M-PACT
Air Circuit Breaker
User Manual

AEG

Catalogue

Table of Contents

The auxiliary power supply in the M-PACT breaker wiring diagram is an optional accessory and is a dependently installed module in any case, the B5-B6 terminal of the M-PACT breaker is only connect to 2VDC power supply(B5+,B6-), we will not be liable if the circuit breaker protection element is burned due to a power wiring error

1 Overview

This manual can be used as a guide for normal on-site installation, operation and maintenance procedures. The M-PACT air circuit breaker can only be installed, operated and maintained by competent and approved personnel. If users need any further instructions regarding the operation or maintenance of the M-PACT air circuit breaker, please contact the technical department of our company.

Telephone: 400-820-5234

Quality assurance

All M-PACT air circuit breakers are designed and manufactured in accordance with technical standards. They comply with the strict procedural requirements of ISO 9001 to ensure product quality.

Guarantee

The terms and conditions related to the guarantee are included in the sales terms of this company.

Serial number

Each air circuit breaker produced has a specific serial number. This number is located in two easily visible locations.

(a) At the top of a telescopic lifting frame (see Figure 7a)

(b) In any connection related to the air circuit breaker on the left side of the front panel (viewed from the front), the serial number should be referenced.

Storage

Air circuit breakers and pull-out panels should be stored in a clean and dry place, and if possible, in their original packaging. Cardboard boxes should not be stacked more than three layers. During storage, ensure that the energy storage springs of the mechanism are in the released state and the air circuit breaker is in the off position.

Safety measures

It is suggested that the following measures should be included in the procedure manual for personnel who use, operate or maintain M-PACT air circuit breakers before starting detailed inspections or any maintenance work:

- Cut off all power supplies of the air circuit breaker.

- The air circuit breaker should be in the off position and the energy storage spring should be released. This releases the energy stored in the spring mechanism, thereby eliminating the risk of injury caused by unintended tripping or closing during inspection and maintenance.

- When installing or removing the circuit breaker, care should be taken to avoid injury from the moving parts.
- During system maintenance, the locking grounding device of the cable/ busbar tray (optional accessory) should be used.
- The air circuit breaker and its accessories should be used within the specified rated values. When removing the circuit breaker from the drawer, it is recommended to use the specially designed air circuit breaker prompt trolley (optional accessory).

Neutral pole warning

When using a three-pole circuit breaker with a neutral pole current transformer in a three-phase four-wire system, the neutral pole current transformer should be in an open-circuit state when the circuit breaker is removed from the switchgear. In some cases, there may still be current flowing through the neutral pole current transformer, thereby inducing high voltage at the secondary terminals. As a safety precaution, in such cases, it is recommended to install a circuit breaker position switch in the switchgear (see Figure 20a) to short-circuit the secondary terminals of the current transformer when the air circuit breaker is removed.

2 M-PACT Circuit Breaker Operation

Install the M-PACT air circuit breaker

"Pull-out type"

Normally, the withdrawable air circuit breaker is shipped with the draw sheet installed. Remove the circuit breaker from the draw sheet by following the procedure described on page A-03 as required. Place the draw sheet on the switchboard as needed.

⚠ Note: The drawer can be lifted by hand. However, if a lifting trolley or other lifting mechanism is used, the four lifting holes at the front and rear of the drawer should be utilized.

The extraction rack is firmly fixed with the 4×M8 bolts at the front and rear fixed points. (See the fixing details and ventilation requirements on the installation diagram). There is a grounding point on the right side of each extraction rack (viewed from the front).

Fixed type

The air circuit breaker should be firmly fixed in a suitable support structure position with 4×M8 bolts. There should be an appropriate space above the air circuit breaker for removing the arc extinguishing cover and inspecting the arc extinguishing grid. (See the installation details and recommended clearance on the installation diagram).

The grounding point is clearly marked on each side of the air circuit breaker.

Operate the M-PACT air circuit breaker

· **Close the program**

Pull out and press down the blue loading handle to store energy in the energy storage spring (about 7 operations of the loading handle are required to fully store energy).
If an electric energy storage device is installed, the spring will automatically store energy when the motor is powered on. Pressing the "close" button or energizing the closing coil (if installed) will cause the air circuit breaker to close.

The following situations are not allowed to close the switch:

- The "off-gate" button is in the pressed position.
- The circuit breaker is in any position between "connected", "test" and "disconnected".
- The M-PRO protector is in the "manual reset" mode and the reset button protrudes on the front panel (the circuit breaker can be closed only by pressing the reset button).
- The under-voltage trip device has been installed but is not powered on.
- The circuit breaker is equipped with a rocking handle and is in the "test" or "connected" position.
- The circuit breaker is equipped with key interlocks (such as Castell, etc.) or mechanical interlocks.

· **Open the program**

Pressing the "off" button or applying power to the split-phase trip device (if installed) can cause the circuit breaker to disconnect.

The tripping under fault conditions is automatic, which depends on the equipment values used by the protection equipment.

Secondary circuit isolation

A set of 32 self-calibrating secondary circuit isolation contacts is contained in the two terminal blocks B and C, with numbers 1 to 16 clearly marked on each block. This facilitates connection from the top of the air circuit breaker to ensure isolation from the secondary circuit when the M-PACT is in the "off" position.

There is a duplex connection device on the terminal, which can be connected to the secondary circuit by screw joint or flat joint. The terminals marked in terminal blocks B and C are all related to the wiring diagram in Chapter 3.

Pull the M-PACT to the maintenance position.

Ensure that the circuit breaker has tripped, indicating "off", and the energy storage spring is completely
relaxed. Remove the padlock from the drawer base.

Take out the rocking handle from the storage place of the handle (Figure 1).

Figure 1

Remove the rocker from the handle and assemble it as shown in the picture.

Figure 2

Use a screwdriver to rotate the transmission position of the rocking handle baffle clockwise (as shown in the figure). Note: If the circuit breaker is closed, this will cause it to open.

Figure 3

Insert the rocking handle and make a counterclockwise rotation until the position indicator passes
from "Connected" through "Test" to the "Disconnected" position.

Note: In the following cases, the rotator cannot operate:

(a) Between the two positions

(b) When the handle is inserted, it is in the "connected" or "test" position.

When a handle is inserted, the circuit breaker in the "off" position can be operated.

Removing the handle causes the baffle to reset automatically.

From the "disconnected" position, continuously rotate the rocking handle counterclockwise until it touches the front stopper.

Note: Before pulling from the "disconnected" position,make sure the energy storage spring is completely released(the spring energy sorage indicator should indicate "not stored").

Use the handles on both sides to pull the circuit breaker along its slide rails until it hits the front stopper (as shown in the figure). The circuit breaker is now in the maintenance position.

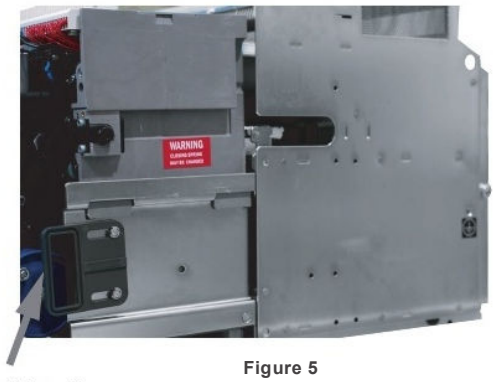


Figure 5

Take out the air circuit breaker from the bracket.

Use the handles on both sides to remove the circuit breaker b ody from the slide rail (Figure 6).

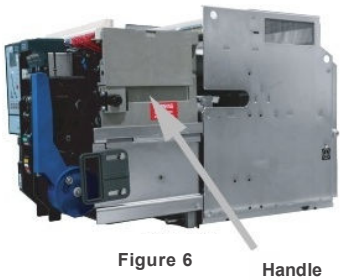


Figure 6

Or use the lifting lugs in the figure and to pull out the circuit breaker body.

Figure 9

Figure 7a

It is easier to lift the circuit breaker using a specially designed lifting trolley (Figure 8).

Figure 8

Be careful! The circuit breaker must not touch hard surfaces during loading and unloading. *If the circuit breaker is collided with a hard or rough surface, some components may be damaged.

Install the circuit breaker in the drawer.

It should be ensured that the rocking handle is disengaged and the rack drive is in the reset position(Figure 9). Using the aforementioned lifting method, lower the circuit breaker to the position on the slide rails. It is necessary to ensure that the side of the circuit breaker body engages with the slots on the two slide rails(Figure 10).

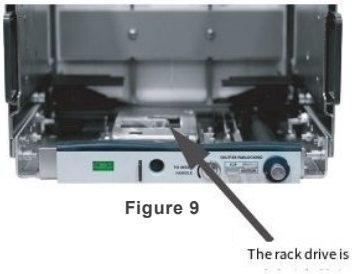


Figure 9

Push the circuit breaker into the bracket until it touches the front stopper.

Figure 10

Use a screwdriver to turn the handle hole locking device clockwise (as shown in the figure) , insert the rocking handle and turn clockwise to make the circuit breaker in the "off" position.

Continue to rotate the crank clockwise until the position indicator of the circuit breaker first shows "test" and finally shows "connected".
When approaching the "connected" position,
the row contacts on the circuit breaker mesh with the fixed bus on the trolley, which increa ses the force exerted on the crank.

Note: If the circuit breaker has been closed in the "off" position, it will automatically trip before reaching the "test" position. Remove and store the operating handle properly. The circuit breaker is now ready for normal operation.

3 M-PACT Accessories

The rated values and performance of the attachment

Device \ Parameters	Rated voltage AC (V)	Rated voltage DC (V)	Power consumption (resistive) under normal operating range and rated current
Auxiliary switch for circuit breaker status	250	-	10A
	-	125	5A
	-	250	0.25 A AC23, DC3 (2 contacts in series)
Circuit breaker carrige switch	250	-	10A
	-	125	5A
	-	250	0.25 A
Shunt trip and closing coil(ST&CC)	110-130	24 - 30, 48	0.7 - 1.1 ×Rated voltage (Split excitation trip) 0.85 - 1.1 ×Rated voltage (closing coil) AC-300VA DC-250W
	220-250	110-130	
	380-440	220-250	
Under-voltage release (UVR)	110-130		"Engagement voltage": 0.85 - 1.1 ×Rated voltage "Release": 0.7 - 0.35 ×Rated voltage 300VA, reduces to 20VA after 0.4 seconds
	220-250	30-48	
	380-440		
Under-voltage Delayed Tripping Device (UVTD)	220-250	30-48	3 ± 1s delay, 350VA on, 20VA off
	380-440		
Motor Operator (MOP)	110-130	24-36	0. 85 - 1. 1 ×Rated voltage AC - 110/220 50VA DC - 110/220 50W Energy storage time: ≤ 3 seconds
	220-250	48	
	-	110-130	
	-	220-250	
	380		

When the system voltage drops below 35% of the rated release voltage, the under-voltage trip causes the circuit breaker to trip (and cannot close). The operating time (from voltage loss to the separation of the circuit breaker contacts) = 50 milliseconds.

Installation of Motors for M-PACT circuit breakers

It is necessary to ensure that the circuit breaker is open and the spring is not charge.

Position the energy storage motor as shown in the figure(Figure 11), place the gearbox bearing on the protruding transmission shaft, and push it into the fulsh with the side plate of the mechanism. If it is not easy to move to the flush position, gently pull down the energy storage handle to facilitate the movement.

It is fixed in place by using three M5 bolts through the small holes on the end plate of the gearbox (torque is tightened to 7 N ·m).

Manually store energy in the energy storage spring.

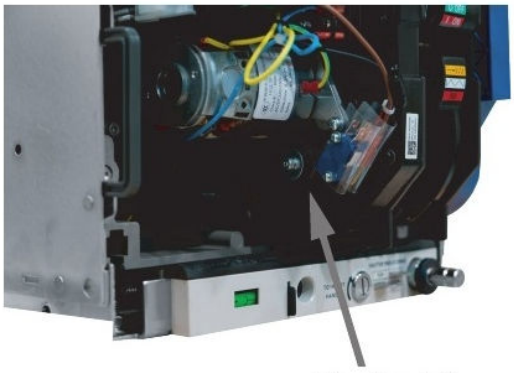


Figure 11 Motor drive shaft

Install the motor switch assembly as shown in the figure (Figure 12). Place the switch operating mechanism on the protruding transmission shaft and ensure that the operating lever of switch is properly positioned.
Fix the operating mechanism with a suitably sized washer and an M4 screw (screwed into the end of the shaft)
(tighten the torque to 5 N·m).

Figure 12

When removing the motor, the above installation procedure can be reversed.

Shunt trip / Closing coil / Under-voltage release

These are all clamp-type devices and do not require fasteners. The installation positions of the three
devices cannot be interchanged and must be as shown in Figure 13.

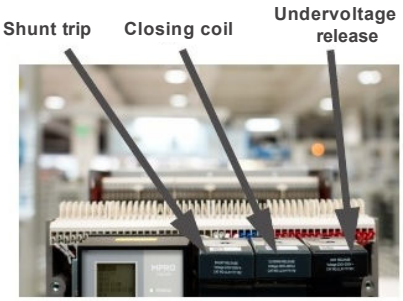


Figure 13

Install these devices: Tilt the device forward and insert the front hook into the support plate at the top of the mechanism. Then tilt it backward until the rear hook is inserted into the groove and press it into place. (Figure 14)

Figure 14

Connect the leads according to the wiring schematic diagram (see pages C-02 to C-03).

Note:

The shunt trip has a plug-in connector.

Both the closing coil and the under-voltage release have flat connectors connected to the secondary terminals.

Remove these devices: disconnect and tilt forward until the rear hook detaches, then lift and release the front hook.

Button padlock
Prevent unauthorized persons from touching the "On/Off" button (Figure 15)

Figure 15

Lift the corresponding window and pass the hasp of the padlock through the keyhole. The diameter of the hasp of the padlock used shall not exceed 8 millimeters.

Splitting position locking

Lock the "Open" button in the depressed position by fully depressing and holding the button. Use a flat-head screwdriver to rotate the locking door on the "Open" button counterclockwise by 90 degrees.

The lock door on the "OFF" button can be locked simultaneously by using the button padlock.

Circuit breaker safety padlock

For safety reasons, lock the circuit breaker in the off position.

When the switch position indicator shows "off", remove the trolley handle. Pull the locking lever forward until the keyhole is exposed and hold it, while inserting the padlock buckle.

Note: Up to three padlocks (with a buckle diameter of at least 6mm) can be used to increase sec urity (Figure 16).

Figure 16

The safety padlock of the safety isolation baffle

Ensure that the circuit breaker is in the off state.

Pull out the baffle lock rods at the "top" or "bottom" (both if necessary) to expose the lock holes. Maintain this state and insert the padlock. (The diameter range allowed by the padlock clasp is 6 millimeters to 8 millimeters).

Figure 17

Open the safety isolation barrier (for trained personnel to use)

If the connection bus is to be inspected, each baffle (or both) can be held open.

Warning: The connection buses at the input terminals are all electrically charged and must be isolated in advance.

Take the circuit breaker out of the drawer. Push the extension rail in until the mechanism opens the baffle.

Attention: If you look at the shelf from the front, the bottom baffle of the left slide rail is opened, and the top baffle of the right slide rail is opened.

Extended guide rail diagram

Install the position switch of the circuit breaker

Optional accessories include position switches, terminal boards, wiring harnesses, and mounting bolts. Fix the position switch to the bottom plate of the drawer (Figure19a) and the terminal board to the outside of the side plate of the drawer (Figure 19b) using the provided mounting holes. Pass the wiring harness through the holes onthe side plate of the drawer and connect it according to the schematic diagram

Figure 19a

Figure 19b also indicates the status of each switch when the circuit breaker is in the "off", "test" and "connected" positions.

figure

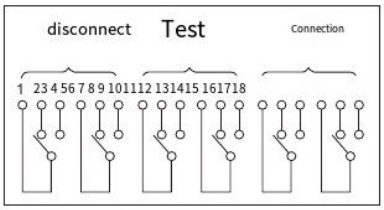


Figure 19b

Install the door interlock device

The door interlocking mechanism can be installed on the right side inside the pull rack for left-opening chain doors (see Figure 20a), and on the left side for right-opening chain doors. When placing an order, it is necessary to specify whether the chain door is left-opening or right-opening.

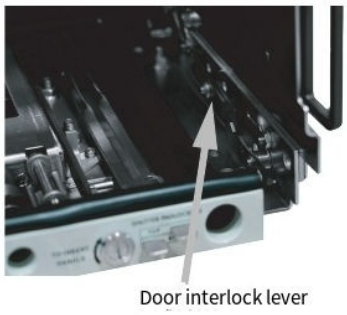


Figure 20a

Interlocking component

Each kit includes - an interlocking rod, a torsion spring, washers and snap rings (as shown in the interlocking components on the left-hand side and right-hand side in Figure 20b), and a lock catch for fixing on the door.

Figure 20b

Assembly (Figure 20C)

Place the torsion spring on the shaft extending from the side plate of the draw sheet. Place the interlocking lever as shown in the figure. Ensure that one end of the torsion spring is placed under the nut and the other end rests against the small boss on the lever.

Protect the position of the linkage bar: Insert the spring clip into the groove of the spring clip shaft, then install the two washers on the supporting boss and fix them with the spring clip.

Figure 20c

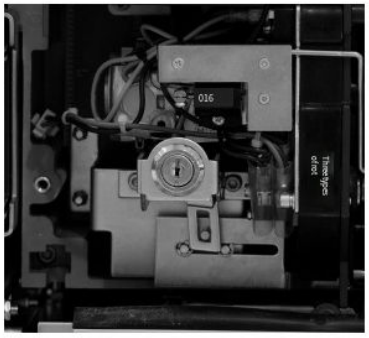


Figure 22

Mechanical operation counter

The counter is an optional component. It is installed above the energy storage motor gearbox and is linked to the operating mechanism. It will accurately record every movement of the mechanism without error.

Note: Once the operation starts, the record on the counter will not reset to zero.

Circuit breaker insertion identification device

It can prevent incompatible circuit breaker bodies (rated value, type, wiring, accessories, etc.) from being inserted into the drawer. Figure 23a shows a circuit breaker identification block installed on the circuit breaker body. Figure 23b shows the corresponding limiting component installed on the drawer.

Figure 23a Circuit breaker identification block

Figure 23b

Note: If necessary, the identification device will be inserted between any given circuit breaker and the draw sheet. On the side to ensure the avoidance of "mismatch" situations.

4 Routine Inspection

Fixed or withdrawable circuit breakers are recommended to be checked once a year or after each short circuit fault is disconnected.

Arc extinguishing system

- The drawout circuit breaker should be pulled out to the maintenance position. Remove the arc extinguishing cover (see the picture).

Figure 24

- Check for signs of wear or damage on the arc extinguishing grid and the side of the enclosure. Replace if necessary. (Note: The arc extinguishing covers on M-PACT circuit breakers have a unique

design feature. They can be used in reverse to extend their lifespan. It is recommended to reverse the arc extinguishing covers during each routine inspection.)

Keep the circuit breaker in the "closed" state and check the gap between the static contact point and the moving contact point (Figure 25).

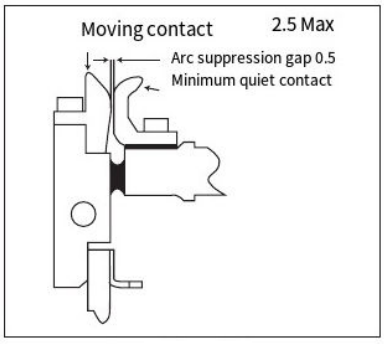


Figure 25

If the gap is greater than 2.5 mm and there is no sign of contact damage, release the fixing contact screw and adjust the clearance to 2.5 mm. Retighten the screw (12 Nm of torque).

If there is significant evidence of excessive contact wear or damage, both the static and moving contacts should be replaced with a gap set to 2.5 mm.

If the gap is less than 0.5 mm, adjust the fixed contacts as described above and reset the gap to between 2.5 and 0.5 mm. If the gap is still less than 0.5 mm, the contact system should be updated.

