                                                                               |
| LSVG 10/100 HS              | 10                | 3 x 25                                             | 1 x 16 | —      | 6 x 16       | 100                            | 600            | 45              |                                                                                                               |
| LSVG 10/140 HS              | 10                | 3 x 35                                             | 1 x 16 | —      | 6 x 16       | 140                            | 600            | 45              |                                                                                                               |
| LSVG 10/200 HS              | 10                | 3 x 50                                             | 1 x 25 | —      | 6 x 16       | 200                            | 600            | 45              |                                                                                                               |
| LSVG 11/ 60 HS              | 11                | 3 x 16                                             | 1 x 16 | 1 x 16 | 6 x 16       | 60                             | 600            | 45              |                                                                                                               |
| LSVG 11/100 HS              | 11                | 3 x 25                                             | 1 x 16 | 1 x 25 | 6 x 16       | 100                            | 600            | 45              |                                                                                                               |
| LSVG 11/140 HS              | 11                | 3 x 35                                             | 1 x 16 | 1 x 35 | 6 x 16       | 140                            | 600            | 45              |                                                                                                               |
| LSVG 11/200 HS              | 11                | 3 x 50                                             | 1 x 16 | 1 x 50 | 6 x 16       | 200                            | 600            | 45              |                                                                                                               |
| LSVG 11/300 HS              | 11                | 3 x 70                                             | 1 x 16 | 1 x 70 | 6 x 16       | 300                            | 600            | 35              |                                                                                                               |

The ground conductor ⊕ is always connected to the Powerail housing and marked accordingly. The ground bar is uninsulated in the case of 5, 7, 9 and 11pole systems. Other copper cross-section combinations are possible.

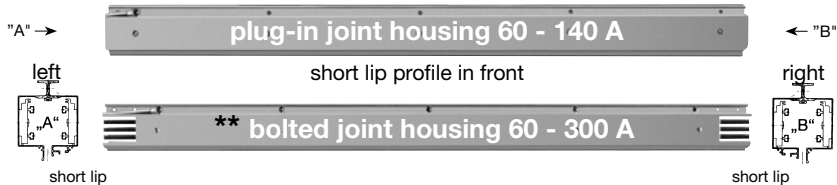
Numbers in parenthesis are used for control circuit applications. For mounting configurations also see pages 8, 11, 23 and 28.



## STANDARD SECTION max. 4 m

## CURVED SECTION

### LSV

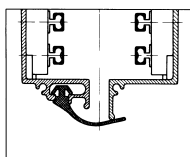


Extra finish of LSV; surcharge Cat.-No.

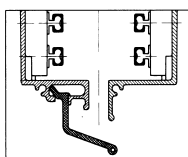
| Type      | Index E<br>anodized housing<br>Cat.-No. | Index I<br>copper conductors with stainless steel cap |                   |
|-----------|-----------------------------------------|-------------------------------------------------------|-------------------|
|           |                       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

Supplements for LSV:

|                                                      | Type      | Weight kg/m | Cat.-No. |
|------------------------------------------------------|-----------|-------------|----------|
| Neoprene sealing strip                               | <b>D</b>  | 0.225       | 254 751  |
| Locking pin for plastic shielding                    |           |             | 258 578  |
| Fastener for sealing strip (pair)                    |           |             | 258 432  |
| Plastic shielding*                                   | <b>FP</b> | 0.260       | 254 752  |
| Coupling for sealing strip for length exceeding 50 m |           |             | 258 300  |

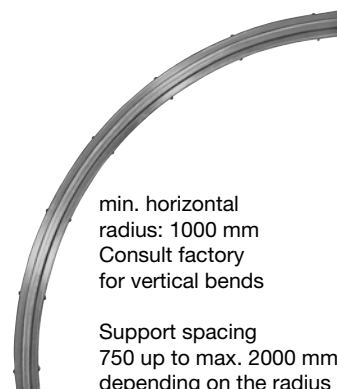


Neoprene  
sealing strip



Plastic  
shielding

Custom built



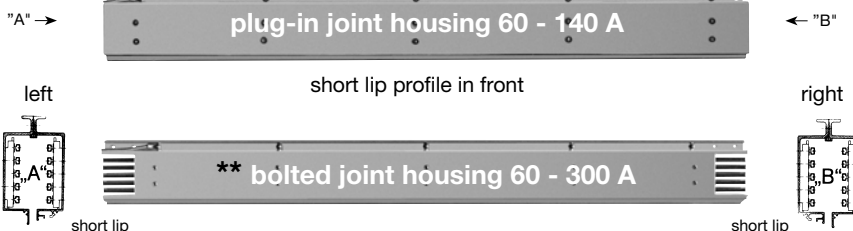
min. horizontal  
radius: 1000 mm  
Consult factory  
for vertical bends

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

| surcharge                        | Cat.-No. |
|----------------------------------|----------|
| horizontal curve<br>L max. 1.8 m | 194 420  |
| horizontal curve<br>L max. 3.2 m | 195 285  |

Long lip side of Powerail should always be  
mounted towards the track (see pages 8, 28).  
Notify exceptions for replacements and/or  
extensions and determine correct curves.

### LSVG

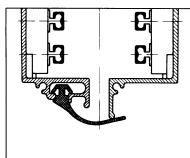


Extra finish of LSVG; surcharge Cat.-No.

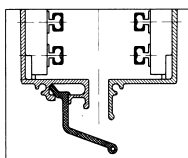
| Type        | Index E<br>anodized housing<br>Cat.-No. | Index I<br>copper conductors with stainless steel cap |                   |
|-------------|-----------------------------------------|-------------------------------------------------------|-------------------|
|             |                 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

Supplements for LSVG:

|                                                      | Type      | Weight kg/m | Cat.-No. |
|------------------------------------------------------|-----------|-------------|----------|
| Neoprene sealing strip                               | <b>D</b>  | 0.225       | 254 751  |
| Locking pin for plastic shielding                    |           |             | 258 578  |
| Fastener for sealing strip (pair)                    |           |             | 258 432  |
| Plastic shielding*                                   | <b>FP</b> | 0.260       | 254 752  |
| Coupling for sealing strip for length exceeding 50 m |           |             | 258 300  |



Neoprene  
sealing strip



Plastic  
shielding

Custom built



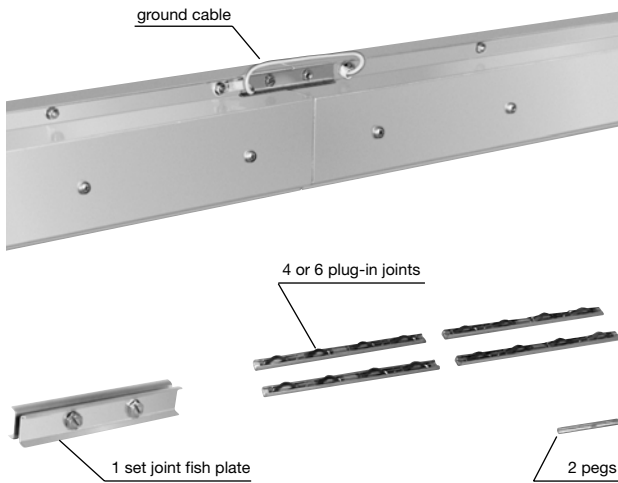
min. horizontal  
radius: 1500 mm  
Consult factory  
for vertical bends

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

| surcharge                        | Cat.-No. |
|----------------------------------|----------|
| horizontal curve<br>L max. 1.8 m | 183 810  |
| horizontal curve<br>L max. 3.2 m | 184 170  |

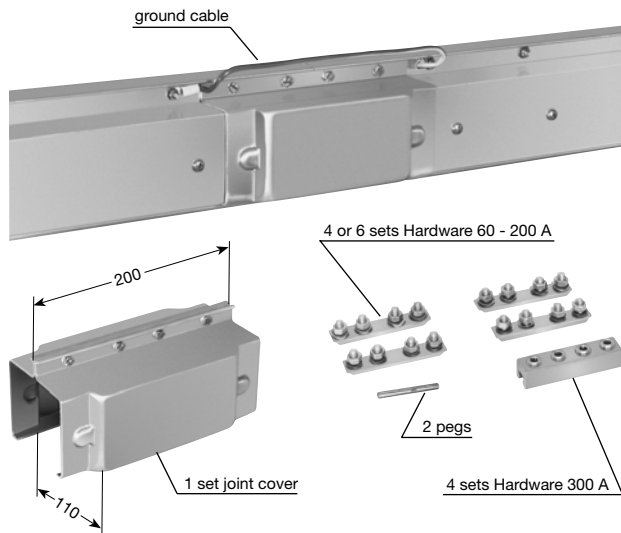
Long lip side of Powerail should always be  
mounted towards the track (see pages 8, 28).  
Notify exceptions for replacements and/or  
extensions and determine correct curves.

### Plug-in joints 60-140 A



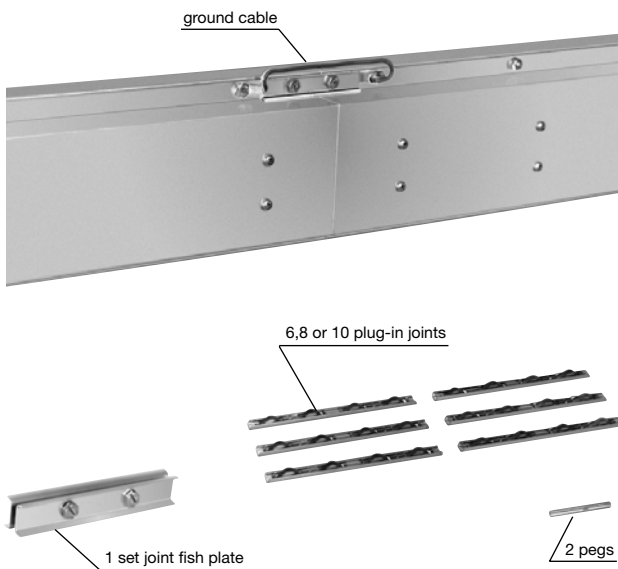
| Type          |                   | Weight kg | Cat.-No. |
|---------------|-------------------|-----------|----------|
| <b>VL 4/5</b> | for 4- and 5-pole | 0.110     | 195 244  |
| <b>VL 6/7</b> | for 6- and 7-pole | 0.140     | 195 246  |

### Bolted joints 60-300 A



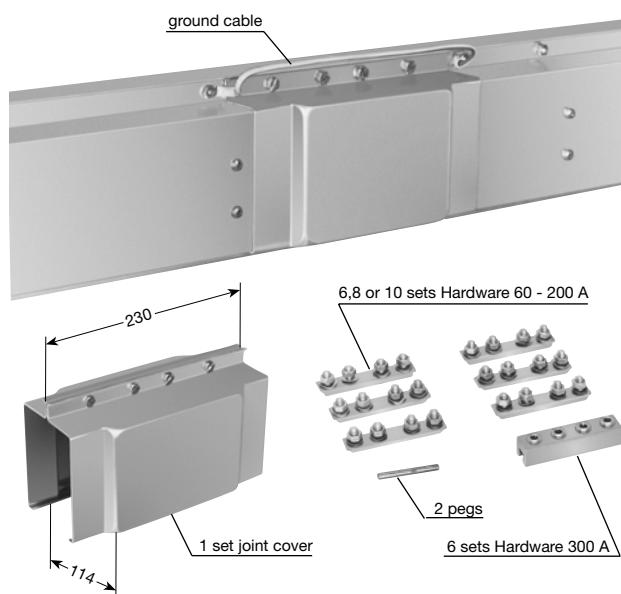
| Type               |                   | Weight kg | Cat.-No. | Cat.-No. anodized |
|--------------------|-------------------|-----------|----------|-------------------|
| <b>VBLS 4/5</b>    | for 4- and 5-pole | 0.450     | 195 248  | –                 |
| <b>VBLS/E 4/5</b>  | 60-200 Amp.       | 0.450     | –        | 195 255           |
| <b>VBLS 6/7</b>    | for 6- and 7-pole | 0.505     | 195 250  | –                 |
| <b>VBLS/E 6/7</b>  | 60-200 Amp.       | 0.505     | –        | 195 259           |
| <b>VBLSG 4/5</b>   | for 4- and 5-pole | 0.605     | 195 252  | –                 |
| <b>VBLSG/E 4/5</b> | 300 Amp.          | 0.605     | –        | 195 256           |

### Plug-in joints 60-140 A



| Type             |                     | Weight kg | Cat.-No. |
|------------------|---------------------|-----------|----------|
| <b>VLG 6/7</b>   | for 6- and 7-pole   | 0.135     | 184 107  |
| <b>VLG 8/9</b>   | for 8- and 9-pole   | 0.165     | 184 109  |
| <b>VLG 10/11</b> | for 10- and 11-pole | 0.195     | 184 111  |

