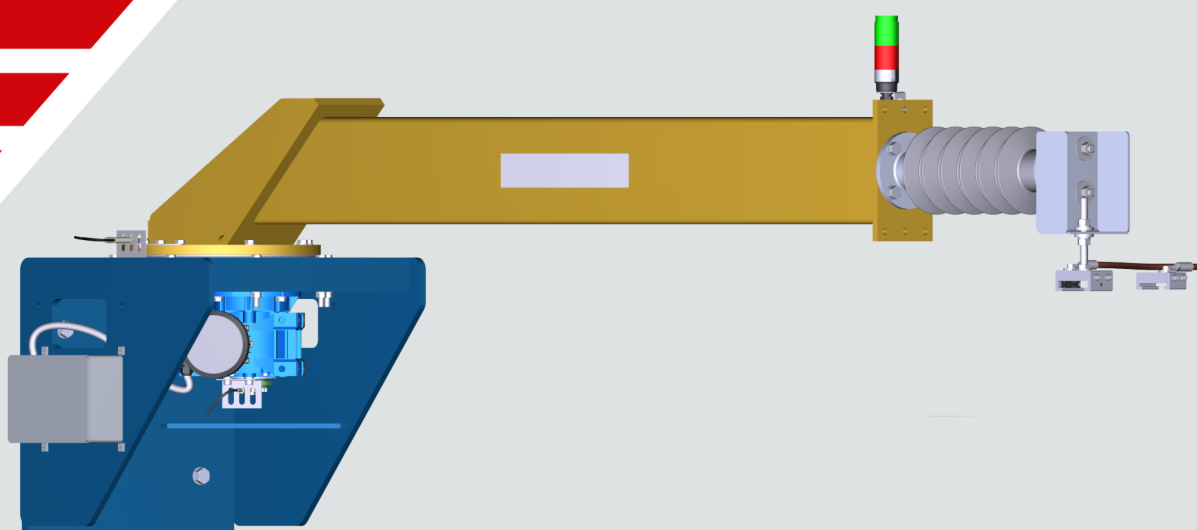


TracFeed[®] SAM

Swivel arm for assembly halls

MANUAL

Version 1.0
English



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Translation of the original

Purpose of this manual



This manual enables safe and efficient handling of the product. The manual is a component of the product and must be kept in the vicinity of the product where personnel can access it at all times.

Scope

This manual applies to the following product types:

- TracFeed® SAM swivel arm for assembly halls

Figures

Figures in this manual are intended for basic understanding and may differ from the actual design.

Target group

This manual is intended for the following target groups:

- Owner
- Assembly personnel
- Licensed electrician
- Authorised service personnel
- Instructed person responsible for packaging and transport work



For detailed information on the target groups and the qualifications they require for the work described in this manual, refer to [🔗](#) 'Qualification' on page 20.

Limitation of liability

All the specifications and information in this manual were compiled in consideration of the applicable standards and regulations, the best available technology and our many years of expertise and experience.

The manufacturer accepts no liability for damage due to:

- Failure to comply with this manual
- Use contrary to the intended use
- Use of untrained personnel
- Unauthorised modifications
- Technical modifications
- Use of non-approved spare parts

In the case of special designs, if additional order options are chosen or due to the latest technical changes, the actual scope of supply may deviate from the explanations and information given here.

The obligations agreed in the delivery contract, the manufacturer's general terms and conditions and delivery conditions, and the applicable statutory regulations at the time of the signing of the contract shall all apply.

Supplemental directives

Copyright

The contents of this manual are protected by copyright and intended solely for end customers.

They may be used within the context of the intended use. Any use beyond this is not permitted without the written authorisation of Rail Power Systems GmbH.

Accompanying documents

In addition to this manual, also observe the accompanying documents and the included instructions and information.



NOTICE!

Find out about any country-specific regulations and take them into account.

List of applicable standards and regulations

EN 50119	Railway applications – Fixed installations – Electric traction overhead contact lines
EN 50122-1	Railway applications – Fixed installations – Electrical safety, earthing and the return circuit Part 1: Protective provisions against electric shock
EN 50122-2	Railway applications – Fixed installations – Electrical safety, earthing and the return circuit Part 2: Provisions against the effects of stray currents caused by d.c. traction systems
EN 50122-3 IEC 62128-3	Railway applications – Fixed installations – Electrical safety, earthing and the return circuit Part 3: Mutual interaction of AC and DC traction systems
EN 50124-1	Railway applications – Insulation coordination Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment
EN 50124-2	Railway applications – Insulation coordination Part 2: Overvoltages and related protection
EN 50126	Railway Applications – The specification and demonstration of reliability, availability, maintainability and safety (RAMS) – Part 1:
EN 50149	Railway applications – Fixed installations – Electric traction – Copper and copper alloy grooved contact wires
IEC/TS 60479-1	Effects of current on human beings and livestock Part 1: General aspects

Additional project documentation	Note
In line with the laws and regulations applicable at the location of the system, and with the specific requirements of the owner. Examine these requirements for each specific project, if applicable, and document any deviations and granted approvals for exceptions accordingly.	
Tests for electrical systems and equipment	
Accident prevention regulation "Electrical installations and equipment" (DGUV regulation 3)	www.dguv.de
<ul style="list-style-type: none"> ■ Manual for TracFeed® OSS overhead conductor rail system RPS document number 3EGF002587D0033 ■ Manual for TracFeed® OSS overhead conductor rail RPS document number 3EGF000863D0033 ■ System description of TracFeed® OSS hall RPS document number 3EGF002510D0016 	
Assembly drawings for applicable tightening torques:	
<ul style="list-style-type: none"> ■ RPS document number 3EGF002458D0025 ■ External control system manual 	

Conformity



Depending on the project requirements, different EU Directives, standards and regulations apply. This can affect the content of the declaration of conformity. For this reason, the declaration of conformity is provided on a product-specific basis when the project is implemented.

The TracFeed® SAM swivel arm for assembly halls fulfils the requirements of the EC Machinery Directive **2006/42/EC**.

Revision table

Date	Revision	Change
12/10/2023	1.0	Created

General queries / training courses

Knowledge of the systems and materials and experience of installation are essential. We recommend arranging for at least one member of the contractor's personnel to be certified by Rail Power Systems GmbH as the person responsible for the work.

We are happy to answer general queries and enquiries regarding training.

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Supplemental directives

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In addition, our employees are always interested in new information and experiences gained from use and which could be of value to the improvement of our products.

Technical customer service

Our technical customer service is available to provide technical information.



Technical information can be requested from the sales department at Rail Power Systems GmbH.

Within Germany:

– E-mail: vertrieb.komponenten@rail-ps.com

International sales:

– E-mail: sales.international@rail-ps.com

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1 Overview

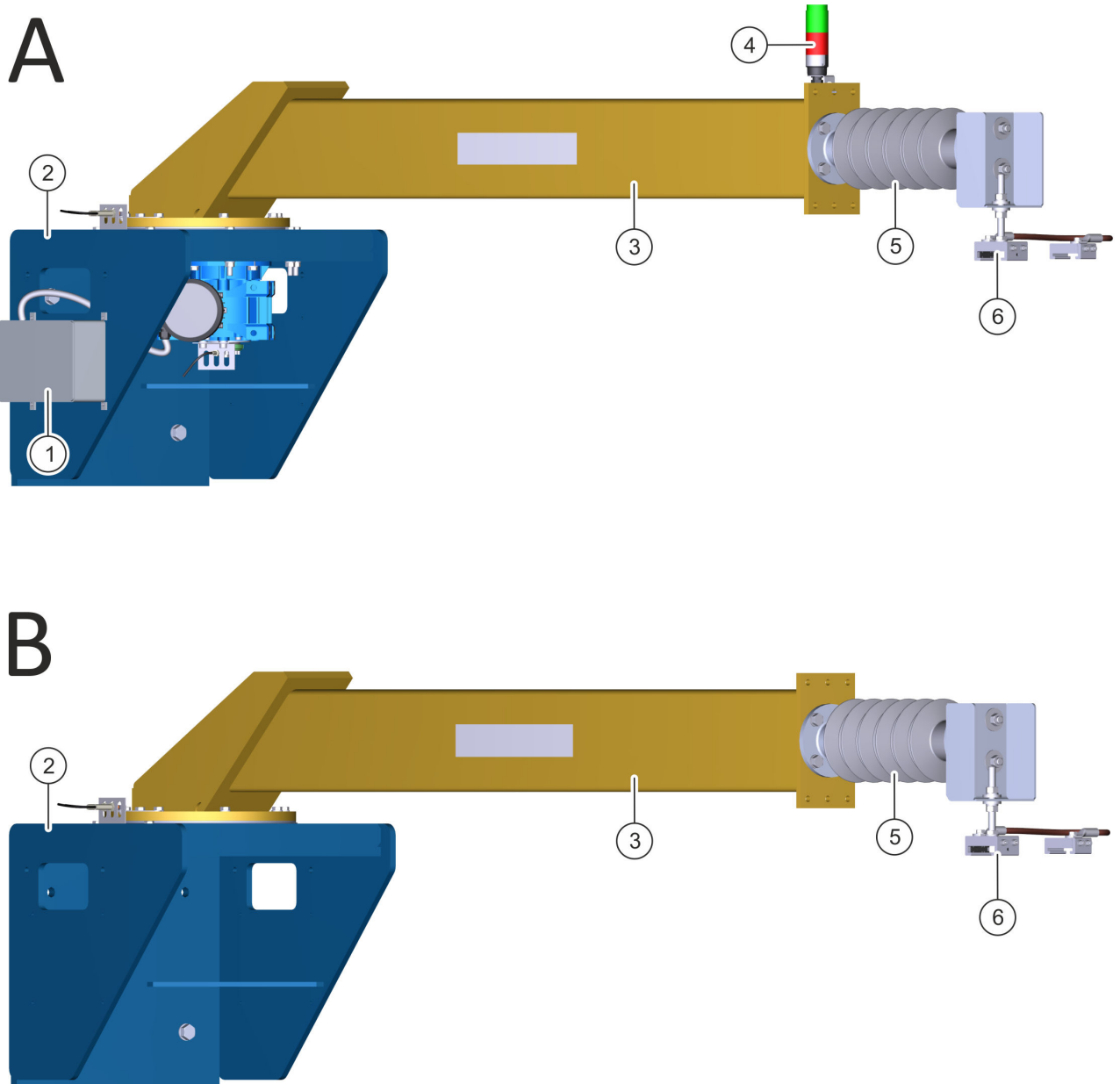


Fig. 1: Swivel arm

- | | |
|--|--|
| <p>A Motorised swivel arm</p> <p>B Non-motorised swivel arm</p> <p>1 Terminal box</p> <p>2 Swivel arm base with drive unit</p> | <p>3 Cantilever arm</p> <p>4 Warning light (optional, not included in the scope of supply)</p> <p>5 Insulator</p> <p>6 Potential equalisation connection</p> |
|--|--|

Brief description

The TracFeed® SAM swivel arm for assembly halls makes it possible to swivel rigid overhead conductor rails in halls.

Overview

When swivelled to the side, the area above the vehicle is freely accessible so that maintenance work can be performed on the vehicle roof.

Motorised and non-motorised swivel arms are installed in the overhead conductor rail system. The non-motorised swivel arms are coupled to the motorised swivel arms and swivel synchronously.

