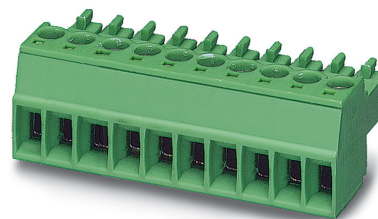


Order No.: 1803688

Type: MC 1,5/13-ST-3,81

PCB connector, Screw connection with tension sleeve



The figure shows a 10-position version of the product

1 Main features



- | | | | |
|---------------------------|--------------------------------------|------------------------|---------------------|
| • No. of pos. | 13 | • Nominal current | 8 A |
| • Conductor cross section | 1.5 mm ² | • Nominal voltage | 160 V |
| • Color | green (6021) | • Connection direction | 0 ° |
| • Pitch | 3.81 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
- ✓ Allows connection of two conductors



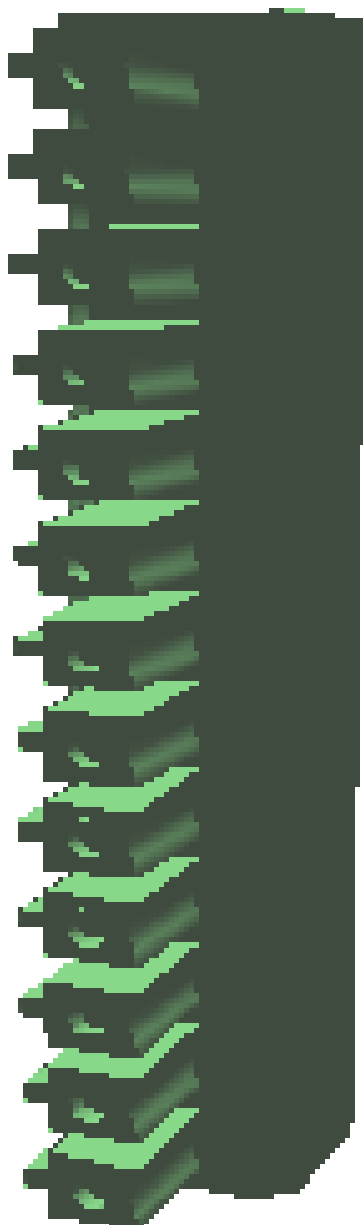
Make sure you always use the latest documentation.
It can be downloaded at: phoenixcontact.net/product/1803688

3 Table of contents

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1803688 MC 1,5/13-ST-3,81

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



1803688 MC 1,5/13-ST-3,81**5 General Technical Data****5.1 item properties**

Order No.	1803688
Type	MC 1,5/13-ST-3,81
Connector system	MINI COMBICON
Product type	PCB connector
Type of contact	Female connector
Range of articles	MC 1,5/..-ST
Pitch	3.81 mm
Number of positions	13
Number of levels	1
Number of connections	13
Number of potentials	13
Connection method	Screw connection with tension sleeve
Screw thread	M2
Drive form screw head	Slotted (L)
Connection direction of the conductor to plug-in direction	0 °
Solder pins per potential	1
Type	Standard

1803688 MC 1,5/13-ST-3,81

6 Mounting

6.1 Flange mounting

Type of locking	without
Mounting flange	without

1803688 MC 1,5/13-ST-3,81**7 Conductor connection****7.1 Connection capacity**

Nominal cross section	1.5 mm ²
Conductor cross section, rigid	0.14 mm ² ... 1.5 mm ²
Conductor cross section, flexible	0.14 mm ² ... 1.5 mm ²
Conductor cross section flexible, with ferrule without plastic sleeve	0.25 mm ² ... 1.5 mm ²
Conductor cross section flexible, with ferrule with plastic sleeve	0.25 mm ² ... 0.75 mm ²
2 conductors with same cross section, solid	0.08 mm ² ... 0.5 mm ²
2 conductors with same cross section, stranded	0.08 mm ² ... 0.75 mm ²
2 conductors with same cross section, stranded, with ferrule without plastic sleeve	0.25 mm ² ... 0.34 mm ²
2 conductors with the same cross section flexible with TWIN ferrule and plastic sleeve	0.5 mm ² ... 0.5 mm ²
Cylindrical gauge a x b / diameter	2.4 mm x 1.5 mm / 1.6 mm
Stripping length	7 mm
Tightening torque	0.22 Nm ... 0.25 Nm

