

1

Connectors

B Series

Connectors
for rail vehicles

Catalogue F160.en



More information here:
schaltbau-gmbh.com

Connectors for rail vehicles, Series B

The connectors, series B, 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

- **IEC 61984:** Connectors - Safety requirements and tests
- **DIN EN 60529:** Degrees of protection provided by enclosures (IP Code)
- **IEC 60664-1:** Insulation coordination for equipment within low-voltage systems

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

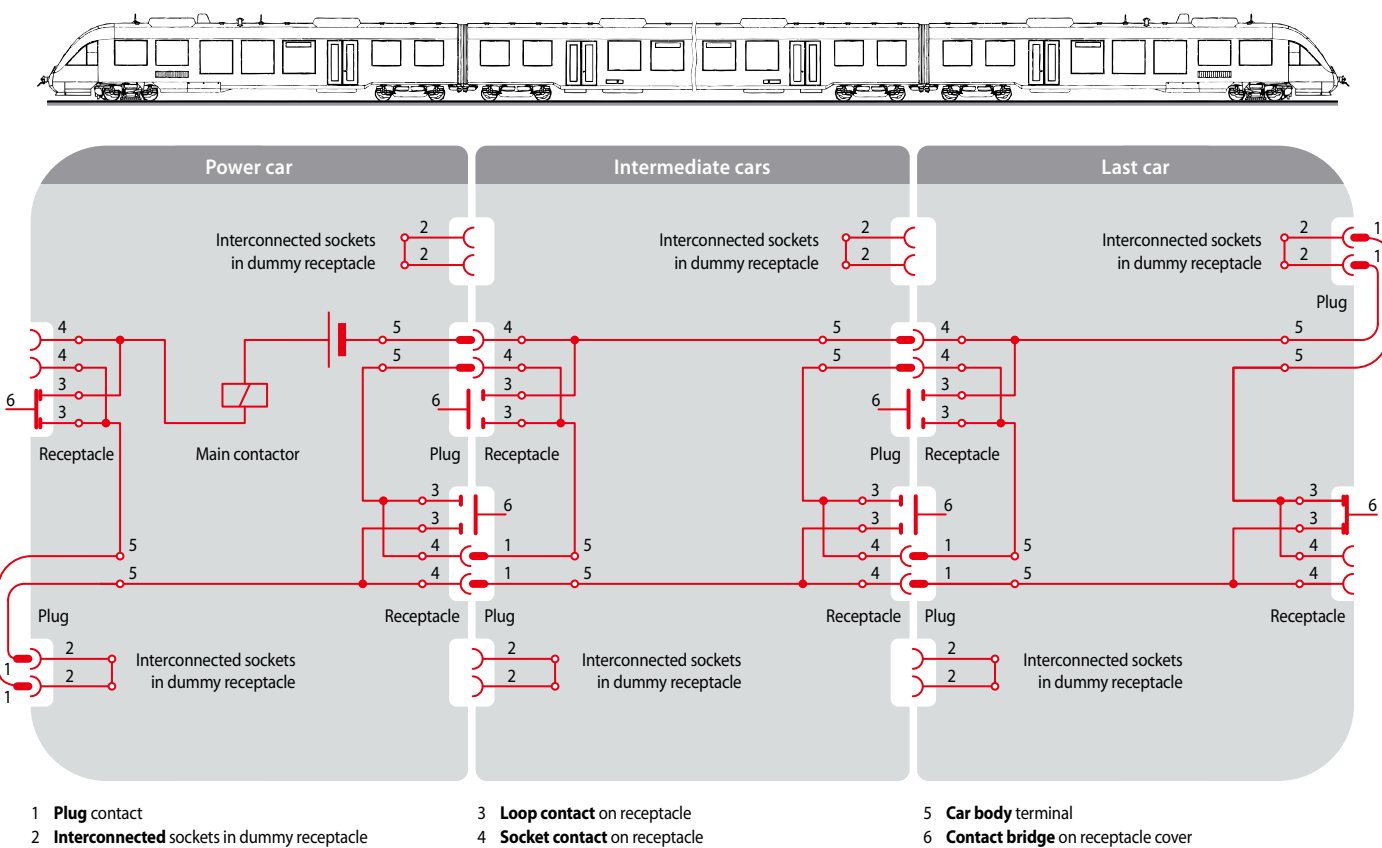
Presented in this catalogue are only stock items that can be supplied in short delivery time.

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



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.

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

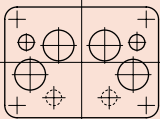
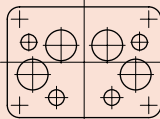
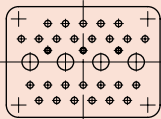
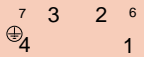
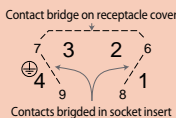
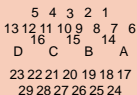

Assembled as set Pre-assembled single and double ended connecting cables

- 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



Specifications

Series B

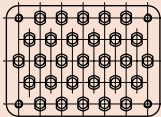
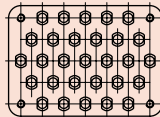
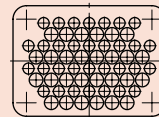







