

MultiLine 0835

Conductor Rail System

Assembly and operation manual

Read this manual prior to performing any task!

Assembly and operation manual (translation of the original)

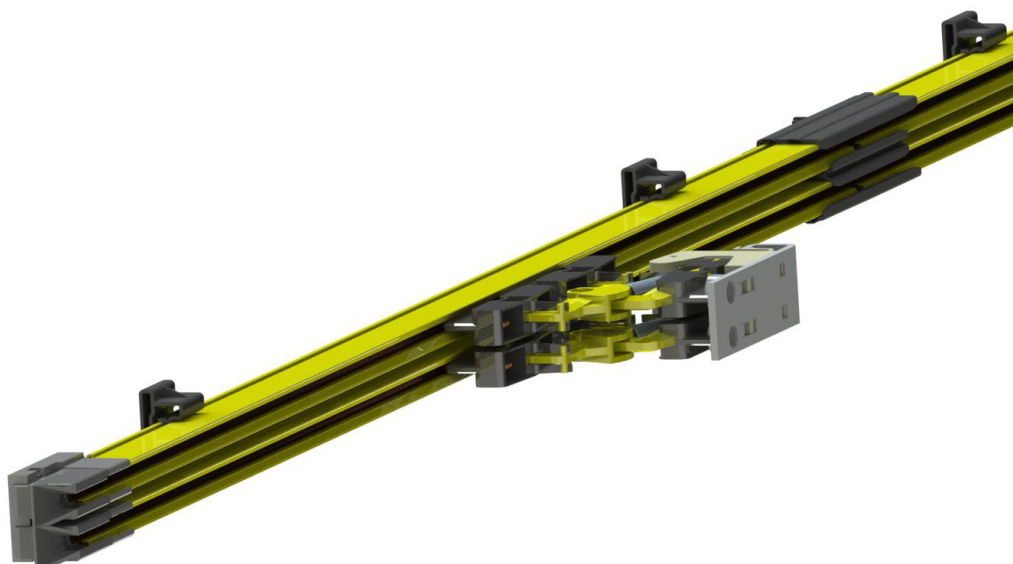


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1 Safety

1.1 Warnings and symbols

This document contains safety-relevant information in various places. The safety section contains general safety instructions that are relevant for several or all phases of the product life cycle. Further safety instructions relating to a specific phase of the product life cycle can be found at the beginning of the corresponding section.

Warnings are also used. These are identified by symbols and signal words. The symbol indicates the type of danger, the signal word indicates the degree of danger. Warnings are handling-related additions that are placed directly next to the respective work step.

Always observe all safety and hazard information and work carefully to avoid accidents, bodily injury or material damage!

The product safety labels, i.e. the symbols affixed to the product, must also be observed. Product safety labels must not be removed from the product. If they have been removed from the product, they must be replaced.

Signal word	Meaning
DANGER	This combination of symbol and signal word indicates an imminently dangerous situation that will result in death or serious injury if it is not avoided.
WARNING	This combination of symbol and signal word indicates a potentially dangerous situation that can result in death or serious injury if it is not avoided.
CAUTION	This combination of symbol and signal word indicates a possible dangerous situation that can result in minor injury if it is not avoided.
NOTICE	This combination of symbol and signal word indicates a potentially dangerous situation that can result in material and environmental damage if it is not avoided.
ENVIRONMENT	This combination of symbol and signal word indicates a potentially dangerous situation that can result in material and environmental damage if it is not avoided.



Tips and recommendations

Indicates tips and recommendations drawn from Conductix-Wampfler's many years of experience. These appear at or after a work step and/or a description.

Warning signs	Type of danger
	Warning – danger zone.

Warning signs	Type of danger
	Warning – crushing hazard.
	Warning – dangerous electrical voltage.
	Warning – danger of entanglement.
	Warning – flammable substances.
	Warning – suspended load.
	Warning – toxic substances.

1.2 Intended use

The conductor rail system is a multi-pole, electric power supply system for track-guided mobile consumers. The conductor rail system may only be used indoors, e.g. for supplying power to a shuttle in a warehouse with horizontal shelving. The area must not be accessible to the public. The conductor rail system must only be installed in a horizontal and straight position. The current collector may only engage the conductor rail from the side.

➔ Chapter 3 “Technical Data” on page 17

Intended use also includes compliance with all the information in this document.

1.3 Improper use

Any use that deviates from or goes beyond the intended use described here involves considerable risks to persons and materials.

Improper use particularly includes, but is not limited to:

- Operation outside the stated technical specifications
- Operation outside the specified operating and ambient conditions
- Operation without initiating measures resulting from the operator's risk assessment

➔ Chapter 1.4 “Operator responsibility” on page 8

- Operation under ambient conditions that permanently damage the material properties and/or reduce the insulating properties
- Operation in areas with flammable or explosive gases and/or dusts
- Operation in clean rooms and/or white rooms
- Exceeding the max. system length
- Operation in an area accessible to the public without protective equipment
➔ *Chapter 1.4 "Operator responsibility" on page 8*
- Overloading of current collectors and conductor rails due to excessive current and voltage
- Operation in areas that require a higher degree of protection than specified
- Use of the conductor rail system as a climbing aid
- Use of unsuitable cleaning agents
➔ *"Unsuitable cleaning agents" on page 83*
- Use of accessories not supplied and not approved or authorized by the manufacturer
- Use of spare parts that have not been approved by the manufacturer
- Use of tools that are not intended for professional use
- Operation of the system by untrained and insufficiently qualified personnel
- Execution of any work on the system by insufficiently qualified personnel
- Overriding of safety devices
- Use of different conductor materials without additional measures
- Use on sections with grade resistance (inclined plane)

1.4 Operator responsibility

The product is used in the commercial sector. The operator is therefore subject to the legal obligations relating to workplace safety. In addition to the warning and safety instructions in this document, all safety, accident protection and environmental regulations valid in the place of operation of the product must also be observed.

This particular applies to the following:

- The operator must ensure protection against electric shock (protection against indirect contact).
- The operator must be informed of the applicable workplace safety regulations and identify any additional dangers that may arise from the specific working conditions at the system operating site. These must be implemented in the form of operating instructions for operating the system.
- The operator must examine the system during the entire operating period and determine whether the operating instructions issued by the operator comply with the current state of the regulations. The operating instructions must be updated if necessary.
- The operator must clearly regulate and define the responsibilities for installation, operation, maintenance, and cleaning.
- The operator must ensure that all personnel who are involved with the system have read and understood these instructions. In addition, the operator must also train the personnel at regular intervals and inform them of dangers.
- The operator must provide the necessary personal protective equipment to the required personnel.
- The operator must store the keys for the switching cabinets securely, i.e. only expressly authorized persons may have access to the keys.

- The operator must ensure that the service intervals specified in this document are observed.
- The operator must ensure that the check points for functionality are carried out before initial commissioning in accordance with this document.
- The controls and safety devices provided by the operator for operating the system must be checked for functional safety and completeness.

1.5 Personnel requirement

All activities may only be carried out by qualified and trained personnel. Inadequate training in the use of the product may result in serious personal injury or material damage. The qualifications listed for various areas of application are stated in this document.

Electrically trained person

- has been trained by a qualified electrician
- knows the potential dangers of improper conduct
- knows the necessary protective measures and protective equipment
- is supervised by a qualified electrician

Minimum two persons

- At least two people are required to carry out specific activities

Qualified electricians

- are specially trained for the working environment surrounding electrical systems,
- are capable of independently performing assigned tasks on electrical systems based on their professional training, knowledge and experience, who also are able to independently recognize and avoid potential hazards and
- possess an understanding of the applicable standards and regulations.

Specialist personnel

- Consists of persons who are capable of independently performing assigned tasks based on their professional training, knowledge and experience, who also are able to independently recognize and avoid potential hazards and
- possess an understanding of the applicable standards and regulations.
- The operator must document that the relevant certificates or other proofs of qualification are available or have been verified.

Users

- may take on tasks within the scope of normal operations.
- have been instructed by the operator in this regard and familiarized with the potential dangers.

1.6 Personal protective equipment

The protective equipment that the persons involved must wear may be specified at the beginning of the instructions.



FFPE protective mask

To protect against serious and permanent respiratory diseases.

An FFP3 mask is recommended when working with very high dust levels.

**Protective clothing**

Primarily to protect against ensnarement by moving machine parts. Protective work clothing must be close fitting with a low resistance to tearing; it must have close-fitting sleeves and no protruding parts.

**Protective eyewear**

For eye protection against mechanical and chemical hazards.

**Protective footwear**

For protection against heavy falling parts and slipping on slippery floors.

**Protective gloves (mechanical)**

For hand protection against mechanical hazards such as friction, abrasions, punctures or deeper wounds.

**Protective headgear**

For protection against falling and flying parts.

1.7 Product-specific safety instructions

The dangers described here describe residual risks that may arise from the product even when used as intended.

➔ Chapter 1.2 "Intended use" on page 7

1.7.1 Electrical hazards

**DANGER****Risk of death due to electric shock**

Contact with electrical components can lead to death or severe injury.

- Do not touch energized components.
- Do not use damaged electrical components and/or cables.
- Observe the 5 Safety Rules.

➔ Chapter 1.8 "5 Safety Rules for working on electrical systems" on page 12

**WARNING****Fire hazard due to overload or sparking**

Fire hazards occur due to overloading the system or individual components (e.g.: Cables, current collectors, etc.), arcing, short circuits or spark formation.

- Comply with permissible current ratings.
- Easily combustible materials may not be stored near the product.
- Observe installation tolerances.
- Check, service and clean the product regularly.

1.7.2 Mechanical hazards



WARNING

Risk of injury due to sharp edges

When working on the conductor rail, skin and limbs may be cut or severed.

- Wear personal protective equipment for all work.



WARNING

Risk of death due to suspended loads

When lifting loads, there is a risk of death due to falling or swinging parts.

- Never walk under suspended loads.
- Only move loads under supervision.
- Observe the specifications for the intended attachment points.
- Never attach parts to projecting machine parts or to eyelets on installed components.
- Check that lashing components are securely fastened.
- Only use authorized lifting gear and separate lifting accessories with sufficient load capacity.
- Do not use torn or worn ropes or straps, replace with new ones if necessary.
- Do not attach ropes or straps to sharp corners and edges.
- Do not knot or twist ropes or straps.
- Set down all suspended loads before leaving the work area.



WARNING

Risk of injury due to impact

Moving components of the conductor rail system can cause injuries to limbs.

- Point out this risk to specialist personnel during instruction.
- Avoid environments containing solvents, as these can cause plastic parts to break. Broken components may cause these or other components to fall.
- Take precautions against falling parts.



DANGER

Risk of injury due to ensnarement

There is a risk of being ensnared by moving parts when the system is in operation.

- Do not enter the danger zones of the system during operation.
- Point out this risk to specialist personnel during instruction.



WARNING

Risk of injury due to crushing of skin and limbs

The spring force of the current collector can lead to the crushing of skin and limbs.

- Wear personal protective equipment for all work.

**WARNING****Risk of injury due to long objects**

When lifting multiple conductor rails, there is a risk of injury if the conductor rails slip out of the collar.

- The conductor rails are to be transported near to the installation site while still inside their packaging.
 - Two persons are to carry the conductor rails to the installation site.
 - Ensure that the conductor bars do not slip out of the insulating profiles.
-

1.7.3 Danger due to substances

**DANGER****Health hazards due to dust**

The abrasion from the sliding contacts is harmful to health. Frequent handling of the conductor rail system and/or careless handling of dust accumulations can lead to sensitization, mucous membrane irritation, respiratory diseases and cancer.

- Wear an FFP3 protective mask when working with very high levels of dust.
-

1.8 5 Safety Rules for working on electrical systems

**Follow the 5 Safety Rules
(see DIN VDE 0105-100)**

1. Disconnect the system from the voltage supply at the main switch.
2. Secure the main switch against being turned back on.
3. Verify the absence of a voltage by measuring.
4. Ground and short-circuit parts of the system on which work will be conducted.
5. Cover or block off adjacent energized parts.

2 General information

This document is part of the product and enables safe and efficient handling of the product. It must be kept accessible to personnel at all times.

Compliance with all warnings, safety instructions and instructions for use is a basic prerequisite for safely working with the product. Furthermore, the local accident prevention regulations and general safety regulations for the use of the system or machine apply.

This document does not provide instructions for operating the system or machine in which the product is integrated.

Illustrations are provided for basic understanding and may deviate from the actual implementation.

2.1 Copyright

The contents of this document are protected by copyright and are subject to industrial property rights. Any misuse is punishable by law.

Reproduction of this document, including excerpts, is only permitted within the limits of the statutory provisions of copyright law. Any modification or abridgement, except for internal purposes, without the express consent of Conductix-Wampfler is prohibited.

2.2 Brands

The names, trade names, goods identification, etc. used in this document may be trademarks even if not specifically marked as such and as such are subject to legal provisions.

2.3 Disclaimer

The contents of this document have been reviewed for concurrence with the product described. Nevertheless, because deviations cannot be entirely ruled out, we assume no liability for the complete concurrence. Necessary corrections are included in the following versions.

2.4 Limitation of liability

The contents of this document have been compiled taking into account the applicable standards and regulations, the state of the art and Conductix-Wampfler's many years of knowledge and experience.

Conductix-Wampfler accepts no liability for damage or operational faults resulting from:

- Non-compliance with the technical documentation
- Improper use
- Use of untrained specialist personnel
- Unauthorized modifications and technical changes
- Use of unauthorized spare parts or accessories
- Use of the product, despite a negative transport inspection
- Disadvantages that arise if the product does not function properly

The actual scope of delivery may differ from the explanations and descriptions provided here if the model in question is a special one, if additional equipped has been ordered or due to recent technical changes.

The obligations agreed upon in the Delivery Agreement and our General Terms and Conditions of Business apply, as do the delivery conditions of the manufacturer and the legal obligations applicable at the time the contract was concluded.

Conductix-Wampfler reserves the right to make technical changes within the context of improvement of function and further development.

2.5 Warranty

The warranty period and the scope of the warranty are determined by your contractual conditions and by Conductix-Wampfler's General Terms of Delivery.

The warranty does not apply in the following circumstances:

- Changes to the product without the consent of Conductix-Wampfler
- Improper handling, transportation or maintenance of the product
- Use of parts that are not original Conductix-Wampfler parts
- Non-compliance with this document
- Non-compliance with tolerances

2.6 Customer service

All Conductix-Wampfler employees are always interested in new information and on-site experience that can contribute to improving the products.

Customer service is available for all technical questions.

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2.7 About this document

Explanation of symbols

Measuring equipment



Instruction-related information for when dimensions must be drawn in, measured, and observed is available in graphic form.

Cutting tool



Instruction-related information for when components must be separated from each other (e.g. with a saw) is available in graphic form.

Rubber mallet



Instruction-related information for joining components with a rubber mallet is available in graphic form.

Power drill



Instruction-related information for drilling components is available in graphic form.

File



Instruction-related information for deburring sharp edges is available in graphic form.

Crimping tool



Instruction-related information for crimping cable ends is available in graphic form.

Hexagon wrench



Instruction-related information for when screws are to be loosened or tightened is available in graphic form. If a torque is specified, a torque wrench is to be used.

Wrench



Instruction-related information for when screws are to be loosened or tightened is available in graphic form. If a torque is specified, a torque wrench is to be used.

Misuse or installation error



Instruction-related information that always contrasts with a graphic showing the correct use is available in graphic form.

Correct use or result

Instruction-related information that always contrasts with a graphic showing incorrect use or an installation error is available in graphic form.

Audible click

Indicates that product components must be audibly connected to each other during assembly. Assembly sequences that show these work steps are available.

Further information**Dimensions within the document**

Dimensions without units are given in millimeters.

Tolerance specification

If no tolerance is specified for a dimension, the following tolerances apply:

Dimension [mm]	Tolerances [mm]
from 0.5 to 3	± 0.1
over 3 to 6	± 0.1
over 6 to 30	± 0.2
over 30 to 120	± 0.3
over 120 to 400	± 0.5
over 400 to 1000	± 0.8
over 1000 to 1200	± 1.2
over 2000 to 4000	± 2

3 Technical Data



Specification of type plate information

The information on the type plate must be provided for all inquiries regarding the product.

Mechanical

Data	Value	Unit
Driving direction	Back and forth	
Conductor rail system installation orientation	Horizontal	
Current collector insertion	From the side	
Number of poles	2, 3, 4, 5, 6	
Pole spacing	14	mm
Max. travel speed	300	m/min
Max. length of free extension in one direction	100	m
Conductor rail length	4	m
Hanger clamp spacing	800	mm
Current collector contact force on the conductor rail	Approx. 6	N
Conductor material of the conductor rail	Copper or steel	

Electrical

Data	Value	Unit
Rated current	32	A
Max. rated voltage	500	V AC/DC
Protection class	IP 2X	
Assignment	2 PH, 1 PH + 1 PE, 3 PH, 2 PH + 1 PE and combinations thereof	
Ohmic resistance, copper °C	0,0007783	Ω/m
Ohmic resistance, steel °C	0,0057766	Ω/m
Impedance, copper, 14 mm pole distance, 50 Hz und 20 °C	0,0008030	Ω/m
Impedance, steel, 14 mm pole distance, 50 Hz und 20 °C	0,005893	Ω/m
Cross-sections for connection cables	1.5 – 2.5 or 4 – 6	mm ²
Conductor cross-section	25	mm ²

Ambient conditions

Data	Value	Unit
Temperature range	-5 to +55	° C
Transport temperature	-25 to +55	° C
Storage temperature	-25 to +55	° C
Relative humidity	Max. 85	%
Max. operating temperature difference	40	K
Environment	Indoors	
Altitude above sea level	≤1000	m

4 Description and Functional Principles



Images and illustrations as examples

The images and illustrations shown are for illustrative purposes only and may differ in detail from your project-specific design.

The conductor rail system consists of two or three compact conductor rail poles that can be installed either individually or in combination.

The following pole numbers result when the compact conductor rail poles are combined:

- 4-pole
- 5-pole: 3-pole above and 2-pole below **or** 2-pole above and 3-pole below
- 6-pole

The hanger clamps can either be connected to the support profile with expanding rivets or clipped into place.

