

Item No.: 1778166

Type: MSTB 2,5/20-STF-5,08

PCB connector, Screw connection with tension sleeve



The figure shows a 10-position version of the product

## 1 Main features



- |                           |                                      |                        |                     |
|---------------------------|--------------------------------------|------------------------|---------------------|
| • No. of pos.             | 20                                   | • Nominal current      | 12 A                |
| • Conductor cross section | 2.5 mm <sup>2</sup>                  | • Nominal voltage      | 320 V               |
| • Color                   | green (6021)                         | • Connection direction | 0 °                 |
| • Pitch                   | 5.08 mm                              | • Type of packaging    | packed in cardboard |
| • Connection method       | Screw connection with tension sleeve |                        |                     |

## 2 Your advantages

- ✓ Well-known connection principle allows worldwide use
- ✓ Low temperature rise, thanks to maximum contact force
- ✓ Screwable flange for superior mechanical stability
- ✓ Allows connection of two conductors



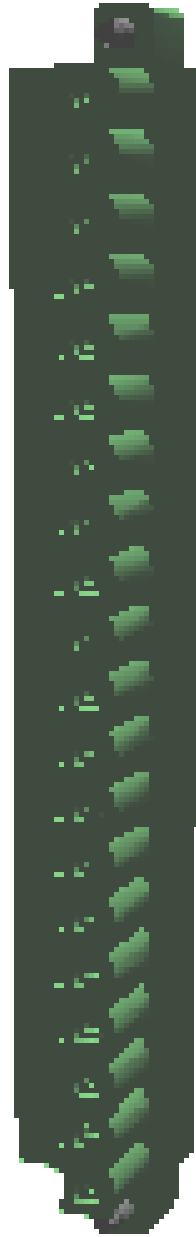
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It can be downloaded at: [phoenixcontact.net/product/1778166](https://phoenixcontact.net/product/1778166)

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1778166 MSTB 2,5/20-STF-5,08

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



**1778166 MSTB 2,5/20-STF-5,08****5 General Technical Data****5.1 item properties**

Item no.	1778166
Type	MSTB 2,5/20-STF-5,08
Product line	COMBICON Connectors M
Connector system	CLASSIC COMBICON
Product type	PCB connector
Type of contact	Female connector
Range of articles	MSTB 2,5/..-STF
Pitch	5.08 mm
Number of positions	20
Number of rows	1
Number of connections	20
Number of potentials	20
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	0 °
Type	Standard

**1778166 MSTB 2,5/20-STF-5,08****6 Mounting****6.1 Flange mounting**

Type of locking

Screw locking

Mounting flange

Screw flange

Torque

0.3 Nm

**1778166 MSTB 2,5/20-STF-5,08****7 Conductor connection****7.1 Connection capacity**

Nominal cross section	2.5 mm <sup>2</sup>
Conductor cross section, rigid	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section, flexible	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section flexible, with ferrule without plastic sleeve	0.25 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section flexible, with ferrule with plastic sleeve	0.25 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
2 conductors with same cross section, solid	0.2 mm <sup>2</sup> ... 1 mm <sup>2</sup>
2 conductors with same cross section, stranded	0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
2 conductors with same cross section, stranded, with ferrule without plastic sleeve	0.25 mm <sup>2</sup> ... 1 mm <sup>2</sup>
2 conductors with the same cross section flexible with TWIN ferrule and plastic sleeve	0.5 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
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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**1778166 MSTB 2,5/20-STF-5,08****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

