STEEL
ENCLOSED CONDUCTOR SYSTEMS

SLG and HSL

VAHLE
ELECTRIFICATION SYSTEMS

INDEX

VAHLE-Trolley-Duct for Monorail Electrification

General:
VAHLE steel enclosed conductor systems, type SLG and HSL are compact and safe prefabricated Electrification Systems. They are especially well suited for high electrical loads and for higher ambient temperatures.

The conductor systems guarantee a maximum electrical and personnel safety and are easy to install. They fully meet all safety requirements; VDE 0470 § 3; Protection IP 23 per DIN 4050 applies.

Application:
SLG and HSL trolley ducting are ideal for indoor and outdoor use, for crane runway and bridge electrification, for monorails and many other mobile machinery applications.

Housing:
The system consists of two prefabricated galvanized steel profiles which are bolted to a top bar. Sheet steel thickness is 2 mm for SLG and 2,5 mm for HSL.

The polarizing long and short lip profiles prevent accidental reversal and avoid phase reversing of collectors (see page 4). Standard duct sections are 4 m long, shorter sections to coincide with your runway requirements are available without extra charge.

The SLG housing allows lateral arrangement of 4–7 conductors and the HSL housing is for suspended arrangement of 4 conductors. Heating systems for icing conditions are available and curved track sections to contour to almost any job requirement can be furnished to order. The open ends are closed by end caps.

Couplings:
Adjacent sections are connected via joint plates.

The copper conductor rails use bolted splice joints.

Hangers:
Standard support spacing is 2 m; up to 3 m support spacing is possible.

Feed kits:
End feeds or line feeds are available. End feeds are designed for 60–120 A, line feed boxes rate from 60 to 300 A.

Factory assembled feed-in tracks are 1 m long for SLG and 4 m long for HSL systems.

Collectors:
The current collector trolleys for SLG systems are made of reinforced polyester fibre glass; HSL trolleys have a metal chassis. All collectors have spring loaded carbon brushes maintaining uniform contact pressure with copper conductors.

The collectors are supplied complete with terminal boxes and the towing connection between the trolleys and the customer's equipment made by a towing arm.

Sectionalizing:
Factory assembled conductor dead sections in the air gap version are available for both trolley duct systems.

Please consult the factory for special evironmetal conditions, such as galvanizing plants, pickling lines etc. or for low voltage and data transmission applications.

To speed up quotations and order processing please submit drawings or sketches for conductor systems with curves, dead sections, turntables, switches etc.

Please use our questionnaire, pages 21–22.

Engineering Data:

SLG

Ampacity: 300 A

Voltage Rating: 750 V

Collector Rating: 70 A & multiple

Carrying capacity of collector: 10 kg
(Higher carrying capacity with special trolleys)

min. bending radius: 900 mm

Temperature resistance:
Standard version: –30° C up to + 70° C
High temp. version: –30° C up to +120° C

HSL

Ampacity: 200 A

Voltage Rating: 600 V

Collector Rating: 70 A & multiple

Carrying capacity of collector: 20 kg
(Higher carrying capacity with special trolley)

min. bending radius: 900 mm

Temperature resistance:
Standard version: –30° C up to +120° C
High temp. version: –30° C up to +120° C

Resistance =	20	30	50	70	mm² copper
	0,89	0,59	0,36	0,26	Ohm/1000 m

Impedance =	20	30	50	70	mm² copper
	0,93	0,65	0,45	0,37	Ohm/1000 m

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

Formulas:

AC: $\Delta u = \sqrt{3}\, x\, I\, x\, \ell\, x\, Z$

DC: $\Delta u = 2\, \ell\, x\, I\, x\, R$

Δu = Voltage drop [V]
I = Ampere load [A]
Z = Impedance [Ohm/1000 m]
R = Resistance [Ohm/1000 m]
ℓ = Power feed length [m]
L = System length [m]

Effective length:

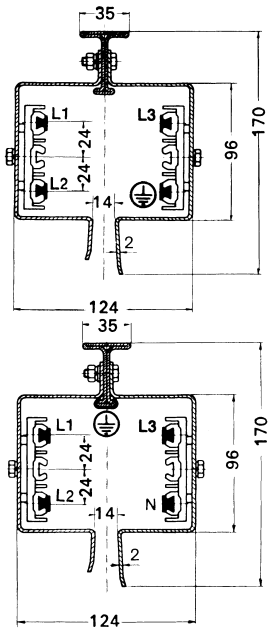
$\ell = L$ power feed located at the end of the system
$\ell = L/2$ power feed located at the mid-point of the system
$\ell = L/4$ power feed located at both ends of the system
$\ell = L/6$ power feed located at $L/6$ from each end of the system

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.

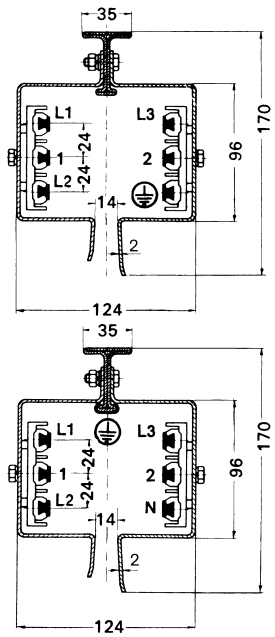
SLG 4+5

Type	No. of conductors x copper section in mm² L 1, L 2, L 3	Ground * ⏚	Neutral	Control-lines	Ampacity at 80 % duty factor A	max. voltage V	Voltage drop with rated current per 100 m	leakage distance mm	min. clearance mm
SLG 4/ 80	3 x 20	1 x 20			80	750	13	91	36
SLG 4/120	3 x 30	1 x 20			120	750	13	91	36
SLG 4/200	3 x 50	1 x 30			200	750	15	91	36
SLG 4/300	3 x 70	1 x 50			300	750	19	91	36
SLG 5/ 80	3 x 20	1 x 30	1 x 20		80	750	13	91	36
SLG 5/120	3 x 30	1 x 30	1 x 30		120	750	13	91	36
SLG 5/200	3 x 50	1 x 30	1 x 50		200	750	15	91	36
SLG 5/300	3 x 70	1 x 30	1 x 50		300	750	19	91	36



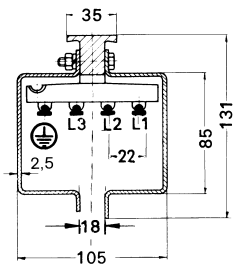
SLG 6+7

Type	No. of conductors x copper section in mm² L 1, L 2, L 3	Ground * ⏚	Neutral	Control-lines	Ampacity at 80 % duty factor A	max. voltage V	Voltage drop with rated current per 100 m	leakage distance mm	min. clearance mm
SLG 6/ 80	3 x 20	1 x 20		2 x 20	80	750	13	44	12
SLG 6/120	3 x 30	1 x 20		2 x 20	120	750	13	44	12
SLG 6/200	3 x 50	1 x 30		2 x 20	200	750	15	44	12
SLG 6/300	3 x 70	1 x 50		2 x 20	300	750	19	44	12
SLG 7/ 80	3 x 20	1 x 30	1 x 20	2 x 20	80	750	13	44	12
SLG 7/120	3 x 30	1 x 30	1 x 30	2 x 20	120	750	13	44	12
SLG 7/200	3 x 50	1 x 30	1 x 50	2 x 20	200	750	15	44	12
SLG 7/300	3 x 70	1 x 30	1 x 50	2 x 20	300	750	19	44	12



HSL 4

Type	No. of conductors x copper section in mm² L 1, L 2, L 3	Ground * ⏚	Neutral	Control-lines	Ampacity at 80 % duty factor A	max. voltage V	Voltage drop with rated current per 100 m	leakage distance mm	min. clearance mm
HSL 4/120	3 x 30	1 x 30			120	600	13	72	16
HSL 4/200	3 x 50	1 x 30			200	600	15	72	12

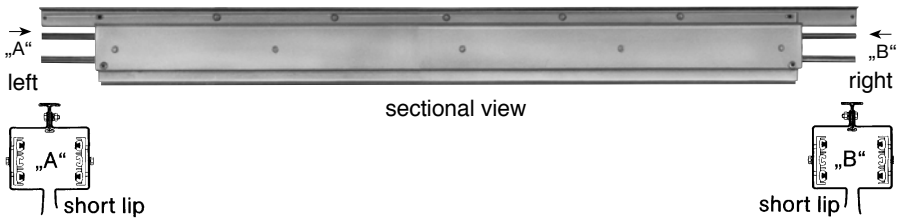


For mounting configurations see pages 7, 17 and 18

* ⏚ The ground conductor is always connected to the trolley duct housing; uninsulated in the case of 5-pole and 7-pole SLG. Other copper cross section combinations are possible.

Standard section – 4 m*

compl. with rail connectors, jointplates and bolts



Type	No. of con-ductors	1 m section Order No.	2 m section Order No.	3 m section Order No.	4 m section Order No.	Weight kg/m
SLG 4/ 80	4	200 001	200 002	200 003	200 004	12,200
SLG 4/120	4	200 011	200 012	200 013	200 014	12,500
SLG 4/200	4	200 021	200 022	200 023	200 024	13,200
SLG 4/300	4	200 031	200 032	200 033	200 034	14,000
SLG 5/ 80	5	200 041	200 042	200 043	200 044	12,500
SLG 5/120	5	200 051	200 052	200 053	200 054	12,900
SLG 5/200	5	200 061	200 062	200 063	200 064	13,700
SLG 5/300	5	200 071	200 072	200 073	200 074	14,300

Index W: Surcharge Order No. 201 340 for high temp. insulators up to 120° C.

Curved section

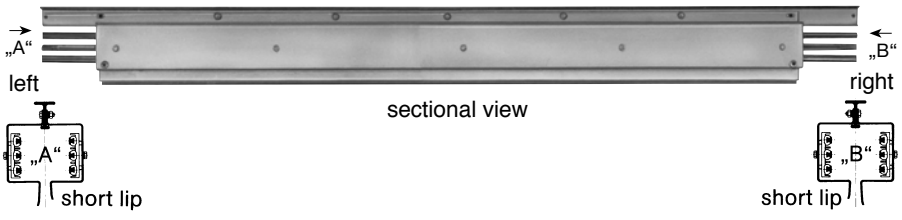
max. 3400 mm long
max. ∢120°

min. Radius: 900 mm

SLG 4+5

Standard section – 4 m*

compl. with rail connectors, jointplates and bolts



Type	No. of con-ductors	1 m section Order No.	2 m section Order No.	3 m section Order No.	4 m section Order No.	Weight kg/m
SLG 6/ 80	6	200 081	200 082	200 083	200 084	12,600
SLG 6/120	6	200 091	200 092	200 093	200 094	12,900
SLG 6/200	6	200 101	200 102	200 103	200 104	13,600
SLG 6/300	6	200 111	200 112	200 113	200 114	14,400
SLG 7/ 80	7	200 121	200 122	200 123	200 124	12,900
SLG 7/120	7	200 131	200 132	200 133	200 134	13,300
SLG 7/200	7	200 141	200 142	200 143	200 144	14,100
SLG 7/300	7	200 151	200 152	200 153	200 154	14,700

Index W: Surcharge Order No. 201 340 for high temp. insulators up to 120° C.

