



INSULATED CONDUCTOR SYSTEM

U 10



INSULATED CONDUCTORS U 10

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Slipring units made up from U 10
see leaflet no. 102 s.



VAHLE serves the international automotive industry

General

VAHLE insulated conductors U 10 are designed in accordance with today's international safety requirements. They fully meet VDE 0100 and are finger safe to VDE 0470, part 1, protection code IP 23.

The adjacent picture demonstrates that the VDE test finger cannot reach live conductors – finger safety is guaranteed.

The shroud which envelops the various conductors is an excellent insulator. Therefore our unipole insulated conductors guarantee utmost safety in operation.

Any number of conductors can be installed side by side at minimum space requirement.

Standard rail sections are 6 m long, shorter sections are available.

The ground conductor is identified by international colour coding.

For obvious safety reasons phase and ground collectors are not interchangeable.

Approved and listed by:

CSA and UL. Consult factory label service.

Hangers

Bolted, snap-in and quarter turn type hangers are available. Standard support distance for U 10 is 600 mm, in curves 300 mm.



Joints

Snap-in joint splices provide mechanical end electrical continuity. They include insulated protection covers.

Expansion joint sections are only required in case of expansion joints in the monorail track.

Feed terminals

Joint assembly and mid-rail assembly feeds are available.

Furthermore transfer guides and isolating assemblies allow for spade connectors.

Transfer guides

Transfer guides serve as an end protection of system runs and accomplish smooth collector transfer in case of switches, drop sections etc. They can be supplied with or without feed clip.

Isolating assemblies

Conductor isolating assemblies are available for sectionalizing control circuits, maintenance bays etc. They can be supplied with or without feed clip.

Curves

Insulated conductors U 10 can be used for horizontal or vertical curves. A special curve tool for individual field preparation is available.

Collectors

The current collectors are made of reinforced polyamide and stainless steel parts. These spring loaded units provide positive contact with the conductor bars and have double pick-up brushes.

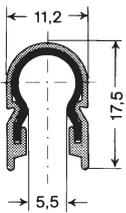
Engineering data of shroud

	standard shroud color green	high temp. shroud color gray
Electrical properties: Di-electric strength DIN 53481	30-40 kV/mm	45 kV/mm
Specific resistance DIN 53482	5×10^{15} Ohm x cm	5×10^{17} Ohm x cm
Surface resistance DIN 53482	10^{13} Ohm	10^{15} Ohm
Leakage resistance IEC 112/VDE 0303	CTI 600 - 1.1	CTI 600 - 1.1
Mechanical properties: Flexible strength	$75 \text{ N/mm}^2 \pm 10 \%$	$95 \text{ N/mm}^2 \pm 10 \%$
Tensile strength	$50 \text{ N/mm}^2 \pm 10 \%$	$50 \text{ N/mm}^2 \pm 10 \%$
Temperature resistance:	- 30° C up to +55° C	- 30° C up to +85° C
Flame test proof per DIN 4102 – part 1	class B1 – no flaming particles, self-extinguishing	
Resistance to chemicals:*	gasoline mineral oil grease	hydrochloric acid. concentr. caustic soda solution 25% and 50%, sulphuric acid to 50%

* Consult factory when synthetic oil and grease involved.



INSULATED CONDUCTORS U 10



Conductor code:

U = unipole insulated conductor
 10 = shroud size
 25 = conductor cross sectional area (mm²)
 C = copper conductor
 F = galvanized steel conductor
 E = stainless steel conductor

Length:

6 m is standard length,
 shorter lengths are available

Support spacing:

for straight runs 0.6 m
 for curves 0.3 m

Conductor spacing:

on compact hangers 14 mm or variable

Curves:

factory prepared, min. radius 400 mm, or in the field with curve tools BVU 10/15 (min. R = 0.4 m)

Application:

indoor use only

See page 3

for shroud properties

Type	U 10/25 C	U 10/25 F	U 10/25 E
Weight kg/m	0.267	0.245	0.246
Standard shroud, color green			
Cat.-No. phase *	167 00 •	167 01 •	167 02 •
Cat.-No. ground *	167 06 •	167 07 •	167 08 •
High temperature shroud, color gray			
Cat.-No. phase *	167 03 •	167 04 •	167 05 •
Cat.-No. ground *	167 09 •	167 10 •	167 11 •

Engineering data

Conductor rail Type	Cross sectional area mm ²			Leakage distance of covers mm	max. voltage V	Continuous ampere capacity A	Resistance Ohm/1000 m	Impedance ** Ohm/1000 m
	Copper	steel	stainless					
U 10/25 C	25			30	600	100	0.744	0.748
U 10/25 F		25		30	600	40	5.411	5.412
U 10/25 E			25	30	600	10	31.328	31.328

Selection of Conductors

in accordance to ampere load and environmental conditions

U 10/25 C copper conductor for power-, control- and data-transmission.

