SCHALTBAU

Connect · Contact · Control

Railway Connector

Plug connector as defined in UIC541-5

User Manual

F121-M.*de*

Introduction

This plug connector conforms to the regulations of standard UIC 541-5. The extremely robust Schaltbau connectors make the electrical connection between the vehicles in a train for the electric-pneumatic braking system (EP brake) and for the electric-pneumatic emergency brake override.

Both systems are served by a common electric cable laid in the train. The feedback for the presence of a plug is given by a pilot contact integrated in the coupling socket (switching element), and detection of the end of the train through a pin contact in the dummy socket.

The Schaltbau plug connector as defined in UIC541-5 is the modern solution for the electrical interconnection of these two systems. It is a reliable complement to the 18-pin signal line as defined in UIC558. The Schaltbau plug connector as defined in UIC541-5 provides both energy and signal transmission.

The EP brake system ensures immediate, parallel response of the air brake. The system shortens the braking distance, and thus the travelling time.

The emergency brake override system allows the guard to override emergency braking caused by the communication cord being pulled, for example to drive out of a tunnel.

The Schaltbau UIC541-5 connector ensures the reliable functioning of both these systems. In addition, Schaltbau provides components such as emergency-brake switches in modern styling.

The Schaltbau UIC541-5 plug connector can also be used for goods wagons, though here the emergency brake bypass function is omitted.

Feedback:

- Plug present: Feedback via optional switching element in the coupling socket
- End of train: Feedback via pin contact in the dummy socket

Housing:

- Socket housing with metal handle
- Snap-in point when locking the cap
- Locking of plug in socket
- Improved waterproofing through new design

Contacts:

- High-quality, solid, turned contacts
- Gold or silver-plated surface
- Crimped connection

The plug connectors in the UIC541-5 series consist of the following components:

- Coupling socket
- Plug
- Dummy socket
- Junction box

The contact inset has 4 power contacts of 10 mm^2, 2 power contacts of 6 mm^2, 2 control contacts of 0.75 .. 1.0 mm^2 and 1 control contact of 2.5 mm^2 cross-section.

Material characteristics
Increased corrosion resistance against chemical influences, in particular against cleaning agents with acidic or alkaline additives.

Configuration
- Socket and plug can be configured to customer specifications on request

Safety notice

The connectors described here are part of special-purpose low-voltage systems. They are constructed and tested according to the recognised technical rules. In principle, electrical equipment can cause serious injury and damage if improperly used, wrongly operated, inadequately maintained or tampered with. These instructions for operating the plug connectors must therefore be followed at all times.

Should anything be unclear, the unit type and manufacturing number must be specified for clarification. It is assumed for the purposes of assembly, operation and maintenance that planning and execution of the mechanical and electrical installation, transport, set-up and commissioning as well as maintenance and repair are carried out by responsible specialists with the appropriate skills.

This applies both to the observance of the general installation and safety regulations applying to work on low-voltage systems, and to the proper use of approved tools. Electrical devices should be protected as well as possible from moisture and dust during assembly and storage.

The housings of the coupling socket and the dummy socket must be earthed.

Note: The plug may become warm during operation.

General safety instructions

Inspection and maintenance must be carried out only by trained specialist staff working to the Schaltbau maintenance instructions.

When exchanging parts, only Schaltbau replacement parts may be used.

