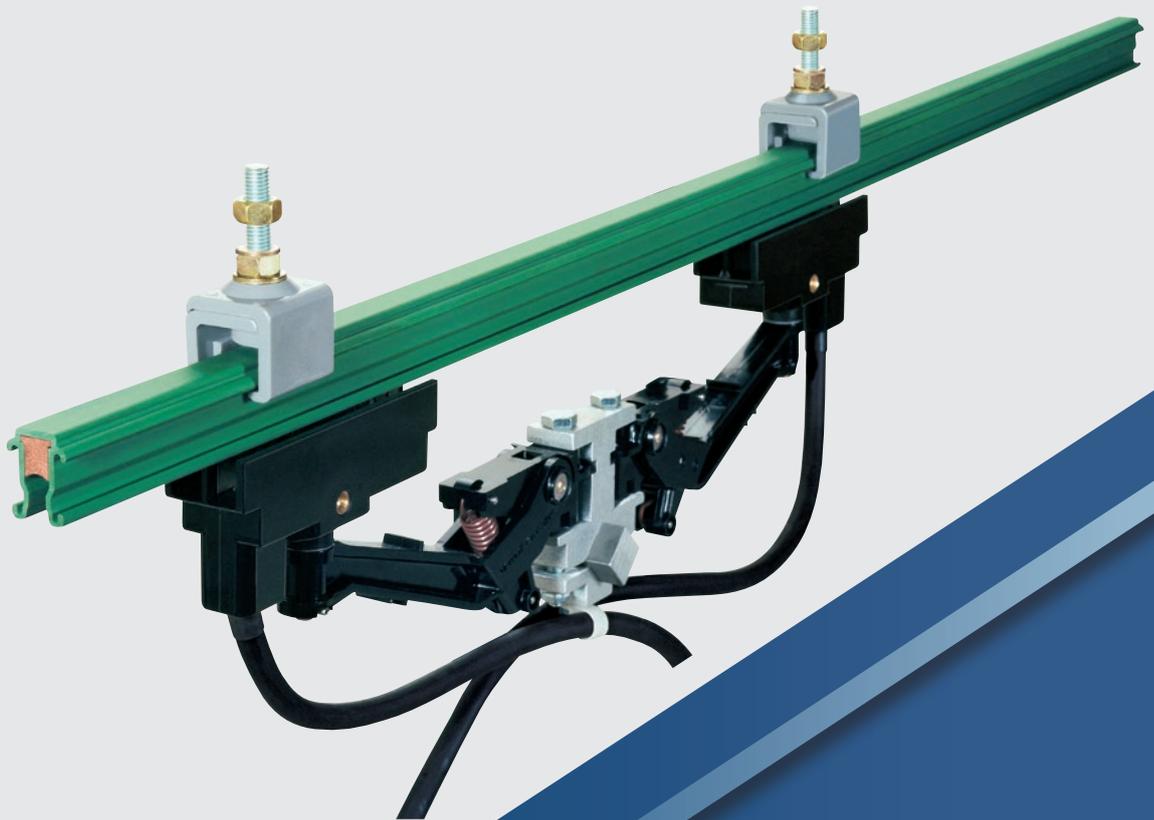




## INSTALLATION MANUAL

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U20 | U30 | U40







**Compact hanger KH (photo 3)**

- bolt or weld bracket profiles 38/17 (photo 4) to the track
- push compact hangers into brackets and set locating pins
- make sure that position of brackets is in level and rectangular to the track.

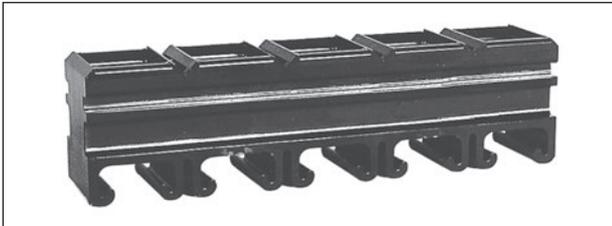


Photo 3: Compact hanger KH 20/5



Photo 4: Bracket profile 38/17

**6. Conductors and splice joints**

Conductor bars are rigidly connected by bolted joints.

All conductor rail sections come ready prepared for joints. Rework the rail ends per 6.1. instructions whenever you have to cut/adjust in the field.

Make sure that joints are clean of any residue; light greasing is required.

Do not leave a gap between conductor ends. Tighten all bolts.

