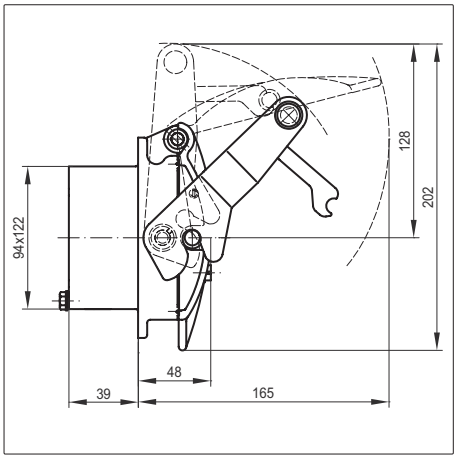
SCHALTBAU

Connect · Contact · Control

Connectors for rail vehicles

Series B



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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 600 V DC and 400 V AC respectively. By adding control contacts, protection circuits may be realised such as the interlocking circuit shown in the diagram below.

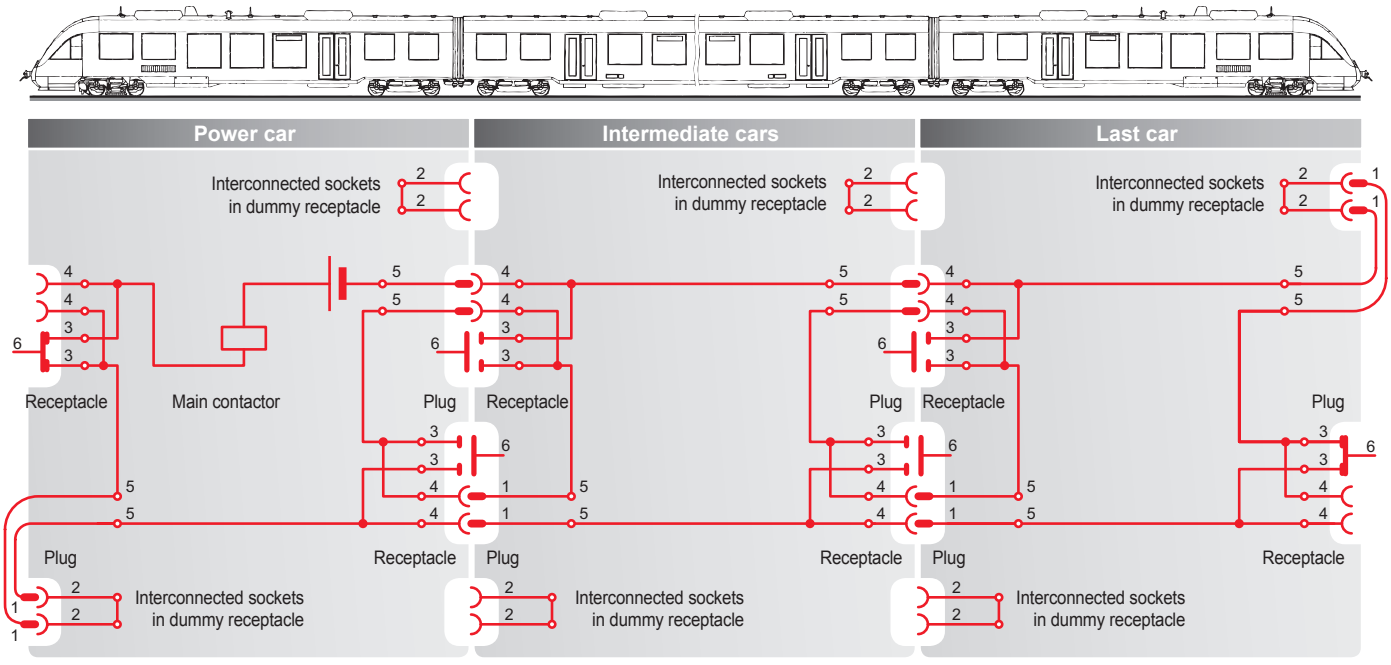
Features

- Rugged design
- Universally useable 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 40050-9:** Road vehicles; degrees of protection (IP-code); protection against foreign objects, water and contact; electrical equipment
- **IEC 60664-1:** Insulation coordination for equipment within low-voltage systems

Application Interlocking circuit to protect personnel from contact with dangerous voltages



1 **Plug** contact
2 **Interconnected** sockets in dummy receptacle
3 **Loop contact** on receptacle
4 **Socket contact** on receptacle
5 **Carbody** terminal
6 **Contact bridge** on receptacle cover

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)
- 2 receptacles B Dx with contact bridge on cover, equipped with additional loop and control contacts (e.g. socket insert B E-3S+PE+2 /M)
- 2 dummy receptacles B BD with contact insert B E-2P / P with both control contacts (Pos. 2) bridged

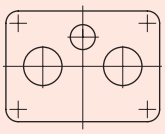
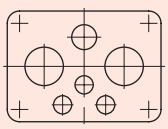
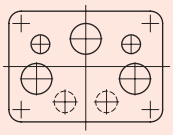
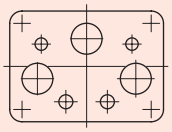
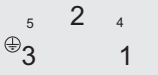
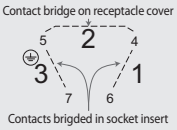
Stock items

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

Special variant

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.

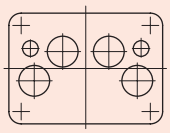
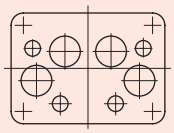
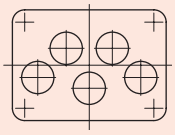
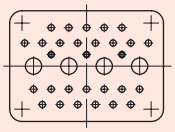
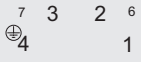
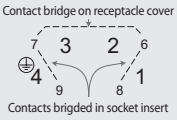
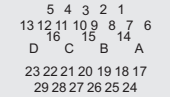
Specifications