Two current collectors that are attached to the end consumer, e.g. in a logistics shuttle, engage in the conductor bar of the conductor rail with their sliding contacts via a permanent contact force. The electrical energy from the power feed is supplied to the current collector via this contact, which passes it on to the end consumer via connection cables.

Connectors are used to connect the conductor rail segments to each other. This means: The connector pins are pushed into the conductor bars and the connection point is protected with a connector cap.

The conductor rail system is electrically connected to the power supply network via the power feed. Power feed terminals with connection cables are installed at the start or end of the system and protected with end caps. The end cap base is also screwed to the support profile on this side of the system. This creates an anchor point that allows the conductor rails to always expand to the same side from this point onward.

The conductor rail system expands at different rates when heated. This allows the system to compensate for temperature differences.

➔ *Chapter 3 "Technical Data" on page 17*

End caps are fitted to the last conductor rail for a protected system termination.

The section power feed of the conductor rail system from the 0815 Product Range is used to feed electrical energy into a track section.

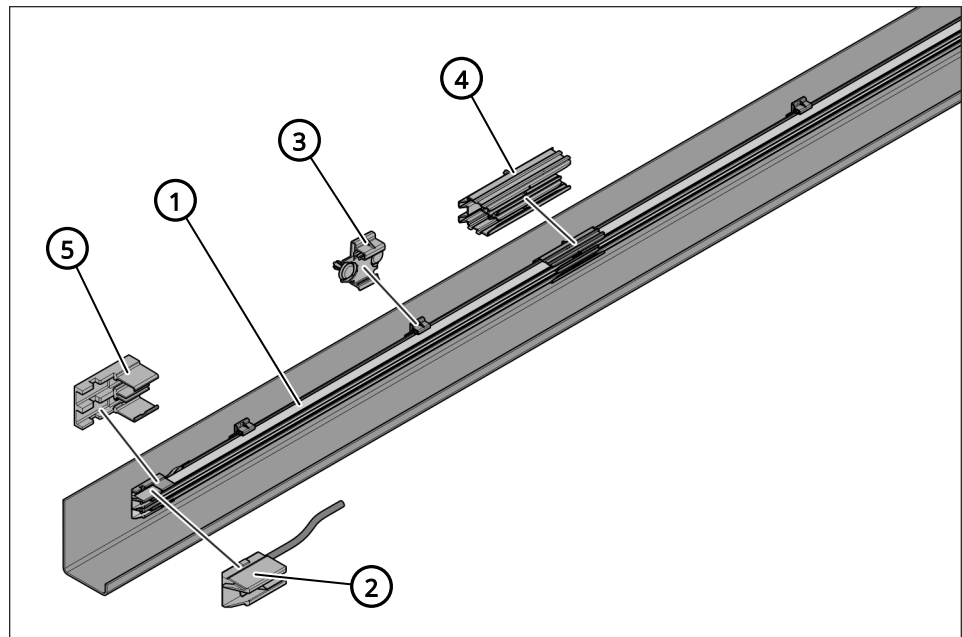


Fig. 1: System start

- 1 Conductor rail
- 2 Power feed
- 3 Hanger clamp
- 4 Connector
- 5 End cap base

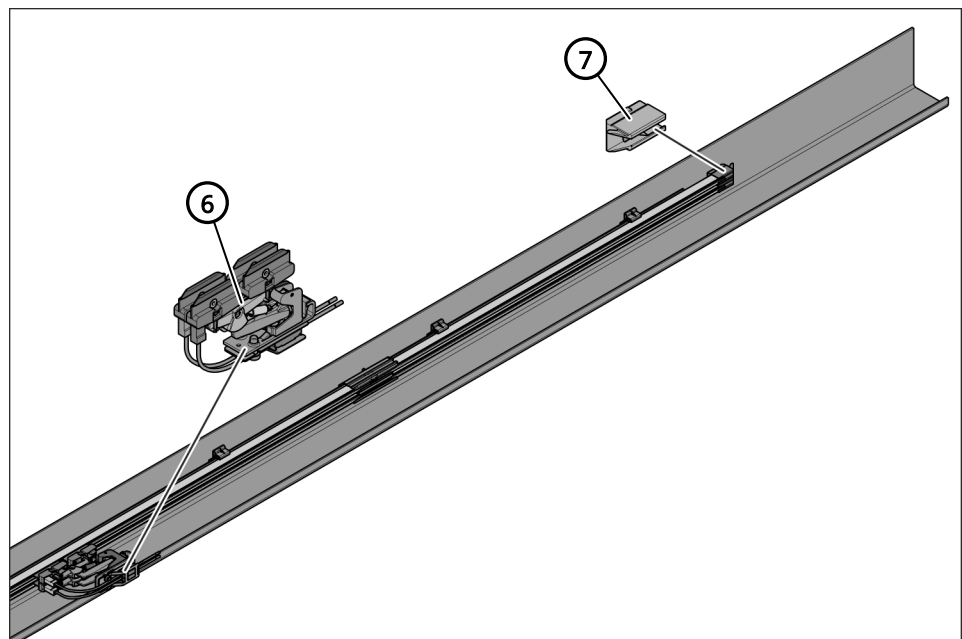


Fig. 2: System end

- 6 Current collector
- 7 End cap



Follow the link or scan the QR code to see the animation:

➔ *Follow here for the system overview*

5 Scope of delivery

Main components



The conductor rail system is available in a 3-pole version.

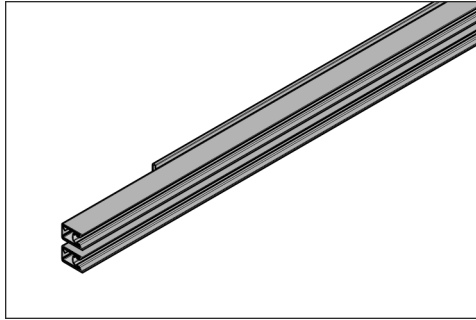


Fig. 3: Conductor rail with recess on the insulated rear side

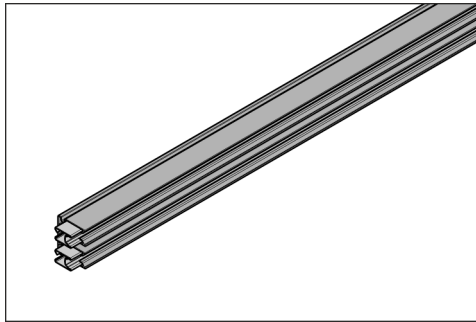


Fig. 4: Conductor rail for system route

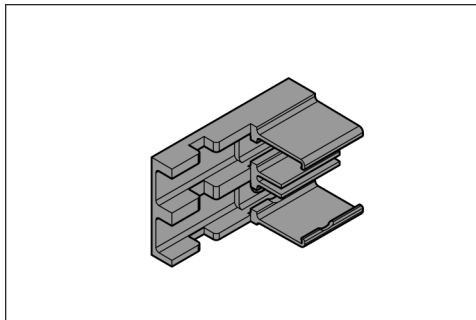


Fig. 5: End cap base

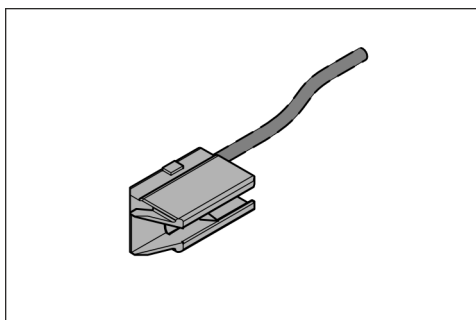


Fig. 6: End cap with power feed

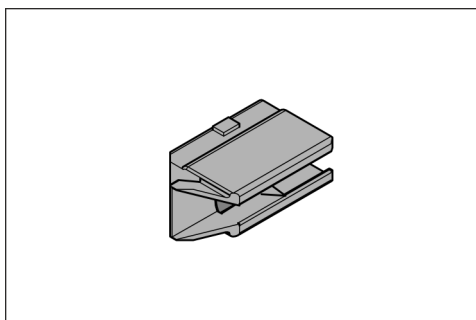


Fig. 7: End cap without power feed

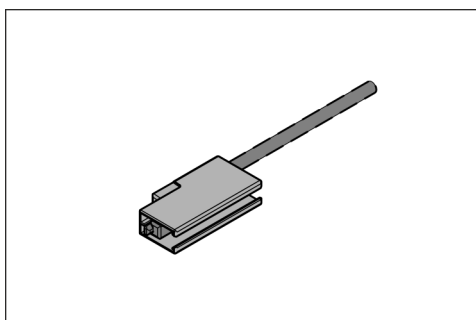


Fig. 8: Section power feed

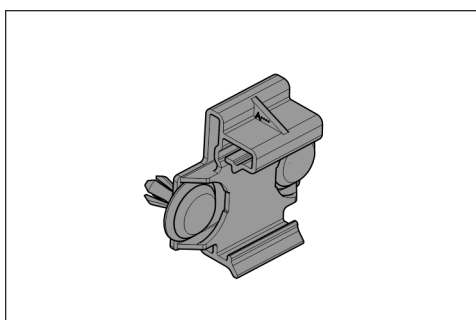


Fig. 9: Hanger clamp with expanding rivet, 2-pole

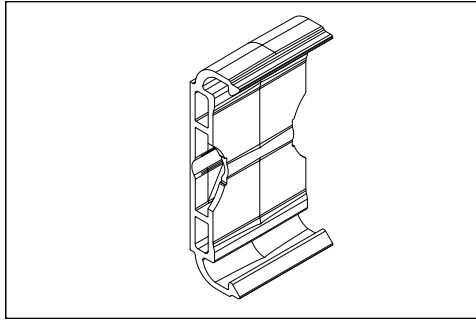


Fig. 10: Snap-in hanger clamp, 2-pole

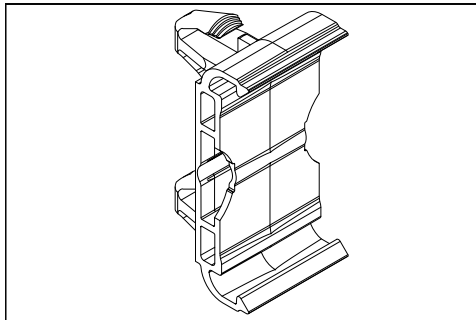


Fig. 11: Snap-in hanger clamp, 3-pole

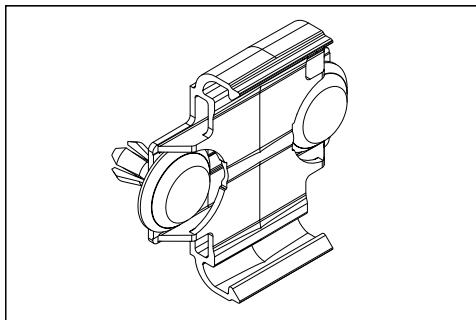


Fig. 12: Hanger clamp with expanding rivet, 3-pole

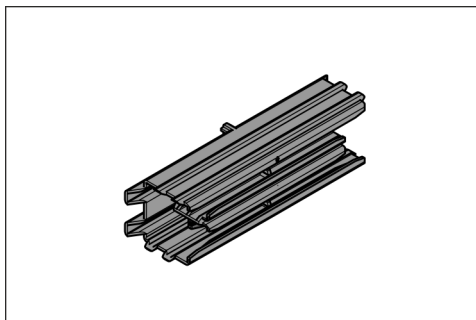


Fig. 13: Connector

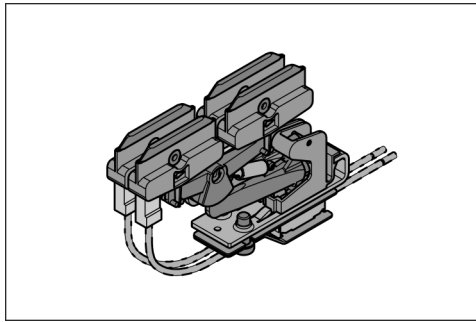


Fig. 14: Current collector unit



The connection cables are not supplied with all current collector units, which is why the connection cables may need to be separately ordered.

Optional accessories 2-pole

The device consists of a mechanical stop and mounting cap (Order No. 08-V015-0463):

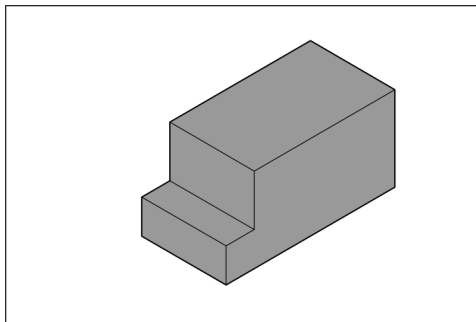


Fig. 15: 2-pole mechanical stop

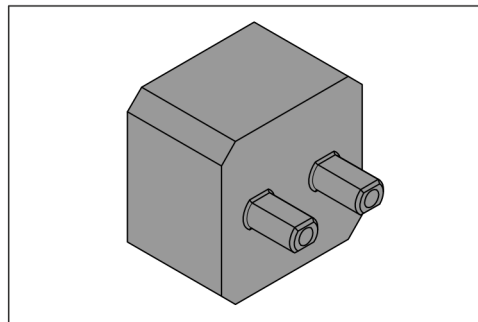


Fig. 16: 2-pole mounting cap

Optional accessories 3-pole

The device consists of a mechanical stop and mounting cap (Order No. 08-V015-0534):

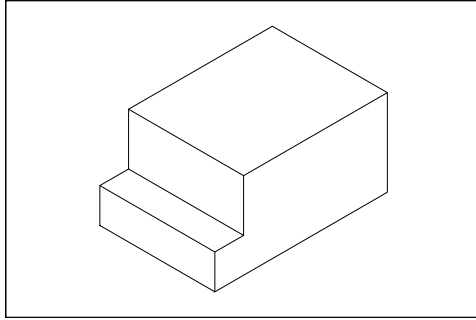


Fig. 17: 3-pole mechanical stop

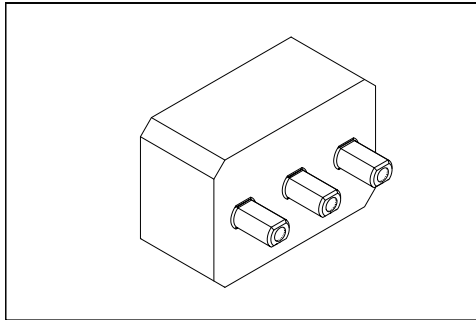


Fig. 18: 3-pole mounting cap

6 Transport and Storage

6.1 Transport inspection

Immediately check the delivery for completeness and transport damage upon delivery, since claims for damages can only be asserted within the complaint periods.

Proceed as follows in the event of externally visible transport damage:

- Document and report any defects identified.
- Do not accept damaged goods or only accept them with reservations.
- Note the extent of the damage on the transport documents or on the transport company's delivery note.
- If Conductix-Wampfler is the deliverer, report the incident to Conductix-Wampfler.

➔ *Chapter 2.6 "Customer service" on page 14*

6.2 Storage

Store packaged parts under the following conditions:

- Dry and dust-free
- Do not expose to aggressive media
- Protect from direct sunlight
- Avoid mechanical vibrations
- Only set on level surfaces
- Do not destroy the packaging; remove it shortly before installation.
- Maintain the ambient conditions according to the technical specifications.

➔ *Chapter 3 "Technical Data" on page 17*

- Check the condition of the parts and their packaging regularly if the storage period exceeds three months. Relocate the packages if necessary

7 Assembly

7.1 Tools and materials

Required tools

Aids such as folding ruler or large screwdriver

An individual aid to reach into the hollow space between the balance and the current collector head.

Brush

Caliper

Crimping tool

Cutting tool

Device

➔ *"Optional accessories 2-pole" on page 25*

➔ *"Optional accessories 3-pole" on page 26*

Drilling machine

File

Hexagon screwdriver AF5

Insulated tool

Measuring equipment for length measurement

Resistance meter according to IEC / EN 61010-1

Rubber mallet

Sandpaper grit 180

Sandpaper grit 400

Screw clamp

Screwdriver for slotted screw

Spatula

Spring scale with a measuring range of 0 to 20 N

Torque wrench, internal SW 2.5

Torque wrench, internal SW 3

Wrench, AF7

Required tools

Absorbent cloth

Cleaning agent

S.LX.-Top

B.W.R. 210

O.C.X. Oxide solvent

Vacuum cleaner with a Class H fine filter

7.2 Preparations on the support profile

Preparation

Personnel:

- Specialist personnel

Protective equipment:

- Protective headgear
- Protective eyewear
- Protective footwear
- Protective gloves (mechanical)

Tool:

- Measuring equipment for length measurement
- Drilling machine

Prepare the support profile:

- After installation, the current collector must be able to engaged in the conductor bar without lateral displacement.
 - ➔ Determine the position of the hanger clamps based on the position and height of the conductor bar.
- At the system start, drill the holes for the end cap base with the anchor point and the first two hanger clamps.

The hole diameter for the hanger clamp expanding rivets depends on the thickness of the support profile.

Support profile thickness	Hole diameter dimension X
2 mm	4.6 ±0.05 mm
3 mm	4.7 ±0.05 mm
4 mm	4.8 ±0.05 mm
5 mm	4.9 ±0.05 mm
6 mm	5.0 ±0.05 mm
7 mm	5.1 ±0.05 mm

The hole diameter for the snap-in hanger clamp depends on the thickness of the support profile.

Support profile thickness	Hole diameter dimension X
3.15 mm	9 mm
2.85 mm	
3.65 mm	9 mm
3.35 mm	
4.15 mm	9 mm
3.85 mm	

- Drill the holes for all other hanger clamps and connectors along the route in the support profile.
- Drill the holes for the hanger clamp and end cap at the system end.



Specification of tolerances

The following dimension specifications apply → "Tolerance specification" on page 16.

