



## Single-Pole Insulated Conductor Rail Program 0813

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### Order number

0813xx-...

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## 1 Product Description

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The single-pole insulated conductor rail product range 0813 is characterized by its ease of installation.

The conductor rail is released for horizontal installations in non-public areas. Local restrictions on use regarding protection classes IP 21 and IP 00 around the current collector must be observed and structural measures taken and included in the risk assessment for the CE conformity of the whole system.

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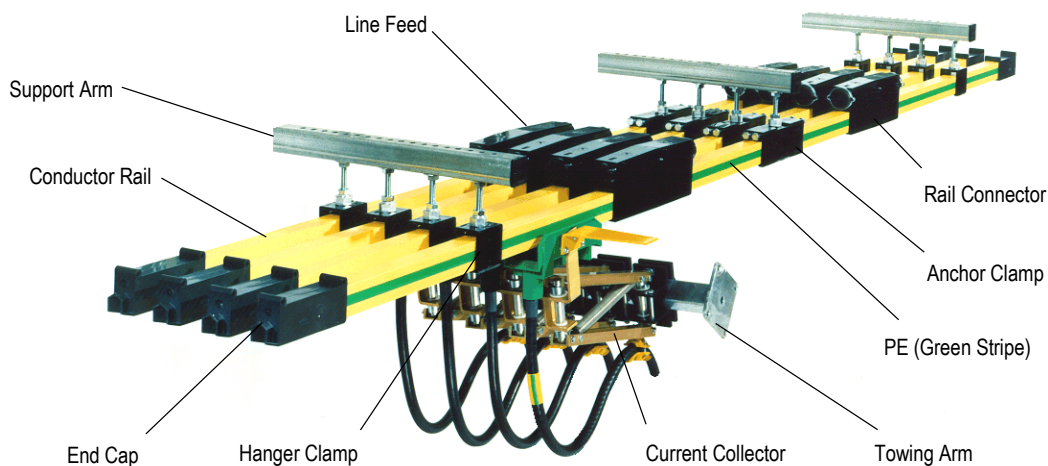
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### 2 Check of the supplied Parts

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The components (see chapter 9) must be checked against the delivery note for completeness and transport damage. The material is individually packed and marked for each system.

#### System Layout:



### 3 Notes

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The conductor rail is installed on the existing support structure. This structure must be installed and checked for dimensional accuracy before starting the installation. A maximum deviation of  $\pm 5$  mm relative to the track of the crane beam is permissible in the horizontal and vertical. The squareness of the support structure relative to the crane-beam track must be ensured.

The various systems are implemented in accordance with the layout drawings, connection diagrams and part lists.

### 4 Intended Use

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Power supply of mobile consumers in the non-public area. Protection class IP21 (current collector entry from the side) and IP23 (current collector from below) for indoor and outdoor use outside the hand area.

### 5 Current Collector

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Always include redundancy for the PE current collector (at least one dual current collector). When using inverters, there must also be redundancy for the phase-current collectors (protection against shutdown due to the loss of phase voltage in the case of transient loss of contact).

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### 6 Installation Sequence

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The **hanger clamps** are first screwed to the existing mounts (**support arms**).



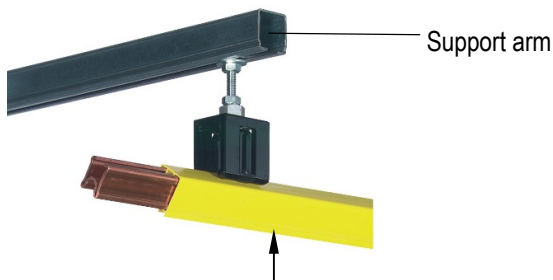
**The hanger clamp mount must be adapted to the respective application!**

The mounting elements are designed for standard mounting applications. The mounts must be adapted to the respective application (e.g. by means of additional screw locking with Loctite 242) for safety-critical mounts, special on-site interfaces (e.g. deviating through-hole geometry or other restrictions affecting the fastening) and/or increased requirements (e.g. vibration). The system manufacturer is responsible for the evaluation.

