

50AF ELCB

EBN50c, EBS50c, EBH50c



EBN53c



EBS53c

Ratings

Frame size		50AF							
Type and pole		N-type		S-type		H-type			
	2-pole (2-sensor)	EBN52c		-		-			
	3-pole (3-sensor)	EBN53c		EBS53c		EBH53c			
	4-pole (3-sensor)	-		EBS54c		EBH54c			
Rated current, I _n		15-20-30-40-50A							
Rated impulse withstand voltage, U _{imp}		6kV							
Instantaneous type	Rated residual current, I _{Δn}	30, 100, 100/200/500, 100/300/500mA (Adjustable)							
	Residual current off-time at I _{Δn}	≤0.1 sec							
	Rated operational voltage, U _e	AC: 220/460V							
Time delay type	Rated residual current	0.1/0.2/0.5/1A, 0.1/0.4/1/2A (Adjustable)							
	Intentional time delay	0/0.2/0.5/1s, 0.5/1/1.5/2s (Adjustable)							
Wiring system	2-pole (2-sensor)	1Ø2W							
	3-pole (3-sensor)	1Ø2W, 1Ø3W, 3Ø3W							
	4-pole (3-sensor)	1Ø2W, 1Ø3W, 3Ø3W, 3Ø4W							
Rated short-circuit breaking capacity, I_{cu}		N-type		S-type		H-type			
AC	460V	14kA		18kA		50kA			
	415V	14kA		18kA		50kA			
	220/250V	30kA		35kA		100kA			
I _{cs} =%×I _{cu}		100%		100%		100%			
Protective function		Overload, short-circuit and ground fault							
Type of trip unit		Thermal-magnetic							
Magnetic trip range		12 × I _n (30A and under: 400A)							
Life cycle ^{Note5)}	Mechanical	25,000 operations							
	Electrical	10,000 operations							
Connection	Standard	Front connection							
	Optional	Rear connection							
Mounting		Standard Screw fixing							
Dimensions (mm)		Pole	2p	3p	3p	4p	3p	4p	
		a	75	75	75	100	90	120	
		b	130		130		155		
		c1 ^{Note1)}	60		60		60		
		c2 ^{Note1)}	64		64		64		
		d	82		82		82		
		Weight, kg	Standard	0.5	0.7	0.7	0.9	1	1.2
		Certification		Pole	2p	3p	3p	4p	3p
CE marking		CE	○	○	○	○	○		

For more information

- Accessories ▶ 7-1 page
- Trip curves ▶ 8-1 ~ 8-2 page
- Drawings ▶ 9-9 ~ 9-10 page
- Connection and mounting ▶ 10-2 page

Note) 1. Depth by door cut size: c1 for large cut, c2 for small cut
 2. Do not test withstand voltage or insulation resistance test between poles to avoid the damage of the PCB.
 3. 4-pole product's ampacity on neutral conductor is equal to or less than 50% of the rated current.
 4. Rated non-trip current sensitivity is equal to or less than 50% of the rated current sensitivity.
 5. Life cycle means not guarantee but limitation
 (Quality guarantee: On/Off frequency on the basis of IEC60947-2 within the term of guarantee.)

Ordering types

Breaker types

Instantaneous type

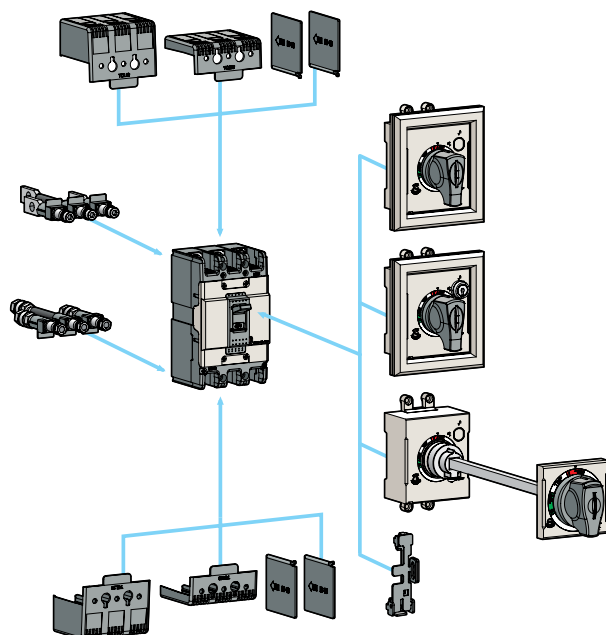
EBN53c		/		20		/		30	
Code	Frame size/ Pole	Code	Rated current	Code	Rated residual current	Code	Rated residual current	Code	Rated residual current
EBN52c	EBN 50AF 2P	15	15A	30	30mA				
EBN53c	EBN 50AF 3P	20	20A	100	100mA				
EBS53c	EBS 50AF 3P	30	30A	100/200/500	100/200/500mA				
EBS54c	EBS 50AF 4P	40	40A	100/300/500	100/300/500mA				
EBH53c	EBH 50AF 3P	50	50A						
EBH54c	EBH 50AF 4P								

Note) EBS53c/20/30: EBS53c, Rated current 20A, Rated residual current 30mA

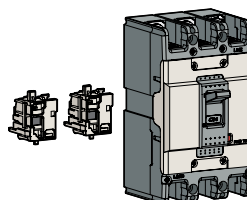
Time delay type

EBN53c		/		20		/		1A1s	
Code	Frame size/ Pole	Code	Rated current	Code	Rated residual current	Code	Rated residual current	Code	Intentional time delay
EBN52c	EBN 50AF 2P	15	15A	1A1s	1A	1s			
EBN53c	EBN 50AF 3P	20	20A	2A2s	2A	2s			
EBS53c	EBS 50AF 3P	30	30A						
EBS54c	EBS 50AF 4P	40	40A						
EBH53c	EBH 50AF 3P	50	50A						
EBH54c	EBH 50AF 4P								

Note) EBS53c/20/30: EBS53c, Rated current 20A, Time delay type 1A1s

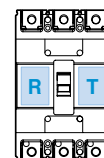


Accessories



Electrical auxiliaries

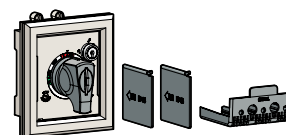
AX	Auxiliary switch
AL	Alarm switch
AX+AL	Combination switch



Maximum possibilities

T-position	Not available
R-position	Option of AX or AL or AX+AL

Note) For more detail see 7-1 page



External accessories

EBN50c EBS50c	EBH50c	Name
IB13	IB23	Insulation barrier
TCL13	TCL23	Terminal cover (Long) - Single type, D-handle type, N-handle type
TCS13	TCS23	Terminal cover (Short) - Single type, D-handle type, N-handle type
N-30c	N-40c	Rotary handle (Direct)
DH100	DH125	Rotary handle (Direct)
DHK100	DHK125	Rotary handle (Direct, key lock)
EH100	EH125	Rotary handle (Extended)
-	RTB2	Rear terminal (Bar)
RTR1	RTR2	Rear terminal (Round)
Handle lock		

Note) For more detail see 7-9 ~ 7-23 page

- Single type: This cover is used without auxiliary handle.
- D-handle type: This cover is used with D-handle.
- N-handle type: This cover is used with N-handle.

60AF ELCB

EBN60c, EBS60c



EBN63c



EBS63c

Ratings

Frame size		60AF			
Type and pole		N-type		S-type	
	2-pole (2-sensor)	-		-	
	3-pole (3-sensor)	EBN63c		EBS63c	
	4-pole (3-sensor)	-		EBS64c	
Rated current, I _n		60A			
Rated impulse withstand voltage, U _{imp}		6kV			
Instantaneous type	Rated residual current, I Δ n	30, 100, 100/200/500, 100/300/500mA (Adjustable)			
	Residual current off-time at I Δ n	≤0.1 sec			
	Rated operational voltage, U _e	AC: 220/460V			
Time delay type	Rated residual current	0.1/0.2/0.5/1A, 0.1/0.4/1/2A (Adjustable)			
	Intentional time delay	0/0.2/0.5/1s, 0.5/1/1.5/2s (Adjustable)			
Wiring system	2-pole (2-sensor)	-			
	3-pole (3-sensor)	1Ø2W, 1Ø3W, 3Ø3W			
	4-pole (3-sensor)	1Ø2W, 1Ø3W, 3Ø3W, 3Ø4W			
Rated short-circuit breaking capacity, I_{cu}		N-type		S-type	
AC	460V	14kA		18kA	
	415V	14kA		18kA	
	220/250V	30kA		35kA	
I _{cs} =%×I _{cu}		100%		100%	
Protective function		Overload, short-circuit and ground fault			
Type of trip unit		Thermal-magnetic			
Magnetic trip range		12×I _n			
Life cycle ^{Note5)}	Mechanical	25,000 operations			
	Electrical	10,000 operations			
Connection	Standard	Front connection			
	Optional	Rear connection			
Mounting		Standard Screw fixing			
Dimensions (mm)		Pole	3p	3p	4p
	a		75	75	100
	b		130	130	130
	c1 ^{Note1)}		60	60	60
	c2 ^{Note1)}		64	64	64
	d		82	82	82
	Weight, kg	Standard	0.7	0.7	0.9
Certification		Pole	3p	3p	4p
CE marking		CE	○	○	○

For more information

- Accessories ▶ 7-1 page
- Trip curves ▶ 8-1 page
- Drawings ▶ 9-9 page
- Connection and mounting ▶ 10-2 page

Note) 1. Depth by door cut size: c1 for large cut, c2 for small cut
 2. Do not test withstand voltage or insulation resistance test between poles to avoid the damage of the PCB.
 3. 4-pole product's ampacity on neutral conductor is equal to or less than 50% of the rated current.
 4. Rated non-trip current sensitivity is equal to or less than 50% of the rated current sensitivity.
 5. Life cycle means not guarantee but limitation
 (Quality guarantee: On/Off frequency on the basis of IEC60947-2 within the term of guarantee.)

Ordering types

Breaker types

Instantaneous type

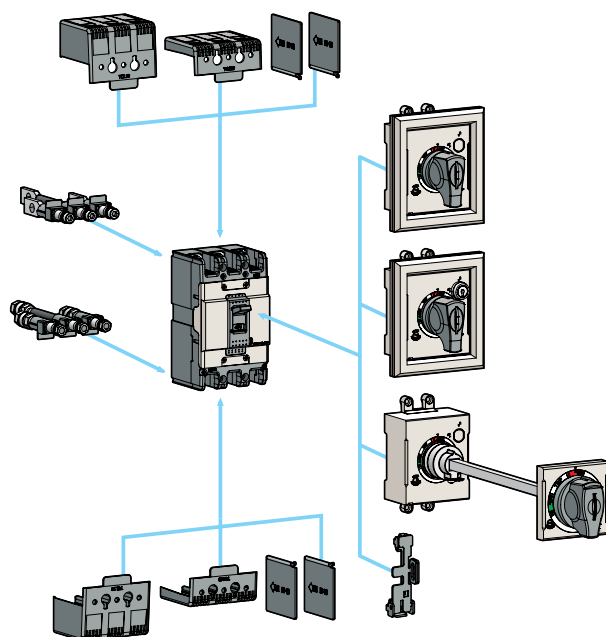
EBN63c		/		60		/		30	
Code	Frame size/ Pole	Code	Rated current	Code	Rated residual current	Code	Rated residual current	Code	Rated residual current
EBN63c	EBN 60AF 3P	60	60A	30	30mA	100/200/500	100/200/500mA	100	100mA
EBS63c	EBS 60AF 3P			100/300/500	100/300/500mA				
EBS64c	EBS 60AF 4P								

Note) EBS63c/60/30: EBS63c, Rated current 60A, Rated residual current 30mA

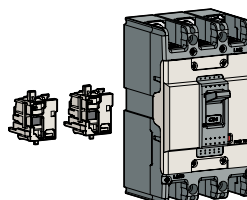
Time delay type

EBN63c		/		60		/		1A1s	
Code	Frame size/ Pole	Code	Rated current	Code	Rated residual current	Code	Rated residual current	Code	Intentional time delay
EBN63c	EBN 60AF 3P	60	60A	1A1s	1A	1s			
EBS63c	EBS 60AF 3P			2A2s	2A	2s			
EBS64c	EBS 60AF 4P								

Note) EBS63c/60/30: EBS63c, Rated current 60A, Time delay type 1A1s

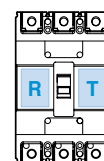


Accessories



Electrical auxiliaries

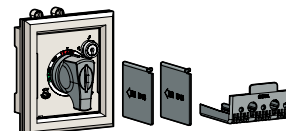
AX	Auxiliary switch
AL	Alarm switch
AX+AL	Combination switch



Maximum possibilities

T-position	Not available
R-position	Option of AX or AL or AX+AL

Note) For more detail see 7-1 page



External accessories

EBS60c EBN60c	Name
IB13	Insulation barrier
TCL13	Terminal cover (Long) - Single type, D-handle type, N-handle type
TCS13	Terminal cover (Short) - Single type, D-handle type, N-handle type
N-30c	Rotary handle (Direct)
DH100	Rotary handle (Direct)
DHK100	Rotary handle (Direct, key lock)
EH100	Rotary handle (Extended)
RTB1	Rear terminal (Bar)
RTR1	Rear terminal (Round)
Handle lock	

Note) For more detail see 7-9 ~ 7-23 page

- Single type: This cover is used without auxiliary handle.
- D-handle type: This cover is used with D-handle.
- N-handle type: This cover is used with N-handle.

100AF ELCB

EBN100c

Metasol



EBN103c

Ratings

Frame size		100AF			
Type and pole		N-type			
	2-pole (2-sensor)	EBN102c			
	3-pole (3-sensor)	EBN103c			
	4-pole (3-sensor)	EBN104c			
Rated current, I_n		60-75-100A			
Rated impulse withstand voltage, U_{imp}		6kV			
Instantaneous type	Rated residual current, $I_{\Delta n}$	30, 100, 100/200/500, 100/300/500mA (Adjustable)			
	Residual current off-time at $I_{\Delta n}$	≤ 0.1 sec			
	Rated operational voltage, U_e	AC: 220/460V			
Time delay type	Rated residual current	0.1/0.2/0.5/1A, 0.1/0.4/1/2A (Adjustable)			
	Intentional time delay	0/0.2/0.5/1s, 0.5/1/1.5/2s (Adjustable)			
Wiring system	2-pole (2-sensor)	1Ø2W			
	3-pole (3-sensor)	1Ø2W, 1Ø3W, 3Ø3W			
	4-pole (3-sensor)	1Ø2W, 1Ø3W, 3Ø3W, 3Ø4W			
Rated short-circuit breaking capacity, I_{cu}		N-type			
AC	460V	18kA			
	415V	18kA			
	220/250V	35kA			
$I_{cs} = \% \times I_{cu}$		100%			
Protective function		Overload, short-circuit and ground fault			
Type of trip unit		Thermal-magnetic			
Magnetic trip range		$12 \times I_n$			
Life cycle ^{Note5)}	Mechanical	25,000 operations			
	Electrical	10,000 operations			
Connection	Standard	Front connection			
	Optional	Rear connection			
Mounting		Standard Screw fixing			
Dimensions (mm)		Pole	2p	3p	4p
	a		75	75	100
	b		130	130	130
	c1 ^{Note1)}		60	60	60
	c2 ^{Note1)}		64	64	64
	d		82	82	82
	Weight, kg	Standard	0.5	0.7	0.9
	Certification		Pole	2p	3p
CE marking		☐	○	○	○

For more information

- Accessories ▶ 7-1 page
- Trip curves ▶ 8-1 page
- Drawings ▶ 9-9 page
- Connection and mounting ▶ 10-2 page

Note) 1. Depth by door cut size: c1 for large cut, c2 for small cut
 2. Do not test withstand voltage or insulation resistance test between poles to avoid the damage of the PCB.
 3. 4-pole product's ampacity on neutral conductor is equal to or less than 50% of the rated current.
 4. Rated non-trip current sensitivity is equal to or less than 50% of the rated current sensitivity.
 5. Life cycle means not guarantee but limitation
 (Quality guarantee: On/Off frequency on the basis of IEC60947-2 within the term of guarantee.)

Ordering types

Breaker types

Instantaneous type

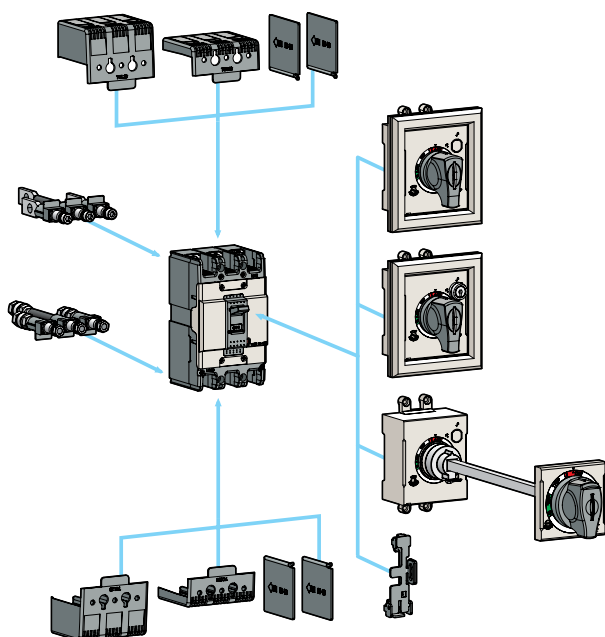
EBN103c		/		100		/		30	
Code	Frame size/ Pole	Code	Rated current	Code	Rated residual current				
EBN102c	EBN 100AF 2P	60	60A	30	30mA				
EBN103c	EBN 100AF 3P	75	75A	100	100mA				
EBN104c	EBN 100AF 4P	100	100A	100/200/500	100/200/500mA	100/300/500	100/300/500mA		

Note) EBN103c/100/30: EBN103c, Rated current 100A, Rated residual current 30mA

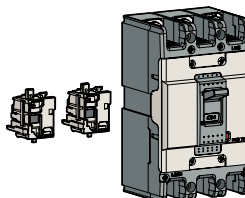
Time delay type

EBN103c		/		100		/			1A1s		
Code	Frame size/ Pole	Code	Rated current	Code	Rated residual current	Intentional time delay					
EBN102c	EBN 100AF 2P	60	60A	1A1s	1A	1s					
EBN103c	EBN 100AF 3P	75	75A	2A2s	2A	2s					
EBN104c	EBN 100AF 4P	100	100A								

Note) EBN103c/100/30: EBN103c, Rated current 100A, Time delay type 1A1s

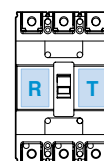


Accessories



Electrical auxiliaries

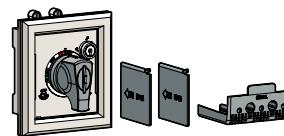
AX	Auxiliary switch
AL	Alarm switch
AX+AL	Combination switch



Maximum possibilities

T-position	Not available
R-position	Option of AX or AL or AX+AL

Note) For more detail see 7-1 page



External accessories

EBN100c	Name
IB13	Insulation barrier
TCL13	Terminal cover (Long) - Single type, D-handle type, N-handle type
TCS13	Terminal cover (Short) - Single type, D-handle type, N-handle type
N-30c	Rotary handle (Direct)
DH100	Rotary handle (Direct)
DHK100	Rotary handle (Direct, key lock)
EH100	Rotary handle (Extended)
RTB1	Rear terminal (Bar)
RTR1	Rear terminal (Round)
Handle lock	

Note) For more detail see 7-9~ 7-23 page Note) For more detail see 82 page

- Single type: This cover is used without auxiliary handle.
- D-handle type: This cover is used with D-handle.
- N-handle type: This cover is used with N-handle.

125AF ELCB

EBS125c, EBH125c



EBS103c



EBH103c

Ratings

Frame size		125AF				
Type and pole		S-type		H-type		
	2-pole (2-sensor)	-		-		
	3-pole (3-sensor)	EBS103c		EBH103c		
	4-pole (3-sensor)	EBS104c		EBH104c		
Rated current, I _n		15-20-30-40-50-60-75-100-125A				
Rated impulse withstand voltage, U _{imp}		6kV				
Instantaneous type	Rated residual current, I _{Δn}	30, 100, 100/200/500, 100/300/500mA (Adjustable)				
	Residual current off-time at I _{Δn}	≤0.1 sec				
	Rated operational voltage, U _e	AC: 220/460V				
Time delay type	Rated residual current	0.1/0.2/0.5/1A, 0.1/0.4/1/2A (Adjustable)				
	Intentional time delay	0/0.2/0.5/1s, 0.5/1/1.5/2s (Adjustable)				
Wiring system	2-pole (2-sensor)	-				
	3-pole (3-sensor)	1Ø2W, 1Ø3W, 3Ø3W				
	4-pole (3-sensor)	1Ø2W, 1Ø3W, 3Ø3W, 3Ø4W				
Rated short-circuit breaking capacity, I_{cu}		N-type		S-type		
AC	460V	37kA		50kA		
	415V	37kA		50kA		
	220/250V	85kA		100kA		
I _{cs} =%×I _{cu}		100%		100%		
Protective function		Overload, short-circuit and ground fault				
Type of trip unit		Thermal-magnetic				
Magnetic trip range		12×I _n (30A and under: 400A)				
Life cycle ^{Note5)}	Mechanical	25,000 operations				
	Electrical	10,000 operations				
Connection	Standard	Front connection				
	Optional	Rear connection				
Mounting		Standard				
Dimensions (mm)		Pole	3p	4p	3p	4p
		a	90	120	90	120
		b	155	155	155	155
		c1 ^{Note1)}	60	60	60	60
		c2 ^{Note1)}	64	64	64	64
		d	82	82	82	82
		Weight, kg	Standard	1	1.2	1
Certification		Pole	3p	4p	3p	4p
CE marking		CE	○	○	○	○

For more information

- Accessories ▶ 7-1 page
- Trip curves ▶ 8-2 page
- Drawings ▶ 9-10 page
- Connection and mounting ▶ 10-2 page

Note) 1. Depth by door cut size: c1 for large cut, c2 for small cut
 2. Do not test withstand voltage or insulation resistance test between poles to avoid the damage of the PCB.
 3. 4-pole product's ampacity on neutral conductor is equal to or less than 50% of the rated current.
 4. Rated non-trip current sensitivity is equal to or less than 50% of the rated current sensitivity.
 5. Life cycle means not guarantee but limitation
 (Quality guarantee: On/Off frequency on the basis of IEC60947-2 within the term of guarantee.)

Ordering types

Breaker types

Instantaneous type

EBS103c		/		100		/		30	
Code	Frame size/ Pole	Code	Rated current	Code	Rated residual current	Code	Rated residual current	Code	Rated residual current
EBS103c	EBS 125AF 3P	15	15A	30	30mA	100/200/500	100/200/500mA	100/300/500	100/300/500mA
EBS104c	EBS 125AF 4P	20	20A	100	100mA				
EBH103c	EBH 125AF 3P	30	30A						
EBH104c	EBH 125AF 4P	40	40A						
		50	50A						
		60	60A						
		75	75A						
		100	100A						
		125	125A						

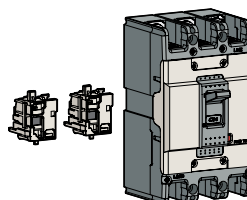
Note) EBS103c/100/30: EBS103c, Rated current 100A, Rated residual current 30mA

Time delay type

EBS103c		/		100		/		1A1s	
Code	Frame size/ Pole	Code	Rated current	Code	Rated residual current	Intentional time delay	Code	Rated residual current	Intentional time delay
EBS103c	EBS 125AF 3P	15	15A	1A1s	1A	1s	2A2s	2A	2s
EBS104c	EBS 125AF 4P	20	20A						
EBH103c	EBH 125AF 3P	30	30A						
EBH104c	EBH 125AF 4P	40	40A						
		50	50A						
		60	60A						
		75	75A						
		100	100A						
		125	125A						

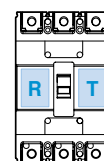
Note) EBS103c/100/30: EBS103c, Rated current 100A, Time delay type 1A1s

Accessories



Electrical auxiliaries

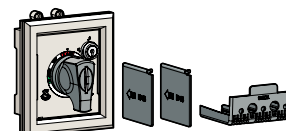
AX	Auxiliary switch
AL	Alarm switch
AX+AL	Combination switch



Maximum possibilities

T-position	Not available
R-position	Option of AX or AL or AX+AL

Note) For more detail see 7-1 page



External accessories

EBS125c EBH125c	Name
IB23	Insulation barrier
TCL23	Terminal cover (Long) - Single type, D-handle type, N-handle type
TCS23	Terminal cover (Short) - Single type, D-handle type, N-handle type
N-40c	Rotary handle (Direct)
DH125	Rotary handle (Direct)
DHK125	Rotary handle (Direct, key lock)
EH125	Rotary handle (Extended)
RTB2	Rear terminal (Bar)
RTR2	Rear terminal (Round)
Handle lock	

Note) For more detail see 7-9 ~ 7-23 page

- Single type: This cover is used without auxiliary handle.
- D-handle type: This cover is used with D-handle.
- N-handle type: This cover is used with N-handle.

