

Electrical auxiliaries of 30~250AF

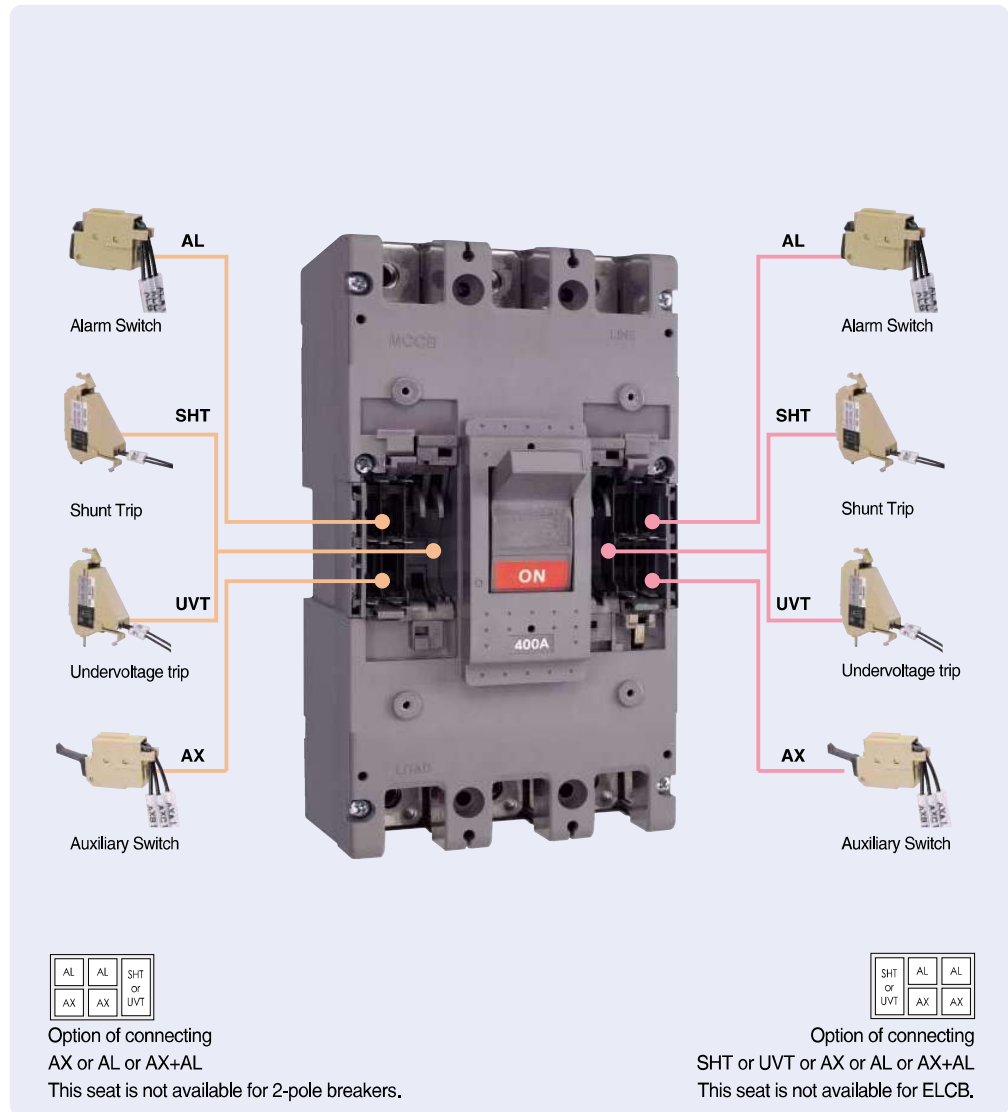
Option of connecting AX or AL or AX+AL
This seat is not available for 2-pole breakers.

