



M-SERIES


Technical Catalogue

Miniature Circuit Breaker

Residual Current Circuit Breaker

Residual Current Circuit Overcurrent

B T B
ELECTRIC



**BTB Electric aims at the best solution
for perfect safety environment, customer
satisfaction through best quality and service**

Miniature Circuit Breaker suitable for protection against Overload & Short Circuit; Residual Current Circuit Breaker suitable for Ground fault & over circuit; Miniature Switch Disconnecter.

Standard IEC/EN 60898-1, IEC 61008-1, IEC 61009-1 & IEC/EN 60947-2, 3



Contents

- 02** Miniature Circuit Breaker
- 08** Residual Current Circuit Breaker
Residual Current Circuit Overcurrent
- 14** Miniature Switch Disconnecter
- 17** Circuit Breaker Accessory
- 19** Handling and Maintenance Inspection

MA63E/S
MA125E/S
Series

Miniature Circuit Breaker

Application scope

Miniature Circuit Breaker is an automatically operated electrical switch. Miniature circuit breakers are intended to prevent damage to an electrical circuit as a result of excess current. They are designed to trip during an overload or short circuit to protect against electrical faults and equipment failure. MCB is used in homes, factories and commercial centers etc.



Applied Standards and Certifications

- IEC/EN 60898-1 Circuit-breakers for overcurrent protection for household and similar installations.
- IEC/EN 60947-2 Low-voltage switchgear and controlgear.



Our **MA** series Miniature circuit breaker is certified by DEKRA certification body and uses the KEMA-KEUR mark on the product.

Ambient temperature

- Storage: -30°C ~ +65°C
- Operation: -5°C ~ +55°C

Altitude

Below 2,000m above sea level

Humidity

95%

Salient features

- Miniature circuit breakers have precisely formed molded case & cover of name retardant high strength thermoplastic material having high melting point, low water absorption, high dielectric strength and temperature withstand.
- The switching mechanism is independent, manual and trip free, i.e., the breaker trips internally even if the operating knob is held in ON position for reliability.
- The arc extinguishing device comprises of 11 plates arc chute. The arc under the action of the magnetic field and the arc guide is moved into the arc trough where it is quickly separated and extinguished. The tripping mechanism is thermal magnetic type.

Image and structure



Selection table



Model	MA63E	MA63S	MA125E	MA125S
Reference Standard	IEC/EN 60898-1	IEC/EN 60898-1	IEC/EN 60947-2	IEC/EN 60947-2
No. of Poles	1P, 1P + N, 2P, 3P, 3P + N, 4P	1P, 1P + N, 2P, 3P, 3P + N, 4P	1P, 1P + N, 2P, 3P, 3P + N, 4P	1P, 1P + N, 2P, 3P, 3P + N, 4P
Rated Current (In)	1, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 45, 50, 63 A	1, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 45, 50, 63 A	40, 50, 63, 80, 100, 125 A	40, 50, 63, 80, 100, 125 A
Rated Voltage (Ue)	AC 240/415 V	AC 240/415 V	AC 240/415 V	AC 240/415 V
Rated Frequency (F)	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Breaking capacity	6 kA (Ics=100% Icn)	10 kA (Ics=75% Icn)	6 kA (Ics=100% Icu)	10 kA (Ics=75% Icu)
Magnetic Release Setting	(3-5) In - B Curve (5-10) In - C Curve (10-20) In - D Curve	(3-5) In - B Curve (5-10) In - C Curve (10-20) In - D Curve	li = 10In	li = 10In
Rated Insulation Voltage (Ui)	500V	500V	690V	690V
Rated Impulse Voltage (Uimp)	4 kV	4 kV	4 kV	4 kV
Dielectric Strength	2.5 kV	2.5 kV	2.5 kV	2.5 kV
Electrical Endurance	10000	10000	5000	5000
Mechanical Endurance	20000	20000	10000	10000
Energy Limit Class	3	3	-	-
Terminal Capacity (max)	35 mm ²	35 mm ²	50 mm ²	50 mm ²
Tightening Torque	2.5 Nm	2.5 Nm	2.5 Nm	2.5 Nm
Vibration	3 g	3 g	3 g	3 g
Shock Resistance	40 mm free fall	40 mm free fall	40 mm free fall	40 mm free fall
Protection Class	IP20	IP20	IP20	IP20
Positive Contact Indication	Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF
Net Weight/Pole in kg	0.102 kg	0.103 kg	0.152 kg	0.155 kg
Dimensions (H x D x W) / Pole in mm	83.8x69.9x17.8	83.8x69.9x17.8	84.2x69.9x26.8	84.2x69.9x26.8
Mounting	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)
Installation Position	Vertical / Horizontal	Vertical / Horizontal	Vertical / Horizontal	Vertical / Horizontal
Case & Cover	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material
Busbar Connections Top/Bottom Side	Pin / Fork type (Bottom)	Pin / Fork type (Bottom)	-	-

Characteristics curves

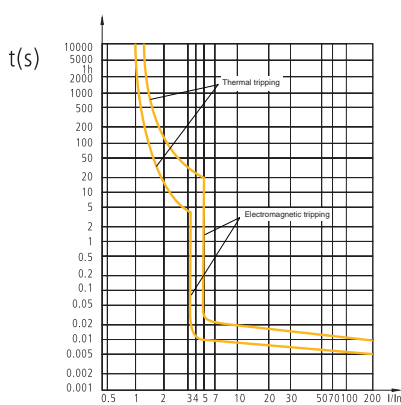
According to IEC/EN 60898-1	Thermal Tripping			Magnetic Tripping		
	No Tripping	Tripping	Time	Hold	Trip	Time
	I1	I2	t	I4	I5	t
B Curve	1.13 x In		≥ 1h	3 x In		≥ 0.1 s
		1.45 x In	< 1h		5 x In	< 0.1 s
C Curve	1.13 x In		≥ 1h	5 x In		≥ 0.1 s
		1.45 x In	< 1h		10 x In	< 0.1 s
D Curver	1.13 x In		≥ 1h	10 x In		≥ 0.1 s
		1.45 x In	< 1h		20 x In	< 0.1 s
I3 = 2.55 x In	1 s < t < 60s for In ≤ 32 A 1 s < t < 120s for In > 32 A					

According to IEC/EN 60947-2	Thermal Tripping			Magnetic Tripping		
	No Tripping	Tripping	Time	Hold	Trip	Time
	I1	I2	t	I4	I5	t
In < 63A	1.05 x In		≥ 1h	8xIn		≥ 0.2s
		1.30 x In	< 1h		12 x In	< 0.2s
In ≥ 63A	1.05xI n		≥ 2h	8xIn		≥ 0.2s
		1.30xI n	< 2h		12 x In	< 0.2s
I3 = 2, 3, 4, 5 x In	According to the operating characteristic curve					