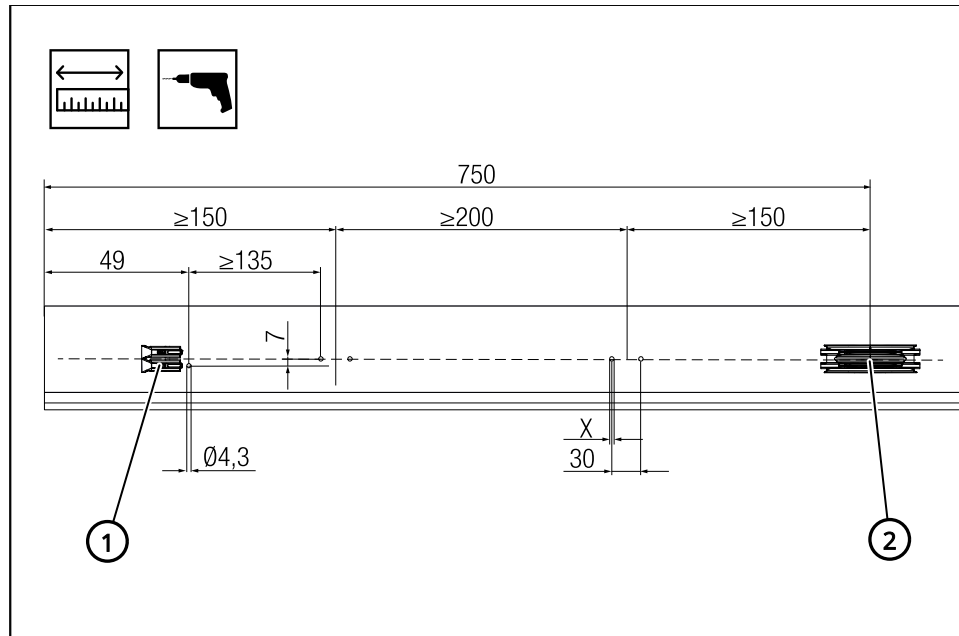


Fig. 19: System start with asymmetrical end cap base

1 Power feed for end cap base

2 Connector

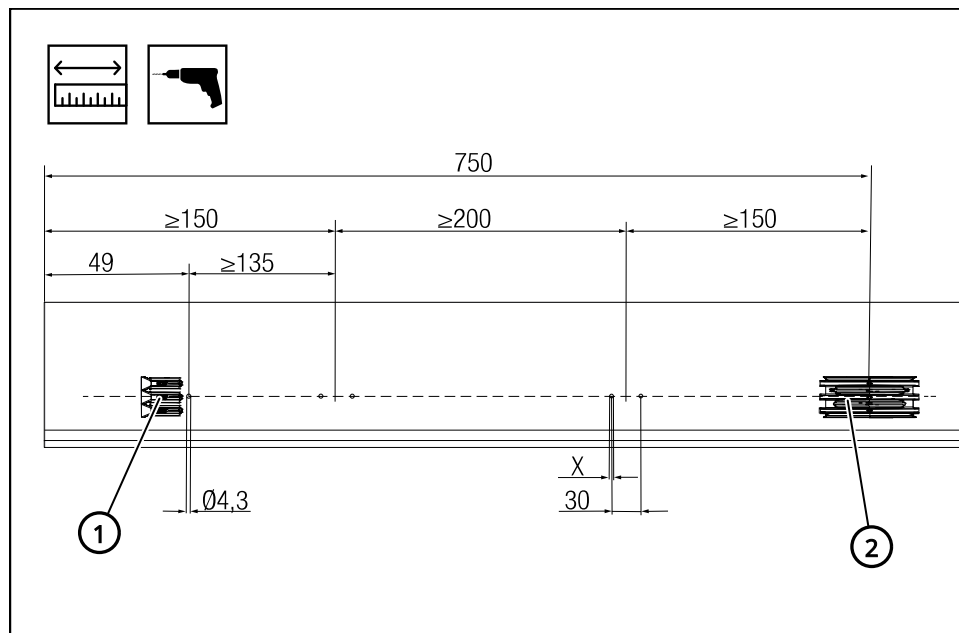


Fig. 20: System start with symmetrical end cap base

1 Power feed for end cap base

2 Connector

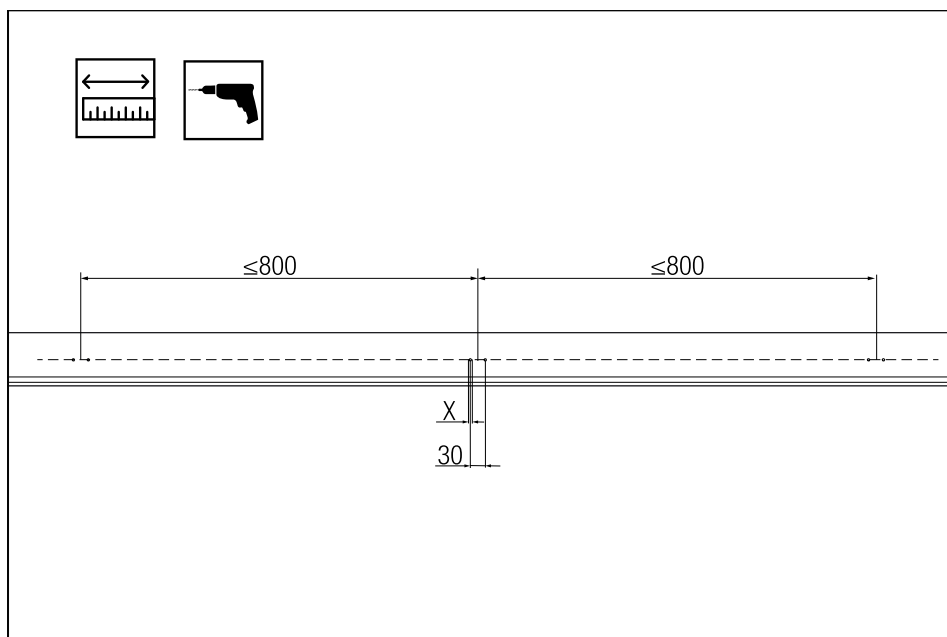


Fig. 21: Holes for hanger clamps

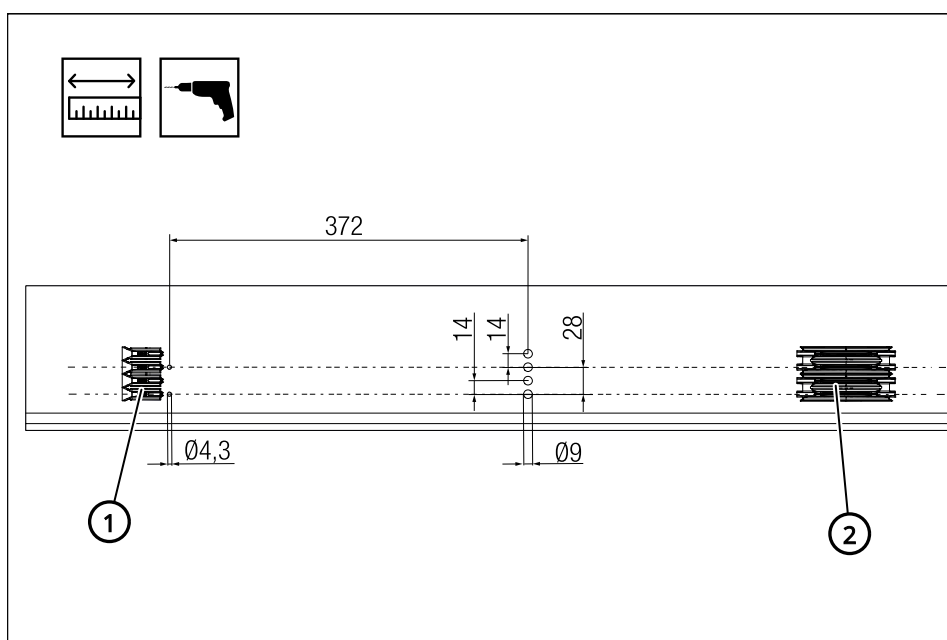


Fig. 22: Spacing in a combined system: 2-pole and 2-pole

- 1 Power feed for end cap base
- 2 Connector

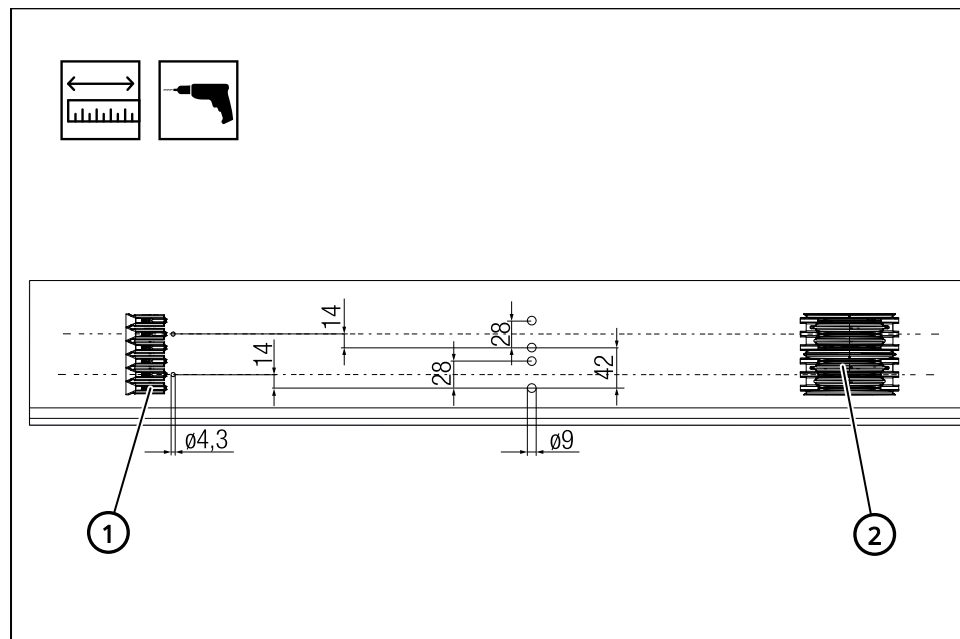


Fig. 23: Spacing in a combined system: 3-pole and 3-pole

- 1 Power feed for end cap base
- 2 Connector

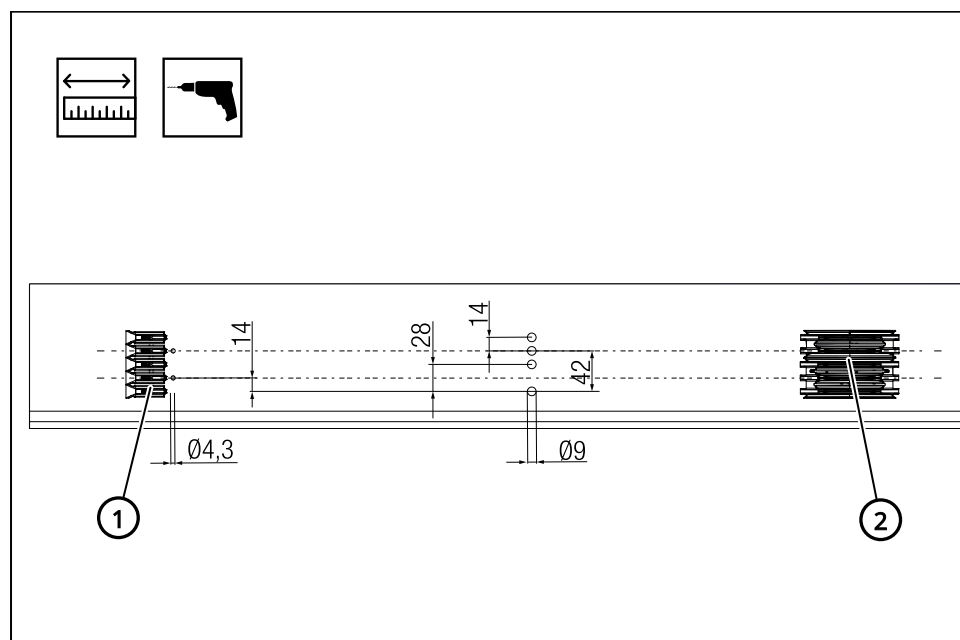


Fig. 24: Spacing in a combined system: 2-pole above and 3-pole below

- 1 Power feed for end cap base
- 2 Connector

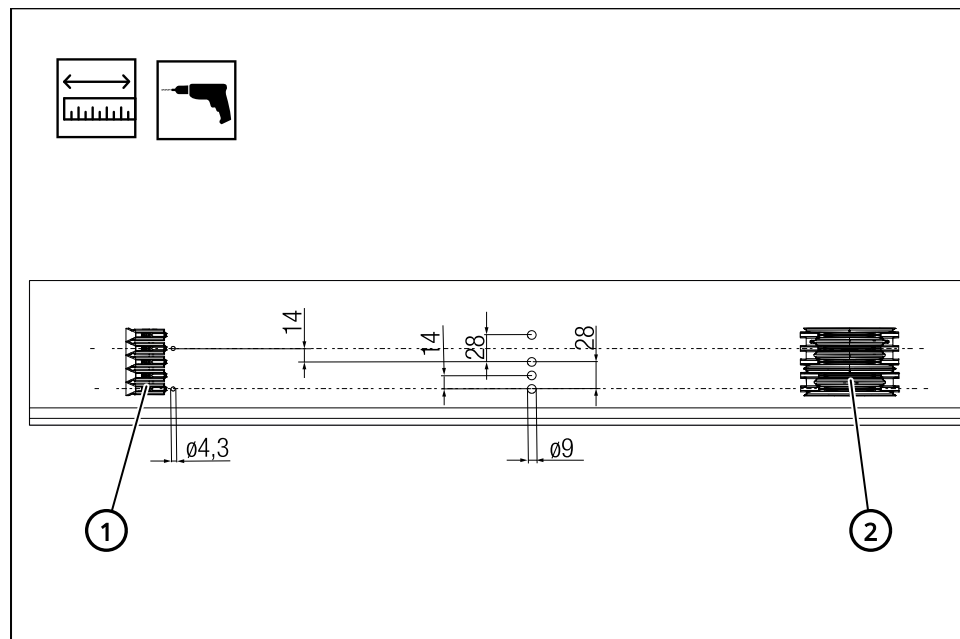


Fig. 25: Spacing in a combined system: 3-pole above and 2-pole below

- 1 Power feed for end cap base
- 2 Connector

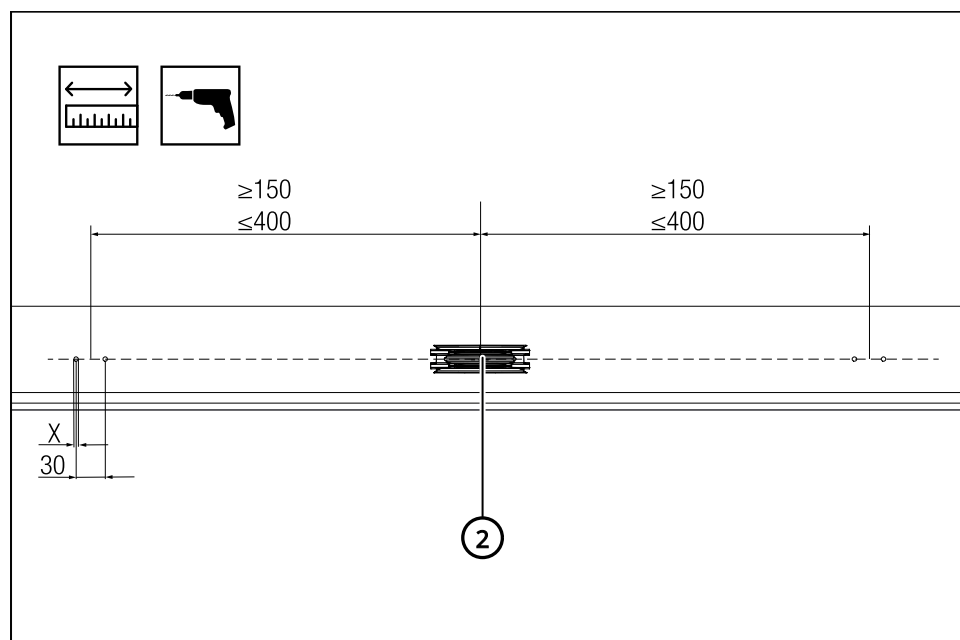


Fig. 26: Spacing between hanger clamp and connector

- 2 Connector

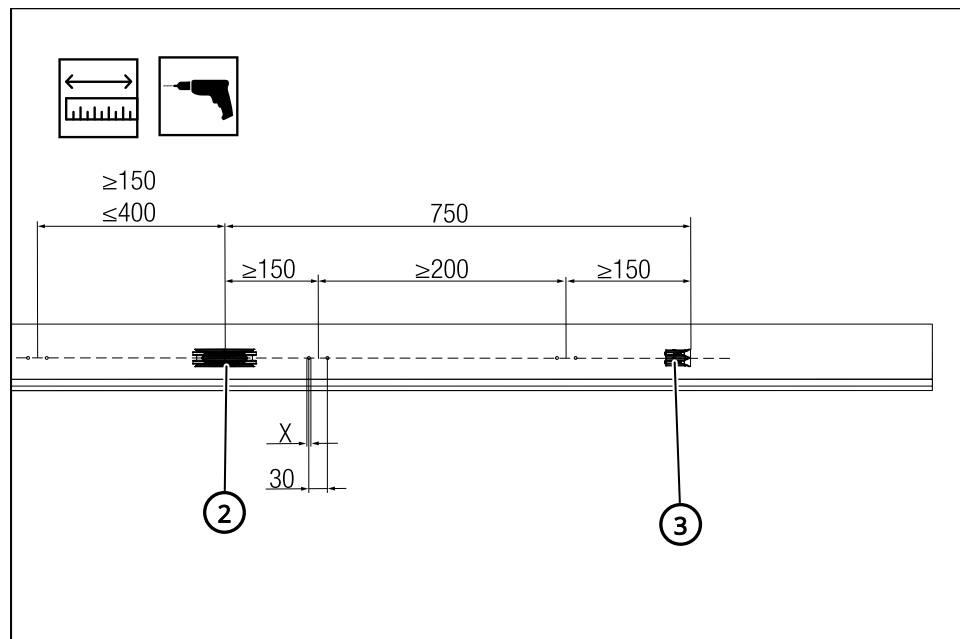


Fig. 27: System end

2 Connector

3 End cap

7.3 Installation dimensions



Allow for sufficient free space

The screws must not restrict the movement of the current collector and the connection cables.

