
Technical Catalogue

# Molded Case Circuit Breakers
# Earth Leakage Circuit Breakers

BTB ELECTRIC

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BTB Electric aims to provide the best solution for a perfectly safe environment and customer satisfaction through the best quality and service.


M series

# Molded Case Circuit Breakers
# Earth Leakage Circuit Breakers

# Contents

# General

### Applied standard

- IEC/EN 60947-1: Low voltage switchgear and controlgear - Part 1: General rules.
- IEC/EN 60947-2: Low voltage switchgear and controlgear - Part 2: Circuit breakers.

### Operating temperature

The M-Series circuit breakers are suitable for operation in ambient temperatures ranging from -25°C to +65°C. They can be safely stored in temperatures between -35°C and +70°C.

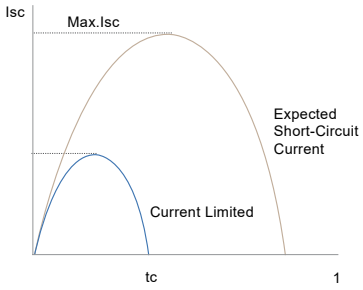
The circuit-breakers equipped with thermomagnetic trip units are calibrated for a reference temperature of +40°C or +55°C. The electronic trip units are not affected by temperature variations.

### Altitude

Up to an altitude of 2000m, M-Series circuit-breakers maintain their rated performances. However, at higher altitudes, changes in atmospheric properties necessitate derating of the circuit-breaker's performance. Derating affects parameters such as maximum rated operating voltage and rated uninterrupted current.

### Excellent short circuit breaking capacity

The M-Series circuit-breakers feature an electric arc interruption system designed to rapidly interrupt very high short-circuit currents. Rapid contact opening speed, dynamic magnetic field action, and specialized arcing chamber structure contribute to quick arc extinguishing.

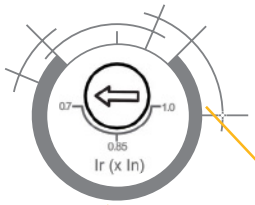


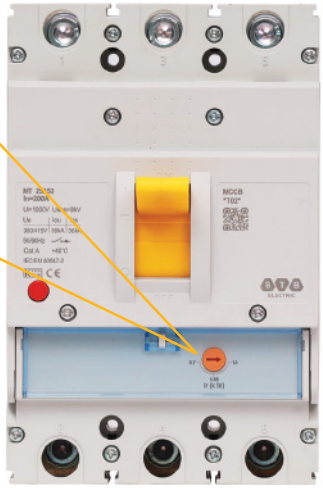

Current Limiting Characteristics

| Code \ Frame | 125 | 160 | 250 | 400 | 630 | 800 | 1600 |
|---|---|---|---|---|---|---|---|
| E | 25kA | 36kA | 36kA | 85kA | 85kA | 85kA | 65kA |
| S | 36kA | 50kA | 50kA | 100kA | 100kA | 100kA | 85kA |
| H | 50kA | 65kA | 65kA | | | | |

### Adjustable rated current

As applying to adjustable rated current design, it is possible to protect circuit optimally according to the load factor. Adjustable range of rated currents:



Thermal Adjustable Type: Settings adjustable to 70% - 85% - 100% or 80% - 90% - 100% of the rated current.

- Electronic Type: adjustable from 40% to 100% of the rated current.
- Pre-trip Alarm Setting: Adjustable from 70% to 100% of the rated current.

### Positive operation

The M-Series circuit-breaker operating mechanism allows for free release regardless of the pressure applied to the lever or the speed of operation. When tripped for protection, the moving contacts are automatically opened. To close them again, the operating mechanism must be reset by pushing the operating lever from the intermediate position into the lowest open position. This ensures deliberate and controlled operation of the circuit-breaker.

### Isolation behaviour

In the open position, the M-Series circuit-breaker ensures compliance with the IEC/EN 60947-2 Standard, guaranteeing circuit isolation. Oversized insulation distances are incorporated to prevent leakage currents and provide dielectric resistance to any overvoltages between the input and output. This ensures safety and reliability in isolating the circuit during maintenance or in the event of fault conditions.

### Installation

Mounting Options: The M-Series circuit-breakers can be installed in switchboards, offering versatility in mounting options. They can be mounted in any orientation, whether horizontal, vertical, or lying down.

Mounting Surfaces: These circuit-breakers can be mounted on the back plate or on rails, providing ease of installation in various types of enclosures or panels.

No Derating: Regardless of the mounting orientation or surface, the M-Series circuit-breakers maintain their rated characteristics without undergoing any derating. This ensures consistent performance and reliability across different installation configurations.

## Approvals and Certications

Having your M-Series Molded Case Circuit Breakers tested by IECEE laboratories demonstrates a commitment to meeting international standards for electrical equipment safety and performance. The IECEE (International Electrotechnical Commission System of Conformity Assessment Schemes for Electrotechnical Equipment and Components) provides a framework for evaluating and certifying electrical products according to recognized standards, ensuring compliance with regulatory requirements and promoting confidence in the products quality and reliability.


ME 1600S3
In=1000A
MCCB
*E01*
In=1000A


ME 400E3
In=400A
MCCB
*E02*
ON
In=400A

MF
MT
Series

# Fixed type
# Thermal adjustable type

## Application scope

The M-Series Molded Case Circuit Breaker is utilized for the distribution of electrical energy and safeguarding electrical lines and power supply equipment from potential damages like overload and short circuits. It serves as an efficient and cost-effective solution to ensure the protection of homes, offices, and other facilities against electrical fires and damage to appliances.

## Salient features

- Protection: The M-Series circuit-breakers provide reliable protection for circuits and equipment in the event of overload or short circuit conditions within the power distribution network.
- Adjustable: Featuring an adjustable rated current design, these circuit breakers allow for optimal circuit protection based on the load factor. The adjustable range of rated currents includes options like thermal adjustable types, such as (70% - 85% - 100%) or (80% - 90% - 100%) of the rated current.
- Suitable for Isolation: These circuit breakers are designed to facilitate safe isolation, ensuring the safety of individuals working behind them.
- Environmental Protection: With a focus on sustainability, most components of the M-Series circuit-breakers are recyclable, contributing to environmental conservation efforts.
- High Performance and Selectivity: These circuit breakers offer high performance and fall under Selectivity category A, indicating their ability to efficiently and selectively isolate faults while maintaining power supply to unaffected areas.

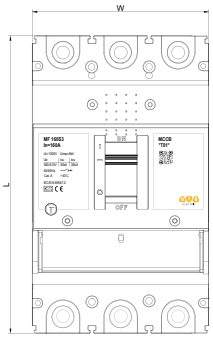
## Image and structure

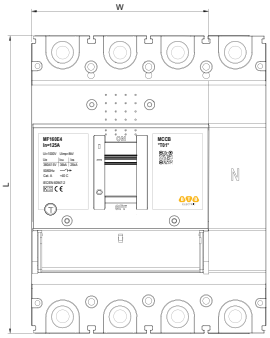
## Selection table

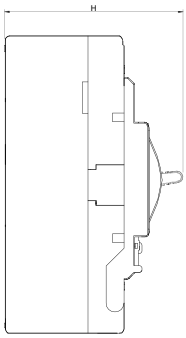
Fixed Type

| Frame | A | 125 | | 160 | | | 250 | | |
|---|---|---|---|---|---|---|---|---|---|
| Type and pole | 3P | MF125E3 | MF125S3 | MF160E3 | MF160S3 | MF160H3 | MF250E3 | MF250S3 | MF250H3 |
| | 4P | MF125E4 | MF125S4 | MF160E4 | MF160S4 | MF160H4 | MF250E4 | MF250S4 | MF250H4 |
| Rated current at 40°C, In | A | 16-20-25-30-32-40-50-60-63-75-80-100-125 | | 32-40-50-60-63-75-80-100-125-150-160 | | | 100-125-150-160-175-200-225-250 | | |
| Rated Operational Voltage, Ue | V | 690 | | 690 | | | 690 | | |
| Rated Insulation Voltage, Ui | V | 800 | | 1000 | | | 1000 | | |
| Impulse Withstand Voltage, Uimp | kV | 8 | | 8 | | | 8 | | |
| Reference Standard | | IEC/EN 60947-2 | | IEC/EN 60947-2 | | | IEC/EN 60947-2 | | |
| Suitablilty for Isolation | | Yes | | Yes | | | Yes | | |
| Polution Degree | | 3 | | 3 | | | 3 | | |
| Utilization Category | | A | | A | | | A | | |
| Trip unit: Thermal Magnetic | | *T01* | | *T01* | | | *T01* | | |
| Long time, LT | Ir | 1.0xIn | | 1.0xIn | | | 1.0xIn | | |
| Instantaneous, INST | Ii | ≤ 30A - 320A<br>≥ 32A - 10xIn | | 10xIn | | | 10xIn | | |
| Breaking capacity level | | E | S | E | S | H | E | S | H |
| Rated ultimate short-circuit breaking capacity, Icu (380/415V) | kA | 25 | 36 | 36 | 50 | 65 | 36 | 50 | 65 |
| Rated service short-circuit breaking capacity, Ics | kA | 18 | 25 | 25 | 36 | 50 | 25 | 36 | 50 |
| Mechanical Endurance | | 25000 | | 25000 | | | 25000 | | |
| Electrical Endurance | | 10000 | | 8000 | | | 8000 | | |
| **Accessories** | | | | | | | | | |
| Auxiliary switch | AUX | ■ | | ■ | | | ■ | | |
| Alarm switch | ALT | ■ | | ■ | | | ■ | | |
| Shunt trip | SHT | ■ | | ■ | | | ■ | | |
| Undervoltage trip | UVT | ■ | | ■ | | | ■ | | |
| Motor operator | MOT | ■ | | ■ | | | ■ | | |
| Extended Rotary Handle | ERH | ■ | | ■ | | | ■ | | |
| Dimensions mm (W x L x H) | 3P | 75x133x82 | | 92x155x93 | | | 107x165x100 | | |
| | 4P | 100x133x82 | | 122x155x93 | | | 142x165x100 | | |

"■" shows it has this option; "□" means it has no this option



## Selection table

Fixed Type

| 400 | | 630 | | 800 | | 1600 | |
|---|---|---|---|---|---|---|---|
| MF400E3 | MF400S3 | MF630E3 | MF630S3 | MF800E3 | MF800S3 | MF1600E3 | MF1600S3 |
| MF400E4 | MF400S4 | MF630E4 | MF630S4 | MF800E4 | MF800S4 | MF1600E4 | MF1600S4 |
| 250-300-315-350-400 | | 400-500-550-630 | | 630-700-800 | | 1000-1250-1600 | |
| 690 | | 690 | | 690 | | 690 | |
| 1000 | | 1000 | | 1000 | | 1000 | |
| 8 | | 8 | | 8 | | 8 | |
| IEC/EN 60947-2 | | IEC/EN 60947-2 | | IEC/EN 60947-2 | | IEC/EN 60947-2 | |
| Yes | | Yes | | Yes | | Yes | |
| 3 | | 3 | | 3 | | 3 | |
| A | | A | | A | | A | |
| *T01* | | *T01* | | *T01* | | *T01* | |
| 1.0xIn | | 1.0xIn | | 1.0xIn | | 1.0xIn | |
| 1.0xIn | | 1.0xIn | | 1.0xIn | | 1.0xIn | |
| E | S | E | S | E | S | E | S |
| 85 | 100 | 85 | 100 | 85 | 100 | 65 | 85 |
| 60 | 75 | 60 | 75 | 60 | 75 | 50 | 65 |
| 20000 | | 20000 | | 20000 | | 5000 | |
| 7000 | | 5000 | | 5000 | | 1000 | |
| | | | | | | | |
| ■ | | ■ | | ■ | | ■ | |
| ■ | | ■ | | ■ | | ■ | |
| ■ | | ■ | | ■ | | ■ | |
| ■ | | ■ | | ■ | | ■ | |
| ■ | | ■ | | ■ | | □ | |
| ■ | | ■ | | ■ | | □ | |
| 140x257x148 | | 150x257x148 | | 210x280x155 | | 212x310x228 | |
| 184x257x148 | | 198x257x148 | | 280x280x155 | | 282x310x228 | |

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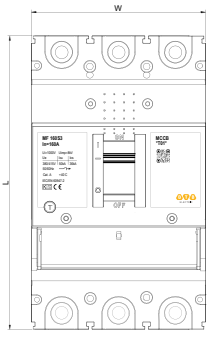


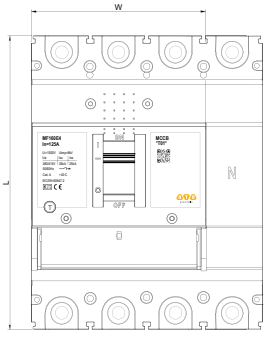


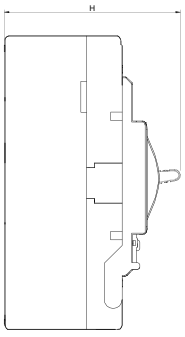

## Selection table

Thermal Adjustable Type

| Frame | A | 125 | | 160 | | | 250 | | |
|---|---|---|---|---|---|---|---|---|---|
| Type and pole | 3P | MT125E3 | MT125S3 | MT160E3 | MT160S3 | MT160H3 | MT250E3 | MT250S3 | MT250H3 |
| | 4P | MT125E4 | MT125S4 | MT160E4 | MT160S4 | MT160H4 | MT250E4 | MT250S4 | MT250H4 |
| Rated current at 40°C, In | A | 16-20-25-30-32-40-50-60-63-75-80-100-125 | | 32-40-50-60-63-75-80-100-125-150-160 | | | 100-125-150-160-175-200-225-250 | | |
| Rated Operational Voltage, Ue | V | 690 | | 690 | | | 690 | | |
| Rated Insulation Voltage, Ui | V | 800 | | 1000 | | | 1000 | | |
| Impulse Withstand Voltage, Uimp | kV | 8 | | 8 | | | 8 | | |
| Reference Standard | | IEC/EN 60947-2 | | IEC/EN 60947-2 | | | IEC/EN 60947-2 | | |
| Suitablilty for Isolation | | Yes | | Yes | | | Yes | | |
| Polution Degree | | 3 | | 3 | | | 3 | | |
| Utilization Category | | A | | A | | | A | | |
| Trip unit: Thermal Magnetic | | *T02* | | *T02* | | | *T02* | | |
| Long time - Adjustable, LT | Ir | (0.7–0.85–1.0)xIn (0.8–0.9–1.0)xIn | | (0.7–0.85–1.0)xIn (0.8–0.9–1.0)xIn | | | (0.7–0.85–1.0)xIn (0.8–0.9–1.0)xIn | | |
| Instantaneous, INST | Ii | ≤ 30A - 320A ≥ 32A - 10xIn | | 10xIn | | | 10xIn | | |
| Breaking capacity level | | E | S | E | S | H | E | S | H |
| Rated ultimate short-circuit breaking capacity, Icu (380/415V) | kA | 18 | 25 | 25 | 36 | 50 | 25 | 36 | 50 |
| Rated service short-circuit breaking capacity, Ics = 100% Icu | kA | 18 | 25 | 25 | 36 | 50 | 25 | 36 | 50 |
| Mechanical Endurance | | 25000 | | 25000 | | | 25000 | | |
| Electrical Endurance | | 10000 | | 8000 | | | 8000 | | |
| **Accessories** | | | | | | | | | |
| Auxiliary switch | AUX | ■ | | ■ | | | ■ | | |
| Alarm switch | ALT | ■ | | ■ | | | ■ | | |
| Shunt trip | SHT | ■ | | ■ | | | ■ | | |
| Undervoltage trip | UVT | ■ | | ■ | | | ■ | | |
| Motor operator | MOT | ■ | | ■ | | | ■ | | |
| Extended Rotary Handle | ERH | ■ | | ■ | | | ■ | | |
| Dimensions mm (W x L x H) | 3P | 75x133x82 | | 92x155x93 | | | 107x165x100 | | |
| | 4P | 100x133x82 | | 122x155x93 | | | 142x165x100 | | |

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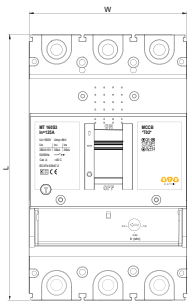

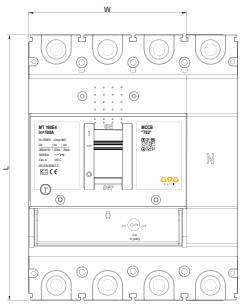

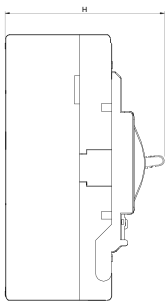

**Selection table**

Thermal Adjustable Type

| 400 | | 630 | | 800 | | 1600 | |
|---|---|---|---|---|---|---|---|
| MT400E3 | MT400S3 | MT630E3 | MT630S3 | MT800E3 | MT800S3 | MT1600E3 | MT1600S3 |
| MT400E4 | MT400S4 | MT630E4 | MT630S4 | MT800E4 | MT800S4 | MT1600E4 | MT1600S4 |
| 250-300-315-350-400 | | 400-500-550-630 | | 630-700-800 | | 1000-1250-1600 | |
| 690 | | 690 | | 690 | | 690 | |
| 1000 | | 1000 | | 1000 | | 1000 | |
| 8 | | 8 | | 8 | | 8 | |
| IEC/EN 60947-2 | | IEC/EN 60947-2 | | IEC/EN 60947-2 | | IEC/EN 60947-2 | |
| Yes | | Yes | | Yes | | Yes | |
| 3 | | 3 | | 3 | | 3 | |
| A | | A | | A | | A | |
| *T02* | | *T02* | | *T02* | | *T02* | |
| (0.7–0.85–1.0)xIn<br>(0.8–0.9–1.0)xIn | | (0.7–0.85–1.0)xIn<br>(0.8–0.9–1.0)xIn | | (0.7–0.85–1.0)xIn<br>(0.8–0.9–1.0)xIn | | (0.7–0.85–1.0)xIn<br>(0.8–0.9–1.0)xIn | |
| 1.0xIn | | 1.0xIn | | 1.0xIn | | 1.0xIn | |
| E | S | E | S | E | S | E | S |
| 60 | 75 | 60 | 75 | 60 | 75 | 50 | 65 |
| 60 | 75 | 60 | 75 | 60 | 75 | 50 | 65 |
| 20000 | | 20000 | | 20000 | | 5000 | |
| 7000 | | 5000 | | 5000 | | 1000 | |
| | | | | | | | |
| ■ | | ■ | | ■ | | ■ | |
| ■ | | ■ | | ■ | | ■ | |
| ■ | | ■ | | ■ | | ■ | |
| ■ | | ■ | | ■ | | ■ | |
| ■ | | ■ | | ■ | | □ | |
| ■ | | ■ | | ■ | | □ | |
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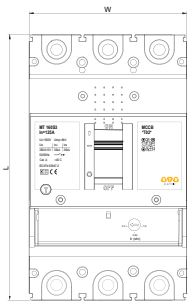
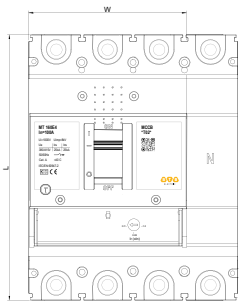
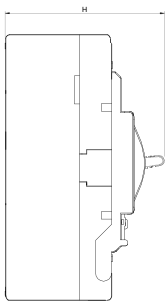
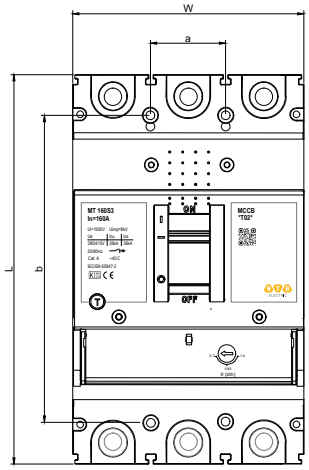


