Connectors

B Series
Connectors for rail vehicles
Catalogue F160.en

1

more information schaltbau.com
The connectors, B series, have been designed especially for the demanding railcar environment. They are superbly suited for power and control circuits on road and rail vehicles alike. The power connectors can be used in applications up to 400 V respectively. By adding control contacts, protection circuits may be realised such as the interlocking circuit shown in the diagram below.

### Features
- Rugged design
- Universally usable connectors for power and control circuits
- Easy replacement of components
- Easy assembly resulting in short assembly times
- Mechanically locking connector

### Standards
<table>
<thead>
<tr>
<th>B series</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC 61984: Connectors - Safety requirements and tests</td>
</tr>
<tr>
<td>DIN EN 60529: Degrees of protection provided by enclosures (IP Code)</td>
</tr>
<tr>
<td>IEC 60664-1: Insulation coordination for equipment within low-voltage systems</td>
</tr>
</tbody>
</table>

### 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.

### Stock items, special variants
- Presented in this catalogue are only stock items that can be supplied in short delivery time.

**Special variants**
If you need a special variant feel free 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 order quantities apply.
**Application** Interlocking circuit to protect personnel from contact with high voltages

**Components comprising the safety loop:**
- 2 plugs B ST with insert and 2 additional control contacts (e.g. pin insert B E-3P+PE+2 /M /150)
- 2 receptacles B Dx with contact bridge on cover, equipped with additional loop and control contacts (e.g. socket insert B E-3S+PE+4 /M /150)
- 2 dummy receptacles B BD with contact insert B E-2P /P with both control contacts (Pos. 2) bridged

**Intended use:**
The main contactor will apply voltage to the power circuit only when all covers are closed and all plugs have been inserted into their respective operating or dummy receptacles. At disengagement of a connector the control contacts (Pos. 1 and 4) interrupt the control circuit before the power contacts disconnect. Thus the main contactor interrupts power before the power contacts actually break their circuit.

**Assembled as set** Pre-assembled single and double ended connecting cables

- Single and double ended connecting cables
- Cables of different lengths and sizes
  - Individual cables laid inside corrugated pipe
  - Hybrid cables
  - Pre-assembled to customer requirements

Subject to change
## Specifications

### B series, number of contacts max.

<table>
<thead>
<tr>
<th>Inserts</th>
<th>3+PE + 2 pole / 3+PE + 4 pole</th>
<th>4 + 29 pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin insert</td>
<td>B E-3P+PE+2 /M</td>
<td>—</td>
</tr>
<tr>
<td>Socket insert</td>
<td>—</td>
<td>B E-3S+PE+2 /M</td>
</tr>
<tr>
<td>Dummy insert</td>
<td>B E-2P /P</td>
<td>B E-4P+29 /ML</td>
</tr>
</tbody>
</table>

### Contact arrangement

#### Contact identification marked on insert:
- Socket insert: Rear view
- Pin insert: Front view

#### Contact bridge on receptacle cover

#### Contacts bridged in socket insert

### Main contacts

- Max. rated current of individual contact
- Rated voltage: 400 / 230 V
- Contact type: V
- Terminals: Screws M10x25

### PE contact*

- Contact type: V
- Terminal: Screw M10x25

### Control contacts

- Max. rated current of individual contact
- Rated voltage: 400 / 230 V
- Contact type: C
- Terminals: Screws M5x10
- Crimp type: 0.75 mm² ... 1.00 mm²
- 1.50 mm²
- 2.50 mm²
- Contact resistance < 10 mΩ
- Insulation resistance > 100 MΩ
- Operating temperature**
- Degree of protection when mated or locked (EN 60529)
- Mechanical endurance (housing part 1) (IEC 60512-5, test 9a)

### Loop contacts (socket insert only)

- Max. rated current of individual contact
- Rated voltage: 60 / 25 V
- Contact type: —
- Terminals: Screws M5x10
- Contact resistance < 10 mΩ
- Insulation resistance > 100 MΩ
- Operating temperature**
- Degree of protection when mated or locked (EN 60529)
- Mechanical endurance (housing part 1) (IEC 60512-5, test 9a)

