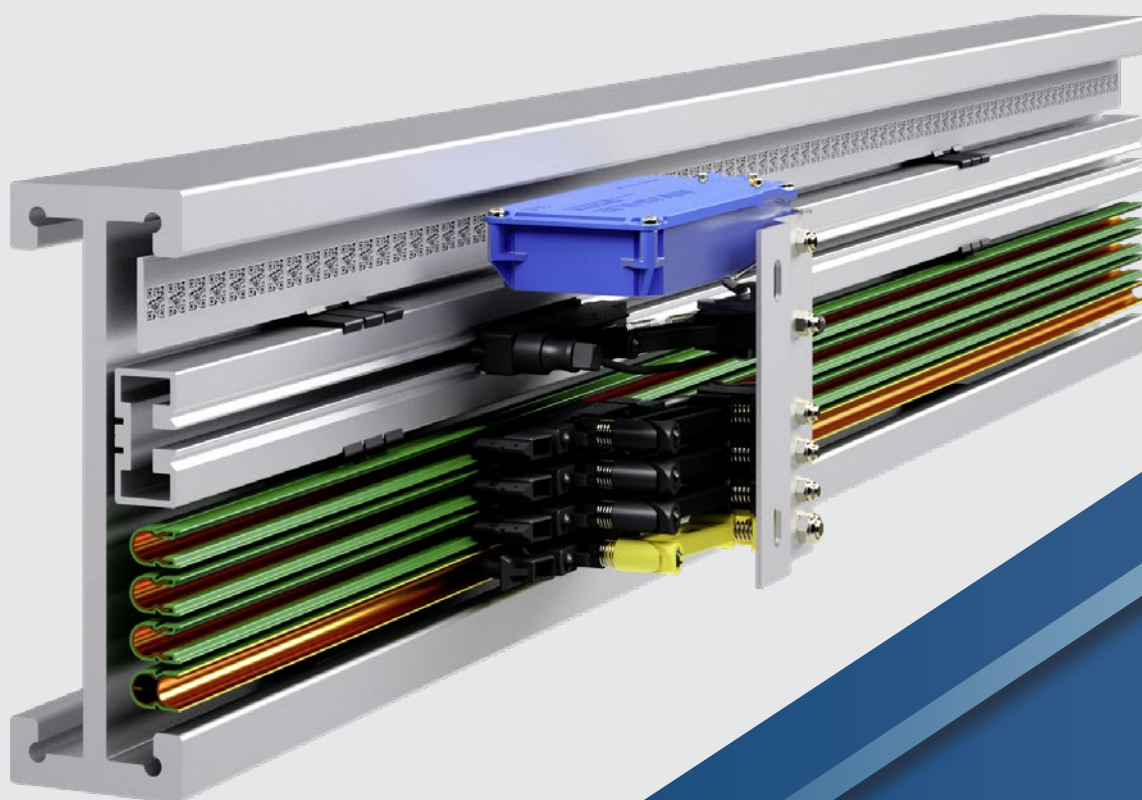




## INSULATED CONDUCTOR SYSTEM U10



# 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)

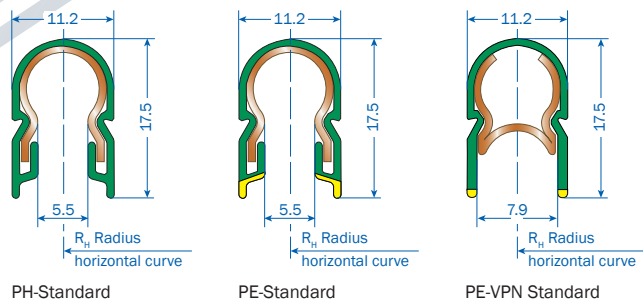
| Type                     | Dielectric insulation<br>DIN 53481 | Specific resistance<br>IEC 60093 | Surface resistivity<br>IEC 60093 | Leakage path resistance<br>IEC 60112 |
|--------------------------|------------------------------------|----------------------------------|----------------------------------|--------------------------------------|
| 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<br>ISO 178 | Tensile strength<br>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<br>>1500 | <100 %                 | –30 °C to<br>+55 °C                      | Flame resistant,<br>self extinguishing,<br>UL 94 V0 |
| High temp. profile, gray | 90 – 100 N/mm <sup>2</sup>  | 47 – 65 N/mm <sup>2</sup>   | Xenon test<br>>1500 | <100 %                 | –30 °C to<br>+85 °C                      | Flame resistant,<br>self extinguishing,<br>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

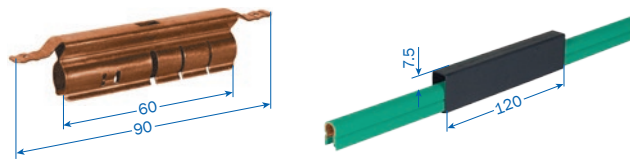
• The last numeral of the order no. indicates the length of the conductor section in meters. Accordingly complete the order no. with 1, 2, 3, 4, 5 or 6.

