M-PACT
Air circuit Breakers

GEIS

About GEIS

GEIS has its roots in the General Electric Company, established by Thomas Edison.

Following the introduction of the first circuit breaker in 1879, Edison's enterprise underwent a significant transformation in 1892, merging with the Houston Electric Company to form General Electric (GE).

In 2018, GE Industrial Solutions was separated from GE, leading to the establishment of GEIS in 2019, which focuses on pioneering electrification solutions.

GEIS offers a comprehensive range of products, including low and medium voltage electrical components, electrical switchgear, distribution power panels, and critical power solutions, all of which have been rigorously developed over decades to ensure reliability in various applications.

Committed to safety, intelligence, and sustainability, GEIS aims to foster a safer, smarter, and greener electrification future while delivering innovative and efficient solutions to its customers.

Safer, Smarter, Greener

Over 130 years, We deliver reliable power

Technical data

Order codes

Wiring diagrams - Dimensional drawings

Rated from 400 to 4000A the M-PACT circuit breaker has been designed to meet the most stringent demands in fault detection and safe interruption thereof.

Available in 2 frame sizes:
- frame size 1 ranging from 400 to 2500A
- frame size 2 ranging from 800 to 4000A

The range has been developed to be aesthetically and technically coordinated with other protective devices within the GE industrial product ranges.

The breaker range has a common height and depth and is available in both fixed pattern and drawout versions which can be manually or electrically operated.

Designed to offer multiple mains connection options it also comes with a wide range of easy-to-install accessories.

Specification

M-PACT air circuit breakers comply with the following specifications for Low Voltage Switchgear:
IEC 60947-1

IEC 60947-2

IEC 60947-3

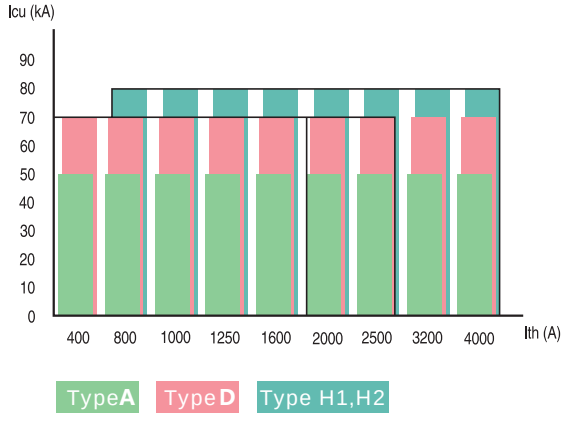
Utilisation category B

Approvals

KEMA certifi cation in accordance with IEC 60947-2,

CCC certifi cation in accordance with GB14048-2

3 performance ranges ***415VAC**
A - 50kA (Icu)
D - 70kA (Icu)
H1,H2 - 80kA (Icu)
2 compact frame sizes
- Frame size 1 - 400 to 2500A
- Frame size 2 - 800 to 4000A
Fixed pattern and withdrawable versions
3 or 4 pole versions
Front and rear access connections (horizontal/vertical)
Devices provided with or without protection relay
Manual or electrical operation
Common height and depth dimensions
Built-in safety features e.g. safety shutters
Wide range of protection settings offering full selectivity
Combinations of earth fault protection
Easy-to-install accessories, common to entire range
Simple and effi cient servicing on site



Fixed Circuit Breaker

All M-PACT fixed pattern air circuit breakers incorporate a stored energy mechanism. The spring can be charged either manually or electrically via a motor operator that is automatically activated after the closing operation.
IP43 front panel and door escutcheon seals are standard features with IP20 protected secondary isolating contacts. For enhanced protection, an optional IP54 door panel is also available.

- Trip-free operating mechanism
- Positive 'ON/OFF' contact indication
- Mechanical/electrical anti-pumping device
- Charging spring status indication (optional)
- Ergonomic manual spring charging handle
- Field-mountable range of accessories
- Auxiliary switches 5 NO and 3 NC, 10A 250V (standard)
- Padlockable push-button cover
- Mechanical cable interlocking (optional)
- Termination: rear, horizontal or front access (optional)
- Electrical clearances according to IEC 60947-2
- Front access of secondary terminals for simple connection
- Mechanical trip alarm switch (1NO) (optional)

Installation

Fixed pattern M-PACT Plus can be fastened into any suitable switchboard or cubicle arrangement using four M8 bolts. Clearance is only required above the unit for the removal and inspection of the arc chutes (see dimensional drawings for mounting details and recommended clearance distances). An earthing point is provided on either side of the circuit breaker.

Power Supply

All stated short circuit ratings are certified with incoming supply connection made to either upper or lower terminals..

1.Motorised spring charging unit (optional)
2.M-PRO Control Unit (optional)
3.Secondary contacts
4.Shunt trip (optional)
5.Closing coil (optional)
6.Undervoltage release (optional)
7.Manual charging handle
8.ON/OFF push-buttons
9.Push-button padlockable covers
10.Positive contact indication
11.Charging spring status indication
12.Mounting plate

Withdrawable Circuit Breaker

6re mounted into a sdf contained tassette', this versatle circuit breaker can be inserted or withdrawn via sliding rails using a racking drive mechanism controlled by a racking handle t provides three set positions: Disconnected / :est /)onnected.
'ny attempt to withdraw the unit whilst in service will automatically trip the breaker, either by the racking position safety mechanism or by the insertion of the racking handle.
It can be racked to the disconnected position with the cubicle door closed or open.

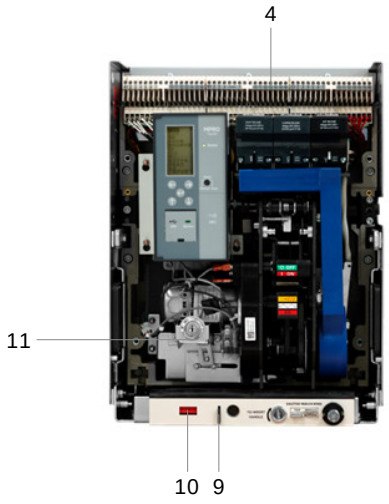
- Insulated, earthed steel shutters to isolate the main contact zone
- Front access padlocking for safety shutters
- Secure padlocking in the "Disconnect" position
- Clearly visible operational position indication
- Carriage position switch (optional)
- Termination: Flat copper palms (standard) with captive M10 fixing nuts
- T' terminal adaptors for horizontal/vertical connection (optional)
- Front access connections (optional)
- Automatic disconnect of secondary circuits
- Lifting lugs for ease of removing the circuit breaker from the cassette
- Front access of secondary terminals for simple connection
- Cassette side mounting fixing parts (optional)

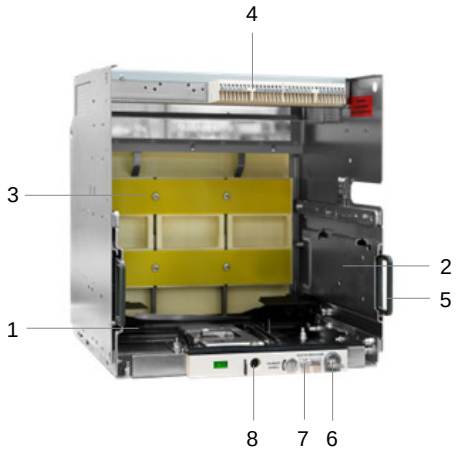
Installation

Circuit breakers are delivered pre-mounted in the cassette (standard)
Versatile fixing awrrangements allow mounting onto any switchboard or cubicle using four M8 bolts (see dimensional drawings for mounting details and recommended clearance distances)
Earthing point situated on the right hand side of cassette (front view)

Power Supply

All stated short circuit ratings are certified with incoming supply connection made to either upper or lower terminals.





1.Carriage position switch (optional)
2.Extension rail
3.Earthed steel safety shutter
4.Secondary terminals
5.2 way cable interlock mechanism (optional)
6.Racking handle (storage)
7.Padlocking for safety shutters
8.Insertion hole for racking handle
9.Padlocking in the DISCONNECTED position
10.Operational position indication
11.Key interlock (optional)

Characteristics

Performance data

Rated current (40°C)				400		800				1000				1250			
Endurance (No. of operating cycles)																	
Mechanical (with maintenance)				40000		40000	25000			40000	25000			40000	25000		
Mechanical (without maintenance)				25000		25000	15000			25000	15000			25000	15000		
Electrical (at rated current)				10000		10000	10000			10000	10000			10000	10000		
Rated service voltage (50/60 Hz)	Ue	V		690		690				690				690			
Rated insulation voltage	Ui	V		1000		1000				1000				1000			
Rated impulse withstand voltage	Uimp	V		12000		12000	12000			12000	12000			12000	12000		
Number of poles				3 & 4		3 & 4				3 & 4				3 & 4			
Rating of 4th pole				100%		100%				100%				100%			
Breaking Code				A	D	A	D	H1	H2	A	D	H1	H2	A	D	H1	H2
Frame size				1	1	1	1	2	2	1	1	2	2	1	1	2	2
Rated ultimate short-circuit	Icu	kA (rms)	220V	50	70	50	70	80	80	50	70	80	80	50	70	80	80
Breaking capacity			415V	50	70	50	70	80	80	50	70	80	80	50	70	80	80
			500V	-	50	-	50	-	80	-	50	-	80	-	50	-	80
			600V	-	50	-	50	-	65	-	50	-	65	-	50	-	65
			690V	-	50	-	50	-	65	-	50	-	65	-	50	-	65
Rated service short-circuit	Ics	kA (rms)	220V	50	65	50	65	80	80	50	65	80	80	50	65	80	80
Breaking capacity			415V	50	65	50	65	80	80	50	65	80	80	50	65	80	80
			500V	-	50	-	50	-	80	-	50	-	80	-	50	-	80
			600V	-	50	-	50	-	65	-	50	-	65	-	50	-	65
			690V	-	50	-	50	-	65	-	50	-	65	-	50	-	65
Rated short time withstand current																	
1 second	Icw 415/690VA	kA (rms)		50	65/50	50	65/50	65	80	50	65/50	65	80	50	65/50	65	80
3 seconds	Icw	kA (rms)		-	50	-	50	-	-	-	50	-	-	-	50	-	-
Rated short-circuit making capacity	Icm	kA (peak)	415V	105	143	105	143	176	176	105	143	176	176	105	143	176	176
			500V	-	143	-	143	-	176	-	143	-	176	-	143	-	176
			600V	-	105	-	105	-	143	-	105	-	143	-	105	-	143
			690V	-	84	-	84	-	105	-	84	-	105	-	84	-	105
消耗功率(固定式)		W		15	10	63	43	23	20	106	68	36	32	175	105	60	53
消耗功率(抽出式)		W		30	21	127	86	49	43	211	135	77	68	351	211	128	113

Note 1: Design and specifications are subject to changes without notice.
AC500V/600V/690V breaking capacity, please contact us.

Note 2: Frame 1, working voltage at 690V, short-circuit breaking capacity of 65kA, breaking code D2

Note 3: Circuit breaker opening time ≤ 30ms; Closing time ≤ 60ms

Note 4: The arcing distance of the circuit breaker is 0

Selectivity

The following table shows the conditions to satisfy full selectivity between UP-STREAM and DOWN-STREAM devices.
Up-stream: M-PACT
Down-stream: M-PACT
ST delay 50 ms minimum between up-stream and downstream
ACB Multiplication coefficient between LT-ratings ≥ 1,56

Up-stream \ Down-stream	-	400	800	1000	1250	1600	2000	2500	3200	4000
400	-	-	-	-	-	-	-	-	-	-
800	Full	-	-	-	-	-	-	-	-	-
1000	Full	-	-	-	-	-	-	-	-	-
1250	Full	Full	-	-	-	-	-	-	-	-
1600	Full	Full	Full	-	-	-	-	-	-	-
2000	Full	Full	Full	Full	-	-	-	-	-	-
2500	Full	Full	Full	Full	Full	Full	-	-	-	-
3200	Full	Full	Full	Full	Full	Full	Full	-	-	-
4000	Full	Full	Full	Full	Full	Full	2000	Full	-	-

Temperature Deratings

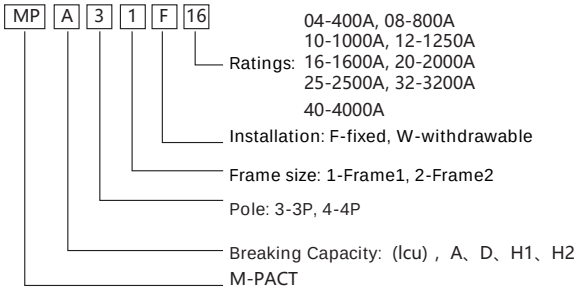
Free Air[1]
The M-PACT ACBs may operate at higher ambient temperatures than 40°C in certain installation conditions.
In this case the current rating in Amperes should be reduced as indicated below.

Ambient Temperature	Current Rating (A)							
	800	1000	1250	1600	2000	2500	3200	4000
50°C	800	1000	1250	1600	2000	2450	3200	3727
60°C	800	1000	1250	1445	2000	2232	3200	3367
65°C	800	1000	1250	1364	2000	2092	3019	3175
70°C	800	1000	1250	1280	1970	1970	2831	2978

The figures specified apply to withdrawable ACB's with flat face vertical copper connections
(1) Protection degree IP00.For use in enclosures with interior temperatures of 40° to 70° the relevant IP values can be applied.

1600				2000				2500				3200				4000			
40000		25000		40000		25000		40000		25000		25000				25000			
25000		15000		25000		15000		25000		15000		15000				15000			
10000		10000		8000		8000		8000		8000		7000		7000		6000		6000	
690				690				690				690				690			
1000				1000				1000				1000				1000			
12000		12000		12000		12000		12000		12000		12000				12000			
3 & 4				3 & 4				3 & 4				3 & 4				3 & 4			
100%				100%				100%				100%				100%			
A	D	H1	H2	A	D	H1	H2	A	D	H1	H2	A	D	H1	H2	A	D	H1	H2
1	1	2	2	1	1	2	2	1	1	2	2	2	2	2	2	2	2	2	2
50	70	80	80	50	70	80	80	50	70	80	80	50	70	80	80	50	70	80	80
50	70	80	80	50	70	80	80	50	70	80	80	50	70	80	80	50	70	80	80
-	50	-	80	-	50	-	80	-	50	-	80	-	-	-	80	-	-	-	80
-	50	-	65	-	50	-	65	-	50	-	65	-	-	-	65	-	-	-	65
-	50	-	65	-	50	-	65	-	50	-	65	-	-	-	65	-	-	-	65
50	65	80	80	50	65	80	80	50	65	80	80	50	65	80	80	50	65	80	80
50	65	80	80	50	65	80	80	50	65	80	80	50	65	80	80	50	65	80	80
-	50	-	80	-	50	-	80	-	50	-	80	-	-	-	80	-	-	-	80
-	50	-	65	-	50	-	65	-	50	-	65	-	-	-	65	-	-	-	65
-	50	-	65	-	50	-	65	-	50	-	65	-	-	-	65	-	-	-	65
50	65	65	80	50	65	65	80	50	65	65	80	50	65	65	80	50	65	65	80
-	50	-	-	-	50	-	-	-	50	-	-	-	-	-	-	-	-	-	-
105	143	143	176	105	143	176	176	105	143	176	176	105	143	176	176	105	143	176	176
-	143	-	143	-	143	-	176	-	143	-	176	-	-	-	176	-	-	-	176
-	105	-	105	-	105	-	143	-	105	-	143	-	-	-	143	-	-	-	143
-	84	-	84	-	84	-	105	-	84	-	105	-	-	-	105	-	-	-	105
284	284	196	98	86	224	163	143	351	351	255	223	418	418	418	366	571	571	571	571
574	574	392	209	184	490	347	306	765	765	542	478	888	888	888	783	1224	1224	1224	1224

Catalogue Number Configuration



For example, the user requires a 1600A, 3-pole, withdrawable, Frame 1，Icu=70kA
The product number should be MPD31W16

Note: Frame 1 , working voltage at 690V, a short-circuit breaking capacity of 65kA, breaking code is D2

Recommended Minimum Copper Size

In accordance with IEC 60947-2

Rating (A)	Copper / phase
400	2 x 50 x 5
800	2 x 50 x 5
1000	2 x 60 x 5
1250	2 x 100 x 5
1600	2 x 100 x 5
2000	3 x 100 x 5
2500	4 x 100 x 5
3200	4 x 100 x 10
4000	4 x 100 x 10 + 1 x 100 x 5

Dimensions in mm

Frame Size	Rating (A)	Poles	Type	Height[1]	Width	Depth[2]
1	400 to 2500	3	Withdrawable	440	329	422
			Fixed	430	342	352
		4	Withdrawable	440	429	422
			Fixed	430	442	352
2	800 to 4000	3	Withdrawable	440	419	424
			Fixed	430	432	352
		4	Withdrawable	440	549	424
			Fixed	430	562	352

(1) Height is from mounting surface to highest part of the ACB.
(2) Depth is from the cubicle door to the back of terminals.
* 4P, Neutral on the left or right Please specify on selection form,the default option is Neutral on right.

Weights (kg)

		S range		N range		H range	
Fixed pattern	**Frame**	**3 Pole**	**4 Pole**	**3 Pole**	**4 Pole**	**3 Pole**	**4 Pole**
400 to 1600A	1	39	49	39	49	/	/
2000 to 2500A	1	43	54	43	54	/	/
800 to 3200A	2	53	68	53	68	53	68
4000A	2	53	68	53	68	53	68
Withdrawable	**Frame**	**3 Pole**	**4 Pole**	**3 Pole**	**4 Pole**	**3 Pole**	**4 Pole**
400 to 1600A	1	68	79	68	79	/	/
2000 to 2500A	1	74	85	74	85	/	/
800 to 3200A	2	90	109	90	109	90	109
4000A	2	113	128	113	128	113	128

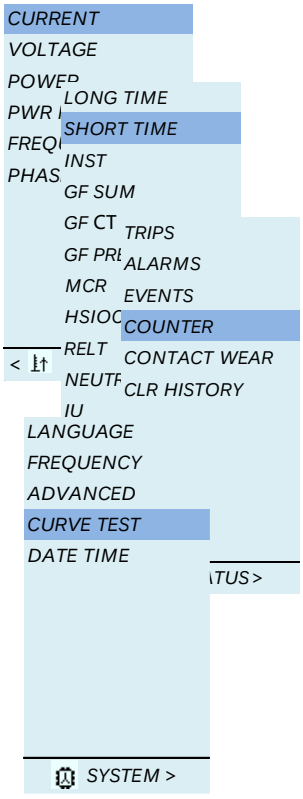
Mpro Intelligent control unit

New generation advanced intelligent control unit

M-PACT offers a full range of air circuit breakers, including the new generation Mpro digital control units Mpro21/22, Mpro31/32, and Mpro41/42. Featuring a unified LCD display design, providing electrical parameters such as current, convenient and accurate function menu keyboard, and a wide range of parameter and current settings.

All function menu settings can be achieved through four setting buttons and one confirmation button, allowing for quick and accurate parameter settings of the device. Users can easily choose between manual or automatic fault reset on the panel.

When the external power module is not powered on, the control unit can also be activated through an external test module with a battery.



Main adjustable options

Ir- Overload long-time protection

Overload long-time protection setting (Ir), adjustable from 0.2-1 In, with a step size of 0.1 * In or 1A. The setting range for Overload long-time tripping time is 0-24s, which can meet the overload protection requirements of different lower level loads.

Isd-Short circuit delay protection

The short-circuit short delay protection setting can be adjusted from 1.5-10 Ir (long delay setting value), with a step size of 0.5 * Ir or 1A. Short circuit short delay Tsd provides two methods: fixed time and inverse time, with a set time of 0-0.4s

Ii -Short circuit instantaneous protection

The short-circuit instantaneous protection setting can be adjusted from 2-15In, with a step size of 1 * In or 1A. The short-circuit instantaneous protection is set to ensure that the lower pole circuit breaker opens first.

Other protective features

Other optional protection functions include RELT, ground protection of vector sum, independent ground CT protection, voltage protection, frequency protection, power protection, etc. Please refer to the control unit function page of the catalogue for details.

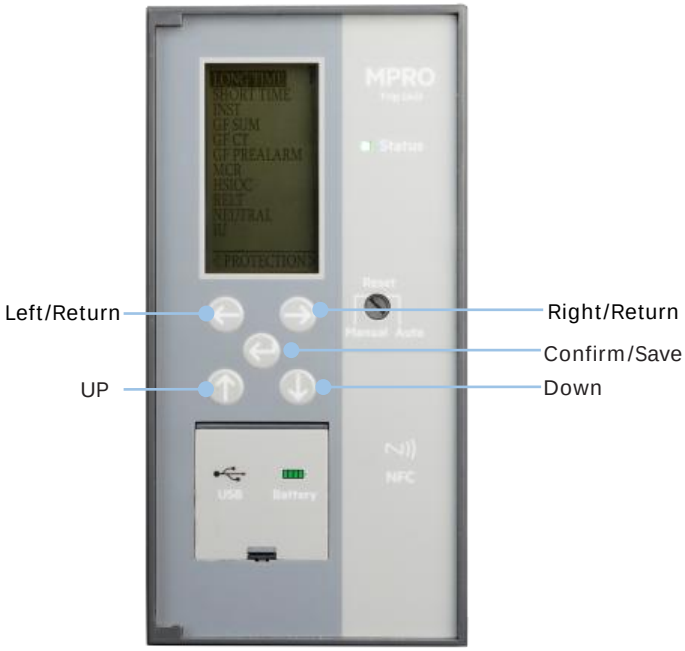
Parameter measurement, relay and communication functions

The control unit can provide Modbus RTU communication function, capturing and recording overload, short circuit, ground tripping events and other functions.

The M-PACT series of circuit breakers can be configured with three basic types of digital electronic control units: Mpro21/22, Mpro31/32, and Mpro41/42. Each basic type of control unit has the same appearance design, a wide rated current setting range (0.2-1In), and a simple and accurate circuit breaker parameter setting menu.

Mpro21/22, Mpro31/32 control units provide ammeter function.
Mpro41/42 control unit provides current, voltage, power, and frequency measurement functions.

By using 4 setting keys and one confirmation key, it is convenient and accurate to set the function menu of the control unit



Before the device is powered on, the control unit can be activated through a power module with a standard configuration of a circuit breaker. During the normal operation of the control unit, power is supplied through the built-in induction coil of the circuit breaker or an external auxiliary power module. When there is no external power supply, the control unit is activated when the circuit breaker is loaded and the load current reaches 20% of the rated current of the circuit breaker.

In the absence of power, the internal battery of the Mpro control unit can also supply power to the control unit. When the "left/return" button on the control unit is pressed, the internal battery will activate the control unit and maintain the LCD on for 10 seconds after the button is released. After the control unit is activated, customers are allowed to set basic parameters, browse ammeters, and record events for the control unit.

It can also be connected to a DC 5V power supply through a USB interface to supply power to the control unit, and parameters can be set and read by connecting to the HMI.

