

Meta-MEC  
**LOW VOLTAGE CIRCUIT BREAKERS**



Electric Equipment



**LG Industrial Systems**

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## General characteristics

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# General characteristics

## Overview | General chart

### Molded Case Circuit Breakers, MCCBs

Type	AF	30AF	50AF	60AF	100AF	225AF	250AF	400AF	800AF	1200AF
ABE			ABE53b 5kA	ABE63b 5kA	ABE103b 10kA	ABE203b 18kA		ABE403b 25kA	ABE803b 35kA	
ABS		ABS33b 5kA	ABS53b 10kA	ABS63b 10kA	ABS103b 25kA	ABS203b 25kA		ABS403b 35kA	ABS803b 50kA	ABS1203 65kA
ABH		ABH33b 10kA	ABH53b 25kA		ABH103b 35kA	ABH203b 35kA		ABH403b 50kA		
ABL								ABL403b 85kA	ABL803b 85kA	
GB Adjustable					GBN103 35kA		GBN203 35kA			
					GBH103 50kA		GBH203 50kA			
					GBL103 85kA		GBL203 85kA			
GB Electronic								GBN403E 35kA	GBN803E 35kA	ABS1203E 65kA
								GBH403E 50kA	GBH803E 50kA	
			GBL53E 85kA		GBL103E 85kA		GBL203E 85kA			

- by three-pole type, ampere frame and breaking capacity at 415VAC.



Molded Case  
Circuit Breaker

Same Size



Earth Leakage  
Circuit Breaker

## Earth Leakage Circuit Breakers, ELCBs

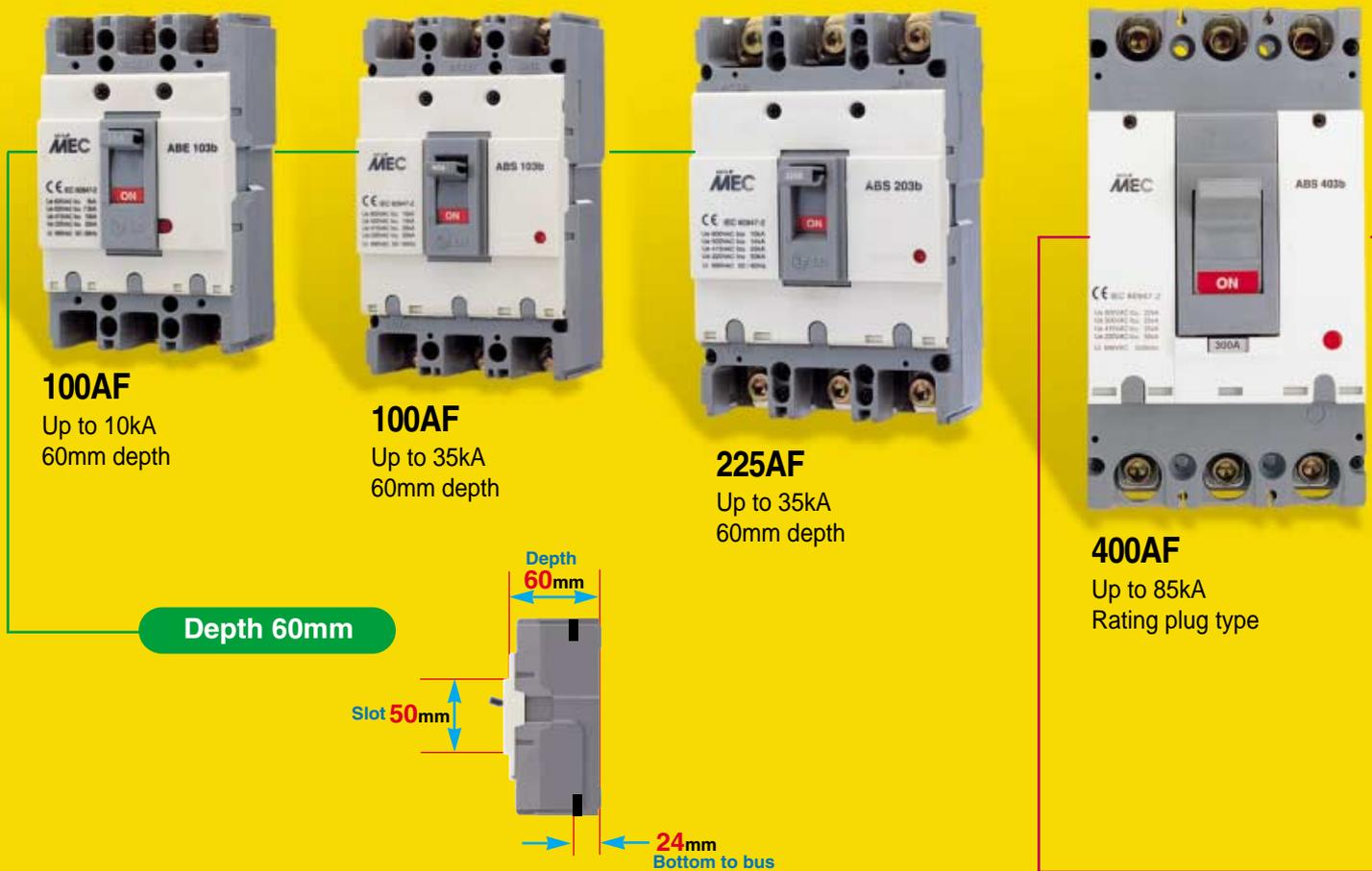
Type	AF	30AF	50AF	60AF	100AF	225AF	250AF	400AF	800AF	1200AF
EBE			EBE53b 5kA	EBE63b 5kA	EBE103b 10kA	EBE203b 18kA		EBE403b 25kA	EBE803b 35kA	
EBS		EBS33b 5kA	EBS53b 10kA	EBS63b 10kA	EBS103b 25kA	EBS203b 25kA		EBS403b 35kA	EBS803b 50kA	
EBH		EBH33b 10kA	EBH53b 25kA		EBH103b 35kA	EBH203b 35kA		EBH403b 50kA		
EBL								EBL403b 85kA	EBL803b 85kA	

- by three-pole type, ampere frame and breaking capacity at 415VAC.



# General characteristics

## Overview | AB type non-adjustable MCCBs



- Offering economical solution with compact sizes and increased interrupting capacities.
- Complete range of two, three and four-pole version.
- Employing a fixed thermal and fixed magnetic trip.
- Rating plugs to change thermal currents are available for 400 and 800AF.
- 3-pole ELCBs physically interchangeable with 3-pole MCCBs are available.
- Offering more accessories such as rear connection and extended rotary type handles.
- Frames made of rigid materials of engineering plastics.



**800AF**  
Up to 85kA  
Rating plug type



Rating plug



**1200AF**  
Up to 65kA  
Adjustable magnetic trip

# General characteristics

## Overview | GB type adjustable MCCBs



### 100AF

35, 50kA  
Thermal-magnetic  
configuration



### 250AF

35, 50, 85kA  
Thermal-magnetic  
configuration



### 250AF

85kA  
Electronic trip  
configuration



### 400AF

35, 50kA  
Electronic trip  
configuration

Thermal-magnetic

- Suitable for use in the system where higher fault currents exist.  
... 35, 50 and 85kA breakers are available.
- Employing a adjustable thermal magnetic or electronic trip unit.
- Current adjustments are made by the knobs on the front of the trip unit.
- Complete range of three pole version to 1200A.
- Offering more accessories for varied applications and allows easy access to install them.
- Frames made of rigid materials of engineering plastics.



**800AF**  
35, 50kA  
Electronic trip  
Configuration

Electronic trip



**AB type 1200AF**  
65kA  
Electronic trip  
configuration

# General characteristics

## Structure

Meta-MEC offers more accessories for varied applications and allows easy access to install them, especially for the electrical auxiliaries.



### Easy & simple installation

Designed for installation in compartments that are accessible from the front. It is not necessary to take off the cover of the circuit breaker.



aux. cover  
opened



#### Left-hand seat

This seat is usually for auxiliary and alarm switches.

It is not available for 2-pole exclusive size MCCBs.

#### Right-hand seat

This seat is usually for shunt trip and undervoltage trip units.

It is not available for ELCBs and MCCBs with electronic trip unit .



### Operating handle

Handle position clearly indicates the tripping of the breaker.



**ON Trip Off**

Breaker handle and face plate shall indicate rated ampacity

All operating mechanisms are of the quick-make, quick-break type and are "trip free"

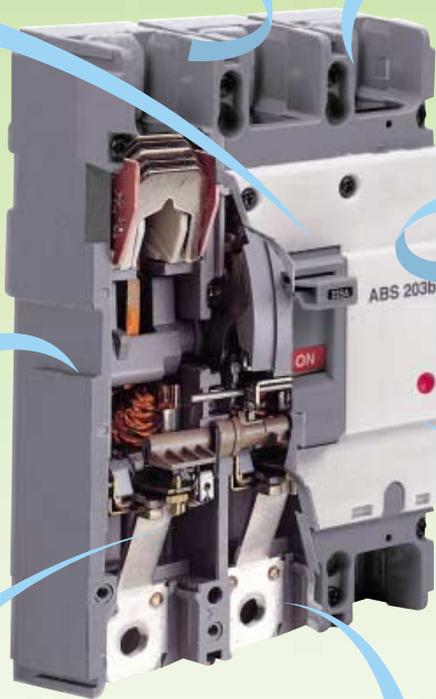
Mechanical interlock between two breakers

Key-lock built-in types are available.



### Rear connection kits

### Terminal covers



### Manual rotary handles



Direct or extensible mounting

Push-to-trip button to exercise the trip mechanism manually

### Trip units



One of three kinds is built in each breaker

- Thermal-magnetic
- Electronic
- Hydraulic-magnetic

Configurations ; I, LI, LSI, LSIA,

Breakers shall have common tripping of all poles.

Thermal elements shall be factory calibrated to operate in a 40°C ambient environment.

Breakers for 50°C are available on request.

### Insulation barriers



-supplied as standard for line side  
-optional for load side.

# General characteristics

**Features** | AB type non-adjustable MCCBs up to 225A

Offering economical solution with compact sizes.



225AF upto 35kA



100AF upto 35kA



100AF upto 10kA

- Offering economical solution with compact sizes and increased interrupting capacities.
- Employing a fixed thermal and fixed magnetic trip.
- Offering more accessories such as rear connection and extended rotary type handles.
- Frames made of rigid materials of engineering plastics.

## Key lock built-in MCCBs



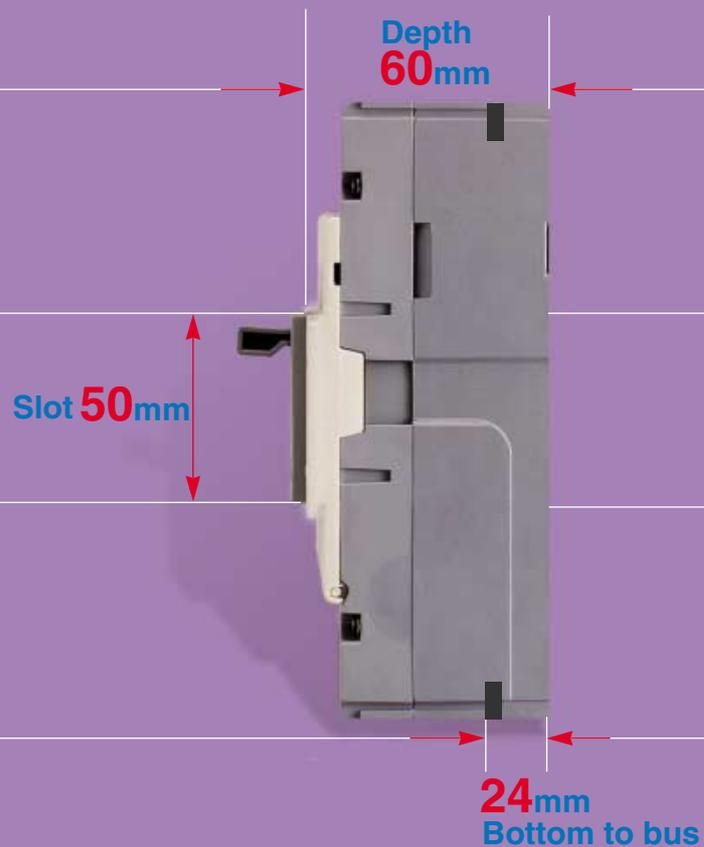
ABS103k

ABS203k



## Compact 2-pole exclusive sizes

Three and four-pole versions are available and also offered in the double-pole version up to 100A with breaking capacities of 10, 25 and 35kA at 380/415V.

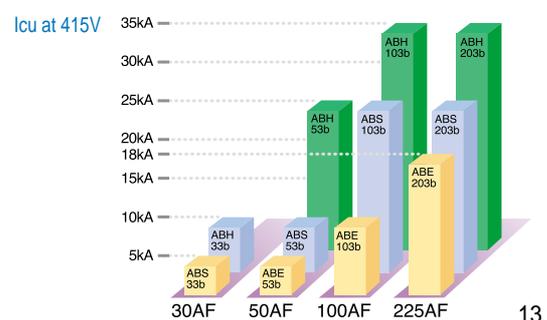


### Standardisation

3 different physical frame sizes but have the same dimensions for installation.

### Earth leakage breakers physically interchangeable with MCCBs.

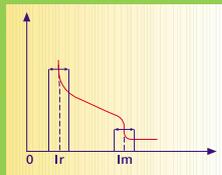
Thanks to the compact earth leakage module it is possible to build the module inside of MCCB without enlarging overall dimensions. Meta-MEC series provide three-pole earth leakage breakers physically interchangeable with MCCBs in the same current rating. It is very useful to construct modular panels.



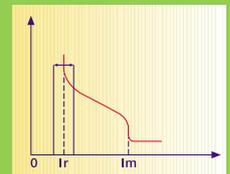
# General characteristics

**Features** | GB type adjustable MCCBs up to 250A

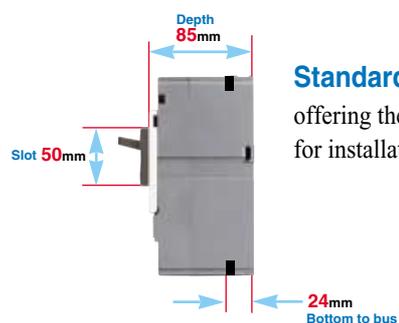
## With thermal-magnetic trip unit



- 2, 3 and 4 pole
- In=16~250amp
- Interrupting capacity ... 35, 50 and 85kA
- LI configuration
- ... adjustable thermal & adjustable magnetic trip
- CE, KEMA certificate according to IEC60947-2
- UL508 certificate as a manual motor controller
- Magnetic only release types for motor protection are available



- 2, 3 and 4 pole
- In=16~100amp
- Interrupting capacity ... 35 and 50kA
- Adjustable thermal & fixed magnetic trip
- CE, KEMA certificate according to IEC60947-2
- UL508 certificate as a manual motor controller





# General characteristics

## Features | 400AF & 800AF MCCBs

### Non-Adjustable Breakers

- Each breaker uses the individual rating plug for determining the continuous current rating.
- MCCB with reference temperature 50°C is available on request.
- Motor protection MCCBs with magnetic only trip are available.



### 800AF

Thermal-magnetic trip unit  
2, 3 and 4 pole  
In=500 to 800 (non-adjustable)  
Interrupting capacity ... 35, 50 and 85kA  
Trip unit with LI configuration  
-fixed thermal and magnetic  
-magnetic adjustable type is optional

### 400AF

Thermal-magnetic trip unit  
2, 3 and 4 pole  
In=250 to 400 (non-adjustable)  
Interrupting capacity ... 25, 35, 50 and 85kA  
Trip unit with LI configuration  
-fixed thermal and magnetic  
-magnetic adjustable type is optional



### Common auxiliaries for 400 & 800AF breakers

Auxiliary switch, Alarm switch, Shunt trip and Under voltage trip unit are frequently used electric auxiliaries for MCCBs. They are designed to be installed easily and to be used in common for 400 and 800AF breakers regardless of the type of the trip unit.

### Standardization

offering the same dimensions for installation.

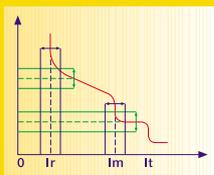


### Earth leakage breakers physically interchangeable with MCCBs.

Thanks to the compact earth leakage module it is possible to build the module inside of MCCB without enlarging overall dimensions. Meta MEC series provide three-pole earth leakage breakers physically interchangeable with MCCBs in the same current rating. It is very useful to construct modular panels.

## Adjustable Breakers

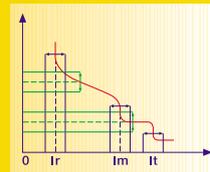
**400AF** electronic trip unit  
Type GBN403E, GBH403E  
3 pole



In=400amp  
(200 ... 400 adjustable)  
Interrupting capacity ... 35, 50kA  
Trip unit with LSIA configuration



**800AF** electronic trip unit  
Type GBN803E, GBH803E  
3 pole



In=800amp  
(400 ... 800 adjustable)  
Interrupting capacity ... 35, 50kA  
Trip unit with LSIA configuration



### Rating plug

is available with fixed ampere rating and the installed one is field interchangeable with the other



The pairs of rating plugs interchangeable each other  
250A ↔ 300A  
350A ↔ 400A  
500A ↔ 600A  
700A ↔ 800A

# General characteristics

## General description for residential breakers

### Miniature Circuit Breakers

#### DIN rail mounting

45mm slot size  
17.5mm width per pole



**Type BKN**  
IEC60898 type MCB  
1 to 4 pole up to 63A & 6kA

see details (p. 86)

#### Bolt on

50mm slot size  
60mm depth



**Type BF**  
American type MCB  
1 to 3 pole up to 100A & 10kA

see details (p. 92)



**Type ABS-Fb**  
IEC type MCCB  
2 & 3 pole up to 100A & 10kA

see details (p. 90)

#### Bolt on

36mm slot size  
42mm depth



**Type BS**  
Economic type MCCB  
2 & 3 pole up to 30A & 1.5kA

see details (p. 94)



## Residual Current Circuit Breakers



see details (p. 88)

**Type RKN**  
IEC1008 type RCCB  
2 & 4 pole up to 63A  
 $I_{\Delta n}$ =30, 100, 300mA



see details (p. 88)

**Type KGR**  
Electronic type RCCB  
2 pole up to 30A, 1.5kA  
 $I_{\Delta n}$ =30mA



see details (p. 90)

**Type EBS-Fb**  
Electronic type RCCB  
2 & 3 pole up to 100A, 10kA  
 $I_{\Delta n}$ =30, 100mA



see details (p. 94)

**Type GR**  
Electronic type RCCB  
2 & 3 pole up to 30A, 2.5kA  
 $I_{\Delta n}$ =30mA



# Quick selection table

## MCCBs | 30AF to 225AF

Frame Size(AF)		30		50			
Frame Type		ABS	ABH	ABE	ABS	ABH	GBL(E)
Breaking capacity(kA), Icu at 415VAC		5	10	5	10	25	85
Number of poles		2, 3	2, 3	2, 3	2, 3, 4	2, 3, 4	3
Type	2 pole	ABS32b	ABH32b	ABE52b	ABS52b	ABH52b	
	3 pole	ABS33b	ABH33b	ABE53b	ABS53b	ABH53b	GBL53E
	4 pole				ABS54b	ABH54b	
Rated current (A)		5, 10, 15, 20, 30		5, 10, 15, 20, 30, 40, 50		15, 20, 30, 40, 50	50 Electronically adjustable : (0.5-0.6-0.7-0.8-0.9-1.0) × In
<b>Technical data conforming to IEC/EN60947-2</b>							
Rated operational voltage(V), Ue(50/60Hz)		600	600	600	600	600	600
Rated operational voltage(V), Ue(DC)		250	250	250	250	250	-
Rated insulation voltage(V), Ui(50/60Hz)		690	690	690	690	690	690
Rated impulse withstand voltage(kV), Uimp		6	6	6	6	6	6
Ultimate breaking capacity(kA), Icu							
AC 50/60Hz	220/240V	10	25	10	25	50	125
	380V	7.5/5	14/10	7.5/5	14/10	25	85
	415V	7.5/5	14/10	7.5/5	14/10	25	85
	440/460V	5	10	5	10	25	85
	480/500V	2.5	7.5	2.5	7.5	14	65/50
	600V	2.5	5	2.5	5	10	35
DC	125V	5	10	5	10	20	-
	250V	2.5	5	2.5	5	14	85
Service breaking capacity(%Icu), Ics		50	50	50	50	50	75
Category of use		A	A	A	A	A	A
Endurance (Number of operations)	mechanical	8500	8500	8500	8500	8500	10000
	electrical	1500	1500	1500	1500	1500	5000
<b>Type of trip unit</b>							
Thermal-magnetic release						fixed	
Electronic release							LSIA configuration
Pre-alarm via LED							●
Hydraulic-magnetic release		fixed	fixed	fixed	fixed		
Magnetic release only without thermal trip							
Earth leakage protection for 3 pole		▲	▲	▲	▲	▲	
<b>Accessories</b>							
Electrical auxiliaries	Auxiliary switch	●	●	●	●	●	●
	Alarm switch	●	●	●	●	●	●
	Shunt trip	●	●	●	●	●	●
	Undervoltage trip	●	●	●	●	●	●
External accessories	Manual rotary handle	●	●	●	●	●	●
	Terminal cover	●	●	●	●	●	●
	Insulation barrier	●	●	●	●	●	●
	Rear connection	●	●	●	●	●	●
	Mechanical interlock	-	-	-	-	-	-
	Remote control	-	-	-	-	-	-
Dimensions (WxHxDmm)	3 pole breaker	75 × 130 × 60		75 × 130 × 60		90 × 155 × 60	105 × 165 × 80
Weight(kg)	2 pole	0.45	0.45	0.45	0.45	0.7	
	3 pole	0.65	0.65	0.65	0.65	1	1.7
	4 pole				0.85	1.2	7.8
Reference page no.		29		30			

Note :  
● applicable or available  
▲ available as a separate breaker



60		100							225		
ABE	ABS	ABE	ABS	ABH	GBN	GBH	GBL	GBL(E)	ABE	ABS	ABH
5	10	10	25	35	35	50	85	85	18	25	35
2, 3	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	3	2, 3, 4	2, 3, 4	2, 3, 4
ABE62b	ABS62b	ABE102b	ABS102b	ABH102b	GBN102	GBH102	GBL102		ABE202b	ABS202b	ABH202b
ABE63b	ABS63b	ABE103b	ABS103b	ABH103b	GBN103	GBH103	GBL103	GBL103E	ABE203b	ABS203b	ABH203b
	ABS64b	ABE104b	ABS104b	ABH104b	GBN104	GBH104	GBL104		ABE204b	ABS204b	ABH204b
60		5, 10, 15, 20 30, 40, 50 60, 75, 100	15, 20, 30, 40, 50 60, 75, 100		16, 20, 25, 32, 40, 50, 63, 80, 100 Thermally adjustable ; (0.8- 0.9-1.0) × In			50 Electronically adjustable ; (0.5-0.6-0.7-0.8- 0.9-1.0) × In	100, 125, 150, 175, 200, 225		
600	600	600	600	600	600	600	600	600	600	600	600
250	250	250	250	250	250	250	250	-	250	250	250
690	690	690	690	690	690	690	690	690	690	690	690
6	6	6	6	6	6	6	6	6	6	6	6
10	25	25	50	65	50	85	125	125	35	50	65
7.5/5	14/10	14/10	25	35	35	50	85	85	18	25	35
7.5/5	14/10	14/10	25	35	35	50	85	85	18	25	35
5	10	10	25	35	35	50	85	85	18	25	35
2.5	7.5	7.5	14	25	30/22	42/35	65/50	65/50	10	14	25
2.5	5	5	10	18	18	25	35	35	7.5	10	18
5	10	10	20	25	-	-	-	-	15	20	25
2.5	5	5	14	18	35	50	85	85	10	14	18
50	50	50	50	50	75	75	75	75	50	50	50
A	A	A	A	A	A	A	A	A	A	A	A
8500	8500	8500	8500	8500	20000	20000	10000	10000	7000	7000	7000
1500	1500	1500	1500	1500	10000	10000	5000	5000	1000	1000	1000
			fixed	fixed	Adjustable-thermal, Fixed-magnetic			LSIA configuration	fixed	fixed	fixed
								●			
fixed	fixed	fixed									
▲	▲	▲	▲	▲			▲		▲	▲	▲
●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
75 × 130 × 60		75 × 130 × 60		90 × 155 × 60		90 × 140 × 86		105 × 165 × 86		105 × 165 × 60	
0.45	0.45	0.45	0.7	0.7	1.1	1.1	1.5	1.5	1.1	1.1	1.
0.65	0.65	0.65	1.1	1.1	1.2	1.2	1.7	1.7	1.2	1.2	1.2
	0.85	0.85	1.2	1.2	1.5	1.5	2.1	7.8	1.5	1.5	1.5
30		31		43		44		32			

# Quick selection table

## MCCBs | 250AF to 1200AF

Frame Size(AF)		250				400		
Frame Type(AF)		GBN	GBH	GBL	GBL(E)	ABE	ABS	ABH
Breaking capacity(kA), Icu at 415VAC		35	50	85	85	25	35	50
Number of poles		2, 3, 4	2, 3, 4	2, 3, 4	3	2,3,4	2,3,4	2,3,4
Type	2 pole	GBN202	GBH202	GBL202		ABE402b	ABS402b	ABH402b
	3 pole	GBN203	GBH203	GBL203	GBL203E	ABE403b	ABS403b	ABH403b
	4 pole	GBN204	GBH204	GBL204		ABE404b	ABS404b	ABH403b
Rated current (A)		125, 160, 200, 250 Thermally adjustable : (0.8- 0.9-1.0) × In			250 Electronically adjustable : (0.5-0.6-0.7-0.8- 0.9-1.0) × In	250, 300, 350, 400 Interchangeable via rating plug between 250 and 300 350 and 400		
<b>Technical data conforming to IEC/EN60947-2</b>								
Rated operational voltage(V), Ue(50/60Hz)		600	600	600	600	600	600	600
Rated operational voltage(V), Ue(DC)		250	250	250	-	250	250	250
Rated insulation voltage(V), Ui(50/60Hz)		690	690	690	690	690	690	690
Rated impulse withstand voltage(kV), Uimp		6	6	6	6	6	6	6
Ultimate breaking capacity(kA), Icu								
AC 50/60Hz	220/240V	50	85	125	125	35	50	85
	380V	35	50	85	85	30	42	65
	415V	35	50	85	85	25	35	50/50(Ics)
	440/460V	35	50	85	85	25	35	50
	480/500V	30/22	42/35	65/50	65/50	18	25	35
	600V	18	25	35	35	18	22	25
DC	125V	-	-	-	-	20	30	50
	250V	35	50	85	85	10	20	40
Service breaking capacity(%Icu), Ics		75	75	75	75	100	100	50
Category of use		A	A	A	A	A	A	A
Endurance (number of operations)	mechanical	10000	10000	10000	10000	4000	4000	4000
	electrical	5000	5000	5000	5000	1000	1000	1000
<b>Type of trip unit</b>								
Thermal-magnetic release		Adjustable-thermal & magnetic				fixed	fixed	fixed
Electronic release					LSIA configuration			
Pre-alarm via LED					●			
Hydraulic-magnetic release								
Magnetic release only without thermal trip				▲		▲		
Earth leakage protection for 3 pole						▲	▲	▲
<b>Accessories</b>								
Electrical auxiliaries	auxiliary switch	●	●	●	●	●	●	●
	alarm switch	●	●	●	●	●	●	●
	shunt trip	●	●	●	●	●	●	●
	undervoltage trip	●	●	●	●	●	●	●
External accessories	manual rotary handle	●	●	●	●	●	●	●
	terminal cover	●	●	●	●	●	●	●
	Insulation barrier	●	●	●	●	●	●	●
	rear connection	●	●	●	●	-	-	-
	mechanical interlock	-	-	-	-	-	●	●
	remote control	-	-	-	-	-	-	-
Dimensions (WxHxDmm)		3 pole breaker				140 × 257 × 110		
Weight(kg)	2 pole	1.5	1.5	1.5		5.2	5.2	5.2
	3 pole	1.7	1.7	1.7	1.7	6.2	6.2	6.2
	4 pole	2.1	2.1	2.1	7.8	7.8	7.8	7.8

Note ;  
 ● applicable or available  
 ▲ available as a separate breaker



400			800					1200		
ABL	GBN(E)	GBH(E)	ABE	ABS	ABL	GBN(E)	GBH(E)	ABS	ABS(electronic trip)	
85	35	50	35	50	85	35	50	65	65	
2, 3, 4	3	3	2, 3, 4	2, 3, 4	2, 3, 4	3	3	3, 4	3	
ABL402b			ABE802b	ABS802b	ABL802b					
ABL403b	GBN403E	GBH403E	ABE803b	ABS803b	ABL803b	GBN803E	GBH803E	ABS1003	ABS1203	
ABL404b			ABE804b	ABS804b	ABL804b			ABS1004	ABS1204	
	400 Electronically adjustable : (0.5-0.6-0.7-0.8-0.9-1.0) × In		500, 600, 630, 700, 800 Interchangeable via rating plug between 500 and 600, 700 and 800			800 Electronically adjustable : (0.5-0.6-0.7-0.8-0.9-1.0) × In		1000	1200	1200 Electronically adjustable : (0.5-0.6-0.7-0.8-0.9-1.0) × In
600	600	600	600	600	600	600	600	600	600	
250	-	-	250	250	250	-	-	250	250	
690	690	690	690	690	690	690	690	690	690	
6	6	6	6	6	6	6	6	6	6	
125	50	85	50	100	125	50	85	100	100	
100	35	50	42	65	100	35	50	65	65	
85/50(lcs)	35	50	35	50/50(lcs)	85	35	50	65	65	
85	30	42	35	50	85	30	42	65	65	
65	22	35	25	45	65	22	35	50	50	
30	18	25	22	25	30	18	25	45	45	
60	-	-	30	50	60	-	-	-	-	
40	-	-	20	40	40	-	-	40	40	
50	50	50	100	50	50	50	50	50	50	
A	A	A	A	A	A	A	A	A	A	
4000	4000	4000	2500	2500	2500	2500	2500	2500	2500	
1000	1000	1000	500	500	500	500	500	500	500	
fixed			fixed	fixed	fixed			Adjustable-thermal, Fixed-magnetic	LSIA configuration	
		LSIA configuration							●	
▲			▲	▲	▲				●	
●	●	●	●	●	●	●	●	●	●	
●	●	●	●	●	●	●	●	●	●	
●	●	●	●	●	●	●	●	●	●	
●	●	●	●	●	●	●	●	●	●	
●	●	●	●	●	●	●	●	●	●	
●	●	●	●	●	●	●	●	●	●	
-	-	-	-	-	-	-	-	-	-	
●	●	●	●	●	●	●	●	●	●	
-	-	-	-	-	-	-	-	-	-	
140 × 257 × 113			210 × 280 × 113					210 × 400 × 105		
5.2			11	11	11					
6.2	7.4		11.5	11.5	11.5	11.5		19.4	19.4	
7.8			18.2	18.2	18.2			27		

# Quick selection table

## ELCBs | 30AF to 225AF

Frame Size(AF)		30	
Frame Type		EBS	EBH
Breaking capacity(kA), I <sub>cu</sub> at 415VAC		5	10
Number of poles		3	3
Type	2 pole	-	-
	3 pole	EBS33b	EBH33b
Rated current (A) (Non-adjustable)		5, 10, 15, 20, 30	
Residual current(A), I <sub>Δn</sub>		0.03 (Fixed) 0.1-0.2-0.5 (Adjustable)	
Residual non-operating current		0.5 x I <sub>Δn</sub>	
Residual current off-time at I <sub>Δn</sub>		≤ 0.1 sec	
Rated operational voltage(V), U <sub>e</sub> (50/60Hz)		176-510	
<b>Technical data conforming to IEC/EN60947-2</b>			
Rated impulse withstand voltage(kV), U <sub>imp</sub>		6	6
Ultimate breaking capacity(kA), I <sub>cu</sub>	AC 50/60Hz	220/240V	10
		415/460V	5
			25
Service breaking capacity(%I <sub>cu</sub> ), I <sub>cs</sub>		50	50
Endurance (number of operations)	mechanical	8500	8500
	electrical	1500	1500
<b>Type of trip unit</b>			
Overcurrent pick-up		Hydraulic-magnetic	
Earth leakage pick-up		Electronic	
<b>Accessories</b>			
Electrical auxiliaries	auxiliary switch	●	●
	alarm switch	●	●
	shunt trip	-	-
	undervoltage trip	-	-
External accessories	manual rotary handle	●	●
	terminal cover	●	●
	Insulation barrier	●	●
	remote control	-	-
Dimensions (WxHxD mm)	3 pole breaker	75 × 130 × 60	
Weight(kg)	2 pole		
	3 pole	0.7	0.7
Reference page no.		70	

Note ;  
● applicable or available



50			60		100			225		
EBE	EBS	EBH	EBE	EBS	EBE	EBS	EBH	EBE	EBS	EBH
5	10	25	5	10	10	25	35	18	25	35
2, 3	3	3	3	3	2, 3	3	3	3	3	3
EBE52b	-	-	-	-	EBE102b	-	-	-	-	-
EBE53b	EBS53b	EBH53b	EBE63b	EBS63b	EBE103b	EBS103b	EBH103b	EBE203b	EBS203b	EBH203b
5, 10, 15, 20, 30, 40, 50		40, 50	60		60, 75, 100	40, 50, 60, 75, 100	60, 75, 100	100, 125, 150, 175, 200, 225		
0.03 (Fixed) 0.1-0.2-0.5 (Adjustable)			0.03 (Fixed) 0.1-0.2-0.5 (Adjustable)		0.03 (Fixed) 0.1-0.2-0.5 (Adjustable)			0.03 (Fixed) 0.1-0.2-0.5 (Adjustable)		
0.5 x I <sub>Δn</sub>			0.5 x I <sub>Δn</sub>		0.5 x I <sub>Δn</sub>			0.5 x I <sub>Δn</sub>		
≤ 0.1 sec			≤ 0.1 sec		≤ 0.1 sec			≤ 0.1 sec		
176-510			176-510		176-510 (EBE102b : 88-242)			176-510		
6	6	6	6	6	6	6	6	6	6	6
10	25	50	10	25	25	50	65	35	50	65
5	10	25	5	10	10	25	35	18	25	35
50	50	50	50	50	50	50	50	50	50	50
8500	8500	8500	8500	8500	8500	8500	8500	7000	7000	7000
1500	1500	1500	1500	1500	1500	1500	1500	1000	1000	1000
Hydraulic-magnetic		Thermal-magnetic	Hydraulic-magnetic		Hydraulic-magnetic	Thermal-magnetic		Thermal-magnetic		
Electronic		Electronic	Electronic		Electronic	Electronic		Electronic		
●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●
-	-	-	-	-	-	-	-	-	-	-
75 x 130 x 60		90 x 155 x 60	75 x 130 x 60		75 x 130 x 60	90 x 155 x 60		105 x 165 x 60		
0.7	0.7	1	0.7	0.7	0.7	1	1.2	1.4	1.4	1.4
71			71			72		73		

# Quick selection table

## ELCBs | 400AF to 800AF

<b>Frame Size(AF)</b>	
Frame Type	
Breaking capacity(kA), Icu at 415VAC	
Number of poles	
Type	2 pole 3 pole
Rated current (A) (Non-adjustable)	
Residual current(A), I <sub>Δn</sub>	
Residual non-operating current	
Residual current off-time at I <sub>Δn</sub>	
Rated operational voltage(V), U <sub>e</sub> (50/60Hz)	
<b>Technical data conforming to IEC/EN60947-2</b>	
Rated impulse withstand voltage(kV), U <sub>imp</sub>	
Ultimate breaking capacity(kA), I <sub>cu</sub>	
AC 50/60Hz	220/240V 415/460V
Service breaking capacity(%I <sub>cu</sub> ), I <sub>cs</sub>	
Endurance (number of operations)	mechanical electrical
<b>Type of trip unit</b>	
Overcurrent pick-up	
Earth leakage pick-up	
<b>Accessories</b>	
Electrical auxiliaries	auxiliary switch alarm switch shunt trip undervoltage trip
External accessories	manual rotary handle terminal cover Insulation barrier remote control
Dimensions (WxHxD mm)	3 pole breaker
Weight(kg)	2 pole 3 pole
Reference page no.	

Note ;  
● applicable or available



400				800		
EBE	EBS	EBH	EBL	EBE	EBS	EBL
25	35	50	65	35	50	65
3	3	3	3	3	3	3
-	-	-	-	-	-	-
EBE403b	EBS403b	EBH403b	EBL403b	EBE803b	EBS803b	EBL803b
250, 300, 350, 400				500, 600, 700, 800		
0.03 ( Fixed ) 0.1-0.2-0.5 ( Adjustable )				0.03 ( Fixed ) 0.1-0.2-0.5 ( Adjustable )		
0.5 x I <sub>Δn</sub>				0.5 x I <sub>Δn</sub>		
≤0.1 sec				≤0.1 sec		
176-510				176-510		
6	6	6	6	6	6	6
35	50	85	125	50	100	125
25	35	50	85	35	50	85
50	50	50	50	50	50	50
4000	4000	4000	4000	4000	4000	4000
1000	1000	1000	1000	1000	1000	1000
Thermal-magnetic				Thermal-magnetic		
Electronic				Electronic		
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
140 × 257 × 110				210 × 280 × 110		
7	7	7	7	11.5	11.5	11.5
74				75		

# MCCBs for general use

## AB type non-adjustable MCCBs

- Offering economical solution with compact and increased interrupting capacities compared to the existing breakers.
- Employing a fixed thermal and fixed magnetic trip.
- Frames made of rigid materials of engineering plastics.
- 3-pole Earth leakage circuit breakers physically interchangeable with 3-pole MCCBs are available.
- Offering more accessories such as rear connection and extended rotary type handles.
- Key lock built-in MCCBs are available.





<b>Rated current, In</b>	5, 10, 15, 20, 30A ... non-adjustable
<b>Magnetic Trip</b>	(8 to 16) × In ... non-adjustable
<b>Type of trip unit</b>	Hydraulic-magnetic
<b>Number of poles</b>	2, 3 pole
<b>Connection</b>	Front (standard) Rear (optional)
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type According to IEC947-2
<b>Breaking capacity, Icu</b>	Ics = 50% of Icu

Type	ABS	ABH
220/240V	10kA	25kA
380V	7.5/5kA	14/10kA
415V	7.5/5kA	14/10kA
440/460V	5kA	10kA
480/500V	2.5kA	7.5kA
600V	2.5kA	5kA

Earth leakage circuit breaker



Types EBS33b, EBH33b physically interchangeable with MCCBs.

\* see details (p. 70)

Catalog No.	for 5kA at 415V ... type ABS	
In	2pole	3pole
5A	ABS32b/5	ABS33b/5
10A	ABS32b/10	ABS33b/10
15A	ABS32b/15	ABS33b/15
20A	ABS32b/20	ABS33b/20
30A	ABS32b/30	ABS33b/30
for 10kA at 415V ... type ABH		
In	2pole	3pole
5A	ABH32b/5	ABH33b/5
10A	ABH32b/10	ABH33b/10
15A	ABH32b/15	ABH33b/15
20A	ABH32b/20	ABH33b/20
30A	ABH32b/30	ABH33b/30

<b>Optional accessories</b>	Auxiliary switch Alarm Switch Shunt trip Undervoltage trip Manual rotary handle Terminal cover Rear connection unit Insulational barrier (standard for line side only)
-----------------------------	--

\* see details (p. 33)

**Certificate**  
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<b>Dimensions (mm)</b>	<b>2pole</b>	50(W) × 130(H) × 60(D)
	<b>3pole</b>	75(W) × 130(H) × 60(D)

# MCCBs for general use

## AB type non-adjustable MCCBs

## 50AF & 60 AF



<b>Rated current, In</b>	5, 10, 15, 20, 30, 40, 50, 60 ... non-adjustable
<b>Magnetic Trip</b>	Non-adjustable (see operating curves)
<b>Type of trip unit</b>	Thermal-magnetic for ABH type Hydraulic-magnetic for ABE/ABS types
<b>Number of poles</b>	2, 3, 4 pole
<b>Connection</b>	Front (standard) Rear (optional)
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC947-2
<b>Breaking capacity, Icu</b>	Ics = 50% of Icu

Type	ABE	ABS	ABH
220/240V	10kA	25kA	50kA
380V	7.5/5kA	14/10kA	25kA
415V	7.5/5kA	14/10kA	25kA
440/460V	5kA	10kA	25kA
480/500V	2.5kA	7.5kA	14kA
600V	2.5kA	5kA	10kA

### Earth leakage circuit breaker



Types EBE53b, EBS53b, EBH53b  
physically interchangeable  
with MCCBs

※ see details (p. 71)

### Optional accessories

- Auxiliary switch
- Alarm Switch
- Shunt trip
- Undervoltage trip
- Manual rotary handle
- Terminal cover
- Rear connection unit
- Insulational barrier  
(standard for line side only)

※ see details p. 33 for ABE/ABS types  
p. 36 for ABH types

### Catalog No. for 5kA at 415V ... type ABS

In	2pole	3pole
5A	ABE52b/5	ABE53b/5
10A	ABE52b/10	ABE53b/10
15A	ABE52b/15	ABE53b/15
20A	ABE52b/20	ABE53b/20
30A	ABE52b/30	ABE53b/30
40A	ABE52b/40	ABE53b/40
50A	ABE52b/50	ABE53b/50
60A	ABE62b/60	ABE63b/60

### for 10kA at 415V ... type ABS

In	2pole	3pole	4pole
5A	ABS52b/5	ABS53b/5	ABS54b/5
10A	ABS52b/10	ABS53b/10	ABS54b/10
15A	ABS52b/15	ABS53b/15	ABS54b/15
20A	ABS52b/20	ABS53b/20	ABS54b/20
30A	ABS52b/30	ABS53b/30	ABS54b/30
40A	ABS52b/40	ABS53b/40	ABS54b/40
50A	ABS52b/50	ABS53b/50	ABS54b/50
60A	ABS62b/60	ABS63b/60	ABS64b/60

### for 25kA at 415V ... type ABH

In	2pole	3pole	4pole
15A	ABH52b/15	ABH53b/15	ABH54b/15
20A	ABH52b/20	ABH53b/20	ABH54b/20
30A	ABH52b/30	ABH53b/30	ABH54b/30
40A	ABH52b/40	ABH53b/40	ABH54b/40
50A	ABH52b/50	ABH53b/50	ABH54b/50

### Dimensions(mm)

	ABE/ABS types	ABH type
2pole	50(W) × 130(H) × 60(D)	60(W) × 155(H) × 60(D)
3pole	75(W) × 130(H) × 60(D)	90(W) × 155(H) × 60(D)
4pole	100(W) × 130(H) × 60(D)	120(W) × 155(H) × 60(D)

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<b>Rated current, In</b>	15, 20, 30, 40, 50, 60, 75, 100 ... non-adjustable
<b>Magnetic Trip Range</b>	Non-adjustable (see operating curves)
<b>Type of trip unit</b>	Thermal-magnetic for ABS/ABH types Hydraulic-magnetic for ABE type
<b>Connection</b>	Front (standard) Rear (optional)
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC947-2
<b>Breaking capacity, Icu</b>	Ics = 50% of Icu

Type	ABE	ABS	ABH
220/240V	25kA	50kA	65kA
380V	14/10kA	25kA	35kA
415V	14/10kA	25kA	35kA
440/460V	10kA	25kA	35kA
480/500V	7.5kA	14kA	25kA
600V	5kA	10kA	18kA

Earth leakage circuit breaker



Types EBE103b, EBS103b, EBH103b  
physically interchangeable with MCCBs

\* see details (p. 72)

Key lock built-in type ;

\* see details (p. 68)

Optional accessories

- Auxiliary switch
- Alarm Switch
- Shunt trip
- Undervoltage trip
- Manual rotary handle
- Terminal cover
- Rear connection unit
- Insulational barrier  
(standard for line side only)

\* see details (p. 33 for ABE types  
p. 36 for ABS/ABH types)

Catalog No.	for 5kA at 415V ... type ABS		
In	2pole	3pole	4pole
5A	ABE102b/5	ABE103b/5	ABE104b/5
10A	ABE102b/10	ABE103b/10	ABE104b/10
15A	ABE102b/15	ABE103b/15	ABE104b/15
20A	ABE102b/20	ABE103b/20	ABE104b/20
30A	ABE102b/30	ABE103b/30	ABE104b/30
40A	ABE102b/40	ABE103b/40	ABE104b/40
50A	ABE102b/50	ABE103b/50	ABE104b/50
60A	ABE102b/60	ABE103b/60	ABE104b/60
75A	ABE102b/75	ABE103b/75	ABE104b/75
100A	ABE102b/100	ABE103b/100	ABE104b/100
In	for 25kA at 415V ... type ABS		
In	2pole	3pole	4pole
15A	ABS102b/15	ABS103b/15	ABS104b/15
20A	ABS102b/20	ABS103b/20	ABS104b/20
30A	ABS102b/30	ABS103b/30	ABS104b/30
40A	ABS102b/40	ABS103b/40	ABS104b/40
50A	ABS102b/50	ABS103b/50	ABS104b/50
60A	ABS102b/60	ABS103b/60	ABS104b/60
75A	ABS102b/75	ABS103b/75	ABS104b/75
100A	ABS102b/100	ABS103b/100	ABS104b/100
In	for 35kA at 415V ... type ABH		
In	2pole	3pole	4pole
15A	ABH102b/15	ABH103b/15	ABH104b/15
20A	ABH102b/20	ABH103b/20	ABH104b/20
30A	ABH102b/30	ABH103b/30	ABH104b/30
40A	ABH102b/40	ABH103b/40	ABH104b/40
50A	ABH102b/50	ABH103b/50	ABH104b/50
60A	ABH102b/60	ABH103b/60	ABH104b/60
75A	ABH102b/75	ABH103b/75	ABH104b/75
100A	ABH102b/100	ABH103b/100	ABH104b/100

Dimensions(mm)	ABE types	ABS/ABH type
2pole	50(W) × 130(H) × 60(D)	60(W) × 155(H) × 60(D)
3pole	75(W) × 130(H) × 60(D)	90(W) × 155(H) × 60(D)
4pole	100(W) × 130(H) × 60(D)	120(W) × 155(H) × 60(D)

**Certificate**  
CE, KEMA, Lloyd

# MCCBs for general use

## AB type non-adjustable MCCBs

225AF



<b>Rated current, In</b>	125, 150, 175, 200, 225A ... non-adjustable
<b>Magnetic Trip Range</b>	(8 to 15) × In ... non-adjustable
<b>Type of trip unit</b>	Thermal-magnetic
<b>Connection</b>	Front (standard) Rear (optional)
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC947-2
<b>Breaking capacity, Icu</b>	Ics = 50% of Icu

Type	ABE	ABS	ABH
220/240V	35kA	50kA	65kA
380V	18kA	25kA	35kA
415V	18kA	25kA	35kA
440/460V	18kA	25kA	35kA
480/500V	10kA	14kA	25kA
600V	7.5kA	10kA	18kA

Earth leakage circuit breaker



Types EBE203b, EBS203b, EBH203b  
physically interchangeable with MCCBs.

