User manual for

AIR CIRCUIT BREAKERS

BTB ELECTRIC

ACB
Air Circuit Breakers

Contents

- Rated insulation voltage: 50Hz, AC1000V
- Rated voltage: 50Hz, AC415V/690V
- Rated current: 630A-6300A
- Mounting mode: draw-out and fixed
- Connections mode: horizontal
- Operation mode: motor and manual
- Tripper type: intelligent release, under-voltage release and shunt release
- Level of contamination: III
- Standard: IEC/EN 60947-2

1. Application

The MA3 series air circuit breaker (ACB), referred to as ACB hereafter, is designed for distribution systems to distribute power and protect circuits and power supply devices against faults such as overloads, under-voltage, short circuits, and single-phase grounding damage. The ACB offers multiple protective functions and high selection protection, enhancing the reliability of power supply.

2. Type

1	2	3	4	5	6	7	8	9	10	11
MA3	16	B	3	M	FH	E	M2	C2	T2	U0

1. Series	
MA3	Air Circuit Breakers / Design number

2. Rated current	
06	630A
08	800A
10	1000A
12	1250A
16	1600A
20	2000A
25	2500A
32	3200A
40	4000A
50	5000A
63	6300A

3. Frame size	
B	2000A (630 ~ 2000A)
D	4000A (2500 ~ 4000A)
E	6300A (4000 ~ 6300A)

4. Pole	
3	3 Pole
4	4 Pole

5. Intelligent trip unit	
M	Relay M type
H	Relay H type
3M	Relay 3M type
3H	Relay 3H type

6. Terminal connection	
Fixed type	
FH	Horizontal type
FV	Vertical type
FM	Mixed type (Horizontal Vertcal)
Draw-out type	
DH	Horizontal type
DV	Vertical type
DM	Mixed type (Horizontal Vertcal)

7. Breaking Capacity	
D	Ics ≠ Icu
E	Ics = Icu

8. Motor-driven charging device	
M0	Manual type
M1	110 VAC
M2	220 VAC
M3	400 VAC
M6	110 VDC
M7	220 VDC

9. Closing electromagnet	
C0	Manual type
C1	110 VAC
C2	220 VAC
C3	400 VAC
C6	110 VDC
C7	220 VDC

10. Shunt release	
T0	Manual type
T1	110 VAC
T2	220 VAC
T3	400 VAC
T6	110 VDC
T7	220 VDC

11. Under-voltage release	
U0	Without
U1	110 VAC
U2	220 VAC
U3	400 VAC
U6	110 VDC
U7	220 VDC

3. Main technical parameter

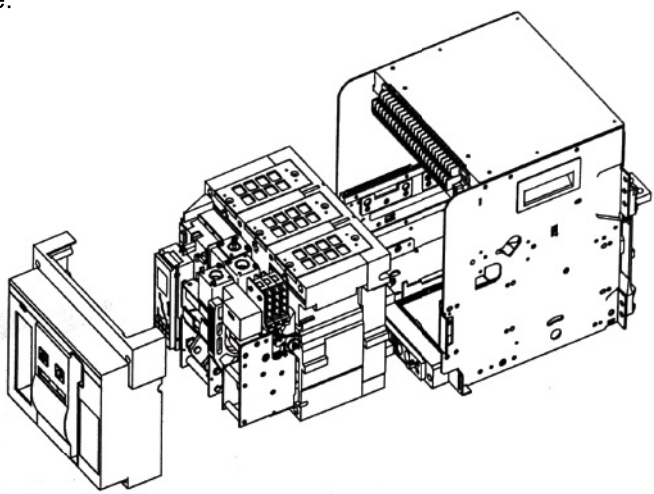
Frame			2000	4000		6300
Rated current, In (A)			630, 800 1000,1250 1600,2000	2500 3200	4000	4000 5000 6300*
Rated Operational Voltage, Ue			AC 415V/690V			
Rated Insulation Voltage, Ui			1000V			
Rated Impulse Withstand Voltage, Uimp			12kV			
Rated Frequency (Hz)			50/60Hz			
No. of Poles			3, 4 (with 6300A only 3P*)			
Rated Current of N-pole			100%In (50% for Frame 6300A)			
Ultimate breaking capacity (kA)	Icu	415V	80 (65)*	100		135
		690V	65	85		100
Rated service breaking capacity (kA)	Ics	415V	65	100		135
		690V	65	85		100
Breaking time (ms)			≤ 35			
Closing time (ms)			≤ 75			
Operating performance	Electrical		8000	6000		1500
	Mechanical		15000	10000		2500
Weight (kg)	Fixed	3P	43	54	62	105
		4P	54	67	81	131
	Draw-Out	3P	79	90	126	212
		4P	91	119	157	231
Dimensions (mm) W×H×D	Fixed	3P	362×323×401	426×325×401	426×367×401	807×396×401
		4P	457×323×401	537×325×401	537×367×401	922×396×401*
	Draw-Out	3P	375×419×432	435×419×432	435×489×432	813×492×432
		4P	470×419×432	550×419×432	550×489×432	928×492×432*

“*” Breaking Capacity according to code E

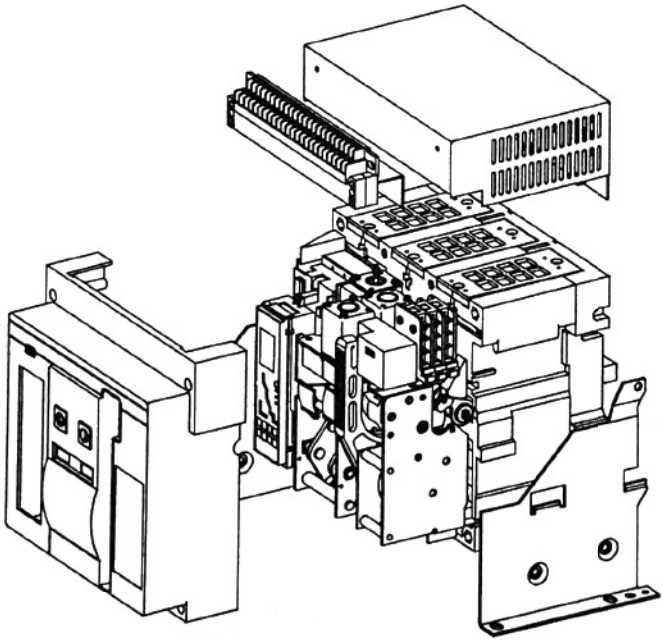
4. Structure of ACB

ACB: draw-out and fixed type.

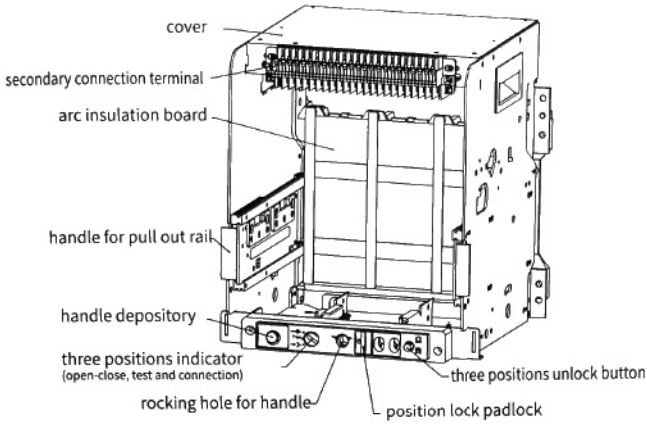
The draw-out type is mounted on the base, while the fixed type is mounted in the frame.



