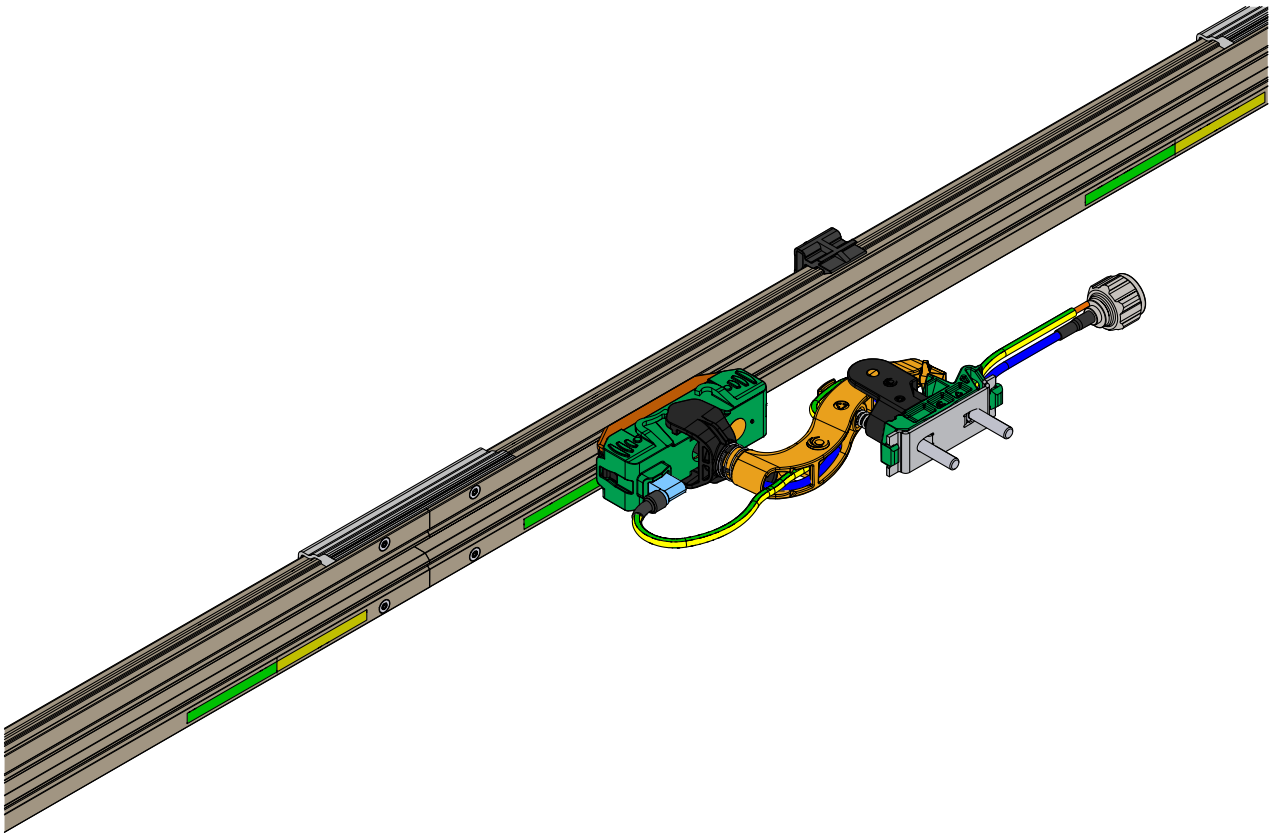
Mounting Instructions

ProfiDAT*compact*
Data Transmission System
Program 0515



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Contents

1 General Information

1.1 About this document

This document facilitates the safe and efficient handling of the ProfiDAT*compact* Data Transmission System.

This document is a component of the system and must be kept accessible to personnel at all times in its immediate vicinity. Personnel must read this document carefully and understand it before starting any work. Compliance with all safety and handling instructions provided in this document is a basic prerequisite for safe working.

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

The illustrations in this document are provided for basic understanding and may deviate from the actual implementation of the system.

In addition to these mounting instructions, the instructions located in the appendices for the individual assembled components also apply.

1.2 Limitation of liability

All data and information in these mounting instructions have been compiled while taking the valid standards and regulations as well as the state-of-the art and our long years of experience and knowledge into consideration.

The manufacturer accepts no liability for damages resulting from:
- Failure to follow these mounting instructions
- Improper use
- Use by untrained personnel
- Unauthorized modifications
- Technical changes
- Use of unauthorized spare parts or 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 equipment has been ordered, or is due to recent technical changes.

The obligations agreed upon in the delivery agreement and our General Terms and Conditions of business apply, as do the delivery conditions of the manufacturer and the legal regulations applicable at the time the contract was concluded.
All products are subject to technical changes and the many years of technical expertise and experiences within the context of improvement of function and further development.

1.3 Copyright

1.4 Spare parts

WARNING!

Incorrect spare parts are a safety hazard!

Incorrect or faulty spare parts can impair safety and result in damage, malfunctions or complete failure.

→ Always use original spare parts from the manufacturer!

Order spare parts from your contracted dealer or directly from the manufacturer.
Contact information: See the last page of this document.
For further documents, see Section 10.

1.5 Material defects

The terms governing material defects can be found in the General Terms and Conditions of Business.

1.6 Technical support

Our Customer Support staff is available for technical support.
Contact information: See the last page of this document.
We are also always interested in new information, experiences and feedback from the field that can help us improve our products.

2 Safety Information

2.1 Explanation of the symbols

Safety information is identified in these mounting instructions using symbols. The safety information is introduced using signal words that indicate the degree of the hazard. Always observe safety information and work carefully to avoid accidents, bodily injury and material damage!

DANGER!

… indicates an immediately hazardous situation, which if not avoided, may result in death or serious injury.

DANGER!

… indicates an immediately hazardous situation due to electricity, which if not avoided, may result in death or serious injury.

WARNING!

… indicates a potentially hazardous situation, which if not avoided, may result in death or serious injury.

WARNING!

… indicates a potentially hazardous situation due to electricity, which if not avoided, may result in death or serious injury.

CAUTION!

… indicates a potentially hazardous situation, which if not avoided, may result in moderate or minor injury.

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

ATTENTION!

::: indicates actions that will help you prevent material damage.

2.2 Personnel requirements

2.2.1 Qualifications

WARNING!

Inadequately trained persons are at risk of injury!

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

→ All activities must only be carried out by qualified personnel.

- Only persons who can be expected to perform their work reliably are acceptable personnel. People whose reactions are impaired by drugs, alcohol or medications, for example, are not authorized.
- When selecting personnel, all age- and occupation-specific regulations applicable at the location of use must be observed.
- The following qualifications are specified in the mounting instructions for certain fields of activity.

- **Trained personnel and 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.
  The operator of the machine or construction must document that the corresponding training has taken place.

- **Specialist personnel**

  Consists of persons capable of performing assigned tasks and independently identifying dangers and avoiding potential hazards based on their specialist training, knowledge and experience as well as their understanding of the applicable standards and regulations.

  Are deemed to be technically qualified if they have successfully completed training as a master electrician, apprentice electrician, electrical engineer or electrical technician. 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 knowledge and skills in the trade required have been tested.

  The machine or construction operator must document that the appropriate certifications or other proofs of qualification have been or are being provided.

2.3 Unauthorized persons

WARNING!

Danger due to unauthorized persons!

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

→ Keep unauthorized persons away from the work area.

→ In case of doubt, address the person and direct them away from the work area.

→ Stop working as long as unauthorized persons are in the work area.

2.3.1 Training

Before commissioning the equipment, personnel must be trained by the operator. Log the implementation of the training for better traceability.

Example of instruction log:

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

2.4 Personal protective equipment

Always wear:

For all tasks:

Protective headgear
For protection against falling or flying parts and materials.

Protective gloves
For the protection of hands against friction, scrapes, puncture or deeper wounds, as well as against contact with hot surfaces.

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

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

To be worn for special tasks

Specific protective equipment is required when conducting special tasks. Separate reference to this is made in the individual sections.

Protective eyewear
For eye protection against harmful influences such as strong light, chemicals, dust, splinters or weather effects.

Hearing protection
For protection against loud noises and to prevent acoustic trauma.

Breathing mask (FFP-3 – according to country-specific requirements)
For protection against materials, particles, and organisms. In this case, for protection against the dust produced by the sliding contacts.

2.5 Intended use

The equipment is exclusively designed and built for the use described here (its intended use).

Intended use
The ProfiDAT*compact* Data Transmission System is used for data communication in indoor industrial applications.
In addition to the ability to transfer data, the ProfiDAT*compact* rail can also be used as a ground conductor rail.

Furthermore, if the positioning strip option was chosen, a strip or matrix bar code tape can be attached to the ProfiDAT*compact* rails that can determine the position of a vehicle with the help of a corresponding reader.

WARNING!

The ProfiDAT*compact* rail must not be used as a phase!

The system includes at least one master and one slave transceiver, as well as a corresponding stationary antenna and a mobile antenna.

Compliance with these technical conditions is mandatory for the installation:

- The permissible maximum travel speed of the collector is 600 m/min.
- The data rail may only be installed horizontally with the insertion from the side

Electrical-technical operating conditions:

- The electrical construction must be protected in accordance with local regulations and guidelines.

2.6 Unintended use

Claims of any kind due to damage incurred during use that deviates from the intended use described above ("use other than the intended use") are excluded.
The operator bears sole liability for all damage that results from unintended use.

WARNING!

Danger due to unintended use!

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

→ Strictly follow all information in these mounting instructions.

→ Refrain from unintended use of the system.

Unintended use particularly includes the following forms of use:

- Operation outside the specified operating conditions (see Section 3.3).
- Use of the data rail for power transmission.
- Use where there is a risk of explosion ("Ex" areas).
- Use of the transceiver without a data rail.
- Use of the data rail without adequate protection.
- Operation in areas that require a higher protection class than IP23.
- Use of the system parallel to a conductor rail system from manufacturers and/or types not approved by Conductix-Wampfler.
- Use of the system with accessories that are not approved and not authorized by the manufacturer.
- Use of the system by untrained personnel.

Environmental conditions

The ProfiDAT*compact* Data Transmission System may **only** be operated under the environmental conditions specified in Section 3.
The ProfiDAT*compact* Data Transmission System may **not** be operated under the following environmental conditions:

- Ambient temperatures below -20 °C and above +55 °C.
- Temperature difference may not exceed 40 K.
- Outdoor areas (natural/solar UV radiation, wind, humidity).
- Installation site at elevations higher than 2000 m above sea level.

2.7 Protective measures by the operator / user

The equipment is designed for use in an industrial setting. The operator of the equipment is therefore subject to compliance with the legal obligations concerning workplace safety. In addition to the safety information in this document, all safety, accident protection and environmental regulations valid in the place of operation of the system must also be observed. This particularly applies to the following:

- Work on electrical components of the system **may only be carried out when disconnected from voltage**.
- The operator must inform theirself of applicable workplace safety guidelines and identify any additional hazards that may arise under the specific working conditions at the location of use of the equipment. This knowledge must be expressed in the form of operating instructions for the operation of the equipment.
- During the entire time the equipment is in use, the operator must check that these operating instructions still correspond to the current state of regulations and adapt them as necessary.
- The operator must clearly regulate and define responsibilities for installation, operation, troubleshooting and maintenance.
- The operator must ensure that all employees involved with the equipment have read and understood these mounting instructions. In addition, the operator must also train the personnel at regular intervals and inform them of dangers.
- The operator must provide personnel with the necessary protective equipment.
- 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 Section2.2.1"Qualifications".
- The operator must observe the following standards, regulations and directives when operating the equipment:

EMC Directive 2014/30/EU including	**EMC Directive**
■ EN 6100-6-2	Interference immunity in industrial areas
■ EN 61000-6-4	Interference emissions for industrial areas
■ EN 61000-3-2	Limit values for harmonic currents
■ EN 61000-3-3	Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage power supply networks for systems with a nominal current of 16 A per conductor that are not subject to special connection requirements
■ EN 62311	Assessment of electrical and electronic equipment with respect to limiting exposure of persons to electromagnetic fields (0 Hz - 300 GHz)

Radio Equipment Directive 2014/53/EC, including	**Radio Equipment**
■ EN 301 489-1 V1.8.1	Protection requirements with regard to EMC
■ EN 301 489-17 V2.2.1	
■ EN 300 328 V1.8.1	Use of the radio frequency spectrum
■ EN 301 893 V1.7.1	
■ EN 300 440-1 V1.6.1	Air interface for radio equipment 2.4–2.4835 GHz; 5.15–6.35 GHz; 5.47–5.725 GHz
Low Voltage Directive 2014/35/EU, including:	**Low Voltage Directive**
■ EN 60529	Types of protection provided by housings (IP Code)

The operator is furthermore responsible for ensuring that the equipment is always in perfect working order.

- The operator must ensure that the service intervals described in these mounting instructions are observed.
- The operator must have all safety systems inspected for functionality and completeness on a regular basis (once annually if possible, but at least as often as required by applicable national regulations).
- If the equipment or construction has been modified, the safety constructions must be inspected again and adapted to the changed conditions so that the equipment or construction is safe again.

2.8 Special risks

The following section lists residual risks determined on the basis of a risk assessment.

→ Follow the safety information and warnings in these mounting instructions to reduce health hazards and to avoid dangerous situations.

2.9 5 Safety Rules for working on electrical constructions

- Work on electrical constructions only when they are disconnected from the power supply. Follow the **5 Safety Rules** before starting work (see DIN VDE 0150-100).
  1. Disconnect the construction from the voltage supply at the main switch.
  2. Secure the main switch against being switched back on.
  3. Verify disconnection from power through measurements.
  4. Ground and short-circuit parts of the construction on which work will be conducted.
  5. Cover or block off adjacent energized parts.
- Only electricians or personnel trained in electrical work may disconnect power or approve reconnection of power after the work is carried out in the disconnected state!

2.9.1 Electrical hazards and sources of danger in combination with a conductor rail

Risk of death due to electrical shock!

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

Burns due to arcing resulting from a short circuit!

DANGER!

Contact with energized components can lead to death or severe injury due to electrical shock. There is also a risk of injury from shock reactions, 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 parts: Power feed, cables, connections, conductor rail, connectors, collectors, equipment and connections within switching cabinets, control systems, etc.
- Parts that have become live due to a fault

Before working on the parts listed above:

→ Switch off the power supply of the conductor rail system according to the 5 Safety Rules and secure it against being switched on again. For the 5 Safety Rules, see Section 2.9.

During work:

→ Use insulated tools

Before switching on:

→ Every time before the equipment or system is started, test the insulation resistance according to locally applicable technical standards, directives and legal regulations.

→ Carry out locally required electrical tests.

Maintain electrical safety:

→ Regularly test and maintain electrical equipment.

→ If dangerous deficiencies are identified, take measures to correct the deficiencies without delay. Inform the construction operator immediately.

→ If it is not possible to correct the dangerous deficiency, cordon off the area involved or switch the equipment off and secure it against being switched on again. Inform the construction operator immediately.

→ Immediately secure loose cables and immediately replace damaged cables.

→ Always replace blown fuses with fuses of the same rating.

Fire hazard due to overload or sparking!

Fire hazards occur due to overloaded cables, electrical arcs, short circuits or sparking. Sparking can occur with poorly serviced, soiled conductor rails or if installation does not comply with the required tolerances.

→ Compliance with permissible current ratings is mandatory.

→ Tolerances must be observed during installation.

→ Install electrical protection as specified.

→ Easily combustible materials may not be stored in close proximity to conductor rails.

→ Check, service and clean conductor rails regularly and as specified. See Sections 8 and 10.

2.9.2 Mechanical hazards and sources of danger in combination with a conductor rail

Risk of injury due to crushing!

Risk of injury due to impacts!

There is a risk of crushing of skin and limbs due to:

- Collector (spring force) during assembly, disassembly and maintenance.
- Falling parts of the conductor rail system after improper installation or in case of unsuitable operating conditions (for example, in areas containing solvents).
- Moving parts (collector), when the construction is in operation.

→ Do not enter the hazardous area of the construction when in operation, except for repair and maintenance tasks.

→ Allow only trained technicians to carry out the installation.

→ When working on the conductor rail system, wear protective footwear, protective gloves and protective headgear.

→ When changing the collectors or sliding contacts, follow Section 8.2 in these mounting instructions.

→ Only install the conductor rail system where suitable operating conditions prevail. See Section 3.3.

Risk of injury due to cutting and amputation!

The ends of data rails and connectors can have sharp edges, particularly if they have been trimmed at the installation site and have not been deburred.

→ Use protective gloves and protective footwear.

→ Deburr the data rail after sawing.

→ Sawed through, dissembled data rails must be handled carefully and properly stored (container or transport box).

→ Be on the lookout for sharp edges near the installation area and avoid contact.

Risk of injury due to falling objects!

The conductor rails, collectors or other components (e.g. antennas), can fall down during operations or during any other works on the system. This can cause severe injuries or fatalities if they fall from great heights.

→ Wear protective headgear.

→ For installation, commissioning, troubleshooting and maintenance: Cordon off the entire danger zone.

→ For decommissioning, disassembly and disposal: Cordon off the entire danger zone. Sawn through, dissembled conductor rails must be handled carefully and properly stored (container or transport box).

Risk of injury due to ensnarement, pulling in and catching!

There is a risk of being ensnared by moving parts when the construction is in operation during installation, commissioning or service. For example, moving parts include the machine and the collectors attached to it.

→ Travel at reduced speed!

→ Before working on the conductor rail, disconnect the conductor rail system according to the 5 Safety Rules and secure it against being switched back on. For the 5 Safety Rules, see Section 2.9.

→ Wear closely fitting work clothing.

2.9.3 Danger from dust and vapors in combination with a conductor rail

Risk of sensitization, mucous membrane irritation and respiratory disease due to dust!

Abrasion from the sliding contacts, data rails and plastic collects in the conductor data rails, the data rail and the support structure. This dust is very fine and is a health hazard. Frequent handling can result in sensitization. Persons who frequently spend longer periods in a heavily used construction without protective equipment must reckon with the **following consequences**:

- Irritations of the mucous membranes
- Respiratory diseases
- Cancer

These consequences must also be expected if accumulations of dust are handled without proper care (e.g. blowing out dust with compressed air).

→ In workplaces with long-term exposure and frequently visited constructions, take effective measures to protect employees from the dust

→ Wear personal protective equipment during all work on the conductor rail system in which collected dust can be stirred up. In particular, wear personal protective equipment when cleaning the system.

- Protective eyewear
- Dust mask, Class FFP3
- Protective gloves
- Disposable coveralls

→ Before starting work, clean the conductor rail in accordance with requirements. There is a special maintenance instruction for this, see Section 10.

→ During cleaning operations, protect the surrounding area, e.g. by covering or removing stored materials and cordoning off areas in which dust could fall down on persons.

→ Do not blow out dust with compressed air, but rather vacuum it away. The vacuum must be equipped with a Class H fine filter.

→ Do not eat, drink or smoke during the work!

Poisonous gases during fire!

In the event of fire in the facility, the plastic parts (PVC) of the conductor rail construction will emit poisonous gases (HCL).

→ The building must be evacuated immediately.

→ Notify the fire department.

2.9.4 Danger in connection with the operational environment in combination with a conductor rail

Danger as a result of environmental influences!

Due to environmental conditions such as flammable dusts/gases, chemical substances, radiation, temperature and contaminants can damage components and cause breakage and falling off. Flammable dusts can cause fires due to sparking.

DANGER!

→ Check influences depending on temperature, exposure time, concentration and interactions.

→ Use in chemical works, galvanizing plants, electroplating plants, composting plants or in warehouses or installations where chemical substances (e.g. aromatics, benzene) are stored or processed must be checked in advance through Conductix-Wampfler.

→ With an installation height of 3 m or more in areas with pedestrian traffic, secure conductor rails against falling down (safety gear).

→ Install and operate the construction according to the ambient conditions that are within the permissible operating conditions.

These characteristics of the conductor rail can create a hazardous situation if the conductor rail is installed in an operational environment with:

- Electrical power
- Sparking
- Dust due to abrasion
- Material composition of the insulating profiles, which release toxic vapors if burned

The **most important measure** to protect against these hazards is to only install the conductor rail system where the **appropriate operating conditions** prevail. See Section 3.3.

The environment of the conductor rail may be exposed to electrical current!

The environment of the conductor rail may be exposed to electrical current under the following circumstances:

- If the conductor rail is severely contaminated or wet.
- If electrically live parts are exposed (insulating profile or the insulation of the connection cable are damaged).
- When the hanger clamps or the insulating profile fail, or if the conductor bar falls down and touches a conductive material.

→ Secure the electrical construction according to specifications.

→ Install the conductor rail according to the corresponding documentation (see Section 10), observe environmental conditions, regularly check, properly maintain and clean.

→ Regularly clean the conductor rail and repair if necessary

Risk of sensitization, mucous membrane irritation and respiratory disease due to dust!

Abrasion from the sliding contacts collects in the conductor data rails, the data rail and the support structure. This dust is very fine and is a health hazard. Possible consequences:

- Irritations of the mucous membranes
- Respiratory diseases
- Cancer

→ For protective measures, see Section 2.9.3.

2.9.5 Unexpected start, unexpected overrun in combination with a conductor rail

Control system failure/fault, software error!

The failure of the data transmission system or a software error can lead to uncontrolled movement of the vehicle.

→ A plausibility check of the signals must be carried out through the customer's superordinate control system.

→ Complete the Start-up Checklist, see Section 6.

Restore the energy feed after failure of the energy supply!

Failure of the energy supply can lead to uncontrolled movements of the system.

→ Initialization of the RAM memory (carried out automatically).

External influences on electrical equipment due to external interference sources!

External interference sources, such as radio or radar, can cause faults in the components and the WLAN network.

→ Only use the manufacturer's data rail (slotted waveguide).

2.9.6 Emergency stop

The ProfiDAT*compact* Data Transmission System does not have its own emergency stop. Suitable safety components must be incorporated to ensure the emergency stop function.
Conductix-Wampfler recommends the use of a PROFIsafe system.

2.9.7 Danger zones

WARNING!

Risk of injury due to moving components!

When the system is operating, severe injuries can result if persons or objects are within the movement range (danger zone!).

→ Do not operate the machine if persons or objects are within the range of motion (danger zone!).

Exception: Repair and maintenance work. The machine may only be run at a reduced speed and with extreme care.

→ Ensure that the machine cannot move in an uncontrolled manner.

→ Do not reach into moving parts.

→ Cordon off the danger zone around the entire construction.

WARNING!

Risk of death due to suspended loads!

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

→ Never walk under suspended loads.

→ Only use authorized lifting gear and lashing components with sufficient load capacity.

→ Ensure that lashing components are properly seated.

→ Do not use torn or worn ropes or straps.

→ Do not attach ropes or straps to sharp corners and edges and do not knot or twist them.

→ Only move loads under supervision.

→ Set down the load before leaving the work area.

CAUTION!

Risk of crushing due to stored energy!

When working on the collector, there is the risk of crushing extremities due to uncontrolled movements as a result of the energy stored in the spring.

→ Pay attention to spring force during all work on the collector. Do not reach between the data rail and the collector.

→ With installation, maintenance and repair: Carefully check the spring force.

2.10 Safety systems

The data transmission system has **no** safety systems. The operation of ProfiDAT*compact* always takes place in connection with the construction in which the ProfiDAT*compact* is installed. Therefore, pay attention to the safety constructions of the respective construction!

WARNING!

Risk of death due to inoperative safety systems!

Safety is only ensured if the safety systems are intact.

→ Before starting work, check that the safety systems are functional and properly installed.

→ Never disable or deactivate safety systems.

2.11 Conduct in the event of accidents and faults

Measures to be taken in the event of accidents:

- Shut down the construction and secure it against unauthorized, unintentional and/or erroneous reactivation.
- Secure the danger zone.
- Remove persons from the danger zone.
- Initiate first aid measures.
- Alert the rescue services.
- Inform responsible parties at the operating site.
- Make access available to rescue vehicles.

Measures in the event of faults:

- Shut down the construction and secure it against unauthorized, unintentional, and/or erroneous reactivation.
- Secure the work area against entry.
- Consult qualified personnel when analyzing the fault.
- Consult authorized personnel for maintenance and repair.
- Check for disconnection from power.
- Remove the equipment and replace it with new equipment.
- Determine the cause of fault and repair the equipment.
- Conductix-Wampfler must be informed immediately if personal injury or material damage can/does occur during breakdowns.

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3 Technical Data

3.1 General information

Specification	Value, Unit
Maximum length of a data rail segment	120 m (with power feed)
data rail length	5000 mm
Outer data rail dimensions (width x height)	21 mm x 37 mm (21 mm x 52 mm)
Pole distances	Depending on the respective parallel mounted conductor rail and the space required
Power supply: ProfiDAT*compact* Transceiver	24 V DC, 4-pole, with screw terminals 48 V DC, PoE (RJ45), (according to IEEE802.3at for Type 1 and IEEE802.3af / typical)
Max. current as a PE rail	400 A (in combination with a conductor rail system with max. 400 A phase current and an ambient temperature of 35 °C)
Maximum data transmission rate	100 Mbps
Maximum travel speed of the mobile antenna / vehicle (straight segment)	600 m/min
Interface	100 Mbps, RJ45
System service life (except wear parts and electrical components)	10 years
Protection class	IP 23 (for collector when inserted)

3.2 Interfaces

3.2.1 Electrical / Electronic

The interfaces to the customer's system are:

- Data interface (for explanation see BAL Transceiver)
- Power supply/control voltage
- Collector
- Grounding (PE)

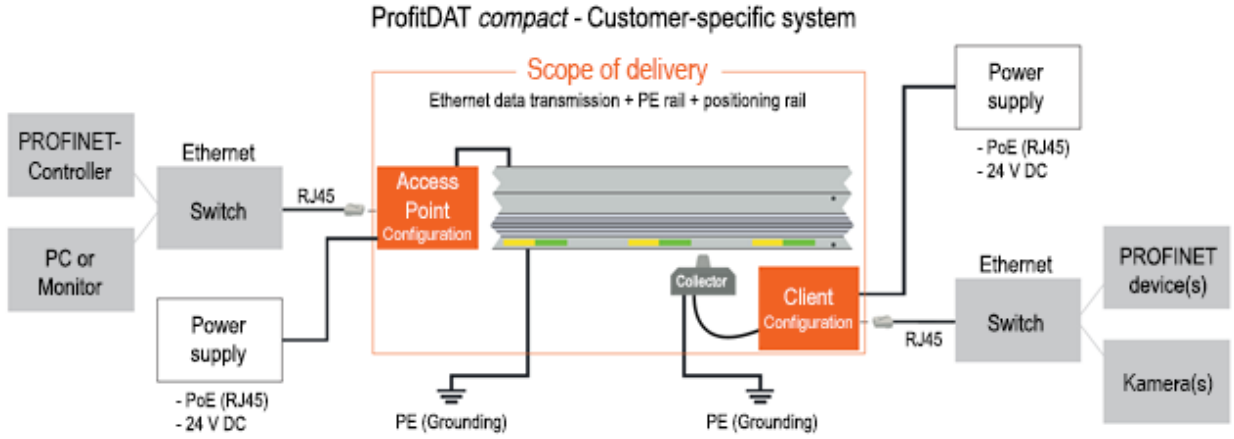


Fig. 1: Overview of ProfiDATcompact interfaces and scope of delivery (simplified)

Collector (including mobile antenna):
The collector head is connected to the on-board electrical system of the mobile consumer of the machine via two flexible cables (HF cable and PE cable). The data cable (HF cable) between the mobile antenna and the transceiver (client) is included in the scope of delivery. The mobile antenna has a 600 mm open-ended power cable installed.
The power cable between the mobile antenna and the consumer must be provided by the customer. The manufacturer/operator of the machine/construction must observe the required conductor cross-sections and when applicable, the design of the power cable and ensure that the power cable is installed flexibly and free of directional forces. The connections are made via screw terminals or plug connectors.

PE interface:
The interface for the customer's ground connection is located at the PE rail connector (see Section 4.3). The PE cable must be connected according to applicable standards.

WARNING!

Risk of injury due to collectors!

Failure to comply with the specified supply voltages for the control can cause a failure in the control and electrical components may be destroyed. As a result, the collector may run jerkily and hit persons or objects.

→ Observe and maintain the specified supply voltages.

→ Keep persons and objects out of the danger zone (see Section 2.9.5).

3.2.2 Mechanical

The interface between the data transmission system and the portable consumer of the machine is:

- Collector

The collector on the data rail fulfills a double function. The collector is guided on the data rail via sliding contacts. The sliding contacts ensure the connection to the ground conductor data rail (data rail), while the data transmission occurs via the built-in mobile antenna in the collector head. The mobile antenna is inserted into the slot of the data rail and is electrically isolated from the sliding contacts.

3.3 Operating conditions

Specification	Value		Notes
Ambient temperature	-20 °C to +55 °C	Conditions: At relative humidity [50 % rel. at +40 °C]	
Temperature difference	75 K		

ATTENTION!

Faults due to incorrect operating conditions!

Operating conditions outside the specified range can lead to malfunctions due to short circuits, premature aging and damage to electrical and mechanical components.

Important parameters are:

- Dust and deposits
- Humidity/condensation
- Cold/hot temperatures
- Corrosion
- Chemical substances

→ The conductor rail system must be switched off if the operating conditions are no longer within the permissible range described above.
→ The conductor rail system must be switched off if it is wet or soiled. Dry or clean as specified (see Section 10 for special maintenance instructions for conductor rail systems).
→ Take the relevant measures to restore suitable operating conditions.

4 Product Description and Functional Principle

4.1 System overview

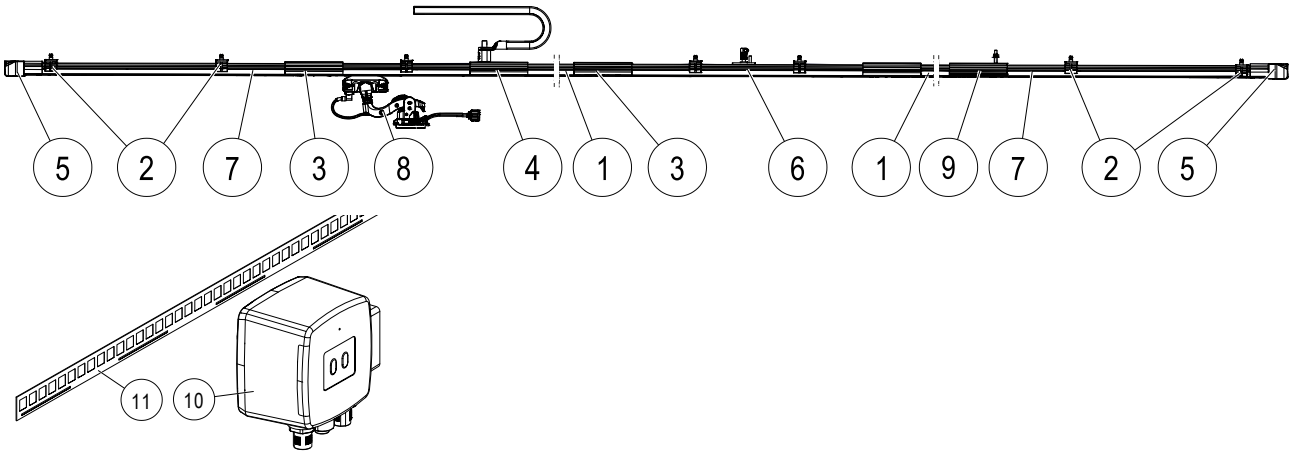


Fig. 2: ProfiDATcompact components in detail

Item	Name
1	Data rail
2	Hanger clamp
3	Connector
4	Ground connection
5	Transfer guide
6	Stationary antenna (power feed)
7	End segment with absorber
8	Mobile antenna (collector)
9	Anchor point
10	Read head for the positioning system (optional)
11	Bar code tape for the positioning system (optional)

4.2 Brief description

The ProfiDAT*compact* Data Transmission System is a system that facilitates the communication between a stationary network and one or more mobile consumers. The mobile consumers move along the guideway in a linear, track-guided manner. The collector follows the movement of the mobile consumer and compensates for guideway deviations between the mobile consumer and the data rail (horizontally and vertically).

The data is coupled with the data rail via the stationary antenna, transmitted to the mobile antenna in the collector head and forwarded to the mobile consumer via a connecting cable on the collector. The collector head of the collector is pressed against the data rail with a permanent contact force (approx. 10 N).

In addition to the data transmission, the ProfiDAT*compact* rail can be simultaneously used as a ground conductor rail and as a positioning system. The positioning system consists of a bar code tape or matrix bar code tape and a read head, which is mounted next to the collector with a mobile antenna.

The system is variable in length. It consists of at least one stationary and one mobile transceiver, the stationary antenna and the mobile antenna. The data rails are attached to the support structure using hanger clamps, which are provided by the customer.