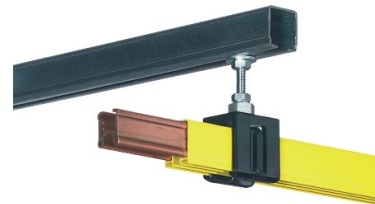


**The maximum tightening torques must not be exceeded (14 Nm for standard hanger clamp with steel nut). Tightening torques that exceed this may lead to damage to the hanger clamp.**

The retaining clip must be rotatable - subsequent alignment is not necessary. After mounting the hanger clamp, the rails and the expansion connectors can be clipped into the hanger clamp. Center distance between hanger clamp and rail connector:  $\geq 400$  mm!



Feed the conductor rail into the hanger clamp at around 45°



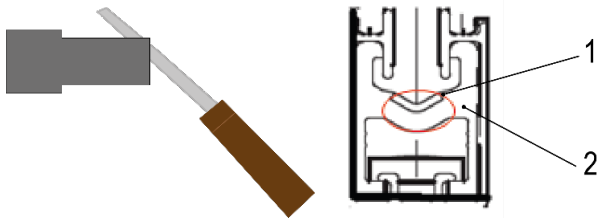
Rail clipped into the hanger clamp

When **cutting the conductor rail**, the insulation profile and rail have to be cut separately. The cut direction is only top down (avoid stainless steel strip to be disconnected from rail!). Use fine saw or angle grinder with fine cutting plate (no rough saw). File a chamfer 1-2 mm 45° at the stainless steel strip at the end of the aluminum rail after cutting. This is important to avoid sliding contact wear! Remove burrs from all other sharp edges of the rail by using a file!

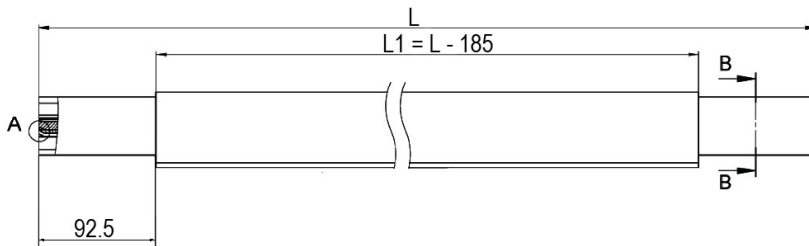
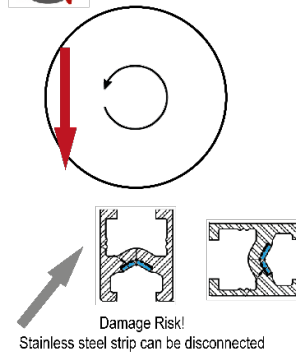
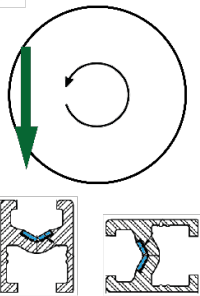
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Copper and steel rails must also be prepared at the ends after cutting! A chamfer 1-2 mm 45° is also required at the sliding surface for the current collector!  
Sharp edges must be burred!



Pos.	Designation
1	Stainless steel strip
2	Aluminum rail body

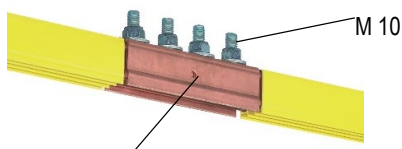


A = Chamfer at stainless steel strip

Insulation is 2x92.5 mm shorter than the conductor rail!

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The rail sections are screwed together using **rail connectors** to form a single unit. In order to achieve a good ohmic contact, the connection points (contact surfaces) are of bare metal thinly coated with conductive paste (080021). Half of an insulating cap is pushed onto each prepared rail end. The conductor rails are now pushed into the connector from either end up to the end stop (Al/steel rails) or to the inspection port. The nuts on the connector centrally located between the two rails to be connected are tightened to a maximum tightening torque of 31 Nm. The insulating caps can now be pushed together and connected using the two screws. This makes the connection point contact safe.