Even if the contact range is within 0.5 to 2.5 mm, always check the tightness of the contact screw, and the torque is 12 Nm.

Replace the Arc Chute.

Circuit breaker operation

Check the "closing" and "opening" operations of the circuit breaker manually or by remote control. Check whether the actions of all indicators are normal.

M-PRO Intelligent Protection Control Unit

The operation of the circuit breaker is tested by using the M-PRO control unit (optional accessory) based on the selected protection setting values.

5 Recommended spare parts for M-PACT

The number of accessories used for each air circuit breaker:

Name	Three poles	Four poles
Frame 1 Air Circuit Breaker - 800A - 2500A		
Fixed contact (800A - 1600A)	3	4
Fixed contact (2000A - 2500A) Moving contact (800A - 1600A)	3	4
Moving contact (2000A - 2500A) Main contact (800A - 1600A)	9	12
Main contact (2000A - 2500A)	12	16
Arc Chute	6	8
Frame 2 Air Circuit Breaker - 800A - 4000A	6	8
Static contact	3	4
Moving contact		
Main contact (800A - 3200A)	3	4
Main contact (4000A)	18	24
Arc Chute	6	8
Attachment (if selected)	6	8
	3	4
Shunt coil	1	1
Closing coil	1	1
Under-voltage coil	1	1
Under-voltage time-delay coil	1	1
Motor	1	1
Suggested storage capacity		
Up to three circuit breakers	a set	
Up to eight circuit breakers	Two sets	
Up to 20 circuit breakers	Three sets	
More than 20 circuit breakers	Four sets	

Mpro control unit

Introduction

This user manual is designed to provide users, installers and maintenance personnel with the technical information necessary to operate the Mpro control unit.

② Before attempting to install, operate, repair or maintain the equipment, please read this book carefully and inspect the equipment to familiarize yourself with it.

③ The Mpro control unit is an electronic device connected to the circuit breaker. It monitors the phase current and neutral current of the circuit breaker and trips the circuit breaker when overcurrent or overvoltage-related conditions occur. It can also provide protection relay function, diagnostic function and communication. The control unit can be disassembled or replaced on-site by powering off and removing the circuit breaker cover.

④ The panel provides a user operation interface, allowing the adjustment of the parameters of the control unit.

⑤ The trip device has five function keys. Press the key  to activate the screen.

⑥ All settings, status, meters and event information can be accessed through these five keys.

Usage environment

Environment	Parameters	Note
Working temperature	-20℃ ~ +70℃	The average value within 24 hours shall not exceed +35℃.
Storage temperature	-25℃ ~ +70℃	
Relative humidity	The monthly average maximum relative humidity in the wettest month of the installation site shall not exceed 90%, and the monthly average minimum temperature in this month shall not exceed +25℃.	It is allowed for condensation on the surface of the product due to temperature changes.
Pollution level	Level 3	When assembling with the circuit breaker
Installation	III	When assembling with the circuit breaker

Attention!

Electrical equipment can only be installed, operated, repaired and maintained by qualified personnel.
The company shall not be liable for any consequences arising from the use of this product.

Qualified personnel refer to those who have the skills and knowledge related to the construction and operation of electrical equipment and its installations, and have received safety training for identifying and avoiding related hazards.

Panel Introduction

Display screen

Backlight color:

- White: Normal state

- Red flashing: Fault detected. Control unit trips. Signal will return.

- Red long light: A fault is detected. The control unit has completed the trip and displayed the fault data.

Press the key and the screen will return to the normal state. Press the reset button. If there is no For other faults, the circuit breaker can work properly.

① Display screen

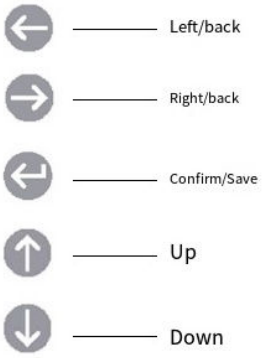
② Operating button

③ Battery, USB jack

④ Indicator light

⑤ Reset button

Operation button



Reset button

Turn the reset button to Manual:

When the circuit breaker automatically trips due to a fault, the reset button pops up automatically. However, when the circuit breaker is manually tripped, the reset button does not pop up. To re-close the circuit breaker, the reset button on the panel must be pressed.

Turn the reset button to Auto:

When the circuit breaker automatically trips due to some reason, the reset button will not pop out automatically.

Battery and USB interface

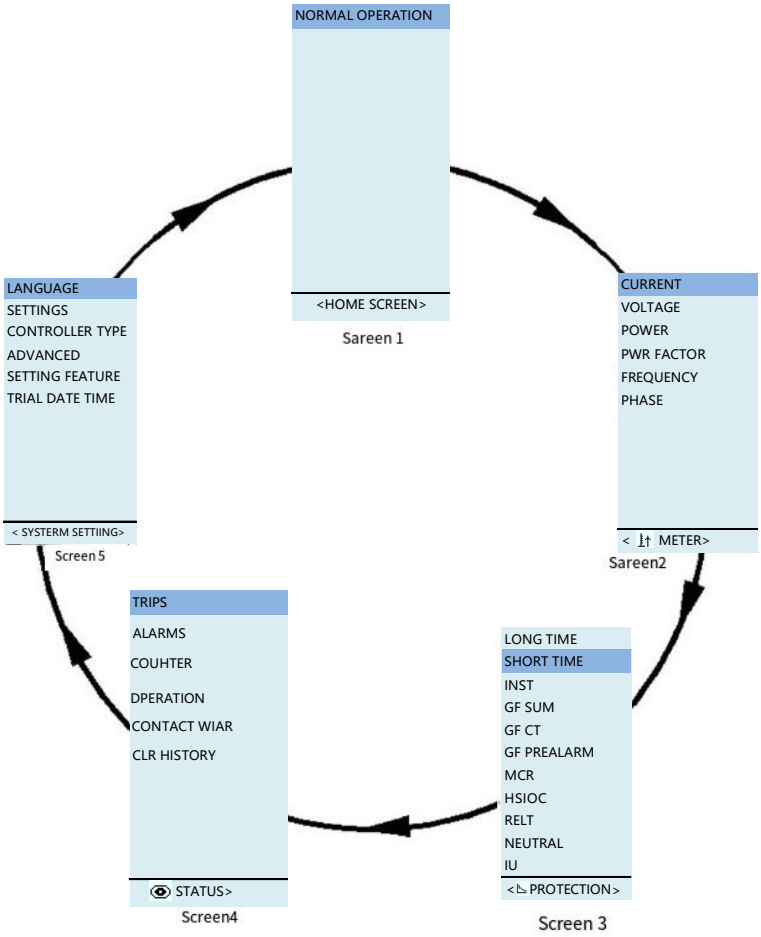
Display screen

Green: Normal state

- Red flashing: Fault detected. Control unit trips. Signal will return.

- Red long light: A fault is detected. The control unit has completed the trip and displayed the fault data.

Press the key and the screen will return to the normal state. Press the reset button. If not There are other malfunctions, but the circuit breaker can work properly.



Menu interface demonstration

Press Key, light up the screen. If you don't do anything, the screen will

It will go out in three seconds.

① Screen 1: Main Interface

On this interface, you can view the three-phase current ratio of A, B and C.

② Screen 2: Measured values

On this interface, you can view the three-phase current of each phase and the maximum phase current.

③ Screen 3: Protection Settings

On this interface, you can set long-term, short-term, instantaneous and grounding faults (grounding protection is optional).

④ Screen 4: Maintenance Record

On this interface, you can view alarms, events, etc.

⑤ Screen 5: System Settings

On this interface, you can view the time, circuit breaker type, trip device type, etc.

Protection settings

Trip curve graph

- Three-stage Protection (LSI)

Rated current (In):

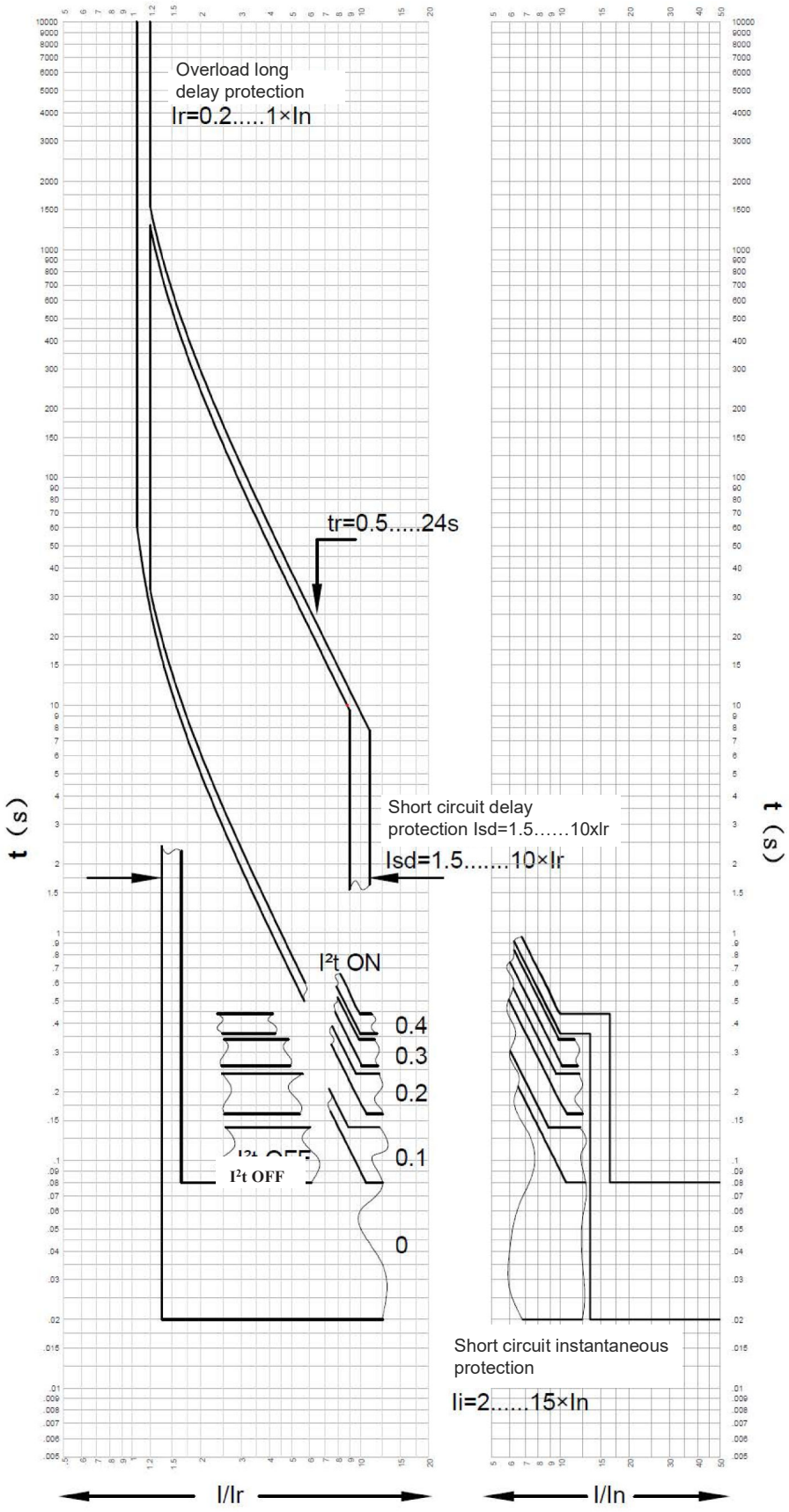
400A, 630A, 800A, 1000A,

1250A, 1600A, 2000A, 2500A,

3200A, 4000A

Frequency:

50/60 Hz



Protection settings

Trip curve graph

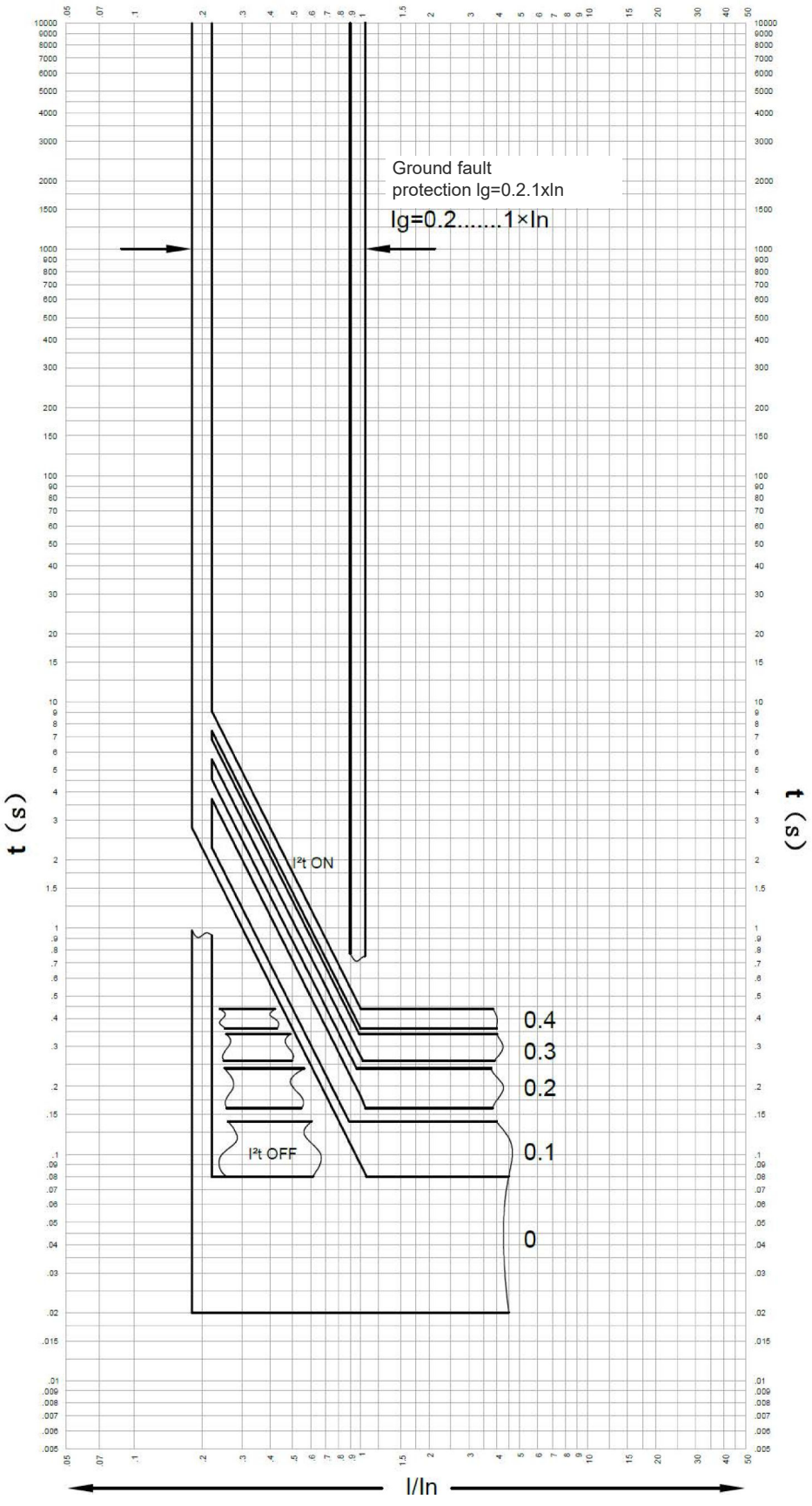
- Ground protection (G)

Rated current (In) :

400A, 630A, 800A, 1000A, 1250A, 1600A, 2000A, 2500A, 3200A, 4000A

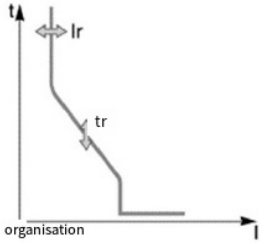
Frequency:

50/60 Hz



Overload long-delay protection

The overload long-delay protection is based on the actual RMS effective value current of each phase and the neutral line. It contains up to 15 harmonics.



Overload long-delay protection value setting

The overload long-delay protection is set as:

- Ir: Overload long-delay tripping current setting value

- tr: Overload long time-delay tripping time setting value

Set up	Unit	Range	Step length	Factory settings
Ir	A	(0.2 to 1) × In	1A	1×In
tr	S	0.5 to 24	0.1	4

Overload long-delay protection feature

T = 35.15625 / (N^2 - 0.84375) * tr

N=I/Ir,

tr = 0.5 - 24, with a step size of 0.1

Protection Feature:

I < 1.05 × Ir: No tripping

I > 1.2 × Ir: Release

The long-delay protection time-delay of Tr overload is applicable under cold conditions.

The phase current or neutral current of 6 × Ir.

When the current is greater than Isd or Ii, the tripping time is in accordance with the short-time-delay and instantaneous protection.
Time works.

The long time-delay minimum tripping time is 500 ms.

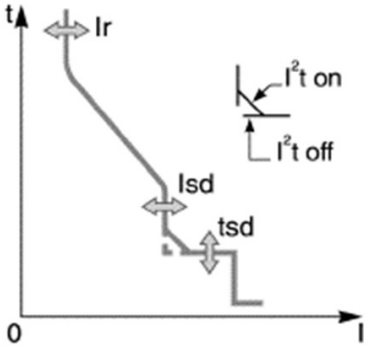
Tr(@6╳Ir)	0.5 seconds	1s	2s	4s	8s	12s	16s	20s	24s
1.5 × Ir	12.5 seconds	25s	50s	100s	200s	300s	400s	500s	600s
6╳Ir	0.5 seconds	1s	2s	4s	8s	12s	16s	20s	24s
7.2 × Ir	0.34 seconds	0.69 seconds	1.38 seconds	2.76 seconds	5.52 seconds	8.3 seconds	11s	13.8 seconds	16.6 seconds

Short-circuit short-delay protection

Short-circuit short-delay protection is based on the phase true RMS current, up to the 15th harmonic.

Short-circuit short-delay protection helps protect equipment from phase-to-phase short circuits and phase-to-phase grounding short circuits, and has complete selectivity.

It includes two characteristics: time-limited and inverse-time-limited, which depend on the status of the I^2t setting.



Short-circuit short-delay protection value setting

Short-circuit short-delay tripping protection accuracy: ±10%

The operating time of short-time-delay protection depends on the tsd time-delay. They are applicable to I^2T ON or OFF.

Set up	Unit	Range	Step length	Factory settings
Isd	A	(1.5 to 10) × Ir	1A	1.5×Ir
Tsd (I^2T ON)	s	0.1 to 0.4	0.1	-
Tsd (I^2T OFF)	s	0 to 0.4	0.1	0.1

Short-circuit short-delay protection characteristic

I^2T OFF-tripping curve (I < 10Ir)

T=(10/N)^2*tsd,

N=I/Ir,

tsd = 0.1, 0.2, 0.3, 0.4

Accuracy: ±10%

Feature	Current multiple (I/Isd)	Agreed release time
Non-action characteristic	<0.9	No detachment
Action characteristics	>1.1	Release
Action delay	⩾1.1	See the following table

I^2t ON Trip time (I ⩾ 10Ir)

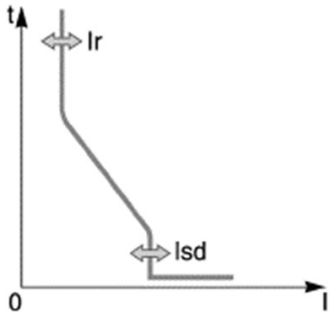
Tsd	0.1 seconds	0.2 seconds	0.3 seconds	0.4 seconds
Non-action time	>80 milliseconds	>160 milliseconds	>260 milliseconds	>360 milliseconds
Maximum release time	<140 milliseconds	<240 milliseconds	<340ms	<440ms

I^2t OFF Release time

Tsd	0s	0.1 seconds	0.2 seconds	0.3 seconds	0.4 seconds
Non-action time	>20 milliseconds	>80 milliseconds	>160 milliseconds	>260 milliseconds	>360 milliseconds
Maximum release time	<80 milliseconds	<140 milliseconds	<240 milliseconds	<340ms	<440ms

Short-circuit instantaneous protection

Instantaneous protection can prevent short circuits between phase lines, between phase lines and neutral lines, and between phase lines and ground in the equipment. This protection operates with time-delay characteristics. It trips immediately when the set current is exceeded, without any other time delay.