U 10/25 F galvanized steel conductor for non-corrosive environment.

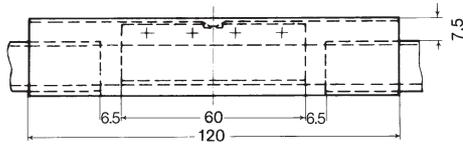
U 10/25 E stainless steel conductor for control and data-transmission in corrosive atmospheres.



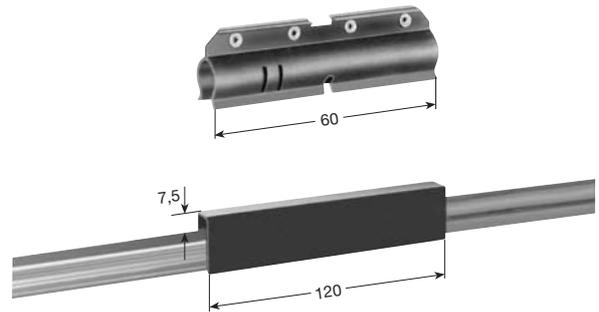
VAHLE U 10 conductors provide power, control and data transmission for automated monorail systems (AMS) in the automotive industry.

Snap-in joint splice

(system controls expansion and contraction)



Type	Weight /kg	Cat.-No.
UV 10	0.020	165 006

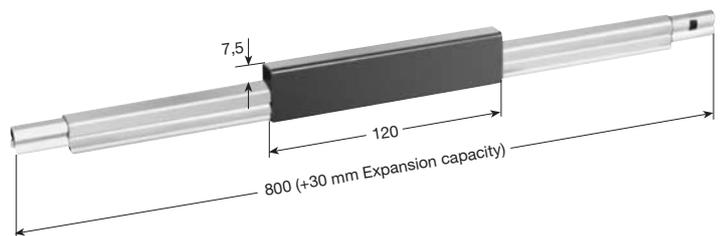


Expansion section

factory assembled to 0.8 m long conductor section incl. one joint splice.

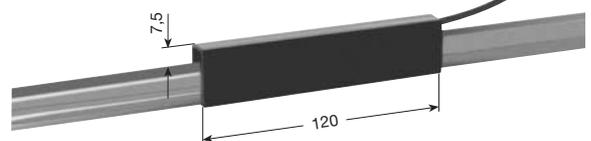
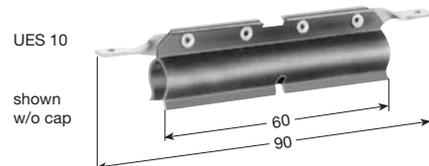
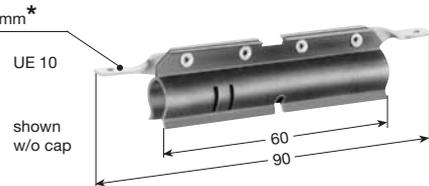
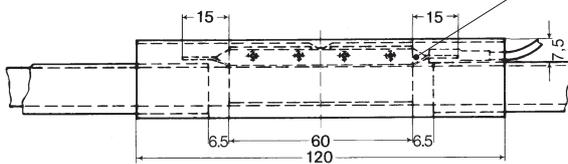
The 0.8 m expansion assembly is part of the system length.

Type	Weight kg	Cat.-No.			
		Standard shrouding color green		High temp. shrouding color gray	
		phase	ground	phase	ground
UDV 10/25 C	0.254	165 192	165 193	165 254	165 255
UDV 10/25 F	0.236	165 250	165 251	165 256	165 257
UDV 10/25 E	0.237	165 252	165 253	165 258	165 259



Feed terminal* (continuous ampere capacity 2 x 25 A)

