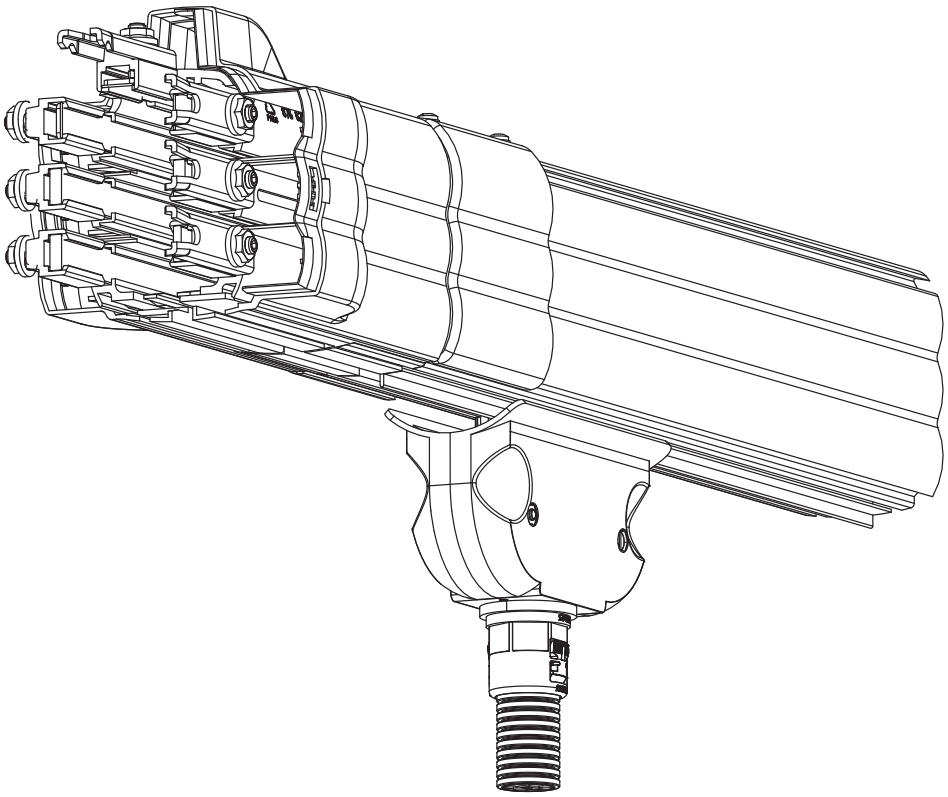
Assembly instructions

Demag DCL-Pro compact conductor line



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Original assembly instructions

Manufacturer:

Demag Cranes & Components GmbH
Forststraße 16
40597 Düsseldorf, Germany
www.demagcranes.com
Email: **info@demagcranes.com**

Further documents are available for sub-assemblies/components in addition to these assembly instructions. These possible sub-assemblies/components are listed below. The corresponding documents are supplied as necessary or can be ordered separately.

Documents[1)]	Order no.	Classification
Technical data/catalogues		
DCL-Pro conductor line technical data	203 751 44	714 **IS** 962.2
DCL-Pro conductor connector technical data	203 757 44	714 **IS** 962.2
Technical data for sliding contact assignments DCL-Pro	203 759 44	714 **IS** 962.2
Operating, assembly, fitting instructions		
DCL-Pro profile seal assembly instructions	211 234 44	719 **IS** 962.2
DCL-Pro shortening set assembly instructions	211 233 44	719 **IS** 962.2
DCL-Pro assembly instructions, removing the shell halves on the current collector	214 148 44	719 **IS** 962.2

Tab. 1

The metric system is used in this document and all figures are shown with a comma as the decimal separator.

 1) the documents can be ordered from the relevant Demag office.

Table of contents

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1 General

1.1 Information on the conductor line

You have purchased a Demag product.

This conductor line is manufactured in accordance with the relevant European standards and regulations.

Conductor lines must be operated in accordance with generally accepted engineering standards.

Regulations to

- DIN VDE / EN
- SEV
- CSA
- and UL

must be complied with.

We expressly refer to the DIN VDE regulations, in particular DIN VDE 0100. From the various regulations, we refer to the following specifications: see DIN VDE 0100, part 200.

1.2 Information on the assembly instructions

These assembly instructions describe how the conductor line can be installed on a crane runway or a travelling hoist runway.

These assembly instructions are designed to provide the assembly company with appropriate instructions for safe and correct work and for maintenance. These assembly instructions are an integral part of the conductor line.

Every individual given the task of transporting, installing, commissioning and maintaining the conductor line and additional equipment must have read and understood the items listed in the following:

- the conductor line assembly instructions
- any other relevant operating instructions
- the safety regulations
- the safety instructions in the individual chapters and sections.

The assembly instructions must be available to the installation personnel in order to prevent operating errors and to ensure smooth and trouble-free operation of our products. They must be kept available in the immediate vicinity at all times.

The conductor line may only be installed by specialist personnel who are fully familiar with the assembly instructions.

If special designs or additional options are ordered or the latest technical modifications are incorporated, the actual scope of supply may differ from the data and information as well as from the illustrations described here. If you have any questions, please contact the manufacturer.

1.3 Symbols/signal words

Important safety information and instructions are marked by corresponding symbols and signal words in these assembly instructions.

Safety instructions and information must be followed. Follow these instructions with care to avoid any accidents, injuries or damage.

Locally applicable accident prevention regulations and general safety regulations must also be followed.

The following symbols and instructions warn against possible injuries or damage and are intended to assist you in your work.

DANGER

This warning indicates an immediate danger that can result in severe injuries or death.

– Follow these instructions at all times and be particularly careful and cautious.

WARNING

This warning indicates a potentially dangerous situation which may result in serious injury or death.

– Follow these instructions at all times and be particularly careful and cautious.

CAUTION

This warning indicates a potentially dangerous situation which may result in medium or slight injuries or damage.

– Follow these instructions at all times and be particularly careful and cautious.

Operating hazard for the conductor line.

- This symbol indicates information on the appropriate use of the conductor line.
- Failure to follow these instructions may result in malfunctions, damage or pollution of the environment.

1.4 Liability and warranty

All information included in these assembly instructions has been compiled on the basis of the relevant regulations, state-of-the-art engineering principles and our many years of experience.

These assembly instructions must be read carefully before starting any work on and with the conductor line, especially before the conductor line is put into service for the first time. The manufacturer assumes no liability for any damage which results from the following:

- Non-compliance with the assembly instructions
- Inappropriate use of the conductor line
- Operation by insufficiently trained personnel
- Unauthorised conversions
- Any technical modifications

Wearing parts are not subject to liability for defects.

We reserve the right to incorporate technical modifications within the scope of improving the operating characteristics and further development of the conductor line.

1.5 Copyright

These assembly instructions must be treated confidentially. They are only intended to be used by people who work with or on the conductor line.

Any and all content, texts, drawings, images and any other information are protected within the sense of copyright law and are subject to further industrial rights. Any misuse is an offence.

No part of this documentation, in whole or in part, may be reproduced, distributed, shown in public or used in any other way without specific prior consent. Infringements are an offence resulting in obligatory compensatory damages. Further rights reserved.

All industrial rights reserved.

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1.6 Spare parts

Only genuine Demag spare parts may be used.

CAUTION

Incorrect or defective spare parts may cause damage, malfunctions or complete failure of the conductor line.

Only use genuine spare parts or parts approved by Demag.

Only genuine Demag spare parts may be used for safety-relevant wear parts.

The use of unauthorised spare parts renders null and void any claims for warranty, service, damages or liability against the manufacturer or his appointed personnel, dealers and representatives.

1.7 Terms and definitions

Manufacturer

The manufacturer is the person who:

1. manufactures machinery under his or her own name and places it on the market for the first time;
2. resells machinery made by other manufacturers under his or her own name, whereby the reseller is not considered to be the manufacturer, provided the name of the manufacturer (as defined in 1.) appears on the equipment;
3. imports machinery into Germany and places it on the market for the first time or
4. exports machinery to another member state of the European Union and hands it over direct to an owner in that country

Owner
Owners (employer, company) are defined as persons who own the product and who use it as intended or allow it to be operated by suitable persons.

Operating personnel
Operating personnel are defined as persons assigned by the owner of the product to operate the product. Operating personnel must be trained by the owner in accordance with the tasks to be performed.

Trained person
Trained persons are defined as persons who have been instructed and trained for the tasks assigned to them and on the possible hazards resulting from inappropriate conduct. Personnel must be informed about the required protective devices, protective measures, relevant regulations, codes of practice, accident prevention regulations and operating conditions and must provide verification of their competence. Trained personnel must be trained by the owner in accordance with the tasks to be performed.

Specialist personnel
Specialist personnel are defined as persons assigned by the owner of the product to carry out special tasks such as installation, setting-up, maintenance and fault elimination. Specialist personnel must be trained by the owner before any work is carried out on or with the product.

Qualified electrician
Qualified electricians are defined as persons who, owing to their technical training, knowledge and experience of electric equipment as well as knowledge of the relevant valid standards, codes of practice and regulations, are able to assess the tasks given to them and to identify and eliminate potential hazards. Qualified electricians must be trained by the owner in accordance with the tasks to be performed.

Experienced technician
Experienced technicians are defined as persons who, owing to their technical training and experience, have sufficient knowledge in the field of the product. They must be familiar with the relevant national industrial safety regulations, codes of practice, accident prevention regulations, directives and generally accepted engineering standards enabling them to judge the safe operating condition of the product.

1.8 After-sales service

If you have any questions on our products or need technical information, please contact our after-sales service.

Please keep the serial or order number for any correspondence or spare part orders. Specifying this data ensures that you receive the correct information or the required spare parts.

Manufacturer:

Demag Cranes & Components GmbH
Forststraße 16
40597 Düsseldorf, Germany
www.demagcranes.com
Email: **info@demagcranes.com**

Addresses and contacts

The current addresses of the sales offices in Germany and the subsidiaries and agencies worldwide can be found on the Demag homepage at **www.demagcranes.com/Contact**.

1.9 Disposal

Unless a return or disposal agreement has been concluded, recycle separated components after proper removal:

- Scrap any remaining metallic material
- Dispose of plastic elements for recycling
- Separate and dispose of any other components by material type

Electric scrap, electronic components, lubricants and other auxiliary materials are subject to special disposal regulations and may only be disposed of by certified companies.

National disposal regulations must be considered regarding environmentally friendly disposal of the conductor line. Further information can be obtained from corresponding local authorities.

2 Safety

2.1 General

The “Safety” chapter provides an overview of all important safety aspects for optimum protection of personnel as well as safe and trouble-free operation of the conductor line.

At the time of its development and manufacture, the conductor line was built according to generally accepted engineering standards and is considered to be safe to operate. The conductor line may still be a cause of danger if it is not used correctly or as intended by suitably trained personnel.

Knowledge of the contents of the assembly instructions is one of the requirements necessary to protect personnel from hazards and to avoid malfunctions and, therefore, to operate the conductor line safely and reliably.

Any conversions, modifications or additions to the conductor line are prohibited unless approved by Demag in writing.

2.2 Safety signs on the conductor lines

Any pictograms, signs or labels on the conductor line must be obeyed and must not be removed. Pictograms, signs or labels that are damaged or no longer legible must be replaced immediately.

2.3 Intended use

The conductor line is intended to be used to guide electric cables, e.g. to supply power to Demag travelling hoists. The product is always used in connection with radio control of the travelling hoist; its use is limited to indoor operation.

The conductor line is permanently connected to the crane girder when it is installed and may not be temporarily, partly or completely removed.

The conductor line is an integral part of the crane installation.

These assembly instructions describe assembly of the conductor line. These assembly instructions do not describe operation of the crane/travelling hoist.

The conductor line can only be installed as intended with reference to the above items and the following limitations. Any other use may result in a danger to life and limb and/or cause damage.

- Intended use also includes compliance with the safety instructions as well as any other instructions on assembly/disassembly, commissioning, function/operation, maintenance/fault elimination as well as compliance with the instructions on safety devices, protection against hazards and any possible remaining hazards.
- The range of movement of the conductor line must not be limited.

Depending on the type and scope of the conductor line, it may be necessary to have an inspection carried out by an expert engineer before it is handed over to the owner.
The conductor line is designed for operation indoors and at temperatures ranging from - 30° C to + 70° C. At extreme temperatures and in aggressive atmospheres, the owner must implement special measures after consulting Demag.

No liability for inappropriate use
The manufacturer is exempt from any liability for use other than the purpose which is technically possible and acceptable in accordance with the entire installation and these assembly instructions. In particular, the manufacturer assumes no liability for damage due to inappropriate or any other prohibited use of the conductor line in the sense of the "Intended use" section.

No liability for structural modifications
The manufacturer is not liable for any unauthorised structural modifications which have not been agreed with him. This includes incorrect connection of the conductor line to devices or equipment that do not belong to our scope of delivery, or the installation or use of third-party accessories, equipment, sub-assemblies or spare parts that are not approved by the manufacturer.

2.4 Hazards that can be caused by the conductor line

No hazard is caused by the conductor line when it is used in regular operation; the guided cables may only be damaged if the conductor line is incorrectly assembled.

WARNING

Damage to electric power cables

The power cables may be damaged and may cause an electric shock if the product is incorrectly assembled.

– Install electric power cables in the energy rail with sufficient play and attach them to the ends of the conductor line.

2.5 Responsibility of the owner

Information on safety at work refers to the regulations of the European Union that apply when the conductor line is manufactured. The owner is obliged to ensure that the specified industrial safety measures comply with the latest rules and regulations and to observe new regulations during the entire service life of the conductor line. Local industrial safety legislation and regional regulations and codes of practice applicable at the site of operation of the conductor line must be observed outside the European Union.

General safety, accident prevention and environmental protection regulations that apply where the conductor line is in operation must be observed and complied with in addition to the safety instructions contained in these assembly instructions.

The owner and any personnel authorised by him are responsible for correct operation of the conductor line and for clearly defining responsibilities for installation, operation, maintenance and cleaning. The assembly instructions must be followed in full and without any limitations.

Special local conditions or applications may lead to situations which are not considered in these assembly instructions. In such cases, the required safety measures must be defined and implemented by the owner. Necessary measures may also relate, for example, to the handling of hazardous materials or tools and the provision/wearing of personal protection equipment. The operating instructions of the entire installation must, if required, be supplemented by the owner with instructions relating to organisation of work, working procedures, authorised personnel, supervising and reporting obligations, etc. For further information, see ⇒ "Safety instructions", Page 52.

Furthermore, the owner must ensure that

- any further working and safety instructions resulting from the hazard assessment of the conductor line workplaces are specified in operating procedures.
- personnel who work with or on the conductor line are provided with appropriate first-aid equipment. Personnel must be trained in the use of the first-aid equipment.
- the assembly instructions are always kept available in the immediate vicinity of the conductor line for installation, operating, maintenance and cleaning personnel.
- personnel are trained in accordance with the work to be performed.
- the conductor line is only operated when in safe and proper working order.
- the safety devices are always kept freely accessible and are checked regularly.
- the national regulations for use of the conductor line are observed.
- any specified regular checks and inspections are carried out on time and are documented.

The owner is urged to develop procedures and guidelines for any malfunctions, to instruct users and to affix these instructions at a suitable place where they can be easily seen.

2.6 Operating personnel requirements

Only authorised and trained personnel may work on the conductor line. The personnel must have received instruction on the conductor line functions and any hazards that may occur.

Every individual given the task of working on or with the conductor line must have read and understood the assembly instructions before any work on the conductor line starts.

Persons under the influence of drugs, alcohol or medicines which affect their reactions must not work on or with the conductor line.

Age and job-specific regulations relevant at the place where the conductor line is operated must be observed for the selection of any personnel.

Personnel are obliged to report to the owner without delay any changes to the conductor line that impair safety.

For independent assembly (assembly fitter) or maintenance (maintenance fitter) of the conductor line, the owner may only employ persons

- who are at least 18 years of age,
- who are mentally and physically suitable,
- who have been instructed in the assembly/maintenance of the conductor line and who have proven their qualification to the owner in this respect.

2.7 Personal protection equipment

When work is carried out on or with the conductor line, the following is recommended to be worn according to the owner's risk assessment:

- Protective clothing, closely fitting working clothes (low tear strength, no loose sleeves, no rings or any other jewellery, etc.).
- Safety shoes to protect against falling parts and against slipping.
- Safety helmet to be worn by everybody in the danger zone.

2.8 Regular inspections

The owner of the machine may be obliged to carry out regular inspections by national industrial safety legislation and regional regulations. This is regulated by the rules and regulations of the German Social Accident Insurance (DGUV) in the Federal Republic of Germany, for example.

The owner is obliged to ensure that the conductor line complies with the latest rules and regulations and to observe new regulations at all times.

If no comparable inspection regulations or requirements apply at the place where the conductor line is operated, we recommend compliance with the above-mentioned regulations.