※ see details (p.73)

Key lock built-in type ;

※ see details (p. 68)



Catalog No.	for 18kA at 415V ... type ABE			
In	2pole	3pole	4pole	
125A	ABE202b/125	ABE203b/125	ABE204b/125	
150A	ABE202b/150	ABE203b/150	ABE204b/150	
175A	ABE202b/175	ABE203b/175	ABE204b/175	
200A	ABE202b/200	ABE203b/200	ABE204b/200	
225A	ABE202b/225	ABE203b/225	ABE204b/225	
for 25kA at 415V ... type ABS				
In	2pole	3pole	4pole	
125A	ABS202b/125	ABS203b/125	ABS204b/125	
150A	ABS202b/150	ABS203b/150	ABS204b/150	
175A	ABS202b/175	ABS203b/175	ABS204b/175	
200A	ABS202b/200	ABS203b/200	ABS204b/200	
225A	ABS202b/225	ABS203b/225	ABS204b/225	
for 35kA at 415V ... type ABH				
In	2pole	3pole	4pole	
125A	ABH202b/125	ABH203b/125	ABH204b/125	
150A	ABH202b/150	ABH203b/150	ABH204b/150	
175A	ABH202b/175	ABH203b/175	ABH204b/175	
200A	ABH202b/200	ABH203b/200	ABH204b/200	
225A	ABH202b/225	ABH203b/225	ABH204b/225	

<b>Optional accessories</b>	Auxiliary switch Alarm Switch Shunt trip Undervoltage trip Manual rotary handle Terminal cover Rear connection unit Insulational barrier (standard for line side only)
※ see details (p. 29)	

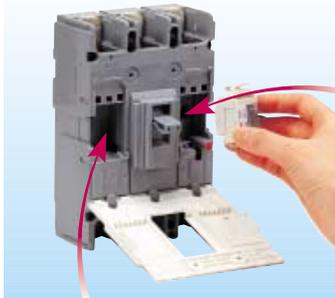
<b>Dimensions (mm)</b>	<b>2/3pole</b>	105(W) × 165(H) × 60(D)
	<b>4pole</b>	140(W) × 165(H) × 60(D)

### Certificate

CE, KEMA, Lloyd



## Electrical auxiliaries



Right-hand seat

Left-hand seat

### Maximum possibilities

#### Left-hand seat

Option of connecting AX or AL or XL  
This seat is not available for 2-pole breakers.

#### Right-hand seat

Option of connecting AX or AL or XL or SHT or UVT.  
This seat is not available for ELCBs.



Auxiliary Switch, AX



Alarm Switch, AL



Shunt Trip, SHT



Under Voltage Trip, UVT

### Application to

ABE52b	ABE53b		EBE53b
ABE62b	ABE63b		EBE63b
ABE102b	ABE103b	ABE104b	EBE102b,103b
ABS32b	ABS33b		EBS33b
ABS52b	ABS53b	ABS54b	EBS53b
ABS62b	ABS63b	ABS64b	EBS63b
ABH32b	ABH33b		EBH33b

### Catalog No.

#### Auxiliary Switch, AX

Signals the contact position of the breaker

- opening by manual or fault
- closing

Consists of a changeover contact (1NO+NC)

1 auxiliary switch fit for the left-hand seat of a handle

1 auxiliary switch fit for the right-hand seat of a handle

AX1E100R

AX1E100T

#### Alarm Switch, AL

Signals the contact position of the breaker

- tripping by manual or fault
- not operated by normal opening or closing of a breaker

Consists of a changeover contact (1NO+NC)

1 alarm switch fit for the left-hand seat of a handle

1 alarm switch fit for the right-hand seat of a handle

AL1E100R

AL1E100T

#### Combination Switch, XL

Consists of a auxiliary switch and a alarm switch (2NO+NC)

1 combination switch fit for the left-hand seat of a handle

1 combination switch fit for the right-hand seat of a handle

XL1E100R

XL1E100T

#### Shunt Trip, SHT

Trips the breaker when any ac(dc) voltage between 85(75) and 110(125)% of nominal control voltage is applied.

Each unit is fitted into the right-hand seat of a handle.

Not applicable to ELCBs.

For 12V AC/DC common use

For 24V AC/DC common use

For 48V AC/DC common use

For 60V AC/DC common use

For AC100~125V/DC100~110V

For AC200~240V/DC200~220V

For 250V AC/DC common use

For 380~450V AC

For 440~480V AC

For 500~550V AC

For 125V DC

For 240V DC

ST12CE100

ST24CE100

ST48CE100

ST60CE100

ST100CE100

ST200CE100

ST250CE100

ST380AE100

ST440AE100

ST500AE100

ST125DE100

ST240DE100

#### Under Voltage Trip, UVT

trips the breaker when control voltage disappears or falls.

Each unit is fitted into the right-hand seat of a handle.

Not applicable to ELCBs.

For 24V AC/DC common use

For 48V AC/DC common use

For 100~110V AC/DC common use

For 200~220V AC/DC common use

For 380~440V AC

For 440~480V AC

UV24CE100

UV48CE100

UV100CE100

UV200CE100

UV380AE100

UV440AE100

# MCCBs for general use

## AB type non-adjustable MCCBs

## Accessories

### External accessories



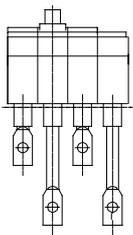
Terminal cover



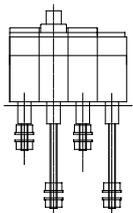
Insulation barrier



rear connection



Bar type



Round type

#### Application to

ABE52b	ABE53b		EBE53b
ABE62b	ABE63b		EBE63b
ABE102b	ABE103b	ABE104b	EBE102b,103b
ABS32b	ABS33b		EBS33b
ABS52b	ABS53b	ABS54b	EBS53b
ABS62b	ABS63b	ABS64b	EBS63b
ABH32b	ABH33b		EBH33b

#### Catalog No.

IB50

#### Insulation Barriers

These are partitions for the insulation between the phases. Barriers for the line side of the breaker are supplied as standard. Barriers for the load side are optional.  
One(1) barrier ... 50mm length

#### Terminal Covers

These are applied to the line/load side of the breaker to prevent accidental contact from live parts. Long and short types are available

##### Long type

3 pole cover

2 pole cover (use 2 ea for 4 pole)

##### Short type

3 pole cover

2 pole cover (use 2 ea for 4 pole)

TBL-13B

TBL-12B

TBS-13B

TBS-12B

#### Rear Connection Kits

Bar and Round types are available.

To apply to 4 pole MCCB use 2 sets of the kit for 2-pole MCCB

##### Application to ;

ABE52b	ABE53b	EBE53b	
ABS32b	ABS33b	EBS33b	
ABS52b	ABS53b	ABS54b	EBS53b
ABH32b	ABH33b	EBH33b	

X-35B-52

X-35B-53

X-35R-52

X-35R-53

a set of the BAR type for a 2-pole MCCB

a set of the BAR type for a 3-pole MCCB

a set of the ROUND type for a 2-pole MCCB

a set of the ROUND type for a 3-pole MCCB

##### Application to ;

ABE62b	ABE63b	EBE63b	
ABE102b	ABE103b	ABE104b	EBE102b,103b
ABS62b	ABS63b	ABS64b	EBS63b

X-35B-102

X-35B-103

X-35R-102

X-35R-103

a set of the BAR type for a 2-pole MCCB

a set of the BAR type for a 3-pole MCCB

a set of the ROUND type for a 2-pole MCCB

a set of the ROUND type for a 3-pole MCCB



## Manual Rotary Handles



Direct Mounting type

### Application to

ABE52b	ABE53b		EBE53b
ABE62b	ABE63b		EBE63b
ABE102b	ABE103b	ABE104b	EBE102b,103b
ABS32b	ABS33b		EBS33b
ABS52b	ABS53b	ABS54b	EBS53b
ABS62b	ABS63b	ABS64b	EBS63b
ABH32b	ABH33b		EBH33b



Extensible Mounting type

### Catalog No.

D-35S

D-35R

D-35L

E-35S

E-35R

E-35L

### Direct Mounting

Vertical type

Horizontal (ON in right-hand) type

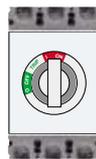
Horizontal (ON in left-hand) type

### Extensible Mounting

Vertical type

Horizontal (ON in right-hand) type

Horizontal (ON in left-hand) type



Vertical type



Horizontal type  
ON in right-hand



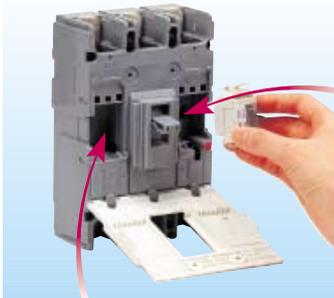
Horizontal type  
ON in left-hand

# MCCBs for general use

## AB type non-adjustable MCCBs

## Accessories

### Electrical auxiliaries ...optional



Left-hand seat

Right-hand seat

#### Maximum possibilities

##### Left-hand seat

Option of connecting AX or AL or XL  
This seat is not available for 2-pole breakers.

##### Right-hand seat

Option of connecting AX or AL or XL or SHT or UVT  
This seat is not available for ELCBs.



Auxiliary Switch, AX



Alarm Switch, AL



Shunt Trip, SHT



Under Voltage Trip, UVT

#### Application to

ABS102b	ABS103b	ABS104b	EBS103b
ABH52b	ABH53b	ABH54b	EBH53b
ABH102b	ABH103b	ABH104b	EBH103b

#### Catalog No.

##### Auxiliary Switch, AX

Signals the contact position of the breaker  
- opening by manual or fault  
- closing

Consists of a changeover contact (1NO+NC)

1 auxiliary switch fit for the left-hand seat of a handle

1 auxiliary switch fit for the right-hand seat of a handle

AX1H100R

AX1H100T

##### Alarm Switch, AL

Signals the contact position of the breaker  
- tripping by manual or fault

- not operated by normal opening or closing of a breaker

Consists of a changeover contact (1NO+NC)

1 alarm switch fit for the left-hand seat of a handle

1 alarm switch fit for the right-hand seat of a handle

AL1H100R

AL1H100T

##### Combination Switch, XL

Consists of an auxiliary switch and an alarm switch (2NO+NC)

1 combination switch fit for the left-hand seat of a handle

1 combination switch fit for the right-hand seat of a handle

XL1H100R

XL1H100T

##### Shunt Trip, SHT

Trips the breaker when any ac(dc) voltage between 85(75) and 110(125)% of nominal control voltage is applied.

Each unit is fitted into the right-hand seat of a handle.

Not applicable to ELCBs.

ST12CH100

For 12V AC/DC common use

ST24CH100

For 24V AC/DC common use

ST48CH100

For 48V AC/DC common use

ST60CH100

For 60V AC/DC common use

ST100CH100

For AC100~125V/DC100~110V

ST200CH100

For AC200~240V/DC200~220V

ST250CH100

For 250V AC/DC common use

ST380AH100

For 380~450V AC

ST440AH100

For 440~480V AC

ST500AH100

For 500~550V AC

ST125DH100

For 125V DC

ST240DH100

For 240V DC

##### Under Voltage Trip, UVT

trips the breaker when control voltage disappears or falls.

Each unit is fitted into the right-hand seat of a handle.

Not applicable to ELCBs.

UV24CH100

For 24V AC/DC common use

UV48CH100

For 48V AC/DC common use

UV100CH100

For 100~110V AC/DC common use

UV200CH100

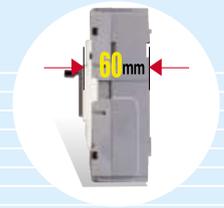
For 200~220V AC/DC common use

UV380AH100

For 380~440V AC

UV440AH100

For 440~480V AC



## External accessories



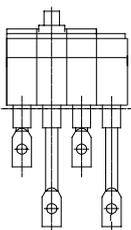
Terminal cover



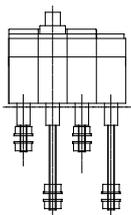
Insulation barrier



rear connection



Bar type



Round type

### Application to

ABS102b	ABS103b	ABS104b	EBS103b
ABH52b	ABH53b	ABH54b	EBH53b
ABH102b	ABH103b	ABH104b	EBH103b

### Catalog No.

#### Insulation Barriers

These are partitions for the insulation between the phases.  
Barriers for the line side of the breaker are supplied as standard.  
Barriers for the load side are optional.

<b>IB50</b>	One(1) barrier ... 50mm length				
	for	ABS102b	ABS103b	ABS104b	EBS103b
<b>IB80</b>	One(1) barrier ... 80mm length	ABH52b	ABH53b	ABH54b	EBH53b
	for	ABH102b	ABH103b	ABH104b	EBH103b

#### Terminal Covers

These are applied to the line/load side of the breaker to prevent accidental contact with live parts.

Long and short types are available

*Long type*

<b>TBL-22B</b>	2 pole cover
<b>TBL-23B</b>	3 pole cover
<b>TBL-24B</b>	4 pole cover

*Short type*

<b>TBS-22B</b>	2 pole cover
<b>TBS-23B</b>	3 pole cover
<b>TBS-24B</b>	4 pole cover

#### Rear Connection Kits

Bar and Round types are available.

To apply to 4 pole MCCB use 2 sets of the kit for 2-pole MCCB

<b>X-45B-102</b>	a set of the BAR type for a 2-pole MCCB
<b>X-45B-103</b>	a set of the BAR type for a 3-pole MCCB
<b>X-45R-102</b>	a set of the ROUND type for a 2-pole MCCB
<b>X-45R-103</b>	a set of the ROUND type for a 3-pole MCCB

# MCCBs for general use

## AB type non-adjustable MCCBs

## Accessories

### Manual Rotary Handles



Direct Mounting type



Extensible Mounting type

#### Application to

ABS102b	ABS103b	ABS104b	EBS103b
ABH52b	ABH53b	ABH54b	EBH53b
ABH102b	ABH103b	ABH104b	EBH103b

#### Catalog No.

D-45S

D-45R

D-45L

E-45S

E-45R

E-45L

#### Direct Mounting

Vertical type

Horizontal (ON in right-hand) type

Horizontal (ON in left-hand) type

#### Extensible Mounting

Vertical type

Horizontal (ON in right-hand) type

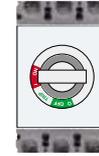
Horizontal (ON in left-hand) type



Vertical type



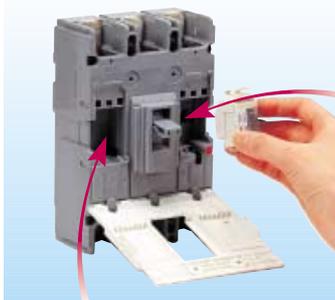
Horizontal type  
ON in right-hand



Horizontal type  
ON in left-hand



## Electrical auxiliaries ... optional



Right-hand seat

Left-hand seat

### Maximum possibilities

#### Left-hand seat

Option of connecting AX or AL or XL  
This seat is not available for 2-pole breakers.

#### Right-hand seat

Option of connecting AX or AL or XL or SHT or UVT  
This seat is not available for ELCBs.



Auxiliary Switch, AX



Alarm Switch, AL



Shunt Trip, SHT



Under Voltage Trip, UVT

### Application to

ABE202b	ABE203b	ABE204b	EBE203b
ABS202b	ABS203b	ABS204b	EBS203b
ABH202b	ABH203b	ABH204b	EBH203b

### Catalog No.

#### Auxiliary Switch, AX

Signals the contact position of the breaker

- opening by manual or fault
- closing

Consists of a changeover contact (1NO+NC)

- 1 auxiliary switch fit for the left-hand seat of a handle
- 1 auxiliary switch fit for the right-hand seat of a handle

AX1H200R  
AX1H200T

#### Alarm Switch, AL

Signals the contact position of the breaker

- tripping by manual or fault
- not operated by normal opening or closing of a breaker

Consists of a changeover contact (1NO+NC)

- 1 alarm switch fit for the left-hand seat of a handle
- 1 alarm switch fit for the right-hand seat of a handle

AL1H200R  
AL1H200T

#### Combination Switch, XL

Consists of a auxiliary switch and a alarm switch (2NO+NC)

- 1 combination switch fit for the left-hand seat of a handle
- 1 combination switch fit for the right-hand seat of a handle

XL1H200R  
XL1H200T

#### Shunt Trip, SHT

Trips the breaker when any ac(dc) voltage between 85(75) and 110(125)% of nominal control voltage is applied.

Each unit is fitted into the right-hand seat of a handle.

Not applicable to ELCBs.

ST12CH200	For 12V AC/DC common use
ST24CH200	For 24V AC/DC common use
ST48CH200	For 48V AC/DC common use
ST60CH200	For 60V AC/DC common use
ST100CH200	For AC100~125V/DC100~110V
ST200CH200	For AC200~240V/DC200~220V
ST250CH200	For 250V AC/DC common use
ST380AH200	For 380~450V AC
ST440AH200	For 440~480V AC
ST500AH200	For 500~550V AC
ST125DH200	For 125V DC
ST240DH200	For 240V DC

#### Under Voltage Trip, UVT

trips the breaker when control voltage disappears or falls.

Each unit is fitted into the right-hand seat of a handle.

Not applicable to ELCBs.

UV24CH200	For 24V AC/DC common use
UV48CH200	For 48V AC/DC common use
UV100CH200	For 100~110V AC/DC common use
UV200CH200	For 200~220V AC/DC common use
UV380AH200	For 380~440V AC
UV440AH200	For 440~480V AC

# MCCBs for general use

## AB type non-adjustable MCCBs

## Accessories

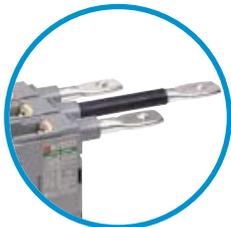
### External accessories



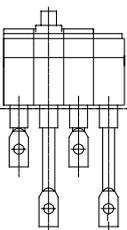
Terminal cover



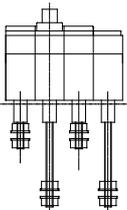
Insulation barrier



rear connection



Bar type



Round type

#### Application to

ABE202b	ABE203b	ABE204b	EBE203b
ABS202b	ABS203b	ABS204b	EBS203b
ABH202b	ABH203b	ABH204b	EBH203b

#### Catalog No.

##### Insulation Barriers

These are partitions for the insulation between the phases.  
Barriers for the line side of the breaker are supplied as standard.

Barriers for the load side are optional.

IB80

One(1) barrier ... 80mm length

##### Terminal Covers

These are applied to the line/load side of the breaker to prevent accidental contact with live parts.

Long and short types are available

Long type

TBL-33B

2, 3 pole cover

TBL-34B

4 pole cover

Short type

TBS-33B

2, 3 pole cover

TBS-34B

4 pole cover

##### Rear Connection Kits

Bar and Round types are available.

X-55B-202

a set of the BAR type for a 2-pole MCCB

X-55B-203

a set of the BAR type for a 3-pole MCCB

X-55B-204

a set of the BAR type for a 4-pole MCCB

X-55R-202

a set of the ROUND type for a 2-pole MCCB

X-55R-203

a set of the ROUND type for a 3-pole MCCB

X-55R-204

a set of the ROUND type for a 4-pole MCCB



# Manual Rotary Handles



Direct Mounting type



Extensible Mounting type

Application to			
ABE202b	ABE203b	ABE204b	EBE203b
ABS202b	ABS203b	ABS204b	EBS203b
ABH202b	ABH203b	ABH204b	EBH203b

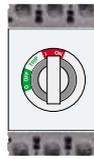
### Catalog No.

#### Direct Mounting

- D-55S Vertical type
- D-55R Horizontal (ON in right-hand) type
- D-55L Horizontal (ON in left-hand) type

#### Extensible Mounting

- E-55S Vertical type
- E-55R Horizontal (ON in right-hand) type
- E-55L Horizontal (ON in left-hand) type



Vertical type



Horizontal type  
ON in right-hand

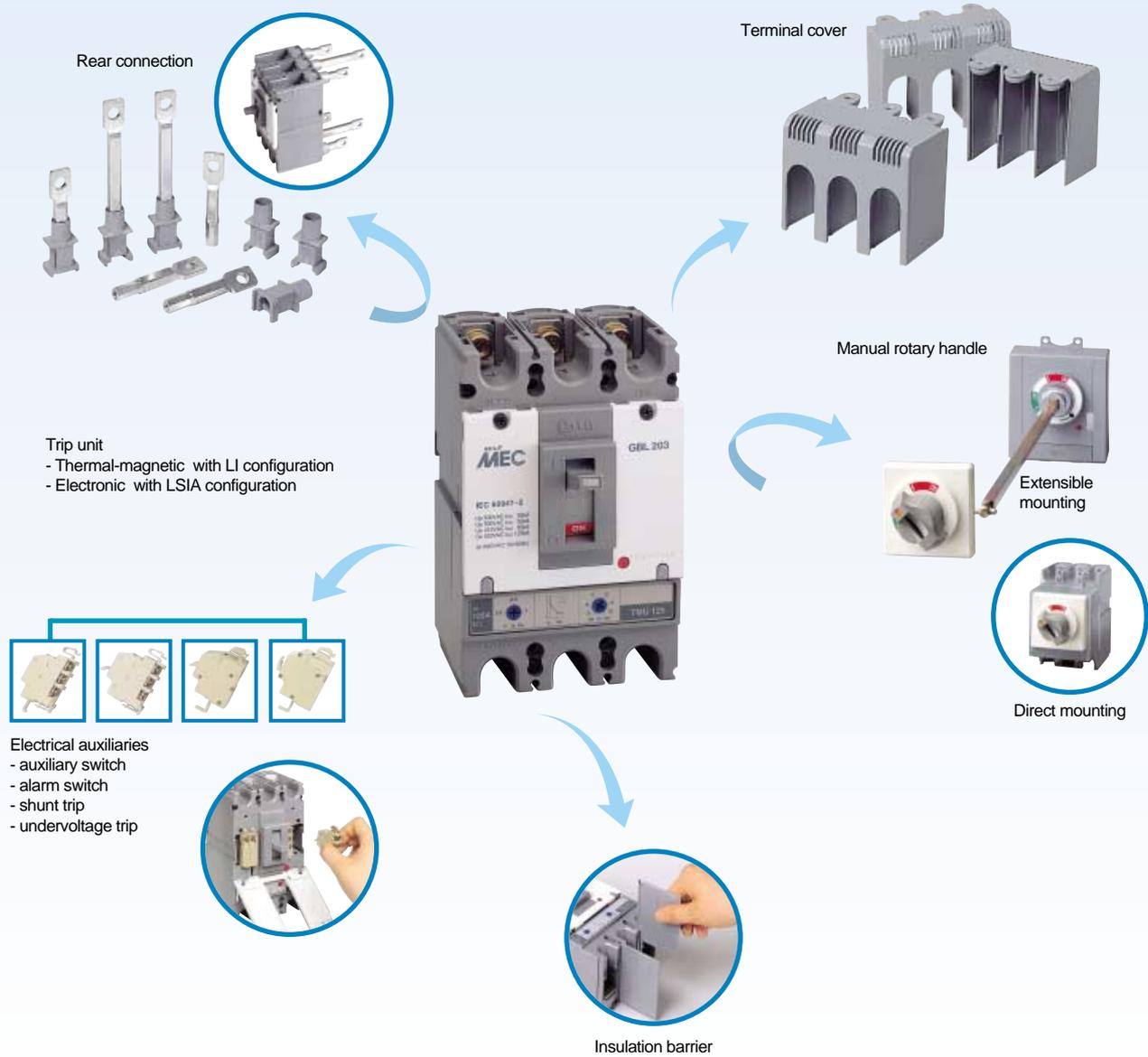


Horizontal type  
ON in left-hand

# MCCBs for general use

## GB type adjustable MCCBs

- Suitable for use in the system where higher fault currents exist.  
35, 65 and 85kAIC breakers are available.
- Employing a adjustable trip unit.
- Current adjustments are made by knobs on the front of the trip unit.
- Electric auxiliaries are common use up to 250 amperes.
- UL508 certificate as a manual motor controller.



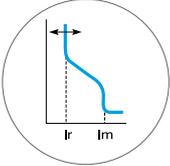


100AF

## Thermal magnetic trip



Knob for adjusting thermal current



### Optional accessories

- Auxiliary switch
- Alarm Switch
- Shunt trip
- Undervoltage trip
- Manual rotary handle
- Terminal cover
- Rear connection unit
- Insulation barrier (standard for line side only)

※ see details (p. 46)

<b>Rated current, In</b>	16, 20, 25, 32, 40, 50, 63, 80, 100A	
<b>Type of trip unit</b>	Adjustable thermal and fixed magnetic	
<b>Thermal current</b>	$(0.8-0.9-1.0) \times I_n$ ... adjustable via knob	
<b>Magnetic Trip</b>	$(8 \text{ to } 12) \times I_n$ ... non-adjustable min. 500A	
<b>Number of poles</b>	2, 3, 4 pole	
<b>Connection</b>	Front (standard) Rear (optional)	
<b>Mounting</b>	Fixed only	
<b>Category of use</b>	Type A according to IEC947-2	
<b>Breaking capacity, Icu</b>	Ics = 75% of Icu	

Type	GBN	GBH
<b>220/240V</b>	50kA	85kA
<b>380V</b>	35kA	50kA
<b>415V</b>	35kA	50kA
<b>440/460V</b>	35kA	50kA
<b>480/500V</b>	30/22kA	42/35kA
<b>600V</b>	18kA	25kA

Catalog No.	for 35kA at 415V ... Type GBN		
In	3pole	4pole	Adjustable thermal range
<b>16A</b>	GBN103/16	GBN104/16	12.8-14.4-16A
<b>20A</b>	GBN103/20	GBN104/20	16-18-20A
<b>25A</b>	GBN103/25	GBN104/25	20-22.5-25A
<b>32A</b>	GBN103/32	GBN104/32	25.6-28.8-32A
<b>40A</b>	GBN103/40	GBN104/40	32-36-40A
<b>50A</b>	GBN103/50	GBN104/50	40-45-50A
<b>63A</b>	GBN103/63	GBN104/63	50.4-56.7-63A
<b>80A</b>	GBN103/80	GBN104/80	64-72-80A
<b>100A</b>	GBN103/100	GBN104/100	80-90-100A
In	for 50kA at 415V ... Type GBH		Adjustable thermal range
In	3pole	4pole	Adjustable thermal range
<b>16A</b>	GBH103/16	GBH104/16	12.8-14.4-16A
<b>20A</b>	GBH103/20	GBH104/20	16-18-20A
<b>25A</b>	GBH103/25	GBH104/25	20-22.5-25A
<b>32A</b>	GBH103/32	GBH104/32	25.6-28.8-32A
<b>40A</b>	GBH103/40	GBH104/40	32-36-40A
<b>50A</b>	GBH103/50	GBH104/50	40-45-50A
<b>63A</b>	GBH103/63	GBH104/63	50.4-56.7-63A
<b>80A</b>	GBH103/80	GBH104/80	64-72-80A
<b>100A</b>	GBH103/100	GBH104/100	80-90-100A

### Certificate

CE, KEMA, Lloyd & UL

UL508 certificate as a manual motor controller

<b>Dimensions (mm)</b>	<b>2/3pole</b>	90(W) × 140(H) × 86(D)
	<b>4pole</b>	120(W) × 140(H) × 86(D)

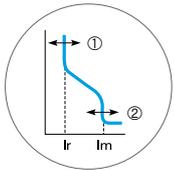
# MCCBs for general use

## GB type adjustable MCCBs | 250AF

### Thermal magnetic trip



- ① Knob for adjusting thermal current
- ② Knob for adjusting Magnetic current



<b>Rated current, In</b>	16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250A
<b>Type of trip unit</b>	Adjustable thermal and adjustable magnetic trip
<b>Thermal current</b>	(0.8-0.9-1.0) × In ... adjustable via knob
<b>Magnetic current</b>	(5-6-7-8-9-10) × In ... adjustable for In=125 to 250A (8 to 12) × In ... non-adjustable for In=16 to 100A
<b>Number of poles</b>	2, 3, 4 pole
<b>Connection</b>	Front (standard) Rear (optional)
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC947-2
<b>Breaking capacity, Icu</b>	Ics = 75% of Icu

Type	GBN	GBH	GBL
<b>220/240V</b>	50kA	85kA	125kA
<b>380V</b>	35kA	50kA	85kA
<b>415V</b>	35kA	50kA	85kA
<b>440/460V</b>	35kA	50kA	85kA
<b>480/500V</b>	30/22kA	42/35kA	65/50kA
<b>600V</b>	18kA	25kA	35kA

Catalog No.	for 35kA at 415V ... Type GBN		
	3pole	4pole	Adjustable thermal range
<b>125A</b>	GBN203/125	GBN204/125	100-112.5-125A
<b>160A</b>	GBN203/160	GBN204/160	128-144-160A
<b>200A</b>	GBN203/200	GBN204/200	160-180-200A
<b>250A</b>	GBN203/250	GBN204/250	200-225-250A
	for 50kA at 415V ... Type GBH		
	3pole	4pole	Adjustable thermal range
<b>125A</b>	GBH203/125	GBH204/125	100-112.5-125A
<b>160A</b>	GBH203/160	GBH204/160	128-144-160A
<b>200A</b>	GBH203/200	GBH204/200	160-180-200A
<b>250A</b>	GBH203/250	GBH204/250	200-225-250A
	for 85kA at 415V ... Type GBL		
	3pole	4pole	Adjustable thermal range
<b>16A</b>	GBL103/16	GBL104/16	12.8-14.4-16A
<b>20A</b>	GBL103/20	GBL104/20	16-18-20A
<b>25A</b>	GBL103/25	GBL104/25	20-22.5-25A
<b>32A</b>	GBL103/32	GBL104/32	25.6-28.8-32A
<b>40A</b>	GBL103/40	GBL104/40	32-36-40A
<b>50A</b>	GBL103/50	GBL104/50	40-45-50A
<b>63A</b>	GBL103/63	GBL104/63	50.4-56.7-63A
<b>80A</b>	GBL103/80	GBL104/80	64-72-80A
<b>100A</b>	GBL103/100	GBL104/100	80-90-100A
<b>125A</b>	GBL203/125	GBL204/125	100-112.5-125A
<b>160A</b>	GBL203/160	GBL204/160	128-144-160A
<b>200A</b>	GBL203/200	GBL204/200	160-180-200A
<b>250A</b>	GBL203/250	GBL204/250	200-225-250A

Note ; Magnetic currents are non-adjustable from In=16 to 100A

#### Optional accessories

- Auxiliary switch
- Alarm Switch
- Shunt trip
- Undervoltage trip
- Manual rotary handle
- Terminal cover
- Rear connection unit
- Insulational barrier  
(standard for line side only)

※ see details (p. 46)

**Certificate**  
CE, KEMA, Lloyd & UL

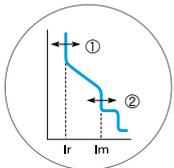
UL508 certificate as a manual motor controller

<b>Dimensions (mm)</b>	<b>2/3pole</b>	90(W) × 140(H) × 86(D)
	<b>4pole</b>	120(W) × 140(H) × 86(D)

- Motor protection circuit breaker - magnetic only release type : see details(p. 64)
- MCCBs with electronic trip units : see details(p. 45)



## Electronic trip



Trip unit configuration



- ① Knob for adjusting long time pick-up current
- Selector of frequency
- LED for alarm
- ② Knob for adjusting short time pick-up current

<b>Rated current, In</b>	50, 100, 250A
<b>Type of trip unit</b>	Electronic trip
<b>Long time pick-up, Ir</b>	(0.5-0.6-0.7-0.8-0.9-1.0) × In ... adjustable via knob
<b>Short time pick-up, Im</b>	(2-3-4-5-6-8-10) × Ir ... adjustable via knob
<b>Instantaneous pick-up</b>	11 × In ... fixed
<b>Alarm</b>	Warning via LED flickering when the load current is between 70 to 110% of set current Ir. LED stays on over 110% of set current Ir.
<b>Rated frequency</b>	50-60 selectable by the switch of the trip unit
<b>Number of poles</b>	3 pole
<b>Connection</b>	Front (standard) Rear (optional)
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC947-2
<b>Breaking capacity, Icu</b>	Ics = 75% of Icu
<b>Type</b>	<b>GBL</b>
<b>220/240V</b>	125kA
<b>380V</b>	85kA
<b>415V</b>	85kA
<b>440/460V</b>	85kA
<b>480/500V</b>	65/50kA
<b>600V</b>	35kA

Catalog No.		
In	3pole	Adjustable thermal range
50A	GBL53E	25-30-35-40-45-50A
100A	GBL103E	50-60-70-80-90-100A
250A	GBL203E	125-150-175-200-225-250A

<b>Optional accessories</b>	Auxiliary switch Alarm Switch Shunt trip Undervoltage trip Manual rotary handle Terminal cover Rear connection unit Insulational barrier (standard for line side only)
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**Dimensions(mm) 3pole** 90(W) × 140(H) × 86(D)

· MCCBs with thermal-magnetic trip : see details (p. 44)

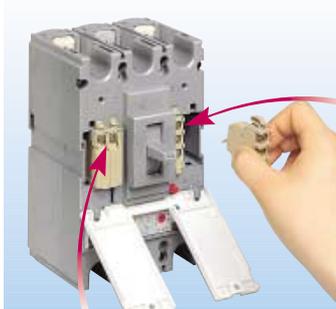
**Certificate**  
CE, KEMA, Lloyd

# MCCBs for general use

## GB type adjustable MCCBs

## Accessories

### Electrical auxiliaries



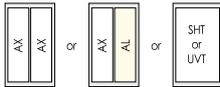
Left-hand seat

Right-hand seat

#### Maximum possibilities

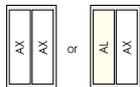
##### Left-hand seat

Option of connecting 2AX or AX+AL or SHT or UVT



##### Right-hand seat

Option of connecting 2AX or AL+AX



Auxiliary Switch, AX



Alarm Switch, AL



Shunt Trip, SHT



Under Voltage Trip, UVT

Common use for GB type breakers up to 250Amp.

... GBN, GBH, GBL

#### Catalog No.

##### Auxiliary Switch, AX

Signals the contact position of the breaker

- opening by manual or fault
- closing

Consists of one change over switch per unit  
1 auxiliary switch (1NO+NC)

AX1G250

##### Alarm Switch, AL

Signals the contact position of the breaker

- tripping by manual or fault
  - not operated by normal opening or closing of a breaker
- Consists of one change over switch

1 alarm switch (1NO+NC)

AL1G250

##### Shunt trip, SHT

Trips the breaker when any ac(dc) voltage between 85(75) and 110(125)% of nominal control voltage is applied.

This unit is fitted into the left-hand seat of a handle.

- For 12V AC/DC common use
- For 24V AC/DC common use
- For 48V AC/DC common use
- For 60V AC/DC common use
- For 250V AC/DC common use
- For AC100~125V
- For AC200~240V
- For AC380~450V
- For AC440~480V
- For AC500~550V
- For DC100~110V
- For DC125V
- For DC200~220V
- For DC240V
- For DC250V

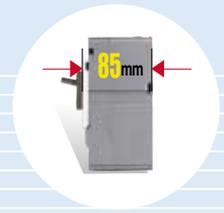
ST12CG250  
ST24CG250  
ST48CG250  
ST60CG250  
ST250CG250  
ST100AG250  
ST200AG250  
ST380AG250  
ST440AG250  
ST500AG250  
ST100DG250  
ST125DG250  
ST200DG250  
ST240DG250  
ST250DG250

##### Under voltage trip, UVT

Trips the breaker when control voltage disappears or falls. This unit is fitted into the left-hand seat of a handle.

- For 24V AC/DC common use
- For 48V AC/DC common use
- For 100~110V AC/DC common use
- For 200~220V AC/DC common use
- For 380~440V AC
- For 440~480V AC

UV24CG250  
UV48CG250  
UV100CG250  
UV200CG250  
UV380AG250  
UV440AG250



## External accessories



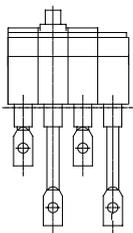
Terminal Covers



Insulation Barriers



Rear connection kits



Bar type

### Catalog No.

IBG250

#### Insulation Barriers

These are partitions for the insulation between the phases. Barriers for the line side of the breaker are supplied as standard. Barriers for the load side are optional. Common use for all GB type breakers up to 250Amp. One(1) barrier

#### Terminal Covers

These are applied to the line/load side of the breaker to prevent accidental contact with live parts.

Different by breaker dimensions.

Use 3pole covers for 2pole breakers

3 pole cover for GBN/GBH103

4 pole cover for GBN/GBH104

3 pole cover for GBN/GBH203, GBL103/203(E)

4 pole cover for GBN/GBH204, GBL104/204

TB-13T

TB-14T

TB-23T

TB-24T

#### Rear Connection Kits --- Bar type

X-102

a set for 2 pole MCCBs of GBN/GBH102

X-103

a set for 3 pole MCCBs of GBN/GBH103

X-104

a set for 4 pole MCCBs of GBN/GBH104

X-202

a set for 2 pole MCCBs of GBN/GBH202, GBL102/202

X-203

a set for 3 pole MCCBs of GBN/GBH203, GBL103/203(E)

X-204

a set for 4 pole MCCBs of GBN/GBH204, GBL104/204

# MCCBs for general use

## GB type adjustable MCCBs

## Accessories

### Manual Rotary Handles



Direct Mounting type



Extensible Mounting type

#### Catalog No.

D-30S  
D-30R  
D-30L

#### Direct Mounting

Applicable for GBN/GBH 100AF, 3-4 pole  
Vertical type  
Horizontal (ON in right-hand) type  
Horizontal (ON in left-hand) type

D-60S  
D-60R  
D-60L

Applicable for GBN/GBH/GBL 250AF, GBL100, 3-4 pole  
Vertical type  
Horizontal (ON in right-hand) type  
Horizontal (ON in left-hand) type

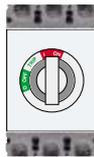
E-30S  
E-30R  
E-30L

#### Extensible Mounting

Applicable for GBN/GBH 100AF, 3-4 pole  
Vertical type  
Horizontal (ON in right-hand) type  
Horizontal (ON in left-hand) type

E-60S  
E-60R  
E-60L

Applicable for GBN/GBH/GBL 250AF, GBL100, 3-4 pole  
Vertical type  
Horizontal (ON in right-hand) type  
Horizontal (ON in left-hand) type



Vertical type,



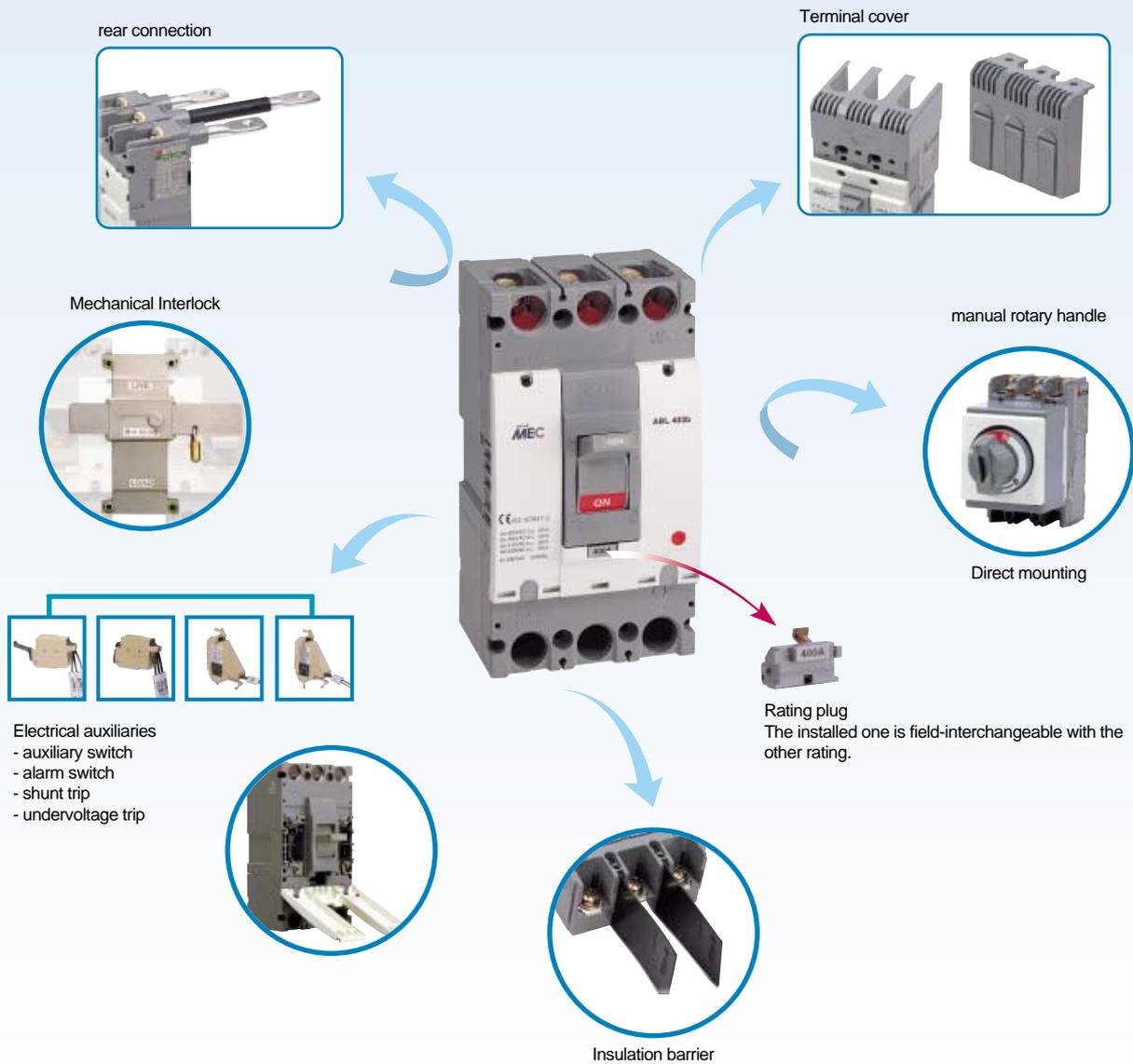
Horizontal type,  
ON in right-hand



Horizontal type,  
ON in left-hand



- Each breaker uses the individual rating plug for determining the continuous current rating.
- Electric auxiliaries are common use between 400 to 800AF.
- 3-pole Earth leakage circuit breakers which are physically interchangeable with 3-pole MCCBs are available.
- MCCB with reference temperature 50 °C is available on request.
- Motor protection MCCBs with magnetic only trip are available.
- CE & KEMA certificated according to IEC60947-2.



# MCCBs for general use

400AF & 800AF

AB type non-adjustable MCCBs

400AF



Rating plug

<b>Rated current, In</b>	250, 300, 350, 400A			
<b>Type of trip unit</b>	Interchangeable thermal and fixed magnetic			
<b>Thermal current</b>	Interchangeable by rating plugs			
<b>Magnetic Trip</b>	(9 to 15) × In ... non-adjustable Magnetic-adjustable types are optional			
<b>Number of poles</b>	2, 3, 4 pole			
<b>Connection</b>	Front (standard) Rear (optional)			
<b>Mounting</b>	Fixed only			
<b>Category of use</b>	Type A according to IEC947-2			
<b>Breaking capacity, Icu</b>	Ics = 100% of Icu(ABE, ABS), 50% of Icu(ABH, ABL)			
<b>Type</b>	<b>ABE</b>	<b>ABS</b>	<b>ABH</b>	<b>ABL</b>
<b>220/240V</b>	35kA	50kA	85kA	125kA
<b>380V</b>	30kA	42kA	65kA	100kA
<b>415V</b>	25kA	35kA	50/50kA(Ics)	85/50kA(Ics)
<b>440/460V</b>	25kA	35kA	50kA	85kA
<b>480/500V</b>	18kA	25kA	35kA	65kA
<b>600V</b>	18kA	22kA	25kA	30kA

## Earth leakage circuit breaker



Types EBE/S/H/L403 physically interchangeable with MCCBs.

※ see details (p. 74)

Catalog No.	for 25kA at 415V ... Type ABE			
In	2pole	3pole	4pole	Interchangeable rating plug
<b>250A</b>	ABE402b/250	ABE403b/250	ABE404b/250	300A
<b>300A</b>	ABE402b/300	ABE403b/300	ABE404b/300	250A
<b>350A</b>	ABE402b/350	ABE403b/350	ABE404b/350	400A
<b>400A</b>	ABE402b/400	ABE403b/400	ABE404b/400	350A
for 35kA at 415V ... Type ABS				
In	2pole	3pole	4pole	Interchangeable rating plug
<b>250A</b>	ABS402b/250	ABS403b/250	ABS404b/250	300A
<b>300A</b>	ABS402b/300	ABS403b/300	ABS404b/300	250A
<b>350A</b>	ABS402b/350	ABS403b/350	ABS404b/350	400A
<b>400A</b>	ABS402b/400	ABS403b/400	ABS404b/400	350A
for 50kA at 415V ... Type ABH				
In	2pole	3pole	4pole	Interchangeable rating plug
<b>250A</b>	ABH402b/250	ABH403b/250	ABH404b/250	300A
<b>300A</b>	ABH402b/300	ABH403b/300	ABH404b/300	250A
<b>350A</b>	ABH402b/350	ABH403b/350	ABH404b/350	400A
<b>400A</b>	ABH402b/400	ABH403b/400	ABH404b/400	350A
for 85kA at 415V ... Type ABL				
In	2pole	3pole	4pole	Interchangeable rating plug
<b>250A</b>	ABL402b/250	ABL403b/250	ABL404b/250	300A
<b>300A</b>	ABL402b/300	ABL403b/300	ABL404b/300	250A
<b>350A</b>	ABL402b/350	ABL403b/350	ABL404b/350	400A
<b>400A</b>	ABL402b/400	ABL403b/400	ABL404b/400	350A

## Optional accessories

- Auxiliary switch
- Alarm Switch
- Shunt trip
- Undervoltage trip
- Manual rotary handle
- Terminal cover
- Mechanical interlock
- Rear connection unit
- Insulational barrier (standard for line side only)

※ see details (p. 52)

<b>Dimensions (mm)</b>	<b>2/3pole</b>	140(W) × 257(H) × 113(D)
	<b>4pole</b>	185(W) × 257(H) × 113(D)

Certificate  
TUV

- MCCB with reference temperature 50 °C is available on request.
- Motor protection circuit breaker - magnetic only release type : see p. 65
- MCCB with electronic trip unit : see p. 56

# 800AF



Rating plug

<b>Rated current, In</b>	500, 600, 700, 800A		
<b>Type of trip unit</b>	Interchangeable thermal and fixed magnetic		
<b>Thermal current</b>	Interchangeable by rating plugs		
<b>Magnetic Trip</b>	(9 to 15) × In ... non-adjustable Magnetic-adjustable types are optional		
<b>Number of poles</b>	2, 3, 4 pole		
<b>Connection</b>	Front (standard) Rear (optional)		
<b>Mounting</b>	Fixed only		
<b>Category of use</b>	Type A according to IEC947-2		
<b>Breaking capacity, Icu</b>	Ics = 100% of Icu(ABE), 50% of Icu(ABS, ABL)		
<b>Type</b>	<b>ABE</b>	<b>ABS</b>	<b>ABL</b>
<b>220/240V</b>	50kA	100kA	125kA
<b>380V</b>	42kA	65kA	100kA
<b>415V</b>	35kA	50/50kA(Ics)	85kA
<b>440/460V</b>	35kA	50kA	85kA
<b>480/500V</b>	25kA	45kA	65kA
<b>600V</b>	22kA	25kA	30kA

## Earth leakage circuit breaker



### Types EBE/S/L803

physically interchangeable with MCCBs.