2 terminals for flat plug 6.3 x 0.8 mm*

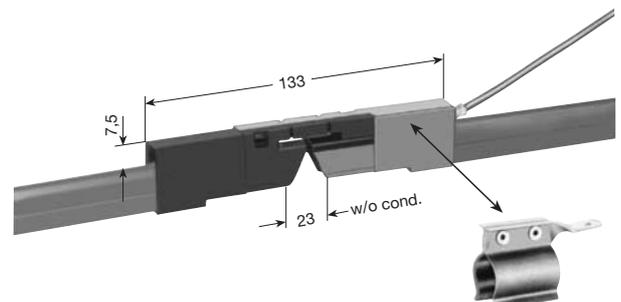


Type	Weight/kg	Cat.-No.
UE 10 joint assembly	0.023	165 007
UES 10 mid-rail assembly	0.023	165 212

Isolating assembly*

Type	symbol	Weight kg	comprising	Cat.-No.
LT /LT -U 10		0.010	2 x LT/U 10 units w/o feed	165 025
LT /LTE-U 10		0.015	2 x LT/U 10 units w/1 feed	165 114
LTE/LTE-U 10		0.020	2 x LTU 10 units w/2 feeds	165 026
separately available: SE 10 feed clip		0.005	1x	165 178

The two transfer button elements are pressed together to form a rigid, well aligned unit.



LT/LTE-U 10

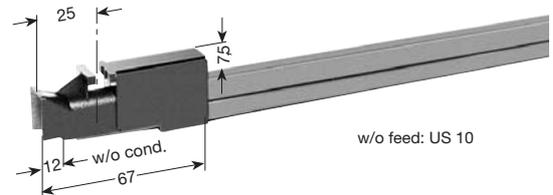
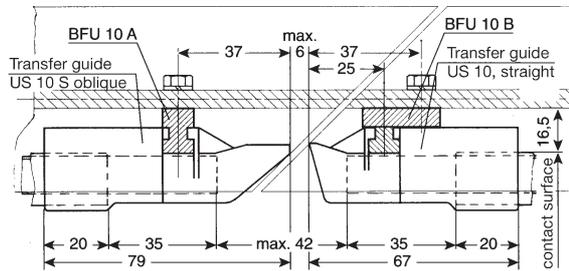
SE 10 feed clip

* For ordering feed cable FLA see page 10.

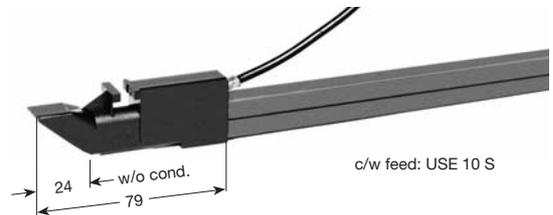


COMPONENTS

Transfer guide & end piece



w/o feed: US 10



c/w feed: USE 10 S

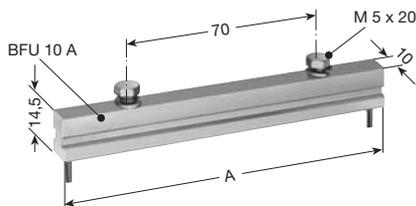
max. vertical and horizontal offset:: ± 3 mm

Type	Weight kg	feed clip	Cat.-No.
US 10	0.004	w/o	165 008
US 10 S	0.005	w/o	165 009
USE 10 **	0.009	c/w	165 010
USE 10 S **	0.010	c/w	165 011
Feed clip only SE 10	0.005		165 178

Anchor bar for transfer guide (Aluminium)

for bolting to the track, consisting of 1 aluminium profile bar, 2 hex. screws M 5 w/washer, 2 locking pins 2 x 20.

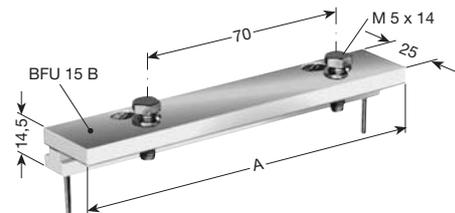
used in conjunction with bolted hangers



(16.5 mm distance between conductor-surface and track)

Type	poles	A/mm	Weight kg	Cat.-No.
BFU 10 A- 8	1- 8	118	0.042	165 168
BFU 10 A-10	1-10	143	0.052	165 176

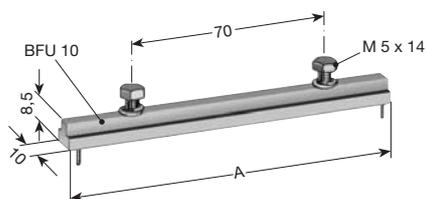
used in conjunction with bolted hangers for oblique cut tracks



