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1 General information

1.1 Information about this installation manual

These assembly instructions make it possible for you to work with the festoon system safely and efficiently.

The assembly instructions are a part of the festoon system, and must be kept accessible to personnel at all times in the immediate vicinity of the festoon system. Personnel must read these instructions carefully and understand them before starting any work. The basic prerequisite for safe work is compliance with all safety and operating guidelines in this installation manual. Furthermore, local accident protection regulations and general safety regulations apply for the area of use of the festoon system.

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

In addition to this installation manual, the instructions located in the appendices for the individual assembled components also apply.

1.2 Limitation of liability

All data and information in this installation manual has been compiled while taking the valid standards and regulations as well as the state-of-the art and our long years of experience and knowledge into consideration.

The manufacturer accepts no liability for damage resulting from:

- Failure to comply with the installation manual
- Improper use
- Use by untrained personnel
- Unauthorized modifications
- Technical changes
- Use of unauthorized replacement parts and accessories.

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

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

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

1.3 Copyright

These assembly instructions are subject to copyright, and are exclusively intended for internal use. Provision of the assembly instructions to third parties, duplications in any form – even in part – as well as the reuse and/or disclosure of their content are not permitted without the written approval of the manufacturer, except for internal use.

Breach or infringement will result in liability for damages. Our right to further claims remains unaffected.

1.4 Replacement parts



WARNING!

Incorrect replacement parts are a safety hazard!

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

Therefore:

- Use only original replacement parts from the manufacturer!

Replacement parts can be ordered from your contracted dealer or directly from the manufacturer. See the last page of these assembly instructions for the address.

1.5 Material defects

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

1.6 Technical support

Our customer support staff is available for technical support. See the last page of these assembly instructions for contact information.

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

2 Safety instructions

2.1 Explanation of symbols

Safety and hazard information is identified in this installation manual by symbols. Safety instructions are introduced by signal words that indicate the degree of the hazard. Always observe safety and hazard instructions, and work carefully to avoid accidents, bodily injury and damage to property!



DANGER!

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



WARNING!

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



WARNING!

... Indicates a potential fire risk if not prevented.



WARNING!

... Indicates a possible danger from electricity, which if not avoided, may result in death or serious injury.



CAUTION!

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



NOTE!

Tips and recommendations:

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

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2.2 Personnel requirements

2.2.1 Qualifications



WARNING!

Inadequately trained persons are at risk of injury!

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

Therefore:

- All activities must be carried out by qualified staff!

The following qualifications have been mentioned in this installation manual for different areas of operation:

- **Trained personnel/operators**

have been instructed by the operator about the tasks assigned to him/her and the possible hazards resulting from improper use.

- **Specialist personnel**

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

- Only persons who can be expected to perform their work reliably are acceptable personnel. Persons whose responsiveness is influenced by drugs, alcohol, or medications, for example, are not permitted.
- When selecting personnel, all age- and occupation-specific regulations applicable at the place of use must be observed.

2.2.2 Unauthorized personnel



WARNING!

Danger due to unauthorized personnel!

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

Therefore:

- Keep unauthorized personnel away from the working area.
- In case of doubt, address such persons and direct them away from the working area.
- Stop work as long as unauthorized persons are in the working area.

2.2.3 Training

Before commissioning the equipment, personnel must be trained by the owner. For better tracking, log the instruction as follows:

| Date | Name | Type of training | Training given by | Signature |
|------|------|------------------|-------------------|-----------|
| | | | | |
| | | | | |
| | | | | |

Fig. 1: Example of instruction log

2.3 Personal protective equipment

Always wear: For all work, always wear:



Protective work clothing

are tightly fitting working clothes with low resistance to tearing, close-fitting sleeves and no protruding parts. They serve primarily as protection against entrapment by moving machine parts.

Rings, neck chains or other items of jewelry must not be worn.



Protective footwear

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

For special tasks, wear: When carrying out particular tasks, special safety gear is required. The individual sections of these instructions specify this gear in detail. The following particular safety gear is explained below:



Protective gloves

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



Protective headgear

for protection from falling and flying parts and materials.



Safety goggles

for eye protection.

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2.4 Intended use

The festoon system is exclusively designed and built for the intended use described here.

The Series 0314 festoon system and its components may only be used for the construction and operation of power supply systems for rail-mounted, mobile consumers such as cranes and lifting accessories in industrial applications. Other applications are only permitted with the written approval of Conductix-Wampfler.



WARNING!

Hazard due to improper use!

Any application that deviates from or goes beyond the intended use of the festoon system can result in a hazardous situation.

Therefore:

Use the festoon system only for its intended use.

- Follow all information in this installation manual strictly.
- The following uses of the festoon system are prohibited.

Non-intended use particularly includes the following:

- Use of the festoon system with accessories not permitted and not authorized by the manufacturer.
- Operation of the festoon system by uninstructed personnel.
- Operation of the festoon system without its being installed on a proper foundation/floor.
- Exceeding the rated load-bearing capacities
- Exceeding projected speeds
- Excessive acceleration
- Use of unsuitable cables
- Changes to atmospheric conditions
 - Change in the anticipated location of use

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

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

2.5 Protective measures to be taken by the operator/user

The festoon system is used in an industrial setting. The operator of the festoon system is thus subject to legal requirements related to workplace safety. In addition to the safety instructions in these assembly instructions, all safety, accident protection, and environmental regulations valid in the place of operation of the festoon system must also be observed. This particularly applies to the following:

- The operator must ensure that the festoon system will only be used for its intended purpose.
- The operator must inform him/herself of applicable workplace safety guidelines and identify any additional hazards that may arise under the specific working conditions at the place of use of the festoon system. This knowledge must be expressed in the form of operating instructions for the operation of the device. .
- During the entire time the festoon system is in use, the operator must check that these operating instructions still correspond to the current state of regulations and adapt them as necessary.
- The operator must clearly manage and define responsibilities for installation, operation, troubleshooting and maintenance.
- The operator must ensure that all employees involved with the festoon system have read and understood these assembly instructions. The owner must also train the personnel at regular intervals and inform them of hazards.
- The owner must provide personnel with the necessary protective equipment.

Furthermore, the operator is responsible for ensuring that the festoon system is always in a technically perfect condition. The following thus apply:

- The operator must ensure that the service intervals described in this installation manual are observed.
- The operator must have all safety systems regularly inspected for functionality and completeness.

2.6 Special hazards

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

- Follow the safety instructions listed here and the warnings in other sections of this installation manual in order to reduce health hazards and avoid dangerous situations.



WARNING!

Risk of death due to suspended loads!

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

Therefore:

- Never walk under suspended loads.
- Only move loads under supervision.
- Follow the specifications for the attachment points provided
- Do not lash to protruding machine parts or eyelets on attached components. Be sure the lashing elements are firmly seated.
- Use only authorized lifting accessories and lashing elements with sufficient load capacity
- Do not use torn or worn ropes or straps
- Do not attach ropes or straps at sharp corners and edges, and do not knot or twist them
- Set loads down when leaving the workplace



WARNING!

Danger of injury from moving components!

Incautious handling of the festoon system can lead to severe injury or damage to the festoon system.

Therefore:

- Be sure that the festoon system does not start by itself.
- While it is moving, do not reach into moving parts, particularly the interface between the buffer and buffer plate.
- Block off the dangerous area under the system.



DANGER!

Danger of injury due to electrocution!

Danger of severe injury or death due to electric current.

Therefore:

- Before working on the cable-festoon system, the system must be disconnected from power using the main switch, and secured against unauthorized, unintentional, and/or erroneous activation. In special cases where there is no main switch, the power disconnection must be carried out according to the specifications of the system manufacturer. Check that parts disconnected from power are voltage free, then ground and short-circuit them. Insulate adjacent live parts!
- Before each commissioning, an insulation test must be carried out in accordance with the local technical standards, guidelines, and law.

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Warning!

Risk of fire!

Risk of fire if undersized cables are used!

Therefore:

- The required cable cross-sections must be adhered to.



CAUTION!

Danger of tripping on projecting parts!

When working on the festoon system, there is a risk of tripping.

Therefore:

- When walking in the work and danger area, be careful of projections and depressions in the floor.
No loose objects may be left on the floor.



WARNING!

Danger of crushing!

When moving the festoon system, there is a danger of crushing limbs between the buffer and buffer plate, as well as between the carriage and the track carrier.

Therefore:

- Do not enter the danger area of the cable-festoon system when the system is moving



CAUTION!

Trap!

There is a danger of being trapped when the cable-festoon system is moving.

Therefore:

- Do not enter the danger area of the cable-festoon system when the system is moving

2.7 Actions in the event of accidents and faults

Measures to take in the event of accidents:

- Take first-aid measures.
- Remove persons from the danger zone.
- Inform responsible parties at the place of operation.
- Alarm the rescue services.
- Make access ready for rescue vehicles.

Measures to take in the event of malfunctions:

- Secure the work area against entry.
- Involve qualified personnel for fault analysis.
- Involve authorized personnel for maintenance and repair.
- Shut down the system and secure it against unauthorized, unintentional, and/or erroneous activation.
- If injury to person or property occurs during a breakdown then Conductix-Wampfler must be informed immediately.

