Technical Catalogue

Molded Case Circuit Breakers
Earth Leakage Circuit Breakers

BTB ELECTRIC

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BTB Electric aims at the best solution for perfect safety environment, customer satisfaction through 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 can be used in ambient conditions where the surrounding air temperature varies between -25°C and +65°C, and stored in ambients with temperatures between -35°C and +70°C.

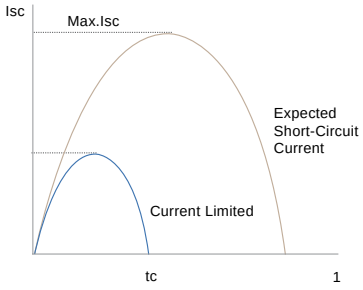
The circuit-breakers fitted with thermomagnetic trip units have their thermal element set for a reference temperature of +40°C or +55°C. The electronic trip units do not undergo any variations in performance as the temperature varies.

Altitude

Up to an altitude of 2000m the M-Series circuit-breakers do not undergo any alterations in their rated performances. As the altitude increases, the atmospheric properties are altered in terms of composition, dielectric resistance, cooling capacity and pressure. Therefore the circuit-breaker performances undergo derating, which can basically be measured by means of the variation in significant parameters such as the maximum rated operating voltage and the rated uninterrupted current.

Excellent short circuit breaking capacity

The electric arc interruption system used on the M-Series circuit-breakers allows the short-circuit currents of very high value to be interrupted extremely rapidly. The considerable opening speed of the contacts, the dynamic blasting action carried out by the magnetic eld and the structure of the arcing chamber contribute to extinguishing the arc in the shortest time.

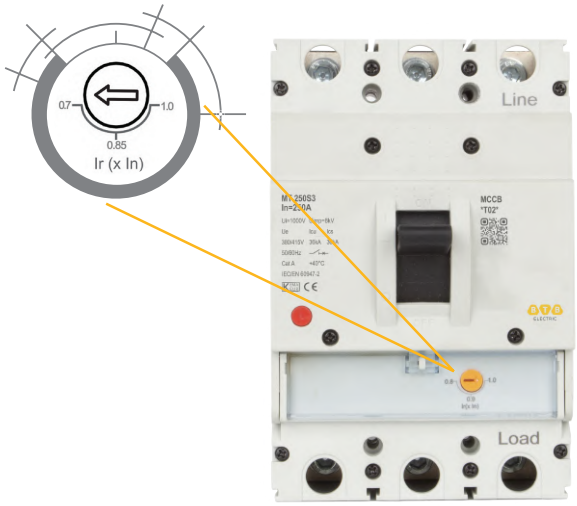


Current Limiting Characteristics

Code \ Frame	125	160	250	400	630	800	1250	1600
E	25kA	36kA	36kA	85kA	85kA	85kA	85kA	85kA
S	36kA	50kA	50kA	100kA	100kA	100kA	100kA	100kA
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 70% - 85% - 100% of rated current.

- Electronic Type 40% ÷100% of rated current
- Pre trip alarm setting multiple 70% ÷ 100% of rated current

Positive operation & Isolation behaviour

The M-Series circuit-breaker operating mechanism has free release regardless of the pressure on the lever and the speed of the operation. Protection tripping automatically opens the moving contacts: to close them again, the operating mechanism must be reset by pushing the operating lever from the intermediate position into the lowest open position.

In the open position, the circuit-breaker guarantees circuit in compliance with the IEC/EN 60947-2 Standard. The oversized insulation distances guarantee there are no leakage currents and dielectric resistance to any overvoltages between input and output.

Installation

M-Series circuit-breakers can be installed in the switchboards, mounted in any horizontal, vertical or lying down position on the back plate or on rails, without undergoing any derating of their rated characteristics.

Approvals and Certications

Our M-Series Molded case circuit breakers air circuit breakers are tested by IECEE laboratories – IEC/ EN system of conformity assessment schemes for electrotechnical equipment and components.


Line
Load


Line
Load


Line
Load


Line
Load

MF
MT
Series

Fixed type
Thermal adjustable type

Application scope

M-series moulded case circuit breaker, it is used to distribute electrical energy and protect lines and the power supply equipment from damages such as overload and short circuit. It's a simple, inexpensive way to protect your home or office from electrical fires and appliance damage.

Salient features

- Protection: The M-Series circuit-breakers will provide protection for the circuit and equipment in case of overload, short circuit condition occurred in the power distribution circuit.
- Adjustable: 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 (70% - 85% - 100%) or (80% - 90% - 100%) of rated current).
- Suitable for isolation, ensuring safety for people working behind the circuit breaker.
- Environmental protection: Most components are recyclable.
- High performance and Selectivity category A.

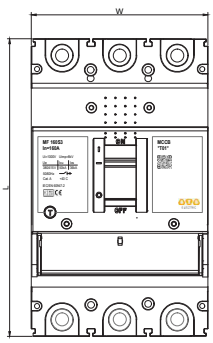
Image and structure

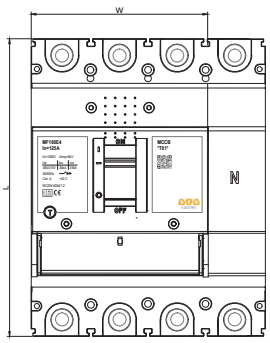
Selection table

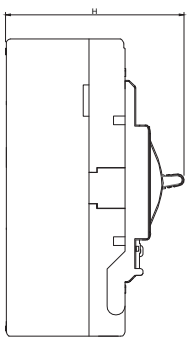
Fixed Type

Frame	A	125		160		250		
Type and pole	3P	MF125E3	MF125S3	MF160E3	MF160S3	MF250E3	MF250S3	MF250H3
	4P	MF125E4	MF125S4	MF160E4	MF160S4	MF250E4	MF250S4	MF250H4
Rated current at 40°C, In	A	16-20-25-30-32-40-50-60-63-75-80-100-125		30-32-40-50-60-63-75-80-100-125-150-160		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 ≥ 32A - 10xIn		10xIn		10xIn		
Breaking capacity level		E	S	E	S	E	S	H
Rated ultimate short-circuit breaking capacity, Icu (380/415V)	kA	25	36	36	50	36	50	65
Rated service short-circuit breaking capacity, Ics	kA	18	25	25	36	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		■		■		■		
Dimensions mm (W x L x H)	3P	75x133x82		95x155x93		106x165x100		
	4P	100x133x82		122x155x93		141x165x100		

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







Selection table

Fixed Type

400		630		800		1250	1600
MF400E3	MF400S3	MF630E3	MF630S3	MF800E3	MF800S3	MF1250E3	MF1600E3
MF400E4	MF400S4	MF630E4	MF630S4	MF800E4	MF800S4	-	-
250-300-315-350-400		400-500-550-630		630-700-800		1000-1250	1600
690		690		690		690	690
1000		1000		1000		1000	1000
8		8		8		8	8
IEC/EN 60947-2		IEC/EN 60947-2		IEC/EN 60947-2		IEC/EN 60947-2	IEC/EN 60947-2
Yes		Yes		Yes		Yes	Yes
3		3		3		3	3
A		A		A		A	A
T01		*T01*		*T01*		*T01*	*T01*
1.0xIn		1.0xIn		1.0xIn		1.0xIn	1.0xIn
1.0xIn		1.0xIn		1.0xIn		1.0xIn	1.0xIn
E	S	E	E	E	S	E	E
85	100	85	100	85	100	85	85
60	75	60	75	60	75	65	65
20000		20000		20000		2500	2500
7000		5000		5000		500	500
■		■		■		□	□
■		■		■		□	□
■		■		■		□	□
■		■		■		□	□
■		■		■		□	□
■		■		■		□	□
150x257x148		150x257x148		210x280x155		210x406x196	210x340x245
198x257x148		198x257x148		280x280x155		-	-

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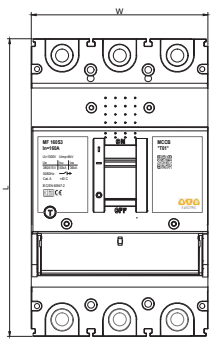

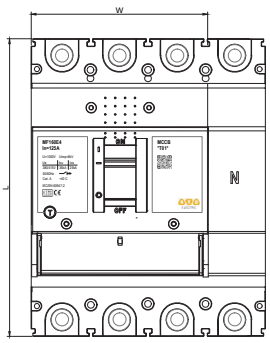

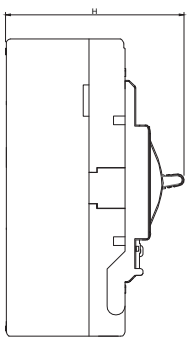

Selection table

Thermal Adjustable Type

Frame	A	125		160		250		
Type and pole	3P	MT125E3	MT125S3	MT160E3	MT160S3	MT250E3	MT250S3	MT250H3
	4P	MT125E4	MT125S4	MT160E4	MT160S4	MT250E4	MT250S4	MT250H4
Rated current at 40°C, In	A	16-20-25-30-32-40-50-60-63-75-80-100-125		30-32-40-50-60-63-75-80-100-125-150-160		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	E	S	H
Rated ultimate short-circuit breaking capacity, Icu (380/415V)	kA	18	25	25	36	25	36	50
Rated service short-circuit breaking capacity, Ics = 100% Icu	kA	18	25	25	36	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		■		■		■		
Dimensions mm (W x L x H)	3P	75x133x82		95x155x93		106x165x100		
	4P	100x133x82		122x155x93		141x165x100		

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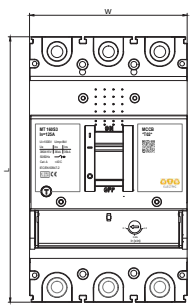

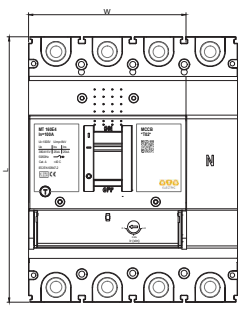

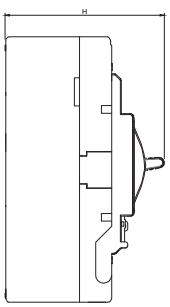

Selection table

Thermal Adjustable Type

400		630		800		1600	
MT400E3	MT400S3	MT630E3	MT630S3	MT800E3	MT800S3	MT1600E3	MT1600S3
MT400E4	MT400S4	MT630E4	MT630S4	MT800E4	MT800S4	-	-
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 (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		(0.7–0.85–1.0)xIn (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		10000	
7000		5000		5000		2000	
■		■		■		■	
■		■		■		■	
■		■		■		■	
■		■		■		■	
■		■		■		■	
■		■		■		■	
150x257x148		150x257x148		210x280x155		210x340x245	
198x257x148		198x257x148		280x280x155		-	

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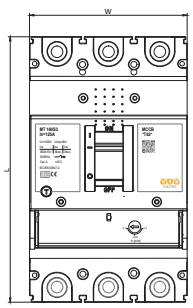
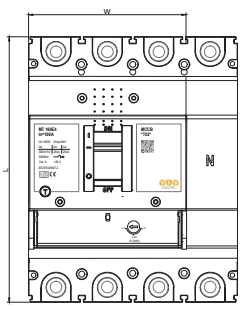
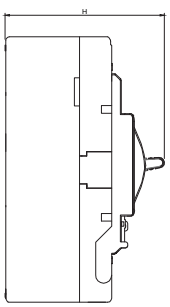
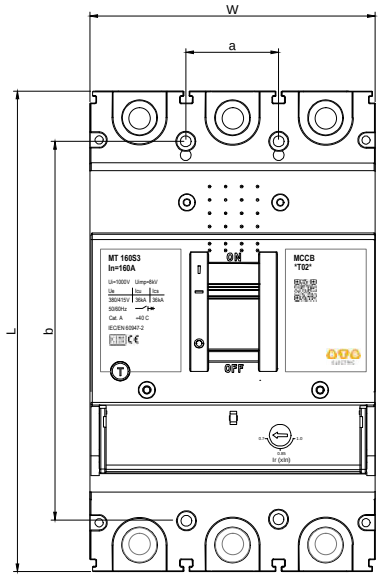


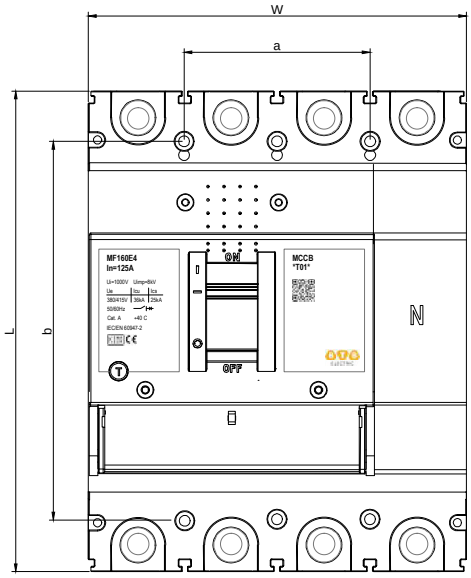


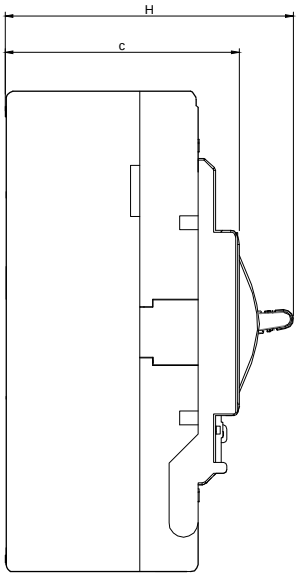


Dimensions

Frame	Type	Poles	Outline Dimension (mm)				Installation Dimension (mm)			Weight
			W	L	H	c	a	b	d	kg
125	MF 125E3; MT 125E3 MF 125S3; MT 125S3	3	75	133	82	66.5	25	111	Φ4	0.9
	MF 125E4; MT 125E4 MF 125S4; MT 125S4	4	100	133	82	66.5	50	111	Φ4	1.2
160	MF 160E3; MT 160E3 MF 160S3; MT 160S3	3	92	150	110	90	30	129	Φ4.5	1.4
	MF 160E4; MT 160E4 MF 160S4; MT 160S4	4	122	150	110	90	60	129	Φ4.5	1.8
250	MF 250E3; MT 250E3 MF 250S3; MT 250S3	3	106	165	100	77	35	126	Φ4.5	1.8
	MF 250E4; MT 250E4 MF 250S4; MT 250S4	4	141	165	100	77	70	126	Φ4.5	2.3
400	MF 400E3; MT 400E3 MF 400S3; MT 400S3	3	150	257	148	111	44	194	Φ7	5.8
	MF 400E4; MT 400E4 MF 400S4; MT 400S4	4	198	257	148	111	88	194	Φ7	7.6
630	MF 630E3; MT 630E3 MF 630S3; MT 630S3	3	150	257	148	111	44	194	Φ7	6.0
	MF 630E4; MT 630E4 MF 630S4; MT 630S4	4	198	257	148	111	88	194	Φ7	7.8
800	MF 800E3; MT 800E3 MF 800S3; MT 800S3	3	210	280	155	117	70	243	Φ7	10.2
	MF 800E4; MT 800E4 MF 800S4; MT 800S4	4	280	280	155	117	140	243	Φ7	13.1
1250	MF 1250E3	3	210	406	196	159	70	374	Φ8.5	24.5
1600	MF1600E3; MT1600E3 MT1600S3	3	210	330	196	159	70	298	Φ8.5	21.5