Drive unit

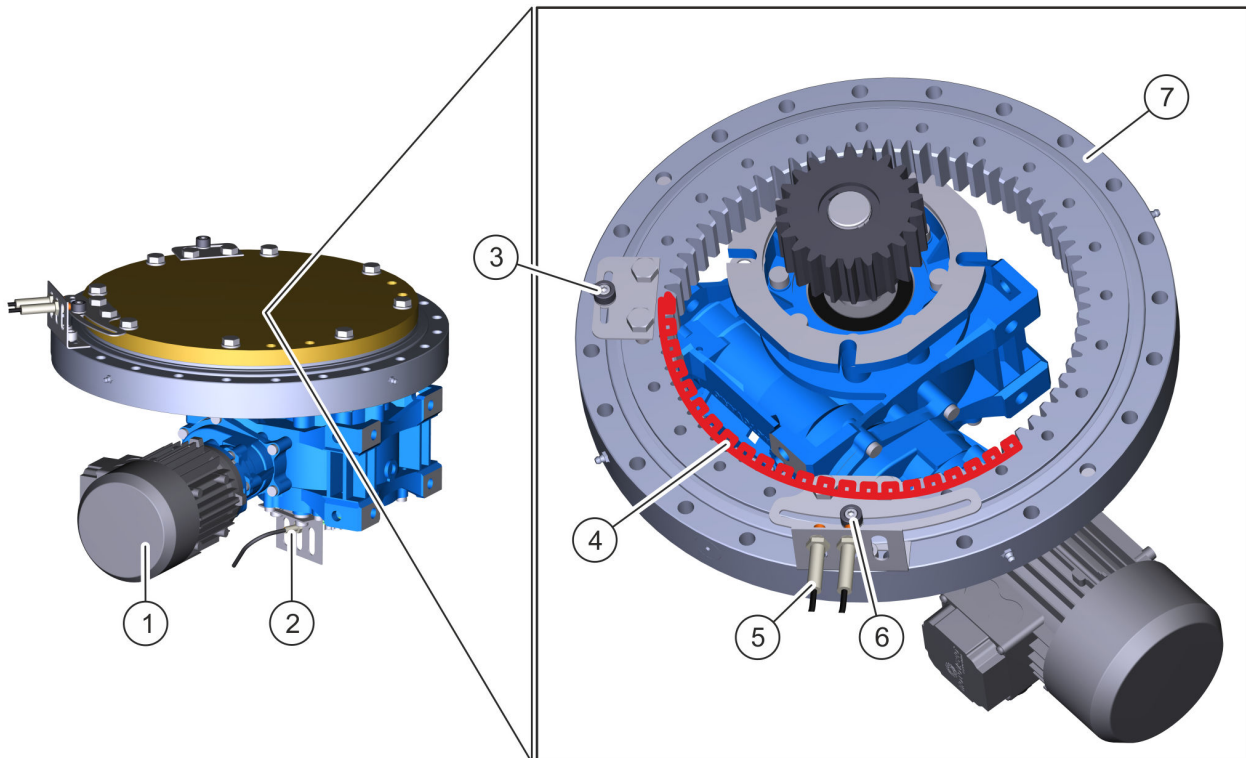


Fig. 2: Drive unit

- | | | | |
|---|------------------------------|---|--------------------------------|
| 1 | Motor gear unit | 5 | Rotation angle sensors |
| 2 | Position sensor | 6 | Query element (start position) |
| 3 | Query element (end position) | 7 | Gear rim |
| 4 | Slewing range | | |

The TracFeed® SAM swivel arm for assembly halls is driven by a motor gear unit (Fig. 2/1).

The slewing range is limited by two rotation angle sensors (Fig. 2/5). If a sensor fails, a sliding clutch (overload protection) in the motor gear unit (Fig. 2/1) limits the slewing range (Fig. 2/4) on the gear rim (Fig. 2/7). The slewing range, the start position and the end position are set via the rotation angle sensors (Fig. 2/5) and the query elements (Fig. 2/3 and 6).

A position sensor (Fig. 2/2) detects the travel over the gear on the motor gear unit (Fig. 2/1) and monitors the synchronous running of all swivel arms installed in the system.

Terminal box

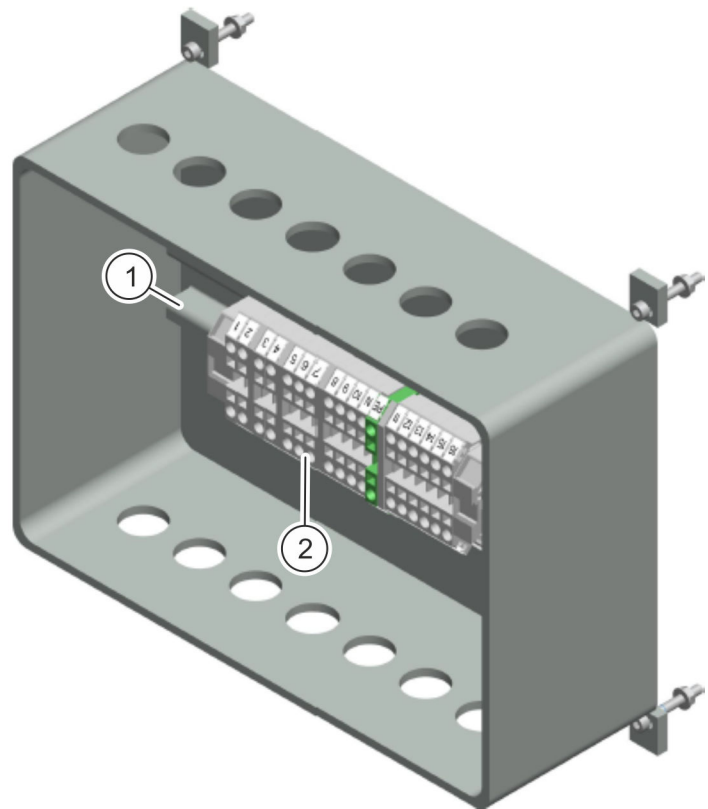


Fig. 3: Terminal box

- 1 Rail
- 2 Terminal clamps

Tab. 1: Terminal allocation diagram

Clamp	Terminal	Function
1 to 2	Sensor connection	Position detection: swivel arm swivelled out
3 to 4	Sensor connection	Position detection: swivel arm swivelled in
5 to 7	Sensor connection	Counter sensor
8 to 10	Motor connection	-
N	Neutral phase	-
PE	Protective earth	-
11 to 16	LEDs	-



For the schematic diagram, see [Appendix 'Terminal box schematic diagram'](#) on page 72.

Potential equalisation unit

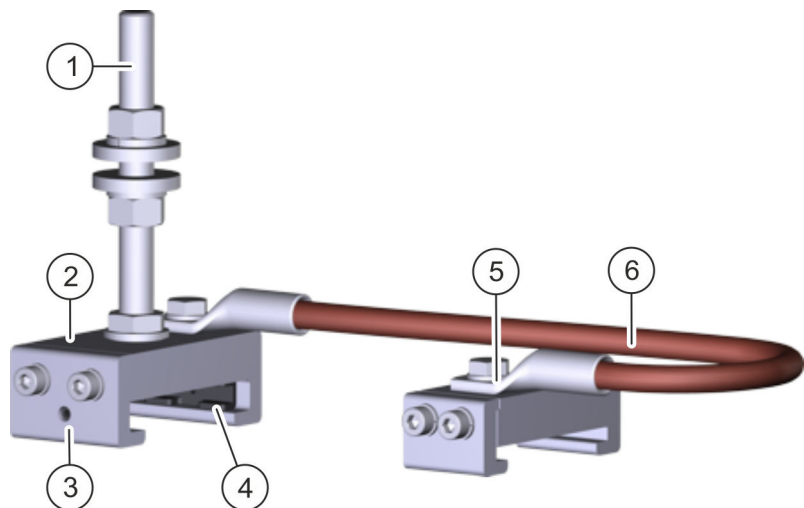


Fig. 4: Sliding clamp (left) with connected equipotential bonding terminal (right)

- 1 Sliding clamp
- 2 Clamp body
- 3 Clamping cap
- 4 Sliding system
- 5 Equipotential bonding terminal
- 6 Electrical connector

Overload protection

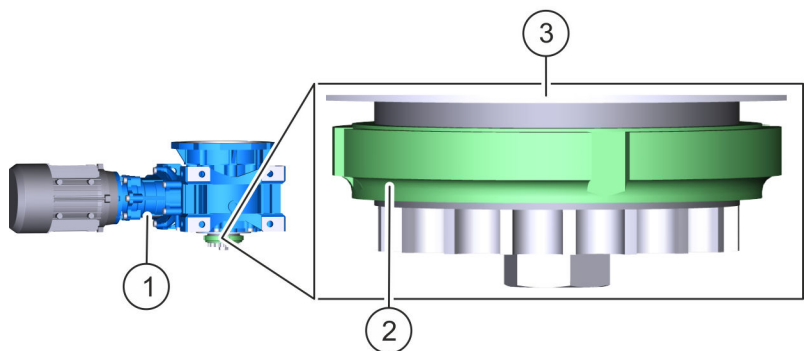



Fig. 5: Overload protection

To protect the mechanical components of the system from overload, the motor gearbox unit (Fig. 5/1) is equipped with a sliding clutch (Fig. 5/3).

If the set torque is exceeded, the sliding clutch slips through until the overload is relieved or the system shuts down after four seconds.


The torque limitation can be adjusted using the shaft groove nut (Fig. 5/2).

 Chapter 6.5 'Adjusting the torque on the overload protection' on page 44


Field of application

The TracFeed® SAM swivel arm for assembly halls is designed for use in halls in combination with rigid overhead conductor rails.

Scope of supply

 *The full scope of supply is specified in the contractual delivery and performance specifications or the resultant detailed design. The scope of supply for a delivery is documented on delivery notes and packing lists.*

Material no.	Designation	Quantity
On request	TracFeed® SAM swivel arm for assembly halls	n

 *Refer to the project planning for the exact number of swivel arms.*

Accessories

Material no.	Designation	Quantity
On request	Warning light	n

Safety

Symbols used

2 Safety

2.1 Symbols used

Safety instructions

Safety instructions are indicated by symbols in this manual. The safety instructions are introduced by signal words that express the extent of the hazard.



DANGER!

This combination of symbol and signal word indicates an imminently hazardous situation that will result in death or severe injuries unless avoided.



WARNING!

This combination of symbol and signal word indicates a potentially hazardous situation that could result in death or severe injuries unless avoided.



CAUTION!

This combination of symbol and signal word indicates a potentially hazardous situation that could result in minor or slight injuries unless avoided.



NOTICE!

This combination of symbol and signal word indicates a potentially hazardous situation that could result in damage to property unless avoided.



ENVIRONMENT!

This combination of symbol and signal word indicates potential hazards to the environment.

Special safety instructions

The following symbol is used in safety instructions to draw attention to special dangers due to electric voltage:



DANGER!

This combination of symbol and signal word indicates hazards due to electric voltage.

Failure to comply with these safety instructions can result in severe to fatal injuries.

The following symbol is used in safety instructions to draw attention to special dangers due to working at height:



WARNING!

This combination of symbol and signal word indicates hazards due to working on ladders or lifting platforms without due care and attention.

Failure to comply with these safety instructions can result in severe injuries.

The following symbol is used in safety instructions to draw attention to special dangers due to falling objects:



WARNING!

This combination of symbol and signal word indicates hazards due to falling objects.

Failure to comply with these safety instructions can result in severe injuries.

The following symbol is used in safety instructions to draw attention to specific dangers due to suspended loads:



WARNING!

This combination of symbol and signal word indicates hazards due to load lifting procedures including suspended loads.

Failure to comply with these safety instructions will pose a danger of serious injuries.

Safety instructions in operating instructions

Safety instructions may refer to specific, individual instructions. Such safety instructions are incorporated into the instructions so that they do not interrupt the reading flow when carrying out the activity. The signal words described above are used.

Safety

Intended use

Example:

1. ➤ Unscrew the screw.

2. ➤



CAUTION!
Risk of pinching at the lid!

Close the lid carefully.

3. ➤ Tighten the screw.

Tips and recommendations



This symbol highlights useful tips and recommendations as well as information for efficient and fault-free operation.

Bullet points

In order to highlight instructions, results, lists, references and other elements, the following markings are used in this manual:

Marking	Explanation
➤	Step-by-step instructions
⇒	Results of actions
↪	References to sections of this manual and to other applicable documents
■	Lists without a specific order

2.2 Intended use

The TracFeed® SAM swivel arm for assembly halls (hereinafter referred to as the swivel arm) is used exclusively for swivelling rigid overhead conductor rails in halls.

The TracFeed® SAM swivel arm for assembly halls has been designed and constructed solely for the intended use described here.

The intended use includes compliance with all the information in this manual, the information in the supplied documents and the documents listed in ↪ 'Accompanying documents' on page 4.

Any use that exceeds or differs from the intended use shall be considered improper use.

Improper use



DANGER!

Danger due to improper use.

Improper use of the TracFeed® SAM swivel arm for assembly halls can result in dangerous situations.

- Only install and operate the TracFeed® SAM swivel arm for assembly halls in accordance with the technical data, the usage limitations, the contractually agreed specifications and the delivery conditions with the supplied accessories.
- Do not operate the TracFeed® SAM swivel arm for assembly halls in areas at risk of explosion.
- Do not make any unauthorised modifications, manipulations or conversions.
- Never use TracFeed® SAM swivel arm for assembly halls other than for swivelling rigid overhead conductor rails in halls.

No claims of any kind will be entertained if such claims result from improper use.

2.3 Work and danger zone

Work range

The **work range** stretches along the track system and it must be defined by the person responsible for the work according to which work is to be carried out.

Danger zone

The **danger zone** includes adjacent areas because trains may be travelling on parallel/crossing tracks, for example, and the direct mounting area at the installation location.

2.4 Owner's responsibility

Owner

The owner is the natural person or legal entity who operates the product for commercial or economic purposes either for that person's own use or transfers it to a third party for use and who bears the legal product liability for the protection of personnel or third parties during operation.

Owner's obligations

The TracFeed® SAM swivel arm for assembly halls is used in the commercial sector. The owner must therefore meet with the statutory occupational safety requirements.

In addition to the safety instructions in this manual, the applicable safety, accident prevention and environmental regulations for the area in which the TracFeed® SAM swivel arm for assembly halls is used must be complied with.

