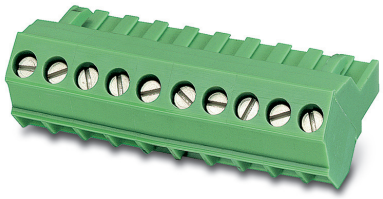
2021-09-03
Product version 04
Document revision 00

Data sheet

Order No.: 1768820

Type: SMSTB 2,5/ 9-ST

PCB connector, Screw connection with tension sleeve



The figure shows a 10-position version of the product

1 Main features

- No. of pos. 9
- Conductor cross section 2.5 mm²
- Color green (6021)
- Pitch 5 mm
- Connection method Screw connection with tension sleeve
- Nominal current 12 A
- Nominal voltage 320 V
- Connection direction -45 °
- Type of packaging packed in cardboard

2 Your advantages

- Well-known connection principle allows worldwide use
- Optimized for tight installation situations: operation and conductor connection from one direction
- Angled conductor connection enables operation and conductor connection from one direction
- Low temperature rise, thanks to maximum contact force

Make sure you always use the latest documentation.
It can be downloaded at: phoenixcontact.net/product/1768820

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3 Table of contents

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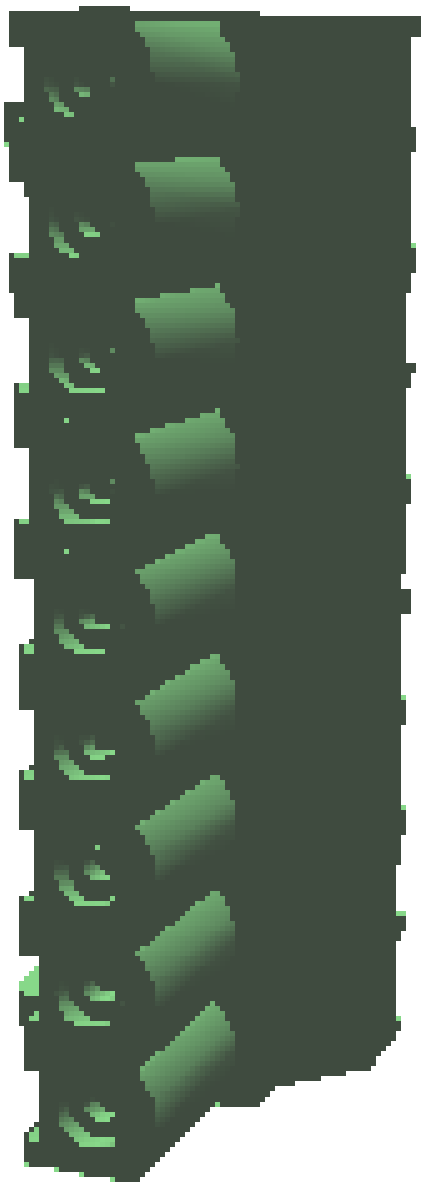
4 3D model in PDF can be activated (Acrobat Reader only)



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5 General Technical Data

5.1 item properties

Order No.	1768820
Type	SMSTB 2,5/ 9-ST
Connector system	CLASSIC COMBICON
Product type	PCB connector
Type of contact	Female connector
Range of articles	SMSTB 2,5/..-ST
Pitch	5 mm
Number of positions	9
Number of rows	1
Number of connections	9
Number of potentials	9
Connection method	Screw connection with tension sleeve
Screw thread	M3
Drive form screw head	Slotted (L)
Connection direction of the conductor to plug-in direction	-45 °
Type	Standard

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6 Mounting

6.1 Flange mounting

Type of locking	without
Mounting flange	without

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7 Conductor connection

7.1 Connection capacity

Nominal cross section	2.5 mm²
Conductor cross section, rigid	0.2 mm² ... 2.5 mm²
Conductor cross section, flexible	0.2 mm² ... 2.5 mm²
Conductor cross section flexible, with ferrule without plastic sleeve	0.25 mm² ... 2.5 mm²
Conductor cross section flexible, with ferrule with plastic sleeve	0.25 mm² ... 2.5 mm²
2 conductors with same cross section, solid	0.2 mm² ... 1 mm²
2 conductors with same cross section, stranded	0.2 mm² ... 1.5 mm²
2 conductors with same cross section, stranded, with ferrule without plastic sleeve	0.25 mm² ... 1 mm²
2 conductors with the same cross section flexible with TWIN ferrule and plastic sleeve	0.5 mm² ... 1.5 mm²
Cylindrical gauge a x b / diameter	2.8 mm x 2.0 mm / 2.4 mm
Stripping length	7 mm
Tightening torque	0.5 Nm ... 0.6 Nm

