

# U10

## INSULATED CONDUCTOR SYSTEM



# INSULATED CONDUCTOR SYSTEM U10

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## GENERAL INFORMATION

The U10 insulated conductor system has been designed in accordance with VDE 0100. It complies with current conductor system safety requirements and protects against accidental human contact as stipulated by VDE 0470, part 1 (DIN EN 60529), (protection classification IP 21).

Fig. 1 illustrates that the VDE test “finger” cannot make contact with current carrying components. Compact collectors provide accidental contact protection only when the contact brushes are correctly and fully inside the conductors and covered by the insulating profile. Conductor systems located within reach of personnel, and with collectors exiting the conductors during operation, must have barriers or shut-off switches installed to prevent accidental contact. This is required only for conductor systems with operating voltage above 25 VAC or 60 VDC.



Fig 1: VDE test finger

U10 Conductor System is approved for indoor systems only.

Conductor systems may consist of any number of conductors. Space requirements are minimal. Contact opening at either downward or sideways orientation is possible.

Standard length for conductor sections is 6 m, shorter sections are available.

The standard PE conductor is marked with a continuous yellow stripe at the insulating profile. The ground conductor has a specifically shaped profile which reliably prevents the collector from entering a phase conductor; thus, the support structure cannot be inadvertently electrified.

## Approvals

UL Certification. Please consult us when ordering.

## Compact hanger

Compact hangers are used for conductor installation and will also provide and maintain the defined 14 mm phase distance. Hanger center distance is max. 0.6 m at straight sections, 0.3 m at curved sections.

## Joint splice/feed

Joint splice/feeds are used to mechanically and electrically connect U10 conductor sections. The included joint splice cap protects personnel from accidentally making contact when the system is under current. Each joint splice/feed can compensate for section expansion/contraction up to 4 mm.

## Feed terminals

A feed connection is possible at every joint splice. Also, each isolating assembly and transfer guide can serve as a feed location when a feed clip is installed. When additional feed points within a conductor section are required, feed terminals (inline only) may be installed.

## Transfer guides

Transfer guides serve as protection of the conductor end as well as a mechanical system separation. They also facilitate reliable passage of collector brushes at movable track sections such as track switches and lift stations. Installed with an aluminum anchor bracket (BFU), transfer guides lock the conductor ends in place at the support track thus creating a system fixpoint.

## Isolating assemblies (air gap)

Isolating assemblies interrupt the electrical current flow in a conductor. To utilize current collectors with the operational task to switch current on/off is only permitted when using low energy control current. For control function, feed sections, maintenance sections etc. we are supplying isolating assemblies with or without SE feed clip.

## Curves

U10 insulated conductors can be bend horizontally or vertically. A curve bending tool is available to produce curves at an installation site.

## Current collector

Current collectors are manufactured using impact resistant synthetic material and stainless steel components. Copper graphite or carbon contact brushes are used.

The length of the current collector cable cannot exceed 3 m if the installed overload protection is not rated for the current capacity of the cable. See also DIN VDE 0100, part 430 and DIN EN 60204-32. Connecting cables as supplied are sufficiently dimensioned for the listed nominal current. For installation variation reduction factors, as with DIN VDE 0298-4, must be observed.

DIN EN 60204-1 and DIN-EN 60204-2 stipulate that the reliability of PE systems using conductor brushes must be ensured. Doubling the PE collector is a practical and simple solution to achieve compliance.

## Industrial designations

DIN – German Institute for Standards

EN – European Standard

ISO – International Organization for Standardization

IEC – International Electrotechnical Commission

VDE – German Electrotechnical Association

IP – International Protection type and classification

UL – International Protection type and classification

## SAFETY NOTE

A safety distance of min. (0.5 m) between Conductor / Current Collector arrangement and other moving or fixed equipment must be kept to prevent accidental injury of personnel!

## Insulation profile values (electrical)

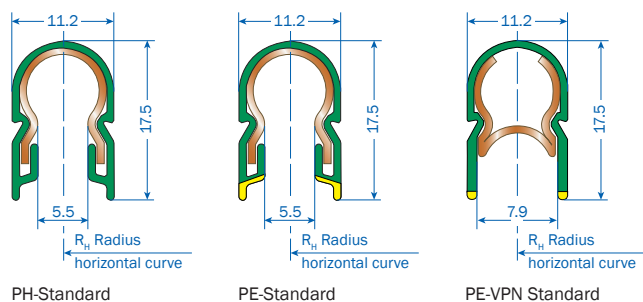
Type	Dielectric insulation DIN 53481	Specific resistance IEC 60093	Surface resistivity IEC 60093	Leakage path resistance IEC 60112
Standard profile, green	>25 kV/mm	>1 x 10 <sup>16</sup> Ohm x cm	2.1 x 10 <sup>15</sup> Ohm	CTI 400 – 1.1
High temp. profile, gray	>25 kV/mm	>1 x 10 <sup>14</sup> Ohm x cm	2.1 x 10 <sup>15</sup> Ohm	CTI 400 – 1.1

## Insulation profile values (mechanical)

Type	Bending rigidity ISO 178	Tensile strength ISO 527	UV resistance	Max. relative humidity	Ambient temperature range <sup>(1)</sup>	Flammability
Standard profile, green	74 – 85 N/mm <sup>2</sup>	44 – 55 N/mm <sup>2</sup>	Xenon test >1500	<100 %	–30 °C to +55 °C	Flame resistant, self extinguishing, UL 94 V0
High temp. profile, gray	90 – 100 N/mm <sup>2</sup>	47 – 65 N/mm <sup>2</sup>	Xenon test >1500	<100 %	–30 °C to +85 °C	Flame resistant, self extinguishing, UL 94 V0

## TECHNICAL DATA

### CONDUCTOR SECTION



### Conductor code

U = Unipole insulated conductor  
 10 = Profile dimensions  
 25 = Conductor cross section (mm<sup>2</sup>)  
 C = Copper conductor  
 E = Stainless steel conductor

### Supplied length

6 m (19.6") standard section,  
 shorter sections available

### Max. support distance

Straight sections: 0.6 m (2")  
 Curves: 0.3 m (1")

### Phase distance

Standard = 14 mm

### Bending conductors

Without pre-bending  $\infty \geq R \geq 5000$  mm

At site:

Horizontal curves  $5000 \text{ mm} \geq R \geq 750$  mm

Inward/outward facing curves  $5000 \text{ mm} \geq R \geq 750$  mm

Curves  $R \leq 750$  mm pls. inquire.

### Application

Indoor systems only

### Versions

Version	Type	Color	Weight kg/m	Order No.
Phase (standard profile)	U10/25C-....PH-B	green	0.267	16700•
	U10/25E-....PH-B	green	0.246	16702•
PE (standard profile)	U10/25C-....PE-A	green, yellow	0.267	16706•
	U10/25E-....PE-A	green, yellow	0.246	16708•
PE-VPN (standard profile)	U10/25C-....VPN-A	green, yellow	0.267	14488•
	U10/25C-....VPNG-A <sup>(4)</sup>	green, yellow	0.267	14490•
Phase (high temp. profile)	U10/25C-....PH-D85	grey	0.267	16703•
	U10/25E-....PH-D85	grey	0.246	16705•
PE (high temp. profile)	U10/25C-....PE-C85	grey/green, yellow	0.267	16709•
	U10/25E-....PE-C85	grey/green, yellow	0.246	16711•
PE-VPN (high temp. profile)	U10/25C-....VPN-C85	grey/green, yellow	0.267	14489•
	U10/25C-....VPNG-C85 <sup>(4)</sup>	grey/green, yellow	0.267	14492•
Phase (heat treated)	U10/25CW-3000PH-B	green	0.267	144403
PE-VPN (heat treated)	U10/25CW-3000VPN-A	green, yellow	0.267	144897
	U10/25CW-3000VPNG-A <sup>(4)</sup>	green, yellow	0.267	144899

### Conductor system values

Type	Leakage distance profile mm	Max. nominal voltage <sup>(3)</sup>	Max. continuous current A	Resistance Ohm/1000 m	Impedance <sup>(2)</sup> Ohm/1000 m
U10/25 C	30	690	100	0.744	0.748
U10/25 E	30	690	10	31.328	31.328

### Selection of conductors

Conductor selection must consider required current capacity and existing environmental conditions.

