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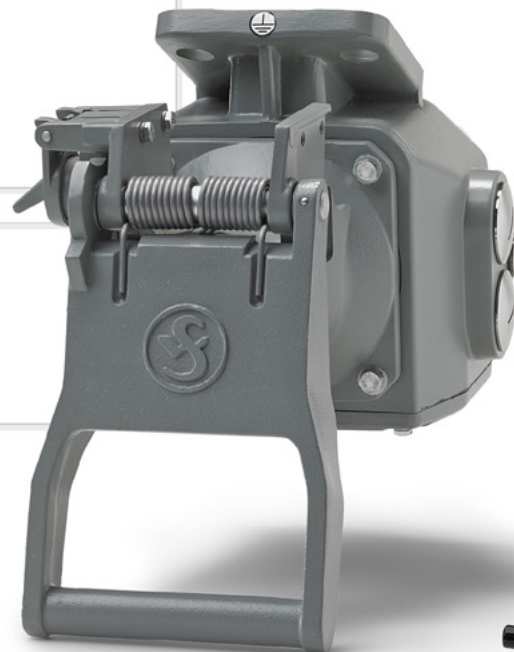
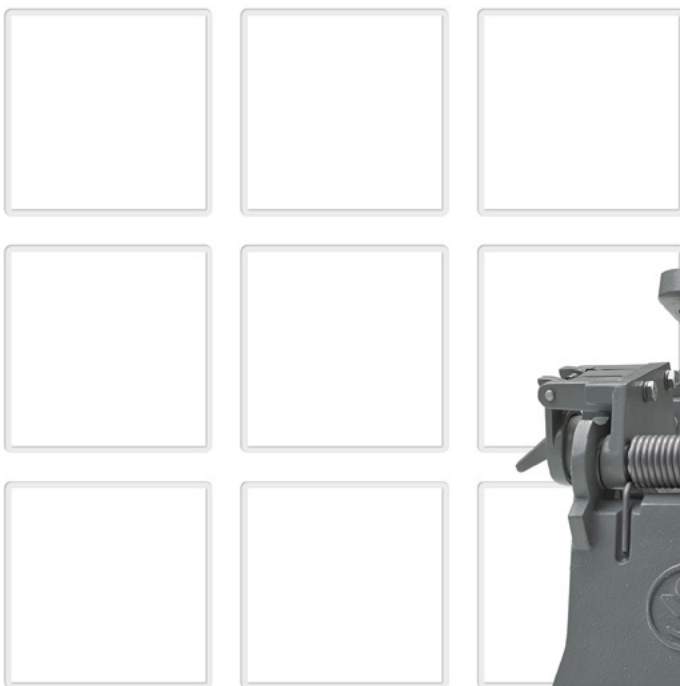
Connectors

ZH Series

Inter-car jumpers
to UIC 552

Installation and
Maintenance Instructions

Manual F122-m.en



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1. Important Basic Information

1.1 Legal Notes

Without prior written consent of Schaltbau GmbH, the installation and maintenance instructions is not allowed to be electronically or mechanically reproduced – as a whole or in parts – be distributed, changed, transmitted, translated into another language or used in any other way.

Schaltbau GmbH cannot be held liable for damage caused by not observing (or only partly observing) the Installation and maintenance instructions

1.2 Conventions for this Installation and Maintenance Instructions

This instructions describe the installation and maintenance of the connectors.

Cross references are presented in bold italics.


To highlight particularly important safety instructions and other information, the following symbols are used in this instructions:

| |
|--|
| ⚠ DANGER |
| Indicates a hazardous situation with a high level of risk which, if not avoided, will result in death or serious injury. |

| |
|---|
| ⚠ WARNING |
| Indicates a hazardous situation with a medium level of risk which, if not avoided, could result in death or serious injury. |

| |
|---|
| ⚠ CAUTION |
| Indicates a hazardous situation with a low level of risk which, if not avoided, may result in minor or moderate injury. |

| |
|---|
| NOTICE |
| Indicates a hazardous situation which, if not avoided, may result in property damage, such as service interruption or damage to equipment or other materials. |

| | |
|--|---|
|  | Refers to technical features and methods aimed at facilitating work or to particularly important information. |
|--|---|

2. General and Security Information

The connectors dealt with in this document are intended for use with high-voltage systems for special installations. They are designed and tested in compliance with the generally recognised state of the art. However, improper use, operation, handling, maintenance of or tampering with electric equipment can cause serious or fatal injury to the user or others, and the appliance or other property can be damaged.

The operation, maintenance and installation instructions for the connectors must therefore be strictly followed.

Any uncertainties must be clarified and all queries must include details of the type of device and the serial number.

Only authorized and trained personnel are allowed to plan and carry out all mechanical and electrical installations, transport, commissioning, as well as maintenance and repair work. This applies to the observation of the general installation and safety regulations for high-voltage systems as well as the proper use of tools approved for this purpose. Electric equipment requires protection from moisture and dust during installation and storage.

2.1 Observing the Installation and Maintenance Instructions

- ▶ All staff must read and understand the instructions and adhere to them when working with the device.
- ▶ **Always carefully observe all safety warnings!**

2.2 User Obligations

- ▶ Observe the respective national instructions and the other applicable safety regulations for the use and cable assembly of connectors and connector systems.
- ▶ Observe all applicable national provisions, all safety, accident prevention and environmental regulations as well as the recognized technical rules for safe and proper working.
- ▶ Carry out regular inspections of all protection and safety devices to see if they work properly.

- ▶ Work on electric equipment may only be performed by an expert or trained personnel working under the direction and supervision of an expert according to the applicable rules of electrical engineering.
- ▶ An expert is a person who can judge and recognise the possible dangers of the jobs commended to him based on his training, knowledge and experience and by knowledge of the appropriate regulations.
- ▶ Staff must be informed clearly about who is responsible for the maintenance of the connectors.

2.3 Intended Use

- ▶ The connectors supply power. They are intended for plugin and detachable connections of components, devices and systems only.
- ▶ In order to comply with DIN EN IEC 61984 make sure that always the live side of the connector is fitted with socket contacts.
- ▶ Crimp connections have to be manufactured according to DIN EN IEC 60352-2 – Solderless Connections.
- ▶ Make sure that there are no undue tensile, pressure, flexing and torsion loads on the connection cable.
- ▶ None of the operating conditions defined in our catalogue **F122.en** in section "**Specifications**", such as voltages, currents, ambient conditions, etc. may be changed
- ▶ Work on the connectors must only be carried out by staff who meets the requirements set out in these instructions.
- ▶ According to DIN EN IEC 61984 connectors used as intended must not be engaged or disengaged when live or under load.
- ▶ The connectors must not be contaminated with aggressive media
- ▶ A connector that does not engage easily requires special attention:
Check for the correct orientation, pollution or if contacts got bent. Remedy the cause without delay. Never use force! The connector should always engage easily.
- ▶ Improper handling of the connectors, e.g. when hitting the floor with some impact, can result in breakage, cracks and deformation. Do not throw the plug with cable to the floor!
- ▶ In order to meet the requirements of the protection class and to protect the connectors against the entry of dirt or moisture, make sure that, when not mated, the hinged lid of receptacles is closed, according to its intended use.

- ▶ In not mated condition, double ended connector cables (ZH622 VK) have to be kept properly in the driver's cab of the vehicle.
- ▶ Dirt, moisture, snow and ice in the interior of a dummy receptacle contaminate the plug. The coupling of a contaminated plug to the coupling receptacle may lead to a life-threatening electric shock! Before inserting a plug into a dummy receptacle always check that the interior of the dummy receptacle is free from dirt, moisture, snow and ice.
- ▶ Make sure that when not mated, the plug of single ended cables (ZH551 SK) is always inserted into a dummy receptacle.
- ▶ When disengaging a connector, pull the plug and never the cable.
- ▶ Do not disengage the connectors with a hammer or other auxiliary tools.
- ▶ Always close the hinged lid of the receptacle by hand, don't let it slam.
- ▶ Use the connector only according to its intended use. Replace or repair damaged parts exclusively with original parts. Any other usage of or tampering with the connector is considered contrary to its intended use. No liability is assumed for damages and accidents caused due to non-compliance with the instructions or improper use of the connector.

2.4 Ambient Conditions

NOTICE

The connectors are constructed for specific ambient conditions.

- ▶ Operate the connectors only under the ambient conditions, like temperature ranges and IP protection classes as defined in our **catalogue F122.en** in section "**Specifications**".
<https://www.schaltbau-gmbh.com/en/Download/Product-information/Connectors/>


Note:


In case of a very low or very high ambient temperature which approximates the limits of the allowable operating temperature range specified in our **catalogue F122.en** in section "**Specifications**",

- a higher effort may be needed for the plugging and unplugging and
- the operational life span of plug and coupling receptacle may thus be reduced due to increased wear and tear.


3. Dangers and Security Measures


3.1 Electrical Dangers


| | |
|---|--|
|  | ⚠ DANGER |
| | <p>The connectors contain components that carry high voltage. Deadly hazard! Always observe the following safety regulations before beginning any work on electrical systems.</p> <ul style="list-style-type: none"> ▶ Disconnect ▶ Ensure that it is not possible to reconnect unintentionally ▶ Clearly mark your work area ▶ Make sure that there is no voltage present ▶ Earth and short circuit the installation ▶ Besides the main electric circuit, also disconnect additional and auxiliary circuits ▶ Insulate or cover adjacent energized parts ▶ Switch off and earth the train bus bar. Be absolutely sure that the earth connection persists. ▶ Only an electrically skilled person may determine if there is no voltage present |

| | |
|---|--|
|  | ⚠ WARNING |
| | <p>Dirt, moisture, snow and ice in the interior of a dummy receptacle contaminate the plug. The coupling of a contaminated plug to the coupling receptacle may lead to a life-threatening electric shock!</p> <ul style="list-style-type: none"> ▶ Before inserting a plug into a dummy receptacle always check that the interior of the dummy receptacle is free from dirt, moisture, snow and ice. ▶ Do not insert a plug into a dummy receptacle when the latter is contaminated, moist or contaminated with snow and ice. ▶ Remove dirt, moisture, snow and ice without residues from the interior of a dummy receptacle. ▶ Never couple a contaminated plug to the coupling receptacle. |


3.2 Other Dangers


| | |
|---|--|
|  | ⚠ WARNING |
| | <p>Exclusively use the connectors for purposes as indicated in the specifications and data sheets. A wrong application can cause accidents and severe damages to persons.</p> <ul style="list-style-type: none"> ▶ The manufacturer doesn't take the responsibility for accidents which were caused by improper use of the product. |

| | |
|---|---|
|  | ⚠ WARNING |
| | <p>The plugging and disconnecting of the connectors on-load can cause electric arcs. When explosive substances or ignition sources of any kind are nearby, there is a risk of fire and explosion!</p> <ul style="list-style-type: none"> ▶ Never plug and disconnect the connectors on-load. |

| | |
|---|--|
|  | ⚠ CAUTION |
| | <p>The connectors may grow warm during operation and they may become hot depending on the ambient temperature and the conditions of use. Risk of burn to the hands!</p> <ul style="list-style-type: none"> ▶ Wear protective gloves when plugging and disconnecting the connectors in the case of a high ambient temperature. |

3.3 Mechanical Dangers

| | |
|---|---|
|  | ⚠ CAUTION |
| | <p>The connectors contain components that are subject to mechanical tension. Risk of crushing!</p> <ul style="list-style-type: none"> ▶ Use appropriate tools for installation and maintenance works on the connectors. ▶ Ensure that components, which are subject to mechanical tension, are secured before installing or dismantling these components. |

| | |
|---|--|
|  | ⚠ CAUTION |
| | <p>The connectors contain sharp-edged parts. Risk of injury!</p> <ul style="list-style-type: none"> ▶ Use appropriate tools for installation and maintenance works on the connectors. ▶ Wear protective gloves when working with sharp-edged components. |

3.4 Measures for Avoiding Damages

| |
|---|
| NOTICE |
| <p>Aggressive fluids may damage the connectors.</p> <ul style="list-style-type: none"> ▶ Make sure that the connectors are not exposed to aggressive fluids. |

| |
|---|
| NOTICE |
| <p>Improper handling of the connectors, e.g. when hitting the floor with some impact, can result in breakage, cracks and deformation.</p> <ul style="list-style-type: none"> ▶ Make sure that the connectors are always used properly. ▶ Do not throw the plug with cable to the floor. ▶ Regularly sight-check the connectors for potential damages. ▶ Immediately replace damaged components. |

3.5 Measures for Avoiding Malfunctions

NOTICE

In the case of damage, wear and tear and/or soiling of the connector components - in the form of a partial break, sharp edges and discoloured surfaces - the functional safety of the connectors is no longer guaranteed.

- ▶ Carry out regular visual checks to detect wear and tear and dirt.
- ▶ Immediately replace damaged parts.
- ▶ Immediately remove dirt without leaving any residues.
- ▶ Immediately replace parts with stubborn dirt.

NOTICE

Inappropriate handling when plugging or disconnecting may damage the connectors. The functional safety of the connectors is no longer guaranteed when parts are damaged.

- ▶ Take care that plug and receptacle do not tilt.
- ▶ Make sure before the plugging procedure that plug and receptacle as well as the hinged lid of the receptacle are not contaminated. Remove any existing dirt.
- ▶ Make sure that when not mated,
 - the plug of single ended cables (ZH551 SK) is always inserted into a dummy receptacle,
 - double ended connector cables (ZH622 VK) are always kept properly in the driver's cab of the vehicle,
 - the hinged lid of receptacles is closed according to its intended use..

4. Description

4.1 Features

- ▶ **ZH Series plug with single or double ended connector cable:**
 - UIC 552 compliant
 - Rugged, durable aluminium die cast housing
 - Termination:
 - High-quality screw machined contact, continuous low contact resistance
 - Crimp connection, wire gauge 185 mm²
 - Earthing: sheathed cable, wire gauge 25 mm², connected to plug housing
 - Assembly of plug: Single or double ended connector cable in different designs and lengths
- ▶ **ZH series receptacle:**
 - UIC 552 compliant: rugged, durable aluminium die cast housing, metal handled lid
 - Termination:
 - High-quality screw machined contact, continuous low contact resistance
 - Screw-type connection with M16 screw
 - Earthing: M10 screw connection at side of shell and mounting surface
 - Optional pilot contact for feedback signalling a plug being mated
 - Housing:
 - Massive, two-piece receptacle shell with universal terminals for connecting cables
 - Easy mounting and maintenance
 - Drain hole for condensate drainage
 - Powder coated shell surface
 - Lock and key for mounting on the right or left
 - Metal latch locking of mated plug in receptacle

- ▶ **ZH Series dummy receptacle:**
 - Rugged, durable aluminium die cast housing
 - Designed to accommodate not mated ZH series plugs (parking position)
 - Lock and key
 - Earthing: mounting surface

- ▶ **ZH Series junction boxes:**
 - Rugged, durable aluminium die cast housing
 - Termination:
 - Screw terminal or terminal block
 - Earthing: mounting surface or M12 screw terminal

- ▶ **Common features**
 - Life:
Designed for frequent use up to 5,000 mating cycles
 - IP54 rated
Receptacle with closed lid and for mated connector, including cable entry
 - Temperature resistance:
-50° C min. up to +85° C max., valid for all materials used
 - Corrosion resistance:
Increased resistance against chemicals, in particular detergents alkaline or acidic
 - Flammability rating:
UL94-V0 rated
Meets requirements for fire protection according to EN 45545e

Technical Information and Material Specification

- ▶ For technical information and material specifications, see our *catalogue F122.en*.
Download at: <https://www.schaltbau-gmbh.com/en/Download/Product-information/Connectors/>

4.2 Design

Connectors of the ZH series are single-pole high performance connectors for looping through the power supply between traction unit and passenger coaches. Schaltbau ZH series connectors fully meet the requirements of UIC 552.

All railway vehicles used in cross-border rail traffic, such as locomotives as well as electric and diesel multiple units that are equipped with a train bus bar require these ZH series jumpers.

ZH series connectors include the following components:

- ▶ Pre-assembled cable sets of different lengths (connector cables with plugs, single or double ended)
- ▶ Receptacles of different designs
 - with or without key lock
 - with or without pilot contact
- ▶ Dummy receptacles (with or without key lock) for unmated connectors
- ▶ Cable junction boxes and junction boxes for the train bus bar

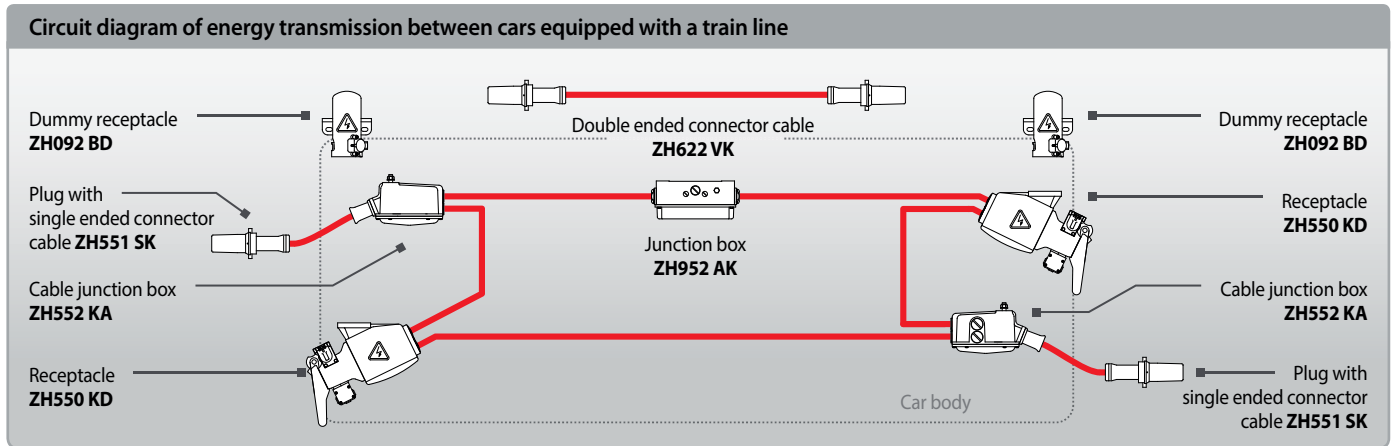


Fig. 1: Schematic diagram of energy transmission illustrated with connector components of the ZH series

4.3 Ordering Code

• ZH plug with cable

Example: **ZH551 SK-L3000**

| | |
|---------------------|---|
| Series | |
| ZH551 SK | Plug with single ended cable |
| ZH622 VK | Double ended cable with 2 plugs |
| Cable length | |
| Lxxxx | Cable length in mm, standard and lengths on request |

• ZH dummy receptacle

Example: **ZH092 BD-V1-B**

| | |
|---------------------|-------------------------|
| Series | |
| ZH092 BD | Dummy receptacle |
| Lock and key | |
| V0 | --- |
| V1 | Lock |
| Colour | |
| B | Black, RAL 9005 |
| C | Concrete grey, RAL 7023 |

• ZH Receptacle

Example: **ZH550-KD-DK-V1-S0-B-P**

| | |
|---------------------------------|--|
| Series | |
| ZH550 KD | Receptacle |
| Handled lid | |
| DL | Handled lid, long |
| DM | Handled lid, medium |
| DK | Handled lid, short |
| Lock and key | |
| V0 | --- |
| V1 | Lock |
| Pilot contact | |
| S0 | --- |
| S1 | 1x Pilot contact |
| Colour | |
| B | Black, RAL 9005, powder coated |
| C | Concrete grey, ground coated, RAL 7023 |
| Threads for cable glands | |
| P | Thread 2x Pg36 / 1x Pg13.5 |
| M40 | Metric thread 2x M40x1.5 / 1x M20x1.5 |
| M50 | Metric thread 2x M50x1.5 / 1x M20x1.5 |

• ZH junction box

Example: **ZH552 KA-B-P**

| | | |
|--------------------------------|---------------------------------------|-----------------|
| Series | | |
| ZH552 KA | Cable junction box for ZH551 SK Lxxxx | |
| ZH952 AK | Junction box | |
| Colour | | |
| B | Black, RAL 9005 | |
| C | Concrete grey, RAL 7023 | |
| Threads of cable glands | | |
| P | Pg36 + Pg13.5 | } ZH552 KA only |
| M40 | M40x1.5 | |
| M50 | M50x1.5 | |
| P1 | Pg36 + Pg29 + Pg13.5 | } ZH952 AK only |
| M1 | M50x1.5 + M25x1.5 + M20x1.5 | |

