

Data sheet

Order No.: 1769816

Type: SMSTBA 2,5/ 3-G

PCB header



The figure shows a 10-position version of the product

1 Main features



- | | | | |
|-------------------------|---------------------|------------------------|---------------------|
| • No. of pos. | 3 | • Nominal current | 12 A |
| • Nominal cross section | 2.5 mm ² | • Nominal voltage | 320 V |
| • Color | green (6021) | • Connection direction | 45 ° |
| • Pitch | 5 mm | • Type of packaging | packed in cardboard |
| • Mounting type | Wave soldering | | |

2 Your advantages

- ✓ Maximum flexibility when it comes to device design – one header for connectors with different connection technologies
- ✓ Well-known mounting principle allows worldwide use
- ✓ Angled connection enables multi-row arrangement on the PCB



Make sure you always use the latest documentation.

It can be downloaded at: phoenixcontact.net/product/1769816

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



1769816 SMSTBA 2,5/ 3-G**5 General Technical Data****5.1 item properties**

Order No.	1769816
Type	SMSTBA 2,5/ 3-G
Plug-in system	CLASSIC COMBICON
Product type	PCB header
Type of contact	Male connector
Range of articles	SMSTBA 2,5/..-G
Pitch	5 mm
Number of positions	3
Number of levels	1
Number of connections	3
Number of potentials	3
Mounting type	Wave soldering
Connection direction of the connector to the PCB	45 °
Pin layout	Linear pinning
Solder pins per potential	1
Type	Standard

1769816 SMSTBA 2,5/ 3-G**6 Mounting****6.1 Flange mounting**

Type of locking	without
Mounting flange	without

7 Material properties**7.1 Material of metal parts**

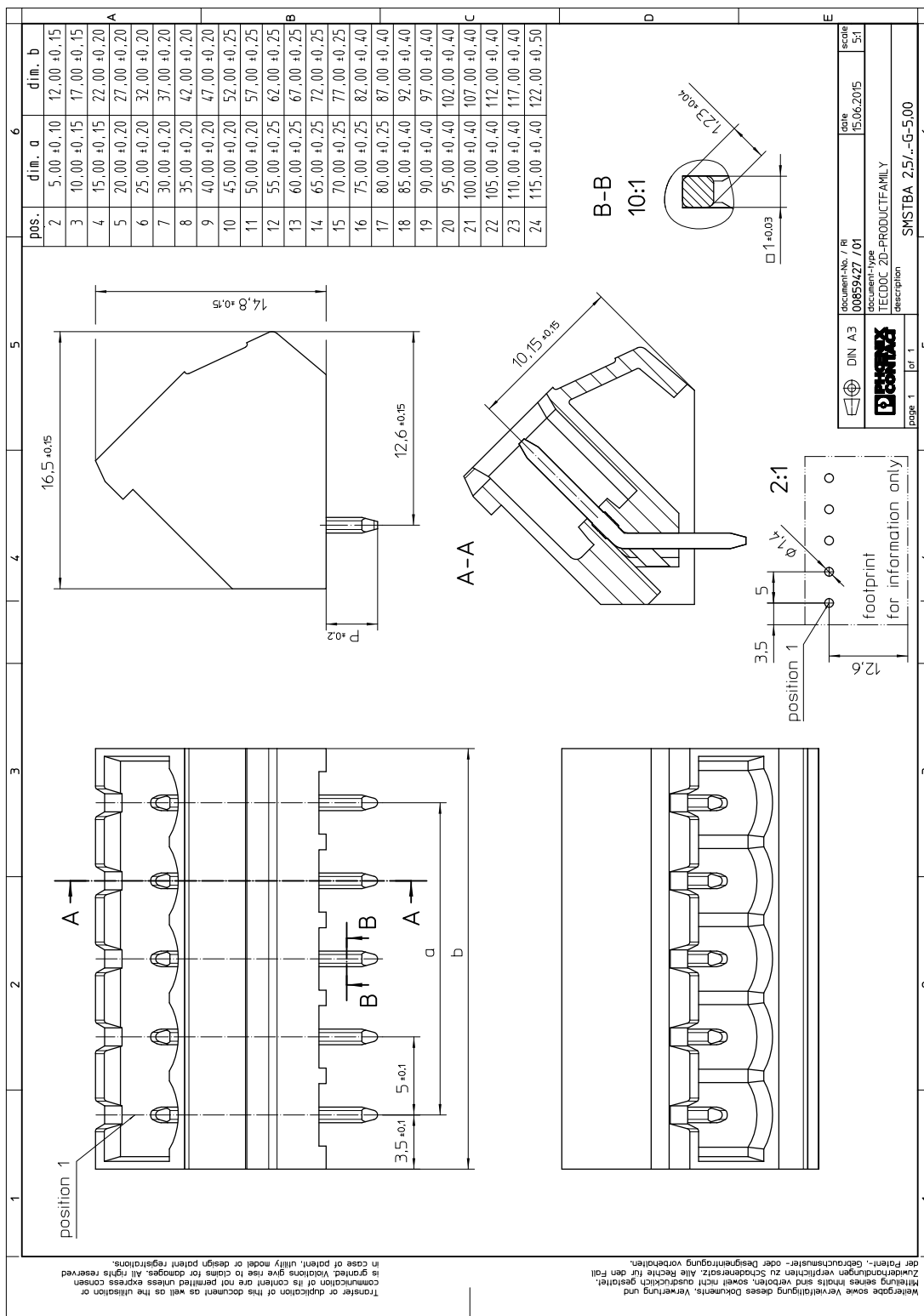
Note	WEEE/RoHS-compliant, whisker-free acc. to IEC 60068-2-82/JEDEC JESD 201
Contact material	Cu alloy
Surface contact area	Nickel (2 - 3 µm Ni) , Tin (5 - 7 µm Sn)
Soldering area surface	Nickel (2 - 3 µm Ni) , Tin (5 - 7 µm Sn)
Surface characteristics	Tin-plated
Insulating material data	Housing
Color	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

