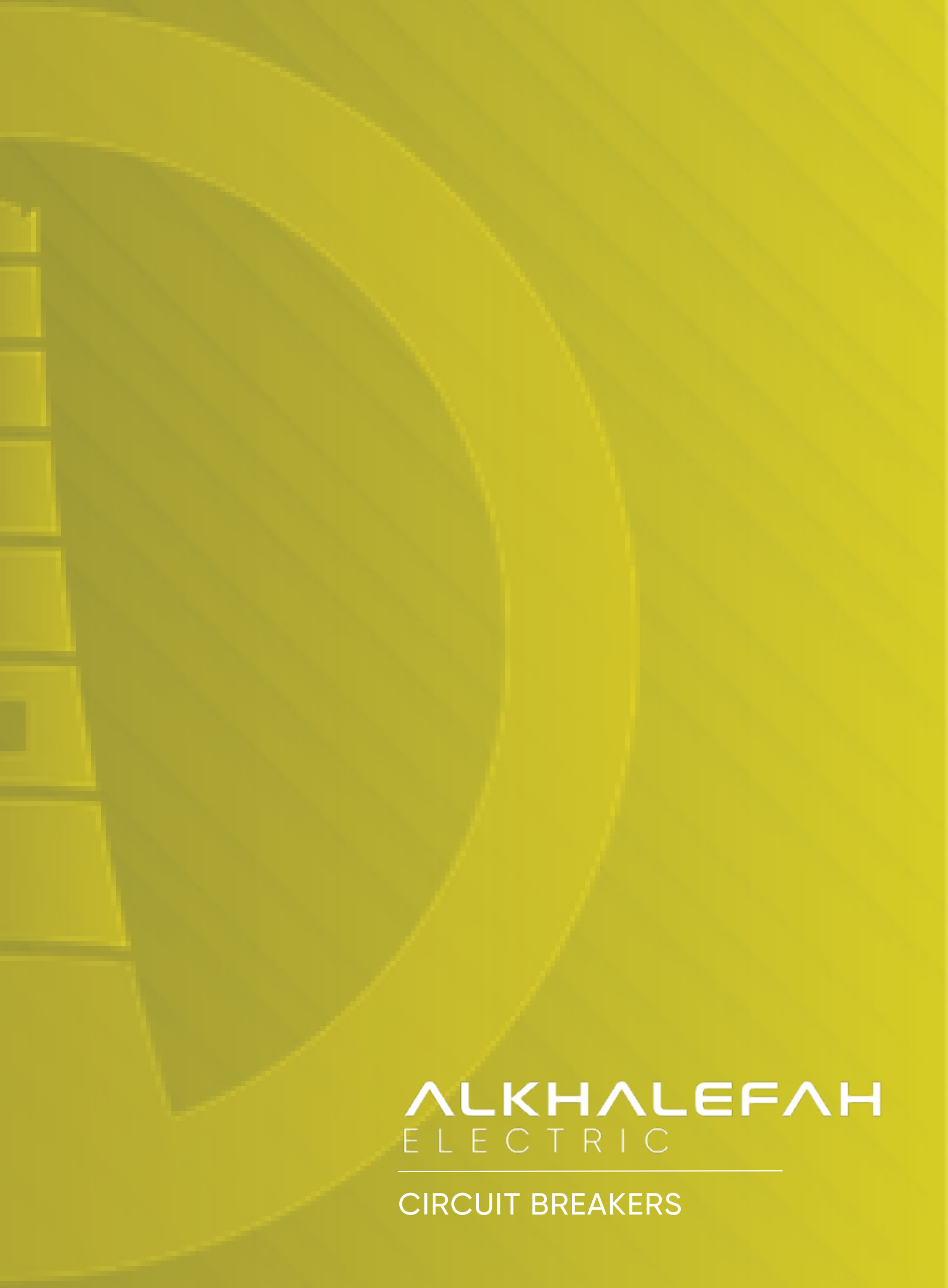




ALKHALEFAH
ELECTRIC

CIRCUIT BREAKERS







Alkhalefah Industries is a leading manufacturer and supplier of high-quality industrial products, serving a wide range of industries, including construction, infrastructure, and manufacturing. Established in 1994, our factory has built a solid reputation for delivering innovative solutions that meet the rigorous demands of today's industrial landscape. Alkhalefah Industries is a prominent Saudi factory aiming to emerge as a global leader in the production and supply of firefighting equipment and high-quality electrical products and services.

We Alkhalefah Industries are proud to contribute in Saudi Arabia's industry through establishments, specialization, partnerships, and eager to excellence.

Alkhalefah Electric is a prominent Saudi factory established in 1994, specializing in electrical solutions. It is a trusted partner of the Saudi Electricity Company (SEC) and collaborates with renowned global electrical companies such as Schneider, ABB, and LS. With over two decades of experience, Alkhalefah Electric has built a strong reputation for delivering high-quality electrical products and services. We offer a comprehensive range of solutions, including distribution panels, switchgear, s transformers, control systems, and automation solutions.

Alkhalefah Firefighting, established in 1994, Riyadh, Saudi Arabia , aims to emerge as a global leader in the production and supply of firefighting equipment. Our specialization lies in providing comprehensive solutions for various high-quality firefighting equipment. Our team comprises highly skilled and committed professionals from diverse backgrounds worldwide. The products manufactured in our facility undergo rigorous certification processes by UL, FM, BSI, LPCB, and Global Mark, ensuring strict compliance with International standards.





INTRODUCTION

Electricity is central to our modern way of life, powering our homes, workplaces, and industries every day. As indispensable as it is, electricity also demands diligent handling and robust safety measures, especially when it is meant to be operated by ordinary people. At **Alkhalefah**, we are fully committed to your safety and the well-being of those around you, which is why we've engineered our Circuit Breakers with high-quality components and advanced protective features. These measures not only safeguard your electrical system but also grant you peace of mind in any environment.



AIR CIRCUIT BREAKER (ACB)



USE AND SCOPE OF USE

The KFIWI series intelligent universal air circuit breaker is designed for use in AC distribution networks operating at 60Hz, with a rated voltage of AC 400V/690V and a current range of 200A to 6300A. It serves to distribute power and safeguard lines and equipment from potential damage caused by overload, under-voltage, short circuits, or single-phase grounding faults.

This breaker features intelligent protection functions, allowing for precise protection settings to enhance the reliability of the power supply while minimizing unnecessary power interruptions. Additionally, it is equipped with open-type communication interfaces, enabling FOUR remote control operations (monitoring, control, diagnosis, and adjustment) to integrate seamlessly with control centers and automated systems.

The breaker can be used as isolator without intelligent controller and sensor, identifying with 

This series of circuit breakers is suitable for power stations, factories, intelligent buildings and other low-voltage distribution fields, and can also be used as an infrequent start of the motor.

The breaker measures up to standards of IEC60947-2 Low Voltage Switch Device and Control Device Circuit Breaker, also according to international specifications and Saudi Electric Co specifications 37-SDMS-04.



CIRCUIT BREAKERS MEET THE FOLLOWING STANDARDS

- Low voltage switchgear and control equipment - Part 1 : General (IEC 60947-1 , MOD)
- Low voltage switchgear and control equipment - Part 2: Circuit breakers (IEC 60947-2, IDT)
- Low voltage switchgear and control equipment - Part 5-1: Control circuit appliances and switching elements - Electromechanical control circuit appliances
- GB/T 2423 .4 Environmental tests for electrical and electronic products - Part 2: Test methods - Test Db : Alternating humidity and heat
- GB/T 14092 .3 Mechanical products Environmental conditions: high altitude
- GB/T 19608 .3 Classification of special environmental conditions - Part 3: Plateau
- GB/T 20645 Special environmental conditions Low voltage electrical appliances for high altitude technical requirements
- GB/T 20626 .3 Special environmental conditions Plateau electrical and electronic products - Part 3: Protection requirements for.

INSTALLATION ENVIRONMENT REQUIREMENTS

The circuit breaker should be installed in a dry, dust-free , non-corrosive gas , no explosive dangerous media environment , can not be impacted. If the environment can not meet this condition , the protection level of the complete set of equipment should be improved accordingly. Specific requirements are shown in the following table:

Item	Norm
Ambient temperature	Electrical and mechanical characteristics applicable to ambient temperature $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$ (certification), ambient temperature greater than $+40^{\circ}\text{C}$ need to reduce capacity, capacity reduction coefficient refer to the manual
Relative humidity	When the maximum temperature is $+50^{\circ}\text{C}$, the relative humidity of the air does not exceed 50%, which can be allowed at lower temperatures High relative humidity, such as 20°C relative humidity can be allowed to reach 90%
Altitude	$\leq 2000\text{m}$, more than 2000m capacity reduction coefficient refer to the manual
Installation requirements	The installation surface of the circuit breaker should be flat, and there should be no additional mechanical pressure on the conductive busbar and circuit breaker, so as to avoid circuit breaker damage or poor contact of the main busbar; The inclination of the mounting surface in each direction shall not exceed 5° ;
Pollution level	3level
Category of use	B
Class of protection	The circuit breaker is installed in the cabinet room, and the door frame is installed, and the front protection level can reach IP40



SEC- MOLDED CASE CIRCUIT BREAKERS

SEC (MCCB) 37-SDMS-01, 02 LATEST REV.



A molded case circuit breaker (MCCB) is a type of electrical protection device that is used to protect the electrical circuit from excessive current, which can cause overload or short circuit. MCCBs can be used for a wide range of voltages and frequencies with adjustable trip settings. These breakers are used instead of miniature circuit breakers (MCBs) in large scale PV systems for system isolation and protection purposes.

A circuit breaker is an automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload or short circuits. Its basic function is to detect a fault condition and interrupt current flow. Unlike a fuse, which operates once and then must be replaced, a circuit breaker can be reset to resume normal operation.