## JOINT (FEED)

Max. 2x 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

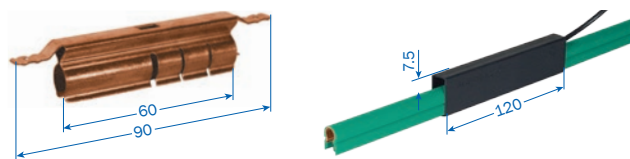


| Type          | Weight kg | Order No. |
|---------------|-----------|-----------|
| VM-UEV10/C    | 0.026     | 165006    |
| VM-UEV10VPN/C | 0.026     | 143213    |

## LINE FEED

Max. 2x 50 A continuous current

Connecting cable not included, please order from page 15



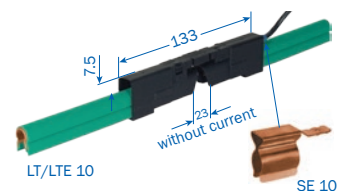
| Type        | Weight kg/m | Order No. |
|-------------|-------------|-----------|
| ES-UES10    | 0.026       | 165212    |
| ES-UES10VPN | 0.026       | 143214    |

## 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 40 A), at least one additional compact hanger required for each isolating assembly.



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

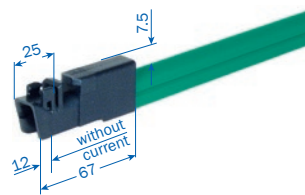
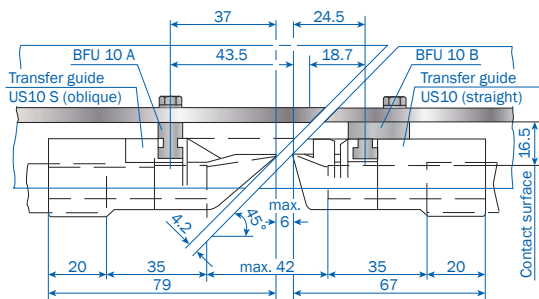
| Type             | Weight kg | Expansion   | Order No. |
|------------------|-----------|-------------|-----------|
| VM-UDV10VPN/C-30 | 0.052     | up to 30 mm | 143356    |
| VM-UDV10VPN/C-45 | 0.075     | up to 45 mm | 143357    |
| VM-UDV10VPN/C-60 | 0.104     | up to 60 mm | 143358    |

## TRANSFER GUIDES

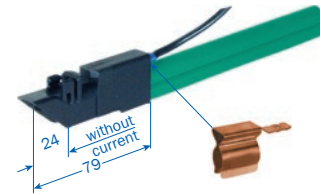
Max. vertical and horizontal offset  $\pm 3$  mm respective

### 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)

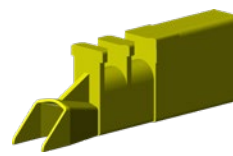
| Type      | Weight kg/m | Version  | Feed clip | Order No. |
|-----------|-------------|----------|-----------|-----------|
| MU-US10   | 0.008       | straight | without   | 165008    |
| MU-US10S  | 0.008       | oblique  | without   | 165009    |
| MU-USE10  | 0.012       | straight | with     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

### TRANSFER GUIDE FOR PE-VPN

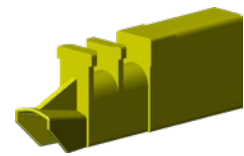
Max. 40 A continuous current



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)

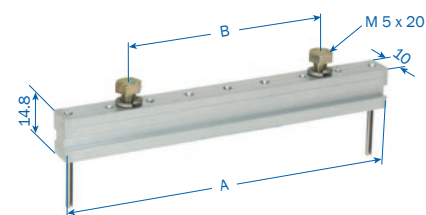
| Type           | Weight kg/m | Version          | Feed clip | Order No. |
|----------------|-------------|------------------|-----------|-----------|
| MU-US10-VPN    | 0.007       | straight         | without   | 144863    |
| MU-US10S-VPN   | 0.007       | oblique          | without   | 144865    |
| 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

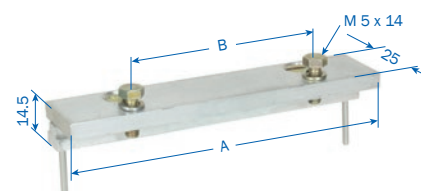
for system height<sup>(1)</sup> = 16.5 mm

| 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).

