

Shanghai Liangxin Electrical Co., Ltd.

NDM3-250 Product Specification

(IPD-ENG-DEV-T20 A1 2016-09-23)

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Revision History					
Version	Revision Reason/Content	Implementation Date	Prepared by	Reviewed by	Approved by
1	Add N,S	2021.09.30	Sun Lanping	Xu Fuping	Ding Fei
2	Add attachment information	2023.02.15	Yang rongrong	Xu Fuping	Ding Fei
3	Logo change	2025.02.24	Yang rongrong	Xu Fuping	Ding fei

1. Applicable Scope and Purpose of Circuit Breaker

The NDM3-250 molded case circuit breaker (hereinafter referred to as circuit breaker) applies to infrequent switching of circuits with the AC 50/60Hz, the working voltage of AC690V and working current of 250A as well as infrequent motor starting. With the overload, short circuit and under-voltage protection functions, the circuit breaker can protect lines and power equipment from damage.

The circuit breaker has an isolating function with the corresponding symbol of $\text{---} \text{---} \text{---} \text{---} \text{---}$;

Comply with standards: IEC 60947-2, GB/T 14048.2.

Products comply with CCC、CE、TUV and CB certification.

2. Product Picture of Circuit Breaker (The picture is for reference only; the specific kind prevail)



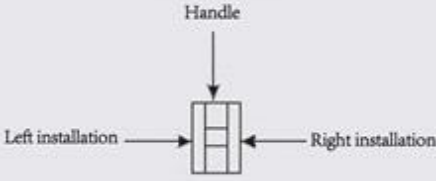
Picture of the Product

3. Specification and Model Description of Circuit Breaker

ND 1	M 2	3 - 250 3 4	☐ 5	☐ / ☐ 6 7	☐ 8	☐ 9	☐ 10	☐ 11	☐ 12	☐ 13	☐ 14	☐ 15	☐ 16
SN	SN name		NDM3										
1	Enterprise code		ND: "Nader" low-voltage apparatus										
2	Product code		M: Molded case circuit breaker (MCCB)										
3	Design SN		3										
4	Shell frame level		250										
5	Breaking capacity level		L: Standard type										
			M: Relatively high breaking type										
			H: High breaking type										
			N: Basics type										
			S: Secondary breaking type										
6	Operation mode		No code: Direct handle-operated mode										
			P: Motor-operated										
			Z: Rotary operation										
7	Number of poles		3, 4										
8	Release code		0: Release (none)										
			2: Instantaneous release only										
			3: Complex release										
9	Accessory code		See Table 1										
10	Application code		No code: Power distribution type										
			2: Motor protection type										
11	N-pole (neutral pole) type of the 4P product		A: The N-pole isn't installed with an overcurrent release, but always connected										
			B: The N-pole isn't installed with an overcurrent release, but on-off with the other three poles										
			C: The N-pole is installed with an overcurrent tripper, and on-off with the other three poles										
12	Special use		Q: Voltage-check self-reset										
13	Special function code		I: Non-tripping at the time of alarming										
14	Rated current		See Table 2										
15	Cabling type		No code: Normal product										
			P: Connection busbar										
			Z1: Rear-plate connection										
			Z3H: Integrated plug-in rear-plate connection										
			Z3Q: Integrated plug-in front-plate connection										
16	Other codes		CS1-A/150: Circular center hole rotary handle + shaft length 150mm										
			CS1-A/200: Circular center hole rotary handle + shaft length 200mm										
			CS1-A/300: Circular center hole rotary handle + shaft length 300mm										
			CS1-A/350: Circular center hole rotary handle + shaft length 350mm										
			CS1-A/650: Circular center hole rotary handle + shaft length 650mm										

