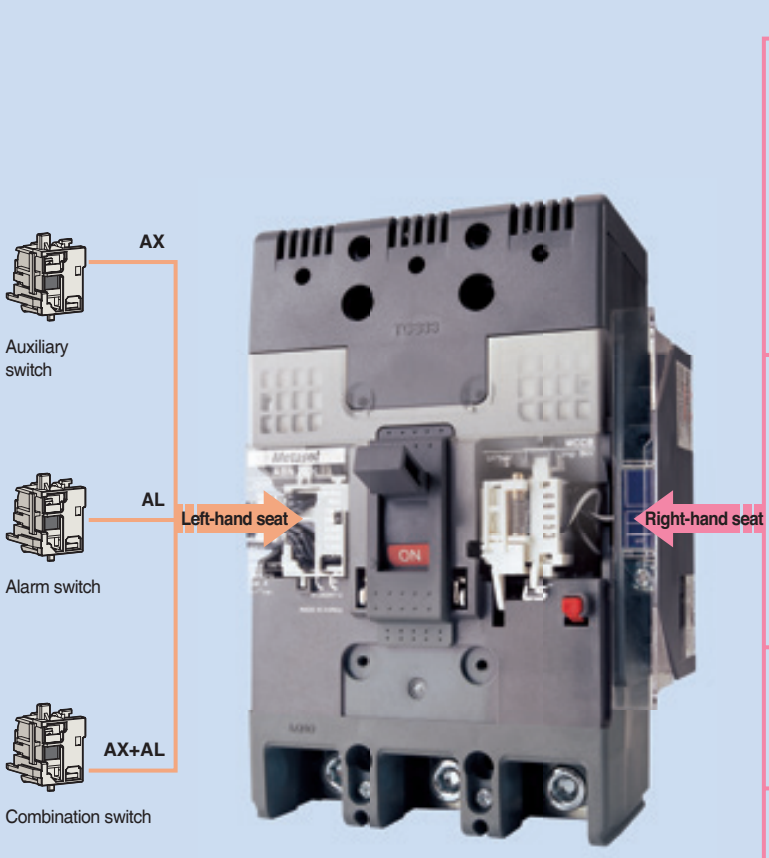
Accessories

Electrical auxiliaries of 100~250AF



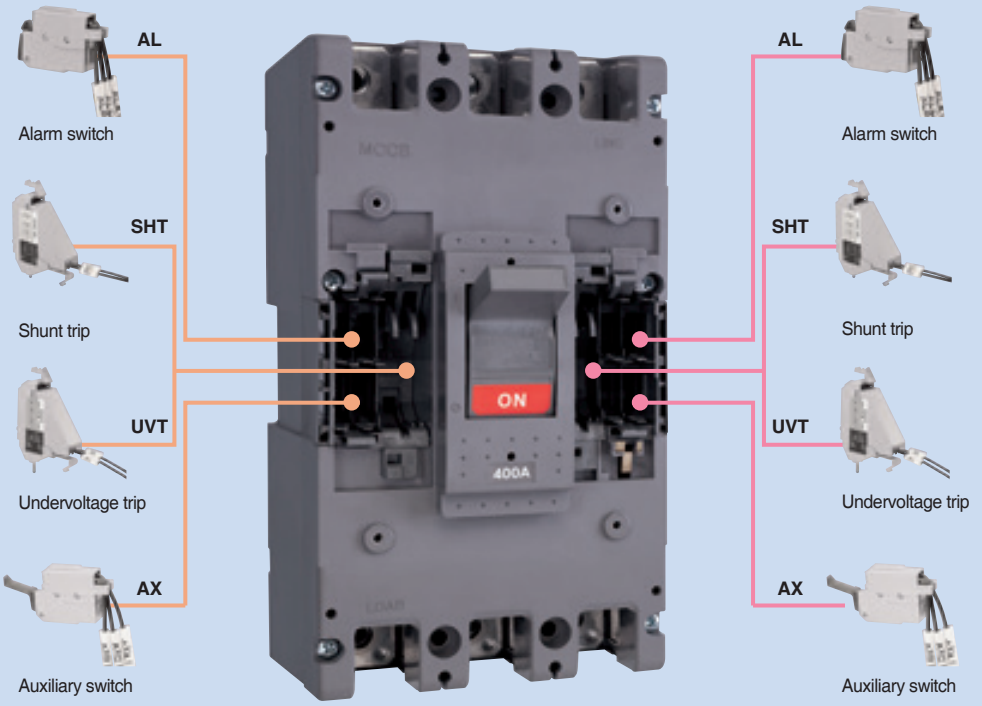
Option of connecting AX or AL or AX+AL
This seat is not available for 2-pole MCCB.

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

Maximum possibilities

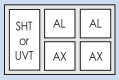
Position	Type	ABN100c		ABH125c		ABH250c	EBN100c	EBH125c	EBH250c
		2p	3/4p	2p	3/4p	2/3/4p	2/3/4p	3/4p	2/3/4p
Left-hand seat	AX	-	1	-	1	1	1	1	1
	AL	-	1	-	1	1	1	1	1
	AX+AL	-	1	-	1	1	1	1	1
Right-hand seat	AX	1	1	1	1	1	-	-	-
	AL	1	1	1	1	1	-	-	-
	AX+AL	1	1	1	1	1	-	-	-
	SHT/UVT	1	1	1	1	1	-	-	-

Electrical auxiliaries of 400~800AF





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



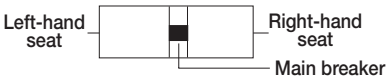
Option of connecting
SHT or UVT or AX or AL or AX+AL
This seat is not available for ELCB.

Maximum possibilities

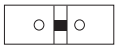
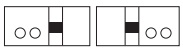
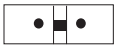
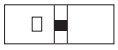
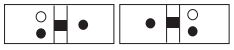
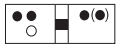
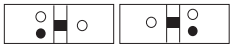
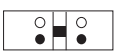
Position	Type	MCCB (400~800AF)	ELCB (400~800AF)
Left-hand seat	AX	2	2
	AL	2	2
	SHT/UVT	1	1
Right-hand seat	AX	2	-
	AL	2	-
	SHT/UVT	1	-

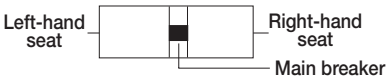
Accessories

Combinations of accessories

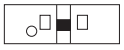
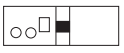
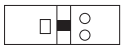
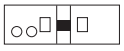
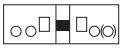
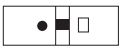
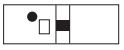
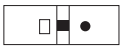
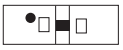
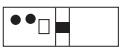
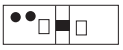
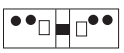
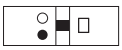
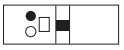
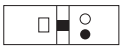
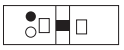
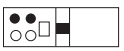
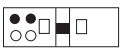
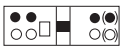


○ Auxiliary switch (AX)
● Alarm switch (AL) □ Shunt trip (SHT) / Undervoltage trip (UVT)

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)							

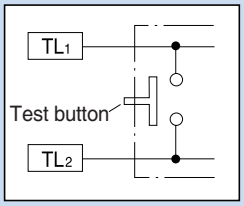


○ Auxiliary switch (AX)
● Alarm switch (AL) □ Shunt trip (SHT) / Undervoltage trip (UVT)

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							

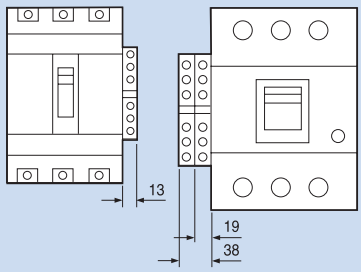
Accessories

Test lead wire (30~250AF)

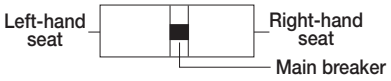


Note) 1. When you touch the lead wire under energized condition, you will be in danger of electric shock.
2. Do not energize on both ends of lead wire.
3. Do not pull out the lead wire excessively or impact on the product.