The following applies in particular:

- The owner must keep themselves informed of the applicable occupational safety regulations and carry out a risk analysis to determine additional hazards that arise due to the specific working conditions at the area in which the TracFeed® SAM swivel arm for assembly halls is used. The owner must then implement this information in a set of manuals governing operation of the TracFeed® SAM swivel arm for assembly halls.
- The owner is obliged to confer with the office responsible for railway operation (control room) before beginning any work and to jointly agree on safety measures (e.g. flagmen or line closure). Before commencing work, ensure that the safety measures are effective.
- The owner must inform personnel sufficiently of any potential dangers that arise from railway operation and of protective measures. The owner must instruct personnel to follow the arrangements of the body responsible for railway operation.
- The owner must clearly lay down and define the responsibilities with respect to assembly, commissioning, operation, troubleshooting and maintenance of the TracFeed® SAM swivel arm for assembly halls.
- The owner must provide personnel with the necessary protective equipment and instruct them to wear the necessary protective equipment.
- The owner must ensure that all personnel dealing with the product have read and understood this manual. In addition, the owner must provide personnel with training and information regarding hazards at regular intervals.
- The owner must arrange and operate the product such that it complies with the local regulations concerning interference emission and immunity in the event of electrical and magnetic fields.
- The owner must arrange the product such that it complies with the local regulations concerning electrical and magnetic fields in terms of their effect on people.
- Throughout the period that the TracFeed® SAM swivel arm for assembly halls is in use, the owner must assess whether the manuals they have issued comply with the present status of regulations, and must update the manuals if necessary.
- The owner must notify the supervisory authorities without delay in the event of any accidents in which a person is killed or severely injured or the product suffers significant damage.
- The owner must notify the supervisory authorities without delay in the event of operating incidents that attract public attention.

Furthermore, the owner is responsible for ensuring that the product is always in technically perfect condition. The following therefore applies:

- The owner must have the product inspected for functionality and completeness by trained qualified personnel at regular intervals.
- The owner must have all safety features inspected for functionality and completeness by trained qualified personnel at regular intervals.

2.5 Personnel requirements

Insufficient qualification



DANGER!

Risk of injury if personnel are insufficiently qualified!

If unqualified personnel perform work on the system or enter the system's danger zone, dangers arise that could result in death or severe injuries. In addition, significant property damage may occur.

- All work must be performed by appropriately qualified or trained personnel only.
- All work on the electrical system must be performed by appropriately qualified electricians only.
- Unqualified/untrained personnel must be kept away from the danger zones.
- Once work on the system is complete, make sure that no tools are left behind.

General requirements

The minimum age for persons permitted to work as personnel and the requirements of employment medical examinations must comply with the locally applicable statutory regulations of the country in which the product is used.

Persons with impaired reactions due to, for example, the consumption of drugs, alcohol, or medication are prohibited.

Records must be kept of persons who work on controlling and monitoring the operating procedure. These records must clearly show the suitability, training, examination results, supervision, courses of instruction and training courses for these persons.

When selecting personnel, the applicable age-related and occupation-related regulations for the operating site must be observed.

Qualification

Personnel require the following qualifications:

Authorised service personnel

Authorised service personnel have been authorised by Rail Power Systems GmbH to perform servicing activities on the contact line system. The manufacturer's service personnel can prove their authorisation by presenting a dated certificate issued by Rail Power Systems GmbH that specifically names the personnel in question.

Overhead conductor rail fitter

Based on their technical training, knowledge, experience and knowledge of the applicable standards and regulations, fitters are able to assemble the overhead conductor rail system and they are able to independently recognise and avoid potential dangers.

Fitters are specially trained for the area of responsibility they are involved with and know the relevant standards and regulations.

Fitters must comply with the requirements of the applicable legal regulations for accident prevention.

Qualified electrician for high and medium voltage

Qualified electricians for high and medium voltage are able to carry out work on high and medium voltage installations safely due to their training, experience and knowledge. Qualified electricians for high and medium voltage avoid dangers to themselves, third parties and material property by implementing the measures for avoiding dangers as specified in the regulations and specifications for handling high and medium voltage applicable at the operating site when performing their tasks. Qualified electricians for high and medium voltage have been trained in relation to the special features of the Rail Power Systems GmbH product.

In particular, the qualified electrician for high and medium voltage has the following knowledge, which they can prove by means of a recognised certificate:

- Particular dangers when handling high and medium voltage components (e.g. arcing)
- Disconnection and earthing of high and medium voltage components
- Ensuring that high and medium voltage components are dead
- Reading and understanding circuit diagrams including the meaning of circuit symbols
- Function and design of high and medium voltage networks and railway power supplies
- Special features of high and medium voltage with AC and DC voltage
- Owner's specifications for disconnection and isolation from the power supply

On account of the aforementioned verifiable knowledge, electricians for high and medium voltage are able to perform the following activities without endangering themselves or third parties:

- On-site disconnection
- Ensuring that the installation is dead
- Switching controls manually

- Earthing and short-circuiting
- Performing certain maintenance activities

Unauthorised persons



WARNING!

Risk of fatal injury to unauthorised persons due to dangers in the vicinity of the working area!

Unauthorised persons who do not meet the requirements described here are not aware of the dangers in the vicinity of the working area. As a result, unauthorised persons face the risk of serious injuries or death.

- Keep unauthorised persons away from the vicinity of the working area.
- If in doubt, talk to persons and instruct them to leave the working area.
- Interrupt work while unauthorised persons are in the vicinity of the working area.

Training

The owner must train personnel on a regular basis. A training log is to be created to improve traceability. At the very least, this log must include:

- Date of the training
- Name of the trainee
- Contents of the training
- Name of the trainer
- Signatures of the trainee and trainer

🔗 *Appendix 'Training log' on page 73*

2.6 Personal protective equipment

Personal protective equipment protects people from adverse effects on safety and health when working.

Personnel must wear personal protective equipment when performing work on and with the product. The relevant equipment is indicated separately in the individual chapters of this manual.

- Always put on the required personal protective equipment before starting the task in question.
- Follow the instructions posted in the work area regarding personal protective equipment.

Safety

Personal protective equipment

Description of personal protective equipment

The personal protective equipment is described below:



High-vis clothing

Wear high-vis clothing to make you more visible to others. Wear high-vis clothing in particular when working in the vicinity of rail tracks.

Dispose of high-vis clothing after use or have it cleaned professionally to maintain its high visibility.



Industrial safety helmet

Industrial safety helmets protect the head from falling objects, suspended loads and impact with stationary objects.



Protective clothing

Protective clothing is closely fitting clothing with a low tear resistance, narrow sleeves and without protruding parts. It primarily serves to protect against being trapped in moving machine parts. Do not wear rings, chains and other jewellery.



Protective gloves

Protective gloves protect the hands from abrasion, scrapes, punctures or deeper injuries as well as contact with hot surfaces.



Safety footwear

Safety footwear protects the feet from crushing by heavy falling parts and from slipping on slippery surfaces.



Safety helmet with visor

The safety helmet with visor provides protection against falling and flying parts and protection of the eyes and face against flames, sparks, embers, hot particles or exhaust gases.

2.7 Dangers

Voltage



DANGER!

Risk of fatal injury due to electric voltage!

Potentially fatal voltages occur on railway systems and in the vicinity of overhead contact lines.

- Permit only qualified electricians to perform work on live components. Personnel must be sufficiently informed of the potential hazards that may occur in railway operations.
- Before commencing any work, make sure that all the precautionary and safety measures have been taken.
- Before starting work on or near overhead contact line systems or active parts of electrical systems and equipment, verify that they are dead and secure them for the duration of the work. Observe the five safety rules here:
 - Isolate from the power supply
 - Securing against re-connection
 - Verify that the installation is dead
 - Earth and short-circuit
 - Cover or shield adjacent live parts

🔗 *Chapter 5 'Ensuring that the installation is dead' on page 35*

- Never bypass or manipulate safety devices.

Rail traffic



DANGER!

Danger to life from rail traffic!

When work is carried out in the vicinity of rail tracks, rail traffic can result in severe to fatal injuries.

- Comply with the national regulations concerning work in the vicinity of rail tracks.
- Before beginning any work, confer with the office responsible for railway operation (control room) and jointly agree on safety measures (e.g. flagmen or line closure).
- Before commencing work, ensure that the safety measures are effective, e.g.:
 - Maintain visual contact and stay within hearing range of safety officer
 - Line closure

Safety

Dangers

Working in the vicinity of rail tracks



DANGER!

Risk of fatal injury in the vicinity of rail tracks!

Carelessness when working in the vicinity of rail tracks can result in severe to fatal injuries.

- Only perform work on overhead contact lines in favourable weather conditions.
- When working in tunnels and at night, ensure sufficient illumination of the work area at all times.

Work at heights



WARNING!

Risk of injury due to work at heights being performed without due care and attention!

Working on ladders or lifting platforms without due care and attention during assembly and maintenance work can lead to injuries.

- Wear fall-arresting equipment when working at fall heights of 3 m or more.
- When working on ladders, make sure that the ladder stands securely on a solid and level surface.
- If necessary, have a second person secure the ladder.
- Comply with the national accident prevention and safety regulations for working with a lifting platform.

Falling components



WARNING!

Risk of injury due to falling components!

During assembly of components on the overhead contact line, falling parts can cause severe injuries.

- Always perform overhead assembly work with at least two persons.
- When working on subassemblies at height, make sure that there are no persons below the work range.
- Wear personal protective equipment when carrying out any work (protective clothing, safety footwear, safety helmet, high-visibility vest, protective gloves where applicable).
- Secure components against falling.

Heavy weight**WARNING!****Risk of injury due to heavy weight!**

Lifting or moving parts with a high dead weight could cause back pain and injuries.

- Do not lift heavy parts alone.
- Use appropriate lifting technology or lifting tools.

Suspended loads**WARNING!****Risk of fatal injury due to suspended loads!**

During lifting procedures, loads may swing out and fall down. This can cause severe to fatal injuries.

- Wear an industrial safety helmet for all work with suspended loads.
- Never walk under or inside the swivel range of suspended loads.
- Only move loads under supervision.
- Only use approved and tested hoists and load-carrying equipment with sufficient load-bearing capacity.
- Do not use torn or frayed load-carrying equipment.
- Do not place load-carrying equipment such as ropes and belts on sharp edges and do not knot or twist them.
- Set down the load before leaving the workplace.

Swivelling out**WARNING!****Risk of fatal injury due to the swivel arms swivelling out!**

Swivel arms may swivel out during assembly and maintenance work. This can cause severe to fatal injuries.

- Ensure that the installation is dead.
- Provide assembly safety devices for non-motorised swivel arms.
Do not release the assembly safety devices until the swivel arms are connected by an overhead conductor rail.
- Do not enter the slewing range at any time during work that requires swivelling out.
- Set up a warning sign.

Safety

Behaviour in the event of fires and accidents

Danger of trapping



CAUTION!

Danger of trapping during work on the swivel arm base!

If the swivel arm is moved during work, personnel can be trapped.

- Ensure that the installation is dead.
- Do not reach into the slewing range at any time during work that requires swivelling out.
- Wear personal protective equipment.

2.8 Behaviour in the event of fires and accidents

Preventive measures

- Always be prepared for fire and accidents!
- Keep first-aid equipment (first-aid kits, blankets etc.) and fire-extinguishing equipment fully functional and within reach.
- Instruct personnel in the use of accident reporting equipment, first-aid equipment and life-saving equipment.
- Keep access routes clear for emergency vehicles.

Measures in the event of fire and accidents

- Immediately trigger an emergency shutdown by activating an emergency stop device, if present.
- If there is no risk to your own health, rescue persons from the danger zone.
- If necessary, initiate first-aid measures.
- Alert the fire brigade and/or emergency services.
- If a fire breaks out: If there is no risk to your own health, fight the fire with fire-extinguishing equipment and continue fighting the fire until the fire brigade arrives.
- Inform the person responsible at the operating site.
- Clear access routes for emergency vehicles.
- Explain the situation to the emergency services.

2.9 Environmental protection



ENVIRONMENT!

Danger for the environment due to improper handling of environmentally harmful substances!

Improper handling of environmentally materials, especially improper disposal, can lead to considerable damage for the environment.

- Always observe the instructions specified below for the handling of environmentally harmful substances and their disposal.
- If environmentally harmful substances are accidentally released to the environment, immediately take suitable measures. In case of doubt, inform the local authorities about the damage and inquire about the appropriate measures to be taken.

The following environmentally harmful substances are used:

Electronic components

Electronic components can contain toxic substances. They may not be released into the environment. Disposal must be carried out by a specialist disposal company.

Lubricants

Lubricants like greases and oils contain toxic substances. They may not be released into the environment. Disposal must be carried out by a specialist disposal company.