Always push the rails in as far as the end stop and with the marking point installed at the joint gap (gap of 2 mm between rail ends is urgent necessary)

Conductor rails with screwed connector



Fully assembled rail connector

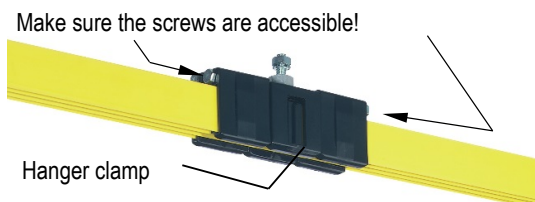


### Destruction of the conductor rail!

- Do not push the conductor rails together with force
- Do not drive them with a hammer
- Respect the tightening torque and use a torque wrench
- Use conductive paste 080021

When trimming the conductor-rail sections, make always sure that the insulating profile is 185 mm shorter than the rail.

**Anchor clamps:** The hanger clamps are sliding supports. Therefore, to ensure uniform expansion on both sides, anchor clamps have to be fixed, preferably at the center of the system or as per the attached layout drawing. The anchor clamps are pushed onto the rails before the connectors are assembled and positioned the right and left of a hanger clamp.



Fixing point: anchor clamps arranged to the right and left of the hanger clamp

The screws for securing the anchor clamp are only tightened once the setting of the expansion units is complete.

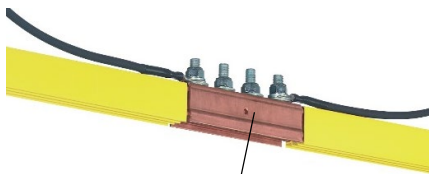
**Comment:** No rail joints are necessary for systems with  $L \leq 200$  m. For systems with  $L > 200$  m, see separate item in these installation instructions.

**Power feeds** are to be installed in place of rail connectors as close as possible to the feed cable of the fixed installation. If the power feed is to be attached within a rail section, the insulating profile needs to be cut at that point and trimmed by

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92.5 mm on either side. In this case, it must be ensured that there is a clearance of 400 mm between the power feed and the hanger clamp due to the temperature shift of the conductor rails. To ensure a permanently good ohmic contact, the clamping points must be cleaned and thinly coated with conductive paste.

As for the rail connectors, the halves of the insulating caps are pushed onto the rail ends. The two rail sections are then pushed into the power supply clamp as far as the end stop and connected to it. The supply cable is inserted into the insulating cap and attached to the power supply clamp (see rail connectors for the maximum tightening torque for nuts). The two halves of the insulating caps can now be pushed together and firmly connected using the two anchor screws. Before the final positioning of the insulating caps, it is easy to check that the joint gap is exactly in the middle of the infeed and not too large (max. 3 mm) using the inspection port in the power-supply clamp.



Gap 2 mm / Rail Joint



Power Feed: Fully assembled connections

Power feed fitted with feed caps.



**NOTE!**

**Do not allow any tensile load on the cable!**

→ Provide a strain relief to the cable at a suitable distance.



**WARNING!**

**Destruction of the conductor rail!**

→ Do not push the conductor rails together with force

→ Do not drive them with a hammer

→ Respect the tightening torque and use a torque wrench

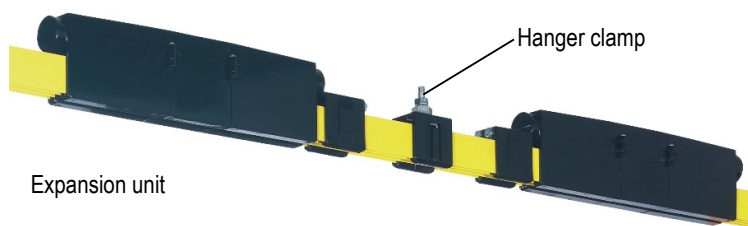
→ Use conductive paste 080021

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The **expansion unit** is supplied complete as a 5-m piece. Except of the installation of connectors right and left on the rail ends, no further assembly is necessary. However, it must be ensured that the two air gaps of the rails in the rail joints —see diagram on page 10 —are adjusted according to the ambient temperature on installation. The air gaps need to be checked again when the anchor clamps have been installed.