3 Technical description

3.1 Components of the DCL-Pro power supply system

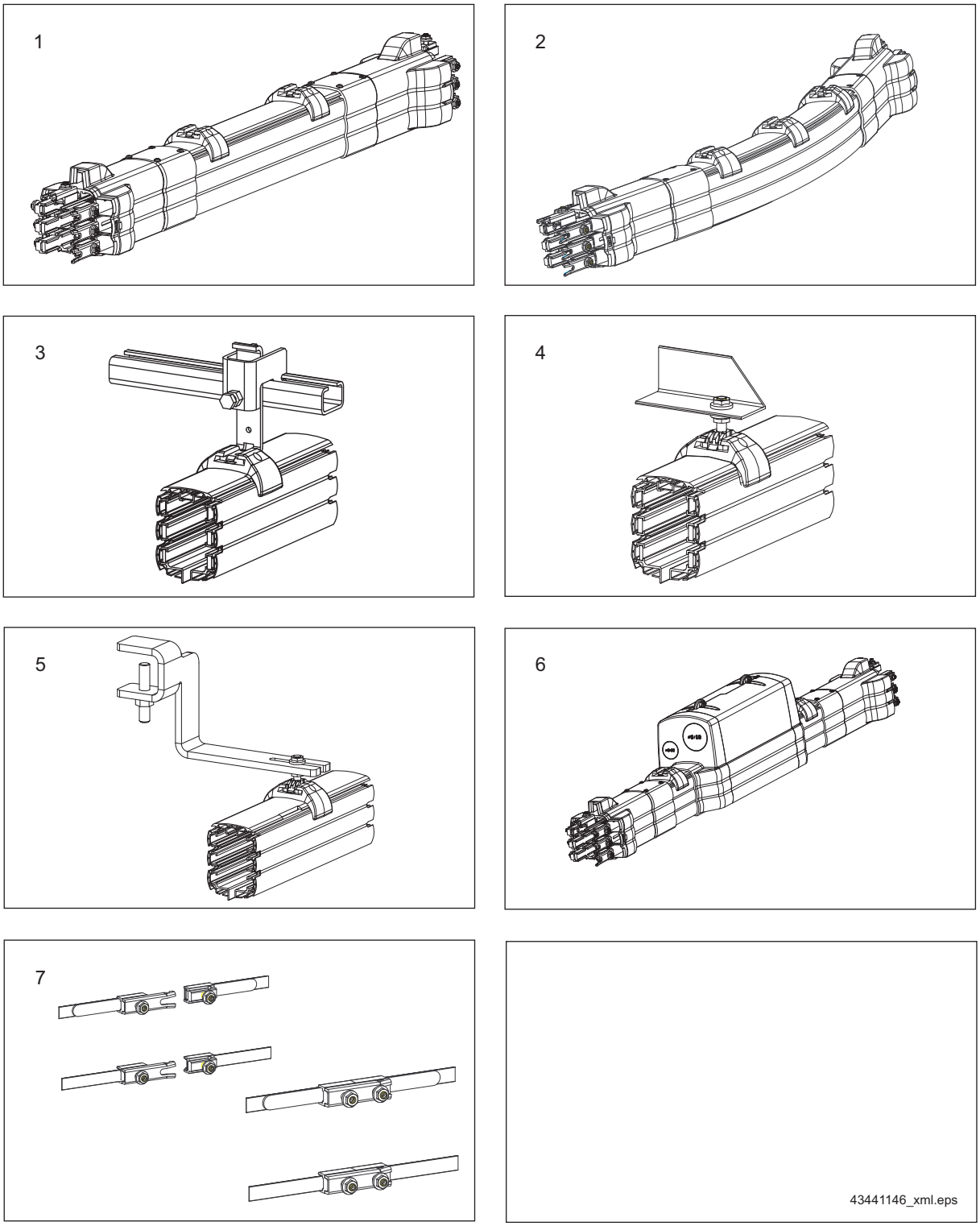

Fig. 1

1 Straight section
2 Curved section
3 Suspension from C-rail
4 Suspension with threaded pin
5 Suspension with retaining bracket
6 Line powerfeed
7 Conductor connector

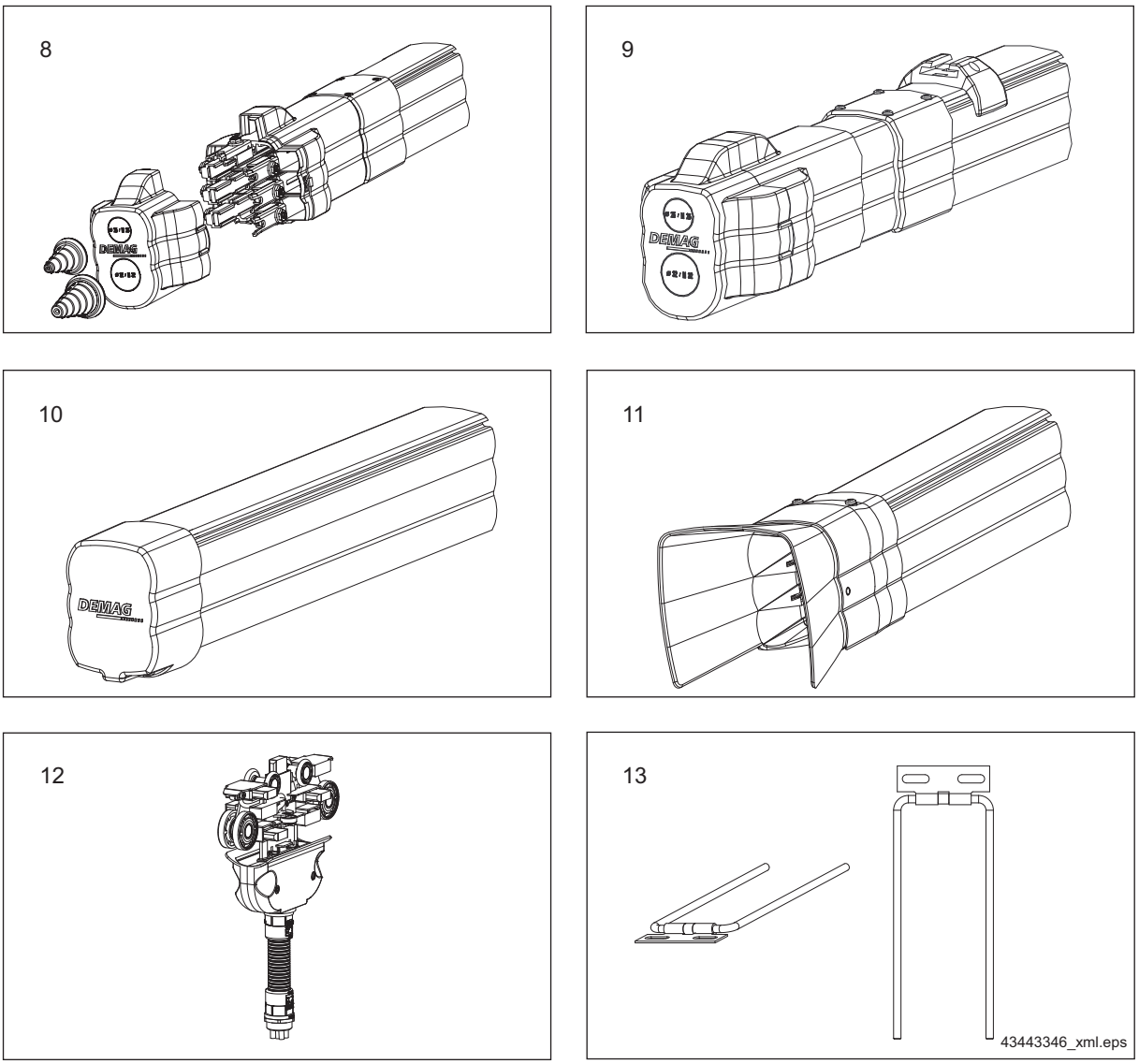

Fig. 2

8 Connector end cap for end powerfeed
9 Connector end cap for track end
10 End cap for track end
11 Entry/transfer ramp
12 Current collector trolley
13 Towing arm (standard)

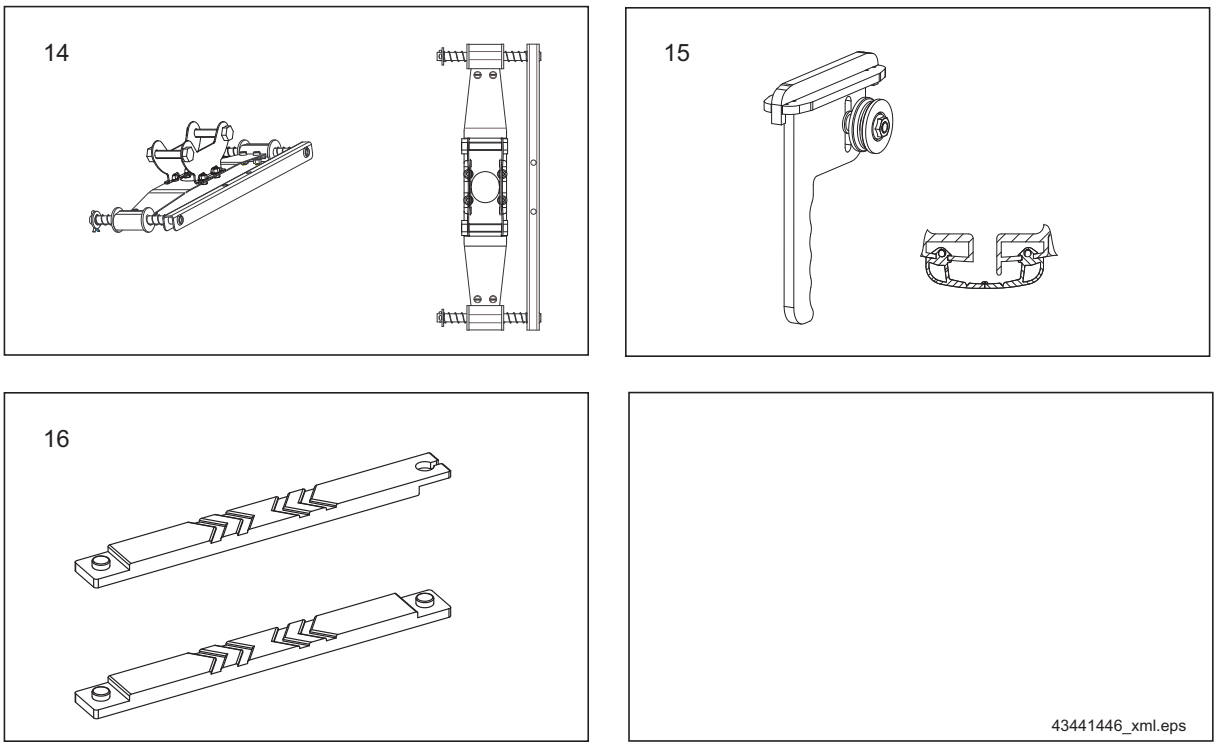

Fig. 3

14 Towing arm for transfer points

15 Profile seal and insertion tool

16 Isolating sections

3.2 Technical data

Conductor line							
Enclosure material		PVC					
Standard length	mm	4000					
Number of conductors/poles		4...7					
Max. suspension distance [2]	mm	1000 [2] / 2000					
Voltage U_N	V AC	24 to 690					
Size/conductor rail cross-section [3]	mm^2	10	15	25	38	56	70
Permissible current (100% CDF up to 35 °C) [3]	A	65	80	100	130	175	200
Copper conductor		X	X	X	X	X	X
Stainless steel-plated conductor [4]		X	-	-	-	-	-
Ambient temperature/enclosure temperature	°C	-30 to +70					
Type of enclosure DIN VDE 0470 P.1/EN 60529	IP code	IP 23/IP 24 with profile seal					
Curved section smallest radius	mm	≥ 800 mm					
Fire protection	Flame-resistant; self-extinguishing to UL94/VO; not halogen-free						

Current collector trolley				
No. of poles		4...7		
Sliding contact material		Bronze	Graphite	Silver graphite
Rated current I_N (80% CDF)		40 A	20 A	
Connection cross-section for power connection (L1 (1), L2 (2), L3 (3), PE (4))	mm^2	6	4	
Connection cross-section for control cable (5/N, 6, 7)	mm^2	2,5		
Connection cable length (standard) [5]	mm	2000		
Max. fusing	A	100		
Max. travel speed	m/min	100 [6] / 200		

Tab. 2

[2] With effect of heat on one side.

[3] The voltage drop must be checked for installations that have large powerfeed sections and a high current load. Calculation ⇒ Technical data 203 751 44

[4] 10 mm^2 copper conductors coated with stainless steel on the contact surface. Applications and further information ⇒ Technical data 203 751 44.

[5] Other cable lengths possible.

[6] For straight sections with entry/transfer ramps.

3.3 Design

3.3.1 DCL-Pro variants

DCL-Pro with line powerfeed

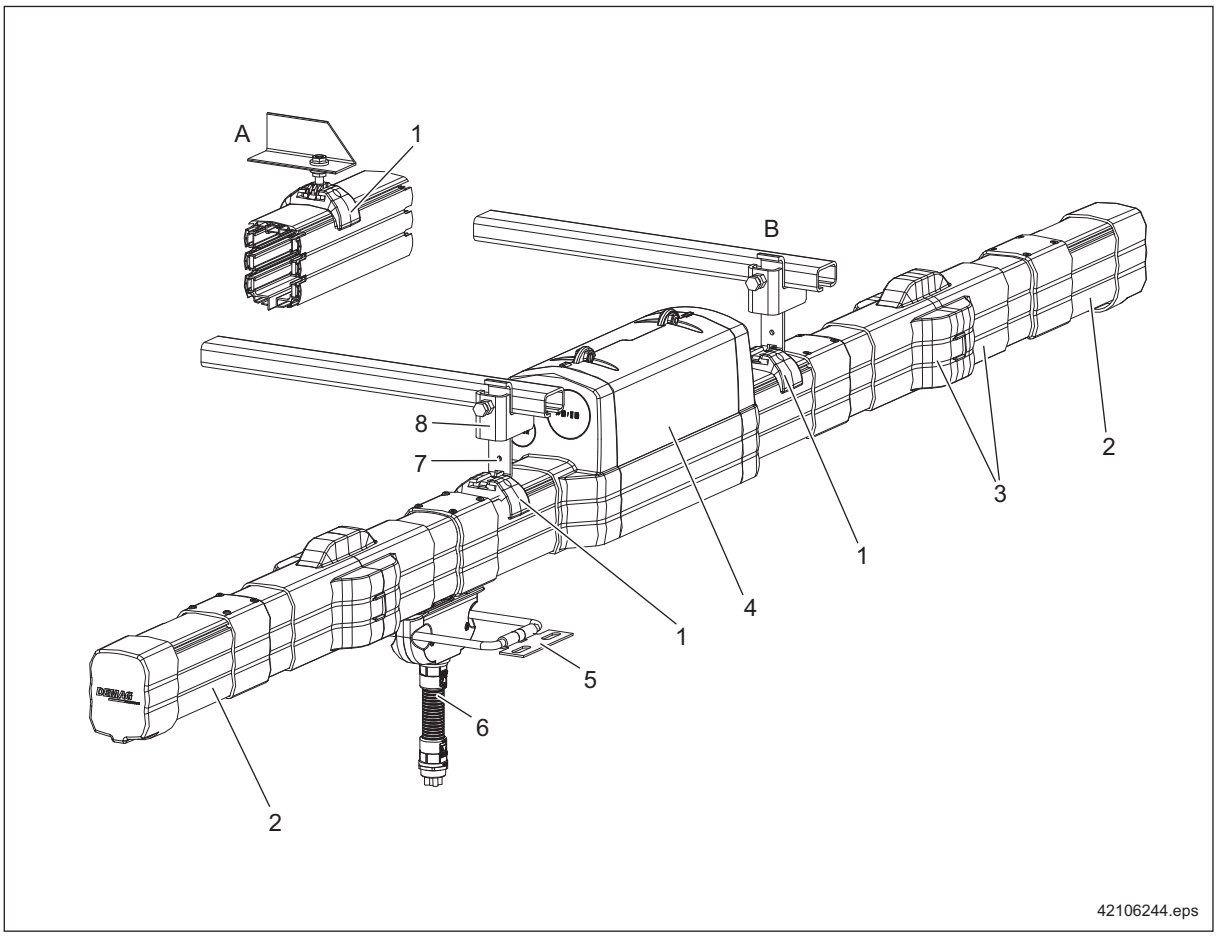

Fig. 4

A	Suspension with threaded pin	4	Line powerfeed
B	Suspension from C-rail [7)] (LxWxH) 40x25x3 or 40x40x3	5	Towing arm
1	Sliding suspension	6	Current collector trolley
2	Straight section with end cap	7	Mounting bracket
3	Connector covers	8	Clamp section