Series B, number of contacts max. ►	2+PE	2+PE + 3 pole	2+PE + 2 pole	2+PE + 2 + 2 pole
Inserts				
Pin insert	B E-2P+PE /M	B E-2P+PE+3 /M	B E-2P+PE+2 /M	---
Socket insert	B E-2S+PE /M	B E-2S+PE+3 /M	---	B E-2S+PE+2+2 /M
Dummy insert	---	---	---	B E-2+PE+2+2 /M
Contact arrangement				
Contact identification marked on insert: Socket insert: Rear view Pin insert: Front view				
Main contacts				
Max. rated current of individual contact	2 x 400 A	2 x 400 A	2 x 200 A	2 x 200 A
Rated voltage (IEC 60038) at PD3 (IEC 60512)	500 V	500 V	400 / 230 V	400 / 230 V
Contact type	X	X	V	V
Terminals	Screws M12x25	Screws M12x25	Screws M10x25	Screws M10x25
PE contact*				
Contact type	V	V	V	V
Terminal	Screw M10x25	Screw M10x25	Screw M10x25	Screw M10x25
Control contacts				
Max. rated current of individual contact	---	3 x 16 A	2 x 35 A	2 x 35 A
Rated voltage (IEC 60038) at PD3 (IEC 60512)	---	60 / 25 V	400 / 230 V	60 / 25 V
Contact type	---	N	C	C
Terminals	---	Screws M6x10	Screws M5x10	Screws M5x10
Crimp type				
0.75 mm² ... 1.00 mm²	---	---	---	---
1.50 mm²	---	---	---	---
2.50 mm²	---	---	---	---
Loop contacts				
Max. rated current of individual contact	---	---	---	2 x 16 A
Rated voltage (IEC 60038) at PD3 (IEC 60512)	---	---	---	60 / 25 V
Contact type	---	---	---	---
Terminals	---	---	---	Screws M5x10
Contact resistance (IEC 60512-2)	< 10 mΩ	< 10 mΩ	< 10 mΩ	< 10 mΩ
Insulation resistance (IEC 60512-2)	> 100 MΩ	> 100 MΩ	> 100 MΩ	> 100 MΩ
Operating temperature **	-40° C ... +85° C	-40° C ... +85° C	-40° C ... +85° C	-40° C ... +85° C
Degree of protection when mated or locked (EN 60529)	IP54	IP54	IP54	IP54
Test standard (EN 60068-1) (t_{min}[°C]/t_{max}[°C]/$t_{testing\ time}$[days])	-25/70/21	-25/70/21	-25/70/21	-25/70/21
Mechanical endurance (mating cycles) (IEC 60512-5, test 9a)	1,000	1,000	1,000	1,000
Materials				
Housing	Die-cast aluminium / painted RAL 7031			
Inserts,	Thermoplastic / Thermoset			
Seals	Perbunan, Neoprene			
Contacts	Copper, crimpable			
Finish	Ag or Ni			

* *PE = protective earthing contact*

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

Specifications

Series B, number of contacts max. ►	3+PE + 2 pole	3+PE + 4 pole	4+PE	4 + 29 pole
Inserts				
Pin insert	B E-3P+PE+2 /M	---	B E-4P+PE /M	B E-4P+29 /ML
Socket insert	---	B E-3S+PE+2 /M	B E-4S+PE /M	B E-4S+29 /ML
Dummy insert	---	B E-2P /P	---	---
Contact arrangement				
Contact identification marked on insert: Socket insert: Rear view Pin insert: Front view				
Main contacts				
Max. rated current of individual contact	3 x 200 A	3 x 200 A	4 x 100 A	4 x 100 A
Rated voltage (IEC 60038) at PD3 (IEC 60512)	400 / 230 V	400 / 230 V	400 / 230 V	60 / 25 V
Contact type	V	V	W	W
Terminals	Screws M10x25	Screws M10x25	Screws M8x20	Screws M8x20
PE contact*				
Contact type	V	V	W	---
Terminal	Screw M10x25	Screw M10x25	Screws M8x20	---
Control contacts				
Max. rated current of individual contact	2 x 35 A	2 x 35 A	---	29 x 20 A
Rated voltage (IEC 60038) at PD3 (IEC 60512)	400 / 230 V	60 / 25 V	---	60 / 25 V
Contact type	C	C	---	H
Terminals	Screws M5x10	Screws M5x10	---	Solder, 4 mm² max.
Crimp type				
0.75 mm² ... 1.00 mm²	---	---	---	---
1.50 mm²	---	---	---	---
2.50 mm²	---	---	---	---
Loop contacts				
Max. rated current of individual contact	---	2 x 16 A	---	---
Rated voltage (IEC 60038) at PD3 (IEC 60512)	---	60 / 25 V	---	---
Contact type	---	---	---	---
Terminals	---	Screws M5x10	---	---
Contact resistance (IEC 60512-2)	< 10 mΩ	< 10 mΩ	< 10 mΩ	< 10 mΩ
Insulation resistance (IEC 60512-2)	> 100 MΩ	> 100 MΩ	> 100 MΩ	> 100 MΩ
Operating temperature **	-40° C ... +85° C	-40° C ... +85° C	-40° C ... +85° C	-40° C ... +85° C
Degree of protection when mated or locked (EN 60529)	IP54	IP54	IP54	IP54
Test standard (EN 60068-1) (t_{min}[°C]/t_{max}[°C]/$t_{testing\ time}$[days])	-25/70/21	-25/70/21	-25/70/21	-25/70/21
Mechanical endurance (mating cycles) (IEC 60512-5, test 9a)	1,000	1,000	1,000	1,000
Materials				
Housing	Die-cast aluminium / painted RAL 7031			
Inserts,	Thermoplastic / Thermoset			
Seals	Perbunan, Neoprene			
Contacts	Copper, crimpable			
Finish	Ag or Ni			

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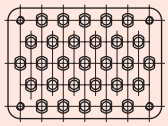
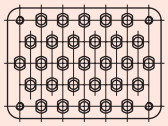
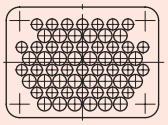
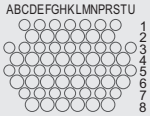
* *PE = protective earthing contact*
** *Operating temperatures exceeding 25° C account for lower current ratings!*