3 Technical data

3.1 General information

| Designation | Value | Notes |
|--------------------|------------|----------------------------------|
| Max. load capacity | 10 - 20 kg | Depending on the number of rolls |
| Max. travel speed | 50 m/min | |

3.2 Interfaces

Mechanical:

| Machine | Part |
|------------------------|---------------------------|
| Load-bearing structure | End clamp, towing trolley |
| Cables | Overlay, conductor holder |

Electrical, data, and media:

| Machine | Part |
|-------------------|--------|
| Switching cabinet | Cables |
| Media supply | Cables |
| Consumer | Cables |

3.3 Operating conditions

Environment:

| Designation | Value | Notes |
|----------------------------|--------------------|-------|
| Temperature range | -20 to +60°C | |
| Relative humidity, maximum | 100% | |
| Max. operating speed | 17.2 -< 20.8 m/sec | |
| Max. wind speed | > 32.7 m/sec | |

3.4 Track beam

The operator is basically responsible for ensuring that the track carrier is securely fastened as well as checking it for wear, corrosion or defects.

The following procedures are to be observed when installing the track beam:

- In general, track beams are to be protected from corrosion using appropriate measures.
- The running surfaces of the main rollers and the horizontal guide rollers must be clean and free of objects or defects that could damage the rollers (scratches, cracks, holes, uneven segments, etc.).
- If multiple beams are welded together, they must all have the same measurements, shape and positional tolerances.
- The beam flanges are to be aligned with particular care in horizontal and vertical planes.
- Track beams that have been damaged during transport or rolling are not permitted for use.
- Modified areas (from welding, sanding, etc.) on the track beam are to be protected from corrosion with appropriate measures.
- There may be no projecting contours on the sides of the track area or under the track beam.

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3.4.1 Smoothing of welded track beams

Bumps and uneven areas on all sides of the welded track beams are to be sanded smooth for a length of 100 mm.

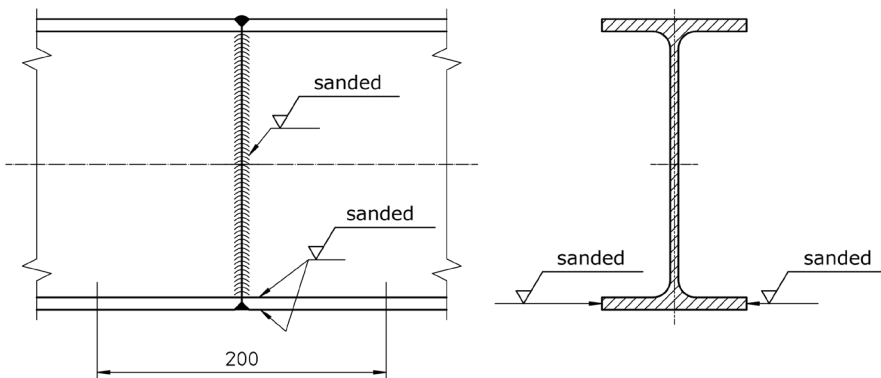
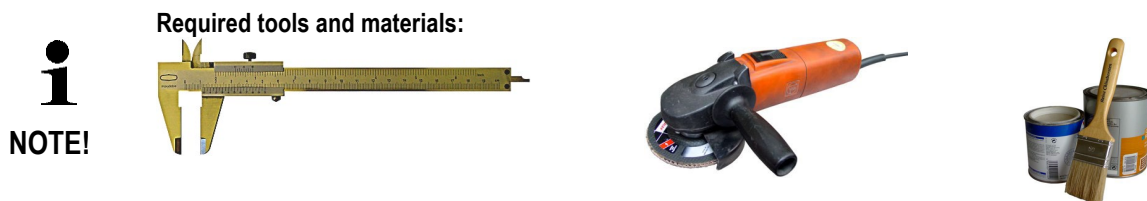


Fig. 2: Smoothing of welded track beams

3.4.2 Use of even welded track beams

Welded joints on the track beams must be even at points that could come into contact with the cable trolleys. Mounting elements and suspended objects that could come into contact with the trolleys are not permitted.

No uneven areas, mounting elements, suspended objects, etc.

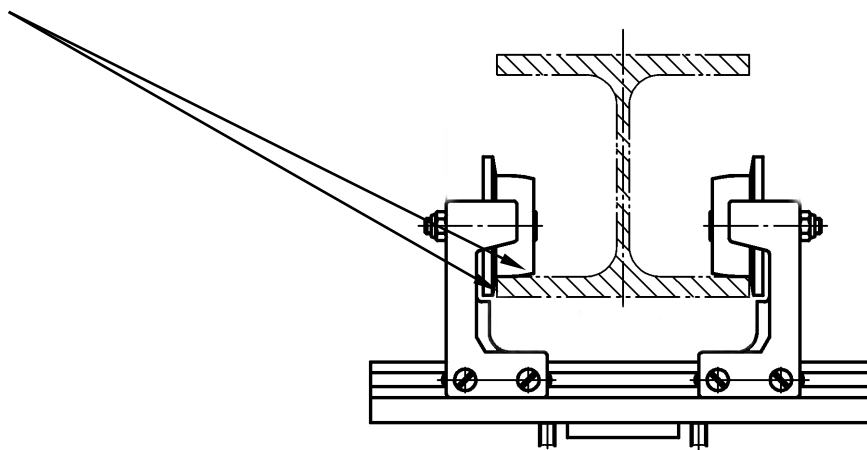


Fig. 3: Use of even welded track beams

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3.4.3 Girder joint for non-welded track beams

For non-welded girder joints, the gap between beams may be **at most 8 mm**. The cut is at a **45°** angle.

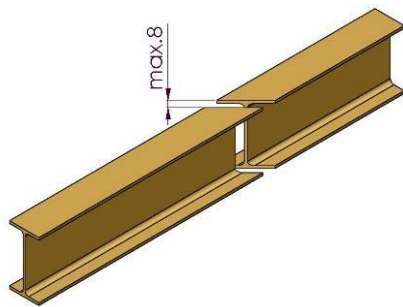


Fig. 4: Girder joint for non-welded track beams

For non-welded girder joints, the horizontal and vertical deviation of the opposing sides of the joint may be **at most 2 mm**. Transitions must be ground smooth within **about 100 mm** of the beginning of the cut. All transitions must be **beveled and rounded**.

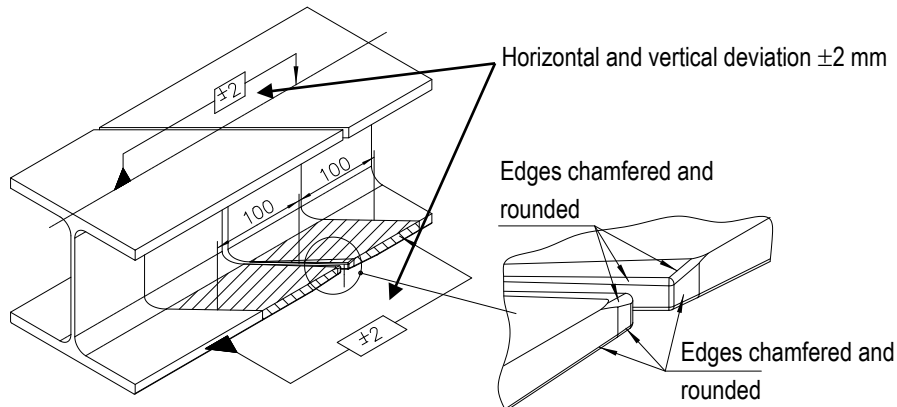
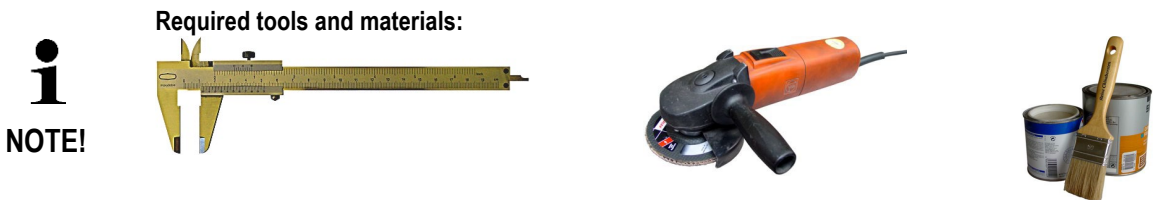


Fig. 5: Girder joint for non-welded track beams

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3.4.4 Horizontal deviation of track beams

The horizontal deviation over the length of the track beam may not exceed ± 5 mm. For lengths shorter than 2 m, deviation may not exceed ± 2 mm.