Technical data

Dimensions and weight

3 Technical data

3.1 Dimensions and weight

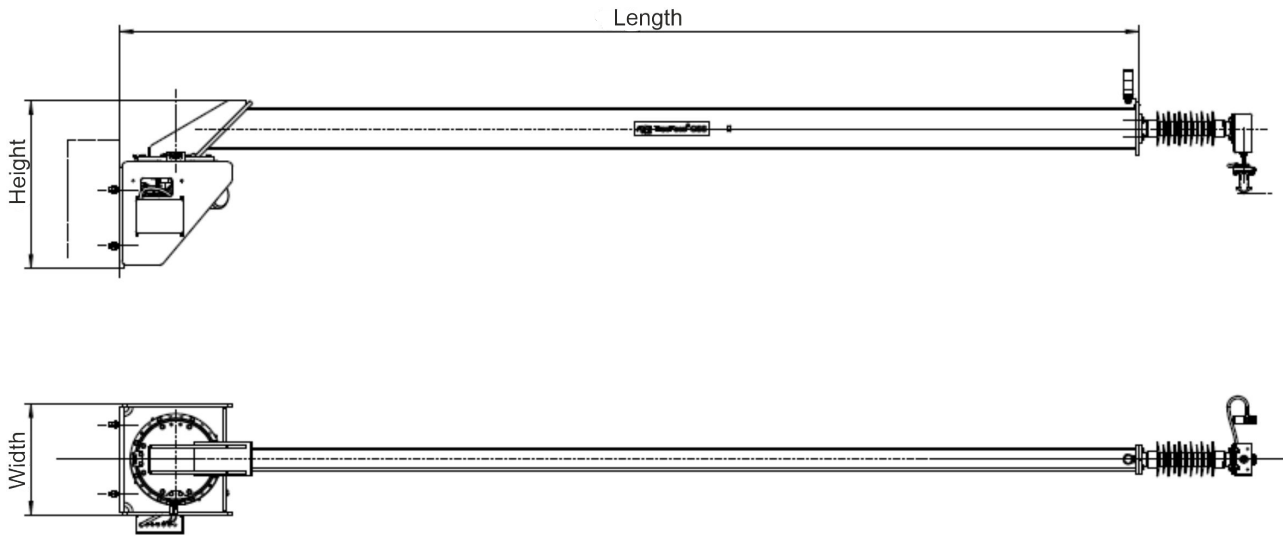


Fig. 6: Sketch of swivel arm

Pole front edge 6 m

Specification	Value	Unit
Weight	465	kg
Width	590	mm
Height	891	mm
Length	5,440	mm
Slewing range	0 to 115	°

Pole front edge 4 m

Specification	Value	Unit
Weight	385	kg
Width	590	mm
Height	891	mm
Length	3,440	mm
Slewing range	0 to 115	°

Pole front edge 2 m

Specification	Value	Unit
Weight	305	kg
Width	590	mm
Height	891	mm

Technical data

Ambient conditions

Specification	Value	Unit
Length	1,440	mm
Slewing range	0 to 115	°

3.2 Mechanical data

Drive torque

Specification	Value	Unit
Drive torque, maximum	1,312.5	Nm

3.3 Connected loads

Performance values

Specification	Value	Unit
Nominal voltage	400/230 to 265/460	V AC
Nominal frequency	50 to 60	Hz
Nominal current	1.2	A

Electric motor

Specification	Value	Unit
Rated power	0.18	kW
Nominal voltage of star connection	400	V AC
Nominal voltage of delta connection	230	V AC
Mains frequency	50/60	Hz
Nominal current of star connection	0.6	A
Nominal current of delta connection	1.04	A

3.4 Ambient conditions

Operating conditions

Specification	Value	Unit
Temperature range	0 to 65	°C
Relative humidity, maximum	95	%

Technical data

Rating plate

Emissions

Specification	Value	Unit
Noise emission	75	dB(A)
Measurement uncertainty [KpA]	1.5	dB(A)

The TracFeed® SAM swivel arm for assembly halls was designed to be low-noise in accordance with the normative specifications. The specified measured sound pressure level only occurs during the swivelling operation.



The noise emission declaration was created in accordance with the harmonised standards listed below:

- *DIN EN ISO 3740:2019-08*
- *DIN EN ISO 11688-1:2009-11*
- *DIN EN ISO 11200:2020-10*

3.5 Rating plate

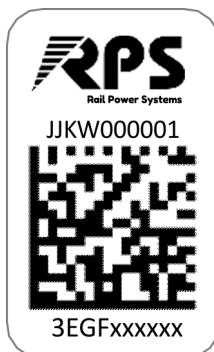


Fig. 7: Plate

Components and subassemblies are labelled with a plate like the one in the example Fig. 7 in order to enable reordering and tracking.

4 Transport, packaging and storage

4.1 Inspection on delivery

On receipt, immediately inspect the delivery for completeness and transport damage.

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

- Do not accept the delivery or accept it only conditionally.
- Note the extent of damage on the transport documents or on the carrier's delivery note.
- Initiate a complaint.



Initiate a complaint in respect of each defect immediately upon detection. Claims for damages can only be asserted within the applicable complaint periods.

4.2 Symbols on the packaging

The following symbols are affixed to the packaging. Always observe the symbols during transport.

Top



The arrowheads of the symbol indicate the top side of the package. They must always point upwards, otherwise the contents could be damaged.

Protect against wetness



Protect packages against wetness and keep them dry.

Attachment points



Only attach sling gear (sling chain, lifting belt) to the points marked with this symbol.

Transport, packaging and storage

Transporting the packages

Weight, attached load



Marks the attachment point for exact weight specifications.
Handle the marked package in accordance with its weight.

4.3 Transporting the packages

Improper transport



NOTICE!

Property damage due to improper transport!

Packages can fall or topple over if not transported correctly. This can result in extensive property damage.

- When unloading the packages on arrival, as well as during transport, proceed with caution and observe the symbols and instructions on the packages.
- Note the weight of the packages. Always use suitable materials handling technology when transporting the packages. If the packages are transported by persons, note the weight and dimension of the packages and transport them with other people if necessary.
- Only remove the packaging immediately prior to assembly.
- Only use the intended attachment points.
- Avoid hard impacts; do not throw the packages, and avoid damage in general.
- If the packages are shipped by sea, seal them in foil to prevent corrosion due to contact with salty air.

Transporting pallets with a forklift or pallet truck

Packages that are attached to pallets may be transported with a forklift or pallet truck under the following conditions:

- The forklift or pallet truck must be designed for the weight of the packages.
- The package must be securely attached to the pallet.
- The forklift operator must be authorised to operate the forklift or pallet truck in accordance with the locally applicable regulations.

Transporting

1. ➤ Drive the forklift or pallet truck with the forks between or under the bars of the pallet.
2. ➤ Insert the forks so that they protrude from the opposite side.
3. ➤ Ensure that the pallet cannot tip over if there is an eccentric centre of gravity.
4. ➤ Lift the pallet with the package and transport it to the intended location.

5. →



WARNING!
Risk of injury from heavy loads!

When packages are transported in the vicinity of the rail track, have them carried by at least two people.

4.4 Storage of the packages

Store the packages under the following conditions:

- Do not store outdoors.
- Store in dry and dust-free conditions.
- Do not expose to aggressive media.
- Avoid mechanical shocks.
- Storage temperature: -30 to +50 °C
- Relative humidity: ≤ 95% non-condensing
- Make sure that the package is not damaged or soiled.
- If storing for longer than three months, check the general condition of all parts and the packaging on a regular basis.



Under certain circumstances, more stringent storage instructions than the requirements specified here may be affixed to packages. Observe this information accordingly.

4.5 Packaging

About the packaging

The product is packaged in cardboard in accordance with the expected transport conditions. Recyclable materials are used in the packaging.

The packaging is intended to protect the individual components from transport damage and other damage prior to assembly. For this reason, do not destroy the packaging and only remove it shortly before assembly.

Handling packaging materials

Dispose of packaging materials according to the applicable legal provisions and local regulations.

Transport, packaging and storage

Packaging



ENVIRONMENT!

Danger to the environment due to incorrect disposal.

Packaging materials are valuable raw materials and can often be re-used or treated and recycled. Incorrect disposal of packaging materials may pose risks to the environment.

- Dispose of packaging materials in an environmentally friendly manner.
- Observe the locally applicable disposal regulations. If necessary, commission a specialist company with the disposal.

5 Ensuring that the installation is dead

Personnel:	■ Qualified electrician for high and medium voltage
Protective equipment:	■ Safety helmet with visor
	■ Protective clothing
	■ Protective gloves
	■ Safety footwear

5.1 Isolate from the power supply

The part of the system on which work is to be performed must be disconnected from all infeeds.

The disconnection must involve isolating distances in the air or equivalent insulation to ensure that no flashover takes place.

5.2 Securing against re-connection

Re-connection must be reliably prevented.

Depending on the legal situation, it may be necessary to attach a prohibition sign, for example.

5.3 Verifying that the installation is dead

Tool: ■ Voltage tester

➔ Verify that all poles in the work range are dead using suitable measuring/testing equipment or voltage testers.

5.4 Earthing and short-circuiting

In high-voltage systems and some low-voltage systems, all parts on which work is to be carried out must be earthed and short-circuited at the work location.

Prerequisite:

■ The earthing and short-circuiting equipment, cables and connections must be suitable and designed for the short-circuit stress at the installation location.

1. ➔ First connect the earthing and short-circuiting equipment to the earthing system and then to the parts to be earthed.

2. ➔ If possible, attach the earthing and short-circuiting equipment so that it is visible from the work location. If this is not feasible, attach it as close as possible to the work location.

Ensuring that the installation is dead

Cover or shield adjacent live parts.

5.5 Cover or shield adjacent live parts.

If it is not possible to disconnect parts of the system in the vicinity of the work location, additional safety measures must be taken before commencing work, as defined for “working near live parts”.

The safety distances that must be kept from active (live) parts, as specified under “Protection by means of distances and oversight”, must be maintained at all times.

Persons without special electrical instruction must maintain a minimum distance of 3 m and persons with special training must maintain a minimum distance of 1.5 m.

1. ► Cover adjacent live components with suitable insulating materials such as rubber mats.
2. ► In addition, indicate the hazard area, for example with barrier tape.

6 Assembly

Tightening torques



Tightening torques

*Unless stated otherwise, the specifications on general tightening torques apply, along with the specifications in RPS document number **3EGF002458D0025**.*

6.1 Tools

The following tools are required during assembly:

Earthing device

Hand tools

- Open-end/ring spanner, A/F 17 to 32
- Lever/changeover ratchet with torque limitation
- Triangular wrench, A/F 13 to 32
- Spirit level
- Folding rule, 2 m
- Screwdriver set
- Set of universal pliers
- Multi-part hexagonal wrench

Voltage tester

Suitable for the system's operating voltage.

Working platforms for working at height

Suitable working platform for track work with options for fall protection.

Wrench for shaft groove nut

Wrench for adjusting the torque on the overload protection (sliding clutch).

6.2 Requirements for the installation location

The following activities have been completed:

- The installation is dead.
↳ *Chapter 5 'Ensuring that the installation is dead' on page 35*
- The tracks are laid in their final position.
- The assembly points for the swivel arms and transition areas are attached in line with the detailed design, or the bores have been executed.
- The control measurements have been performed.

Assembly

Requirements for the installation location

If tracks have not been laid in their final position yet, alternative reference measuring points can be used; these are then used for the entire assembly process and subsequent checks. The following description assumes that the tracks have been laid in their final position.