7.2 Connection capacity AWG

Conductor cross section AWG	28 ... 16
-----------------------------	-----------

1803688 MC 1,5/13-ST-3,81**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 (4 - 8 µm Sn)
Surface contact area	Tin (4 - 8 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

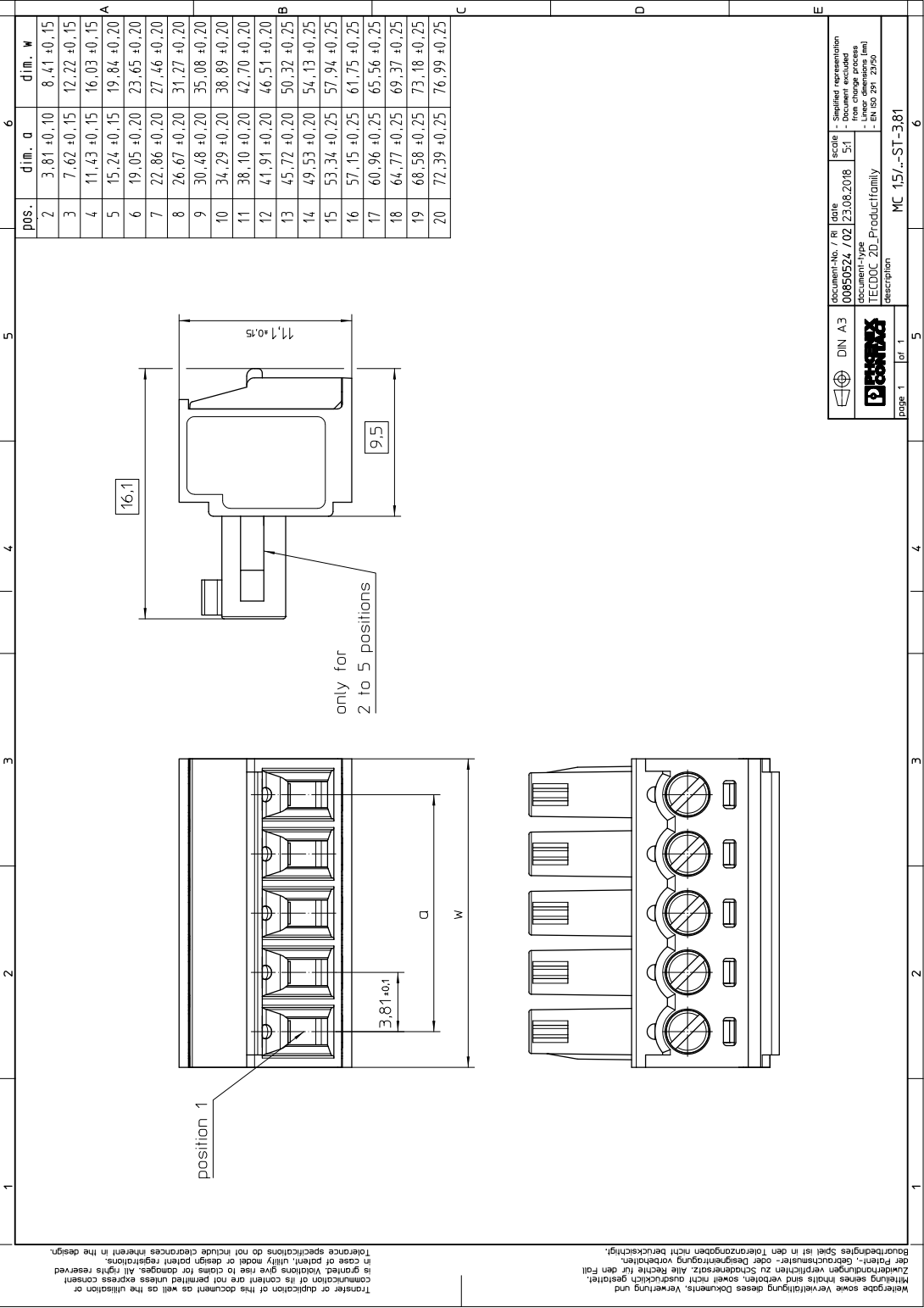
1803688 MC 1,5/13-ST-3,81

9 Dimensions

9.1 Dimensions for the product

Length	16.1 mm
Width	50.32 mm
Installed height	11.1 mm
Total height	11.1 mm

10 Series drawing



1803688 MC 1,5/13-ST-3,81

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)