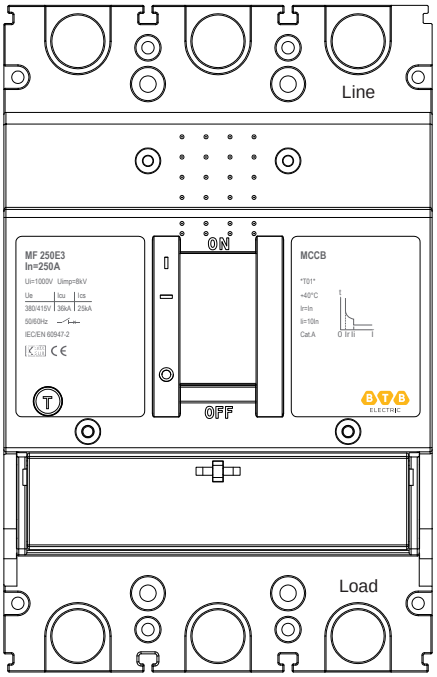


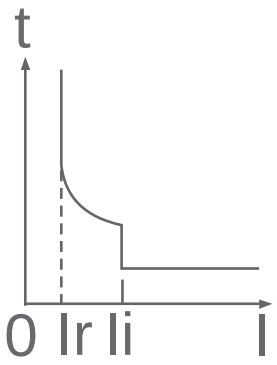




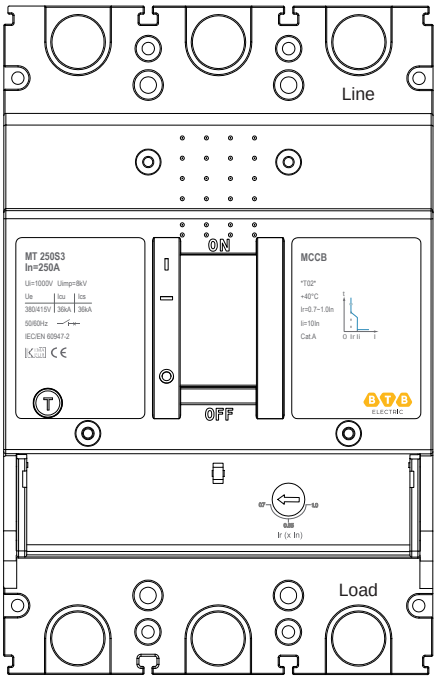
Operation characteristic curve

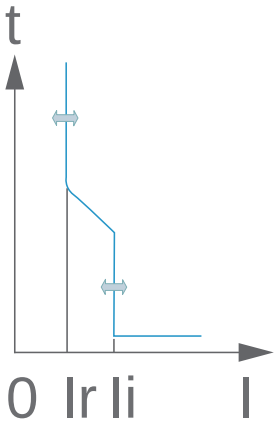
Characteristic curve Fixed type





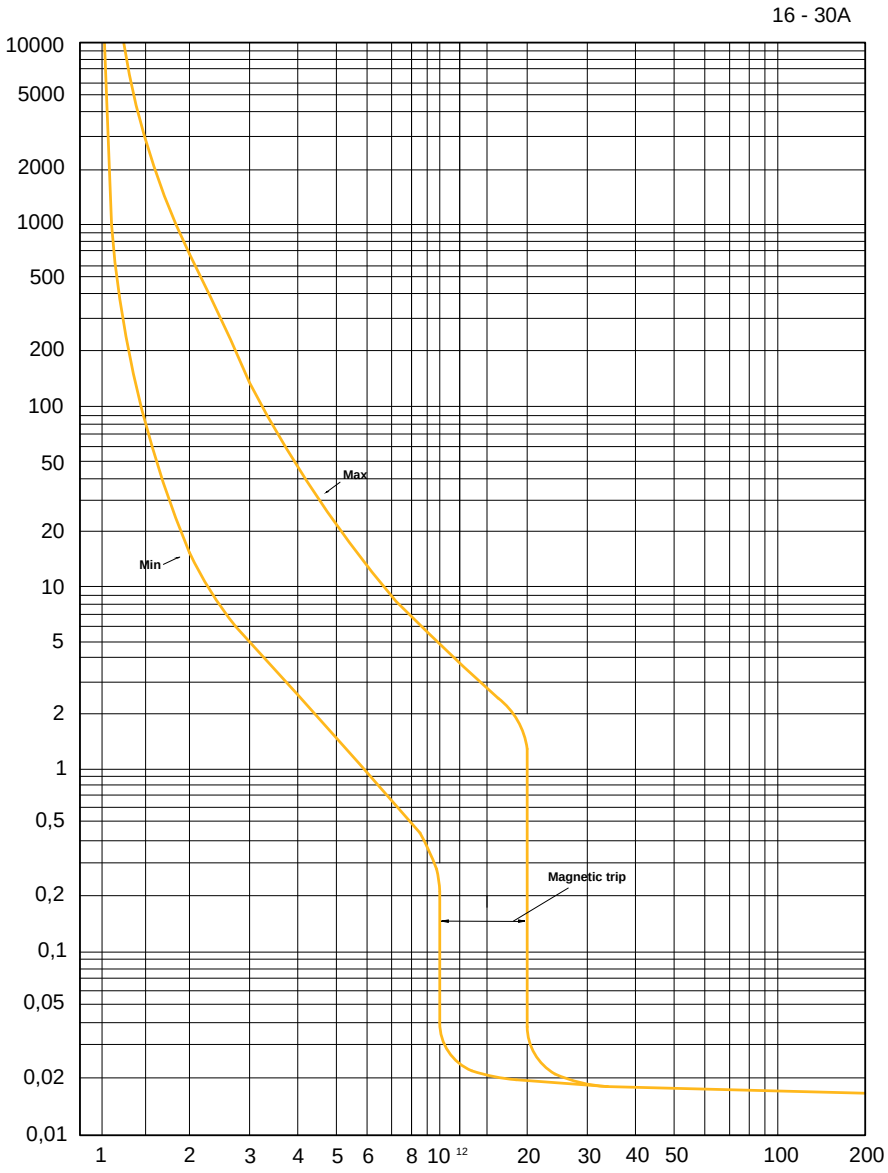
Characteristic curve Thermal adjustable type

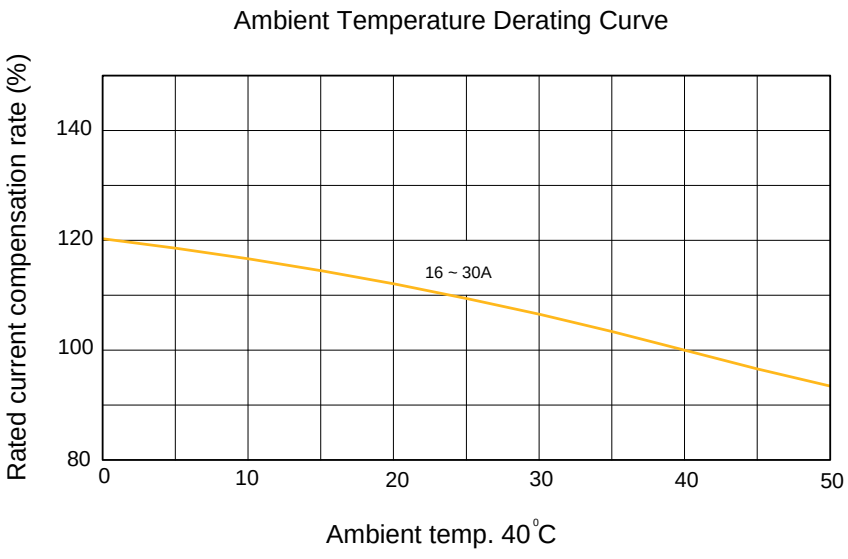




Operation characteristic curve

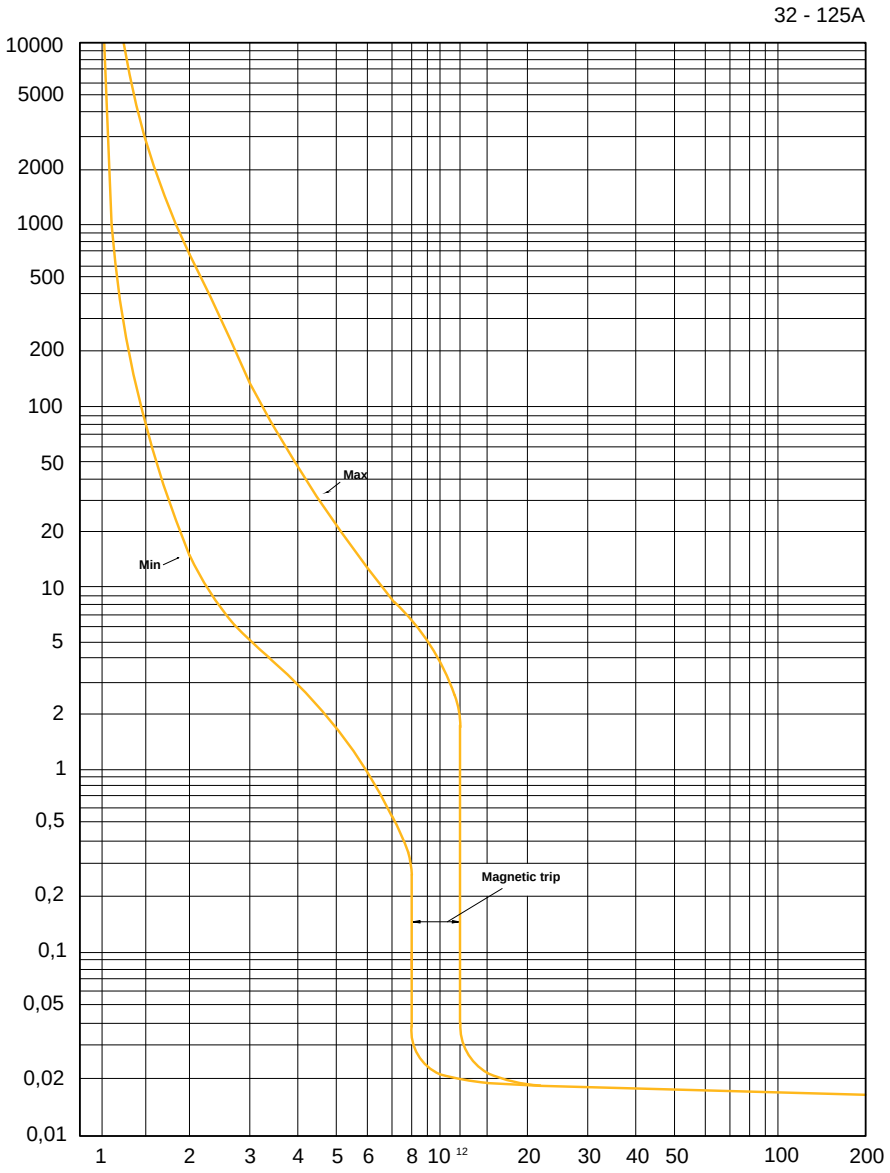
Frame 125A Time current characteristic curve (16 ~ 30A)