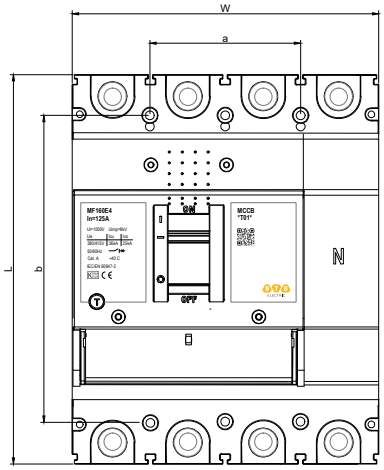


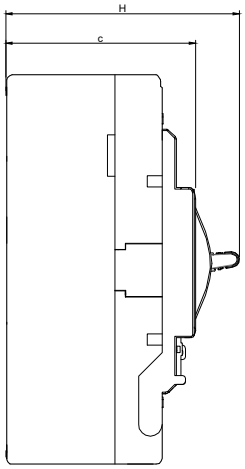


## Dimensions

| Frame | Type | Poles | Outline Dimension (mm) | | | | Installation Dimension (mm) | | | Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | W | L | H | c | a | b | d | kg |
| 125 | MF 125E3; MT 125E3<br>MF 125S3; MT 125S3 | 3 | 75 | 133 | 82 | 66.5 | 25 | 111 | Φ4 | 0.9 |
| | MF 125E4; MT 125E4<br>MF 125S4; MT 125S4 | 4 | 100 | 133 | 82 | 66.5 | 50 | 111 | Φ4 | 1.2 |
| 160 | MF 160E3; MT 160E3<br>MF 160S3; MT 160S3<br>MF 160H3; MT 160H3 | 3 | 92 | 155 | 93 | 75 | 30 | 122 | Φ4.5 | 1.4 |
| | MF 160E4; MT 160E4<br>MF 160S4; MT 160S4<br>MF 160H4; MT 160H4 | 4 | 122 | 155 | 93 | 75 | 60 | 122 | Φ4.5 | 1.8 |
| 250 | MF 250E3; MT 250E3<br>MF 250S3; MT 250S3<br>MF 250H3; MT 250H3 | 3 | 107 | 165 | 100 | 77 | 35 | 126 | Φ4.5 | 1.8 |
| | MF 250E4; MT 250E4<br>MF 250S4; MT 250S4<br>MF 250H4; MT 250H4 | 4 | 142 | 165 | 100 | 77 | 70 | 126 | Φ4.5 | 2.3 |
| 400 | MF 400E3; MT 400E3<br>MF 400S3; MT 400S3 | 3 | 140 | 257 | 148 | 111 | 43.5 | 194 | Φ7 | 5.4 |
| | MF 400E4; MT 400E4<br>MF 400S4; MT 400S4 | 4 | 184 | 257 | 148 | 111 | 87 | 194 | Φ7 | 7.5 |
| 630 | MF 630E3; MT 630E3<br>MF 630S3; MT 630S3 | 3 | 150 | 257 | 148 | 111 | 44 | 194 | Φ7 | 6.0 |
| | MF 630E4; MT 630E4<br>MF 630S4; MT 630S4 | 4 | 198 | 257 | 148 | 111 | 88 | 194 | Φ7 | 7.8 |
| 800 | MF 800E3; MT 800E3<br>MF 800S3; MT 800S3 | 3 | 210 | 280 | 155 | 117 | 70 | 243 | Φ7 | 10.2 |
| | MF 800E4; MT 800E4<br>MF 800S4; MT 800S4 | 4 | 280 | 280 | 155 | 117 | 140 | 243 | Φ7 | 13.1 |
| 1600 | MF 1600E3; MF 1600S3<br>MT 1600E3; MT 1600S3 | 3 | 212 | 310 | 228 | 168 | 70 | 245 | Φ8.5 | 16.2 |
| | MF 1600E4; MF 1600S4<br>MT 1600E4; MT 1600S4 | 4 | 282 | 310 | 228 | 168 | 140 | 245 | Φ8.5 | 20.8 |

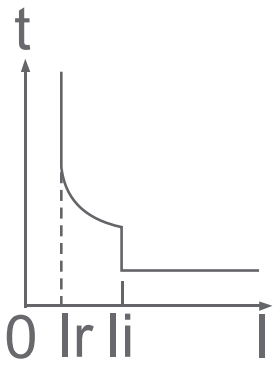


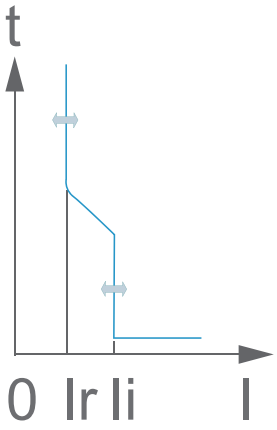



**Operation characteristic curve**

Characteristic curve Fixed type

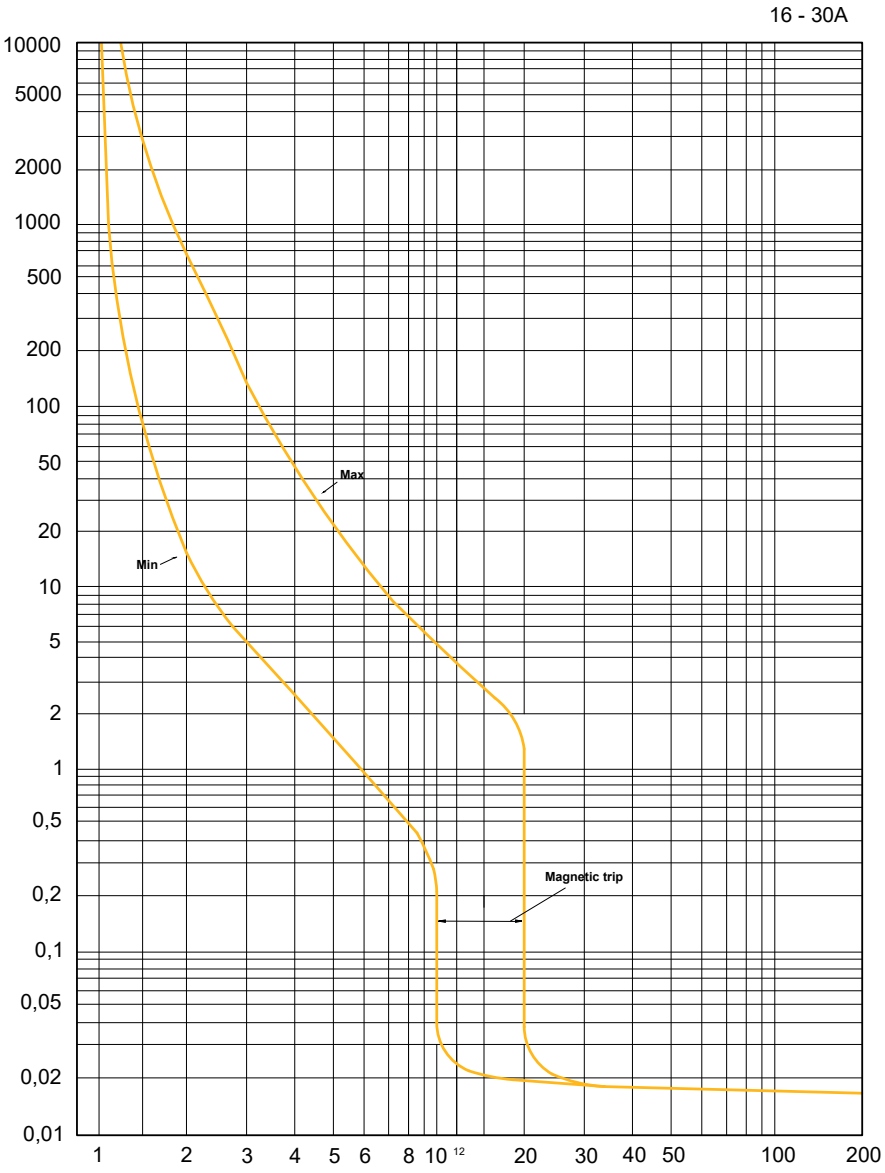


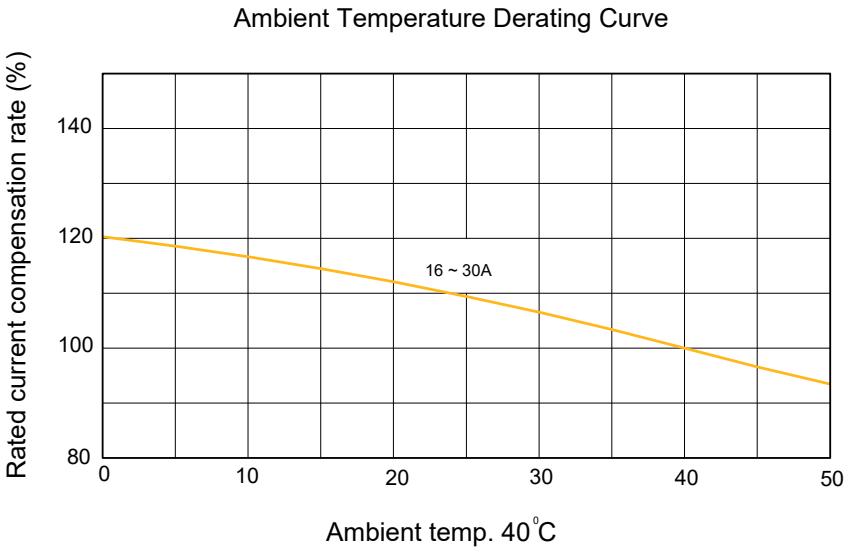

Characteristic curve Thermal adjustable type



**Operation characteristic curve**

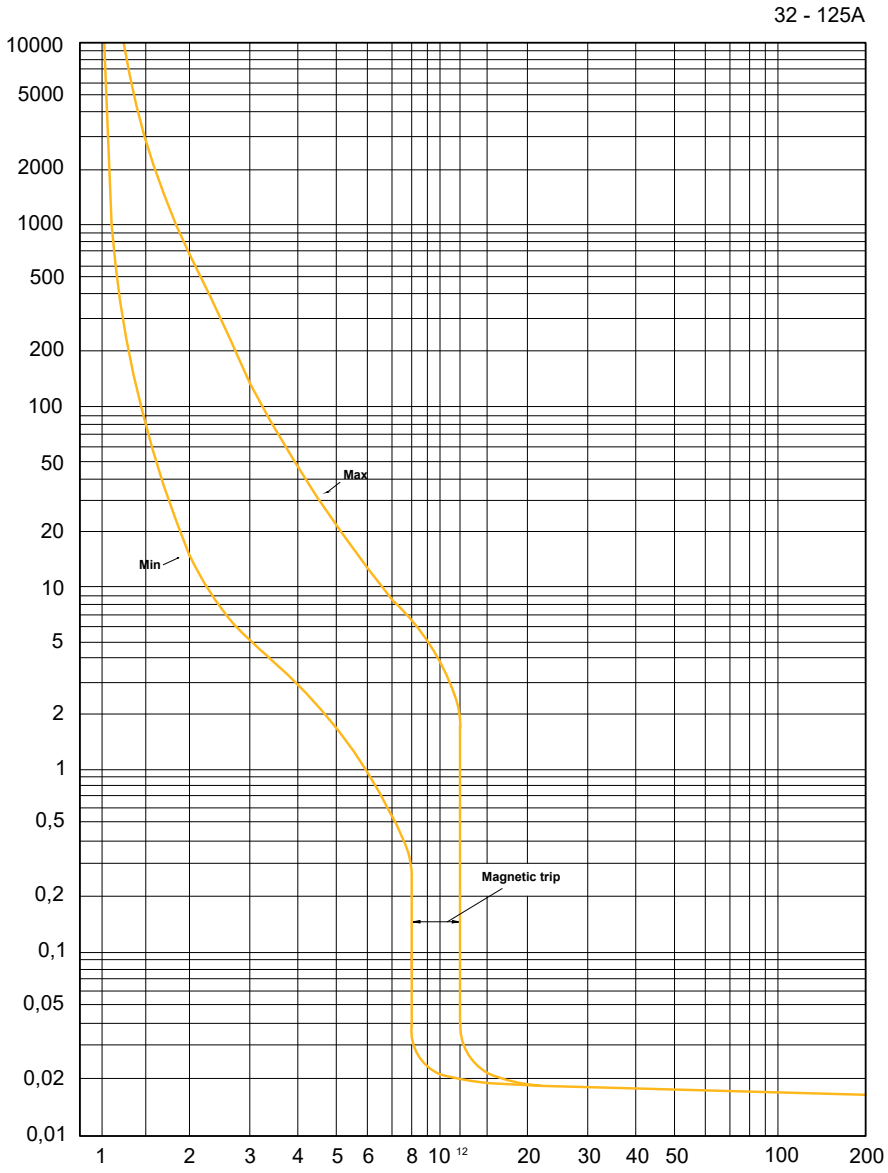
Frame 125A Time current characteristic curve (16 ~ 30A)

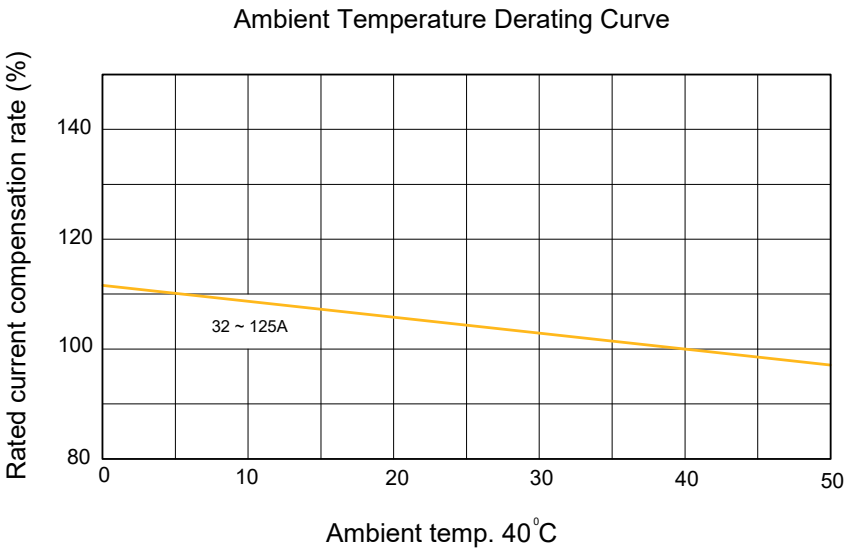


**Operation characteristic curve**

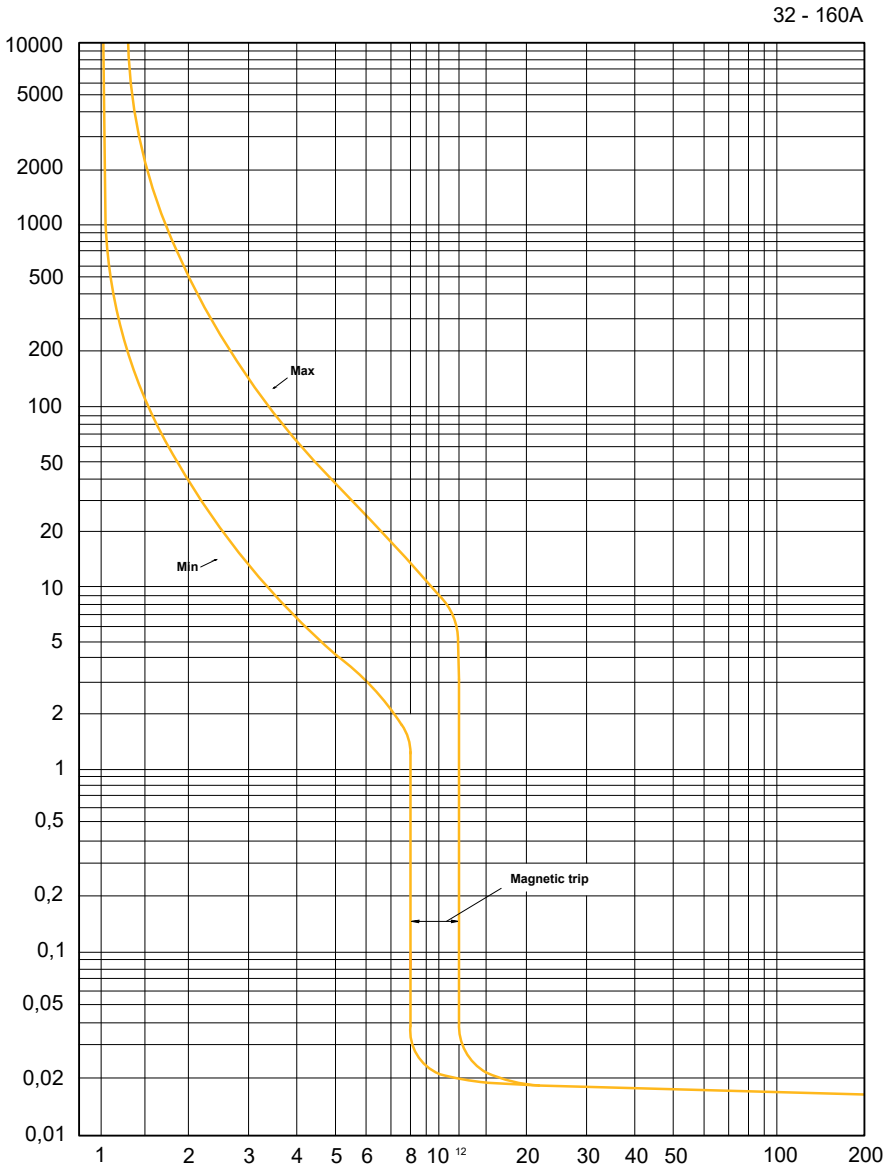
Frame 125A Time current characteristic curve (32 ~ 125A)

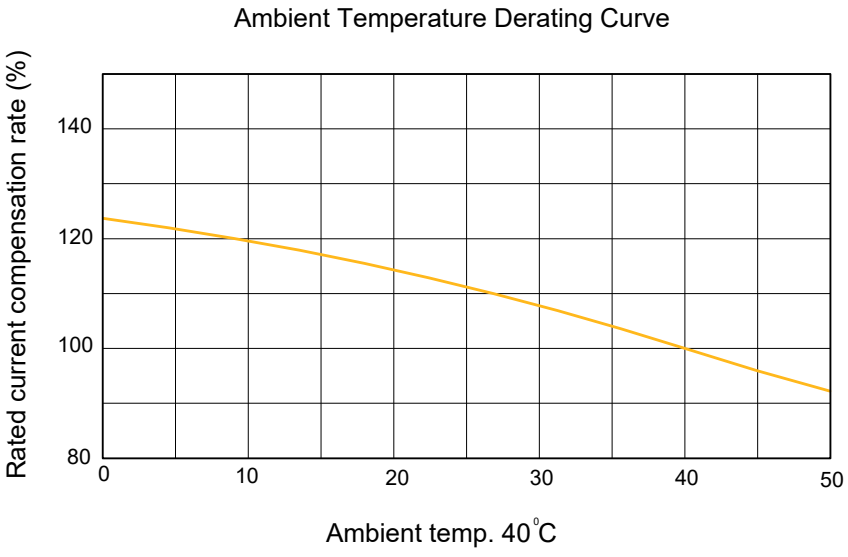


**Operation characteristic curve**

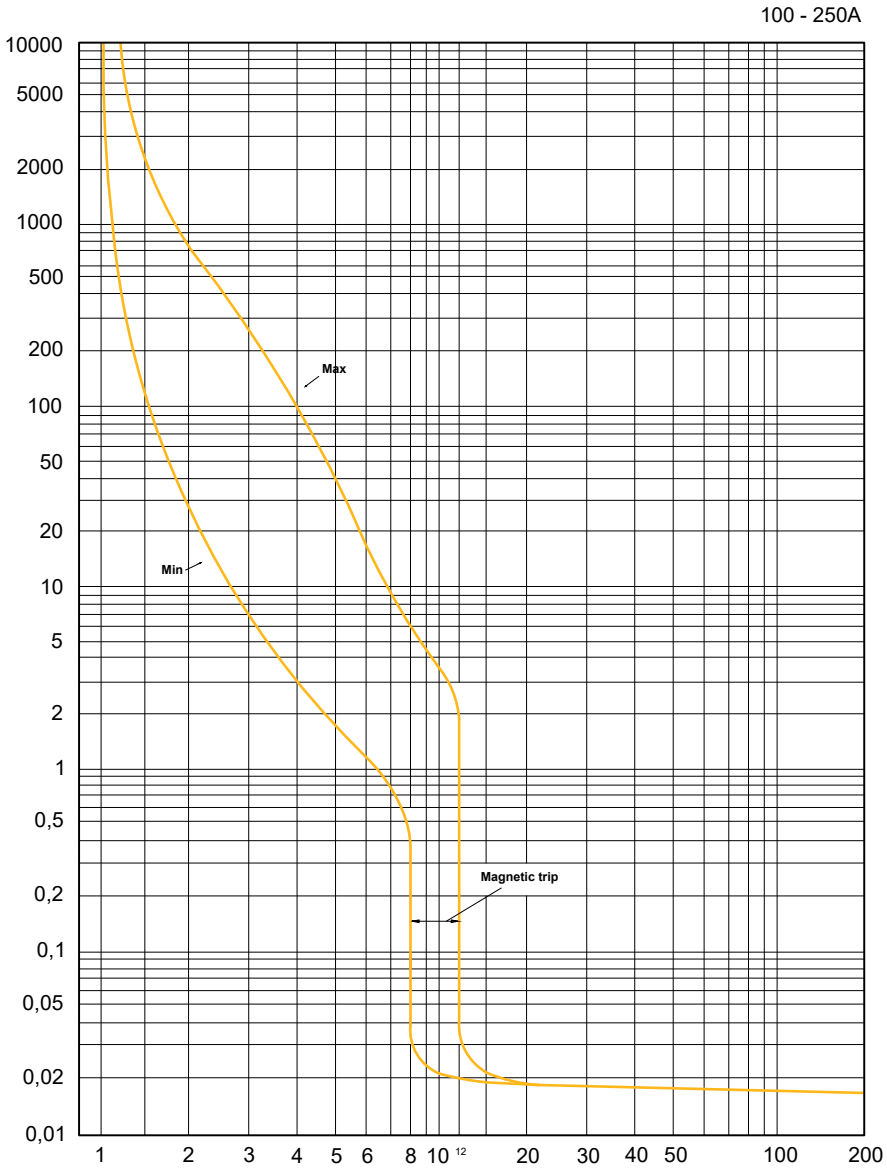
Frame 160A Time current characteristic curve