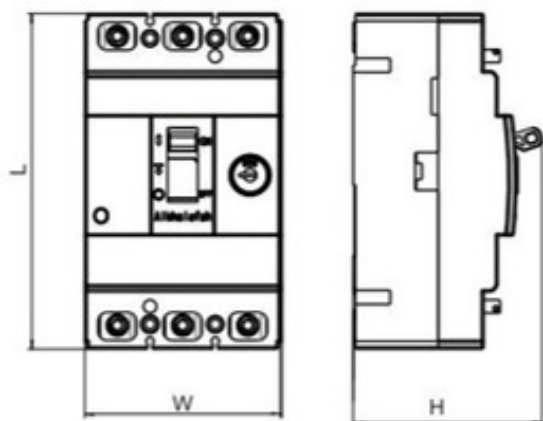
Additionally, MCCB (Molded Case Circuit Breaker) can handle currents up to 800A.

Circuit breakers are made in varying sizes, from small devices that protect an individual household appliance up to large switchgear designed to protect high-voltage circuits feeding an entire city.

The MCCB- Molded Case Circuit Breaker for Low Voltage Distribution Panels is made out of high-quality raw material to insure that it will withstand tough working conditions and it is tested and designed according to international specifications and Saudi Electric Co specifications 37-SDMS-02 Latest Rev.



OVERALL AND MOUNTING



CODE NUMBERS FOR LOW VOLTAGE MOLDED CASE CIRCUIT BREAKERS-MCCB FOR SERVICE CONNECTIONS

S.No	SEC Code	Description	SEC Specification
1	908371001	MCCB KFMI-30A 3P With Lock	37-SDMS-01, Latest Rev.
2	908371012	MCCB KFMI-40A 3P With Lock	37-SDMS-01, Latest Rev.
3	908371013	MCCB KFMI-50A 3P With Lock	37-SDMS-01, Latest Rev.
4	908371014	MCCB KFMI-70A 3P With Lock	37-SDMS-01, Latest Rev.
5	908371003	MCCB KFMI-100A 3P With Lock	37-SDMS-01, Latest Rev.
6	908371004	MCCB KFMI-150A 3P With Lock	37-SDMS-01, Latest Rev.
7	908371005	MCCB KFMI-200A 3P With Lock	37-SDMS-01, Latest Rev.
8	908371006	MCCB KFMI-300A 3P With Lock	37-SDMS-01, Latest Rev.
9	908371007	MCCB KFMI-400A 3P With Lock	37-SDMS-01, Latest Rev.
10	908371008	MCCB KFMI-500A 3P With Lock	37-SDMS-01, Latest Rev.
11	908371009	MCCB KFMI-600A 3P With Lock	37-SDMS-01, Latest Rev.
12	908371010	MCCB KFMI-800A 3P With Lock	37-SDMS-01, Latest Rev.
13	908372001	MCCB KFMI-400A 3P Without Lock	37-SDMS-01, Latest Rev.

EXTERNAL CIRCUIT BREAKER (ECB)

250/1250

LOW VOLTAGE - SWITCHGEAR

PRISMA SET ENCLOSURE

MODULAR PANEL-BOARD

CUSTOMIZED PANELBOARD



ECB-250/1250

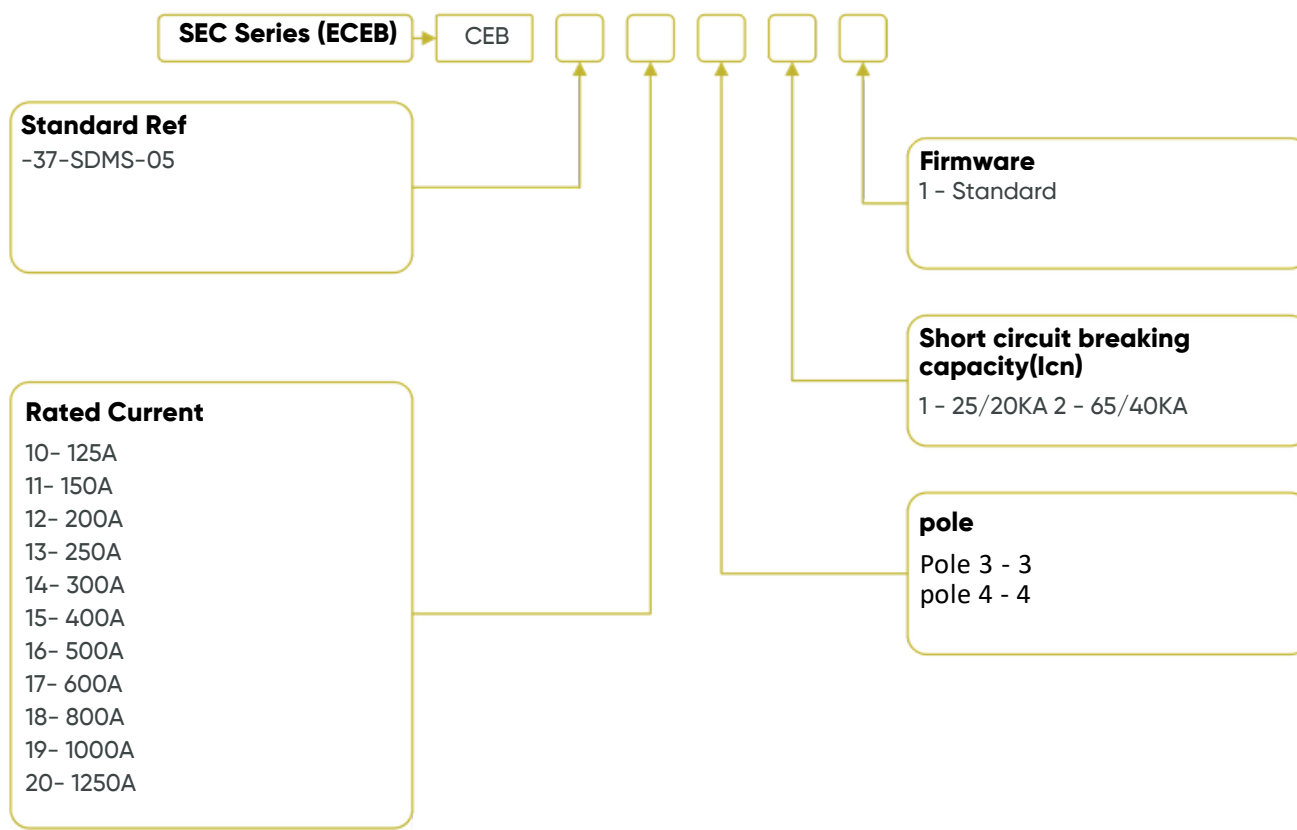


SCOPE OF APPLICATION:

- The ECB series external circuit breaker (also known as "motor-operated circuit breaker") is an electrically operated molded-case circuit breaker specifically designed for circuit protection in low-voltage distribution systems.
- The ECB is designed in accordance with standard IEC 60947-2 and SEC specification 37-SDMS-05, featuring functionality to interact with smart meters and enabling remote connection/disconnection of power via SEC's control room.
- The circuit breaker complies with IEC-60947-2 and SEC standard 37-SDMS05 (latest revision) and is marked with the Saudi Electricity Company logo.



PRODUCTS AND IMPLICATIONS:



MAIN TECHNICAL SPECIFICATIONS

The thermal-magnetic trip unit of the circuit breaker features inverse-time tripping characteristics, while the magnetic trip unit's operating characteristics are specified in the table below

Thermal-Magnetic and Magnetic Trip Unit Operating Characteristics

Rated Current (A)	Thermal-Magnetic Trip Unit(Ambient Temperature+55°C		Magnetic Trip Current (A)
	1.05 In (Cold State) Non-OperationTime(h)	1.30 In (Hot State) Operation Time (h)	
100≤In≤1250	2	2	10In±20%

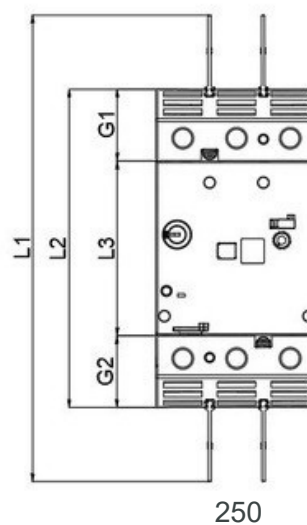
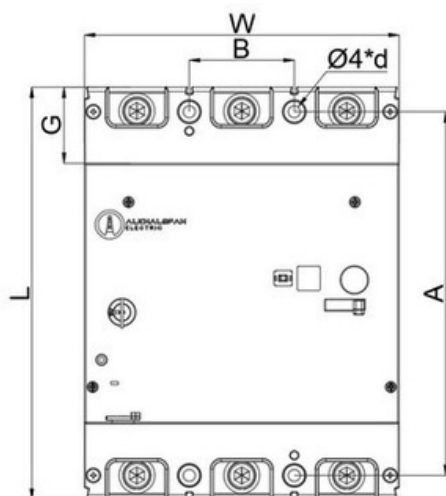


MAIN TECHNICAL SPECIFICATIONS

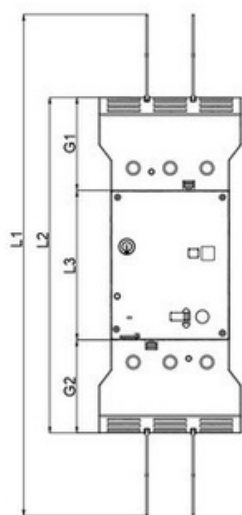
Basic Parameters					
Frame Current Rating →		250	400/600		1250
Rated Operational Voltage Ue(V) →		230, 400/415			
Rated Insulation Voltage Ui(V) →		100			
Rated Impulse Withstand Voltage Uimp(kV) →		8			
Poles →		3P			
Rated Frequency(Hz) →		50/60			
Rated Current In(A) →		100A-250A	250A-400A 400A-600A	500A-8 00A	1000A-1250A
Rated Ultimate Short-circuit Breaking Capacity (Icu)	230V	25KA	25KA	65KA	65KA
	400V	20KA	20KA	40KA	40KA
Rated Service Short-circuit Breaking Capacity (Ics)		Ics=100%Icu			
Operating Ambient Temperature →		-10 °C ~ 75 °C			
Trip Mechanism →		Thermal-Magnetic Trip			
Category of Use →		CatA			