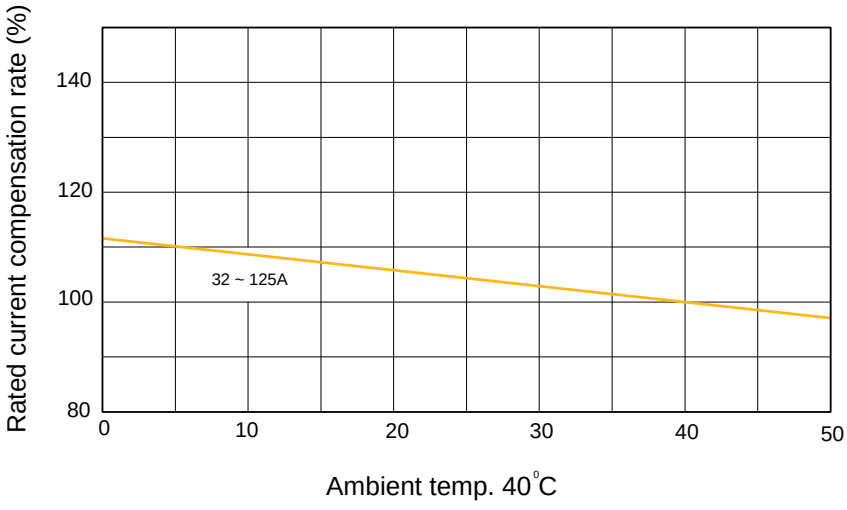


Operation characteristic curve

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

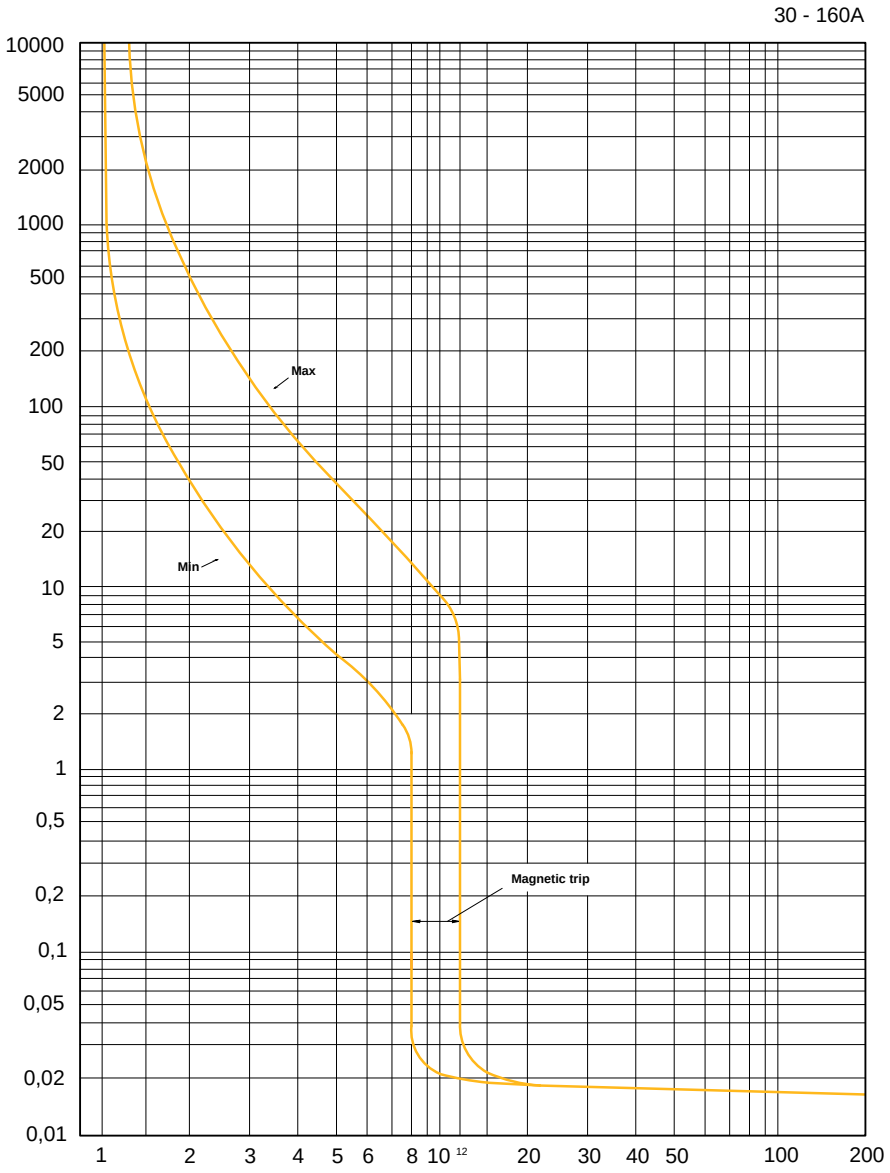


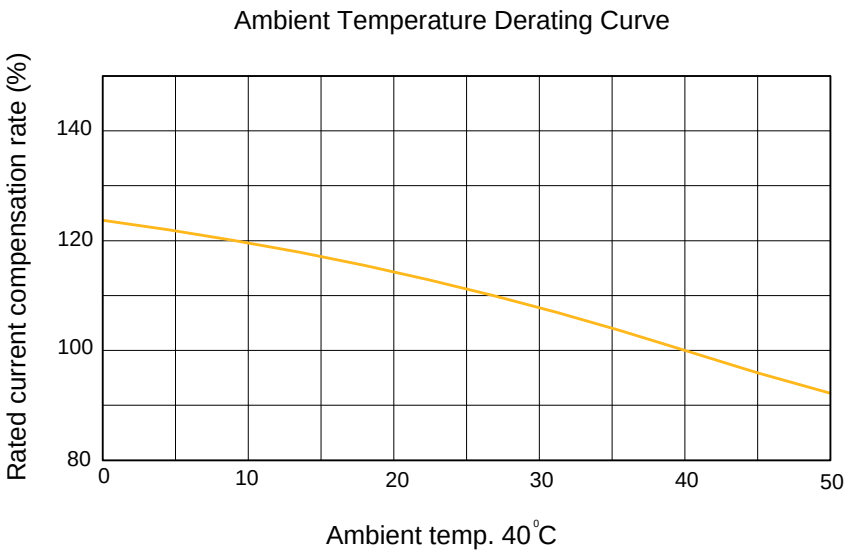
Ambient Temperature Derating Curve



Operation characteristic curve

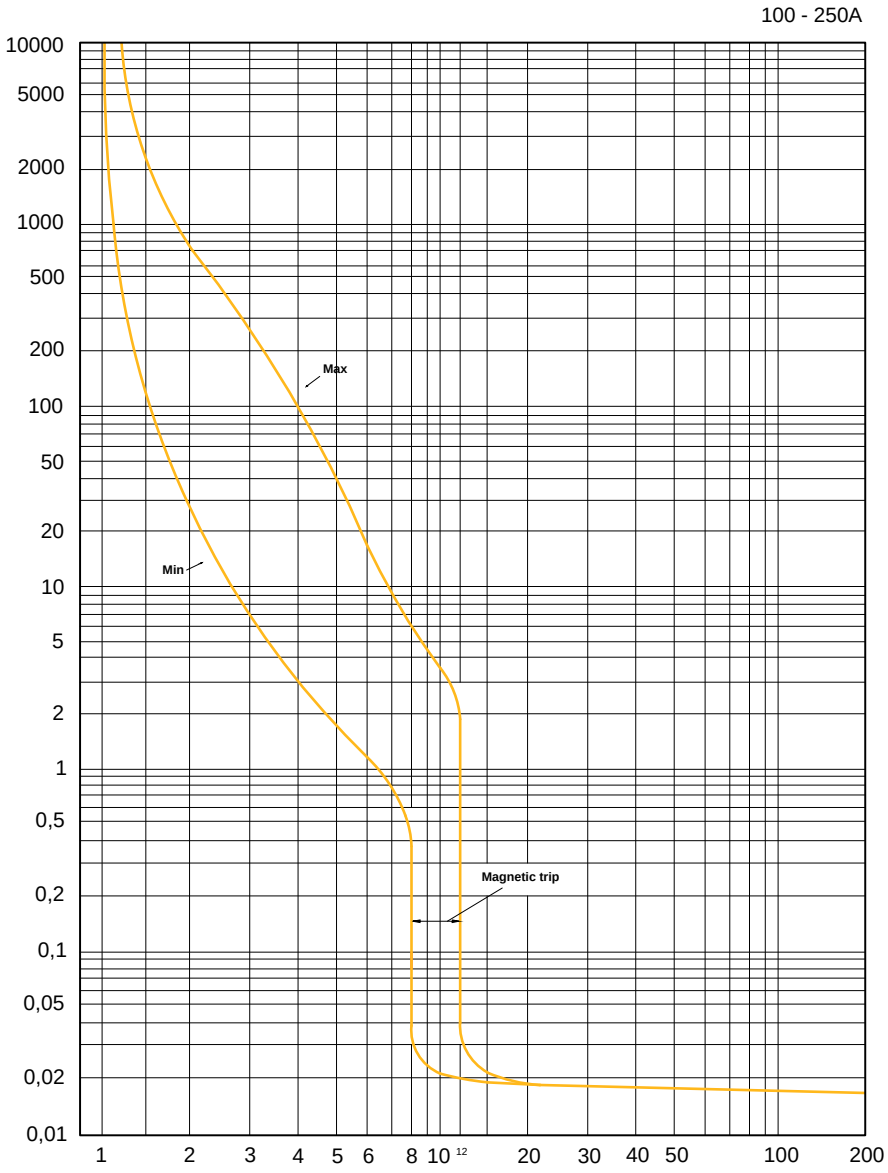
Frame 160A Time current characteristic curve