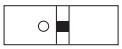
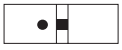
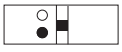
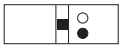
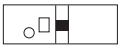
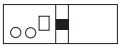
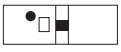
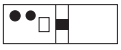
Terminal block type



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)				

Auxiliary and alarm switch



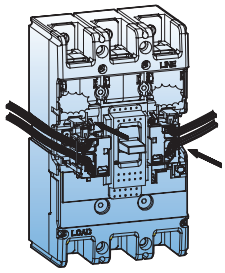
Auxiliary switch (AX)

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)

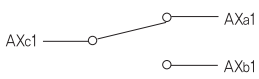
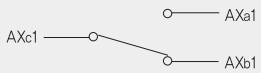
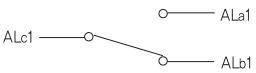
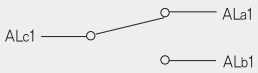
Alarm switches offer provisions for immediate audio or visual indication of a tripped breaker due to overload, short circuit, shunt trip, or undervoltage release conditions.
They are particularly useful in automated plants where operators must be signaled about changes in the electrical distribution 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)

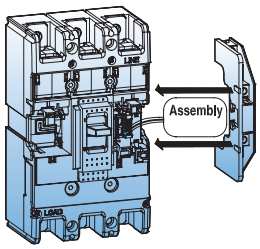
MCCB	On	Off	Trip
AX			
AL			

Rating (AX+AL)

Conventional thermal current, Ith		5A			
Rated operational current, Ie	Voltage, Ue	Current, Ie			
		Resistive load	Inductive load	Minimum laod current	Applicable MCCB/ELCB
AC 50/60Hz	125V	5	3		
	250V	3	2		Metasol
	500V	-	-	5V DC 160mA	MCCB/ELCB
DC	30V	4	3	30V DC 30mA	30~250AF
	125V	0.4	0.4		400~800AF
	250V	0.2	0.2		

Accessories

Shunt trip, SHT

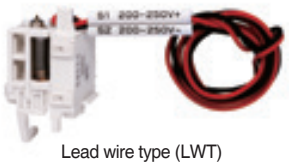


The shunt trip opens the mechanism in response to an externally applied voltage signal. The releases include coil clearing contacts that automatically clear the signal circuit when the breaker has tripped. This is not available for ELCBs of 30~250AF .





Terminal block type (TBT)

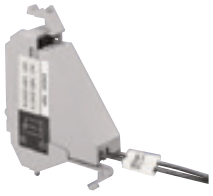


Lead wire type (LWT)

Rating for 30~250AF

Control voltage, Ue		Power consumption		MCCB/ELCB
		AC (VA)	DC (W)	
Voltage	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	
	AC/DC 100~130V	1.5	1.5	
	AC/DC 200~250V	1.5	1.5	
	AC 380~450V	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



Lead wire type (LWT)

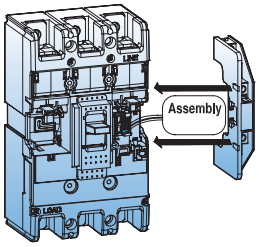
Rating for 400~800AF

Control voltage, Ue
AC/DC 24~48
AC 100~240/DC 100~220
AC 380~550

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

Power consumption		
V	mA	W
AC 24	14	0.3
DC 24	15.4	0.4
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

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

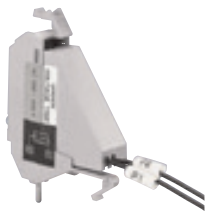
Rating for 30~250AF



Terminal block type (TBT)

Control voltage, Ue		Power consumption		
		AC (VA)	DC (W)	mA
Voltage	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		

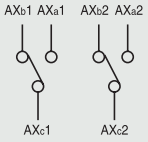
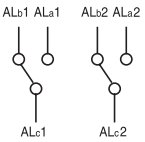
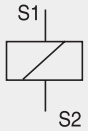
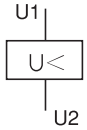
Rating for 400~800AF



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			

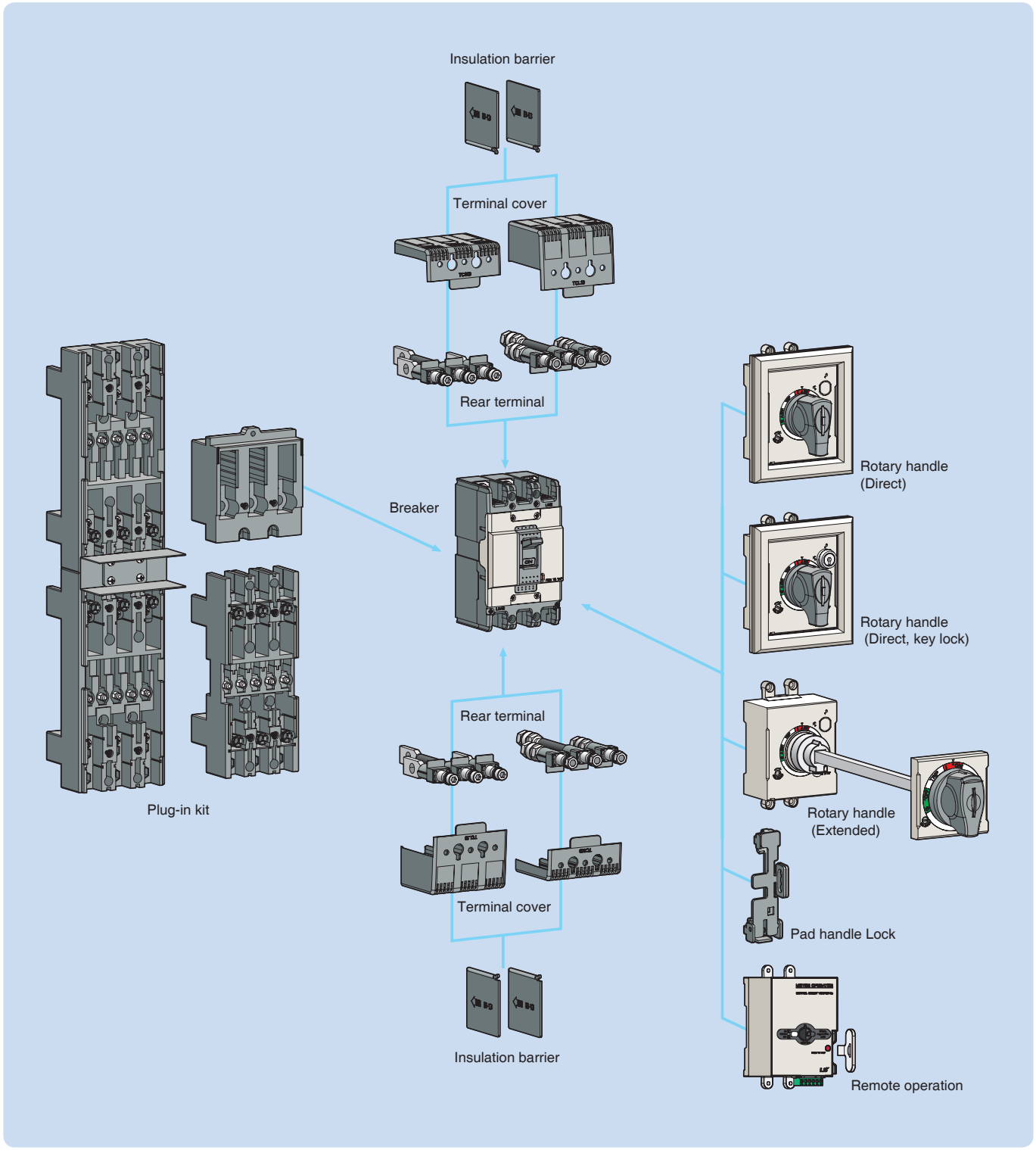
Terminal numbering

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



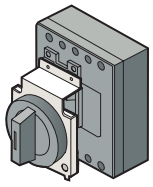
Direct type
(DH 30~250AF)



