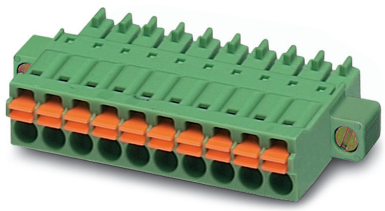
2020-11-19
Product version 04
Document revision 01

Data sheet

Order No.: 1748354

Type: FMC 1,5/ 2-STF-3,81

PCB connector, Push-in spring connection



The figure shows a 10-position version of the product

1 Main features

- No. of pos. 2
- Conductor cross section 1.5 mm²
- Color green (6021)
- Pitch 3.81 mm
- Connection method Push-in spring connection
- Nominal current 8 A
- Nominal voltage 160 V
- Connection direction 0 °
- Type of packaging packed in cardboard

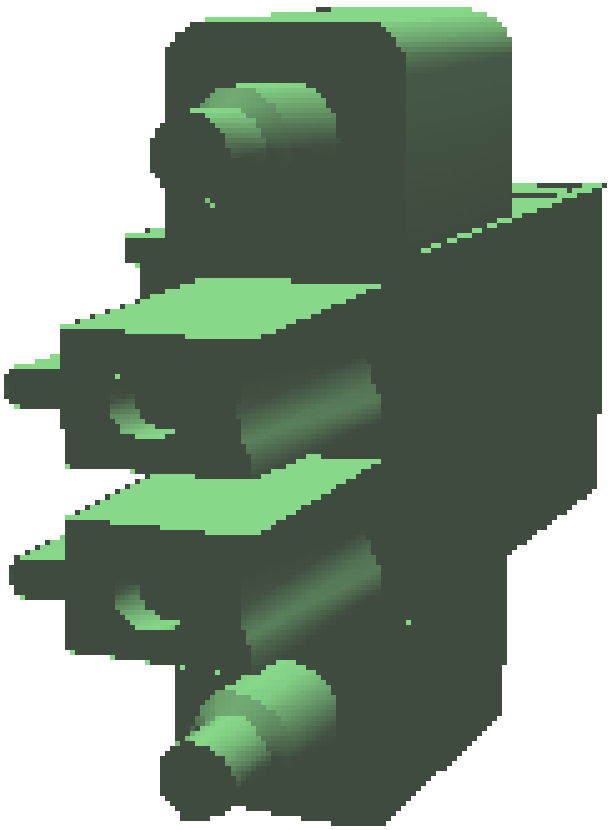
2 Your advantages

- Time saving push-in connection, tools not required
- Defined contact force ensures that contact remains stable over the long term
- Intuitive use through colour coded actuation lever
- Operation and conductor connection from one direction enable integration into front of device
- Screwable flange for superior mechanical stability

Make sure you always use the latest documentation.
It can be downloaded at: phoenixcontact.net/product/1748354

3 Table of contents

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



5 General Technical Data

5.1 item properties

Order No.	1748354
Type	FMC 1,5/ 2-STF-3,81
Plug-in system	MINI COMBICON
Product type	PCB connector
Type of contact	Female connector
Range of articles	FMC 1,5/..-STF
Pitch	3.81 mm
Range of positions	2...20
Number of positions	2
Number of levels	1
Number of connections	2
Number of potentials	2
Connection method	Push-in spring connection
Connection direction of the conductor to the PCB	0 °
Solder pins per potential	1
Type	Standard

6 Mounting

6.1 Flange fixing

Type of locking	Screw locking
Mounting flange	Screw flange
Torque	0.3 Nm

6.2 Connection capacity

Nominal cross section	1.5 mm^2
Conductor cross section, rigid	0.2 mm^2 ... 1.5 mm^2
Conductor cross section, flexible	0.2 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	0.14 mm^2 ... 0.75 mm^2
Cylindrical gauge a x b / diameter	2.4 mm x 1.5 mm / 1.6 mm
Stripping length	10 mm

6.3 Connection capacity AWG

Conductor cross section AWG	24 ... 16

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
Terminal point surface	, Tin (4 - 8 µm Sn)
Surface contact area	, Tin (4 - 8 µm Sn)
Surface characteristics	hot-dip tin-plated