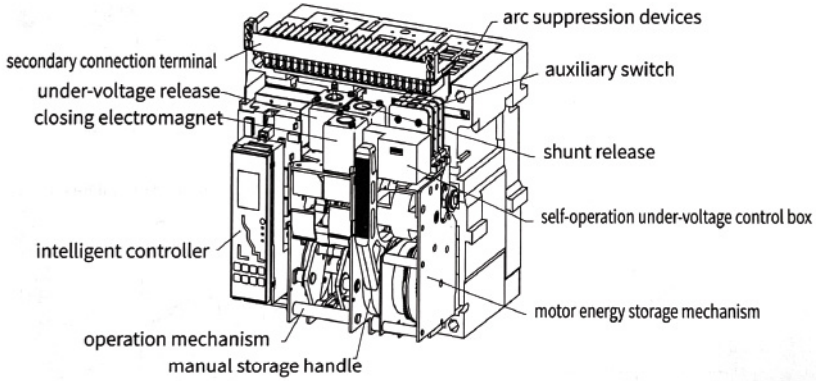
Draw-out



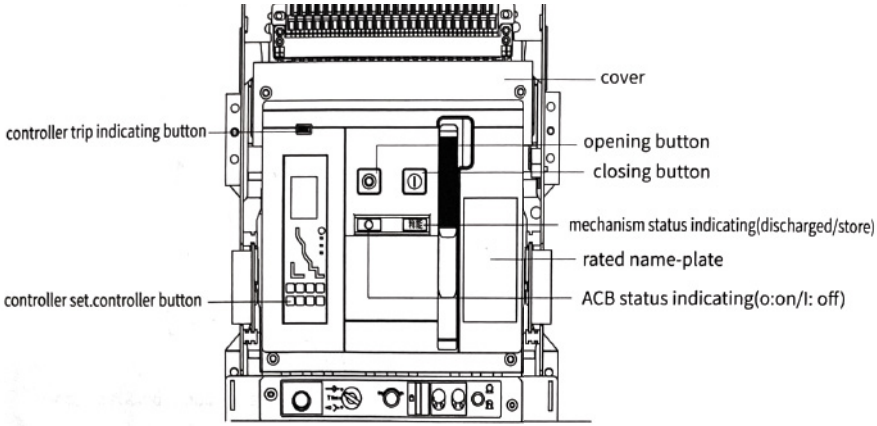
Fixed



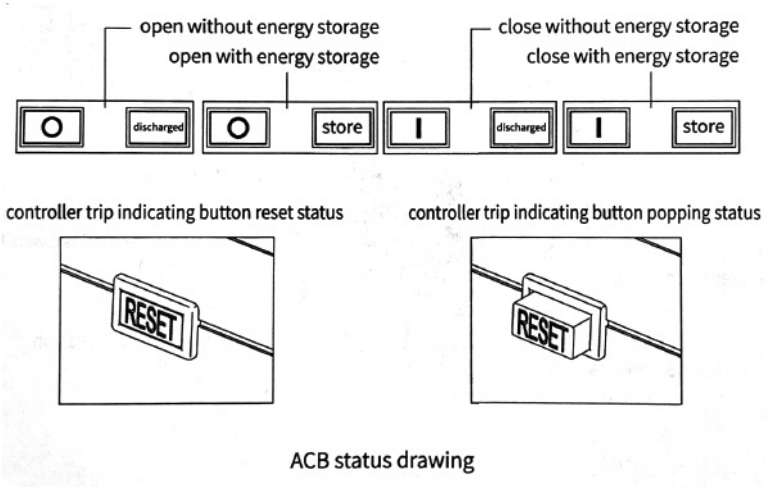
Structure of ACB



ACB body



ACB front



ACB status drawing

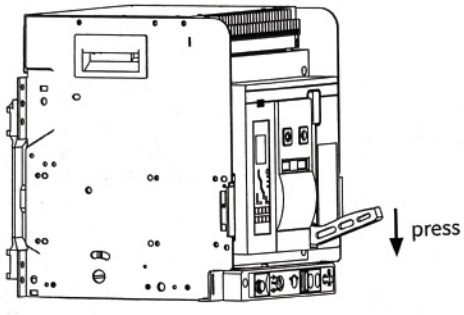
5. Use of ACB

ACB energy storage

The ACB employs energy storage for the operation mechanism spring before closing. There are two methods: manual energy storage and motor energy storage.

- Manual energy storage

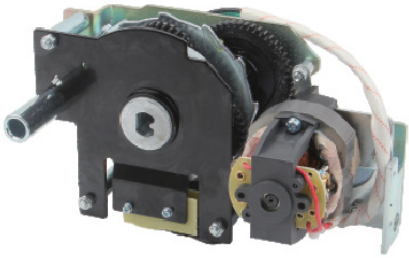
Repeatedly press the handle 6-7 times until a “click” is heard. At that point, the mechanism transitions from release to storing energy, indicating the completion of energy storage.



- Motor-driven charging device

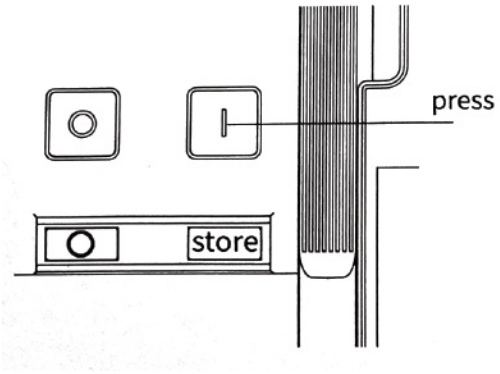
If the motor energy storage mechanism is installed, the ACB automatically stores energy again after each closing.

Operational power supply range of the motor energy storage mechanism: (85%~110%) of Us. (Us: rated control voltage)



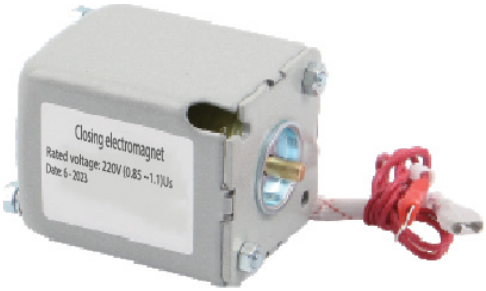
ACB closing

- ON button (I): Press the ON button (I), the mechanism status changes from “store” to “discharged”, and the status indicator changes from “O” to “I”, then close.

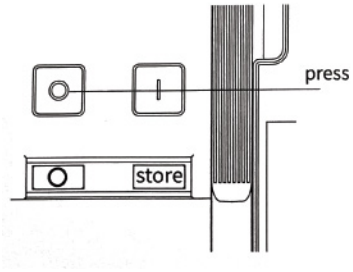


- Closing Electromagnet: For ACBs equipped with a closing electromagnet, pressing the electric closing button can close the ACB.

Operational power supply range of the closing electromagnet: (85%~110%) Us



ACB open



- OFF Button:

Press the OFF button (O), the status indicator changes from “I” to “O”, then open.

- Shunt Release:

For ACBs equipped with a shunt trip release, pressing the electric opening button can open the ACB. Operable power supply range for shunt trip release: (70%~110%) Us.

- Under-voltage Release:

◊ ACB open is managed remotely if under-voltage release is installed.

◊ <35%Ue: ACB cannot be closed.

◊ 35%~70%Ue: ACB opens.

◊ 85%~110%Ue: ACB closes reliably.

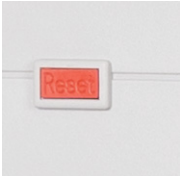
◊ Ue: rated service voltage.

- Intelligent Release Trip

ACB trip signal:

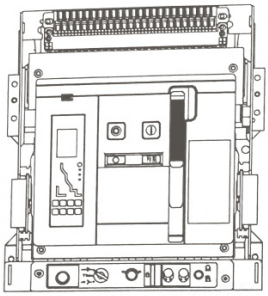
Trip indicating button pops up on the ACB interface.

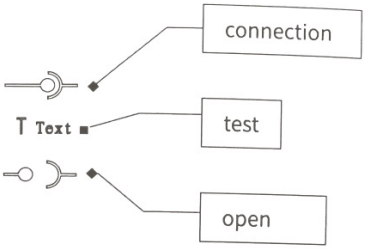
Controller indicates “fault to trip” through contacts (3,4,5 for terminal code).



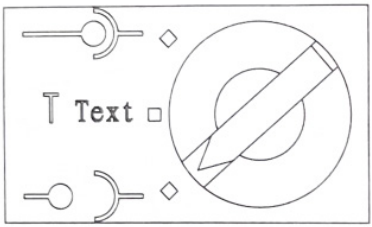
Identify ACB position

The draw-out base for frame position typically includes three position indicators.



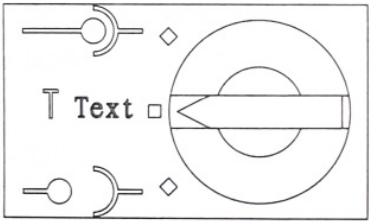


"open" position



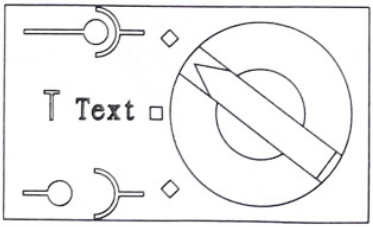
- main circuits open
- arc insulation board close
- secondary circuits open

"test" position



- main circuits open
- arc insulation board close
- secondary circuits open

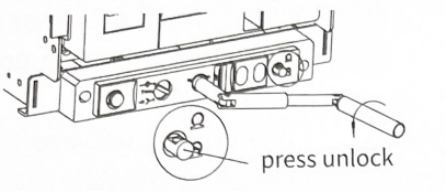
"connection" position



- main circuits open
- arc insulation board close
- secondary circuits open

Draw-out body

ACB body from “connection” to “open” position, then draw out rail and take out ACB body by hands.