Key lock
(DH 30~250AF)

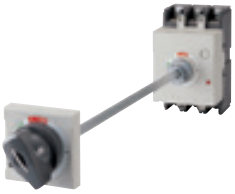


(N 30~250AF)

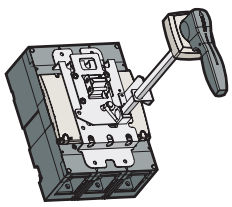


(N 400~800AF)

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
DH125	DHK125	EH125		EBH50c/125c
N-50c	-	-	ABN/S/H/L250c	EBN/S/H250c
DH250	DHK250	EH250		
N-70	-	E-70U	ABN/S/H/L400c	EBN/S/H/L400c
N-80	-	E-80U	ABN/S/L800c	EBN/S/L800c

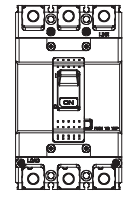
Note: Padlock type for N-handle
- On or Off state type - Only Off state type

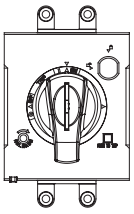
Type suffix according to the mounting position

S-type

Line

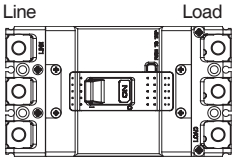
Load



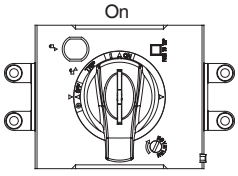


L-type

Line Load

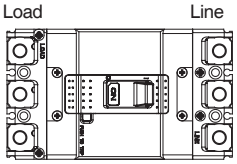


On

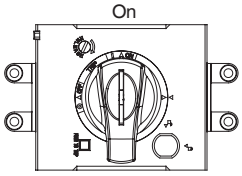


R-type

Load Line

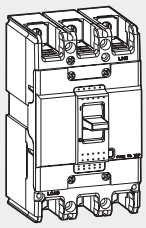
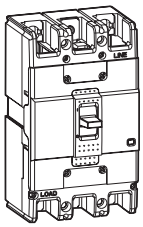
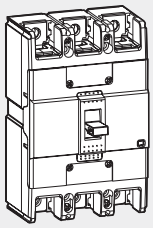


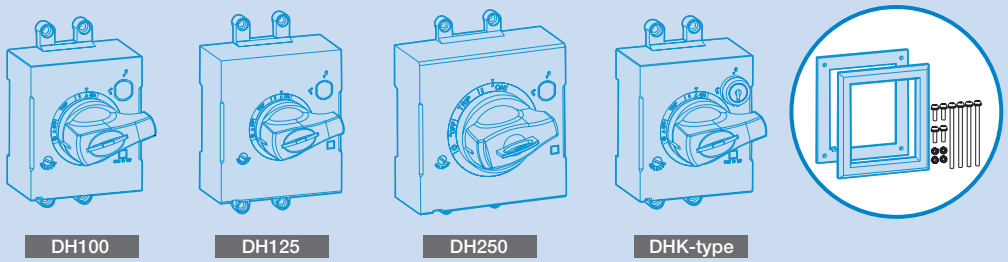
On



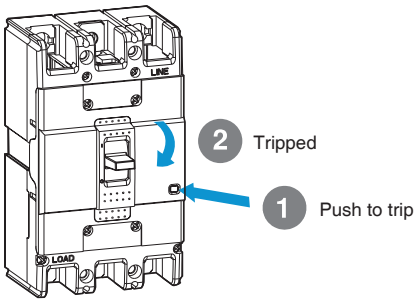
D-handle

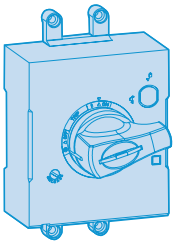
MCCB and D-handle

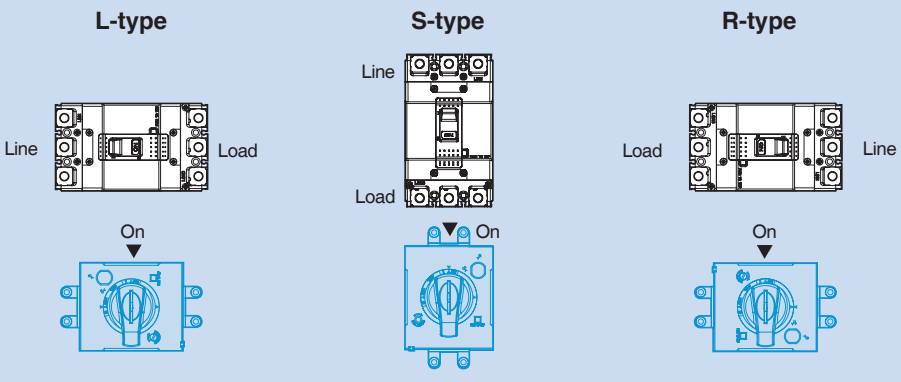
ABN100c	ABH125c	ABH250c
		



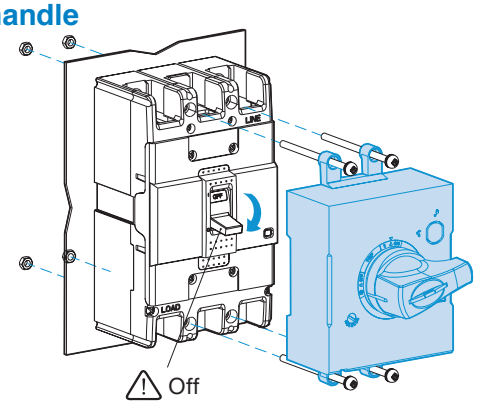
Tripping MCCB & install type

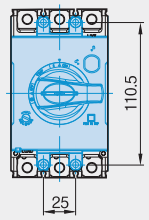
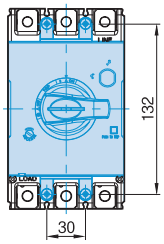
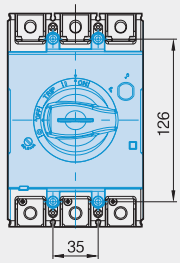