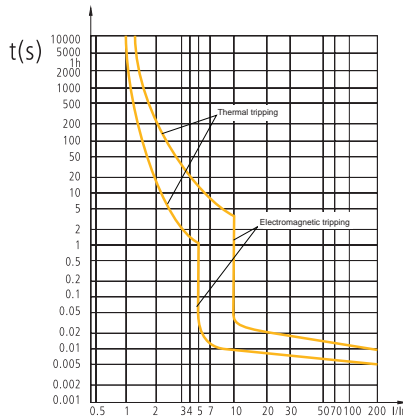
Tripping characteristics

According to IEC/EN 60898-1

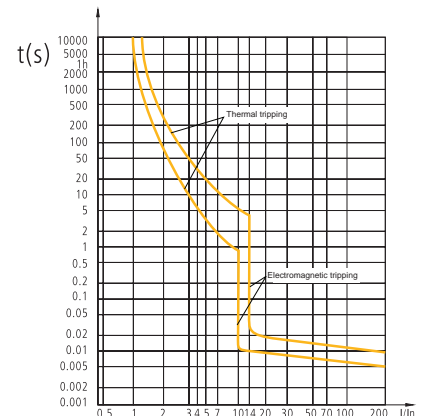
Based on the tripping characteristics, MCBs are available in 'B', 'C' and 'D' curve to suit different types of applications.



'B' Curve: for protection of electrical circuits with equipment that does not cause surge current (lighting and distribution circuits). Short circuit release is set to (3-5) In



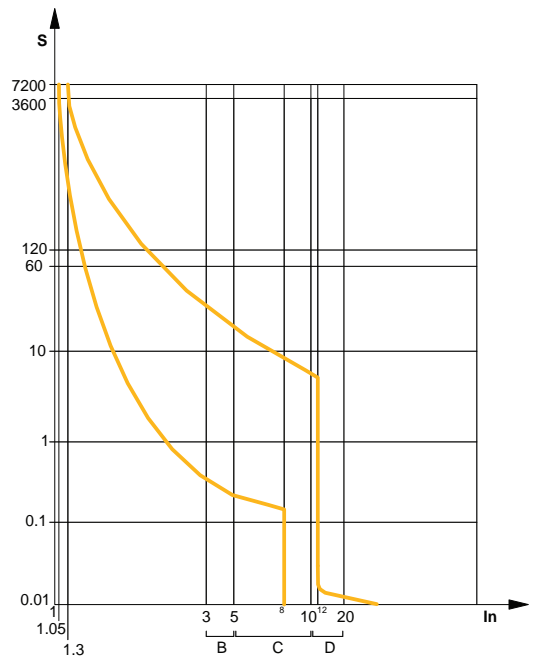
'C' Curve: for protection of electrical circuits with equipment that causes surge current (inductive loads and motor circuits). Short circuit release is set to (5-10)In



'D' Curve: for protection of electrical circuits which causes high inrush current, typically 12-15 times the thermal rated current (transformers, X-ray machines etc.) Short circuit release is set to (10-20)In

According to IEC/EN 60947-2

- Protection range:
Protection of conventional load and power distribution cable and industrial power distribution system.
- Rated current:
40 ~ 125A
- Tripping characteristic:
 - Default instantaneous tripping range $10I_n$ (8-12) I_n
 - Also the instantaneous shear range follows B, C, D curves as illustrated by the side line (Option).



Temperature compensation

According to IEC/EN 60898-1

Rated Current (A)	Ambient Temperature (°C)												
	-5°C	0°C	5°C	10°C	15°C	20°C	25°C	30°C	35°C	40°C	45°C	50°C	55°C
1	1.27	1.23	1.9	1.15	1.14	1.08	1.04	1.00	0.96	0.92	0.89	0.85	0.81
2	2.53	2.46	3.8	2.3	2.28	2.15	2.08	2.00	1.92	1.85	1.77	1.7	1.62
3	3.8	3.68	5.7	3.46	3.42	3.23	3.11	3.00	2.89	2.77	2.66	2.54	2.43
4	5.06	4.91	7.6	4.61	4.56	4.3	4.15	4.00	3.85	3.7	3.54	3.39	3.24
6	7.6	7.37	11.4	6.91	6.84	6.46	6.23	6.00	5.77	5.54	5.32	5.09	4.86
10	12.66	12.28	19	11.52	11.4	10.76	10.38	10.00	9.62	9.24	8.86	8.48	8.1
13	16.46	15.96	24.7	14.98	14.82	13.99	13.49	13.00	12.51	12.01	11.52	11.02	10.53
16	20.26	19.65	30.4	18.43	18.24	17.22	16.61	16.00	15.39	14.78	14.18	13.57	12.96
20	25.32	24.56	38	23.04	22.8	21.52	20.76	20.00	19.24	18.48	17.72	16.96	16.2
25	31.65	30.7	47.5	28.8	28.5	26.9	25.95	25.00	24.05	23.1	22.15	21.2	20.25
32	40.51	39.3	60.8	36.86	36.48	34.43	33.22	32.00	30.78	29.57	28.35	27.14	25.92
40	50.64	49.12	76	46.08	45.6	43.04	41.52	40.00	38.48	36.96	35.44	33.92	32.4
45	56.97	55.26	85.5	51.84	51.3	48.42	46.71	45.00	43.29	41.58	39.87	38.16	36.45
50	63.3	61.4	95	57.6	57	53.8	51.9	50.00	48.1	46.2	44.3	42.4	40.5
63	79.76	77.36	119.7	72.82	71.82	67.79	65.39	63.00	60.61	58.21	55.82	53.42	51.03

According to IEC/EN 60947-2

Rated Current (A)	Ambient Temperature (°C) @30°C						Ambient Temperature (°C) @50°C			
	30°C	35°C	40°C	45°C	50°C	55°C	50°C	55°C	60°C	65°C
40	40.00	38.50	37.00	35.00	33.11	31.45	40.00	38.48	36.80	34.90
50	50.00	48.00	45.50	43.50	41.59	39.76	50.00	47.98	45.35	43.35
63	63.00	60.50	57.50	54.50	51.67	49.03	63.00	60.48	57.40	54.40
80	80.00	76.50	73.50	69.60	65.91	62.42	80.00	76.50	73.40	69.45
100	100.00	96.00	91.50	87.00	82.74	78.60	100.00	96.00	91.35	86.80
125	125.00	120.00	114.00	108.80	103.80	99.02	125.00	119.95	113.88	108.72