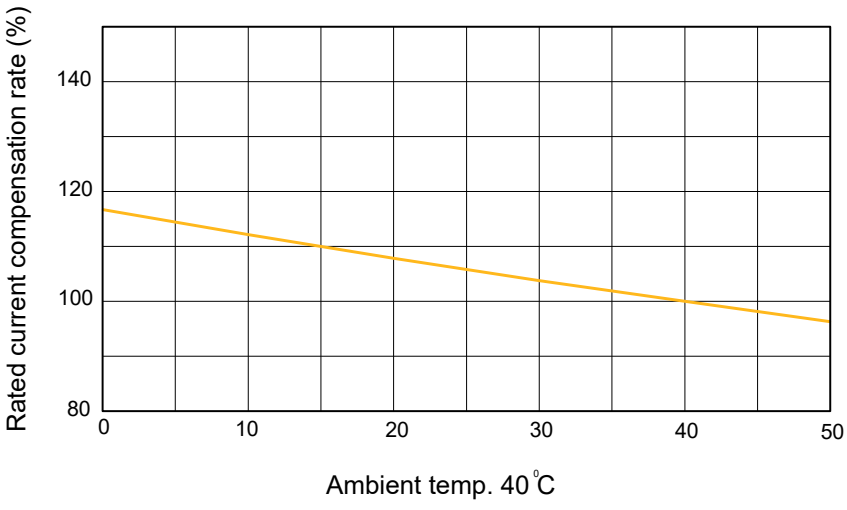



**Operation characteristic curve**

Frame 250A Time current characteristic curve

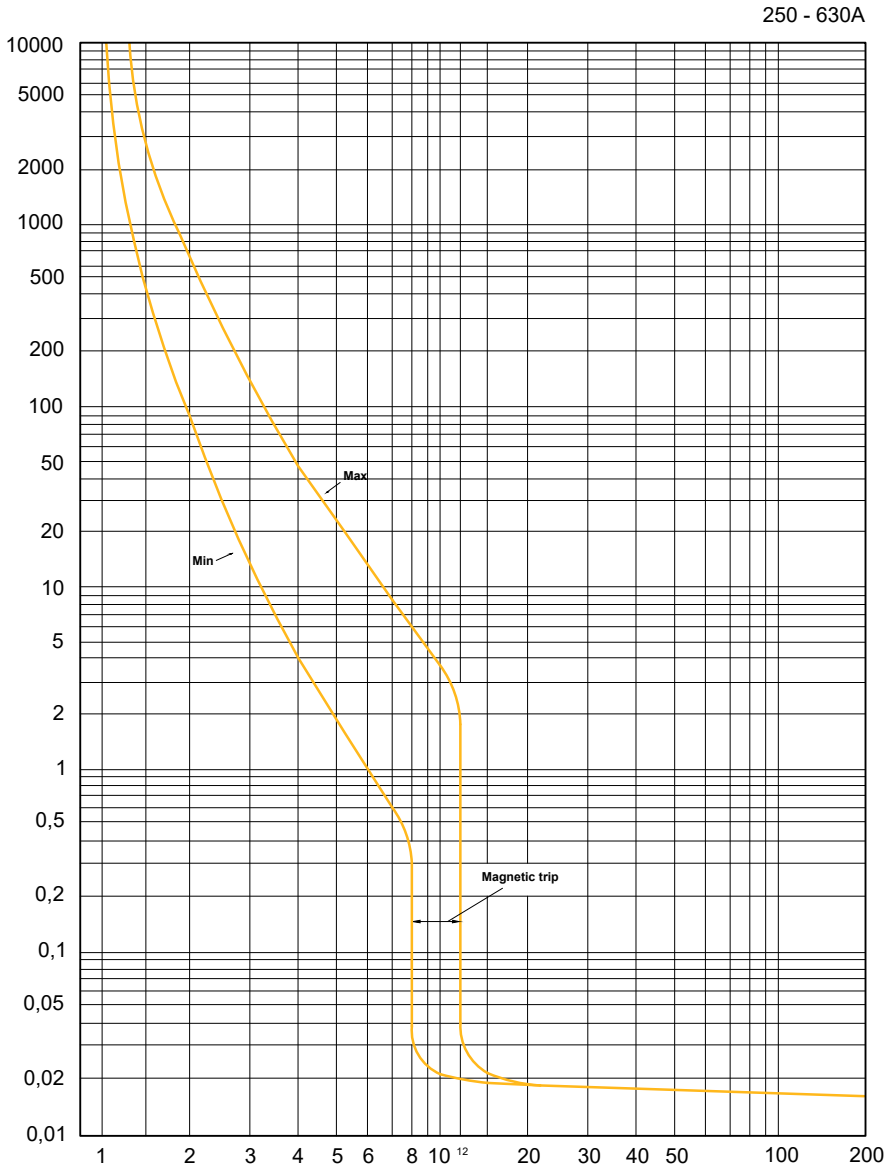



Ambient Temperature Derating Curve

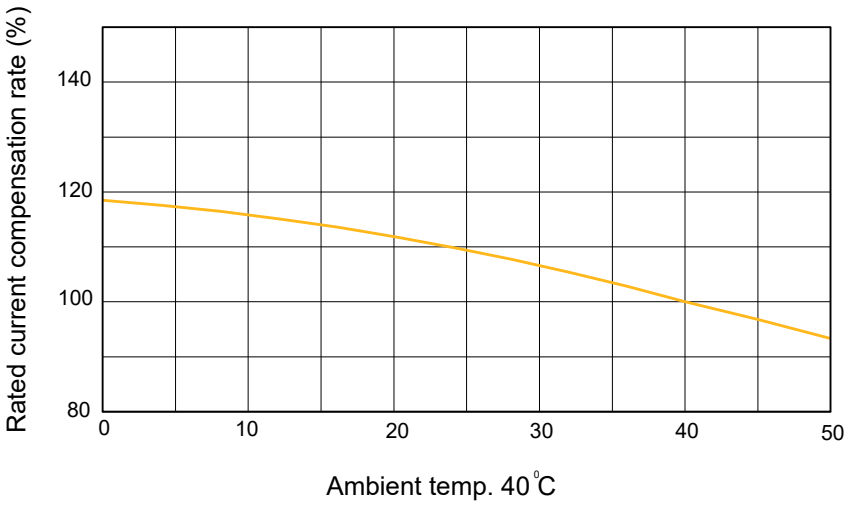


**Operation characteristic curve**

Frame 400A & 630A Time current characteristic curve

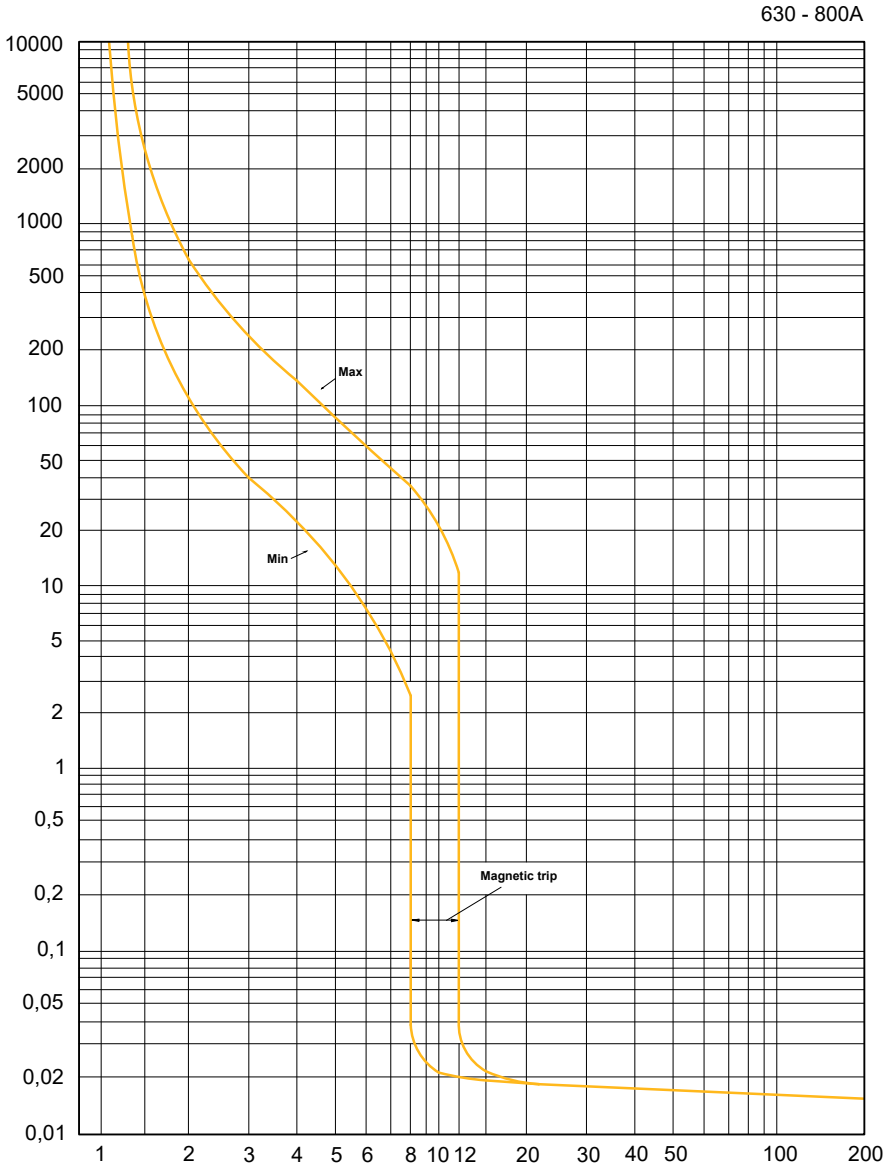



Ambient Temperature Derating Curve

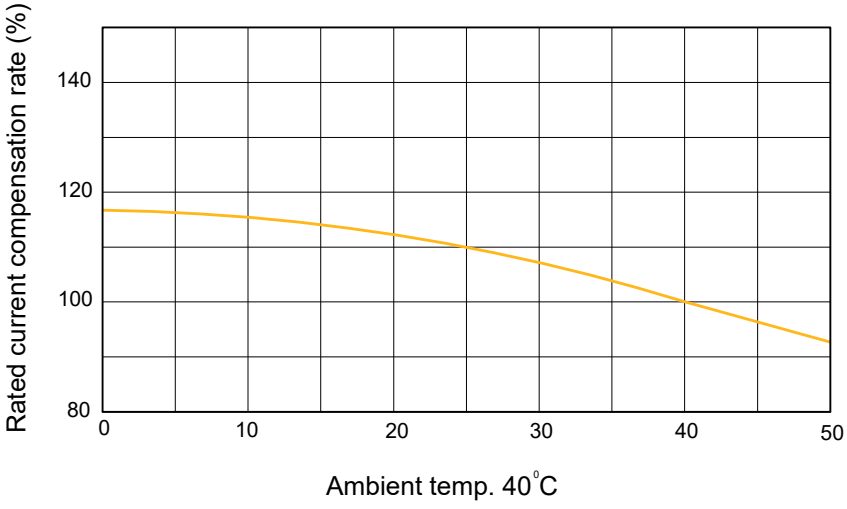


**Operation characteristic curve**

Frame 800A Time current characteristic curve

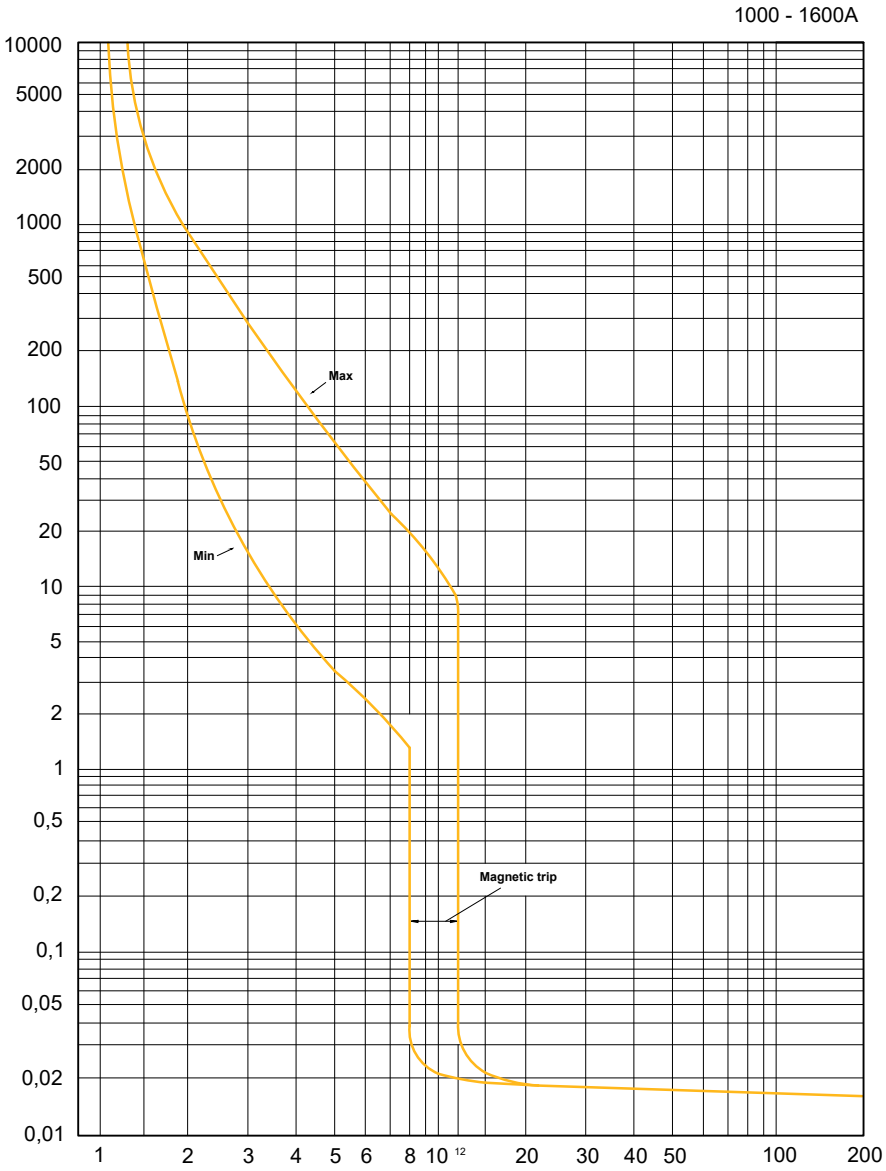



Ambient Temperature Derating Curve

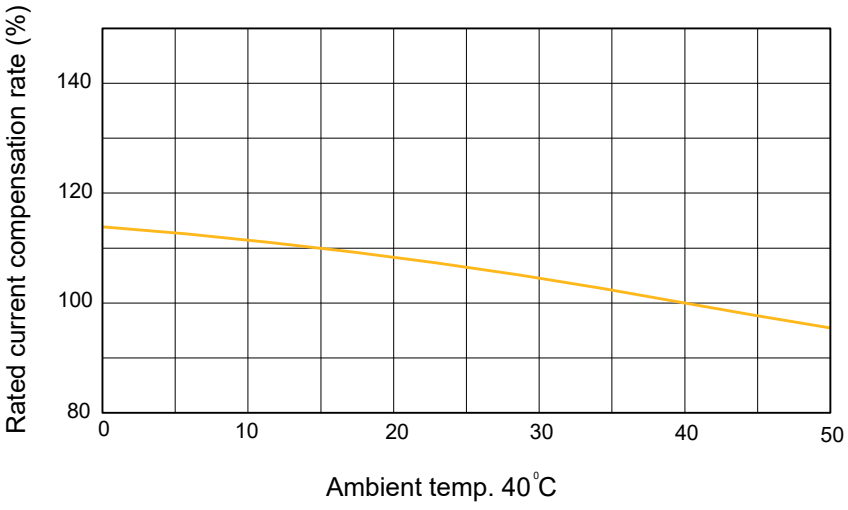


**Operation characteristic curve**

Frame 1600 Time current characteristic curve




Ambient Temperature Derating Curve



ME
IME
Series

# Electronic type with button
# Electronic type with LCD

## Application scope

The electronic molded case circuit breaker (MCCB) is used to distribute electrical energy and protect power supply lines and equipment from damage caused by overload, short circuit, and ground fault. The ME and IME models are excellent devices for safeguarding your home, office, or factory from electrical fires and equipment damage.

## Salient features

- Protection: M-Series circuit-breakers provide reliable protection for circuits and equipment in case of overload, short circuit, or ground fault conditions in the power distribution circuit.
- Adjustable: With an adjustable rated current design, optimal circuit protection is achievable according to the load factor. The adjustable range of rated currents is 40% to 100% of the rated current.
- Self-power: The intelligent controller is powered directly by the circuit breaker itself, eliminating the need for external power sources.
- Overload Indicator: The LED indicator flashes when the load current exceeds the rated setting by more than 5%, indicating an overload. The LED remains solid when the load current is between 40% and 100% of the setting for an extended period, indicating normal operation. If the current exceeds this range, an alarm will be triggered.
- Rated Short-Time Withstand Current: The minimum rated short-time withstand current is 12 times the nominal current (12In) or 5 kA, whichever is greater.
- Suitable for Isolation: Ensures the safety of personnel working behind the circuit breaker by providing reliable isolation.
- Environmental Protection: Most components of the circuit breaker are recyclable, supporting environmental sustainability.