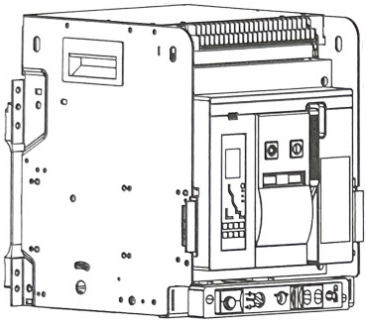


Steps:

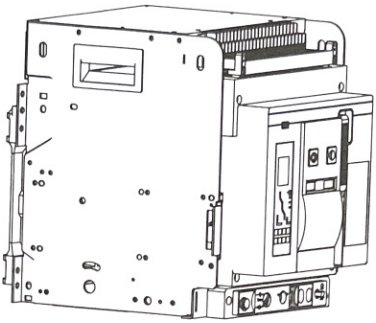
①Handle insert into rocking hole

②Press three positions unlock button

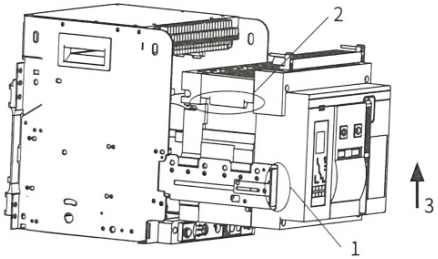
③Counterclockwise turn handle



“connection” position



“open” position

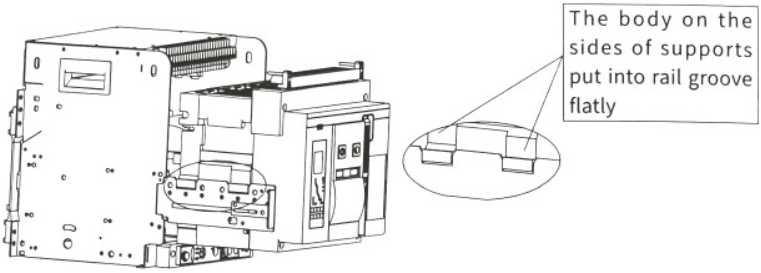


Pull out the body:

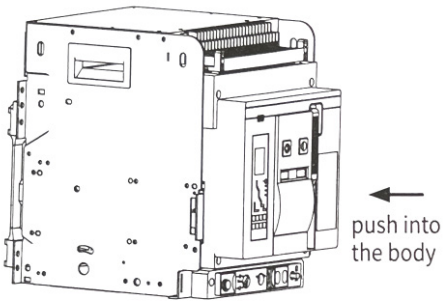
1. Hold rail handle ① and pull out the body by hands
2. Hold the body②by hands
3. Lift the body③by hands

Insert into ACB body

ACB body put into rail for ensure body on the sides of support in the rail groove.



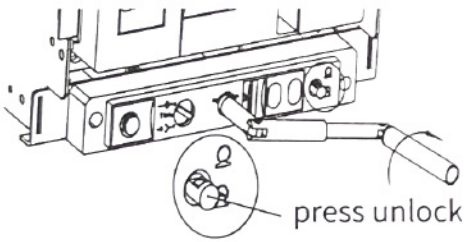
Securely hold the ACB cover with your hands, then push the body into the base until it stops moving.



Remarks:

1. Ensure that all three positions are in the “OFF” state before pushing the body.

2. Ensure that the entire body is inside the base; otherwise, it will not function properly.



Press the unlock button, then turn the handle clockwise until the three-position indicator reaches the “connections” position. Once the indicator reaches this position, the unlock button will pop out, indicating that the ACB is in the “connections” position.

Store

Store the ACB in a dust-free and dry environment with temperatures ranging from -25°C to +55°C and a relative humidity of less than 95%. Ensure that the ACB is in the OFF state and discharged before sealing it. Avoid storing it in high humidity or salt spray environments to prevent corrosion of metals and conductive parts.

Open the carton

Carefully read the parameter nameplate, which includes information such as the rated voltage for the intelligent controller, under-voltage release, shunt release, closing electromagnet, and motor energy storage.

Turn the switch to the “test” position, connect the power supply to the secondary circuits, and test each control accessory to ensure they are functioning properly.

After confirming that everything is working correctly, turn the switch back to the “connections” position.

Maintenance

Ensure that the insulation function of the ACB is maintained well and cleaned regularly. Test the regular contacts system, including arc suppression devices, contact connections, and connecting pieces, to ensure proper functioning. Regular maintenance and testing help maintain the reliability and safety of the ACB.

Secondary circuits connections

Secure the connections of the secondary circuits using tight screws. Tighten the screws using a cross screwdriver and ensure that the conductors are properly compacted. This helps maintain the integrity and reliability of the secondary circuits.

Requirement of primary circuits connections

Tightening torque for busbar connection bolt: **M10 ≥ 45Nm, M12: > 70Nm**

Connect the busbars with adequate support to prevent any power bearing on the main busbar circuits of the ACB. Additionally, ensure that the ACB is grounded for reliability protection, and place it in a location marked for grounding purposes.

Common tackle the fault solutions

Fault	Probable causes	Solutions
Cannot be closed	Under-voltage release not engaging	Ensure under-voltage release engages properly by checking if voltage exceeds 85% Ue
	Fault button not resetting	Test circuits after a fault to trip. Press the fault reset button after resolving the fault
	Draw-out ACB not fully turning to “connection” position	Ensure the draw-out ACB fully turns to the “connection” position
	Operation mechanism not storing energy	Ensure the operation mechanism stores energy and indicates “store”
	Interlock engaged	Release any locks on the ACB
	Open button locked by obstruction	Test if the open button is locked and unlock if necessary
Cannot be open	Low control voltage for shunt release	Test circuits and voltage for the shunt release
	Open button (O) locked by obstruction	Test the button functionality and clear any obstructions after removing the cover
Cannot be stored	Energy storage handle obstructed	Test and clear any obstructions obstructing the energy storage handle
	Low voltage for motor energy storage mechanism	Test circuits to ensure the voltage exceeds 85% Us for the motor energy storage mechanism
Cannot pulled out from “Open” position	ACB locked by obstruction	Remove any obstructions causing the lock on the ACB
	ACB not fully turned to “Open” position	Ensure the ACB is fully turned to the “Open” position
Handle cannot inserted into the rocking hole	Pull-out position locked with padlock	Reset the padlock on the pull-out position if necessary
Cannot turn the handle	Three positions of ACB body locked	Press the unlock button to release any locks on the ACB body

Cannot press the unlock	Body is in “connections” or “test” position	Gently sway the handle and press the button to unlock if it’s stuck
Trip	Fault in main circuits	Test circuits according to the controller menu after a fault
	Under-voltage release activated	Test circuits to ensure main circuits voltage exceeds 85% Ue for the under-voltage release

6. Mounting ambinent

Ambient temperature:

-5°C to +40°C (the average value within 24 hours should not exceed +35°C, except in special situations)

Altitude:

Below 2,000 m above sea level.

Air conditions:

Maximum temperature: +40°C (relative humidity should be below 85%)

Maximum temperature: +20°C (relative humidity should be below 90%)

Mounting conditions:

Perpendicularity and angularity should be ≤5°.

The air circuit breaker should be installed in environments that are non-explosive, non-conductive dust, non-corrosive to metals, and without conditions that would damage insulation.