Mpro Basic protection Functions

		Mpro21	Mpro22	Mpro31	Mpro32	Mpro41	Mpro42	**Default**
Display	LCD	●	●	●	●	●	●	
	Touch key	-	-	-	-	-	-	
	langue，Chinese/English	●	●	●	●	●	●	chinese
	Trip reset auto/manual	●	●	●	●	●	●	
Overload long time **protection, Ir**	Select from 0.2-1In，step 1A	●	●	●	●	●	●	1xIn
	Trip time form 0.5-24s，step 0.1s	●	●	●	●	●	●	4s
	State setting，Close/Trip	●	●	●	●	●	●	Trip
Short circuit delay **protection, Isd**	Select from 1.5-10Ir，step 1A	●	●	●	●	●	●	1.5xIn
	Trip time Tsd (I^2T ON) form 0.1-0.4s step 0.1s	●	●	●	●	●	●	
	Trip time Tsd (I^2T OFF) form 0.1-0.4s step 0.1s	●	●	●	●	●	●	0.1s
Instantaneous protection, Ii	State setting，Close/Trip	●	●	●	●	●	●	Trip
	Select from 2-15In，step 1A	●	●	●	●	●	●	2xIn
Ground Sum **protection,Ig**	State setting，Close/Trip/alarm	-	●	-	●	-	●	Close
	Select from 0.2-1In，step 1A	-	●	-	●	-	●	0.2xIn
	Trip time Tsd (I^2T ON) form 0.1-0.4s step 0.1s	-	●	-	●	-	●	0.1s
	Trip time Tsd (I^2T OFF) form 0.1-0.4s step 0.1s	-	●	-	●	-	●	0.1s
Ground **CT protection**	State setting，Close/Trip/alarm	-	●	-	●	-	●	Close
	Select from 0.2-1In，step 1A	-	●	-	●	-	●	0.2xIn
	Trip time Tsd (I^2T ON) form 0.1-0.4s step 0.1s	-	●	-	●	-	●	0.1s
	Trip time Tsd (I^2T OFF) form 0.1-0.4s step 0.1s	-	●	-	●	-	●	0.1s
Ground **fault** Pre-alarm	State setting，Close/GFSUM/GFCT	-	●	-	●	-	●	Close
	Select from 120-1200A，step 1A	-	●	-	●	-	●	200A
	Pre-alarm time from 1-10s，step 0.1s	-	●	-	●	-	●	10
	Return value select from120-1200A，step 1A	-	●	-	●	-	●	120A
	Return time form 1-10s，step 0.1s	-	●	-	●	-	●	10
Neutral protection	State setting，Close/Trip	●	●	●	●	●	●	Trip
	Neutral phase value，OFF or 50%-160%	●	●	●	●	●	●	100%
MCR and HSIOC protection	MCR protection mode，trip	●	●	●	●	●	●	Trip
	MCR value，30In/Icw	●	●	●	●	●	●	30In
	HSIOC protection mode，trip	●	●	●	●	●	●	Trip
	HSIOC value，30In/Icw	●	●	●	●	●	●	30In
	No tripping time，>20ms	●	●	●	●	●	●	
	Longest tripping time，≤80ms	●	●	●	●	●	●	
Reduced Instantaneous (RELT)	State setting，Close/Trip	●	●	●	●	●	●	Close
	Select from 2-15In，step 1A	●	●	●	●	●	●	10In
	No tripping time，>20ms	●	●	●	●	●	●	
	Longest tripping time，≤80ms	●	●	●	●	●	●	

● : Standard;　　○: Optional　　- : No this function

Mpro Advanced Protection Functions

		Mpro21	Mpro22	Mpro31	Mpro32	Mpro41	Mpro42	**Default**
Overvoltage and undervoltage protection	State setting，Close/Trip/alarm	-	-	-	-	●	●	Close
	Select from 20V～1500V，step 1V	-	-	-	-	●	●	280V
	Time from 0.1~300s，step 1s	-	-	-	-	●	●	10s
	Return value，20V～1500V，step 1V	-	-	-	-	●	●	360V
	Return time from 0.1~300s，step 1s	-	-	-	-	●	●	10s
Voltage unbalance protection	State setting，Close/Trip/alarm	-	-	-	-	●	●	Close
	Select from 2%~90%，step 1%	-	-	-	-	●	●	20%
	Time from 0.1~300s，step 1s	-	-	-	-	●	●	10s
	Return value from 2%~90%，step 1%	-	-	-	-	●	●	10%
	Return time from 0.1~300s，step 1s	-	-	-	-	●	●	10s
Under frequency protection	State setting，Close/Trip/alarm	-	-	-	-	●	●	Close
	Select from 40-70Hz，step 0.5Hz	-	-	-	-	●	●	45
	Time from 0.1~300s，step 1s	-	-	-	-	●	●	10s
	Return value from 40-70Hz，step 0.5Hz	-	-	-	-	●	●	49
	Return time from 0.1~300s，step 1s	-	-	-	-	●	●	10s
Over frequency protection	State setting，Close/Trip/alarm	-	-	-	-	●	●	Close
	Select from 40-70Hz，step 0.5Hz	-	-	-	-	●	●	55
	Time from 0.1~300s，step 1s	-	-	-	-	●	●	10s
	Return value from 40-70Hz，step 0.5Hz	-	-	-	-	●	●	51
	Return time from 0.1~300s，step 1s	-	-	-	-	●	●	10s
Reverse power protection	State setting，Close/Trip/alarm	-	-	-	-	●	●	Close
	Select from 50-5000kW，step 10kW	-	-	-	-	●	●	55
	Time from 0.1~300s，step 1s	-	-	-	-	●	●	10s
	Return value from 50-5000kW，step 10kW	-	-	-	-	●	●	51
	Return time from 0.1~300s，step 1s	-	-	-	-	●	●	10s
Phase sequence protection	State setting，Close/Trip/alarm	●	●	●	●	●	●	Close
	Select: a-b-c/a-c-b	●	●	●	●	●	●	a-b-c
Others	Interlock protection	-	-	-	-	●	●	
	Communication [1)]	●	●	●	●	●	●	
	Power supply, DC 24V	●	●	●	●	●	●	
	Test module	●	●	●	●	●	●	

● : Standard;　　○: Optional　　- : No this function

Note: 1) Mpro21/22 control unit, communication module not optional, no communication function; If you need communication function, please select other control units;

Mpro Measurement and maintains

		Mpro21	Mpro22	Mpro31	Mpro32	Mpro41	Mpro42	Default
Meter	Current (Ia, Ib, Ic, In, Ig, IgCT)	●	●	●	●	●	●	
	Voltage (Ua, Ub, Uc, Uab, Uac, Ubc)	-	-	-	-	●	●	
	Energy Total Real (kW·h)	-	-	-	-	-	-	
	Active power (L1, L2, L3) (kW)	-	-	-	-	●	●	
	Reactive power (L1, L2, L3) (kVar)	-	-	-	-	●	●	
	Apparent power (L1, L2, L3) (kVA)	-	-	-	-	●	●	
	Factor (L1, L2, L3)	-	-	-	-	●	●	
	Frequency	-	-	-	-	●	●	
	Phase position	-	-	-	-	●	●	
Status	Failure record	●	●	●	●	●	●	
	Alarm record	●	●	●	●	●	●	
	Events record	●	●	●	●	●	●	
	Operate times	●	●	●	●	●	●	
	contact wear	●	●	●	●	●	●	

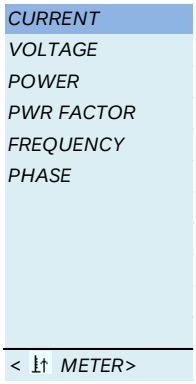
● : Standard; ○: Optional - : No this function

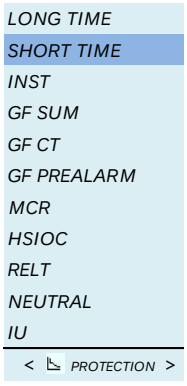
Function menu

On the control unit, pressing the left button can light up the screen, by pressing the 'left button'
Pressing the right arrow key can enter the corresponding protection menu, measurement menu, maintenance record menu, system settings menu, and other interfaces to complete all function settings and parameter viewing.

Meter

The meter function can be accessed through the display screen and by pressing the "left" and " right" keys. Press the "confirm" key to enter different electrical parameter display options, and press the "up" and "down" keys to read and observe load current, voltage, apparent, active, reactive power, and other electrical parameters. All current and voltage measurements are based on true RMS.
The control unit of M-PACT circuit breaker provides ammeter function, and Mpro41/42 type provides complete electrical parameter measurement function. The ammeter and electrical parameter measurement functions require power supply to the control unit, which can be achieved through internal power supply, external battery pack, or grid power supply. The complete electrical parameter measurement function requires an external 3-phase voltage transformer and transmitter.





Protection

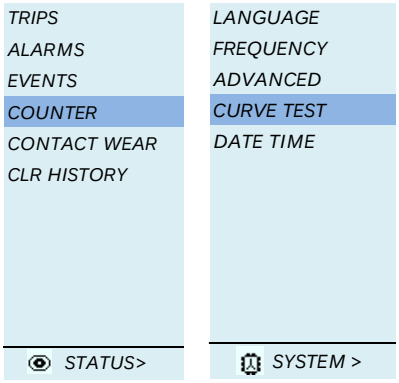
The Mpro control unit of the circuit breaker can provide Overload long-time (Ir), adjustable overload long delay curve (tr), adjustable short-circuit short delay protection function (Isd, tsd), and adjustable short-circuit instantaneous protection function (Ii). According to the different models selected by the customer, the control unit also has other advanced protection functions: ground fault, overvoltage and undervoltage, phase sequence, current imbalance, power, frequency, input/output relays, area interlocking, etc. The specific functional details will be described in detail in this chapter.

Status

Select the "Status" function menu through the display screen and press the "Left" and "Right" keys. Press the confirm button to view the corresponding records. You can view data such as fault records,alarm records, event records, and operation times. This function requires an external 24VDC power supply to ensure the continuous operation of the control unit and complete event recording.

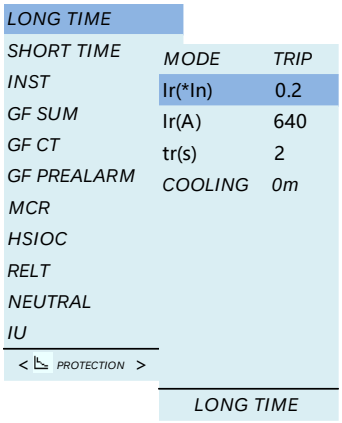
System settings

Select the "System" function through the display screen and press the " Left" and "Right" keys. This menu allows you to set the language type, time, etc. of the control unit.



Overload long-time protection

Overload long-time protection is based on the actual RMS effective current of each phase and neutral line.



Overload long-time protection value setting

The Overload long-time protection is set to:

- Ir : Overload long-time tripping current setting value

- tr : Overload long-time tripping time setting value, at 6Ir

Setting	Unit	Range	Step	Default
Ir	**A**	**(0.2-1) xIn**	**1A** or **0.1xIn**	**1 xIn**
tr	S	0.5-24	0.1	4

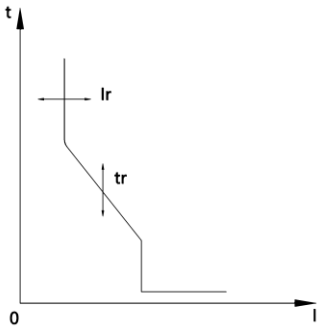
Overload long-time protection feature

tr=0.5-24s, step 0.1s

protection feature:

I< 1.05 × Ir: No trip

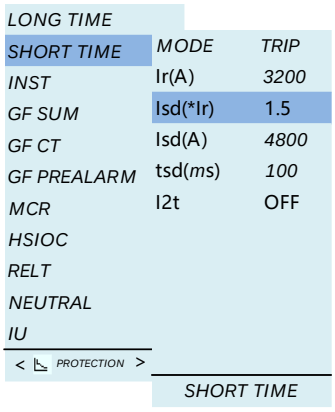
I > 1.2 × Ir: Tripping



Tr Overload long-time protection time delay is applicable to cold conditions, for phase currents or neutral line currents equal to 6 × Ir.
When the current is greater than Isd or Ii, the tripping time takes effect according to the short delay and instantaneous protection time.
Long delay minimum trip time 500ms.

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

Short circuit delay protection



Short circuit delay protection is based on the true effective current of the phase.

Setting of short-circuit delay protection value

Short circuit delay protection helps to protect equipment from phase to phase short circuits and phase to ground short circuits, with complete selectivity.

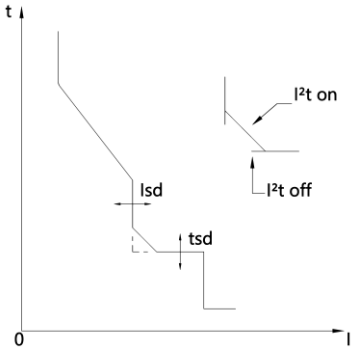
It includes two features: timed and inverse timed, depending on the state of the I ² t setting.

Short circuit delay tripping protection accuracy: ± 10%.

The running time of short delay protection depends on the tsd time delay. They are suitable for I ² T ON or OFF.

Setting	Unit	Range	Step	Default
Isd	A	(1.5~10) ×Ir, OFF	1A	1.5×Ir
Tsd (I²T ON)	s	0.1~0.4	0.1	-
Tsd (I²T OFF)	s	0~0.4	0.1	0.1

Short circuit delay protection characteristics



I²T ON tripping curve (I<10Ir),

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

N=I/Ir,

tsd=0.1,0.2,0.3,0.4

Features	Current multiplier **(I/Isd)**	Agreed release time
Non action feature	<0.9	no trip
action feature	>1.1	tirpping
action delay	≥1.1	see following table

- **I²t ON** trip time**(I≥10Ir)**

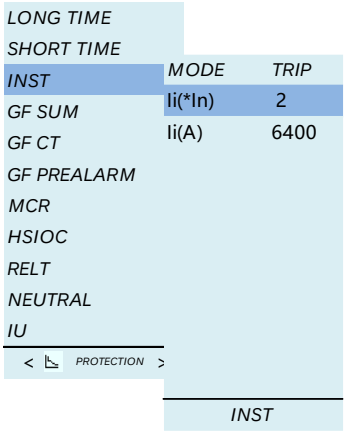
Tsd	0.1s	0.2s	0.3s	0.4s
Non action time	> 80ms	> 160ms	> 260ms	> 360ms
Maximum trip time	< 140ms	< 240ms	< 340ms	< 440ms

- **I²t OFF** trip time

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

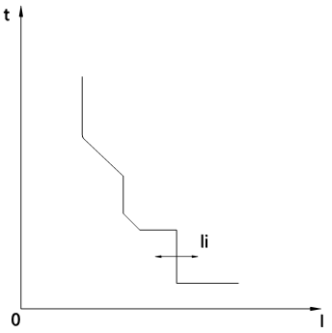
Short circuit instantaneous protection

Instantaneous protection can prevent equipment from experiencing short circuits between phase lines, between phase lines and neutral lines, and between phase lines and ground. This protection operates with a time limited characteristic. When the set current is exceeded, the product will trip without any other time delay.



Short circuit instantaneous protection value setting

Setting	Unit	Range	Step	Default
Ii	-	off /trip	-	trip
Ii	A	(2~15) ×In	1A	2.0×In



Short circuit instantaneous protection features

I< 0.9 × Ii: no trip

I > 1.1 × Ii: tripping

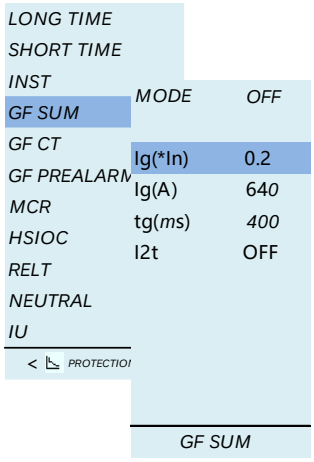
Features	Unit	
Non release time	ms	>20
Maximum release time	ms	≤80

Ground fault protection, GF SUM

Ground fault protection is based on the true effective current of the phase.

Ground fault protection can prevent phase to ground faults and is suitable for TN-S (three-phase five wire system) systems as well as other grounding systems.

The grounding fault current is calculated or measured based on the configuration of the circuit breaker, as shown in the table below.



Calculation method for ground fault protection

Circuit breaker configuration	**Ig** (Ground 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

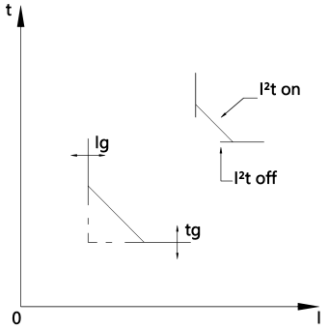
Ground fault protection switch and setting

Setting	Unit	Range	Step	Default	accuracy
Ig Enable	-	off / trip	-	off	
Ig	A	Ig=(0.2-1)In	1A	0.2 In	±10%

Ground fault protection characteristics

The operation time of ground fault protection depends on the Tg time delay. It suitable for I ² T ON or OFF.

tg	0s	0.1s	0.2s	0.3s	0.4s	Default
I²T ON	-	0.1s	0.2s	0.3s	0.4s	0.1
I²T OFF	0s	0.1s	0.2s	0.3s	0.4s	0.1



I²t ON trip time (I<In)

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

N=I/In,

tg=0.1,0.2,0.3,0.4

protection features:

I< 0.9 × Ig: no trip

I > 1.1 × Ig: tripping

- **I²t ON** trip time **(I≥In)**

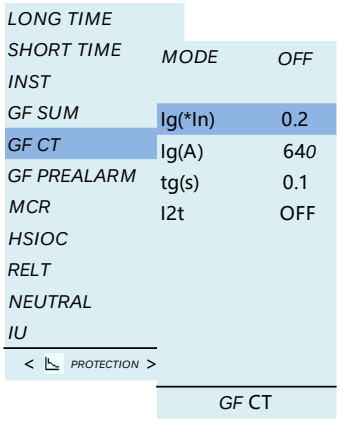
tg	0.1s	0.2s	0.3s	0.4s
Non trip time	> 80ms	> 160ms	> 260ms	> 360ms
Max. trip time	< 140ms	< 240ms	< 340ms	< 440ms

- **I²t OFF** trip time

tg	0	0.1s	0.2s	0.3s	0.4s
Non trip time	> 20ms	> 80ms	> 160ms	> 260ms	> 360ms
Max. trip time	< 80ms	< 140ms	< 240ms	< 340ms	< 440ms

Ground fault protection, GF CT

Applicable to leakage faults caused by equipment insulation damage or leakage faults caused by human contact with exposed conductive parts, the leakage trip value I Δ n is directly expressed in amperes and is independent of the rated current of the circuit breaker. The signal acquisition method is zero sequence sampling, which requires an additional rectangular transformer; This type of sampling has high accuracy and sensitivity, and is suitable for protection with small currents. This protection is only applicable to Mpro32/42 control units.



Setting	Unit	Range	Step	Default	Accuracy
Ig *Enable*	-	*Off / Trip*	-	*off*	
Ig *Action value*	A	Ig=(0.2-1)In	1A	0.2 In	±10%

The operation time of ground fault protection depends on the Tg time delay. It suitable for I ² T ON or OFF。

tg	0s	0.1s	0.2s	0.3s	0.4s	Default
I²T ON	-	0.1s	0.2s	0.3s	0.4s	0.1
I²T OFF	0s	0.1s	0.2s	0.3s	0.4s	0.1

I²t ON *trip time*(I<In); T=(1/N)^2*tg,

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

- **I²t ON** trip time **(I≥In)**

tg	0.1s	0.2s	0.3s	0.4s
Non trip time	> 80ms	> 160ms	> 260ms	> 360ms
Max. trip time	< 140ms	< 240ms	< 340ms	< 440ms

- **I²t OFF** *trip time*

tg	0	0.1s	0.2s	0.3s	0.4s
Non trip time	> 20ms	> 80ms	> 160ms	> 260ms	> 360ms
Max. trip time	< 80ms	< 140ms	< 240ms	< 340ms	< 440ms

Protection feature:

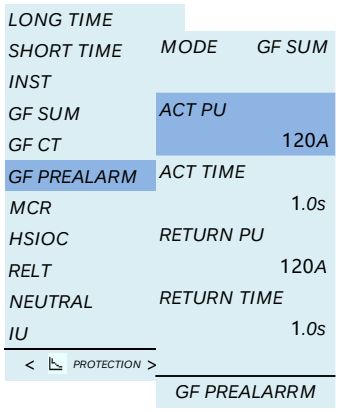
I< 0.9 × Ig: *non trip*

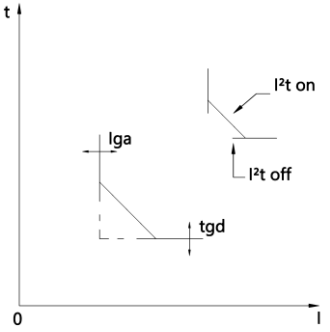
I > 1.1 × Ig: *tripping*

Ground fault pre-alarm

The grounding pre-alarm function and grounding protection function are independent of each other and exist simultaneously, with their own independent setting parameters. The action mode of the alarm function is the same as that of the ground fault protection, using the same sensors, curves, and protection time. Grounding fault pre-alarm is based on the total current of each phase line and neutral line, or external transformers, current grounding circuit current transformers connected to the control unit through modules.

Powered by internal CT without the need for external power supply.





Grounding fault warning setting

Setting	Unit	Range	Step	Setting	Accuracy
Grounding pre alarm mode	-	*Off* ,GFSUM,GFCT	-	*Off*	
Grounding and alarm values	A	120-1200A	1A	200A	±10%
Grounding pre alarm time	s	1-10	0.1s	10	>400ms: ±10%≤400ms: *see* I²t OFF,*Short delay tripping time*
Grounding pre alarm return value	A	120-1200A	1A	120A	±10%
Grounding pre alarm return time	S	1-10	0.1s	10	>400ms: ±10%≤400ms: *see* I²t OFF,*Short delay tripping time*

Protection feature:

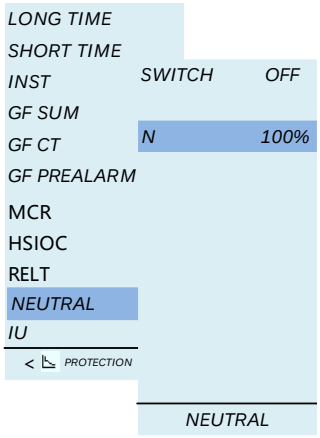
I< 0.9 × Ig: *U*n-warning

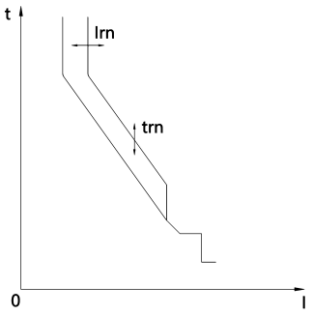
I > 1.1 × Ig: *w*arning

Neutral line protection (N-phase protection)

In practical applications, the cables and current characteristics used for the neutral phase often differ greatly from those of other three phases, and different protections need to be implemented for the neutral phase according to different application situations. When the neutral line is thin, a semi fixed value method can be used for protection; When the neutral line is the same as others, it can be protected using the method of full set value; When the harmonics in the power grid are relatively heavy, a protection method of 1.6 times the fixed value can be used for protection.

The setting of neutral line protection is only for long delay protection, and other protection settings are the same as those for phase line protection.





Explanation of M-PACT Neutral Line Protection Corresponding to breaker Types

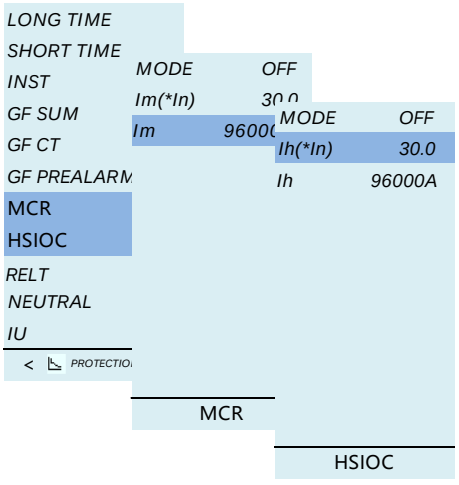
Item	Breakers	Neutral line protection
1	3PT-*3P Breaker*	-
2	3P+N-*3P Breaker+external neutral line RC*	*Off*, 50%, 100%, 160%
3	4PT- *4P Breaker*	*Off*, 50%, 100%, 160%

Neutral line protection (N-phase protection) setting

Setting	Unit	Range	Default
N-phase protection mode	-	*Off / Trip*	*Trip*
N-phase action value	A	50%-160%	100%

MCR and **HSIOC** protection

MCR protection is a closing short circuit protection for the circuit breaker itself; When the fault current exceeds the limit, MCR protection protects the circuit breaker's ability to make connections, preventing the switch from being damaged due to current exceeding the limit of the circuit breaker's ability to make connections. The protection is activated at the moment the circuit breaker is closed (within 120ms); HSIOC protection protects the maximum carrying capacity of the circuit breaker, preventing the switch from carrying current exceeding the level limit breaking capacity, and takes effect 120ms after closing.



MCR and HSIOC protection parameter settings

Setting	Unit	Range	Default
MCR protection	-	*Trip /Off*	*Trip*
MCR *action value*	A	30In *or Icw*	30In

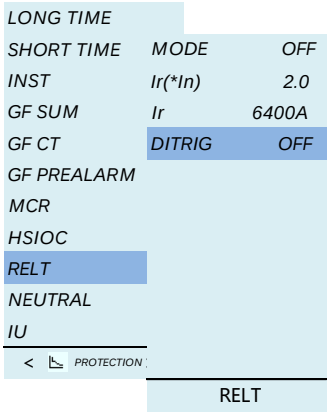
Setting	Unit	Range	Default
HSIOC *protection*	-	*Trip /Off*	*Trip*
HSIOC *action value*	A	30In *or Icw*	30In

MCR and **HSIOC** protection feature

Feature	Unit	
Non-Trip time	ms	>20
Max. trip time	ms	≤80

Short-**ci**r**cui**t **P**rot**ecti**on t**empora**ry r**educed (RELT)**

When a Short-circuit event takes place, large amount of electrical energy is released that can be hazardous to users in the direct vicinity of such an occurrence. In order to limit the current levels during such events and to reduce their time span, the Mpro control Unit can be equipped with a temporary Reduced Instantaneous Device.The RELT device can be turned ON by accessing input one of the trip unit (1). When the device is switched ON Relay output one (1) changes position and reverts to it ' s standard position when RELT is OFF.



RELT protection parameter settings

Setting	Unit	Range	Step	Default
RELT *Enable*	-	*Off / Trip*	-	*Off*
RELT *Value*	A	(2~15) In	1A	10In

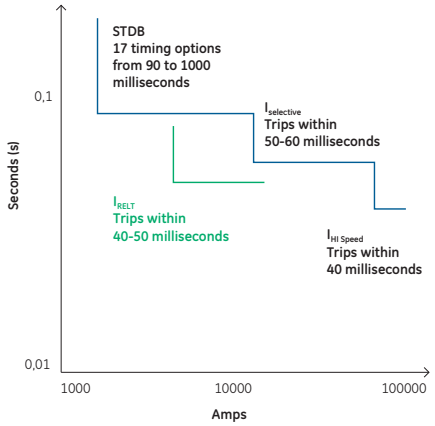
Trip time

Feature	Unit	
Non-trip time	ms	>20
Max. trip time	ms	≤80

RELT Feature:

I < 0.9 × IRELT: *Non-trip*

I > 1.1 × IRELT: *tripping*



Current imbalance protection

Current imbalance protection protects against current imbalance between phase and three-phase, and takes protective actions based on the imbalance rate between the three-phase currents. When the execution mode is alarm, its action principle is the same as grounding protection.