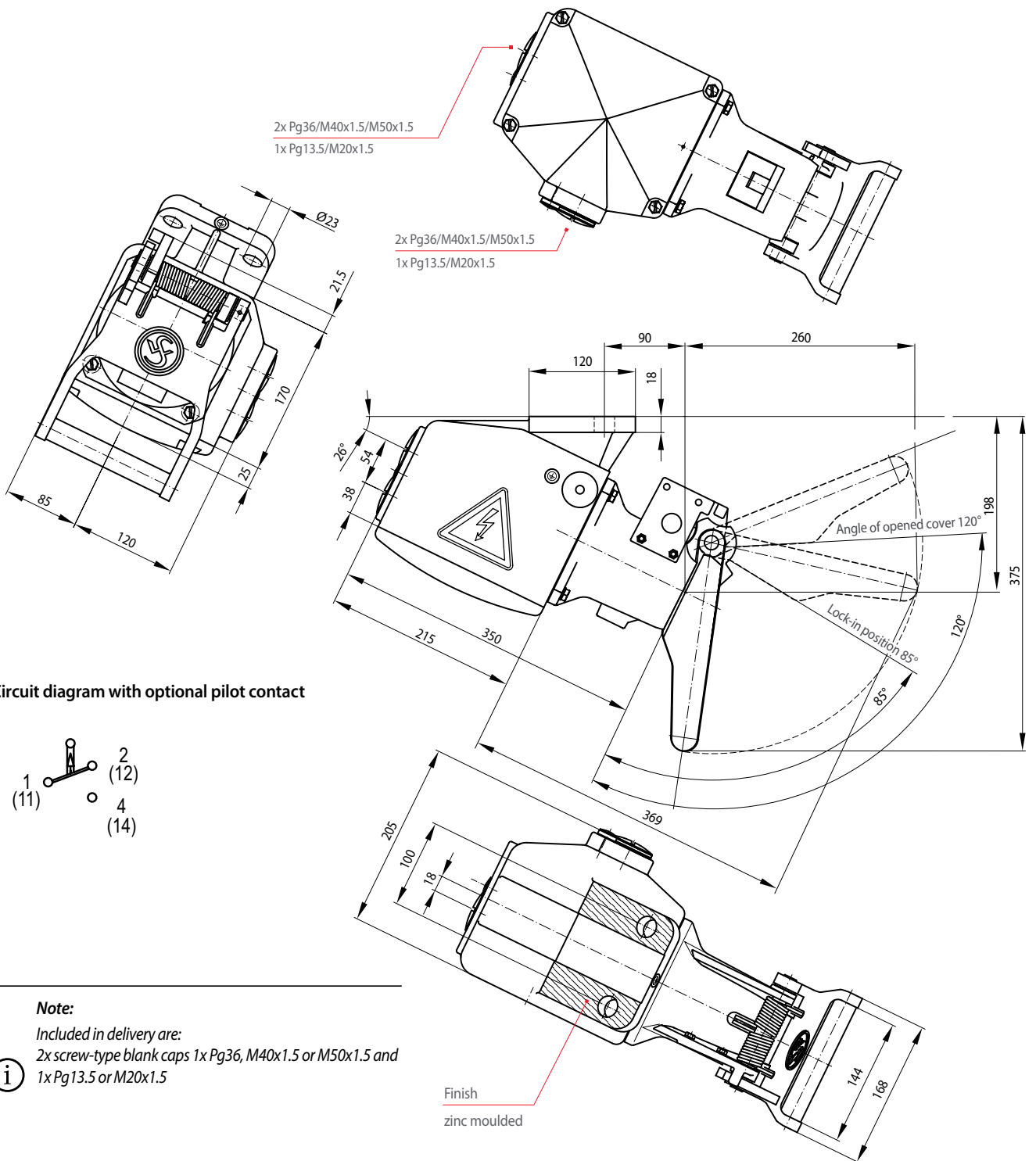
4.4 Survey of the Components (Stock Items)

| ZH551 SK Single ended connector cable with plug | | | | | | | | | | | | | | | | | | | | | |
|--|--|-----------------|-----------|-----------------|----------------|----------|----------|----------------|----------|----------|----------------|----------|----------|--------------|-----------|------------|------|------------------------|------|-------------------------|------|
| Figure/description (dimensions in mm) | Standard lengths | | | | | | | | | | | | | | | | | | | | |
| <p>ZH551 SK connector cable single ended, completely assembled cable set with plug and cable lugs on the cable terminal side</p> | <p>ZH551 SK Lxxxx</p> <table border="1"> <thead> <tr> <th>Ordering code</th> <th>Length L*</th> <th>Total length L2</th> </tr> </thead> <tbody> <tr> <td>ZH551 SK L1420</td> <td>1,420 mm</td> <td>1,814 mm</td> </tr> <tr> <td>ZH551 SK L1800</td> <td>1,800 mm</td> <td>2,094 mm</td> </tr> <tr> <td>ZH551 SK L3300</td> <td>3,300 mm</td> <td>3,954 mm</td> </tr> </tbody> </table> <p>* Length at ordering code</p> <table border="1"> <thead> <tr> <th>Cable length</th> <th>Tolerance</th> </tr> </thead> <tbody> <tr> <td>≤ 2,000 mm</td> <td>± 20</td> </tr> <tr> <td>> 2,000 mm, ≤ 4,000 mm</td> <td>± 30</td> </tr> <tr> <td>> 4,000 mm, ≤ 10,000 mm</td> <td>± 60</td> </tr> </tbody> </table> <p>Other lengths on request</p> | Ordering code | Length L* | Total length L2 | ZH551 SK L1420 | 1,420 mm | 1,814 mm | ZH551 SK L1800 | 1,800 mm | 2,094 mm | ZH551 SK L3300 | 3,300 mm | 3,954 mm | Cable length | Tolerance | ≤ 2,000 mm | ± 20 | > 2,000 mm, ≤ 4,000 mm | ± 30 | > 4,000 mm, ≤ 10,000 mm | ± 60 |
| Ordering code | Length L* | Total length L2 | | | | | | | | | | | | | | | | | | | |
| ZH551 SK L1420 | 1,420 mm | 1,814 mm | | | | | | | | | | | | | | | | | | | |
| ZH551 SK L1800 | 1,800 mm | 2,094 mm | | | | | | | | | | | | | | | | | | | |
| ZH551 SK L3300 | 3,300 mm | 3,954 mm | | | | | | | | | | | | | | | | | | | |
| Cable length | Tolerance | | | | | | | | | | | | | | | | | | | | |
| ≤ 2,000 mm | ± 20 | | | | | | | | | | | | | | | | | | | | |
| > 2,000 mm, ≤ 4,000 mm | ± 30 | | | | | | | | | | | | | | | | | | | | |
| > 4,000 mm, ≤ 10,000 mm | ± 60 | | | | | | | | | | | | | | | | | | | | |

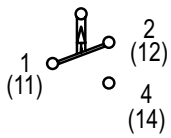
| ZH622 VK Double ended connector cable with two plugs | | | | | | | | | | | | | | | | | | | | | |
|---|--|-----------------|-----------|-----------------|----------------|----------|----------|----------------|----------|----------|----------------|----------|----------|----------------|-----------|------------|------|------------------------|------|-------------------------|------|
| Figure/description (dimensions in mm) | Standard lengths | | | | | | | | | | | | | | | | | | | | |
| <p>ZH622 VK connector cable double ended, completely assembled cable set with two plugs</p> | <p>ZH622 VK Lxxxx</p> <table border="1"> <thead> <tr> <th>Ordering code</th> <th>Length L*</th> <th>Total length L2</th> </tr> </thead> <tbody> <tr> <td>ZH622 VK L1200</td> <td>1,200 mm</td> <td>1,476 mm</td> </tr> <tr> <td>ZH622 VK L1460</td> <td>1,460 mm</td> <td>1,736 mm</td> </tr> <tr> <td>ZH622 VK L3400</td> <td>3,400 mm</td> <td>3,672 mm</td> </tr> </tbody> </table> <p>* Length at ordering code</p> <table border="1"> <thead> <tr> <th>Cable length L</th> <th>Tolerance</th> </tr> </thead> <tbody> <tr> <td>≤ 2,000 mm</td> <td>± 20</td> </tr> <tr> <td>> 2,000 mm, ≤ 4,000 mm</td> <td>± 30</td> </tr> <tr> <td>> 4,000 mm, ≤ 10,000 mm</td> <td>± 60</td> </tr> </tbody> </table> <p>Other lengths on request</p> | Ordering code | Length L* | Total length L2 | ZH622 VK L1200 | 1,200 mm | 1,476 mm | ZH622 VK L1460 | 1,460 mm | 1,736 mm | ZH622 VK L3400 | 3,400 mm | 3,672 mm | Cable length L | Tolerance | ≤ 2,000 mm | ± 20 | > 2,000 mm, ≤ 4,000 mm | ± 30 | > 4,000 mm, ≤ 10,000 mm | ± 60 |
| Ordering code | Length L* | Total length L2 | | | | | | | | | | | | | | | | | | | |
| ZH622 VK L1200 | 1,200 mm | 1,476 mm | | | | | | | | | | | | | | | | | | | |
| ZH622 VK L1460 | 1,460 mm | 1,736 mm | | | | | | | | | | | | | | | | | | | |
| ZH622 VK L3400 | 3,400 mm | 3,672 mm | | | | | | | | | | | | | | | | | | | |
| Cable length L | Tolerance | | | | | | | | | | | | | | | | | | | | |
| ≤ 2,000 mm | ± 20 | | | | | | | | | | | | | | | | | | | | |
| > 2,000 mm, ≤ 4,000 mm | ± 30 | | | | | | | | | | | | | | | | | | | | |
| > 4,000 mm, ≤ 10,000 mm | ± 60 | | | | | | | | | | | | | | | | | | | | |

ZH550 KD-DL-Vx-Sx-B-P Receptacle, handled lid long

Figure/description (dimensions in mm)



● Circuit diagram with optional pilot contact



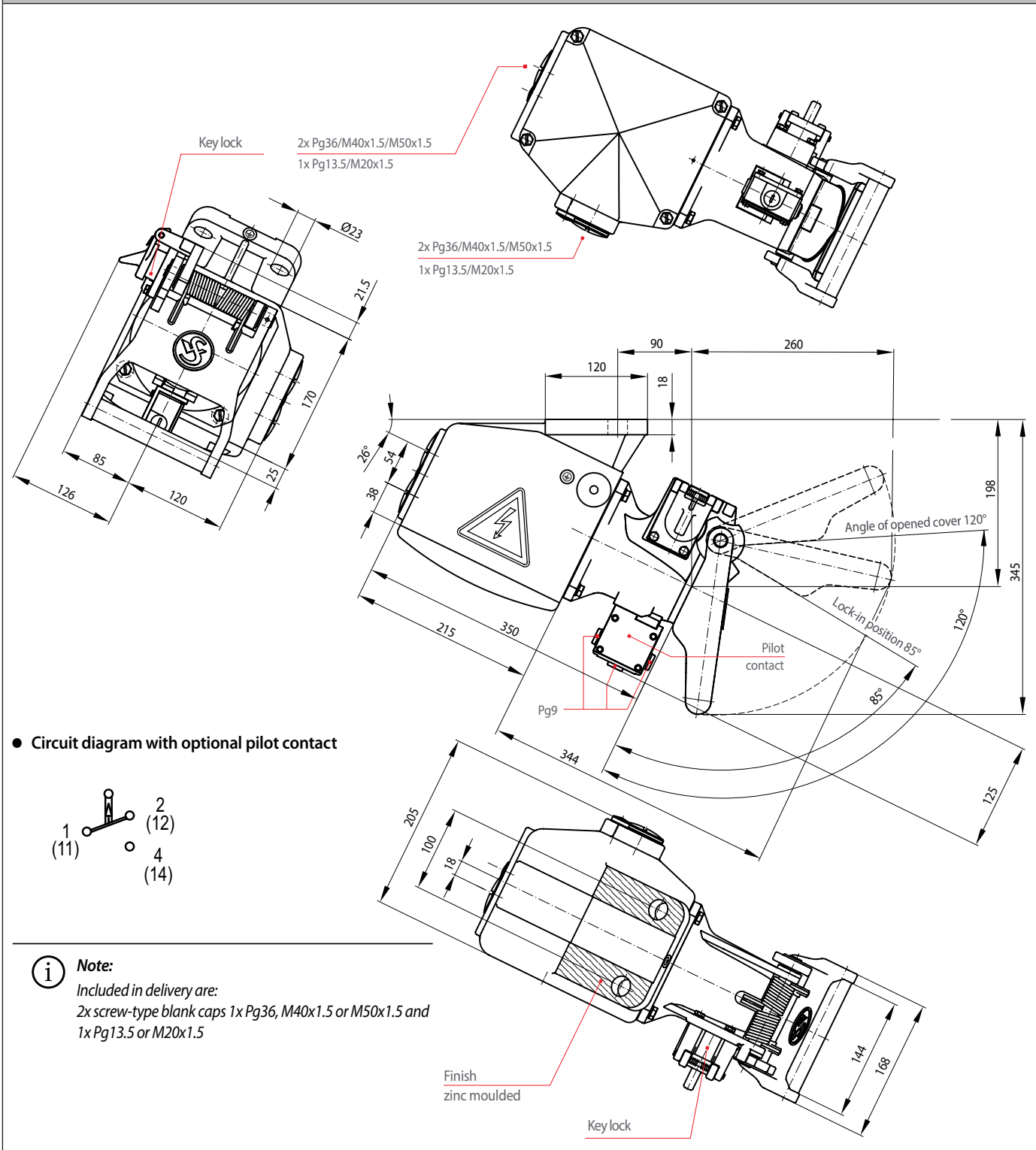
Note:

Included in delivery are:
2x screw-type blank caps 1x Pg36, M40x1.5 or M50x1.5 and
1x Pg13.5 or M20x1.5



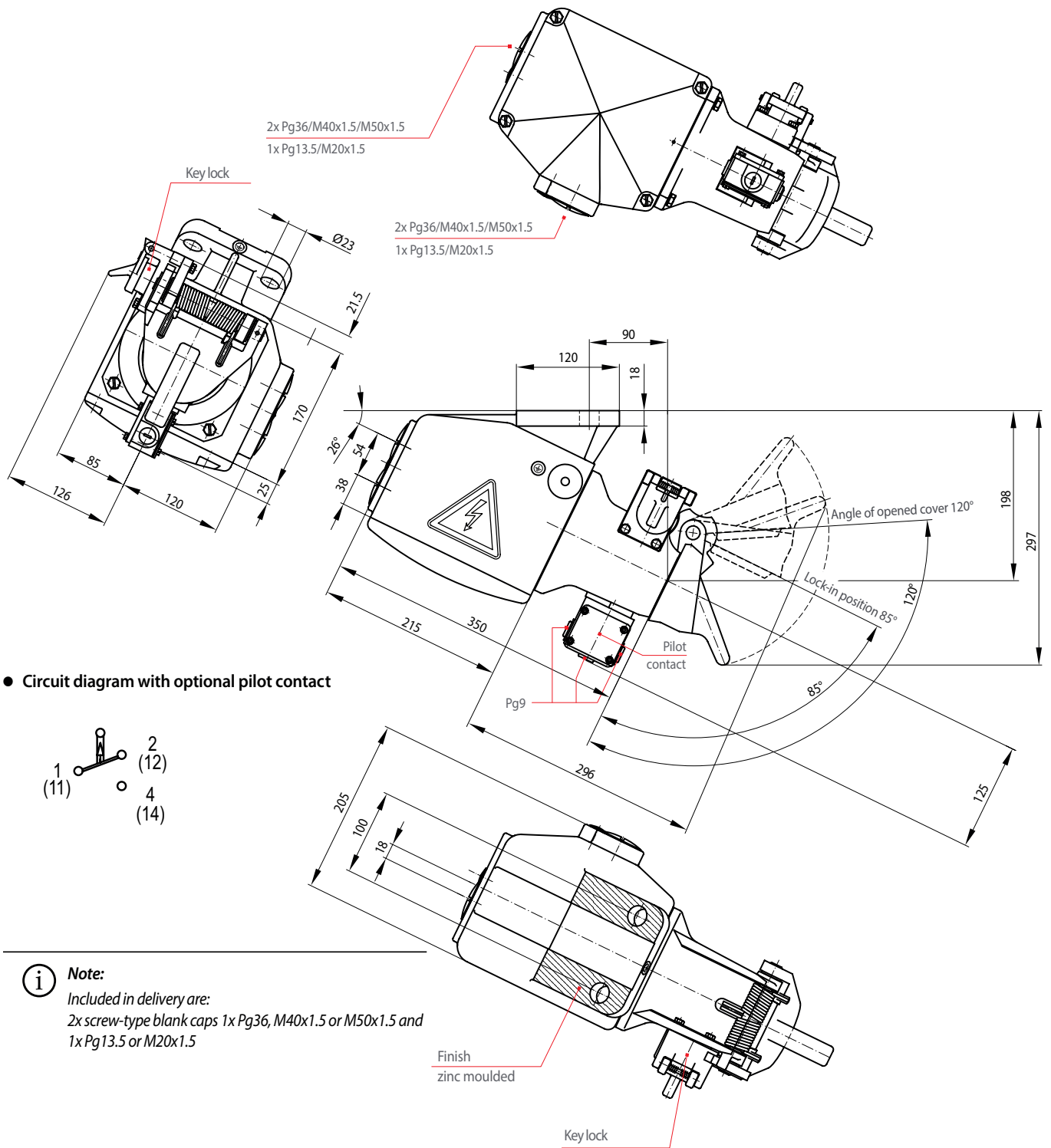
ZH550-KD-DM-Vx-Sx-B-P Receptacle, handled lid medium

Figure/description (dimensions in mm)



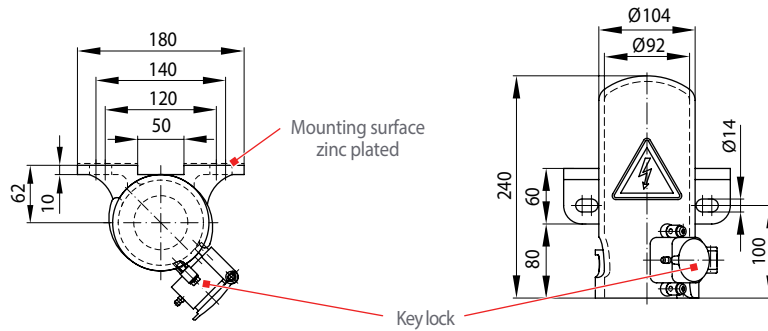
ZH550-KD-DK-Vx-Sx-B-P Receptacle, handled lid short

Figure/description (dimensions in mm)

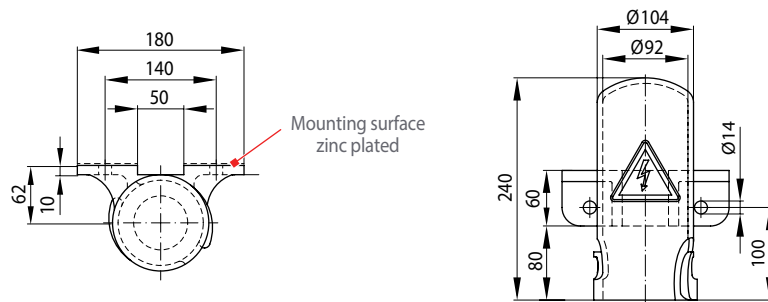


ZH092 BD Dummy receptacle

Figure/description (dimensions in mm)



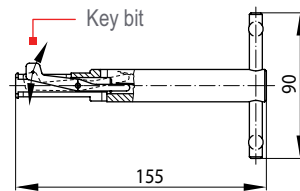
ZH092-BD-V1 Dummy receptacle with lock and key



ZH092-BD-V0 Dummy receptacle without lock and key

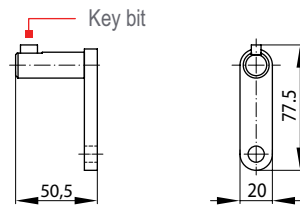
ZH 550 Key for locking receptacles and dummy receptacles with key lock option

Figure/description (dimensions in mm)