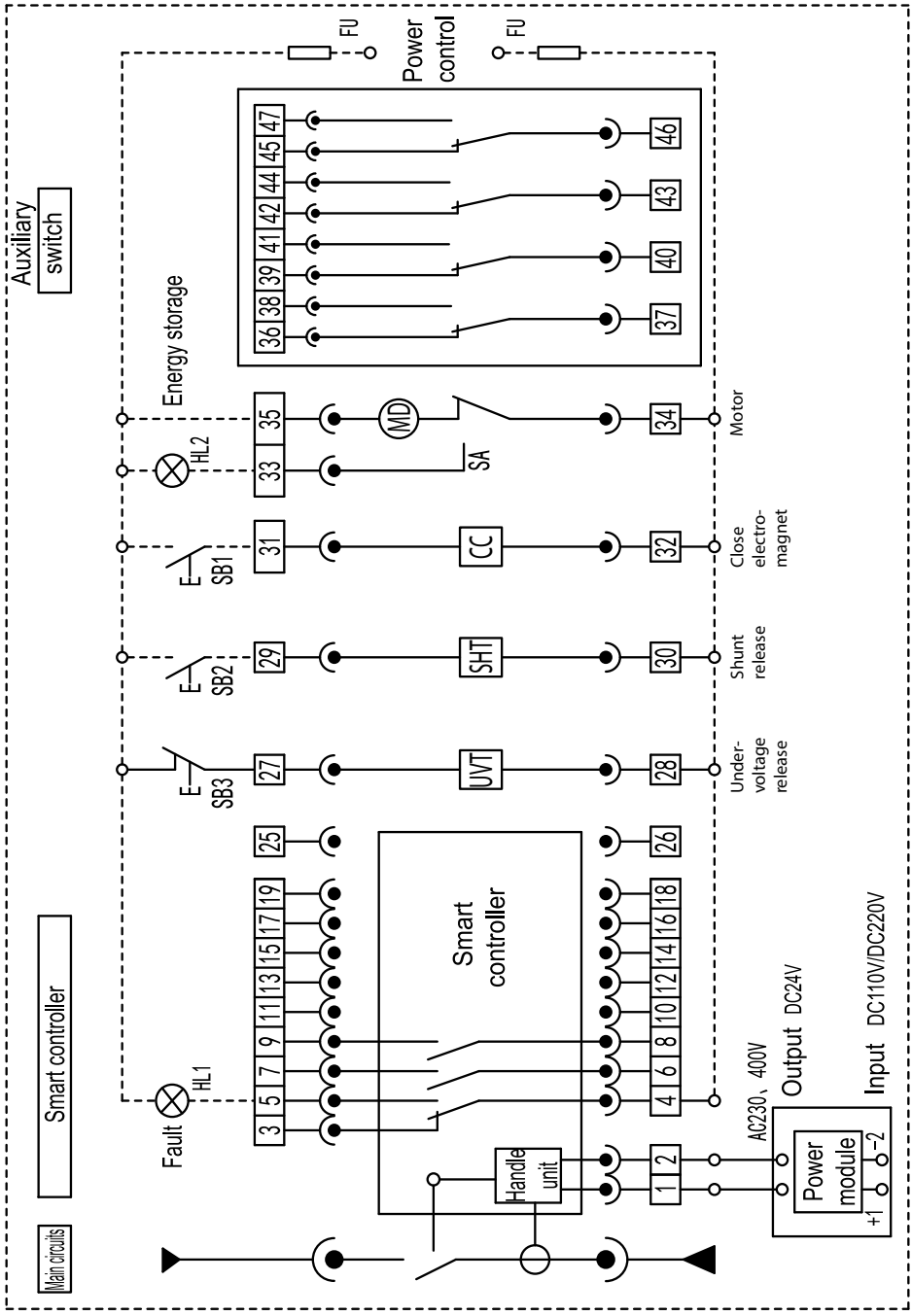
Note:

Without the intelligent controller, the breaker functions as a switch-disconnector.

The total harmonic distortion (THD) rate should be managed below 5% in the distribution system phase. Failure to comply may cause heating in the product.

7. Electrical diagram

M type connections



1,2: Auxiliary power supply incoming for smart controller. auxiliary power supply is DC, which add the power module

3,4,5: Signal contacts for release fault to trip indicating, 4 for common terminal

6,7 & 8,9: Two sets of auxiliary open contacts for circuit breakers (for selection)

10,11: /

12,13: Group 1 controller signal outgoing (for selection)

14,15: Group 2 controller signal outgoing (for selection)

16,17: Group 3 controller signal outgoing (for selection)

18,19: Group 4 controller signal outgoing (for selection)

20: Controller grounding

21,22,23,24: N, A, B, C phase voltage signal incoming (for selection)

25, 26: External connection N pole or incoming of earth current transformer

27,28: Under-voltage release

29,30: Shunt release

31,32: Closing electromagnet

33,34,35: Motor operation mechanism, 34 for common terminal

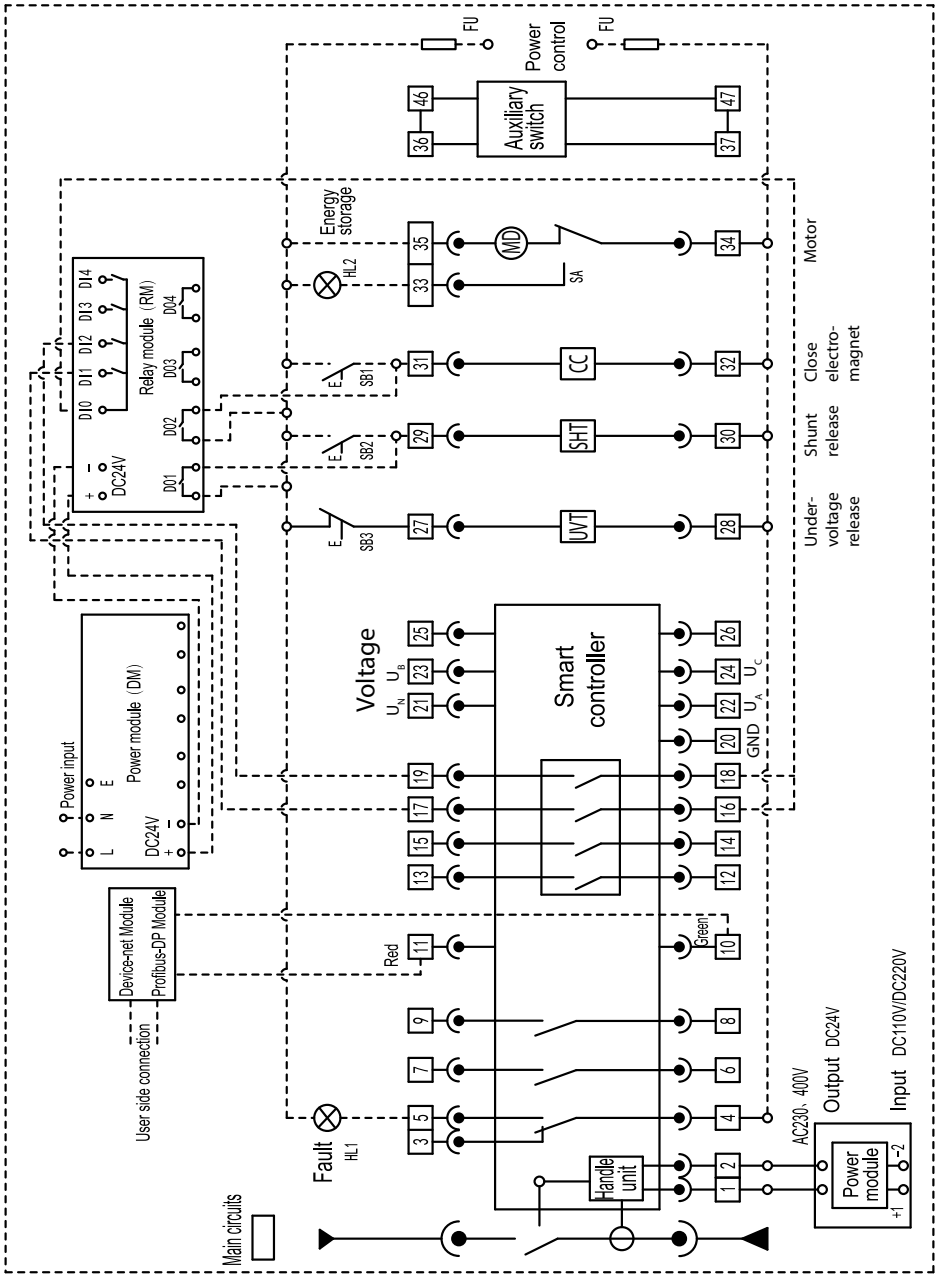
UVT, SHT, CC, MD: Under-voltage release, shunt release, closing electromagnet, motor operation mechanism

HL1,HL2: Fault to trip indicating, motor energy storage fulfill indicating (provide by the user)

SB1,SB2,SB3: Close, open, under-voltage button (provide by the user/under-voltage shall be short connection)

SA,FU: Motor travel switch (with motor), fuse (provide by the user)

H type connections



1,2: Auxiliary power supply incoming for smart controller. auxiliary power supply is DC, which add the power module