※ see details (p. 75)

## Optional accessories

- Auxiliary switch
- Alarm Switch
- Shunt trip
- Undervoltage trip
- Manual rotary handle
- Terminal cover
- Mechanical interlock
- Rear connection unit
- Insulation barrier (standard for line side only)

※ see details (p. 52)

Catalog No.	for 35kA at 415V ... Type ABE			
In	2pole	3pole	4pole	Interchangeable rating plug
<b>500A</b>	ABE802b/500	ABE803b/500	ABE804b/500	600A
<b>600A</b>	ABE802b/600	ABE803b/600	ABE804b/600	500A
<b>630A</b>	ABE802b/630	ABE803b/630	ABE804b/630	
<b>700A</b>	ABE802b/700	ABE803b/700	ABE804b/700	800A
<b>800A</b>	ABE802b/800	ABE803b/800	ABE804b/800	700A
for 50kA at 415V ... Type ABS				
In	2pole	3pole	4pole	Interchangeable rating plug
<b>500A</b>	ABS802b/500	ABS803b/500	ABS804b/500	600A
<b>600A</b>	ABS802b/600	ABS803b/600	ABS804b/600	500A
<b>630A</b>	ABS802b/630	ABS803b/630	ABS804b/630	
<b>700A</b>	ABS802b/700	ABS803b/700	ABS804b/700	800A
<b>800A</b>	ABS802b/800	ABS803b/800	ABS804b/800	700A
for 85kA at 415V ... Type ABL				
In	2pole	3pole	4pole	Interchangeable rating plug
<b>500A</b>	ABL802b/500	ABL803b/500	ABL804b/500	600A
<b>600A</b>	ABL802b/600	ABL803b/600	ABL804b/600	500A
<b>630A</b>	ABL802b/630	ABL803b/630	ABL804b/630	
<b>700A</b>	ABL802b/700	ABL803b/700	ABL804b/700	800A
<b>800A</b>	ABL802b/800	ABL803b/800	ABL804b/800	700A

<b>Dimensions</b>	<b>2/3pole</b>	210(W) × 280(H) × 113(D)
<b>(mm)</b>	<b>4pole</b>	280(W) × 280(H) × 113(D)

## Certificate

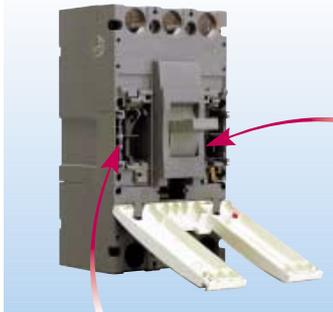
TUV

- MCCB with reference temperature 50 °C is available on request.
- Motor protection circuit breaker - magnetic only release type : see p. 65
- MCCB with electronic trip unit : see p. 57

# MCCBs for general use

## 400AF & 800AF | AB type non-adjustable MCCBs

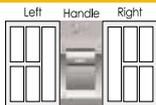
### Electrical auxiliaries



Left-hand seat

Right-hand seat

#### Maximum possibilities



#### Left-hand seat

Option of connecting 2AX, 2AL and SHT or UVT



#### Right-hand seat

Option of connecting 2AX, 2AL and SHT or UVT



This seat is not available for GBN403E, GBN803E and ELCBs.



Auxiliary Switch, AX



Alarm Switch, AL



Shunt Trip, SHT



Under Voltage Trip, UVT

Common use for breakers

Type AB 400AF and 800AF as well as type GB 400AF and 800AF.

#### Catalog No.

#### Auxiliary Switch, AX

Signals the contact position of the breaker

- opening by manual or fault
- closing

Consists of one change over switch per unit

1 auxiliary switch (1NO+NC)

AX1L800

#### Alarm Switch, AL

Signals the contact position of the breaker

- tripping by manual or fault
- not operated by normal opening or closing of a breaker

Consists of one change over switch

1 alarm switch (1NO+NC)

AL1L800

#### Shunt Trip, SHT

Trips the breaker when any ac(dc) voltage between 85(75) and 110(125)% of nominal control voltage is applied.

For 24~48V AC/DC common use

For AC100~125/DC100~110V

For AC200~240/DC200~220V

For AC380~460V

For AC480~550V

ST48CL800

ST100CL800

ST200CL800

ST380AL800

ST480AL800

#### Under Voltage Trip, UVT

Trips the breaker when control voltage disappears or falls.

For 24V AC/DC common use

For 48V AC/DC common use

For 100~110V AC/DC common use

For 200~220V AC/DC common use

For 380~440V AC

For 440~480V AC

UV24CL800

UV48CL800

UV100CL800

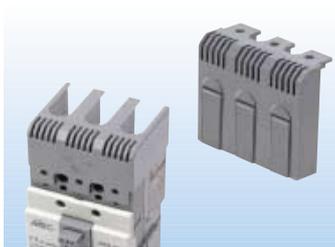
UV200CL800

UV380AL800

UV440AL800



External accessories



Terminal cover



Insulation barrier



Mechanical Interlock

Catalog No.

**Insulation Barriers**

These are partitions for the insulation between the phases. Barriers for the line side of the breaker are supplied as standard.

Barriers for the load side are optional.

IBL400

One(1) barrier for AB 400AF (250 to 400A)

IBL800

One(1) barrier for AB 800AF (500 to 800A)

**Terminal Covers**

These are applied to the line/load side of the breaker to prevent accidental contact from live parts.

Different by breaker dimensions.

Use 3pole covers for 2pole breakers

T1-43A

for AB 400AF (250 to 400A)

T1-63A

for AB 800AF (500 to 800A)

**Mechanical Interlock**

These are applied between two breakers to prevent mechanically them closing together.

MI-43S

for 3 pole AB 400AF (250 to 400A)

MI-44S

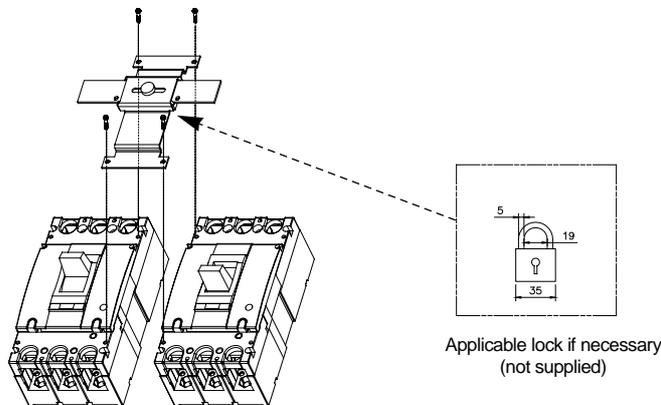
for 4 pole AB 400AF (250 to 400A)

MI-83S

for 3 pole AB 800AF (500 to 800A)

MI-84S

for 4 pole AB 800AF (500 to 800A)



# MCCBs for general use

400AF & 800AF

AB type non-adjustable MCCBs

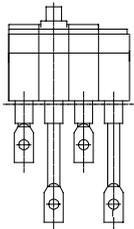
Accessories



Direct Mounting type



Rear connection



Bar type

## Catalog No.

N-70S

N-70R

N-70L

N-80S

N-80R

N-80L

### Manual Rotary Handle --- Direct Mounting types

*Applicable for AB 400AF, 3-4 pole*

Vertical type

Horizontal (ON in right-hand) type

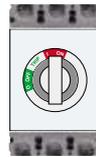
Horizontal (ON in left-hand) type

*Applicable for AB 800AF, 3-4 pole*

Vertical type

Horizontal (ON in right-hand) type

Horizontal (ON in left-hand) type



Vertical type,



Horizontal type,  
ON in right-hand



Horizontal type,  
ON in left-hand

### Rear Connection Kits --- Bar type

X-402

X-403

X-404

X-802

X-803

X-804

a set for 2 pole MCCBs of AB 400AF

a set for 3 pole MCCBs of AB 400AF

a set for 4 pole MCCBs of AB 400AF

a set for 2 pole MCCBs of AB 800AF

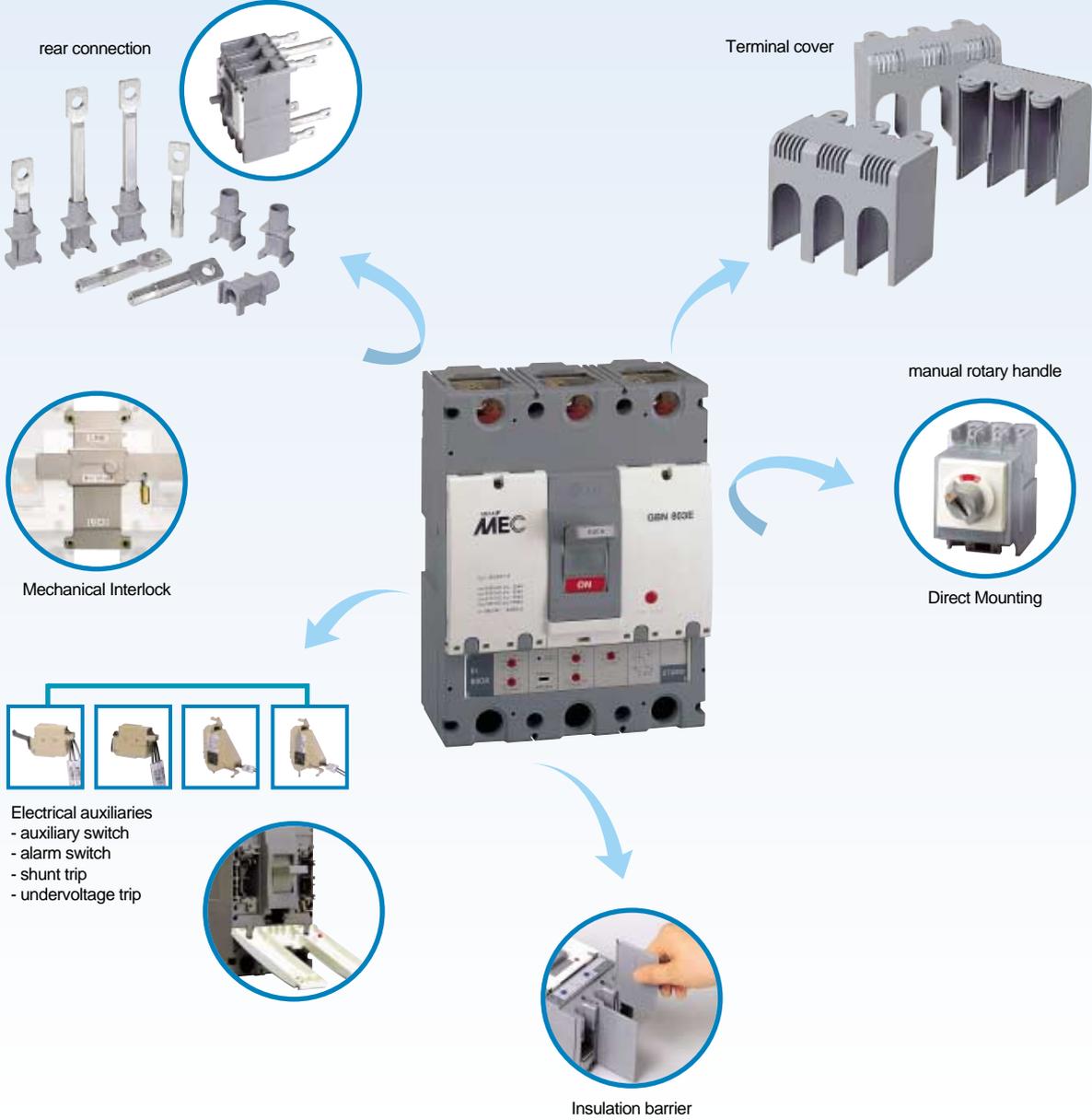
a set for 3 pole MCCBs of AB 800AF

a set for 4 pole MCCBs of AB 800AF



# GB type adjustable MCCBs

- Electric trip units with LSIA configuration.
- Electric auxiliaries are common use between 400 to 800AF.
- Motor protection MCCBs with magnetic only trip are available.
- CE & KEMA certificated according to IEC60947-2.



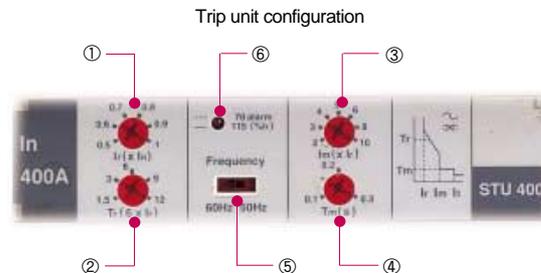
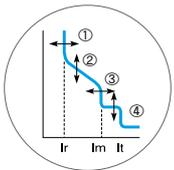
# MCCBs for general use

400AF & 800AF

GB type adjustable MCCBs

400AF

## Electronic trip



<b>Rated current, In</b>	400A
<b>Type of trip unit</b>	Electronic trip with LSIA configuration
<b>① Long time pick-up, Ir</b>	(0.5-0.6-0.7-0.8-0.9-1.0) x In ... adjustable via knob
<b>② Long time delay, tr</b>	1.5-3-6-9-12 sec at 6 x Ir ... adjustable via knob
<b>③ Short time pick-up, Im</b>	(2-3-4-5-6-8-10) x Ir ... adjustable via knob
<b>④ Short time delay, tm</b>	0.1-0.2-0.3 sec ... adjustable
<b>Instantaneous pick-up</b>	≥ 12.5 x In ... fixed
<b>⑤ Rated frequency</b>	50-60 selectable by the switch of the trip unit
<b>⑥ Alarm</b>	Warning via LED flickering when the load current is between 70 to 115% of set current Ir. LED stays on over 115% of set current Ir
<b>Number of poles</b>	3 pole
<b>Connection</b>	Front only
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC947-2
<b>Breaking capacity, Icu</b>	Ics = 50% of Icu

Type	GBN	GBH
220/240V	50kA	85kA
380V	35kA	50kA
415V	35kA	50kA
440/460V	30kA	42kA
480/500V	22kA	35kA
600V	18kA	25kA

Catalog No.		
In	3pole	Adjustable thermal range
400A	GBN403E	200-240-280-320-360-400A
	GBH403E	200-240-280-320-360-400A

Optional accessories	
※ see details (p. 58)	Auxiliary switch
	Alarm Switch
	Shunt trip
	Undervoltage trip
	Manual rotary handle
	Terminal cover
	Insulational barrier
	(standard for line side only)

**Dimensions(mm) 3pole** 140(W) × 257(H) × 113(D)

If the GBN 403E/GBN803E/GBH403E/GBH803E, are used at high temperature, the setting must take into account the thermal limits of circuit breaker :  
the overload protection setting cannot exceed 0.9 at 50°, 0.8 at 60° and 0.7 at 70°.

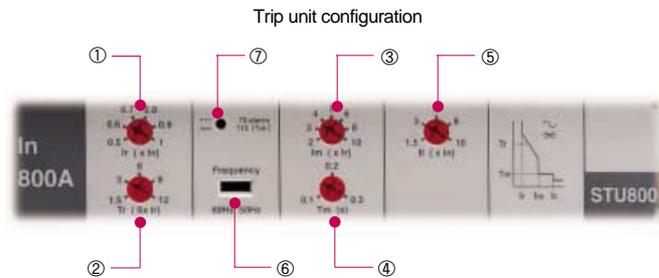
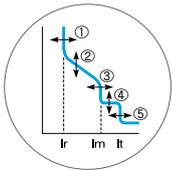
- Motor protection circuit breaker - magnetic only release type : see p. 65
- MCCB with thermal-magnetic trip unit : see p. 50

Certificate

CE



## Electronic trip



<b>Rated current, In</b>	800A
<b>Type of trip unit</b>	Electronic trip with LSIA configuration
① <b>Long time pick-up, Ir</b>	(0.5-0.6-0.7-0.8-0.9-1.0) x In ... adjustable via knob
② <b>Long time delay, tr</b>	1.5-3-6-9-12 sec at 6 x Ir ... adjustable via knob
③ <b>Short time pick-up, Im</b>	(2-3-4-5-6-8-10) x Ir ... adjustable via knob
④ <b>Short time delay, tm</b>	0.1-0.2-0.3 sec... adjustable
⑤ <b>Instantaneous pick-up</b>	(1.5-3-6-8-10) x In ... adjustable via knob
⑥ <b>Rated frequency</b>	50-60 selectable by the switch of the trip unit
⑦ <b>Alarm</b>	Warning via LED flickering when the load current is between 70 to 115% of set current Ir. LED stays on over 115% of set current Ir
<b>Number of poles</b>	3 pole
<b>Connection</b>	Front only
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC947-2
<b>Breaking capacity, Icu</b>	Ics = 50% of Icu

Type	GBN	GBH
<b>220/240V</b>	50kA	85kA
<b>380V</b>	35kA	50kA
<b>415V</b>	35kA	50kA
<b>440/460V</b>	30kA	42kA
<b>480/500V</b>	22kA	35kA
<b>600V</b>	18kA	25kA

Catalog No.		
In	3pole	Adjustable thermal range
800A	GBN803E	400-480-560-640-720-800A
	GBH803E	400-480-560-640-720-800A

Optional accessories	
※ see details (p. 58)	Auxiliary switch
	Alarm Switch
	Shunt trip
	Undervoltage trip
	Manual rotary handle
	Terminal cover
	Insulational barrier
	(standard for line side only )

**Dimensions(mm)** 3pole 210(W) × 280(H) × 113(D)

If the GBN 403E/GBN803E/GBH403E/GBH803E, are used at high temperature, the setting must take into account the thermal limits of circuit breaker :  
 the overload protection setting cannot exceed 0.9 at 50°, 0.8 at 60° and 0.7 at 70°.  
 · Motor protection circuit breaker - magnetic only release type : see p. 65  
 · MCCB with thermal-magnetic trip unit : see p. 51

Certificate

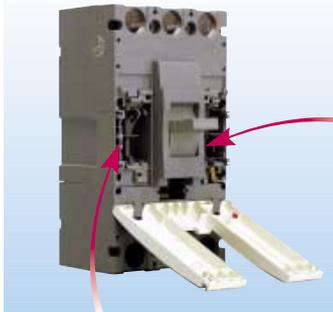
CE

# MCCBs for general use

400AF & 800AF

GB type adjustable MCCBs

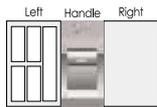
## Electrical auxiliaries



Left-hand seat

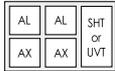
Right-hand seat

### Maximum possibilities



#### Left-hand seat

Option of connecting 2AX , 2AL and SHT or UVT



#### Right-hand seat

This seat is not available.



Auxiliary Switch, AX



Alarm Switch, AL



Shunt Trip, SHT



Under Voltage Trip, UVT

Common use for breakers

Type AB 400AF and 800AF as well as type GB 400AF and 800AF.

### Catalog No.

#### Auxiliary Switch, AX

Signals the contact position of the breaker

- opening by manual or fault
- closing

Consists of one change over switch per unit

1 auxiliary switch (1NO+NC)

AX1L800

#### Alarm Switch, AL

Signals the contact position of the breaker

- tripping by manual or fault
- not operated by normal opening or closing of a breaker

Consists of one change over switch

1 alarm switch (1NO+NC)

AL1L800

#### Shunt Trip, SHT

Trips the breaker when any ac(dc) voltage between 85(75) and 110(125)% of nominal control voltage is applied.

ST48CL800

For 24~48V AC/DC common use

ST100CL800

For AC100~125/DC100~110V

ST200CL800

For AC200~240/DC200~220V

ST380AL800

For AC380~460V

ST480AL800

For AC480~550V

#### Under Voltage trip, UVT

Trips the breaker when control voltage disappears or falls.

UV48CL800

For 48V AC/DC common use

UV100CL800

For 100~110V AC/DC common use

UV200CL800

For 200~220V AC/DC common use

UV380AL800

For 380~440V AC

UV440AL800

For 440~480V AC



External accessories



Terminal cover



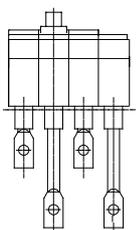
Insulation barrier



Direct Mounting type



Rear connection



Bar type

Type GB MCCBs use the same accessories with the AB type 400AF & 800AF MCCBs.

※ see details (p. 53)

Catalog No.

**Insulation Barriers**

- IBL400 One(1) barrier for GBN403E, GBH403E
- IBL800 One(1) barrier for GBN803E, GBH803E

**Terminal Covers**

- T1-43A for GBN403E, GBH403E
- T1-63A for GBN803E, GBH803E

**Mechanical Interlock**

- MI-83S for 3 pole GBN803E, GBH803E

**Manual Rotary Handle, Direct mounting types**

*Applicable for GBN403E, GBH403E*

- N-70S Vertical type
- N-70R Horizontal (ON in righthand) type
- N-70L Horizontal (ON in lefthand) type

*Applicable for GBN803E, GBH803E*

- N-80S Vertical type
- N-80R Horizontal (ON in righthand) type
- N-80L Horizontal (ON in lefthand) type

**Rear Connection Kits ... Bar type**

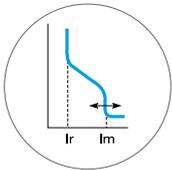
- X-403 a set for GBN403E, GBH403E
- X-803 a set for GBN803E, GBH803E

# MCCBs for general use

## 1200AF MCCBs

### AB type non-adjustable MCCB

#### Thermal magnetic trip



<b>Rated current, I<sub>n</sub></b>	1000, 1200A
<b>Type of trip unit</b>	Fixed thermal and adjustable magnetic
<b>Frequency</b>	50 or 60Hz (Not common use)
<b>Number of poles</b>	3, 4 pole
<b>Connection</b>	Front (standard)
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC60947-2
<b>Breaking capacity, I<sub>cu</sub></b>	I <sub>cs</sub> = 50% of I <sub>cu</sub>

Type	ABS
220/240V	100kA
380V	65kA
415V	65kA
440/460V	65kA
480/500V	50kA
600V	45kA

Catalog No.	For 50Hz		
I <sub>n</sub>	3pole	4pole	Magnetic adjustable range
1000A	ABS1003/50	ABS1004/50	3000 to 6000A
1200A	ABS1203/50	ABS1204/50	3000 to 7200A
For 60Hz			
I <sub>n</sub>	3pole	4pole	Magnetic adjustable range
1000A	ABS1003/60	ABS1004/60	3000 to 6000A
1200A	ABS1203/60	ABS1204/60	3000 to 7200A

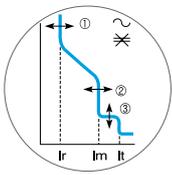
<b>Optional accessories</b>	Auxiliary switch
* see details (p. 62)	Alarm Switch
	Shunt trip
	Undervoltage trip
	Insulational barrier
	(standard for line side only)

<b>Dimensions (mm)</b>	<b>3pole</b>	210(W) × 580(H) × 105(D)
	<b>4pole</b>	280(W) × 580(H) × 105(D)

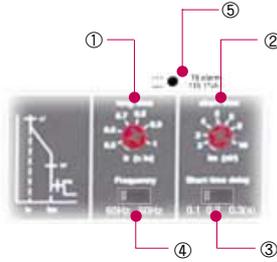
- MCCB with reference temperature 50°C is available on request.
- MCCB with electronic trip unit : see p. 61

# GB type adjustable MCCB

## Electronic trip



Trip unit configuration



<b>Rated current, In</b>	800, 1200A
<b>Type of trip unit</b>	Electronic trip with LSIA configuration
<b>① Long time pick-up, Ir</b>	(0.5-0.6-0.7-0.8-0.9-1.0) × In ... adjustable via knob
<b>② Short time pick-up, Im</b>	(2-3-4-5-6-8-10) × Ir ... adjustable via knob
<b>③ Short time delay, tm</b>	0.1-0.2-0.3 sec ... adjustable
<b>Instantaneous pickup</b>	11 × In ... fixed
<b>④ Rated frequency</b>	50-60 selectable by the switch of the trip unit
<b>⑤ Alarm</b>	Warning via LED flickering when the load current is between 70 to 110% of set current Ir. LED stays on over 110% of set current Ir
<b>Number of poles</b>	3 pole
<b>Connection</b>	Front only
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC60947-2
<b>Breaking capacity, Icu</b>	Ics = 50% of Icu
<b>Type</b>	<b>ABS</b>
<b>220/240V</b>	100kA
<b>380V</b>	65kA
<b>415V</b>	65kA
<b>440/460V</b>	65kA
<b>480/500V</b>	50kA
<b>600V</b>	45kA

<b>Catalog No.</b>	<b>In</b>	<b>3pole</b>	Adjustable thermal range
	<b>1200A</b>	<b>ABS1203E</b>	600-720-840-960-1080-1200A

<b>Optional accessories</b>	Auxiliary switch Alarm Switch Shunt trip Undervoltage trip Insulational barrier (standard for line side only)
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<b>Dimensions(mm)</b>	<b>3pole</b>	210(W) × 580(H) × 105(D)
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# MCCBs for general use

## 1200AF MCCBs

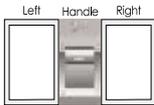
## Accessories

### Electrical auxiliaries



Seats for electrical auxiliaries  
... both sides of the handle

#### Maximum possibilities



#### Left-hand seat

Option of connecting  
SHT or UVT

#### Right-hand seat

Option of connecting  
AX1 or AX2 or AL1 or AL2 or XL1 or  
X2L

#### Catalog No.

#### Auxiliary Switch, AX

Signals the contact position of the breaker

- opening by manual or fault
- closing

Consists of one or two change over contacts per unit

- 1 auxiliary switch (1NO+NC)
- 2 auxiliary switch (2NO+NC)

#### Alarm Switch, AL

Signals the contact position of the breaker

- tripping by manual or fault
- not operated by normal opening or closing of a breaker

Consists of one or two change over contacts per unit

- 1 alarm switch (1NO+NC)
- 2 alarm switch (2NO+NC)

#### Combination Switch, XL

Consists of one or two auxiliary switch and a alarm  
switch per unit

- 1 auxiliary + 1 alarm switch (2NO+NC)
- 2 auxiliary + 1 alarm switch (3NO+NC)

#### Shunt Trip, SHT

Trips the breaker when any ac(dc) voltage between  
85(75) and 110(125)% of nominal control voltage is applied.

- ST100AS1200 For AC100~110V
- ST200AS1200 For AC200~220V
- ST380AS1200 For AC380~440V
- ST48DS1200 For DC48V
- ST100DS1200 For DC100~110V
- ST200DS1200 For DC200~220V

#### Under Voltage Trip, UVT

Trips the breaker when control voltage disappears or falls.

- UV100AS1200 For AC100~110V
- UV200AS1200 For AC200~220V
- UV380AS1200 For AC380~440V
- UV100DS1200 For DC100 (not available for ABS803E, ABS1203E)
- UV200DS1200 For DC200 (not available for ABS803E, ABS1203E)

# MCCBs for definite purpose

## Motor protection MCCBs



### Case 1. MCCB with magnetic only release

MCCB provides protection against short-circuit without thermal elements.

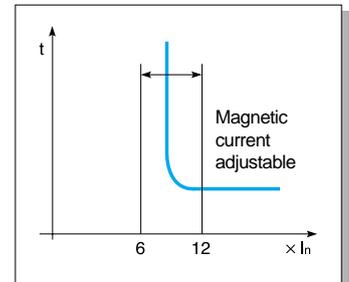
Selecting MCCB by

- motor power
- type of starting
- fault current

Contactor for motor switching.

Overload relay for protection against overload and phase failure.

\* see details (p. 64)



MCCB Operating curve



### Case 2. Thermal-Magnetic Motor protection breaker

MCCB offers protections against short-circuit and overload.

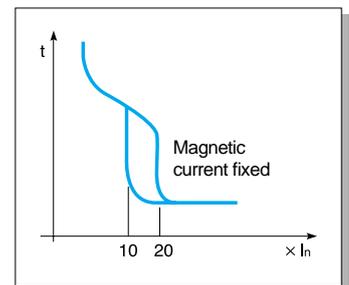
Sometimes it covers manual switching without a contactor for economic solution.

All current ratings are non-adjustable.

Thermal currents are similar to full load currents of motors.

Magnetic trip currents are between 10 to 20 times of thermal currents.

\* see details (p. 66)



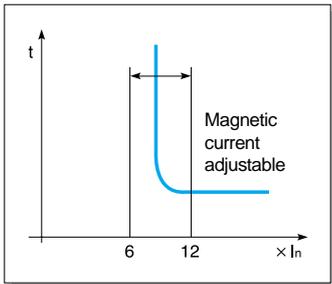
MCCB Operating curve

# MCCBs for definite purpose

## Motor protection MCCBs

## Magnetic only type

1.6A to 250A



Operating curve

<b>Type of trip unit</b>	Adjustable magnetic trip without thermal elements
<b>Rated current, In</b>	1.6, 3.2, 6.3, 12, 20, 32, 50, 63, 100, 160, 200, 250A
<b>Magnetic current</b>	(6-12) × In (6-step adjustment)
<b>Connection</b>	Front (standard) Rear (optional)
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC60947-2
<b>Breaking capacity, Icu</b>	Ics = 75% of Icu

Type	GBL
220/240V	125kA
380/415V	85kA
440/460V	85kA
480/500V	65/50kA
600V	35kA

### Catalog No.

In	Setting current	Catalog No.
1.6A	10-12-14-16-18-20A	GBL103IN/1.6
3.2A	20-24-28-32-36-40A	GBL103IN/3.2
6.3A	40-48-56-64-72-80A	GBL103IN/6.3
12A	70-84-98-112-126-140A	GBL103IN/12
20A	120-144-168-192-216-240A	GBL103IN/20
32A	180-216-252-288-324-360A	GBL103IN/32
50A	300-360-420-480-560-600A	GBL103IN/50
63A	400-480-560-640-720-800A	GBL103IN/63
100A	625-750-875-1000-1125-1250A	GBL103IN/100
160A	1000-1200-1400-1600-1800-2000A	GBL203IN/160
200A	1250-1500-1750-2000-2250-2500A	GBL203IN/200
250A	2000-2250-2500-2750-3000-3250A	GBL203IN/250

### Optional accessories

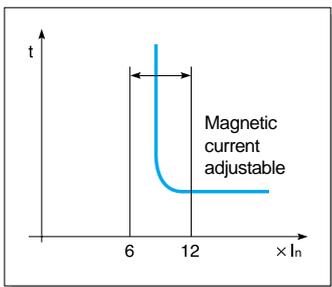
\* see details (p. 46)

- Auxiliary switch
- Alarm Switch
- Shunt trip
- Undervoltage trip
- Manual rotary handle
- Terminal cover
- Rear connection unit
- Insulational barrier  
(standard for line side only)

### Dimensions(mm)

105(W) × 165(H) × 86(D)

## 300 to 800A



Operating curve

<b>Type of trip unit</b>	Adjustable magnetic trip without thermal elements
<b>Rated current, I<sub>n</sub></b>	300, 350, 400, 500, 600, 700, 800A
<b>Magnetic current</b>	(4-10) × I <sub>n</sub> ... adjustable
<b>Connection</b>	Front (standard)
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC60947-2
<b>Breaking capacity, I<sub>cu</sub></b>	I <sub>cs</sub> = 50% of I <sub>cu</sub>

Type	ABL403aIN	ABL803aIN
220/240V	125kA	125kA
380/415V	65kA	65kA
440/460V	65kA	65kA
480/500V	50kA	50kA
600V	35kA	42kA

### Catalog No.

I <sub>n</sub>	Setting current	Catalog No.
300A	1200 to 3000A	ABL403bIN/300
350A	1400 to 3500A	ABL403bIN/350
400A	1600 to 4000A	ABL403bIN/400
400A	1500 to 3750A	ABL803bIN/400
500A	2000 to 5000A	ABL803bIN/500
600A	2400 to 6000A	ABL803bIN/600
700A	2800 to 7000A	ABL803bIN/700
800A	3200 to 8000A	ABL803bIN/800

### Accessories available

\* see details (p. 52)

Auxiliary switch  
 Alarm Switch  
 Shunt trip  
 Undervoltage release  
 Manual rotary handle  
 Terminal cover  
 Insulational barrier  
 Rear connection unit  
 Mechanical Interlock

<b>Dimensions (mm)</b>	<b>ABL403aIN</b>	140(W) × 257(H) × 110(D)
	<b>ABL803aIN</b>	210(W) × 280(H) × 110(D)

# MCCBs for definite purpose

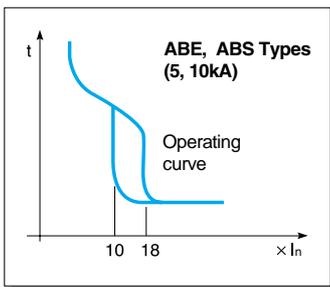
## Motor protection MCCBs

## Thermal magnetic type

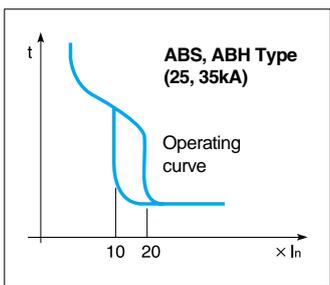
10A to 90A



<b>Type of trip unit</b>	Fixed thermal and magnetic trip Thermal-magnetic ; ABH53, ABH103, ABS103 types Hydraulic-magnetic ; ABE53, ABE63, ABE103, ABS53, ABS63 types
<b>Rated current, I<sub>n</sub></b>	10, 12, 16, 24, 32, 45, 60, 75, 90 ... non-adjustable
<b>Magnetic Trip</b>	(10 to 20) × I <sub>n</sub> ... non-adjustable
<b>Connection</b>	Front (standard) Rear (optional)
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC947-2



※ Accessories details (p. 33)



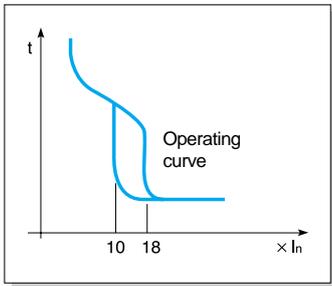
※ Accessories details (p. 36)

### Accessories available

- Auxiliary switch
- Alarm Switch
- Shunt trip
- Undervoltage release
- Manual rotary handle
- Terminal cover
- Insulational barrier
- Rear connection unit

Catalog No.	for 5kA at 415V, 3 pole	Breaking capacity, I <sub>cu</sub>	
10A	ABE53bM/10	220/240V	10kA
12A	ABE53bM/12	380/415V	7.5/5kA
16A	ABE53bM/16	440/460V	5kA
24A	ABE53bM/24	480/500V	2.5kA
32A	ABE53bM/32	600V	2.5kA
45A	ABE53bM/45		
60A	ABE63bM/60		
Catalog No.	for 10kA at 415V, 3 pole	Breaking capacity, I <sub>cu</sub>	
10A	ABS53bM/10	220/240V	25kA
12A	ABS53bM/12	380/415V	14/10kA
16A	ABS53bM/16	440/460V	10kA
24A	ABS53bM/24	480/500V	7.5kA
32A	ABS53bM/32	600V	5kA
45A	ABS53bM/45		
60A	ABS63bM/60		
75A	ABE103bM/75		
90A	ABE103bM/90		
Catalog No.	for 25kA at 415V, 3 pole	Breaking capacity, I <sub>cu</sub>	
16A	ABH53bM/16	220/240V	50kA
24A	ABH53bM/24	380/415V	25kA
32A	ABH53bM/32	440/460V	25kA
45A	ABH53bM/45	480/500V	14kA
60A	ABS103bM/60	600V	10kA
75A	ABS103bM/75		
90A	ABS103bM/90		
Catalog No.	for 35kA at 415V, 3 pole	Breaking capacity, I <sub>cu</sub>	
60A	ABH103bM/60	220/240V	65kA
75A	ABH103bM/75	380/415V	35kA
90A	ABH103bM/90	440/460V	35kA
		480/500V	25kA
		600V	18kA
Dimension (mm)	3 pole	5kA & 10kA	25kA & 35kA
		75(W) × 130(H) × 60(D)	90(W) × 155(H) × 60(D)

## 125A to 225A



<b>Type of trip unit</b>	Fixed thermal and magnetic trip		
<b>Rated current, In</b>	125, 150, 175, 225 ... non-adjustable		
<b>Magnetic Trip</b>	(10 to 16) × In ... non-adjustable		
<b>Connection</b>	Front (standard) Rear (optional)		
<b>Mounting</b>	Fixed only		
<b>Category of use</b>	Type A according to IEC947-2		
<b>Breaking capacity, Icu</b>	Ics = 50% of Icu		
<b>220/240V</b>	35kA	50kA	65kA
<b>380/415V</b>	18kA	25kA	35kA
<b>440/460V</b>	18kA	25kA	35kA
<b>480/500V</b>	10kA	14kA	25kA
<b>600V</b>	7.5kA	10kA	18kA

Catalog No.	for 18kA at 415V, 3 pole
125A	ABE203bM/125
150A	ABE203bM/150
175A	ABE203bM/175
225A	ABE203bM/225
for 25kA at 415V, 3 pole	
125A	ABS203bM/125
150A	ABS203bM/150
175A	ABS203bM/175
225A	ABS203bM/225
for 35kA at 415V, 3 pole	
125A	ABH203bM/125
150A	ABH203bM/150
175A	ABH203bM/175
225A	ABH203bM/225

<b>Accessories available</b>	Auxiliary switch
※ Accessories details (p.39)	Alarm Switch
	Shunt trip
	Undervoltage trip
	Manual rotary handle
	Terminal cover
	Insulational barrier
	Rear connection unit

<b>Dimension(mm) 3 pole</b>	105(W) × 165(H) × 60(D)
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# MCCBs for definite purpose

## Key-locking Breakers

up to 150A



### Off position lock

Key-locking breakers are used to prevent the breakers from unauthorized closing when the breakers are tripped or opened. The lock is built in the right-hand of the breaker handle as shown in the pictures.

<b>Rated current, I<sub>n</sub></b>	30, 60, 100, 150A (Non-adjustable)
<b>Reference temperature</b>	55°C
<b>Type of trip unit</b>	Thermal-magnetic
<b>Number of poles</b>	3 pole
<b>Connection</b>	Front (standard)
<b>Type of terminal</b>	Lug
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC947-2
<b>Breaking capacity, I<sub>cu</sub></b>	I <sub>cs</sub> = 100% of I <sub>cu</sub>
<b>Type</b>	<b>ABS</b>
<b>220V</b>	25kA
<b>380V</b>	20kA

Catalog No.	for 5kA at 415V ... type ABS
<b>I<sub>n</sub></b>	<b>3pole</b>
<b>30A</b>	ABS103k/30
<b>60A</b>	ABS103k/60
<b>100A</b>	ABS103k/100
<b>150A</b>	ABS203k/150

<b>Accessories</b>	Auxiliary switch Alarm Switch Terminal cover (supplied as standard) Sealing plate (supplied as standard) Key (supplied as standard)
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<b>Dimensions (mm)</b>	<b>ABS103k</b>	90(W) × 155(H) × 60(D)
	<b>ABS203k</b>	105(W) × 165(H) × 60(D)

Certificate

CE

# ELCBs

## Descriptions

- Protection against overload, short-circuit and ground fault.
- Offering economical solution with compact and increased interrupting capacities compared to the existing breakers.
- Employing a fixed thermal and fixed magnetic trip.
- Frames made of rigid materials of engineering plastics
- Offering the physically same size with MCCBs.

rear connection



Terminal cover



Manual rotary handle



Electrical auxiliaries  
- auxiliary switch  
- alarm switch



Earthleakage  
trip indicator

Trip test button  
- Earthleakage

Residual current  
selector

Trip test button  
- mechanical



Insulation barrier

# ELCBs

## 30AF



MCCBs

physically interchangeable with ELCBs.

\* see details (p. 29)

<b>Types of the protection</b>	Overload, short-circuit and ground fault
<b>Rated operational voltage</b>	176 to 510V, 50/60Hz
<b>Rated current, <math>I_n</math></b>	5, 10, 15, 20, 30A ... non-adjustable
<b>Rated residual current, <math>I_{\Delta n}</math></b>	0.03A ... non-adjustable
	0.1-0.2-0.5A ... adjustable
<b>Residual non-operating current</b>	$0.5 \times I_{\Delta n}$
<b>Residual current off-time at <math>I_{\Delta n}</math></b>	$\leq 0.1$ sec
<b>Magnetic trip current</b>	$(8 \text{ to } 16) \times I_n$ ... non-adjustable
<b>Type of trip unit</b>	Hydraulic-magnetic for overcurrent pick-up
	Electronic for earthleakage pick-up
<b>Number of poles</b>	3 pole
<b>Connection</b>	Front (standard)
	Rear (optional)
<b>Mounting</b>	Fixed only
<b>Breaking capacity, <math>I_{cu}</math></b>	$I_{cs} = 50\%$ of $I_{cu}$

Type	EBS	EBH
220/240V	10kA	25kA
415/460V	5kA	10kA

Catalog No.	for $I_{\Delta n}=0.03A$ ( 30mA )	
	5kA	10kA
<b><math>I_n</math></b>		
5A	EBS33b/5/30	EBH33b/5/30
10A	EBS33b/10/30	EBH33b/10/30
15A	EBS33b/15/30	EBH33b/15/30
20A	EBS33b/20/30	EBH33b/20/30
30A	EBS33b/30/30	EBH33b/30/30
	for $I_{\Delta n}=0.1-0.2-0.5A$ (100-200-500mA)	
<b><math>I_n</math></b>		
5A	EBS33b/5/100	EBH33b/5/100
10A	EBS33b/10/100	EBH33b/10/100
15A	EBS33b/15/100	EBH33b/15/100
20A	EBS33b/20/100	EBH33b/20/100
30A	EBS33b/30/100	EBH33b/30/100

Note; Breaking capacity at 415VAC.

<b>Optional accessories</b>	Auxiliary switch
* see details (p. 76)	Alarm Switch
	Terminal cover
	Rear connection unit
	Insulational barrier
	(standard for line side only)

<b>Dimensions(mm)</b>	<b>3pole</b>	75(W) × 130(H) × 60(D)
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# 50AF & 60AF



MCCBs

physically interchangeable with ELCBs

\* see details (p. 30)

<b>Types of the protection</b>	Overload, short-circuit and ground fault
<b>Rated operational voltage</b>	176 to 510V, 50/60Hz
<b>Rated current, I<sub>n</sub></b>	5, 10, 15, 20, 30, 40, 50, 60A ... non-adjustable
<b>Rated residual current, I<sub>Δn</sub></b>	0.03A ... non-adjustable 0.1-0.2-0.5A ... adjustable
<b>Residual non-operating current</b>	0.5 x I <sub>Δn</sub>
<b>Residual current off-time at I<sub>Δn</sub></b>	≤ 0.1 sec
<b>Magnetic trip current</b>	(8 to 16) x I <sub>n</sub> ... Non-adjustable
<b>Type of trip unit</b>	Hydraulic-magnetic for overcurrent pick-up (Thermal -magnetic for EBH type only) Electronic for earthleakage pick-up
<b>Number of poles</b>	3 pole
<b>Connection</b>	Front (standard) Rear (optional)
<b>Mounting</b>	Fixed only
<b>Breaking capacity, I<sub>cu</sub></b>	I <sub>cs</sub> = 50% of I <sub>cu</sub>

Type	EBE	EBS	EBH
220/240V	10kA	25kA	50kA
415/460V	5kA	10kA	25kA

Catalog No.	for I <sub>Δn</sub> =0.03A (30mA)				
	I <sub>n</sub>	5kA(2pole)	5kA	10kA	25kA
5A	EBE52b/5/30	EBE53b/5/30	EBS53b/5/30	N.A.	N.A.
10A	EBE52b/10/30	EBE53b/10/30	EBS53b/10/30	N.A.	N.A.
15A	EBE52b/15/30	EBE53b/15/30	EBS53b/15/30	N.A.	N.A.
20A	EBE52b/20/30	EBE53b/20/30	EBS53b/20/30	N.A.	N.A.
30A	EBE52b/30/30	EBE53b/30/30	EBS53b/30/30	N.A.	N.A.
40A	EBE52b/40/30	EBE53b/40/30	EBS53b/40/30	EBH53b/40/30	N.A.
50A	EBE52b/50/30	EBE53b/50/30	EBS53b/50/30	EBH53b/50/30	N.A.
60A	N.A.	EBE63b/60/30	EBS63b/60/30	N.A.	N.A.
for I <sub>Δn</sub> =0.1-0.2-0.5A (100-200-500mA)					
I <sub>n</sub>	5kA(2pole)	5kA	10kA	10kA	
5A	EBE52b/5/100	EBE53b/5/100	EBS53b/5/100	N.A.	N.A.
10A	EBE52b/10/100	EBE53b/10/100	EBS53b/10/100	N.A.	N.A.
15A	EBE52b/15/100	EBE53b/15/100	EBS53b/15/100	N.A.	N.A.
20A	EBE52b/20/100	EBE53b/20/100	EBS53b/20/100	N.A.	N.A.
30A	EBE52b/30/100	EBE53b/30/100	EBS53b/30/100	N.A.	N.A.
40A	EBE52b/40/100	EBE53b/40/100	EBS53b/40/100	EBH53b/40/100	N.A.
50A	EBE52b/50/100	EBE53b/50/100	EBS53b/50/100	EBH53b/50/100	N.A.
60A	N.A.	EBE63b/60/100	EBS63b/60/100	N.A.	N.A.

Note: Breaking capacity at 415VAC.

### Optional accessories

- Auxiliary switch
- Alarm Switch
- Manual rotary handle
- Terminal cover
- Rear connection unit
- Insulational barrier (standard for line side only)

\* see details (p. 76)

Dimensions (mm)	3pole	Types EBE, EBS	Types EBH
		75(W) x 130(H) x 60(D)	90(W) x 155(H) x 60(D)

# ELCBs

## 100AF



MCCBs

physically interchangeable with ELCBs.

※ see details (p. 31)

<b>Types of the protection</b>	Overload, short-circuit and ground fault
<b>Rated operational voltage</b>	176 to 510V, 50/60Hz 88 to 242Vac for EBE102b only
<b>Rated current, I<sub>n</sub></b>	40, 50, 60, 75, 100A ... non-adjustable
<b>Rated residual current, I<sub>Δn</sub></b>	0.03A ... non-adjustable 0.1-0.2-0.5A ... adjustable
<b>Residual non-operating current</b>	0.5 × I <sub>Δn</sub>
<b>Residual current off-time at I<sub>Δn</sub></b>	≤ 0.1 sec
<b>Magnetic trip current</b>	(8 to 16) × I <sub>n</sub> ... non-adjustable
<b>Type of trip unit</b>	Thermal -magnetic for overcurrent pick-up (Hydraulic-magnetic for EBE type only) Electronic for earth leakage pick-up
<b>Number of poles</b>	3 pole
<b>Connection</b>	Front (standard) Rear (optional)
<b>Mounting</b>	Fixed only
<b>Breaking capacity, I<sub>cu</sub></b>	I <sub>cs</sub> = 50% of I <sub>cu</sub>

Type	EBE	EBS	EBH
220/240V	25kA	50kA	65kA
415/460V	10kA	25kA	35kA

Catalog No.	for I <sub>Δn</sub> =0.03A ( 30mA )			
	I <sub>n</sub>	10kA(2pole)	10kA	25kA
40A	N.A.	N.A.	EBS103b/40/30	N.A.
50A	N.A.	N.A.	EBS103b/50/30	N.A.
60A	EBE102b/60/30	EBE103b/60/30	EBS103b/60/30	EBH103b/60/30
75A	EBE102b/75/30	EBE103b/75/30	EBS103b/75/30	EBH103b/75/30
100A	EBE102b/100/30	EBE103b/100/30	EBS103b/100/30	EBH103b/100/30
Catalog No.	for I <sub>Δn</sub> =0.1-0.2-0.5A (100-200-500mA)			
	I <sub>n</sub>	10kA(2pole)	10kA	25kA
40A	N.A.	N.A.	EBS103b/40/100	N.A.
50A	N.A.	N.A.	EBS103b/50/100	N.A.
60A	EBE102b/60/100	EBE103b/60/100	EBS103b/60/100	EBH103b/60/100
75A	EBE102b/75/100	EBE103b/75/100	EBS103b/75/100	EBH103b/75/100
100A	EBE102b/100/100	EBE103b/100/100	EBS103b/100/100	EBH103b/100/100

Note; Breaking capacity at 415VAC.