The current collectors must be within the following tolerances:

Data	Value	Unit
Working stroke of the current collector relative to the conductor rail	± 10	mm
Lateral deflection relative to the conductor rail	± 10	mm

The contact force is approx. 6 N. The contact force specification refers to the current collector in vertical engagement and with new sliding contacts. The contact force tolerance is $\pm 20\%$.

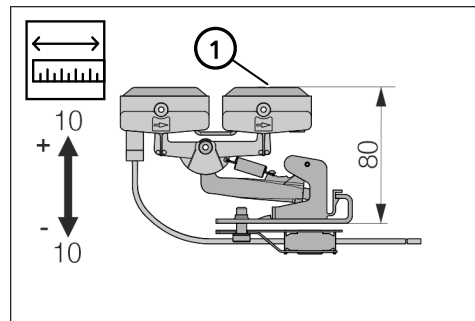


Fig. 28: Check the installation dimensions of the double current collector and contact force. The working stroke must not be exceeded or fall short.

1 Contact surface

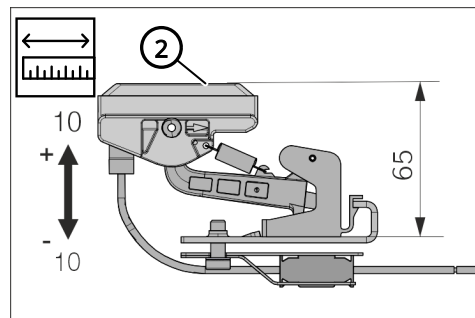


Fig. 29: Check the installation dimensions of the single current collector and contact force. The working stroke must not be exceeded or fall short.

2 Contact surface

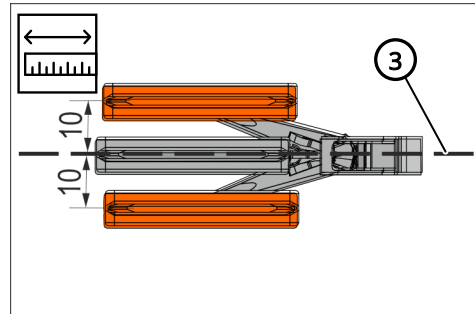


Fig. 30: Align the sliding contacts of the current collector in the center of the conductor rail axis and check the lateral working range of ± 10 mm of the current collector.

3 Conductor rail axis

7.4 Work steps

7.4.1 Mounting the hanger clamp, end segment, and power feed

Preparation

Personnel:

- Specialist personnel

Protective equipment:

- Protective headgear
- Protective footwear
- Protective gloves (mechanical)

Tool:

- Torque wrench, internal SW 2.5
- Torque wrench, internal SW 3
- Wrench, AF7
- Crimping tool

Requirements:

- The support profile is level and free of interfering contours (e.g. screw heads).
- All holes for the end cap base with anchor point, hanger clamp and connector are drilled.
➔ Chapter 7.2 "Preparations on the support profile" on page 29
- A hole for the connection cables was drilled at the system start.

Mount end cap base with anchor point and hanger clamp

The hanger clamps and the 4 m conductor rails connected to them must be within the following tolerances:

Data	Value	Unit
Conductor rail on the X-axis	± 1	mm
Conductor rail on the Y-axis	± 1	mm

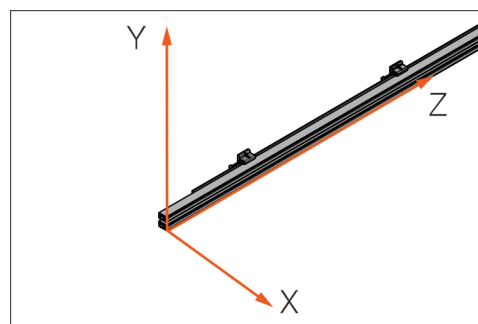


Fig. 31: Coordinate system

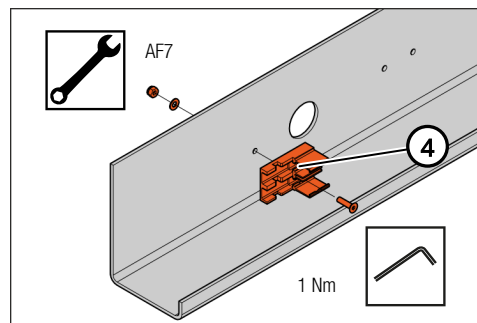


Fig. 32: Mount the end cap base.

4 End cap base



Observe the function of the screwed-on end cap base

The anchor point of the conductor rail system is the screwed-on end cap base. This means that from this rail end, the expansion begins in the direction of the rail end without the screwed-on end cap base.

The system start is the conductor rail section to which the end cap base is screwed.

Allow a free space of up to 200 mm at the system end for expansion.

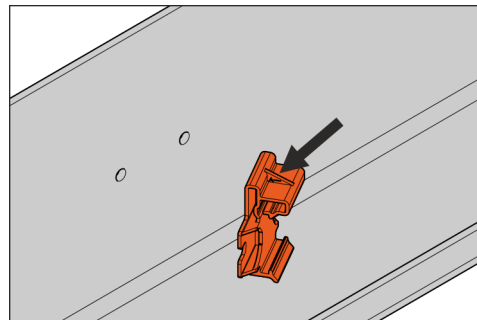


Fig. 33: The clip is seated at the top.

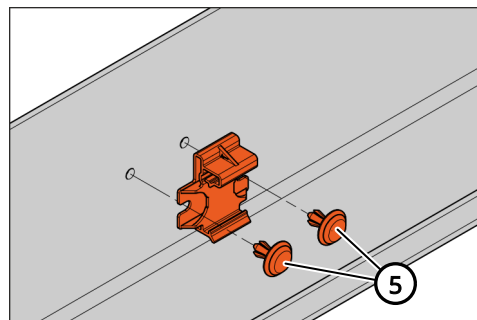


Fig. 34: Mount the hanger clamp. The expanding rivets must be tapped in centrally and perpendicularly.

5 Expanding rivet

DANGER: Danger due to the reuse of expanding rivets. Dispose of dismantled expanding rivets.

Mount power feed at the start of the system

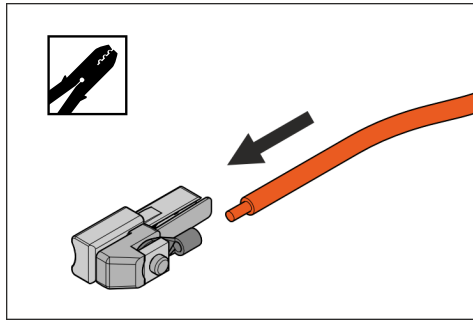


Fig. 35: Crimp the connection cables.

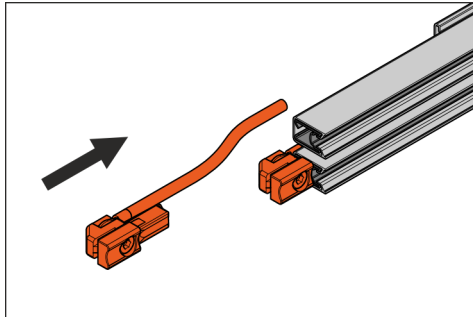


Fig. 36: Slide the power feed terminals into the conductor bar.

Check the seating of the conductor bar and the power feed terminal (see Fig. 37 and Fig. 38).

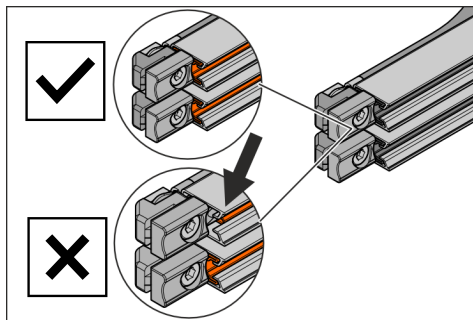


Fig. 37: The connector must lie flush with the conductor bar.

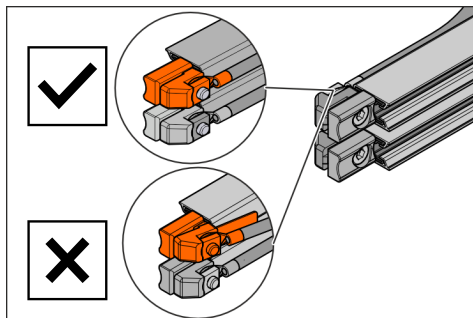


Fig. 38: The power feed terminal must not protrude.

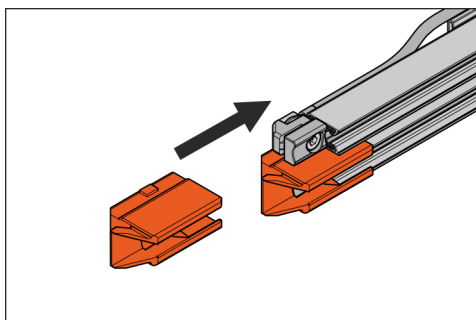


Fig. 39: Slide the end caps over the conductor rail end.

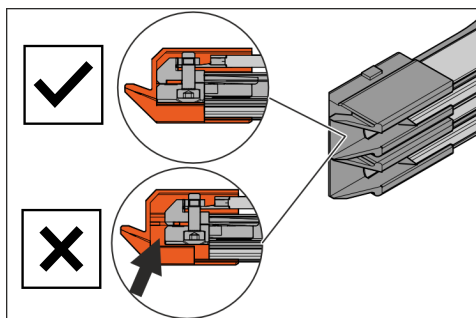


Fig. 40: Check the seating of the end caps.

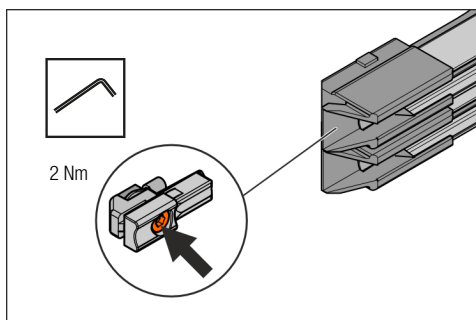


Fig. 41: Tighten the power feed terminal and check that the power feed terminal and end cap are firmly seated.

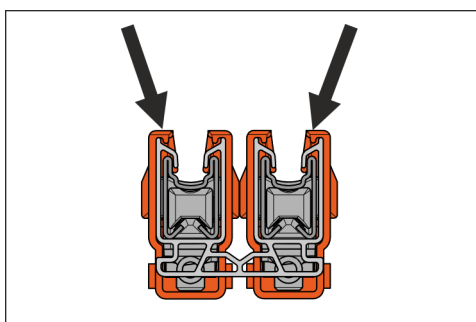


Fig. 42: Check the seating of the end caps in the insulation profile.

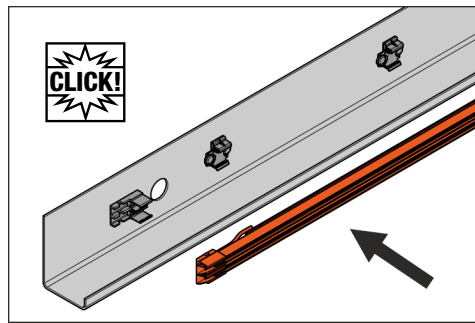


Fig. 43: Hook the first conductor rail into the end cap base and the hanger clamps.

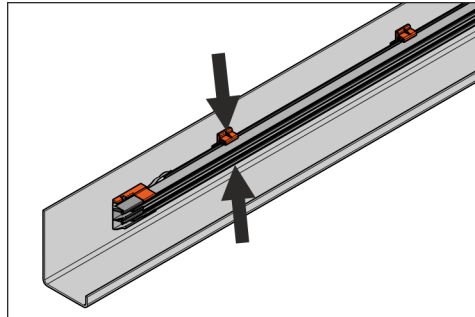


Fig. 44: Check the seating of the conductor rail in the hanger clamps.



Follow the link or scan the QR code to see the animation:

➔ [Follow here for mounting the hanger clamp and end segment with anchor point](#)

Mounting the section power feed

The section power feed of the conductor rail system from the 0815 Product Range is used to feed electrical energy into the system section.

The end piece (750 mm) with the recess on the back of the insulation profile for the track section is used for this (see Fig. 3).

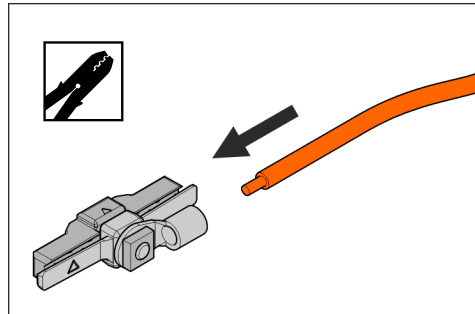


Fig. 45: Crimp the connection cables.

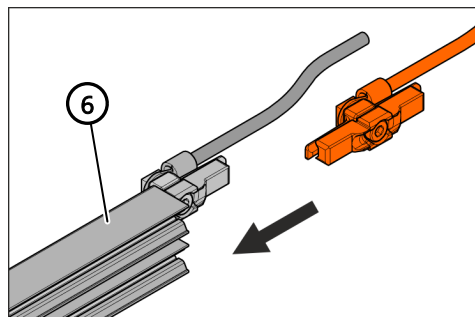


Fig. 46: Slide the power feed terminals into the conductor bar of an end piece.

6 End piece (750 mm)

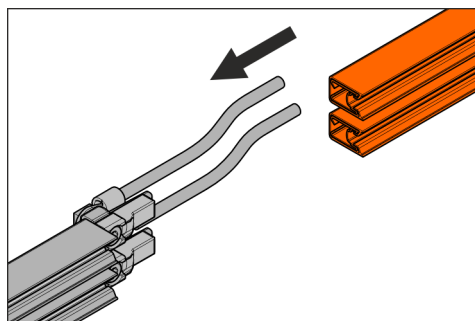


Fig. 47: Slide the second end piece over the section power feed.

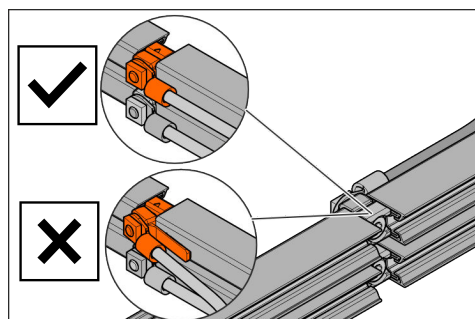


Fig. 48: Check the seating of the power feed terminal. The power feed terminal must not protrude.

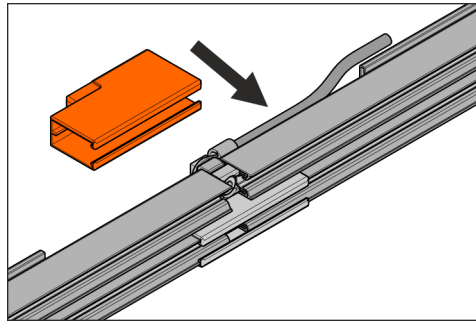


Fig. 49: Slide the power feed cap over the connection point.

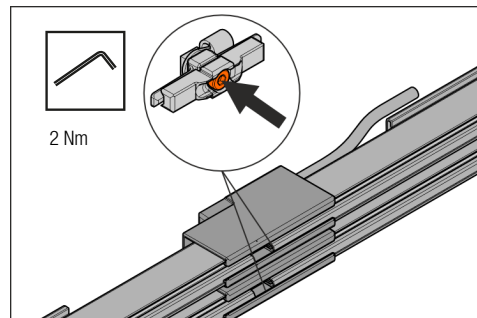


Fig. 50: Tighten the power feed terminal.

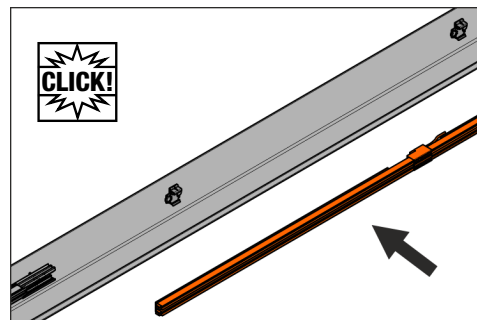


Fig. 51: Hook the conductor rail with section power feed into the hanger clamp.

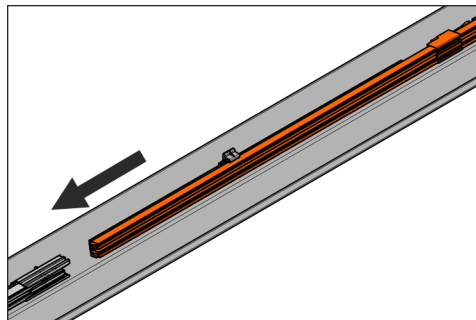


Fig. 52: Slide the conductor rail with section power feed into the connector.

➔ Chapter 7.4.3 "Connecting the conductor rail" on page 45

7.4.2 Trimming the conductor rail

Preparation

Personnel:

- Specialist personnel

Protective equipment:

- Protective eyewear
- Protective gloves (mechanical)
- Protective clothing
- Protective footwear
- Protective gloves (mechanical)

Tool:

- Measuring equipment for length measurement
- Cutting tool
- File

Requirements:

- The mounting surface is prepared for trimming.

Work steps

The conductor rail must not be trimmed shorter than 300 mm. The recess on the insulated rear side must not be trimmed off at the end piece.

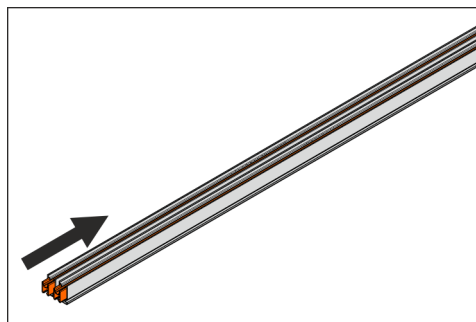


Fig. 53: Slide the conductor bar flush with the insulation profile.