Short-circuit instantaneous protection value setting

Set up	Unit	Range	Step length	Factory settings
"Ii status"	-	"Close / Release"	-	Release
Ii tuning	A	(2 to 15) × In	1A	2.0 × In

Short-circuit instantaneous protection characteristic

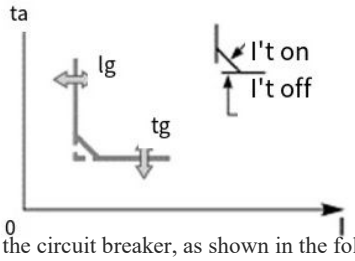
· λ I < 0.9 × Ii: No tripping

· λ > 1.1 × Ii: Release

Feature	Unit	
Non-detachable time	ms	>20
Maximum release time	ms	⩽80

Ground fault protection (optional)

Ground fault protection is based on the true RMS current of phase, up to the 15th harmonic.



Ground fault protection can prevent faults from phase lines to ground wires. It is applicable to the TN-S (three-phase five-wire system) and can also be used in other grounding systems.

The ground fault current is calculated or measured according to the configuration of the circuit breaker, as shown in the following table.

Calculation method of ground fault protection

Circuit breaker configuration	Ig (Grounding Fault Current)
3P	Ig=IA+IB+IC
4P	Ig=IA+IB+IC+IN
3P+N(T)	Ig=IA+IB+IC+IN(ENCT)
3P/4P(W)	Ig=IW

Ground fault protection switch and setting

Set up	Unit	Range	Step length	Factory settings	Accuracy
Ig status	-	Shut off / Release / Alarm	-	Close	
Ig tuning	A	Ig = (0.2 - 1) In	1A	0.2 In	±10%

Ground fault protection characteristic

The operating time of ground fault protection depends on the tg time-delay. They are applicable to I^2T ON or OFF.

tg	0s	0.1 seconds	0.2 seconds	0.3 seconds	0.4 seconds	Factory settings
I^2T ON	-	0.1 seconds	0.2 seconds	0.3 seconds	0.4 seconds	0.1
I^2T OFF	0s	0.1 seconds	0.2 seconds	0.3 seconds	0.4 seconds	0.1

I^2t ON release time (I < In)

T=(1/N)^2*tg,

N=I/In,

Protection characteristics of tg = 0.1,

0.2, 0.3, 0.4:

· I < 0.9 × Ig: No tripping

· I > 1.1 × Ig: Release

I^2t ON Trip time (I ⩾ In)

tg	0.1 seconds	0.2 seconds	0.3 seconds	0.4 seconds
Non-detachable time	>80 milliseconds	>160 milliseconds	>260 milliseconds	>360 milliseconds
Maximum release time	<140 milliseconds	<240 milliseconds	<340ms	<440 milliseconds

I^2t OFF Release time

tg	0	0.1 seconds	0.2 seconds	0.3 seconds	0.4 seconds
Non-detachable time	>20 milliseconds	>80 milliseconds	>160 milliseconds	>260 milliseconds	>360 milliseconds
Maximum release time	<80 milliseconds	<140 milliseconds	<240 milliseconds	<340ms	<440 milliseconds

Grounding fault CT protection (optional)

It is applicable to the leakage fault caused by insulation damage of the equipment or the leakage fault caused by human contact with the exposed conductive part. The leakage tripping value IΔn is directly expressed in amperes and has nothing to do with the rated current of the circuit breaker. The signal acquisition method is zero sequence sampling, and an additional rectangular transformer is required. This sampling method has high accuracy and sensitivity and is suitable for the protection of smaller currents.

Set up	Unit	Range	Step length	Factory settings	Accuracy
Ig is enabled.	-	Shutdown / Release / Alarm	-	Close	
Ig threshold	A	Ig = (0.2 - 1) In	1A	0.2 In	±10%

The operating time of ground fault protection depends on the tg time-delay. They are applicable to I^2T ON or OFF.

tg	0s	0.1 seconds	0.2 seconds	0.3 seconds	0.4 seconds	Factory settings
I^2T ON	-	0.1 seconds	0.2 seconds	0.3 seconds	0.4 seconds	0.1
I^2T OFF	0s	0.1 seconds	0.2 seconds	0.3 seconds	0.4 seconds	0.1

I^2t ON release time (I < In); T=(1/N)^2*tg,

N = I/In; tg = 0.1, 0.2, 0.3, 0.4

I^2t ON Trip time (I ⩾ In)

tg	0.1 seconds	0.2 seconds	0.3 seconds	0.4 seconds
Non-detachable time	>80 milliseconds	>160 milliseconds	>260 milliseconds	>360 milliseconds
Maximum release time	<140 milliseconds	<240 milliseconds	<340ms	<440ms

I^2t OFF Release time

tg	0	0.1 seconds	0.2 seconds	0.3 seconds	0.4 seconds
Non-detachable time	>20 milliseconds	>80 milliseconds	>160 milliseconds	>260 milliseconds	>360 milliseconds
Maximum release time	<80 milliseconds	<140 milliseconds	<240 milliseconds	<340ms	<440ms

Protection Feature:

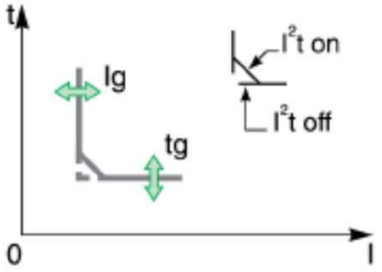
I < 0.9 × Ig: No tripping

I > 1.1 × Ig: Trip

Grounding fault early warning (optional)

The grounding alarm function and the grounding protection function are independent of each other and exist simultaneously, with their own independent setting parameters. The working mode of the alarm function is the same as that of the grounding fault protection, using the same sensors, the same curves and protection times. The grounding fault alarm is based on the sum of the currents of each phase line and the neutral line, or the external transformer, the current transformer of the current grounding loop, and is accessed to the control unit through the module.

Powered by the internal CT, no external power is required.



Grounding fault early warning setting

Set up	Unit	Range	Step length	Factory settings	Accuracy
Grounding pre-alarm mode	-	Turn off GFSUM and GFCT	-	Close	
Grounding and alarm action value	A	120-1200A	1A	200A	±10%
Grounding pre-alarm time	s	1-10	0.1 seconds	10	> 400ms: ±10% ⩽ 400ms: See the I^2 t OFF short-delay tripping time
Grounding pre-alarm return value	A	120-1200A	1A	120A	±10%
Grounding pre-alarm return time	S	1-10	0.1 seconds	10	> 400ms: ±10% ⩽ 400ms: See the short-delay tripping time of I^2t OFF

Protection Feature:

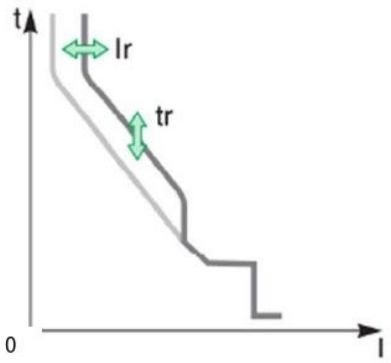
I < 0.9 × Ig: No tripping

I > 1.1 × Ig: Trip

Neutral line protection

In practical applications, the cables and current characteristics used for the neutral line (N phase) often have significant differences from those of the other three phases. Different protection measures need to be implemented for the neutral line depending on the application. When the neutral line is relatively thin, the semi-fixed-value method can be adopted for protection; when the neutral line is the same as the other phases, the full-fixed-value method can be used for protection; when the harmonics in the power grid are relatively heavy, the protection method using 1.6 times the fixed value can be adopted.

The setting of neutral line protection is only for long-delay protection. Other protection settings are the same as those for phase line protection.



Explanation of the correspondence between neutral line protection and the type of switch

Serial number	Circuit breaker	Neutral wire protection
1	3PT - Three-stage circuit breaker	Close
2	3P + N - Three-level circuit breaker + External neutral line RC	Off, 50%, 100%, 160%
3	4PT - Four-stage Circuit Breaker	Off, 50%, 100%, 160%

Neutral line protection (Phase N protection) setting

Set up	Unit	Range	Factory settings
N-phase protection mode	-	"Close / Release"	Release
N-phase action value	A	OFF, 50% - 160%	100%

MCR and HSIOC protection

MCR protection is the closing short-circuit protection for the circuit breaker itself. When an over-limit fault current occurs, MCR protection protects the closing ability of the circuit breaker to prevent the circuit breaker from closing a current exceeding the closing limit capacity, thereby causing switch damage. It takes effect at the moment of circuit breaker closing (within 120 ms). HSIOC protection protects the limit carrying capacity of the circuit breaker to prevent the switch from carrying a current exceeding the limit breaking capacity. It takes effect 120 ms after closing.

MCR and HSIOC protection parameter setting

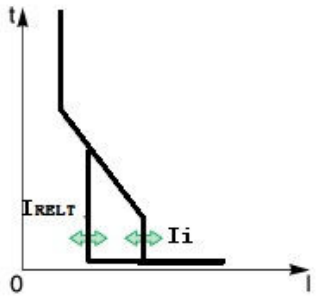
Set up	Unit	Range	Factory settings
MCR protection mode	-	Release	Release
MCR action value	A	30In or short-term tolerance capacity	30In

Set up	Unit	Range	Factory settings
HSIOC protection mode	-	Release	Release
HSIOC action value	A	30In or short-term tolerance capacity	30In

The protection action characteristics of MCR and HSIOC

Feature	Unit	
Non-detachable time	ms	>20
Maximum release time	ms	⩽80

Double short-circuit protection (RELT)



Double short-circuit protection is a double setting of the Mpro control unit for instant short circuits, so that the short-circuit protection can be adjusted when the circuit breaker is powered by two power sources with significantly different short-circuit currents. For example, when the circuit breaker is powered by the power grid or a generator. It trips when the set current is exceeded without any other time delay. It can be automatically triggered through the menu or remote input.

RELT protection setting parameters

Set up	Unit	Range	Step length	Factory settings
RELT is enabled.	-	"Close / Release"	-	Close
RELT threshold	A	(2 to 15) In	1A	10In

Release time

Feature	Unit	
Non-detachable time	ms	>20
Maximum release time	ms	⩽80

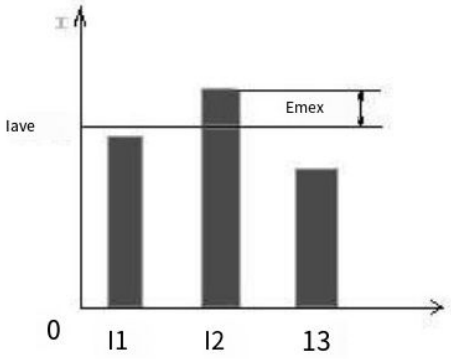
Double short-circuit protection feature:

I < 0.9 ×IRELT: No tripping

I > 1.1 ×IRELT: Trip

Current imbalance protection (optional)

The current imbalance protection protects against phase loss and three-phase current imbalance, and takes protective actions based on the imbalance rate among the three-phase currents. When the operation mode is alarm, its action principle is the same as that of the grounding protection.



Calculation method of imbalance rate:

$$Iunbal = \frac{|Emax|}{Iavg} \times 100\%$$

Iavg: The average value of the true RMS of the three-phase currents I1, I2, and I3

$$Iavg = \frac{I1 + I2 + I3}{3}$$

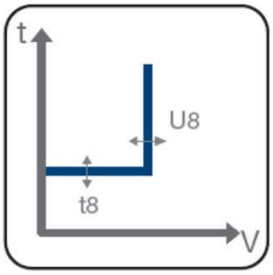
Emax: The maximum difference between the current of each phase and Iavg.

Current imbalance protection setting

Set up	Unit	Range	Step length	Factory settings	Accuracy
Current unbalance mode	-	Shut off / Release / Alarm	-	Close	-
Action value of current imbalance	%	2% to 90%	1%	20%	±10%
Current imbalance time	s	0.1 to 300 seconds	0.1 seconds	10s	> 400ms: ±10% ⩽ 400ms: See the short-delay tripping time of I^2t OFF
Current imbalance return value	%	2% to 90%	1%	2%	±10%
Current imbalance return time	s	0.1 to 300 seconds	0.1 seconds	10s	> 400ms: ±10% ⩽ 400ms: See the short-delay tripping time of I^2t OFF

Under-voltage protection (optional)

The control unit measures the true RMS value of the primary circuit voltage. When the three phase-to-phase voltages (line voltages) or phase-to-neutral line (phase voltages) are all less than the set value, that is, when the maximum value of the three voltages is less than the set value of under-voltage protection, the under-voltage protection operates; when the maximum value of the three line voltages is greater than the return value, the alarm operates and returns. It is powered by an external 24V power supply.



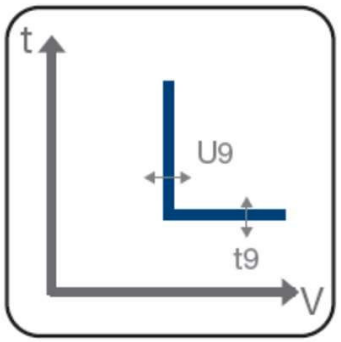
Current imbalance protection setting

Set up	Unit	Range	Step length	Factory settings	Accuracy
Under-voltage protection mode	-	Shut off / Release / Alarm	-	Close	-
Under-voltage protection operating value	V	20V ~ 1500V	1V	280V	±10%
Under-voltage protection time	s	0.1 to 300 seconds	0.1 seconds	10s	> 400ms: ±10% ⩽ 400ms: See the I^2t OFF short-delay tripping time
Under-voltage protection return value	%	20V ~ 1500V	1V	360V	±10%
Under-voltage protection return time	s	0.1 to 300 seconds	0.1 seconds	10s	> 400ms: ±10% ⩽ 400ms: See the I^2t OFF short-delay tripping time

Overvoltage protection (optional)

The control unit measures the true RMS value of the primary circuit voltage. When the three phase-to-phase voltages (line voltages) or phase-to-neutral line voltages (phase voltages) are all greater than the set value, that is, when the minimum value of the three voltages is greater than the overvoltage protection set value, the overvoltage protection operates; when the minimum value of the three voltages is less than the return value, the alarm operates and returns.

When the minimum line voltage is greater than the action threshold, the alarm or trip delay is activated. When the action delay time is up, the alarm or trip signal is sent out, and the DO for overvoltage fault acts. When the operation mode is alarm, after the alarm action, when the minimum line voltage is less than the return threshold, the return delay is activated. When the return delay time is up, the alarm is removed and the DO for overvoltage fault returns.



Powered by an external 24V power supply.

Overvoltage protection setting

Set up	Unit	Range	Step length	Factory settings	Accuracy
Overvoltage protection mode	-	Shut off / Release / Alarm	-	Close	-
Overvoltage protection action value	V	20V ~ 1500V	1V	460V	±10%
Overvoltage protection time	s	0.1 to 300 seconds	0.1 seconds	10s	> 400ms: ±10% ≤ 400ms: See the I^2t OFF short-delay tripping time
Overvoltage protection return value	%	20V ~ 1500V	1V	440V	±10%
Overvoltage protection return time	s	0.1 to 300 seconds	0.1 seconds	10s	> 400ms: ±10% ≤ 400ms: See the I^2t OFF short-delay tripping time

Voltage imbalance protection (optional)

Voltage unbalance protection operates based on the unbalance rate among the three line voltages.

The operating principle of its action is the same as that of overvoltage protection.

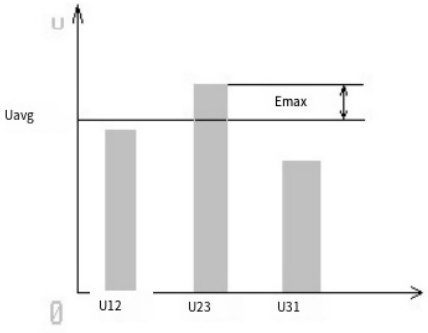
Calculation method of imbalance rate:

$$Uunbal = \frac{|Emax|}{Uavg} \times 100\%$$

In the formula, Uavg: The average value of the true RMS of the three-phase line voltage

$$Uavg = \frac{U12 + U22 + U13}{3}$$

Emax: The maximum difference between each line voltage and the average value

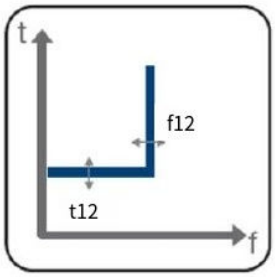


Voltage imbalance protection setting

Set up	Unit	Range	Step length	Factory settings	Accuracy
Voltage imbalance protection mode	-	Shut off / Release / Alarm	-	Close	-
Voltage unbalance protection operating value	%	2% to 90%	1%	20%	±10%
Voltage imbalance protection time	s	0.1 to 300 seconds	0.1 seconds	10s	> 400ms: ±10% ≤ 400ms: See the I^2t OFF short-delay tripping time
Voltage imbalance protection return value	%	2% to 90%	1%	10%	±10%
Voltage imbalance protection return time	s	0.1 to 300 seconds	0.1 seconds	10s	> 400ms: ±10% ≤ 400ms: See the I^2t OFF short-delay tripping time

Underfrequency protection (optional)

The control unit detects the frequency of the system voltage and can provide protection when the frequency is too high or too low. The operating principle and characteristics of over-frequency and under-frequency protection are the same as those of over-voltage and under-voltage protection.



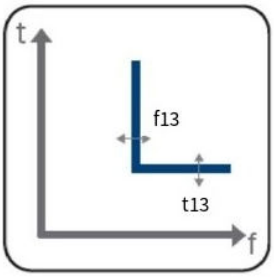
Powered by an external 24V power supply.

Underfrequency protection setting

Set up	Unit	Range	Step length	Factory settings	Accuracy
Underfrequency protection mode	-	Shut off / Release / Alarm	-	Close	-
Underfrequency protection action value	Hz	40～70	0.5Hz	45	±10%
Underfrequency protection time	s	0.1 to 300 seconds	0.1 seconds	10s	> 400ms: ±10% ≤ 400ms: See the I^2t OFF short-delay tripping time
Underfrequency protection return value	Hz	40～70	0.5 Hz	49	±10%
Underfrequency protection return time	s	0.1 to 300 seconds	0.1 seconds	10s	> 400ms: ±10% ≤ 400ms: See the I^2t OFF short-delay tripping time

Over-frequency protection (optional)

The control unit detects the frequency of the system voltage and can provide protection when the frequency is too high or too low. The operating principle and characteristics of over-frequency protection are the same as those of over-voltage and under-voltage protection.



Powered by an external 24V power supply.

Over-frequency protection setting

Set up	Unit	Range	Step length	Factory settings	Accuracy
Over-frequency protection mode	-	Shut off / Release / Alarm	-	Close	-
Over-frequency protection action value	Hz	40～70	0.5 Hz	55	±10%
Over-frequency protection time	s	0.1 to 300 seconds	0.1 seconds	10s	> 400ms: ±10% ≤ 400ms: See the I^2t OFF short-delay tripping time
Over-frequency protection return value	Hz	40～70	0.5 Hz	51	±10%
Over-frequency protection return time	s	0.1 to 300 seconds	0.1 seconds	10s	> 400ms: ±10% ≤ 400ms: See the I^2t OFF short-delay tripping time

Reverse power protection (optional)

Reverse power protection, also known as reverse active power protection, takes the sum of the three-phase active power. When the flow direction of the power is opposite to the power direction set by the user and is greater than the set value, the protection is initiated. The power direction and the incoming power line direction are set in the "Measurement Table Settings" menu phase and must be consistent with the actual application situation. Its operating principle is the same as that of overvoltage protection. Powered by an external 24V power supply.