1. Coupling Socket UIC541

1.1 Installation instructions

1.1.1 Unpacking and further handling:

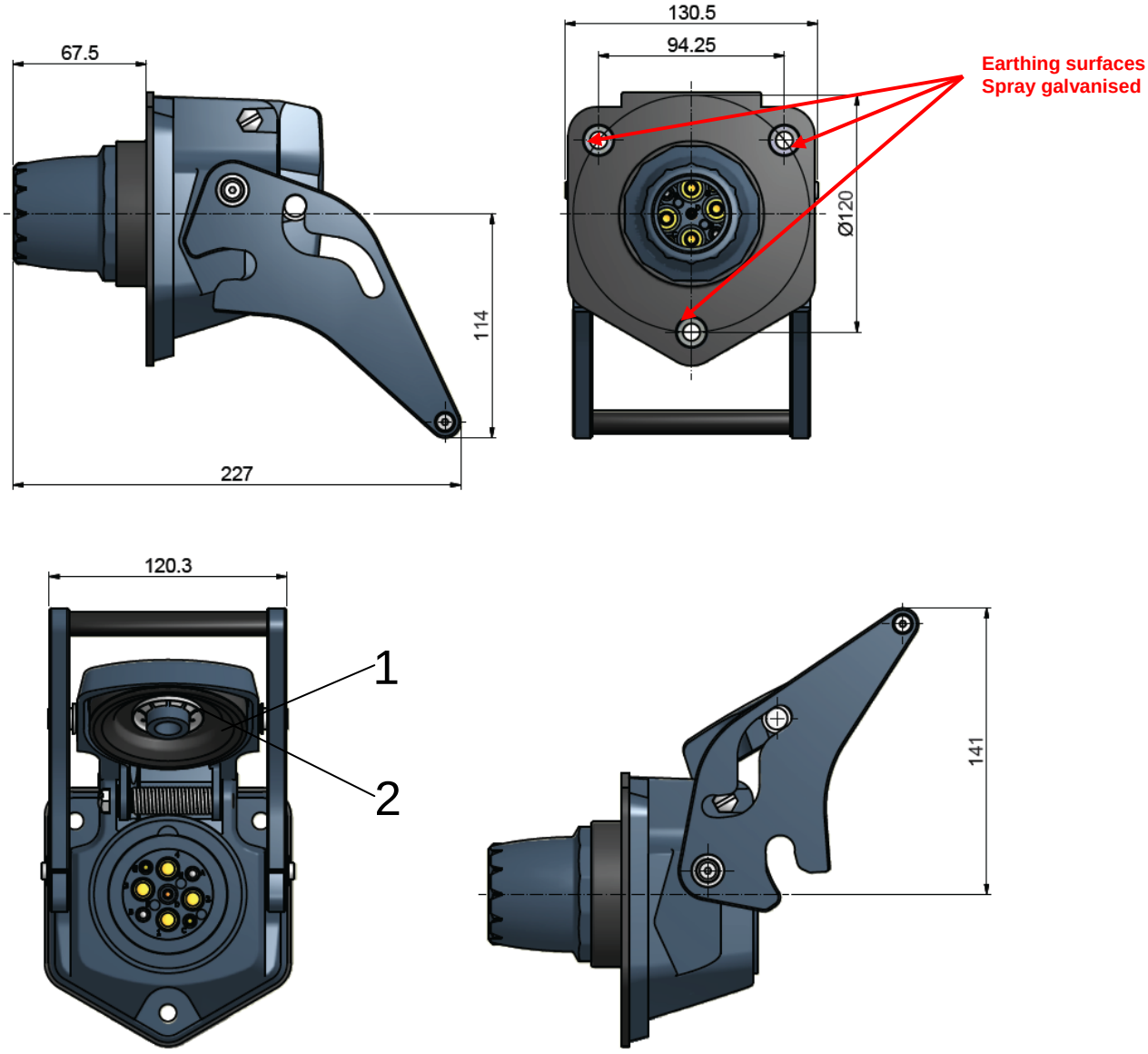
Before assembling the components, inspect them visually for damage in transit.