### Bolted joints 60-300 A



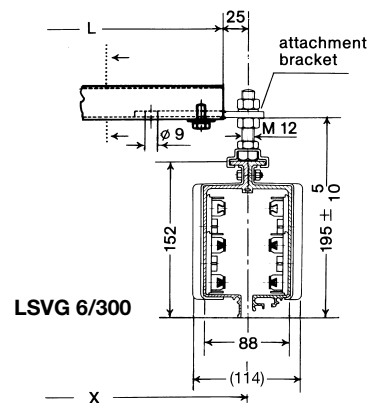
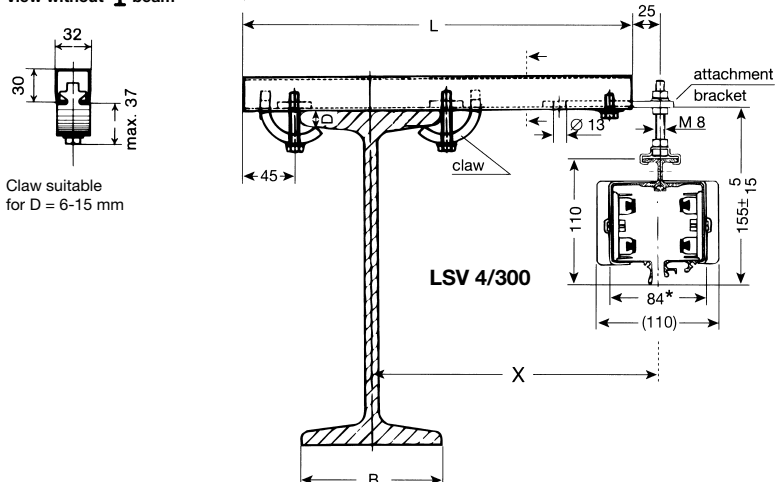
| Type                |                     | Cat.-No. | Cat.-No. anodized | Weight kg |
|---------------------|---------------------|----------|-------------------|-----------|
| <b>VLGS 6/7</b>     | for 6- and 7-pole   | 184 113  | –                 | 0.665     |
| <b>VLGS/E 6/7</b>   | 60-200 Amp.         | –        | 184 121           | 0.665     |
| <b>VLGS 8/9</b>     | for 8- and 9-pole   | 184 115  | –                 | 0.720     |
| <b>VLGS/E 8/9</b>   | 60-200 Amp.         | –        | 184 125           | 0.720     |
| <b>VLGS 10/11</b>   | for 10- and 11-pole | 184 117  | –                 | 0.770     |
| <b>VLGS/E 10/11</b> | 60-200 Amp.         | –        | 184 127           | 0.770     |
| <b>VLGSG 6/7</b>    | for 6- and 7-pole   | 184 119  | –                 | 0.890     |
| <b>VLGSG/E 6/7</b>  | 300 Amp.            | –        | 184 122           | 0.890     |



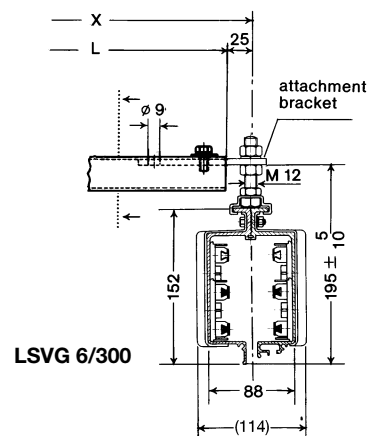
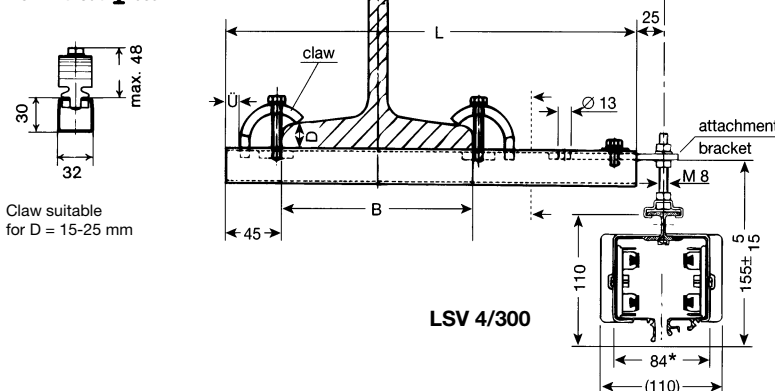
# BRACKETS

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

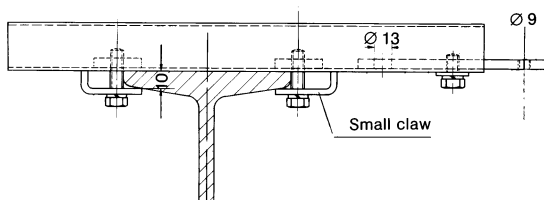
View without I-beam



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, Cat. 8a.

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

|     |      | Type     | X<br>mm | L<br>mm | B max.<br>mm | Weight<br>kg | Cat.-No.<br>for std.<br>brackets | Cat.-No.<br>with small<br>claw |
|-----|------|----------|---------|---------|--------------|--------------|----------------------------------|--------------------------------|
| LSV | LSVG | EHKL 250 | 250     | 350     | 170          | 1.070        | 194 210                          | 194 300                        |
|     |      | EHKL 300 | 300     | 400     | 170          | 1.150        | 194 220                          | 194 310                        |
|     |      | EHKL 400 | 400     | 500     | 170          | 1.300        | 194 230                          | 194 320                        |
|     |      | EHKL 500 | 500     | 600     | 170          | 1.450        | 194 240                          | 194 330                        |
|     |      | EHKL 600 | 600     | 700     | 170          | 1.600        | 194 250                          | 194 340                        |
|     |      | EHKL 700 | 700     | 800     | 170          | 1.750        | 194 260                          | 194 350                        |
|     |      | EHKL 750 | 750     | 850     | 170          | 1.820        | 194 270                          | 194 360                        |
|     |      | EHKL 800 | 800     | 900     | 170          | 1.900        | 194 280                          | 194 370                        |

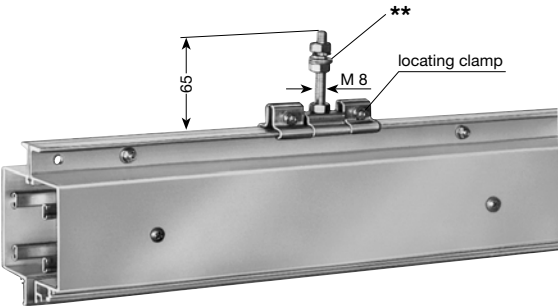


# FIXPOINT HANGER\*

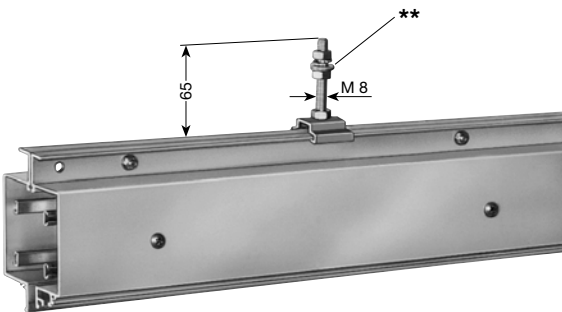
# SLIDING HANGER\*



LSV

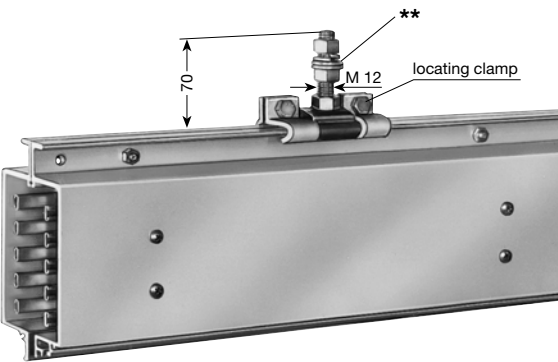


| Type       | Weight<br>kg | Cat.-No. |
|------------|--------------|----------|
| <b>FAL</b> | 0.150        | 190 120  |

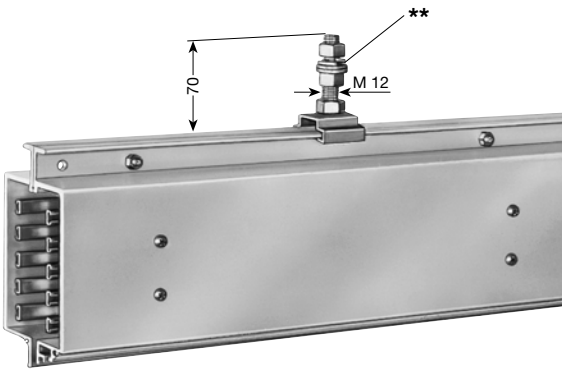


| Type       | Weight<br>kg | Cat.-No. |
|------------|--------------|----------|
| <b>GAL</b> | 0.080        | 190 130  |

LSVG



| Type        | Weight<br>kg | Cat.-No. |
|-------------|--------------|----------|
| <b>SAFG</b> | 0.410        | 180 310  |



| Type       | Weight<br>kg | Cat.-No. |
|------------|--------------|----------|
| <b>SAS</b> | 0.175        | 180 300  |

\* Illustrations show hangers mounted to powerail.  
\*\* Flat washers only to be used in slotted holes.



## END CAP

## END FEED\*

c/w 1 m Powerail

LSV



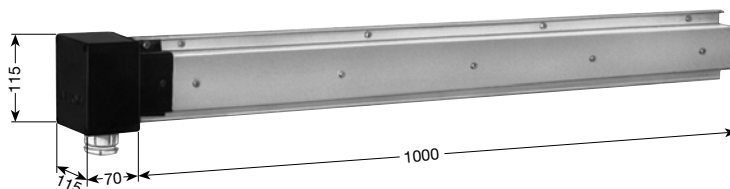
Plastic cap with plug-in joints

| Type       | Weight<br>kg | Cat.-No. |
|------------|--------------|----------|
| <b>EKL</b> | 0.080        | 190 220  |

Aluminium cap with bolted joints

| Type          | Weight<br>kg | Cat.-No. |
|---------------|--------------|----------|
| <b>EKLS</b>   | 0.300        | 195 149  |
| <b>EKLS/E</b> | 0.300        | 195 303  |

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



max. Ø of feed cable: 4 & 5pole 1 x PG 29 mm  
6 & 7pole 1 x PG 29 mm  
and 1 x PG 21 mm

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

LSVG



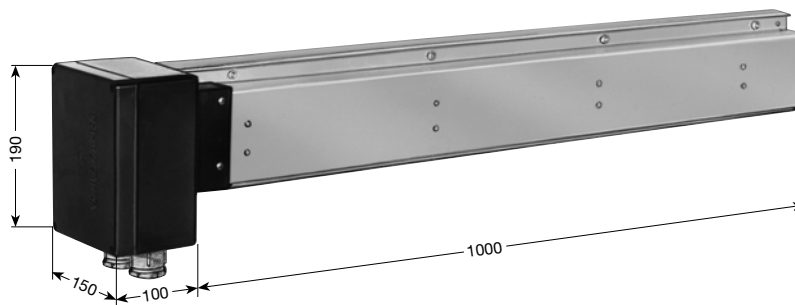
Plastic cap with plug-in joints

| Type        | Weight<br>kg | Cat.-No. |
|-------------|--------------|----------|
| <b>EKLG</b> | 0.120        | 180 320  |

Aluminium cap with bolted joints

| Type           | Cat.-No. | Weight<br>kg |
|----------------|----------|--------------|
| <b>EKLGS</b>   | 0.450    | 184 100      |
| <b>EKLGS/E</b> | 0.450    | 184 177      |

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



max. Ø of feed cable: for all types 1 x PG 29 mm  
and 1 x PG 21 mm

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

# LINE FEED\*

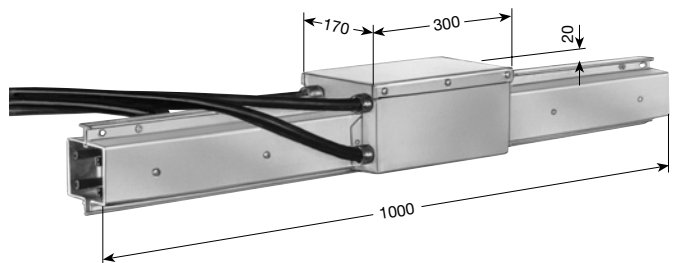
c/w 2 m feed-in cable and 1 m Powerail

# LINE FEED\*

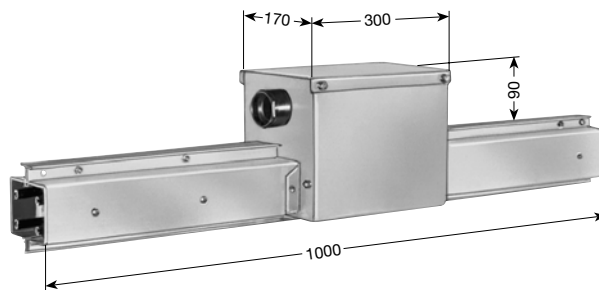
c/w terminal box and 1 m Powerail



LSV

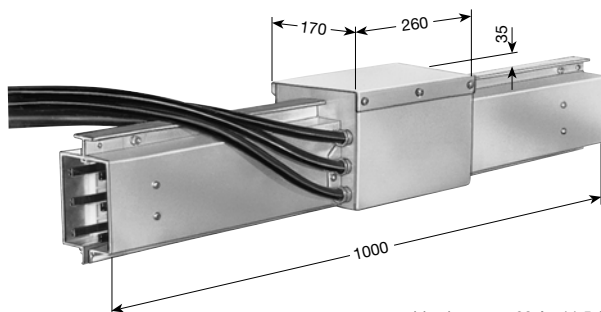


cable size: 60 A 11.5 Ø 10 mm<sup>2</sup>  
100 A 13.5 Ø 25 mm<sup>2</sup>  
140 A 14.5 Ø 35 mm<sup>2</sup>

