Connectors

UIC Series
Inter-car jumpers
to UIC 558 VE

Catalogue F120.en
Schaltbau jumpers for inter-car connections to UIC standard – cost-effective, durable and highly reliable

The rugged jumpers typically connect lines used for the remote control of lights and train doors or for public address systems in passenger coaches of trains or diesel and electric multiple units. They are also ideally suited for the transmission of binary data, as for instance, via CAN bus.

Break-away connector that ensures, provided the receptacle is installed in the correct position, a non-destructive separation of plug and receptacle when two electrically not decoupled vehicles move apart. The jumpers fully comply with the requirements of UIC 558 VE (until 1994: UIC 568 VE).

Features

- **Break-away connector:**
  Ensures a non-destructive separation of plug and receptacle when two electrically not decoupled vehicles move apart in accordance with UIC 558

- **Design life:**
  10,000 mating cycles

- **Cable assembly:**
  We supply on request receptacles and plugs assembled complete with cables or wires to suit the customer’s specific requirements

- **Seal:**
  IP67: receptacle, also empty and dummy receptacle, with closed lid, IP69K: connector when mated; cable entry of plug included

- **Weather proof - and temperature resistant:**
  -50° C min. up to +90° C max., no material excluded

- **Corrosion resistant**
  Increased corrosion resistance to chemicals, in particular to detergents containing acids or alkalis

- **Assembly:**
  - Suitable for gangway connections
  - Quick and easy to assemble
  - Seals can be replaced without disassembling the contacts

- **Flammability:**
  - UL94-V0 listed
  - Complies with fire protection standard EN 45545

- **Shells:**
  Shells of plug, receptacle, dummy and empty receptacle, compliant with UIC 558

- **New: Replacement insert**
  Schaltbau has developed a new replacement insert for the receptacle of the UIC 558 connector which is likely to reduce maintenance and downtime considerably. For if during maintenance it becomes necessary to replace worn contacts, there is no need of a cable replacement any longer. All you need do is exchange the replacement insert of the receptacle. You can do that from the front and outside the engine shed and even do without the electrical test of the connector’s contacts and wires

- **Receptacle, dummy and empty receptacle:**
  Aluminium die cast: rugged and durable

- **Plug:**
  Polyamide, glass fibre reinforced

- **Inserts:**
  - 13, 18 and 22 pole + PE
  - Compatible with 13 or 18 pole inserts to UIC standard
  - 13 pole plug intermateable with 18 pole receptacle in accordance with UIC 558 VE
  - Polyamide, glass fibre reinforced

- **Contacts:**
  - High-quality machined contacts
  - Nickel, silver or gold plated
  - Crimp connection 18 ... 17 AWG (0.75 ... 1.00 mm²)
  - Continuous low contact resistance
### Specifications

<table>
<thead>
<tr>
<th>UIC Series</th>
<th>Standard</th>
<th>13 pole</th>
<th>18 pole</th>
<th>22 pole + PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jumper to UIC standard</td>
<td>UIC 558 VE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(until 1994: UIC 568 VE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Layout**

- **Contact cavities:**
  - Implemented
  - Empty

**Contact arrangement**

- Contact identification marked on insert
- Pin insert: front view
- Socket insert: rear view

**Rated operating voltage, no PE**

| IEC 60038 | 60 V | 60 V | 60 V |

**Rated operating voltage, plus PE**

| | --- | --- | 110 V |

**Rated insulation voltage**

- at pollution degree
  - 100 V PD3A
  - 100 V PD3A
  - 100 V / 150 V PD3A / PD3

**Current rating of individual contacts**

- 10 A
- 10 A *1
- 10 A

**Terminal type**

- Crimp, machined contacts
- Crimp, machined contacts
- Crimp, machined contacts

**Contact diameter**

- 3 mm
- 3 mm
- 3 mm

**Connector type**

- Cable plug
- Receptacle
- Receptacle with replacement insert

- Pin contacts
- Socket contacts
- Pin contacts
- Socket contacts
- Pin contacts
- Socket contacts