(16.5 mm distance between conductor-surface and track)

Type	poles	A/mm	Weight kg	Cat.-No.
BFU 10 B- 8 *	1- 8	118	0.087	165 272
BFU 10 A-10 *	1-10	143	0.101	165 274

used in conjunction with snap-in and quarter turn hangers



(10 mm distance between conductor-surface and track)

Type	poles	A/mm	Weight kg	Cat.-No.
BFU 10- 8	1- 8	118	0.022	165 115
BFU 10-10	1-10	143	0.026	165 123

* B-Type anchor bar essential for more than 15 mm distance between conductor-surface and track on oblique cut tracks.

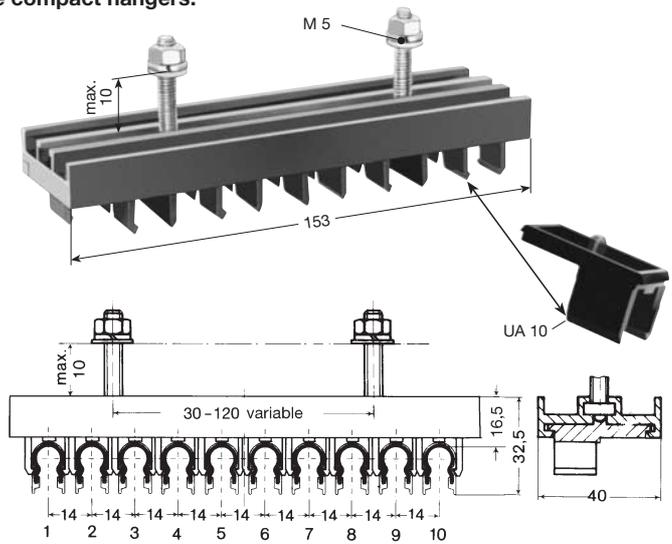
** Connecting cable with flat plug FLA is to be ordered separately (see page 10).

Any number of conductors can be assembled by combining the compact hangers.

Compact hanger with hardware, for up to 10 conductors

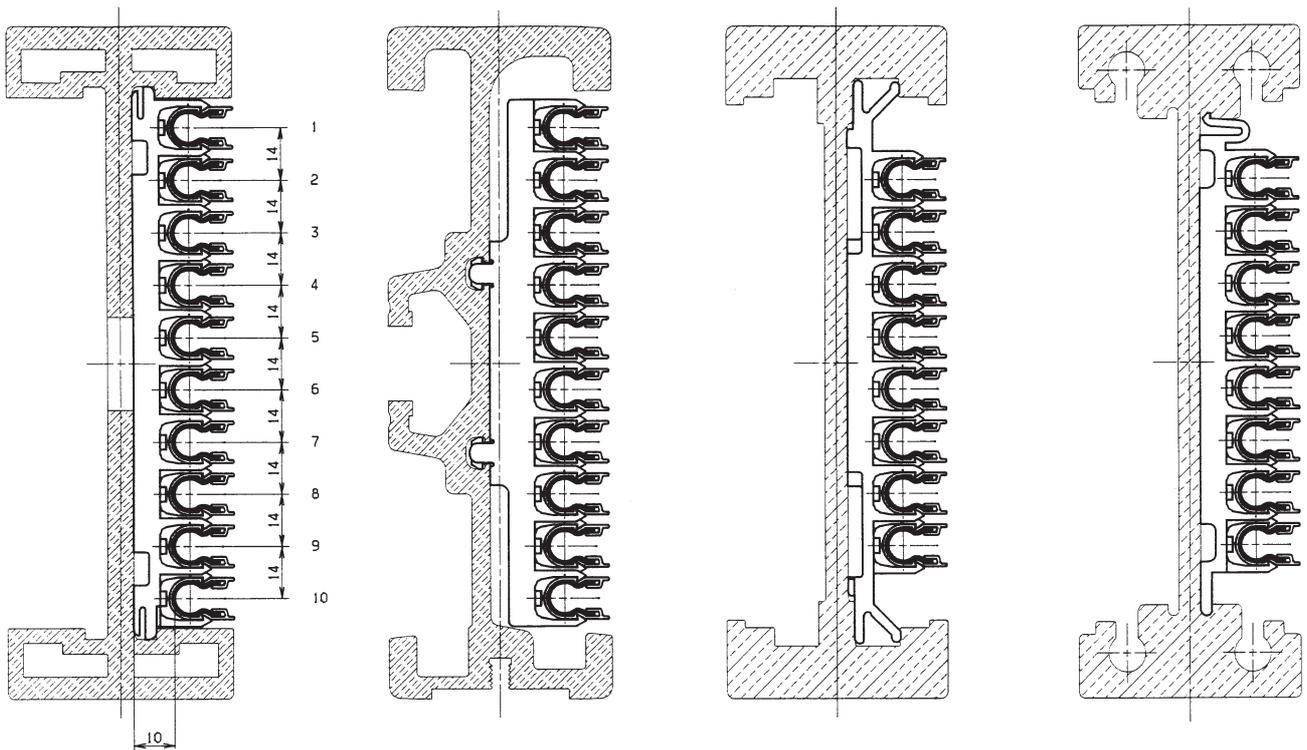
comprising one basic unit (153 mm long) and up to 10 rail clips UA 10, **ready assembled**; c/w 2 T-head bolts M 5 x 85 and hardware

