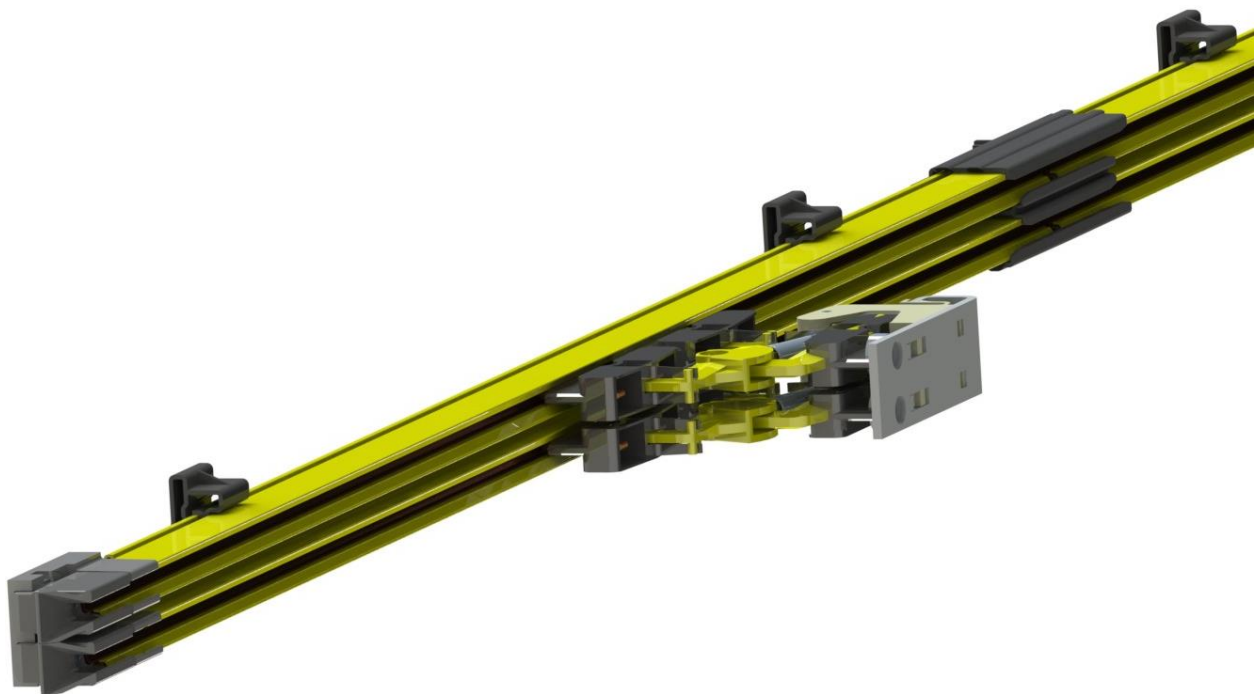


Mounting Instruction



Conductor rail system MultiLine 0835



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1 General information

1.1 Information about this mounting instruction

The information provided in this mounting instruction is designed to enable the above device to be used safely and efficiently.

The mounting instruction forms part of the device and must be kept accessible to personnel at all times and stored right by the device. Personnel must read these instructions carefully and understand them before starting any work. The basic prerequisite for safe work is compliance with all safety and operating guidelines in this mounting instruction.

Local accident protection regulations and general safety guidelines for the area of use of the device also apply.

Illustrations in this document are provided for illustration purposes only and can deviate from the actual design of the conductor rail system.

In addition to this mounting instruction, the instructions in the appendix for the individual system components also apply.

1.2 Limitation of liability

All of the data and information in this document has been compiled taking into account all valid standards and regulations, as well as the state-of-the art and our long years of experience and knowledge.

The manufacturer is in no way liable for damage resulting from:

- Failure to comply with this installation and mounting instruction
- Improper use
- Use by untrained personnel
- Unauthorized modifications
- Technical changes
- Use of unauthorized replacement parts and accessories

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 of Business apply, as do the delivery conditions of the manufacturer and all legal regulations applicable at the time the contract was concluded.

All products are subject to technical modifications in the context of improvement of function and further development.

1.3 Copyright

This installation and mounting instruction is subject to copyright and exclusively intended for internal use by the customer. Provision of the installation and mounting instruction to third parties, duplications in any form – even in part – as well as the reuse and/or disclosure of their content are not permitted without the written approval of the manufacturer, except for internal use by the customer.

Breach or infringement will result in liability for damages. This shall not affect our right to assert claims for further loss or damage.

1.4 Spare parts



WARNING!

Wrong spare parts are a safety hazards!

Wrong or faulty spare parts can result in damage, malfunctions, complete failure and affect safety.

→ Always use original spare parts from the manufacturer!

Replacement parts can be ordered from your contracted dealer or directly from the manufacturer.

See section 14 for the contact details for ordering spare parts.

1.5 Material defects

The regulations about material defects are listed in the general terms and conditions of business.

1.6 Technical support

For technical support please contact our staff from the Customer Support Department.

Spare part orders: See section 14 for contact details.

We are also always interested in new information, experiences and feedback from the field that can help us improve our products.

2 Safety instructions

2.1 General safety information

Safety and hazard information are always marked with corresponding symbols in this mounting instruction. Safety instructions are introduced by signal words that signal the scale of the hazard. Always observe safety and hazard instructions, and work carefully to avoid accidents, bodily injury and damage to property!



DANGER!

... indicates an immediate hazard that, if not avoided, may result in death or serious injury.



DANGER!

... indicates an immediate hazard due to electrical current, which, if not avoided, may result in death or serious injury.



WARNING!

... indicates a potential hazard that, if not avoided, may result in death or serious injury.



WARNING!

... indicates a potential hazard due to electrical current, which, if not avoided, may result in death or serious injury.



CAUTION!

... indicates a potential hazard that, if not avoided, may result in moderate or minor injury and property damage.



Tips and recommendations:

... refers to useful tips and recommendations as well as information for efficient and trouble-free operation.

2.2 Personnel requirements

2.2.1 Qualifications



Personnel who are not adequately trained are at risk of injury!

Improper use can result in serious injury to persons and property.

→ Work on and with the system must only be performed by personnel with adequate training for the relevant task.

The following qualifications are mentioned in this mounting instruction for different areas of operation:

- **Trained personnel/operators**

Have been instructed in a training session by the operator with respect to the tasks assigned to them and the potential dangers arising from improper actions.

- **Qualified specialists**

Are, due to their specialized training, knowledge, experience and knowledge of applicable regulations, capable of carrying out work assigned to them, while independently recognizing and avoiding possible risk.

Personnel are considered qualified if they have successfully concluded training, for example, as electricians, master electricians, electrical engineers, or electrical technicians. Personnel are also considered qualified who have been employed correspondingly for several years, have been educated in theory and practice during that time, and whose electrical knowledge and skills have been tested.

The operator of the electrical system must document that the corresponding certification or other documentation of qualification are present or have been demonstrated.

- Only those persons are authorized as personnel who can be expected to perform their work reliably. People whose capacity for reaction is influenced e.g. by drugs, alcohol, or medications are not authorized.
- When selecting personnel, all age- and occupation-specific guidelines must be observed that are applicable at the deployment site.

2.2.2 Unauthorized personnel



Danger due to unauthorized personnel!

Unauthorized persons, who do not meet the requirements described here, are not acquainted with the dangers in the working area.

- Keep unauthorized personnel away from the working area
- In case of doubt, address the person and direct them away from the working area
- Stop work as long as unauthorized personnel is in the working area

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2.2.3 Training

Before commissioning the equipment, personnel must be trained by the operator. This training has to be documented as shown in the template below in order to create a record of the training.

Date	Name	Type of training	Training given by	Signature
05.11.2009	John Doe	First safety training for personnel	Horst Müller	

2.3 Personal protective equipment

Always wear For all work, always wear



Protective clothing

Protective clothing serves primarily as protection against entrapment by moving machine parts. Working clothes must fit tightly and have a low resistance to tearing; they must have close-fitting sleeves and no protruding parts.



Protective footwear

Used to protect feet from heavy falling parts and slipping on slippery floors.

To be worn for special tasks

When carrying out certain tasks, personnel must wear special personal protective equipment. The need for such personal protective equipment will be detailed in the individual sections of this manual.



Protective gloves

For the protection of hands against friction, scrapes, stabbing or deep wounds, as well as against contact with hot surfaces.



Protective headgear

For protection against falling or flying parts and materials.



Safety goggles

To protect the eyes from harmful influences, such as strong light, chemicals, dust, splinters or effects of the weather.



Breathing mask (FFP-3 – according to country-specific requirements)

For protection against substances, particles and organisms. Here: Protection against dust, which is generated by abrasion by the carbon brushes and the PVC insulation of the conductor rail.

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2.4 Intended use

This product is designed and built only for the intended use described here.



WARNING!

Danger from improper use!

Any application that deviates from or goes beyond the intended use of the devices can result in hazardous situations.

- The specifications in this mounting instruction must be strictly complied with
- Do not use the system in any way that does not conform to its intended use!
- Observe the information on improper use in section 2.4.1

We do not accept any liability for damage arising from improper use.

The operator bears sole liability for all damage that result from improper use.

Intended use

The conductor rail system MultiLine 0835 is an electric power supply system for track-guided mobile consumers operated in indoor spaces in the warehouse area not accessible to the public.

One of its typical applications is, for example, to supply power to shuttles inside a warehouse with horizontal storage racks.

The following technical requirements must always be strictly observed during installation:

- The consumer's max. permissible travel speed is 300 m/min.
- The conductor rail must only be fitted horizontally.



CAUTION!

To fit the conductor rail vertically, there are a number of extra points that need to be taken into consideration and doing so is only possible using special components.

- The conductor rail system must only be fitted and operated using either steel **or** copper materials, but on no account a mixture of steel and copper components.
- Max. permissible system length: 150 m
- The conductor rail system must not be exposed to splashing water.

Electrotechnical operating conditions

- The electrical system has to be protected with fuses in compliance with local guidelines.

2.4.1 Improper use

Improper use in particular include the following types of use:

- Operating the system outside the specified operating conditions (see section 3.3).
- Exceeding the max. permissible travel speed.
- Installing the conductor rail system with the opening for the current collector's access facing upwards.
- Installing the conductor rail system at an angle.
- Installation in area accessible to the public.
- Creating a conductor rail that is more than 150 m long.
- Using the system in clean rooms or ultra-clean rooms.
- Using the system in areas that must not be contaminated with abraded materials (e.g. unpackaged food).
- Use of the system with accessories that have not been certified and have not been approved by the manufacturer.

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- Operation of the system by untrained personnel.
- Using both steel and copper components in the system.



CAUTION!

Fire hazard, destruction of the conductor rail!

If the current or voltage used for the conductor rail system is too high, the system may be unable to cope.

→ Do not exceed the nominal current indicated in section 3!



CAUTION!

The conductor rail system must only be operated under the environmental conditions detailed in section 3!

The conductor rail system must not be operated under the following environmental conditions:

- In areas with highly flammable materials. Risk of fire and explosion!
- In areas that contain solvents. Risk of components dropping!
- Near splashing water. Short circuit, risk of death through electrocution!
- In clean rooms or ultra-clean rooms. The conductor rail system generates dust through abrasion

2.5 Protective measures to be taken by the operator/user

The device is designed for use in an industrial setting. The operator of the device is therefore subject to compliance with the relevant legal obligations concerning workplace safety. In addition to the safety guidelines in this installation and operating manual, the safety, accident protection, and environmental protection regulations applicable to the place of operation of the unit must be followed. This particularly includes:

- Work on electrical components of the system may only be carried out **when disconnected from the power supply**.
- The operator has to inform himself of applicable workplace safety guidelines and identify any additional hazards that may arise under special working conditions at the deployment location of the device. This knowledge has to be expressed in the form of operating instructions for the operation of the device.
- During the entire time the device is in use, the operator must check that these operating instructions still correspond to the current state of regulations and adapt these as necessary.
- The operator must clearly manage and define responsibilities, for installation, operation, troubleshooting and maintenance.
- The operator must ensure that all employees involved with the unit have read and understood this installation and operating manual. He must furthermore train personnel at regular intervals and inform them of hazards.
- The operator must provide personnel with all required protective equipment (work clothes, safety shoes, hearing protection, protective gloves, safety helmet, goggles, breathing mask).
- The operator must keep the keys for the switching cabinets in a safe place. "Safe" means that only explicitly authorized personnel may have access to the keys. The keys may only be issued to technical personnel as described in section 2.2.1.

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The operator is furthermore responsible for ensuring that the device is always in perfect working order. The following thus applies:

- The operator must ensure that the maintenance schedule described in this installation and operating manual is followed.
- The operator must get all safety systems regularly inspected for functionality and completeness. If possible, this inspection should be carried out once a year, but at least as often as required under the applicable national regulations.
- If the device or system has been modified, the safety systems must be inspected again and adapted to the changed conditions in such a way that the device or system is safe again.

2.6 5 safety rules for working on electrical systems

Requirement:



- Work on electrical systems must only be carried out when they are disconnected from the power supply. The **5 safety rules** (see DIN VDE 0150-100:2009-10/EN 50110-1:2004-11) must always be followed before starting any work:
 1. Disconnect system from the power supply at the main switch.
 2. Secure the main switch against being switched back on,
 3. Check that the system is disconnected by measuring the current
 4. Ground and short-circuit the parts of the system on which work will be carried out
 5. Cover or block off adjacent components that are still live
- Only skilled electricians or personnel trained in electrical work may disconnect power or approve reconnection of power after work carried out in the disconnected state!

2.7 Specific hazards

The following section lists residual risks, which were determined on the basis of a risk assessment. Follow the safety instructions listed here and the warnings in other sections of this installation and operating manual in order to reduce health hazards and avoid dangerous situations.

2.7.1 Electrical hazards and sources of danger

Requirement:



DANGER!

Risk of death by electrocution!

Contact with components carrying electrical power can lead to death by electrocution or severe injury. There is also a risk of injury from shock, falling or being thrown across the room as a result of an electrical shock.

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DANGER!

Risk of injury from falling or being thrown across the room after an electrical shock!

Work on the following components is dangerous:

- Main power supply
- Live components:
 - Power feeds
 - Cables
 - Connections
 - Conductor rail
 - Connectors
 - Current collector
 - Equipment and connections inside switching cabinets
 - Control systems etc.
- Components that have become electrically charged due to a fault



CAUTION!

Before working on these components!

- **Disconnect the conductor rail system** from the power supply according to the 5 safety rules **and secure it against being switched back on**. For the 5 safety rules, see section 2.6



CAUTION!

Before switching the system on!

- Every time before the device or system is started, measure the insulation resistance according to locally applicable technical standards, directives and legal regulations.
- Perform required country-specific electrical tests



CAUTION!

Maintain electrical safety!

- Regularly test and maintain electrical equipment
- If dangerous faults are identified, take measures to correct the faults immediately. Inform the system operator immediately.
- If it is not possible to correct a dangerous fault, block off the area in question or turn the equipment off, and secure it against being switched back on. Inform the system operator immediately
- Immediately reattach loose and replace damaged cables
- Always replace burned fuses with equivalent fuses

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DANGER!

Fire hazard due to overload or spark formation!

A fire hazard can occur due to overloads of the cable, electrical arcing, short-circuits or the generation of sparks. Sparks can occur due to badly maintained, dirty conductor rails or because required tolerances are not observed during installation.

- The permitted current values must be observed
- The tolerances must be observed during installation
- Electrical fuses must be installed according to regulations
- Do not store easily combustible materials near conductor rails
- Conductor rails must be regularly inspected, maintained and cleaned in conformity with regulations. See section 12.3

2.7.2 Mechanical hazards and sources of danger

Required protective equipment:



DANGER!

Risk of injury through crushing and impacts!

