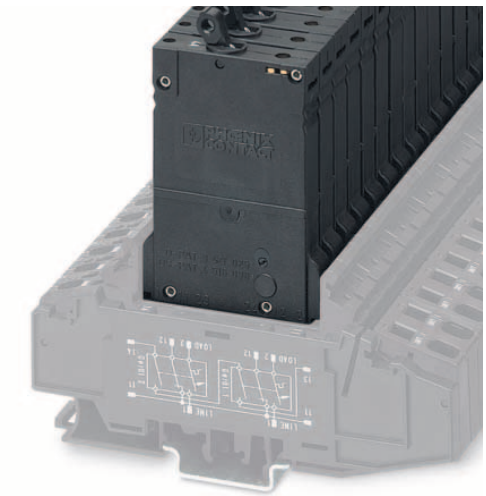
TMCP

Thermomagnetic circuit breaker for mounting in a base



CLIPLINE

Data sheet
100211_en_02

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1 Description

Single or multi-position thermomagnetic circuit breaker with lever actuation, base or front mounting, trip-free mechanism that cannot be influenced, various characteristic curves, all-pole tripping.

The circuit breakers meet the requirements of circuit breaker standard EN 60934 (IEC 60934): S-type, TM.

Typical areas of application are telecommunications systems, power supply units, industrial switchgear and control systems, and rail vehicles.

The ideal characteristic curve shown here illustrates the curve of the thermomagnetic trigger characteristic. The time-delayed tripping protects the thermal part of the characteristic curve against overload. The magnetic part of the circuit breaker responds without delay to high overload and short-circuit currents and trips within a few milliseconds.

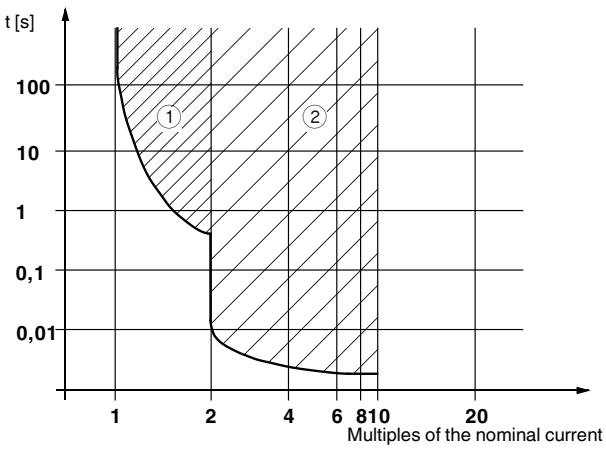


Figure 1 Ideal characteristic curve

① Thermal tripping range
② Magnetic tripping range

Make sure you always use the latest documentation.
It can be downloaded at www.phoenixcontact.net/catalog.

This data sheet is valid for all products listed on the following page:

2 Ordering data

Thermomagnetic circuit breaker

Description	Type	Order No.	Pcs./Pkt.
Thermomagnetic circuit breaker, plug-in, 1, 2, and 3-pos.	TMCP... (see order key)		6

2.1 Order key

Type	Main current paths	Characteristic curves	Auxiliary contact versions	Nominal current
TMCP	**1** ≙ Single-pos. **2** ≙ Two-pos. **3** ≙ Three-pos.	**F1**≙ Thermal 1.05 x I_N ... 1.4 x I_N, magnetic 2 x I_N ... 4 x I_N DC (fast-blow), **only for DC applications** **M1**≙ Thermal 1.05 - 1.4 I_N, magnetic 6 x I_N ... 12 x I_N AC, 7.8 x I_N ... 15.6 x I_N DC (medium-blow)	**300** ≙ Single-pos.: 1 N/O contact and 1 N/C contact per position	0.2 A 2.5 A 0.3 A 3 A 0.4 A 4 A 0.5 A 5 A 0.6 A 6 A 0.8 A 8 A 1 A 10 A 1.2 A 12 A 2 A 16 A

Ordering example

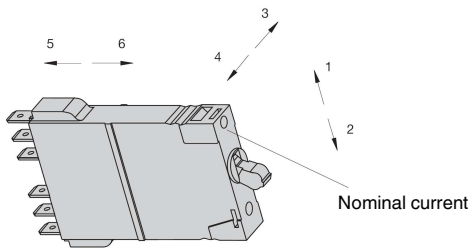
TMCP with 1-pos. main current path, one N/O contact and N/C contact, medium-blow characteristic curve, and a nominal current of 2 A: **TMCP 1 M1 300 2A**

