

Data sheet

Order No.: 1769900

Type: SMSTBA 2,5/12-G

PCB header



The figure shows a 10-position version of the product

1 Main features



- | | | | |
|-------------------------|---------------------|------------------------|---------------------|
| • No. of pos. | 12 | • 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



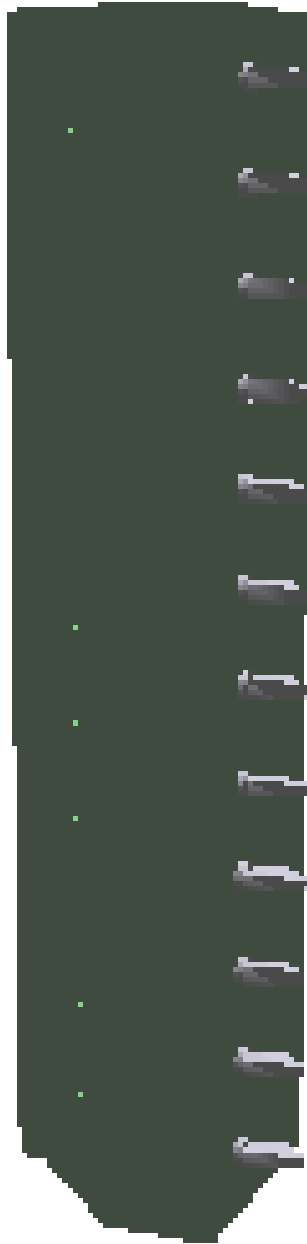
Make sure you always use the latest documentation.

It can be downloaded at: phoenixcontact.net/product/1769900

1769900 SMSTBA 2,5/12-G**3 Table of contents**

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



1769900 SMSTBA 2,5/12-G**5 General Technical Data****5.1 item properties**

| | |
|--|------------------|
| Order No. | 1769900 |
| Type | SMSTBA 2,5/12-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 | 12 |
| Number of levels | 1 |
| Number of connections | 12 |
| Number of potentials | 12 |
| Mounting type | Wave soldering |
| Connection direction of the connector to the PCB | 45 ° |
| Pin layout | Linear pinning |
| Solder pins per potential | 1 |
| Type | Standard |

1769900 SMSTBA 2,5/12-G**6 Mounting****6.1 Flange mounting**

| | |
|-----------------|---------|
| Type of locking | without |
| Mounting flange | without |