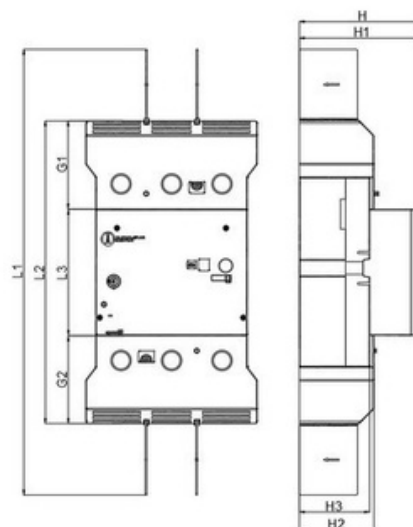
OUTLINE AND INSTALLATION DIMENSIONS



250



600



800~1250

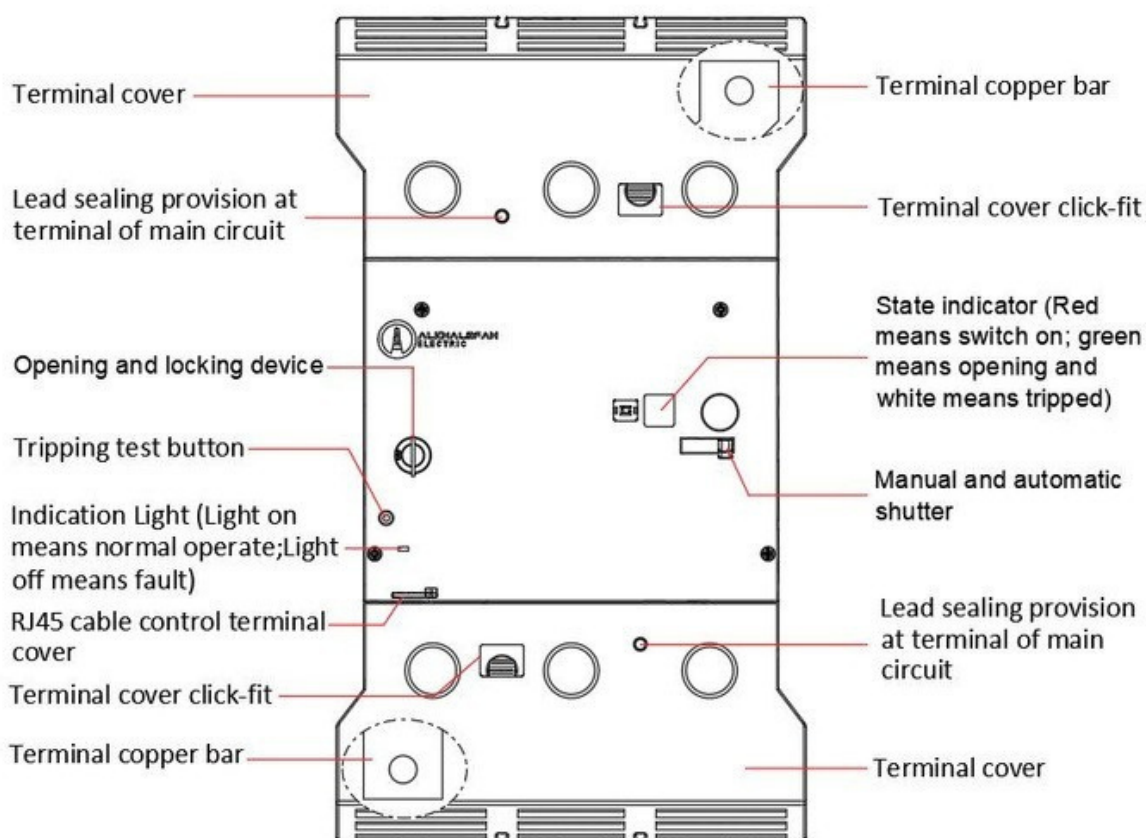
ECB-	OUTLINE DIMENSIONS(MM)												INSTALLATION DIMENSIONS(MM)		
	W	L	H	G	G1	G2	L1	L2	L3	H1	H2	H3	A	B	D
250	105	165	119.6	25.5	46.8	46.8	305	208	114	116	68	61	126	35	Φ 9
600	140	157	138.1	40	110	110	594	397.3	176.5	135.3	103	97.2	194	44	Φ 7
800/1250	210	276	175.2	51	121.5	121	615	417.7	174	171.5	103	97.2	243	70	8



ACCESSORY PARTS

Model Qty	MOUNTING SCREW KIT	NUT	PHASE BARRIER	TERMINAL COVER	CONTROL CABLE	SEAL CLAMP	LEAD SEAL
							
250	M4*55: 4	M4:4	4	2	1	4	4
400/630	M6*65: 4	M6:4	4	2	1	4	4
800/1250	M6*40: 4	M6:4	4	2	1	4	4

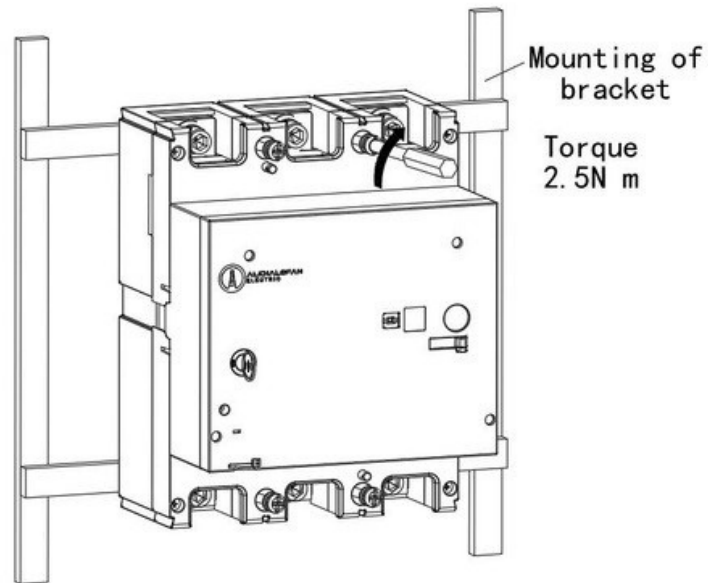
EXTERNAL DIMENSIONS AND ASSEMBLY DIMENSIONS:





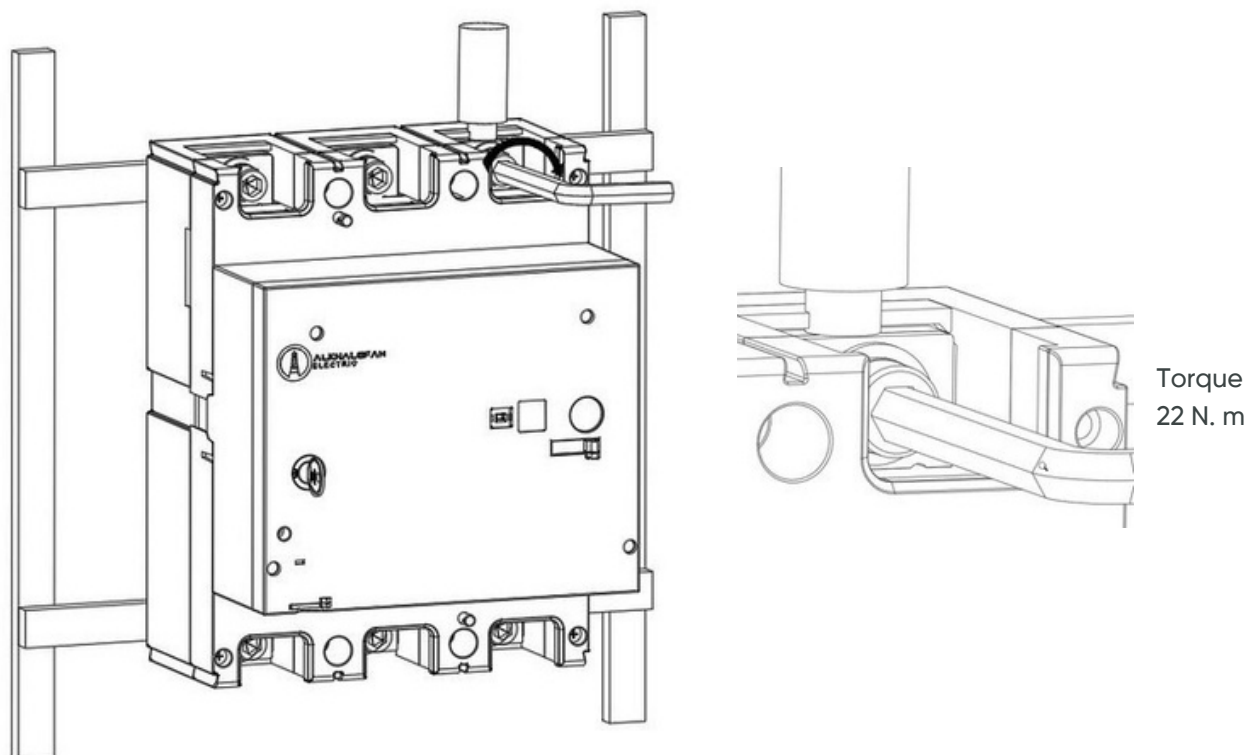
ECB INSTALLATION AND WIRING:

- INSTALLATION:



During installation of every product , the tightening torque of screws shall conform to the requirements.