### Materials

- Housing: Die-cast aluminium
- Colour: RAL 7031 (blue grey)
- Inserts: Thermoplastic / Thermoset
- Seals: Perbunan, Neoprene
- Contacts: Copper, crimpable
- Finish: Ag

### Approvals

* PE = protective earthing contact

** Operating temperatures exceeding 25°C account for lower current ratings!
## Specifications

### B series, number of contacts max.

<table>
<thead>
<tr>
<th>Inserts</th>
<th>28 pole + PE</th>
<th>29 pole</th>
<th>59 pole + PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin insert</td>
<td>B E-28P+PE /M</td>
<td>B E-29P /M</td>
<td>B E-59P+PE /Cxx</td>
</tr>
<tr>
<td>Socket insert</td>
<td>B E-28S+PE /M</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Dummy insert</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

### Contact arrangement

<table>
<thead>
<tr>
<th>Contact identification marked on insert:</th>
<th>28 pole + PE</th>
<th>29 pole</th>
<th>59 pole + PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socket insert: Rear view</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pin insert: Front view</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Main contacts

| Max. rated current of individual contact | --- | --- | --- |
| Rated voltage | --- | --- | --- |
| Contact type | --- | --- | --- |
| Terminals | --- | --- | --- |

### PE contact*

| Contact type | --- | --- | --- |
| Terminal | C | --- | --- |
| Screws M5x10 | --- | --- | --- |

### Control contacts

| Max. rated current of individual contact | 28 x 25 A | 29 x 25 A | 59 x 16 A |
| Rated voltage | 110 V | 110 V | 400 / 230 V |
| Contact type | --- | --- | --- |
| Terminals | Screws M5x10 | Screws M5x10 | Crimp |

### Loop contacts (socket insert only)

| Max. rated current of individual contact | --- | --- | --- |
| Rated voltage | --- | --- | --- |
| Contact type | --- | --- | --- |
| Terminals | --- | --- | --- |

### Contact resistance

| < 10 mΩ | < 10 mΩ | < 10 mΩ |

### Insulation resistance

| > 100 MΩ | > 100 MΩ | > 100 MΩ |

### Operating temperature **

| -40° C ... +85° C | -40° C ... +85° C | -40° C ... +85° C |

### Degree of protection when mated or locked (EN 60529)

| IP54 | IP54 | IP54 |

### Mechanical endurance (housing part 1) (IEC 60512-5, test 9a)

| 1,000 | 1,000 | 1,000 |

### Materials

| Housing | Die-cast aluminium |
| Colour | RAL 7031 (blue grey) |
| Inserts, Seals | Thermoplastic / Thermoset |
| Contacts | Perbunan, Neoprene |
| Finish | Copper, crimpable |
| Ag or Ni |

### Approvals

| EAC | EAC |

* PE = protective earthing contact

** Operating temperatures exceeding 25° C account for lower current ratings!
<table>
<thead>
<tr>
<th>Insert</th>
<th>Contact</th>
<th>Housing part 1</th>
<th>Housing part 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>B E-3S+PE 4 /M 150</td>
<td>B DL Pg29</td>
<td>B DL Receptacle</td>
<td>B VD Pg48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(page 10)</td>
<td>Cover with Pg48 thread</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B DL Receptacle long</td>
<td>(page 11)</td>
</tr>
<tr>
<td>B E-4S+29 /ML</td>
<td></td>
<td></td>
<td>B VD M50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cover with M50 thread</td>
</tr>
<tr>
<td>B E-28S+PE /M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B E-25S /M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B E-95S+PE /C1,5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B E-95S+PE /C2,5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B E-2P /P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BHC-1,50 Ag</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or BHC-2,50-Ni</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B DK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B HC-1,50-M50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**B ST Pg42, B ST Pg48** Plug for ferrule with Pg42 / Pg48 thread, housing Part 1  
*B series*

![Figure A](image1)

![Figure B](image2)