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

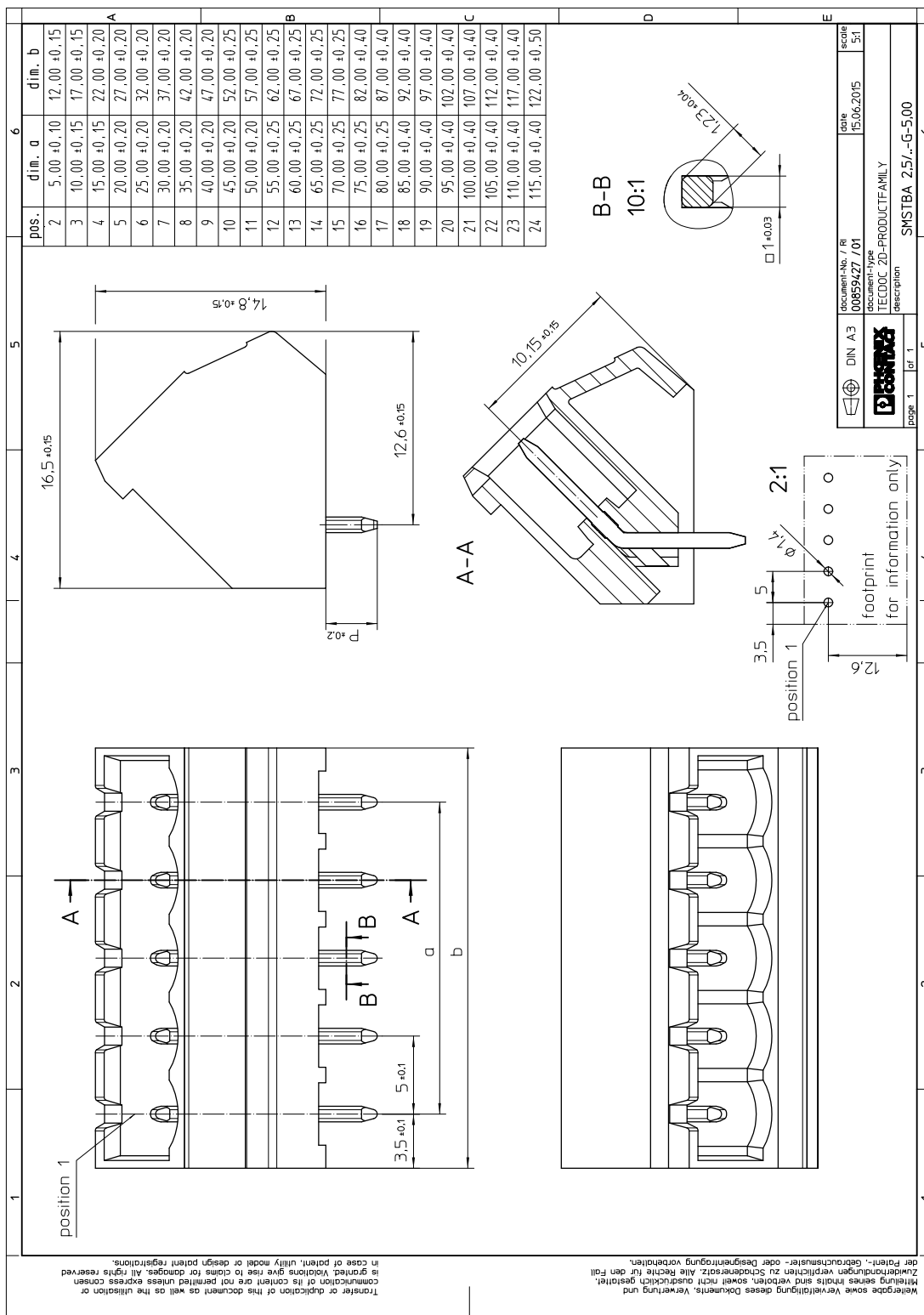
| | |
|---|---|
| Note | WEEE/RoHS-compliant, whisker-free acc. to IEC 60068-2-82/JEDEC JESD 201 |
| Contact material | Cu alloy |
| Surface contact area | Nickel (2 - 3 µm Ni) , Tin (5 - 7 µm Sn) |
| Soldering area surface | Nickel (2 - 3 µm Ni) , Tin (5 - 7 µm Sn) |
| Surface characteristics | Tin-plated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

1769900 SMSTBA 2,5/12-G**8 Dimensions****8.1 Dimensions for the product**

| | |
|-----------------------------|---------|
| Length | 16.5 mm |
| Width | 62 mm |
| Height (without solder pin) | 14.8 mm |
| Total height | 18.3 mm |
| Solder pin [P] | 3.5 mm |

1769900 SMSTBA 2,5/12-G

9 Series drawing



1769900 SMSTBA 2,5/12-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 | 50 |

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) |

1769900 SMSTBA 2,5/12-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 |

1769900 SMSTBA 2,5/12-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 |

1769900 SMSTBA 2,5/12-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

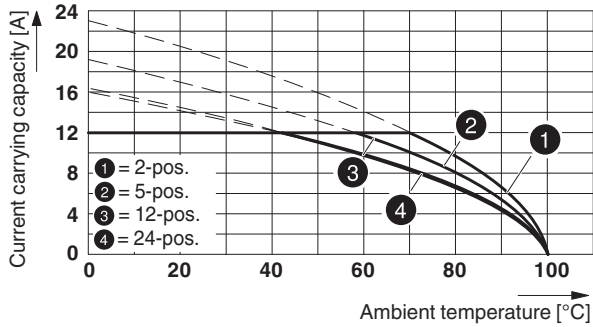
| | | | |
|---|---------------------|--------|--------|
| Component | PCB header | | |
| Specification | IEC 60664-1:2007-04 | | |
| Mains type | unearthed mains | | |
| Insulating material group | I | | |
| Comparative tracking index (IEC 60112:2003-01) | CTI 600 | | |
| Rated insulation voltage | 320 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 |