1803688 MC 1,5/13-ST-3,81**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	0.14 mm ² / solid / > 7 N
Conductor cross section/conductor type/tractive force actual value	0.14 mm ² / flexible / > 7 N
Conductor cross section/conductor type/tractive force actual value	1.5 mm ² / solid / > 40 N
Conductor cross section/conductor type/tractive force actual value	1.5 mm ² / flexible / > 40 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

1803688 MC 1,5/13-ST-3,81

Polarization when inserted
Requirement >20 N

Test passed

Specification

IEC 60512-13-5:2006-02

1803688 MC 1,5/13-ST-3,81

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.	6 N
Withdraw strength per pos. approx.	4 N

1803688 MC 1,5/13-ST-3,81**16 Electrical tests**

Rated current / conductor cross section	8 A / 1.5 mm ²
Rated insulation voltage (III/2)	160 V
Rated surge voltage (III/2)	2.5 kV
Contact resistance	1.3 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	160 V	160 V	320 V
Rated surge voltage	2.5 kV	2.5 kV	2.5 kV
Degree of pollution	3	2	2
Overvoltage category	III	III	II
Minimum clearance case A (inhomogeneous field)	1.5 mm	1.5 mm	1.5 mm
Minimum value of the creepage path requirement in acc. with table	2 mm	1.5 mm	1.6 mm