250AF ELCB

EBN250c, EBS250c, EBH250c



EBN203c



EBS203c

Ratings

Frame size		250AF							
Type and pole		N-type		S-type		H-type			
	2-pole (2-sensor)	EBN202c		-		-			
	3-pole (3-sensor)	EBN203c		EBS203c		EBH203c			
	4-pole (3-sensor)	-		EBS204c		EBH204c			
Rated current, I _n		100-125-150-175-200-225-250A							
Rated impulse withstand voltage, U _{imp}		6kV							
Instantaneous type	Rated residual current, I _{Δn}	30, 100, 100/200/500, 100/300/500mA (Adjustable)							
	Residual current off-time at I _{Δn}	≤0.1 sec							
	Rated operational voltage, U _e	AC: 220/460V							
Time delay type	Rated residual current	0.1/0.2/0.5/1A, 0.1/0.4/1/2A (Adjustable)							
	Intentional time delay	0/0.2/0.5/1s, 0.5/1/1.5/2s (Adjustable)							
Wiring system	2-pole (2-sensor)	1Ø2W							
	3-pole (3-sensor)	1Ø2W, 1Ø3W, 3Ø3W							
	4-pole (3-sensor)	1Ø2W, 1Ø3W, 3Ø3W, 3Ø4W							
Rated short-circuit breaking capacity, I_{cu}		N-type		S-type		H-type			
AC	460V	26kA		37kA		50kA			
	415V	26kA		37kA		50kA			
	220/250V	65kA		85kA		100kA			
I _{cs} =%×I _{cu}		100%		100%		100%			
Protective function		Overload, short-circuit and ground fault							
Type of trip unit		Thermal-magnetic							
Magnetic trip range		12×I _n							
Life cycle ^{Note5)}	Mechanical	20,000 operations							
	Electrical	5,000 operations							
Connection	Standard	Front connection							
	Optional	Rear connection							
Mounting		Standard Screw fixing							
Dimensions (mm)		Pole	2p	3p	3p	4p	3p	4p	
		a	105	105	105	140	105	140	
		b	165		165		165		
		c1 ^{Note1)}	60		60		60		
		c2 ^{Note1)}	64		64		64		
		d	87		87		87		
		Weight, kg	Standard	1.1	1.2	1.2	1.5	1.2	1.5
		Certification		Pole	2p	3p	3p	4p	3p
CE marking		CE	○	○	○	○	○		

For more information

- Accessories ▶ 7-1 page
- Trip curves ▶ 8-3 page
- Drawings ▶ 9-11 page
- Connection and mounting ▶ 10-2 page

Note) 1. Depth by door cut size: c1 for large cut, c2 for small cut
 2. Do not test withstand voltage or insulation resistance test between poles to avoid the damage of the PCB.
 3. 4-pole product's ampacity on neutral conductor is equal to or less than 50% of the rated current.
 4. Rated non-trip current sensitivity is equal to or less than 50% of the rated current sensitivity.
 5. Life cycle means not guarantee but limitation
 (Quality guarantee: On/Off frequency on the basis of IEC60947-2 within the term of guarantee.)

Ordering types

Breaker types

Instantaneous type

EBS203c		/		250		/		30	
Code	Frame size/ Pole	Code	Rated current	Code	Rated residual current				
EBN202c	EBN 250AF 2P	100	100A	30	30mA				
EBN203c	EBN 250AF 3P	125	125A	100	100mA				
EBS203c	EBS 250AF 3P	150	150A	100/200/500	100/200/500mA				
EBS204c	EBS 250AF 4P	175	175A	100/300/500	100/300/500mA				
EBH203c	EBH 250AF 3P	200	200A						
EBH204c	EBH 250AF 4P	225	225A						
		250	250A						

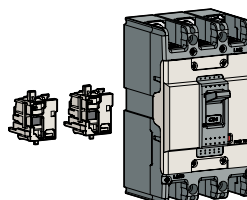
Note) EBS203c/250/30: EBS203c, Rated current 250A, Rated residual current 30mA

Time delay type

EBS203c		/		250		/		1A1s	
Code	Frame size/ Pole	Code	Rated current	Code	Rated residual current	Intentional time delay			
EBN202c	EBN 250AF 2P	100	100A	1A1s	1A	1s			
EBN203c	EBN 250AF 3P	125	125A	2A2s	2A	2s			
EBS203c	EBS 250AF 3P	150	150A						
EBS204c	EBS 250AF 4P	175	175A						
EBH203c	EBH 250AF 3P	200	200A						
EBH204c	EBH 250AF 4P	225	225A						
		250	250A						

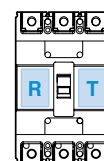
Note) EBS203c/250/30: EBS203c, Rated current 250A, Time delay type 1A1s

Accessories



Electrical auxiliaries

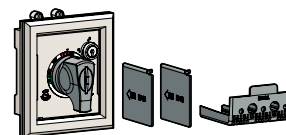
AX	Auxiliary switch
AL	Alarm switch
AX+AL	Combination switch



Maximum possibilities

T-position	Not available
R-position	Option of AX or AL or AX+AL

Note) For more detail see 7-1 page



External accessories

EBN250c EBS250c EBH250c	Name
IB23	Insulation barrier
TCL33	Terminal cover (Long) - Single type, D-handle type, N-handle type
TCS33	Terminal cover (Short) - Single type, D-handle type, N-handle type
N-50c	Rotary handle (Direct)
DH250	Rotary handle (Direct)
DHK250	Rotary handle (Direct, key lock)
EH250	Rotary handle (Extended)
RTB3	Rear terminal (Bar)
RTR3	Rear terminal (Round)
Handle lock	

Note) For more detail see 7-9 ~ 7-23 page

- Single type: This cover is used without auxiliary handle.
- D-handle type: This cover is used with D-handle.
- N-handle type: This cover is used with N-handle.

400AF ELCB

EBN400c, EBS400c, EBH400c, EBL400c



EBS403c



EBL404c

Ratings

Frame size		400AF									
Type and pole				N-type		S-type		H-type		L-type	
		3-pole (3-sensor)		EBN403c		EBS403c		EBH403c		EBL403c	
		4-pole (3-sensor)		EBN404c		EBS404c		EBH404c		EBL404c	
Rated current, I _n		250-300-350-400A									
Rated impulse withstand voltage, U _{imp}		6kV									
Rated operational voltage, U _e		220/460V									
Instantaneous type	Rated residual current, I Δ n	30, 100/200/500mA (Adjustable)									
	Residual current off-time at I Δ n	≤0.1 sec									
Time delay type	Rated residual current	0.1/0.4/1/2A (Adjustable)									
	Intentional time delay	0.5/1/1.5/2s (Adjustable)									
Wiring system	3-pole (3-sensor)	1Ø2W, 1Ø3W, 3Ø3W									
	4-pole (3-sensor)	1Ø2W, 1Ø3W, 3Ø3W, 3Ø4W									
Rated short-circuit breaking capacity, I _{cu}				N-type		S-type		H-type		L-type	
AC		415V/460V		37kA		50kA		65kA		85kA	
		220/250V		50kA		75kA		85kA		125kA	
I _{cs} =%×I _{cu}				100%		100%		100%		75%	
Protective function		Overload, short-circuit and ground fault									
Type of trip unit		Thermal-magnetic									
Magnetic trip range		8~12I _n									
Life cycle ^{Note5)}	Mechanical	4,000 operations									
	Electrical	1,000 operations									
Connection		Standard		Front connection							
Mounting		Standard		Screw fixing							
Dimensions (mm)		Pole		3p		4p		3p		4p	
		a		140		184		140		184	
		b		257		257		257		257	
		c1 ^{Note1)}		109		109		109		109	
		c2 ^{Note1)}		113		113		113		113	
		d		145		145		145		145	
Weight, kg		Standard		7		8.4		7		8.4	
Certification		Pole		3p		4p		3p		4p	
CE marking		☐		○		○		○		○	

For more information

- Accessories ▶ 7-2 page
- Trip curves ▶ 8-4 page
- Drawings ▶ 9-12 page
- Connection and mounting ▶ 10-3 page

Note) 1. Depth by door cut size: c1 for large cut, c2 for small cut
 2. Do not test withstand voltage or insulation resistance test between poles to avoid the damage of the PCB.
 3. 4-pole product's ampacity on neutral conductor is equal to or less than 50% of the rated current.
 4. Rated non-trip current sensitivity is equal to or less than 50% of the rated current sensitivity.
 5. Life cycle means not guarantee but limitation
 (Quality guarantee: On/Off frequency on the basis of IEC60947-2 within the term of guarantee.)

Ordering types

Breaker types

Instantaneous type

EBS403c		/		400		/		30	
Code	Frame size/ Pole	Code	Rated current	Code	Rated residual current				
EBN403c	EBN 400AF 3P	250	250A	30	30mA				
EBN404c	EBN 400AF 4P	300	300A	100/200/500	100/200/500mA				
EBS403c	EBS 400AF 3P	350	350A						
EBS404c	EBS 400AF 4P	400	400A						
EBH403c	EBH 400AF 3P								
EBH404c	EBH 400AF 4P								
EBL403c	EBH 400AF 3P								
EBL404c	EBH 400AF 4P								

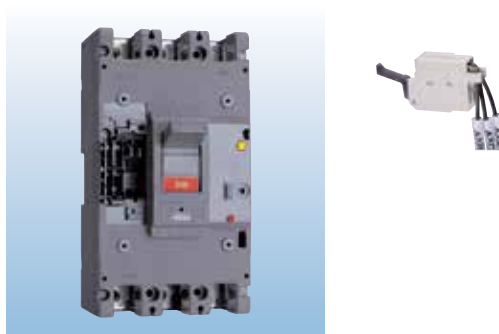
Note) EBS403c/400/30: EBS403c, Rated current 400A, Rated residual current 30mA

Time delay type

EBS403c		/		400		/		2A2s	
Code	Frame size/ Pole	Code	Rated current	Code	Rated residual current	Intentional time delay			
EBN403c	EBN 400AF 3P	250	250A	2A2s	2A	2s			
EBN404c	EBN 400AF 4P	300	300A						
EBS403c	EBS 400AF 3P	350	350A						
EBS404c	EBS 400AF 4P	400	400A						
EBH403c	EBH 400AF 3P								
EBH404c	EBH 400AF 4P								
EBL403c	EBH 400AF 3P								
EBL404c	EBH 400AF 4P								

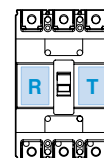
Note) EBS403c/400/30: EBS403c, Rated current 400A, Time delay type 2A2s

Accessories



Electrical auxiliaries

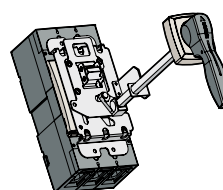
AX	Auxiliary switch
AL	Alarm switch
SHT	Shunt trip
UVT	Undervoltage trip



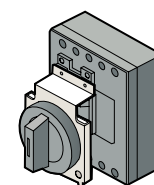
Maximum possibilities

T-position	Not available
R-position	Option of 2AX, 2AL and SHT or UVT

Note) For more detail see 7-2 page



E-70U



N-70

External accessories

B-43B	Insulation barrier
T1-43A	Terminal cover (Long) - 2, 3pole - Single type, N-handle type
T1-44A	Terminal cover (Long) - 4pole
N-70	Rotary handle (Direct)
E-70U	Rotary handle (Extended)
MI-43	Mechanical interlock - 2, 3pole
MI-44	Mechanical interlock - 4pole

Note) For more detail see 7-9 ~ 7-23 page

800AF ELCB

EBN803c, EBS803c, EBL803c



EBS803c

Ratings

Frame size		800AF		
Type and pole		N-type	S-type	L-type
		3-pole (3-sensor)	EBN803c	EBS803c
		4-pole (3-sensor)	-	-
Rated current, I _n		500-630-700-800A		
Rated impulse withstand voltage, U _{imp}		6 kV		
Rated operational voltage, U _e		220/460V		
Instantaneous type	Rated residual current, I Δ n	30, 100/200/500mA (Adjustable)		
	Residual current off-time at I Δ n	≤0.1 sec		
Time delay type	Rated residual current	0.1/0.4/1/2A (Adjustable)		
	Intentional time delay	0.5/1/1.5/2s (Adjustable)		
Wiring system	3-pole (3-sensor)	1Ø2W, 1Ø3W, 3Ø3W		
	4-pole (3-sensor)	-		
Rated short-circuit breaking capacity, I _{cs}		N-type	S-type	L-type
AC	415/460V	37kA	65kA	85kA
	220/250V	50kA	85kA	125kA
I _{cs} =%×I _{cu}		100%	100%	75%
Protective function		Overload, short-circuit and ground fault		
Type of trip unit		Thermal-magnetic		
Magnetic trip range		8~12I _n		
Life cycle ^{Note4)}	Mechanical	2,500 operations		
	Electrical	500 operations		
Connection		Standard		
Mounting		Standard		
Dimensions (mm)		Pole	3p	
		a	210	
		b	280	
		c1 ^{Note1)}	109	
		c2 ^{Note1)}	113	
		d	145	
Weight, kg		Standard	11.5	
Certification		Pole	3p	
CE marking		☐	○	

For more information

- Accessories ▶ 7-2 page
- Trip curves ▶ 8-4 page
- Drawings ▶ 9-14 page
- Connection and mounting ▶ 10-3 page

Note) 1. Depth by door cut size: c1 for large cut, c2 for small cut
 2. Do not test withstand voltage or insulation resistance test between poles to avoid the damage of the PCB.
 3. Rated non-trip current sensitivity is equal to or less than 50% of the rated current sensitivity.
 4. Life cycle means not guarantee but limitation
 (Quality guarantee: On/Off frequency on the basis of IEC60947-2 within the term of guarantee.)

Ordering types

Breaker types

Instantaneous type

EBS803c		/		800		/		30	
Code	Frame size/ Pole	Code	Rated current	Code	Rated residual current				
EBS803c	EBN 800AF 3P	500	500A	30	30mA				
EBS803c	EBS 800AF 3P	630	630A	100/200/500	100/200/500mA				
EBL803c	EBH 800AF 3P	700	700A						
		800	800A						

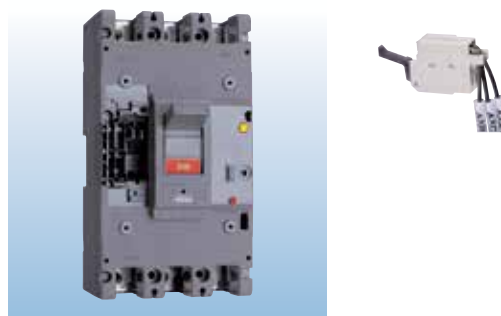
Note) EBS803c/800/30: EBS803c, Rated current 800A, Rated residual current 30mA

Time delay type

EBS803c		/		800		/		2A2s	
Code	Frame size/ Pole	Code	Rated current	Code	Rated residual current	Intentional time delay			
EBS803c	EBN 800AF 3P	500	500A	2A2s	2A	2s			
EBS803c	EBS 800AF 3P	630	630A						
EBL803c	EBH 800AF 3P	700	700A						
		800	800A						

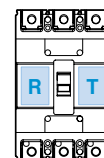
Note) EBS803c/800/30: EBS803c, Rated current 800A, Time delay type 2A2s

Accessories



Electrical auxiliaries

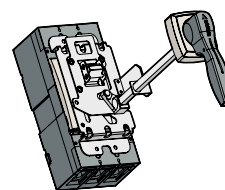
AX	Auxiliary switch
AL	Alarm switch
SHT	Shunt trip
UVT	Undervoltage trip



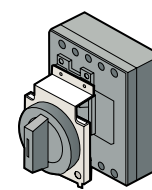
Maximum possibilities

T-position	Not available
R-position	Option of 2AX, 2AL and SHT or UVT

Note) For more detail see 7-2 page



E-80U



N-80

External accessories

B-33C	Insulation barrier
T1-63A	Terminal cover (Long) - 2, 3pole - Single type, N-handle type
T1-64A	Terminal cover (Long) - 4pole
N-80	Rotary handle (Direct)
E-80U	Rotary handle (Extended)
MI-83S	Mechanical interlock - 2, 3pole
MI-84S	Mechanical interlock - 4pole

Note) For more detail see 7-9 ~ 7-23 page

Electrical auxiliaries of 100~250AF

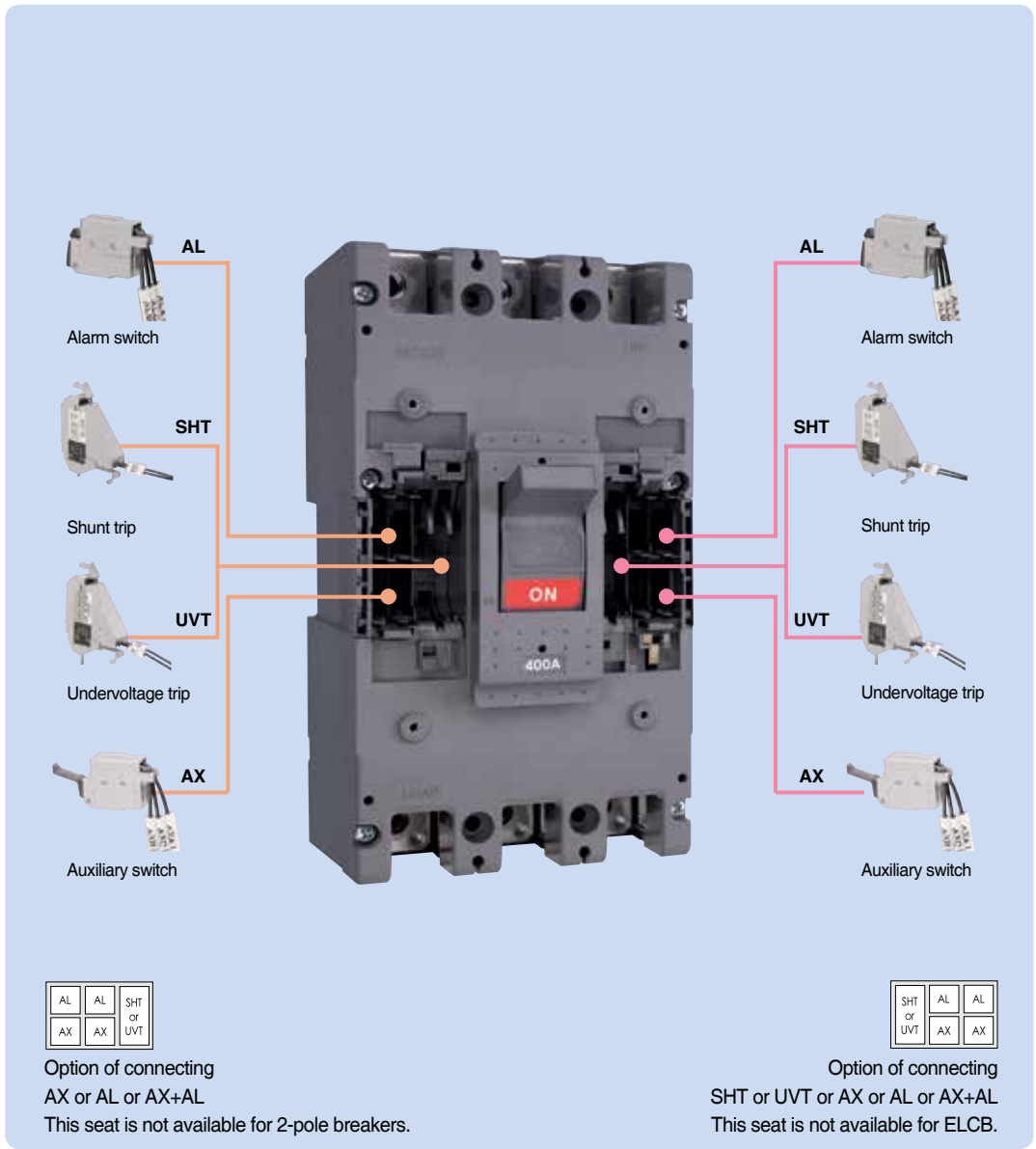
Option of connecting AX or AL or AX+AL
This seat is not available for 2-pole MCCB.

Option of connecting SHT or UVT
or AX or AL or AX+AL
This seat is not available for ELCB.

Maximum possibilities

Position	Type	ABN100c		ABH125c		ABH250c	EBN100c	EBH125c	EBH250c
		2p	3/4p	2p	3/4p	2/3/4p	2/3/4p	3/4p	2/3/4p
Left-hand seat	AX	-	1	-	1	1	1	1	1
	AL	-	1	-	1	1	1	1	1
	AX+AL	-	1	-	1	1	1	1	1
Right-hand seat	AX	1	1	1	1	1	-	-	-
	AL	1	1	1	1	1	-	-	-
	AX+AL	1	1	1	1	1	-	-	-
	SHT/UVT	1	1	1	1	1	-	-	-

Electrical auxiliaries of 400~800AF

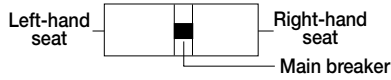


Maximum possibilities

Position	Type	MCCB (400~800AF)	ELCB (400~800AF)
Left-hand seat	AX	2	2
	AL	2	2
	SHT/UVT	1	1
Right-hand seat	AX	2	-
	AL	2	-
	SHT/UVT	1	-

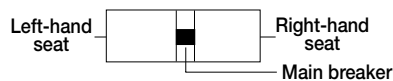
Accessories

Combinations of accessories



- Auxiliary switch (AX)
- Alarm switch (AL)
- Shunt trip (SHT) / Undervoltage trip (UVT)

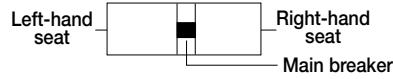
Series		MCCB (30~250AF)			MCCB (400~800AF)	MCCB (1,000~1200AF)	
Type	N-type	ABE 32b	ABE 33b	ABN 52c ABN 62c ABN 102c/102e	ABN 53c/54c ABN 63c/64c ABN 103c/104c, ABN 103e/104e ABN 202c/203c/204c	ABN 402c/403c/404c ABN 802c/803c/804c	-
	S-type	-	-	ABS 32c ABS 52c ABS 62c ABS 102c	ABS 33c/34c ABS 53c/54c ABS 63c/64c ABS 103c/104c ABS 202c/203c/204c	ABS 402c/403c/404c ABS 802c/803c/804c	ABS 1003b ABS 1004b ABS 1203b ABS 1204b ABS 1203bE
	H-type	-	-	ABH 52c ABH 102c	ABH 53c/54c ABH 103c/104c ABH202c/203c/204c	ABH 402c/403c/404c	-
	L-type	-	-	ABL 102c	ABL 103c/104c ABL 202c/203c/204c	ABL 402c/403c/404c ABL 802c/803c/804c	ABL 1003b ABL 1004b ABL 1203b ABL 1204b
Pole	2 pole	3 pole	2 pole	2, 3, 4 pole		2, 3, 4 pole	3, 4 pole
AX							
AX2							
AX3 (4)							
AL							
AL2							
AL3 (4)							
SHT (UVT)							
SHT (UVT) 2							
AX+AL							
AX+AL2							
AX+AL3 (4)							
AX2+AL							
AX2+AL2							
AX2+AL3 (4)							
AX3 (4) +AL							
AX3 (4) +AL2							
AX3 (4) +AL3 (4)							
AX+SHT (UVT)							



- Auxiliary switch (AX)
- Alarm switch (AL) □ Shunt trip (SHT) / Undervoltage trip (UVT)

Series		MCCB (30~250AF)			MCCB (400~800AF)	MCCB (1,000~1200AF)	
Type	N-type	ABE 32b	ABE 33b	ABN 52c ABN 62c ABN 102c/102d/102e	ABN 53c/54c ABN 63c/64c ABN 103c/104c, ABN 103e/104e ABN 202c/203c/204c	ABN 402c/403c/404c ABN 802c/803c/804c	-
	S-type	-	-	ABS 32c ABS 52c ABS 62c ABS 102c	ABS 33c/34c ABS 53c/54c ABS 63c/64c ABS 103c/104c ABS 202c/203c/204c	ABS 402c/403c/404c ABS 802c/803c/804c	ABS 1003b ABS 1004b ABS 1203b ABS 1204b ABS 1203bE
	H-type	-	-	ABH 52c ABH 102c	ABH 53c/54c ABH 103c/104c ABH202c/203c/204c	ABH 402c/403c/404c	-
	L-type	-	-	ABL 102c	ABL 103c/104c ABL 202c/203c/204c	ABL 402c/403c/404c ABL 802c/803c/804c	ABL 1003b ABL 1004b ABL 1203b ABL 1204b
Pole		2 pole	3 pole	2 pole	2, 3, 4 pole	2, 3, 4 pole	3, 4 pole
AX+SHT (UVT) 2							
AX2+SHT (UVT)							
AX2+SHT (UVT) 2							
AX3 (4)+SHT (UVT)							
AX3 (4)+SHT (UVT) 2							
AL+SHT (UVT)							
AL+SHT (UVT) 2							
AL2+SHT (UVT)							
AL2+SHT (UVT) 2							
AL3 (4) +SHT (UVT)							
AL3 (4) +SHT (UVT) 2							
AX+AL+SHT (UVT)							
AX+AL+SHT (UVT) 2							
AX2+AL2+SHT (UVT)							
AX2+AL2+SHT (UVT) 2							
AX3 (4)+AL3 (4)+SHT (UVT)							
AX3 (4)+AL3 (4)+SHT (UVT) 2							

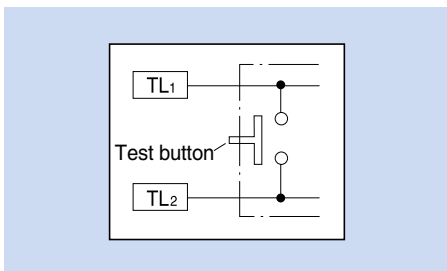
Combinations of accessories



- Auxiliary switch (AX)
- Alarm switch (AL) Shunt trip (SHT) / Undervoltage trip (UVT)

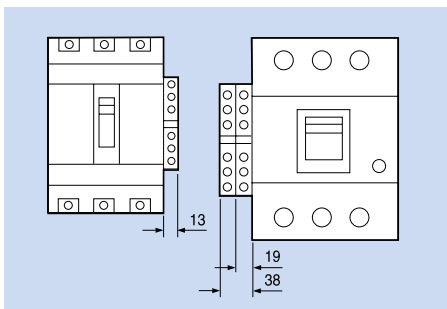
Series		ELCB (30~250AF)	ELCB (400~800AF)	ELCB (1,000~1200AF)
Type	N-type	EBN 52c/53c/54c EBN 63c EBN 102c/103c/104c EBN 202c/203c	EBN 403c/404c EBN 803c	-
	S-type	EBS 32c/33c/34c EBS 53c/54c EBS 63c/64c EBS 103c/104c EBS 203c/204c	EBS 403c/404c EBS 803c	EBS 1003b EBS 1203b
	H-type	EBH 53c/54c EBH 53c/54c EBH 103c/104c	EBH 403c/404c	-
	L-type	-	EBL 403c/404c EBL 803c	-
Pole		3, 4 pole	3 pole	3 pole
AX				
AX2				
AL				
AL2				
SHT (UVT)				
AX+AL				
AX+AL2				
AX2+AL				
AX2+AL2				
AX+SHT (UVT)				
AX2+SHT (UVT)				
AL+SHT (UVT)				
AL2+SHT (UVT)				
AX+AL+SHT (UVT)				
AX2+AL2+SHT (UVT)				

Test lead wire (30~250AF)



- Note) 1. When you touch the lead wire under energized condition, you will be in danger of electric shock.
 2. Do not energize on both ends of lead wire.
 3. Do not pull out the lead wire excessively or impact on the product.