1769900 SMSTBA 2,5/12-G

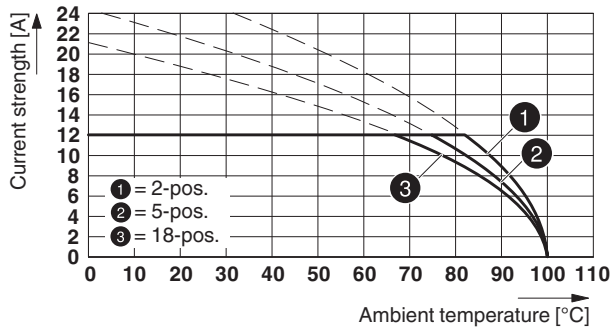
16 Current carrying capacity/derating curves

| | |
|-------------------------|---|
| 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 |

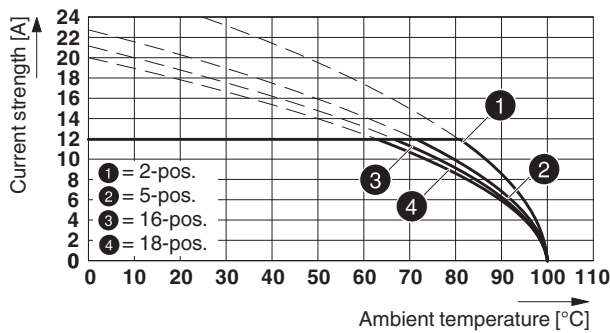
Type: SMSTB 2,5/...-ST with SMSTBA 2,5/...-G



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

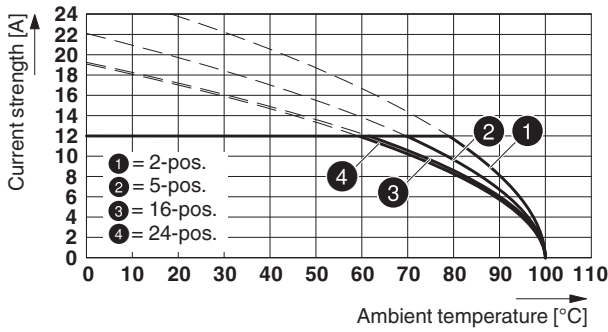


Type: MSTBT 2,5/...-ST with SMSTBA 2,5/...-G

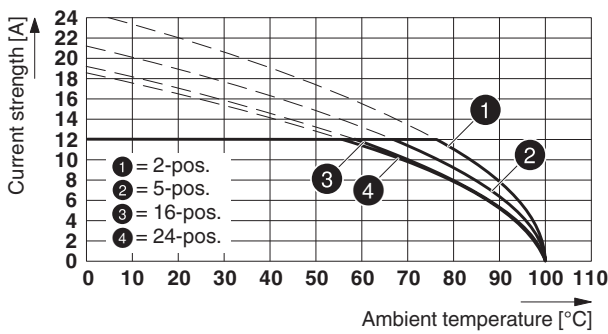


1769900 SMSTBA 2,5/12-G

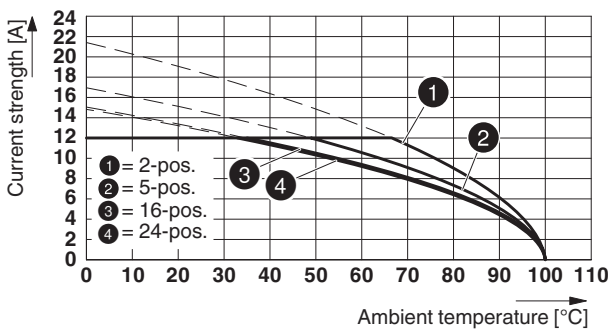
Type: MSTB 2,5/...-ST with SMSTBA 2,5/...-G