The data rails are mechanically connected using connectors that ensure stability and a secure connection of the data rails. The data is coupled to the data rails by means of a stationary antenna. The data can be continuously received and sent via the mobile antenna.

Examples of applications are:

- Electrified monorail systems (EMS)
- Logistics shuttles
- Packaging machines
- Small parts warehouses

4.3 Components within scope of delivery

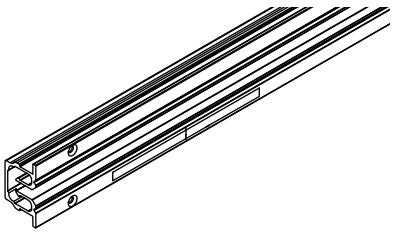


Fig. 3: Data rail without positioning strip

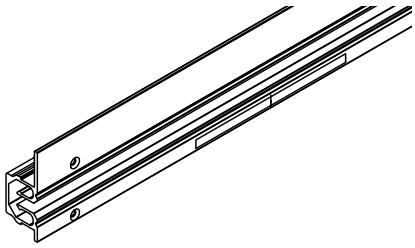


Fig. 4: Data rail with positioning strip (optional)

- **Data rail (slotted waveguide)**

The data rails are used as a data channel. They are electrically conductive and used as a grounding rail (PE rail).

There are two types of data rails:

- without positioning strip (width: 21 mm, height: 37 mm)
- optional with positioning strip (width: 21 mm, height: 52 mm)

The standard length of a data rail is 5 m.
The data rails can also be purchased as bends from Conductix-Wampfler (for more information, see KAT0515-0001).

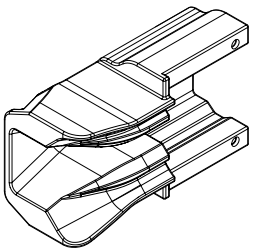


Fig. 5: Plastic transfer guide

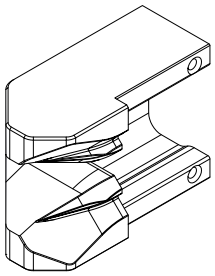


Fig. 6: Aluminium transfer guide

- **Transfer guide**

These serve as insulation termination of the data rail and as a guide for the sliding contacts during a transfer. At a transfer, the current collector is guided from one rail section to the following segment.

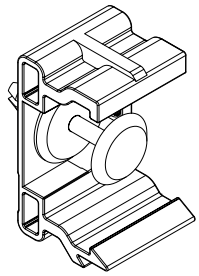


Fig. 7: Hanger clamp

■ **Hanger clamp**

The hanger clamp (see Fig. 7) is fastened to the support structure by means of expanding rivets that are provided by the customer.

There are additional fastening variants for the hanger clamp. The hanger clamp can also be fastened to the support structure with screws (see Fig. 8).

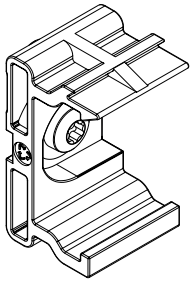


Fig. 8: Hanger clamp with screw fastening

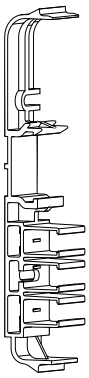


Fig. 9: Exemplary EMS hanger clamp

Project-specific hanger clamps can be developed and produced for the various conductor data rail systems in combination with the data rail (with and without positioning strip), (see Fig. 9).

Project-specific hanger clamps, such as for EMS applications, are typically clipped on or screwed into the EMS traverse beam. In this regard, separate documentation, such as technical drawings, can be requested within the scope of a project.

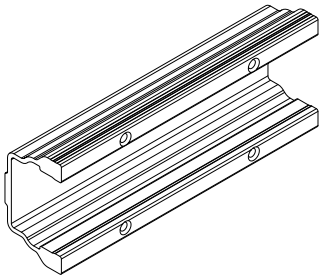


Fig. 10: Connector

■ **Connector**

The connector connects two data rails together and is fastened to the data rails using screws.

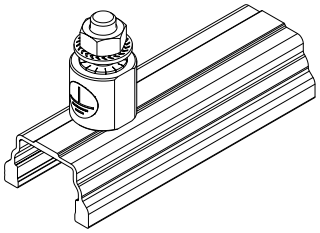


Fig.: 11 Ground connection M8

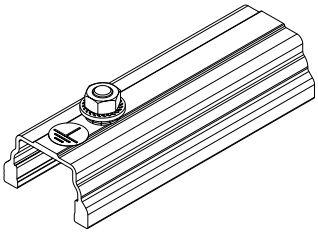


Fig.: 12 Ground connection M6

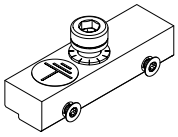
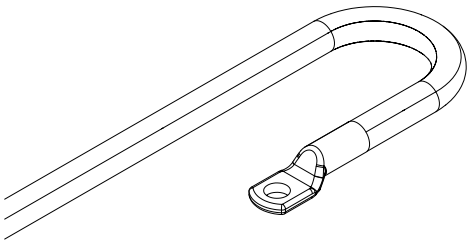


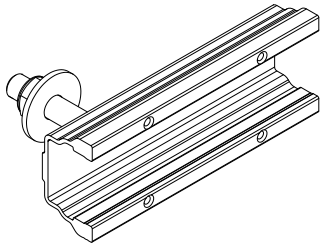
Fig. 13: Ground connection (side-mounted) M6

■ **Ground connection**

The ground connection is mounted to the data rail every 25 m for grounding. The flexible drilling jig is used for screwing (see Section 6.4.8). The ground connection is suitable for a cable cross-section of up to max. 25 mm².
An elongated hole in the support structure is required for the installation the M6 or M8 ground connection (see Section 6.4.8). No elongated hole is required in the support structure for the ground connection (Fig. 13).



■ **PE cable with M6 or M8 cable lug**



■ **Anchor point**

The anchor point is used to fasten the data rail.

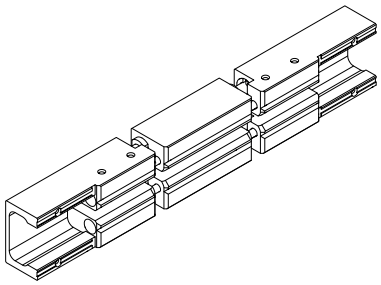


Fig. 14: Expansion unit

- **Expansion unit**

The expansion unit connects two data rails together and serves to compensate for changes in length of the data rails due to temperature fluctuations.

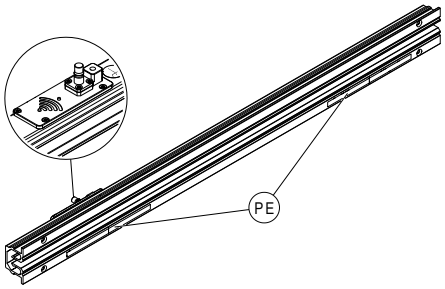


Fig. 15: Power feed on left (signal transmission on one side)

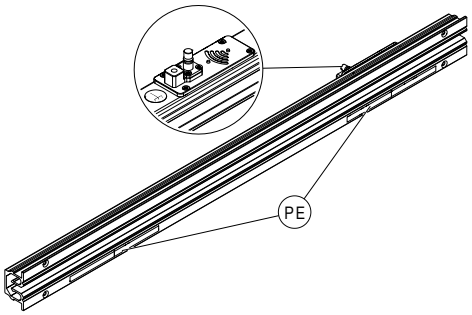


Fig. 16: Power feed on right (signal transmission on one side)

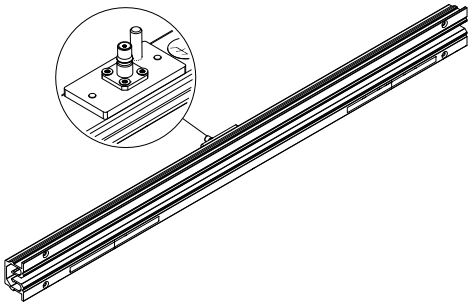


Fig. 17: Power feed (signal transmission on both sides)

- **Power feed**

The power feed is mounted on the data rail line. It is used to couple the data signals.
There are different types of power feeds:

- Power feed on left (signal transmission on one side)
- Power feed on right (signal transmission on one side)
- Power feed (signal transmission on both sides)

On the back of the stationary antenna for the power feed with one-sided signal transmission, there is a symbol (see below) that indicates the transmission direction of the signal. The transmission direction must not point in the direction of the expansion units or transfer units, but rather must always point in the direction of the segment to be supplied with the signal.

 Signal transmission one-sided

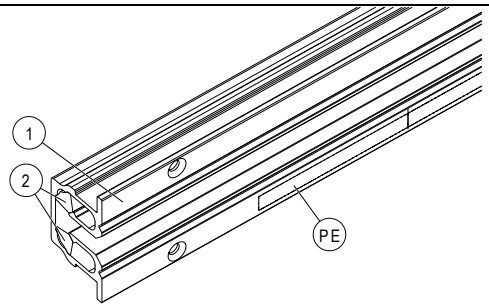


Fig. 18: End segment with absorber (left)

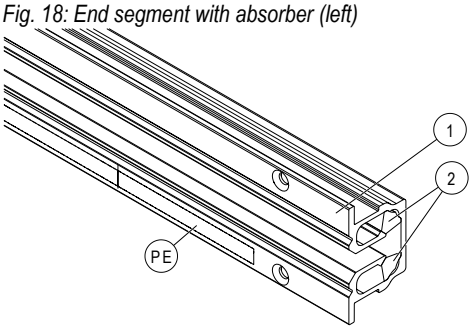


Fig. 19: End segment with absorber (right)

- **End segment with absorber**

The end segment with absorber (2) is used to attenuate the signal so strongly that no interference radiation is produced for other devices in the vicinity of the data transmission system (e.g. at transfers).

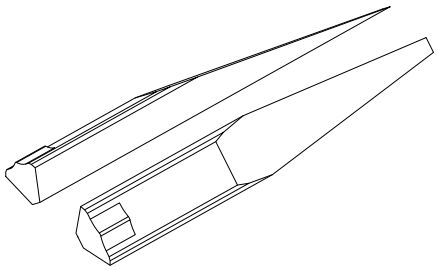


Fig. 20: Absorber set

- **Absorber set**

Two absorbers for self-installation with drilling jig (Order No.: 05-V015-0005)

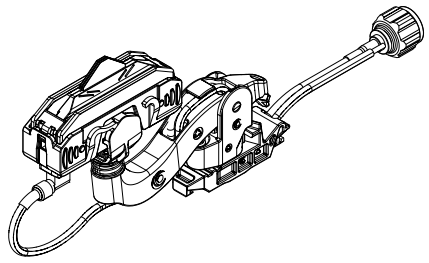


Fig. 21: Collector

- **Mobile antenna (collector) with or without PE**

The mobile antenna is inserted into the slot of the data rail and is electrically isolated from the sliding contacts. The collector is guided on the data rail via two split sliding contacts or sliding blocks.

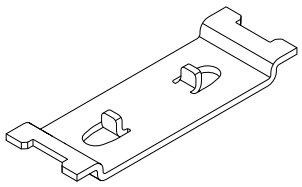


Fig. 22: Towing device

■ **Towing device**

The towing device connects the collector to the customer's application. The towing device is screwed onto the support structure and collector is clipped onto the towing device.

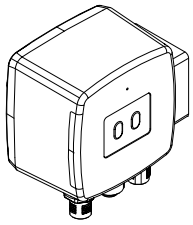


Fig. 23: Read head (optional)

■ **Read head for the positioning system (optional)**

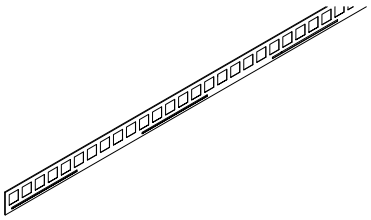


Fig. 24: Bar code tape (optional)

■ **Bar code tape (optional)**

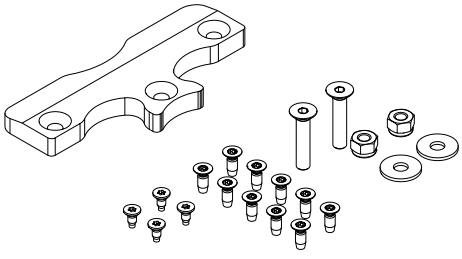


Fig. 25: Rail positioning device

■ **Installation package**

10 x plastic screws (countersunk head) M2.5x6
120 x countersunk head screws DIN 7500 M3x8
2 x countersunk head screws DIN7991 M4x20
2 x washer DIN9021 A4,3
2 x lock nuts DIN 985 M4
1 x rail positioning device

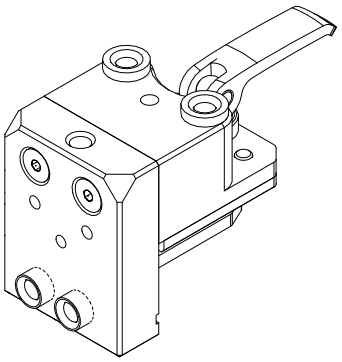


Fig. 26: Drilling jig 05-V015-0005

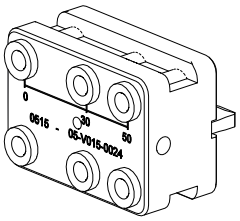


Fig. 27: *Drilling jig 05-V015-0024*

■ **Drilling jig**

05-V015-0005

The drilling jig is used to drill new holes for the connector and the cut-outs for the absorbers on a shortened data rail.

05-V015-0024

The drilling jig is used to drill the holes for the ground connections in the data rail.

4.4 Modes of operation

The ProfiDAT*compact* Data Transmission System is used in "**normal operation**" mode.
The operator controls the system during normal operation. No person may be present in the construction working area to monitor the working process during normal operation. Travel commands are exclusively given by the operator.

5 Transport, Packaging and Storage

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 due to parts falling or swinging out of control.

→ Never walk under suspended loads.

→ Follow the specifications for the attachment points provided.

→ Do not lash onto protruding machine parts or eyes on installed components. Ensure that lashing components are properly seated.

→ Only use authorized lifting gear and lashing components with sufficient load capacity.

→ Do not use torn or worn ropes or straps.

→ Do not attach ropes or straps to sharp corners and edges and do not knot or twist them.

Damage due to improper transport!

Damage due to improper transport!

Improper transport can result in significant material damage.

→ Unload packaged parts upon delivery and during internal transport with care and observe the symbols and the information on the packaging.

→ Only use the attachment points provided.

→ Only remove packaging shortly before installation.

5.1.2 Transporting packaged parts

Transport packaged parts under the following conditions:

- Dry and dust-free
- Do not expose to aggressive media
- Protect from direct sunlight
- Avoid mechanical vibrations
- Transport temperature: -25 °C to + 55 °C (without condensation)
- Relative humidity max.: 60%

5.1.3 Transport inspection

Immediately check the delivery for completeness and transport damage upon delivery.

In the event of visible damage proceed as follows:

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

ATTENTION!

File a complaint on each defect as soon as it is detected. Damage compensation claims may only be made within the applicable claim periods.

5.2 Packaging

The individual packages are packed appropriately for the expected transportation conditions. We exclusively use environmentally friendly packaging materials.
The packaging has the function of protecting the individual components against transport damage, corrosion and other damage until they are installed. Hence, do not destroy the packaging; remove it only shortly before installation.

Handling packaging materials:
Dispose of packaging material according to applicable legal regulations and local guidelines.

WARNING!

Environmental damage due to improper disposal!

Packaging materials are valuable raw materials and can be reused in many cases or sensibly processed and recycled.

→ Dispose of packaging materials in an environmentally appropriate manner.

→ Comply with locally applicable disposal guidelines; if necessary, engage a specialist to handle the disposal.

5.3 Storage of packaged parts

Store packaged parts under the following conditions:

- Do not store outdoors
- Store in a dry, dust-free area
- Do not expose to aggressive media
- Protect from direct sunlight
- Avoid mechanical vibrations
- Storage temperature: -25 °C to + 55 °C (without condensation)
- Relative humidity max.: 60%
- When storing for more than 3 months, check the general condition of all parts and the packaging at regular intervals. If necessary, refresh or replace the preservative.

ATTENTION!

In some cases, there may be instructions for storage on the packaged parts that go beyond the requirements listed here. Comply with them accordingly.

6 Installation and Commissioning

The commissioning checklists are listed in Section 10.2.

6.1 Safety

Personnel:

- Installation and commissioning may only be carried out by specially trained technicians!

Wear the following personal protective equipment for all installation and commissioning work:

- Protective clothing
- Protective headgear
- Protective footwear
- Protective gloves

DANGER!

Risk of death due to suspended loads!

Falling loads can cause serious injuries or even death.

→ Never walk under suspended loads.

→ Only move loads under supervision.

→ Set down the load before leaving the work area.

Risk of injury due to improper installation and initial commissioning!

Improper installation and initial commissioning can result in serious personal injury and/or material damage.

→ Before starting work, ensure sufficient space for installation.

→ Use caution when working with open, sharp-edged components.

→ Ensure that the installation area is clean and tidy! Loosely stacked or scattered components and tools are a source of accidents.

→ Install components properly. Comply with the specified tightening torques.

6.2 Preparation

Required tools:

- Cross-cut saw
- Open-end wrench SW7 (M4)
- Open-end wrench SW8 (M5)
- Open-end wrench SW13 (M8)
- Hexagon screwdriver (Allen key) SW 2.5
- Cordless drill driver
- Bit attachment hexagon socket (Torx) TX8
- Bit attachment hexagon socket plus (Torx Plus) TP10
- Round file with ≥ 3 grade of cut
- Flat file with ≥ 3 grade of cut
- Diamond square file (curved)
- Step drill M3 90°
- Drilling jig (Order No.: 05-V015-0005)
- Flexible drilling jig (Order No.: 05-V015-0024)
- Mounting aid (Order No.: 05-V015-0010)
- Torque screwdriver (e.g. Wiha TorqueVario-S 0.1 – 0.6 Nm)
- Blade for torque screwdriver, hexagon socket (Torx) T8
- Torque shut-off screwdriver (e.g. TorqBee from HS-Technik)

Tools required for replacing sliding contacts:

- Torx attachment TX5
- Flat-head screwdriver ≤ 3.0
- Torque screwdriver (e.g. Wiha TorqueVario-S 0.1 – 0.6 Nm)

Required tools for replacing collector heads:

- Torx attachment TX5
- Flat-head screwdriver ≤ 3.0

Required materials:

- Cable ties

6.3 Grounding

The construction operator must ensure sufficient grounding of the support structures, particularly the coated components. Safety regulations and country-specific directives for the grounding of electrical equipment (e.g. VDE/UVV/VBG4) must be followed.

The grounding of the support structure must be taken into consideration for different applications:

- Protection against electrical shock
- Lightning protection

DANGER!

Risk of death due to electrical shock!

The support structure can be under high voltage if it is **not properly grounded**.

Contact with the support structure can lead to death or severe injury. There is also a high risk of injury from over-reaction caused by electrical shock.

Therefore:

→ Read and follow the locally applicable and international guidelines for proper grounding installation and lightning protection.

→ Provide the grounding installation that is appropriate to the architecture of the power grid at the place of installation of the construction (TT grid or TN grid).

→ Connect the support structure to the grounding installation.

→ Install a conductive connection between all parts of the support structure. Use toothed washers for screw connections or other suitable components to establish a conductive connection between coated components.

→ Regularly check the proper grounding of the support structure.

6.3.1 TN grid

→ In the TN grid, data rail (ground conductor data rail) is directly connected to the grounded star point of the supply transformer through a cable.

→ To ensure that the protective device of the conductor rail is switched off in the event of a fault, the total resistance of the construction between the phase conductor and PE conductor must be checked. The maximum permissible total resistance is calculated using the formula:

$$Z_s \leq \frac{U_0}{I_a} \qquad\qquad Z_s \times I_a \leq U_0$$

Z_s = The impedance of the fault loop including current source of the active conductor up to the fault location and the protective conductor between the fault location and the current source.
I_a = The current that causes the protective device to switch off automatically within the specified time.
U_0= The nominal AC voltage toward the end.

For the measurement, the phase conductor and the PE conductor must be short-circuited at the end of the conductor rail; measurements are taken at the output of the protective device or the following output clamps (connection terminals of the conductor rail supply line).

Example of maximum permissible total resistance for the Conductor Rail System 0815 with ProfiDAT*compact*:

Power supply 400 V, short-circuit current circuit breaker 100 A according to Data Sheet 500 A

$$Z_s \leq \frac{U_0}{I_a} = \frac{400V\ /\sqrt{3}}{500\ A} = 0.46\ \Omega$$

6.3.2 Information on the implementation of grounding

→ There are various ground connections that are used for functional grounding or protective equipotential bonding.

→ Local standards or regulations may require different cross-sections or ground resistance values. The construction operator must check the locally applicable standards and regulations and implement the grounding construction accordingly. If the standard requirements and the functional aspects such as voltage drop, voltage capacities and leakage currents are maintained and verified, other cross-sections can also be used to connect the data rail to the support structure.

→ The ground resistance must be measured during installation and a test report prepared with the following content:

- Condition of the ground connections
- Degree of corrosion and corrosion protection
- Cable and component fastenings
- Measurement of ground resistance
- Documentation of changes and extensions

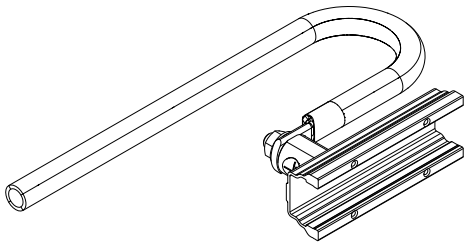


Fig. 28: Ground connection M8

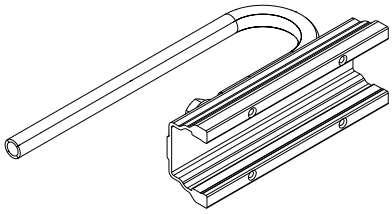


Fig. 29: Ground connection M6

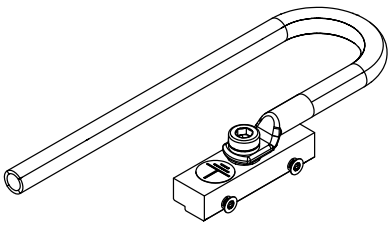


Fig. 30: Ground connection (on the side)

6.4 Mechanical installation

Personnel:

- Installation only by technical personnel
- At least 2 persons

The following describes the installation of the data transmission system in a step by step manner and one after the other in a practical order. Some steps may be carried out in parallel on site.

6.4.1 Mount hanger clamps

The standard hanger clamp distance is ≤1000 mm.
Deviating distances to the rail components must be observed:

Transfer guide	Dimension X
Plastic	35
Aluminium	25

Item	Name
1	Hanger clamp (standard or combined/project-specific)
2	data rail
3	Connector
4	Data power feed
5	Ground connection
6	Transfer guide
7	Expansion unit
8	Anchor point

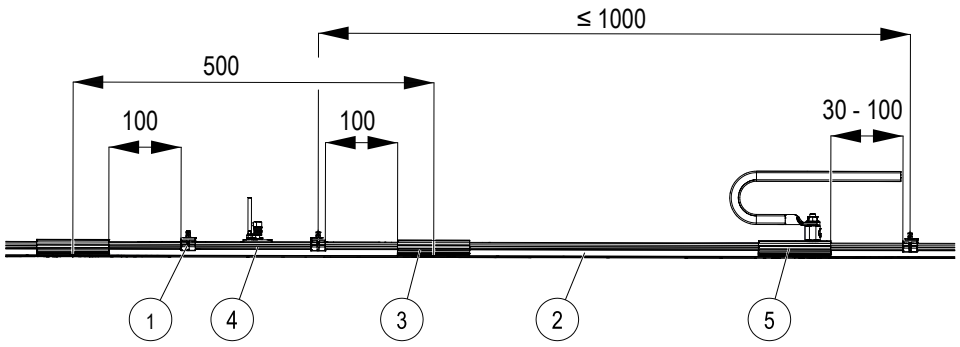


Fig. 31: Distances between the hanger clamps at the power feed (signal propagation on both sides)

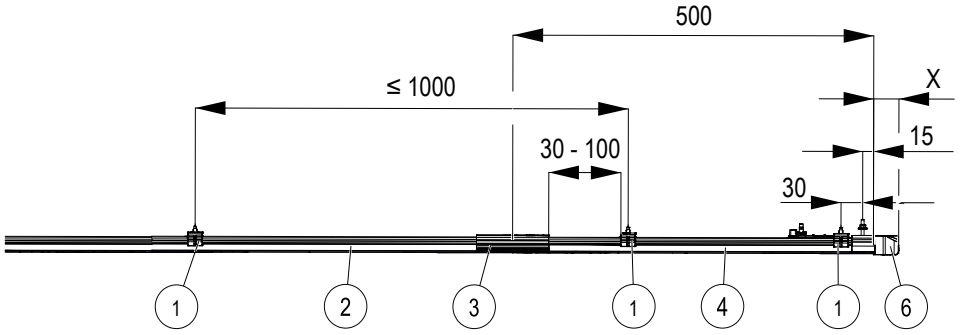


Fig. 32: Distances between hanger clamps at power feed (signal propagation on one side)

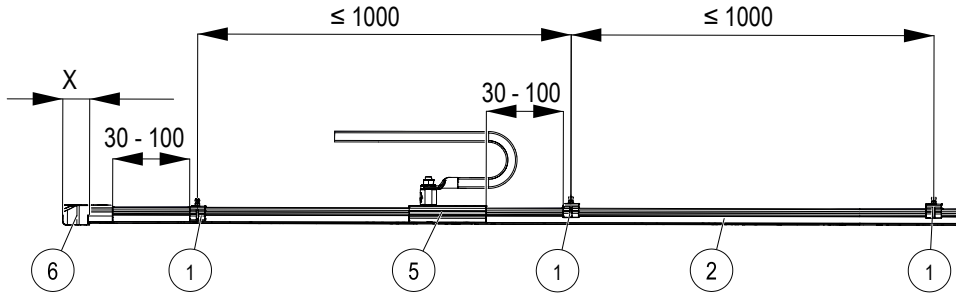


Fig. 33: Distances between hanger clamps at transfer guide

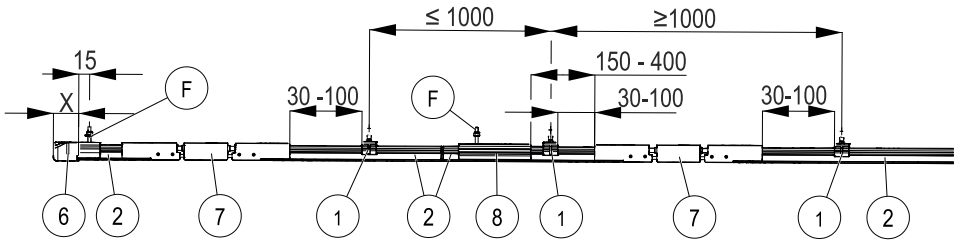


Fig. 34: Distances between hanger clamps at expansion unit

The distances between the hanger clamps must not exceed 1 m on straight segments or 0.5 m on bends/curves (Fig. 35).

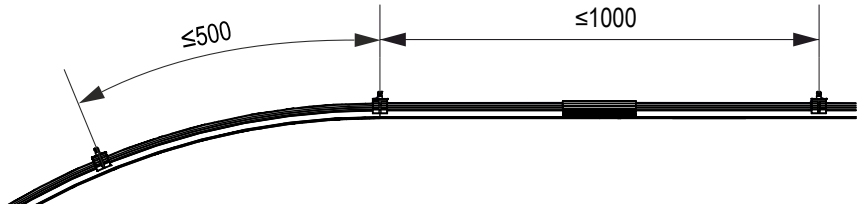


Fig. 35: Hanger clamping distances

6.4.1.1 Standard hanger clamp

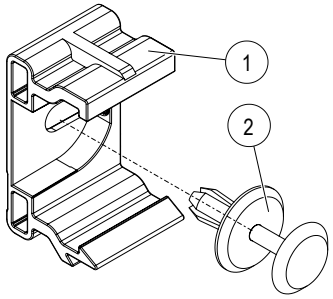


Fig. 36: Hanger clamp (1) with expanding rivet (2)

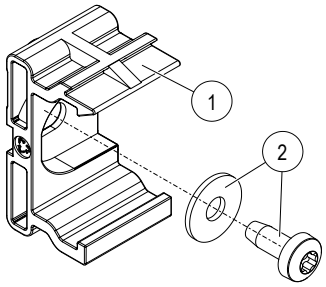


Fig. 37: Hanger clamp with screw (optional)

Hanger clamp with expanding rivet
Work steps:

→ Drill the support structure for the hanger clamps according to Fig. 38. The diameter "X" depends on the thickness of the support structure and can be taken from the table below:

Thickness "D" of support structure [mm]	Diameter "X" of the drill holes for the mounting holes [mm]
2	Ø 4.6 ±0.05
3	Ø 4.7 ±0.05
4	Ø 4.8 ±0.05
5	Ø 4.9 ±0.05
6	Ø 5.0 ±0.05
7	Ø 5.1 ±0.05

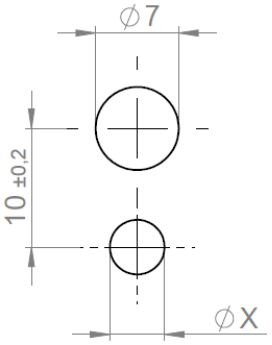


Fig. 38: Distance between holes in support structure for hanger clamps

→ Mount the hanger clamp (1) on the side of the support structure.

→ Fasten the hanger clamp with an expanding rivet (2). Press the head of the expanding rivet straight into the hole.

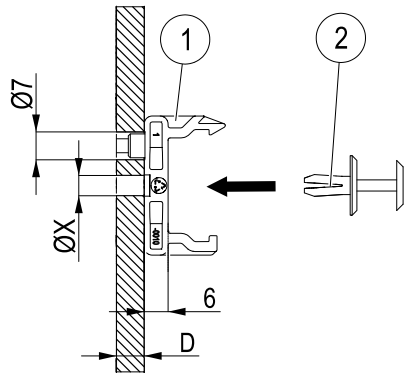


Fig. 39: Fasten hanger clamp with an expanding rivet

If the head of the expanding rivet should break off, the expanding rivet pin can still be driven into the hole.

Hanger clamp with screw (optional)

The hanger clamp (1) can be fastened with the following screws (2).

→ Self-tapping screws can be used in steel and aluminium (DIN 7500 CE)

→ Cylinder head screw (DIN 7984)

→ Hex bolt (DIN 933)

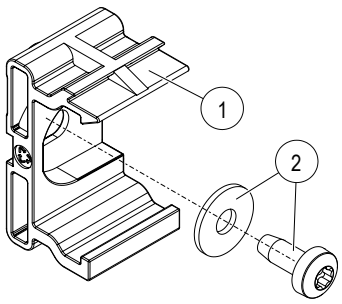


Fig. 40: Hanger clamp with self-tapping screw

Work steps:

→ Support structure for the hanger clamps according to Fig. 34. The diameter "X" depends on the fastening of the hanger clamp.

Fastening	Diameter "X" of the drill holes for the mounting holes [mm]
Self-tapping screw	Diameter according to Table 1
Cylinder head screw	4.5
Hexagon screw	4.5

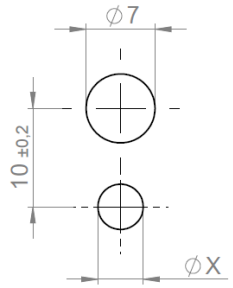


Fig. 41: Distance between holes in support structure for hanger clamps

Thread reach	Thread M4	
	St	Al
3.5	3.65	-
4	3.65	-
5	3.70	-
6	3.70	-
6.5	3.70	-
7	3.70	-
7.5	3.70	-
8	3.70	3.70
9	-	3.70
10	-	3.70

Table 1: Hole diameter standard values according to DIN 7500-2

→ Mount the hanger clamp (1) on the side of the support structure.

→ Fasten the hanger clamp (1) with the washer and screw (2). Use the tightening torque from Table 2Fig.

Fastening	DIN	Tightening Torque (Nm)
Self-tapping screw	DIN 7500 CE	1.2
Cylinder head screw	DIN 7984	1.5
Hexagon screw	DIN 933	1.5

Table 2: Tightening torques

6.4.1.2 Combined and project-specific hanger clamps

The mounting of combined hanger clamps can be found in the respective documentation of the conductor rail system or, on request, in the project-specific documentation.
The same distance dimensions for the standard hanger clamps must be observed for the hanger clamps (Section 6.4.1).