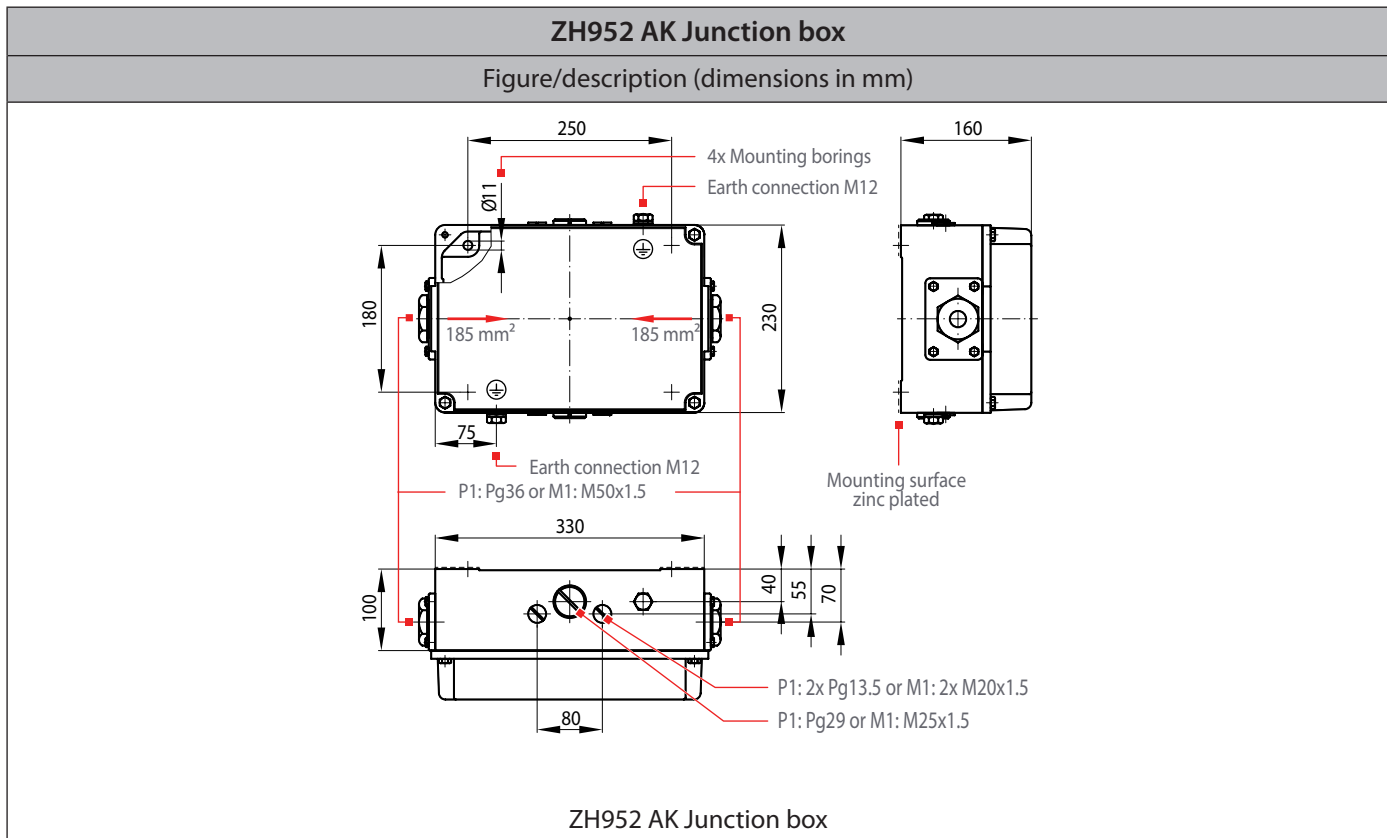
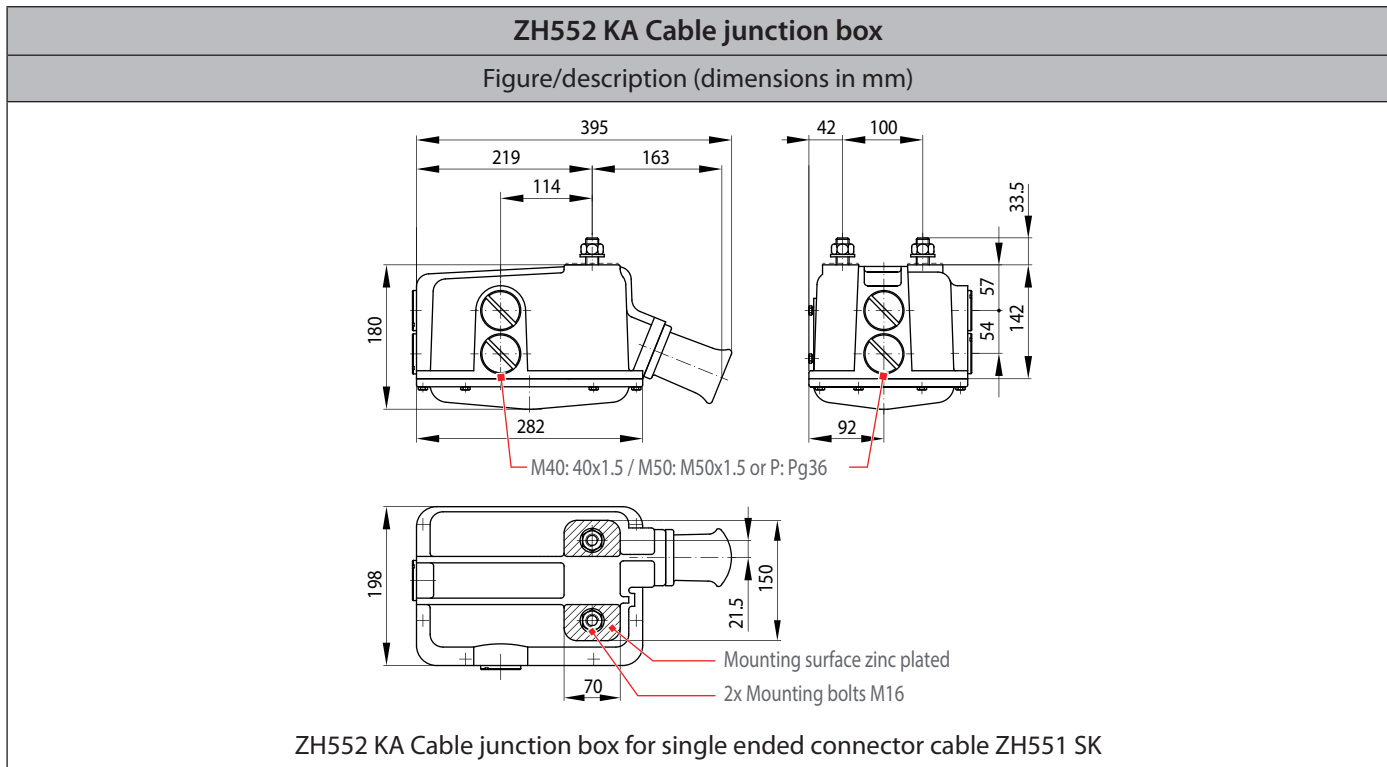
ZH550 VS1 Key with movable bit

Feature: Key can be inserted and removed in any position




ZH550 VS2 Key with fixed bit

Feature: Key can only be inserted and removed when locked



5. Installation

| | |
|---|--|
|  | <p>⚠ DANGER</p> |
| | <p>The connectors contain components that carry high voltage. Deadly hazard! Always observe the following safety regulations before beginning any work on electrical systems.</p> <ul style="list-style-type: none"> ▶ Disconnect ▶ Ensure that it is not possible to reconnect unintentionally ▶ Clearly mark your work area ▶ Make sure that there is no voltage present ▶ Earth and short circuit the installation ▶ Besides the main electric circuit, also disconnect additional and auxiliary circuits ▶ Insulate or cover adjacent energized parts ▶ Switch off and earth the train bus bar. Be absolutely sure that the earth connection persists. ▶ Only an electrically skilled person may determine if there is no voltage present |

NOTICE

During installation, ensure that dirt caused by surrounding construction activities does not get into the connectors.

5.1 Check Parts for Transport Damage

NOTICE

If parts are damaged, the functional reliability of the connectors is no longer given.

- ▶ Before installing, check all parts for any possible transport damage.
- ▶ Do not install any damaged parts.

5.2 Dimensions/Interfaces to the Vehicle

The dimensions to the interfaces of the vehicle and further technical specifications are given in the respective data sheets or in our catalogue **F122.en**. Download: <https://www.schaltbau-gmbh.com/en/Download/Product-information/Connectors/>

5.3 Installing the Coupling Receptacle

Preliminaries

- ▶ The installation has to be carried out by qualified trained personnel.

- ▶ An appropriate mounting frame with 2 bore holes (Ø 23 mm) with a distance of 100 mm has to be provided for the fastening of the coupling receptacle.
- ▶ The coupling receptacle is fixed to the mounting frame with 2 hexagon screws M20 incl. nuts.
- ▶ In order to secure the screws against self-loosening, appropriate screw locking devices have to be provided.
- ▶ The tightening torque and the length of the fixing screws have to be determined by the manufacturer of the vehicle according to the according to the constructional conditions.
- ▶ All earthing surfaces must be free from varnish and any contaminations and have to be cleaned e.g. with a brass brush. The earthing surfaces must be metallic bright.

Correct Mounting Position

The mounting position of the coupling receptacle must be performed in compliance with UIC 552.

The coupling receptacle is screwed with the horizontally aligned fastening flange from below to the horizontally aligned mounting frame. **Fig. 2/A** shows an example of a correct mounting position.

NOTICE

The mounting of the coupling receptacle must be carried out with horizontally aligned fastening flange, from below (see Fig. 2/A). Other mounting positions like shown for example in Fig. 2/B and C are not permissible!

When the receptacle lid is open during the plugging procedure or in the plugged condition in this mounting positions, contamination and moisture might penetrate the contacts and accumulate there.

The drainage function is also restricted or invalidated completely in such mounting positions. Furthermore, such mounting positions cause a not definable restriction of the required laying of single ended or double ended connector cables.

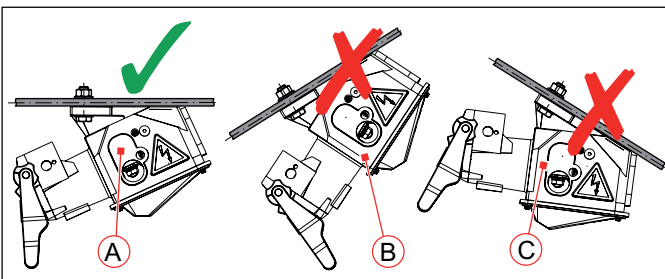


Fig. 2: Example for intended mounting position (A) and not permissible mounting positions (B, C) of receptacles

Mounting Points

The coupling receptacle is fixed to the mounting frame with 2 hexagon screws M20 incl. nuts.

The tightening torque and the length of the fastening screws as well as suitable screw locking devices have to be determined by the manufacturer of the vehicle according to the constructional conditions.

The dimensions and arrangement of the mounting holes are shown in Fig. 3.

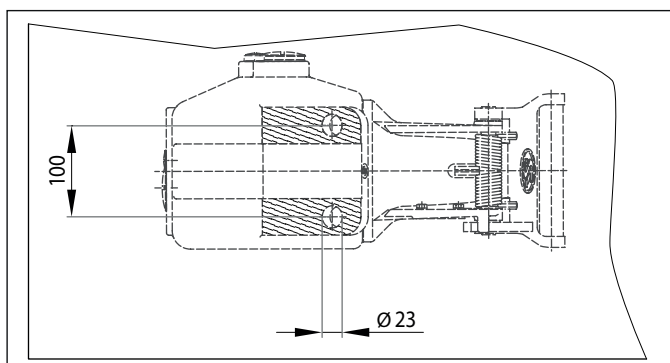


Fig. 3: Coupling receptacle: Dimensions and arrangement of the mounting holes

Earthing Surfaces

DANGER



An electrically conducting transition between the receptacle and the mounting frame has to be guaranteed!

▶ Before the installation, make sure that the earthing surfaces on the receptacle and on the mounting frame (Fig. 4/1 und 2) are free of varnish or any contamination.

▶ If existent, completely remove varnish and contamination on the earthing surfaces, e.g. with a brass brush. The earthing surfaces must be metallic bright.

▶ The cleaned and metallic bright earthing surfaces can additionally be lubricated with terminal grease.

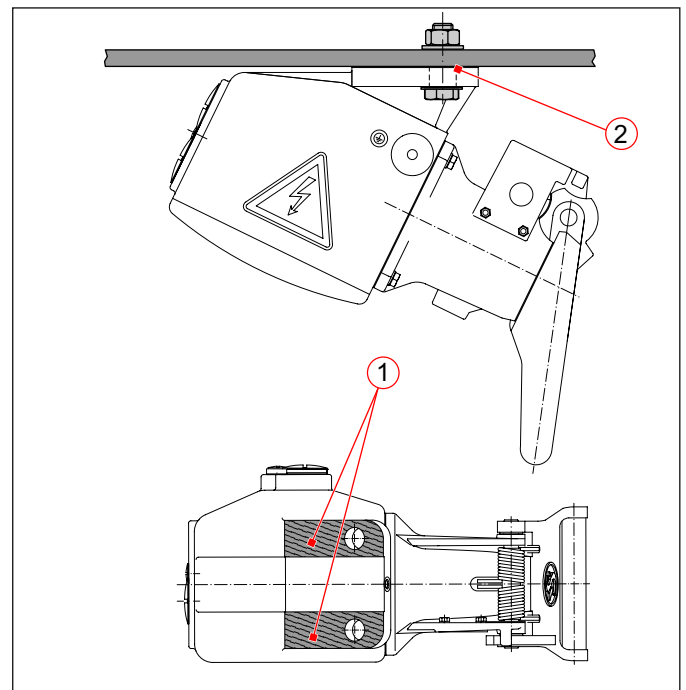


Fig. 4: Earthing surfaces on coupling receptacle (1) and mounting frame (2)

Connections for Earthing Cable / Strap

Depending on the model, the coupling receptacle has an earthing terminal M10 either on the left side or on the right side of the coupling receptacle (Fig. 5/15).


For the connection of an earthing cable/strap you need:

- Screw M10 (16), the depth of thread of the earthing terminal is: 13+2 mm
- Screw locking devices (17)
- Earthing cable/strap (18), equipped with appropriate connection, e.g. cable lug

⚠
DANGER

An electrically conducting transition must be guaranteed between earthing terminal (Fig. 5/15) of the coupling receptacle and earthing cable/strap!

- ▶ Make sure before the installation that the earthing surfaces on the coupling receptacle and earthing cable/strap are free from varnish and any contamination.
- ▶ Remove any existing varnish as well as any contamination on the earthing surfaces without residue, e.g. with a brass brush. The earthing surfaces must be metallic bright.



▶ The cleaned and metallic bright earthing surfaces can additionally be lubricated with terminal grease.

▶ Screw the earthing cable / strap (18) with the screw M10 (16) and locking devices (17) to the earthing terminal (15). Depending on the model, the earthing terminal is either on the left or on the right side of the coupling receptacle.

Torque for the earthing screw: 10 Nm

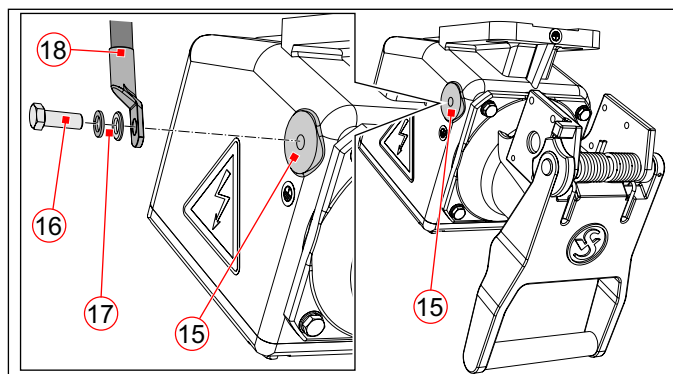


Fig. 5: Connection for earthing cable / strap

Cable Exits

The coupling receptacle has several cable exits (example see Fig. 6 / 5 and 6). Appropriate cables and cable glands have to be used depending on the model of the receptacle and on the mounting situation.

Not used cable exits must be closed with blank caps.

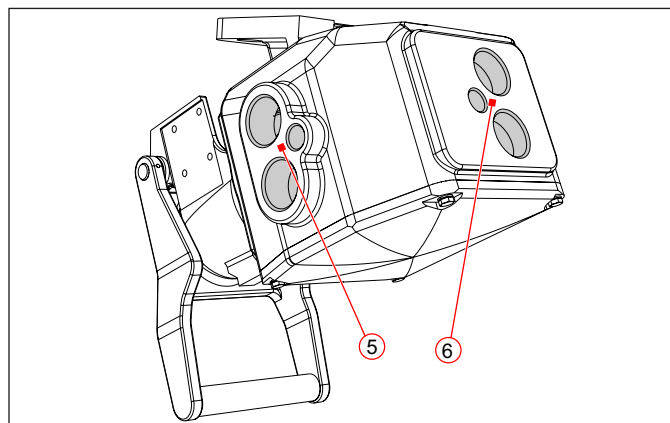


Fig. 6: Cable exits laterally (5) and at the back(6)

Models of receptacles with cable exits with different-threads are listed in the following table .

| Ordering code | Cable exits |
|---------------|---------------------------------------|
| P | Thread 2x Pg36 / 1x Pg13.5 |
| M40 | Metric thread 2x M40x1.5 / 1x M20x1.5 |
| M50 | Metric thread 2x M50x1.5 / 1x M20x1.5 |

Installation

▶ Tighten the receptacle (Fig. 7/19) with 2 hexagon screws M20 incl. nuts and appropriate screw locking devices (20) to the prepared mounting frame (21). The torque for the fixing screws has to be determined by the manufacturer of the vehicle according the constructional conditions.

▶ Then, attach the included warning plate (22).

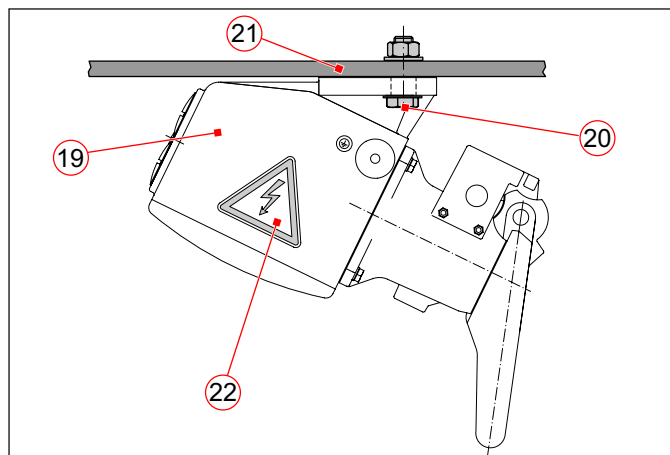


Fig. 7: Install the coupling receptacle (19) with screws and screw locking devices (20) on the mounting frame (21) and glue on warning plate (22)

5.4 Connecting the Coupling Receptacle

Preconditions

According to UIC 552, the minimum cross section of the connection cables must be 185 mm².

Furthermore, the connection cables must be provided with cable lugs and heat shrink tubings installed according to instructions.

Appropriate cable glands are required depending on the model of the receptacle.

Cable Connection / Laying

- ▶ For preparing the connections, release the 4 screws (23) of the shell cover (24) on the bottom side of the coupling receptacle (Fig. 8).
- ▶ Remove the lower shell cover (24) together with the glued in seal.

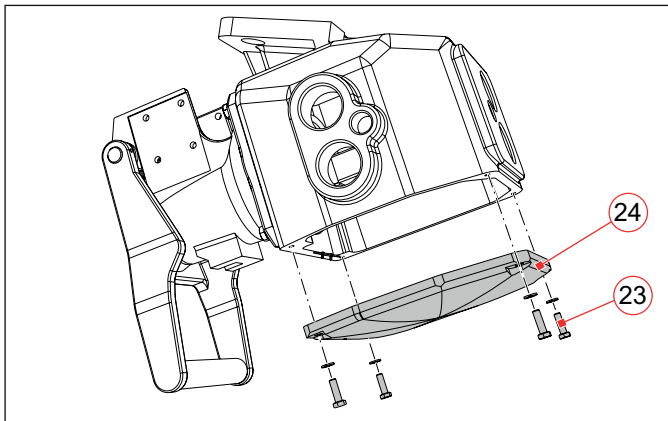


Fig. 8: Remove the lower shell cover of the coupling receptacle

- ▶ Depending on the type of cable connection (laterally, back, see Fig. 9 to Fig. 12), fix the prepared cable glands to the cables or to the cable exits respectively and insert the cables into the coupling receptacle.

Connection 2x at the back, vertical (Fig. 9)

- ▶ For connection type 2x at the back, connect the cables according to Fig. 9 with screw (11), washers as well as spring lock washers (12) and nut (14) to the connecting piece (13).

In doing so,

- screw the cable lug (9) from above to the connecting piece (13)
- and cable lug (10) from below to the connecting piece (13).

Torque for the cable connecting screw: 200 Nm

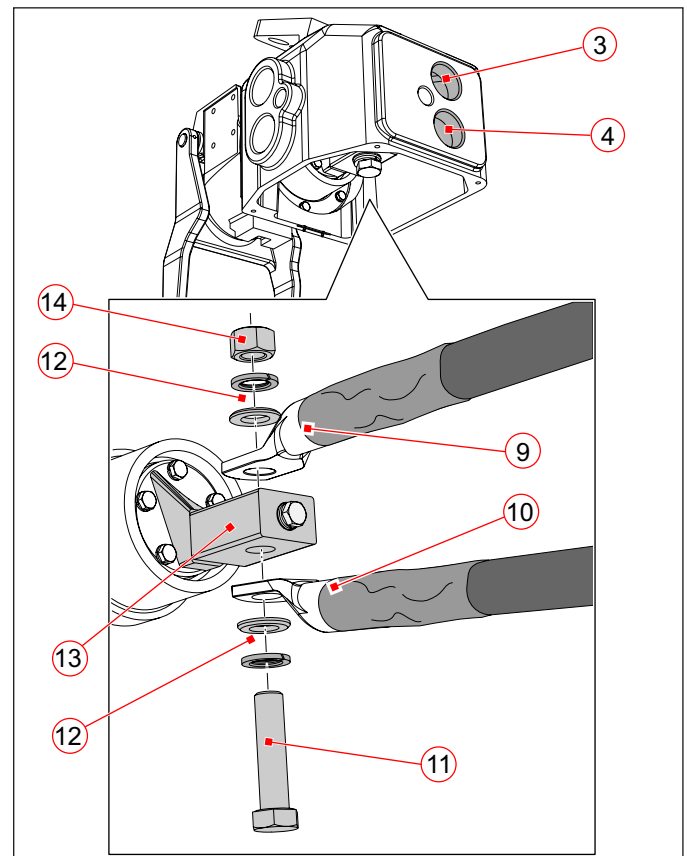


Fig. 9: Cable connections 2x at the back, vertical

- 3/4 Cable exits vertical, 2x at the back
- 9/10 Cables with cable lugs and heat shrink tubings
- 11 Cable connecting screw M16
- 12 Spring lock washers and washers
- 13 Connecting piece with through bore
- 14 Nut M16

Connection 2x lateral, vertical (Fig. 10)

► For connection type 2x lateral (1/6), connect the cables according to **Fig. 10** with screw (11), washers as well as spring lock washers (12) and nut (14) to the connecting piece (13).

In doing so,

- screw the cable lug (9) from above to the connecting piece (13)
- and cable lug (10) from below to the connecting piece (13).

Torque for the cable connecting screw: 200 Nm

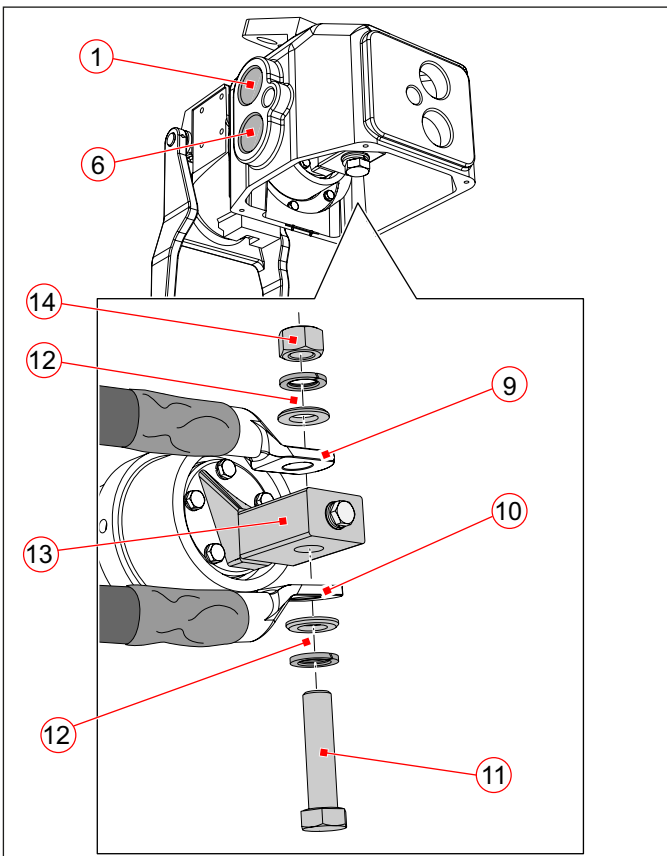


Fig. 10: Cable connections 2x lateral, vertical

| | |
|------|--|
| 1/6 | Cable exits vertical, 2x lateral |
| 9/10 | Cables with cable lugs and heat shrink tubings |
| 11 | Cable connecting screw M16 |
| 12 | Spring lock washers and washers |
| 13 | Connecting piece with through bore |
| 14 | Nut M16 |

Connection 1x lateral, 1x at the back, vertical (Fig. 11)

► For connection type 1x lateral (6), 1x at the back (3), connect the cables according to **Fig. 11** with screw (11) and washers as well as spring lock washers (12) and nut (14) to the connecting piece (13).