## Image and structure

## Selection table

Electronic type with button

| Frame | A | 250 | | | 400 | |
|---|---|---|---|---|---|---|
| Type and pole | 3P | ME250E3 | ME250S3 | ME250H3 | ME400E3 | ME400S3 |
| | 4P | ME250E4 | ME250S4 | ME250H4 | ME400E4 | ME400S4 |
| Rated current, In | A | 125-250 | | | 320-400 | |
| Rated Operational Voltage, Ue | V | 690 | | | 690 | |
| Rated Insulation Voltage, Ui | V | 1000 | | | 1000 | |
| Impulse Withstand Voltage, Uimp | kV | 8 | | | 8 | |
| Reference Standard | | IEC/EN 60947-2 | | | IEC/EN 60947-2 | |
| Suitablilty for Isolation | | Yes | | | Yes | |
| Polution Degree | | 3 | | | 3 | |
| Utilization Category | | B | | | B | |
| Trip unit: Electronic | | *E01* | | | *E01* | |
| Trip unit rating, In | A | 125-250 | | | 320-400 | |
| Long delay current range, Ir | A | **125** (50-63-70-75-80-85-90-95-100-125) **250** (100-112-125-140-150-160-180-200-225-250) | | | **320** (128-152-180-200-220-240-260-280-300-320) **400** (160-190-225-250-275-300-325-350-375-400) | |
| Long delay time, tr | s | 12-60-100-150-OFF **@2Ir** | | | 12-60-100-150-OFF **@2Ir** | |
| Short circuit protection of low level faults, Isd | A | 2-2.5-3-4-5-6-7-8-10-12 x Ir | | | 2-2.5-3-4-5-6-7-8-10-12 x Ir | |
| Short circuit protection time at low level faults, tsd | s | 0.06-0.1-0.2-0.3-OFF **@1.5Isd** | | | 0.06-0.1-0.2-0.3-0.4-0.5-1.0-OFF **@1.5Isd** | |
| Short circuit protection of high level faults, Ii | A | 4-6-7-8-10-12-13-14 x Ir – OFF | | | 4-6-7-8-9-10-11-12-14 x Ir -OFF | |
| Pre trip alarm setting multiple, Ip | A | 0.7-0.75-0.8-0.85-0.9-0.95-1.0 x Ir | | | 0.7-0.75-0.8-0.85-0.9-0.95-1.0 x Ir | |
| Ground fault pickup current, Ig | A | 0.2-0.3-0.4-0.5-0.6-0.7-0.8-0.9-1.0 x In - OFF | | | 0.2-0.3-0.4-0.5-0.6-0.7-0.8-0.9-1.0 x In - OFF | |
| Ground fault pickup current, tg | s | Fixed for 0.4 sec | | | Fixed for 0.4 sec | |
| Breaking capacity level | | E | S | H | E | S |
| Rated ultimate short-circuit breaking capacity, Icu (380/415V) | kA | 25 | 36 | 50 | 60 | 75 |
| Rated service short-circuit breaking capacity, Ics | kA | 25 | 36 | 50 | 60 | 75 |
| Rated shor-time withstand current, Icw | kA/s | 5 | | | 8 | |
| Mechanical Endurance | | 25000 | | | 20000 | |
| Electrical Endurance | | 8000 | | | 7000 | |
| **Accessories** | | | | | | |
| Auxiliary switch | AUX | ■ | | | ■ | |
| Alarm switch | ALT | ■ | | | ■ | |
| Shunt trip | SHT | ■ | | | ■ | |
| Undervoltage trip | UVT | ■ | | | ■ | |
| Motor operator | MOT | ■ | | | ■ | |
| Extended Rotary Handle | ERH | ■ | | | ■ | |
| Dimensions mm | 3P | 107x165x100 | | | 150x257x148 | |
| (W x L x H) | 4P | 142x165x100 | | | 198x257x148 | |

“■” shows it has this option; “□” means it has no this option; “Time delay accuracy” ± 20% or below

## Selection table

Electronic type with button

| 630 | | 800 | | 1600 | |
|---|---|---|---|---|---|
| **ME630E3** | **ME630S3** | **ME800E3** | **ME800S3** | **ME1600E3** | **ME1600S3** |
| **ME630E4** | **ME630S4** | **ME800E4** | **ME800S4** | **ME1600E4** | **ME1600S4** |
| 500-630 | | 630-800 | | 1000-1250-1600 | |
| 690 | | 690 | | 690 | |
| 1000 | | 1000 | | 1000 | |
| 8 | | 8 | | 8 | |
| IEC/EN 60947-2 | | IEC/EN 60947-2 | | IEC/EN 60947-2 | |
| Yes | | Yes | | Yes | |
| 3 | | 3 | | 3 | |
| B | | B | | B | |
| *E01* | | *E01* | | *E01* | |
| 500-630 | | 630-800 | | 1000-1250-1600 | |
| **500** (200-238-278-317-345-377-408-436-472-500)<br>**630** (252-300-350-400-435-475-515-550-595-630) | | **630** (252-300-350-400-435-475-515-550-595-630)<br>**800** (320-435-550-630-660-690-715-745-770-800) | | **1000** (400-500-630-700-800-850-900-950-1000)<br>**1250** (500-630-700-800-900-1000-1100-1200-1250)<br>**1600** (630-800-900-1000-1100-1250-1400-1500-1600) | |
| 12-60-100-150-OFF **@2Ir** | | 12-60-100-150-OFF **@2Ir** | | 12-60-100-150-OFF **@2Ir** | |
| 2-2.5-3-4-5-6-7-8-10-12 x Ir | | 2-2.5-3-4-5-6-7-8-10-12 x Ir | | 2-2.5-3-3.5-4-5-6-7-8-10 x Ir - OFF | |
| 0.06-0.1-0.2-0.3-0.4-0.5-1.0-OFF **@1.5Isd** | | 0.06-0.1-0.2-0.3-0.4-0.5-1.0-OFF **@1.5Isd** | | 0.06-0.1-0.2-0.3-0.4-0.5-1-OFF **@1.5Isd** | |
| 4-6-7-8-9-10-11-12-14 x Ir -OFF | | 4-6-7-8-9-10-11-12-14 x Ir -OFF | | 4-5-6-7-8-9-10-11-12 x Ir - OFF | |
| 0.7-0.75-0.8-0.85-0.9-0.95-1.0 x Ir | | 0.7-0.75-0.8-0.85-0.9-0.95-1.0 x Ir | | N/A | |
| 0.2-0.3-0.4-0.5-0.6-0.7-0.8-0.9-1.0 x In - OFF | | 0.2-0.3-0.4-0.5-0.6-0.7-0.8-0.9-1.0 x In - OFF | | 0.2-0.3-0.4-0.5-0.6-0.7-0.8-0.9-1.0 x In - OFF | |
| Fixed for 0.4 sec | | Fixed for 0.4 sec | | Fixed for 0.4 sec | |
| E | S | E | S | E | S |
| 60 | 75 | 60 | 75 | 50 | 65 |
| 60 | 75 | 60 | 75 | 50 | 65 |
| 8 | | 10 | | 20 | |
| 20000 | | 20000 | | 5000 | |
| 5000 | | 5000 | | 1000 | |
| | | | | | |
| ■ | | ■ | | ■ | |
| ■ | | ■ | | ■ | |
| ■ | | ■ | | ■ | |
| ■ | | ■ | | ■ | |
| ■ | | ■ | | □ | |
| ■ | | ■ | | □ | |
| 150x257x148 | | 210x280x155 | | 212x310x228 | |
| 198x257x148 | | 280x280x155 | | 282x310x228 | |

“■” shows it has this option; “□” means it has no this ; “Time delay accuracy” ± 20% or below

## Selection table

Electronic type with LCD

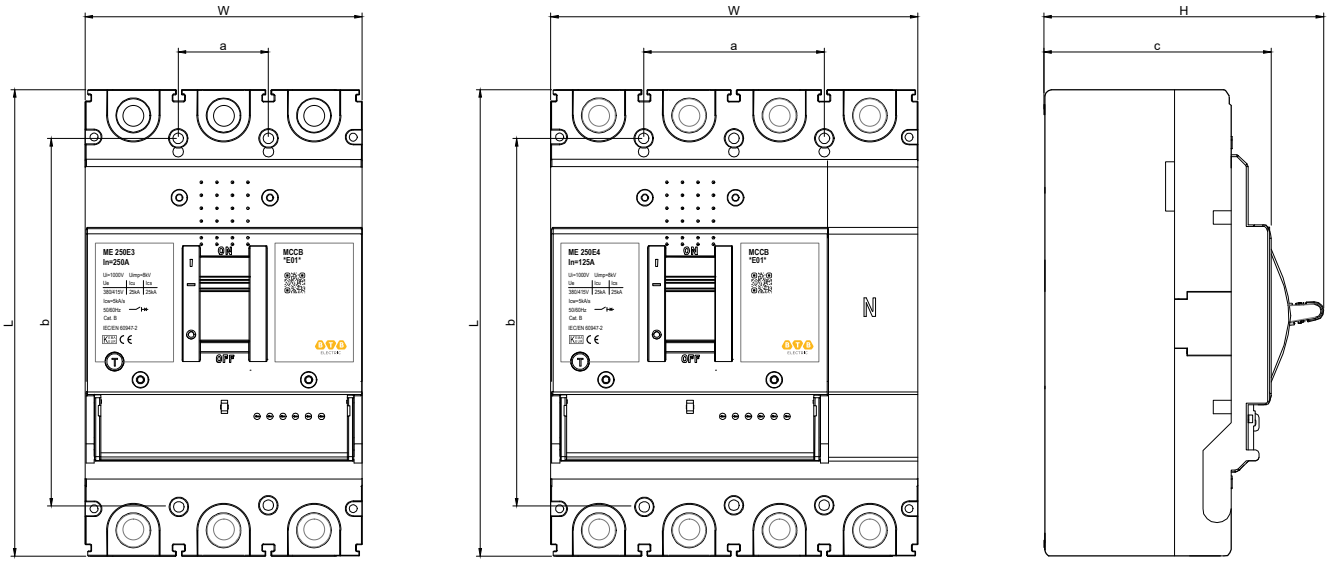
| Frame | A | 400 | | 630 | | 800 | |
|---|---|---|---|---|---|---|---|
| Type and pole | 3P | iME400E3 | iME400S3 | iME630E3 | iME630S3 | iME800E3 | iME800S3 |
| | 4P | iME400E4 | iME400S4 | iME630E4 | iME630S4 | iME800E4 | iME800S4 |
| Rated current, In | A | 250-400 | | 250-400-630 | | 630-800 | |
| Rated Operational Voltage, Ue | V | 690 | | 690 | | 690 | |
| Rated Insulation Voltage, Ui | V | 1000 | | 1000 | | 1000 | |
| Impulse Withstand Voltage, Uimp | kV | 8 | | 8 | | 8 | |
| Reference Standard | | IEC/EN 60947-2 | | IEC/EN 60947-2 | | IEC/EN 60947-2 | |
| Suitablilty for Isolation | | Yes | | Yes | | Yes | |
| Polution Degree | | 3 | | 3 | | 3 | |
| Utilization Category | | B | | B | | B | |
| Trip unit: Electronic | | *E02* | | *E02* | | *E02* | |
| Trip unit rating, In | A | 250-320-400 | | 400-500-630 | | 630-800 | |
| Long delay current range, Ir | A | **250** (100-250)<br>**320** (128-320)<br>**400** (160-400)<br>with increment by 1A | | **400** (160-400)<br>**500** (200-500)<br>**630** (252-630)<br>with increment by 1A | | **630** (252-630)<br>**800** (320-800)<br>with increment by 1A | |
| Long delay time, tr | s | 12-150 with increment by 1 sec + OFF **@2Ir** | | 12-150 with increment by 1 sec + OFF **@2Ir** | | 12-150 with increment by 1 sec + OFF **@2Ir** | |
| Short circuit protection of low level faults, Isd | A | **250** (200-3000)<br>**320** (256-3200)<br>**400** (320-4800)<br>with increment by 1A | | **400** (320-4800)<br>**500** (400-5000)<br>**630** (500-7560)<br>with increment by 1A | | **630** (500-7560)<br>**800** (650-8000)<br>with increment by 1A | |
| Short circuit protection time at low level faults, tsd | s | 0.06-1s with increment by 0.02 sec + OFF **@1.5Isd** | | 0.06-1s with increment by 0.02 sec + OFF **@1.5Isd** | | 0.06-1s with increment by 0.02 sec + OFF **@1.5Isd** | |
| Short circuit protection of high level faults, Ii | A | **250** (400-3500 +OFF)<br>**320** (512-4480 +OFF)<br>**400** (640-5600 +OFF)<br>with increment by 1A | | **400** (640-5600 +OFF)<br>**500** (800-7000 +OFF)<br>**630** (1000-8820 +OFF)<br>with increment by 1A | | **630** (1000-8820 +OFF)<br>**800** (1300-9600 +OFF)<br>with increment by 1A | |
| Pre trip alarm setting multiple, Ip | A | **250** (70-250)<br>**320** (90-320)<br>**400** (112-400)<br>with increment by 1A | | **400** (112-400)<br>**500** (140-500)<br>**630** (175-630)<br>with increment by 1A | | **630** (175-630)<br>**630** (228-800)<br>with increment by 1A | |
| Ground fault pickup current, Ig | A | **250** (50-250 +OFF)<br>**320** (64-320 +OFF)<br>**400** (80-400 +OFF)<br>with increment by 1A | | **400** (80-400 +OFF)<br>**500** (100-500 +OFF)<br>**630** (126-630 +OFF)<br>with increment by 1A | | **630** (126-630 +OFF)<br>**800** (160-800 +OFF)<br>with increment by 1A | |
| Ground fault pickup current, tg | s | Fixed for 0.4 sec | | Fixed for 0.4 sec | | Fixed for 0.4 sec | |
| Breaking capacity level | | E | S | E | S | E | S |
| Rated ultimate short-circuit breaking capacity, Icu (380/415V) | kA | 60 | 75 | 60 | 75 | 60 | 75 |
| Rated service short-circuit breaking capacity, Ics = 100% Icu | kA | 60 | 75 | 60 | 75 | 60 | 75 |
| Rated shor-time withstand current, Icw/1s | kA/s | 8 | | 8 | | 10 | |
| Mechanical Endurance | | 20000 | | 20000 | | 20000 | |
| Electrical Endurance | ERH | 7000 | | 5000 | | 5000 | |

| Frame | A | 400 | 630 | 800 |
|---|---|---|---|---|
| **Accessories** | | | | |
| Auxiliary switch | AUX | ■ | ■ | ■ |
| Alarm switch | ALT | ■ | ■ | ■ |
| Shunt trip | SHT | ■ | ■ | ■ |
| Undervoltage trip | UVT | ■ | ■ | ■ |
| Motor operator | MOT | ■ | ■ | ■ |
| Extended Rotary Handle | ERH | ■ | ■ | ■ |
| Dimensions mm | 3P | 150x257x148 | 150x257x148 | 210x280x155 |
| (W x L x H) | 4P | 198x257x148 | 198x257x148 | 280x280x155 |

“■” shows it has this option; “□” means it has no this option; “Time delay accuracy” ± 20% or below

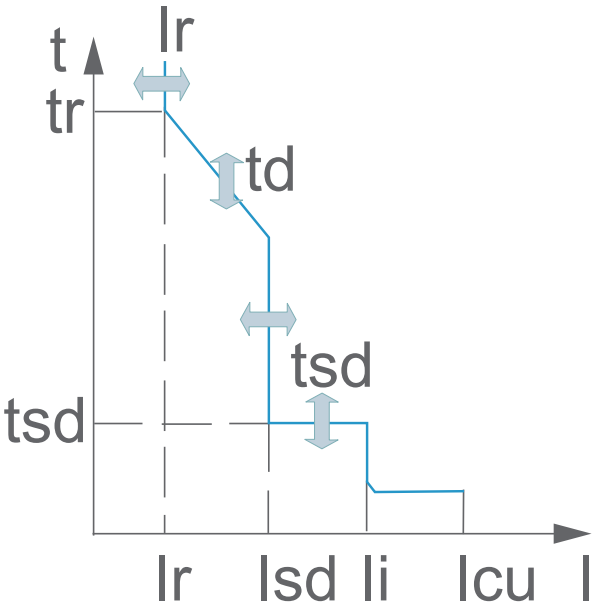
## Dimensions

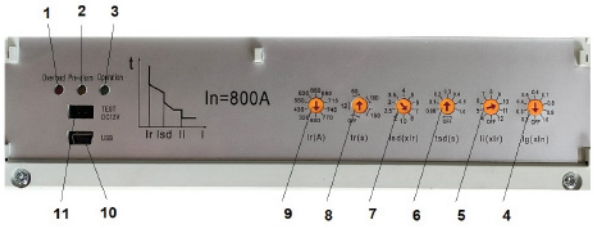
| Frame | Type | Poles | Outline Dimension (mm) | | | | Installation Dimension (mm) | | | Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | W | L | H | c | a | b | d | kg |
| 250 | ME 250E3; ME 250S3; ME 250H3 | 3 | 107 | 165 | 100 | 77 | 35 | 126 | Φ4.5 | 1.8 |
| | ME 250E4; ME 250S4; ME 250H4 | 4 | 142 | 165 | 100 | 77 | 70 | 126 | Φ4.5 | 2.3 |
| 400 | ME 400E3; ME 400S3 iME 400E3; iME 400S3 | 3 | 150 | 257 | 148 | 111 | 44 | 194 | Φ7 | 5.8 |
| | ME 400E4; ME 400S4 iME 400E4; iME 400S4 | 4 | 198 | 257 | 148 | 111 | 88 | 194 | Φ7 | 7.6 |
| 630 | ME 630E3; ME 630S3 iME 630E3; iME 630S3 | 3 | 150 | 257 | 148 | 111 | 44 | 194 | Φ7 | 6.0 |
| | ME 630E4; ME 630S4 iME 630E4; iME 630S4 | 4 | 198 | 257 | 148 | 111 | 88 | 194 | Φ7 | 7.8 |
| 800 | ME 800E3; ME 800S3 iME 800E3; iME 8030S3 | 3 | 210 | 280 | 155 | 117 | 70 | 243 | Φ7 | 10.2 |
| | ME 800E4; ME 800S4 iME 800E4; iME 800S4 | 4 | 280 | 280 | 155 | 117 | 140 | 243 | Φ7 | 13.1 |
| 1600 | ME 1600E3; ME 1600S3 | 3 | 212 | 310 | 228 | 168 | 70 | 245 | Φ8.5 | 16.2 |
| | ME 1600E4, ME 1600S4 | 4 | 282 | 310 | 228 | 168 | 140 | 245 | Φ8.5 | 20.8 |



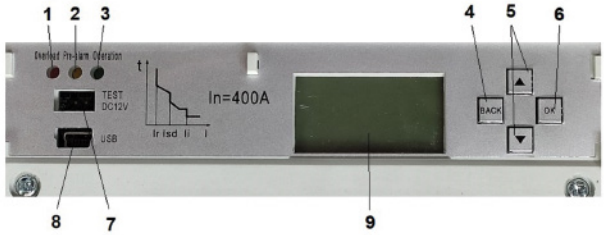
**Operation characteristic curve**

Installation Instructions



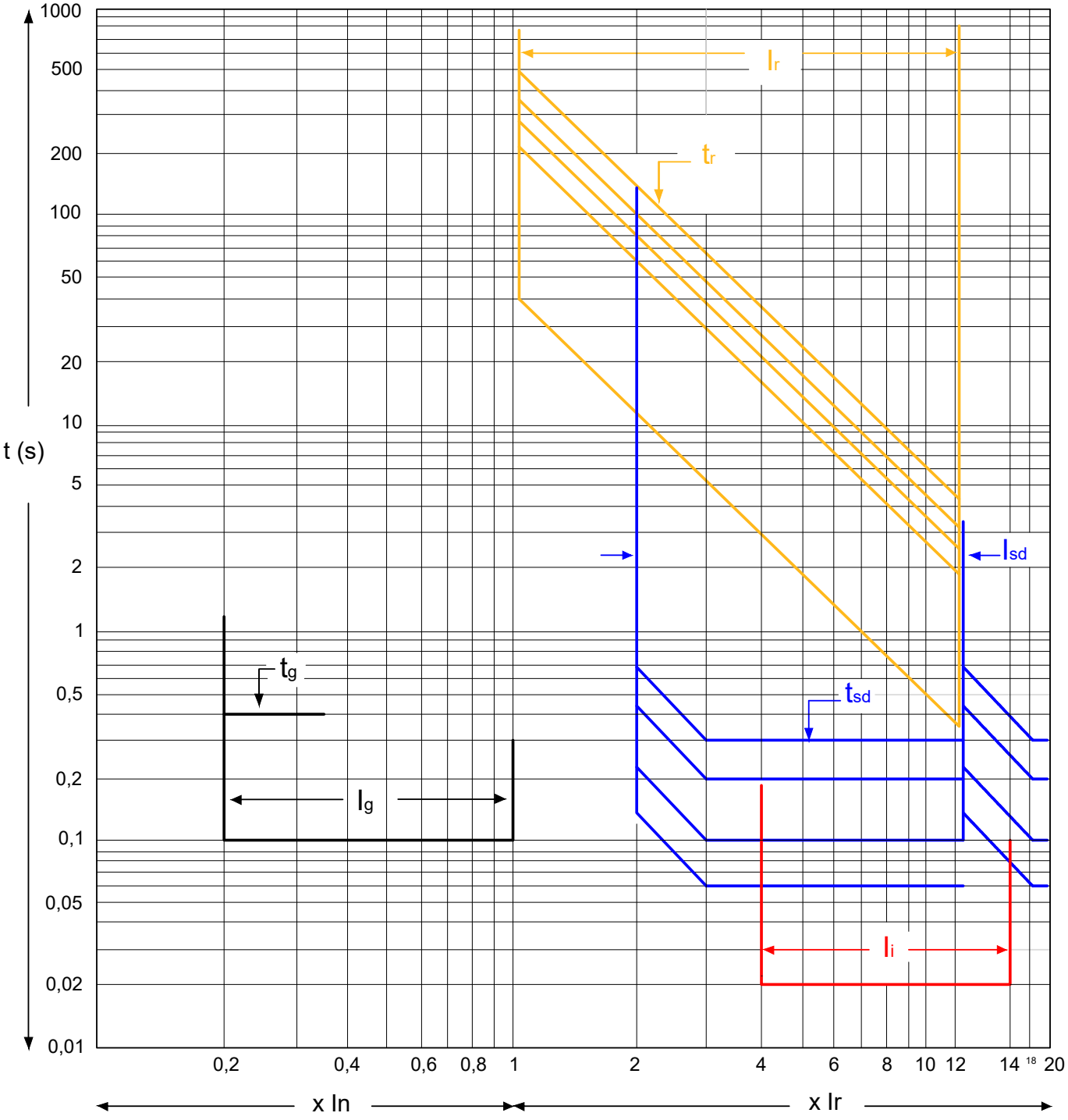

| Electronic type with button | |
|---|---|
| **1** | Trip indicator LED |
| **2** | Pre trip alarm LED |
| **3** | Operation LED |
| **4** | Pre trip alarm setting multiple |
| **5** | Short circuit protection of high level faults |
| **6** | Short circuit protection time at low level faults |
| **7** | Short circuit protection of low level faults |
| **8** | Long delay time |
| **9** | Long delay current range |
| **10** | Debug port |
| **11** | Test port |




| Electronic type with LCD | |
|---|---|
| **1** | Trip indicator LED |
| **2** | Pre trip alarm LED |
| **3** | Operation LED |
| **4** | Go back to previous settings |
| **5** | Up & Down value |
| **6** | Setting and confirmation |
| **7** | Test port |
| **8** | Debug port |
| **9** | Display screen |

**Operation characteristic curve**

Current-time characteristic curve for electronic type MCCB



# ML Series | Earth leakage circuit breakers type

## Application scope

Earth Leakage Circuit Breakers (ELCB) are molded case circuit breakers used in low-voltage AC electrical circuits to provide electric shock protection and prevent fires from current leakages. ELCB is referred to as a 'Circuit-breaker incorporating residual current protection' (IEC/EN 60947-2) or a 'Residual current operated circuit breaker' (IEC/EN 61009-1). It is also known as a 'Ground-fault circuit-interrupter'.