Series B, number of contacts max. ▶	3+PE + 2 pole / 3+PE + 4 pole		4 + 29 pole
Inserts Pin insert Socket insert Dummy insert	B E-3P+PE+2 /M --- ---	--- B E-3S+PE+2 /M B E-2P /P	B E-4P+29 /ML B E-4S+29 /ML ---
Contact arrangement			
Contact identification marked on insert: Socket insert: Rear view Pin insert: Front view			
Main contacts Max. rated current of individual contact Rated voltage Contact type Terminals	3 x 200 A 400 / 230 V V Screws M10x25		4 x 100 A 60 / 25 V W Screws M8x20
PE contact* Contact type Terminal	V Screw M10x25		--- ---
Control contacts Max. rated current of individual contact Rated voltage Contact type Terminals Crimp type 0.75 mm ² ... 1.00 mm ² 1.50 mm ² 2.50 mm ²	2 x 35 A 400 / 230 V C Screws M5x10		29 x 20 A 60 / 25 V H Solder, 4 mm ² max. --- --- ---
Loop contacts (socket insert only) Max. rated current of individual contact Rated voltage Contact type Terminals	2 x 16 A 60 / 25 V --- Screws M5x10		--- --- --- ---
Contact resistance	< 10 mΩ		< 10 mΩ
Insulation resistance	> 100 MΩ		> 100 MΩ
Operating temperature **	-40° C ... +85° C		-40° C ... +85° C
Degree of protection when mated or locked (EN 60529)	IP54		IP54
Mechanical endurance (housing part 1) (IEC 60512-5, test 9a)	1,000		1,000
Materials Housing Colour Inserts, Seals Contacts Finish	Die-cast aluminium RAL 7031 (blue grey) Thermoplastic / Thermoset Perbunan, Neoprene Copper, crimpable Ag		
Approvals			

* PE = protective earthing contact

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

Specifications


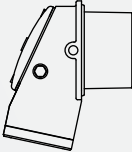


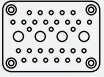

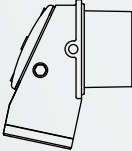
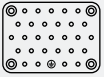

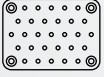
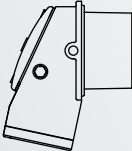
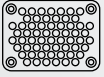


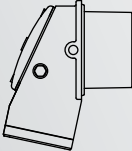
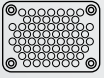
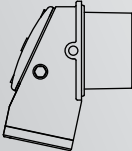
Series B

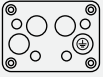
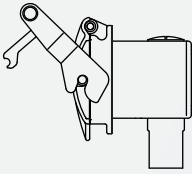

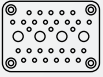
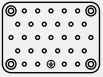
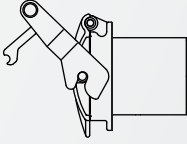

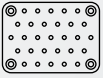
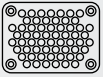
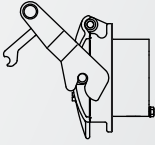
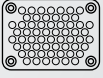

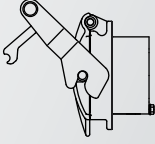

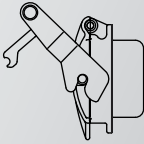
Series B, number of contacts max. ►	28 pole + PE	29 pole	59 pole + PE
Inserts Pin insert Socket insert Dummy insert	B E-28P+PE /M B E-28S+PE /M ---	B E-29P /M B E-29S /M ---	B E-59P+PE /Cxx B E-59S+PE /Cxx ---
Contact arrangement			
Contact identification marked on insert: Socket insert: Rear view Pin insert: Front view	5 4 3 2 1 11 10 9 8 7 6 18 17 16 15 14 13 12 24 23 22 21 20 19 29 28 26 25	5 4 3 2 1 11 10 9 8 7 6 18 17 16 15 14 13 12 24 23 22 21 20 19 29 28 27 26 25	ABCDEFGHJKLMNPRSTU  1 2 3 4 5 6 7 8
Main contacts Max. rated current of individual contact Rated voltage Contact type Terminals	--- --- --- ---	--- --- --- ---	--- --- --- ---
PE contact* Contact type Terminal	 Screws M5x10	--- ---	--- ---
Control contacts Max. rated current of individual contact Rated voltage Contact type Terminals Crimp type 0.75 mm ² ... 1.00 mm ² 1.50 mm ² 2.50 mm ²	28 x 25 A 110 V  Screws M5x10 --- --- ---	29 x 25 A 110 V  Screws M5x10 --- --- ---	59 x 16 A 400 / 230 V  Crimp --- ● (.../C1,5) ● (.../C2,5)
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 Colour Inserts, Seals Contacts Finish	Die-cast aluminium RAL 7031 (blue grey) Thermoplastic / Thermoset Perbunan, Neoprene Copper, crimpable Ag		Die-cast aluminium RAL 7031 (blue grey) Thermoplastic / Thermoset Perbunan, Neoprene Copper, crimpable Ag or Ni
Approvals			