Reverse power protection setting

Set up	Unit	Range	Step length	Factory settings	Accuracy
Reverse power protection mode	-	Shut off / Release / Alarm	-	Close	-
Reverse power protection operating value	kW	50～5000	10	55	±10%
Reverse power protection time	s	1~300s	0.1 seconds	10s	> 400ms: ±10% ≤ 400ms: See the I^2t OFF short-delay tripping time
Reverse power protection return value	kW	50～5000	10	51	±10%
Reverse power protection return time	s	1~300s	0.1 seconds	10s	> 400ms: ±10% ≤ 400ms: See the I^2t OFF short-delay tripping time

Phase sequence protection (optional)

Phase sequence detection is taken from the primary voltage. When the detected phase sequence is in the same direction as the set direction of the starting value, the protection action is triggered. The protection action characteristic is instantaneous. When there is no voltage in one or more phases, this function is automatically exited.

Phase sequence protection setting Set up	Unit	Range	Step length	Factory settings	Accuracy
Phase sequence protection mode	-	Shut off / Release / Alarm	-	Close	-
Phase sequence protection operating value		a-b-c/a-c-b	-	a-b-c	

Operation of the Mpro control unit

View the measured values

Steps	1	2	3	4
Operation	Press the key ← to light up the screen.	Press ← to switch → to the measured value menu.	Press ↵ to open the measurement value menu.	View relevant data by clicking ↑ ↓
Example		CURRENT VOLTAGE POWER PWR FACTOR FREQUENCY PHASE < METER>	RMS Ia: 0.00A Ib: 0.00A Ic: 0.00A Ig: 0.00A IgCT: 0.00A MAX Ia: 0.00A Ib: 0.00A Ic: 0.00A Ig: 0.00A CURRENT	IgCT: 0.00A AVERAGE Ia: 0.00A Ib: 0.00A Ic: 0.00A UNBALANCE Ia: 0% Ib: 0% Ic: 0% MAXUNBAL Ia: 100% Ib: 100% Ic: 202% CURRENT

Display maintenance records

Steps	1	2	3
Operation	Press the key ← to light up the screen.	Press ← to switch → to the Maintenance Record menu.	Press ↵ the menu to open and view the relevant data.
Example		TRIPS ALARMS COUHTER DPERATION CONTACT WIAR CLR HISTORY STATUS>	SHORT TIME t=0.20s IA: 773A IB: 0A IC: 0A IN: 0A IG: 0A 2037:09:13 13:21:85 !Fault 01/01

Protection Setting (Taking 3200A as an Example)

Procedure	1	2	3	4
Operation	Press down ← light up the screen.	Press ← → toggle to the protection menu.	Press ↵ to open the measurement value menu.	Press ↵ to the "Short Delay" menu to open.
Example		LONG TIME SHORT TIME INST GF SUM GF CT GF PREALARM MCR HSIOC RELT NEUTRAL IU <⊾ PROTECTION>	LONG TIME SHORT TIME INST GF SUM GF CT GF PREALARM MCR HSIOC RELT NEUTRAL IU <⊾ PROTECTION>	MODE TRIP Ir(A) 3200 Isd(*Ir) 2.0 Isd(A) 4800 tsd(ms) 100 I2t OFF SHORT TIME

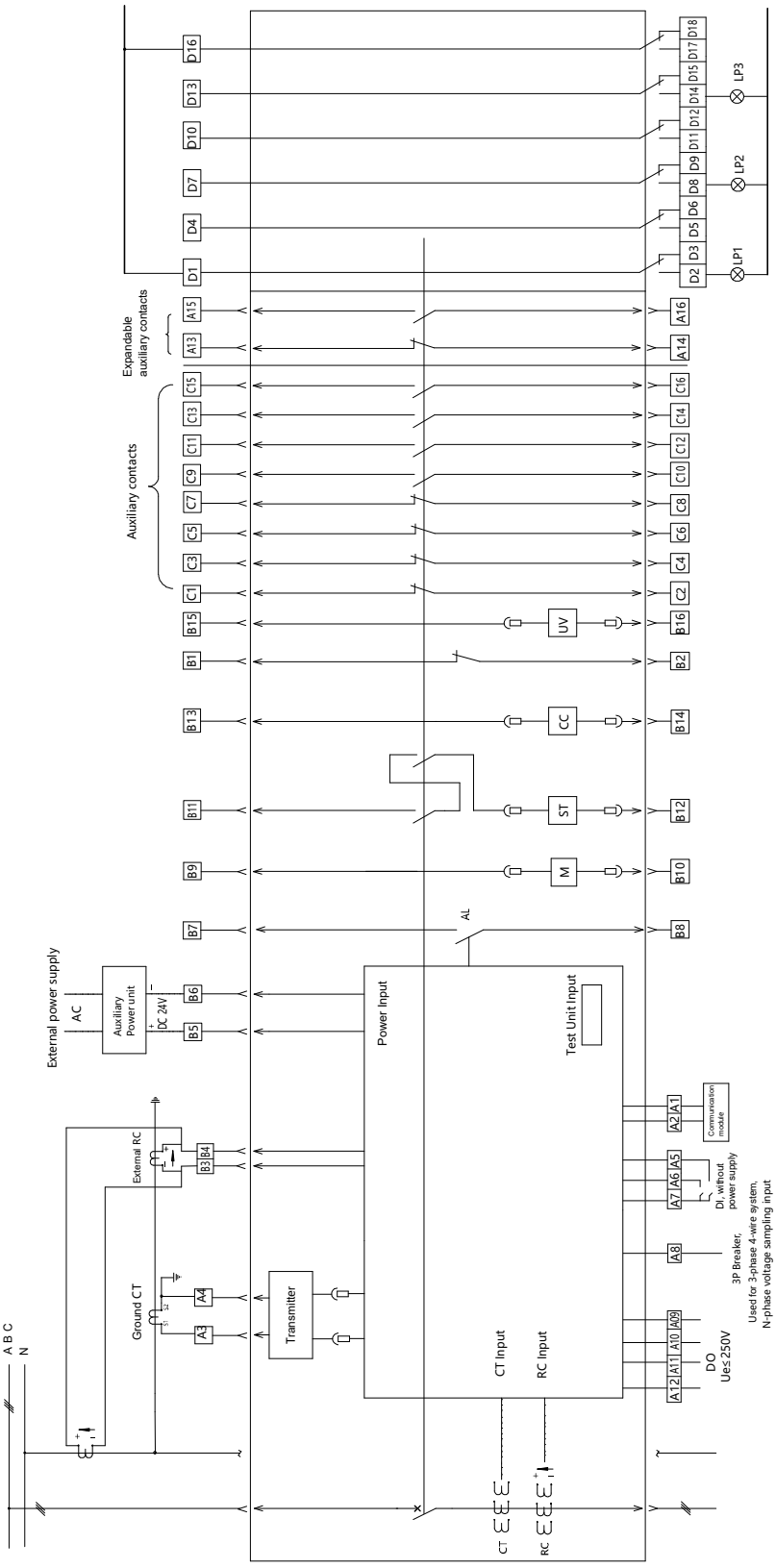
5	6	7	8	9
Press the ↓ select multiple Press ← parameter to flash by data to enter the edit state.	Press the key ↑ select a multiple of 2.0	Press ↵ Go to save screen.	Press ← select "Yes"	Press ↵ Protected by saved modified parameters:
MODE TRIP Ir(A) 3200 Isd(*Ir) 2.0 Isd(A) 4800 tsd(ms) 100 I2t OFF SHORT TIME	MODE TRIP Ir(A) 3200 Isd(*Ir) 2.0 Isd(A) 4800 tsd(ms) 100 I2t OFF SHORT TIME	SAVES? YES NO LANGUAGE	SAVES? YES NO LANGUAGE	MODE TRIP Ir(A) 3200 Isd(*Ir) 2.0 Isd(A) 4800 tsd(ms) 100 I2t OFF SHORT TIME

Modify system settings

Procedure	1	2	3	4
Operation	Press down light up the screen.	Press to switch to the System Setting menu.	Press to open the Language Setting menu.	Press to enter the editing state.
Example		LANGUAGE SETTINGS CONTROLLER TYPE ADVANCED SETTING FEATURE TRIAL DATE TIME < SYSTERM SETTIING>	CHINESE LANGUAGE	CHINESE LANGUAGE

5	5	7	8
Press the to select the desired language.	Press Go to save screen.	Press select "Yes"	Press save success
ENGLISH LANGUAGE	SAVES? YES NO LANGUAGE	SAVES? YES NO LANGUAGE	SAVES? YES NO LANGUAGE

M-PACT ACB with Mpro21/22/31/32/41/42 control unit



Secondary wiring terminal description

B1-B2	Energy storage signal (closed after energy storage)
B3-B4	External RC of 3P circuit breaker, N-phase current sampling
B5-B6	Auxiliary power supply
B7-B8	Trip alarm contact
B9-B10	Power input for Motor operator
B11-B12	Shunt Trip
B13-B14	Closing Coil
B15-B16	UV / UVTD

C1-C16	Auxiliary contacts, standard for 4NO+4NC; When 5NO+3NC, C7/C8 are normally open; When 3NO+5NC, C9/C10 are normally closed;
A1-A2	Communication
A3-A4	Grounding CT (applicable only to Mpro32/42)
A5/A6/A7	DI1 , DI2
A8	3P Breaker, Used for 3-phase 4-wire system, N-phase voltage sampling input
A9-A10	DO1
A11-A12	DO2
A13-A16	Expandable auxiliary contacts, NC (A13-A14) , NO (A15-A16)

D1-D6	Disconnected indication
D7-D12	Test indication
D13-D18	Connected indication

M	Motor operator
ST	Shunt Trip
CC	Closing Coil
UVR	Undervoltage releasr
UVTD	Time delayed undervoltage release
AL	Trip alarm contact
CT	Power CT
RC	Rogowski coils for measuring
GROUNDCT	Ground CT for （SEF）

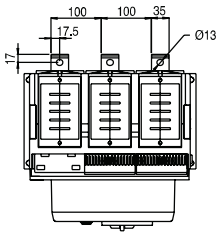
Warning!

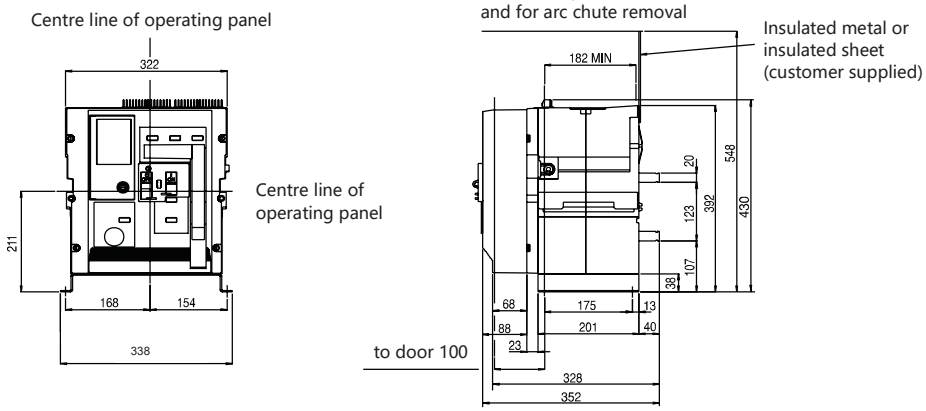
The auxiliary power supply in the wiring diagram of the M-PACT Breaker is an optional accessory and an independently installed module. In any case, the B5-B6 wiring terminals of the M-PACT Breaker can only be connected to a 24VDC power supply (B5+, B6-). If the circuit breaker protection components are burned out due to power wiring errors, our company will not bear responsible.

Dimensional drawings

Note: Bottom plate installation hole diameter - fixed type
Frame 1-9.2mm, it is recommended to use M8x4 bolts of grade 8.8 Frame 2-11.2mm, it is recommended to use M10x4 bolts of grade 8.8.

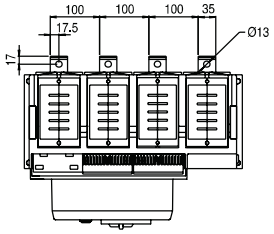
Fixed, horizontal, rear connection
3P, Type A, 400A to 1600A

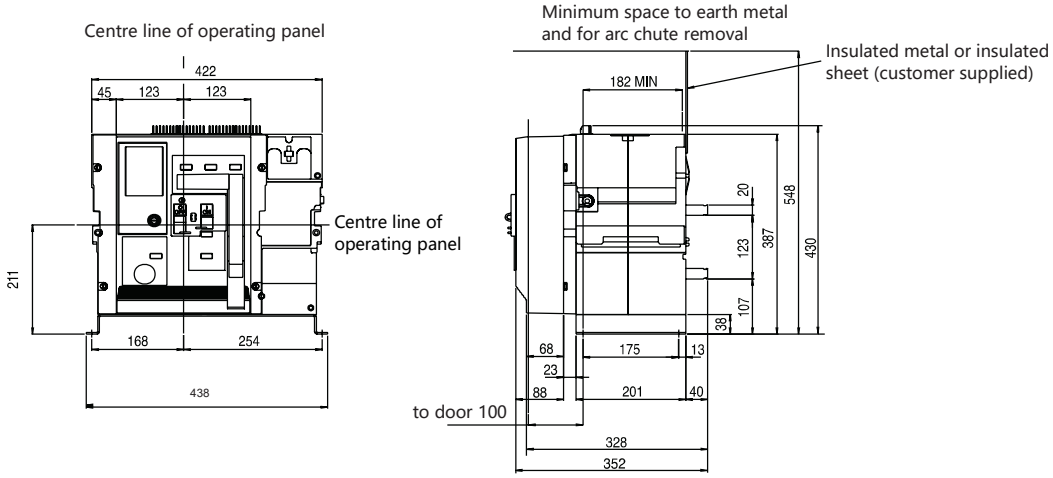




Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm. Note: Gap on both sides of the circuit breaker ≥25mm

4P, Type A, 400A to 1600A

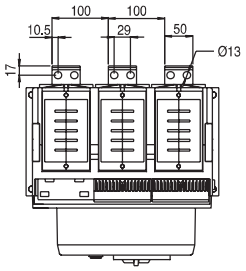


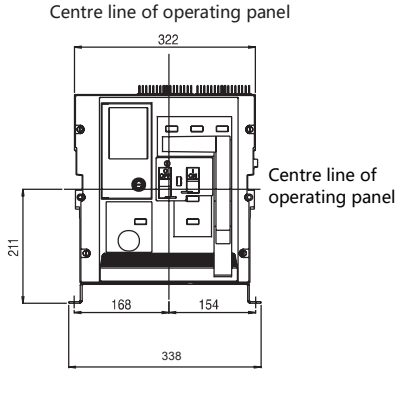


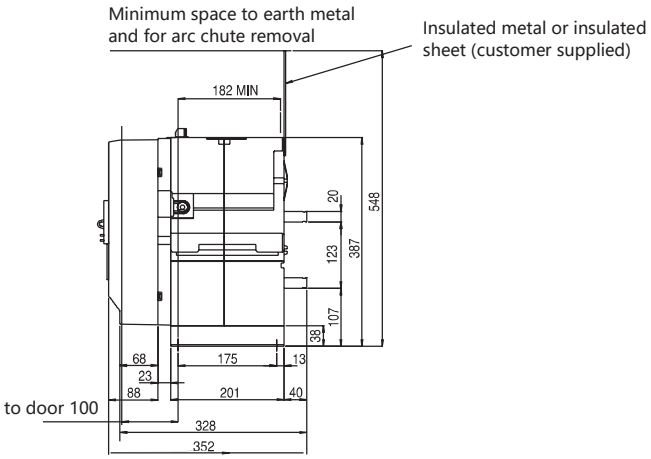
Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.
Note: Gap on both sides of the circuit breaker ≥25mm

Fixed, horizontal, rear connection

3P, Type D, 400A to 1600A

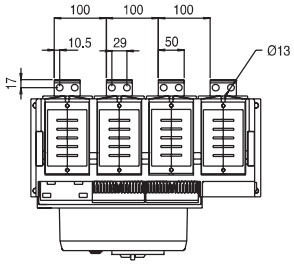


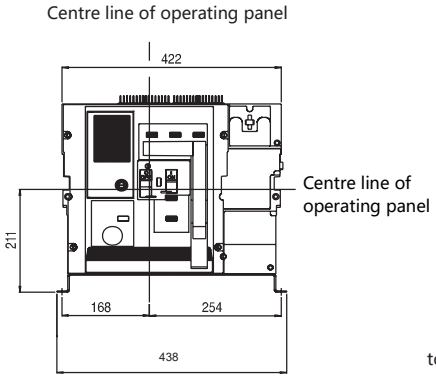


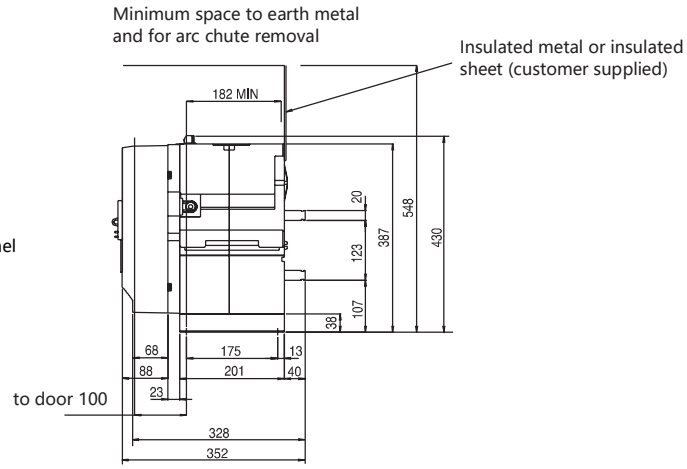


Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm. Note: Gap on both sides of the circuit breaker ≥25mm