Curved section

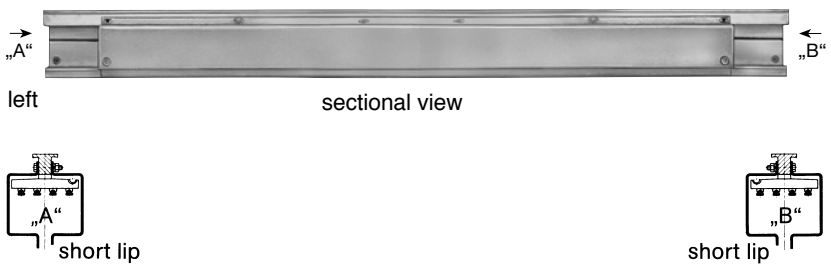
max. 3400 mm long
max. ∢120°

min. Radius: 900 mm

SLG 6+7

Standard section – 4 m*

compl. with rail connectors, jointplates and bolts



Type	No. of con-ductors	1 m section Order No.	2 m section Order No.	3 m section Order No.	4 m section Order No.	Weight kg/m
HSL 4/120	4	210 001	210 002	210 003	210 004	13,800
HSL 4/200	4	210 011	210 012	210 013	210 014	14,550

Curved section

max. 3400 mm long
max. ∢120°

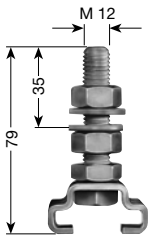
min. Radius: 900 mm

HSL 4

*** Shorter sections to coincide with your runway requirements will be furnished without extra charge.**
The long lip housing profiles should always be mounted against the machinery track (see page 17); exceptions should be noted when ordering system extensions.
In case you are using the conductor lines for control circuits only please notify the factory accordingly.

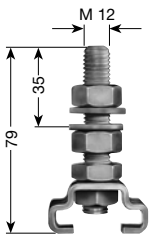
SLG 4+5

Silding hanger



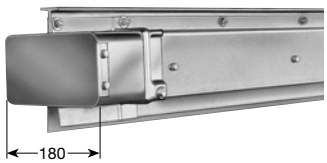
Type	Order No.	Weight kg
SAS	200 160	0,16

Fix point hanger



Type	Order No.	Weight kg
SAF	200 170	0,15

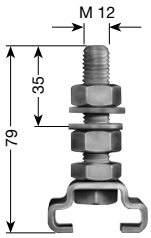
End plate*



Type	Order No.	Weight kg
SEK R	200 180	2,00
SEK L	200 190	2,00

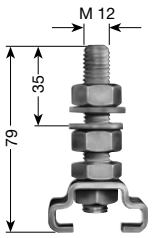
SLG 6+7

Silding hanger



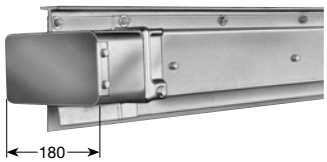
Type	Order No.	Weight kg
SAS	200 160	0,16

Fix point hanger



Type	Order No.	Weight kg
SAF	200 170	0,15

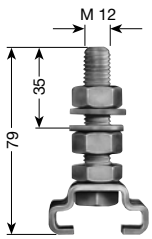
End plate*



Type	Order No.	Weight kg
SEK R	200 180	2,00
SEK L	200 190	2,00

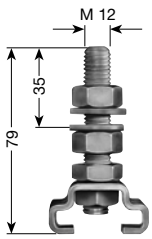
HSL 4

Silding hanger



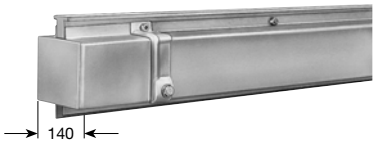
Type	Order No.	Weight kg
SAS	200 160	0,16

Fix point hanger



Type	Order No.	Weight kg
SAF	200 170	0,15

End plate*

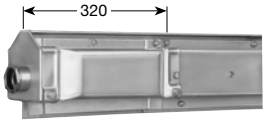


Type	Order No.	Weight kg
HEB R	210 020	0,40
HEB L	210 030	0,40

* Please indicate position of end plates (R. = right, L. = left end of conductor system – see page 5).

SLG 4+5

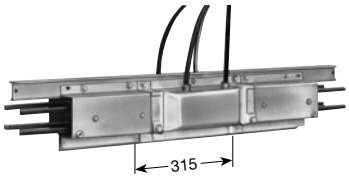
End feed*



Max. width 174 mm

Type	Order No.	A	Cond. ø mm	Weight kg
SKE 4/ 80 R	200 200	80	29	2,40
SKE 4/ 80 L	200 210	80	29	2,40
SKE 4/120 R	200 220	120	36	2,50
SKE 4/120 L	200 230	120	36	2,50
SKE 5/ 80 R	200 240	80	29	2,50
SKE 5/ 80 L	200 250	80	29	2,50
SKE 5/120 R	200 260	120	36	2,60
SKE 5/120 L	200 270	120	36	2,60

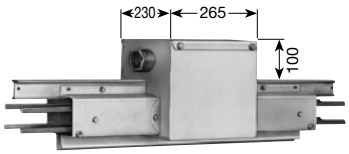
Line feed with leads 2 m long



Max. width 174 mm

Type	Order No.	A	Cond. ø mm	Weight kg
SNL 4/ 80	200 360	80	13,5Ø/ 25 mm²	1,90
SNL 4/120	200 370	120	16,5Ø/ 35 mm²	2,70
SNL 5/ 80	200 380	80	13,5Ø/ 25 mm²	2,35
SNL 5/120	200 390	120	15,5Ø/ 35 mm²	3,35

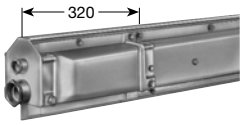
Line feed



Type	Order No.	A	Cond. ø mm	Weight kg
SNK 4/ 80	201 668	80	36	3,00
SNK 4/120	201 669	120	36	3,00
SNK 4/200	200 440	200	42	3,00
SNK 4/300	200 450	300	48	3,00
SNK 5/ 80	201 670	80	36/21	3,20
SNK 5/120	201 671	120	36/21	3,20
SNK 5/200	200 460	200	42/21	3,20
SNK 5/300	200 470	300	48/21	3,20

SLG 6+7

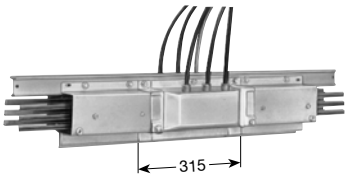
End feed*



Max. width 174 mm

Type	Order No.	A	Cond. ø mm	Weight kg
SKE 6/ 80 R	200 280	80	29/21	2,60
SKE 6/ 80 L	200 290	80	29/21	2,60
SKE 6/120 R	200 300	120	36/21	2,70
SKE 6/120 L	200 310	120	36/21	2,70
SKE 7/ 80 R	200 320	80	29/21	2,70
SKE 7/ 80 L	200 330	80	29/21	2,70
SKE 7/120 R	200 340	120	36/21	2,80
SKE 7/120 L	200 350	120	36/21	2,80

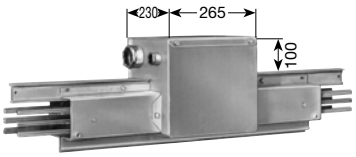
Line feed with leads 2 m long



Max. width 174 mm

Type	Order No.	A	Cond. ø mm	Weight kg
SNL 6/ 80	200 400	80	13,5Ø/ 25 mm²	2,85
SNL 6/120	200 410	120	15,5Ø/ 35 mm²	3,00
SNL 7/ 80	200 420	80	13,5Ø/ 25 mm²	3,30
SNL7/120	200 430	120	16,5Ø/ 35 mm²	4,70

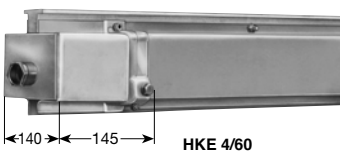
Line feed



Type	Order No.	A	Cond. ø mm	Weight kg
SNK 6/ 80	201 672	80	36/21	3,40
SNK 6/120	201 673	120	36/21	3,40
SNK 6/200	200 480	200	42/21	3,40
SNK 6/300	200 490	300	48/21	3,40
SNK 7/ 80	201 674	80	36/21	3,60
SNK 7/120	201 675	120	36/21	3,60
SNK 7/200	200 500	200	42/21	3,60
SNK 7/300	200 510	300	48/21	3,60

HSL 4

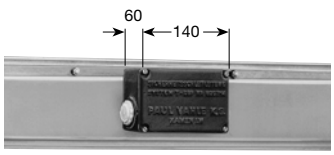
End feed*



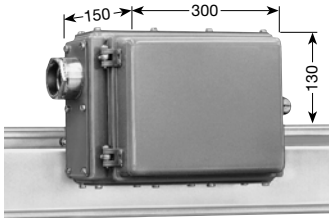
HKE 4/60

Type	Order No.	A	Cond. ø mm	Weight kg
HKE 4/60 R	210 040	60	29	0,45
HKE 4/60 L	210 050	60	29	0,45

Line feed

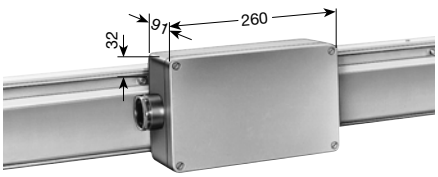


HNK 4/60



HNK 4/200

Line feed



HNK 4/120

Type	Order No.	A	Cond. ø mm	Weight kg
HNK 4/ 60	210 060	60	29	1,00
HNK 4/120	210 070	120	36	2,80
HNK 4/200	210 080	200	42	3,00

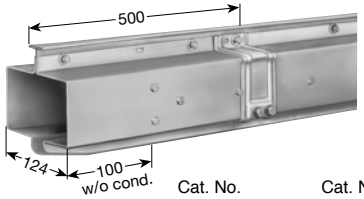
The feed kits come ready assembled on 1 m SLG or 4 m HSL sections and are a part of your system length (prices for feed kits do not include the 1 or 4 m section, which will be charged separately).

***** Please consult factory for feed kit assemblies on other lengths and indicate position of end feeds – left or right per explanation on page 5.