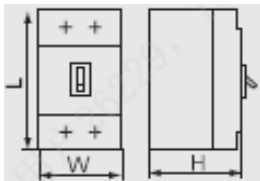
	CS1-F/150: Square center hole rotary handle + shaft length 150mm
	CS1-F/200: Square center hole rotary handle + shaft length 200mm
	CS1-F/300: Square center hole rotary handle + shaft length 300mm
	CS1-F/350: Square center hole rotary handle + shaft length 350mm
	CS1-F/650: Square center hole rotary handle + shaft length 650mm
	CS2-A/150: Circular eccentric hole rotary handle + shaft length 150mm
	CS2-A/200: Circular eccentric hole rotary handle + shaft length 200mm
	CS2-A/300: Circular eccentric hole rotary handle + shaft length 300mm
	CS2-A/350: Circular eccentric hole rotary handle + shaft length 350mm
	CS2-A/650: Circular eccentric hole rotary handle + shaft length 650mm
	CS2-F/150: Square eccentric hole rotary handle + shaft length 150mm
	CS2-F/200: Square eccentric hole rotary handle + shaft length 200mm
	CS2-F/300: Square eccentric hole rotary handle + shaft length 300mm
	CS2-F/350: Square eccentric hole rotary handle + shaft length 350mm
	CS2-F/650: Square eccentric hole rotary handle + shaft length 650mm
	CS1-IP65/150: IP65 Square center hole rotary handle + shaft length 150mm
	CS1-IP65/200: IP65 Square center hole rotary handle + shaft length 200mm
	CS1-IP65/300: IP65 Square center hole rotary handle + shaft length 300mm
	CS1-IP65/350: IP65 Square center hole rotary handle + shaft length 350mm
	CS1-IP65/650: IP65 Square center hole rotary handle + shaft length 650mm
	CS2-IP65/150: IP65 Square eccentric hole rotary handle + shaft length 150mm
	CS2-IP65/200: IP65 Square eccentric hole rotary handle + shaft length 200mm
	CS2-IP65/300: IP65 Square eccentric hole rotary handle + shaft length 300mm
	CS2-IP65/350: IP65 Square eccentric hole rotary handle + shaft length 350mm
	CS2-IP65/650: IP65 Square eccentric hole rotary handle + shaft length 650mm
	DC1 24V: Electric operation voltage DC24V
	DC1 110V: Electric operation voltage AC/DC110V
	DC1 220V: Electric operation voltage AC230V/DC220V
	DC1 380V: Electric operation voltage AC380/400V
	AC230V: Shunt release/Under-voltage release operation voltage AC220/230V
	AC380V: Shunt release/Under-voltage release operation voltage AC380/400V
	DC24V: Shunt release operation voltage DC24V
	DC220V: Shunt release operation voltage DC220/230V
	Z: Terminal housing
	MS2: MS2 lock

Table 1: Comparison Table of Accessory Code:

			Legend  Single auxiliary contact  Dual-auxiliary contact  Alarm contact  Shunt release  Under-voltage release  Auxiliary alarm contact (a single accessory features the auxiliary and alarm functions)	
Access ory code	Accessory name	Model	NDM3 -250L/M/H N/S	
			3	4
00	N/A		—	—
10	Shunt release			
20	Dual-auxiliary contact			
21	Single auxiliary contact			
30	Under-voltage release			
40	Shunt release, dual-auxiliary contact			
41	Shunt release, single auxiliary contact			
50	Shunt release, under-voltage release			
60	Two sets of dual-auxiliary contacts			
61	Two sets of single auxiliary contacts			
62	Dual-auxiliary contact, single auxiliary contact			
70	Under-voltage release, single auxiliary contact			
71	Under-voltage release, dual-auxiliary contact			
08	Alarm contact			
18	Shunt release, alarm contact			
28	Dual-auxiliary contact, alarm contact			
38	Under-voltage release, alarm contact			
48	Shunt release, auxiliary alarm contact			
58	Auxiliary alarm contact			
68	Dual-auxiliary contact, auxiliary alarm contact			
78	Under-voltage release, auxiliary alarm contact			