4P, Type D, 400A to 1600A





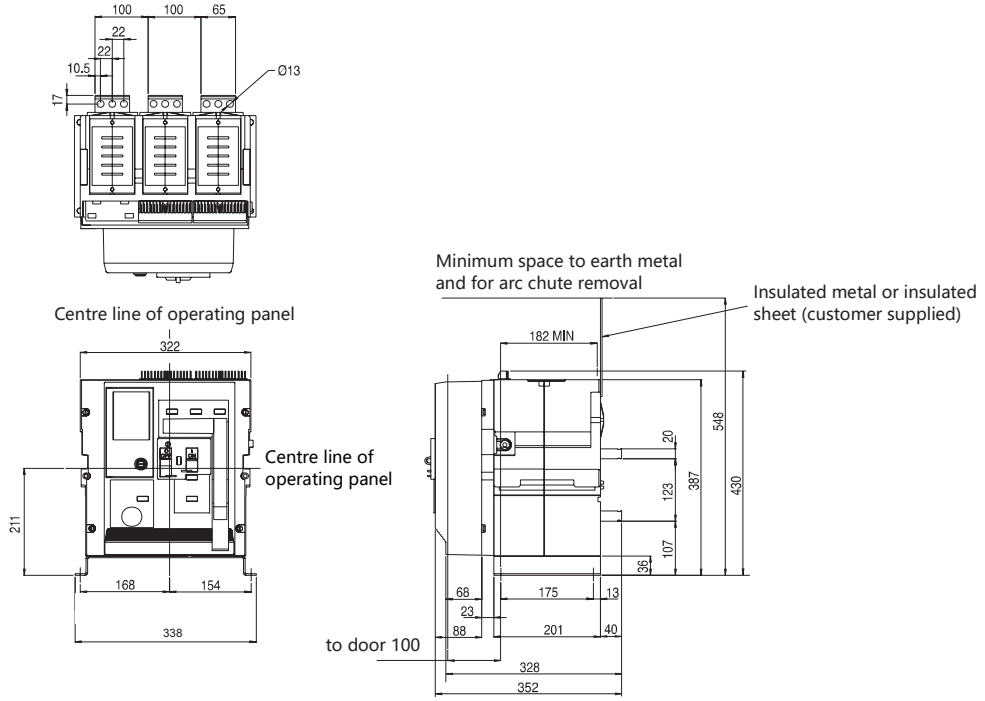


Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

Note: 690V 1600A D-type rear terminal hole reference to 2000/2500A

Fixed, horizontal, rear connection

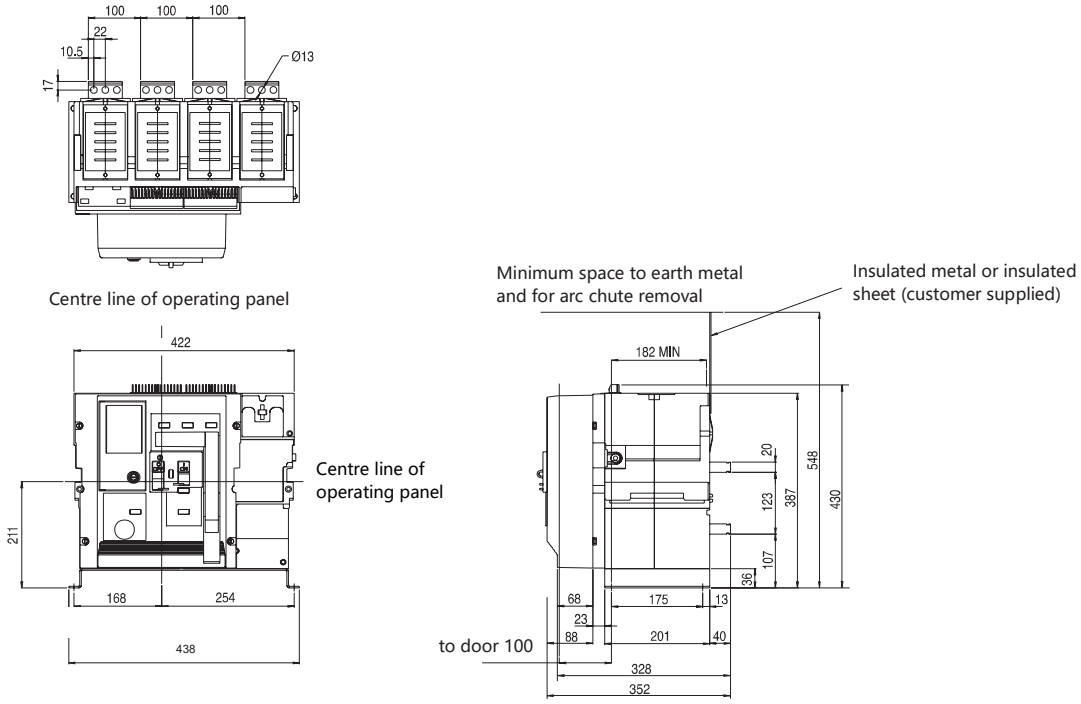
3P, Type A and Type D, 2000A to 2500A; Type D2 400A to 2500A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

Note: Gap on both sides of the circuit breaker ≥25mm

4P, Type A and Type D, 2000A to 2500A; Type D2 400A to 2500A

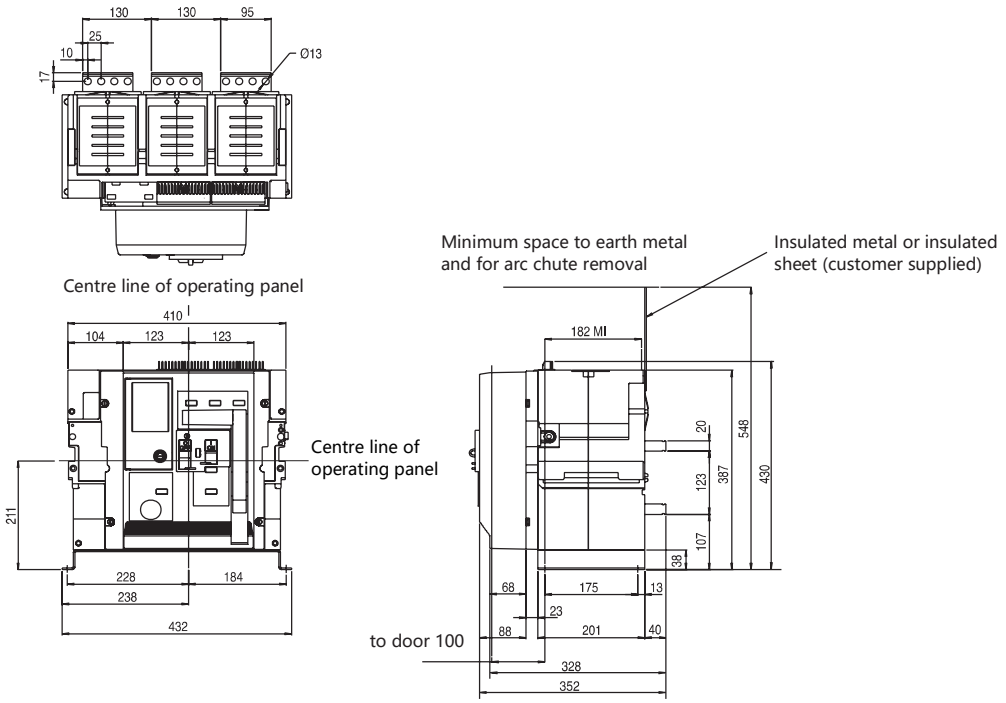


Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

Note: Gap on both sides of the circuit breaker ≥25mm

Fixed, horizontal, rear connection

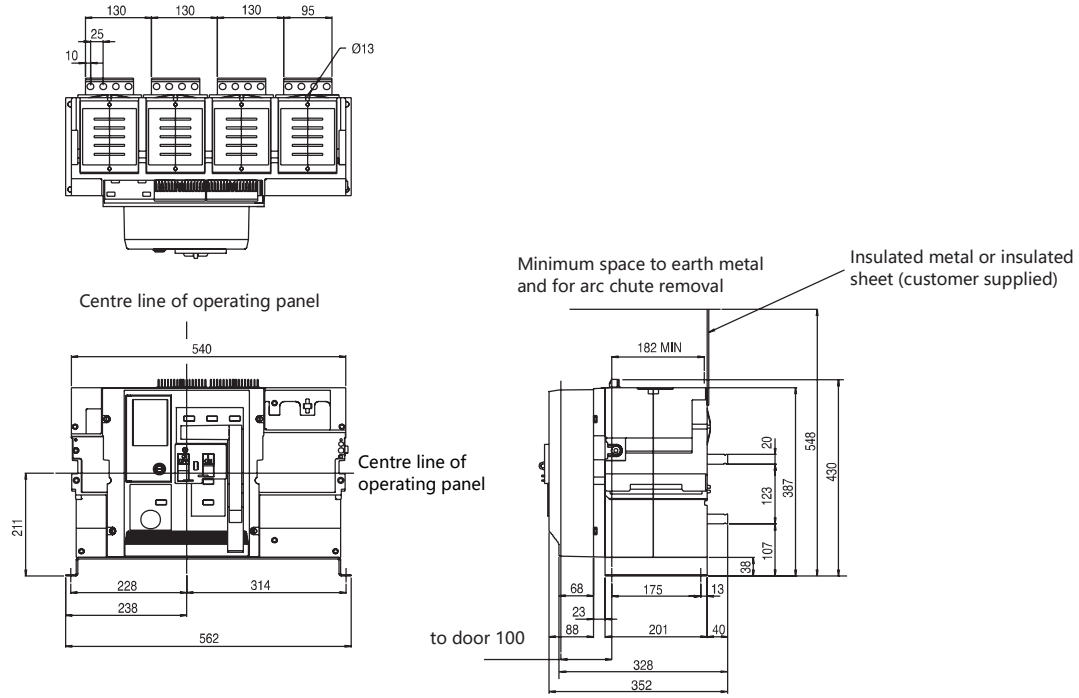
3P, Type A and Type D, 3200A to 4000A
3P, Type H_1 and Type H_2 , 800A to 4000A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

Note: Gap on both sides of the circuit breaker ≥25mm

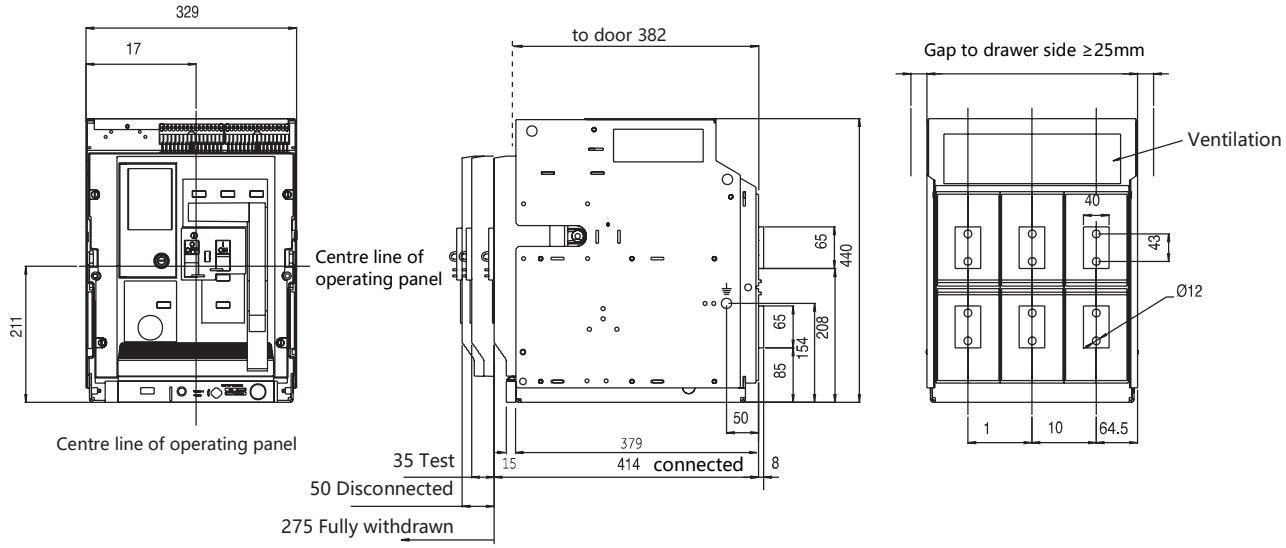
4P, Type A and Type D, 3200A to 4000A
4P, Type H_1 and Type H_2 , 800A to 4000A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

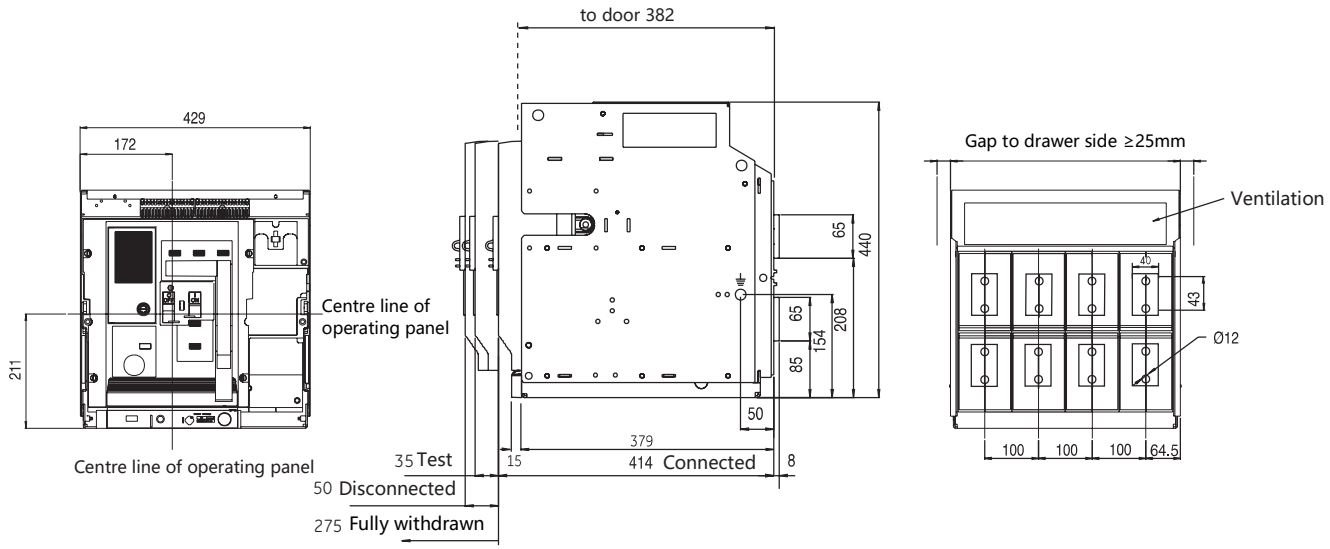
Note: Gap on both sides of the circuit breaker ≥25mm

Withdrawable, rear connection
3P, Type A, 400A to 1600A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

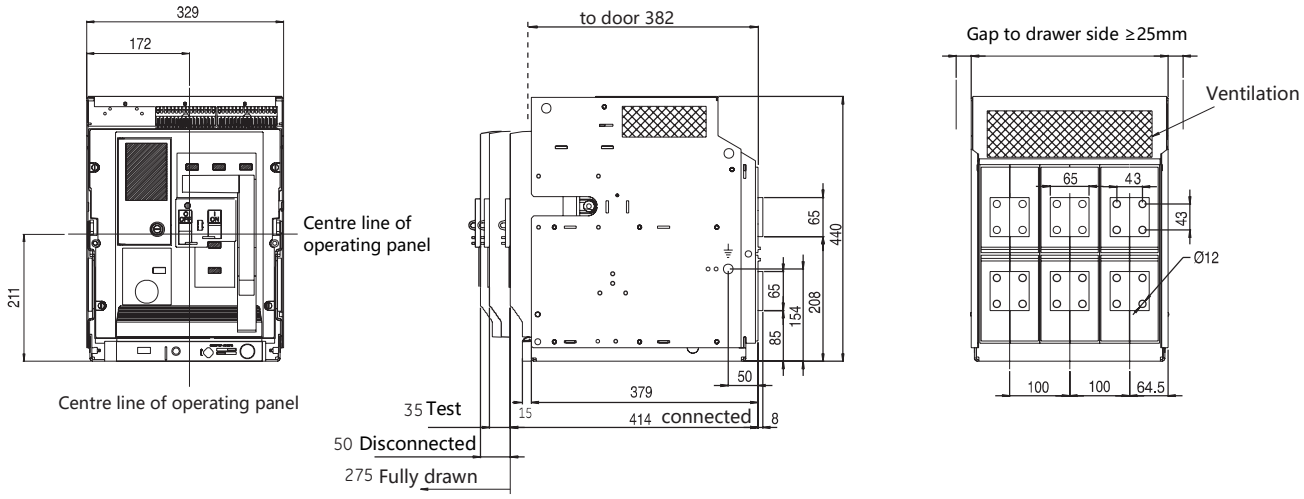
4P, Type A, 400A to 1600A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

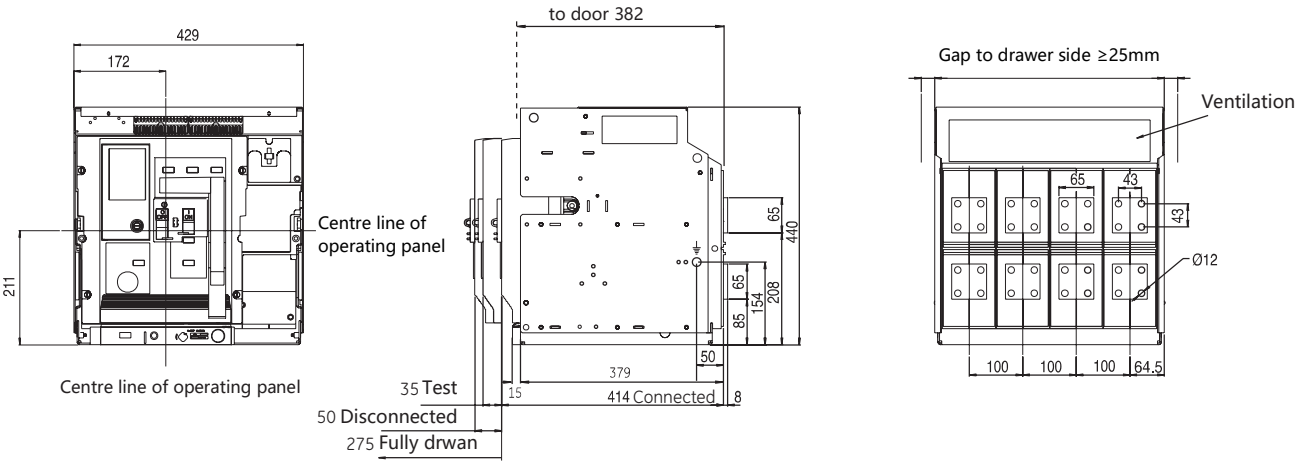
Withdrawable, rear connection

3P, Type A, 2000A to 2500A
3P, Type D and Type D2, 400A to2500A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

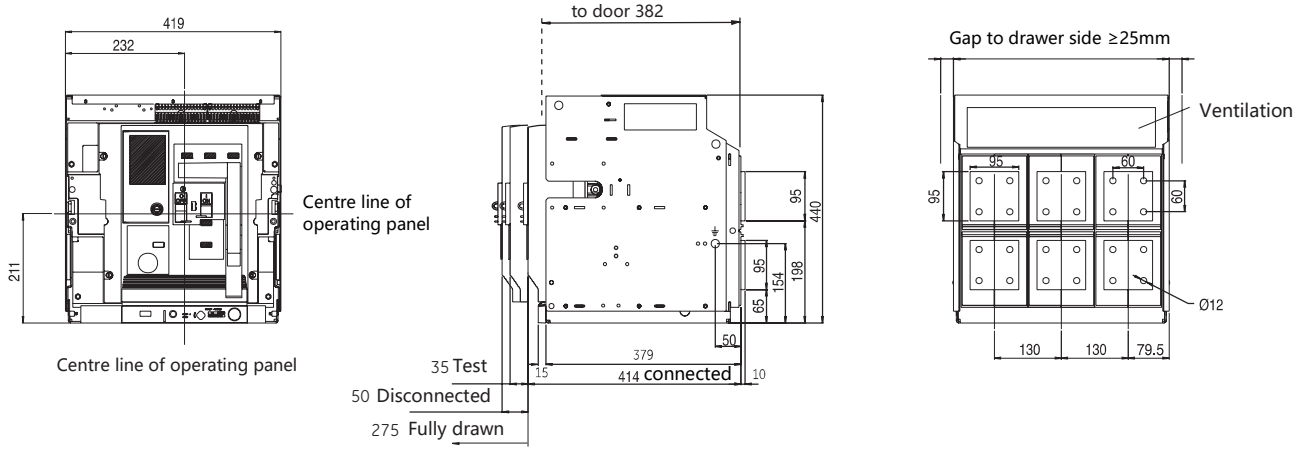
4P, Type A, 2000A to 2500A
4P, Type D and Type D2, 400A to2500A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

