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UT 6-TMC M...

Thermomagnetic circuit breakers

CLIPLINE

Data sheet
103943_en_04

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1 Description

The UT 6-TMC M circuit breaker is a single-position overload circuit breaker with thermomagnetic tripping. It is a space-saving circuit breaker with trip-free mechanism in the event of overload and short circuits within the maximum interrupting rating. The UT 6-TMC M is mounted on an NS 35 DIN rail.

UT 6-TMC M thermomagnetic circuit breakers feature a compact design, large labeling areas, and a double plug-in bridge shaft.

The circuit breakers provide a high level of system availability thanks to their reclosure function and clear status display.

Eleven nominal current versions can be selected from 0.5 A to 16 A. The large center labeling area enables clear assignment of the relevant circuit breaker.



NOTE: The magnetic tripping ranges differ for alternating currents (AC) and direct currents (DC) (see page 3). The magnetic operating currents for direct currents (DC) are approximately 1.6 times higher.



NOTE: When mounted in rows with simultaneous load, a mutual thermal effect occurs (see page 4). Calibration is required for an ambient temperature of +23°C. A correction factor must be used to determine the nominal current for a lower or higher ambient temperature (see page 5).



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

2 Ordering data

Circuit breakers

Description	Nominal current	Type	Order No.	Pcs./Pkt.
Thermomagnetic circuit breaker, 1-pos.	0.5 A	UT 6-TMC M 0,5A	0916603	6
Thermomagnetic circuit breaker, 1-pos.	1 A	UT 6-TMC M 1A	0916604	6
Thermomagnetic circuit breaker, 1-pos.	2 A	UT 6-TMC M 2A	0916605	6
Thermomagnetic circuit breaker, 1-pos.	4 A	UT 6-TMC M 4A	0916606	6
Thermomagnetic circuit breaker, 1-pos.	5 A	UT 6-TMC M 5A	0916607	6
Thermomagnetic circuit breaker, 1-pos.	6 A	UT 6-TMC M 6A	0916608	6
Thermomagnetic circuit breaker, 1-pos.	8 A	UT 6-TMC M 8A	0916609	6
Thermomagnetic circuit breaker, 1-pos.	10 A	UT 6-TMC M 10A	0916610	6
Thermomagnetic circuit breaker, 1-pos.	12 A	UT 6-TMC M 12A	0916611	6
Thermomagnetic circuit breaker, 1-pos.	15 A	UT 6-TMC M 15A	0916612	6
Thermomagnetic circuit breaker, 1-pos.	16 A	UT 6-TMC M 16A	0916613	6

Accessories

Description	Type	Order No.	Pcs./Pkt.
Plug-in bridge, for cross connection in the bridge shaft, red, 2-pos.	FBS 2-6	3030336	50
Plug-in bridge, for cross connection in the bridge shaft, red, 3-pos.	FBS 3-6	3030242	50
Plug-in bridge, for cross connection in the bridge shaft, red, 4-pos.	FBS 4-6	3030255	50
Plug-in bridge, for cross connection in the bridge shaft, red, 5-pos.	FBS 5-6	3030349	50
Plug-in bridge, for cross connection in the bridge shaft, red, 10-pos.	FBS 10-6	3030271	10
Plug-in bridge, for cross connection in the bridge shaft, red, 20-pos.	FBS 20-6	3030365	10
Warning label, for UT series, yellow	WS UT 6	3047345	10
Screwdriver	SZS 1,0X4,0	1205066	10
UniCard sheet, for labeling	UC-TM 12	(See CLIPLINE catalog)	
Zack marker strip, for labeling	ZB 12	(See CLIPLINE catalog)	

3 Electrical data

Nominal current, nominal voltage, and additional electrical data

Rated insulation voltage	440 V AC
Rated frequency	50/60 Hz (at 240 V AC)
Nominal voltage	240 V AC, 28 V DC
Nominal current AC/DC	Depending on module: 0.5 A, 1 A, 2 A, 4 A, 5 A, 6 A, 8 A, 10 A, 12 A, 15 A, 16 A
Operating voltage range	50 V AC ... 264 V AC, 5 V DC ... 30.8 V DC
Operating frequency range	48 Hz ... 62 Hz
Insulation resistance (main circuit)	> 100 MΩ
Insulation resistance	50 Hz: 2000 V Pulse: 2800 V
Surge voltage category	II
Pollution degree	2

	AC	DC
Switching cycles		
Service life under load	6000 cycles at 1 x I _n	6000 cycles at 1 x I _n
Overload according to IEC 60943	40 cycles at 6 x I _n	40 cycles at 6 x I _n
Overload according to UL 1077	50 cycles at 1.5 x I _n	50 cycles at 1.5 x I _n
Short-circuit switching capacity (Inc)	200 A	400 A
Conditional short-circuit switching capacity (Inc)[Backup fuse]	2000 A	2000 A

Backup fuse	Nominal current UT 6-TMC M	Maximum backup fuse
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NOTE: If in the application the maximum short-circuit switching capacity (I_{cn}) could be exceeded in the event of an error, a backup fuse must be used in combination with the circuit breaker.