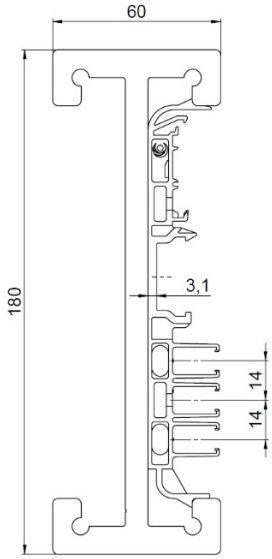


Fig. 42: Hanger clamp 0815 in EMS profile

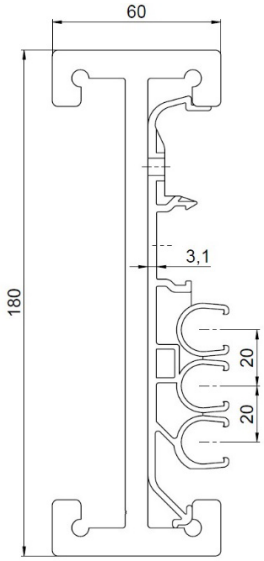


Fig. 43: Hanger clamp 0811 in EMS profile

6.4.2 Mount the power feed

The power feed must be mounted with two hanger clamps (see Section 6.4.1).

ATTENTION!

The position of the stationary antenna (1) may differ depending on the construction. This changes the drilling pattern of the stationary antenna (1). Please note the project-specific documentation and, if necessary, contact Conductix-Wampfler.

The power feed of the signal in the data rail occurs via the stationary antenna (1). Drill a through hole in the support structure (2) in the center of the data rail slot before installing the power feed in the hanger clamps:

- With anchor point (F): Hole Ø 25 mm (Fig. 47)
- Without anchor point: Elongated hole 25x75 mm (Fig. 48)

ATTENTION!

For applications with built-in expansion units (due to the thermal expansion of the data rail), the through hole must be designed as an elongated hole to compensate for the movement of the stationary antenna relative to the support structure.

After creating the through hole for the power feed, screw the power feed with data rail into the hanger clamp as described in Section 6.4.5.

If data transmission faults occur within the construction due to excessive shield currents or excessive potential differences, an equipotential bonding cable can be attached to Position A using the cable lug and fasteners supplied (Fig. 47 and Fig. 48 (signal propagation on one side) or Fig. 51 and Fig. 52 (signal propagation on both sides)).
The HF cable for the data power feed is connected to Position B (Fig. 47, Fig. 48, Fig. 51, Fig. 52 and Section 6.5.1).

6.4.2.1 Left/right power feed (signal propagation on one side)

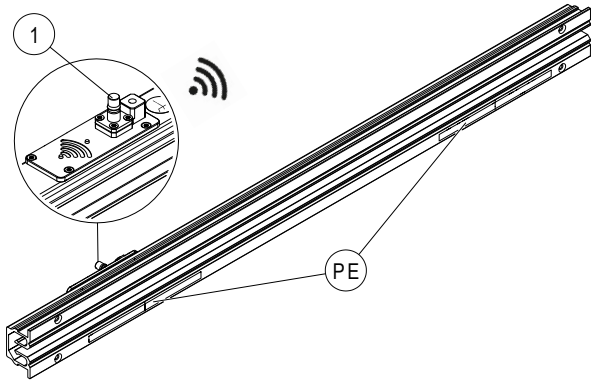


Fig. 44: Power feed on left

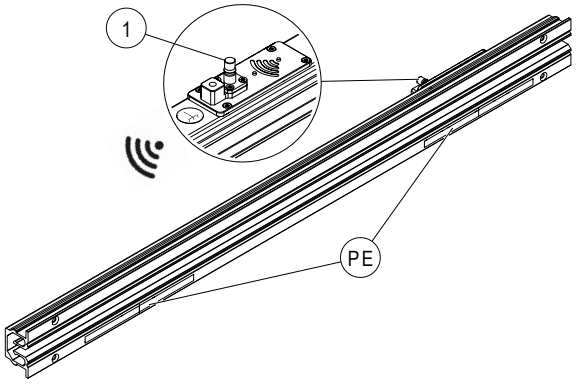


Fig. 45: Power feed on right

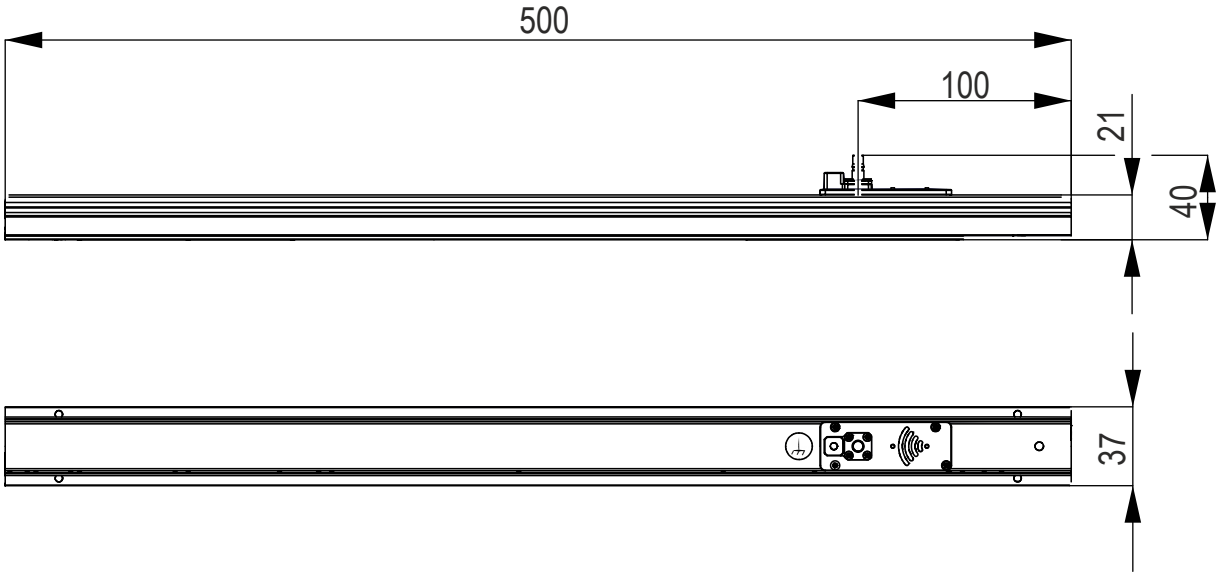


Fig. 46: Left/right power feed dimensions

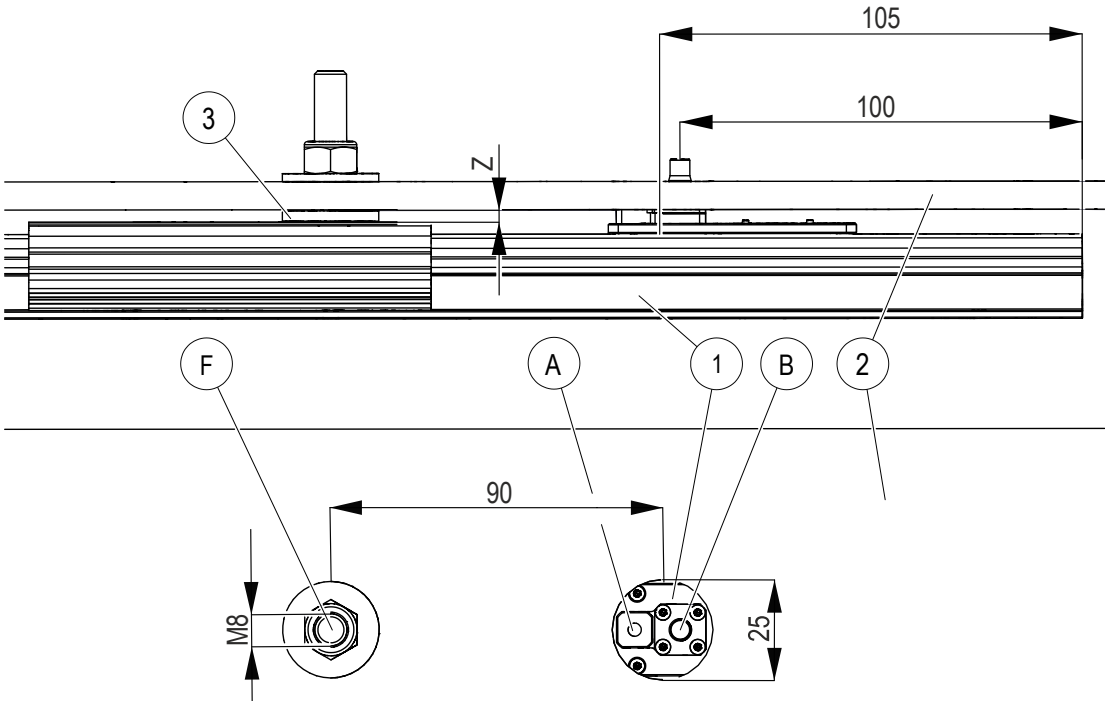


Fig. 47: Through hole in support profile (2) for stationary antenna (1) for anchor point (F)

If an anchor point is used, the gap (Z) between the support profile (2) and the anchor point (F) must be filled with washers (3).

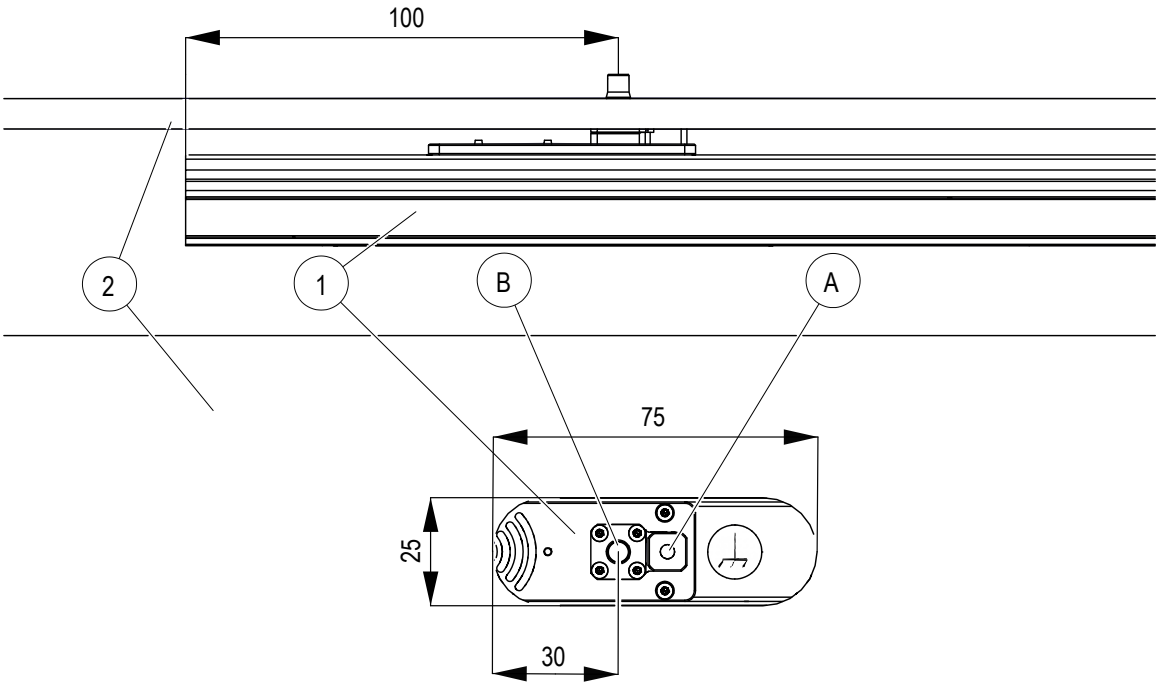


Fig. 48: Through hole in support profile (2) for stationary antenna (1) without anchor point (F)

6.4.2.2 Power feed (signal propagation on both sides)

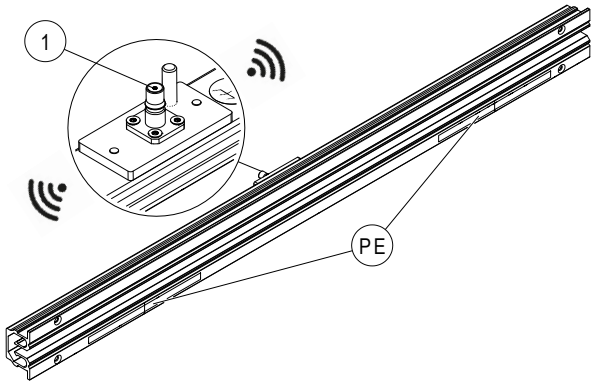


Fig. 49: Power feed

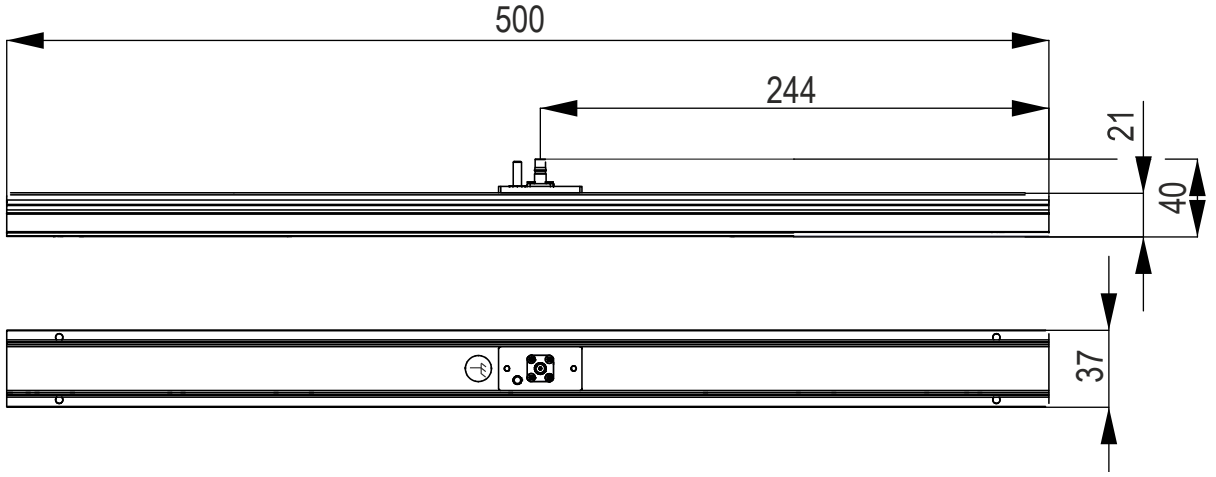


Fig. 50: Power feed dimensions

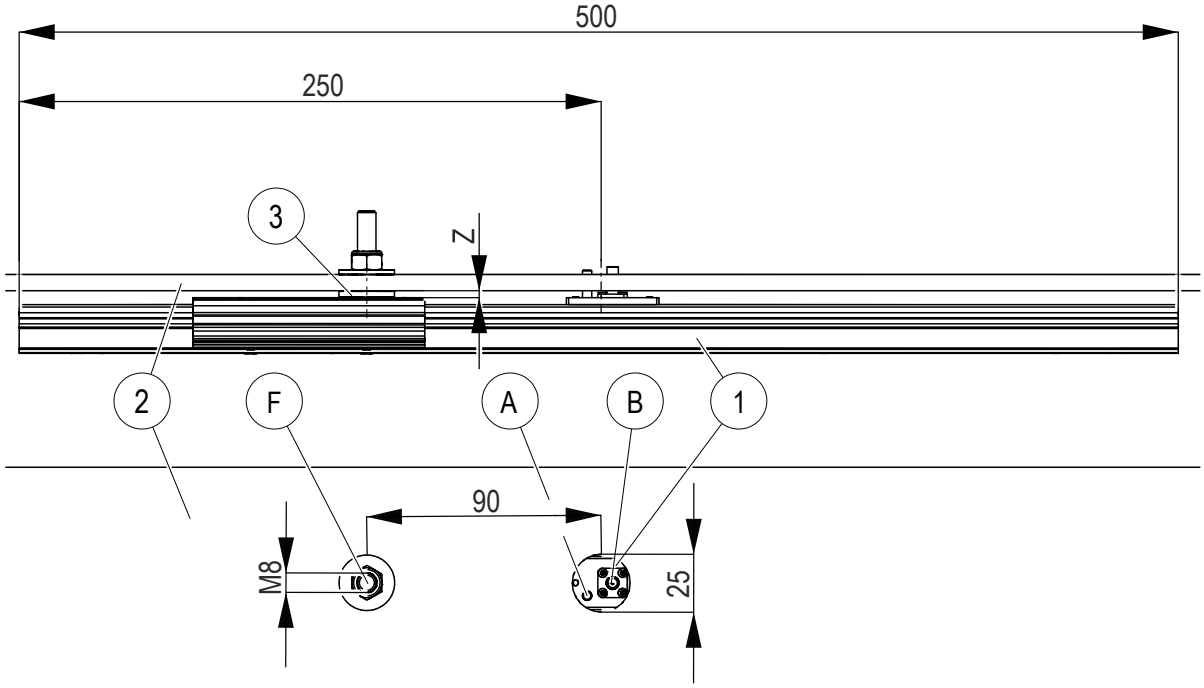


Fig. 51: Through hole in support profile (2) for stationary antenna (1) with anchor point (F)

If an anchor point is used, the gap (Z) between the support profile (2) and the anchor point (F) must be filled with washers (3).

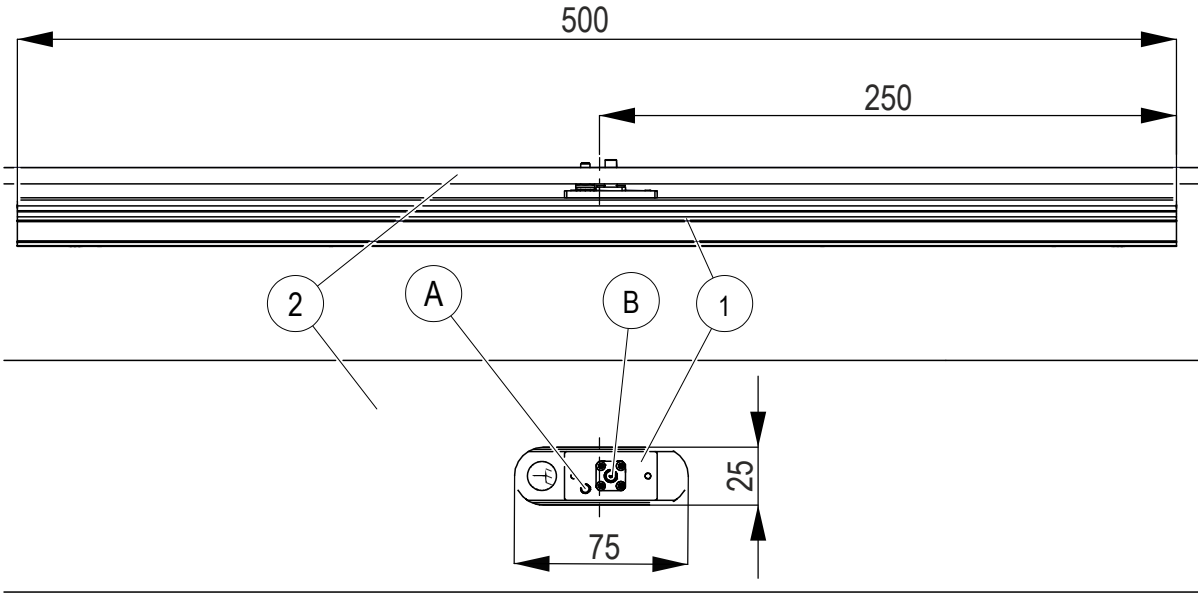


Fig. 52: Through hole in support profile (2) for stationary antenna (1) without anchor point (F)

6.4.3 Mount the transfer guide

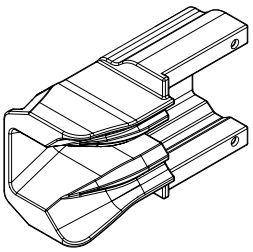


Fig. 53: Plastic transfer guide

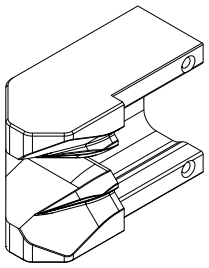


Fig. 54: Aluminium transfer guide

Transfer guides can also serve as anchor points. The holes (F) marked in Fig. 55 and Fig. 56 can be used for this purpose. To install the anchor point screw, it is necessary to drill a through hole of 6 mm through the support structure.

Transfer guide dimensions

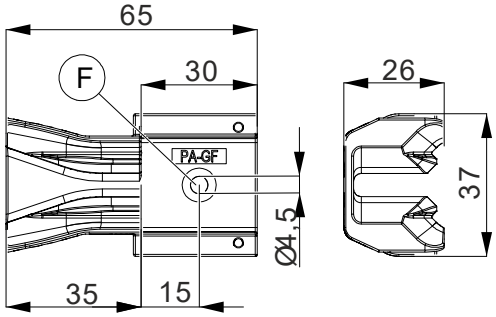


Fig. 55: Plastic transfer guide dimensions

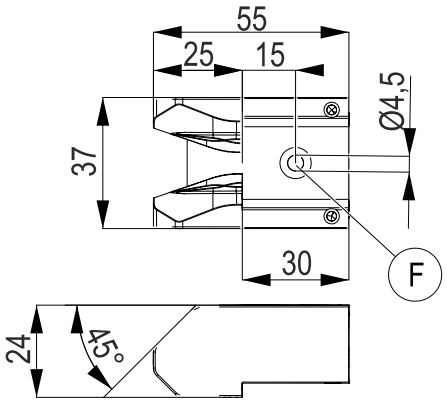
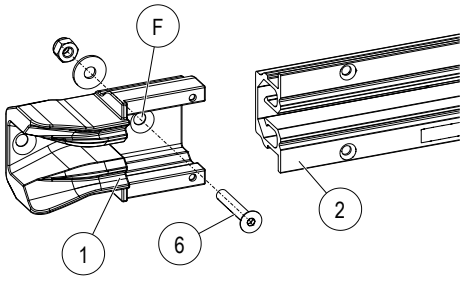


Fig. 56: Aluminium transfer guide dimensions

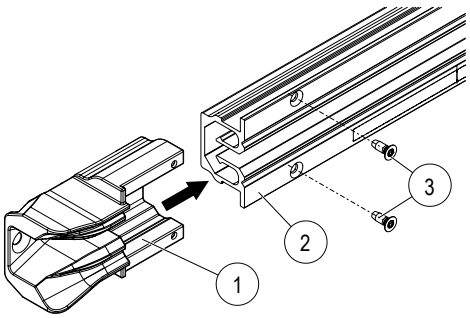
Work steps for mounting: (illustrations of plastic transfer guides)



1. Before mounting the transfer guide, check whether an anchor point is provided there.

   When attaching the anchor point screw (6), ensure that it is mounted in the transfer guide before sliding the transfer guide onto the data rail (2).

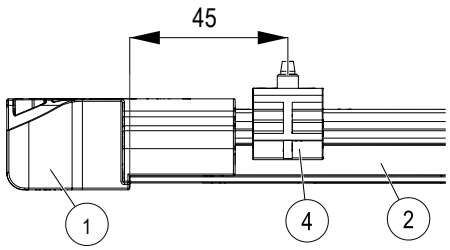
   A through hole (D= 4.5 mm) must be drilled through the support structure for the anchor point screw (6). The position of the through hole can be taken from Fig. 55 and Fig. 56Fig.
   Mount the anchor point screw nut (6) with a tightening torque of 3.0 Nm.



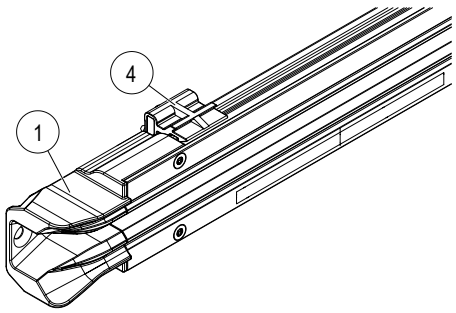
2. Slide the transfer guide (1) onto the data rail (2) and fasten with screws (3).

ATTENTION!

If the transfer guide (1) is used as an anchor point, the anchor point screw must be mounted before the transfer guide is mounted (Fig. 55 and Fig. 56 Pos. F).



3. A hanger clamp (4) must be fitted at a distance of 45 mm from the end of the data rail (see Section 6.4.1).



4. Fully mounted transfer guide (1) with hanger clamp (4).

In order to ensure a trouble-free transfer of the collector at transfer points, the following additional conditions must be observed:

- The distance of the opposing transfer guides must be between 5 and 10 mm (direction of travel).
- Lateral displacement < 3 mm and height offset < 5 mm.

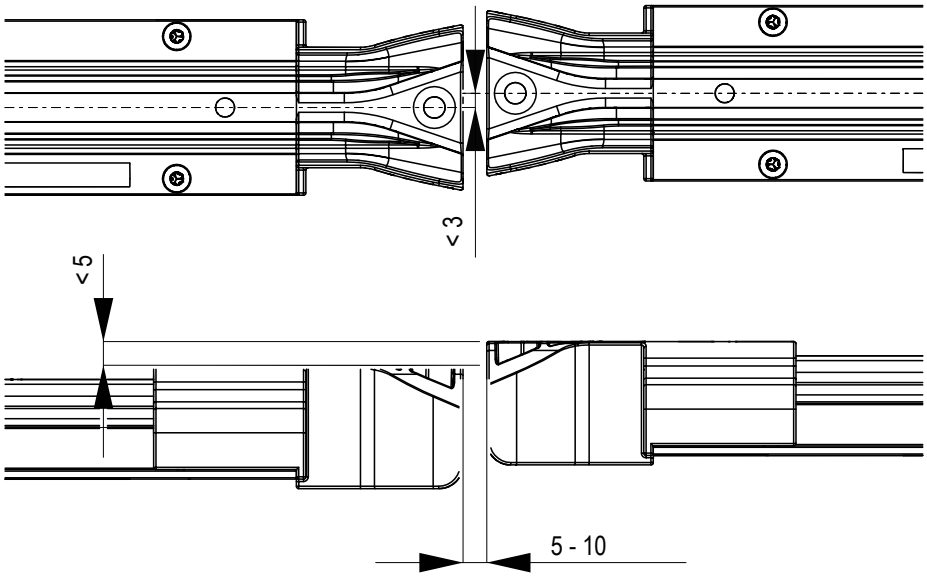


Fig. 57: Transfer guide distances

6.4.4 Expansion unit

6.4.4.1 Expansion unit layout

Number of expansion units per segment:
The maximum segment length for a power feed (in the center) is 120 meters. The maximum segment length is linked to the data transmission and not to the individual aluminium data rail.

Segment length with 1 stationary access point and 1 mobile participant (client): **max. 120 meters (2 x 60 meters)**
1 mobile participant (client) corresponds to a maximum of 2 mobile antennas.

Segment length with 1 stationary access point and 6 to 20 mobile participants (clients): **max. 100 meters (2 x 50 meters)**
1 mobile participant (client) corresponds to a maximum of 2 mobile antennas.

Number of Expansion Units (EU)		0		1		2		3	
Length		a							
Number of mobile participants (clients)		1 mobile participant (client)	6 – 20 mobile participants (clients)	1 mobile participant (client)	6 – 20 mobile participants (clients)	1 mobile participant (client)	6 – 20 mobile participants (clients)	1 mobile participant (client)	6 – 20 mobile participants (clients)
Temperature difference Δt_{total} [K]	10	60 m	50 m	60 m	50 m				
	15	60 m	50 m	60 m	50 m				
	20	60 m	50 m	50 m	50 m	60 m			
	25	60 m	50 m	40 m	40 m	60 m	50 m		
	30	60 m	50 m	30 m	30 m	60 m	50 m		
	35	60 m	50 m	35 m	35 m	60 m	50 m		
	40	60 m	50 m	25 m	25 m	50 m	50 m	60 m	
	45	60 m	50 m	20 m	20 m	45 m	45 m	60 m	50 m
	50	60 m	50 m	20 m	20 m	40 m	40 m	60 m	50 m

data rail material: Aluminum with a 0.0000234 1/K linear expansion coefficient

Δt total = ΔtU + ΔtSW
ΔtU = Temperature range of the ambient temperature [°C]
ΔtSW = Temperature increase due to current heat [°C]

Because the ProfiDAT*compact* may only be used as a PE and not as a PH rail, the value for ΔtSW always corresponds to 0°.
Δt total = ΔtU

With power feed (signal propagation on both sides)
Example of segment length or route length "S" with intermediate lengths a_1 and a_2.

ATTENTION!

Data transmission does not occur in the area of the expansion unit. If there are several expansion units in a row, the distance between the two antennas must be dimensioned accordingly!

Fig. 58: Example drawing for two expansion units, two anchor points and one power feed (signal propagation on both sides)

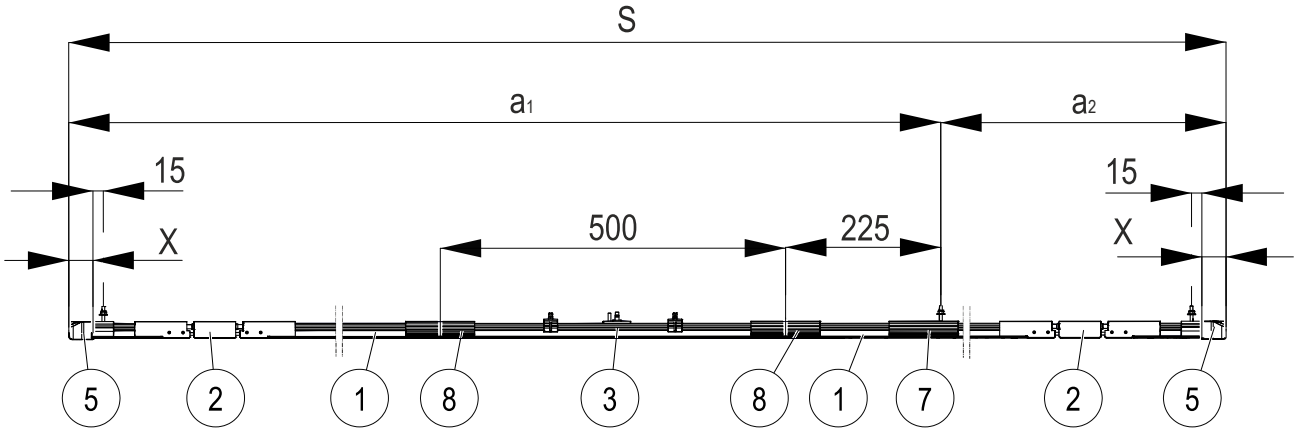


Fig. 59: Drawing of two expansion elements and power feed (signal propagation on both sides)

With power feed (signal propagation on one side)

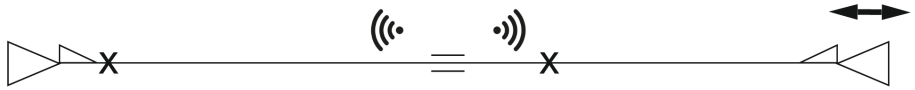


Fig. 60: Example drawing for an expansion element and two power feeds (signal propagation on one side) with free-expanding end

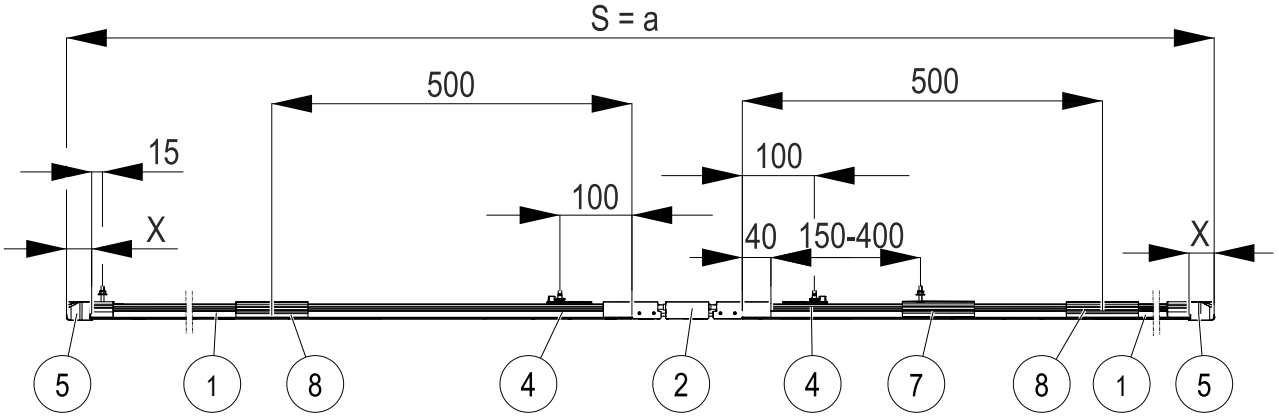


Fig. 61: Drawing for an expansion element and two power feeds (signal propagation on one side) with free-expanding end

Symbol	Item	Name
	1	data rail
	2	Expansion unit
	3	Power feed (signal propagation on both sides)
	4	Power feed (signal propagation on one side)
	5	Transfer guide
	6	Absorber
	7	Anchor point
	8	Connector
		Free-expanding end

Item	Name
S	Segment length
a_1	Intermediate length a_1
a_2	Intermediate length a_2

Transfer guide	Dimension X
Plastic	35
Aluminium	25

Transfers and curves are anchor points, this area must therefore be taken into account when designing the system!