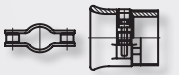
Specifications

Series B, number of contacts max. ►	28 pole + PE	29 pole	59 pole + PE
Inserts			
Pin insert	B E-28P+PE /M	B E-29P /M	B E-59P+PE /Cxx
Socket insert	B E-28S+PE /M	B E-29S /M	B E-59S+PE /Cxx
Dummy insert	---	---	---
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 (IEC 60038) at PD3 (IEC 60512)	---	---	---
Contact type	---	---	---
Terminals	---	---	---
PE contact*			
Contact type	C	---	---
Terminal	Screws M5x10	---	---
Control contacts			
Max. rated current of individual contact	28 x 25 A	29 x 25 A	59 x 16 A
Rated voltage (IEC 60038) at PD3 (IEC 60512)	110 V	110 V	400 / 230 V
Contact type	C	C	H
Terminals	Screws M5x10	Screws M5x10	Crimp
Crimp type			
0.75 mm² ... 1.00 mm²	---	---	---
1.50 mm²	---	---	• (... /C1,5)
2.50 mm²	---	---	• (... /C2,5)
Loop contacts			
Max. rated current of individual contact	---	---	---
Rated voltage (IEC 60038) at PD3 (IEC 60512)	---	---	---
Contact type	---	---	---
Terminals	---	---	---
Contact resistance (IEC 60512-2)	< 10 mΩ	< 10 mΩ	< 10 mΩ
Insulation resistance (IEC 60512-2)	> 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
Test standard (EN 60068-1) (t_{min}[°C]/t_{max}[°C]/$t_{testing\ time}$[days])	-25/70/21	-25/70/21	-25/70/21
Mechanical endurance (mating cycles) (IEC 60512-5, test 9a)	1,000	1,000	1,000
Materials			
Housing	Die-cast aluminium/ painted RAL 7031		
Inserts,	Thermoplastic / Thermoset		
Seals	Perbunan, Neoprene		
Contacts	Copper, crimpable		
Finish	Ag or Ni		

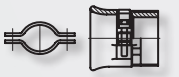
* *PE = protective earthing contact*

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

Housing part 2	Housing part 1	Contact	Insert

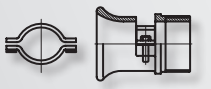


B VS Pg42/25-29
Ferrule
(page 9)

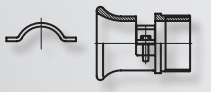


B VS Pg42/30-35
Ferrule
(page 9)

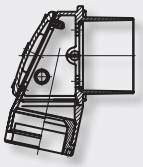
B VS M48/25-30
Ferrule
(page 9)



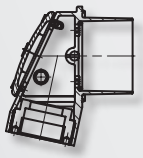
B VS Pg48/36-41
Ferrule
(page 9)



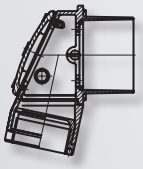
B VS Pg48/42-48
Ferrule
(page 9)



B ST Pg42
Plug
(page 8)



B ST M48
Plug
(page 8)



B ST Pg48
Plug
(page 8)

SHC-1.50-Ag
or
SHC-2.50-Ni
Pin contact, crimp
(page 13)

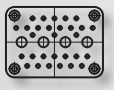
B E-2P+PE /M
Pin insert
(page 12)

B E-2P+PE+3 /M
Pin insert
(page 12)

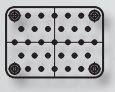
B E-2P+PE+2 /M
Pin insert
(page 12)

B E-3P+PE+2 /M
Pin insert
(page 12)

B E-4P+PE /M
Pin insert
(page 12)

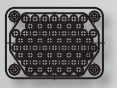


B E-4P+29 /ML
Pin insert
(page 12)



B E-28P+PE /M
B E-29P+PE /M
Pin insets including crimp contacts
(page 12)

B E-59P+PE /C1,5
B E-59P+PE /C2,5
Pin inserts
(page 12)



B E-59P+PE
Pin insert without crimp contacts
(page 12)

B series Receptacle

Insert	Contact	Housing part 1	Housing part 2

B E-2S+PE /M
Socket insert
(page 12)

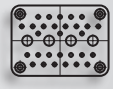
B E-2S+PE+3 /M
Socket insert
(page 12)

B E-2S+PE+2+2 /M
Socket insert
B E-2+PE+2+2 /M
Dummy insert
(page 12)

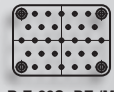
B E-3S+PE+2 /M
Socket insert
B E-2P /P
Dummy insert
(page 12)

B E-2S+PE+4 /M
Socket insert
(page 12)

B E-4S+PE /M
Socket insert
(page 12)

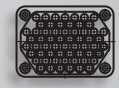


B E-4S+29 /ML
Socket insert
(page 12)

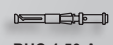


B E-28S+PE /M
B E-29S /M
Socket inserts
(page 12)

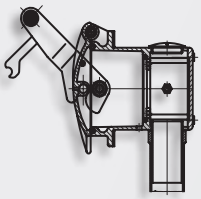
B E-59S+PE /C1,5
B E-59S+PE /C2,5
Socket inserts including crimp contacts
(page 12)



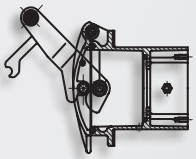
B E-59S+PE
Socket inserts without crimp contacts
(page 12)



BHC-1.50-Ag
or
BHC-2.50-Ni
Socket contact, crimp
(page 13)

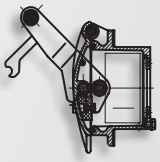


B DL Pg29
Receptacle
(page 10)

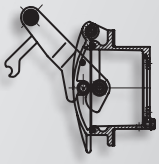


B DL
Receptacle long
(page 10)

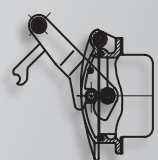
B VD Pg48
Cover with thread
(page 11)



B DL R
Receptacle (contact bridge on cover)
(page 10)



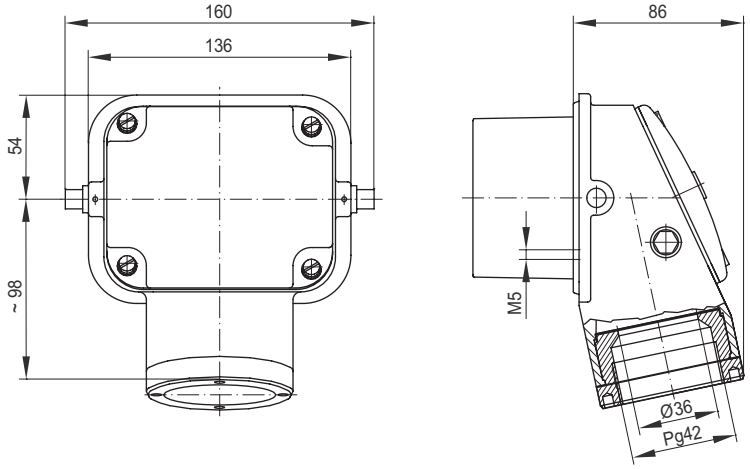
B DK
Receptacle short
(page 11)



