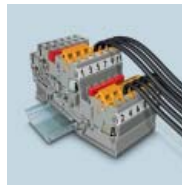


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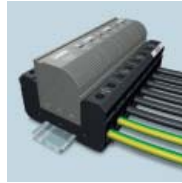
CLIPLINE

- DIN rail-mount terminal blocks
- Marking materials and printers
- Tools
- Ferrules



TRABTECH

- Surge voltage protection



INTERFACE

- Analog signal converters
- Power supplies
- Relays
- PLC cabling
- Rail-mount breakout modules
- Intrinsic safety modules



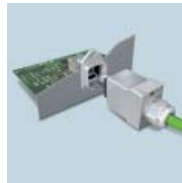
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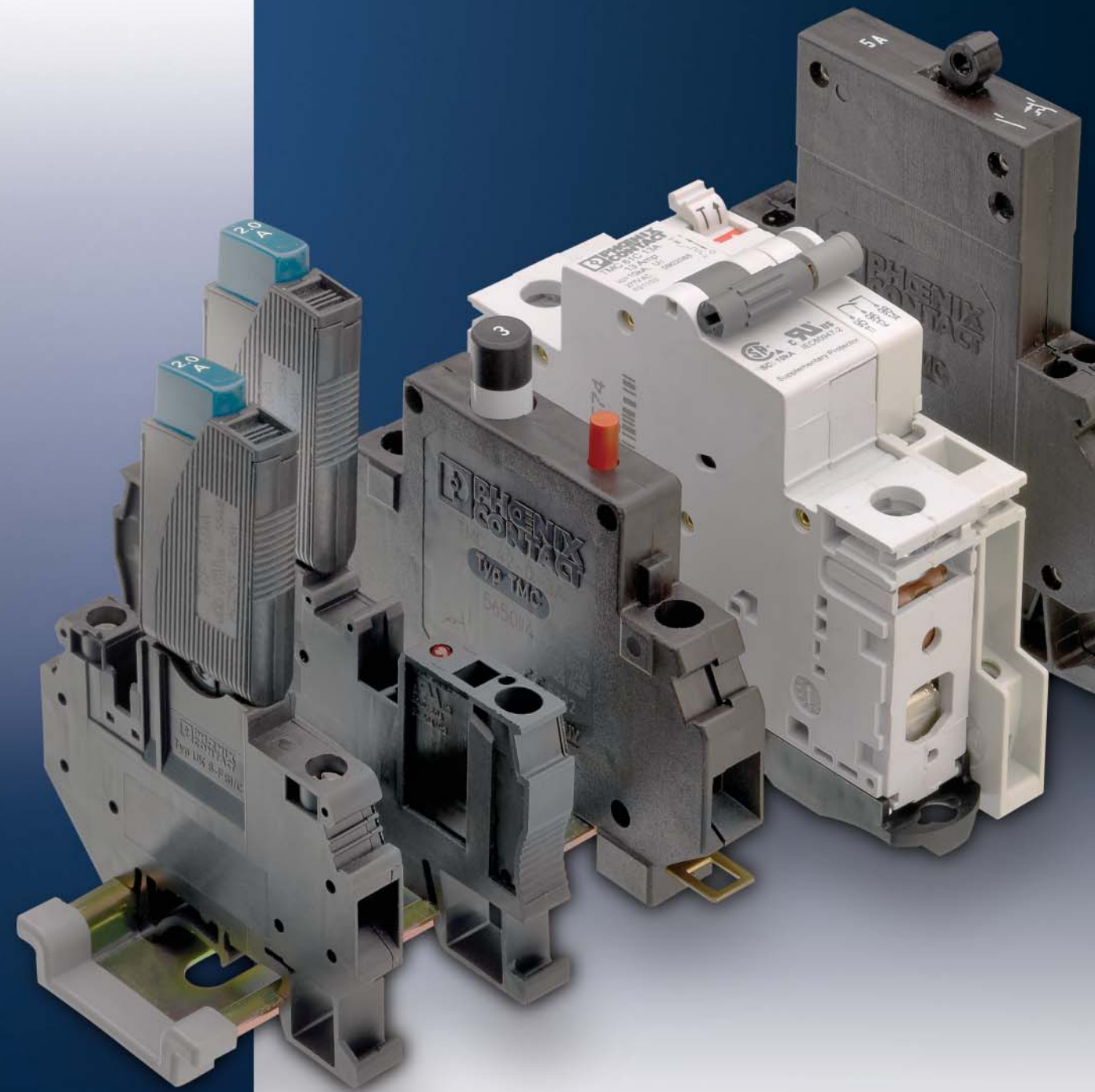


Canada

PHOENIX CONTACT Ltd.
235 Watline Avenue
Mississauga, Ontario L4Z 1P3
Phone: 905-890-2820
Technical Service: 800-890-2820
Fax: 905-890-0180
Website: www.phoenixcontact.ca

USA

PHOENIX CONTACT
P.O. Box 4100
Harrisburg, PA 17111-0100
Phone: 800-888-7388
717-944-1300
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Circuit Breakers

DIN rail-mounted equipment protection

To choose a circuit breaker, determine the following:

The normal current load (nominal current)

Specify the size of the breaker in amps based on the normal current load.

Possible types of failure

Match the short-circuit and overload protection requirements to the performance characteristics of the breaker.

Rupture capacity

Specify the breaker, knowing the maximum fault current that can be repeatedly (3x minimum) interrupted without failure of the breaker.

Maximum interrupting capacity

Choose the breaker, knowing the maximum current at a given voltage that the breaker can interrupt safely without damage to surrounding components.

The wire size the breaker must accommodate

Determine if the breaker can accept the wire sizes required.

How fast the circuit breaker must react to a fault condition

Specify a breaker by selecting a speed that avoids nuisance tripping but protects against component damage.

How many poles are needed

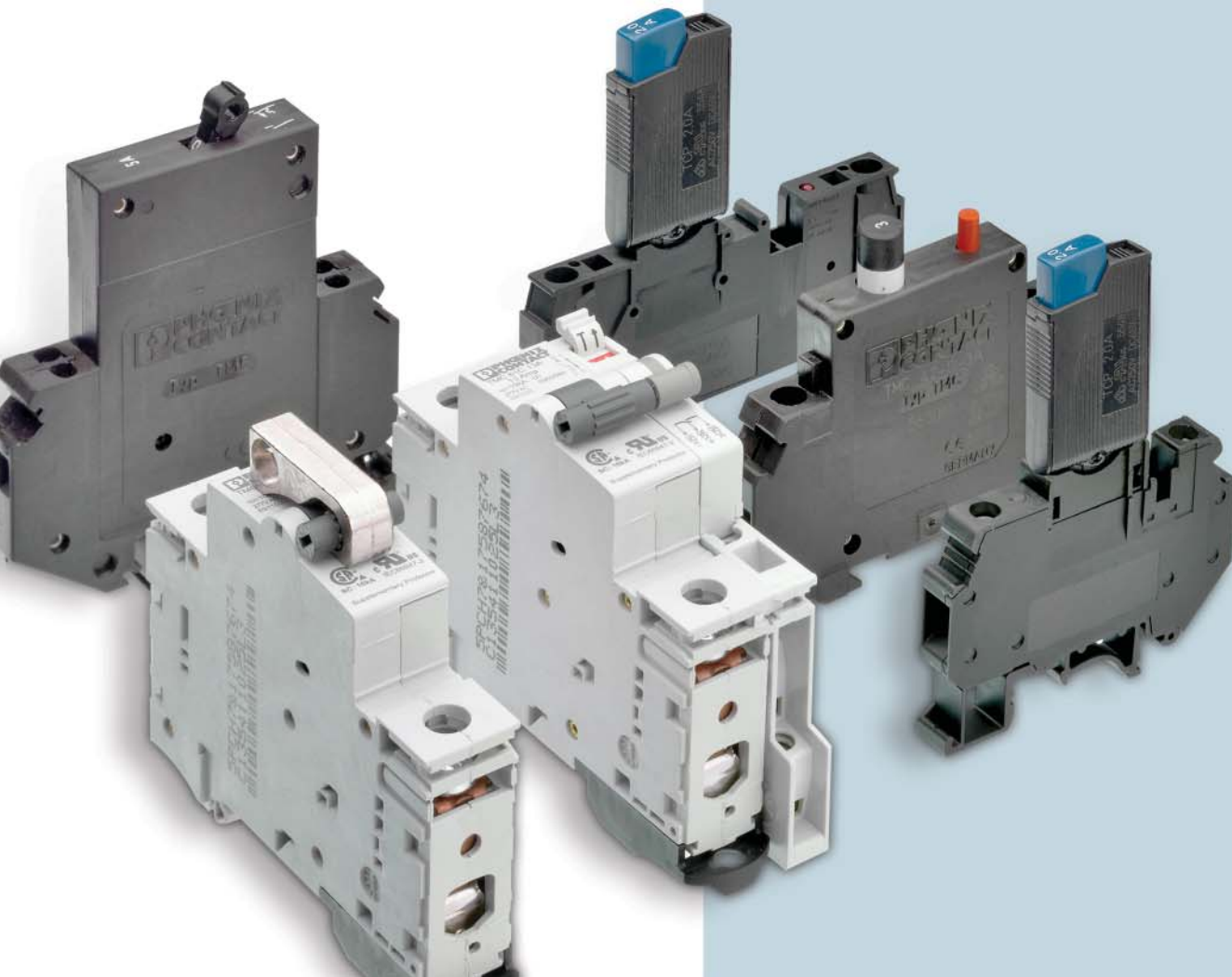
Determine the number of poles needed that are connected electrically and structurally.