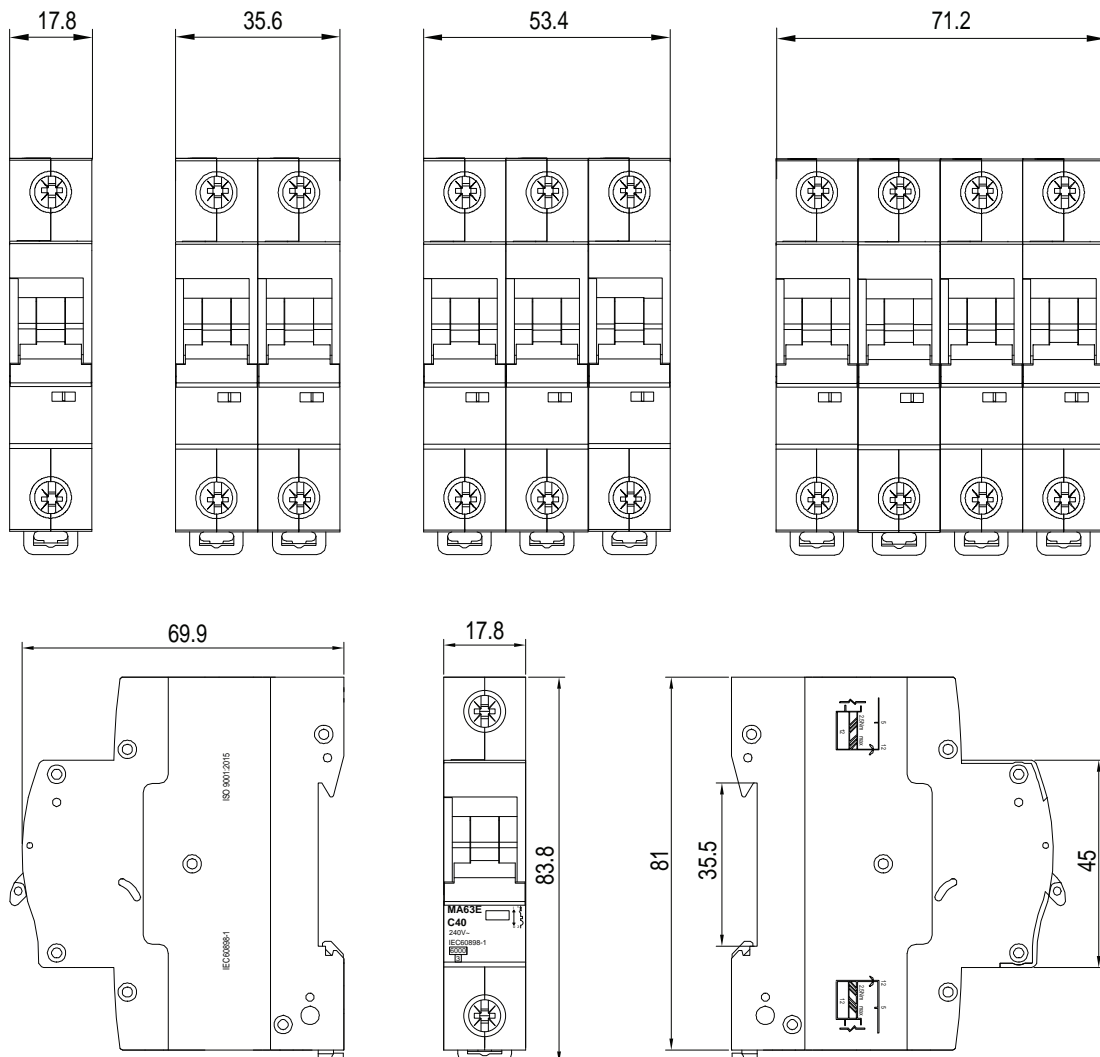
Cold resistance & power loss details

Rated Current In (A)	6	10	16	20	25	32	40	50	63	80	100	125
Cold Resistance (mΩ)	25.1	12	8.2	4.6	3.8	2.6	2.0	1.65	1.4	1.00	0.82	0.68
Power Loss per Pole (W)	1.4	1.6	2.3	2.5	3.1	3.5	3.8	5.0	5.5	7.5	8.5	10.5

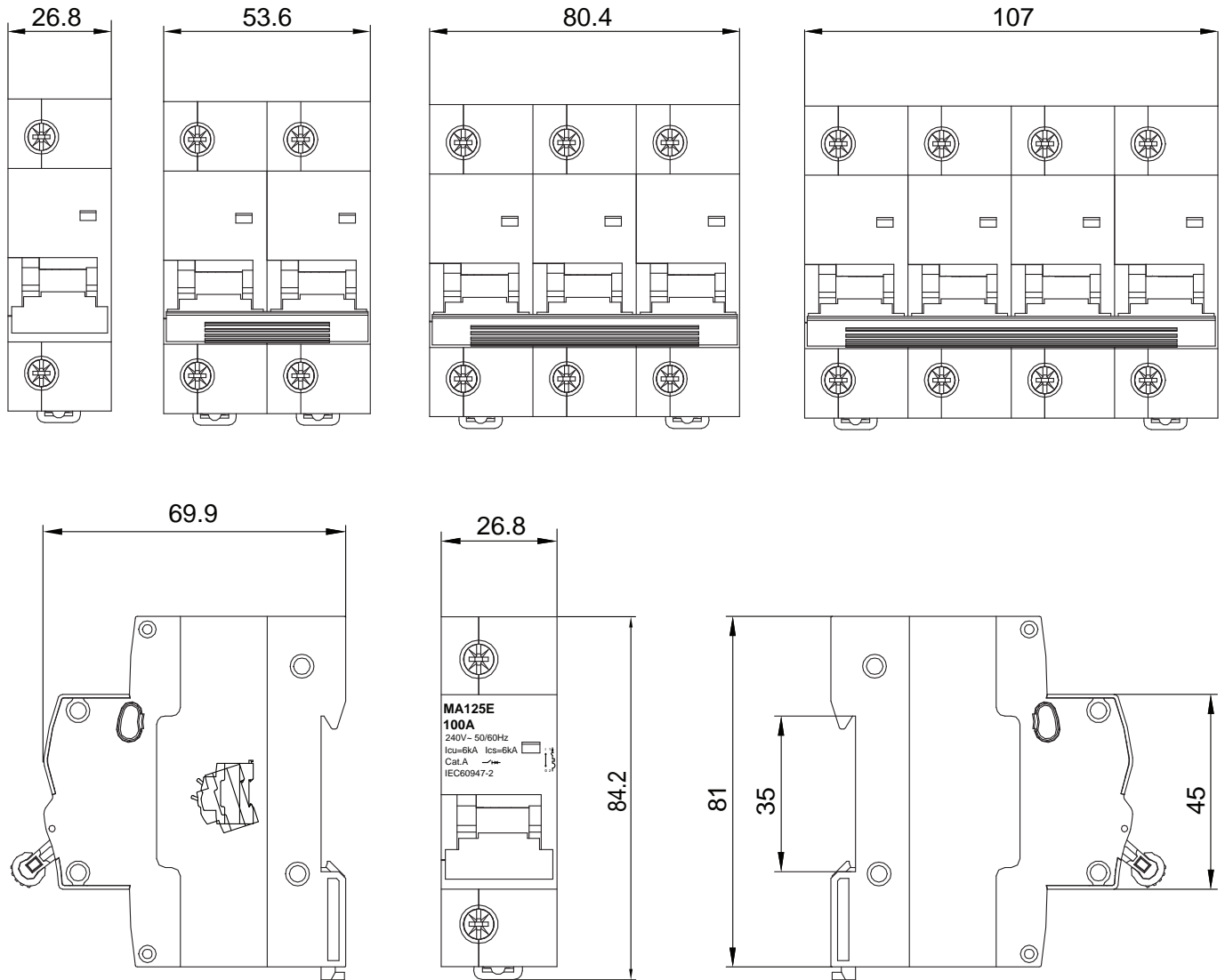
- The power loss value declared at rated current
- Tolerance ±5%

Dimensions (mm)

Frame 63



Frame 125



Ordering guidelines

Model MA63E-C40-2P	MA	Type MCB
	63	Frame: 63 , 125
	E	Economy 6kA Standard 10kA
	C	B Curve (3-5In) C Curve (5-10In) D Curve (10-20In)
	40	Rated Current 1, 2... 40 ...125A
	2P	Number of Poles 1P, 1N, 2P , 3P, 3N, 4P

MR63
MR100
MO32
MO63
Series

Residual Current Circuit Breaker

Residual Current Circuit Breaker with Overcurrent

Application scope

Residual current circuit breaker (RCCB) detects earth leakage in a circuit. It monitors the difference between the current flowing through the phase and neutral wires. When there is an imbalance, it trips to protect against electrical hazards.