Reference measuring points

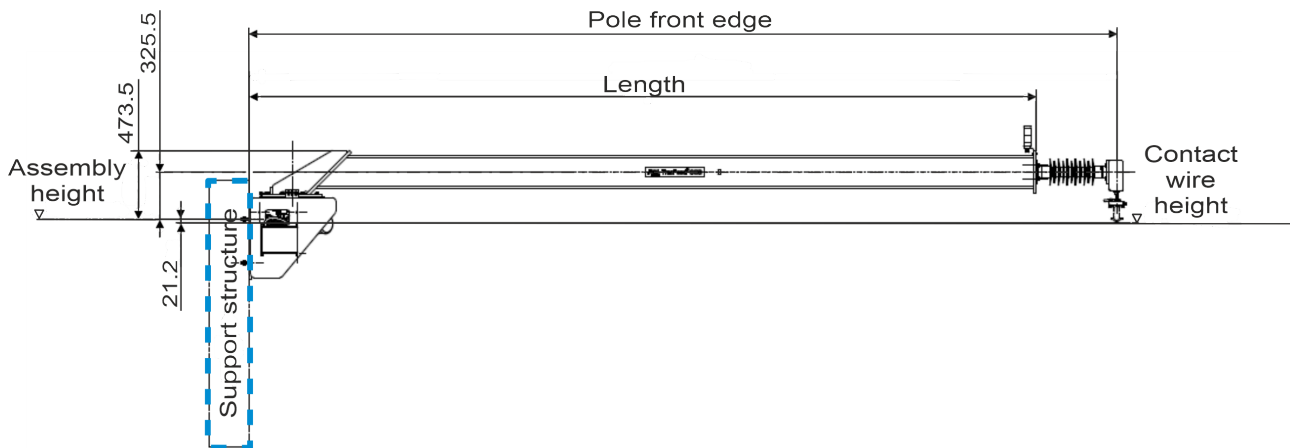


Fig. 8: Reference measuring points for swivel arm

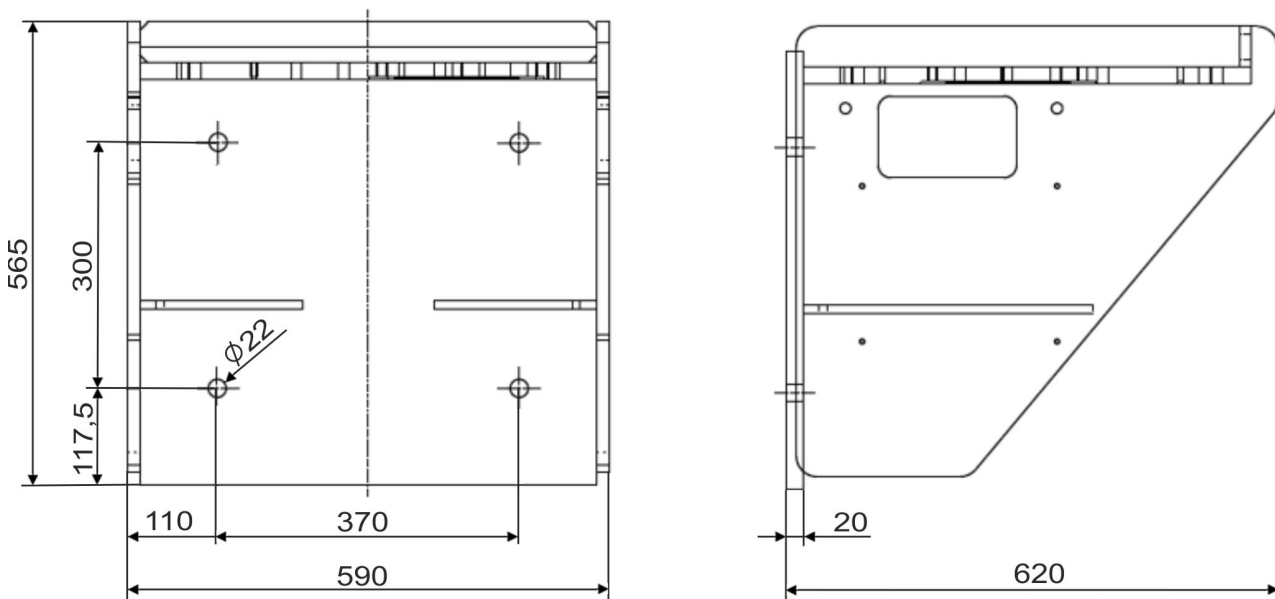


Fig. 9: Reference measuring points for swivel arm base



The assembly of a motorised swivel arm is described in the following.

The differences for assembly of a non-motorised swivel arm are listed in the corresponding assembly steps.

6.3 Assembling the swivel arm

- | | |
|-----------------------|---|
| Personnel: | ■ Overhead conductor rail fitter |
| Protective equipment: | ■ Industrial safety helmet |
| | ■ Protective clothing |
| | ■ Protective gloves |
| | ■ Safety footwear |
| | ■ High-vis clothing |
| Tool: | ■ Working platforms for working at height |
| | ■ Hand tools |

Requirement:

- The requirements for the installation location are met.
 ↪ Chapter 6.2 'Requirements for the installation location' on page 37

Completing the cantilever arm

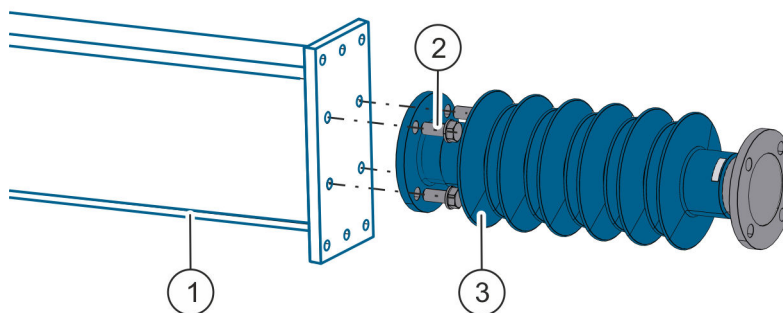


Fig. 10: Assembling the insulator

1. ➔ Assemble the insulator (Fig. 10/3) on the cantilever (Fig. 10/1) with four screws (Fig. 10/2).
2. ➔ Tighten the screws with the specified torque.
 ⇨ The cantilever arm has been completed.

Assembly

Assembling the swivel arm

Assembling the swivel arm base

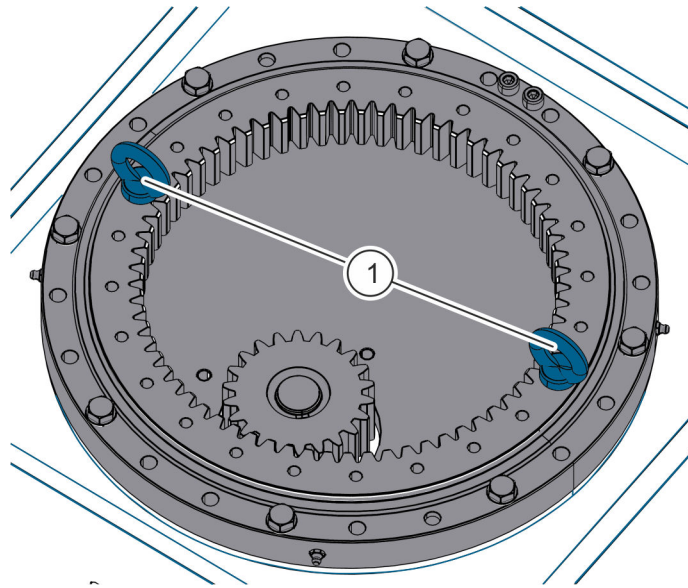


Fig. 11: Mounting eyelets

3. Lift the swivel arm base to the assembly position by the mounting eyelets (Fig. 11/1).

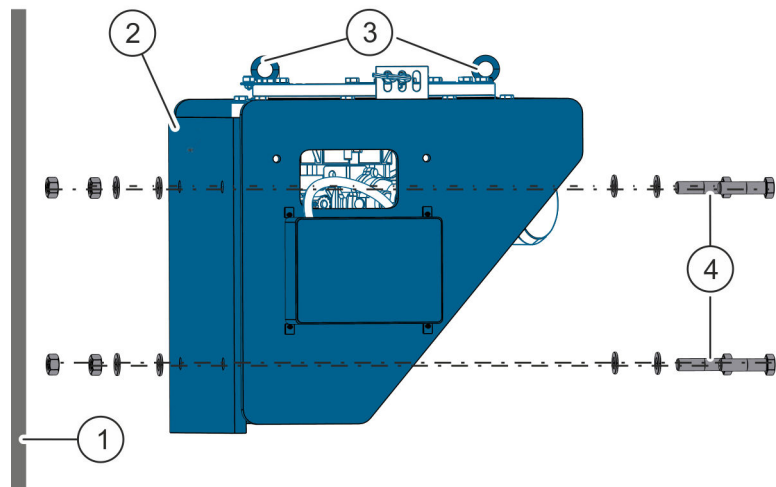


Fig. 12: Swivel arm base

4. Assemble the swivel arm base (Fig. 12/2) on the building structure (Fig. 12/1) according to the detailed design with four screws and nuts (Fig. 12/4).

↳ Chapter 6.2 'Requirements for the installation location' on page 37

5. Tighten the screws with the specified torque.
6. Remove the mounting eyelets (Fig. 12/3).
⇒ The swivel arm base is mounted on the building structure.

Assembling the cantilever arm on the swivel arm base

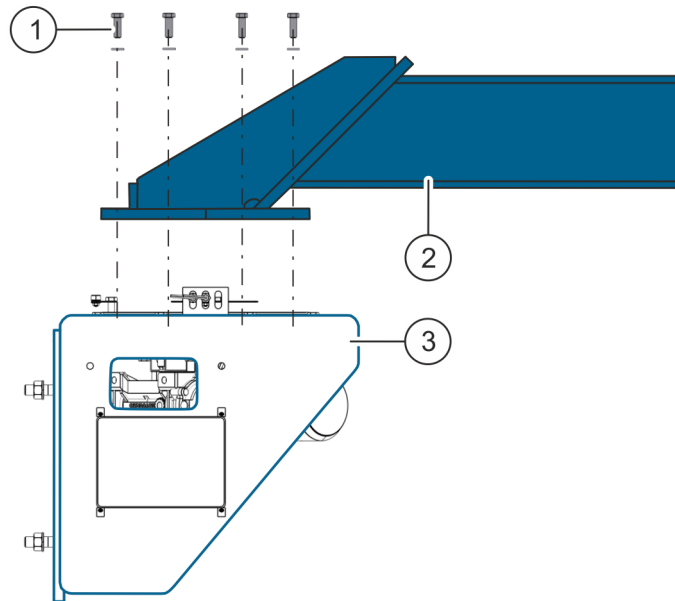


Fig. 13: Assembling the cantilever arm

- 7.** ➤ Assemble the cantilever (Fig. 13/2) on the swivel arm base (Fig. 13/3) with eight screws and nuts (Fig. 13/1).
- 8.** ➤ Tighten the screws with the specified torque.
 - ⇒ The cantilever arm has been assembled.

Assembly

Assembling the swivel arm

Securing the non-motorised swivel arm



Non-motorised swivel arms are secured with an assembly safety device to prevent unwanted swivelling out during assembly.

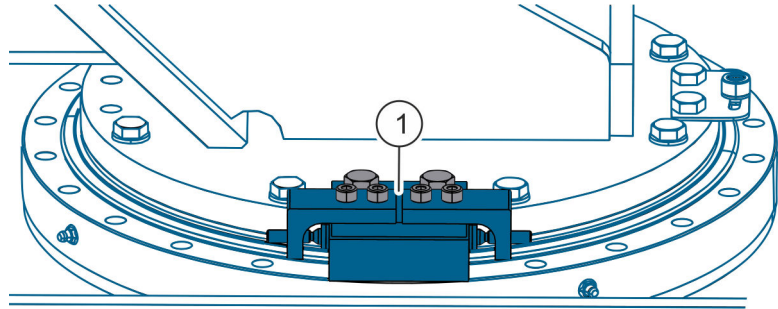


Fig. 14: Assembly safety device

9. ➤ Assemble the assembly safety device (Fig. 14/1).



WARNING!

Do not release the assembly safety device until all swivel arms are connected by the overhead conductor rail system component.

- ↪ Manual for TracFeed® OSS overhead conductor rail
- ⇒ The non-motorised swivel arm is secured against swivelling out.

6.4 Assembling the potential equalisation connection

- | | |
|-----------------------|---|
| Personnel: | ■ Overhead conductor rail fitter |
| Protective equipment: | ■ Industrial safety helmet |
| | ■ Protective clothing |
| | ■ Protective gloves |
| | ■ Safety footwear |
| | ■ High-vis clothing |
| Tool: | ■ Working platforms for working at height |
| | ■ Hand tools |

Requirements:

- The rigid overhead conductor rail has been assembled.
 - ↳ Manual for TracFeed® OSS overhead conductor rail
- The swivel arm has been assembled.
 - ↳ Chapter 6.3 'Assembling the swivel arm' on page 39

Completing potential equalisation

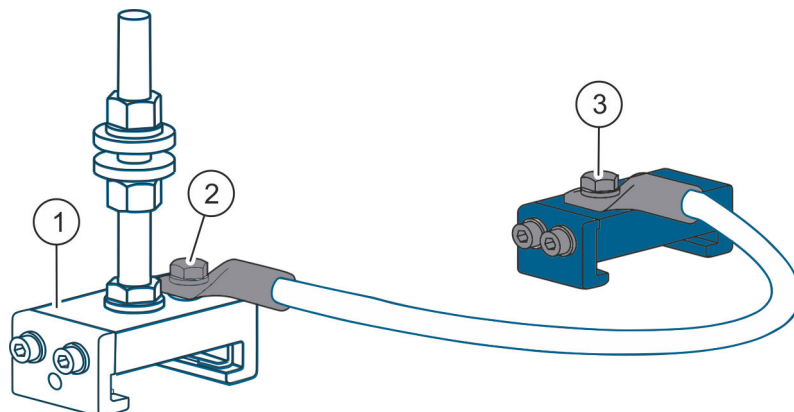


Fig. 15: Equipotential bonding terminal

1. ➔ Screw the equipotential bonding terminal (Fig. 15/3) to the sliding clamp (Fig. 15/1) with the electrical connector (Fig. 15/2).
2. ➔ Assemble the support for the equipotential bonding terminal.