Type	poles engaged	Weight/kg	Cat.-No.
KA 10- 2	1- 2	0.038	142 072
KA 10- 4	1- 4	0.042	142 073
KA 10- 6	1- 6	0.046	142 074
KA 10- 8	1- 8	0.050	142 075
KA 10-10	1-10	0.054	142 076
separately available: UA 10 rail clip		0.002	165 024



Conductor spacing: 14 mm standard
other spacing on special order

Compact hanger, self-locking, for up to 10 conductors on special order to fit your monorail track

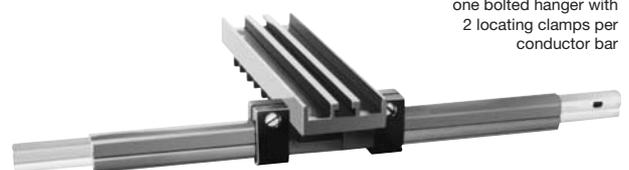


snap-in & quarter turn type hangers for typical monorail track electrification

Locating clamp

(see installation instructions page 16, paragraph 10)

Type	Weight/kg	Cat.-No.
USK 10	0.030	165 645



for each anchor point use
one bolted hanger with
2 locating clamps per
conductor bar



COLLECTORS

Compact double collector KDS 2/40* (two-way conveying)

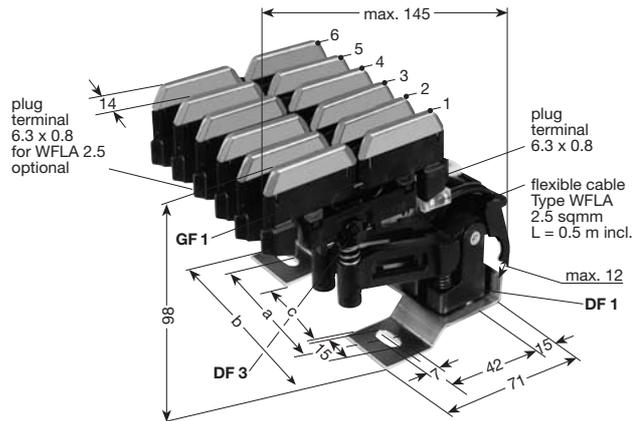
for conductor spacing of 14 mm

Ampacity: 1 Plug terminal 25 A
2 Plug terminals 2 x 20 A

swivel ± 15 mm · lift ± 15 mm;
contact pressure 3.5 N per brush
feed cable WFLA 2.5 one included, one optional

ground at No. 4, other position on request

for safety reasons during maintenance ground collector
is always first and last contact.



Type	poles	dim. a	dim. b	dim. c	Weight kg	base plate	Cat.-No.	
							for power w/1 ground	for control only
KDS 2/40- 1-14	1	28	62	-	0.170	4-pole (No. 2 to 4 = blank)	168 079	168 091
KDS 2/40- 2-14	2	28	62	-	0.240	4-pole (No. 3 and 4 = blank)	168 080	168 092
KDS 2/40- 3-14	3	28	62	-	0.310	4-pole (No. 4 = blank)	168 081	168 093
KDS 2/40- 4-14	4	28	62	-	0.380	4-pole	168 082	168 094
KDS 2/40- 5-14	5	56	90	-	0.490	6-pole (No. 6 = blank)	168 083	168 095
KDS 2/40- 6-14	6	56	90	-	0.560	6-pole	168 084	168 096
KDS 2/40- 7-14	7	80	118	53	0.675	8-pole (No. 8 = blank)	168 085	168 097
KDS 2/40- 8-14	8	80	118	53	0.745	8-pole	168 086	168 098
KDS 2/40- 9-14	9	80	146	53	0.860	10-pole (No. 10 = blank)	168 087	168 099
KDS 2/40-10-14	10	80	146	53	0.930	10-pole	168 088	168 100
KDS 2/40-11-14	11	120	174	80	1.020	12-pole (No. 12 = blank)	168 089	168 101
KDS 2/40-12-14	12	120	174	80	1.090	12-pole	168 090	168 102
separately available: KDS 2/40 collector	1				0.070	w/o	phase black 168 073	ground yellow 168 074