4. Main Technical Parameters of Circuit Breaker

Table 2 Main Technical Parameters of Circuit Breaker

Model			NDM3-250							
Rated current of frame Inm (A)			250							
Rated current In (A)			100, 125, 140, 160, 180, 200, 225, 250							
Rated insulation voltage Ui (AC V)			1000							
Rated impulse withstand voltage Uimp (V)			8000							
Rated working voltage Ue (AC V)			380/400/415, 500, 660/690							
Power frequency withstand voltage U (1min) (V)			3500							
Utilization category			A							
Number of poles			3					4		
Breaking capacity level			L	M	H	N	S	/	N	S
Rated limit short-circuit breaking capacity Icu (kA)		AC380/400/415V	50	70	100	50	70	70	50	70
		AC500V	/	40	/	/	/	40	/	/
		AC660/690V	/	20	/	/	/	20	/	/
Rated operating short-circuit breaking capacity Ics (kA)		AC380/400/415V	40	50	70	50	70	50	50	70
		AC500V	/	40	/	/	/	40	/	/
		AC660/690V	/	10	/	/	/	10	/	/
Operating performance (times)	Electrical life		8000							
	Mechanical life	Maintainable free life	20000							
		Maintainable life	40000							
Boundary dimension			L(mm)	165	165			165		
			W(mm)	107	107			142		
			H(mm)	88	105			105		
Flashover distance(mm)			50							

Note: The overall dimension does not include the dimension of terminal cover.

4.1 Selection of the circuit breaker connecting bus or cable cross-section area:

Table 3 Selection of the NDM3-250 Connecting Bus or Cable Cross-section Area

Rated current (A)	100	125, 140	160	180, 200, 225	250
Wire cross-section area (mm ²)	35	50	70	95	120

4.2 Tightening Torque of the Circuit Breaker Terminal and Mounting Screw

Table 4 Tightening Torque of the Circuit Breaker Terminal and Mounting Screw

Model	Thread Specifications	Torque (N·m)
NDM3-250	M8	12
	M4	1.5

4.3 Derating factor of temperature change for the circuit breaker

Table 5 Derating Factor Table of Temperature Change for the Circuit Breaker

Model	Derating factor of product temperature change							
NDM3-250	Temperature (°C)	40	45	50	55	60	65	70
	Derating factor	1	0.982	0.963	0.944	0.924	0.904	0.882

Note: 1) When the operating ambient temperature is below +40°C, the product can be used normally without derating capacity.

2) The above derating factors are measured at the frame current.

4.4 High-altitude derating factor of the circuit breaker

Table 6 High-altitude Derating Factor Table of Circuit Breaker

Elevation (m)	Working current correction coefficient	Maximum working current correction coefficient	Power frequency withstand voltage correction coefficient	Isolation voltage correction coefficient
2000	1	690	3500	1000
2500	1	690	3500	1000
3000	0.98	620	3150	900
3500	0.97	580	3000	850
4000	0.95	550	2800	810
4500	0.94	520	2650	770
5000	0.93	500	2500	730