* PE = protective earthing contact

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

Overview :: B Series – Plug

Housing part 2	Housing part 1	Contact	Insert
 <p>B VS Pg48/36-41 Ferrule (page 8)</p>	 <p>B ST Pg48 Plug (page 8)</p>		 <p>B E-3P+PE+2/M/150 Pin insert (page 12)</p>
 <p>B VS Pg48/42-48 Ferrule (page 8)</p>			 <p>B E-4P+29/ML Pin insert (page 12)</p>
 <p>B VS Pg42/25-29 Ferrule (page 8)</p>	 <p>B ST Pg42 Plug (page 8)</p>		 <p>B E-28P+PE/M Pin insert (page 12)</p>
 <p>B VS Pg42/30-35 Ferrule (page 8)</p>			 <p>B E-29P/M Pin insert (page 12)</p>
	 <p>B ST M40 Plug (page 9)</p>		 <p>B E-59P+PE/C1,5 B E-59P+PE/C2,5 Pin insert including crimp contacts (page 12)</p>
		 <p>SHC-1,50-Ag or SHC-2,50-Ni Pin contact, crimp (page 13)</p>	
 <p>B VS M48/25-30 Cable gland (page 9)</p>	 <p>B ST M48 Plug (page 9)</p>		 <p>B E-59P+PE Pin insert without crimp contacts (page 12)</p>
	 <p>B ST M50 Plug (page 9)</p>		

Insert	Contact	Housing part 1	Housing part 2
 <p>B E-3S+PE+4/M/150 Socket insert (page 12)</p>		 <p>B DL Pg29 Receptacle (page 10)</p>	 <p>B VD Pg48 Cover with Pg48 thread (page 11)</p>
 <p>B E-4S+29/ML Socket insert (page 12)</p>			
 <p>B E-28S+PE/M Socket insert (page 12)</p>		 <p>B DL Receptacle long (page 10)</p>	 <p>B VD M50 Cover with M50 thread (page 11)</p>
 <p>B E-29S/M Socket insert (page 12)</p>			
 <p>B E-59S+PE/C1,5 B E-59S+PE/C2,5 Socket insert including crimp contacts (page 12)</p>		 <p>B DL R Receptacle (contact bridge on cover) (page 10)</p>	
 <p>B E-59S+PE Socket insert without crimp contacts (page 12)</p>	 <p>BHC-1,50-Ag or BHC-2,50-Ni Socket contact, crimp (page 13)</p>		
		 <p>B DK Receptacle short (page 11)</p>	
 <p>B E-2P/P Dummy insert (page 12)</p>		 <p>B BD Dummy receptacle (page 11)</p>	

B ST Pg42, B ST Pg48 Plug for ferrule with Pg42 / Pg48 thread, housing Part 1

Series B

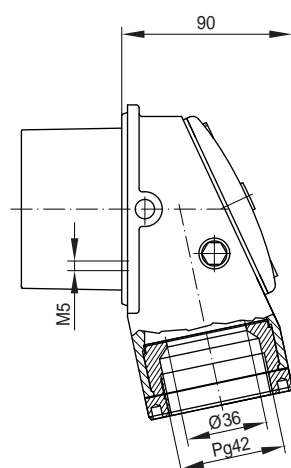
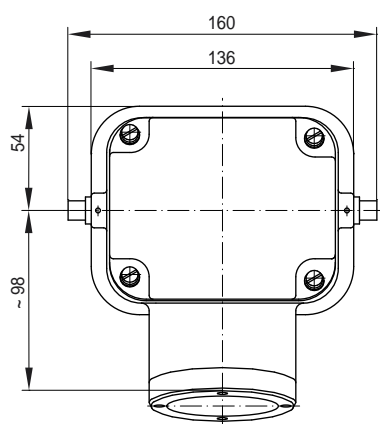


Figure A

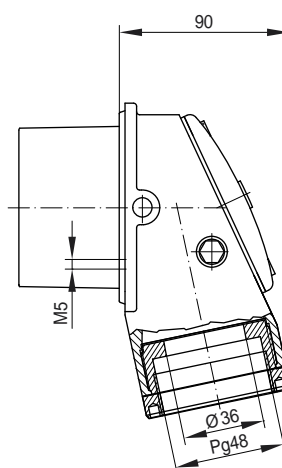


Figure B

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 P,G thread housing Part 2 Series B

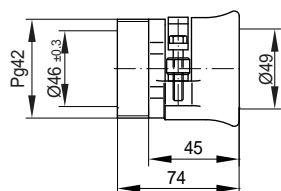


Figure A

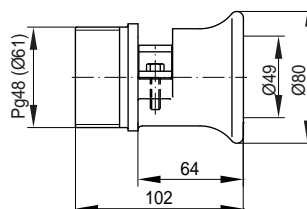
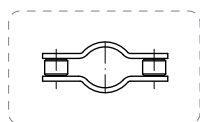


Figure C

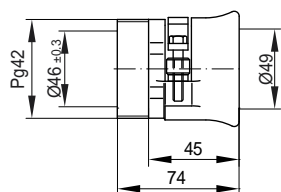
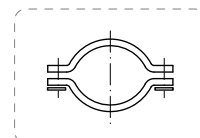


Figure B

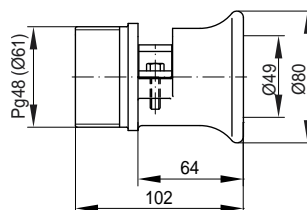
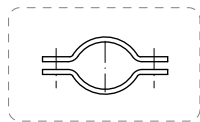
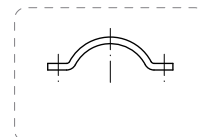