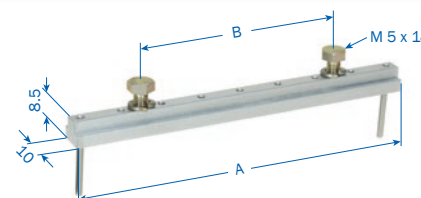
for system height<sup>(1)</sup> = 16.5 mm



| 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



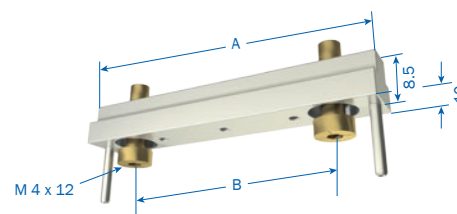
| Type                    | No. of poles | A mm | B mm | Weight kg | Order No. |
|-------------------------|--------------|------|------|-----------|-----------|
| MU-BFU10H4/10/14-62/42  | 1 - 4        | 62   | 42   | 0.022     | 144022    |
| MU-BFU10H6/10/14-90/42  | 1 - 6        | 90   | 42   | 0.026     | 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    |

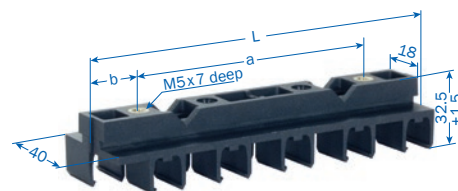
(1) System height = distance contact surface to back of compact hanger (at web of monorail)