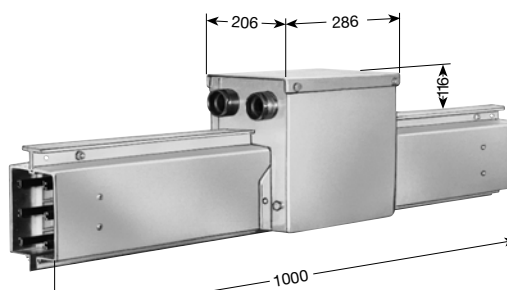


max. cable glands:  
1 x PG 29 for 4 & 5pole power circuits 60 A  
1 x PG 36 for 4 & 5pole power circuits 100 & 140 A  
1 x PG 42 for 4 & 5pole power circuits 200 A  
1 x PG 48 for 4 & 5pole power circuits 300 A  
1 x PG 29 & 1 x PG 21 for 6 & 7pole power circuits 60 A  
1 x PG 36 & 1 x PG 21 for 6 & 7pole power circuits 100 & 140 A  
1 x PG 42 & 1 x PG 21 for 6 & 7 pole power circuits 200 A  
1 x PG 29 for 4 & 6pole control circuits 60 A

| Type                              | Weight<br>kg | A   | Cat.-No. | Type                         | Weight<br>kg | A   | Cat.-No. | Type                         | Weight<br>kg | A   | Cat.-No. | Type                              | Weight<br>kg | A   | Cat.-No. |
|-----------------------------------|--------------|-----|----------|------------------------------|--------------|-----|----------|------------------------------|--------------|-----|----------|-----------------------------------|--------------|-----|----------|
| Power line <b>HS</b> with PE      |              |     |          | Power line <b>HS</b> with PE |              |     |          | Power line <b>HS</b> with PE |              |     |          | Power line <b>HS</b> with PE      |              |     |          |
| LAL 4/ 60                         | 5.65         | 60  | 195 060  | LAL 6/ 60                    | 6.65         | 60  | 195 067  | NKL 4/ 60                    | 4.40         | 60  | 195 074  | NKL 6/ 60                         | 4.80         | 60  | 195 085  |
| LAL 4/100                         | 6.55         | 100 | 195 061  | LAL 6/100                    | 7.80         | 100 | 195 068  | NKL 4/100                    | 4.80         | 100 | 195 075  | NKL 6/100                         | 5.20         | 100 | 195 086  |
| LAL 4/140                         | 7.40         | 140 | 195 062  | LAL 6/140                    | 8.45         | 140 | 195 069  | NKL 4/140                    | 5.10         | 140 | 195 076  | NKL 6/140                         | 5.50         | 140 | 195 087  |
| LAL 4/200                         | 8.00         | 200 | 195 637  | LAL 6/200                    | 8.95         | 200 | 195 639  | NKL 4/200                    | 5.80         | 200 | 195 077  | NKL 6/200                         | 6.00         | 200 | 195 567  |
| LAL 5/ 60                         | 6.10         | 60  | 195 064  | LAL 7/ 60                    | 7.15         | 60  | 195 071  | NKL 4/300                    | 6.50         | 300 | 195 078  | NKL 7/ 60                         | 5.00         | 60  | 195 089  |
| LAL 5/100                         | 7.00         | 100 | 195 065  | LAL 7/100                    | 9.00         | 100 | 195 072  | NKL 5/ 60                    | 4.60         | 60  | 195 080  | NKL 7/100                         | 5.40         | 100 | 195 090  |
| LAL 5/140                         | 8.25         | 140 | 195 066  | LAL 7/140                    | 9.25         | 140 | 195 073  | NKL 5/100                    | 5.00         | 100 | 195 081  | NKL 7/140                         | 5.70         | 140 | 195 091  |
| LAL 5/200                         | 8.85         | 200 | 195 638  | LAL 7/200                    | 9.80         | 200 | 195 640  | NKL 5/140                    | 5.30         | 140 | 195 082  | NKL 7/200                         | 6.30         | 200 | 195 568  |
| Control line <b>SS</b> without PE |              |     |          |                              |              |     |          | NKL 5/200                    | 6.00         | 200 | 195 083  | Control line <b>SS</b> without PE |              |     |          |
| LAL 4/ 60                         | 5.65         | 60  | 195 063  |                              |              |     |          | NKL 5/300                    | 6.70         | 300 | 195 084  | NKL 4/ 60                         | 4.40         | 60  | 195 079  |
| LAL 6/ 60                         | 6.65         | 60  | 195 070  |                              |              |     |          |                              |              |     |          | NKL 6/ 60                         | 4.80         | 60  | 195 088  |



cable size: 60 A 11.5 Ø 10 mm<sup>2</sup>  
100 A 13.5 Ø 25 mm<sup>2</sup>  
140 A 14.5 Ø 35 mm<sup>2</sup>

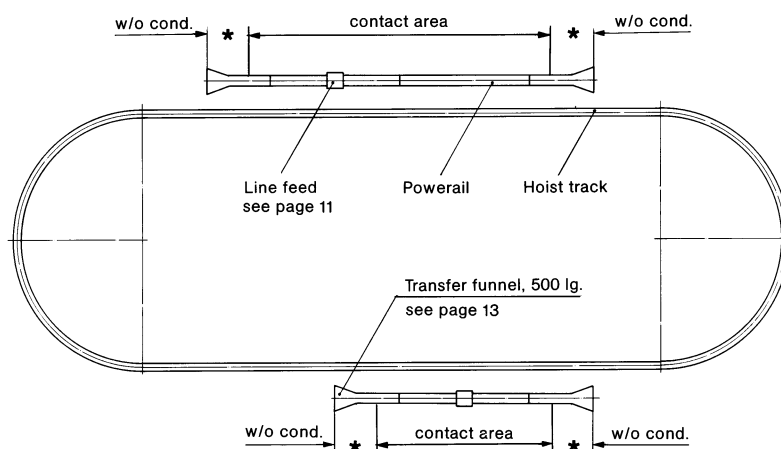


max. cable glands:  
1 x PG 29 & 1 x PG 21 for 6-11pole power circuits 60 A  
1 x PG 36 & 1 x PG 21 for 6-11pole power circuits 100 & 140 A  
1 x PG 42 & 1 x PG 21 for 6+7pole power circuits 200 A  
1 x PG 48 & 1 x PG 21 for 6+7pole power circuits 300 A  
2 x PG 21 for 6, 8 & 10pole control circuits 60 A

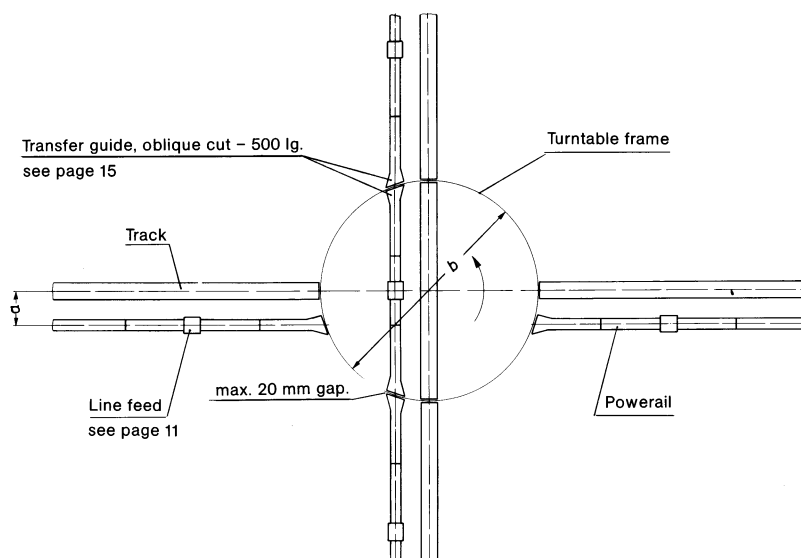
| Type                              | Weight<br>kg | A   | Cat.-No. | Type                         | Weight<br>kg | A   | Cat.-No. | Type                         | Weight<br>kg | A   | Cat.-No. | Type                              | Weight<br>kg | A   | Cat.-No. |
|-----------------------------------|--------------|-----|----------|------------------------------|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

\* The feed sets (page 10 & 11) come ready assembled on 1 m Powerail section and are a part of the system length.

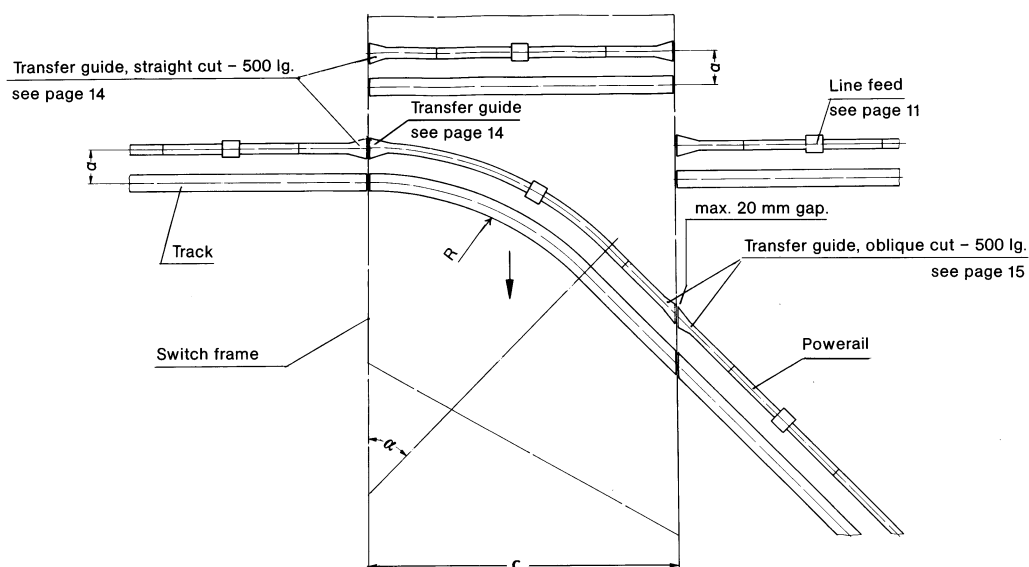
## Contact section



## Turntable



## Sliding switch



Please submit drawings of transfer applications. Specify dimenions a, b, c and angle  $\alpha$ .

for horizontal offset  $\pm 15$  mm  
for vertical offset  $\pm 10$  mm  
KFM or KFML tow arm required; applications see page 12, 22

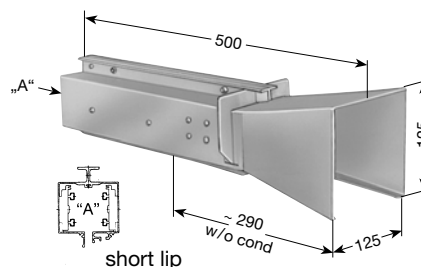
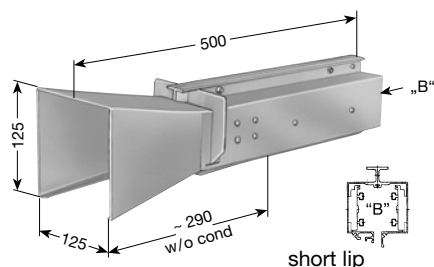


Illustration shows L. H. version short lip in front (see page 6)

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

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

for horizontal offset  $\pm 15$  mm  
for vertical offset  $\pm 10$  mm  
GFM tow arm required; applications see page 12, 22

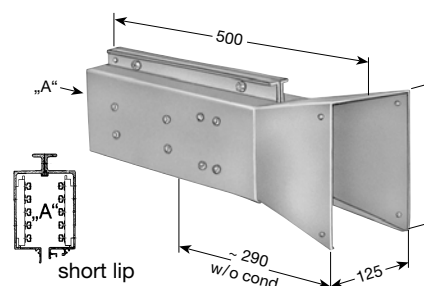
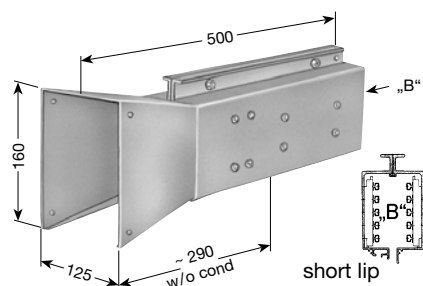


Illustration shows L. H. version short lip in front (see page 6)

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

| Type                   | Weight kg | Cat.-No. | Type                       | Weight kg | Cat.-No. | Type                 | Weight kg | Cat.-No. | Type                       | Weight kg | Cat.-No. |
|------------------------|-----------|----------|----------------------------|-----------|----------|----------------------|-----------|----------|----------------------------|-----------|----------|
| Power line HS witht PE |           |          | Power line HS with PE      |           |          | Power line HS mit PE |           |          | Power line HS mit 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  |

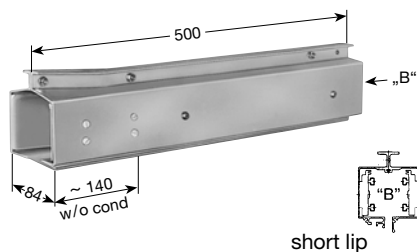




# TRANSFER GUIDE, STRAIGHT CUT\*

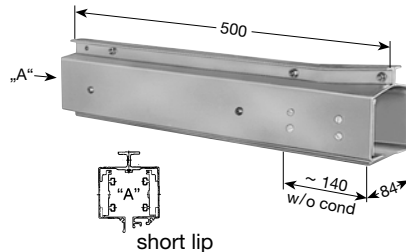
LSV

for horizontal offset  $\pm 5$  mm  
for vertical offset  $\pm 3$  mm  
applications see page 12



short lip

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



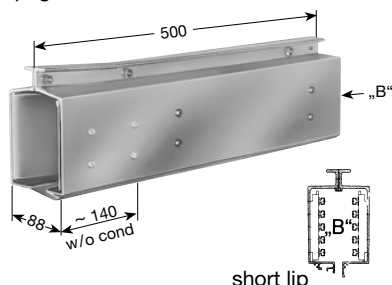
short lip

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

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

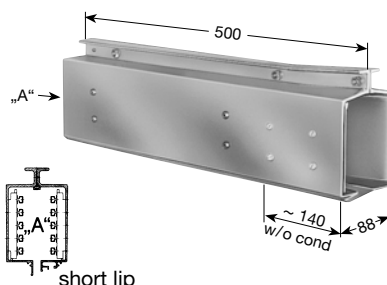
LSVG

for horizontal offset  $\pm 5$  mm  
for vertical offset  $\pm 3$  mm  
applications see page 12



short lip

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



short lip

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

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

# TRANSFER GUIDE, OBLIQUE CUT\*



LSV

for horizontal offset  $\pm 5$  mm  
for vertical offset  $\pm 3$  mm  
applications see page 12