Assembling the support

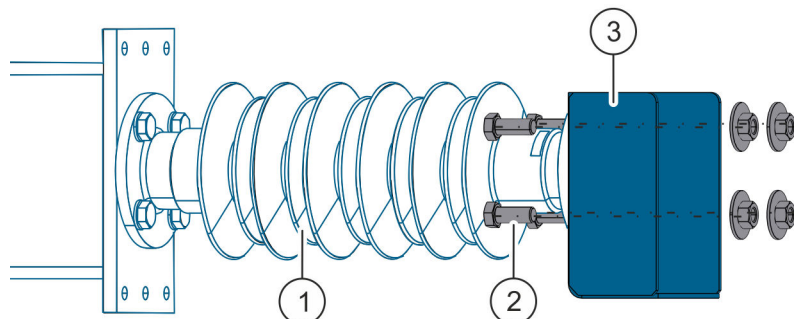


Fig. 16: Support

3. ➔ Assemble the support for the equipotential bonding terminal (Fig. 16/3) on the insulator (Fig. 16/1) with four screws and nuts (Fig. 16/2).

Assembly

Adjusting the torque on the overload protection

Assembling potential equalisation

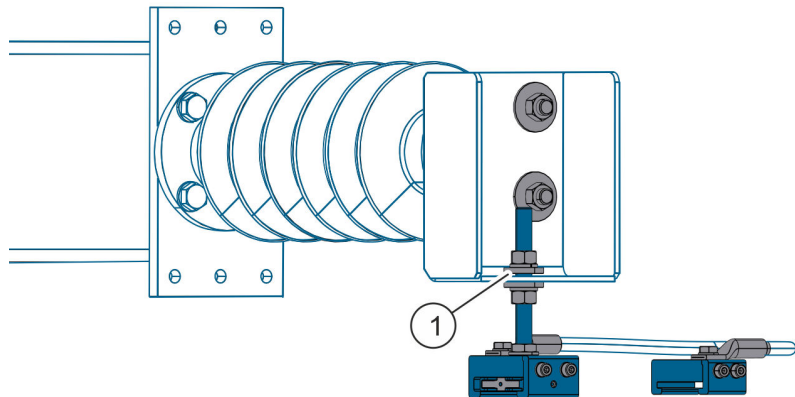


Fig. 17: Assembling potential equalisation

4. ▶ Assemble the potential equalisation on the support (Fig. 17/1).
5. ▶ Tighten the screws with the specified torque.
⇒ The potential equalisation has been assembled.

6.5 Adjusting the torque on the overload protection

The torque limitation of the sliding clutch is set to 370 Nm in the factory (80% of the max. torque) and must be adjusted after assembly according to the ambient and operating conditions.

- | | |
|-----------------------|---|
| Personnel: | ■ Overhead conductor rail fitter |
| Protective equipment: | ■ Industrial safety helmet |
| | ■ Protective clothing |
| | ■ Protective gloves |
| | ■ Safety footwear |
| | ■ High-vis clothing |
| Tool: | ■ Working platforms for working at height |
| | ■ Wrench for shaft groove nut |

Requirement:

- The swivel arm has been fully assembled.
 ↳ Chapter 6.3 'Assembling the swivel arm' on page 39

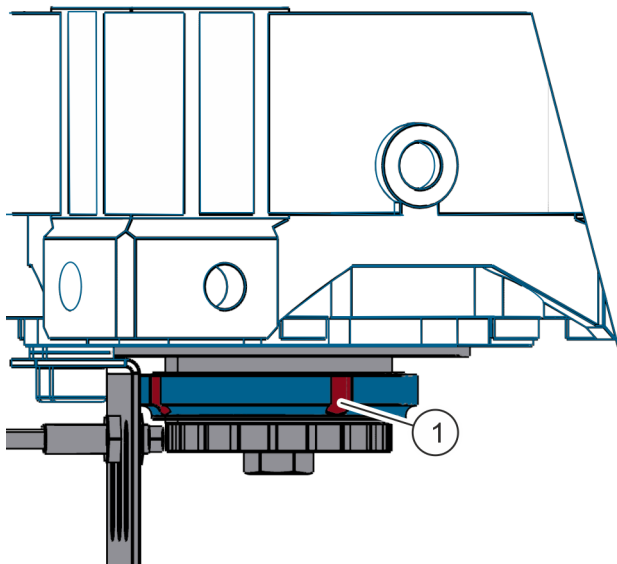


Fig. 18: Setting the torque limitation

1. ➤ Use a wrench on the shaft groove nut (Fig. 18/1) to adjust the torque.

The four notches on the shaft groove nut (Fig. 18/1) each correspond to a 90° rotation.

A 90° rotation corresponds to an increase or decrease in torque by approx. 70 Nm.

2. ➤ If necessary, readjust until the correct torque is set.
 - ⇒ The torque limitation on the overload protection is set.

6.6 Establishing electrical connections

- | | |
|-----------------------|--|
| Personnel: | <ul style="list-style-type: none"> ■ Qualified electrician for high and medium voltage |
| Protective equipment: | <ul style="list-style-type: none"> ■ Industrial safety helmet ■ Protective clothing ■ Protective gloves ■ Safety footwear ■ High-vis clothing |
| Tool: | <ul style="list-style-type: none"> ■ Working platforms for working at height ■ Hand tools |
| Requirements: | |

Assembly

Establishing electrical connections

- The voltage-free state has been established.
 - ↳ *Chapter 5 'Ensuring that the installation is dead' on page 35*
- The swivel arm has been assembled.
 - ↳ *Chapter 6.3 'Assembling the swivel arm' on page 39*

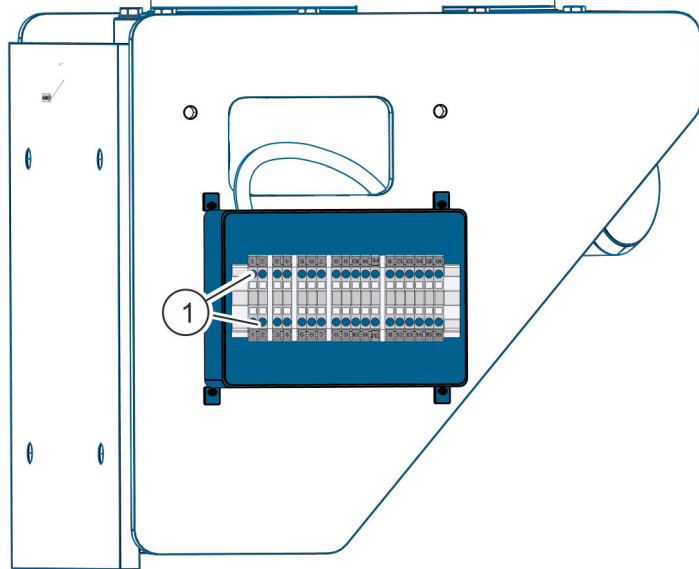


Fig. 19: Electrical connections

- ➔ Establish electrical connections (Fig. 19/1) for the swivel arm according to the terminal allocation diagram.
 - ↳ *'Terminal allocation diagram' on page 11*
- ⇒ The electrical connections of the swivel arm are established.

6.7 Setting the sensors

Adjusting the position sensor

- | | |
|-----------------------|---|
| Personnel: | ■ Overhead conductor rail fitter |
| Protective equipment: | ■ Industrial safety helmet |
| | ■ Protective clothing |
| | ■ Protective gloves |
| | ■ Safety footwear |
| | ■ High-vis clothing |
| Tool: | ■ Working platforms for working at height |
| | ■ Hand tools |

Requirement:

- The swivel arm is controlled by hand.
 ↪ Chapter 8.1 'Moving the swivel arm by hand' on page 52

1. ↪ Move the swivel arm into its folded-in position by hand.

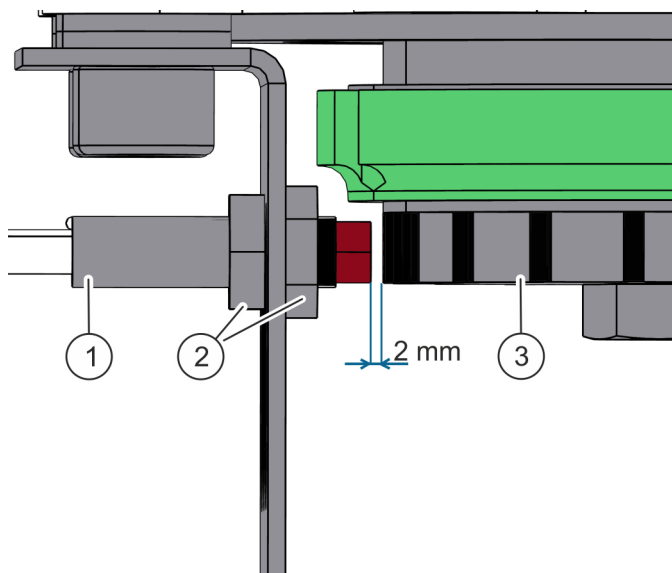


Fig. 20: Adjusting the position sensor

2. ↪ Loosen the nuts (Fig. 20/2) on the position sensor.
3. ↪ Set the position sensor (Fig. 20/1) so that the distance to the gear (Fig. 20/3) is no more than 2 mm.
4. ↪ Tighten the nuts on the position sensor (Fig. 20/2).
 ⇨ The position sensor is set.

Setting the rotation angle sensors

Requirement:

- The swivel arm is controlled by hand.
 - ↳ Chapter 8.1 'Moving the swivel arm by hand' on page 52
- 1. ➤ Move the swivel arm into its folded-in position by hand.

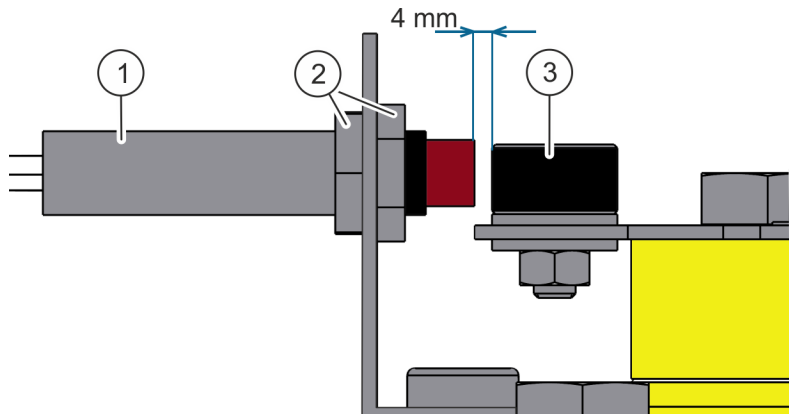


Fig. 21: Setting the rotation angle sensor

2. ➤ Loosen the nuts on the first rotation angle sensor (Fig. 21/2).
3. ➤ Set the rotation angle sensor (Fig. 21/1) so that the distance to the query element (Fig. 21/3) is no more than 4 mm.
4. ➤ Tighten the nuts on the first rotation angle sensor.
5. ➤ Move the swivel arm by hand into the position of the second rotation angle sensor so that the second position sensor is at the height of the query element.
6. ➤ Loosen the nuts on the second rotation angle sensor (Fig. 21/2).
7. ➤ Set the rotation angle sensor (Fig. 21/1) so that the distance to the query element (Fig. 21/3) is no more than 4 mm.
8. ➤ Tighten the nuts on the second rotation angle sensor.
 - ⇒ The rotation angle sensors are set.

6.8 Adjusting the angle of rotation

The angle of rotation of the swivel arm is set to 370 Nm at the factory. After assembly or conversion of the system, the slewing angle must be checked and adjusted in line with the detailed design.

- Personnel: ■ Overhead conductor rail fitter
- Protective equipment: ■ Industrial safety helmet
 ■ Protective clothing
 ■ Protective gloves
 ■ Safety footwear
 ■ High-vis clothing
- Tool: ■ Working platforms for working at height
 ■ Hand tools

Requirement:

- The swivel arm is controlled by hand.
 ↪ Chapter 8.1 'Moving the swivel arm by hand' on page 52

Determining the start position

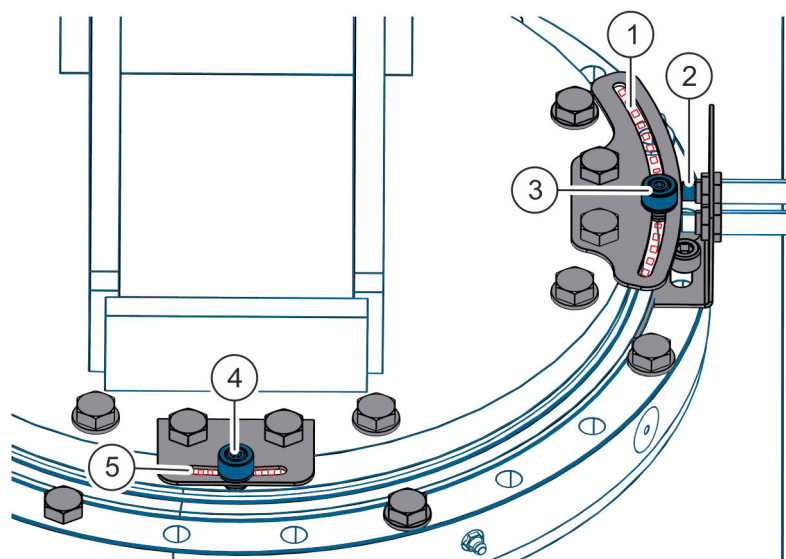


Fig. 22: Angle of rotation

1. ➤ Loosen the screw of the first query element (Fig. 22/3).
2. ➤ Move the query element (Fig. 22/3) to the desired angle of rotation (Fig. 22/1) until the query element is at the height of the first rotation angle sensor (Fig. 22/2).
3. ➤ Swivel the swivel arm into its end position by hand.
4. ➤ Loosen the screw of the second query element (Fig. 22/4).
5. ➤ Move the query element (Fig. 22/4) to the desired angle of rotation (Fig. 22/5) until the query element is at the height of the second rotation angle sensor (Fig. 22/2).
6. ➤ Screw the two query elements tight.
 ⇨ The angle of rotation is set.