There is a risk of crushing skin and limbs from:

- Current collectors (spring force) during installation, deinstallation and maintenance
- Falling conductor rail system components if they have not been properly installed or if operated in inappropriate operating conditions (e.g. environment that contains solvents)
- Moving parts when the system is in operation

- Do not enter the system's danger zone during operation
- Installation work must only be carried out by trained personnel
- When working on the conductor rail system, protective footwear, protective gloves and protective headgear must be worn
- When exchanging carbon brushes, observe the separate instructions on this topic. See section 12.3
- The conductor rail system must only be installed in locations with appropriate operating conditions. See section 3.3.1

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Required protective equipment:



DANGER!

Risk of injury from cuts and cutting!

The ends of the power rails can have sharp edges, especially if they were cut to size at the construction site and have not been deburred.

- Wear protective gloves and protective footwear.
- During installation: Carefully deburr the insulation profile and the power rail after they have been cut to size
- During disassembly: Cut, dismantled conductor rails must be handled carefully and properly stored (container or transport box)
- Look out for sharp edges near the installation surface and avoid contact.

Required protective equipment:



DANGER!

Risk of injury from falling power rails when transported incorrectly!

When being transported on the construction site, there is a risk that the power rails may slide out of the insulation profiles if they are not held roughly vertical during transport. This can cause serious injury and even death if they fall from a great height and hit somebody with their front end.

- The conductor rails should be transported as close as possible to the site of installation inside their packaging.
- The conductor rails must be carried to the installation site by two people and care must be taken that the power rails do not slide out of the insulation profiles
- Do not transport the conductor rails in bundles with a crane
- Wear protective headgear

Required protective equipment:



DANGER!

Risk of injury due to entrapment!

There is a risk of being trapped by moving parts when the system is in operation. Moving parts include, e.g. the shuttle and the current connector fitted to it.

- Do not enter the system's danger zone during operation
- Always **disconnect the conductor rail system from the power supply** according to the 5 safety rules and **secure it against being switched back** on before working on it. For the 5 safety rules, see section 2.6
- Wear close fitting working clothes

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2.7.3 Danger from dust and vapours

Required protective equipment:



DANGER!

Risk of sensitization, irritations of the mucous membranes and disorders of the respiratory tract through dust!

Dust from the carbon brushes collects in the conductor rails and the guide profile. This dust is very fine and is categorized as a health risk. Working a lot with the conductor rail system and/or not applying the requisite level of care when handling accumulated dust (e.g. cleaning the system with compressed air) can lead to sensitization. People that frequently spend long periods of time inside a busy facility without protective equipment may be affected by the **following**:

- Irritation of the mucous membranes
 - Diseases of the respiratory tract
 - Cancer
- At workplaces that are continuously exposed, and also strongly frequented facilities, personnel must be protected through effective measures against dust
- Personal protective equipment must be worn during all works on the conductor rail system during which accumulated dust is disturbed
- The following personal protective equipment must be worn during cleaning operations:
- Safety goggles
 - Dust mask class FFP3
 - Gloves
 - Disposable overall
- Before starting work, clean the conductor rails according to regulations. See section 12.3
- Protect the surroundings during cleaning work, for instance by covering or removing warehouse goods and blocking access to those areas in which dust could fall down on persons
- Remove dust with a vacuum cleaner. **Do not blow out dust with compressed air** Vacuum cleaners should be fitted with a class H fine filter
- Do not eat and/or drink while cleaning!
- Do not smoke while cleaning!



DANGER!

Poisonous gases in case of fire!

In case of fire in the facility, the plastic parts (PVC) of the conductor rail system will generate poisonous gases (HCL).

- Evacuate the building immediately in the event of fire
- Notify the fire brigade if there is a fire

Conductor rail system

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2.7.4 Hazards arising from the operating environment

The following conductor rail properties can give rise to hazards if it is installed in an operating environment where they can be dangerous:

- Electrical energy
- Spark formation
- Dust caused by friction
- Material composition of the insulation profiles, which emits poisonous gases when burned

The most **important measure** for preventing these hazards is to install the conductor rail system only in operating environments with **appropriate operating conditions**, see section 3.3.1.



DANGER!

Do not energize the conductor rail!

The conductor rail must not be energized under the following conditions:

- If the conductor rail is very dirty
- If the conductor rail becomes wet
- When live components are exposed (insulation profile or the insulation of the connecting cable are damaged)
- If the hanger clamp or insulation profile fail
- If the power rail falls down and contacts a conductive material

- Secure the electric system according to regulations
- Install the conductor rail as described in the installation manual
- Take environmental conditions into account, perform regular checks, maintain and clean as detailed in the instructions
- The conductor rail must be regularly inspected and, if necessary, repaired



DANGER!

Fire hazard due to overload or spark formation!

A fire hazard can occur due to overloads of the cable, electrical arcing, short-circuits or the generation of sparks. Sparks can occur due to badly maintained, dirty conductor rails or because required tolerances are not observed during installation.

- The permitted current values must be observed
- The tolerances must be observed during installation
- Electrical fuses must be installed according to regulations
- Do not store easily combustible materials near to conductor rails
- Conductor rails must be regularly inspected, maintained and cleaned in conformity with the regulations. See section 12.3



DANGER!

Poisonous gases in case of fire!

In case of fire in the facility, the plastic parts (PVC) of the conductor rail system will generate poisonous gases (HCL).

- Evacuate the building immediately in the event of fire
- Notify the fire brigade if there is a fire

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Required protective equipment:



DANGER!

Risk of sensitization, irritations of the mucous membranes and disorders of the respiratory tract through dust!

Dust from the carbon brushes collects in the conductor rails and the guide profile. This dust is very fine and is categorized as a health risk. Working a lot with the conductor rail system and/or not applying the requisite level of care when handling accumulated dust (e.g. cleaning the system with compressed air) can lead to sensitization. People that frequently spend long periods of time inside a busy facility without protective equipment may be affected by the **following**:

- Irritation of the mucous membranes
- Diseases of the respiratory tract
- Cancer
- At workplaces that are continuously exposed, and also strongly frequented facilities, personnel must be protected through effective measures against dust
- Personal protective equipment must be worn during all works on the conductor rail system during which collected dust is disturbed
- The following personal protective equipment must be worn during cleaning operations:
 - Safety goggles
 - Dust mask class FFP3
 - Gloves
 - Disposable overall
- Before starting work, clean the conductor rails according to regulations. See section 12.3
- Protect the surroundings during cleaning works, for instance by covering or removing warehouse goods and blocking access to those areas in which dust could fall down on persons
- Remove dust with a vacuum cleaner. **Do not blow out dust with compressed air** Vacuum cleaners should be fitted with a class H fine filter
- Do not eat and/or drink while cleaning!
- Do not smoke while cleaning!

2.8 What to do in the event of an accident or a malfunction

Measures to take in the event of accidents:

- Shut down the system and secure it against unauthorized, unintentional, and/or erroneous activation
- Secure the danger zone
- Keep personnel out of the danger zone
- Initiate first-aid measures
- Alarm the rescue services
- Inform responsible parties at the operating site
- Clear access roads for rescue vehicles

Measures to take in the event of malfunctions:

- Shut down the system and secure it against unauthorized, unintentional, and/or erroneous re-activation

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- Secure the work area against entry
- Consult qualified personnel when analysing the fault
- Conductix-Wampfler must be informed immediately in the event malfunctions can cause personal injury or damage to property:

Conductix-Wampfler GmbH

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79576 Weil am Rhein - Märkt
Germany

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Fax: +49 (0) 7621 662-144
info.de@conductix.com
www.conductix.com

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3 Technical specifications

3.1 Electrical

Rated current		max. 32 A at 100 % DC (DC = duty cycle)
Nominal voltage	without protective earth (PE)	max. 48 V AC/DC
	with protective earth (PE)	max. 500 V AC
Number of pins		2
Assignment		2 phases or 1 phase, PE
Cross sections for connecting cables		1.5 – 2.5 mm ² or 4 – 6 mm ²
Conductor material		Copper or steel
Protection class		IP 2X

3.2 Mechanical

Max. travel speed		300 m/min
Direction of travel		Back and forth (reversing)
Gap between pins		14 mm

3.2.1 Length

Max. length of the installed conductor rail		150 m*
Power rails		max. 4000 mm (standard), 500 to 3900 mm available on request
Min. permissible power rail length		300 mm
End segment with power feed (first section)		750 mm
End segment (end section)		750 mm
Longitudinally acting section of the connector*		2.5 mm + 1 mm per side

* Systems that are longer than 150 m are only available in consultation with Conductix-Wampfler.

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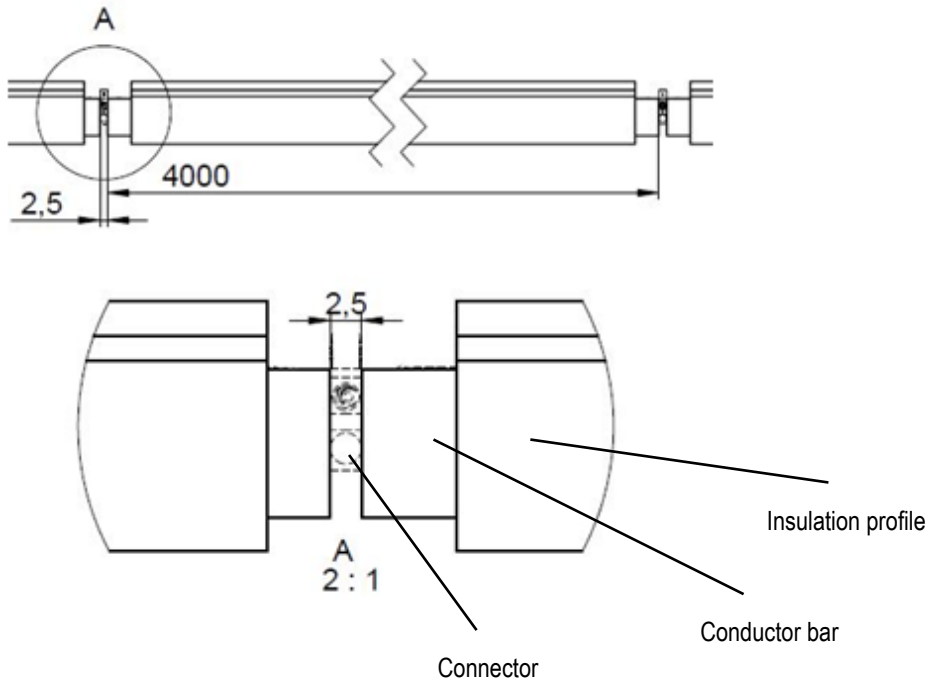


Fig. 1: Conductor rail and connector

The Annex contains a table showing the possible total system lengths when using standard components (L_{STD}), see section 13.1.

3.2.2 Installation orientation



WARNING!

Do not fit the conductor rails vertically!

→ Fit conductor rails horizontally and level, see section 3.2.3



WARNING!

The current collector must not access the conductor rail from the top!

The current collector has to access the conductor rail from the bottom or the side (see Fig. 2).

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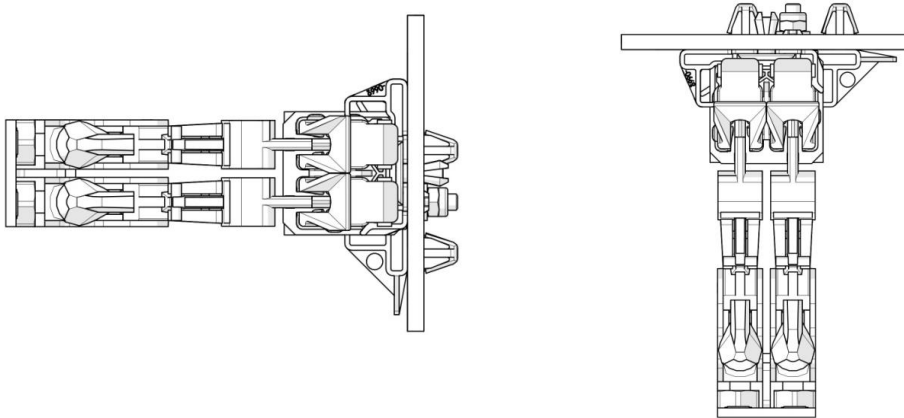


Fig. 2: Current collector access

3.2.3 Tolerances

The conductor rail must be installed within the following tolerances. Conductix-Wampfler does not accept any responsibility for the conductor rail's correct functioning if these tolerances are not observed. In such a case, Conductix-Wampfler does also not accept any liability for any problems that may arise if the conductor rail system does not function correctly.

Conductor rails	x: ± 3 mm; y: ± 1 mm (see Fig. 3)
Gap at the connector between 2 conductor bars	z: 2.5 mm + 1 mm per side
Current collector	x: ± 10 mm; y: ± 10 mm
Force with which the current collector contacts the rail	approx. 9 N

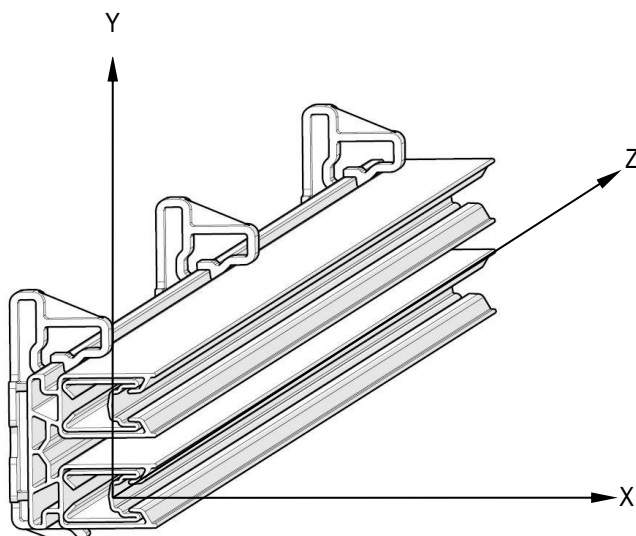


Fig. 3: Conductor bar 0835 coordinates

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3.3 Operating conditions

Designation	Value	Notes
Temperature range	-5 °C to +60 °C	In temperatures of 0 °C and below, the max. relative humidity must not exceed 30%.
Max. relative humidity	85 %	See above
Max. operating temperature difference	40 K	
Installation situation/environment	Indoors	No condensation, no direct UV radiation (solar radiation)
Protection class	IP2X	
	IP4X	If the conductor rail is fitted in the direction of the Z-axis (see Fig. 3) and the current collector accesses it from the side or from below (DIN EN 60204-1).
MASL	≤ 1000 m	Above mean sea level (DIN EN 60204-1).

3.3.1 Unsuitable environmental conditions

The conductor rail is not suitable for and **must not be installed and operated** under the following environmental conditions:

- In environments containing chemical substances or gases that can potentially permanently damage the conductor rail's materials (corrosion) or drastically impact on the insulation
- In ambient air that contains solvent vapours or aromatic compounds
- In ambient air that contains flammable or explosive gases or dusts
- In dusty environments
- Outside closed rooms
- In environments with relative humidity of more than 85%
- In close proximity to splashing water
- In environments that require a higher protection class than IP 2X



WARNING!

Faults due to incorrect operating conditions!

If the operating conditions change or are no longer within the specified range, the conductor rails can malfunction due to short circuits, premature aging and damage to electrical and mechanical components.

- The conductor rail must be switched off if the operating conditions are no longer within the permissible range described above.
- The conductor rail must be switched off if it gets wet or is dirty. Dry or clean as specified, see section 12.3
- Take the relevant measures required to restore the operating conditions to suitable conditions.

Conductor rail system

MultiLine 0835

4 Description and mode of operation

4.1 Brief description

MultiLine 0835 is a conductor rail system that can be used to supply e.g. a shuttle (in a shuttle storage system) or similar mobile consumers in other kind of applications with energy. The system is variable in length.

The conductor rail system MultiLine 0835 comprises:

- Conductor rail components:
 - End segment with power feed (first section)
 - Conductor rail
 - End segment
- Connectors
- Hanger clamps

The hanger clamps are used to attach the conductor rails to a straight and smooth installation surface provided by the customer.

The installation surface generally comprises a steel profile. The conductor rails are connected to one another with the aid of connectors, which ensure a low ohmic resistance and that the rails are securely connected.