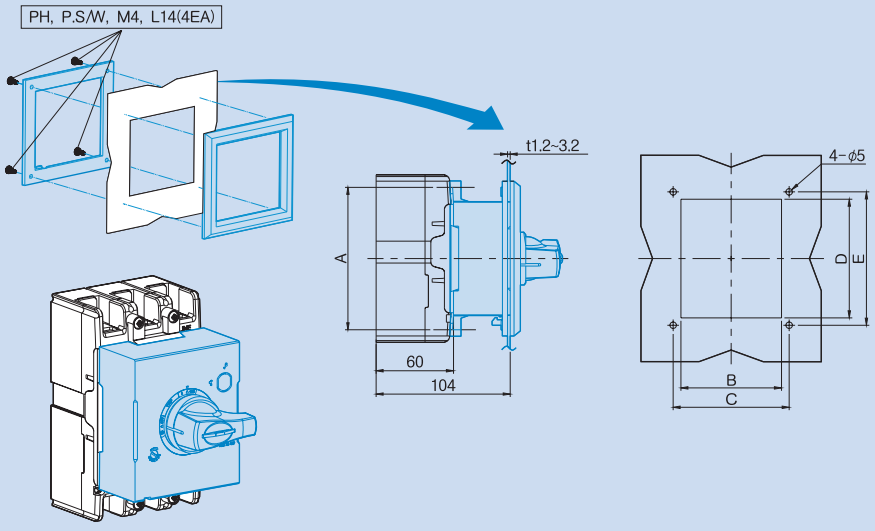


Installing the D-handle



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

Accessories

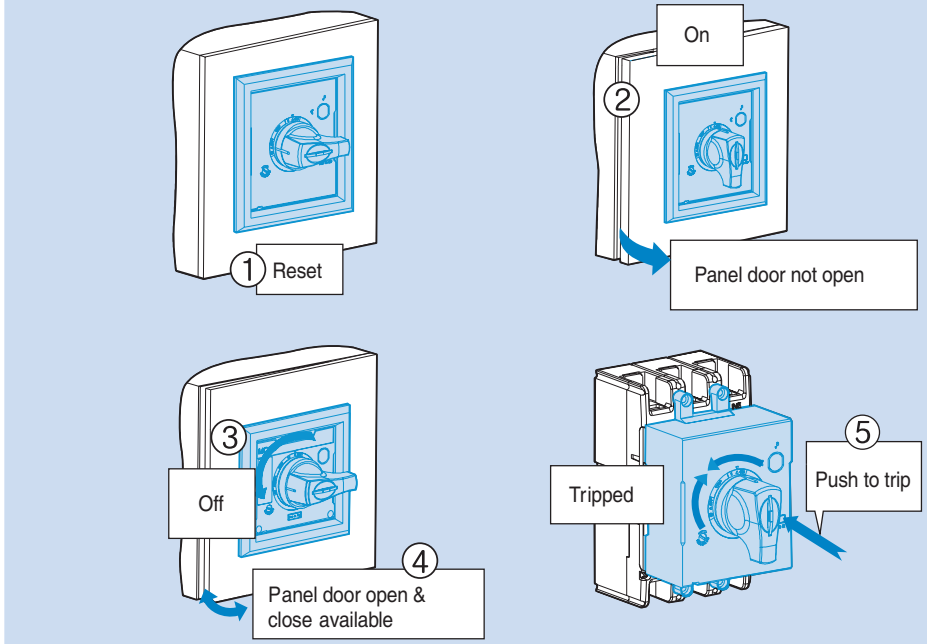
D-handle

Operating test

⚠ CAUTION

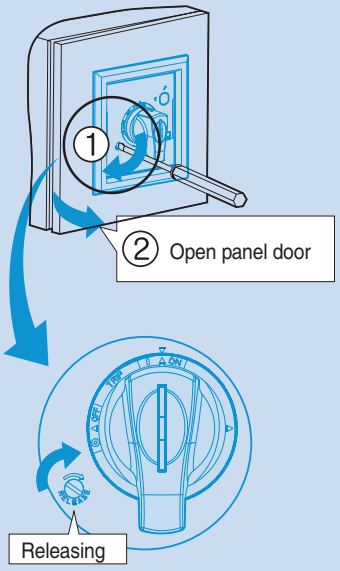
If the door is opened with much pressure when the position of handle is On or trip, the handle lock lever will be demaged.

Trip position: Panel door can't be opened

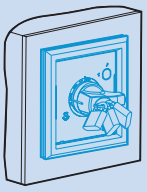


Locking system

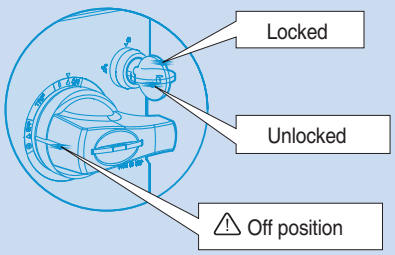
Releasing (at On position)



Locking (On, Off position)



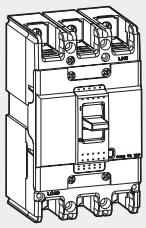
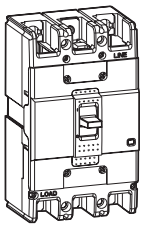
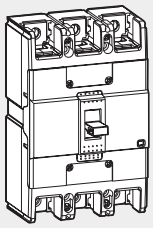
Key lock

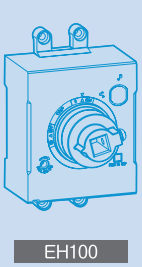


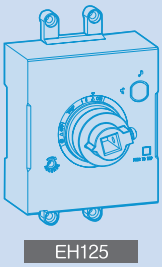
⚠ Remove the key if you operate the handle.

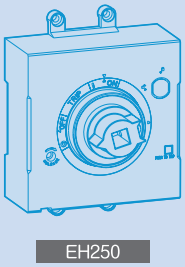
E-handle

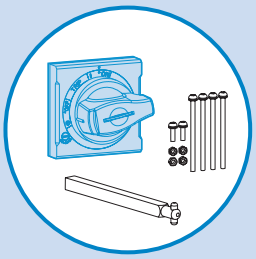
MCCB and E-handle

ABN100c	ABH125c	ABH250c
		

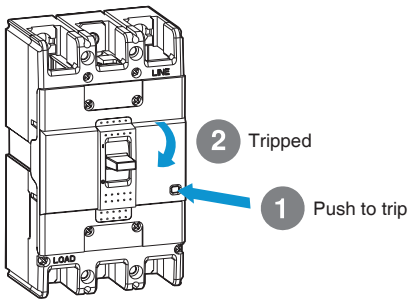


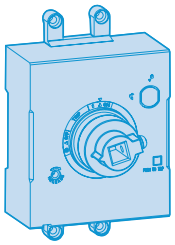


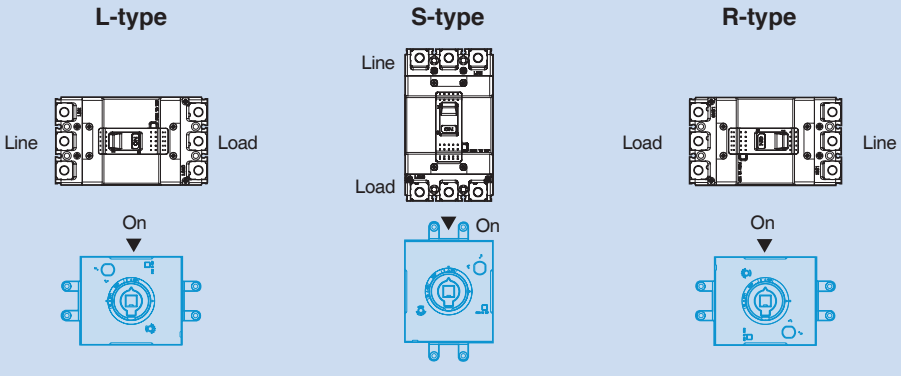




Tripping MCCB & install type

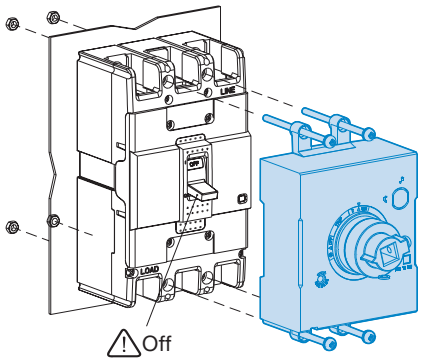


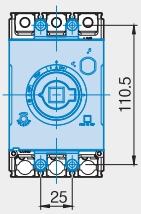
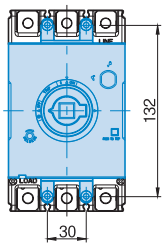
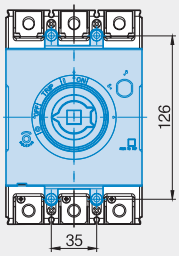