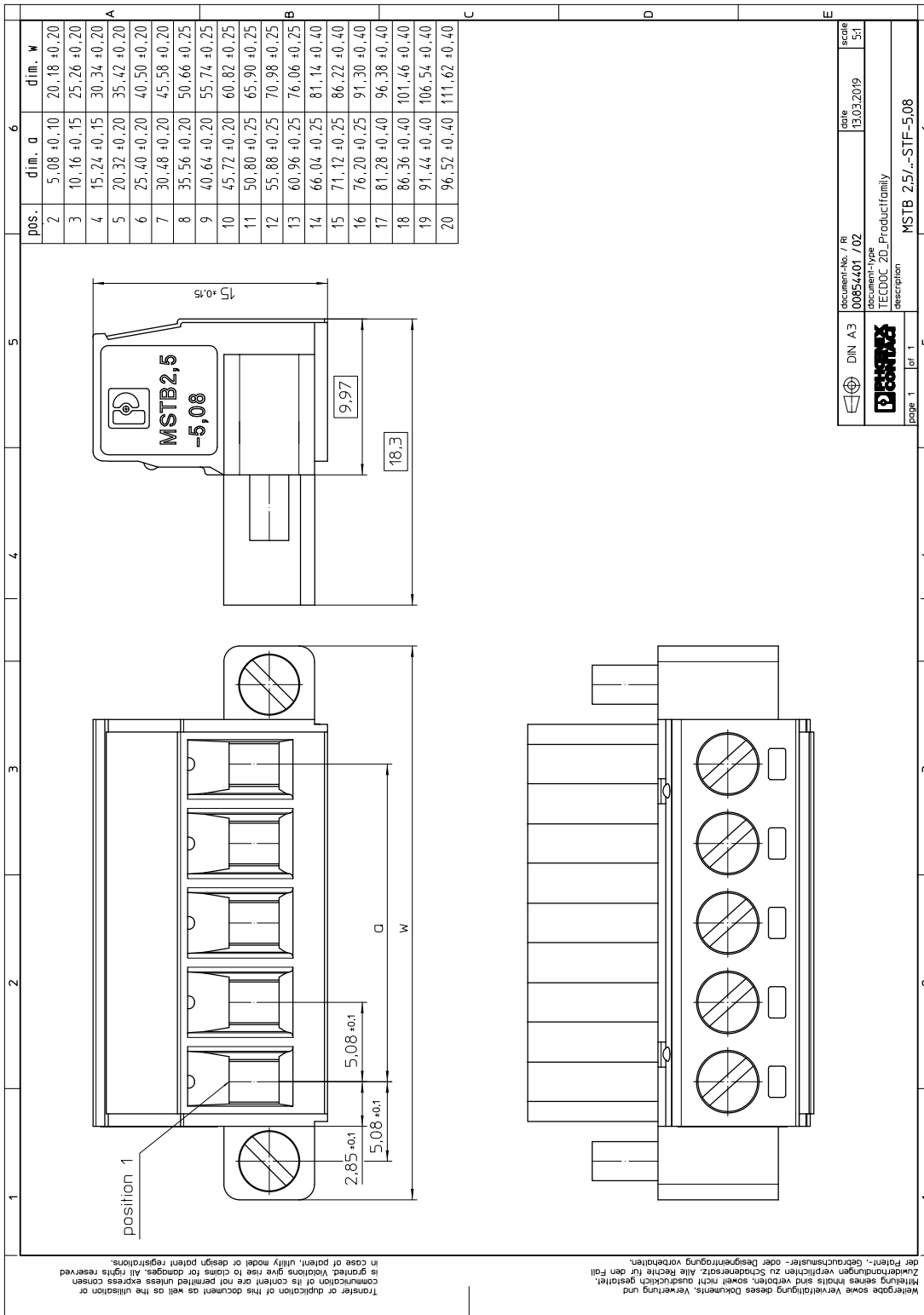
**1778166 MSTB 2,5/20-STF-5,08****9 Dimensions****9.1 Dimensions for the product**

Length		18.3 mm
Width		111.61 mm
Installed height		15 mm
Total height		15 mm



1778166 MSTB 2,5/20-STF-5,08

10 Series drawing



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description	MSTB 2,5/...-STF-5,08				
page 1	of 1				

**1778166 MSTB 2,5/20-STF-5,08****11 Product notes****11.1 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.

**12 Packaging information**

Type of packaging

packed in cardboard

Pieces per package

50

**13 Application****13.1 Temperature limit values**

Ambient temperature (storage/transport)

-40 °C ... 70 °C

Relative humidity (storage/transport)

30 % ... 70 %

Ambient temperature (assembly)

-5 °C ... 100 °C

Ambient temperature (operation)

-40 °C ... 100 °C (dependent on the derating curve)

**1778166 MSTB 2,5/20-STF-5,08****14 General tests****14.1 Specification**

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

**15 Mechanical tests****15.1 Check for damage to conductor or loosening**

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

**15.2 Pull-out test**

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

**15.3 Torque test**

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

**15.4 Visual examination**

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

**15.5 Dimensional test**

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

**15.6 Resistance of marking**

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

**15.7 Polarization and coding**

# 1778166 MSTB 2,5/20-STF-5,08

Polarization when inserted  
Requirement >20 N

Test passed

Specification

IEC 60512-13-5:2006-02

**1778166 MSTB 2,5/20-STF-5,08****16 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

**1778166 MSTB 2,5/20-STF-5,08****17 Electrical tests**

Rated current / conductor cross section	12 A / 2.5 mm <sup>2</sup>
Rated insulation voltage (III/2)	320 V
Rated surge voltage (III/2)	4 kV
Contact resistance	1.3 mΩ
Degree of pollution	2