The following maximum backup fuse values are recommended according to characteristic gG (VDE 0636, IEC 269)

0.5 A	16 A
1 A	16 A
2 A	16 A
4 A	16 A
5 A	20 A
6 A	20 A
8 A	25 A
10 A	25 A
12 A	25 A
15 A	25 A
16 A	25 A

Tripping characteristics

Type of actuation	Manual ON/OFF (S type)
Tripping method	Thermomagnetic (TM)
Tripping type	Trip-free mechanism
Specified non-tripping current (no tripping within an hour)	$1.05 \times I_n$
Specified tripping current (tripping within an hour)	$1.32 \times I_n$
Instantaneous non-tripping current	$6 \times I_n$ (AC)
Instantaneous tripping current	$12 \times I_n$ (AC)



NOTE: The magnetic tripping ranges differ for alternating currents (AC) and direct currents (DC). Please observe the tripping characteristics shown in Figure 1.
The magnetic operating currents for direct currents (DC) are approximately 1.6 times higher.

3.1 Tripping characteristics

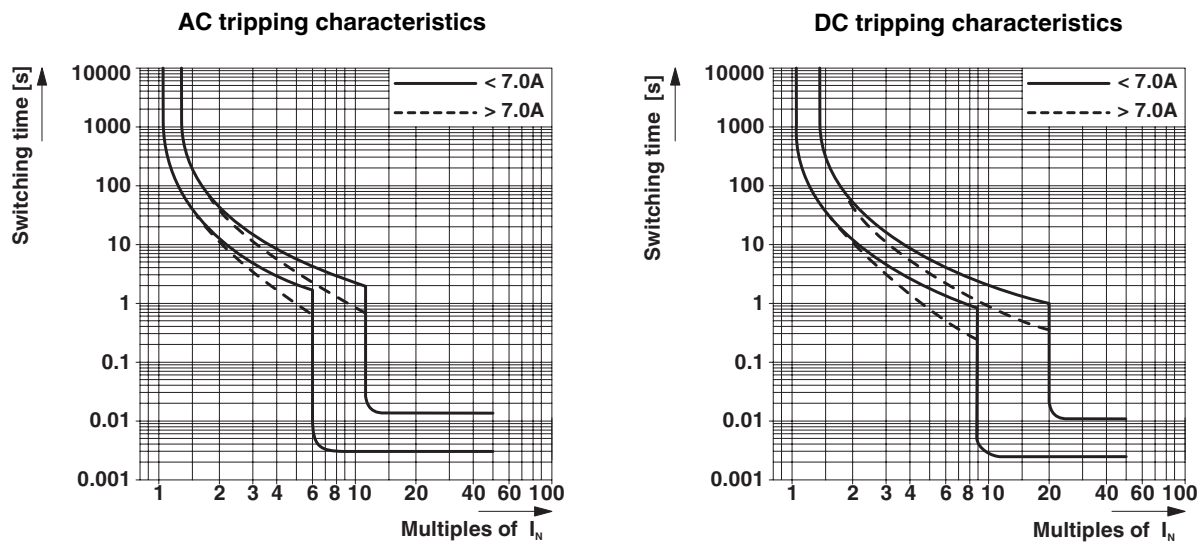


Figure 1 AC and DC tripping characteristics

3.2 Effect on thermal tripping of mounting in rows



NOTE: When mounted in rows with simultaneous load, a mutual thermal effect occurs.

The mutual thermal effect is tantamount to an increase in the ambient temperature (see page 5). This depends on the following:

- The nominal current
- The ambient temperature
- The number of devices
- The distance between devices

The nominal device current can be either oversized or limited. When the UT 6-TMC M is mounted in rows, the correction factor is usually in the range of 1.25 or at 80% (reciprocal) in relation to the limiting nominal current. These values apply in the event of continuous load and at an ambient temperature of +23°C.

Since the thermal effect varies for each planned installation when mounting in rows, the correction factors must be defined individually and tested.

Calculation example for overdimensioning

5 circuit breakers with $I_n = 10\text{ A}$ are to be mounted in rows. The ambient temperature is +23°C.

Nominal current when not mounted in rows $I_n = 10\text{ A}$

Typical correction factor $d_f = 1.25$

Theoretical nominal current when mounting in rows $I_{n\text{ row}} = 10\text{ A} \times 1.25 = 12.5\text{ A}$

3.3 Internal resistance of the UT 6-TMC M

Nominal current	Resistance
0.5 A	4.37 Ω
1.0 A	0.95 Ω
2.0 A	0.33 Ω
4.0 A	88.0 mΩ
5.0 A	55.8 mΩ
6.0 A	41.7 mΩ
8.0 A	22.2 mΩ
10.0 A	12.3 mΩ
12.0 A	10.9 mΩ
15.0 A	8.3 mΩ
16.0 A	7.7 mΩ

Measurement between the LINE and LOAD connections.

Tolerance: ±10%

4 Mechanical data

Fixing

Mounting method

On a DIN rail according to DIN EN 60715, NS 35N/7,5 or NS 35/15
The tripping characteristics are not dependent on the mounting position.