3,4,5: Signal contacts for release fault to trip indicating, 4 for common terminal

6,7 & 8,9: Two sets of auxiliary open contacts for circuit breakers

10,11: Communication interface

12,13: Load monitor 1 (default)

14,15: Load monitor 2 (default)

16,17: Opening signal output

18,19: Closing signal output

20: Controller grounding

21,22,23,24: N, A, B, C phase voltage signal incoming

25,26: External connection N pole or earth current transformer incoming

27,28: Under-voltage release or no-voltage release

29,30: Shunt release

31,32: Close electromagnet

33,34,35: Motor operation mechanism (34 for common terminal)

36 – 47: Auxiliary switch

UVT, SHT: Under-voltage release and shunt release

CC, MD: Close electromagnet and operation mechanism

HL1,HL2: Fault to trip indicating and motor energy storage finish indicating (provide by the user)

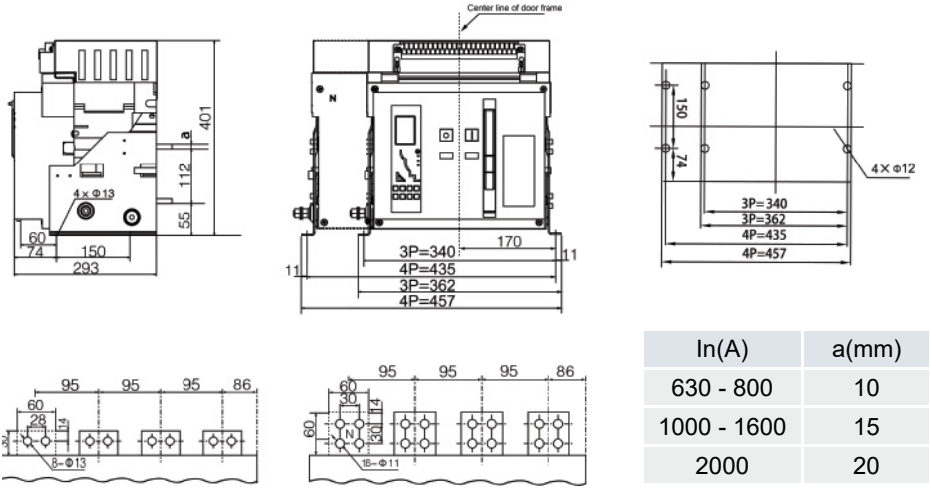
SB1,SB2,SB3: Opening, closing and under-voltage button (provide by the user)

SA: Motor travel switch with the motor

FU: Fuse (provide by the user)

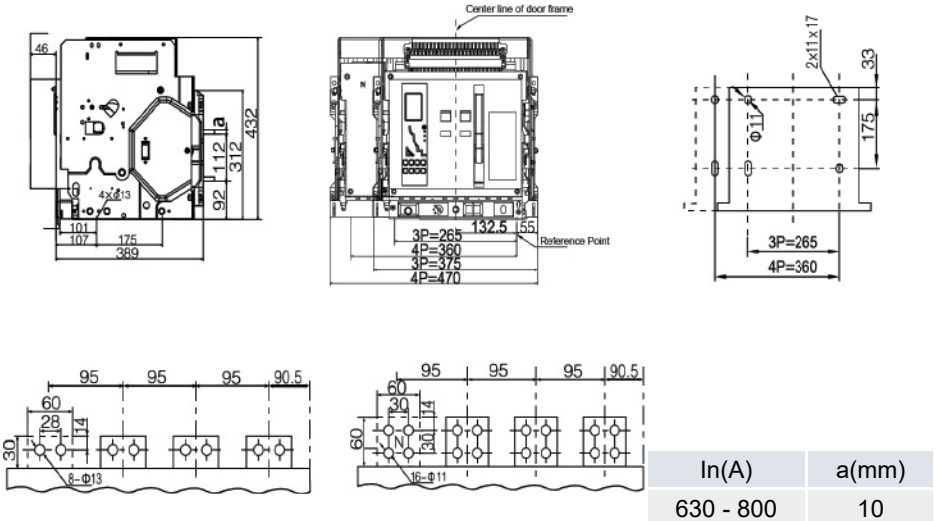
8. Overall & mounting dimensions

ACB Fixed type - Frame 2000A 3P/4P (630A ~ 2000A)



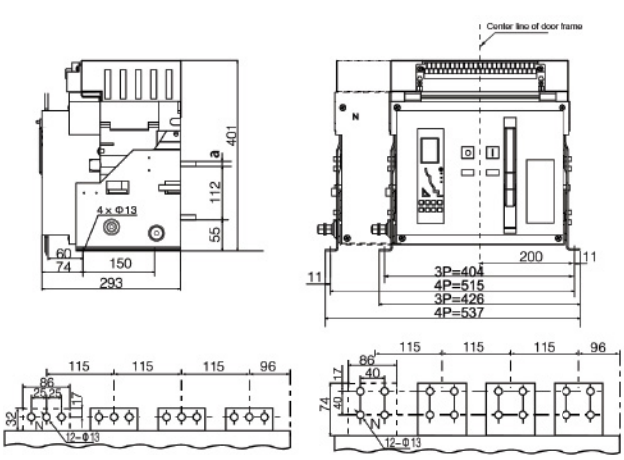
In(A)	a(mm)
630 - 800	10
1000 - 1600	15
2000	20

ACB Drawout type - Frame 2000A 3P/4P (630A ~ 2000A)



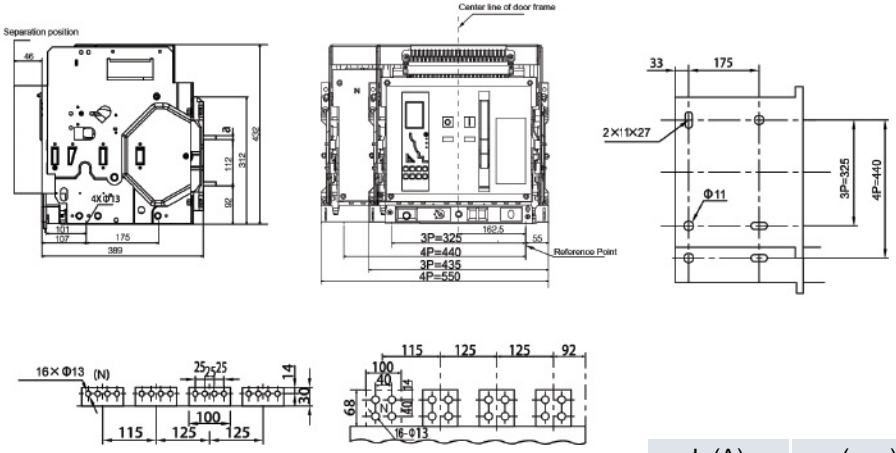
In(A)	a(mm)
630 - 800	10
1000 - 1600	15
2000	20

ACB Fixed type - Frame 4000A 3P/4P (2500A, 3200A)



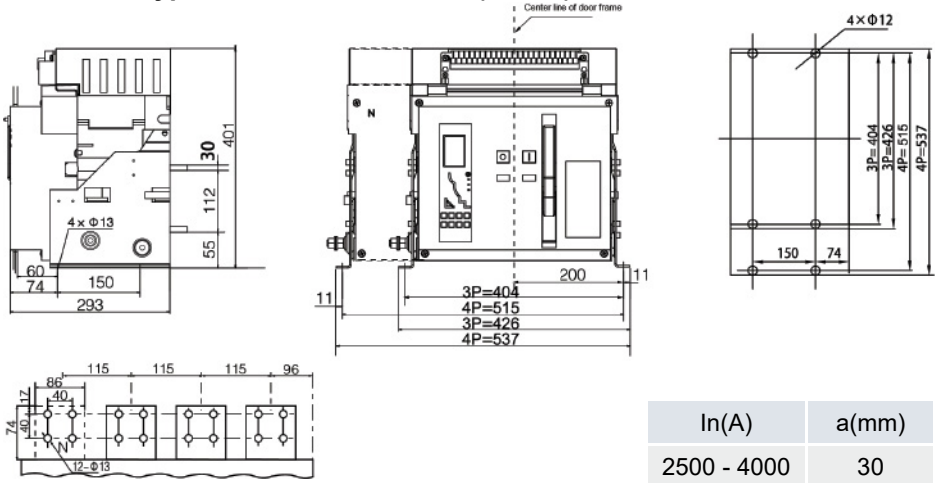
In(A)	a(mm)
2000, 2500	20
3200	30

ACB Drawout type - Frame 4000A 3P/4P (2500A, 3200A)