**1778166 MSTB 2,5/20-STF-5,08****18 Air and creepage distances**

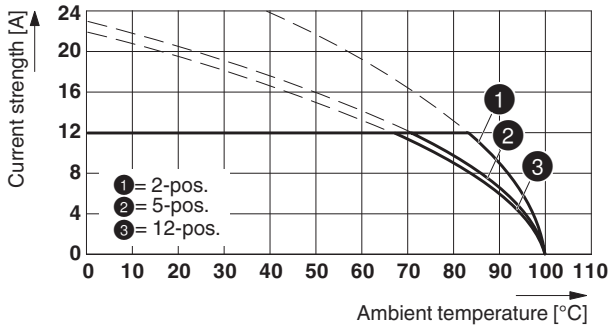
Component	PCB connector		
Specification	IEC 60664-1:2007-04		
Mains type	unearthed mains		
Insulating material group	I		
Comparative tracking index (IEC 60112:2003-01)	CTI 600		
Rated insulation voltage	250 V	320 V	630 V
Rated surge voltage	4 kV	4 kV	4 kV
Degree of pollution	3	2	2
Overvoltage category	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

1778166 MSTB 2,5/20-STF-5,08

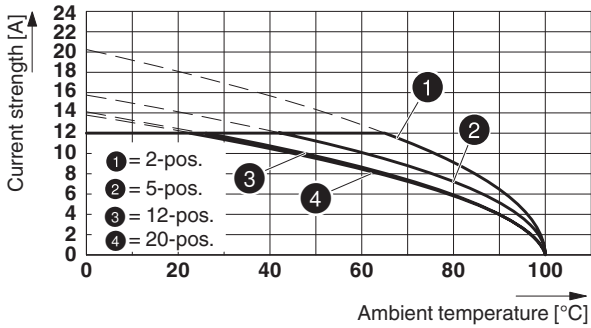
19 Current carrying capacity/derating curves

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 <sup>2</sup>

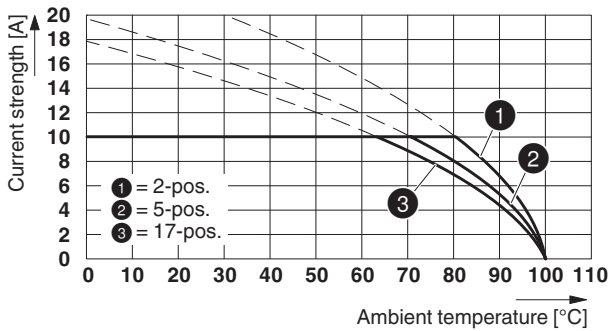
Type: MSTB 2,5/...-STF-5,08 with CC 2,5/...-GF-5,08 P26THR



Type: MSTB 2,5/...-STF-5,08 with MSTBV 2,5/...-GF-5,08



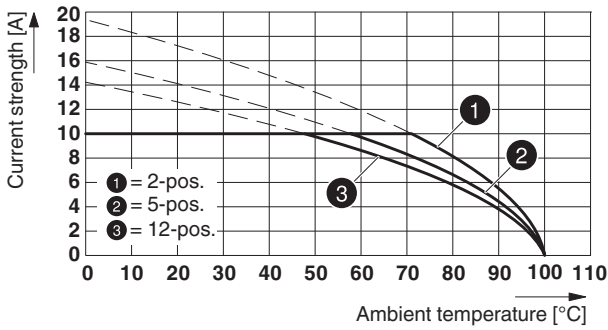
Type: MSTB 2,5/...-STF-5,08 with MDSTB 2,5/...-GF-5,08



