

Circuit Breaker for Equipment thermal-magnetically with Metal Actuator



See below:

**Approvals and Compliances**

**Description**

- TMF12-211 - Thermal-magnetic circuit breaker ,
- Metal switch non-illuminated and illuminated
- 1-pole
- Quick connect terminals 6.3 x 0.8 mm / screw terminals

**Applications**

- Power supplies
- Uninterruptible power supply
- Power tools
- Household appliances

**References**

Component 1: circuit breakers  
 Component 2: metal switch  
 Component 3: Coupler

**Weblinks**

[pdf data sheet](#), [html datasheet](#), [General Product Information](#), [Distributor-Stock-Check](#), [Detailed request for product](#), [Product News](#)

**Technical Data**

Rated Voltage AC	AC 240 V: 50/60
Rated Voltage DC	28 V
Rated current range AC	0.05 - 15 A
Conditional short circuit capacity Inc	IEC 60934: PC1, AC 240 V: 1 kA
Dielectric Strength	50Hz: > 1.5kV Impulse 1.2/50 µs: > 2.5kV
Insulation Resistance	500VDC > 100 MΩ
Endurance typical	2 x I <sub>r</sub> : 5000 switching cycles
Reset type	AC : 2 x I <sub>r</sub> , cos φ 0.6 : DC : 2 x I <sub>r</sub> , L/R = 2 - 3 ms : 50 switching cycles
Manual ON/OFF type	AC : 2 x I <sub>r</sub> , cos φ 0.6 :  DC : 2 x I <sub>r</sub> , L/R = 2 - 3 ms : 5000 switching cycles

Overload	IEC: min. 40 trips @ 6 x I <sub>r</sub> , cos φ 0.6 UL / CSA: min. 50 trips @ 1.5 x I <sub>r</sub> , cos φ 0.75
Allowable Operation Temp.	-5 °C to 60 °C
Vibration Resistance	± 0.75 mm @ 5 - 60 Hz acc. to IEC 60068-2-6, test Fc 7 G @ 60 - 500 Hz acc. to IEC 60068-2-6, test Fc
Shock Resistance	60 G / 18ms acc. to IEC 60068-2-27, test Ea
Tripping Type	Thermal-Magnetic
Actuation Type	Manual ON/OFF
Shock Protection	IK07
Tightening Torque Stainless Steel Nut	12 Nm for thread M19, 16 Nm for M22
Salt Spray Test (acc. to DIN 50021-SS)	24 h / 48 h / 96 h Residence Time
Supply Voltage	24 VDC Ring Illumination without series resistor Point Illumination
Weight	ca. 55 g




**Approvals and Compliances**

Detailed information on product approvals, code requirements, usage instructions and detailed test conditions can be looked up in [Details about Approvals](#)

SCHURTER products are designed for use in industrial environments. They have approvals from independent testing bodies according to national and international standards. Products with specific characteristics and requirements such as required in the automotive sector according to IATF 16949, medical technology according to ISO 13485 or in the aerospace industry can be offered exclusively with customer-specific, individual agreements by SCHURTER.

## Product standards

Product standards that are referenced

Organization	Design	Standard	Description
	Designed according to	IEC 60934	Circuit-breakers for equipment (CBE)
	Designed according to	UL 1077	Standard for Supplementary Protectors for Use in Electrical Equipment
	Designed according to	GB 17701	Circuit-breaker for equipment






## Application standards

Application standards where the product can be used

Organization	Design	Standard	Description
	Suitable for applications acc.	IEC/UL 62368-1	Audio/video, information and communication technology equipment - Part 1: Safety requirements

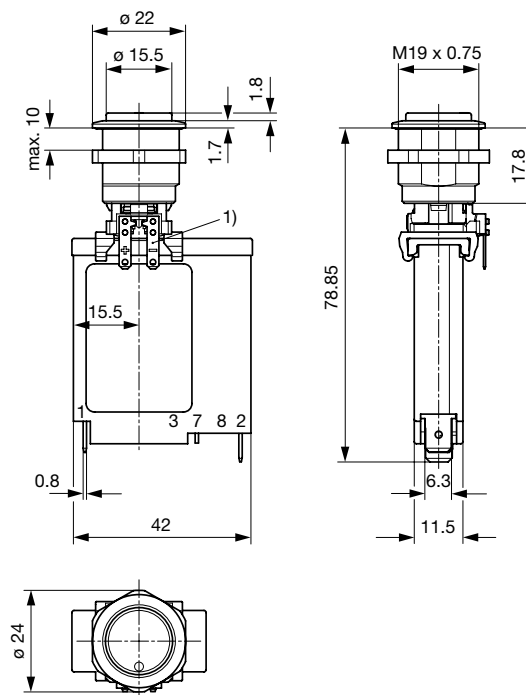
## Compliances

The product complies with following Guide Lines

Identification	Details	Initiator	Description
	<a href="#">CE declaration of conformity</a>	SCHURTER AG	The CE marking declares that the product complies with the applicable requirements laid down in the harmonisation of Community legislation on its affixing in accordance with EU Regulation 765/2008.
	<a href="#">UKCA declaration of conformity</a>	SCHURTER AG	The UKCA marking declares that the product complies with the applicable requirements laid down in the British Amendment of Regulation (EC) 765/2008.
	RoHS	SCHURTER AG	Directive RoHS 2011/65/EU, Amendment (EU) 2015/863
	China RoHS	SCHURTER AG	The law SJ / T 11363-2006 (China RoHS) has been in force since 1 March 2007. It is similar to the EU directive RoHS.
	REACH	SCHURTER AG	On 1 June 2007, Regulation (EC) No 1907/2006 on the Registration, Evaluation, Authorization and Restriction of Chemicals 1 (abbreviated as "REACH") entered into force.