Accessories

Description	Type	Order No.	Pcs./Pkt.
Modular base, 2-pos., designed to accommodate two 1-pos. circuit breakers, width of 12.5 mm per position	TMCP SOCKET M	0916589	10
Base termination elements, can be plugged into both the left and right-hand side, contain the connections for the reset inputs/group query	TMCP CONNECT LR	0916592	3
Spring lock, for mechanical locking if mounted overhead, 1-pos.	SPRING-LOCK	0713009	10
Zack marker strip, 10-section, for labeling the center of the terminal block	ZB 6	See CLIPLINE catalog	
UniCard sheets, for labeling terminal blocks using a Zack marker strip groove, 80-section, can be labeled with BLUEMARK and CMS-P1-PLOTTER, color: white	UC-TM 6	0818085	10
Plug-in bridge, not insulated, 500 mm long, can be cut to length, for distribution of the supply potential in the base, I_{max} = 50 A	FBST 500 TMCP	0916615	20
Plug-in bridge, 500 m long, can be cut to length, for potential distribution, I_{max} = 32 A, red	FBST 500-PLC RD	2966786	20
Plug-in bridge, 500 m long, can be cut to length, for potential distribution, I_{max} = 32 A, blue	FBST 500-PLC BU	2966692	20
Signal bridge, plug-in, for bridging group indication when there is a free slot on the TMCP SOCKET M base, I_{max} = 1 A	TMCP SB	0916602	6

3 Technical data for TMCP

Technical data for TMCP...	
Nominal voltage	250 V AC (65 V DC) 3 433 V AC (50/60 Hz)
Nominal current range	0.2 A ... 16 A, see order key
Auxiliary circuit	240 V AC (65 V DC), 1 A
Service life	10,000 cycles with 1 x I_N, inductive
Ambient temperature	-30°C ... +60°C (T 60)
Insulation coordination (IEC 60664)	2.5 kV/2, increased insulation in the actuation area
Dielectric strength	
Actuation area	3000 V AC test voltage
Main to auxiliary circuit	1500 V AC test voltage
Auxiliary circuit 11 - 12 to 23 - 24	1000 V AC test voltage
Position to position	1500 V AC test voltage
Insulation resistance	> 100 MΩ (500 V DC)
Switching capacity I_{cn}	
TMCP...0,2 A ... TMCP...5 A	400 A
TMCP...6 A ... TMCP...16 A	800 A
Characteristic curve F1 and M1	2500 A (at 32 V DC)
Switching capacity I_N (UL 1077)	I_N = 0.2 A ... 8 A
1 and 2-pos.	250 V AC/1000 A
3-pos.	250 V AC/1000 A
1 and 2-pos.	250 V DC/2000 A
Switching capacity I_N (UL 1077)	I_N = 10 A ... 16 A
1 and 2-pos.	250 V AC/2000 A
3-pos.	250 V AC/2000 A
1 and 2-pos.	250 V DC/2000 A
Vibration resistance	
Characteristic curve F1	3g (57 Hz ... 500 Hz), ±0.23 mm (10 Hz ... 57 Hz)
Characteristic curve M1	53g (57 Hz ... 500 Hz), ±0.38 mm (10 Hz ... 57 Hz)
	Test according to IEC 60068-2-6, Test Fc, 10 frequency cycles/axis
Degree of protection (IEC 60529)	
Actuation area	IP30
Connection area	IP20
Vibration resistance	
Characteristic curve F1	3g (57 Hz ... 500 Hz), ±0.23 mm (10 Hz ... 57 Hz)
Characteristic curve M1	53g (57 Hz ... 500 Hz), ±0.38 mm (10 Hz ... 57 Hz)
	Test according to IEC 60068-2-6, Test Fc, 10 frequency cycles/axis
Shock resistance	
Characteristic curve F1	25g (11 ms), shock direction 1, 2, 3, 4, 5; 10g (11 ms), shock direction 6
Characteristic curve M1	25g (11 ms), shock direction 1, 2, 3, 4, 5; 20g (11 ms), shock direction 6
	Test according to IEC 60068-2-27, Test Ea