**U 20 and U 40:**

Assemble and bolt together insulated protection joint covers (photo 5). Make sure that cover fit accurately in the grooves of the conductor bar shrouding.

**U 30:**

Assemble joint cover halves from the sides to the conductor bar joint. Press the two halves together until they interlock. Tighten cover bolts.

**U 20, U 30 and U 40:**

Slight height variations of the conductor profile are possible due to production tolerances. Smooth-out joints where necessary.

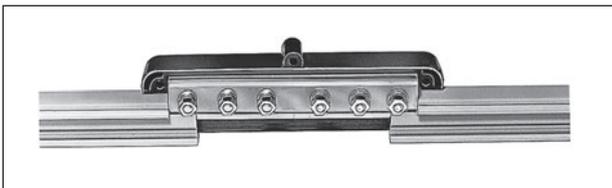


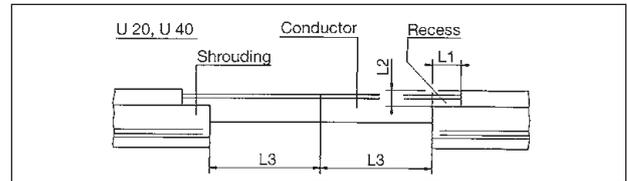
Photo 5: Bolted rigid joint

**6.1 Preparing of short lengths**

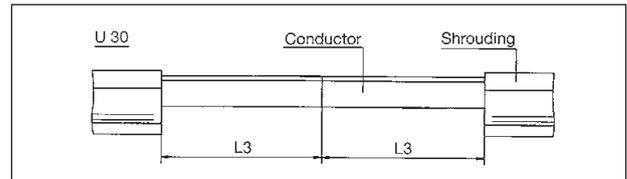
If short lengths have to be made at site prepare conductor ends as follows:

- Mark conductor length, cut it and trim conductor ends.

- push back conductor w/i shrouding cut shrouding by  $2 L_3$  and trim cut ends.
- For U 20 and U 40 prepare additional recess in the shrouding with length  $L_2$  and trim cut ends.



Sketch a



Sketch b

Table 3

Type	Dimension $L_1$	Dimension $L_2$	Dimension $L_3$
U 20	31	7	2
U 30	-	-	102
U 40	20	13	78

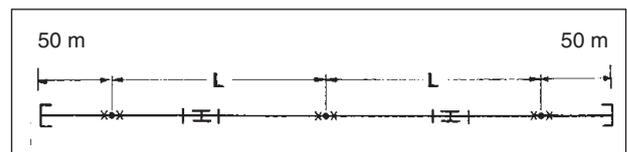
- reset copper conductor and place it equally within shrouding.

**7. Expansion sections**

Expansion joints come ready assembled on conductor rail sections.

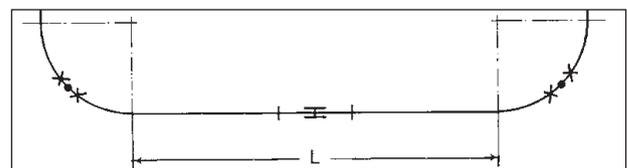
Expansion joints will be required for:

1. Lengths exceeding 100 meters, in approx. 42 m intervals. Make sure you have an anchor point in the center between two expansion joints or between an expansion joint and the end of the system run (see sketch c).



Sketch c

2. Conductor lengths between two curves, switches or other fix points exceeding 20 meters (see sketch d).



Sketch d

Furthermore dimension L depends on the temperature difference ( $\Delta t$ ):

Table 4

max. $\Delta t$	max. L		max. $\Delta t$	max. L	
	U 20	U 30/U 40		U 20	U 30/U 40
20 °C	88 m	100 m	40 °C	44 m	50 m
30 °C	58 m	68 m	50 °C	35 m	40 m

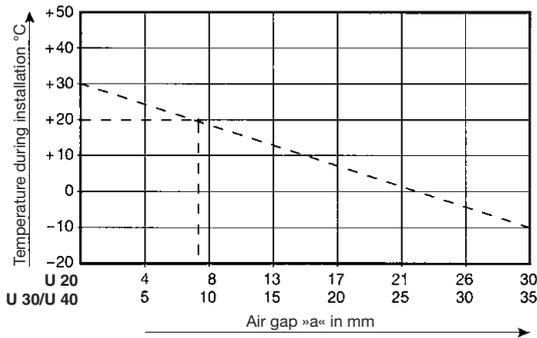
Expansion joints compensate max.:

U 20 = 30 mm      U 30 = 35 mm      U 40 = 35 mm

To determine the adjustable airgap of the expansion joint proceed as follows:

- a) Mark lowest and highest anticipated temperature in Sketch e and connect the two points.
- b) Indicate the ambient temperature during installation and compute dimension »a« from the chart.