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

Maximum possibilities

Position	Type	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

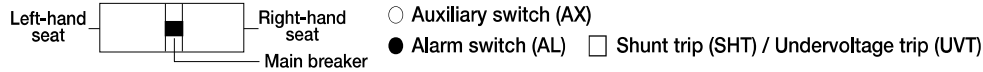


Maximum possibilities

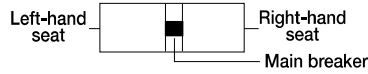
Position	Type	MCCB (400~800AF)	ELCB (400~800AF)
Left-hand seat	AX	2	2
	AL	2	2
	SHT/UVT	1	1
Right-hand seat	AX	2	-
	AL	2	-
	SHT/UVT	1	-

Accessories

Combinations of accessories



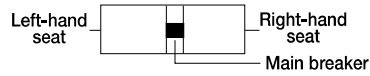
Series	MCCB (30~250AF)				MCCB (400~800AF)	MCCB (1000-1200AF)	
Type	N-Type	ABE 32b	ABE 33b	ABN 52c ABN 62c ABN 102c/102d	ABN 53c/54c ABN 63c/64c ABN 103c/104c, ABN 103d/104d ABN 202c/203c/204c	ABN 402c/403c/404c ABN 602c/603c/604c ABN 802c/803c/804c	-
	S-Type	-	-	ABS 32c ABS 52c ABS 62c ABS 102c	ABS 33c/34c ABS 53c/54c ABS 63c/64c ABS 103c/104c ABS 202c/203c/204c	ABS 402c/403c/404c ABS 602c/603c/604c 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 402c/403c/404c ABL 602c/603c/604c 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 (1000-1200AF)	
Type	N-Type	ABE 32b	ABE 33b	ABN 52c ABN 62c ABN 102c	ABN 53c/54c ABN 63c/64c ABN 103c/104c ABN 202c/203c/204c	ABN 402c/403c/404c ABN 602c/603c/604c 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 602c/603c/604c 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 402c/403c/404c ABL 602c/603c/604c 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							

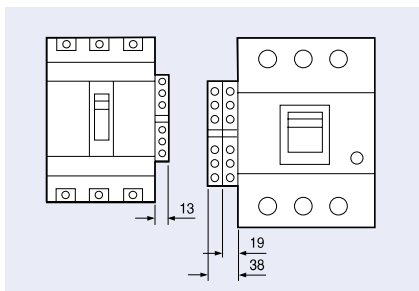
Combinations of accessories



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

Series		ELCB (30~250AF)	ELCB (400~800AF)	ELCB (1000~1200AF)
Type	N-Type	EBN 52c/53c/54c EBN 63c EBN 102c/103c/104c EBN 202c/203c	EBN 403c/404c EBN 603c EBN 803c	-
	S-Type	EBS 33c/34c EBS 53c/54c EBS 63c/64c EBS 103c/104c EBS 203c/204c	EBS 403c/404c EBS 603c ABS 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 603c 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)				

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)



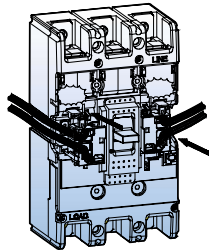
Alarm switches offer provisions for immediate audio or visual indication of a tripped breaker due to overload, short circuit, shunt trip, or undervoltage release conditions.

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.



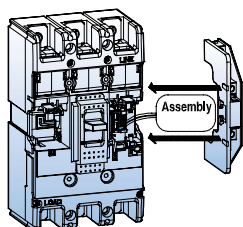
Contact (AX+AL)

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
AC 50/60Hz	125V	5	3
	250V	3	2
	500V	-	-
DC	30V	4	3
	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		
	AC (VA)	DC (W)	mA
AC/DC 12V	0.35	0.36	30
AC/DC 24V	0.64	0.65	27
AC/DC 48V	1.09	1.1	23
AC/DC 60V	1.2	1.22	20
AC/DC 100~130V	0.73	0.75	5.8
AC/DC 200~250V	1.21	1.35	5.4
AC 380~450V	1.67	-	3.8
AC 440~500V	1.68	-	3.5
Max. opening time	50ms (max.)		
Tightening torque of terminal screw	12 kgf · cm		