SLG 4+5

Transfer guide, straight cut

for transfer applications,
for horizontal offset ± 5 mm
for vertical offset ± 3 mm



Type	Cat. No. left	Cat. No. right
SU 4/ 80	201 618	200 520
SU 4/120	201 619	200 530
SU 4/200	201 620	200 540
SU 4/300	201 621	200 550
SU 5/ 80	201 622	200 560
SU 5/120	201 623	200 570
SU 5/200	201 624	200 580
SU 5/300	201 625	200 590

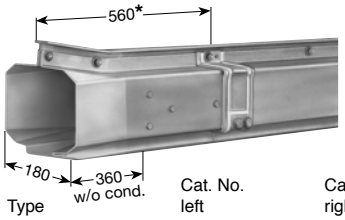
Transfer guide, oblique cut

for switches and turntables
custom built per your drawings

Type	Cat. No. left	Cat. No. right
SUS 4/ 80	201 634	200 680
SUS 4/120	201 635	200 690
SUS 4/200	201 636	200 700
SUS 4/300	201 637	200 710
SUS 5/ 80	201 638	200 720
SUS 5/120	201 639	200 730
SUS 5/200	201 640	200 740
SUS 5/300	201 641	200 750

Transfer funnel, straight cut

for max. horizontal offset ± 20 mm
for max. vertical offset ± 10 mm
GFM towing arm required

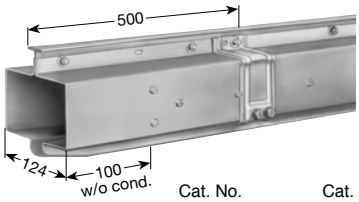


Type	Cat. No. left	Cat. No. right
SET 4/ 80	201 650	200 840
SET 4/120	201 651	200 850
SET 4/200	201 652	200 860
SET 4/300	201 653	200 870
SET 5/ 80	201 654	200 880
SET 5/120	201 655	200 890
SET 5/200	201 656	200 900
SET 5/300	201 657	200 910

SLG 6+7

Transfer guide, straight cut

for transfer applications,
for horizontal offset ± 5 mm
for vertical offset ± 3 mm



Type	Cat. No. left	Cat. No. right
SU 6/ 80	201 626	200 600
SU 6/120	201 627	200 610
SU 6/200	201 628	200 620
SU 6/300	201 629	200 630
SU 7/ 80	201 630	200 640
SU 7/120	201 631	200 650
SU 7/200	201 632	200 660
SU 7/300	201 633	200 670

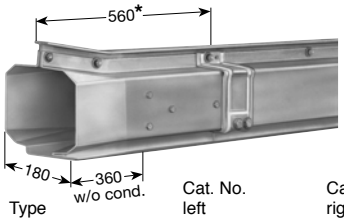
Transfer guide, oblique cut

for switches and turntables
custom built per your drawings

Type	Cat. No. left	Cat. No. right
SUS 6/ 80	201 642	200 760
SUS 6/120	201 643	200 770
SUS 6/200	201 644	200 780
SUS 6/300	201 645	200 790
SUS 7/ 80	201 646	200 800
SUS 7/120	201 647	200 810
SUS 7/200	201 648	200 820
SUS 7/300	201 649	200 830

Transfer funnel, straight cut

for max. horizontal offset ± 20 mm
for max. vertical offset ± 10 mm
GFM towing arm required

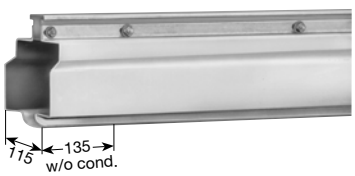


Type	Cat. No. left	Cat. No. right
SET 6/ 80	201 658	200 920
SET 6/120	201 659	200 930
SET 6/200	201 660	200 940
SET 6/300	201 661	200 950
SET 7/ 80	201 662	200 960
SET 7/120	201 663	200 970
SET 7/200	201 664	200 980
SET 7/300	201 665	200 990

HSL 4

Transfer guide, straight cut

for transfer applications,
for horizontal offset ± 5 mm
for vertical offset ± 3 mm



Type	Cat. No. left	Cat. No. right
HEF	210 691	210 090

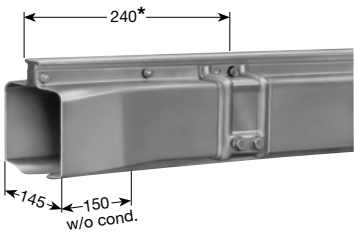
Transfer guide, oblique cut

for switches and turntables
custom built per your drawings

Type	Cat. No. left	Cat. No. right
HEFS	210 692	210 100

Transfer funnel, straight cut

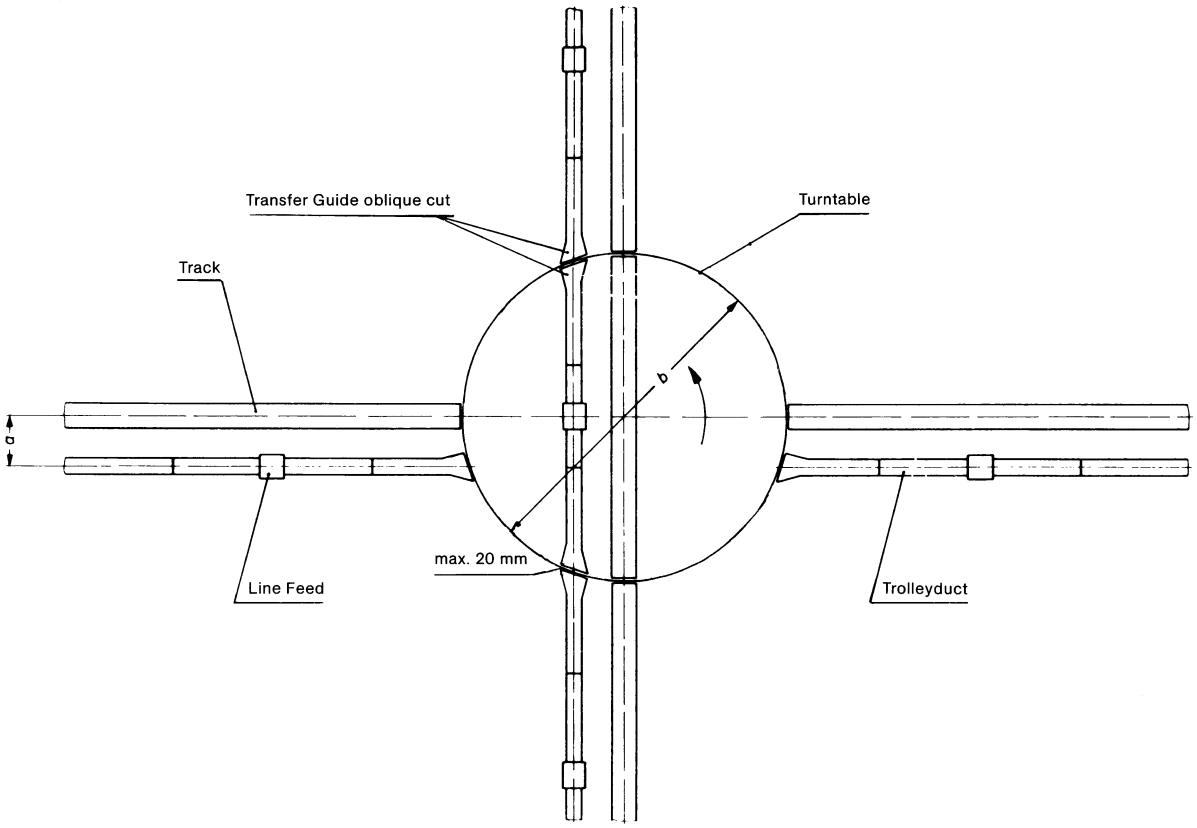
for max. horizontal offset ± 20 mm
for max. vertical offset ± 10 mm
MBS trolley towing arm required

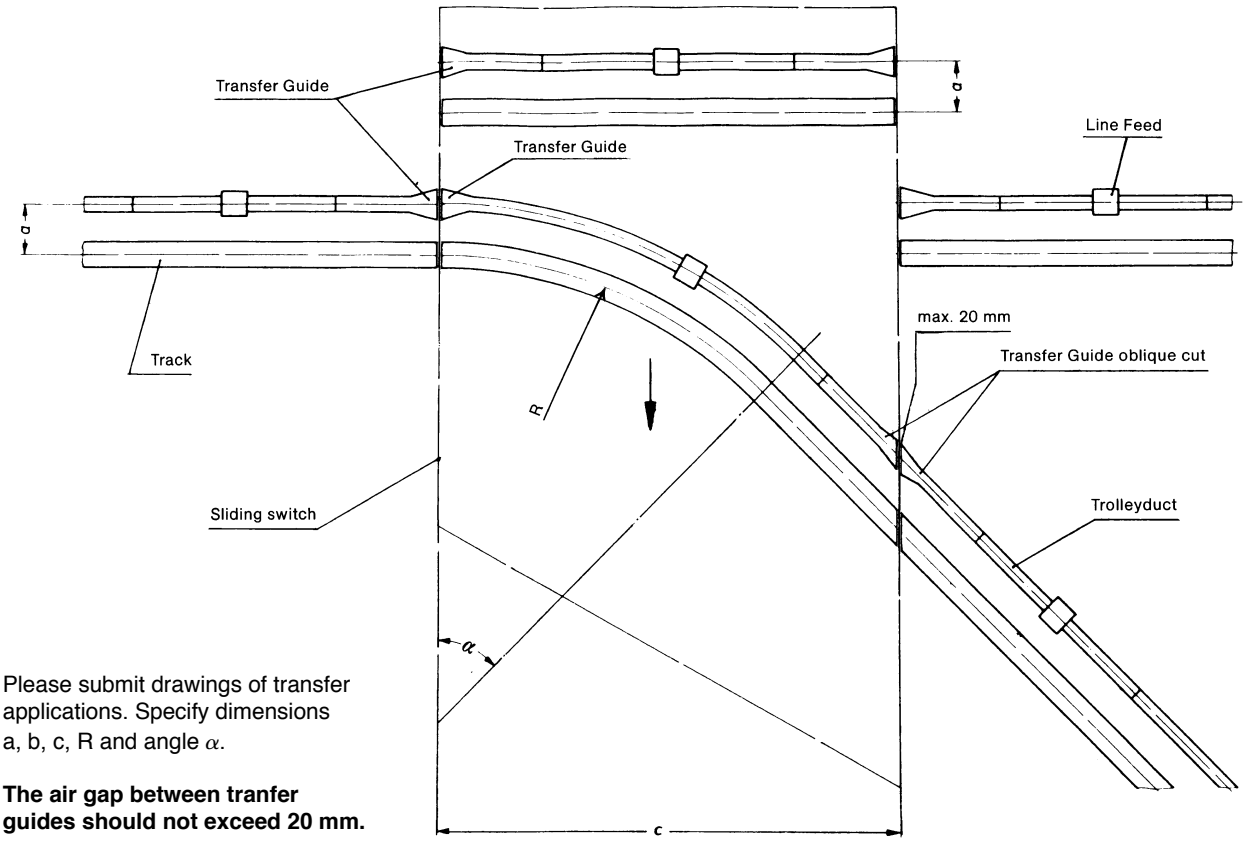


Type	Cat. No. left	Cat. No. right
HET	210 693	210 110

Illustrations show the standard flared end sections forming a part of your system length (prices for transfer guides and funnels do however not include the trolley duct section, which will be charged separately).

***** Dimensions refer to steel sheet profiles up to first joint plate; the top bar is continuous.

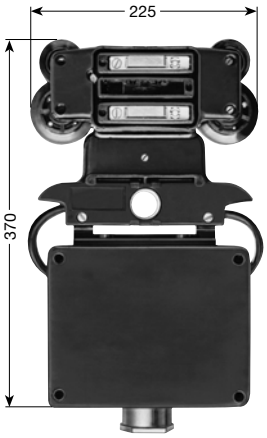




Please submit drawings of transfer applications. Specify dimensions a, b, c, R and angle α.