As can be seen from the photo below, a hanger clamp (with securing arm) must be attached to the centerpiece of the expansion unit.



Dual current collectors must be used when using expansion units.

A hanger clamp must be fixed to the center-piece of the expansion unit.

After completion of the rail assembly as far as the following anchor point, the two air gaps of the expansion unit can be set. The size of the air gap can be taken from the diagram for the ambient temperature at the time of the installation.

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### 7 Pickup Guide

#### Installation of Intersections

For areas in which the collector must be driven in or out of the conductor rail system, pickup guides are used in combination with current collectors provided for this purpose. The speed for pickup guide entry must not exceed 80 m/min and that pickup guides must be considered wearing parts.

Installation tolerances must be considered. Simultaneous alignment gaps with maximum tolerances in the X and Y directions are not permitted.

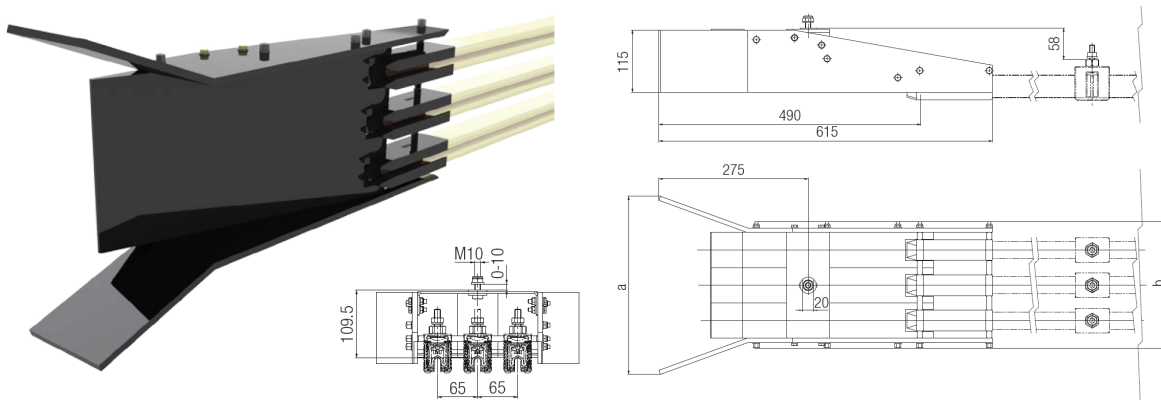


Fig. 1: Hanger clamp interval for systems with pickup guides

Dimensions [mm]	Number of Poles				
	1	2	3	4	5
<b>a</b>	200	265	330	395	460
<b>b</b>	105	170	235	300	365

The pickup guide centers the current collector with a maximum lateral and vertical alignment tolerance of  $\pm 25$  mm:

- Settings of less than  $\pm 10$  mm are recommended.
- In installations with pickup guides, a corresponding number of current collectors must be available, and mounted in intervals that ensure that just the necessary numbers of current collectors needed for momentary power requirements are in use.