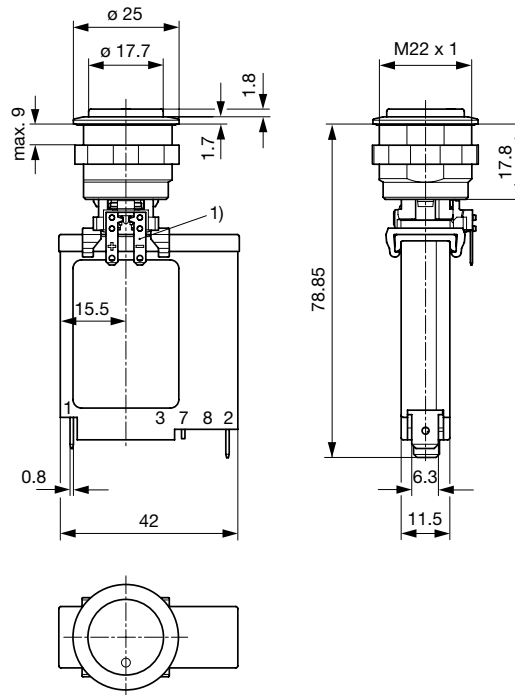
## Dimension [mm]

TM12 MSM 19



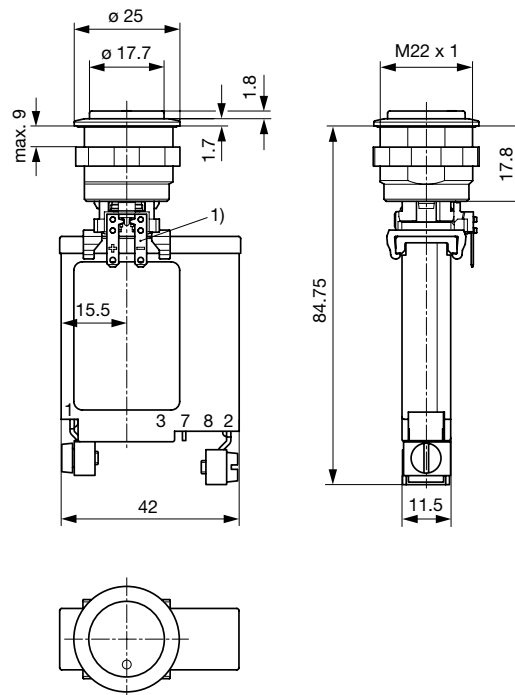
1) only among MSM PI / RI quick connect terminal 2.8x0.5 mm

TM12 MSM 22



1) only among MSM PI / RI quick connect terminal 2.8x0.5 mm

TM12 MSM 22 screw version



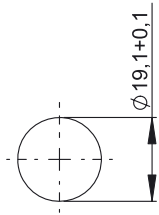
1) only among MSM PI / RI quick connect terminal 2.8x0.5 mm

MSM 19 LA ST / MSM 19 LA RI

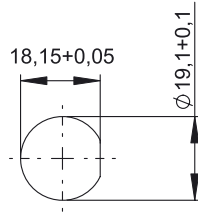
MSM 19 LA LE / MSM 19 LA PI /  
 MSM 19 LA RI optional

MSM 22 LA ST / MSM 22 LA RI

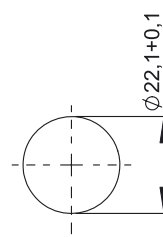
MSM 22 LA LE / MSM 22 LA PI /  
 MSM 22 LA RI optional



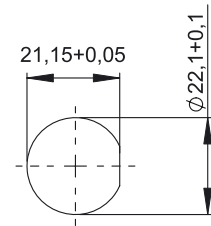
Drilling diagram



Drilling diagram



Drilling diagram



Drilling diagram

[nicht konfiguriert]:  
 element\_name:MSM\_beleuchtet\_Punktbeleuchtung: id:168861

## Point Illumination

Operating Data	Forward Cur-	Forward Vol-	Forward Vol-	Forward Vol-
LED red	30 mA	1,9 VDC		3,0 VDC
LED green	30 mA	2,1 VDC		3,0 VDC
LED blue	20 mA		3,7 VDC	4,5 VDC