7.2 Connection capacity AWG

Conductor cross section AWG	24 ... 12

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8 Material properties

8.1 Material of metal parts

Note	WEEE/RoHS-compliant, whisker-free acc. to IEC 60068-2-82/JEDEC JESD 201
Contact material	Cu alloy
Terminal point surface	Tin (5 - 7 µm Sn)
Surface contact area	Tin (5 - 7 µm Sn)
Surface characteristics	hot-dip tin-plated

8.2 Material of plastic parts

	Housing
Color	green (6021)
Insulating material	PA
Insulating material group	I
CTI according to IEC 60112	600
Flammability rating according to UL 94	V0
Glow wire flammability index GWFI according to EN 60695-2-12	850
Glow wire ignition temperature GWIT according to EN 60695-2-13	775
Temperature for the ball pressure test according to EN 60695-10-2	125 °C

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9 Dimensions

9.1 Dimensions for the product

Length	25.6 mm
Width	45 mm
Installed height	15.5 mm
Total height	15.5 mm

10 Product notes

10.1 General information

Notes on operation	In accordance with IEC 61984, COMBICON connectors have no switching power (COC). During designated use, they must not be plugged in or disconnected when carrying voltage or under load.

11 Packaging information

Type of packaging	packed in cardboard
Pieces per package	50

12 Application

12.1 Temperature limit values

Ambient temperature (storage/transport)	-40 °C ... 70 °C
Ambient temperature (assembly)	-5 °C ... 100 °C
Ambient temperature (operation)	-40 °C ... 100 °C (dependent on the derating curve)

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13 General tests

13.1 Specification

Specification	IEC 61984
Specification	IEC 60999-1
Brief description	Printed-circuit board connector

14 Mechanical tests

14.1 Check for damage to conductor or loosening

Result	Test passed
Specification	IEC 60999-1:1999-11

14.2 Pull-out test

Specification	IEC 60999-1:1999-11
Result	Test passed
Conductor cross section/conductor type/tractive force actual value	0.2 mm^2 / solid / > 10 N
Conductor cross section/conductor type/tractive force actual value	0.2 mm^2 / flexible / > 10 N
Conductor cross section/conductor type/tractive force actual value	2.5 mm^2 / solid / > 50 N
Conductor cross section/conductor type/tractive force actual value	2.5 mm^2 / flexible / > 50 N

14.3 Torque test

Specification	IEC 60999-1:1999-11
Result	Test passed

14.4 Visual examination

Specification	IEC 61984:2008-10
Visual examination	Test passed
Specification	IEC 60512-1-1:2002-02

14.5 Dimensional test

Dimensional test	Test passed
Specification	IEC 60512-1-2:2002-02

14.6 Resistance of marking

Resistance of marking	Test passed
Specification	IEC 60068-2-70:1995-12

14.7 Polarization and coding

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Polarization when inserted Requirement >20 N	Test passed
Specification	IEC 60512-13-5:2006-02

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15 Insertion and withdrawal forces

Insertion and withdrawal force	Test passed
Specification	IEC 60512-13-2:2006-02
No. of cycles	25
Insertion strength per pos. approx.	8 N
Withdraw strength per pos. approx.	6 N

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16 Electrical tests

Rated current / conductor cross section	12 A / 2.5 mm²
Rated insulation voltage (III/2)	320 V
Rated surge voltage (III/2)	4 kV
Contact resistance	2.3 mΩ
Degree of pollution	2

16.1 Air and creepage distances

Component	PCB connector		
Specification	IEC 60664-1:2007-04		
Mains type	unearthed mains		
Insulating material group	I		
Comparative tracking index (IEC 60112:2003-01)	CTI 600		
Rated insulation voltage	250 V	320 V	630 V
Rated surge voltage	4 kV	4 kV	4 kV
Degree of pollution	3	2	2
Overvoltage category	III	III	II
Minimum clearance case A (inhomogeneous field)	3 mm	3 mm	3 mm
Minimum value of the creepage path requirement in acc. with table	3.2 mm	3 mm	3.2 mm