Determining the end position



The angle of rotation of the swivel arm is infinitely adjustable from 0° to 115°.

6.9 Final checks

Check and acceptance

Personnel:	<ul style="list-style-type: none">■ Overhead conductor rail fitter■ Qualified electrician for high and medium voltage
Protective equipment:	<ul style="list-style-type: none">■ Industrial safety helmet■ Protective clothing■ Protective gloves■ Safety footwear■ High-vis clothing
Tool:	<ul style="list-style-type: none">■ Working platforms for working at height■ Hand tools

Carry out the following activities after assembly:

- Check that the sensors are firmly mounted and fasten them if necessary.
- Check that the electrical connections are connected correctly.
- Check all bolted connections with the specified torque.
- Perform several swivelling operations and adjust, if necessary.
- Measure and log the tilting play under load.
Determine the measuring position between the lower and upper connection structure and mark and record the position of the bearing rings.

The swivel arms can be checked and accepted together with the contact line installation or other installations, such as:

- Foundations
- Poles
- Earthing clamps
- Track and rail bonds

7 Commissioning

7.1 Prerequisites

Before commissioning and before the electrical voltage is connected, all short-circuit-proof bypasses at insulators and mobile earthing fittings must be removed.

7.2 Putting into operation

Commissioning normally takes place according to a commissioning programme created in accordance with the owner's processes and adapted to the local situation; it can also include dynamic test runs along the contact line installation.

7.3 Implementing the external control



Information on implementation can be found in the manual for the external control.

Operation

Moving the swivel arm by hand

8 Operation

The swivel arm itself does not have any operating controls. It is operated via the external control system.



All the information on operation can be found in the manual for the external control system.

8.1 Moving the swivel arm by hand

- | | |
|-----------------------|---|
| Personnel: | ■ Authorised service personnel |
| | ■ Overhead conductor rail fitter |
| Protective equipment: | ■ Industrial safety helmet |
| | ■ Protective clothing |
| | ■ Protective gloves |
| | ■ Safety footwear |
| | ■ High-vis clothing |
| Tool: | ■ Working platforms for working at height |
| | ■ Wrench for shaft groove nut |

The following activities have been completed:

- The voltage-free state has been established.
↳ *Chapter 5 'Ensuring that the installation is dead' on page 35*
- The swivel arm has been disconnected from the overhead conductor rail.
↳ *Manual for TracFeed® OSS overhead conductor rail*



Non-motorised swivel arms can already be moved by hand after disconnection from the overhead conductor rail.

Opening the sliding clutch

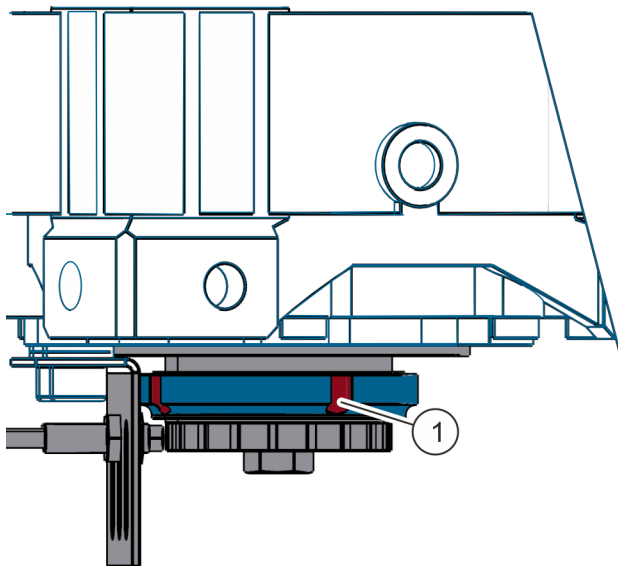


Fig. 23: Opening the sliding clutch

1. ➤ Mark the position of the shaft groove nut (Fig. 23/1).
2. ➤ Turn the shaft groove nut (Fig. 23/1) to the left as far as the bedstop with the wrench.
 - ⇒ The sliding clutch opens and the swivel arm can be moved by hand.



WARNING!

Do not enter the slewing range at any time when the swivel arm is moved by hand.

Closing the sliding clutch

3. ➤ Use the wrench to adjust the shaft groove nut (Fig. 23/1) to the marked position.
 - ⇒ The swivel arm can no longer be moved by hand.

9 Preventive servicing

Swivelling out



WARNING!

Risk of fatal injury due to the swivel arms swivelling out!

Swivel arms may swivel out during assembly and maintenance work. This can cause severe to fatal injuries.

- Ensure that the installation is dead.
- Provide assembly safety devices for non-motorised swivel arms.
Do not release the assembly safety devices until the swivel arms are connected by an overhead conductor rail.
- Do not enter the slewing range at any time during work that requires swivelling out.
- Set up a warning sign.

Danger of trapping



CAUTION!

Danger of trapping during work on the swivel arm base!

If the swivel arm is moved during work, personnel can be trapped.

- Ensure that the installation is dead.
- Do not reach into the slewing range at any time during work that requires swivelling out.
- Wear personal protective equipment.

9.1 Maintenance plan

Interval		Personnel
for the first time after 100 operating hours, then every six months	Check the fastening screws of the rotary joint ↳ Chapter 9.3 'Maintaining the rotary joint' on page 56	Authorised service personnel
every 150 operating hours	Lubricate the rotary joint ↳ Chapter 9.3 'Maintaining the rotary joint' on page 56	Authorised service personnel
every 1,000 operating hours or annually	Check bearing/tilting play of the rotary joint ↳ Chapter 9.3 'Maintaining the rotary joint' on page 56	Authorised service personnel
every 10,000 operating hours	Check the oil level of the motor gear unit ↳ Chapter 9.4 'Check the oil level of the motor gear unit' on page 58	Authorised service personnel
Annually	State check Z ↳ Chapter 9.1.1 'State check Z' on page 55	Authorised service personnel
After extraordinary events	Extraordinary check ↳ Chapter 9.1.2 'Extraordinary check' on page 55	Authorised service personnel

9.1.1 State check Z

Scope of check:

- Perform a visual check for damage to the entire swivel arm.
- Check swivel arms for synchronous swivelling.

Check interval:

- Annually

9.1.2 Extraordinary check

This check is carried out after extraordinary events, e.g.:

- Short circuits
- Extreme weather situations (storm, heat, ice, hail > 4 cm)
- Fire below and in the immediate vicinity (< 50 m) of the contact line (effects of heat, soot deposit) and contact with extinguishing agent (foam)

Scope of check:

- Inspection of the area in question as per state check Z.

Check interval:

- As needed.

Preventive servicing

Maintaining the rotary joint

9.2 Corrosion protection measures

If the components exhibit faulty corrosion protection during a state check or inspection of the system, the corrosion protection has to be removed.

Components whose corrosion protection consists of a special coating can be protected by renewing the coating, provided that the component's actual material has not yet become corroded. This is also possible in individual cases for galvanised components, provided that only the layer of zinc has worn off and the component's material does not show any corrosion. In this case, zinc paste can be applied.

Before applying new corrosion protection, properly clean the areas to be treated, e.g. by means of steam blasting and brushing. Comply with the instructions of the corrosion protection material's manufacturer to ensure optimum effectiveness.

General components that show corrosion damage at stressed cross sections and surfaces that reduces the material thickness by more than 5% must be replaced without delay.

9.3 Maintaining the rotary joint

Scope of check

- Visual inspection of the gaskets for warping, positioning, pollution (metal particles, abrasion etc.).
- Removing old grease residues and pollution.
- Check all fastening screws using a torque wrench.
- Measure the tilting play under load.
 - If the tilting play is twice as much as the initial measurement, replace the rotary joint.
↳ *'Technical customer service' on page 6*



The tilting play is measured for the first time after assembly has been completed.

↳ *Chapter 6.9 'Final checks' on page 50*

Lubrication

To ensure a long service life for the tracks and gears, the rotary joint must be lubricated correctly. The choice of lubricant is determined by operating conditions such as loads, temperatures, speeds, vibrations etc.



Standard grease: ESSO BEACON EP2

**NOTICE!****Use only approved greases!**

Greases containing molybdenum disulphide MoS₂ must not be used!

Recommendations for bearing grease:

- Soap on lithium basis.
- Minimum viscosity of the base: 150 mm²/s.
- NLGI class 2.
- Equipped with additions to protect against wear and extreme pressures.
- Operating temperature: - 30°C to + 120°C
- Four-ball wear test as per ASTM D 2596 (NT24) > 300

Grease nipple:

- Positioned on the side
- Size M10 x 10 mm
- Sealed by plastic caps or Hc screws

Requirement:

- The swivel arm is controlled by hand.
↳ Chapter 8.1 'Moving the swivel arm by hand' on page 52

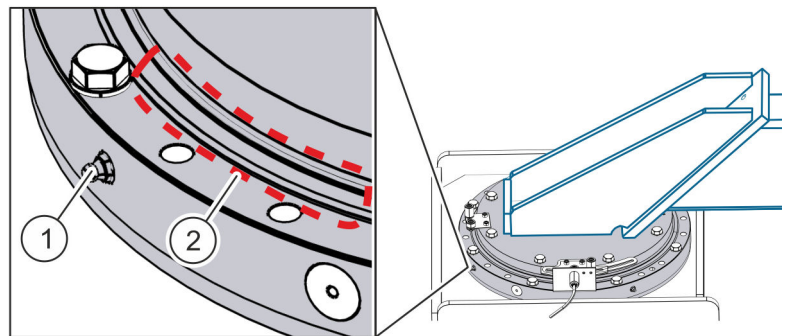


Fig. 24: Lubricating the rotary joint

- ➔ During swivelling, press the grease into one of the grease nipples (Fig. 24/1) until grease emerges from the grease lips (Fig. 24/2).

Perform at least five complete swivelling operations in order to ensure even distribution of the grease.

- ⇒ The rotary joint is lubricated.

Preventive servicing

Check the oil level of the motor gear unit

9.4 Check the oil level of the motor gear unit



The motor gear unit is lubricated by the manufacturer for its entire service life.

Requirement:

- The swivel arm is controlled by hand.
↳ Chapter 8.1 'Moving the swivel arm by hand' on page 52

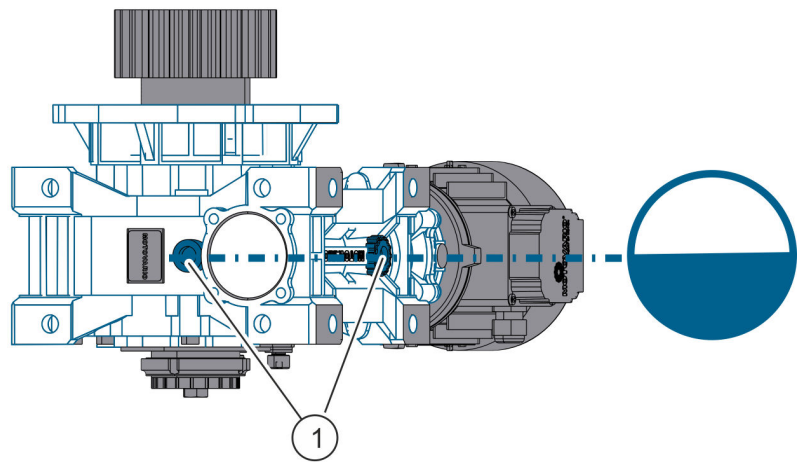


Fig. 25: Motor gear oil

- ➔ Check the oil level via the inspection holes (Fig. 25/1).
The inspection holes must be at least half full.
If the oil level is too low, contact the manufacturer.
↳ 'Technical customer service' on page 6

10 Corrective servicing

10.1 Behaviour in the event of faults

If faults occur frequently, shorten the preventive maintenance intervals accordingly.