6.4.4.2 Set up the expansion unit

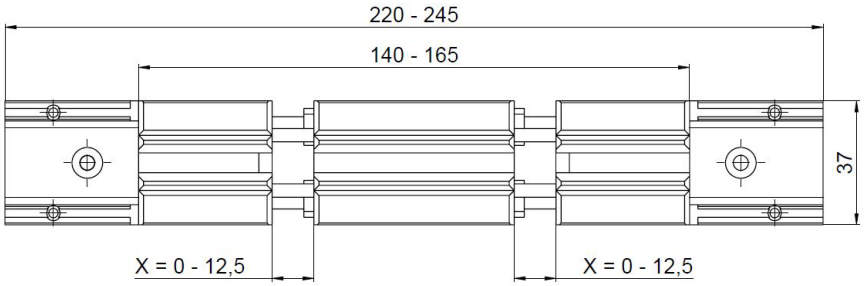


Fig. 62: Air gap in expansion unit

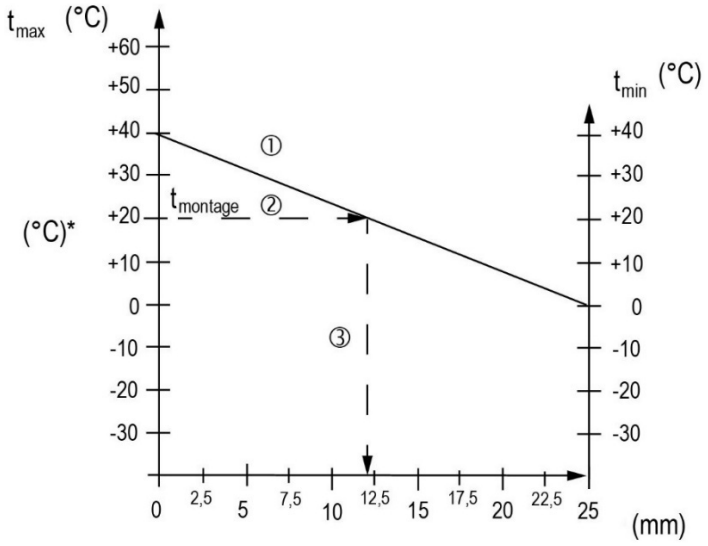


Fig. 63: Determine air gap

Example:

Temperature difference: from +40 °C to 0 °C

Ambient temperature during installation: + 20 °C

Expansion unit setting: Set expansion distance at 12.5 mm per expansion unit and 2 x 6.25 mm air gap

t_{min} = the lowest temperature occurring the given application

t_{max} = highest possible operating temperature in the given application

* = Ambient temperature during installation

Instructions for determining the air gap:

1. Enter the connecting line from t_{min} to t_{max}.
2. Enter the ambient temperature horizontally for installation $t_{installation}$.
3. Draw a line down from the intersection of the two lines and read the air gap to be set.

The diagram in Section 10.3 can be used to help determine the air gap at the installation site!

6.4.4.3 Required materials

- 1 x expansion unit

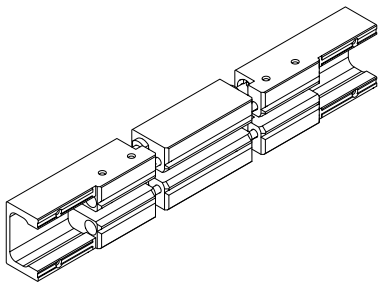


Fig. 64: Expansion unit

- 1 x rail adapter

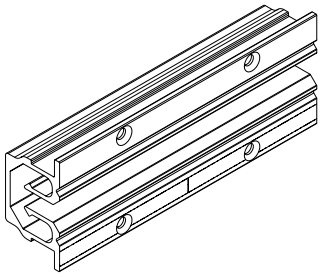


Fig. 65: Rail adapter

- Countersunk head screw M4x20, washer and lock nut for the anchor point

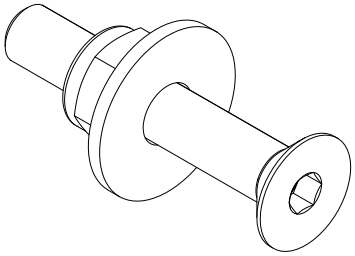


Fig. 66: Anchor point screw

- 4 x self-tapping screw M3 x 8 similar to DIN 7500 – M; hexagon socket (TorxPlus) TP10

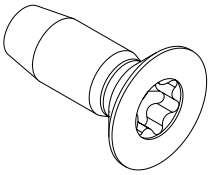
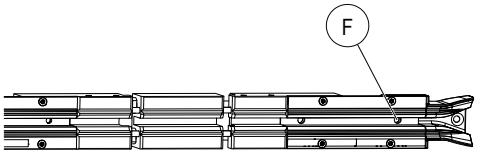
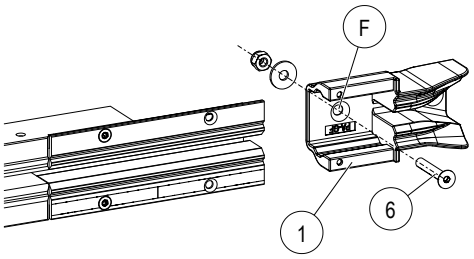


Fig. 67: Self-tapping screw

6.4.4.4 Mount the expansion unit at the end of the segment

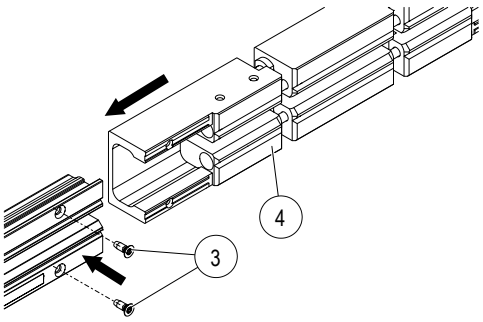




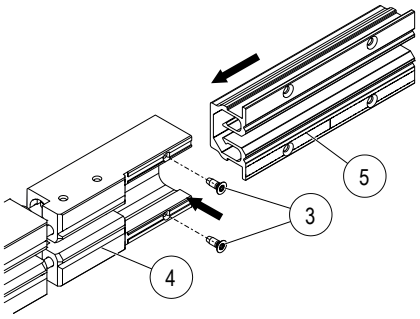
1. Before mounting the expansion unit, check whether an anchor point (F) is provided on the transfer guide (1).

   When attaching the anchor point screw (6), ensure that it is mounted in the transfer guide (1) before sliding the transfer guide onto the data rail.

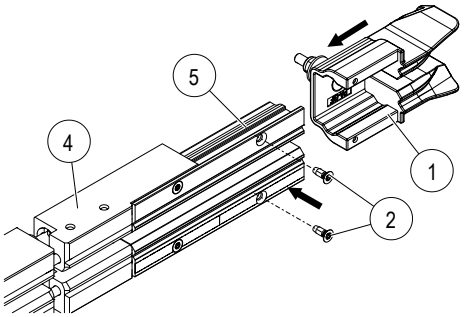
   A through hole (D= 4.5 mm) must be drilled through the support structure for the anchor point screw (6). The position of the through hole can be taken from Fig. 68 and Fig. 69.
   Mount the nut of the anchor point screw (6) with a tightening torque of 3.0 Nm.



2. Slide the expansion element (4) onto the data rail side and tighten the 2 self-tapping screws (3) with a torque shut-off screwdriver (mechanically) to 2 Nm.



3. Mount the rail adapter (5) with the 2 self-tapping screws (3). Tighten the screws (3) to 2 Nm using a torque shut-off screwdriver (mechanically).



4. Slide the transfer guide (1) onto the expansion element (4) with the rail adapter (5). Tighten the 2 screws (2) with a tightening torque as on Table.

Transfer guide	Plastic	Aluminium
Screws (2)	M2.5x6	M3x8
Drive	Torx T8	TorxPlus TP10
Torque	0.3 Nm	2 Nm Torque shut-off screwdriver (mechanically)

System example:

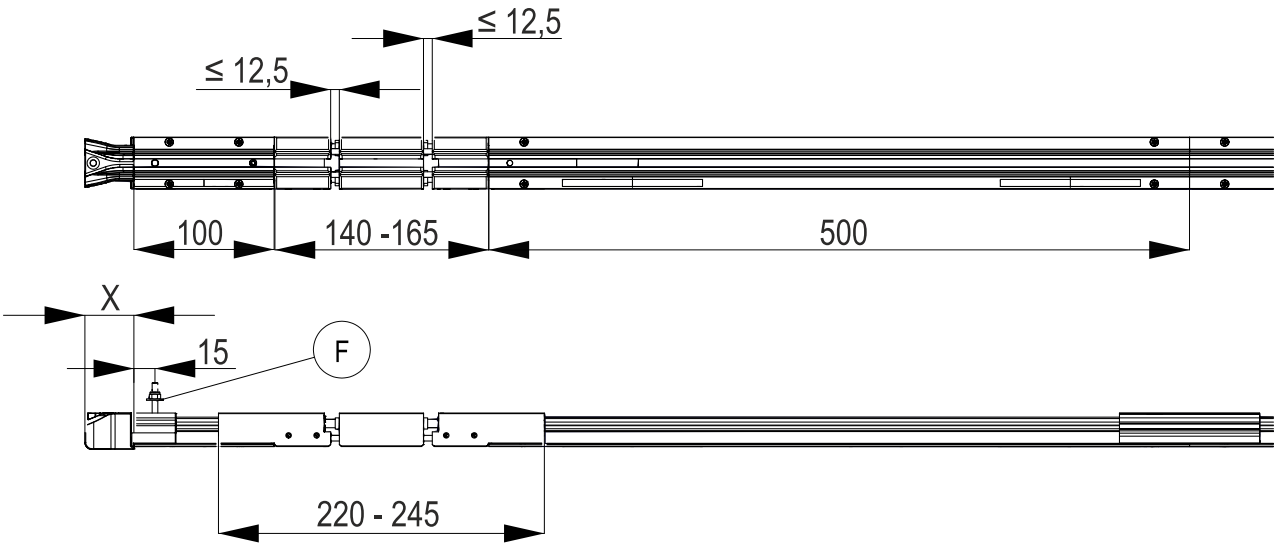


Fig. 68: Dimensions of expansion unit – end feed (mounted on left), F = anchor point at Position A

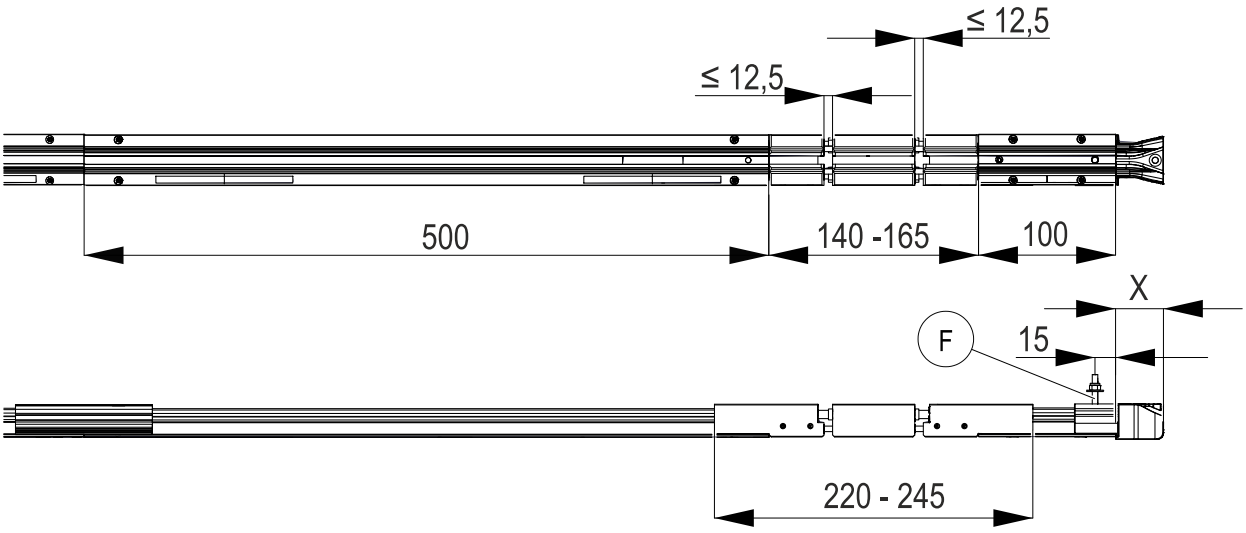
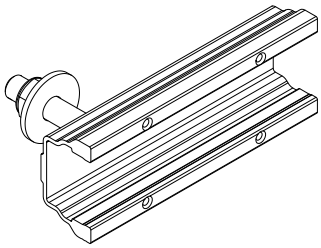


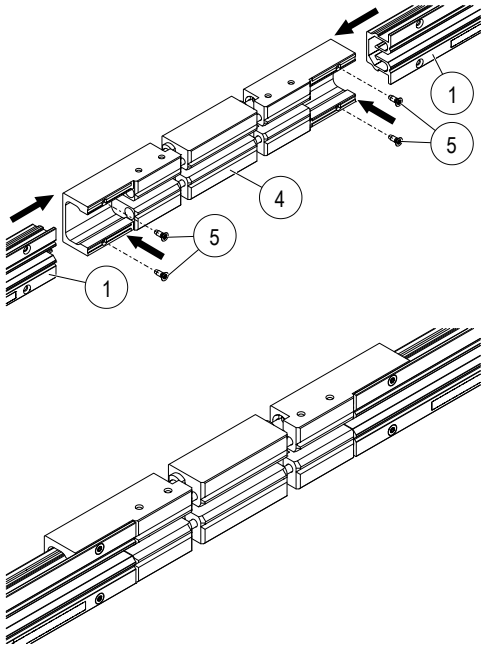
Fig. 69: Dimensions of expansion unit – end feed (mounted on right), F = anchor point at Position A

6.4.4.5 Mount the expansion unit in the segment



1. Before mounting the expansion unit, check whether an anchor point is provided to the left or right of the expansion point. If an anchor point needs to be mounted, do so as described in Section 6.4.7Fig.

   A through hole (D= 8.6 mm) must be drilled through the support structure for the anchor point screw (6). The position of the through hole can be taken from Fig. 70Fig.
   Mount the anchor point screw nut (6) with a tightening torque of 12 ±2 Nm.



2. Slide the data rail ends (2) with power feed segment (1) (right and left) onto the expansion element (4).
   Tighten the 4 self-tapping screws (5) to 2 Nm using a torque shut-off screwdriver (mechanically). Screw type: Hexagon socket (TorxPlus TP10).

System example:

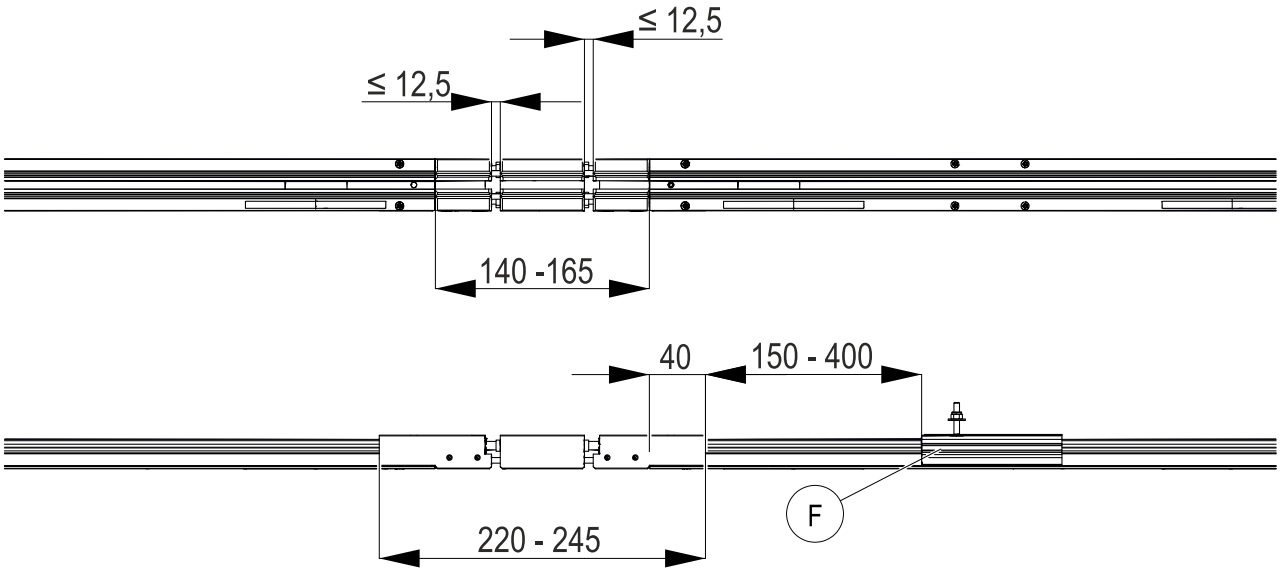


Fig. 70: Dimensions of expansion element F = anchor point

6.4.5 Mount the data rail

Work steps:

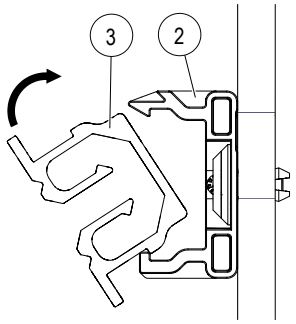


Fig. 71: Screw the data rail (3) into the hanger clamp (2).

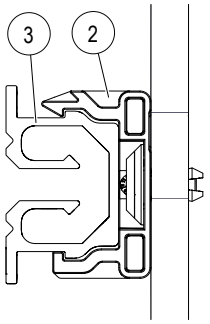


Fig. 72: Data rail (3) is correctly enclosed by hanger clamp (2).

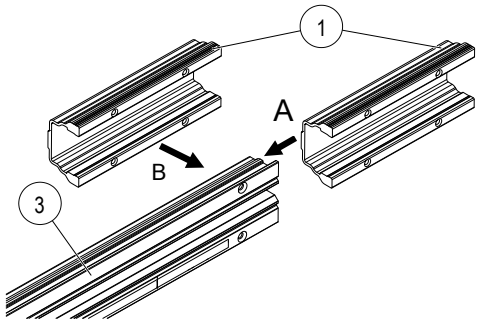
→ Screw the data rail (3) into the hanger clamps (2). Ensure that the hanger clamp grips the data rail correctly. The hanger clamps are elastic and thus allow easy insertion/locking of the data rail into the hanger clamp. The data rails can be moved in the hanger clamps.

→ Screw all other data rails into the hanger clamps in the same way.

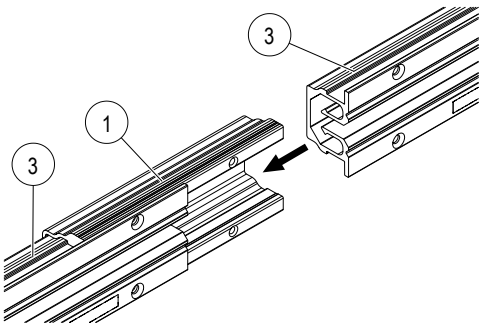
6.4.6 Mount the connectors

The individual data rails are connected to each other via connectors.

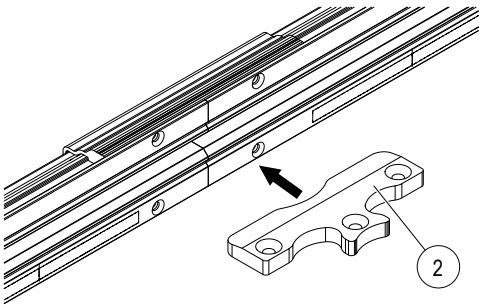
Work steps:

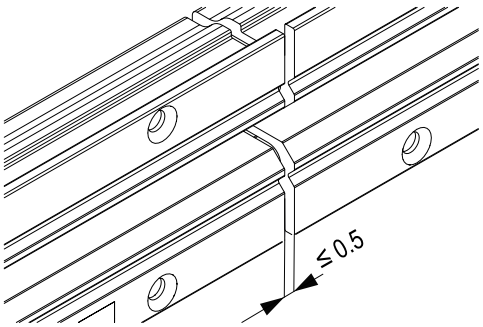


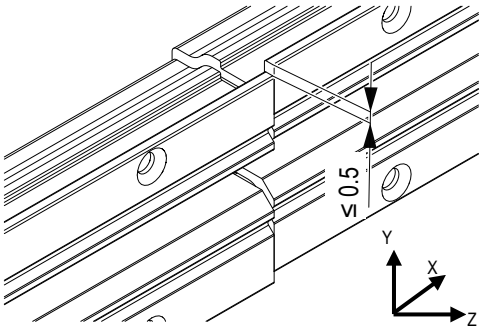
1. Slide (A) or clip (B) the connector (1) onto the first data rail (3) up to its center.



2. Slide the second data rail (3) into the connector (1).





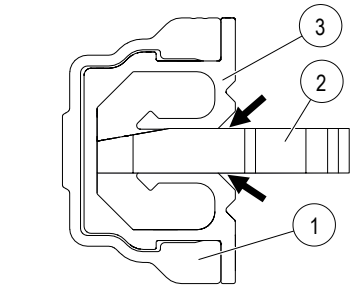
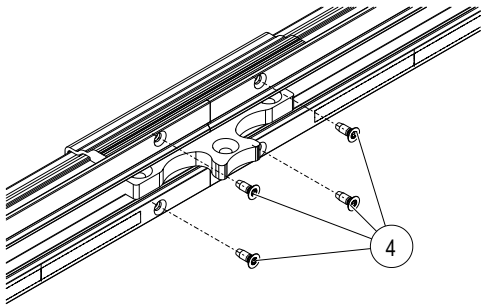
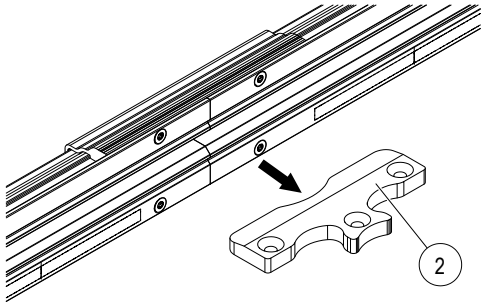
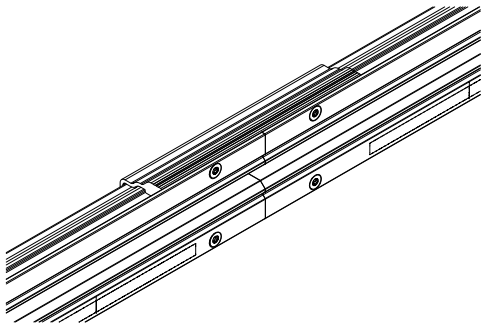


3. To avoid offset at the connection point, insert the mounting aid (2) into the connection point.

ATTENTION!

In order to ensure a trouble-free transfer of the collector at transfer points, the following additional conditions must be observed:

- **The two data rail ends must be in direct contact with each other! The gap between the data rails must not exceed 0.5 mm.**
- **The sliding surfaces for the sliding contacts must be level with each other and deburred.**
- **If both data rails have an offset of more than 0.5 mm in the Y direction, at least one data rail must be replaced.**

	4. Insert the mounting aid (2) into the data rail (3) in such a way that it lies flat against the inner surface of the data rail.
	5. Tighten all 4 screws (4) to 2 Nm using a torque shut-off screwdriver (mechanically).
	6. Remove the mounting aid (2) from the connection point.
	7. Deburr the transitions with a diamond square file (curved). The distance from the connector to the hanger clamp must be 30-100 mm (see Section 6.4.1).

6.4.7 Mount the anchor point

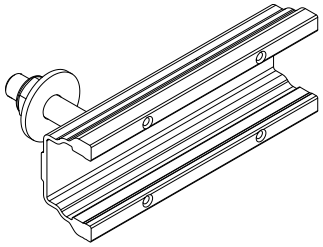


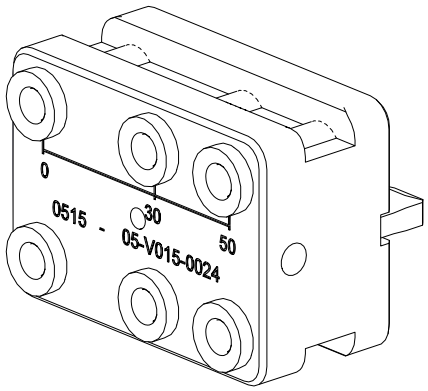
Fig. 73: Anchor point

ATTENTION!

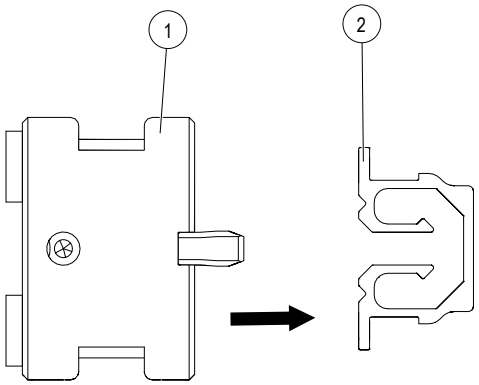
Note the following for the anchor point:

- Mount the anchor points according to the layout plan.
- The anchor point must not be used as a connector.
- If the anchor point is installed at a power feed, the short end must always point toward the power feed.

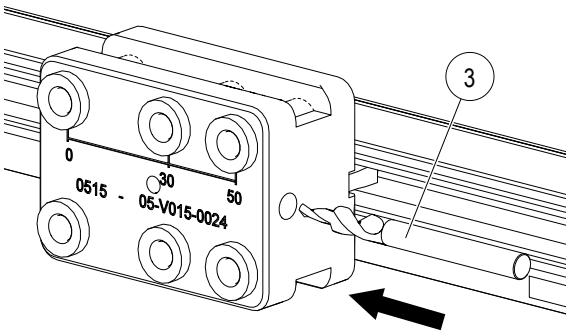
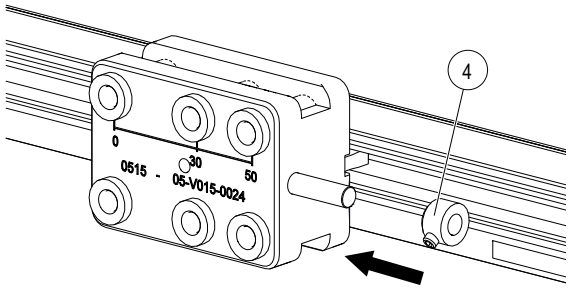
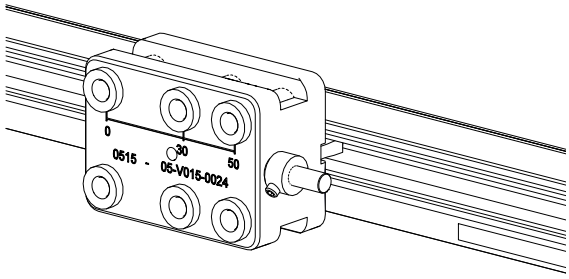
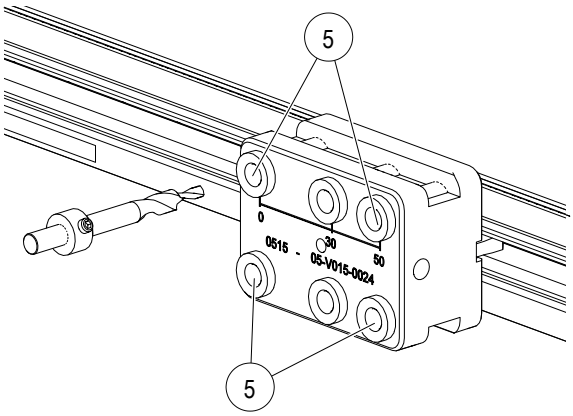
Work steps:

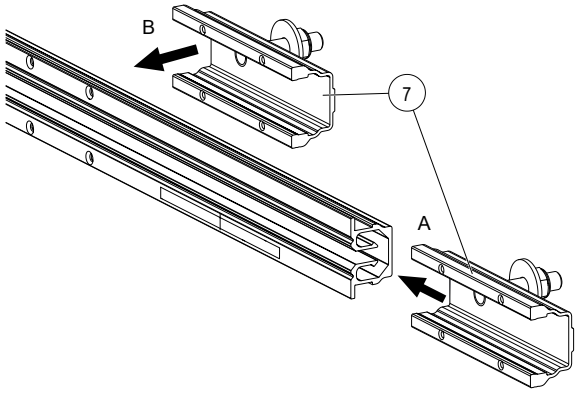
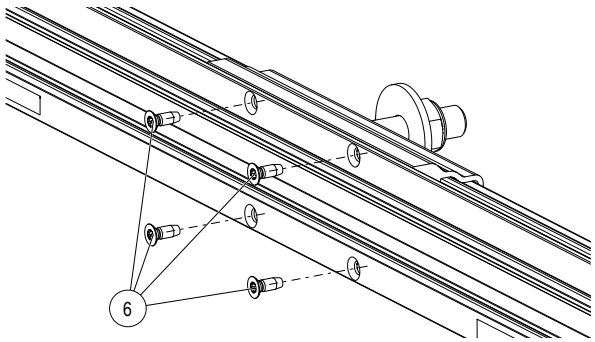
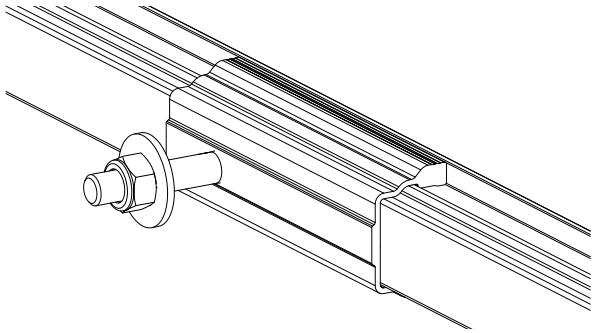
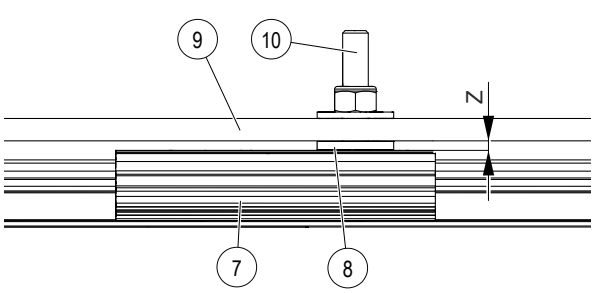


1. Use the flexible drilling jig 08-V015-0024 to drill the mounting holes for the anchor point in the data rail.



2. Align the drilling jig (1) in the data rail (2).

	3. To adjust the drilling depth, insert step drill M3 90° (3) into the lateral drill hole on the drilling jig up to the mechanical stop.
	4. Slide the stop ring (4) over the step drill M3 90°.
	5. Align the stop ring correctly and fasten it accordingly.
	6. Drill the 4 holes (5) into the data rail. The drill holes are deburred during the drilling process.

	7. Slide the anchor point (7) onto the data rail (A) or clip it in (B).
	8. Tighten the 4 self-tapping screws (W5154-K30X8-ES) (6) to 2 Nm using a torque shut-off screwdriver.
	9. Mounted anchor point.
	10. A through hole (D= 8.6 mm) must be drilled through the support structure (9) for the anchor point screw (10). Mount the anchor point screw nut (6) with a tightening torque of 12 ±2 Nm. The gap (Z) between the support profile (9) and anchor point (7) must be filled with washers (8).

6.4.8 Mount the ground connection

There are various ground connections (illustrations with PE cable and cable lug)

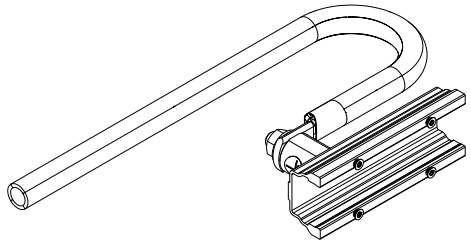


Fig. 74: Ground connection M8

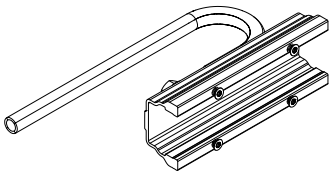


Fig. 75: Ground connection M6

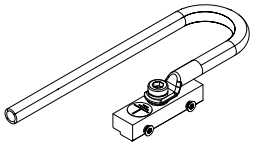


Fig. 76: Side ground connection (optional)

ATTENTION!