Technical data for TMCP... (continued)	
Corrosion resistance	96 hours in 5% salt fog Test according to IE 60068-2-11, Text Ka
Humidity test	240 hours in 95% relative humidity Test according to IE 60068-2-78, Text Cab
Weight	50 g per position, approximately

Technical data according to IEC/DIN VDE	
Impulse voltage withstand level	2.5 kV
Pollution degree	2

Connection capacity	Main contact	Auxiliary contact
Nominal voltage	250 V AC (65 V DC)	240 V AC (65 V DC) (Slip-on connection 6.3 mm x 0.8 mm)
Nominal current	0.2 A ... 16 A, see order key	1 A
Maximum load current	Depends on the nominal current, with slip-on connection according to DIN 46244	1 A with slip-on connection according to DIN 46244

General data	
Width x length	12.5 mm x 50 mm
Height	90 mm, maximum
Insulation material	PA-F
Inflammability class according to UL 94	V0

Approvals

Test center	Nominal voltage	Nominal current range
GL, VDE (EN 60934)	250 V AC, 65 V DC, 433 V AC	0.1 A ... 25 A
UL, CSA	277 V AC, 65 V DC, 277/480 V AC	0.1 A ... 25 A

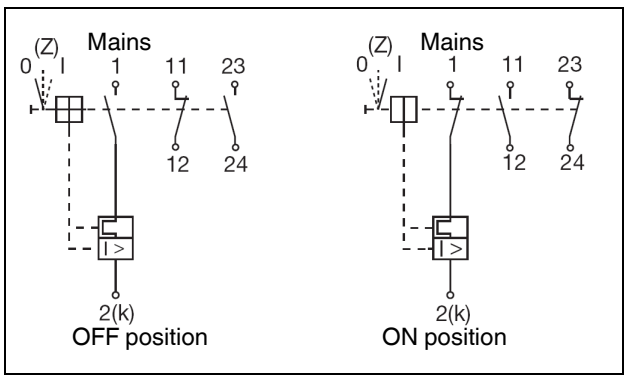


Figure 2 Circuit diagrams

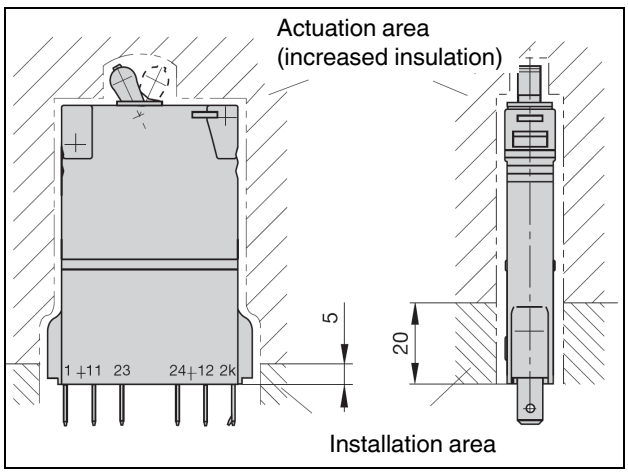


Figure 3 Installation diagram

4 Dimensions

4.1 TMCP with base and base termination element

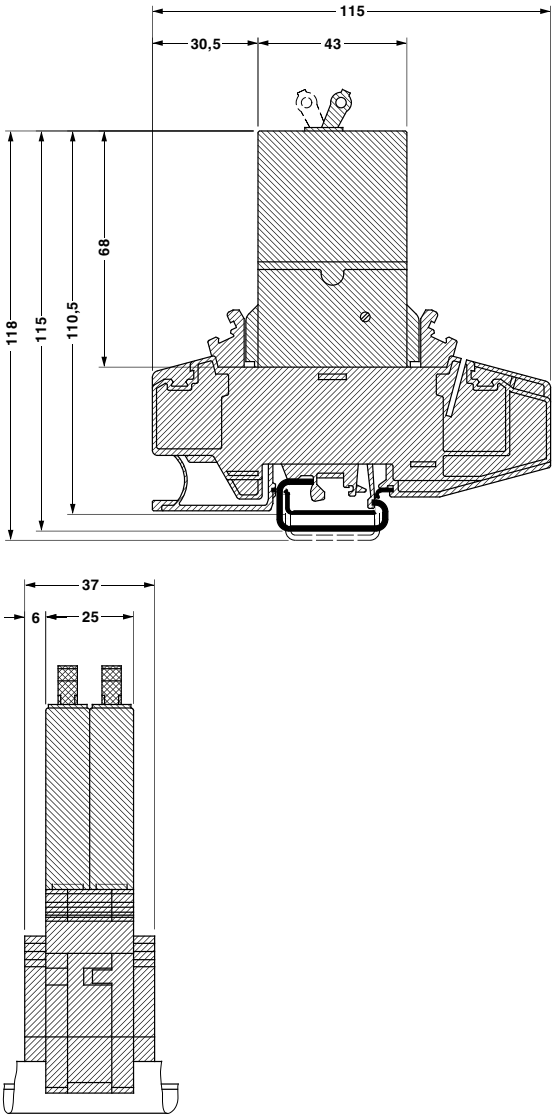


Figure 4 Dimensional drawing with base (dimensions in mm)

4.2 Dimensional drawing for TMCP... circuit breakers

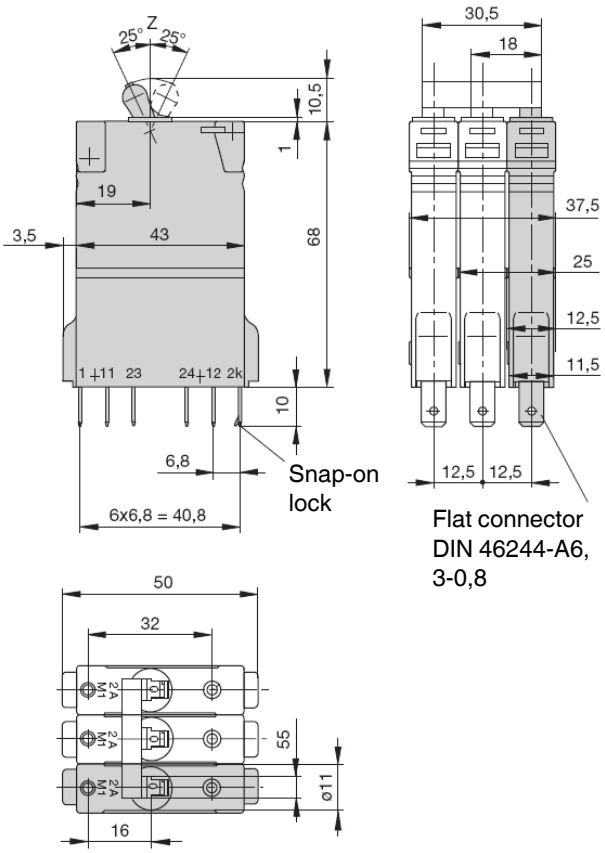


Figure 5 Dimensional drawing (dimensions in mm)

4.3 Drilling diagram for front plate mounting

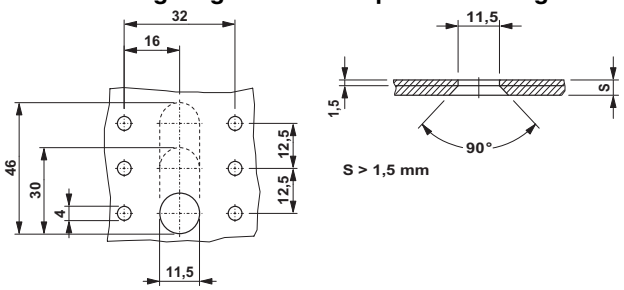


Figure 6 Dimensions (in mm) for 1, 2, and 3-pos. circuit breakers

5 Backup fuse

NOTE: Use a backup fuse in combination with the circuit breaker if the maximum switching current can be exceeded in the event of an error.

The table lists the maximum switching current, the relevant internal resistance, and the resulting backup fuse.