**Wire gauge**

- IEC 60512-2
- 18 ... 17 AWG
- 18 ... 17 AWG
- 18 ... 17 AWG

**Contact resistance, typ. with replacement insert**

- IEC 60512-3-1
- < 4 mΩ
- < 4 mΩ
- < 4 mΩ

**Insulation resistance**

- > 10 MΩ
- > 10 MΩ
- > 10 MΩ

**IP rating**

- EN 60529
- IP69K: Plug connection when mated; cable entry of plug included
- IP67: receptacle, also empty and dummy receptacle, with closed lid

**Shock, Vibration**

- EN 61373
- Category 1, Class B

**Operating temperature range**

- –50 °C ... +90 °C

**Mechanical endurance**

- IEC 60512-5, test 9a
- 10,000 mating cycles

**Shells/Contact material**

- **Receptacle shell**
  - Colour *4
  - Aluminium die cast RAL 7035 (light grey)
  - Polyamide PA 6 GF30 black
  - Silicone
  - Polyamide PA 6 GF30 black non-halogen
  - Copper wrought alloy, crimpable Ni / Ag / Au

- **Plug shell**
  - Colour *4
  - Aluminium die cast RAL 7035 (light grey) + red bar
  - Polyamide PA 6 GF30 black + red bar
  - Silicone
  - Polyamide PA 6 GF30 black non-halogen
  - Copper wrought alloy, crimpable Ni / Ag / Au

- **Seal**
  - Silicone

- **Insert**
  - Polyamide PA 6 GF30 black non-halogen

**Contacts**

- **Finish *5**
  - Copper wrought alloy, crimpable Ni / Ag / Au

**Approvals**

- EAC
- EAC
- EAC

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### Quality and Safety

**Rail vehicles in good hands – with Schaltbau connectors**

The development, manufacture and assembly of our products are subject to the quality management provisions of DIN EN ISO 9001 and IRIS (International Railway Industry Standard). Continuous testing guarantees consistently high quality. Your benefit: Great performance at low operating costs. Maximum operating reliability and long lifetime of your rolling stock.

*1 Current rating of individual contacts with replacement insert: maximum temperature rise 70 K at 10 A, exceeding by far the 30 K at 1 A according to UIC 558 VE.

*2 Contact resistance with replacement insert: after climate test < 200 mΩ typ.

*3 Standard is nickel. Silver or gold plated contacts upon request (not available for BT, CA).

*4 Colour: RAL.

*5 Standard is nickel. Silver or gold plated contacts upon request.
### Ordering code

Example: **UIC SL 18P ER D2 Lxxxx**

**Series**
- **UIC**
  - Inter-car jumpers to UIC 558 VE

**Plug / receptacle / dummy / empty**
- **SL**
  - Plug, pre-assembled with connector cable
- **VK**
  - Connector cable, double ended, pre-assembled
- **ST**
  - Plug
- **DL**
  - Socket insert, pre-assembled with connector cable
- **BT**
  - Replacement insert, requiring CA *
- **CA**
  - Crimp adapter, requiring BT *
- **KD**
  - Receptacle *
- **BD**
  - Dummy receptacle with insert, no contacts
- **LD**
  - Empty receptacle, no insert implemented
- **KK**
  - Cable gland Pg21 for through hole mounting

**Insert: Number of / type of contacts / finish**
- **13P**
  - Plug: 13 pole pin, nickel plated
- **18P**
  - Plug: 18 pole pin, nickel plated
- **22P**
  - Plug: 22 pole + PE pin, nickel plated
- **13S**
  - Receptacle: 13 pole socket, nickel plated
- **18S/P**
  - Replacement insert: 18 pole socket on both ends, nickel plated
- **18S**
  - Receptacle: 18 pole socket, nickel plated
- **22S**
  - Receptacle: 22 pole + PE socket, nickel plated
- **130-180-220**
  - Dummy receptacle: with insert, no contacts implemented
- **00**
  - Empty receptacle: no insert implemented