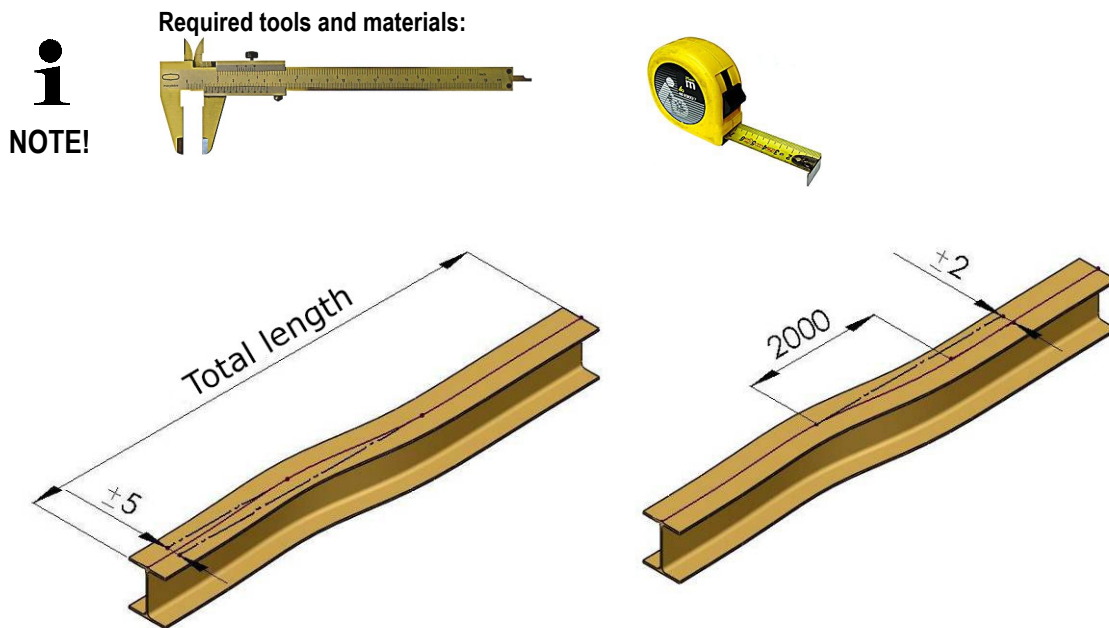


Fig. 6: Horizontal deviation of track beams

3.4.5 Vertical deviation of track beams

The vertical deviation over the length of the track beam may not exceed ± 5 mm. For lengths shorter than 2 m, deviation may not exceed ± 2 mm.

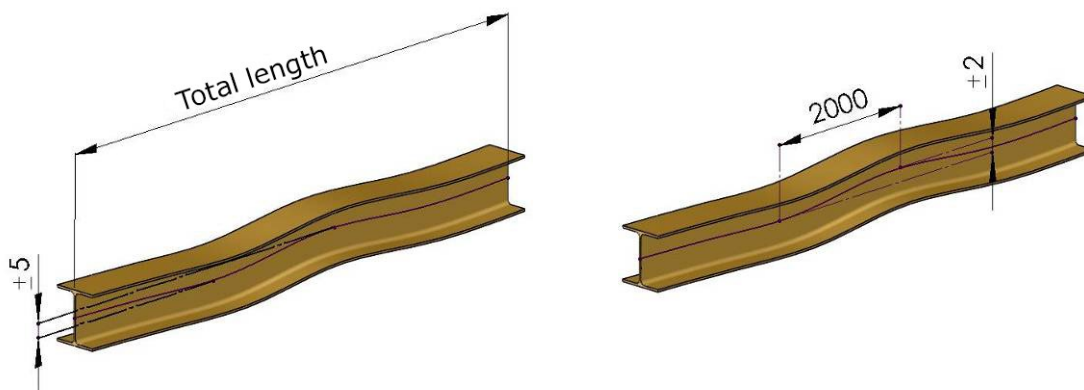


Fig. 7: Vertical deviation of track beams

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3.4.6 Poor horizontal alignment between the crane beam and the track beam

The vertical alignment gap between the crane beam and track beam must not exceed ± 7.5 mm. This tolerance should include a possible alignment deviation of the trolley winch.

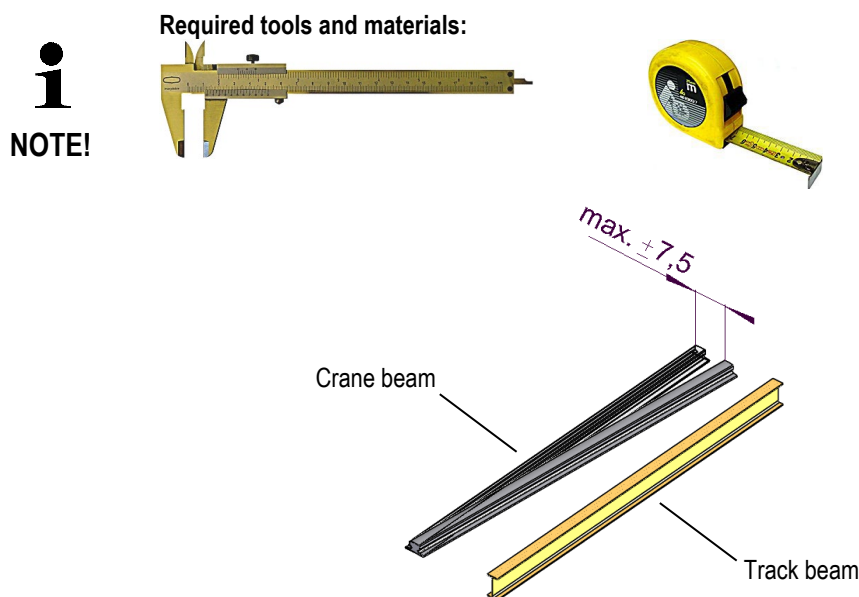


Fig. 8: Poor horizontal alignment between the crane beam and the track beam

3.4.7 Poor vertical alignment between the crane beam and track beam

The vertical alignment gap between the crane beam and track beam must not exceed ± 15 mm. This tolerance should include a possible alignment deviation of the trolley winch.

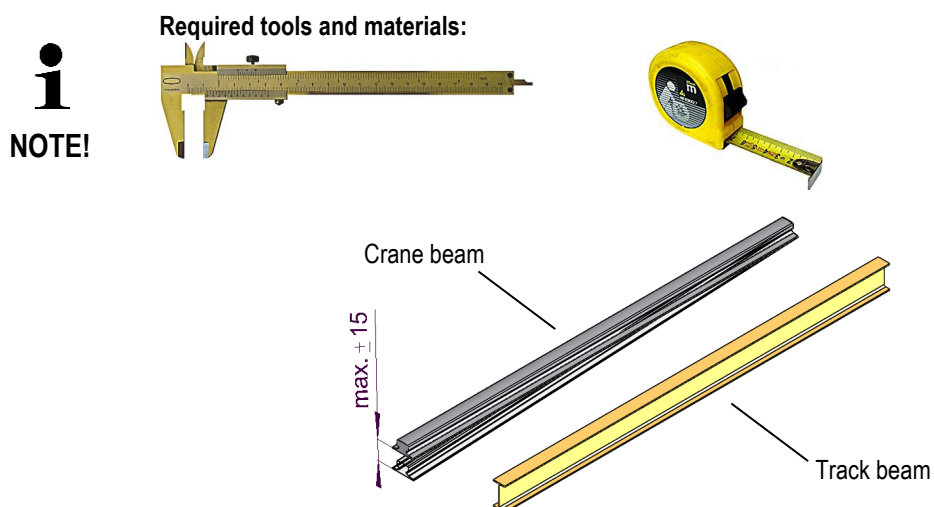


Fig. 9: Poor vertical alignment between the crane beam and track beam

4 Product description and mode of operation

4.1 Overview of the festoon system

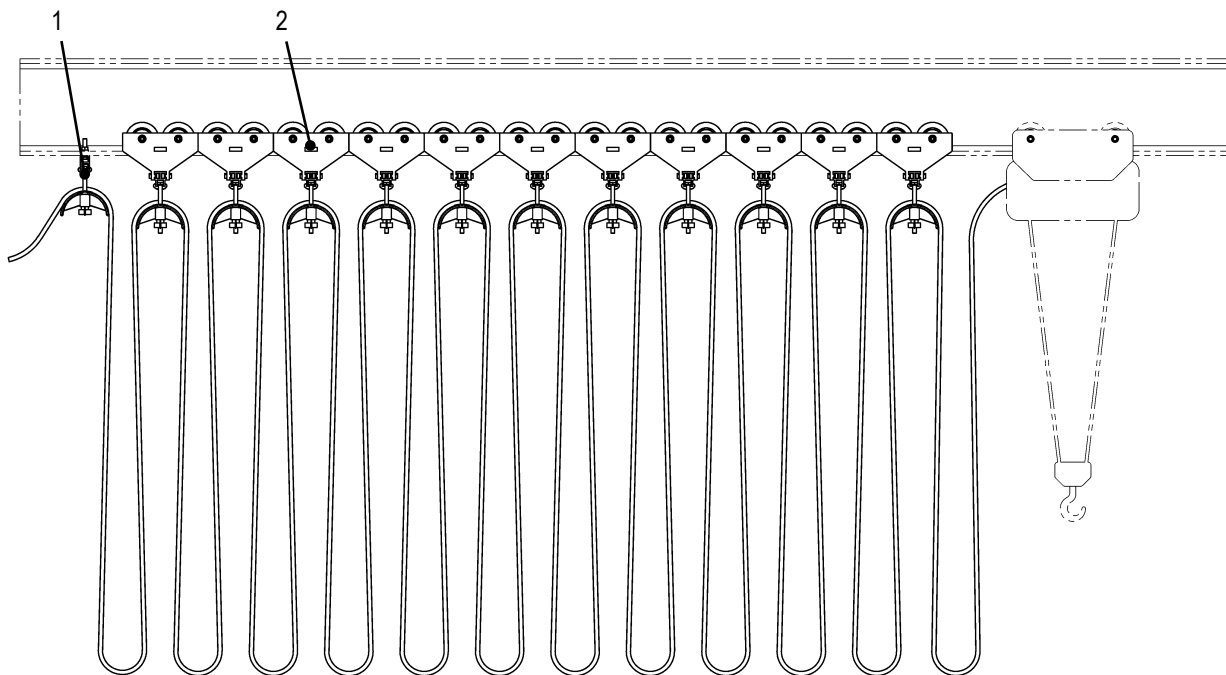


Fig. 10: Overview of the festoon system

- 1) End clamp
- 2) Festoon

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4.2 Brief description

A festoon system consists of end clamp and cable trolley. The last cable trolley is coupled via the line to the mobile consumer via which the subsequent cable trolleys are pulled.