Observe the following for the ground connection:

- Install the functional grounding according to the layout plan.
- Establish protective equipotential bonding with the substructure every 25 m.
- Connect the data rail to the terminal box (functional grounding) using a ground connection for each power feed of the conductor data rail system. Only necessary if the data rail is used as a grounding system. If the PE cable is at the front of the support structure, it must be led back through (e.g. through a hole in the support structure) in such a way that it is possible to connect it to the terminal box.
- The ground connection must not act as an anchor point.
- The ground connection must not be used as a connector.

Before installing the M8 or M6 ground connection, drill an elongated hole in the support structure for the PE bolt through which the distance piece can be guided (see Fig. 78). The dimensions of the elongated hole depend on the air gap set in the expansion unit (see Section 6.4.4.2). In addition, the distance piece must be able to move freely in the elongated hole.
A through hole in the support structure is not required for a ground connection from the side.

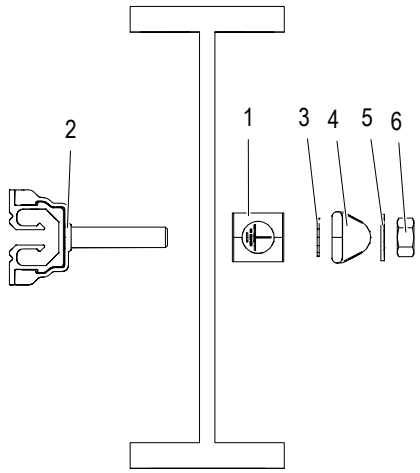


Fig. 77: Mount ground connection on support structure

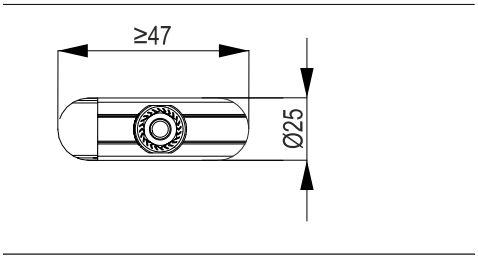
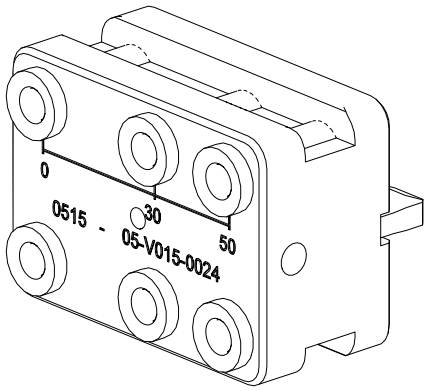


Fig. 78: Elongated hole for ground connection in support profile

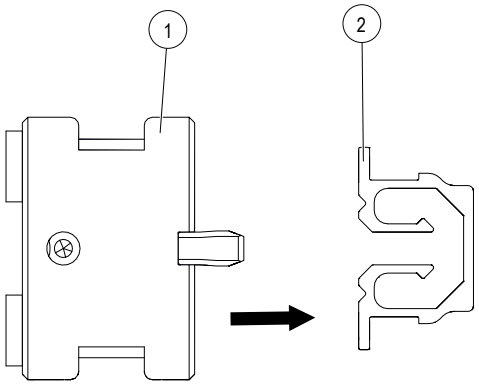
Item	Name
1	Distance piece Ø 21 mm
2	Ground connection
3	Serrated washer DIN6798
4	Cable lug
5	Detent-edged washer
6	Locking edge washer

6.4.8.1 Mount the M8 or M6 ground connection

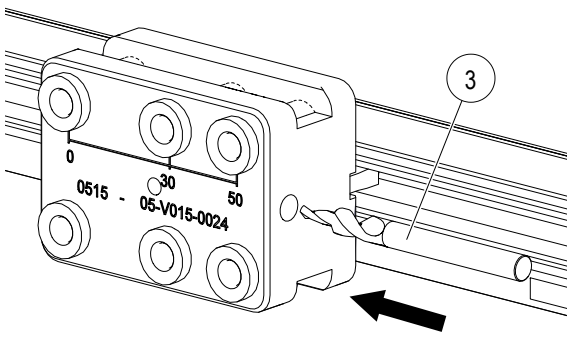
Work steps:



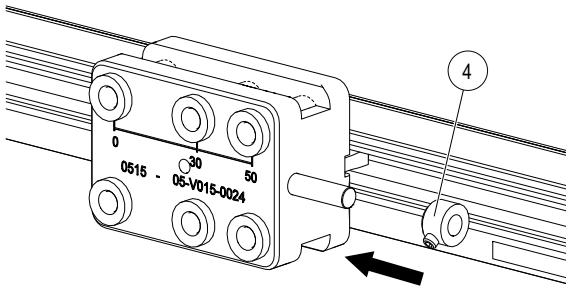
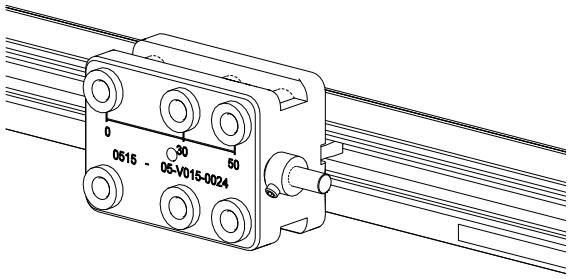
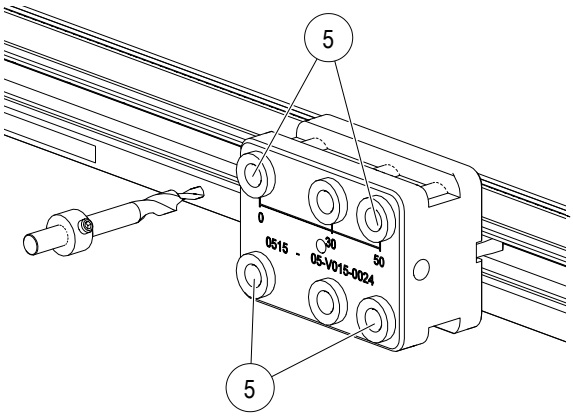
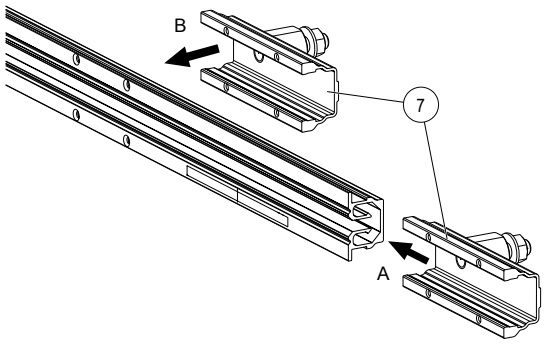
11. Use the flexible drilling jig 08-V015-0024 to drill the mounting holes for the ground connection in the data rail.

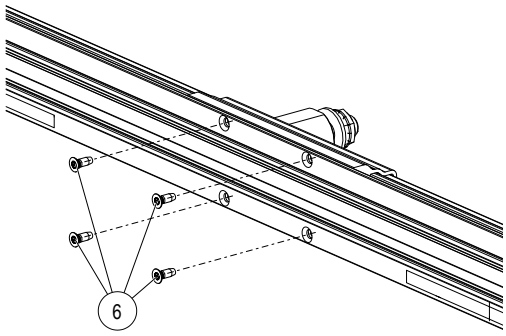
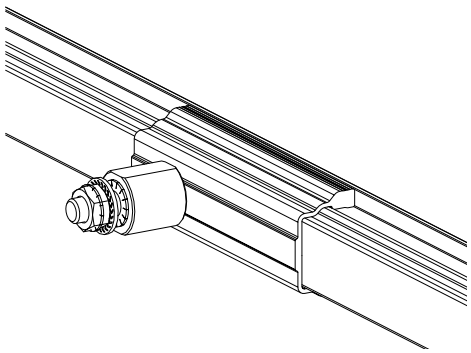


12. Align the drilling jig (1) in the data rail (2).



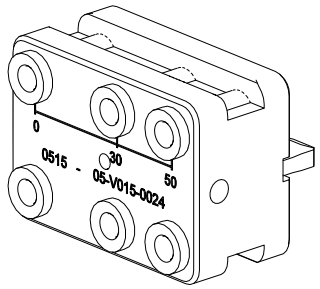
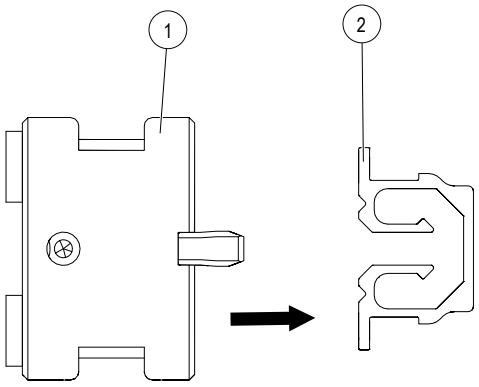
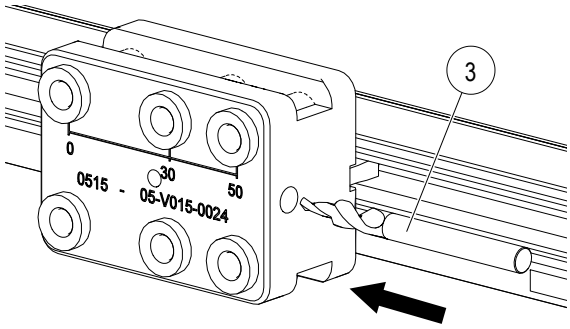
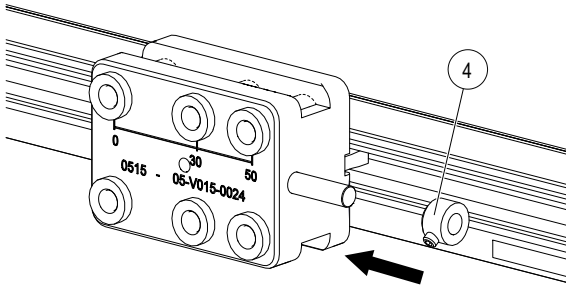
13. To adjust the drilling depth, insert step drill M3 90° (3) into the lateral drill hole on the drilling jig up to the mechanical stop.

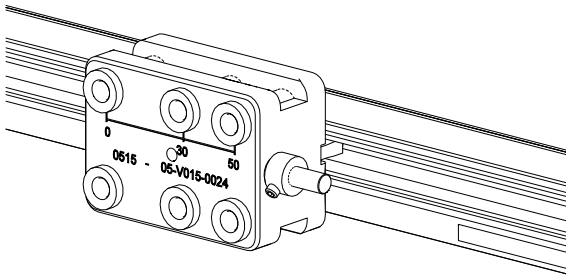
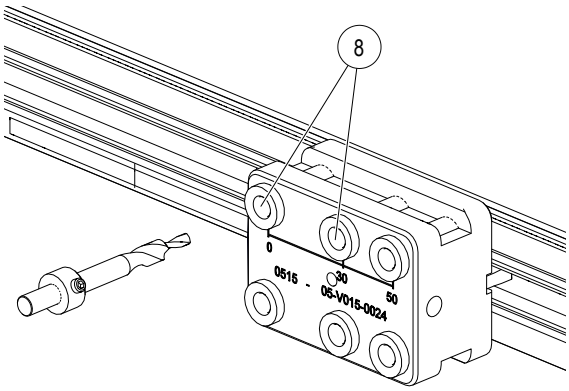
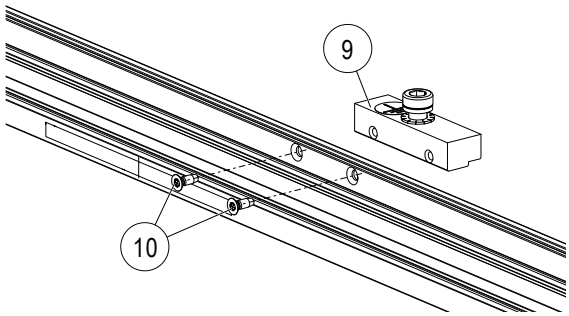
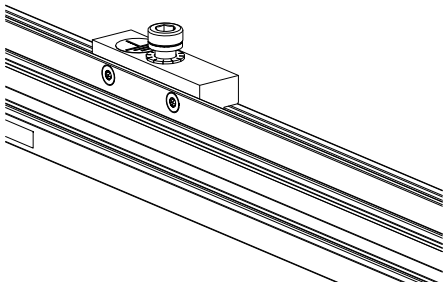
	14. Slide the stop ring (4) over the step drill M3 90°.
	15. Align the stop ring correctly and fasten it accordingly.
	16. Drill the 4 holes (5) into the data rail. The drill holes are deburred during the drilling process.
	17. Slide the ground connection (7) onto the data rail (A) or clip it in (B).

	18. Tighten the 4 self-tapping screws (W5154-K30X8-ES) (6) to 2 Nm using a torque shut-off screwdriver.
	19. Ground connection mounted.

6.4.8.2 Mount the ground connection on the side of the data rail (optional)

Work steps:

	1. The ground connection is mounted on the data rail. Use the flexible drilling jig 08-V015-0024 for drilling holes in the data rail.
	2. Align the drilling jig (1) in the data rail (2).
	3. To adjust the drilling depth, insert step drill M3 90° (3) into the lateral drill hole on the drilling jig up to the mechanical stop.
	4. Slide the stop ring (4) over the step drill M3 90°.

	5. Align the stop ring correctly and fasten it accordingly.
	6. Drill the 2 holes (8) in the data rail. The drill holes are deburred during the drilling process.
	7. Tighten the 2 self-tapping screws (W5154-K30X8-ES) (10) to 2 Nm using a torque shut-off screwdriver.
	8. Ground connection (side-mounted).

6.4.9 Connect PE cable to ground connection

If the data rail is operated in conjunction with a conductor data rail system and used as a PE system, it must also be connected to the customer's PE cable at the power feed points of the phase rail. If the route is interrupted by one or more transfers, each segment must be connected to the customer's system with a PE cable.
The cable cross-section of the PE cable can be determined by the customer, but must be designed to correspond to at least half the phase current. In addition, the PE cable must be suitable for an operating temperature of at least 90 °C.
The ground connection is used to connect the PE cable to the data rails.

Work steps:

→ Fasten the PE cable to the PE connector with the cable lug (for screw size M8) according to the applicable standards and regulations (see Fig. 79).

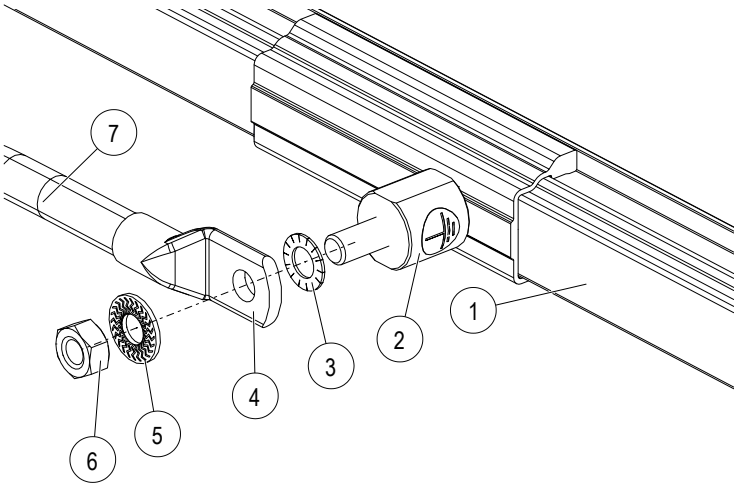
→ Use nickel-plated cable lugs (for corrosion protection).

ATTENTION!

Note the following for the PE cable:

- Do not crimp the PE cable!
- Comply with the bending radii of the PE cables (see Data Sheet).
- The PE cable must be suitable for an operating temperature of at least 90° C!

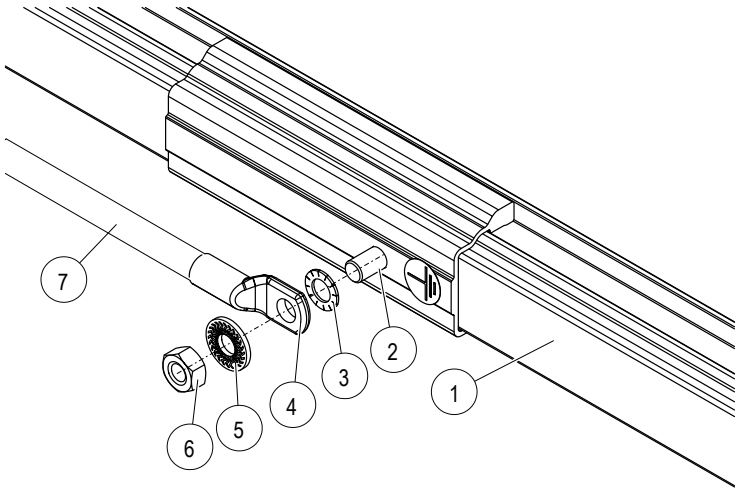
6.4.9.1 Mount the M8 or M6 ground connection



Item	Name
1	data rail
2	Ground connection with PE symbol
3	Serrated washer
4	Cable lug
5	Detent-edged washer
6	Nut
7	PE cable

Fig. 79: Ground connection M8 with PE cable

Tightening torque of nut M8 (1): 12 ±2 Nm

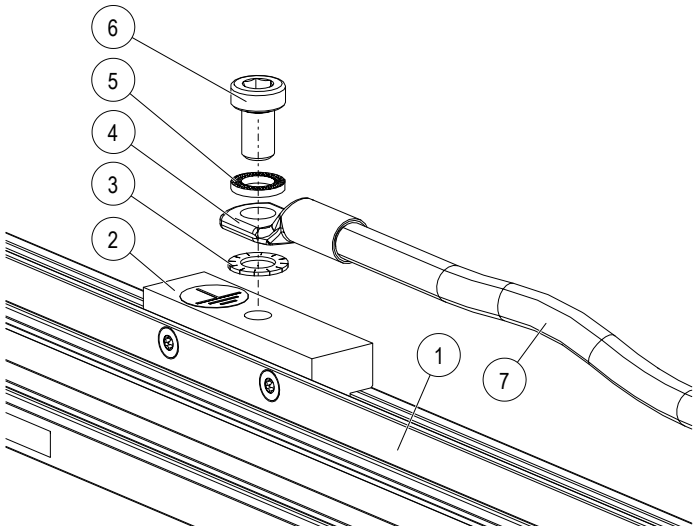


Item	Name
1	data rail
2	Ground connection with PE symbol
3	Serrated washer
4	Cable lug
5	Detent-edged washer
6	Nut
7	PE cable

Fig. 80: Ground connection M6 with PE cable

Tightening torque of nut M6 (1): 3.8 ±0.4 Nm

6.4.9.2 Side ground connection (optional)



Item	Name
1	data rail
2	Ground connection with PE symbol
3	Serrated washer
4	Cable lug up to 25 mm² M6 possible with max. width (W) of <14 mm
5	Detent-edged washer
6	Cylinder head screw
7	PE cable

Fig. 81: Ground connection (on the side)

Tightening torque of the cylinder head screw (6): 3.8 ±0.4 Nm

6.4.10 Adjust the length of the data rail

The data rails have a standard length of 5 m. Shorter lengths are available, but are usually produced at the installation site.

The connection points between the data rails have a great impact on the attenuation of the system. In order for the attenuation to be as low as possible, the rails must be precisely machined and connected at the connection points.
We therefore recommend that the installation only be carried out by Conductix-Wampfler personnel.

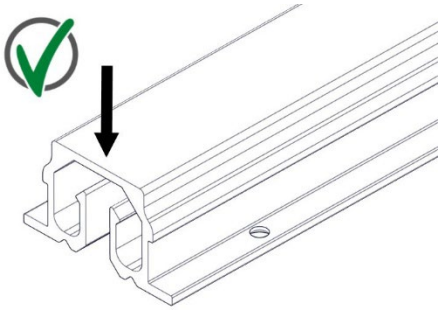


Fig. 82: Correct cutting direction

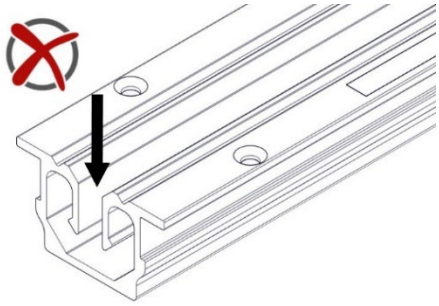


Fig. 83: Incorrect cutting direction

Work steps:

→ Determine the required length of the data rail.

→ The cutting direction (1) must be from the closed data rail side.

→ Saw the data rails at right angles with the cross-cut saw.

→ Drill holes and countersinks with the step drill M3 90° for connectors using the drilling jig (see Section 6.4.11).

→ Deburr all edges in the area in accordance with DIN ISO 13715 (Fig. 84).

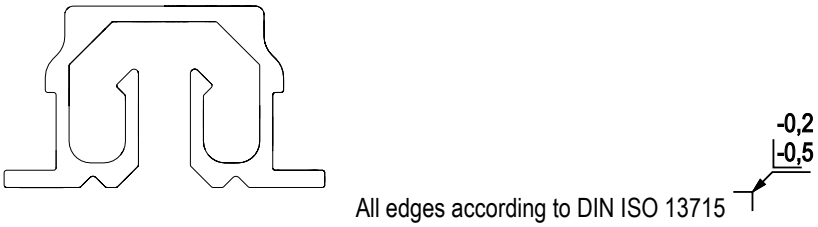


Fig. 84: Deburr data rail

ATTENTION!

Sharp edges due to a poor saw cut

A poor saw cut can result in a gap or offset at the joints of the data rails. This leads to increased wear of the sliding contacts within a short period. It can also have a negative impact on the quality of data transmission. Follow the instructions in Section 6.4.6.

6.4.11 Finishing for connectors

After sawing the data rail, the holes for the connection in the data rail must be re-drilled. The drilling jig (Order No.: 05-V015-0005) must be used for this.

Steps for drilling the data rail with the drilling jig:

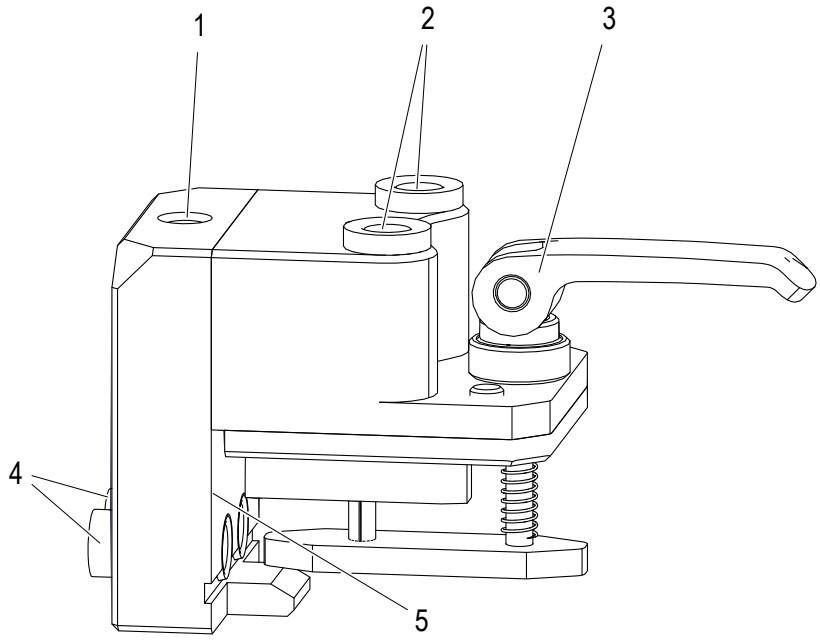
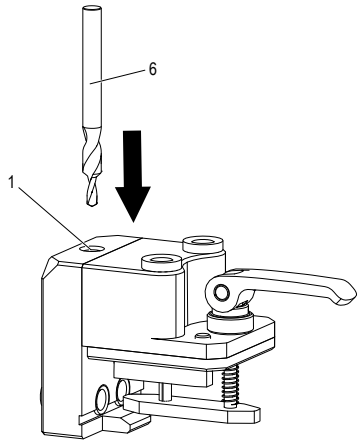


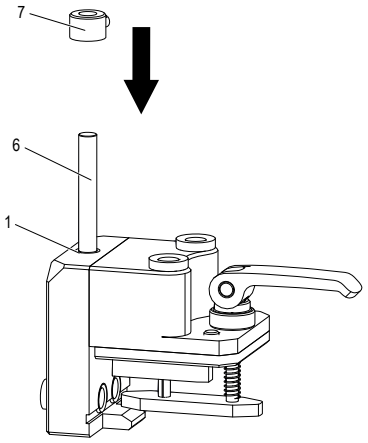
Fig. 85: Drilling jig 0515 overview

Item	Name
1	Drilling hole (to set/adjust the adjusting ring)
2	Drill guide
3	Eccentric tappet with adjustment nut
4	Drill boring bushes for the cut-outs
5	Rail stop

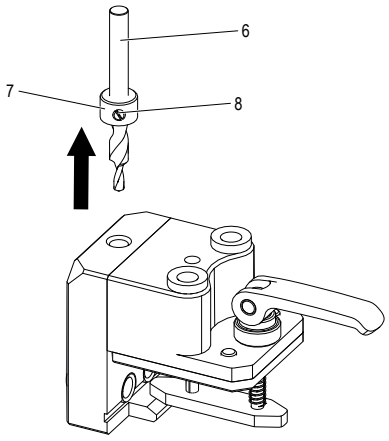
Work steps:



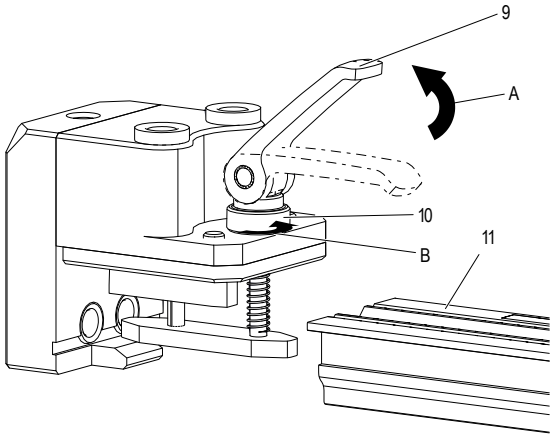
1. Insert the step drill M3 90° (6) into the drill hole (1) up to the mechanical stop to set the correct dimension.



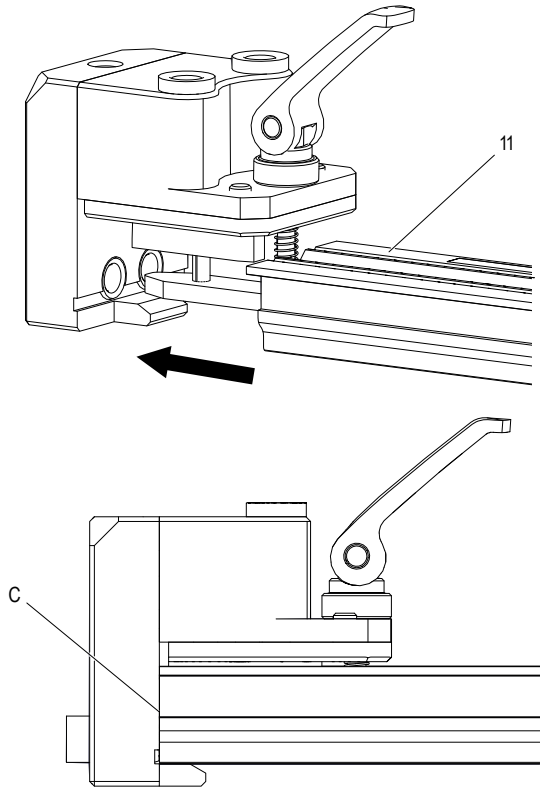
2. Insert the adjusting ring (7) over the step drill (6) into the drill hole (1).



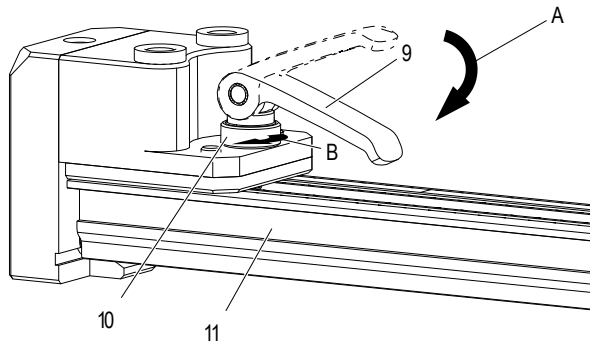
3. Remove the step drill (6) from the drill hole (1) with the adjusting ring (7) and set screw (8) tightened.



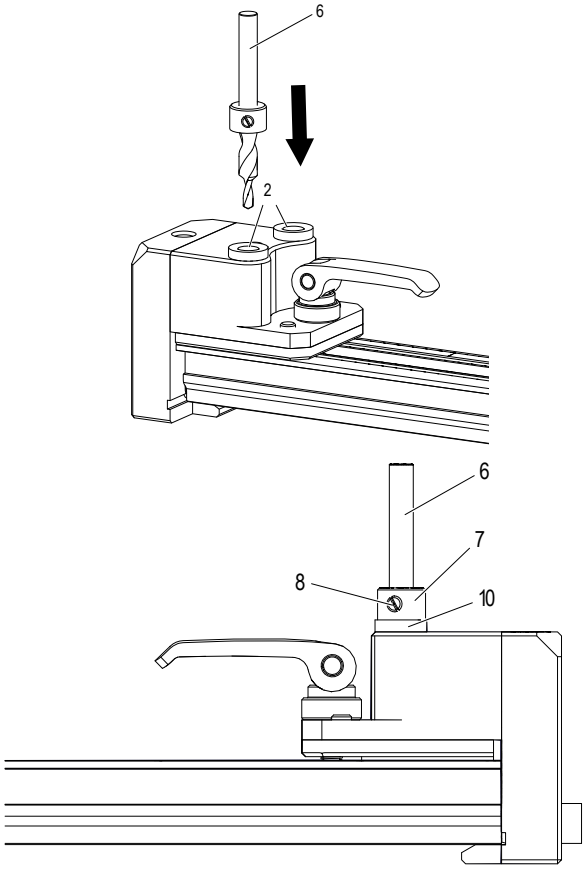
4. To release the drilling device, open the eccentric tappet (9) (A) and loosen the adjustment nut (10) (B).
   Position the data rail (11) at the drilling jig.



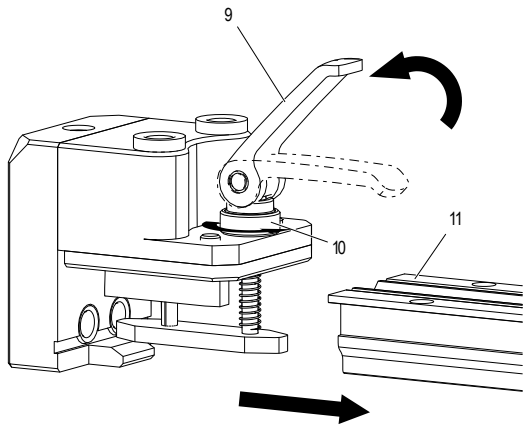
5. Slide the data rail (11) up to the data rail stop (C).



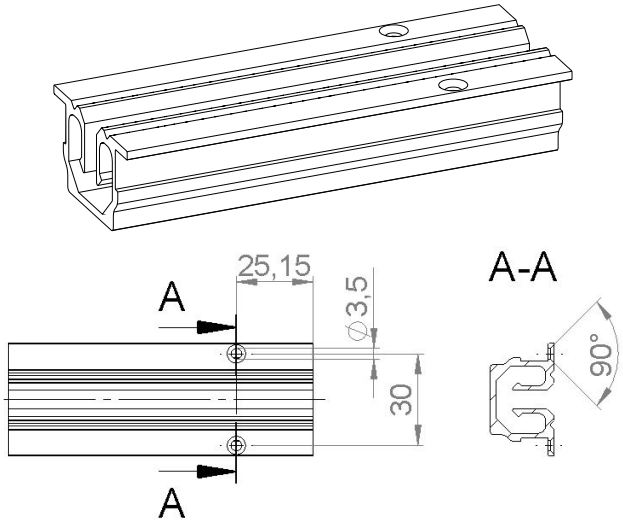
6. Close the eccentric clamp (9) (A) and tighten the adjustment nut (10) (B) to fix the data rail (11) in the drilling jig.



7. Drill the data rail with a cordless screwdriver (incl. countersink). The adjusting ring must make contact with the drill bush.