Figure D



Ordering code	Fig.	Thread size	Cable diameter [mm]
B VS Pg42/25-29	A	Pg42	25 ... 29
B VS Pg42/30-35	B	Pg42	30 ... 35

Note:

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

Ordering code	Fig.	Thread size	Cable diameter [mm]
B VS Pg48/36-41	C	Pg48	36 ... 41
B VS Pg48/42-48	D	Pg48	42 ... 48

Note:

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

B ST M42, B ST M48, B ST M50 Plug for ferrule with M40x1.5 / M48x3 / M50x1.5 thread, housing Part 1

Series B

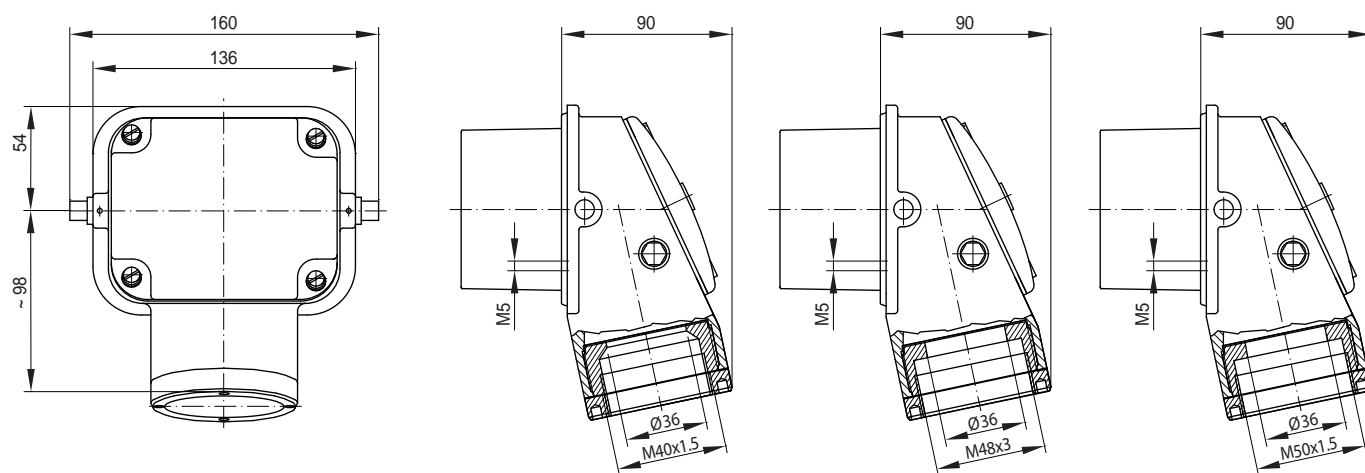


Figure A

Figure B

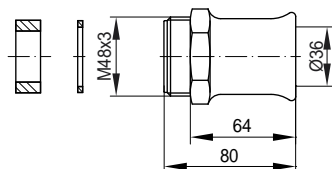
Figure C

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.

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

Series B



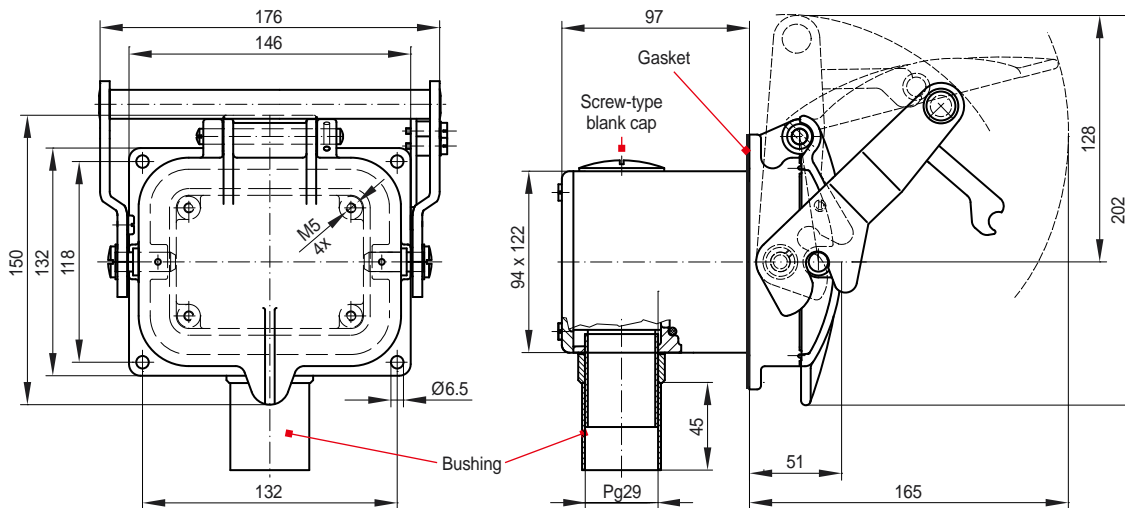
Ordering code	Thread size	Cable diameter [mm]
B VS M48/25-30	M48x3	25 ... 30

Note:

- Cable glands B VS M48/25-30 for plugs B ST M48
- Cable glands M40x1,5 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