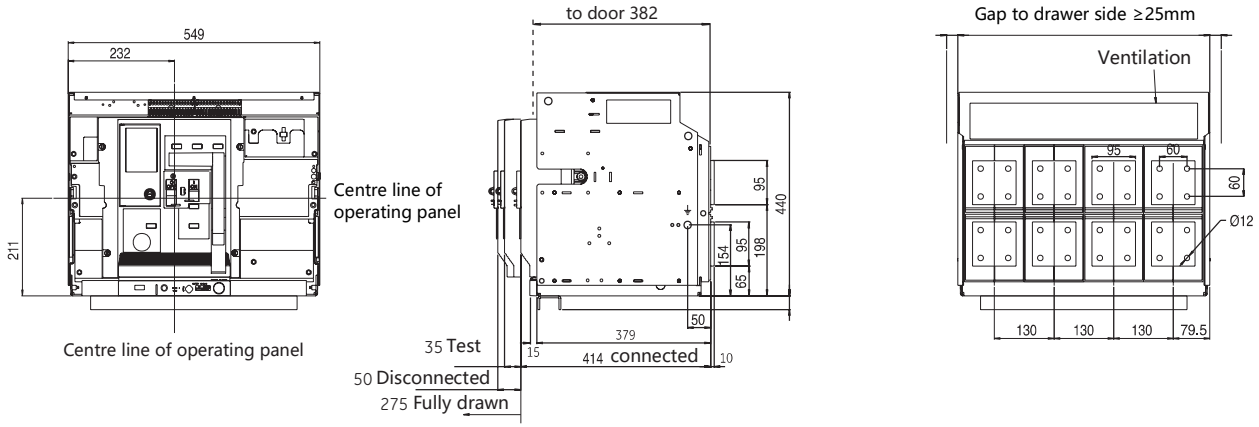
Withdrawable, rear connection

3P, Type A and Type D, 3200A
3P, Type H_1 and Type H_2, 800 to 3200A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

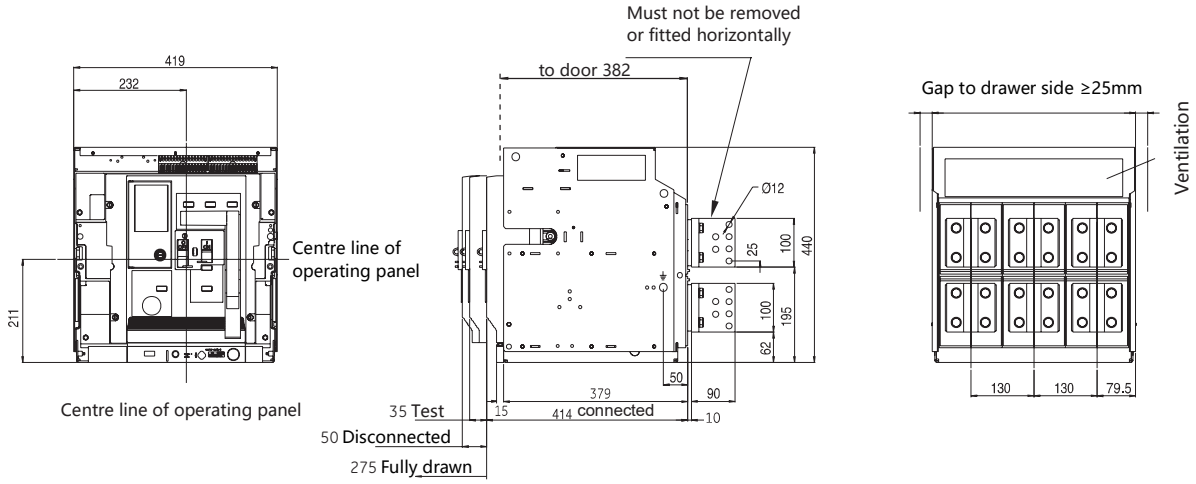
4P, Type A and Type D, 3200A
4P, Type H_1 and Type H_2, 800 to 3200A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

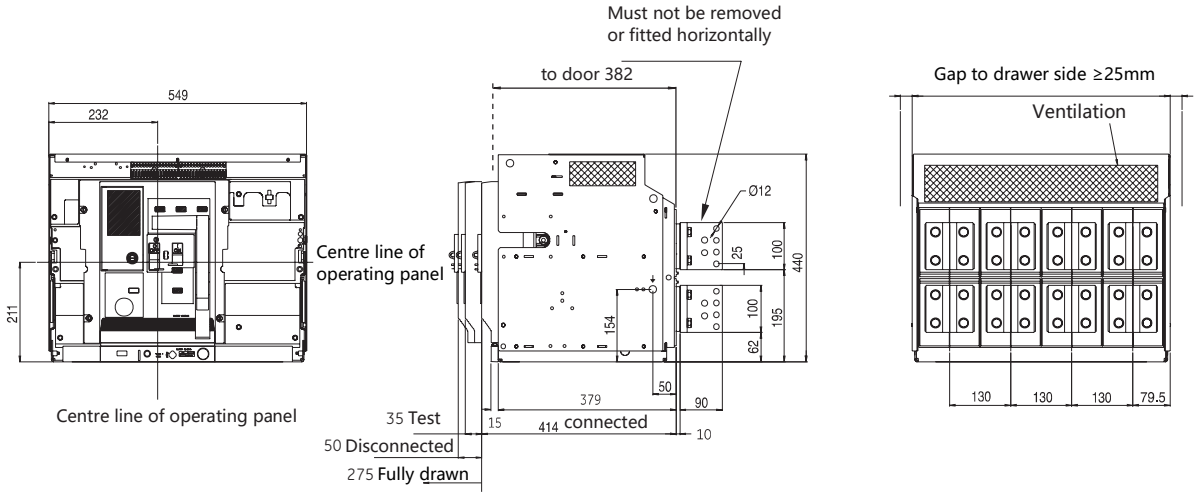
Withdrawable, rear connection

3P, Type A, Type D,Type H, 4000A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

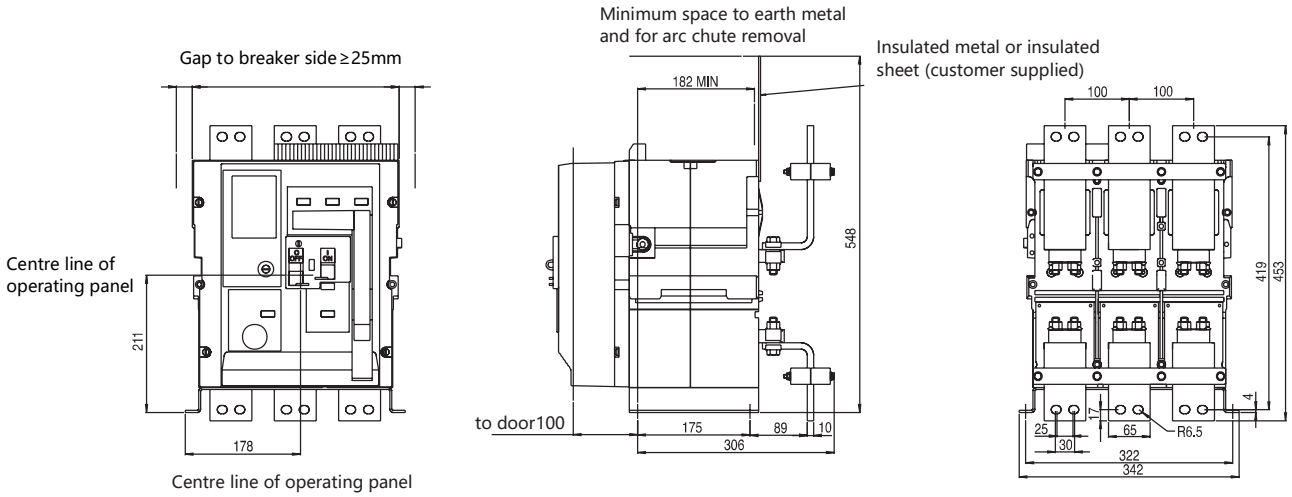
4P, Type A, Type D,Type H, 4000A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

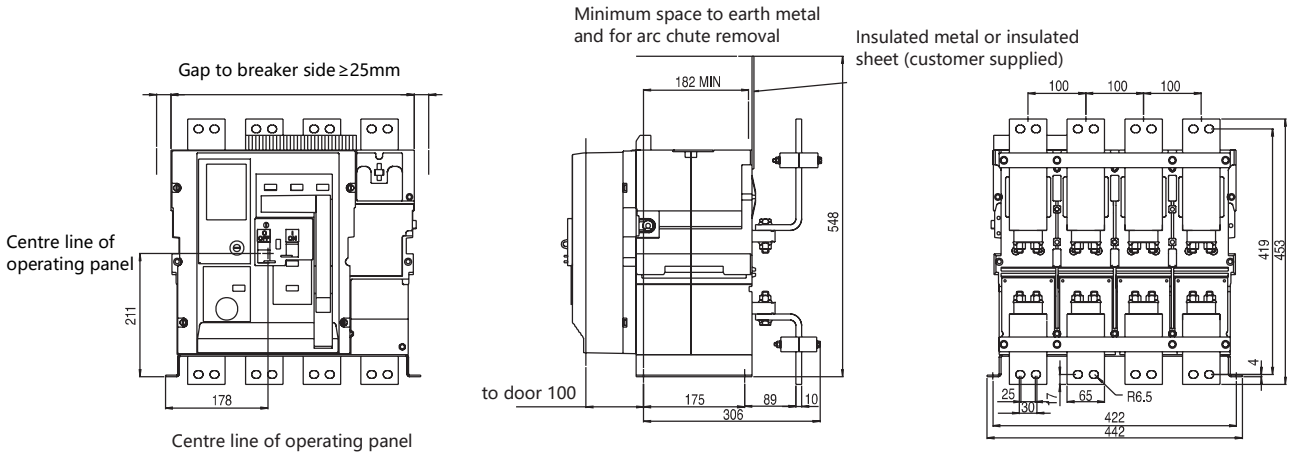
Front access connection of Fixed type

3P, Tpye A, Type D, 400A to 1600A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

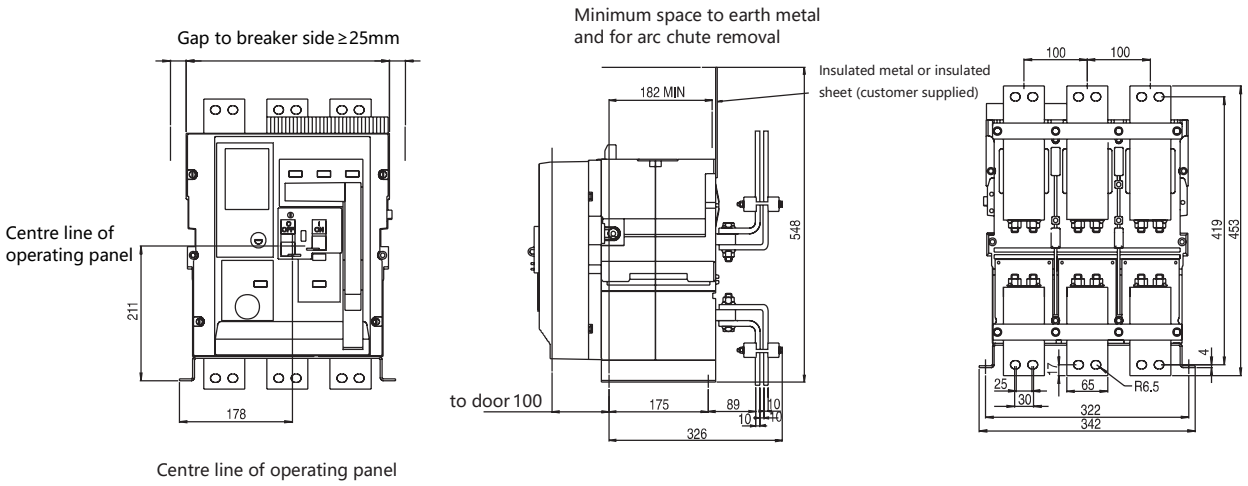
4P, Tpye A, Type D, 400A to 1600A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

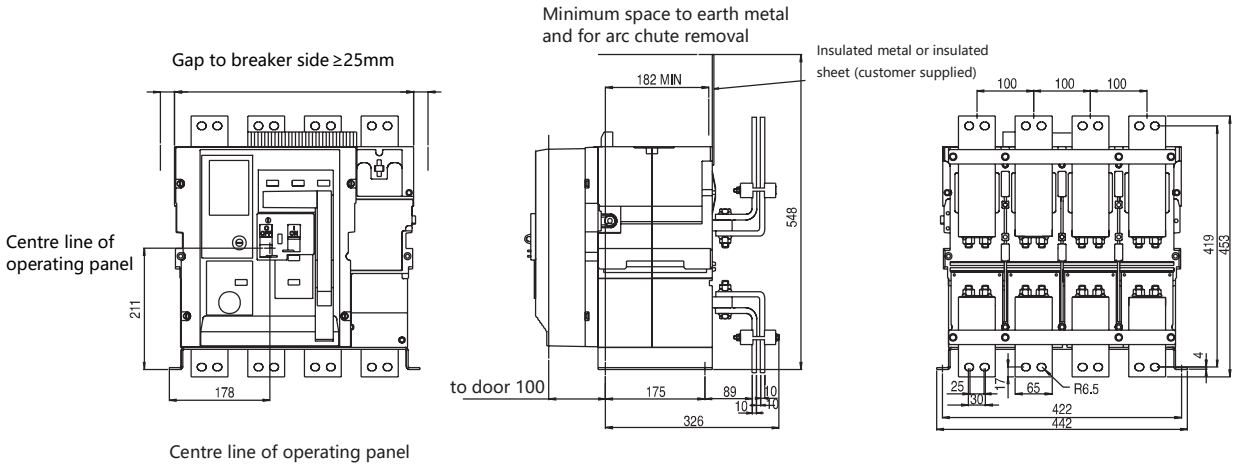
Front access connection of Fixed type

3P, Type A and Type D, 2000A to 2500A，Type D2 400A to 2500A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

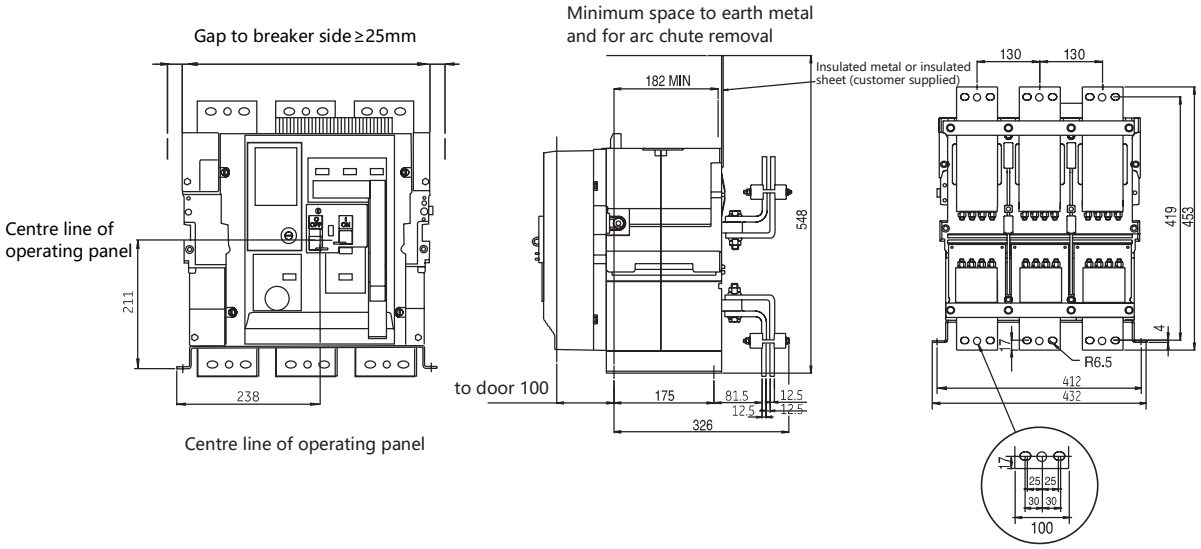
4P, Type A and Type D, 2000A to 2500A，Type D2 400A to 2500A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

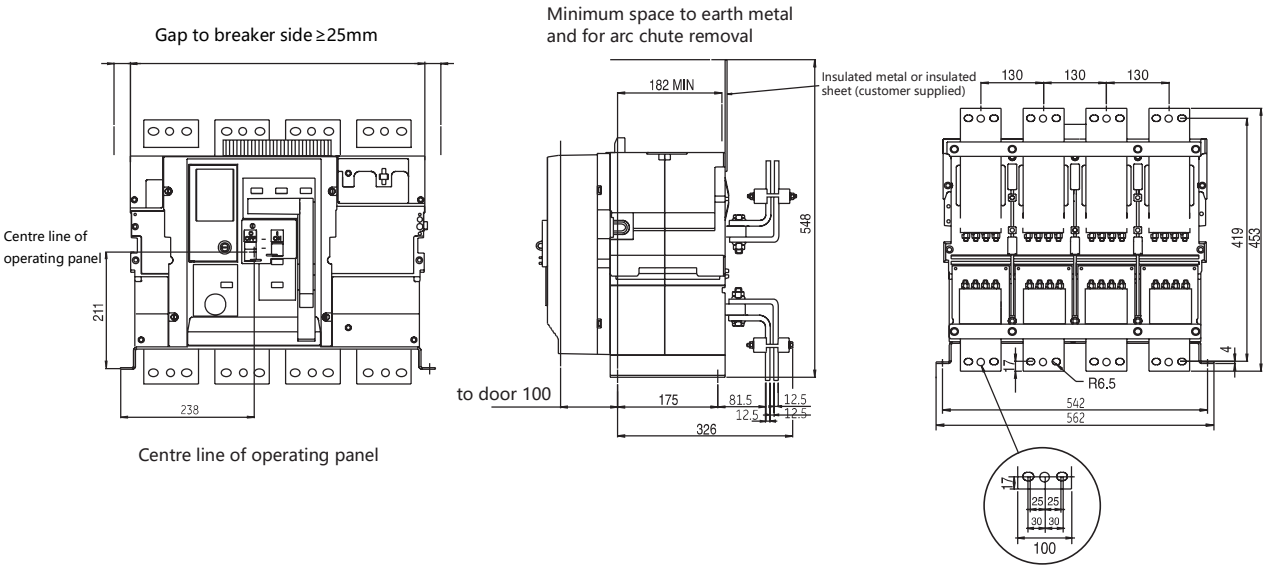
Front access connection of Fixed type

3P, Type A and Type D, 3200A to 4000A
3P, Type H_1 and Type H_2, 800A to 4000A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

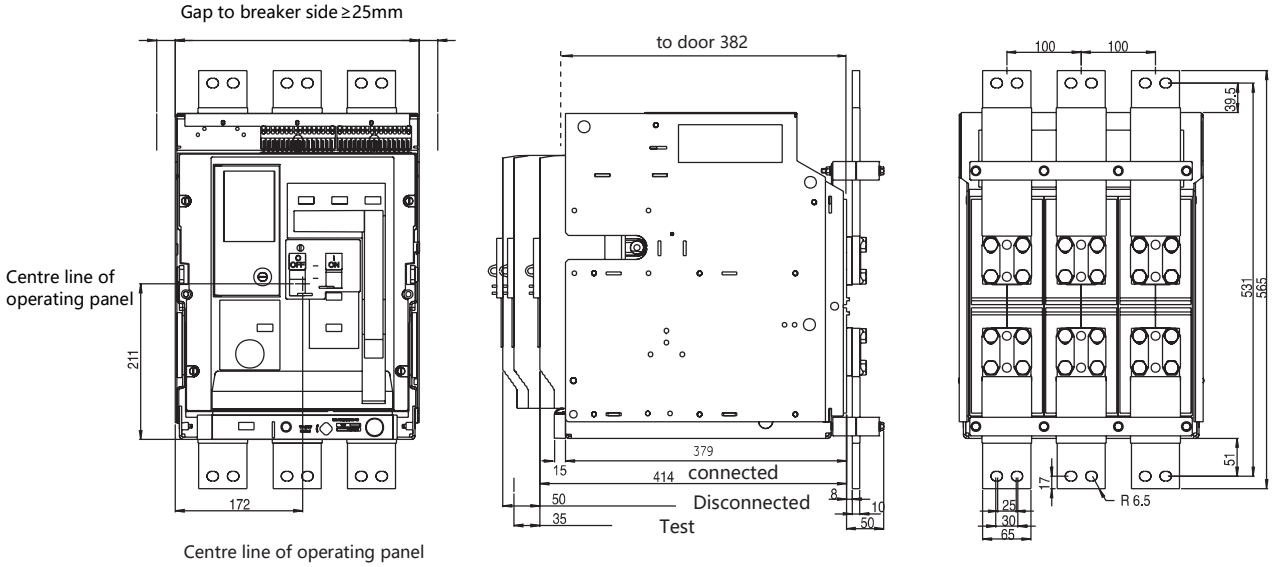
4P, Type A and Type D, 3200A to 4000A
4P, Type H_1 and Type H_2, 800A to 4000A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