Functional requirements of the breaker

Define the requirements for visual inspection, switching, auxiliary circuits or space.

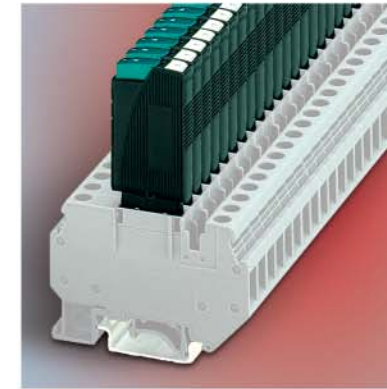
Environmental factors – temperature, moisture, vibration

Determine if there are unusual conditions in which the breaker must operate.



DIN rail-mounted

Thermal Miniature and Thermal Magnetic Circuit Breakers



Thermal Miniature Circuit Protection (TCP)

Thermal circuit protectors use heat-sensitive bimetallic elements that respond to overload electrical currents.

- **Thermal Miniature Circuit Protectors** are compact protectors designed to interrupt an electric current under overload conditions. The protector can accommodate ten nominal currents ranging from 0.10 A to 10 A.

After an overload has occurred, TCP breakers are easily reset by pushing the reset button. The breakers can be plugged into UK 6-FSI/C (screw) or ST 4-FSI/C (spring) terminal blocks for convenient DIN rail mounting.



Thermal Magnetic Circuit Breakers (TMC)

Thermal Magnetic circuit breakers interrupt an electrical current under overload or short-circuit conditions. They have both thermal circuit interruption and magnetic interruption functions. The thermal function uses heat-sensitive bimetallic elements that respond to overload currents. The magnetic function responds to very high current overloads such as those that might occur during short-circuit conditions.

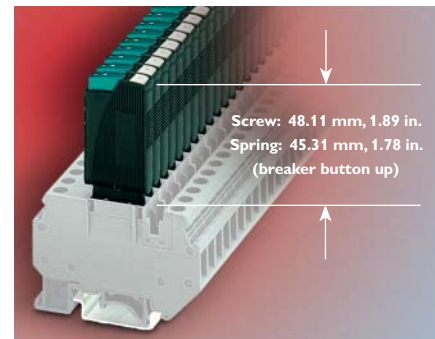
- **TMC 42** breakers are available in one- or two-pole configuration for currents ranging from 0.10 to 16 amps. TMC 42 breakers can be snapped directly on a DIN rail. They are reset by pushing a red reset button.
- **TMC 60** breakers are available in one-, two-, or three-pole configurations for currents ranging from 0.5 to 63 amps. TMC 60-Series breakers can be snapped directly on a DIN rail. They are reset by moving the toggle switch to the green (activation) position.
- **TMC 1** breakers are available in one-, two- or three-pole configurations for currents ranging from 0.1 to 32 amps. This high-density breaker has built-in auxiliary contacts. TMC 1 breakers can be snapped directly on a DIN rail. They are reset by moving the toggle switch to the I (activation) position.



Thermal (Miniature) Circuit Protectors (TCP)

TCPs are compact circuit protectors designed to interrupt an electric current under overload conditions. There are ten nominal current ratings available, ranging from 0.10 A to 10 A.

TCP protectors are trip-free and reset easily after a current interruption by pushing the reset button. The protector can be plugged into UK 6-FSI/C or ST 4-FSI/C fuse base terminal blocks for convenient DIN rail-mounting.



| | [V AC] | [V DC] |
|-----------------|--------|--------|
| Nominal Voltage | 250 | 72 |

| Technical Data | Type | Order No. | Pcs./Pkt. |
|--|---------------------|-----------|------------|
| Thermal Circuit Breaker | Nominal current [A] | | |
| plugged into UK 6-FSI/C or ST 4-FSI/C base terminal blocks | 0.10 | TCP 0.10 | 07 12 10 7 |
| | 0.25 | TCP 0.25 | 07 12 12 3 |
| | 0.50 | TCP 0.5 | 07 12 15 2 |
| | 1.00 | TCP 1 | 07 12 19 4 |
| | 2.00 | TCP 2 | 07 12 21 7 |
| | 3.00 | TCP 3 | 07 12 23 3 |
| | 4.00 | TCP 4 | 07 12 25 9 |
| | 6.00 | TCP 6 | 07 12 27 5 |
| | 8.00 | TCP 8 | 07 12 29 1 |
| | 10.00 | TCP 10 | 07 12 31 4 |

| | | | |
|--|--------------------------------------|------------|----|
| (1) Flat Zack strip, unprinted, 10-section for labeling the upper marker grooves | ZBF 5:WH: Unprinted | 08 08 64 2 | 10 |
|--|--------------------------------------|------------|----|

| Technical data in accordance with IEC/DIN VDE | | |
|---|-----------------|-----------|
| Nominal voltage | [V AC] / [V DC] | 250 / 72 |
| Nominal current | [A] | 0.10-10 |
| Ambient temperature | °C | -20...+60 |

| Interrupting capacity | | |
|------------------------------------|-----|---------------------|
| for nominal currents of 0.10 - 4 A | [A] | 6x rated current * |
| for nominal currents of 6 - 10 A | [A] | 8x rated current ** |
| for short circuit | | 2,000 Amps |

| Insulating material | | |
|---|-----------------------|-------------------|
| Polymide (PA), non-reinforced | | |
| Inflammability class in accordance with UL 94 | V0 | |
| Approval data (UL and c/UL) | [V AC] / [V DC] / [A] | 250 / 72 / 0.1-10 |

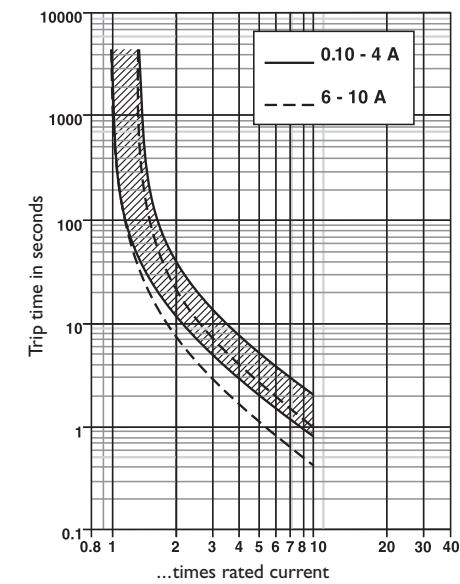
* If fault current exceeds 6 times I_n, TCP may require replacing.
** If fault current exceeds 8 times I_n, TCP may require replacing.

Thermal Miniature Circuit Breaker TCP compared to glass fuses

| TCP Feature | TCP | Glass Fuses |
|------------------------|---|---|
| Convenience | Reset with reset button when overload is resolved | Storing, ordering and locating issues |
| Deterioration | Virtually no aging | Age with eventual failure at normal loads |
| Life expectancy | 3,000 operations at current rating, 500 operations at 2x current rating | Unknown |
| Interruption detection | Visual identification | Status not determined until fuse is removed from its holder |
| ON / OFF capability | Switch duty actuator allows product to operate as an electrical switch | Not applicable |
| Hot-swappable | May be removed or replaced under load | Not applicable |
| Controlled trip | Avoids nuisance trips due to high in-rush currents | Not applicable |

Technical data for TCP

Time/current characteristic curve
Ambient temperature 23 C



Nominal currents and internal resistances

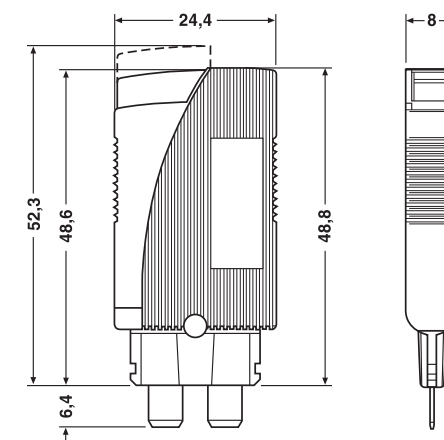
| Nominal current [A] | Internal resistance [W] |
|---------------------|-------------------------|
| 0.1 | 81 |
| 0.25 | 14 |
| .5 | 3.4 |
| 1 | 0.9 |
| 2 | 0.25 |
| 3 | 0.11 |
| 4 | 0.07 |
| 6 | ≤ 0.05 |
| 8 | ≤ 0.05 |
| 10 | ≤ 0.05 |

The time/current characteristic curve depends on the ambient temperatures. To avoid a premature or late switch-off, the nominal current of the circuit breaker must be multiplied with a temperature factor.