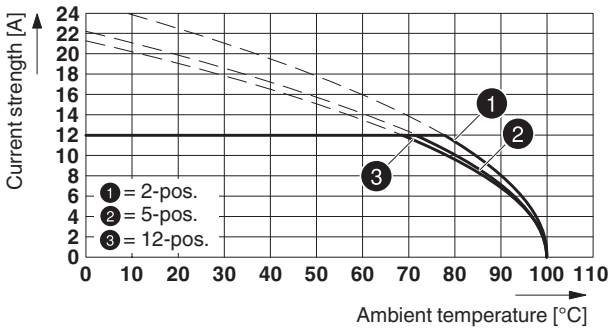


1778166 MSTB 2,5/20-STF-5,08

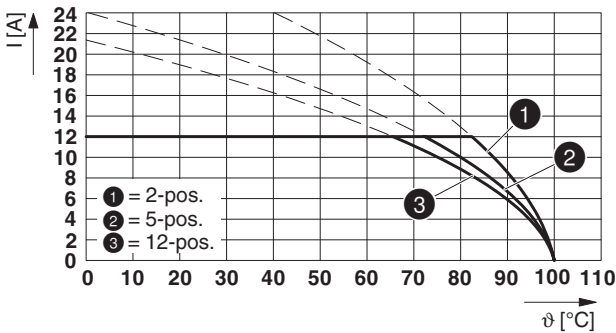
Type: MSTB 2,5/...-STF-5,08 with MDSTBV 2,5/...-GF-5,08



Type: MSTB 2,5/...-STF-5,08 with CCV 2,5/...-GF-5,08 P26THR

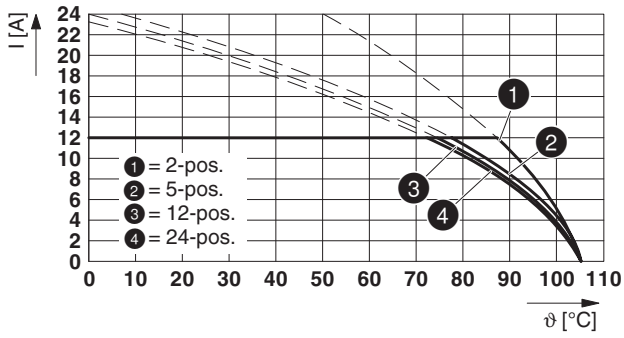


Type: MSTB 2,5/...-STF-5,08 with CCV 2,5/...-GF-5,08-LR P...THR



**1778166 MSTB 2,5/20-STF-5,08**

Type: MSTB 2,5/...-STF-5,08 with CC 2,5/...-GF-5,08-LR P...THR



## 20 Environmental and durability tests

### 20.1 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.

### 20.2 Insulation resistance

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

**1778166 MSTB 2,5/20-STF-5,08****21 Type approval and special tests****21.1 Shock testing**








Specification	IEC 60068-2-27:2008-02
Result	Test passed
Pulse shape	Semi-sinusoidal
Peak acceleration	30g
Shock duration	18 ms
Number of shocks per direction	3
Test directions	X-, Y- and Z-axis (pos. and neg.)

**22 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
Locking	no
Connection method	Screw terminal points

## 1778166 MSTB 2,5/20-STF-5,08

## 23 Approvals / Certificates

CSA 	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm <sup>2</sup> ]
<b>Usegroup B</b>				
	300 V	15 A	28 - 12	-
<b>Usegroup D</b>				
	300 V	10 A	28 - 12	-
IECEE CB Scheme 	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm <sup>2</sup> ]
	250 V	12 A	-	0.2 - 2.5
EAC 				
cULus Recognized 	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm <sup>2</sup> ]
<b>Usegroup B</b>				
	300 V	15 A	30 - 12	-
<b>Usegroup D</b>				
	300 V	10 A	30 - 12	-
DNV GL 				
RS 				
VDE Zeichengenehmigung 	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm <sup>2</sup> ]
	250 V	12 A	-	0.2 - 2.5

**1778166 MSTB 2,5/20-STF-5,08****24 Commercial Data**

Item no.	1778166
Type	MSTB 2,5/20-STF-5,08
Pieces per package	50
Net weight	34.186 g
GTIN	4017918040031
	Information that applies locally, see link on page 1

**25 corresponding headers**

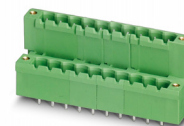
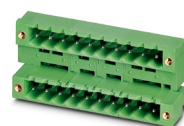
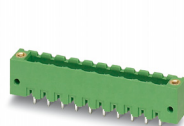
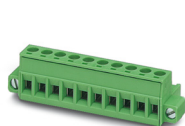
Item no.	Type
1776689	MSTB 2,5/20-GF-5,08
1777251	MSTBV 2,5/20-GF-5,08