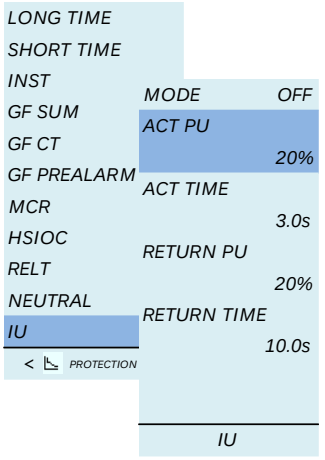
Calculation method for imbalance rate:

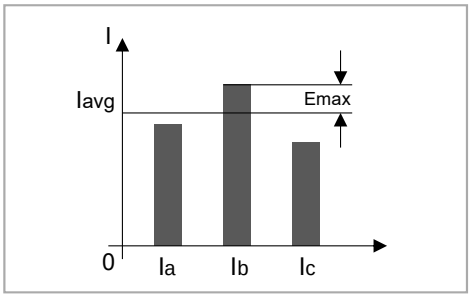
$$\text{Iunbal} = \frac{|\text{Emax}|}{\text{Iavg}} \times 100\%$$

Iavg: *The average RMS value of the three-phase currents Ia, Ib, Ic:*

$$\text{Iavg} = \frac{I_a + I_b + I_c}{3}$$

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





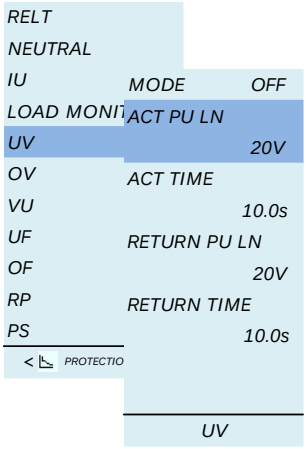
Current imbalance protection setting

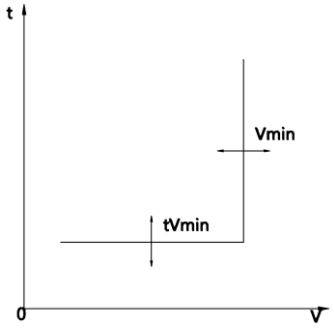
Setting	Unit	Range	Step	Default	Accuracy
Current imbalance mode	-	*Off / Trip /Alarm*	-	*Off*	-
Current imbalance action value	%	2%~90%	1%	20%	±10%
Current imbalance time	s	0.1~300s	0.1s	10s	>400ms：±10% ≤400ms：见I²t OFF
Return value of current imbalance	%	2%~90%	1%	2%	±10%
Current imbalance return time	s	0.1~300s	0.1s	10s	>400ms：±10% ≤400ms：见I²t OFF

Undervoltage protection

The control unit measures the true effective value of the main circuit voltage. When the three phase to phase voltages (line voltage) or phase to neutral line voltages (phase voltage) are all less than the set value, that is, when the maximum value of the three voltages is less than the undervoltage protection set value, the undervoltage protection will activate; When the maximum value of the three line voltages is greater than the return value, the alarm action returns.

The control unit needs to be powered by an external 24V power supply.



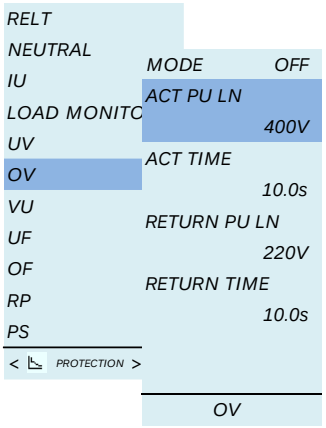


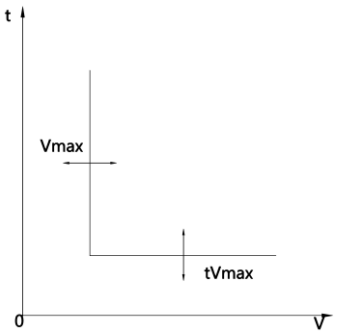
Undervoltage protection setting

Setting	Unit	Range	Step	Default	Accuracy
Undervoltage protection mode	-	*Off / Trip / Alarm*	-	*Off*	-
Undervoltage protection action value	V	20V ~ 1500V	1V	280V	±5%
Undervoltage protection time	s	0.1~300s	0.1s	10s	>400ms: ±5% ≤400ms: *see* I²t OFF
Under voltage protection return value	%	20V ~ 1500V	1V	360V	±5%
Undervoltage protection return time	s	0.1~300s	0.1s	10s	>400ms: ±5% ≤400ms: *see* I²t OFF

Overvoltage protection

The control unit measures the true effective value of the main circuit voltage. When all three phase to phase voltages (line voltage) or phase to neutral line voltages (phase voltage) are 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 will activate; When the minimum value of the three voltages is less than the return value, the alarm action returns. When the minimum line voltage is greater than the action threshold, an alarm or trip delay is triggered. When the action delay time is reached, an alarm or trip





Overvoltage protection setting

Setting	Unit	Range	Step	Default	Accuracy
Overvoltage protection mode	-	*Off / Trip / Alarm*	-	*Off*	-
Overvoltage protection action value	V	20V ~ 1500V	1V	460V	±10%
Overvoltage protection time	s	0.1~300s	0.1s	10s	> 400ms: ±10%
Overvoltage protection return value	%	20V ~ 1500V	1V	440V	±10%
Overvoltage protection return time	s	0.1~300s	0.1s	10s	> 400ms: ±10%

Voltage imbalance protection

Voltage imbalance protection operates based on the imbalance rate between three line voltages. Its operating principle is the same as overvoltage protection.

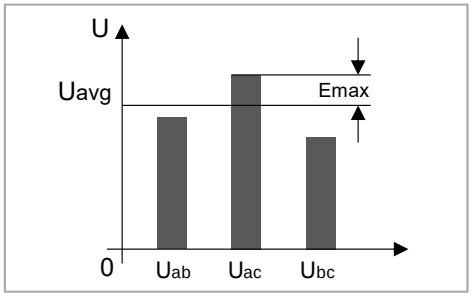
Calculation method for imbalance rate:

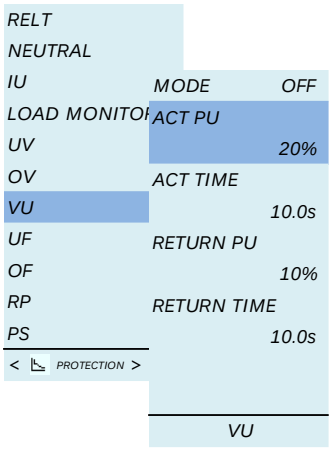
$$Uunbal = \frac{|Emax|}{Uavg} \times 100\%$$

Uavg: The average RMS value of three-phase line voltage

$$Uavg = \frac{Uab + Uac + Ubc}{3}$$

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





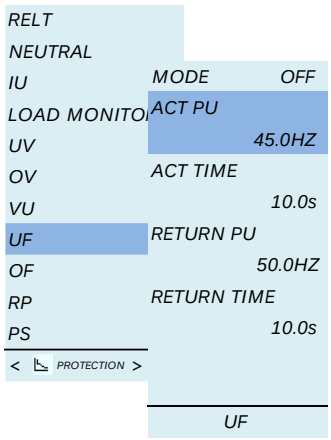
Voltage imbalance protection setting

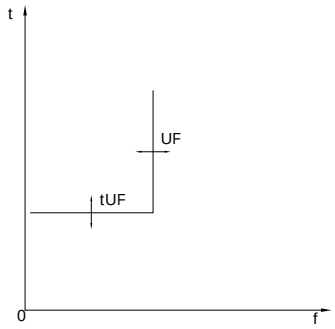
Setting	Unit	Range	Step	Default	Accuracy
Voltage imbalance protection mode	-	*Off / Trip / Alarm*	-	*Off*	-
Voltage imbalance protection action value	%	2%~90%	1%	20%	±10%
Voltage imbalance protection time	s	0.1~300s	0.1s	10s	>400ms: ±10% ≤400ms: *see* I²t OFF
Voltage imbalance protection return value	%	2%~90%	1%	10%	±10%
Voltage imbalance protection return time	s	0.1~300s	0.1s	10s	>400ms: ±10% ≤400ms: *see* I²t OFF

Underfrequency protection

The control unit detects the frequency of the system voltage and can provide protection for frequencies that are too high or too low. The operating principles 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.





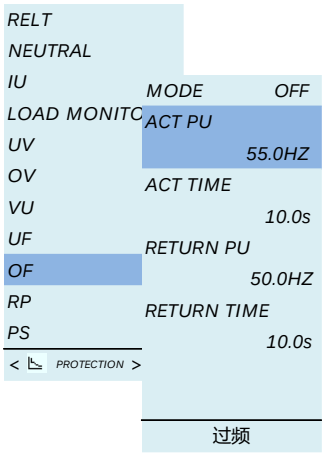
Underfrequency protection setting

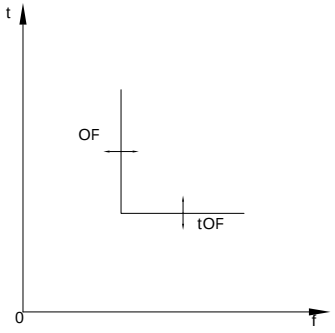
Setting	Unit	Range	Step	Default	Accuracy
Underfrequency protection mode	-	*Off / Trip /Alarm*	-	*Off*	-
Underfrequency protection action value	Hz	40～70	0.1Hz	45	±10%
Underfrequency protection time	s	0.1~300s	0.1s	10s	>400ms：±10% ≤400ms：*see* I²t OFF
Underfrequency protection return value	Hz	40～70	0.1 Hz	49	±10%
Underfrequency protection return time	s	0.1~300s	0.1s	10s	>400ms：±10% ≤400ms：*see* I²t OFF

Overfrequency protection

The control unit detects the frequency of the system voltage and can provide protection for frequencies that are too high or too low. The operating principles and characteristics of overclocking and overclocking protection are the same as those of overvoltage and undervoltage protection.

Powered by an external 24V power supply.





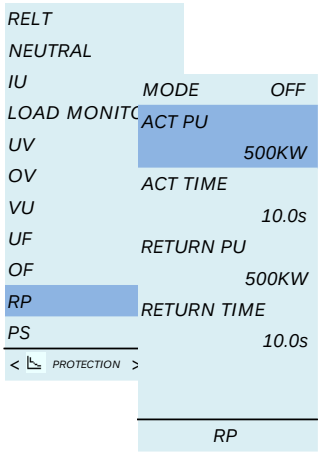
Overfrequency protection setting

Setting	Unit	Range	Step	Default	Accuracy
Overfrequency protection mode	-	*Off / Trip /Alarm*	-	*Off*	-
Overfrequency protection action value	Hz	40 ~ 70	0.1 Hz	55	±10%
Overfrequency protection time	s	0.1~300s	0.1s	10s	> 400ms: ±10% ≤400ms: *see* I²t OFF
Overfrequency protection return value	Hz	40 ~ 70	0.1 Hz	51	±10%
Overfrequency protection return time	s	0.1~300s	0.1s	10s	> 400ms: ±10% ≤400ms: *see* I²t OFF

Power reversal protection

Power reversal protection, also known as reverse active power protection, takes the sum of three-phase active power. When the direction of power flow is opposite to the user set power direction and greater than the set value, the protection is activated. The power direction and power input direction should be set in the " Measurement Meter Settings" menu and must be consistent with the actual application situation. Its operating principle is the same as overvoltage protection.

Powered by an external 24V power supply.

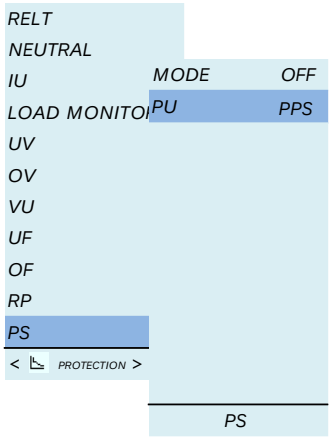


Power reversal protection setting

Setting	Unit	Range	Step	Default	Accuracy
Power reversal protection mode	-	*Off / Trip / Alarm*	-	*Off*	-
Power reversal action value	kW	50 ~ 5000	10	55	±10%
Power reversal protection time	s	1~300s	0.1s	10s	>400ms: ±10% ≤400ms: *see* I²t OFF
Power reversal protection return value	kW	50 ~ 5000	10	51	±10%
Power reversal protection return time	s	1~300s	0.1s	10s	>400ms: ±10% ≤400ms: *see* I²t OFF

Phase sequence protection

The phase sequence detection is taken from the main circuit voltage. When the phase sequence is detected to be in the same direction as the starting value setting, the protection action is activated, and the protection characteristic is instantaneous. When one or more phase voltages are not present, this function automatically exits.



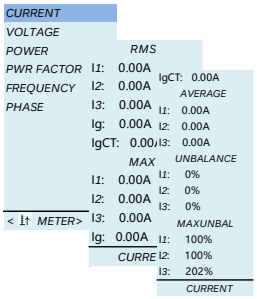
Phase sequence protection setting

Setting	Unit	Range	Step	Default	Accuracy
Phase sequence protection mode	-	*Off / Trip / Alarm*	-	*Off*	-
Phase sequence protection action value	-	a-b-c/a-c-b	-	a-b-c	

Measurement of electrical parameters

Ammeter

The Mpro control unit provides current measurement function, which can measure the current of each phase, as well as the grounding current, average current, current imbalance, and minimum imbalance.

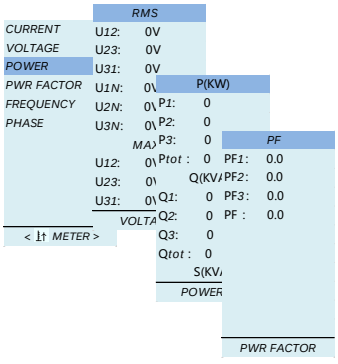


Standard on	Mpro21/22	Mpro31/32	Mpro41/42

Measurement of electrical parameters

The Mpro41/42 control unit provides comprehensive electrical parameter measurement functions, allowing customers to browse real-time data of multiple electrical parameters. The menu on the right lists most of the parameter measurement functions. After entering the "Measurement" menu, users can select and browse the corresponding measurement functions.

It can measure the maximum, minimum, average, and voltage imbalance of the displayed voltage. Users can choose to view line voltage or phase voltage type according to their needs.
The power measurement function for supply and demand includes effective power P (kW), apparent power Q (KVA), and reactive power S (KVAR).
The Mpro control unit provides advanced measurement functions such as power factor, frequency, phase, etc.



Standard on	Mpro41/42

Voltage measurement and external additional power supply

It is necessary to measure the voltage of the three-phase and neutral lines using the above-mentioned comprehensive electrical parameter measurement function, and feedback this data to the control unit. The Mpro41/42 control unit provides standard voltage measurement and transmission modules for safe and reliable measurement of voltage parameters by the control unit.

Accessory	Mpro41/42

External additional power supply and reset settings

External additional power supply

The application of advanced functions of the control unit requires an external 24V DC power supply for continuous power supply. The auxiliary power supply unit module can convert the corresponding grid voltage to 24V DC, and this module can also set parameters for the control unit when the load current is low (<20%).

In addition, the testing module can also be used to temporarily supply power to the control unit.

The test module is equipped with a built-in 24V DC battery pack module.

Standard on	Mpro21/22	Mpro31/32	Mpro41/42

Reset settings

Usually, circuit breakers trip due to circuit faults. Users need to carefully check the specific cause of the fault in the lower level circuit, confirm the cause of the fault and eliminate it before allowing the circuit breaker to be reset and reconnected. The Mpro electronic control unit provides a comprehensive fault trip recording function to help customers analyze the cause, level, size, and location of faults, and take corresponding measures.

In order to track the occurrence of faults, the control unit provides a trip reset function, usually manual reset. But customers can also set the trip reset to manual or automatic reset through the selection knob on the panel. If remote reset of the circuit breaker is required, the selection button on the panel can be set to manual reset, and a remote reset coil can be equipped to achieve the function of tripping and resetting the circuit breaker.

Standard on	Mpro21/22	Mpro31/32	Mpro41/42

Communication function

Communication function

The optional communication function of the control unit has full duplex Modbus RTU communication function. The communication function requires an external 24V DC power supply, and for Modbus, a power capacity of no less than 90mA is required.

The control unit with communication function can simultaneously set parameters through panel or communication, including overcurrent protection setting and protection relay setting.

The control unit complies with the Modbus communication protocol and a 2-wire RS485 interface, and can set baud rates of 4800, 9600, and 19200.

Optional	Mpro31/32	Mpro41/42

NFC function

All Mpro control units are equipped with NFC near-field communication function, using short-range wireless communication method, integrating RFID and interconnection technology, supporting the use of compatible devices to quickly and easily identify and exchange data with M-PACT air circuit breakers at close range.

Standard on	Mpro21/22	Mpro31/32	Mpro41/42

Testing module

The testing module is used to verify whether the coordination between the circuit breaker and the control unit is good. This module is equipped with a 24V DC battery pack, which can be used to supply power to the control unit when there is no load current in the distribution network. There is a test port on the control unit panel for connecting with the test module.

The circuit breaker management software toolkit allows users to monitor, set, and even test the trip curve through a laptop.

Mpro31/32 | Mpro21/22 | Mpro31/32 | Mpro41/42

Protection relay: relay input/output

Relay input DI

Provide two relay input functions. Each relay input can choose OFF/TRIP/RELT (one of three options), configured as follows:

DI	Function	Description
Setting option	OFF	*OFF*
	TRIP	*After inputting the signal, the circuit breaker outputs a trip pulse to the magnetic flux coil, causing the circuit breaker to trip*
	RELT	*After inputting the signal, enable the RELT setting value. (RELT must be set to remote)*

Relay output DO

Provide 2 relay output functions. The first group has been automatically assigned to circuit breaker closing, and the second group has been automatically assigned to circuit breaker opening. Each relay output can choose EVENT/ALARM/TRIP (one out of three), and there are multiple options in the sub menu for each function, as shown in the table below

DO	Function	Description
Setting option	EVENT	*Action event* *Lower level menu: NONE (no output), REMOTE-OFF (remote opening), REMOTE-ON (remote closing), RELT-ON (dual short circuit protection)*
	ALARM	*Send an alarm command, and the circuit breaker will execute the alarm when receiving it* *Submenus: ALL (All), SELF-TEST (Self check Test), CONT (Electrical Contact Life), PS (Phase Sequence), OF (Overfrequency Alarm), UF (Underfrequency Alarm), RP (Power Reverssal Alarm), VU (Voltage Imbalance Alarm), OV (Overvoltage Alarm), UV (Undervoltage Alarm), IU (Current Imbalance Alarm), N-ST (N-Phase Short Circuit Short Delay Alarm), N-LT (N-Phase Overload Long Time Alarm), GFCT (Ground Leakage Alarm), GFSUM (Ground Fault Alarm), GA (Ground Alarm), LT (Overload Long Time Alarm), NONE (No Output)*
	TRIP	*Send output command, circuit breaker receives trip pulse, magnetic flux trips, circuit breaker trips* *ALL (All), PS (Phase Sequence), OF (Overfrequency Protection), UF (Underfrequency Protection), RP (Reverse Power Protection), VU (Voltage Imbalance Protection), OV (Overvoltage Protection), UV (Undervoltage Protection), IU (Current Imbalance Protection), N-I (N-Phase Short Circuit Transient Protection), N-ST (N-Phase Short Circuit Short Delay Protection), N-LT (N-Phase Overload Long Time Protection), RELT (Double Short Circuit Protection), HSIOC (Restricted Short Circuit Transient Protection), MCR (Closed Short Circuit Protection), GF CT (Ground Leakage Protection), GF SUM (Ground Fault Protection), I (Short Circuit Transient Protection), ST (Short circuit short delay protection), LT (Overload long Time protection), NONE (No output)*

Optional | Mpro31/32 | Mpro41/42

Note: Mpro21/22 control unit, no relay input/output configuration.

Accessories

A wide range of optional accessories have been developed that are compatible with all M-PACT air circuit breakers, regardless of nominal rating or frame size. Each one incorporates 'easy-fit' design features for quick installation, either in the factory or by the user on site.

Motorised spring charging unit

The unique motor/gearbox unit is specially designed to operate with the full range of M-PACT breakers.
It is easily fitted with just two bolts. In the event of circuit breaker closure, this unit will automatically recharge the spring in readiness for instant reclosure should the need arise. High speed recharging ensures that the springs are fully charged within approximately three seconds following a release. As an optional feature, a "springs charged" contact is available for the motor unit.

Circuit breaker closing coil

The closing coil is an easy-to-fit, clip-on unit, with simple plug-in connectors. This permits either local or remote release of the spring charged closing mechanism by electrical operation.
An additional anti-pumping safety feature also ensures that the electrical closing signal must be released before further closure is attempted, and a cut-off is instigat-ed should a closing signal be maintained.
Because each coil operates within a wide voltage range, the number of individually rated coils required is drastically reduced.

Shunt trip

Energisation, locally or remote, will instantaneously activate the circuit breaker mechanism, ensuring rapid disconnection of the main contacts.
In addition, a series connected auxiliary switch ensures automatic isolation whenever the circuit breaker is open.
Shunt trip releases also have a wide operational voltage range, and they include the same easy-fit, clip-on/plug-in connectors as the closing coil above.

Undervoltage release

Instantaneously releases the circuit breaker trip mechanism should the supply voltage dip below the pre-set value.
Simple to install, these devices have the same easy-fit features as previously described.
Note: This is a 'no-volt/ no-close device. The circuit breaker cannot be closed (manually or electrically) unless the undervoltage release coil is energised.
Time delay undervoltage release Similar to the above, but this electronic device prevents nuisance tripping of the circuit breaker if circuit interruption is not desirable when supply voltage drop is only transient. Fixed time delay 3 sec ±1sec.

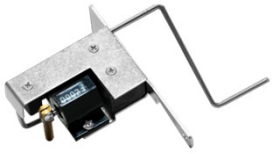
Auxiliary trip combination

The M-PACT circuit breaker can be equipped with the following auxiliary trips or releases 1 x Shunt trip + 1 x Closing coil + 1 x Undervoltage release or 1 time delay Undervoltage release.

Auxiliary switches

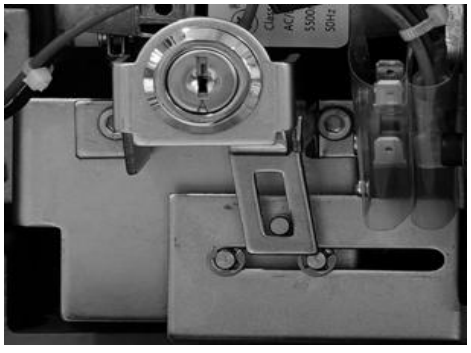
The M-PACT circuit breaker is equipped with 5 NO and 3 NC auxiliary switches as standard. Maximum number of contacts is 8, for alternative configurations please contact for availability.

Mechanical operation counter



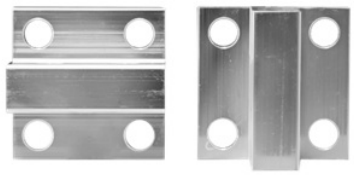
Easily fi tted, this useful accessory may be specifi ed for use with either manual or motor charged M-PACT circuit breakers.
It is clearly visible through the front panel, and the counter provides an accurate record of the cumulative number of complete breaker closing operations.

Key interlock facility



Ready-to-fit interlocking device: Ronis, for installation between separate circuit breakers, available in kit form.
This valuable safeguard ensures that a circuit breaker cannot be closed unless the dedicated key has been inserted and secured within the lock.

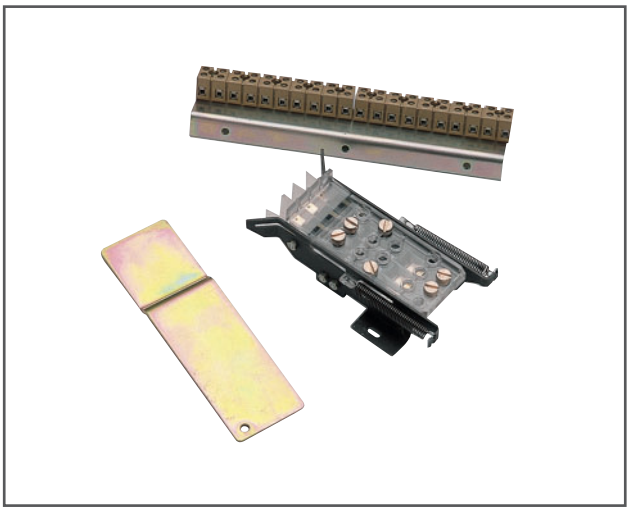
Cassette main terminal adaptors



Combinations of rear and front access connections possible for entire range. Tested and approved from 50 to 80kA.

To simplify main busbar or cable termination, M-PACT provides a full range for rear and/or front access connection. Bolt-on adaptor kits can be fitted easily to suit either horizontal or vertical connections.