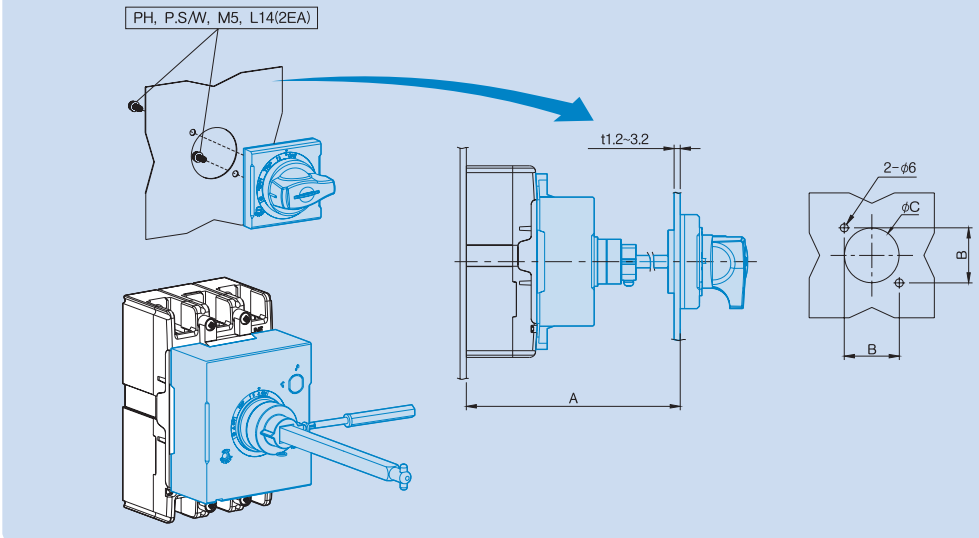
E-handle

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

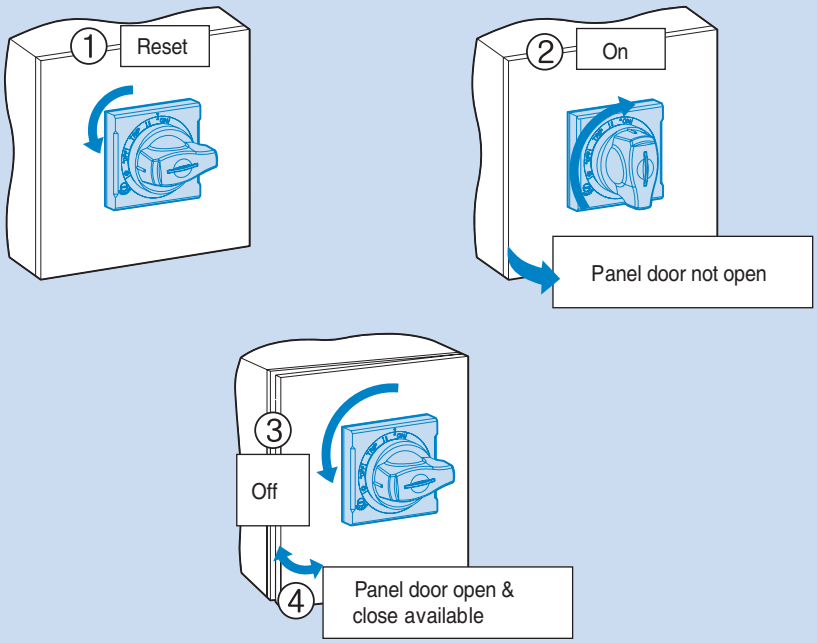
Note: An extension shaft that must be adjusted to the distance between back of circuit breaker and door

Operating test

⚠ CAUTION

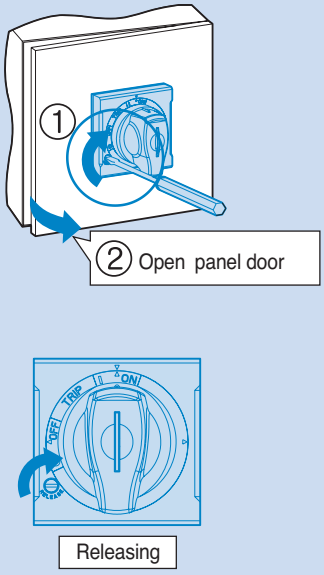
If the door is opened with much pressure when the position of handle is On or trip, the handle lock lever will be demaged.

Trip position: Panel door can't be opened

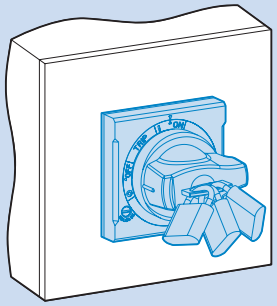


Locking system

Releasing (at On position)



Locking (On, Off position)



⚠ Use lock with 6mm diameter.