8. Open the eccentric tappet (9) and the adjustment nut (10) to remove the data rail.

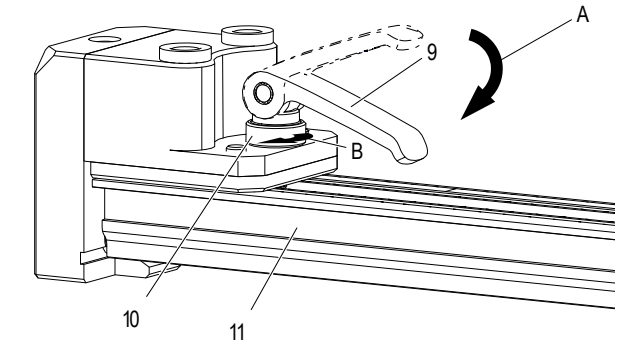


9. Check the distance dimensions.

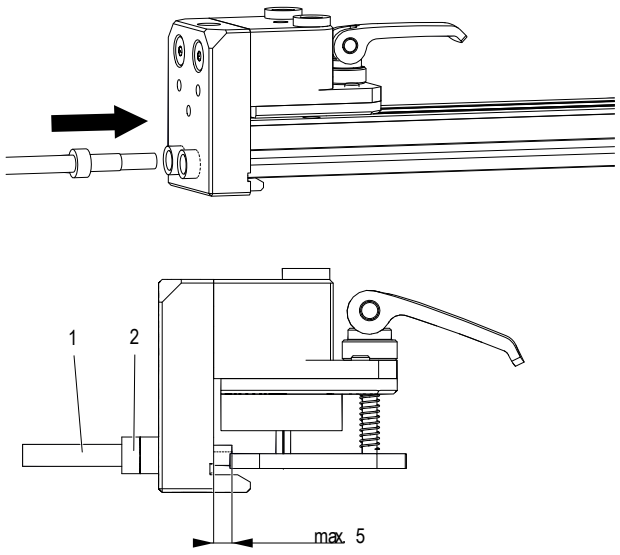
6.4.12 Finishing for absorbers (only when installing absorbers in special cases)

Absorbers are required at the open ends of the data rails in the event of route interruptions such as air gaps, expansion units or switches, etc. The absorbers prevent signals from being exchanged between the ProfiDAT*compact* system and the environment. To insert the absorbers, use the drilling jig (Order No.: 05-V015-0005) to make cut-outs at the applicable data rail ends.

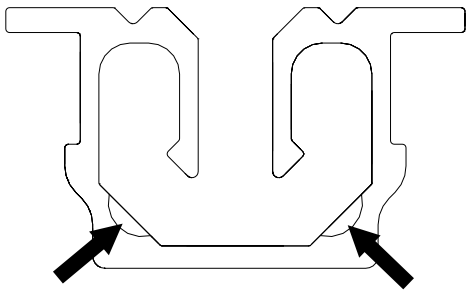
Work steps for producing the cut-out with the drilling jig:



1. Close the eccentric clamp (9) (A) and tighten the adjustment nut (10) (B) to fix the data rail (11) in the drilling jig.



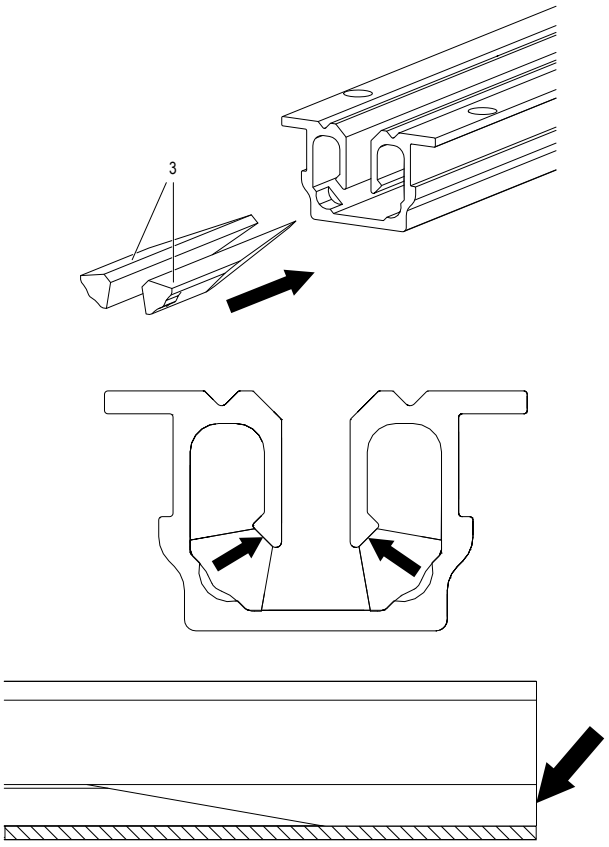
2. Insert the supplied 5.5 mm Ø milling cutter (1) with the adjustment ring (2) into the boring bush. If the adjustment ring has slipped, the adjustment ring must then be adjusted so that a 5 mm deep pocket can be milled into the data rail.



3. Produce the cut-out in the data rail. After milling, deburr the milled pocket and remove chips from the data rail.

ATTENTION!

The milling cutter must be rotating before it comes into contact with the data rail. Otherwise, the milling cutter may tilt and there will not be a clean cut!



4. Insert the absorbers (3) into the data rail with increased manual force so that they are flush with the data rail. If necessary, use a rubber mallet for installation if the absorbers are not flush with the data rail. If a small splinter forms when the absorber is inserted, it must be removed.

6.4.13 Drilling patterns for support structure

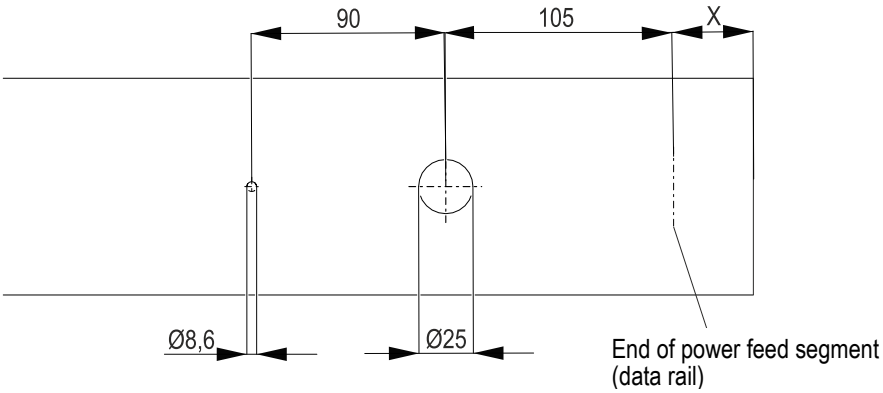
If the support structure is located directly at the rear of the data rail, through holes must be drilled in the support structure for the stationary antennas, ground connection and anchor points. This is described in the respective sections within this document.
Common drilling patterns are shown below. However, there may be deviations from this within the scope of projects, which is why this should be discussed with Conductix-Wampfler in the design phase.
Project-specific drawings can be requested from Conductix-Wampfler during the design phase.

ATTENTION!

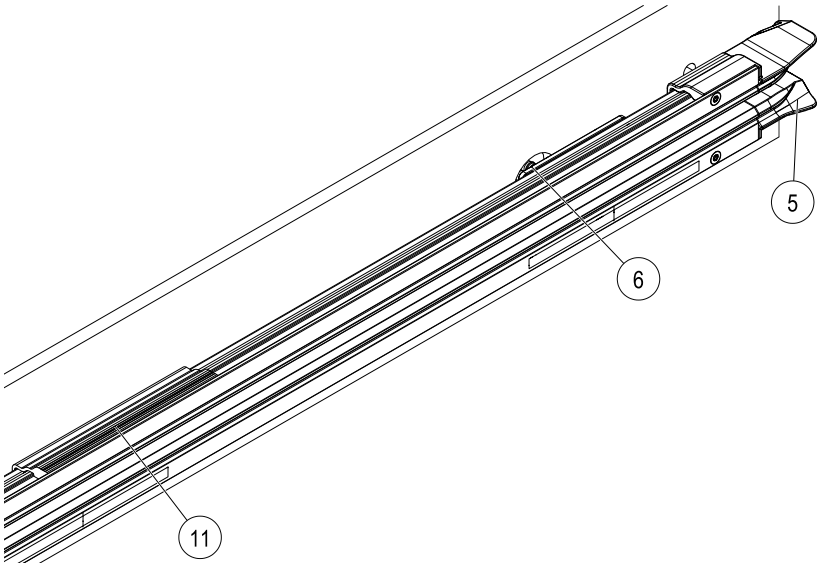
Drilling patterns in Sections 6.4.13.1 to 6.4.13.6 are not suitable for support structures with diagonal cuts!

6.4.13.1 Drilling pattern for transfer guide with anchor point and left/right power feed (signal propagation on one side)

Drilling pattern for power feed left/right, anchor point in anchor point

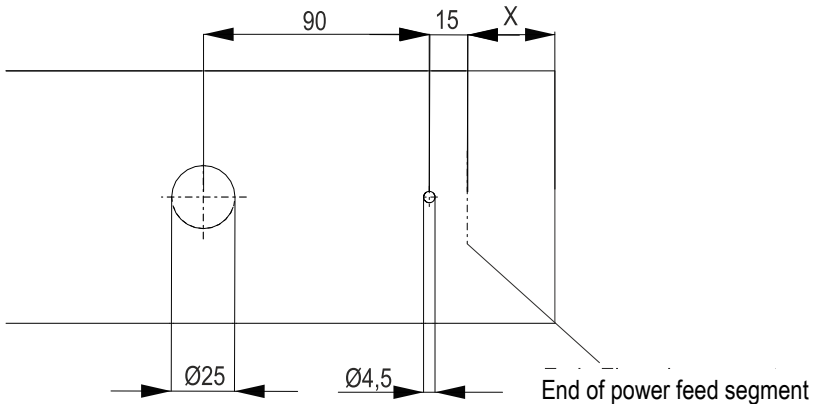


Transfer guide	Dimension X
Plastic	35
Aluminium	25

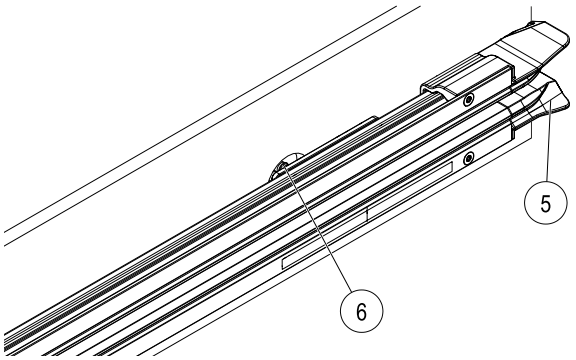


Item	Name
5	Transfer guide
6	Stationary antenna (power feed)
11	Anchor point

Drilling pattern for power feed left/right, anchor point in transfer guide

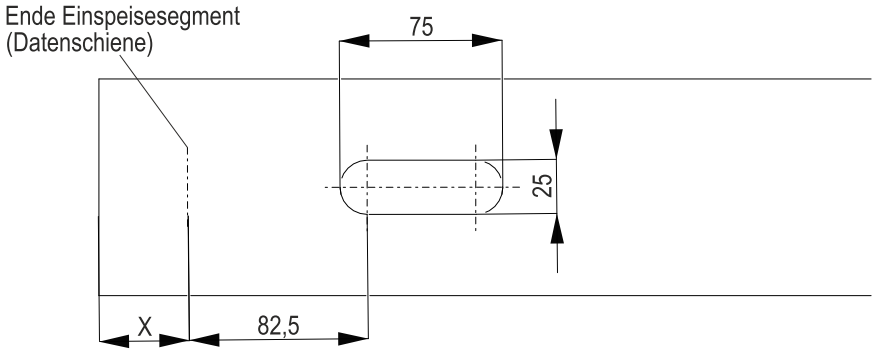


Transfer guide	Dimension X
Plastic	35
Aluminium	25

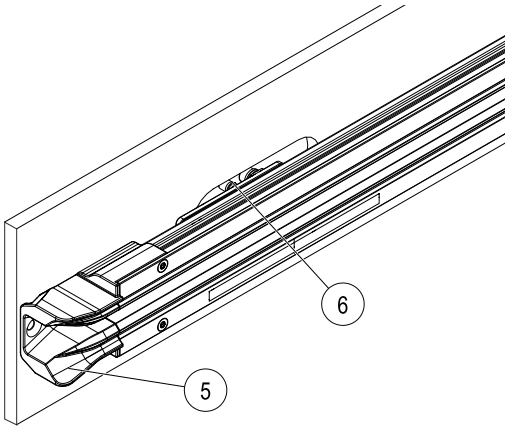


Item	Name
5	Transfer guide with anchor point
6	Stationary antenna (power feed)

6.4.13.2 Drilling pattern for transfer guide without anchor point and left/right power feed (signal propagation on one side)



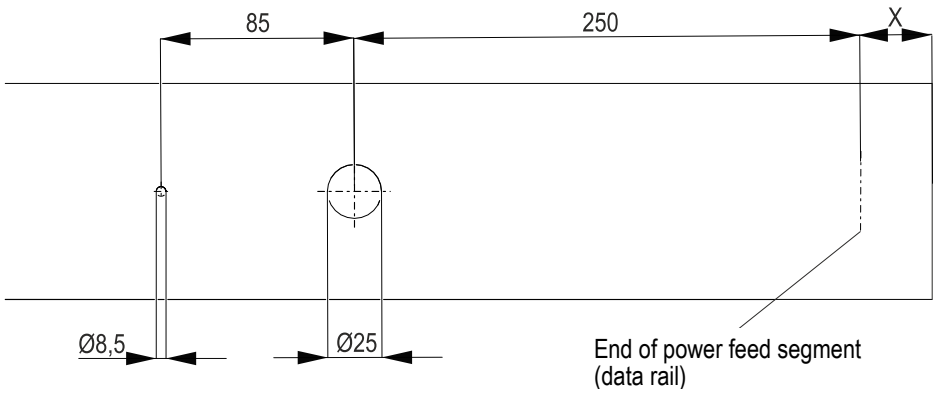
Transfer guide	Dimension X
Plastic	35
Aluminium	25



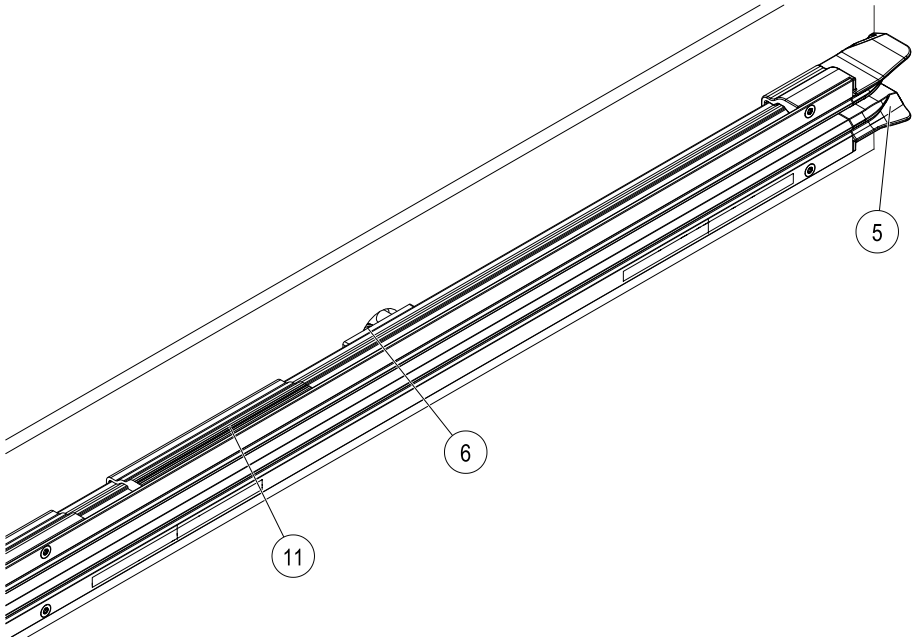
Item	Name
5	Transfer guide
6	Stationary antenna (power feed)

6.4.13.3 Drilling pattern for transfer guide with anchor point and power feed (signal propagation on both sides)

Drilling pattern for power feed with anchor point in anchor point

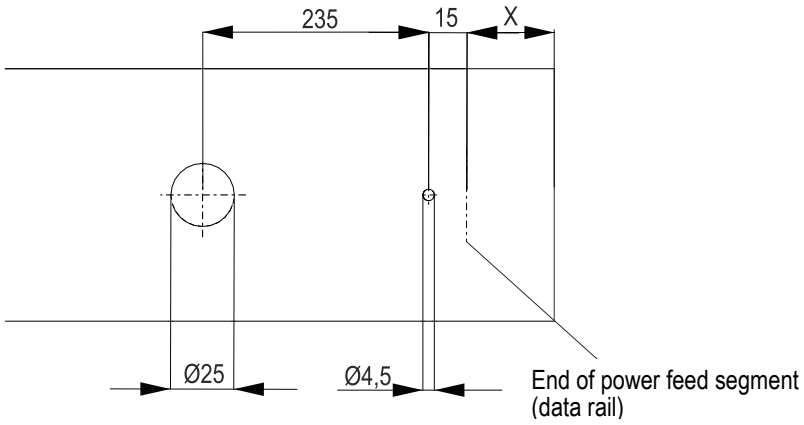


Transfer guide	Dimension X
Plastic	35
Aluminium	25

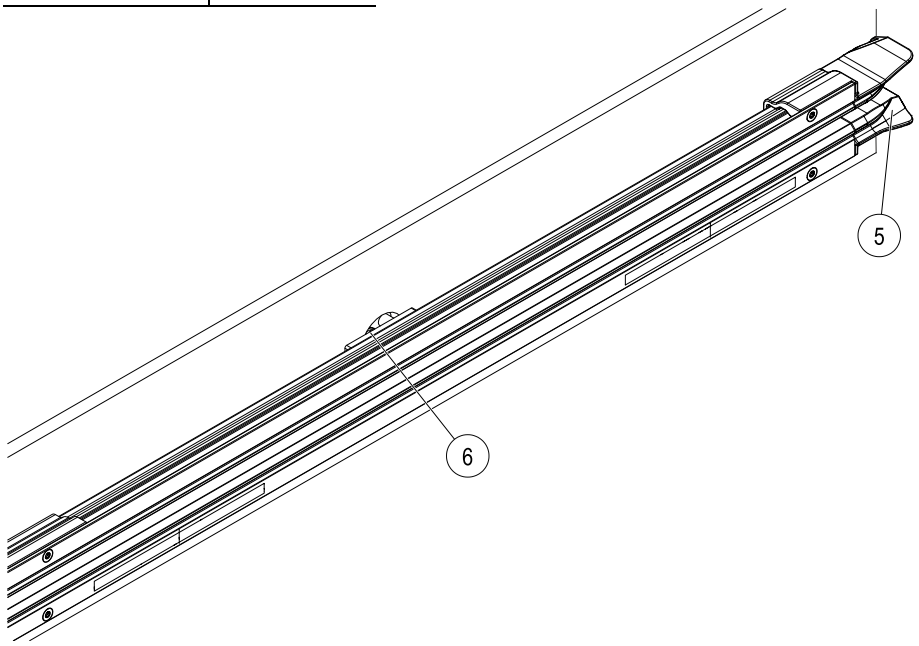


Item	Name
5	Transfer guide
6	Stationary antenna (power feed)
11	Anchor point

Drilling pattern for power feed with anchor point in transfer guide

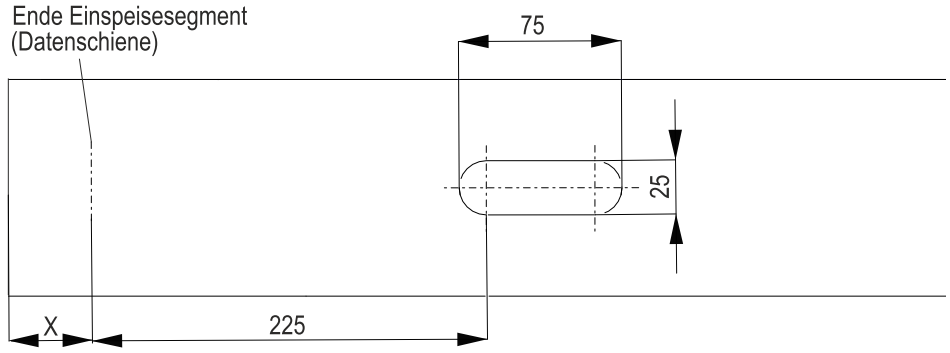


Transfer guide	Dimension X
Plastic	35
Aluminium	25

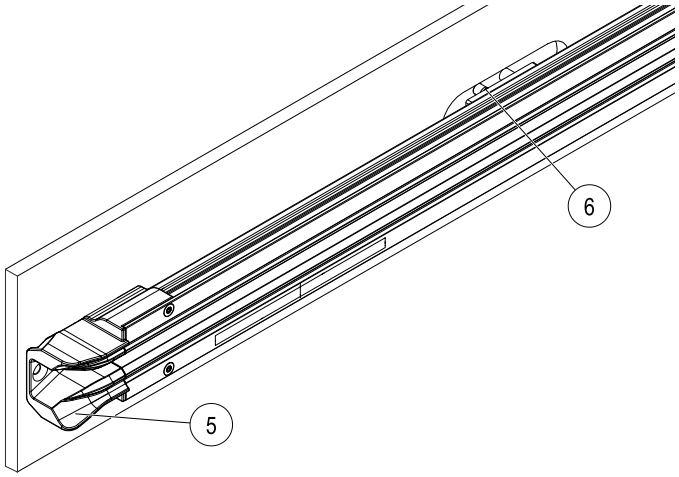


Item	Name
5	Transfer guide with anchor point
6	Stationary antenna (power feed)

6.4.13.4 Drilling pattern for transfer guide without anchor point and power feed (signal propagation on both sides)

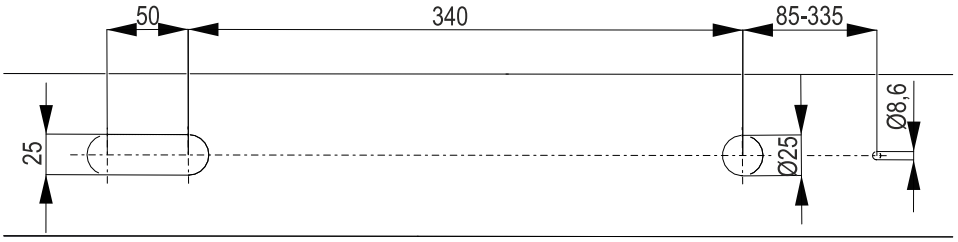


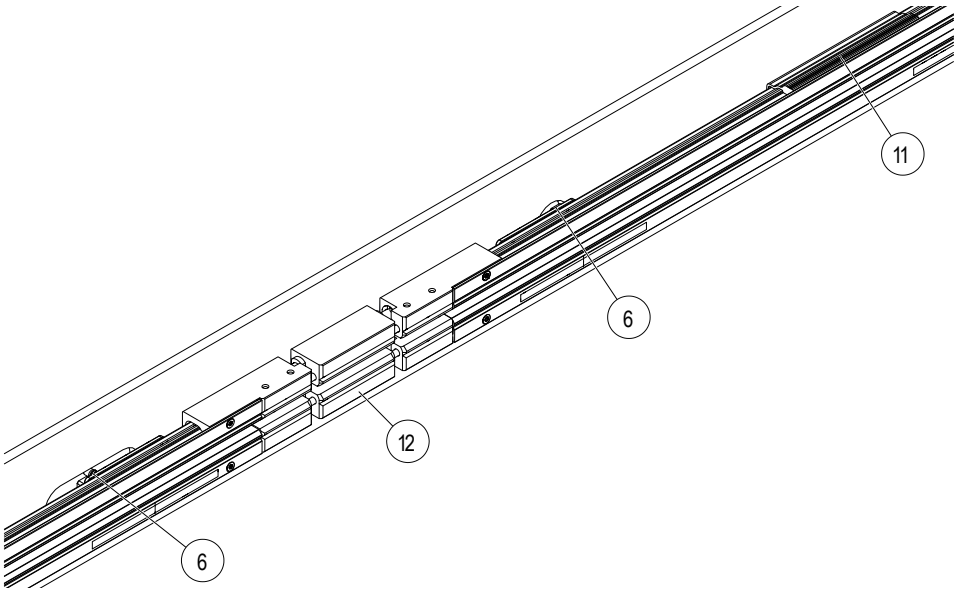
Transfer guide	Dimension X
Plastic	35
Aluminium	25



Item	Name
5	Transfer guide
6	Stationary antenna (power feed)

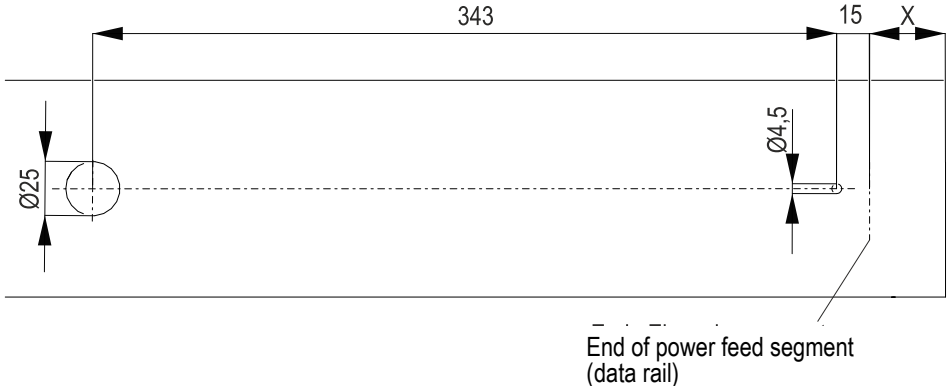
6.4.13.5 Drilling pattern for end feed left, end feed right (signal propagation on one side) with one expansion element



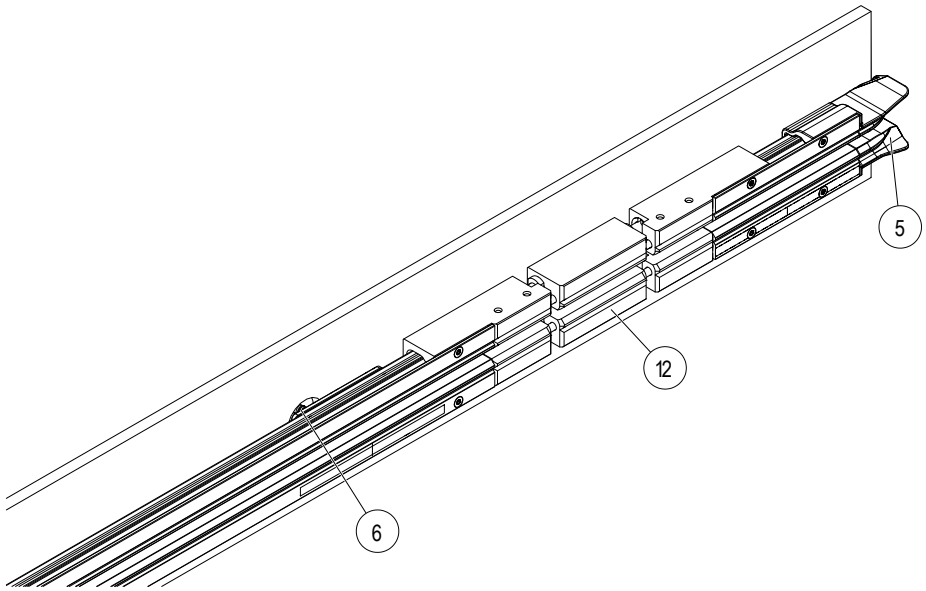


Item	Name
6	Stationary antenna (power feed)
11	Anchor point
12	Expansion unit

6.4.13.6 Drilling pattern for transfer guide, end feed left/right (signal propagation on one side) with one expansion element

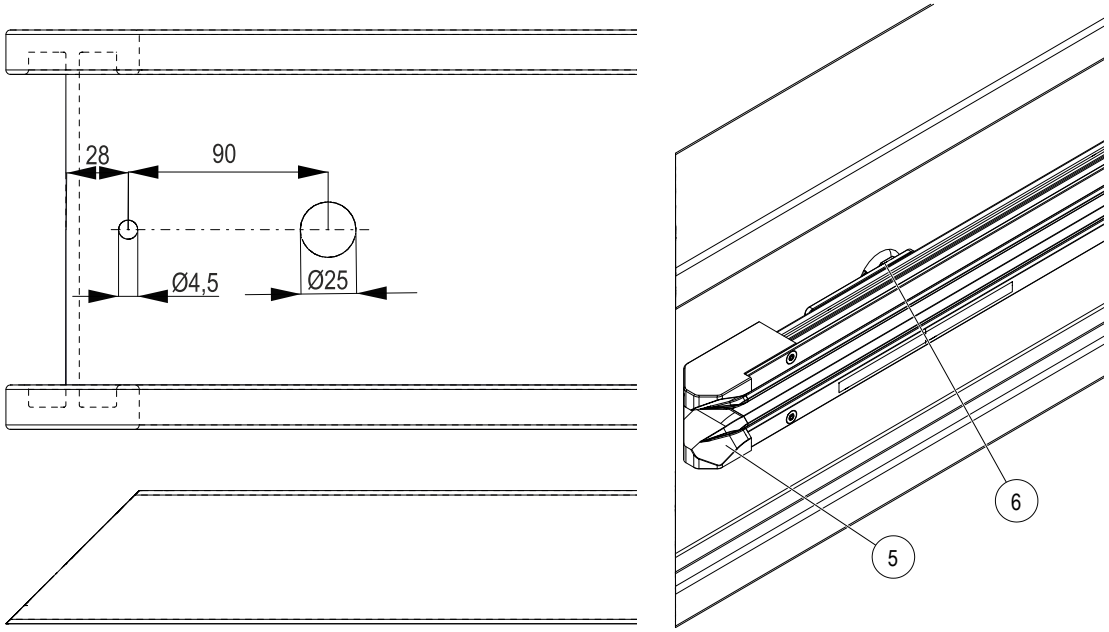


Transfer guide	Dimension X
Plastic	35
Aluminium	25



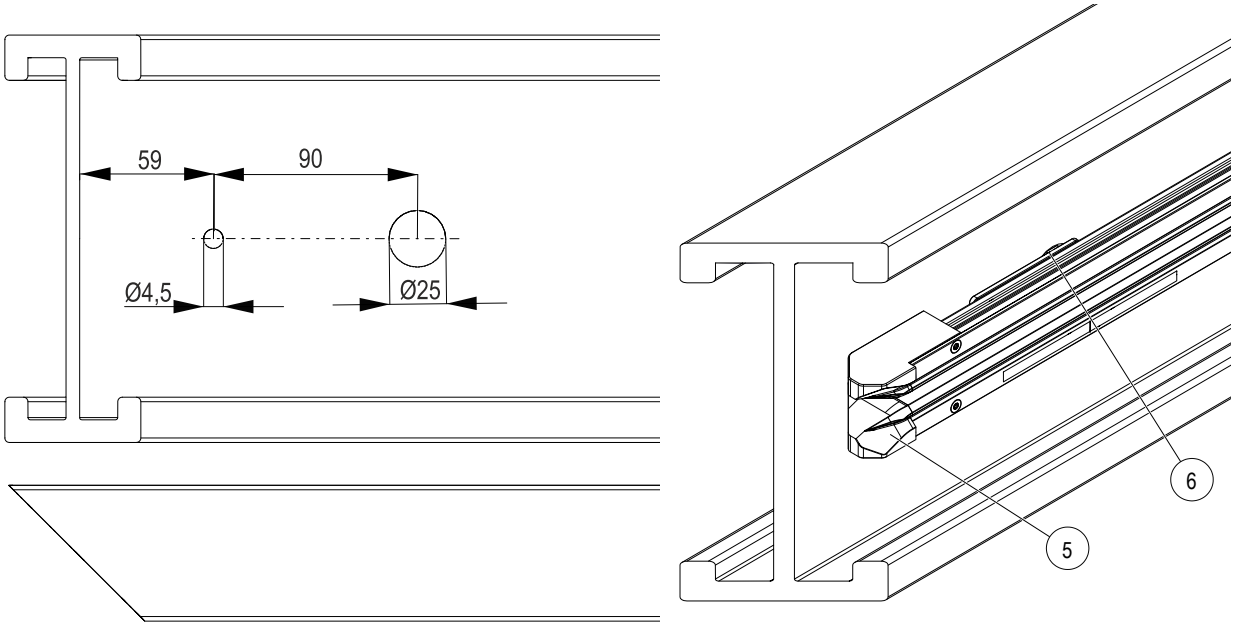
Item	Name
5	Transfer guide with anchor point
6	Stationary antenna (power feed)
12	Expansion unit

6.4.13.7 Drilling pattern for aluminium transfer guide, left/right power feed (signal propagation on one side) with anchor point (45° cut short side)