Sketch e



Example: max. ambient = + 30° C }  $\Delta t = 40^\circ C$   
 min. ambient = - 10° C }  
 during installation = 20° C  
 dimension »a« = 7 mm for U 20  
 = 8 mm for U 30/U 40

– Set expansion joint with appropriate gap.

### 8. Locating clamps (photo 6)

Locating clamps are required to avoid unwanted sliding of conductors. Two locating clamps, left and right of a hanger make up an anchor point.

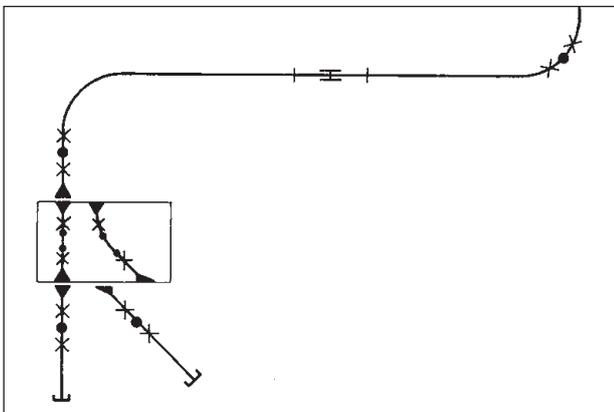
Where to provide anchor points:

In case of short straight runs – in the center (see sketch below)



Sketch f

In bends, as well as in areas of switches, drop sections etc. – see sketch below.



Sketch g

Check shroud opening after tightening locating clamps (see photo 6, dim. a)

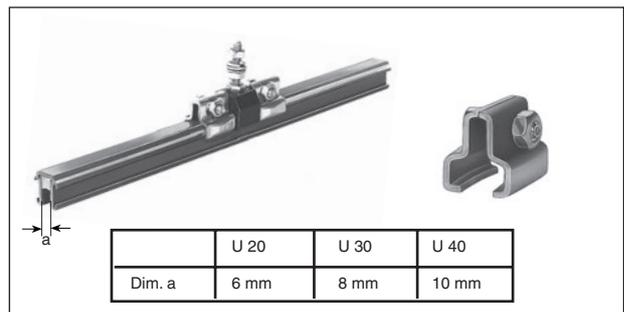


Photo 6: Fixpoint (insulated rail holder with 2 locating clamps)

### 9. Feeds (photo 7)

The feeds are preferably set between two bars, taking the position of the rigid joint near existing power supply (U 20 and U 30 type UE, U 40 type UEV, UEVG).

Treatment of contact surfaces and further mounting as per item 6.

Feed cables must not restrict free movement of conductors and must give clearance for the collectors passing through. Provide tension relief for cable.

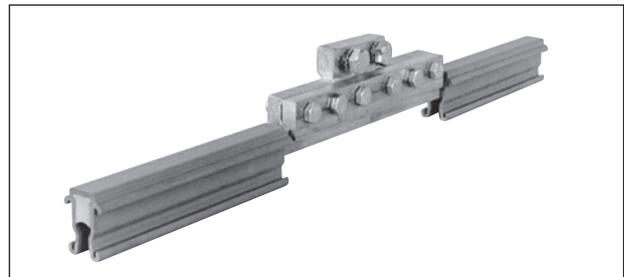
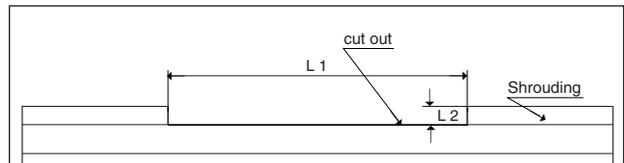


Photo 7: Feed terminal UEV 30 without cap

#### Procedure for assembling of feed terminals on conductor sections U 20 and U 40:

- Slide shrouding over the conductor as per sketch a
- Mark position of feeding on the conductor rail
- Pull off shrouding from conductor and cut out at the marked position (sketch h), trim cut areas of shrouding and push it back onto the conductor
- Treatment of contact surfaces and further mounting as per item 6



Sketch h

Table 5

Type	Dimension L1	Dimension L2
U 20	62	7
U 30 (UEG)	196	11
U 40	196	13

#### U 30:

- Slide shrouding over the conductor as per sketch b
- Mark position of feeding on the conductor rail
- Pull off shrouding from conductor and make a vertical cut at the marked position
- Shorten shrouding in this place by 102 mm each side, trim ends and push shroudings back onto the conductor
- Treatment of contact surfaces and further mounting as per item 6

### 10. Isolating sections

These sections provide electrical interruption (discontinuous circuits) in the conductor line.