1803688 MC 1,5/13-ST-3,81**17 Current carrying capacity/derating curves**

Specification

IEC 61984:2008-10

Note

Representation based on IEC 60512-5-2:2002-02

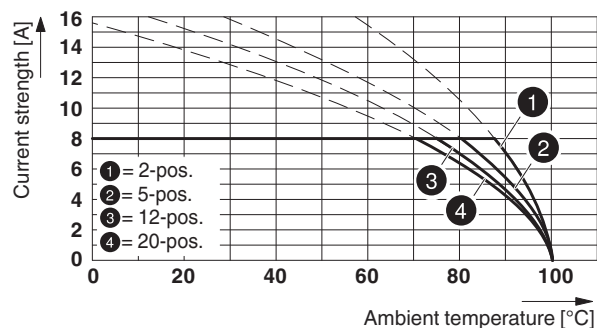
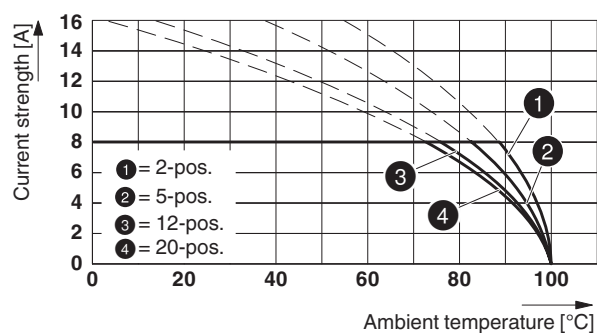
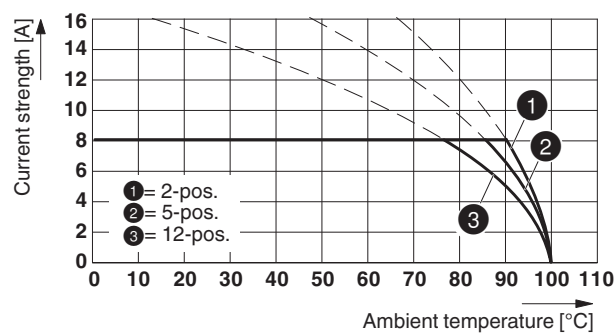
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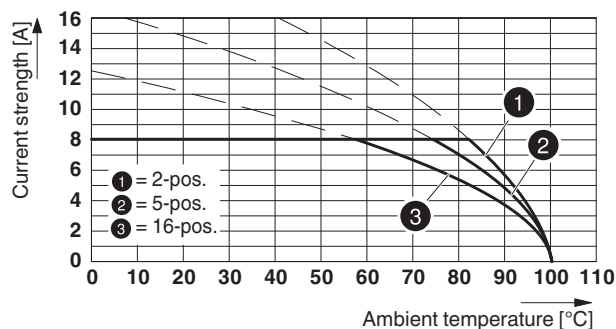
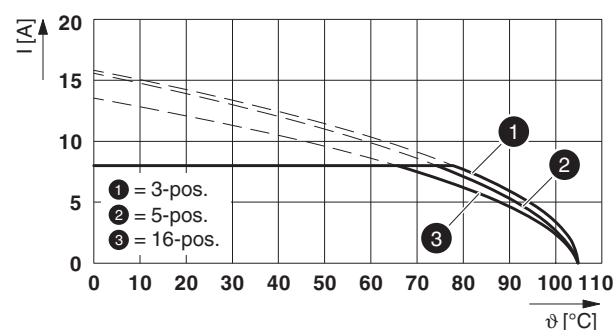
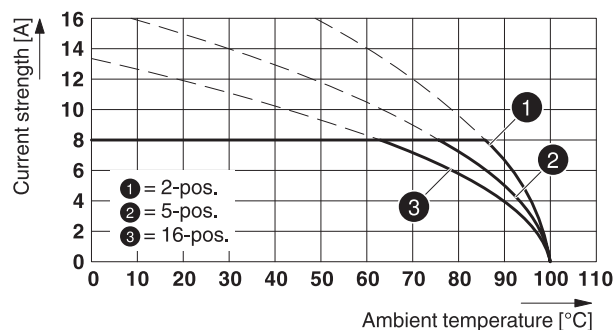
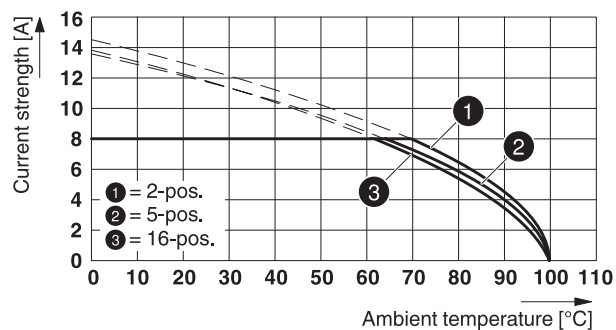
For number of positions, see diagram

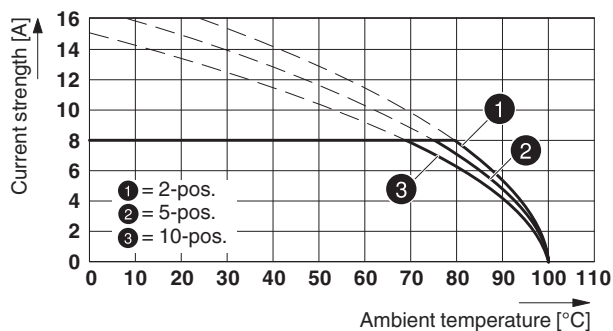
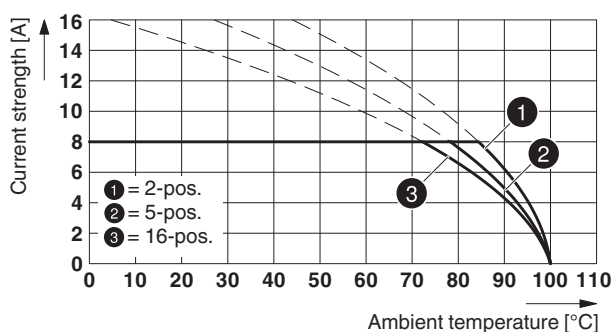
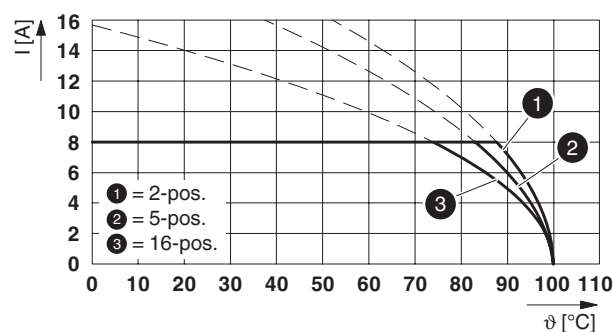
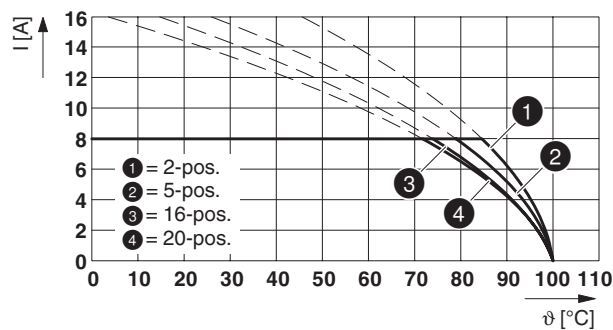
Reduction factor