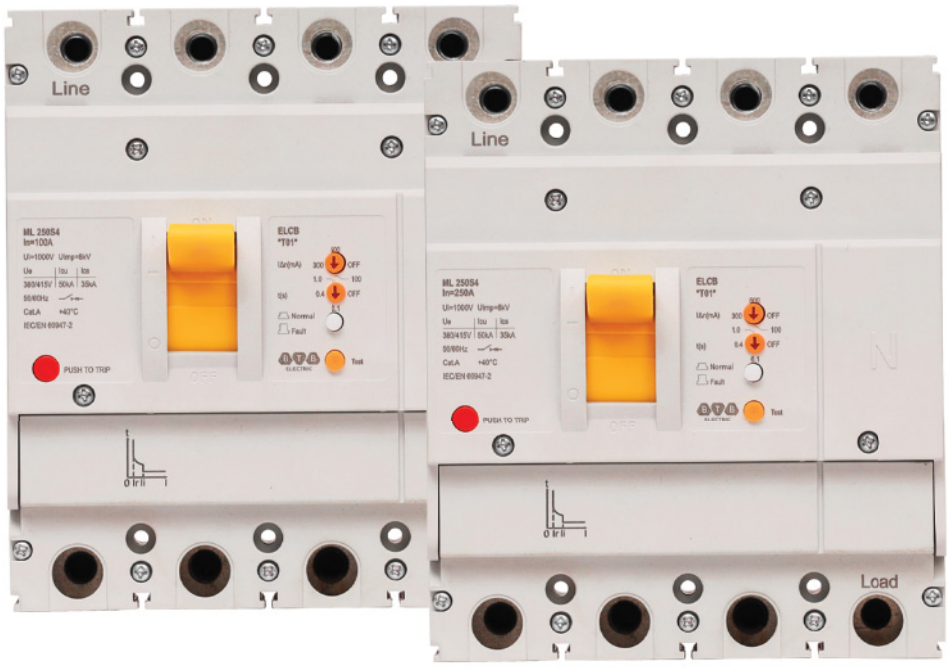
Why are ELCBs needed?

Awareness of electric shock injuries and short-circuit fires has increased, aiming to save human lives and assets. Additionally, the places requiring the installation of ELCBs have increased for legal reasons.

## Salient features

- Residual current circuit breakers are primarily used to provide protection against leakage current, which may cause insulation failure and electric shock to equipment and the human body, regardless of the standard protection against overload and short-circuit conditions.
- Designed with standardized accessory sizes, they seamlessly integrate with MCCBs.
- Offering adjustable residual current and current cut-off time settings, they provide flexibility and tailored protection.
- Ideal for use in 3-phase power supply systems, they ensure uninterrupted operation even in the event of a single-phase loss fault.

## Image and structure



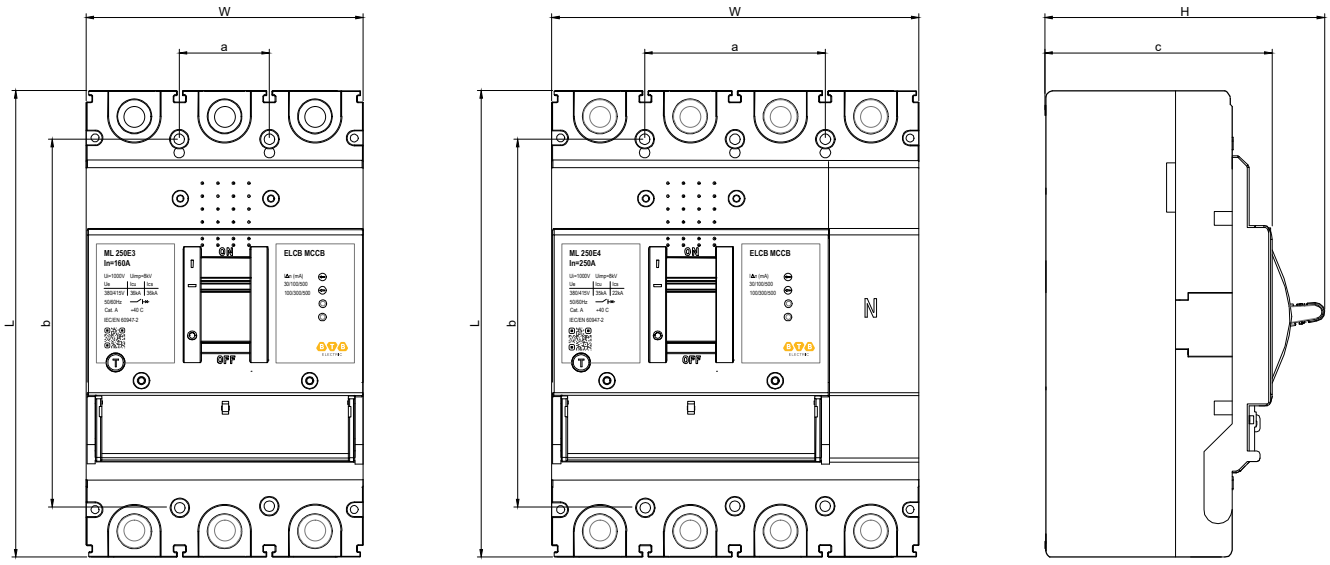
**Selection table**

| **Frame** | **A** | **250** | | **400** | | **800** | |
|---|---|---|---|---|---|---|---|
| **Type and pole** | **4P** | **ML250E4** | **ML250S4** | **ML400E3** | **ML400S4** | **ML800E4** | **ML800S4** |
| Rated current at 40°C, In | A | 100-125-160-200-250 | | 250-315-350-400 | | 630-700-800 | |
| Rated Operational Voltage, Ue | V | 440 | | 440 | | 440 | |
| Rated Insulation Voltage, Ui | V | 1000 | | 1000 | | 1000 | |
| Impulse Withstand Voltage, Uimp | kV | 8 | | 8 | | 8 | |
| Reference Standard | | IEC/EN 60947-2 | | IEC/EN 60947-2 | | IEC/EN 60947-2 | |
| Suitablilty for Isolation | | Yes | | Yes | | Yes | |
| Polution Degree | | 3 | | 3 | | 3 | |
| Utilization Category | | A | | A | | A | |
| Rated residual operating current IΔn(mA) | | G6 or G7 | | G7 | | G8 | |
| IΔn (Without time delay) | mA | 30/100/500<br>100/300/500 | | 100/300/500 | | 300/500/1000 | |
| IΔn (With time delay) | mA | 100/300/500 | | 100/300/500 | | 300/500/1000 | |
| Rated residual non-operating current | mA | ½ IΔn | | ½ IΔn | | ½ IΔn | |
| Breaking time at a residual current | s | 2IΔn | | 5IΔn | | 10IΔn | |
| **Max. breaking times** | | | | | | | |
| Without time delay | s | 0.15 | | 0.04 | | 0.04 | |
| With time delay | s | 0.4/1 | | 0.4/1 | | 0.4/1 | |
| Trip unit: Thermal Magnetic | | *T01* | | *T01* | | *T01* | |
| Long time, LT | Ir | 1.0xIn | | 1.0xIn | | 1.0xIn | |
| Instantaneous, INST | Ii | 10xIn | | 10xIn | | 10xIn | |
| Breaking capacity level | | E | S | E | S | E | S |
| Rated ultimate short-circuit breaking capacity, Icu (380/415V) | kA | 22 | 35 | 35 | 65 | 35 | 65 |
| Rated service short-circuit breaking capacity, Ics (380/415V) | kA | 22 | 35 | 35 | 65 | 35 | 65 |
| Mechanical Endurance | | 8500 | | 7000 | | 4000 | |
| Electrical Endurance | | 1500 | | 1000 | | 1000 | |
| **Accessories** | | | | | | | |
| Auxiliary switch | AUX | ■ | | ■ | | ■ | |
| Alarm switch | ALT | ■ | | ■ | | ■ | |
| Shunt trip | SHT | ■ | | ■ | | ■ | |
| Undervoltage trip | UVT | ■ | | ■ | | ■ | |
| Motor operator | MOT | ■ | | ■ | | ■ | |
| Extended Rotary Handle | ERH | ■ | | ■ | | ■ | |
| Dimensions mm (W x L x H) | 3P | 107x165x100 | | 150x257x148 | | 210x280x155 | |
| | 4P | 142x165x100 | | 198x257x148 | | 280x280x155 | |

“■” shows it has this option; “□ ” means it has no this option.

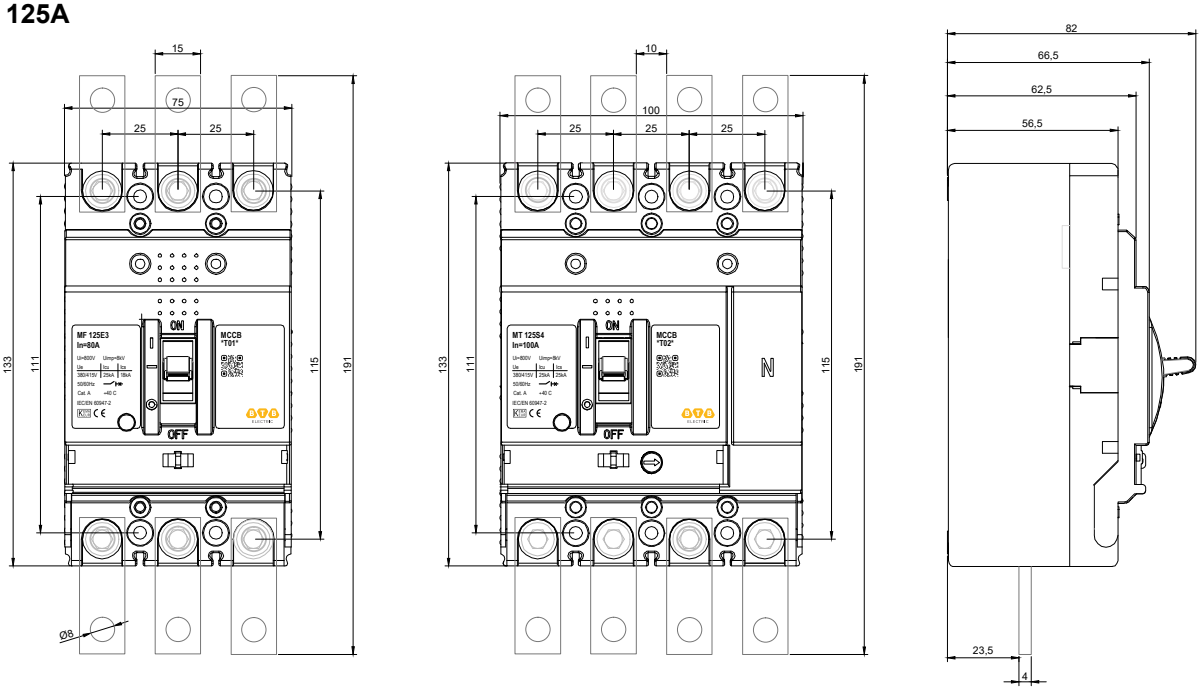
## Dimensions

| Frame | Type | Poles | Outline Dimension (mm) | | | | Installation Dimension (mm) | | | Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | W | L | H | c | a | b | d | kg |
| **250** | ML 250E4; ML 250S4 | 4 | 142 | 165 | 100 | 77 | 70 | 126 | Φ4.5 | 2.3 |
| **400** | ML 400E4; ML 400S4 | 4 | 198 | 257 | 148 | 111 | 88 | 194 | Φ7 | 7.6 |
| **800** | ML 800E4; ML 800S4 | 4 | 280 | 280 | 155 | 117 | 140 | 243 | Φ7 | 13.1 |