1769816 SMSTBA 2,5/ 3-G**8 Dimensions****8.1 Dimensions for the product**

Length	16.5 mm
Width	17 mm
Height (without solder pin)	14.8 mm
Total height	18.3 mm
Solder pin [P]	3.5 mm

1769816 SMSTBA 2,5/ 3-G

9 Series drawing



1769816 SMSTBA 2,5/ 3-G**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 Application**12 Packaging information**

Type of packaging	packed in cardboard
Pieces per package	100

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)

1769816 SMSTBA 2,5/ 3-G**13 Mechanical tests****13.1 Visual examination**

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

13.2 Dimensional test

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

13.3 Resistance of marking

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

13.4 Polarization and coding

Polarization and coding	Test passed
Specification	IEC 60512-13-5:2006-02
Test force	20 N

13.5 Contact retention in insert

Contact holder in insert Requirements >20 N	Test passed
Specification	IEC 60512-15-1:2008-05

1769816 SMSTBA 2,5/ 3-G**14 Insertion and withdrawal forces**

Insertion and withdrawal force	
Specification	Test passed
No. of cycles	25
Insertion strength per pos. approx.	11 N
Withdraw strength per pos. approx.	6 N

1769816 SMSTBA 2,5/ 3-G**15 Electrical tests**

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

15.1 Air and creepage distances

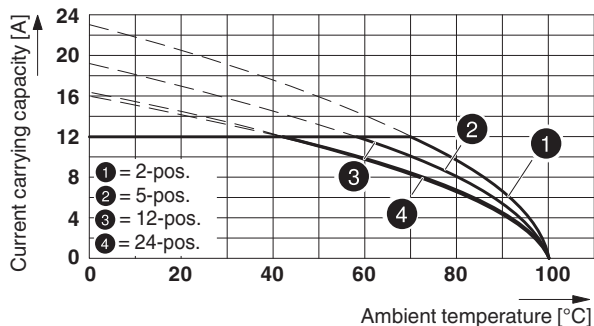
Component	PCB header		
Specification	IEC 60664-1:2007-04		
Mains type	unearthed mains		
Insulating material group	I		
Comparative tracking index (IEC 60112:2003-01)	CTI 600		
Rated insulation voltage	320 V	320 V	630 V
Rated surge voltage	4 kV	4 kV	4 kV
Degree of pollution	3	2	2
Overvoltage category	III	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	4 mm	1.6 mm	3.2 mm

1769816 SMSTBA 2,5/ 3-G

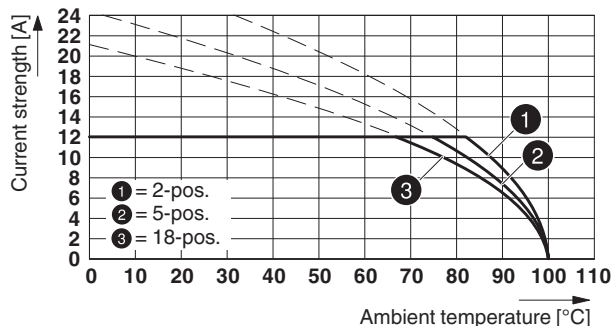
16 Current carrying capacity/derating curves