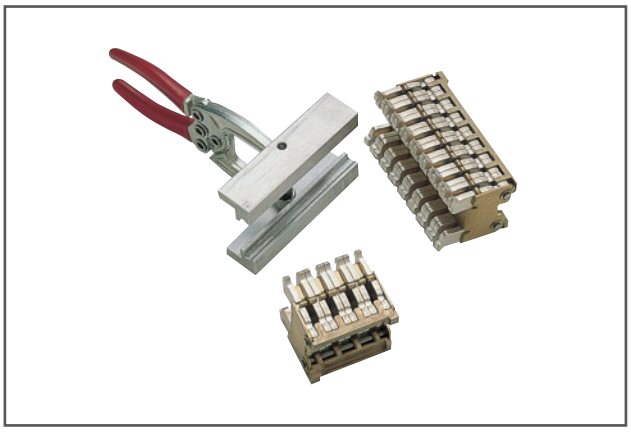
Carriage position switch



Available as an optional device for mounting within the base of the cassette, this switch provides six single pole changeover contacts for local or remote electrical indication of the circuit breaker status: Connected, Test and Disconnected.
The Disconnected position is indicated only when minimum isolating distances between contacts on both the main and auxiliary circuits have been achieved.
This option is in addition to the mechanical indicators which are fitted as standard.
When installed, the carriage switch is IP2X protected and includes wiring to a terminal block located on the left-hand side of the cassette.

Note: The carriage position switch is an option only suitable for withdrawable circuit breakers.

Cluster contacts



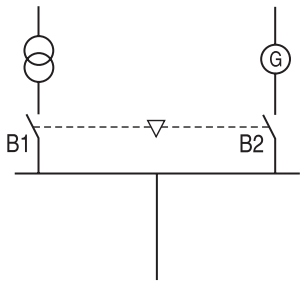
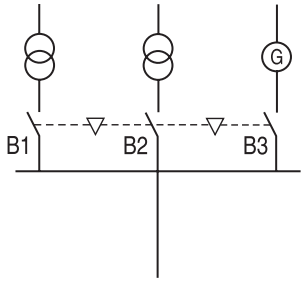
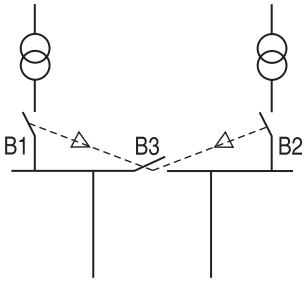
These are the main isolating contacts which are fitted to the rear terminals on the moving portion of the withdrawable unit.
As part of standard inspection and maintenance procedures, cluster contacts have been designed to be easily and quickly.

2/3 way cable mechanical interlocks

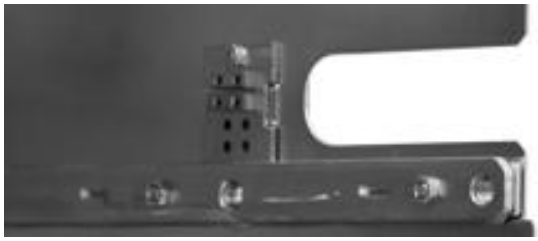
Available for fixed and withdrawable circuit breakers.
These units enable the direct interlocking of M-PACT circuit breakers, either mounted side-by- side or stacked.
The interlocking mechanisms are connected by a specially designed cable in '1 from 3' OR '2 from 3' configuration, and any mix of current ratings / pole confi gurations can be accommodated.
Standard cable lengths available: 1.6, 2.0, 3.0 metres.
(Please contact our technical customer service department if longer length is required.)

Interlocks

Mechanical interlocks can be fitted to the following electrical systems and can link 2 or 3 circuit breakers of any rating or number of poles, fixed or withdrawable.

Typical circuit	Interlock configuration	Possible combinations
	Type A Interlocking between 2 circuit breakers B1 normal power supply B2 generator (emergency) supply	B1 B2 0 0 I 0 0 I Circuit breaker B1 can only close if B2 is open Circuit breaker B2 can only close if B1 is open
	Type B Interlocking between 3 circuit breakers 3 power supplies (generator or transformers) feeding the same busbar but parallel operation is prevented.	B1 B2 B3 0 0 0 I 0 0 0 I 0 0 0 I Only 1 from 3 breakers can be closed
	Type C Interlocking between 3 circuit breakers 2 bus sections can be powered by a single transformer (bus coupler closed) or by both transformers (bus coupler open).	B1 B2 B3 0 0 0 I 0 0 0 I 0 0 0 I I 0 I 0 I I I I 0 Any 2 from 3 circuit breakers can be closed Any 1 from 3 circuit breakers can be closed

Circuit breaker insertion interlock



By incorporating this optional security interlock device into a system, it prevents the inadvertent insertion of an incorrectly rated withdrawable circuit breaker into a cassette.

Cassette interlock

Available for withdrawable circuit breakers only, this sophisticated interlock system secures the circuit breaker in the disconnected position by means of a Ronis key. When the key is removed, the safety shutters are automatically locked in position, thus preventing access to the contacts and also ensuring that the racking mechanism is not operable. For lock and key details refer to key interlock facility section.

Circuit breaker handling truck

Specifically designed for use with the M-PACT Plus range, this dedicated handling truck is a useful accessory when faced with the task of inserting or removing the circuit breaker from its panel, or when transporting the unit should it be outside its cassette. Installers will also find it particularly valuable for top-tier mounted circuit breakers.

Sealed door panel escutcheon

An optional IP54 complete front door panel is available should a higher degree of protection be necessary.

Portable Test Unit

Specially designed for reliable testing of the MCR and HSISC protection systems on each phase, by means of tertiary injection.
The test unit incorporates a set of rechargeable batteries and includes a charger unit as standard.

Auxiliary Power Unit

Available to be fitted within the circuit breaker cubicle, an APU ensures that MPRO receives independent and continuous power at all times. The APU accepts any input supply voltage within 380VAC, 110V, 220V AC/DC.
Maximum input current is 0.5 A. 1m length cable (twisted pair) should be used to connect auxiliary supply and MPRO protection relay.

Accessories Performance Data

Device	Operating Voltage (V) AC	Operating Voltage (V) DC	Operating range	Rating (Amps resisitive)
Auxiliary and Carriage switch	250		-	**10**
		125	-	**5**
		250	-	**0.25**
Motor operator	220-250	220-250		**AC-50VA DC-50W**
	110-130	110-130		
	380-440	48, 60	0.85-1.1 times rated voltage	
		24-30		
Closing coil	220-250	220-250		**AC-300VA DC-250W**
	110-130	110-130		
	380-440	48	0.85-1.1 times rated voltage	
		24-30		
Shunt trip	220-250	220-250		**AC-300VA DC-250W**
	110-130	110-130		
	380-440	48	0.7-1.1times rated voltage	
		24-30		
Instantaneous undervoltage release	380-440	110-130	-	Inrush power consumption 300VA Holding power consumption 20VA
	220-250	48	-	
	110-130		-	
Auxiliary power unit	110, 220, 380	110, 220	-	**-**

Order codes

M-PACT Air circuit breaker

1. PO No.: 2.Delivery date: 3. Brand: 4.Switchgear manufacturer:

5.Customer name: 6.Project name: 7.Industry: 8.Quantity: _____ Pcs

Specify on the Order

Code MP ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Voltage (Ue) ☐ 415V ☐ 690V

1.Breaking capacity	☐ Type A 415V 50kA	☐ Type D 415V 70kA, 690V 50kA(400-2500A)	☐ Type D2 690V 65kA(400-2500A)*		
	☐ Type D 415V 70kA(3200-4000A)	☐ Type H1 415V 80kA	☐ Type H2 415/500V 80kA, 690V 65kA		
2.Rating	☐ 400A	☐ 800A	☐ 1000A	☐ 1250A	☐ 1600A
	☐ 2000A	☐ 2500A	☐ 3200A	☐ 4000A	
3.Number of poles	☐ 3P	☐ 4P Left Neutral	☐ 4P Right Neutral		
4.System	☐ 3 phase 3 wire	☐ 3 phase 4 wire			
5.Frequency	☐ 50Hz	☐ 60Hz			

6.Busbar Type	Connections		Top & Bottom	
	☐ Fix	☐ Front	☐ Rear Horizontal	
	☐ Withdrawable	☐ Front	☐ Rear Horizontal	☐ Rear Vertical
	☐ Moving portion only			
	☐ Cassette only	☐ Front	☐ Rear Horizontal	☐ Rear Vertical

7.Control Unit	☐ Non-protection	☐ Mpro 21	☐ Mpro 31	☐ Mpro 41
		☐ Mpro 22	☐ Mpro 32	☐ Mpro 42
Mpro22/32/42 Optional grounding protection	☐ 3P, external neutral wire RC (UEF)	☐ External grounding CT (SEF, only applicable to Mpro32/42)		
8.Auxillary Power Unit	☐ 110V AC/DC	☐ 220V AC/DC	☐ 380V AC	
9.Auxillary Contact	☐ 5NO+3NC	☐ 4NO+4NC		

10.Control Voltage	MOP	CC	ST	UV	UVTD
24/30V DC	☐	☐	☐	☐	
48V DC	☐	☐	☐	☐	
110/130V DC	☐	☐	☐	☐	☐
110/130V AC	☐	☐	☐	☐	☐
220/250V DC	☐	☐	☐		
220/250V AC	☐	☐	☐	☐	☐
380/440V AC	☐	☐	☐	☐	☐

☐ If there are dedicated monitoring relays for opening and closing coils in the secondary control circuit, please check this option; Otherwise, please ignore

11.Carriage	☐ Factory 2NO+2NC				
12.Interlocks					
	Door interlock	☐ *Left Hand Door Interlock*	☐ *Right Hand Door Interlock*		
	☐ *Ronis Cassette Key interlock*				
	☐ *Ronis Breaker Key interlock*	☐ *Lock A*	☐ *Lock B*	☐ *Lock C*	☐ *Lock D*
	☐ *Circuit breaker misinsertion interlock*				
	Cable Interlock				
	☐ *Type A* 2 way	☐ *Type B 1 from 3 way*			
	☐ *Type C* 2 from 3 way	☐ *Type D* 1from 3 way			
	Cable Length required (in centimeters)				
	☐ 100cm	☐ 160cm	☐ 200cm	☐ 300cm	
13.*Other accessories*	☐ *Mechanical operation counter*	☐ *Trip alarm contact*	☐ Portable Test Unit		
	☐ *Phase separator*	☐ Modbus communication module (optional only for Mpro31/32/41/42)			

14.*If there are any other special requirements, please indicate them here:*

Customer signature:

*Note: Note: 1. Frame 1 type D2 , frame 2 type H2 can provide Ue=690V, others are Ue=415V ; * is customized products, please contact us before placing an order; 2. Standard configuration includes motor energy storage (with signal output) and opening and closing coils; 3. Standard configuration auxiliary power module; 4. Standard configuration includes 4NO+4NC auxiliary contacts, busbar terminals (L-shaped terminals for type A breakers 1600A and below, T-shaped terminals for others), door frames; 5. Only Mpro31/32/41/42 control unit, optional communication modul.*

Quickly select circuit breaker

MP
Series
M-PACT *Air circuit breaker*

D		
Breaking capacity		
A	50kA	*Frame 1，2*
D	70kA	*Frame 1，2*
H1	80kA	*Frame 2*
H2	80kA	*Frame 2*

3	
Poles	
3	3*P*
4	4*P*

1	
Frame 1	
1	*Frame 1*
2	*Frame 2*

W	
Installation	
W	*Withdrawable*
F	*Fixed*

25	
Current	
04	400A
06	630A
08	800A
10	1000A
12	1250A
16	1600A
20	2000A
25	2500A
32	3200A
40	4000A

Mpro21
Mpro *Control unit*
Mpro21
Mpro22
Mpro31
Mpro32
Mpro41
Mpro42
Non

Note：Frame 1，Ue= 690V，Icu=Ics=Icw=65kA，the breaking code is D2.

Control Unit Functions Overview

Mpro21	LSI protection, current measurement, no DI/DO, communication module not optional
Mpro22	LSIG protection, current measurement, no DI/DO, communication module not optional
Mpro31	LSI protection, current measurement, with DI/DO, optional communication module
Mpro32	LSIG protection, current measurement, with DI/DO, optional communication module
Mpro41	LSI protection, full electrical parameter measurement, with DI/DO, optional communication module
Mpro42	LSIG protection, full electric parameter measurement, with DI/DO, optional communication module
Blank	Non-protection

Note: The following components are standard configurations for circuit breakers:

1. 24V DC auxiliary power supply
2. IP30 flange door
3. T-shaped terminal of withdrawable circuit breaker
4. Auxiliary contacts of 4NO+4NC or 5NO+3NC
5. The fourth pole current transformer with grounding fault protection for a 3-pole circuit breaker
6. Safety baffle

Circuit breaker control voltage type

Motor Operator

0	No
1	24/30V DC
2	48V DC
3	110/130V DC/AC
4	220/250V DC/AC

Shunt Trip

0	No
1	24/30V DC
2	48V DC
3	110/130V DC/AC
4	220/250V DC/AC
5	380/400V AC

Closing Coil

0	No
1	24/30V DC
2	48V DC
3	110/130V DC/AC
4	220/250V DC/AC

Undervoltage release

0	No
1	30/48V DC
2	110/130V AC
3	220/250V AC
4	380/440V AC
5	30/48V DC - delay
6	220/250V AC - delay
7	380/440V AC - delay

M-PACT Air circuit breaker-Type A 50kA

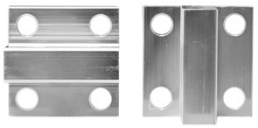
Withdrawable circuit breaker - including the body and cassette of the circuit breaker, providing rear connection terminals.
Fixed circuit breaker - The circuit breaker body defaults to a rear horizontal terminal block.

Fixed and Withdrawable Breakers

Frame	Rating (A)	Poles	Withdrawable Cat. no.	Fixed Cat. no.
1	400	3	MPA31W04	MPA31F04
		4	MPA41W04	MPA41F04
1	800	3	MPA31W08	MPA31F08
		4	MPA41W08	MPA41F08
1	1000	3	MPA31W10	MPA31F10
		4	MPA41W10	MPA41F10
1	1250	3	MPA31W12	MPA31F12
		4	MPA41W12	MPA41F12
1	1600	3	MPA31W16	MPA31F16
		4	MPA41W16	MPA41F16
1	2000	3	MPA31W20	MPA31F20
		4	MPA41W20	MPA41F20
1	2500	3	MPA31W25	MPA31F25
		4	MPA41W25	MPA41F25
2	3200	3	MPA32W32	MPA32F32
		4	MPA42W32	MPA42F32
2	4000	3	MPA32W40	MPA32F40
		4	MPA42W40	MPA42F40

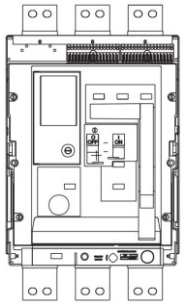
Installation: Products smaller than *1600A* have smaller copper bar sizes, as shown in section for external dimensions.

Rear connections "T" terminal (Cassette)



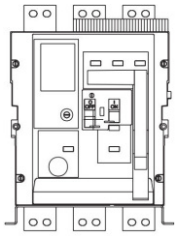
Frame	Rating (A)	Poles	Quantity required	Cat. no.	Remark
1	400 to 1600	3	6	RT1HOR	Horizontal
		4	8	RT1HOR	Horizontal
1	400 to 1600	3	6	RT1VER	Vertical
		4	8	RT1VER	Vertical
1	2000 & 2500	3	6	RT1UNI	Universal
		4	8	RT1UNI	Universal
2	3200	3	6	RT2UNI	Universal
		4	8	RT2UNI	Universal
2	4000	3	6	N/A	Vertical
		4	8	N/A	Vertical

Front connections



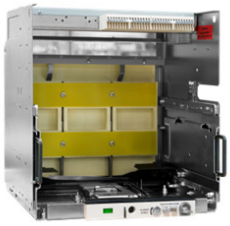
Frame	Rating (A)	Poles	Withdrawable Top connections Cat. no.	Withdrawable Bottom connections Cat. no.
1	400 to 1600	3	FA31WA16T	FA31WA16B
		4	FA41WA16T	FA41WA16B
1	2000 to 2500	3	FA31WA25T	FA31WA25B
		4	FA41WA25T	FA41WA25B
2	3200	3	FA32WA32T	FA32WA32B
		4	FA42WA32T	FA42WA32B
2	4000	3	FA32WA40T	FA32WA40B
		4	FA42WA40T	FA42WA40B

Front connections



Frame	Rating **(A)**	Poles	Fixed	
			Top connections	Bottom connections
			Cat. no.	*Cat. no.*
1	400 to 1600	3	FA31FA16T	FA31FA16B
		4	FA41FA16T	FA41FA16B
1	2000 to 2500	3	FA31FA25T	FA31FA25B
		4	FA41FA25T	FA41FA25B
2	3200	3	FA32FA32T	FA32FA32B
		4	FA42FA32T	FA42FA32B
2	4000	3	FA32FA40T	FA32FA40B
		4	FA42FA40T	FA42FA40B

Cassette only



Basic cassette with flat copper terminals rear connected

Frame	Rating **(A)**	Poles	*Cat. no.*
1	400 to 1600	3	MPA31C16
		4	MPA41C16
1	2000 to 2500	3	MPA31C25
		4	MPA41C25
2	3200	3	MPA32C32
		4	MPA42C32
2	4000	3	MPA32C40
		4	MPA42C40

Moving portion only

Standard configuration - auxiliary contact with 5 NO and 3 NC

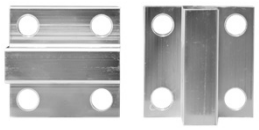
Frame	Rating **(A)**	Poles	Cat. no.
1	400	3	MPA31M04
		4	MPA41M04
1	800	3	MPA31M08
		4	MPA41M08
1	1000	3	MPA31M10
		4	MPA41M10
1	1250	3	MPA31M12
		4	MPA41M12
1	1600	3	MPA31M16
		4	MPA41M16
1	2000	3	MPA31M20
		4	MPA41M20
1	2500	3	MPA31M25
		4	MPA41M25
2	3200	3	MPA32M32
		4	MPA42M32
2	4000	3	MPA32M40
		4	MPA42M40

M-PACT Air circuit breaker-Type D 70kA

Withdrawable circuit breaker - including the body and cassette of the circuit breaker, providing rear connection terminals.
Fixed circuit breaker - The circuit breaker body defaults to a rear horizontal terminal block.

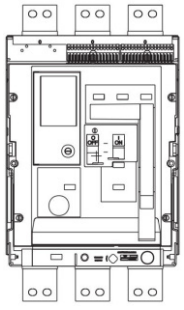
Fixed and Withdrawable Breakers

Frame	Rating (A)	Poles	Withdrawable Cat. no.	Fixed Cat. no.
1	400	3	MPD31W04	MPD31F04
		4	MPD41W04	MPD41F04
1	800	3	MPD31W08	MPD31F08
		4	MPD41W08	MPD41F08
1	1000	3	MPD31W10	MPD31F10
		4	MPD41W10	MPD41F10
1	1250	3	MPD31W12	MPD31F12
		4	MPD41W12	MPD41F12
1	1600	3	MPD31W16	MPD31F16
		4	MPD41W16	MPD41F16
1	2000	3	MPD31W20	MPD31F20
		4	MPD41W20	MPD41F20
1	2500	3	MPD31W25	MPD31F25
		4	MPD41W25	MPD41F25
2	3200	3	MPD32W32	MPD32F32
		4	MPD42W32	MPD42F32
2	4000	3	MPD32W40	MPD32F40
		4	MPD42W40	MPD42F40



Rear connections "T" terminal (Cassette)

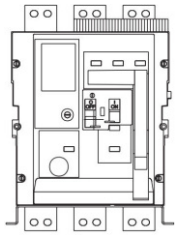
Frame	Rating (A)	Poles	Quantity required	Cat. no.	Remark
1	400 to 1600	3	6	RT1UOR	Universal
		4	8	RT1UOR	Universal
2	3200	3	6	RT2UNI	Universal
		4	8	RT2UNI	Universal
2	4000	3	6	N/A	Vertical
		4	8	N/A	Vertical



Front connections

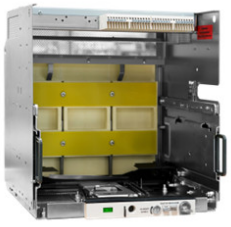
Frame	Rating (A)	Poles	Withdrawable TOP connections Cat. no.	Withdrawable Bottom connections Cat. no.
1	400 to 1600	3	FA31WA16T	FA31WA16B
		4	FA41WA16T	FA41WA16B
1	2000 to 2500	3	FA31WA25T	FA31WA25B
		4	FA41WA25T	FA41WA25B
2	3200	3	FA32WA32T	FA32WA32B
		4	FA42WA32T	FA42WA32B
2	4000	3	FA32WA40T	FA32WA40B
		4	FA42WA40T	FA42WA40B

Front connections



Frame	Rating (A)	Poles	Fixed	
			Top connections	Bottom connections
			Cat. no.	Cat. no.
1	400 to 1600	3	FA31FD16T	FA31FD16B
		4	FA41FD16T	FA41FD16B
1	2000 to 2500	3	FA31FD25T	FA31FD25B
		4	FA41FD25T	FA41FD25B
2	3200	3	FA32FD32T	FA32FD32B
		4	FA42FD32T	FA42FD32B
2	4000	3	FA32FD40T	FA32FD40B
		4	FA42FD40T	FA42FD40B

Cassette only



Basic cassette with flat copper terminals rear connected

Frame	Rating (A)	Poles	Cat. no.
1	400 to 2500	3	MPD31C25
		4	MPD41C25
2	3200	3	MPD32C32
		4	MPD42C32
2	4000	3	MPD32C40
		4	MPD42C40

Moving portion only

Standard configuration - auxiliary contact with 5 NO and 3 NC

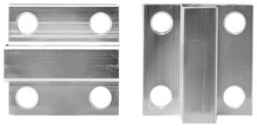
Frame	Rating (A)	Poles	Cat. no.
1	400	3	MPD31M04
		4	MPD41M04
1	800	3	MPD31M08
		4	MPD41M08
1	1000	3	MPD31M10
		4	MPD41M10
1	1250	3	MPD31M12
		4	MPD41M12
1	1600	3	MPD31M16
		4	MPD41M16
1	2000	3	MPD31M20
		4	MPD41M20
1	2500	3	MPD31M25
		4	MPD41M25
2	3200	3	MPD32M32
		4	MPD42M32
2	4000	3	MPD32M40
		4	MPD42M40

M-PACT Air circuit breaker-Type H1, H2-80kA

Withdrawable circuit breaker - including the body and cassette of the circuit breaker,providing rear connection terminals.
Fixed circuit breaker - The circuit breaker body defaults to a rear horizontal terminal block.