<b>Optional accessories</b>	Auxiliary switch
※ see details (p. 76)	Alarm Switch
	Manual rotary handle
	Terminal cover
	Rear connection unit
Insulational barrier	(standard for line side only)

Dimensions (mm)	3pole	Types EBE, EBS	Types EBH
		75(W) × 130(H) × 60(D)	90(W) × 155(H) × 60(D)

# 225AF



MCCBs

physically interchangeable with ELCBs.

※ see details (p. 32)

<b>Types of the protection</b>	Overload, short-circuit and ground fault
<b>Rated operational voltage</b>	176 to 510V, 50/60Hz
<b>Rated current, I<sub>n</sub></b>	125, 150, 175, 200, 225A ... non-adjustable
<b>Rated residual current, I<sub>Δn</sub></b>	0.03A ... non-adjustable 0.1-0.2-0.5A ... adjustable
<b>Residual non-operating current</b>	0.5 × I <sub>Δn</sub>
<b>Residual current off-time at I<sub>Δn</sub></b>	≤ 0.1 sec
<b>Magnetic trip current</b>	(8 to 16) × I <sub>n</sub> ... non-adjustable
<b>Type of trip unit</b>	Thermal -magnetic for overcurrent pick-up Electronic for earth leakage pick-up
<b>Number of poles</b>	3 pole
<b>Connection</b>	Front (standard) Rear (optional)
<b>Mounting</b>	Fixed only
<b>Breaking capacity, I<sub>cu</sub></b>	I <sub>cs</sub> = 50% of I <sub>cu</sub>

Type	EBE	EBS	EBH
220/240V	35kA	50kA	65kA
415/460V	18kA	25kA	3kA

Catalog No.	for I <sub>Δn</sub> =0.03A ( 30mA )			
	I <sub>n</sub>	18kA	25kA	35kA
	125A	EBE203b/125/30	EBS203b/125/30	EBH203b/125/30
	150A	EBE203b/150/30	EBS203b/150/30	EBH203b/150/30
	175A	EBE203b/175/30	EBS203b/175/30	EBH203b/175/30
	200A	EBE203b/200/30	EBS203b/200/30	EBH203b/200/30
	225A	EBE203b/225/30	EBS203b/225/30	EBH203b/225/30
Catalog No.	for I <sub>Δn</sub> =0.1-0.2-0.5A (100-200-500mA)			
	I <sub>n</sub>	18kA	25kA	35kA
	40A	EBE203b/125/100	EBS203b/125/100	EBH203b/125/100
	50A	EBE203b/150/100	EBS203b/150/100	EBH203b/150/100
	60A	EBE203b/175/100	EBS203b/175/100	EBH203b/175/100
	75A	EBE203b/200/100	EBS203b/200/100	EBH203b/200/100
	100A	EBE203b/225/100	EBS203b/225/100	EBH203b/225/100

Note; Breaking capacity at 415VAC.

<b>Optional accessories</b>	Auxiliary switch
※ see details (p. 76)	Manual rotary handle
	Terminal cover
	Rear connection unit
	Insulational barrier (standard for line side only)

<b>Dimensions(mm)</b>	<b>3pole</b>	105(W) × 165(H) × 60(D)
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# ELCBs

## 400AF



MCCBs

physically interchangeable with ELCBs.

※ see details (p. 50)

<b>Types of the protection</b>	Overload, short-circuit and ground fault
<b>Rated operational voltage</b>	176 to 510V, 50/60Hz
<b>Types of the protection</b>	Overload, short-circuit and ground fault
<b>Rated operational voltage</b>	176 to 510V, 50/60Hz
<b>Rated current, I<sub>n</sub></b>	250, 300, 350, 400A ... non-adjustable
<b>Rated residual current, I<sub>Δn</sub></b>	0.03A ... non-adjustable 0.1-0.2-0.5A ... adjustable
<b>Residual non-operating current</b>	0.5 × I <sub>Δn</sub>
<b>Residual current off-time at I<sub>Δn</sub></b>	≤ 0.1 sec
<b>Magnetic trip current</b>	(8 to 16) × I <sub>n</sub> ... non-adjustable
<b>Type of trip unit</b>	Thermal -magnetic for overcurrent pick-up Electronic for earth leakage pick-up
<b>Number of poles</b>	3 pole
<b>Connection</b>	Front (standard) Rear (optional)
<b>Mounting</b>	Fixed only
<b>Breaking capacity, I<sub>cu</sub></b>	I <sub>cs</sub> = 50% of I <sub>cu</sub>

Type	EBE	EBS	EBH	EBL
220/240V	35kA	50kA	85kA	125kA
415/460V	25kA	35kA	50kA	85kA

Catalog No.	for I <sub>Δn</sub> =0.03A (30mA)				
	In	25kA	35kA	50kA	85kA
	250A	EBE403b/250/30	EBS403b/250/30	EBH403b/250/30	EBL403b/250/30
	300A	EBE403b/300/30	EBS403b/300/30	EBH403b/300/30	EBL403b/300/30
	350A	EBE403b/350/30	EBS403b/350/30	EBH403b/350/30	EBL403b/350/30
	400A	EBE403b/400/30	EBS403b/400/30	EBH403b/400/30	EBL403b/400/30
Catalog No.	for I <sub>Δn</sub> =0.1-0.2-0.5A (100-200-500mA)				
	In	25kA	35kA	50kA	85kA
	250A	EBE403b/250/100	EBS403b/250/100	EBH403b/250/100	EBL403b/250/100
	300A	EBE403b/300/100	EBS403b/300/100	EBH403b/300/100	EBL403b/300/100
	350A	EBE403b/350/100	EBS403b/350/100	EBH403b/350/100	EBL403b/350/100
	400A	EBE403b/400/100	EBS403b/400/100	EBH403b/400/100	EBL403b/400/100

Note; Breaking capacity at 415VAC.

<b>Optional accessories</b>	Auxiliary switch
※ see details (p. 77)	Alarm Switch
	Shunt trip
	Undervoltage trip
	Manual rotary handle
	Terminal cover
	Rear connection unit
	Insulational barrier (standard for line side only)

<b>Dimensions(mm)</b>	<b>3pole</b>	140(W) × 257(H) × 110(D)
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# 800AF



MCCBs

physically interchangeable with ELCBs.

※ see details (p. 51)

<b>Types of the protection</b>	Overload, short-circuit and ground fault
<b>Rated operational voltage</b>	176 to 510V, 50/60Hz
<b>Rated current, <math>I_n</math></b>	500, 600, 700, 800A ... non-adjustable
<b>Rated residual current, <math>I_{\Delta n}</math></b>	0.03A ... non-adjustable 0.1-0.2-0.5A ... adjustable
<b>Residual non-operating current</b>	$0.5 \times I_{\Delta n}$
<b>Residual current off-time at <math>I_{\Delta n}</math></b>	$\leq 0.1$ sec
<b>Magnetic trip current</b>	$(8 \text{ to } 16) \times I_n$ ... non-adjustable
<b>Type of trip unit</b>	Thermal -magnetic for overcurrent pick-up Electronic for earth leakage pick-up

<b>Number of poles</b>	3 pole
<b>Connection</b>	Front (standard) Rear (optional)

<b>Mounting</b>	Fixed only
<b>Breaking capacity, <math>I_{cu}</math></b>	$I_{cs} = 50\%$ of $I_{cu}$

Type	EBE	EBS	EBL
220/240V	50kA	100kA	125kA
415/460V	35kA	50kA	85kA

Catalog No.	for $I_{\Delta n}=0.03A$ (30mA)		
	$I_n$	35kA	50kA
500A	EBE803b/500/30	EBS803b/500/30	EBL803b/500/30
600A	EBE803b/600/30	EBS803b/600/30	EBL803b/600/30
700A	EBE803b/700/30	EBS803b/700/30	EBL803b/700/30
800A	EBE803b/800/30	EBS803b/800/30	EBL803b/800/30
for $I_{\Delta n}=0.1-0.2-0.5A$ (100-200-500mA)			
$I_n$	35kA	50kA	85kA
500A	EBE803b/500/100	EBS803b/500/100	EBL803b/500/100
600A	EBE803b/600/100	EBS803b/600/100	EBL803b/600/100
700A	EBE803b/700/100	EBS803b/700/100	EBL803b/700/100
800A	EBE803b/800/100	EBS803b/800/100	EBL803b/800/100

Note: Breaking capacity at 415VAC.

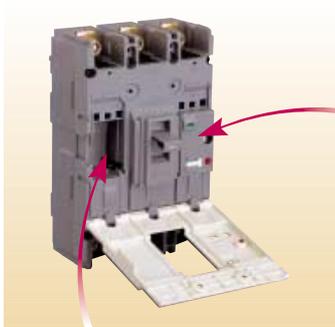
<b>Optional accessories</b>	Auxiliary switch Alarm Switch Shunt trip Undervoltage trip Manual rotary handle Terminal cover Rear connection unit Insulational barrier (standard for line side only)
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※ see details (p. 77)

<b>Dimensions(mm)</b>	<b>3pole</b>	210(W) × 280(H) × 110(D)
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### Electrical auxiliaries

up to 225AF



Right-hand seat  
(not available)

Left-hand seat

#### Maximum possibilities

##### Left-hand seat

Option of connecting  
AX or AL or XL

This seat is not  
available for 2-pole breakers

##### Right-hand seat

This seat is not  
available for Earth leakage breakers



Auxiliary Switch, AX



Alarm Switch, AL

#### Catalog No.

##### Applicable breaker types

EBE53b	EBS103b	EBE203b
EBE63b	EBH53b	EBS203b
EBE102b,103b	EBH103b	EBH203b
EBS33b		
EBS53b		
EBS63b		
EBH33b		

AX1E100R AX1H100R AX1H200R

AL1E100R AL1H100R AL1H200R

XL1E100R XL1H100R XL1H200R

page 33	page 36	page 39
page 35	page 38	page 41
page 34	page 37	page 40
page 34	page 37	page 40
page 34	page 37	page 40

#### Auxiliary Switch, AX

Consists of a changeover contact (1NO+NC)  
1 auxiliary switch fit for the left-hand seat  
of a handle

#### Alarm Switch, AL

Consists of a changeover contact (1NO+NC)  
1 alarm switch fit for the left-hand seat  
of a handle

#### Combination Switch, XL

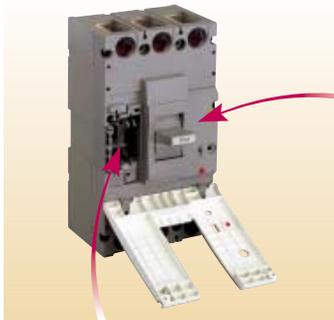
Consists of a auxiliary switch and a alarm  
switch (2NO+NC)  
1 combination switch fit for the left-hand  
seat of a handle

#### Other accessories

Reference page no. for more detail  
Manual rotary handle  
Terminal cover  
Rear connection unit  
Insulational barrier

## Electrical auxiliaries

## Thermal magnetic type



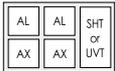
Left-hand seat

Right-hand seat  
(not available)

### Maximum possibilities

#### Left-hand seat

Option of connecting  
2AX and 2AL and SHT or UVT



#### Right-hand seat

This seat is not available for Earth  
leakage breakers

### Catalog No.

#### Auxiliary Switch, AX

**AX1L800** 1 auxiliary switch (1NO+NC)

#### Alarm Switch, AL

**AL1L800** Consists of one change over switch  
1 alarm switch (1NO+NC)

#### Shunt trip, SHT

**ST48CL800** For 24~48V AC/DC common use  
**ST100CL800** For AC100~125/DC100~110V  
**ST200CL800** For AC200~240/DC200~220V  
**ST380AL800** For AC380~460V  
**ST480AL800** For AC480~550V

#### Under voltage trip, UVT

**UV24CL800** For 24V AC/DC common use  
**UV48CL800** For 48V AC/DC common use  
**UV100CL800** For 100~110V AC/DC common use  
**UV200CL800** For 200~220V AC/DC common use  
**UV380AL800** For 380~440V AC  
**UV440AL800** For 440~480V AC

See page 52 for more detail

## Other accessories

Manual rotary handle	See page 53
Terminal cover	See page 54
Insulational barrier	See page 54

# Old type MCCBs

## 30AF to 225AF Hi-MEC series

Frame Size(AF)		30		
Frame Type		ABE	ABS	ABH
Breaking capacity(kA), Icu at 415Vac		1.5	5	10
Number of poles		2, 3	2, 3	2, 3
Type	2 pole	ABE32	ABS32a	ABH32a
	3 pole	ABE33	ABS33a	ABH33a
	4 pole			
Rated current (A)		3, 5, 10, 15, 20, 30		5, 10, 15, 20
In at 40 °C				
<b>Technical data conforming to IEC/EN60947-2</b>				
Rated operational voltage(V), Ue(50/60Hz)		460	600	600
Rated operational voltage(V), Ue(DC)		-	250	250
Rated insulation voltage(V), Ui(50/60Hz)		460	660	660
Rated impulse withstand voltage(kV), Uimp		6	6	6
Ultimate breaking capacity(kA), Icu				
	AC 50/60Hz			
	220/240V	2.5	10	25
	380/415V	1.5	5	14/10
	440/460V	1.5	5	10
	480/500V	-	2.5	7.5
	600V	-	2.5	5
	DC			
	125V	-	5	10
	250V	-	2.5	5
Service breaking capacity(%Icu), Ics		50	50	50
Category of use		A	A	A
Endurance	mechanical	8500	8500	8500
(number of operations)	electrical	1500	1500	1500
<b>Type of trip unit</b>				
Thermal-magnetic release				
Electronic release				
Pre-alarm via LED				
Hydraulic-magnetic release		fixed	fixed	fixed
<b>Accessories</b>				
Electrical auxiliaries	auxiliary switch	-	●	●
	alarm switch	-	●	●
	shunt release	-	●	●
	undervoltage release	-	●	●
External accessories	manual rotary handle	-	●	●
	terminal cover	-	●	●
	Insulation barrier	-	●	●
	rear connection	-	-	-
	mechanical interlock	-	-	-
	remote control	-	-	-
Dimensions (WxHxD mm)	3 pole breaker	75 × 96 × 60	75 × 130 × 60	
Weight(kg)	2 pole	0.3	0.45	0.6
	3 pole	0.5	0.65	0.8
	4 pole			
Reference page No.		80		



50				60		100				225				
ABE	ABS	ABH	ABL	ABE	ABS	ABE	ABS	ABH	ABL	ABE	ABS	ABH	ABL	
5	10	14	65	5	10	10	14	22	65	10	14	45	65	
2, 3	2, 3, 4	2, 3, 4	2, 3, 4	2, 3	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	
ABE52a	ABS52a	ABH52a	ABL52a	ABE62a	ABS62a	ABE102a	ABS102a	ABH102a	ABL102a	ABE202a	ABS202a	ABH202a	ABL202a	
ABE53a	ABS53a	ABH53a	ABL53a	ABE63a	ABS63a	ABE103a	ABS103a	ABH103a	ABL103a	ABE203a	ABS203a	ABH203a	ABL203a	
	ABS54a	ABH54a	ABL54a		ABS64a	ABE104a	ABS104a	ABH104a	ABL104a	ABE204a	ABS204a	ABH204a	ABL204a	
5, 10, 15, 20, 30, 40, 50		15, 20, 30, 40, 50		60		5, 10, 15, 20, 30, 40, 50, 60, 75, 100		15, 20, 30, 40, 50, 60, 75, 100		100, 125, 150, 175, 200, 225				
600	600	600	600	600	600	600	600	600	600	600	600	600	600	
250	250	250	250	250	250	250	250	250	250	250	250	250	250	
660	660	660	660	660	660	660	660	660	660	660	660	660	660	
6	6	6	6	6	6	6	6	6	6	6	6	6	6	
10	25	25	100	10	25	25	25	30	100	18	25	85	125	
5	14/10	14	65	5	14/10	14/10	14	22	65	10	18/14	45	65	
5	10	14	65	5	10	10	14	18	65	10	14	42	65	
2.5	7.5	7.5	42	2.5	7.5	7.5	7.5	14	50/42	7.5	7.5	35	50/42	
2.5	5	7.5	35	2.5	5	5	7.5	14	35	7.5	7.5	25	35	
5	10	15	60	5	10	10	15	20	60	15	15	50	60	
2.5	5	10	40	2.5	5	5	10	10	40	10	10	40	40	
50	50	50	50	50	50	50	50	50	50	50	50	50	50	
A	A	A	A	A	A	A	A	A	A	A	A	A	A	
8500	8500	8500	8500	8500	8500	8500	8500	8500	8500	7000	7000	7000	7000	
1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1000	1000	1000	1000	
		fixed	fixed					fixed	fixed	fixed	fixed	fixed	fixed	
fixed	fixed			fixed	fixed	fixed								
●	●	●	●	●	●	●	●	●	●	●	●	●	●	
●	●	●	●	●	●	●	●	●	●	●	●	●	●	
●	●	●	●	●	●	●	●	●	●	●	●	●	●	
●	●	●	●	●	●	●	●	●	●	●	●	●	●	
●	●	●	●	●	●	●	●	●	●	●	●	●	●	
●	●	●	●	●	●	●	●	●	●	●	●	●	●	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	
75 × 130 × 60		90 × 155 × 60	105 × 165 × 82	75 × 130 × 60		75 × 130 × 60		90 × 155 × 60		105 × 165 × 82		105 × 165 × 60		105 × 165 × 99
0.45	0.6	0.7	1	0.45	0.6	0.6	0.7	0.7	1	1.1	1.1	2.1	2.1	
0.65	0.8	1.1	1.7	0.65	0.8	0.8	1.1	1.1	1.7	1.3	1.3	2.3	2.3	
	1	1.5	2.3		1	1	1.5	1.5	2.3	1.5	1.5	2.5	2.5	
81						82				83				

# Old type MCCBs

## 30AF to 225AF Hi-MEC series

### 30AF



Certificate

CE

<b>Rated current, In</b>	3, 5, 10, 15, 20, 30A (Non-adjustable)
<b>Type of trip unit</b>	Hydraulic-magnetic
<b>Number of poles</b>	2, 3 pole
<b>Connection</b>	Front only
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC60947-2
<b>Breaking capacity, Icu</b>	Ics = 50% of Icu

Type	ABE	ABS	ABH
220/240V	2.5kA	10kA	25kA
380/415V	1.5kA	5kA	14/10kA
440/460V	1.5kA	5kA	10kA
480/500V	-	2.5kA	7.5kA
600V	-	2.5kA	5kA

Catalog No.	for 1.5kA at 415V ... type ABE	
In	2pole	3pole
3A	ABE32/3	ABE33/3
5A	ABE32/5	ABE33/5
10A	ABE32/10	ABE33/10
15A	ABE32/15	ABE33/15
20A	ABE32/20	ABE33/20
30A	ABE32/30	ABE33/30
for 5kA at 415V ... type ABS		
In	2pole	3pole
3A	ABS32a/3	ABS33a/3
5A	ABS32a/5	ABS33a/5
10A	ABS32a/10	ABS33a/10
15A	ABS32a/15	ABS33a/15
20A	ABS32a/20	ABS33a/20
30A	ABS32a/30	ABS33a/30
for 10kA at 415V ... type ABH		
In	2pole	3pole
5A	ABH32a/5	ABH33a/5
10A	ABH32a/10	ABH33a/10
15A	ABH32a/15	ABH33a/15
20A	ABH32a/20	ABH33a/20
30A	ABH32a/30	ABH33a/30

<b>Optional accessories</b>	Auxiliary switch Alarm Switch Shunt trip Undervoltage trip Manual rotary handle Terminal cover Insulational barrier (standard for line side only)
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※ See page (p.84)

※ Accessories for ABE types are not available.

Dimensions(mm)	ABE type	ABS/ABH types
2pole	50(W) × 96(H) × 60(D)	50(W) × 130(H) × 60(D)
3pole	75(W) × 96(H) × 60(D)	75(W) × 130(H) × 60(D)

## 50AF & 60AF



<b>Rated current, In</b>	3, 5, 10, 15, 20, 30A ... non-adjustable
<b>Rated current, In</b>	5, 10, 15, 20, 30, 40, 50, 60 ... non-adjustable
<b>Type of trip unit</b>	Thermal-magnetic for ABH & ABL types Hydraulic-magnetic for ABE & ABS types
<b>Number of poles</b>	2, 3, 4 pole
<b>Connection</b>	Front only
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC60947-2
<b>Breaking capacity, Icu</b>	Ics = 50% of Icu

Type	ABE	ABS	ABH	ABL
<b>220/240V</b>	10kA	25kA	25kA	100kA
<b>380/415V</b>	5kA	14/10kA	14kA	65kA
<b>440/460V</b>	5kA	10kA	14kA	65kA
<b>480/500V</b>	2.5kA	7.5kA	7.5kA	42kA
<b>600V</b>	2.5kA	5kA	7.5kA	35kA

**Certificate**  
CE, Lloyd

### Optional accessories

- Auxiliary switch
    - Alarm Switch
    - Shunt trip
    - Undervoltage trip
    - Manual rotary handle
    - Terminal cover
    - Insulational barrier  
(standard for line side only)
- \* See page (p.84)

### Dimensions

ABE/ABS types	
<b>2pole</b>	50(W) × 130(H) × 60(D)
<b>3pole</b>	75(W) × 130(H) × 60(D)
<b>4pole</b>	100(W) × 130(H) × 60(D)
ABH type	
<b>2pole</b>	60(W) × 155(H) × 60(D)
<b>3pole</b>	90(W) × 155(H) × 60(D)
<b>4pole</b>	120(W) × 155(H) × 60(D)
ABL type	
<b>2pole</b>	74(W) × 165(H) × 82(D)
<b>3pole</b>	105(W) × 165(H) × 82(D)
<b>4pole</b>	140(W) × 165(H) × 82(D)

Catalog No.	for 5kA at 415V ... type ABE		
In	2pole	3pole	
<b>5A</b>	ABE52a/5	ABE53a/5	
<b>10A</b>	ABE52a/10	ABE53a/10	
<b>15A</b>	ABE52a/15	ABE53a/15	
<b>20A</b>	ABE52a/20	ABE53a/20	
<b>30A</b>	ABE52a/30	ABE53a/30	
<b>40A</b>	ABE52a/40	ABE53a/40	
<b>50A</b>	ABE52a/50	ABE53a/50	
<b>60A</b>	ABE62a/60	ABE63a/60	
	for 10kA at 415V ... type ABS		
In	2pole	3pole	4pole
<b>5A</b>	ABS52a/5	ABS53a/5	ABS54a/5
<b>10A</b>	ABS52a/10	ABS53a/10	ABS54a/10
<b>15A</b>	ABS52a/15	ABS53a/15	ABS54a/15
<b>20A</b>	ABS52a/20	ABS53a/20	ABS54a/20
<b>30A</b>	ABS52a/30	ABS53a/30	ABS54a/30
<b>40A</b>	ABS52a/40	ABS53a/40	ABS54a/40
<b>50A</b>	ABS52a/50	ABS53a/50	ABS54a/50
<b>60A</b>	ABS62a/60	ABS63a/60	ABS64a/60
	for 14kA at 415V ... type ABH		
In	2pole	3pole	4pole
<b>15A</b>	ABH52a/15	ABH53a/15	ABH54a/15
<b>20A</b>	ABH52a/20	ABH53a/20	ABH54a/20
<b>30A</b>	ABH52a/30	ABH53a/30	ABH54a/30
<b>40A</b>	ABH52a/40	ABH53a/40	ABH54a/40
<b>50A</b>	ABH52a/50	ABH53a/50	ABH54a/50
	for 65kA at 415V ... type ABL		
In	2pole	3pole	4pole
<b>15A</b>	ABL52a/15	ABL53a/15	ABL54a/15
<b>20A</b>	ABL52a/20	ABL53a/20	ABL54a/20
<b>30A</b>	ABL52a/30	ABL53a/30	ABL54a/30
<b>40A</b>	ABL52a/40	ABL53a/40	ABL54a/40
<b>50A</b>	ABL52a/50	ABL53a/50	ABL54a/50

# Old type MCCBs

## 30AF to 225AF Hi-MEC series

### 100AF



**Certificate**  
CE, Lloyd

#### Optional accessories

- Auxiliary switch
- Alarm Switch
- Shunt trip
- Undervoltage trip
- Manual rotary handle
- Terminal cover
- Insulational barrier  
(standard for line side only)

\* see details (p. 84)

#### Dimensions

##### ABE type

<b>2pole</b>	50(W) × 130(H) × 60(D)
<b>3pole</b>	75(W) × 130(H) × 60(D)
<b>4pole</b>	100(W) × 130(H) × 60(D)

##### ABS/ABH types

<b>2pole</b>	60(W) × 155(H) × 60(D)
<b>3pole</b>	90(W) × 155(H) × 60(D)
<b>4pole</b>	120(W) × 155(H) × 60(D)

##### ABL type

<b>2pole</b>	74(W) × 165(H) × 82(D)
<b>3pole</b>	105(W) × 165(H) × 82(D)
<b>4pole</b>	140(W) × 165(H) × 82(D)

<b>Rated current, In</b>	15, 20, 30, 40, 50, 60, 75, 100( Non-adjustable)
<b>Type of trip unit</b>	Thermal-magnetic for ABH & ABL types Hydraulic-magnetic for ABE & ABS types
<b>Number of poles</b>	2, 3, 4 pole
<b>Connection</b>	Front only
<b>Mounting</b>	Fixed only
<b>Category of use</b>	Type A according to IEC60947-2
<b>Breaking capacity, Icu</b>	Ics = 50% of Icu

Type	ABE	ABS	ABH	ABL
<b>220/240V</b>	25kA	25kA	30kA	100kA
<b>380/415V</b>	14/10kA	14kA	22kA	65kA
<b>440/460V</b>	10kA	14kA	18kA	65kA
<b>480/500V</b>	7.5kA	7.5kA	14kA	50/42kA
<b>600V</b>	5kA	7.5kA	14kA	35kA

Catalog No.	for 5kA at 415V ... type ABE		
In	2pole	3pole	4pole
<b>5A</b>	ABE102a/5	ABE103a/5	ABE104a/5
<b>10A</b>	ABE102a/10	ABE103a/10	ABE104a/10
<b>15A</b>	ABE102a/15	ABE103a/15	ABE104a/15
<b>20A</b>	ABE102a/20	ABE103a/20	ABE104a/20
<b>30A</b>	ABE102a/30	ABE103a/30	ABE104a/30
<b>40A</b>	ABE102a/40	ABE103a/40	ABE104a/40
<b>50A</b>	ABE102a/50	ABE103a/50	ABE104a/50
<b>60A</b>	ABE102a/60	ABE103a/60	ABE104a/60
<b>75A</b>	ABE102a/75	ABE103a/75	ABE104a/75
<b>100A</b>	ABE102a/100	ABE103a/100	ABE104a/100
In	for 14kA at 415V ... type ABS		
In	2pole	3pole	4pole
<b>15A</b>	ABS102a/15	ABS103a/15	ABS104a/15
<b>20A</b>	ABS102a/20	ABS103a/20	ABS104a/20
<b>30A</b>	ABS102a/30	ABS103a/30	ABS104a/30
<b>40A</b>	ABS102a/40	ABS103a/40	ABS104a/40
<b>50A</b>	ABS102a/50	ABS103a/50	ABS104a/50
<b>60A</b>	ABS102a/60	ABS103a/60	ABS104a/60
<b>75A</b>	ABS102a/75	ABS103a/75	ABS104a/75
<b>100A</b>	ABS102a/100	ABS103a/100	ABS104a/100
In	for 22kA at 415V ... type ABH		
In	2pole	3pole	4pole
<b>15A</b>	ABH102a/15	ABH103a/15	ABH104a/15
<b>20A</b>	ABH102a/20	ABH103a/20	ABH104a/20
<b>30A</b>	ABH102a/30	ABH103a/30	ABH104a/30
<b>40A</b>	ABH102a/40	ABH103a/40	ABH104a/40
<b>50A</b>	ABH102a/50	ABH103a/50	ABH104a/50
<b>60A</b>	ABH102a/60	ABH103a/60	ABH104a/60
<b>75A</b>	ABH102a/75	ABH103a/75	ABH104a/75
<b>100A</b>	ABH102a/100	ABH103a/100	ABH104a/100
In	for 65kA at 415V ... type ABL		
In	2pole	3pole	4pole
<b>15A</b>	ABL102a/15	ABL103a/15	ABL104a/15
<b>20A</b>	ABL102a/20	ABL103a/20	ABL104a/20
<b>30A</b>	ABL102a/30	ABL103a/30	ABL104a/30
<b>40A</b>	ABL102a/40	ABL103a/40	ABL104a/40
<b>50A</b>	ABL102a/50	ABL103a/50	ABL104a/50
<b>60A</b>	ABL102a/60	ABL103a/60	ABL104a/60
<b>75A</b>	ABL102a/75	ABL103a/75	ABL104a/75
<b>100A</b>	ABL102a/100	ABL103a/100	ABL104a/100

# 225AF



**Certificate**  
CE, KEMA, Lloyd

### Optional accessories

- Auxiliary switch
  - Alarm Switch
  - Shunt trip
  - Undervoltage trip
  - Manual rotary handle
  - Terminal cover
  - Insulational barrier  
(standard for line side only)
- ※ see details (p. 84)

<b>Rated current, In</b>	125, 150, 175, 200, 225A ( Non-adjustable)			
<b>Type of trip unit</b>	Thermal-magnetic for ABH & ABL types			
<b>Number of poles</b>	2, 3, 4 pole			
<b>Connection</b>	Front only			
<b>Mounting</b>	Fixed only			
<b>Category of use</b>	Type A according to IEC60947-2			
<b>Breaking capacity, Icu</b>	Ics = 50% of Icu			
<b>Type</b>	<b>ABE</b>	<b>ABS</b>	<b>ABH</b>	<b>ABL</b>
<b>220/240V</b>	18kA	25kA	85kA	125kA
<b>380/415V</b>	10kA	18/14kA	45kA	65kA
<b>440/460V</b>	10kA	14kA	42kA	65kA
<b>480/500V</b>	7.5kA	7.5kA	35kA	50/42kA
<b>600V</b>	7.5kA	7.5kA	25kA	35kA

Catalog No.	for 5kA at 415V ... type ABE		
In	2pole	3pole	4pole
125A	ABE202a/125	ABE203a/125	ABE204a/125
150A	ABE202a/150	ABE203a/150	ABE204a/150
175A	ABE202a/175	ABE203a/175	ABE204a/175
200A	ABE202a/200	ABE203a/200	ABE204a/200
225A	ABE202a/225	ABE203a/225	ABE204a/225
for 14kA at 415V ... type ABS			
In	2pole	3pole	4pole
125A	ABS202a/125	ABS203a/125	ABS204a/125
150A	ABS202a/150	ABS203a/150	ABS204a/150
175A	ABS202a/175	ABS203a/175	ABS204a/175
200A	ABS202a/200	ABS203a/200	ABS204a/200
225A	ABS202a/225	ABS203a/225	ABS204a/225
for 45kA at 415V ... type ABH			
In	2pole	3pole	4pole
125A	ABH202a/12	ABH203a/125	ABH204a/125
150A	ABH202a/150	ABH203a/150	ABH204a/150
175A	ABH202a/175	ABH203a/175	ABH204a/175
200A	ABH202a/200	ABH203a/200	ABH204a/200
225A	ABH202a/225	ABH203a/225	ABH204a/225
for 65kA at 415V ... type ABL			
In	2pole	3pole	4pole
125A	ABL202a/125	ABL203a/125	ABL204a/125
150A	ABL202a/150	ABL203a/150	ABL204a/150
175A	ABL202a/175	ABL203a/175	ABL204a/175
200A	ABL202a/200	ABL203a/200	ABL204a/200
225A	ABL202a/225	ABL203a/225	ABL204a/225

Dimensions(mm)	ABE/ABS types	ABH/ABL types
2/3pole	105(W) × 165(H) × 60(D)	105(W) × 165(H) × 99(D)
4pole	140(W) × 165(H) × 60(D)	140(W) × 165(H) × 99(D)

# Old type MCCBs

## 30AF to 225AF Hi-MEC series | Accessories

### Electrical auxiliaries



Left-hand seat

Right-hand seat

#### When ordering electrical auxiliaries specify followings

- (1) type of the auxiliary
- (2) type of the breaker ... catalog no.
- (3) position to install ... left or right
- (4) voltage, if necessary.

#### Maximum possibilities

##### Left-hand seat

Option of connecting AX or AL or XL  
This seat is not available for 2-pole breakers

##### Right-hand seat

Option of connecting AX or AL or XL or SHT or UVT  
This seat is not available for Earth leakage breakers



Auxiliary Switch, AX



Alarm Switch, AL



Shunt Trip, SHT



Under Voltage Trip, UVT

#### Auxiliary Switch, AX

Signals the contact position of the breaker  
-opening by manual or fault  
-closing  
Consists of a changeover contact (1NO+NC)

#### Alarm Switch, AL

Signals the contact position of the breaker  
- tripping by manual or fault  
- not operated by normal opening or closing of a breaker  
Consists of a changeover contact (1NO+NC)

#### Combination Switch, XL

Consists of a auxiliary switch and a alarm switch (2NO+NC)

#### Shunt Trip, SHT

Trips the breaker when any ac(dc) voltage between 85(75) and 110(125)% of nominal control voltage is applied.  
Each unit is fitted into the right-hand seat of a handle.  
Not applicable to Earth leakage breakers  
Available operating voltages  
For 12V AC/DC common use  
For 24V AC/DC common use  
For 48V AC/DC common use  
For 60V AC/DC common use  
For AC100~125V/DC100~110V  
For AC200~240V/DC200~220V  
For 250V AC/DC common use  
For 380~450V AC  
For 440~480V AC  
For 500~550V AC  
For 125V DC  
For 240V DC

#### Under Voltage Trip, UVT

Trips the breaker when control voltage disappears or falls.  
Each unit is fitted into the right-hand seat of a handle.  
Not applicable to Earth leakage breakers  
For 24V AC/DC common use  
For 48V AC/DC common use  
For 100~110V AC/DC common use  
For 200~220V AC/DC common use  
For 380~440V AC  
For 440~480V AC

## External accessories



Insulation Barriers



Terminal Covers



Manual rotary handle

### Insulation Barriers

These are partitions for the insulation between the phases.  
Barriers for the line side of the breaker are supplied as standard.  
Barriers for the load side are optional.  
When ordering specify the type of the breaker.

### Terminal Covers

These are applied to the line/load side of the breaker to prevent accidental contact with live parts.  
Long and short types are available. When ordering specify the type of the breaker.

### Manual Rotary Handles --- Direct Mounting types

#### Catalog No.

	<i>description</i>	<i>*application to</i>
N-30S	<i>Vertical type</i>	ABS33a, ABH33a, ABE53a, ABS53a ABE63a, ABS63a, ABE103a
N-30R	Horizontal (ON in righthand) type	
N-30L	Horizontal (ON in lefthand) type	
N-40S	<i>Vertical type</i>	ABH53a, ABS103a, ABH103a
N-40R	Horizontal (ON in righthand) type	
N-40L	Horizontal (ON in lefthand) type	
N-50S	<i>Vertical type</i>	ABE203a, ABS203a
N-50R	Horizontal (ON in righthand) type	
N-50L	Horizontal (ON in lefthand) type	
N-55S	<i>Vertical type</i>	ABL53a, ABL103a
N-55R	Horizontal (ON in righthand) type	
N-55L	Horizontal (ON in lefthand) type	
N-60S	<i>Vertical type</i>	ABH203a, ABL203a
N-60R	Horizontal (ON in righthand) type	
N-60L	Horizontal (ON in lefthand) type	

Note: \* Applicable type names are for 3 pole MCCBs.  
2 and 4 pole MCCBs use the same handles with 3 pole MCCBs.

# Residential Breakers

DIN rail mounting

Miniature circuit breakers, BKN type



Certificate

CE

## Technical data ... MCB

<b>Standard</b>	Confirming to IEC60898	
<b>Protection</b>	Against overload and short circuit	
<b>Rated current In</b>	1, 2, 3, 4, 6, 10, 16, 20, 25, 32, 40, 50, 63A	
<b>Rated voltage</b>	240/415VAC	
<b>Breaking capacity</b>	6kA for 1pole & 1 to 63A of 2,3,4pole	
<b>Characteristic</b>	B, C, D curve (magnetic trip between 5 and 10 × In)	
<b>Number of poles</b>	1P, 1P+N, 2P, 3P, 3P+N and 4P	
<b>Type of trip</b>	Thermal-magnetic release	
<b>Type of terminal</b>	Lug type	
<b>Terminal capacity</b>	Cables up to 25mm <sup>2</sup>	
<b>Installation</b>	Mounting on 35mm DIN rail	
<b>Width</b>	17.5mm per pole	
<b>Electrical endurance</b>		
<b>In</b>	<b>1 ... 32A</b>	<b>40 ... 63A</b>
<b>Endurance</b>	6000 cycles	6000 cycles
<b>Max. frequency (Cycles/hour)</b>	240	120



## Optional accessories ... Auxiliary switch, AX

<b>Composition</b>	consists of 1 changeover contact.	
<b>Rating</b>	<b>AC circuit</b>	<b>DC circuit</b>
	6A at 240VAC	2A at 48VDC
	3A at 415VAC	1A at 125VDC
<b>Type of terminal</b>	Lug type	
<b>Terminal capacity</b>	Cables up to 2.5mm <sup>2</sup>	
<b>Width</b>	9mm	



## Catalog No.

### MCB 6kA at 240VAC C curve

In	1 pole	1pole+N
1A	BKNC611	BKNC61N1
2A	BKNC612	BKNC61N2
3A	BKNC613	BKNC61N3
4A	BKNC614	BKNC61N4
6A	BKNC616	BKNC61N6
10A	BKNC6110	BKNC61N10
16A	BKNC6116	BKNC61N16
20A	BKNC6120	BKNC61N20
25A	BKNC6125	BKNC61N25
32A	BKNC6132	BKNC61N32
40A	BKNC6140	BKNC61N40
50A	BKNC6150	BKNC61N50
63A	BKNC6163	BKNC61N63



### MCB 6kA at 240/415VAC C curve

In	2 pole	3 pole	3pole+N	4 pole
1A	BKNC621	BKNC631	BKNC63N1	BKNC641
2A	BKNC622	BKNC632	BKNC63N2	BKNC642
3A	BKNC623	BKNC633	BKNC63N3	BKNC643
4A	BKNC624	BKNC634	BKNC63N4	BKNC644
6A	BKNC626	BKNC636	BKNC63N6	BKNC646
10A	BKNC6210	BKNC6310	BKNC63N10	BKNC6410
16A	BKNC6216	BKNC6316	BKNC63N16	BKNC6416
20A	BKNC6220	BKNC6320	BKNC63N20	BKNC6420
25A	BKNC6225	BKNC6325	BKNC63N25	BKNC6425
32A	BKNC6232	BKNC6332	BKNC63N32	BKNC6432
40A	BKNC6240	BKNC6340	BKNC63N40	BKNC6440

### MCB 4.5kA at 240/415VAC C curve

In	2 pole	3 pole	3pole+N	4 pole
50A	BKNC6250	BKNC6350	BKNC63N50	BKNC6450
63A	BKNC6263	BKNC6363	BKNC63N63	BKNC6463



### Auxiliary switch 1c contact

1EA	AX1BKN
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# Residential Breakers

DIN rail mounting

Residual current circuit breakers, RKN & KGR type



RKN, 4pole



RKN, 2pole



KGR, 2pole

## Technical data

Type	RKN	KGR
Standard	Confirming to IEC61008	KSC4613
Protection	Ground fault	Ground fault and Overcurrent
Rated current, $I_n$	25, 32, 40, 63A	15, 20, 30A
Number of poles	2(1+N), 4(3+N)pole	2 pole
Rated sensitivity currents, $I_{\Delta n}$	30, 100, 300mA	15, 30mA
Rated residual non-operating current	$0.5 \times I_{\Delta n}$	$0.5 \times I_{\Delta n}$
Rated voltages	2pole	240VAC
	4pole	240/415VAC
Rated residual non-operating current		110/220VAC
Residual current off-time at $I_{\Delta n}$	$\leq 0.1s$	$\leq 0.03s$
Rated making capacity, $I_m$	500A for $I_n=25, 32, 40A$	
	630A for $I_n=63A$	
Rated conditional short-circuit current, $I_{nc}$	1500A for $I_n=25, 32, 40A$	$I_{cu}=1.5kA$
	3000A for $I_n=63A$	
Type of trip	Electro-magnetic release	Electronic Bimetalic to overcurrent
Type of terminal	Lug type	Clamp type
Terminal capacity	Cables up to 35mm <sup>2</sup>	Cables up to 25mm <sup>2</sup> (solid)
Installation	35mm DIN rail	35mm DIN rail
Slot size		45mm 45mm

## Catalog No.

### Type RKN

$I_n$	2 pole, $I_{\Delta n}=30mA$	4 pole, $I_{\Delta n}=30mA$
25A	RKN622530	RKN642530
32A	RKN623230	RKN643230
40A	RKN624030	RKN644030
63A	RKN626330	RKN646330
$I_n$	2 pole, $I_{\Delta n}=100mA$	4 pole, $I_{\Delta n}=100mA$
25A	RKN6225100	RKN6425100
32A	RKN6232100	RKN6432100
40A	RKN6240100	RKN6440100
63A	RKN6263100	RKN6463100
$I_n$	2 pole, $I_{\Delta n}=300mA$	4 pole, $I_{\Delta n}=300mA$
25A	RKN6225300	RKN6425300
32A	RKN6232300	RKN6432300
40A	RKN6240300	RKN6440300
63A	RKN6263300	RKN6463300

### Type KGR

$I_n$	2 pole, $I_{\Delta n}=30mA$	2 pole, $I_{\Delta n}=15mA$
15A	32KGRa1530	32KGRa1515
20A	32KGRa2030	32KGRa2015
30A	32KGRa3030	32KGRa3015

## Switch disconnecter, BKD type



### Technical data

<b>Number of poles</b>	1, 2, 3, 4pole	
<b>Standard</b>	IEC60947-3	
<b>Rated currents</b>	40, 50, 63, 80, 100, 125A	
<b>Rated voltages</b>	240/415Vac	
<b>Electrical endurance</b>	63A	20000 cycles
	80, 100A	10000 cycles
<b>Type of terminal</b>	Tunnel type	
<b>Terminal capacity</b>	Cables up to 50mm <sup>2</sup>	
<b>Installation</b>	Mounting on 35mm DIN rail	
<b>Width</b>	17.5mm per pole	

### Catalog No.

<b>Type BKD</b>	<b>In</b>	<b>1 pole</b>	<b>2 pole</b>	<b>3 pole</b>	<b>4 pole</b>
<b>63A</b>		BKD10163	BKD10263	BKD10363	BKD10463
<b>80A</b>		BKD10180	BKD10280	BKD10380	BKD10480
<b>100A</b>		BKD101100	BKD102100	BKD103100	BKD104100

# Residential Breakers

Bolt on mounting

60mm depth twin breakers , ABS-Fb & EBS-Fb type

30AF / 2pole



50AF / 3pole



## Technical data

		MCCB			RCCB		
Type		ABS-Fb			EBS-Fb		
Protection		overload short circuit			overload short circuit ground fault		
Rated current $I_n$		3 ... 30A	5 ... 50A	60 ... 100A	3 ... 30A	5 ... 50A	60 ... 100A
Rated voltage		AC 460V			AC 100~220V		
Rated residual current, $I_{\Delta n}$		N.A.			30mA	30mA	30, 100mA
Breaking capacity, $I_{cu}$	AC 460V	2.5kA	2.5kA	5kA	-	-	-
	AC 380V	2.5kA	2.5kA	5kA	2.5kA	2.5kA	5kA
	AC 220V	5kA	5kA	10kA	5kA	5kA	10kA
	AC 100/110V	5kA	5kA	10kA	5kA	5kA	10kA
Residual non-operating current		N.A.			0.5 x $I_{\Delta n}$		
Residual current off-time at $I_{\Delta n}$		N.A.			$\leq 0.03$ sec to $I_{\Delta n}=30$ mA $\leq 0.1$ sec to $I_{\Delta n}=100$ mA		
Type of trip unit		Hydraulic-magnetic			Hydraulic-magnetic for overcurrent pick-up Electronic for earth leakage pick-up		
Number of poles		2, 3 pole					
Connection		Front					
Mounting		Bolt on or DIN rail					
Type of terminal		Clamp					

100AF / 3pole



ABS103Fb

## Description

- Offering MCCBs and RCCBs in the same physical and ampere frame size.
- Trip unit with a fixed thermal and fixed magnetic trip.
- All operating mechanisms are of the quick-make, quick-break type and are trip free
- Two and three-pole breakers shall have common tripping of all poles.
- Operating handle is Trip to Off .
- Face plate shall indicate rated ampacity.
- Thermal elements shall be factory calibrated to operate in a 40°C ambient environment.
- Offering the same slot and depth sizes with the GB type MCCBs
  - 60mm depth
  - 50mm slot

## Catalog No.

	MCCB		RCCB		
<b>30AF</b>	with $I_{\Delta n}=30mA$				
	In	2 pole	3 pole	2 pole	3 pole
	3A	ABS32Fb3	ABS33Fb3	EBS32Fb3	EBS33Fb3
	5A	ABS32Fb5	ABS33Fb5	EBS32Fb5	EBS33Fb5
	10A	ABS32Fb10	ABS33Fb10	EBS32Fb10	EBS33Fb10
	15A	ABS32Fb15	ABS33Fb15	EBS32Fb15	EBS33Fb15
	20A	ABS32Fb20	ABS33Fb20	EBS32Fb20	EBS33Fb20
	30A	ABS32Fb30	ABS33Fb30	EBS32Fb30	EBS33Fb30
	weight	0.3kg	0.42kg	0.4kg	0.5kg
	<b>50AF</b>	with $I_{\Delta n}=30mA$			
In		2 pole	3 pole	2 pole	3 pole
5A		ABS52Fb5	ABS53Fb5	EBS52Fb5	EBS53Fb5
10A		ABS52Fb10	ABS53Fb10	EBS52Fb10	EBS53Fb10
15A		ABS52Fb15	ABS52Fb15	EBS52Fb15	EBS53Fb15
20A		ABS52Fb20	ABS52Fb20	EBS52Fb20	EBS53Fb20
30A		ABS52Fb30	ABS52Fb30	EBS52Fb30	EBS53Fb30
40A		ABS52Fb40	ABS52Fb40	EBS52Fb40	EBS53Fb40
50A		ABS52Fb50	ABS52Fb50	EBS52Fb50	EBS53Fb50
weight		0.3kg	0.42kg	0.4kg	0.5kg
<b>100AF</b>	with $I_{\Delta n}=30mA$				
	In	2 pole	3 pole	2 pole	3 pole
	60A	ABS102Fb60	ABS103Fb60	EBS102Fb60	EBS103Fb60
	75A	ABS102Fb75	ABS103Fb75	EBS102Fb75	EBS103Fb75
	100A	ABS102Fb100	ABS103Fb100	EBS102Fb100	EBS103Fb100
weight	0.47kg	0.5kg	0.5kg	0.6kg	
	with $I_{\Delta n}=100mA$				
In	2 pole	3 pole			
60A	EBS102Fb60	EBS103Fb60			
75A	EBS102Fb75	EBS103Fb75			
100A	EBS102Fb100	EBS103Fb100			
weight	0.5kg	0.6kg			

# Residential Breakers

Bolt on mounting

60mm depth miniature circuit breakers, BF type



## Description

- Trip unit with a fixed thermal and fixed magnetic trip.
- All operating mechanisms are of the quick-make, quick-break type and are “trip free”
- Two and three-pole breakers shall have common tripping of all poles.
- Operating handle is “Trip to Off” .
- Operating handle and face plate shall indicate rated ampacity.
- Thermal elements shall be factory calibrated to operate in a 40°C ambient environment.
- Offering the same slot and depth sizes with the GB type MCCBs.
  - 60mm depth
  - 50mm slot

## Technical data

Type	BF-a	BF-c	BF
Rated current	6 ... 100A	6 ... 100A	6 ... 50A
Breaking capacity, Icu	220V	10kA	5kA
	415V	2.5kA (2, 3pole)	2.5kA (2, 3pole)
Rated insulation voltage	460VAC		220VAC
Number of poles	1, 2, 3 pole		1, 2 pole
Protection	Against overload and short circuit		
Characteristic	See operating curves		
Type of trip	Thermal-magnetic release		
Type of terminal	Clamp type		
Installation	Bolt on with fixing brackets		
Width	25mm per pole		
Accessory	Not available		

## Catalog No.

### BF-a



#### For 10kA at 220VAC

In	1 pole	2 pole	3 pole
6A	BF51a6	BF52a6	BF53a6
10A	BF51a10	BF52a10	BF53a10
15A	BF51a15	BF52a15	BF53a15
20A	BF51a20	BF52a20	BF53a20
30A	BF51a30	BF52a30	BF53a30
40A	BF51a40	BF52a40	BF53a40
50A	BF51a50	BF52a50	BF53a50
60A	BF101a60	BF102a60	BF103a60
75A	BF101a75	BF102a75	BF103a75
100A	BF101a100	BF102a100	BF103a100
Weight	0.11kg	0.23kg	0.35kg

### BF-c



#### For 5kA at 220VAC

In	1 pole	2 pole	3 pole
6A	BF51c6	BF52c6	BF53c6
10A	BF51c10	BF52c10	BF53c10
15A	BF51c15	BF52c15	BF53c15
20A	BF51c20	BF52c20	BF53c20
30A	BF51c30	BF52c30	BF53c30
40A	BF51c40	BF52c40	BF53c40
50A	BF51c50	BF52c50	BF53c50
60A	BF101c60	BF102c60	BF103c60
75A	BF101c75	BF102c75	BF103c75
100A	BF101c100	BF102c100	BF103c100
Weight	0.11kg	0.23kg	0.35kg



### BF

#### For 2.5kA at 220VAC

In	1 pole	2 pole
6A	BF516	BF526
10A	BF5110	BF5210
15A	BF5115	BF5215
20A	BF5120	BF5220
30A	BF5130	BF5230
40A	BF5140	BF5240
50A	BF5150	BF5250
Weight	0.14kg	0.29kg

# Residential Breakers

Bolt on mounting

42mm depth twin breakers, BS & GR type

30AF / 2pole



MCCB

RCCB

30AF / 3pole



MCCB

RCCB

## Technical data

	MCCB	RCCB
Type	BS	GR
Protection	overload	overload & ground fault or ground fault only (30GRh)
Rated current I <sub>n</sub>	6, 10, 15, 20, 30A	15, 20, 30A
Rated voltage	110/220VAC	AC 88~242V
Rated residual current, I <sub>Δn</sub>	N.A.	30mA
Breaking capacity, I <sub>cu</sub>	1.5kA at 110/220VAC	
Residual non-operating current	N.A.	0.5 × I <sub>Δn</sub>
Residual current off-time at I <sub>Δn</sub>	N.A.	≤0.03 sec
Type of trip unit	Thermal	Thermal for overcurrent pick-up Electronic for earth leakage pick-up
Number of poles	1P+N, 2P, 2P+N	
Connection	Front	
Mounting	Bolt on	
Depth	42mm	
Type of terminal	Lug	

## Description

- Compact and economic type with single- mold frame.
- Offering MCCBs and RCCBs in the same physical and ampere frame size.
- Trip unit with a fixed thermal without a magnetic trip.
- All operating mechanisms are trip free
- Two and three-pole breakers shall have common tripping of all poles.
- Operating handle is Trip to Off .
- Thermal elements shall be factory cablirated to operate in a 40°C ambient environment.