[7)] C-rail: special order

DCL-Pro with end powerfeed

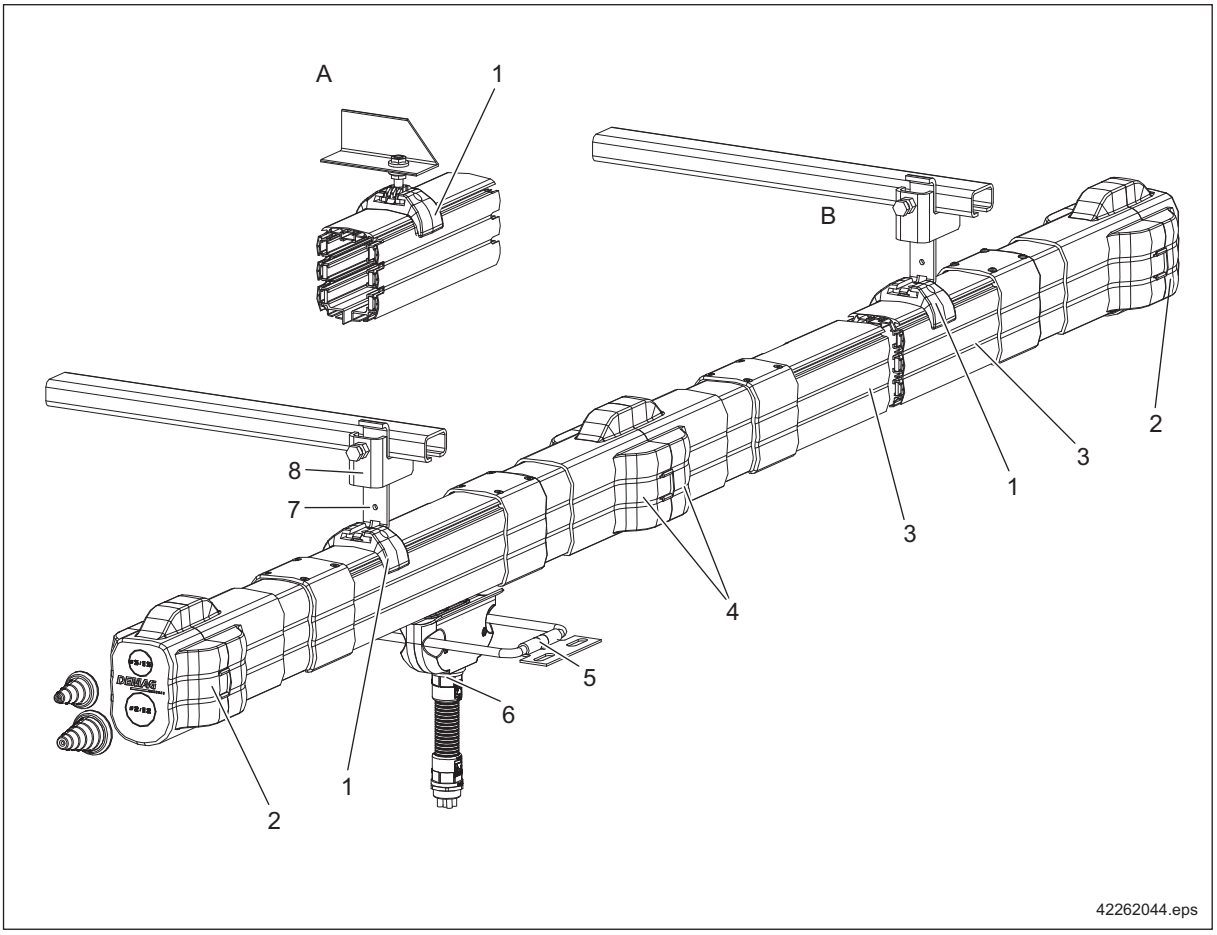

Fig. 5

A	Suspension with threaded pin	4	Connector covers
B	Suspension from C-rail [8)] (LxWxH) 40x25x3 or 40x40x3	5	Towing arm (standard)
1	Sliding suspension	6	Current collector trolley
2	Connector end cap (with powerfeed)	7	Mounting bracket
3	Straight section (standard length 4000 mm or shortened)	8	Clamp section

Line and end powerfeeds can be combined with each other.

[8)] C-rail: special order

DCL-Pro with entry/transfer ramp

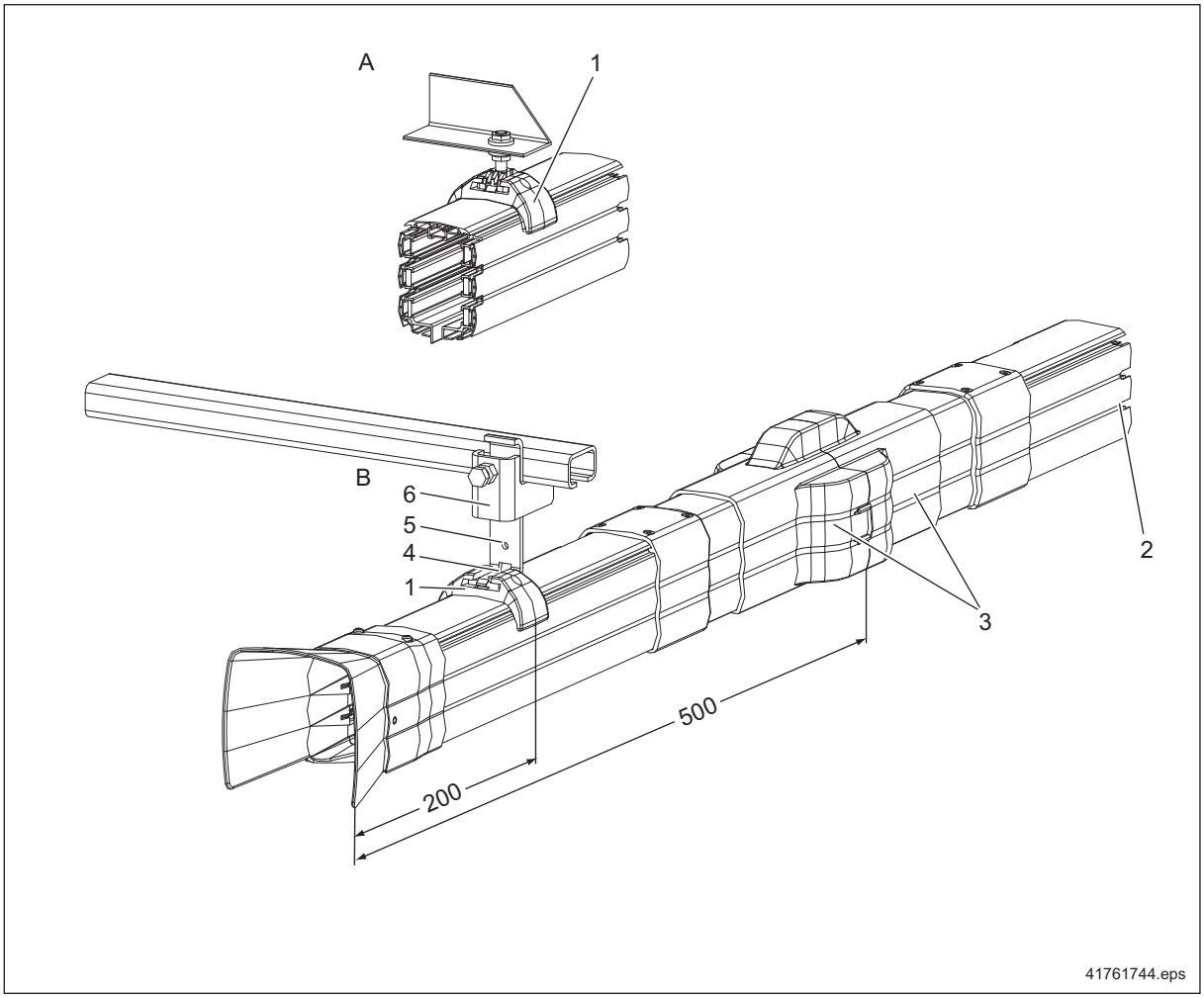

Fig. 6

A	Suspension with threaded pin	3	Connector covers
B	Suspension from C-rail [9)]	4	Fixed point [10)]
	(LxWxH) 40x25x3 or 40x40x3	5	Mounting bracket
1	Sliding suspension	6	Clamp section
2	Straight section (standard length 4000 mm or shortened)		

[9)] C-rail: special order

[10)] 3,5 x 9,5 self-tapping screw to DIN 7981

3.3.2 Variant without protective earth conductor (PE)

Installations and current collector trolleys that do not have a protective earth conductor (PE) connection are delivered as follows.

Installations

The green/yellow protective earth conductor marking is omitted. The conductor/pole is fitted or provided and can be used for the transmission of power or control signals. In this case, the cross-section corresponds to the conductor cross-section for power transmission (applies for conductor cross-sections measuring 38 mm^2 and larger).

Current collector trolley

In this variant, the green/yellow conductor is replaced by a black cable. The protective earth conductor marking (PE) is omitted. The sliding contacts are fitted to match the number of conductors/poles.

4 Transport, packing, storage

4.1 Safety instructions

WARNING

Risk of injury from falling parts

Danger to life and limb.

Secure components when they are being transported. Do not step under the suspended load.

CAUTION

Inappropriate transport

The conductor line may be damaged.

Lift loads only at the marked lifting points. Only use suitable lifting equipment which has sufficient load capacity.

4.2 Transport inspection

- Check that the delivery is complete and for transport damage immediately on receipt.
- If any transport damage is visible from the outside, only conditionally accept the delivery. Note the scope of damage in the shipping documents/delivery note of the forwarding company and lodge a claim.
- Lodge a claim for any defects that are not immediately detected as soon as they are discovered, since claims for damages may only be asserted within the relevant claim notification periods.

4.3 Packing

If no agreement has been made on the return of the packing material, separate the materials according to type and size and make them available for further use or recycling.

Environmental protection:

- Always dispose of packing materials in an environmentally compatible way and according to locally applicable disposal regulations.
- If required, utilise the services of a recycling company.

4.4 Storage

Until they are installed, the conductor line and installation materials must be kept closed and may only be stored under the following conditions:

- Do not store outdoors.
- Store in dry and dust-free places, relative air humidity: max. 60%.
- Do not expose to aggressive media.
- Protect against direct sunlight.
- Avoid mechanical vibrations.
- Storage temperature: -30 °C to +70 °C.
- Avoid strong temperature fluctuations (condensation).
- Store sections in a straight and flat position with no load applied to them.
- Check the general condition of all parts of the packing at regular intervals. If required, refresh or renew rust protection.
- If stored in a damp location, the conductor line must be packed tight and protected against corrosion (desiccant).

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5 Assembly

5.1 General information for assembly

5.1.1 Safety instructions and notes

WARNING

Risk of injury if incorrectly assembled

Incorrect installation may result in severe injury and/or damage to property.

Therefore, this work may only be carried out by authorised, instructed personnel who are familiar with the principle of operation of the conductor line in compliance with all safety regulations:

- Ensure sufficient working clearance before starting assembly work.
- Secure and fence off the working and danger zone.
- First check that the voltage and frequency specified on the data plates match the owner's mains power supply.
- In the course of putting the unit into operation, it may be necessary to render safety devices or features temporarily inoperative.
- Wear protective clothing.
- Be careful when working on open components that have sharp edges. Risk of injury.
- Keep the working area clean and tidy. Store any unneeded parts and tools in such a way that there is no risk of them falling.
- Fit components correctly and as intended. Comply with specified bolt tightening torques. Incorrectly fitted components may fall and cause severe injuries.
- The electrode holder and earth must always be connected to the same assembly when welding work is carried out as otherwise serious damage may be caused to the machine.
- Only carry out installation work when all requirements regarding the installation location are met.
- All components (copper rail, conductor connectors, powerfeeds, etc.) which are used to supply current may heat up considerably. When assembly work is carried out, ensure that the installation is allowed to cool down immediately after operation to avoid the danger of burns.

- Pay attention to the orientation of the DCL-Pro installation as specified in the design diagram when assembling the components ⇒ "Fitting the suspension", Page 25.
- To support the sections, fit
  - brackets
  - C-rail fittings
  - and supports

  along the track layout.
- Ensure that the DCL-Pro installation is installed parallel to the crane or travelling hoist runway, etc.
- The DCL-Pro installation may need to be aligned following assembly.

Within the permissible temperature range from - 30 °C to + 70 °C, any change in length that occurs will be compensated by the DCL-Pro system without the need for any additional expansion joints.

5.1.2 General layout/suspension arrangement

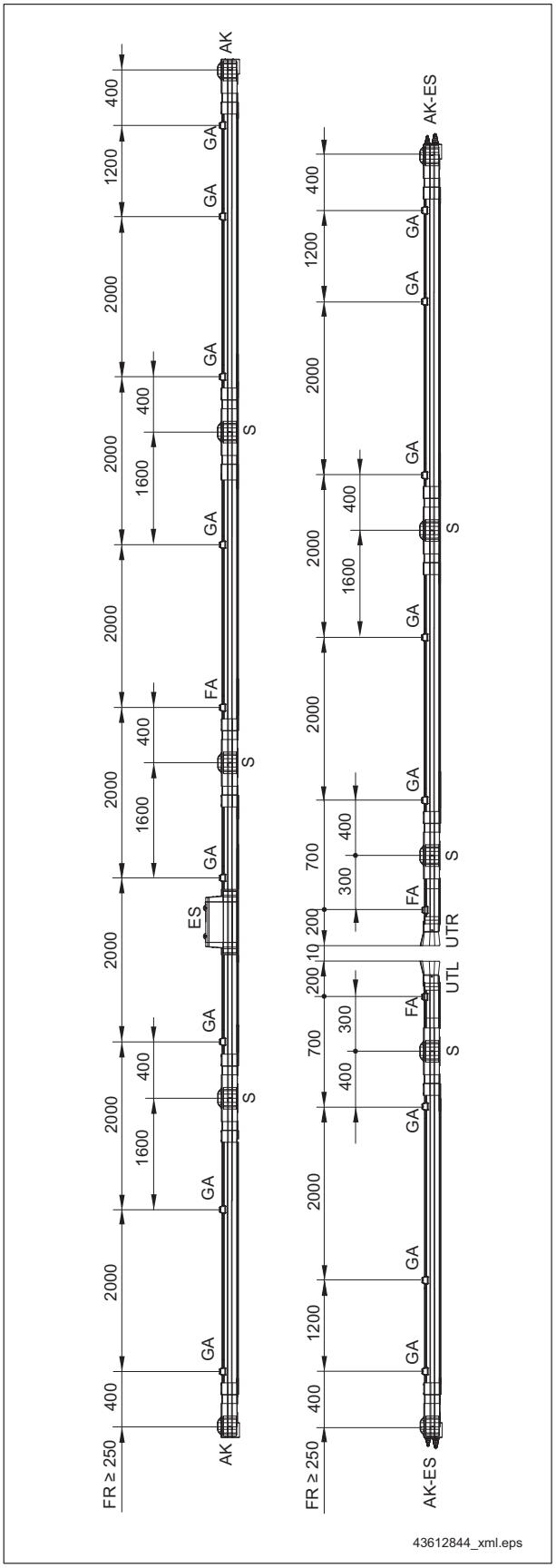

Fig. 7

Explanation of the abbreviations	
AK	Connector end cap with track connection
-AK-ES	Connector end cap with powerfeed
BS	Curved section
EK	End cap
ES	Line powerfeed
FA	Fixed suspension
GA	Sliding suspension
GS	Straight section
	Towing arm
	Towing arm for transfer points
S	Joint connector
	Current collector trolley
UTL or UTR	Entry/transfer ramp

Tab. 3

5.1.3 General assembly instructions

Connector end caps/end caps

- An entry/transfer ramp section may be installed instead of the connector end cap (AK).
- Ensure that there is enough working space/clearance for the connector end cap (AK) or end cap (EK) at the ends of the track.

Sliding suspension

- When large cable cross-sections (as of M50) ⇒ "Connecting a line powerfeed", Page 33 are used with a section incorporating a line powerfeed, an additional third sliding suspension must be fitted close to the powerfeed enclosure.
- Additional sliding suspensions must be provided for components which do not fit into the pattern of 2000 mm intervals between sliding suspensions.
- The minimum permitted distance between a GA sliding suspension and an S joint connector is 325 mm. The maximum distance is 400 mm (sliding range 325 mm – 400 mm). The suspension must be installed at a maximum distance of 400 mm.
- Install the sliding suspensions (GA) for the last straight section in such a way that any overhang is no larger than 400 mm.

Entry/transfer ramp

An additional suspension must be fitted at a distance of 200 mm from the end of the track for entry/transfer ramp sections.

Track routing

The conductor line must be installed parallel to the crane runway in the vertical and horizontal directions.

5.1.4 General assembly order

1. Install supports along the track layout.
2. Install sections (e.g. straight sections) with their suspensions and joint connectors and align them (horizontally and vertically).
3. Install fixed points.
   One fixed point suspension must usually be included in each DCL-Pro installation.

DANGER

Live components

Danger to life and limb.

All wiring and connection work may only be carried out by an instructed and qualified electrician according to the specifications of the electric connection diagram included in the supply.

4. Install the line powerfeed and connect the electric supply cable (line connection).
5. Install connector end caps and/or end caps.
6. Disconnect the conductor line from the power supply before installing the current collector trolleys.

5.2 Preparation

5.2.1 Completeness and storage

Check to ensure that the components are undamaged and complete before assembling the DCL-Pro installation.

Please make sure that you

- Store the components appropriately.
- Store sections in a straight and flat position with no load applied to them.
- Do not treat the installation with any materials, such as paint, etc.
- Do not store beyond a temperature range of -30 °C to +70 °C.