Nominal current [A]	NH backup fuse [A]	Internal resistance [Ω]		Switching capacity according to EN 60934 [A]
		F1 (fast-blow) for DC	M1 (medium-blow) for DC/AC	
0.2	Any	39.3	26.1	400
0.3	Any	17.5	11.6	400
0.4	Any	9.2	6.6	400
0.5	Any	6.8	4.1	400
0.6	Any	4.2	3	400
0.8	Any	2.8	1.65	400
1	Any	1.6	1.10	400
1.5	25	0.78	0.47	400
2	25	0.42	0.28	400
2.5	25	0.26	0.183	400
3	25	0.18	0.124	400
4	25	0.12	0.077	400
5	25	0.092	0.063	400
6	50	0.054	0.045	800
8	50	0.025	≤ 0.02	800
10	50	0.022	≤ 0.02	800
12	50	≤ 0.02	≤ 0.02	800
16	50	≤ 0.02	≤ 0.02	800

6 Trigger characteristics

The thermomagnetic circuit breaker is available in 18 nominal current levels and in single and multi-pos. versions.

The version with the "medium-blow (M1)" trigger characteristic is suitable for AC and DC applications. The "fast-blow (F1)" characteristic version is suitable for DC applications.

The characteristic curves (see page 7) depend on the ambient temperatures. To avoid early or late disconnection, the circuit breaker nominal current must be multiplied by a factor.

Ambient temperature	Multiplication factor
-30°C	0.76
-20°C	0.79
-10°C	0.83
0°C	0.88
10°C	0.93
20°C	1
30°C	1.04
40°C	1.11
50°C	1.19
60°C	1.29

The characteristic curves (see page 7) are also valid for multi-position devices if all positions have an equal load. For multi-position devices and only 1-pos. overload, the thermal tripping limit changes for characteristic curves F1 and M1 to a maximum of 1.7 x I_N.

For DC, the magnetic operate values of the curves are around factor 1.3 higher.

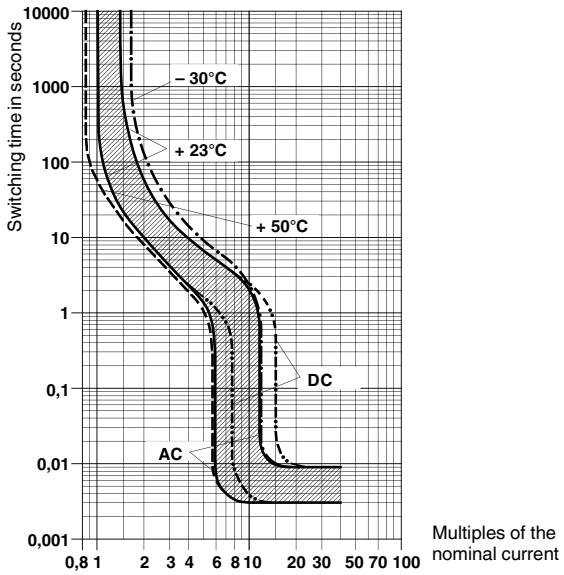
Tripping is supported even with high-energy current peaks < 0.003 s.

NOTE: When mounting several circuit breakers in rows, observe the mutual warming effect. When the circuit breakers are loaded simultaneously, a mutual warming effect occurs, which has the same effect as an increase in ambient temperature.

In this case, the nominal current can only be led to 80%. Alternatively, the load current can be increased by a multiplication factor and the circuit breaker dimensioned accordingly.

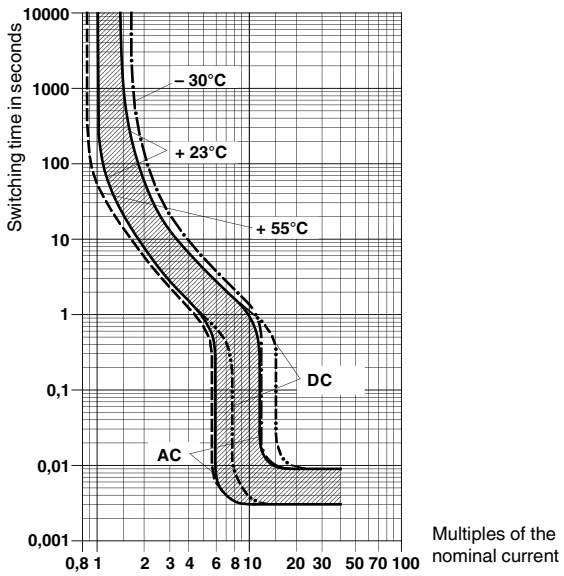
6.1 Medium-blow (M1): Nominal value 0.2 A ... 6 A