- U10/25 C conductor system with copper conductor for main current, control signal and data
- U10/25 E conductor system with stainless steel conductor for control signal and data transmission at corrosive environments

(1) Type designation to be completed, e.g. U10/25E-**6000**PH-B for 6 m phase, order no. 167026  
 The four-digit number (printed bold) at the type designation indicates the length of the conductor section.

(2) Based on 14 mm phase distance at 50 Hz

(3) Not with UL certification  $U_{UL} = 600$  V

(4) For inward facing curves and outward facing curves

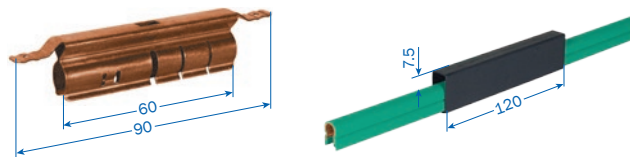
• The last numeral of the order no. indicates the length of the conductor section in meters. Accordingly complete the order no. with 1, 2, 3, 4, 5 or 6.

## JOINT (FEED)

Max. 2 x 40 A continuous current

Compensates for up to 4 mm section expansion/contraction caused by temperature fluctuations

Connecting cables not included, please order from page 15

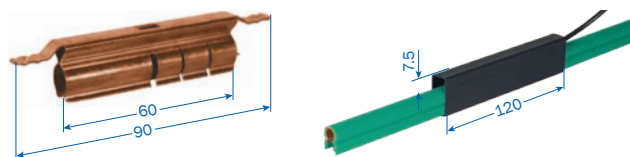


Type	Weight kg	Order No.
VM-UEV10/C	0.026	165006
VM-UEV10VPN/C	0.026	143213

## LINE FEED

Max. 2 x 50 A continuous current

Connecting cable not included, please order from page 15



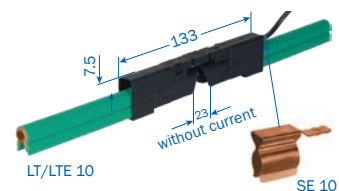
Type	Weight kg/m	Order No.
ES-UES10	0.026	165212
ES-UES10VPN	0.026	143214

## ISOLATING ASSEMBLY (AIR GAP)

Max. 40 A continuous current

Two halves are joined during installation

Feed clip SE 10 with tab connector 6.3x0.8 mm (max. continuous current 40A), at least one additional compact hanger required for each isolating assembly.



Type	Description	Weight kg	Comprising	Order No.
ST-LT/LT10		0.017	2 x LT/U 10	165025
ST-LT/LTE10		0.021	2 x LT/U 10 1 x Feed clip SE 10	165114
ST-LTE/LTE10		0.025	2 x LT/U 10 2 x Feed clip SE 10	165026

## SPACER CLIP

to provide support for isolating assembly by filling gap between isolating assembly and web of aluminum monorail track at 16.5 mm system height<sup>(1)</sup>.



Type	Weight kg	Order No.
EU-DK10/16.5	0.002	165682

(1) System height = distance contact surface to back of compact hanger (at web of monorail track)

## EXPANSION SECTION

single conductor, to be completed at installation site

Expansion capability of expansion section must equal the max. expansion capability of the EMS track.

Two fix points are required with each expansion section. Please order as required by the EMS track layout.

An additional compact hanger is required for each 15 mm expansion capability. Please add to your order as required.

### Standard

Type	Weight kg	Expansion	Order No.
VM-UDV10/C-30	0.052	up to 30 mm	166542
VM-UDV10/C-45	0.075	up to 45 mm	166543
VM-UDV10/C-60	0.104	up to 60 mm	166544

### PE-VPN

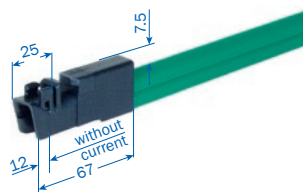
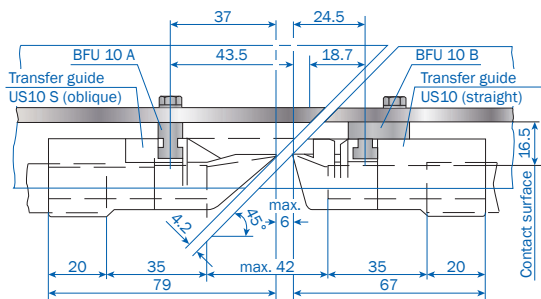
Type	Weight kg	Expansion	Order No.
VM-UDV10VPN/C-30	0.052	up to 30 mm	143356
VM-UDV10VPN/C-45	0.075	up to 45 mm	143357
VM-UDV10VPN/C-60	0.104	up to 60 mm	143358

## TRANSFER GUIDES

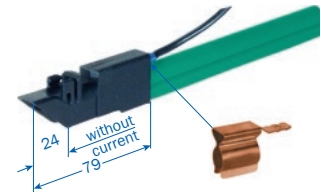
Max. vertical and horizontal offset  $\pm 3$  mm respective

### Transfer guide for phase + PE

Max. 40 A continuous current



without feed clip: US 10

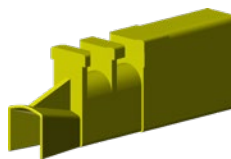


with feed clip: USE 10 S  
(tab connector 6.3x0.8 mm)

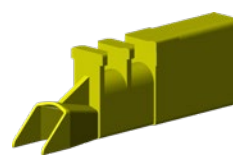
Type	Weight kg/m	Version	Feed clip	Order No.
MU-US10	0.008	straight	without	165008
MU-US10S	0.008	oblique	without	165009
MU-USE10	0.012	straight	with	165010
MU-USE10S	0.012	oblique	with	165011

### Transfer guide for PE-VPN

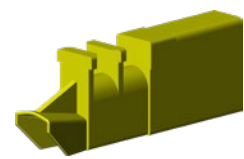
Max. 40 A continuous current



without feed clip:  
US 10 PE-VPN



without feed clip:  
US 10 SP-VPN



without feed clip:  
US 10 S-VPN  
(tab connector 6.3x0.8 mm)

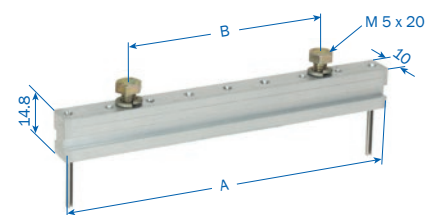
Type	Weight kg/m	Version	Feed clip	Order No.
MU-US10-VPN	0.007	straight	without	144863
MU-US10S-VPN	0.007	oblique	without	144865
MU-US10SP-VPN	0.008	oblique positive	without	144867
MU-USE10-VPN	0.011	straight	with	144864
MU-USE10S-VPN	0.011	oblique	with	144866
MU-USE10SP-VPN	0.012	oblique positive	with	144868

## ANCHOR BRACKET (ALUMINUM) FOR TRANSFER GUIDES

to be bolted to the track

Two holes to be drilled through the EMS track to screw on the anchor bracket from the back.

Kit comprises: 1x anchor bracket, 2x hex screws M5 with lock washer, 2x roll pins 2x20.



### BFU 10A

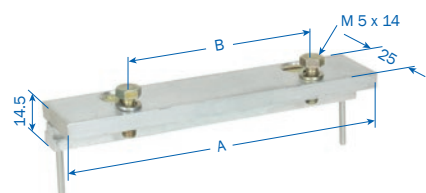
for system height<sup>(1)</sup> = 16.5 mm

Type	No. of poles	A mm	B mm	Weight kg	Order No.
MU-BFU10H4/16.5/14-59/42	1 - 4	59	42	0.032	144422
MU-BFU10H6/16.5/14-90/42	1 - 6	90	42	0.040	144499
MU-BFU10H8/16.5/14-118/70	1 - 8	118	70	0.048	165168
MU-BFU10H10/16.5/14-143/70	1 - 10	143	70	0.056	165176

### BFU 10B

to be used when EMS track has been cut obliquely (see drawing page 6).