The air gap between tranfer guides should not exceed 20 mm.

SLG 4+5



Type	Cat. No.	A*	Poles	Weight kg	Max. speed in m/min. normal	transfer	General
KWG/g 4/70	201 679	70	4	2,60	200	100	For straight runs with ball bearing wheels and guide rollers FM: for transfer funnels see page 12 and 18
KWG/g 5/70	201 685	70	5	2,90	200	100	
KWG/g 4/70 FM	201 681	70	4	2,60	200	100	
KWG/g 5/70 FM	201 687	70	5	2,90	200	100	
KWG/n 4/70	201 678	70	4	2,60	200	100	For curved runs with ball bearing wheels and guide rollers FM: for transfer funnels see page 12 and 18
KWG/n 5/70	201 684	70	5	2,90	200	100	
KWG/n 4/70 FM	201 680	70	4	2,60	200	100	
KWG/n 5/70 FM	201 686	70	5	2,90	200	100	

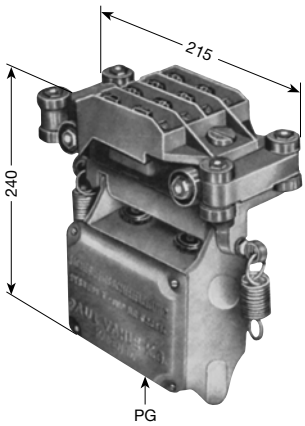
max. Ø of cable outlet: 36 mm.
Cleaning trolleys and high temp. version over 70° C on request.

SLG 6+7

Type	Cat. No.	A*	Poles	Weight kg	Max. speed in m/min. normal	transfer	General
KWG/g 6/70	201 320	70	6	3,30	200	100	For straight runs with ball bearing wheels and guide rollers FM: for transfer funnels see page 12 and 18
KWG/g 7/70	201 330	70	7	3,60	200	100	
KWG/g 6/70 FM	201 400	70	6	3,30	200	100	
KWG/g 7/70 FM	201 420	70	7	3,60	200	100	
KWG/n 6/70	201 010	70	6	3,30	200	100	For curved runs with ball bearing wheels and guide rollers FM: for transfer funnels see page 12 and 18
KWG/n 7/70	201 030	70	7	3,60	200	100	
KWG/n 6/70 FM	201 390	70	6	3,30	200	100	
KWG/n 7/70 FM	201 410	70	7	3,60	200	100	

max. Ø of cable outlet: 36 mm and 21 mm.
Cleaning trolleys and high temp. version over 70° C on request.

HSL 4



Type**	Cat. No.	A*	Poles	Weight kg	Max. speed in m/min. normal	transfer	General
HSW 4/70	210 130	70	4	4,00	200	100	With ball bearing wheels and guide rollers
HSW 4/70 S	210 694	70	4	4,00	200	100	W/special brushes for dusty environment
HSW 4/70 T	210 640	70	4	4,20	200	100	For transfer funnel see page 12 and 18
HSW 4/70 TS	210 701	70	4	4,20	200	100	For transf. funn. w/spec. brushes for dusty env.

max. Ø of cable outlet: 36 mm.
Cleaning trolleys and high temp. version over 70° C on request.

* All ampere data for 60% intermittent duty.
** Also for curves.

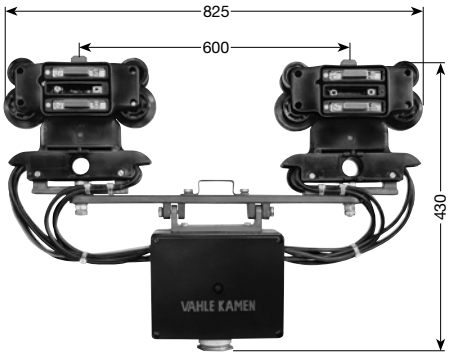
SLG 4+5

General: see single collectors

Type	Cat. No.	A*	Poles	Weight kg
DKWG/g 4/140	201 683	140	4	5,40
DKWG/g 5/140	201 689	140	5	6,00
DKWG/n 4/140	201 682	140	4	5,40
DKWG/n 5/140	201 688	140	5	6,00

max. Ø of cable outlet: 42 mm.

Cleaning trolleys and high temp. over 70° C version on request.



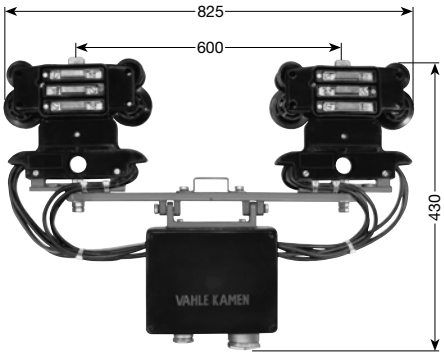
SLG 6+7

General: see single collectors

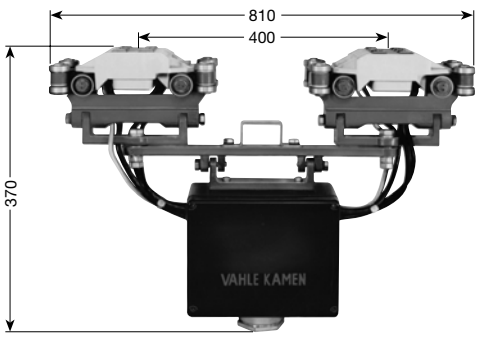
Type	Cat. No.	A*	Poles	Weight kg
DKWG/g 6/140	201 360	140	6	6,70
DKWG/g 7/140	201 380	140	7	7,30
DKWG/n 6/140	201 050	140	6	6,70
DKWG/n 7/140	201 070	140	7	7,30

max. Ø of cable outlet: 42 mm and 21 mm.

Cleaning trolleys and high temp. over 70° C version on request.



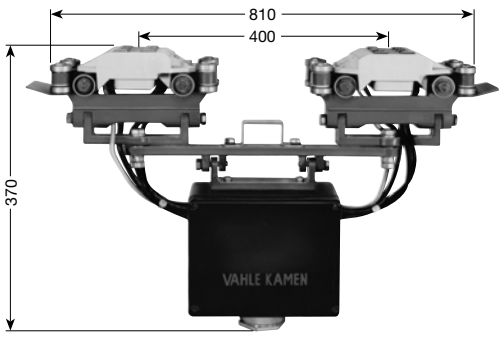
HSL 4



General: see single collectors

Type	Cat. No.	A*	Poles	Weight kg
HDW 4/140	210 170	140	4	6,40
HDW 4/140 S (S = with special brushes for dusty environment)	210 695	140	4	6,40

max. Ø of cable outlet: 42 mm.



General: see single collectors

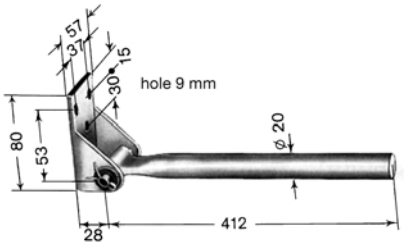
Type	Cat. No.	A*	Poles	Weight kg
HDW 4/140 E (E = for transfers)	210 210	140	4	6,45
HDW 4/140 E/S (E/S = for transfers with spec. dust brushes)	210 696	140	4	6,45

Cleaning trolleys and high temp. over 70° C version on request.

***** All ampere data for 60% intermittent duty.

SLG 4+5

Trolley towing arm
for single & double collector

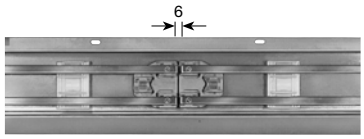


Type	Cat. No	Weight kg
GKM	201 690	0,62
GKM/K	201 691	0,62

Trolley towing arm
support type for single collector
for transfer funnel SET
see page 8 and 18

Type	Cat. No	Weight kg
GFM	201 692	1,30

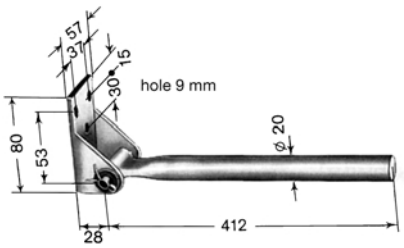
Conductor dead section*
factory assembled



Type	Cat. No
TS 1	201 080
TS 2	201 090
TS 3	201 100
TS 4	201 110

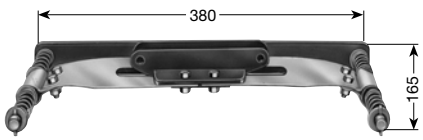
SLG 6+7

Trolley towing arm
for single & double collector



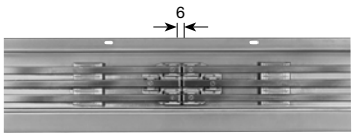
Type	Cat. No	Weight kg
GKM	201 690	0,62
GKM/K	201 691	0,62

Trolley towing arm
support type for single collector
for transfer funnel SET
see page 8 and 18



Type	Cat. No	Weight kg
GFM	201 692	1,30

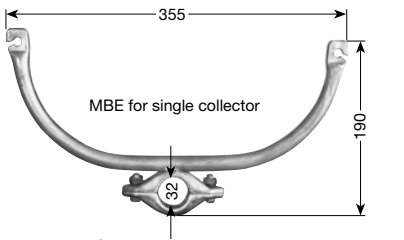
Conductor dead section*
factory assembled

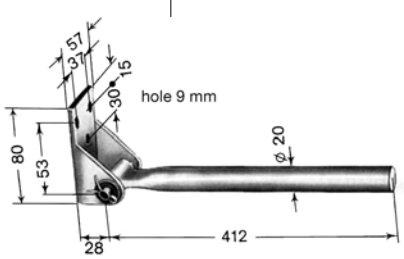


Type	Cat. No
TS 1	201 080
TS 2	201 090
TS 3	201 100
TS 4	201 110
TS 5	201 120
TS 6	201 130

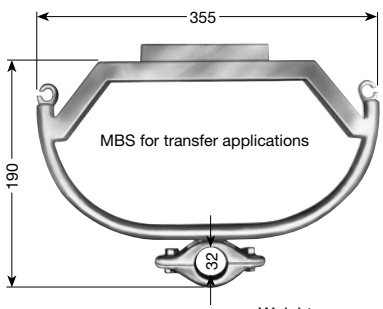
HSL 4

Trolley towing arm
for single & double collector



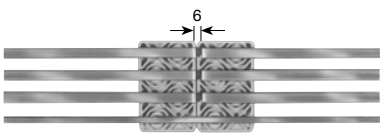


Trolley towing arm
support type for single collector
for transfer funnel HET
see page 8 and 18