Attention: Switches

## Recommendation of series resistors for point illumination

LED-Color	$I_D$ [mA]	$I_{DMax}$ [mA]	$U_V$				$U_V$				$U_V$			
			[V]	$R_V$ [ $\Omega$ ]	$R_V^{E24}$ [ $\Omega$ ]	$P_V$ [W]**	[V]	$R_V$ [ $\Omega$ ]	$R_V^{E24}$ [ $\Omega$ ]	$P_V$ [W]**	[V]	$R_V$ [ $\Omega$ ]	$R_V^{E24}$ [ $\Omega$ ]	$P_V$ [W]
red	10	---	5	310	330	0,03	12	1010	1000	0,10	24	2210	2200	0,22
	---	30		67	68	0,06		300	300	0,27		700	750	0,63
green	10	---		290	300	0,03		990	1000	0,10		2190	2200	0,22
	---	30		67	68	0,06		300	300	0,27		700	750	0,63
blue	8	---		163	160	0,01		1038	1100	0,07		2538	2700	0,16
	---	20		25	27	0,01		375	390	0,15		975	1000	0,39

- $I_D$  LED-Forward Current [8mA/10mA]
- $I_{DMax}$  LED-Forward Current max. [20mA/30mA]
- $R_V$  Series Resistor (calculated)
- $R_V^{E24}$  Series Resistor (regarding E24-Resistor series)
- $P_V$  Power dissipation concerning  $R_V$  (calculated)

### Typical internal resistance TMF12

Rated Current [A]	Internal Resistance [ $\Omega$ ]
0.05	335.00
0.50	4.37
1.00	1.23
2.00	0.369
3.00	0.181
4.00	0.097
5.00	0.055
6.00	0.044
7.00	0.0231
8.00	0.0227
9.00	0.0142
10.00	0.0123
11.00	0.012
12.00	0.012
13.00	0.0108
14.00	0.0091
15.00	0.0089
16.00	0.0071

### Effect of ambient temperature

The units are calibrated for an ambient temperature of +23°C. To determine the rated current for a lower or higher ambient temperature, use a correction factor (typical value) from the table below:

Ambient Temperature [°C]	Correction factor
-5	0.87
0	0.90
10	0.95
23	1.00
30	1.05
40	1.12
50	1.20
60	1.30

Example: Rated current = 5 A, Environmental temperature = 50 °C, --> Correction factor = 1.2, Resulting current = 6.0 A

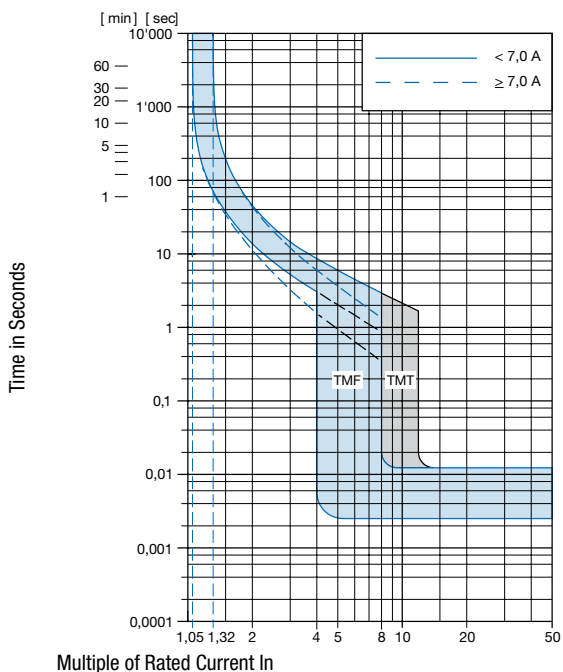
### Marking

The three digits are part of the ordner number key

000	No Lettering
001-100	Standard Lettering
101-	Customized Lettering

Lettering options see on Datasheet MSM LA 22

## Time-Current-Curves



## All Variants

Circuit Breakers			Momentary Action Switches		Order Number
Type	Rated cur-	Connection type	Type	Illumination	
TMF12-221-10	10A	Quick connect terminals 6.3 x 0.8 mm	MSM LA 19	non-illuminated	4410.9013
TMF12-221-16	16A	Quick connect terminals 6.3 x 0.8 mm	MSM LA 19	non-illuminated	4410.9014
TMF12-221-10	10A	Quick connect terminals 6.3 x 0.8 mm	MSM LA 22	non-illuminated	4410.9015
TMF12-221-16	16A	Quick connect terminals 6.3 x 0.8 mm	MSM LA 22	non-illuminated	4410.9016
TMF12-221-15	15A	Quick connect terminals 6.3 x 0.8 mm	MSM LA 22	non-illuminated	4410.9020
TMF12-221-15	15A	Quick connect terminals 6.3 x 0.8 mm	MSM LA 22	Ring Illumination, blue, 24 VDC	4410.9022

Coupler is included

Availability for all products can be searched real-time: <https://www.schurter.com/en/info-center/support-tools/stock-check-distributors>

**Packaging Unit**

10 Pcs



- Actuating elements in ESD safe packaging
- Screw nuts and sealing rings in a bag (enclosed in the box)
- Circuit breaker in a bag (enclosed in the box)