The power feed at the top end of the conductor rail is used to supply the rail with electrical energy that the shuttle (or a different kind of mobile consumer) can continuously access with the aid of a current collector.

4.2 Description of assemblies

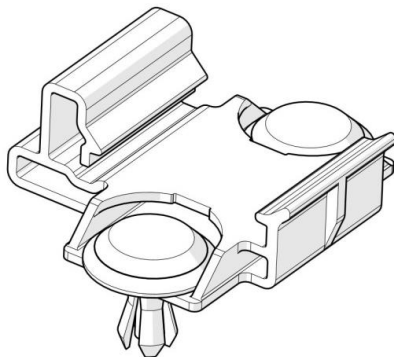


Fig. 4: Hanger clamp 0835 with expanding rivet

- **Hanger clamp 0835 (universal model)**

Hanger clamp 0835 is designed to be fitted with two expanding rivets to the installation surface provided by the customer.

Hanger clamps 0835 are designed to hold the conductor rails and end segments which are clipped into them.

Special hanger clamp models are available upon request.

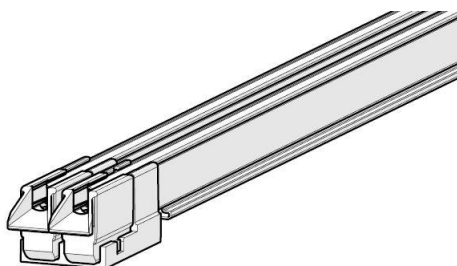


Fig. 5: End segment 0835

- **End segment 0835**

The end segments are fitted at the top and bottom end of the conductor rail.

The end segment fitted at the top end contains an end cap bar to which the conductor rail is fastened. This is why an end cap bar is only fitted at the top end. This end segment also contains the power feed.

Variants:

- Copper or steel
- For connection cross-sections of 1.5 – 2.5 mm² or 4 – 6 mm²
- 2 x phase (standard) or 1 x phase, 1 x PE (protective earth)

Conductor rail system

MultiLine 0835

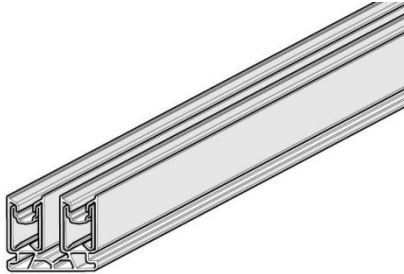


Fig. 6: Conductor rail 0835

■ Conductor rail 0835

The conductor rail is designed for transmitting energy. Every conductor rail contains two conductor bars that are protected by an insulation profile.

All conductor rails have a standard length of 4 m. Conductix-Wampfler can also supply shorter conductor rails of 0.5 m - 3.90 m on request.

Variants:

- Copper or steel
- 2 x phase (standard) or 1 x phase, 1 x PE (protective earth)



DANGER!

In a worst case scenario, dismantling the connectors can cause a fire!

The connectors cannot be removed. Using force to remove a connector will damage the connector and means that it can no longer be used because it will have become deformed, which means that it will no longer be possible to guarantee that it will function properly.

- Connectors must only be installed level, i.e. within the system and to the installation surface.
- The connectors have to be made of the same material as the conductor bar.
- The connection must not be bent or twisted.

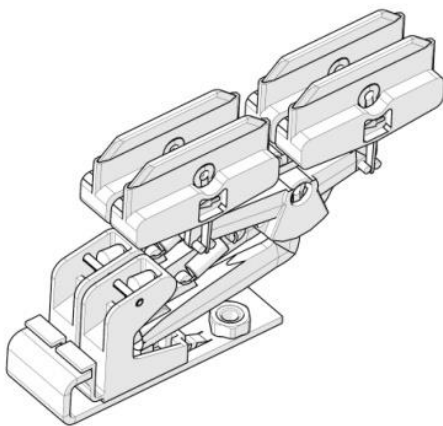


Fig. 7: Current collector 0815

■ Current collector 0815

The current collector supplies the track-guided mobile consumer with the required energy.

Mounting Instruction

Conductor rail system

MultiLine 0835

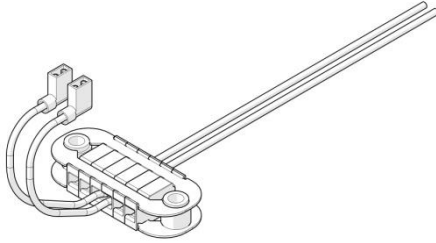


Fig. 8: Example: Cable bundle with strain relief

- **Cable bundle with strain relief**

The strain relief ensures that the cables do not pull on the sliding contacts or current collectors, press against them or twist.



Use the QR code ("click" or "scan"), to watch our animation **MultiLine 0835 System Overview**.

4.3 Accessories

The following accessories are included in the scope of delivery:

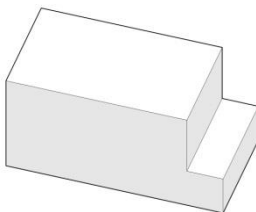


Fig. 9: Arrester 0835

- **Arrester 0835**

The arrester is fitted to the very top end of the conductor rail and marks its start. This is the point from which the system is built over its entire length. The arrester must be tightly fastened (e.g. using a screw clamp)! See section 6.2

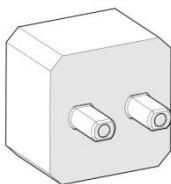


Fig. 10: Installation block 0835

- **Installation block 0835**

The installation block is a tool designed to enable the two conductor bars to be evenly pushed onto the connectors. See section 6.2

Conductor rail system MultiLine 0835

- Small parts - replacement parts package comprises:
 - End cap bar
 - End cap
 - Crimp-type sockets 2.5 mm² and 6 mm²
 - Connector cap
 - Hanger clamps
 - Expanding rivet
 - Installation block 0835
 - Stop 0835

4.4 Overview of the system

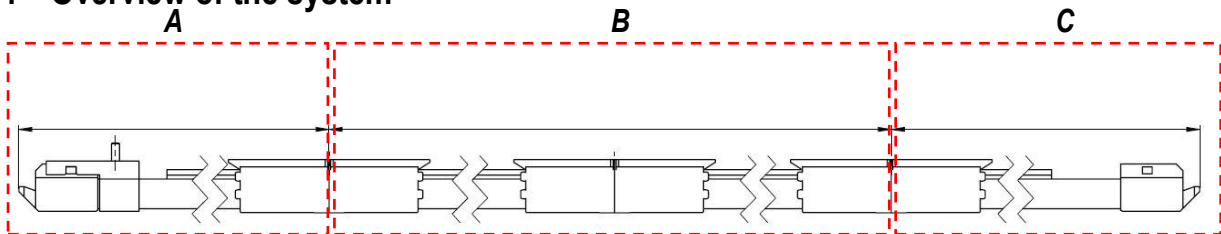


Fig. 11: Overview: First section (A), middle section (B), end section (C)

A

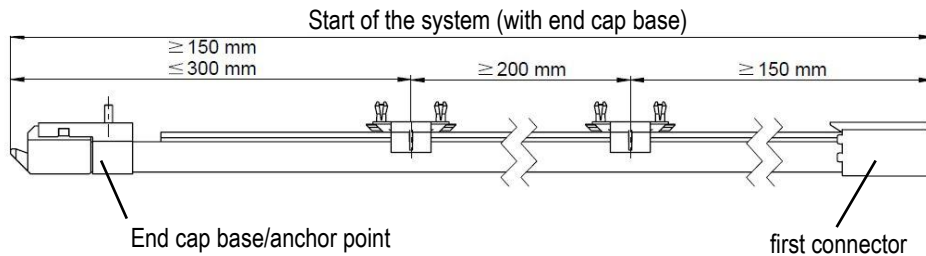


Fig. 12: Overview: First section

B

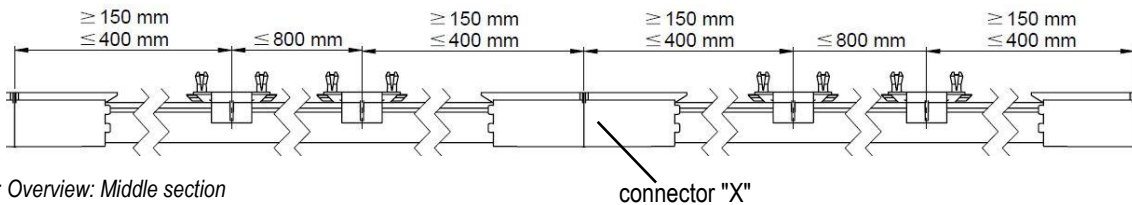


Fig. 13: Overview: Middle section

Conductor rail system

MultiLine 0835

C

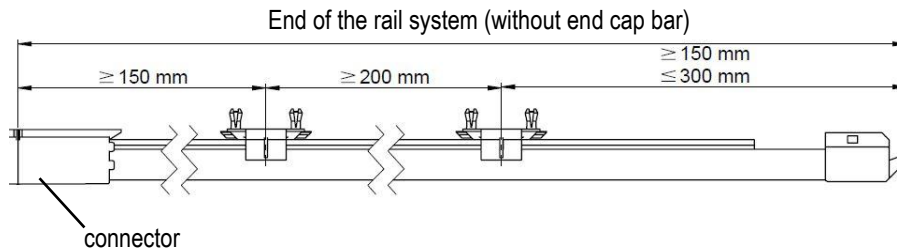


Fig. 14: Overview: End section

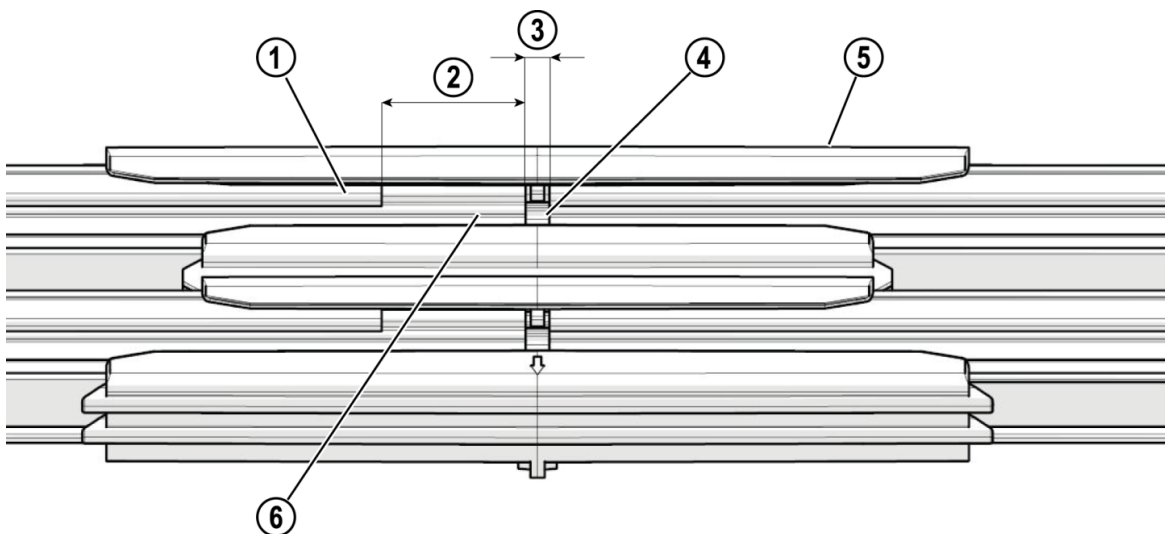


Fig. 15: Overview: Isometric view of the connection

(1) Insulation profile	(4) Connector
(2) Difference in length between the insulation profile – conductor bar approx. 15 mm	(5) Connector cap
(3) Clearance between 2 conductor bars, 2.5 mm + 1 mm per side	(6) Conductor bar

4.4.1 Expansion

- Since the individual conductor bars are solidly connected to each other, each pole is considered a continuous conductor bar.
- The connector caps between the conductor bars are solidly connected to the conductor bars and move in line with the conductor bars when they expand.
- The insulation profiles of the conductor rail segments are 15 mm shorter than the conductor bar to compensate for the differences in linear expansion between the insulation profile and conductor bar.
- The end cap base is the anchor point for the conductor rail. The conductor rail must only be fitted with 1 end cap base at the start of the conductor rail system. The start of the conductor rail system is defined as the end of the conductor rail with the power feed.
- The use of expansion elements is not planned in case of adherence to the maximum system length, permissible temperature range, and installation specifications.
- Provide free space of ≥ 200 mm, since the conductor rail system can expand.

5 Shipment, storage and packing

5.1 Transport

5.1.1 Safety instructions for transport



WARNING!

Risk of death due to suspended loads!

When lifting loads, there is a risk of death from falling parts or parts swinging out of control.

- Never step under suspended loads
- Move loads only under supervision
- Follow the specifications provided for the attachment points
- Do not attach to projecting machine parts or to eyelets on installed components. Make sure the connection elements are tightly fastened
- Only use authorized lifting accessories and connection elements with sufficient load capacity
- Discard torn or worn ropes or straps and replace with new ones
- Do not attach ropes or straps to sharp corners and edges, and do not knot or twist them
- Lower loads onto the ground before leaving the workplace



DANGER!

Risk of injury from falling power rails when transported incorrectly!

When being transported on the construction site, there is a risk that the power rails may slide out of the insulation profiles if they are not held roughly vertical during transport. This can cause serious injury and even death if they fall from a great height and hit somebody with their front end.

- The conductor rails should be transported as close as possible to the site of installation in their packaging.
- The conductor rails must be carried to the installation site by two people and care must be taken that the power rails do not slide out of the insulation profiles
- Do not transport the conductor rails in bundles with a crane
- Wear protective headgear



WARNING!

Possible damage from improper transport!

Improper transport can result in substantial property damage.

- Unload packaged parts upon delivery and during internal transport with care, and observe the symbols and the hazard information on the packaging
- Use only the attachment points provided
- Wait to remove packaging material until just before installation

Mounting Instruction



Conductor rail system

MultiLine 0835

Required protective equipment:



CAUTION!

Risk of injury from punctures and cuts!

The packaging material may contain sharp objects such as nails and wood splinters that can cause injury to limbs.

- Wear protective gloves
- Wear safety shoes

5.1.2 Transporting the packed parts

Packages must be transported under the following conditions:

- Keep dry and do not expose to dust
- Do not expose to aggressive media
- Protect from direct sunlight
- Avoid mechanical vibrations
- Transport temperature: -25 °C to +55 °C
- Relative humidity: max. 85%

5.1.3 Transport inspection

The individually packaged parts have been packed in accordance with the anticipated transport conditions. Check the delivery for completeness and transport damage immediately on receipt.

If transport damage is externally visible, proceed as follows:

- Do not accept delivery, or accept it only with reservations
- Record the scope of the damage on the transport documents or on the transporter's delivery note
- File a complaint



CAUTION!

All damage must be reported immediately following detection. Damage compensation claims may only be made within the applicable claim periods.

5.2 Storing the packed parts



CAUTION!

In some cases, there may be instructions for storage on the packed parts that go beyond the requirements listed here. These must be correspondingly observed.

Packaged parts must be stored under the following conditions:

- Do not store outdoors
- Store in a dry, dust-free place
- Do not expose to aggressive media
- Protect from direct sunlight

Conductor rail system

MultiLine 0835

- Avoid mechanical vibrations
- Storage temperature: -25 °C to max. 55 °C
- Relative humidity: max. 85%
- When storing for more than 3 months, check the general condition of all parts and the packaging at regular intervals. If necessary, add or replace the preservative material



If stored within this temperature range, stacking the conductor rails on top of each other can cause the plastic insulation profiles to deform!

→ Taking the conductor rails out of their packaging

5.3 Removing the packaging

Required protective equipment:



CAUTION!

Risk of injury from punctures and cuts!

The packaging material can contain sharp objects such as nails and wood splinters that can cause injury to limbs.

→ Wear protective gloves

→ Wear safety shoes

The packaging is designed to protect the individual components from transport damage, corrosion and other damage until installation. As a result, do not destroy the packaging and remove it only shortly before installation.