Terminal block type



Auxiliary and alarm switch

Auxiliary switch (AX)



Auxiliary switch is for applications requiring remote "On" and "Off" indication.

Each switch contains two contacts having a common connection.

One is open and the other closed when the circuit breaker is open, and viceversa.

Alarm switch (AL)

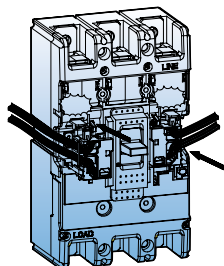


Alarm switches offer provisions for immediate audio or visual indication of a tripped breaker due to overload, short circuit, shunt trip, or undervoltage release conditions.

They are particularly useful in automated plants where operators must be signaled about changes in the electrical distribution system. This switch features a closed contact when the circuit breaker is tripped automatically. In other words, this switch does not function when the breaker is operated manually.

Its contact is open when the circuit breaker is reset.

Combination switch (AX+AL)



It consists of one auxiliary switch (AX) and one alarm switch (AL) in a body to connect into the same position of the breaker.

Contact (AX+AL)

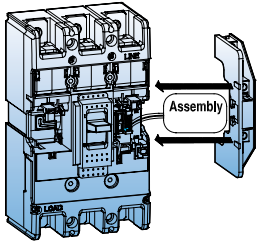
MCCB	On	Off	Trip
AX			
AL			

Rating (AX+AL)

Conventional thermal current, I _{th}		5A			
Rated operational current, I _e	Voltage, U _e	Current, I _e			
		Resistive load	Inductive load	Minimum load current	Applicable MCCB/ELCB
AC 50/60Hz	125V	5	3	5V DC 160mA	Metasol MCCB/ELCB
	250V	3	2		
	500V	-	-		
DC	30V	4	3	30V DC 30mA	30~250AF 400~800AF
	125V	0.4	0.4		
	250V	0.2	0.2		

Shunt trip, SHT

The shunt trip opens the mechanism in response to an externally applied voltage signal. The releases include coil clearing contacts that automatically clear the signal circuit when the breaker has tripped. This is not available for ELCBs of 30~250AF .



Rating for 30~250AF

Control voltage, Ue	Power consumption		Applicable MCCB/ELCB
	AC (VA)	DC (W)	
DC 12V	-	1.5	Metasol MCCB ABN100c ABH125c ABH250c
AC/DC 24~30V	1.5	1.5	
AC/DC 48~60V	1.5	1.5	
Voltage AC/DC 100~130V	1.5	1.5	
AC/DC 200~250V	1.5	1.5	
AC 380~440V	1.5	-	
AC 440~500V	1.5	-	
Max. opening time	50ms (max.)		
Tightening torque of terminal screw	8.2 kgf · cm		

Note: 1. Range of operational voltage: 0.7 ~ 1.1Vn
Frequency (Only AC) : 45Hz ~ 65Hz



Terminal block type (TBT)



Lead wire type (LWT)

Rating for 400~800AF

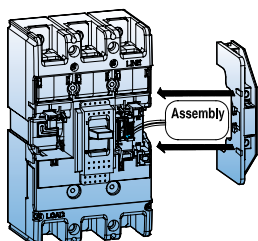
Control voltage, Ue	Power consumption		
	V	mA	W
AC/DC 24~48V	AC 24	14	0.3
AC 100~240/DC 100~220V	DC 24	15.4	0.4
AC 380~550V	AC 48	14	0.7
	DC 48	16	0.8
	AC 110	6	0.7
	DC 110	6.6	0.7
	AC 220	6.8	1.5
	DC 200	7.6	1.5
	AC 440	4.3	1.9
	AC 480	4.4	3.3
	AC 550	4.6	2.4

Note: Range of operational voltage
AC: 0.85 ~ 1.1Vn
DC: 0.75 ~ 1.25Vn



Lead wire type (LWT)

Undervoltage release, UVT



The undervoltage release automatically opens a circuit breaker when voltage drops to a value ranging between 20% to 70% of the line voltage. The operation is instantaneous, and after tripping, the circuit breaker cannot be re-closed again until the voltage returns to 85% of line voltage.

Continuously energized, the undervoltage release must be operating before the circuit breaker can be closed. This is not available for ELCBs of 30~250AF.

- Range of tripping voltage: 0.2 ~ 0.7Vn
- Reset and closing of a breaker is possible when the control voltage is over 0.85Vn
- Frequency (Only AC: 45Hz ~ 65Hz)

Rating for 30~250AF



Terminal block type (TBT)

Control voltage, Ue	Power consumption		
	AC (VA)	DC (W)	mA
AC/DC 24V	0.64	0.65	27
AC/DC 48V	1.09	1.1	23
AC/DC 100~110V	0.73	0.75	5.8
AC/DC 200~220V	1.21	1.35	5.4
AC 380~440V	1.67	-	3.8
AC 440~480V	1.68	-	3.5
Max.opening time	50ms (max.)		
Tightening torque of terminal screw	8.2 kgf · cm		
Operating voltage range	Trip	20~70% Vn	
	Reset/Closing	≥ 0.85Vn	

Rating for 400~800AF



Lead wire type (LWT)

Control voltage, Ue	Trip voltage	Reset/closing voltage	Time rating
AC/DC 48	· AC: 85~1.1Vn · DC: 85~1.25Vn	· AC: 0.2~0.7Vn · DC: 0.2~0.7Vn	Continuous
AC/DC 100~125			
AC 200~240 / DC 200~240			
AC 380~440			
AC 440~480			

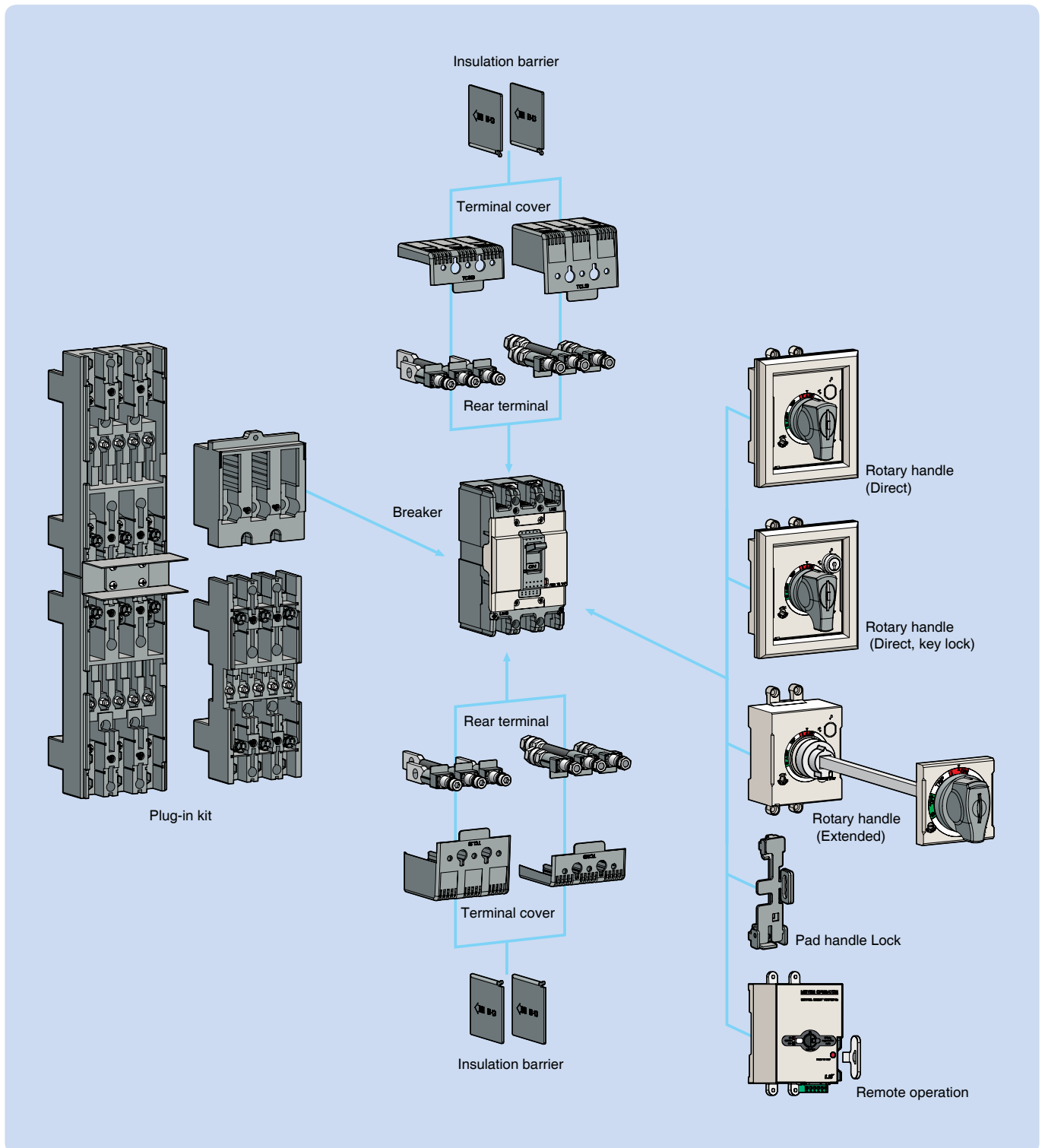
Terminal numbering

Auxiliary switch (AX)	Alarm switch (AL)	Shunt trip (SHT)	Undervoltage trip (UVT)

Accessories

External accessories

Wide range of external accessories provides user-friendly solution for mounting, cable connection, insulation, safety lock and remote control.



Rotary handles

Direct type



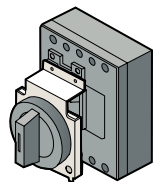
Direct type
(DH 30~250AF)



Key lock
(DH 30~250AF)



(N 30~250AF)

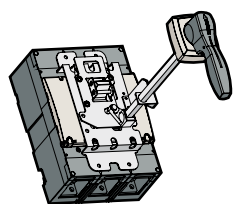


(N 400~800AF)

Extended type



(30~250AF)



(400~800AF)

The rotary handle operating mechanism is available in either the direct version or in the extended version on the compartment door. It is always fitted with a compartment door lock and on a request it can be supplied with a key lock in the open position.

Direct type , D-handle and N-handle

- D-handle: Directly mountable to a circuit breaker. Trip button is built as standard. Key lock type is optional.
- N-handle: Directly mountable to a circuit breaker. Door is locked in the Off state. handle size is greater than D-handle.

Extended type, E-handle

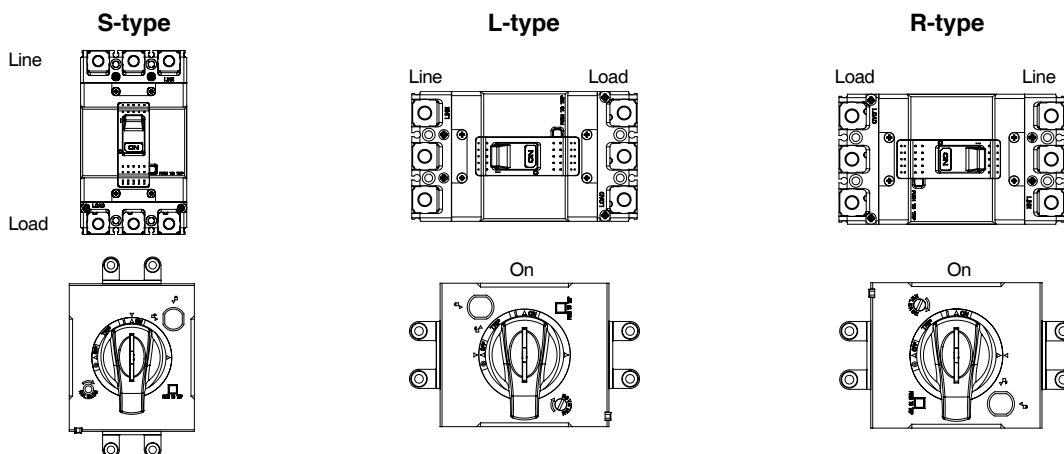
It is used in case direct type handle can not be applied because of the longer distance between the breaker and the panel door.

Type

Direct type	Direct type (Key lock)	Extended type	Breaker type	
			MCCB	ELCB
N-30c	-	-	ABN50c/60c/100c/100e*	EBN50c/60c/100c
DH100	DHK100	EH100	ABS30c/50c/60c*	EBS30c/50c/60c
N-40c	-	-	ABS125c* ABH50c/125c* ABL125c*	EBS125c EBH50c/125c
N-50c	-	-	ABN/S/H/L250c	EBN/S/H250c
DH250	DHK250	EH250	ABN/S/H/L400c	EBN/S/H/L400c
N-70	-	E-70U	ABN/S/H/L400c	EBN/S/H/L400c
N-80	-	E-80U	ABN/S/L800c	EBN/S/L800c

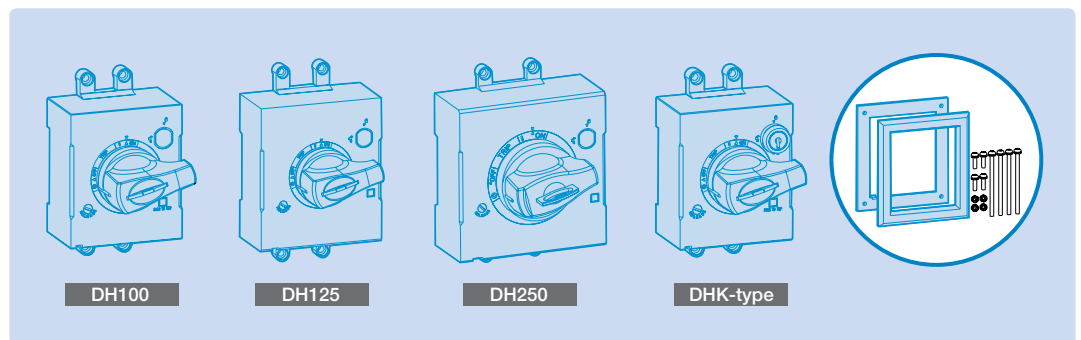
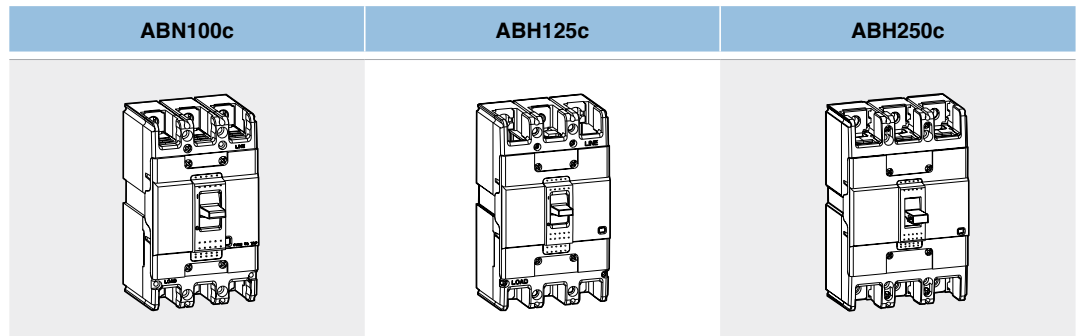
Note: Padlock type for N-handle
 - On or Off state type - Only Off state type
 * DH100 and DH125 cannot be mounted on 2-pole products.

Type suffix according to the mounting position

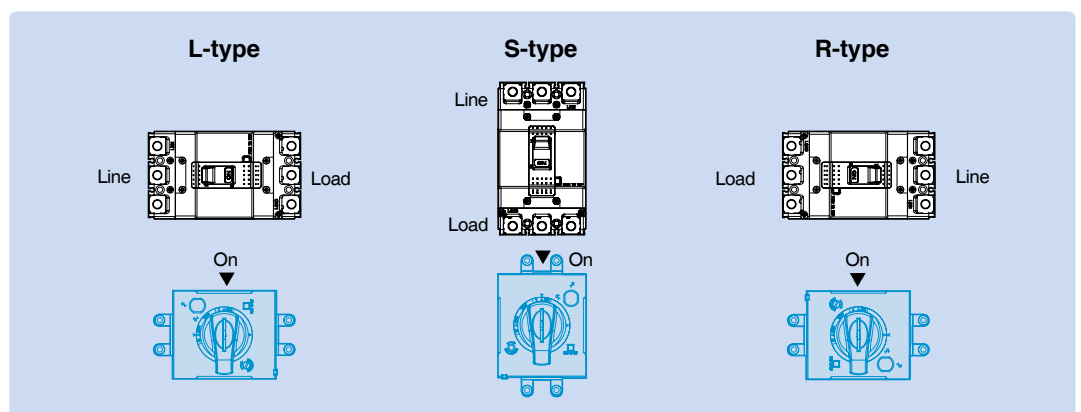
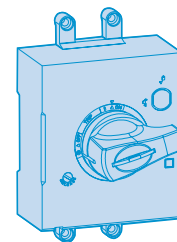
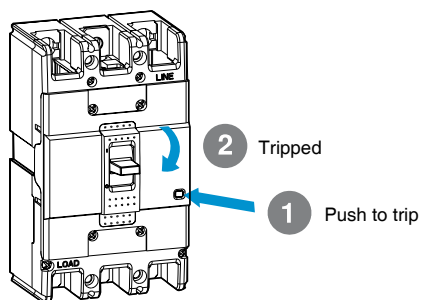


D-handle

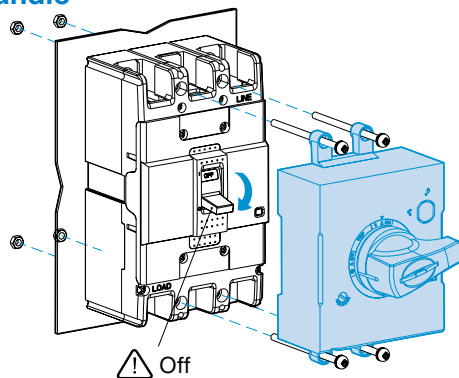
MCCB and D-handle



Tripping MCCB & install type

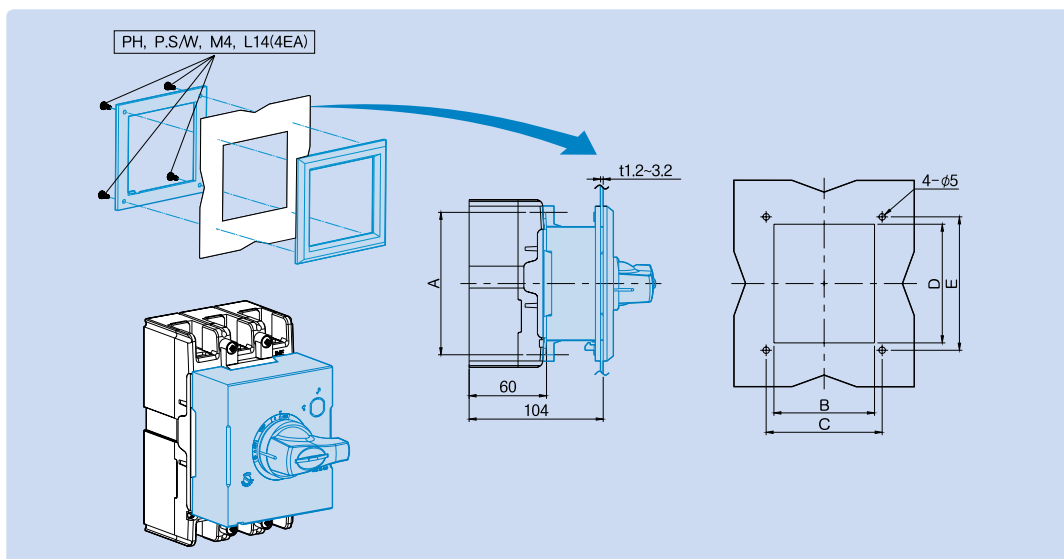


Installing the D-handle



ABN100c, EBN100c	ABH125c, EBH125c	ABH250c, EBH250c

Cutting panel



Direct type	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	Breaker
DH100	110.5	78	90	92	103.4	100AF
DH125	132	94	105	108	120	125AF
DH250	126	108	121	110	122	250AF

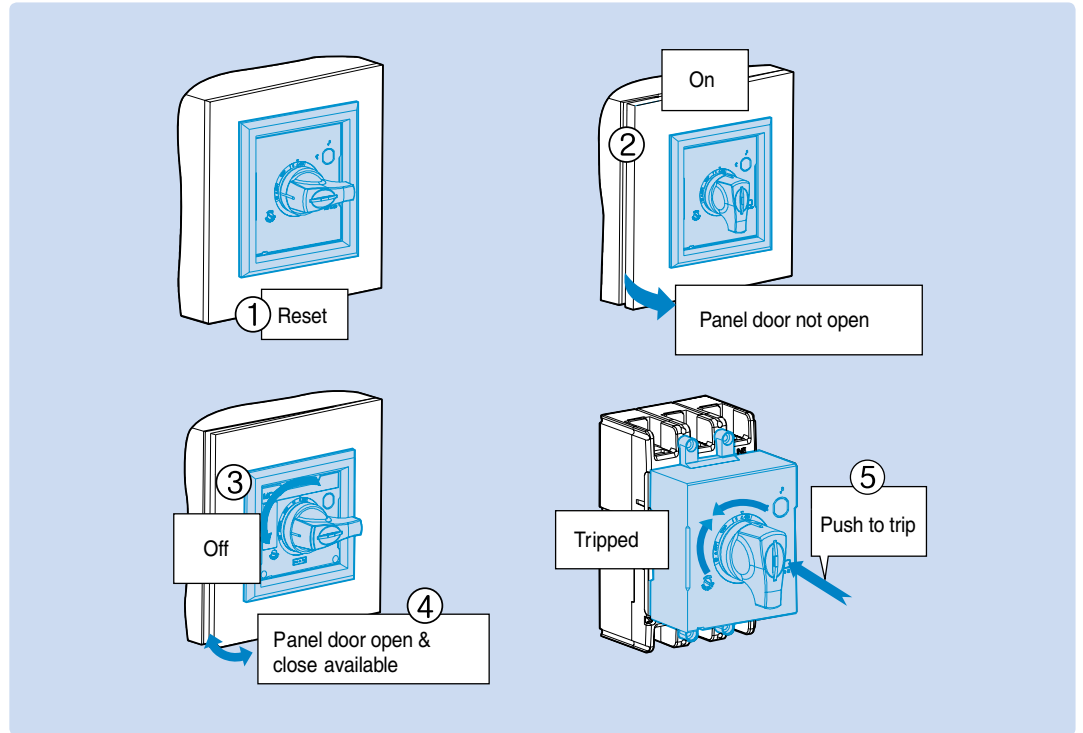
D-handle

Operating test

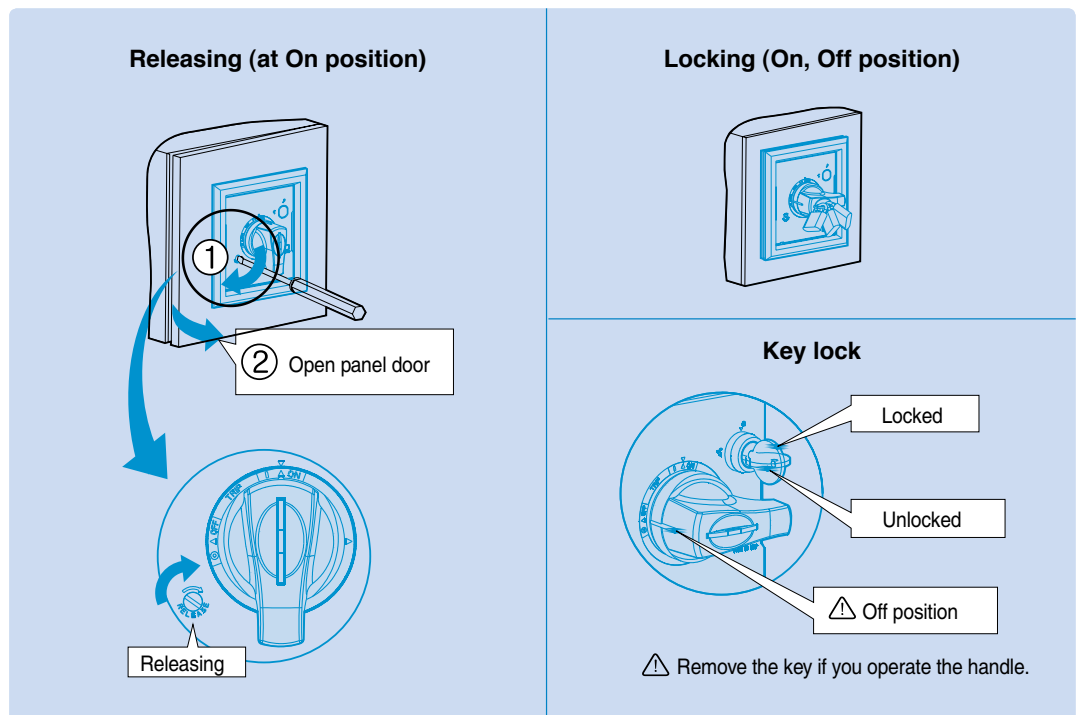
CAUTION

If the door is opened with much pressure when the position of handle is On or trip, the handle lock lever will be damaged.