## Catalog No.



BS32a



BS33

		<i>MCCB</i>	<i>RCCB</i>
<b>For 1pole+N</b>	<b>In</b>	<b>BS31a</b>	<b>30GRh</b>
	<b>6A</b>	<b>BS31a6</b>	
	<b>10A</b>	<b>BS31a10</b>	
	<b>15A</b>	<b>BS31a15</b>	
	<b>20A</b>	<b>BS31a20</b>	
	<b>30A</b>	<b>BS31a30</b>	<b>30GRh</b>
	<b>weight</b>	0.1kg	0.1kg

Note ; BS31a and 30GRh are in the same physical size.  
30GRh is the breaker with ground fault protection only.

		<i>MCCB</i>	<i>RCCB</i>	<i>RCCB</i>
<b>For 2pole</b>	<b>In</b>	<b>BS32a</b>	<b>32GRh</b>	<b>32GRa</b>
	<b>6A</b>	<b>BS32a6</b>		
	<b>10A</b>	<b>BS32a10</b>		
	<b>15A</b>	<b>BS32a15</b>	<b>32GRh15</b>	<b>32GRa15</b>
	<b>20A</b>	<b>BS32a20</b>	<b>32GRh20</b>	<b>32GRa20</b>
	<b>30A</b>	<b>BS32a30</b>	<b>32GRh30</b>	<b>32GRa30</b>
	<b>weight</b>	0.1kg	0.1kg	0.21kg

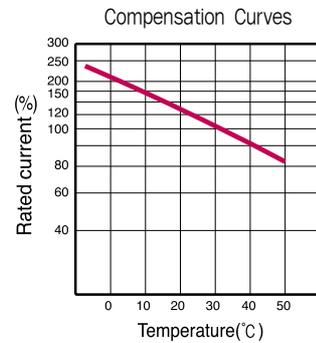
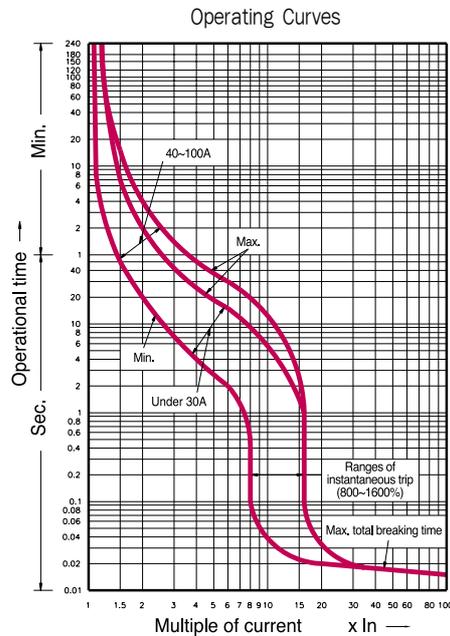
Note ; BS32a and 32GRh are in the same physical size.

		<i>MCCB</i>	<i>RCCB</i>
<b>For 2pole+N</b>	<b>In</b>	<b>BS33</b>	<b>33GR</b>
	<b>15A</b>	<b>BS3315</b>	<b>33GR15</b>
	<b>20A</b>	<b>BS3320</b>	<b>33GR20</b>
	<b>30A</b>	<b>BS3330</b>	<b>33GR30</b>
	<b>weight</b>	0.15kg	0.28kg

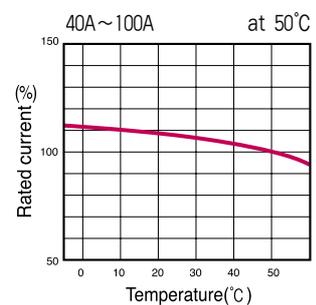
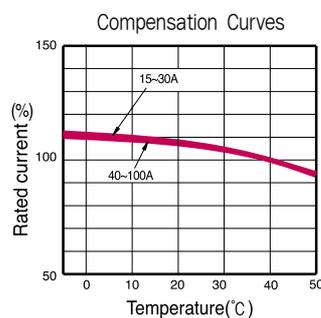
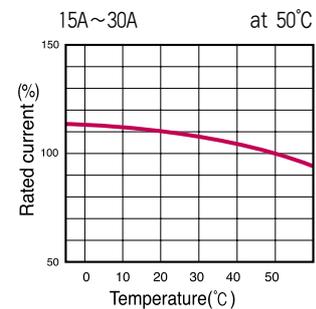
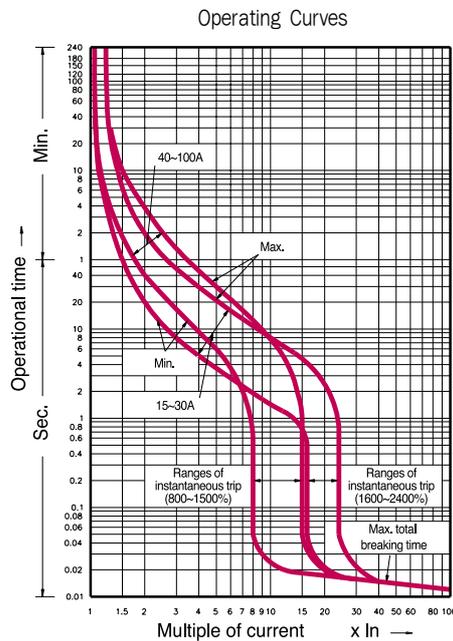
# Operating curves & temperature compensation

## AB type non-adjustable MCCBs

ABE52b	ABS63b
ABE53b	ABS64b
ABE62b	ABH32b
ABE63b	ABH33b
ABS32b	EBE53b
ABS33b	EBE63b
ABE102b	EBE33b
ABE103b	EBE102b
ABS52b	EBE103b
ABS53b	EBS53b
ABS54b	EBS63b
ABS62b	EBH33b

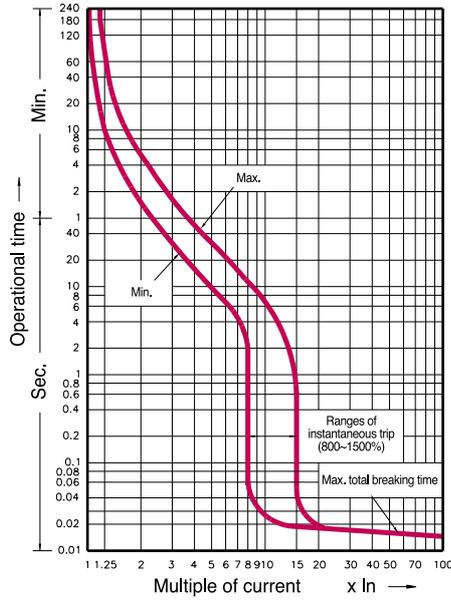


ABS102b
ABS103b
ABS104b
ABH52b
ABH53b
ABH54b
ABH102b
ABH103b
ABH104b
EBS103b
EBH53b
EBH103b

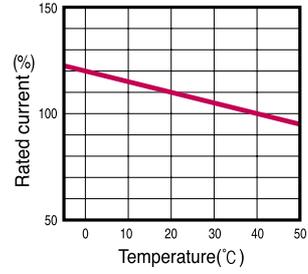


- ABE202b
- ABE203b
- ABE204b
- ABS202b
- ABS203b
- ABS204b
- ABH202b
- ABH203b
- ABH204b
- EBE203b
- EBS203b
- EBH203b

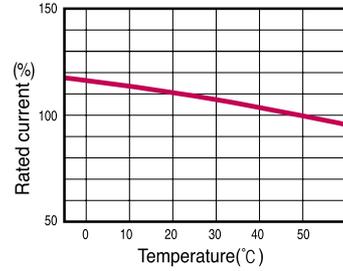
Operating Curves



Compensation Curves

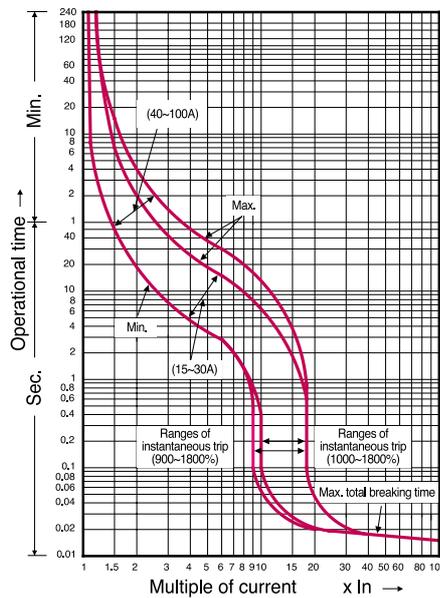


200AF at 50°C

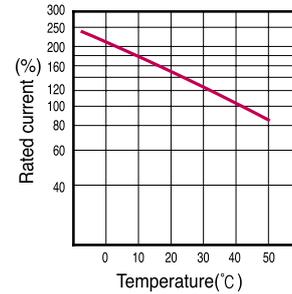


- ABE53bM
- ABE63bM
- ABE103bM
- ABS33bM
- ABS53bM
- ABS63bM

Operating Curves



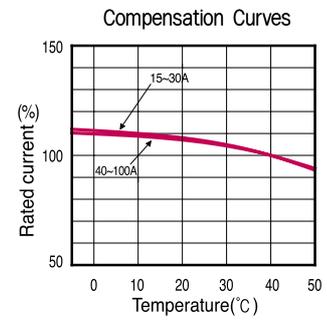
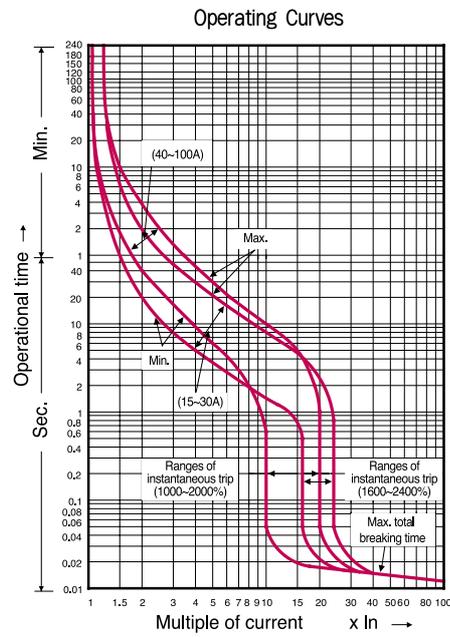
Compensation Curves



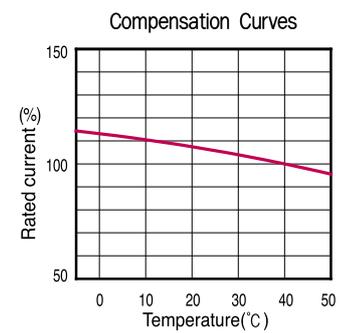
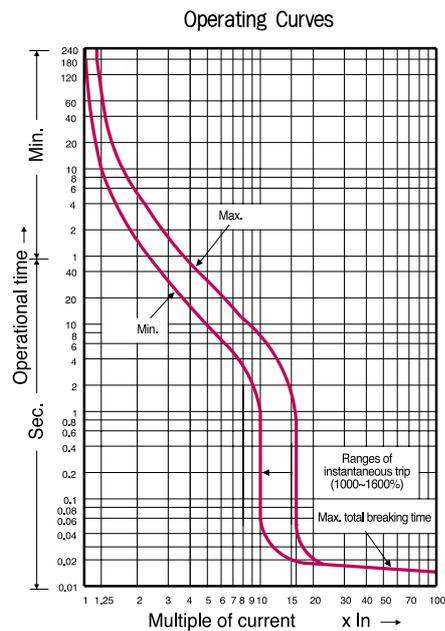
# Operating curves & temperature compensation

## AB type non-adjustable MCCBs

- ABS103bM
- ABH53bM
- ABH103bM

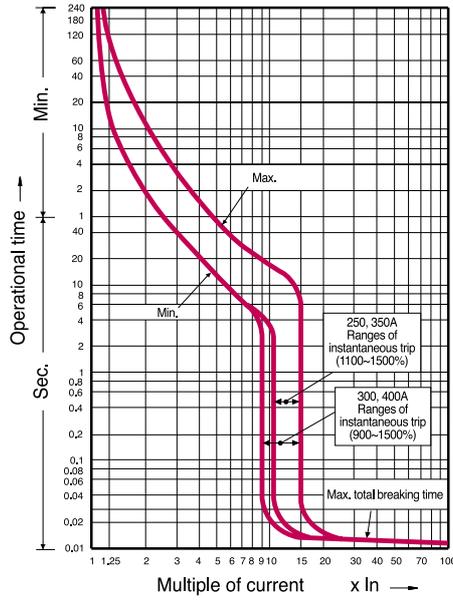


- ABE203bM
- ABS203bM

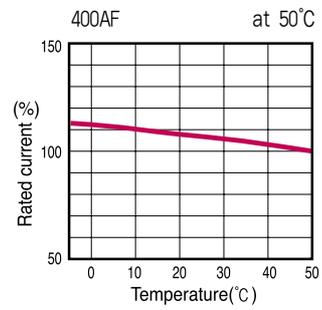
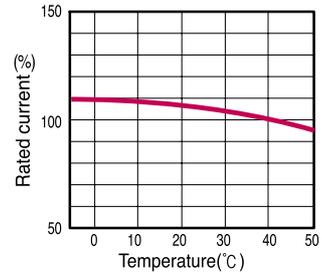


- ABE402b
- ABE403b
- ABE404b
- ABS402b
- ABS403b
- ABS404b
- ABH402b
- ABH403b
- ABH404b
- EBE403b
- EBS403b
- EBH403b
- EBL403b

Operating Curves

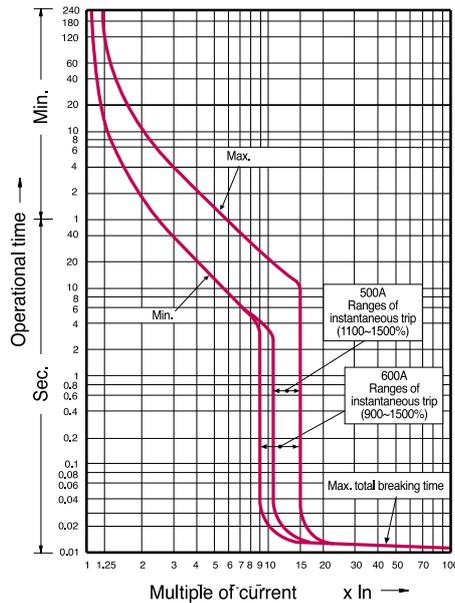


Compensation Curves

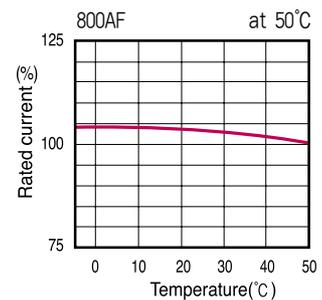
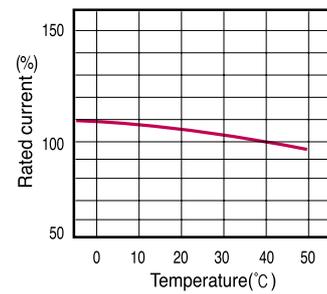


- ABE802b(500, 600A)
- ABE803b(500, 600A)
- ABE804b(500, 600A)
- ABS802b(500, 600A)
- ABS803b(500, 600A)
- ABS804b(500, 600A)
- ABL802b(500, 600A)
- ABL803b(500, 600A)
- ABL804b(500, 600A)
- EBE803b(500, 600A)
- EBS803b(500, 600A)
- EBL803b(500, 600A)

Operating Curves



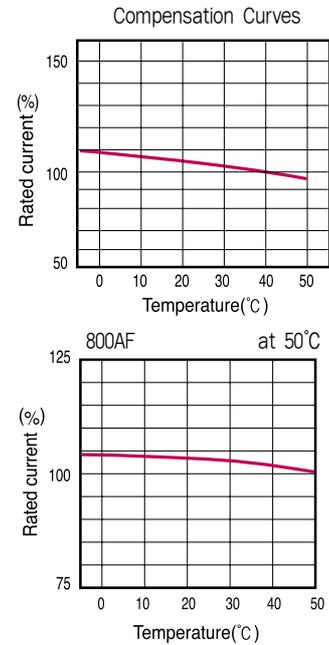
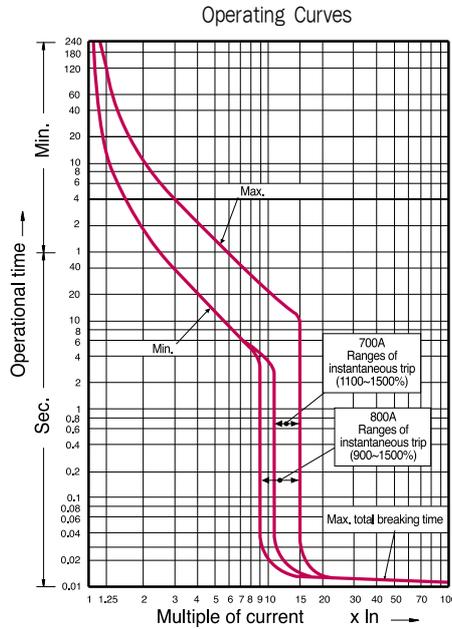
Compensation Curves



# Operating curves & temperature compensation

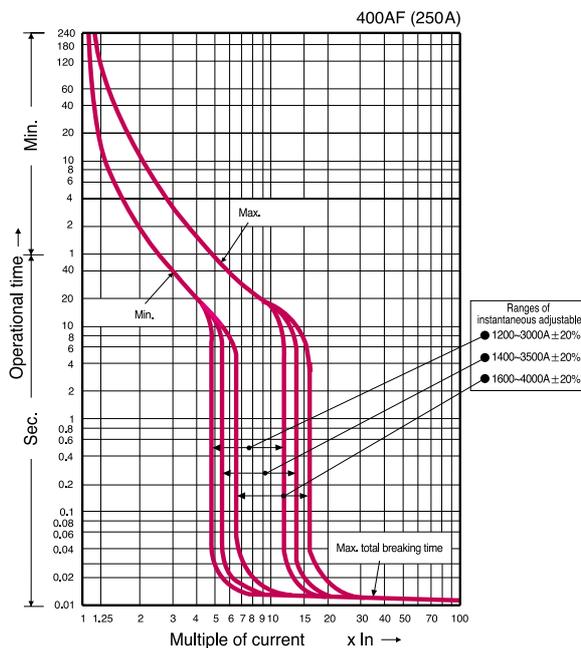
## AB type non-adjustable MCCBs

- ABE802b(700, 800A)
- ABE803b(700, 800A)
- ABE804b(700, 800A)
- ABS802b(700, 800A)
- ABS803b(700, 800A)
- ABS804b(700, 800A)
- ABL802b(700, 800A)
- ABL803b(700, 800A)
- ABL804b(700, 800A)
- EBE803b(700, 800A)
- EBS803b(700, 800A)
- EBL803b(700, 800A)

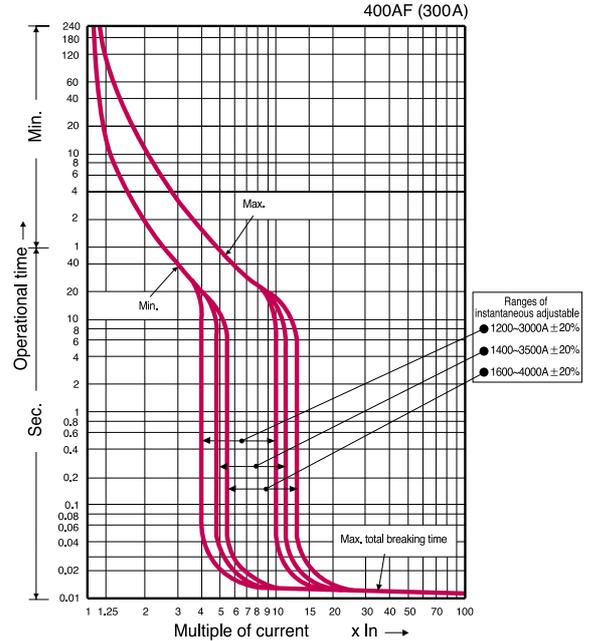


### ABL403bIN

Operating Curves

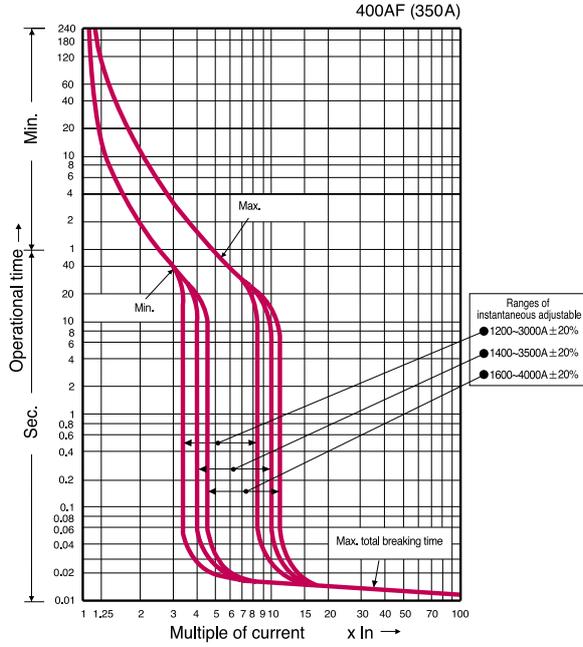


Operating Curves

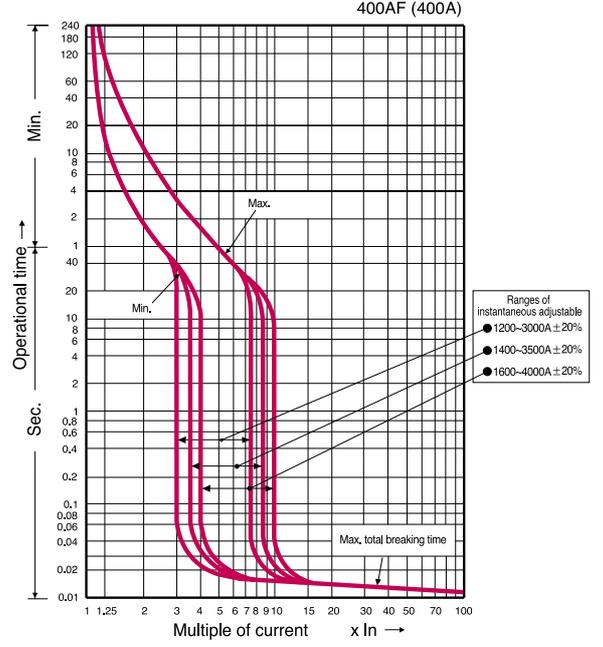


**ABL403bIN**

Operating Curves

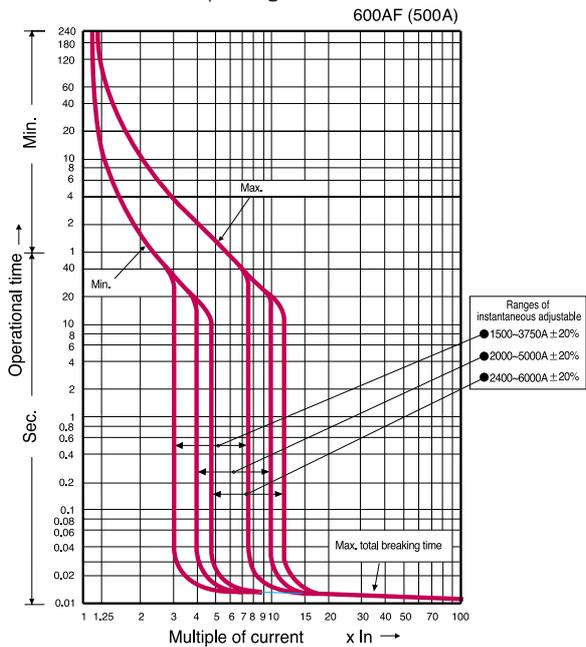


Operating Curves

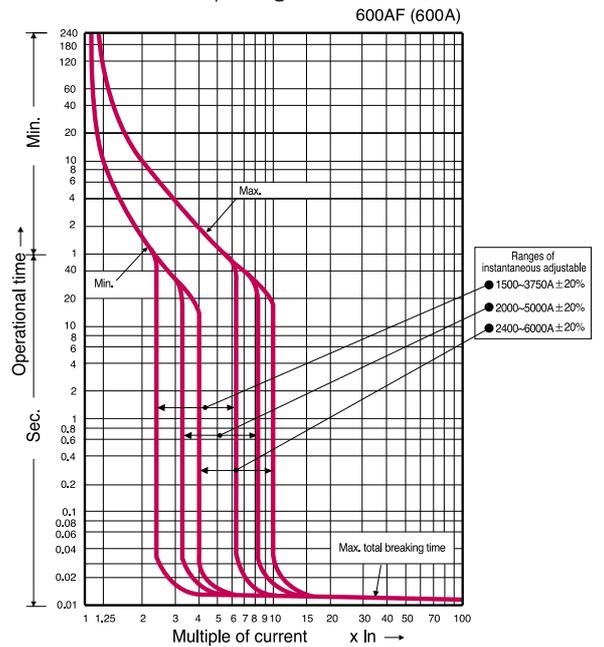


**ABL803bIN(500, 600A)**

Operating Curves



Operating Curves

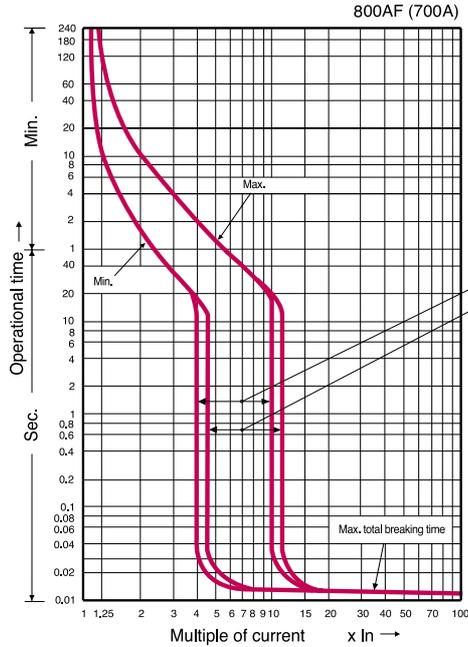


# Operating curves & temperature compensation

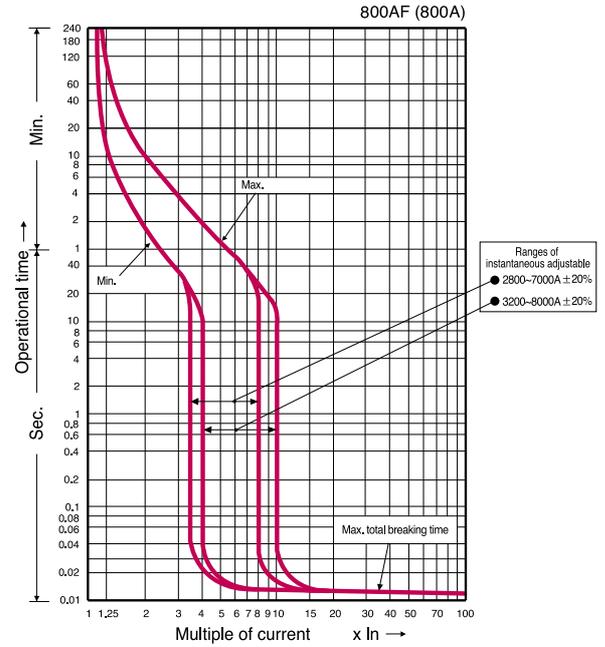
## AB type non-adjustable MCCBs

ABL803bIN(700, 800A)

Operating Curves



Operating Curves



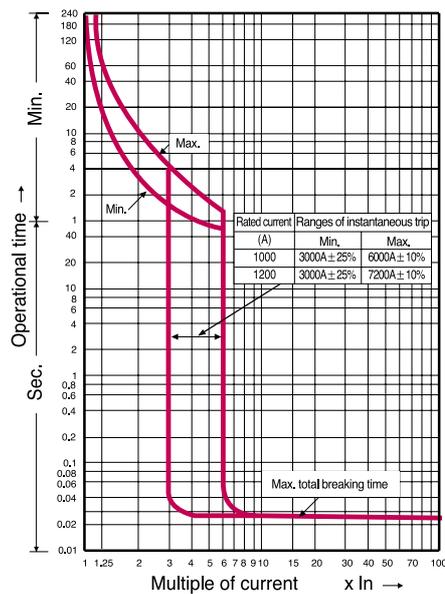
ABS1003

ABS1004

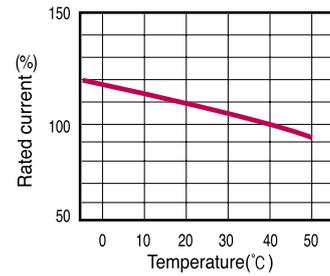
ABS1203

ABS1204

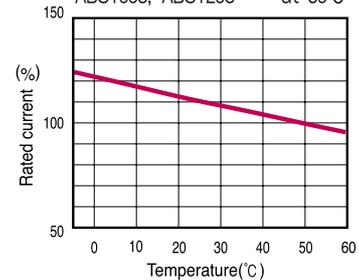
Operating Curves



Compensation Curves

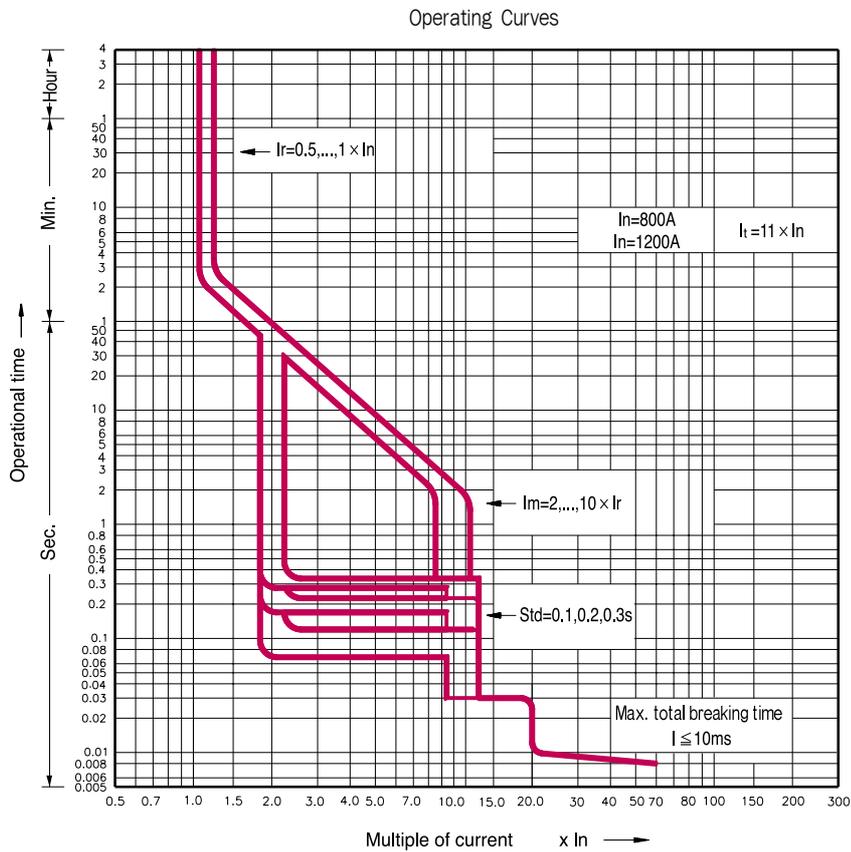


ABS1003, ABS1203 at 50°C



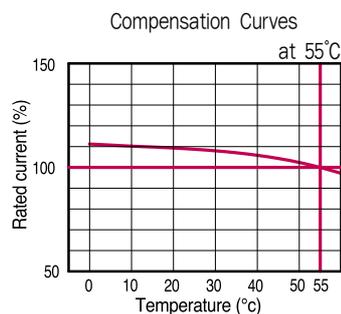
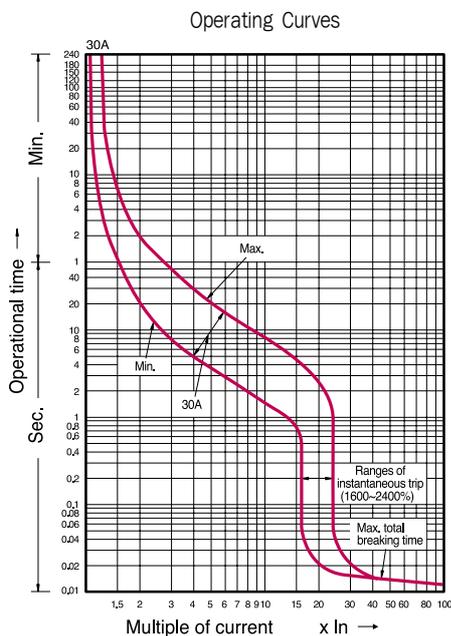
# GB type adjustable MCCBs

ABS1203E



## Key lock type MCCB

ABS103K(30A)

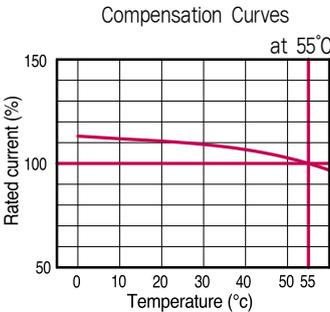
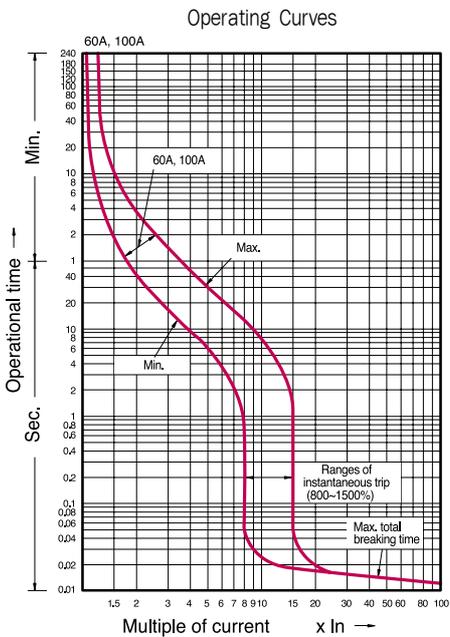


# Operating curves & temperature compensation

## GB type adjustable MCCBs

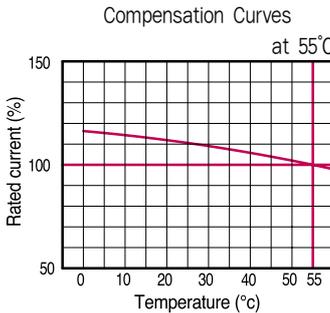
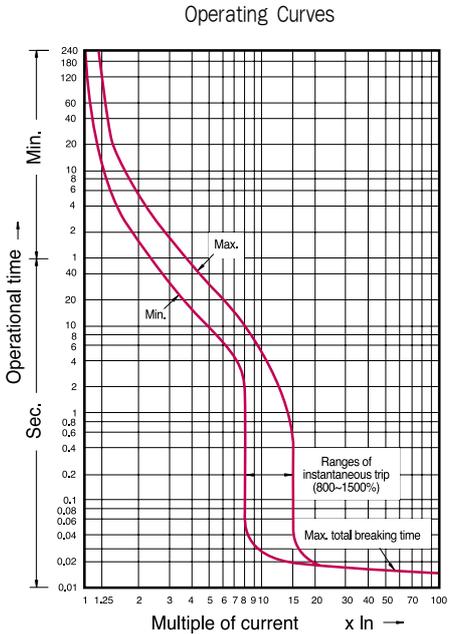
### Key lock type MCCB

ABS103K(60, 100A)



### Key lock type MCCB

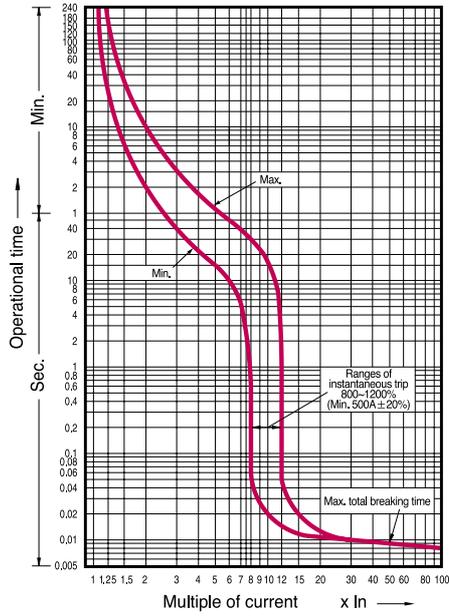
ABS203k(150A)



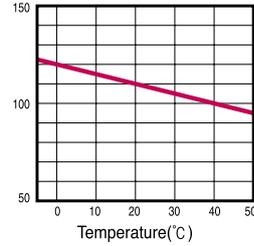
GBH103

GBN103

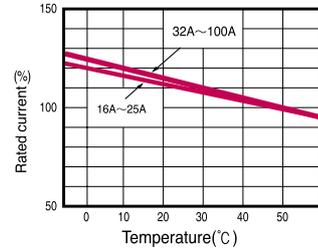
Operating Curves



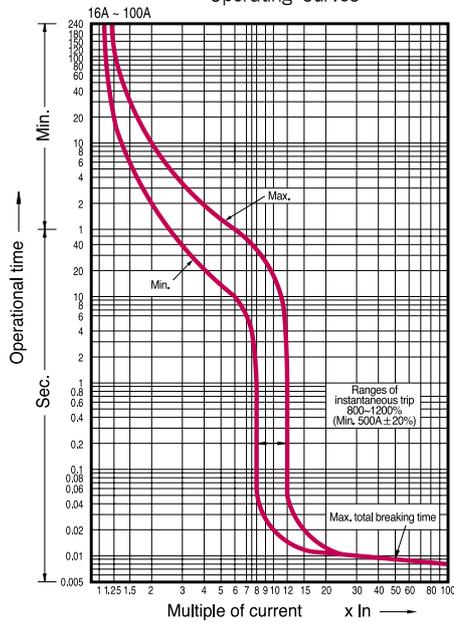
Compensation Curves



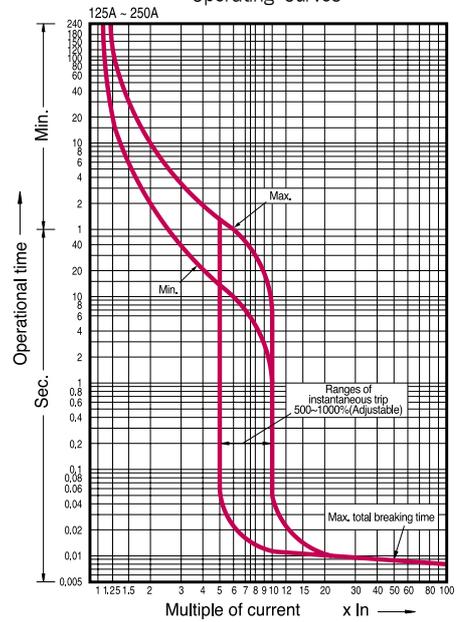
at 50°C



Operating Curves



Operating Curves



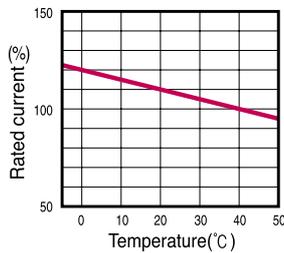
GBH203

GBL103

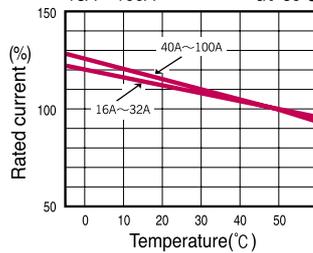
GBL203

GBN203

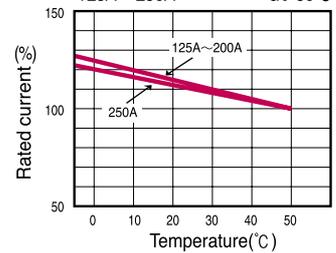
Compensation Curves



16A~100A at 50°C



125A~250A at 50°C

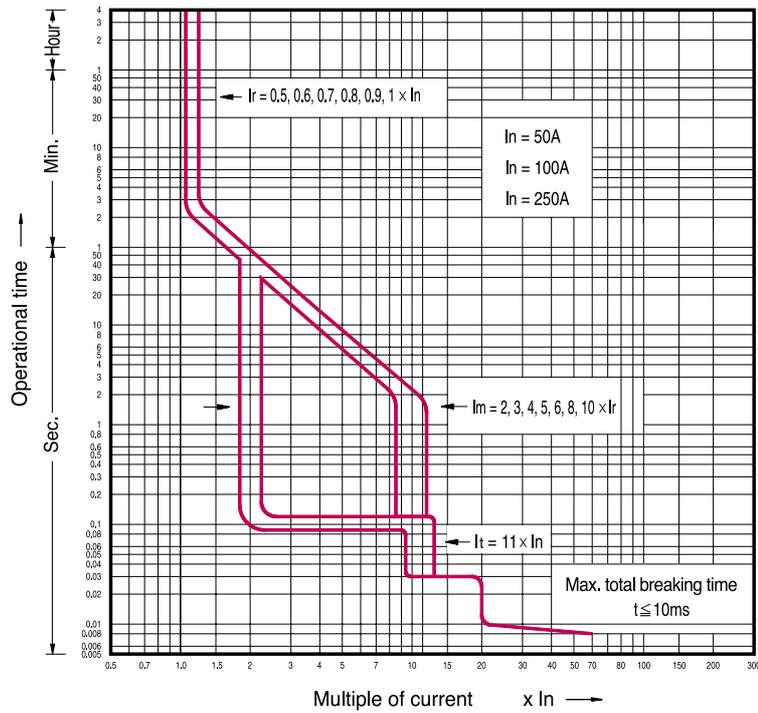


# Operating curves & temperature compensation

## GB type adjustable MCCBs

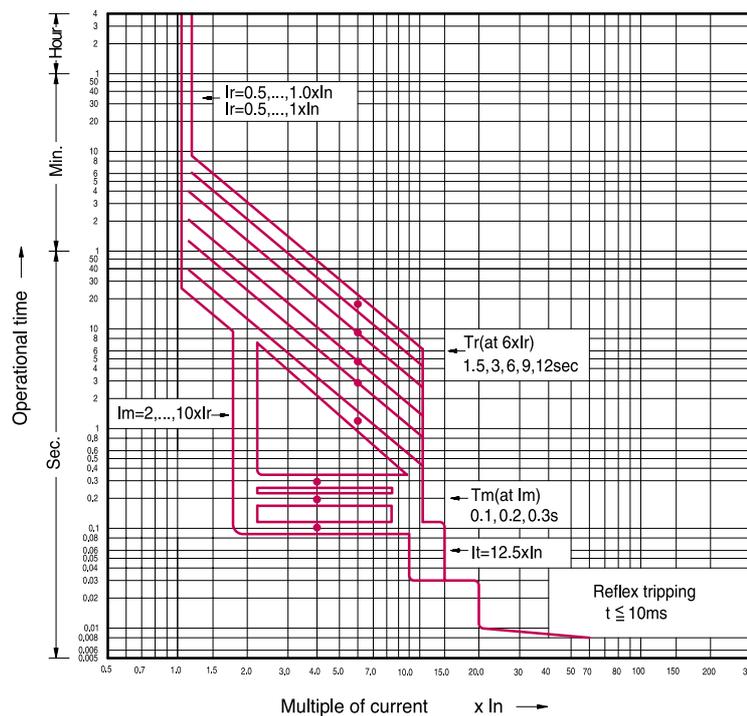
- GBL53E
- GBL103E
- GBL203E

Operating Curves



- GBN403E
- GBH403E

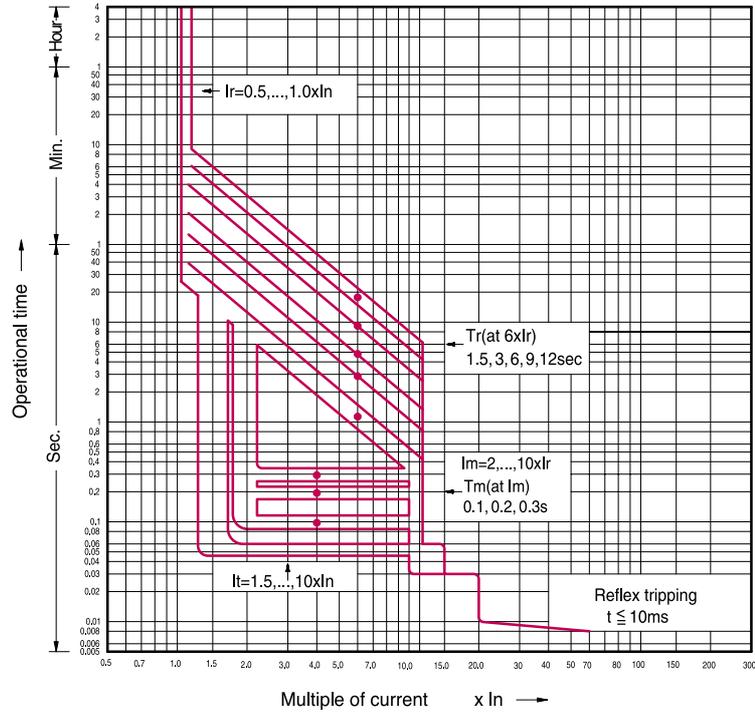
Operating Curves



GBN803E

GBH803E

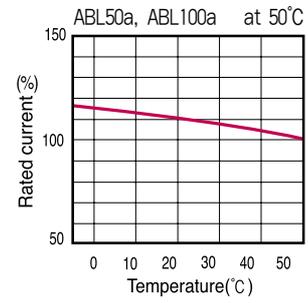
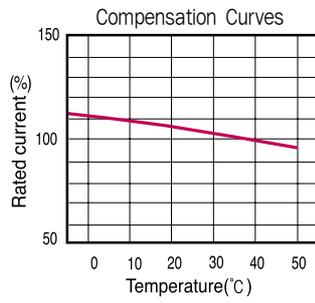
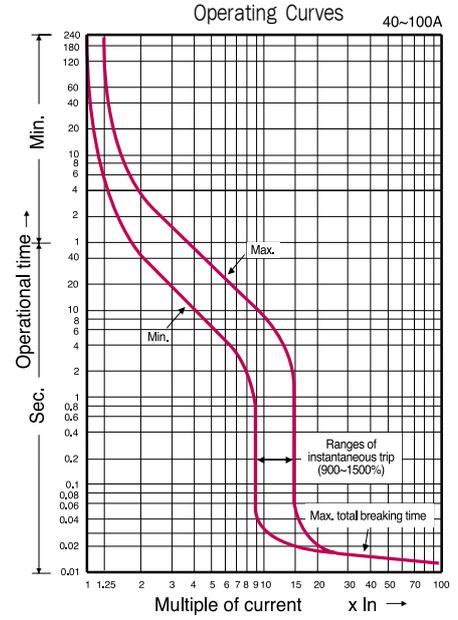
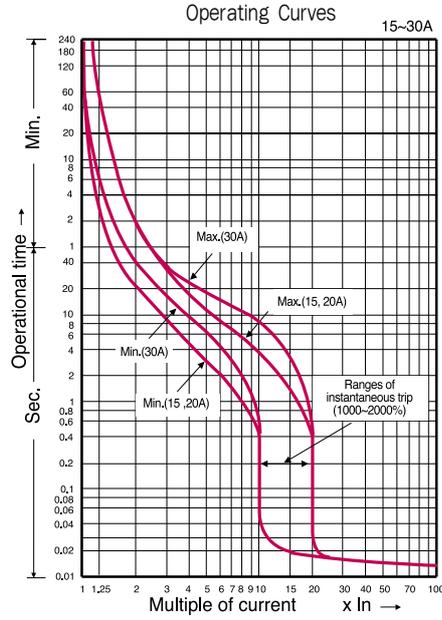
### Operating Curves