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 mm ²

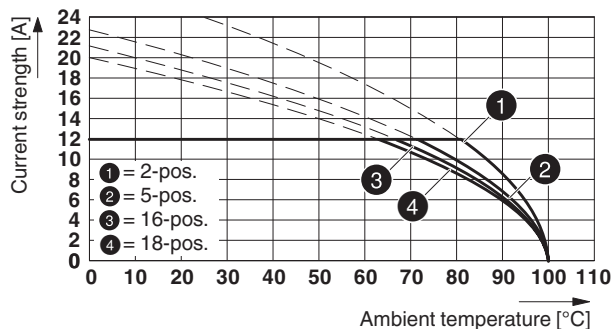
Type: SMSTB 2,5/...-ST with SMSTBA 2,5/...-G



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

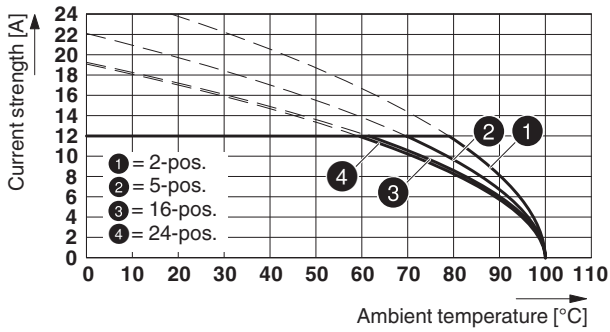


Type: MSTBT 2,5/...-ST with SMSTBA 2,5/...-G

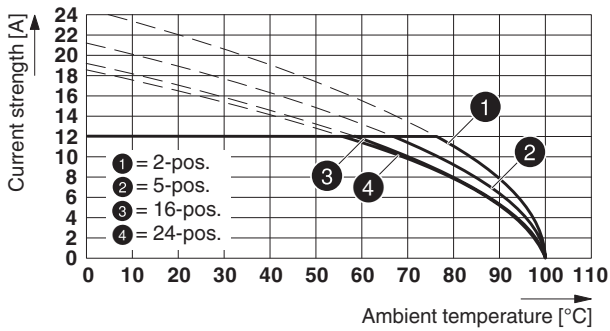


1769816 SMSTBA 2,5/ 3-G

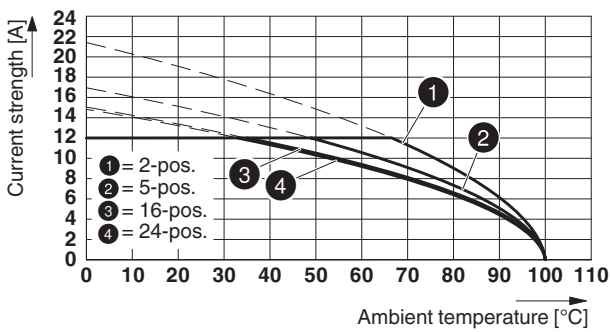
Type: MSTB 2,5/...-ST with SMSTBA 2,5/...-G



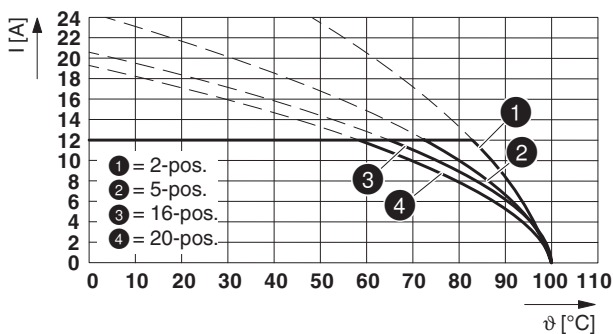
Type: FRONT-MSTB 2,5/..-ST with SMSTBA 2,5/...-G