5.2.2 Tools needed

- 0,8 x 4 flat-blade screwdriver
- 1 x 5,5 flat-blade screwdriver
- Size 2 crosstip screwdriver
- SW10 open-end wrench
- SW13 open-end wrench
- SW8 socket wrench
- SW10 socket wrench
- 5 – 30 Nm torque wrench
- Cable knife
- Cable terminal pliers
- Measuring rod

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5.3 Fitting the suspension

5.3.1 Suspension variants

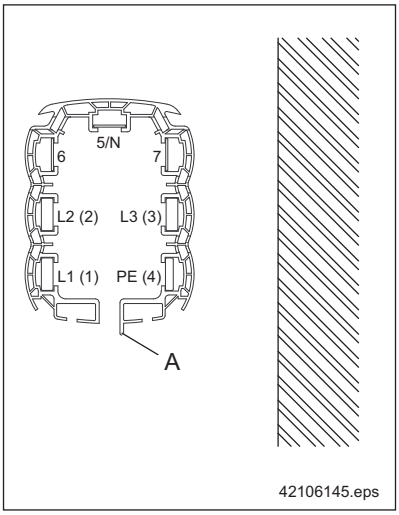

Fig. 8

Unless the installation is designed otherwise, it must be ensured that all sections are fitted in such a way that the protective earth conductor (PE) and profile rib (B) on the conductor enclosure face towards the steelwork or mounting device (A). Ensure that the straight sections are all installed in the same way.

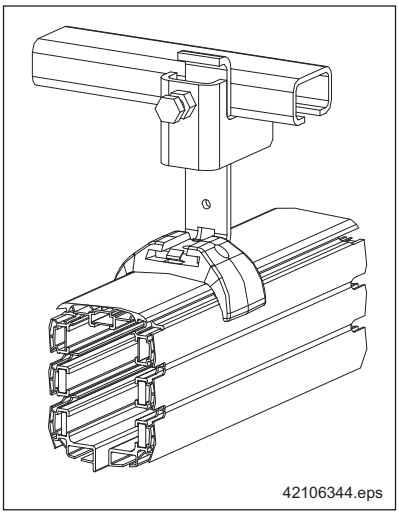

Fig. 9

There are three variants for suspension of the conductor line.

Suspension with C-rails (LxWxH) 40x25x3 or 40x40x3 ⇒ "Installing C-rail suspensions", Page 26

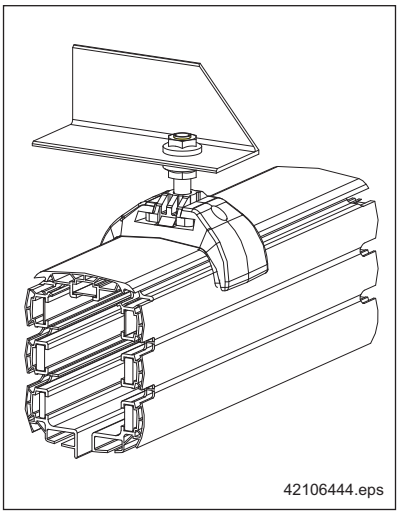

Fig. 10

Suspension with threaded pins on the steel superstructure or mounting device. ⇒ "Installing threaded pin suspensions", Page 27

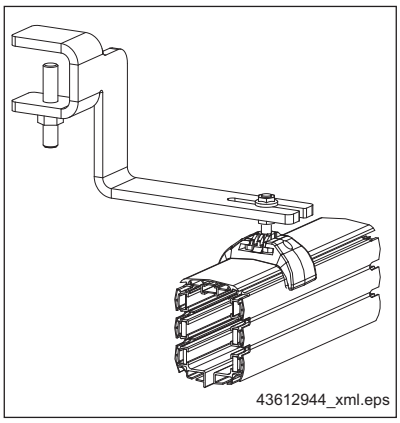

Fig. 11

Suspension with retaining bracket on IPE or INP girder and M8 threaded pin ⇒ "Installing retaining brackets on IPE or INP girders", Page 29

5.3.2 Installing C-rail suspensions

– Slide the clamp section into the C-rail and lightly tighten the M8 hexagon bolt.

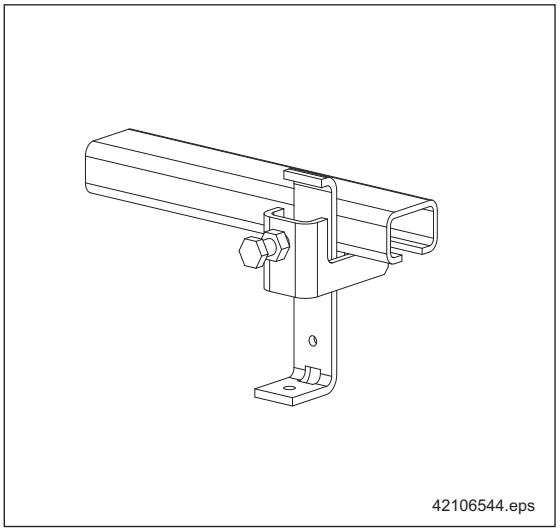

Fig. 12

– Clip the mounting bracket into the sliding suspension.

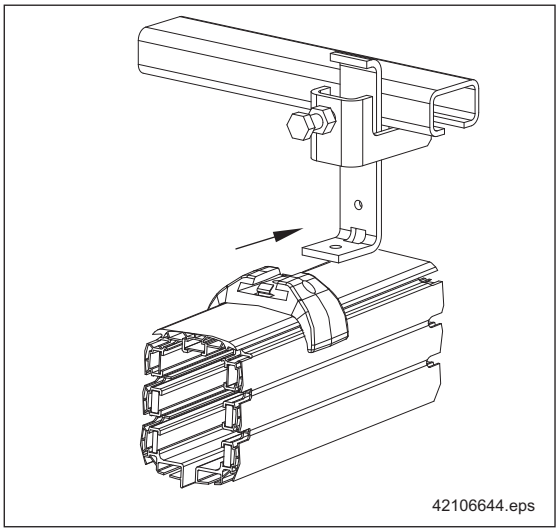

Fig. 13

– Align the profile section in the vertical and horizontal directions.
Tighten the M8 hexagon bolt and counter it with the M8 hexagon nut.
Tightening torque 20 Nm.

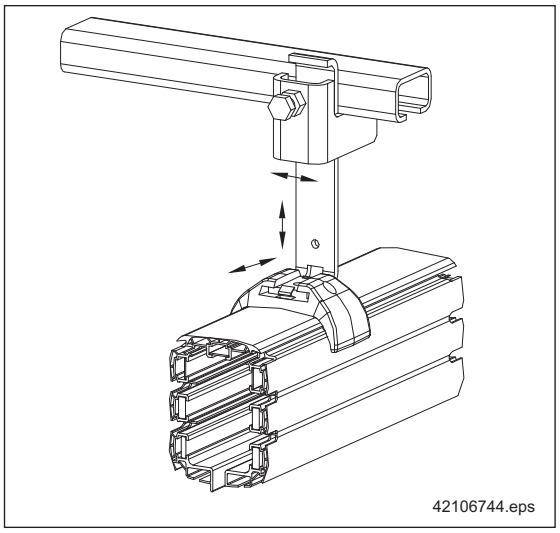

Fig. 14

5.3.3 Installing threaded pin suspensions

– Slide the plastic fitting over the M8 x 70 countersunk screw.

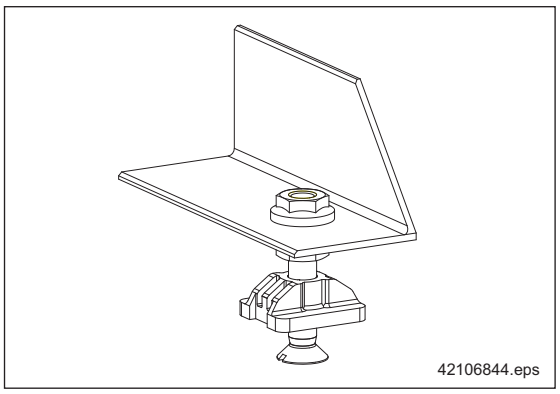

Fig. 15

– Insert the M8 x 70 countersunk screw into the support steelwork and secure it against slipping with the M8 Verbus-Ripp nuts.

– Clip the plastic fitting onto the sliding suspension.

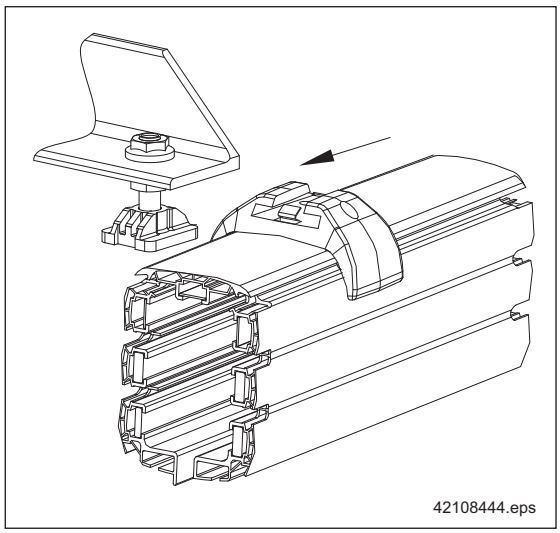

Fig. 16

– Align the profile section in the vertical and horizontal directions.

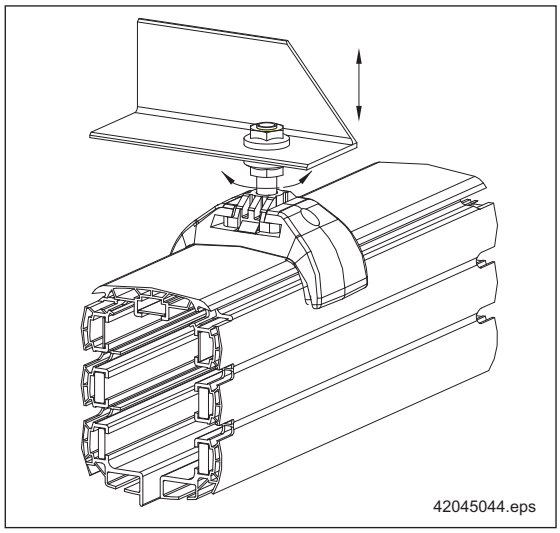

Fig. 17

– Counter-tighten both M8 Verbus-Ripp nuts to secure.

5.3.4 Installing the first sliding suspension

– Install the first sliding suspension 400 mm from one end of the track.

5.3.5 Installing additional sliding suspensions

Additional sliding suspensions are included in the supply.

– Install the following sliding suspensions at continuous intervals of 2000 mm.

If further sliding suspensions are required for design reasons, they can be installed as described in the following.

– Insert the sliding suspension into one of the recesses on the section.

– Move the sliding suspension to the required position and install it for the given suspension variant (C-rail or threaded pin).

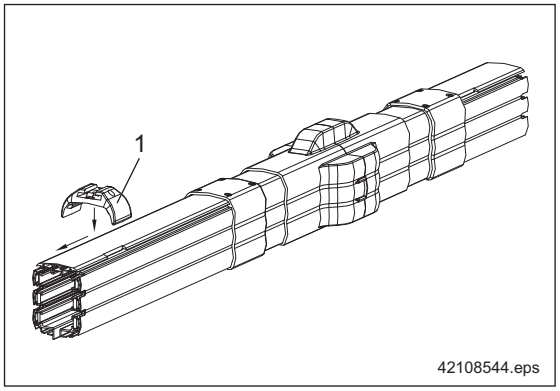

Fig. 18

5.3.6 Installing retaining brackets on IPE or INP girders

– Function dimensions:

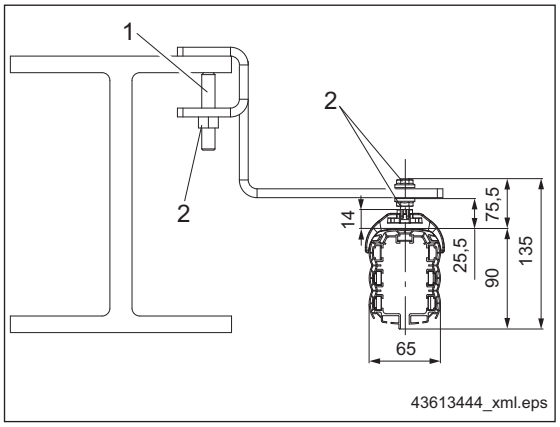

Fig. 19

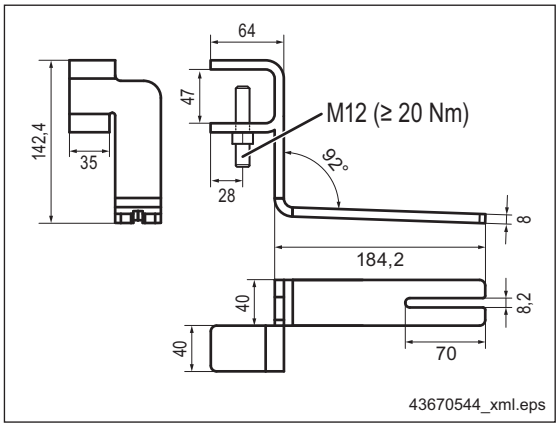

Fig. 20

1	M12 threaded pin with hexagon socket head (≥ 20 Nm)
2	M12 locknut

Tab. 4

– Attachment to IPE girder upper flange

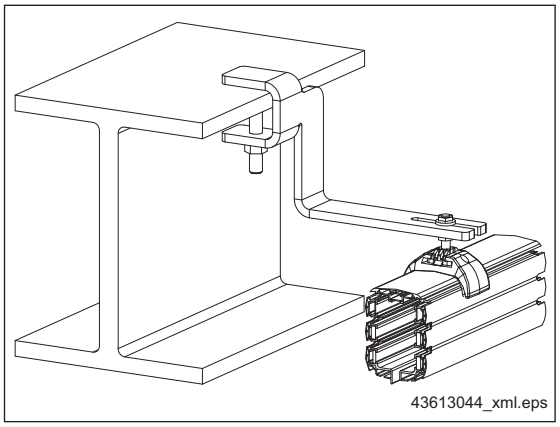

Fig. 21

– Attachment to IPE girder lower flange

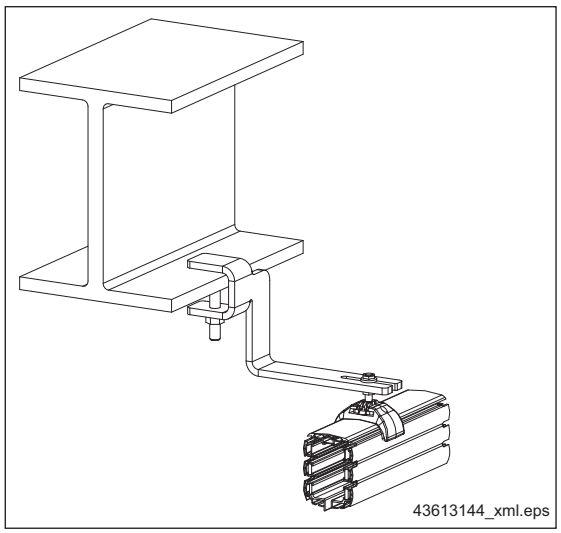

Fig. 22

– Attachment to INP girder "only" on upper flange

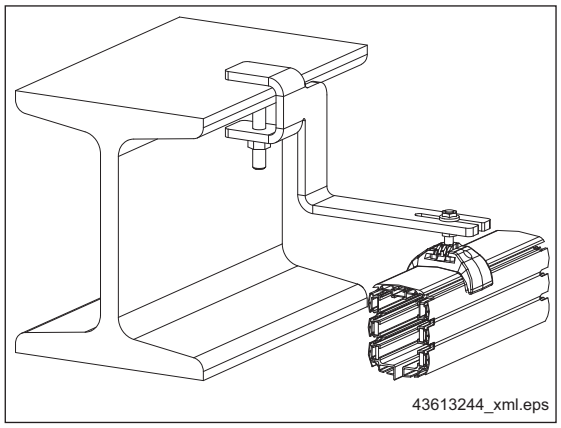

Fig. 23

5.4 Connecting the sections

The notch of the conductor connector U-section in combination with the transverse web of the conductor connecting lugs ensures easy assembly and a flush conductor line joint with increased functional reliability.

To install two track sections, both conductor connectors previously had to be positioned with reference to each with great care to avoid any play between the copper conductors. The patented connector system allows both conductor connectors to snap into place already when they are connected and ensures that the conductors are flush when they are bolted and tightened.

Ensure that the protective earth conductor (PE) and the profile rib are in the correct position when the sections are assembled ⇒ Fig. 8, Page 25.

– Combine sections (1) with the pre-assembled joint connectors.

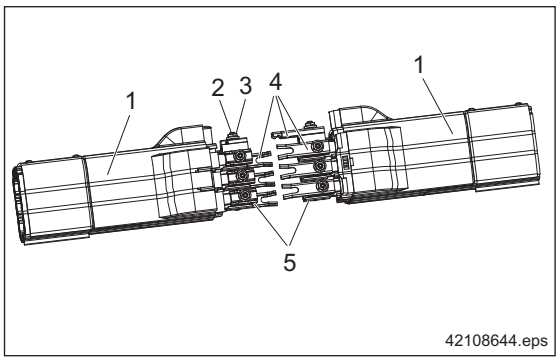

Fig. 24

– Loosen the M6 hexagon nuts (3) on the conductor connectors that do not have a U-section (5) with a SW10 socket wrench.

The M6 threaded pins (2) must not be loosened, as the conductor connecting lugs will move.