7.2 Material of plastic parts

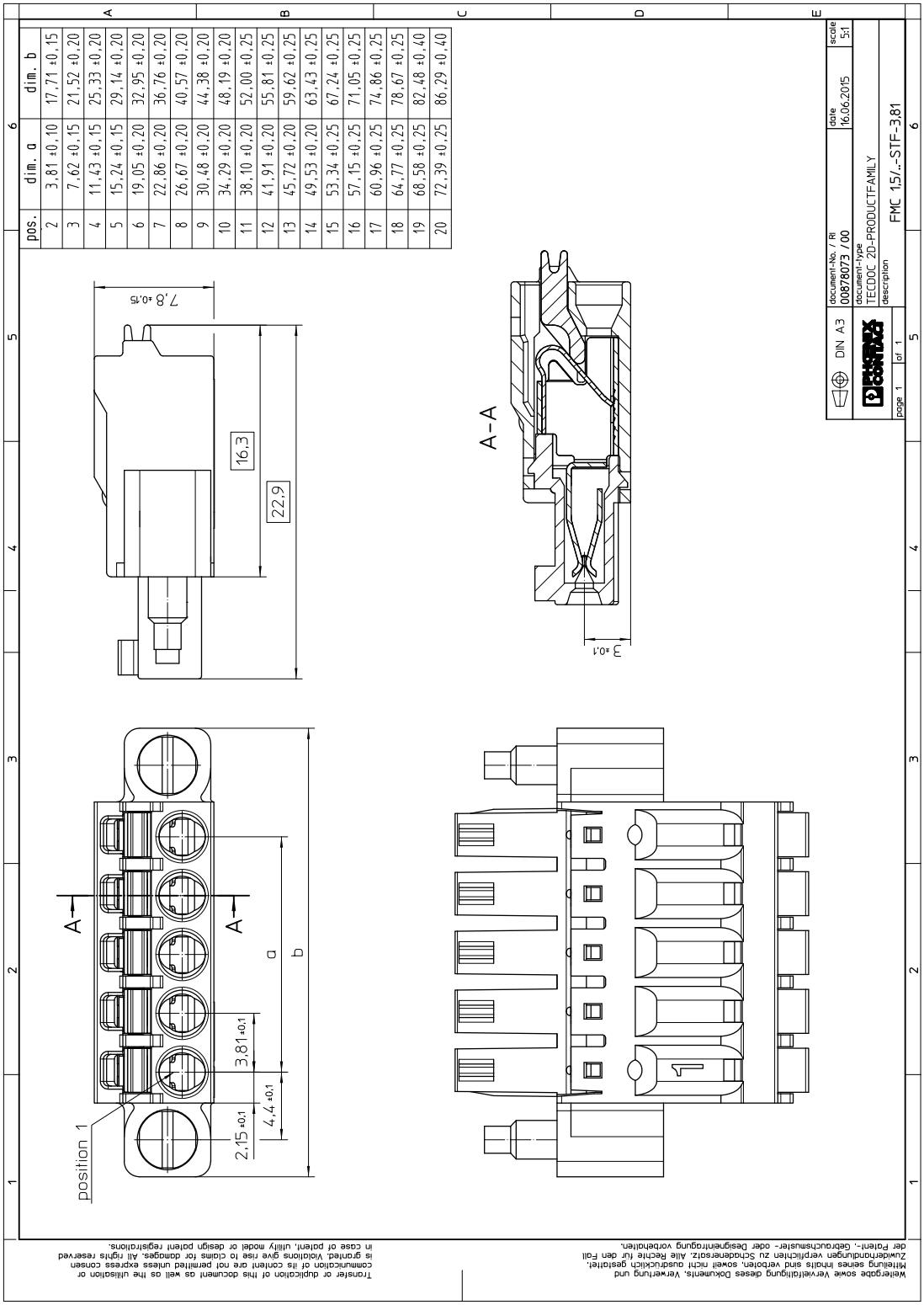
	Housing	Actuation element
Color	green (6021)	orange (2003)
Insulating material	PA	PBT
Insulating material group	I	I
CTI according to IEC 60112	600	600
Flammability rating according to UL 94	V0	V0
Glow wire flammability index GWFI according to EN 60695-2-12	850	
Glow wire ignition temperature GWIT according to EN 60695-2-13	775	
Temperature for the ball pressure test according to EN 60695-10-2	125 °C	