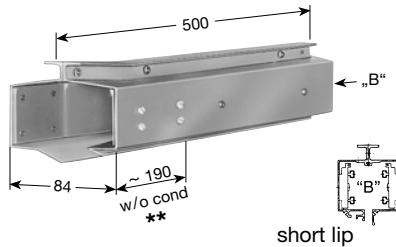


Illustration shows L. H. version  
short lip in front  
(see page 6)

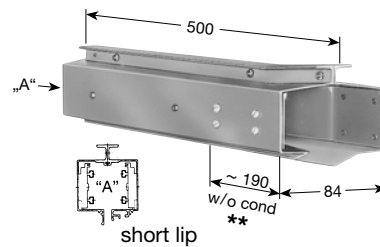


Illustration shows R. H. version  
short lip in front  
(see page 6)

| Type                  | Weight kg | Cat.-No. | Type                       | Weight kg | Cat.-No. | Type                  | Weight kg | Cat.-No. | Type                       | Weight kg | Cat.-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 horizontal offset  $\pm 5$  mm  
for vertical offset  $\pm 3$  mm  
applications see page 12

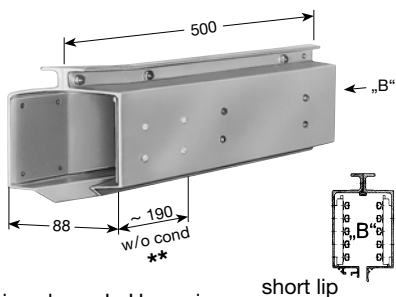


Illustration shows L. H. version  
short lip in front  
(see page 6)

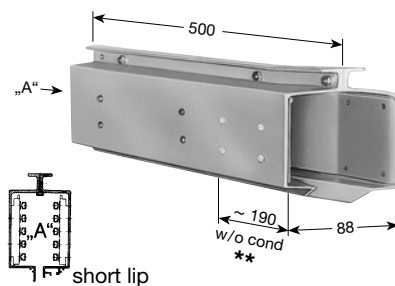


Illustration shows R. H. version  
short lip in front  
(see page 6)

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

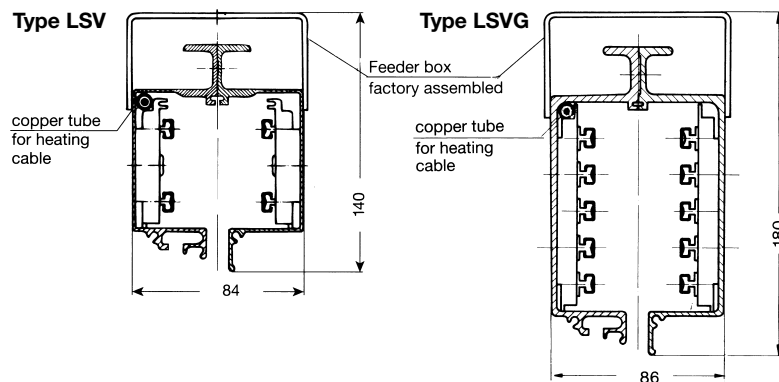
\* All transfer guides are 0.5 m long and are a part of the system length.  
Always use double collectors for transfer applications.

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



# HEATING SYSTEM

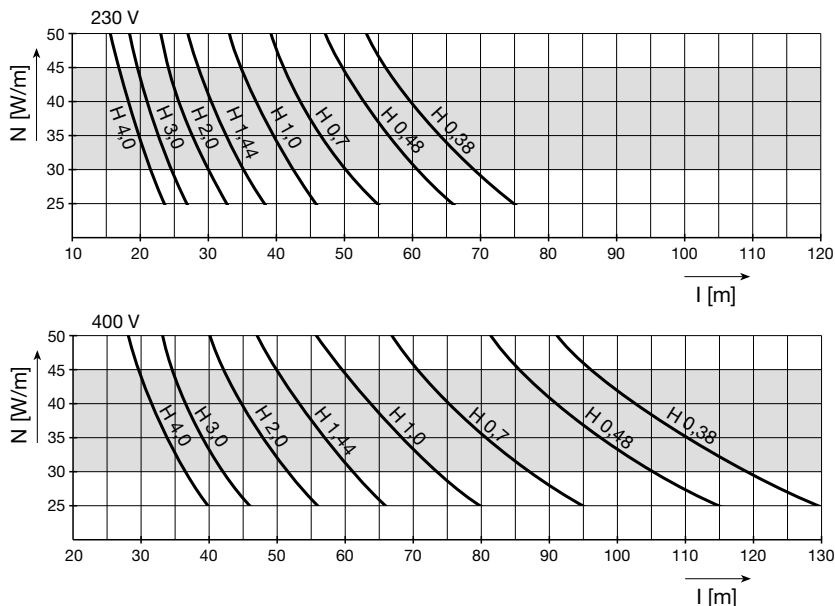
## Arrangement of heating cables



Heating systems are recommended for outdoor Powerail installations with icing conditions and for extremely humid environments. The heating is accomplished by heating conductors being arranged inside the Powerail 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



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.

Supply lower voltage via a transformer in case of shorter heating sections.

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

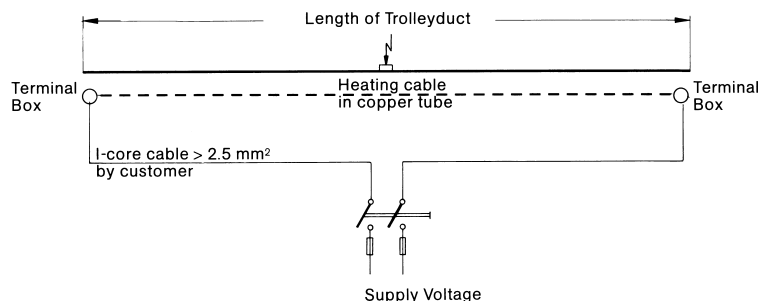
U = supply voltage [Volt]  
R = resistance of heating cable [Ohm/m]  
L = length of heating section [m]

### Wire resistance data:

heating cable: H 0,38 → 0,38 Ohm/m  
heating cable: H 0,48 → 0,48 Ohm/m  
heating cable: H 0,70 → 0,70 Ohm/m  
heating cable: H 1,00 → 1,00 Ohm/m  
heating cable: H 1,44 → 1,44 Ohm/m  
heating cable: H 2,00 → 2,00 Ohm/m  
heating cable: H 3,00 → 3,00 Ohm/m  
heating cable: H 4,00 → 4,00 Ohm/m  
tolerance ± 2,5 %

**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 Ø

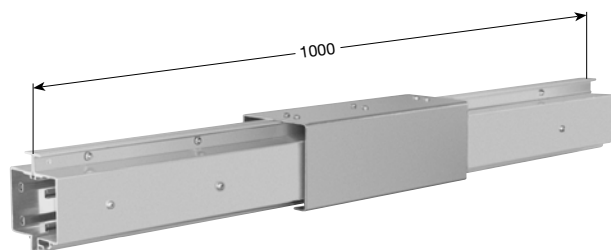
## Layout of one heating section with feeder boxes at both ends



### Example for ordering heating system for 60 m trolleyduct

- 1) 61 m heating cable type H 1.0  
(60 m + 1 m safety length)  
Supply voltage 380 V, 1 heating section  
Heating capacity per above diagram approx. 40 W/m  
with 60 m x 40 W/m approx. 2400 W = 2.40 kW
- 2) 60 m copper protection tube  
8 x 1 mm factory assembled
- 3) 2 terminal boxes for heating system
- 4) 2 sets of connecting material

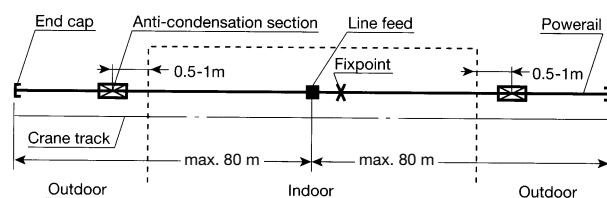
All switches, fuses, cable etc. by others!



## 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

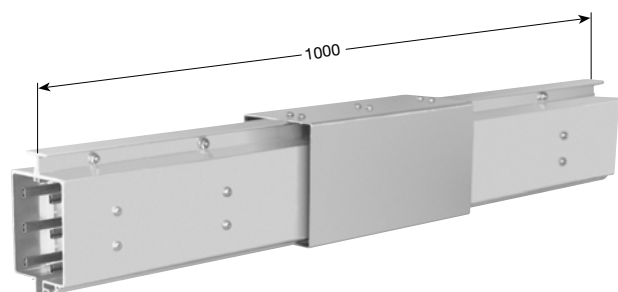
No extra feeds required as the Powerail is not interrupted.

## Collectors

No extra collectors required.

## Installation

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

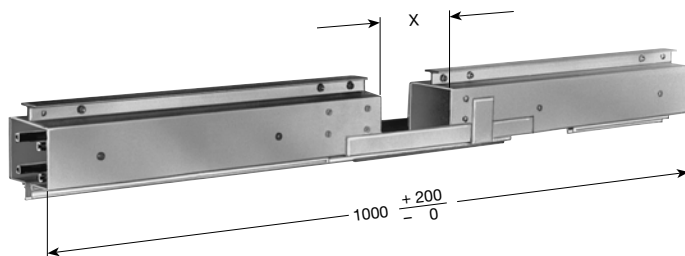


| Type             | Cat.-No.<br>Power line <b>HS</b> with PE | Cat.-No.<br>Control line <b>SS</b> without PE |
|------------------|------------------------------------------|-----------------------------------------------|
| <b>BTL 4/ 60</b> | 195 154                                  | 195 159     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

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



## TELESCOPE SECTIONS\*



Telescope sections consist of two transfer guides. The connecting profile pieces serve as running and guiding track for the current collectors.

Foto shows telescope section for LSV.

| LSV                          |          |                                   |          | LSVG                         |          |                              |          |                                   |          |
|------------------------------|----------|-----------------------------------|----------|------------------------------|----------|------------------------------|----------|-----------------------------------|----------|
| Type                         | Cat.-No. | Type                              | Cat.-No. | Type                         | Cat.-No. | Type                         | Cat.-No. | Type                              | Cat.-No. |
| Power line <b>HS</b> with PE |          | Power line <b>HS</b> with PE      |          | Power line <b>HS</b> with PE |          | Power line <b>HS</b> with PE |          | Power line <b>HS</b> with PE      |          |
| <b>TSL 4/ 60</b>             | 193 840  | <b>TSL 6/ 60</b>                  | 193 940  | <b>TSLG 6/ 60</b>            | 183 310  | <b>TSLG 8/ 60</b>            | 183 410  | <b>TSLG 11/ 60</b>                | 183 500  |
| <b>TSL 4/100</b>             | 195 096  | <b>TSL 6/100</b>                  | 195 104  | <b>TSLG 6/100</b>            | 184 001  | <b>TSLG 8/100</b>            | 184 009  | <b>TSLG 11/100</b>                | 184 015  |
| <b>TSL 4/140</b>             | 195 097  | <b>TSL 6/140</b>                  | 195 105  | <b>TSLG 6/140</b>            | 184 002  | <b>TSLG 8/140</b>            | 184 010  | <b>TSLG 11/140</b>                | 184 016  |
| <b>TSL 4/200</b>             | 195 098  | <b>TSL 6/200</b>                  | 195 624  | <b>TSLG 6/200</b>            | 184 003  | <b>TSLG 8/200</b>            | 184 648  | <b>TSLG 11/200</b>                | 184 651  |
| <b>TSL 4/300</b>             | 195 099  |                                   |          | <b>TSLG 6/300</b>            | 184 004  |                              |          |                                   |          |
|                              |          | <b>TSL 7/ 60</b>                  | 193 970  |                              |          | <b>TSLG 9/ 60</b>            | 183 440  | Control line <b>SS</b> without PE |          |
|                              |          | <b>TSL 7/100</b>                  | 195 106  |                              |          | <b>TSLG 9/100</b>            | 184 011  |                                   |          |
| <b>TSL 5/ 60</b>             | 193 890  | <b>TSL 7/140</b>                  | 195 107  | <b>TSLG 7/ 60</b>            | 183 360  | <b>TSLG 9/140</b>            | 184 012  | <b>TSLG 6/ 60</b>                 | 183 530  |
| <b>TSL 5/100</b>             | 195 100  | <b>TSL 7/200</b>                  | 195 625  | <b>TSLG 7/100</b>            | 184 005  | <b>TSLG 9/200</b>            | 184 649  | <b>TSLG 8/ 60</b>                 | 183 540  |
| <b>TSL 5/140</b>             | 195 101  |                                   |          | <b>TSLG 7/140</b>            | 184 006  | <b>TSLG 10/ 60</b>           | 183 470  | <b>TSLG 10/ 60</b>                | 183 550  |
| <b>TSL 5/200</b>             | 195 102  | Control line <b>SS</b> without PE |          | <b>TSLG 7/200</b>            | 184 007  | <b>TSLG 10/100</b>           | 184 013  |                                   |          |
| <b>TSL 5/300</b>             | 195 103  | <b>TSL 4/ 60</b>                  | 194 000  | <b>TSLG 7/300</b>            | 184 008  | <b>TSLG 10/140</b>           | 184 014  |                                   |          |
|                              |          | <b>TSL 6/ 60</b>                  | 194 010  |                              |          | <b>TSLG 10/200</b>           | 184 650  |                                   |          |

### Application of Telescope section

- For Powerail lengths exceeding 160 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 30 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.