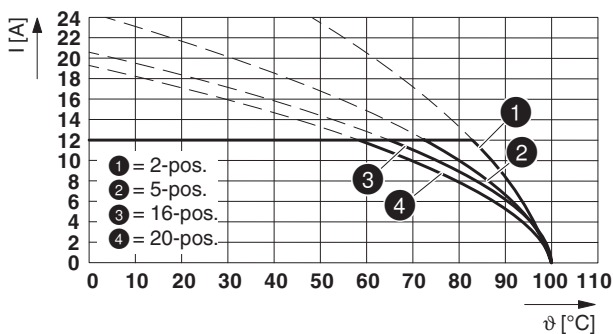
Type: FRONT-MSTB 2,5/..-ST with SMSTBA 2,5/...-G



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

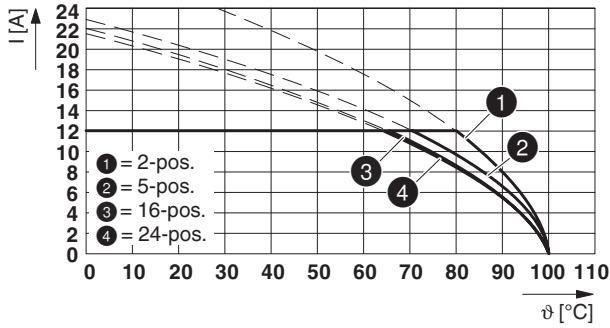


Type: FKCT 2,5/...-ST with SMSTBA 2,5/...-G

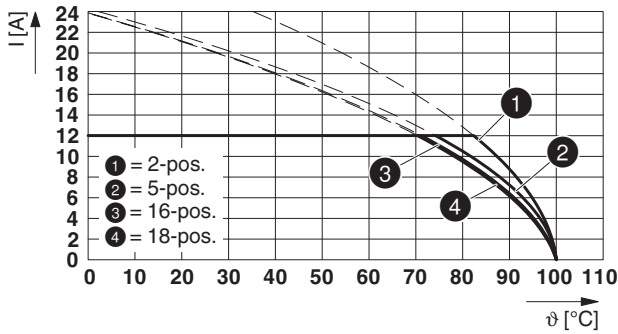


1769900 SMSTBA 2,5/12-G

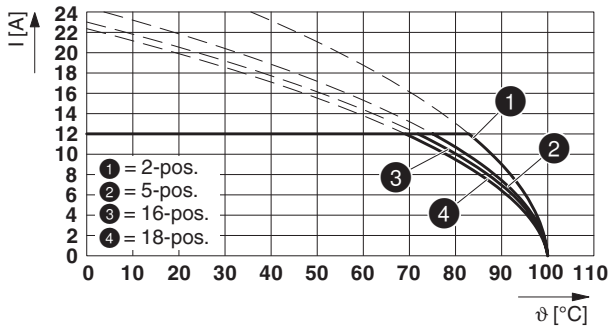
Type: MSTBP 2,5/...-ST with SMSTBA 2,5/...-G



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



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



1769900 SMSTBA 2,5/12-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 |

1769900 SMSTBA 2,5/12-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 | - | - |

1769900 SMSTBA 2,5/12-G**19 Commercial Data**

| | |
|--------------------|--|
| Order No. | 1769900 |
| Type | SMSTBA 2,5/12-G |
| Pieces per package | 50 |
| Net weight | 6.74 g |
| GTIN | 4017918035129 |
| | Information that applies locally, see link on page 1 |
| | Information that applies locally, see link on page 1 |