Type: MVSTB(R/W) 2,5/...-ST with SMSTBA 2,5/...-G

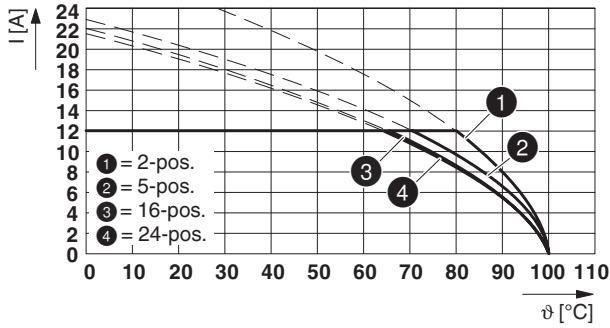


Type: FKCT 2,5/...-ST with SMSTBA 2,5/...-G

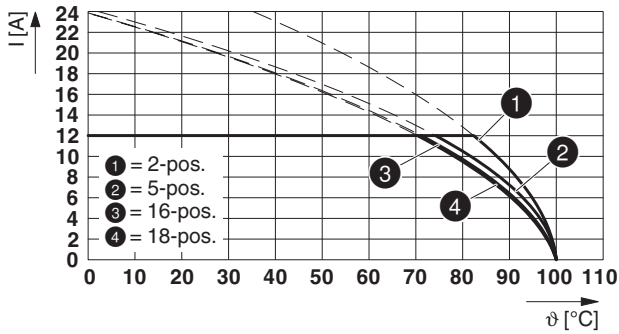


1769816 SMSTBA 2,5/ 3-G

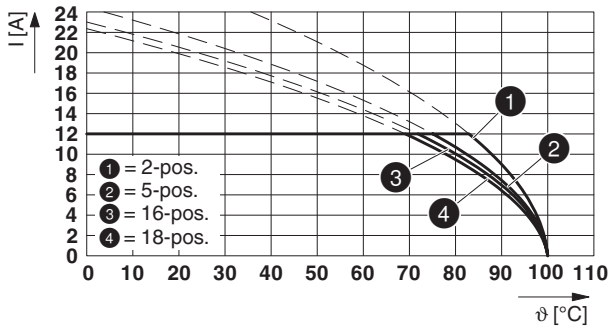
Type: MSTBP 2,5/...-ST with SMSTBA 2,5/...-G



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



Type: FKCV(W/R) 2,5/...-ST with SMSTBA 2,5/...-G



1769816 SMSTBA 2,5/ 3-G**17 Environmental and durability tests****17.1 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	5 g (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.

17.2 Insulation resistance

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

1769816 SMSTBA 2,5/ 3-G

18 Approvals / Certificates

CSA 	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm ²]
Usegroup B				
	300 V	15 A	-	-
Usegroup D				
	300 V	10 A	-	-
IECEE CB Scheme 	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm ²]
	250 V	12 A	-	-
EAC 				
VDE Zeichengenehmigung 	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm ²]
	250 V	12 A	-	-
cULus Recognized 	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm ²]
Usegroup B				
	300 V	15 A	-	-
Usegroup D				
	300 V	10 A	-	-
VDE Zeichengenehmigung 	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm ²]
	250 V	12 A	-	-

1769816 SMSTBA 2,5/ 3-G**19 Commercial Data**

Order No.	1769816
Type	SMSTBA 2,5/ 3-G
Pieces per package	100
Net weight	2.02 g
GTIN	4017918035037
	Information that applies locally, see link on page 1
	Information that applies locally, see link on page 1

20 corresponding plugs

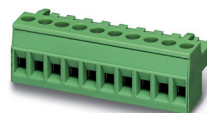
Order No.	Type
1713842	TVFKC 1,5/ 3-ST
1715934	TVFKCL 1,5/ 3-ST
1717974	QC 1,5/ 3-ST
1732755	FKCN 2,5/ 3-ST
1754465	MSTB 2,5/ 3-ST
1765784	MSTBP 2,5/ 3-ST
1768778	SMSTB 2,5/ 3-ST
1779424	FRONT-MSTB 2,5/ 3-ST
1779848	MSTBT 2,5/ 3-ST
1792029	MVSTBR 2,5/ 3-ST
1792537	MVSTBW 2,5/ 3-ST
1909223	FKCT 2,5/ 3-ST
1909728	FKCVR 2,5/ 3-ST
1910047	FKCVW 2,5/ 3-ST
1910364	FKC 2,5/ 3-ST
1921683	QC 1/ 3-ST-BUS
1974740	FKCS 2,5/ 3-ST

21 Accessories

Description	Order No.	Type
Coding section, inserted into the recess in the header or the inverted plug, red insulating material	1734401	CR-MSTB
	0804183	SK 5/3,8:FORTL.ZAHLEN
Keying cap, for forming sections, plugs onto header pin, green insulating material	1755477	MSTB-BL