RCBO is a step up from a RCCB, providing additional protection. RCBOs trip when overloading or short circuiting occurs, whereas RCCBs do not.

Applied Standards and Certifications

- IEC/EN 61008-1 Residual current operated circuit-breakers without integral overcurrent protection for household and similar use.
- IEC/EN 61009-1 Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses.



Ambient temperature

- Storage: -30°C ~ +65°C
- Operation: -5°C ~ +55°C

Altitude

Below 2,000m above sea level

Humidity

95%

Salient features

- The RCCB works on the current balance principle. The supply conductors, i.e. the phases and the neutral, are passed through a toroid and form the primary windings of a current transformer. Its secondary winding is connected to a highly sensitive electromagnetic trip relay, which operates the trip mechanism.
- In a normal circuit, sum of the currents in phases, is equal to the current in the neutral and the vector sum of all currents is equal to zero. If there is any insulation fault in the current and leakage current flows to earth, the currents do not balance and their vector sum is not equal to zero. This imbalance is detected by the core balanced current transformer, and the RCCB is tripped and supply to load is interrupted. The trip mechanism is operated at a residual current between 50-100 % of its rated tripping current.
- Where RCBO is the sum of the protections of the MCB and the RCCB.

Image and structure



Selection table



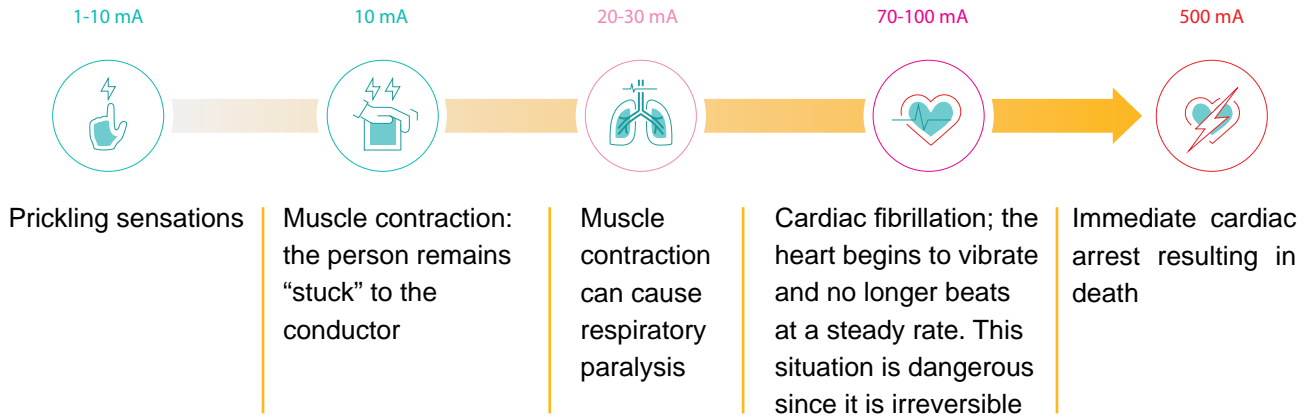
Model	MR63 / MR100	MO32 / MO63
Reference Standard	IEC/EN 61008-1	IEC/EN 61009-1
No. of Poles	2P (1P+N), 4P (3P + N)	1P+N
Rated Current (In)	16, 20, 25, 32, 40, 50, 63, 80, 100 A	6, 10, 16, 20, 25, 32, 40, 63 A
Rated Voltage (Ue)	AC 240/415 V	AC 240 V
Rated Frequency (F)	50/60 Hz	50/60 Hz
Rated Conditional Short Circuit Current	6kA, 10 kA (Inc)	6 kA (Ics=100%Icn)
Rated Residual Operating Current (I Δ c)	10 mA, 30 mA, 100 mA, 300 mA	10 mA, 30 mA, 100 mA, 300 mA
Magnetic Release Setting	-	(3-5) In - B Curve (5-10) In - C Curve
Trip Time at I Δ c	≤ 100 ms	≤ 100 ms
Detactuin of Wave Form	AC, A, S	AC, A
Rated Insulation Voltage (UI)	500 V	500 V
Rated Impuls e Voltage (Uimp)	4 kV	4 kV
Dielectric Strength	2.5 kV	2.5 kV
Electrical Endurance	10000	10000
Mechanical Endurance	20000	30000
Term inal Capacity (max)	35 mm ²	16 mm ²
Tightening Torque	2.5Nm	1.2Nm
Vibration	3 g	3 g
Shock Resistance	40 mm free fall	40 mm free fall
Protection Class	IP20	IP20
Positive Contactindication	Red-ON, Green-OFF	Red-ON, Green-OFF
Dimensions (H x D x W)/Pole in mm	84.5 x 74.5 x 35.5 mm for 2P 84.5 x 74.5 x 71 mm for 4P	83.8 x 72.6 x 17.8 mm 84.3 x 72.6 x 35.6 mm
Mounting	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)
Installation Position	Vertical / Horizontal	Vertical / Horizontal
Case & Cover	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material
Busbar Connections	Pin / Fork type	Pin / Fork type

Standard use environment

The use of exposed, substandard, badly wired, wrongly connected or damaged equipment as well as frayed or badly repaired cables reduces the safety of an installation and increases the risk of person receiving an electric shock. RCCBs are electrical devices which afford a very high degree of protection against the risks of electrocution and fire caused by earth faults.

Protection Against Electrocution

Electrocution is a passage of current through human body, which is dangerous. The flow of current through human body affects vital functions of breathing & heartbeat. Effect of electric current through human body has been well researched and following chart summarizes the results:



However, electrocution should not be viewed in terms of "current" alone, but in terms of "contact voltage". A person gets electrocuted by coming in contact with an object that has a different potential from his/her own. The difference in potential causes the current to flow through the body.

The human body has known limits:

- Under normal dry conditions, voltage limit = 50 V
- In damp surroundings, voltage limit = 25 V

A correctly chosen RCCB can detect small currents flowing to earth and reduces the risk of electrocution.