B BD
Dummy receptacle
(page 11)

B ST Pg42 Plug for ferrule with Pg42 thread

Series B



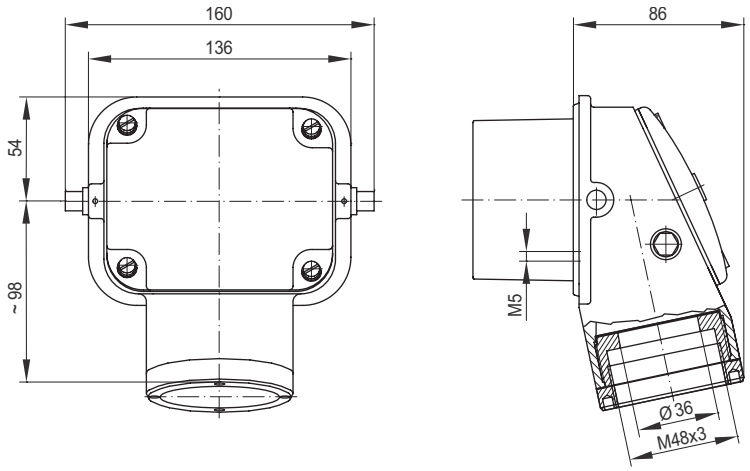
Housing Part 1

Note: *Matching ferrule, available for different cable sizes - diameters 25 - 29 and 30 - 35 resp., to be ordered separately:*

- **B VS Pg42/25-29**
- **B VS Pg42/30-35**

B ST M48 Plug for ferrule with M48 thread

Series B



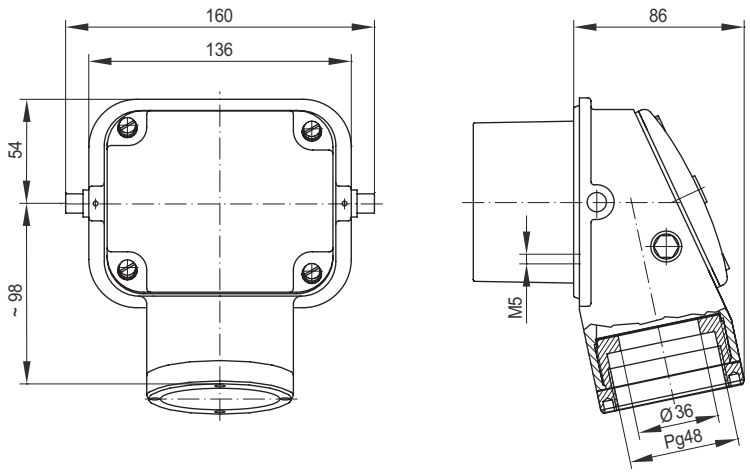
Housing part 1

Note: *Matching ferrule to be ordered separately:*

- **B VS M48/25-30**

B ST Pg48 Plug for ferrule with Pg48 thread

Series B



Housing part 1

Note: *Matching ferrule, available for different cable sizes - diameters 36 - 41 and 42 - 48 resp., to be ordered separately:*

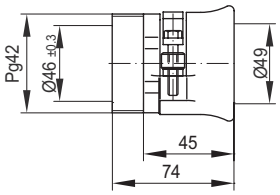
- **B VS Pg48/36-41**
- **B VS Pg48/42-48**

Reduced scale diagrams / dimensions in mm

B VS Pg42/25-29, B VS Pg42/30-35 Ferrule

Series B

Housing part 2



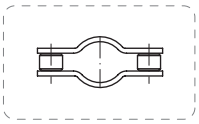
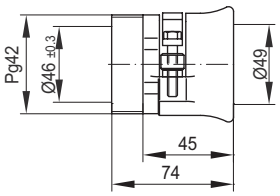


Figure A



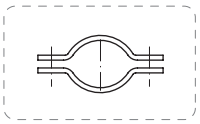


Figure B

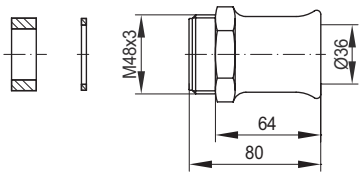
Ordering code	Fig.	Thread size	Cable diameter [mm]
B VS Pg42/25-29	A	Pg42	25 ... 29
B VS Pg42/30-35	B	Pg42	30 ... 35

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

B VS M48/25-30 Ferrule

Series B

Housing part 2



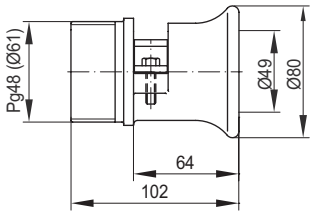
Ordering code	Thread size	Cable diameter [mm]
B VS M48/25-30	M48	30 ... 35

Note:
*Ferrule intended for use with plug **B ST M48***

B VS Pg48/36-41, B VS Pg48/42-48 Ferrule

Series B

Housing part 2



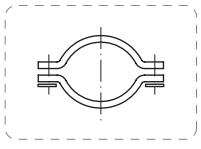
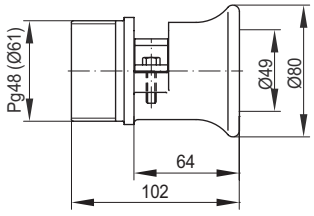