The dimensions of the festoon system can be found in the project-specific dimension sheet.

4.3 Description of assemblies

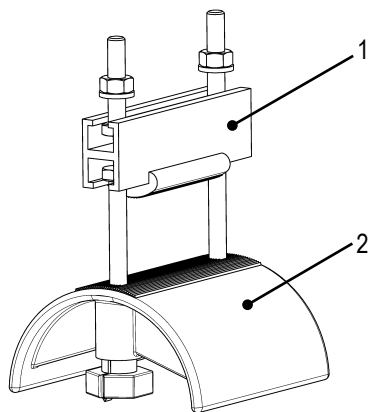


Fig. 11: End terminal for flat cables

■ End clamp for flat cables, consisting of:

- 1) Rail
- 2) Saddle

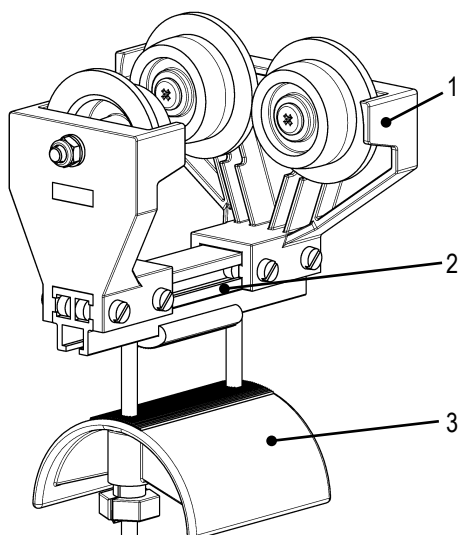
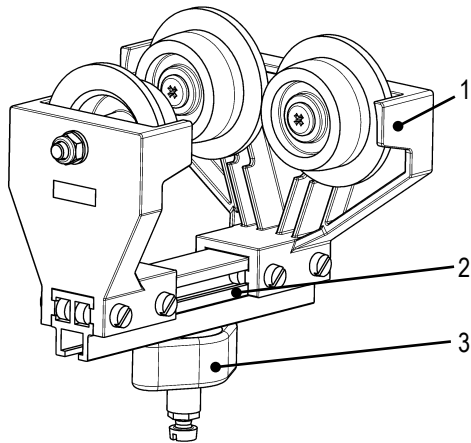


Fig. 12: Cable trolley for flat cables

■ Cable festoon for flat cables, consisting of:

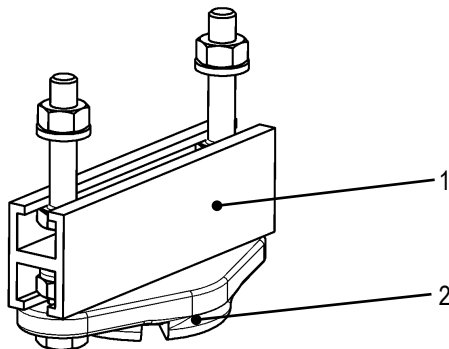
- 1) Side part (one or two rolls)
- 2) Rail
- 3) Saddle

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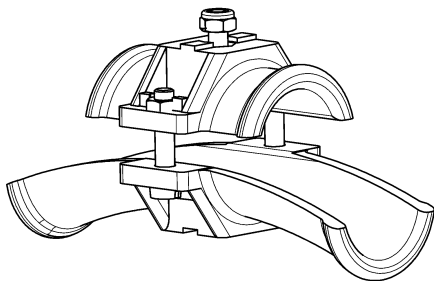
- Cable festoon for round cables, consisting of:
 - 1) Side part (one or two rolls)
 - 2) Rail
 - 3) Lower part

Fig. 13: Cable trolley for round cables



- End clamp for round cables, consisting of:
 - 1) Rail
 - 2) Lower part

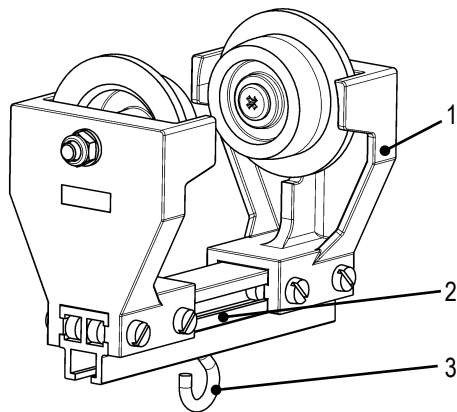
Fig. 14: End clamp for round cables



- Cable support bracket for round cables
Several cable support brackets can be used one above the other.
The largest should be placed uppermost.

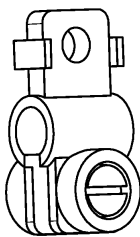
Fig. 15: Cable holder

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- Cable trolley with hook consisting of:
 - 1) Side panel (single roll)
 - 2) Rail
 - 3) Hook

Fig. 16: Cable trolley with hook



- Cable collar for round cables
Cable collars can be used one above the other. The largest should be placed uppermost.

Fig. 17: Cable collar

4.4 Working and danger areas

The following illustration shows the working area of the festoon system. There is a danger of injury from moving parts in this area.

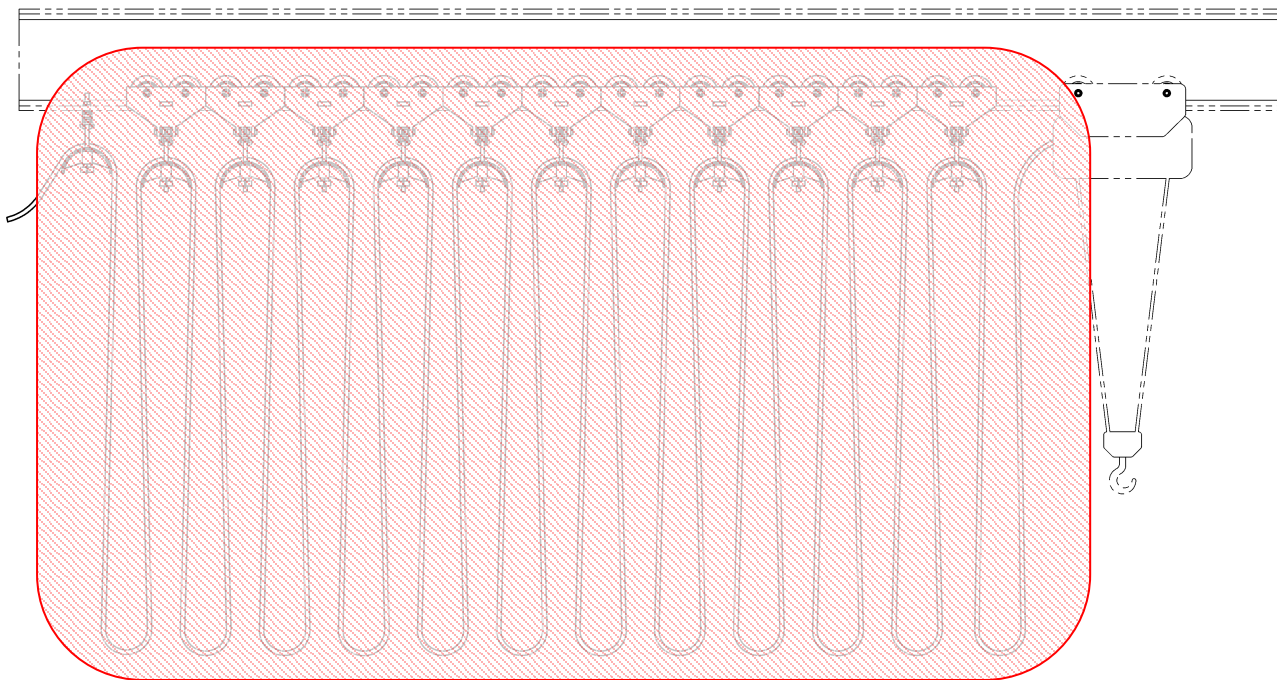


Fig. 18: Working and danger areas

Working and danger areas:

- Between the buffer and the buffer plate
- Between the carriage and the track beam
- In the vicinity of the cables.