4.5 Power loss coefficient of Circuit breaker

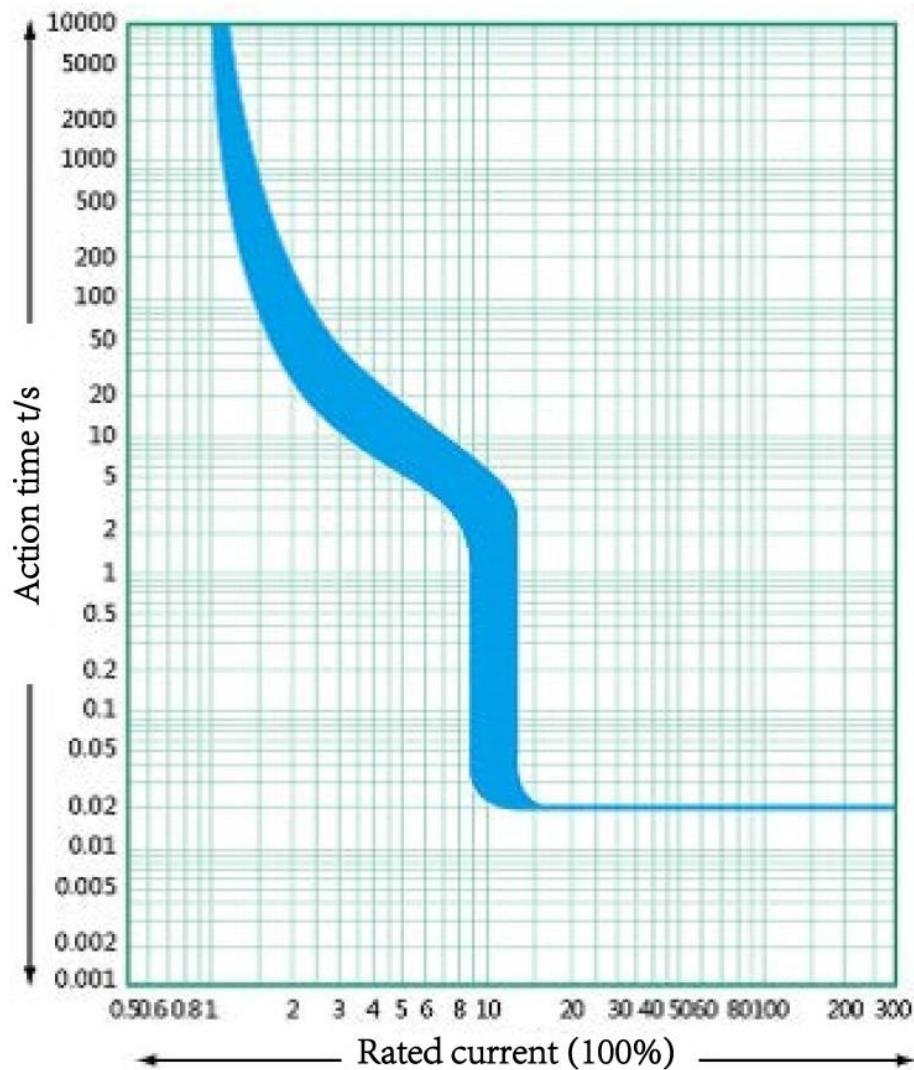
Table 7 Power loss coefficient table of Circuit breaker

Model	Energizing current(A)	Total power loss(W)		
		Wiring before and after board	Plug in board front wiring	Plug in bear board wiring
NDM3-250	225	62	66	70
NDM3-250	250	67	73	73

5. Normal Working Environment of Circuit Breaker

- 1) The altitude of the installation site doesn't exceed 2,500m. See the "High-altitude Derating Factor Table of Circuit Breaker" for the derating factor at the altitude;
- 2) The ambient temperature is $-35^{\circ}\text{C} \sim +70^{\circ}\text{C}$; the average within 24 h shall not be more than $+35^{\circ}\text{C}$. If the ambient temperature is higher than $+40^{\circ}\text{C}$, the user needs to reduce the capacity. See the "Derating Factor Table of Temperature Change for the Circuit Breaker" for the derating factor;
- 3) Its relative humidity at an ambient temperature of $+40^{\circ}\text{C}$ should not exceed 50%. A higher relative humidity is allowed at a lower temperature. For example, the relative humidity at 20°C can reach 90%; for frost due to temperature change, the corresponding measures should be taken;
- 4) The product can withstand the effects of wet air, salt mist, oil mist and mould;
- 5) The installation category of the circuit breaker connected to the main loop is: Category III (power distribution and control level), The installation category of the circuit breaker not connected to the main loop is: Category II (load level);
- 6) The pollution level is Level 3;
- 7) The product should be installed in places that are free from explosive media, media corrosive to metal, insulation damaging gas, and conductive dust, which should be also avoided from snow and rain;
- 8) In case of stricter user conditions than the above description, negotiate with the manufacturer.