– Push conductor connector U-section (4), ⇒ Fig. 24, Page 31 onto the connecting lugs until the conductors butt against each other.

The connectors for 10 mm² and 15 mm² conductor cross-sections have additional clamp sections.

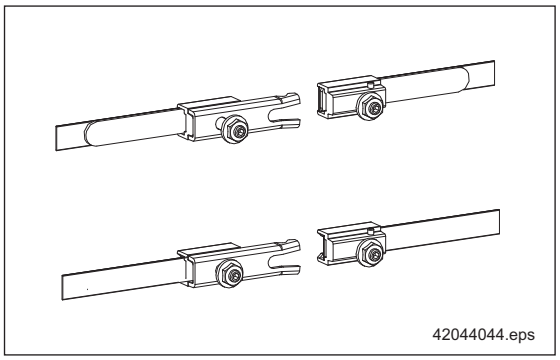

Fig. 25

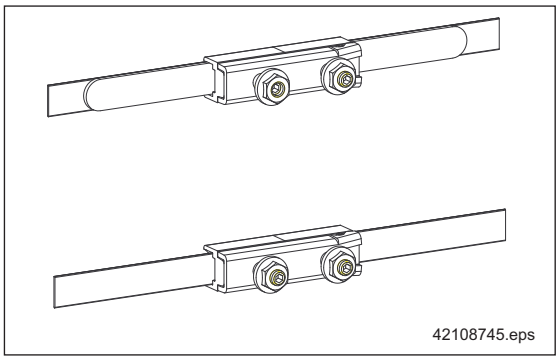

Fig. 26

– Tighten the M6 hexagon nuts to a tightening torque of 9 Nm.

– Check the copper rail connections by visual inspection and by feel before closing the connector cover. The joint must be smooth, flush and free of any burrs. This ensures that the sliding contacts of the current collector trolley will not be damaged.

– Push and clip the connector covers together.

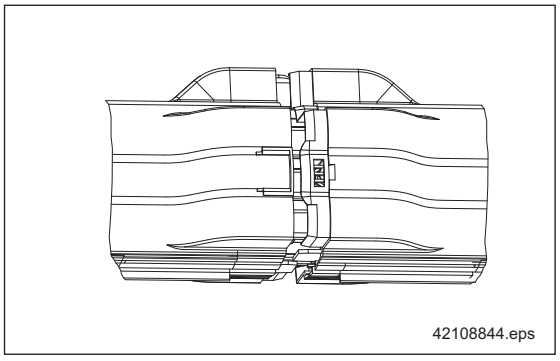

Fig. 27

5.5 Installing a fixed point

When all sections have been fitted on systems that do not have entry/transfer ramps, a fixed point must be installed at a sliding suspension at the middle of the track (allow for thermal expansion) to prevent lateral displacement of the installation.

The ramps must be fixed in place on installations that have entry/transfer ramps. In this case, there vis no need for a fixed point at the middle of the track.

CAUTION

Live parts

There is a risk of contact with live parts if self-tapping screws are used which are too long.

Use only the enclosed 3,5 x 9,5 mm self-tapping screws to DIN 7981 as there is a risk of accidental contact with live parts if longer screws are used.

– Screw the enclosed 3,5 x 9,5 mm self-tapping screw through the sliding suspension and into the conductor enclosure.

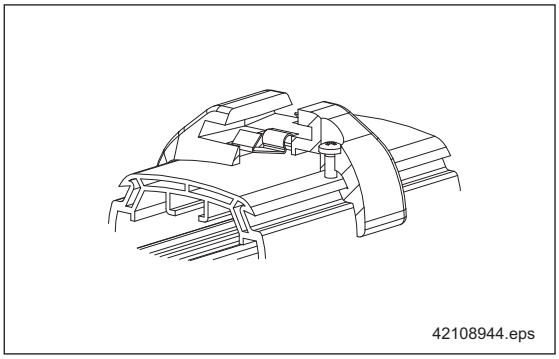

Fig. 28

5.6 Installing and connecting a line powerfeed

Installing a line powerfeed

The line powerfeed is in installed in the track in the same way as for any other straight track section.

There are two connection variants :

- For line powerfeeds that have 10 mm^2 and 15 mm^2 conductor cross-sections:

  Terminal connection direct on the conductor rail for connecting cables that have a core cross-section from 1,5 mm^2 to 16 mm^2.
- For line powerfeeds that have 25 mm^2 to 70 mm^2 conductor cross-sections:

  Screw terminal with connector bar for core cross-sections from 25 mm^2 to 70 mm^2.

Connecting a line powerfeed

– Open the line powerfeed.

  To do this, remove two screws (1), ⇒ Fig. 29, Page 33 and lever off tab (2) on the middle of the enclosure with a screwdriver.

Note: the rubber sleeve is supplied loose inside the line powerfeed housing.

– Break open the required M32 or M50 opening at prepared hole (3) in the powerfeed housing.

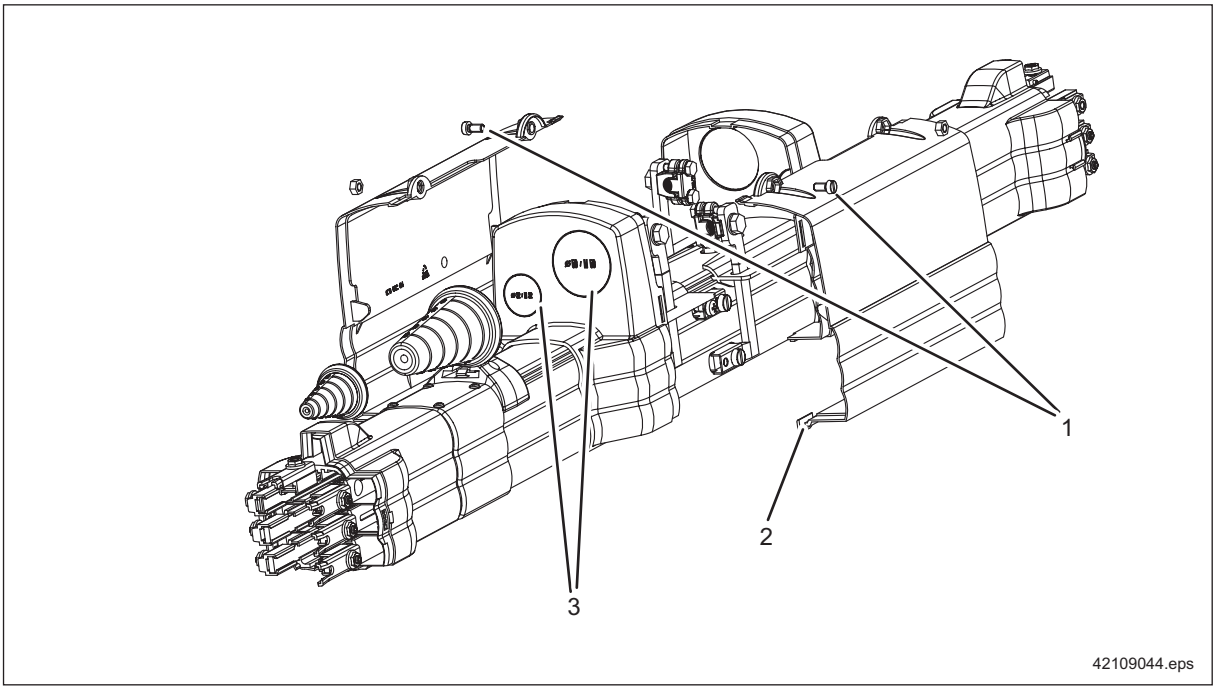

Fig. 29

– Cut the rubber sleeve to match the cable diameter and install it in the line powerfeed.

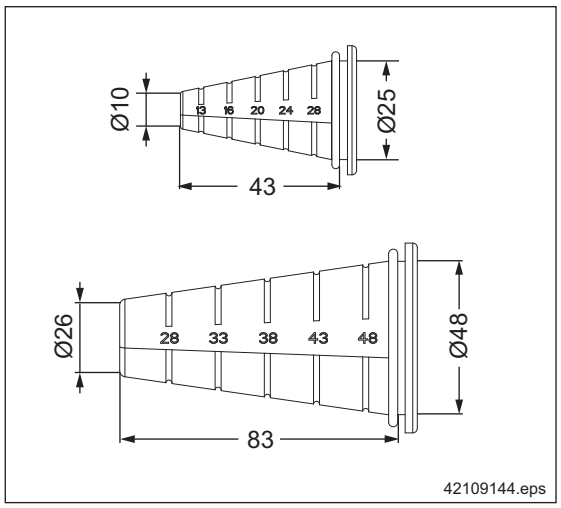

Fig. 30

Next steps

Arrange the connecting cable to the line powerfeed in such a way that the power supply is not inhibited by any changes in length as a result of temperature differences.

– Cut the connecting cable to the appropriate length for the required connecting positions.

– Remove the protective sheath of the connecting cable over a length of approx. 240 mm.

– Strip the individual wires as required for the connection.

– Insert the connecting cable through the M32 or M50 rubber sleeve.

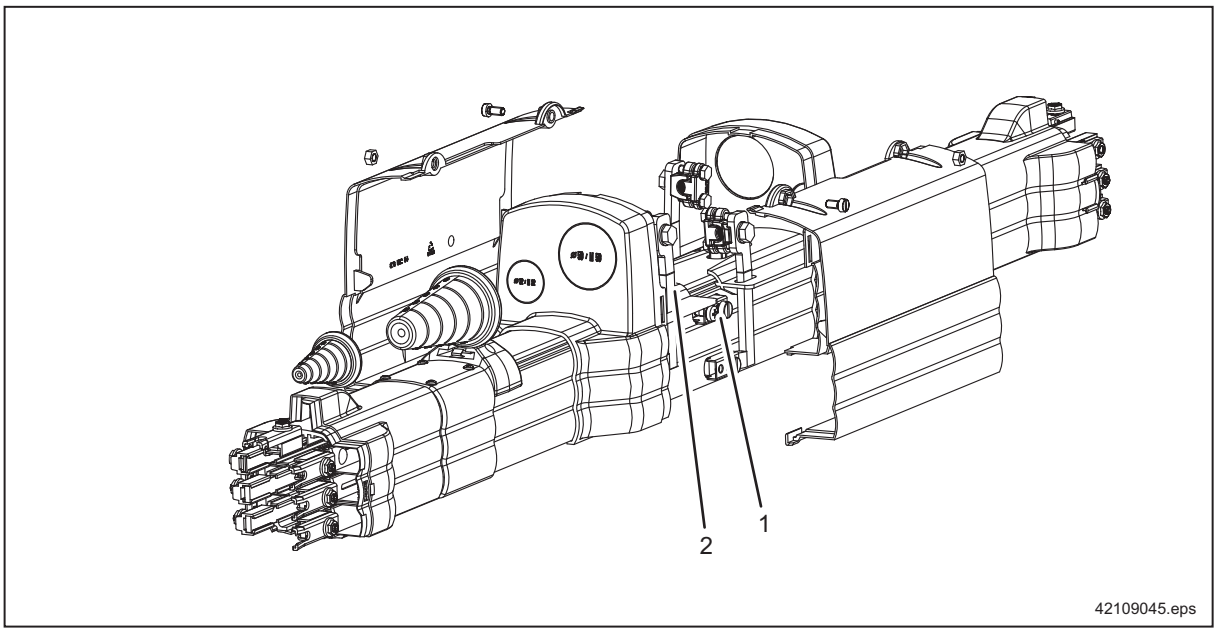

Fig. 31

With **connecting terminal** (1), ⇒ Fig. 31, Page 34:

1,5 mm² to 16 mm² single wires: fit cable lug and connect with screw. Only for line powerfeeds that have 10 mm² and 15 mm² conductor cross-sections.

With **connector bar** (2):

Lay 25 mm² to 70 mm² individual wires to the screw terminal on the connector bar and secure them with the two hexagon-head bolts. Only for line powerfeeds that have 25 mm^2 and 70 mm^2 conductor cross-sections.

Tighten both hexagon-head bolts to 9 Nm.

– Use available free space when laying the cables and avoid sharp edges and live parts.

– Check connections.

– Pay attention to protective earth (PE) position.

– Close line powerfeed, engage clips and secure with screws.

– Provide relief against tensile forces for the connecting cable outside the line powerfeed.

5.7 Fitting connector end cap for end powerfeed or track end

The connector end cap must be installed at the beginning or end of a DCL-Pro installation. The connector end cap can be used as an end powerfeed arrangement or as a track end at a joint connector. It provides protection against accidental contact at the end of the track.

Minimum distance to building walls, steel superstructures or other objects: 250 mm

Connecting a connector end cap for end powerfeed (only for 10 mm² and 15 mm² cable cross-sections)

1,5 mm² to 16 mm² cross-section wires are connected direct to the conductor connectors.

– Lever off the tabs on the sides of the connector cap with a screwdriver to open it.

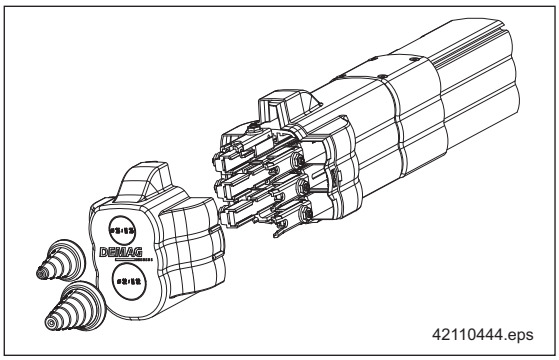

Fig. 32

– Remove conductor connector U-sections.

– Break open the M32 prepared holes in the end powerfeed enclosure, as required.

– Cut the rubber sleeve to match the cable diameter and install it in the end powerfeed.

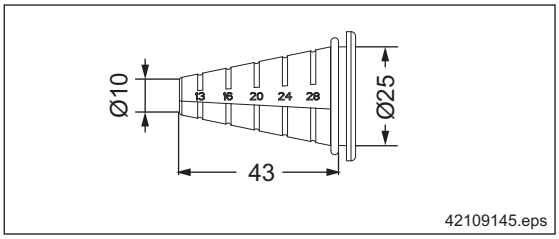

Fig. 33

Next steps

Arrange the connecting cable to the connector cap, i.e. end powerfeed, in such a way that the power supply is not inhibited by any changes in length as a result of temperature differences.

– Cut the connecting cable to the appropriate length for the required connecting positions.

– Remove the protective sheath of the connecting cable over a length of approx. 100 mm.

– Strip the individual wires as required for the connection.

– Insert the connecting cable through the M32 + M25 rubber sleeve.
1,5 mm² to 16 mm² single wires: fit cable lug and connect with hexagon nut.

– Use available free space when laying the cables and avoid sharp edges and live parts.

– Check connections.

– Pay attention to protective earth (PE) position.

– Close the connector cap and clip it into place.

5.8 Assembling current collector trolleys

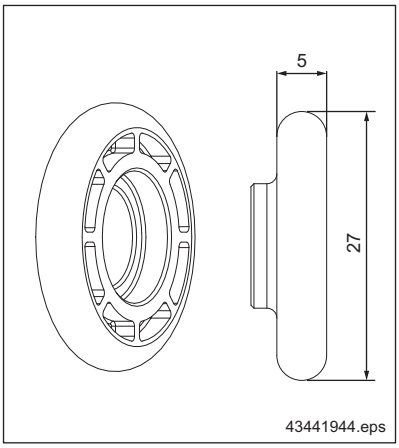

Fig. 34

Guide wheel with narrow wheel contour (transparent) – optimised guidance of the current collector trolley for straight and curved track installations

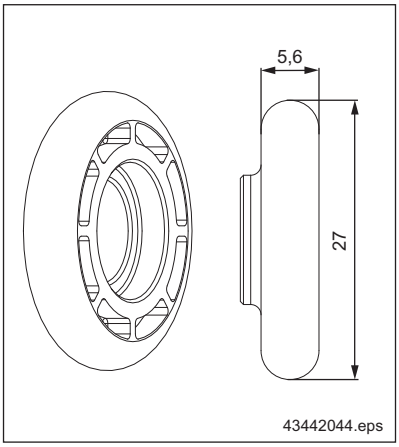

Fig. 35

Guide wheel with wide wheel contour (black) – optimised guidance of the current collector trolley for straight track installations

DANGER

Live components

Danger to life and limb.

All wiring and connection work may only be carried out by an instructed and qualified electrician according to the specifications of the electric connection diagram included in the supply.

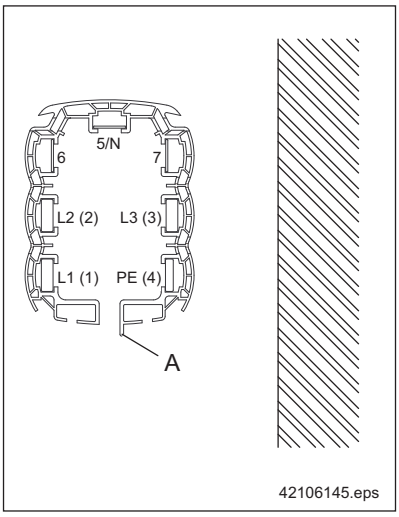

Fig. 36

A current collector trolley can be installed at any open end while the sections are being installed.

The protective earth conductor side (PE) and profile rib (A) on the section must be arranged opposite the orientation rib on the current collector trolley.