WARNING!

Danger of injury from moving components!

Contact with the festoon system during operation can lead to severe injuries and damage to the festoon system.

Therefore:

- During automatic operation, no-one may be located in or under the working area of the festoon system.
- In manual operation, the operator must ensure that no-one is in or under the working area of the festoon system.
- Block off the dangerous area under the system.

4.5 Modes of Operation

The festoon system can be operated in one of two modes

- Automatic operation
- Manual operation.

4.5.1 Automatic operation

The standard operating mode is automatic operation, in which the festoon system is operated via the consumer's controller. In this mode, no person may be in or under the working area of the festoon system. The customer must block off the working area.

4.5.2 Manual operation

Manual operation is used for commissioning, maintenance, and repair. It may be necessary to make adjustments directly at the festoon system and to monitor them.

5 Transport, packaging and storage

5.1 Transport

5.1.1 Safety instructions for transport



WARNING!

Risk of death due to suspended loads!

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

Therefore:

- Never walk under suspended loads.
- Block off the dangerous area under the system.
- Follow the specifications for the attachment points provided
- Do not lash to protruding machine parts or eyelets on attached components. Be sure the lashing elements are firmly seated.
- Use only authorized lifting accessories and lashing elements with sufficient load capacity
- Do not use torn or worn ropes or straps
- Do not attach ropes or straps at sharp corners and edges, and do not knot or twist them



CAUTION!

Possible damage from improper transport!

Improper transport can result in substantial property damage.

Therefore:

- When unloading packaged parts upon delivery and during internal transport, proceed with caution and observe the symbols and information on the packaging.
- Use only the provided lashing points.
- Only remove packaging just before installation.

5.1.2 Transport inspection

Check the delivery for completeness and transport damage immediately on receipt.

If transport damage is externally visible, proceed as follows:

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



NOTE!

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

5.2 Packaging

The individually packaged parts have been packed in accordance with the anticipated transport conditions. Only environmentally friendly materials have been used for packaging.

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

Handling packaging materials:

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



CAUTION!

Environmental damage due to improper disposal!

Packaging materials are valuable resources and can be reused or usefully processed or recycled in many cases.

Therefore:

- Dispose of packaging materials in an environmentally appropriate manner.
- Comply with locally applicable disposal guidelines; if necessary, engage a specialist to handle disposal.

5.3 Storage of packed parts

Store packed parts under the following conditions:

- Do not store outdoors.
- Store in a dry, dust-free place.
- Do not expose to aggressive media.
- Protect from direct sunlight.
- Avoid mechanical vibrations.
- Storage temperature: +15 to +35°C.
- Relative humidity max. 50%
- When storing for more than 3 months, check the general condition of all parts and the packaging at regular intervals. If necessary, refresh or replace the preservative.



NOTE!

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

6 Installation and commissioning

6.1 Safety

Personnel:

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

Wear the following protective gear during all work of installation and commissioning:

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



WARNING!

Risk of death due to suspended loads!

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

Therefore:

- Never walk under suspended loads.
- Block off the dangerous area under the system.
- Only move loads under supervision.
- Follow the specifications for the attachment points provided
- Do not lash to protruding machine parts or eyelets on attached components. Be sure the lashing elements are firmly seated.
- Use only authorized lifting accessories and lashing elements with sufficient load capacity
- Do not use torn or worn ropes or straps
- Do not attach ropes or straps at sharp corners and edges, and do not knot or twist them
- Set loads down when leaving the workplace



WARNING!

Risk of injury due to improper installation and commissioning!

Improper installation and commissioning can result in serious injury to person and property.

Therefore:

- Before starting work, make sure there is sufficient space for assembly.
- Handle open, sharp-edged components with care.
- Ensure the installation area is clean and tidy! Loosely stacked or scattered components and tools can cause accidents
- Install components properly. Comply with specified screw-tightening torques
- Secure components so they cannot fall or topple

6.2 Preparations

Required tools:

- Power drill
- Metal drill
- Crescent wrench
- Corrosion protection
- Lubricant
- Gauges

6.3 Installation

Personnel:

- May only be carried out by trained technicians
- At least two people



CAUTION!

Danger of tripping on projecting parts!

When working on the festoon system, there is a risk of tripping.

Therefore:

- When walking in the work and danger area, be careful of projections and depressions in the floor.
No loose objects may be left on the floor.



WARNING!

Danger of crushing!

When moving the festoon system, there is a danger of crushing limbs between the buffer and buffer plate, as well as between the carriage and the track carrier.

Therefore:

- Do not enter the danger area of the cable-festoon system when the system is moving



WARNING!

Danger of crushing!

During assembly of the festoon system, there is a danger of crushing limbs between load carriers and the rail carrier.

Therefore:

- During assembly, do not enter the danger area of the festoon system.

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6.3.1 Assembling the festoon

The cable trolleys can be pushed into the front end of the track beam or mounted from below on the track beam. The trolleys must be adjusted to the respective track beam (see Adjusting the trolleys).

6.3.2 Adjusting the trolleys

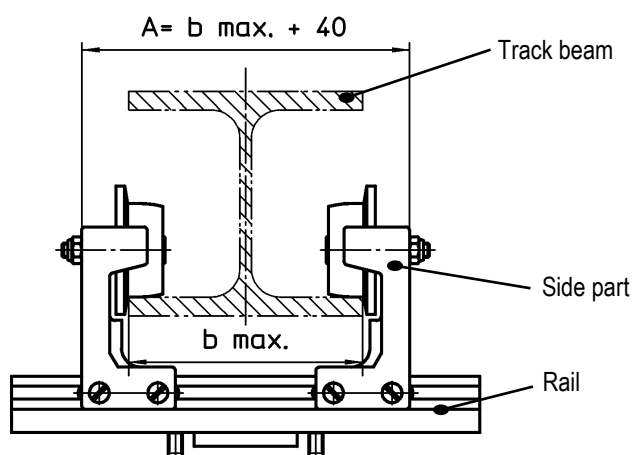


Fig. 19: Adjusting the trolleys

The side parts of the chassis are movable on the rail. They have to be adjusted to the track beam. The distance A between the two side parts of the cable trolley should be **max. support width + 40 mm**.

The cable trolley base is to be centrally located below the track beam after adjustment. After adjustment, tighten the screws.

6.3.3 Mounting the end clamp

The end clamp is fastened to the track beam (provided by the customer) using a screw connection. Select the position of the end clamp so that when arranging the cables, the smallest bend radius of the cables can be maintained. The installation length is to be selected so that the cable is lying completely on the support and that the clamping is sufficient during operation.

6.3.4 Fitting round cables



WARNING!

Risk of fire!

Risk of fire if undersized cables are used!

Therefore:

- The required cable cross-sections must be adhered to.



WARNING!

Danger due to improper cable installation!

Incorrect arrangement of the cables in the cable bundles and the loop may result in cable damage and electric shocks.

Only use qualified electricians to connect up the cables.


Check the cables regularly for signs of wear or damage.

The cable configuration designed for the festoon system must be adhered to. The following rules are recommended:

- When using cable trolleys with multiple cable support, the heaviest cables are to be placed on the uppermost cable clamp.
- In the case of multilevel cable trolleys, the cables of the respective upper cable holders must be laid with a little less length than the cables of the underlying cable holders.
- The screws of the cable holders must be screwed tight enough so that thin cables are not pulled through during operation, but the cables are not damaged by excessive clamping.


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6.3.5 Laying flat cables



WARNING!

Risk of fire!
Risk of fire if undersized cables are used!
Therefore:
- The required cable cross-sections must be adhered to.



WARNING!

Danger due to improper cable installation!
Incorrect arrangement of the cables in the cable bundles and the loop may result in cable damage and electric shocks.
Only use qualified electricians to connect up the cables.
Check the cables regularly for signs of wear or damage.

The cable configuration designed for the festoon system must be adhered to. The following rules are recommended:

- Place the cable package towards the middle of the track beam so that the torque is in balance.
- Where flat cables are laid in layers, each higher layer of cables should be laid with slightly less slack in terms of length than those below.
- Cables of large copper cross-section should be arranged symmetrically to the trolley center and as the very top cable in the bundle.

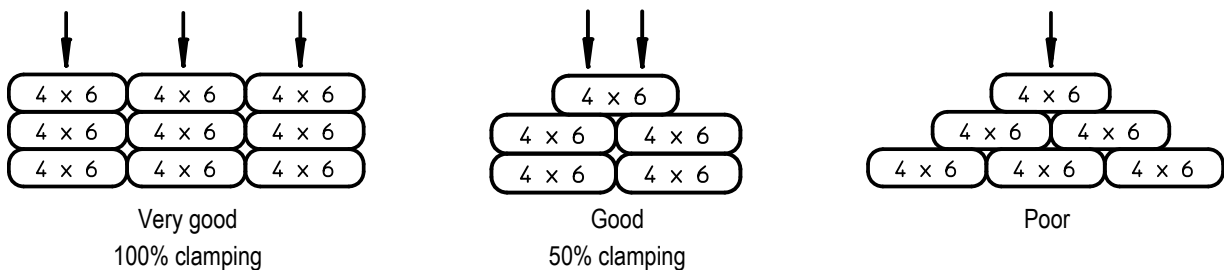
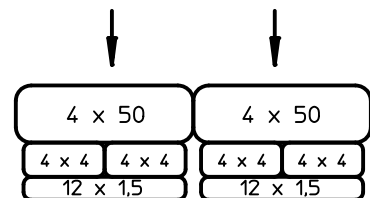


Fig. 20: Laying flat cables

Thicker cables (such as 4x50) are to be placed at the top of the cable package. This allows for good heat dissipation and tight clamping of smaller cables. Traction forces that occur during movement can be taken up by these cables.