- WIRING:



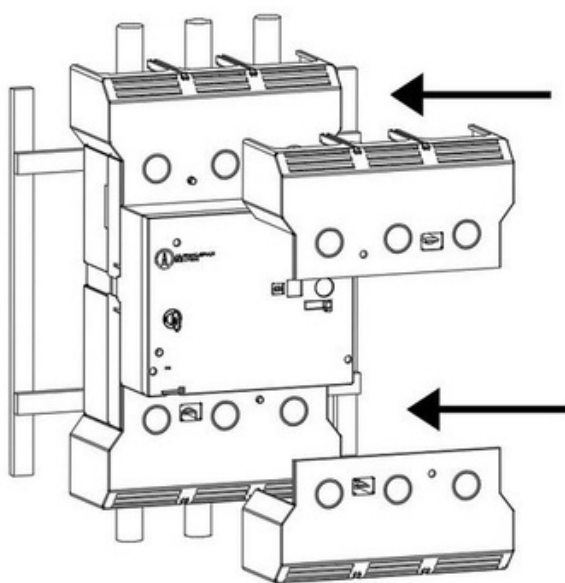


RATED CURRENT	RECOMMENDED CROSS-SECTIONAL AREA OF COPPER CONDUCTOR (MM ²)
160	70
250	120
400	240
500	300
600	370
700	480
800	480
1000	600
1250	800

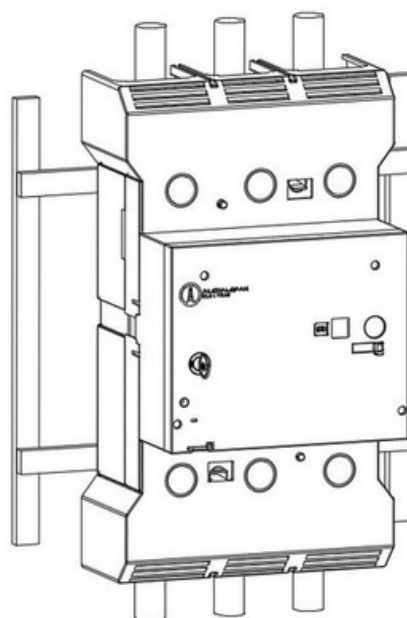
Note : Ensure every connecting screw is fastened to the specified torque . Regular inspection and maintenance are required. After wiring , ensure that all the connections between wire and terminals are secure and properly fixed .

Remove any foreign objects from the meter box.

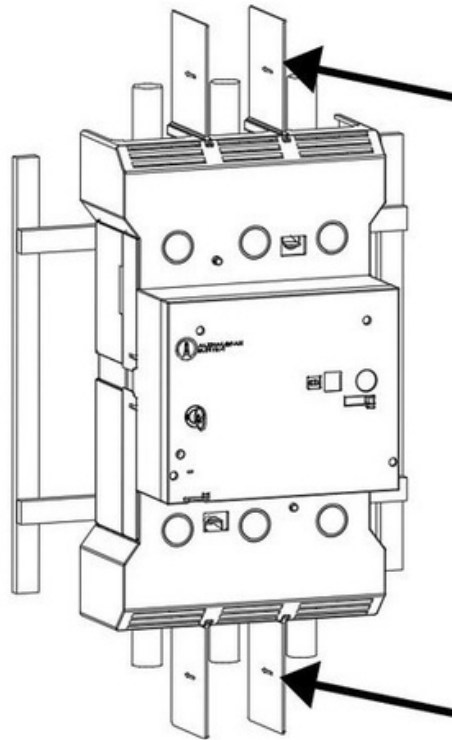
• INSTALLATION TERMINAL COVER AND PHASE BARRIER



① Insert terminal cover at incoming and outgoing terminals of breaker respectively



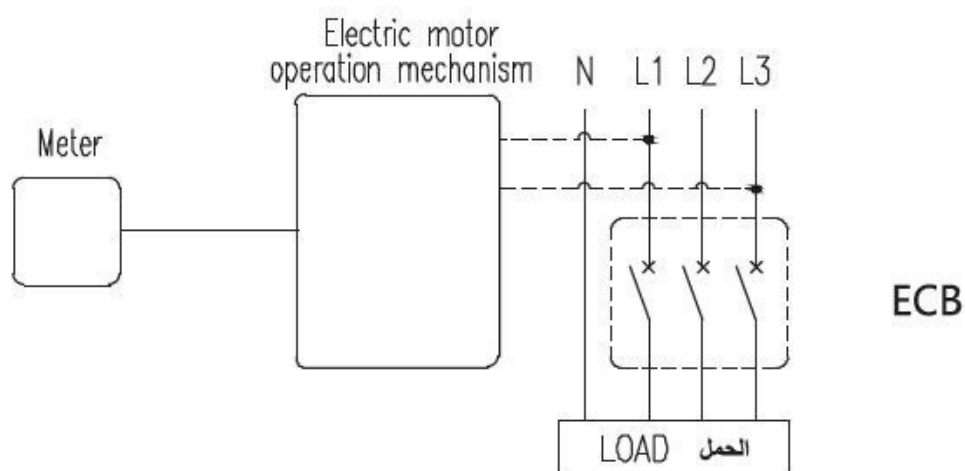
② Install the terminal cover in place



③ Insert Phase barriers in the direction of arrow marked on it , Push the phase barrier into terminal cover

• WIRING DIAGRAM OF CONTROLLER

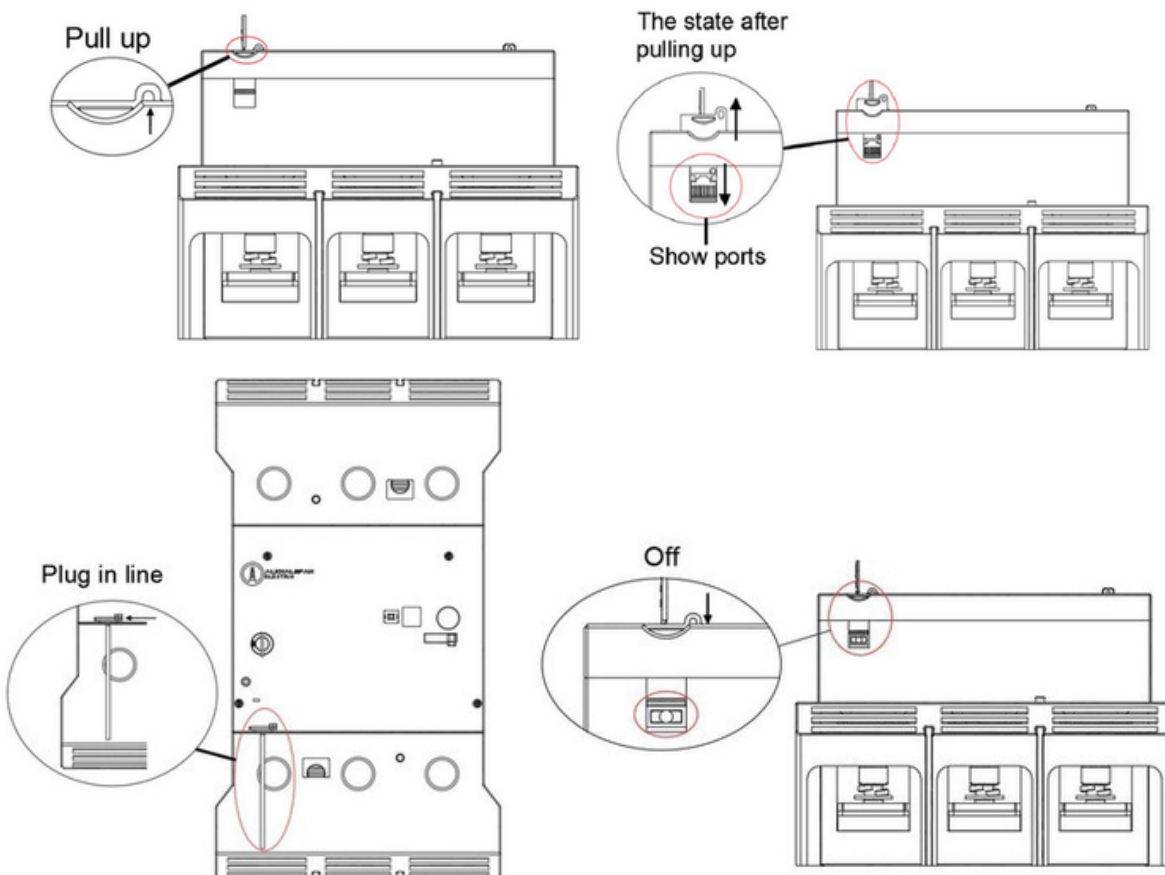
Ensure L1 & L3 (A/C phase) terminals connected to input supply voltage 230–400V AC : PH-N or Ph-ph;





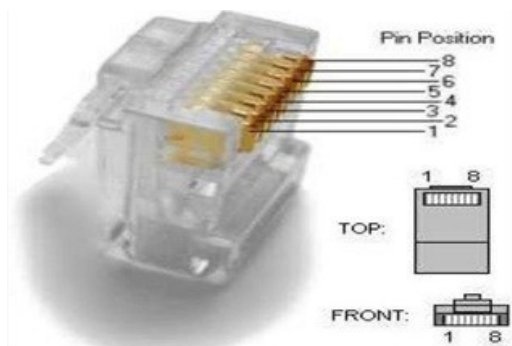
• RJ45 WIRING DIAGRAM

wiring of controller terminal block



• RJ45 NETWORK PORT

PinNo	1	2	3	4	5	6	7	8
PinOut	12Vdc+		NS	RS-485(+)	RS-485(-)	NC	GND V dc-	





SAFETY GUIDELINES:

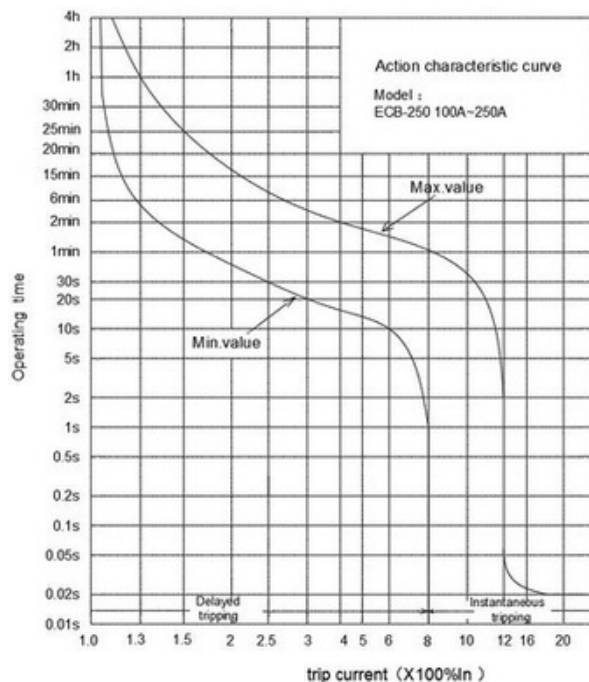
- **For Motor operation For Maintenance**

- Select Manual Mode Ensure
- ECB OFF Manually Select
- Auto Mode Lock - ECB by
- Manual Key

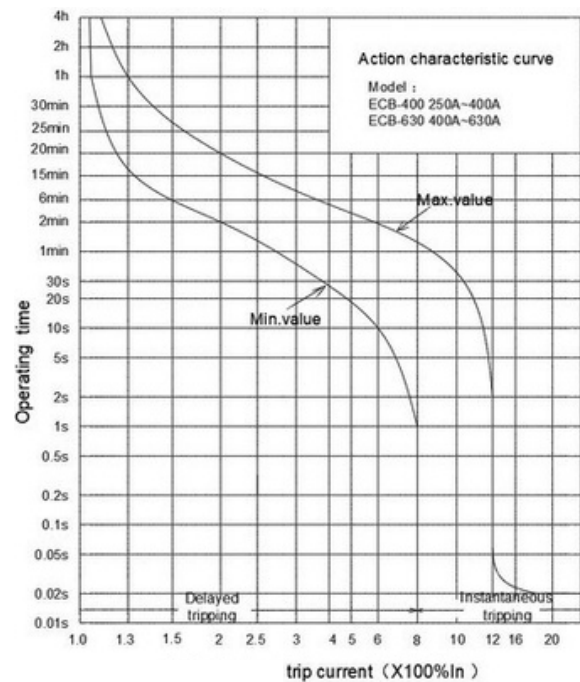
- **To Resume Normal Operation**

- Unlock a by Manual Key
- Select Manual Mode
- Ensure ECB ON Manually
- Select Auto Mode

CURRENT/TIME CURVE AND DE-RATING COMPENSATION FACTOR CURVE

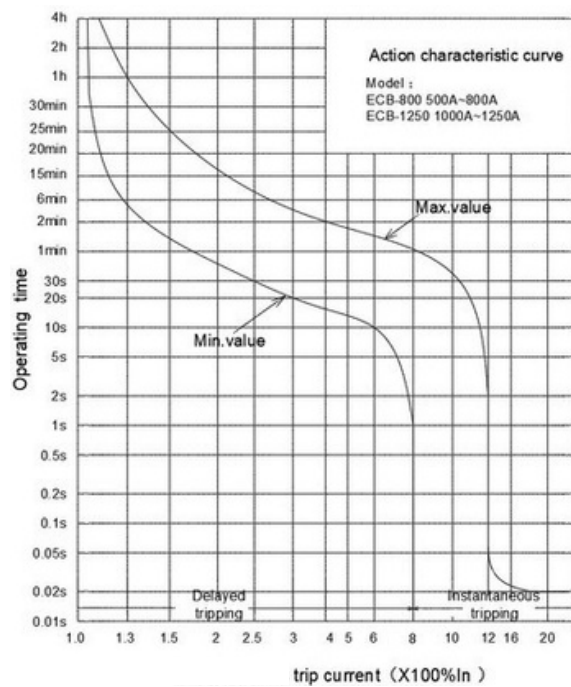


ECB-250

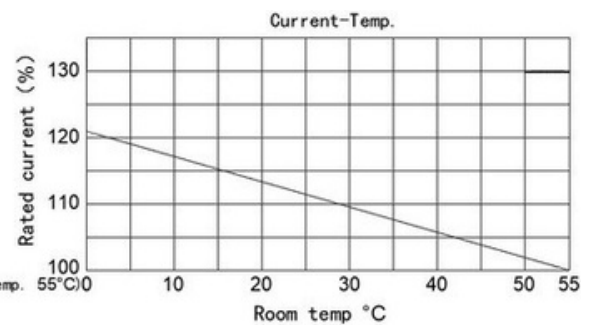


ECB-400/ECB-630

External Circuit Breaker (ECB)



ECB-800/ECB-1250



Note : Ensure every connecting screw is fastened to the specified torque . Regular inspection and maintenance are required. After wiring , ensure that all the connections between wire and terminals are secure and properly fixed . Remove any foreign objects from the meter box.



ECB FUNCTION MACHINE AND LOGICAL OPERATION MANUAL:

1. ECB Tripped

The MSB (Most Significant Bit) of error register 10 shall be set high if tripped is occurred due to manual trip button or by short circuit or overload.

2. ECB Disconnected

Bit 5 of error register 10 shall be set high if the disconnect command is set locally or remotely (HES).

3. ECB Connected

Bit 6 of error register 10 shall be set high if the connection command is set locally or remotely (HES).

4. ECB Auto State

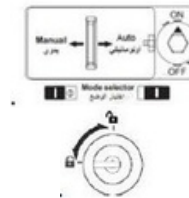
Bit 3 of error register 10 shall be set high if the ECB shutter is in auto state and the ECB Key is in the unlock position.



5. ECB Manual State

Bit 4 of error register 10 shall be high in the following cases.

- If the ECB shutter is in manual position/state.
- If the ECB Key position is in lock state.
- The following table is applicable.



ECB Different States and Bites 4 & 3 Status						
	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
ECB Manual State	1	0	0	1	1	1
ECB Auto State	0	1	1	1	1	0
ECB Key(Lock Position)	1	0	1	0	1	0
ECB Manual (Bit 4)	1	0	1	X	X	1
ECB Auto (Bit 3)	0	1	0	X	X	0

6. ECB Tampered

Bit 2 of error register 10 shall be set high in the following states:

- The RJ-45 port is disconnected.
- If the ECB motor assembly supply is disconnected. (power supply (230 or 400V cut).
- If meter does not receive the status after 3 times (3*5seconds) inquiry continuously.

Note: If the ECB communication wire is removed or cut, the ECB shall not make the operation of disconnect immediately or after some time period.



7. ECB Normal Condition

Bit 1 of error register 10 will be set high if all conditions in clause 2.7 are restored.

Note: Bit 2 and Bit 1 of error register must be toggled.

8. ECB Malfunction

The LSB (Least Significant Bit) of error register 10 will be set high by the ECB under the following conditions:

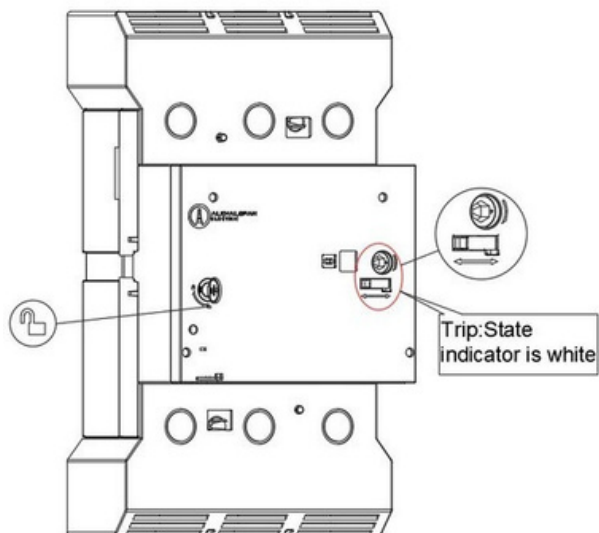
- Connect to disconnect command is set but the error register 10 Bit5 is not high.
- Disconnect to Connect command is set but the error register 10 Bit 6 is not high.
- After the trip if the disconnect command is set but the error register 10 Bit 5 is not high.
- If any of the above conditions occur (locally or remotely), the ECB "healthy light indicator" remains off in any case except ECB supply voltage recovers to normal as per ECB specification.