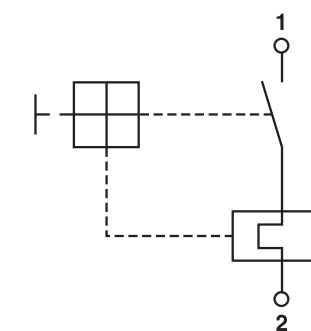
| | | | | | | | |
|---------------------------|-------------|-------------|-------------|----------|-------------|-------------|-------------|
| Ambient temperature °F | -4 | 14 | 32 | 73.4 | 104 | 122 | 140 |
| °C | -20 | -10 | 0 | 23 | 40 | 50 | 60 |
| Temperature factor | 0.76 | 0.84 | 0.92 | 1 | 1.08 | 1.16 | 1.24 |

NOTE: If the TCP circuit protectors are mounted side-by-side with less than the minimum of 1 mm of space for air movement, then do not exceed 80 percent of their rating.

Dimensional drawing



Switching diagram

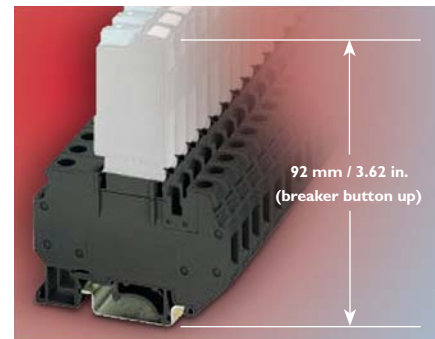


Thermal Miniature Circuit Protector Base

Base terminal block with screw connection for accommodating the TCP circuit breaker UK 6-FSI/C

| (IEC) | rigid | flexible | AWG | [A] | [V] |
|--------------------|----------|----------|--------|-----|------|
| [mm ²] | solid | stranded | 24 - 8 | * | 250* |
| Connection data | 0.2 - 10 | 0.2 - 6 | 24 - 8 | * | 250* |

*The current and voltage are determined by the thermal circuit breaker



| Technical Data | Type | Order No. | Pcs./Pkt. |
|--|---|--|------------|
| Fuse Terminal Block with universal foot for mounting on NS 32 or NS 35 DIN rails | UK 6-FSI/C | 31 18 20 3 | 50 |
| Fuse Terminal Block as shown above with light indicator | Light indicator / voltage [V DC] Current [mA] | | |
| | LED red / 12 2.0 | UK 6-FSI/C-LED 12 | 50 |
| | LED red / 24 2.0 | UK 6-FSI/C-LED 24 | 50 |
| (1) Fixed Bridge for cross connections in the terminal center, screw heads with insulating collar, 10-position, divisible, with 10 screws | FBI 10-8 $i_{max}:34 A$ | 02 03 26 3 | 50 |
| (2) Separating Plate for electrical separation of neighboring bridges, can be fitted later, no loss of pitch | TS-KK 3 | 27 70 21 5 | 100 |
| (3) Zack Strip, 10-section, white | ZB 8: UNPRINTED | 10 52 00 2 | 10 |
| (4) Screwdriver | SZS 1.0 x 4.0 | 12 05 06 6 | 10 |
| Dimensions | | | |
| Width / length | [mm / in.] | Width: 8.2 mm / 0.32 in.; Length: 64 mm / 2.52 in. | |
| Height (NS 35:7.5/NS 35:15/NS 32) | [mm / in.] | NS 35:7.5: 7.5 mm / 0.30 in.; NS 35:15: 15 mm / 0.60 in. | |
| Technical data in accordance with IEC/DIN VDE | | | |
| Fuse type ISO/DIS 8820/DIN 72-581-3 | - | C | |
| Maximum current with single arrangement ¹⁾ | [A] | 30 | |
| Maximum power dissipation | | | |
| Rated surge voltage / contamination class | [kV] / - | 4 / 3 | |
| Surge voltage category / insulation material group | - / - | III / I | |
| Connection capacity | | | |
| Stranded with ferrule without/with plastic sleeve [mm ² / in. ²] | Without: 0.25-6 mm ² / 0.00039-0.00930 in. ² ; With: 0.25-4 mm ² / 0.00039-0.00620 in. ² | | |
| Multi-conductor connection (2 cond. with same cross section) | | | |
| Solid / stranded | [mm ²] | Solid: 0.2-2.5; Stranded: 0.2-2.5 | |
| Stranded with ferrule without plastic sleeve | [mm ²] | 0.25 - 2.5 | |
| Stranded with TWIN ferrule with plastic sleeve | [mm ²] | 0.5 - 4 | |
| Stripping length | [mm] | 10 | |
| Internal cylindrical gauge (IEC 60 947-1) | | A5 | |
| Screw thread/torque | - / [Nm] / in. lbs | M 4 / 1.5-1.6 / M 4 / 13.3-14.2 | |
| Insulation material | | Polyamide (PA), non-reinforced | |
| Inflammability class in accordance with UL 94 | | V0 | |
| Approval data (UL and cUL) ²⁾ | UL: [V] / [A] / AWG | 300 / 30 / 26 - 8 | |
| Nom. voltage / nom. current / conduc. sizes | cUL: [V] / [A] / AWG | 300 / 30 / 26 - 8 | |

¹⁾ Special arrangement on request

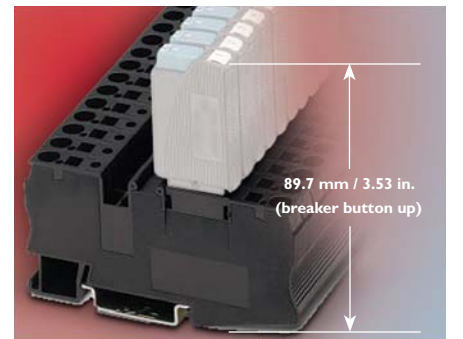
²⁾ File number E 140459

Thermal Miniature Circuit Protector Base

Base terminal block with spring-cage connection for accommodating the TCP circuit breaker ST 4-FSI/C

| (IEC) | rigid | flexible | AWG | [A] | [V] |
|--------------------|---------|----------|---------|-----|------|
| [mm ²] | solid | stranded | 24 - 10 | * | 400* |
| Connection data | 0.2 - 6 | 0.2 - 4 | 24 - 10 | * | 400* |

*The current and voltage are determined by the thermal circuit breaker



| Technical Data | Type | Order No. | Pcs./Pkt. |
|---|--|--|--|
| Fuse Terminal Block with universal foot for mounting on 35 DIN rail | ST 4-FSI / C | 30 36 37 2 | 50 |
| Fuse Terminal Block, ¹⁾ as shown above with light indicator | Light indicator / voltage [V DC] Current [mA] | | |
| | LED red / 12 2.0 | ST 4-FSI / C-LED12 | 50 |
| | LED red / 24 2.0 | ST 4-FSI / C-LED 24 | 50 |
| (1) Insulating stop sleeve , prevents unintentional clamping of the insulation in the case of smaller cross sections | | | |
| Cross section range | 0.25-0.5 mm ² / 0.0039-0.0077 in. ² 0.75-1 mm ² / 0.00116-0.00155 in. ² | Gray ISH 4 / 0.5 Black ISH 4 / 1 | 30 02 88 5 30 02 89 8 |
| (2) Plug-in bridge , for cross connections in the terminal center | | | |
| | 2-position $i_{max}:41 A$ | FBS 2-8 | 30 30 28 4 |
| | 3-position | FBS 3-8 | 30 30 29 7 |
| | 4-position | FBS 4-8 | 30 30 30 7 |
| | 5-position | FBS 5-8 | 30 30 31 0 |
| | 10-position | FBS 10-8 | 30 30 32 3 |
| (3) Test adapter , for 4 mm Ø test adapter PS and 4 mm safety test plugs, making contact in the bridge shaft | | PAI 4 | 30 30 92 5 |
| (4) 2.3 mm Ø test plus ²⁾ , consisting of a metal part and a red insulating sleeve | | MPS-RD | 02 01 55 3 |
| (5) Modular test plug , can be labeled with ZBFM 8 | | PS 8 | 30 31 00 5 |
| (6) Zack marker sheet , flat, 50-section, for labeling in the outer marker grooves | | ZBFM 8/WH: UNPRINTED | 08 00 73 4 |
| (7) Zack strip , 10-section, for labeling in the terminal center | | ZB 8: UNPRINTED | 10 52 00 2 |
| (8) Screwdriver , for actuating the spring cage | | SZF 1 - 0.6x3.5 | 12 04 51 7 |
| Dimensions | | | |
| Width / length | [mm / in.] | Width 8.2 mm / 0.32 in. / Length 86.5 mm / 3.4 in. | |
| Height (NS 35:7.5/NS 35:15) | [mm / in.] | 7.5 mm / 0.30 in. / 15 mm / 0.60 in. | |
| Technical data in accordance with IEC/DIN VDE | | | |
| Fuse type ISO/DIS 8820/DIN 72 581-3 | - | C | |
| Maximum current with single arrangement | [A] | 30 | |
| Maximum power dissipation | | | |
| Rated surge voltage / contamination class | [kV] / - | 6 / 3 | |
| Surge voltage category / insulation material group | - / - | III / I | |
| Connection capacity | | | |
| Stranded with ferrule without / with plastic sleeve | [mm ²] / AWG | 0.25-4 mm ² / 24-12 | |
| Stranded with TWIN ferrule with plastic sleeve | [mm ²] / AWG | 0.5-1 mm ² / 20-18 | |
| Stripping length | [mm / in.] | 10 / 0.39 | |
| Internal cylindrical gauge (IEC 60 947-1) | | A4 | |
| Insulation material | | | |
| Inflammability class in accordance with UL 94 | | Polyamide (PA), non-reinforced | |
| Approval data (UL and cUL) | UL: [V] / [A] / AWG | 300 / 30 / 24 - 10 | |
| Nominal voltage/nominal current/conduc. sizes | cUL: [V] / [A] / AWG | 300 / 30 / 24 - 10 | |

¹⁾ If the fuse is defective, the downstream circuit is not off-load

²⁾ Additional colors are available on request

Thermal Magnetic Circuit Breaker

TMC 42-01/42-02

One- and two-pole thermal magnetic circuit breaker with tease-free, trip-free, snap action mechanism and two-button operation (M-type TMCBE to IEC 934). The one-pole features a narrow profile housing, recessed terminals, standard DIN rail-mounting and precision CBE performance.