8 Dimensions

8.1 Dimensions for the product

Length	22.9 mm
Width	17.71 mm
Installed height	7.8 mm
Total height	7.8 mm

9 Series drawing



10 Packaging information

Type of packaging	packed in cardboard
Pieces per package	50

11 Application

11.1 Specifications for ferrules

Note on application	The 0.75 mm² ferrule is to be inserted parallel to the groove of the spring opener.
Ferrules without insulating collar, according to DIN 46228–1	
Recommended crimping pliers	1212034 CRIMPFOX 6
Ferrules without insulating collar, according to DIN 46228–1	Cross section: 0.25 mm²; Length: 7 mm Cross section: 0.34 mm²; Length: 7 mm Cross section: 0.5 mm²; Length: 8 mm ... 10 mm Cross section: 0.75 mm²; Length: 8 mm ... 10 mm Cross section: 1 mm²; Length: 8 mm ... 10 mm Cross section: 1.5 mm²; Length: 10 mm
Ferrules with insulating collar, according to DIN 46228–4	
Recommended crimping pliers	1212034 CRIMPFOX 6
Ferrules with insulating collar, according to DIN 46228–4	Cross section: 0.14 mm²; Length: 8 mm Cross section: 0.25 mm²; Length: 8 mm ... 10 mm Cross section: 0.34 mm²; Length: 8 mm ... 10 mm Cross section: 0.5 mm²; Length: 8 mm ... 10 mm Cross section: 0.75 mm²; Length: 10 mm

11.2 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)

12 General tests

12.1 Specification

Specification	IEC 61984
Specification	IEC 60999-1
Brief description	COMBICON spring-cage connectors

13 Mechanical tests

13.1 Check for damage to conductor or loosening

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

13.2 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	1.5 mm^2 / solid / > 40 N
Conductor cross section/conductor type/tractive force actual value	1.5 mm^2 / flexible / > 40 N

13.3 Repeated connection and disconnection

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

13.4 Conductor connection

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

13.5 Visual examination

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

13.6 Dimensional test

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

13.7 Resistance of marking

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

13.8 Polarization and coding

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

13.9 Contact retention in insert

Contact retention in insert	Test passed
Specification	IEC 60512-15-1:2008-05
Test force per pos.	27 N

14 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

15 Electrical tests

15.1 Electrical data

Rated current / conductor cross section	8 A / 1.5 mm²
Rated insulation voltage (III/2)	160 V
Rated surge voltage (III/2)	2.5 kV
Contact resistance	1.8 mΩ
Degree of pollution	2

15.2 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

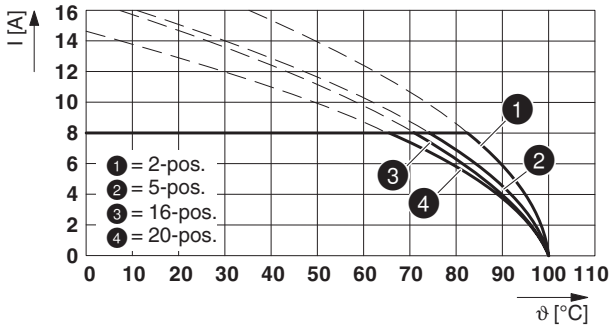
15.3 Insulation resistance

Specification	IEC 60512-3-1:2002-02
Result	Test passed
Insulation resistance, neighboring positions	> 80 GΩ

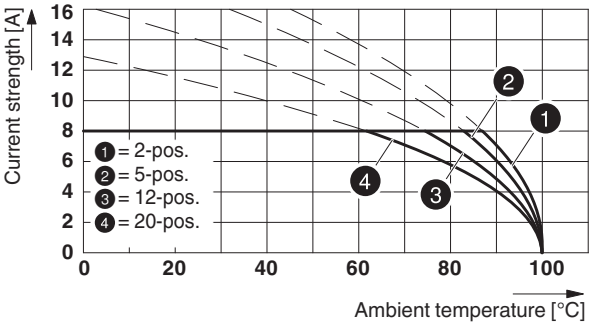
16 Current carrying capacity/derating curves