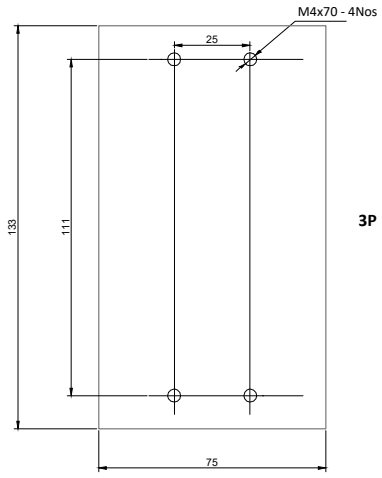


# Dimensions

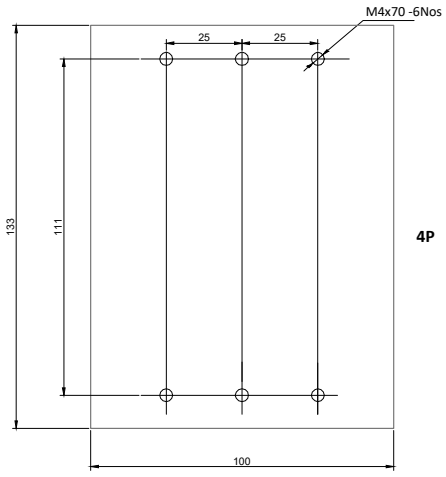
## Frame 125A




### Panel drilling

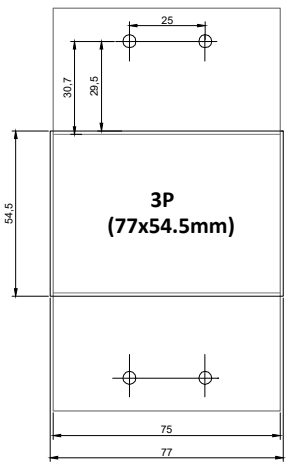


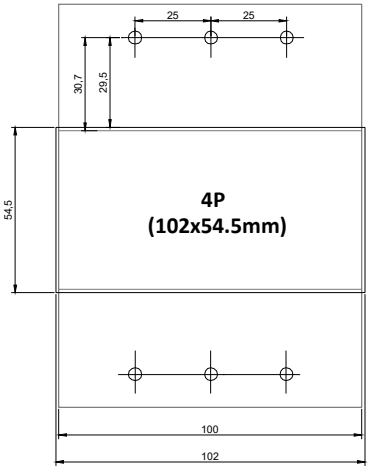

3P



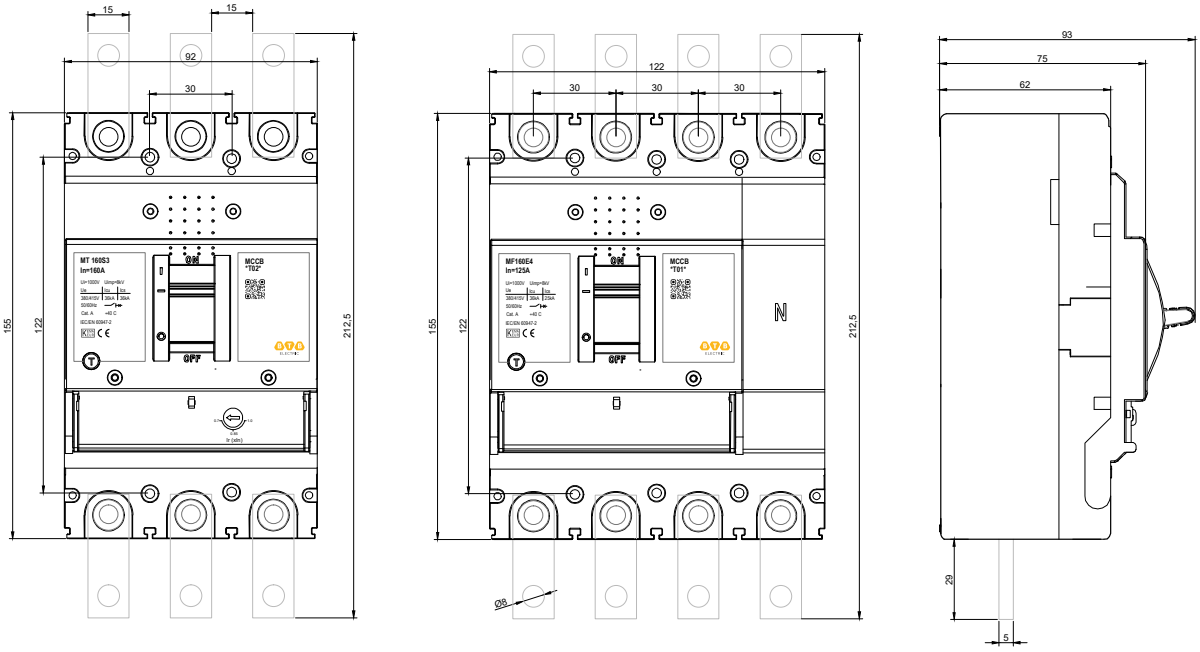

4P

### Front panel cutting

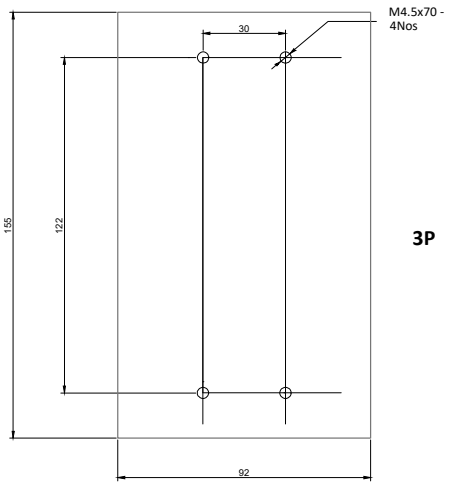


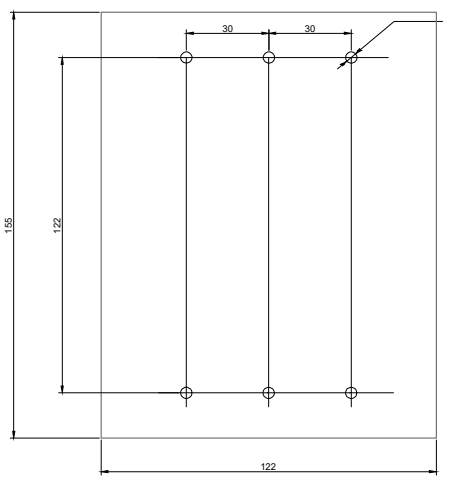
## Frame 160A




### Panel drilling

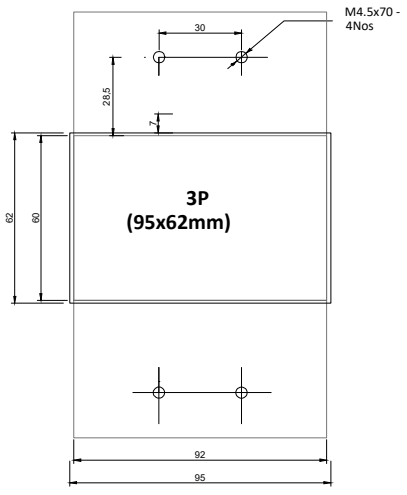


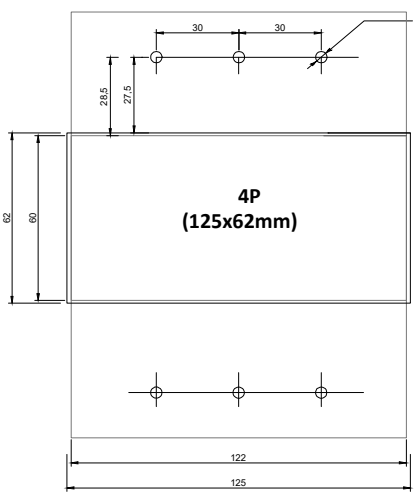

3P



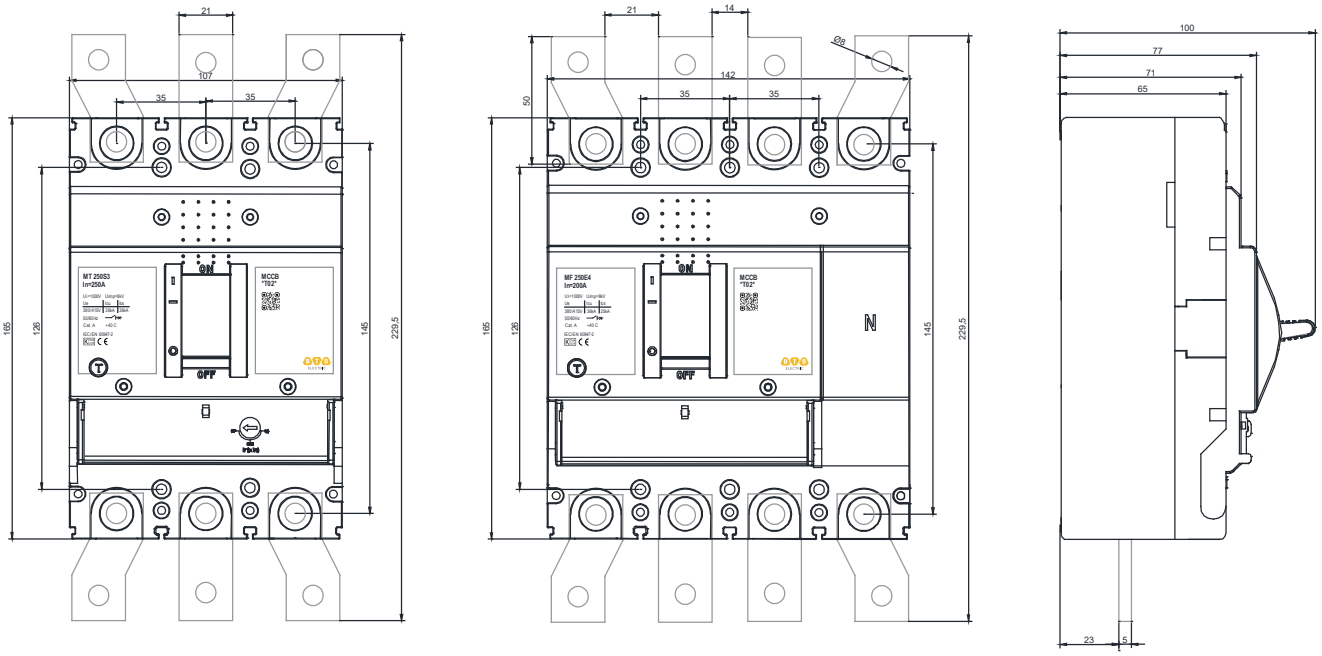

4P

### Front panel cutting

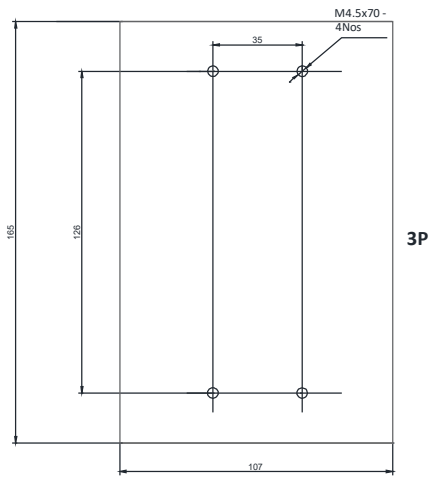


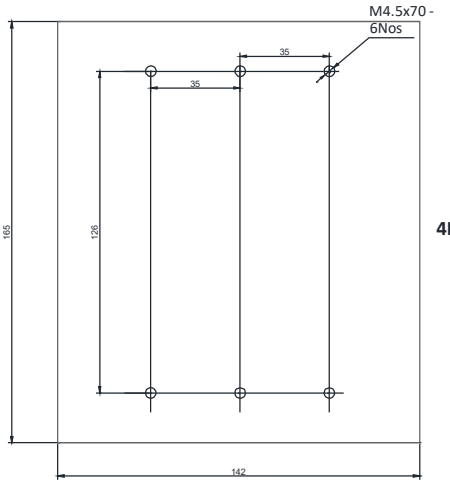
## Frame 250A




### Panel drilling

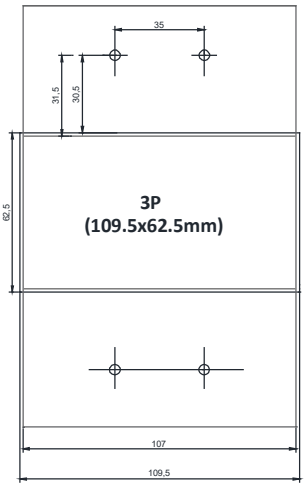


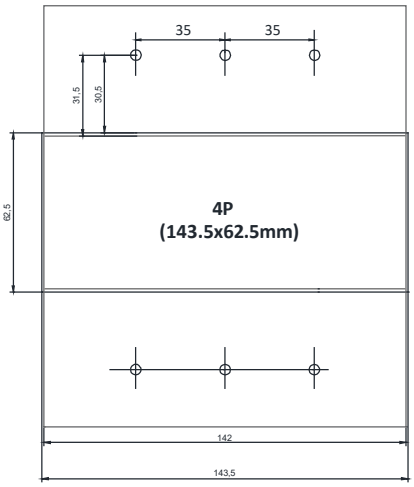

3P



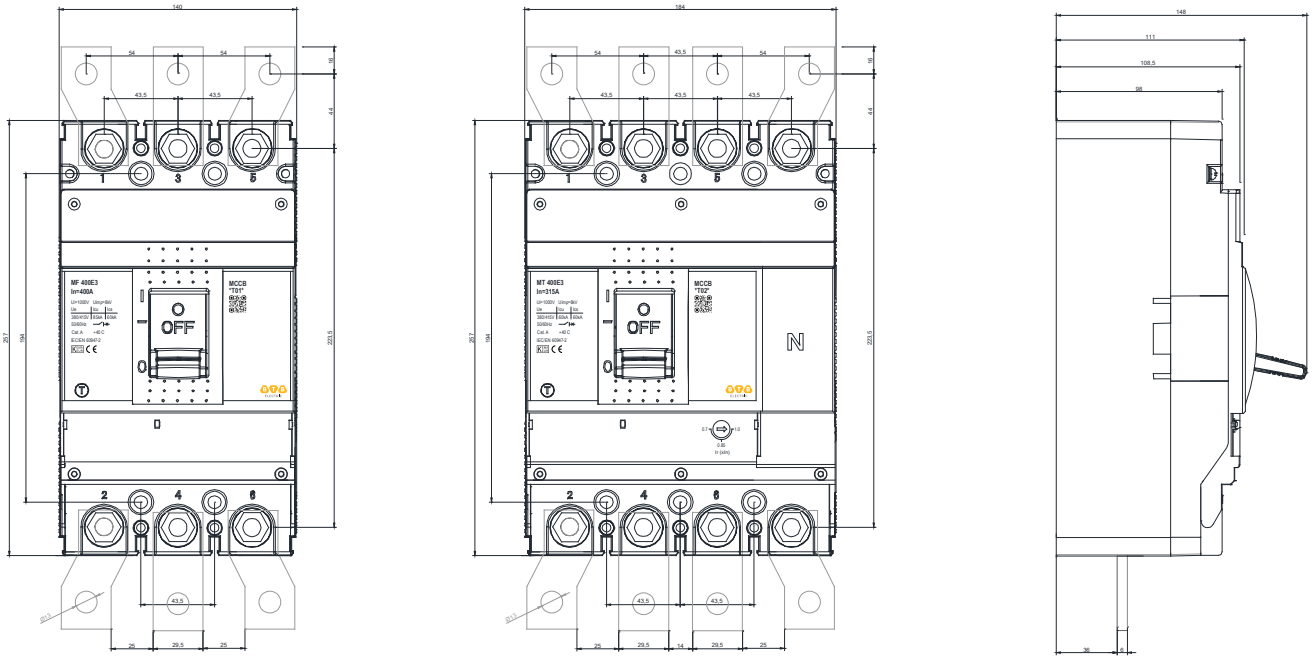

4P

### Front panel cutting

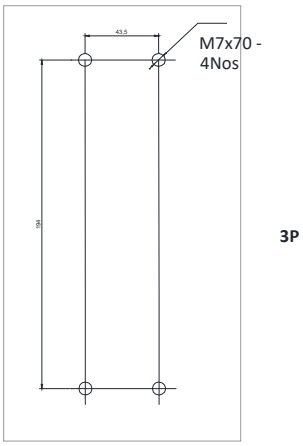


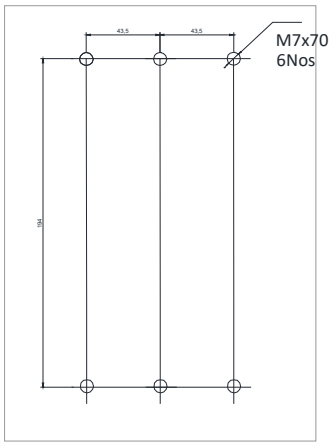
## Frame 400A for MF, MT




### Panel drilling

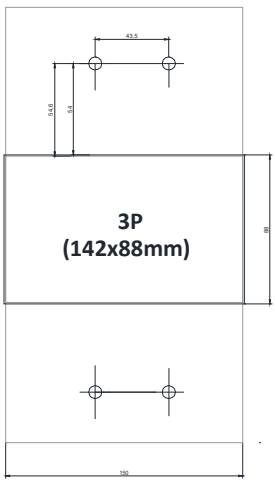


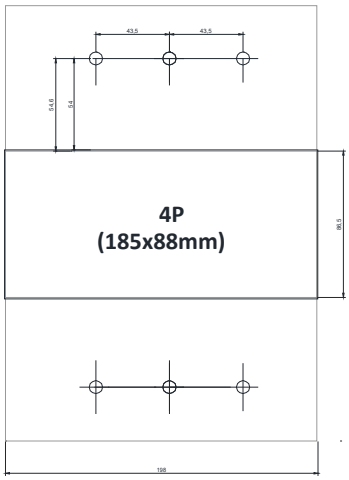

3P



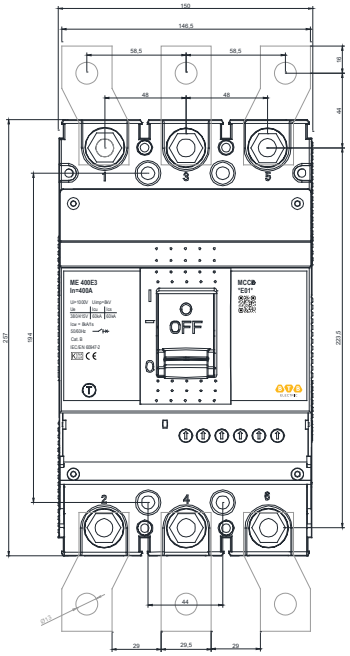

4P

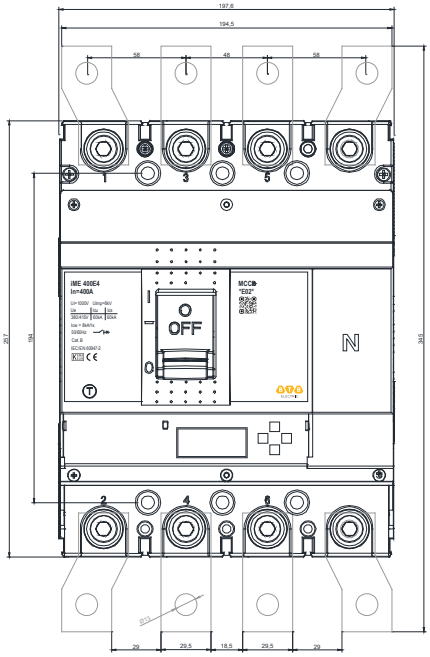
### Front panel cutting

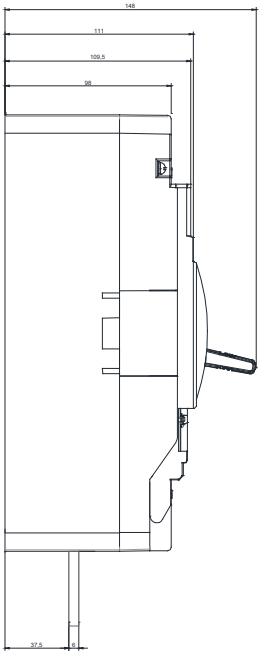


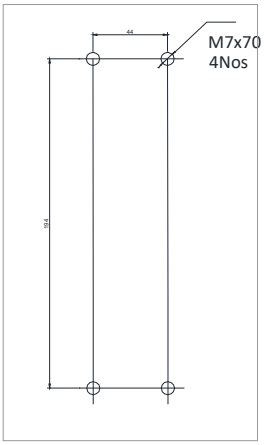
## Frame 400A for ME, iME



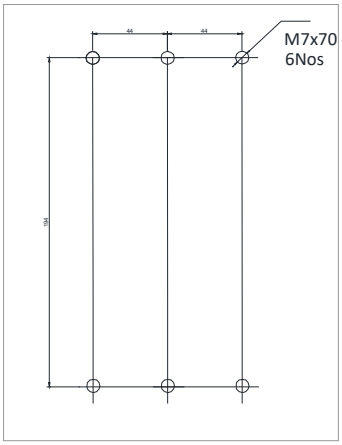



### Panel drilling

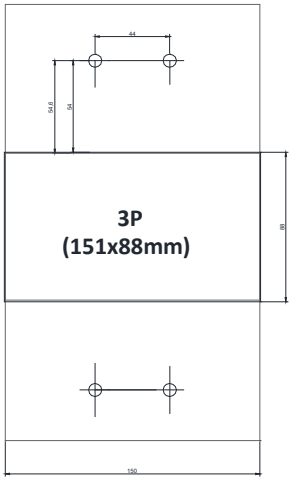


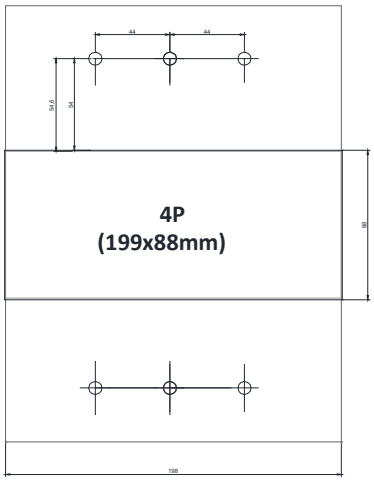

3P



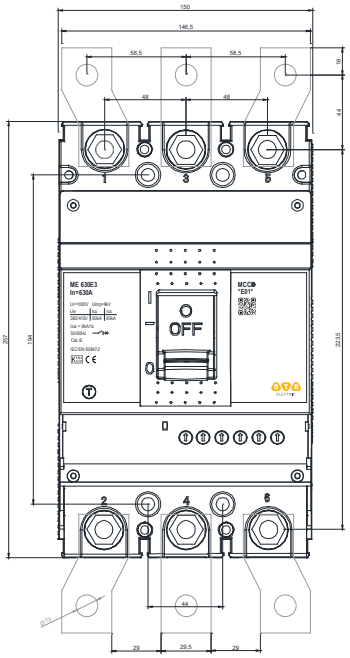

4P

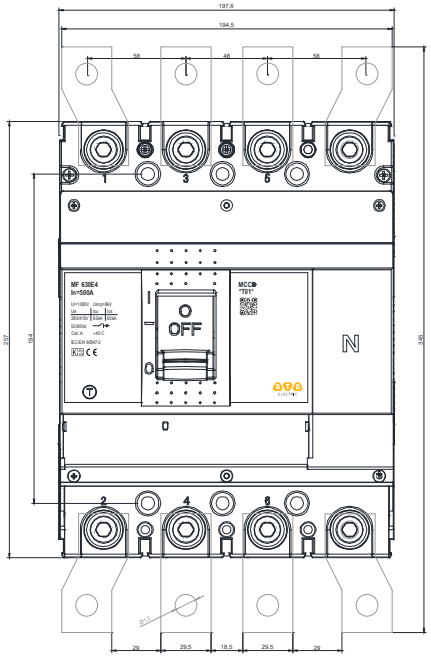
### Front panel cutting

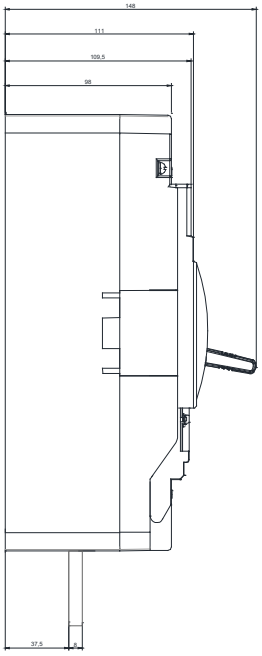


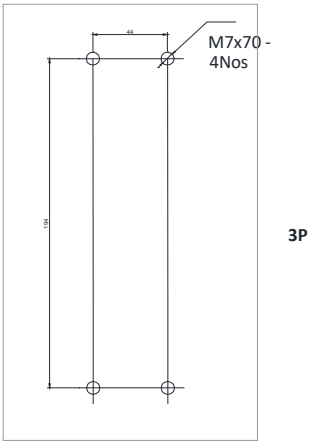
## Frame 630A



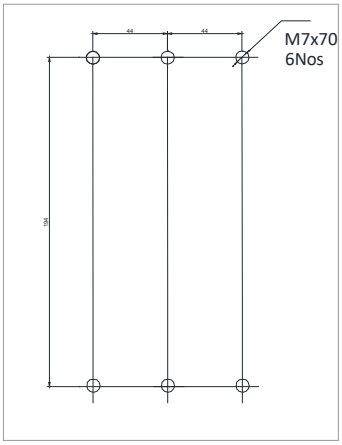



### Panel drilling

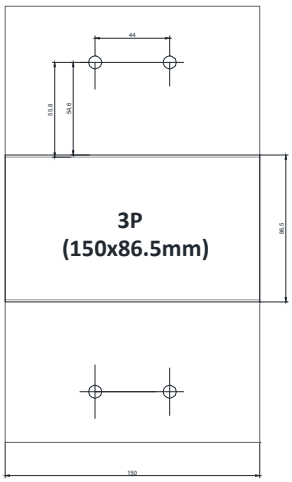


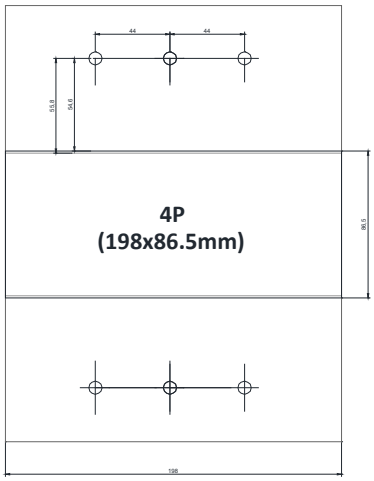

3P



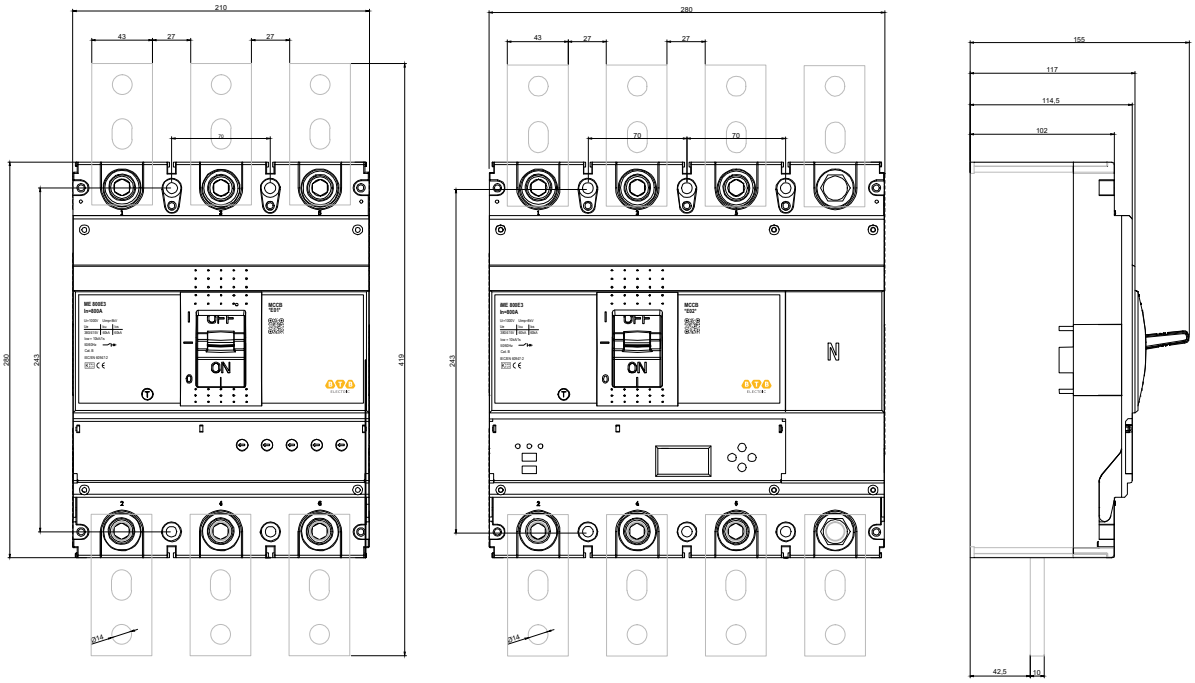

4P