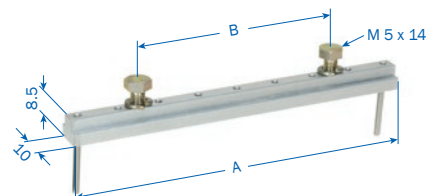
for system height<sup>(1)</sup> = 16.5 mm



Type	No. of poles	A mm	B mm	Weight kg	Order No.
MU-BFU10H4/16.5/14-59/42-25	1 - 4	59	42	0.053	144419
MU-BFU10H6/16.5/14-90/42-25	1 - 6	90	42	0.065	143982
MU-BFU10H8/16.5/14-118/70-25	1 - 8	118	70	0.077	165272
MU-BFU10H10/16.5/14-143/70-25	1 - 10	143	70	0.089	165274

### BFU 10

for system height<sup>(1)</sup> = 10.5 mm



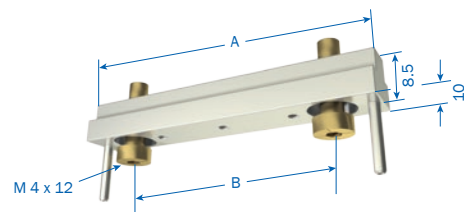
Type	No. of poles	A mm	B mm	Weight kg	Order No.
MU-BFU10H4/10/14-62/42	1 - 4	62	42	0.022	144022
MU-BFU10H6/10/14-90/42	1 - 6	90	42	0.026	143983
MU-BFU10H8/10/14-118/70	1 - 8	118	70	0.030	165115

### BFU 10V

for system height<sup>(1)</sup> = 10.5 mm

Socket head screws inserted at front of EMS track. Anchor bracket kit consists of:

1x anchor bracket, 2x socket head screws M4, 2x roll pins.



Type	No. of poles	A mm	B mm	Weight kg	Order No.
MU-BFU10V4/10/14-59/42	1 - 4	59	42	0.015	144355
MU-BFU10V6/10/14-90/42	1 - 6	90	42	0.021	144513
MU-BFU10V8/10/14-118/70	1 - 8	118	70	0.026	144514

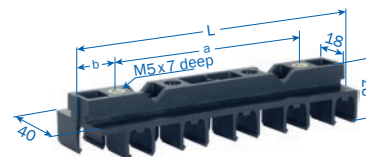
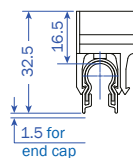
(1) System height = distance contact surface to back of compact hanger (at web of monorail)

## STANDARD COMPACT HANGERS

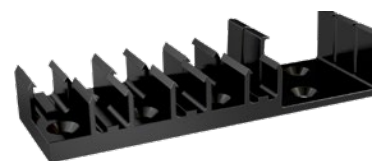
for system height = 16.5 mm

Screw material must be selected according to the web thickness.

These compact hangers may be combined to support any number of conductors.



Type	Max. number of poles	L	a	b	Weight kg	Order No.
AH-KA10L-2/16.5-N-PA-14	2	29	0	20.5	0.012	142072
AH-KA10L-4/16.5-10N-PA-14	4	57	42	7.5	0.024	142073
AH-KA10L-6/16.5-10N-PA-14	6	85	42	21.5	0.033	142757
AH-KA10L-8/16.5-10N-PA-14	8	113	42	35.5	0.045	142075
AH-KA10L-10/16.5-N-PA-14	10	141	100	20.5	0.056	142076



6 poles + SMGM

### Compact hanger KA10 (used with screws)

incl. adapter for SMGM

Type	Max. number of poles	L	Weight kg	Order No.
AH-KA10-4/10.5-UNI-PA-SMG-14	4	100	0.027	144354
AH-KA10-6/10.5-UNI-PA-SMG-14	6	128	0.036	100102 11

## LOCATING CLAMPS

2 USK10 location clamps are required for each fix point



Illustration shows positioning of the two Locating clamps at a compact hanger

### Locating clamp standard

Type	Weight kg	Order No.
USK10	0.006	165645

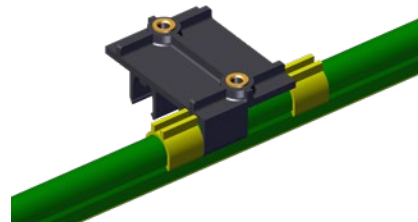


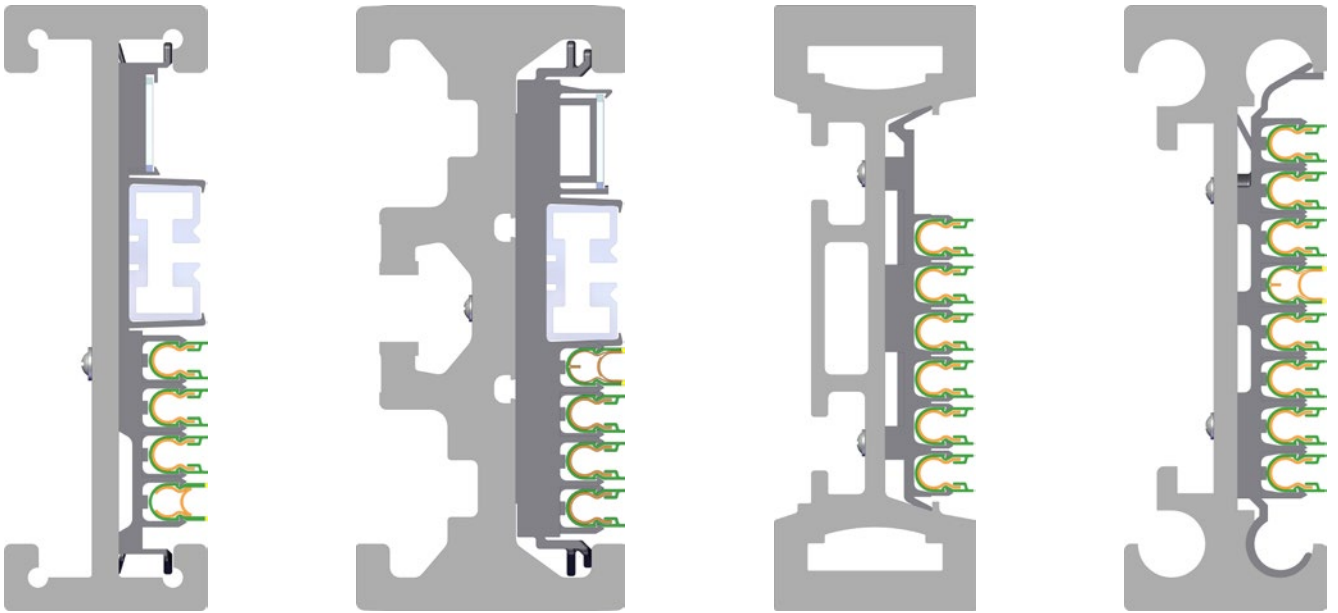
Illustration shows positioning of the two locating clamps at a compact hanger