1769816 SMSTBA 2,5/ 3-G

22 Combination tests

**SMSTBA 2,5/..-G**

IEC 61984

Mechanical tests (A)

Insertion/withdrawal force per position

approx. 11 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 R₁ 1st level

2.3 mΩ

1.1 mΩ

1.3 mΩ

1.3 mΩ

Contact resistance R₁ 2nd level

Insertion/withdrawal cycles

25

25

25

25

Contact resistance R₂

2.4 mΩ

1.2 mΩ

1.3 mΩ

1.4 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

18

18

24

Tested conductor cross section

2.5 mm²2.5 mm²2.5 mm²2.5 mm²

Test current

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 dm³ SO₂ on 300 dm³/
40 °C/1 cycle0.2 dm³ SO₂ on 300 dm³/
40 °C/1 cycle0.2 dm³ SO₂ on 300 dm³/
40 °C/1 cycle0.2 dm³ SO₂ on 300 dm³/
40 °C/1 cycleRated 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

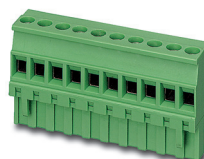
Degree of protection

Finger safety with IP20
test fingerFinger safety with IP20
test fingerFinger safety with IP20
test fingerFinger safety with IP20
test finger

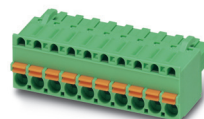
1769816 SMSTBA 2,5/ 3-G



SMSTBA 2,5/..-G

FRONT-MSTB 2,5/
..-ST

MVSTBR 2,5/..-ST



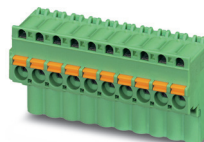
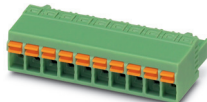
FKCT 2,5/..-ST



MSTBP 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	1.6 mΩ	2.5 mΩ	1.1 mΩ	1.3 mΩ
Contact resistance R ₁ 2nd level				
Insertion/withdrawal cycles	25	25	25	25
Contact resistance R ₂	1.6 mΩ	2.5 mΩ	1.2 mΩ	1.4 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	20	24
Tested conductor cross section	2.5 mm ²	2.5 mm ²	2.5 mm ²	2.5 mm ²
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

1769816 SMSTBA 2,5/ 3-G

**SMSTBA 2,5/..-G**

IEC 61984

Mechanical tests (A)

Insertion/withdrawal force per position

Polarization when inserted
Requirement >20 NContact holder in insert
Requirements >20 N**Durability tests (B)**Contact resistance R₁ 1st levelContact resistance R₁ 2nd level

Insertion/withdrawal cycles

Contact resistance R₂Rated impulse voltage at sea level
Voltage waveform ≥ (1.2/50 μs)Power-frequency withstand voltage
Voltage waveform ≥ (50/60 Hz)**Thermal tests (C)**

Tested number of positions

Tested conductor cross section

Test current

Upper limiting temperature
Requirements < 100°C**Climatic tests (D)**

Test sequence 1: low temperature storage

Test sequence 2: heat storage

Test sequence 3: noxious gas storage
(ISO 6988)Rated impulse voltage at sea level
Voltage waveform ≥ (1.2/50 μs)Power-frequency withstand voltage
Voltage waveform ≥ (50/60 Hz)**Environmental and endurance tests (E)**

Specification

Degree of protection

FKCN 2,5/..-ST

IEC 61984

approx. 8 N / 6 N

Test passed

Test passed

1 mΩ

25

1.1 mΩ

4.8 kV

2.21 kV

18

2.5 mm²

12 A

Test passed

-40 °C/2 h

100 °C/168 h

0.2 dm³ SO₂ on 300 dm³/
40 °C/1 cycle

4.8 kV

2.21 kV

IEC 61984:2008-10

Finger safety with IP20
test finger**FKCVW 2,5/..-ST**

IEC 61984

approx. 8 N / 6 N

Test passed

Test passed

1 mΩ

25

1.2 mΩ

4.8 kV

2.21 kV

18

2.5 mm²

12 A

Test passed

-40 °C/2 h

100 °C/168 h

0.2 dm³ SO₂ on 300 dm³/
40 °C/1 cycle

4.8 kV

2.21 kV

IEC 61984:2008-10

Finger safety with IP20
test finger