0.8

Conductor cross section

1.5 mm²**Type: MC 1,5/...-ST-3,81 with MC 1,5/...-G-3,81****Type: MC 1,5/...-ST-3,81 with MCV 1,5/...-G-3,81****Type: MC 1,5/...-ST-3,81 with MCV 1,5/...-G-3,81 P26 THR**

1803688 MC 1,5/13-ST-3,81**Type: MC 1,5/...-ST-3,81 with MCD 1,5/...-G1-3,81****Type: MC 1,5/...-ST-3,81 with MCVK 1,5/...-G-3,81****Type: MC 1,5/...-ST-3,81 with MCDV 1,5/...-G1-3,81****Type: MC 1,5/...-ST-3,81 with MCVU 1,5/...-GFD-3,81**

1803688 MC 1,5/13-ST-3,81**Type: MC 1,5/...-ST-3,81 with MCO 1,5/...-GR-3,81****Type: MC 1,5/...-ST-3,81 with IMC 1,5/...-ST-3,81****Type: MC 1,5/...-ST-3,81 with SMC 1,5/...-G-3,81****Type: MC 1,5/...-ST-3,81 with MC 1,5/...-G-3,81 P...THR**

1803688 MC 1,5/13-ST-3,81**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

1803688 MC 1,5/13-ST-3,81**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

1803688 MC 1,5/13-ST-3,81**21 Approvals / Certificates**

CSA 	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm ²]
Usegroup B				
	300 V	8 A	28 - 16	-
Usegroup D				
	300 V	8 A	28 - 16	-
IECEE CB Scheme 	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm ²]
	160 V	8 A	-	0.2 - 1.5
EAC 				
VDE Gutachten mit Fertigungsüberwachung 	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm ²]
	160 V	8 A	-	0.2 - 1.5
cULus Recognized 	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm ²]
Usegroup B				
	300 V	8 A	30 - 14	-
Usegroup D				
	300 V	8 A	30 - 14	-
VDE Gutachten mit Fertigungsüberwachung 	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm ²]
	160 V	8 A	-	0.2 - 1.5

1803688 MC 1,5/13-ST-3,81**22 Commercial Data**

Order No.	1803688
Type	MC 1,5/13-ST-3,81
Pieces per package	50
Net weight	9.123 g
GTIN	4017918045999
	Information that applies locally, see link on page 1
	Information that applies locally, see link on page 1

23 corresponding headers

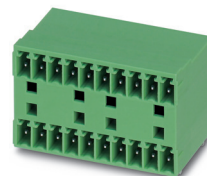
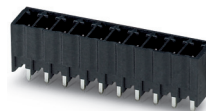
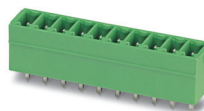
Order No.	Type
1803387	MC 1,5/13-G-3,81
1803536	MCV 1,5/13-G-3,81
1827389	SMC 1,5/13-G-3,81
1830062	MCD 1,5/13-G-3,81
1830512	MCDV 1,5/13-G-3,81
1837544	MCVDU 1,5/13-G-3,81
1843185	MCD 1,5/13-G1-3,81
1847848	MCDV 1,5/13-G1-3,81
1860757	EMCV 1,5/13-G-3,81
1897911	EMC 1,5/13-G-3,81