Figure A



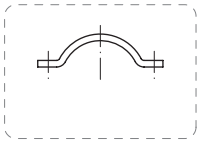


Figure B

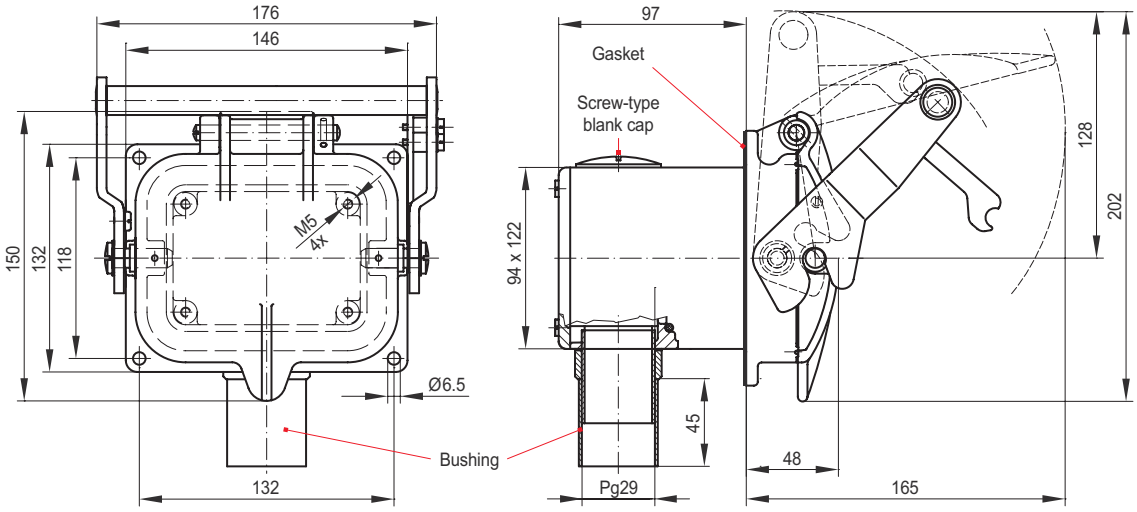
Ordering code	Fig.	Thread size	Cable diameter [mm]
B VS Pg48/36-41	A	Pg48	36 ... 41
B VS Pg48/42-48	B	Pg48	42 ... 48

Note:
*Ferrule and cable clamp or part of clamp intended for use with plug **B ST Pg48***

Reduced scale diagrams / dimensions in mm

B ST Pg42 Receptacle with 90° cable entry for ferrule with Pg29 thread, locked — Series B

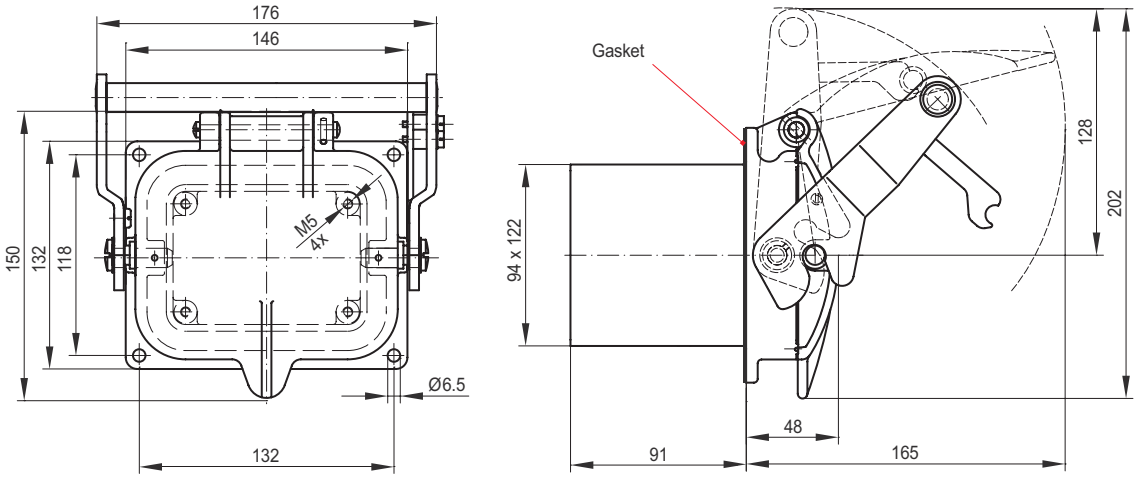
Housing part 1



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

B DL Receptacle long — Series B

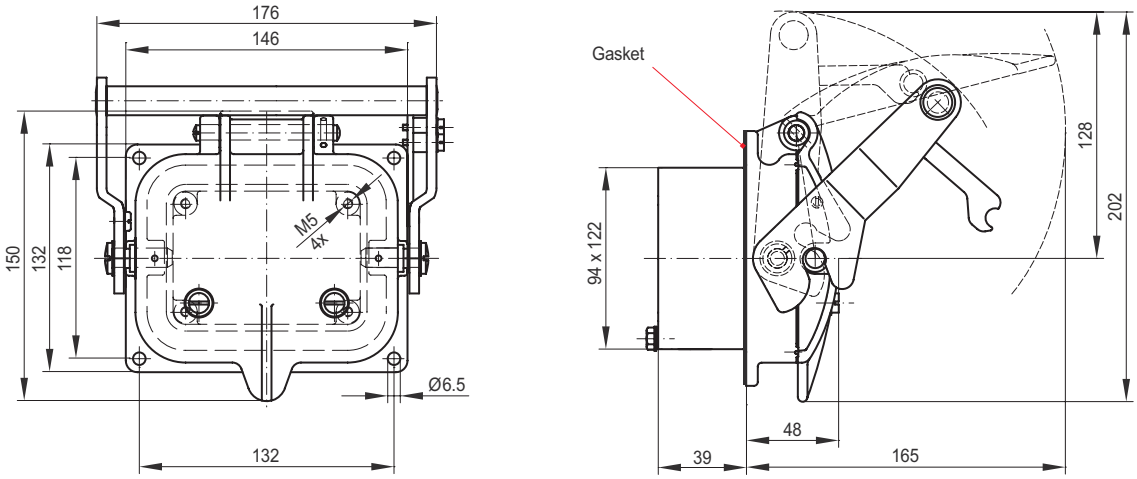
Housing part 1



Note: *Gasket supplied with the product*

B DK R Receptacle short with contact bridge on cover — Series B

Housing part 1



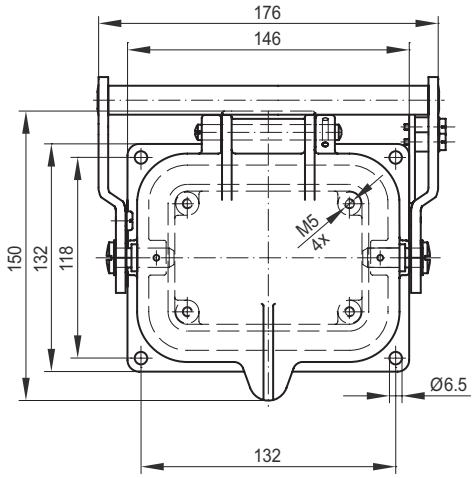
Note: *Gasket supplied with the product*