Typical Applications

Circuit protection for process control systems, equipment manufacturers and instrumentation.

Approvals

| Authority | Voltage Ratings | Current Ratings |
|--------------|-----------------|-----------------|
| VDE, Demko | AC 250V, DC 65V | 0.10 to 16 A |
| UL 1077, CSA | AC 250V, DC 80V | 0.10 to 16 A |

Label Slot



Technical Data

| | | |
|--|--|------------------|
| Maximum Voltage Rating | 250V AC, 50 / 60 Hz; 80V DC | |
| Current Rating Range | 42-01 : 0.10...16 A | |
| Typical Life | 5,000 operations at 2 x I _n | |
| Temperature Range | 0° to 55° C (32° to 131° F) | |
| Creepage Resistance | PTI 600 to IEC 112 | |
| Insulation Coordination (IEC 664 and 664A) | Rated Impulse Withstand Voltage | Pollution Degree |
| Operating Area | 4k V | 3 |
| Dielectric Strength (IEC 664 and 664A) | Test Voltage | |
| Operating Area | AC 4,000V (double insulation) | |
| Insulation Resistance | >100 MΩ (DC 500V) | |
| Interrupting Capacity (VDE 0660, Part 101, P-2) | 0.05 to 0.8 A | Self Limiting |
| | 1 to 2 A | 200 A |
| | 2.5 to 16 A | 400 A |
| Interrupting Capacity (UL 1077/EN60934 PC1) | I _N | U _N |
| | 0.05 to 16 A | 250V AC |
| | 0.05 to 16 A | 80V DC |
| | | 1,000 A |
| | | 1,000 A |

Environmental Protection (IEC 529/DIN 40050)

Operating Area IP 40, Terminal Area IP 20
Vibration 5g (57-50 Hz), +0.38 mm (10-57 Hz) to IEC 68-2-6, Test Fc 10 frequency cycles/axis

Shock 25g (11ms) to IEC 68-2-27, Test Ea

Corrosion 96 hours at 5% saltspray to IEC 68-2-11, Test Ka

Humidity 240 hours at 95% RH to IEC 68-2-3, Test Ca

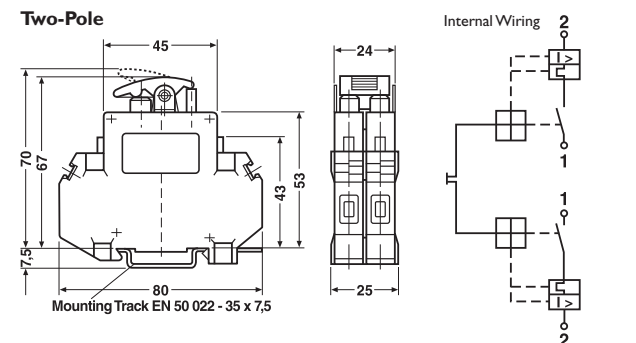
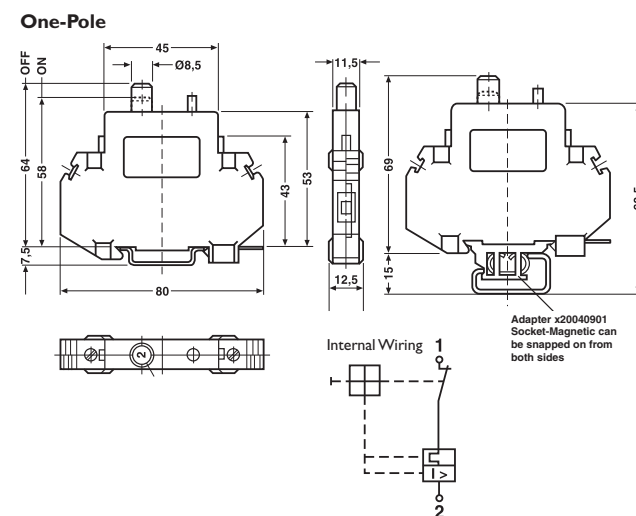
Weight Approx. 60g

Conductor Size 0.5-6mm² (AWG 20-AWG 10)

Recommended Torque 0.8 Nm max

Mounting Adapter 5650505 (TMC 42 C-Rail Adapter)

Dimension

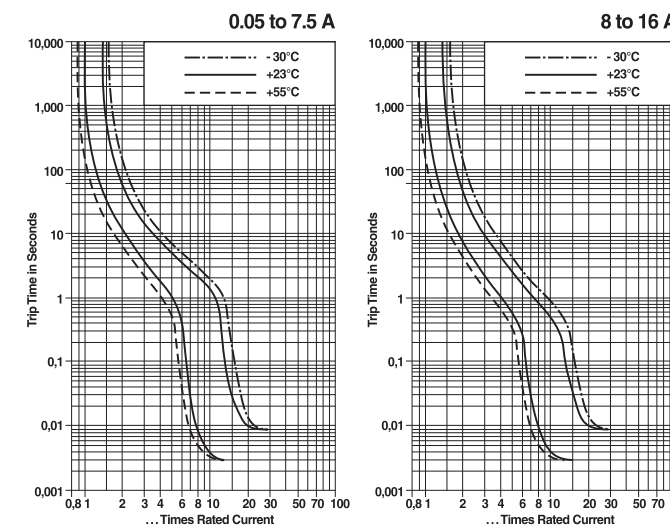


Standard current ratings and typical internal resistance values

| Thermal Magnetic Circuit Breakers | | | | | |
|-----------------------------------|----------------|-----------------------|----------------|-----------------------|----------------|
| Ohms | Current Rating | TMC 42-01 One-Pole | | TMC 42-02 Two-Pole | |
| | | Type | Part# | Type | Part # |
| 447.00 | 0.05 | TMC42-01-0.05 A | 5600509* | N/A | N/A |
| 131.00 | 0.10 | TMC42-01-0.1 A | 5530915 | TMC42-02-0.1 A | 5650123* |
| 40.00 | 0.20 | TMC42-01-0.2 A | 5650102* | TMC42-02-0.2 A | 5650124* |
| 19.30 | 0.30 | TMC42-01-0.3 A | 5650103* | TMC42-02-0.3 A | 5650127* |
| 10.40 | 0.40 | TMC42-01-0.4 A | 5530944 | TMC42-02-0.4 A | 5531244* |
| 7.10 | 0.50 | TMC42-01-0.5 A | 5650106* | TMC42-02-0.5 A | 5531257* |
| 4.30 | 0.60 | TMC42-01-0.6 A | 5530960* | TMC42-02-0.6 A | 5531260* |
| 3.30 | 0.70 | N/A | N/A | TMC42-02-0.7 A | 5650128* |
| 2.50 | 0.80 | TMC42-01-0.8 A | 5530986* | TMC42-02-0.8 A | 5531286* |
| 1.67 | 1.00 | TMC42-01-1.0 A | 5650108 | TMC42-02-1.0 A | 5531299 |
| 1.22 | 1.22 | TMC42-01-1.2 A | 5531008* | TMC42-02-1.2 A | 5531309* |
| 0.61 | 1.50 | TMC42-01-1.5 A | 5650109 | TMC42-02-1.5 A | 5650129* |
| 0.55 | 1.80 | TMC42-01-1.8 A | 5650110* | TMC42-02-1.8 A | 5531325* |
| 0.38 | 2.00 | TMC42-01-2.0 A | 5600314 | TMC42-02-2.0 A | 5531338 |
| 0.24 | 2.50 | TMC42-01-2.5 A | 5650113* | TMC42-02-2.5 A | 5650130* |
| 0.19 | 3.00 | TMC42-01-3.0 A | 5650114 | TMC42-02-3.0 A | 5650131 |
| 0.16 | 3.50 | TMC42-01-3.5 A | 5531053* | TMC42-02-3.5 A | 5531367* |
| 0.09 | 4.00 | TMC42-01-4.0 A | 5531066 | TMC42-02-4.0 A | 5650134* |
| 0.09 | 4.50 | TMC42-01-4.5 A | 5650115* | TMC42-02-4.5 A | 5650135* |
| 0.06 | 5.00 | TMC42-01-5.0 A | 5531082 | TMC42-02-5.0 A | 5651396 |
| 0.07 | 5.50 | TMC42-01-5.5 A | 5531095* | TMC42-02-5.5 A | 5531406* |
| 0.04 | 6.00 | TMC42-01-6.0 A | 5531105 | TMC42-02-6.0 A | 5650136* |
| 0.04 | 6.50 | TMC42-01-6.5 A | 5650116* | TMC42-02-6.5 A | 5650137* |
| 0.03 | 7.00 | TMC42-01-7.0 A | 5650117* | TMC42-02-7.0 A | 5531435* |
| 0.02 | 8.00 | TMC42-01-8.0 A | 5650120 | TMC42-02-8.0 A | 5650138* |
| 0.02 | 9.00 | TMC42-01-9.0 A | 5531147* | TMC42-02-9.0 A | 5531451* |
| <0.02 | 10.00 | TMC42-01-10 A | 5650121 | TMC42-02-10 A | 5531464 |
| <0.02 | 11.00 | TMC42-01-11 A | 5531163* | TMC42-02-11 A | 5531477* |
| <0.02 | 12.00 | TMC42-01-12 A | 5650122* | TMC42-02-12 A | 5650141* |
| <0.02 | 13.00 | TMC42-01-13 A | 5531189* | TMC42-02-13 A | 5531493* |
| <0.02 | 14.00 | TMC42-01-14 A | 5531192* | TMC42-02-14 A | 5531503* |
| <0.02 | 15.00 | TMC42-01-15 A | 5600310 | TMC42-02-15 A | 5600309 |
| <0.02 | 16.00 | TMC42-01-16 A | 5531202 | TMC42-02-16 A | 5650142* |