1.1.2 Interfaces to the vehicle:

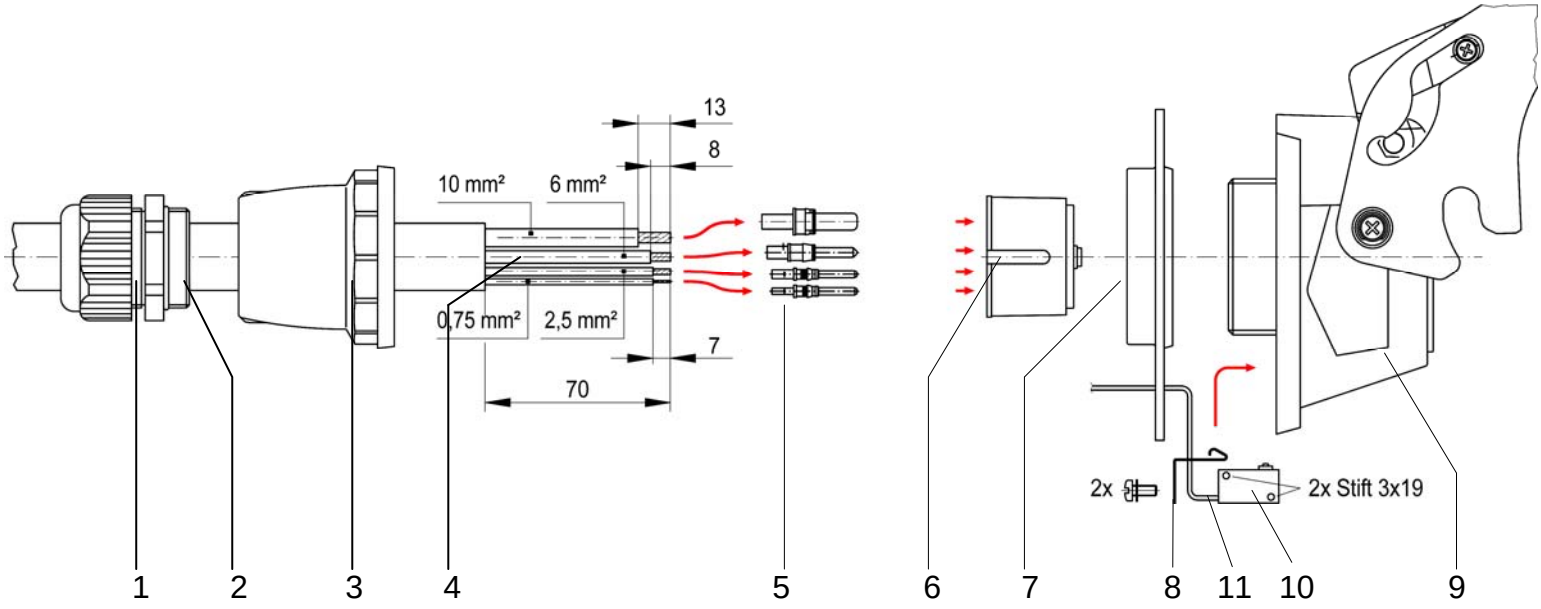
The dimensions of the vehicle interfaces will be found in the relevant data sheets and/or the catalogue.

1.1.3 Assembly of the coupling socket

Assembly must be carried out by qualified specialist staff only



A conductive transition between coupling socket and attachment surface must be ensured!



Thread the screw gland (Item 1) with the integrated strain relief (Item 2) and the end housing (Item 3) onto the cable. Cut the mantle off the cable and strip the individual cores (Item 4) as show in the drawing. Then crimp the contacts (Item 5).
Take care that the insulation of the cores goes right up to the crimp.
Insert the crimped contacts (Item 5) in the contact inset (Item 6).
Ensure that the clip snaps into the contact inset.
After that, insert the contact inset (Item 6) in the housing (Item 9), and screw the end housing (Item 3) to the housing (Item 9).
Assemble the snap switch (Item 10) with the accessories (Item 8), and lay the cores (Item 11). The cores must be secured with a protection sleeve.
Then set the seal (Item 7) on the socket housing and assemble the coupling socket.

1.1.4 Electrical requirements:

Various cable cross-sections must be used for the wiring:

- Contacts 1, 2, 3, 4: 10 mm^2
- Contacts A, B: 6 mm^2
- Contacts C, E: 0.75 .. 1.0 mm^2

Only Schaltbau-approved crimping tools may be used.