Only environmentally friendly materials have been used for packaging. Dispose of packaging material according to valid legal regulations and local guidelines.



Environmental damage due to improper disposal!

Packaging material is a valuable resource and can be reused, reprocessed or recycled in many cases.

→ Dispose of packaging materials in an environmentally appropriate manner

→ Comply with locally applicable disposal guidelines; if necessary, commission a specialist to dispose of the packing

6 Installation

6.1 Safety

6.1.1 Personnel

- The system must only be installed by specialist personnel!
- The system has to be installed by at least 2 people.

Required protective equipment:



6.1.2 Safety instructions



Risk of death due to suspended loads!

Falling parts or uncontrolled swinging loads can lead to severe injury or even death.

- Never step under suspended loads
- Move loads only under supervision
- Follow the specifications provided for the attachment points
- Do not attach to projecting machine parts or to eyelets on installed components. Make sure the connection elements are tightly fastened
- Only use authorized lifting accessories and connection elements with sufficient load capacity
- Discard torn or worn ropes or straps and replace with new ones
- Do not attach ropes or straps to sharp corners and edges, and do not knot or twist them
- Lower loads onto the ground before leaving the workplace



Risk of injury from improper installation!

Improper installation and incorrectly putting the system into operation can result in serious injury to persons and/or property.

- Before starting work, make sure there is sufficient space for assembly
- Handle open, sharp-edges components carefully
- Make sure the installation area is tidy and clean! Loosely stacked and/or components and tools that are left lying around are a source of danger
- Install components properly. Comply with the specified screw tightening torques
- Secure components so that they cannot fall or fall over

Mounting Instruction



Conductor rail system

MultiLine 0835

Required protective equipment:



DANGER!

Risk of injury through crushing and impacts!

There is a risk of crushing skin and limbs from:

- Current collector (spring force) during installation, deinstallation and maintenance
- Falling conductor rail system components if they have not been properly installed or if operated in inappropriate operating conditions (e.g. environment that contains solvents)
- Moving parts when the system is in operation

- Do not enter the system's danger zone during operation
- Installation work must only be carried out by trained personnel
- When working on the conductor rail system, protective footwear, protective gloves and protective headgear must be worn
- When exchanging carbon brushes, observe the separate instructions on this topic. See section 12.3
- The conductor rail system must only be installed in locations with appropriate operating conditions. See section 3.3.1

Required protective equipment:



DANGER!

Risk of injury from cuts and cutting!

The ends of the power rails can have sharp edges, especially if they were cut to size at the construction site and have not been deburred.

- Wear protective gloves and protective footwear.
- During installation: Carefully deburr the insulation profile and the power rail after they have been cut to size
- During disassembly: Cut, dismantled conductor rails must be handled carefully and properly stored (container or transport box)
- Look out for sharp edges near the installation surface and avoid contact

Mounting Instruction



Conductor rail system

MultiLine 0835

Required protective equipment:



CAUTION!

Risk of injury from punctures and cuts!

The packaging material can contain sharp objects such as nails and wood splinters that can cause injury to limbs.

- Wear protective gloves
- Wear safety shoes

Electrical hazards

Before starting any work:



DANGER!

Risk of death by electrocution!

Contact with components carrying electrical power can lead to death by electrocution or severe injury. There is also a risk of injury from shock, falling or being thrown across the room as a result of an electrical shock.



DANGER!

Risk of injury from falling or being thrown across the room after an electrical shock!

Work on the following components is dangerous:

- Main power supply
- Live components:
 - Power feed
 - Cables
 - Connections
 - Conductor rails
 - Connectors
 - Current collectors
 - Equipment and connections inside switching cabinets
 - Control systems etc.
- Components that have become electrically charged due to a fault



CAUTION!

Before working on these components!

- **Disconnect the conductor rail system** from the power supply according to the 5 safety rules **and secure it against being switched back on.** For the 5 safety rules, see section 2.6

Conductor rail system

MultiLine 0835



CAUTION!

Before switching the system on!

- Every time before the device or system is started, measure the insulation resistance according to locally applicable technical standards, directives and legal regulations.
- Perform required country-specific electrical tests

6.1.3 Attaching the contact guard

The following **hazard zone** in particular also requires special care in addition to the power feed and power rail:

When using dual current collectors, one of the sliding contact, which will be live, might stick out of the end of the conductor rail.

Touching this sliding contact might cause injury from an electric shock, as a result of falling or being thrown some distance across the room. The system operator must ensure that the current collector does not project, instead remaining within the conductor rails, or must make the danger area inaccessible (e.g. by providing a cover).



CAUTION!

Take the requisite protective measures!

- Fit a contact guard that will safely cover the sliding contact if it sticks out of the conductor rail!



CAUTION!

Alert personnel to the hazard!

- Attach a sign saying "Risk of death by electrocution" with the relevant hazard symbol in all areas with live components

6.2 Procedure

6.2.1 Required tools

- Crimp tool
- 27 mm diameter – size 2 – plastic hammer
- Inner hex torque wrench (1 Nm) size 2.5
- Torque wrench Hexagon socket (2 Nm) SW 3
- Wrench AF 7
- Screw clamp
- Cutting tools
- File
- Measuring tool

Conductor rail system MultiLine 0835

6.2.2 Required accessories

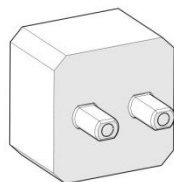
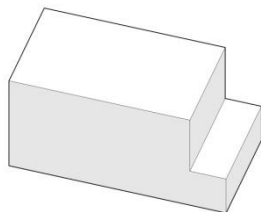


Fig. 16: Arrester 0835

Installation block 0835

6.2.3 Structural specifications for installing the system

Item	Specification/comment	Drawing
End cap base (anchor point)	The conductor rail system must only be fitted with 1 end cap base at the start of the system . The start of the conductor rail system is defined as the end of the conductor rail with the section power feed. The system's end section must not be fitted with an end cap base.	Fig. 11
Distances between the hanger clamps	From the beginning to the end of the conductor rail:	≤ 150 mm
	Before and after connectors	150 – 400 mm
	Between the hanger clamps located in front of and behind connectors	≤ 800 mm
Connectors	<ul style="list-style-type: none"> ■ Once fitted, connectors and connector caps cannot be removed again! This is why the connectors must always be carefully aligned first before they are fitted. If they need to be changed, please get in touch with Conductix-Wampfler before doing so. See section 6.2.4 → When using copper conductor bars, use copper-plated connectors. → When using steel conductor bars, use tin-coated connectors. 	
Connector caps	<ul style="list-style-type: none"> ■ The connector caps have to be supported by the installation surface so as to be able to withstand the contact force of the current collector. ■ The backs of the connector caps have to be level with the hanger clamps. 	Fig. 35
Installation surface	The installation surface has to be level. The area around the back of the conductor rail must not feature any elements that protrude (e.g. screw heads) or edges.	
Insulation	The conductor rails must not be directly contacted by electrically conductive materials.	
Minimum rail segment length	The individual rail segments must have a minimum length of 300 mm.	

i CAUTION!

Once fitted, connectors and connector caps cannot be removed again!

This is why the connector caps must always be carefully aligned first before they are fitted. If they need to be changed, please get in touch with Conductix-Wampfler before doing so. See section 6.2.4

6.2.4 Separating connected elements

If the installers forgot to fit e.g. a connector cap during installation or if a connector was fitted wrong, the wrong connector has to be cut out and a new connection has to be created.

Conductor rail system

MultiLine 0835

To correct a connection:

- Loosen conductor rails to the left and right of the connector from the hanger clamps to permit cutting
- Cut the conductor rails to the left and right of the connector using a suitable cutting tool
- Deburr the cut edges
- Fit a new connector and connector cap (see Fig. 33 - Fig. 38)

6.2.5 Replace a rail along the course

If a damage rail section is to be replaced along the course, the following work steps must be observed:

- Disconnect the system from the power supply.
- Measure the length of the section to be replaced and mark the cut point on the insulation profile.
- Cut the replacement rail piece to size and deburr all cutting surfaces as well as chamfer the running surface.
- Clip the rail left and right of the repair area out of the hanger clamps by ca. 2 m each and support if necessary.
- Cut out the damaged rail section and deburr all cutting surfaces as well as chamfer the running surface.
- Insert the connector pins into the "end of the old rail" section and fit the connector cap.
- Fit the replacement rail piece into the connector pins and make connection (push rail on as far as possible and close connector with a soft-face hammer).
- Insert the connector pins into the "start of the old rail".
- Fit the connector cap onto the end of the replacement rail piece.
- Connect the end of the replacement rail piece with the connector cap to the beginning of the section (insert the connector as far as possible) (see Fig. 37).
- Clip the rail into the hanger clamps (see Fig. 22 and Fig. 23).
- Remove the end caps from the "end of the old rail".
- Close the gap at the connector point by using a soft-face hammer and the installation block at the end of the rail by striking the end of the rail slightly (observe the connector pins with a second specialist who gives feedback to the person at the end of the rail) (see Fig. 38). Drive the rail as far as it will go. A gap of 2.5 mm remains (see Fig. 33 - Fig. 37).
- After the above described working steps have been carried out, the following must be checked:
 - Are the connection points closed?
 - Are the connector caps in position (correctly clipped into the insulation profile of the conductor rail)?
 - Are the rails correctly clipped into the hanger clamps?

Conductor rail system

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6.2.6 Adjusting the size

The conductor rail system should be built using as many standard components as possible. The total length of a conductor rail system built using standard (L_{STD}) is made up of the following elements:

L_{STD} = End segment (first section) + n (connectors + power rails) + connector + end segment (end section).

The power rails must not be seamlessly connected to each other. The connectors must not be fully inserted into the conductor rails, but with a 2.5 mm wide gap between the conductor rail's arrester and the power rails with a tolerance of 1 mm on each side. This tolerance means that it is not possible to calculate the conductor rail's exact length in advance.

The Annex contains a table showing the possible total minimum and maximum system lengths when using standard components (L_{STD}), see section 13.1.

In most cases, it is not actually possible to achieve the actual length required (projected length L_P) by connecting standard components (L_{STD}) in series. The projected length (L_P) is achieved by adding X [mm] to the next smallest length achievable with standard components L_{STD} :

$$L_P = L_{STD} + X$$

Turning this equation around makes it easier to calculate X:

$$X = L_P - L_{STD}$$

X = 1 connector + the last conductor bar.

→ **If X is less than 302.5 mm** (2.5 mm connector, 300 mm power rail), the **conductor bar in front of the last one has to be shortened as well.**

i
CAUTION!

Check the number of conductor bars!

Double check the number of conductor bars before installation.

Once the section before the last one has been fitted, it can be difficult and time-consuming to cut because the conductor rail cannot be removed without permanently damaging the connector.

i
CAUTION!

Make sure that the hanger clamps are fitted at the correct intervals, see section 6.2.3.

Mounting Instruction



Conductor rail system

MultiLine 0835

Example 1:

Projected length L_P	46030 mm
Length achieved using standard components L_{STD}^*	45530 – 45554 mm
$X = L_P - L_{STD}$	476 – 500 mm

*the tolerance for the clearance of the conductor bars means that the system's length cannot be precisely predicted in advance.

1 conductor bar has to be shortened.

The exact length of X and exact length L_S of the conductor bar (= X-connector) has to be established on site during installation!

Example 2:

Projected length L_P	45780 mm
Length achieved using standard components L_{STD}^*	45530 to 45554 mm
$X = L_P - L_{STD}$	226 – 250 mm

*the tolerance for the clearance of the conductor bars means that the system's length cannot be precisely predicted in advance.

2 conductor bars have to be shortened.

The exact length of X has to be established on site during installation!

Lengths L_{S1} and L_{S2} of the conductor bars can then be calculated as follows:

→ Subtract the connector in front of the end segment from X:

$$X - \text{connector} = 250 - 2.5 = 247.5 \text{ mm}$$

$$L_{S1} + L_{S2} = 4000 + 247.5 = 4247.5 \text{ mm}$$

→ Divide the length 4247.5 mm into 2 sensible sections $L_{S1} + L_{S2}$ E.g.: 3000 mm + 1247.5 mm.



Make sure that the hanger clamps are fitted at the correct intervals, see section 6.2.3.

Conductor rail system MultiLine 0835

6.2.7 Installation example

1. Fitting the end cap base of the end segment with the power feed (first section).

- Determine the diameter of the holes for the expanding rivets (see Table 1).
- The diameter of these fastening holes depends on the material thickness of the installation surface:

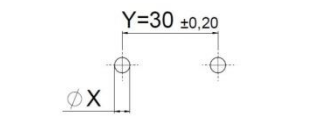
	Diameter "X" of the holes for the fastening holes [mm]	Material thickness of the installation surface [mm]
	$\varnothing 4.6 \pm 0,05$	2
	$\varnothing 4.7 \pm 0,05$	3
	$\varnothing 4.8 \pm 0,05$	4
	$\varnothing 4.9 \pm 0,05$	5
	$\varnothing 5.0 \pm 0,05$	6
	$\varnothing 5.1 \pm 0,05$	7

Table 1: Diameter of the holes for the expanding rivets

- Drilling the fastening holes for end cap base holes, see Fig. 17

i Installation position "Z" depends on the installation height and position of the conductor bars!
CAUTION!

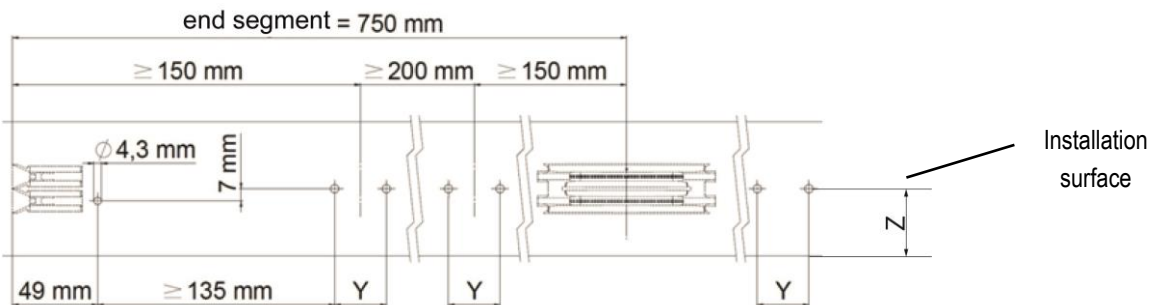


Fig. 17: Holes for the first section of the conductor rail system

- Drill all of the other fastening holes for the hanger clamps, see Fig. 18 and 19.

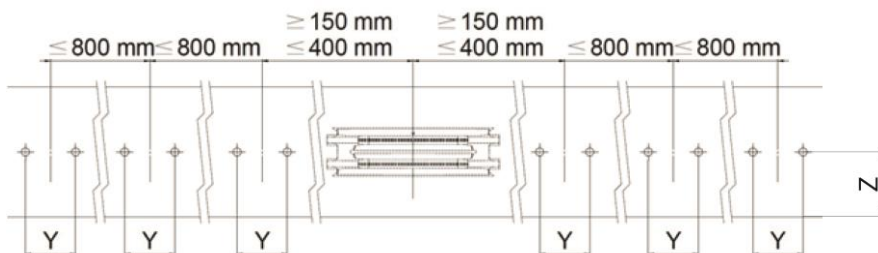


Fig. 18: Holes for the middle section

Mounting Instruction



Conductor rail system

MultiLine 0835

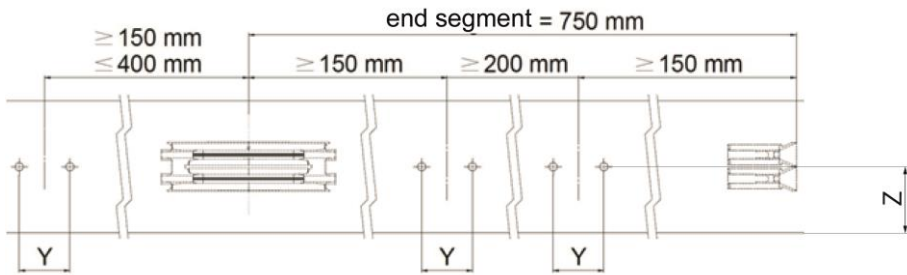


Fig. 19: Holes for the end section of the conductor rail system

→ The end cap base has to be aligned flush with the direction of travel.