20 corresponding plugs

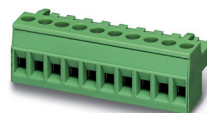
| Order No. | Type |
|-----------|----------------------|
| 1718067 | QC 1,5/12-ST |
| 1732836 | FKCN 2,5/12-ST |
| 1754643 | MSTB 2,5/12-ST |
| 1759350 | MSTB 2,5/12-STZ |
| 1765878 | MSTBP 2,5/12-ST |
| 1768859 | SMSTB 2,5/12-ST |
| 1779518 | FRONT-MSTB 2,5/12-ST |
| 1779932 | MSTBT 2,5/12-ST |
| 1792113 | MVSTBR 2,5/12-ST |
| 1792621 | MVSTBW 2,5/12-ST |
| 1909317 | FKCT 2,5/12-ST |
| 1909812 | FKCVR 2,5/12-ST |
| 1910131 | FKCVW 2,5/12-ST |
| 1910458 | FKC 2,5/12-ST |
| 1974834 | FKCS 2,5/12-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 |

1769900 SMSTBA 2,5/12-G

22 Combination tests

**SMSTBA 2,5/12-G**

IEC 61984

Mechanical tests (A)

Insertion/withdrawal force per position

SMSTB 2,5/12-ST

IEC 61984

approx. 11 N / 6 N

FKCS 2,5/12-ST

IEC 61984

approx. 8 N / 6 N

MSTBT 2,5/12-ST

IEC 61984

approx. 8 N / 6 N

MSTB 2,5/12-ST

IEC 61984

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

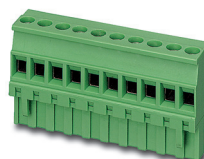
Degree of protection

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

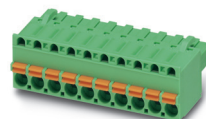
1769900 SMSTBA 2,5/12-G



SMSTBA 2,5/..-G

FRONT-MSTB 2,5/
..-ST

MVSTBR 2,5/..-ST

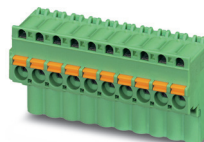
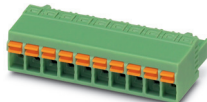


FKCT 2,5/..-ST



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 |

1769900 SMSTBA 2,5/12-G**SMSTBA 2,5/12-G****FKCN 2,5/12-ST****FKCVW 2,5/12-ST**

IEC 61984

IEC 61984

IEC 61984

Mechanical tests (A)

Insertion/withdrawal force per position

approx. 8 N / 6 N

approx. 8 N / 6 N

Polarization when inserted
Requirement >20 N

Test passed

Test passed

Contact holder in insert
Requirements >20 N

Test passed

Test passed

Durability tests (B)Contact resistance R₁ 1st level

1 mΩ

1 mΩ

Contact resistance R₁ 2nd level

Insertion/withdrawal cycles

25

25

Contact resistance R₂

1.1 mΩ

1.2 mΩ

Rated impulse voltage at sea level
Voltage waveform ≥ (1.2/50 μs)

4.8 kV

4.8 kV

Power-frequency withstand voltage
Voltage waveform ≥ (50/60 Hz)

2.21 kV

2.21 kV

Thermal tests (C)

Tested number of positions

18

18

Tested conductor cross section

2.5 mm²2.5 mm²

Test current

12 A

12 A

Upper limiting temperature
Requirements < 100°C

Test passed

Test passed

Climatic tests (D)

Test sequence 1: low temperature storage

-40 °C/2 h

-40 °C/2 h

Test sequence 2: heat storage

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 cycleRated impulse voltage at sea level
Voltage waveform ≥ (1.2/50 μs)

4.8 kV

4.8 kV

Power-frequency withstand voltage
Voltage waveform ≥ (50/60 Hz)

2.21 kV

2.21 kV

Environmental and endurance tests (E)

Specification

IEC 61984:2008-10

IEC 61984:2008-10

Degree of protection

Finger safety with IP20
test fingerFinger safety with IP20
test finger