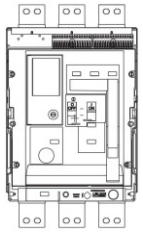
Fixed and Withdrawable Breakers

Frame	Rating (A)	Poles	Withdrawable Cat. no.	Fixed Cat. no.	Withdrawable Cat. no.	Fixed Cat. no.
2	800	3	MPH32W08	MPH32F08	MPH232W08	MPH232F08
		4	MPH42W08	MPH42F08	MPH242W08	MPH242F08
2	1000	3	MPH32W10	MPH32F10	MPH232W10	MPH232F10
		4	MPH42W10	MPH42F10	MPH242W10	MPH242F10
2	1250	3	MPH42W12	MPH32F12	MPH232W12	MPH232F12
		4	MPH42W12	MPH42F12	MPH242W12	MPH242F12
2	1600	3	MPH32W16	MPH32F16	MPH232W16	MPH232F16
		4	MPH42W16	MPH42F16	MPH242W16	MPH242F16
2	2000	3	MPH32W20	MPH32F20	MPH232W20	MPH232F20
		4	MPH42W20	MPH42F20	MPH242W20	MPH242F20
2	2500	3	MPH32W25	MPH32F25	MPH232W25	MPH232F25
		4	MPH42W25	MPH42F25	MPH242W25	MPH242F25
2	3200	3	MPH32W32	MPH32F32	MPH232W32	MPH232F32
		4	MPH42W32	MPH42F32	MPH242W32	MPH242F32
2	4000	3	MPH32W40	MPH32F40	MPH232W40	MPH232F40
		4	MPH42W40	MPH42F40	MPH242W40	MPH242F40



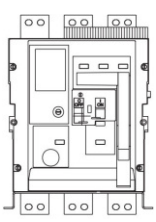
Rear connections "T" terminal (Cassette)

Frame	Rating (A)	Poles	Quantity required	Cat. no.
2	800 - 3200	3	6	RT2UNI
		4	8	RT2UNI
2	4000	3	6	N/A
		4	8	N/A



Front connections

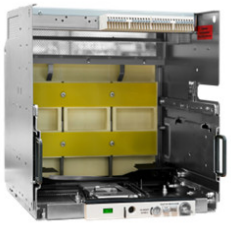
Frame	Rating (A)	Poles	Withdrawable Top connections Cat. no.	Withdrawable Bottom connections Cat. no.
2	800 - 3200	3	FA42WH32T	FA32WH32B
		4	FA42WH32T	FA42WH32B
2	4000	3	FA32WH40T	FA42WH40B
		4	FA42WH40T	FA42WH40B



Front connections

Frame	Rating (A)	Poles	Fixed Top connections Cat. no.	Fixed Bottom connections Cat. no.
2	800 - 3200	3	FA32FH32T	FA32FH32B
		4	FA42FH32T	FA42FH32B
2	4000	3	FA32FH40T	FA32FH40B
		4	FA42FH40T	FA42FH40B

Cassette only



Basic cassette with flat copper terminals rear connected

Frame	Rating **(A)**	Poles	Cat. no.
2	800 - 3200	3	MPH32C32
		4	MPH42C32
2	4000	3	MPH32C40
		4	MPH42C40

Moving portion only

Standard configuration - auxiliary contact with 5 NO and 3 NC

Frame	Rating **(A)**	Poles	Cat. no.	Cat. no.
2	800	3	MPH32M08	MPH232M08
		4	MPH42M08	MPH242M08
2	1000	3	MPH32M10	MPH232M10
		4	MPH42M10	MPH242M10
2	1250	3	MPH32M12	MPH232M12
		4	MPH42M12	MPH242M12
2	1600	3	MPH32M16	MPH232M16
		4	MPH42M16	MPH242M16
2	2000	3	MPH32M20	MPH232M20
		4	MPH42M20	MPH242M20
2	2500	3	MPH32M25	MPH232M25
		4	MPH42M25	MPH242M25
2	3200	3	MPH32M32	MPH232M32
		4	MPH42M32	MPH242M32
2	4000	3	MPH32M40	MPH232M40
		4	MPH42M40	MPH242M40

Electrical accessories

	Range	Voltage	Cat. no.	Ref. No.
Shunt Trip (ST)	24/30 V	DC	ST30	B40006554
	48 V	DC	ST48	B40006555
	110/130 V	AC/DC	ST130	B40006401
	220/250 V	AC/DC	ST250	B40006500
	380/440 V	AC	ST440	B40006497
Motor operator (MOP)	24/30 V	DC	MOP30	B40029600
	48 V	DC	MOP48	B40029601
	110/130 V	AC/DC	MOP130	B40033630
	220/250 V	AC/DC	MOP250	B40032398
	380/440 V	AC	MOP440A	B90000018
Closing Coil (CC)	24/30 V	DC	CC30	B40006556
	48 V	DC	CC48	B40006557
	110/130 V	AC/DC	CC130	B40006402
	220/250 V	AC/DC	CC250	B40006498
	300/440 V	AC	CC440	B90000018
Undervoltage release (UV)	48 V	DC	UV48	B40027558
	110/130 V	AC	UV130A	B40027559
	110/130 V	DC	UV130D	B40027570
	220/250 V	AC	UV250	B40033628
	380/440 V	AC	UV440	B40006578
Undervoltage release Time Delayed (UVTD)	48 V	DC	UVTD48	B40027571
Note: The undervoltage time delay release already includes both the undervoltage release and the delay device, and there is no need to order an additional undervoltage release.	220/250 V	AC	UVTD250	B40006576
	380/440 V	AC	UVTD440	B40006580
	250 V	AC/DC	CSWFF	B40011377
Springs charged signal (1 x NO)			SCC	
Provided as a standard accessory for energy storage motors				

Accessories

Mechanical accessories

1-2 interlock/cable — Type **A**

Frame	Version	Poles	Cat.no.	Ref.No.
1	Withdrawable	3	2WCI3PW	406342
1		4	2WCI4PW	406343
2		3	2WCI3PW	405459
2		4	2WCI4PW	405461
1	Fixed	3	2WCI3PF	406340
1		4	2WCI4PF	406341
2		3	2WCI3PF	405463
2		4	2WCI4PF	405465

1-3 interlock/cable — Type **B**

Frame	Version	Poles	Cat.no.	Ref.No.
1	Withdrawable	3	B13WCI3PW	406350
1		4	B13WCI4PW	406351
2		3	B13WCIF23PW	405475
2		4	B13WCIF24PW	405477
1	Fixed	3	B13WCI3PF	406348
1		4	B13WCI4PF	406349
2		3	B13WCIF23PF	405479
2		4	B13WCIF24PF	405481

2-3 interlock/cable — Type **C**

Frame	Version	Poles	Cat.no.	Ref.No.
1	Withdrawable	3	C23WCI3PW	406358
1		4	C23WCI4PW	406359
2		3	C23WCIF23PW	405491
2		4	C23WCIF24PW	405493
1	Fixed	3	C23WCI3PF	406356
1		4	C23WCI4PF	406357
2		3	C23WCIF23PF	405495
2		4	C23WCIF24PF	405497

Cable for interlock

Item	Cat.no.	Ref.No.
cable, 100cm	100BCMCI	405531
cable, 160cm	160BCMCI	405532
cable, 200cm	200BCMCI	405533
cable, 300cm	300BCMCI	405611

Note: If you need longer mechanical interlocking steel cables, please contact us.

Interlocks

Item	Cat.no.	Ref.No.
Roins key breaker interlock(1)	RONLOK	B40006515
Ronis key cassete interlock (factory fitted)	RONCASFF	B40011378

Others

Item	Cat.no.	Ref.No.
Operations counter	MOC	B40006511
Left hand door interlock - hinged left	DILHS	B40006546
Right hand door interlock - hinged right	DIRHS	B40006504
Mis-insertion device	ACBMID	B40006503
IP54 door	IP54DOOR	B40006507
Handling (lifting) truck	ACBLIFT	B40006832
Trip alarm contact	MPROMAC	B40006573

(1) There are 4 types of lock cores available for selection (A, B, C, D). Please indicate the lock cores (A, B, C, D) after the order number when placing an order.

Frame **1,2**

Spare parts

Neutral / Earth leg (4th)(1)
Current transformer with mounting kit

Neutral (4th) Rogowski coil
with mounting kit (2)

		Current transformer		Rogowski coil (2)	
Frame	Rating **(A)**	Cat.no.	Ref.No.	Cat.no.	Ref.No.
1	800	ELCT8001		RCMK8001	
2		ELCT8002		RCMK8002	
1	1000	ELCT10001		RCMK10001	
2		ELCT10002		RCMK10002	
1	1250	ELCT12501		RCMK12501	
2		ELCT12502		RCMK12502	
1	1600	ELCT16001		RCMK16001	
2		ELCT16002		RCMK16002	
1	2000	ELCT20001		RCMK20001	
2		ELCT20002		RCMK20002	
1	2500	ELCT25001		RCMK25001	
2		ELCT25002		RCMK25002	
2	3200	ELCT32002		RCMK32002	
2	4000	ELCT40002		RCMK40002	

(1) The grounding current transformer is used in conjunction with electronic release devices to achieve GF CT function.This accessories needs to be purchased separately and is not provided as a standard accessories. If necessary, please contact your local sales.

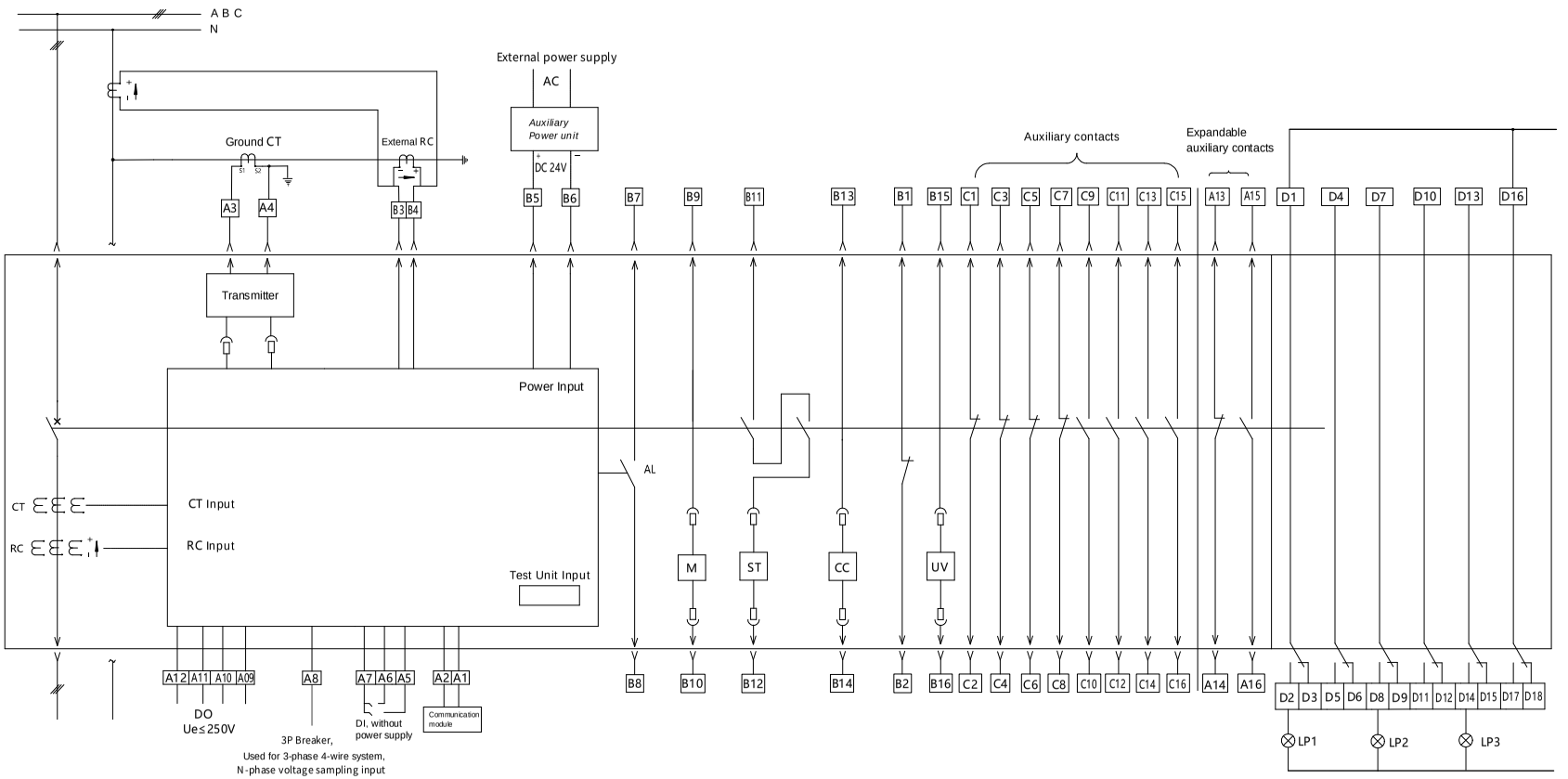
(2) Simultaneously provide output twisted pair cables (length ≤ 2m).The fourth pole neutral current transformer used for ground fault protection is standard configuration. If you need to order an independent fourth pole neutral current transformer, please contact your local sales.

Technical data

Order codes

Wiring diagrams

■ 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
GROUND CT	Ground CT for (SEF)

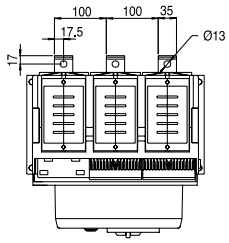
Warning!

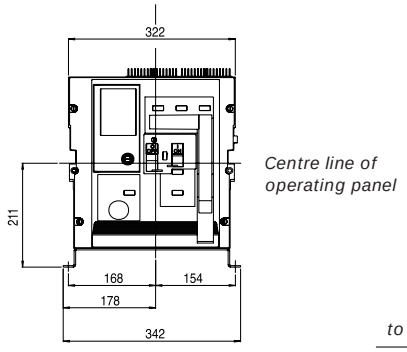
The auxiliary power supply in the wiring diagram of the M-PACT Breaker is an optional accessory and an independently installed module. In any case, the B5-B6 wiring terminals of the M-PACT Breaker can only be connected to a 24VDC power supply (B5+, B6-). If the circuit breaker protection components are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

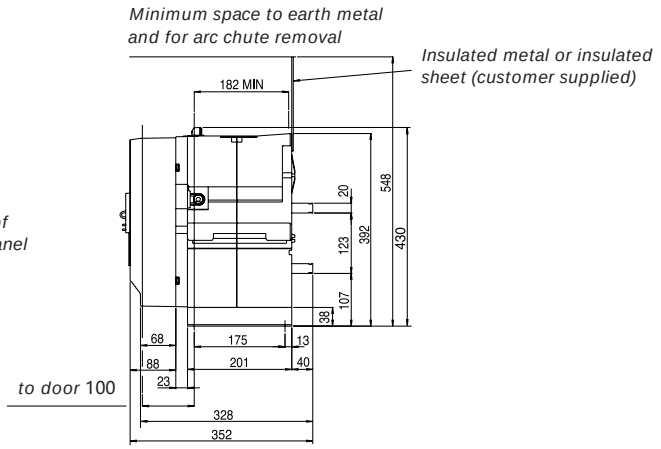
Dimensional drawings

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**



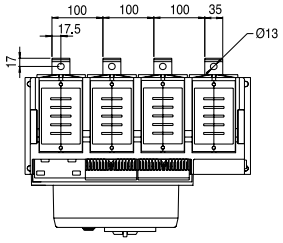


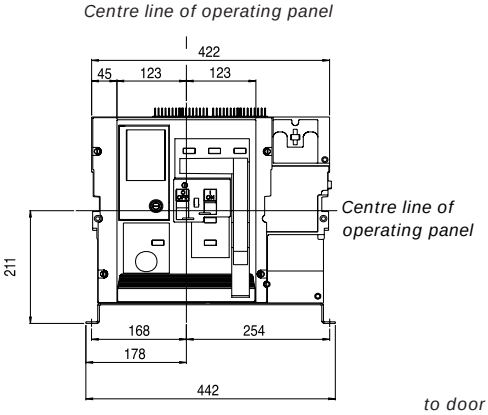


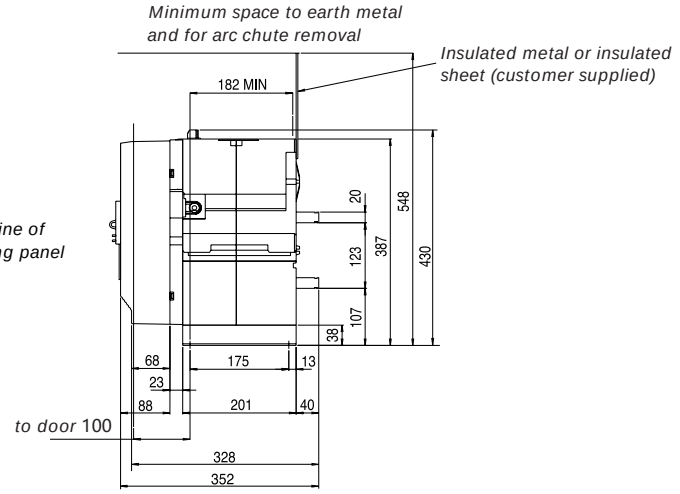
Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

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

4P, Type A, 400A to 1600A





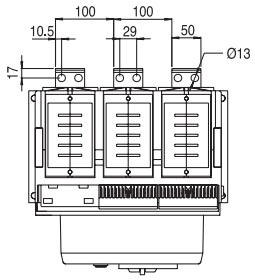


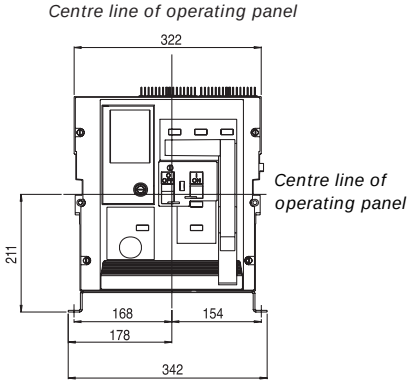
Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

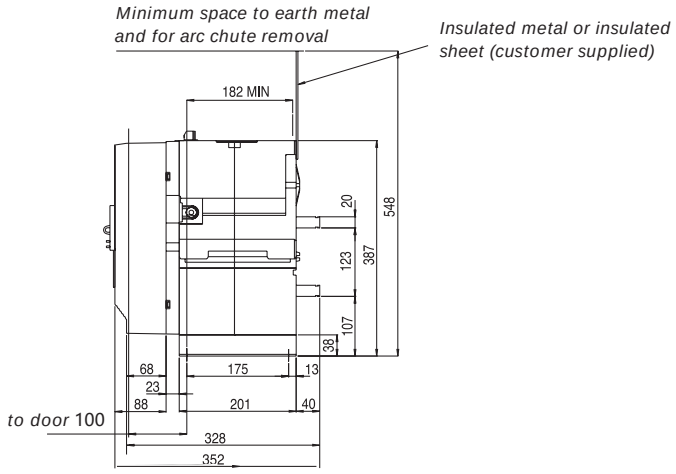
Note: Gap on both sides of the circuit breaker ≥25mm

Fixed, horizontal, rear connection

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



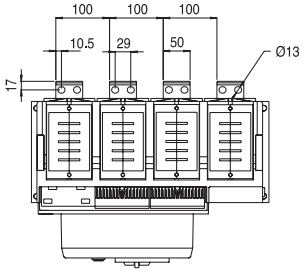


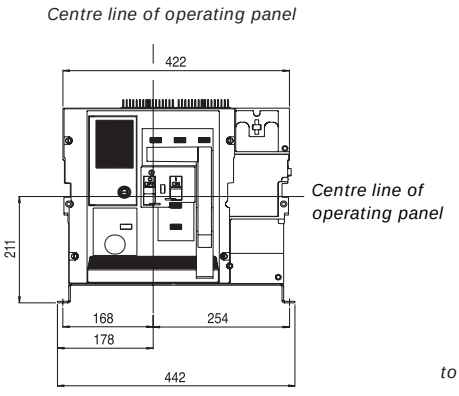


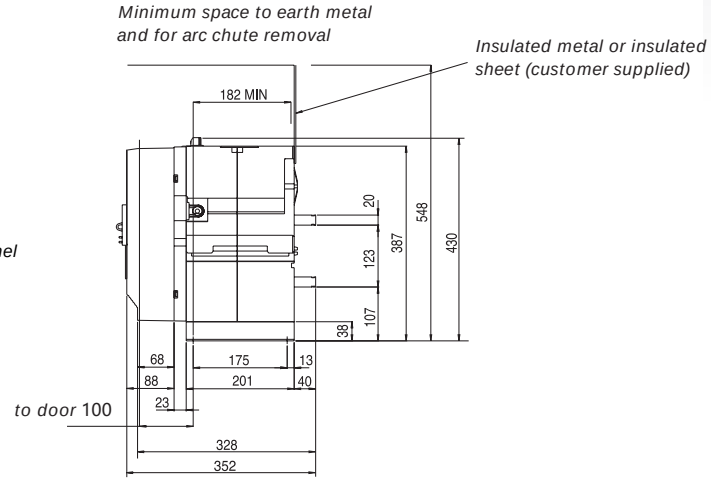
Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

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

4P, Type D, 400A to 1600A







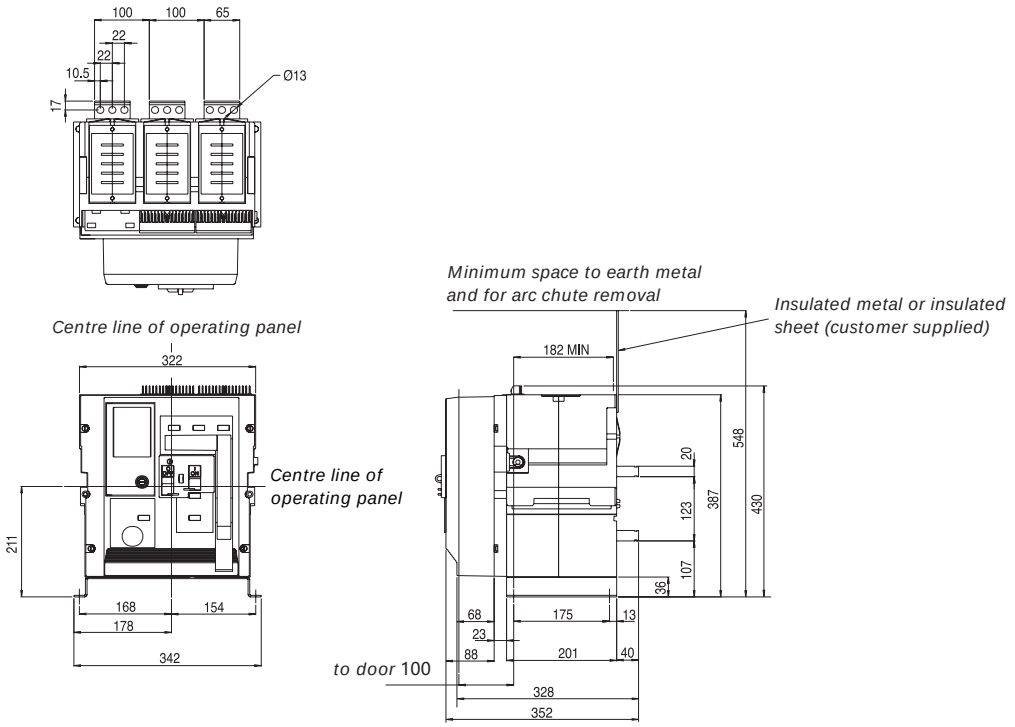
Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

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

Gap on both sides of the circuit breaker ≥25mm

Fixed, horizontal, rear connection

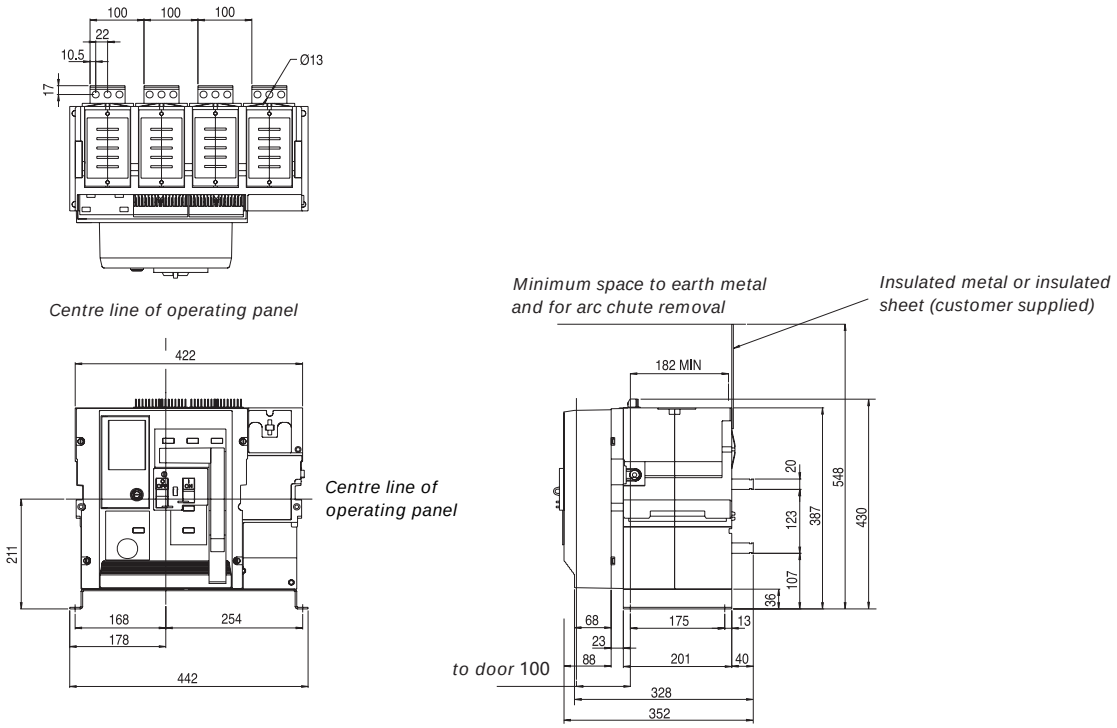
3P, Type **A** and Type **D**, **2000A** to **2500A**; Type **D2 400A** to **2500A**