1.1.5 Installation:

When installing the coupling socket, ensure that everything is kept clean, particularly the earthing surfaces.
The coupling socket is attached with M6 Allen screws. Select screws of a length to suit the installation position.

1.2 Commissioning:

Before commissioning, the plug connection must be tested as defined in EN 50215!

Before commissioning, the coupling socket must be subjected to a high voltage test!

1.3 Maintenance

It is vital to observe the following points before starting any work on the connector:

1. **The system must be switched off**
2. **The system must be secured against switching on again**
3. **Absence of voltage must be ascertained**
4. **The system must be earthed and short-circuited**
5. **Neighbouring parts that are live must be covered or cordoned off**

Pay attention to additional and auxiliary circuits as well as the main circuits!

1.3.1 Recommended inspection and maintenance

Description of test steps	Test interval
Visual inspection	Every time the coupling is used
Maintenance	35 to 42 days

1.3.1.1 Visual inspection:

A visual inspection of the coupling socket must be made every time it is plugged or unplugged.
If this visual inspection reveals damage to the housing, the cap or the insulation element, the coupling socket must be replaced by a new one immediately.

1.3.1.2 Maintenance:

Maintenance Step	Requirements	Notes
Visual and functional inspection	• Spring force noticeable when opening • Ease of movement • No apparent damage • No loose or missing attachment elements • Torsion spring not broken • No cracks or porous places in cap seal	In case of faults, repair or replace the affected parts
Visual inspection of rubber seal on attachment flange	• No cracks or porous places	
Visual inspection of socket inset	• No apparent damage • No dirt	

1.4 Replacement parts:

Item	Designation
1	Spring washer
2	EP bellows seal

1.4.1 Technical data:

You will find the technical data in catalogue F121 and in the relevant dimensioned drawings.

1.4.2 Standards:

UIC541-5 (2005)	**Brake – Electric-pneumatic brake (EP brake) – Electric-pneumatic emergency brake override**
EN60077-1 (2003)	**Rail applications – Electrical equipment on rail vehicles** General operating conditions and general rules
EN50125-1 (2000)	**Rail applications – Environmental conditions for equipment** Equipment on rail vehicles
EN50215 (2009)	**Testing of rail vehicles after completion and before commissioning**

2. UIC541 Plug

2.1 Installation instructions

2.1.1 Unpacking and further handling:

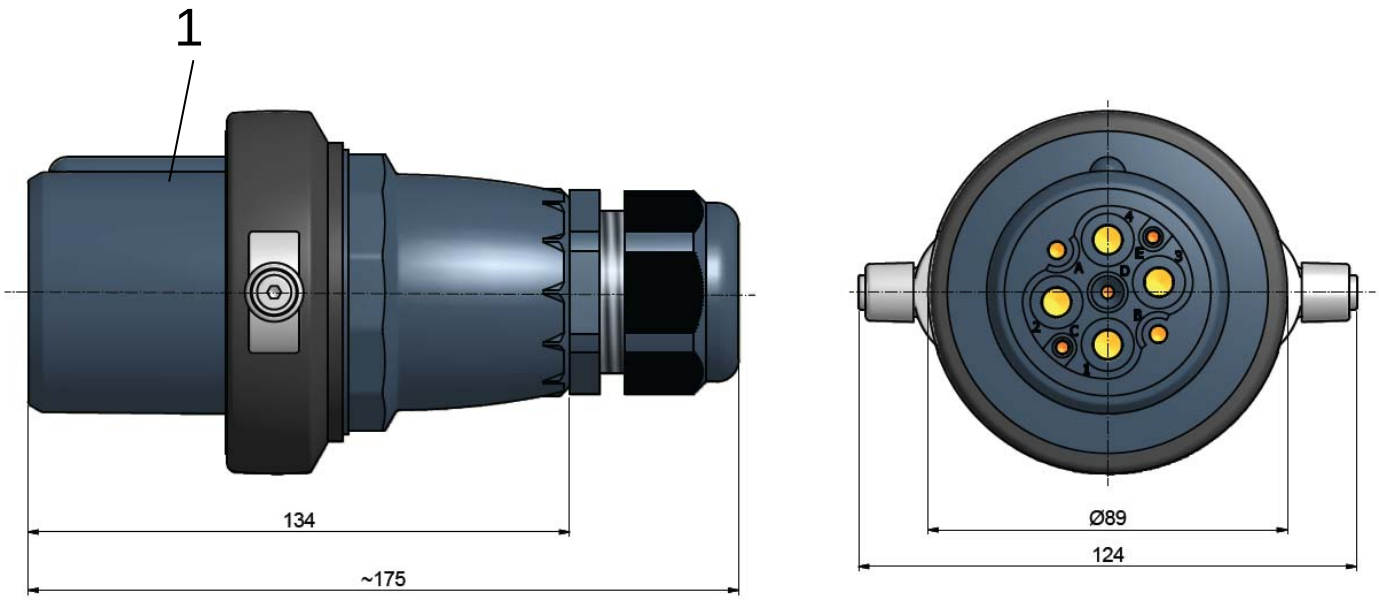
Before assembling the components, inspect them visually for damage in transit.