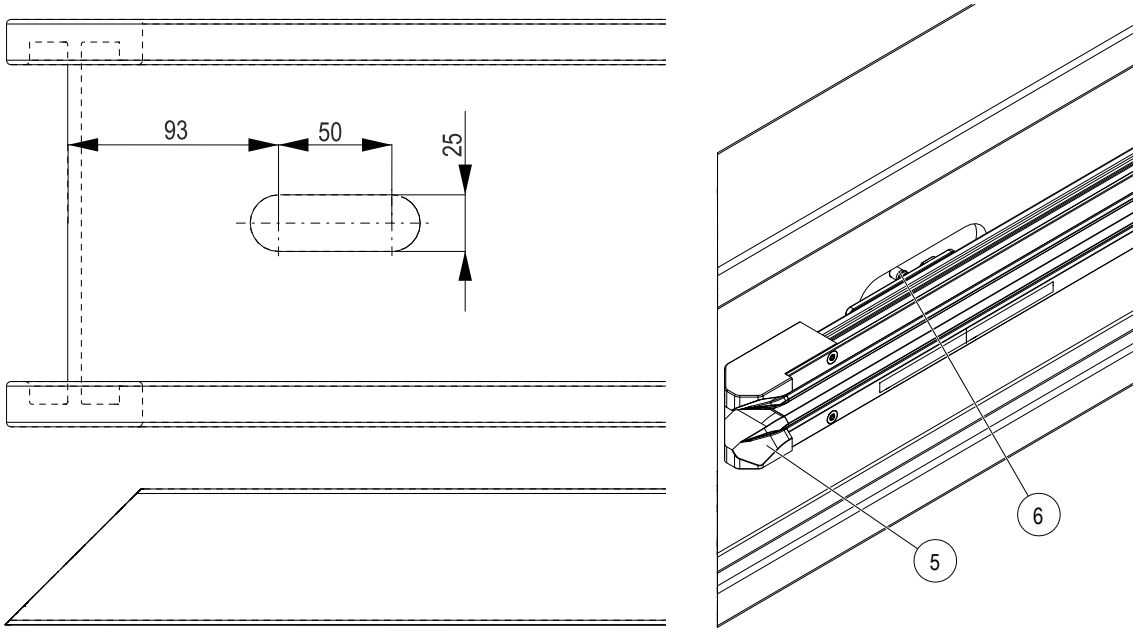
Item	Name
5	Transfer guide with anchor point
6	Stationary antenna (power feed)

6.4.13.8 Drilling pattern for aluminium transfer guide, left/right power feed (signal propagation on one side) with anchor point (45° cut long side)



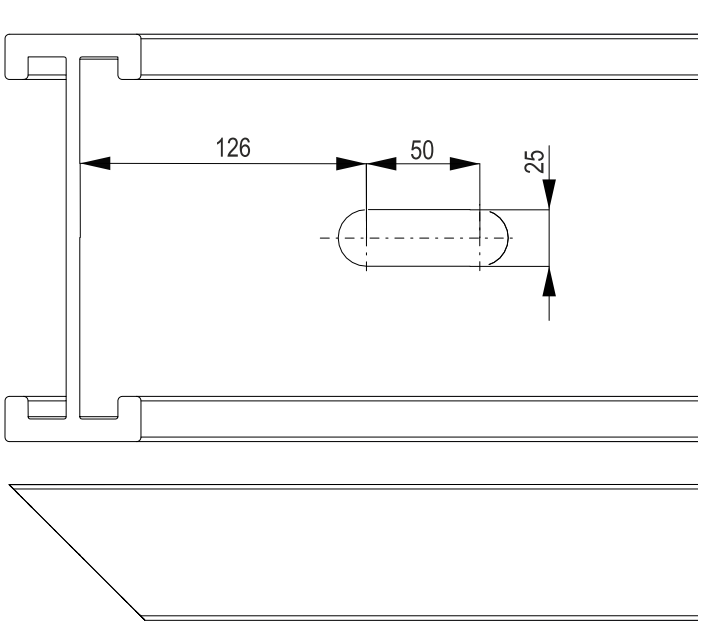
Item	Name
5	Transfer guide with anchor point
6	Stationary antenna (power feed)

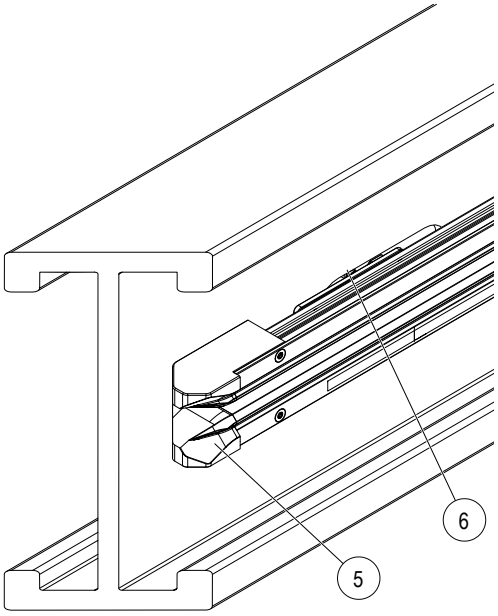
6.4.13.9 Drilling pattern for aluminium transfer guide, left/right power feed (signal propagation on one side) without anchor point (45° cut short side)



Item	Name
5	Transfer guide
6	Stationary antenna (power feed)

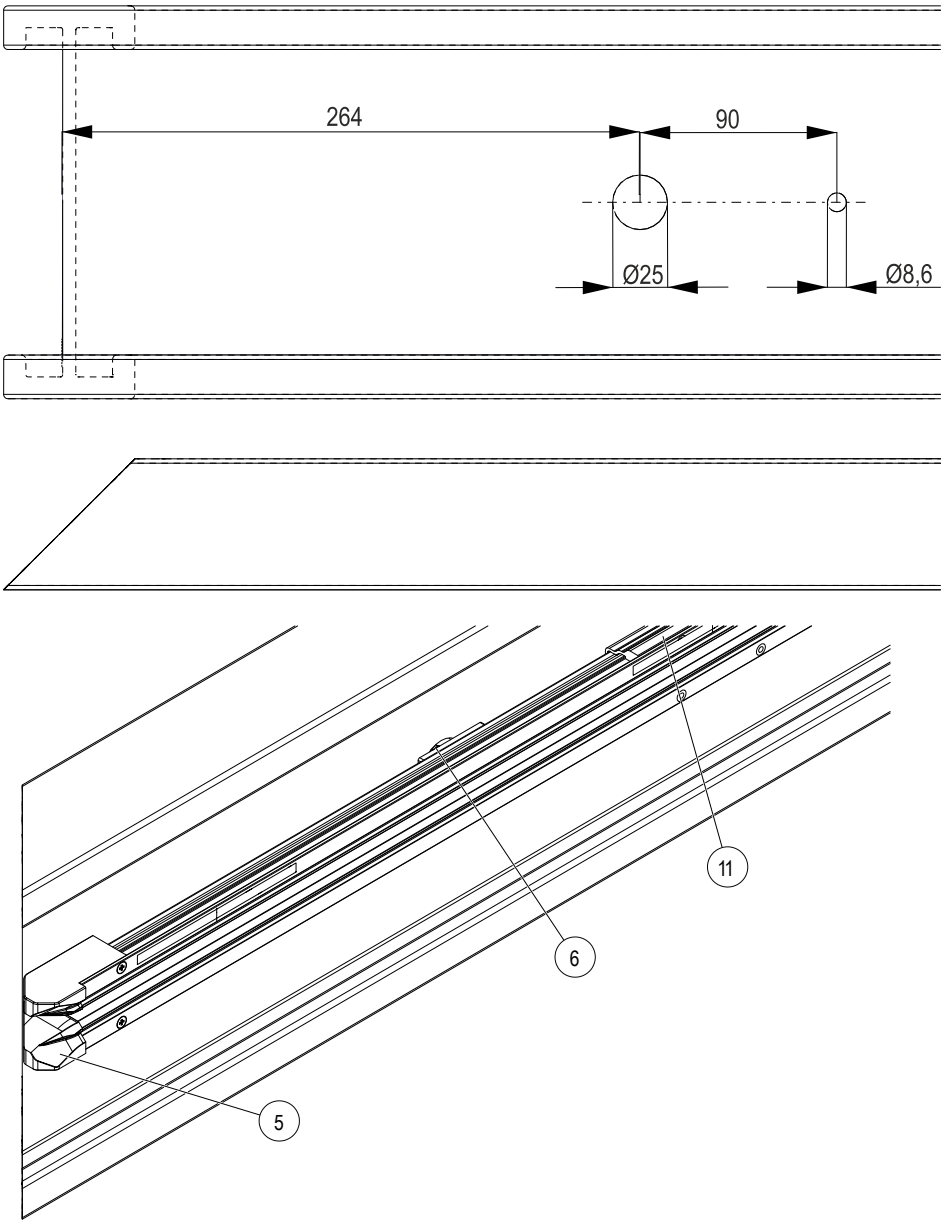
6.4.13.10 Drilling pattern for aluminium transfer guide, left/right power feed (signal propagation on one side) without anchor point (45° cut long side)





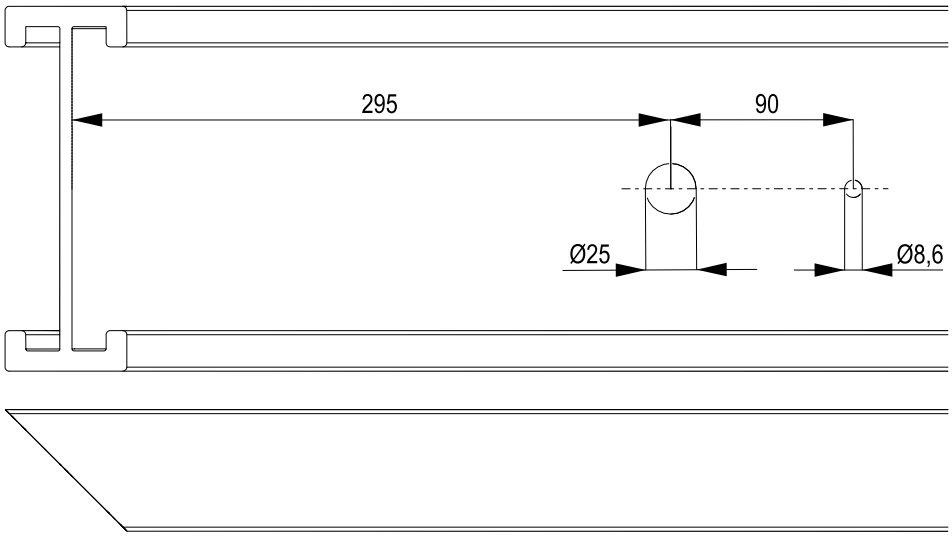
Item	Name
5	Transfer guide
6	Stationary antenna (power feed)

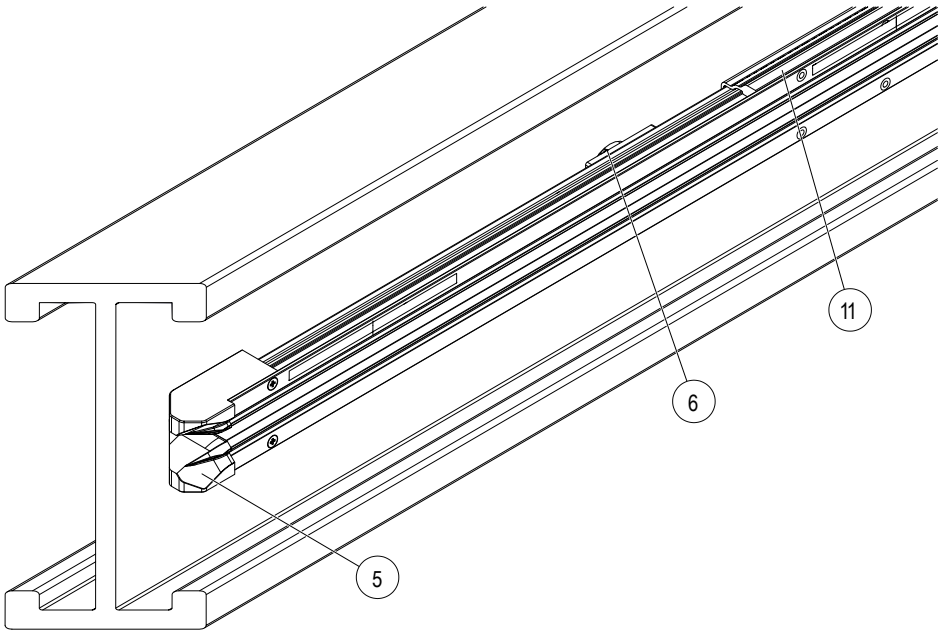
6.4.13.11 Drilling pattern for aluminium transfer guide, power feed (signal propagation on both sides) with anchor point (45° cut short side)



Item	Name
5	Transfer guide
6	Stationary antenna (power feed)
11	Anchor point

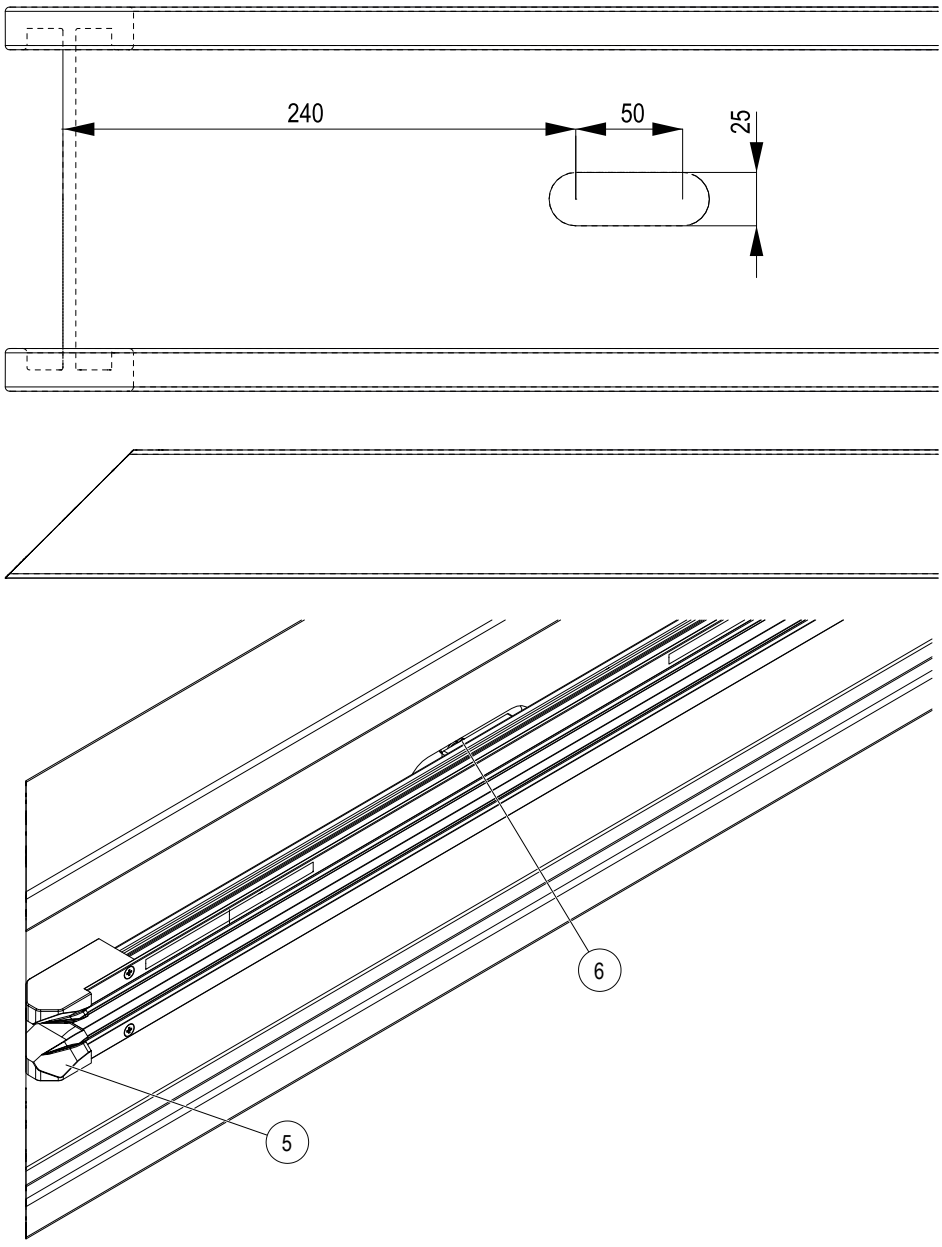
6.4.13.12 Drilling pattern for aluminium transfer guide, power feed (signal propagation on both sides) with anchor point (45° cut long side)





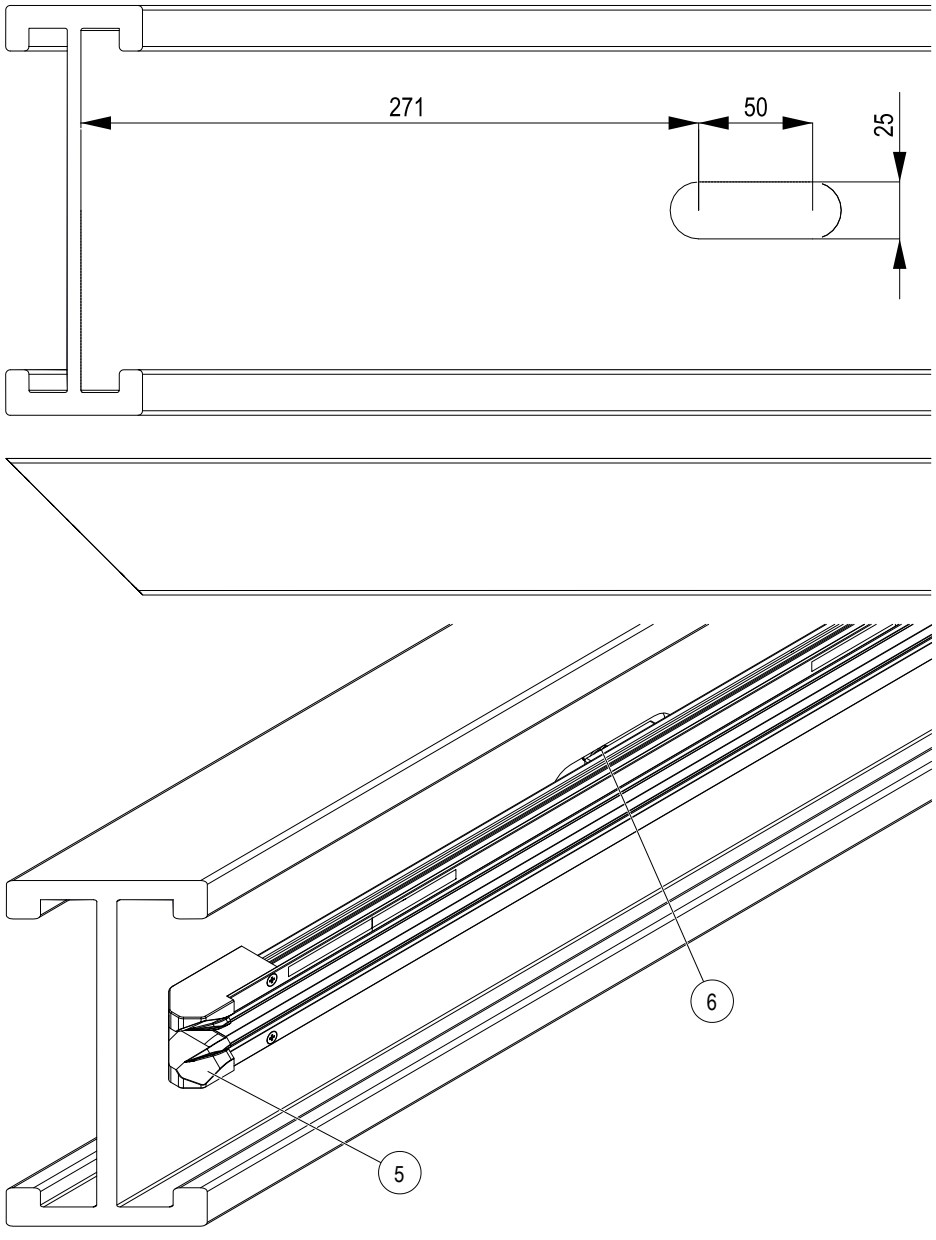
Item	Name
5	Transfer guide
6	Stationary antenna (power feed)
11	Anchor point

6.4.13.13 Drilling pattern for aluminium transfer guide, power feed (signal propagation on both sides) without anchor point (45° cut short side)



Item	Name
5	Transfer guide
6	Stationary antenna (power feed)

6.4.13.14 Drilling pattern for aluminium transfer guide, power feed (signal propagation on both sides) without anchor point (45° cut long side)



Item	Name
5	Transfer guide
6	Stationary antenna (power feed)

6.4.14 Mount the collector

The collector is mounted on the vehicle or on a separate, customer-specific mobile consumer.

Work steps:

→ Drill holes in the support structure at a distance of 30 mm (see Fig. 101).

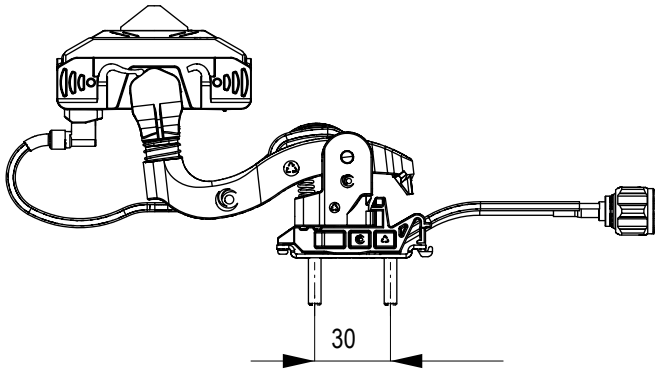


Fig. 86: Screw distances in towing device

→ Mount the towing device (1) with 2 x M5 hexagon screws (DIN EN 4017 (DIN 933) – Steel 8.8) (2) on the support structure with a tightening torque of 6 Nm.

→ Mount/engage the collector/collector bearing (3) onto the towing device (1).

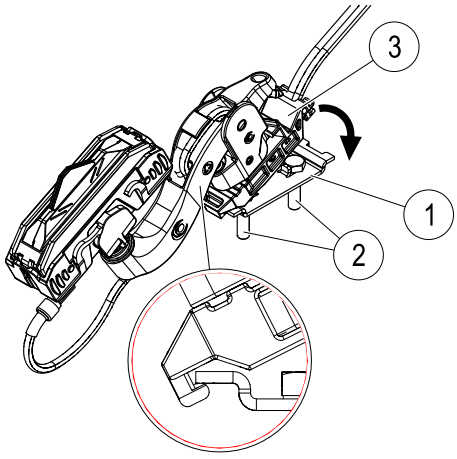


Fig. 87: Mount collector on towing device

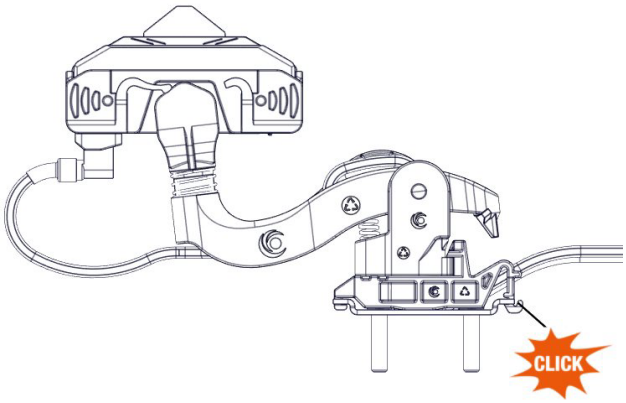


Fig. 88: Engage collector in towing device

→ Slide the collector head (4) with the mobile antenna into the data rail from the side.

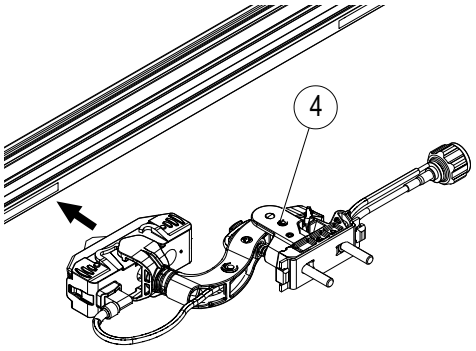


Fig. 89: Slide collector into data rail

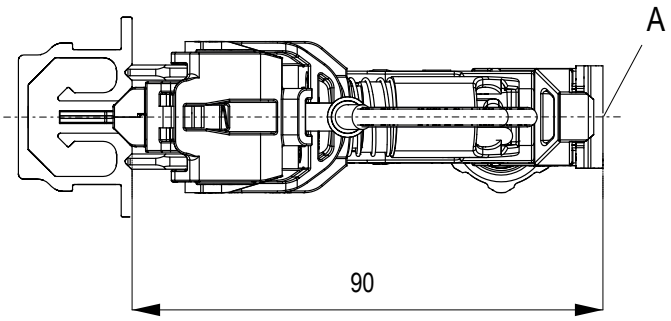


Fig. 90: Collector mounting dimension: From towing device to bottom edge of rail

→ Align the collector, including the towing device (1) toward the data rail (see Fig. 90).

ATTENTION!

It must be ensured that the center axis (A) of the data rail is mounted exactly on the center axis of the collector and that the specified mounting distance between the towing device and data rails is maintained (see layout plan and Fig. 90).

6.4.15 Mount the positioning system (optional)

The positioning system consists of the bar code tape (10) and the read head (9), which is located on the vehicle.

The read head and the bar code tape are mounted according to the manufacturer's operating instructions.

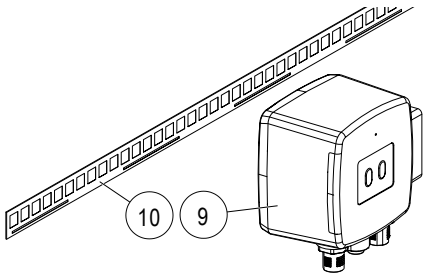


Fig. 91: Positioning system in detail

6.4.16 Use of the data rail without PE function

If the data rail is used without the PE function, it must nevertheless be connected to the grounded support structure. Carry out the following steps if the PE function is not used:

→ Connect both segment ends to the customer's grounded support structure using the ground connection.

→ Connect the green-yellow PE cable (minimum cross-section 25 mm^2) (see Fig. 79).

→ In addition, the general instructions for designing the data rail as a ground conductor data rail must be observed (see Section 6.3.2).

6.4.17 Check the installation through attenuation measurement

In order to check the quality of the mechanical installation, the attenuation of the data rail can be measured with suitable measuring means. This measurement can be carried out by the "International Service" of Conductix-Wampfler GmbH.

The expected values for this measurement for each ProfiDAT*compact* segment are part of the project-specific documentation. Exceeding the expected values indicates a defective mechanical mounting of ProfiDAT*compact* and must be corrected.

6.5 Electrical installation

DANGER!

Risk of death due to electrical shock!

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

- → Disconnect the construction from the voltage supply at the main switch.
- → If there is no main switch, disconnect the power source from the construction according to the construction manufacturer's instructions.
- → Secure the construction against being switched back on again.
- → Confirm that the power has been disconnected.
- → Ground and then short-circuit parts of the construction that have been disconnected from the power supply.
- → Cover or block off adjacent energized parts.
- → Before each start-up, test the insulation resistance according to locally applicable technical standards, directives and laws.

6.5.1 Connect the transceiver (access point) to the stationary antenna

The connecting cable for the power feed to the data rail is mounted between the transceiver (access point) and the connection to the power feed (stationary antenna).

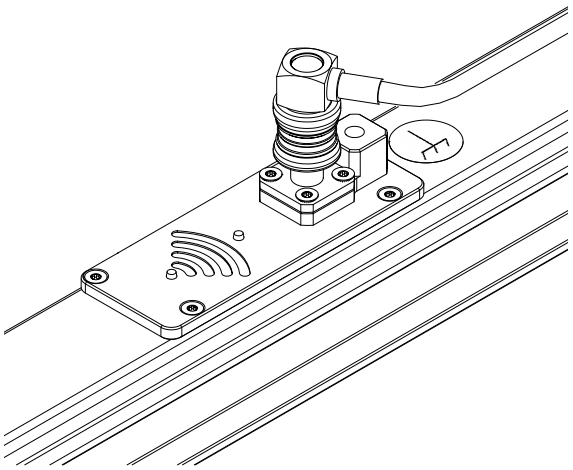


Fig. 92: Power feed left/right at stationary antenna (signal propagation on one side)

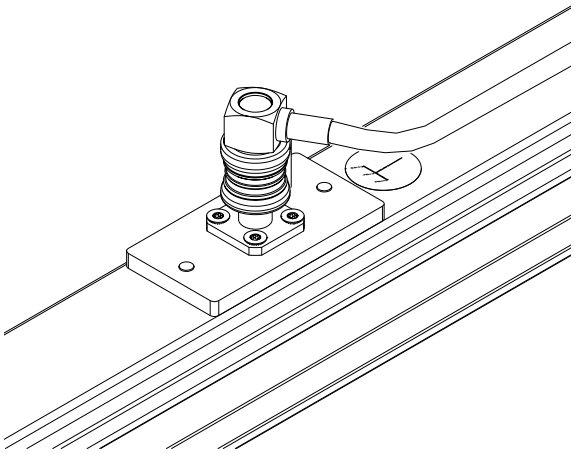


Fig. 93: Power feed at stationary antenna (signal propagation on both sides)

6.5.2 Mount the equipotential bonding cable on the power feed segment

ATTENTION!

The equipotential bonding cables must not have a green-yellow sheath color (DIN EN 60204-1/32).

If data transmission faults occur within the construction due to excessive shield currents or excessive potential differences, an equipotential bonding cable can be attached to Position A using the cable lug and fasteners supplied (Fig. 94 and Fig. 95).
The RF cable for feeding in the data is connected to position B (Fig. 94 and Fig. 95).

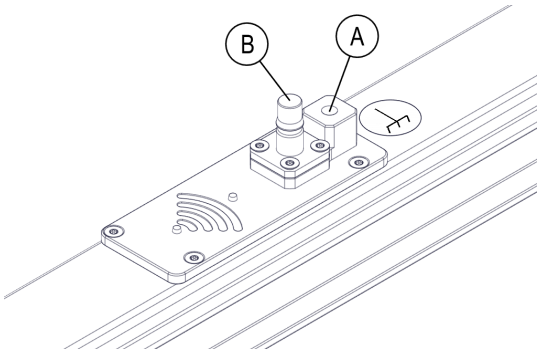


Fig. 94: Connection for equipotential bonding cable to power feed segment (signal propagation on one side)

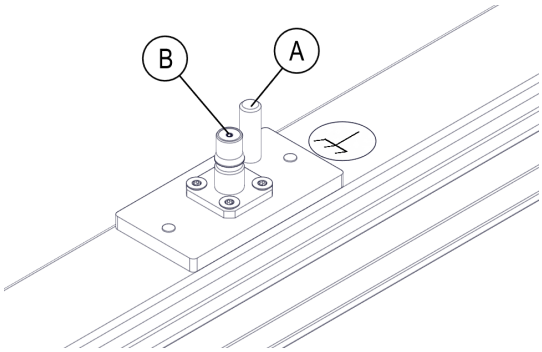


Fig. 95: Connection for equipotential bonding cable to power feed segment (signal propagation on both sides)

→ Crimp the equipotential bonding cable (1) and crimping cable lug (2) together using a crimping tool (see Fig. 96).

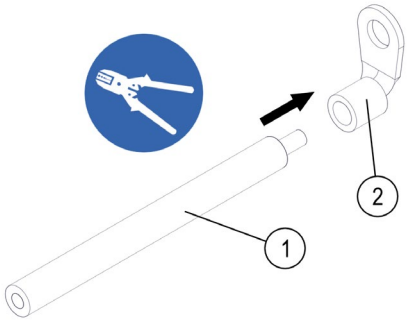


Fig. 96: equipotential bonding cable and crimping cable lug

→ The power feed segment of the data rail has an equipotential bonding connector (6). Screw the crimped equipotential bonding cable (1 and 2) to these using the fittings, consisting of the cylinder head screw or nut (4), detent-edged washer (5) and serrated washer (3) (see Fig. 97 to Fig. 100).