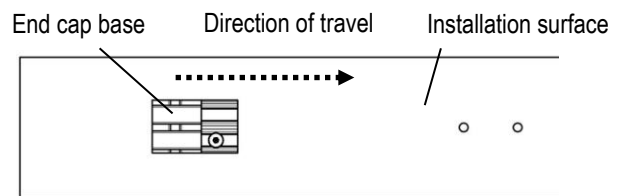


Fig. 20: Aligning the end cap bar

→ Fasten the end cap base (5) with the countersunk screw M4 (1), the washer (3) and lock nut (2).
Tightening torque: **1 Nm**

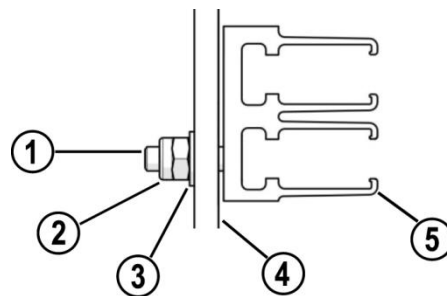


Fig. 21: Side view of the fitted end cap bar

- | | |
|-----------------------|--------------------------|
| (1) Countersunk screw | (4) Installation surface |
| (2) Lock nut | (5) End cap bar |
| (3) Washer | |

Conductor rail system

MultiLine 0835

2. Fitting the hanger clamps

- Drill the holes for the expanding rivets (see Fig. 17 until Fig. 19). Refer to Table 1 for the correct drill hole.
- When positioning the hanger clamp, the clip must point upwards (see Fig. 23).
- Press the head of the expansion rivets straight into the holes.

NOTE:

If the head of the expansion rivet breaks off, the pin of the expansion rivet can still be driven into the hole.

CAUTION!

Check immediately that the expansion rivets are seated correctly. Once the conductor rails are installed, nothing can be corrected!

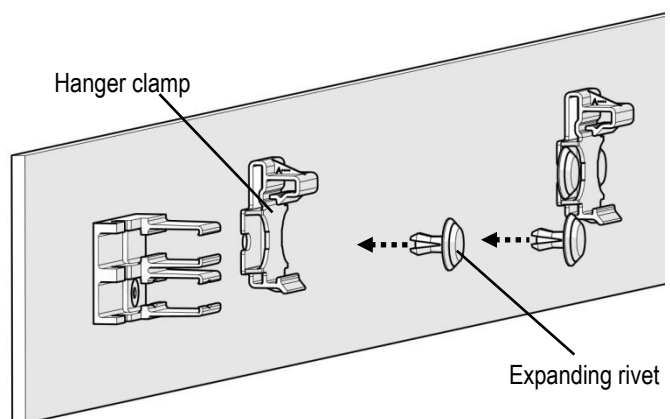


Fig. 22: Positioning and fitting the hanger clamps

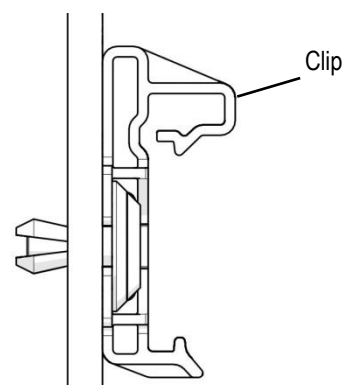


Fig. 23: Side view of a hanger clamp

Conductor rail system

MultiLine 0835

3. Installing end segment with power feed (anchor point)

Requirement:



DANGER!

Risk of death by electrocution!

Touching the connecting cable can result in death and severe injury from electric shock.

- Disconnect the power supply for the conductor rail by switching it off at the main switch
- If there is no main switch, disconnect the end of the connecting cable from the power source or do not yet connect the cable that is not going to be connected to the conductor rail's power terminal.
- Protect the power supply from being switched back on
- Make sure the system is disconnected by measuring the current
- Ground and then short-circuit parts of the system that have been disconnected from the power supply
- Cover or block adjacent components that are still live
- Attach a sign saying "Risk of death by electrocution" with the relevant hazard symbol in all areas with live components (power feed)

- Properly crimp the crimp-type sockets (1) on the connecting cables (2) with the Klauke K2 crimping tool.

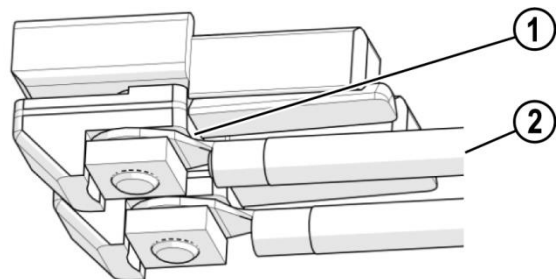


Fig. 24: Power terminals with crimp-type socket (1),
connecting cable (2)

Mounting Instruction



Conductor rail system

MultiLine 0835

→ Push the power feed terminal with connecting cable onto the rail (see Fig. 26).

ATTENTION: Make sure that the clamping unit of the power feed terminal does not protrude over the insulation profile (see Fig. 27) and that the conductor bar is pushed in as far as the power feed terminal (see Fig. 28).

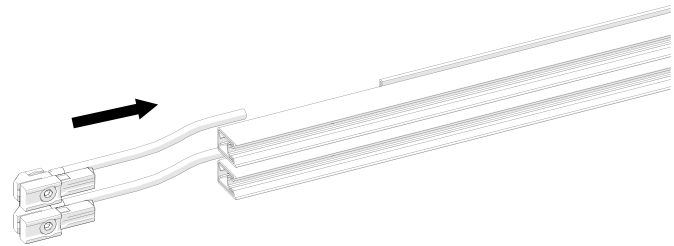


Fig. 25: Push power feed terminals with crimped connection cables onto the rail

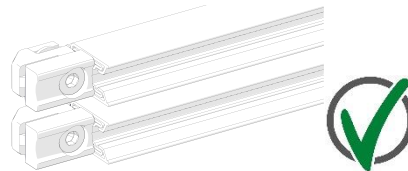


Fig. 26: Correct: Power feed terminals are pushed onto the rail correctly

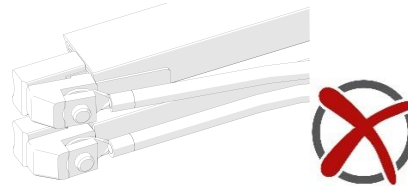


Fig. 27: False: The clamping unit protrudes above the insulation profile

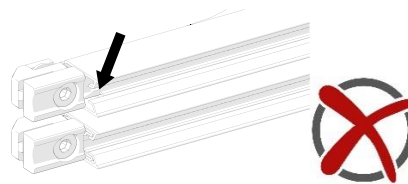


Fig. 28: False: Conductor bar is not pushed correctly onto the clamping unit

→ Slide the end caps over the power feed terminals and tighten the cylinder screw DIN6912-M4x12 of the power feed terminals with 2 Nm.

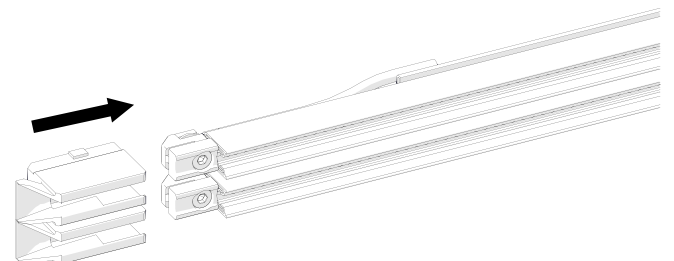


Fig. 29: Slide the end caps over the power feed terminals

Mounting Instruction



Conductor rail system MultiLine 0835

→ Clip the rail with the mounted end caps into hanger clamps and end cap set.

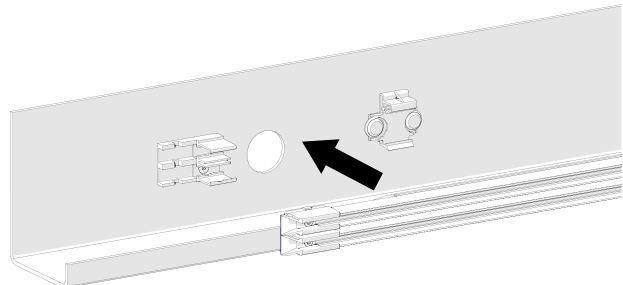


Fig. 30: Clip the rail with end caps into hanger clamps and end cap base

- (1) Hanger clamp
- (2) Insulation profile
- (3) Support profile (customized)
- (4) End caps
- (5) Cylinder screw
- (6) Power feed terminal
- (7) Conductor bar
- (8) End cap base

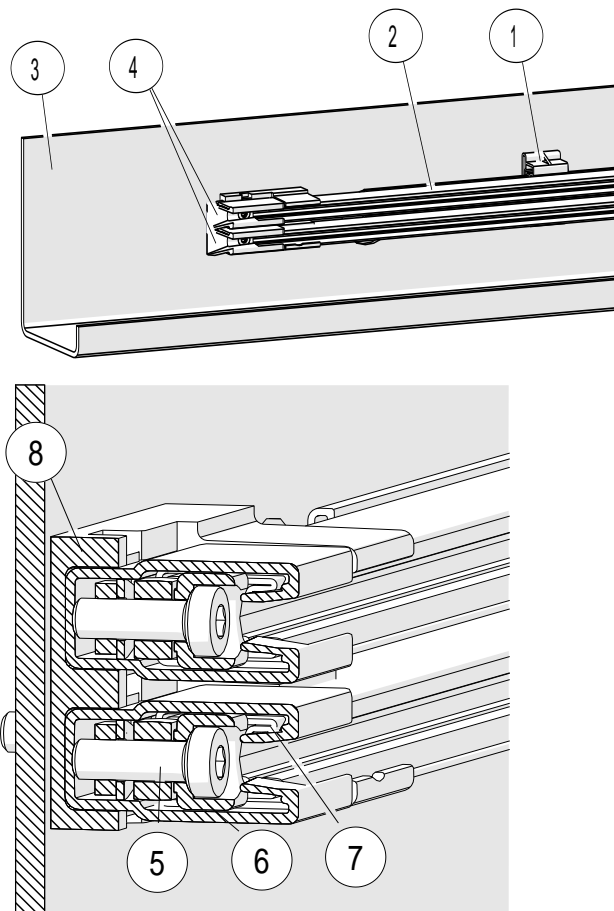


Fig. 31: End segment in detail



Use the QR code ("click" or "scan"), to watch our animation
Mounting End Segment (with Anchor Point).

4. Fitting and connecting the conductor rails

Requirements and required protective equipment:



WARNING!

Danger of death due to incorrect installation!

The contact guard cannot be fitted if the connector cap has not been fitted. **Risk of death by electrocution!**

Risk of injury from **falling components** if they are not fastened properly.

- Carefully prepare the installation material
- The connectors and rails must only be fitted if the rails are fastened to a level installation surface!
Do not connect them before they are fitted!
- Follow the installation manual
- Wear protective headgear



CAUTION!

Reusing disposable components can give rise to hazards!

Reusing a connector or expanding rivet can give rise to the following hazards:

- The connection and fastening element are not in perfect working order and not reliable
 - Expanding rivet: There is a risk that conductor rails may come loose, become quickly worn or destroyed
 - Connectors: The connection may heat up because of excessive resistance. If there are any easily flammable materials nearby, there will be a risk of fire
- Dispose of disassembled connectors and expanding rivets and replace with new ones.
Do not reuse!

Mounting Instruction



Conductor rail system MultiLine 0835

→ Fasten the arrester in front of the end cap base with a screw clamp.

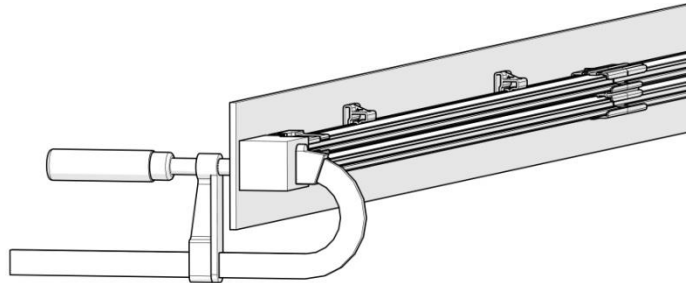


Fig. 32: Fastening the arrester

→ Insert one connector for each conductor bar and lightly push in by hand.

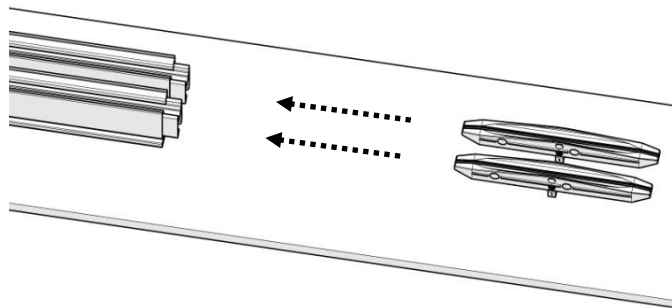


Fig. 33: Insert connectors by hand

→ Drive the connectors into the connector rails up to the stop (1) with a plastic hammer.

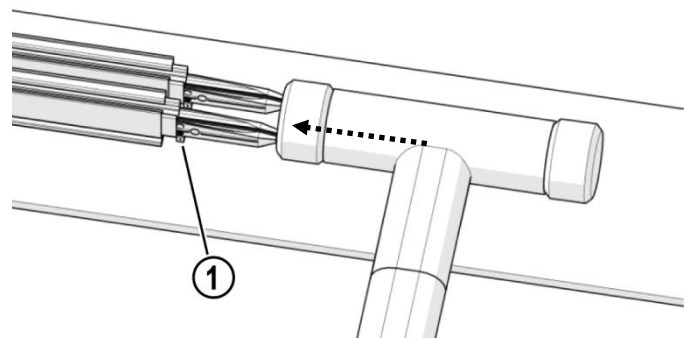


Fig. 34: Drive the connectors in up to the stop (1)

Mounting Instruction

Conductor rail system

MultiLine 0835

- Push the connector cap onto the conductor rail up to the stop.

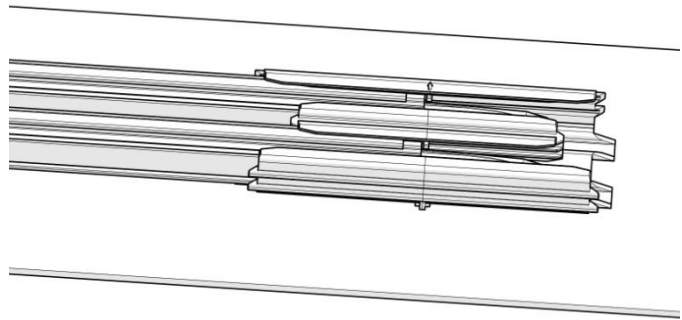


Fig. 35: Connector cap, pushed onto the conductor rail

- Clip the next conductor rail into the hanger clamp (see Fig. 22).
→ Align the conductor bars to be flush with the insulation profile.

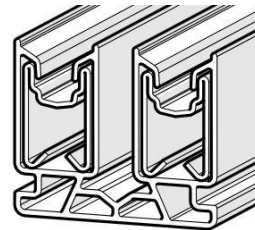


Fig. 36: Power rails flush with insulation profile

- Push the insulation profile (2) into the connector cap (1).