### Locating clamp PE-VPN

Type	Weight kg	Order No.
USK10A-VPN	0.001	144876

## COMPACT HANGERS (CUSTOMER SPECIFIC)

Engineered and manufactured to fit customer specific EMS track



## COMPACT CURRENT COLLECTOR

### KDS2/40

PE-VP for EMS installations

for installations with mostly one-way travel

with 1x0.5m connecting cable type WFLA 2.5

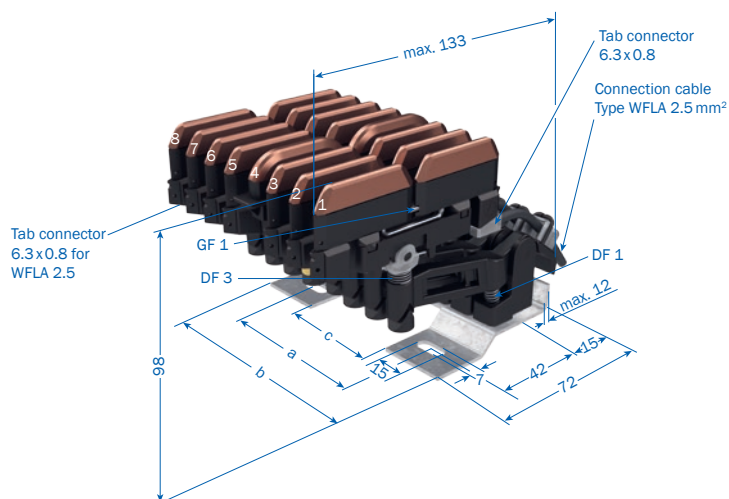
Max. current: 1 connecting cable 2.5 mm<sup>2</sup>, 25 A  
2 connecting cables 2.5 mm<sup>2</sup>, 40 A

Lift: ±15 mm

Swivel: ±15 mm

Contact pressure: approx. 3.5 N per contact brush

Connecting cable: 2.5 mm<sup>2</sup> type WFLA 2.5 high flex included



PE standard at No. 4 position, variations are possible.

PE makes contact first when entering conductors.

Type	No. of poles	Dim. a mm	Dim. b mm	Dim. c mm	Weight kg	Base plate	Order No. with PE-VP	with PE Standard
SA-KDS2/40/4/14VP0.5/4/4	4	28	62	-	0.428	4-pole	143277	-
SA-KDS2/40/4/14HS0.5/4/4	4	28	62	-	0.428	4-pole	-	168082
SA-KDS2/40/5/14VP0.5/4/6/6	5	56	90	-	0.549	6-pole (No. 6 = open)	143332	-
SA-KDS2/40/5/14HS0.5/4/6/6	5	56	90	-	0.549	6-pole (No. 6 = open)	-	168083
SA-KDS2/40/6/14VP0.5/4/6	6	56	90	-	0.637	6-pole	143219	-
SA-KDS2/40/6/14HS0.5/4/6	6	56	90	-	0.637	6-pole	-	168084
SA-KDS2/40/7/14VP0.5/4/8/8	7	80	118	53	0.744	8-pole (No. 8 = open)	143377	-
SA-KDS2/40/7/14HS0.5/4/8/8	7	80	118	53	0.744	8-pole (No. 8 = open)	-	168085
SA-KDS2/40/8/14VP0.5/4/8	8	80	118	53	0.832	8-pole	143220	-
SA-KDS2/40/8/14HS0.5/4/8	8	80	118	53	0.832	8-pole	-	168086
SA-KDS2/40/9/14VP0.5/4/10/10	9	80	156	53	0.959	10-pole (No. 10 = open)	143378	-
SA-KDS2/40/9/14HS0.5/4/10/10	9	80	156	53	0.959	10-pole (No. 10 = open)	-	168087
SA-KDS2/40/10/14VP0.5/4/10	10	80	156	53	1.047	10-pole	143379	-
SA-KDS2/40/10/14HS0.5/4/10	10	80	156	53	1.047	10-pole	-	168088
Single conductor available with 0.5m connecting cable							Phase, black	PE, yellow
SA-KDS2/40/04PH-88/15-0.5					0.091	w/o	168073	-
SA-KDS2/40/30VP-79/15-0.5					0.105	w/o	-	143218
SA-KDS2/40/04PE-88/15-0.5					0.090	w/o	-	168074

### Current collector sets (trailing unit)

Single conductor on base plate. PE standard at No. 4 position, variations possible!

Type	Dim. a mm	Dim. b mm	Dim. c mm	Weight kg	Base plate	Order No. PE-VP	Order No. PE
SA-KDS2/40/1/14VP0.5/4/4/1-3	28	62	-	0.164	4-pole	143361	-
SA-KDS2/40/1/14HS0.5/4/4/1-3	28	62	-	0.164	4-pole	-	168079-D
SA-KDS2/40/1/14VP0.5/4/6/1-3U5-6	56	90	-	0.197	6-pole	143369	-
SA-KDS2/40/1/14HS0.5/4/6/1-3U5-6	56	90	-	0.197	6-pole	-	167454
SA-KDS2/40/1/14VP0.5/4/8/1-3U5-8	80	118	53	0.216	8-pole	143635	-
SA-KDS2/40/1/14HS0.5/4/8/1-3U5-8	80	118	53	0.216	8-pole	-	167830

## KUFR2/40

for installations requiring bi-directional travel

with 1x0.5 m connecting cable type WFLA 2.5

Max. current: 1 connecting cable 2.5 mm<sup>2</sup>, 25 A  
2 connecting cables 2.5 mm<sup>2</sup>, 40 A

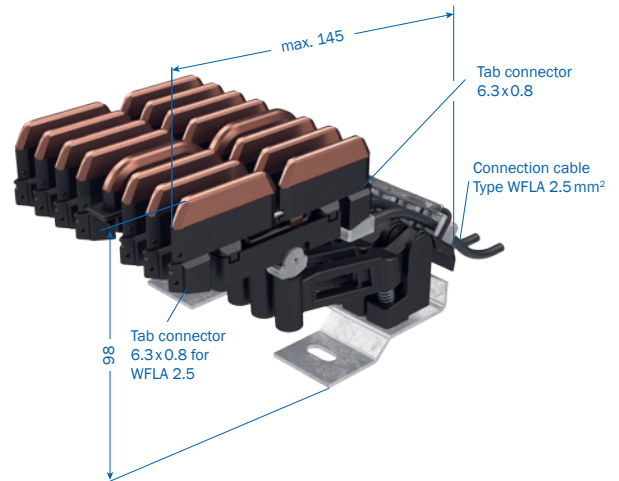
Stroke: ±15 mm

Swivel: ±15 mm

Contact pressure: approx. 3.5 N per contact brush

Connecting cable: 2.5 mm<sup>2</sup> Type WFLA 2.5

Length: 0.5 m, high flex included



PE standard at No. 4 position, variations are possible.

Dimensions of base plate see KDS2/40.

PE makes contact first when entering conductors.

Type	No. of poles	Weight kg	Base plate	Order No.	
				with PE-VP	with PE Standard
SA-KUFR2/40/4/14VP0,5/4/4	4	0.448	4-pole	144474	-
SA-KUFR2/40/4/14HS0,5/4/4	4	0.448	4-pole	-	165927
SA-KUFR2/40/5/14VP0,5/4/6/6	5	0.573	6-pole (No. 6 = open)	144475	-
SA-KUFR2/40/5/14HS0,5/4/6/6	5	0.573	6-pole (No. 6 = open)	-	165928
SA-KUFR2/40/6/14VP0,5/4/6	6	0.666	6-pole	144476	-
SA-KUFR2/40/6/14HS0,5/4/6	6	0.666	6-pole	-	165929
SA-KUFR2/40/7/14VP0,5/4/8/8	7	0.779	8-pole (No. 8 = open)	144478	-
SA-KUFR2/40/7/14HS0,5/4/8/8	7	0.779	8-pole (No. 8 = open)	-	165930
SA-KUFR2/40/8/14VP0,5/4/8	8	0.872	8-pole	144479	-
SA-KUFR2/40/8/14HS0,5/4/8	8	0.872	8-pole	-	165931
SA-KUFR2/40/9/14VP0,5/4/10/10	9	1.004	10-pole (No. 10 = open)	144480	-
SA-KUFR2/40/9/14HS0,5/4/10/10	9	1.004	10-pole (No. 10 = open)	-	165932
SA-KUFR2/40/10/14VP0,5/4/10	10	1.097	10-pole	144481	-
SA-KUFR2/40/10/14HS0,5/4/10	10	1.097	10-pole	-	165933
Single conductor available with 0.5 m connecting cable				Phase, black	PE, yellow
SA-KUFR2/40/20PH-88/15-0.5		0.093		165955	-
SA-KUFR2/40/20PE-88/15-0.5		0.091		-	165956
SA-KUFR2/40/04VP-79/15-0.5		0.105		-	143776

## Current collector sets (trailing unit)

Single conductor on base plate. PE standard at No. 4 position, variations possible!