9. ECB other test cases

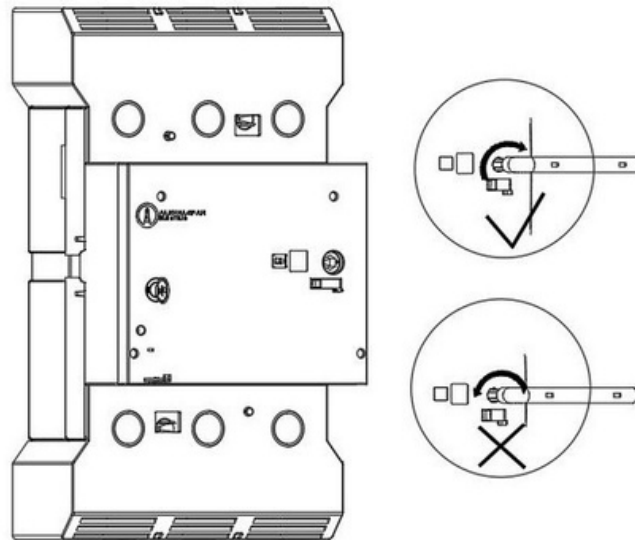
MODES	FUNCTIONS	OPERATIONS	ECB STATUS	WINDOW COLOR INDICATOR
MANUAL	On to Off (Manual)	With manual tool/handle, provided with ECB	OFF	Green
	Off to ON (remote reconnect)	DISABLE (Remote Command by HES/Smart Meter)	OFF	Green
	Off to ON (Manual)	With manual tool/handle	ON	Red
	Manual Connect (OFF to ON) @ DISCONNECT Command Issued from Meter/HES	With manual tool/handle	OFF > 5 s	Green
	Push to Trip	With External Push Button	TRIP	White
	Auto Re-Connect after TRIP	DISABLE Remote operation	TRIP	White
	(On to Off) Remote	Enable (remote command)	OFF	Green
AUTO	Auto Disconnect (ON to OFF)	By Remote Command from HES/Smart Meter	OFF	Green
	Manual Connect (OFF to ON) @ DISCONNECT Command Issued	With manual tool/handle (clockwise rotation)	OFF > 5 s	Green
	Auto Connect (OFF to ON)	By Remote Command	ON	Red
	Push to Trip	With External Push Button	TRIP	White
	Auto Re-Connect after TRIP (Twostep function)	Remote operation (NC to NO then NO to NC)	ON	Red
	ECB shall reconnect remotely after unlocking	Enable	ON	Red
LOCK	Manual Connect (OFF to ON)	DISABLE	OFF	Green
	Auto Connect (OFF to ON)	DISABLE	OFF	Green
	Push to Trip	DISABLE	OFF	Green



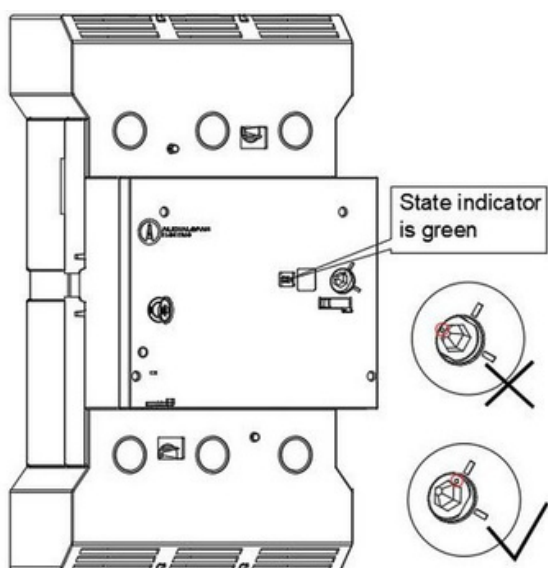
MANUAL OPERATION



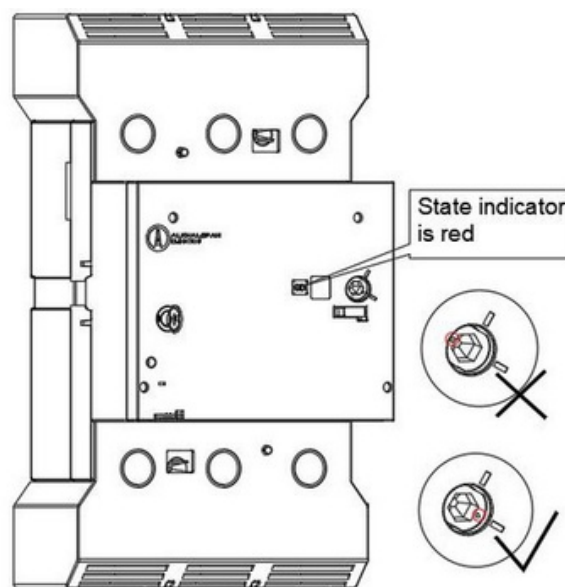
① manual mode



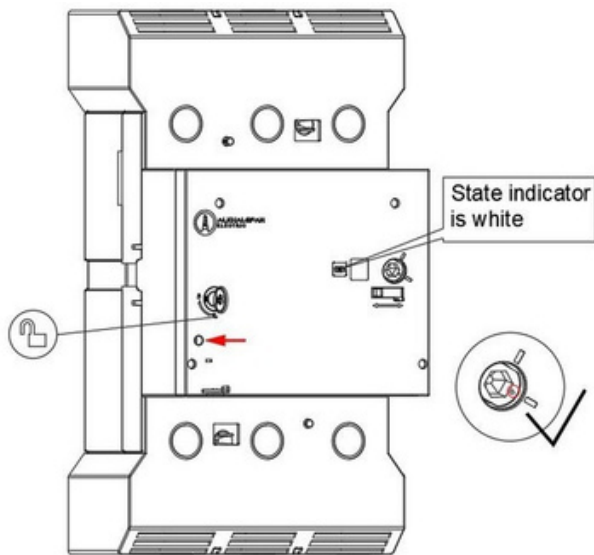
② Insert the handle into the slot



③ Opening state



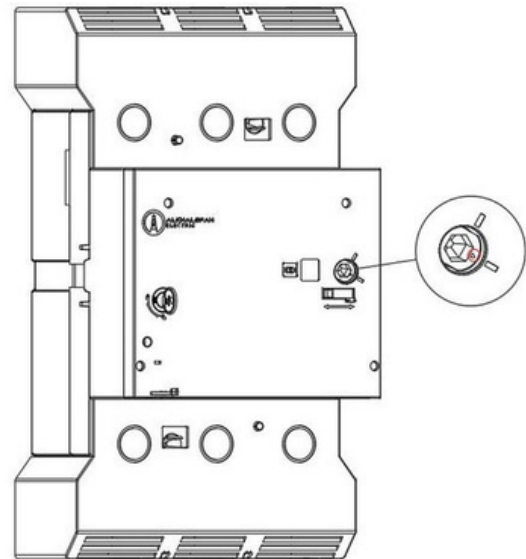
④ Closing state



⑤ Tripping

Note:

The tripping operation can only be performed when the circuit breaker is in the unlocked position.



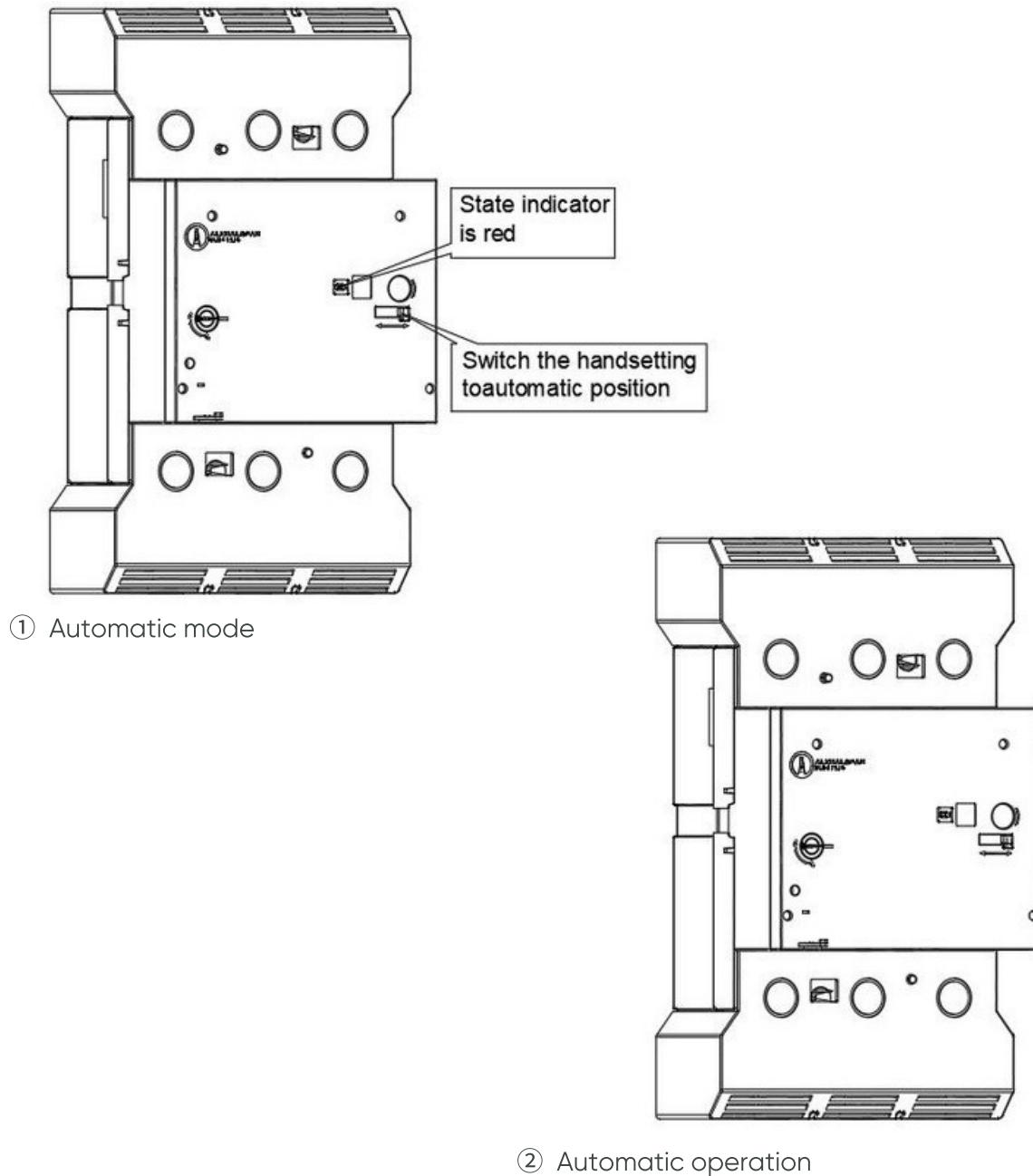
⑥ Manual operation

Note:

do not operate the handle to counter clockwise direction.