They normally come factory assembled per layout plan; for field assembling consider the following:

Mark the desired position on a conductor rail section.

Pull out conductor and cut at the marking point, the length you cut away depends on the type of rail-dead-section you are using.

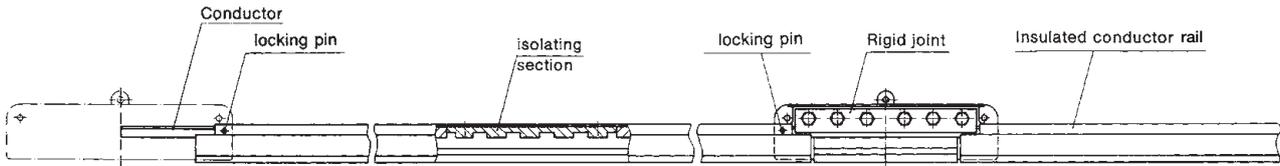
Insert the isolating piece and the two conductor lengths into the shrouding.

Prepare Ø 3 DIN 1481 fix points at the bar-ends as shown below (locking pins).

Multi-pole systems require an accurate side by side position of the isolating sections.

An additional hanger on each side of the isolating section must be provided for stability.

(One hanger each side at max. 200 mm for U 20, 300 mm for U 30, 400 mm for U 40).



### 11. Transfer guides (photo 8)

These units are mainly required for switch and drop section applications.

Installation:

Conductor U 20 and U 30 will be cut straight; sand paper where necessary. Push type US transfer guide over the end and secure tightly.

Type UTI transfer guides always come factory assembled.

Max. vertical and horizontal offset:

U 20 ± 2 mm
U 30 ± 4 mm
U 40 ± 6 mm

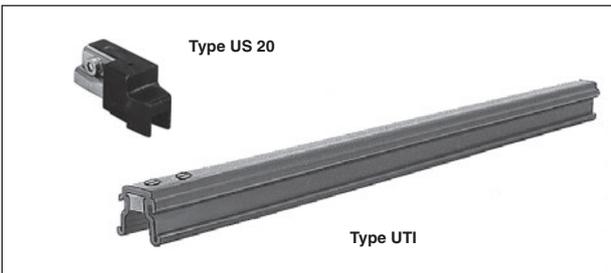


Photo 8: Transfer guide

### 12. Transfer funnel (photo 9)

These transfer funnels come factory assembled with conductor sections to meet your system layout.

Make sure the transfer funnel is fastened to a non-vibrating support structure.

Consider proper alignment for re-tracking your collectors. These transfer funnels serve for any length of conductor rail interruption.

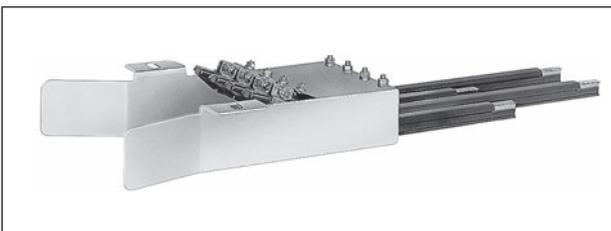


Photo 9: Transfer funnel

### 13. End caps (photo 10)

The end caps are closing the conductor rail ends and are secured by means of nylon screws.

In case you have to field cut the end conductor bar make sure that you are securing the shrouding with a locking pin Ø 3 DIN 1481 before assembling the end cap.

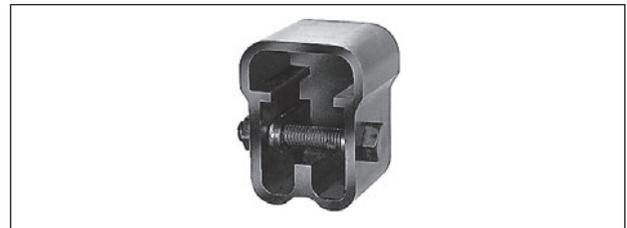


Photo 10: End cap

### 14. Bending of conductor rails

All insulated conductor rails can be bent. Field bending of U 20 with radius > 2500 mm (with our bending tool BVU) smaller radii and U 30 and U 40 curves are available on request from the factory.