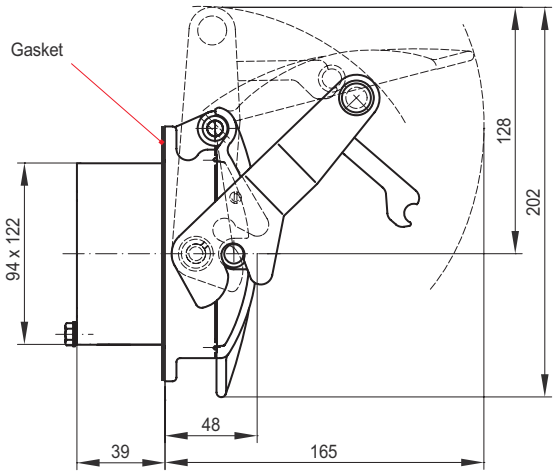
Reduced scale diagrams / dimensions in mm

B DK Receptacle short

Series B

Housing part 1



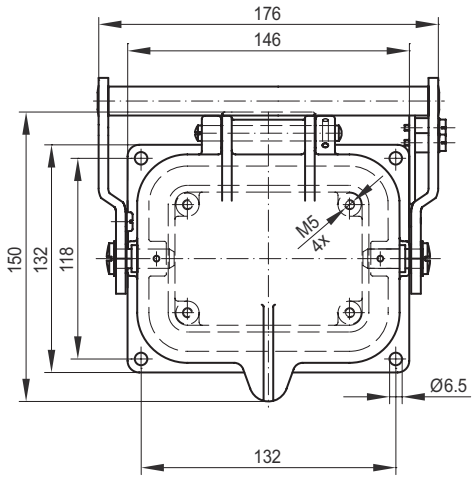


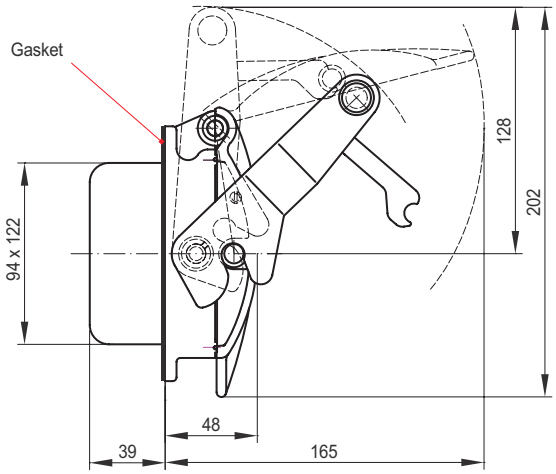
Note: *Gasket supplied with the product*

B BD Dummy receptacle

Series B

Housing part 1



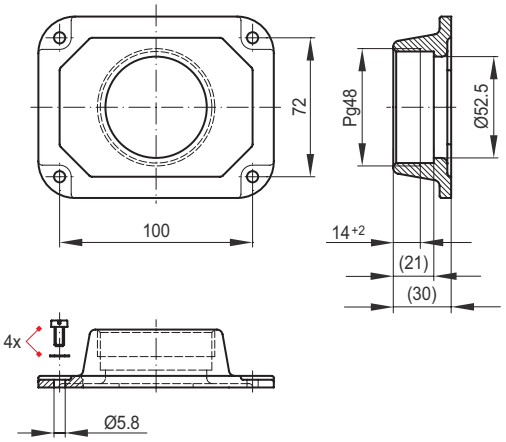


Note: *Gasket supplied with the product*

B VD Pg48 Cover with Pg48 thread

Series B

Housing part 2



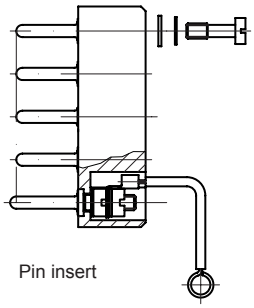
Note: *Screws and washers supplied with the product*

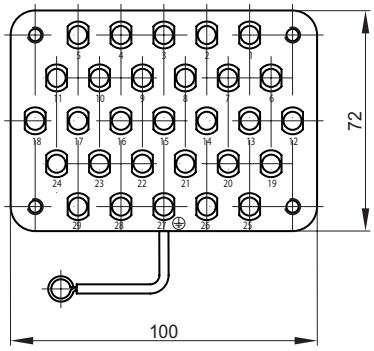
Reduced scale diagrams / dimensions in mm

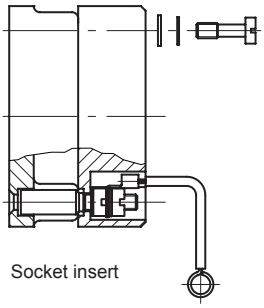
Pin and socket inserts

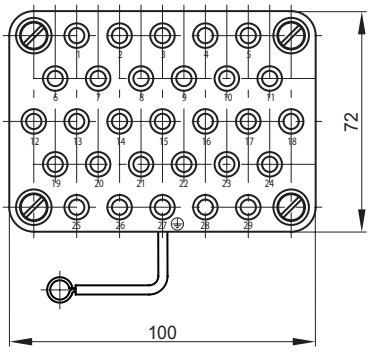
Series B

Inserts


Pin insert




Socket insert



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

Number of contacts max.		2+PE	2+PE+3 pole	2+PE+2 pole	2+PE+2+2 pole
Inserts					
Pin insert		B E-2P+PE /M	B E-2P+PE+3 /M	B E-2P+PE+2 /M	---
Socket insert		B E-2S+PE /M	B E-2S+PE+3 /M	---	B E-2S+PE+2+2 /M
Dummy insert		---	---	---	B E-2+PE+2+2 /M
Contact arrangement					
Contact identification marked on insert:					
Socket insert:	Rear view				
Pin insert:	Front view				
Main contacts	Contact type	X	X	V	V
	Terminals	Screws M12x25	Screws M12x25	Screws M10x25	Screws M10x25
PE contact *	Contact type	V	V	V	V
	Terminals	Screws M10x25	Screws M10x25	Screws M10x25	Screws M10x25
Control contacts	Contact type	---	N	C	C
	Terminals	---	Screws M6x10	Screws M5x10	Screws M5x10
	Crimp type	---	---	---	---