24 Accessories

Description	Order No.	Type
	0804109	SK 3,81/2,8:FORTL.ZAHLEN
Screwdriver, slot-headed, VDE insulated, size: 0.4 x 2.5 x 80 mm, 2-component grip, with non-slip grip	1205037	SZS 0,4X2,5 VDE
	0805399	SK 3,81/2,8:UNBEDRUCKT
Marker pen, for manual labeling of unprinted Zack strips, smear-proof and waterproof, line thickness 0.5 mm	1051993	B-STIFT
	1834453	KGG-MC 1,5/13
Insertion bridge for plugs featuring a screw connection with a 3.81 mm pitch	1733495	EBPL 2-3,81
Insertion bridge for plugs featuring a screw connection with a 3.81 mm pitch	1733505	EBPL 3-3,81
Insertion bridge for plugs featuring a screw connection with a 3.81 mm pitch	1733518	EBPL 4-3,81

1803688 MC 1,5/13-ST-3,81

25 Combination tests

**MC 1,5/13-ST**

IEC 61984

Mechanical tests (A)

Insertion/withdrawal force per position

approx. 6 N / 4 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

1.3 mΩ

Contact resistance R_1 2nd level

2.2 mΩ

Insertion/withdrawal cycles

25

Contact resistance R_2

1.5 mΩ

Rated impulse voltage at sea level
Voltage waveform $\geq (1.2/50 \mu s)$

2.95 kV

Power-frequency withstand voltage
Voltage waveform $\geq (50/60 \text{ Hz})$

1.39 kV

Thermal tests (C)

Tested number of positions

20

Tested conductor cross section

1.5 mm²

Test current

8 A DC

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 dm³ SO₂ on 300 dm³/
40 °C/1 cycleRated impulse voltage at sea level
Voltage waveform $\geq (1.2/50 \mu s)$

2.95 kV

Power-frequency withstand voltage
Voltage waveform $\geq (50/60 \text{ Hz})$

1.39 kV

Environmental and endurance tests (E)