**Colour of shell**
- **E** for plug: black
- **R** for plug: red
- **C** for receptacle: RAL 7035, light grey, acc. to standard
- **D** for receptacle: RAL 3020, traffic red
- **F** for receptacle: RAL 7012, basalt grey
- **G** for receptacle: RAL 5022, night blue
- **T** for receptacle: RAL 7022, umbra grey
- **0** for socket insert: black

**Colour marking**
- **R** red: only for 18 pole jumpers, acc. to standard
- **B** blue: only for 22 pole +PE jumpers
- **0** none

**Cable gland**
- **D1**
  - only plug: for cable diameters 12.5 ... 15.5 mm
- **D2**
  - only plugs: for cable diameters 16.5 ... 18.5 mm

**Connector cable**
- **Lxxxx**
  - Cable length (for assembled cable sets only with the length you require)
  - Length in mm

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**Note:**
This catalogue shows only stock items. For some variants minimum quantities apply. Please ask for the conditions.

**Special variant:**
If you need a special variant of the connector, please do not hesitate to contact us. Maybe the type of connector you are looking for is among our many special designs. If not, we can also supply customized designs. In this case, however, minimum ordering quantities apply.
Stock items  Variants for 18 pole jumpers  UIC series

- **UIC SL 18P ER Lxxxx**  Connector cable, single ended

  ![Connector Cable Diagram]

  - **UIC** Series
  - **SL** Plug with single ended connector cable
  - **18P** 18 pole, pins, nickel plated
  - **E** Colour of backshell: black
  - **R** Colour marking of backshell: red
  - **Lxxxx** Cable length in mm as required

- **UIC VK 18P ER Lxxxx**  Connector cable, double ended

  ![Connector Cable Diagram]

  - **UIC** Series
  - **VK** Plug with double ended connector cable
  - **18P** 18 pole, pins, nickel plated
  - **E** Colour of backshell: black
  - **R** Colour marking of backshell: red
  - **Lxxxx** Cable length in mm as required

- **Receptacle with insert and connector cable, including:**

  ![Receptacle Diagram]

  1. **UIC LD 180 CR**  Empty receptacle

     ![Empty Receptacle Diagram]

     - **UIC** Series
     - **LD** Empty receptacle
     - **180** with insert, no contacts
     - **C** RAL 7035, light grey
     - **R** Colour marking of shell: red

  2. **UIC DL 18S 00 Lxxxx**  Socket insert

     ![Socket Insert Diagram]

     - **UIC** Series
     - **DL** Socket insert with connector cable
     - **18S** 18 pole, sockets, nickel plated
     - **0** Colour of insert: black
     - **0** Colour marking: none
     - **Lxxxx** Cable length in mm as required

- **Receptacle with replacement insert, adapter and connector cable, including:**

  ![Receptacle Diagram]

  1. **UIC LD 180 CR ZW**  Empty receptacle

     ![Empty Receptacle Diagram]

     - **UIC** Series
     - **LD** Empty receptacle
     - **180** with insert, no contacts
     - **C** RAL 7035, light grey
     - **R** Colour marking of shell: red
     - **ZW** Empty receptacle with centring guide

  2. **UIC BT 18S/P**  Replacement insert

     ![Replacement Insert Diagram]

     - **UIC** Series
     - **BT** Replacement insert, only together with crimp adapter
     - **18S/P** 18 pole, sockets, implemented at both ends, nickel plated

  3. **UIC CA 18P 00 Lxxxx**  Crimp adapter with connector cable

     ![Crimp Adapter Diagram]

     - **UIC** Series
     - **CA** Crimp adapter
     - **18P** 18 pole, pins, nickel plated
     - **0** Colour of insert: black
     - **0** Colour marking: none
     - **Lxxxx** Cable length in mm as required

- **UIC ST 18P ER D2**  Plug

  ![Plug Diagram]

  - **UIC** Series
  - **ST** Plug
  - **18P** 18 pole, pins, nickel plated
  - **E** Colour of backshell: black
  - **R** Colour marking of backshell: red
  - **D2** Cable gland Ø 16.5 ... 18.5 mm

- **UIC KD 18S CR**  Receptacle

  ![Receptacle Diagram]

