

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: > 1.5 kV<br>Impulse 1.2/50 $\mu$ s: > 2.5 kV |
| Insulation Resistance                  | 500 VDC > 100 M $\Omega$                           |
| Endurance typical                      | 2 x Ir: 5000 switching cycles                      |
|                                        | Reset type                                         |
|                                        | AC : 2 x Ir , cos $\phi$ 0.6 :                     |
|                                        | DC : 2 x Ir , L/R = 2 - 3 ms :                     |
|                                        | 50 switching cycles                                |
|                                        | Manual ON/OFF type                                 |
|                                        | AC : 2 x Ir , cos $\phi$ 0.6 :                     |
|                                        | DC : 2 x Ir , L/R = 2 - 3 ms :                     |
|                                        | 5000 switching cycles                              |

|                                        |                                                                                                                    |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Overload                               | IEC: min. 40 trips<br>@ 6 x Ir, cos $\phi$ 0.6<br>UL / CSA: min. 50 trips<br>@ 1.5 x Ir, cos $\phi$ 0.75           |
| Allowable Operation Temp.              | -5 °C to 60 °C                                                                                                     |
| Vibration Resistance                   | $\pm$ 0.75 mm @ 5 - 60 Hz<br>acc. to IEC 60068-2-6, test Fc<br>7 G @ 60 - 500 Hz<br>acc. to IEC 60068-2-6, test Fc |
| Shock Resistance                       | 60 G / 18 ms<br>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<br>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                                                                                   |
|----------------------------------------------------------------------------------|--------------------------------|----------------|-----------------------------------------------------------------------------------------------|
|  | Designed for applications acc. | IEC/UL 62368-1 | Audio/video, information and communication technology equipment - Part 1: Safety requirements |

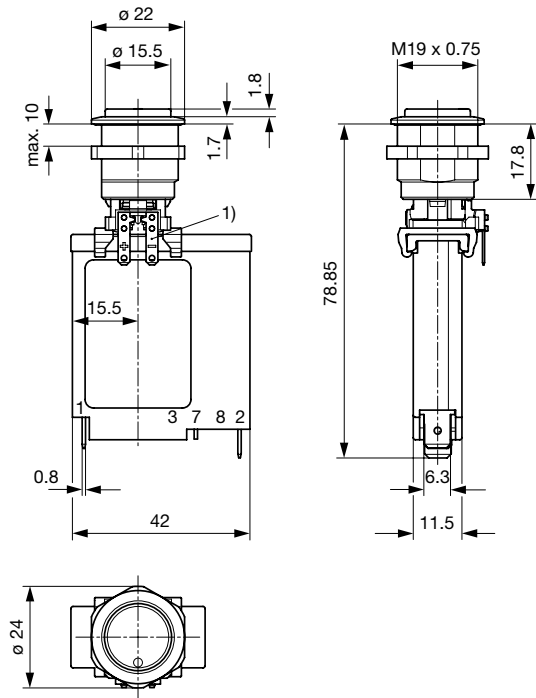
Compliances

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.                               |

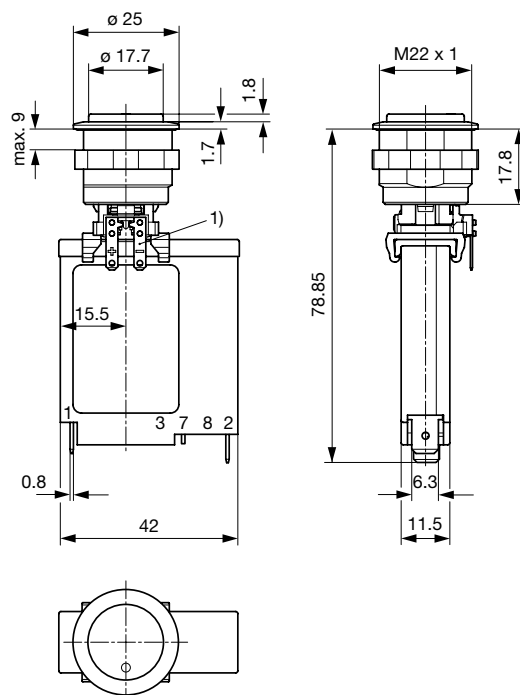
Dimension [mm]

TM12 MSM 19



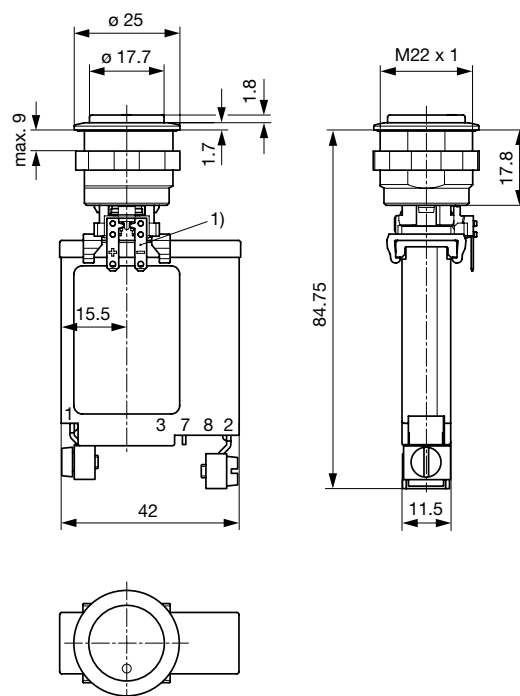
1) only among MSM PI / RI quick connect terminal 2.8x0.5 mm