For flexible jumper cables see Fig. 2.

### Collectors

Two single collectors, 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.

### Installation

The telescope section is installed halfway between anchor points. The Powerail is installed with sliding hangers according to installation instructions (see pages 30-32).

The gap setting dimension "X" between the transfer guides depends on the ambient temperature during the installation of the Powerail and the anticipated temperature fluctuation (see adjacent diagram).

### ⊗ Example

Temperature during installation: 18° C

Anticipated temperature fluctuation: -20° C / +80° C

Telescope section gap setting: "X" = 125 mm

When in doubt – please consult the factory.

Fig. 1

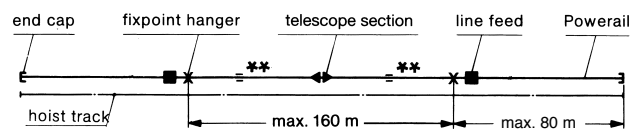


Fig. 2

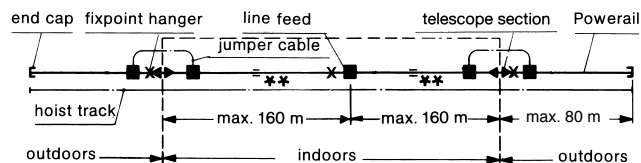
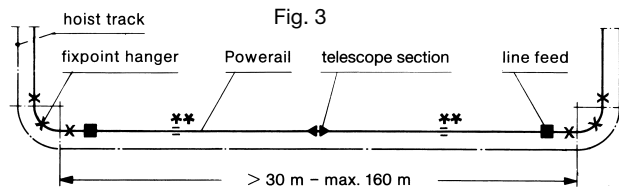
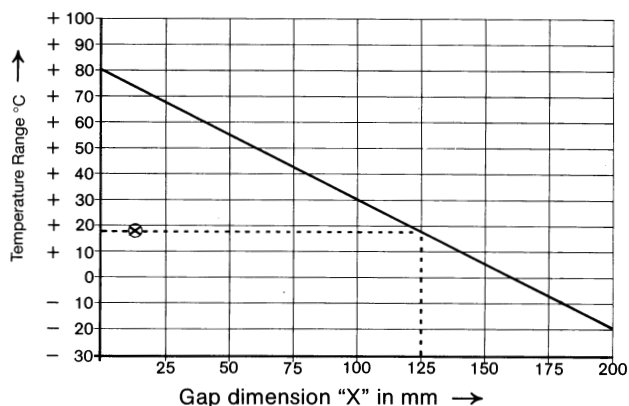


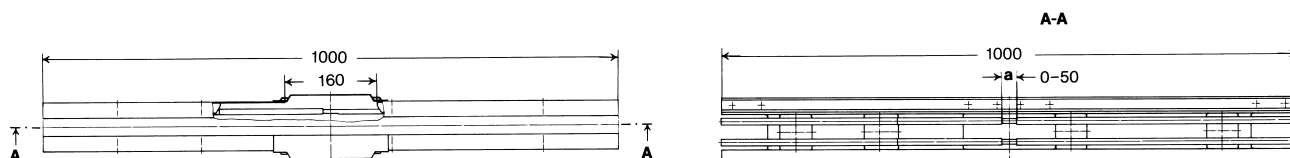
Fig. 3



Expansion-Diagram







Drawings show expansion joint section for LSV

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

Expansion joints are only required for LSV and LSVG systems using bolted joints. They serve to compensate for the different expansion and contraction of the aluminium housing and the copper conductors in varying temperatures.

(Plug-in type connectors, sliding inside the hollow conductors do automatically take care of this – with the copper conductors being anchored in each standard Powerail section).

Expansion joints are required if the Powerail length between two anchor points (feeds, sectionalizings and transfer guides are such anchor points and factory assembled extra anchor points FPL/Cu and FPLG/Cu are available) exceeds L/6 per Fig. 1 and 2.

Corresponding to an anticipated temperature difference ( $\Delta t$ ) the maximum length L would be as follows:

|                          |                          |
|--------------------------|--------------------------|
| $\Delta t$ 40° C = 160 m | $\Delta t$ 60° C = 100 m |
| $\Delta t$ 45° C = 140 m | $\Delta t$ 80° C = 80 m  |
| $\Delta t$ 50° C = 120 m | $\Delta t$ 100° C = 60 m |

When in doubt regarding position and number of expansion joints please consult the factory for layout plans.

## Feeding

No extra feeds required as the Powerail is not interrupted.

## Collectors

No extra collectors required.

## Installation

The expansion joint integrated in the one meter powerail section is installed on sliding hangers in the center between two anchor points of the copper conductors.

The gap dimension "a" is factory set to 30 mm, suited for a temperature of +5° C up to +30° C during installation.

When in doubt – please consult the factory.

Fig. 1

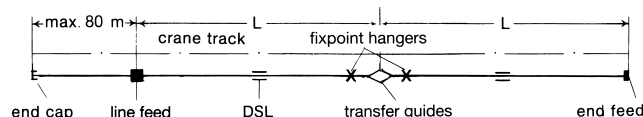
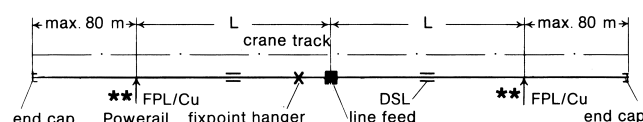


Fig. 2



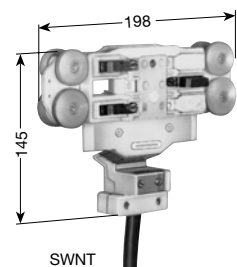
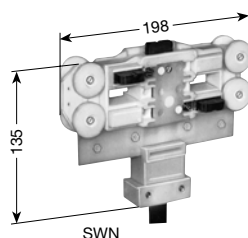
## Anchor points for copper conductors (\*\* ↑)

| LSV           |              |          | LSVG           |              |          |
|---------------|--------------|----------|----------------|--------------|----------|
| Type          | No. of cond. | Cat.-No. | Type           | No. of cond. | Cat.-No. |
| <b>FPL/Cu</b> | 4 & 5        | 194 530  | <b>FPLG/Cu</b> | 6 & 7        | 183 830  |
| <b>FPL/Cu</b> | 6 & 7        | 194 540  | <b>FPLG/Cu</b> | 8 & 9        | 183 840  |
|               |              |          | <b>FPLG/Cu</b> | 10 & 11      | 183 850  |



# COLLECTORS

## LSV

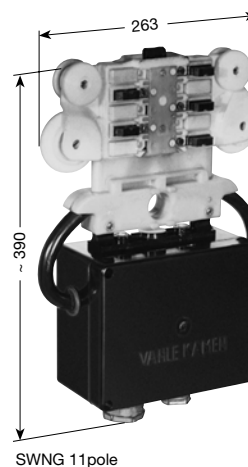
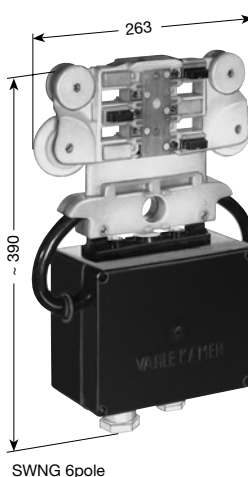


| Type**                         | A* | Cat.-No. | Type**                           | A* | Cat.-No. | Poles | Weight<br>kg | max. speed<br>m/min.<br>nor-<br>mal | trans-<br>fer | General                                                           |
|--------------------------------|----|----------|----------------------------------|----|----------|-------|--------------|-------------------------------------|---------------|-------------------------------------------------------------------|
| for Power <b>HS</b> with PE    |    |          | for Control <b>ST</b> without PE |    |          |       |              |                                     |               |                                                                   |
| <b>SWK 4/25-1</b>              | 25 | 250 230  | <b>SWK 4/25-1</b>                | 25 | 250 240  | 4     | 0,76         | 80                                  | 60            | for straight runs and curves R > 2.5 m for LSV 4/60 and LSV 4/100 |
| <b>SWK 4/40-1</b>              | 40 | 257 394  | —                                | —  | —        | 4     | 0,86         | 80                                  | 60            |                                                                   |
| <b>LSV SWN 4/40-1</b>          | 40 | 194 691  | <b>SWN 4/25-1</b>                | 25 | 194 692  | 4     | 0,85         | 150                                 | 80            | for straight runs and curves with ball bearing wheels             |
| <b>SWN 5/40-1</b>              | 40 | 194 693  |                                  |    |          | 5     | 0,95         | 150                                 | 80            |                                                                   |
| <b>SWN 6/40-1</b>              | 40 | 194 694  | <b>SWN 6/25-1</b>                | 25 | 194 695  | 6     | 1,20         | 150                                 | 80            |                                                                   |
| <b>SWN 7/40-1</b>              | 40 | 194 696  |                                  |    |          | 7     | 1,30         | 150                                 | 80            |                                                                   |
| <b>LSV+D or FP SWNT 4/40-1</b> | 40 | 194 772  | <b>SWNT 4/25-1</b>               | 25 | 194 773  | 4     | 0,85         | 100                                 | 60            | for straight runs and curves with ball bearing wheels             |
| <b>SWNT 5/40-1</b>             | 40 | 194 774  |                                  |    |          | 5     | 0,95         | 100                                 | 60            |                                                                   |
| <b>SWNT 6/40-1</b>             | 40 | 194 775  | <b>SWNT 6/25-1</b>               | 25 | 194 776  | 6     | 1,20         | 100                                 | 60            |                                                                   |
| <b>SWNT 7/40-1</b>             | 40 | 194 777  |                                  |    |          | 7     | 1,30         | 100                                 | 60            |                                                                   |

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

Cleaning trolleys on request.

## LSVG



| Type**                         | A* | Cat.-No. | Type**                           | A* | Cat.-No. | Poles | Weight<br>kg | max. speed<br>m/min.<br>nor-<br>mal | trans-<br>fer | General                                                                 |
|--------------------------------|----|----------|----------------------------------|----|----------|-------|--------------|-------------------------------------|---------------|-------------------------------------------------------------------------|
| for Power <b>HS</b> with PE    |    |          | for Control <b>ST</b> without PE |    |          |       |              |                                     |               |                                                                         |
| <b>LSVG SWNG 6/40</b>          | 40 | 183 883  | <b>SWNG 6/25</b>                 | 25 | 183 884  | 6     | 2,10         | 200                                 | 100           | for straight runs and curves with ball bearing wheels and guide rollers |
| <b>SWNG 7/40</b>               | 40 | 183 885  |                                  |    |          | 7     | 2,15         | 200                                 | 100           |                                                                         |
| <b>SWNG 8/40</b>               | 40 | 183 886  | <b>SWNG 8/25</b>                 | 25 | 183 887  | 8     | 2,20         | 200                                 | 100           |                                                                         |
| <b>SWNG 9/40</b>               | 40 | 183 888  |                                  |    |          | 9     | 2,25         | 200                                 | 100           |                                                                         |
| <b>SWNG 10/40</b>              | 40 | 183 889  | <b>SWNG 10/25</b>                | 25 | 183 890  | 10    | 2,30         | 200                                 | 100           |                                                                         |
| <b>SWNG 11/40</b>              | 40 | 183 891  |                                  |    |          | 11    | 2,35         | 200                                 | 100           |                                                                         |
| <b>LSVG SWNG 6/40 FM</b>       | 40 | 183 901  | <b>SWNG 6/25 FM</b>              | 25 | 183 902  | 6     | 2,10         | 200                                 | 80            | like above however, for transfer applications                           |
| <b>SWNG 7/40 FM</b>            | 40 | 183 903  |                                  |    |          | 7     | 2,15         | 200                                 | 80            |                                                                         |
| <b>SWNG 8/40 FM</b>            | 40 | 183 904  | <b>SWNG 8/25 FM</b>              | 25 | 183 905  | 8     | 2,20         | 200                                 | 80            |                                                                         |
| <b>SWNG 9/40 FM</b>            | 40 | 183 906  |                                  |    |          | 9     | 2,25         | 200                                 | 80            |                                                                         |
| <b>SWNG 10/40 FM</b>           | 40 | 183 907  | <b>SWNG 10/25 FM</b>             | 25 | 183 908  | 10    | 2,30         | 200                                 | 80            |                                                                         |
| <b>SWNG 11/40 FM</b>           | 40 | 183 909  |                                  |    |          | 11    | 2,35         | 200                                 | 80            |                                                                         |
| <b>LSVG+D or FP SWNGT 6/40</b> | 40 | 183 892  | <b>SWNGT 6/25</b>                | 25 | 183 893  | 6     | 2,10         | 100                                 | 60            | for straight runs and curves with ball bearing wheels and guide rollers |
| <b>SWNGT 7/40</b>              | 40 | 183 894  |                                  |    |          | 7     | 2,15         | 100                                 | 60            |                                                                         |
| <b>SWNGT 8/40</b>              | 40 | 183 895  | <b>SWNGT 8/25</b>                | 25 | 183 896  | 8     | 2,20         | 100                                 | 60            |                                                                         |
| <b>SWNGT 9/40</b>              | 40 | 183 897  |                                  |    |          | 9     | 2,25         | 100                                 | 60            |                                                                         |
| <b>SWNGT 10/40</b>             | 40 | 183 898  | <b>SWNGT 10/25</b>               | 25 | 183 899  | 10    | 2,30         | 100                                 | 60            |                                                                         |
| <b>SWNGT 11/40</b>             | 40 | 183 900  |                                  |    |          | 11    | 2,35         | 100                                 | 60            |                                                                         |

connecting cables to terminal box: 2.5 mm<sup>2</sup> for 25 Amp. trolleys  
4 mm<sup>2</sup> for 40 Amp. trolleys

max. Ø of cable outlets: 1 of 29 mm and 1 of 21 mm for power and control circuits.