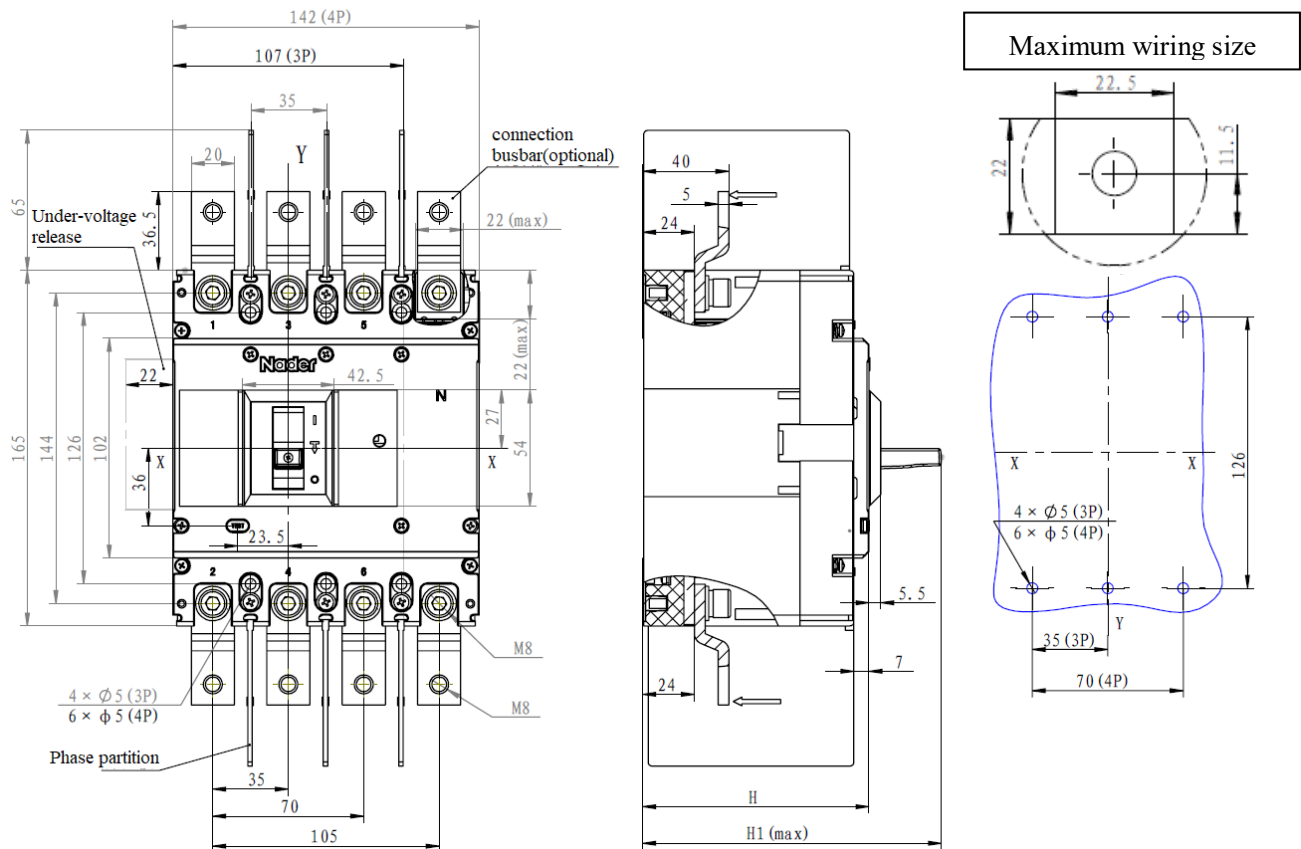
6. Short-circuit Overload Protection Characteristic Curve of Circuit Breaker