TM12 MSM 22



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

TM12 MSM 22 screw version



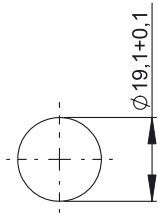
1) only among MSM PI / RI quick connect terminal 2.8x0.5 mm

MSM 19 LA ST / MSM 19 LA RI

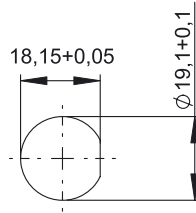
MSM 19 LA LE / MSM 19 LA PI /  
MSM 19 LA RI optional

MSM 22 LA ST / MSM 22 LA RI

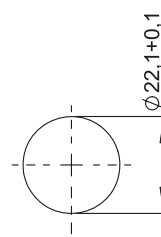
MSM 22 LA LE / MSM 22 LA PI /  
MSM 22 LA RI optional



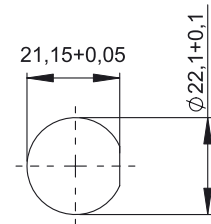
Drilling diagram



Drilling diagram



Drilling diagram



Drilling diagram

## Point Illumination

| Operating Data | Forward Current max. | Forward Voltage at 10 mA | Forward Voltage at 8 mA | Forward Voltage max. |
|----------------|----------------------|--------------------------|-------------------------|----------------------|
| 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 are delivered without series resistor.

## Recommendation of series resistors for point illumination

| LED-Color | I <sub>D</sub><br>[mA] | I <sub>DMax</sub><br>[mA] | U <sub>V</sub><br>[V] | R <sub>V</sub><br>[Ω] | R <sub>V</sub> <sup>E24</sup><br>[Ω] | P <sub>V</sub><br>[W]** | U <sub>V</sub><br>[V] | R <sub>V</sub><br>[Ω] | R <sub>V</sub> <sup>E24</sup><br>[Ω] | P <sub>V</sub><br>[W]** | U <sub>V</sub><br>[V] | R <sub>V</sub><br>[Ω] | R <sub>V</sub> <sup>E24</sup><br>[Ω] | P <sub>V</sub><br>[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                  |
|           | 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                  |
| green     | 8                      | ---                       | 5                     | 163                   | 160                                  | 0,01                    | 12                    | 1038                  | 1100                                 | 0,07                    | 24                    | 2538                  | 2700                                 | 0,16                  |
|           | ---                    | 20                        |                       | 25                    | 27                                   | 0,01                    |                       | 375                   | 390                                  | 0,15                    |                       | 975                   | 1000                                 | 0,39                  |
|           | 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      | 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                  |
|           | 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                  |

I<sub>D</sub> LED-Forward Current [8mA/10mA]

I<sub>DMax</sub> LED-Forward Current max. [20mA/30mA]

R<sub>V</sub> Series Resistor (calculated)

R<sub>V</sub><sup>E24</sup> Series Resistor (regarding E24-Resistor series)

P<sub>V</sub> Power dissipation concerning R<sub>V</sub> (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

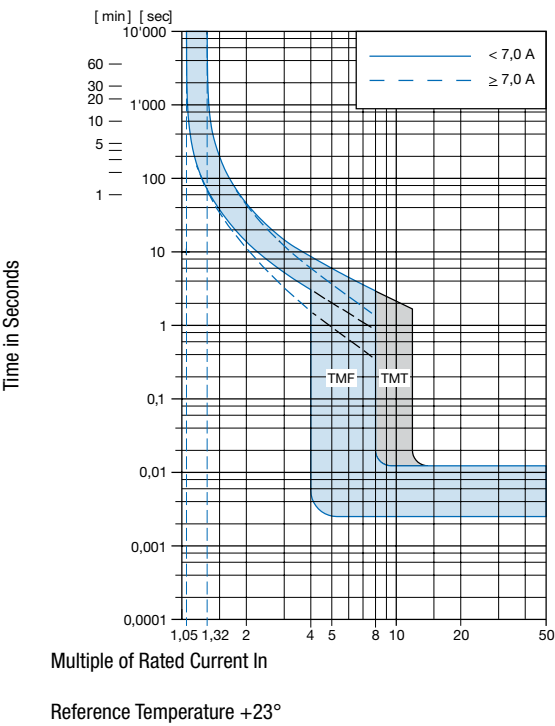
### Marking

The last three digits in the order number define the lettering:

|         |                      |
|---------|----------------------|
| 000     | No Lettering         |
| 001-074 | 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

■ Most Popular.

Availability for all products can be searched real-time:<https://www.schurter.com/en/Stock-Check/Stock-Check-SCHURTER>

**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)