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**

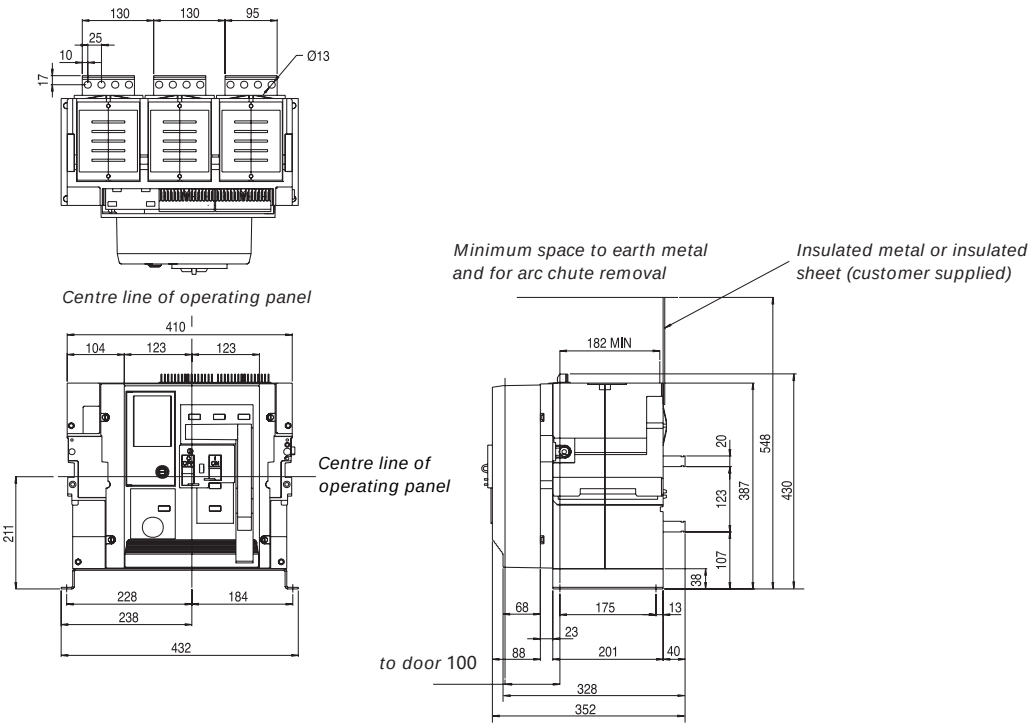


Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

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

Fixed, horizontal, rear connection

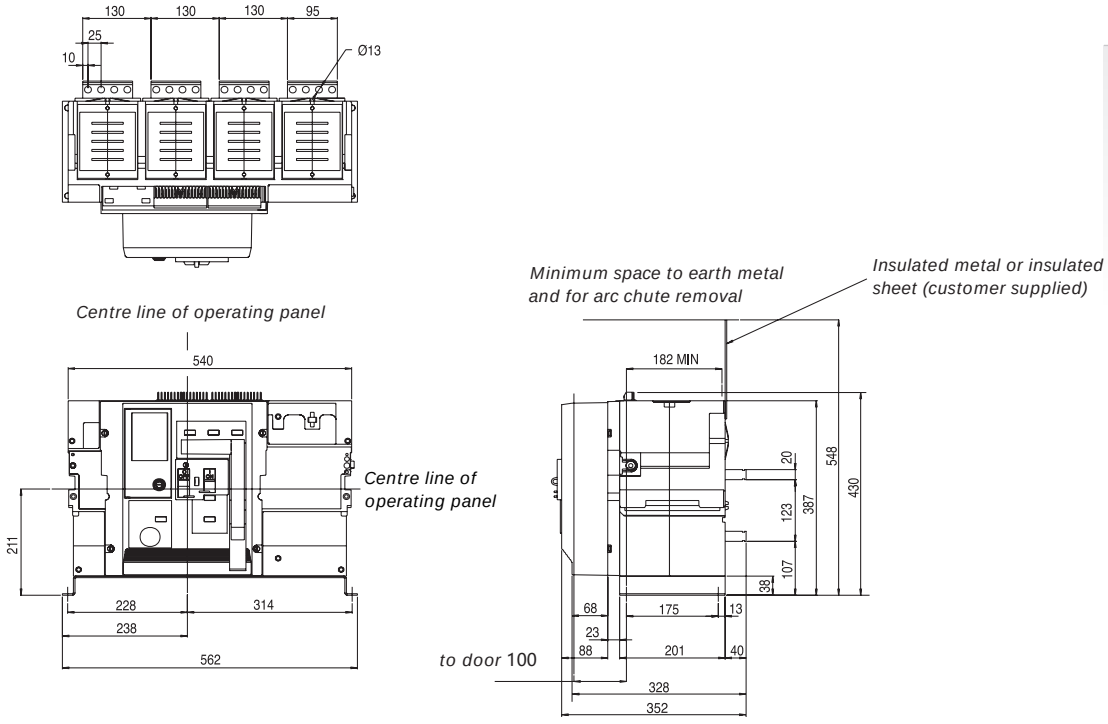
3P, Type **A** and Type **D**, **3200A** to **4000A**
3P, Type **H1** and Type H_2 , **800A** to **4000A**



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

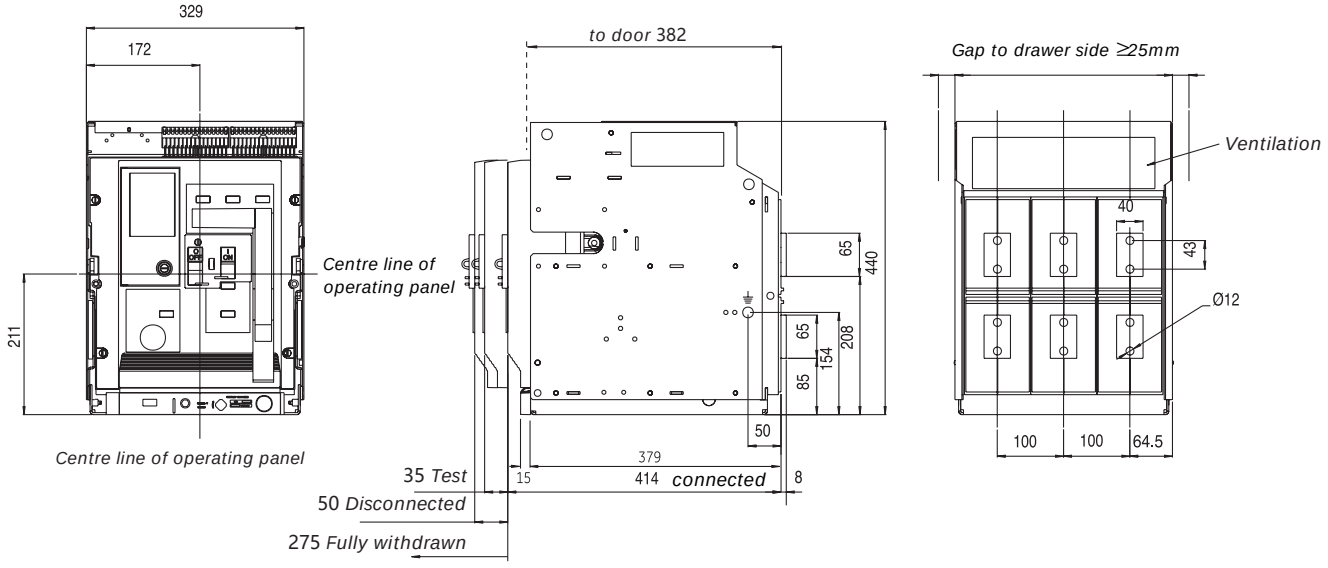
4P, Type **A** and Type **D**, **3200A** to **4000A**
4P, Type **H1** and Type H_2 , **800A** to **4000A**



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

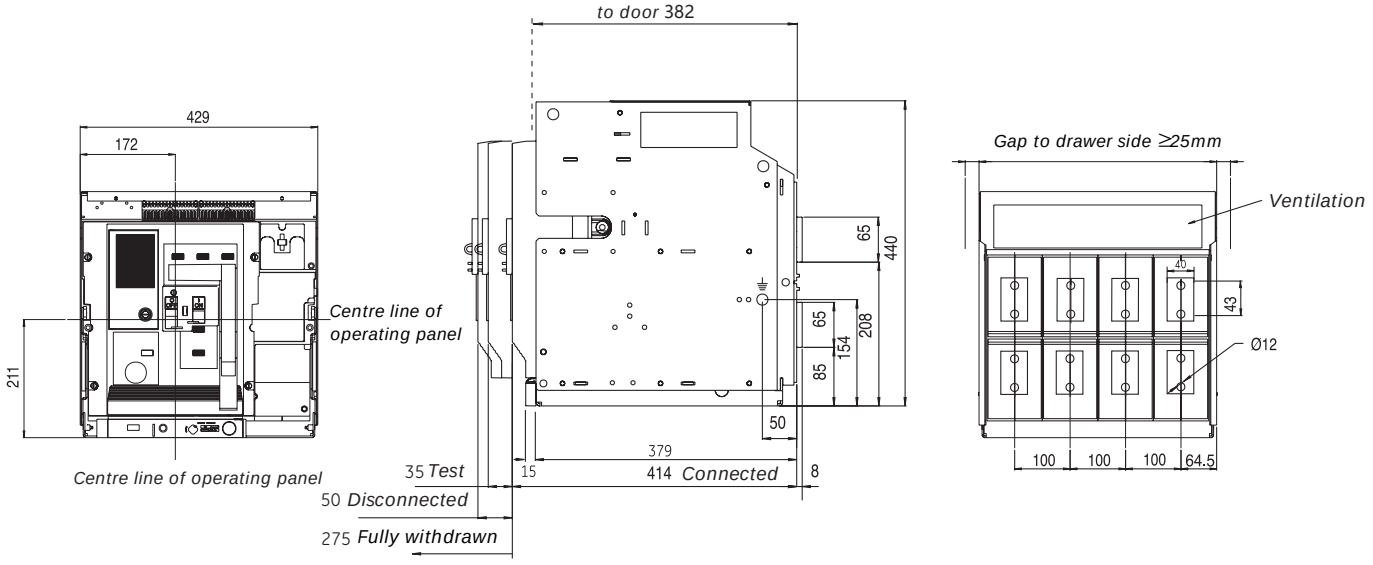
Note: Gap on both sides of the circuit breaker ≥25mm

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.

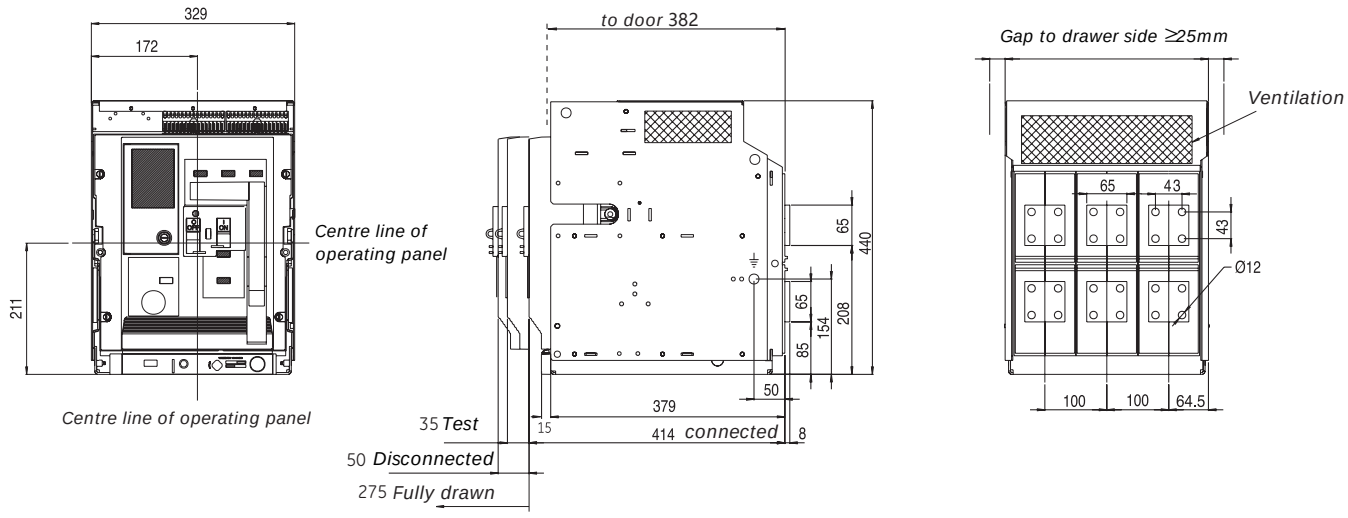
4P, Type **A**, **400A** to **1600A**



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

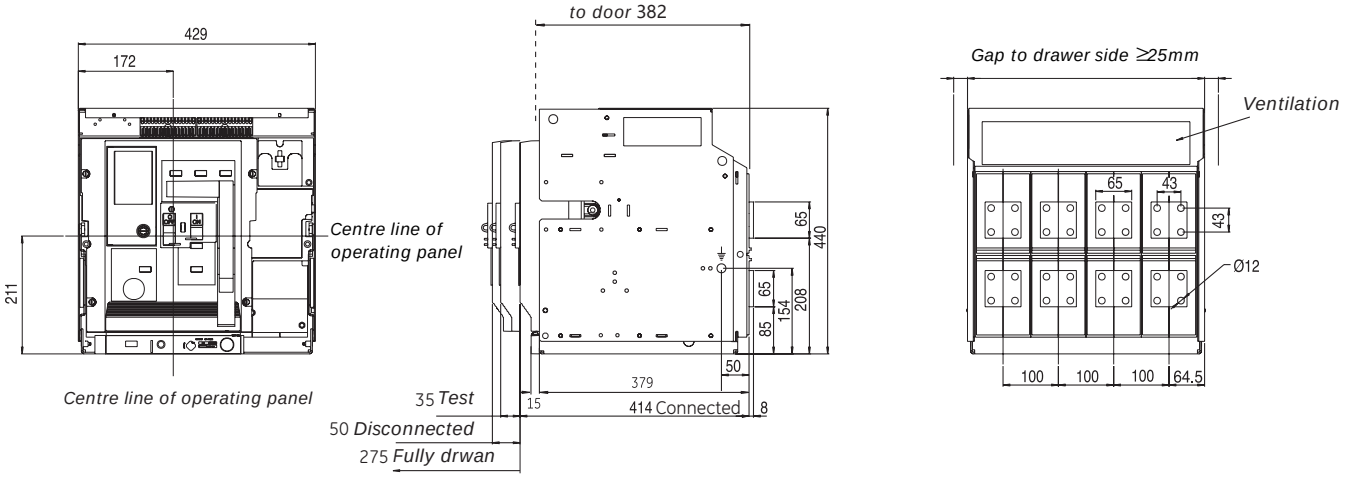
Withdrawable, rear connection

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

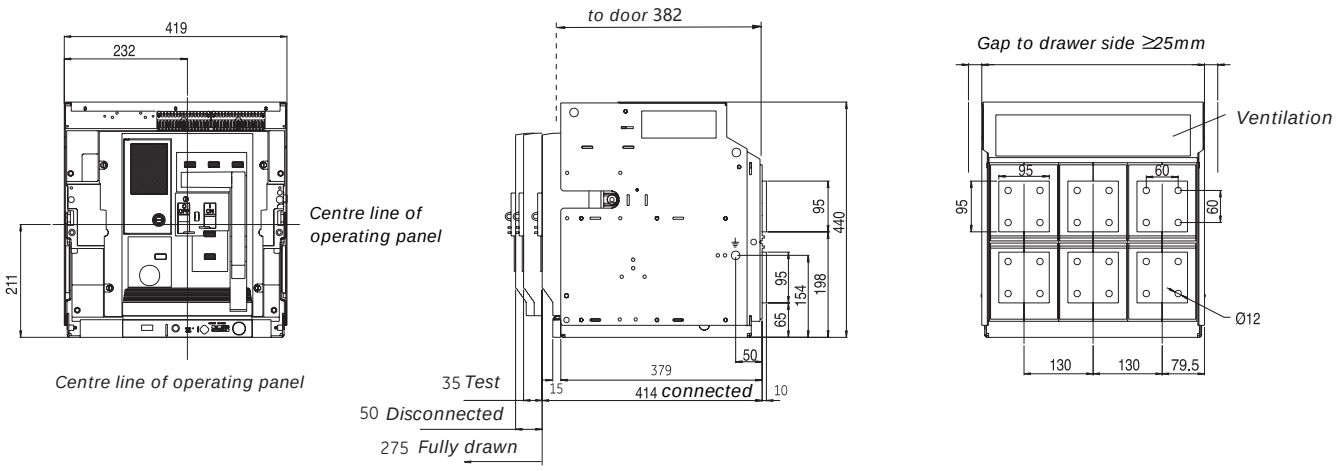


Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

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

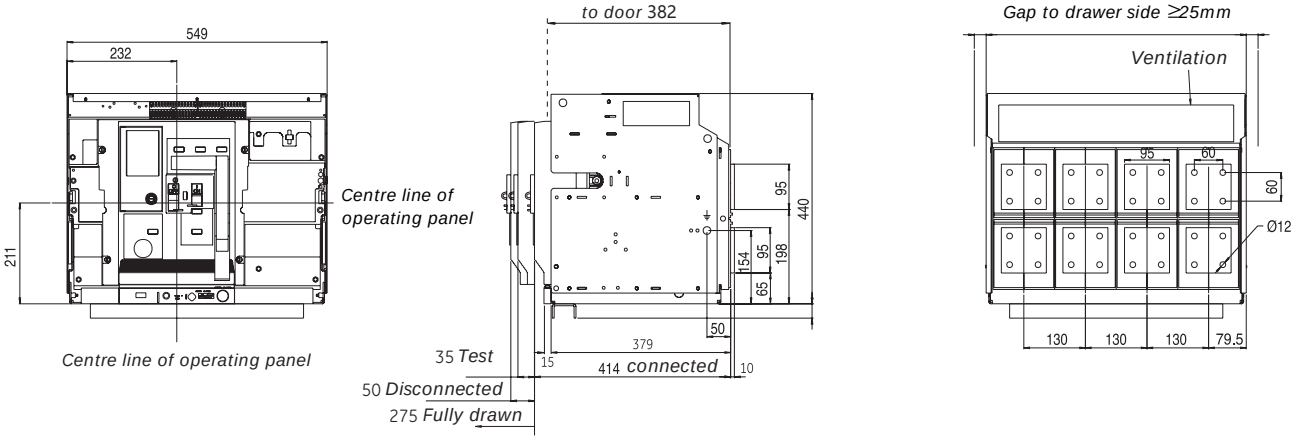
Withdrawable, rear connection

3P, Type **A** and Type **D**, **3200A**
3P, Type **H1** 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.

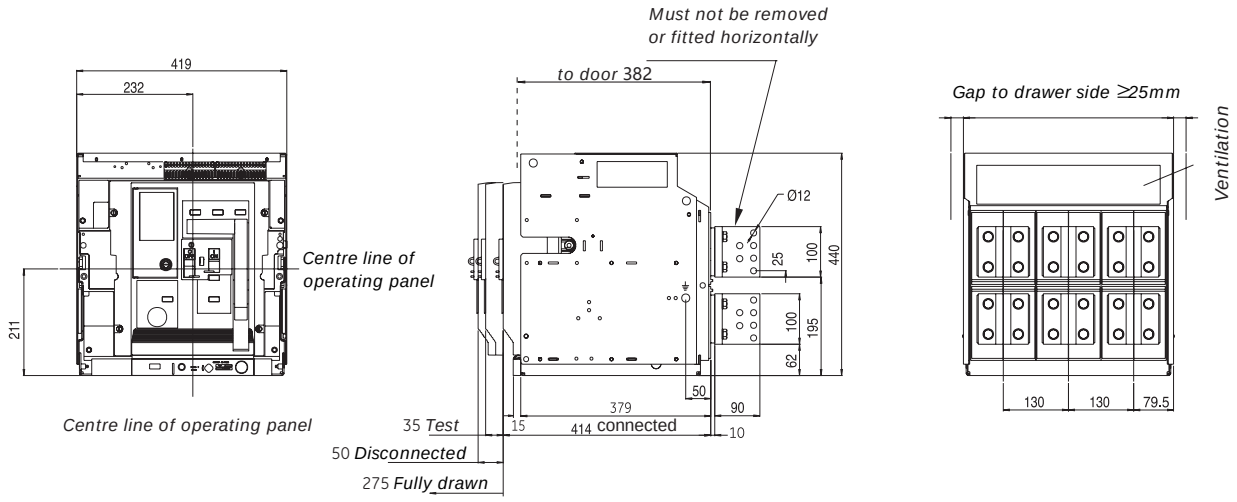
4P, Type **A** and Type **D**, **3200A**
4P, Type **H1** and Type H_2, **800** to **3200A**



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

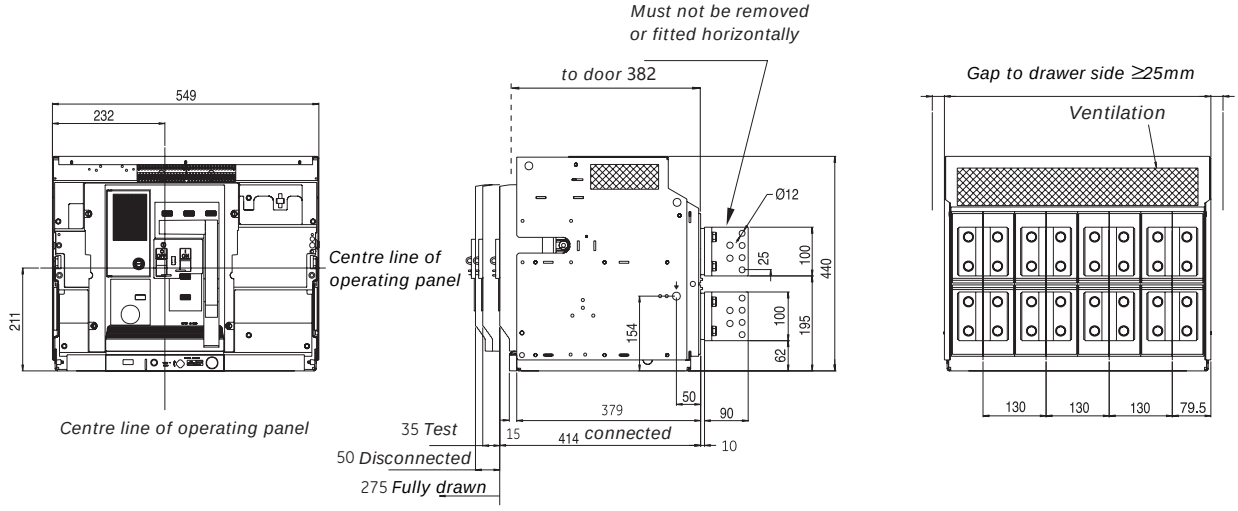
Withdrawable, rear connection

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.

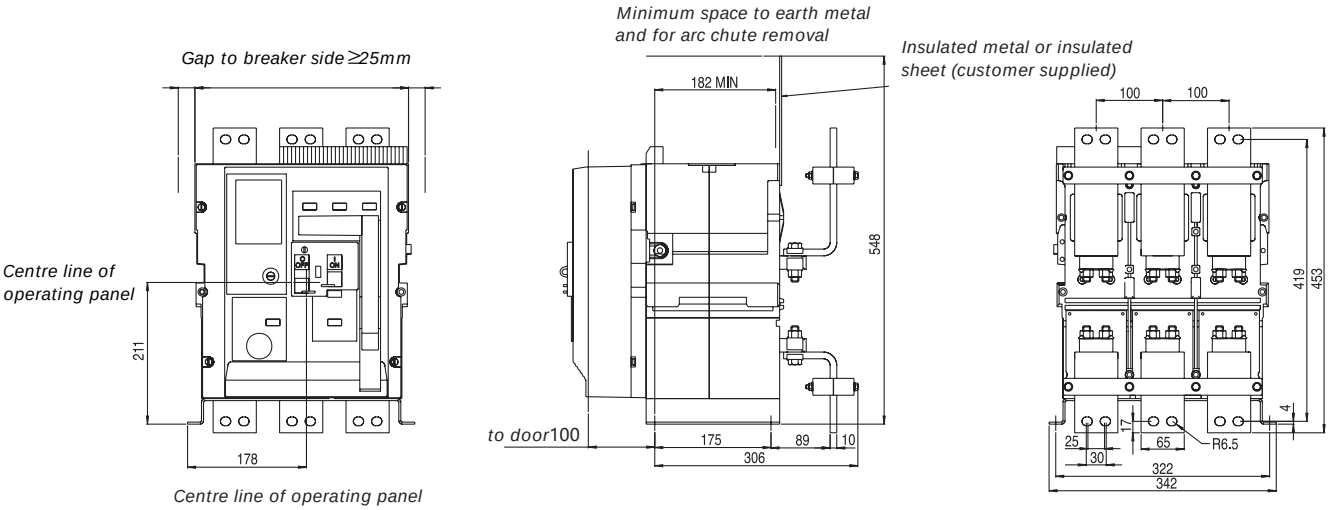
4P, Type **A**, Type **D**,Type **H**, **4000A**



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

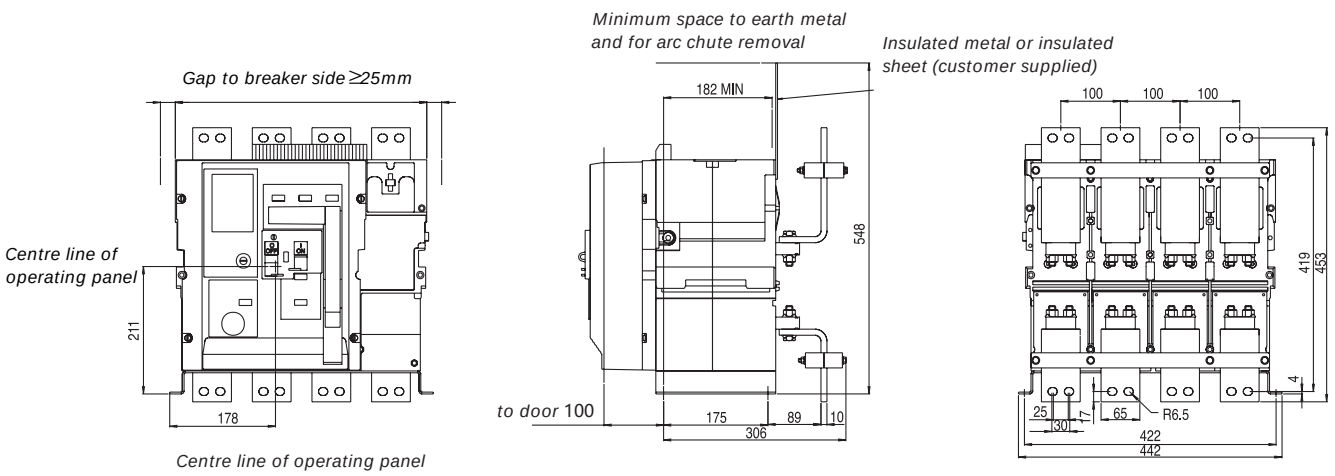
Front access connection of Fixed type

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.