**Note:**
Matching ferrule, available for different cable sizes, to be ordered separately:

1x B VS Pg42/25-29, cable diameter 25 ... 29 mm
1x B VS Pg42/30-35, cable diameter 30 ... 35 mm
1x B VS Pg48/36-41, cable diameter 36 ... 41 mm
1x B VS Pg48/42-48, cable diameter 42 ... 48 mm

**B VS Pg42/25-29, B VS Pg42/30-35, B VS Pg48/36-41, B VS Pg48/42-48** Ferrule with PG thread housing Part 2  
*B series*

![Figure A](image3)

![Figure B](image4)

![Figure C](image5)

![Figure D](image6)

<table>
<thead>
<tr>
<th>Ordering code</th>
<th>Fig.</th>
<th>Thread size</th>
<th>Cable diameter [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>B VS Pg42/25-29</td>
<td>A</td>
<td>Pg42</td>
<td>25 ... 29</td>
</tr>
<tr>
<td>B VS Pg42/30-35</td>
<td>B</td>
<td>Pg42</td>
<td>30 ... 35</td>
</tr>
</tbody>
</table>

**Note:**
Ferrule and cable clamp intended for use with plug B ST Pg42.

<table>
<thead>
<tr>
<th>Ordering code</th>
<th>Fig.</th>
<th>Thread size</th>
<th>Cable diameter [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>B VS Pg48/36-41</td>
<td>C</td>
<td>Pg48</td>
<td>36 ... 41</td>
</tr>
<tr>
<td>B VS Pg48/42-48</td>
<td>D</td>
<td>Pg48</td>
<td>42 ... 48</td>
</tr>
</tbody>
</table>

**Note:**
Ferrule and cable clamp intended for use with plug B ST Pg48.

---

Dimensions in mm / Subject to change
B ST M42, B ST M48, B ST M50  Plug for ferrule with M40x1.5 / M48x3 / M50x1.5 thread, housing Part 1

B VS M40/xx-xx  Cable gland with metric thread, housing Part 2

<table>
<thead>
<tr>
<th>Ordering code</th>
<th>Thread size</th>
<th>Cable diameter [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BVS M48/25-30</td>
<td>M48x3</td>
<td>25 ... 30</td>
</tr>
</tbody>
</table>

Note:
- Cable glands are only available for plugs B ST M48 (figure B).
- Cable glands for plugs B ST M40 (figure A) and B ST M50 (figure C) are not available. Please order separately.

Note:
- Cable glands BVS M48/25-30 for plugs B ST M48
- Cable glands M48x1.5 for plugs B ST M40 and cable glands M50x1.5 with metric thread for plugs B ST M50 are not available. Please order separately.
**B DL Pg29** Receptacle with 90° cable entry for ferrule with Pg29 thread, housing part 1

*Note:* Gasket and Pg29 threaded bushing supplied with the product.

**B DL** Receptacle long, housing part 1

*Note:* Gasket supplied with the product. Please order cover B VD Pg48 or B VD M50 separately.

**B DK R** Receptacle short with contact bridge on cover, housing part 1

*Note:* Gasket supplied with the product. Please order cover B VD Pg48 or B VD M50 separately.
**B DK** Receptacle short, housing part 1

*Note:* Gasket supplied with the product.
Please order cover B VD Pg48 or B VD M50 separately.

---

**B BD** Dummy receptacle, housing part 1

*Note:* Gasket supplied with the product

---

**B VD Pg48, B VD M50** Cover, housing part 2

- **B VD Pg48** cover with Pg48 thread
- **B VD M50** cover with M50 thread

*Note:* Gasket, screws and washers supplied with the product.
## Pin and socket inserts

### B series

**Number of contacts max.**

<table>
<thead>
<tr>
<th>Inserts</th>
<th>3 + PE + 2 pole / 3 + PE + 4 pole</th>
<th>4 + 29 pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin insert</td>
<td>B E-3P+PE+2 /M</td>
<td>B E-4P+29 /M</td>
</tr>
<tr>
<td>Socket insert</td>
<td>B E-3S+PE+2 /M</td>
<td>B E-3S+PE+4 /M</td>
</tr>
<tr>
<td>Dummy insert</td>
<td>—</td>
<td>B E-2P /P</td>
</tr>
</tbody>
</table>