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

Accessories

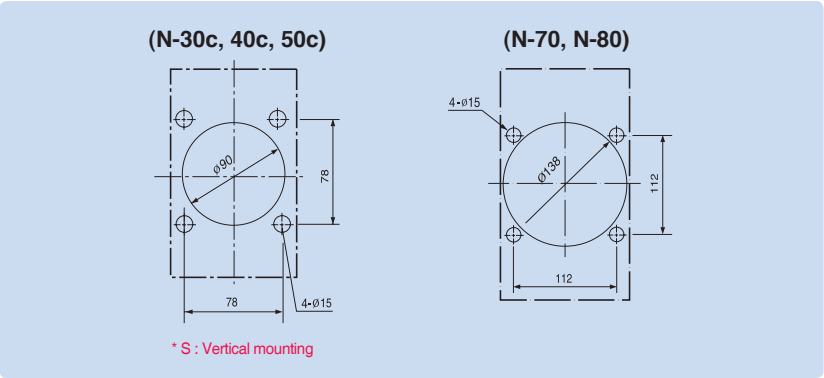
N-handle

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

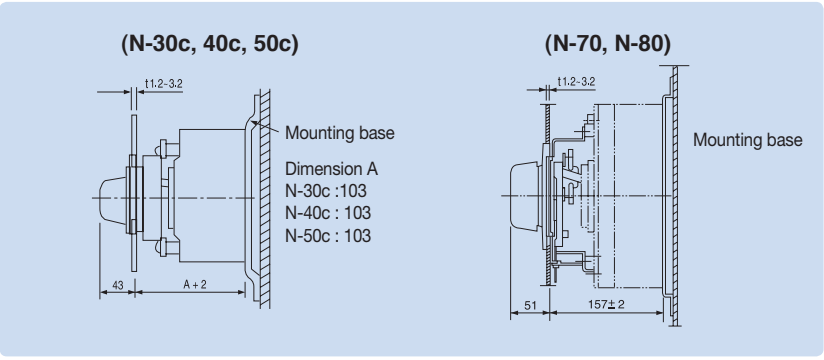


<Fig 1>

(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

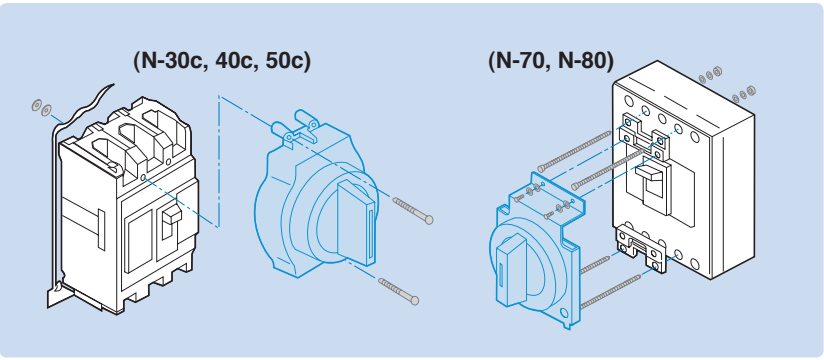


<Fig 2>

(3) Fixing

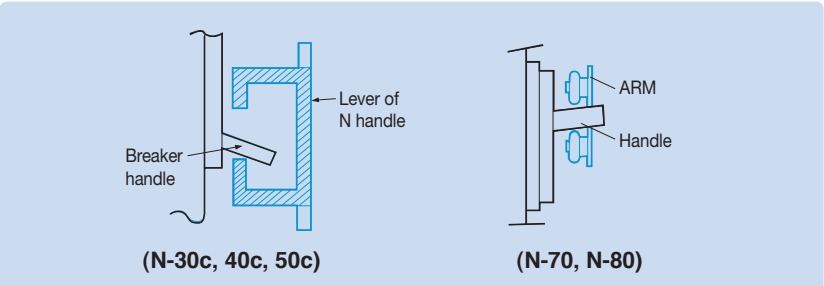
① Fixing a breaker and a handle at the same time.

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>

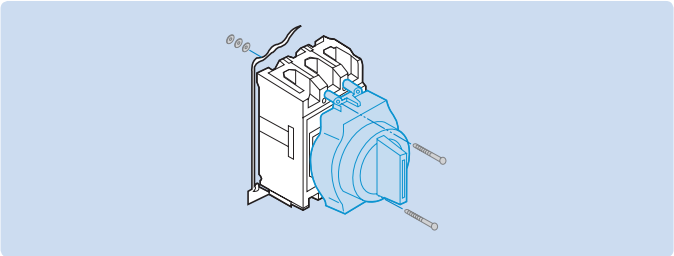
② Fixing a handle and a breaker step by step

a) Check if there is any thin membrane in the mounting hole of the breaker cover and remove it, If exists.

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

c) Fix the N handle on the breaker with the 2 (Short) screws enclosed.

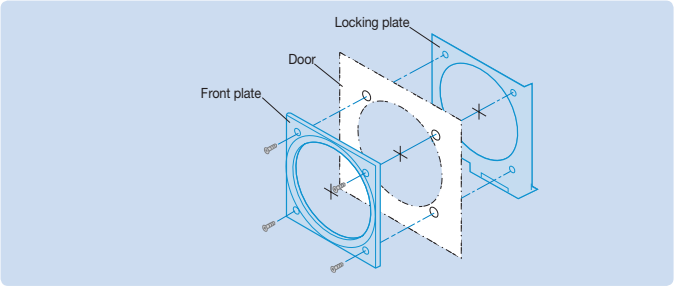
d) Fix the breaker on a mounting base with the 2 (Long) screws



<Fig 5>

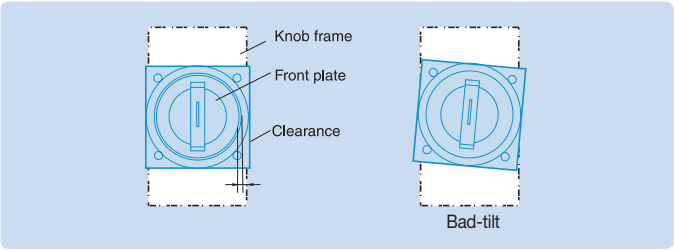
(4) Fixing front plate and lock plate

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



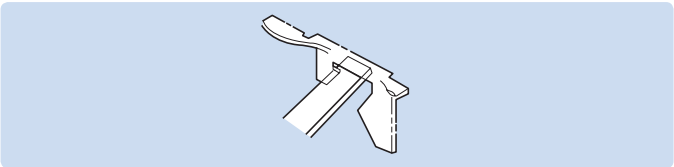
<Fig 6>

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



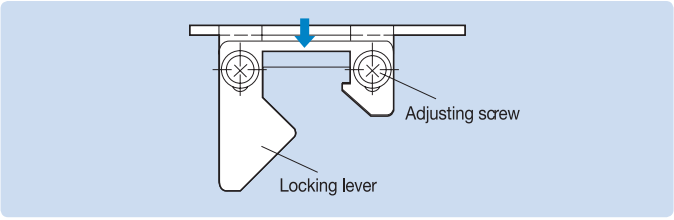
<Fig 7>

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.



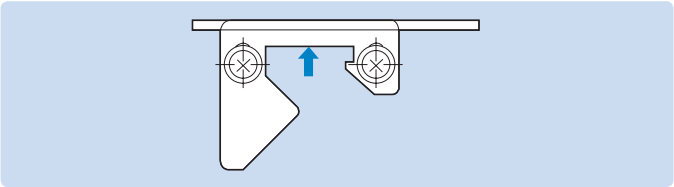
<Fig 8>

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 platein the direction of the arrow as shown in Fig. 9.



<Fig 9>

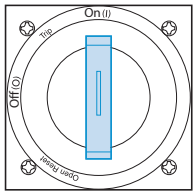
b) In the event the door does not lock after closing the door
This happens if the distance between the door panel and the mounting base the panels of the door is long.
Loosen the adjusting screw in the lock plate and move the plate in the direction of the arrow as shown in Fig. 10.



<Fig 10>

Accessories

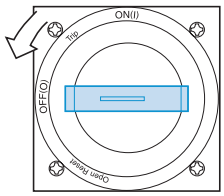
N-handle



<Fig 11>

(1) Operation in the door closed

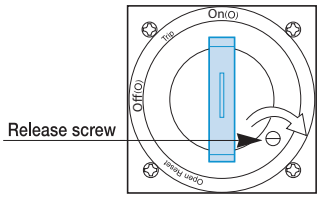
① To have the breaker On turn the handle to be vertical. <Fig. 11>
② To have the breaker Off turn the handle to be horizontal. <Fig. 12>
③ If the breaker is tripped, the handle points to the Trip position.
④ To reset the breaker turn the handle to Reset position.



<Fig 12>

(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>



<Fig 13>

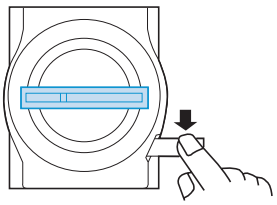
(3) Operation of the breaker in the door open

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.