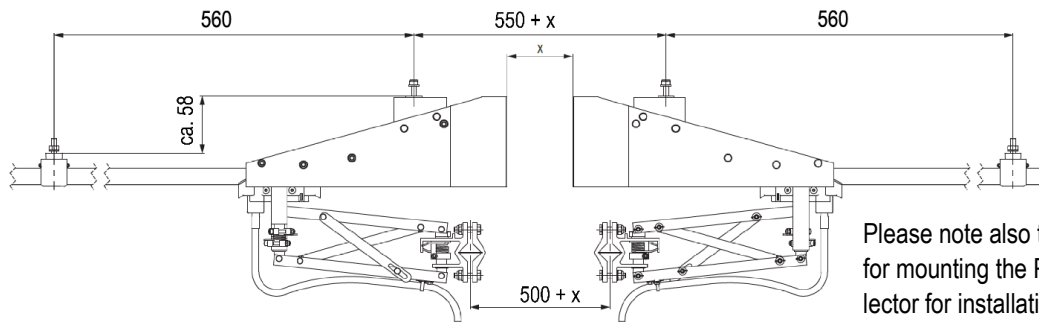
#### Disconnect the current from power or protect it against contact!

The user must ensure that the current collectors between the pickup guides are disconnected from power or are protected against contact.



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### Hanger Clamp Interval for systems with Pickup Guides



The phase distance is reduced in the intersections area from 80 mm to 65 mm.

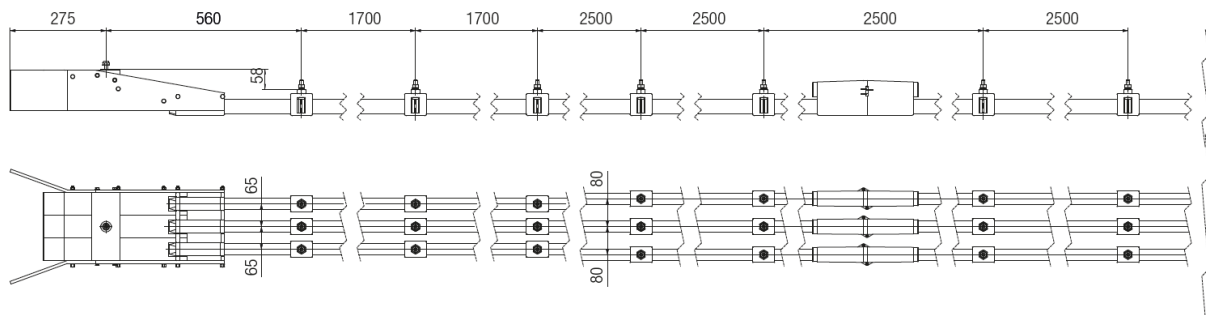


#### NOTE!

The middle distance (phase distance) between two conductors is 65 mm. This is reduced to 60 mm using the last hanger clamp before the pickup guide in order to ensure that the current collector enters the pickup guide precisely.

- The pickup guide is delivered complete end caps. The end caps are pushed onto the rails with a soft-head hammer until they hit the end stops.
- The clamping screws are then tightened firmly.
- Notice the interval pickup guide to the first hanger clamp (560 mm)!

### Hanger clamp interval for systems with Pickup Guides



Please note also the instructions for mounting the PE Current Collector for installations with Pickup Guides.

When using multiple-pole pickup guides, the gap between phases must be reduced from 80 mm to 65 mm on the section shortly before the funnel. To this end, two or three hanger clamps are installed with a gap of 65 mm before the funnel. The remaining hanger clamp gap is set to 80 mm.

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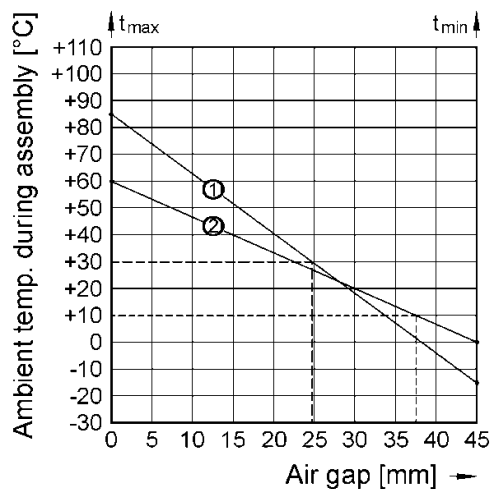


**NOTE!**

- Observe the reduced gap between phases near the funnel area
- Use dual current collectors with vertical-motion limiters for the funnel paths
- Remove PE deflectors for funnel applications
- Disconnect the current collector near the transition or take construction measures for shock protection, such as the installation height, covers, etc.