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	1.5 mm²

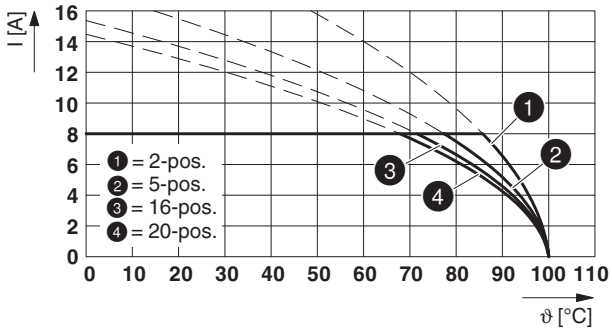
Type: FMC 1,5/...-STF-3,81 with MC 1,5/...-GF-3,81 P...THR



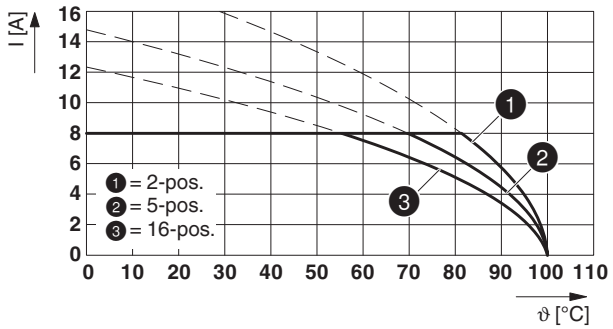
Type: FMC 1,5/...-STF-3,81 with MCV 1,5/...-GF-3,81 P... THR



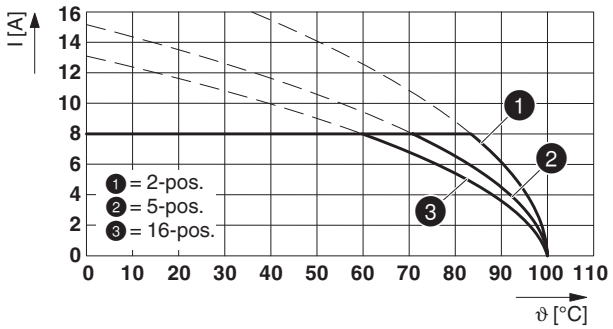
Type: FMC 1,5/...-STF-3,81 with MCV 1,5/...-GF-3,81



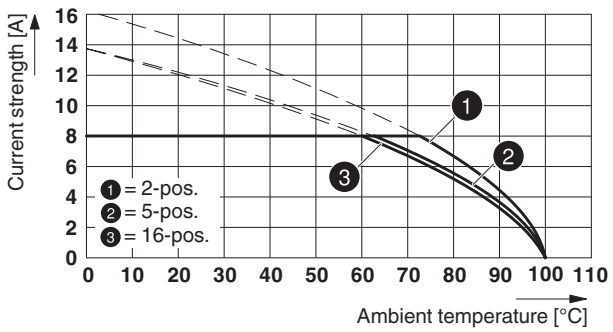
Type: FMC 1,5/...-STF-3,81 with MCD 1,5/...-G1F-3,81



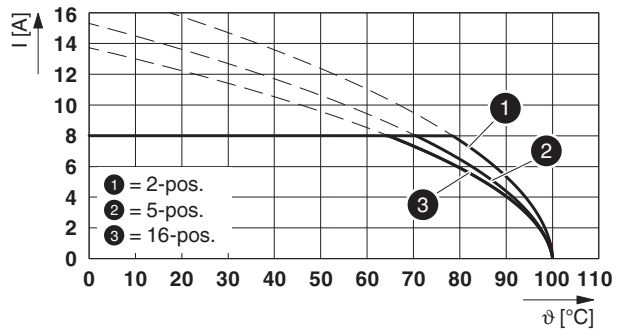
Type: FMC 1,5/...-STF-3,81 with MCDV 1,5/...-GF-3,81