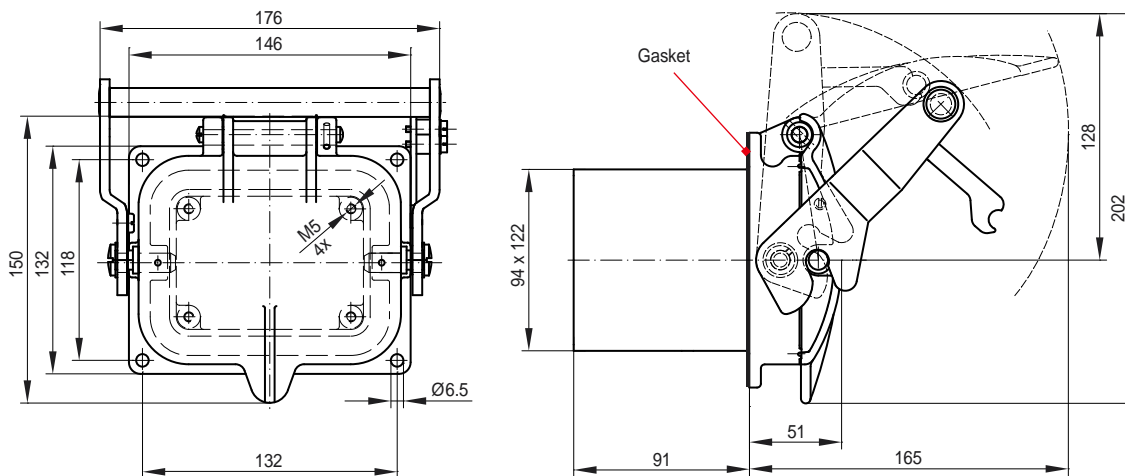
Series B



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

B DL Receptacle long, housing part 1

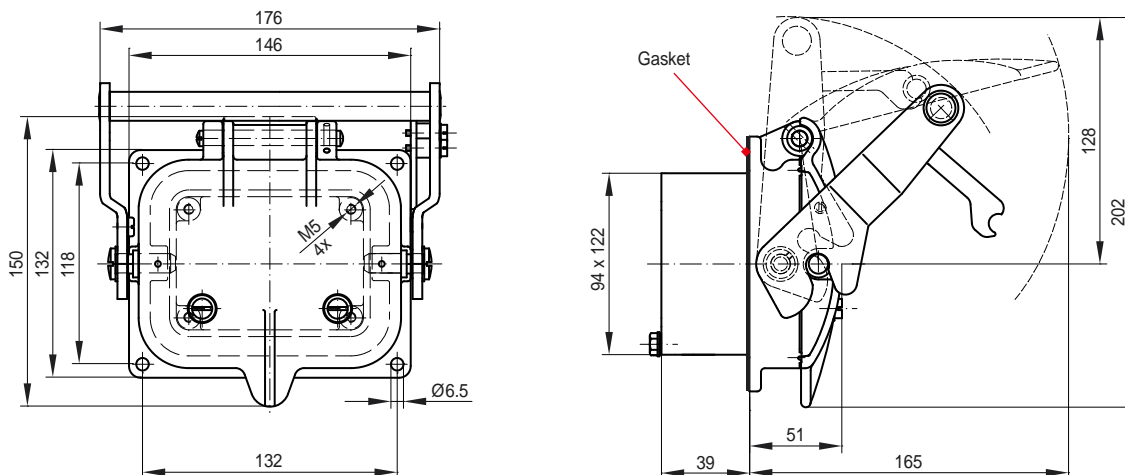
Series B



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

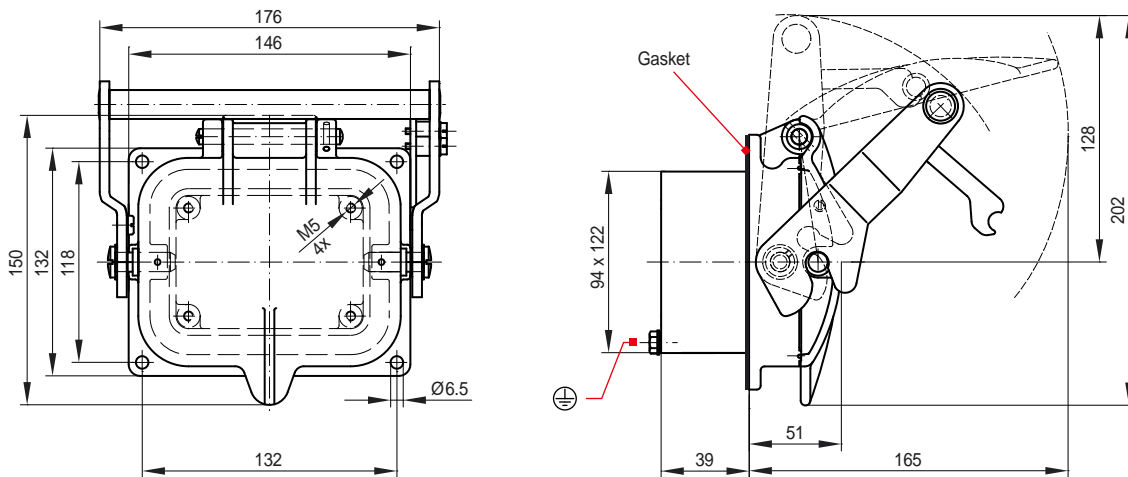
Series B



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

B DK Receptacle short, housing part 1

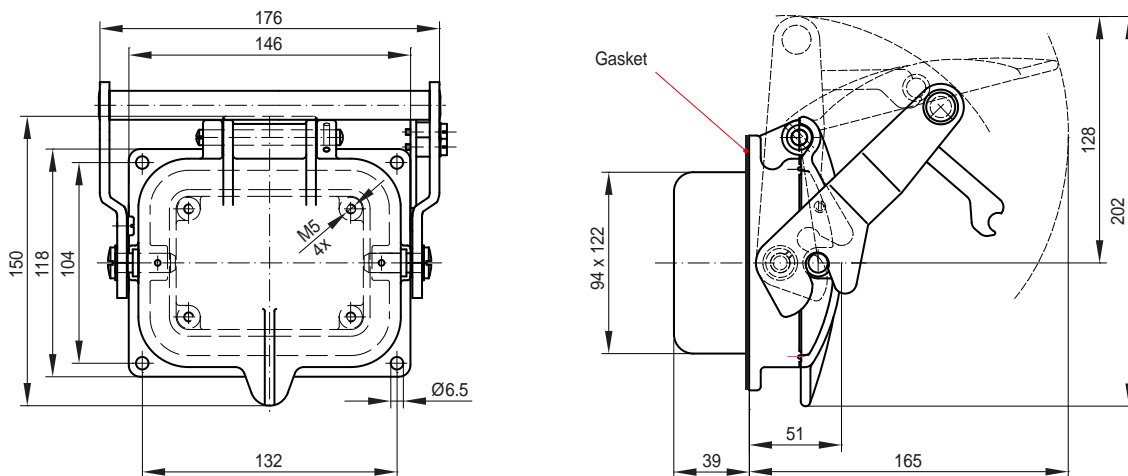
Series B



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