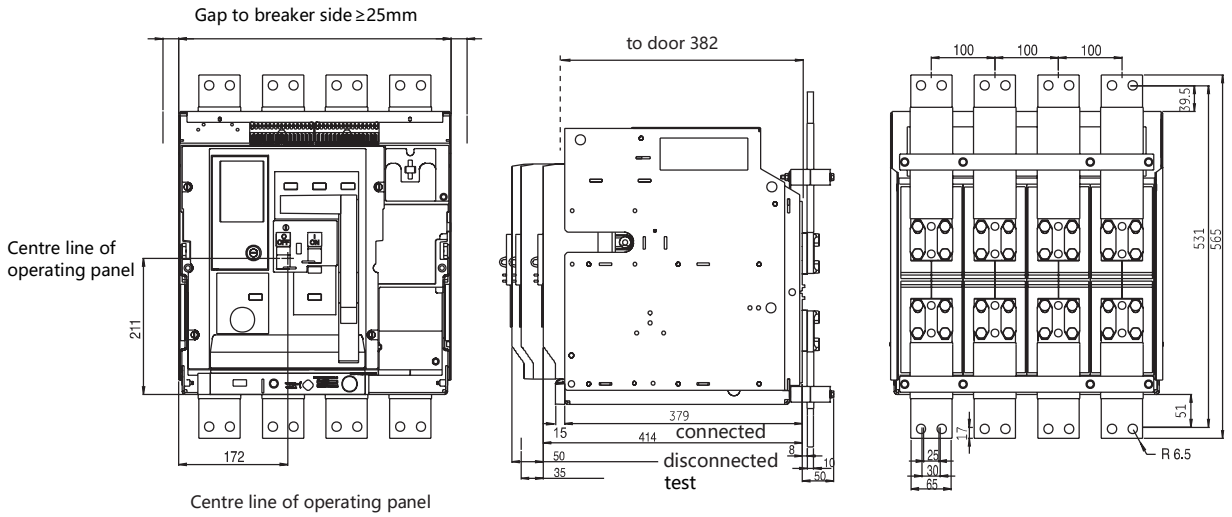
Front access connection of Withdrawable type

3P, Type A and Type D, 400A to 1600A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

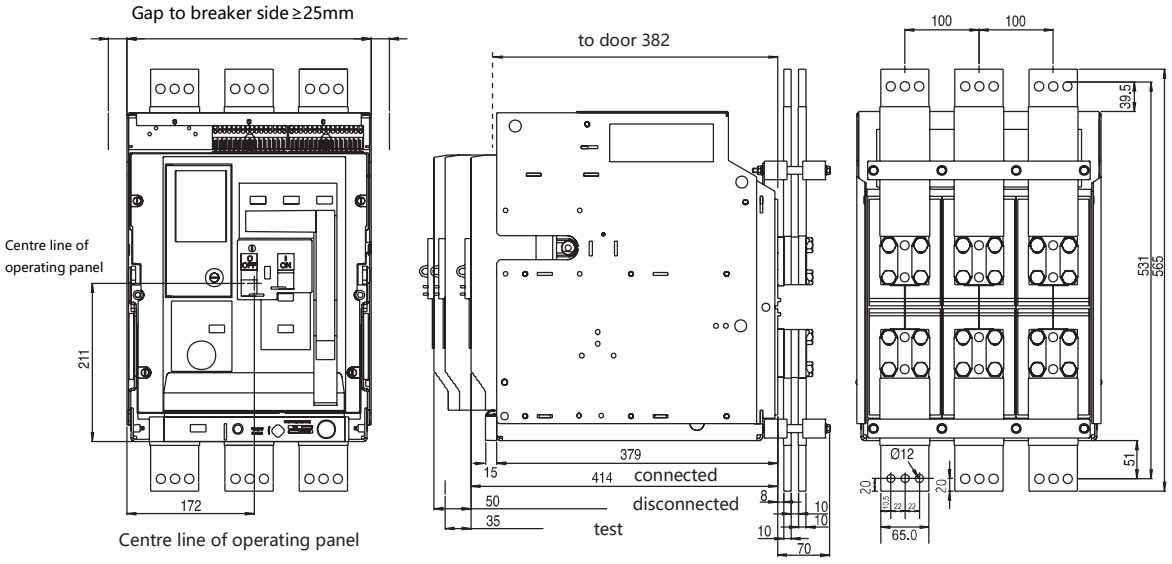
4P, Type A and Type D, 400A to 1600A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

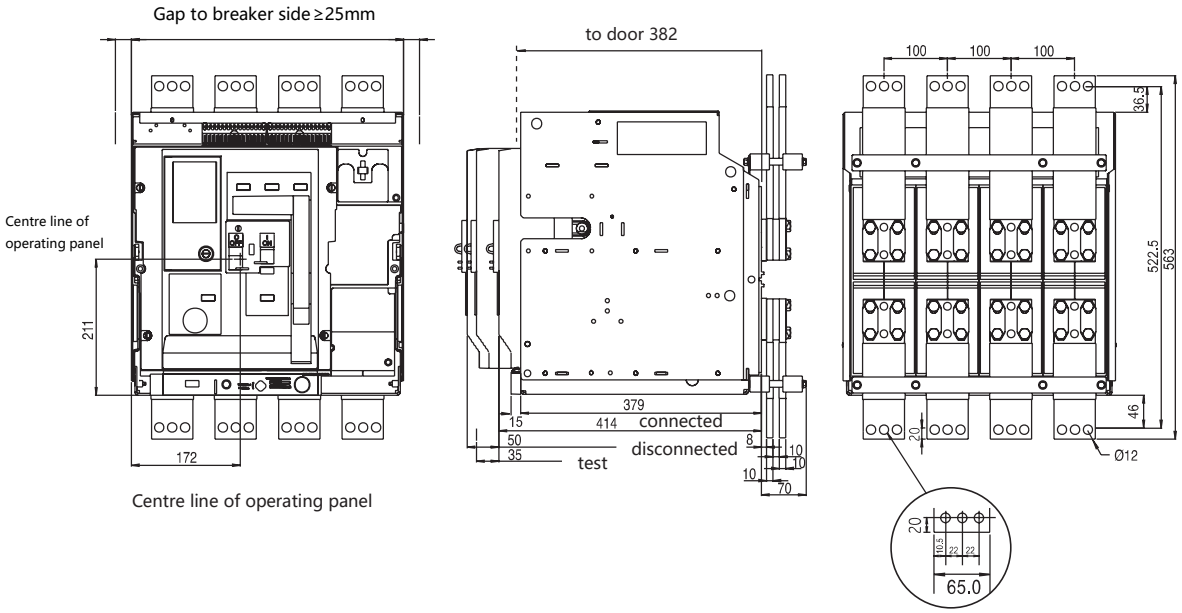
Front access connection of Withdrawable type

3P, Type A and Type D, 2000A to 2500A，Type D2, 400 to 2500A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

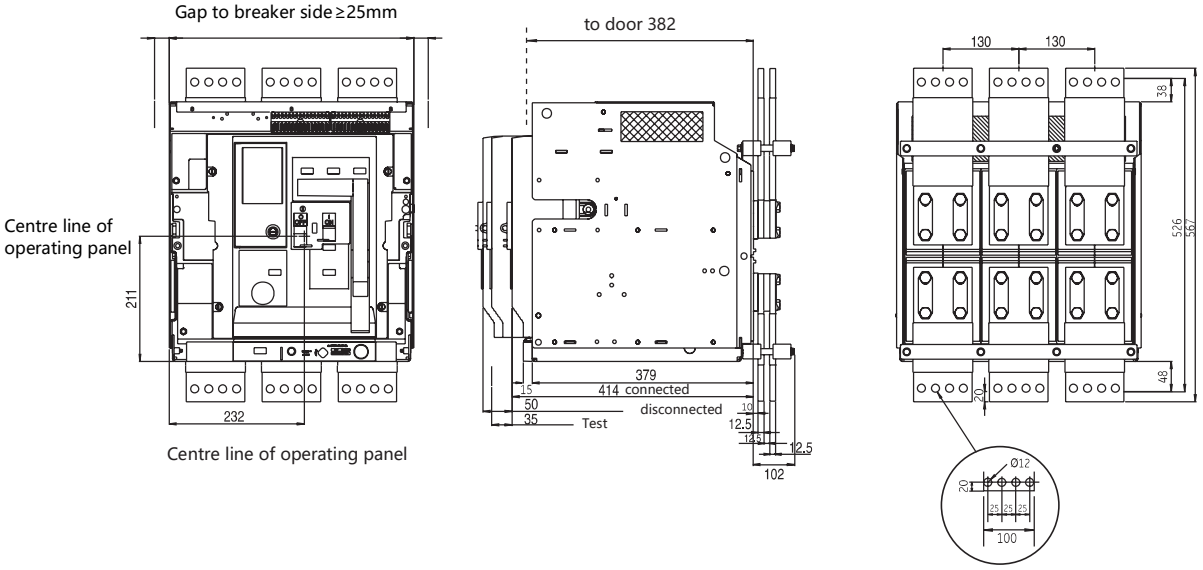
4P, Type A and Type D, 2000A to 2500A，Type D2, 400 to 2500A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

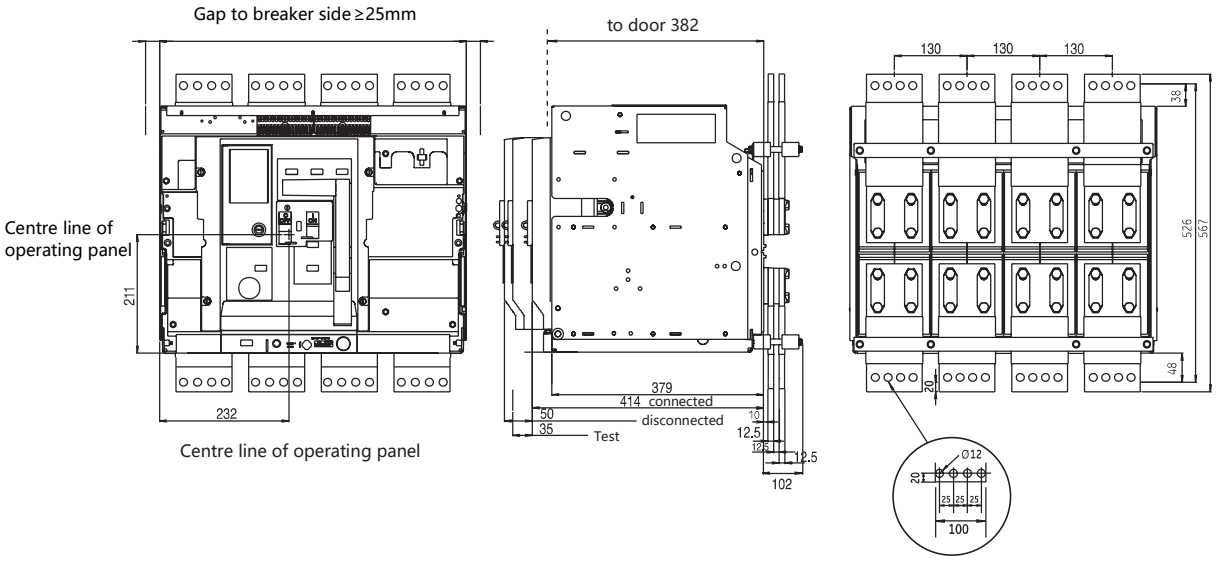
Front access connection of Withdrawable type

3P, Type A and Type D, 3200A to 4000A
3P, Type H, 800A to 4000A



Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

3P, Type A and Type D, 3200A to 4000A
3P, Type H, 800A to 4000A

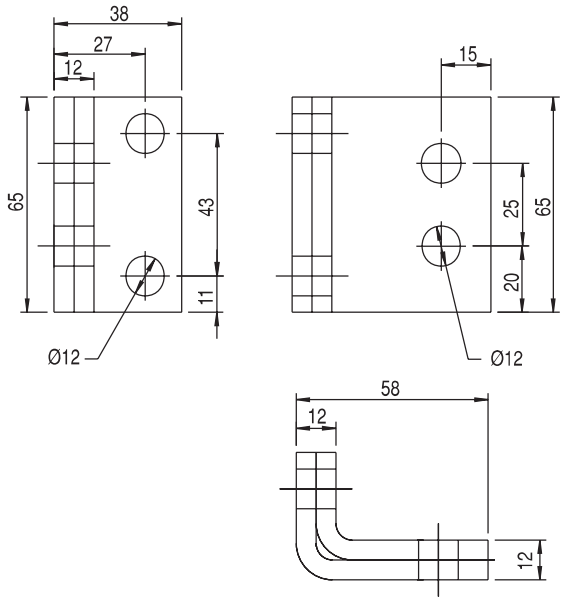


Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

Adaptor connections

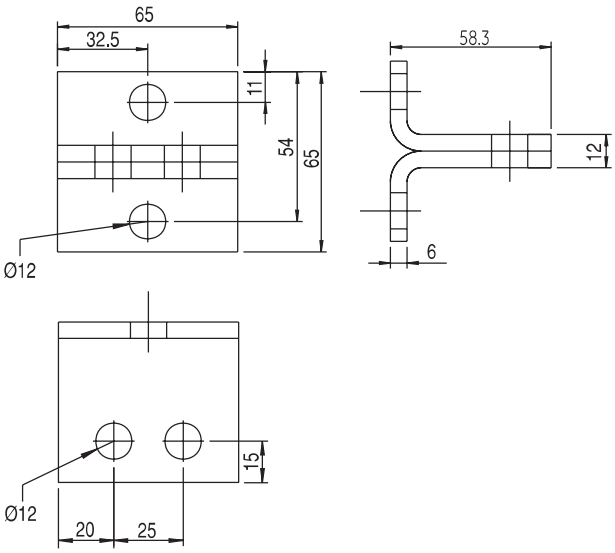
Rear Adapter Vertical Connection

Frame 1, Type A, L-Vertical, In=400-1600A



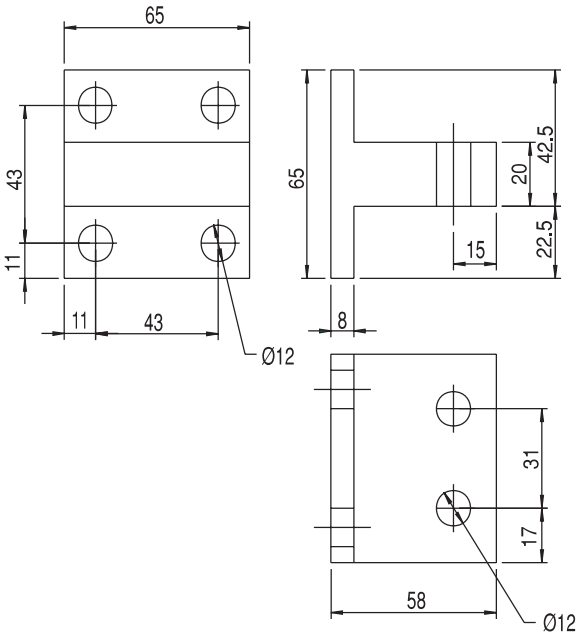
Rear Adapter Horizontal Connection

Frame 1, Type A, L-Horizontal, In=400-1600A

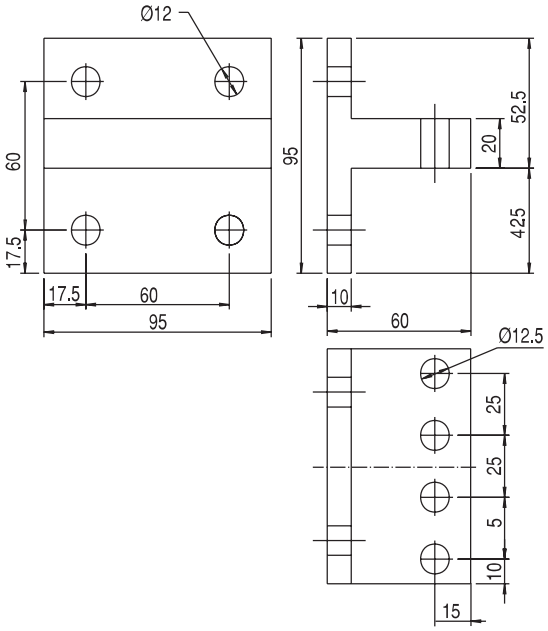


Rear Adapter Vertical / Horizontal Connection

Frame 1, Type D and Type D2, T-shaped , In=400-2500A

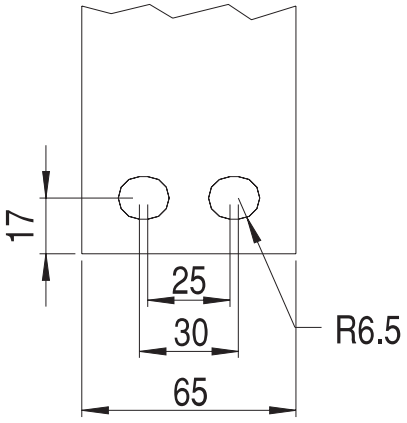


Frame 2, Type A, D, H,T-shaped, In=800-3200

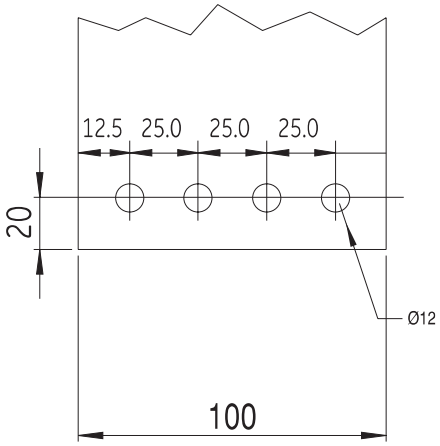


Copper connections - Front access (Fixed and/or withdrawable)

Type A, In=400A to 2500A
Type D, In=400A to 2500A

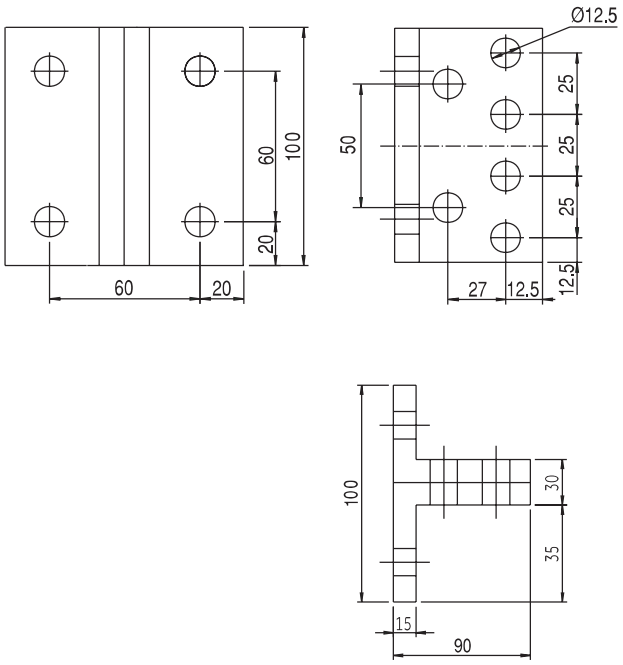


Type A, D, In =3200A to 4000A
Type H, In =800A to 4000A

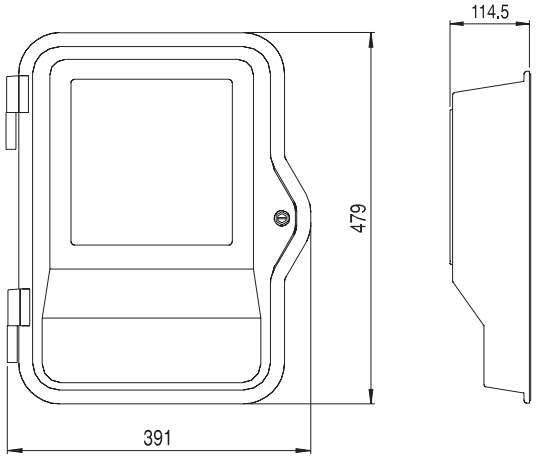


Copper connections - Rear access (withdrawable)