## STANDARD COMPACT HANGERS

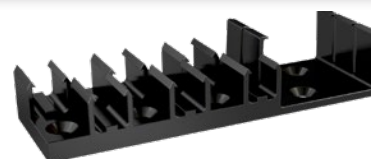
for system height = 16.5 mm

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    |

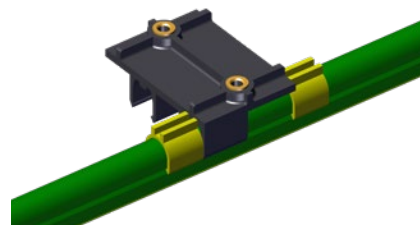


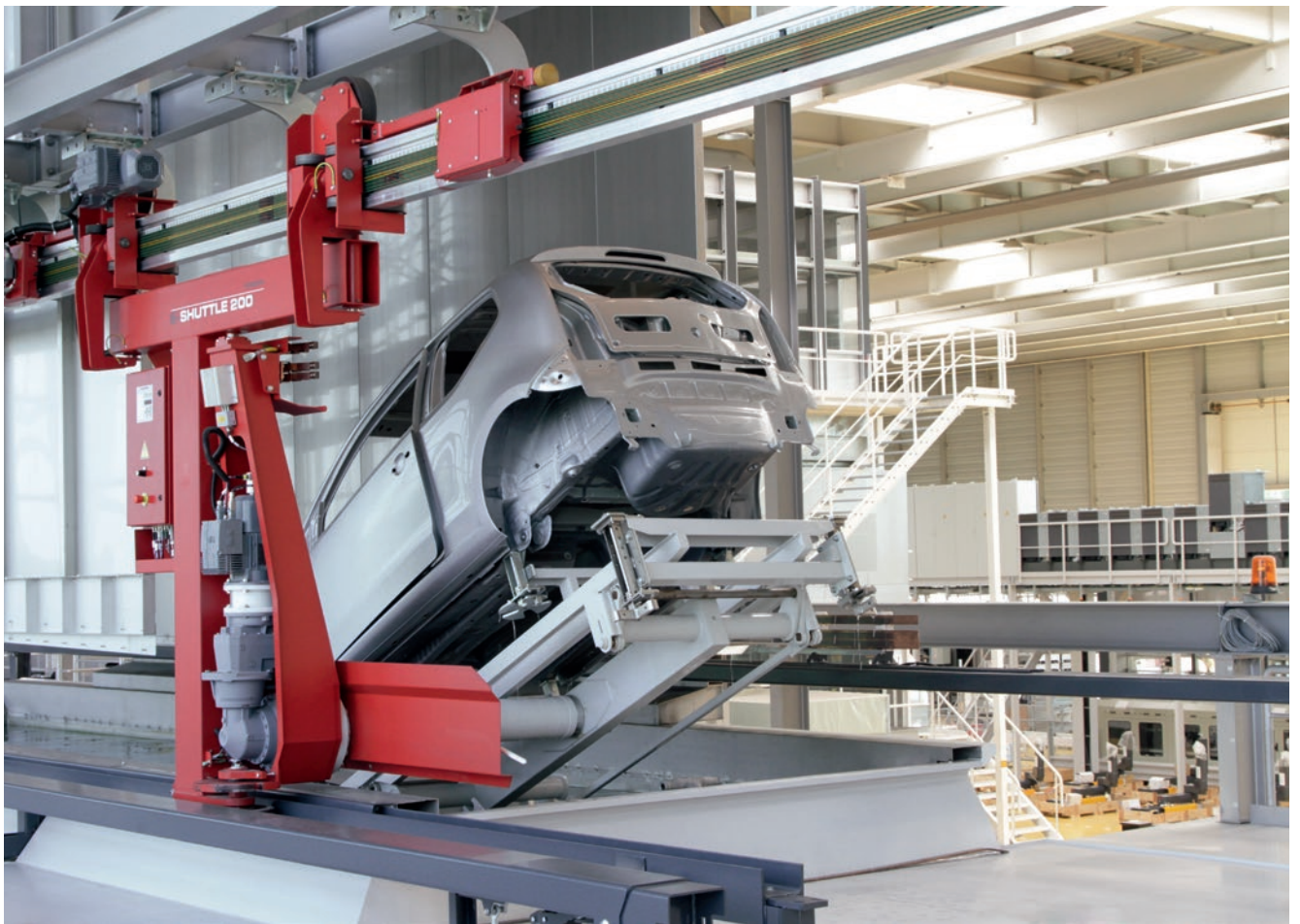
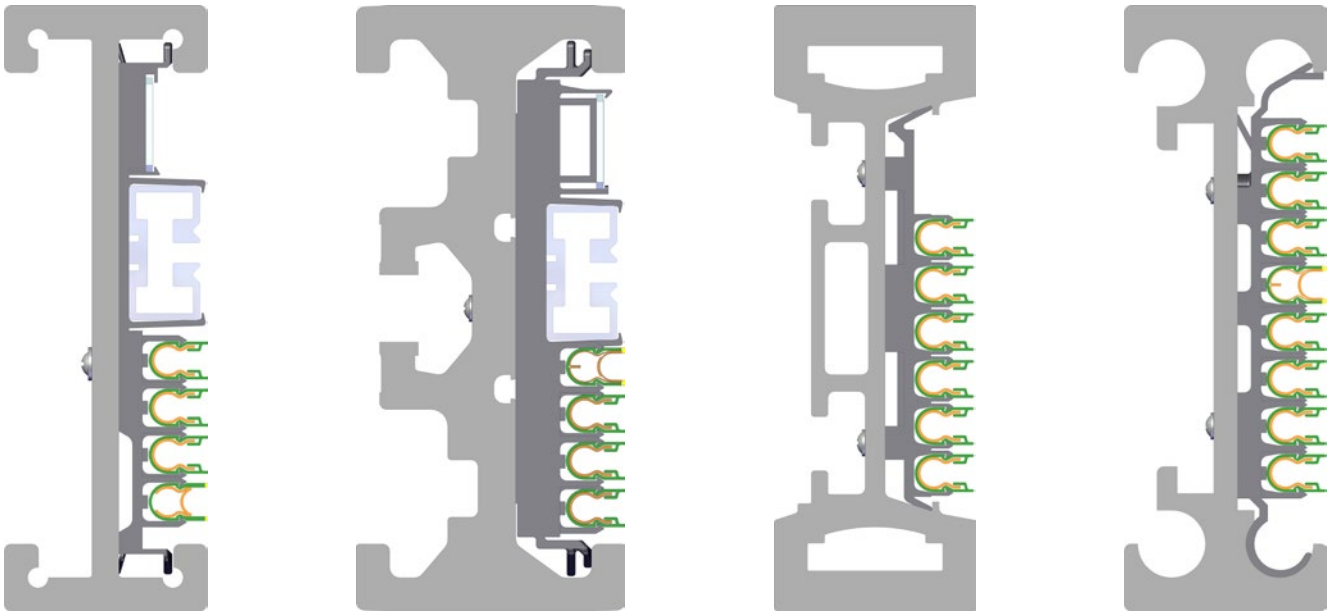
Illustration shows positioning of the two locating clamps at a compact hanger