B BD Dummy receptacle, housing part 1

Series B

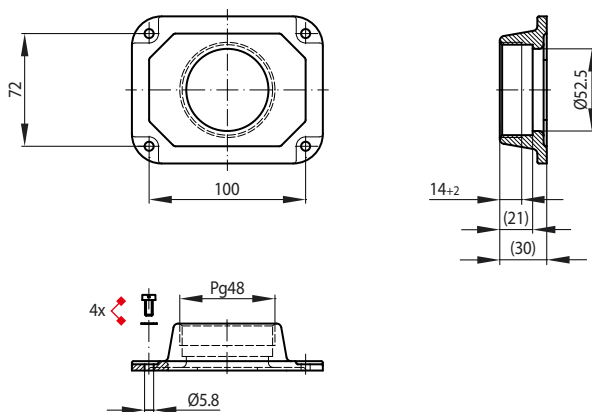


Note: Gasket supplied with the product

BVDPg48, BVDM50 Cover, housing part 2

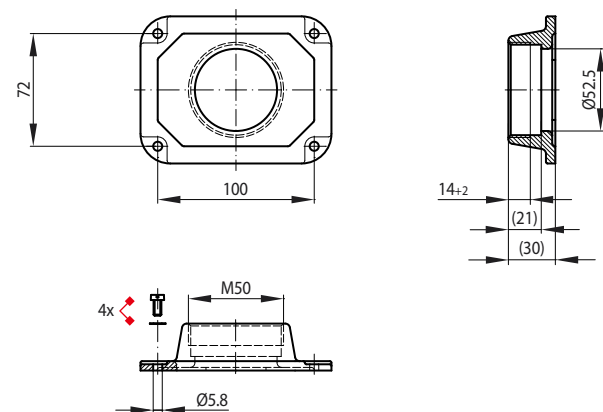
Series B

• BVD Pg48 cover with Pg48 thread



Note: Gasket, screws and washers supplied with the product

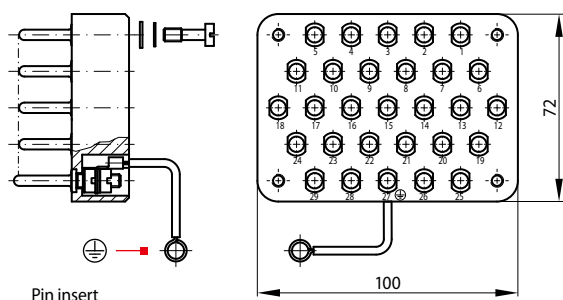
• BVD M50 cover with M50 thread



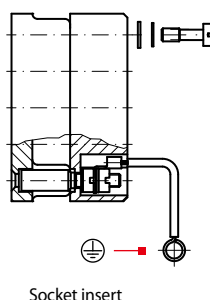
Note: Gasket, screws and washers supplied with the product