* Indicates breakers that are made-to-order and may require an 8 to 10 week lead time.

Typical time / current characteristics at 23 degrees Celsius



Direct Current – Magnetic tripping currents are increased by 30 percent in DC circuits with the effect of shifting the magnetic trip range 30 percent to the right of AC trip curves.

The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, multiply the circuit breaker current ratings by the derating factor shown below.

| Ambient temperature | °F | -22 | -4 | 14 | 32 | 73.4 | 104 | 122 | 140 |
|------------------------|----|-------------|-------------|-------------|-------------|----------|-------------|-------------|-------------|
| | °C | -30 | -20 | -10 | 0 | 23 | 40 | 50 | 60 |
| Derating factor | | 0.76 | 0.79 | 0.83 | 0.88 | 1 | 1.08 | 1.16 | 1.24 |

Thermal Magnetic Circuit Breakers - UL 1077

TMC 60 Series for mounting on 35 mm DIN rail

Overview

The TMC 60 Series provides supplemental overload and short-circuit protection. An interrupt capacity of 10 kAIC at 480 / 277V AC and DC ratings make the series ideal for a wide range of applications.

These DIN rail-mountable circuit breakers are available in one-, two- and three-pole configurations. An auxiliary contact in S- or H-function status output is also available. The TMC 60 Series is UL recognized, CSA approved and carries the CE mark.

Typical Application

Circuit protection for power supplies, UPS, controller I/O points, relay/contactors coils, control circuits, appliances and motor circuits.



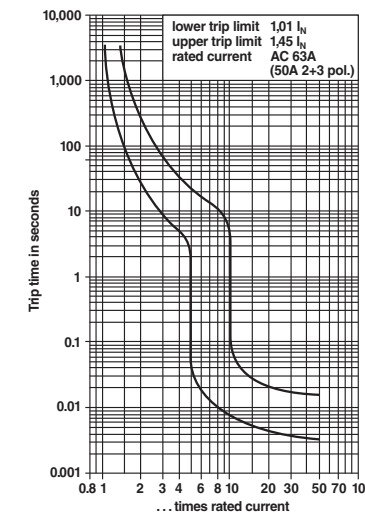
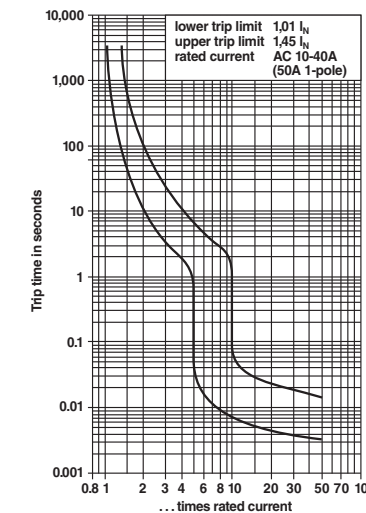
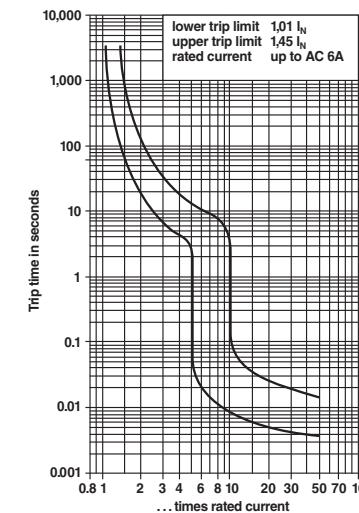
Technical Data

| | | | |
|---|---|----------------------------------|-----------------------------------|
| Maximum Voltage Rating | AC 277 / 480 V | Vibration | 3 g (10 to 55 Hz) to IEC 68-2-6 |
| Interrupting Capacity | 10,000 Amps | Trip Characteristics | C: 0.5-63A |
| Current Rating Range | 0.05 A to 63 A | Torque | 4.5 Nm / 39.8 lb _f -in |
| Temperature Range | | Vibration (per IEC 60077) | 3 g (in x, y, z direction) |
| Operating Temperature | -25° to +55°C (-13° to +131°F) | Plastics Rating per UL 94 | V0 |
| Storage Temperature | -55° to +55°C (-67° to +131°F) | Protection Level | IP 20 |
| Insulation Values (IEC 664 and 664A) | Rated Impulse Withstand Voltage | Configuration | 1 pole 2 pole 3 pole |
| Operating Area | 6.0 kV | Weight | 125 g 250 g 375 g |
| Insulation Resistance | >100 MΩ (DC 500V) | | |
| Life at Rated Current Mechanical | 6,000 operations (UL tested) 10,000 operations | | |
| Cable Size | max 35 mm ² / AWG 2 (LINE) max 25 mm ² / AWG 3 (LOAD) max 2.5 mm ² / AWG 12 (auxiliary circuits) | | |
| | Minimum 1 mm ² or AWG 16 for all circuits. Use a ferrule with wire sizes smaller than 16 AWG. | | |

Standard current ratings and typical internal resistance values

| One-pole | | Two-pole | | Three-pole | |
|-------------|--------------|-------------|--------------|-------------|--------------|
| Part Number | Description | Part Number | Description | Part Number | Description |
| 0902014 | TMC 61C 0,5A | 0902166 | TMC 62C 0,5A | 0902315 | TMC 63C 0,5A |
| 0902027 | TMC 61C 01A | 0902179 | TMC 62C 01A | 0902328 | TMC 63C 01A |
| 0902030 | TMC 61C 02A | 0902182 | TMC 62C 02A | 0902331 | TMC 63C 02A |
| 0902043 | TMC 61C 03A | 0902195 | TMC 62C 03A | 0902344 | TMC 63C 03A |
| 0902056 | TMC 61C 04A | 0902205 | TMC 62C 04A | 0902357 | TMC 63C 04A |
| 0902069 | TMC 61C 06A | 0902218 | TMC 62C 06A | 0902360 | TMC 63C 06A |
| 0902072 | TMC 61C 10A | 0902221 | TMC 62C 10A | 0902373 | TMC 63C 10A |
| 0902085 | TMC 61C 13A | 0902234 | TMC 62C 13A | 0902386 | TMC 63C 13A |
| 0902098 | TMC 61C 16A | 0902247 | TMC 62C 16A | 0902399 | TMC 63C 16A |
| 0902108 | TMC 61C 20A | 0902250 | TMC 62C 20A | 0902409 | TMC 63C 20A |
| 0902111 | TMC 61C 25A | 0902263 | TMC 62C 25A | 0902412 | TMC 63C 25A |
| 0902124 | TMC 61C 32A | 0902276 | TMC 62C 32A | 0902425 | TMC 63C 32A |
| 0902137 | TMC 61C 40A | 0902289 | TMC 62C 40A | 0902438 | TMC 63C 40A |
| 0902140 | TMC 61C 50A | 0902292 | TMC 62C 50A | 0902441 | TMC 63C 50A |
| 0902153 | TMC 61C 63A | 0902302 | TMC 62C 63A | 0902454 | TMC 63C 63A |

Typical time/current characteristics at 23 degrees Celsius



Direct Current - Magnetic tripping currents are increased by 30 percent in DC circuits with the effect of shifting the magnetic trip range 30 percent to the right of Alternating Current (AC) trip curves.