### 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

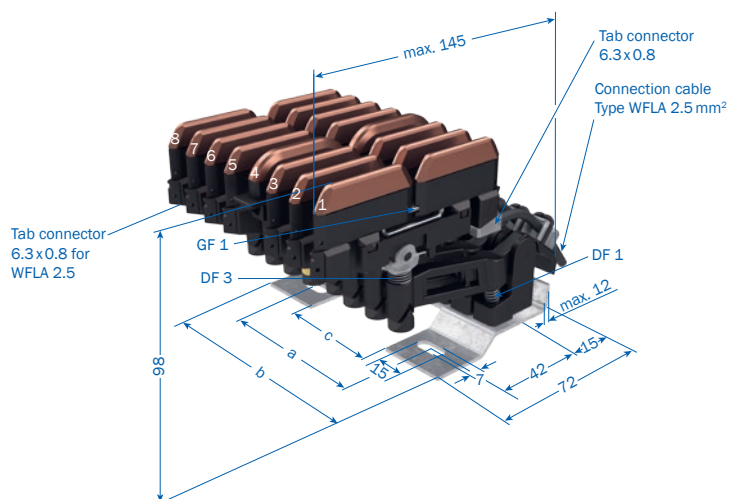
Swivel: ±15 mm

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 0.5 m 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

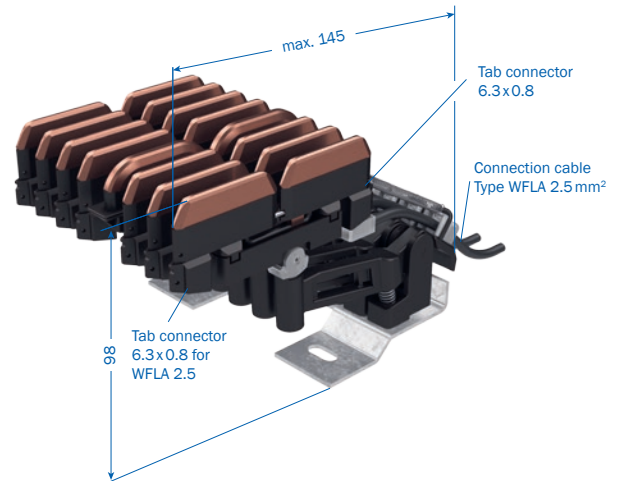
Stroke: ±15 mm

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-KUFR2/40/5/14HS0.5/6/6                              | 5            | 0.573     | 6-pole (No. 6 = open)   | -            | 165928           |
| SA-KUFR2/40/6/14VP0.5/4/6                              | 6            | 0.666     | 6-pole                  | 144476       | -                |
| SA-KUFR2/40/6/14HS0.5/6                                | 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-KUFR2/40/7/14HS0.5/8/8                              | 7            | 0.779     | 8-pole (No. 8 = open)   | -            | 165930           |
| SA-KUFR2/40/8/14VP0.5/4/8                              | 8            | 0.872     | 8-pole                  | 144479       | -                |
| SA-KUFR2/40/8/14HS0.5/8                                | 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-KUFR2/40/9/14HS0.5/10/10                            | 9            | 1.004     | 10-pole (No. 10 = open) | -            | 165932           |
| SA-KUFR2/40/10/14VP0.5/4/10                            | 10           | 1.097     | 10-pole                 | 144481       | -                |
| SA-KUFR2/40/10/14HS0.5/10                              | 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