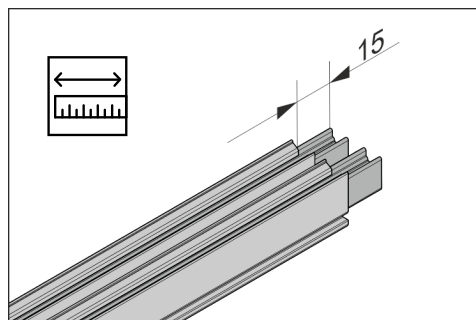


Fig. 54: Check the conductor bar overhang.

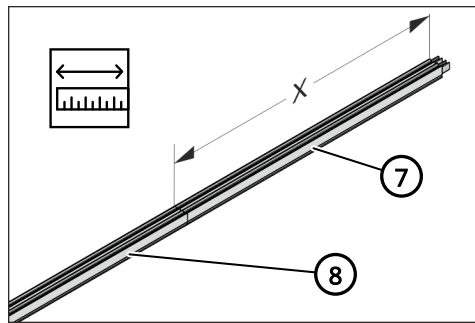


Fig. 55: Mark the dimension at the end of the rail with the overhang.

7 Rail end with overhang

8 Rail end without overhang (waste piece)

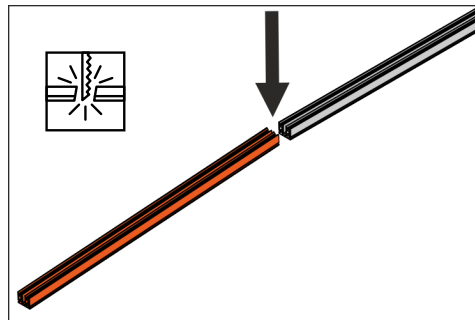


Fig. 56: Trim off the rail end from top to bottom without overhang. The conductor rail opening points in the direction of the saw blade.

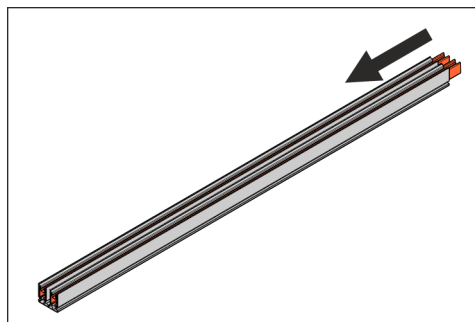


Fig. 57: Slide the conductor bar back evenly after trimming.

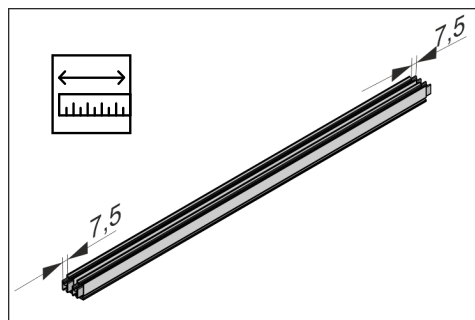


Fig. 58: Check the conductor bar overhang.

NOTE: Sharp edges lead to loss of contact with the contact surface. Chamfer the conductor bar and insulation profile.

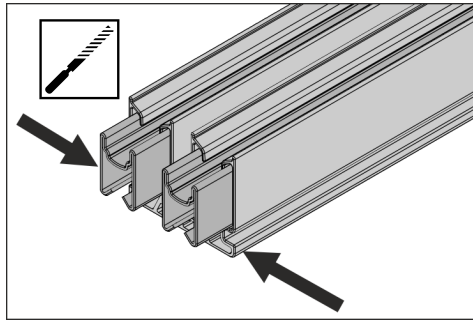


Fig. 59: Chamfer the conductor bar and the insulation profile.



Follow the link or scan the QR code to see the animation:

➔ *Follow here for trimming the conductor rail*

7.4.3 Connecting the conductor rail

Preparation

Personnel:

- Specialist personnel
- Minimum two persons

Protective equipment:

- Protective headgear
- FFPE protective mask
- Protective footwear
- Protective gloves (mechanical)

Tool:

- Device
- Screw clamp
- Rubber mallet

Requirements:

- All hanger clamps are mounted.
- The end segment with end cap base is mounted.

Work steps

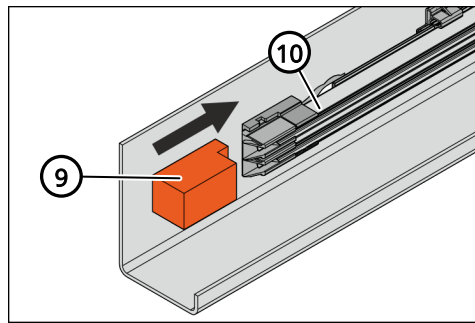


Fig. 60: Mount the mechanical stop at the end segment.

9 Mechanical stop

10 End segment

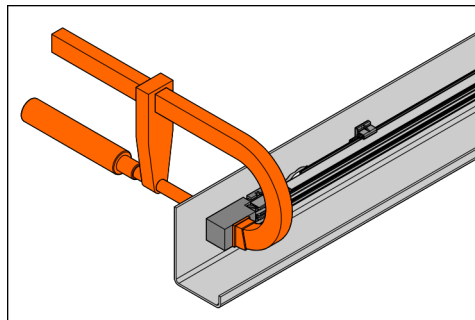


Fig. 61: Attach the mechanical stop to the support profile with a screw clamp.

WARNING: Fire hazard due to defective plug connectors. Do not reuse dismantled plug connectors ➔ Chapter 11.4 "Replacing conductor rail in a section" on page 78. Dispose of dismantled plug connectors ➔ Chapter 12 "Disassembly and Disposal" on page 86.

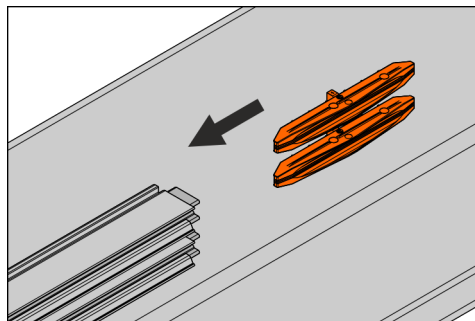


Fig. 62: Plug the connector pins into the conductor bar up to the mechanical stop.

Observe the following when installing the connectors:

- Only install the connector on the level.
- Do not bend or twist the connector.
- The rear sides of the connector caps must be able to support themselves and must not hang openly in the air.

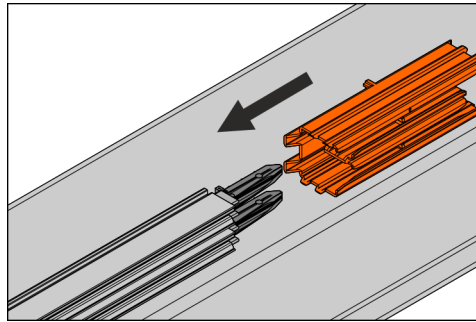


Fig. 63: Slide the connector cap over the connector pins.

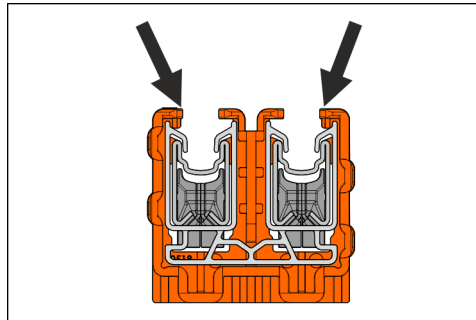


Fig. 64: Check the seating of the connector caps in the insulation profile.

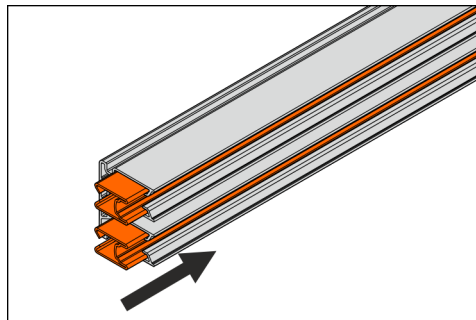


Fig. 65: Slide the conductor bar flush with the insulation profile.

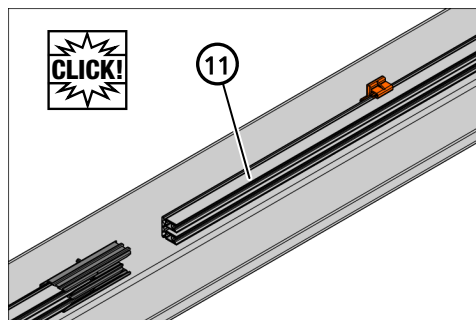


Fig. 66: Hook the second conductor rail into the hanger clamp. When connecting, ensure that the PE strip forms a continuous strip.

11 Second conductor rail

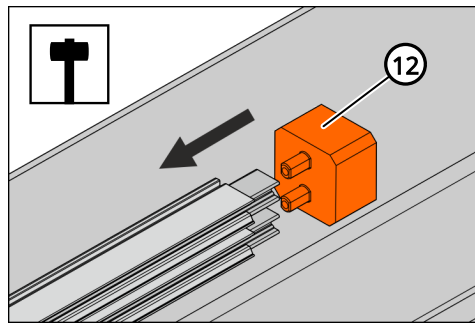


Fig. 67: Tap the mounting cap with a hammer until the conductor bar lies against the mechanical stop of the connector.

12 Mounting cap

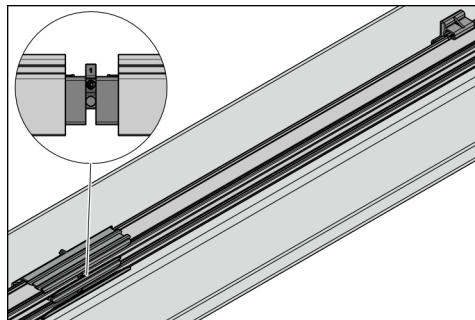


Fig. 68: The connector pins must have a gap of approx. 2.5 mm.

NOTE: Material damage due to forgotten installation aids. Remove all required installation aids once the installation is complete.

Care must be taken to ensure that the arrow markings on both connector caps are pointing upward.

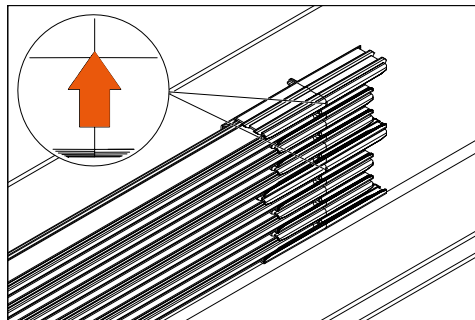


Fig. 69: The arrow mark on the connector caps points upward.



Follow the link or scan the QR code to see the animation:

➔ *Follow here for connecting the conductor rail*

7.4.4 Mounting the end caps

Preparation

Personnel:

- Specialist personnel
- Minimum two persons

Protective equipment:

- Protective headgear
- FFPE protective mask
- Protective footwear
- Protective gloves (mechanical)

Tool:

- Device
- Rubber mallet
- Torque wrench, internal SW 2.5

Requirements:

- The conductor rail system is connected through to the last conductor rail and hooked into the hanger clamps.
- The last connector cap is mounted at the last connection point.
- The last two hanger clamps are mounted at the system end.

Mounting the end caps

At the end piece (750 mm), the conductor bar is aligned flush with the insulation profile.

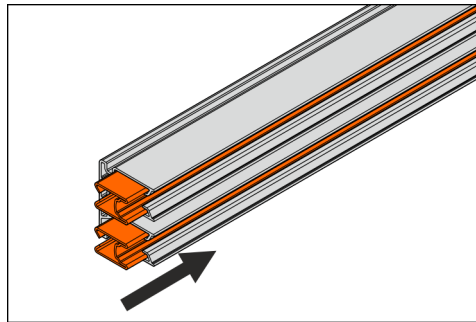


Fig. 70: Slide the conductor bar flush with the insulation profile.

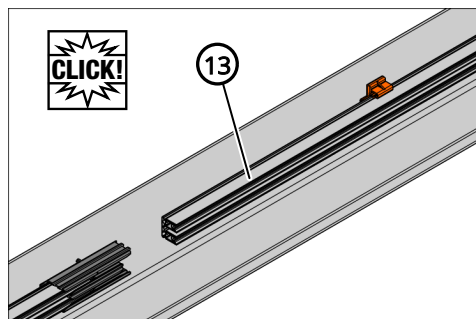


Fig. 71: Hook the second end piece into the hanger clamp.

13 End piece

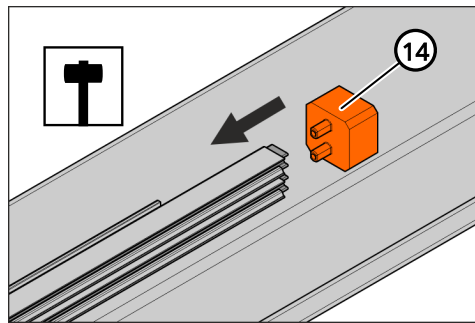


Fig. 72: Tap the mounting cap with a hammer to connect the second end piece.

14 Mounting cap

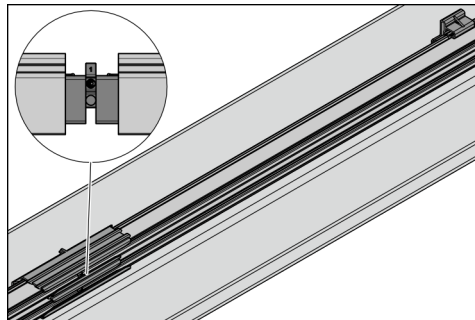


Fig. 73: The connector pins at the connection point must have a gap of approx. 2.5 mm.

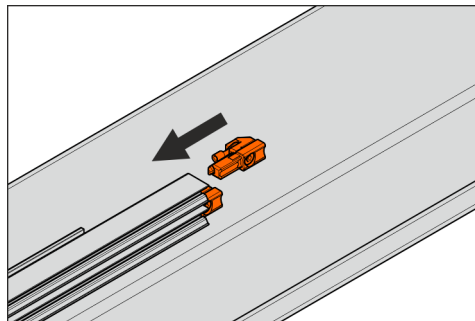


Fig. 74: Slide the power feed terminals without connection cable into the conductor bars.

Check the seating of the conductor bar and the power feed terminal (see Fig. 75 and Fig. 76).

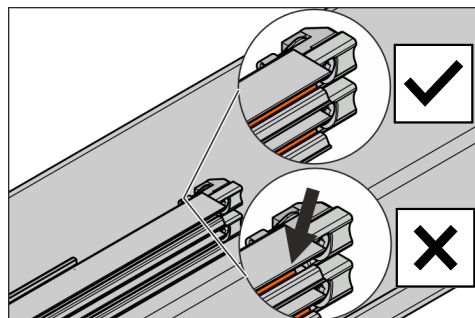


Fig. 75: The connector must lie flush with the conductor bar.

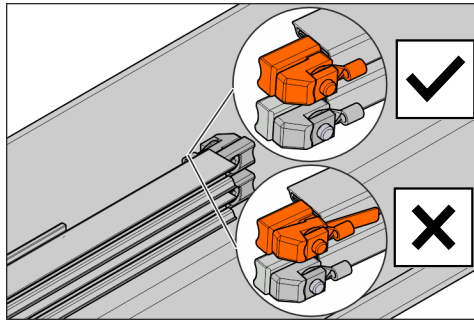


Fig. 76: The power feed terminal must not protrude.

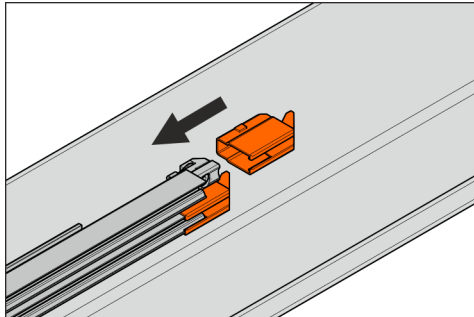


Fig. 77: Slide the end caps over the conductor rail end.

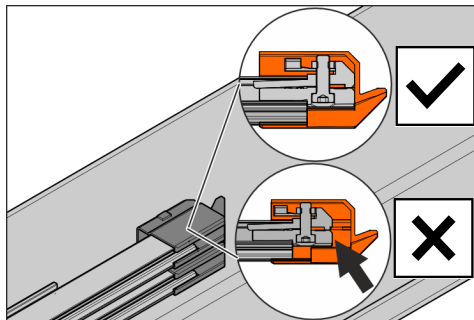


Fig. 78: Check the seating of the end caps and check that the power feed terminal and end cap are firmly seated.

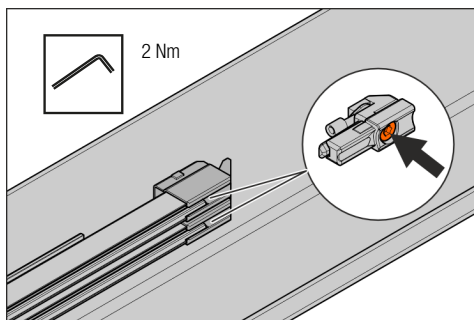


Fig. 79: Tighten the power feed terminal.

NOTE: Material damage due to forgotten installation aids. Remove all required installation aids once the installation is complete.



Follow the link or scan the QR code to see the animation:

➔ *Follow here for mounting the end caps*

7.4.5 Installing the current collector

Operation types

For double current collectors, a distinction between the reversing and towing operations is made depending on the driving direction of the system.

NOTE: Incorrect use of the different operation types leads to uneven wear of the sliding contacts. This reduces the service life of the sliding contacts. If the incorrect operation type is used with a double current collector, the collector head must be replaced, since it is not sufficient to simply reattach the spring, since a different sliding contact and a different spring are required for the correction.

➔ *Chapter 11.3 "Replacing the current collector head" on page 74*

Towing operation

The towing operation is used in systems where movement is predominantly in one direction. Travel in the opposite direction is possible. The arrows on the collector head point in the driving direction.