Protection Against Indirect Contact

Over current protection devices like MCB are unable to act promptly on small earth leakage currents. To comply with wiring regulations, the earth fault loop impedance in Ohms, multiplied by the rated tripping current of the RCCB in amperes must not exceed 50.

Example

For an RCCB with a rated tripping current of 30 mA, the maximum permissible earth fault loop impedance is calculated as follows: $Z_s (\text{max}) = 50/I_n = 50/0.03 = 1,666$

Protection Against Fire

The majority of fires which occur as a result of faulty wiring are started by current flowing to earth. Fire can be started by fault current of less than 1 amp. The normal domestic overload protective device such as a fuse or MCB will not detect such a small current. A correctly chosen RCCB will detect this fault current and interrupt the supply, hence, reducing the risk of a fire starting.

Rated Tripping Current of the RCCB	Maximum Permissible Earth Fault Loop Impedance in
10 mA	5,000
30 mA	1,666
100 mA	500
300 mA	166

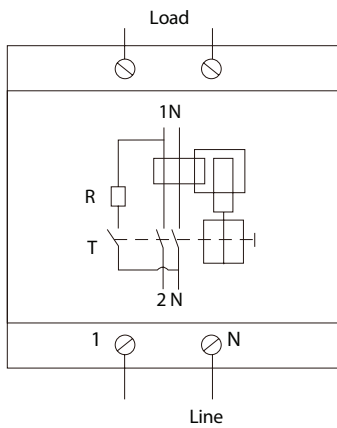
Selection of RCCB type

Type		Circuit	Load Current	Residual Current	
A	AC	1			
	A	2			
		3			
		4			
		5			
		6			

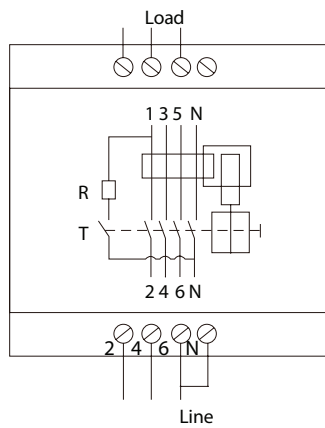
Device is suitable for electronic equipment with input current circuits 1 to 6 in below table

Wiring diagram

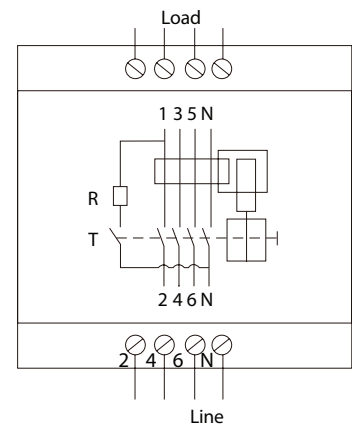
For Single Phase - 2 Wire



For Single Phase - 3 Wire



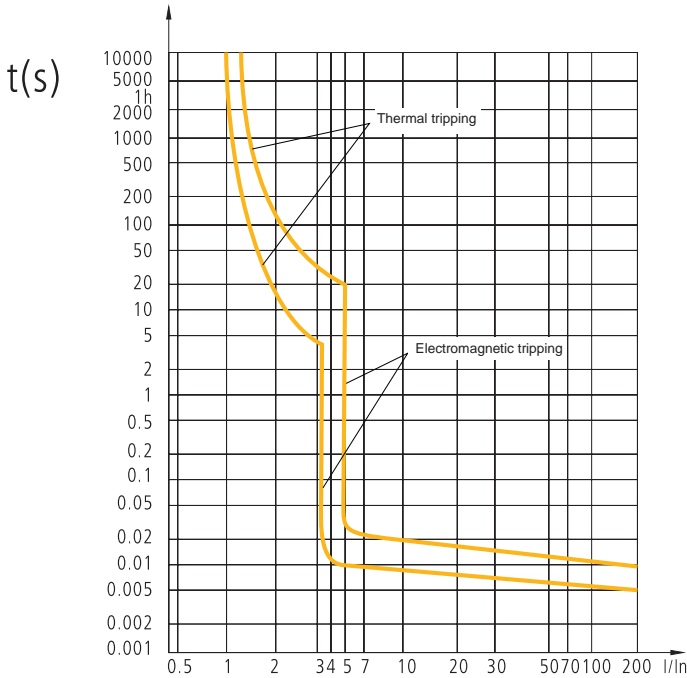
For Single Phase - 4 Wire



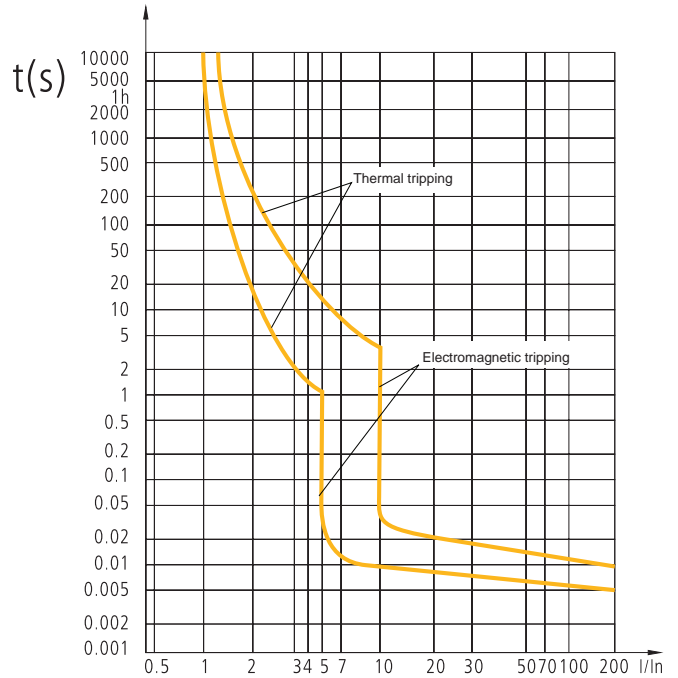
Breaking time of residual current

In(A)	IΔc (A)	Max. breaking time			
		IΔc	2IΔc	5IΔc	5A, 10A, 50A, 100A
6, 10, 16, 20, 25, 32, 40, 50, 63, 80, 100A	0.01, 0.03, 0.1, 0.3	100ms	80ms	40ms	40ms