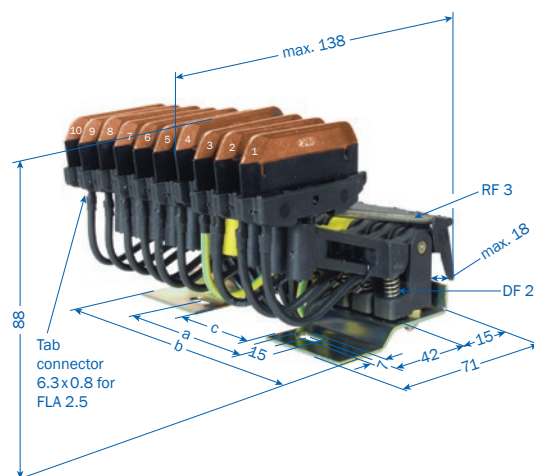
Swivel: ±15 mm

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

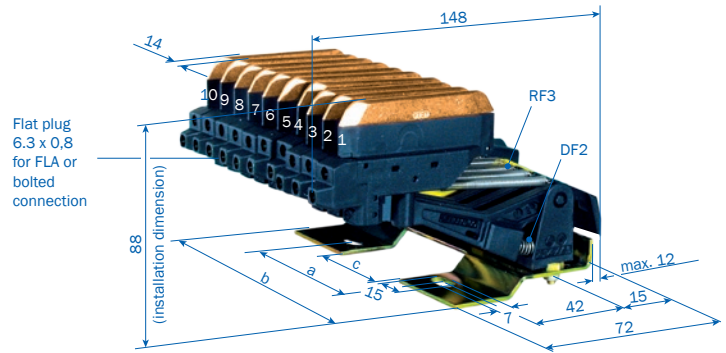
Stroke: +15 mm

Swivel: ±15 mm

Contact pressure: approx. 7 N per contact brush

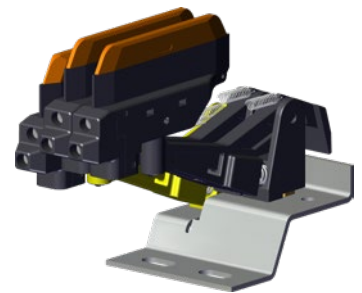
PE standard at No. 4 position, variations are possible.

PE makes contact first when entering conductors.



| max. continuous current | Tab connector |
|-------------------------|---------------|
| 32A                     | FLA 2.5       |
| 40A                     | FLA 4.0       |
| 55A                     | FLA 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     |



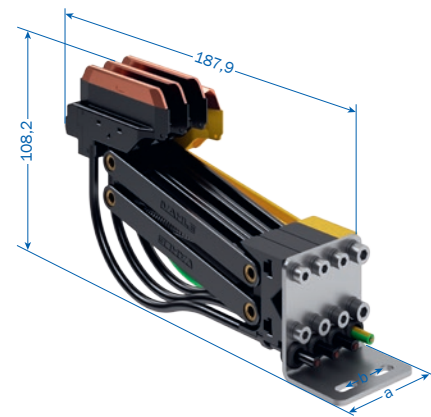
## KESR VP

| 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. 4 = 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: 63A 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                                                 | 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 |              |           |           | 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   | -         |

## ENTRY FUNNEL

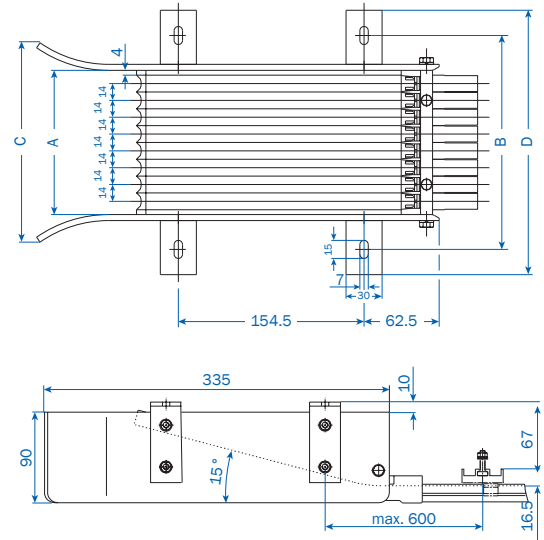
### EFT10

for current collector KUFU25

Please note: Entry funnel without current.

Entry speed: max. 100 m/min  
 Entry tolerance: horizontal:  $\pm 10$  mm  
 vertical:  $\pm 10$  mm

Version with ground reverse polarity protection on request  
 suitable current collector KESR



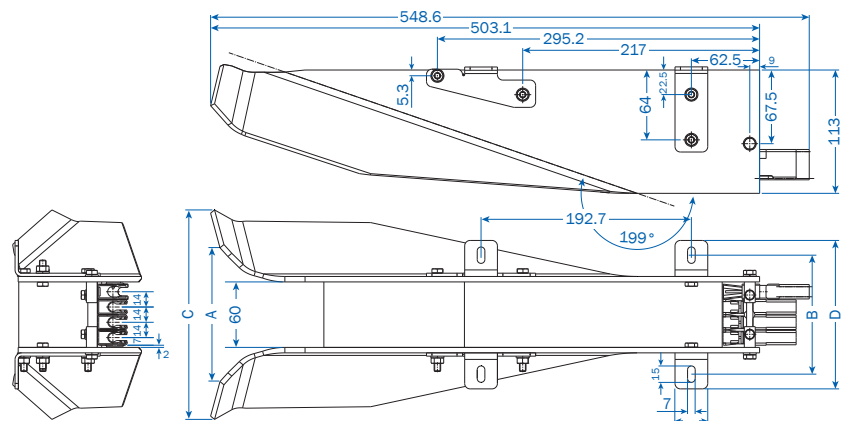
| Type             | No. of poles | Dim. A mm | Dim. B mm | Dim. C mm | Dim. D mm | Weight kg | Order No. |
|------------------|--------------|-----------|-----------|-----------|-----------|-----------|-----------|
| MU-EFT10-2-KUFU  | 2            | 36        | 94        | 82        | 136       | 1.145     | 167675    |
| MU-EFT10-3-KUFU  | 3            | 50        | 108       | 96        | 150       | 1.230     | 167676    |
| MU-EFT10-4-KUFU  | 4            | 64        | 122       | 110       | 164       | 1.315     | 167677    |
| MU-EFT10-5-KUFU  | 5            | 78        | 136       | 124       | 178       | 1.400     | 167678    |
| MU-EFT10-6-KUFU  | 6            | 92        | 150       | 138       | 192       | 1.485     | 167679    |
| MU-EFT10-7-KUFU  | 7            | 106       | 164       | 152       | 206       | 1.570     | 167680    |
| MU-EFT10-8-KUFU  | 8            | 120       | 178       | 166       | 220       | 1.655     | 167681    |
| MU-EFT10-9-KUFU  | 9            | 134       | 192       | 180       | 234       | 1.740     | 167682    |
| MU-EFT10-10-KUFU | 10           | 148       | 206       | 194       | 248       | 1.825     | 167683    |