Type	Dim. a mm	Dim. b mm	Dim. c mm	Weight kg	Base plate	Order No. PE-VP	Order No. PE
SA-KUFR2/40/1/14VP0,5/4/4/1-3	28	62	-	0.164	4-pole	143774	-
SA-KUFR2/40/1/14HS0,5/4/4/1-3	28	62	-	0.164	4-pole	-	166491
SA-KUFR2/40/1/14VP0,5/4/6/1-3U5-6	56	90	-	0.197	6-pole	143836	-
SA-KUFR2/40/1/14HS0,5/4/6/1-3U5-6	56	90	-	0.197	6-pole	-	167573
SA-KUFR2/40/1/14VP0,5/4/8/1-3U5-8	80	118	53	0.216	8-pole	144482	-
SA-KUFR2/40/1/14HS0,5/4/8/1-3U5-8	80	118	53	0.216	8-pole	-	167661

## COMPACT CURRENT COLLECTOR

## KUFU25

for installations requiring bi-directional travel

for entry funnel EFT10-KUFU

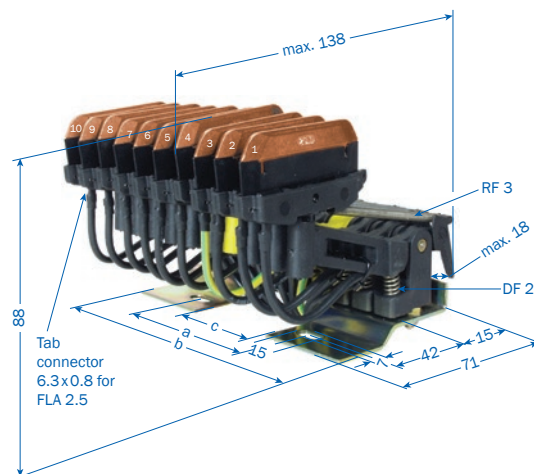
with 1 m connecting cable type FLA 2.5

max. continuous current: 25 A

Stroke: +15 mm / -10 mm

Swivel:  $\pm 15\text{ mm}$

Contact pressure: approx. 3.5 N per contact brush



PE at No. 4 position, with 3 conductors at No. 3, with 2 conductors at No. 2. Variations are possible. PE makes contact first when entering conductors.

Type	No. of poles	Dim. a mm	Dim. b mm	Dim. c mm	Weight kg	Base plate	Order No. with PE-VP	with PE-Standard
SA-KUFU25/2/14HS1.0/2/2	2	-	34	-	0.228	2-pole	168040	-
SA-KUFU25/2/14SS1.0/2	2	-	34	-	0.228	2-pole	-	168051
SA-KUFU25/3/14HS1.0/3/4/4	3	28	62	-	0.340	4-pole (No. 4 = open)	168041	-
SA-KUFU25/3/14SS1.0/4/4	3	28	62	-	0.340	4-pole (No. 4 = open)	-	168052
SA-KUFU25/4/14HS1.0/4/4	4	28	62	-	0.428	4-pole	168042	-
SA-KUFU25/4/14SS1.0/4	4	28	62	-	0.428	4-pole	-	168053
SA-KUFU25/5/14HS1.0/4/6/6	5	56	90	-	0.549	6-pole (No. 6 = open)	168043	-
SA-KUFU25/5/14SS1.0/6/6	5	56	90	-	0.549	6-pole (No. 6 = open)	-	168054
SA-KUFU25/6/14HS1.0/4/6	6	56	90	-	0.637	6-pole	168044	-
SA-KUFU25/6/14SS1.0/6	6	56	90	-	0.637	6-pole	-	168055
SA-KUFU25/7/14HS1.0/4/8/8	7	80	118	53	0.744	8-pole (No. 8 = open)	-	168045
SA-KUFU25/7/14SS1.0/8/8	7	80	118	53	0.744	8-pole (No. 8 = open)	-	168056
SA-KUFU25/8/14HS1.0/4/8	8	80	118	53	0.832	8-pole	168046	-
SA-KUFU25/8/14SS1.0/8	8	80	118	53	0.832	8-pole	-	168057
SA-KUFU25/9/14HS1.0/4/10/10	9	80	146	53	0.959	10-pole (No. 10 = open)	168047	-
SA-KUFU25/9/14SS1.0/10/10	9	80	146	53	0.959	10-pole (No. 10 = open)	-	168058
SA-KUFU25/10/14HS1.0/4/10	10	80	146	53	1.047	10-pole	168048	-
SA-KUFU25/10/14SS1.0/10	10	80	146	53	1.047	10-pole	-	168059
Single conductor available, without connecting cable							Phase, black	PE, yellow
SA-KUFU25/20PH-78/15-0.0					0.051		168015	-
SA-KUFU25/20PE-78/15-0.0					0.051		-	168016

## KESR 32-55

for installations requiring bi-directional travel

max. continuous current: 55A

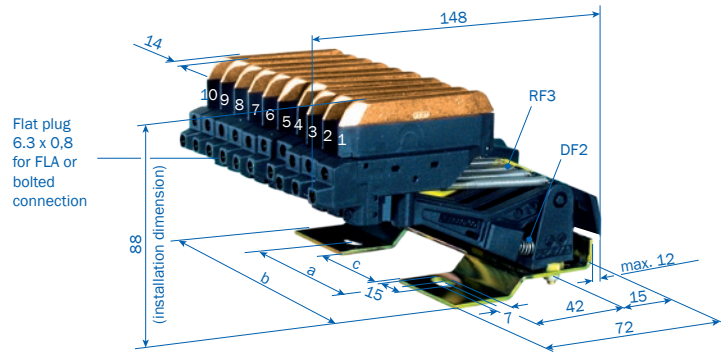
Stroke: +15 mm

Swivel: ±15 mm

Contact pressure: approx. 7 N per contact brush

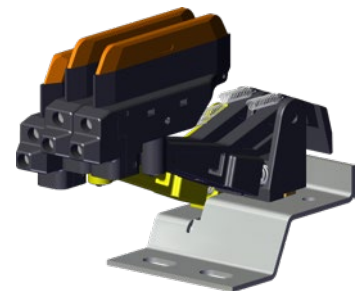
PE standard at No. 4 position, variations are possible.

PE makes contact first when entering conductors.



max. continuous current	Tab connector	Wire end ferrule
32A	FLA 2.5	AEA 2.5
40A	FLA 4.0	AEA 4.0
55A	FLA 6.0	AEA 6.0

Type	No. of poles	Dim. a mm	Dim. b mm	Dim. c mm	Weight kg	Base plate	Order No.	
SA-KESR32-55F-4-14HS-0-04-04	4	28	62	–	0.480	4-pole	143170	
SA-KESR32-55F-5-14HS-0-04-06-06	5	56	90	–	0.540	6-pole (No. 6 = open)	143373	
SA-KESR32-55F-6-14HS-0-04-06	6	56	90	–	0.600	6-pole	143113	
SA-KESR32-55F-7-14HS-0-04-08-08	7	80	118	53	0.660	8-pole (No. 8 = open)	143114	
SA-KESR32-55F-8-14HS-0-04-08	8	80	118	53	0.720	8-pole	143115	
SA-KESR32-55F-9-14HS-0-04-10-10	9	80	146	53	0.780	10-pole (No. 10 = open)	143116	
SA-KESR32-55F-10-14HS-0-04-10	10	80	146	53	0.840	10-pole	143117	
Single conductor available, without connecting cable							Phase, black	PE, yellow
SA-KESR32-55F/14 ... -31-0					0.060		143111	143112