Number of contacts max.		3+PE+2 pole	3+PE+4 pole	4 pole+PE	4+29 -pole
Inserts					
Pin insert		B E-3P+PE+2 /M	---	B E-4P+PE /M	B E-4P+29 /ML
Socket insert		B E-3S+PE+2 /M	B E-3S+PE+4 /M	B E-4S+PE /M	B E-4S+29 /ML
Dummy insert		---	B E-2P /P	---	---
Contact arrangement					
Contact identification marked on insert:					
Socket insert:	Rear view				
Pin insert:	Front view				
Main contacts	Contact type	V	V	W	W
	Terminals	Screws M10x25	Screws M10x25	Screws M8x20	Screws M8x20
PE contact *	Contact type	V	V	---	---
	Terminals	Screws M10x25	Screws M10x25	---	---
Control contacts	Contact type	C	C	---	H
	Terminals	Screws M5x10	Screws M5x10	---	Solder, 4 mm² max.
	Crimp type	---	---	---	---

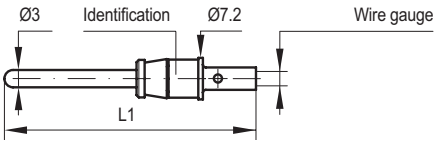
Number of contacts max.		28 pole+PE	29 pole+PE	59 pole+PE	
Inserts					
Pin insert		B E-28P+PE	B E-29P /M	B E-59P+PE	B E-59P+PE /C1.5 ... /C2.5
Socket insert		B E-28S+PE /M	B E-29S /M	B E-59S+PE	B E-59S+PE /C1.5 ... /C2.5
Dummy insert		---	---	---	---
Contact arrangement					
Contact identification marked on insert:					
Socket insert:	Rear view				
Pin insert:	Front view				
Main contacts	Contact type	---	---	---	---
	Terminals	---	---	---	---
PE contact *	Contact type	---	---	---	---
	Terminals	---	---	---	---
Control contacts	Contact type	C	C	*for contacts size* H	H
	Terminals	Screws M5x10	Screws M5x10	*Pin insert without contacts*	Crimp
	Crimp type	---	---	1.5 mm² or 2.5 mm²	1.5 mm² or 2.5 mm²

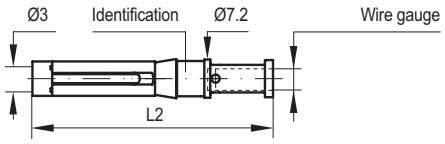
* *PE = protective earthing contact*

Reduced scale diagrams / dimensions in mm

Contacts Crimp (pin/socket) — 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

Termination

Wire gauge*	Rated current
1.5 mm²	16 A
2.5 mm²	27.5 A

AWZ-x Extraction tool — CWZ-600 Crimp tool — Series B

(Figure reduced)

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

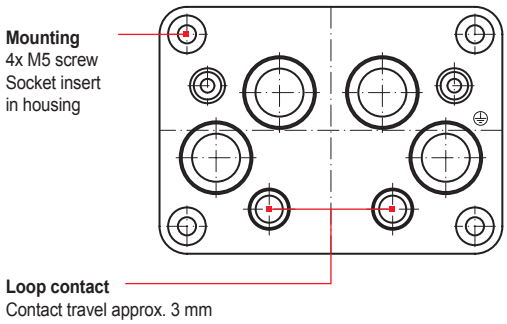
CWZ-600: Crimp tool for wire gauges* ranging from 0.14 mm² to 6 mm²

* *For AWG sizes refer to the conversion table on our homepage* www.schaltbau-gmbh.de/en/produkte/electrical-wire-conversion-table.htm

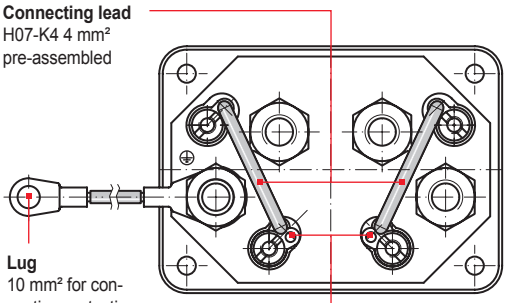
Reduced scale diagrams / dimensions in mm