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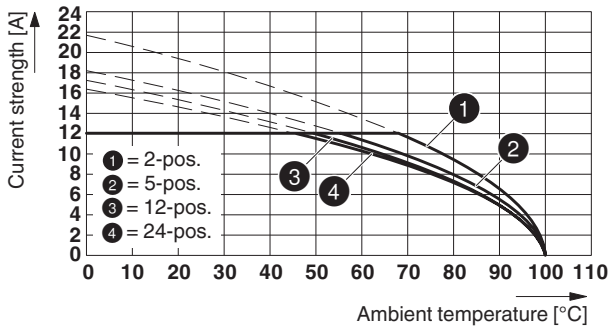
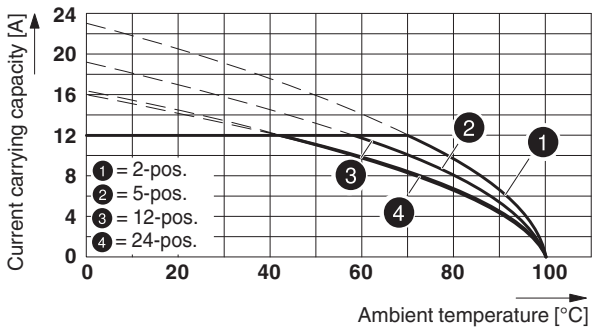
17 Current carrying capacity/derating curves

Specification	IEC 61984:2008-10
Note	Representation based on IEC 60512-5-2:2002-02
Note	For number of positions, see diagram
Reduction factor	0.8
Conductor cross section	2.5 mm²

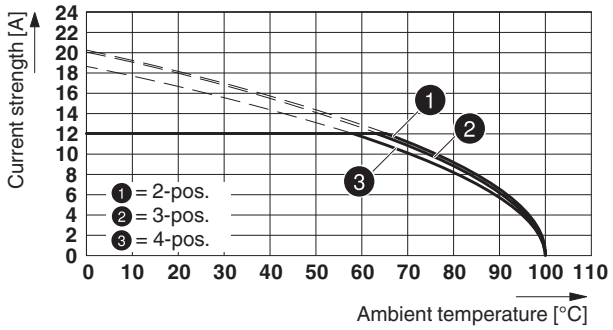
Type: SMSTB 2,5/...-ST with MSTB 2,5/...-G



Type: SMSTB 2,5/...-ST with SMSTBA 2,5/...-G



Type: SMSTB 2,5/...-ST with MSTBO 2,5/...-G1R



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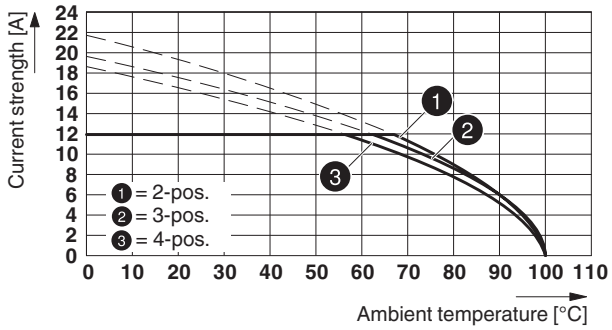
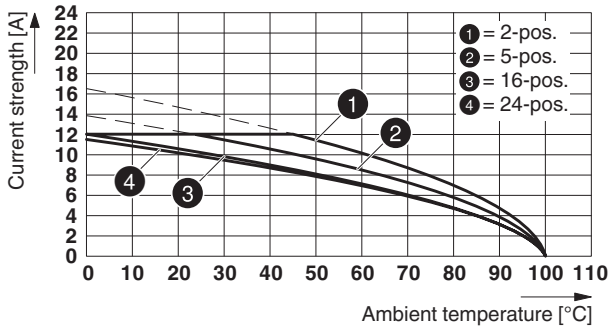
1768820 SMSTB 2,5/ 9-ST

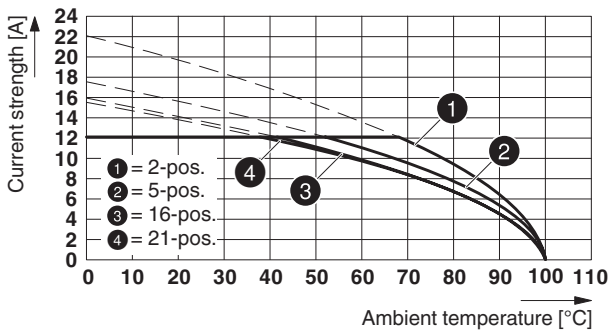
Type: SMSTB 2,5/...-ST with MSTBO 2,5/...-G1L