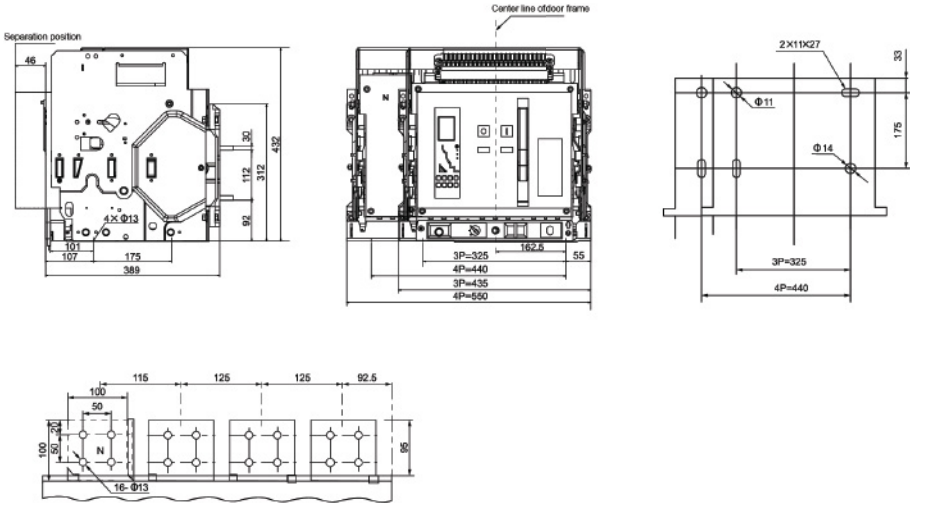
In(A)	a(mm)
2000, 2500	20
3200	30

ACB Fixed type - Frame 4000A 3P/4P (4000A)



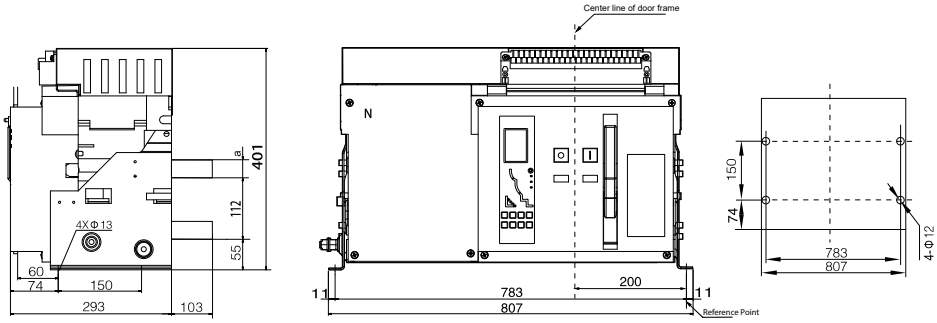
In(A)	a(mm)
2500 - 4000	30

ACB Drawout type - Frame 4000A 3P/4P (4000A)

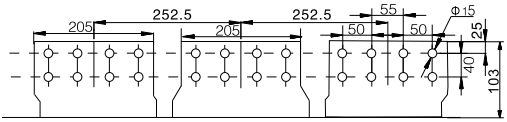


In(A)	a(mm)
2000, 2500	20
3200, 4000	30

ACB Fixed type - Frame 6300A (4000A, 5000A/3P)

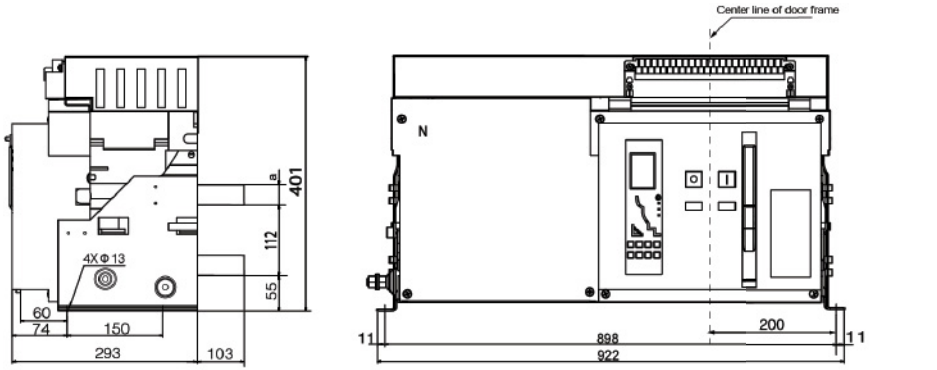


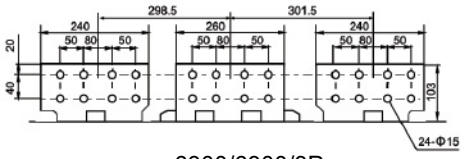
6300/4000A, 5000A/3P



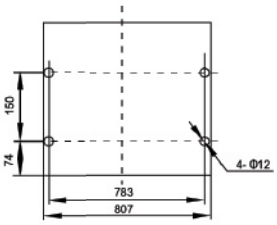
In(A)	a(mm)
4000	20
5000	30

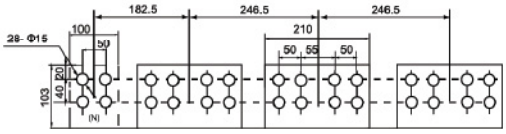
ACB Fixed type - Frame 6300A (4000A, 5000A/4P, 6300A/3P)





6300/6300/3P

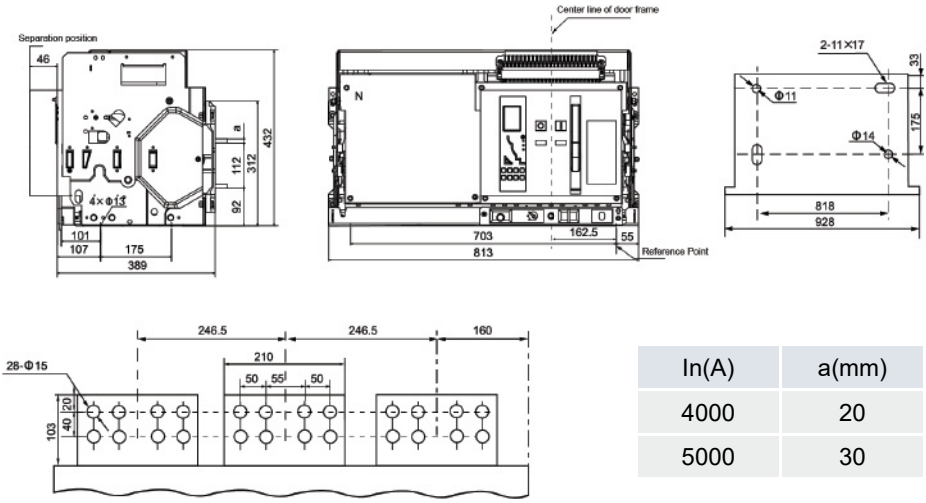




6300/4000A, 5000A/4P

In(A)	a(mm)
4000	20
5000, 6300	30

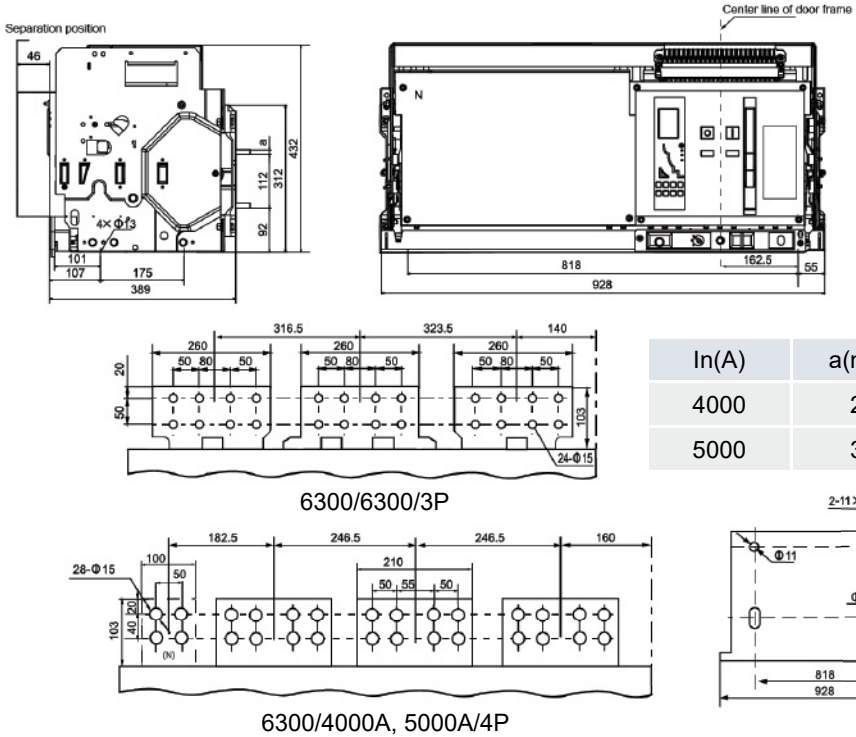
ACB Drawout type - Frame 6300A 3P (4000A, 5000A/3P)