  - **UIC** Series
  - **KD** Receptacle
  - **18S** 18 pole, sockets, nickel plated
  - **C** RAL 7035, light grey
  - **R** Colour marking of shell: red

Subject to change
**Connector cable** pre-assembled cable sets for plugs

- **UIC SL 13P E0 Lxxxx** 13 pole plug with single ended connector cable

  13x pin contacts

  - Backshell

  - 13 pins

  - Cable length Lxxxx in mm

**Single ended connector cable with 13 pole plug and cable harness, pre-assembled with the length you require**

<table>
<thead>
<tr>
<th>Layout</th>
<th>Ordering code</th>
<th>Colour</th>
<th># of contacts</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UIC SL 13P E0 Lxxxx</td>
<td>black, no colour marking</td>
<td>13 pins</td>
<td>Cable length Lxxxx in mm</td>
</tr>
</tbody>
</table>

- **UIC SL 18P ER Lxxxx** 18 pole plug with single ended connector cable

  18x pin contacts

  - Colour marking

  - Backshell

  - 18 pins

  - Cable length Lxxxx in mm

**Single ended connector cable with 18 pole plug, pre-assembled with the length you require**

<table>
<thead>
<tr>
<th>Layout</th>
<th>Ordering code</th>
<th>Colour</th>
<th># of contacts</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UIC SL 18P ER Lxxxx</td>
<td>black, red colour marking</td>
<td>18 pins</td>
<td>Cable length Lxxxx in mm</td>
</tr>
</tbody>
</table>

**Connector cable** pre-assembled cable sets for plugs

- **UIC VK 13P E0 Lxxxx, UIC VK 18P ER Lxxxx** 18 pole double ended connector cables with 2 plugs

  18x pin contacts

  - Colour marking

  - Backshell

  - 18 pins

  - Cable length Lxxxx in mm

**Double ended connector cables with plugs, pre-assembled with the length you require**

<table>
<thead>
<tr>
<th>Layout</th>
<th>Ordering code</th>
<th>Colour</th>
<th># of contacts</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UIC VK 13P E0 Lxxxx</td>
<td>black, no colour marking</td>
<td>13 pins</td>
<td>Cable length Lxxxx in mm</td>
</tr>
</tbody>
</table>

|          | UIC VK 18P ER Lxxxx | black, colour marking: red | 18 pins       | Cable length Lxxxx in mm |

**Note:**

- 13 pole plug, with 18 wire connector cable (5 wires not used)
Connector cable  pre-assembled cable sets for receptacles  UIC series

- 13 pole receptacle with socket insert and single ended connector cable, including:

  Empty receptacle UIC, see table ①

  Socket insert 13 pole, see table ⑦

<table>
<thead>
<tr>
<th>Ordering code</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>UIC LD 130 CD</td>
<td>RAL 7035, light grey</td>
</tr>
</tbody>
</table>

  **Note:**
  - 13 pole socket insert with 18 wire connector cable (5 wires not used)

- 18 pole receptacle with socket insert and single ended connector cable, including:

  Empty receptacle UIC, see table ①

  Socket insert 18 pole, see table ⑦

  Colour marking: red

<table>
<thead>
<tr>
<th>Ordering code</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>UIC LD 180 CR</td>
<td>RAL 7035, light grey  Colour marking: red</td>
</tr>
</tbody>
</table>

  **Note:**
  - 18 pole socket insert with 18 wire connector cable (5 wires not used)
Replacement insert for receptacle pre-assembled

- Replacement insert for 18 pole receptacles

Schaltbau has developed a new replacement insert for the 18 pole receptacle which is likely to reduce maintenance and downtime considerably. For if during maintenance it becomes necessary to replace worn contacts, there is no need of a cable replacement any longer. All you need do is exchange the replacement insert of the receptacle. You can do that from the front and outside the engine shed and even do without the electrical test of the connector’s contacts and wires.