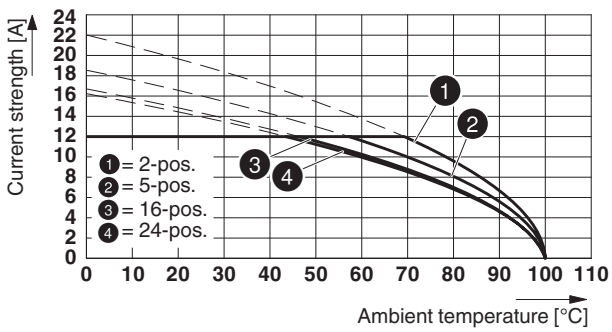
Type: SMSTB 2,5/...-ST with MSTBV 2,5/...-G



Type: SMSTB 2,5/...-ST with MSTBW 2,5/...-G



Type: SMSTB 2,5/...-ST with SMSTB 2,5/...-G



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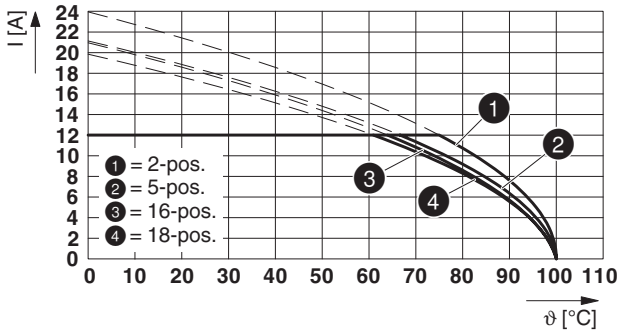
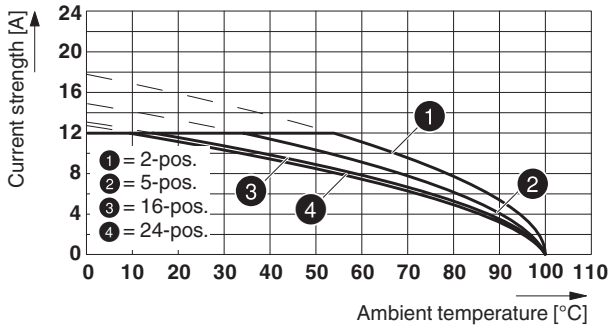
1768820 SMSTB 2,5/ 9-ST

Type: SMSTB 2,5/...-ST with FKIC 2,5/...-ST



Type: SMSTB 2,5/...-ST with MSTBVA 2,5/...-G



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18 Environmental and durability tests

18.1 Vibration test

Specification	IEC 60068-2-6:2007-12
Result	Test passed
Frequency	10 - 150 - 10 Hz
Sweep speed	1 octave/min
Amplitude	0.35 mm (10 - 60.1 Hz)
Acceleration	5g (60.1 - 150 Hz)
Test duration per axis	2.5 h
Test directions	X-, Y- and Z-axis
Note	The connected conductor loops were guided to the test sample at a distance of approx. 10 cm.

18.2 Insulation resistance

Specification	IEC 60512-3-1:2002-02
Result	Test passed
Insulation resistance, neighboring positions	> 5 MΩ

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19 Type approval and special tests

20 Classification for connectors

Specification	IEC 61984:2008-10
Main features	Connectors without switching capacity (COC)
Construction form	Fixed connectors
Strain relief elements	without strain relief
Connection method	Can be reconnected
Protection against electric shock	Not encapsulated - touch-proof when inserted
Protective conductor	without PE
Lock	no
Connection method	Screw terminal points

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21 Approvals / Certificates

CSA	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm²]
Usegroup B				
	300 V	15 A	28 - 12	-
Usegroup D				
	300 V	10 A	28 - 12	-

EAC

cULus Recognized	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm²]
Usegroup B				
	300 V	15 A	30 - 12	-
Usegroup D				
	300 V	10 A	30 - 12	-

IECEE CB Scheme	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm²]
	250 V	12 A	-	0.2 - 2.5

VDE Zeichengenehmigung	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm²]
	250 V	12 A	-	0.2 - 2.5

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22 Commercial Data

Order No.	1768820
Type	SMSTB 2,5/ 9-ST
Pieces per package	50
Net weight	16.554 g
GTIN	4017918034184
	Information that applies locally, see link on page 1