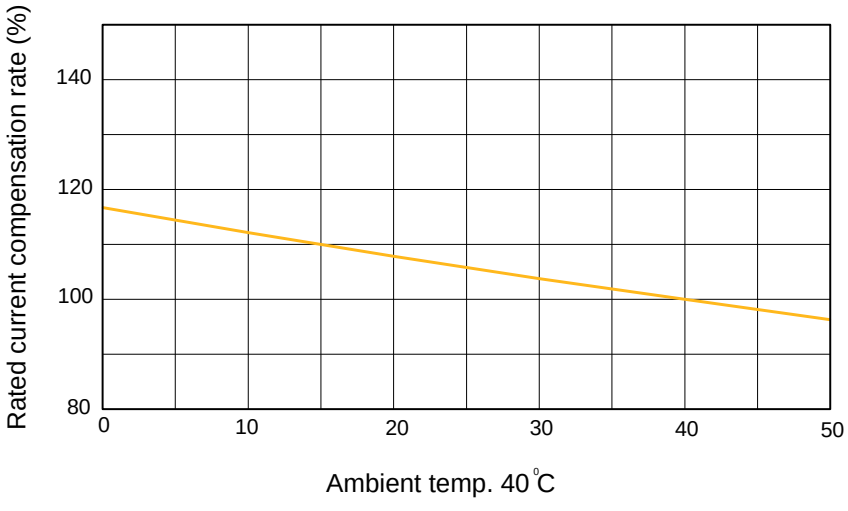


Operation characteristic curve

Frame 250A Time current characteristic curve

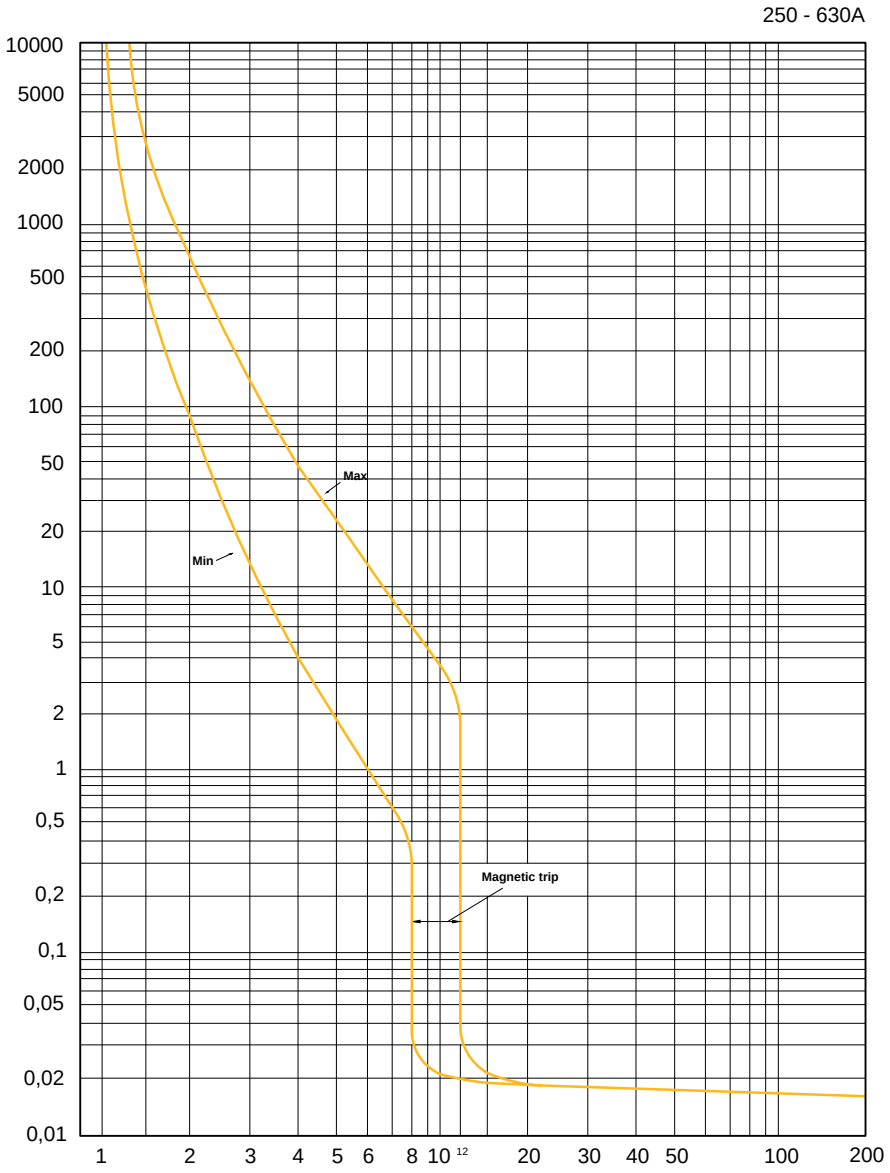


Ambient Temperature Derating Curve

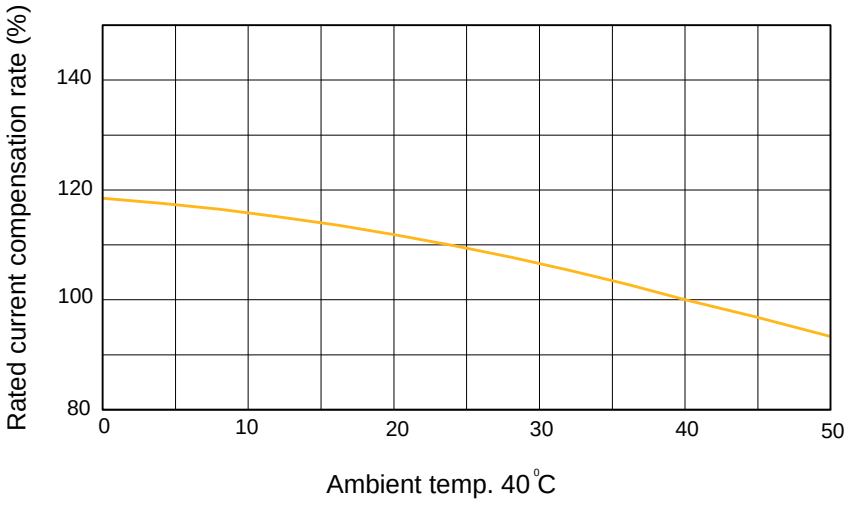


Operation characteristic curve

Frame 400A & 630A Time current characteristic curve

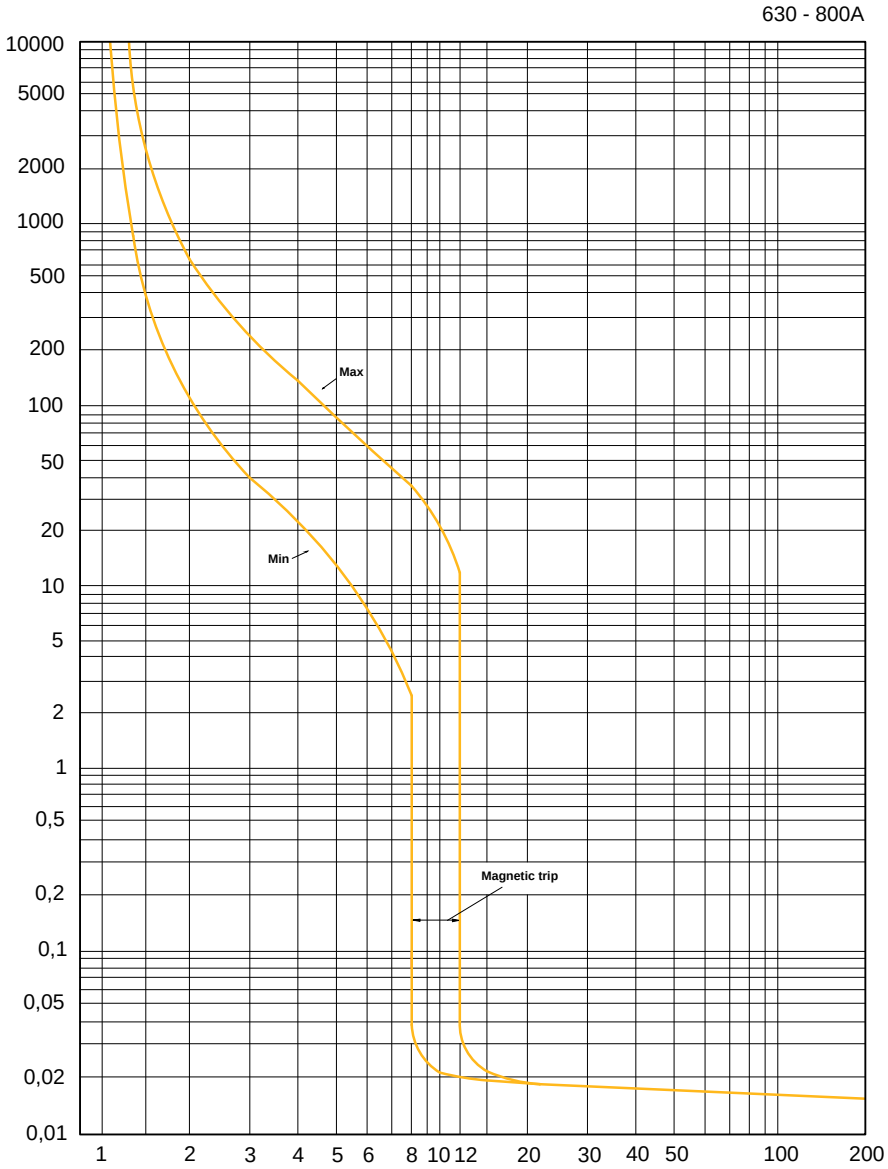


Ambient Temperature Derating Curve

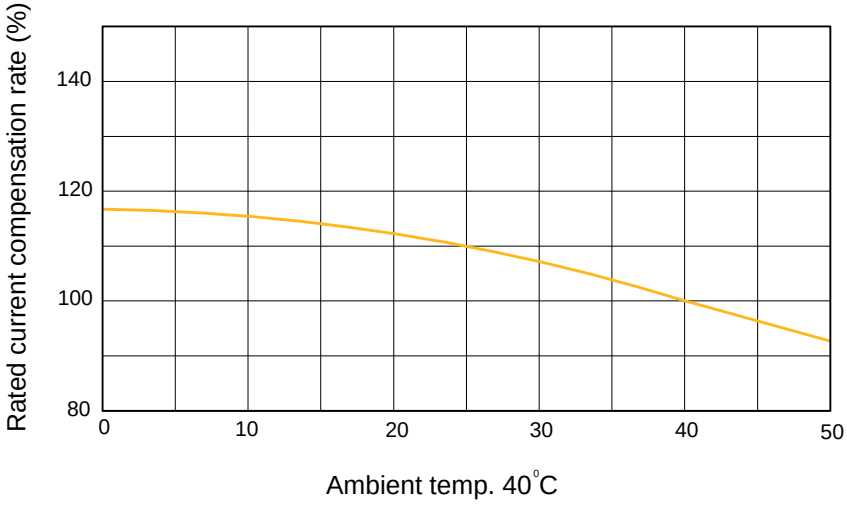


Operation characteristic curve

Frame 800A Time current characteristic curve

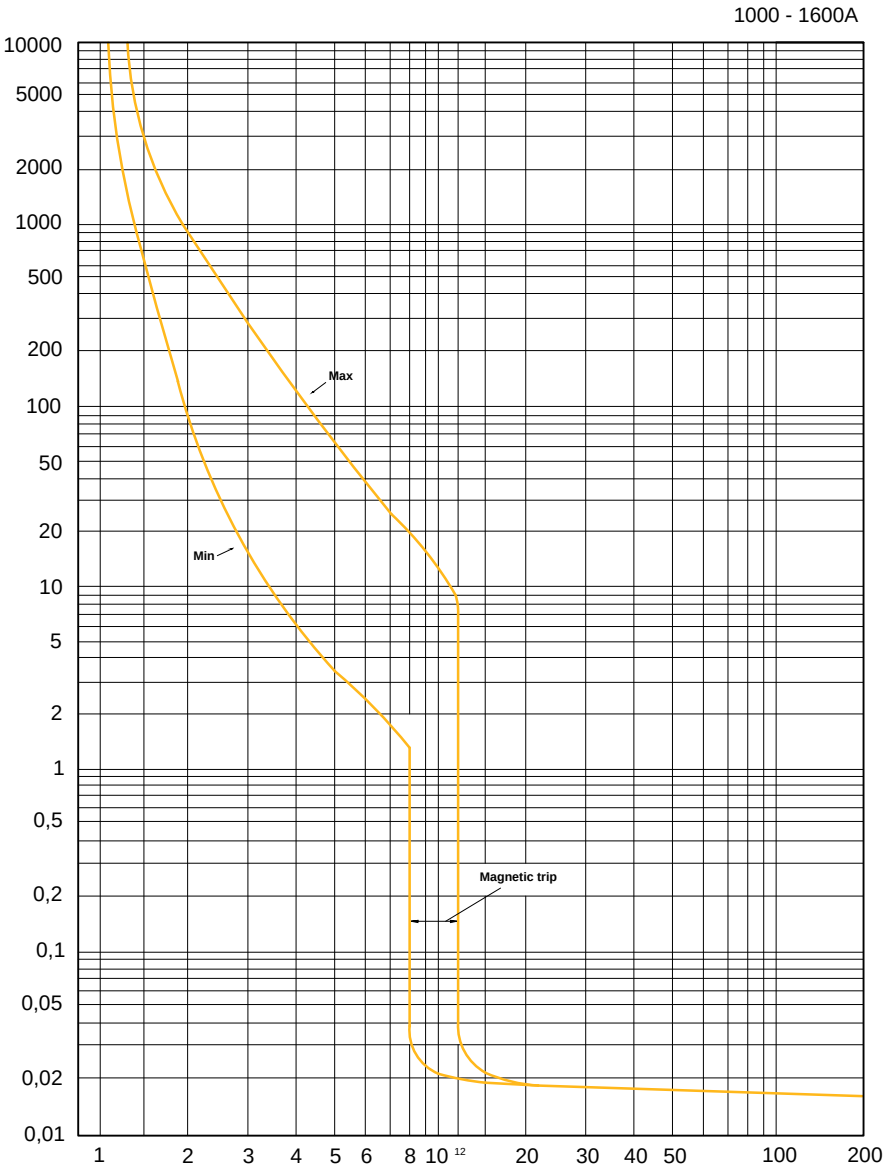


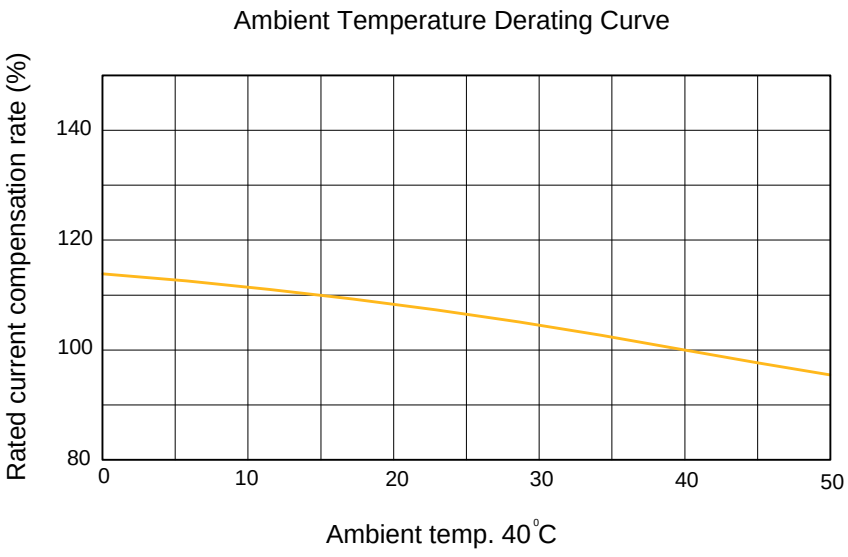
Ambient Temperature Derating Curve



Operation characteristic curve

Frame 1250A - 1600 Time current characteristic curve





ME
IME
Series

Electronic type with button
Electronic type with LCD

Application scope

Electronic molded case circuit breaker, it is used to distribute electrical energy and protect power supply lines and equipment from damages such as overload, short circuit and ground fault. ME and IME this is a great device to protect your home or office or factory from electrical fires and equipment damage.

Salient features

- Protection: The M-Series circuit-breakers will provide protection for the circuit and equipment in case of overload, short circuit and ground fault condition occurred in the power distribution circuit.
- Adjustable: As applying to adjustable rated current design, it is possible to protect circuit optimally according to the load factor. Adjustable range of rated currents 40% ~ 100% of rated current.
- Self-power: Intellectual controller is powered by circuit breaker itself.
- Overload indicator: The LED indicator twinkled when load current exceed rated setting current >5%, means it's overload Over-load alarm indicator. The LED indicator solid when load current between 40% and 100% of setting current in long time delay, means running normally, otherwise will be alarm.
- Rated short-time withstand current: Minimum values of rated short-time withstand current 12In or 5 kA, whichever is the greater.
- Suitable for isolation, ensuring safety for people working behind the circuit breaker.
- Environmental protection: Most components are recyclable.

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			250-400	
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 (Can be set to A)			B (Can be set to A)	
Rated shor-time withstand current, Icw/1s	kA/s	5			8	
Trip unit: Electronic		*E01*			*E01*	
Trip unit rating, In	A	125-250			250-400	
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)			**250** (100-112-125-140-150-160-180-200-225-250) **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
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		■			■	
Dimensions mm	3P	106x165x100			150x257x148	
(W x L x H)	4P	141x165x100			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**
400-630		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 (Can be set to A)		B (Can be set to A)		B (Can be set to A)	
8		10		10	
E01		*E01*		*E01*	
400-630		630-800		1000-1250-1600	
400 (160-190-225-250-275-300-325-350-375-400) **630** (252-300-350-400-435-475-515-550-595-630)		**630** (252-300-350-400-435-475-515-550-595-630) **800** (320-435-550-630-660-690-715-745-770-800)		**1000** (400-500-600-700-800-900-1000) **1250** (500-625-750-875-1000-1125-1250) **1600** (640-800-960-1120-1280-1440-1600)	
12-60-100-150-OFF **@2Ir**		12-60-100-150-OFF **@2Ir**		8-12-16-24-32-48-64-96-128-256-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		2-3-4-5-6-7-8-10-12 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**		0.05-0.1-0.15-0.2-0.3-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		4-6-7-8-9-10-11-12-14 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		0.6-0.65-0.7-0.75-0.8-0.85-0.9-0.95-1.0 x Ir - 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		0.2-0.3-0.4-0.5-0.6-0.7-0.8-0.9-1.0 x In - OFF	
Fixed at 0.4		Fixed at 0.4		Fixed at 0.4	
E	E	E	S	E	S
60	75	60	75	50	65
60	75	60	75	50	65
20000		20000		10000	
5000		5000		2000	
■		■		■	
■		■		■	
■		■		■	
■		■		■	
■		■		■	
■		■		■	
150x257x148		210x280x155		210x340x245	
198x257x148		280x280x155		280x340x245	

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

Selection table

Electronic type with LCD

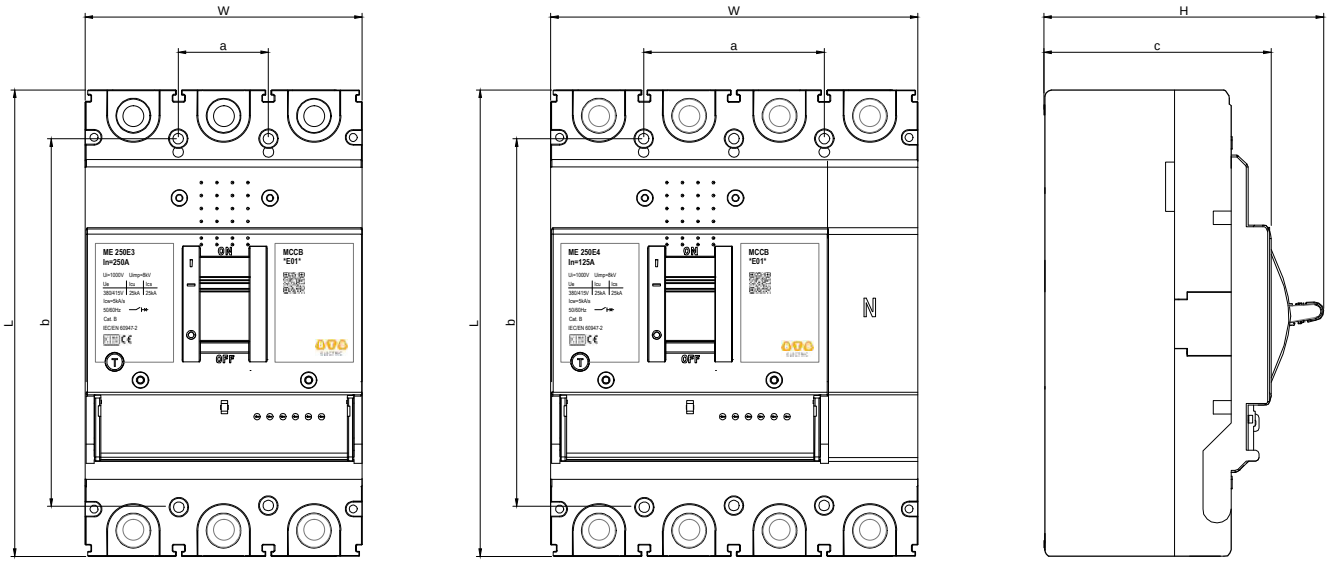
Frame	A	400		630		800	
Type and pole	3P	iME400E3	iME400S3	iME630E3	iME630S3	iME800E3	iME800S3
	4P	iME400E4	iME400S4	iME630E4	iME630S4	iME800E4	iME800S4
Rated current, In	A	250-400		250-400-630		630-800	
Rated Operational Voltage, Ue	V	690		690		690	
Rated Insulation Voltage, Ui	V	1000		1000		1000	
Impulse 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 (Can be set to A)		B (Can be set to A)		B (Can be set to A)	
Rated shor-time withstand current, Icw/1s	kA/s	8		8		10	
Trip unit: Electronic		*E02*		*E02*		*E02*	
Trip unit rating, In	A	250-400		250-400-630		630-800	
Long delay current range, Ir	A	**250** (100-250) **400** (160-400) with increment by 1A		**250** (100-250) 400 (160-400) **630** (252-630) with increment by 1A		**630** (252-630) **800** (320-800) 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) **400** (320-4800) with increment by 1A		**250** (200-3000) **400** (320-4800) **630** (500-7560) with increment by 1A		**630** (500-7560) **800** (650-8000) 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) 400 (640-5600 +OFF) with increment by 1A		250 (400-3500 +OFF) 400 (640-5600 +OFF) 630 (1000-8820 +OFF) with increment by 1A		630 (1000-8820 +OFF) 800 (1300-9600 +OFF) with increment by 1A	
Pre trip alarm setting multiple, Ip	A	**250** (70-250) **400** (112-400) with increment by 1A		**250** (70-250) **400** (112-400) **630** (175-630) with increment by 1A		**630** (175-630) **630** (228-800) with increment by 1A	
Ground fault pickup current, Ig	A	**250** (50-250 +OFF) **400** (80-400 +OFF) with increment by 1A		**250** (50-250 +OFF) **400** (80-400 +OFF) **630** (126-630 +OFF) with increment by 1A		**630** (126-630 +OFF) **800** (160-800 +OFF) 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
Mechanical Endurance		20000		20000		20000	
Electrical Endurance		7000		5000		5000	