2.1.2 Interfaces to the vehicle:

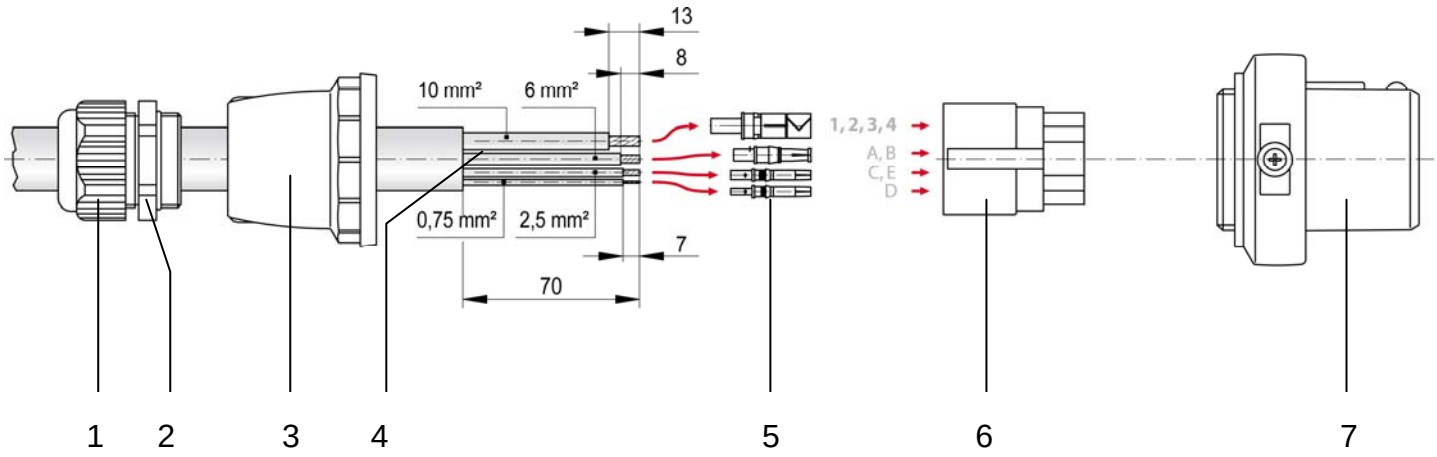
The dimensions of the vehicle interfaces will be found in the relevant data sheets and/or the catalogue.

2.1.3 Assembly of the plug

Assembly must be carried out by qualified specialist staff only



Please note that the supplied contacts must be crimped to the cable before assembly.



Thread the screw gland (Item 1) with the integrated strain relief (Item 2) and the end housing (Item 3) onto the cable. Cut the mantle off the cable and strip the individual cores (Item 4) as show in the drawing. Then crimp the contacts (Item 5).
Take care that the insulation of the cores goes right up to the crimp.
Insert the crimped contacts (Item 5) in the contact inset (Item 6).
Ensure that the clip snaps into the contact inset.
After that, insert the contact inset (Item 6) in the housing (Item 7), and screw the end housing (Item 3) to the housing (Item 7).