**26 Accessories**

Description	Item No.	Type
Actuation tool, for ST terminal blocks, insulated, also suitable for use as a bladed screwdriver, size: 0.6 x 3.5 x 100 mm, 2-component grip, with non-slip grip	1205053	SZS 0,6X3,5
	0804293	SK 5,08/3,8:FORTL.ZAHLEN
	0803906	SK U/3,8 WH:UNBEDRUCKT
Marker pen, for manual labeling of unprinted Zack strips, smear-proof and waterproof, line thickness 0.5 mm	1051993	B-STIFT
Marker pen without ink cartridge, for manual labeling of markers, labeling extremely wipe-proof, line thickness 0.35 mm	0811228	X-PEN 0,35
	1805615	KGS-MSTB 2,5/20

## 1778166 MSTB 2,5/20-STF-5,08

## 27 Combination tests



MSTB 2,5/..-STF	CC 2,5/..-GF	MSTBV 2,5/..-GF	MDSTB 2,5/..-GF	MDSTBV 2,5/..-GF
IEC 61984	IEC 61984	IEC 61984	IEC 61984	IEC 61984
<b>Mechanical tests (A)</b>				
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
<b>Durability tests (B)</b>				
Contact resistance R <sub>1</sub> 1st level	1.3 mΩ	2.5 mΩ	1.3 mΩ	2.5 mΩ
Contact resistance R <sub>1</sub> 2nd level			1.6 mΩ	1.6 mΩ
Insertion/withdrawal cycles	25	25	25	25
Contact resistance R <sub>2</sub>	1.4 mΩ	2.6 mΩ	1.3 mΩ	2.5 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
Insulation resistance Requirements > 5 MΩ	> 5 MΩ	> 5 MΩ	> 5 MΩ	> 5 MΩ
<b>Thermal tests (C)</b>				
Tested number of positions	12	20	17	12
Tested conductor cross section	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>
Test current	12 A	12 A	10 A	10 A
Upper limiting temperature Requirements < 100°C	Test passed	Test passed	Test passed	Test passed
<b>Climatic tests (D)</b>				
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 <sup>3</sup> SO <sub>2</sub> on 300 dm <sup>3</sup> / 40 °C/1 cycle	0.2 dm <sup>3</sup> SO <sub>2</sub> on 300 dm <sup>3</sup> / 40 °C/1 cycle	0.2 dm <sup>3</sup> SO <sub>2</sub> on 300 dm <sup>3</sup> / 40 °C/1 cycle	0.2 dm <sup>3</sup> SO <sub>2</sub> on 300 dm <sup>3</sup> / 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
<b>Environmental and endurance tests (E)</b>				
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

## 1778166 MSTB 2,5/20-STF-5,08

**MSTB 2,5/...STF**

IEC 61984

**CCV 2,5/...GF**

IEC 61984

**CCV 2,5/...GF-LR**

IEC 61984

**CC 2,5/...GF-LR**

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

Polarization when inserted  
Requirement >20 N

Test passed

Test passed

Test passed

Contact holder in insert  
Requirements >20 N

Test passed

Test passed

Test passed

**Durability tests (B)**Contact resistance R<sub>1</sub> 1st level

1.3 mΩ

1.2 mΩ

1.2 mΩ

Contact resistance R<sub>1</sub> 2nd level

Insertion/withdrawal cycles

25

25

25

Contact resistance R<sub>2</sub>

1.3 mΩ

1.3 mΩ

1.3 mΩ

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

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

Insulation resistance  
Requirements > 5 MΩ

&gt; 5 MΩ

&gt; 5 MΩ

&gt; 5 MΩ

**Thermal tests (C)**

Tested number of positions

12

12

12

Tested conductor cross section

2.5 mm<sup>2</sup>2.5 mm<sup>2</sup>2.5 mm<sup>2</sup>

Test current

12 A

12 A

12 A

Upper limiting temperature  
Requirements < 100°C

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

Test sequence 2: heat storage

100 °C/168 h

100 °C/168 h

105 °C/168 h

Test sequence 3: noxious gas storage  
(ISO 6988)0.2 dm<sup>3</sup> SO<sub>2</sub> on 300 dm<sup>3</sup>/  
40 °C/1 cycle0.2 dm<sup>3</sup> SO<sub>2</sub> on 300 dm<sup>3</sup>/  
40 °C/1 cycle0.2 dm<sup>3</sup> SO<sub>2</sub> on 300 dm<sup>3</sup>/  
40 °C/1 cycleRated impulse voltage at sea level  
Voltage waveform ≥ (1.2/50 μs)

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

**Environmental and endurance tests (E)**

Specification

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 finger