In doing so,

- screw the cable lug (9/exit at the back) from above to the connecting piece (13)
- and screw the cable lug (10/lateral exit) from below to the connecting piece (13).

Torque for the cable connecting screw: 200 Nm

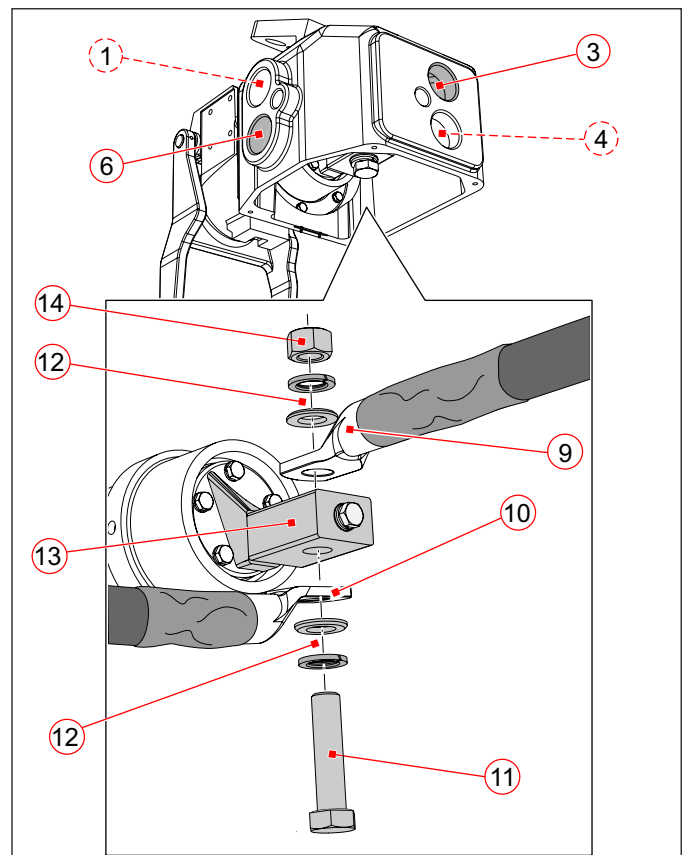


Fig. 11: Cable connections 1x lateral, 1x at the back, vertical

| | |
|------|--|
| 3/6 | Cable exits vertical, 1x lateral, 1x at the back |
| 9/10 | Cables with cable lugs and heat shrink tubings |
| 11 | Cable connecting screw M16 |
| 12 | Spring lock washers and washers |
| 13 | Connecting piece with through bore |
| 14 | Nut M16 |

Alternatively, the cable exits (1) and (4) can be used. In this case the cable lugs must be screwed to the connecting piece (13) as follows:

- cable lug (10/lateral exit) from above
- and cable lug (9/exit at the back) from below.

Connection 2x at the back, horizontal (Fig. 12)

- ▶ For connection type 2x at the back, horizontal, connect the cables according to **Fig. 12** with screws (15) and washers as well as spring lock washers (12) to the connecting piece (16). In doing so, screw both cable lugs (9 and 10/exit at the back) from below to the connecting piece (16). Torque for the cable connecting screws: 200 Nm

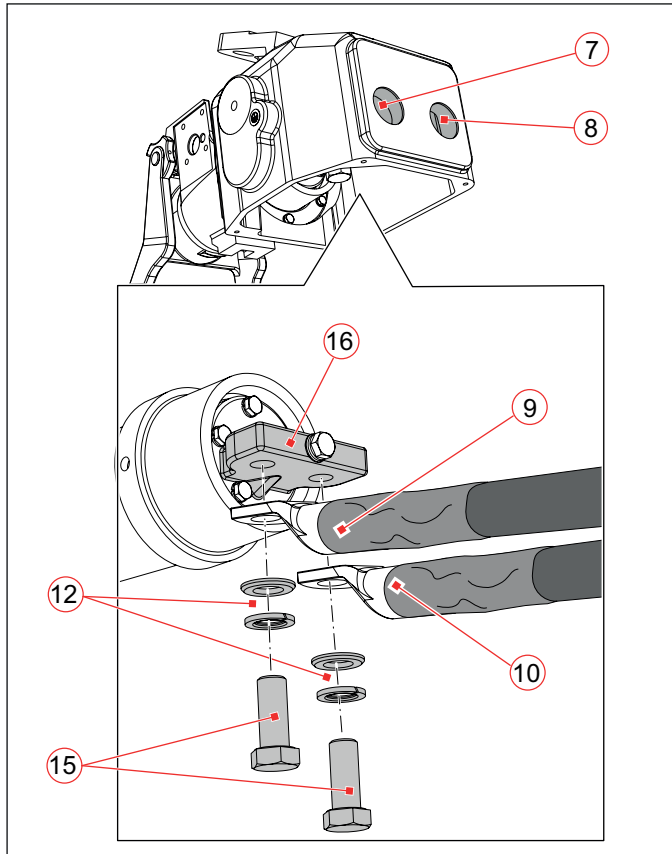


Fig. 12: Cable connections 2x at the back, horizontal

- 1/5 Cable exits horizontal, 2x at the back
- 9/10 Cables with cable lugs and heat shrink tubings
- 12 Spring lock washers and washers
- 15 Cable connecting screws M16
- 16 Connecting piece with threaded holes M16

Mount the Shell Cover

- ▶ After having checked all cable connections for correct laying and secure attachment, mount the shell cover again on the bottom side of the coupling receptacle (see **Fig. 8**).
- ▶ Insert the lower shell cover (24) with glued in seal from below into the receptacle shell (see **Fig. 8**).
- ▶ Screw on the shell cover (24) with the 4 screws (23) including spring lock washers (**Fig. 8**). Torque for the shell cover screws: 6 Nm

Test

- ▶ Check that all of the installed parts are in the correct position and function properly.
- ▶ Make sure that there are no undue tensile, pressure, flexing and torsion loads on the connection cables.
- ▶ Check the functionality of the receptacle lid.

For coupling receptacles which are equipped with locking and/or an optional pilot contact:

- ▶ Check the functional capability of the locking and/or the pilot contact.

Commissioning

| | |
|--|--|
| | ⚠ DANGER |
| | <p>The coupling receptacle contains components which carry high voltage. Deadly hazard!</p> <ul style="list-style-type: none"> ▶ Before commissioning the coupling receptacle, a high voltage test must be carried out. |

- ▶ Before commissioning the coupling receptacle, it must be tested in accordance with EN 50215.

5.5 Installing the Dummy Receptacle

Preliminaries

- ▶ The installation has to be carried out by qualified trained personnel.
- ▶ An appropriate mounting frame with 2 bore holes (Ø 13.5 mm) in a distance of 140 mm has to be provided for the fastening of the dummy receptacle.
- ▶ The dummy receptacle is fixed to the mounting frame with 2 hexagon screws M12 incl. nuts.
- ▶ In order to secure the fixing screws against self-loosening, appropriate screw locking devices have to be provided.
- ▶ The tightening torque and the length of the fastening screws have to be determined by the manufacturer of the vehicle according to the constructional conditions.
- ▶ All earthing surfaces must be free from varnish and any contamination and have to be cleaned e.g. with a brass brush. The earthing surfaces must be metallic bright.

Correct mounting position

The mounting position of the dummy receptacle must be executed according to UIC 552. The dummy receptacle is aligned vertically, opening of the receptacle from below, and is screwed to a vertically aligned mounting frame on the front ends of the vehicle. **Fig. 13/A** shows an example for an intended mounting position.

NOTICE

The dummy receptacle must be mounted in a vertically aligned position, opening of the receptacle from below (see **Fig. 13/A**). Other mounting positions, like shown for example in **Fig. 13/B and C**, are not permissible!

In such mounting positions, contamination and moisture might penetrate the dummy receptacle and accumulate there. The drainage function is also restricted or invalidated completely in such mounting positions. Furthermore, such mounting positions cause a not definable restriction of the required laying of single ended or double ended connector cables when inserting a plug into the dummy receptacle.

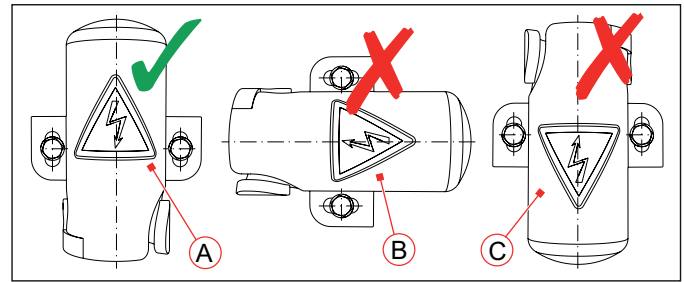


Fig. 13: Example for intended mounting position (A) and not permissible mounting positions (B, C) of dummy receptacles

Mounting Points

For measures and arrangement of the mounting holes, refer to **Fig. 14**.

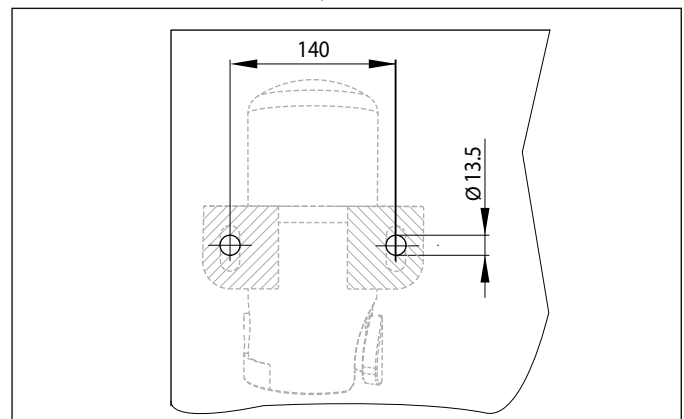


Fig. 14: Dummy receptacle: Measures and arrangement of the mounting holes

Earthing Surfaces

⚠ DANGER

An electrically conducting transition between the dummy receptacle and the mounting frame has to be guaranteed!

- ▶ Before the installation, make sure that the earthing surfaces on the dummy receptacle and on the mounting frame (**Fig. 15/1 and 2**) are free of varnish or any contamination.

- ▶ If existent, completely remove varnish and contamination on the earthing surfaces, e.g. with a brass brush. The earthing surfaces must be metallic bright.



- ▶ The cleaned and metallic bright earthing surfaces can additionally be lubricated with terminal grease.

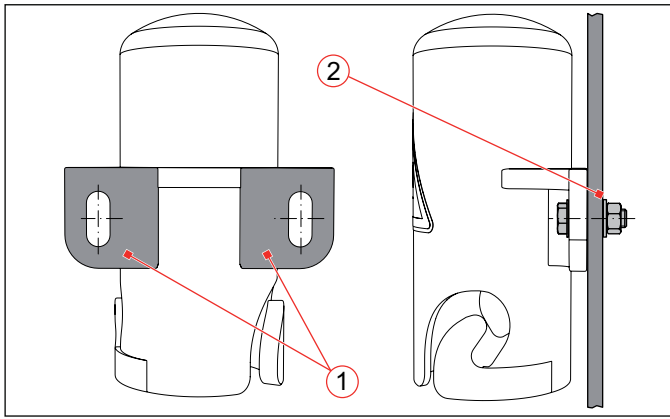


Fig. 15: Earthing surfaces on dummy receptacle (1) and mounting frame (2)

Installation

- ▶ Tighten the dummy receptacle (Fig. 16/3) with 2 hexagon screws M12 incl. nuts and appropriate screw locking devices (4) to the prepared mounting frame (2).
- The torque for the fixing screws has to be determined by the manufacturer of the vehicle according to the constructional conditions.
- ▶ Then, attach the included warning plate (5) .

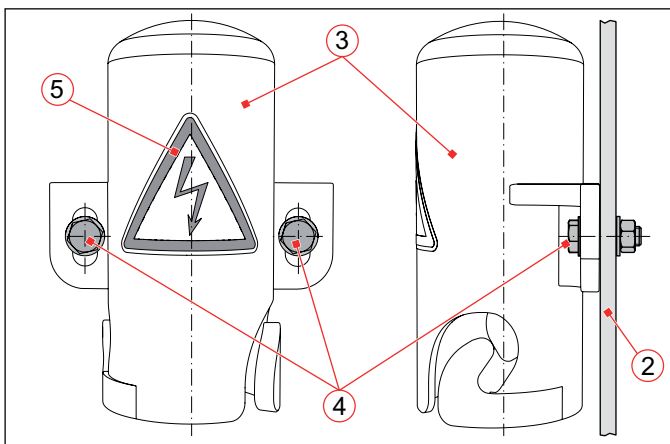


Fig. 16: Install the dummy receptacle (3) with screws and screw locking devices (4) to the mounting frame (2) and glue on warning plate (5)

Test

- ▶ Check all assembled components for correct fit.
- For Dummy receptacles that are equipped with a key lock:
- ▶ Check the key lock for operability.

Commissioning

- ▶ Before the dummy receptacle is put into operation, it has to be tested according to EN 50215.

5.6 Installing the Cable Junction Box

Preliminaries

- ▶ The installation has to be carried out by qualified trained personnel.
- ▶ An appropriate mounting frame with 2 bore holes (Ø 17.5 mm) in a distance of 100 mm has to be provided for the fastening of the cable junction box.
- ▶ The cable junction box is fixed to the mounting frame with 2 hexagon nuts M16. For this purpose, the cable junction box has 2 threaded bolts with a length of 33 mm.
- ▶ In order to secure the nuts against self-loosening, appropriate screw locking devices have to be provided.
- ▶ All earthing surfaces must be free from varnish and any contamination and have to be cleaned e.g. with a brass brush. The earthing surfaces must be metallic bright.

Correct Mounting Position

The mounting position of the cable junction box must be executed according to UIC 552. The cable junction box is screwed with the horizontally aligned fastening flange from below to the horizontally aligned mounting frame.

NOTICE

The cable junction box must be mounted from below with horizontally aligned fastening flange (see Fig. 17/A). Other mounting positions like shown for example in Fig. 17/B and C are not permissible! In such mounting positions, contamination and moisture might penetrate the cable junction box and accumulate there. The drainage function is also restricted or invalidated completely in such mounting positions. Furthermore, such mounting positions cause a not definable restriction of the required laying of single ended or double ended connector cables.

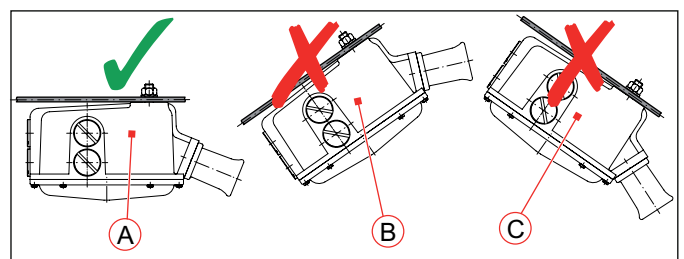


Fig. 17: Example for intended mounting position (A) and not permissible mounting positions (B, C) of cable junction boxes.

Mounting points

For measures and arrangement of the mounting holes refer to *Fig. 18*.

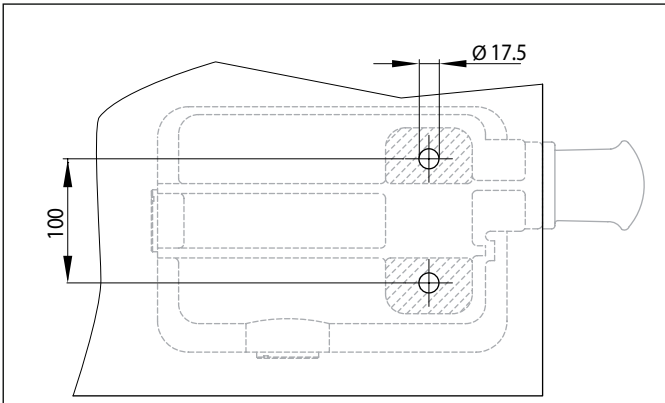



Fig. 18: Cable junction box: Measures and arrangement of the mounting holes

Earthing Surfaces

| | |
|---|--|
|  | <p>⚠ DANGER</p> |
| | <ul style="list-style-type: none"> ▶ Before the installation, make sure that the earthing surfaces on the cable junction box and on the mounting frame (<i>Fig. 19/1 and 2</i>) are free of varnish or any contamination. ▶ Remove any existing varnish as well as any contamination on the earthing surfaces without residue, e.g. with a brass brush. The earthing surfaces must be metallic bright. |

- ▶ The cleaned and metallic bright earthing surfaces can additionally be lubricated with terminal grease.

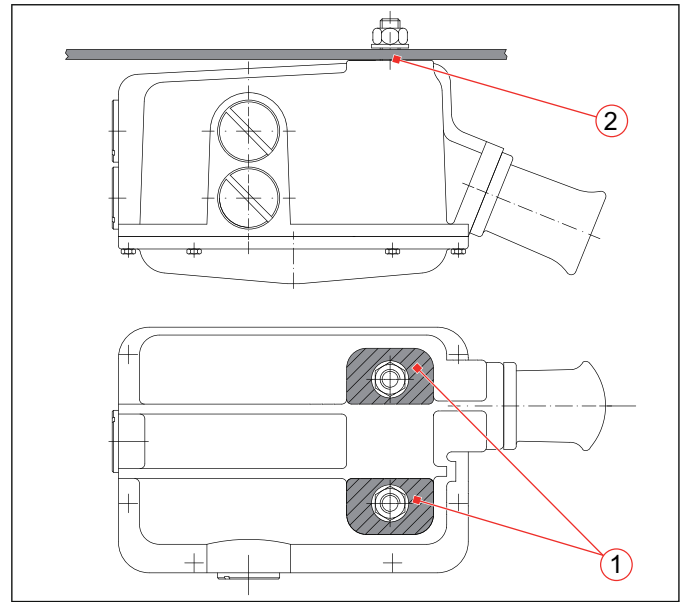


Fig. 19: Earthing surfaces on cable junction box (1) and mounting frame (2)

Cable Exits

The cable junction box has several cable exits (for examples see *Fig. 20/7 and 8*). Depending on the model of the junction box and on the mounting situation, appropriate cables and cable glands have to be used.

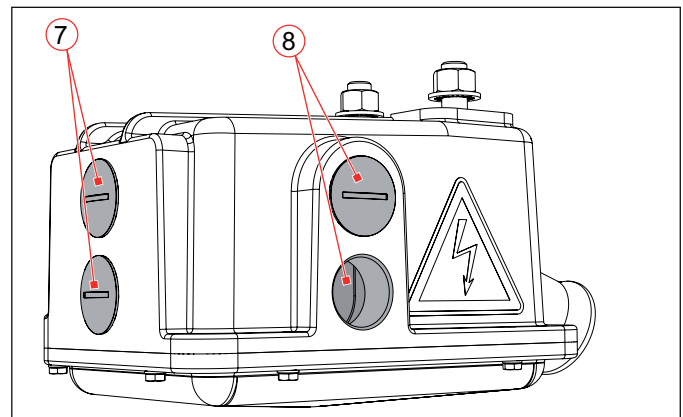


Fig. 20: Example for cable exits on the cable junction box

Installation

- ▶ Screw the cable junction box (*Fig. 21/10*) with 2 nuts M16 incl. screw locking devices (11) from below to the prepared mounting frame (12). Torque for the fixing screws: 150 Nm
- ▶ Then, attach the included warning plate (13).

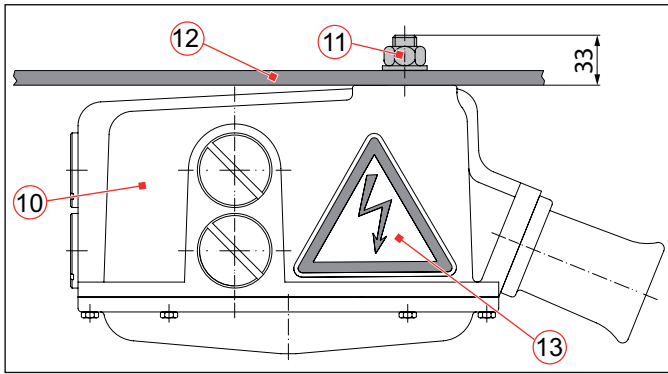


Fig. 21: Install cable junction box (10) with nuts and screw locking devices (11) to the mounting frame (12) and glue on warning plate (13)

5.7 Connecting the Cable Junction Box

Preconditions

According to UIC 552, the minimum cross section of the connection cables must be 185 mm².

Furthermore, the connection cables must be provided with cable lugs and heat shrink tubings installed according to instructions.

Appropriate cable glands are required depending on the model of the junction box.

Cable Connection / Laying

- ▶ For preparing the connections, release the 6 screws (14) of the shell cover (15) on the bottom side of the cable junction box (Fig. 22).
- ▶ Remove the shell cover (15) together with the glued in seal.