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

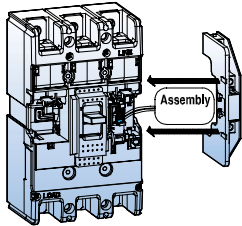
Rating for 400~800AF



Control voltage, Ue	Power consumption		
	V	mA	W
AC/DC 24~48	AC 24	14	0.3
AC 100~125/DC 100~110	DC 24	15.4	0.4
AC 200~240/DC 200~220	AC 48	14	0.7
AC 380~460	DC 48	16	0.8
AC 480~550	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

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



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	12 kgf · cm		
Operating voltage range	Trip	20~70% Vn	
	Reset/Closing	≥ 0.85Vn	

Rating for 400~800AF



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/DC 200~240			
AC 380~440			
AC 440~480			

Terminal numbering

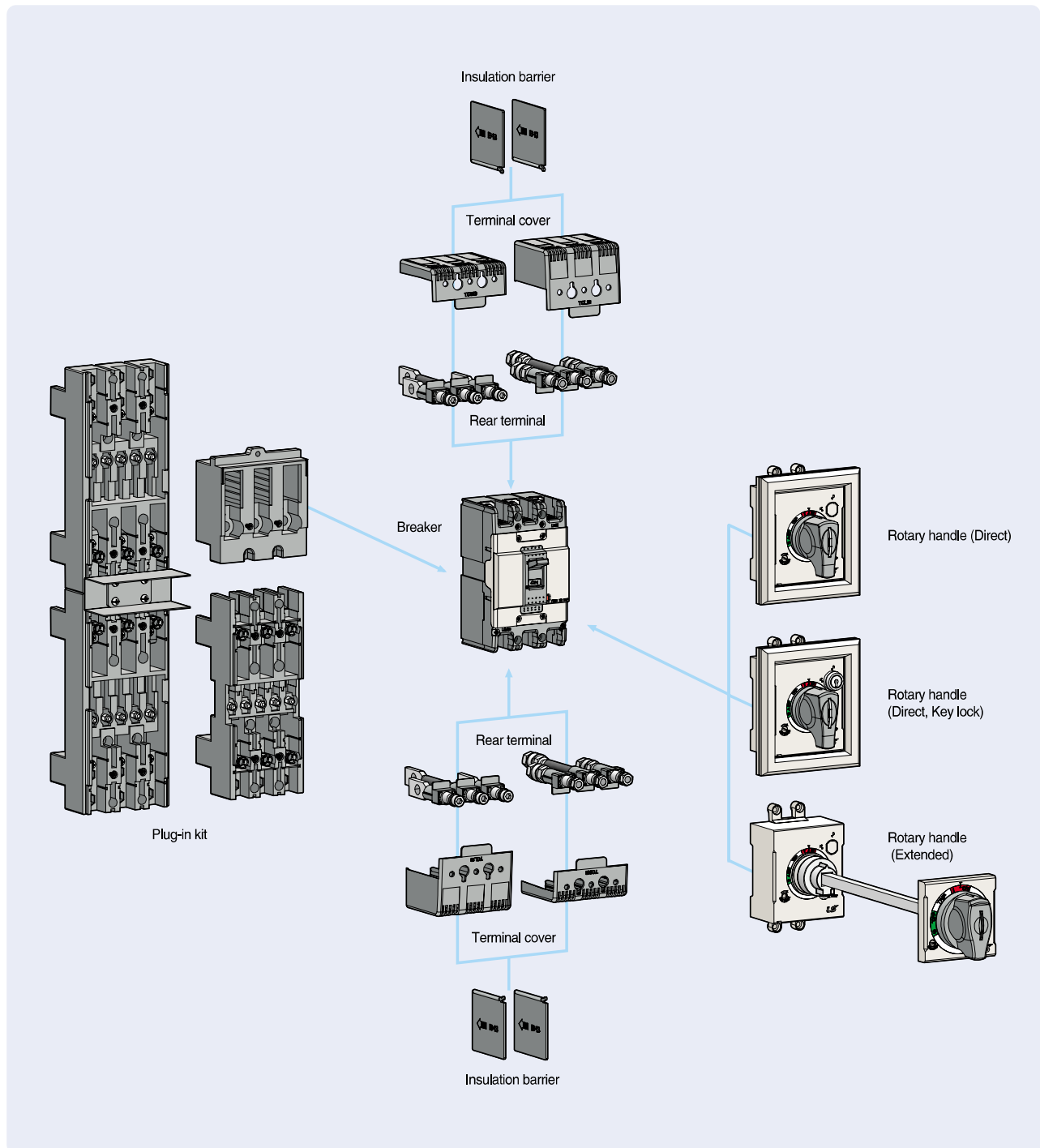
Auxiliary Switch (AX)	Alarm Switch (AL)	Shunt Trip (SHT)	Undervoltage trip (UVT)