(multipole types: all poles symmetrically loaded)

The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, multiply the circuit breaker current ratings by the derating factor shown at right.

| Amps | Temperature | | | | | | | | | | | | | | |
|-----------|-------------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| | -20°C | -15° | -10° | -5° | 0° | +5° | +10° | +15° | +20° | +25° | +30° | +35° | +40° | +45° | +50° |
| | -4°F | +5° | +14° | +23° | +32° | +41° | +50° | +59° | +68° | +77° | +86° | +95° | +104° | +113° | +122° |
| 0.5 - 4.0 | 0.84 | 0.85 | 0.87 | 0.88 | 0.89 | 0.91 | 0.93 | 0.94 | 0.96 | 0.98 | 1.00 | 1.02 | 1.04 | 1.06 | 1.09 |
| 8.0 - 10 | 0.75 | 0.77 | 0.78 | 0.81 | 0.83 | 0.85 | 0.88 | 0.90 | 0.93 | 0.96 | 1.00 | 1.04 | 1.09 | 1.14 | 1.20 |
| 13 - 40 | 0.79 | 0.80 | 0.82 | 0.84 | 0.86 | 0.88 | 0.90 | 0.93 | 0.94 | 0.97 | 1.00 | 1.03 | 1.06 | 1.11 | 1.15 |
| 50-60 | 0.81 | 0.83 | 0.84 | 0.85 | 0.87 | 0.89 | 0.91 | 0.93 | 0.94 | 0.97 | 1.00 | 1.02 | 1.05 | 1.09 | 1.12 |

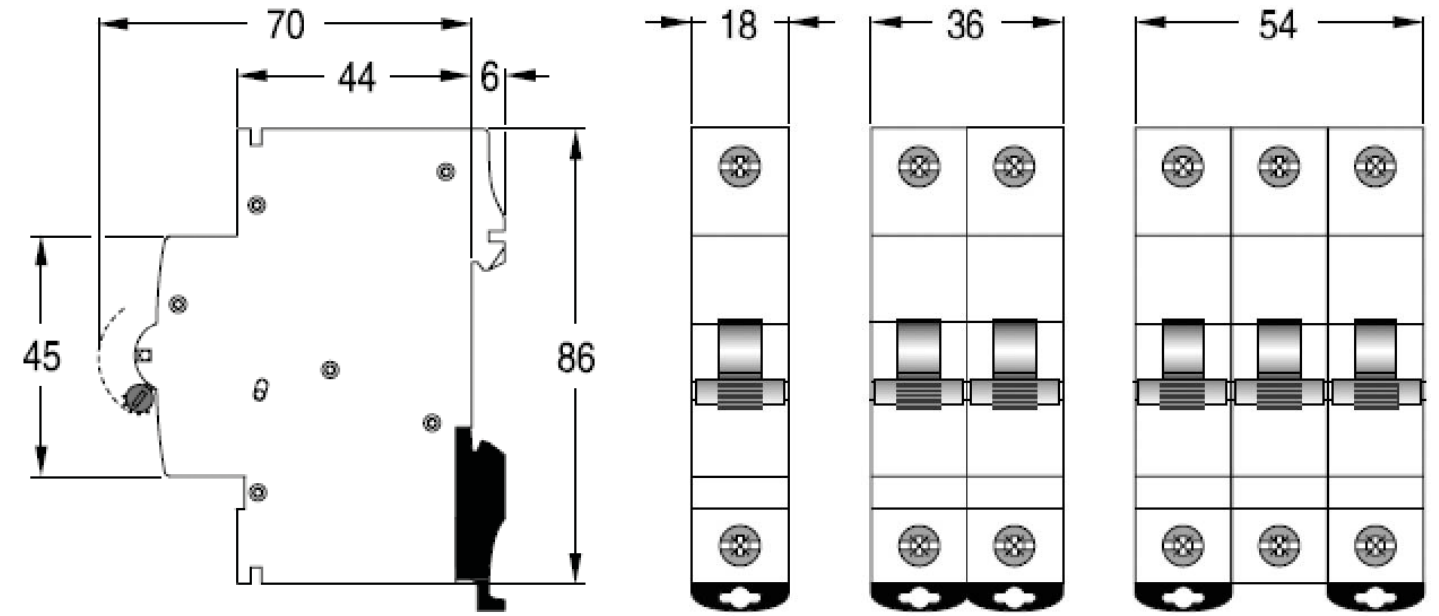
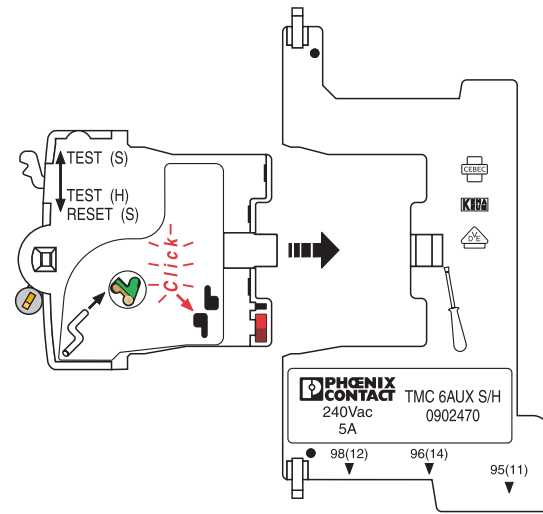
Thermal Magnetic Circuit Breakers - UL 1077

TMC 60 Series Accessories

Technical Data

| Auxiliary Contact | | |
|--------------------|------------------------------|------------------|
| Ratings | Voltage / Current | AC 240 V / 5 A |
| | | DC 24 V / 4 A |
| | | DC 60 V / 1 A |
| | | DC 220 V / 0.4 A |
| Contacts | 1 Form C | |
| Rated Wire Sizes | 2.5 mm ² / 14 AWG | |
| Weight | 70 g | |
| Contact Functions* | Auxiliary (H) or Signal (S) | |

*The TMC 6AUX S / H can operate as either an auxiliary contact (H function) or a signal contact (S function). The operation of the auxiliary switch is determined at the time of installation. The operation of the auxiliary switch is determined at the time of installation. The signal contact (function S) status provides the automatic trip status of the protection device. The auxiliary (H function) provides the OPEN/ CLOSED status of the protective device. A test button on the front of the auxiliary switch simulates functions S or H. The test button also acts as a reset for the trip signal (function S) contacts.



Dimensions

Note: all measurements in millimeters

Accessories



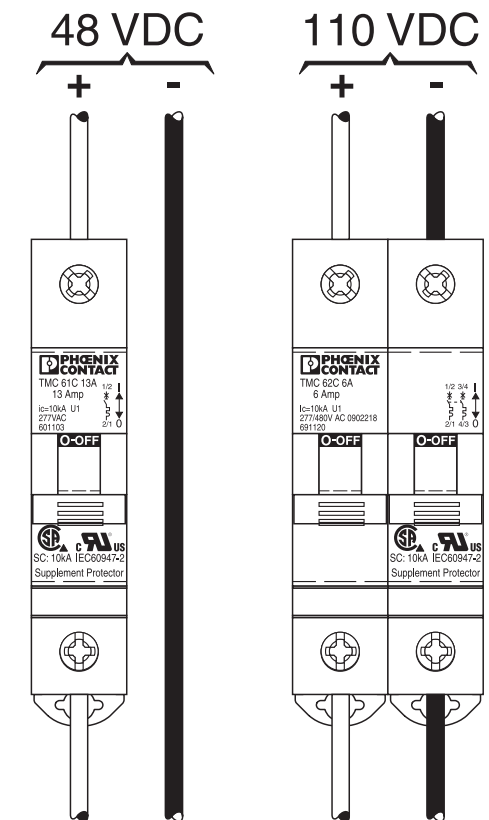
| Auxiliary Contact | Lock Out Component | 3-Phase Comb Bridge | Single Row Comb Bridge |
|---------------------------|-------------------------|----------------------------------|---------------------------------------|
| 0902470 TMC 6AUX S / H | 0902467 TMC 6LOCKOUT | 2809241* 3-Phase / 6 position | 2809212* Single Phase / 3 position |

* Available in up to 57 positions



| Marking | End Covers |
|--|-------------------------------------|
| 2809128 ZBN 18: UNBEDRUCKT quantity: 10 pieces | 2809322 3-Phase bridge end cover |

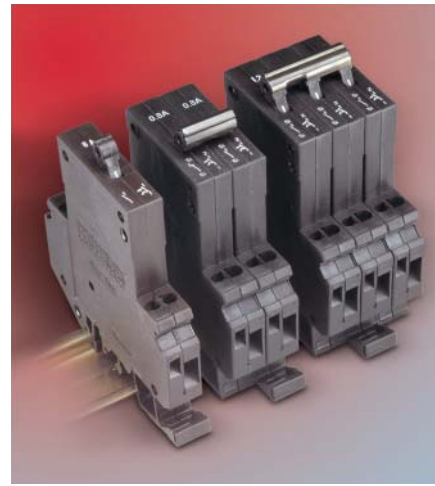
DC Circuit Wiring



Thermal Magnetic Circuit Breaker (TMC)

TMC 1/2/3

One-, two- and three-pole thermal magnetic circuit breakers with trip-free, snap action mechanism and toggle actuation (S-type: IEC 934). Breaker has a universal mounting foot so it can be snapped on both NS 35 and NS 32 mounting rail profiles. Available with auxiliary contact (1 x N / O or 1 x N / C) for status signaling. Two- and three-pole models are internally linked to ensure that all poles trip in the event of an overload on one pole, even if the actuator is held in the ON position. This circuit breaker can be supplied in current ratings to 32 A with a choice of characteristic curves. All screw terminals are recessed for safety.