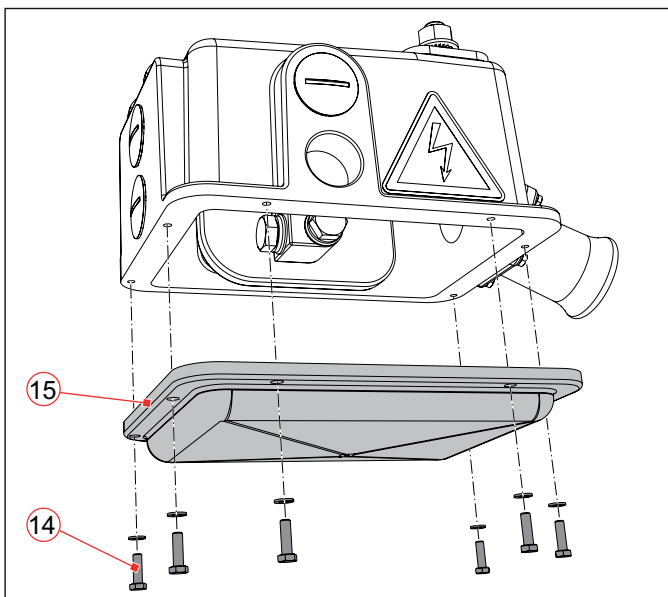


Fig. 22: Remove the shell cover of the cable junction box

Depending on the model of the junction box, the single ended connector cables can be screwed on at different places on the top side or on the bottom side of the connecting piece (Fig. 23/23).

NOTICE

When the cables are laid, the required bend radii have to be observed. Min. bend radius of the cable:

- for fixed installation: 6 x cable diameter
- for free installation: 10 x cable diameter

Connect Single Ended Connector Cable with Plug (for Cable Junction Boxes with Vertical Connecting Piece)

- ▶ Insert the single ended connector cable (Fig. 23/17) into the cable junction box.
- ▶ Screw the cable lug of the single ended connector cable (like shown for example in Fig. 23/18) with screw, washer and spring lock washer (19) to the connecting piece (23).
- ▶ Screw the 2 cable lugs (21) of the two earthing cables with screws (20) and spring lock washers to the earthing terminals (22).
- ▶ Check all cable connections for correct laying and secure attachment.

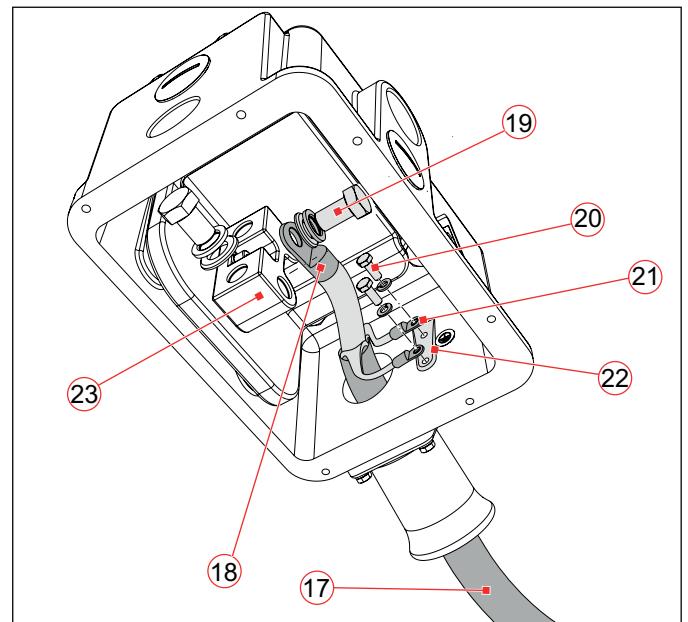


Fig. 23: Connect the single ended connector cable (17)

- 17 Single ended connector cable with plug
- 18 Cable lug of the single ended connector cable
- 19 Screw M16 with spring lock washers and washer for single ended connector cable
- 20 Two screws M6 with spring lock washers for connection of the two earthing cables.
- 21 Two earthing cables with cable lugs
- 22 Earthing terminals for the earthing cables
- 23 Connecting piece vertical, with thread M16

Connect Junction Cable and Train Bus Bar (for Cable Junction Boxes with Vertical Connecting Piece)

- ▶ Fix the prepared wall-mount cable gland to the cables or to the cable exits respectively.
- ▶ Screw the cable lug of the junction cable (like shown for example in *Fig. 24/24*) with screw, washer a spring lock washer (25) to the connecting piece (23).
- ▶ Torque for the cable connector screw: 80 Nm
- ▶ Screw the cable lug of the train bus bar (like shown for example in *Fig. 24/26*) with screw, washer and spring lock washer (27) to the connecting piece (23).
- ▶ Torque for the cable connector screw: 80 Nm
- ▶ Check all cable connections for correct laying and secure attachment.

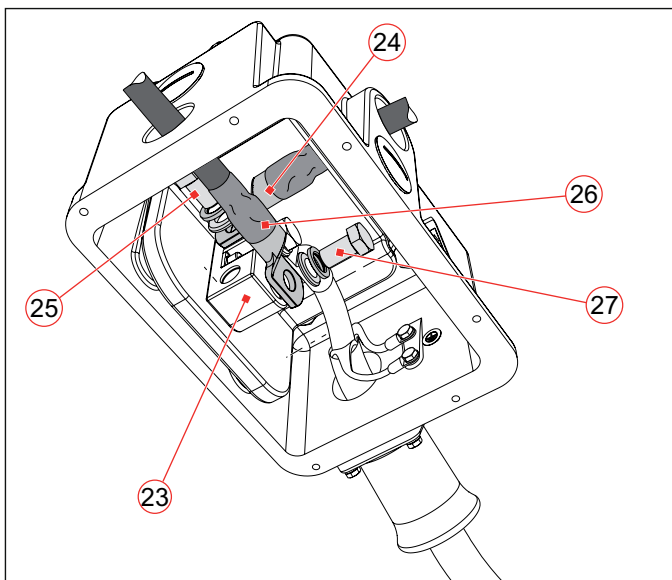


Fig. 24: Example for the connection of junction cable and train bus bar with a vertical connecting piece

- 23 Connecting piece vertical, with thread M16
- 24 Cable (e.g. junction cable) with cable lug and heat shrink tubing
- 25 Screw M16 with spring lock washers and washer for cable connection
- 26 Cable (e.g. train bus bar) with cable lug and heat shrink tubing
- 27 Screw M16 with spring lock washer and washer for cable connection

Connect Single Ended Connector Cable, Junction Cable and Train Bus Bar (for Cable Junction Boxes with Horizontal Connecting Piece)

- ▶ Fix the prepared wall-mount cable gland to the cables or to the cable exits respectively.
- ▶ Insert the single ended connector cable (*Fig. 25/17*) into the cable junction box.
- ▶ Screw the 2 cable lugs (21) of the two earthing cables with screws (20) and spring lock washers to the earthing terminals (22).
- ▶ Torque for the earthing terminal screws: 5 Nm
- ▶ Insert the junction cable (24) and the cable of the train bus bar (26) through the cable exits.
- ▶ Screw the cable lug of the single ended connector cable (18) together with the cable lug of the junction cable (24) (like shown for example in *Fig. 25/18,24*) with screw (29), washer and spring lock washer (30) to the left terminal at the connecting piece (28).
- ▶ Torque for the cable connector screw: 80 Nm
- ▶ Screw the cable lug of the train bus bar (26) (like shown for example in *Fig. 25/26*) with screw (29), washer and spring lock washer (30) to the right terminal at the connecting piece (23).
- ▶ Torque for the cable connector screw: 80 Nm
- ▶ Check all cable connections for correct laying and secure attachment.

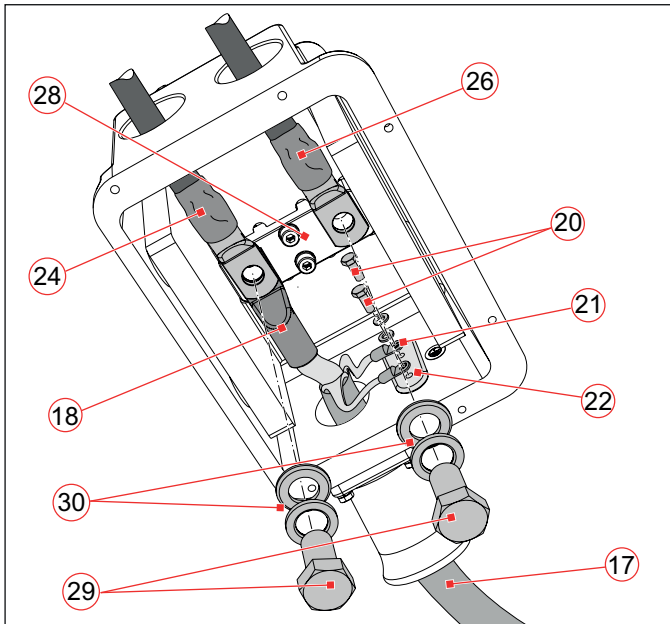


Fig. 25: Example for the connection of the single ended connector cable, junction cable and train bus bar with a horizontal connecting piece

- 17 Single ended connector cable with plug
- 18 Cable lug of the single ended connector cable
- 20 2 screws M6 with spring lock washers for connection of the 2 earthing cables.
- 21 2 earthing cables with cable lugs
- 22 Earthing terminals for the earthing cables
- 24 Cable (e.g. junction cable) with cable lug and heat shrink tubing
- 26 Cable (e.g. train bus bar) with cable lug and heat shrink tubing
- 28 Connecting piece horizontal, with thread M16
- 29 2 screws M16 for cable connection
- 30 2 spring lock washers and 2 washers for screws M16

Mount the Shell Cover

After having checked all cable connection for correct laying and secure attachment, mount the shell cover again on the bottom side of the cable junction box, see Fig. 22.

- ▶ Attach the shell cover (15) with the glued in seal to the bottom side of the shell of the cable junction box.
- ▶ Screw on the shell cover with the 6 screws (14). Torque for the cover screws: 6 Nm

Test

- ▶ Check that all of the installed parts are in the correct position and function properly.
- ▶ Make sure that there are no undue tensile, pressure, flexing and torsion loads on the connection cables.

Commissioning

| | |
|--|--|
| | <p>⚠ DANGER</p> |
| | <p>The cable junction box contains components which carry high voltage. Deadly hazard!</p> <p>▶ Before commissioning the cable junction box a high voltage test must be carried out.</p> |

- ▶ Before commissioning the cable junction box, it must be tested in accordance with EN 50215.

5.8 Installing the Junction Box for the Train Bus Bar

Preliminaries

- ▶ The installation has to be carried out by qualified trained personnel.
- ▶ An appropriate mounting frame with 4 bore holes (Ø 11 mm) has to be provided for the fastening of the junction box for the train bus bar.
- ▶ The junction box is fixed to the mounting frame with 4 hexagon screws M10 incl. nuts.
- ▶ In order to secure the screws against self-loosening, appropriate screw locking devices have to be provided.
- ▶ The wall thickness (clamping height) of the junction box on the attachment points of the 4 screws is 20 mm. In addition to the clamping height, the screw locking devices and the thickness of the mounting frame have to be taken into account for determining the length of the screws.
- ▶ The tightening torque and the length of the fastening screws have to be determined by the manufacturer of the vehicle according to the constructional conditions.
- ▶ All earthing surfaces must be free from varnish and any contaminations and have to be cleaned e.g. with a brass brush. The earthing surfaces must be metallic bright.

Correct Mounting Position

The mounting position of the junction box must be executed according to UIC 552. The junction box is aligned horizontally and screwed to the horizontally aligned mounting frame.

NOTICE

The junction box for the train bus bar must be mounted with horizontally aligned fastening flange (see **Fig. 26/A**). Other mounting positions like shown for example in **Fig. 17/B and C** are not permissible! In such mounting positions, contamination and moisture might penetrate the junction box and accumulate there. The drainage function is also restricted or invalidated completely in such mounting positions. Furthermore, such mounting positions cause a not definable restriction of the required laying of single ended or double ended connector cables.

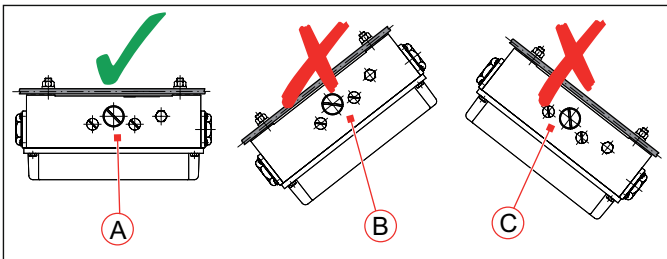


Fig. 26: Example for intended mounting position (A) and not permissible mounting positions (B, C) of junction boxes for the train bus bar.

Mounting Points

For measures and arrangement of the mounting holes, refer to **Fig. 27**.

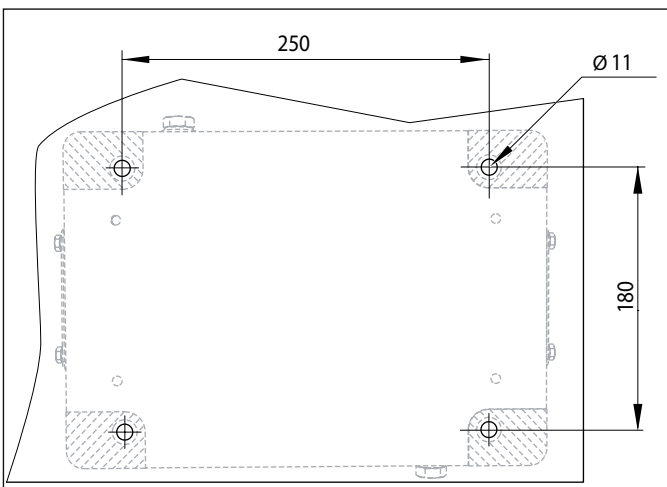


Fig. 27: Junction box for the train bus bar: Measures and arrangement of the mounting holes

Earthing Surfaces

⚠ DANGER

An electrically conducting transition between the junction box and the mounting frame has to be guaranteed!

- ▶ Before the installation, make sure that the earthing surfaces on the junction box and on the mounting frame (**Fig. 28/1 and 2**) are free of varnish or any contamination.
- ▶ Remove any existing varnish as well as any contamination on the earthing surfaces without residue, e.g. with a brass brush. The earthing surfaces must be metallic bright.



- ▶ The cleaned and metallic bright earthing surfaces can additionally be lubricated with terminal grease.

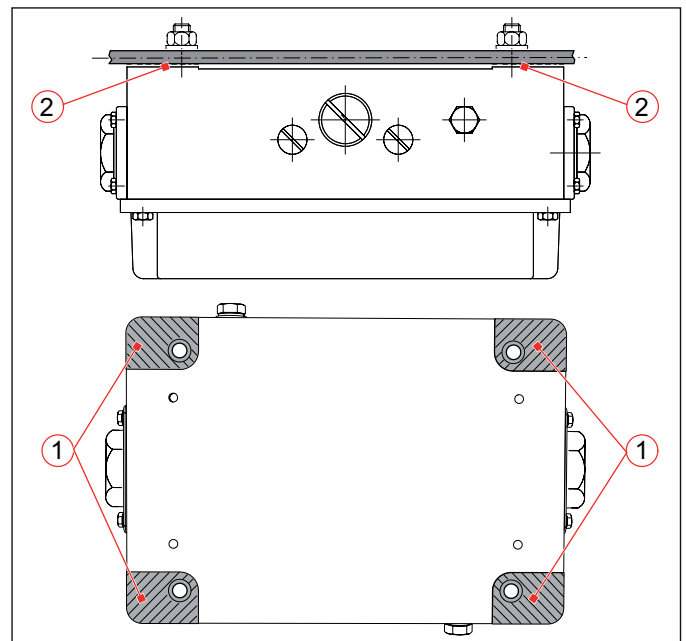


Fig. 28: Earthing surfaces on junction box (1) and mounting frame (2)

Connections for Earthing Cable / Strap

The junction box for the train bus bar has an earthing terminal M12 on the left side as well as on the right side (**Fig. 29/3**).

An earthing cable / strap (6) equipped with an appropriate connection, e.g. a cable lug, is needed for the connection.

⚠ DANGER

An electrically conducting transition must be guaranteed between earthing terminal (Fig. 29/3) on the junction box and earthing cable/strap!



- ▶ Before the installation, make sure that the earthing surfaces on junction box and earthing cable/strap are free from varnish and any contamination.
- ▶ Remove any existing varnish as well as any contamination on the earthing surfaces without residue, e.g. with a brass brush. The earthing surfaces must be metallic bright.

- ▶ For the installation, screw the earthing cable/strap (6) with earthing screw M12 (4) and screw locking devices (5) either to the left or to the right earthing terminal (3) of the junction box.
Torque for the earthing screw: 15 Nm

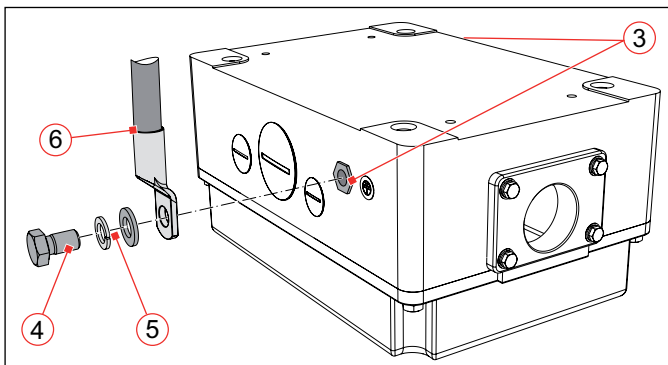


Fig. 29: Connections for earthing for the cable/strap

Cable Exits

The junction box for the train bus bar has several cable exits (for examples see Fig. 30/7 and 8). Depending on the model of the junction box and on the mounting situation, appropriate cables and cable glands have to be used.

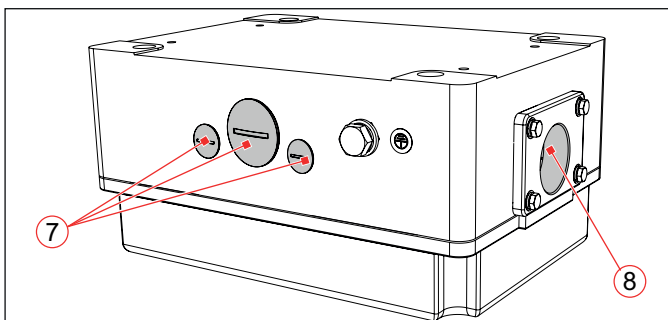


Fig. 30: Examples for cable exits on the junction box for the train bus bar

Installation

- ▶ For preparing the installation, release the 4 hexagon screws M8 (9) of the shell cover (10) on the bottom side of the junction box (Fig. 31).
- ▶ Remove the shell cover (10) together with the glued in seal.

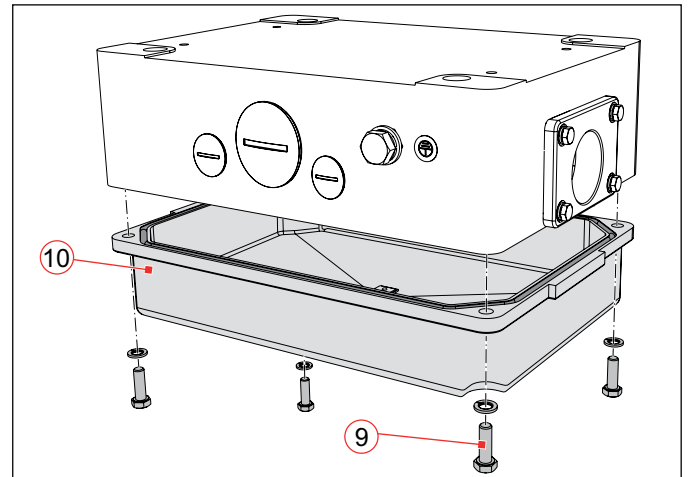


Fig. 31: For preparing the installation, remove the shell cover (10) on the bottom side of the junction box

- ▶ Insert 4 hexagon screws M10 (Fig. 32/12) incl. screw locking devices (13) from below through the fastening holes on the inside of the junction box.
 - ▶ Then screw the junction box with nuts M10 (14) incl. screw locking devices (15) to the prepared mounting frame (2).
- The torque for the fixing screws has to be determined by the manufacturer of the vehicle according to the constructional conditions.

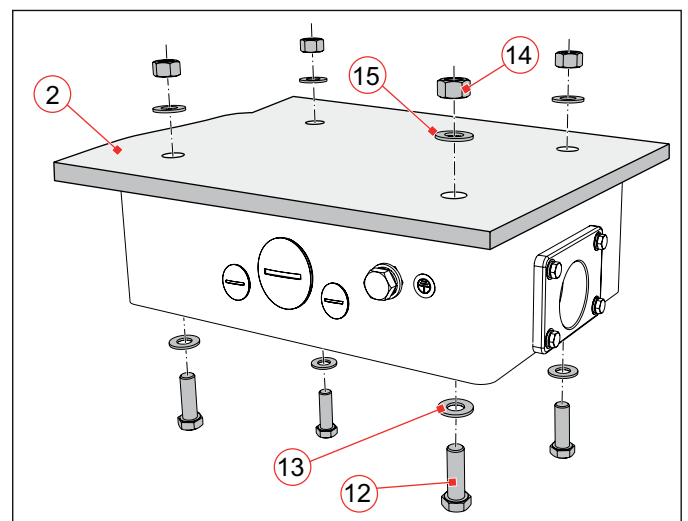


Fig. 32: Screw the shell of the junction box to the mounting frame (2)

5.9 Connecting the Junction Box for the Train Bus Bar

Preconditions

According to UIC 552, the minimum cross section of the connection cables must be 185 mm².

The junction cable must be provided with cable lugs and heat shrink tubings installed according to instructions.

Appropriate cable glands are required depending on the model of the junction box.

The shell cover of the junction box must be removed (see Fig. 31).