Tripping characteristics for RCBO



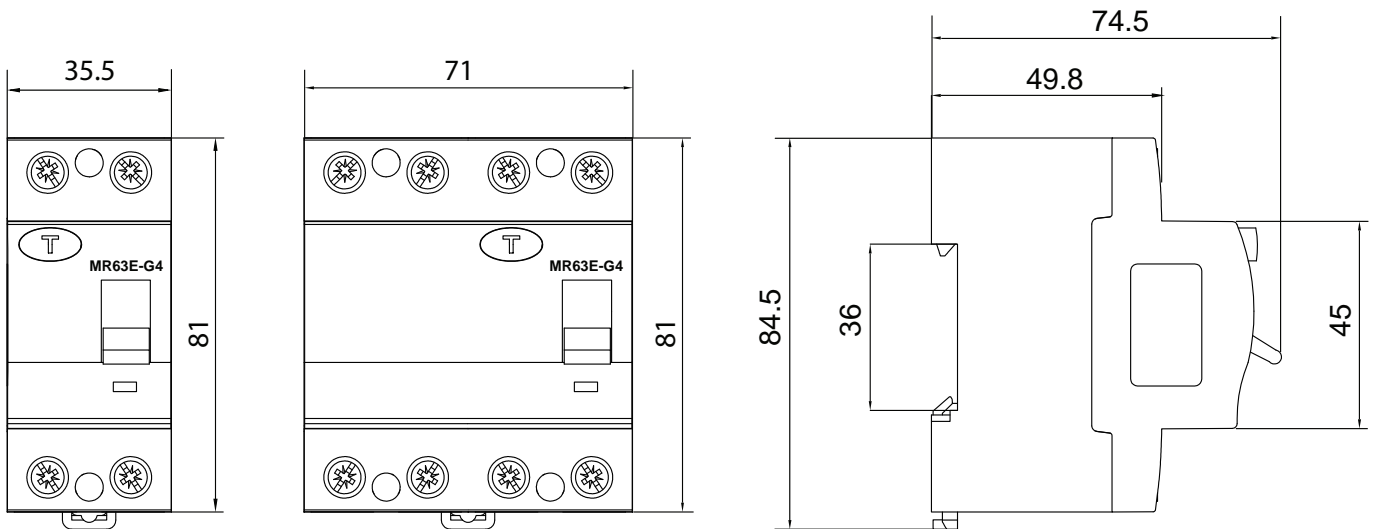
'B' Curve: for protection of electrical circuits with equipment that does not cause surge current (lighting and distribution circuits). Short circuit release is set to (3-5)In



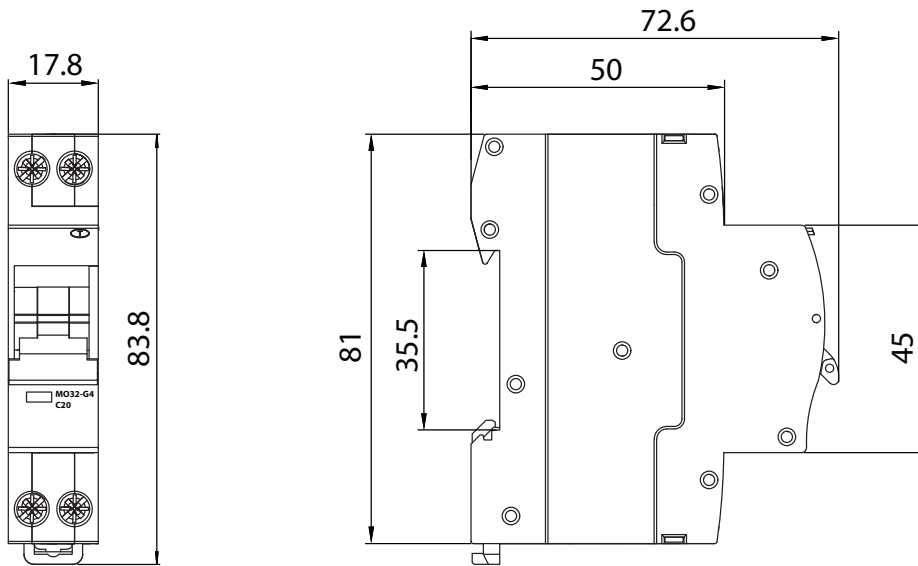
'C' Curve: for protection of electrical circuits with equipment that causes surge current (inductive loads and motor circuits). Short circuit release is set to (5-10)In

Dimensions (mm)

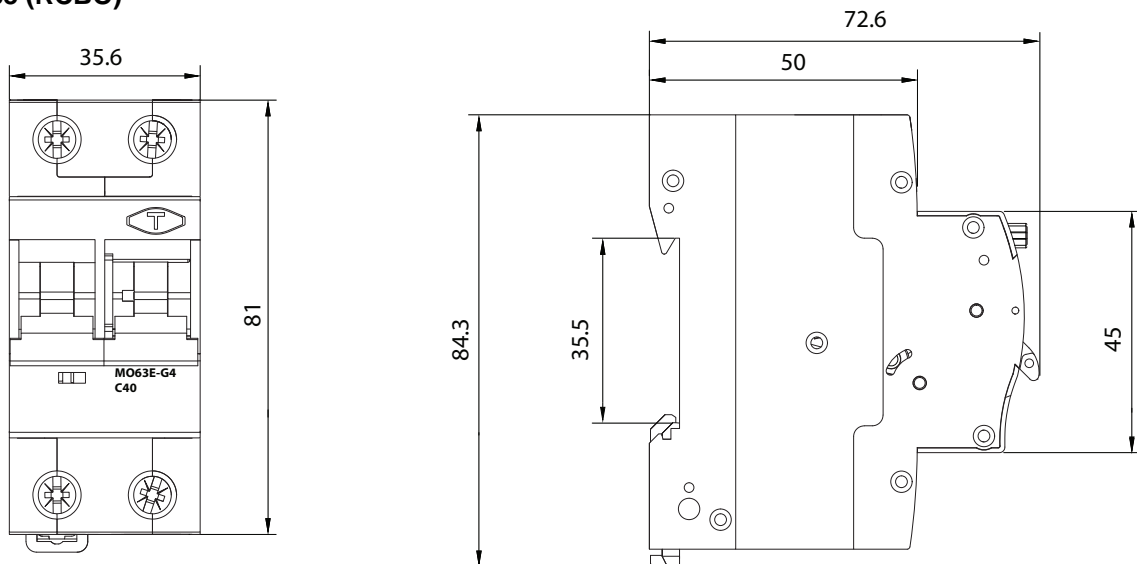
For MR (RCCB)



For MO32 (RCBO)



For MO63 (RCBO)



Ordering guidelines

Model MO63E-G4-40-2P-AC-C	MO	MR type RCCB MO type RCBO
	63	Frane: 32, 63 , 80
	E	Economy 6kA Standard 10kA
	G4	G3 - 10mA G4 - 30mA G6 - 100mA G7 - 300mA
	40	Rated Current 16, 20, 25, 32, 40 , 63, 80, 100A
	2P	Number of Poles 2P (1P+N), 4P (3P + N)
	AC	AC type A type S type
	C	B Curve B (3-5I _n) C Curve C (5-10I _n)

Application scope

Miniature switch disconnecter intended for electrical circuit switching and disconnection under normal conditions up to 125A. Available in a modular frame of 2, 3 and 4 poles.



Applied Standards and Certifications

- IEC/EN 60947-3 Low-voltage switchgear and controlgear - Switches, disconnectors, switch-disconnectors and fuse-combination units



Ambient temperature

- Storage: -30°C ~ +65°C
- Operation: -5°C ~ +55°C

Altitude

Below 2,000m above sea level

Humidity

95%

Salient features

- BTB electric MD type switch disconnectors are mainly used for isolation and switching in the terminal combined electric appliances under the alternating current 50/60 Hz, rated voltage AC 240V or AC 415 V and with rated current 20 to 125 A.
- The double point direct moving structure enlarges the current capacity while making full use of the electrical power supplement. In addition, power reserving handle mechanism with high on/off speed promotes the working reliability. MD type breakers comply with IEC/EN standard, and can be applied to industry, commerce, high-rise buildings, household and other similar installations.