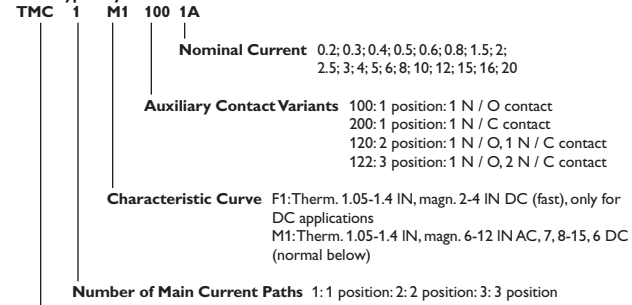


| Technical Data | |
|--|--|
| Maximum Voltage Rating | AC 277V; 3 AC 480 V (50/60 Hz) DC 65 V |
| Current Rating Range | 0.1...32 A non-inductive |
| Auxiliary Circuit | 1 A, AC 277V / DC 65V |
| Typical Life | 10,000 operations at 1 x I _N |
| Temperature Range | 0° to +55°C (+32° to +131°F) |
| Creepage Resistance | PTI 400 to IEC 112 |
| Insulation Coordination | |
| (IEC 664 and 664A) | Rated Impulse Withstand Voltage Pollution Degree |
| Operating Area | 2.5 k V 2 |
| Main/Auxiliary Circuit | 2.5 k V 2 |
| Pole/Pole | 2.5 k V 2 |
| Dielectric Strength (IEC 664 and 664A) | |
| | Test Voltage |
| Operating Area | AC 3,000 V (double insulation) |
| Main / Auxiliary Circuit | AC 3,000 V |
| Pole / Pole | AC 1,500 V |
| Insulation Resistance | >100 MΩ (DC 500 V) |
| Interrupting Capacity (VDE 0660, Part 101, P-2) (AC 250/415 V, DC 65 V) | 0.1...5 A 400 A; 6...32 A 800 A Curve T2; 0.1...32 A 15 I _N Curve M3; 0.1...2 A 200 A AC |
| Interrupting Capacity (UL 1077/EN 60934 PC 1) | I _N U _N Self Limiting |
| | 0.1...16 A AC 277V 5,000 A |
| | 20...32 A AC 277V 2,000 A |
| | 0.1...16 A 3 AC 480 V 5,000 A |
| | 20...32 A 3 AC 480 V 2,000 A |
| | 0.1...32 A DC 65 V 2,000 A |
| Environmental Protection (IEC 529/DIN 40050) | |
| Vibration | Operating Area IP 30 Terminal Area IP 20 |
| | Curve F1: 3g (57-500 Hz) ±0.23 mm (10-57 Hz) Curves M1, M3, T1, T2: 5g (57-500 Hz ±0.38 mm (10-57 Hz) to IEC 68-2-6, Test FC 10 Frequency Cycles/Axis |
| Shock | |
| | Curve F1: 25g (11 ms), directions 1-5 10g (11 ms), direction 6 |
| | Curves M1, M3, T1, T2 25g (11 ms), directions 1-5 20g (11 ms), direction 6 to IEC 68-2-27, Test Ea |
| Corrosion | 96 hours at 5% saltspray to IEC 68-2-11, Test Ka |
| Humidity | 240 hours at 95% RH to IEC 68-2-3, Test Ca |
| Weight | Approximately 60g per Pole |

Typical Applications

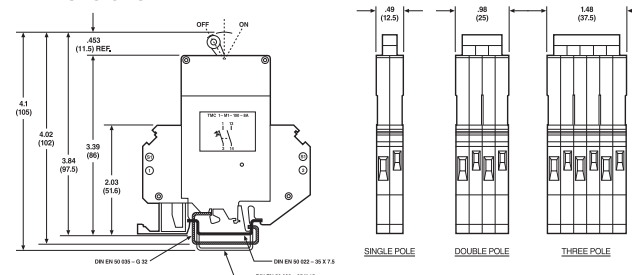
Process control equipment, robotics, machine tool control, communications systems, instrumentation.

TMC Type Key for Orders

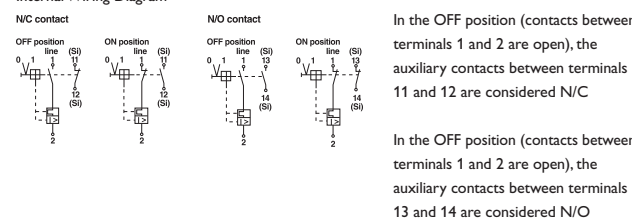


Type Designation Thermal Magnetic Circuit Breaker

Dimensions



Internal Wiring Diagram



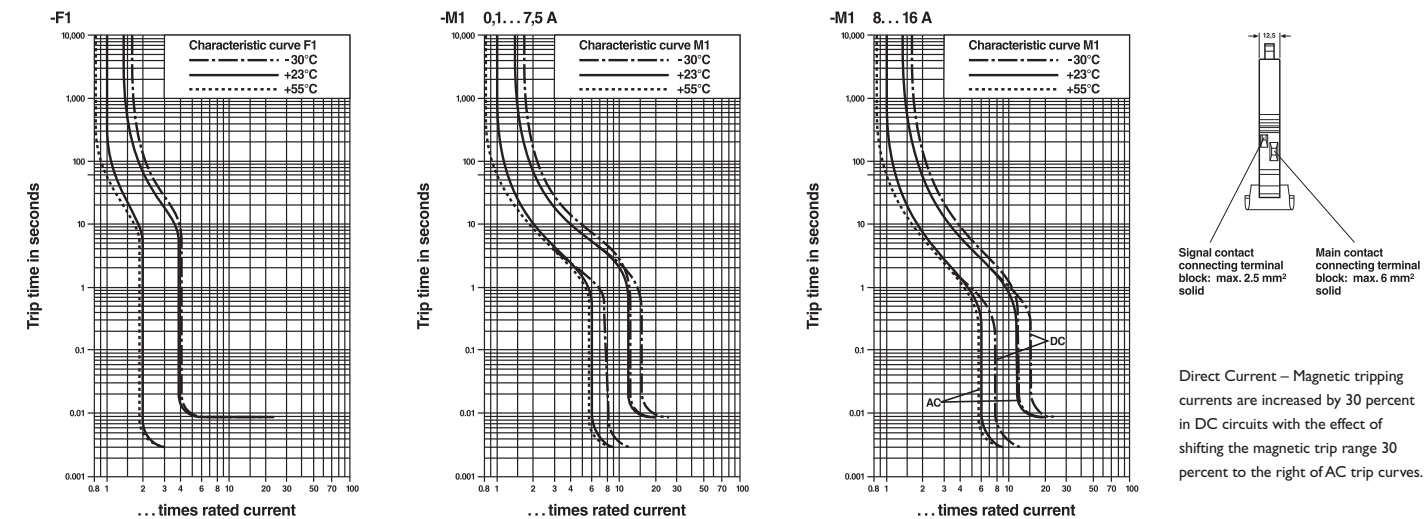
Standard current ratings and typical internal resistance values

| Thermal Magnetic Circuit Breakers | | | | | | | |
|-------------------------------------|------------------------|--------------------------------|--------------------------------|------------------------------|------------------------------|--------------------------------|--------------------------------------|
| Internal Resistance per Pole (ohms) | Current Ratings (amps) | TMC 1 M1 100 | TMC 1 M1 200 | TMC 1 F1 100 | TMC 1 F1 200 | TMC 2 M1 120 | TMC 3 M1 122 |
| | | One-Pole N/O Aux.Con.** Part # | One-Pole N/C Aux.Con.** Part # | One-Pole N/O Aux.Con. Part # | One-Pole N/C Aux.Con. Part # | Two-Pole NO/NC Aux.Con. Part # | Three-Pole 1N/O 2N/C Aux.Con. Part # |
| 92 | 0.1 | 5650299* | 5650418* | N/A | N/A | 5650425* | 5650467* |
| 26.1 | 0.2 | 5531422 | 5531040* | 5650525* | 5531231 | 5650426* | 5650470* |
| 11.6 | 0.3 | 5650267* | 5650416* | 5650526* | N/A | 5650427* | 5650471* |
| 6.6 | 0.4 | 5650411* | 5650417* | 5650527* | N/A | 5650428* | 5650472* |
| 4.1 | 0.5 | 5531370 | 5531752* | 5650528 | 5651057 | 5650429* | 5650473* |
| 3 | 0.6 | 5650412* | 5650419* | 5531817* | N/A | 5650430* | 5650435* |
| 1.65 | 0.8 | 5531273 | 5650420* | 5650529* | N/A | 5650431* | 5650436* |
| 1.1 | 1.0 | 5531723 | 5531341* | 5531914 | 5531532 | 5650254 | 5532997 |
| 0.47 | 1.5 | 5531176* | 5531558 | 5650530* | 5650282* | 5650385* | 5650437* |
| 0.28 | 2.0 | 5531820 | 5531448* | 5530928 | 5650352* | 5517967* | 5650438* |
| 0.183 | 2.5 | 5531079* | 5650421* | 5650531* | N/A | 5650432 | 5650439* |
| 0.124 | 3.0 | 5531927 | 5531545* | 5531024 | 5602531* | 5650255 | 5650440* |
| 0.077 | 4.0 | 5530973 | 5531354* | 5531875 | 5650829* | 5650266 | 5650441* |
| 0.063 | 5.0 | 5530931 | 5531642 | 5531121 | 5650830* | 5512014 | 5650384 |
| 0.045 | 6.0 | 5531969 | 5600358* | 5650532* | 5650366* | 5530863 | 5650442* |
| <0.02 | 7.0 | N/A | N/A | N/A | N/A | 5650574 | N/A |
| <0.02 | 8.0 | 5531037 | 5531749* | 5531228* | 5650831 | 5517954 | 5650443* |
| <0.02 | 10 | 5531862 | 5530957 | 5650533 | 5650283* | 5511170 | 5650354 |
| <0.02 | 12 | 5531134 | 5531846* | 5650534* | 5602532* | 5650433* | 5518979 |
| <0.02 | 15 | 5510757 | 5650475* | N/A | N/A | 5600432 | 5650353 |
| <0.02 | 16 | 5531765 | 5531943* | 5531574 | 5651032* | 5530892 | 5530876 |
| <0.02 | 20 | 5650413* | 5650422* | N/A | N/A | 5650308 | 5650445 |
| <0.02 | 25 | 5650414* | 5650423* | N/A | N/A | 5650476* | 5650446* |
| <0.02 | 32 | 5650415* | 5650424* | N/A | N/A | 5650434 | 5650447 |

* Indicates breakers that are made-to-order and may require an 8- to 10-week lead time.