– Disconnect the conductor line from the power supply before installing the current collector trolleys.

– Press sliding contact (1) down and insert the current collector trolley into the section.

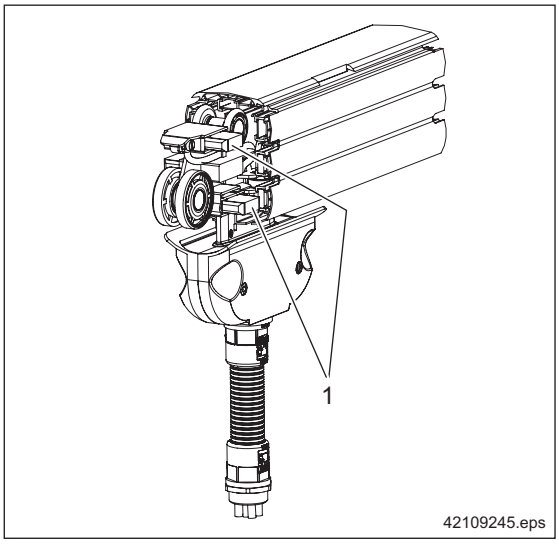

Fig. 37

Run the current collector trolley moved by hand over the entire length of the installation as a mechanical function check.

– Attach the connecting cables arranged inside the corrugated tube to the relevant equipment.

– Arrange the connecting cable in a generous curve to prevent any lateral forces from acting on the current collector trolley.

The current collector trolley must travel vertically in the DCL-Pro profile section after the corrugated tube has been connected and arranged. If the current collector trolley does not travel vertically in the profile section, this will result in increased wear and contact problems. The connecting cables must not inhibit the mobility of the current collector trolley.

Installing the towing arm

– Insert both pins of the towing arm into the current collector trolley.

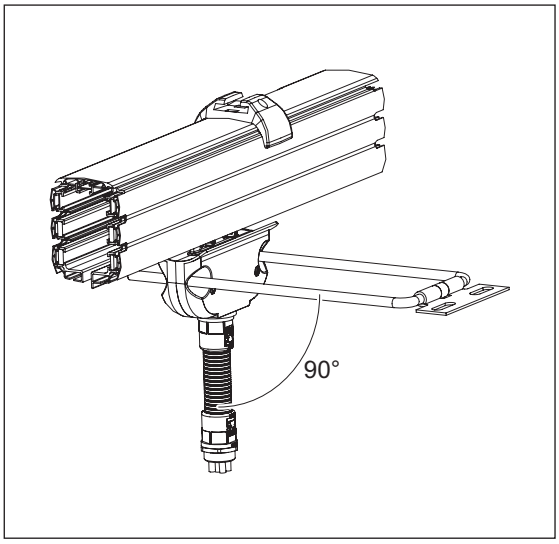

Fig. 38

The towing arm must be installed at an angle of 90° to the corrugated tube on the current collector.

– Install the towing arm horizontally and in such a way that no force caused by vertical or lateral displacement of the connected equipment is transmitted to the current collector trolley.

Preparing current collector trolleys for use with other components

The current collector trolley needs to be modified if an entry/transfer ramp or a profile seal is to be installed.
⇒ Tab. 1, Page 2

– Use a knife to cut along line (1) to remove upper shell half (2).

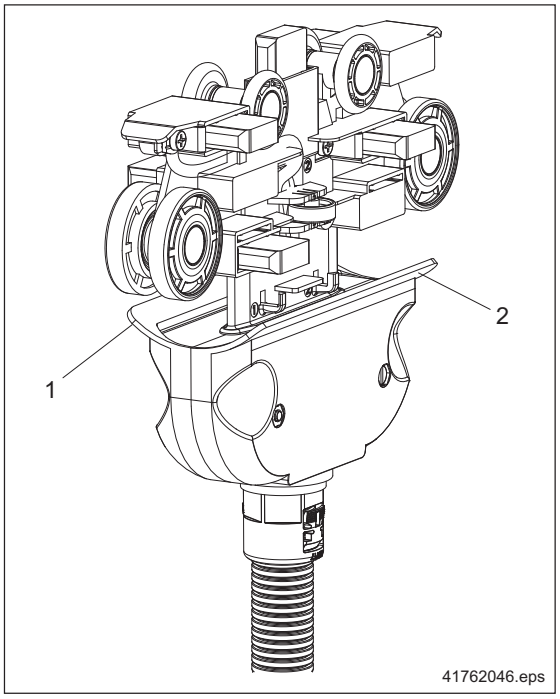

Fig. 39

5.9 Creating a straight section with end cap

5.9.1 Attaching an end cap to a straight section

If a straight section needs to be shortened, an end cap can be attached to the end to be shortened to provide protection against accidental contact with the conductor rails, i.e. a "straight section with end cap left" or "right" can be created.

Proceed as follows:

– Remove the straight section to be shortened.

– If necessary, fit a connector cap to the connector cover at the open end of the DCL-Pro installation as temporary protection against accidental contact.

– Remove the conductor connectors on the side to be shortened and remove the conductor rails from the enclosure profile section. Pay attention to the orientation of the enclosure profile section (see profile rib).

– Shorten the enclosure profile section of the straight section to the required length.

– Shorten all conductor rails by a further 30 mm with reference to the end of the enclosure profile section.

CAUTION

Live parts

There is a risk of contact with live parts if self-tapping screws are used which are too long.

Use only the enclosed 4,2 x 9,5 self-tapping screws to DIN 7981 as there is a risk of accidental contact with live parts if longer screws are used.

– Slide the end cap onto the shortened end of the profile enclosure section and secure it with two 4,2 x 9,5 mm oval head screws on the underside of the end cap.

– Slide the conductor rails back into the enclosure profile section. The result is a "straight section with end cap left" or "right".

– Remove the temporary protection against accidental contact from the end of the track and install the straight section with end cap.

Ensure that the conductor rails do not slide out of the enclosure profile section during assembly.

The conductor rails of factory-built straight sections with end cap are protected against sliding out by special packing.

- The distance (30 mm) of the conductor rails to the end cap within the enclosure profile section is designed to create the necessary insulation and creepage distances.
- The end cap must be located at a distance of at least 150 mm from building walls, suspensions or other limitations.

5.9.2 Shortening a straight section with the help of a connector cover adapter

As an alternative to the procedure described in ⇒ "Attaching an end cap to a straight section", Page 40, a straight section can be shortened and both joint connectors retained.

In general, a DCL-Pro installation is designed precisely for the geometry of the installation. Therefore, it does not usually need to be modified.

The modular design of the DCL-Pro conductor line enables existing straight sections to be adjusted in length at a later date.

The length of a straight section or track can be adapted on site by means of a connector cover adapter. The connector cover adapter of the conductor line establishes the connection between the enclosure profile section and the connector cover.

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Equipment and tools

Shortening set consisting of

- Shortening template
- 5-pole drilling protector
- Saw for cutting the enclosure
- Cutter/drill
- Instructions

Required tools (provided by the customer)

- Pen/pencil
- Measuring equipment
- Wire brush to clean the cut edges
- Power drill

Using the shortening set (part no.: 876 645 84)

The shortening set enables the conductor enclosure to be shortened to the required length and the necessary recesses (slots) to be formed in the enclosure.

The slots are required to maintain electric clearance distances. The enclosed template already includes these slots and specifies their exact positions.

The following slots are required, depending on the number of poles:

- 4 and 5-pole: 4 slots
- 4-5 and 6-pole: 4 slots
- 7-pole: 6 slots

The slots must be cut as described, otherwise the enclosed adapter cannot be fitted. If this is this case, the installation must no be put into operation. Further details are explained in the instructions included with the shortening set.

5.10 Installing entry/transfer ramps

Entry/transfer ramps must be installed at the beginning or end of a section. The entry ramp is used to allow current collector trolleys to enter the section.

Two opposing ramps (“left-hand” and “right-hand” types) must be installed at transfer sections.

The single joint connector and the suspension are as for straight sections. The C-rail attachment or threaded pin suspension on the ramp section must be a fixed suspension.

– Align entry/transfer ramps and screw them into place

  Min. distance between ramps for transfer sections 10 mm.

  Max. lateral misalignment between the ramps ± 10 mm.

  Max. vertical misalignment between the ramps ± 8 mm.

– The current collector is loosely installed on a towing arm.

  Set a vertical displacement of 22 mm between the top edge of the ramp and the top edge of sliding contact channel 6 or 7 when the current collector trolley is installed.

  This will ensure smooth travel into and out of the ramps.

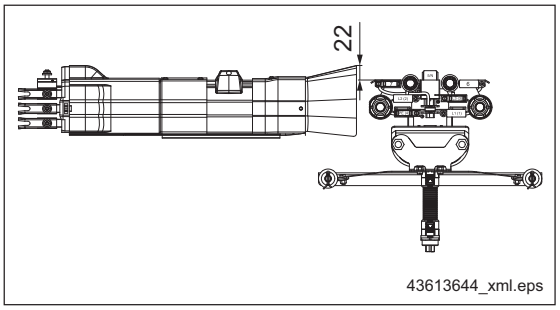

Fig. 40

– Do not exceed tolerances at transfer sections.

– Observe the transfer characteristics of the current collector trolley and, if necessary, correct adjustments on the track, on the current collector trolley or the towing arm (use towing arm for transfer sections).

The entry/transfer ramp is 500 mm long.

– Maintain a distance of 200 mm between the suspension and the beginning of the ramp section ⇒ Fig. 41, Page 43.

– Ensure that the protective earth conductor (PE) and the profile rib on the entry/transfer ramp are correctly positioned ⇒ Fig. 41, Page 43.

– A current collector trolley is only protected against accidental contact when it is located completely inside the conductor line system. Conductor line systems in which the current collector trolley leaves the conductor line in normal operation and, therefore, may be within hand’s reach, must be provided with protection against accidental contact by the customer.

  Measures for example: barriers or cut-off.

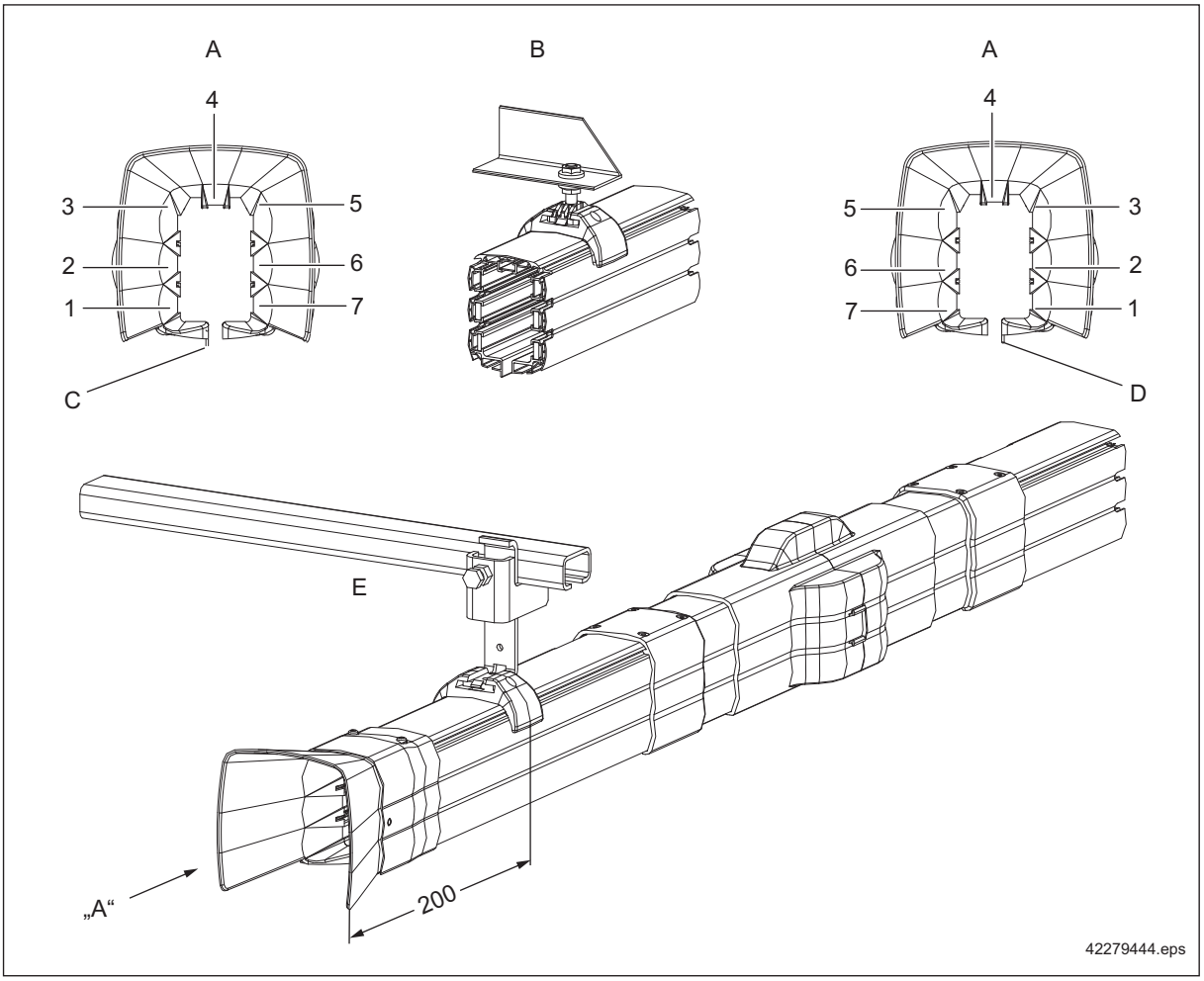

Fig. 41

A	View "A"	2	L3 conductor (3)
B	Suspension with threaded pin	3	Conductor 7
C	Profile rib (orientation rib), left-hand ramp	4	Conductor 5/N
D	Profile rib (orientation rib), right-hand ramp	5	Conductor 6
E	Suspension from C-rail [8)]	6	L2 conductor (2)
	(LxWxH) 40x25x3 or 40x40x3	7	L1 conductor (1)
1	PE conductor (4)		

5.11 Inserting a profile seal

The profile seal is supplied on rolls in lengths measuring a maximum of 40 m.

Requirement

- End/connector cap and current collector trolleys must not be installed.
- The current collector trolley must be prepared for operation in DCL-Pro installations that have profile seals ⇒ "Preparing current collector trolleys for use with other components", Page 39.

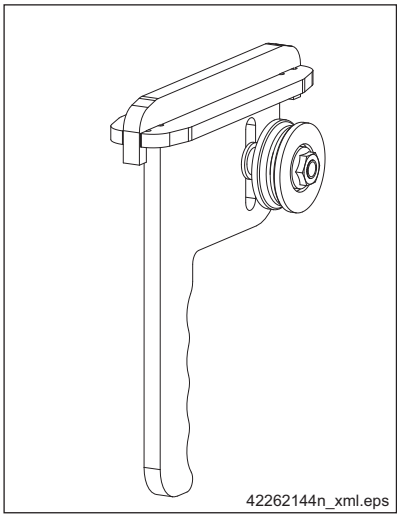

Fig. 42

Installation is much easier when a tool is used ⇒ Fig. 42, Page 44.

CAUTION

Live parts

There is a risk of contact with live parts when the profile seal is installed.

Disconnect the installation from the power supply before installing the profile seal.

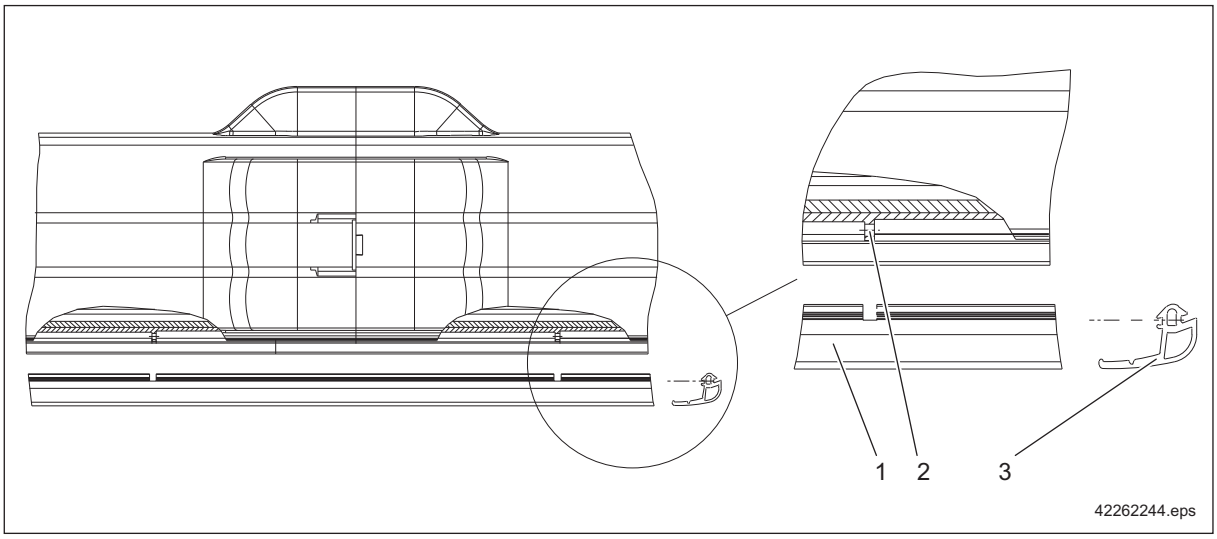

Fig. 43

Do not twist the profile seal during assembly.