Cable Connection / Laying (Fig. 33)

- ▶ Fix the prepared cable glands to the cables or to the cable exits of the junction box respectively.
- ▶ Unscrew the total of 8 screws M8 (19) from the 4 clamping blocks (21) and remove the screws, spring lock washers (20) and upper parts of clamping block (21).
- ▶ Connect the skinned train bus bar (17) on both sides with the screws M8 (19) and spring lock washers (20) in the clamping blocks (21). Torque for the clamping block screws (19): 10 Nm.
- ▶ Fix the junction cable (18) provided with cable lug and heat shrink tubing with fastening screw M8 to one of the two connection points (22).
- ▶ Check all cable connections for correct laying and secure attachment.

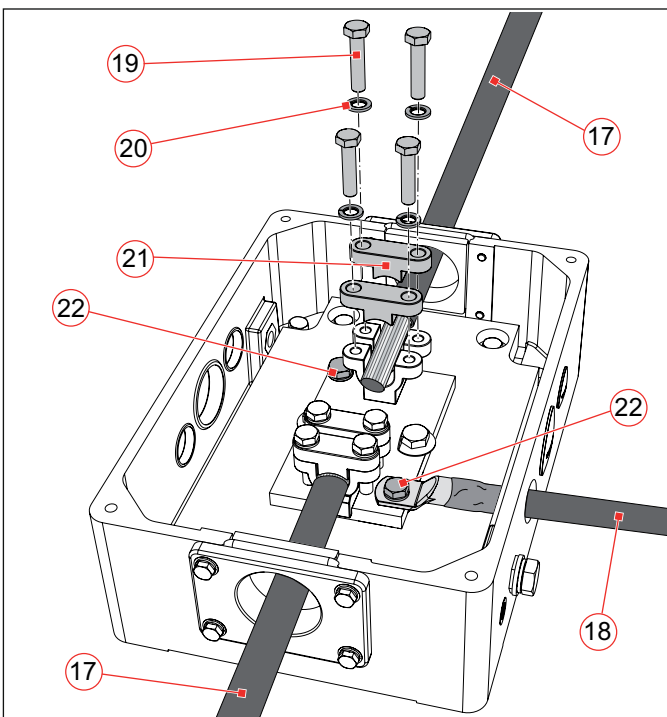


Fig. 33: Example for cabling of the junction box for the train bus bar

Mount the Shell Cover


After having checked all cable connections for correct laying and secure attachment, mount the shell cover again on the bottom side of the junction box, see Fig. 31.

- ▶ Attach the shell cover (10) with the glued in seal to the bottom side of the shell of the junction box.
- ▶ Tighten the shell cover with the 4 screws M8 (9) incl. spring lock washers.
Torque for the cover screws: 10 Nm
- ▶ After that, glue the warning plate included in the delivery from below to the shell cover of the junction box.

Test

- ▶ Check that all of the installed parts are in the correct position and function properly.
- ▶ Make sure that there are no undue tensile, pressure, flexing and torsion loads on the connection cables.

Commissioning

| | |
|---|---|
| ⚠ DANGER | |
|  | <p>The junction box for the train bus bar contains components which carry high voltage. Deadly hazard!</p> |
| | <ul style="list-style-type: none"> ▶ Before the commissioning of the junction box for the train bus bar a high voltage test must be carried out. |






- ▶ Before the commissioning of the junction box for the train bus bar, it must be tested in accordance with EN 50215.

5.10 Storage of Double Ended Connector Cables (ZH662)

| |
|---|
| NOTICE |
| <p>In the not mated condition, the double ended connector cables (ZH622 VK) must always be stored in the driver's cab of the vehicle.</p> <p>When storing the double ended connector cables in the respective vehicles or driver's cabs, the bend radii must be observed and the cable must be protected against blows and contamination.</p> |

6. Plugging Procedure

For the plugging procedure observe the requirements in chapter "2.3 Intended Use".

| | |
|---|---|
|  | <p>⚠ WARNING</p> <p>Dirt, moisture, snow and ice in the interior of the dummy receptacle contaminate the coupling plug. The coupling of a contaminated plug to the coupling receptacle may lead to a life-threatening electrical shock.</p> <ul style="list-style-type: none"> ▶ Always check if the interior of the dummy receptacle is free from dirt, moisture, snow and ice before inserting a plug in the dummy receptacle. ▶ Do not insert a plug into a dummy receptacle when the latter is contaminated, moist or contaminated with snow and ice. ▶ Remove dirt, moisture, snow and ice without residues from the interior of the dummy receptacle. ▶ Never couple a contaminated plug to the coupling receptacle. |
|   | <p>⚠ WARNING</p> <p>The plugging and disconnecting of the connectors on-load can cause electric arcs. When explosive substances or ignition sources of any kind are nearby, there is a risk of fire and explosion!</p> <ul style="list-style-type: none"> ▶ Never plug and disconnect the connectors on-load. |
|  | <p>⚠ CAUTION</p> <p>The connectors contain sharp-edged components as well as components which are subject to mechanical tension. Crushing hazard / risk of injury!</p> <ul style="list-style-type: none"> ▶ Wear safety gloves when plugging and disconnecting the connectors. |
|  | <p>⚠ CAUTION</p> <p>The connectors may grow warm during operation and they may become hot depending on the ambient temperature and the conditions of use. Risk of burn to the hands!</p> <ul style="list-style-type: none"> ▶ Wear safety gloves when plugging and disconnecting the connectors in the case of a high ambient temperature. |

NOTICE

Inappropriate handling when plugging or disconnecting may damage the connectors. The functional safety of the connectors is no longer guaranteed when parts are damaged.

- ▶ Take care that plug and receptacle do not tilt and that they are plugged without exceeding force.
- ▶ Make sure before the plugging procedure that plug and receptacle as well as the receptacle lid are not contaminated and are free from moisture, snow and ice. Remove any existing dirt.
- ▶ Make sure that in the not mated condition
 - the plug of single ended connector cables (ZH551 SK) is always inserted into a dummy receptacle
 - double ended connector cables (ZH622 VK) are always stored in the driver's cab of the vehicle.
 - the receptacle lid is closed as intended
- ▶ Open the receptacle lid by an angle of at least 110° but not more than 120° (see **Fig. 34**). An overstretching of the receptacle lid may shorten the operational life span of the torsion spring and damage the hinge mechanism.
- ▶ Always close the receptacle lid by hand, don't let it slam!!
- ▶ Do not throw the plug with cable to the floor.



Note:

In case of a very low or very high ambient temperature which approximates the limits of the allowable operating temperature range specified in our catalogue **F122.en** in section "**Specifications**",

- a higher effort may be needed for the plugging and unplugging and
- the operational life span of plug and coupling receptacle may thus be reduced due to increased wear and tear.

6.1 Plugging

- ▶ Open the receptacle lid (3).
- In doing so, observe the opening angle:
- at least 110°
 - but not more than 120°

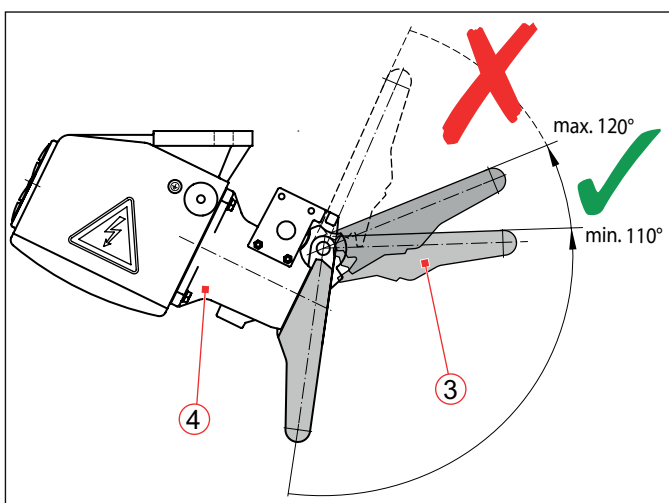


Fig. 34: Open the receptacle lid (3) of the coupling receptacle (4): Opening angle at least 110°, at most 120°

- ▶ Then insert the plug (5) without excessive force until the limit stop into the coupling receptacle (4). In doing so take care that
 - the plug and the receptacle are aligned axially (a plug placed at an angle can be plugged by hand only with difficulty or not at all!),
 - the plug is plugged in completely (flush) and is lined with the receptacle shell (see **Fig. 36/6**).

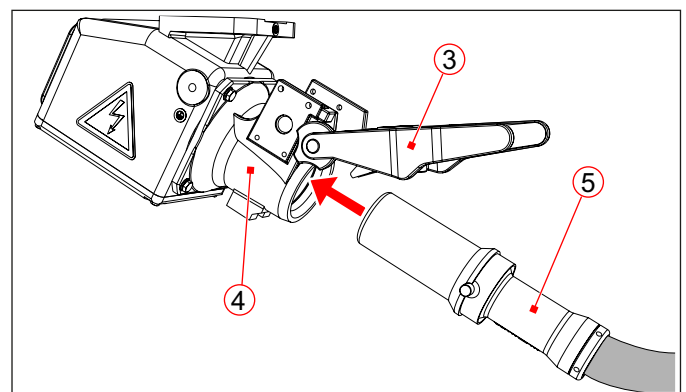


Fig. 35: Insert plug (5) until the limit stop into the coupling receptacle (4)

- ▶ After that, close the receptacle lid (3) by hand until the locking nose (7) on the lid engages into the safety notch (8) on the plug (see Fig. 36).

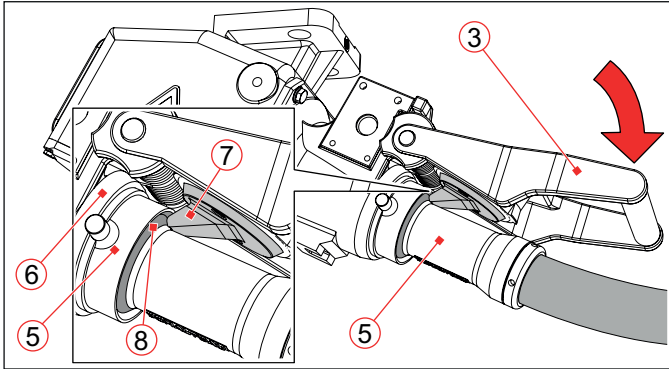


Fig. 36: Plug (5) must be inserted flushly and must be lined with the receptacle shell (6). Close receptacle lid (3) by hand until the locking nose (7) on the lid engages into the safety notch (8) on the plug

6.2 Unplugging

- ▶ Open the receptacle lid (3). In doing so, observe the opening angle:
 - at least 110°
 - but not more than 120°
- ▶ Hold the receptacle lid (3) and remove the plug (5) from the receptacle (4).
 - Only pull on the plug, not on the cable.
 - Do not disengage the connectors with a hammer or other auxiliary tools!
- ▶ Close the receptacle lid (3) by hand. Take care that the lid closes tightly with the receptacle shell.

6.3 Functionality of the Pilot Contact / Operations when Plugging and Unplugging

For receptacles with optional pilot contact a change-over contact element is used as pilot contact. The table below shows the switching conditions and circuit diagrams of the pilot contact.

| Switching condition | Figure | Circuit diagram |
|-------------------------------------|--------|-----------------|
| not actuated, plug is not connected | | |
| actuated, plug is connected | | |

When inserting a plug (5) into receptacles with pilot contact, first the pilot contact (9) will be actuated and a signal is triggered to indicate a plug being mated.

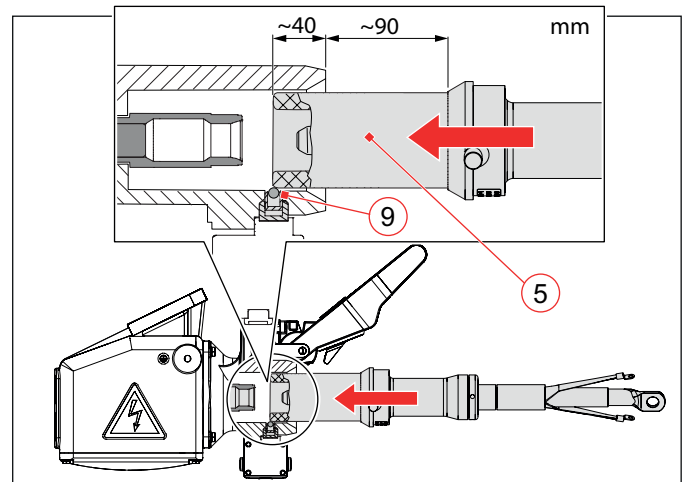


Fig. 37: Pilot contact (9) actuates and triggers a signal indicating a plug being mated

When inserting the plug further, the pin contact (10) of the plug (5) gets in touch with the socket contact (11) of the receptacle.

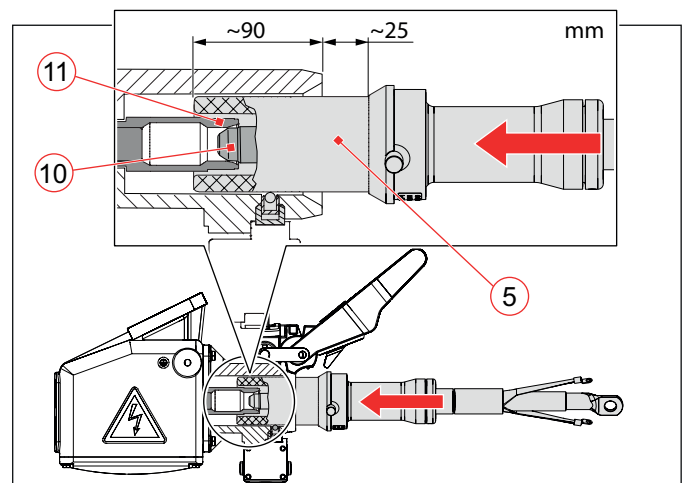


Fig. 38: Pin contact (10) of the plug (5) gets in touch with the socket contact (11) of the receptacle

After inserting the plug (5) further up to the stop, the maximum plug-in depth (12) is reached. The plug must be plugged in completely (flush) and seal with the receptacle shell.

When closing the receptacle lid, the locking nose (7) on the lid must engage into the safety notch (8) on the plug in order to secure the connection against self-loosening.

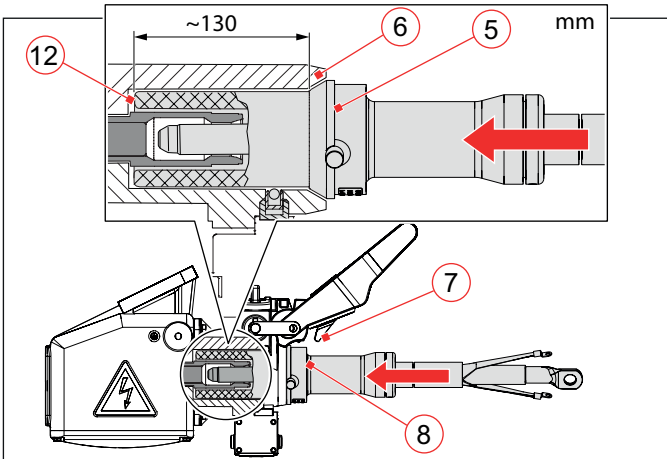


Fig. 39: Maximum plug-in depth (12)

When pulling the plug, the operations mentioned above occur in reverse order:

- Plug is pulled out of maximum plug-in depth
- Pin contact of the plug gets separated from the socket contact of the receptacle
- Pilot contact goes into not actuated position signaling that there is no plug present.

6.4 Locking/Unlocking

Depending on the receptacle type, the lock of receptacles with lock option can either be operated from the left or right-hand side:

- receptacles with long lid (DL): from the left hand-side only
- receptacles with short lid (DK): from the left hand-side only
- receptacles with medium lid (DM): from the left or right-hand side



The key can only be inserted and removed when locked.

Locking/Unlocking with Receptacle Lid in Closed Position

- ▶ Open the keyhole cover (1) and insert the key (2) in vertical position into the keyhole. The receptacle lid is in locked position.

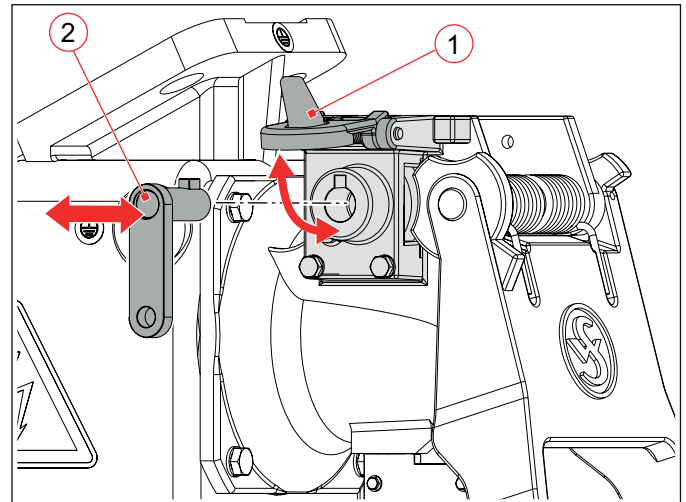


Fig. 40: Receptacles with lock on the left side (DL, DK, DM): Insert the key

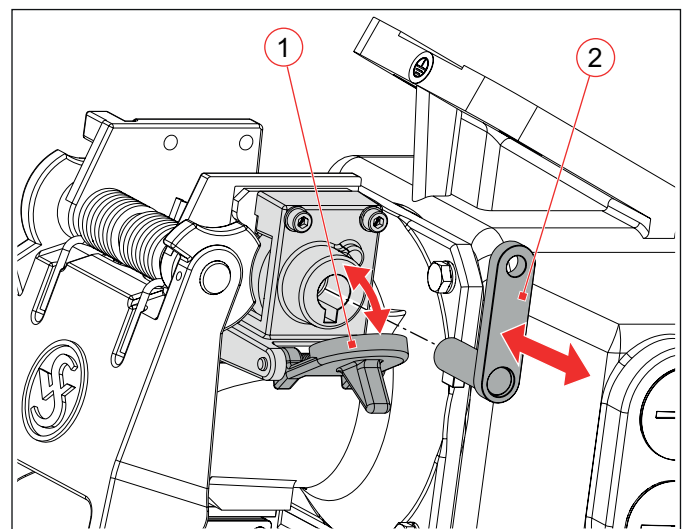


Fig. 41: Receptacles with lock on the right side (DM only): Insert the key

- ▶ To unlock the receptacle lid, turn the key 90° counterclockwise (4).
- ▶ To lock the receptacle lid, turn the key 90° clockwise (3).

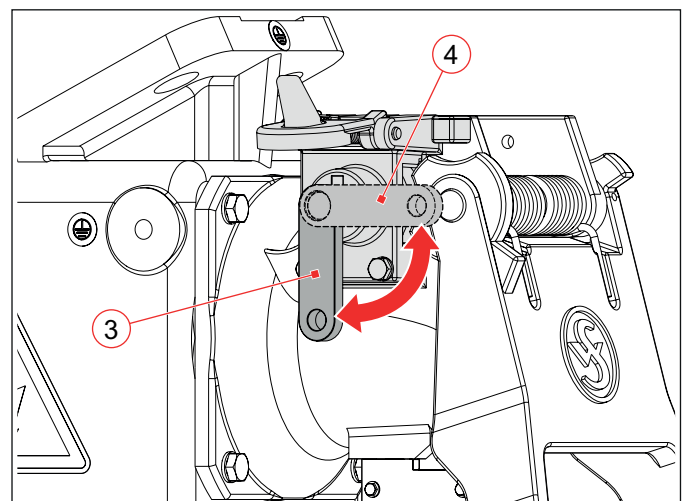


Fig. 42: Receptacles with lock on the left side (DL, DK, DM): Key in locked (3) and unlocked (4) position

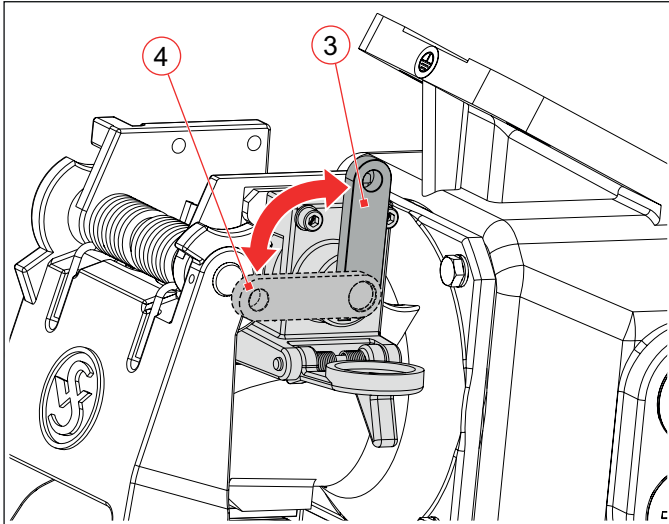


Fig. 43: Receptacles with lock on the right side (DM only):
Key in locked (3) and unlocked (4) position

- ▶ After the receptacle lid is locked, remove the key (2) and close the keyhole cover (1).

Locking/Unlocking in Mated Condition

When mated and locked it is not possible to lift up the receptacle lid. Thus, the plug cannot be pulled out.

- ▶ To unlock the receptacle lid, turn the key 90° counterclockwise (4).
The receptacle lid can be lifted up and the plug be pulled out.
- ▶ To lock the receptacle lid, turn the key 90° clockwise (3).
The receptacle lid cannot be lifted up and thus the plug not be pulled out.

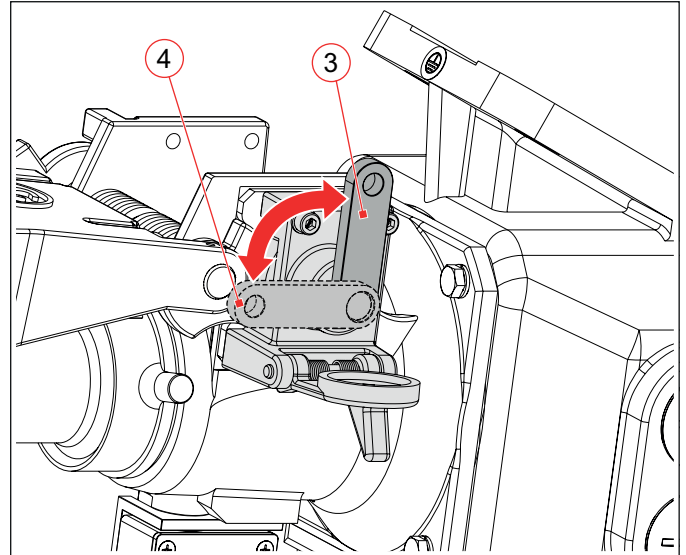


Fig. 45: Receptacles with lock on the right side (DM only):
Key in locked (3) and unlocked (4) position

- ▶ After the receptacle lid is locked, remove the key (2) and close the keyhole cover (1).