– Lower tripping limit: 1.05 x I_N
– Upper tripping limit: 1.4 x I_N



6.2 Medium-blow (M1): Nominal value 8 A ... 16 A

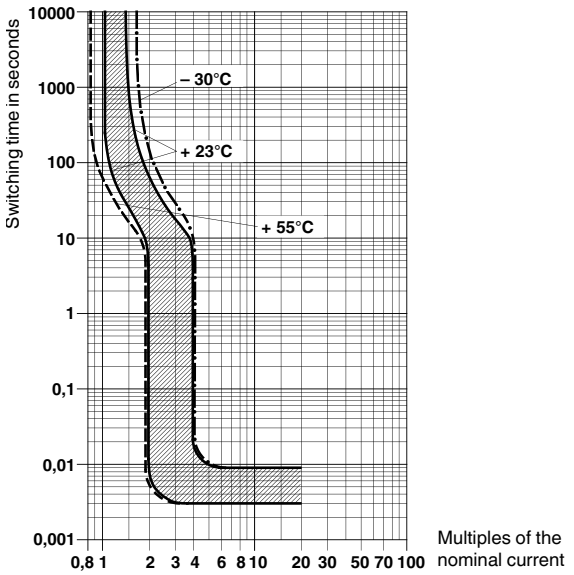
– Lower tripping limit: 1.05 x I_N
– Upper tripping limit: 1.4 x I_N



6.3 Fast-blow (F1): Nominal value 0.2 A ... 16 A

Only for DC applications.

– Lower tripping limit: 1.05 x I_N



7 Mounting on a modular base

The TMCP SOCKET M base is snapped onto a DIN rail and can accommodate two TMCP... devices.

The two-channel bases are modular, which means that larger distribution systems can be created. A TMCP CONNECT LR base termination element is inserted at both the start and end of the system.

The base module has an integrated bridge shaft on the power input side. A plug-in bridge system, which can be cut to any length, can thus be used to create a current distribution with up to 40 positions. The maximum supply current depends on the type of supply and the bridge used.

Signal contacts, N/C contacts, and N/O contacts are already integrated in the circuit breakers.

All electrical connections are established using spring-cage terminal blocks.

Individual indication can be established via connection 11 on the TMCP CONNECT LR base termination elements and connection 12 on the base module.

Group indication is fully wired internally. The supply at connection 13 and the signal tap at connection 14 support the quick creation of a signal loop via all circuit breakers.

NOTE: If a slot is free on a base, the TMCP-SB signal bridge must be used here to feed through the signal.

The internal wiring is illustrated in the circuit diagram.

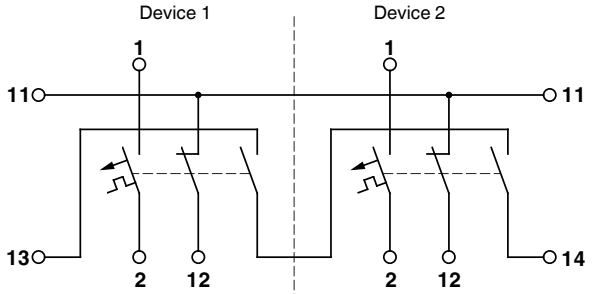


Illustration and definitions when switched off and with zero current.

7.1 Technical data

Connections

Spring-cage terminal blocks for solid wires and stranded cables with and without ferrules.

Use the specified screwdriver size (SD) to release the spring cage.

Connection	Spring-cage terminal blocks for	Stripping length	Screwdriver size (SD)
Input (1)	1.5 mm^2 ... 10 mm^2	15 mm	SD 2 (0.8 x 4.0 mm)
Output (2)	0.25 mm^2 ... 4 mm^2	12 mm	SD 1 (0.6 x 3.5 mm)
Auxiliary contacts (11, 13/14)	0.25 mm^2 ... 2.5 mm^2	10 mm	SD 1 (0.6 x 3.5 mm)
Single output (12)	0.25 mm^2 ... 1.5 mm^2	10 mm	SD 0 (0.4 x 2.5 mm)