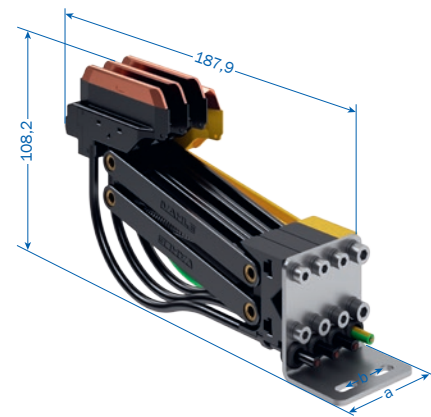
## KESR VP

Type	No. of poles	Weight kg	Base plate	Order No.
SA-KESR32-55/3/14VP0,0S/1/4/4	3	0.324	4-pole (No. 4 = open)	0144599-A
SA-KESR32-55/3/14VP0,0S/4/4/1	3	0.324	4-pole (No. 1 = open)	0144599
SA-KESR32-55/4/14VP0,0S/1/4	4	0.403	4-pole	0144607-A
SA-KESR32-55/4/14VP0,0S/4/4	4	0.403	4-pole	0144607

COMPACT CURRENT COLLECTOR

SKID63

- for installations requiring bi-directional travel
- Current collector for skillet system applications
- Special funnel to compensate the high swivel (funnel on request)
- Possible swivel: ±30 mm ↕ ↔
- Travel speed: up to 180 m/min
- Max. continuous current: 63 A per contact brush
- Contact pressure: approx. 7.5 N per contact brush
- Contact protection according to IP21
- PE ground reverse polarity protection
- Automatic centering for funnel entries



Type (32 A)	No. of poles	Dim. a mm	Dim. b mm	Weight kg	Base plate	Order No.	
SA-KSTUR32-4/14VP1,0/4/4	4	62	18	0.596	4-pole	144683/00	
SA-KSTUR32-4/14VP1,0/1/4	4	62	18	0.596	4-pole	144683/00-A	
Single conductor available with 1 m connecting cable (32 A)				Weight kg	Base plate	Order No. Phase	PE-VP
SA-KSTUR32/14VP-20A-1000				0.110	without	-	144696/00
SA-KSTUR32/14PH-31A-1000				0.110	without	144695/00	-

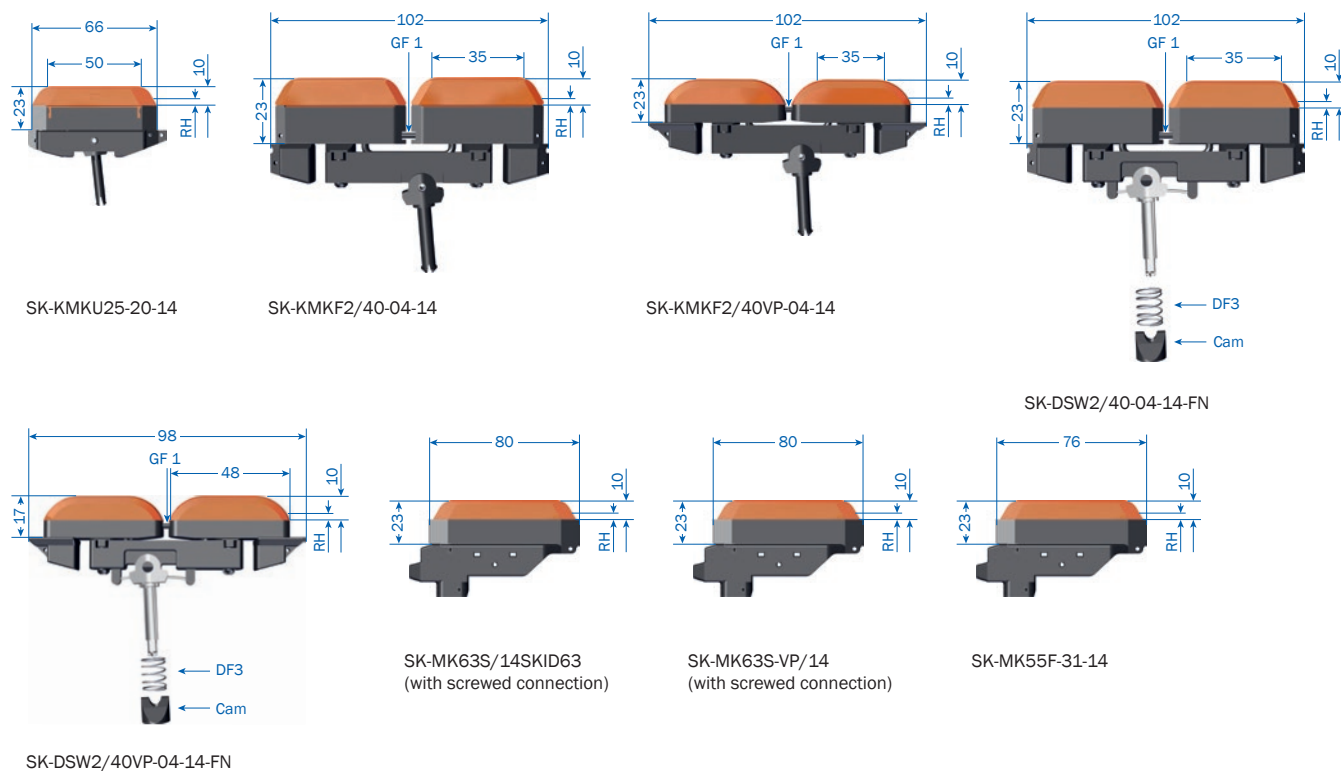
Other current ratings on request.

Other versions on request.

## CARBON BRUSHES

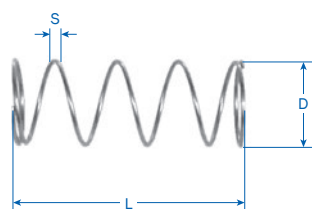
width of contact brushes = 3.8 mm, min. remaining brush height (RH) = 3 mm

with tab connector



Type	for current collector	Weight kg	Order No.
SK-KMKU25-20-14	KUFU25	0.030	168284
SK-DSW2/40-04-14-FN	KDS2/40	0.049	168151
SK-DSW2/40VP-04-14-FN	KDS2/40 PE-VP	0.060	144059
SK-KMKF2/40-04-14	KUFR2/40	0.050	144277
SK-KMKF2/40VP-04-14	KUFR2/40VP	0.060	143777
SK-MK63S/14	SKID63 and KESR55	0.046	144691
SK-MK63S-VP/14	SKID63 and KESR55	0.050	144692
SK-MK55F-31-14	KESR	0.038	780920

## SPRINGS



Compression spring DF3



Tension spring RF3



Alignment spring GF1



Cam

Type	for current collector	S mm	D mm	L mm	Order No.
DF3	KDS2/40	0.55	9.55	24.00	152011
RF3	KUFU25, KUFR2/40	0.40	4.40	31.00	153849
GF1	KDS2/40, KUFR2/40	-	2.00	21.50	153850
NOCKEN	KDS2/40				1011917

## CONNECTING CABLES

### Connecting cable, highly flexible

for current collector, feed terminal, transfer guide and isolating assembly  
(for current collector KDS and KUFR use connecting cable WFLA 2.5)