2.1.4 Electrical requirements:

Various cable cross-sections must be used for the wiring:

- Contacts 1, 2, 3, 4: 10 mm^2
- Contacts A, B: 6 mm^2
- Contacts C, E: 0.75 .. 1.0 mm^2

Only Schaltbau-approved crimping tools may be used.

2.1.5 Installation:

When assembling the plug ensure that it is kept absolutely clean.
Contacts must be straight (no inclination!).
The strain relief must be checked for sufficiently firm attachment.

2.2 Commissioning:

Before commissioning, the plug connection must be tested as defined in EN 50215!

Before commissioning, the coupling socket must be subjected to a high voltage test!

2.3 Maintenance

It is vital to observe the following points before starting any work on the connector:

1. **The system must be switched off**
2. **The system must be secured against switching on again**
3. **Absence of voltage must be ascertained**
4. **The system must be earthed and short-circuited**
5. **Neighbouring parts that are live must be covered or cordoned off**

Pay attention to additional and auxiliary circuits as well as the main circuits!

3.3.1 Recommended inspection and maintenance

Description of test steps	Test interval
Visual inspection	Every time the coupling is used
Maintenance	35 to 42 days

2.3.1.1 Visual inspection:

A visual inspection of the plug must be made every time it is plugged or unplugged.
If this visual inspection reveals damage to the plug, it must be replaced by a new one immediately.

2.3.1.2 Maintenance:

Maintenance Step	Requirements	Notes
Visual and functional inspection	• No apparent damage to housing • Effective strain relief • No damage to guide pin	In case of faults, repair or replace the affected parts
Visual inspection of rubber seal on attachment flange	• No cracks or porous areas	
Visual inspection of plug inset	• No visible damage • No dirt	
Visual inspection of cable	• No apparent damage to mantle • No signs of mechanical stress	

2.4 Replacement parts:

Item	Designation
1	Plug

2.4.1 Technical data

You will find the technical data in catalogue F120 and the relevant dimensioned drawings.

3. Dummy Socket UIC541

3.1 Installation Instructions

3.1.1 Unpacking and further handling:

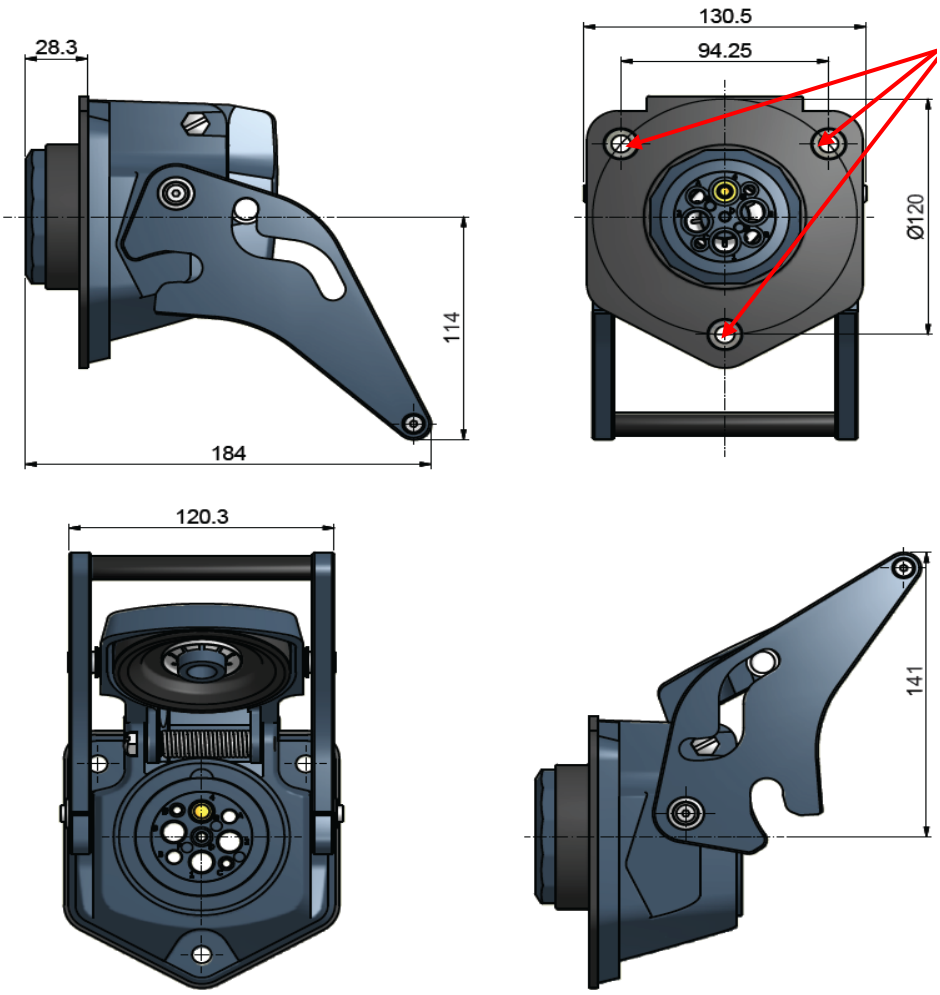
Before assembling the components, inspect them visually for damage in transit.