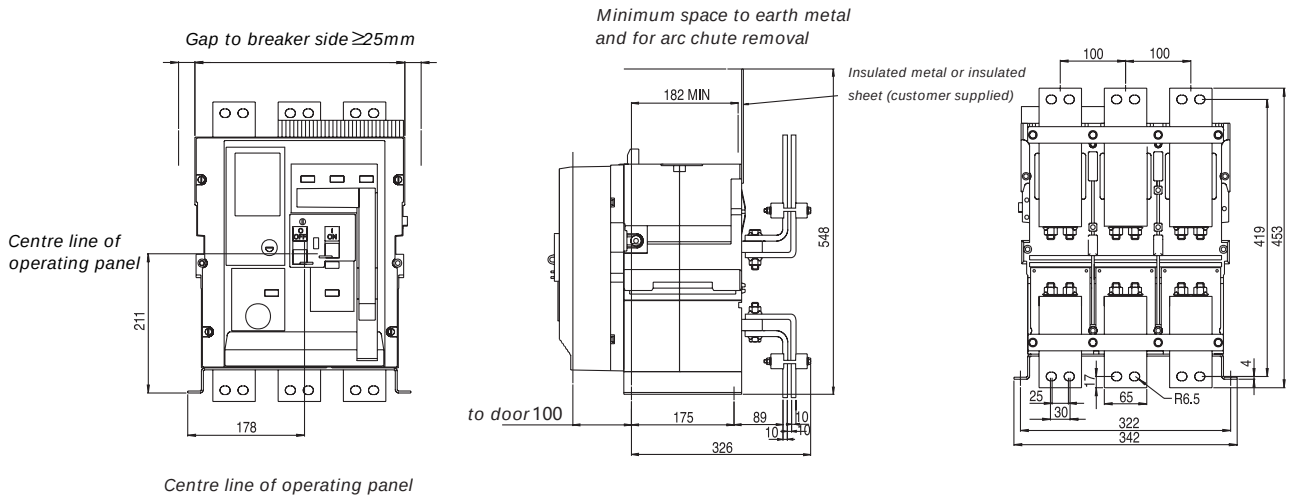
4P, Tpye **A**, Type **D**, **400A** to **1600A**



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

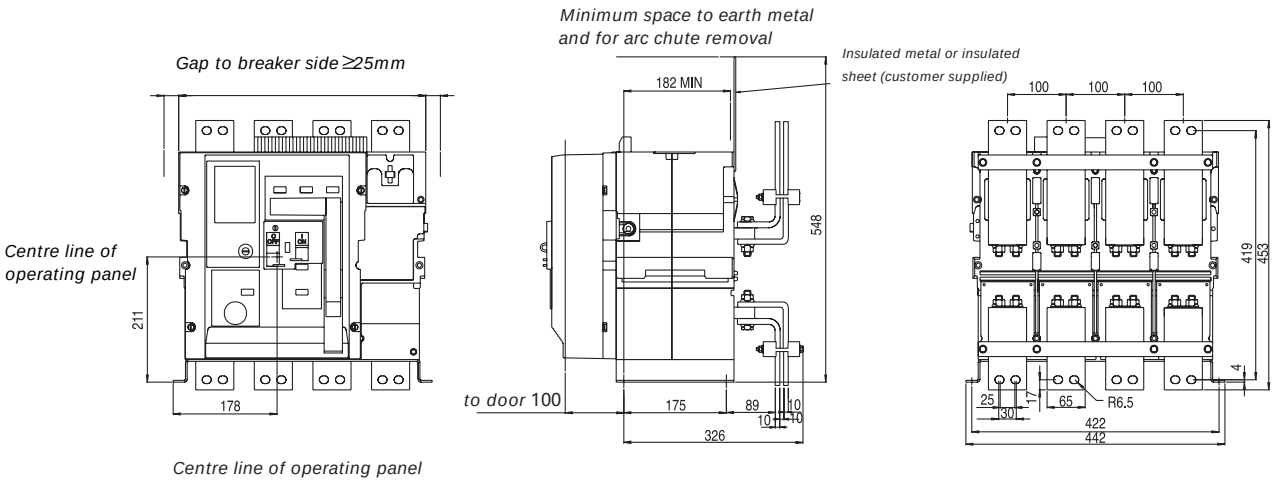
Front access connection of Fixed type

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.

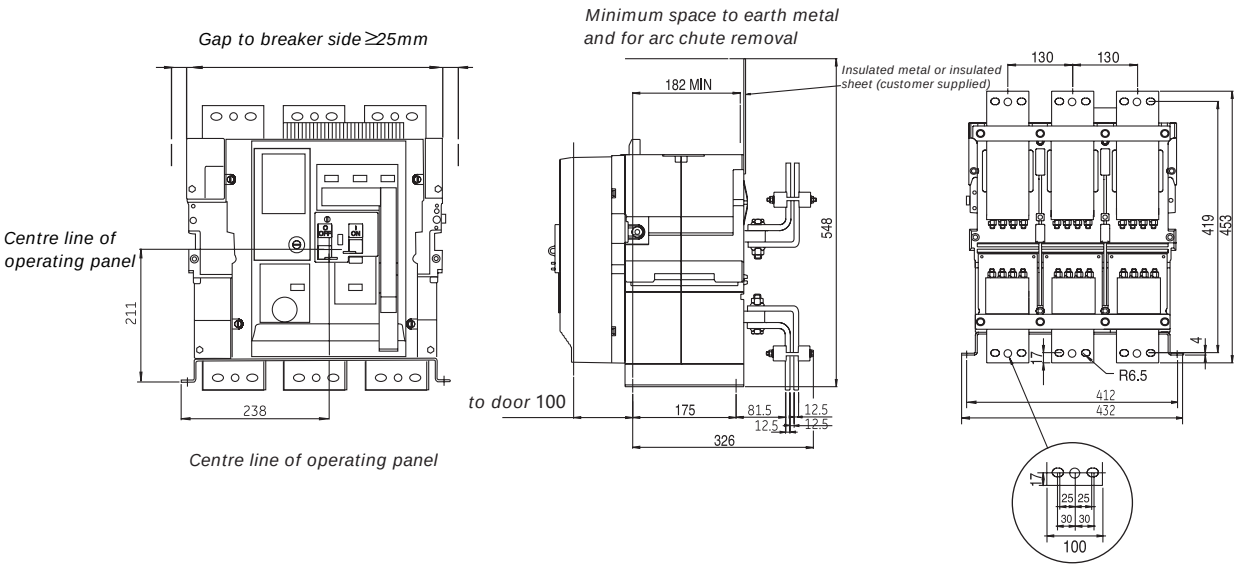
4P, Type **A** and Type **D**, **2000A** to **2500A**, Type **D2 400A** to **2500A**



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

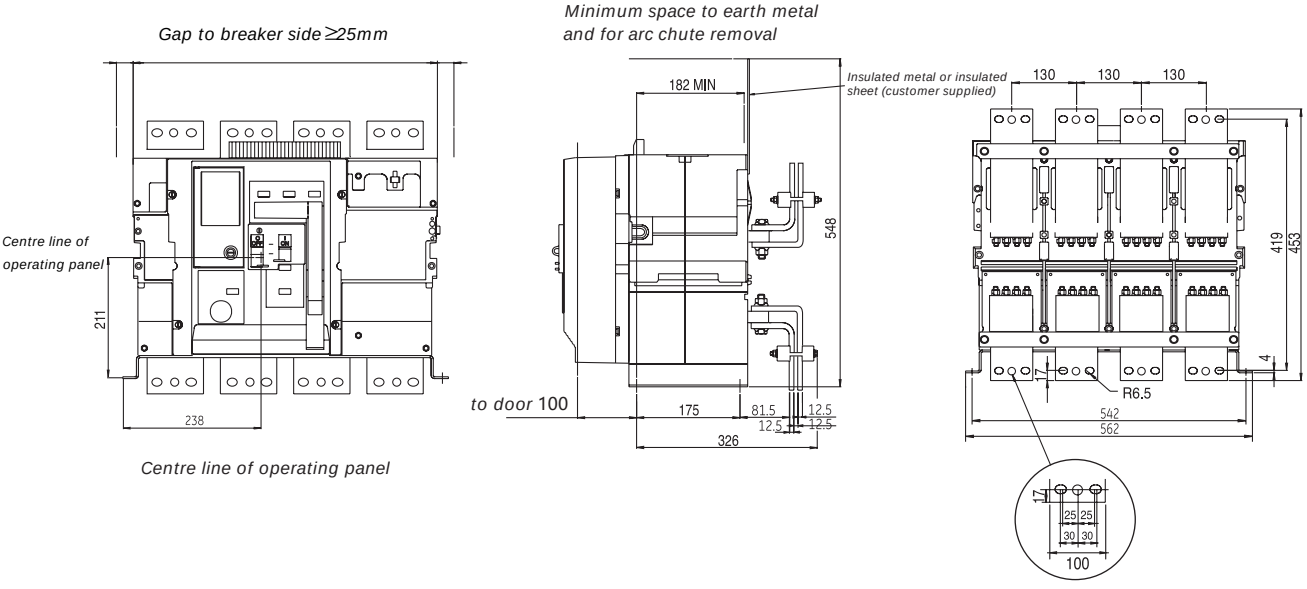
Front access connection of Fixed type

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.

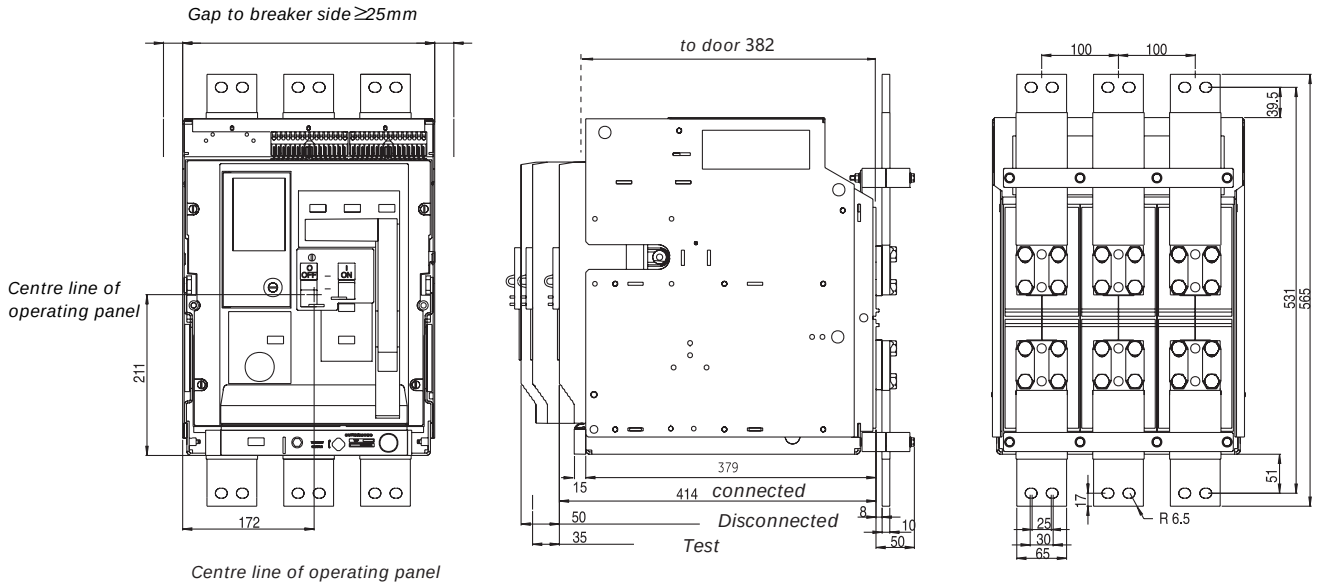
4P, Type **A** and Type **D**, **3200A** to **4000A**
4P, Type **H_1** and Type H_2, **800A** to **4000A**



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

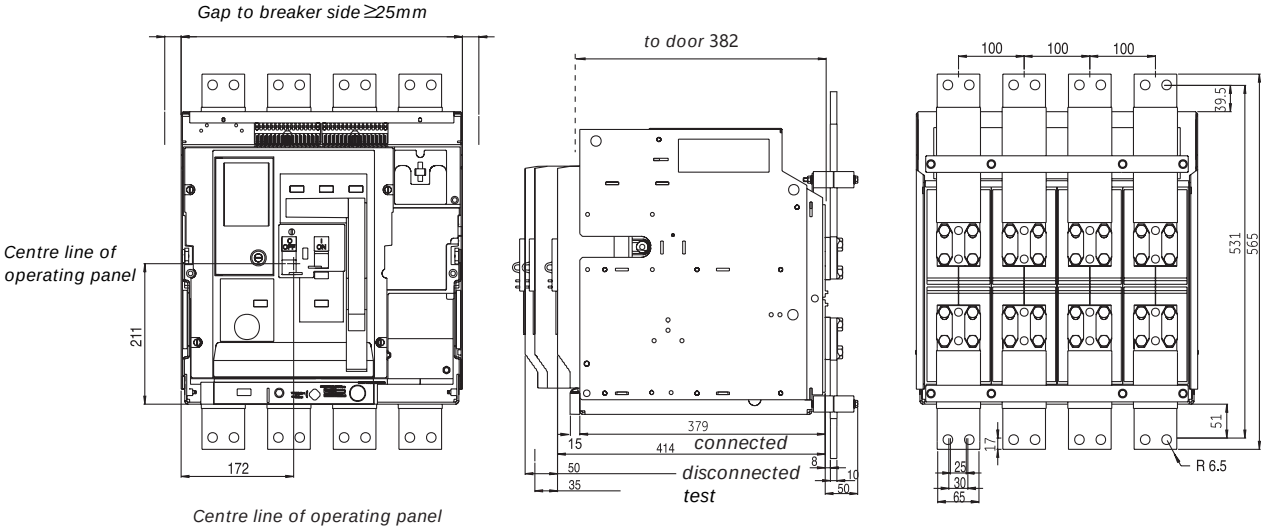
Front access connection of Withdrawable type

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.

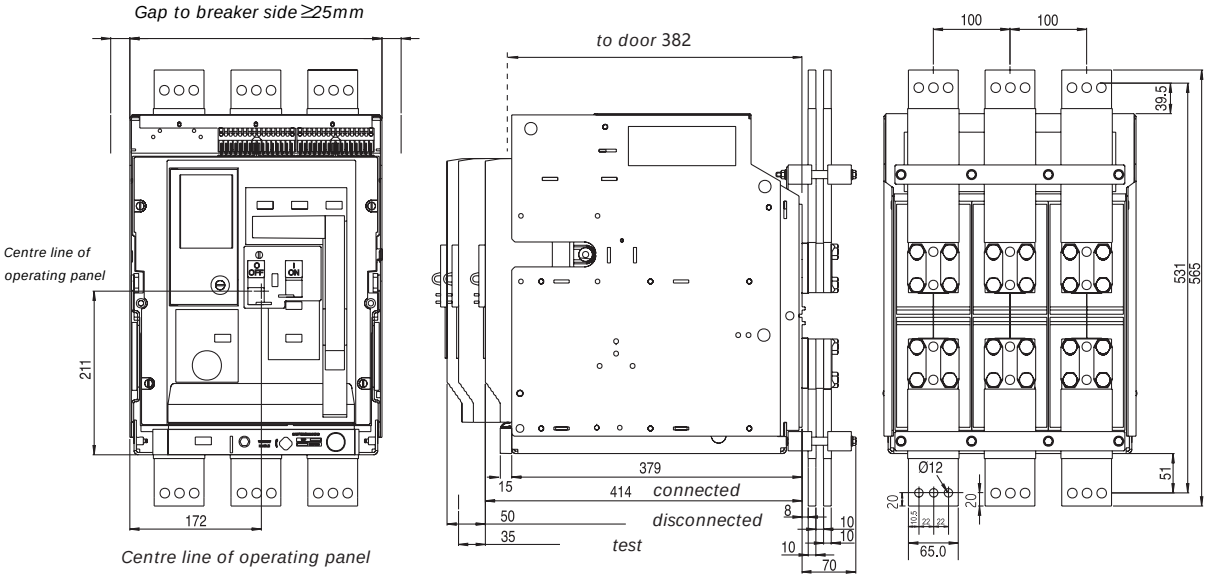
4P, Type **A** and Type **D**, **400A** to **1600A**



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

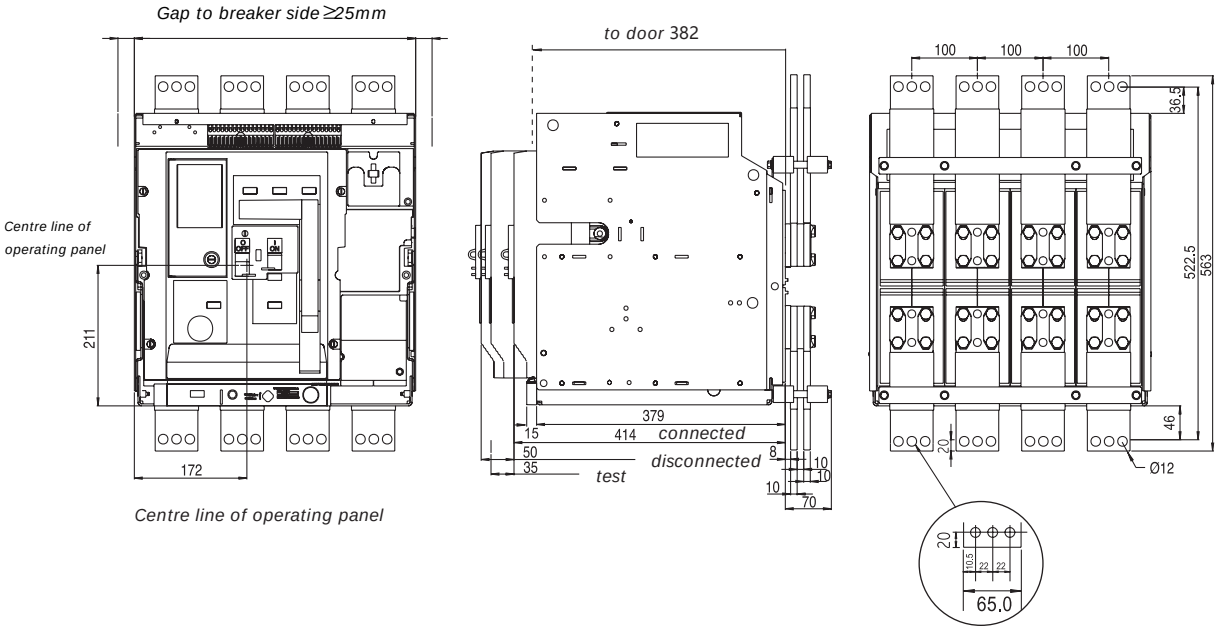
Front access connection of Withdrawable type

3P, Type **A** and Type D, 2**000A** 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.

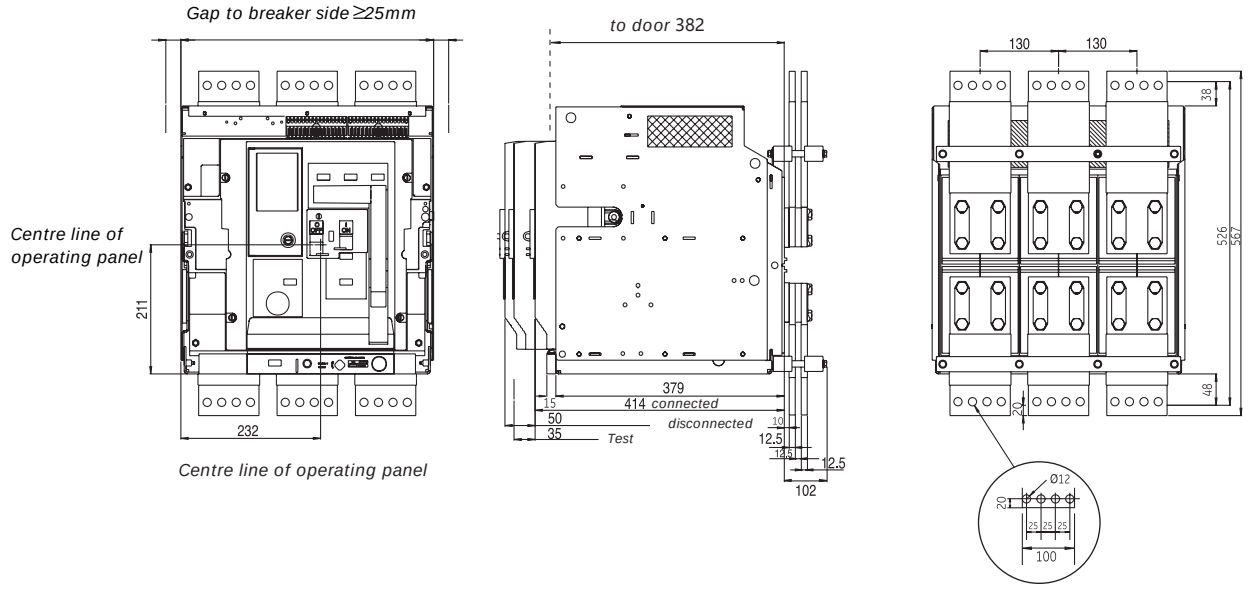
4P, Type **A** and Type D, 2**000A** to **2500A,** Type **D2**, **400** to **2500A**



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

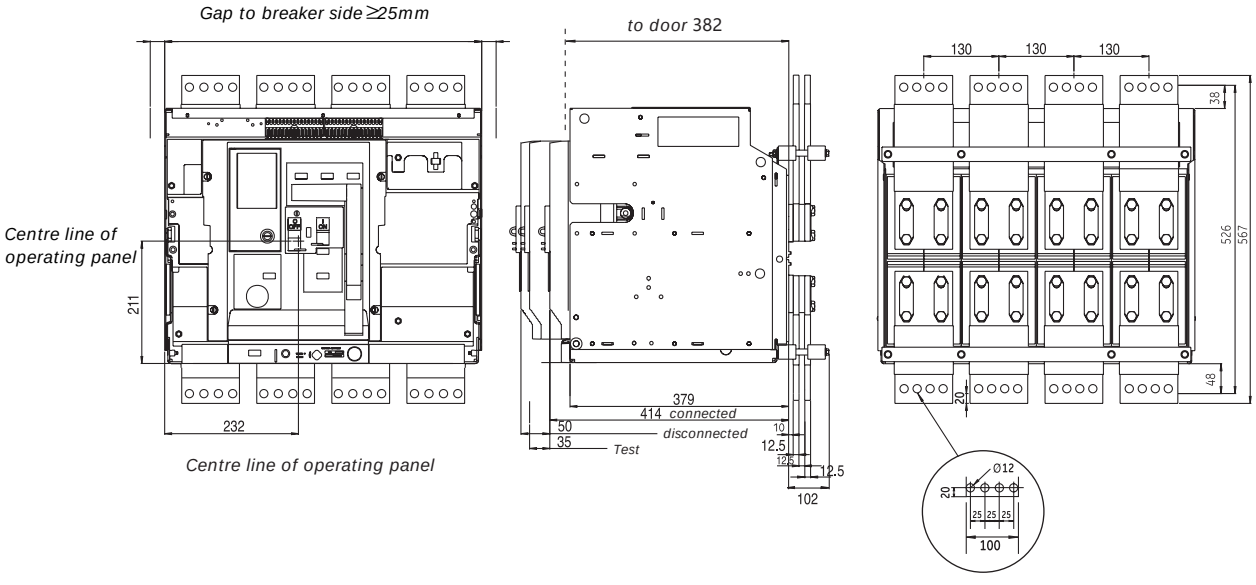
Front access connection of Withdrawable type

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**

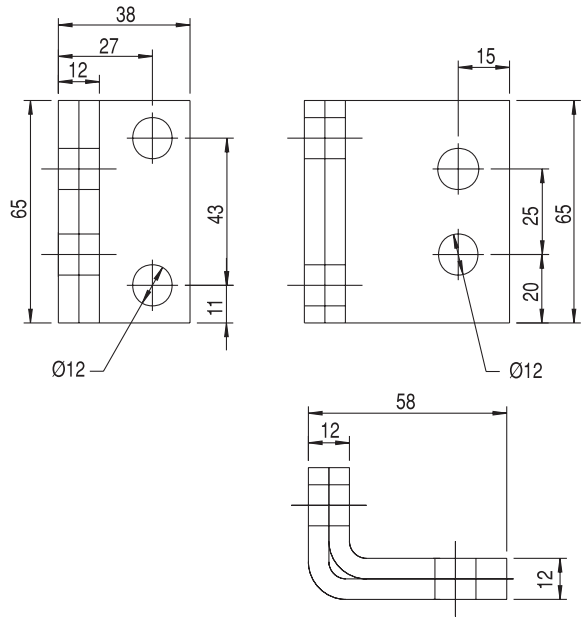


Copperwork must be supported within 200 mm of breaker connections-busbars or cables. All connections to be tightened to 50Nm.