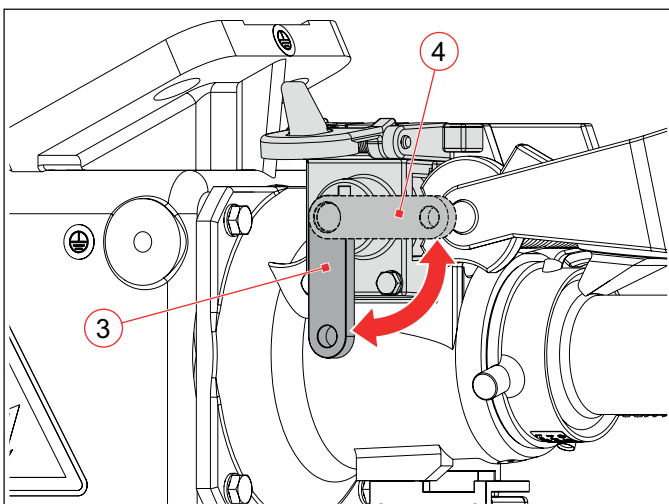



Fig. 44: Receptacles with lock on the left side (DL, DK, DM):
Key in locked (3) and unlocked (4) position

7. Maintenance

Note the expert knowledge which is essential for carrying out maintenance work, mentioned in chapter "2. General and Security Information".

| | |
|---|--|
|  | ⚠ DANGER |
| | <p>The connectors contain components that carry high voltage. Deadly hazard! Always observe the the following safety regulations before beginning any work on electrical constructions:</p> <ul style="list-style-type: none"> ▶ Disconnect ▶ Ensure that it is not possible to reconnect unintentionally ▶ Clearly mark your work area ▶ Make sure that there is no voltage present ▶ Earth and short circuit the installation ▶ Besides the main electric circuit, also disconnect additional and auxiliary circuits ▶ Insulate or cover adjacent energized parts ▶ Switch off and earth the train bus bar. Be absolutely sure that the earth connection persists. ▶ Only an electrically skilled person may determine if there is no voltage present |

All of the maintenance activities that may be carried out on the connectors by skilled personnel are listed below.

7.1 Intervals for Checks and Maintenance


Carrying out of the following maintenance activities reduces wear and tear of the connectors. The wear and tear depends on various factors (e. g. operating and environmental conditions, frequency of use). General maintenance intervals can therefore not be made, but must be determined by the operator according to the specific factors.

| Checks / Maintenance | Interval |
|---|--|
| Visual inspection of - Plug and single ended connector cable - Plug and double ended connector cable - Receptacles - Receptacle lids - Cables - Contacts (in plug and receptacle)) - Dummy receptacles (must be free from dirt, moisture, snow, ice) - Cable junction boxes | ▶ At every plugging |
| Complete maintenance during which all parts of the connectors, including the junction box for the train bus bar, have to be checked for damages and for correct functioning. | ▶ As determined by the operator, according to the specific factors |

| Checks / Maintenance | Interval |
|--|---------------------------------|
| Lubricate the contact sockets of the coupling receptacles with contact grease (e.g. contact grease copper 02770 of the company Druseidt) | ▶ After every 500 mating cycles |

7.2 Visual and Functional Inspection at Each Plugging

At every plug-in, all components of the connectors must be visually and functionally inspected.

| | |
|---|---|
|  | ⚠ DANGER |
| | <p>When damages are visible on cable, plug, receptacles, receptacle lid, junction boxes or on seals or other elements of the connectors during the test, the safety of the connectors is no longer guaranteed.</p> <ul style="list-style-type: none"> ▶ Immediately give damaged components of the connectors to maintenance. ▶ Immediately replace all damaged components with new components. |

In addition to the visual inspection at every plugging a complete maintenance, during which all parts of the connectors are checked for damages and correct function, must be performed at regular intervals as determined by the operator.

7.3 Visual and Functional Inspection/Maintenance of the Coupling Receptacle

| Connector element | Visual and functional inspection | Measures |
|---|---|---|
| Shell of the coupling receptacle | Check for: <ul style="list-style-type: none"> ▶ ease of movement when plugging ▶ dirt ▶ damage or wear and tear ▶ cracks and ruptured patches ▶ loose or missing fastening elements ▶ clogged or contaminated condensate drainage hole on the lower shell cover ▶ damaged cable glands ▶ damaged seals | In case of defects: <ul style="list-style-type: none"> ▶ remove existent dirt without leaving any residue ▶ immediately replace damaged parts ▶ clean a clogged or contaminated condensate drainage hole |
| Receptacle lid of the coupling receptacle | Check for: <ul style="list-style-type: none"> ▶ tears and porosity in the receptacle lid seal ▶ dirt ▶ damage or wear and tear ▶ cracks and ruptured patches ▶ loose or missing fastening elements ▶ secure and firm attachment of the receptacle lid ▶ broken or distorted locking washer / locking nose ▶ correct functioning of the locking nose when engaging in the safety notch of the plug ▶ sufficient closing force of the receptacle lid | In case of defects: <ul style="list-style-type: none"> ▶ remove existent dirt without leaving any residue ▶ immediately replace damaged parts |
| Torsion springs at receptacle lid | Check for: <ul style="list-style-type: none"> ▶ insufficient lubrication of torsion springs ▶ broken or overstretched torsion springs ▶ secure and firm fit of torsion springs ▶ sufficient closing force of the receptacle lid | In case of defects: <ul style="list-style-type: none"> ▶ lubricate torsion springs with Molykote ▶ immediately replace damaged parts |
| Contact socket | Check for: <ul style="list-style-type: none"> ▶ damage or wear and tear ▶ dirt ▶ signs of moisture ▶ cracks and ruptured patches ▶ insufficient lubrication with contact grease ▶ traces of burn-off or carbonisation ▶ sufficient contact pressure ▶ damaged seal on the mounting ring ▶ damaged insulating sleeve | In case of defects: <ul style="list-style-type: none"> ▶ remove existent dirt without leaving any residue ▶ lubricate contact socket again with contact grease (e.g. contact grease copper 02770 of the company Dru-seidt) ▶ when the contact socket or the insulating sleeve is damaged, immediately replace the complete coupling insert |
| Key lock (only receptacles with optional key lock) | Check for: <ul style="list-style-type: none"> ▶ fault at the key lock | In case of defects: <ul style="list-style-type: none"> ▶ immediately replace a faulty key lock |
| Earthing cable / strap (not included in the delivery from Schaltbau) | Check for: <ul style="list-style-type: none"> ▶ damage on earthing cable / strap ▶ loose or missing fixing elements | In case of defects: <ul style="list-style-type: none"> ▶ immediately replace a damaged or loose earthing cable / strap |
| Warning plate ("Warning - live voltage") | Check for: <ul style="list-style-type: none"> ▶ damage of the warning plate or warning plate non-existent | In case of defects: <ul style="list-style-type: none"> ▶ replace a damaged or non-existent warning plate |

Clean Condensate Drainage Hole

The coupling receptacle ZH 550 has a condensate drainage hole at the bottom side of the shell cover, see Fig. 46.

- ▶ Check the condensate drainage hole (1).
- ▶ Clean a clogged or contaminated condensate drainage hole using a sharp object.
- ▶ If necessary remove the lower shell cover and clean the condensate drainage hole. See section "Replace the seal for the lower shell cover (Fig. 49)" on page 39.

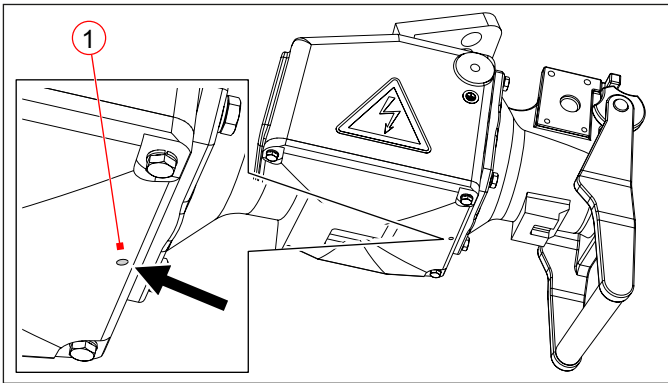


Fig. 46: Clean the drainage hole (1)

Check Clamping Force of the Receptacle Lid

The clamping force measured at the handle of the closed receptacle lid should be at least 10 N. Check the spring effectiveness:

- ▶ Open the receptacle lid up to 120° (Fig. 47).
 - ▶ Measure the holding force at the handle (4) of the opened lid.
- Required holding force: at least 40 N

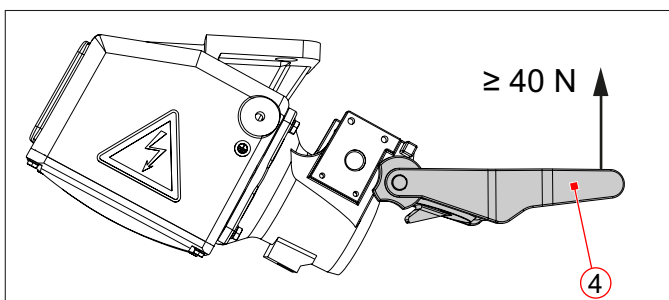


Fig. 47: Check the clamping force of the receptacle lid

Check Contact Pressure at the Contact Socket

The immediate measuring of the contact pressure is not feasible with simple means on the contact socket. For a contact socket lubricated with contact grease (e.g. contact grease copper 02770 of the company Druseidt), the plug in force should be a medium of 200 N, the slide by force at least 100 N but not more than 200 N. When the contact socket is heavily contaminated or damaged, the complete coupling insert has to be replaced immediately. See also section "Replace the Coupling Insert (Fig. 52)" on page 40.

Replace Seals

The seals listed below are mounted in the receptacle:

Replace the sealing ring for the receptacle lid (Fig. 48)

- ▶ For replacing the sealing ring for the receptacle lid, release the 2 cylinder screws M6 x 20 (5) of the locking washer (6) using a hexagon socket wrench.
- ▶ Remove the locking washer (6).
- ▶ Remove the old sealing ring (7) and carefully clean the annular groove and sealing surface, e.g. with acetone. The annular groove must be free of grease.
- ▶ Glue a new sealing ring (7) with adhesive Loctite 480 into the cleaned and greaseless annular groove.
- ▶ Screw on the locking washer (6) with the cylinder screws (5) including spring lock washers. Torque for the cylinder screws: 3 Nm

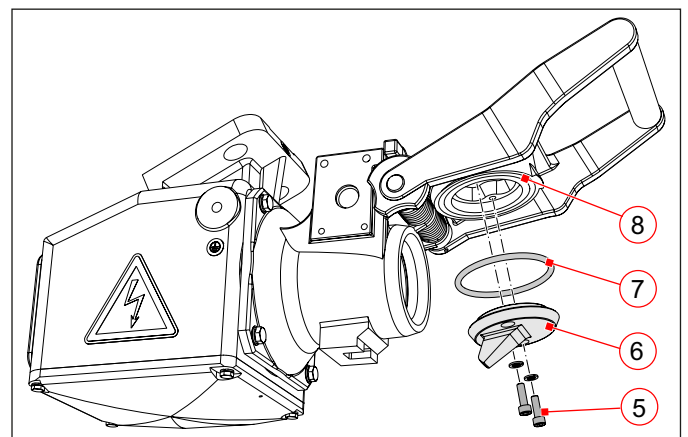


Fig. 48: Replace the sealing ring (7) for the receptacle lid

Replace the seal for the lower shell cover (Fig. 49)

- ▶ Release the 4 hexagon screws M6 (8) of the lower shell cover (9) and remove the shell cover.
- ▶ Remove the old seal (10) and carefully clean the glued surface as well as the sealing surface, e.g. with acetone. The glued surface must be free of grease.
- ▶ Use adhesive Loctite 480 and glue a new seal (10) into the cleaned and greaseless lower shell cover (9).
- ▶ Attach the shell cover (9) with the glued in seal (10) again and screw on.
Torque for the shell cover screws: 6 Nm

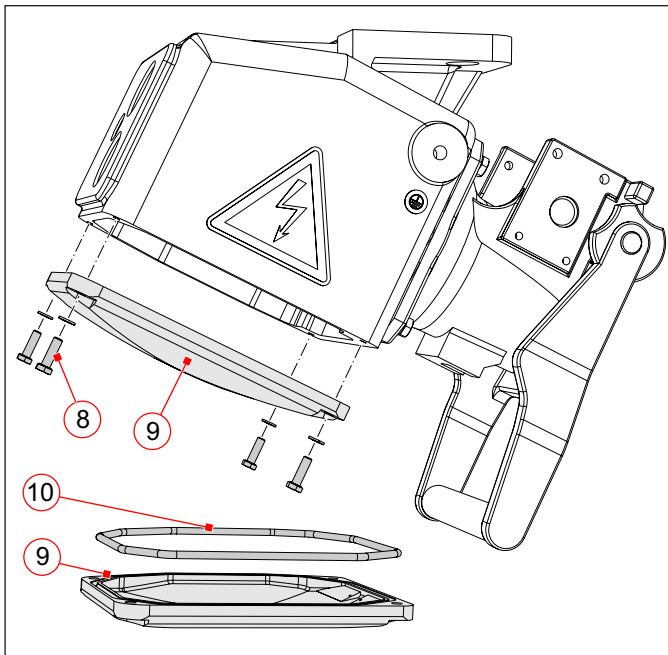


Fig. 49: Replace the seal (10) for the lower shell cover

Replace the seal of the bottom part of the shell (Fig. 50)

- ▶ For replacing the seal of the bottom part of the shell (12), unscrew the 4 hexagon screws M8 (11) and remove the bottom part of the shell.
- ▶ Remove the old seal (13) and carefully clean the adhesive surface as well as the sealing surface, e.g. with acetone. The adhesive surface must be free of grease.
- ▶ Glue a new seal (13) with adhesive Loctite 480 to the cleaned and greaseless bottom part of the shell (12).

- ▶ Attach the bottom part of the shell (12) with the glued on seal and screw on with the 4 hexagon screws M8 (11) including spring lock washers.
Torque for the hexagon screws: 10 Nm

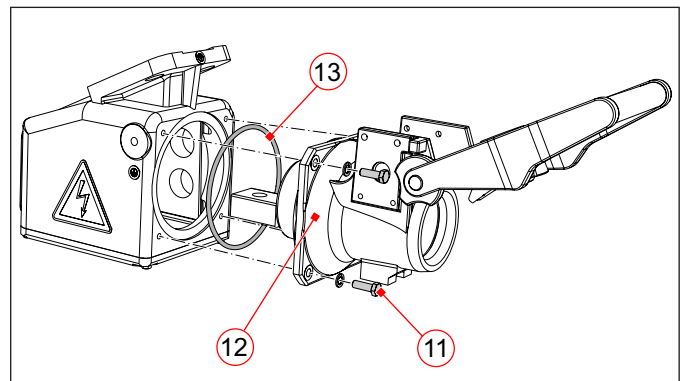


Fig. 50: Replace the seal (13) of the bottom part of the shell

Replace the Locking Washer of the Receptacle Lid (Fig. 51)

When the locking washer on the receptacle lid is damaged, it has to be replaced immediately for reasons of safety.

- ▶ For this, release the 2 cylinder screws M6 x 10 (5) of the locking washer (6) using a hexagon socket wrench and remove the old locking washer.
- ▶ Check the sealing ring (20) for damages. In the case of damages, replace the sealing ring (see section "Replace the sealing ring for the receptacle lid (Fig. 48)" on page 38).
- ▶ Attach a new locking washer (19), observing the mounting position, and screw on with the cylinder screws (18) including spring lock washers.
Torque for the cylinder screws: 3 Nm

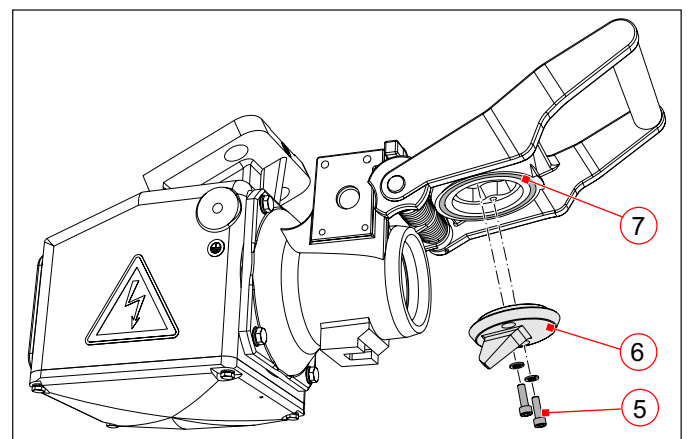


Fig. 51: Replace the locking washer (6) of the receptacle lid

Replace the Coupling Insert (Fig. 52)

If the contact socket or the insulating sleeve of the coupling receptacle are damaged, the complete coupling insert (Fig. 52/22) must be replaced for safety reasons.

- ▶ For the removal of the coupling insert, first remove the lower shell cover of the coupling receptacle and disconnect the cables (for this, see section **"5.4 Connecting the Coupling Receptacle"** on page 19).
- ▶ Remove the bottom part of the shell (for this, see section **"Replace the seal of the bottom part of the shell (Fig. 50)"** on page 39).
- ▶ Release the 6 hexagon screws M6 (20) of the mounting ring (21) and remove the mounting ring.
- ▶ Pull the complete coupling insert (22) out of the bottom part of the shell (23).
- ▶ Lubricate the sliding surfaces of the contact socket in the new, complete coupling insert (22) with contact grease (e.g. contact grease copper 02770 of the company Druseidt).
- ▶ Insert the new coupling insert (22) into the bottom part of the shell (23).
- ▶ Attach the mounting ring (21) to the bottom part of the shell (23) and screw on with the 6 hexagon screws M6 (20) and spring lock washers.
Torque for the hexagon screws: 10 Nm

- ▶ Connect the cable with the hexagon screw to the connecting piece (for this, see also section **"5.4 Connecting the Coupling Receptacle"** on page 19).
Torque for the cable connecting screw: 200 Nm
- ▶ Check the seal of the lower shell cover for the receptacle. If there are damages, replace the seal (for this, see section **"Replace the seal for the lower shell cover (Fig. 49)"** on page 39).
- ▶ Attach the lower shell cover with the glued in seal again and screw on (see page 39).
Torque for the shell cover screws: 6 Nm

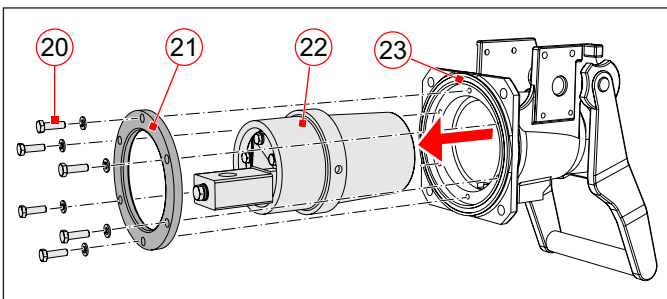


Fig. 52: Replace the complete coupling insert (22)

- ▶ Check the seal of the bottom part of the shell (23) for damages. If there are damages, replace the seal (for this, see section **"Replace the seal of the bottom part of the shell (Fig. 50)"** on page 39).
- ▶ Then attach the bottom part of the shell (23) to the receptacle shell and screw on with the 4 hexagon screws M8 (11) including spring lock washers.
Torque for the hexagon screws: 10 Nm

7.4 Visual and Functional Inspection/Maintenance of Plugs with Single Ended and Double Ended Connector Cables

| Connector element | Visual and functional check | Measures |
|--------------------------------------|--|---|
| Plugs | Check for: <ul style="list-style-type: none"> ▶ ease of movement when plugging ▶ damage or wear and tear <ul style="list-style-type: none"> - on the upper part of the plug - on the handle - on the safety notch on the upper part of the plug - on the sealing surface to the coupling receptacle ▶ dirt, moisture, snow, ice ▶ cracks and ruptured patches ▶ secure attachment of the pin contact ▶ loose or missing fastening elements ▶ signs of moisture ▶ traces of burn-off or carbonisation on the pin contact | In case of defects: <ul style="list-style-type: none"> ▶ remove any existing dirt, moisture, snow or ice without residue ▶ for all other defects: immediately replace plug with cable |
| Cables (single ended / double ended) | Check for: <ul style="list-style-type: none"> ▶ damages to the coating ▶ kinks or crushing points ▶ signs of mechanical excessive stress and of too high temperature | In case of defects: <ul style="list-style-type: none"> ▶ immediately replace complete plug with single ended cable or double ended cable with plugs respectively |

7.5 Visual and Functional Inspection/Maintenance of the Dummy Receptacle

| Connector element | Visual and functional check | Measures |
|---|---|--|
| Dummy receptacle | Check for: <ul style="list-style-type: none"> ▶ damage or wear and tear ▶ dirt, moisture, snow, ice ▶ cracks and ruptured patches ▶ loose or missing fastening elements | In case of defects: <ul style="list-style-type: none"> ▶ remove any existing dirt, moisture, snow or ice without residue ▶ for all other defects immediately replace the complete dummy receptacle |
| Key lock (only dummy receptacles with optional key lock) | Check for: <ul style="list-style-type: none"> ▶ Fault at the key lock | In case of defects: <ul style="list-style-type: none"> ▶ Immediately replace a faulty key lock |
| Warning plate ("Warning - live voltage") | Check for: <ul style="list-style-type: none"> ▶ damage of the warning plate or warning plate non-existent | In case of defects: <ul style="list-style-type: none"> ▶ replace a damaged or non-existent warning plate |