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

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

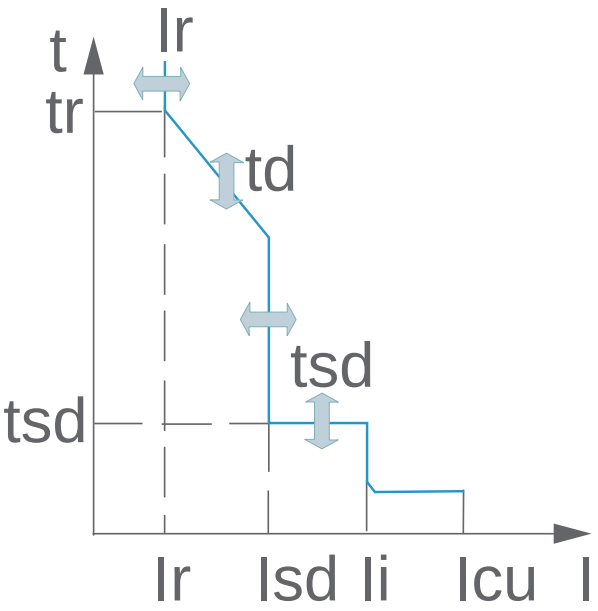
Dimensions

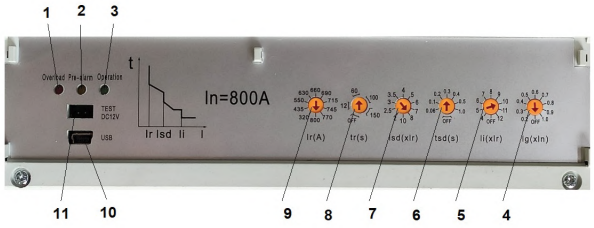
Frame	Type	Poles	Outline Dimension (mm)				Installation Dimension (mm)			Weight
			W	L	H	c	a	b	d	kg
250	ME 250S3; ME 250L3	3	106	165	100	77	35	126	Φ4.5	1.8
	ME 250S4; ME 250L4	4	141	165	100	77	70	126	Φ4.5	2.3
400	ME 400E3; ME 400S3 iME 400E3; iME 400S3	3	150	257	148	111	44	194	Φ7	5.8
	ME 400E4; ME 400S4 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	210	340	192	152	70	303	Φ8.5	21.5
	ME 1600E4, ME 1600S4	4	280	340	192	152	140	303	Φ8.5	28.1



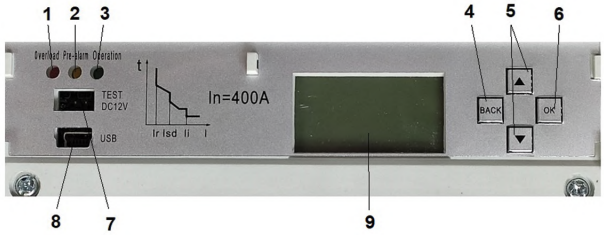
Operation characteristic curve

Installation Instructions





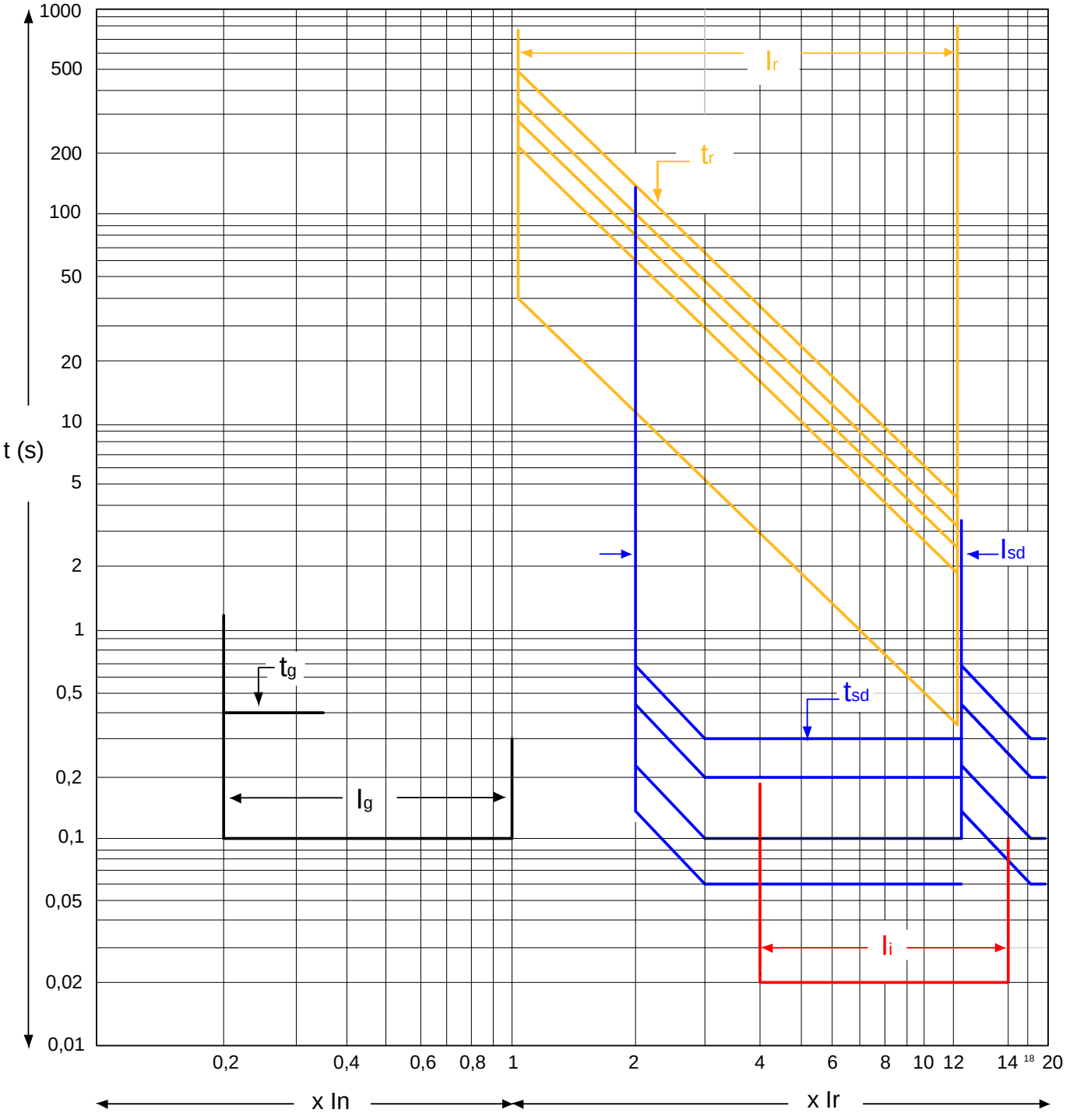
Electronic type with button	
1	Trip indicator LED
2	Pre trip alarm LED
3	Operation LED
4	Pre trip alarm setting multiple
5	Short circuit protection of high level faults
6	Short circuit protection time at low level faults
7	Short circuit protection of low level faults
8	Long delay time
9	Long delay current 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) is a molded case circuit breaker used in a low-voltage AC electrical circuit to provide electric shock protection and prevent fires from current leakages. ELCB is called 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 referred to as a “Ground-fault circuit-interrupter”.

Why is ELCB needed?

Awareness toward electric shock injuries and short-circuit fires has increased in view of saving human life and assets. In addition, places requiring installation of ELCB has increased for legal reasons.

Salient features

- Residual current circuit breakers are used mainly to provide protection against leakage current which may cause insulation failure , electric shock to equipment and human body irrespectively along with the standard protection against over load & short circuit condition.
- Standardized size of accessories, compatible with MCCB.
- Adjustable Residual current and current cut-Off time.
- Application of 3 phase power supply system, enabling normal operation under one phase loss fault.

Image and structure

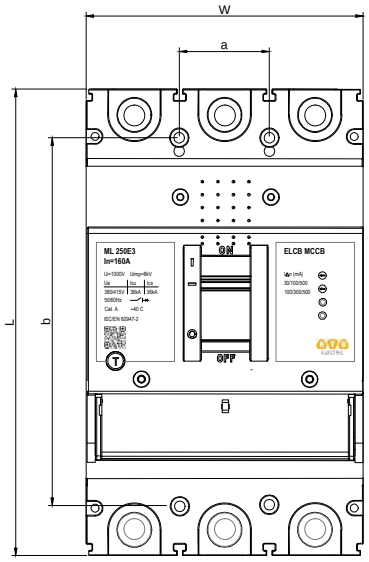
Selection table

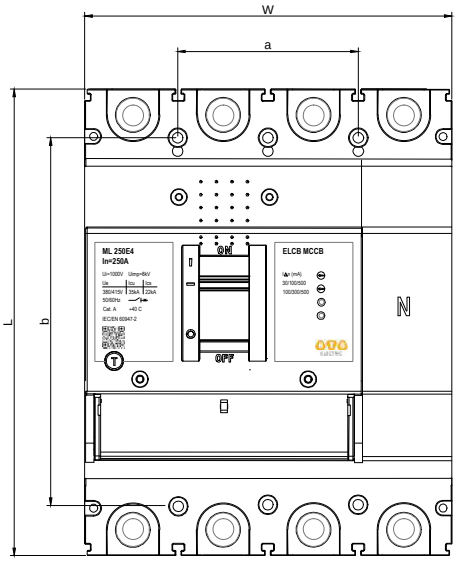
Frame	A	250		400		800	
Type and pole	3P	ML250E3	ML250S3	ML400E3	ML400S3	ML800E3	ML800S3
	4P	ML250E4	ML250S4	ML400E3	ML400S4	ML800E4	ML800S4
Rated current at 40°C, In	A	100-125-160-200-225		225-250-315-350-400		630-700-800	
Rated Operational Voltage, Ue	V	440		440		440	
Rated Insulation Voltage, Ui	V	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		G7	
IΔn (Without time delay)	mA	30/100/500 100/300/500		100/300/500		100/300/500	
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	35	50	50	100	50	100
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		■		■		■	
Dimensions mm (W x L x H)	3P	106x165x100		150x257x148		210x280x155	
	4P	141x165x100		198x257x148		280x280x155	

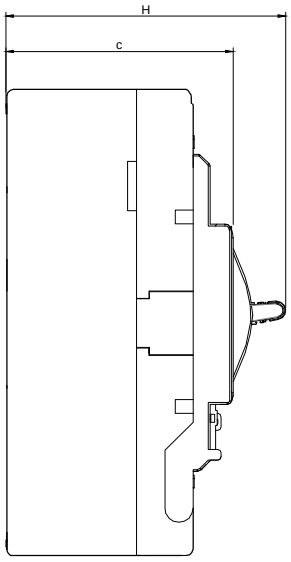
“■” shows it has this option; “□ ” means it has no this option.

Dimensions

Frame	Type	Poles	Outline Dimension (mm)				Installation Dimension (mm)			Weight
			W	L	H	c	a	b	d	kg
250	ML 250E3; ML 250S3	3	106	165	100	77	35	126	Φ4.5	1.8
	ML 250E4; ML 250S4	4	141	165	100	77	70	126	Φ4.5	2.3
400	ML 400E3; ML 400S3	3	150	257	148	111	44	194	Φ7	5.8
	ML 400E4; ML 400S4	4	198	257	148	111	88	194	Φ7	7.6
800	ML 800E3; ML 800S3	3	210	280	155	117	70	243	Φ7	10.2
	ML 800E4; ML 800S4	4	280	280	155	117	140	243	Φ7	13.1