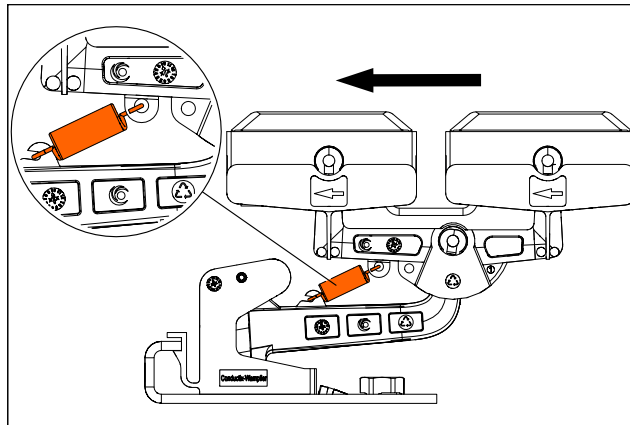


Fig. 80: Towing operation

Reverse operation

Reverse operation is used in systems where the direction of movement is evenly distributed.

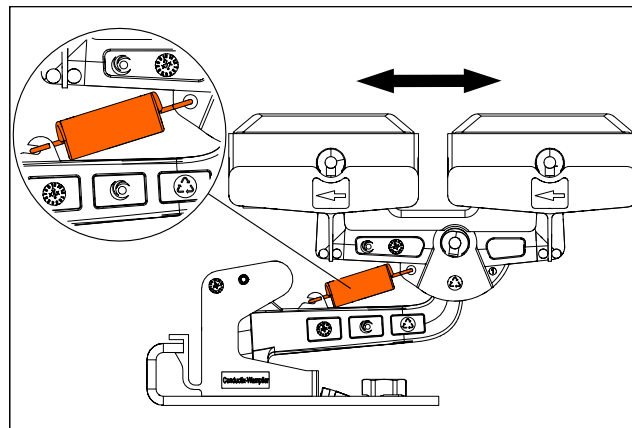


Fig. 81: Reverse operation

Preparation

Personnel:

- Qualified electricians

Protective equipment:

- Protective headgear
- Protective footwear
- Protective gloves (mechanical)

Tool:

- Hexagon screwdriver AF5

Requirements:

- The conductor rail system is fully assembled.

Work steps

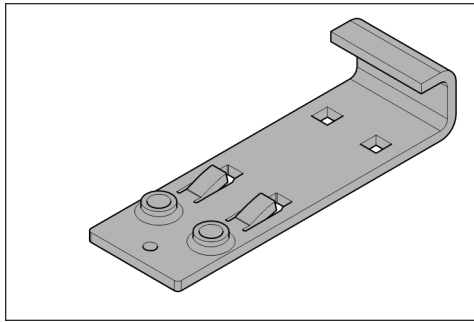


Fig. 82: Towing plate without notch

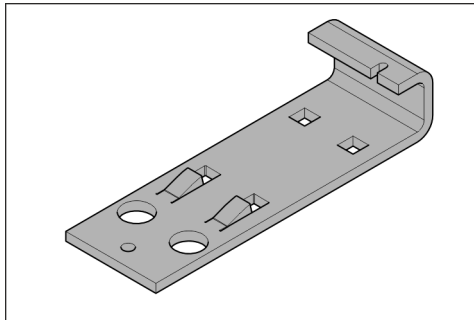


Fig. 83: Towing plate with notch

**Check PE current collectors on old systems**

The PE current collector cam have a polarity error protection function.

➔ Chapter 11.2 "Replacing the current collector" on page 70

**Always include redundancy for PE current collectors**

For standard-compliant use (DIN EN 61140-2016-7.3.5.1 and DIN EN 60204-1-2018), Conductix-Wampfler recommends always including a redundancy for PE current collectors.

Further measures must be taken depending on the applications and the results of the operator's risk assessment.

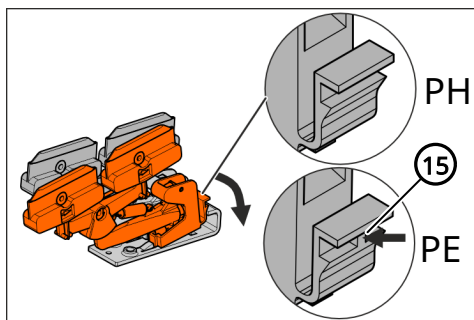


Fig. 84: Hook the current collectors into the towing plate. Ensure that the PE current collector cam engages in the towing plate notch.

15 Cam

DANGER: The position of the green PE current collector must not be reversed. The green PE current collector may only be engaged in the PE conductor rail. The PE conductor rail is identified by a green stripe on the insulation profile.

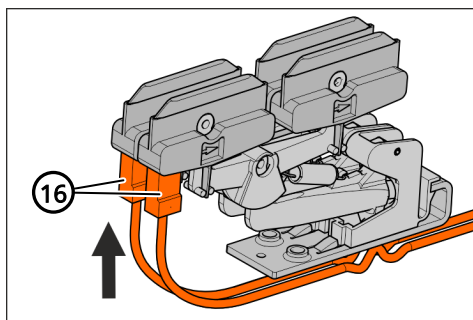


Fig. 85: Insert the insulation sleeves with the connection cables into the collector head.

16 Insulation sleeve

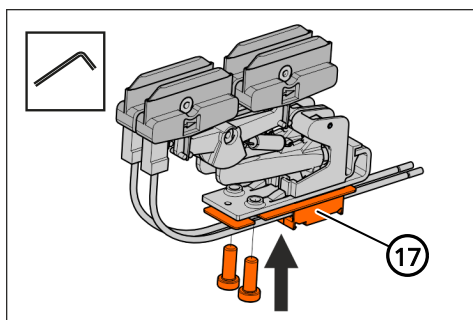


Fig. 86: Screw the tension relief to the towing plate.

17 Tension relief



NOTICE

Current collector connection cables

- No tensile forces and/or directional forces and/or compressive forces may have affect on connection cables.
- Connection cables must not be exposed.
- Do not compress or kink connection cables.
- Do not fix or bundle connection cables with cable ties.
- Do not provide connection cables with identification labels.
- Do not twist the connection cables.
- Use connection cables from Conductix-Wampfler or highly flexible connection cables similar to Conductix-Wampfler cables.



Follow the link or scan the QR code to see the animation:

➔ *Follow here for the current collector tolerance ranges*

8 Commissioning

8.1 Check list

Preparation

Personnel:

- Specialist personnel
- Qualified electricians

Protective equipment:

- Protective headgear
- Protective footwear
- Protective gloves (mechanical)

1. All installation work has been completed.
2. Switch off the system according to the 5 Safety Rules.

➔ Chapter 1.8 "5 Safety Rules for working on electrical systems" on page 12

8.1.1 Checking the system

Check points:

1. Ambient conditions correspond to the planned design (ambient temperature, humidity, etc.).
➔ "Ambient conditions" on page 18
2. The system has been checked against the installation plan (power feeds, anchor points, etc. are complete and in the correct position).
3. The installation position of the conductor rail and current collector is correct (e.g. height, phase spacing).
4. Installed components are correctly unmounted, undamaged, clean and dry.
5. There are no interfering contours or parts in the working area of the current collectors.
6. PE is in the correct position.
7. The necessary covers and barriers are available.
8. The connection cables are dimensioned according to the loads and ambient conditions and/or installation conditions.

Consequences of non-compliance:

- The system is not operational.

8.1.2 Checking the conductor rail

Check points:

1. There is no visible change in height on straight sections.
2. There is no lateral displacement on straight sections.
3. No "waves" are visible on the mounted conductor rails.
4. Conductor rail runs parallel to the current collector route.
5. There is no lateral displacement from the conductor rail to the current collector.
6. The insulation profile is fully hooked into the hanger clamps.
7. The conductor bar may only be visible at the access opening for the current collector.
8. The conductor bar contact surfaces are clean and free of soiling, oxidation and pitting corrosion.

9. The transitions between conductor rail and other components (power feed, end caps, connectors, etc.) are checked for secure connection.
10. The conductor bar and insulation profile are burr-free at the ends.

Consequences of non-compliance:

- Uneven wear of sliding contacts and conductor rail.
- Poor electrical contact.
- Conductor rails can come loose from the hanger clamps if they are not fully hooked into the hanger clamps.
- Risk of electric shock and fire hazard.

8.1.3 Checking the hanger clamps

Check points:

1. The hanger clamps are mounted with the correct spacing from each other and from the connector caps in accordance with the installation plan.
2. The hanger clamps are aligned at right angles to the conductor rail.
3. All screws securing the hanger clamp fastenings have been tightened and checked.
4. The conductor rail can slide freely in the hanger clamps.

Consequences of non-compliance:

- Damage to the conductor rail system such as e.g. waves in the conductor rail, bent conductor rail, pulled connectors, broken hanger clamps.

8.1.4 Checking the connectors

Check points:

1. The conductor bars at the connection joint are aligned to each other without displacement.
2. Care was taken to ensure that the insulation profile and conductor bar were free of burrs if the conductor rails were trimmed on site.
3. The gap between the 2 conductor bars at the connection point is approx. 2.5 mm.
4. The arrow on the connector cap points upward.
5. The insulation profile is completely enclosed by the connector cap.
6. The specified tightening torques were observed.

Consequences of non-compliance:

- Increased wear of the sliding contacts.
- Risk of electric shock and fire hazard.
- Poor electrical contact.

8.1.5 Checking the end cap base

Check points:

1. The conductor rails are fully hooked into the end cap base.
2. The end cap base is firmly connected to the support profile.
3. The specified tightening torques have been checked.
4. Only one end cap base is screwed on one side.

Consequences of non-compliance:

- Correct linear expansion of the conductor rail is not ensured.

8.1.6 Checking the power feeds

Check points:

1. The power feeds and cables are professionally installed and connected in accordance with the instructions.
2. The power feed terminal screws are tightened to the specified tightening torques.
3. The power supply connection cables are flexibly laid.
4. The cap is fitted correctly and completely covers the power feed.
5. The distance from the system end (where the end cap base is **not** seated) to the end of the customer-side support profile is ≥ 200 mm. This means that the connection cables can compensate for the movement of the conductor rail during expansion.

Consequences of non-compliance:

- Risk of electric shock and fire hazard.
- Disconnection of the electrical connection and damage to the connection cables.
- Optimal energy transmission cannot be ensured.
- The power feed terminals can become detached from the conductor rail.
- Poor electrical contact.
- Damage to the conductor rail system such as e.g. waves in the conductor rail, bent conductor rail, broken hanger clamps.

8.1.7 Checking the current collectors

Check points:

1. The current collectors (not engaged) are visually and mechanically in order (without damage, movements are smooth).
2. The current collectors are correctly attached and aligned.
3. The installation spacing for the current collectors (engaged) are correct according to the specification.
4. The connection cables of the current collector are laid free of directional and tensile forces. The cables must not exert any tensile, compressive, or torsional forces on the collector heads.
5. The freedom of movement of the collector heads is not restricted.
6. The collector heads do not jam; they slide through the conductor rail without resistance.

Consequences of non-compliance:

- The sliding contacts wear unevenly.
- The current collectors can break off.

8.1.8 Electrical checking of the system

Check points:

1. The insulation resistance was measured.
➔ *Chapter 8.2 "Measuring insulation resistance" on page 60*
2. All metal components (e.g. substructure / supporting construction) were grounded in accordance with regulations.
3. Are all electrical protection devices are installed, tested and functioning.
4. The specified national electrical tests have been conducted.

Consequences of non-compliance:

- Risk of electric shock and fire hazard.

8.1.9 Other system checks

Check points:

1. A test travel was carried out at low speed in compliance with the safety regulations. Damage to the system could be detected in good time before operation.
2. Current collector slides well over the connection and disconnection points.
3. All safety symbols and type plates have been attached.
4. All tools and aids have been removed.
5. The operating personnel have been instructed.

Consequences of non-compliance:

- Damage to the system.
- Collisions during operation.

8.2 Measuring insulation resistance

Personnel:

- Qualified electricians

Tool:

- Resistance meter according to IEC / EN 61010-1

Requirements:

- The system has been disconnected from the power supply in accordance with the Five Safety Rules.

➔ *Chapter 1.8 "5 Safety Rules for working on electrical systems" on page 12*

1. Connect the resistance meter to the appropriate measuring points.
2. Set the resistance meter to the test voltage.
 - ➔ For systems with a rated voltage $< 1000\text{ V}$, the measured DC voltage must be 1000 V and the insulation resistance must be $\geq 1.0\text{ M}\Omega$.
3. Begin the measurement and observe the resistance meter display.
4. Document the measured values including a sketch of the measured sections in the corresponding measurement log.
5. Dismantle the measurement setup and ensure that the system is ready to be switched on again.
6. Switch the system back on and check that it is working properly.

➔ *Chapter 8.1.1 "Checking the system" on page 56*

9 Operation

Personnel:

- Users

1. Normal operation is the uninterrupted power supply to the mobile end consumer. The following points were taken into account:

- The conductor rail system is designed to suit the ambient conditions.
- In case of possible mechanical failure of the suspension, the conductor rail was secured against falling.

WARNING: Conductor rail components can break due to material fatigue. Secure the components against falling when installing a conductor rail system at greater heights.

2. If faults occur, the conductor rail system must be switched off and secured against being switched on again.

➔ *Chapter 1.8 "5 Safety Rules for working on electrical systems" on page 12*

➔ *Chapter 10.1 "Troubleshooting" on page 62*

3. If normal operation has been interrupted and operation must be resumed, the following points must be observed:

- There must be no coarse soiling or objects in the conductor rails.
➔ *Chapter 11.5 "Cleaning the conductor rail" on page 80*
- Ensure that all work has been completed.
- The full length of the sliding contacts must be in contact with the conductor bar.
- Measure insulation resistance.

➔ *Chapter 8.2 "Measuring insulation resistance" on page 60*

10 Faults

10.1 Troubleshooting

Preparation

Personnel:

- Qualified electricians

Protective equipment:

- Protective footwear
- Protective gloves (mechanical)
- FFPE protective mask
- Protective headgear

Tool:

- Insulated tool

Switch off the system according to the 5 Safety Rules.

➔ *Chapter 1.8 "5 Safety Rules for working on electrical systems" on page 12*

10.1.1 Faults on the current collector and sliding contacts

Fault description	Cause	Remedy
Sliding contacts are unevenly worn.	The collector head's range of movement is restricted.	• Check the connection cables of the current collector for directional, torsional and tensile forces. • Allow the current collector to move freely e.g. by removing any cable ties.
	Contact force is too high or low.	• Check whether the correct connection cables of Class 6 (according to DIN VDE 0295) have been used. • Check and correct the installation dimensions of the current collector. ➔ <i>Chapter 7.3 "Installation dimensions" on page 34</i> • Check the tolerance range of the overall system on the X-axis and Y-axis. ➔ <i>"Mount end cap base with anchor point and hanger clamp" on page 36</i> • Check the current collector for parallelism to the conductor rail and correct as needed. see <i>Fig. 30</i>
Sliding contact insulation is worn away on the side down to the sliding contact.	The height of the current collector is not correctly adjusted to insertion from the side.	• Replace the collector heads and align the height correctly. ➔ <i>Chapter 11.3 "Replacing the current collector head" on page 74</i>

Fault description	Cause	Remedy
Sliding contact insulation is worn away on the side down to the sliding contact.	The height of the current collector is not correctly adjusted to insertion from the side.	If the problem persists after replacement and height adjustment, a slightly elevated installation of the current collectors above the conductor rail axis is permissible in this case (see <i>Fig. 30</i>). The Conductix-Wampfler Expert System Team will be happy to assist you with any questions. ➔ <i>Chapter 2.6 "Customer service" on page 14</i>
Sliding contacts wear out too fast.	Sharp edges on power feed terminals, conductor rails and/or at the connection points of the individual conductor rails.	● Deburr sharp edges.
	Conductor rail is soiled or has burnt areas.	● Check the system, e.g. for excessive current values. ➔ <i>Chapter 3 "Technical Data" on page 17</i> ● Clean the conductor rail. ➔ <i>Chapter 11.5 "Cleaning the conductor rail" on page 80</i> ● If the contact surfaces of the conductor rail are damaged, replace the affected section. ➔ <i>Chapter 11.4 "Replacing conductor rail in a section" on page 78</i>
	Contact force too high.	● Check whether the correct connection cables of Class 6 (according to DIN VDE 0295) have been used. ● Check the tolerance range of the overall system on the X-axis and Y-axis. ➔ <i>"Mount end cap base with anchor point and hanger clamp" on page 36</i> ● Check the current collector for parallelism to the conductor rail and correct as needed. ➔ <i>Chapter 7.3 "Installation dimensions" on page 34</i>
Energy supply is not continuous.	The end and section power feeds are not installed according to the manufacturer's specifications.	● Retighten the cylinder screws with a torque wrench 2 Nm. ➔ <i>Chapter 7.4.1 "Mounting the hanger clamp, end segment, and power feed" on page 36</i> ➔ <i>Chapter 7.4.4 "Mounting the end caps" on page 49</i> ● Mount power feed terminal correctly. ➔ <i>Chapter 7.4.1 "Mounting the hanger clamp, end segment, and power feed" on page 36</i>

Fault description	Cause	Remedy
Energy supply is not continuous.	The end and section power feeds are not installed according to the manufacturer's specifications.	➔ <i>Chapter 7.4.4 "Mounting the end caps" on page 49</i> Check the crimp connection between cable lug and connection cable and re-crimp if necessary. ➔ <i>Chapter 7.4.1 "Mounting the hanger clamp, end segment, and power feed" on page 36</i>
	Contact force too low.	- Check whether the correct connection cables from Class 6 (according to DIN VDE 0295) have been used. - Check and correct the installation dimensions of the current collector. ➔ <i>Chapter 7.3 "Installation dimensions" on page 34</i> - Check the tolerance range of the overall system on the X-axis and Y-axis. ➔ <i>"Mount end cap base with anchor point and hanger clamp" on page 36</i> - Check the current collector for parallelism to the conductor rail and correct as needed. ➔ <i>Chapter 7.4.5 "Installing the current collector" on page 52</i>
	Collision with system components.	- Examine the system layout. - Attach affected components for collision-free operation. - Replace damaged components. - Check the lateral clearance of 4 mm between the conductor rail and metallic components and correct if necessary.
	Abrasion of the sliding contacts has accumulated at the end points of the section.	Clean the conductor rail. ➔ <i>Chapter 11.5 "Cleaning the conductor rail" on page 80</i>
	Oblique removal of sliding contacts	- Check the current collector for parallelism to the conductor rail and correct as needed. - Check the contact force approx. 6 N. - Check whether the collector head needs to be replaced. ➔ <i>Chapter 11.3 "Replacing the current collector head" on page 74</i>

After completing the troubleshooting activities, carry out the work steps for the restarting operation.