Type: FMC 1,5/...-STF-3,81 with DFK-MC 1,5/...-GF-3,81

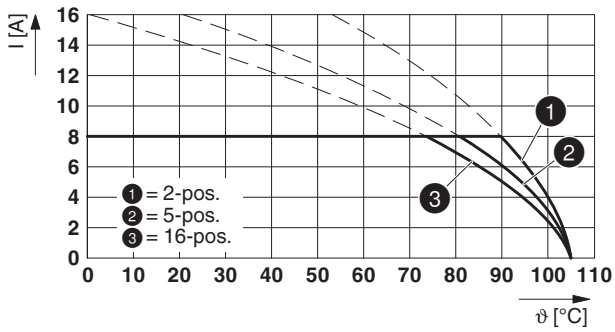


Type: FMC 1,5/...-STF-3,81 with IMC 1,5/...-STGF-3,81

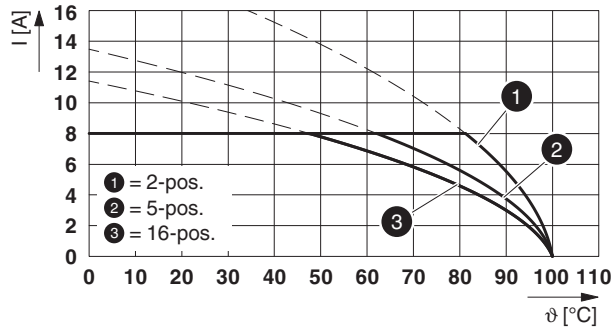


1748354 FMC 1,5/ 2-STF-3,81

Type: FMC 1,5/...-STF-3,81 with SMC 1,5/...-GF-3,81



Type: FMC 1,5/...-STF-3,81 with MCD 1,5/...-GF-3,81



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.

18 Type approval and special tests

18.1 Insulation resistance

Specification	IEC 60512-3-1:2002-02
Result	Test passed
Insulation resistance, neighboring positions	> 80 GΩ

19 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	Screwless terminal points

20 Approvals / Certificates

IECEE CB Scheme	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm²]
	160 V	8 A	-	0.2 - 1.5

EAC

VDE Gutachten mit Fertigungsüberwachung	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm²]
	160 V	8 A	-	0.2 - 1.5

cULus Recognized	Voltage [V]	Current [A]	Cross section [AWG]	Cross section [mm²]
Usegroup B				
	300 V	8 A	24 - 16	-
Usegroup C				
Factory wiring	50 V	8 A	24 - 16	-

21 Commercial Data

Order No.	1748354
Type	FMC 1,5/ 2-STF-3,81
Pieces per package	50
Net weight	2.24 g
GTIN	4046356311397
	Information that applies locally, see link on page 1
Country of origin	Information that applies locally, see link on page 1

22 corresponding headers

Order No.	Type
1707214	MCV 1,5/ 2-GF-3,81 P14 THR
1707638	MCV 1,5/ 2-GF-3,81 P26 THR
1713347	MCV 1,5/ 2-GF-3,81 P26 THRR32
1782022	MC 1,5/ 2-GF-3,81 P20 THRR32
1827428	SMC 1,5/ 2-GF-3,81
1827868	MC 1,5/ 2-GF-3,81
1830101	MCD 1,5/ 2-GF-3,81
1830253	MCDV 1,5/ 2-GF-3,81
1830596	MCV 1,5/ 2-GF-3,81
1842762	MCDV 1,5/ 2-G1F-3,81
1842911	MCD 1,5/ 2-G1F-3,81
1879285	EMCV 1,5/ 2-GF-3,81
1896941	EMC 1,5/ 2-GF-3,81
1908871	MC 1,5/ 2-GF-3,81 THT
1996537	MC 1,5/ 2-GF-3,81 THT-R32

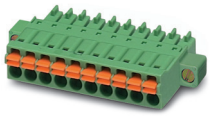
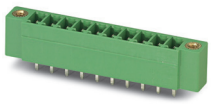
23 Accessories