TMCP SOCKET M - Base

Technical data		
Test contact for testing group indication on a cable interrupt	ø = 2 mm	
Nominal voltage (without circuit breaker)	433 V AC (65 V DC)	
Nominal current (without circuit breaker)	Input (1)	50 A
	Output (2)	25 A[1]
	Supply (11)	10 A
	Single output (12), group indication (13, 14)	1 A
Internal resistance (without circuit breaker)	Input/output (1, 2)	≤ 5 mΩ
	Indication, parallel (11 - 12)	≤ 9 mΩ/per position
	serial (13 - 14)	≤ 8 mΩ/per position
Supply rail for current distribution, plug-in bridge		
FBST 500-PLC...	I_{max} = 32 A	
FBST 500-TMCP[2]	I_{max} = 50 A	
Dielectric strength		
Between main circuits (without plug-in bridge)		1500 V
Main circuit to signal circuit		1500 V
Signal circuit to signal circuit		1500 V
Weight		
Central part	85 g, approximately	
Connection elements (pair)	30 g, approximately	

[1] When several circuit breakers are mounted in rows, the entire nominal current cannot be led due to the mutual thermal effect.
When $I_N \leq 16$ A, the maximum load is 80%.
When $I_N > 16$ A, the maximum load is 65%.

[2] Uninsulated power rail I_{max} = 50 A (the uninsulated power rail is inserted fully and is therefore safe to touch)

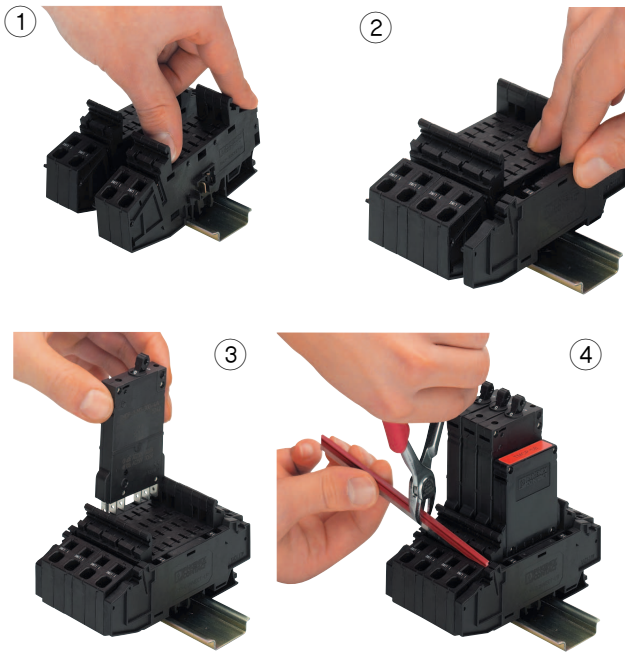
TMCP CONNECT LR - Base termination element

Connection capacity	Supply Auxiliary contact 11	Group output Auxiliary contacts 13/14
Nominal voltage	250 V AC (65 V DC)	250 V AC (65 V DC)
Nominal current	10 A	1 A
Maximum load current	10 A for 2.5 mm^2	1 A for 2.5 mm^2

General data

TMCP CONNECT LR	Width x length	25 mm (2-pos.) x 115 mm
TMCP SOCKET M	Width x length	6 mm x 115 mm
Height on NS 35/7.5... DIN rail		110.5 mm
Height on NS 35/15... DIN rail		118 mm
Insulation material		PA-F
Inflammability class according to UL 94		V0
Impulse voltage withstand level		2.5 kV
Pollution degree		2

7.2 Mounting



To assemble, proceed as follows:

- Snap the TMCP SOCKET M base onto a DIN rail according to EN 60751 (1).
  Individual bases can be mounted side by side to create any number of positions.
- Push bases together.
- Snap on TMCP CONNECT LR base termination elements to the left and right-hand side (2).
  The termination elements contain the contacts for group indication and the supply for individual indication.
- Insert TMCP (3).

WARNING: Always fill empty slots with the TMCP SB signal bridge.

- If a slot on the base is empty, the TMCP SB signal bridge is used. It bridges the group signal and replaces the circuit breaker.
  The bridging option in the base enables supply potential distribution over a maximum of 40 positions.
- Cut FBST 500... plug-in bridge to length as required and insert in bases (4).
- Insert the connecting cables in the spring-cage terminal blocks.
- If mounted overhead, secure the TMCP and base using the SPRING-LOCK clamp.