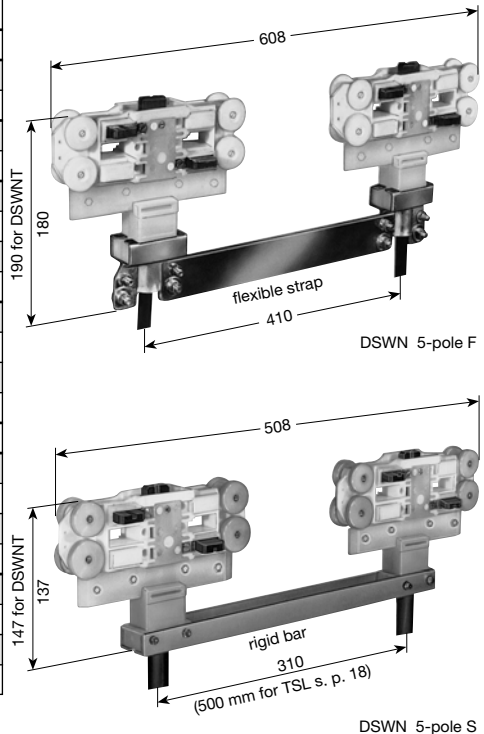
Cleaning trolleys on request.

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

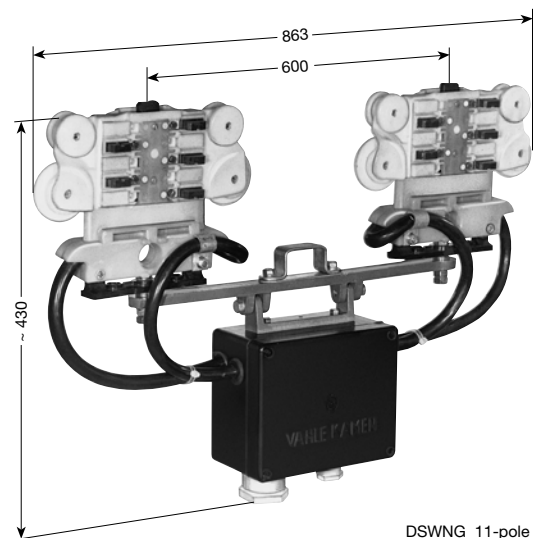
| Type**                      | A*       |    | Cat.-No.      | Type**                           | A*       |    | Cat.-No. | Poles | Weight<br>kg |
|-----------------------------|----------|----|---------------|----------------------------------|----------|----|----------|-------|--------------|
| for Power <b>HS</b> with PE |          |    |               | for Control <b>ST</b> 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        |

With 2 connecting cables, each 1 m long; copper cross section 2.5 mm<sup>2</sup>, resp. 4 mm<sup>2</sup> (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.



|                         | Type**                      | A* | Cat.-No. | Type**                           | A* | Cat.-No. | Poles | Weight<br>kg |
|-------------------------|-----------------------------|----|----------|----------------------------------|----|----------|-------|--------------|
|                         | for Power <b>HS</b> with PE |    |          | for Control <b>ST</b> without PE |    |          |       |              |
| <b>LSVG</b>             | DSWNG 6/80                  | 80 | 183 910  | DSWNG 6/50                       | 50 | 183 911  | 6     | 4,15         |
|                         | DSWNG 7/80                  | 80 | 183 912  |                                  |    |          | 7     | 4,25         |
|                         | DSWNG 8/80                  | 80 | 183 913  | DSWNG 8/50                       | 50 | 183 914  | 8     | 4,35         |
|                         | DSWNG 9/80                  | 80 | 183 915  |                                  |    |          | 9     | 4,45         |
|                         | DSWNG 10/80                 | 80 | 183 916  | DSWNG 10/50                      | 50 | 183 917  | 10    | 4,55         |
|                         | DSWNG 11/80                 | 80 | 183 918  |                                  |    |          | 11    | 4,65         |
| <b>LSVG with D + FP</b> | DSWNGT 6/80                 | 80 | 183 919  | DSWNGT 6/50                      | 50 | 183 920  | 6     | 4,15         |
|                         | DSWNGT 7/80                 | 80 | 183 921  |                                  |    |          | 7     | 4,25         |
|                         | DSWNGT 8/80                 | 80 | 183 922  | DSWNGT 8/50                      | 50 | 183 923  | 8     | 4,35         |
|                         | DSWNGT 9/80                 | 80 | 183 924  |                                  |    |          | 9     | 4,45         |
|                         | DSWNGT 10/80                | 80 | 183 925  | DSWNGT 10/50                     | 50 | 183 926  | 10    | 4,55         |
|                         | DSWNGT 11/80                | 80 | 183 927  |                                  |    |          | 11    | 4,65         |



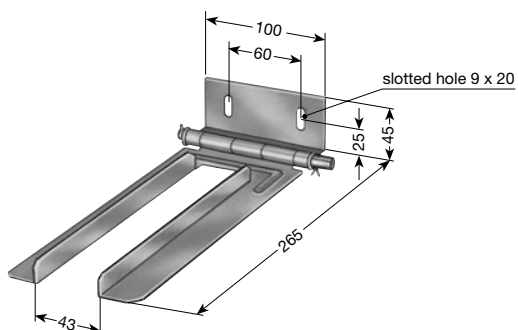
connecting cable to terminal box:  
 2 x 2.5 mm<sup>2</sup> for 50 Amp. trolleys  
 2 x 4 mm<sup>2</sup> for 80 Amp. trolleys  
 max. Ø of cable outlets:  
 1 of 36 mm and 1 of 21 mm for power circuits  
 1 of 29 mm and 1 of 21 mm for control circuits



## TOW ARMS

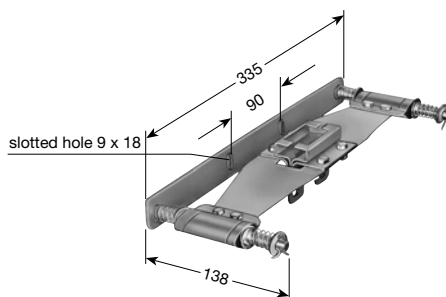
### LSV

for single and double collector



| Type          | Weight<br>kg | Cat.-No. |
|---------------|--------------|----------|
| <b>KWS</b>    | 0.480        | 250 380  |
| <b>KWS/K*</b> | 0.480        | 252 340  |

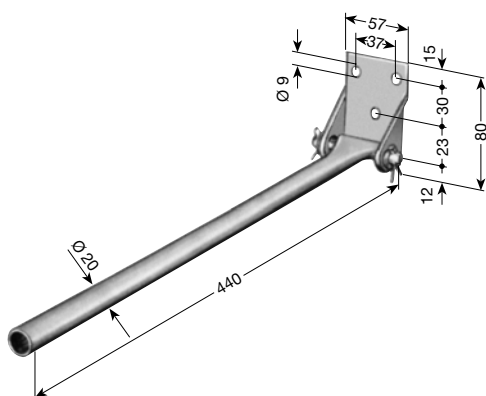
flexible support type with single collector  
for tranfer funnel ETL; see pages 13 & 23



| Type                               | Weight<br>kg | Cat.-No. |
|------------------------------------|--------------|----------|
| <b>KFM</b><br>for SWK              | 1.160        | 250 390  |
| <b>KFML</b><br>for SWN<br>and SWNT | 1.170        | 250 970  |

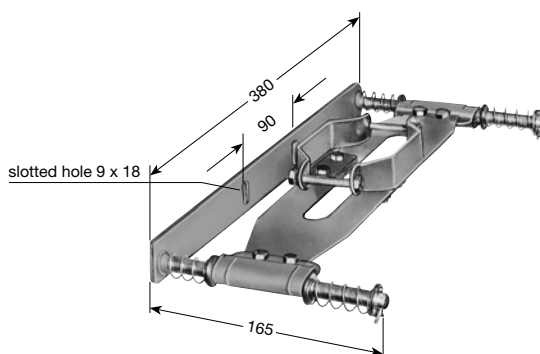
### LSVG

for single and double collector



| Type          | Cat.-No. | Weight<br>kg |
|---------------|----------|--------------|
| <b>GKM</b>    | 0.620    | 260 350      |
| <b>GKM/K*</b> | 0.620    | 261 560      |

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

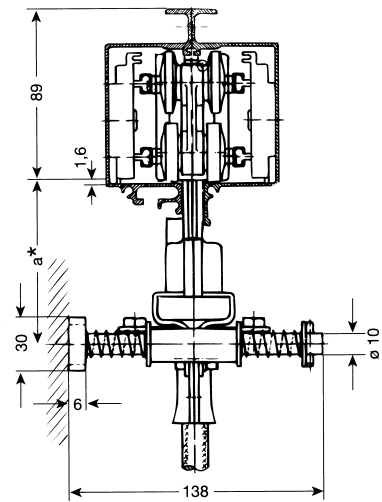
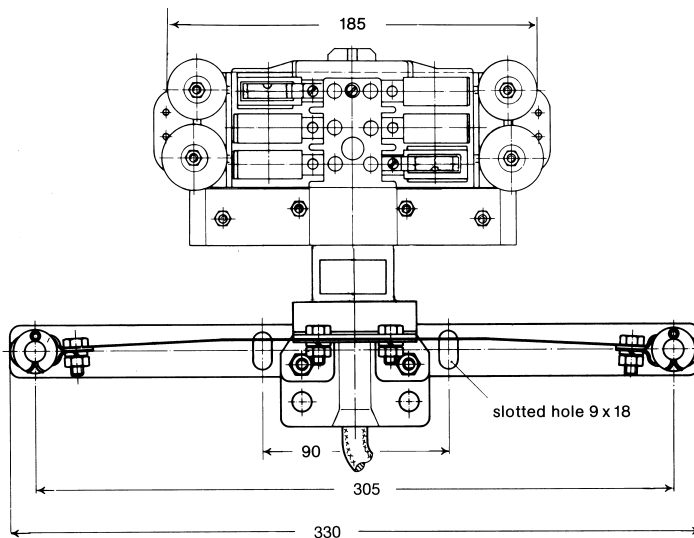


| Type                      | Weight<br>kg | Cat.-No. |
|---------------------------|--------------|----------|
| <b>GFM</b><br>for SWNG/FM | 1.300        | 260 360  |

# FLEXIBLE TOW ARM CONFIGURATIONS



SWN 5/40 collector and KFML tow arm

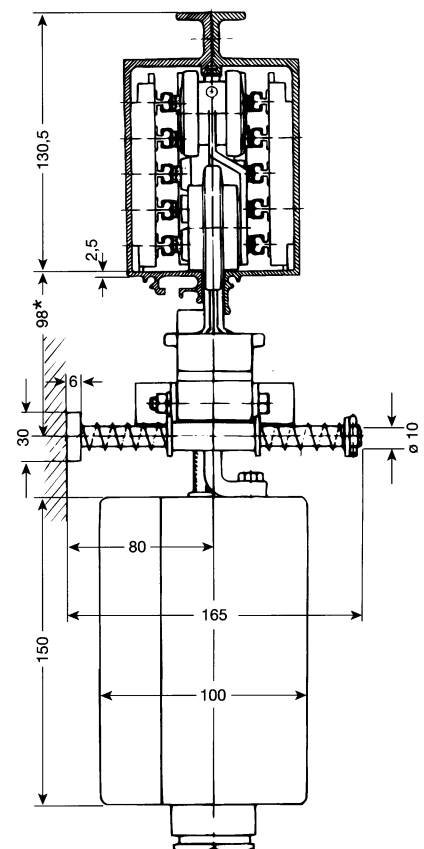
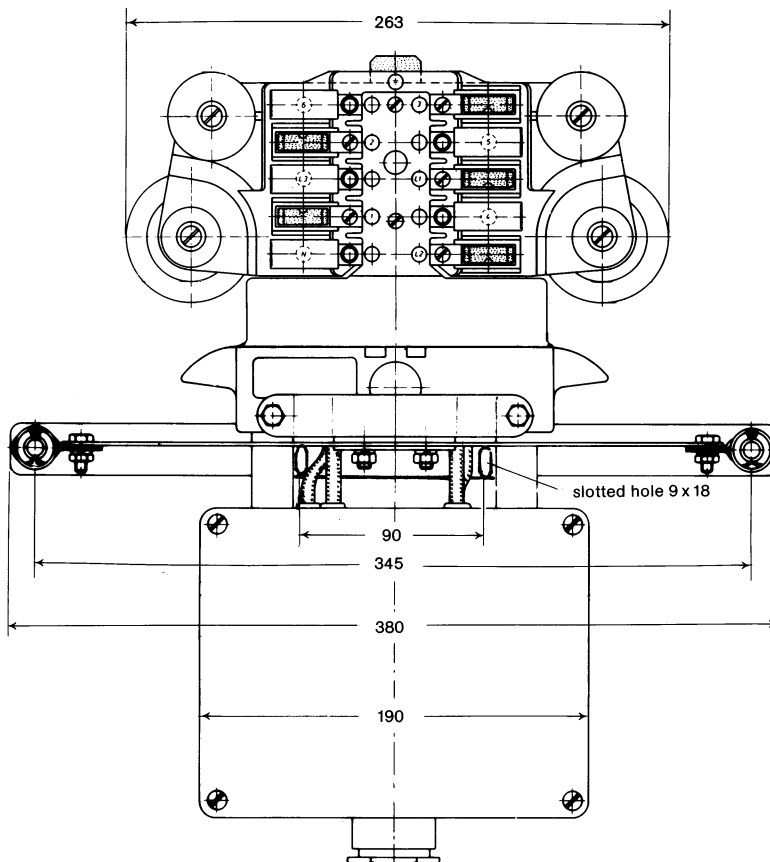