AUTOMATIC TEST AND OPERATION



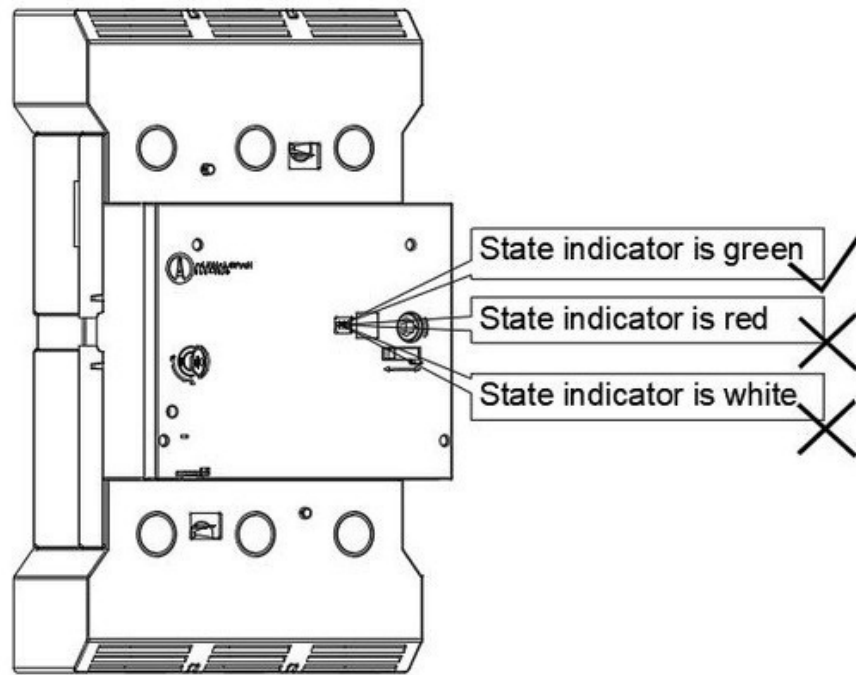
- Automatic opening for arrearage
- release closing order after payment
- ECB can realize automatic closing

(Note: When the ECB is first installed, switch the blinds to the manual position; after inspection and maintenance, manually operate to the closed state: switch the blinds to the automatic position, and test the opening and closing functions of the product).

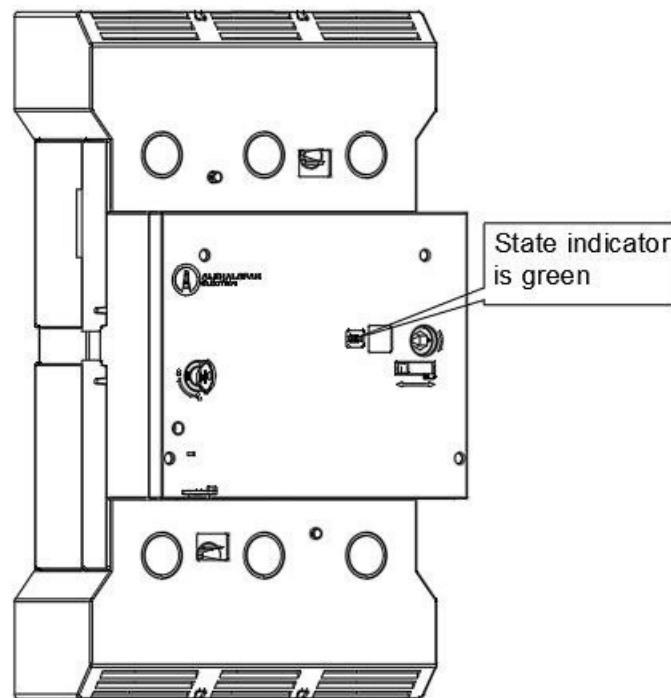


FOR MAINTENANCE

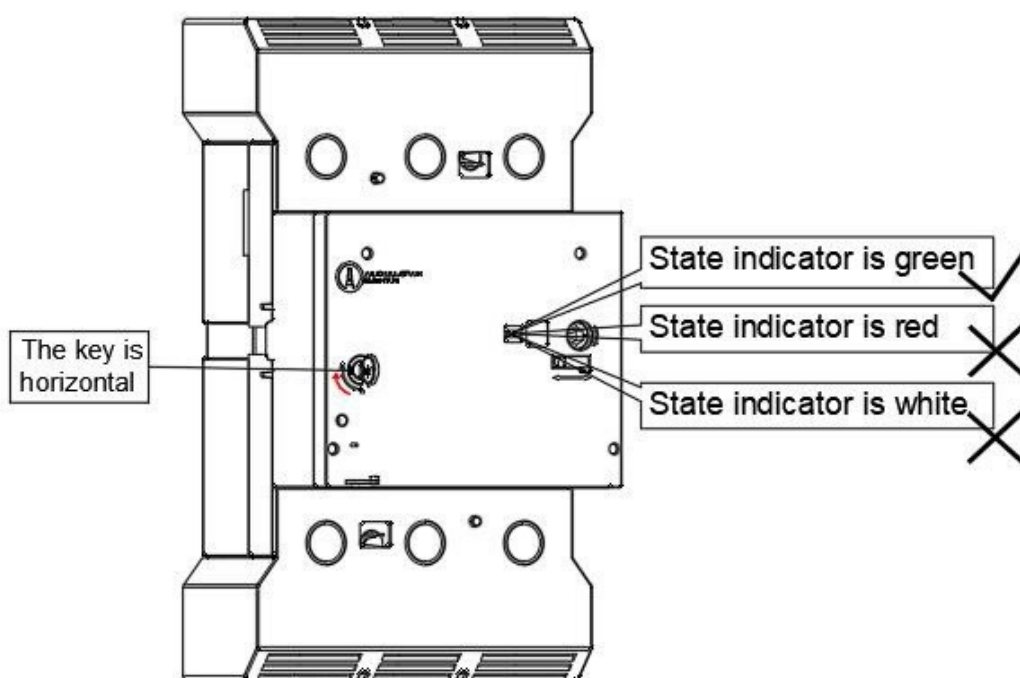
- MAINTAINANCE



① Select manual mode

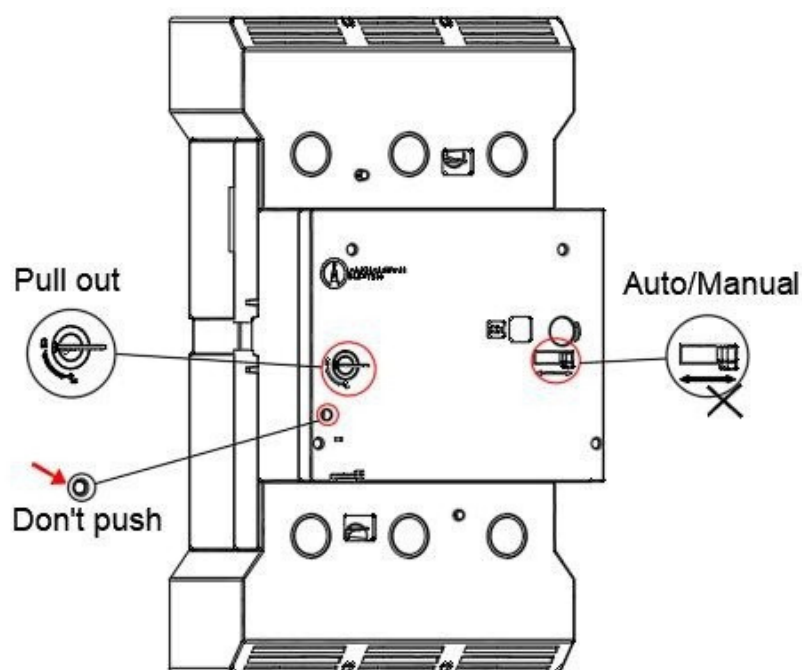


② Ensure ECB OFF manually



③ Lock ECB by key

(Note : The product can't be locked by the key under closing and free trip state.)

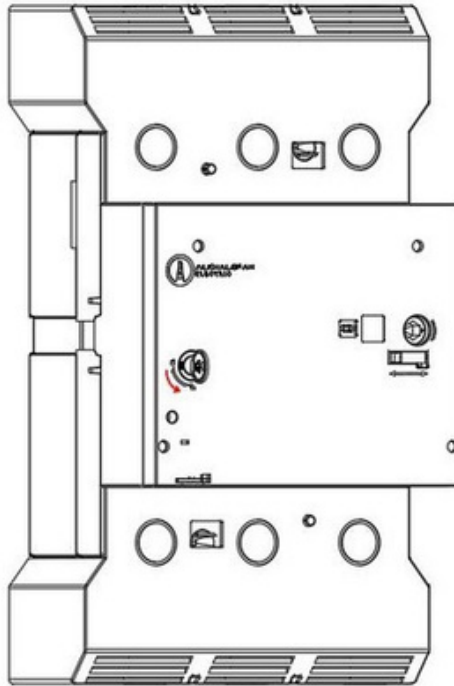


④ Ensure Auto mode before locking

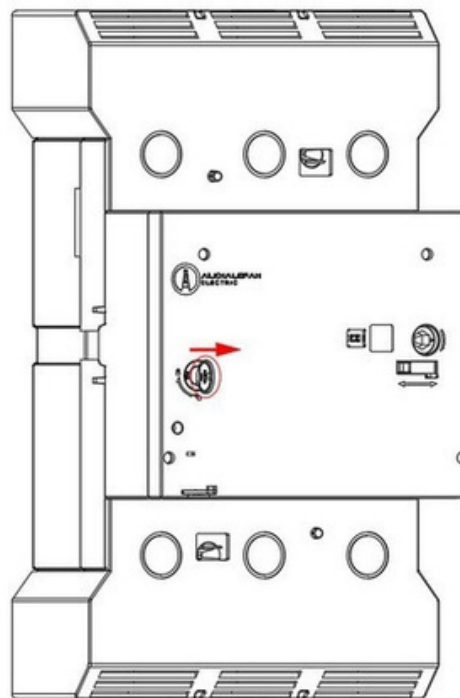
Note : When the product is in the locked state ,manual or remote opening or closing is not lowed , and free trip button won' t work.