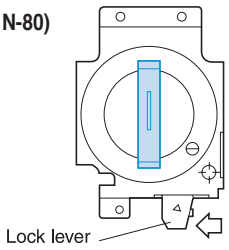
Padlocking

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

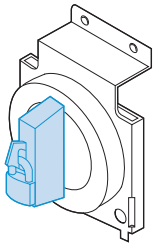
(N-30, 40, 50)



(N-70, N-80)

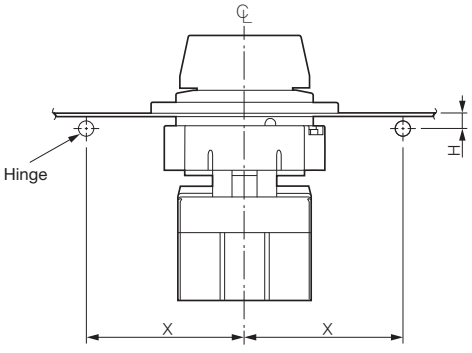


<Fig 14>



<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

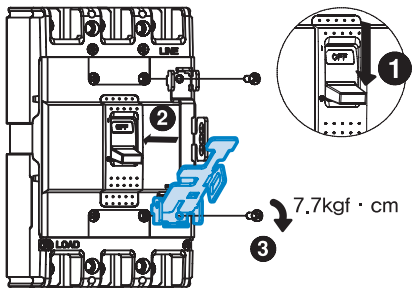
Fixed locking device

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, ABL400cABN800c, ABS800c, ABL800c	EBN400c, EBS400c, EBH400c, EBL400cEBN800c, EBS800c, EBL800c

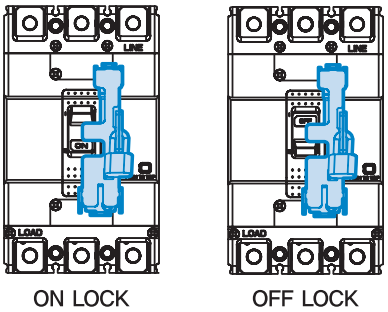
How to use

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**

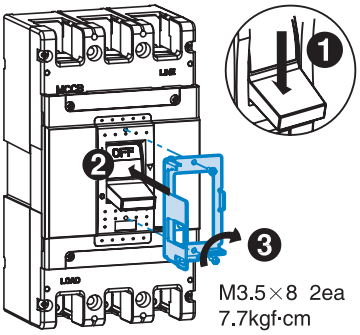


<Fig. 1>

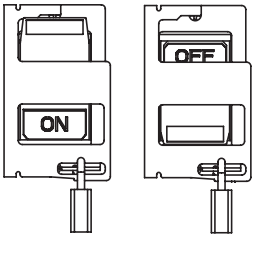


<Fig. 3>

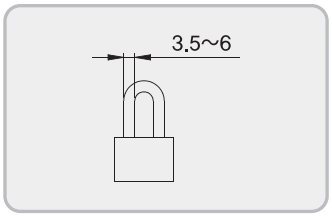
• **For 400AF / 800AF MCCBs**



<Fig. 2>



<Fig. 4>



<Fig. 5>

Accessories

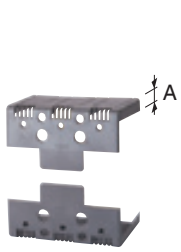
Terminal covers

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 ara classified in to 2 different type: Independent, Attachable and detachable with D or N handle

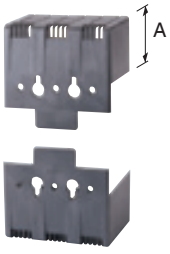
- **Short type covers, TCS:**
  For fixed circuit-breakers with rear terminals and for moving parts of plug-in.
- **Long type covers, TCL:**
  For fixed circuit-breakers with front, front extended, front for cables terminals.

Terminal covers						Pole	Applied breaker		Size extended (A), mm	
Short type			Long type							
Inde	D-handle	N-handle	Inde	D-handle	N-handle		MCCB	ELCB	Short type	Long type
TBS22	-	-	-	-	-	2P	ABE30b	-	10	-
TBS23	-	-	-	-	-	3P				
TCS12	-	-	TCL12	-	-	2P	ABN50c/60c/100c/100e ABS30c/50c/60c	-	5.5	30
TCS/T-12	-	-	TCL/T-12							
TCS13	TCS13	TCS13	TCL13	TCL13	TCL13	3P		EBN50c/60c/100c EBS30c/50c/60c		
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				
TCS/T-14	TCS/T-14	TCS/T-14		TCL/T-14	TCL/T-14					
TCS22	-	-	TCL22	-	-	2P	ABS125c ABH50c/125c ABL125c	-	5.5	40
TCS/T-22	-	-	TCL/T-22	-	-					
TCS23	TCS23		TCL23	TCL23		3P		EBS125c EBH50c/125c		
TCS/T-23	TCS/T-23		TCL/T-23	TCL/T-23						
TCS24	TCS24		TCL24	TCL24		4P				
TCS/T-24	TCS/T-24			TCL/T-24						
TCS33	TCS33		TCL33	TCL33		2, 3P	ABN250c, ABS250c ABH250c, ABL250c	EBN250c, EBS250c EBH250c	5.5	50
TCS/T-33	TCS/T-33		TCL/T-33	TCL/T-33						
TCS34	TCS34		TCL34	TCL34		4P				
TCS/T-34	TCS/T-34			TCL/T-34						
-	-	-	T1-43A	-	-	2, 3P	ABN/S/H/L400c	EBN/S/H/L400c	-	120
-	-	-	T1-44A	-	-	4P				
-	-	-	T1-63A	-	-	2, 3P	ABN/S/L630c/800c	EBN/S/L630c/800c	-	141
-	-	-	T1-63A	-	-	4P				

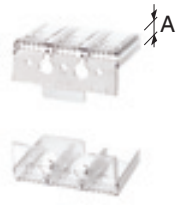
Note: Terminal covers for 400AF and 800AF MCCBs are in acrylic.



TCS (Short type)



TCL (Long type)



TCS/T (Short type)

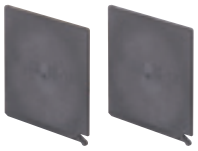


TCL/T (Long type)

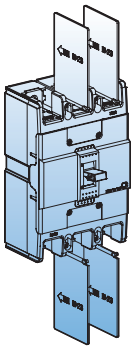

Short type construction


Long type construction

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.

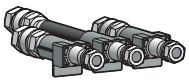
Accessories

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.

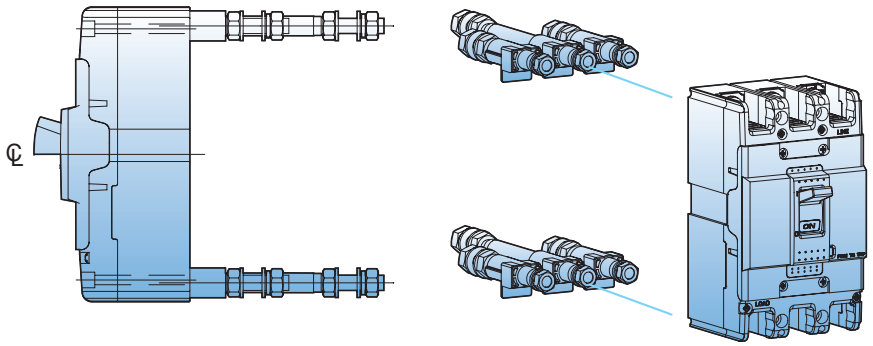
- Flat type
- Round type

Round type terminals

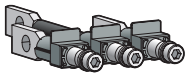




Breaker	For 2-pole	For 3-pole	For 4-pole
ABN100c 50AF	RTR1-52	RTR1-53	-
ABN100c 100AF	RTR1-102	RTR1-103	RTR1-104
ABH125c	RTR2-102	RTR2-103	RTR2-104
ABH250c	RTR3-202	RTR3-203	RTR3-204