**Bending procedure:**

- Install hangers.
  - Push or press conductor rails into the hangers and the flexibility of the conductors allows to follow the required curve.
  - Small support intervals for curves guarantee a proper layout without kinking.
- Check the entry slot of the shrouding. It should be
  - U 20 = 6 mm ± 1
  - U 30 = 8 mm ± 1
  - U 40 = 10 mm ± 1

### 15. Collectors:

Collectors for U 20 and U 30 conductors are square bar mounted. The triangular attachment is prepared for the ground collector.

Weld the square bar bracket to the moving equipment, rectangular and in level with conductors. Consider the normal working heights of the collectors.

All collectors for U 40 conductors are for bolt mounting (M 16). Stud spacing for phase collectors is 70 mm, for ground collectors 120 mm.

Specially balanced and re-tracking collectors are available for transfer applications. Always make sure that the collector shoe is in parallel with the conductor rails and entering transfer funnels slightly (min. 20 mm) beneath the top part of these guides.

### 16. Commissioning and final check-up:

Make test runs; start with low speed and inspect all components for proper function. Check positive contact between pick up shoes and conductors – no vibration of collectors and no sparking. In case of sparking clean conductor contact surface.

All transfer applications require special attention for proper passing over and re-tracking of collectors.

### 17. Maintenance instructions:

VAHLE unipole insulated conductor rail systems require a minimum of maintenance.

- 1) Visual inspection of conductors and collectors in regular intervals, depending on the duty cycle. Consult factory in case of irregularities.
- 2) Collector shoes must be replaced prior to the brush holder touches the conductor shrouding.
- 3) Transfer funnels require replacement of the isolating cover, if collector trackings are 2–2.5 mm deep.
- 4) If cleaning of the conductor surface becomes necessary we recommend:
  - a) Cleaning with high pressure water stream
  - b) Cleaning with liquid Rivolta SRK.  
Use a flat brush or impregnated felt, dry the cleaned surfaces afterwards.

### Hints for the Installation Procedure:

Proper and careful treatment of all materials, especially the non-metallic parts, keeping everything clean etc. is important. Make sure, that joints and all other connecting points are clean of any residue. Tighten all hardware, using lockwashers etc. carefully. Take care of proper alignment between conductor rails and crane runway.

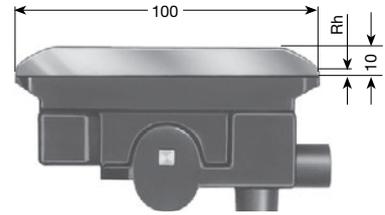
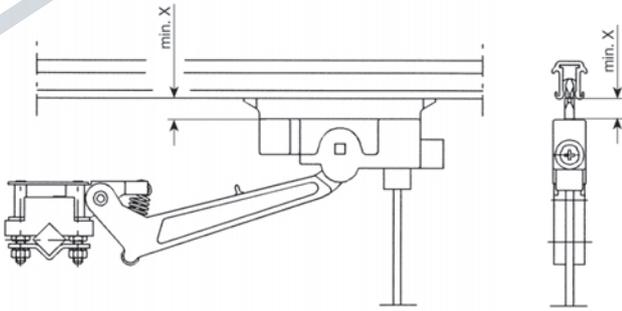
Install conductor rails in accordance to appertaining layout plans. Make sure that position of expansion joints and locating clamps is exactly per drawing and/or catalog instructions.

### Safety Regulations for work with electrical equipment:

1. Disconnect mains
2. Prevent reconnection
3. Test for absence of harmful voltages
4. Ground and short circuit
5. Cover or close off nearby live parts

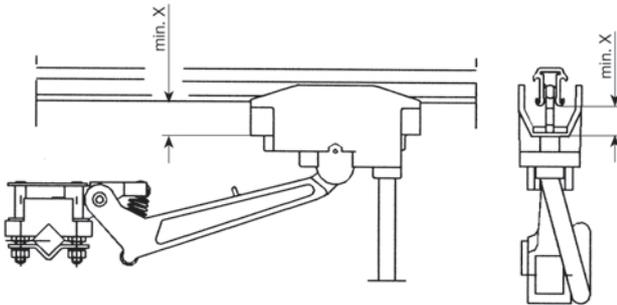
To energize, apply in reverse order.