### Front panel cutting



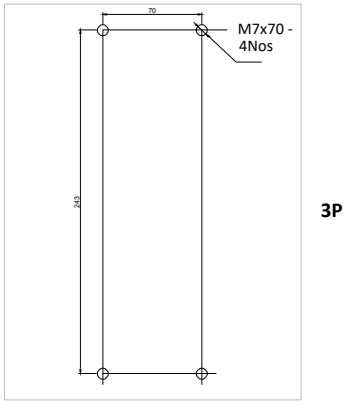
## Frame 800A



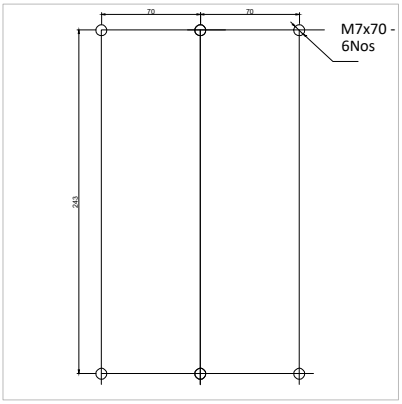

3P

4P

### Panel drilling

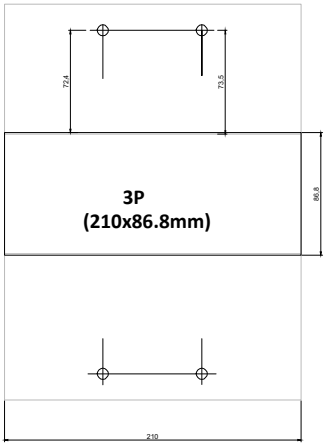


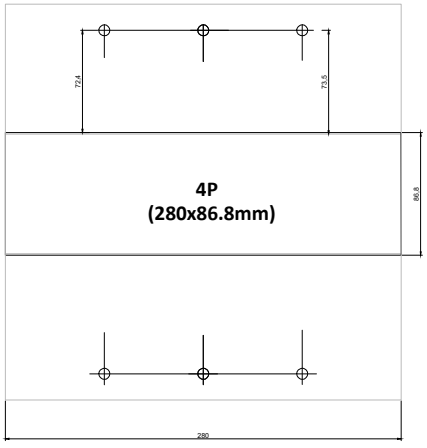

3P



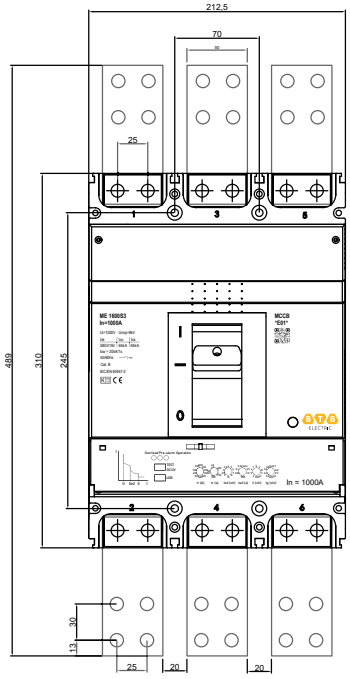

4P

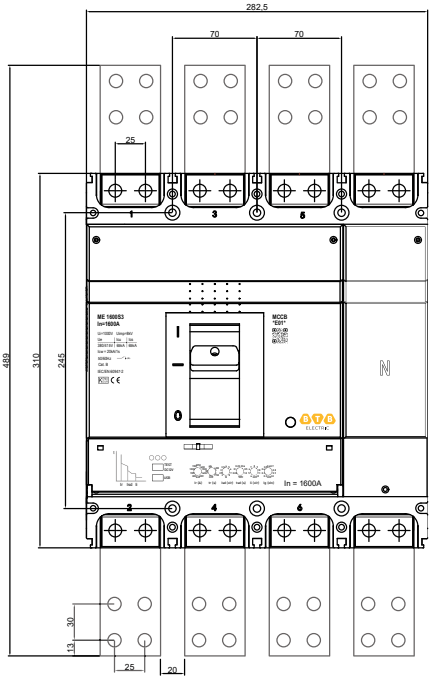
### Front panel cutting

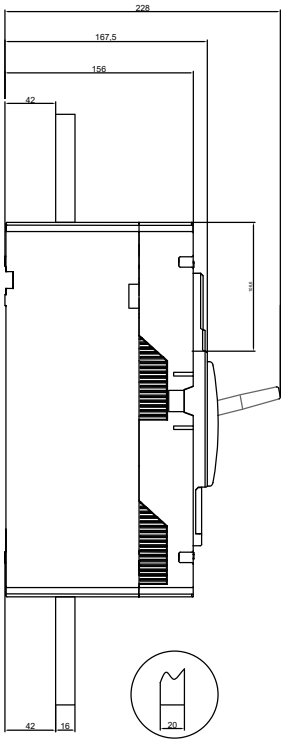


## Frame 1600

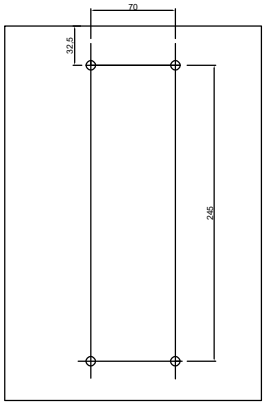


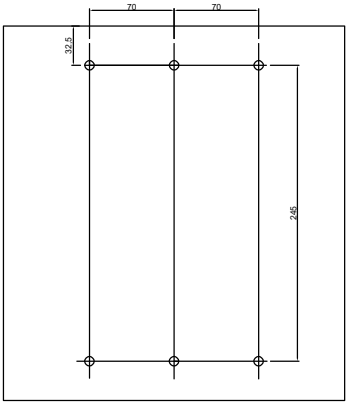




**1000-1250A** **1600A**

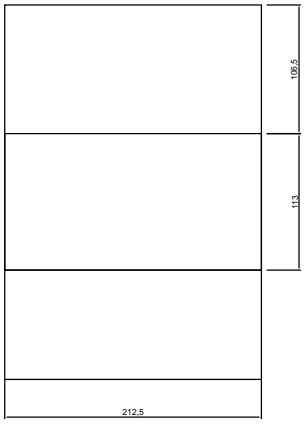
**Panel drilling**



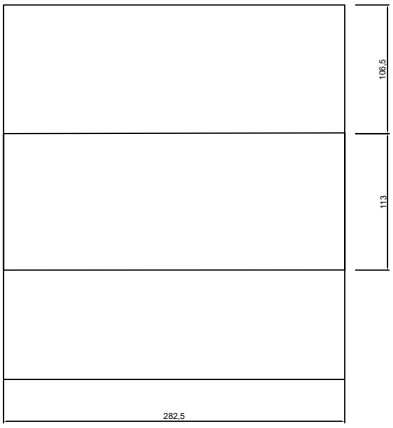




**3P** **4P**

**Front panel cutting**

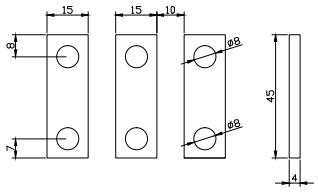



**3P**
**(212.5x113mm)**

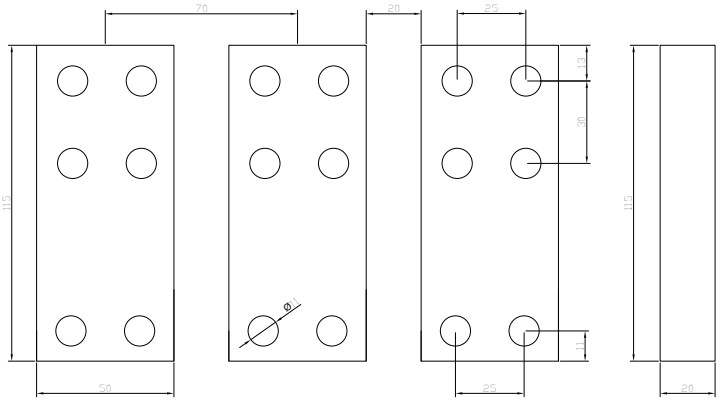



**4P**
**(282.5x113mm)**

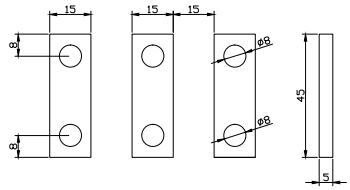
## Spreader links



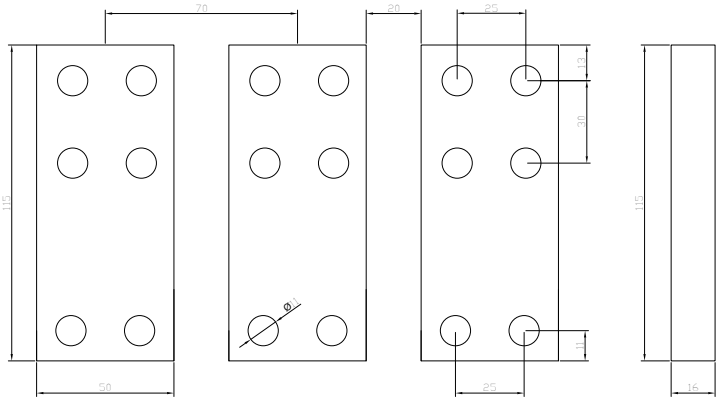

Frame 125A



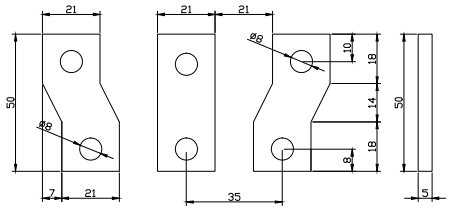

Frame 1600A / 1600A



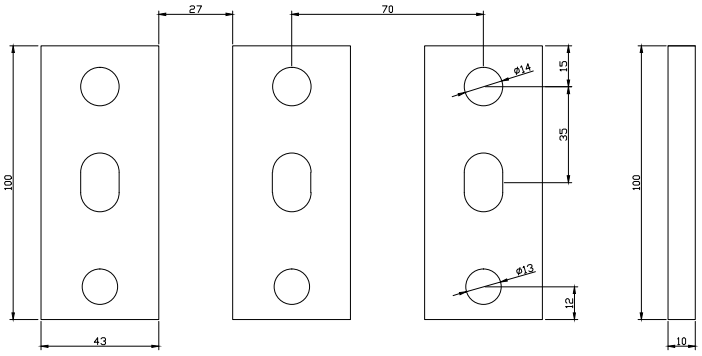

Frame 160A



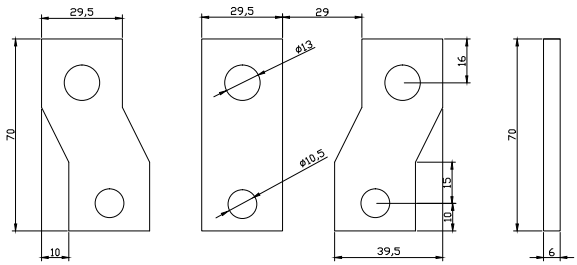

Frame 1600A / 1250A, 1000A



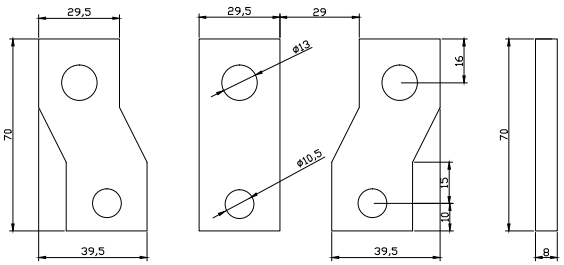

Frame 250A




Frame 800A



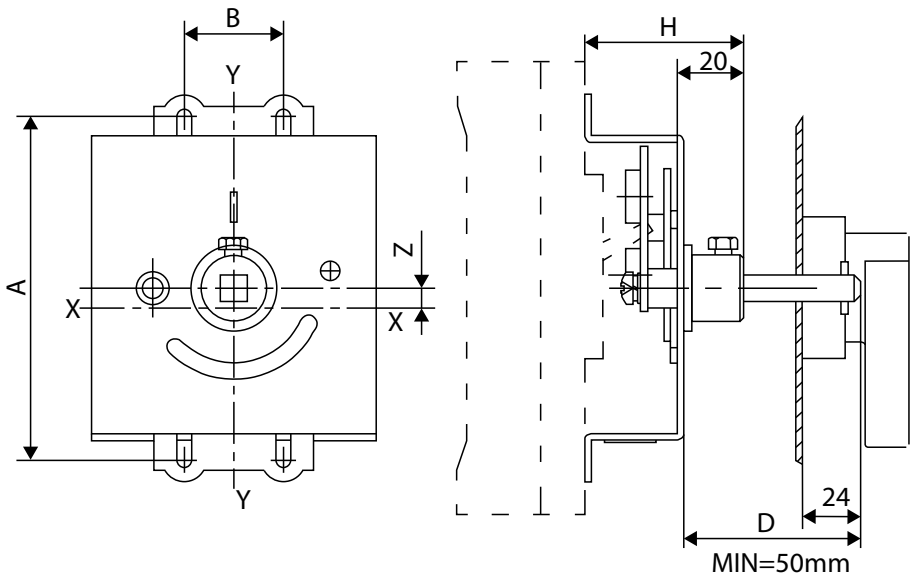

Frame 400A



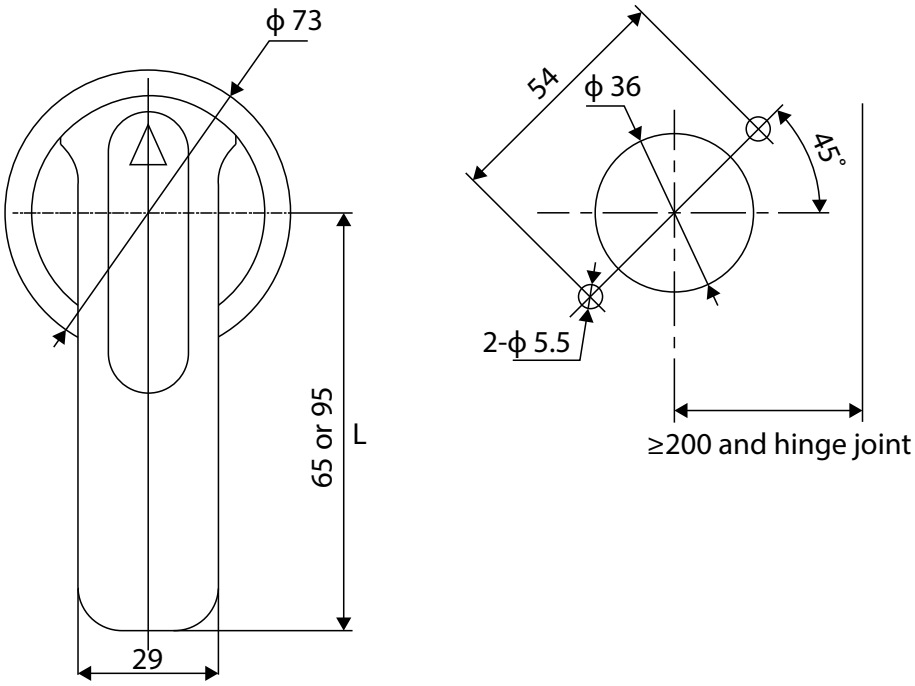

Frame 630A

**Extended Rotary Handle**

Mounting with MCCB dimensions

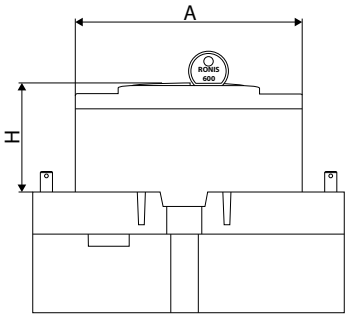



Handle and door cutting dimensions(mm)



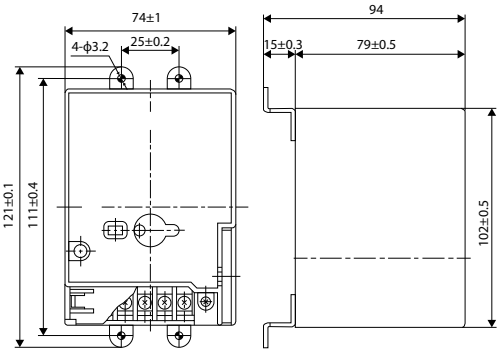

| Model | Installation dimensions (mm) | | | |
|---|---|---|---|---|
| | A | B | H | L |
| ERH125M | 111 | 25 | 53 | 65/95 |
| ERH160M | 122 | 30 | 58 | 65/95 |
| ERH250M | 143 | 35 | 63 | 65/95 |
| ERH400M | 221.5 | 44 | 77 | 65/95 |

## Motor operator

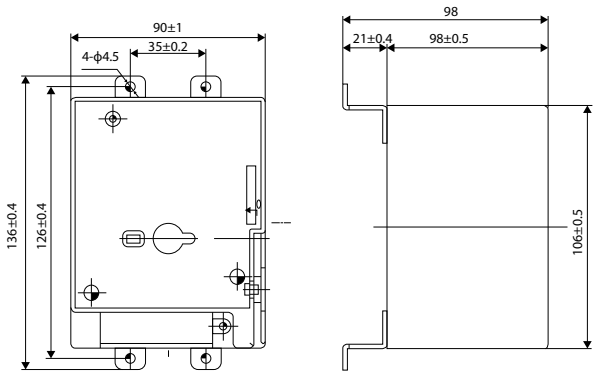



| Frame | A | H |
|---|---|---|
| 125 | 102 | 94 |
| 160 | 116 | 96.5 |
| 250 | 116 | 98 |
| 400 | 176 | 144 |
| 630/800 | 176 | 144 |