Features
- Replacement insert implemented with sockets on both ends
- Crimp adapter with per-assembled cable
- Insert can be replaced on site
- No need of rewiring the rail vehicle
- No need of electrical testing the jumper’s contacts and wires

- 18 pole receptacle with replacement insert, crimp adapter and single ended connector cable, including:

<table>
<thead>
<tr>
<th>Empty receptacle</th>
<th>Replacement insert 18 pole</th>
<th>Crimp adapter 18 pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>UIC LD 180 CR ZW</td>
<td>UIC BT 18S/P</td>
<td></td>
</tr>
<tr>
<td>Colour marking: red</td>
<td>Colour marking: red</td>
<td>Colour marking: red</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Replacement insert 18 pole</th>
<th>Crimp adapter 18 pole with single ended connector cable, pre-assembled with the length you require, see Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>UIC CA 18P 00 Lxxxx</td>
<td>18 pins</td>
</tr>
</tbody>
</table>

Dimensions in mm / Subject to change
Plug

Receptacle, dummy and empty receptacle

- Receptacle, dummy:
  - 13, 18, 22 pole

- Empty receptacle:
  - Shell only

Receptacle, Table

<table>
<thead>
<tr>
<th>Ordering code</th>
<th># of contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>UIC KD 13S C0</td>
<td>13</td>
</tr>
<tr>
<td>UIC KD 18S CR</td>
<td>18</td>
</tr>
<tr>
<td>UIC KD 22S CB</td>
<td>22</td>
</tr>
</tbody>
</table>

Empty receptacle, Table

<table>
<thead>
<tr>
<th>Ordering code</th>
<th># of contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>UIC LD 130 C0</td>
<td>---</td>
</tr>
<tr>
<td>UIC LD 180 CR</td>
<td>---</td>
</tr>
<tr>
<td>UIC LD 220 CB</td>
<td>---</td>
</tr>
</tbody>
</table>

Note:
- All socket contacts included in delivery
- For options, such as switching contact, earthing bolt or other shell colours, refer to Ordering code, p. 4, or contact us.

Pin and socket contacts

- Pin contact

- Socket contact

Pin contact

<table>
<thead>
<tr>
<th>Ordering code</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHC-1,00-Ni-30</td>
<td>Nickel</td>
</tr>
<tr>
<td>SHC-1,00-Au-30</td>
<td>Gold*</td>
</tr>
<tr>
<td>SHC-1,00-Ag-30</td>
<td>Silver*</td>
</tr>
</tbody>
</table>

Socket contact

<table>
<thead>
<tr>
<th>Ordering code</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>BHC-1,00-Ni-30</td>
<td>Nickel</td>
</tr>
<tr>
<td>BHC-1,00-Au-30</td>
<td>Gold*</td>
</tr>
<tr>
<td>BHC-1,00-Ag-30</td>
<td>Silver*</td>
</tr>
</tbody>
</table>

Specifications

<table>
<thead>
<tr>
<th>Wire gauge</th>
<th>Current rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>18...17 AWG</td>
<td>10 A</td>
</tr>
<tr>
<td>18...17 AWG</td>
<td>10 A</td>
</tr>
</tbody>
</table>

* Special design, upon request
Cable gland for through hole mounting

- Pg21 antikink cable glands:

Delivery:
Kit including the parts mentioned above. All parts individually packed.

<table>
<thead>
<tr>
<th>Ordering code</th>
<th>Crimp tool for</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWZ-600-1</td>
<td>Contacts, type H: SHC-x, BHC-x</td>
</tr>
</tbody>
</table>

Assembly and disassembly

- Extraction tool

<table>
<thead>
<tr>
<th>Ordering code</th>
<th>Extraction tool for</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWZ-B</td>
<td>Contacts, type H: SHC-x, BHC-x</td>
</tr>
</tbody>
</table>

- Extraction tool (not shown)

<table>
<thead>
<tr>
<th>Ordering code</th>
<th>Extraction tool for</th>
</tr>
</thead>
<tbody>
<tr>
<td>UIC-DWZ</td>
<td>Extraction of crimp adapter from replacement insert</td>
</tr>
</tbody>
</table>

Cable 18pole cable connectors, single and double ended

Both single and double ended 18 pole cable connectors comply with the EN 45545 standard and are delivered by the metre.