Accessories

Metasol

External accessories

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



Rotary handles

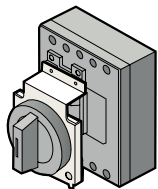
Direct type



Direct type



Key lock
(30-250AF)

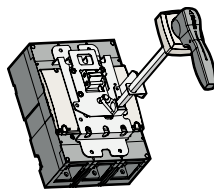


(400-800AF)

Extended type



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.

Type

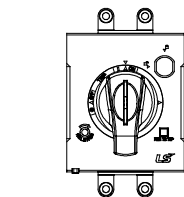
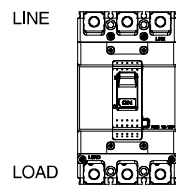
Direct type	Direct type (Key lock)	Extended type	Breaker type	
			MCCB	ELCB
DH100	DHK100	EH100	ABN50c/60c/100c ABS30c/50c/60c	EBN50c/60c/100c EBS30c/50c/60c
DH125	DHK125	EH125	ABS125c ABH50c/125c	EBS125c EBH50c/125c
DH250	DHK250	EH250	ABN250c, ABS250c ABH250c	EBN250c, EBS250c EBH250c
N-70	-	E-70U	ABN/S/H/L400c	EBN/S/H/L400c
N-80	-	E-80U	ABN/S/L800c	EBN/S/L800c

Degree of protections

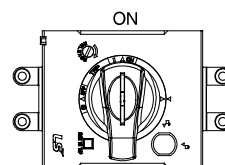
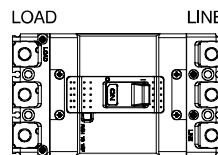
Type	Degree of protection	IP degree
Circuit breaker with cover frame and rotary direct handle	The access probe of 1.0mm diameter shall not penetrate.	IP40
Circuit breaker with cover frame and rotary extended handle	Totally protected against ingress of dust and water jets from any direction	IP65

Type suffix according to the mounting position

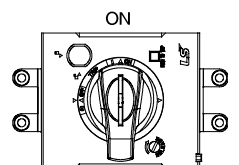
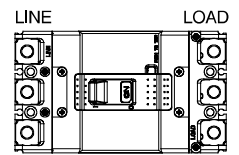
S-Type



L-Type



R-Type



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 IP40 degree of protection.



- **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.