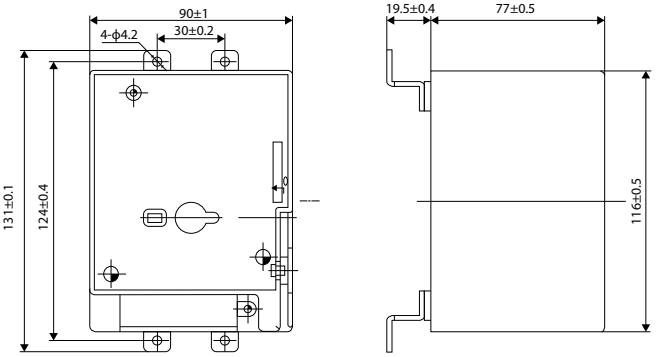
MOT125



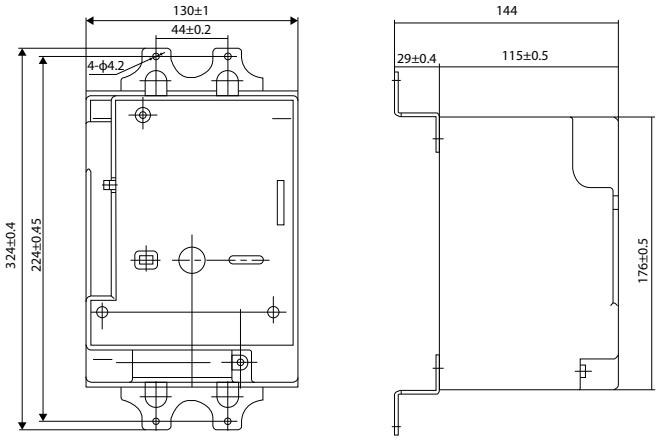

MOT250



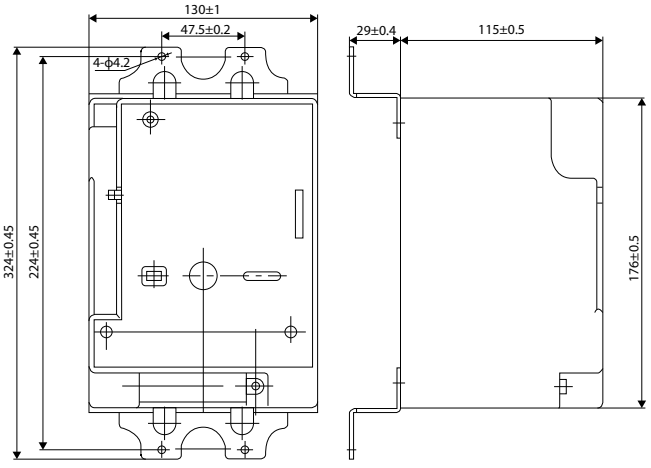

MOT160



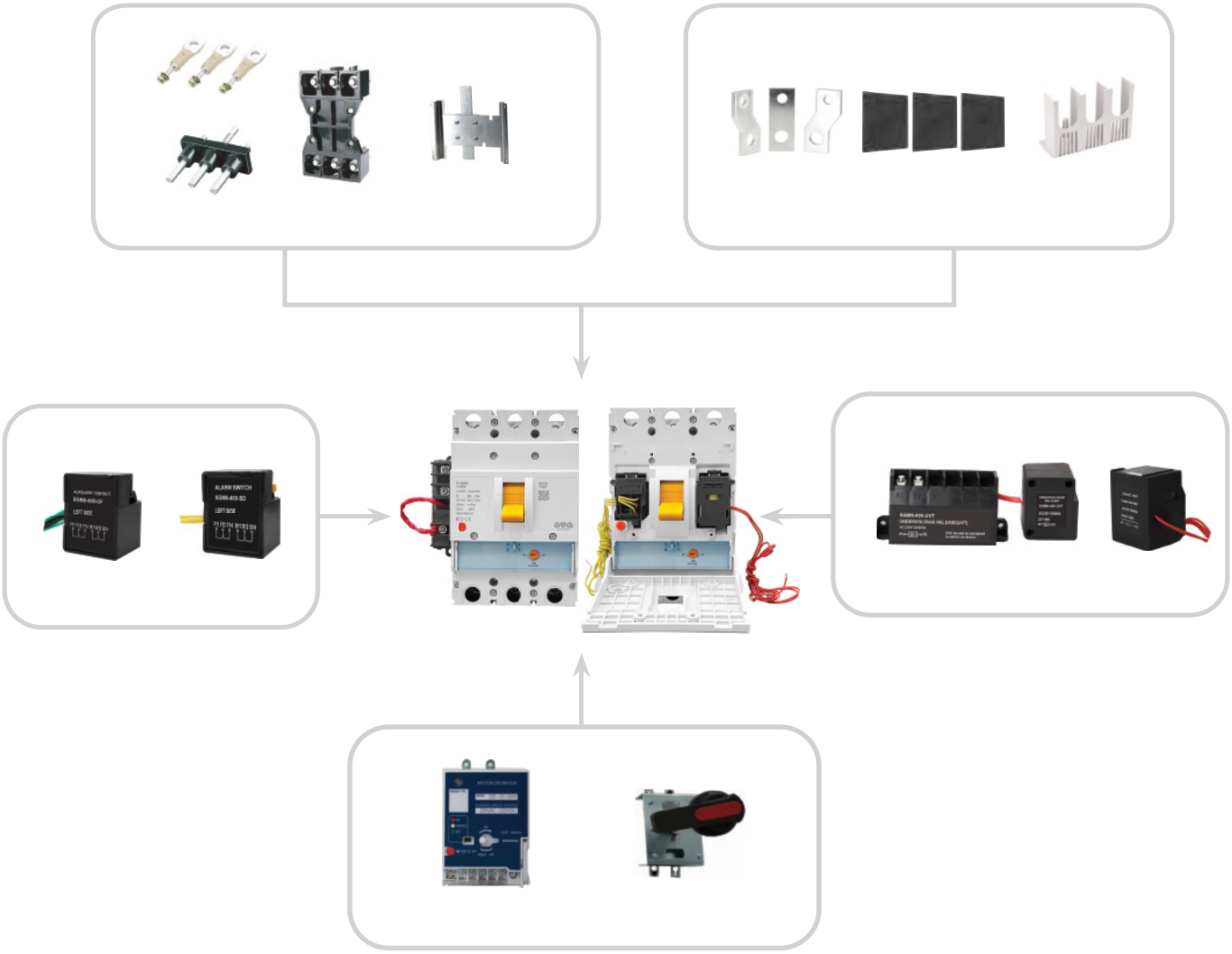

MOT400




MOT630/800



# Accesories



**Auxiliary switch**

- Breaking capacity: 1.5A at 240VAC; 0.27A at 220VDC
- Available joining conductors.
- Options: 1NO1NC, 2NO2NC

| Frame | Contact | Model | |
|---|---|---|---|
| | | Left | Right |
| 125 | 1NO1NC | AUX11L125M | AUX11R125M |
| | 2NO2NC | AUX22L125M | AUX22R125M |
| 160 | 1NO1NC | AUX11L160M | AUX11R160M |
| | 2NO2NC | AUX22L160M | AUX22R160M |
| 250 | 1NO1NC | AUX11L250M | AUX11R250M |
| | 2NO2NC | AUX22L250M | AUX22R250M |
| 400/630/800 | 1NO1NC | AUX11L400M | AUX11R400M |
| | 2NO2NC | AUX22L400M | AUX22R400M |
| 1600 | 1NO1NC | AUX11L1600M | AUX11R1600M |
| | 2NO2NC | AUX22L1600M | AUX22R1600M |

### Alarm switch

- Breaking capacity: 1.5A at 240VAC; 0.27A at 220VDC
- Available joining conductors.
- Standard model: 1NO1NC

| Frame | Model | |
|---|---|---|
| | Left | Right |
| 125 | ALT11L125M | ALT11R125M |
| 160 | ALT11L160M | ALT11R160M |
| 250 | ALT11L250M | ALT11R250M |
| 400/630/800 | ALT11L400M | ALT11R400M |
| 1600 | ALT11L1600M | ALT11R1600M |

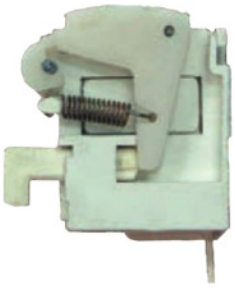
### Shunt trip

- Operating voltage: 230/400V 50Hz
- Operating voltage: (0.7~1.1)Us
- Standard model: Left
- Available joining conductors.

| Frame | Model | |
|---|---|---|
| | AC230V | AC400V |
| 125 | SHTP7L125M | SHTV7L125M |
| 160 | SHTP7L160M | SHTV7L160M |
| 250 | SHTP7L250M | SHTV7L250M |
| 400/630/800 | SHTP7L400M | SHTV7L400M |
| 1600 | SHTP7L1600M | SHTV7L1600M |

### Undervoltage trip

- Action voltage (0.35~0.7)Us
- Reliable making voltage (0.85~1.1)Us
- Standard model: Right
- Available joining conductors.



| Frame | Model | |
|---|---|---|
| | AC230V | AC400V |
| 125 | UVTP7R125M | UVTV7R125M |
| 160 | UVTP7R160M | UVTV7R160M |
| 250 | UVTP7R250M | UVTV7R250M |
| 400/630/800 | UVTP7R400M | UVTV7R400M |
| 1600 | UVTP7R1600M | UVTV7R1600M |

### Motor operator

- Operating voltage: 230/400V 50/60Hz; 110/220VDC
- Operating voltage: (0.85~1.1)Us
- The base is bolted right on the cover, used to control the MCCB remotely / locally via the motor.

| Frame | Model | | |
|---|---|---|---|
| | AC230V | AC400V | DC220V |
| 125 | MOTP7125M | MOTV7125M | MOTMD125M |
| 160/250 | MOTP7160M | MOTV7160M | MOTMD160M |
| 400/630/800 | MOTP7400M | MOTV7400M | MOTMD400M |

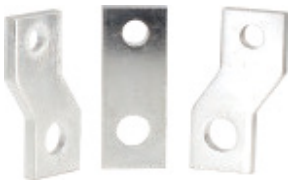
### Extended Rotary Handle

- The circuit breaker can be operated by the rotation of the handle and the ergonomically designe rotation handle makes the operation of the circuit breaker more flexible.
- 3 position indications: OFF, ON and TRIP.
- The circuit breaker cannot be switched on when the door is open.
- The door cannot be opened when the circuit breaker is switched on.
- The axial length of the extended handle can be custom made according to the distance from the back of the circuit breaker to the door (defult 150mm).

| Frame | Contact |
|---|---|
| 125 | ERH125M |
| 160 | ERH160M |
| 250 | ERH250M |
| 400/630 | ERH400M |

### Spreader links

- The spreader links are connected to the terminal of the circuit breaker, in order to provide many other wiring schemes in the limited space:
  - Direct spreader links.
  - Spreader link with inter-electrode distance.
- The busbar and extension terminal can be connected to the inlet or outlet terminal of the circuit breaker.



| Frame | Model | |
|---|---|---|
| | 3P (6pcs) | 4P (8pcs) |
| 125 | SP3P125M | SP4P125M |
| 160 | SP3P160M | SP4P160M |
| 250 | SP3P250M | SP4P250M |
| 400 | SP3P400M | SP4P400M |
| 630 | SP3P630M | SP4P630MM |
| 800 | SP3P800M | SP4P800M |
| 1600 (1000A/1250A) | SP3P1000M | SP4P1000M |
| 1600 (1600A) | SP3P1600M | SP4P1600M |

### Rear connection

Easy to install and connect the products in the rear connection.

| Frame | Model | |
|---|---|---|
| | 3P (6pcs) | 4P (8pcs) |
| 125 | RC3P125M | RC4P125M |
| 160 | RC3P160M | RC4P160M |
| 250 | RC3P250M | RC4P250M |
| 400 | RC3P400M | RC4P400M |
| 630 | RC3P630M | RC4P630M |
| 800 | RC3P800M | RC4P800M |

## Plug-in

- The wiring type is divided into plug-in Rear Connection and plug-in Front Connection.
- The plug-in connection for the products is easy for maintenance and replacement, but plug-in and plug-out cannot be done with the electricity.

| Frame | Connection type | Model | |
|---|---|---|---|
| | | 3P | 4P |
| 125 | Front connection | PF3PF125M | PF4PF125M |
| | Rear connection | PF3PR125M | PF4PR125M |
| 160 | Front connection | PF3PF160M | PF4PF160M |
| | Rear connection | PF3PR160M | PF4PR160M |
| 250 | Front connection | PF3PF250M | PF4PF250M |
| | Rear connection | PF3PR250M | PF4PR250M |
| 400/630 | Front connection | PF3PF400M | PF4PF400M |
| | Rear connection | PF3PR400M | PF4PR400M |
| 800 | Rear connection | PF3PR800M | PF4PR800M |

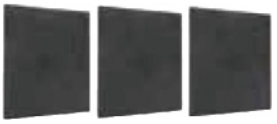
## Mechanical interlock

- Mechanical interlock is intended to prohibit both power sources from being simultaneously connected to the load.
- The interlocking system disables one circuit breaker by mechanically preventing handle movement from the Off position while the other circuit breaker is in the On position.

| Frame | Model | |
|---|---|---|
| | 3P | 4P |
| 125 | MI3P125M | MI4P125M |
| 160 | MI3P160M | MI4P160M |
| 250 | MI3P250M | MI4P250M |
| 400/630 | MI3P400M | MI4P400M |
| 800 | MI3P630M | MI4P630M |

## Interphase barriers

The interphase barriers can enhance the insulating performances between phase and phases. They can be installed from the product front even though the products had mounted Interphase barriers will be offered by standard, 3P product(4pcs), 4P product(6pcs).

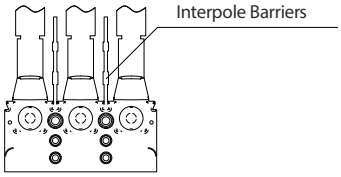


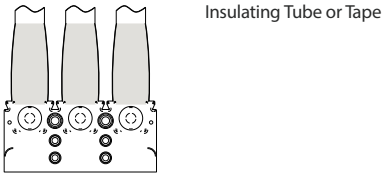
| Frame | Model | |
|---|---|---|
| | 3P (4pcs) | 4P (6pcs) |
| 125/160/250 | IB3P125M | IB4P125M |
| 400/630/800 | IB3P400M | IB4P400M |
| 1600 | IB3P1600M | IB4P1600M |

# Installations

**Precaution**

- Installation should be performed by a licensed worker.
- Always check if the circuit breaker is in the open position before wiring.
- Use the specified torque when tightening terminal bolts to connect busbars or wires. Loose connections may lead to faults.
- Ensure that terminal bolts are properly tightened as specified in the manual or catalog. Loose connections may cause short circuits.
- Provide sufficient insulation space to prevent blockage of arc gas vents. Blocked vents may result in trip operation failure.
- Avoid installing the breaker in environments with hot and humid air, dust, corrosive gas, vibration, or shock, as this may cause fire or malfunction.
- Take appropriate measures to prevent the entry of foreign substances after installation to prevent fires or malfunctions.
- This product is designed for use with insulation barriers. Using it without insulation barriers may lead to additional short-circuit faults.

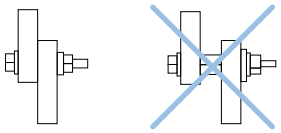



**Connections to the Power Circuit**

- Prior to installation, ensure that connection terminals are thoroughly cleaned:

To prevent an increase in contact resistance, remove any dust, dirt, or damage.

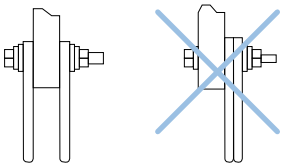


- Conductors should be connected directly:

Avoid using bolts or nuts between conductors. Failure to connect conductors directly may result in elevated temperatures and potential fires.

- Conductors should be connected without overlap:

When connecting multiple conductors, ensure that the busbar is installed on both sides to prevent overlap.



**Inspection and Maintenance**

Initial Inspection

- Ensure that terminal parts are free from dust, metal pieces, and other debris.
- Inspect the breaker for any cracks or damage.
- Check terminal parts to ensure they are tightened to the specified torque.
- Verify the values of Ue and Icu for the breakers.
- Test insulation resistance, which should be more than 5 MΩ.

- Dielectric Test

| Main Circuit | | Secondary and Control Circuit | |
|---|---|---|---|
| Rated Insulation Voltage [Ui] | Test Voltage | Rated Insulation Voltage [Ui] | Test Voltage |
| Ui ≤ 300 V | 2,000 V for 1 min | Uis ≤ 60 V | 1,000 V for 1 min |
| 300 < Ui ≤ 600 V | 2,500 V for 1 min | 60 V < Uis ≤ 600 V | 1,500 V for 1 min |

- Standard of Inspection

| Standard | Circumstance | Inspection Cycle after Installation |
|---|---|---|
| Normal | Clean air, no humidity | Within 10 years: Once 2 - 3 year |
| | | More than 10 years: Once a year |
| | | More than 15 years: Once 6 month |
| | Dust but no corrosive gas | Within 10 years: Once 1 year |
| | | More than 10 years: Once 6 month |
| | | More than 15 years: Once a year |
| Bad | Sulfurous gas, salinity, vapor | Within 5 years: Once 6 month |
| | | More than 5 years: Once a year |
| | Excessive corrosive gas | Once a month |

- Periodic Check Point

| Item of Inspection | Procedure | Trouble Shooting |
|---|---|---|
| Tightening terminal torque | Applying the tightening torque indicated in manual | Too strong tightening torque may cause damage |
| Dust and dirt | Confirm dust and dirt on breaker's body and upper side of the line part. Clean to secure insulation | Remove debris with a clean tool |
| Case | Check for damage and cracks on breakers | Replace with a new breaker if damaged or cracked |
| Arc exhaust part | Check terminal part for arc exhaust | Replace with a new breaker if black soot and melted metal parts are found |
| Operation | Manually turn On and OFF several times to reduce friction and stabilize contact resistance | Replace with a new breaker if malfunction occurs during ON and OFF operations or if mechanical and electrical durability limits are exceeded |
| Terminal discoloration | Check for discolored terminal and conductor parts. Confirm insulation capability on conductor parts | Lightly discolored silver coating parts are acceptable. Replace with a new breaker if insulation trouble is caused by heat |
| Insulation resistance | Measure insulation resistance between each pole, terminal, and earth | Insulation resistance should be more than 5 MΩ. Replace with a new breaker if insulation resistance is lower than 5 MΩ |

- If there is no pollution in the arc exhaust parts and no other abnormality, the breaker can be reused.
- Measure the insulation resistance when carbonizing symptoms are found around the arc exhaust parts. If the resistance value is more than 5MΩ, there is no dielectric breakdown at the withstand test voltage, and there is no excessive temperature rise of terminal parts, the breaker can be reused.
- If the handle part is carbonized or there is metallic melting in the internal parts of the breaker, please replace it with a new one.

# Ordering types

| a | b | c | d | e | f | g |
|---|---|---|---|---|---|---|
| M | E | 400 | S | 3 | 320A | - |

**a** Series
**b** Type of release
**c** Frame
**d** Short-Circuit Capacity
**e** Number of Poles
**f** Rated current
**g** Rated residual current

| a | Series |
|---|---|
| M | MCCB M-series |
| iM | MCCB M-series with LCD |

| b | Type of release |
|---|---|
| F | Fixed Type |
| T | Thermal Adjustable Type |
| E | Electronic Type |
| L | Earth Leakage Circuit Breakers |

| c | Frame |
|---|---|
| 100 | 100A |
| 125 | 125A |
| 160 | 160A |
| 225 | 225A |
| 250 | 250A |
| 400 | 400A |
| 630 | 630A |
| 800 | 800A |
| 1250 | 1250A |
| 1600 | 1600A |

| d | Short-Circuit Capacity |
|---|---|
| E | E type |
| S | S type |
| H | H type |
| L | L type |

| e | Number of Poles |
|---|---|
| 2 | 2 Pole |
| 3 | 3 Pole |
| 4 | 4 Pole |

| f | Rated current |
|---|---|
| 20A | 20A |
| 25A | 25A |
| 32A | 32A |
| ... | ... |
| 1600A | 1600A |

| g | Rated residual current |
|---|---|
| G6 | 30/100/500mA |
| G7 | 100/300/500mA |
| G8 | 300/500/1000mA |

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