Image and structure

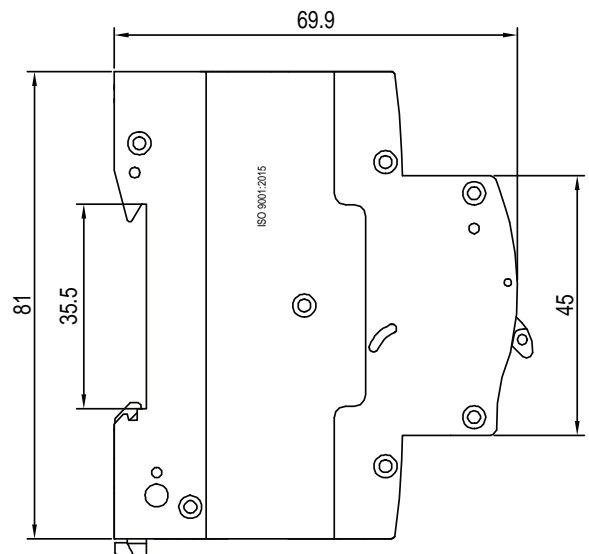
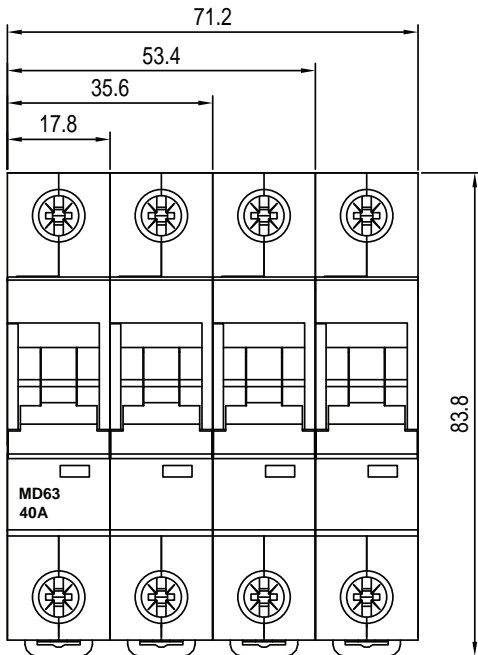


Selection table

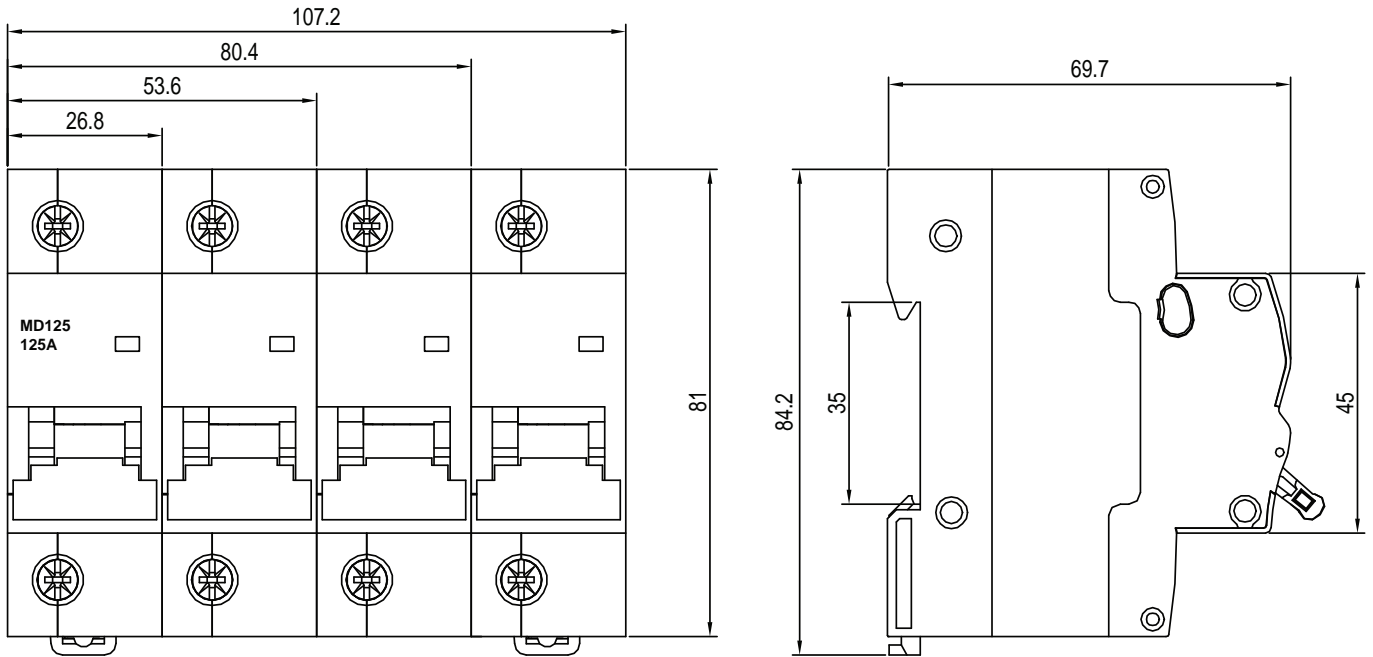
Model	MD63 / MD125
Reference Standard	IEC/EN 60947-3
No. of Poles	2P, 3P, 4P
Rated Current (In)	20, 40, 63, 80, 100, 125 A
Rated Voltage (Ue)	AC 240/415 V
Rated Frequency (F)	50/60 Hz
Rated Insulation Voltage (Ui)	500 V
Rated Impulse Voltage (Uimp)	6 kV
Dielectric Strength	2.5 kV
Electrical Endurance	10000
Mechanical Endurance	20000
Terminal Capacity (max)	35 mm ²
Tightening Torque	2.5Nm
Vibration	3 g
Shock Resistance	40 mm free fall
Protection Class	IP20
Positive Contact Indication	Red-ON, Green-OFF
Dimensions (H x D x W)/Pole in mm	83.8 x 69.9 x 17.8 mm for Frame 63 84.2 x 69.7 x 26.8 mm for Frame 125
Mounting	Clip on DIN Rail (35 mm x 7.5 mm)
Installation Position	Vertical / Horizontal
Case & Cover	Molded, flame retardant thermoplastic material
Busbar Connections	Pin/Fork type

Dimensions (mm)

Frame 63



Frame 125



Ordering guidelines

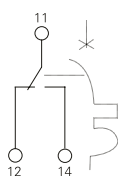
Model MD63-40-2P	MD	Type MSD
	63	Frame: 63 , 125
	40	Rated Current: 20, 40 , 63, 80, 100, 125 A
	2P	Number of Poles: 2P , 3P, 4P