**Contact arrangement**

Contact identification marked on insert:

- Socket insert: Rear view
- Pin insert: Front view

**Main contacts**

- Contact type:
  - Terminals: Screws M10x25

**Control contacts**

- Contact type:
  - Terminals: Screws M5x10

---

**Number of contacts max.**

<table>
<thead>
<tr>
<th>Inserts</th>
<th>28 pole + PE</th>
<th>29 pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin insert</td>
<td>B E-28P+PE /M</td>
<td>B E-29P /M</td>
</tr>
<tr>
<td>Socket insert</td>
<td>B E-28S+PE /M</td>
<td>B E-29S /M</td>
</tr>
<tr>
<td>Dummy insert</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

**Contact arrangement**

Contact identification marked on insert:

- Socket insert: Rear view
- Pin insert: Front view

**Main contacts**

- Contact type:
  - Terminals: Screws M5x10

**Control contacts**

- Contact type:
  - Terminals: Screws M5x10

---

**Number of contacts max.**

<table>
<thead>
<tr>
<th>Inserts</th>
<th>9 pole + PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin insert</td>
<td>B E-9P+PE</td>
</tr>
<tr>
<td>Socket insert</td>
<td>B E-9S+PE</td>
</tr>
<tr>
<td>Dummy insert</td>
<td>—</td>
</tr>
</tbody>
</table>

**Contact arrangement**

Contact identification marked on insert:

- Socket insert: Rear view
- Pin insert: Front view

**Main contacts**

- Contact type:
  - Terminals: Screws M5x10

**Control contacts**

- Contact type:
  - Terminals: Screws M5x10

---

**Note:** Accessories such as screws, lugs and crimp contacts are supplied with the product.

---

**Dimensions in mm / Subject to change**
**Contacts**  Crimp (pin/socket), for B E-59P+PE and B E-59S+PE only

**Contacts SHC-x, BHC-x**  Crimp contacts (pin/socket):

![Crimping tool](image1)

- **Pin contact**
  - **Ordering code**
    - SHC-1.50-Ag: 43.6 2 grooves
    - SHC-2.50-Ni: 43.6 3 grooves

- **Socket contact**
  - **Ordering code**
    - BHC-1.50-Ag: 42.4 2 grooves
    - BHC-2.50-Ni: 42.4 3 grooves

* For AWG sizes refer to the conversion table on our homepage
  

**AWZ-x**  Extraction tool

**AWZ-C/H**  Extraction tool for contacts Type C and Type H

**CWZ-600-1**  Crimp tool

**Mounting template**

- **Mounting cut-outs for:**
  - B DL Pg29  Receptacle for Pg29 threaded ferrule, locked
  - B DL  Receptacle long
  - B DL R  Receptacle short with contact bridge in cover
  - B DK  Receptacle short

- **Mounting cut-out for:**
  - B BD  Dummy receptacle

Subject to change / Dimensions in mm
Assembly  Receptacle B DL R with insert B E-3S+PE+4 /M / 150

Pre-assembled cables  Single and double ended connector cables

Do you prefer a pre-assembled connector?
Do not hesitate to contact us. We supply on request receptacles and plugs assembled complete with cables or wires to suit the customer’s specific requirements.

Schaltbau offers a host of cable lengths and wire gauges to suit your application and guarantees a constant high quality of the assembled connectors.

Double ended connector cable

Single ended connector cable

Pre-assembled plugs
- Single and double ended connecting cables
- Cables of different lengths and sizes
  - Individual cables laid inside corrugated pipe
  - Hybrid cables
  - Pre-assembled to customer requirements
**Installation and safety instructions**

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.

**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!**

Due to our continuous improvement programme, the design of our products can be modified at any time. 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/download/en. 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.
- 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".

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

Observe all applicable national provisions, all safety, accident prevention and environmental regulations as well as the recognized technical rules for safe and proper working.
**Electrical Components and Systems for Railway Engineering and Industrial Applications**

### 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
- Enabling switches
- 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