The profile seal sections have to be bonded together at the joints (1)), ⇒ Fig. 43, Page 44 using cyanoacrylate glue (super glue) part no. 000 383 44) for longer DCL-Pro tracks.

– Ensure the bonding surfaces are clean and fit together.

– Coat retaining lug (3) of the profile seal with silicone-free lubricant (e.g. domestic detergent, liquid soap).

– Push the profile seals into place like a zip fastener.

The connector covers of the joint connector have small transverse ribs (2) in the recess for the profile seal.

– For continuous installation of the profile seal: cut a recess in the profile seal with a side cutter or knife in the area of the transverse ribs.

– Insert the current collector trolleys into the system and install the end caps or connector end caps.

– Insert approx. 50 mm of profile seal into the end caps or connector end caps.

– Ensure correct fit of the tab.

5.12 Installing isolating sections

For control purposes, the conductor line can be interrupted by means of isolating sections on straight sections or at line powerfeeds. These isolating sections can be installed in the factory or on site.

If the isolating sections are fitted in the factory, the following detailed information is required:

- position of the isolating section/sections in the installation,
- length of each isolating section.

Assembling isolating sections on site

One or more isolating sections can be installed depending on the length of the section to be isolated.

Isolating sections can only be combined with corresponding conductor rails that have a cross-section of 25 mm^2. If necessary, the existing conductor rail must be replaced with a corresponding conductor rail.

– Remove the conductor rail that needs to be interrupted from the conductor line enclosure.

– Shorten the conductor rail at the required position by the length of the isolating section to be installed.

– Drill a hole at each end of the separated conductor rails. See diagram for distances and dimensions.

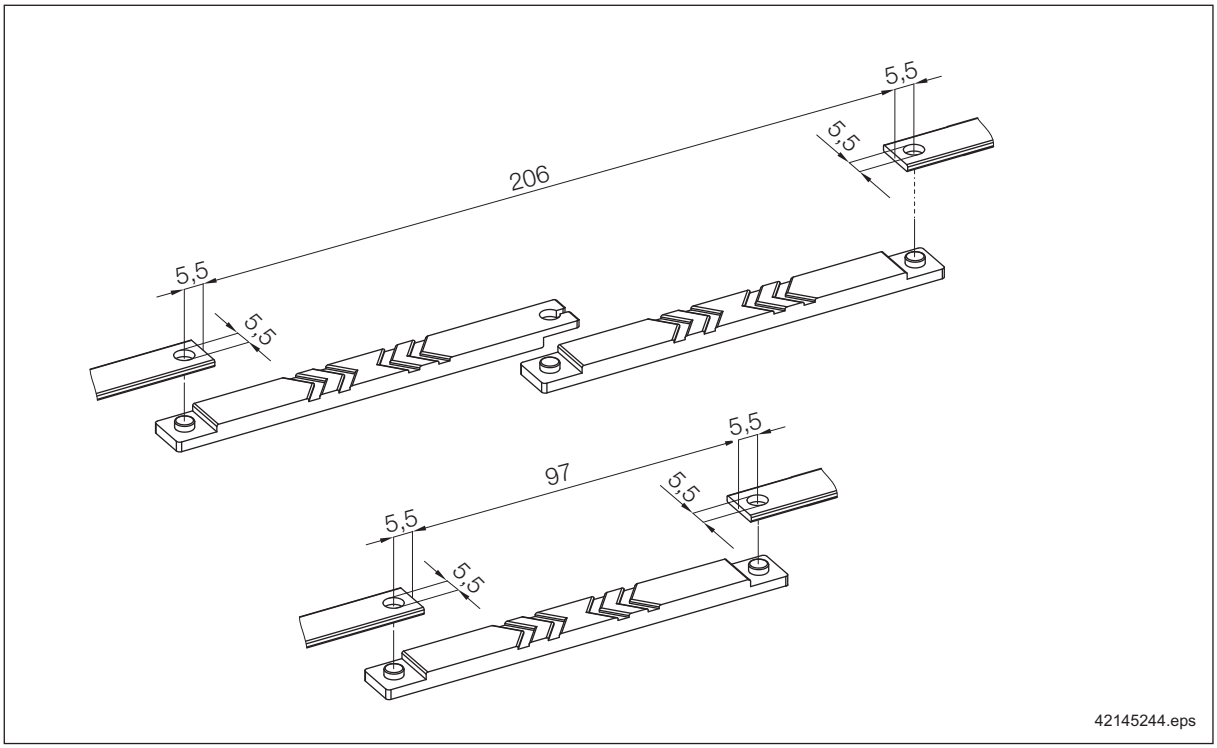

Fig. 44

– Attach the isolating section or sections to the conductor rail.

– Slide the conductor rail with the fitted isolating section back into the enclosure profile section.
Avoid any misalignment and bends in the conductor rail.

– Fit the joint connector and install the section in the track.

5.13 Fitting curved sections

Curved sections are assembled and completed in the factory. If the system cannot be shipped when it is assembled (e.g. due to a large overall curved section length), the system must be assembled on site. This section contains some information for simple assembly if the system needs to be completed on site.

All curved sections are first completed, assembled over their entire length and checked in the factory. If necessary, they are then dismantled for shipping and packed safely to be transported.

Multi-part curved sections consist of

- 1 left-hand curved section with connector cover and conductor connectors
- 1 right-hand curved section with connector cover and conductor connectors
- no, one or several centre curved sections (depending on the angle, radius and overall curve length).

Assembly of the complete curve includes insertion of the conductor rails and screwing together the enclosure parts. Refer to the enclosed shipping documents and the packages included in the delivery for information on how the sections are combined.

If the curve consists of more than 3 sections, every section is identified with a letter in the sequence of assembly. The conductor rails to be inserted are also marked. The characters marked on the conductor rails correspond to the characters on the curved sections and the rail channels in the profiles.

– Introduce the rails into rail channels (1) by pushing or pulling them.

  Pull the rails into the relevant section by segments, if required.

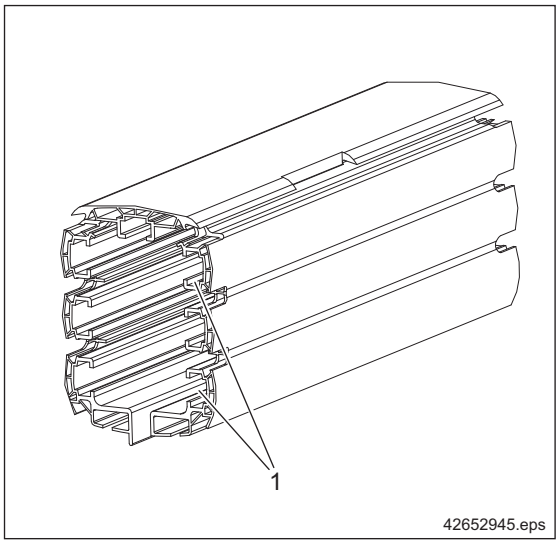

Fig. 45

– Fit the enclosed conductor connectors on the copper rails.
  ⇒ Fig. 46, Page 48 shows the fully equipped enclosure profile section.

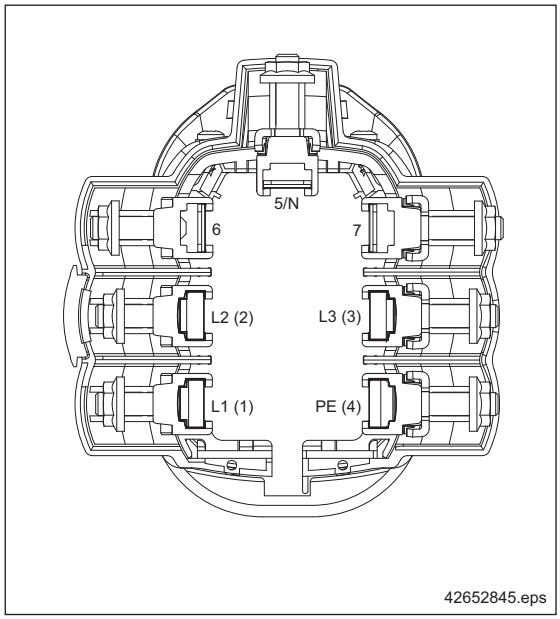

Fig. 46

CAUTION

Live parts

There is a risk of contact with live parts if self-tapping screws are used which are too long.

Use only the enclosed self-tapping screws to DIN 7981 as there is a risk of accidental contact with live parts if longer screws are used.

– Connect the curved sections with the connector covers and the screws included in the delivery.
  To do this, bolt connector covers (2), ⇒ Fig. 47, Page 48 to enclosure profile sections (3).

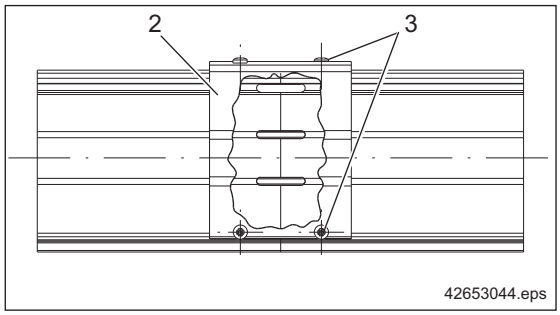

Fig. 47

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6 Compatibility between DCL and DCL-Pro

6.1 Extensions and replacement

DCL-Pro conductor line is compatible with DCL. This means that it can also be used to supply components for and extend existing DCL track systems.

Extending existing DCL track systems or replacing individual DCL track sections with DCL-Pro

Owing to their interface geometry, DCL conductor line straight and curved sections can be combined with DCL-Pro straight and curved sections.

Components	Valid for type	Compatibility
Connector covers	DCL and DCL-Pro	1:1
10, 15, 25, 38 and 56 mm^2 copper conductor	DCL and DCL-Pro	1:1
70 mm^2 copper conductor	DCL-Pro	—

Tab. 5

The conductor connectors for DCL and DCL-Pro are **not** compatible with each other. The DCL conductor connectors at joints between DCL and DCL-Pro track sections must be replaced by DLC-Pro conductor connectors.

If a DCL track section is replaced by a DCL-Pro track section in an existing DCL system, the DCL conductor connectors adjacent to the DCL-Pro track section must be replaced by DCL-Pro conductor connectors.

If a section needs to be replaced within an installation, i.e. where there are DCL track sections on the left and right, then a DCL-Pro conductor connector set is required for each conductor rail.

If a DCL installation is extended, i.e. with a connection only at one end, one DCL-Pro conductor connector set can be used for two conductors.

Required conductor connector sets when a DCL-Pro track section is installed in a DCL system:

Installation variant 1: installation with DCL track sections connected on the left and right

Installation variant 2: extension to an existing DCL installation, i.e. with a connection only at one end

Quantity of sets	4-pole	5-pole	6-pole	7-pole
Installation variant 1	4	5	6	7
Installation variant 2	2	3	3	4

Tab. 6

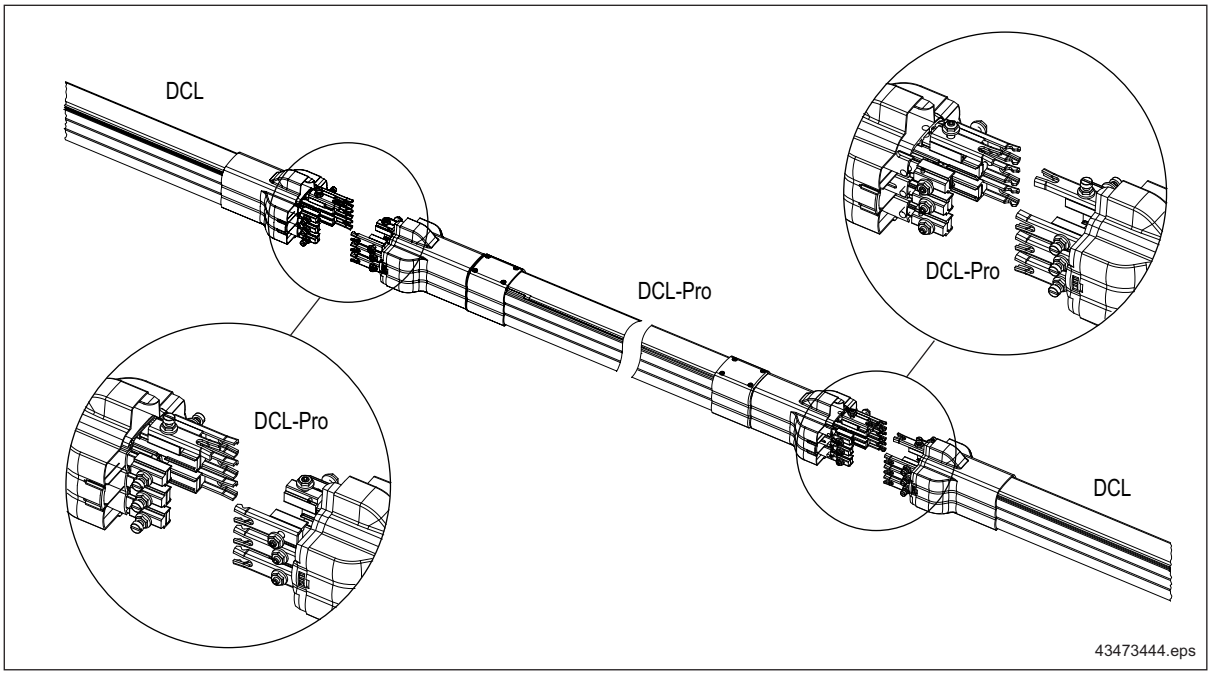

Fig. 48

Using the new DCL-Pro current collector trolley in DCL track systems

DCL-Pro current collector trolleys can be used in existing DCL installations. They feature the same max. permissible current, but have been adapted to meet the special requirements of straight and curved track layouts.

For straight track layouts, current collector trolleys are available with guide wheels featuring a wide wheel contour (current collector trolley for straight track layout); for straight and curved track layouts, trolleys are available with guide wheels that have a narrow wheel contour (universal current collector trolley).

Current collector trolleys previously used for DCL can also be used in DCL-Pro installations.

7 Removal and maintenance

7.1 Safety instructions

WARNING

Risk of injury.

Incorrect maintenance work may result in severe injury or damage to property.

Maintenance work may only be carried out by authorised and instructed specialist personnel in compliance with all safety regulations.

DANGER

Live components

Danger to life and limb from electric current.

Work on electric equipment may only be carried out by qualified personnel in compliance with the safety regulations.

7.2 Removing components

7.2.1 Removing straight track sections

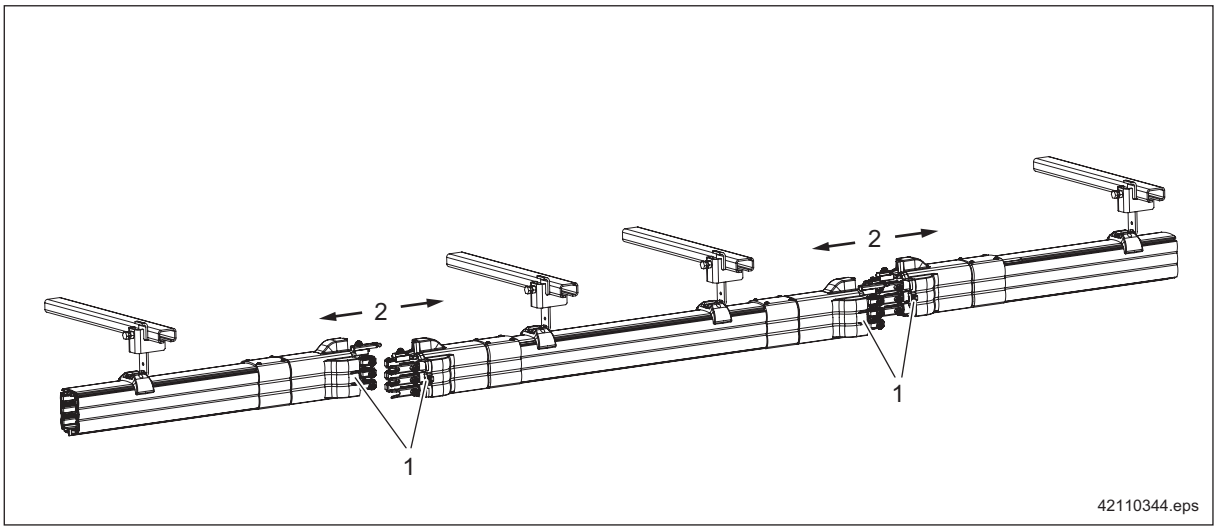

Fig. 49

Opening connector covers

– Use a screwdriver to lever off both side tabs (1), ⇒ Fig. 49, Page 52 on the middle of the enclosure.

– Slide the connector covers apart (2).

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Removing conductor connector U-sections

– Loosen all M6 nuts (1).