** N/O = Normally Open, N/C = Normally Closed

Typical time/current characteristics at 23 degrees Celsius



The time / current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, multiply the circuit breaker current ratings by the derating factor shown below.

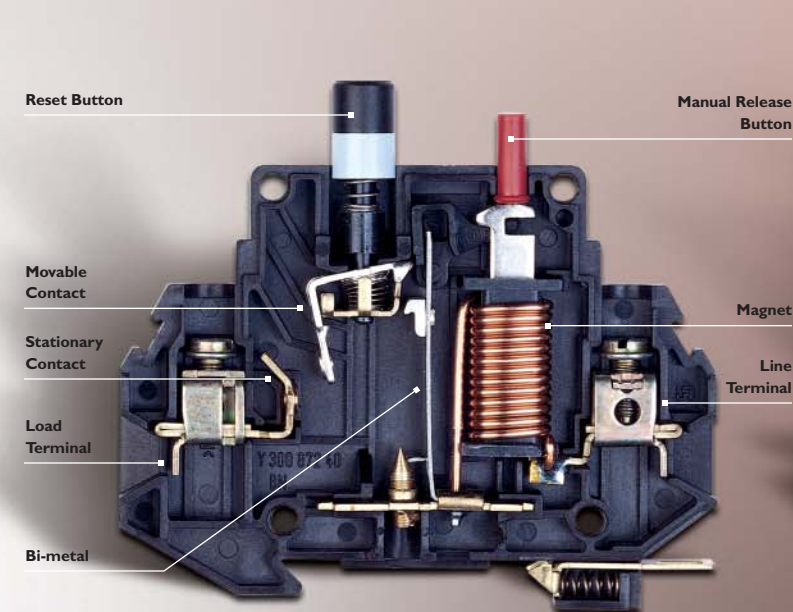
| Ambient temperature | °F | -22 | -4 | 14 | 32 | 50 | 73.5 | 86 | 104 | 122 | 140 |
|------------------------------|----|------|------|------|------|------|------|------|------|------|------|
| | °C | -30 | -20 | -10 | 0 | 10 | 23 | 30 | 40 | 50 | 60 |
| Multiplication factor | | 0.76 | 0.79 | 0.83 | 0.88 | 0.93 | 1 | 1.04 | 1.11 | 1.19 | 1.29 |

Circuit Protector Comparison Sheet

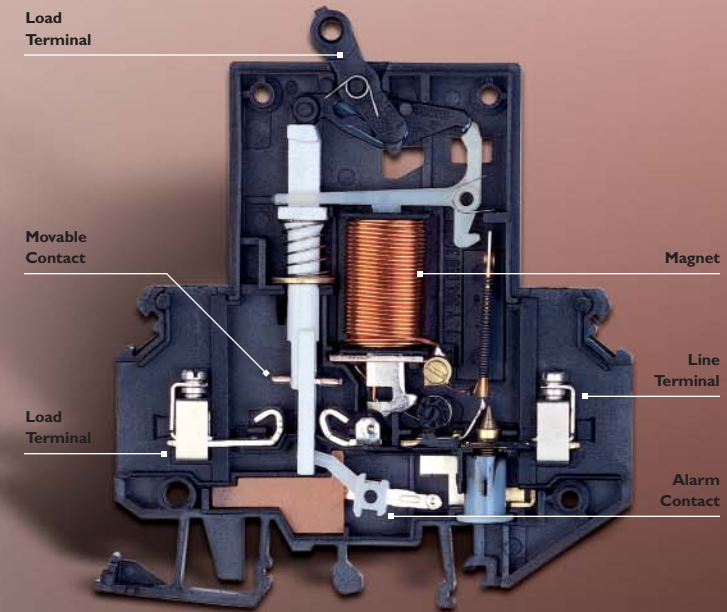
| Protector | Type (1) | Breaker Construction | Mechanism | Poles | Amps | UL Voltage | Interrupting Capacity (2) (3) | Maximum Interrupting Capacity (4) | Trip Speed (5) | AWG | Overall Size (mm) HxDxW | Auxiliary Contacts (6) | Trip Free (7) | Tease Free (8) | Bus Connection Available (9) | Characteristics |
|--|---------------------|--|-------------|-------------|--------|--------------------------|---|--|---|--|--|------------------------|---------------|----------------|--|---|
| TMC 42 1 2 | Thermal Magnetic | Single Body | Push Button | 1, 2 | 0.1-16 | AC 250 | Self-Limiting (0.1-8 A) | 200A @ AC 250V (0.05-4.5A) | Medium [similar to C-type breaker] | 20-8 Sol. 20-10 Str. | 70 x 80 x 12 | None | Yes | Yes | Yes | General Purpose, High Density Pkg. |
| | | | | | | AC 250 | 200 A (1-2 A) | 1,000A @ AC 250 / 125 (0.05-16A) | | | | | | | | |
| | | | | | | DC 80 | 400 A (2.5-16 A) | 1,000 @ DC 80V (0.05-16A) | | | | | | | | |
| TMC 1 2 3 | Thermal Magnetic | Single Body | Toggle | 1, 2, 3 | 0.1-32 | AC 277 | 400 A (0.1-5 A) | 5,000A @ AC 277 / 480V (0.1-16A) | Delayed [similar to D-type breaker] Medium [similar to C-type breaker] Fast [similar to B-type breaker] | Main – Up to 10 Sol. Aux. – Up to 16 Sol. | 90 x 80 x 12 | 1 N/O or N/C | Yes | Yes | Yes | Trip Speed Options, Aux. Contacts |
| | | | | | | 3 AC 480 | 800 A (6-32 A) | 2,000A @ AC 277 / 480V (20-32A) | | | | 2 N/O, N/C | | | | |
| | | | | | | DC 65 | | 2,000A @ DC 65V | | | | 3 N/O, 2 N/C | | | | |
| TMC 61 TMC 62 TMC63 | Thermal Magnetic | Single Body | Toggle | 1 2 3 | 0.5-63 | AC 277/480 (0.5-63 A) | 10,000 A | 10,000A @ AC 277 / 480V (0.5-63A) 6,000A @ DC 48V | Medium [C-type breaker] | Line to 2 Load to 3 | 70 x 95 x 18 | Available | Yes | No | Yes | Low to High AC Amperage |
| TCP Plugs into UK6-FSI/C Screw or ST 4-FSI/C Spring Blk. | Thermal | Two Piece: TCP Plugs in Terminal Blocks | Push Button | 1 | 0.1-10 | AC 250 DC 65 | 6 x Inductive Load (0.1-5 A) 8 x Inductive Load (6-10 A) | AC 250V: 2,000A DC 65V: 200A | Slow [similar to D-type breaker] | 26-8 Screw Block; 24-10 Spring Block | 92.0 x 64.0 x 8.2 Screw; 89.7 x 86.5 x 8.2 Spring | None | Yes | Yes | Yes Bridge possible on Base Blocks | Plug-in, Thermal only, LED Available on Base Block |

- (1) Thermal Magnetic – Thermal provides overload protection; magnetic provides short-circuit protection.
- (2) Interrupting capacity is the maximum fault current that can be repeatedly (3x minimum) interrupted without failure of the breaker.
- (3) Self-limiting means that internal resistance is high enough to restrict the flow of current to a level that will not harm the circuit breaker.
- (4) Maximum current at a given voltage at which the circuit breaker can interrupt safely without damage to surrounding components.
- (5) Review trip curve for precise trip behavior of the breaker.
- (6) N/O means auxiliary contacts are open and N/C means auxiliary contacts are closed when main terminal contacts are open.
- (7) Trip-free means the breaker contacts cannot be forced or held closed during any fault condition (overloads or short circuits).
- (8) Tease-free means breaker contacts cannot be forced close enough for current to arc (and potentially weld together) under a fault condition.
- (9) A bus bar can connect to the supply terminal and can feed a series of breakers.

TMC 42 Series



TMC 1 Series (with Alarm Contact)



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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9