Specification

IEC 61984:2008-10

Degree of protection

Finger safety with IP20
test finger**MC 1,5/13-G**

IEC 61984

approx. 6 N / 4 N

Test passed

Test passed

1.3 mΩ

2.2 mΩ

25

1.5 mΩ

2.95 kV

1.39 kV

20

1.5 mm²

8 A DC

Test passed

-40 °C/2 h

100 °C/168 h

0.2 dm³ SO₂ on 300 dm³/
40 °C/1 cycle

2.95 kV

1.39 kV

IEC 61984:2008-10

Finger safety with IP20
test finger**MCV 1,5/13-G**

IEC 61984

approx. 8 N / 6 N

Test passed

Test passed

1.2 mΩ

2.2 mΩ

25

1.2 mΩ

2.95 kV

1.39 kV

20

1.5 mm²

8 A DC

Test passed

-40 °C/2 h

100 °C/168 h

0.2 dm³ SO₂ on 300 dm³/
40 °C/1 cycle

2.95 kV

1.39 kV

IEC 61984:2008-10

Finger safety with IP20
test finger**MCV 1,5/13-G-THR**

IEC 61984

approx. 8 N / 6 N

Test passed

Test passed

1.1 mΩ

2.2 mΩ

25

1.2 mΩ

2.95 kV

1.39 kV

12

1.5 mm²

8 A

Test passed

-40 °C/2 h

100 °C/168 h

0.2 dm³ SO₂ on 300 dm³/
40 °C/1 cycle

2.95 kV

1.39 kV

IEC 61984:2008-10

Finger safety with IP20
test finger**MCD 1,5/13-G1**

IEC 61984

approx. 8 N / 5 N

Test passed

Test passed

1.2 mΩ

2.2 mΩ

25

1.3 mΩ

2.95 kV

1.39 kV

16

1.5 mm²

8 A

Test passed

-40 °C/2 h

100 °C/168 h

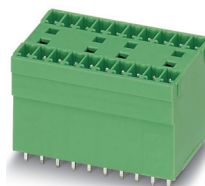
0.2 dm³ SO₂ on 300 dm³/
40 °C/1 cycle

2.95 kV

1.39 kV

IEC 61984:2008-10

Finger safety with IP20
test finger

1803688 MC 1,5/13-ST-3,81

MC 1,5/13-ST	MCVK 1,5/13-G	MCDV 1,5/13-G1	MCVU 1,5/13-GFD	MCO 1,5/13-GR
IEC 61984	IEC 61984	IEC 61984	IEC 61984	IEC 61984
Mechanical tests (A)				
Insertion/withdrawal force per position	approx. 8 N / 4 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	3.3 mΩ	1.7 mΩ	3.4 mΩ	2.6 mΩ
Contact resistance R ₁ 2nd level		1.7 mΩ		
Insertion/withdrawal cycles	25	25	25	25
Contact resistance R ₂	3.3 mΩ	2 mΩ	3.4 mΩ	2.7 mΩ
Rated impulse voltage at sea level Voltage waveform ≥ (1.2/50 μs)	2.95 kV	2.95 kV	2.95 kV	2.95 kV
Power-frequency withstand voltage Voltage waveform ≥ (50/60 Hz)	1.39 kV	1.39 kV	1.39 kV	1.39 kV
Thermal tests (C)				
Tested number of positions	16	16	16	10
Tested conductor cross section	1.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²
Test current	8 A	8 A	8 A	8 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	105 °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)	2.95 kV	2.95 kV	2.95 kV	2.95 kV
Power-frequency withstand voltage Voltage waveform ≥ (50/60 Hz)	1.39 kV	1.39 kV	1.39 kV	1.39 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	No contact safety (IP00) in acc. with IEC 60529:1989-11 + AMD 1:1999-11 + AMD 2:2013-08

1803688 MC 1,5/13-ST-3,81**MC 1,5/13-ST**

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 R_1 1st levelContact resistance R_1 2nd level

Insertion/withdrawal cycles

Contact resistance R_2 Rated impulse voltage at sea level
Voltage waveform $\geq (1.2/50 \mu s)$ Power-frequency withstand voltage
Voltage waveform $\geq (50/60 \text{ Hz})$ **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 $\geq (1.2/50 \mu s)$ Power-frequency withstand voltage
Voltage waveform $\geq (50/60 \text{ Hz})$ **Environmental and endurance tests (E)**

Specification

Degree of protection

IMC 1,5/13-ST

IEC 61984

approx. 8 N / 6 N

Test passed

Test passed

1.9 mΩ

25

2 mΩ

2.95 kV

1.39 kV

16

1.5 mm²

8 A

Test passed

-40 °C/2 h

100 °C/168 h

0.2 dm³ SO₂ on 300 dm³/
40 °C/1 cycle

2.95 kV

1.39 kV

IEC 61984:2008-10

Finger safety with IP20
test finger**SMC 1,5/13-ST**

IEC 61984

approx. 7 N / 4 N

Test passed

Test passed

1.3 mΩ

25

1.5 mΩ

2.95 kV

1.39 kV

16

1.5 mm²

8 A

Test passed

-40 °C/2 h

100 °C/168 h

0.2 dm³ SO₂ on 300 dm³/
40 °C/1 cycle

2.95 kV

1.39 kV

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Finger safety with IP20
test finger**MC 1,5/13-ST-G-THR**

IEC 61984

approx. 8 N / 6 N

Test passed

Test passed

1.3 mΩ

25

1.6 mΩ

2.95 kV

1.39 kV

20

1.5 mm²

8 A

Test passed

-40 °C/2 h

100 °C/168 h

0.2 dm³ SO₂ on 300 dm³/
40 °C/1 cycle

2.95 kV

1.39 kV

IEC 61984:2008-10

Finger safety with IP20
test finger