➔ *Instruction on page 61*

10.1.2 Faults on the conductor rail

Fault description	Cause	Remedy
Insulation profile is not hooked into the hanger clamp.	Improper installation of the hanger clamp and/or the conductor rail.	Check the hanger clamp and conductor rail for damage and check that they have been correctly installed. Replace damaged components if necessary. ➔ "Mount end cap base with anchor point and hanger clamp" on page 36

After completing the troubleshooting activities, carry out the work steps for the restarting operation.

➔ *Instruction on page 61*

10.2 Handling unknown faults

Conductix-Wampfler must be contacted if unknown faults occur.

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Phone: +49 (0) 7621 662 – 0
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Email: info.de@conductix.com
➔ www.conductix.de
Country of origin: Germany

Worldwide sales and service location addresses:

➔ www.conductix.contact

11 Service and Maintenance

11.1 Maintenance schedule



CAUTION**Individually adapt maintenance intervals to real conditions**

The maintenance intervals specified in the maintenance schedule presume ideal conditions.

➔ *Chapter 11.1 "Maintenance schedule" on page 66*

- The specialist personnel must make a recommendation for the individual maintenance intervals of the system, otherwise the system performance will be affected.
- Depending on experience, the operator must adjust the maintenance intervals so that the operating conditions and system status are taken into account.
- Contact Conductix-Wampfler with any questions regarding service and maintenance work.

➔ *Chapter 2.6 "Customer service" on page 14*

- Document service and maintenance work.
-

Personnel:

- Qualified electricians
- Specialist personnel

Protective equipment:

- Protective footwear
- Protective gloves (mechanical)
- Protective eyewear
- Protective headgear

Tool:

- Caliper
- Spring scale with a measuring range of 0 to 20 N

Chap.	Task to perform	4 weeks after commissioning	1 month after commissioning	Interval depending on the operating conditions and system status	Every 3 months	Page
11.1.1	Visual inspection of the current collector after commissioning	X				67
11.1.2	Visual inspection of the current collector				X	67
11.1.3	Visual inspection of the sliding contact		X	X		68
11.1.4	Visual inspection of the conductor rail				X	69
11.1.5	Current collector functional check				X	70

11.1.1 Visual inspection of the current collector after commissioning

1. Check the sliding contacts in the contact area for wear.
➔ Chapter 11.1.3 "Visual inspection of the sliding contact" on page 68
2. Check the sliding contact insulation for cracks and scraping.
➔ Replace the current collector if the sliding contact insulation is damaged.
➔ Chapter 11.2 "Replacing the current collector" on page 70
3. Check the connection cables for damage.
4. Check the routing of the connection cables.

11.1.2 Visual inspection of the current collector

1. Check the sliding contacts in the contact area for wear.
➔ Chapter 11.1.3 "Visual inspection of the sliding contact" on page 68
2. Check the sliding contact insulation for cracks and scraping.
➔ Replace the current collector if the sliding contact insulation is damaged.
➔ Chapter 11.2 "Replacing the current collector" on page 70

3. Check the connection cables for damage.
 - ➡ Check the insulation or braids.
 - ➡ Check the cable routing.
 - ➡ Check the plug-socket connection.
 - ➡ Check the screw connections.
 - ➡ Check the braid cross-sections at the screw terminal points of the collector heads.
4. Check the routing of the connection cables.
5. Ensure freedom of movement of the collector heads.

11.1.3 Visual inspection of the sliding contact

1. Check the wear level of the contact surface:
 - PE current collector: 2 mm (see *Fig. 87* and *Fig. 88*)
 - PH current collector: 1 mm (see *Fig. 89* and *Fig. 90*)

➡ Replace the collector head if the wear level of the contact surface has been exceeded.

➔ Chapter 11.3 "Replacing the current collector head" on page 74

WARNING: Current collectors that have fallen below the wear limit damage the patina, which leads to roughening of the conductor rail (see *Fig. 110*). Check sliding contacts regularly for wear. The sliding contact of the PE current collector in particular must be regularly monitored. The maintenance interval depends on the operating conditions and system status.

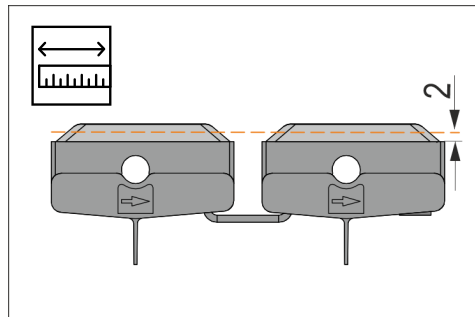


Fig. 87: PE double current collector wear limit

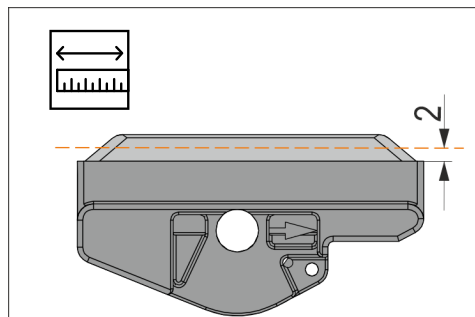


Fig. 88: PE single current collector wear limit

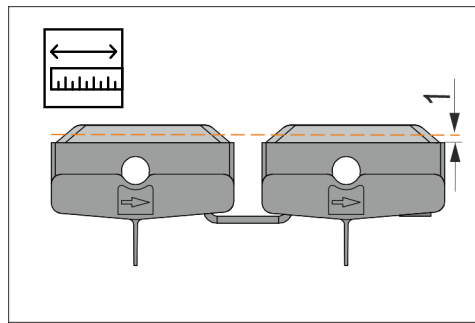


Fig. 89: PH double current collector wear limit

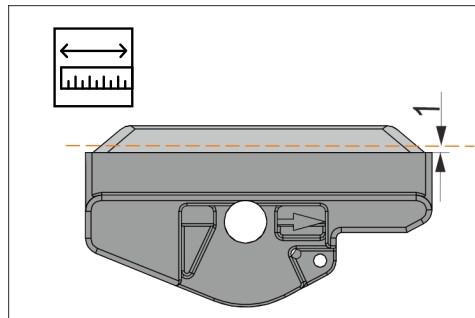


Fig. 90: PH single current collector wear limit

2. Check sliding contacts for drifting.
 - ➔ Replace the collector head if the sliding contacts are worn at an angle.
 - ➔ Chapter 11.3 "Replacing the current collector head" on page 74
3. Check the connection cables of the collector heads in the event of heavy drifting.

11.1.4 Visual inspection of the conductor rail

1. Check the conductor rail insulation profile for wear, soiling and burn marks.
 - ➔ Clean the insulation profile with a suitable cleaning agent.
 - ➔ Chapter 11.5 "Cleaning the conductor rail" on page 80
 - ➔ Replace the damaged conductor rail.
 - ➔ Chapter 11.4 "Replacing conductor rail in a section" on page 78
2. Check the individual conductor bars for bottlenecks e.g. caused by abrasion or adherent soiling.
 - ➔ Clean the conductor bars.
 - ➔ Chapter 11.5 "Cleaning the conductor rail" on page 80
3. Check all connection elements e.g. screws, rivets, nuts, split pins, etc.
4. Check the conductor rail for corrosion.
 - ➔ "Clean regularly" on page 83

11.1.5 Current collector functional check

1. Check the spring between the collector arm and collector head.
 - ➔ Replace the current collector if the spring is missing and/or damaged.
 - ➔ *Chapter 11.2 "Replacing the current collector" on page 70*
2. Check the installation dimensions of the current collector.
 - ➔ *Chapter 7.4.5 "Installing the current collector" on page 52*
3. Check the attachment position of the current collector.
4. Check the freedom of motion of each individual collector arm.
 - ➔ Clean the collector arm if it is heavily soiled.
 - ➔ *Chapter 11.5 "Cleaning the conductor rail" on page 80*
 - ➔ Replace the current collector if the collector arm can no longer be moved easily after intensive cleaning.
 - ➔ *Chapter 11.2 "Replacing the current collector" on page 70*
5. Check the contact force of the current collector with a spring balance.
 - ➔ The contact force must be approx. 6 N.
 - ➔ *Chapter 7.3 "Installation dimensions" on page 34*
6. Check the working stroke limits of the current collector to the conductor rail.
 - ➔ *Chapter 7.3 "Installation dimensions" on page 34*
7. Check the lateral tolerance of the current collector to the conductor rail.
 - ➔ *Chapter 7.3 "Installation dimensions" on page 34.*

11.2 Replacing the current collector

Preparation

Personnel:

- Qualified electricians

Protective equipment:

- Protective headgear
- FFPE protective mask
- Protective footwear
- Protective gloves (mechanical)

Requirements:

- Sliding contacts have reached the wear limit:
 - PE current collector wear limit: 2 mm (see *Fig. 87* and *Fig. 88*)
 - PH current collector wear limit: 1 mm (see *Fig. 89* and *Fig. 90*)
- Sliding contact insulation shows heavy wear.
- Switch off the system according to the 5 Safety Rules.
 - ➔ *Chapter 1.8 "5 Safety Rules for working on electrical systems" on page 12*

Work steps

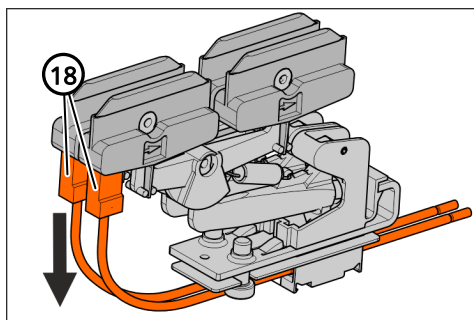


Fig. 91: Remove the insulation sleeves and connection cables from the collector head. Do not pull on the connection cables.

18 Insulation sleeve

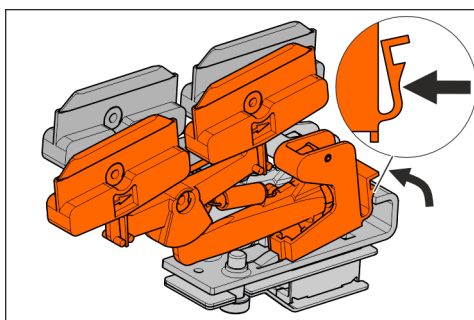


Fig. 92: Unhook the current collectors.

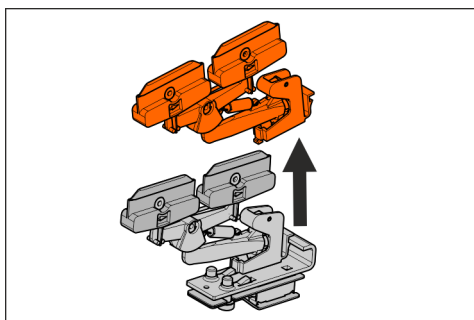


Fig. 93: Remove the first current collector from the towing plate.

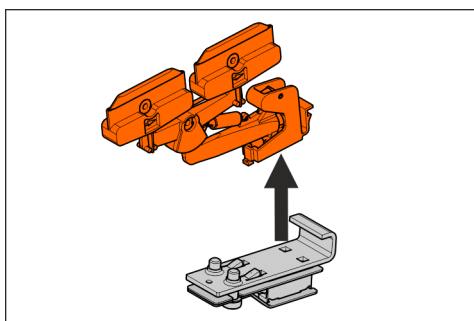


Fig. 94: Remove the second current collector from the towing plate.

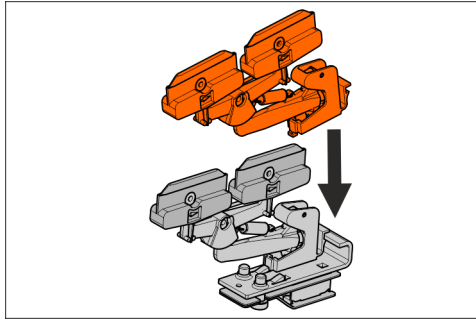


Fig. 95: Mount the new current collector on the towing plate.

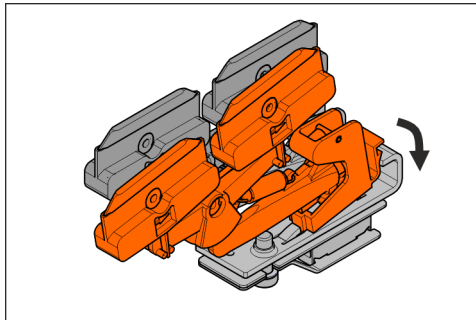


Fig. 96: Hook the current collector into the towing plate.

DANGER: The position of the green PE current collector must not be reversed. The towing plate is available with a notch to help prevent such a reversal. The PE current collector cam fits into this notch.

Fig. 83

DANGER: The green PE current collector may only be engaged in the PE conductor rail. The PE conductor rail is identified by a green stripe on the insulation profile.

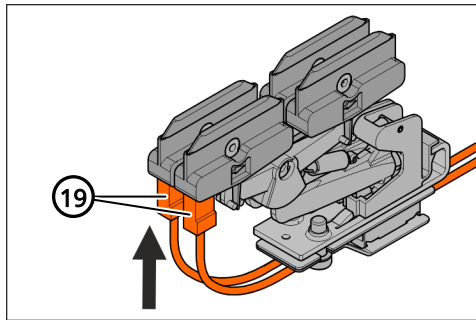


Fig. 97: Remount the insulation sleeves and connection cables.

19 Insulation sleeve

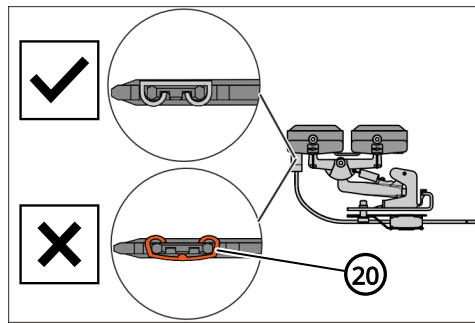


Fig. 98: Check the plug-socket connection to the sliding contact for correct seating and function after each plugging process.

20 Plug-socket connection to sliding contact

NOTE: A loose plug-socket connection to the sliding contact will lead to energy transmission losses. Replace the plug-socket connection after the 5th Replace the current collector to ensure full current carrying capacity in continuous operation.

After the replacement:

1. Connect the connection cables.
2. Check the insulation sleeves for tight fit. Ensure the correct plug-socket connection

Fig. 98

3. Observe the installation dimensions when aligning.

➔ Chapter 7.3 "Installation dimensions" on page 34

➔ In the event of excessive tolerance deviations, contact the service partner or Conductix-Wampfler.

➔ Table on page 65

4. Measure and record the insulation resistance.

➔ Chapter 8.2 "Measuring insulation resistance" on page 60



NOTICE

Current collector connection cables

- No tensile forces and/or directional forces and/or compressive forces may have affect on connection cables.
- Connection cables must not be exposed.
- Do not compress or kink connection cables.
- Do not fix or bundle connection cables with cable ties.
- Do not provide connection cables with identification labels.
- Do not twist the connection cables.
- Use connection cables from Conductix-Wampfler or highly flexible connection cables similar to Conductix-Wampfler cables.

11.3 Replacing the current collector head

Preparation

Personnel:

- Qualified electricians

Protective equipment:

- Protective headgear
- FFPE protective mask
- Protective footwear
- Protective gloves (mechanical)

Tool:

- Aids such as folding ruler or large screwdriver

Requirements:

- Collector heads are no longer sufficiently fastened to the balance.
- Collector head shows visible damage.
- Individual components have too much play.
- Sliding contacts have reached the wear limit:
PE current collector wear limit: 2 mm (see *Fig. 87* and *Fig. 88*)
PH current collector wear limit: 1 mm (see *Fig. 89* and *Fig. 90*)
- Sliding contact insulation shows heavy wear.
- The system is switched off according to the 5 Safety Rules.

➔ Chapter 1.8 "5 Safety Rules for working on electrical systems" on page 12

Work steps

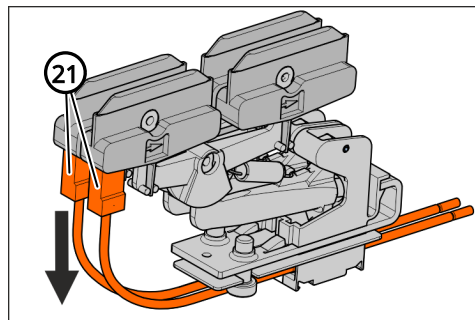


Fig. 99: Remove the insulation sleeves and connection cables from the current collector.

21 Insulation sleeve

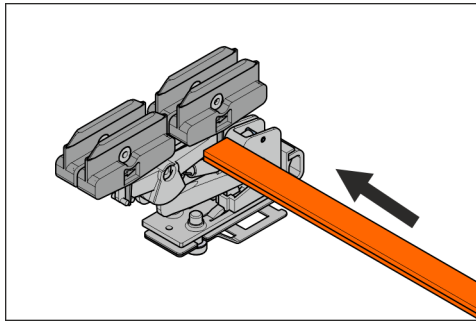


Fig. 100: Insert an aid (e.g. two layers of a folding ruler) into the hollow space between the balance and the collector head.

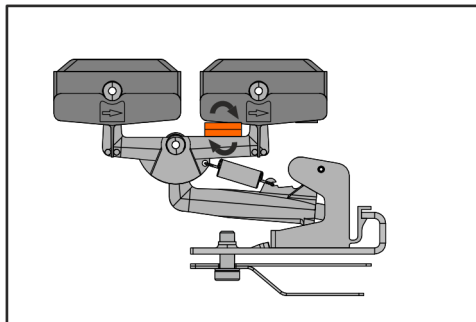


Fig. 101: Loosen the first collector head using a rotary movement of the aid.