6.4 Testing and commissioning



WARNING!

Risk of injury due to improper commissioning!

Improperly performed commissioning can lead to dangerous situations for personnel.

Therefore:

- Before commissioning, carry out the tests in the test list of the manufacturer.
- Never start the festoon system without testing according to the manufacturer's test list.
- Before commissioning, perform a visual check and carry out the prescribed tests.
- Any procedures that could threaten safety are to be avoided.
- Notify the responsible person immediately of any damage to the festoon system.
- The festoon system should only be operated with functional protective gear and safety devices.
- It is forbidden to enter the operating area of the festoon system.



CAUTION!

Danger of tripping on projecting parts!

When working on the festoon system, there is a risk of tripping.

Therefore:

- When walking in the work and danger area, be careful of projections and depressions in the floor.
No loose objects may be left on the floor.



WARNING!

Danger of crushing!

When moving the festoon system, there is a danger of crushing limbs between the buffer and buffer plate, as well as between the carriage and the track carrier.

Therefore:

- Do not enter the danger area of the cable-festoon system when the system is moving



CAUTION!

Trap!

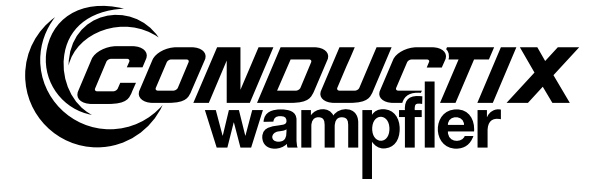
There is a danger of being trapped when the cable-festoon system is moving.

Therefore:

- Do not enter the danger area of the cable-festoon system when the system is moving

The festoon system is commissioned together with the system operator and is documented. All necessary personnel for commissioning including operators, electricians and installation technicians are to be provided by the system operator for the course of commissioning. Free access to the system must be provided. After commissioning is complete, Conductix-Wampfler will receive an authorized final acceptance protocol from the operator, in which it is logged that the system corresponds to the requirements.

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6.4.1 Commissioning test list

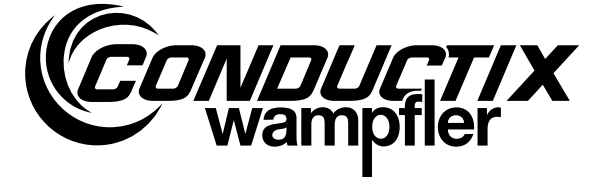


This checklist should be used as a guideline to ensure the safety operation of the festoon system. The checklist is intended for qualified specialists who install the festoon systems, operate them and who are familiar with the requirements regarding work safety and accident prevention.

If Conductix-Wampfler performed the commissioning, the final acceptance protocol on the last page should be filled out.

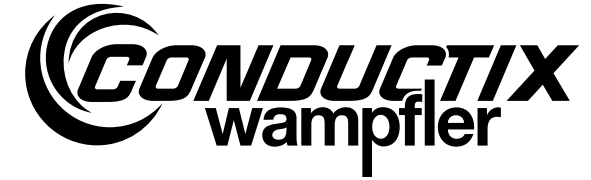
| | | | |
|---------------------------------|--|-------------------------|--|
| Customer: | | Customer number: | |
| | | Order number.: | |
| Contractor: | | Contract number: | |
| Commissioning location: | | Postal code: | |
| Street address: | | Country: | |
| Name of system: | | | |
| Start of commissioning: | | Commissioner | |
| Ending of commissioning: | | Name: | |
| | | Date: | |
| | | Signature: | |

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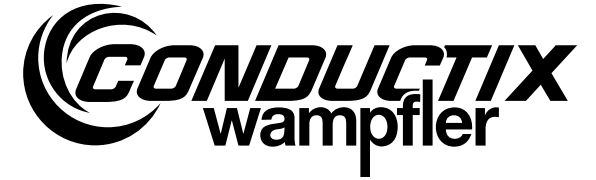
| Checks with the system at a standstill | | OK | Not OK |
|---|---|--------------------------|--------------------------|
| A01 | The track of the carriage corresponds to the project-specific technical documentation. | <input type="checkbox"/> | <input type="checkbox"/> |
| A02 | The storage length of the festoon system corresponds to the project-specific technical documentation. | <input type="checkbox"/> | <input type="checkbox"/> |
| A03 | All bolts used are of sufficient length and are protected. The projecting ends of the screws are visible (at least 2 thread projection). | <input type="checkbox"/> | <input type="checkbox"/> |
| A04 | Cables are to be arranged according to specifications in the cable arrangement recommendation (see project-specific technical documentation). | <input type="checkbox"/> | <input type="checkbox"/> |
| A05 | Loop lengths of the cables correspond to the specifications of the project-specific technical documentation. The permissible length deviation is ± 50 mm. | <input type="checkbox"/> | <input type="checkbox"/> |
| | Actual | | |
| A06 | Cables are arranged free of twists | <input type="checkbox"/> | <input type="checkbox"/> |
| A07 | Cables show <u>no</u> damage caused by transport or assembly. | <input type="checkbox"/> | <input type="checkbox"/> |
| A08 | The cables are mounted on the supports in such a way that the cable trolleys run horizontally on the track profile (balance of the cables on the right and left supports). Cable holders are to be firmly tightened so that cables cannot be pulled out manually, but still with enough play that the cables are also not crushed. | <input type="checkbox"/> | <input type="checkbox"/> |
| A09 | Cable ends (installation lengths) are arranged with sufficient strain relief and the right length to the end or towing side. | <input type="checkbox"/> | <input type="checkbox"/> |
| A10 | Check steel structure for collision-free travel of the festoon system. No trapping and hooking of lines possible. | <input type="checkbox"/> | <input type="checkbox"/> |
| A11 | Joints of the track carrier have no height and side offset | <input type="checkbox"/> | <input type="checkbox"/> |

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| Checks with the system at a standstill | | OK | Not OK |
|--|--|--------------------------|--------------------------|
| A12 | Welded joints of the track beam are ground smooth on all roller surfaces. | <input type="checkbox"/> | <input type="checkbox"/> |
| A13 | The corrosion protection is undamaged and intact. | <input type="checkbox"/> | <input type="checkbox"/> |
| Inspections on running systems with 10% running speed: Movement forwards from cable trolley storage/termination fitting end in direction of towing end until the cable train is fully extended. Movement backwards from towing end in the direction of cable trolley storage/termination fitting end until end position is reached. | | | |
| B01 | Horizontal alignment gap between the cable trolley and the crane construction is wide enough that no collision can take place with cable trolleys or their components. | <input type="checkbox"/> | <input type="checkbox"/> |
| B02 | Check of the loop lengths at the maximum pulled out festoon system corresponds to the project-specific technical documentation. | <input type="checkbox"/> | <input type="checkbox"/> |
| Documentation | | <input type="checkbox"/> | <input type="checkbox"/> |
| F01 | Project-specific documentation is available and complete at the customer's facility, along with technical data, system diagrams, cable layout suggestion, and round / flat cable terminal layouts. | <input type="checkbox"/> | <input type="checkbox"/> |

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Remarks / other

7 Operation

7.1 Safety



WARNING!

Risk of death due to suspended loads!

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

Therefore:

- Never walk under suspended loads.
- Block off the dangerous area under the system.
- Only move loads under supervision.
- Follow the specifications for the attachment points provided
- Do not lash to protruding machine parts or eyelets on attached components. Be sure the lashing elements are firmly seated.
- Use only authorized lifting accessories and lashing elements with sufficient load capacity
- Do not use torn or worn ropes or straps
- Do not attach ropes or straps at sharp corners and edges, and do not knot or twist them
- Set loads down when leaving the workplace



WARNING!

Danger of injury due to improper operation!

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

Therefore:

- Perform all operating steps according to the specifications of this installation manual
- Before starting work, ensure that all covers and safety devices are installed and working properly.
- Never disable the safety systems during operation.
- Maintain order and cleanliness in the working area! Loosely stacked or scattered components and tools can cause accidents



WARNING!

Danger for unauthorized personnel!

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

Therefore:

- Keep unauthorized personnel away from the working area.
- In case of doubt, address such persons and direct them away from the working area.
- Stop work as long as unauthorized persons are in the working area.



CAUTION!

Danger of tripping on projecting parts!

When working on the festoon system, there is a risk of tripping.