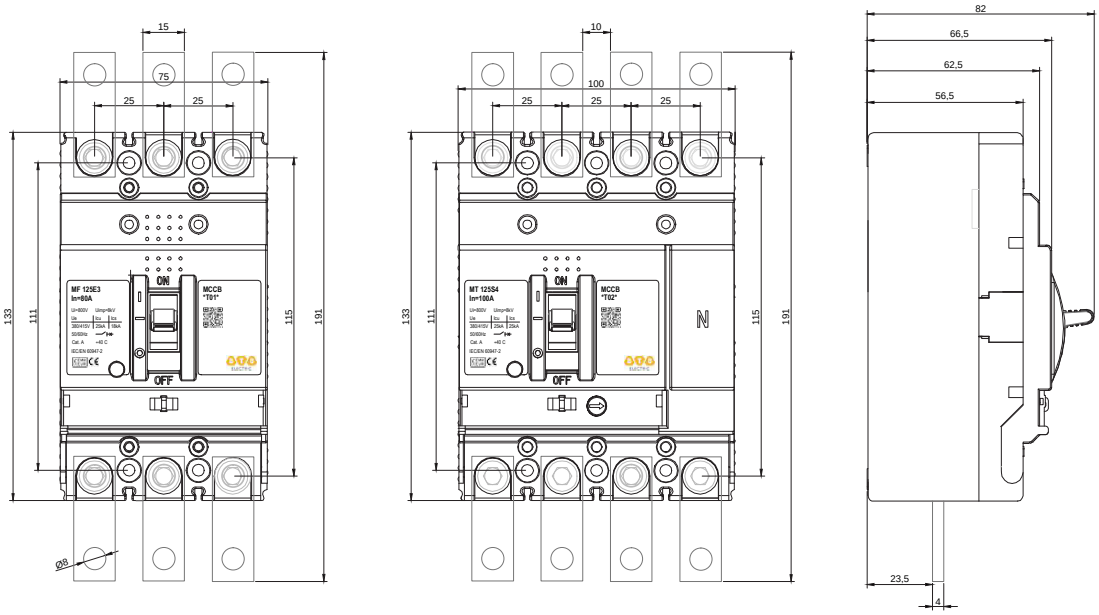




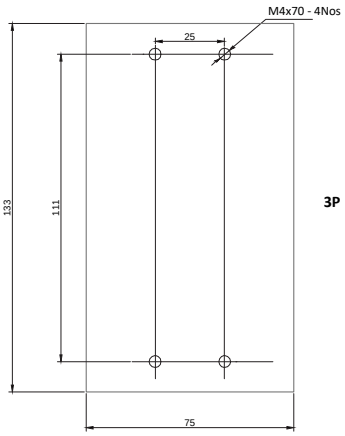


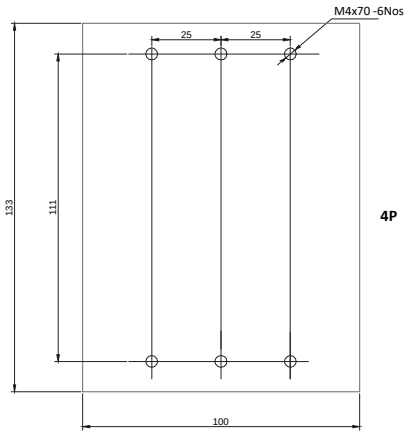
Dimensions

Frame 125A

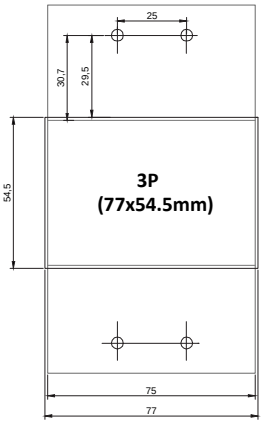


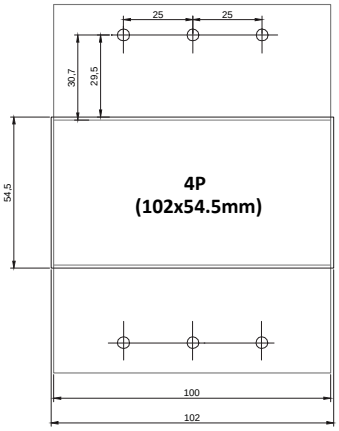
Panel drilling



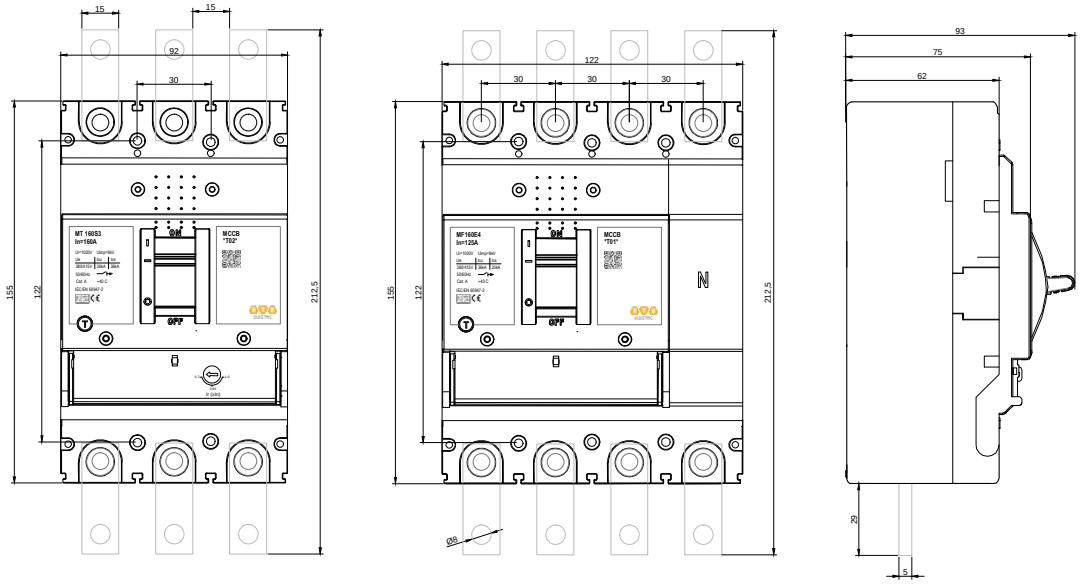


Front panel cutting

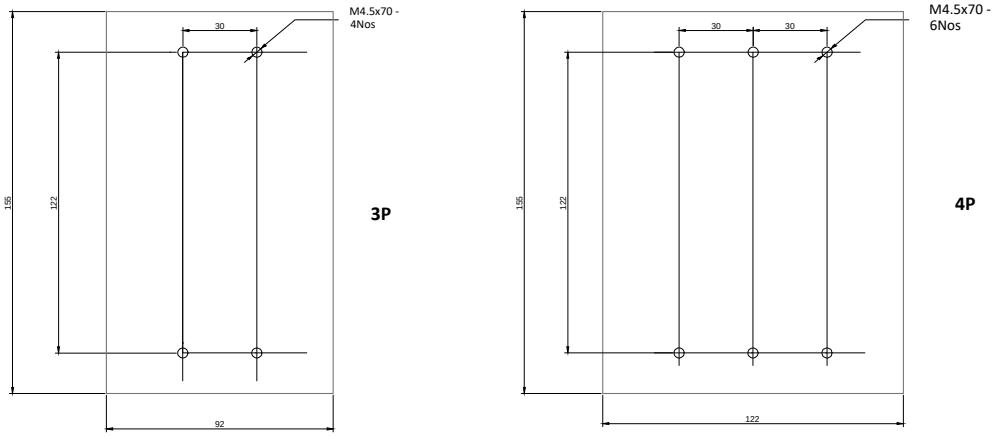




Frame 160A



Panel drilling



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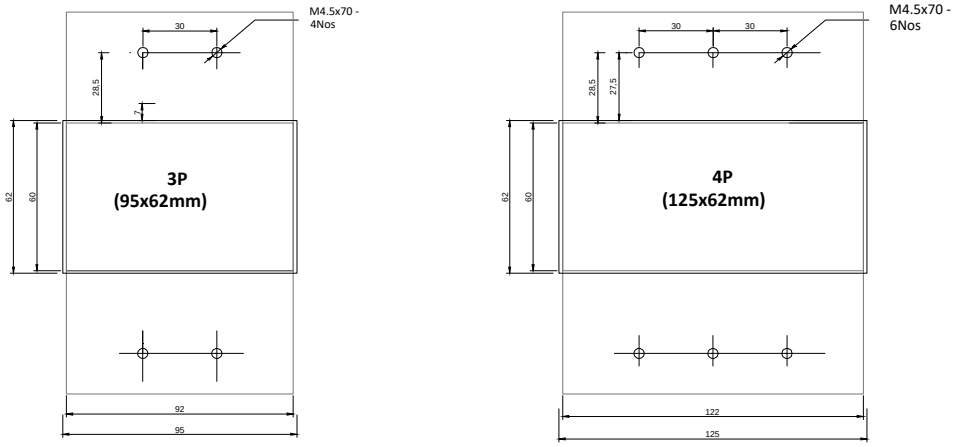
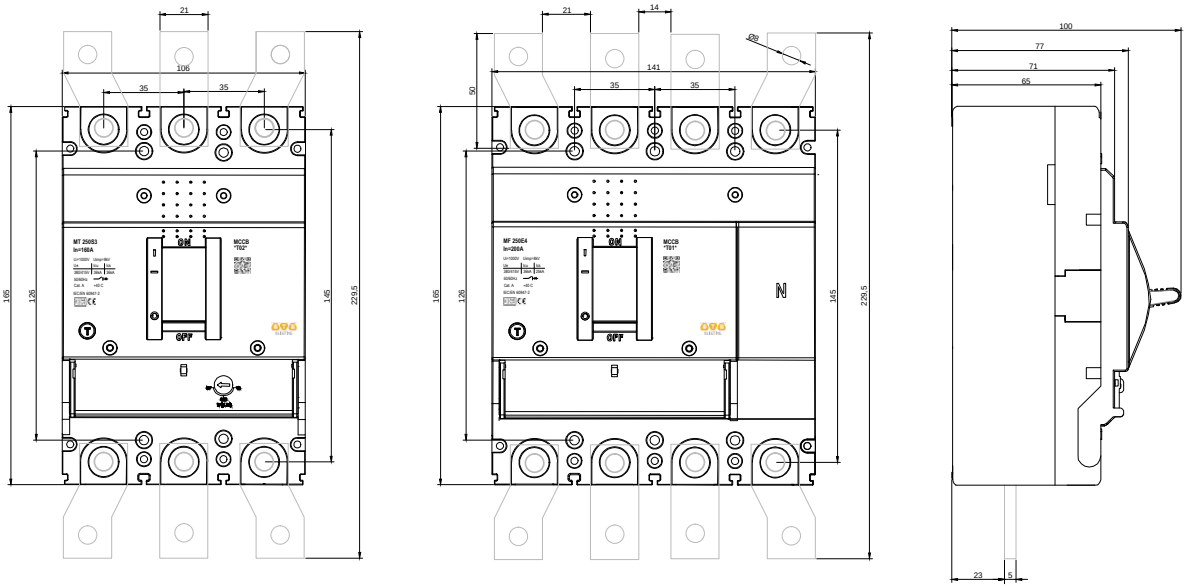


Frame 250A



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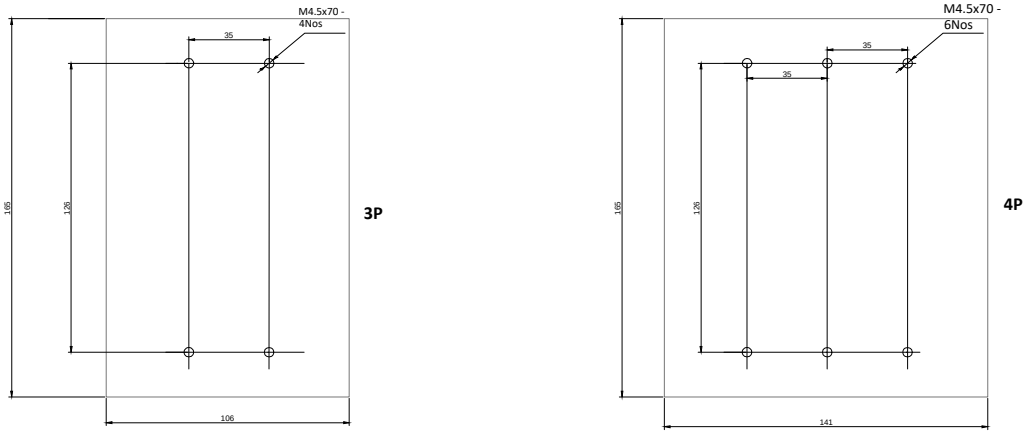

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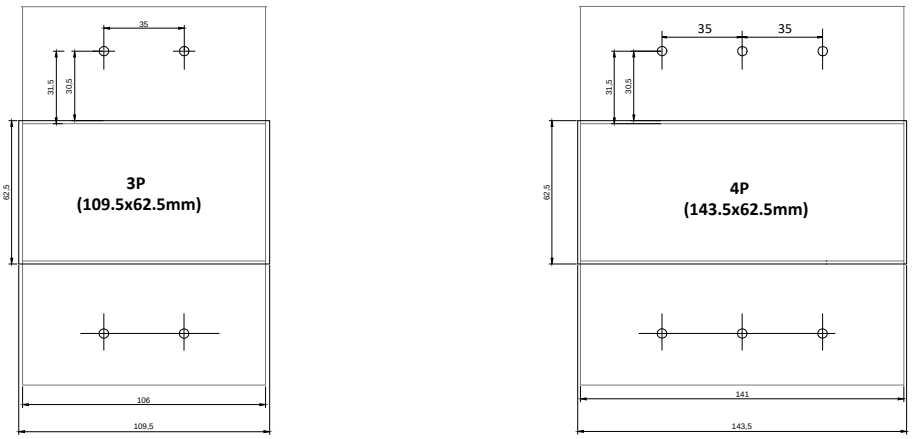
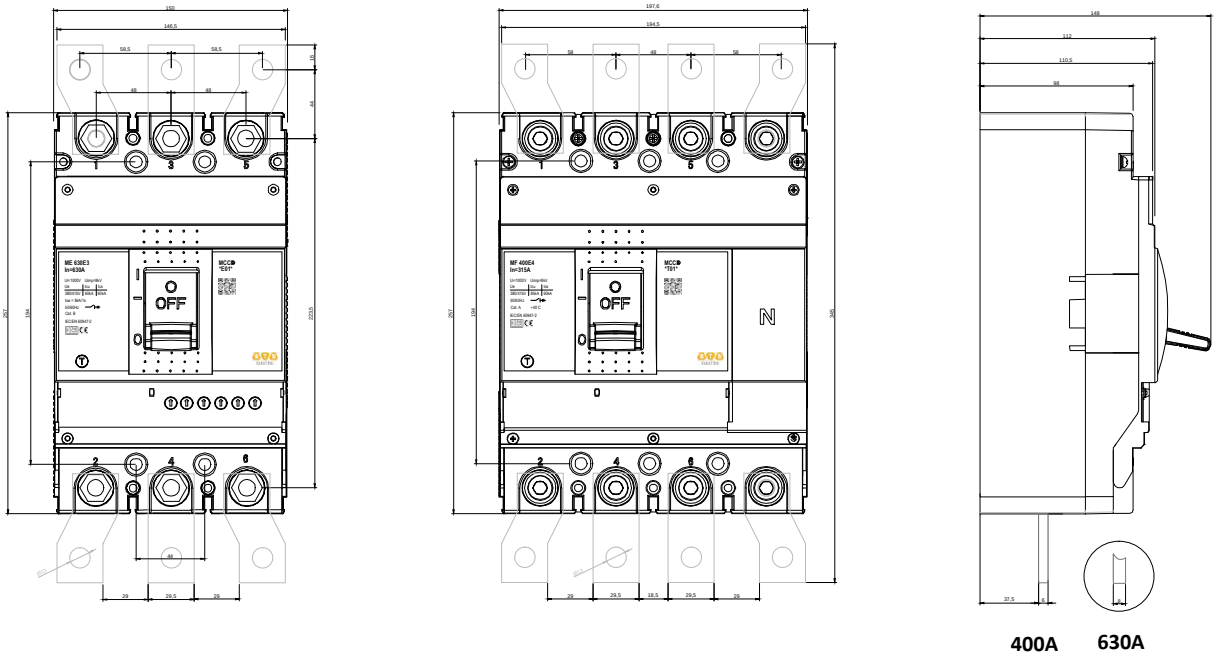
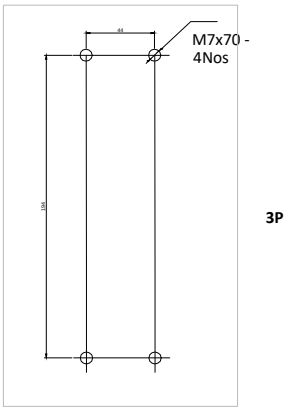