Pin and socket inserts

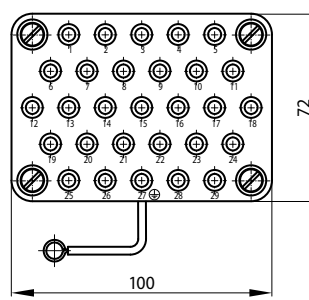
Series B



Pin insert



Socket insert



Inserts

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

Number of contacts max.		3+PE+2 pole / 3+PE+4 pole		4+29 pole
Inserts	Pin insert	B E-3P+PE+2 /M	---	B E-4P+29 /ML
	Socket insert	B E-3S+PE+2 /M	B E-3S+PE+4 /M	B E-4S+29 /ML
Contact arrangement	Dummy insert	---	B E-2P /P	---
	Contact identification marked on insert:			
Main contacts	Contact type	V		W
	Terminals	Screws M10x25		Screws M8x20
PE contact*	Contact type	V		---
	Terminals	Screws M10x25		---
Control contacts	Contact type	C		C
	Terminals	Screws M5x10		Screws M5x10
	Crimp type	---		---

Number of contacts max.		28 pole+PE	29 pole
Inserts	Pin insert	B E-28P+PE /M	B E-29P /M
	Socket insert	B E-28S+PE /M	B E-29S /M
Contact arrangement	Dummy insert	---	---
	Contact identification marked on insert:		
Main contacts	Contact type	---	---
	Terminals	---	---
PE contact*	Contact type	---	---
	Terminals	---	---
Control contacts	Contact type	C	C
	Terminals	Screws M5x10	Screws M5x10
	Crimp type	---	---

Number of contacts max.		59 pole+PE	
Inserts	Pin insert	B E-59P+PE	B E-59P+PE/C1.5 or B E-59P+PE/C2.5
	Socket insert	B E-59S+PE	B E-59S+PE/C1.5 or B E-59S+PE/C2.5
Contact arrangement	Dummy insert	---	---
	Contact identification marked on insert:		
Main contacts	Contact type	---	---
	Terminals	---	---
PE contact*	Contact type	---	---
	Terminals	---	---
Control contacts	Contact type	for contacts size H **	H ***
	Terminals	(Crimp) **	Crimp
	Crimp type	1.5 mm ² or 2.5 mm ²	1.5 mm ² or 2.5 mm ²

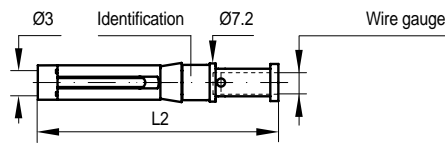
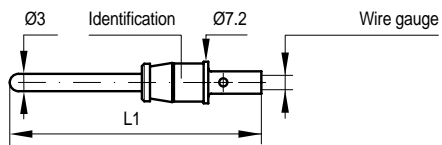
* PE = protective earthing contact

** Insert without contacts, please order separately

*** Contacts included in delivery

Contacts Crimp (pin/socket), for BE-59P+PE und BE-59S+PE only

Series B

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


Pin contact

Ordering code	L1	Identification
SHC-1.50-Ag	43.6	2 grooves
SHC-2.50-Ni	43.6	3 grooves

Socket contact

Ordering code	L2	Identification
BHC-1.50-Ag	42.4	2 grooves
BHC-2.50-Ni	42.4	3 grooves

Specification

Wire gauge*	Rated current
1.5 mm ²	16 A
2.5 mm ²	27.5 A

* For AWG sizes refer to the conversion table on our home page

<http://www.schaltbau-gmbh.com/files/awg-electrical-wire-conversion-table.pdf>
AWZ-x Extraction tool

CWZ-600-1 Crimp tool

Series B

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


(Figure reduced in scale)

CWZ-600-1 Crimp tool for wire gauges* ranging
from 0,14 ... 6,00 mm²

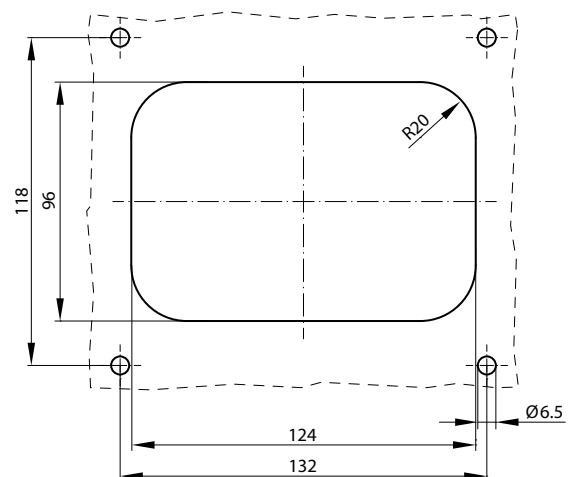

(Figure reduced in scale)

Mounting template

Series B

Mounting template for all receptacles:

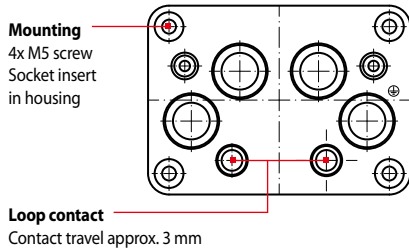
- B DL Pg29 Receptacle for Pg29 threaded ferrule, locked
- B DL Receptacle long
- B DL R Receptacle short with contact bridge in cover
- B DK Receptacle short
- B BD Dummy receptacle