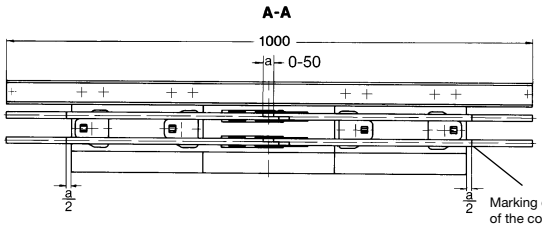
Type	Cat. No	Weight kg
MBE	210 240	0,80
GKM	210 709	0,62
MBS	210 600	1,20

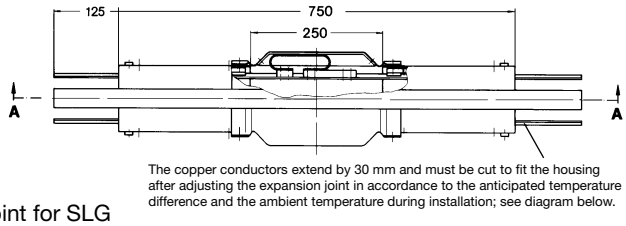
Conductor dead section*
factory assembled



Type	Cat. No
T 1	210 250
T 2	210 260
T 3	210 270
T 4	210 280

***** Please indicate which conductors are to be interrupted.





Drawings show expansion joint for SLG

Expansion joint for copper conductors									
SLG								HSL	
Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
SDV 4/ 80	201 520	**SDV 5/ 80**	201 530	**SDV 6/ 80**	201 560	**SDV 7/ 80**	201 570	**HDV 4/120**	210 650
SDV 4/120	201 702	**SDV 5/120**	201 704	**SDV 6/120**	201 706	**SDV 7/200**	201 708	**HDV 4/200**	210 660
SDV 4/200	201 703	**SDV 5/200**	201 705	**SDV 6/200**	201 707	**SDV 7/200**	201 709		
SDV 4/300	201 540	**SDV 5/300**	201 550	**SDV 6/300**	201 580	**SDV 7/300**	201 590		

Expansion joints for VAHLE steel enclosed conductor systems SLG and HSL serve to compensate for the different expansion and contraction of the steel housing and the copper conductors in varying temperatures.

Expansion joints are required for longer runs and in between two anchor points of the copper conductors.

Please note that feed kits, sectionalizings and transfer guides or transfer funnels are such anchor points (see fig. 1 and 2 – symbol ↑) in which the copper conductor rails have a mechanical rigid connection to the housing, although electrically insulated.

The conductor housing has its own fixpoint hangers in the center of the systems or at the transfer points and works independent from the position of the expansion joints for the copper conductors.

Expansion joints do not interrupt electrical power and do not influence the voltage drop of a system.

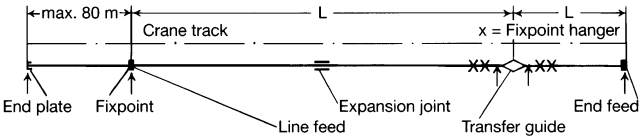


Fig. 1

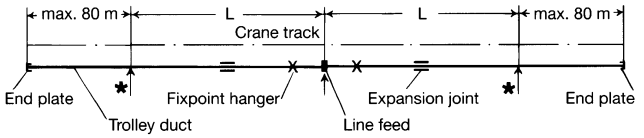


Fig. 2

*additional anchor points for copper conductors					
SLG			HSL		
Type	Poles	Order No.	Type	Poles	Order No.
FPS/Cu	4+5	201 666	**FPH/Cu**	4	210 700
FPS/Cu	6+7	201 667			

How to use expansion joints:

The maximum length L (see fig. 1 and 2) between 2 anchor points of the copper conductors is to be determined from the anticipated termperature difference (Δ t) and the compensating length of an expansion joint.

Dimension L is maximum:
100 m with Δ t = 40° C 50 m with Δ t = 80° C
68 m with Δ t = 60° C 40 m with Δ t = 100° C

When you have above lengths between 2 anchor points of the copper conductors then you should at least install 1 expansion joint.

Longer runs than L require more expansion joints and additional anchor points (see adjacent table).

When in doubt regarding position and number of expansion joints – please consult the factory and fill in our questionnaire on pages 21/22, giving us all the technical data for a detailed layout plan.

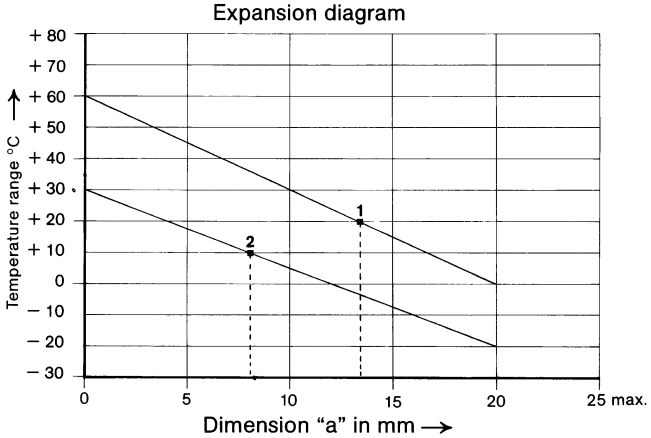
Installation:

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

The gap dimension “a” depends on the ambient temperature during erection and the anticipated max. temperature difference (Δ t) – see adjacent diagram and example.

When in doubt - please consult the factory.

Expansion diagram



Example:

[1] Δ t = 60° C (0° C to + 60° C) during installation + 20° C } “a” = 13 mm see diagram

[2] Δ t = 50° C (–20° C to + 30° C) during installation + 10° C } “a” = 8 mm see diagram

EXAMPLES FOR ORDERING

For conductor system SLG	Cat. No.
Jointplate	201 140
Copper conductor rail 20 mm²	201 150
Copper conductor rail 30 mm²	201 160
Copper conductor rail 50 mm²	201 170
Copper conductor rail 70 mm²	201 180
Insulator	201 500
Insulator, high-temp.	201 190
Rail connector for SLG 80 & 120	201 200
Rail connector for SLG 200 & 300	201 210
End feed terminal	201 220
Top alignment clamp for SLG 5 & 7	201 720

For collector trolleys

Carbon brush, 70 amp, phase	201 693
Carbon brush, 70 amp, ground (4- & 6pole SLG)	201 694
Carbon brush, 70 amp, ground (5- & 7pole SLG)	201 695
Brass carbon holder, phase	201 696
Brass carbon holder, ground (4- & 6pole SLG)	201 697
Brass carbon holder, ground (5- & 7pole SLG)	201 698
Trolley wheel	201 699
Guide wheel	201 700

For conductor system HSL	Cat. No.
Jointplate	210 290
Copper conductor rail 30 mm²	210 300
Copper conductor rail 50 mm²	210 310
Insulator	210 330
Rail connector/HSL 120	210 340
Rail connector/HSL 200	210 350
End feed terminal	210 370
Locating clamp for copper conductors	210 380

For collector trolleys

Carbon brush, phase 70 amp	210 410
Carbon brush, ground 70 amp	210 420
Dust carbon brush, phase, 70 amp	210 460
Dust carbon brush, ground, 70 amp	210 470
Carbon holder	210 697
Carbon holder, c/w carbon brushes	210 698
Carbon holder, c/w dust brushes	210 699
Brass carbon housing, phase	210 540
Brass carbon housing, ground	210 620
Trolley wheel, dust-proof (ball bearing) Ø 30 x 14	210 550
Guide roller, dust-proof (ball bearing) Ø 20 x 8	210 560
Trolley towing spring	210 570

Straight Track

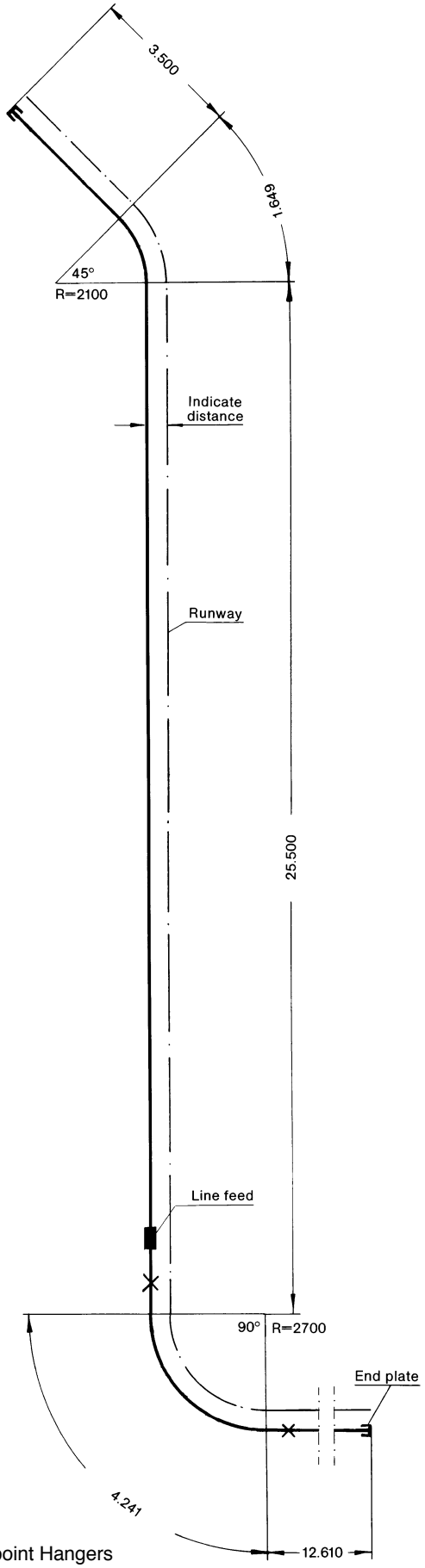
	Type	Cat. No.
99 m VAHLE-Trolleyduct	**SLG 4/120**	200 010
48 Sliding Hangers	SAS	200 160
2 Fix point Hangers	SAF	200 170
1 End plate (right)	SEK R.	200 180
1 End plate (left)	SEK L.	200 190
1 Line feed	SNL 4/120	200 370
1 Collector trolley	KWG/g 4/70	201 679
1 Towing arm	GKM	201 690

Straight Track

	Type	Cat. No.
99 m VAHLE-Trolleyduct	**SLG 6/200**	200 100
48 Sliding Hangers	SAS	200 160
2 Fix point Hangers	SAF	200 170
1 End plate (right)	SEK R.	200 180
1 End plate (left)	SEK L.	200 190
1 Line feed	SNK 6/200	200 480
1 Collector trolley	DKWG/g 6/140	201 050
1 Towing arm	GKM	201 690

Straight Track

	Type	Cat. No.
99 m VAHLE-Trolleyduct	**HSL 4/120**	210 000
48 Sliding Hangers	SAS	201 707
2 Fix point Hangers	SAF	201 708
1 End plate (right)	HEB R.	210 020
1 End plate (left)	HEB L.	210 030
1 Line feet	HNK 4/120	210 070
1 Collector trolley	HSW 4/70	210 130
1 Towing arm	MBE	210 240



X = Fix point Hangers
support spacing in curves: max. 1000 mm.