Frame 400A & 630A

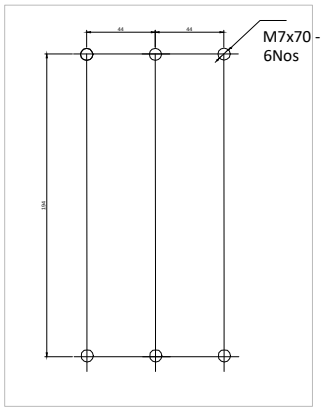


400A 630A

Panel drilling

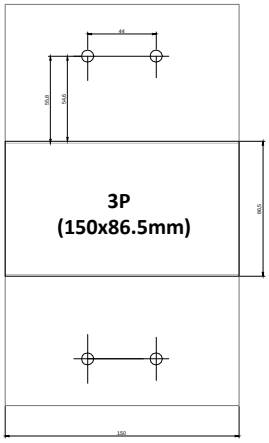


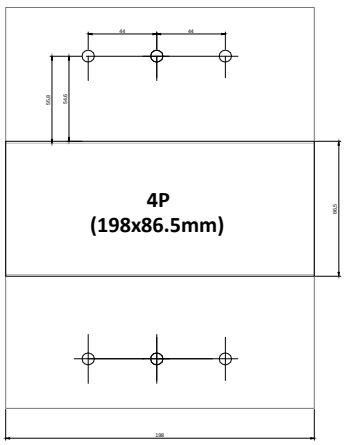
3P



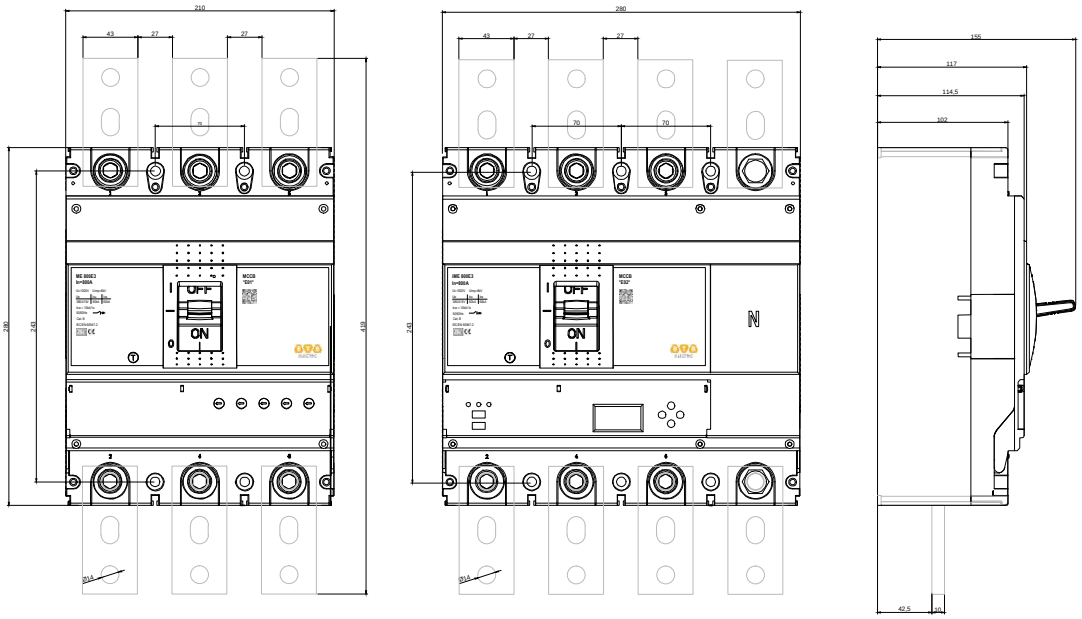
4P

Front panel cutting



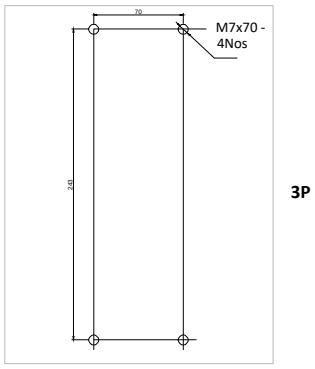


Frame 800A

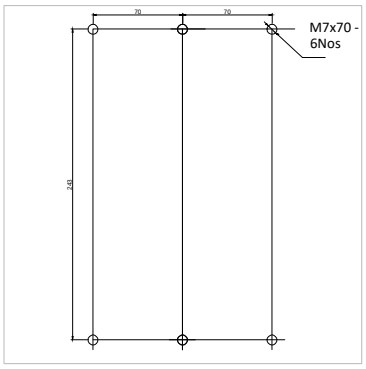


3P 4P

Panel drilling

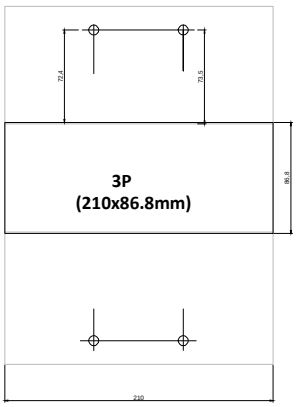


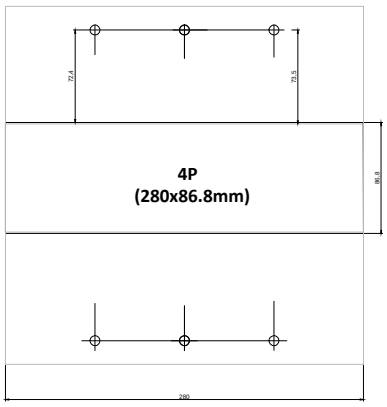
3P



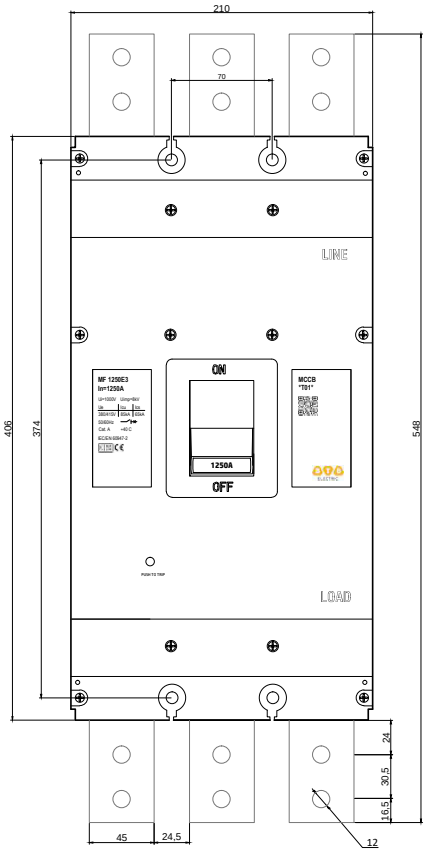
4P

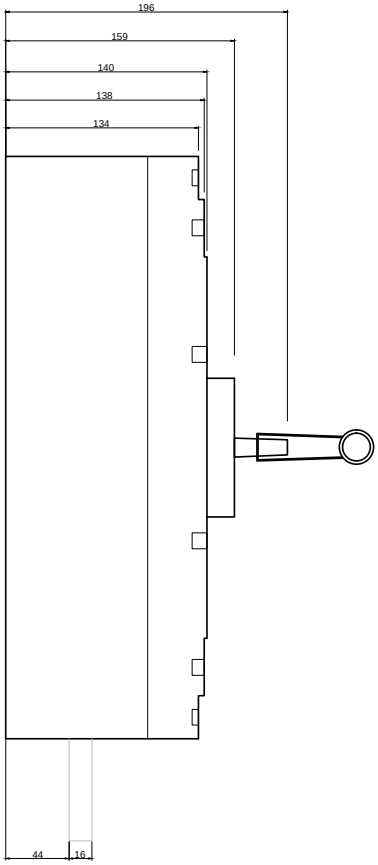
Front panel cutting



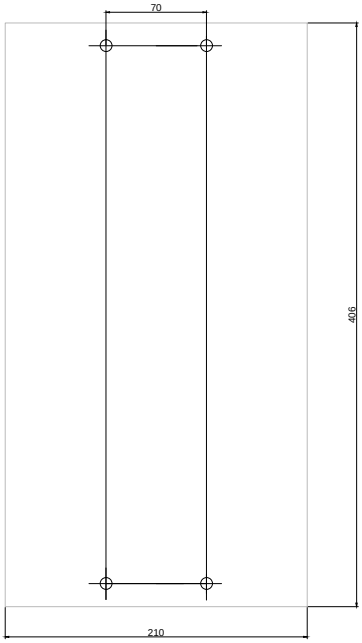


Frame 1250A

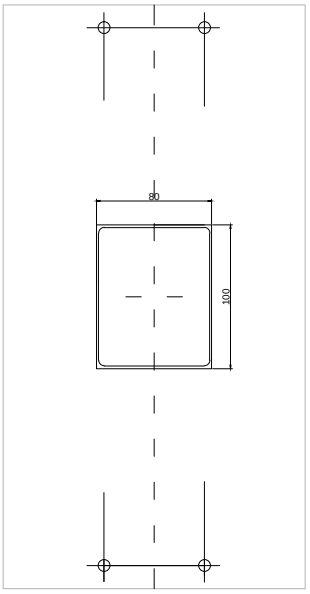




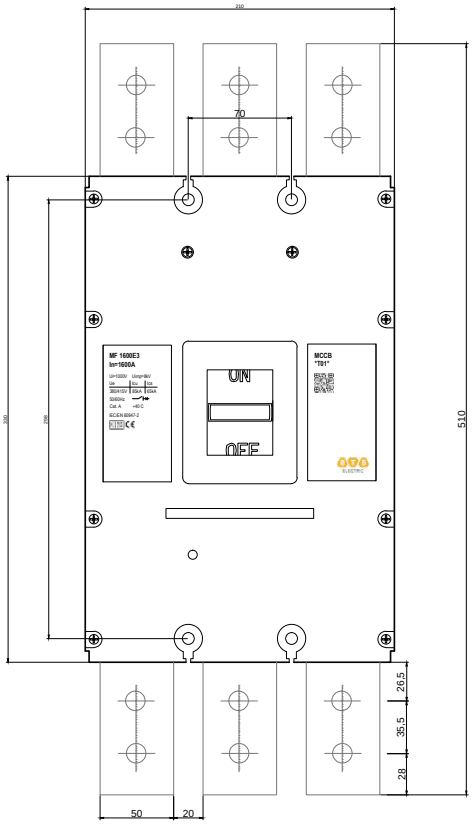
Panel drilling

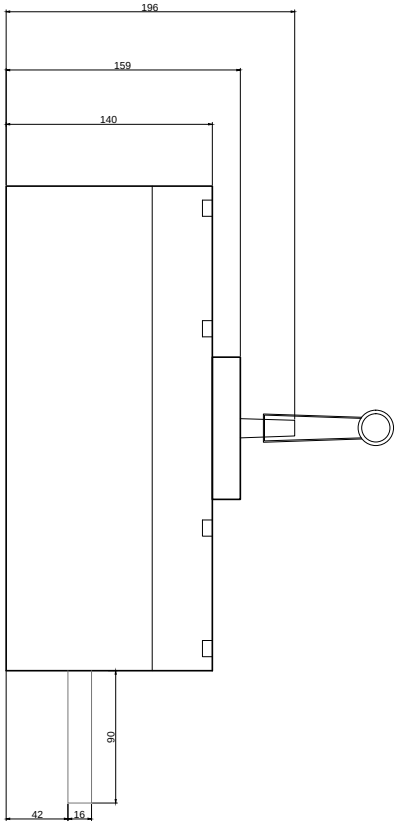


Front panel cutting

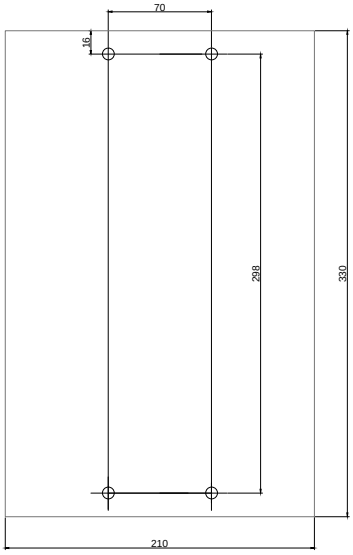


Frame 1600A (MF)

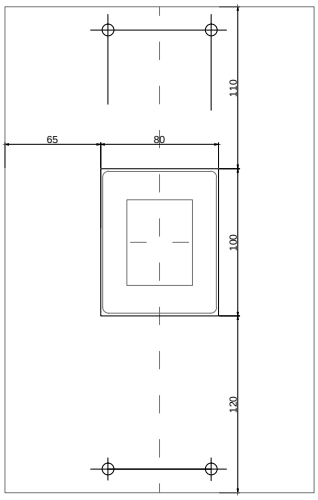




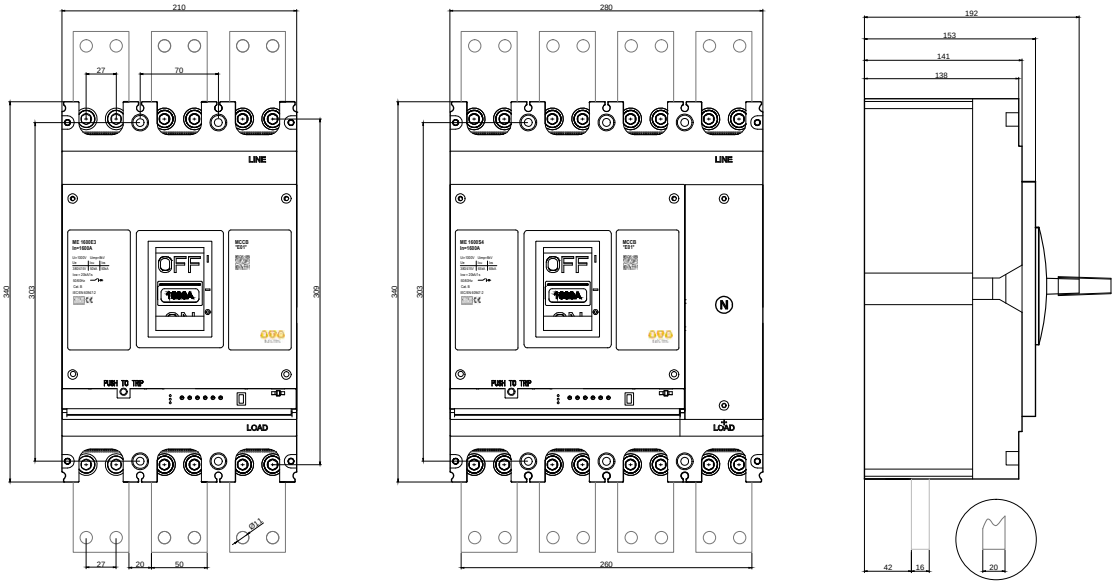
Panel drilling



Front panel cutting

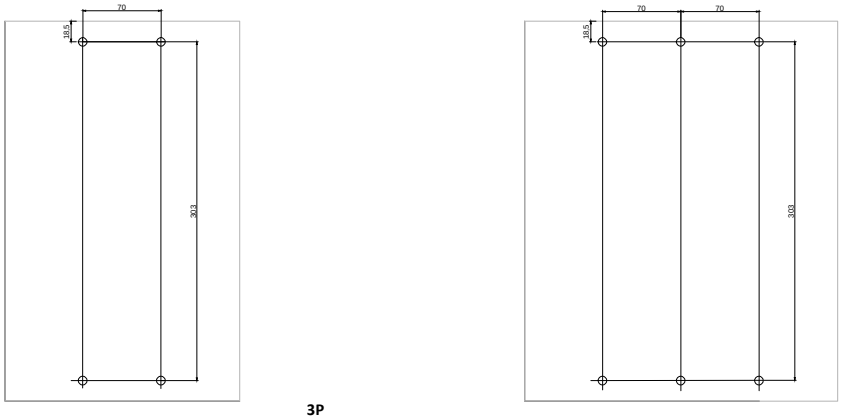


Frame 1600A (MT & ME)