Description	Order No.	Type
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
Crimping pliers, for ferrules without insulating collar according to DIN 46228 Part 1 and ferrules with insulating collar according to DIN 46228 Part 4, 0.25 mm² ... 6.0 mm², lateral entry, trapezoidal crimp	1212034	CRIMPFOX 6
	0804109	SK 3,81/2,8:FORTL.ZAHLEN
	1707214	MCV 1,5/ 2-GF-3,81 P14 THR
	1707638	MCV 1,5/ 2-GF-3,81 P26 THR
	1713347	MCV 1,5/ 2-GF-3,81 P26 THRR32
	1782022	MC 1,5/ 2-GF-3,81 P20 THRR32
	1827428	SMC 1,5/ 2-GF-3,81
	1827868	MC 1,5/ 2-GF-3,81
	1830101	MCD 1,5/ 2-GF-3,81
	1830253	MCDV 1,5/ 2-GF-3,81
	1830596	MCV 1,5/ 2-GF-3,81
	1842762	MCDV 1,5/ 2-G1F-3,81
	1842911	MCD 1,5/ 2-G1F-3,81
	1879285	EMCV 1,5/ 2-GF-3,81

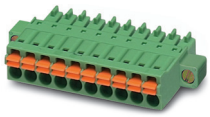
1748354 FMC 1,5/ 2-STF-3,81

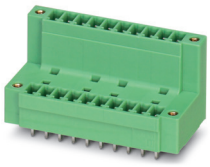
Description	Order No.	**Type**
	1896941	EMC 1,5/ 2-GF-3,81
	1908871	MC 1,5/ 2-GF-3,81 THT
	1996537	MC 1,5/ 2-GF-3,81 THT-R32

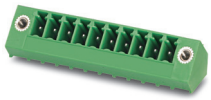
24 Combination tests

					
	FMC 1,5/..-STF	**MC 1,5/..-GF-THR**	**MCV 1,5/..-GF-THR**	**MCV 1,5/..-GF**	**MCD 1,5/..-G1F**
IEC 61984	IEC 61984	IEC 61984	IEC 61984	IEC 61984	IEC 61984
Mechanical tests (A)					
Insertion/withdrawal force per position	approx. 8 N / 6 N	approx. 9 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	1.8 mΩ	1.4 mΩ	1.5 mΩ	2.6 mΩ	
Insertion/withdrawal cycles	25	25	25	25	
Contact resistance R_2	2 mΩ	1.5 mΩ	1.7 mΩ	2.6 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	20	20	20	16	
Tested conductor cross section	1.5 mm²	1.5 mm²	1.5 mm²	1.5 mm²	
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	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 SO_2 on 300 dm³/ 40 °C/1 cycle	0.2 dm³ SO_2 on 300 dm³/ 40 °C/1 cycle	0.2 dm³ SO_2 on 300 dm³/ 40 °C/1 cycle	0.2 dm³ SO_2 on 300 dm³/ 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	Finger safety with IP20 test finger	

1748354 FMC 1,5/ 2-STF-3,81

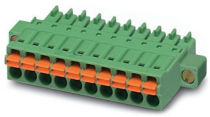






FMC 1,5/..-STF	MCDV 1,5/..-GF	DFK-MC 1,5/..-GF	IMC 1,5/..-STGF	SMC 1,5/..-GF
IEC 61984	IEC 61984	IEC 61984	IEC 61984	IEC 61984
Mechanical tests (A)				
Insertion/withdrawal force per position	approx. 8 N / 6 N	approx. 7 N / 4 N	approx. 7 N / 4 N	approx. 11 N / 6 N
Polarization when inserted Requirement >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	2 mΩ	2.5 mΩ	2.6 mΩ	1.6 mΩ
Insertion/withdrawal cycles	25	25	25	25
Contact resistance R_2	2.2 mΩ	2.6 mΩ	2.8 mΩ	1.8 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	16
Tested conductor cross section	1.5 mm²	1.5 mm²	1.5 mm²	1.5 mm²
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	100 °C/168 h	100 °C/168 h	100 °C/168 h	105 °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	KFW 0.2 S/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	Finger safety with IP20 test finger

1748354 FMC 1,5/ 2-STF-3,81



FMC 1,5/..-STF	MCD 1,5/..-GF
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	2.3 mΩ
Insertion/withdrawal cycles	25
Contact resistance R_2	2.3 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	16
Tested conductor cross section	1.5 mm^2
Test current	8 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