Curved Track

SLG

	Type	Cat. No.
47.5 m VAHLE-Trolleyduct	**SLG 4/120**	200 010
including:		
1 bend 90°, r = 2700 mm, L = 4240 mm = 2 curved sections		
1 bend 45°, r = 2100 mm, L = 1649 mm = 1 curved section		
25 Sliding Hangers	SAS	200 160
2 Fix point Hangers	SAF	200 170
1 End plate (right)	SEK R.	200 180
1 End plate (left)	SEK L.	200 190
1 Line feed	SNL 4/120	200 370
1 Collector trolley	KWG/n 4/70	201 678
1 Towing arm	GKM	201 690

Curved Track

	Type	Cat. No.
47.5 m VAHLE-Trolleycut	**SLG 6/200**	200 100
including:		
1 bend 90°, r = 2700 mm, L = 4240 mm = 2 curved sections		
1 bend 45°, r = 2100 mm, L = 1649 mm = 1 curved section		
25 Sliding Hangers	SAS	200 160
2 Fix point Hangers	SAF	200 170
1 End plate (right)	SEK R.	200 180
1 End plate (left)	SEK L.	200 190
1 Line feed	SNK 6/200	200 480
1 Collector trolley	DKWG/n 7/140	201 050
1 Towing arm	GKM	201 690

Curved Track

HSL

	Type	Cat. No.
47.5 m VAHLE-Trolleycut	**HSL 4/120**	210 000
including:		
1 bend 90°, r = 2700 mm, L = 4240 mm = 2 curved sections		
1 bend 45°, r = 2100 mm, L = 1649 mm = 1 curved section		
25 Sliding Hangers	SAS	210 707
2 Fix point Hangers	SAF	210 708
1 End plate (right)	HEB R.	210 020
1 End plate (left)	HEB L.	210 030
1 Line feed	HNK 4/120	210 070
1 Collector trolley	HSW 4/70	210 130
1 Towing arm	MBE	210 240

EXAMPLES FOR ORDERING

SLG

a) for Spur Rail	Type	Cat. No.
15 m Trolleyduct	**SLG 4/120**	200 010
6 Sliding Hangers	SAS	200 160
2 Fix point Hangers	SAF	200 170
1 End plate (left)	SEK L.	200 190
1 Line feed	SNL 4/120	200 370
1 Transfer guide	SU 4/120	200 530
1 Double collector trolley	DKWG/g 4/140	201 683
1 Trolley towing arm	GKM	201 690

b) for Crane Bridge		
12 m Trolleyduct	**SLG 4/120**	200 010
5 Sliding Hangers	SAS	200 160
2 Fix point Hangers	SAF	200 170
1 End plate (right)	SEK R.	200 180
1 Line feed	SNL 4/120	200 370
1 Transfer guide	SU 4/120	200 530

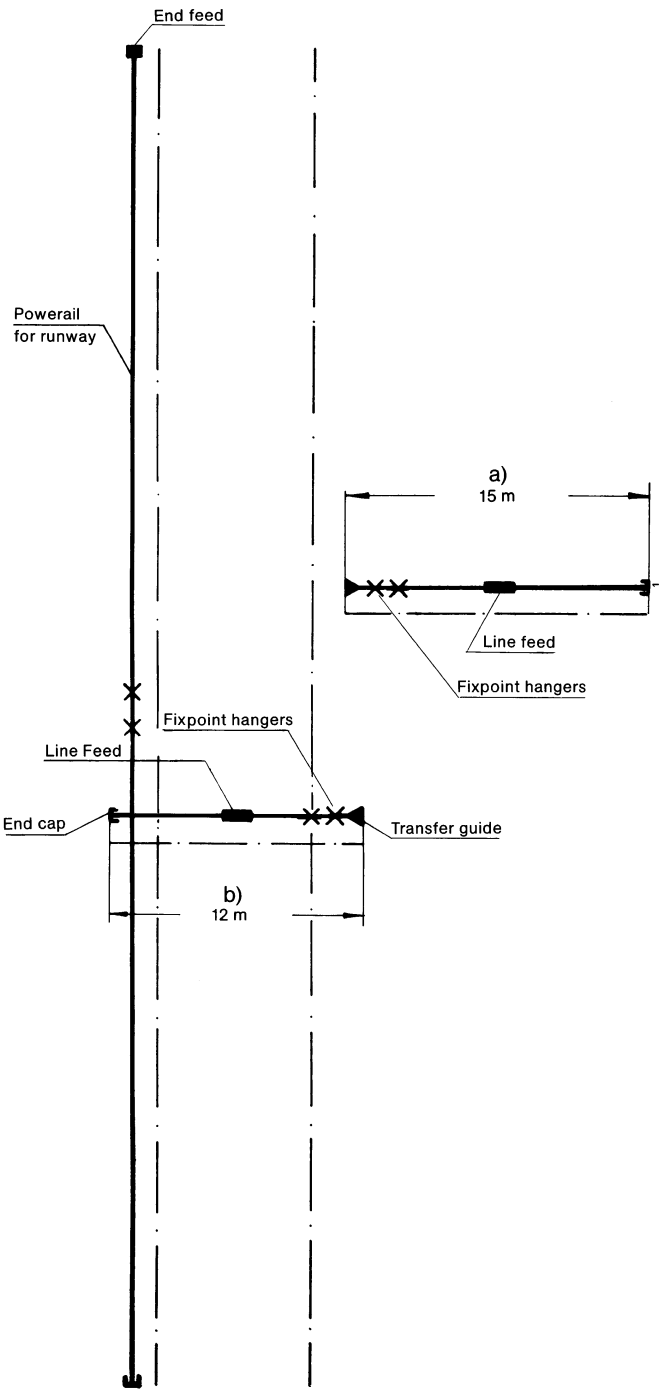
a) for Spur Rail	Type	Cat. No.
15 m Trolleyduct	**SLG 6/200**	200 100
6 Sliding Hangers	SAS	200 160
2 Fix point Hangers	SAF	200 170
1 End plate (left)	SEK L.	200 190
1 Line feed	SNK 6/200	200 480
1 Transfer guide	SU 6/200	200 620
1 Double collector trolley	DKWG/g 6/140	201 360
1 Trolley towing arm	GKM	201 690

b) for Crane Bridge		
12 m Trolleyduct	**SLG 6/200**	200 100
5 Sliding Hangers	SAS	200 160
2 Fix point Hangers	SAF	200 170
1 End plate (right)	SEK R.	200 180
1 Line feed	SNK 6/200	200 480
1 Transfer guide	SU 6/200	200 620

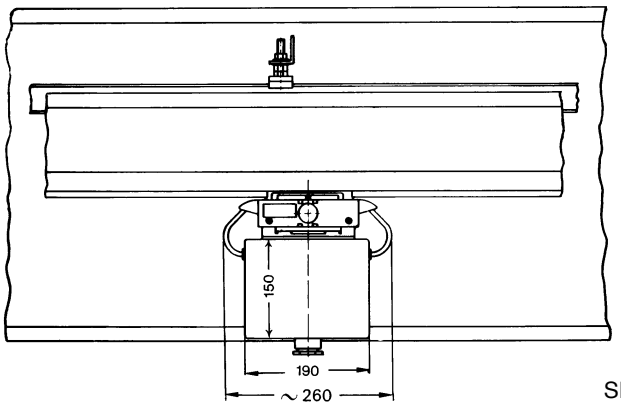
HSL

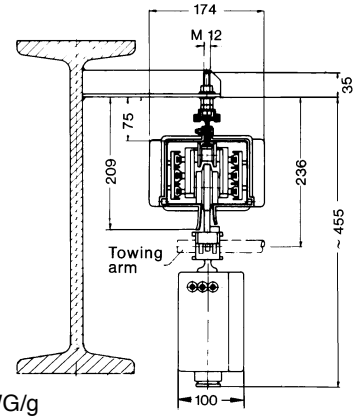
a) for Spur Rail	Type	Cat. No.
15 m Trolleyduct	**HSL 4/120**	210 000
6 Sliding Hangers	SAS	210 707
2 Fix point Hangers	SAF	210 708
1 End plate (left)	HEB L.	210 030
1 Line feed	HNK 4/120	210 070
1 Transfer guide	HEF 4	210 090
1 Double collector trolley	HDW 4/140 E	210 210
1 Trolley towing arm	GKM	210 709

b) for Crane Bridge		
12 m Trolleyduct	**HSL 4/120**	210 000
5 Sliding Hangers	SAS	210 707
2 Fix point Hangers	SAF	210 708
1 End plate (right)	HEB R.	210 020
1 Line feed	HNK 4/120	210 070
1 Transfer guide	HEF 4	210 090