Copper-graphite brushes for U 20



KMK 60 / KMK 60 U

Conductor Type	Reference dim. X	Remaining height = Rh brush type KMK 60 / KMK 60 U
U 20/50 AF U 20/50 CE U 20/50 AC	3,5	2
U 20/50 C		3
U 20/50 CH		4

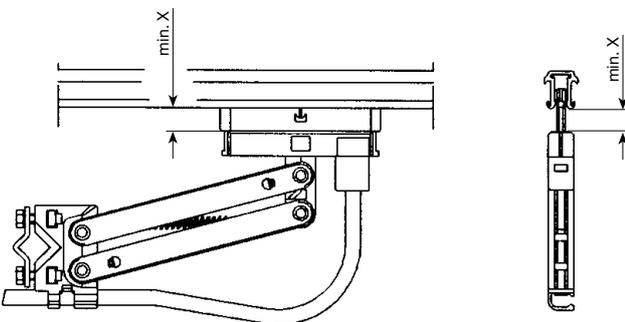


KMU 40 / KMU 60

Conductor Type	Reference dim. X	Remaining height = Rh brush type KMU 40 / KMU 40 U KMU 60 / KMU 60 U
U 20/50 AF U 20/50 CE U 20/50 AC	8	20
U 20/50 C		21
U 20/50 CH		22



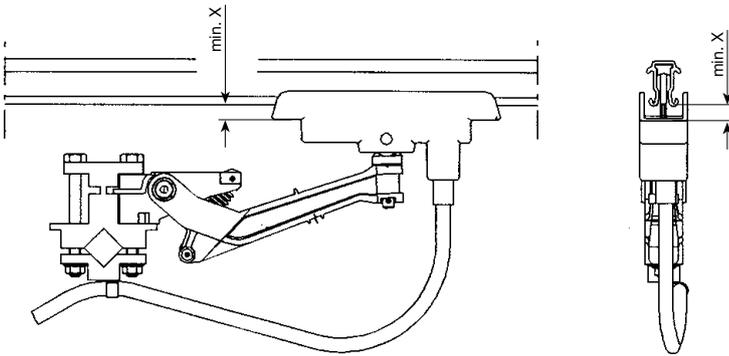
KMU 40 / KMU 60 U



KM 55 phase / ground

Conductor Type	Reference dim. X	Remaining height = Rh brush type KM 55
U 20/50 AF U 20/50 CE U 20/50 AC	3	0
U 20/50 C		1
U 20/50 CH		

**Copper-graphite brushes for U 30**



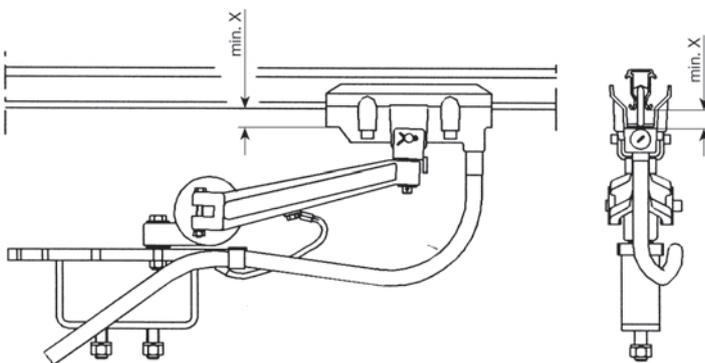
KMK 100/30

Conductor Type	Reference dim. X	Remaining height = Rh brush type	
		KMK 100/30	KMK 140/30
U 30/125 AC	9	47	9
U 30/225 AC		43	6
U 30/120 CE		53	16
U 30/ 75 C		47	10
U 30/100 C		54	17
U 30/130 CH		54	17
U 30/150 C		50	13
U 30/200 C		46	9
U 30/200 CH		48	11



KMK 140/30

**Copper-graphite brushes for U 40**



Conductor Type	Reference dim. X	Remaining height = Rh brush type
		KMU 200
U 40/300 AC	8	19
U 40/200 C		20
U 40/400 C		
U 40/300 C		25
U 40/400 CH		
U 40/300 CH		19
U 40/500 CH		18
U 40/500 C		15
U 40/500 CHH		12



KMU 200



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