### Air gap installation with expansion units

Both rail joints must have the same air gap.



### Instructions

$t_{min}$  = lowest occurring temperature in the respective application case

$t_{max}$  = highest possible operating temperature in the respective application case

1. Enter a tie line from  $t_{min}$  to  $t_{max}$ .
2. Enter a horizontal line at the ambient temperature during installation.
3. Drop a line down from the intersection of the two lines, and read off the air gap to adjust.

### Examples:

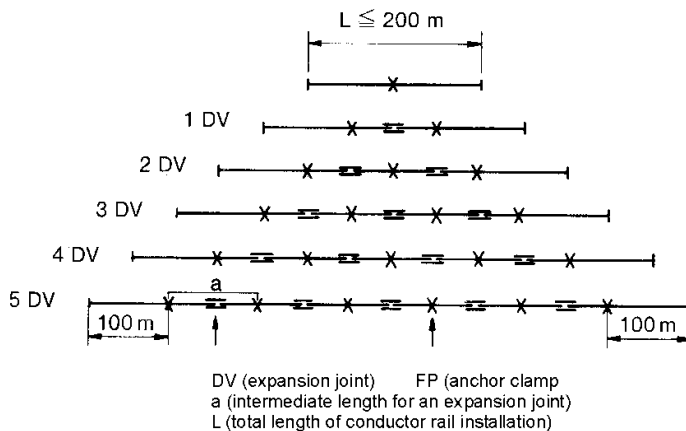
← = Temperature range from  $-15^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$   
(ambient temperature during installation  $+30^{\circ}\text{C}$ )  
air gap (read off): 25 mm

↑ = Temperature range from  $0^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$   
(ambient temperature during installation  $+10^{\circ}\text{C}$ )  
air gap (read off): 37 mm

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For conductor rail systems > 200 m, expansion units must be installed at certain intervals:

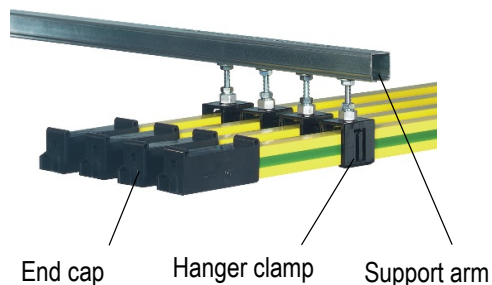
Number of expansion joints	Intermediate length a			
	Material	St	Al	Cu
$\Delta T_{ges}$	10	200	200	200
	20	200	187	200
	30	200	125	176
	40	187	93	132
	50	150	75	106
	60	125	62	88
	70	107	53	75
	80	93	47	66
	90	83	42	59
	100	75	37	53



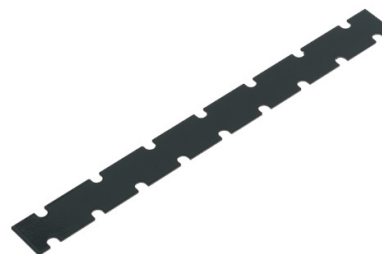
After setting the expansion unit, the anchor clamps are slid onto the hanger clamps and the clamping screws tightened. The expansion unit, especially the air gaps, are checked again for the correct setting and clean continuity of the sliding contact.

The rail ends are protected by end caps that are pushed onto the rail with light hammer taps (the outer edges of the rail ends need to be deburred). The end caps are secured using clamping screws (firmly tightened).

The maximum distance from the cap end to the center of the hanger clamp is 250 mm.



The use of the installation comb is indicated for setting the hanger clamp interval when installing with support arms. The standard center-to-center distance of the conductor rails is 80 mm.