Compact double collector (one-way conveying)

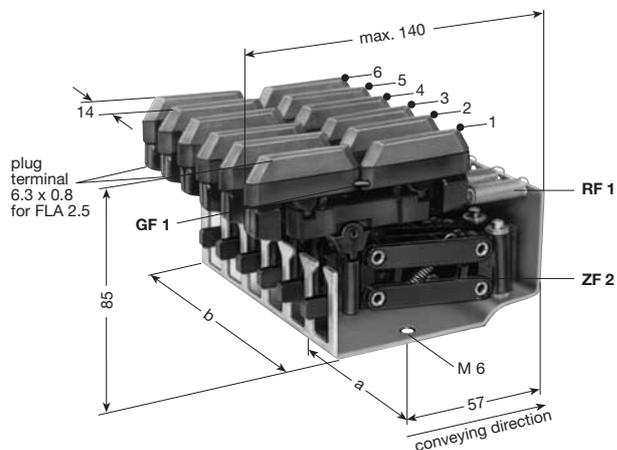
for conductor spacing of 14 mm

Ampacity: 1 Plug terminal 25 A

swivel ± 4 mm · lift ± 10 mm;
contact pressure 3.5 N per brush

feed cable FLA 2.5 (see page 10)

ground at No. 4, other position on request

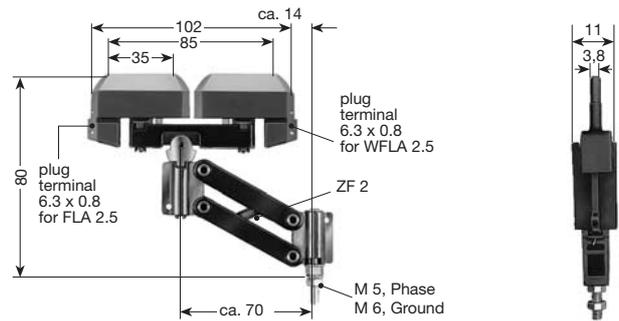


Type	poles	dim. a	dim. b	Weight kg	Cat.-No.	
					for power w/1 ground	for control only
KSTF 2/40- 2	2	-	31	0.244	-	168 126
KSTF 2/40- 3	3	14	45	0.362	168 118	168 127
KSTF 2/40- 4	4	28	59	0.480	168 119	168 128
KSTF 2/40- 5	5	42	73	0.598	168 120	168 129
KSTF 2/40- 6	6	56	87	0.716	168 121	168 130
KSTF 2/40- 7	7	70	101	0.834	168 122	168 131
KSTF 2/40- 8	8	80	115	0.952	168 123	168 132
KSTF 2/40- 9	9	80	129	1.070	168 124	168 133
KSTF 2/40-10	10	80	143	1.188	168 125	168 134
separately available: KSTF 2/40** collector	1			0.080	phase black 168 114	ground yellow 168 115

Double Collector *

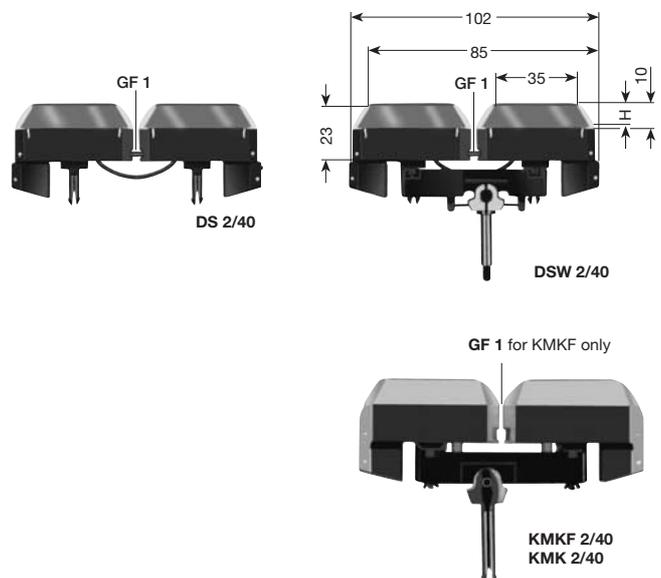
Ampacity: 1 Plug terminal 25 A
2 Plug terminals 2 x 20 A