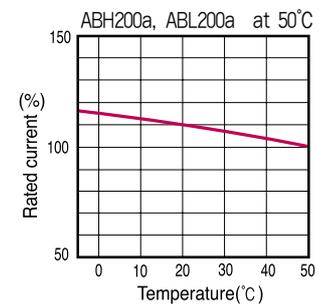
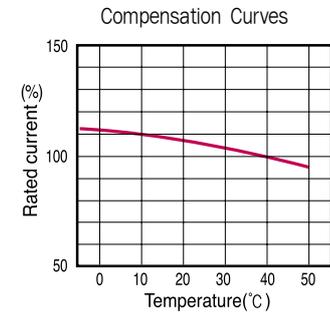
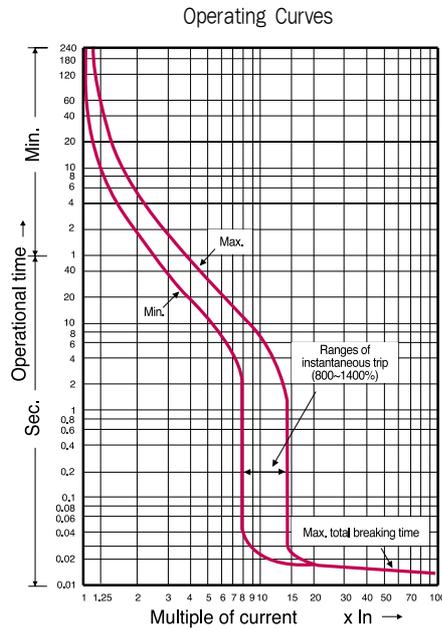
# Operating curves & temperature compensation

## Hi-MEC MCCBs

- ABL52a
- ABL53a
- ABL54a
- ABL102a
- ABL103a
- ABL104a

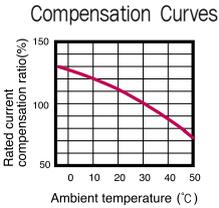
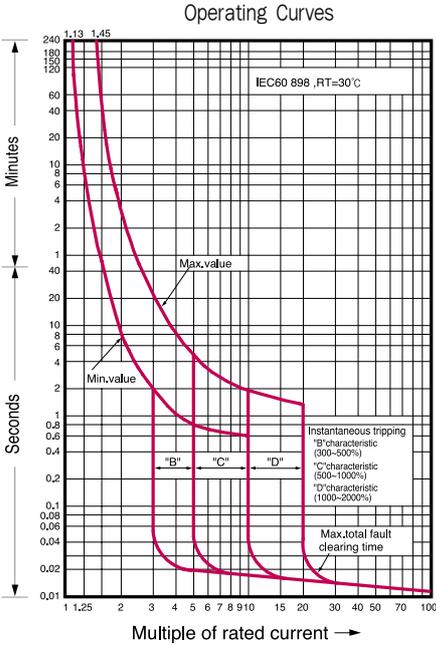


- ABH202a
- ABH203a
- ABH204a
- ABL202a
- ABL203a
- ABL204a

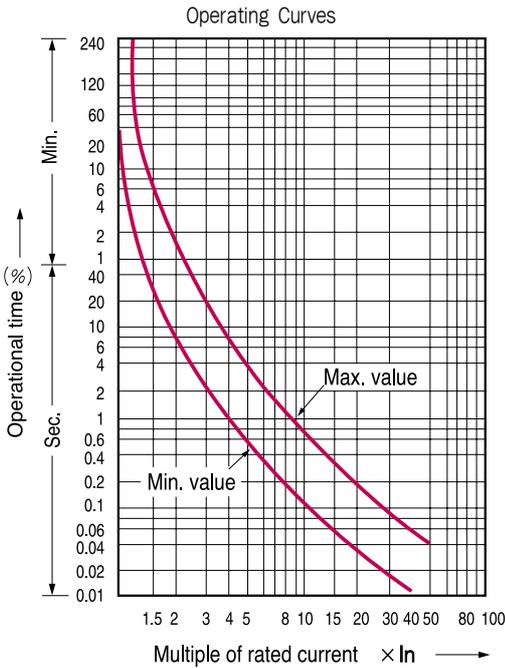


# Residential Breakers

**BKN**



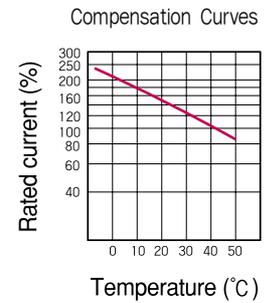
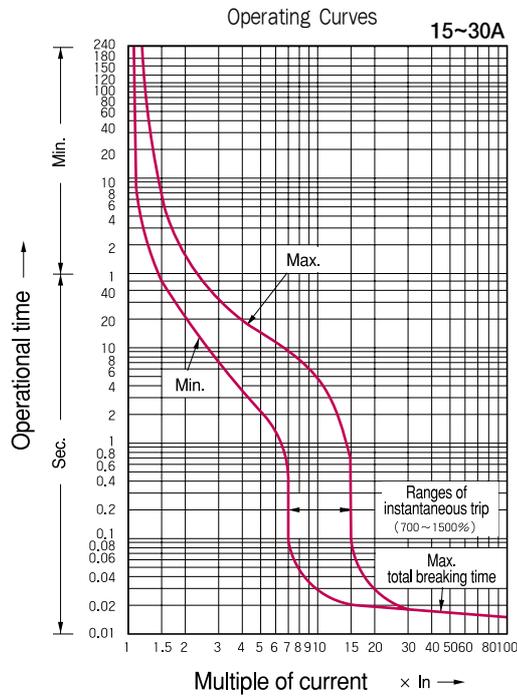
**32KGRa**



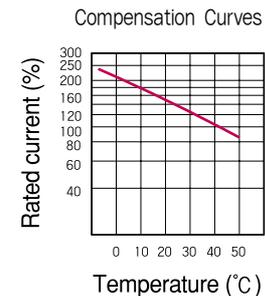
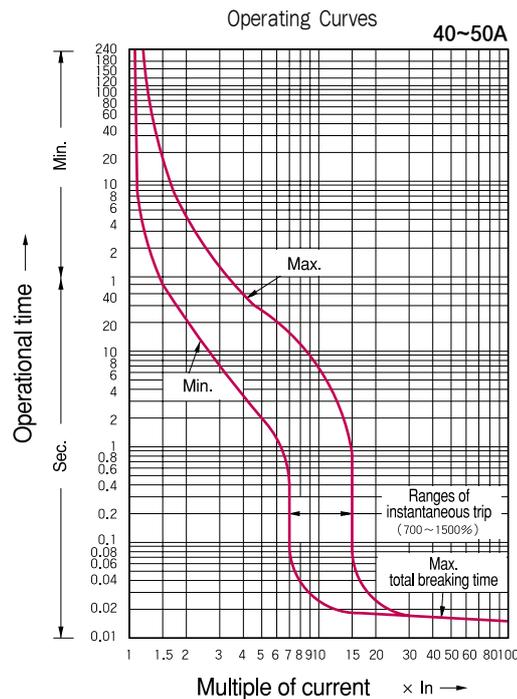
# Operating curves & temperature compensation

## Residential Breakers

- ABS32Fb
- ABS33Fb
- ABS52Fb
- ABS53Fb
- EBS32Fb
- EBS33Fb
- EBS52Fb
- EBS53Fb

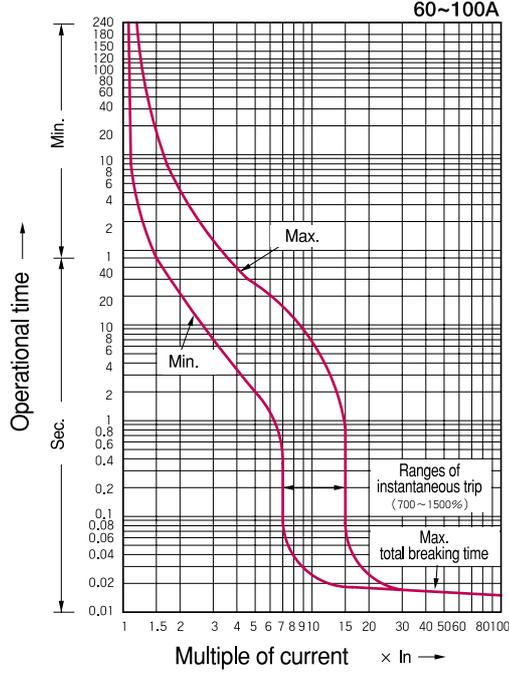


- ABS52Fb
- ABS53Fb
- EBS52Fb
- EBS53Fb

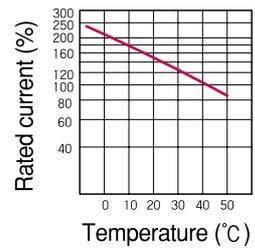


- ABS102Fb
- ABS103Fb
- EBS102Fb
- EBS103Fb

Operating Curves

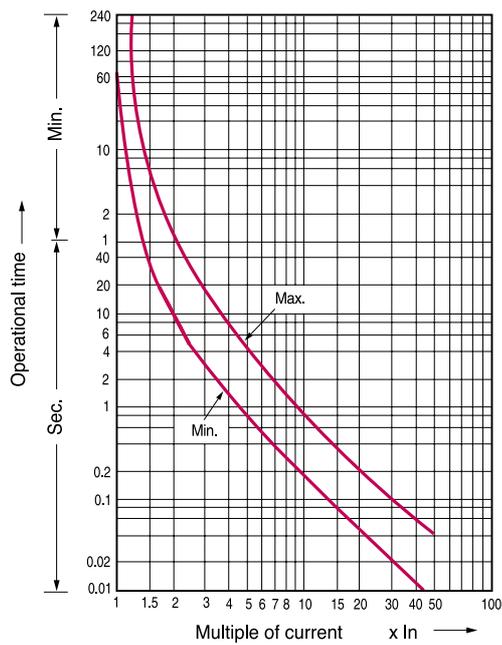


Compensation Curves

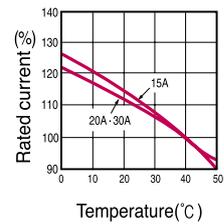


- BS-31a
- BS-32a

Operating Curves



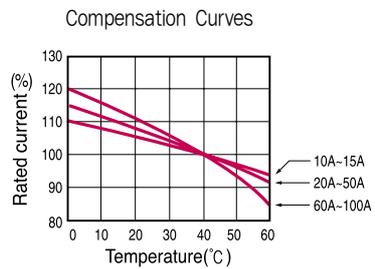
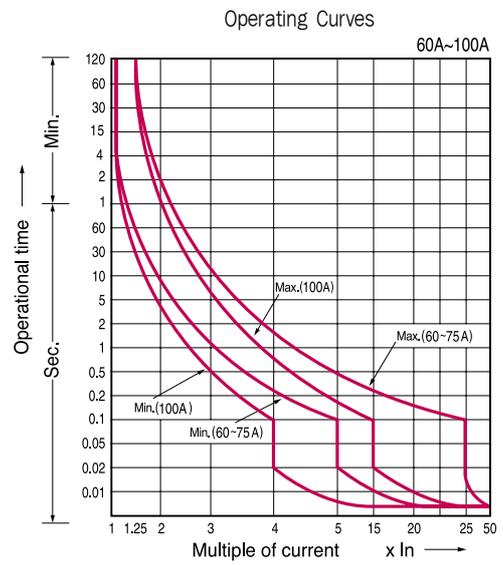
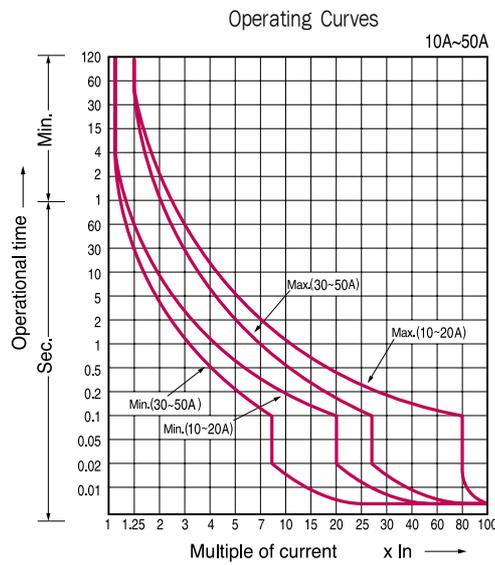
Compensation Curves



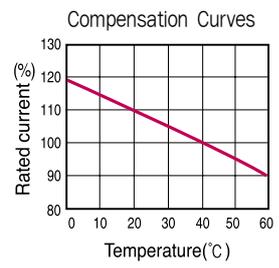
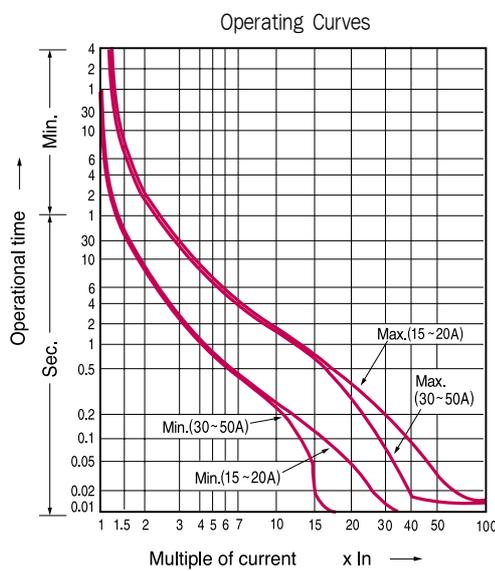
# Operating curves & temperature compensation

## Residential Breakers

### BF-a,c



### BF

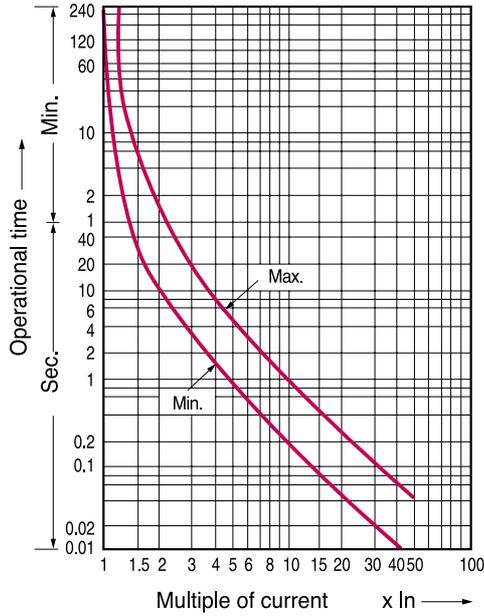


32GRa

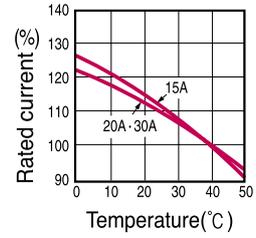
32GRh

33GR

Operating Curves

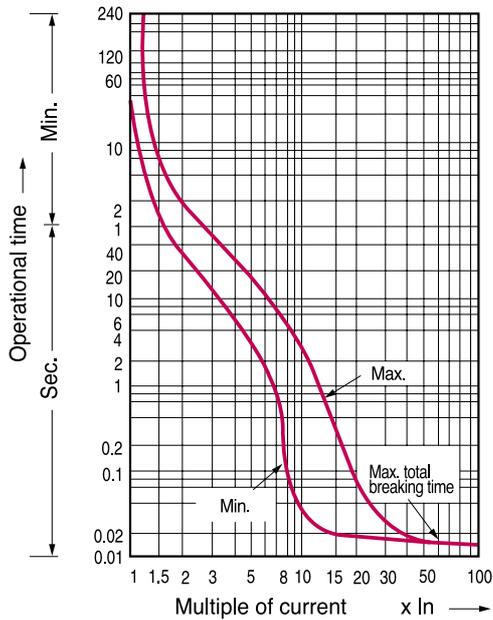


Compensation Curves

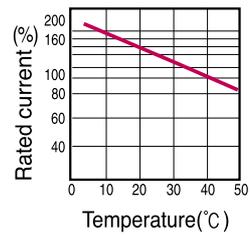


52GRa

Operating Curves



Compensation Curves



# Operating curves & temperature compensation

## Table of the temperature compensation

- ABH53b, ABH63b, ABH103b, ABS103b

Ambient temperature : 40 °C				Ambient temperature : 50 °C			
Temperature	Rated current 15~30A	Rated current 40~100A	Remark	Temperature	Rated current 15~30A	Rated current 40~100A	Remark
-5 °C	111.9 %	110.2 %		-5 °C	113.1 %	111.2 %	
0 °C	111.3 %	109.8 %		0 °C	112.5 %	110.7 %	
10 °C	110.0 %	108.7 %		10 °C	111.3 %	109.8 %	
20 °C	108.0 %	107.0 %		20 °C	110.0 %	108.7 %	
25 °C	106.6 %	105.8 %		25 °C	109.1 %	108.0 %	
30 °C	104.9 %	104.3 %		30 °C	108.0 %	107.0 %	
35 °C	102.7 %	102.4 %		35 °C	106.6 %	105.8 %	
40 °C	100.0 %	100.0 %	Ambient temperature	40 °C	104.9 %	104.3 %	
45 °C	96.8 %	97.2 %		45 °C	102.7 %	102.4 %	
50 °C	93.3 %	94.0 %		50 °C	100.0 %	100.0 %	Ambient temperature

- ABE203b, ABS203b, ABH203b

Ambient temperature : 40 °C			Ambient temperature : 50 °C		
Temperature	Rated current 100~225A	Remark	Temperature	Rated current 100~225A	Remark
-5 °C	114.3 %		-5 °C	116.3 %	
0 °C	113.2 %		0 °C	115.4 %	
10 °C	110.6 %		10 °C	113.2 %	
20 °C	107.5 %		20 °C	110.6 %	
25 °C	105.8 %		25 °C	109.1 %	
30 °C	104.0 %		30 °C	107.5 %	
35 °C	102.0 %		35 °C	105.8 %	
40 °C	100.0 %	Ambient temperature	40 °C	104.0 %	
45 °C	97.9 %		45 °C	102.0 %	
50 °C	95.6 %		50 °C	100.0 %	Ambient temperature

- GB-TYPE MCCB(Ambieent temperature : 50°C)

Temperature	Rated current		Rated current			Remark
	16~25A	32~100A	16~32A	40~200A	250A	
-5 °C	1.220	1.275	1.200	1.275	1.200	
0 °C	1.200	1.250	1.200	1.250	1.200	
10 °C	1.160	1.200	1.160	1.200	1.160	
20 °C	1.120	1.150	1.120	1.150	1.120	
25 °C	1.100	1.125	1.100	1.125	1.100	
30 °C	1.080	1.100	1.080	1.100	1.080	
35 °C	1.060	1.075	1.060	1.075	1.060	
40 °C	1.040	1.050	1.040	1.050	1.040	
45 °C	1.020	1.025	1.020	1.025	1.020	
50 °C	1.000	1.000	1.000	1.000	1.000	Ambient temperature

- KEY LOCK MCCB(Ambieent temperature : 55°C)

Temperature	ABS103K 30A	ABS103K 60A~100A	ABS203K 150A	Remark
	0 °C	113.1 %	111.2 %	
10 °C	111.9 %	110.2 %	114.3 %	
20 °C	110.7 %	109.3 %	111.9 %	
25 °C	110.0 %	108.7 %	110.6 %	
30 °C	109.1 %	108.0 %	109.1 %	
35 °C	108.0 %	107.0 %	107.5 %	
40 °C	106.6 %	105.8 %	105.8 %	
45 °C	104.9 %	104.3 %	104.0 %	
50 °C	102.7 %	102.4 %	102.0 %	
55 °C	100.0 %	100.0 %	100.0 %	Ambient temperature

● ABE400b, ABS400b, ABL400b

Ambient temperature : 40 °C			Ambient temperature : 50 °C		
Temperature	Rated current	Remark	Temperature	Rated current	Remark
-5 °C	110.0 %		-5 °C	113.0 %	
0 °C	109.0 %		0 °C	112.0 %	
10 °C	107.0 %		10 °C	110.0 %	
20 °C	105.0 %		20 °C	108.0 %	
25 °C	104.0 %		25 °C	107.0 %	
30 °C	103.0 %		30 °C	106.0 %	
35 °C	101.5 %		35 °C	104.5 %	
40 °C	100.0 %	Ambient temperature	40 °C	103.0 %	
45 °C	98.5 %		45 °C	101.5 %	
50 °C	97.0 %		50 °C	100.0 %	Ambient temperature

● ABE600b, ABS600b, ABL600b

Ambient temperature : 40 °C			Ambient temperature : 50 °C		
Temperature	Rated current	Remark	Temperature	Rated current	Remark
-5 °C	110.0 %		-5 °C	113.0 %	
0 °C	109.0 %		0 °C	112.0 %	
10 °C	107.0 %		10 °C	110.0 %	
20 °C	105.0 %		20 °C	108.0 %	
25 °C	104.0 %		25 °C	107.0 %	
30 °C	103.0 %		30 °C	106.0 %	
35 °C	101.5 %		35 °C	104.5 %	
40 °C	100.0 %	Ambient temperature	40 °C	103.0 %	
45 °C	98.5 %		45 °C	101.5 %	
50 °C	97.0 %		50 °C	100.0 %	Ambient temperature

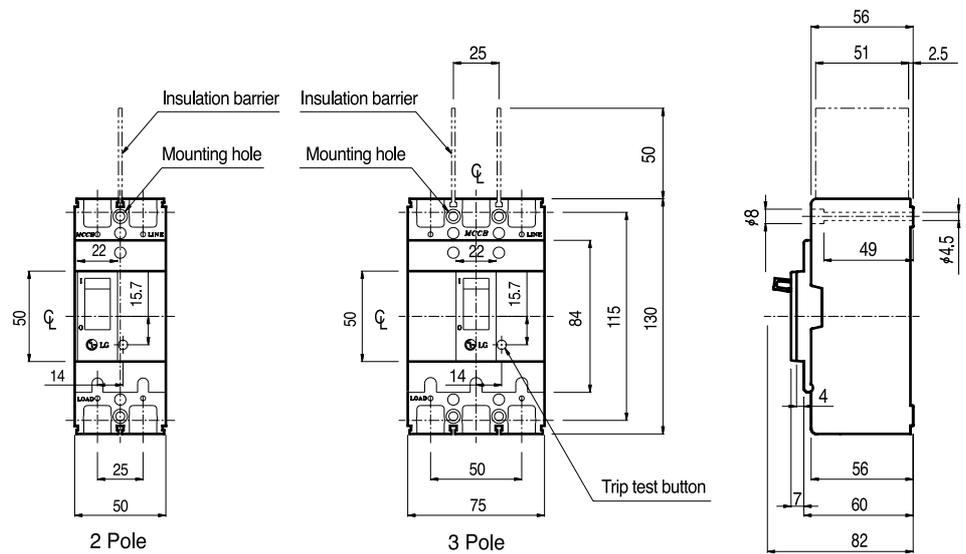
● ABE800b, ABS800b, ABL800b

Ambient temperature : 40 °C			Ambient temperature : 50 °C		
Temperature	Rated current	Remark	Temperature	Rated current	Remark
-5 °C	110.0 %		-5 °C	113.0 %	
0 °C	109.0 %		0 °C	112.0 %	
10 °C	107.0 %		10 °C	110.0 %	
20 °C	105.0 %		20 °C	108.0 %	
25 °C	104.0 %		25 °C	107.0 %	
30 °C	103.0 %		30 °C	106.0 %	
35 °C	101.5 %		35 °C	104.5 %	
40 °C	100.0 %	Ambient temperature	40 °C	103.0 %	
45 °C	98.5 %		45 °C	101.5 %	
50 °C	97.0 %		50 °C	100.0 %	Ambient temperature

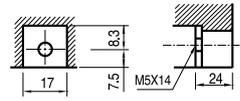
# Overall dimensions

## AB type non-adjustable MCCBs

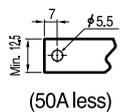
- ABE52b
- ABE53b
- ABE62b
- ABE63b
- ABS32b
- ABS33b



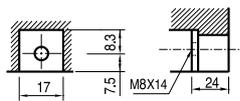
Detailed terminal



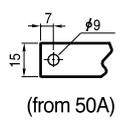
Hole size of a conductor



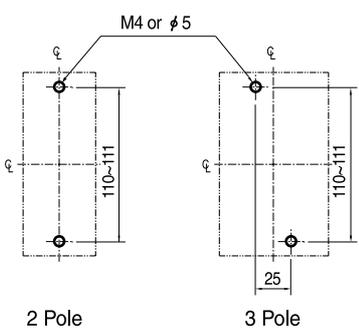
Detailed terminal



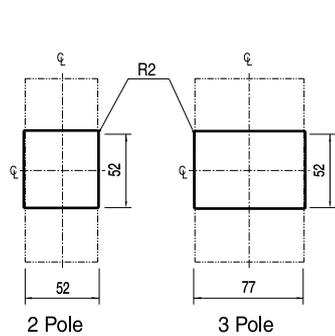
Hole size of a conductor



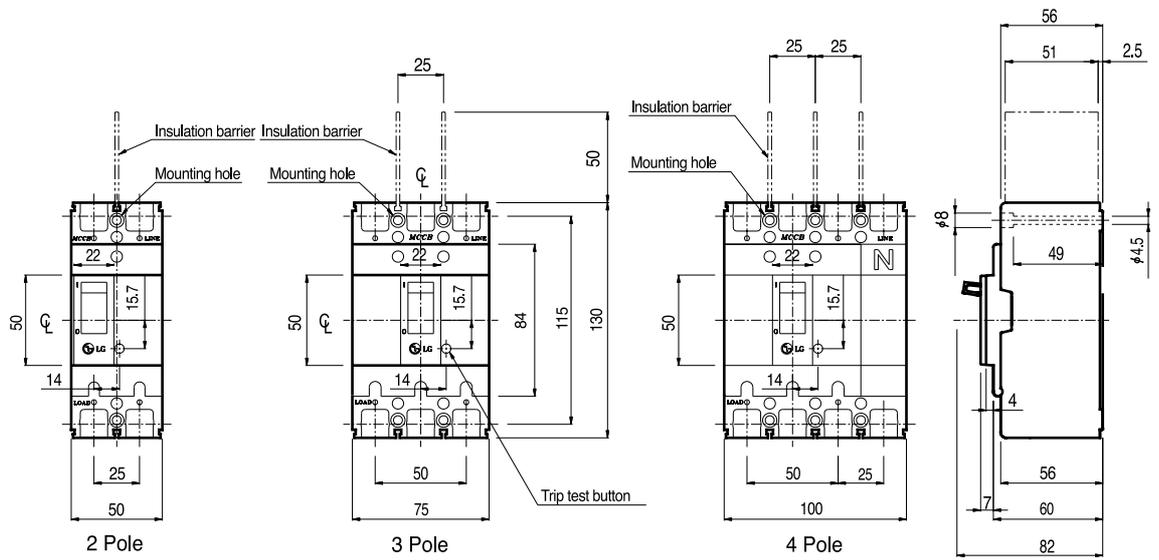
Mounting



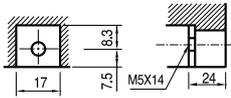
Slot



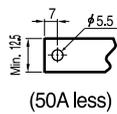
- ABE102b
- ABE103b
- ABS52b
- ABS53b
- ABS54b
- ABS62b
- ABS63b
- ABS64b
- ABH32b
- ABH33b



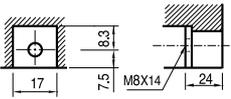
Detailed terminal



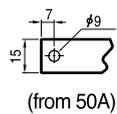
Hole size of a conductor



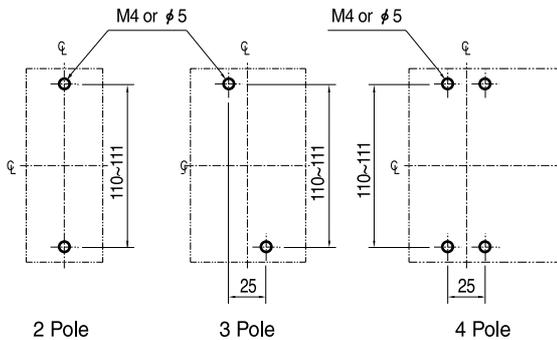
Detailed terminal



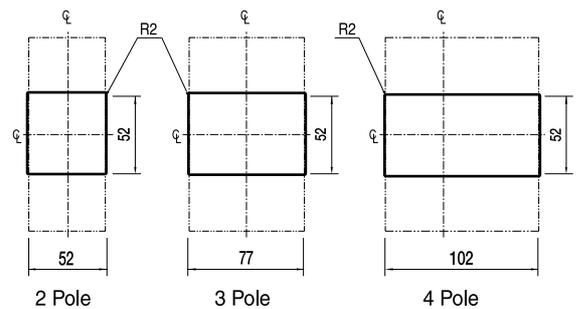
Hole size of a conductor



Mounting



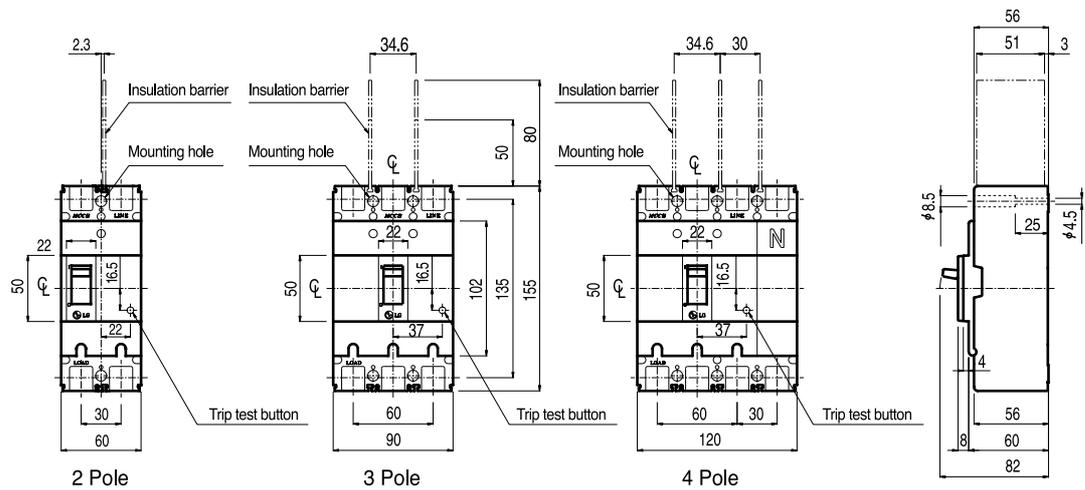
Slot



# Overall dimensions

## AB type non-adjustable MCCBs

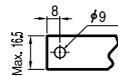
- ABS102b
- ABS103b
- ABS104b
- ABH52b
- ABH53b
- ABH102b
- ABH103b
- ABH104b



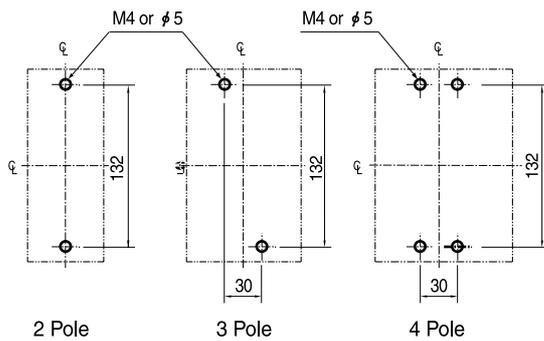
Detailed terminal



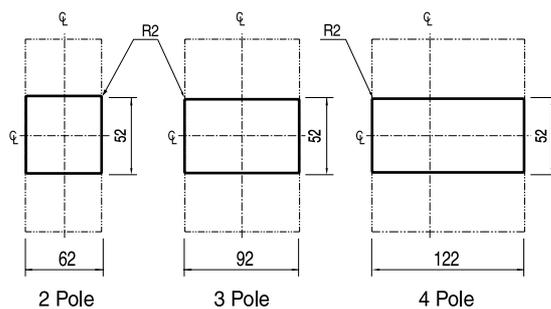
Hole size of a conductor



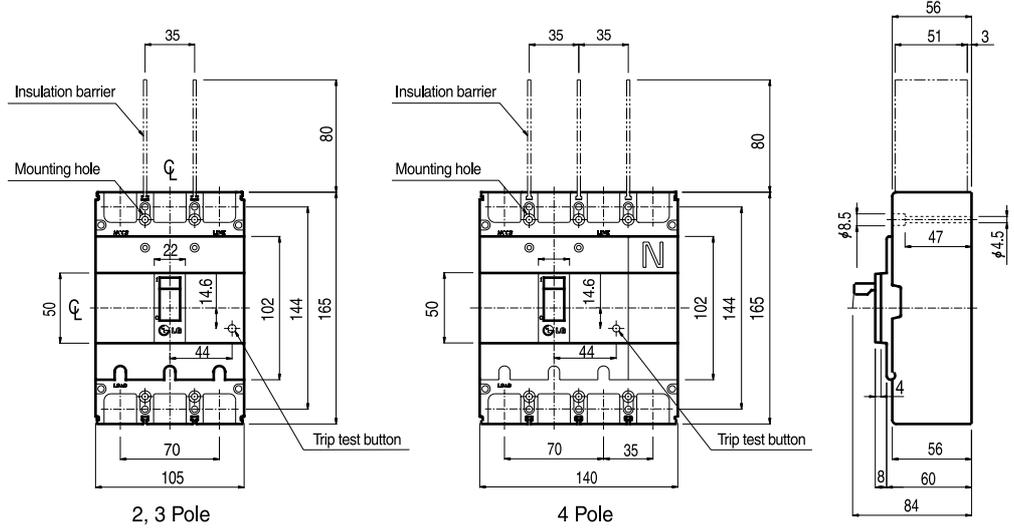
Mounting



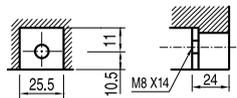
Slot



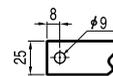
- ABE202b
- ABE203b
- ABE204b
- ABS202b
- ABS203b
- ABS204b
- ABH202b
- ABH203b
- ABH204b



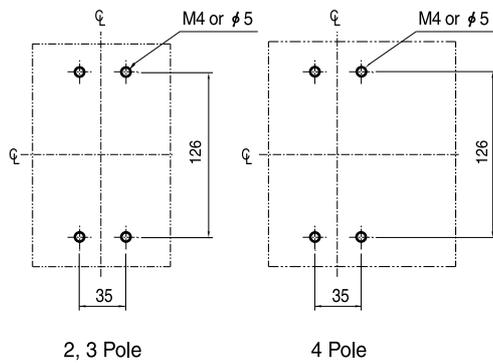
Detailed terminal



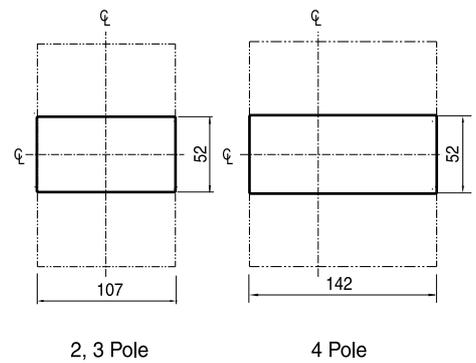
Hole size of a conductor



Mounting



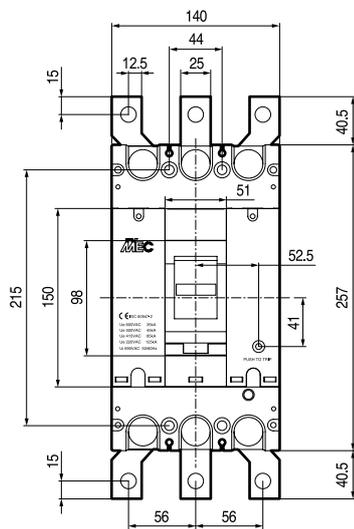
Slot



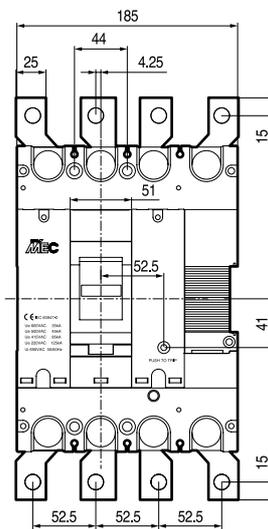
# Overall dimensions

## AB type non-adjustable MCCBs

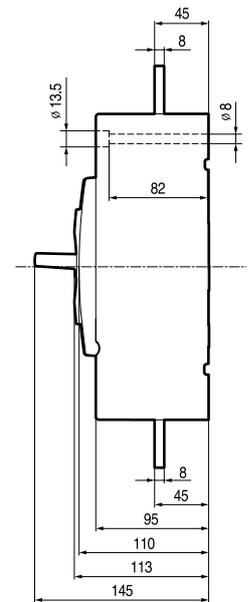
- ABE402b
- ABE403b
- ABE404b
- ABS402b
- ABS403b
- ABS404b
- ABH402b
- ABH403b
- ABH404b
- ABL402b
- ABL403b
- ABL404b



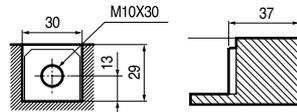
2,3 Pole



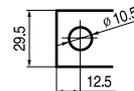
4 Pole



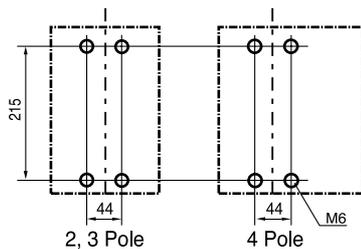
Detailed terminal



Hole size of a conductor



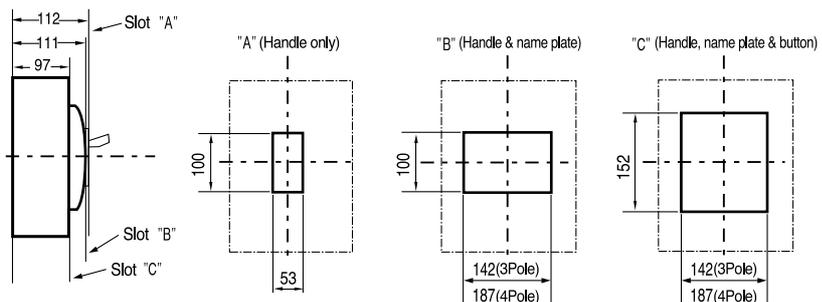
Mounting



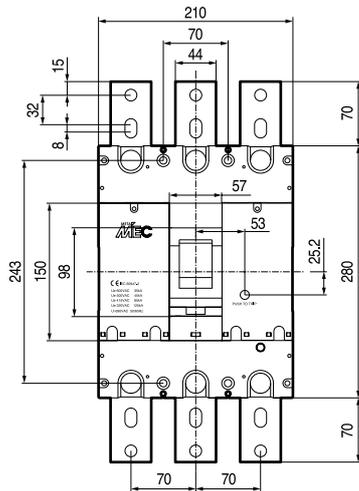
2, 3 Pole

4 Pole

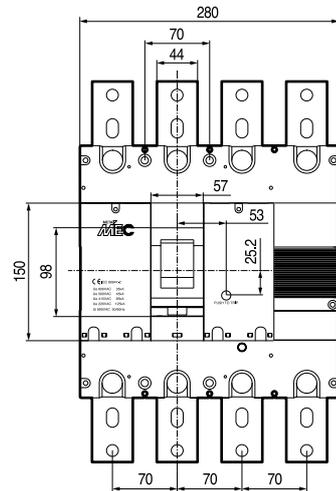
Slot



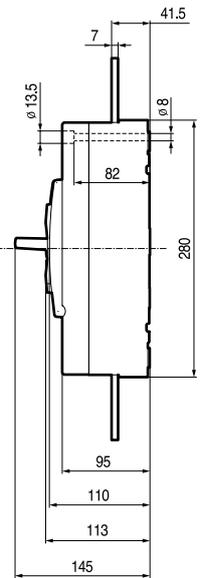
- ABE802b(500, 600A)
- ABE803b(500, 600A)
- ABE804b(500, 600A)
- ABS802b(500, 600A)
- ABS803b(500, 600A)
- ABS804b(500, 600A)
- ABL802b(500, 600A)
- ABL803b(500, 600A)
- ABL804b(500, 600A)



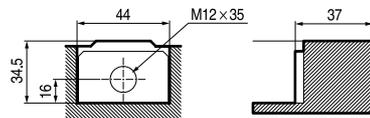
2,3 Pole



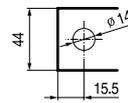
4 Pole



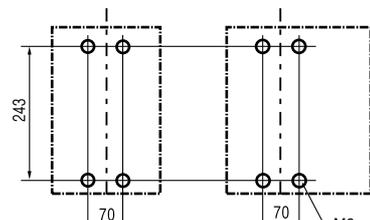
Detailed terminal



Hole size of a conductor



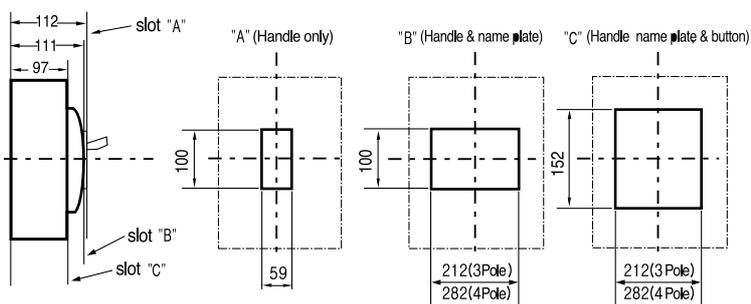
Mounting



2, 3 Pole

4 Pole

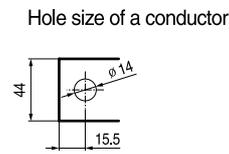
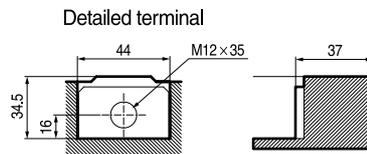
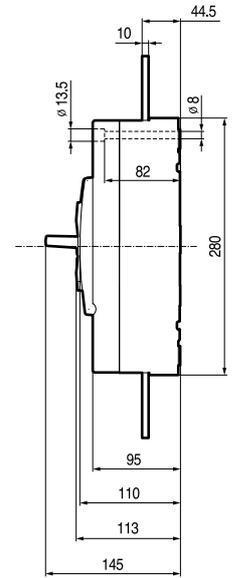
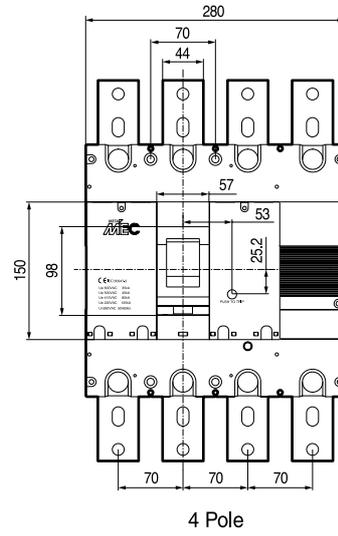
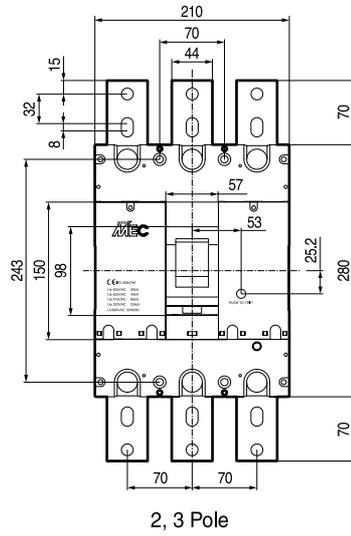
Slot