At the end of the installation, the system must undergo electrical and mechanical testing over its entire length before the system is put into operation.

The range of motion of the current collector over the entire traversing range must be checked in slow-speed mode.

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### 8 Maintenance

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The following tests must be conducted at half-yearly intervals after commissioning the system.

#### 8.1 Hanger Clamps 081341- ...and 081343-...

- a) Check for firm seating of screws and nuts.
- b) Check that the conductor rail sits well in the hanger clamp.
- c) The plastic clamp of the hanger clamp must be able to move within the tolerance limits on the conductor rail and must not be jammed, so that the conductor rail can move through the sliding seating of the hanger clamp when the temperature changes.

#### 8.2 Rail Connectors 081321- ...and Power Feeds 081351-...

- a) Through the access slot in the conductor rail, check that the rails installed at these points do not have gaps greater than a maximum of 3 mm and if necessary open up the rail connector and power feed and readjust.
- b) Check whether the two adjacent rail ends have burrs and whether the contact heights are equal and remove burrs or realign if necessary.
- c) Check that the power supply clamping bolts are firmly seated.

#### 8.3 Expansion Units 081362-...

For expansion units, check the distance between the two neighboring rail ends at the ambient temperature prevailing during the test in accordance with the installation instructions for conductor rail systems. If it can be seen from the graph that the gap is not correct, it is essential to readjust it. Differences between the measured value and graph value  $\leq 5$  mm are to be disregarded.

#### 8.4 Anchor Clamps 081331-...

Check the anchor clamps for correct seating on the conductor rail and that they are attached as closely as possible left and right of the hanger clamp. Readjust and tighten if necessary. The position of the anchor clamp must be compatible with the functioning of the expansion unit.

#### 8.5 Conductor Rails 0813XX-...

- a) The insulation is to be visually inspected for cracks or deformation due to parts falling on the system or inadmissibly excessive temperatures, replacing the insulating sleeve if necessary.
- b) The wear resistance of the guide lips of insulating sleeve is also to be checked at the access slot. There is normally no wear here. There may, however, be localized wear due to improper forced operation of the current collectors; replace any worn insulating sleeves and check the current-collector system at these points and readjust as specified in the drawing if necessary.

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### 8.6 Current Collectors 081301- ...to 081304-...

- a) Check the installation dimensions in accordance with catalog KAT0813-0001 and adjust if necessary.
- b) Check the sliding contact of the carbon brushes with a spring balance. The contact force must be 28 N. If this is not the case, the springs must be replaced.
- c) Check the position and securing of the connecting cables. These connecting cables must not affect the current collector heads. The proper positioning and functioning of the current collector heads can be determined very easily:  
The outer current-collector heads are withdrawn from the conductor rail and held against the rail. The brushes must be at the height of the contact surface and parallel to it. If this is not the case, the fastening of the connecting cable must be corrected. The cables must be adjusted accordingly in all further current collector heads.
- d) The sliding contacts must be replaced if they are worn down to approximately 2 mm from the insulation.
- e) Lightly oil the joints and bolts.

Always include redundancy for the PE current collector (at least one dual current collector). When using inverters, there must also be redundancy for the phase current collectors (protection against shutdown due to the loss of phase voltage in the case of transient loss of contact).

### 8.7 Heating Cable

- a) Check all circuit breakers and replace it if necessary.
- b) Check all heating cable runs for continuity.



**CAUTION!**

#### **Only use solvent-free cleaning agents!**

When cleaning rails and power consumers, it must be ensured that only solvent-free cleaning agents are used that do not have an aggressive action on or destroy plastics such as PVC, PC and PBTP (see WV0800-0001).