23 corresponding headers

Order No.	Type
1736043	MSTBW 2,5/ 9-G
1753576	MSTBV 2,5/ 9-G
1770559	MSTBA 2,5/ 9-G-LA
1845853	MDSTBVA 2,5/ 9-G
1846001	MDSTBV 2,5/ 9-G
1846438	MDSTB 2,5/ 9-G
1846580	MDSTBA 2,5/ 9-G
1846881	MDSTBW 2,5/ 9-G
1899919	EMSTBA 2,5/ 9-G
1914920	EMSTBVA 2,5/ 9-G

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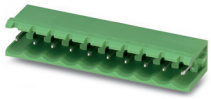
24 Combination tests



SMSTB 2,5/..-ST	**MSTB 2,5/..-G**	**SMSTBA 2,5/..-G**	**MSTBO 2,5/..-G1R**	**MSTBO 2,5/..-G1L**
IEC 61984	IEC 61984	IEC 61984	IEC 61984	IEC 61984
Mechanical tests (A)				
Insertion/withdrawal force per position	approx. 8 N / 6 N	approx. 11 N / 6 N	approx. 8 N / 6 N	approx. 8 N / 6 N
Polarization when inserted Requirement >20 N	Test passed	Test passed	Test passed	Test passed
Contact holder in insert Requirements >20 N	Test passed	Test passed	Test passed	Test passed
Durability tests (B)				
Contact resistance R_1 1st level	2.3 mΩ	2.3 mΩ	2.4 mΩ	2.4 mΩ
Contact resistance R_1 2nd level				
Insertion/withdrawal cycles	25	25	25	25
Contact resistance R_2	2.3 mΩ	2.4 mΩ	2.4 mΩ	2.4 mΩ
Rated impulse voltage at sea level Voltage waveform ≥ (1.2/50 µs)	4.8 kV	4.8 kV	4.8 kV	4.8 kV
Power-frequency withstand voltage Voltage waveform ≥ (50/60 Hz)	2.21 kV	2.21 kV	2.21 kV	2.21 kV
Thermal tests (C)				
Tested number of positions	24	24	4	4
Tested conductor cross section	2.5 mm²	2.5 mm²	2.5 mm²	2.5 mm²
Test current	12 A	12 A	12 A	12 A
Upper limiting temperature Requirements < 100°C	Test passed	Test passed	Test passed	Test passed
Climatic tests (D)				
Test sequence 1: low temperature storage	-40 °C/2 h	-40 °C/2 h	-40 °C/2 h	-40 °C/2 h
Test sequence 2: heat storage	100 °C/168 h	100 °C/168 h	100 °C/168 h	100 °C/168 h
Test sequence 3: noxious gas storage (ISO 6988)	0.2 dm^3 SO_2 on 300 dm^3/ 40 °C/1 cycle	0.2 dm^3 SO_2 on 300 dm^3/ 40 °C/1 cycle	0.2 dm^3 SO_2 on 300 dm^3/ 40 °C/1 cycle	0.2 dm^3 SO_2 on 300 dm^3/ 40 °C/1 cycle
Rated impulse voltage at sea level Voltage waveform ≥ (1.2/50 µs)	4.8 kV	4.8 kV	4.8 kV	4.8 kV
Power-frequency withstand voltage Voltage waveform ≥ (50/60 Hz)	2.21 kV	2.21 kV	2.21 kV	2.21 kV
Environmental and endurance tests (E)				
Specification	IEC 61984:2008-10	IEC 61984:2008-10	IEC 61984:2008-10	IEC 61984:2008-10
Degree of protection	Finger safety with IP20 test finger	Finger safety with IP20 test finger	No contact safety (IP00) in acc. with IEC 60529:1989-11 + AMD 1:1999-11 + AMD 2:2013-08	No contact safety (IP00) in acc. with IEC 60529:1989-11 + AMD 1:1999-11 + AMD 2:2013-08

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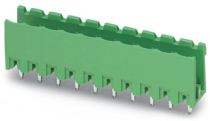
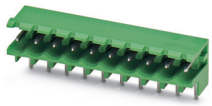
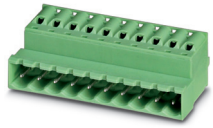
1768820 SMSTB 2,5/ 9-ST