Technical data

Standard	IEC/EN 62019
Rated insulation voltage U	500V
Rated voltage	AC 230V
Rated frequency (Hz)	50/60Hz
Utilization category	AC14, AC15
Ambient temperature (°C)	-5~+40, max 95%humidity
Electric endurance	4000
Mechanical endurance	10000 2000V/1min
Dielectric strength	2000V/1min
Protection degree	IP20



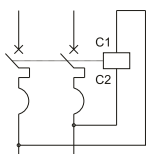
OF Auxiliary contact



- Mounted on the left side of the MCB, RCBO, indicating “ON”, “OFF” status of combined MCB, RCBO
- Terminal Connection Height: 8.8mm

Type code	Rated voltage	Rated current
OF23A	230VAC	6A
OF40A	400VAC	3A

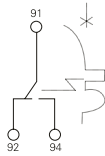
MX Shunt trip



- Operate voltage range: 70-110% Us.
- Mounting on the left side of MCB/RCBO, used to trip the combined MCB/RCBO by remote controlling device.
- Terminal Connection Height: 19mm

Type code	Rated voltage
MX23A	230VAC
MX40A	400VAC

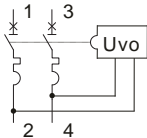
SD alarm switch



- Is used to connect ON/OFF auxiliary contact, work as circuit breaker ON/OFF indicator in case of faulty (tripping)
- Terminal Connection Height: 8.8mm

Type code	Rated voltage	Rated current
SD23A	230VAC	6A
SD40A	400VAC	3A

MN Over-voltage / Under-voltage trip



- Over-voltage tripping range: 280V \pm 5%
- Under-voltage tripping range: 170V \pm 5%.
- Mounted on the left side of circuit breaker, actuate the combined device to trip in case of under-voltage or over-voltage, effectively prevent the device from closing operation under abnormal power voltage condition.
- Terminal Connection Height: 19mm

Type code	Rated voltage
MN23A	230VAC

Storage

Ambient temperature: -20~60°C

Altitude: Below 1,000 m above sea level

Relative humidity: Within 45% ~ 85%

The surrounding environment may affect the insulation function and endurance of the molded case and earth leakage circuit breakers so the environmental condition for usage must be accurately checked before application.



Do not store in places with corrosive gas.
Do not leave it around gas containing sulfurous gas or sulfur or ammonia gas and others.



Do not store in places with high humidity for a long period of time.



Do not leave under direct sunlight for a long period of time.



Avoid places with a lot of dust.
Do not store in expose places, use cover or packaging material to prevent dust from piling up on the circuit breaker.



Avoid storage in high or low temperature.
Storage temperature must be maintained between -30°C ~ +65°C.



Handling and Maintenance Inspection

Installation

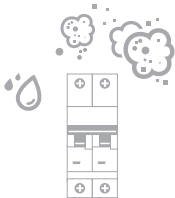
Installation Precautions

Install the circuit breaker in a place that satisfies the following environmental conditions. Installing the circuit breaker in places and environment other than the following may cause malfunction of circuit breaker, fire and others.

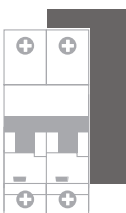
- Ambient temperature of -5°C to $+55^{\circ}\text{C}$ (However, the 24-hour average temperature must not exceed 45°C).
- Relative humidity to be within 45 ~ 95%
- Excessive vibration or impact to be avoided.
- Altitude to be below 2,000 m
- To be used in an environment without excessive water vapor, oil vapor, smoke, dust, alkaline, corrosive material and others.
- To avoid direct sunlight.



Arc gas exhaust hole must not be blocked
It may drop the breaking capacity



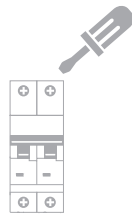
Attention to be paid to dust, metal fragments and others
After installation, protection cover and covers to be covered during work



The insulation plate attached to the bottom of the circuit breaker must not be separated
It may destroy insulation and drop the insulation performance.

Connection Precautions

When fastening the terminal screw, it should be fastened according to the specified torque



Incomplete fastening of terminal screw may cause overheating so each terminal screw must be fastened completely according to the specified torque may cause damage in the terminal screw and the circuit breaker case.

Exposed conductor must be insulated
Insulating tube or insulating tape must be used for complete insulation between the bare conductors of the MCCB.



In case the terminals are not insulated, it may cause secondary short-circuit during short-circuit accidents.

In case of 4 pole circuit breaker, the neutral wire of 3 phase 4 wire must be connected to the N phase



It may not function in overcurrent which may cause fire.

Use of lubricant at the terminal screw part is prohibited



Lubricant reduces the friction of the screw, causing the screw to loosen, ultimately leading to an increase in temperature.

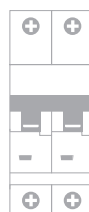
Stud must not be deformed



Excessive force must not be applied to the stud at the conductor connecting part of the rear connection type.

In addition, stud must not be deformed during wiring.

The conductor must be fixed firmly on a flat state



As for the connecting conductor, electromagnetic force between conductors is generated by extremely big fault current so it must be fixed firmly.

Maintenance inspection

Initial Inspection

- Residues of steel plate, grinded materials of the wire, other conductor's foreign substances and others must not be left around the terminal of the circuit breaker.
- There must be no crack and damage in the cover and base.
- The fastening status of the terminal fastening part must be checked.
- Check if the rated voltage and breaking capacity of the circuit breaker are correct.
- When the insulation resistance is measured using a 500 V insulation-resistance tester, it must be above 5 MΩ.

Withstand voltage

Main Circuit		Auxiliary Circuit or Control Circuit	
Rated Insulation Voltage	Test Voltage (Effective Value of Interchange)	Rated Insulation Voltage of Operational Circuit	Test Voltage (Effective Value of Interchange)
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	2-Uis 1,000 V (min. 1,500 V) for 1 min

Regular Inspection

Inspection shall be conducted 1 month before/after the commencement of the equipment operation in order to maintain the performance of the circuit breaker and to prevent unexpected accidents. After that, regular inspection is required depending on the environment.

Standard inspection period

Extent	Environment	Standard of Inspection Period
Standard Usage State	Clean and dry state of air	Less than 10 years after installation-Once in 2~3 years
		More than 10 years after installation-Once a year
		More than 15 years after installation-Once in 6 months
	Place without corrosive gas even though there is dust inside	Less than 10 years after installation-Once a year
		More than 10 years after installation-Once in 6 months
		More than 15 years after installation-Once a month
Bad Environment	Place containing sulfurous acid, hydrogen sulfide, salinity, vapor and others	Less than 5 years after installation-Once in 6 months
		More than 5 years after installation-Once a year
	Places with specially more corrosive gas	Once a month



**REALVALUE
FOR LIFE**

Designed by BTB Electric
Add: Orhangazi Mah. Mimsan San. Sit. 1780 sok.
No: 5 Esenyurt / İstanbul / Türkiye
E-mail: sales@btb-electric.com
Web: btb-electric.com