Ordering code: UIC558 adapter cable 18-pin

- Train bus: 1 x 2 x 18 AWG, wires 17, 18
- Signal cable: 4 x 4 x 17 AWG, wires 1 ... 12, 14 ... 16
- Shielded cable: Overall screen, Cu braid, wire 13

Note:
This type of cable is used for our pre-assembled 13 and 18 pole cable sets. The 18 wire cable is also used for 13 pole jumpers. In this case, however, 5 wires remain unconnected.

Mounting, holes, orientation

Schaltbau standard: >3 hole mounting<

Mounting orientation

As break-away connector the jumper ensures in compliance with UIC 558 a non-destructive separation of plug and receptacle when two electrically not decoupled vehicles move apart. To this end make sure to mount the receptacle upright onto the front end of the vehicle or carriage, so that the lid opens upwards.

* Diameter for all fixing and securing elements, such as screw heads: 12.5 mm max.
The UIC Series inter-car jumpers dealt with in this catalogue are intended for use with low-voltage systems and special installations. They are designed and tested in compliance with the generally recognised state of the art. However, the 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.

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 [schaltbau.info/download1en](http://schaltbau.info/download1en). The updated catalogue renders the previous issue invalid.

- 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 low-voltage systems as well as the proper use of tools approved for this purpose. Electric equipment requires protection from moisture and dust during installation, operation and storage.
- Electrical hazards: Any exposure to the connector’s live parts. Risk of electrical shock!
- Work on electric equipment may only be performed by a qualified electrician or trained personnel working under the direction and supervision of a qualified electrician according to the applicable rules of electrical engineering.
- 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 a qualified electrician or trained personnel working under the direction and supervision of a qualified electrician according to the applicable rules of electrical engineering.
- The connectors supply power and signals. They are intended for plug-in and detachable connections of components, devices and systems only.
- In order to comply with IEC 61984 make sure that always the live side of the connector – no matter whether plug or receptacle – is fitted with socket contacts. Crimp connections have to be manufactured according to IEC 60352-2 – Solderless Connections.

Installation and maintenance manual

For a detailed list of all safety, installation and maintenance instructions, download our manual [F120-M.en](http://schaltbau.info/F120-M.en).

Visual inspections

Be sure to make visual inspections regularly. Improper handling of the connector, e.g. when hitting the floor with some impact, can result in breakage, visible cracks and deformation.

Defective and/or leaky parts must be replaced instantaneously!

Electrical hazards: Any exposure to the connector’s live parts. Risk of electrical shock!

- Make sure that there is no undue strain, pressure, flexing and torsion on the cable connection.
- For optimum protection of the cable connection make sure the connector is supplied with a strain relief.
- According to IEC 61984 connectors used as intended must not be engaged or disengaged when live or under load.
- Crimp connections have to be manufactured according to IEC 60352-2 – Solderless Connections.
- When disengaging a connector, pull the plug and never the cable.
- 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.
- 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 plug is always inserted into a dummy receptacle
  - the hinged lid of receptacles is closed, according to its intended use
- 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.
- 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 on page 3 “Specifications”. 
Connectors
- Connectors manufactured to industry standards
- Connectors to suit the special requirements of communications engineering (MIL connectors)
- Charging connectors for battery-powered machines and systems
- Connectors for railway engineering, including UIC connectors
- Special connectors to suit customer requirements

Snap-action switches
- Snap-action switches with positive opening operation
- Snap-action switches with self-cleaning contacts
- Snap-action switch made of robust polyetherimide (PEI)
- Snap-action switch with two galvanically isolated contact bridges
- Special switches to suit customer requirements

Contactors
- Single and multi-pole DC contactors
- High-voltage AC/DC contactors
- Contactors for battery powered vehicles and power supplies
- Contactors for railway applications
- Terminal bolts and fuse holders
- DC emergency disconnect switches
- Special contactors to suit customer requirements

Electrics for rolling stock
- Equipment for driver’s cab
- Equipment for passenger use
- High-voltage switchgear
- High-voltage heaters
- High-voltage roof equipment
- Equipment for electric brakes
- Design and engineering of train electrics to customer requirements