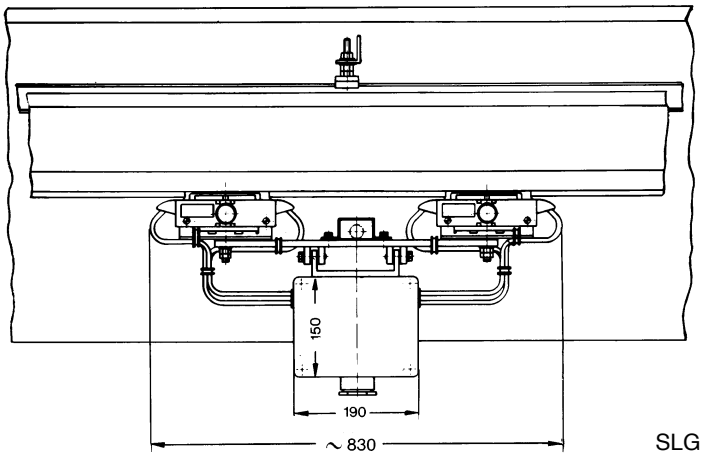
X = Fix point Hangers

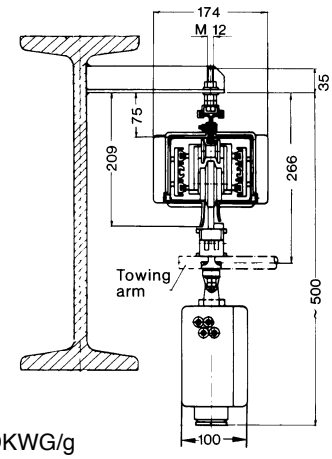




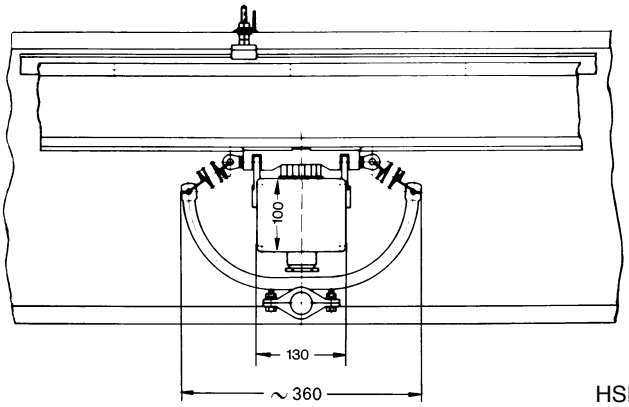
SLG 6 with KWG/n or KWG/g

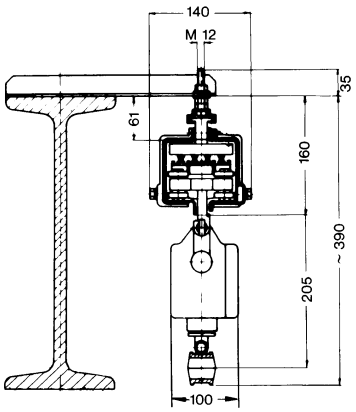
SLG





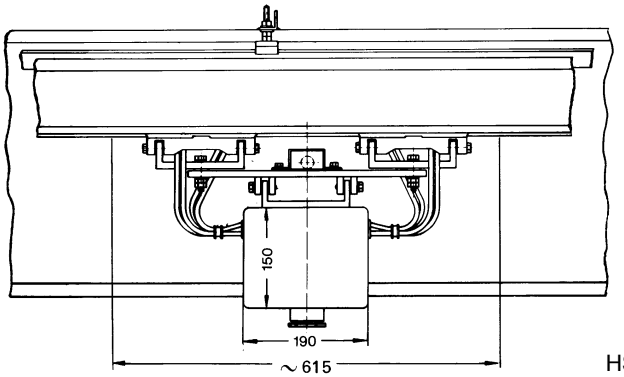
SLG 4 with DKWG/n or DKWG/g

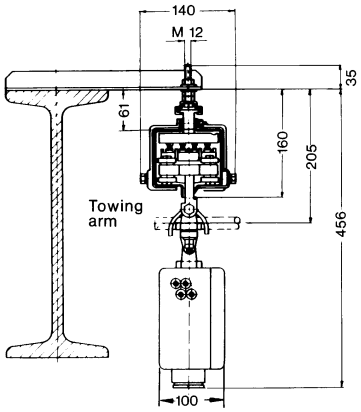




HSL with HSW

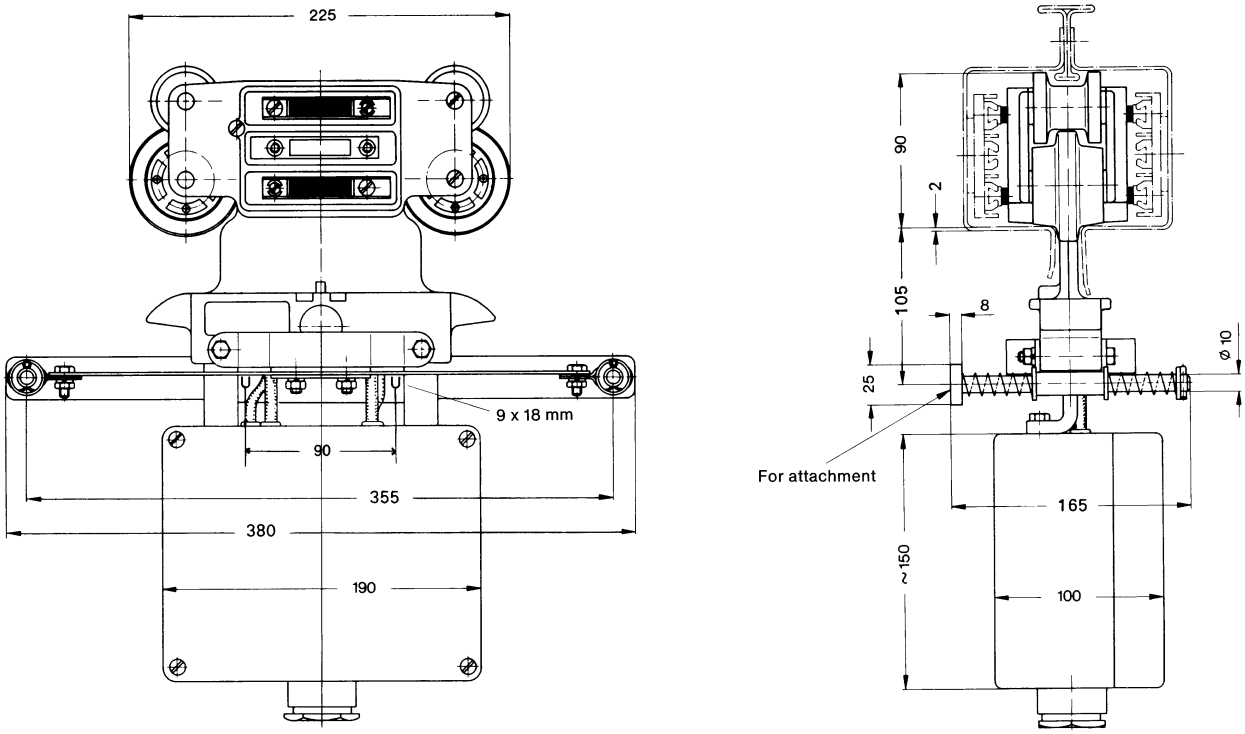
HSL





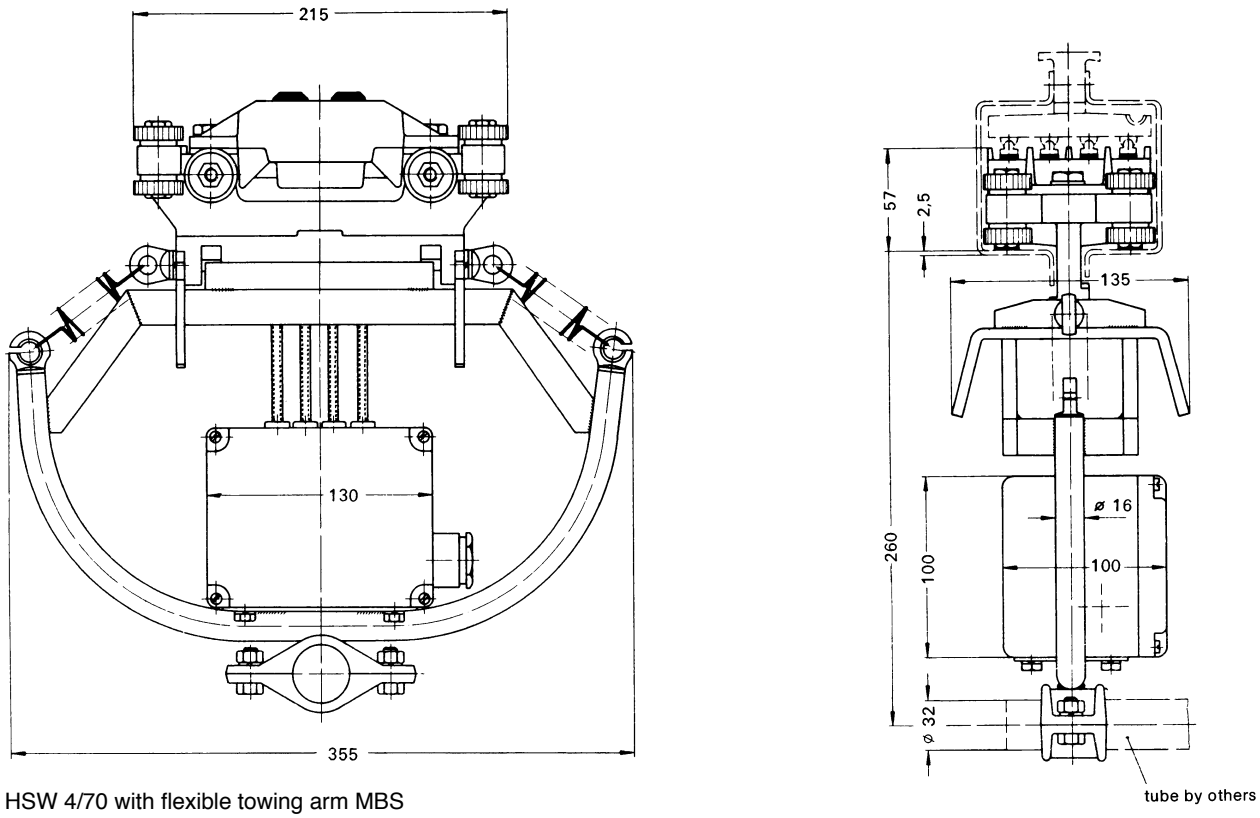
HSL with HDW

SLG



KWG/n FM or KWG/g FM with flexible towing arm GFM

HSL



HSW 4/70 with flexible towing arm MBS

1. Mounting of supporting brackets:

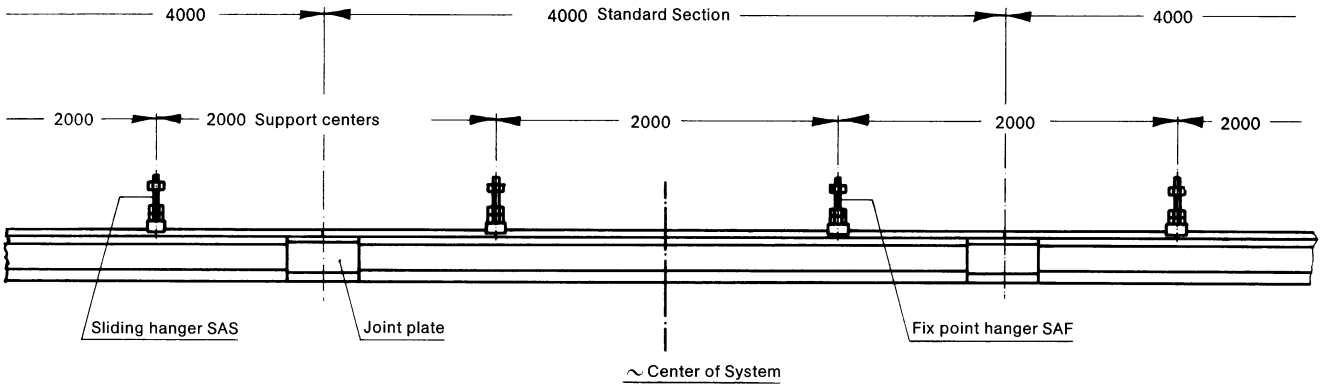
Steel angle supports or fixing brackets must first be bolted or welded for suspending the conductor systems (see examples on page 17). The distance from centreline of housing to centreline of runway girder depends on construction and size of hoist or crane and must be determined before producing the angles and brackets.

It is wise to provide the steel supports with elongated holes which permit the housing to be lined up in the horizontal plane. The fixing bolts of the suspensions are long enough that the housing can also be lined up in the vertical plane.

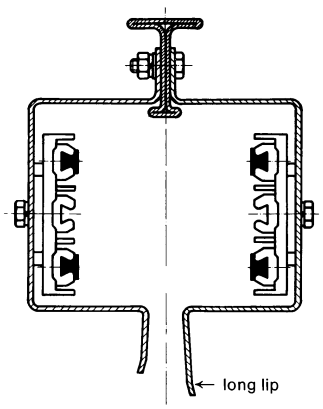
The support spacing for systems SLG and HSL is 2 m. Provide 2 Fix point hangers SAF in the centre of the system (see adjacent sketch) to allow expansion and contraction towards both ends. (The SAF fittings are marked by yellow bichromate treatment).