7.6 Visual and Functional Inspection/Maintenance of the Cable Junction Box

| Connector element | Visual and functional check | Measures |
|--|--|--|
| Cable junction box - shell | Check for: <ul style="list-style-type: none"> ▶ damage or wear and tear ▶ cracks and ruptured patches ▶ loose or missing fastening elements ▶ clogged and contaminated condensate drainage on the lower shell cover ▶ damaged cable glands ▶ damaged seals | In case of defects: <ul style="list-style-type: none"> ▶ immediately replace damaged parts ▶ clean a clogged or contaminated condensate drainage |
| Shell cover seal | Check for: <ul style="list-style-type: none"> ▶ visible damage ▶ secure attachment ▶ cracks or porosity, dented places | In case of defects: <ul style="list-style-type: none"> ▶ immediately replace a damaged seal |
| Clamping piece, clamping piece carrier of the cable junction box | Check for: <ul style="list-style-type: none"> ▶ visible damage ▶ loose or ineffective fastening elements ▶ dirt | In case of defects: <ul style="list-style-type: none"> ▶ remove existent dirt without leaving any residue ▶ immediately replace damaged parts |
| Warning plate ("Warning - live voltage") | Check for: <ul style="list-style-type: none"> ▶ damage of the warning plate or warning plate non-existent | In case of defects: <ul style="list-style-type: none"> ▶ replace a damaged or non-existent warning plate |

Replace the Seal of the Shell Cover (Fig. 53)

- ▶ For replacing of the shell cover seal of the cable junction box, release the 6 hexagon screws M6 (2) on the bottom side of the shell cover (1) and remove the shell cover.
- ▶ Remove the old seal (3) and carefully clean the annular groove as well as the sealing surface, e.g. with acetone. The annular groove must be free of grease.
- ▶ Cut off a new endless round cord seal to the required length.
- ▶ Glue the prepared round cord seal (3) with adhesive Loctite 480 into the cleaned and greaseless annular groove of the shell cover and glue the open ends of the round cord seal together.
- ▶ Lubricate the 6 hexagon screws M6 (2) for the shell cover with low-temperature lubrication grease OPTITEMP TT1.
- ▶ Attach the shell cover (1) with the glued in seal (3) again and screw on with the 6 hexagon screws (2) and spring lock washers.
Torque for the cover screws: 6 Nm

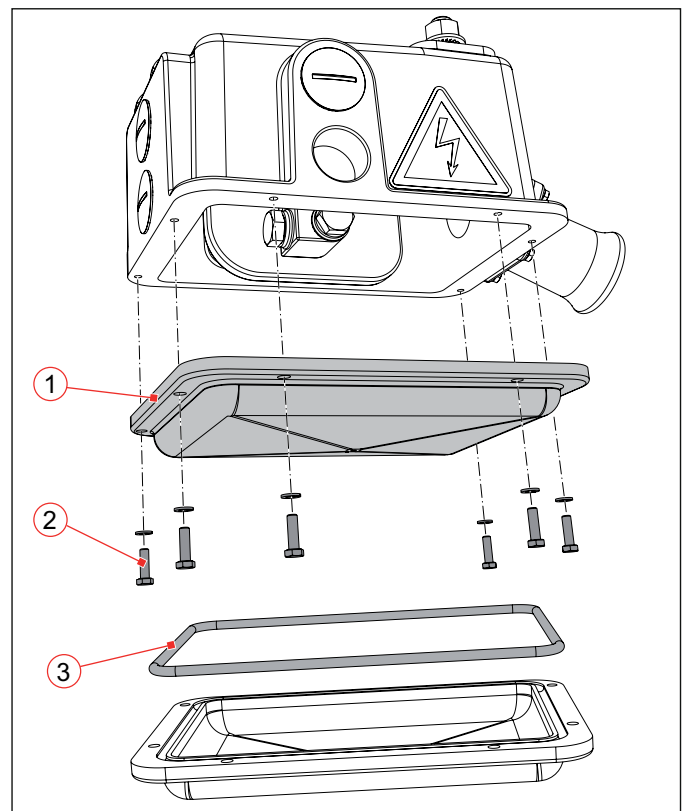


Fig. 53: Replace cover seal (3) of the cable junction box

Replace the Clamping Piece Carrier and/or the Clamping Piece (Fig. 54)

- ▶ For replacing the clamping piece carrier and/or clamping piece, release the 6 hexagon screws M8 (Fig. 53/2) on the bottom side of the shell cover (1) of the cable junction box and remove the shell cover.
- ▶ Release the hexagon screws (Fig. 54/4) and disconnect the cables.
- ▶ For dismantling the clamping piece carrier (6), release the 3 hexagon screws M8 (5) on the shell.
- ▶ If only the clamping piece carrier or only the clamping piece has to be replaced, release the two Allen screws M8 (7) and remove the clamping piece (8) from the clamping piece carrier (6).
- ▶ Replace the clamping piece carrier (6) and/or the clamping piece (8).
- ▶ Screw the clamping piece (8) with the two Allen screws (7) and spring lock washers to the clamping piece carrier (6). Torque: 10 Nm
- ▶ Screw the clamping piece carrier (6) with the 3 hexagon screws M8 (5) and spring lock washers to the shell. Torque: 10 Nm
- ▶ Connect the cables again with the hexagon screws (4). Torque: 80 Nm
- ▶ Check the seal of the shell cover. If there are damages, replace the seal (for this, see section **“Replace the Seal of the Shell Cover (Fig. 53)”** on page 42).
- ▶ Lubricate the 6 hexagon screws M8 (Fig. 53/2) for the shell cover (1) with low-temperature lubrication grease OPTITEMP TT1.

- ▶ Attach the shell cover (1) with the glued in seal (3) again and screw on with the 6 hexagon screws (2) and spring lock washers.
Torque for the cover screws: 6 Nm.

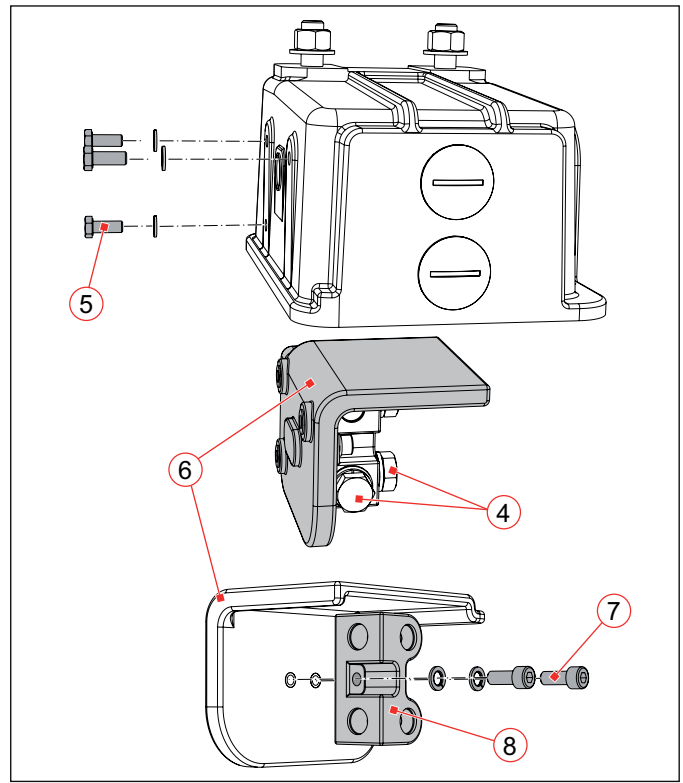


Fig. 54: Replace the clamping piece carrier (6) and/or the clamping piece (8)

7.7 Visual and Functional Inspection / Maintenance of the Junction Box for the Train Bus Bar

| Connector element | Visual and functional check | Measures |
|--|--|--|
| Shell of the junction box | Check for: <ul style="list-style-type: none"> ▶ damage or wear and tear ▶ cracks and ruptured patches ▶ loose or missing fastening elements ▶ clogged and contaminated condensate drainage on the lower shell cover ▶ damaged cable glands ▶ damaged seals | In case of defects: <ul style="list-style-type: none"> ▶ immediately replace damaged parts ▶ clean a clogged or contaminated condensate drainage |
| Shell cover seal | Check for: <ul style="list-style-type: none"> ▶ visible damage ▶ secure attachment ▶ cracks or porosity, dented places | In case of defects: <ul style="list-style-type: none"> ▶ immediately replace a damaged seal |
| Junction box - insert | Check for: <ul style="list-style-type: none"> ▶ visible damage ▶ loose or ineffective fastening elements ▶ dirt | In case of defects: <ul style="list-style-type: none"> ▶ remove existent dirt without leaving any residue ▶ immediately replace damaged parts |
| Earthing cable / strap (not included in the delivery from Schaltbau) | Check for: <ul style="list-style-type: none"> ▶ damage on earthing cable / strap ▶ loose or missing fastening elements | In case of defects: <ul style="list-style-type: none"> ▶ immediately replace a damaged or loose earthing cable / strap |
| Warning plate ("Warning - live voltage") | Check for: <ul style="list-style-type: none"> ▶ damage of the warning plate or warning plate non-existent | In case of defects: <ul style="list-style-type: none"> ▶ replace a damaged or non-existent warning plate |

Replace the Seal of the Shell Cover of the Junction Box (Fig. 55)

- ▶ For replacing the seal of the shell cover, release the 4 hexagon screws M8 (2) of the cover (1) on the bottom side of the junction box.
- ▶ Remove the shell cover (1) together with the glued in seal.
- ▶ Remove the old seal (3) and carefully clean the annular groove as well as sealing surface, e.g. with acetone. The annular groove must be free of grease.
- ▶ Cut off a new endless round cord seal to the required length.
- ▶ Glue the prepared round cord seal (3) with adhesive Loctite 480 into the cleaned and greaseless annular groove of the shell cover and glue the open ends of the round cord seal together
- ▶ Lubricate the 4 hexagon screws M8 (2) for the shell cover with low-temperature lubrication grease OPTITEMP TT1.
- ▶ Attach the shell cover (1) again and screw on with the hexagon screws (2) and spring lock washers. Torque for the cover screws: 10 Nm

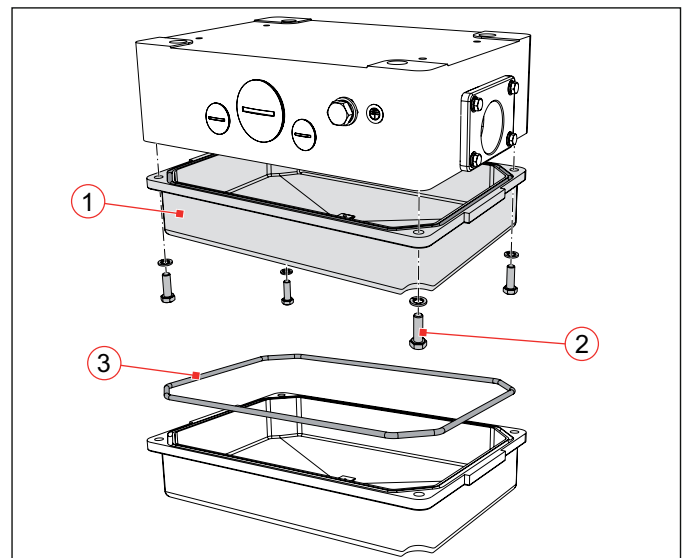


Fig. 55: Replace seal of the shell cover of the junction box

8. Spare Parts

| Spare parts for ZH550 Receptacles (Fig. 56) | | |
|---|---------------------------------------|-----|
| Item | Designation | Pcs |
| 4 | Seal for shell cover | 1 |
| 5 | Sealing ring for receptacle lid | 1 |
| 6 | Locking washer | 1 |
| 7 | Seal for the bottom part of the shell | 1 |
| 8 | Coupling insert complete. | 1 |
| without | ZH550 VS1/VS2 Key | 1 |
| without | Key lock complete | 1 |
| without | Pilot contact | 1 |

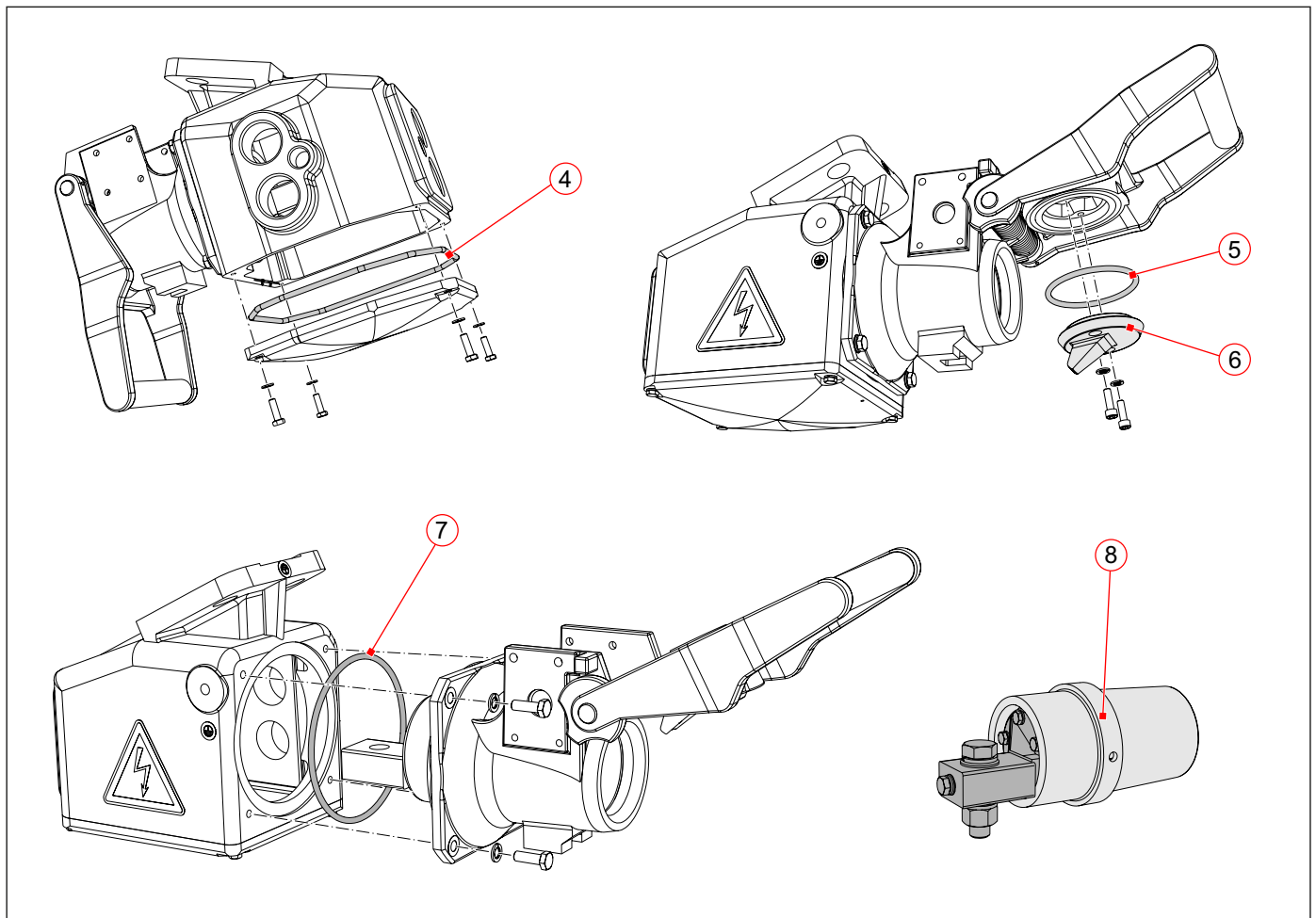


Fig. 56: Spare parts for the ZH550 Receptacles

| Spare parts for ZH551/ZH622 plugs with single ended cable / double ended cable (Fig. 57) | | |
|--|--|-----|
| Item | Designation | Pcs |
| 9 | Plug with single ended connector cable ZH551 SK | 1 |
| 10 | Double ended connector cable with 2 plugs ZH622 VK | 1 |

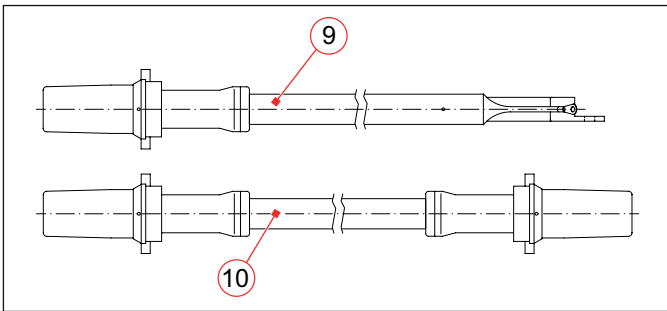


Fig. 57: Spare parts for ZH 551/ZH 622 plugs with single ended / double ended connector cable

| Spare parts for the ZH092 dummy receptacle (Fig. 58) | | |
|--|------------------------|-----|
| Item | Designation | Pcs |
| 11 | Dummy Receptacle ZH092 | 1 |
| without | ZH550 VS1/VS2 Key | 1 |
| without | ZH092 Key lock | 1 |

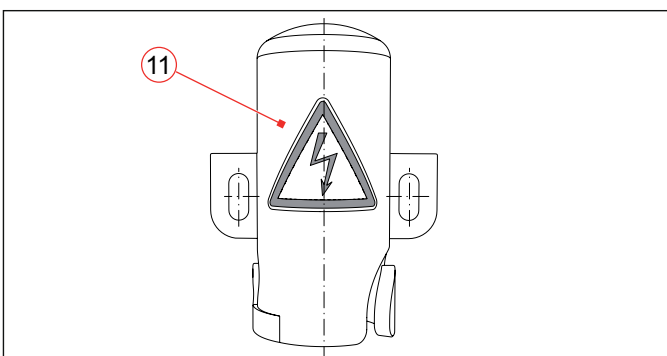


Fig. 58: Spare parts for the ZH 092 dummy receptacle

| Spare parts for the ZH552 cable junction box (Fig. 59) | | |
|--|-----------------------------|-----|
| Item | Designation | Pcs |
| 12 | Clamping piece carrier | 1 |
| 13 | Clamping piece | 1 |
| 14 | Seal foam rubber round cord | 1 |

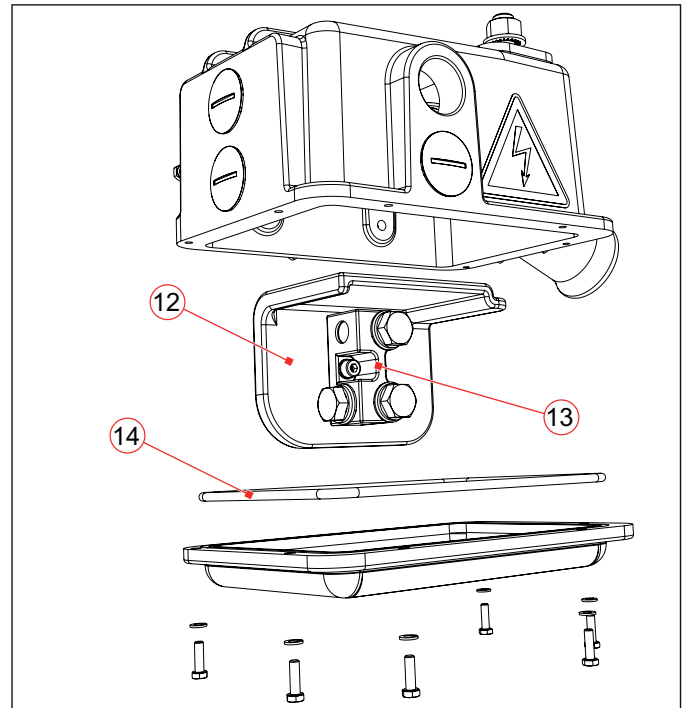


Fig. 59: Spare parts for the ZH 552 cable junction box

| Spare parts for the ZH952 junction box for the train bus bar (Fig. 60) | | |
|--|-----------------------------|-----|
| Item | Designation | Pcs |
| 15 | Seal foam rubber round cord | 1 |

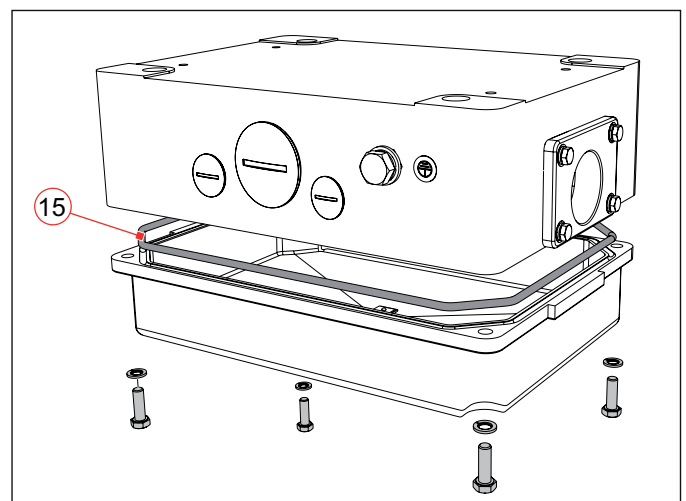


Fig. 60: Spare parts for the ZH 952 junction box for the train bus bar

9. Technical Data

Specifications and information on the material characteristics for the connectors in the UIC 552 series are given in our catalogue **F122.en**.

Due to our continuous improvement programme, the design of our products can be modified at any time. So some features may differ from the descriptions, specifications and drawings in the catalogue. You can download the latest update of the catalogue at: <https://www.schaltbau-gmbh.com/en/Download/Product-information/Connectors/>. The updated catalogue renders the previous issue invalid.

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Snap-action switches with self-cleaning contacts
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High-voltage heaters
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Equipment for electric brakes
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