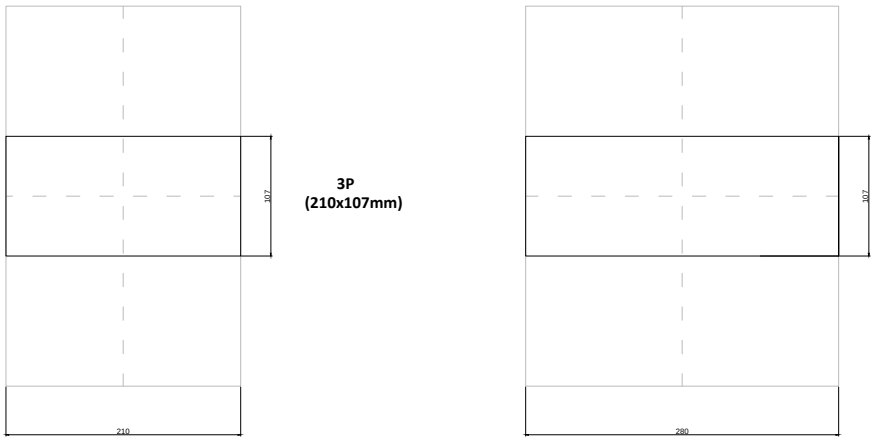
1000-1250A **1600A**

Panel drilling



3P **4P**

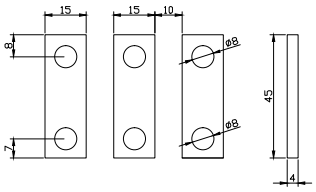
Front panel cutting



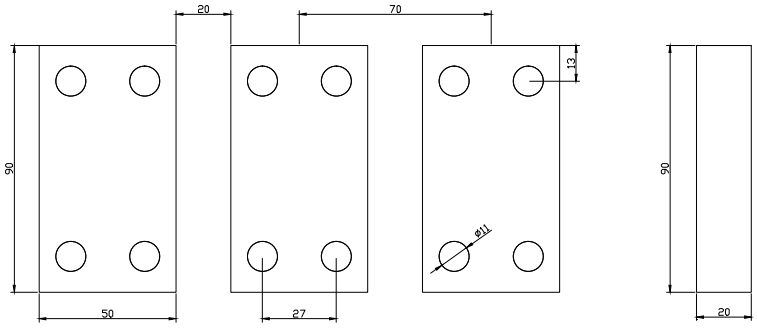
3P (210x107mm)

4P (280x107mm)

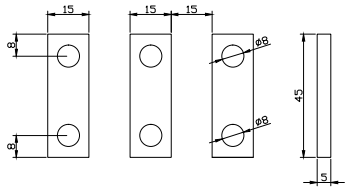
Spreader links



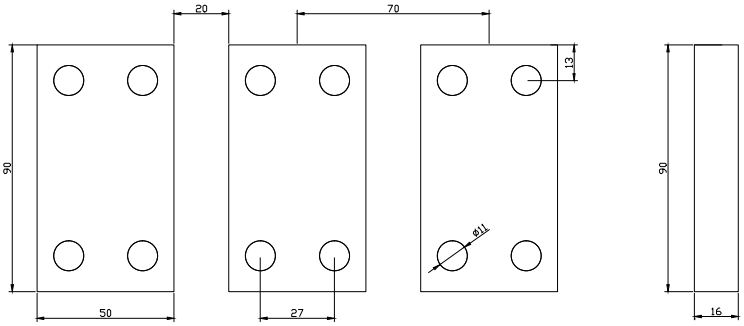
Frame 125A



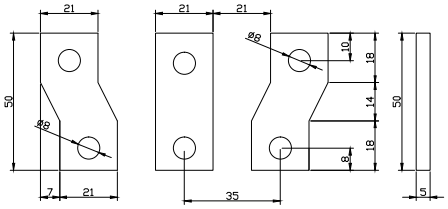
Frame 1600A



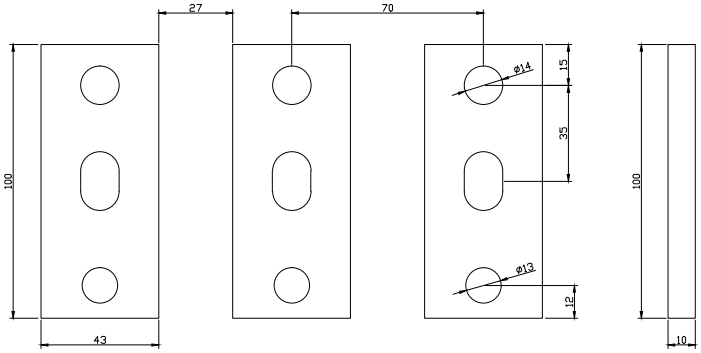
Frame 160A



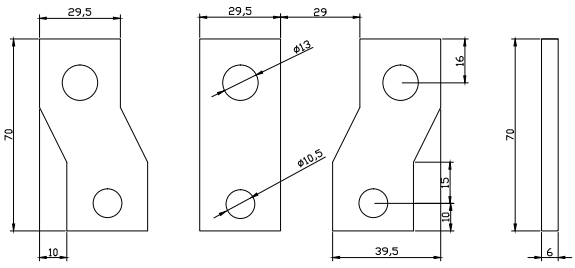
Frame 1250A



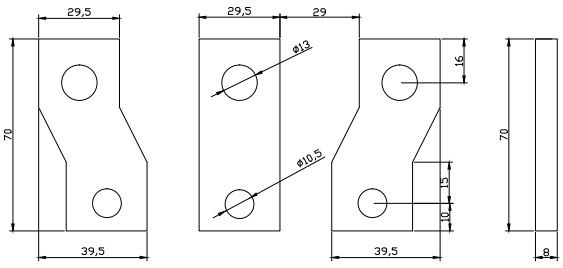
Frame 250A



Frame 800A

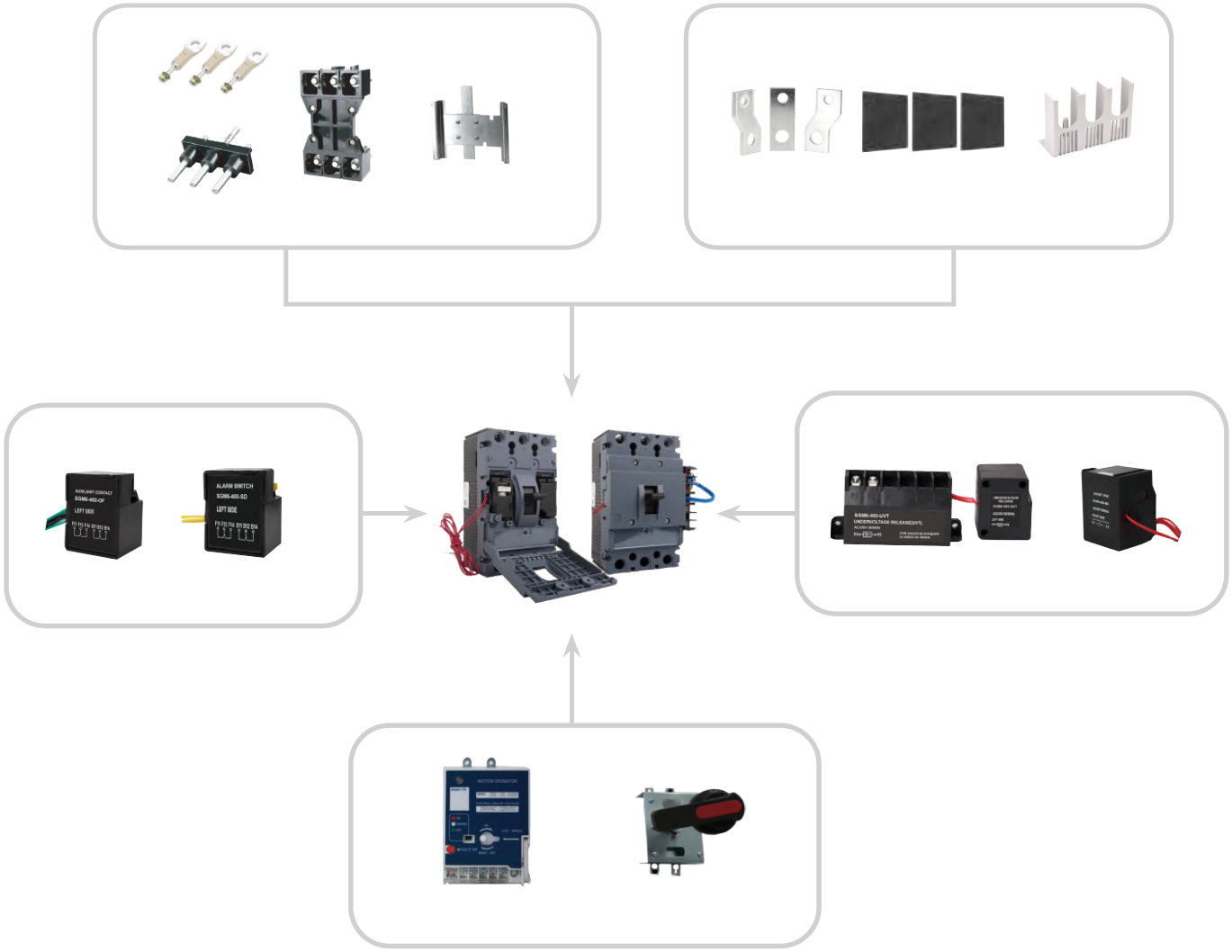


Frame 400A



Frame 630A

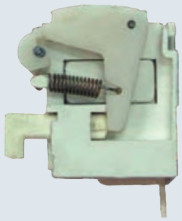
Accesories



	**Auxiliary switch (AUX)** • For breakers up to 160A operating current through the auxiliary contact: 3A • For breakers from 250 to 800A operating current through the auxiliary contact: 6A • Available joining conductors • Labeling of the cables
	**Alarm switch (ALT)** • The device changes its condition conformably to the breaker's condition; it has a NO and a NC contactor.

Shunt trip (SHT)

- Rated operating voltage: 230/400V 50/60Hz
- Electromagnetic coil 100VA for breakers up to 400A
- Electromagnetic coil 150VA for breakers 630-800A
- Available joining conductors



Undervoltage trip (UVT)

- Operating voltage: 230/400V 50Hz
- Electromagnetic coil 6VA for breakers up to 400A
- Electromagnetic coil 10VA for breakers 630-800A
- Available joining conductors
- Switches off at voltage decrease under 75% of the operating

Motor operator (MOT)

- The base is bolted right on the cover, used to control the MCCB remotely / locally via the motor

Extended Rotary Handle

- The base is mounted with bolts right on the cover, and the handle is mounted at the door of the distribution box, using an extension axis it is joined to the base.
- Use for MCCB frame 125A to 800A

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:

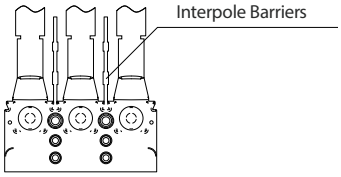
- Direct spreader links
- Spreader link with inter-electrode distance

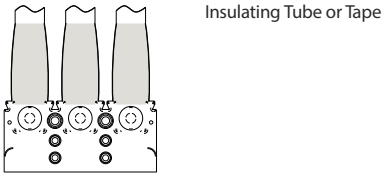
The busbar and extension terminal can be connected to the inlet or outlet terminal of the circuit breaker.

Installations

Precaution

- Installations must be carried out by licensed worker.
- Check whether the circuit breaker is open before performing any wiring.
- Tighten the terminal bolt using the proper torque as specified in the manual when connecting the bus or wire. Loose connections may result in.
- Tighten the terminal bolt as proper torque specified in manual or catalog. If do not insulated, it may cause short circuit fault.
- Provide enough insulating space to avoid arc gas vent blockage. Blocked arc gas vent may cause trip operation failure.
- Do not install in an environment where hot and humid air, dust, corrosive gas, vibration and shock is present. This may cause a fire or malfunction.
- To prevent fires or malfunctions, provide appropriate measures to prevent the entry of foreign substances following installation.
- This product is designed to be used with insulation barrier. Using with no insulation barrier may result in additional short-circuit fault.

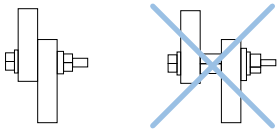




Connections to the Power Circuit

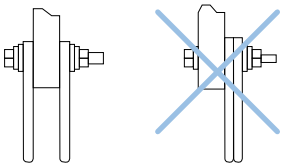
- Before installation, be sure to clean on connection terminals:

To prevent to increasing contact resistance, eliminate any dust, dirt or damages of any kind.



- Conductor should be connected directly:

Bolts or Nuts is not allowed between conductors. If the conductors are not connected directly, it may results in rising temperatures and fires.



- Conductors should be connected without overlap:

When connecting several conductors, the busbar should be installed on both sides.

Inspection and Maintenance

Initial Inspection

- Terminal parts shall be clean from dust, metal pieces and so on.
- Breaker shall not have any crack or damage.
- Check terminal parts. It should be tightened with specified torque.
- Be sure to check the value of Ue, Icu of the breakers.
- Insulance resistance 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	Tightening torque on terminals	Applying the tightening torque indicated in manual. Too strong tightening torque cause damaged
Dust and dirt	Confirm to breaker's body and upper side of the line part. Be sure to clean in term of dust and dirt to secure insulation	Remove the debris with a clean tool
Case	Check for damaged and cracked on breakers	Replace with a new breaker
Arc exhaust part	Check terminal part for arc exhaust.	Replace with a new breaker in case you can find the black soot and melted metal parts on the breakers
Operation	Manually On and OFF several times in case holding close position. It makes to reduce friction which is created harden grease and to stabilize contact resistance	Replace with a new breaker in case malfunction on ON and OFF Replace with a new breaker in case exceed mechanical and electrical durability
Terminal discoloration	Check for discolored terminal and conductor parts Be sure to confirm insulation capability on conductor parts	There in no problem with discolored silver coating parts lightly. In case breakers have an insulation trouble caused by heat, replace with a new breaker
Insulation resistance	Measure insulation resistance between each poles, terminal and earth	Insulation resistance should be more than 5 MΩ, unless lower than 5 MΩ, Replace with new one

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

Ordering types

a	b	c	d	e	f
M	E	400	S	3	G6*

a Series
b Type of release
c Frame size
d Short-Circuit Capacity
e Number of Poles
f 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

d	Number of Poles
2	2 Pole
3	3 Pole
4	4 Pole

f	Rated residual current
G6	30/100/500mA
G7	100/300/500mA

BTB ELECTRIC

REALVALUE FORLIFE

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