The rest of the Trolleyduct is supported by Sliding Hangers type SAS, in which the housing can slide, so that a controlled expansion takes place from the fixed center point to either end.

Note:
Before bolting the sections together, remove the wooden clamping pieces securing the conductors during transport, and in the case of HSL the additional spacers in the slot. Sections with line feed – or end feed – must be mounted first. In the case of tracks with curves, start erection at curves.



2. Erection of SLG



Continue suspending of trolleyduct sections.

Push connectors (brass type for 80 and 120 amp. systems – copper type for 200 and 300 amp. systems) onto dove tail shaped conductor ends of the follwing trolleyduct section.

Take care of alignment. Long lip housing profile must always be on the same side, facing the girder or other mounting structure.

Top profile and housing/conductor rail joints must be in the vertical plane.

Move the connectors centrally over the conductor rail joints and tighten the screws rigidly.

Install joint plates after perfect alignment of top profile (if necessary use clamping tool) and fasten screws rigidly. Release clamping tool.

Additional clamps (No. 201720) to cover each trolleyduct joint and align the top profile are always included in SLG 5 and SLG 7 shipments.
Fit grounding cable on both sides of joint plate.

3. Checking of the steel housing:

Inspect the slot opening of the steel housing: opening should be 14 mm ± 1 mm. Adjustment is possible by using simple angle shaped steel lever for widening. The fixing screws at the top profile should be retightened after this procedure.

4. Inserting current collectors:

Insert collectors from either end, single collectors can be installed at each joint of the trolley ducting. Make sure that safety key is showing toward short lip of housing. Trolleys will only fit one way to avoid phase reversing.

Allow for sufficient manual test runs. The collector trolley should run smoothly. The correct slot opening of the trolleyduct housing is important and should be adjusted again if necessary.

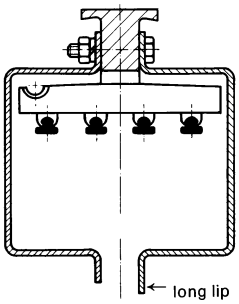
Connect collector trolley cable and towing arm to machinery.

5. Fit end plates.

6. Connect current supply cables to trolleyduct feed points.

INSTALLATION PROCEDURE SLG AND HSL

2. Erection of HSL



Continue suspension of trolleyduct sections.

The short lip profile is the accessible side of the trolleyduct, i. e. long lip housing profile must always face the girder or other mounting structure.

Important: All conductor rail joints are staggered by 90 mm, (first rail reaching over top profile by 45 mm, second rail 45 mm shorter than top profile, etc.).

Push rail connectors centrally over rail joints. Start with the connector on the rear conductor.

Install joint plate and fit ground cable.

3. Checking of the steel housing:

Inspect the slot opening of the steel housing: opening should be 18 mm ± 1 mm. If necessary, adjustment is possible at site by using a simple angle shaped steel lever to widen the slot opening.

After adjustment if needed the fixing bolts of the steel housing on the top bar must be retightened.

4. Inserting current collectors:

Insert current collectors from either end, single collectors can be installed at each joint of the trolleyducting. In this case use gauge plate for depressing the carbon brushes. Make sure that safety key is showing towards short lip of housing. Trolleys will only fit one way to avoid phase reversing.

Allow for sufficient manual test runs. The collector trolleys should run smoothly. The correct slot opening of the trolleyduct is important and should be adjusted again if necessary.

Connect collector trolley cable and towing arm to machinery (type MBE for single trolleys, type GKM for double trolleys).

Towing springs of MBE must pull downwards at an angle of 30°. Make sure that all trolleys pull along in line with the housing slot.

5. Fit end plates.

6. Connect current supply cables to trolleyduct feed points.

Installation of heating systems for SLG and HSL (details see page 23)

1. Pull the heating cable into the factory assembled copper tube.

   Use a thin stiff wire and pull the heating cable through the entire length of your heating section (two men required for pulling from one end and pushing from the other end).

   Important: Smooth insertion of the heating cable and no kinking.

2. Connecting the heating cable at the factory assembled terminal box.

   The heating cable comes 1 m longer than required for the heating section, so that you can cut a suitable connecting end.

   Prepare the connecting end per adjacent sketch as follows:

   a) Remove the sheathing for about 40 mm.

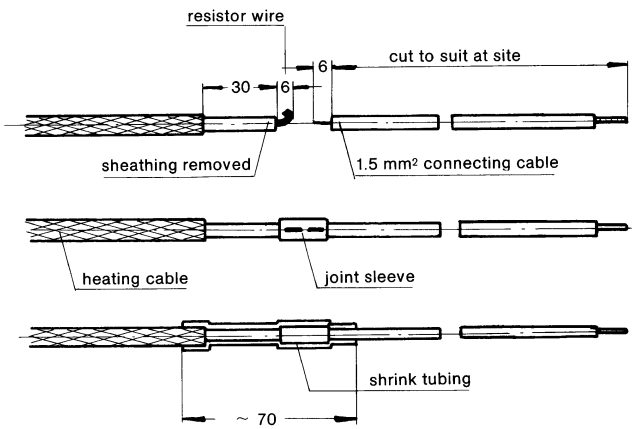
   b) Cut back the insulation for about 12 mm and bend the wire per sketch.

   c) Prepare the 1,5 sqmm connecting cable, cut back the insulation for approx. 6 mm.

   d) Both, the heating cable and the connecting cable, now to be jointed in a standard sleeve, using a crimping tool.

   e) Push shrink-tubing over the joint and braise carefully with small lighter flame.

   f) Cut the 1,5 sqmm connecting cable to suit into the terminal box. Remove 6 mm insulation and connect to the terminal clamp.



3. Wiring

   Connect the supply cable (220, 380 V) to the terminal box. A considerable shortening of the heating cable may cause overheating and burning – so never cut the heating cable too much.

   The supply cable, switches, fuses and temperature regulating devices to be supplied by the customer.

   When using thermostats for automatic regulation, those should be adjusted at + 2° C up to – 3° C to put the heating system in operation.

Proper and careful installation is an important fact for troublefree operation. Therefore, please follow the instructions in all details. When in doubt, please ask. We shall be glad to give any information and put our experts at your disposal. Please call us or our area engineer.

QUESTIONNAIRE FOR VAHLE POWERAILS SLG AND HSL

CUSTOMER _____ ATTENTION OF _____

ADRESS _____

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 influence etc.): _____

_____

7. Temperature conditions: ____°C min. ____°C max.
8. Number and position of feeder 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 22)
12. Max. travelling speed of machinery: _____
13. Type of Powerail preferred: _____
14. Other pertinent data: _____

_____

_____

_____

_____

_____

_____

_____

For curved tracks, breaks in system etc. please submit prints or sketches.

QUESTIONNAIRE FOR VAHLE POWERAILS SLG AND HSL

To our nearest local agency:

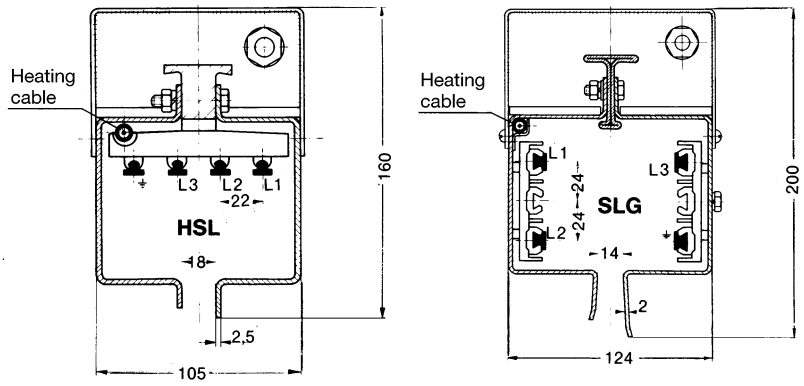
Date:

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

Mark with * any motors that may be operated simultaneously.

Additional Comments: _____

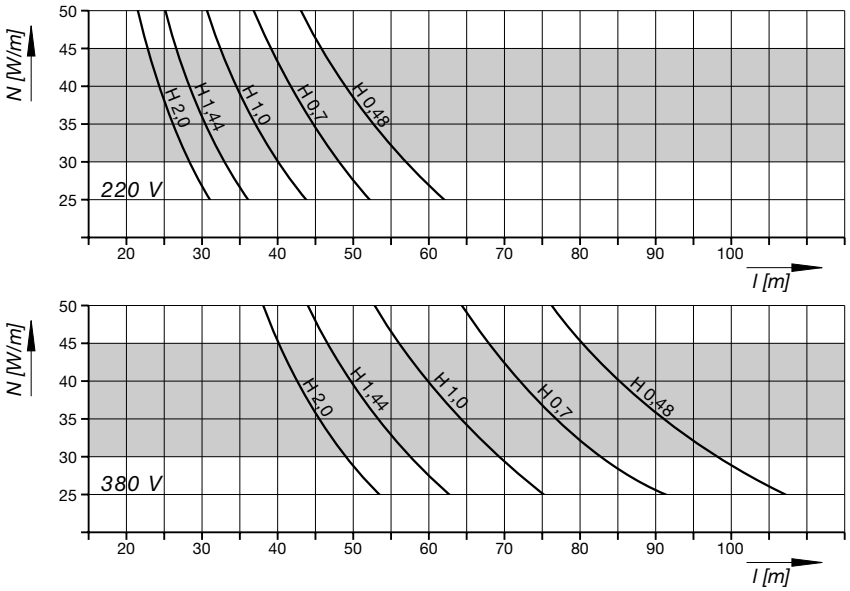
Arrangement of heating cables



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 erection 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 diagramms, divide the length of the system into two or more heating sections.

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

Composition of heating cable: Conductor: material resistor Cr Ni, stranded
Insulation: TFE-(Teflon)-insulation, natural colour glass-silk sheath
Sheath: V 2 A-wire Ø ca. 4 mm

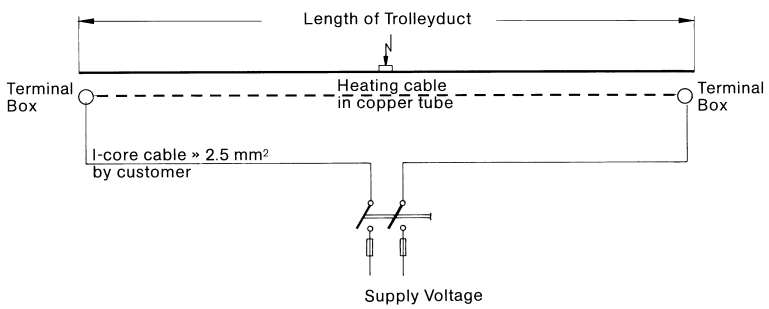
Heating capacity [Watt/m]: $N' = \frac{U^2}{R \cdot L^2}$

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

Wire restistance data:
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

tolerance ± 2,5%

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
   Heating capacity per above diagram approx. 39 W/m
   with 60 m x 39 W/m approx.
   2340 W = 2,34 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