Trip position: Panel door can't be opened

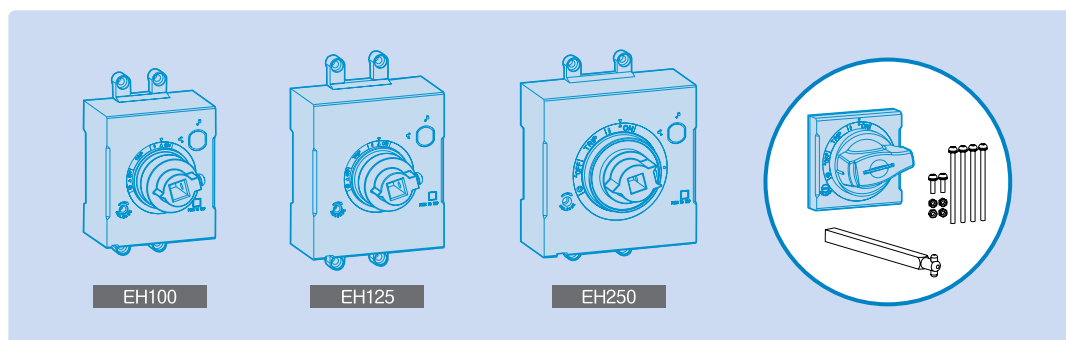
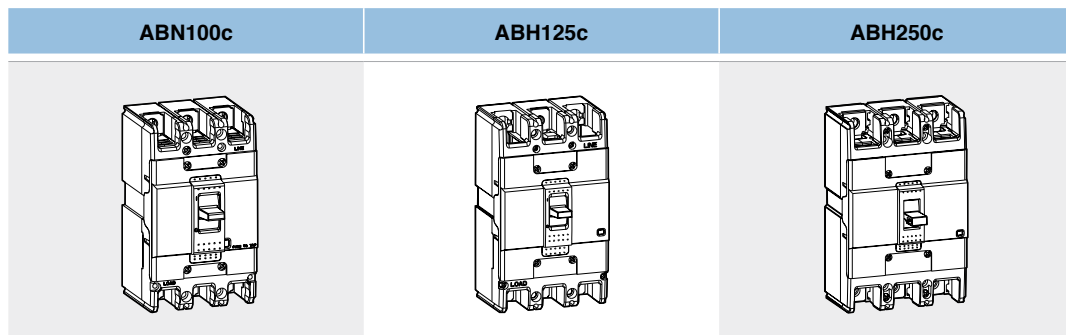


Locking system

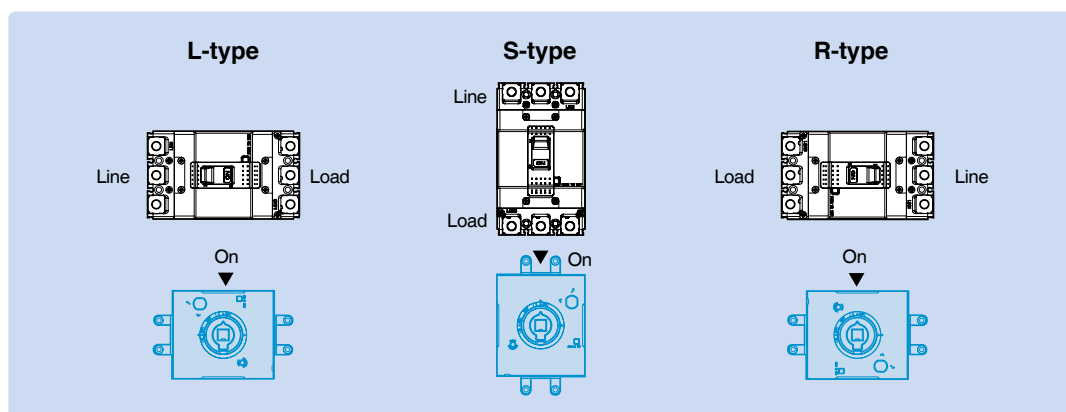
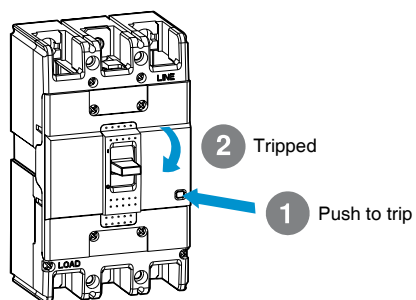


E-handle

MCCB and E-handle

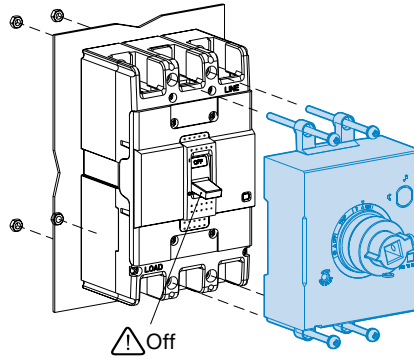


Tripping MCCB & install type



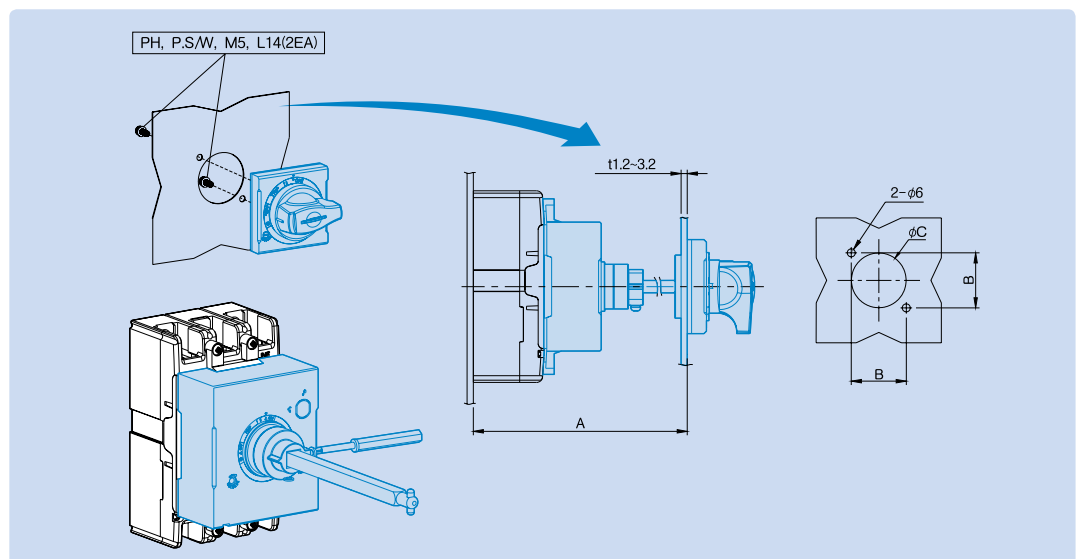
E-handle

Installing the E-handle



ABN100c, EBN100c	ABH125c, EBH125c	ABH250c, EBH250c

Cutting panel



E-handle	A (mm)	B (mm)	C (mm)	Breaker
EH100	min 150, max 573.5 (Shaft469mm)	47	Ø53	100AF
EH125	min 150, max 573.5 (Shaft469mm)	47	Ø53	125AF
EH250	min 150, max 571.5 (Shaft469mm)	47	Ø53	250AF

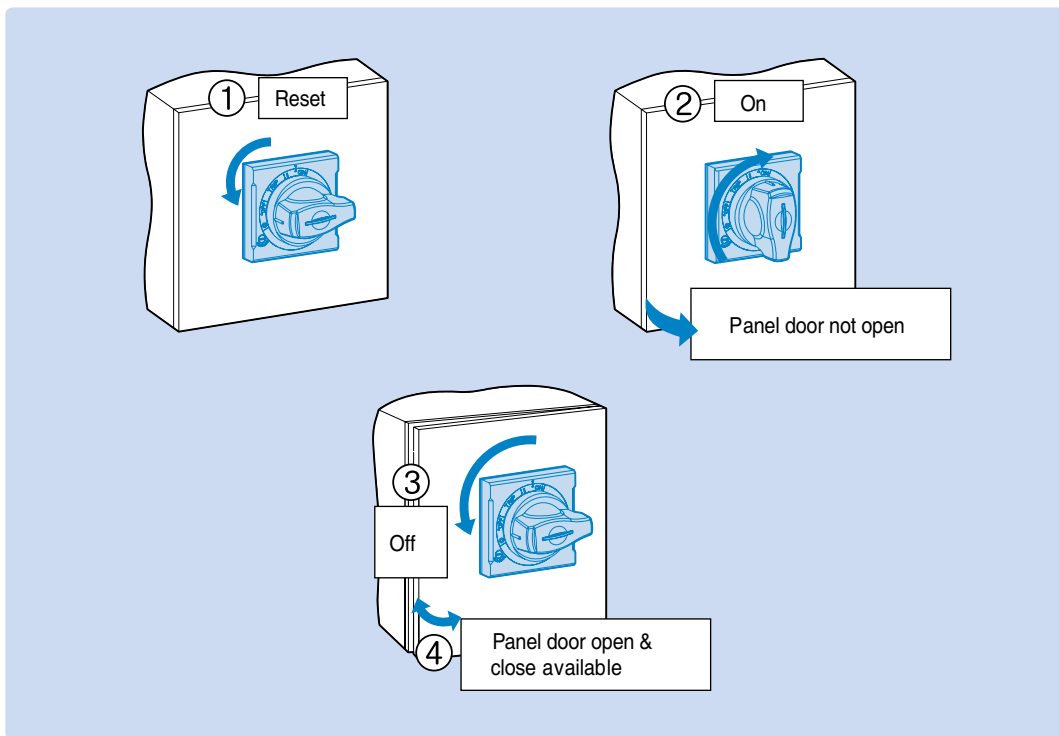
Note: An extension shaft that must be adjusted to the distance between back of circuit breaker and door

Operating test

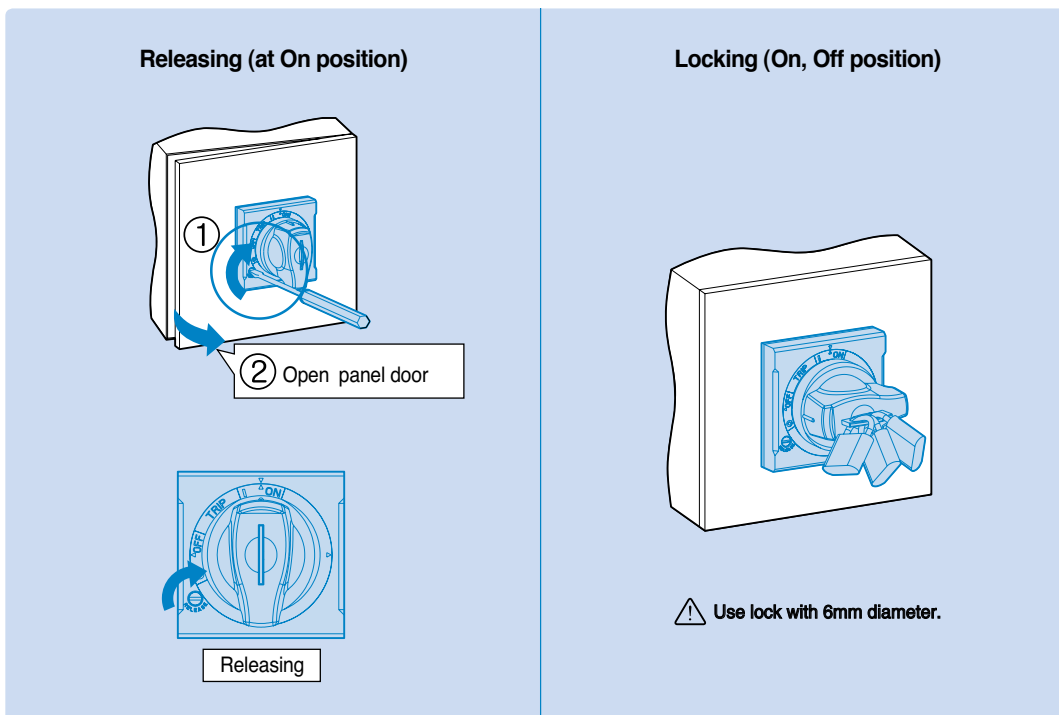
CAUTION

If the door is opened with much pressure when the position of handle is On or trip, the handle lock lever will be damaged.

Trip position: Panel door can't be opened



Locking system



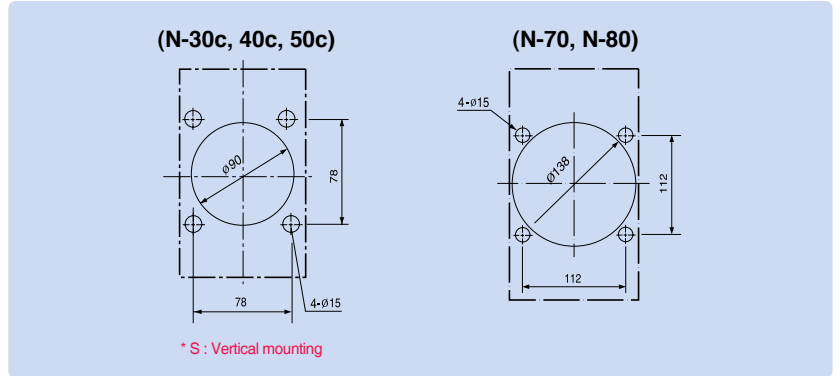
Note : In case of EH100/125/250 Semi Type, it is possible to lock E-handle only in the condition of OFF.

N-handle

How to mount

1) Drilling on the panel door

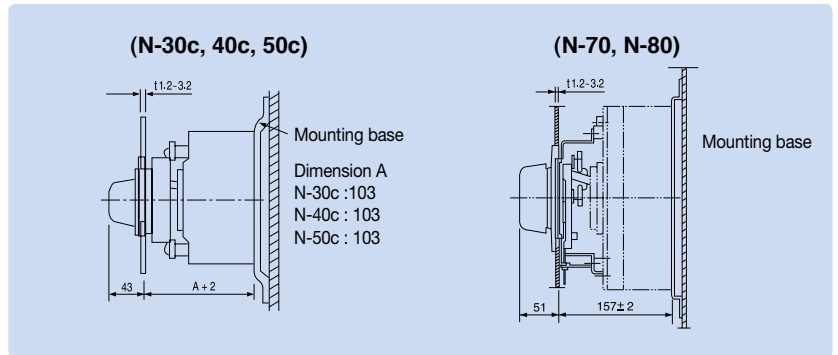
- ① All the N handles require the same size of mounting hole.
- ② Drill the holes according to the Fig. 1



<Fig 1>

(2) Mounting base

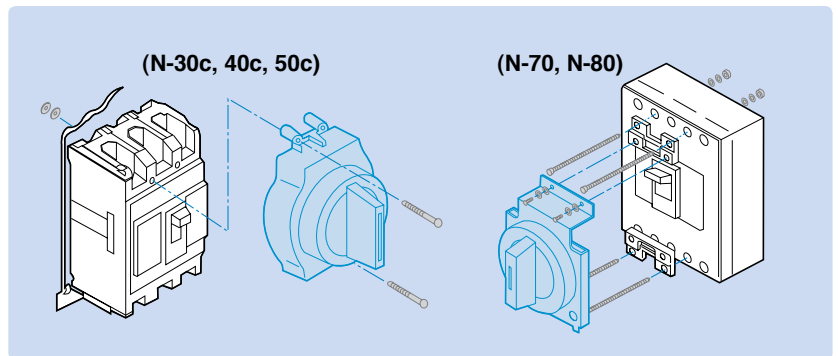
- ① Prepare a mounting base according to the Fig. 2. The distance between the door panel and the mounting base should be A+2. Dimension A is shown in the Fig.
- ② In the case of horizontal mounting turn the breaker mounting holes by 90 degrees



<Fig 2>

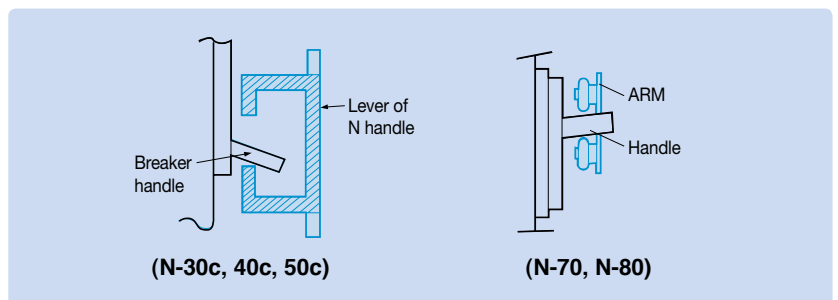
(3) Fixing

- ① Fixing a breaker and a handle at the same time.
 - a) As shown in the Fig. 3 a breaker and a handle can be fixed at the same time on a mounting base with the 4 (long) screws enclosed.



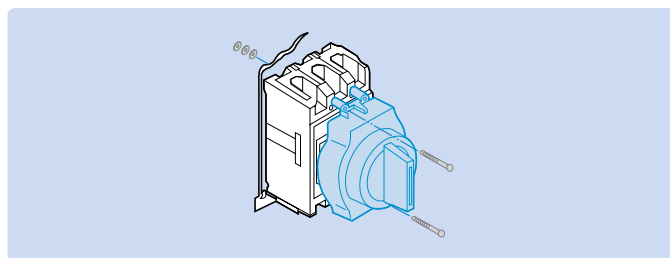
<Fig 3>

- b) Have the breaker handle and the lever of N handle be located in the position shown in Fig. 4.



<Fig 4>

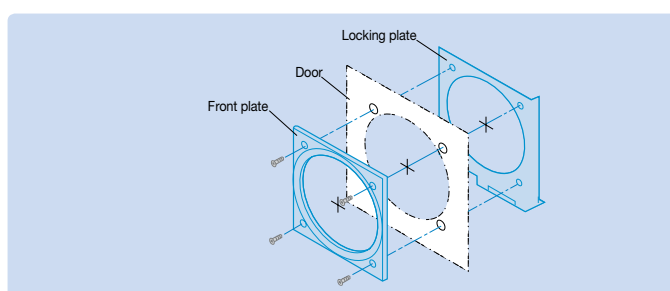
- ② Fixing a handle and a breaker step by step
- Check if there is any thin membrane in the mounting hole of the breaker cover and remove it, If exists.
 - Have the breaker handle and the lever of N handle be located in the position shown in Fig. 4.
 - Fix the N handle on the breaker with the 2 (Short) screws enclosed.
 - Fix the breaker on a mounting base with the 2 (Long) screws



<Fig 5>

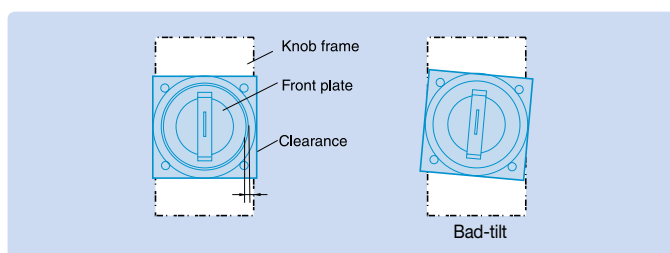
(4) Fixing front plate and lock plate

- ① Set the front plate and the locking plate on the door as shown in Fig. 6 fix them with screws.



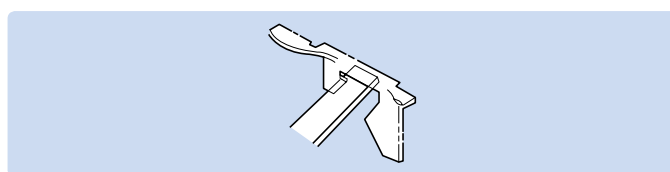
<Fig 6>

- ② Adjust if front plate or handle is at tilt against the breaker .



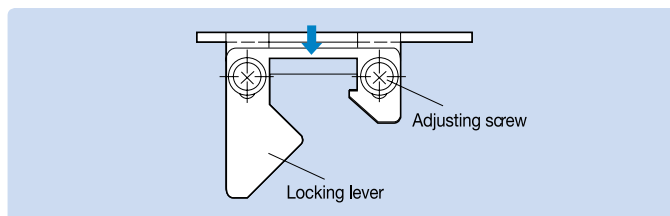
<Fig 7>

- ③ Verify that locking plate and locking lever interact on each other properly when the panel door is closed.
If necessary adjust them by following instructions.



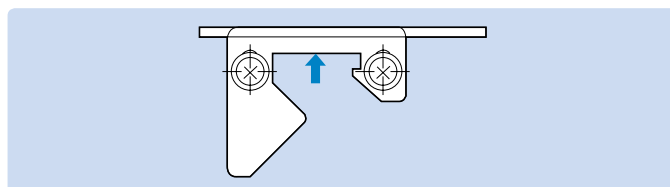
<Fig 8>

- a) In the event the panel door is not fully closed
This happens if the distance between the door panel and the mounting base the panels of the door is short.
Loosen the adjusting screw in the lock plate and move the plate in the direction of the arrow as shown in Fig. 9.



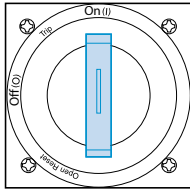
<Fig 9>

- b) In the event the door does not lock after closing the door
This happens if the distance between the door panel and the mounting base the panels of the door is long.
Loosen the adjusting screw in the lock plate and move the plate in the direction of the arrow as shown in Fig. 10.

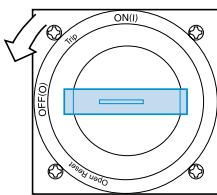


<Fig 10>

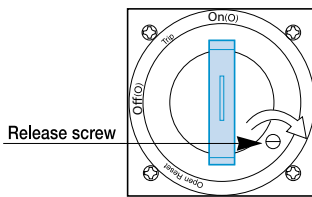
N-handle



<Fig 11>



<Fig 12>



<Fig 13>

(1) Operation in the door closed

- ① To have the breaker On turn the handle to be vertical. <Fig. 11>
- ② To have the breaker Off turn the handle to be horizontal. <Fig. 12>
- ③ If the breaker is tripped, the handle points to the Trip position.
- ④ To reset the breaker turn the handle to Reset position.

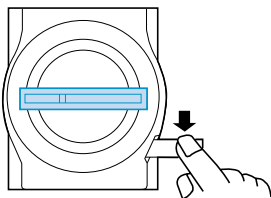
(2) Unlocking the panel door

- ① The door is locked and will not open at On, Off and Trip status.
- ② To unlock the door from Off or Trip status turn the handle toward OPEN direction. (Unlocked after taking the hand off the handle.)
- ③ To unlock the door from on state turn the Release screw clockwise <Fig. 13>

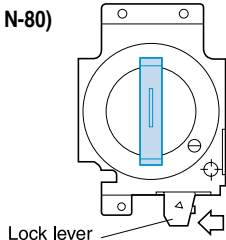
(3) Operation of the breaker in the door open

- ① When the door is open the breaker will not be on as the lock lever operates.
- ② To release the locking pull the lock lever to be nearly horizontal position. Then the breaker can be closed. <Fig. 14>
- ③ If the door is closed the lock lever will be reset automatically.

(N-30, 40, 50)



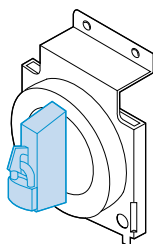
(N-70, N-80)



<Fig 14>

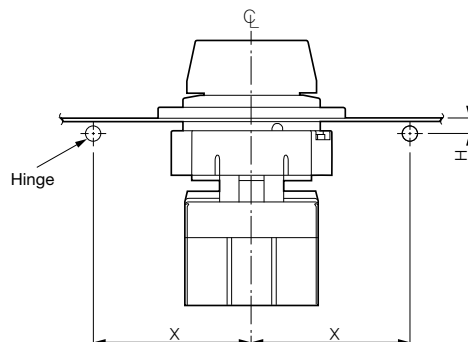
Padlocking

- ① Lockable at On or Off state with a padlock. (Padlock is not supplied)
- Lockable at Off state with a padlock is an optional spec.
- ② Pull the lock plate on the front of the handle and fasten the lock. <Fig. 15>
- ③ If the breaker is tripped after padlocking at on state, the handle will point to the trip.
- ④ Padlock diameter should be 3.5 ~ 6mm



<Fig 15>

Dimensions for N-handle hinges



Unit: mm

Handle types	Hinge dimensions	
	H	X
N-30c N-40c N-50c	0 or more	5H + 110 or more
N-70 N-80	0 or more	5H + 100 or more

Locking device

It is a handle locking device which is used by being fixed on a breaker.
You can use the padlock in the On or Off position of the breaker handle

Fixed locking device

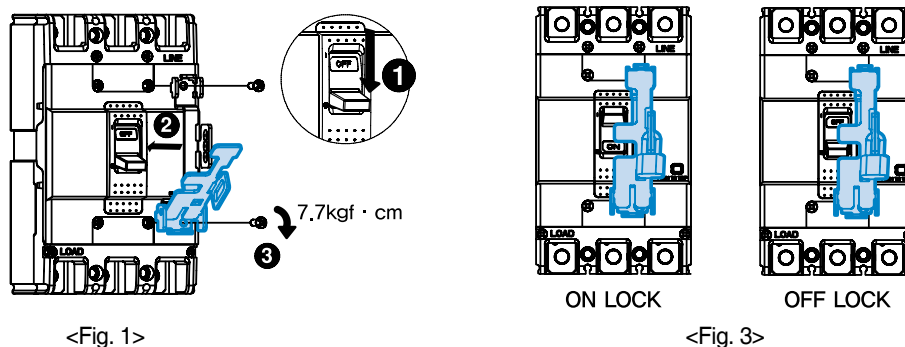
Locking device types	MCCB	ELCB
Handle Lock, ABN100c	ABS30c, ABS50c, ABS60c, ABN50c, ABN60c, ABN100c, ABN100d, ABN100e	EBS30c, EBS50c, EBS60c, EBN50c, EBN60c, EBN100c
Handle Lock, ABH125c	ABS125c, ABH50c, ABH125c, ABL125c	EBS125c, EBH50c, EBH125c
Handle Lock, ABH250c	ABN250c, ABS250c, ABH250c, ABL250c	EBN250c, EBS250c, EBH250c
Handle Lock, ABE/S/H/L400b-800b	ABN400c, ABS400c, ABH400c, ABL400c, ABN800c, ABS800c, ABL800c	EBN400c, EBS400c, EBH400c, EBL400c, EBN800c, EBS800c, EBL800c

How to use

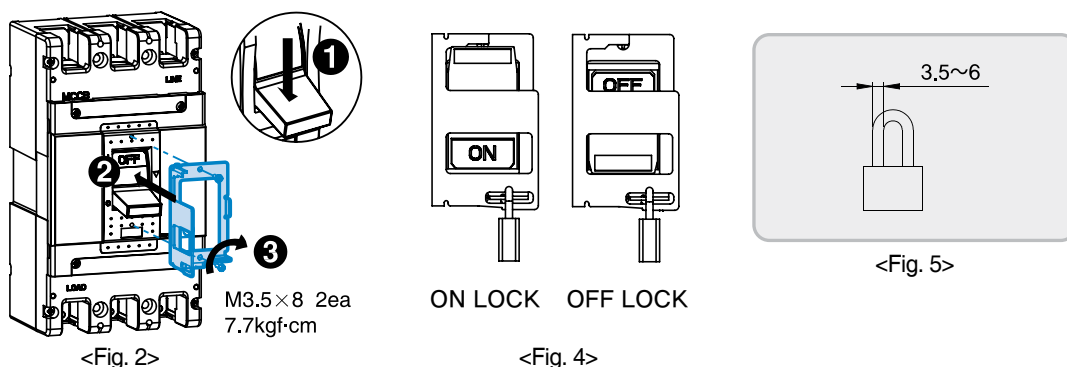
The handle lock is designed to be easily attached to the front of the breaker.