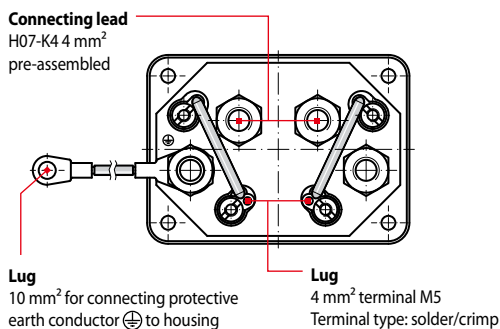
Assembly Receptacle B DL R with insert B E-3S+PE+4 /M / 150

Series B

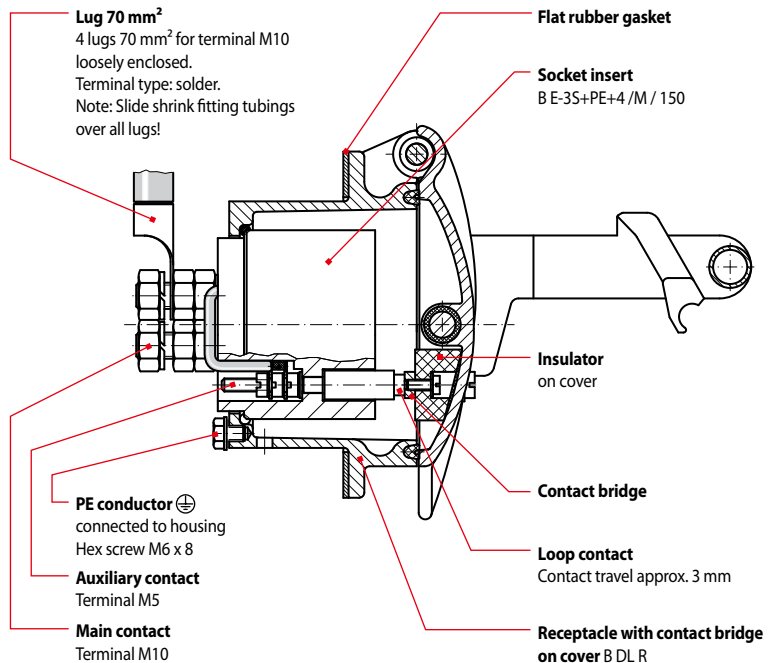
Socket insert: front view



Socket insert: rear view



Receptacle (Sectional view)



Pre-assembled cables Single and double ended connector cables

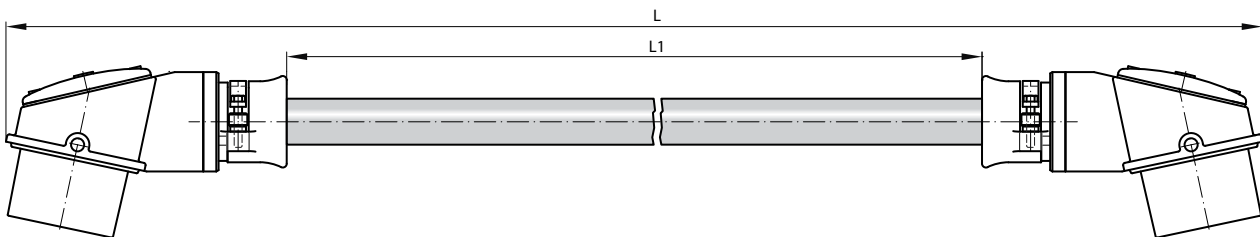
Series B

Do you prefer a pre-assembled connector?

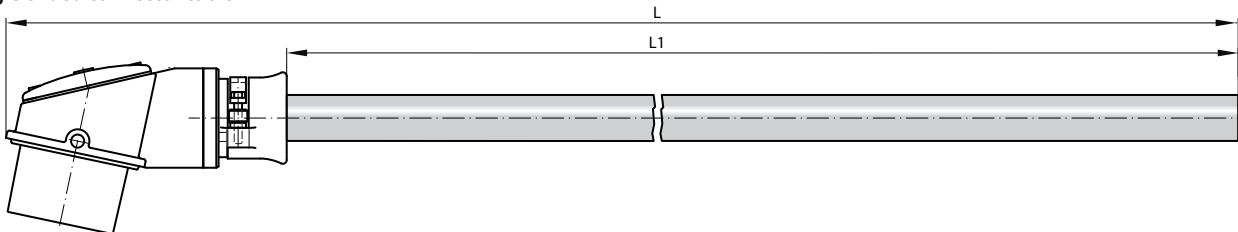
Do not hesitate to contact us. We supply on request receptacles and plugs assembled complete with cables or wires to suit the customer's specific requirements.

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

Series B

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. The updated catalogue renders the previous issue invalid.



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.

- 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.
- 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".

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!

Schaltbau GmbH

For detailed information on our products and services visit our website – or give us a call!

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Internet www.schaltbau-gmbh.com
e-Mail contact@schaltbau.de

with compliments:



Schaltbau GmbH manufactures in compliance with RoHS.



The production facilities of Schaltbau GmbH have been IRIS certified since 2008.



Certified to DIN EN ISO 14001 since 2002. For the most recent certificate visit our website.



Certified to DIN EN ISO 9001 since 1994. For the most recent certificate visit our website.

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

Subject to change!

For updated product information visit www.schaltbau-gmbh.com