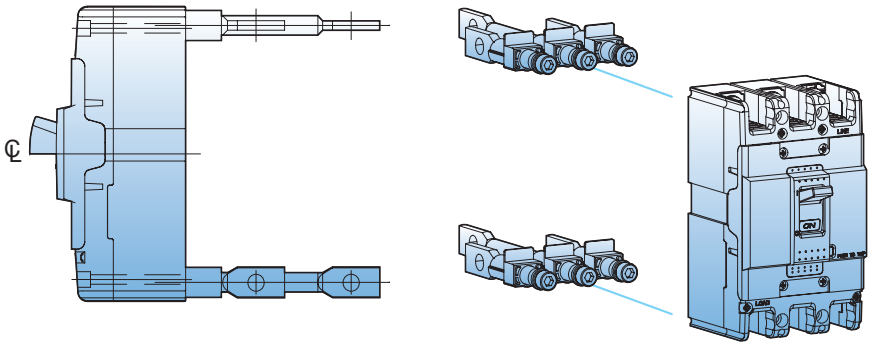


Flat type terminals





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
Mechanical interlock

AF	
1	100AF
2	125AF
3	250AF
4	400AF
8	800AF

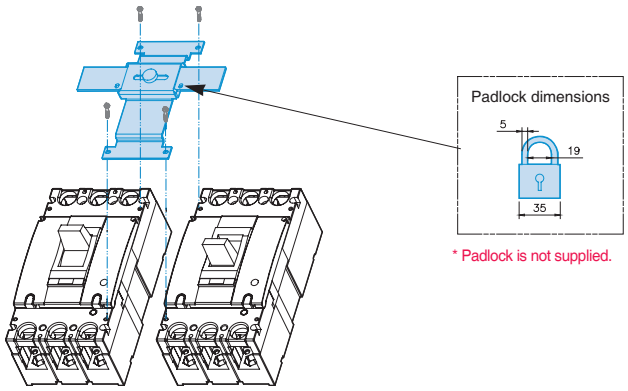
Pole	
3	3P
4	4P

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

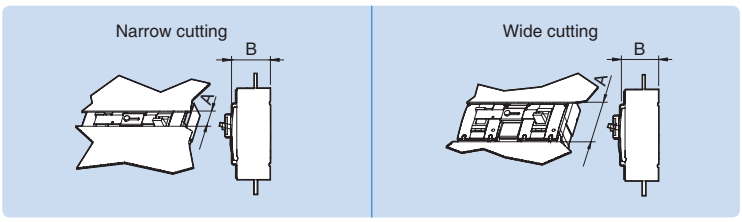
Note) MI is not applicable to 2-pole version breakers of 100AF and 125AF.

Layout



* Padlock is not supplied.

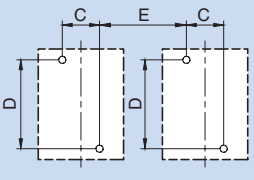
MCCB panel cutting



(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

Accessories



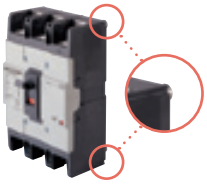
Plug-in base

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



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



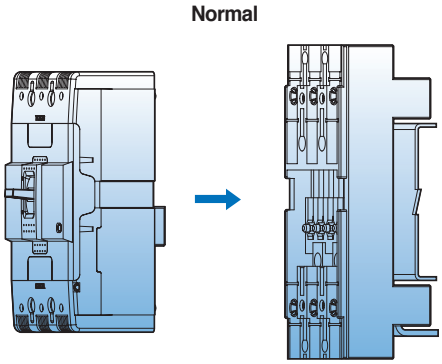
ABH103c plug-in type

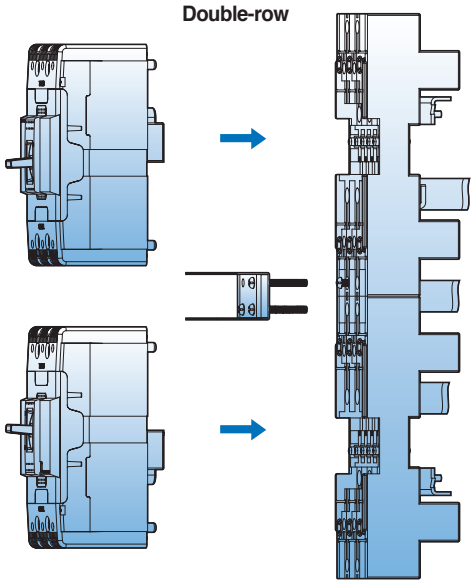


ABH203c plug-in type

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	
	Line-only	PB-C3-FRL	
ABH250c	Normal	PB-D3-FR	
400AF	Normal/Line-only	PB-I3-FR/PB-I3-FRL	
800AF	Normal	PB-J3-FR	





Remote operation

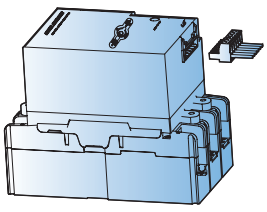


Motor operator

Motor operators can also be operated by manual. The motor drives a mechanism which switches TD & TS 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.

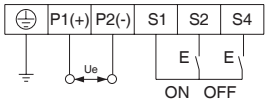
MCCB			Type	Control voltage	Actuation current (A)	Response time (ms)		Mechanical service life (operations)	No. of operations per hour
2P	3P	4P				Closing	Opening		
-	ABN53c, ABN63c, ABN103c, ABN103e, ABS33c, ABS53c, ABS63c	ABN54c, ABN64c, ABN104c, ABN104e, ABS34c, ABS54c, ABS64c	MOP-M1	① DC24V ② AC110V~DC110V 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



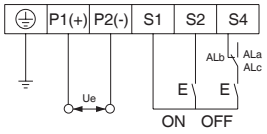
Standard connection

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



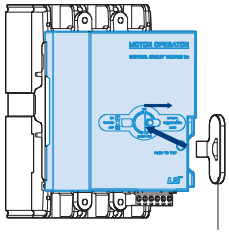
Connection with alarm switch (AL)

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.



Accessories

Remote operation


Manual handle

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.

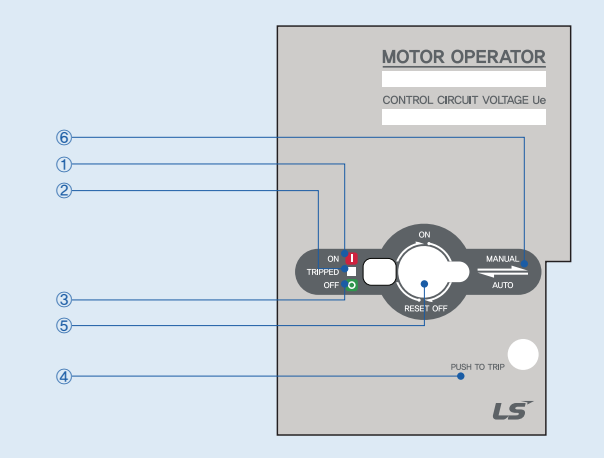
Automatic operation

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.

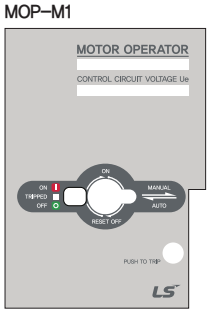
Motor operator

Feature

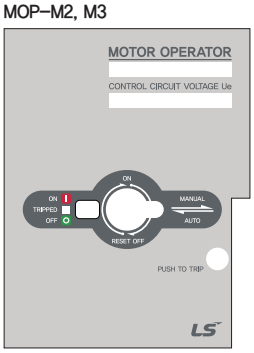
① On position indication (Red color)
② Trip position indication (White color)
③ Off position indication (Green color)
④ Button for push to trip
⑤ On/Off/Reset selection lever
⑥ Manual/Auto selection lever



MOP–M1



MOP–M2, M3



MOP–M4/M5/M6