Adaptor connections

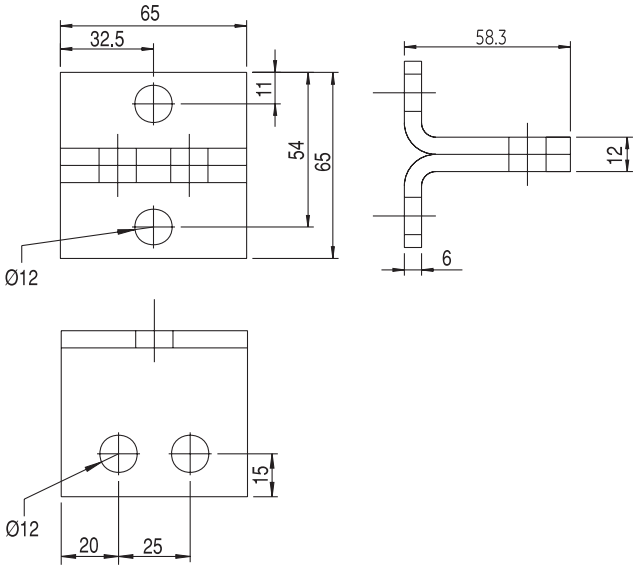
Rear Adapter Vertical Connection

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



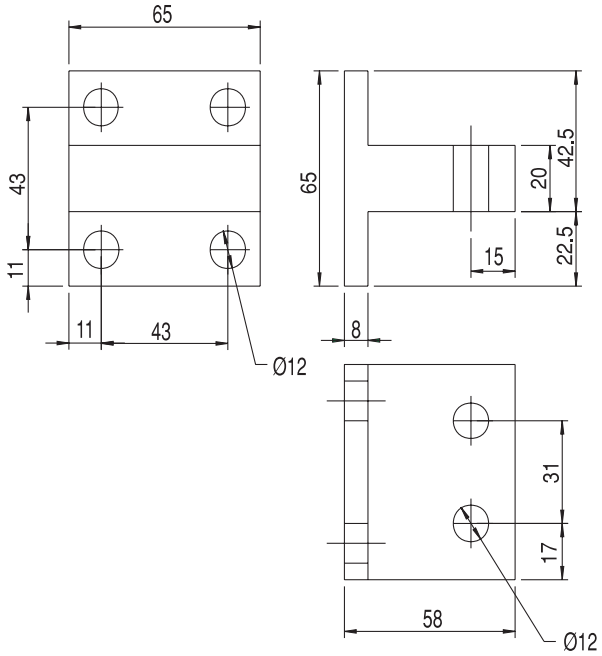
Rear Adapter **H**orizontal Connection

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

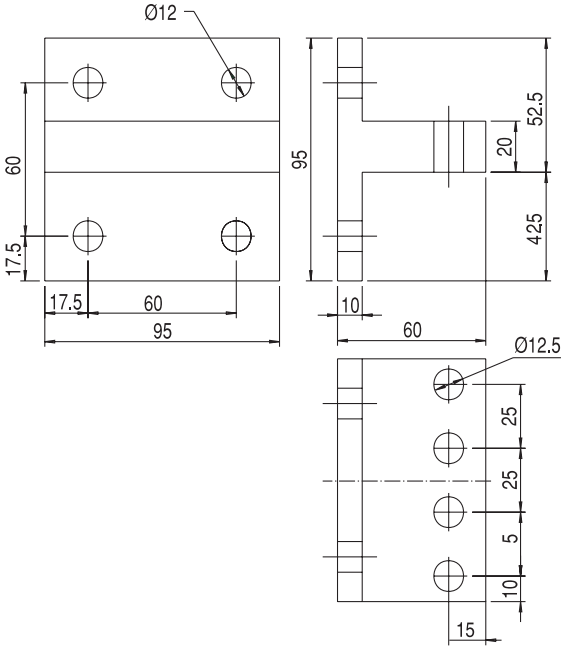


Rear Adapter Vertical / Horizontal Connection

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

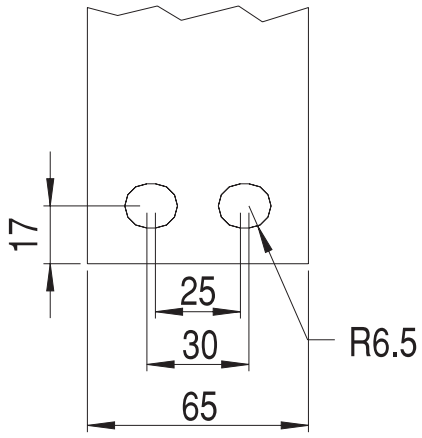


Frame 2, Type **A**, **D**, **H**,T-shaped, **In=800-3200**

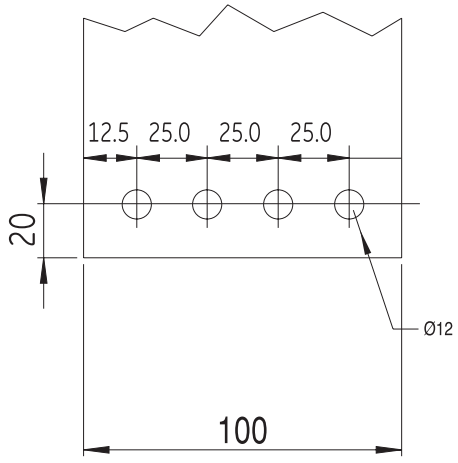


Copper connections - Front access (Fixed and/or withdrawable)

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

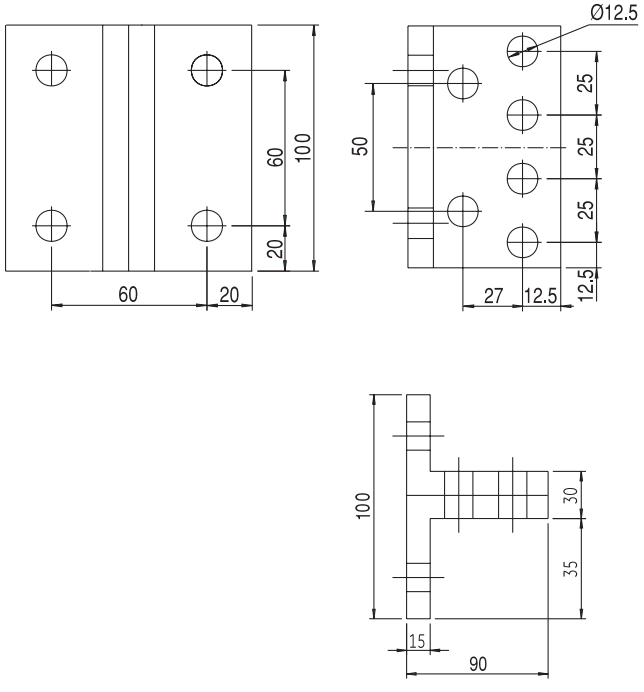


Type **A, D, In =3200A** to **4000A**
Type **H, In =800A** to **4000A**

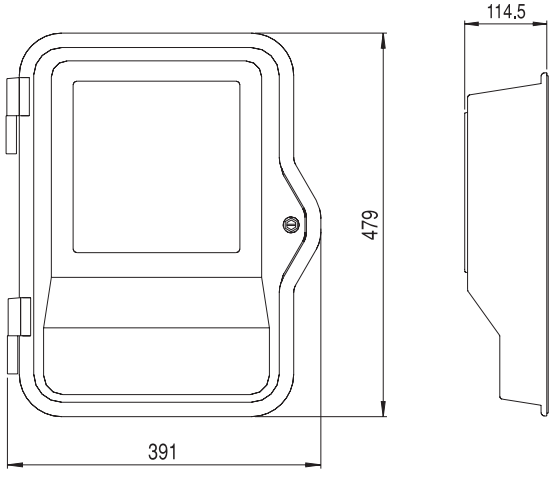


Copper connections - Rear access (withdrawable)

Type **A, D, H, In= 4000A**

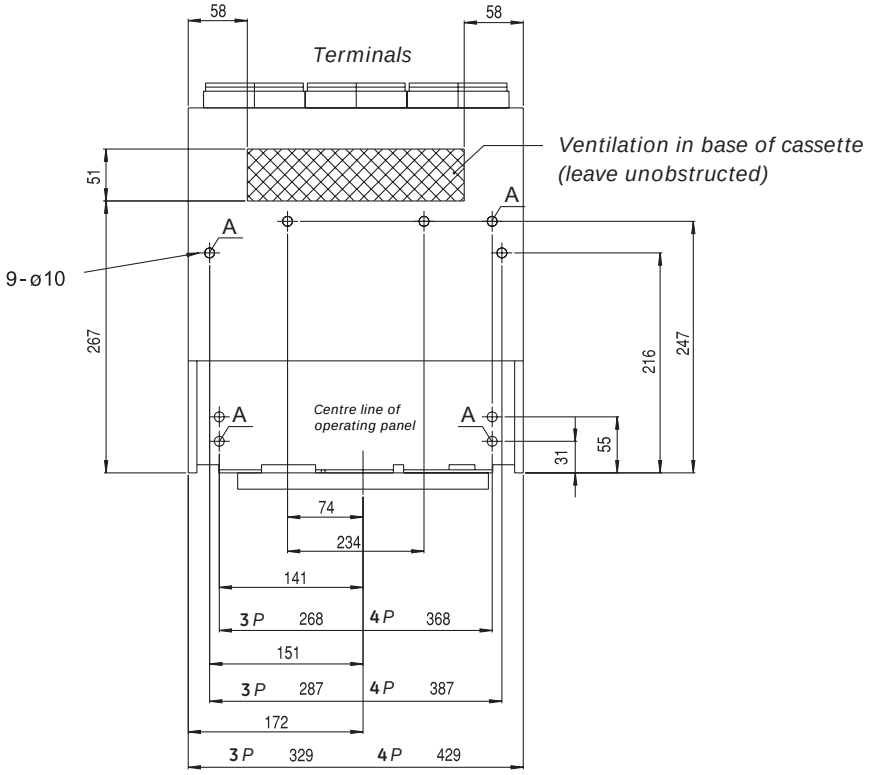


IP54 Door
(Withdrawable unit only - Frame 1&2 only)

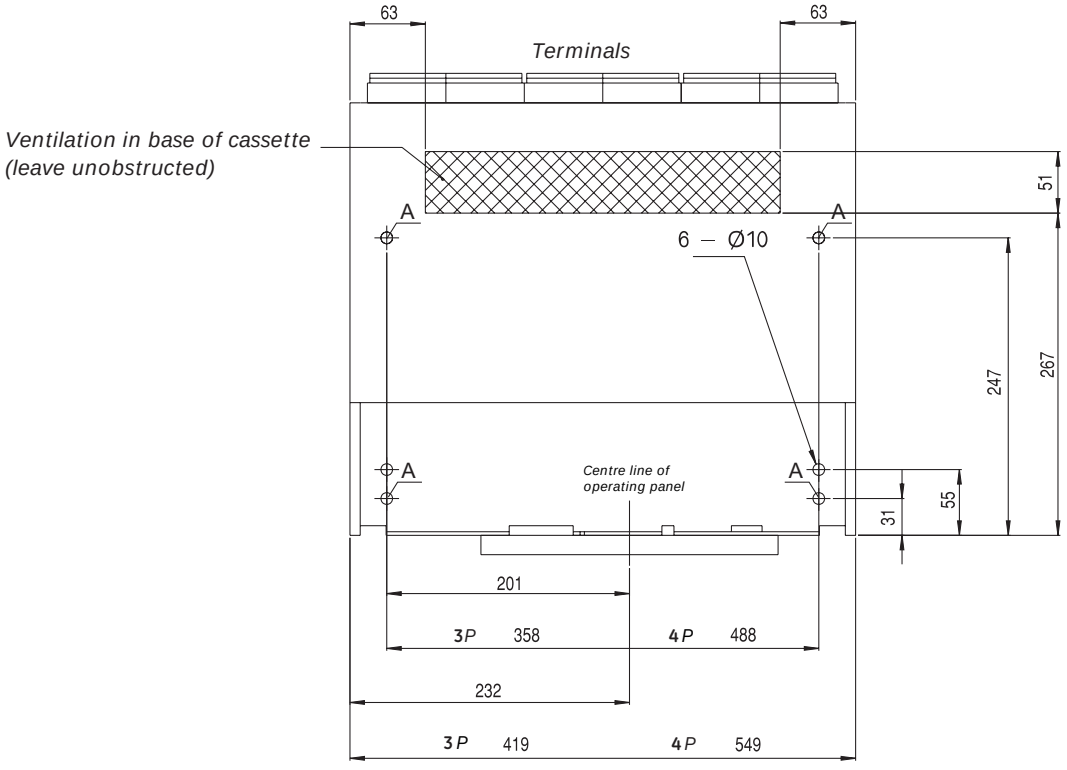


Cassette mounting details (Top view)

Type **A, D、D2, In=400A** to **2500A**



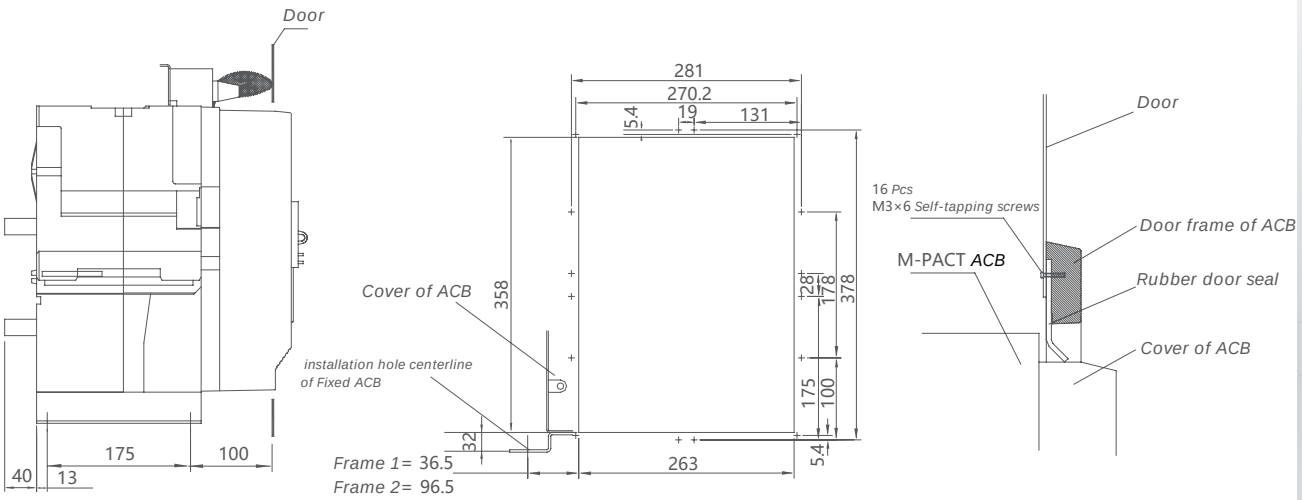
Type **A, D, In = 3200A** to **4000A**
Type **H**, **In = 800**A to **4000A**



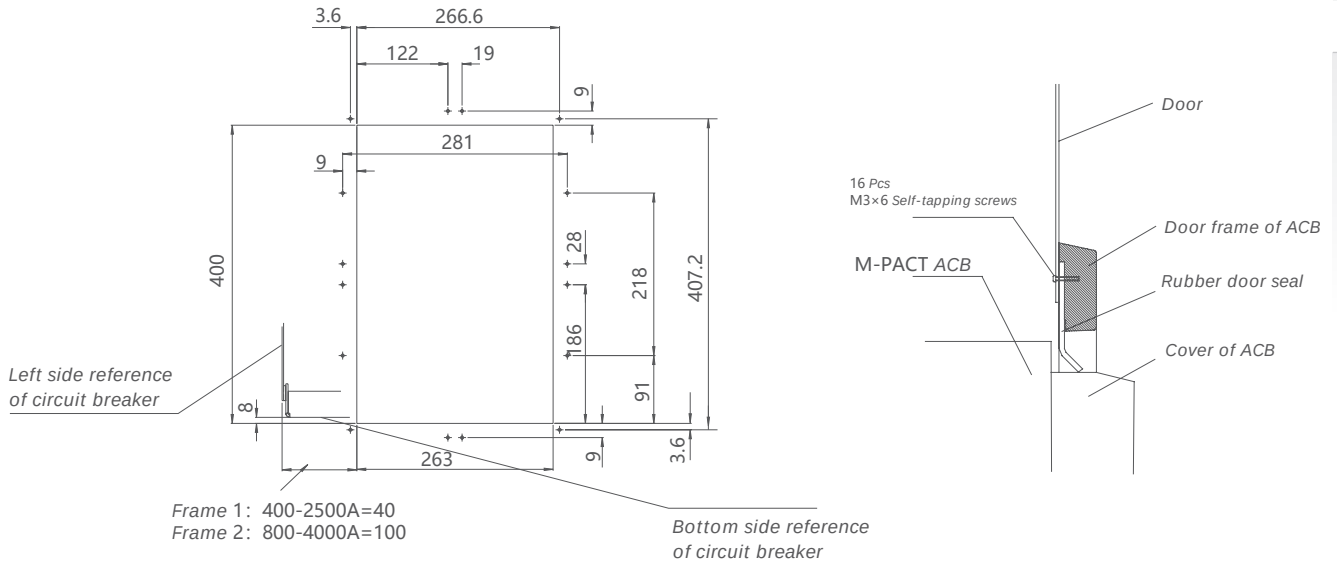
A = recommended installation mounting cut

Door cut-outs

Fixed

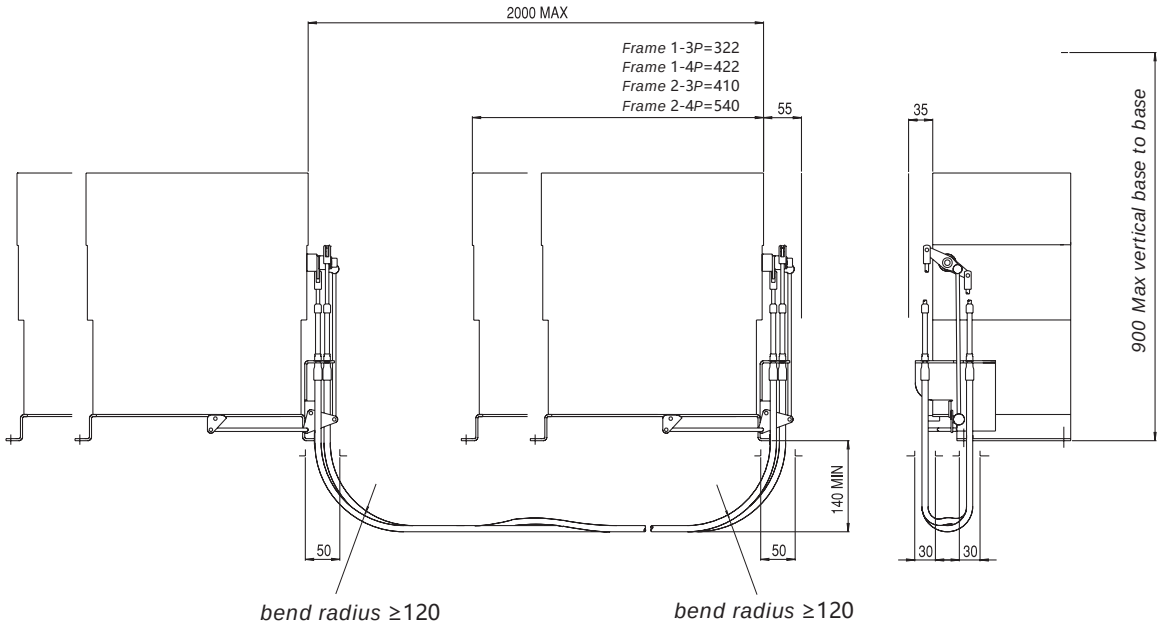


Withdrawable

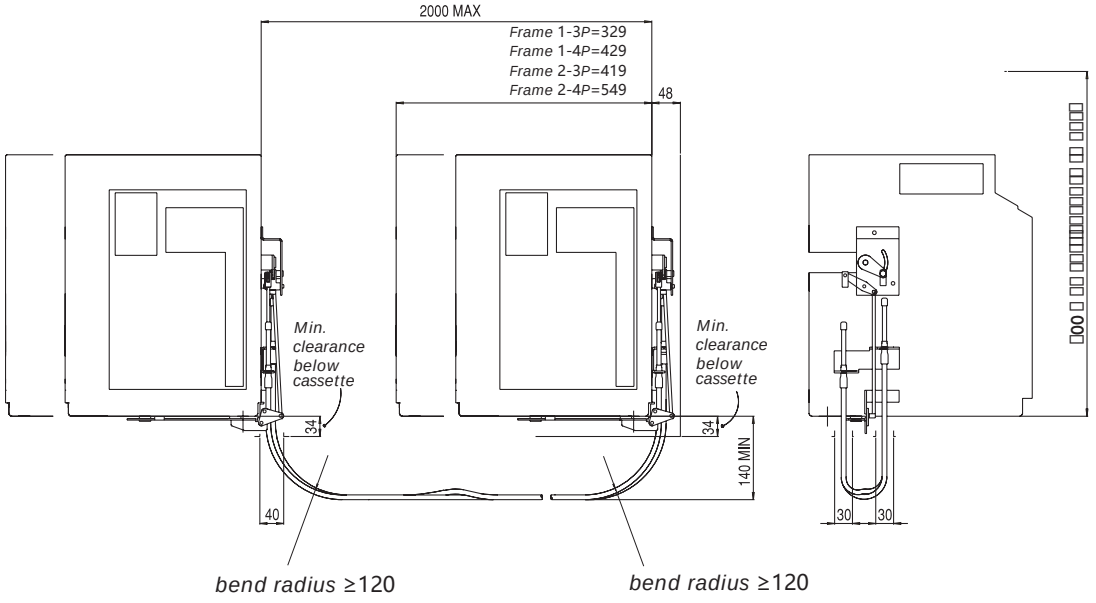


2-Way cable interlocking

Fixed

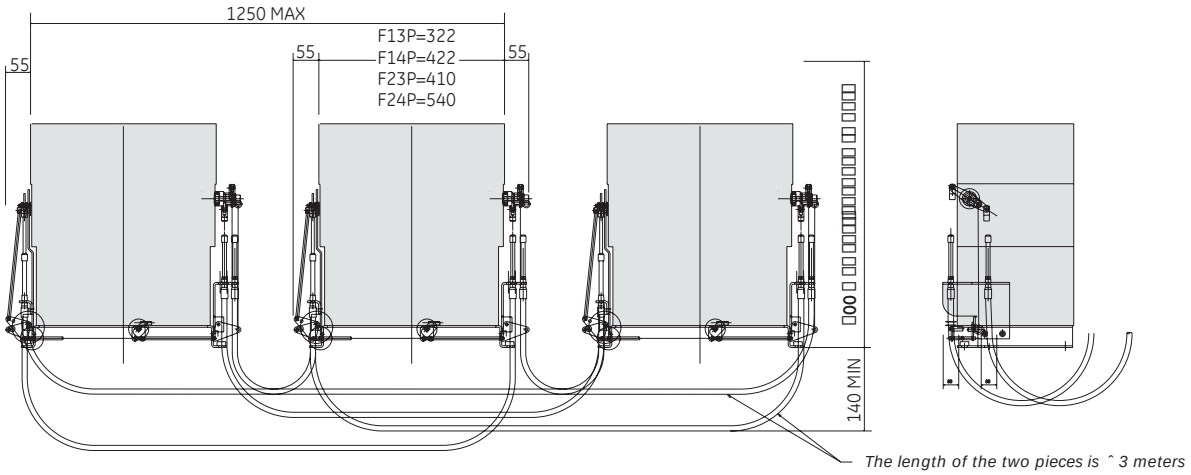


Withdrawable

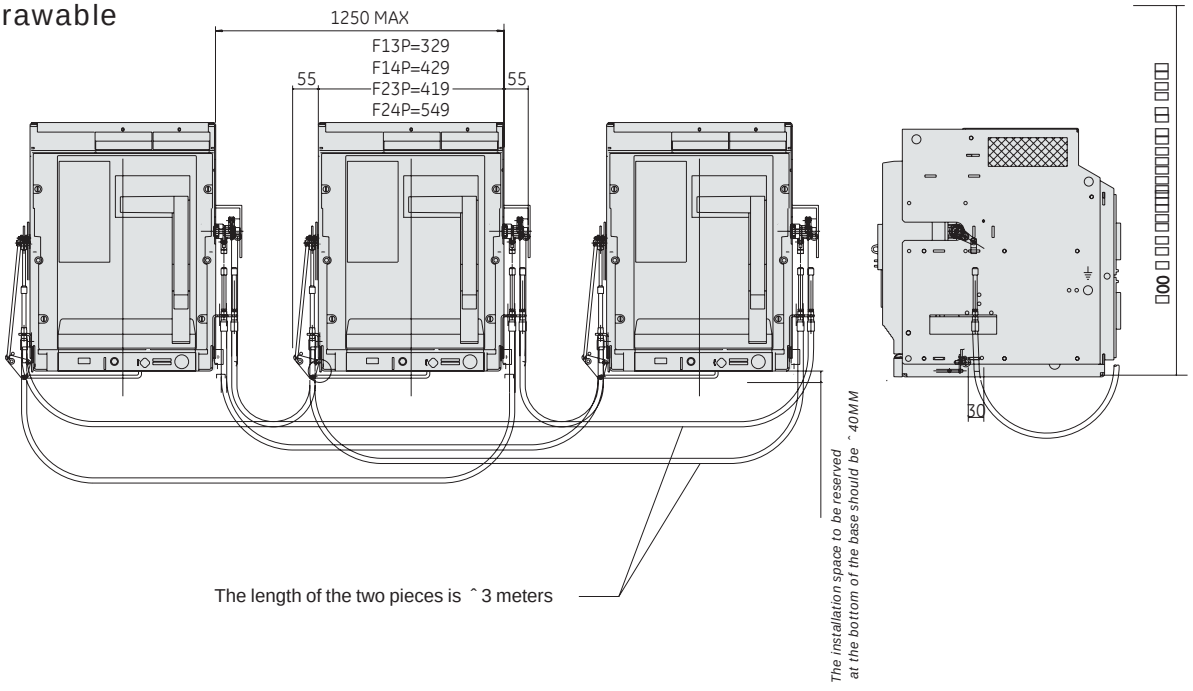


3-Way cable interlocking

Fixed



Withdrawable



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Version No：GENCLV*AC*24V1