swivel ± 10 mm · lift ± 10 mm;
contact pressure 3.5 N per brush
feed cable FLA 2.5 and WFLA 2.5 (see page 10)



Type	Weight kg	Cat.-No.	
		phase black	ground yellow
KST 2/40	0.080	168 137	168 138

Copper-graphite brush assembly



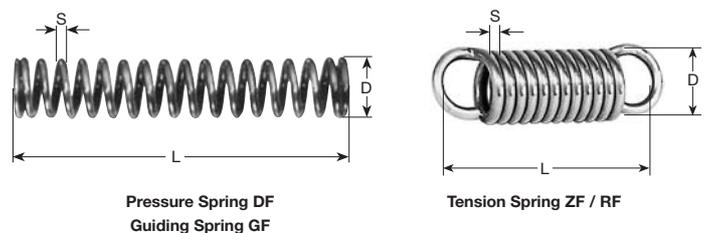
H = max. brush wear

Type	for collector	H/mm	Weight kg	Cat.-No.
DS 2/40**	KDS 2/40	7	0.050	168 065
DSW 2/40**	KDS 2/40		0.050	168 151
KMKF 2/40	KSTF 2/40		0.050	168 110
KMK 2/40	KST 2/40		0.050	168 135

all brushes 3.8 mm wide

Springs

Type	for collector	S mm	D mm	L mm	Cat.-No.
DF 1	KDS 2/40	1.00	7.00	38.00	153 847
DF 3	KDS 2/40	0.55	9.55	24.00	152 011
RF 1	KSTF 2/40-2 up to 10	0.50	7.70	18.00	153 779
ZF 2	KST 2/40, KSTF 2/40	0.85	6.45	24.00	153 515
GF 1	KDS, KSTF	0.35	2.00	22.00	153 850



* Install collector in dragging position when equipment moves one way only.

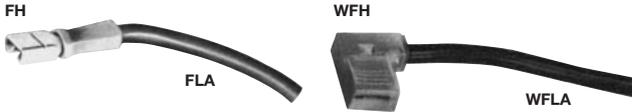
** Also for obsolete KUF 2/40 and KUFR 2/40.



COMPONENTS

Connecting cable

for collectors, feed terminals, transfer guides and isolating assemblies



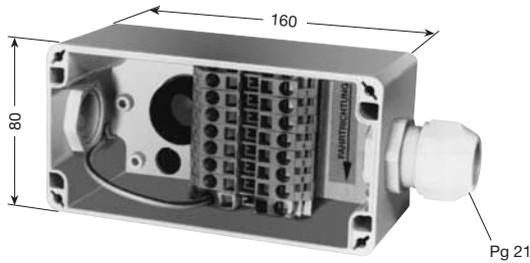
1 m long with quick connect plug 6.3 x 0.8 (female spade connector). Longer cable available.

Heavy double insulation

Type	cross section mm ²	A Ø mm	Weight kg	Cat.-No.	
				phase black	ground green/yellow
FLA 1.5	1.5	4.0	0.014	166 555	166 556
FLA 2.5	2.5	4.4	0.080	165 049	165 050
FLA 4	4.0	6.4	0.100	165 051	165 052
WFLA 2.5	2.5	4.4	0.080	168 107	168 108

Terminal box AKE

for feeding and sectionalizing
(max. 7 terminals 6 mm² plus 2 idem for ground)



Type	Weight kg	Cat.-No.
AKE	0.445	169 462

Plug only

Type	for cable Ø	Cat.-No.
FH 2.5	2.5	165 120
FH 4	4.0	165 121
WFH 2.5	2.5	168 109

Simple insulation (for AKE & AKB boxes only)