Assembly Receptacle B DL R with insert B E-3S+PE+2 /M — Series B

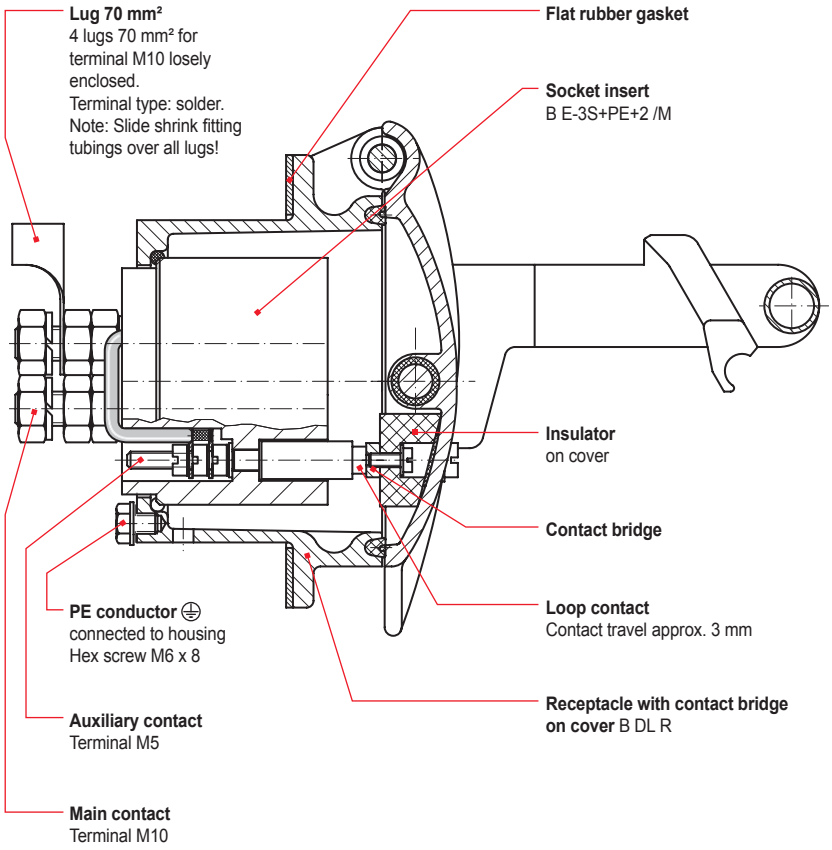
Socket insert Front view



Socket insert Rear view



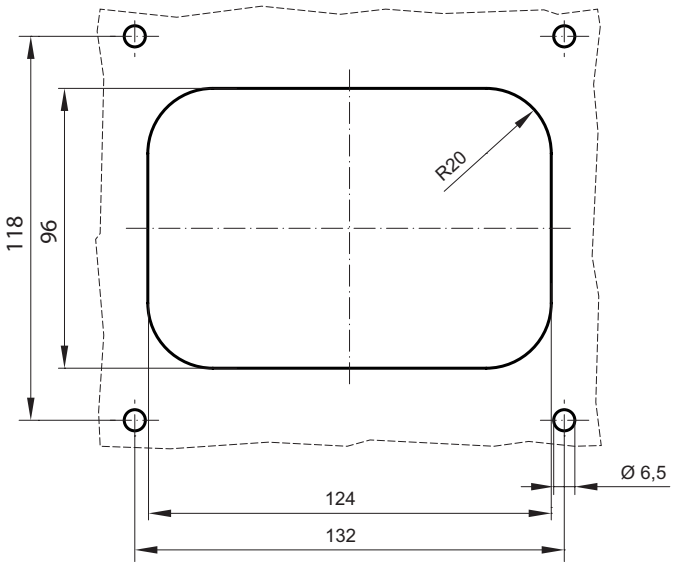
Receptacle (Sectional view)



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



Reduced scale diagrams / dimensions in mm

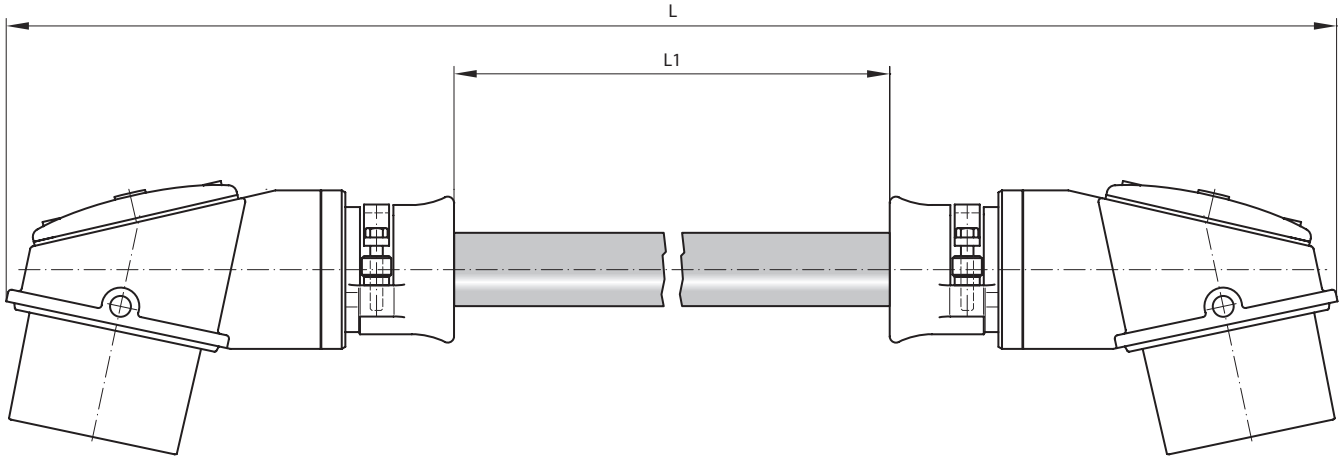
Pre-assembled cables Signle and double ended connector cables Series B

Do you prefer a pre-assembled connector?

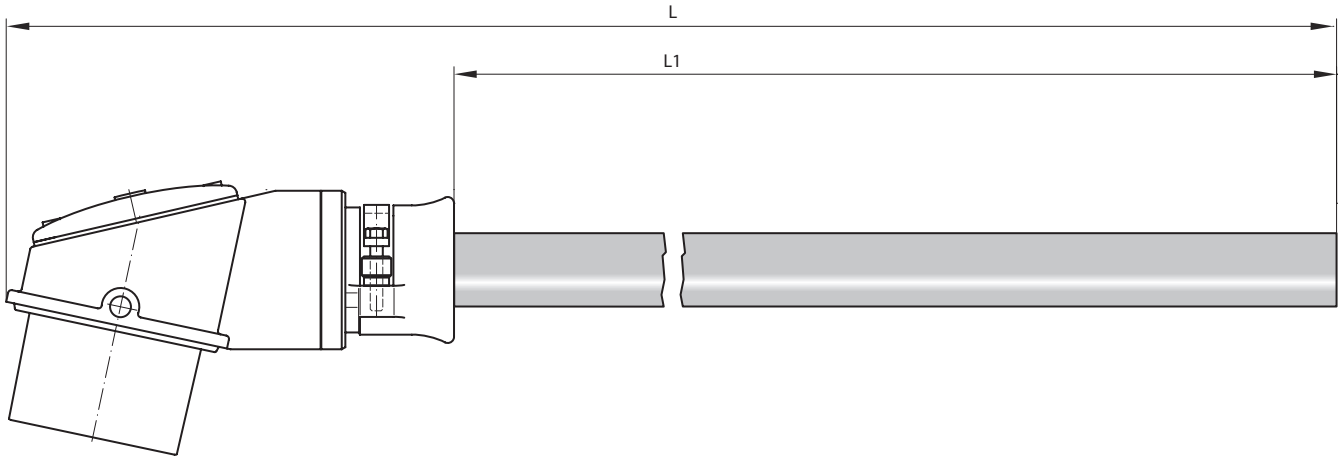
Do not hesitate to contact us. We supply on request receptacles and plugs assembled complete with cables or wires to suit the customer‘s specific requirements.

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



Quality assurance:

- DIN EN ISO 9001:2000
- EN ISO 14001:1996

Minimum order quantity:

- The minimum quantity for which Schaltbau can accept an order is 50.
- For orders below that quantity we can name a certified manufacturer or authorized sales partner in your neighbourhood.

Reduced scale diagrams / dimensions in mm

RoHS 2002/95/EC

Schaltbau GmbH manufactures in compliance with RoHS.

ISO 14001:2005 BUREAU VERITAS Certification

Schaltbau GmbH has an environment management system that has been certified since 2002.

ISO 9001:2000 BUREAU VERITAS Certification

Schaltbau GmbH has a quality management system that has been certified since 1994.

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 stop 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

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