max. horizontal offset  $\pm 15$   
max. vertical offset  $\pm 10$

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

LSV

SWNG 11/40 FM collector and GFM tow arm



max. horizontal offset  $\pm 15$   
max. vertical offset  $\pm 10$

LSVG





## SPARE PARTS

## SECTIONALIZING

### LSV

#### for Powerail

|                                                                  | Cat.-No. |
|------------------------------------------------------------------|----------|
| joint fish plate (stainless), pair                               | 191 830  |
| joint cover, pair                                                | 191 840  |
| joint cover anodized, pair                                       | 190 470  |
| peg to fix housing                                               | 190 510  |
| copper conductor 16 mm <sup>2</sup> , 5th and 7th pole (top)     | 195 190  |
| copper conductor rail 16 mm <sup>2</sup>                         | 191 880  |
| copper conductor rail 25 mm <sup>2</sup>                         | 191 900  |
| copper conductor rail 35 mm <sup>2</sup>                         | 191 910  |
| copper conductor rail 50 mm <sup>2</sup>                         | 191 920  |
| copper conductor rail 50 mm <sup>2</sup> (for ground 300 A only) | 201 170  |
| copper conductor rail 70 mm <sup>2</sup> (for Phase 300 A only)  | 201 180  |
| 2pole insulator for 60-200 A systems                             | 191 850  |
| 2pole insulator for 300 A systems                                | 191 860  |
| 3pole insulator for 60-200 A systems                             | 191 870  |
| 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                         | 191 820  |
| locking pin for plastic shielding                                | 258 578  |
| coupling for sealing strip                                       | 258 300  |
| fastener for sealing strip                                       | 258 432  |
| mounting trolley for sealing strip                               | 258 345  |

#### for Collectors

| Type                                                           | SWK*     | SWN      | SWNT     |
|----------------------------------------------------------------|----------|----------|----------|
|                                                                | Cat.-No. | Cat.-No. | Cat.-No. |
| carbon brush phase, incl. brush holder                         | 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                        | 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\*\*

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



Illustration shows STA 3

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

### LSVG

#### for Powerail

|                                                                    | Cat.-No. |
|--------------------------------------------------------------------|----------|
| joint fish plate (stainless), pair                                 | 183 060  |
| joint cover, pair                                                  | 183 080  |
| joint cover anodized, pair                                         | 183 090  |
| peg to fix housing                                                 | 190 510  |
| copper conductor rail 16 mm <sup>2</sup>                           | 191 880  |
| copper conductor 16 mm <sup>2</sup> , 7th, 9th and 11th pole (top) | 195 190  |
| copper conductor rail 25 mm <sup>2</sup>                           | 191 900  |
| copper conductor rail 35 mm <sup>2</sup>                           | 191 910  |
| copper conductor rail 50 mm <sup>2</sup>                           | 191 920  |
| copper conductor rail 70 mm <sup>2</sup>                           | 191 930  |
| 5pole insulator for 60-200 A systems                               | 183 160  |
| 2pole insulator for 300 A systems                                  | 183 170  |
| 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                           | 191 820  |
| locking pin for plastic shielding                                  | 258 578  |
| coupling for sealing strip                                         | 258 300  |
| fastener for sealing strip                                         | 258 432  |
| mounting trolley for sealing strip                                 | 184 033  |

#### for Collectors

| Type                                             | SWNG    | SWNGT   |
|--------------------------------------------------|---------|---------|
| carbon brush phase, incl. brush holder           | 254 890 | 254 890 |
| carbon brush ground 7th, 9th and 11th pole (top) | 254 891 | 254 891 |
| carbon brush ground, incl. brush holder          | 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\*\*

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

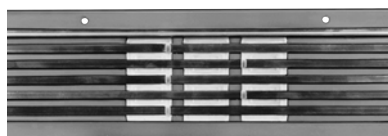
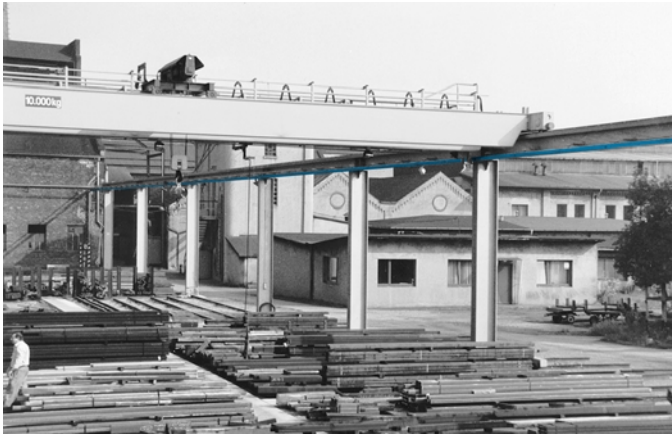
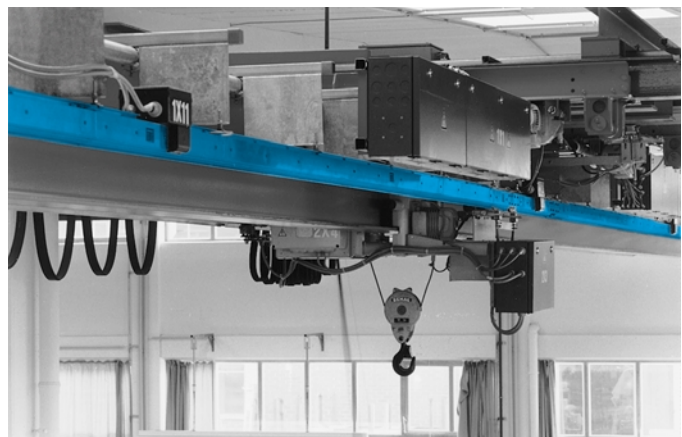


Illustration shows STAG 5

| Type    | with air gap 5 mm Cat.-No. | Type    | with insul. section 30 mm Cat.-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                            |



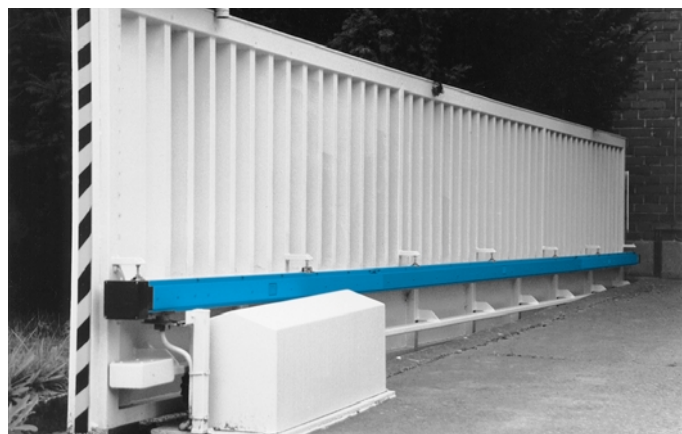
LSV feeding steel yard cranes



LSVG on crane bridge



LSV serves for OHT crane electrification

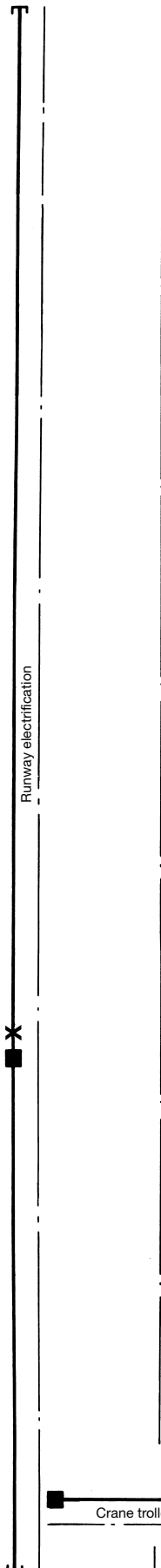


LSV power gates



# EXAMPLES FOR ORDERING

with Bolted joints



## Runway electrification · 40 m

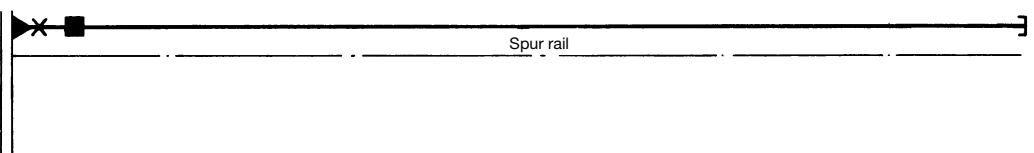
| Qty |                     | Type                    | Cat.-No. | Type                   | Cat.-No. |
|-----|---------------------|-------------------------|----------|------------------------|----------|
| 9   | Powerails, 4 m long | LSV 4/60-4 <b>HS</b>    | 190 004  | LSVG 10/60-4 <b>HS</b> | 180 164  |
| 1   | Powerail, 3 m long  | LSV 4/60-3 <b>HS</b>    | 190 003  | LSVG 10/60-3 <b>HS</b> | 180 163  |
| 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  |
| 1   | Line feed, 1 m long | NKL 4/60 <b>HS</b>      | 195 074  | NKLG 10/60 <b>HS</b>   | 183 988  |
| 2   | End caps            | EKL                     | 190 220  | EKLG                   | 180 320  |
| 1   | Double collector    | DSWN 4/80 S-1 <b>HS</b> | 194 808  | DSWNG 10/80 <b>HS</b>  | 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 <b>HS</b>    | 190 074 | LSVG 11/60-4 <b>HS</b> | 180 194 |
| 1 | Powerail, 3 m long (cut in 2.5 m) | LSV 7/60-3 <b>HS</b>    | 190 073 | LSVG 11/60-3 <b>HS</b> | 180 193 |
| 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 | End feed, 1 m long                | KEL 7/60 R <b>HS</b>    | 190 170 | KELG 11/60 R <b>HS</b> | 180 480 |
| 1 | Transfer guide, 0.5 m long        | AÜL 7/60 L <b>HS</b>    | 192 450 | AÜLG 11/60 L <b>HS</b> | 181 350 |
| 1 | Double collector                  | DSWN 7/80 S-1 <b>HS</b> | 194 813 | DSWNG 11/80 <b>HS</b>  | 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 <b>HS</b> | 190 074 | LSVG 11/60-4 <b>HS</b> | 180 194 |
| 1  | Powerail, 1 m long (cut in 0.5 m) | LSV 7/60-1 <b>HS</b> | 190 071 | LSVG 11/60-1 <b>HS</b> | 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 <b>HS</b>   | 195 089 | NKLG 11/60 <b>HS</b>   | 183 992 |
| 1  | Transfer guide, 0.5 m long        | AÜL 7/60 R <b>HS</b> | 192 460 | AÜLG 11/60 R <b>HS</b> | 181 360 |
| 1  | End cap                           | EKL                  | 190 220 | EKLG                   | 180 320 |



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

# EXAMPLES FOR ORDERING

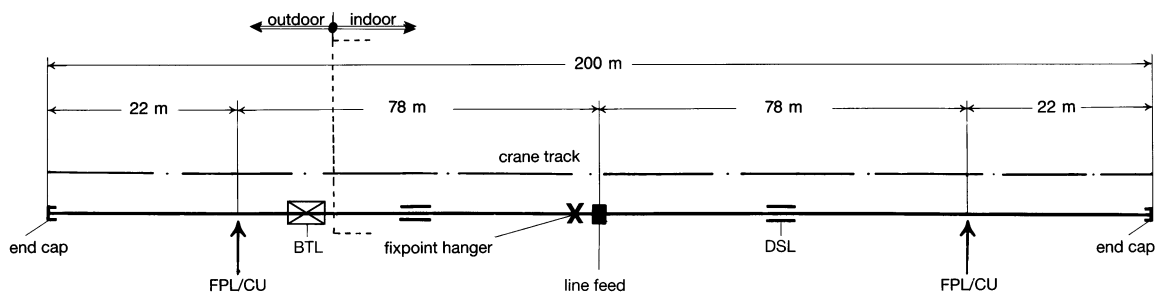
with Bolted joints 200 A



## Straight track electrification · 200 m · with Line feed and Bolted joints

Anticipated temperature difference  $\Delta t = 80^\circ \text{C}$ ,  $L = \text{max. } 80 \text{ m}$ ;  
for example  $-20^\circ \text{C}$  up to  $+60^\circ \text{C}$ ; see page 19

| Qty |                                     | Type                    | Cat.-No. | Type                   | Cat.-No. |
|-----|-------------------------------------|-------------------------|----------|------------------------|----------|
| 49  | Powerails, 4 m long                 | LSV 4/200-4 <b>HS</b>   | 190 614  | LSVG 6/200-4 <b>HS</b> | 180 034  |
| 52  | Joint materials                     | VBLS 4/5                | 195 248  | VLGS 6/7               | 184 113  |
| 2   | Anchor points for copper conductors | FPL/Cu 4pole            | 194 530  | FPLG/Cu 6pole          | 183 830  |
| 99  | Sliding hangers                     | GAL                     | 190 130  | SAS                    | 200 160  |
| 1   | Fixpoint hanger                     | FAL                     | 190 120  | SAFG                   | 180 310  |
| 1   | Line feed, 1 m long                 | NKL 4/200 <b>HS</b>     | 195 077  | NKLG 6/200 <b>HS</b>   | 185 031  |
| 2   | Expansion joint sections, 1 m long  | DSL 4/200 <b>HS</b>     | 195 109  | DSL 6/200 <b>HS</b>    | 184 018  |
| 1   | Anti-condensation section, 1 m long | BTL 4/200 <b>HS</b>     | 195 157  | BTL 6/200 <b>HS</b>    | 184 052  |
| 2   | End caps                            | EKLS                    | 195 149  | EKLGS                  | 184 100  |
| 2   | Double collectors                   | DSWN 4/80 S-1 <b>HS</b> | 194 808  | DSWNG 6/80 <b>HS</b>   | 183 910  |
| 2   | Tow arms                            | KWS                     | 250 380  | GKM                    | 260 350  |