Type A, D, H, In= 4000A

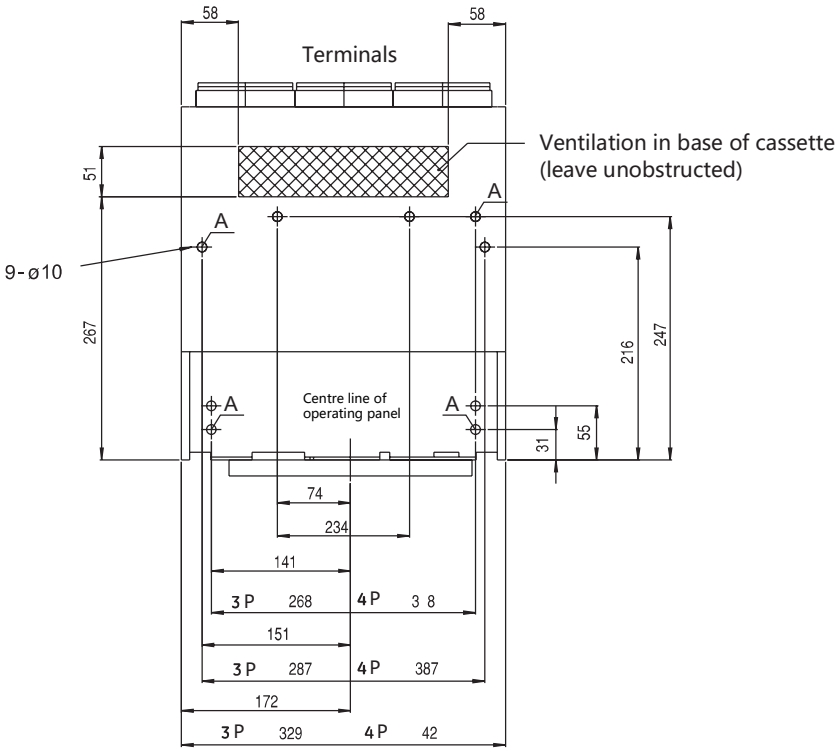


IP54 Door
(Withdrawable unit only - Frame 1&2 only)

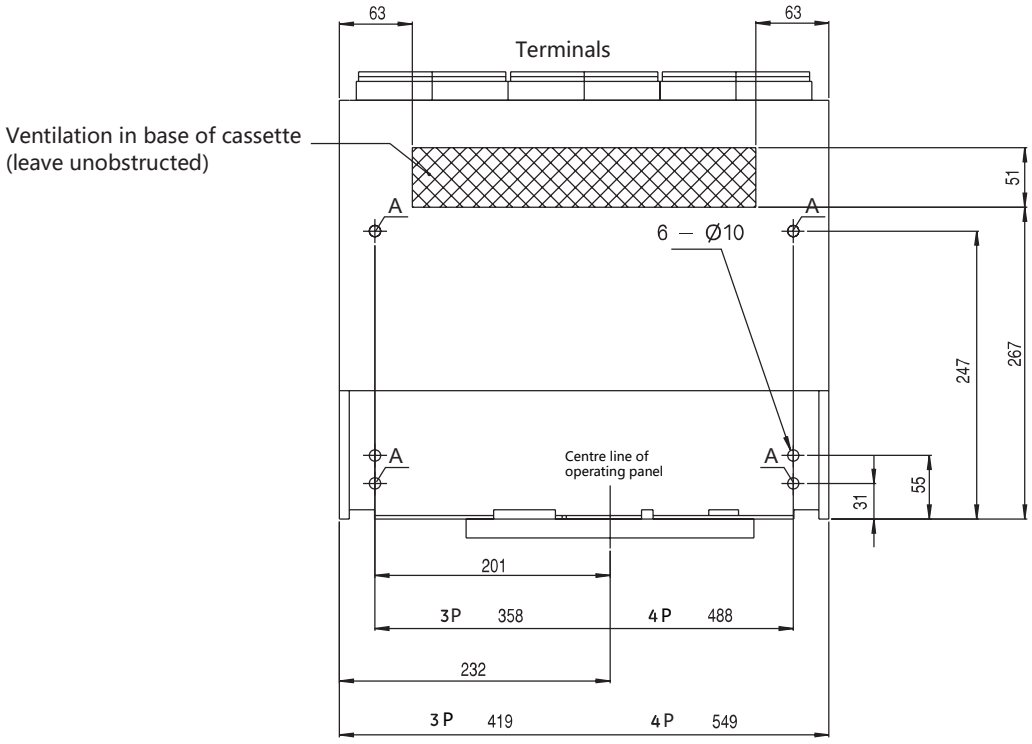


Cassette mounting details (Top view)

Type A, D、D2, In=400A to 2500A



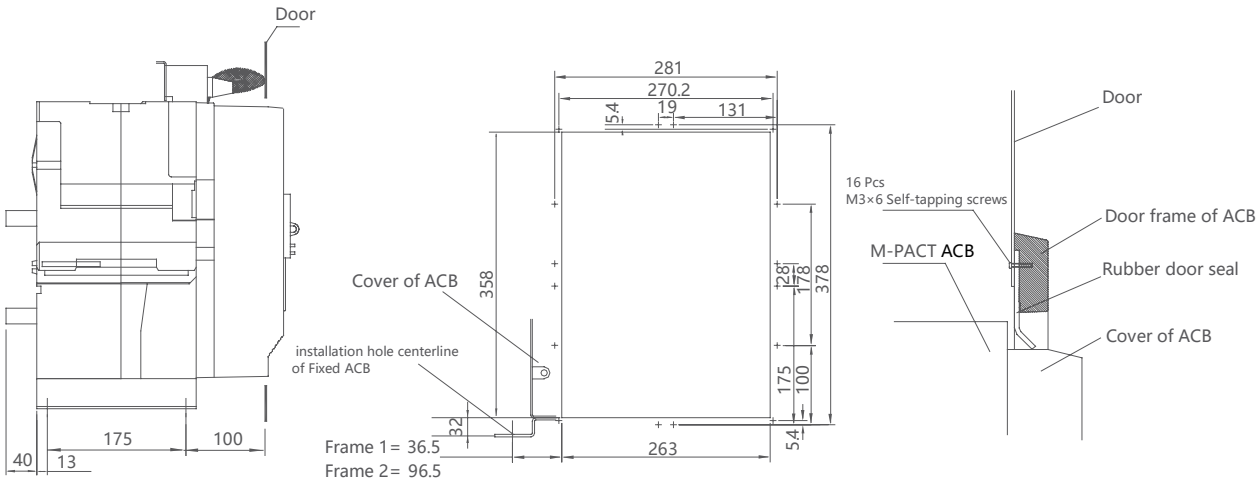
Type A, D, In = 3200A to 4000A
Type H, In = 800A to 4000A



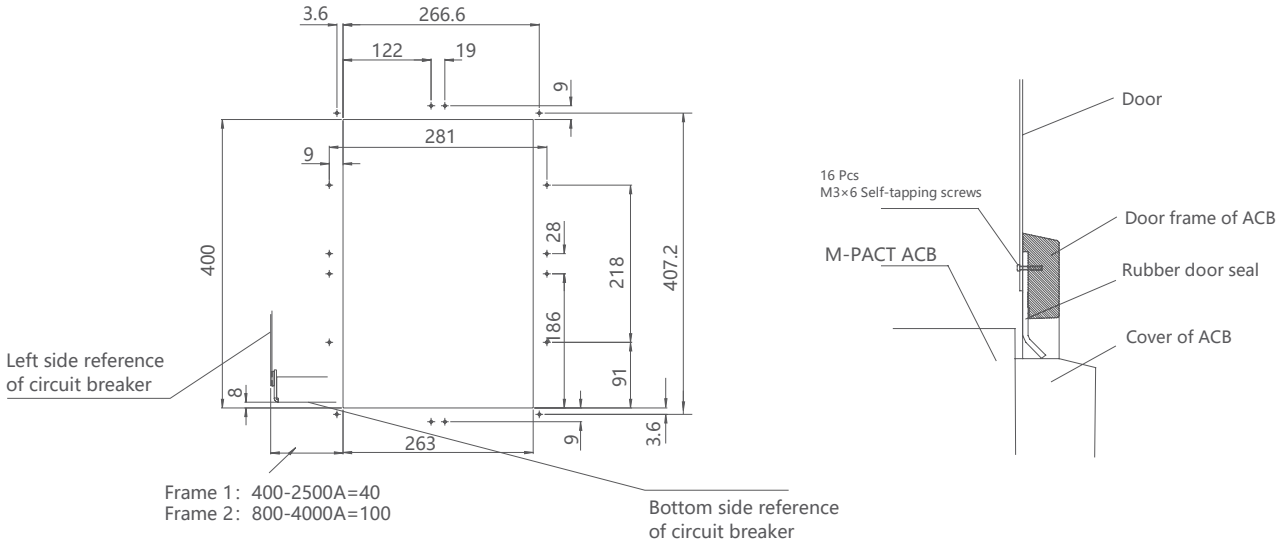
A = recommended installation mounting cut

Door cut-outs

Fixed

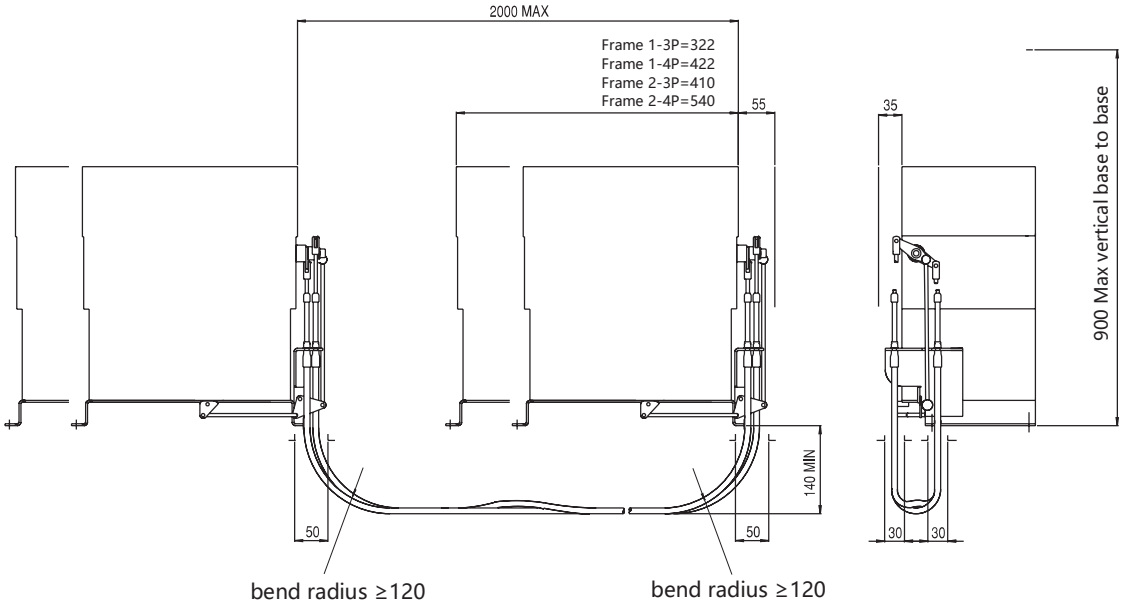


Withdrawable



2-Way cable interlocking

Fixed



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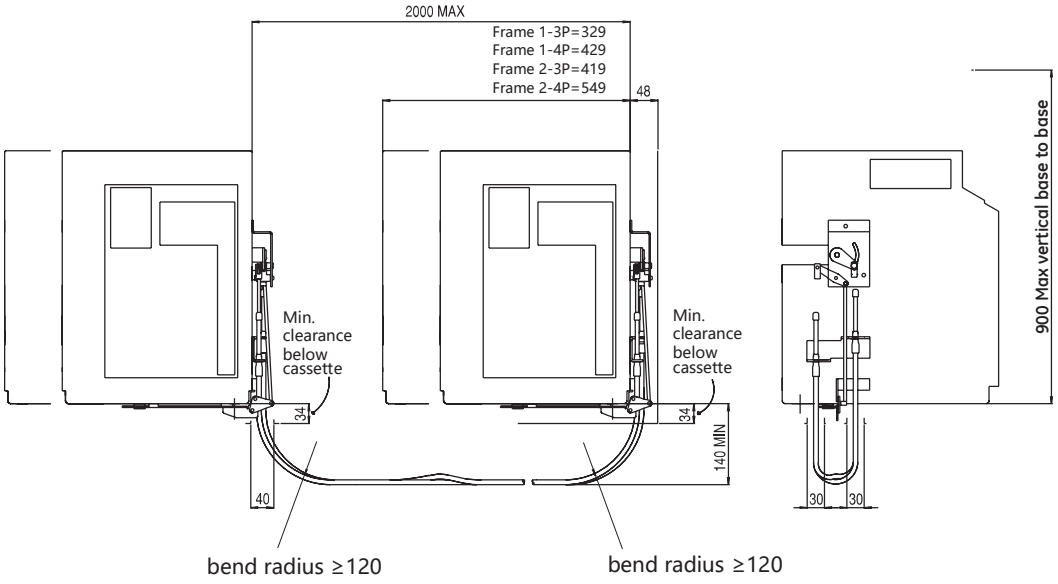
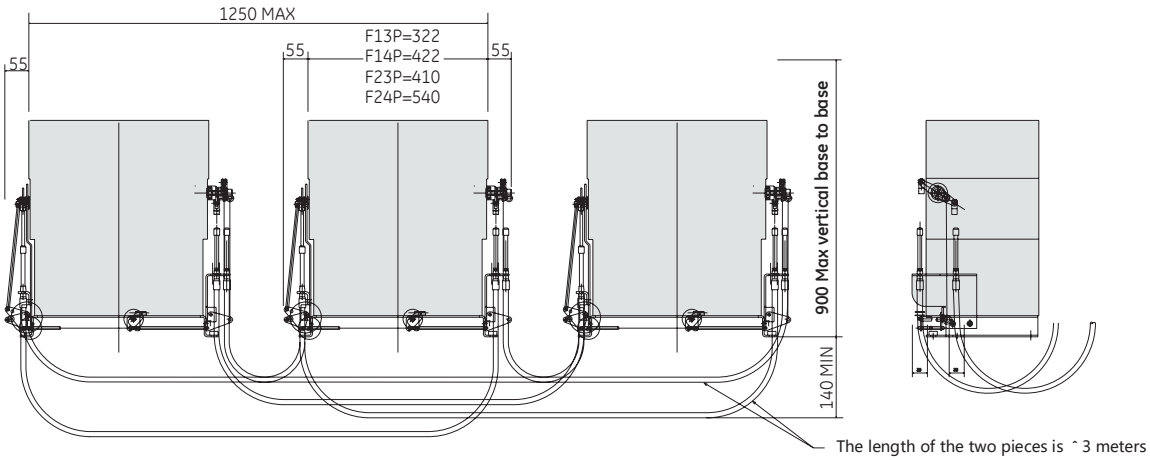
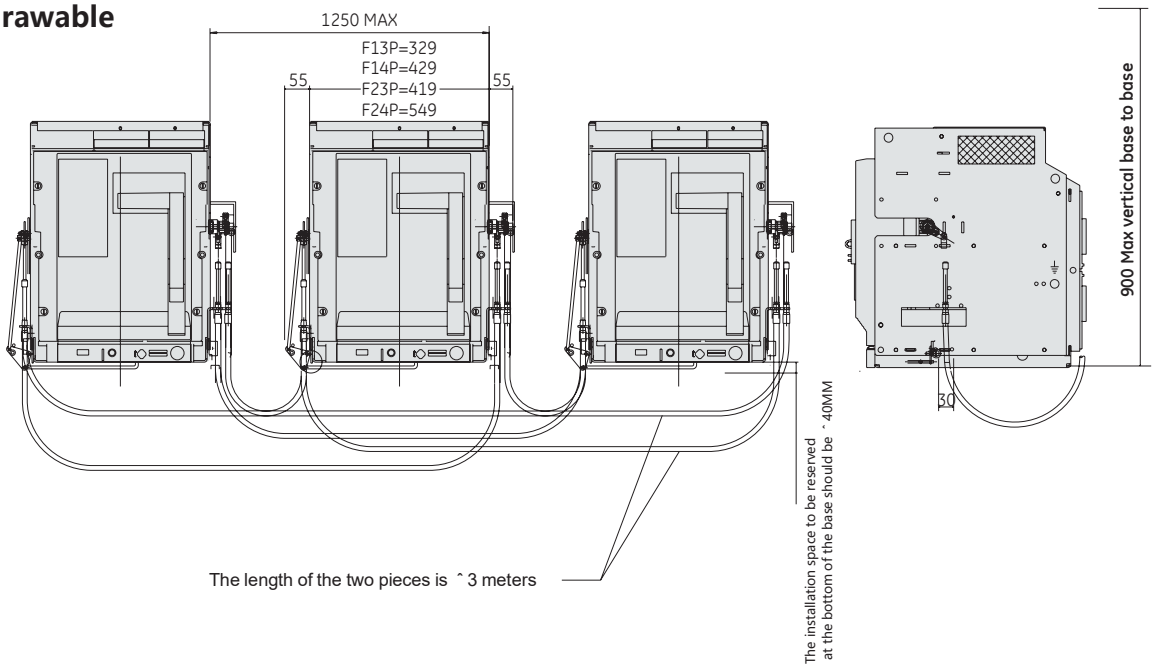


3-Way cable interlocking

Fixed



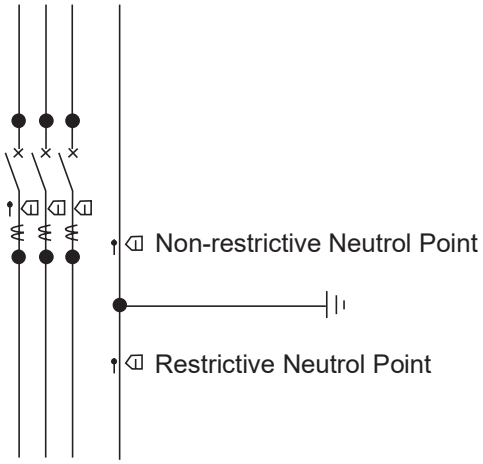
Withdrawable



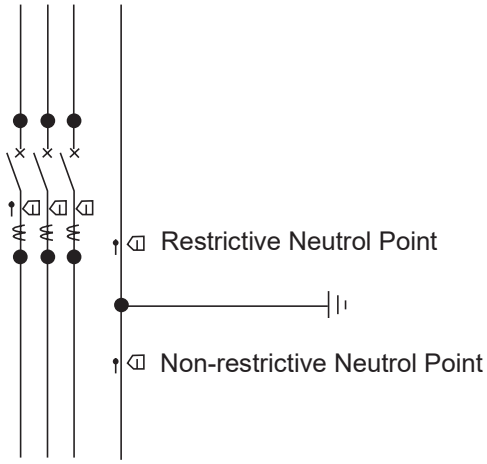
Ground fault protection (GF SUM) and Ground fault protection (GF CT)

Ground Fault Protection (GF SUM) Connection Diagram

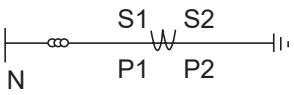
Power input at the top terminal



Power input at the top terminal



Ground fault protection (GF CT)



Ground lead CT

Power	Terminal Connection
CT(S1)	B3
CT(S2)	B4

AEG

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This catalog may be subjected to revision without prior notice.
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