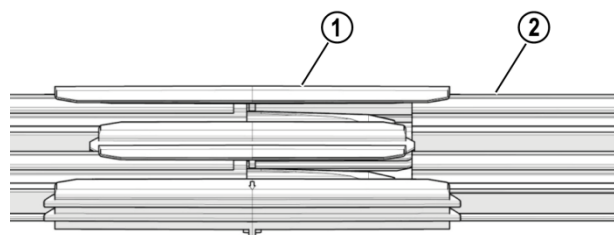


Fig. 37: Pushing in the insulation profile

Conductor rail system

MultiLine 0835

- Hold the installation block at against the open end of the conductor rail.
- Drive the 2nd conductor rail onto the connector up to stop with the plastic hammer.

CAUTION!

- The conductor bars must not be seamlessly connected to each other. Drive the conductor bar only up to the stop of the connector pins (see Fig. 34), leaving a gap of approx. 2.5 mm (see Fig. 39).
- Repeat the process until the rail has reached the projected length minus the two last rail segments (which corresponds to a gap of approx. 4 to 8 mm).
- Check whether 1 or 2 conductor bars and insulation profiles have to be shortened in order to achieve the projected length, see section 6.2.5
- If only the last power rail has to be shortened, it will be necessary to fit an additional standard conductor rail (4m).

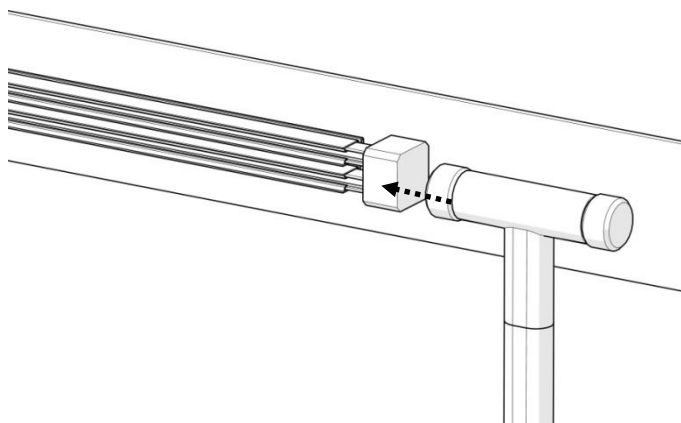


Fig. 38: Insert the installation block and drive the rail onto the connector

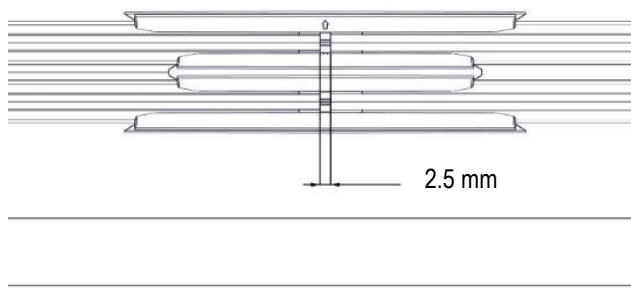


Fig. 39: Gap at connector



Use the QR code ("click" or "scan"), to watch our animation
Mounting and Connecting Conductor Rails.

Conductor rail system

MultiLine 0835

5. Cutting the rail sections in front of the end segment to size.



The rail sections have to be at least 300 mm long!

See section 6.2.5 for information on adjusting the rails' length.

CAUTION!

- Determine the length of the rail sections or rail section to be fitted, see section 6.2.5
- Align the conductor bars and insulation profile to be flush with one another at one end.

NOTE!

The conductor rail expands when the temperature rises. Please provide ≥ 200 mm of free space at the end.

- The conductor bar must be protruding 15 mm from the insulation profile at the other end. Measure the required protruding section of rail from the end of the conductor bar, mark and cut to size. This means that, with a single cut, the conductor bar will have been shortened to the required size and have a shorter insulation profile (extra space for expansion).
- Carefully deburr the insulation profile and conductor bar.

CAUTION!

- If the conductor bar has not or not been properly deburred, the sliding contact will wear very heavily at this point.
- Fit the right rail section with the connector and connector cap.

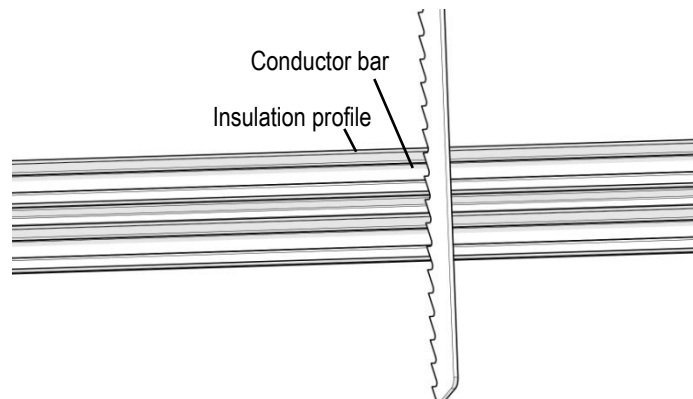


Fig. 40: Cut the conductor rail to size



Use the QR code ("click" or "scan"), to watch our animation **Cutting the Conductor Rail.**

Mounting Instruction



Conductor rail system

MultiLine 0835

6. Mount end segment at rail end (without anchor point).

- Mount the last connector and connector cap described at page 46.
- Slide the power feed terminals into the conductor bar of the already mounted conductor rail.
- Slide the end caps over the power feed terminals.
- Tighten the cylinder screw on the power feed terminals. Tightening torque: **2 Nm**

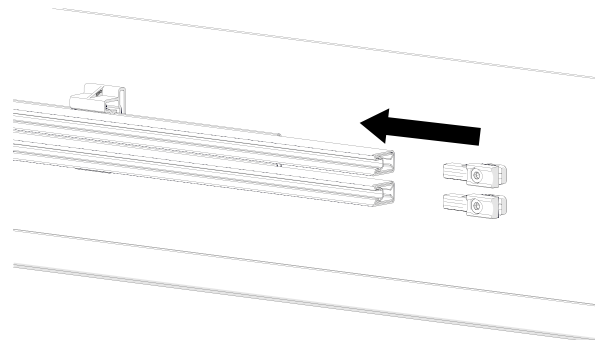


Fig. 41: Slide the power feed terminals into conductor bar

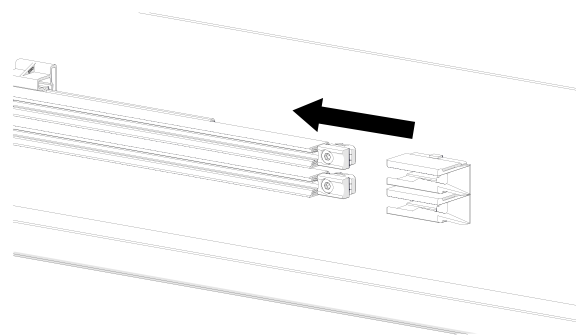


Fig. 42: Slide end caps into power feed terminals

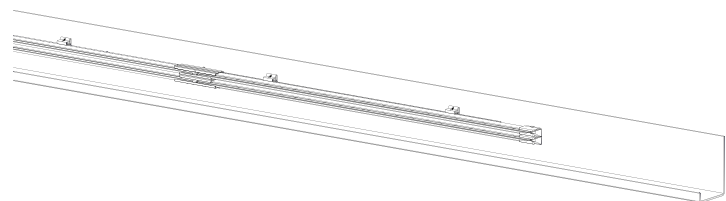


Fig. 43: Conductor rail is completely mounted



Use the QR code ("click" or "scan"), to watch our animation
Mounting the End Segment.

Mounting Instruction



Conductor rail system MultiLine 0835

7. Removing the arrester.

- Check whether all of the components have been properly fitted.
- Remove the arrester at the start of the system.

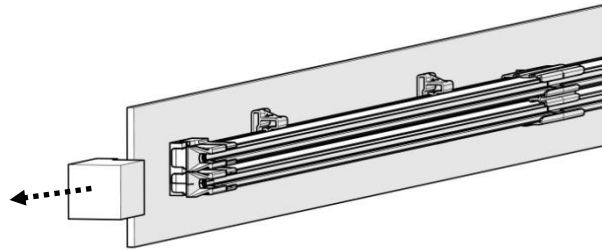


Fig. 44: Removing the stop

8. Aligning the current collectors.

- Aligning the current collectors, see Fig. 45

CAUTION!

- The current collectors must be able to move freely in order to maintain the best possible level of contact with the conductor bar.
- The connecting cables must not pull on, press against or cause the current collectors to twist (see section 4.2).

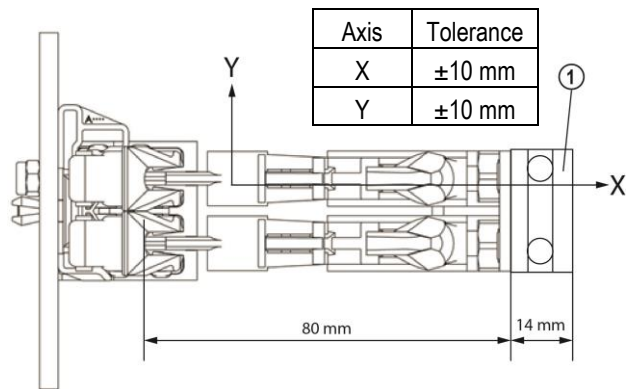


Fig. 45: Aligning the current collectors (viewed from the front)

1 = strain relief

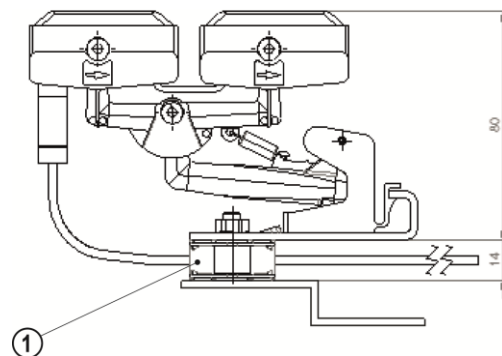


Fig. 46: Dimensions in the direction of the X-axis, with strain relief (side view)



Use the QR code (“click“ or “scan“), to watch our animation **Current Collector Tolerances.**

6.2.8 Installation instructions for systems with rail segment and/or end segment power feeds

If there is a need for an intermediate power feed at the start of a lane in addition or as an alternative to the standard power feed, the lane must be divided accordingly.

Example:

If an 83 m long lane is to be fitted with an end segment power feed and an additional power feed in the middle of the lane, the lane has to be divided as follows:

→ Divide the lane into 2 sections containing one conductor bar and final segment of 750 mm at their ends each.

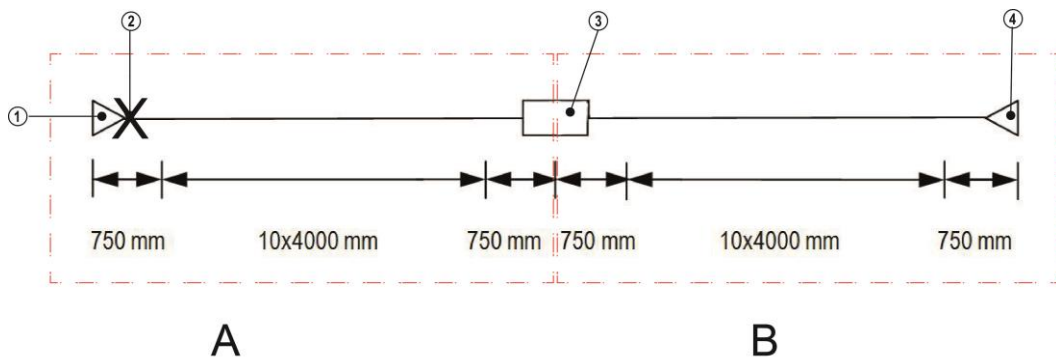


Fig. 47: 83 m shuttle lane with extra power feed

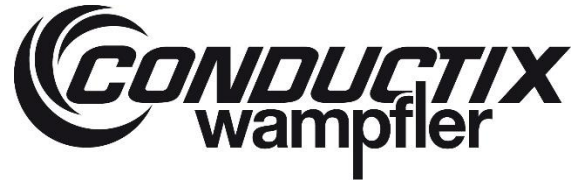
Item	Name
1	Profile end feed
2	Fixed point
3	Section power feed
4	End section

A = 1st section

B = 2nd section

→ Replace the end cap on the end section of the 1st section A and the start segment of the 2nd section incl. the clamping part with 2x intermediate power feeds 081551-....

Mounting Instruction



Conductor rail system

MultiLine 0835

i
CAUTION!

When replacing the end caps with intermediate power feeds, the conductor rail will become approx. 40 mm shorter.

→ The 1st section must be installed as described in section 6.2.

i
CAUTION!

Do **not** fit the end caps on the final segment. The end caps on the end cover plate are replaced with power feed connectors and caps after installation of the second section.

→ To install the 2. section, replace the arrester with screw clamps from the start of the 1. section to the start of the 2. section.

i
CAUTION!

Fit section 2 in the same way as section 1.

→ Remove the arrester with the screw clamp once the 2nd section and end section has been fitted.

→ Connect both sections with the intermediate power feed 081551_....

Installing the intermediate power feed 081551_...

The two sections must be connected as follows:

→ Unclip the conductor rail from the hanger clamps for 1 - 2 m to the left and right of the connection point.

→ Loosely connect the connecting cable's ring terminal with the power feed's screw connection:

- Remove square nut
- Attach ring terminal
- Loosely tighten nut by hand

→ Insert the clamping parts of the two power feeds into the end of the end section of section 1.

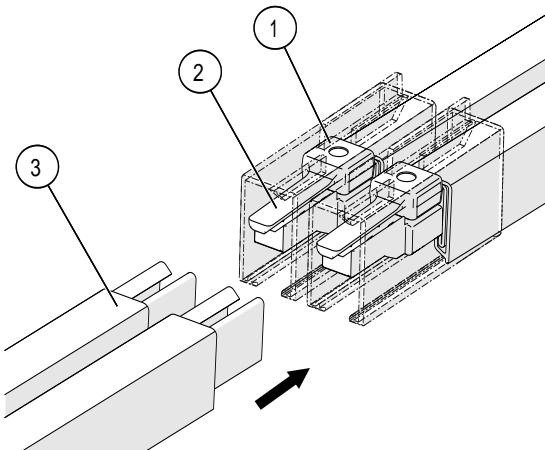


Fig. 48: Move conductor rail

Item	Name
1	Connector
2	Clamp wing
3	Conductor rail

Mounting Instruction

Conductor rail system

MultiLine 0835

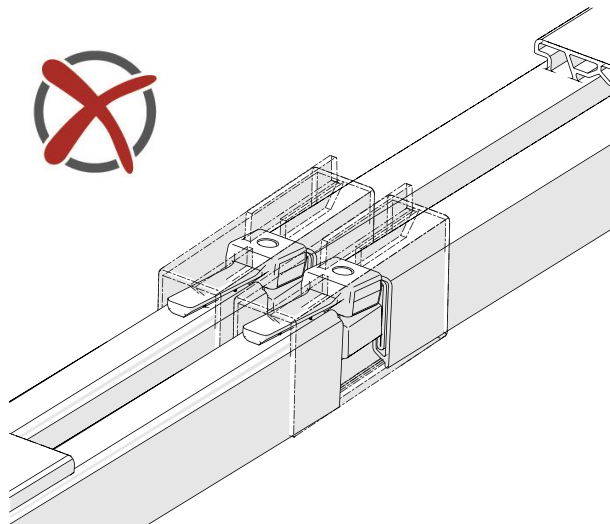


Fig. 49: Wrong: Clamp wing is not between the conductor rail and the insulation

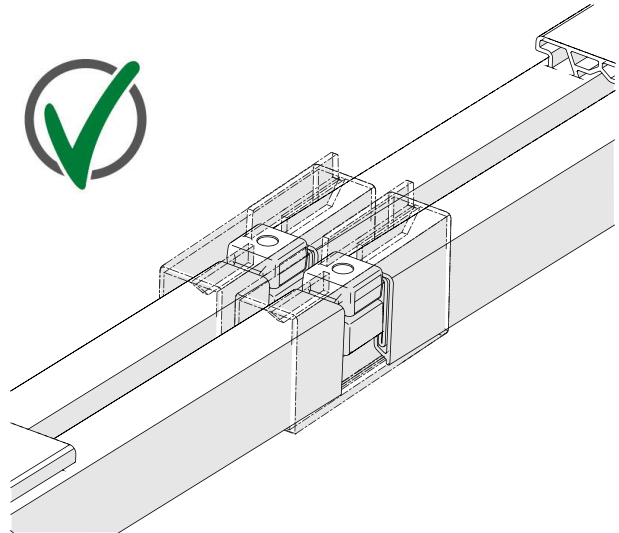


Fig. 50: Right: Clamp wing is between the conductor rail and the insulation



WARNING!