- (1) Set the breaker handle to the Off position. (Figures 1 and 2)
- (2) Secure the locking device on the cover of the circuit breaker. (Figures 1 and 2)
- (3) Use the padlock in the On or Off position. (Figures 3, 4 and 5)

• For 100AF/125AF/250AF MCCBs



• For 400AF / 800AF MCCBs



Accessories

Terminal covers

The terminal covers are applied to the circuit-breaker to prevent accidental contact with live parts and thereby guarantee protection against direct contacts.

Two types by length are available and provide IP20 degree of protection.

Also, covers are classified into 2 different types: Independent, Attachable and detachable with D or N handle

- **Short type covers, TCS:**

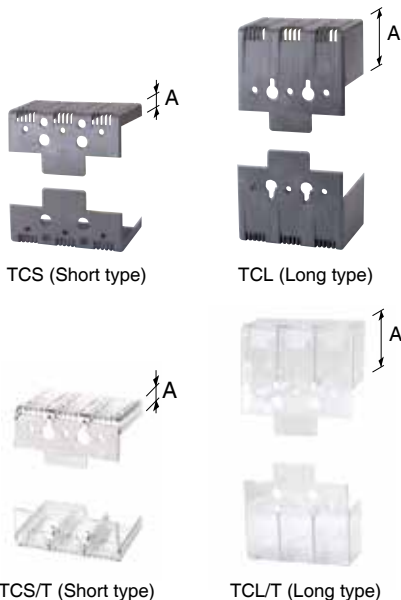
For fixed circuit-breakers with rear terminals and for moving parts of plug-in.

- **Long type covers, TCL:**

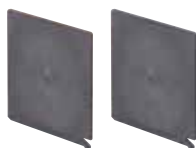
For fixed circuit-breakers with front, front extended, front for cables terminals.

Terminal covers						Pole	Applied breaker		Size extended (A), mm	
Short type			Long type				MCCB	ELCB	Short type	Long type
Inde	D-handle	N-handle	Inde	D-handle	N-handle					
TBS22	-	-	-	-	-	2P	ABE30b	-	10	-
TBS23	-	-	-	-	-	3P				
TCS12	-	-	TCL12	-	-	2P	ABN50c/60c/100c/100e	-	5.5	30
TCS/T-12	-	-	TCL/T-12	-	-					
TCS13	TCS13	TCS13	TCL13	TCL13	TCL13	3P	ABS30c/50c/60c	EBN50c/60c/100c	5.5	30
TCS/T-13	TCS/T-13	TCS/T-13	TCL/T-13	TCL/T-13	TCL/T-13					
TCS14	TCS14	TCS14	TCL14	TCS14	TCS14	4P	ABS30c/50c/60c	EBS30c/50c/60c	5.5	30
TCS/T-14	TCS/T-14	TCS/T-14	TCL/T-14	TCL/T-14	TCL/T-14					
TCS22	-	-	TCL22	-	-	2P	ABS125c	-	5.5	40
TCS/T-22	-	-	TCL/T-22	-	-					
TCS23	TCS23	TCS23	TCL23	TCL23	TCL23	3P	ABH50c/125c	EBS125c	5.5	40
TCS/T-23	TCS/T-23	TCS/T-23	TCL/T-23	TCL/T-23	TCL/T-23					
TCS24	TCS24	TCS24	TCL24	TCL24	TCL24	4P	ABL125c	EBH50c/125c	5.5	40
TCS/T-24	TCS/T-24	TCS/T-24	TCL/T-24	TCL/T-24	TCL/T-24					
TCS33	TCS33	TCS33	TCL33	TCL33	TCL33	2, 3P	ABN250c, ABS250c	EBN250c,	5.5	50
TCS/T-33	TCS/T-33	TCS/T-33	TCL/T-33	TCL/T-33	TCL/T-33					
TCS34	TCS34	TCS34	TCL34	TCL34	TCL34	4P	ABH250c, ABL250c	EBS250c	5.5	50
TCS/T-34	TCS/T-34	TCS/T-34	TCL/T-34	TCL/T-34	TCL/T-34					
-	-	-	T1-43A	-	T1/T-43A	2, 3P	ABN/S/H/L400c	EBN/S/H/L400c	-	120
-	-	-	T1-44A	-	-	4P				
-	-	-	T1-63A	-	T1/T-63A	2, 3P	ABN/S/L630c/800c	EBN/S/L630c/800c	-	141
-	-	-	T1-64A	-	-	4P				

Note: Terminal covers for 400AF and 800AF MCCBs are in acrylic.



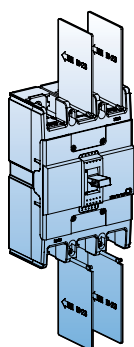
Insulation barriers



Insulation barrier allows the insulation characteristics between the phases at the connections to be increased. They are mounted from the front, even with the circuit-breaker already installed, inserting them into the corresponding slots.

They are incompatible with both the insulating terminal covers.

It is possible to mount the phase separating partitions between two circuit-breakers side by side.



Type	Breaker	
	MCCB	ELCB
IB-13	ABN50c/60c/100c/100e ABS30c/50c/60c	EBN50c/60c/100c EBS30c/50c/60c
IB-23	ABS125c ABH50c/125c ABN250c, ABS250c ABH250c ABL125c, ABL250c	EBS125c EBH50c/125c EBN250c, EBS250c EBH250c
B-43B	ABN/S/H/L400c	EBN/S/H/L400c
B-33C	ABN/S/L800c	EBN/S/L800c



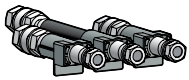
Insulation barriers for line side are provided as standard.

Rear connection terminals

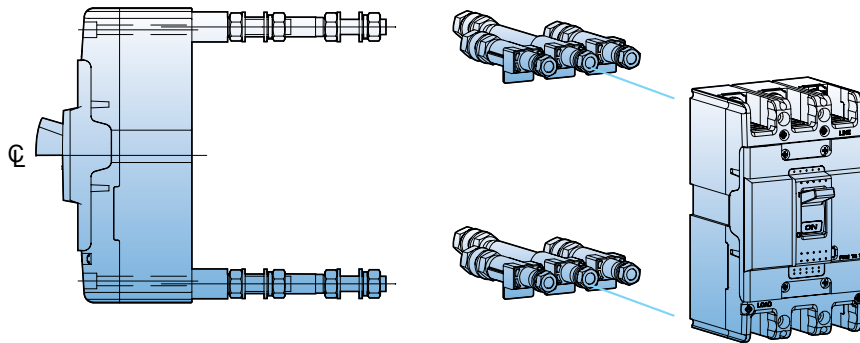
Rear connection terminals are used to adapt the circuit breakers to switchboards or other applications that require rear connection. There are two kinds of rear connection terminals.

- Flat type
- Round type

Round type terminals



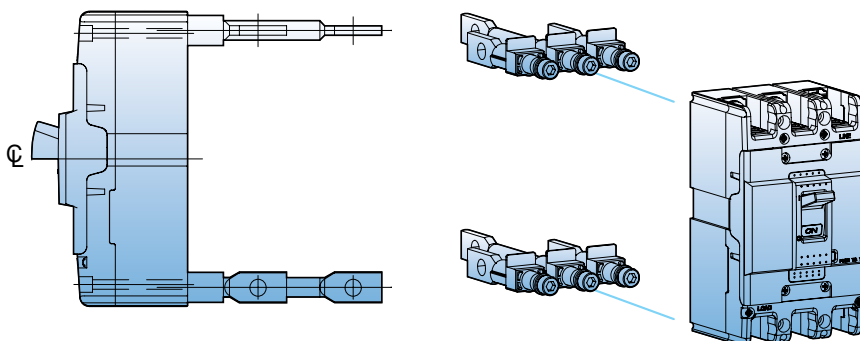
Breaker	For 2-pole	For 3-pole	For 4-pole
ABN100c 50AF	RTR1-52	RTR1-53	-
ABN100c 100AF	RTR1-102	RTR1-103	RTR1-104
ABH125c	RTR2-102	RTR2-103	RTR2-104
ABH250c	RTR3-202	RTR3-203	RTR3-204



Flat type terminals



Breaker	For 2-pole	For 3-pole	For 4-pole
ABN100c	RTB1-102	RTB1-103	RTB1-104
ABH125c	RTB2-102	RTB2-103	RTB2-104
ABH250c	RTB3-202	RTB3-203	RTB3-204



Mechanical interlock

The mechanical interlock is installed on the front of two breakers mounted side by side, in either the 3-pole or 4-pole version and prevents simultaneous closing of the two breakers. So it is suitable for consisting of manual sourcechangeover system.

Type numbering system

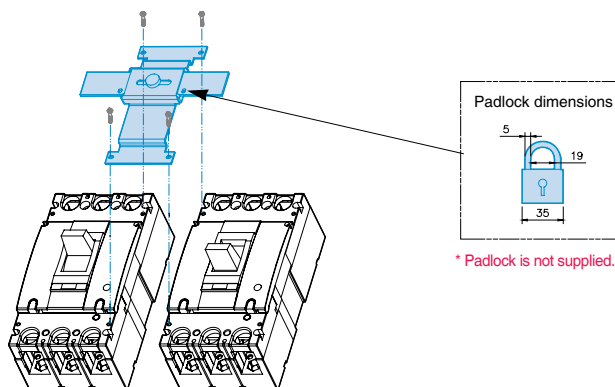
MI	—	4	3														
Type		AF	Pole														
Mechanical interlock		<table border="1"> <tr><td>1</td><td>100AF</td></tr> <tr><td>2</td><td>125AF</td></tr> <tr><td>3</td><td>250AF</td></tr> <tr><td>4</td><td>400AF</td></tr> <tr><td>8</td><td>800AF</td></tr> </table>	1	100AF	2	125AF	3	250AF	4	400AF	8	800AF	<table border="1"> <tr><td>3</td><td>3P</td></tr> <tr><td>4</td><td>4P</td></tr> </table>	3	3P	4	4P
1	100AF																
2	125AF																
3	250AF																
4	400AF																
8	800AF																
3	3P																
4	4P																

Types and applicable breakers

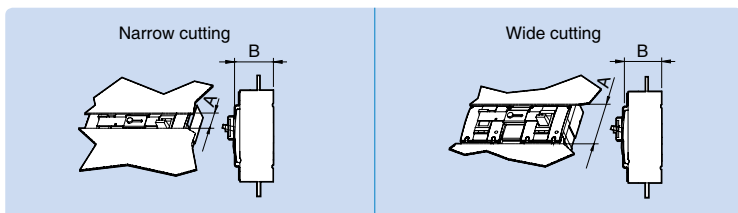
Type	MCCB	ELCB
MI-13, 14	ABS30c, ABS50c, ABS60c, ABN50c, ABN60c, ABN100c, ABN100e	EBS30c, EBS50c, EBS60c, EBN50c, EBN60c, EBN100c
MI-23, 24	ABS125c, ABH50c, ABH125c, ABL125c	EBS125c, EBH50c, EBH125c
MI-33, 34	ABN/S/H/L250c	EBN/S/H250c
MI-43, 44	ABN/S/H/L400c	EBN/S/H/L400c
MI-83, 84	ABN/S/L800c	EBN/S/L800c

Note) MI is not applicable to 2-pole version breakers of 100AF and 125AF.

Layout



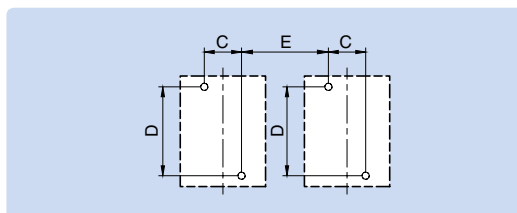
MCCB panel cutting



(Unit in: mm)

Cutting	MI-13, 14		MI-23, 24		MI-33, 34		MI-43, 44		MI-83, 84	
	A	B	A	B	A	B	A	B	A	B
Narrow	52	66	52	66	52	66	100	111	100	111
Wide	86	62	102	62	104	62	152	97	152	97

MCCB panel drilling



(Unit in: mm)

Breaker	C		D		E	
	3P	4P	3P	4P	3P	4P
100AF	25	25	110.5	110.5	70	95
125AF	30	30	132	132	84	114
250AF	35	35	126	126	99	134
400AF	44	44	215	215	166	210
800AF	70	70	243	243	210	280



Plug-in base

Plug-in devices

Plug-in device makes it possible to extract and/or rapidly replace the circuit breaker without having to touch connections for ship and important installations.

The plug-in base is the fixed part of the plug-in version of the circuit-breaker.

It will be installed directly on the back plate of panel.

The circuit-breaker is racked out by unscrewing the top and bottom fixing screws.

Normal type plug-in MCCB

- MCCB current rating upto 250A
- Generally used in switchgears

Double-row type plug-in MCCB

- For 125AF MCCB
- Generally used in branch circuits

Type names of blocks

Breaker	Arrangement	Plug-in block	Remark
ABN100c	Normal	PB-A3-FR	
	Single-row	PB-A3-1DB	
	Double-row	PB-A3-2DB	
	Line-only	PB-A3-FRL	
ABH125c	Normal	PB-C3-FR	
	Single-row	PB-C3-1DB	
	Double-row	PB-C3-2DB	
ABH250c	Normal	PB-D3-FR	
400AF	Normal/Line-only	PB-I3-FR/PB-I3-FRL	
800AF	Normal	PB-J3-FR	



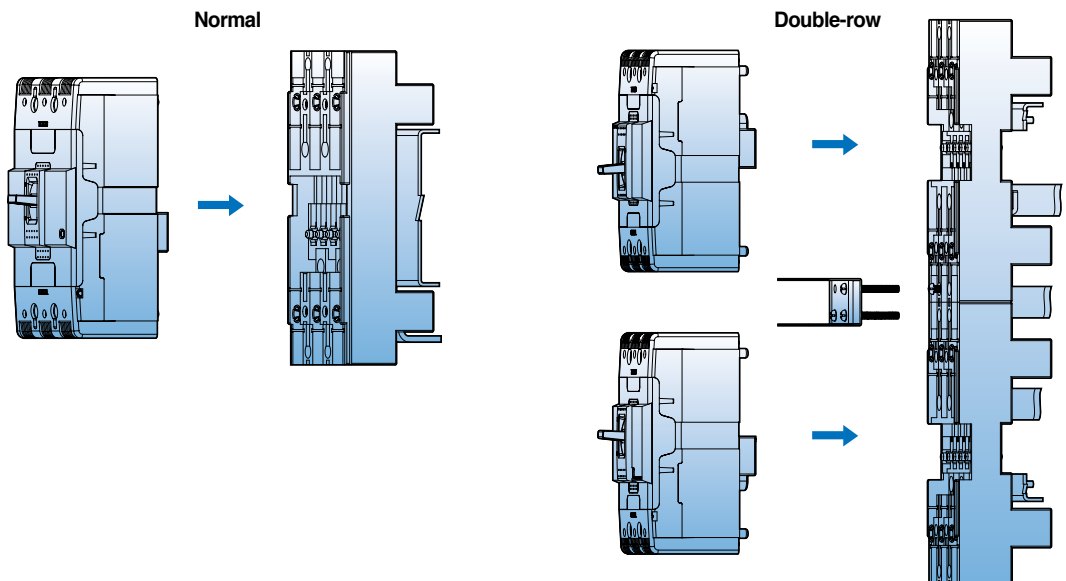
Plug-in type MCCB
(Plug-in terminal built)



ABH103c plug-in type



ABH203c plug-in type



Remote operation



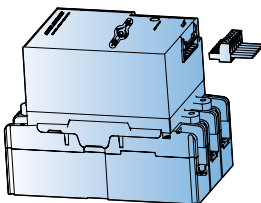
Motor operator

Motor operators can also be operated by manual. The motor drives a mechanism which switches Metasol toggle handle to the "On" and "Off/Reset" positions.

- The manual actuator handle is located on the front of the cover.
- Manual or Automatic operation can be selected.
- Applicable to 2, 3 and 4-pole breakers.

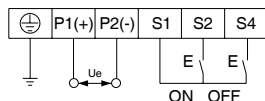
MCCB			Type	Control voltage	Actuation current (A)	Response time (ms)		Mechanical service life (operations)	No. of operations per hour
2P	3P	4P				Closing	Opening		
-	ABN53c, ABN63c, ABN103c, ABN103e, ABS33c, ABS53c, ABS63c	ABN54c, ABN64c, ABN104c, ABN104e, ABS34c, ABS54c, ABS64c	MOP-M1	① DC24V ② AC110V~DC110V ③ AC230V/DC220V	≤3A (DC24V) ≤0.5A (AC)	700	700	10,000	120
-	ABS103c, ABH53c, ABH103c, ABL103c	ABS104c, ABH54c, ABH104c, ABL104c	MOP-M2	① DC24V ② AC110V~DC110V ③ AC230V/DC220V	≤3A (DC24V) ≤0.5A (AC)	840	840	10,000	120
ABN202c, ABS202c, ABH202c, ABL202c	ABN203c, ABS203c, ABH203c, ABL203c	ABN204c, ABS204c, ABH204c, ABL204c	MOP-M3	① DC24V ② AC110V~DC110V ③ AC230V/DC220V	≤3A (DC24V) ≤0.5A (AC)	840	840	10,000	120
ABN402c, ABS402c, ABH402c, ABL402c	ABN403c, ABS403c, ABH403c, ABL403c	ABN404c, ABS404c, ABH404c, ABL404c	MOP-M4	① DC24V ② AC110~DC110V ③ AC230V/DC220V	≤6A (DC24V) ≤0.8A (AC)	1,200	1,200	4,000	60
ABN802c, ABS802c, ABL802c	ABN803c, ABS803c, ABL803c	ABN804c, ABS804c, ABL804c	MOP-M5	① DC24V ② AC110~DC110V ③ AC230V/DC220V	≤6A (DC24V) ≤0.8A (AC)	1,200	1,200	2,500	60
-	ABS1003b, ABS1203b, ABL1003b, ABL1203b	ABS1004b, ABS1204b, ABL1004b, ABL1204b	MOP-M6	① AC230V/DC220V	≤6A (DC24V) ≤0.8A (AC)	1,500	1,500	2,500	20

Wiring connection



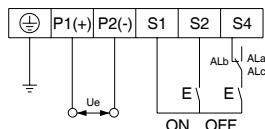
Standard connection

- 1) Remote On and Off of MCCB and manual operation
- 2) Be careful not to change the polarity at DC24V



Connection with alarm switch (AL)

- 1) The connection diagram is the method of using a alarm switch (AL) without shunt or undervoltage trip. A trip due to a fault or trip button prevent a remote reset.
- 2) The fault must be cleared surely and reset it with manual operation.

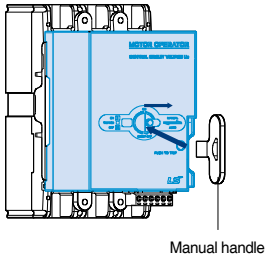


Remote operation

Manual operation

- 1) Insert the manual handle into the slot of Motor operator surface and rotate it clockwise.
- 2) It must be rotated just 180° clockwise for safe operation of micro switch in the motor operator.
- 3) Return the manual handle after the manual operation
- 4) Turn the slide switch back to the position of Auto.

CAUTION: When the circuit breaker is tripped by trip button in the Off status, it is impossible to operate motor operator automatically. It must be reset by manual operation.



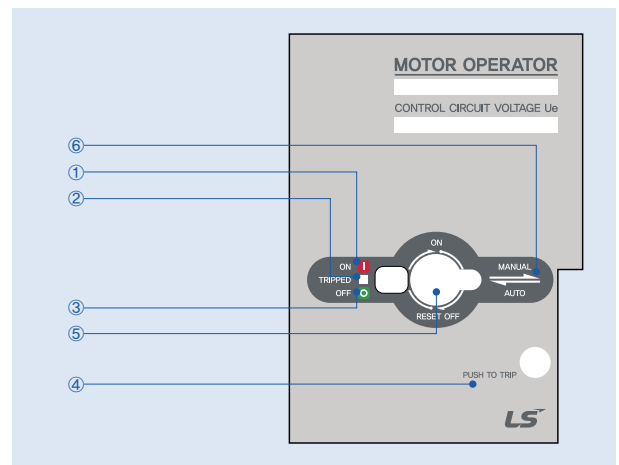
Automatic operation

- 1) Set the slide switch to Auto, then internal power is closed automatically.
- 2) Operating frequency should be less than these below regulated values.
MOP-M1~M3, M7 (120 operations per hour) , MOP-M4 (60 operations per hour) ,
MOP-M5, M6 (20 operations per hour)
- 3) Use the On/Off switch in the range of regulated values.
- 4) It may interfere near communication equipments because of internal switching power supply.
It's recommended that a noise filter be installed to power supply.
- 5) Please do not input On/Off signals at the same time during the automatic operation.
- 6) If the circuit breaker has a UVT attached inside, charge a UVT on the rated voltage before performing Motor operator.