WFLA



FLA/FKA

FH

### Connecting cable, double insulated

for current collector or feed terminal

Length: 0.5 m with tab plug 6.3x0.8  
Longer connecting cable available

Length: 1 m with tab plug 6.3x0.8  
Longer connecting cable available

Type	Cross section mm <sup>2</sup>	Ø mm		Weight kg		Order No. Phase black	Order No. PE green/yellow
		PH	PE	PH	PE		
AL-FLA2.5PH1-6.3	2.50	3.9	-	0.037	-	165049	-
AL-FLA2.5PE1-6.3	2.50	-	3.6	-	0.035	-	165050
AL-FLA4PH1-6.3	4.00	5.4	-	0.064	-	165051	-
AL-FLA4PE1-6.3	4.00	-	5.2	-	0.059	-	165052
AL-FLA6PH1-6.3	6.00	5.7	-	0.086	-	166368	-
AL-FLA6PE1-6.3	6.00	-	5.7	-	0.083	-	166369
AL-WFLA2.5PH0.5-6.3	2.50	3.9	-	0.020	-	168107	-
AL-WFLA2.5PE0.5-6.3	2.50	-	3.6	-	0.018	-	168108

### Connecting cable, single insulation

for isolating assembly only

Type	Cross section mm <sup>2</sup>	Ø mm		Weight kg		Order No. Phase black	Order No. PE green/yellow
		PH	PE	PH	PE		
AL-IFKA1.5PH1-6.3	1.50	3.0	-	0.020	-	166557	-
AL-IFKA1.5PE1-6.3	1.50	-	3.0	-	0.020	-	166558
AL-IFKA2.5PH1-6.3	2.50	3.7	-	0.032	-	166238	-
AL-IFKA2.5PE1-6.3	2.50	-	3.7	-	0.032	-	166239
AL-IFKA4PH1-6.3	4.00	4.3	-	0.050	-	166240	-
AL-IFKA4PE1-6.3	4.00	-	4.3	-	0.050	-	166241
AL-IFKA6-PH1-6.3	6.00	4.9	-	0.064	-	166242	-
AL-IFKA6-PE1-6.3	6.00	-	4.9	-	0.064	-	166243

### Tab plug only (without cable)

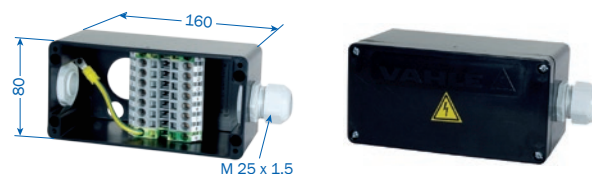
Type	for cable cross section mm <sup>2</sup>	Weight kg	Order No.
FH2.5	2.5	0.002	165120
FH4-6	4-6	0.002	165121
WFH2.5	2.5	0.002	168109

## TERMINAL BOXES

### Terminal box AKE

for conductor current supply with max.  $7 \times 6 \text{ mm}^2$  terminal clamps and  $2 \times 6 \text{ mm}^2$  PE terminal clamps.

Please inquire when terminal clamp variations are desired.



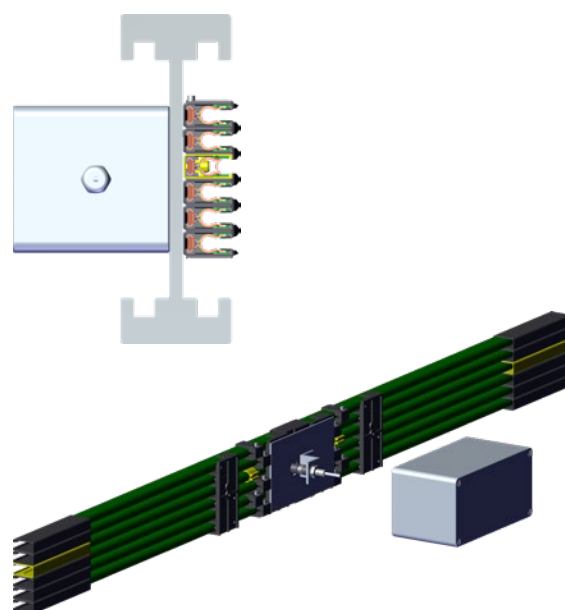
Type	Weight kg	Order No.
ES-AKE1-PH7 x 2L6-PE2 x 2L6-M25	0.445	169462

## BRUSH WEAR INDICATOR

Brush wear indicator can be supplied installed on 1 m conductor section. Please specify the corresponding conductor arrangement and position when ordering.

The brush wear indicator checks the remaining brush height each time a collector set passes. Max. travel speed 70 m/min. When the remaining brush height reaches the preset value of 3 mm the brush wear indicator will send an impulse. It is practical to install the brush wear indicator ahead of a track switch, then the impulse can actuate the track switch to send the unit directly into a maintenance spur.

An opening, min. width 120 mm height 50 mm, must be cut at the EMS track web. PE position is variable, similarly to the conductor arrangement; please inquire. Differing remaining brush height settings above 3 mm are also available.



### Brush wear indicator with inductive proximity switch

The last slot of a brush wear indicator with an uneven number of conductors remains unoccupied.

Type	Number of poles	Weight kg	Order No. PE-VPN at No. 4	Order No. PE at No. 4
VT-KVT10-4-14VPN4B	4	2.011	144907	-
VT-KVT10-4-14HS4B	4	2.011	-	166957
VT-KVT10-5-14VPN4B/6	5	2.252	144908	-
VT-KVT10-5-14HS4B/6	5	2.252	-	167440
VT-KVT10-6-14VPN4B	6	2.453	144909	-
VT-KVT10-6-14HS4B	6	2.453	-	166895
VT-KVT10-7-14VPN4B/8	7	2.692	144910	-
VT-KVT10-7-14HS4B/8	7	2.692	-	167441
VT-KVT10-8-14VPN4B	8	2.893	144911	-
VT-KVT10-8-14HS4B	8	2.893	-	166896
VT-KVT10-9-14VPN4B/10	9	3.131	144912	-
VT-KVT10-9-14HS4B/10	9	3.131	-	167442
VT-KVT10-10-14VPN4B	10	3.335	144913	-
VT-KVT10-10-14HS4B	10	3.335	-	166897

## INSTALLATION TOOLS

### Curve tool

for forming U10 vertical and horizontal curves.

Filler rods must be ordered separately. For the conductor system PE-VPN no filler rod is required.

Buy or rent (on request) possible.



Type	Description	Weight kg	Order No.
MZ-BVU10-VPN	Curve tool	6.918	143318
MZ-FU10-V <sup>(1)</sup>	Filler rod for PH/PE (4 m)	0.371	165234
MU-FU10-H <sup>(2)</sup>	Filler rod for PH/PE (4 m)	0.354	144416

### Crosscut saw

for cutting U10 insulator profiles and conductor profiles

Voltage required: 230V, 50Hz



Type	Description	Weight kg	Order No.
MZ-KS10	Crosscut saw, complete	6.500	165276
MZ-SB	Spare saw blade	0.510	144889

### Conductor punch tool

for punching joint splice window into conductor profile

after cutting standard length section.

For phase and PE and PE-VPN conductors.



Standard PH/PE



PE-VPN

Type	Description	Weight kg	Order No.
MZ-LZ10PH/PE	Conductor punch tool for Phase and Standard PE	0.480	144363
MZ-LZ10PE-VPN	Conductor punch tool for PE-VPN	0.563	144875



RF



HRF

### Deburring file

Type	Application	Weight kg	Order No.
MZ-RF-150-H3-D6	Deburr inside profile after cutting section	0.085	143330
MZ-HRF-150-H3	Deburr outside profile after cutting section	0.085	165264

### Adjustment jig

facilitates cutting precise length of insulation profile without using measuring tape.



Type	Weight kg	Order No.
MZ-ST10	0.150	165091

### Transfer guide PE to PE-VPN

The transfer guide is used for a limited time in systems in which the standard PE conductor rail is to be replaced by the PE-VPN conductor rail. 200,000 transfers or 2 months (whichever comes first).



Type	Weight kg	Order No.
ÜBERLEITUNGSSTÜCK PE AUF PE-VPN	0.035	144880

(1) For making vertical EMS curve sections.

(2) For making horizontal and outward facing AEM curve sections.