### EFT10 ESPECIALLY FOR SKID63

Please note: Entry funnel without current.

Entry speed: max. 100 m/min  
 Entry tolerance: horizontal:  $\pm 30$  mm  
 vertical:  $\pm 30$  mm

Version with PE-VP on request,  
 suitable current collector SKID63

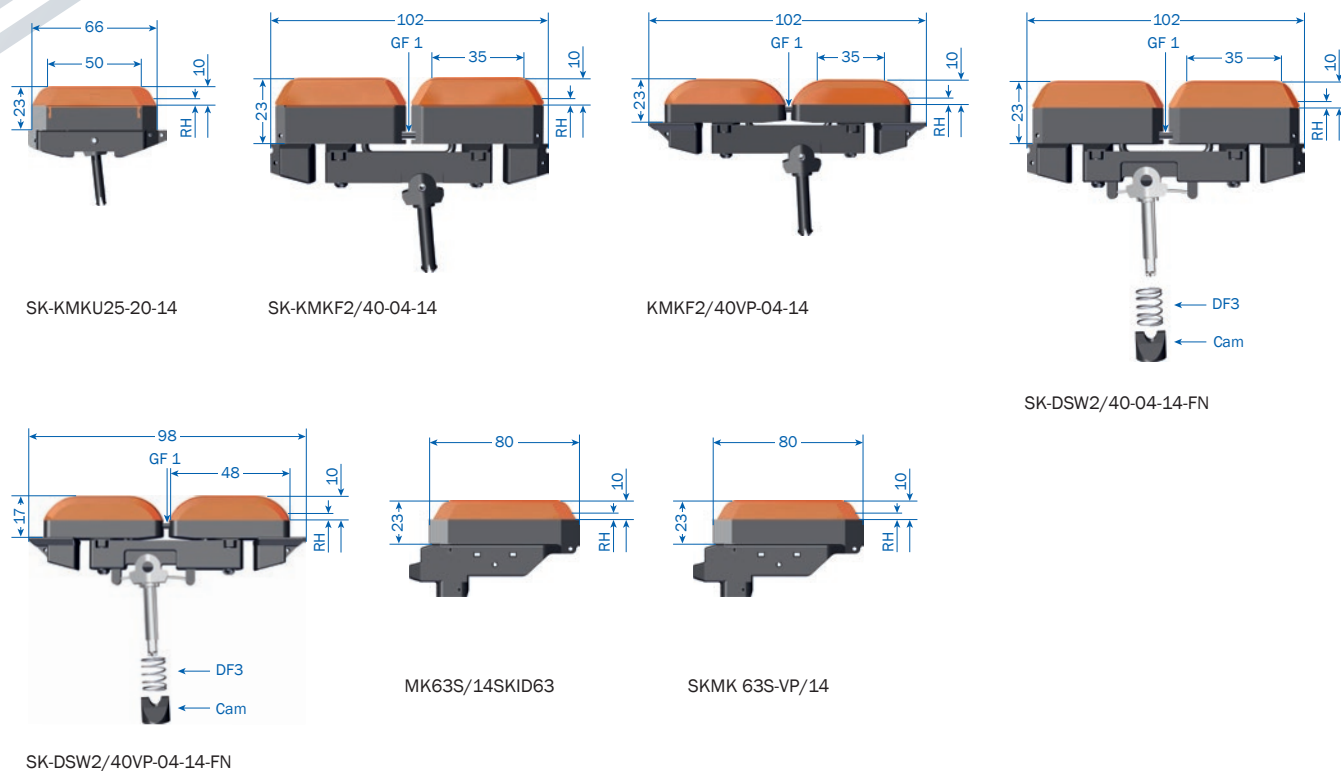


| Type                     | No. of poles | Dim. A mm | Dim. B mm | Dim. C mm | Dim. D mm | Weight kg | Order No. |
|--------------------------|--------------|-----------|-----------|-----------|-----------|-----------|-----------|
| MU-EFT10-4L-VP-4-KSTUR63 | 4            | 122.6     | 109.0     | 191.9     | 136.0     | 2.133     | 144752    |
| MU-EFT10-4R-VP-4-KSTUR63 | 4            | 122.6     | 109.0     | 191.9     | 136.0     | 2.133     | 144753    |

Other versions on request.

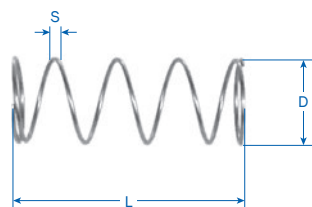
## CARBON BRUSHES

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



| 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 MK 63S/14          | SKID63                | 0.046     | 144691    |
| SK MK 63S-VP/14       | SKID63                | 0.050     | 144692    |

## 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<br>mm <sup>2</sup> | Ø mm |     | Weight kg |       | Order No.<br>Phase black | Order No.<br>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<br>mm <sup>2</sup> | Ø mm |     | Weight kg |       | Order No.<br>Phase black | Order No.<br>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.



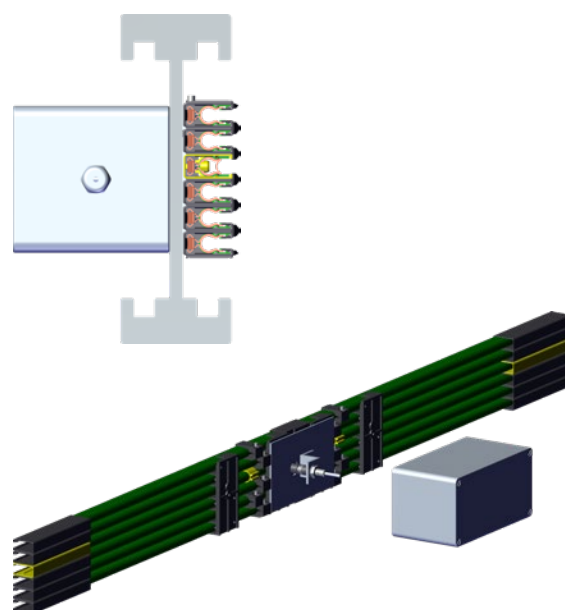
| Type                            | Weight kg | Order No. |
|---------------------------------|-----------|-----------|
| ES-AKE1-PH7 x 2LG-PE2 x 2LG-M25 | 0.445     | 169462    |