Motor operator

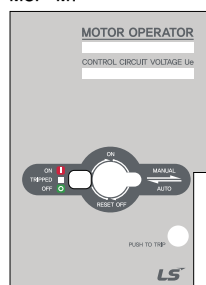
Feature

- ① On position indication (Red color)
- ② Trip position indication (White color)
- ③ Off position indication (Green color)
- ④ Button for push to trip
- ⑤ On/Off/Reset selection lever
- ⑥ Manual/Auto selection lever

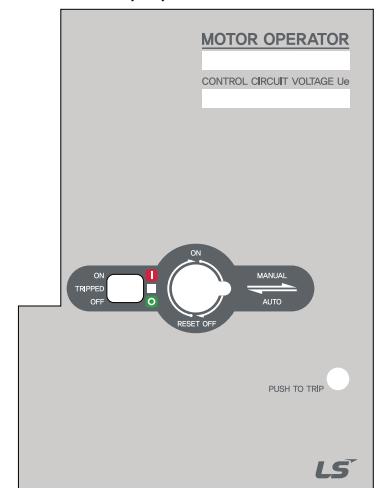
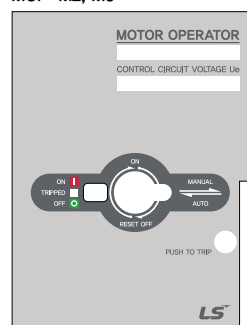


MOP-M4/M5/M6

MOP-M1



MOP-M2, M3

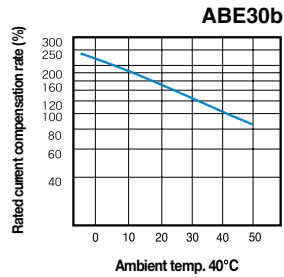


Characteristics curves

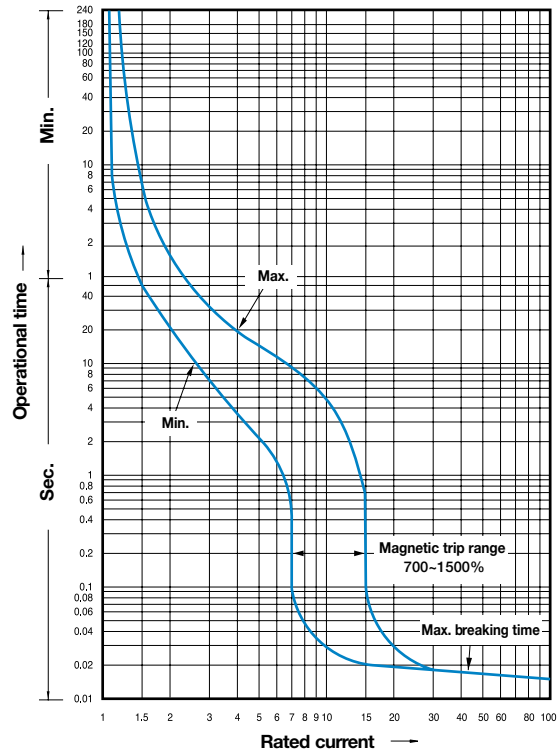
Breaker types

MCCB
ABE30b

Compensation curves



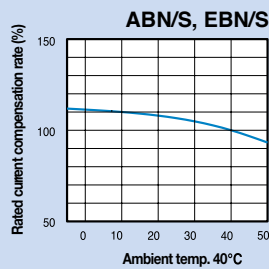
Rated current: 3~30A (ABE)



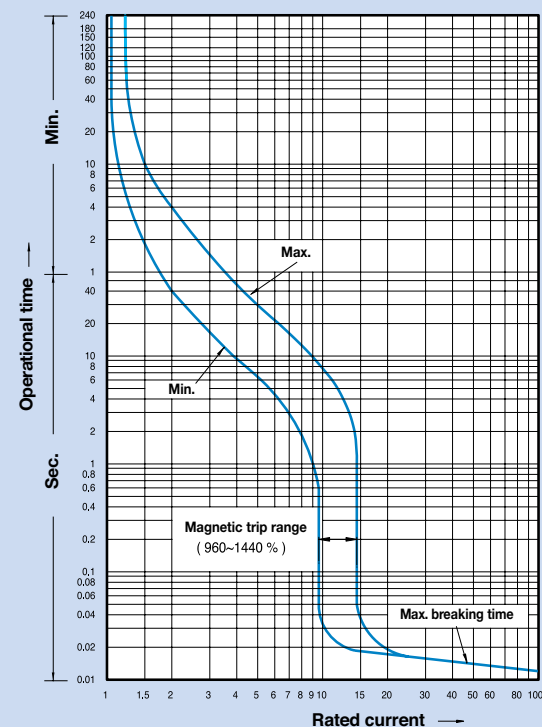
Breaker types

MCCB
ABN50c/60c/100c/100e
ABS30c/50c/60c
ELCB
EBN50c/60c/100c
EBS30c/50c/60c

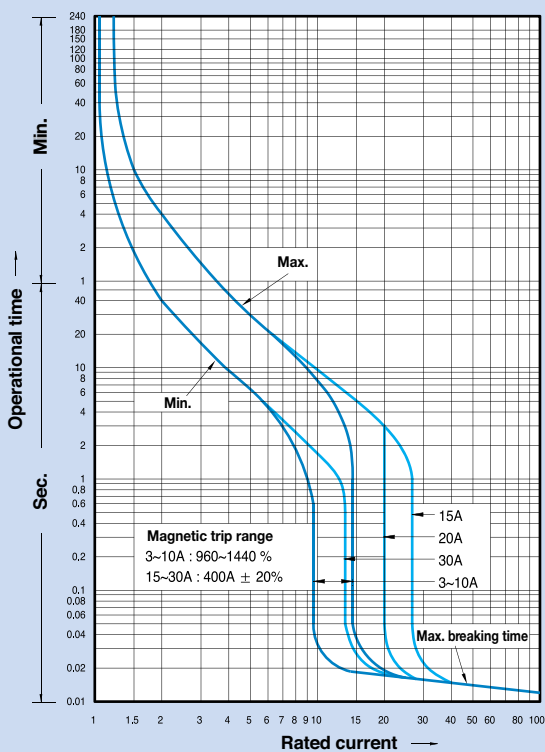
Compensation curves



Rated current: 40~100A (ABN/S,EBN/S)



Rated current: 3~30A (ABN/S,EBN/S)

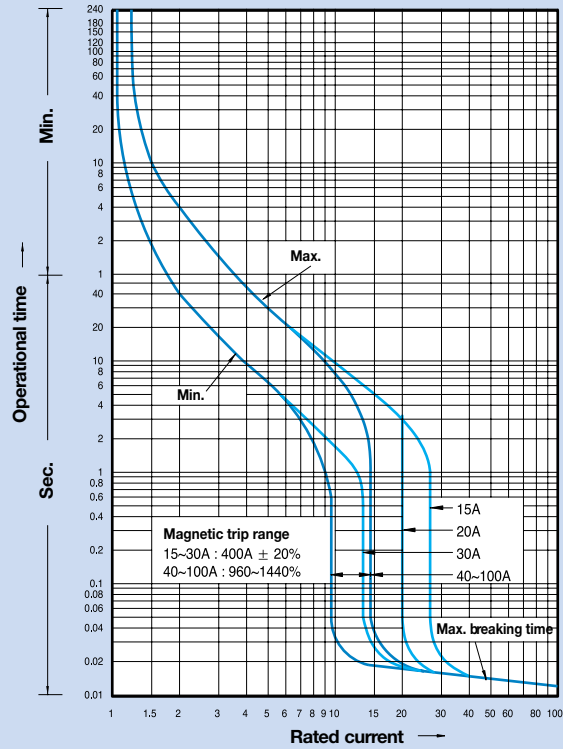


Characteristics curves

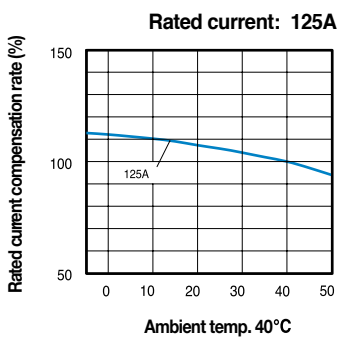
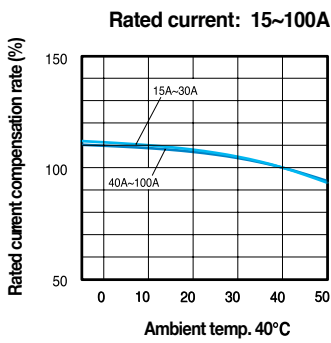
Breaker types

MCCB
ABS125c
ABH50c/125c
ABL125c
ELCB
EBS125c
EBH50c/125c

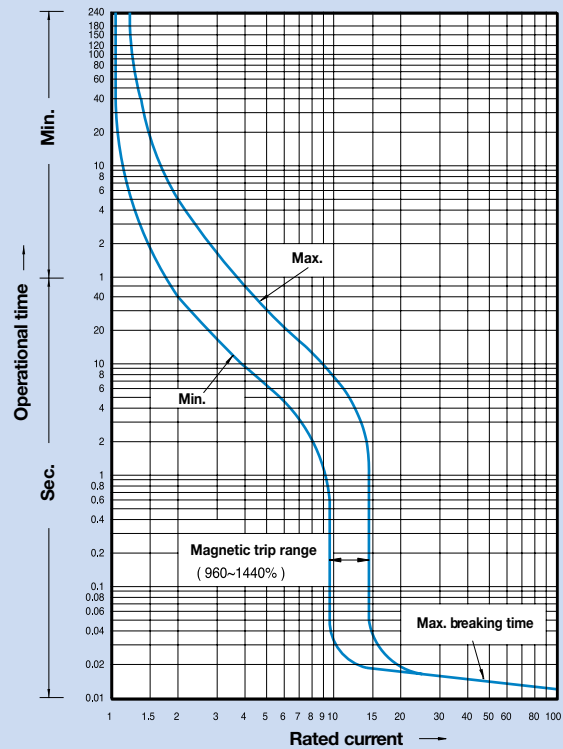
Rated current: 15~30A, 40~100A



Compensation curves



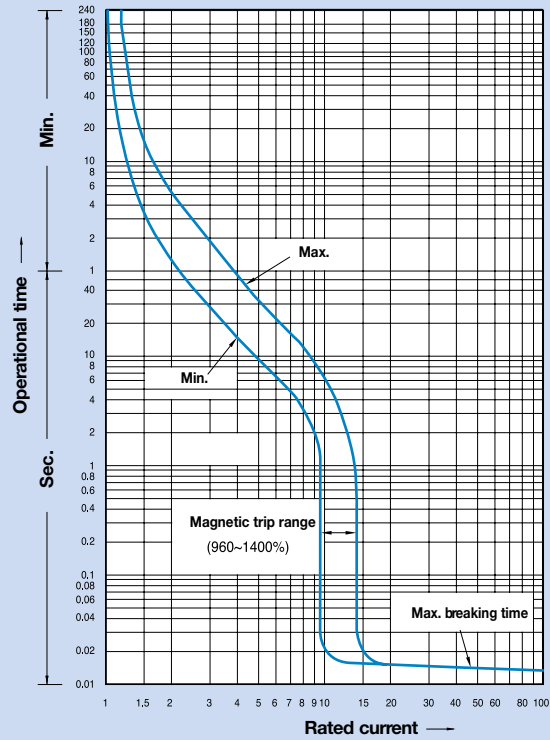
Rated current: 125A



Breaker types

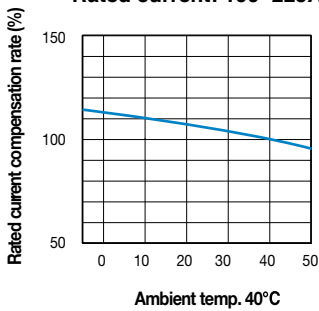
MCCB
ABN250c, ABS250c
ABH250c, ABL250c
ELCB
EBN250c, EBS250c
EBH250c

Rated current: 100~225A

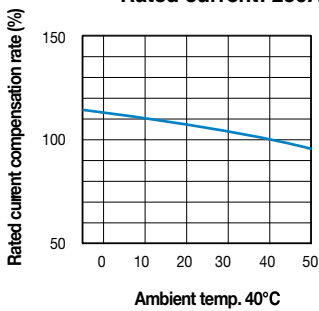


Compensation curves

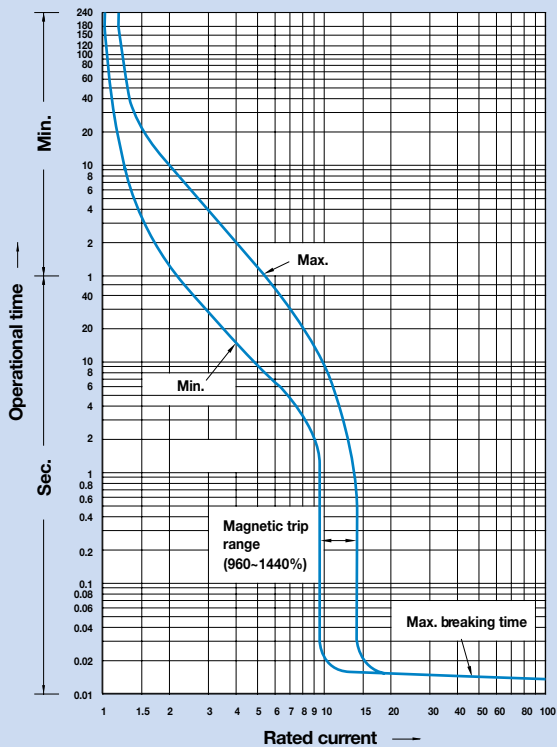
Rated current: 100~225A



Rated current: 250A



Rated current: 250A



Characteristics curves

Breaker types

MCCB

ABN400c, ABS400c, ABH400c, ABL400c

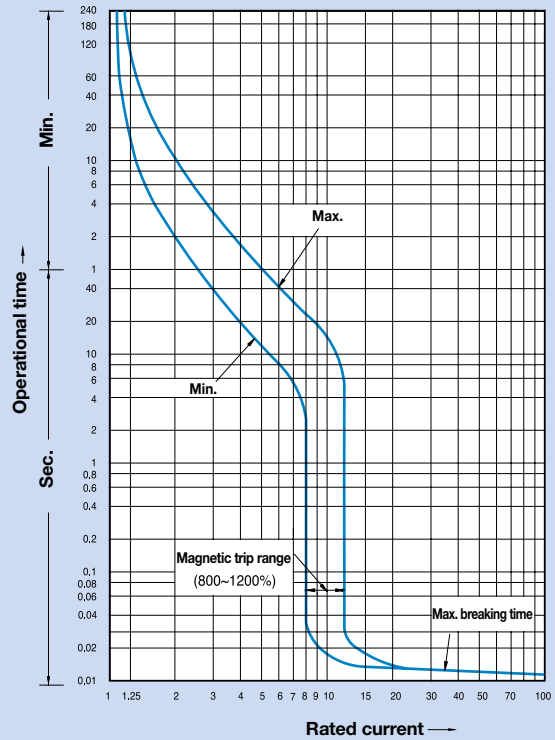
ABN800c, ABS800c, ABL800c

ELCB

EBN400c, EBS400c, EBH400c, EBL400c

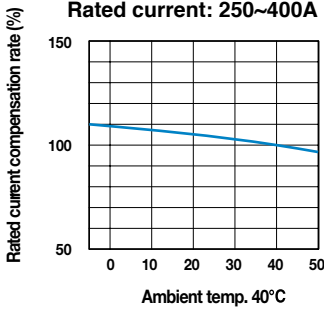
EBN800c, EBS800c, EBL800c

Rated current: 250~400A

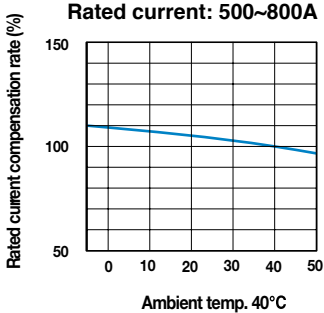


Compensation curves

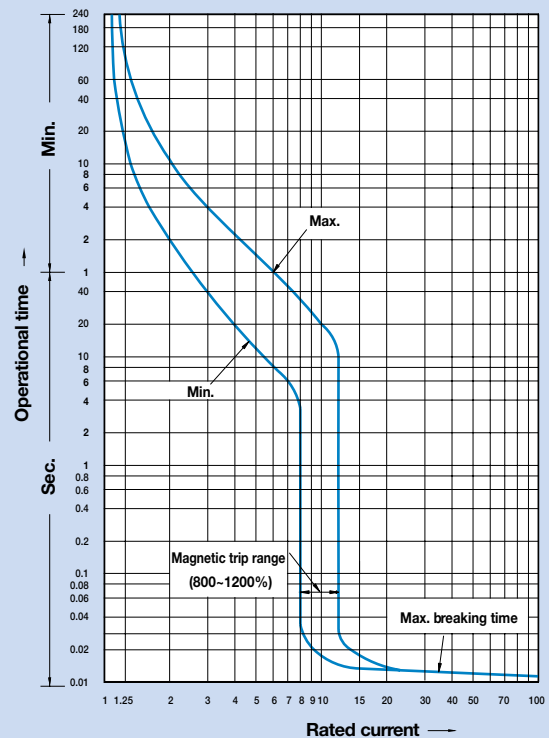
Rated current: 250~400A



Rated current: 500~800A



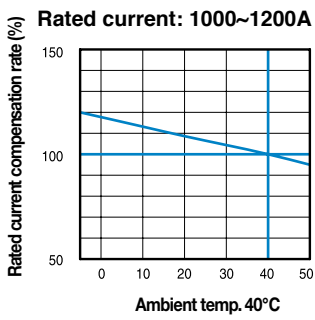
Rated current: 500~800A



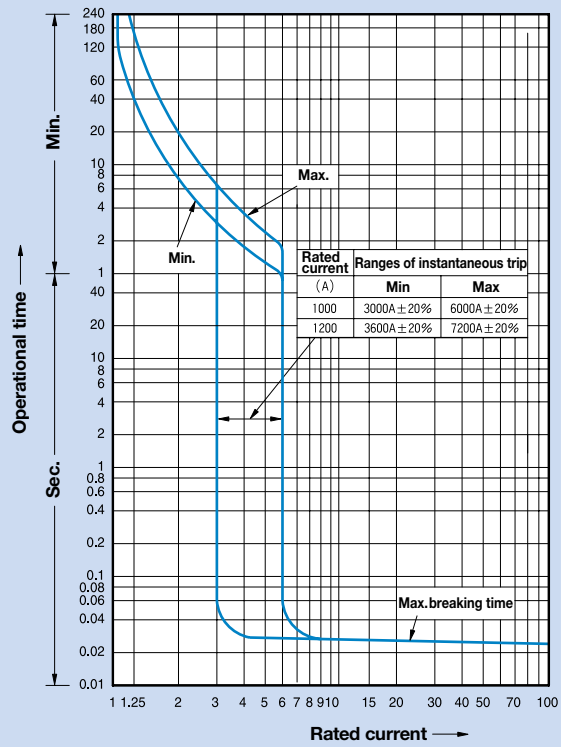
Breaker types

MCCB
ABS1000b, ABL1000b
ABS1200b, ABL1200b
ELCB
EBS1003b, EBS1203b

Compensation curves



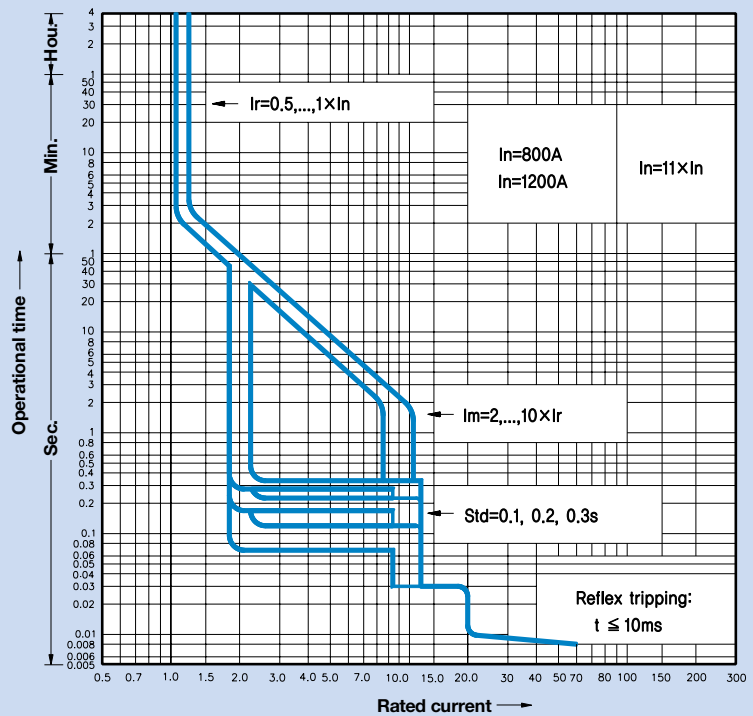
Rated current: 1000~1200A



Breaker types

MCCB
ABS1200bE

Rated current: 1200A

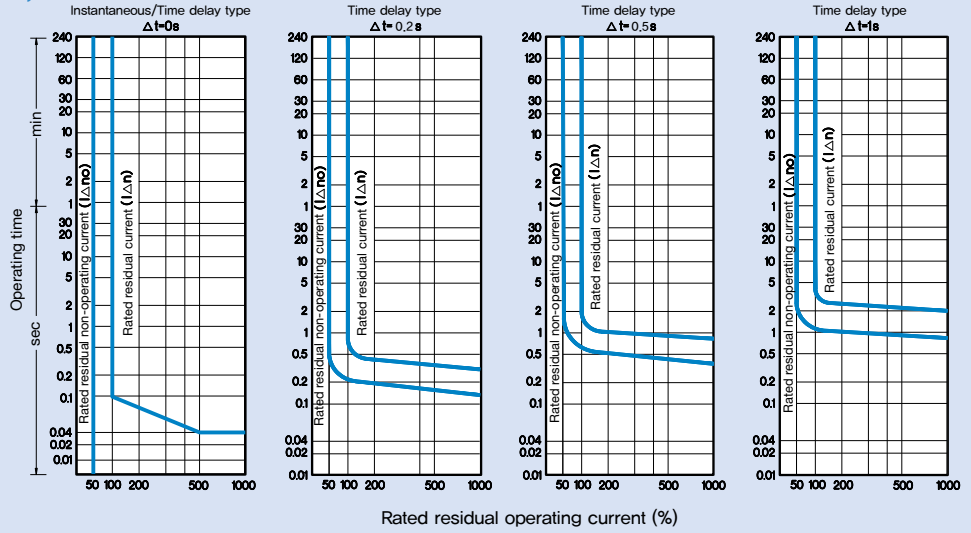


Characteristics curves (ELCB Adjustable)

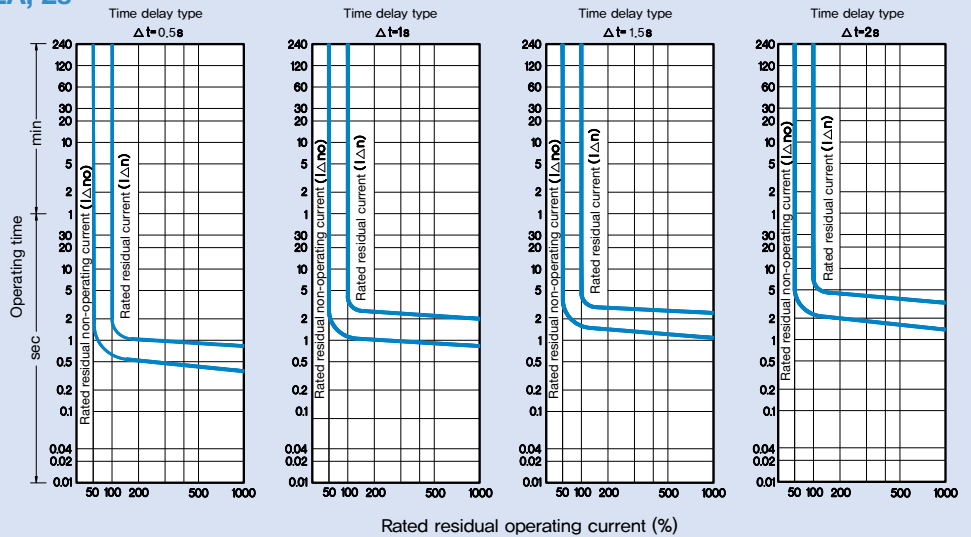
Breaker types

ELCB
EBN 50c/60c/100c/250c
EBS 30c/50c/60c/125c/250c
EBH 50c/125c/250c

1A, 1s



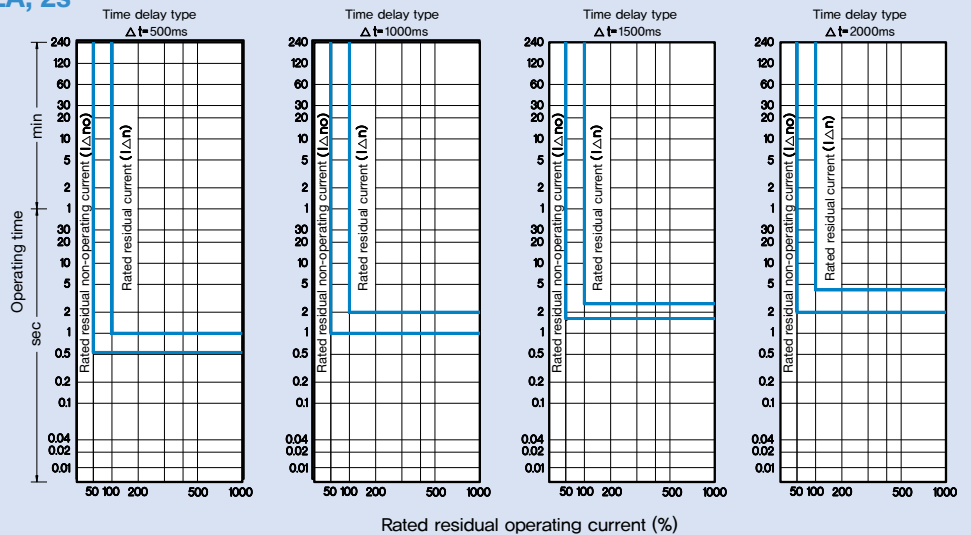
2A, 2s



Breaker types

ELCB
EBN400c, EBS400c,
EBH400c, EBL400c
EBS800c, EBS800c, EBL800c

2A, 2s



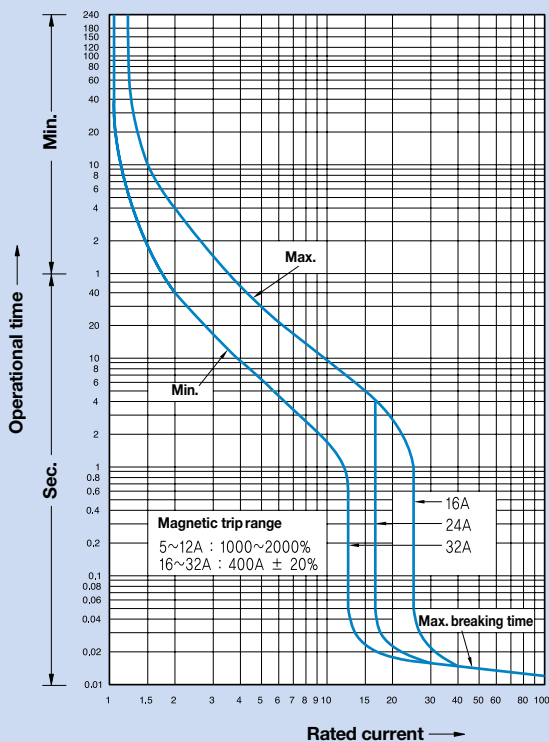
Characteristics curves

Motor protection type

Breaker types

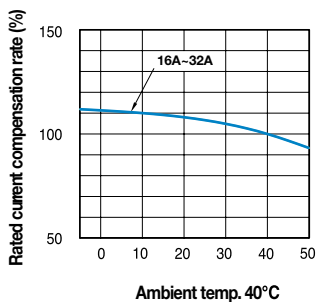
MCCB
ABN50cM/60cM/100cM/100dM
ABS30cM/50cM/60cM