**You can find further information in the catalog KAT0813-0001!**

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### 9 Relevant Components



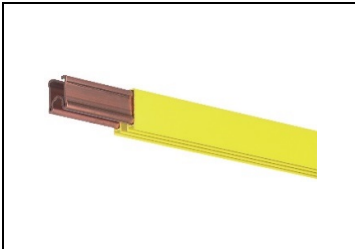
081341-...;  
Hanger clamp with steel nut



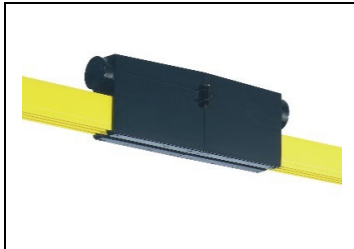
081343-...;  
Hanger clamp for attachment to a support arm



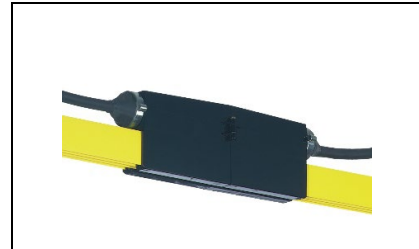
081331-...;  
Anchor clamp



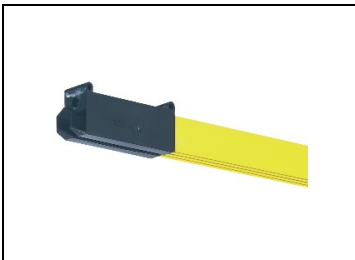
0813XX-...  
Sliding contact



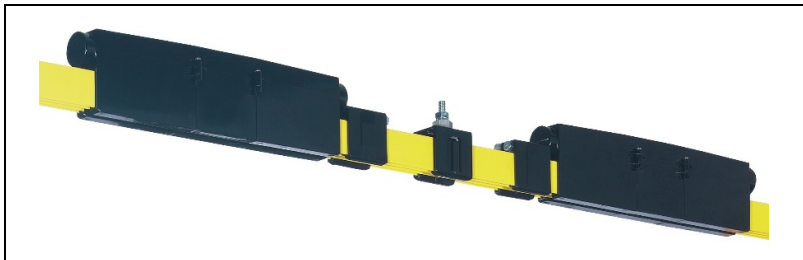
081321-...;  
Rail connector



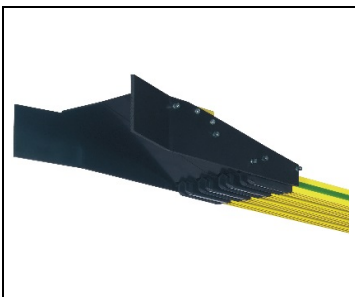
081351-...;  
Line feed



081371-... / 73-...  
End cap



081362-...  
Expansion unit



081382-...  
Pickup guide for section transitions



081394-... / 95-...  
Air gap

## Single-Pole Insulated Conductor Rail Program 0813



020186-...;  
Support arm



020286-...;  
Bracket for support arm



020180-...;  
Clamping bracket



020197-...;  
Towing arm



080052-...;  
Cable lug for supply cable



080401-... / 02- / 03-...;  
Insulator



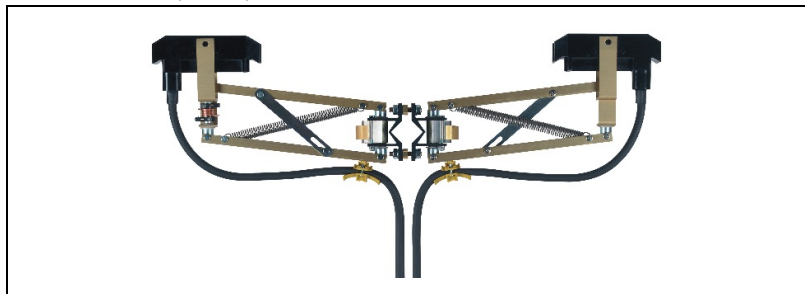
081301-...;  
Current collector



081301-...;  
Dual current collector (standard)



081003-...;  
Sliding contact (spare part)



081302-... / 03-... / 04-...  
Dual current collector for section transitions

# Installation Instructions



## Single-Pole Insulated Conductor Rail Program 0813

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