## 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.<br>PE-VPN at No. 4 | Order No.<br>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.



| 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    |

### TABLE SAW

for cutting U10 insulator profiles and conductor profiles, with length stop

Voltage required: 230V, 50Hz



| Type    | Description         | Weight kg | Order No. |
|---------|---------------------|-----------|-----------|
| MZ-KS10 | Table saw, complete | 6.500     | 165276    |
| MZ-SB   | Spare saw blade     | 0.070     | 165263    |

### 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. |
|--------------------------------------------|----------------------------------------------|-----------|-----------|
| ROUND FILE RF-150 LONG/HIEB 3/<br>D = 6 mm | Deburr inside profile after cutting section  | 0.085     | 143330    |
| HALF ROUND FILE HRF-150 LONG/<br>HIEB 3    | 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    |

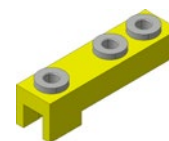
## CONDUCTOR REMOVAL TOOL

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

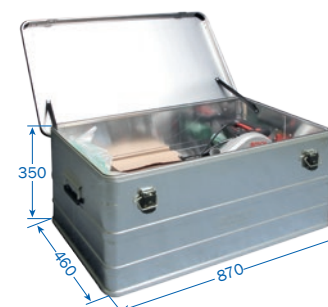
to drill holes for locating clamps USK 10A-VPN at fix points



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

## INSTALLATION TOOL BOX

includes 1x BVU10-VP curve Tool, with filler rods 1x FU10,  
 1x FU10S-VP and 1x FU10VP-E, 1x KS10 table 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 | Fon | E-mail |
|--------------------|------|-----|--------|
| 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<br>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

## 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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REMARKS[illegible]

## NOTES

## NOTES

## NOTES



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