In(A)	a(mm)
4000	20
5000	30

6300/4000, 5000/3P

ACB Drawout type - Frame 6300A 3P (4000A, 5000A/4P, 6300A/3P)



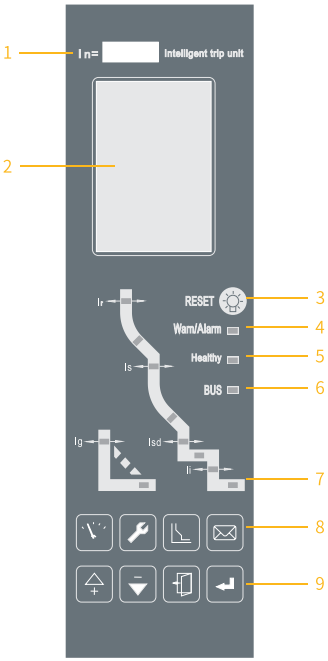
In(A)	a(mm)
4000	20
5000	30

6300/6300/3P

6300/4000A, 5000A/4P

9. Intelligent trip unit

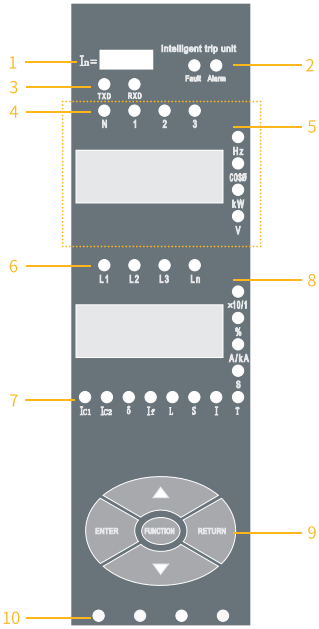
Explanation of 3M/3H type



1. Fault to trip & reset
2. Rated current for name-plate
3. CD indicating interface
4. Fault/alarm resetting button
5. Fault/alarm LED indicating (LED without light while normal working.LED with continuous blinking quickly while fault to trip. LED with light fixed while alarm)
6. LED always continuous blinking while controller on power and normal working status
7. Communication indicating (Modbus: extinguish without communication. Continuous blinking while communication. Proibus; extinguish without communication. Light fixed while communication - for 3H type)
8. Curve LED (Fault to trip at corresponding LED light flash indicating fault type. LED light fixed indicating present setting items while protective parameter setting).
9. In sequence of testing function, setting function, protection function and information function button. From left to right
10. In sequence of upward, downward, ESC and selection OK button. from left to right

Remarks: Serial no.: 7 is with communication function controller. No indicating if no-communication function

Explanation of M/H type



1. Fault to trip & reset
2. Rated current for name-plate
3. In sequence of fault & alarm indicating
4. In sequence of communication emission & receiver indicating *(for H type)*
5. In sequence of N phase, A phase,B phase, C phase voltage indicating *(for H type)*
6. In sequence of frequency, power factor, power, voltage indicating from upper to bottom *(for H type)*
7. In sequence of A phase, B phase, C phase, N phase current indicating
8. In sequence

   Ic1: load monitor1,

   Ic2: load monitor 2,

   δ: asymmetric current,

   If: grounding protection,

   L: over-load long delay,

   S: short-circuit short delay,

   I: short-circuit instantaneous indicating
9. In sequence of opening & closing time, main contacts abrasion rate, current unit, time, self-diagnostics fault statues indicating from upper to bottom
10. 5 pieces operation buttons
11. In sequence of controller setting, query, testing, store service status indicating
12. Notes:

1. The dashed box is controller with voltage indicating function. Without indicating if no.

2.Serial no.: 4 is with communication function controller. Without indicating if no.

3. A/KA of serial no.: 9, light fixed is current A and continuous blinking in kA

4. kW of serial no.: 6, light fixed is active power and continuous blinking is reactive power

Setting and Protective Characteristics

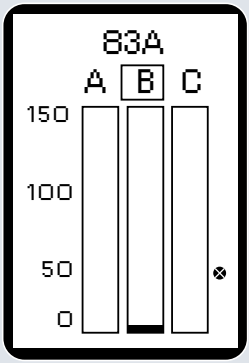
Over-load long delay protection M/H type & 3M/3H type		
Current setting IR	(0.4 ~1.0 or 1.25) In or OFF (OFF-function close) Notes: Distribution protection is 1.0In; Generator protection is 1.25In	
6 categories protective current	SI: Normal inverse time t=0.01396 Tr/ (NO.02-1) VI: Fast inverse time t=Tr/ (N−1) EI (G): Express inverse time (use of general distribution protection) t=3 Tr/ (N^2−1) EI (M): Express inverse time (use of generator protection) t=2.95 Trx In [N^2/ (N^2-1.15)] HV: High voltage fuse compatibility t=15Tr/(N^4–1) I2t: Normal distribution protection **t=2.25Tr/N^2** (factory default) N=I/Ir I-fault current t-long delay acting time Ir-long delay setting current Tr-long delay setting time Remarks: Only normal distribution protection I2t for M/H type controller. Other protective curves shall be ordered. 3M/3H type controller with 6 categories protective curve selection.	
Normal distribution protection I2t time setting Tr **(1.5Ir)**	M/H: 15, 20, 25, 30, 40, 50, 60, 80, 100, 120, 160, 200, 240, 320, 400, 480 (s)	
	3M/3H: 15, 30, 60, 120, 240, 360, 480, 600, 720, 840, 960 (s)	
Protective curre type	3M/3H: C1-C16 over-load long delay protective operating delay time in the drop-down list	
Protective characteristics (Accuracy ±10%)	Current (I/Ir)	Trip time
	1.05	> 2h no-acting
	1.3 (Distribution protection)	< 2h acting
	1.2 (Motor protection)	< 2h acting
	≥1.2Ir	Acting time as per 6 categories protection type formula calculator or current query
Thermal memory time	M/H type: 30ms (ON) or power failure release 3M/3H type: instantaneous, 10ms,20ms,30ms, 45ms, 1hr, 2hrs, 3hrs or power failure release. Remarks: Connect the controller for auxiliary power supply with thermal memory function and auxiliary power supply failure, that is, release thermal memory	