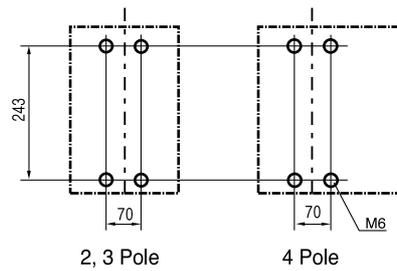
# Overall dimensions

## GB type adjustable MCCBs

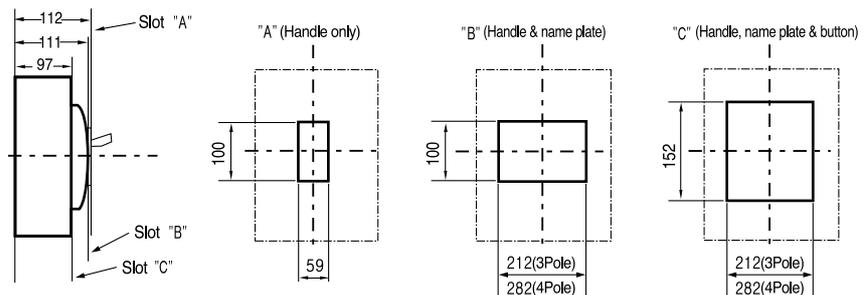
- ABE802b(700, 800A)
- ABE803b(700, 800A)
- ABE804b(700, 800A)
- ABS802b(700, 800A)
- ABS803b(700, 800A)
- ABS804b(700, 800A)
- ABL802b(700, 800A)
- ABL803b(700, 800A)
- ABL804b(700, 800A)



### Mounting



### Slot

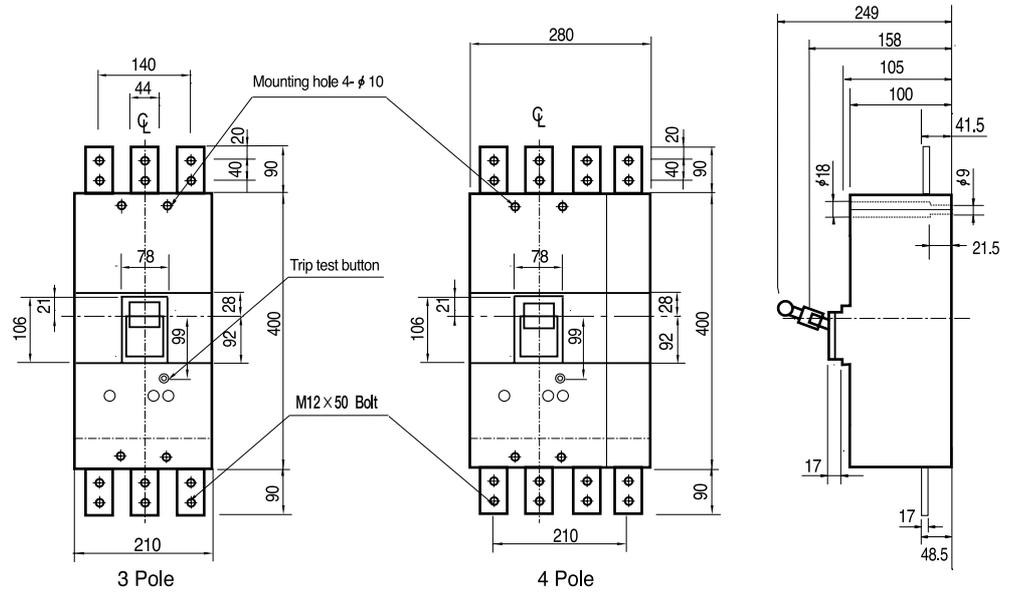


ABS1003

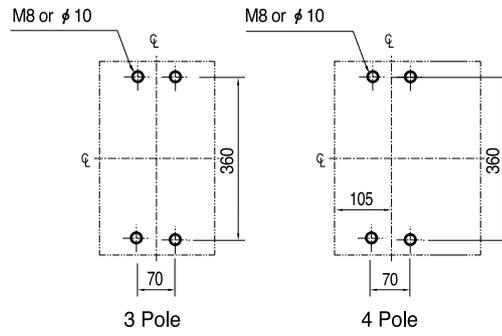
ABS1004

ABS1203

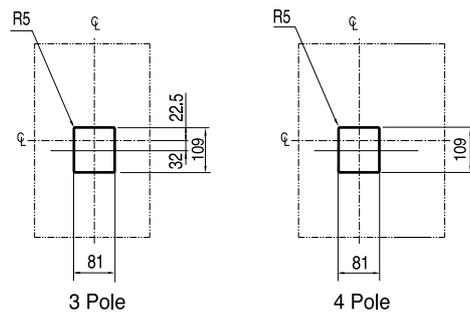
ABS1204



### Mounting



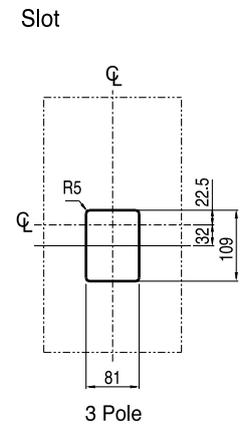
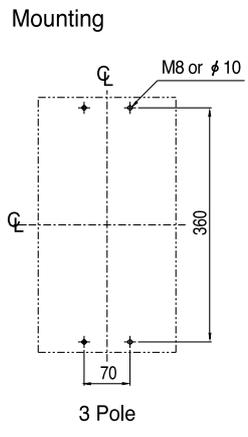
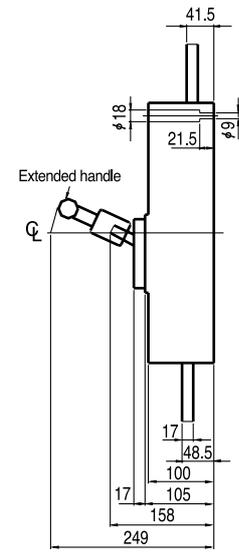
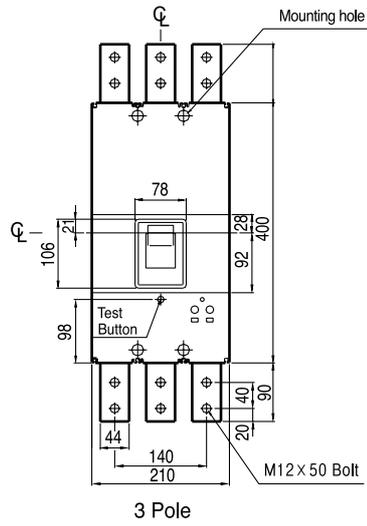
### Slot



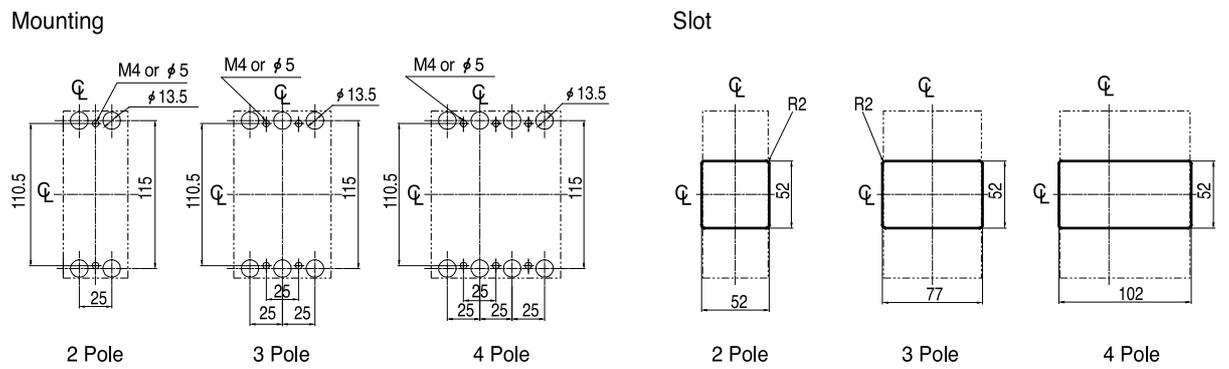
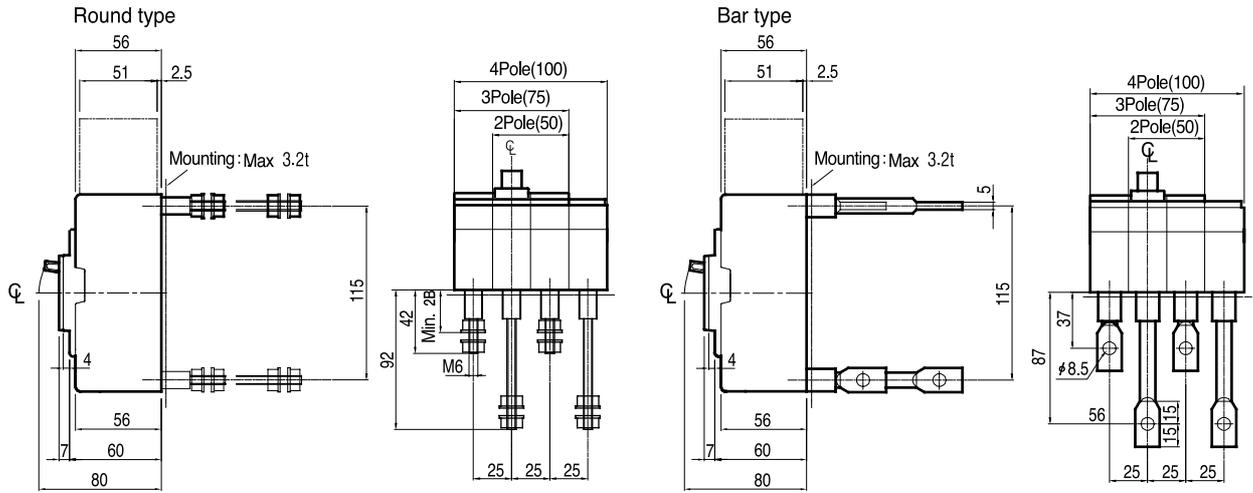
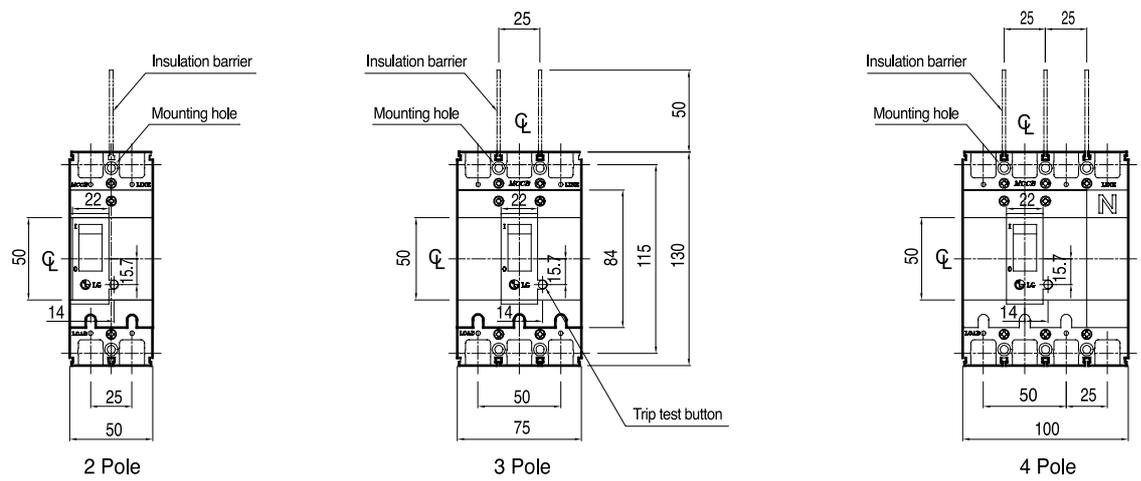
# Overall dimensions

## AB type non-adjustable MCCBs

ABS1203E



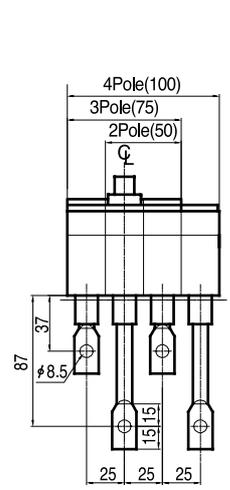
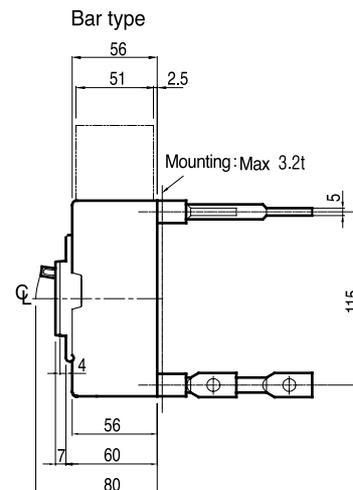
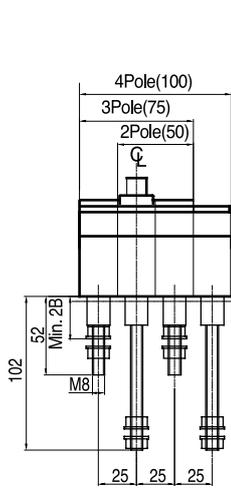
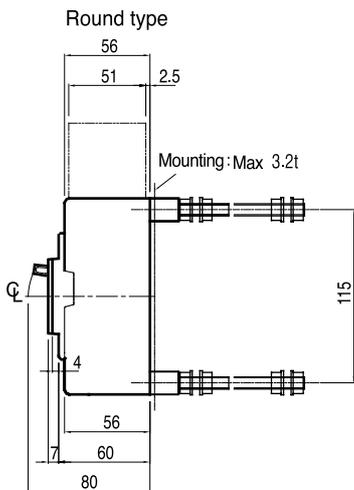
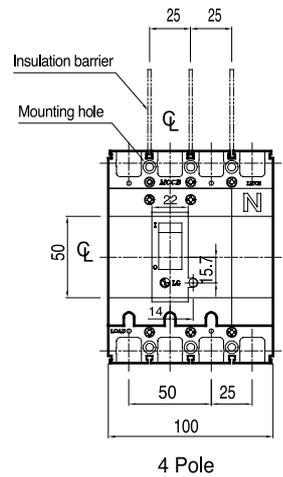
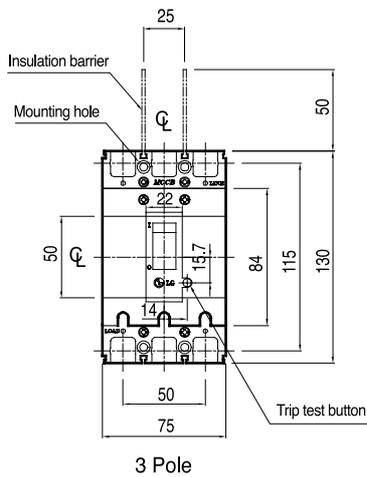
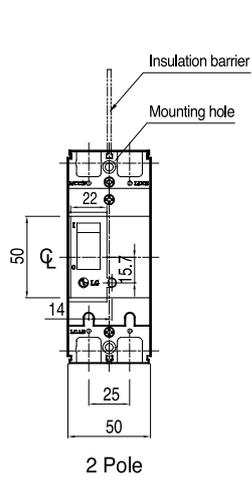
- ABS30bX
- ABH30bX
- ABE50bX
- ABS50bX
- ABE100bX(3-50A)



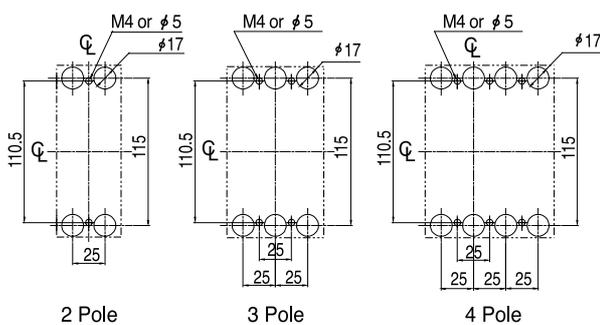
# Overall dimensions

## AB type non-adjustable MCCBs

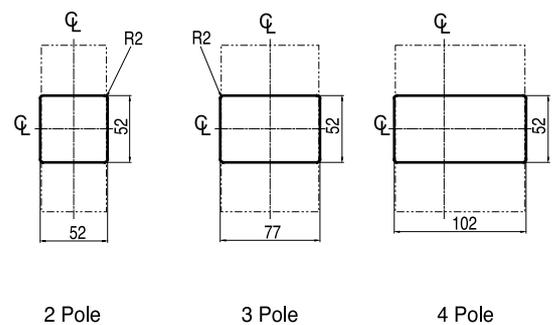
- ABE60bX
- ABS60bX
- ABE100bX(60-100A)



### Mounting



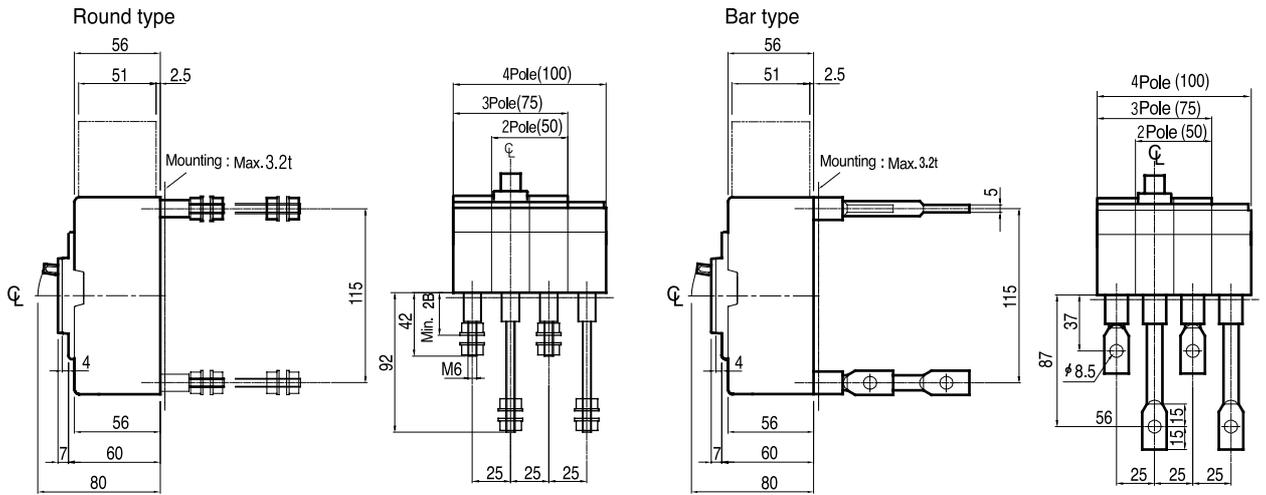
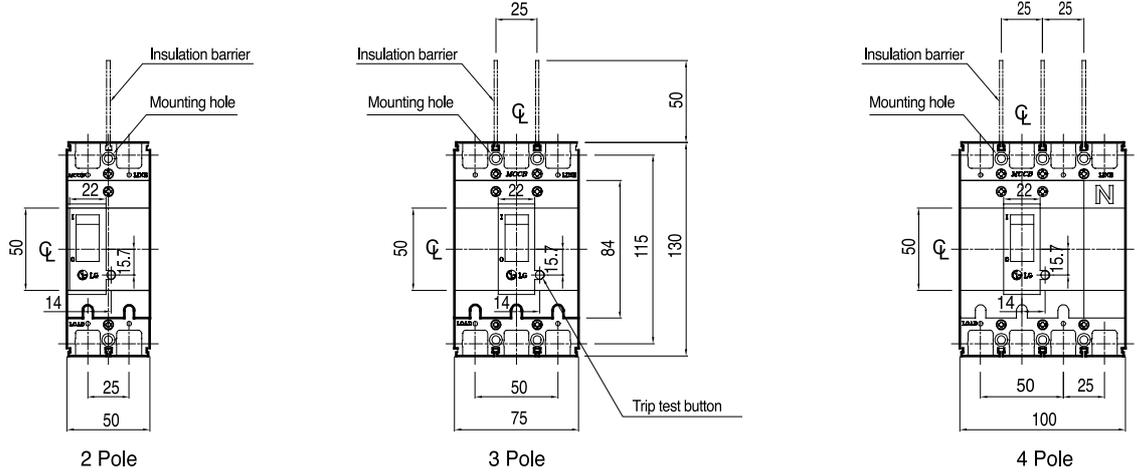
### Slot



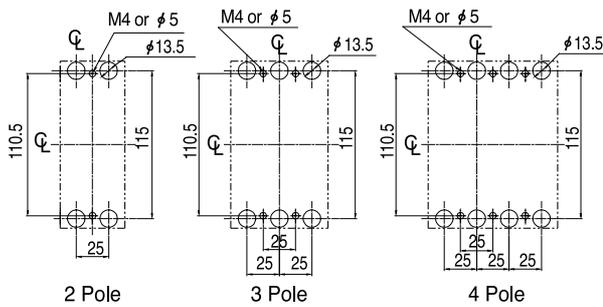
ABH50bX

ABS100bX

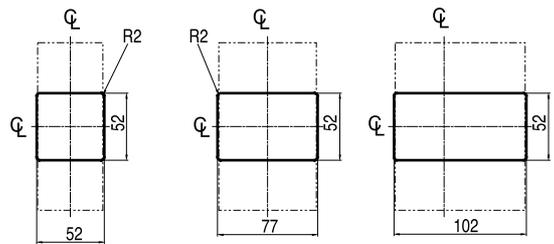
ABH100bX



Mounting



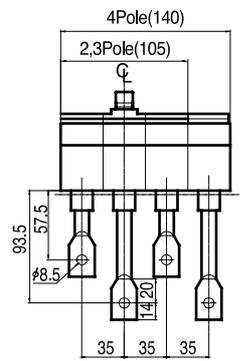
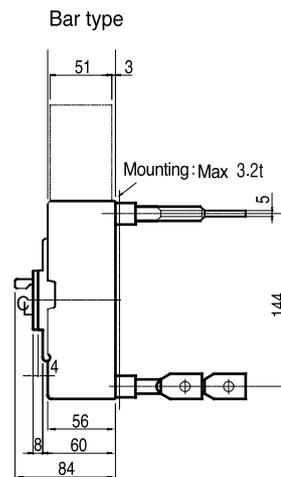
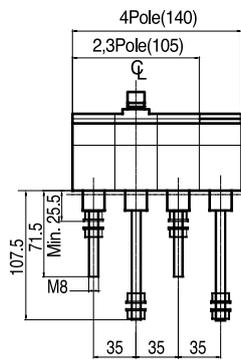
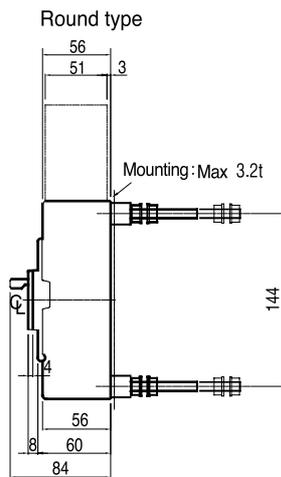
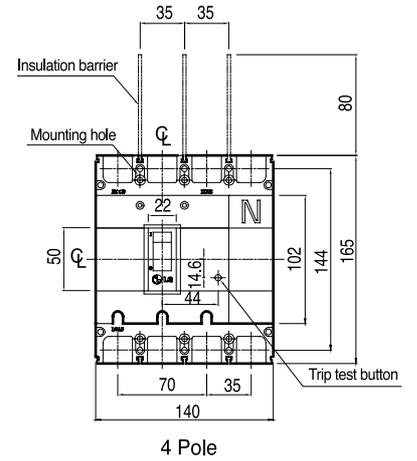
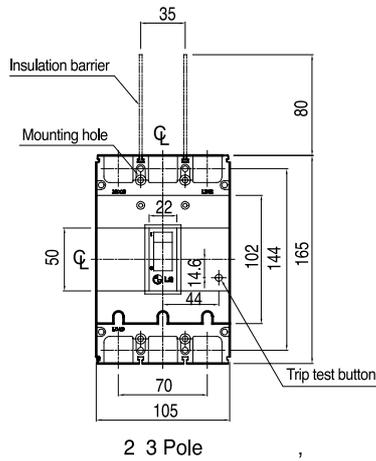
Slot



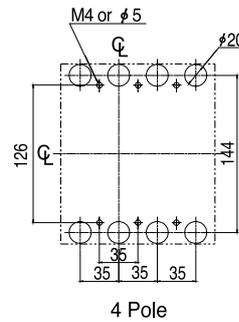
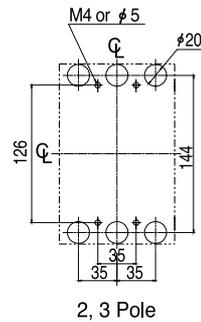
# Overall dimensions

## AB type non-adjustable MCCBs

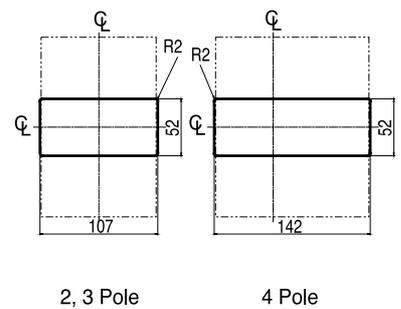
- ABE200bX
- ABS200bX
- ABH200bX



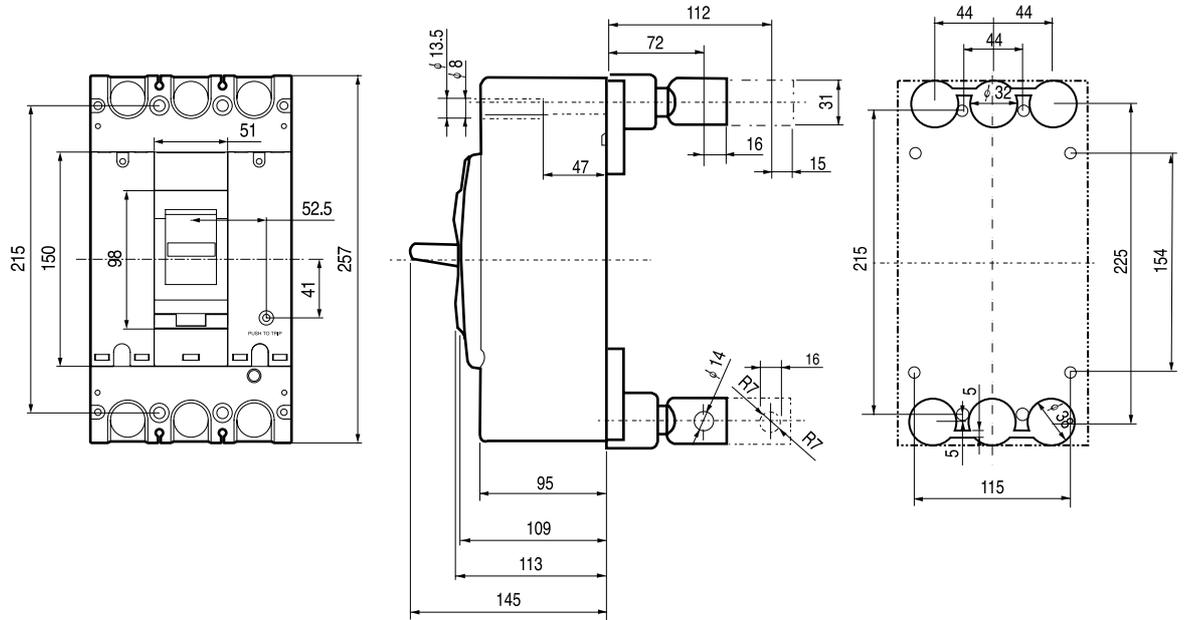
### Mounting



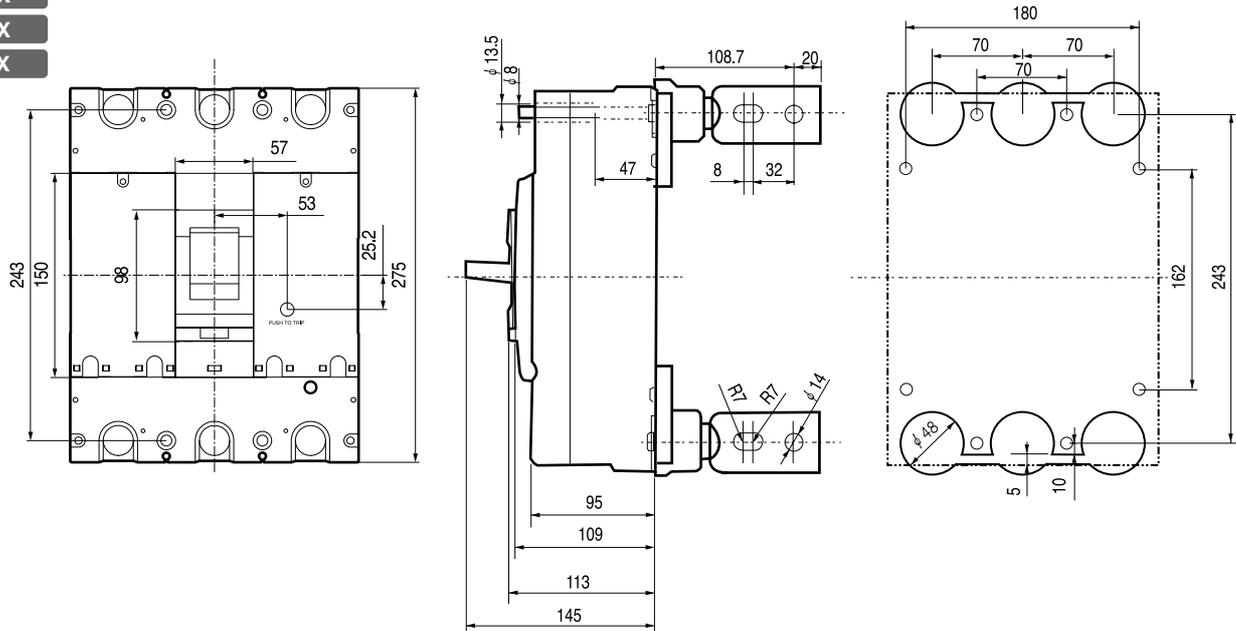
### Slot



- ABE400bX
- ABS400bX
- ABH400bX
- ABL400bX



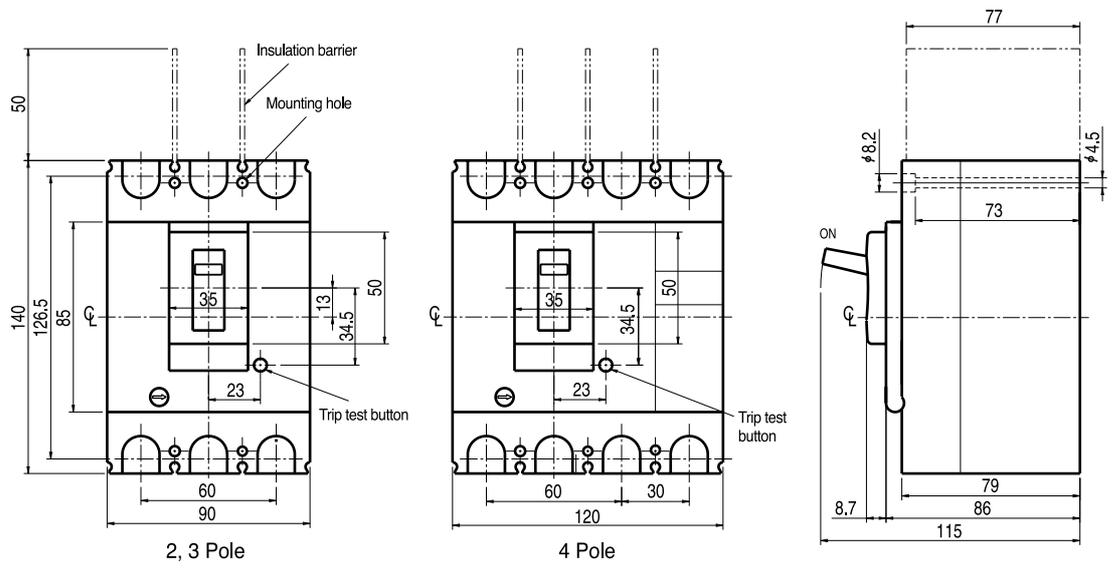
- ABE800bX
- ABS800bX
- ABL800bX



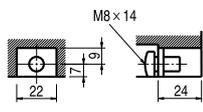
# Overall dimensions

## GB type adjustable MCCBs

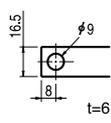
- GBN102
- GBN103
- GBN104
- GBH102
- GBH103
- GBH104



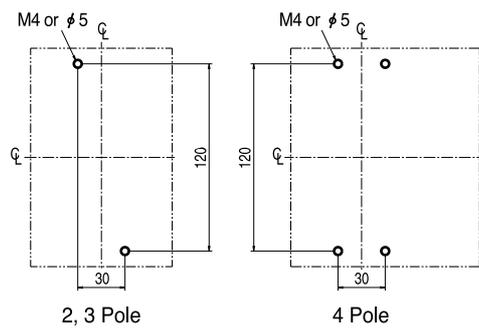
Detailed terminal



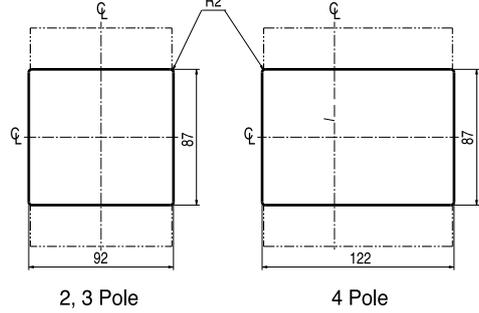
Hole size of a conductor



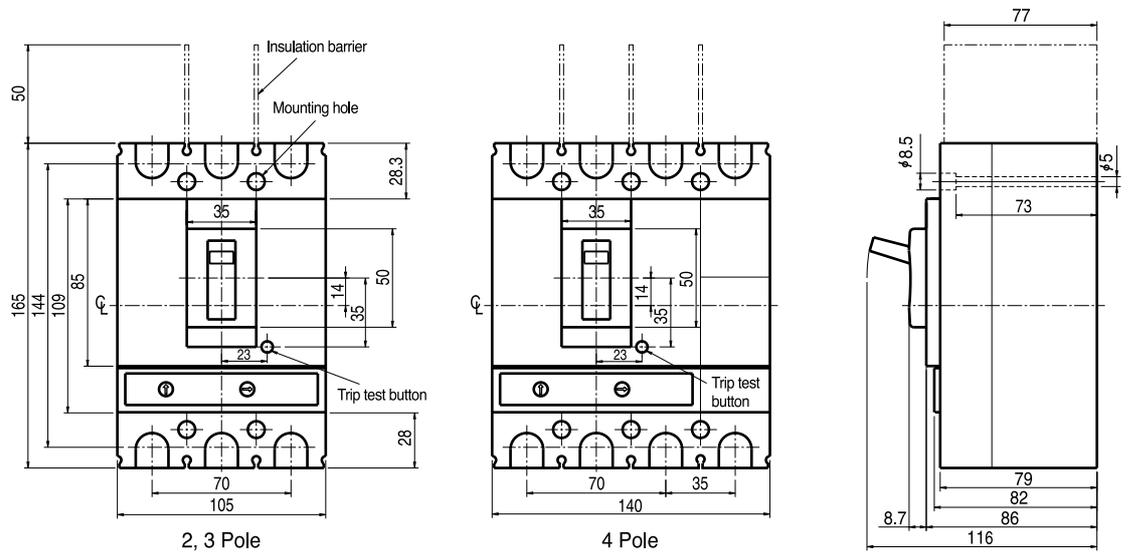
Mounting



Slot

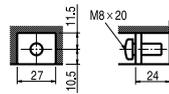


- GBN202
- GBN203
- GBN204
- GBH202
- GBH203
- GBH204
- GBL102
- GBL103
- GBL104
- GBL202
- GBL203
- GBL204

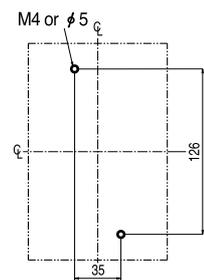


Detailed terminal

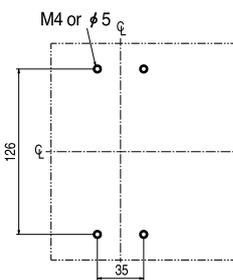
Hole size of a conductor



Mounting

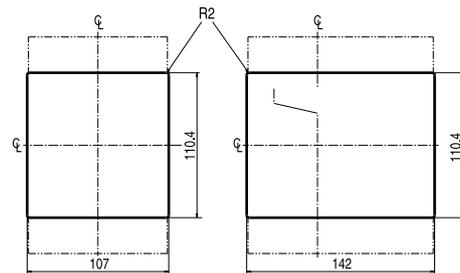


2, 3 Pole



4 Pole

Slot



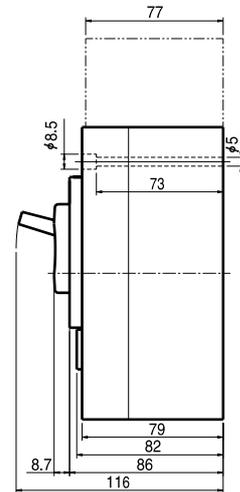
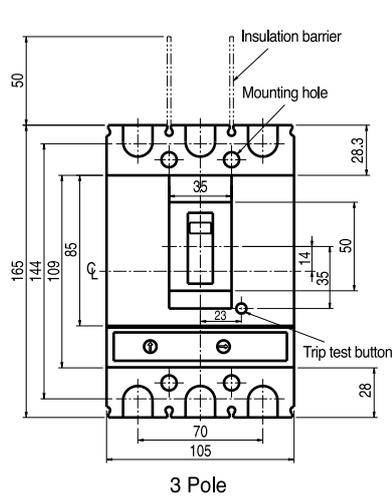
2, 3 Pole

4 Pole

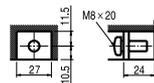
# Overall dimensions

## GB type adjustable MCCBs

- GBL53E
- GBL103E
- GBL203E



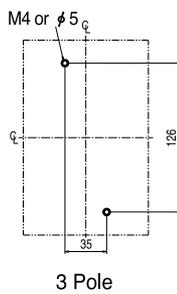
Detailed terminal



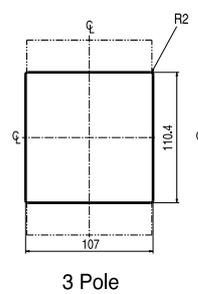
Hole size of a conductor



Mounting



Slot

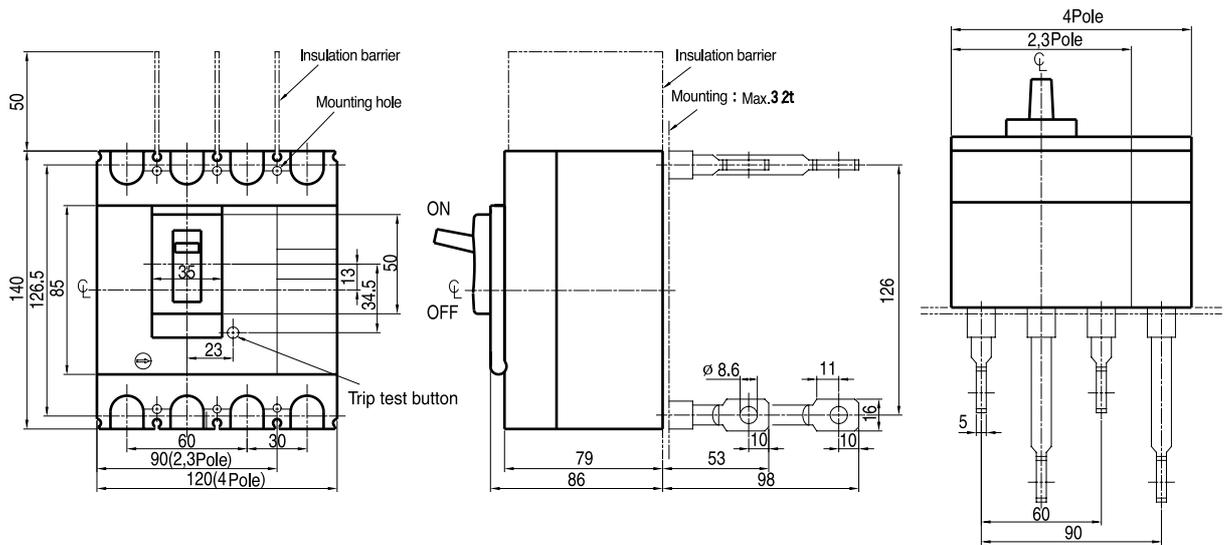


GBH50X

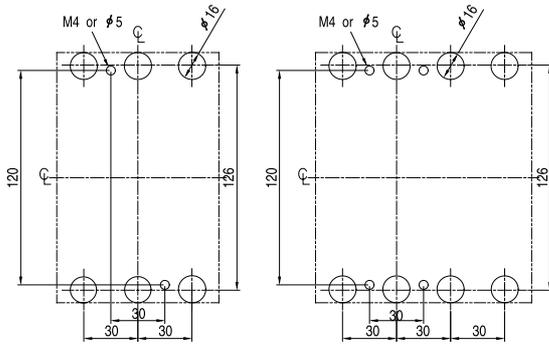
GBH100X

GBN50X

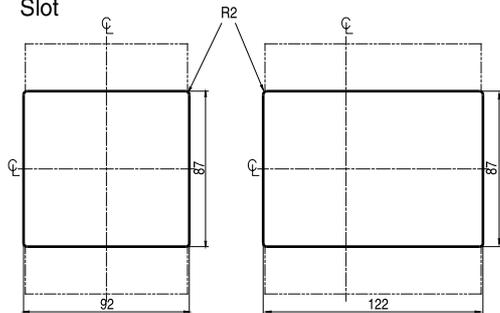
GBN100X



### Mounting



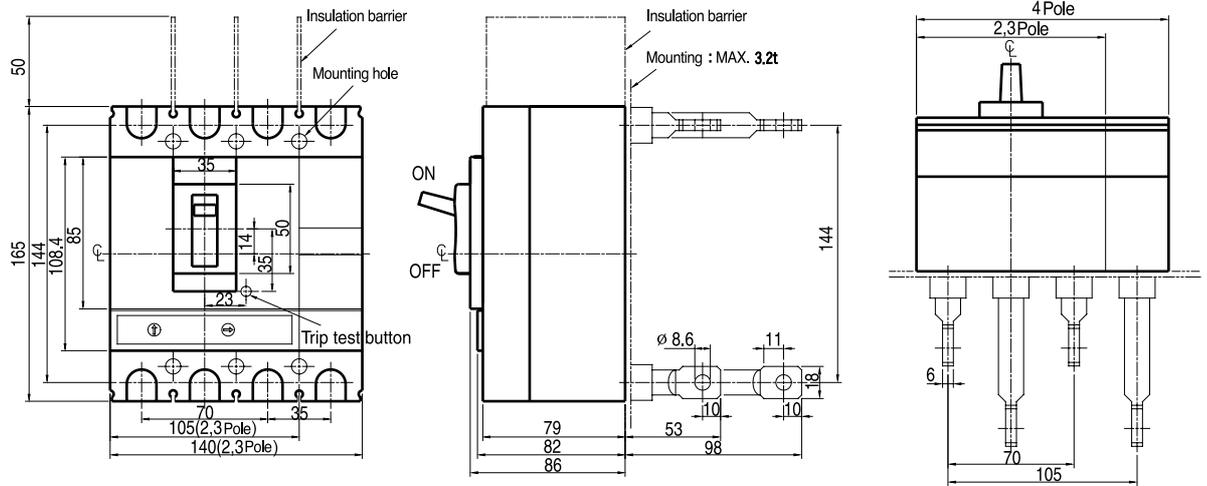
### Slot



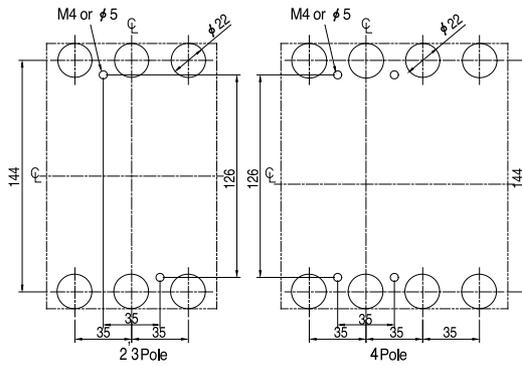
# Overall dimensions

## GB type adjustable MCCBs

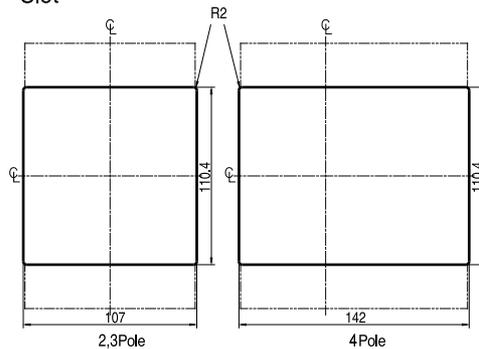
- GBH250X
- GBN250X
- GBL50X(E)
- GBL100X(E)
- GBL250X(E)



### Mounting

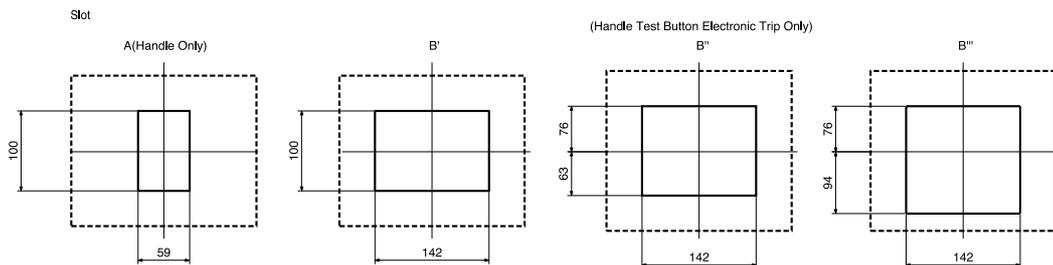
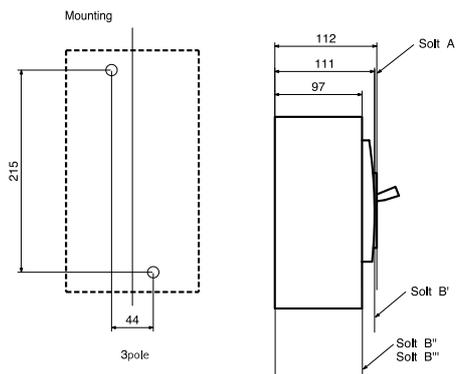
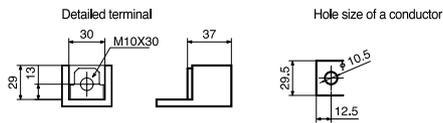
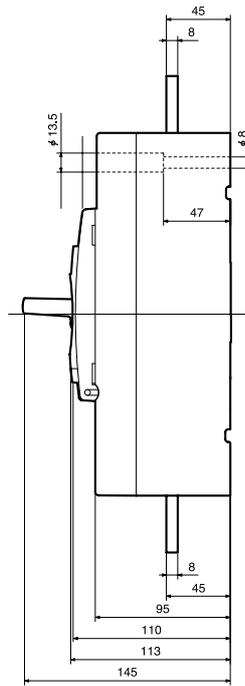
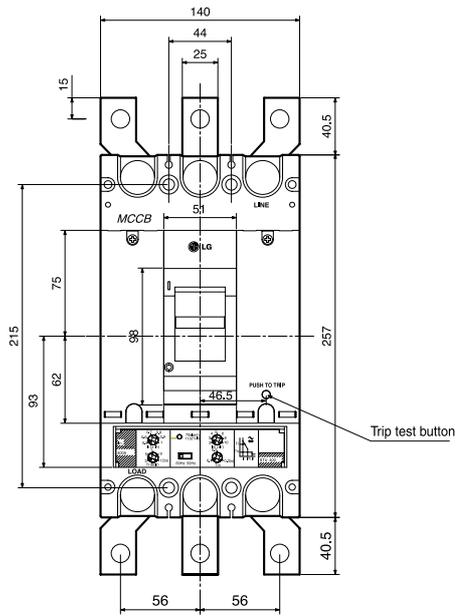