### Joint splice/feed assembling tool

To push conductor into joint splice clip

If necessary, to widen conductor slot opening

To move joint splice cap in place



Type	Weight kg	Order No.
MZ-MG-SW10	0.125	165093

### Locking pin driver

to insert BFU anchor bar transfer guide locking pins



Type	Weight kg	Order No.
MZ-ED10	0.010	165277

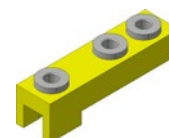
### Conductor removal tool

to release and remove conductors from compact hangers



Type	Weight kg	Order No.
MZ-DMW10	0.039	165119

### Drilling jig for fix point (PE-VPN)



Type	Weight kg	Order No.
MZ-BS10A-VPN	0.069	144877
MZ-BS10A-VPN incl. spiral drill	0.077	144878

### Spiral drill

to drill holes for locating clamps USK 10A-VPN at fix points



Type	Weight kg	Order No.
SPIRAL DRILL Ø 3.2 MM, Type N	0.003	143426

### Installation tool box

includes 1x BVU10-VPN curve Tool, with filler rods 1x FU10,

1x FU10S-VP and 1x FU10VP-E, 1x KS10 crosscut saw, 1x SB spare blade,

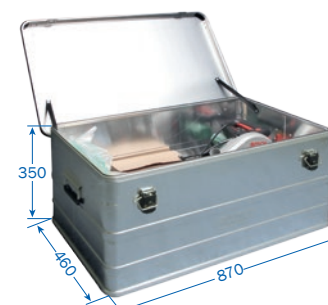
1x LZ10PE-VPN and 1x LZ10PH/PE conductor punch tool, 1x RF round file

and 1x HRF half round file, 1x ST10 adjustment jig, 1x MG-SW 10 joint splice/feed assembly tool,

1x ED10 locking pin driver, 1x DMW10 conductor removal tool,

1x BS10A drilling jig, 1x spiral drill Ø 3.2 mm

Installation tool box can be locked.



Type	Weight kg	Order No.
MZ-MWK-K	26.500	166548

# APPLICATION QUESTIONNAIRE FOR U10

Customer \_\_\_\_\_ Date \_\_\_\_\_  
 Final customer \_\_\_\_\_ Projekt No. \_\_\_\_\_  
 Installation \_\_\_\_\_

## Customer contact

	Name	Phone	Email
Technical planning			
Purchasing			

## Scope of supply

☐ vCONDUCTOR      ☐ vPOS      ☐ vCOM      ☐ vDRIVE  
☐ Installation VAHLE components   ☐ Installation Non-VAHLE components \_\_\_\_\_  
☐ Disassembly      ☐ Disassembly Non-VAHLE components \_\_\_\_\_

## Schedule

Proposal submittal \_\_\_\_\_ week/date      Delivery \_\_\_\_\_ week/date  
 Installation start \_\_\_\_\_ finish \_\_\_\_\_ week/date      ☐ Weekdays   ☐ Weekends

## Mechanical data

### 1. Installation concept

☐ New installation  
☐ Alteration / Expansion      Original Conductor System Delivery No.: \_\_\_\_\_  
☐ Replacement 1:1      Original Conductor System Delivery No.: \_\_\_\_\_

### 2. Type of application

☐ EMS  
☐ Floor track systems (2 tracks)  
☐ Skillet system  
☐ Other

### 3. Carrier track / Carrier track supplier / Track designation

☐ 180x60 / \_\_\_\_\_ / \_\_\_\_\_  
☐ 240x80 / \_\_\_\_\_ / \_\_\_\_\_  
☐ Other \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

### 4. Conductor orientation

☐ Facing sideways      In direction of travel: ☐ Right   ☐ Left  
☐ Facing downward

### 5. Installation height

Off facility floor or support floor \_\_\_\_\_ mm      ☐ Freely traversible

### 6. Track expansion gaps

Expansion distance / gap dimension \_\_\_\_\_ mm

## 7. Building expansion gaps

Expansion distance/ gap dimension \_\_\_\_\_ mm

## 8. Specific building features

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**Electrical data**

## 9. Operating voltage

☐ Three-phase voltage   ☐ AC Voltage   ☐ DC voltage   \_\_\_\_\_ V   \_\_\_\_\_ Hz

## 10. Type of conductor

☐ U10/25C copper conductor☐ U10/25E stainless steel conductor

## 11. Number of conductors (poles)

Main current \_\_\_\_\_ Control current \_\_\_\_\_ Ground (PE) standard \_\_\_\_\_

PE-VP Ground conductor with phase collector avoidance protection available only in copper \_\_\_\_\_

## 12. Conductor sequence

Compact hanger number of conductors

Location top to bottom:

Pole	Position	Example 12-pole hanger 6-pole used
1.		open
2.		open
3.		L1
4.		L2
5.		L3
6.		PE-VPN
7.		S1
8.		S2
9.		open
10.		open
11.		open
12.		open

## 13. Travel mode

☐ One direction only   ☐ Bi-directional \_\_\_\_\_ / \_\_\_\_\_ %

## 14. Travel speeds

Travel speed V max. straight: \_\_\_\_\_ m/min

Travel speed V max. curve: \_\_\_\_\_ m/min

Acceleration \_\_\_\_\_ m/s<sup>2</sup>

Acceleration time \_\_\_\_\_ s

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## 15. Connecting cables for conductors

Line feed Main current conductors \_\_\_\_\_ cross section \_\_\_\_\_ mm<sup>2</sup>  
 Track switch transfer guides Main current conductors \_\_\_\_\_ cross section \_\_\_\_\_ mm<sup>2</sup>  
 Feeds and transfer guides Control current \_\_\_\_\_ cross section \_\_\_\_\_ mm<sup>2</sup>

**Environmental requirements**

## 16. Installation location

☐ Indoor system ☐ Cool storage ☐ Freezer (to -30 °C)

17. Ambient temperature \_\_\_\_\_  
 \_\_\_\_\_ °C min. \_\_\_\_\_ °C max.

Installation temperature  
 approx. \_\_\_\_\_ °C

18. Relative humidity \_\_\_\_\_ %  
 at ambient temperature \_\_\_\_\_ °C

☐ Oxygen reduced atmosphere  
 Oxygen content \_\_\_\_\_ %

## 19. Extraordinary environmental conditions

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**vPOS – Positioning**

## 20. Type

☐ APOS Optic  
☐ APOS Magnetic  
☐ Support system for Leuze Barcode (35 mm)

**vCOM – Data transmission**

## 21. Type

☐ SMGM  
☐ Powercom (utilizing conductor system)  
☐ Semi-Wave (utilizing conductor system, only together with vDRIVE)  
☐ CAN-Bus (utilizing conductor system, only together with vDRIVE)

**Configuration notes**

Not suited for outdoor installation.

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## Quantity framework

Position	Quantity	Piece/m	Description	
1.		pieces	carrier	
2.		m	length total	
3.		m	length straight	
4.		pieces	H-curves to 15 °	R = mm
5.		pieces	H-curves to 30 °	R = mm
6.		pieces	H-curves to 45 °	R = mm
7.		pieces	H-curves to 60 °	R = mm
8.		pieces	H-curves to 75 °	R = mm
9.		pieces	H-curves to 90 °	R = mm
10.		pieces	H-curves to 180 °	R = mm
11.		pieces	TS-connection curves	R = mm
12.		pieces	V-curves to 45 °	R = mm
13.		pieces	two-way track switches	
14.		pieces	three-way track switches	
15.		pieces	V-track switches	
16.		pieces	turntables	
17.		pieces	quattro track switches	
18.		pieces	lift stations vertical	No. of connections ____ beams ____
19.		pieces	shift units horizontal	No. of connections ____ beams ____
20.		pieces	track expansions	
21.		pieces	building expansions	
22.		pieces	brush wear indicator	
23.		pieces	PE verification	
24.		pieces	connecting cables, capacity	
25.		pieces	connecting cables, PE	
26.		pieces	connecting cables, control	
27.		pieces	terminal boxes	
28.		pieces	conductor vacuum incl. suction head	

### Remarks

[illegible]

## NOTES

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