The clamp wings have to be located between the conductor rail and insulation!

The clamp wing must not be located **behind** the insulation.

→ Insert the rail of the 2nd section into the power feeds.

i CAUTION!

It might be necessary for a 2nd person to push against the back end of the 2nd section.

→ Attach the connector cap at the back and clip it into the yellow insulation profile.

→ Tighten the clamping screws of the two power feeds with an Allen wrench. Tightening torque: **2 Nm**

→ Clip the conductor rail into the hanger clamps.

i NOTE!

The conductor rail system Multiline 0835 is compatible with the Conductix-Wampfler Single FlexLine 0815 range. The components for the additional power feed are components from the 0815 range.

Mounting Instruction



Conductor rail system

MultiLine 0835



NOTE!

Additional power feeds are used in order to reduce the voltage drop. Moving the power feed into the centre of the conductor rail system or using several power feeds will reduce the conductor rail's effective length.



CAUTION!

The conductor rail system (conductor and insulation) expands at different rates when it becomes warm!

It must also be taken into account that the length of a lane is also limited by the resulting voltage drop. The expansion will be absorbed by the system, which is able to compensate for this up to a maximum lane length of 150 m and a temperature difference of 25 K

Conductor rail system

MultiLine 0835

7 Commissioning

7.1 Safety

Personnel:

- The conductor rail system must only be commissioned and operated for the first time after a repair by qualified electricians!
- These qualified electricians have to meet the requirements described in section 2.2.1.

Required protective equipment:



Requirement:



WARNING!

Risk of injury due to improper commissioning!

Improperly performed commissioning can lead to dangerous situations for personnel.

- Before commissioning, carry out the inspections on the inspection list of the manufacturer.
- Always measure the insulation resistance before commissioning the system. This must be done in compliance with the local technical standards, guidelines and legislation
- Always make sure that all of the assembly and installation work has been fully completed before commissioning the system
- Always make sure that all of the components have been properly installed before commissioning the system



CAUTION!

Before working on these components!

- **Disconnect the conductor rail system** from the power supply according to the 5 safety rules **and secure it against being switched back on.** For the 5 safety rules, see section 2.6




CAUTION!

Before switching the system on!

- Every time before the device or system is started, measure the insulation resistance according to locally applicable technical standards, directives and legal regulations.
- Perform the required country-specific electrical tests

Conductor rail system

MultiLine 0835

 WARNING!	<p>Risk of fire!</p> <p>A fire hazard can occur due to overloads of the cable, electrical arcing, or short-circuits.</p> <ul style="list-style-type: none"> → The permitted current values must be observed → Electrical fuses must be installed according to regulations → Warn against misuse → Do not store easily combustible materials near to conductor rails
--	--

7.2 Testing and initial commissioning

7.2.1 Inspection list

Warning! Disconnect the system from the **power supply** before testing!

Check	Checked
Installation height as per specifications (see section 3)	
Components must be clean and in perfect working order	
The clearance of the rail joints (2.5 mm + 1 mm on each side) (visual inspection)	
Distance of the current collector as per specifications	
The intervals at which the hanger clamp are fitted (see section 4.4)	
Have the end caps been fitted correctly and to the first and end section?	
Has an end cap base (fastening point) been fitted to the start as opposed to the end of the conductor rail?	
Are the insulation profiles properly clipped into all of the hanger clamps?	
Is the power feed properly connected?	
Are all screws tightened to the specified torque?	
Has the stop been removed?	
Is the operating area tidy (no parts or tools)?	
Has the operating personnel been trained?	

.....
Date

.....
Signature

Conductor rail system

MultiLine 0835

7.2.2 Initial commissioning

1. Every time before the device or system is started, measure the insulation resistance according to locally applicable technical standards, directives and legal regulations.
2. Carry out locally required electrical tests.

→ Move a loose current collector over every pole of the conductor rail system and check for freedom of motion.

→ The current collector may not stick and must slide in the rail without hindrance

i
NOTE!

The current collectors must not become caught, stick or scrape against anything.
Where necessary, repair any faults.

3. Let the conductor rail run for a full cycle in automatic mode (walking speed).
4. Check the current collectors' connecting cables.

i
NOTE!

The connecting cables must not pull on, press against or cause the current collectors to twist.

Conductor rail system

MultiLine 0835

8 Operation

Installing and commissioning the conductor rail means that all of the other work required on the conductor rail will be performed as part of the system's maintenance, see section 9.

The only operations required to operate the conductor rail system are switching the power supply on and off to stop/activate the system, see section 8.3.

The safety information in section 8.1 has to be observed to ensure the system's safety during operation.

8.1 Safety

8.1.1 Personnel



The system must only be operated by trained personnel!

Required protective equipment:

For all work, always wear (see section 2.3):



For special tasks, wear (see section 2.3):



8.1.2 Safety instructions



Danger for unauthorized personnel!

Unauthorized personnel are not familiar with the hazards in the working area.

- Keep unauthorized personnel out of the working area
- In case of doubt, address the person and direct them away from the working area
- Stop work as long as unauthorized personnel is in the working area

Conductor rail system

MultiLine 0835

Requirement:



DANGER!

Risk of injury due to entrapment!

There is a risk of being trapped by moving parts when the system is in operation. Moving parts include, e.g. the shuttle and the current connectors fitted to it.

- Do not enter the system's danger zone during operation
- Always **disconnect the conductor rail system from the power supply** according to the 5 safety rules and **secure it against being switched back** on before working on the conductor rail system. For the 5 safety rules, see section 2.6
- Wear close fitting working clothes

In order to observe the **most important safety measures**, the **appropriate operating conditions** specified in section 3.3.1 and the following sections have to be observed.



DANGER!

Risk of injuries from falling conductor rails!

The following and similar substances can cause the conductor rails' holders to fail and cause the conductor rail to fall down if they are kept near the conductor rail system:

- Food that contains and from which aromatic compounds evaporate
 - Coating compounds and varnishes
 - Separating agents or coolants and lubricants
- Do not store any of the above or similar substances near the conductor rails.



DANGER!

Do not energize the conductor rail!

The conductor rail must not be energized under the following conditions:

- If the conductor rail is very dirty
 - If the conductor rail becomes wet
 - When live components are exposed (insulation profile or the insulation of the connecting cable are damaged)
 - If the hanger clamp or insulation profile fail
 - If the power rail falls down and contacts a conductive material
- Secure the electric system according to regulations
- Install the conductor rail as described in the mounting instruction
- Take environmental conditions into account, perform regular checks, maintain and clean as detailed in the instructions
- The conductor rail must be regularly inspected and, if necessary, repaired.

Conductor rail system

MultiLine 0835



DANGER!

Fire hazard due to overload or spark formation!

A fire hazard can occur due to overloads of the cable, electrical arcing, short-circuits or the generation of sparks. Sparks can occur due to badly maintained, dirty conductor rails or because required tolerances are not observed during installation.

- The permitted current values must be observed
- The tolerances must be observed during installation
- Electrical fuses must be installed according to regulations
- Do not store easily combustible materials near to conductor rails
- Conductor rails must be regularly inspected, maintained and cleaned in conformity with the regulations. See section 12.3

8.2 Normal operation

The conductor rail system 0835 is designed for use in indoor facilities in which track-guided mobile consumers (shuttles) have to be supplied with energy. The consumer travels back and forth (reverses) and operates automatically.

8.3 Stopping the system

Requirement:



DANGER!

Risk of injury from electric shock!

- **Disconnect the conductor rail system** from the power supply according to the 5 safety rules **and secure it against being switched back on**. For the 5 safety rules, see section 2.6

8.4 Continuing operation



WARNING!

Risk of injury if safety equipment is switched off!

- Before switching the system back on, make sure that all covers and safety systems are installed and working properly

Before switching the system back on, make sure that:

- The current collector's sliding contact is resting on the conductor rail along its full length. E.g. push the shuttle into the conductor rail
- There is no coarse dirt or objects in the conductor rails
 - Visually inspect the system
- The insulation resistance corresponds to the applicable technical guidelines
 - Every time before the device or system is started, measure the insulation resistance according to locally applicable technical standards, directives and legal regulations.

9 Servicing and maintenance

9.1 Safety



NOTE!

The system must only be serviced and maintained by specialist personnel!

Requirement:



Required protective equipment:



DANGER!

Risk of sensitization, irritations of the mucous membranes and disorders of the respiratory tract through dust!

Dust from the carbon brushes collects in the conductor rails and the guide profile. This dust is very fine and is categorized as a health risk. Working a lot with the conductor rail system and/or not applying the requisite level of care when handling accumulated dust (e.g. cleaning the system with compressed air) can lead to sensitization. People that frequently spend long periods of time inside a busy facility without protective equipment may be affected by the **following**:

- Irritation of the mucous membranes
 - Diseases of the respiratory tract
 - Cancer
- At workplaces that are continuously exposed, and also strongly frequented facilities, personnel must be protected through effective measures against dust
- Personal protective equipment must be worn during all works on the conductor rail system during which collected dust is disturbed
- The following personal protective equipment must be worn during cleaning operations:
- Safety goggles
 - Dust mask class FFP3
 - Gloves
 - Disposable overall
- Before starting work, clean the conductor rails according to regulations. See section 12.3
- Protect the surroundings during cleaning works, for instance by covering or removing warehouse goods and blocking access to those areas in which dust could fall down on persons
- Remove dust with a vacuum cleaner. **Do not blow out dust with compressed air** Vacuum cleaners should be fitted with a class H fine filter
- Do not eat and/or drink while cleaning!
- Do not smoke while cleaning!

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DANGER!

Risk of death by electrocution!

The following hazard zone in particular also requires special care in addition to the power feed and power rail:

- When using dual current collectors, one of the sliding contacts, which will be live might stick out of the end. Touching this sliding contact might cause injury from an electric shock, as a result of falling or being thrown some distance across the room.



CAUTION!

Take the requisite measures to prevent this risk!

- Fit a contact guard that will safely cover the sliding contact if it sticks out of the conductor rail!



CAUTION!

Alert personnel to the hazard!

- Attach a sign saying "Risk of death by electrocution" with the relevant hazard symbol in all areas with live components



CAUTION!

Before working on these components!

- **Disconnect the conductor rail system** from the power supply according to the 5 safety rules **and secure it against being switched back on**. For the 5 safety rules, see section 2.6



CAUTION!

Before switching the system on!

- Always test the insulation resistance according to locally applicable technical standards, directives, and law every time before the device or system is started.
- Perform the required country-specific electrical tests



WARNING!

Risk of injury due to improperly performed maintenance work!

Improper maintenance can result in serious injury to person and property. Loosely stacked or components and tools that are left lying around are a source of danger. They are a trip hazards and improperly stored components can fall over or fall to the ground.

- Before starting work, make sure there is sufficient space for assembly
- Make sure the installation area is tidy and clean!
- If components have been removed, be careful to reinstall them properly, replace all fastening elements and comply with the screw tightening torques (see section 6.2.7)



WARNING!

Risk of injury if safety equipment is switched off!

- Never switch off safety equipment

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Performing maintenance work on the current collectors



DANGER!

Risk of injury from crushing and impacts!

There is a risk of crushing skin and limbs from:

- Current collectors (spring force) during installation, deinstallation and maintenance
- Falling conductor rail system components if they have not been installed properly or if operated in inappropriate operating conditions (e.g. environment that contains solvents)
- Moving parts when the system is in operation

- Do not enter the system's danger zone during operation
- Installation work must only be carried out by trained personnel
- When working on the conductor rail system, protective footwear, protective gloves and protective headgear must be worn
- When exchanging sliding contacts, observe the separate instructions on this topic. See section 12.3
- The conductor rail system must only be installed in locations with appropriate operating conditions. See section 3.3.1

Replacing conductor rails

Required protective equipment:



DANGER!

Risk of injury from cuts and cutting!

The ends of the conductor bar can have sharp edges, especially if they were cut to size at the construction site and have not been deburred.

- Wear protective gloves and protective footwear.
- During installation: Carefully deburr the insulation profile and the conductor bar after they have been cut to size
- During disassembly: Cut, dismantled conductor rails must be handled carefully and properly stored (container or transport box)
- Lookout for sharp edges near the installation surface and avoid contact

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9.2 Tools and materials

The maintenance work on the conductor rail must be performed using commercially available metric tools.

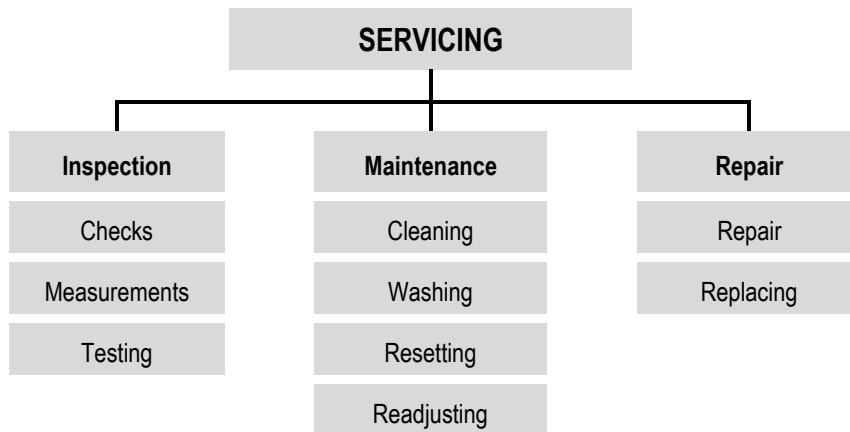
Maintenance work	Tool
Measuring the height of the carbon brushes	Calliper
Measuring the contact force of the carbon brushes	Spring balance with a measuring range of 0 to 20 N

9.3 Cleaning

See document WV0800-0001, "Cleaning conductor rails".

9.4 Servicing schedule

The following tasks fall under the category "Servicing":



The following sections describe the servicing work required for optimal and trouble-free operation. The tasks specified and performed as per the maintenance plan must be documented in a record.

If regular inspections reveal increased wear, the corresponding servicing intervals should be shortened in accordance with the actual signs of wear.

Contact the manufacturer in case of any questions regarding servicing tasks and intervals - see the customer service address on the last page.

The operator must organize the following maintenance measures on their own in order to preserve the warranty and for general prevention of damage.

- Inspection, maintenance, and repair work must only be carried out by trained, qualified technicians!
- Inspection, maintenance, and repair measures must always be documented!

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Required protective equipment:



DANGER!

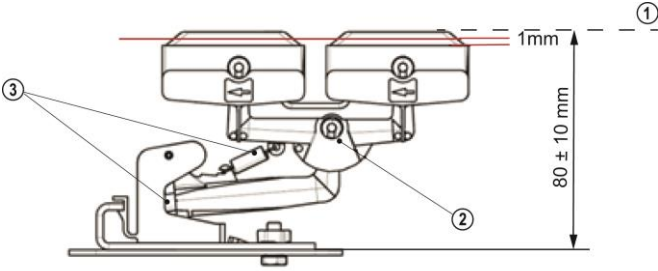
Risk of sensitization, irritations of the mucous membranes and disorders of the respiratory tract through dust!