### Slot



GBN403E

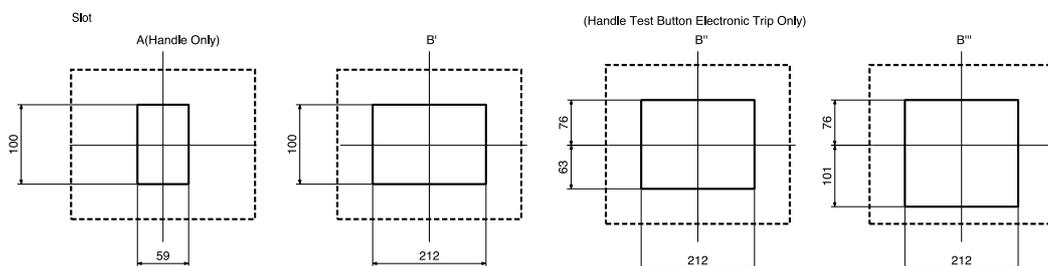
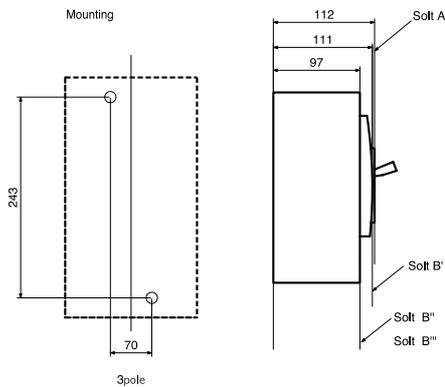
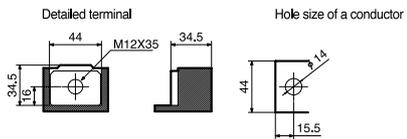
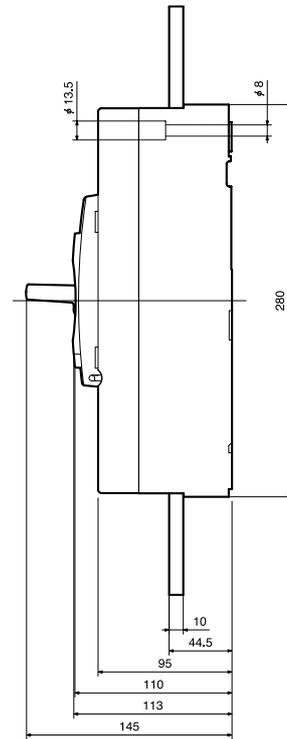
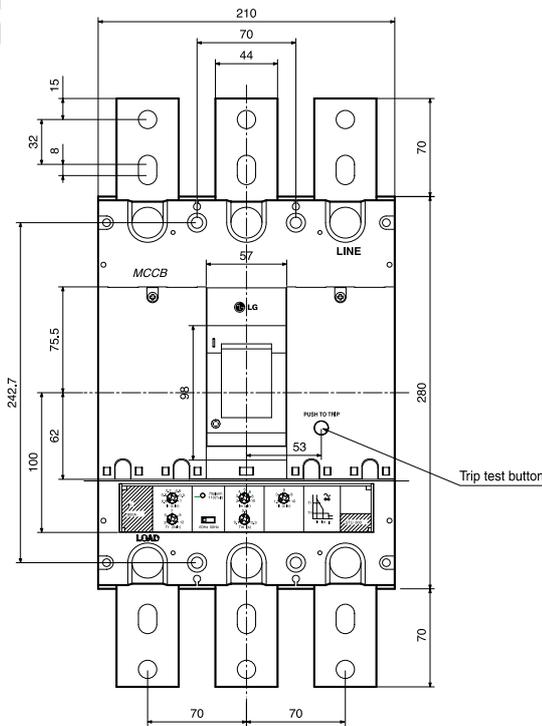
GBH403E



# Overall dimensions

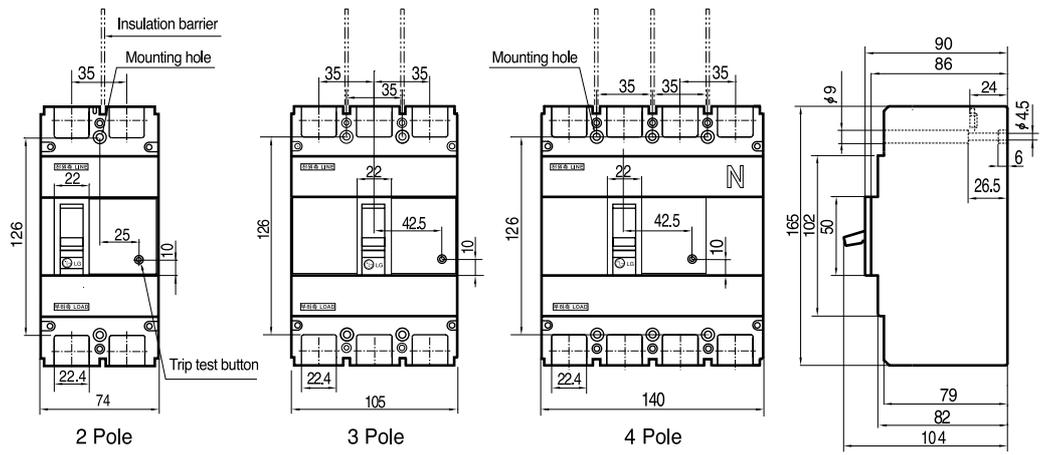
## GB type adjustable MCCBs

GBN803E  
GBH803E

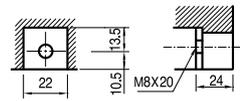


# Hi-MEC MCCBs

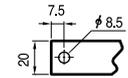
- ABL52a
- ABL53a
- ABL54a
- ABL102a
- ABL103a
- ABL104a



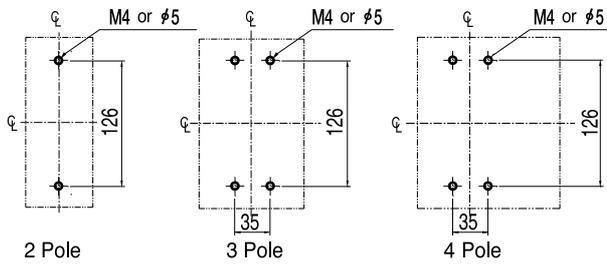
Detailed terminal



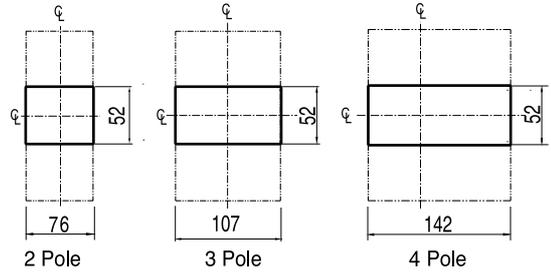
Hole size of a conductor



Mounting



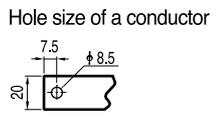
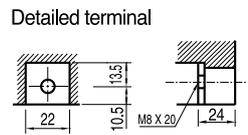
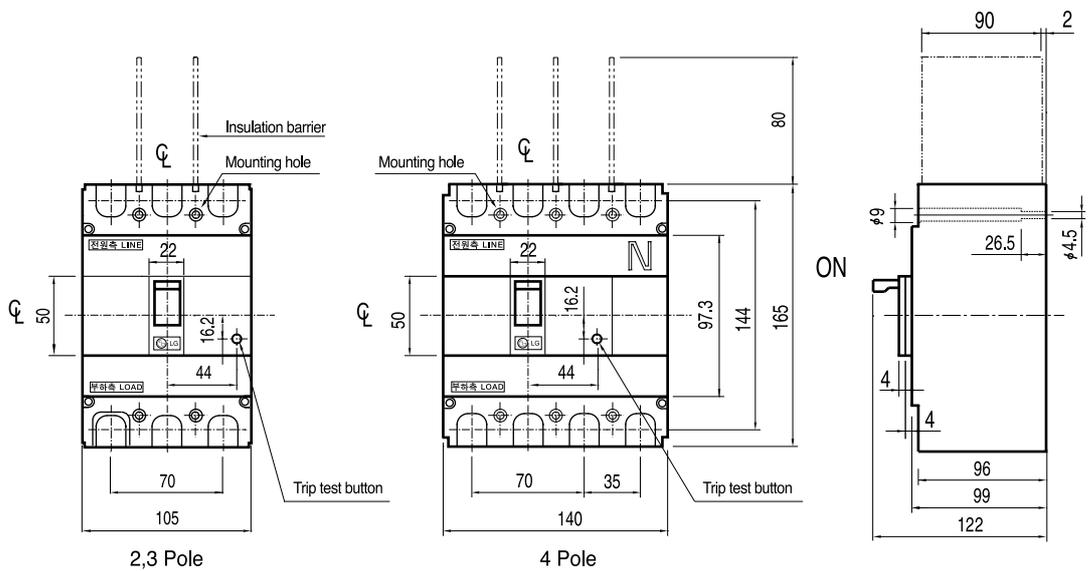
Slot



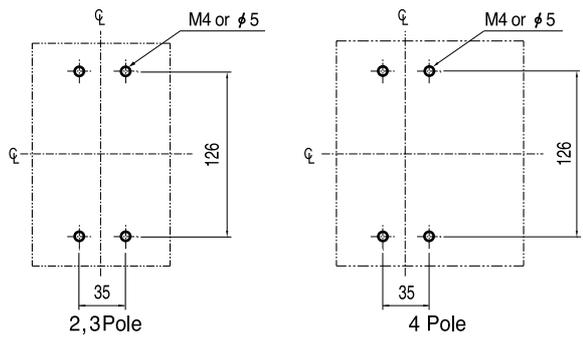
# Overall dimensions

## Hi-MEC MCCBs

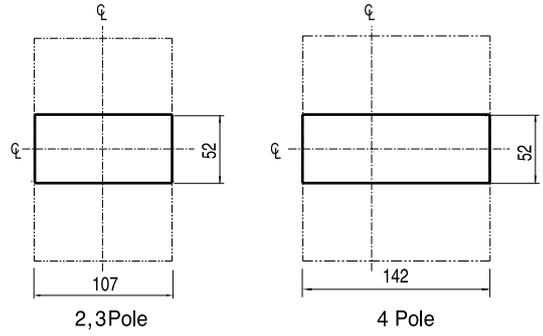
- ABL202a
- ABL203a
- ABL204a



### Mounting

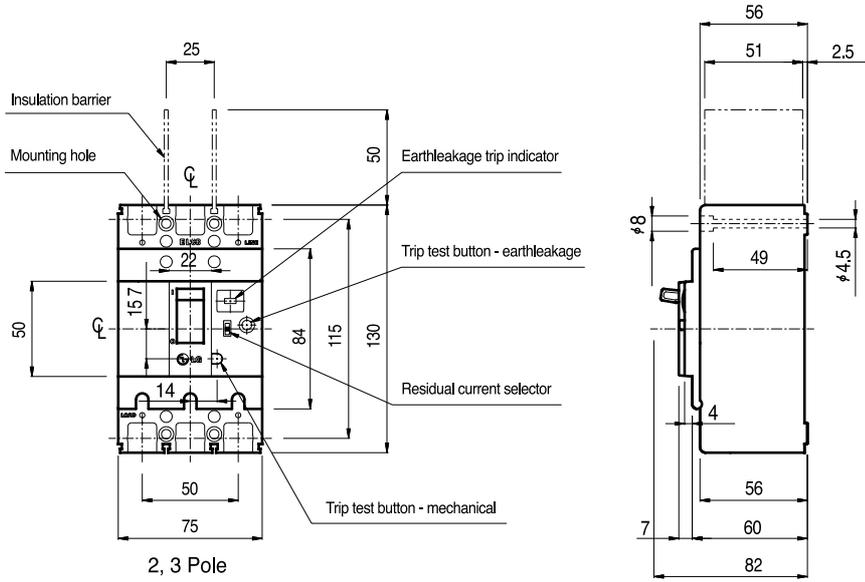


### Slot



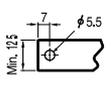
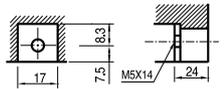
# ELCBs

- EBE53b
- EBE63b
- EBE102b
- EBE103b
- EBS33b
- EBS53b
- EBS63b
- EBH33b



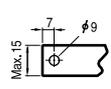
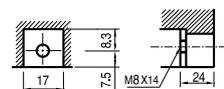
Detailed terminal (50A less)

Hole size of a conductor

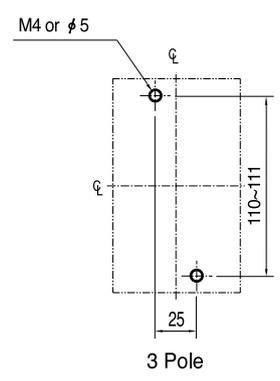


Detailed terminal (from 50A)

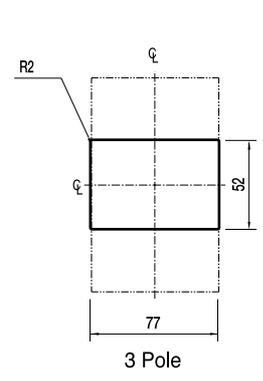
Hole size of a conductor



Mounting



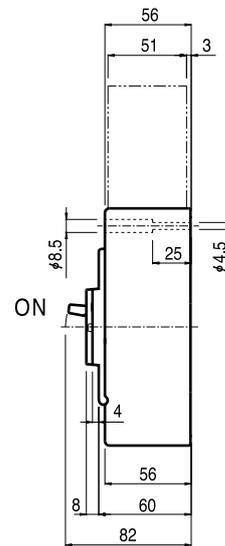
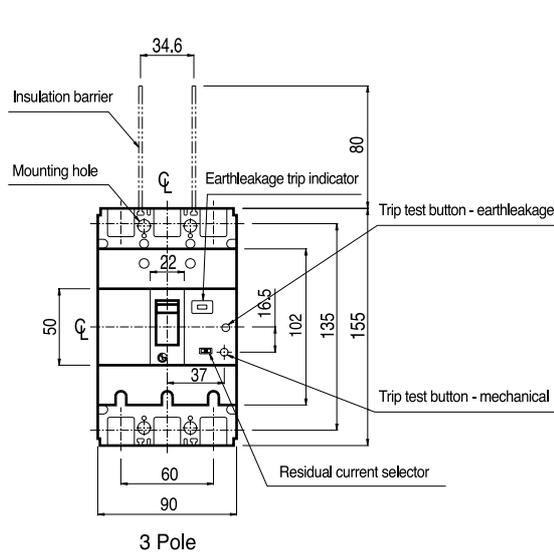
Slot



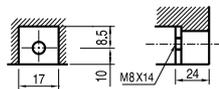
# Overall dimensions

## ELCBs

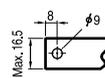
- EBS103b
- EBH53b
- EBH103b



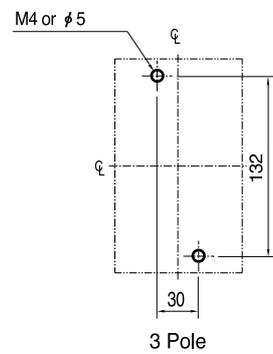
Detailed terminal



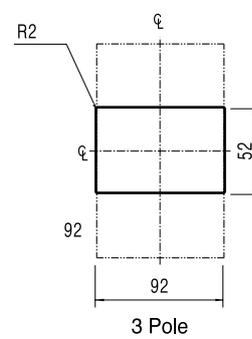
Hole size of a conductor



Mounting



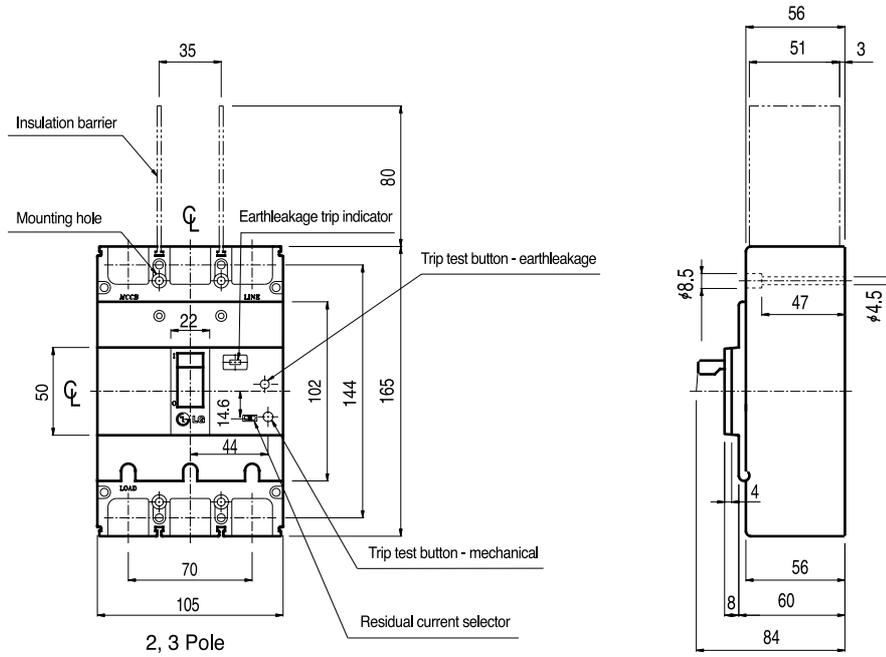
Slot



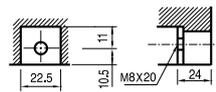
EBE203b

EBH203b

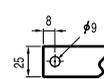
EBS203b



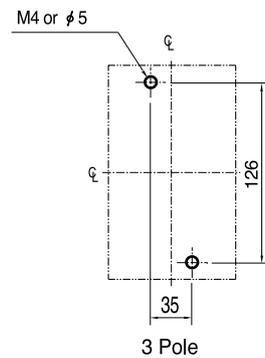
Detailed terminal



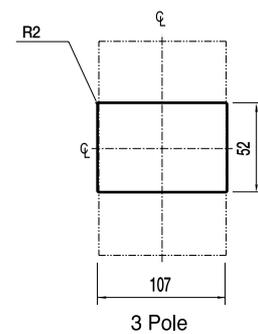
Hole size of a conductor



Mounting



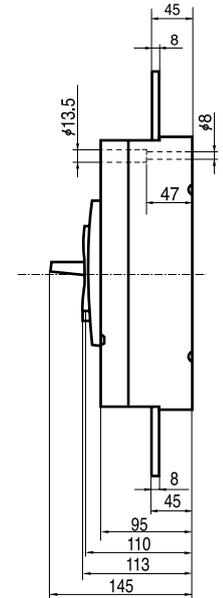
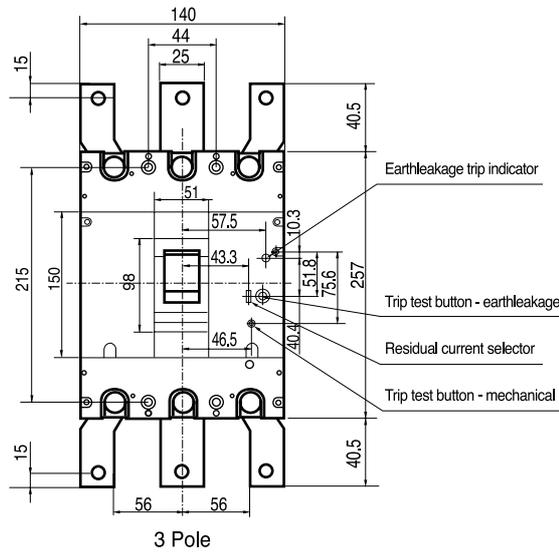
Slot



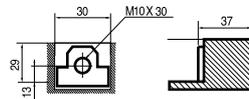
# Overall dimensions

## ELCBs

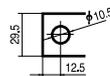
- EBE403b
- EBS403b
- EBH403b
- EBL403b



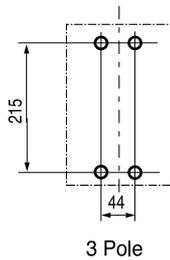
Detailed terminal



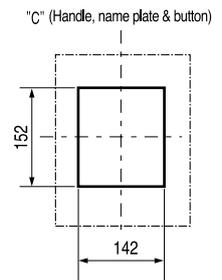
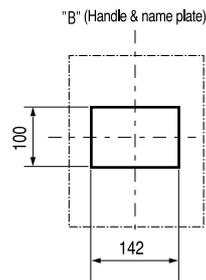
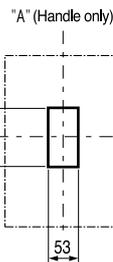
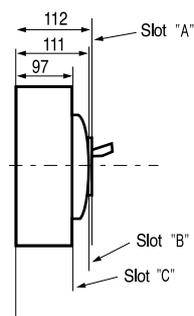
Hole size of a conductor



Mounting



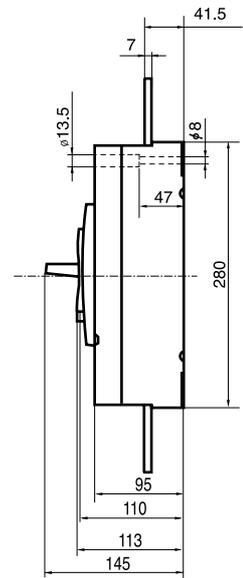
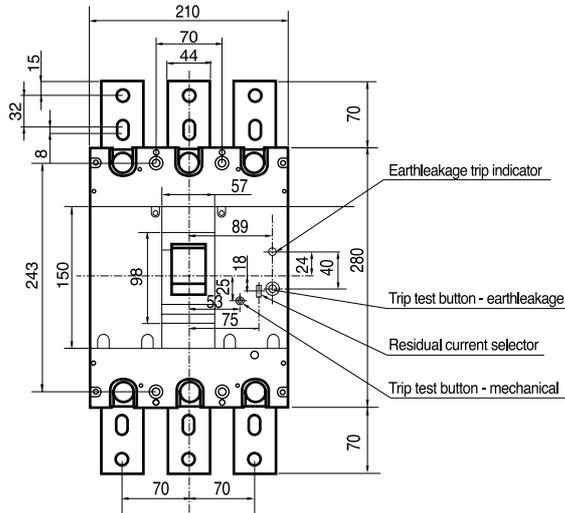
Slot



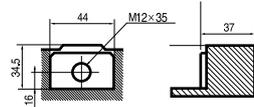
EBE803b(500, 600A)

EBS803b(500, 600A)

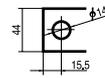
EBL803b(500, 600A)



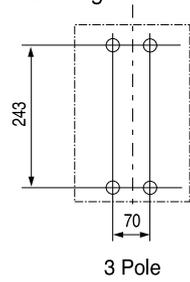
Detailed terminal



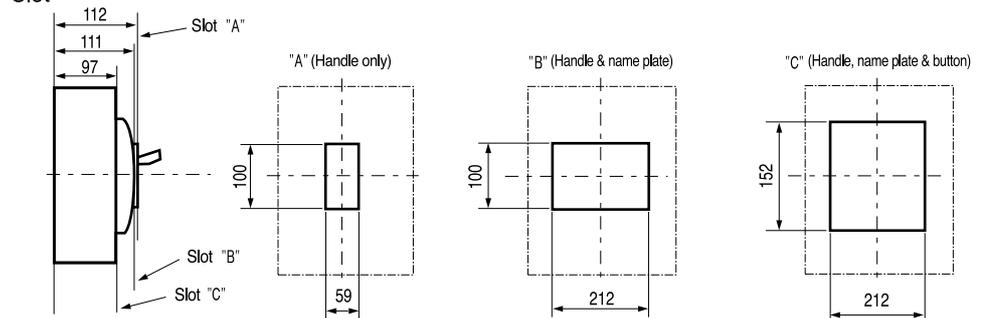
Hole size of a conductor



Mounting



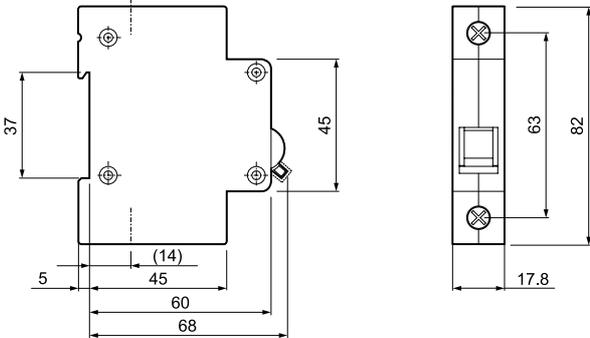
Slot



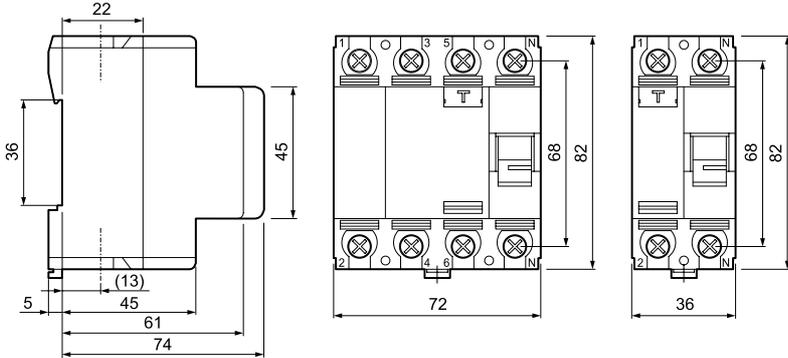


# Residential Breakers

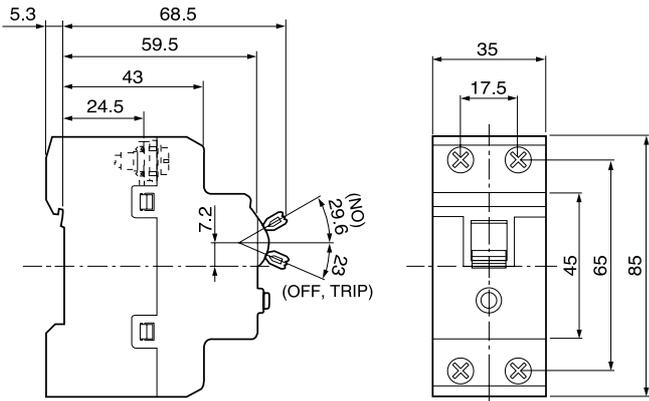
**BKN**



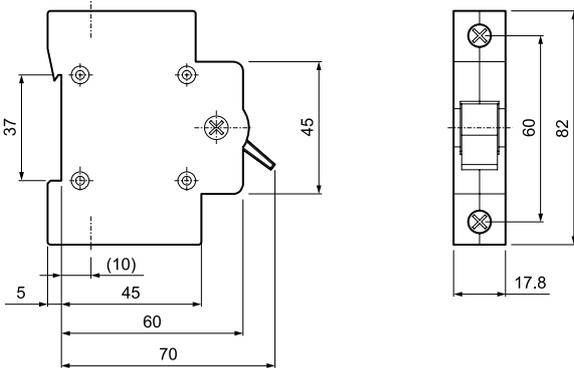
**RKN**



**32KGRa**



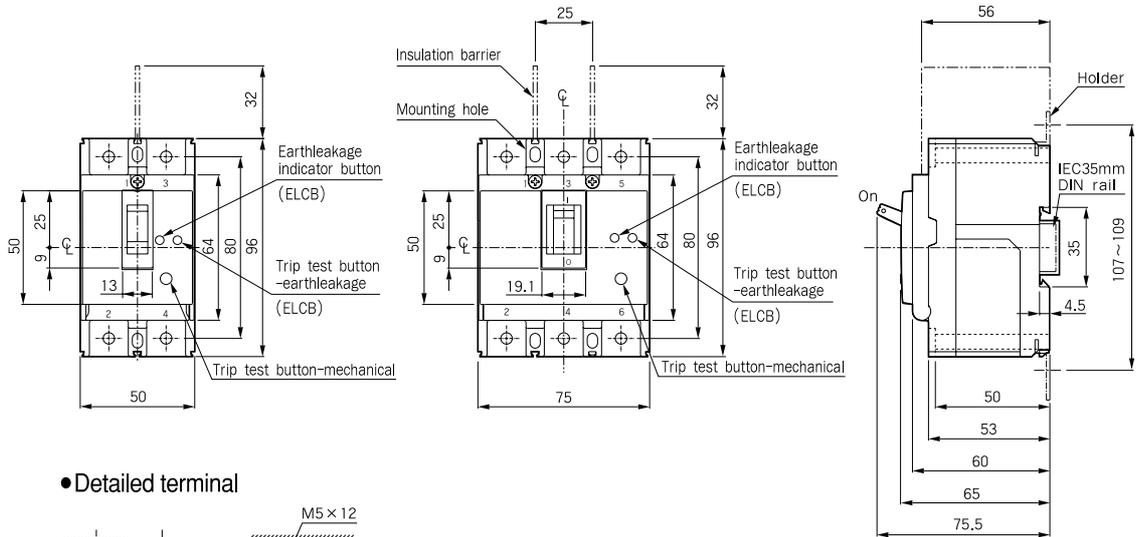
**BKD**



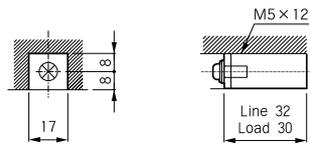
# Overall dimensions

## Residential Breakers

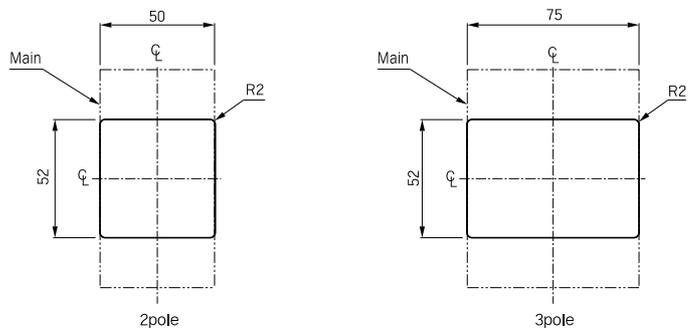
- ABS32Fb
- ABS33Fb
- ABS52Fb
- ABS53Fb
- EBS32Fb
- EBS33Fb
- EBS52Fb
- EBS53Fb



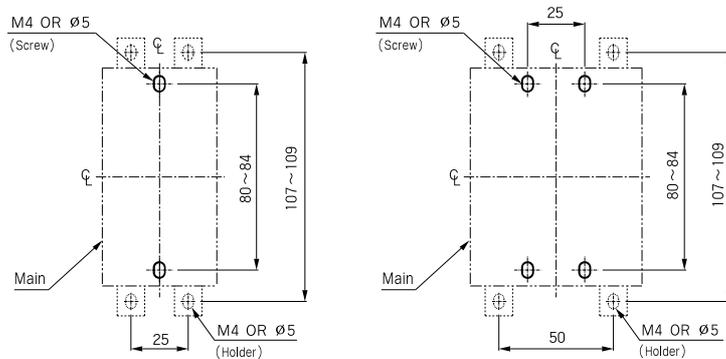
### • Detailed terminal



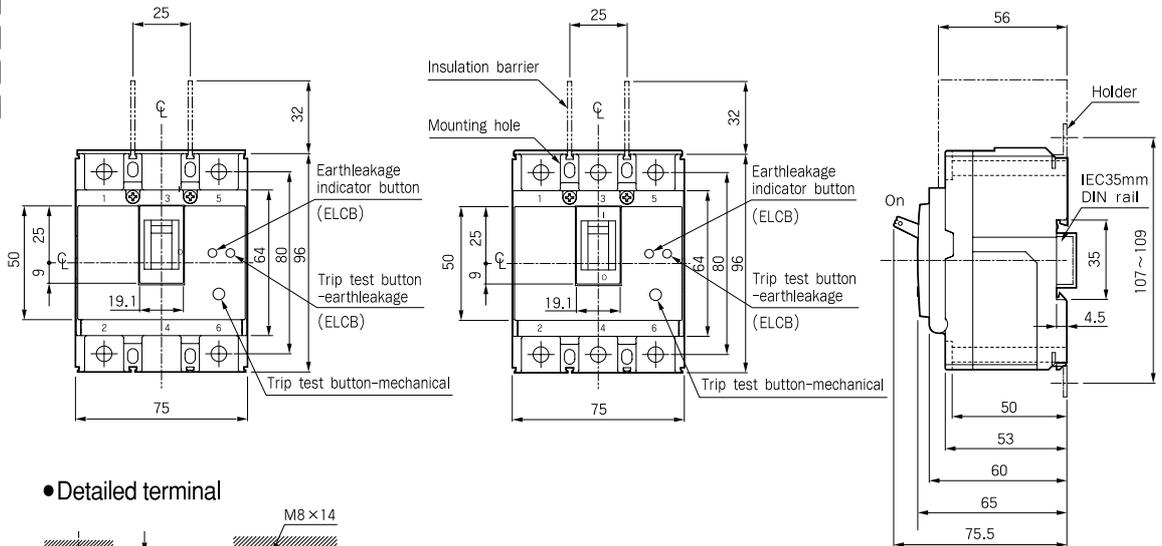
### Slot



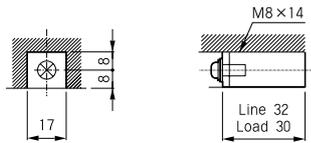
### Mounting



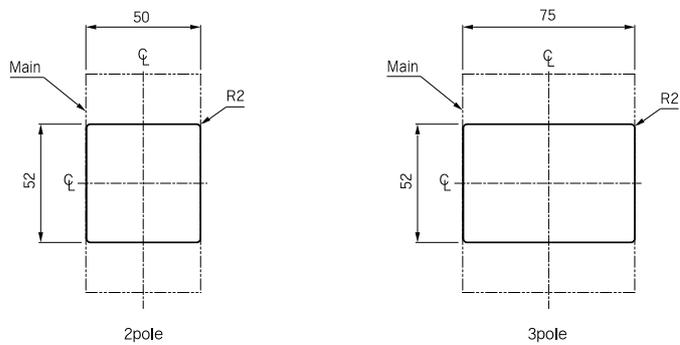
- ABS102Fb
- ABS103Fb
- EBS102Fb
- EBS103Fb



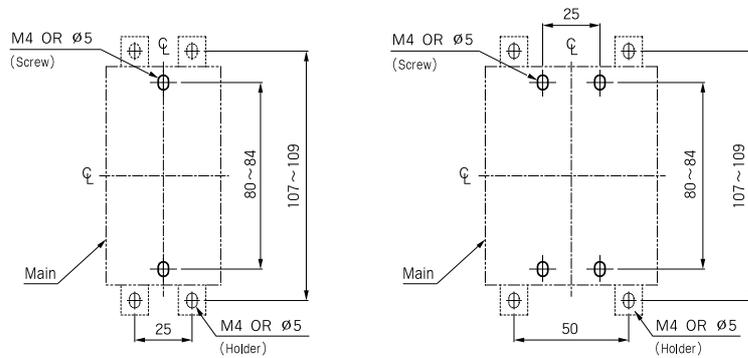
• Detailed terminal



Slot



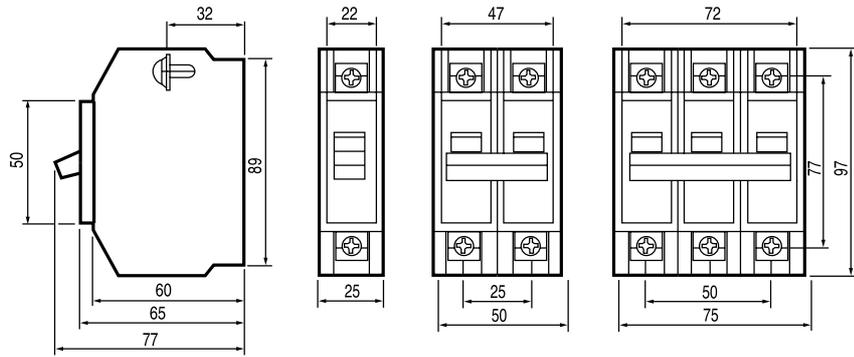
Mounting



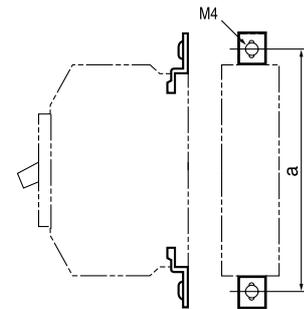
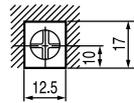
# Overall dimensions

## Residential Breakers

### BF-a.c

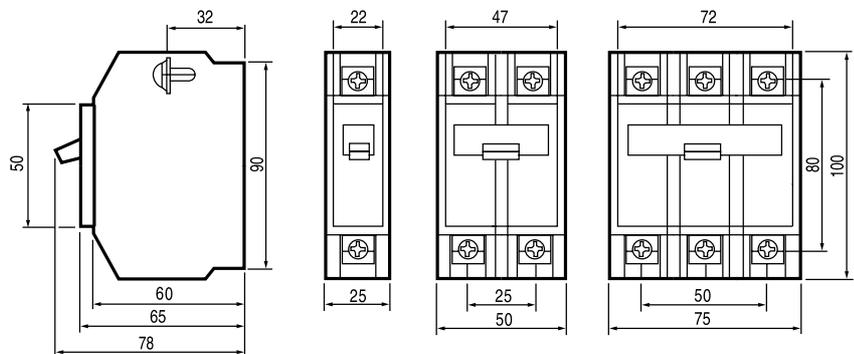


<Detailed terminal>



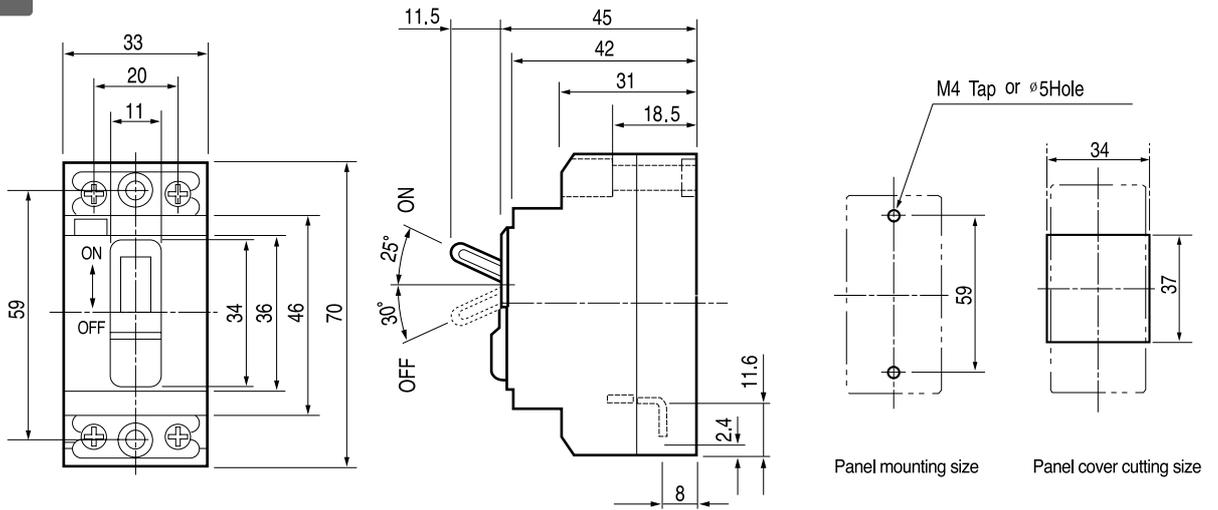
- ※ a size
- BF-a,c(96~104mm)
- BF-(104~111mm)

### BF

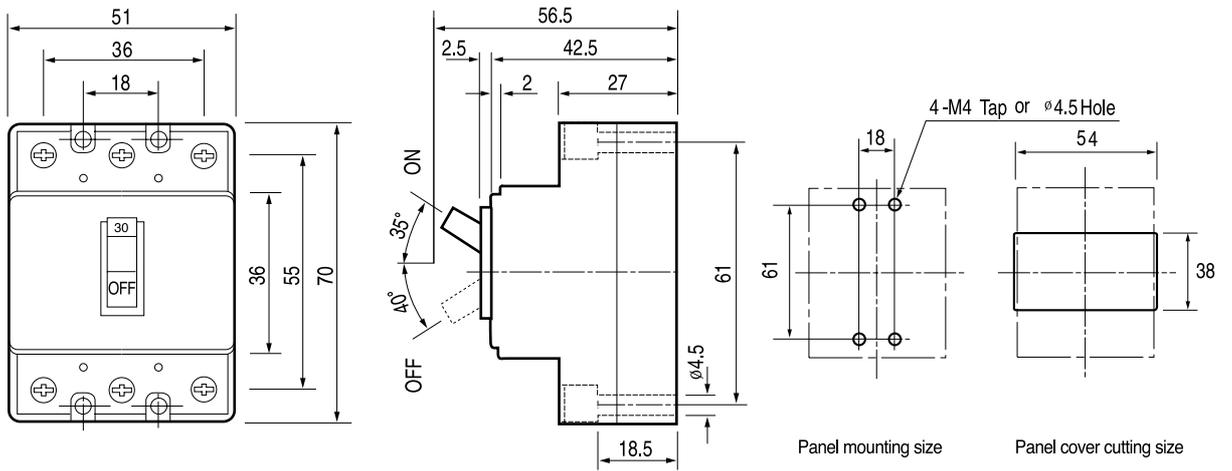


BS-31a

BS-32a



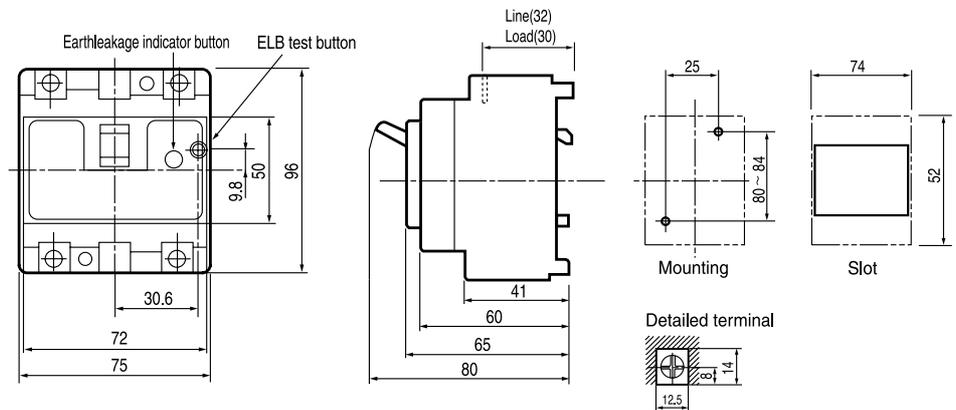
BS-33



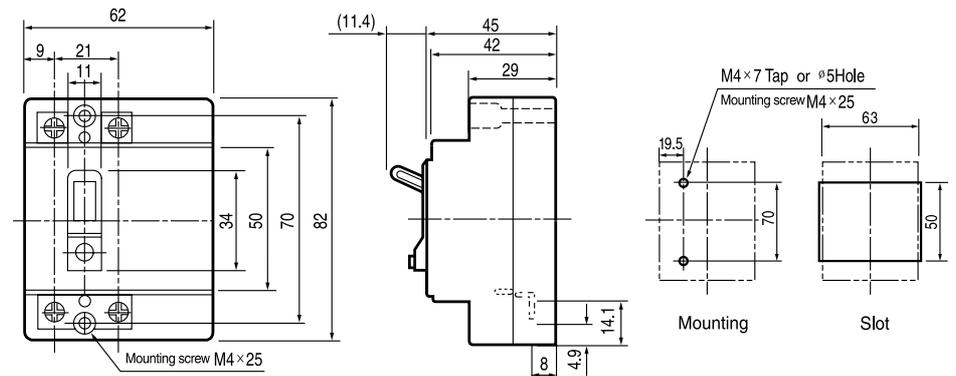
# Overall dimensions

## Residential Breakers

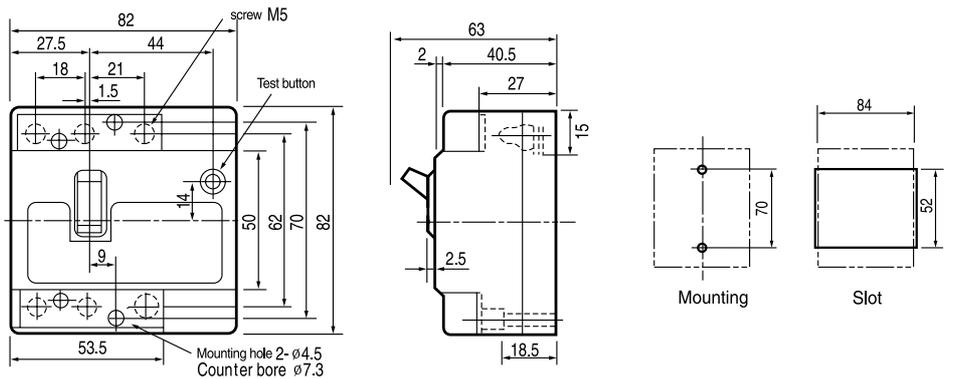
### 52GRa



### 32GRa

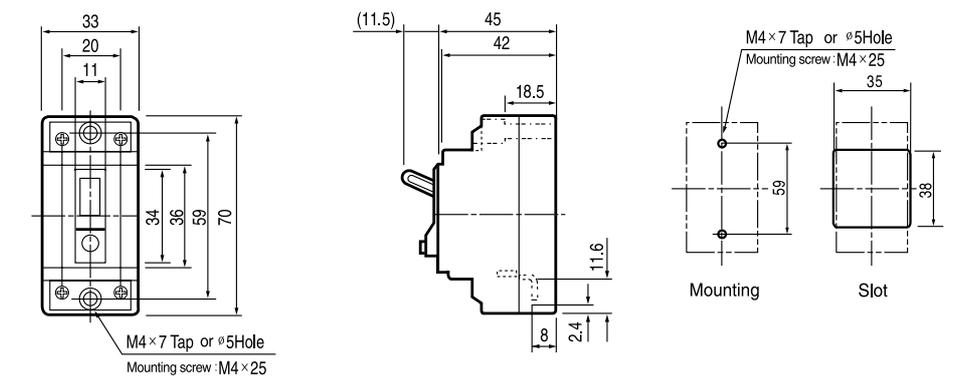


### 33GR



### 30GRh

### 32GRh



## Leader in Electrics & Automation



### Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance. Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.



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