Rated current: 16~32A

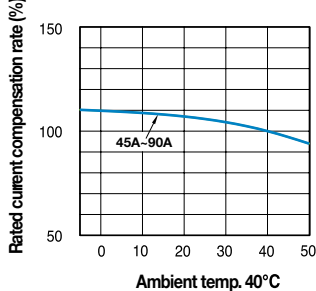


Compensation curves

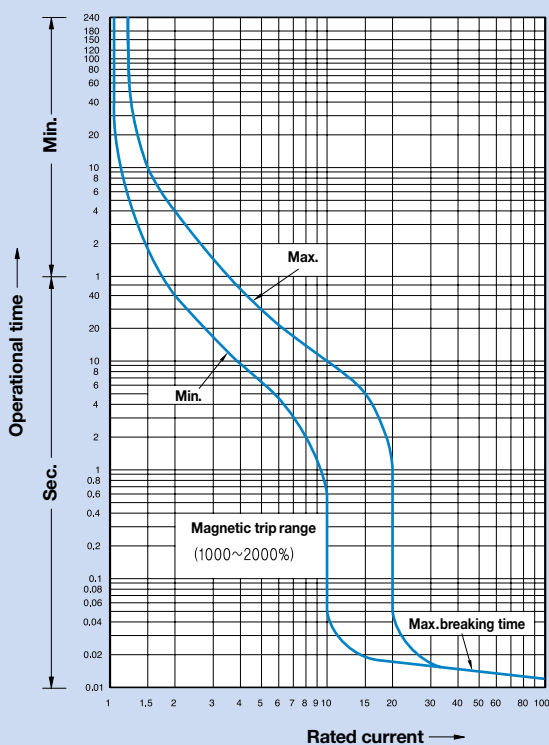
Rated current: 16~32A



Rated current: 45~90A



Rated current: 45~90A



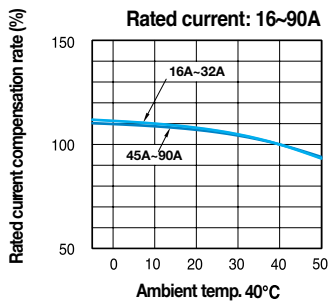
Characteristics curves

Motor protection type

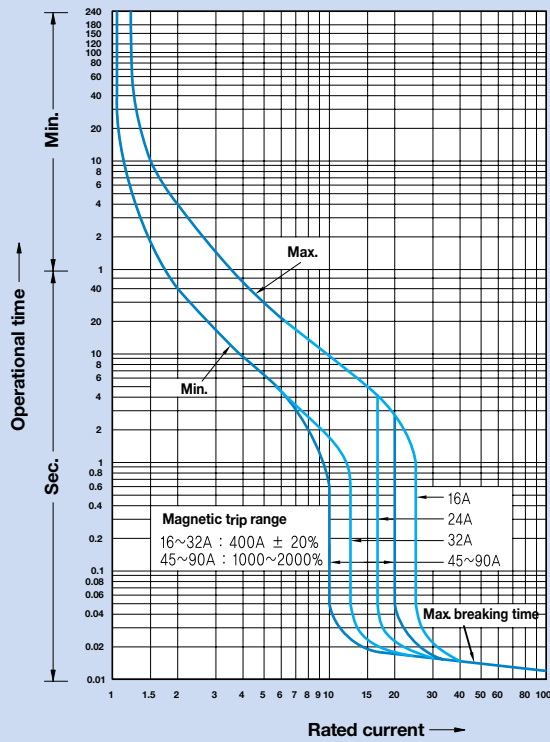
Breaker types

MCCB
ABS125cM
ABH50cM/125cM

Compensation curves



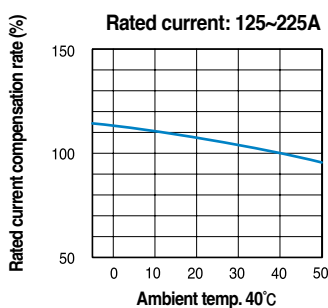
Rated current: 16~90A



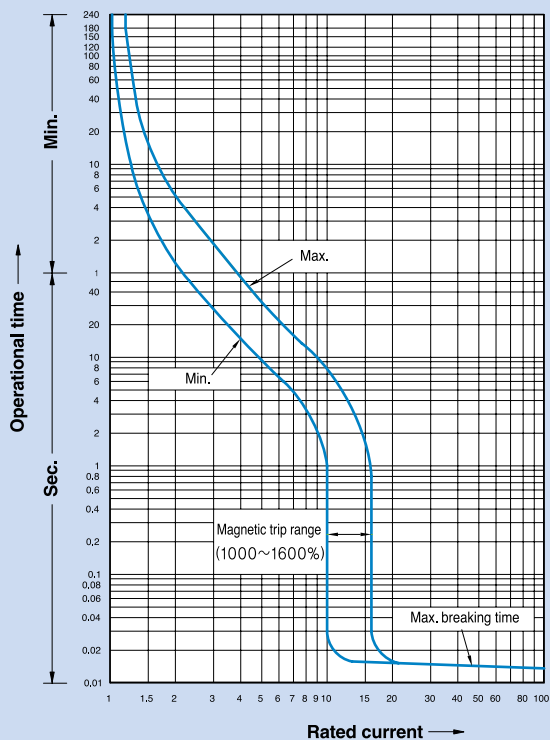
Breaker types

MCCB
ABN250cM, ABS250cM
ABH250cM

Compensation curves

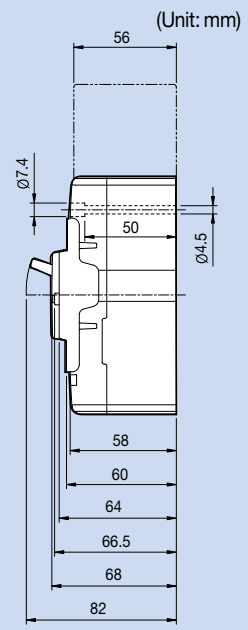
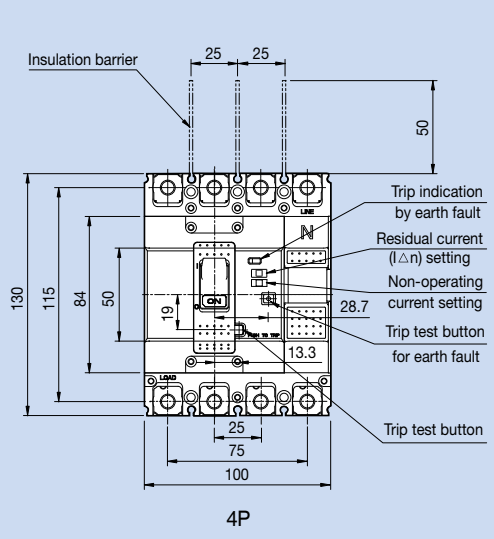
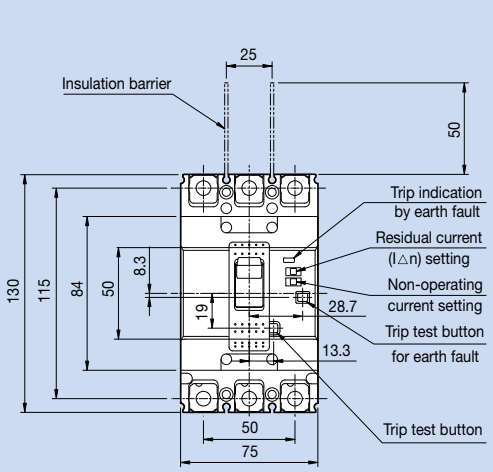


Rated current: 125~225A

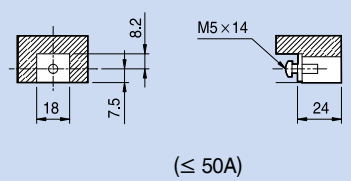


ELCB

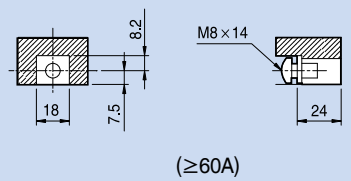
EBS30c	EBS50c
EBS60c	EBS100c



Terminal details

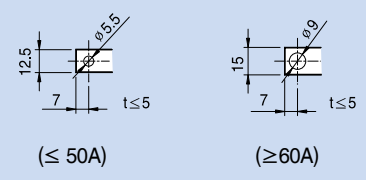


(≤ 50A)



(≥ 60A)

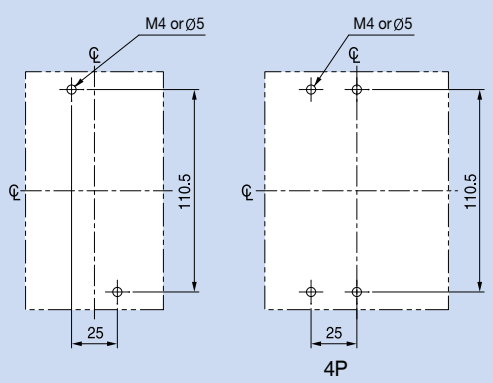
Connecting



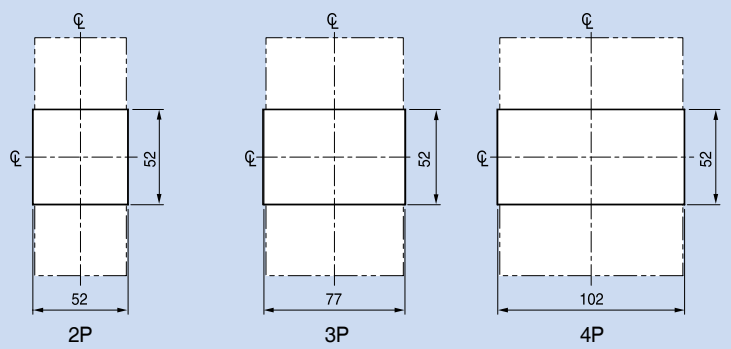
(≤ 50A)

(≥ 60A)

Panel drilling



Front panel cutting



Dimensions

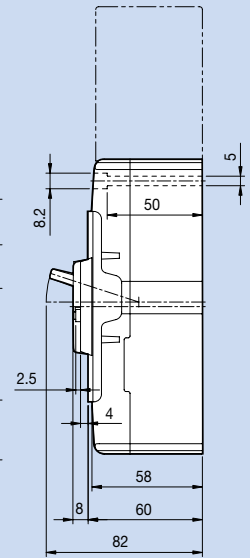
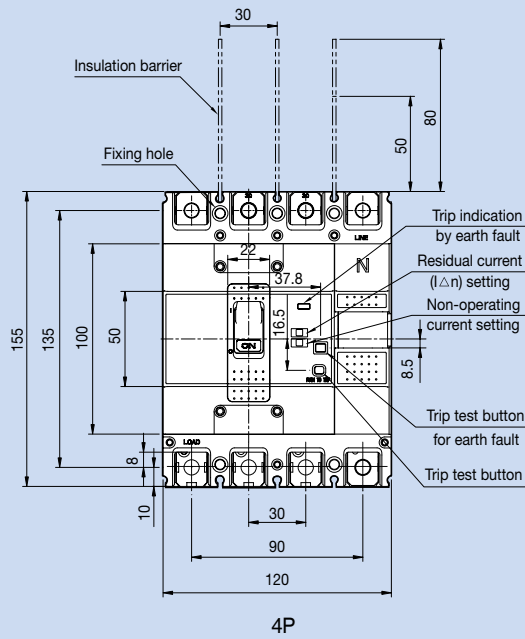
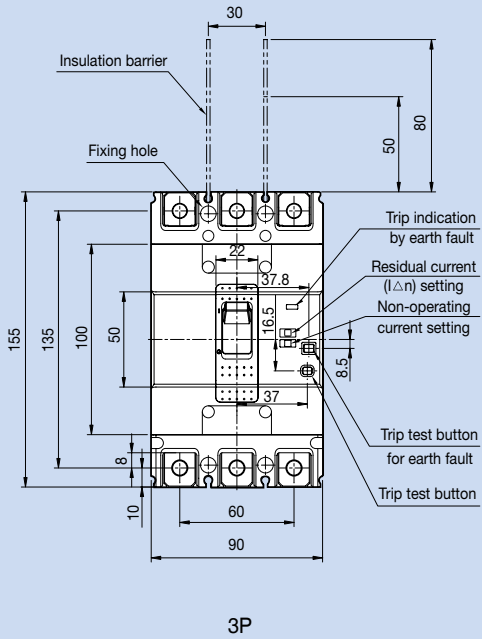
ELCB

EBS125c

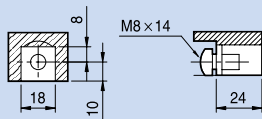
EBH50c

EBH125c

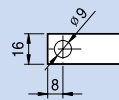
(Unit: mm)



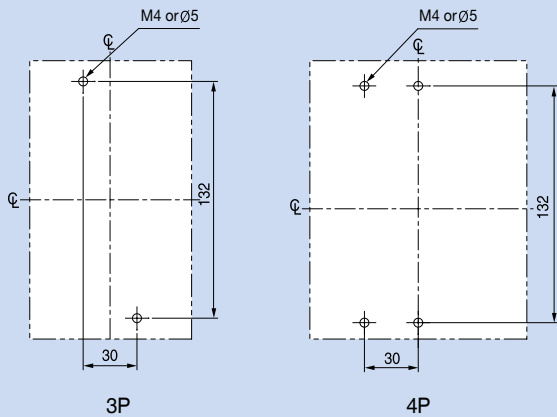
Terminal details



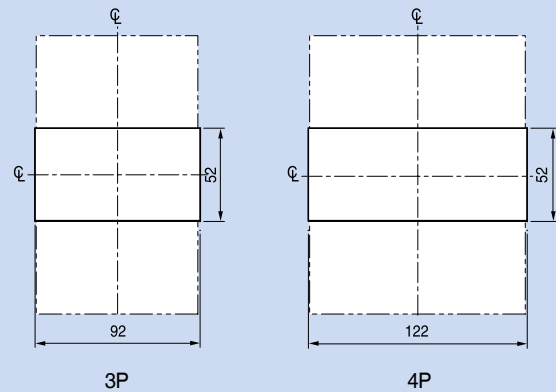
Connecting



Panel drilling



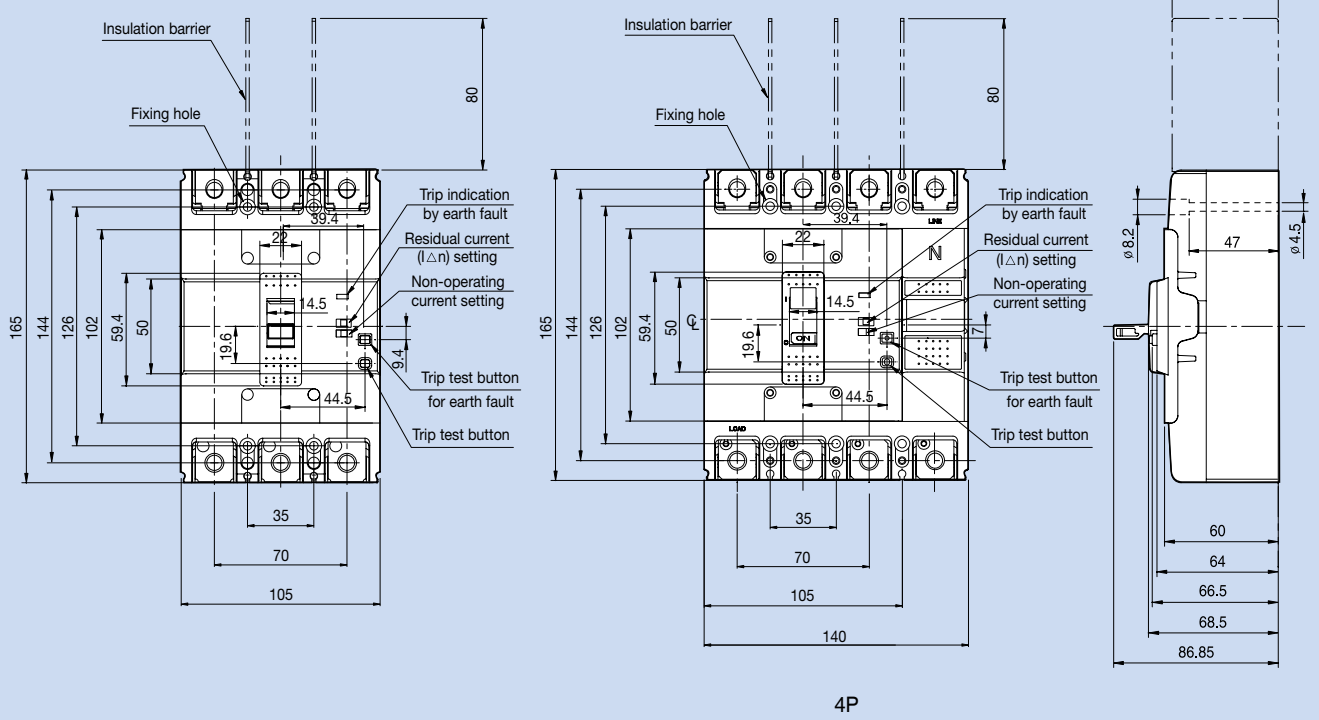
Front panel cutting



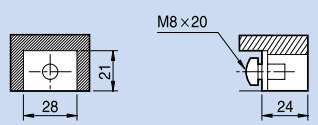
ELCB

- EBN250c
- EBS250c
- EBH250c

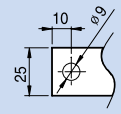
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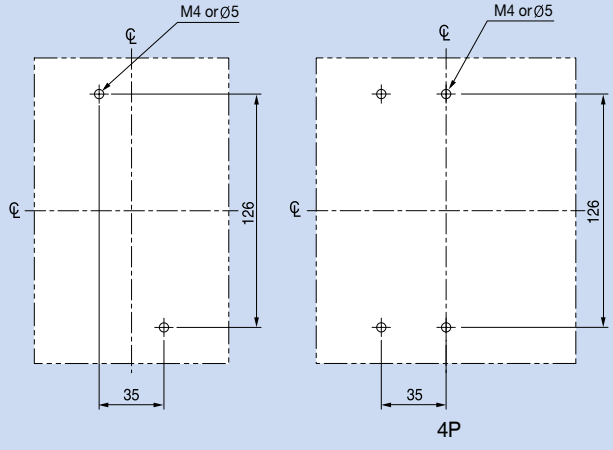
Terminal details



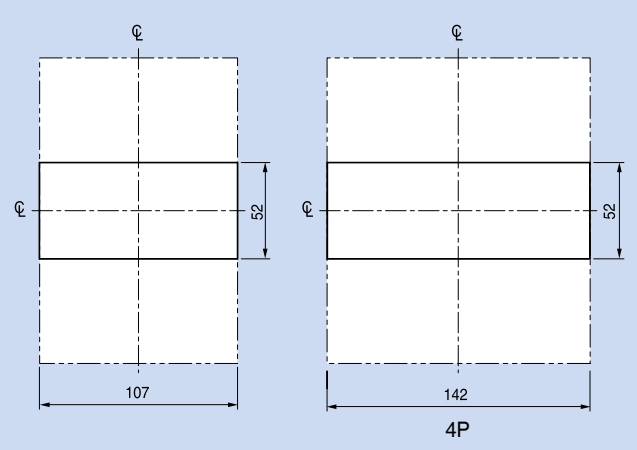
Connecting



Panel drilling



Front panel cutting

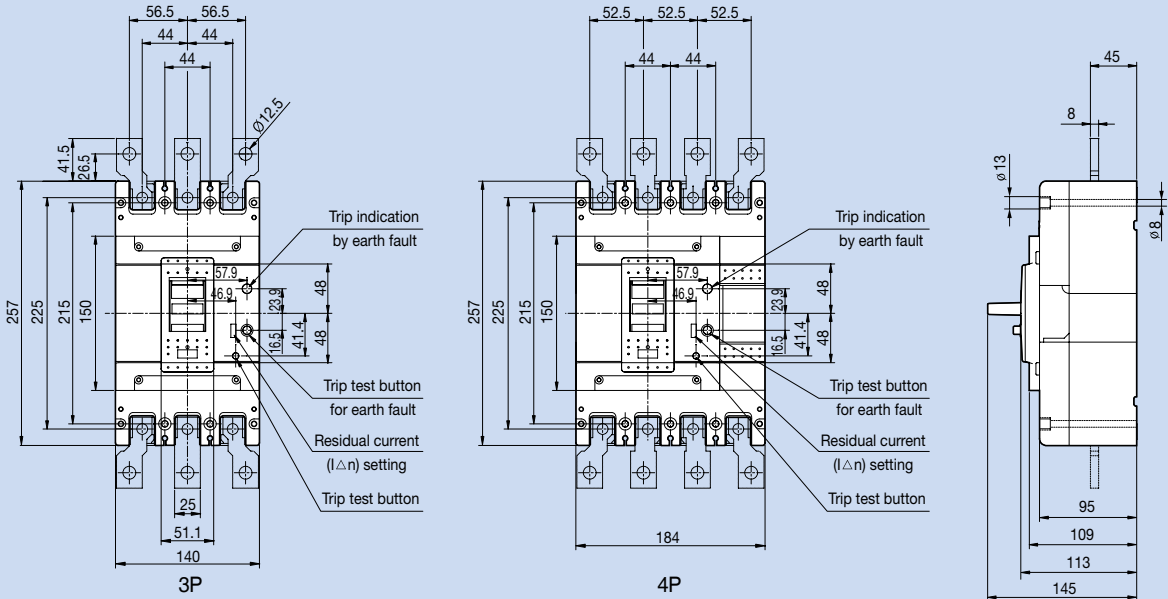


Dimensions

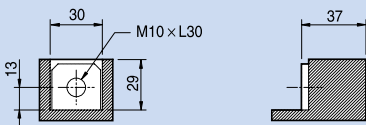
ELCB (Instantaneous type)

- EBN400c
- EBS400c
- EBH400c
- EBL400c

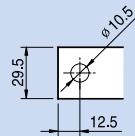
(Unit: mm)



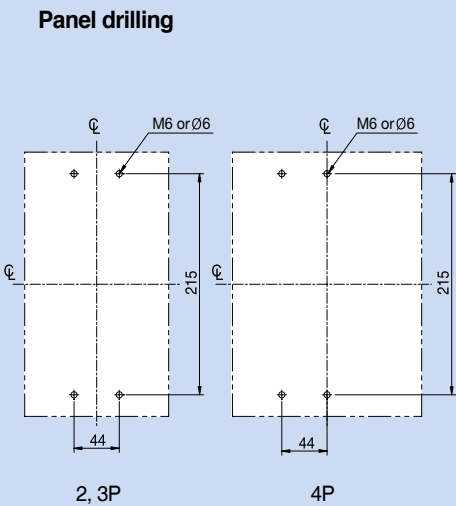
Terminal details



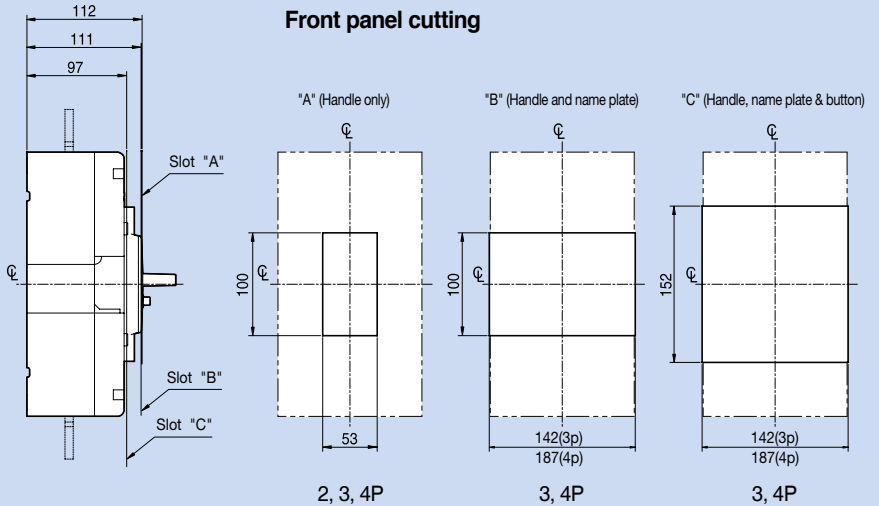
Connecting



Panel drilling



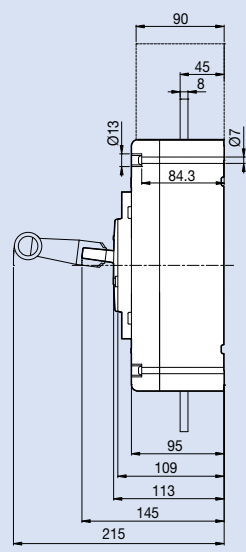
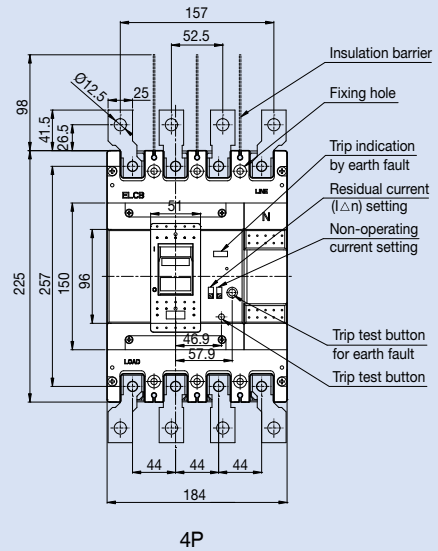
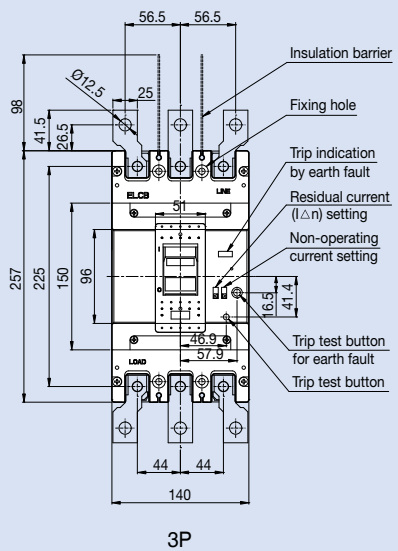
Front panel cutting



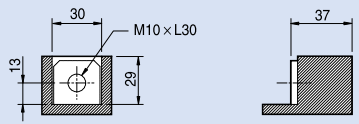
ELCB (Time delay type)