Type		Pole	Breaker	
Short Type	Long Type		MCCB	ELCB
TBS22	-	2P	ABE30b	-
TBS23	-	3P		
TCS12	TCL12	2P	ABN50c/60c/100c	EBN50c/60c/100c
TCS13	TCL13	3P		
TCS14L	TCL14L	4P Line	ABS30c/50c/60c	EBS30c/50c/60c
TCS14R	TCL14R	4P Load		
TCS22	TCL22	2P	ABS125c	EBS125c
TCS23	TCL23	3P		
TCS24L	TCL24L	4P Line	ABH50c/125c	EBH50c/125c
TCS24R	TCL24R	4P Load		
TCS33	TCL33	2/3P	ABN250c, ABS250c	EBN250c, EBS250c
TCS34L	TCL34L	4P Line		
TCS34R	TCL34R	4P Load	ABH250c	EBH250c
-	T1-43A	2, 3P		
-	T1-44A	4P	ABN/S/H/L400c	EBN/S/H/L400c
-	T1-63A	2, 3P		
-	T1-64A	4P	ABN/S/L800c	EBN/S/L800c
-	-	-		

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



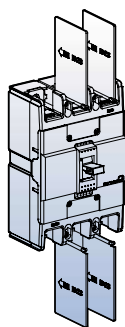
Insulation barriers



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	EBN50c/60c/100c
	ABS30c/50c/60c	EBS30c/50c/60c
IB-23	ABS125c	EBS125c
	ABH50c/125c	EBH50c/125c
	ABN250c, ABS250c	EBN250c, EBS250c
	ABH250c	EBH250c
IBL400	ABN/S/H/L400c	EBN/S/H/L400c
IBL800	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.

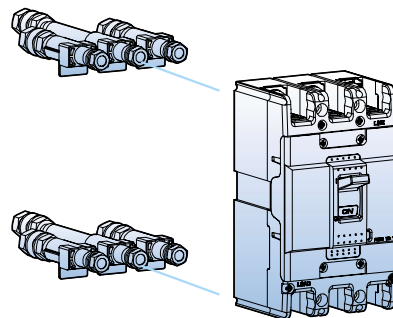
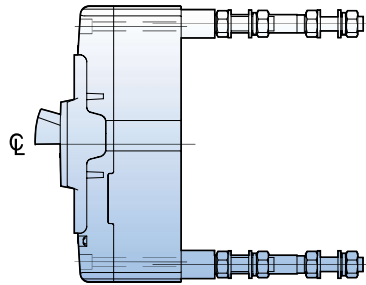
There are two kinds of rear connection terminals.

- Flat type
- Round type

Round type terminals



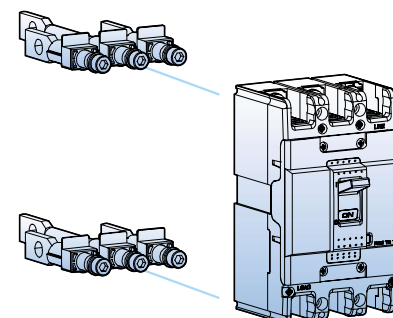
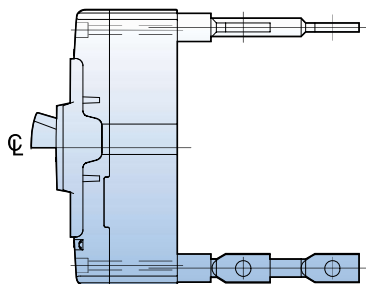
Breaker	For 2-pole	For 3-pole	For 4-pole
ABN100c 50AF	RTR1-52	RTR1-53	-
ABN100c 100AF	RTR1-102	RTR1-103	RTR1-104
ABH125c	RTR2-102	RTR2-103	RTR2-104
ABH250c	RTR3-202	RTR3-203	RTR3-204



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
AB□400c	X-402	X-403	X-404
AB□800c	X-802	X-803	X-804



Plug-in devices



Plug-in base

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.

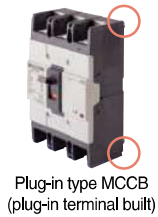
The circuit-breaker is racked out by unscrewing the top and bottom fixing screws.

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	P lug-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	