Type	cross section mm ²	A Ø mm	Weight kg	Cat.-No.	
				phase black	ground green/yellow
FKA 1.5	1.5	3.0	0.014	166 557	166 558
FKA 2.5	2.5	3.5	0.026	166 238	166 239
FKA 4	4.0	5.0	0.040	166 240	166 241
FKA 6	6.0	6.0	0.060	166 242	166 243

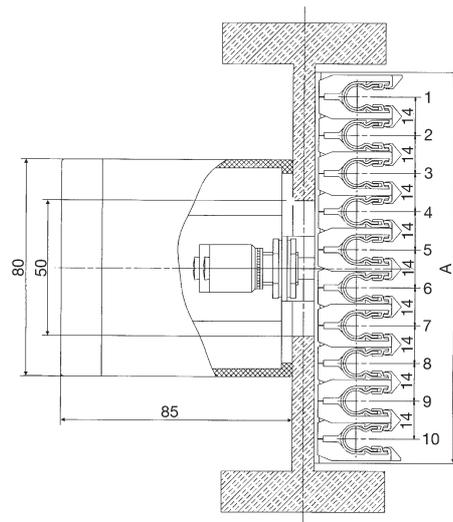
Terminal box AKB

for process-zones control



Type	Weight kg	Cat.-No.
AKB	0.469	169 481

Brush wear indicator KVT 10 N



Shown is KVT 10 N-10

The brush wear indicator will automatically check the brush wear and indicate necessary brush replacement. A continuous axle connected to an enclosed microswitch is equipped with steel feeler pins, arranged between the conductor bars and adjustable to the maximum brush wear level.

Current collectors with worn down brushes will depress the feeler pins, rotating the axle and activating the microswitch to promote a signal or a control function to route for example a carrier thru a track switch into a maintenance bay area.

Track- and vehicle-drawings will be useful for a smooth coordination. Opening in the track, length: 120 mm, height: Dim. A.

Brush wear indicator KVT 10 N

Type	poles	dim. A	Weight kg	Cat.-No.
KVT 10 N- 4	4	60	0.809	166 957
KVT 10 N- 5	5	88	0.957	167 440
KVT 10 N- 6	6	88	1.104	166 895
KVT 10 N- 7	7	116	1.252	167 441
KVT 10 N- 8	8	116	1.400	166 896
KVT 10 N- 9	9	144	1.546	167 442
KVT 10 N-10	10	144	1.694	166 897
KVT 10 N-11	11	172	1.842	167 443
KVT 10 N-12	12	172	1.990	167 444

Conductor cleaning device

Consult factory for details.

Type	Cat.-No.
RG 10 - 8	166 430
RG 10 - 10	166 432
RG 10 - 12	166 434



Curve tool

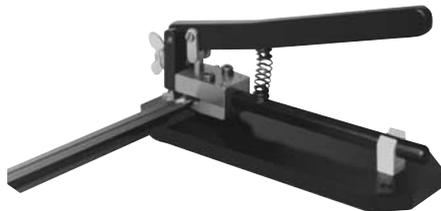
Filler rod is to be ordered separately.

Type	Weight kg	Cat.-No.
BVU 10/15	10.000	160 147
FU 10 Filler rod, 4 m long	0.340	165 234



Table saw

Type	Weight kg	Cat.-No.
KS	6.500	165 276
SB Spare blade	0.070	165 263

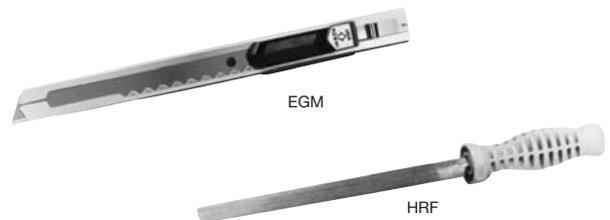


Conductor punch tool

Type	Weight kg	Cat.-No.
LZ 10	2.400	165 867

Deburring tool

for inside of conductor



Half-round file

for deburring and bevelling of conductor outside

Type	Weight	Cat.-No.
EGM	0.018	165 275
HRF	0.085	165 264



Adjustment jig

Type	Weight kg	Cat.-No.
ST 10	0.150	165 091



Conductor joint assembling tool

Type	Weight kg	Cat.-No.
MG-SW 10	0.125	165 093



Locking pin driver

for BFU anchor bar

Type	Weight kg	Cat.-No.
ED 10	0.010	165 277



Conductor dismantle tool

Type	Weight kg	Cat.-No.
DMW 10	0.039	165 119



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