Plug-in bridge, for cross connection in the bridge shaft

FBS x-6 plug-in bridge (see "Accessories" on page 2)

Connection polarity

Independent polarity (for DC) for the LINE and LOAD connections

Suitability

"Factory wiring"

Weight

51 g

Housing material

PA 66

Fuse type

Medium blow fuse

Inflammability class according to UL 94

V0

Maximum number of cycles

6000 at $1 \times I_n$

Connection terminal block

Screw connection

M4

Connection capacity

Solid

Stranded

With ferrule

1 conductor

0.2 mm² ... 10 mm²

0.2 mm² ... 10 mm²

0.25 mm² ... 6 mm²

2 conductors (two conductors with same cross-section, ferrule without plastic sleeve)

0.2 mm² ... 2.5 mm²

0.25 mm² ... 1.5 mm²

2 stranded conductors with a TWIN ferrule

0.5 mm² ... 4 mm²

Stripping length

12 mm

Tightening torque (EN 60934)

1.5 Nm ... 1.8 Nm

5 Environmental influences

5.1 Temperature range, influence on the ambient temperature



NOTE: Calibration is required for an ambient temperature of +23°C.

Temperature range -30°C ... +60°C

Reference temperature +23°C

The following typical correction factors must be observed to calculate the nominal current:

Correction factors

I _n [A]	°C									
	-30	-20	-10	0	10	23	30	40	50	60
0.5	0.77	0.81	0.84	0.87	0.90	1.00	1.03	1.08	1.15	1.21
1	0.77	0.81	0.84	0.87	0.90	1.00	1.03	1.06	1.13	1.19
2	0.77	0.81	0.84	0.87	0.90	1.00	1.03	1.08	1.15	1.21
4	0.77	0.81	0.84	0.87	0.90	1.00	1.03	1.08	1.15	1.21
5	0.77	0.81	0.84	0.87	0.90	1.00	1.03	1.08	1.15	1.25
6	0.70	0.73	0.78	0.84	0.90	1.00	1.03	1.08	1.15	1.21
8	0.70	0.73	0.78	0.84	0.90	1.00	1.03	1.06	1.13	1.21
10	0.78	0.81	0.84	0.87	0.90	1.00	1.05	1.15	1.21	1.30
12	0.77	0.80	0.85	0.90	0.95	1.00	1.03	1.08	1.15	1.21
15	0.73	0.73	0.78	0.84	0.90	1.00	1.03	1.08	1.11	1.21
16	0.70	0.73	0.78	0.84	0.90	1.00	1.03	1.08	1.15	1.21
∅	0.75	0.78	0.82	0.86	0.90	1.00	1.03	1.08	1.15	1.22

Example calculation:

A circuit breaker with I_n = 4 A is to be used at an ambient temperature of +60°C.

Nominal current at +23°C I_n (+23°C) = 4 A

Ambient temperature T_{amb} = +60°C

Correction factor df = 1.21

Theoretical nominal current at +60°C

I_n (+60°C) = 4 A x 1.21 = 4.84 A

At +60°C, a nominal current of 5 A should be selected.

5.2 IP protection class

IP protection class	Actuation area	IP40
	Connection area	IP20

5.3 Resistance to vibrations and shocks

Shock resistance according to EN 60068-2-27, Test Ea [3 shocks in each direction (= 18 shocks)]

Peak G	Pulse length	Pulse form
50g	11 ms	Half-sine

Vibration resistance according to EN 60068-2-6, Test Fc - frequency range: 5 Hz ... 500 Hz

< 60 Hz (constant amplitude)	> 60 Hz (constant acceleration)
0.15 mm	2g

5.4 Approvals

Certification body	Standard	License number	Approved as
VDE	IEC 60934	400028127	Circuit Breaker for Equipment
UL	UL 1077	E140459	Supplementary Protector
UL	CSA 22.2 No.235	E140459	Supplementary Protector
CSA	CSA 22.2 No.235	250505	Supplementary Protector

6 Dimensions

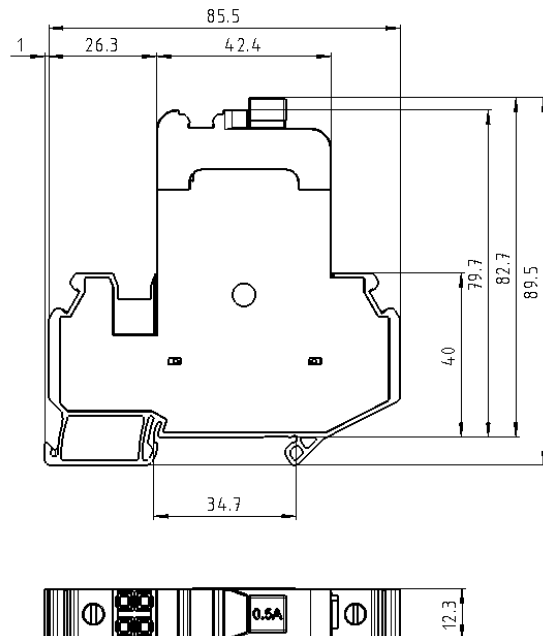


Figure 2 Dimensions (in mm)