**X** = Fixpoint hanger; all other support points are sliding hangers. Consider supplements (p. 6 & 16) if required.

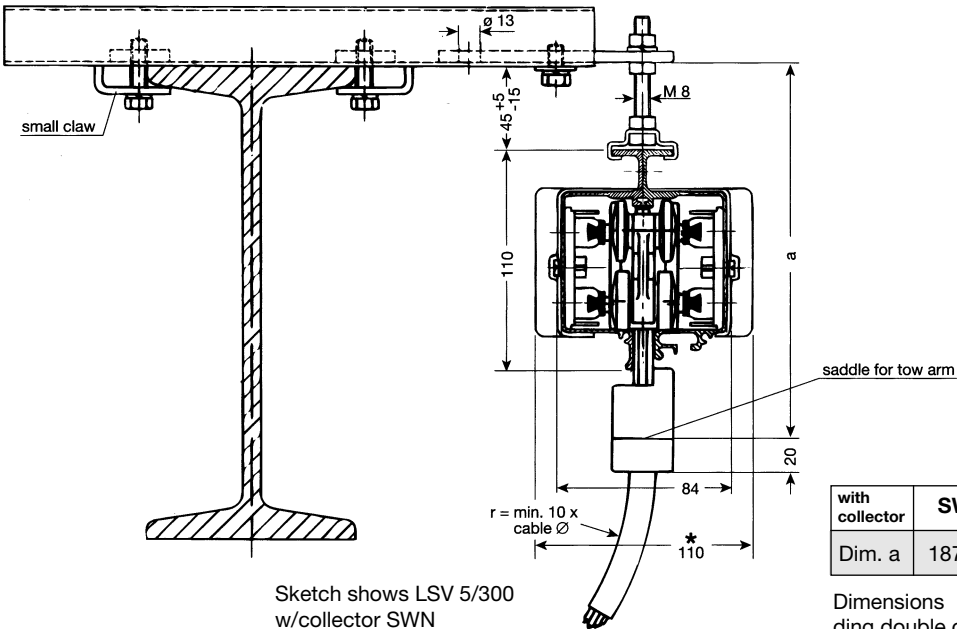


LSVG Powerail feeding a production machine

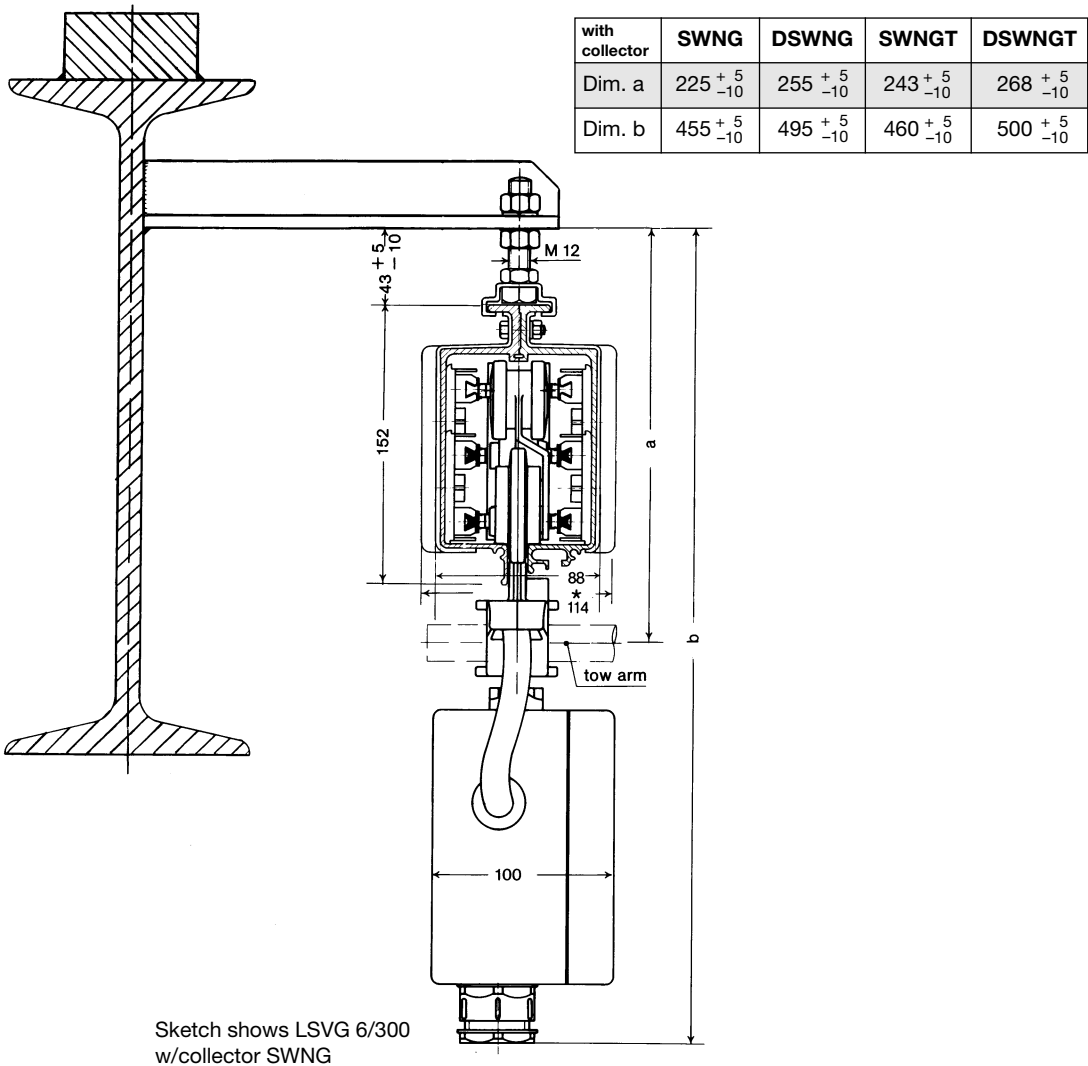


LSV Powerail feeding a steel yard crane

## LSV



## LSVG





TELEPHONE \_\_\_\_\_

1. Type of crane/machine to be electrified \_\_\_\_\_
2. Voltage \_\_\_\_\_ Volts~/=: \_\_\_\_\_ Phases, \_\_\_\_\_ c/s
3. Length of conductor system \_\_\_\_\_
4. Number of conductors required: \_\_\_\_\_ power lines, \_\_\_\_\_ control lines, \_\_\_\_\_ neutral (ground)
5. Indoor ☐ Outdoor ☐
6. Special site conditions (humidity, dust, chemical influences etc.) \_\_\_\_\_
7. Temperature conditions \_\_\_\_\_ °C min. \_\_\_\_\_ °C max.
8. Number and position of feed points \_\_\_\_\_
9. Installation position envisaged \_\_\_\_\_  
(prints or sketches should be submitted whenever obtainable)
10. Number of cranes/machines supplied by the one system \_\_\_\_\_
11. Ampere load of each crane/machine \_\_\_\_\_  
(use table on page 30)
12. Max. travelling speed of machinery \_\_\_\_\_
13. Other important data: \_\_\_\_\_

[illegible]

29



## QUESTIONNAIRE LSV – LSVG

To our nearest local agency

Date:

| Motor data                  | Crane 1        |                 |                   | Crane 2        |                 |                   | Crane 3        |                 |                   |
|-----------------------------|----------------|-----------------|-------------------|----------------|-----------------|-------------------|----------------|-----------------|-------------------|
|                             | Power<br>kW/HP | Current<br>Amps | Duty-<br>factor % | Power<br>kW/HP | Current<br>Amps | Duty-<br>factor % | Power<br>kW/HP | Current<br>Amps | Duty-<br>factor % |
| Hoist motor                 |                |                 |                   |                |                 |                   |                |                 |                   |
| Auxiliary hoist             |                |                 |                   |                |                 |                   |                |                 |                   |
| Travel motor – main-trolley |                |                 |                   |                |                 |                   |                |                 |                   |
| Travel motor – aux.-trolley |                |                 |                   |                |                 |                   |                |                 |                   |
| Main travel                 |                |                 |                   |                |                 |                   |                |                 |                   |
| Slewing                     |                |                 |                   |                |                 |                   |                |                 |                   |
| Luffing                     |                |                 |                   |                |                 |                   |                |                 |                   |
|                             |                |                 |                   |                |                 |                   |                |                 |                   |
|                             |                |                 |                   |                |                 |                   |                |                 |                   |
|                             |                |                 |                   |                |                 |                   |                |                 |                   |
|                             |                |                 |                   |                |                 |                   |                |                 |                   |
|                             |                |                 |                   |                |                 |                   |                |                 |                   |

Mark with\* any motors that may be in simultaneous operation.

Additional Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

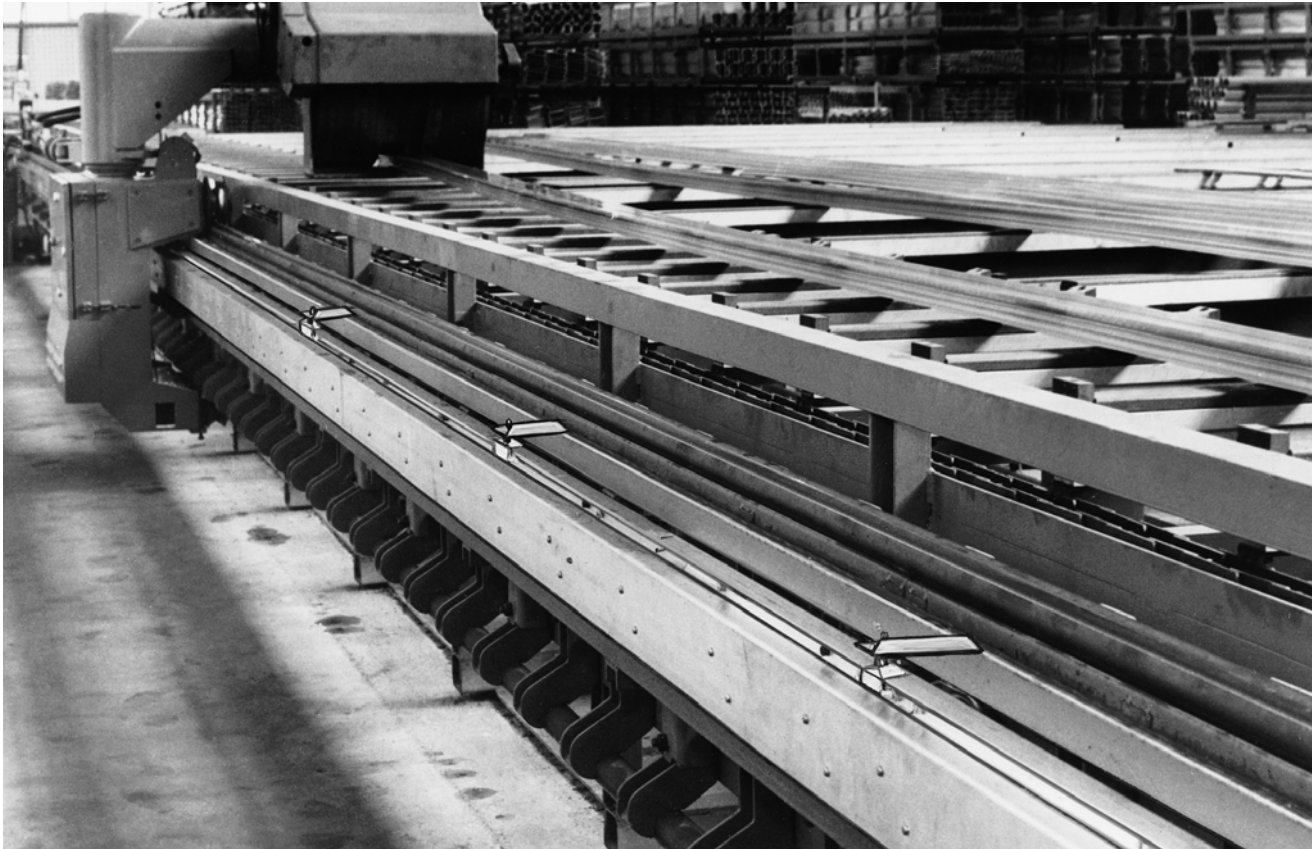
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LSVG Powerail for drawing bench electrification



LSV Powerail feeding sewage treatment system



Reg. No. 3140

## Catalog No.

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