Therefore:

- When walking in the work and danger area, be careful of projections and depressions in the floor. No loose objects may be left on the floor.



WARNING!

Danger of crushing!

When moving the festoon system, there is a danger of crushing limbs between the buffer and buffer plate, as well as between the carriage and the track carrier.

Therefore:

- When the system is moving, do not enter the traveling area of the festoon system.



CAUTION!

Trap!

There is a danger of being trapped when the cable-festoon system is moving.

Therefore:

- When the system is moving, do not enter the traveling area of the festoon system.

Personnel:

- The system may only be operated by trained personnel!

7.2 Functioning

A festoon system consists of end clamp and cable trolley. The last cable trolley is coupled via the line to the mobile consumer via which the subsequent cable trolleys are pulled.

The dimensions of the festoon system can be found in the project-specific dimension sheet.

During operation, the system should be monitored for any changes in operating noise and irregularities.

If irregularities are identified during operation, the system must be shut down immediately. The cause of the fault is to be determined using the fault table (see Chapter 9).

The fault table includes the causes for the disturbance as well as the recommendations for their remedy. If the cause cannot be identified, or a repair cannot be effected using the Operator's own resources, we recommend that a customer service engineer be called from one of our customer service points.

8 Maintenance and servicing

8.1 Safety



WARNING!

Danger of injury due to improperly executed maintenance tasks!

Improper maintenance can result in serious injury to person and property.

Therefore:

- Before starting work, make sure there is sufficient space for assembly.
- Ensure the installation area is clean and tidy! Loosely stacked or scattered components and tools can cause accidents
- If components have been removed, ensure their correct assembly, reinstall all fasteners and observe the tightening torques for the screws.



WARNING!

Danger of injury from moving components!

Incautious handling of the festoon system can lead to severe injury or damage to the festoon system.

Therefore:

- Be sure that the festoon system does not start by itself.
- While it is moving, do not reach into moving parts, particularly the interface between the buffer and buffer plate.
- Block off the dangerous area under the system.



CAUTION!

Danger of tripping on projecting parts!

When working on the festoon system, there is a risk of tripping.

Therefore:

- When walking in the work and danger area, be careful of projections and depressions in the floor.
No loose objects may be left on the floor.



WARNING!

Danger of crushing!

When moving the festoon system, there is a danger of crushing limbs between the buffer and buffer plate, as well as between the carriage and the track carrier.

Therefore:

- Do not enter the danger area of the cable-festoon system when the system is moving



CAUTION!

Trap!

There is a danger of being trapped when the cable-festoon system is moving.

Therefore:

- Do not enter the danger area of the cable-festoon system when the system is moving

8.2 Maintenance/inspection plan

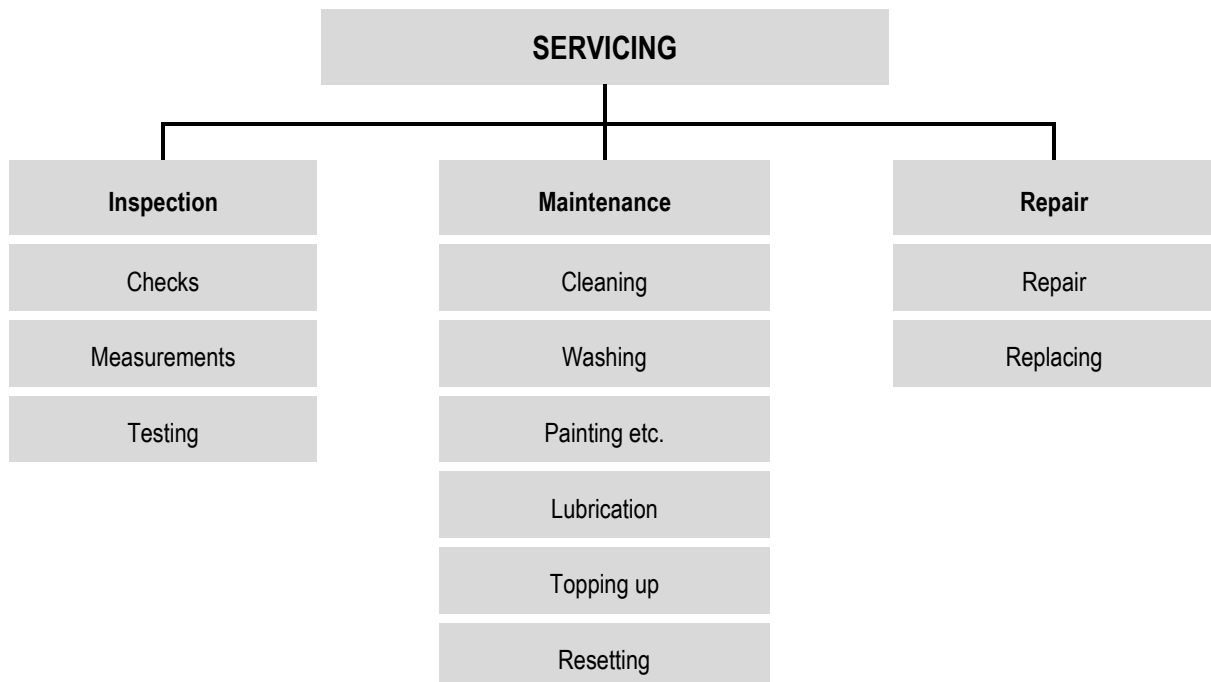
The following sections describe the maintenance tasks required for optimal, trouble-free operation. If regular inspections reveal increased wear, the corresponding maintenance intervals should be shortened in accordance with the actual signs of wear. Contact the manufacturer with any questions about maintenance tasks or intervals.

In order to retain the warranty rights and to avoid damage, the system operator is responsible for performing the following maintenance tasks. Inspection, service and repair are to be performed and documented by trained and qualified specialists.


i The intervals indicated for maintenance are dependent for the most part on operational conditions of the festoon system. Therefore only mean values can be indicated here.

NOTE!

The following tasks fall under the category "Servicing":



8.2.1 Inspection with the system at a standstill


| | |
|--|--|
|  CAUTION! | <ul style="list-style-type: none"> - Protect the festoon system from inadvertent activation. - Any safety devices that have been removed during inspection of the system when at a standstill must be refitted immediately on completion of the work and tested. - Check measuring tools used after clean up/ collection and inventory. |
|--|--|

Inspection measures

| Interval | Components | Measure | Description |
|--|-----------------------------------|-------------------|-------------------------------|
| Every 14 days: 3 and 4-shift operation at the latest after 300 operational hours Every 30 days: 2-shift operation at the latest after 300 operational hours | Rollers | Visual inspection | - for good condition |
| | Cable saddles | | - for proper functioning |
| | Fasteners | | - for proper movement |
| | Cables | | - for tight attachment |
| | Fixed cabling | | - for deformation |
| | Connections with the installation | | - for wear |
| | Track beam | | - for damage |
| | | | - for degree of contamination |
| | | | - for corrosion |

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8.2.2 Inspection with the system moving

| | |
|--|--|
|  CAUTION! | <ul style="list-style-type: none"> - Any procedures that could threaten safety are to be avoided. - The system should only be commissioned with functional protective gear and safety devices. - It is forbidden to enter the operating area of the festoon system. |
|--|--|

Inspection measures

| Interval | Components | Measure | Description |
|--|------------------------|------------------|---|
| Every 14 days: 3 and 4-shift operation at the latest after 300 operational hours Every 30 days: 2-shift operation at the latest after 300 operational hours | Rollers | Functional check | Easy and misalignment-free running of the main roller, on the track beam running surfaces. Visible wear, damage. |
| | Cable trolley | | for proper entry and exit of the cable trolleys in the storage area |
| | Track beam and support | | of the track beam and the entire system, for dirt and corrosion that influence functionality. |

Should problems be identified during inspection, service work is urgent.

8.2.3 Logging

The results of inspections as well as the remedies performed are to be documented in written reports. Conductix-Wamplfer must be informed immediately of defects and malfunctions during the test phase and the warranty period.

8.2.4 Maintenance of the festoon system



CAUTION!

- Turn off the power supply and ensure that no inadvertent activation is possible.
- When installation tasks are carried out above eye level, use proper climbing aids and working platforms.
- Do not use machine components as climbing aids.
- Ensure that process and auxiliary materials are drained, collected and disposed of in a safe and environmentally friendly manner.
- Safety devices that were removed for installation, service or repair must be immediately remounted and inspected after work is completed.
- Observe the inspection and maintenance intervals described in the maintenance instructions.
- Ensure that sufficient space for maintenance work is available.
- Ensure that the festoon system is not inadvertently activated during maintenance work.
- Ensure that detached parts do not fall.
- Screw joints that were loosened during maintenance work must be retightened and secured according to instructions.
- Fasteners and seals that cannot be reused are to be replaced (such as self-locking nuts, disks, splints, O-rings, glued or microencapsulated screws).
- Lubrication/greasing points that are cleaned or wiped during maintenance and repair work must be relubricated as instructed.
- After finishing work, collect all tools and materials and check that all are present.
- Disassembled parts and components that were exchanged are to be collected, stored in a safe place, recycled or sent back.