This fault description relates to the entire contact line system. If components such as the expansion joint device are affected, the relevant manuals are authoritative.

If faults occur and they cannot be rectified with the help of the information below, contact the manufacturer ☞ *'Technical customer service' on page 6.*

The following applies in general:

1. ➤ In the event of faults that present an immediate danger to persons or material property, halt operation of the contact line system.
2. ➤ Identify the cause of the fault.
3. ➤ Immediately inform the person responsible at the operating site of the fault.
4. ➤ Depending on the type of fault, have it rectified by authorised specialist personnel or rectify it yourself.

10.2 Possible faults

- | | |
|-----------------------|----------------------------------|
| Personnel: | ■ Overhead conductor rail fitter |
| Protective equipment: | ■ Industrial safety helmet |
| | ■ Protective clothing |
| | ■ Protective gloves |
| | ■ Safety footwear |
| | ■ High-vis clothing |

Corrective servicing

Possible faults

Swivelling out



WARNING!

Risk of fatal injury due to the swivel arms swivelling out!

Swivel arms may swivel out during assembly and maintenance work. This can cause severe to fatal injuries.

- Ensure that the installation is dead.
- Provide assembly safety devices for non-motorised swivel arms.
Do not release the assembly safety devices until the swivel arms are connected by an overhead conductor rail.
- Do not enter the slewing range at any time during work that requires swivelling out.
- Set up a warning sign.

Danger of trapping



CAUTION!

Danger of trapping during work on the swivel arm base!

If the swivel arm is moved during work, personnel can be trapped.

- Ensure that the installation is dead.
- Do not reach into the slewing range at any time during work that requires swivelling out.
- Wear personal protective equipment.

Fault description	Cause	Remedy
Rotation angle sensor does not report end position	Rotation angle sensor not set or not set correctly.	Set the rotation angle sensor. 🔗 <i>Chapter 6.7 'Setting the sensors' on page 47</i>
	Rotation angle sensor defective	<ul style="list-style-type: none"> ■ Visually check the rotation angle sensor. The rotation angle sensor reacts to metallic objects, e.g. metal plate. The LED on the sensor lights when there is a signal.
	Cabling or voltage supply of the rotation angle sensor is defective.	<ul style="list-style-type: none"> ■ Check the cabling or voltage supply of the rotation angle sensor.
Swivel arm does not reach end position	Angle of rotation not set correctly.	<ul style="list-style-type: none"> ■ Check the angle of rotation and correct if necessary. 🔗 <i>Chapter 6.8 'Adjusting the angle of rotation' on page 48</i>
	Rotation of the swivel arm is faulty.	<ul style="list-style-type: none"> ■ Check sliding clamps. If necessary, remove dirt in the slewing range.

Fault description	Cause	Remedy
Automatic swivelling operation is not working	Voltage supply or motor gear unit is defective	<ul style="list-style-type: none"> ■ Check the voltage supply for the motor gear unit. ■ Check and adjust the overload protection (sliding clutch). <ul style="list-style-type: none"> ↳ <i>Chapter 6.5 'Adjusting the torque on the overload protection' on page 44</i> ■ Renew the motor gear unit. <ul style="list-style-type: none"> ↳ <i>'Technical customer service' on page 6</i> <p>Until the motor gear unit is renewed, open the sliding clutch on the motor gear unit to maintain operation of the system.</p>

11 Spare parts

Incorrect spare parts



WARNING!

Risk of injury due to the use of incorrect spare parts!

The use of incorrect or defective spare parts can cause dangers for personnel and result in damage, malfunctions or total failure.

- Only use spare parts approved by Rail Power Systems.
- If in doubt, contact customer service at Rail Power Systems.

📞 *‘Technical customer service’ on page 6*



NOTICE!

Loss of warranty!

Use of non-approved spare parts will result in a loss of warranty.

Spare parts list

RPS material number	Designation
3EGF019609	TracFeed® OSS profile clamp, electrical connection/infeed
3EGF019610	TracFeed® OSS profile clamp with shackle for earthing
3EGF019877	TracFeed® OSS profile clamp, potential equalisation
3EGF021465	Drive unit
3EGF021710	Rotation angle sensor
3EGF021438	Sensor holder for rotation angle sensor
3EGF016971	Position sensor
3EGF021441	Sensor holder for position sensor
3EGF021442	Query element
3EGF021707	Spacer with counterbore M6 L10
3EGF021437	Rotary joint
On request	Inverter
On request	Insulator

12 Decommissioning, disassembly and disposal

12.1 Decommissioning

Personnel:	<ul style="list-style-type: none"> ■ Qualified electrician for high and medium voltage
Protective equipment:	<ul style="list-style-type: none"> ■ Industrial safety helmet ■ Protective clothing ■ Protective gloves ■ Safety footwear ■ High-vis clothing
Tool:	<ul style="list-style-type: none"> ■ Voltage tester ■ Earthing device

1. ➤ De-energise the track section.
 ↪ *Chapter 5 'Ensuring that the installation is dead' on page 35*
2. ➤ Earth the overhead conductor rail with an earthing device.
3. ➤ If there is no residual voltage, begin disassembling the swivel arm.

12.2 Disassembly

Improper disassembly



WARNING!

Risk of injury due to improper disassembly!

Stored residual energy, angular components, points and corners can cause injuries.

- Ensure sufficient space before starting work.
- Handle exposed, sharp-edged components with care.
- Ensure orderliness and cleanliness in the workplace. Loosely stacked or scattered components and tools could cause accidents.
- Disassemble the components properly. Note that some components are heavy. If necessary, use hoists.
- Secure components so that they cannot fall down or topple over.
- If in doubt, contact customer service at Rail Power Systems.

↪ *'Technical customer service' on page 6*

Decommissioning, disassembly and disposal

Disposal

Electrical system



DANGER!

Risk of fatal injury due to electric current!

Contact with live parts poses a risk of fatal injury. Electrical components that are switched on can execute uncontrolled movements and lead to severe injuries.

- Only allow trained electricians to execute work on electrical parts.
- Before starting disassembly, switch off the electricity supply and disconnect it permanently.

- Personnel: ■ Overhead conductor rail fitter
- Protective equipment: ■ Protective clothing
 ■ Protective gloves
 ■ Safety footwear

Requirement:

- The track section is out of operation.

🔗 *Chapter 12.1 'Decommissioning' on page 63*

1. ➤ Remove the swivel arm.
2. ➤ Remove operating supplies and auxiliary materials and remaining processing materials and dispose of these in an environmentally friendly manner.
3. ➤ Properly clean the assemblies and components and dismantle them in observance of applicable local occupational and environmental safety regulations.

12.3 Disposal

At the end of its useful life, the product has to be disassembled and disposed of in an environmentally friendly manner.

If no return or disposal agreement was signed, send the disassembled components for recycling:

- Have metals scrapped.
- Send plastic elements for recycling.
- Collect oil and grease in suitable containers and send for recycling.
- Dispose of the remaining components sorted by material characteristics.



ENVIRONMENT!

Danger to the environment due to incorrect disposal.

Incorrect disposal may pose risks to the environment.

- Have electronic scrap, electronic components, lubricants and other auxiliary materials disposed of by specialist companies.
- If in doubt, contact your local authority or specialist disposal companies for information about environmentally sound disposal.

13 Glossary

AC	The term “alternating current” is used to refer to AC current as well as AC voltage.
DC	The term “direct current” is used to refer to DC current as well as DC voltage.
Earthing	Earthing establishes a defined reference potential or equipotential loading.
Extraordinary check	<p>This check is carried out after extraordinary events, e.g.:</p> <ul style="list-style-type: none">■ Short circuits■ Extreme weather situations (storm, heat, ice, hail > 4 cm)■ Fire below and in the immediate vicinity (< 50 m) of the contact line (effects of heat, soot deposit) and contact with extinguishing agent (foam) <p>Perform an inspection of the area in question as per state check Z.</p>
Overhead conductor rail	The TracFeed® OSS overhead conductor rail is part of the TracFeed® OSS overhead conductor rail system and is the equivalent of the catenary system. The overhead conductor rail provides power to vehicles that are supplied with electric power via a pantograph fitted to their roof.
Overhead conductor rail system	The TracFeed® OSS overhead conductor rail system was developed for use in tunnels. Due to its flatter design, the overhead conductor rail can be used in places where there is no space for standard overhead lines.
Overload protection	Protects the power equipment against thermal overloading and it protects the line section against impermissible current loads.
RAMS	<p>The term “RAMS” stands for Reliability, Availability, Maintainability, Safety.</p> <p>RAMS is a process as per EN 50126 that is intended to prevent errors in the project planning phase. RAMS can already be applied during the planning, development, realisation and introduction of new products and systems. RAMS management ensures that systems are defined, risk analyses carried out, hazard rates determined, detailed checks performed and that safety certificates are compiled.</p>
State check Z	Visual inspection of the state of catenary systems (fixed points, section insulators, section insulation, neutral sections, retensioning devices, points spans), support points and retensioning equipment and distances to active parts.
TSI	Technical Specifications for Interoperability of the railway system

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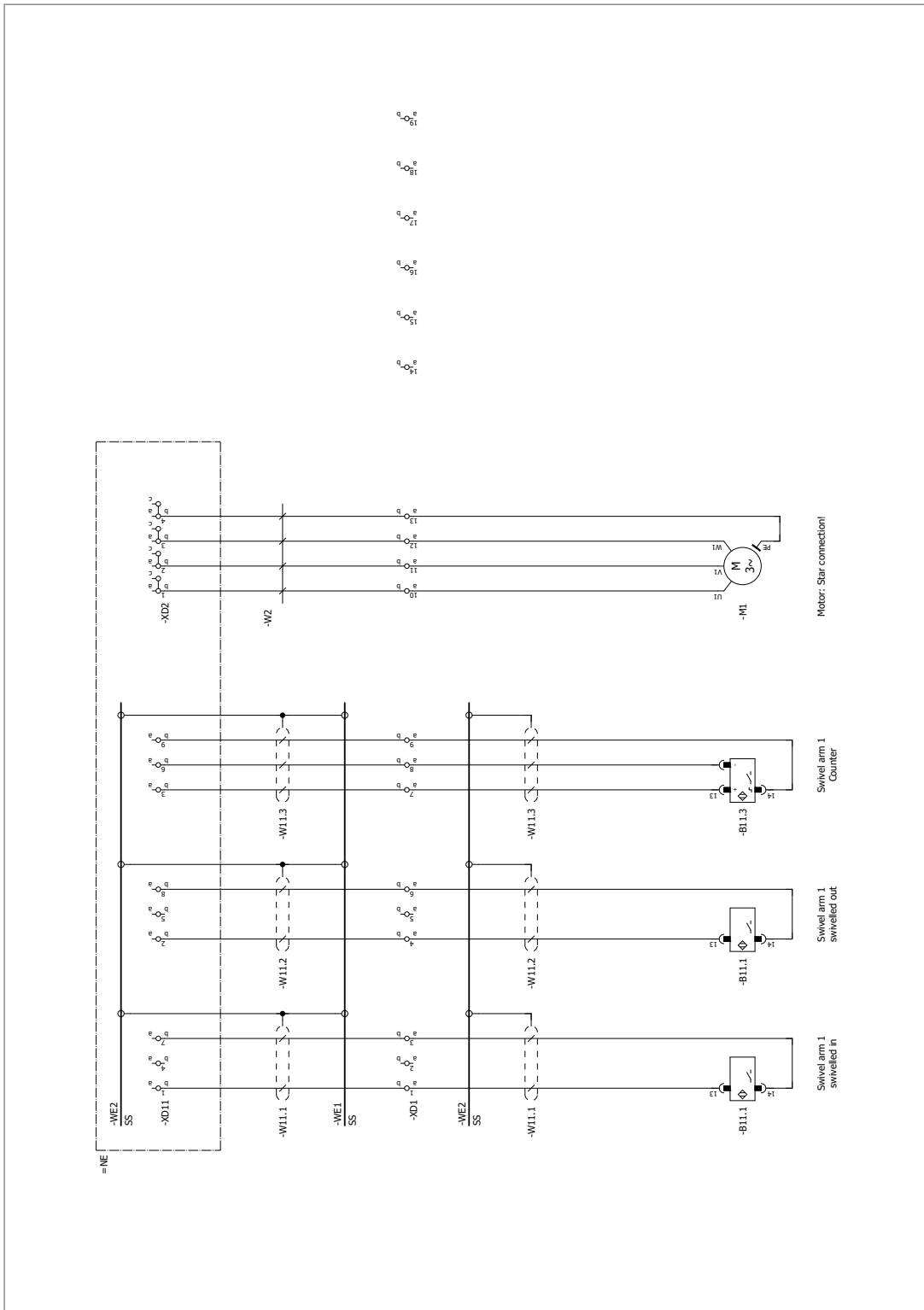
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A Terminal box schematic diagram



C Directory of other documents and descriptions

D Information about the order