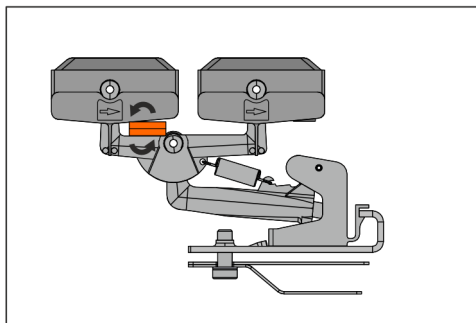


Fig. 102: Loosen the second collector head with a rotary movement of the aid to be able to remove the first double sliding contacts.

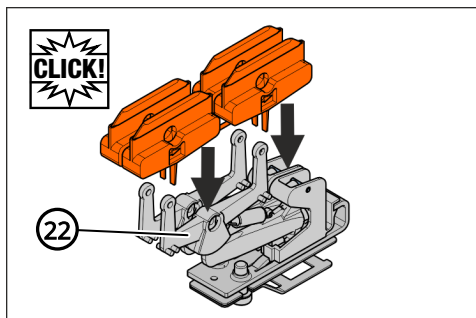


Fig. 103: Slide the new collector heads onto the balance until an audible engagement into place is heard. The collector heads must be firmly connected to the balance.

22 Balance

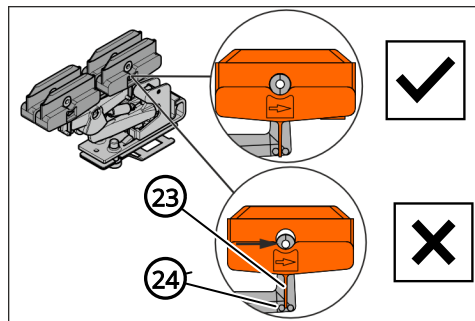


Fig. 104: Check the position of the bases: The sliding contact insulation base must sit completely between the pins.

23 Sliding contact insulation base

24 Pins on the balance

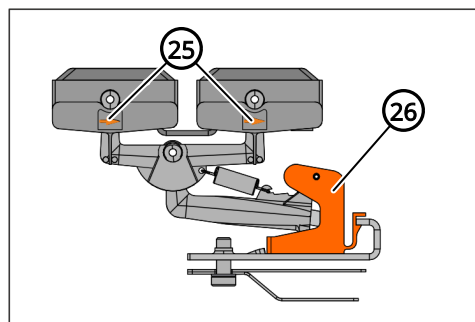


Fig. 105: The arrows on the sliding contact insulation must point in the direction of the current collector bearing.

25 Arrows on sliding contact insulation

26 Current collector bearing

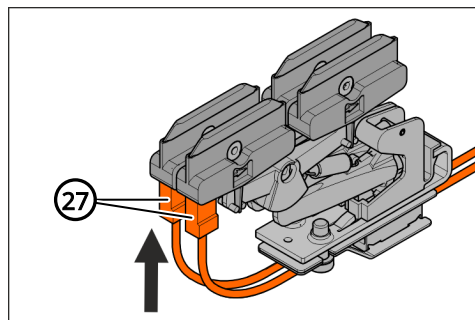


Fig. 106: Remount the insulation sleeves and connection cables.

27 Insulation sleeve

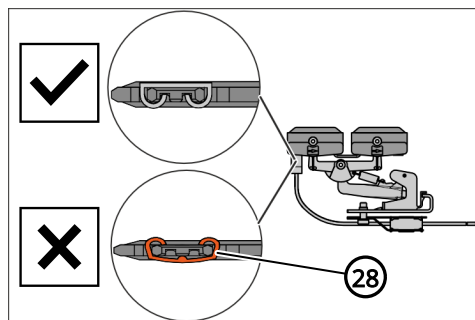


Fig. 107: Ensure correct plug-socket connection to sliding contact.

28 Plug-socket connection to sliding contact

After the replacement:

1. Connect the connection cables.
2. Check the insulation sleeves for tight fit. Ensure correct plug-socket connection (see *Fig. 98*).
3. Observe the installation dimensions and tolerances when aligning.

➞ *Chapter 7.3 "Installation dimensions" on page 34*

➞ In the event of excessive tolerance deviations, contact the service partner or Conductix-Wampfler.

➞ *Table on page 65*

4. Measure and record the insulation resistance.

➞ *Chapter 8.2 "Measuring insulation resistance" on page 60*



NOTICE

Current collector connection cables

- No tensile forces and/or directional forces and/or compressive forces may have affect on connection cables.
- Connection cables must not be exposed.
- Do not compress or kink connection cables.
- Do not fix or bundle connection cables with cable ties.
- Do not provide connection cables with identification labels.
- Do not twist the connection cables.
- Use connection cables from Conductix-Wampfler or highly flexible connection cables similar to Conductix-Wampfler cables.

11.4 Replacing conductor rail in a section

Preparation

Personnel:

- Qualified electricians
- Minimum two persons

Protective equipment:

- Protective headgear
- Protective eyewear
- FFPE protective mask
- Protective footwear
- Protective gloves (mechanical)
- Protective clothing

Tool:

- Measuring equipment for length measurement
- Cutting tool
- Rubber mallet
- File
- Device

Requirements:

- Switch off the system according to the 5 Safety Rules.

➔ *Chapter 1.8 "5 Safety Rules for working on electrical systems" on page 12*

Work steps

NOTE: Conductor rails bend easily. Plan at least 1 person per conductor rail end.

1. Measure the length of the defective section and mark it on the insulation profile.
2. Cut the new piece of rail to the measured length.

➔ *Chapter 7.4.2 "Trimming the conductor rail" on page 43*

NOTE: Sharp edges lead to loss of contact with the contact surface. Chamfer the conductor bar and insulation profile.

➔ Deburr all cut surfaces and contact surfaces with a file.

3. Remove the conductor rail from the hanger clamp.

NOTE: Pointed and/or sharp disassembly tools damage the insulation profile. Do not use pointed and/or sharp disassembly tools.

➔ The conductor rail must no longer be engaged in the hanger clamps 20 m on the right and left of the defective track section.

4. Slide the insulation profile of the defective track section in one direction of the connectors so that the conductor bar protrudes 15 mm on the other side of the rail.

5. Cut the defective track section with a cutting tool on the side where the conductor bar protrudes 15 mm.

NOTE: Sharp edges lead to loss of contact with the contact surface. Chamfer the conductor bar and insulation profile.

➡ Deburr all cut surfaces and contact surfaces with a file.

6. Slide the insulation profile of the defective track section to the other side so that the insulation profile protrudes 15 mm on the cut side.

7. Cut the defective track section with a cutting tool on the other side.

➡ Deburr all cut surfaces and contact surfaces with a file.

8. Hammer the connector pins into the conductor bar of the first conductor rail end with light hammer taps up to the mechanical stop of the connector pins.

9. Slide the connector cap over the connection point.

➡ The insulation profile must be completely enclosed by the connector cap.

10. Slide the conductor bar of the new rail section flush with the insulation profile.

11. Hammer the new rail section onto the connector pins with light hammer taps using the mounting cap.

12. Slide the connector pins into the conductor bar of the new rail section.

13. Slide the connector cap over the connection point.

➡ The insulation profile must be completely enclosed by the connector cap.

14. Insert the second conductor rail end into the new rail section.

15. Audibly hook the conductor rail into all hanger clamps.

16. Remove the end cap at the end of the lane.

On the opposite side, secure the conductor bar with a mechanical stop and screw clamp so that the mounting cap can be pushed into the conductor rail (see). *Fig. 61*).

➡ At the end of the lane, tap the mounting cap with a rubber mallet to mount the new rail piece.

17. Remount the end cap to the rail end of the lane end.

➡ *Chapter 7.4.4 "Mounting the end caps" on page 49*

NOTE: Material damage due to forgotten installation aids. Remove all required installation aids once the installation is complete.

18. Measure and record the insulation resistance.

➡ *Chapter 8.2 "Measuring insulation resistance" on page 60*

11.5 Cleaning the conductor rail

Preparation

Personnel:

- Qualified electricians
- Electrically trained person

Protective equipment:

- Protective headgear
- Protective eyewear
- FFPE protective mask
- Protective footwear
- Protective gloves (mechanical)

Tool:

- Brush
- Sandpaper grit 180
- Sandpaper grit 400
- Spatula

Material:

- Cleaning agent
- Absorbent cloth
- Vacuum cleaner with a Class H fine filter

Requirements:

1. Switch off the system according to the 5 Safety Rules.

➔ *Chapter 1.8 "5 Safety Rules for working on electrical systems" on page 12*

2. Measure the insulation resistance with a resistance meter in accordance with IEC / EN 61010-1 to determine whether a cleaning is necessary.

➔ *Chapter 8.2 "Measuring insulation resistance" on page 60*

➔ Cleaning is necessary if the permissible reference values are not reached.

Suitable cleaning agents



Coordinate the cleaning project with Conductix-Wampfler

Contact Conductix-Wampfler for the appropriate cleaning methods and cleaning agents before cleaning.

Additional service and maintenance work must also be coordinated with Conductix-Wampfler.

➔ *Chapter 2.6 "Customer service" on page 14*

An inspection of the system by Conductix-Wampfler personnel is recommended before cleaning.



Current safety data sheets and product documentation for the cleaning agents

In order to view current safety data sheets and product documentation in the personal customer area, it is necessary to register with the Bremer & Leguil manufacturer.

Cleaning agent:	B.W.R 210
Component:	Insulation profile
Soiling:	Dust, sliding contact abrasion or light soiling Greasy, oily, sooty or other soiling
Application:	Mix with water. Mix ratio: 1:5 to 1:50 Spray onto an absorbent cloth with a sprayer.
Biodegradable:	more than 97 %
Flash point:	Non-flammable
Labeling according to GefStoffV:	See safety data sheet
Packaging:	Loose goods or in canisters
Storage:	Store in plastic containers at room temperature.

Cleaning agent:	S.L.X- Top
Component:	Sliding contact Conductor bar Insulation profile Hanger clamp Connector cap Power feed cap
Soiling:	Greasy, oily, sooty or other soiling
Application:	Spray undiluted onto an absorbent cloth with a spray bottle or apply directly to the absorbent cloth.
Note:	Plastics are not degraded. Approved for the food industry. Cleaning agent may only be used cold. NFS labeling
Flash point:	> 55° C - Class A III
Labeling according to GefStoffV:	Not required
Packaging:	Loose goods or in spray bottle
Storage:	Close container tightly and store in sufficiently ventilated rooms at room temperature.

Cleaning agent:	O.C.X. Oxide solvent
Component:	Power feed terminal Connector pins Conductor bar
Soiling:	Corrosion
Application:	Spray from aerosol cans.
Note:	Always reclean with S.L.X.-Top. Only suitable for cleaning metallic parts. Degrades plastics after prolonged exposure and is therefore only suitable for cleaning plastics that are resistant to mineral oils and solvents. NFS labeling
Flash point:	> 65 ° C - Class A III
Labeling according to GefStoffV:	Not required
Packaging:	Loose goods or in spray bottle
Storage:	Close container tightly and store in sufficiently ventilated rooms at room temperature.

Unsuitable cleaning agents

These substances wear or damage the product components when applied:

- Contact cleaners
- Contact sprays
- Degreasing sprays
- Engine cleaners
- Moisture-displacing cleaning agents
- Solvents
- Abrasive fabrics with or without polishing agent

Clean regularly

The surface quality of the conductor bar is extremely vital to the trouble-free function of the conductor rail system.

The following images show symbolic examples of different surface finishes:

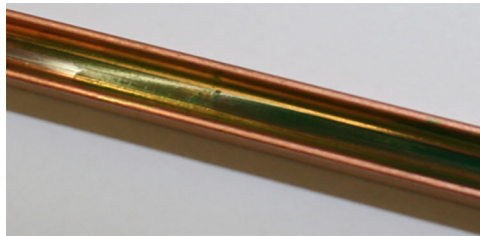


Fig. 108: Copper conductor bar with verdigris formation

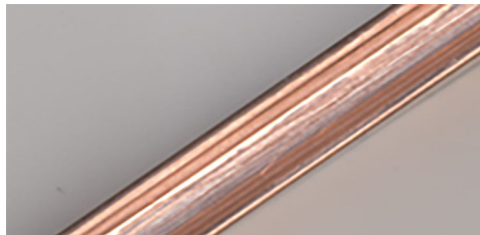


Fig. 109: Cleaned copper conductor bar with rough surface

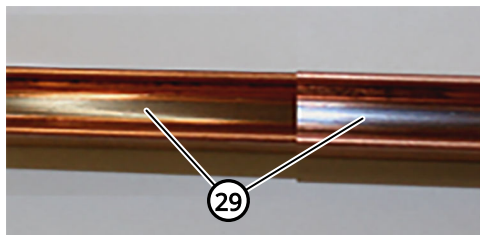


Fig. 110: Copper conductor bar with patina

29 Patina

NOTE: Energy and signal transmission or system failure due to heavy soiling. Remove dust accumulations, foreign bodies, strong oxidation and foreign substances in the conductor bar.

The following work steps will help maintain the operational safety and the system's protection against contact:

1. Abrasion on the conductor rail.

Use a vacuum cleaner with a Class H fine filter to remove abrasion from the conductor rail.

Apply undiluted S.L.X.-Top cleaning agent to an absorbent cloth and remove any other adherent residues on the conductor rail.

Wipe with clean water.

Allow the water to evaporate.

2. Adherent soiling on insulation profile.

Brush off adherent soiling from the insulation profile with a brush.

Vacuum the remaining loose soiling with a fine filter Class H vacuum cleaner.

3. Coarse soiling on insulation profile.

Spray on a mixture of water and the cleaning agent B.W.R. 210 and remove adherent foreign substances such as oils and greases or similar substances from the insulation profile.

➔ *"Suitable cleaning agents" on page 81*

Apply the cleaning agent sparingly to prevent the cleaning agent from penetrating the gaps in the insulation profile.

In the event of major soiling, dismount the affected track section so the components can be individually cleaned.

➔ *Chapter 11.4 "Replacing conductor rail in a section" on page 78*

After cleaning, wipe with clean water and blow out the gaps in the insulation profile with compressed air.

4. Insulating layers on the conductor bar.

Remove verdigris and burn marks with sandpaper (coarse sanding): Grain size 180 and fine sanding: Grain size 400).

**NOTICE****Faults caused by removing the patina from copper conductor bars**

The patina 29 is an iridescent steel-blue to black colored run mark in the conductor bar. The patina forms through normal operation and oxidation and has a positive effect on the service life of the current collector heads and the performance of the overall system.

Current collectors that have fallen below the wear limit damage the patina, which leads to roughening of the conductor rail.

(see Fig. 87, Fig. 88, Fig. 89 and Fig. 90)

Removing the patina can change the running performance or the overall system performance.

Apply undiluted S.L.X.-Top cleaning agent to an absorbent cloth and remove any other adherent residues on the conductor bar.

Place the absorbent cloth with the applied cleaning agent around a plastic spatula so it can evenly penetrate the contact surface of the conductor bar.

Run the spatula through the access opening of all conductor rail poles. Change the work angle during this to be able to evenly clean the lower and upper areas of the conductor bar.

Also clean the hanger clamps when wiping across the individual poles.

5. Remount dismantled components.

➡ *Chapter 7 "Assembly" on page 28*

6. Measure the insulation resistance with a resistance meter according to IEC / EN 61010-1. Compare the new measured values with the previously measured values to determine whether the cleaning has improved the performance of the conductor rail system.

➡ *Chapter 8.2 "Measuring insulation resistance" on page 60*

- ➡ Do not put the system back into operation until the valid reference value has been reached.
- ➡ Do not put the system back into operation until the evaporation of all water is ensured.

12 Disassembly and Disposal

12.1 Disassembly

Preparation

Personnel:

- Specialist personnel

Protective equipment:

- Protective headgear
- FFPE protective mask
- Protective footwear
- Protective gloves (mechanical)

Tool:

- Wrench, AF7
- Screwdriver for slotted screw
- Cutting tool

Requirements:

- Switch off the system according to the 5 Safety Rules.
➔ *Chapter 1.8 "5 Safety Rules for working on electrical systems" on page 12*

Work steps

1. Loosen all screw connections.
2. Slide and turn the slotted screwdriver between the clip of the hanger clamp and the conductor rail so that the conductor rail can be removed from the hanger clamp.
3. Remove power feeds, connectors and end caps from the conductor rail.
4. Separately dispose of all disassembled components according to their respective material group.
➔ *"Material groups relevant for disposal" on page 87*
5. Remove the hanger clamps from the support profile.

CAUTION: Risk of injury when sawing the connector due to the saw jumping. When disconnecting the conductor rail, maintain a distance of at least 100 mm from the end of the insulation profile.

12.2 Disposal

Preparation

Personnel:

- Specialist personnel

Protective equipment:

- Protective gloves (mechanical)
- Protective headgear
- Protective footwear

Material groups relevant for disposal

When the system has reached the end of its service life, the disassembled components must be separated and disposed of in an environmentally friendly manner.

- Insulation profile: Plastic
- Conductor bar: Copper or steel
- Hanger clamp: Plastic
- Connector cap: Plastic
- Power feed cap: Plastic
- Connector pins: Copper alloy or steel
- Connector terminals: Copper alloy or steel
- Power feed terminals: Copper alloy or steel
- Current collector: Ultramid, aluminium, steel
- Sliding contacts: Copper graphite or graphite



ENVIRONMENT**Environmental damage due to improper disposal!**

Valuable raw materials can be reused through environmentally friendly disposal.

- Observe locally applicable disposal regulations.
 - Have a specialized company carry out the disposal if necessary
 - Comply with the Hazardous Substances Ordinance, particularly the regulations on handling hazardous substances.
 - Dispose of materials marked for recycling using the respective recycling process.
-

13 Approvals and standards

The Declaration of Conformity for this product can be requested from Conductix-Wampfler.

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Country of origin: Germany

Worldwide sales and service location addresses:

➔ www.conductix.contact

14 Animations overview

System overview



➔ *Follow here for the system overview*

Mount hanger clamp and end segment with anchor point



➔ *Follow here for mounting the hanger clamp and end segment with anchor point*

Trimming the conductor rail



➔ *Follow here for trimming the conductor rail*

Connecting the conductor rail



➔ *Follow here for connecting the conductor rail*

Mounting the end cap



➔ *Follow here for mounting the end caps*

Current collector tolerance
ranges



➔ *Follow here for the current collector tolerance ranges*

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