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Service measures

| Interval | Components | Measure | Description |
|--|--|---------------------|---|
| Every 14 days: 3 and 4-shift operation at the latest after 300 operational hours Every 30 days: 2-shift operation at the latest after 300 operational hours | Roller mounting | Maintenance measure | Tighten all fasteners. |
| | Cable attachment | | Tighten all fasteners on clamping bars and cable clamps. |
| Annually (depends on external influences) | Surface/ corrosion protection Corrosion coating | repair / replace | Refinish hot-dip galvanized surfaces with zinc coating. Refinish lacquered surfaces. |

8.2.5 Wearing parts

Wearing parts are excluded from the warranty. This includes:

- All trolley rollers including main rollers, horizontal guide rollers, counter-pressure rollers
- Other definitions require written documentation.

8.2.6 Wear limits

| Components | Wear limit has been reached if |
|---------------|---|
| Rollers | <ul style="list-style-type: none"> - the diameter of the roller has been reduced from the nominal diameter by 2 mm - Sharp impressions can be seen - Increased bearing play occurs due to worn ball bearings - significant lubrication leakage is seen - The rollers do not run smoothly |
| Cable saddles | <ul style="list-style-type: none"> - corrosion protection has failed - initial signs of cracks in the supports are seen |
| Fasteners | <ul style="list-style-type: none"> - corrosion protection has failed - Connection integrity (screw joints, clamp connections, glued connections) is no longer ensured |
| Cables | <ul style="list-style-type: none"> - wire, shielding or jacket breakage is seen - Corkscrews have formed |
| End clamp | <ul style="list-style-type: none"> - corrosion protection has failed - attachment to the track beam is no longer secure |
| Track beam | <ul style="list-style-type: none"> - corrosion protection has failed - Significant tracks from the rollers of the cable trolley appear |

8.2.7 Repeat inspections



Devices and systems are to be periodically inspected by an expert. In general, visual and functional checks are to be performed. The condition of components with regard to damage, wear, corrosion or other damage is to be determined. Generally speaking, the completeness and functionality of the safety equipment is evaluated. To better evaluate the wear and tear of parts, disassembly may be required.

All regular inspections are to be performed by the operator.

Every operator is to record all inspection, service and maintenance tasks in a machine book in an orderly manner. This is to be confirmed by a technical expert. In case of inaccurate or missing entries, the warranty is rendered null and void.

8.2.8 Repair

You should always call in a Conductix-Wampfler customer service engineer for any repairs.

If the operator's qualified specialist personnel carry out repairs themselves, they must follow the instructions in this installation manual to the letter.

Conductix-Wampfler accepts no liability or provide warranty for damages and production faults resulting from failure to comply with this installation manual.

For maintenance and repair, only use

- Suitable tools in good working order
- only original replacement parts from Conductix-Wampfler or replacement parts explicitly authorized by Conductix-Wampfler.

9 Troubleshooting



WARNING!

Danger of injury due to improper troubleshooting!

Improper troubleshooting can result in serious injury to person and property.

Therefore:

- Contact the manufacturer in case of malfunction.
- Allow troubleshooting to be carried out only by personnel from or authorized by the manufacturer



CAUTION!

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

Therefore:

Elimination of faults may only be performed by qualified specialists.

| Malfunctions | Cause | Remedy |
|--|---------------------------------|---------------------------------|
| Reduction in function of rollers | Excessive load Wear-and-tear | Exchange roller |
| Evident mechanical overload on components (deformation, cracks, abrasion) | Malfunction* | Replace the relevant components |

* If injury to person or property could occur during a breakdown then Conductix-Wampfler must be informed immediately.

10 Dismantling and disposal

10.1 Safety



WARNING!

Danger of injury due to improper disassembly!

Stored energy, sharp components, points, and edges on and in the festoon system or the tools needed can cause injury.

Therefore:

- Make sure there is sufficient space before starting work
- Handle open, sharp-edged components with care.
- Make sure the workplace is tidy and clean! Loosely stacked or scattered components and tools can cause accidents
- Dismount components properly. Be aware of the high dead weight of some components. If necessary, use lifting gear.
- Secure components so they cannot fall or topple
- Involve the manufacturer in case of any unclear points.



WARNING!

Danger of injury from moving components!

Incautious handling of the festoon system can lead to severe injury or damage to the festoon system.

Therefore:

- Be sure that the festoon system does not start by itself.
- While it is moving, do not reach into moving parts, particularly the interface between the buffer and buffer plate.
- Block off the dangerous area under the system.



CAUTION!

Danger of tripping on projecting parts!

When working on the festoon system, there is a risk of tripping.

Therefore:

- When walking in the work and danger area, be careful of projections and depressions in the floor.
No loose objects may be left on the floor.



WARNING!

Danger of crushing!

When moving the festoon system, there is a danger of crushing limbs between the buffer and buffer plate, as well as between the carriage and the track carrier.

Therefore:

- Do not enter the danger area of the cable-festoon system when the system is moving

10.2 Dismantling

After the system is no longer in use, the festoon system must be disassembled and environmentally friendly disposal carried out.

Before starting disassembly:

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

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

Personnel:

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

Required tools:

- Crescent wrench
- Tools for securing



CAUTION!

Loads are to be carefully fastened onto suitable hoists or load-carrying devices that are technically intact and have sufficient load capacity.

10.3 Disposal

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

- Scrap metals.
- Take plastic elements for recycling.
- The other components are to be disposed of according to their material composition.



CAUTION!

Environmental damage due to improper disposal!

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

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

11 Additional Documents

11.1 Declaration of incorporation

The declaration of incorporation is available as a separate document.

11.2 Documentation for electrical equipment

See separate electrical documentation.

11.3 Spare parts list



NOTE!

Keeping a stock of the most essential spare and wear parts at the place of installation ensures constant operational readiness of the system.



CAUTION!

Incorrect replacement parts are a safety hazard!

Wrong or faulty spare parts can result in damage, malfunctions or complete failure as well as impair safety.

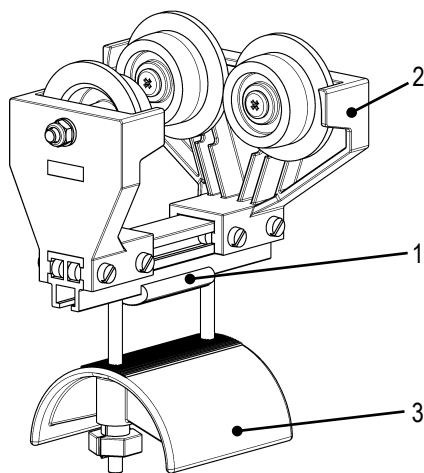
Therefore:

- Use only original replacement parts from the manufacturer!

No liability is accepted or warranty given for damages that occur from the use of unauthorized spare parts and accessories.

For spare part orders, please indicate the following data:

- Order number.
- Type designation
- Description
- Unit count
- Desired mode of shipping (postal, freight, sea, air, express)
- Shipping address



■ Replacement parts available:

- 1) complete trolley
- 2) side plate complete with trolley rollers
- 3) Supports

The exact replacement part name can be found in the project-specific replacement parts list.

Fig. 21: Cable trolley for flat cables

**Festoon Systems for I-Beams
Program 0314**

11.4 Product observations

We strive to observe our products after delivery in order to further improve them and better meet your needs.

Please use the form on the following pages to communicate your experiences and issues with us that could be of interest for our improvement process.

Thank you very much for your help.

Please fax the filled out form to: ++49 7621 662 284

For example

- changed configuration data
- experiences with the festoon system
- recurrent errors
- difficulties with documentation

Your contact data:

| | |
|-----------------|----------------------|
| <hr/> | |
| Company: | Customer number.: |
| <hr/> | |
| Department: | |
| <hr/> | |
| Contact Person: | |
| <hr/> | |
| Address: | Zip code |
| <hr/> | |
| PO Box | |
| <hr/> | |
| City: | |
| <hr/> | |
| Phone: | Fax: |
| <hr/> | |
| E-mail: | |
| <hr/> | |

Your experiences and observations:

Festoon Systems for I-Beams
Program 0314

11.5 Final inspection protocol

| | | | |
|--|--------------------------------|----------------------------------|--|
| Customer: | Customer number.: | | |
| | Order no.: | | |
| | Contractor: | | |
| | Order acceptance no.: | | |
| Construction location: | Project name: | | |
| | Address | | |
| | Postal code: | City: | |
| | Contact person / phone number: | Meeting place: | |
| Start of installation (on site) | | End of installation (on site) | |
| Installation time required (in hours): | | Travel time required (in hours): | |

Installation of the above project was concluded today by Conductix-Wampfler GmbH, Germany.

Risk is transferred to the customer today.

The acceptance was confirmed in the customer-specific "Handover" protocol: Yes

Attachment:

The maintenance instructions were handed out: Yes

CE label was attached: Yes

Customer remarks:

Supplier remarks:

The following tasks included in the order could not be carried out:

| Contact for installation (Conductix-Wampfler GmbH) | | Contact for construction (customer) | |
|--|------------|-------------------------------------|------------|
| Name: | | Name: | |
| Date: | Signature: | Date: | Signature: |

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