<table>
<tr><th colspan="6">Short-circuit short delay protection M/H type & 3M/3H type</th></tr>
<tr><td colspan="2">Current setting Isd</td><td colspan="4">(1.5~15) Ir or OFF (OFF-functions close)</td></tr>
<tr><td rowspan="2">Time setting Tsd (s)</td><td>Tsd1 inverse time</td><td colspan="4">M/H type: 0.1 ~ 1.0</td></tr>
<tr><td>Tsd2 definite time</td><td colspan="4">3M/3H type: 0.1, 0.2, 0.3, 0.4 (selection: 0.1~1.0)</td></tr>
<tr><td colspan="2" rowspan="4"></td><td>Current (I/Isd)</td><td colspan="2">Trip time</td></tr>
<tr><td>≤0.9</td><td colspan="2">No-acting</td></tr>
<tr><td rowspan="2">≥1.1</td><td>Inverse time
Isd<I<8Ir</td><td>Currents 1-5 and over-load long delay simultaneously, but curve speed faster 10 times. current 6 characteristics formula t=64Tsd/N²</td></tr>
<tr><td>Definite time
I> 8Ir (or I>Isd)</td><td>Delay protection as per definite time delay setting time Tsd</td></tr>
<tr><td colspan="2">Thermal memory time</td><td colspan="4">M/H type: 15min (ON) or power failure release
3M/3H type: instantaneous, 10ms, 20ms, 30ms, 45ms, 1hr, 2hrs, 3hrs or power failure release
Remarks: connecting controller for auxiliary power supply with thermal memory function and auxiliary power supply failure, that is, release thermal memory</td></tr>
<tr><th colspan="6">Short-circuit instantaneous protection M/H type & 3M/3H type</th></tr>
<tr><td colspan="2">Current setting Ii</td><td colspan="4">M/H type: 1.0In ~ 50kA or OFF (OFF-function close)
3M/3H type: (1.0 ~ 20) In or OFF (OFF-function close)</td></tr>
<tr><td colspan="2" rowspan="3">Protective characteristics (Accuracy ±10%)</td><td>Current (I/Ii)</td><td colspan="2">Trip time</td></tr>
<tr><td>≤0.85</td><td colspan="2">no-acting</td></tr>
<tr><td>>1.15</td><td colspan="2"><40ms acting</td></tr>
<tr><th colspan="6">Grounding protection/alarm M/H type & 3M/3H type</th></tr>
<tr><td colspan="2">Protection type</td><td colspan="4">Differential type (T), Earth current type (W), alternative factory default is differential type (T)</td></tr>
<tr><td colspan="2">Current setting Ig</td><td colspan="4">(0.2 ~ 1.0) In or OFF (OFF-function close)</td></tr>
<tr><td rowspan="2">Time setting Tg</td><td>Definite time delay Tg (s)</td><td colspan="4">0.1 ~ 1.0 or OFF (OFF-only alarm and no trip)</td></tr>
<tr><td>Inverse time factor KG</td><td colspan="4">1.5 ~ 6 or OFF (OFF-grounding protection is definite time)</td></tr>
<tr><td colspan="2" rowspan="4">Protective characteristics (Accuracy ± 10%)</td><td>Current (I/Ig)</td><td colspan="2">Trip time</td></tr>
<tr><td>≤0.8</td><td colspan="2">No-acting (no alarm)</td></tr>
<tr><td rowspan="2">≥1.0</td><td>(I/Ig) <KG</td><td>Inverse time delay acting (or alarm) t=Tg x KG x Ig/I</td></tr>
<tr><td>(I/Ig) ≥KG</td><td>Definite time delay acting (or alarm) as per time setting</td></tr>
</table>

Settings for 3M/3H type

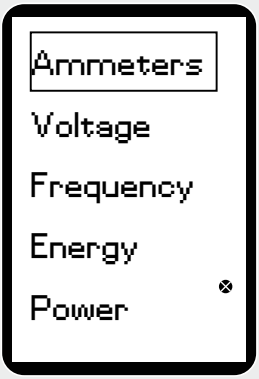
1. Default interface

- The controller displays the default interface when powered on.
- Under each subject menu, pressingor the corresponding subject key returns to the default interface.
- If no keys are pressed within 5 minutes, the panel cursor will automatically show the maximum phase.
- In the non-activated fault interface, if no keys are pressed within 30 minutes, it will automatically return to the default interface.



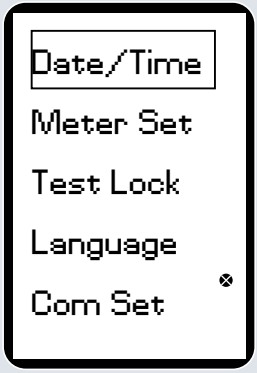
2. “Measure” Menu:

- Press to enter into “Measure” menu
- Press or to return to default interface
- In other non-fault interfaces, press to jump to the “Measure” menu



3. “System parameter set” menu

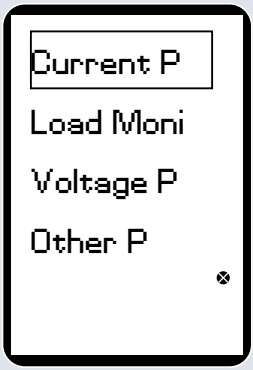
- Press or to return to default interface
- In other non-fault interface, press to jump to system parameter set menu



4. “Protection parameter set” menu

• Press or to return to default interface

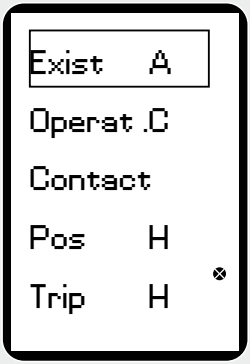
• In other non-fault interface, press to jump to the protection parameter set menu



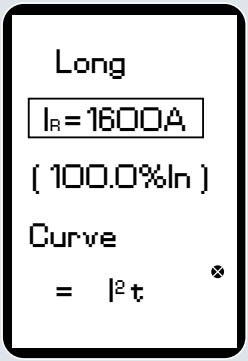
5. “History and maintenance” menu

• Press or to return to the default interface

• In other non-fault interface, press to jump to the history and maintenance menu



6. Sub-menu operation example: Overload long delay protection set then adjust fixed value save fixed value



Settings for M/H type

MENU	ITEM	SETTING		FUNCTION
SET	I_{C1}	Setting current	0.2 ~ 1.0 In or OFF	Load monitor 1
		Time setting (s)	15, 30, 50, 100 … 480	
	I_{C2}	Setting current	0.2 ~ 1.0 In or OFF	Load monitor 2
		Time setting (s)	15, 30, 50, 100 … 480	
	δ	Settingcurrent	40% ~ 100% of OFF	Asymmetric current
		Time setting (s)	0.1 ~ 1.0 or OFF	
	I_f	Setting current	0.2 ~ 1.0 In or OFF	Grounding protection
		Definite time delay (s)	0.1 ~ 1.0 or OFF	
		Inverse time factor (s)	1.5 ~ 6 or OFF	
	L	Setting current	0.4 ~ 1.0 In or OFF	Over-load long delay
		Time setting (s)	15, 20, 25…480 **@1.5Ir**	
	S	Setting current (Inverse time)	1.5 ~ 15 Ir or OFF	Short-circuit short delay
		Setting current (Definite time)	1.5 ~15 Ir or OFF	
		Time setting (s)	0.1 ~ 1.0 (**@ 8Ir** - Inverse) (**@I>8Ir** - Definite)	
	I	Setting current	1.0 ~ 20 In or OFF	Short-circuit instantaneous indicating
		< 40ms acting **@ I > 1.15Ii**		
TEST	The controller can conduct a tripping test. Press the “Function” button successively until the “Test” lamp illuminates, then press “Enter”. The controller will initiate the tripping demand, and the “Test” lamp will remain constantly lit. Press “Return” to exit and return to normal operation status. The test can only be performed when the lock is in the “Set” position.			
MEMORY	Repetitive overloads can cause the conductor to heat up. After the controller delays action due to an overload or short-time delay fault, it incorporates a simulated bimetal thermal effect function. The long-time delay energy for overload is released within 30 minutes, while the short-time delay energy is released within 15 minutes. If an overload or short-time delay occurs again when the circuit breaker is closed during this period, the delay action time will be shortened, providing better protection for the circuit and equipment. The accumulated thermal effect will be automatically cleared when the intelligent controller is powered off. This function is selective according to requirements.			

10. Troubleshooting

Fault phenomenon	Cause analysis	Exclusion scheme	Remarks
Motor cannot store energy or is exhibiting abnormal behavior	The voltage specification is inconsistent with the circuit breaker	Check whether the data label on the circuit breaker conforms to the ordering requirements, otherwise, it will be replaced	The external power supply must meet the requirements, and the wiring must be correct
	Incorrect wiring of the circuit breaker or external lines	Use the universal meter to check the circuit against the wiring diagram	
	Motor burned out	Replace the motor	
	The motor continues to operate after energy storage	Replace the travel switch if it is broken	
The circuit breaker cannot be closed	Undervoltage coil not engaged	Supply power to the undervoltage coil and replace it if burnt out	
	Load short circuit or controller reset button not reset	Reset the reset button of the controller after eliminating the short circuit fault	
	Shunt coil energized for a long time	If the shunt coil cannot be energized or checked for a long time, replace it if burnt out	
The circuit breaker cannot be opened	No action of shunt coil and undervoltage coil	Supply power to the shunt coil and replace it if burnt out	
		Make the undervoltage coil lose power, and replace it if it does not act	
	No action of flux converter	If there is no signal from the ETU, replace the ETU	
		Adjust the position of the flux converter	
Frequent tripping of circuit breaker	Controller red reset button pops up	Check which protection indicator is on and eliminate the cause of the fault	
		If there is no fault in the circuit, replace the controller	
	Undervoltage coil protection function starts	Check if the grid voltage fluctuates	
		Check whether the power supply of the undervoltage coil is loose	
		Can the fault be eliminated after removing the undervoltage coil?	

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