Dust from the carbon brushes collects in the conductor rails and the guide profile. This dust is very fine and is categorized as a health risk. Working a lot with the conductor rail system and/or not applying the requisite level of care when handling accumulated dust (e.g. cleaning the system with compressed air) can lead to sensitization. People that frequently spend long periods of time inside a busy facility without protective equipment may be affected by the **following**:

- Irritation of the mucous membranes
 - Diseases of the respiratory tract
 - Cancer
- At workplaces that are continuously exposed, and also strongly frequented facilities, personnel must be protected through effective measures against dust
- Personal protective equipment must be worn during all works on the conductor rail system during which collected dust is disturbed
- The following personal protective equipment must be worn during cleaning operations:
- Safety goggles
 - Dust mask class FFP3
 - Gloves
 - Disposable overall
- Before starting work, clean the conductor rails according to regulations. See section 12.3
- Protect the surroundings during cleaning works, for instance by covering or removing warehouse goods and blocking access to those areas in which dust could fall down on persons
- Remove dust with a vacuum cleaner. **Do not blow out dust with compressed air** Vacuum cleaners should be fitted with a class H fine filter
- Do not eat and/or drink while cleaning!
- Do not smoke while cleaning!

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Interval	Servicing task	To be performed by								
Daily	Visual inspection ■ Is there any coarse dirt or objects in the conductor rail?	Operator								
4 weeks after commissioning Thereafter: Every 3 months	<p>Visual inspection:</p> <ul style="list-style-type: none"> ■ Check whether the contact areas of the sliding contacts are worn out → If the wear limit of 1 mm (ratio between sliding contact insulation and sliding contact) has been reached or exceeded, replace the current collector  <p><i>Fig. 51: Sliding contact wear limit</i></p> <table border="1" data-bbox="411 1093 1046 1249"> <thead> <tr> <th>Item</th> <th>Name</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Conductor surface of the conductor rails</td> </tr> <tr> <td>2</td> <td>Middle joint</td> </tr> <tr> <td>3</td> <td>Spring</td> </tr> </tbody> </table> <ul style="list-style-type: none"> ■ Check the sliding contact insulation for cracks and abrasion. → If the insulation is damaged and the sliding contact is visible or the sliding contact insulation has cracks, replace the current collector ■ Check the insulation for wear, dirt and burn marks → If necessary, clean insulation profile or repair defect. ■ Make sure that there are no constrictions inside the individual poles of the insulation profile (dust or stuck on dirt). → Clean the insulation profile with a vacuum cleaner or brush or replace ■ Make sure that the insulation is not affected by foreign matter (shavings, fluids, contamination, etc.) (risk of short circuit). → Clean or, if it is not possible to fully restore the insulating properties, replace components. 	Item	Name	1	Conductor surface of the conductor rails	2	Middle joint	3	Spring	Technician
Item	Name									
1	Conductor surface of the conductor rails									
2	Middle joint									
3	Spring									

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<p>Functional inspection:</p> <ul style="list-style-type: none">→ Check for presence of springs→ Check for correct installation height of the current collector 80 ± 10 mm (see Fig. 51)→ Change the fastening position if it is not correct→ If the fastening position of the current collector is correct, the required contact force is being exerted. However, if measurement of the contact force is required, the following steps must be followed: Attach a suitable spring balance to the current collector arm as close as possible to the middle joint of the two current collector heads. Pull the current collector head vertically away from the conductor bar with the spring balance. Reading the measured value: Check the value measured by the spring balance when the sliding contact lifts off the sliding surface! The contact force has to be 9 ± 0.5 N! <ul style="list-style-type: none">■ Check ease of motion of each individual arm of the current collector→ Clean or completely replace the current collector if necessary■ Check the lift and lateral tolerance of the current collector against the conductor rail→ Correct the fastening position if necessary→ Clean the insulation profile or repair damaged places if necessary	Technician
---	------------

10 Repairing faults

Requirement:



WARNING!

Risk of injury from incorrect fault repair!

Incorrect fault repairs can result in serious injury to person and property.

- Contact the manufacturer in case of faults
- Faults must only be repaired by personnel from or authorized by the manufacturer.

The faults that, to Conductix-Wampfler's best knowledge, tend to arise are listed in the following table together with their corresponding remedial measures.

i

NOTE!

Faults must only be repaired by qualified personnel!

Required protective equipment:



DANGER!

Risk of sensitization, irritations of the mucous membranes and disorders of the respiratory tract through dust!

Dust from the carbon brushes collects in the conductor rails and the guide profile. This dust is very fine and is categorized as a health risk. Working a lot with the conductor rail system and/or not applying the requisite level of care when handling accumulated dust (e.g. cleaning the system with compressed air) can lead to sensitization. People that frequently spend long periods of time inside a busy facility without protective equipment may be affected by the **following**:

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- Cancer
- At workplaces that are continuously exposed, and also strongly frequented facilities, personnel must be protected through effective measures against dust
- Personal protective equipment must be worn during all works on the conductor rail system during which collected dust is disturbed
- The following personal protective equipment must be worn during cleaning operations:
 - Safety goggles
 - Dust mask class FFP3
 - Gloves
 - Disposable overall
- Before starting work, clean the conductor rails according to regulations. See section 12.3

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- Protect the surroundings during cleaning works, for instance by covering or removing warehouse goods and blocking access to those areas in which dust could fall down on persons
- Remove dust with a vacuum cleaner. **Do not blow out dust with compressed air.** Vacuum cleaners should be fitted with a class H fine filter
- Do not eat and/or drink while cleaning!
- Do not smoke while cleaning!

Required protective equipment:



DANGER!

Risk of death by electrocution!

Contact with components carrying electrical power can lead to death by electrocution or severe injury. There is also a risk of injury from shock, falling or being thrown across the room as a result of an electrical shock.

Work on the following components is dangerous:

- Main power supply
- Live components:
 - Power feeds
 - Cables
 - Connections
 - Conductor rail
 - Connectors
 - Current collector
 - Equipment and connections inside switching cabinets
 - Control systems etc.
- Components that have become electrically charged due to a fault



CAUTION!

Before working on these components!

- **Disconnect the conductor rail system** from the power supply according to the 5 safety rules **and secure it against being switched back on.** For the 5 safety rules, see section 2.6



CAUTION!

Before switching the system on!

- Every time before the device or system is started, measure the insulation resistance according to locally applicable technical standards, directives and legal regulations.
- Perform the required country-specific electrical tests



CAUTION!

Alert personnel to the hazard!

- Attach a sign saying "Risk of death by electrocution" with the relevant hazard symbol in all areas with live components

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CAUTION!

Take the requisite measures to prevent this risk!

→ Fit a contact guard that will safely cover the sliding contact if it sticks out of the conductor rail!

10.1 Fault remedy table

Fault	Cause	Corrective measures
The sliding contacts show uneven wear.	The current collector heads' range of movement is restricted.	Only use original Conductix-Wampller current collectors, check cable position (make sure cables can move freely).
	Contact pressure is too high or low.	Install current collector as specified in Fig. 45; use highly flexible class 6 connecting cables (in accordance with ICE 602228).
The sliding contact insulation on the side has been worn away down to the sliding contact.	If installed horizontally: The current collector's height has not been correctly adjusted.	Replace current collector heads; move the current collector to the correct height (see Fig. 45 and Fig. 46).
Sliding contacts are wearing too fast.	Sharp edges on the power terminal, conductor rails, connections between the conductor rails	Smoothen sharp edges with a file, air file or sanding paper.
	Conductor rails dirty or scorched in places.	Check current values; clean rails as specified in maintenance instruction WV0800-0001; if necessary, replace conductor rails.
	Contact pressure too high.	Install current collector as specified in Fig. 45.
The power supply gets interrupted, the contact is disrupted.	End segment and power terminal are not properly connected.	Tighten all screws to the specified torque, see 6.2.5; If necessary, crimp and install crimp-type socket again, see 6.2.5
	Current collector not properly connected.	Install current collector as specified in Fig. 45; correct connecting cable, replace if necessary
	Contact pressure too low.	Install current collector as specified in Fig. 45.
	Collides with other system components	Check the system's layout, fasten the affected components in such a way that they cannot be collided with, replace damaged components.

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Fault	Cause	Corrective measures
	Abrasive dust has collected at one of the more frequently used transfer points (where the direction of travel is reversed).	Adjust the consumer's movement profile. Move over the end position to push the collected abrasive dust out of the conductor bar.
Insulation profile does not snap into the hanger clamp	Conductor rail has not been properly fitted.	Snap in the insulation profile, check components, replace if necessary
	Use of damaged components.	Replace damaged components.

11 Dismantling and disposal

11.1 Safety

Personnel:

- Must only be performed by trained technicians. At least 2 people

Requirement:



Required protective equipment:



DANGER!

Risk of death by electrocution!

Contact with components carrying electrical power can lead to death by electrocution or severe injury. There is also a risk of injury from shock, falling or being thrown across the room as a result of an electrical shock.

Work on the following components is dangerous:

- Main power supply
- Live components:
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 - Cables
 - Connections
 - Conductor rail
 - Connectors
 - Current collectors
 - Equipment and connections inside switching cabinets
 - Control systems etc.

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Required protective equipment:



DANGER!

Risk of sensitization, irritations of the mucous membranes and disorders of the respiratory tract through dust!

Dust from the carbon brushes collects in the conductor rails and the guide profile. This dust is very fine and is categorized as a health risk. Working a lot with the conductor rail system and/or not applying the requisite level of care when handling accumulated dust (e.g. cleaning the system with compressed air) can lead to sensitization. People that frequently spend long periods of time inside a busy facility without protective equipment may be affected by the **following**:

- Irritation of the mucous membranes
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- Cancer
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- Personal protective equipment must be worn during all works on the conductor rail system during which collected dust is disturbed
- The following personal protective equipment must be worn during cleaning operations:
 - Safety goggles
 - Dust mask class FFP3
 - Gloves
 - Disposable overall
- Before starting work, clean the conductor rails according to regulations. See section 12.3
- Protect the surroundings during cleaning works, for instance by covering or removing warehouse goods and blocking access to those areas in which dust could fall down on persons
- Remove dust with a vacuum cleaner. **Do not blow out dust with compressed air.** Vacuum cleaners should be fitted with a class H fine filter
- Do not eat and/or drink while cleaning!
- Do not smoke while cleaning!



CAUTION!

Take the requisite measures to prevent this risk!

- Fit a contact guard that will safely cover the sliding contact if it sticks out of the conductor rail!



CAUTION!

Alert personnel to the hazard!

- Attach a sign saying "Risk of death by electrocution" with the relevant hazard symbol in all areas with live components

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WARNING!

Danger of injury due to improper disassembly!

Residual energy, sharp components, sharp points, and edges on and in the device or the required tools can cause injury.

- Make sure there is sufficient space before starting work
- Handle open, sharp-edged components carefully
- Make sure the work area is tidy and clean!
- Disassemble components properly
- Please contact the manufacturer if there are any questions

11.2 Dismantling

11.2.1 General information on dismantling the system

Once the system is no longer in use, it has to be disassembled and disposed of in an environmentally friendly way.

Before starting disassembly:

- Remove operating and auxiliary materials as well as residual processing material, and dispose of them in an environmentally appropriate manner.



WARNING!

Always beware of hazards due to electric shock, dust that is harmful to health, sharp edges and movable parts!

- Then clean the assemblies and components properly and disassemble them as required by applicable local workplace safety and environmental protection regulations.

11.2.2 Tools needed

- | | |
|------------------------------|------------------|
| ■ Allen wrench | SW 2.5 |
| ■ Allen wrench | SW 3 |
| ■ Spanner | SW 7 |
| ■ Flat head screwdriver | 1.2 x 6.5x150 mm |
| ■ Cutting tool (e.g. jigsaw) | |

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11.2.3 Dismantling the conductor rail



WARNING!

Danger of injury due to improper disassembly!

Residual energy, sharp components, sharp points, and edges on and in the device or the required tools can cause injury.

- Make sure there is sufficient space before starting work
- Handle open, sharp-edged components carefully.
- Make sure the work area is tidy and clean!
- Disassemble components properly
- Please contact the manufacturer if there are any questions

→ Push the screwdriver between the clip of the hanger clamp and the conductor rail and turn

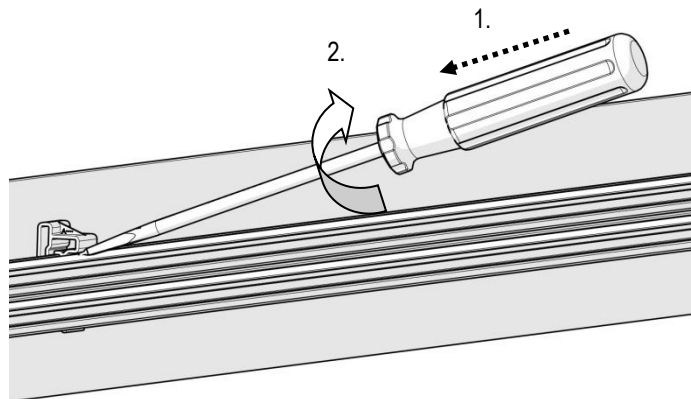


Fig. 52: Disassemble the conductor rails



CAUTION!

Risk of injury when removing the connector!

The connector is very large compared to the insulation profile and the conductor bar and an e.g. saw blade could easily become trapped in it. The saw could also jump and injure the installer.

- When separating the 4-m rail segments, keep at a distance of at least 100 mm from the end of the insulation profile



CAUTION!

Reusing disposable components can give rise to hazards!

Reusing a connector or expanding rivet can give rise to the following hazards:

- The connection is not perfect and reliable
 - Expanding rivet: There is a risk that conductor rails may come loose, become quickly worn or destroyed
 - Connectors: High-resistance connection, heating up, fire hazard due if there are easily flammable materials nearby, drop in performance
- Dispose of disassembled connectors and expanding rivets and replace with new ones. Do not reuse!

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11.3 Disposal

In the absence of a return or disposal agreement, disassembled components must be recycled as follows:

- Metal components must be recycled
- Plastic components must be recycled
- Sort other components by type of material and dispose of accordingly



CAUTION!

Environmental damage due to improper disposal!

Electrical waste, electronic components, lubricants, and other auxiliary materials are subject to hazardous waste disposal regulations and may only be disposed of by authorized specialists.

Local community officials or special disposal companies can provide information about environmentally appropriate disposal.

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12 Additional documents

12.1 Conformity declaration

The conformity declaration for this product can be obtained from Conductix-Wampfler on request.

12.2 Spare parts list

The spare parts are listed in the relevant catalogues.

12.3 Other applicable documents

Order No.:	Document no.	Name of document
1	WV0800-0001	Cleaning conductor rails
2	WV0800-0002	Conductor rail maintenance plan

13 Appendix

13.1 Table with standard lengths

End segment (first section) [mm]	Connector [mm]	Power rail [mm]	Number n (rails + connectors)	Connector n+1 [mm]	End segment [mm]	Std. L minimal [mm]	Std. L max. [mm]
750	2.5	4000	2	2.5	750	9,507.5	9,513.5
			3			13,510.0	13,518.0
			4			17,512.5	17,522.5
			5			21,515.0	21,527.0
			6			25,517.5	25,531.5
			7			29,520.0	29,536.0
			8			33,522.5	33,540.5
			9			37,525.0	37,545.0
			10			41,527.5	41,549.5
			11			45,530.0	45,554.0
			12			49,532.5	49,558.5
			13			53,535.0	53,563.0
			14			57,537.5	57,567.5
			15			61,540.0	61,572.0
			16			65,542.5	65,576.5
			17			69,545.0	69,581.0
			18			73,547.5	73,585.5
			19			77,550.0	77,590.0
			20			81,552.5	81,594.5
			21			85,555.0	85,599.0
			22			89,557.5	89,603.5
			23			93,560.0	93,608.0
			24			97,562.5	97,612.5
			25			101,565.0	101,617.0
			26			105,567.5	105,621.5
			27			109,570.0	109,626.0
			28			113,572.5	113,630.5
			29			117,575.0	117,635.0
			30			121,577.5	121,639.5
			31			125,580.0	125,644.0
			32			129,582.5	129,648.5
			33			133,585.0	133,653.0
			34			137,587.5	137,657.5
			35			141,590.0	141,662.0
			36			145,592.5	145,666.5
			37			149,595.0	149,671.0

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