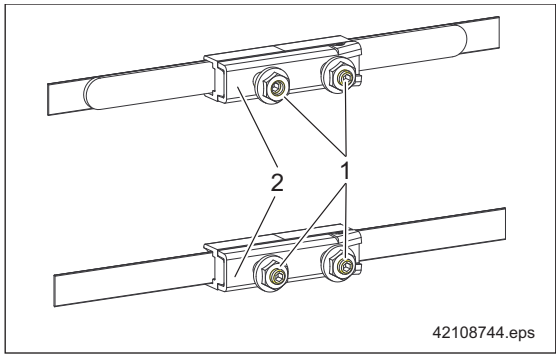

Fig. 50

The threaded pins must not be unscrewed.

– Remove conductor connector U-sections (2) by sliding them to the side.

Disconnecting suspensions

CAUTION

Risk of parts falling when suspensions are disconnected.

Incorrect disconnection of the suspensions can result in injuries if the conductor line drops.

– Suspensions must only be disconnected by two service specialists.

Suspension from C-rail

– Undo locknut (1) on the clamp section.

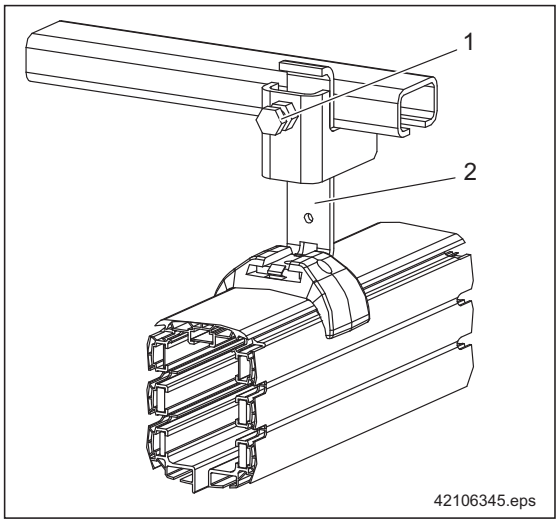

Fig. 51

– Unscrew the screw until mounting bracket (2) passes through the clamp section and the rail section can be removed by two people.

Suspension on threaded pin

– Loosen lower locknut (1) on the threaded pin.

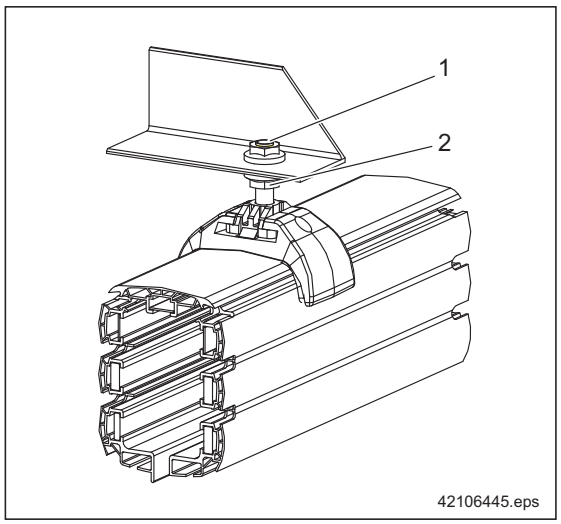

Fig. 52

– Unscrew upper hexagon nut (2) to enable the section to be removed by two people.

7.2.2 Disassembling current collector trolleys

The following disassembly steps are only necessary if the current collector trolley cannot be removed at the beginning or end of a DCL-Pro installation.

DANGER

Live components

Danger to life and limb.

All wiring and connection work may only be carried out by an instructed and qualified electrician according to the specifications of the electric connection diagram included in the supply.

- Disconnect the conductor line from the power supply before dismantling the current collector trolley.
- Position the current collector trolley at the middle of any joint.
- Open connector covers ⇒ "Opening connector covers", Page 52.
- Remove conductor connector U-sections ⇒ "Removing conductor connector U-sections", Page 53.
- Remove the towing arm fittings for the current collector trolley.
- Push both sides of the joint apart in the horizontal direction until the current collector trolley can be removed.

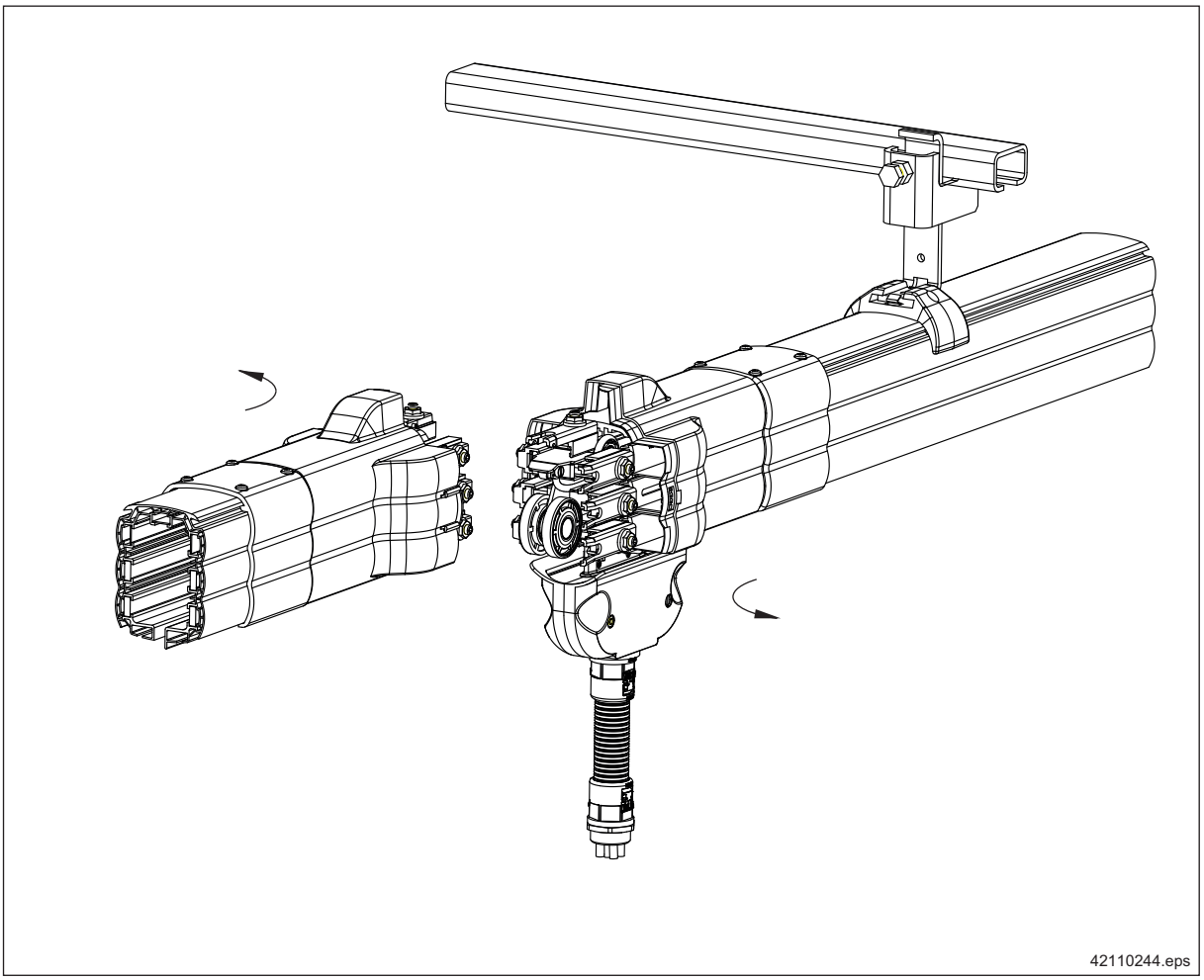

Fig. 53

7.2.3 Replacing sliding contacts

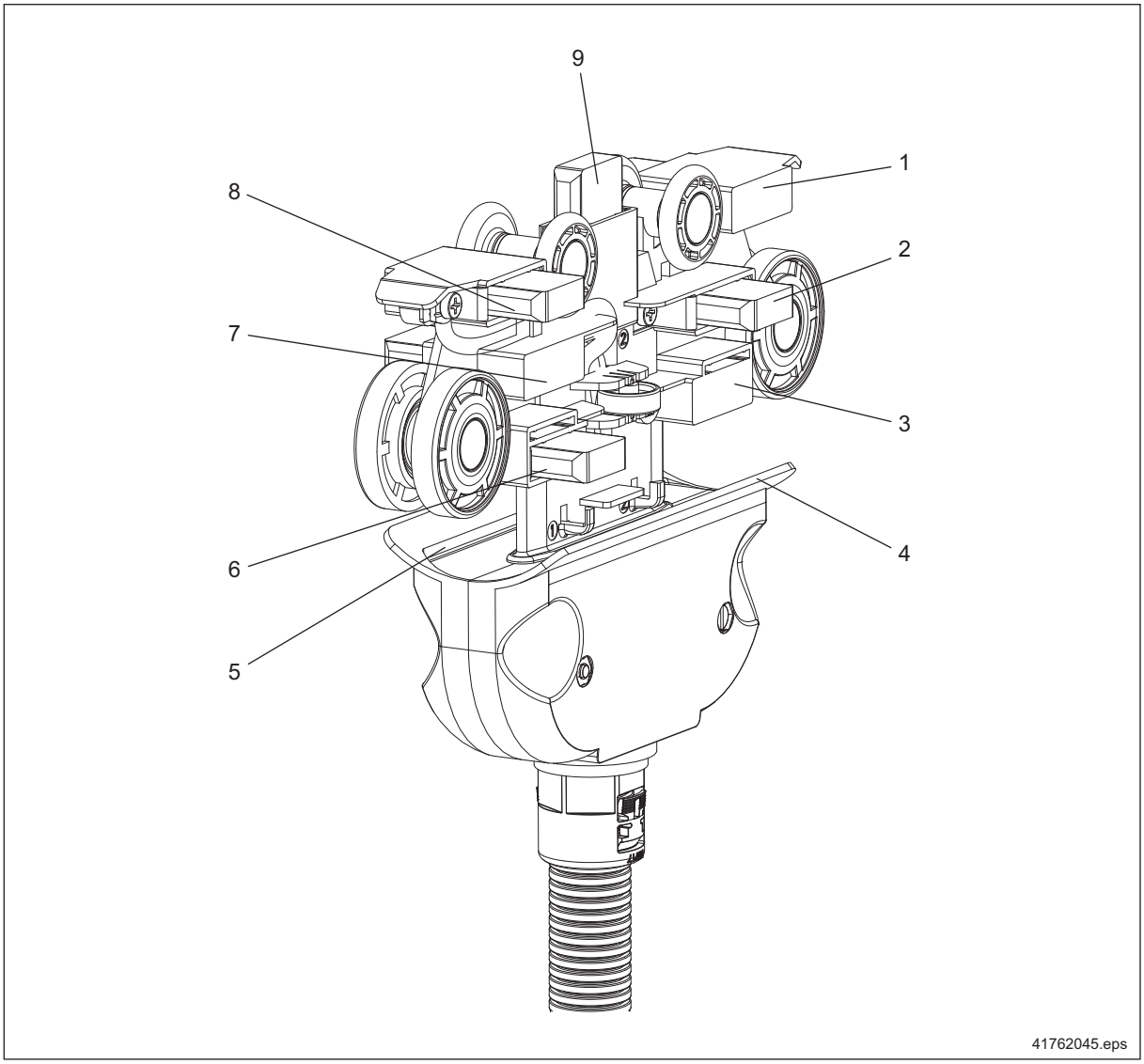

Fig. 54

1	Rear of the sliding contact for terminal 7	5	Prepared opening
2	L3 terminal (3)	6	L1 terminal (1)
3	Rear of the sliding contact for PE terminal (4)	7	Rear of the sliding contact for L2 terminal (2)
		8	Terminal 6
4	Shell half	9	Terminal 5/N

– Unscrew the screws on the sliding contacts.

– Remove old sliding contacts.

– Install new sliding contacts.

  Make sure that the connecting wires are in the correct position for sliding contacts 5, 6 and 7 that have external wire connections.

  Pay attention to correct assignment of the sliding contacts.

– Install sliding contacts 2 and 3 with reinforced contact springs on 6 and 7-pole current collector trolleys.

– Secure sliding contacts with screws to a tightening torque of 1,2 Nm.

Replace sliding contacts with pre-configured sliding contact sets ⇒ "Current collectors/current collector trolleys", Page 60.

7.3 Maintenance schedule

The specified inspection and maintenance intervals apply to normal operating conditions. If routine maintenance reveals that the intervals are too long, they should be shortened according to the specific operating conditions.

DANGER

Live components

Danger to life and limb.

All wiring and connection work may only be carried out by an instructed and qualified electrician according to the specifications of the electric connection diagram included in the supply.

Current collector trolleys: visual inspection for wear

– Position the current collector trolley at the middle of any joint.

– Disconnect the conductor line from the power supply before opening the connector cover.

– Open connector covers:
  Use a screwdriver to lever off both side tabs on the middle of the enclosure.
  Slide the connector covers apart.

– Check and assess the condition of the current collector trolley, especially its sliding contacts.

If the visual inspection makes it necessary to remove the current collector trolley, continue with dis-assembly as described in section ⇒ "Disassembling current collector trolleys", Page 55, step 3.

8 Component and spare parts

8.1 Component sets

DCL-Pro C-rail suspension set

Designation	Qty	Part no.
Sliding suspension	1	876 638 84
Mounting bracket	1	
C-rail clamp section	1	

Tab. 7

For 1 suspension

DCL-Pro threaded pin suspension set

Designation	Qty	Part no.
Sliding suspension	1	876 637 84
M8 hexagon bolt counterpart	1	
M8 locknut	2	
M8 x 70 countersunk screw	1	

Tab. 8

For 1 suspension

DCL-Pro conductor connector set

Designation	Qty	Part no.
Conductor connecting lug	2	876 693 84
Conductor connecting lug with clamp section [11)]	2	
Conductor connector U-section	1	
M6 x 22 threaded pin [12)]	2	
M6 locknut	2	
Instructions	1	

Tab. 9

The conductor connectors for DCL and DCL-Pro are **not** compatible with each other.

If a DCL track section is replaced by a DCL-Pro track section in an existing DCL system, the DCL conductor connectors adjacent to the DCL-Pro track section must be replaced by DCL-Pro conductor connectors.

If a section needs to be replaced within an installation, i.e. where there are DCL track sections on the left and right, then a DCL-Pro conductor connector set is required for each conductor rail.

If a DCL installation is extended, i.e. with a connection only at one end, one DCL-Pro conductor connector set can be used for two conductors.

Required conductor connector sets when a DCL-Pro track section is installed in a DCL system:

Installation variant 1: installation with DCL track sections connected on the left and right

Installation variant 2: extension to an existing DCL installation, i.e. with a connection only at one end

Quantity of sets	4-pole	5-pole	6-pole	7-pole
Installation variant 1	4	5	6	7
Installation variant 2	2	3	3	4

Tab. 10

[11)] The clamp section is only required for 10 and 15 mm^2 conductor cross-sections.

[12)] The M6 x 22 threaded pin is only required for 56 and 70 mm^2 conductor cross-sections.

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DCL-Pro track end set

Designation	Qty	Part no.
End cap	2	876 785 84
DCL-Pro-AK-ES connector end cap	2	
M32 entry sleeve	2	
M25 entry sleeve	2	
ST 4,2 x 9,5 self-tapping screw	4	

Tab. 11

DCL-Pro enclosure profile shortening set

Designation	Qty	Part no.
Shortening template with attachment	1	876 645 84
Drilling protector (5-pole)	1	
Saw for cutting the enclosure	1	
5 mm cutter	1	
5 mm drill	1	
Wire brush for cleaning/deburring	1	
G clamp	1	
Instructions	1	

Tab. 12

Electric isolating sections

Designation	Part no.
U isolating section [13)]	876 676 84
S isolating section [13)]	876 678 84

Tab. 13

[13)] S isolating section = 97 mm isolating distance, U isolating section = 109 mm isolating distance; S isolating section + U isolating section = 206 mm isolating distance. The isolating distance can be extended by adding further U isolating sections ⇒ "Installing isolating sections", Page 46.

8.2 Spare part sets

8.2.1 Current collectors/current collector trolleys

The parts listed below are subject to a greater or lesser amount of wear while a current collector trolley is in operation. Wear depends on various factors and is not determined by the current collector trolley operating period alone.

Preventive maintenance is, therefore, required.

Worn current collector trolleys or components must be replaced without delay.

Bronze sliding contact set [14)]

Designation	Part no.
5-pole 40 A sliding contact set (for 4 + 5-pole CCT)	876 715 33
7-pole 40 A sliding contact set (for 6 + 7-pole CCT)	876 716 33

Tab. 14

Graphite sliding contact set [15)]

Designation	Part no.
5-pole 20 A sliding contact set (for 4 + 5-pole CCT)	876 717 33
7-pole 20 A sliding contact set (for 6 + 7-pole CCT)	876 718 33

Tab. 15

Bronze/silver-graphite sliding contact set [16)]

Designation	Part no.
5-pole 40 A/20 A sliding contact set (for 5-pole CCT)	876 726 33
7-pole 40 A/20 A sliding contact set (for 6 + 7-pole CCT)	876 727 33

Tab. 16

Cleaning trolley available on request

[14)] Power and control conductor sliding contacts: bronze
[15)] Power and control conductor sliding contacts: graphite
[16)] Power conductor sliding contacts: bronze, control conductor sliding contacts: silver graphite

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