- UNLOCKING AND RESUME NORMAL OPERATION



① Unlock by key

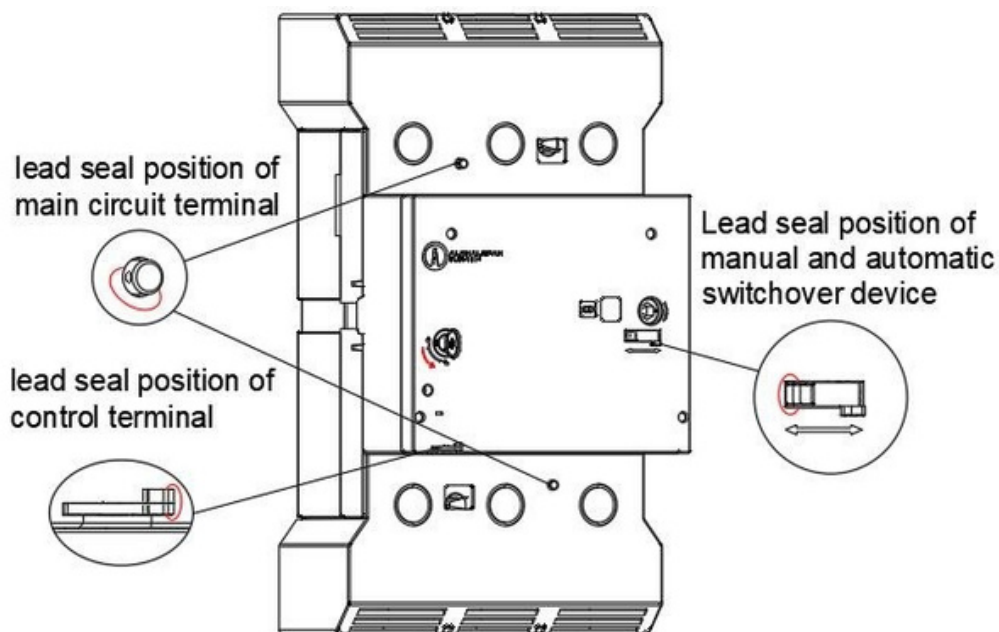


② Unlock and Resume normal Operation



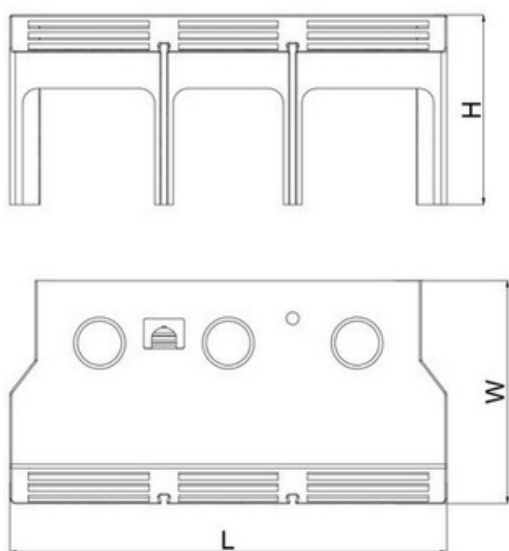
LEAD SEALING

• INSTRUCTION FOR LEAD SEAL INSTALLATION



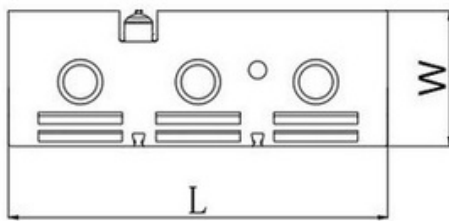
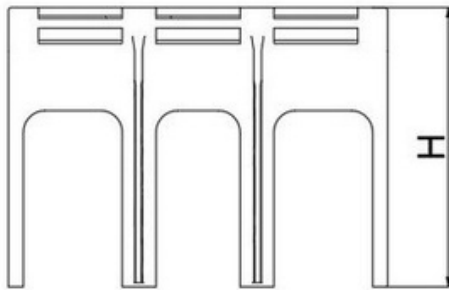
Note :Sealing can be done with ordinary sealing pliers.

• REMOVAL OF TERMINAL COVER



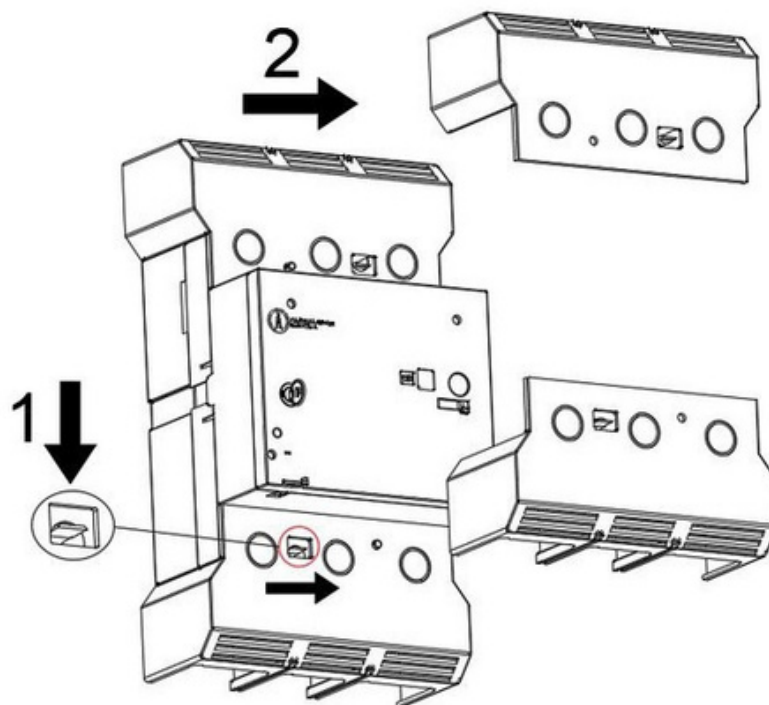
Short wide style

ECB-	Overall Dimension		
	L	W	H
400	168	110	103
630	168	110	103
800	237.6	121	103
1250	237.6	121	103



Narrow long style

ECB-	Overall Dimension		
	L	W	H
160	105	46.8	67.5
250	105	46.8	67.5
400	140	50	103
600	140	50	103



Demolition steps:

1. Gently lever the fastener to loosen it.
2. Remove the terminal cover from breaker.



PURPOSE

With a rated insulation voltage of 1,000V, KFIWI Series Intelligent Four-Remote Circuit Breaker is applicable to power distribution networks with AC 50/60Hz, rated voltage of 400V and below, and rated current up to 1,250A. Under normal conditions, the circuit breaker can be used for the infrequent conversion of circuits and the infrequent starting of motors. It also can protect the circuit against overload and short circuit, specifically protection for overvoltage, undervoltage and phase loss of the circuit. Moreover, it can measure the information of the circuit, including current, voltage, frequency, active power, reactive power, apparent power, power factor, electrical energy and harmonics. It has four remote functions, including telemetry, remote signaling, remote control and remote adjustment, which are enabled by the upper computer software. The circuit breaker is small in size, easy to install, stable in operation, and intuitive in turn on/ off and re-tripping display. It can be manually operated, with comprehensive performance reaching the advanced level of similar products in the world.

The product conforms to the following standards:

GB/T 14048.2-2020: Low-voltage Switchgear and Controlgear - Part 2: Circuit Breakers;

GB/T 22710-2008: Electronic Controller for Low-Voltage Circuit Breaker;

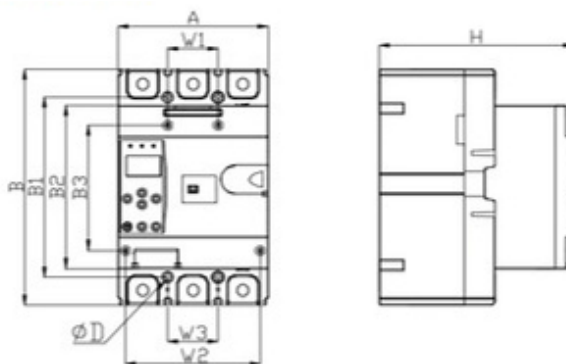
DL/T 645-2007: Multi-function Watt-hour Meter Communication Protocol;



PRODUCT MODELS AND PARAMETERS

Intelligent four-remote circuit breaker		250MP3		400MP3		630MP3		800MP3		1250MP3	
Shell frame current In		50A-125A 100A-250A		160A-400A		250A-630A		630A(250-630A) 800A(320-800A)		1,000A (400-1,000A) 1,250A (500-1,000A)	
Short-circuit breaking capacity code		M	H	M	H	M	H	M	H	M	H
Number of poles		3P, 4P									
Rated operating voltage Ue(V),AC		AC400V									
Rated insulation voltage Ui (V)		1000V									
Rated impulse withstand voltage Uimp (kV)		8kV									
Rated operating short-circuit breaking capacity Ics (kA)	AC400V	35kA	65kA	50kA	70kA	50kA	70kA	50kA	65kA	50kA	65kA
Rated Ultimate short-circuit breaking capacity Icu (kA)	AC400V	50kA	65kA	50kA	70kA	50kA	70kA	50kA	85kA	50kA	85kA
Rated short time withstand current Icw (kA)		10kA/1 s						20kA/1 s			
Optional categories		Class B									
Type of overcurrent trip unit		Electronic									

OVERALL AND INSTALLATION DIMENSIONS



Model	250MP3	400MP3	630MP3	800MP3	1000MP3
Dimension	Grade 3				
H	136	160		172	
A	105	140		210	
B	165	257		275.5	
B1	126	194		243	
B2	114	177		174	
B3	87.5	123.5		124	
W1	35	87		151	
W2	94.5	128.5		199	
W3	35	44		70	
D	4*Ø4.5	4*Ø7		4*Ø8	



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