- EBN400c
- EBS400c
- EBH400c
- EBL400c

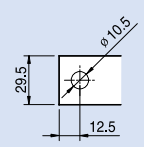
(Unit: mm)



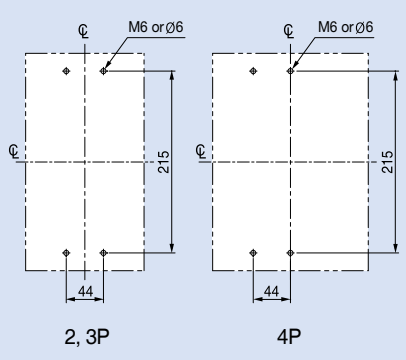
Terminal details



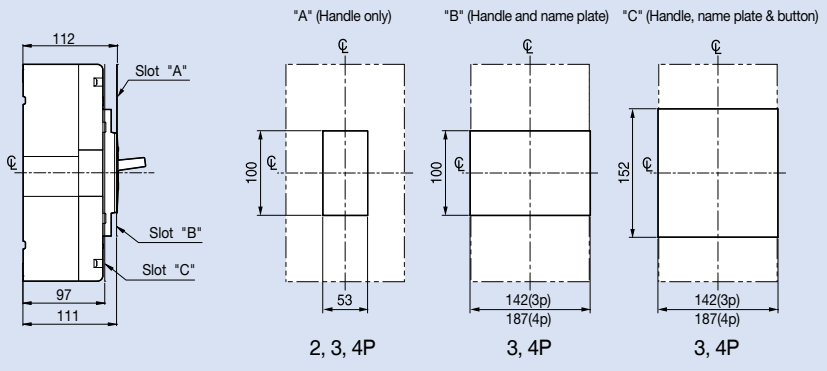
Connecting



Panel drilling



Front panel cutting



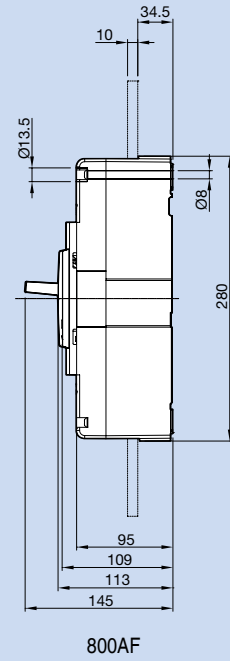
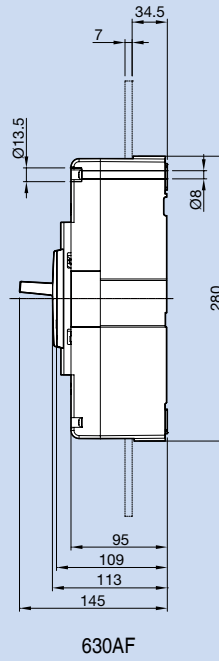
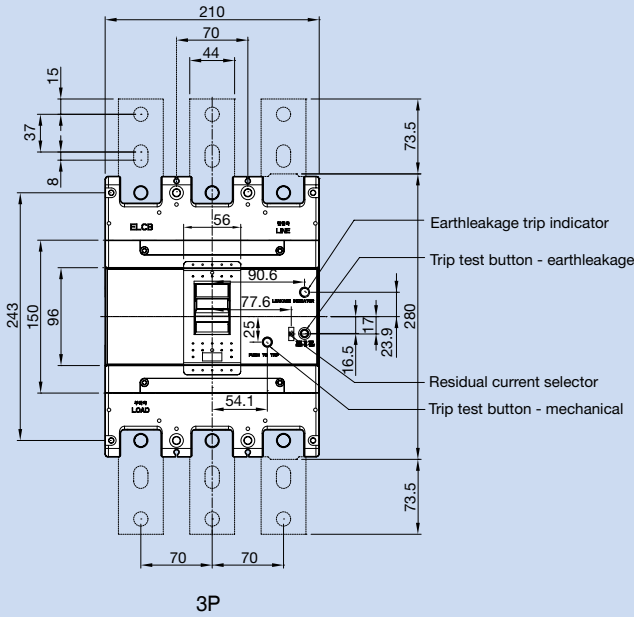
ELCB (Instantaneous type)

EBN800c

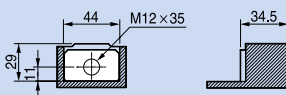
EBS800c

EBL800c

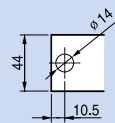
(Unit: mm)



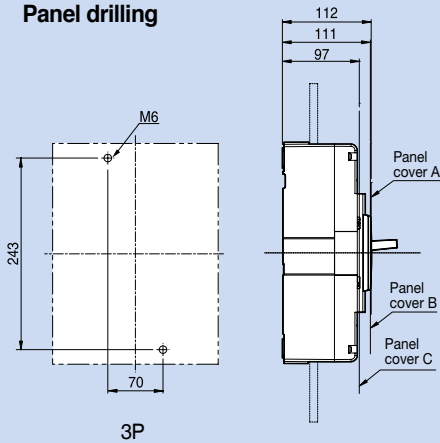
Terminal details



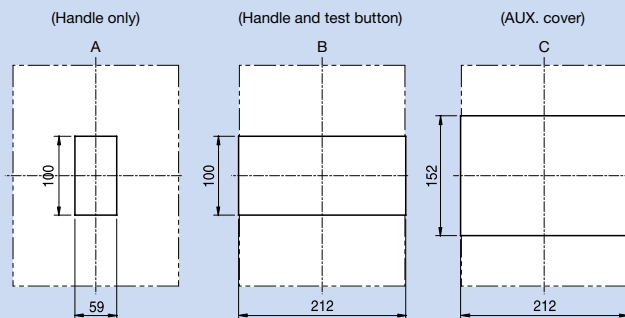
Connecting



Panel drilling



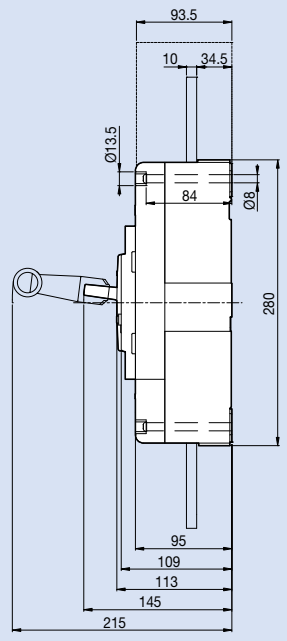
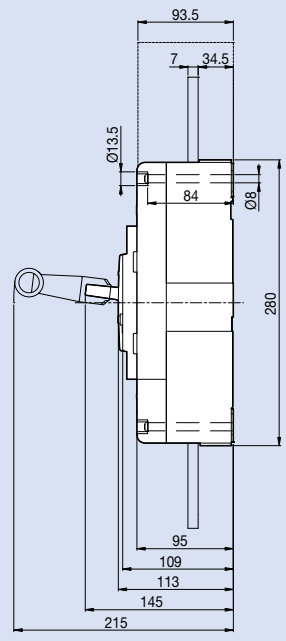
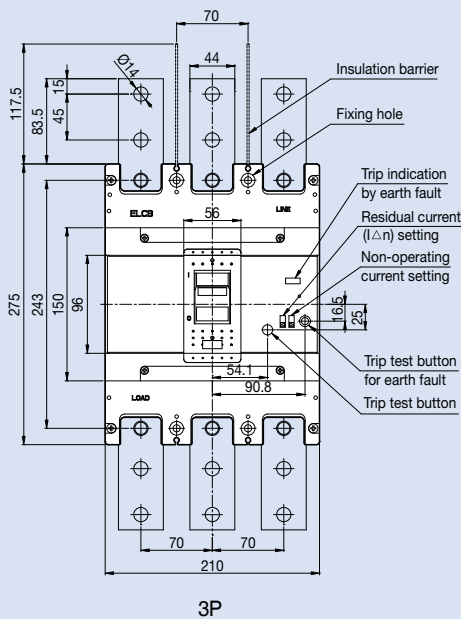
Front panel cutting



ELCB (Time delay type)

- EBN800c
- EBS800c
- EBL800c

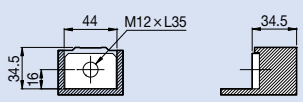
(Unit: mm)



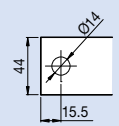
630AF

800AF

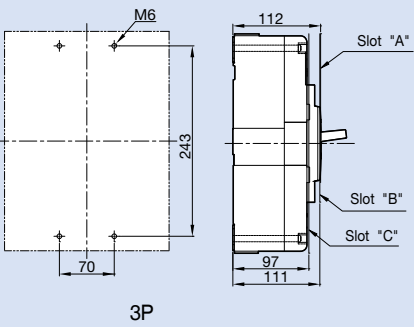
Terminal details



Connecting

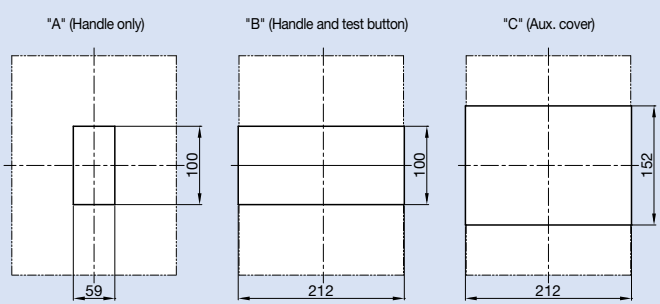


Panel drilling



3P

Front panel cutting



Standards & approval

Metasol series circuit breakers and auxiliaries comply with the following international standard:

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

The following certificates are available on a request.

- CE Declaration of conformity
- Certificate of conformance test (CB) - IEC 60947

CE conformity marking

The CE conformity marking shall indicate conformity to all the obligations imposed on the manufacturer, as regards his products, by virtue of the European community directives providing for the affixing of the CE marking.

When the CE marking is affixed on a product, it represents a declaration of the manufacturer or of his authorized representative that the product in question conforms to all the applicable provisions including the conformity assessment procedures.

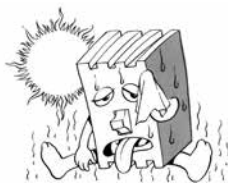


Standard use environment

Standard use environment for molded case circuit breaker

The operation characteristic of Molded Case Circuit Breaker including short-circuit, overload, endurance and insulation is often influenced largely by external environment and thus should be applied appropriately with conditions of the place where it is used taken into consideration. In particular, the operation characteristic of the circuit breaker with a thermal magnetic trip element (FTU, FMU, ATU) applied changes a bit with the ambient temperature so you have to adjust the value of power rating accordingly when it is actually in use.

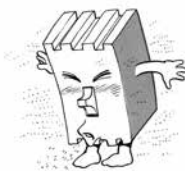
- 1) Ambient temperature: Within the range of -5°C ~ $+40^{\circ}\text{C}$ (However, the average for the duration of 24 hours must not exceed 35°C .)
- 2) Relative humidity: Within the range of 45~85%
- 3) Altitude: 2,000m or less (However, if it exceeds 1,000m, atmosphere correction through humidity test and withstand voltage test can be considered.)
- 4) Atmosphere where excessive steam, oil steam, smoke, dust, salt, conductive powder and other corrosive materials do not exist



- If a standard circuit breaker is used in high temperature exceeding 40°C , you are advised to use it according to the current corrected for each level of ambient temperature in catalog.
- If used in conditions of highly humidity, the dielectric strength or electric performance may be degraded.



- There is no problem in conduction switch, trip or short circuit isolation in the temperature of -20°C .
- Passing or storage in stone-cold area is allowed in the temperature of 40°C .
- The operating characteristic of the breaker with a thermal magnetic trip element changes as the base ambient temperature is adjusted to 40°C .



- It is highly recommended to use a dust cover or anti-humid agent if it is used in dusty and humid conditions.
- Excessive vibration may cause a trip break such as connection fault or flaw on mechanical parts.



- If it is left On or Off for a long time, it is recommended to switch load current on a regular basis.
- It is recommend to put it in the sealed protection if corrosive gas is prevalent.

Special use environment

Environment where ambient temperature exceeds 40°C

The temperature of each module of a Molded Case Circuit Breaker is the sum of temperature increase by conduction and ambient temperature and if the ambient temperature exceeds 40°C the passing current needs to be reduced so that the temperature of such element as internal insulator of MCCB exceed the maximum allowable temperature.

The base ambient temperature of Metasol breaker is set as 40°C so if it has to be used in conditions with higher temperature than this, the rated current is required to be reduced a little as described in the table below.

Table of rated current for Metasol MCCB corrected according to ambient temperature

Ampere frame	Rated current	Model name of breaker	Rated current	Table of rated current corrected according to ambient temperature (A)							
				10°C	20°C	30°C	40°C	45°C	50°C	55°C	
30	3	ABS30c	3	3	3	3	3	3	3	3	
	5		5	5	5	5	5	5	4		
	10		10	10	10	10	10	9	9		
	15		15	15	15	15	15	14	13		
	20		20	20	20	20	19	19	18		
	50	30	30	30	30	29	28	27			
	40	ABN50c, ABS50c	40	40	40	40	40	39	38	36	
	50		50	50	50	50	49	47	45		
	60	60	ABN60c, ABS60c	60	60	60	60	60	58	56	55
	100	75	ABN100c, ABN100e	75	75	75	75	75	73	71	68
100		100		100	100	100	97	94	91		
125	125	ABH50c, ABS125c, ABH125c, ABL125c	125	125	125	125	125	121	116	107	
250	150	ABN250c, ABS250c, ABH250c, ABL250c	150	150	150	150	150	145	140	128	
	175		175	175	175	175	169	163	150		
	200		200	200	200	200	193	186	171		
	225		225	225	225	225	217	209	193		
	250		250	250	250	250	241	233	214		
400	250	ABN400c, ABS400c, ABH400c, ABL400c	250	250	250	250	250	246	242	238	
	300		300	300	300	300	295	291	287		
	350		350	350	350	350	345	339	332		
	400		400	400	400	400	394	388	381		
800	700	ABN800c, ABS800c	700	700	700	700	700	689	679	668	
	800	ABL800c	800	800	800	800	800	788	776	764	

Special use environment

Table of rated current for Metasol ELCB corrected according to ambient temperature

Ampere frame	Rated current	Model name of breaker	Rated current	Table of rated current corrected according to ambient temperature (A)							
				10°C	20°C	30°C	40°C	45°C	50°C	55°C	
30	15	EBS30c	15	15	15	15	15	15	15	15	
	20		20	20	20	20	20	19	19	18	
	30		30	30	30	30	30	29	28	27	
	50	40	EBN50c, EBS50c	40	40	40	40	40	39	38	36
		50		50	50	50	50	49	47	45	
	60	60	EBN60c, EBS60c	60	60	60	60	60	58	56	55
		75	EBN100c	75	75	75	75	75	73	71	68
	100	100		100	100	100	100	97	94	91	
125	125	EBH50c, EBS125c, EBH125c	125	125	125	125	125	121	116	107	
250	150	EBN250c, EBS250c, EBH250c	150	150	150	150	150	145	140	128	
	175		175	175	175	175	169	163	150		
	200		200	200	200	200	193	186	171		
	225		225	225	225	225	217	209	193		
	250		250	250	250	250	241	233	214		
400	250	EBN400c, EBS400c, EBH400c, EBL400c	250	250	250	250	246	242	238	238	
	300		300	300	300	295	291	287	287		
	350		350	350	350	345	339	332	332		
	400		400	400	400	394	388	381	381		
800	700	EBN800c, EBS800c	700	700	700	700	689	679	668	668	
	800	EBL800c	800	800	800	800	788	776	764	764	

Environment where ambient temperature is -5°C or less

Molded Case Circuit Breaker is subject to the effect of low temperature brittle of metal part inside and insulator, or changes in viscosity of lubricating oil in device, extra care should be taken not to have the temperature drop extremely with the use of such device as space heater. In addition, in case of using a thermal magnetic trip element (FTU, FMU, ATU), the operating characteristic changes toward the difficult direction, so you should identify the relationship of protection and correct accordingly.

Although MCCB is not affected by conduction switch, trip, or short circuit isolation in the temperature of -20°C, it is highly recommended to use a temperature maintaining device such as space heater. In addition, transportation and passing in stone-cold area in the temperature as low as -40°C is allowed but it is recommended to leave the status of MCCB off or tripped in order to minimize the effect of brittle due to a low temperature.

High humidity condition (Relative humidity 85% or more)

Using Molded Case Circuit Breaker in a place of high humidity requires a rigorous maintenance including installation of anti-humidity agent within the structure in order to prevent the insulation sag of insulator or corrosion of mechanical parts as a result of high humidity. Also, in case of installing MCCB within the enclosed equipment, a space heater needs to be installed as well to prevent dew condensation that might occur due to a drastic temperature change.

Environment where petrochemical gas exists

The contact material of Molded Case Circuit Breaker is silver or silver alloy which develops creation of petrochemical coat that might cause a poor connection if it gets in contact with petrochemical gas.

However, it is easy for petrochemical coat to be mechanically taken off so it is no problem if make-and-break operation occurs frequently but it needs to be switched back and forth between make and break if the operation rarely occurs.

The lead wire of moving contact of Molded Case Circuit Breaker can be disconnected as it is corroded or hardened by petrochemical gas. The silver coating is effective to prevent this from occurring and there is a need to increase durability of MCCB with the use of silver coated lead wire if it is used in environment with thick petrochemical gas.

Environment where potentially explosive gas exists

It is advised, in principle, not to install a Molded Case Circuit Breaker that switches and inhibits current in a dangerous place such as this one.

Impact of altitude

If an MCCB is used in an elevated area higher than 2000m sea level, its operating performance is subject to dramatic drop in atmospheric pressure and temperature. For example, the air pressure is reduced to 80% of ordinary pressure at 2,200m and further 50% at 5,500m although the short-circuit performance is not affected. If it is used in areas of high sea level, you can do correction based on the correction parameter table in high altitude environment, as described below

* Refer to the correction parameter table in high altitude environment (ANSI C37. 29-1970)

1) How to correct voltage:

- If the rated voltage is AC 600V at 4,000m above sea level,
 $600\text{V (rated voltage)} \times 0.82 \text{ (correction parameter)} = 492\text{V}$.

2) How to correct current:

- If the rated current is AC 800A at above 4,000m sea level,
 $800\text{A (rated current)} \times 0.96 \text{ (correction parameter)} = 768\text{A}$.

[Correction parameter table for altitude]

Altitude	Voltage correction parameter	Current correction parameter
2,000m	1.00	1.00
3,000m	0.91	0.98
4,000m	0.82	0.96
5,000m	0.73	0.94
6,000m	0.65	0.92

Environment with vibration and impulse exercised

Impact of vibration and impulse

An excessive vibration and impulse may cause damage on breaker or other security problems including dynamic strength. An appropriate consideration is required to select a right MCCB for an adverse environmental stress such as this one. Moreover, this stress may incur from vibration during transportation, magnetic impulse while manipulating a switch or may be affected by equipment in surrounding area.

There is a standard call [Vibration testing method for small electric appliances] for vibration and impulse test for electric equipment and the seismic and endurance tests of Molded Case Circuit Breaker are conducted in accordance with this standard, considering the circumstance mentioned above.

Vibration

The magnitude of vibration is measured by double amplitude and frequency with the following equation with accelerator.

$$\alpha g = 0.002 \times \text{frequency (Hz)} \times \text{double amplitude (mm)}$$

* αg : Multiple of gravitational acceleration ($g = 9.8\text{m/sec}^2$)

There are three types of vibration tests including resonance test, vibration endurance test, and malfunction test as described below.

1) Resonant test

Alter the frequency of sinusoidal wave within the range of 0~55Hz gradually with 0.5~1mm of double amplitude applied to see if there is any occurrence of vibration on a specific part of MCCB.

2) Vibration endurance test

A sinusoidal wave with double amplitude of 0.5~1mm and frequency of 55Hz (Resonant frequency obtained in previous clause if there is a resonant point) is manually created to check the operational status.

3) Malfunction test

Apply vibration for 10 minutes for each condition of altering double amplitude and frequency to check if there is any malfunction in MCCB.

Impulse

The magnitude of impulse is denoted by the multiple of gravitational acceleration imposed on the equipment and part. The test is conducted through a drop impulse test.

Impact of high frequency

In case of high frequency current, you are required to reduce the rated current of the breaker with a thermal magnetic trip element embedded due to heat incurred by the skin effect of conductor and/or core loss of structure. The reduction rate varies according to the frame Size and rated current and decreases down to 70~80% at 400Hz. In addition, the core loss decreases attractive force, which leads to increase of instantaneous trip current.

* Core loss: It refers to the electrical loss in a transformer caused by magnetization of the core that changes over time and is categorized into hysteresis loss and eddy current loss.

* Hysteresis loss: It takes up the majority portion of no-load loss of electric equipment and is calculated like this.

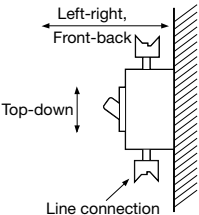
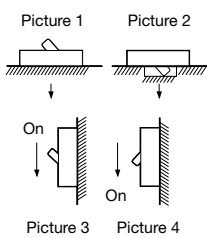
$$P_h = \sigma f B_m n$$

B_m : Maximum value of magnetic flux density, n : constant (1.6~2.0), f : Frequency, σ : Hysteresis constant

* Eddy current: It refers to an induced electric current formed within the body of a conductor when it moves through a non-uniform or changing magnetic field. The eddy current that incurs at winding of transformer or core is considered as one of the transformer losses as a part of exciting current. It is also called 'eddy current loss'.




Use environment with vibration and impulse applied

[Table of seismic performance and internal impulse performance]




		Test	Internal impulse
Test condition	Mounting vibration, direction of impulse	<ul style="list-style-type: none"> Vertical mounting Top-down, Left-right, Front-back 	<ul style="list-style-type: none"> Picture 1, 2, 3, 4 (→ Represents the direction of drop) 
	Status of MCCB	(1) Non-conduction (On or Off status) (2) Status where rated current is conducted until the temperature of MCCB becomes constant and keeps being conducted	Non-conduction (On or Off status)
Test result	Judgment condition	<ul style="list-style-type: none"> If it is On, it should not be Off If it is Off, it should not be On No abnormal status such as damage, transformation, or annealing of nut part Characteristics of switch and trip after the test must be normal 	




Certifications

MCCB

Type Certificate	Approvals		Certificates
	Safet certi	IEC	KEMA
Mark and name			
Type	Korea	Europe	Netherlands
ABS32c	•	•	•
ABS33c	•	•	•
ABS34c	•	•	•
ABN52c	•	•	•
ABN53c	•	•	•
ABN54c	•	•	•
ABS52c	•	•	•
ABS53c	•	•	•
ABS54c	•	•	•
ABN62c	•	•	•
ABN63c	•	•	•
ABN64c	•	•	•
ABS62c	•	•	•
ABS63c	•	•	•
ABS64c	•	•	•
ABN102c	•	•	•
ABN103c	•	•	•
ABN104c	•	•	•
ABS32d	•	•	•
ABS33d	•	•	•
ABS34d	•	•	•
ABN52d	•	•	•
ABN53d	•	•	•
ABN54d	•	•	•
ABS52d	•	•	•
ABS53d	•	•	•
ABS54d	•	•	•
ABN62d	•	•	•
ABN63d	•	•	•
ABN64d	•	•	•
ABS62d	•	•	•
ABS63d	•	•	•
ABS64d	•	•	•
ABN102d	•	•	•
ABN103d	•	•	•
ABN104d	•	•	•
ABP52c	•	•	•
ABP53c	•	•	•
ABP54c	•	•	•
ABH52c	•	•	•
ABH53c	•	•	•
ABH54c	•	•	•
ABS102c	•	•	•
ABS103c	•	•	•
ABS104c	•	•	•
ABP102c	•	•	•
ABP103c	•	•	•

ELCB

Type Certificate	Approvals		Certificates
	Safet certi	IEC	KEMA
Mark and name			
Type	Korea	Europe	Netherlands
ABP104c	•	•	•
ABH102c	•	•	•
ABH103c	•	•	•
ABH104c	•	•	•
ABN202c	•	•	•
ABN203c	•	•	•
ABN204c	•	•	•
ABS202c	•	•	•
ABS203c	•	•	•
ABS204c	•	•	•
ABP202c	•	•	•
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ABP204c	•	•	•
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ABN802c		•	•
ABN803c		•	•
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ABS802c		•	•
ABS803c		•	•
ABS804c		•	•
ABL802c		•	•
ABL803c		•	•
ABL804c		•	•

Type Certificate	Approvals		Certificates
	Safet certi	IEC	KEMA
Mark and name			
Type	Korea	Europe	Netherlands
EBS32c	•	•	•
EBS33c	•	•	•
EBS34c	•	•	•
EBN52c	•	•	•
EBN53c	•	•	•
EBS53c	•	•	•
EBS54c	•	•	•
EBN63c	•	•	•
EBS63c	•	•	•
EBS64c	•	•	•
EBN102c	•	•	•
EBN103c	•	•	•
EBN104c	•	•	•
EBS33d	•	•	•
EBS34d	•	•	•
EBN52d	•	•	•
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EBS63d	•	•	•
EBS64d	•	•	•
EBN102d	•	•	•
EBN103d	•	•	•
EBN104d	•	•	•
EBP53c	•	•	•
EBP54c	•	•	•
EBH53c	•	•	•
EBH54c	•	•	•
EBS103c	•	•	•
EBS104c	•	•	•
EBP103c	•	•	•
EBP104c	•	•	•
EBH103c	•	•	•
EBH104c	•	•	•
EBN202c	•	•	•
EBN203c	•	•	•
EBS203c	•	•	•
EBS204c	•	•	•
EBP203c	•	•	•
EBP204c	•	•	•
EBH203c	•	•	•
EBH204c	•	•	•

Note: • (Completion)



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.



- According to The WEEE Directive, please do not discard the device with your household waste.



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