SMSTB 2,5/..-ST	MSTBV 2,5/..-G	MSTBW 2,5/..-G	SMSTB 2,5/..-G	FKIC 2,5/..-ST
IEC 61984	IEC 61984	IEC 61984	IEC 61984	IEC 61984
Mechanical tests (A)				
Insertion/withdrawal force per position	approx. 8 N / 6 N	approx. 8 N / 6 N	approx. 8 N / 6 N	approx. 8 N / 6 N
Polarization when inserted Requirement >20 N	Test passed	Test passed	Test passed	Test passed
Contact holder in insert Requirements >20 N	Test passed	Test passed	Test passed	Test passed
Durability tests (B)				
Contact resistance R_1 1st level	3.4 mΩ	2.3 mΩ	2.2 mΩ	2.1 mΩ
Contact resistance R_1 2nd level				
Insertion/withdrawal cycles	25	25	25	25
Contact resistance R_2	3.5 mΩ	2.3 mΩ	2.2 mΩ	2.2 mΩ
Rated impulse voltage at sea level Voltage waveform ≥ (1.2/50 µs)	4.8 kV	4.8 kV	4.8 kV	4.8 kV
Power-frequency withstand voltage Voltage waveform ≥ (50/60 Hz)	2.21 kV	2.21 kV	2.21 kV	2.21 kV
Thermal tests (C)				
Tested number of positions	24	21	24	18
Tested conductor cross section	2.5 mm²	2.5 mm²	2.5 mm²	2.5 mm²
Test current	12 A	12 A	12 A	12 A
Upper limiting temperature Requirements < 100°C	Test passed	Test passed	Test passed	Test passed
Climatic tests (D)				
Test sequence 1: low temperature storage	-40 °C/2 h	-40 °C/2 h	-40 °C/2 h	-40 °C/2 h
Test sequence 2: heat storage	100 °C/168 h	100 °C/168 h	100 °C/168 h	100 °C/168 h
Test sequence 3: noxious gas storage (ISO 6988)	0.2 dm^3 SO_2 on 300 dm^3/ 40 °C/1 cycle	0.2 dm^3 SO_2 on 300 dm^3/ 40 °C/1 cycle	0.2 dm^3 SO_2 on 300 dm^3/ 40 °C/1 cycle	0.2 dm^3 SO_2 on 300 dm^3/ 40 °C/1 cycle
Rated impulse voltage at sea level Voltage waveform ≥ (1.2/50 µs)	4.8 kV	4.8 kV	4.8 kV	4.8 kV
Power-frequency withstand voltage Voltage waveform ≥ (50/60 Hz)	2.21 kV	2.21 kV	2.21 kV	2.21 kV
Environmental and endurance tests (E)				
Specification	IEC 61984:2008-10	IEC 61984:2008-10	IEC 61984:2008-10	IEC 61984:2008-10
Degree of protection	Finger safety with IP20 test finger	Finger safety with IP20 test finger	Finger safety with IP20 test finger	Finger safety with IP20 test finger

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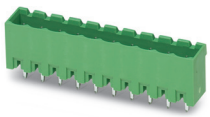

SMSTB 2,5/..-ST	MSTBVA 2,5/..-G			
IEC 61984	IEC 61984			
Mechanical tests (A)				
Insertion/withdrawal force per position	approx. 8 N / 6 N			
Polarization when inserted Requirement >20 N	Test passed			
Contact holder in insert Requirements >20 N	Test passed			
Durability tests (B)				
Contact resistance R_1 1st level	3.5 mΩ			
Contact resistance R_1 2nd level				
Insertion/withdrawal cycles	25			
Contact resistance R_2	3.5 mΩ			
Rated impulse voltage at sea level Voltage waveform ≥ (1.2/50 µs)	4.8 kV			
Power-frequency withstand voltage Voltage waveform ≥ (50/60 Hz)	2.21 kV			
Thermal tests (C)				
Tested number of positions	24			
Tested conductor cross section	2.5 mm^2			
Test current	12 A			
Upper limiting temperature Requirements < 100°C	Test passed			
Climatic tests (D)				
Test sequence 1: low temperature storage	-40 °C/2 h			
Test sequence 2: heat storage	100 °C/168 h			
Test sequence 3: noxious gas storage (ISO 6988)	0.2 dm^3 SO_2 on 300 dm^3/ 40 °C/1 cycle			
Rated impulse voltage at sea level Voltage waveform ≥ (1.2/50 µs)	4.8 kV			
Power-frequency withstand voltage Voltage waveform ≥ (50/60 Hz)	2.21 kV			
Environmental and endurance tests (E)				
Specification	IEC 61984:2008-10			
Degree of protection	Finger safety with IP20 test finger			

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