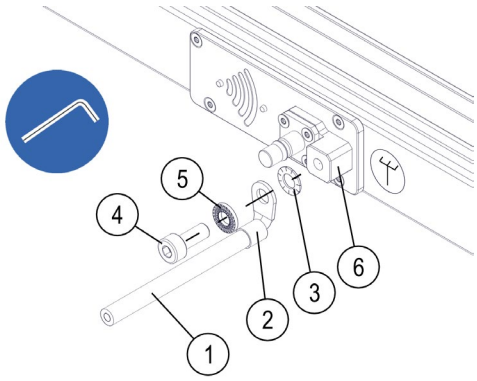


Fig. 97: Mount equipotential bonding cable to power feed segment of data rail (signal propagation on one side)

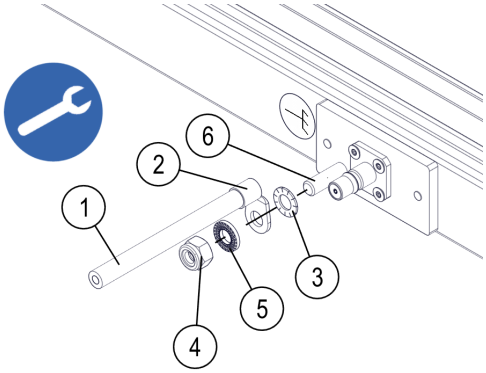


Fig. 98: Mount equipotential bonding cable to power feed segment of data rail (signal propagation on both sides)

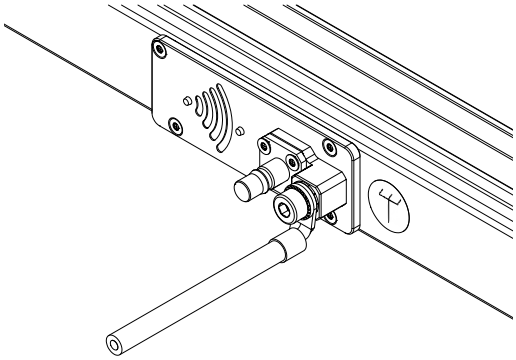


Fig. 99: Fully mounted equipotential bonding cable (signal propagation on one side)

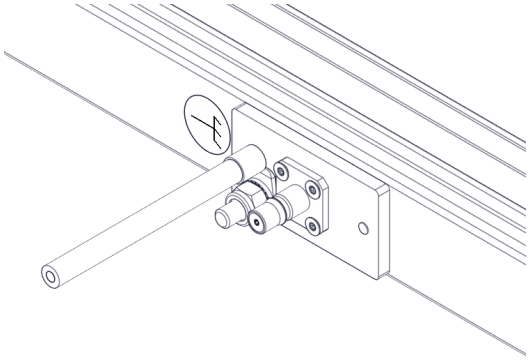


Fig. 100: Fully mounted equipotential bonding cable (signal propagation on both sides)

6.5.3 Connect the transceiver module with the mobile antenna

The connection cables of the collector's mobile antenna are connected to the transceiver (client) on the vehicle.

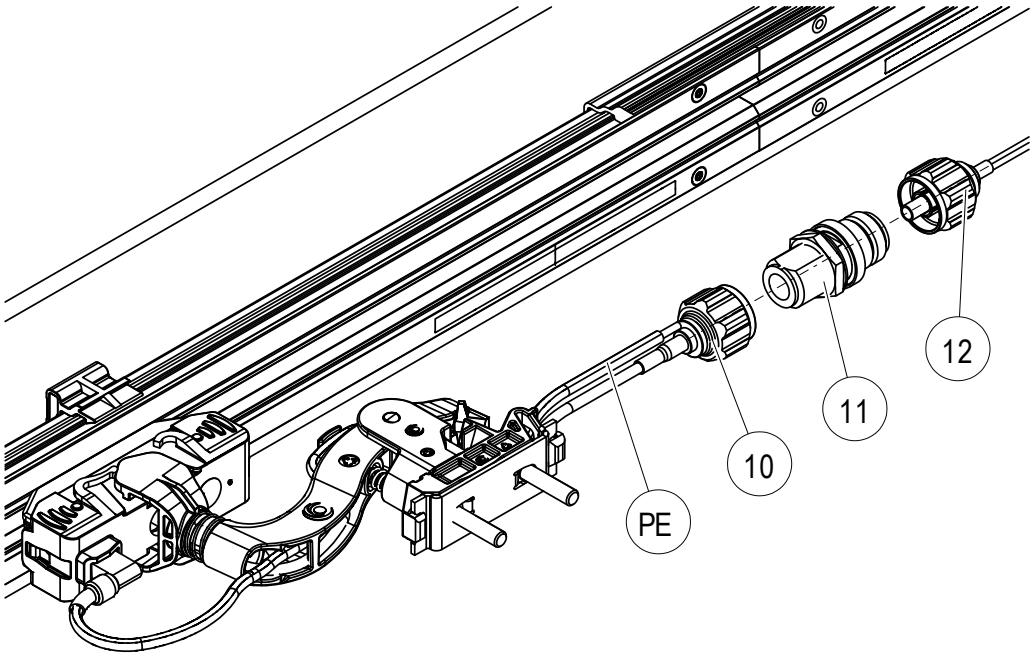


Fig. 101: Connection to mobile antenna

Work steps:

→ Connect the N plug of the cable (12) to the cable on the collector (10) using the N installation socket (11). Secure the N installation socket (11). Observe the information on equipotential bonding. This N installation socket (11) must be mounted insulated. The N installation socket (11) can also serve as a strain relief for fastening to a tab/strain relief plate.

7 Operation

7.1 Safety

Risk of injury due to improper operation!

Improper operations can result in serious personal injury and material damage.

→ Conduct all operating steps according to the specifications of these mounting instructions.

→ Before starting work, ensure that all covers and safety systems are installed and working properly.

→ Never disable the safety systems during operation.

→ Maintain order and cleanliness in the work area! Loosely stacked or scattered components and tools are a source of accidents.

Unauthorized personnel are at risk!

Unauthorized persons who do not meet the requirements described here are not acquainted with the dangers in the work area!

→ Keep unauthorized persons away from the work area.

→ In case of doubt, address the person and direct them away from the work area.

→ Stop working as long as unauthorized persons are in the work area.

Electrical

Do not exceed the nominal voltages specified in Section 3! The data transmission system can be overloaded due to excessive current or voltage. Risk of fire and/or destruction of the data transmission system!

Personnel:

- The system may only be operated by trained personnel!

Personal protective equipment (these items must be worn during all work):

- Protective clothing
- Protective footwear

8 Maintenance and Service

8.1 Safety

WARNING!

Risk of injury due to improperly conducted maintenance works!

Improper maintenance can cause serious injuries to persons or material damage.

→ Before starting work, ensure sufficient space for installation.

→ Ensure that the installation area is clean and tidy! Loosely stacked or scattered components and tools are a source of accidents.

→ If components have been removed, be careful to reinstall them properly, replace all fastenings and comply with screw tightening torques.

→ Switch off the main power supply and secure it against unauthorized reactivation.

→ Use the climbing aids and working platforms provided when installation tasks are carried out above eye level.

→ Do not use machine components as climbing aids.

→ Ensure the safe and environmentally friendly drainage, collection and disposal of operating and auxiliary materials.

→ Safety systems that have been removed for installation, service or repair work must be reinstalled and inspected immediately after the work is complete.

→ Observe the intervals for inspection and maintenance work specified in the maintenance instructions.

→ Ensure that sufficient space for maintenance work is available.

→ Ensure that powered components are not inadvertently activated during maintenance work.

→ Secure detached parts against falling.

→ Screw joints that were loosened during maintenance work must be retightened and secured according to instructions.

→ Fasteners and seals that cannot be reused are to be replaced (such as self-locking nuts, disks, splints, O-rings, glued or micro-encapsulated screws).

→ Lubrication or greasing points that are cleaned or wiped during maintenance and repair work must be re-lubricated as instructed.

→ After finishing work, collect all tools and materials and check that all are present.

→ Disassembled parts and components that were exchanged are to be collected, stored in a safe place, recycled or returned.

→ Before entering constructions, they must be disconnected from power using the main switch and secured against unauthorized, unintentional, and/or erroneous switching on.

8.2 Maintenance schedule

The following sections describe the maintenance work required for optimal, trouble-free operation. The work carried out according to the maintenance plan must be logged.
If signs of heavier wear are revealed during regular inspections, reduce the maintenance intervals according to the actual signs of wear.
Contact the manufacturer in case of any questions regarding maintenance tasks and intervals. See the service address on the last page.

Interval	Maintenance work	Conducted by
Every 14 Days: 3 and 4 shift operation **Every 30 Days: 2 shift operation; after 300 hours at the latest**	Visual inspection of the components of the ProfiDAT*compact* System ■ Proper condition ■ Proper function ■ Firm seating of screws and nuts ■ Deformation ■ Wear ■ Damage ■ Level of soiling ■ Corrosion	Operator
Every 4 weeks	Visual and functional inspection ■ Wear of the sliding contacts	Specialist technician
Every 6 months	Visual and functional inspection ■ Check for ease of motion ■ All electrical connections and cables Visual inspection of the components of the ProfiDAT*compact* System for: ■ Proper condition ■ Proper function ■ Deformation ■ Wear ■ Damage ■ Level of soiling ■ Corrosion	Specialist technician
	Check the screw connections ■ Check the tightness of the screws ■ If necessary, tighten with tightening torque (see Section 6).	Specialist technician
Every 6 months	Check the collector ■ Installation dimensions ■ Contact force of the sliding contacts ■ Connector cables ■ Oil joints and/or bolts	

8.2.1 Documentation

→ The results of inspections and the measures taken are to be documented in written reports.

→ Conductix-Wampfler must be immediately informed of any defects or malfunctions that occur during the test phase and within the warranty period.

8.2.2 Maximum wear of the sliding contacts

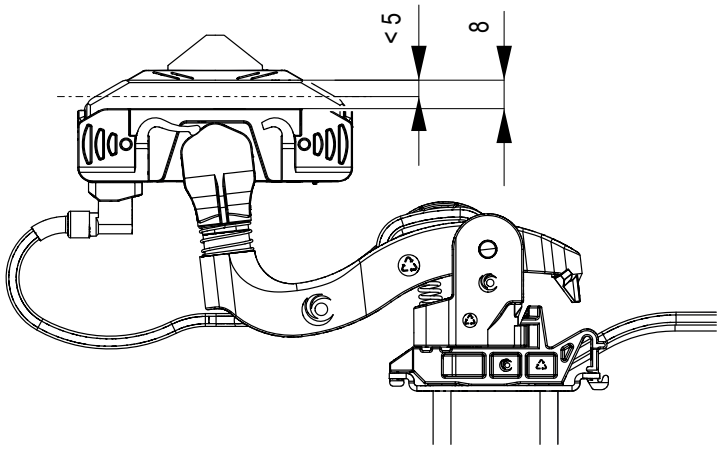
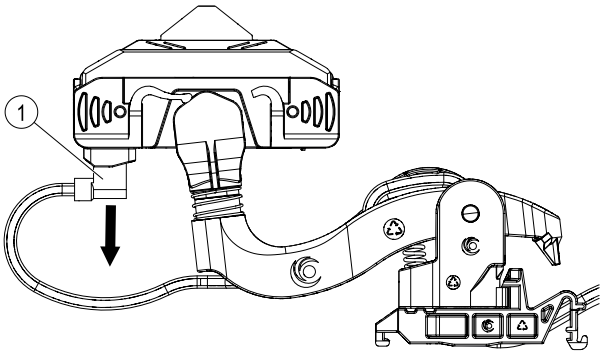


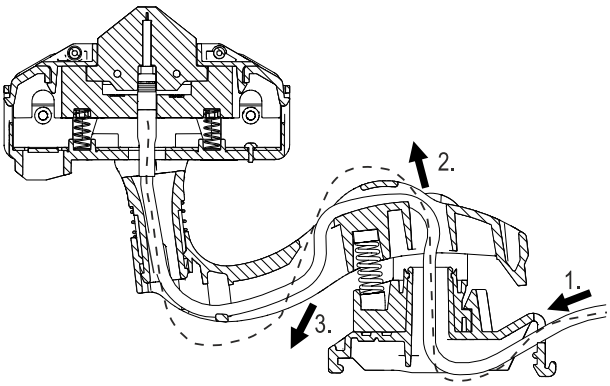
Fig. 102: Wear limit of sliding contacts on ProfiDATcompact collector

8.2.3 Replacement of the collector head

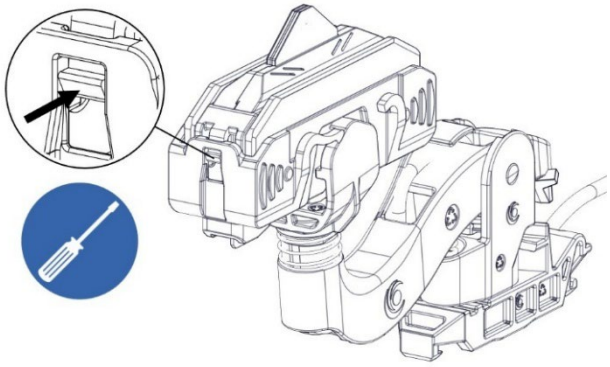
Work steps (illustration of collector in installed state):



1. Remove the angled blade receptacle (1) from the collector head.

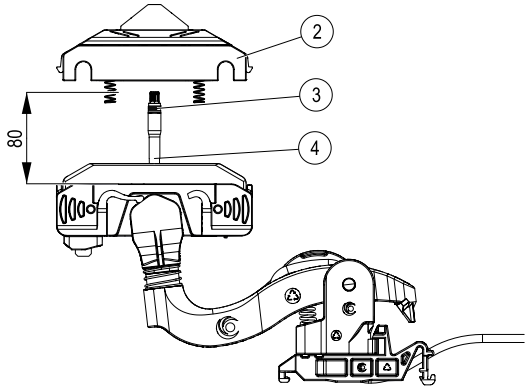
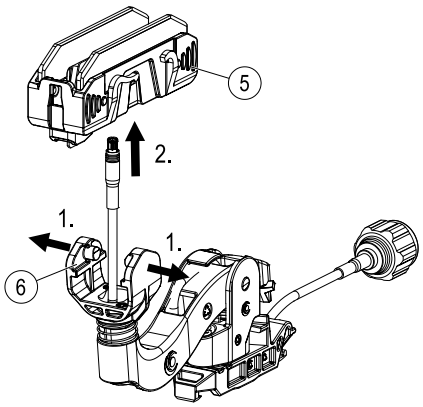
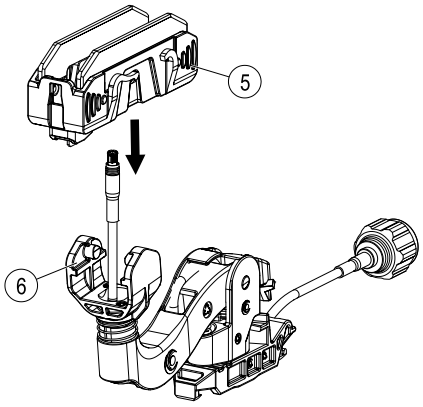


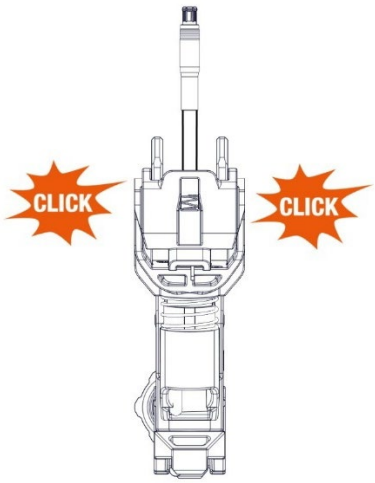
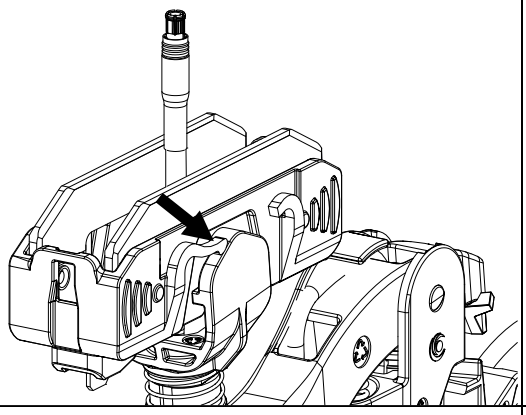
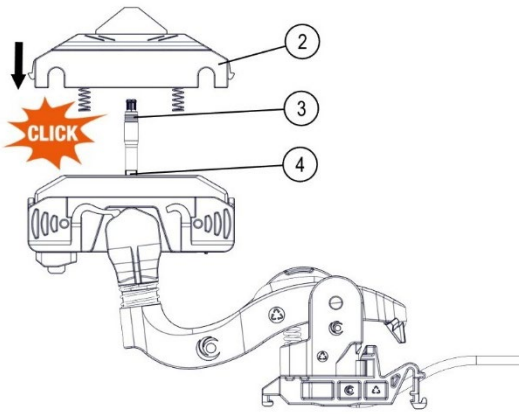
2. Pull the data cable (HF cable) so that the collector head can be better loosened from the joint.

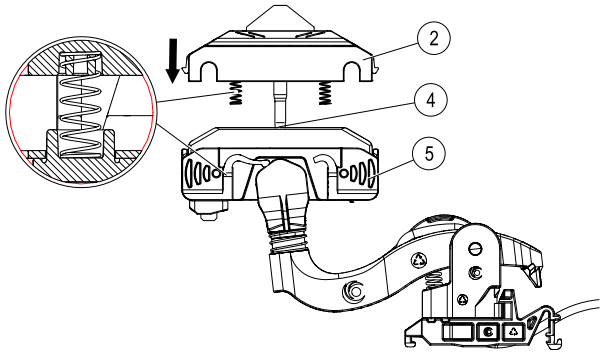


3. Using a flat-head screwdriver ≤ 3.0, gently push in a nose of the collector housing inward to remove the collector housing.

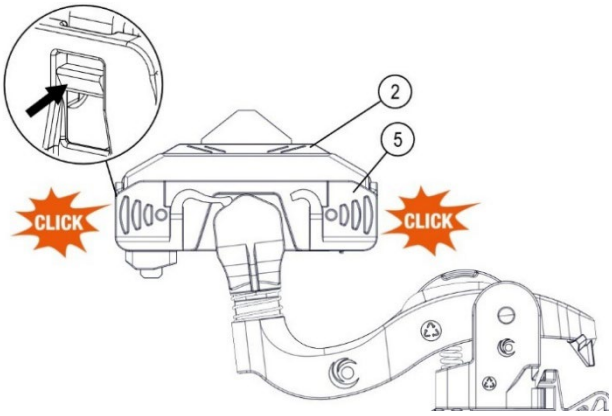
ATTENTION! **Springs can jump out!**

	4. Disconnect the collector housing (2) from the plug (3) of the data cable (HF cable) (4). The data cable must protrude approx. 80 mm from the joint.
	5. Remove the balance (5) from the joint (6). To do this, pull the tabs at the joint apart (1.). If necessary, use a flat-head screwdriver > 3.0. Pull out the balance (2.).
	6. Mount new balance incl. sliding contact (5) on the joint of the collector arm (6)

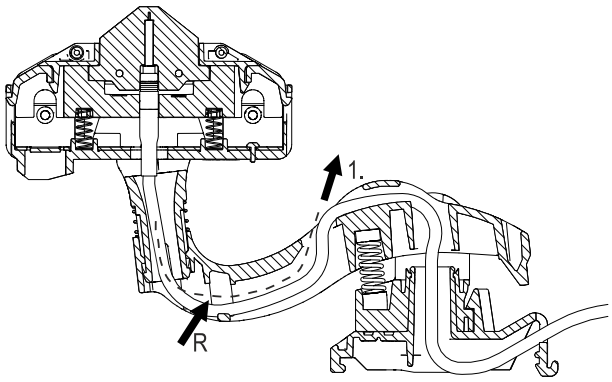
	7. The balance must engage audibly twice over the side bolts in the joint (6).
	8. The balance springs must lay correctly on the bearing.
	9. Connect collector housing incl. glued-in compression spring (2) to the data cable (4). To do this, insert the data cable into the collector housing. The plug (3) of the data cable (4) must audibly click into the plug on the circuit board of the collector housing (2).



10. Mount the collector housing (2) and the balance (5). Carefully tighten the data cable



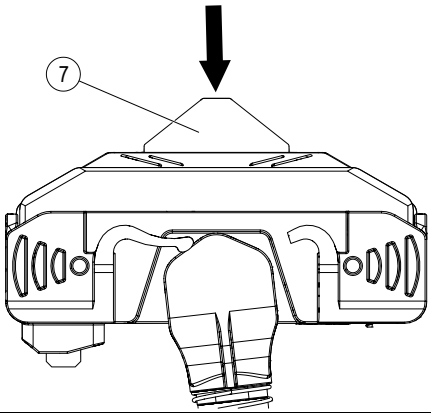
11. The collector housing (2) must audibly engage in the balance (5) on both sides.



12. Pull back the data cable (HF cable) (1.).

ATTENTION!

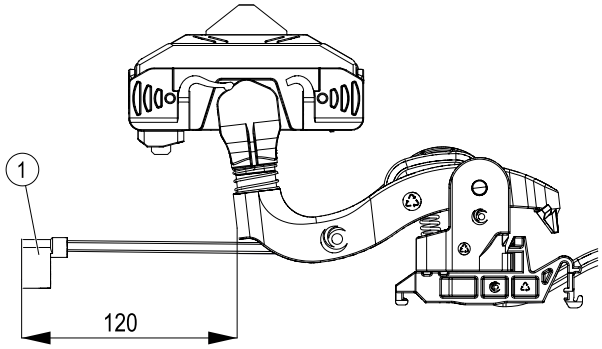
The data cable (HF cable) must rest after being pulled back through!



13. Check the ease of movement the antenna (7). Once the antenna has been pushed in, it must spring out again automatically.

ATTENTION!

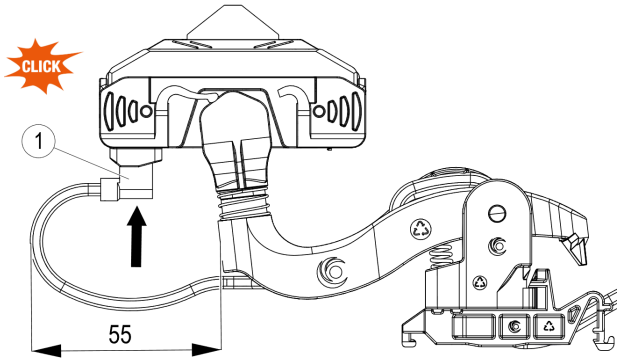
The data cable (HF cable) must not apply any force on the antenna from below!



14. Check the length of the PE cable.

ATTENTION!

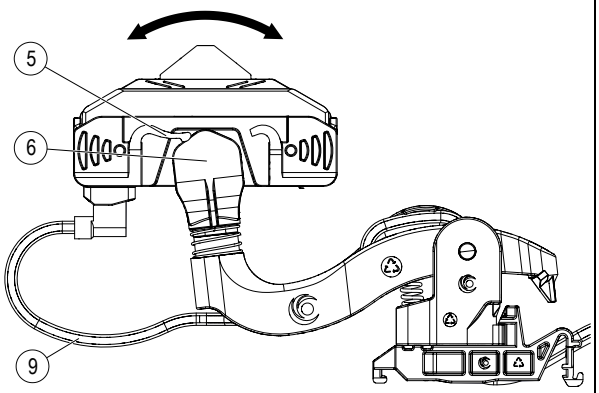
The angled blade receptacle must be facing down after pulling back through. It must not twist!



15. Attach the angled blade receptacle (1).

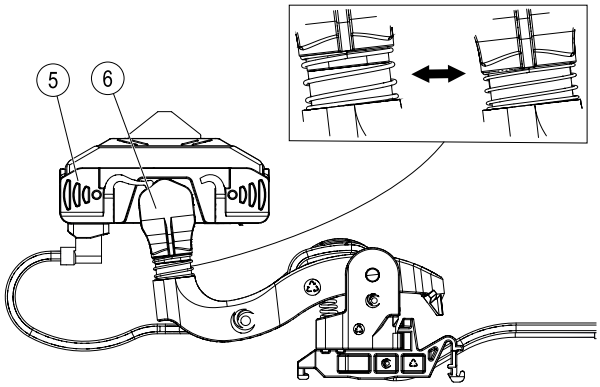
ATTENTION!

After mounting the angled blade receptacle, the collector head must not be pushed upward or pulled downward by the PE cable!

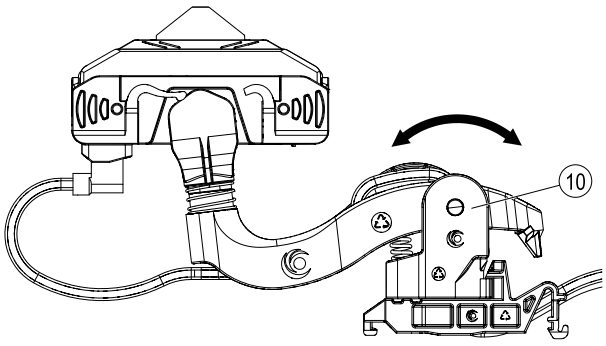


16. Move the collector head back and forth.
    Check the 2 plastic springs (8):
    - Are the 2 plastic springs (8) available?
    - Is the geometry of the plastic springs (8) completely filled with plastic?
    - Are all 2 plastic springs (8) in contact with the joint (6) or are the plastic springs (8) in an oblique position?

ATTENTION! **The PE cable (9) must not be bent or compressed!**



17. Simulate ease of movement of the collector head in an installed state. Spring in the balance (5) and joint (6) to the mechanical stop and hold. After being released, they must spring out again automatically.



18. Check ease of movement of the collector on the bearing (10).

9 Disassembly and Disposal

9.1 Safety

WARNING!

Risk of injury due to improper disassembly!

Stored residual energy, sharp components, points and edges on and in the data transmission system or the tools needed can cause injuries.

→ Ensure sufficient space before starting work.

→ Use caution when working with open, sharp-edged components.

→ Ensure that the work area is tidy and clean! Loosely stacked or scattered components and tools are a source of accidents.

→ Disassemble components properly. Observe the high dead weight some components. Use lifting gear, if necessary.

→ Secure components so they cannot fall or topple over.

→ Consult the manufacturer in case of doubt.

9.2 Disassembly

After the end of its service life, the data transmission system must be disassembled and disposed of in an environmentally friendly manner.

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

WARNING!

Observe the dangers due to electrical shock, harmful dusts, sharp edges and moving parts!

→ Clean the assemblies and components properly and disassembly and dispose of them in compliance with locally applicable occupational safety and environmental protection regulations.

9.2.1 Disassembly of the assemblies

DANGER!

Risk of fatal injury due to falling parts!

Falling parts can cause serious injuries or even death.

There is a risk of components falling down while disassembling the data transmission system. These can lead to extremely serious injuries or even death.

→ Secure all components against falling during disassembly work.

→ Never walk underneath the disassembly area.

→ Cordon off the disassembly area.

Personnel

- May only be carried out by trained technicians
- At least 2 persons

Required tools

- Open-end wrench SW8 (M5)
- Open-end wrench SW10 (M6)
- Open-end wrench SW13 (M8)
- Cordless drill driver
- Torx attachment TX8
- Tools for securing

9.3 Disposal

In the absence of return and disposal agreements, recycle the disassembled components:

- All metal parts must be scrapped
- Plastic components must be sent for recycling
- All other components are to be disposed of according to their material composition.

CAUTION!

Environmental damage due to improper disposal!

Electrical scrap, electronic components, lubricants, and other auxiliary materials are subject to hazardous waste treatment and may only be disposed of by authorized specialists!

Local authorities or disposal specialists can provide information regarding environmentally appropriate disposal.

10 Additional Documents

10.1 Declaration of Conformity

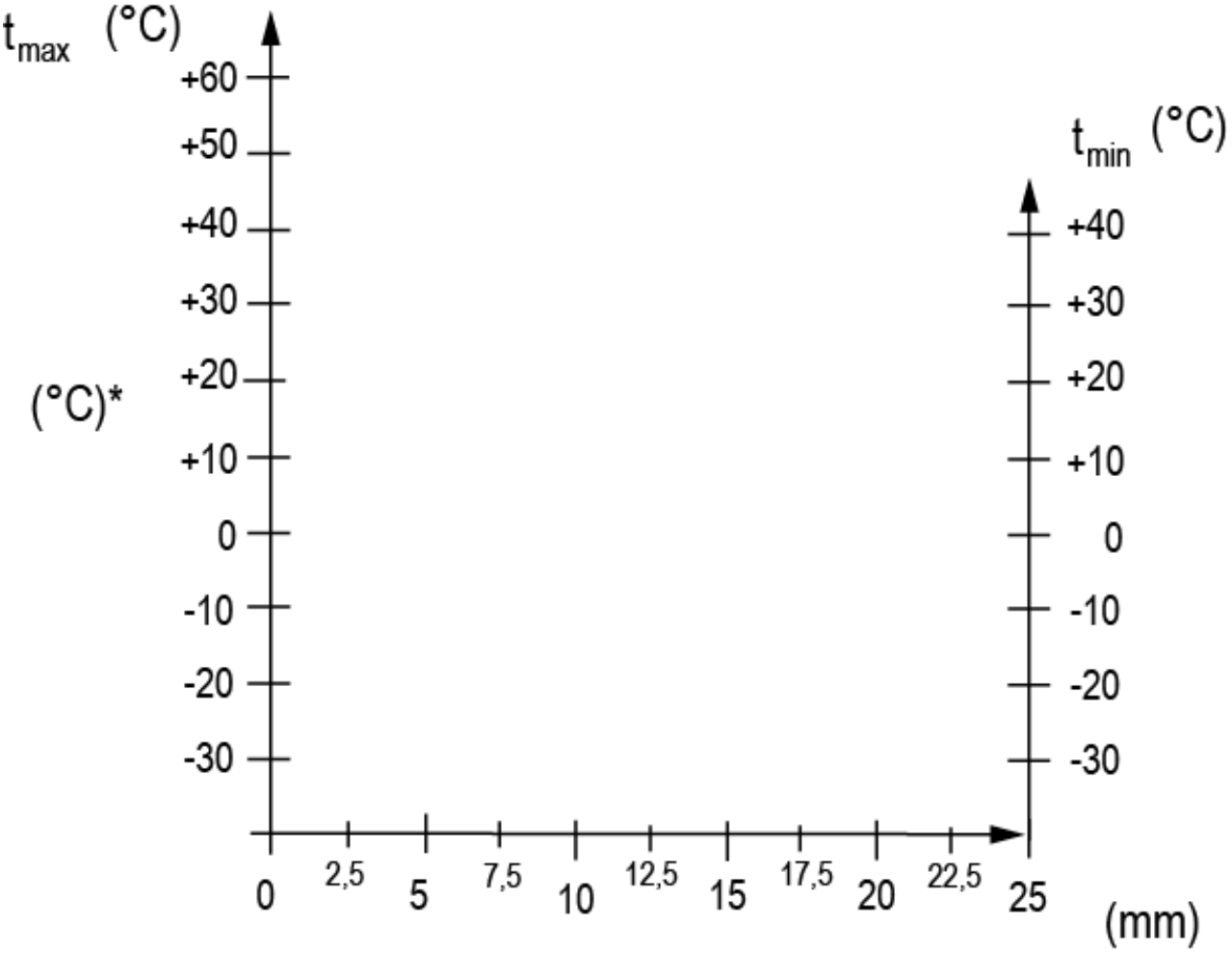
The Declaration of Conformity for this product can be obtained from Conductix-Wampfler upon request.

10.2 Applicable documents

Seq.No.	Document No.	Document Name
Conductix-Wampfler GmbH		
01	WV0800-0001	Cleaning of conductor rails
02	03 TI0514-0001	Network integration ProfiDAT/ProfiDAT*compact*
03	03 TI0514-0003-EN	Accessing Diagnostic Information of ProfiDAT 0514-0515
04	-	Project-specific documentation
05	05 BAL0514-0003-EN	ProfiDAT HF Measurement Kit Operating Instructions
	BAL0500-0036	
	BAL0500-0037	
	BAL0500-0038	
	BAL0500-0039	
06	IBC0500-0002	AC-HB-RW Transceiver System
07	IBC0500-0003	AX-SI Transceiver System
08	IBC0500-0004	AC-SI Transceiver System
09	IBC0500-0005	N-SI Transceiver System
Siemens		
10	C79000-G8900-C323-12	Configuration Manual Scalance W770 / W730 Web Based Management
11	C79000-G8900-C325-15	Scalance W774-1 / W734-1 Operating Instructions
12	FAQ 109475919	FAQ Setting Profinet IO Update Time and F-monitoring Time
13	FAQ 26562314	FAQ Layer 2 Tunnel Quantity Framework

10.3 Air gap diagram for the expansion unit

The diagram can be used as an aid for determining the air gap at the installation site (see also Section 6.4.4.2).



10.4 Project-specific documentation

The project-specific documentation can include the following points:

- Layout Plan
- HF layout (only based on the data transmission: ProfiDAT*compact* conductor rail and HF cables, positions of access points, channel distribution, expected values of attenuation measurement, definition and installation location of attenuators for leveling the construction, if available).
- Transceiver list with IP addresses, serial numbers and transceiver login data.
- Mechanical drawings if components deviate from the standard.

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