3.1.2 Interfaces to the vehicle:

The dimensions of the vehicle interfaces will be found in the relevant data sheets and/or the catalogue.

3.1.3 Assembly of the dummy socket

Assembly must be carried out by qualified specialist staff only.



When installing the dummy socket, ensure that everything is kept clean, particularly the earthing surfaces.

A conductive transition between coupling socket and attachment surface must be ensured!

3.1.4 Electrical requirements:

3.1.5 Installation:

When installing the dummy socket, ensure that everything is kept clean, particularly the earthing surfaces.
The dummy socket is attached with M6 Allen screws. Select screws of a length to suit the installation position.

3.2 Commissioning:

Before commissioning, the plug connection must be tested as defined in EN 50215!

Before commissioning, the coupling socket must be subjected to a high voltage test!

3.3 Maintenance

It is vital to observe the following points before starting any work on the connector:

1. **The system must be switched off**
2. **The system must be secured against switching on again**
3. **Absence of voltage must be ascertained**
4. **The system must be earthed and short-circuited**
5. **Neighbouring parts that are live must be covered or cordoned off**

Pay attention to additional and auxiliary circuits as well as the main circuits!

3.3.1 Recommended inspection and maintenance

Description of test steps	Test interval
Visual inspection	Every time the coupling is used
Maintenance	35 to 42 days

3.3.1.1 Visual inspection:

A visual inspection of the plug must be made every time it is plugged or unplugged. If this visual inspection reveals damage to the plug, it must be replaced by a new one immediately.

3.3.1.2 Maintenance:

Maintenance Steps	Requirements	Notes
Visual and functional inspection	• Spring force noticeable when opening • Ease of movement • No apparent damage • No loose or missing attachment elements • Torsion spring not broken • No cracks or porous places in cap seal	In case of faults, repair or replace the affected parts
Visual inspection of rubber seal on attachment flange	• No cracks or porous places	
Visual inspection of socket inset	• No apparent damage • No dirt	

3.4 Replacement parts:

Item	Designation
1	Spring washer
2	EP bellows seal

3.4.1 Technical data

You will find the technical data in catalogue F120 and the relevant dimensioned drawings.

3.4.2 Standards:

UIC541-5 (2005)	**Brake – Electric-pneumatic brake (EP brake) – Electric-pneumatic emergency brake override**
EN60077-1 (2003)	**Rail applications – Electrical equipment on rail vehicles** General operating conditions and general rules
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