Time/Current Characteristic Curve

7. Outline and Mounting Hole Dimensions of Circuit Breaker

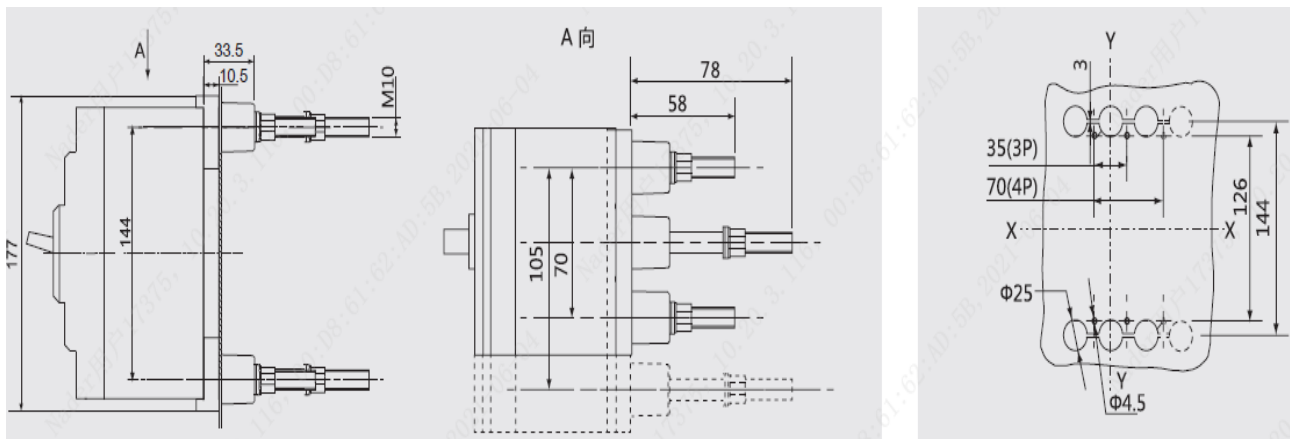
7.1 Outline and mounting hole dimensions of circuit breaker (Unit: mm)



型号	H	H1
NDM3-250L	88	122.5
NDM3-250M/H/N/S	105	139.5
NDM3-250/4P/N/S		

Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

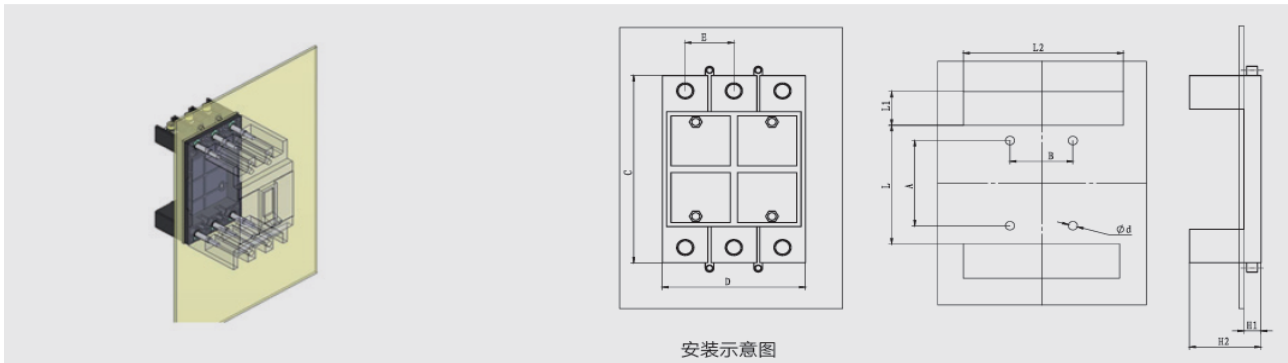
7.2 Z1: opening size of rear wiring mounting plate (Unit: mm)



Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.3 Z3H: 3P、4P Plug-in front-plate connection

7.3.1 Integrated plug-in rear-plate connection



Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

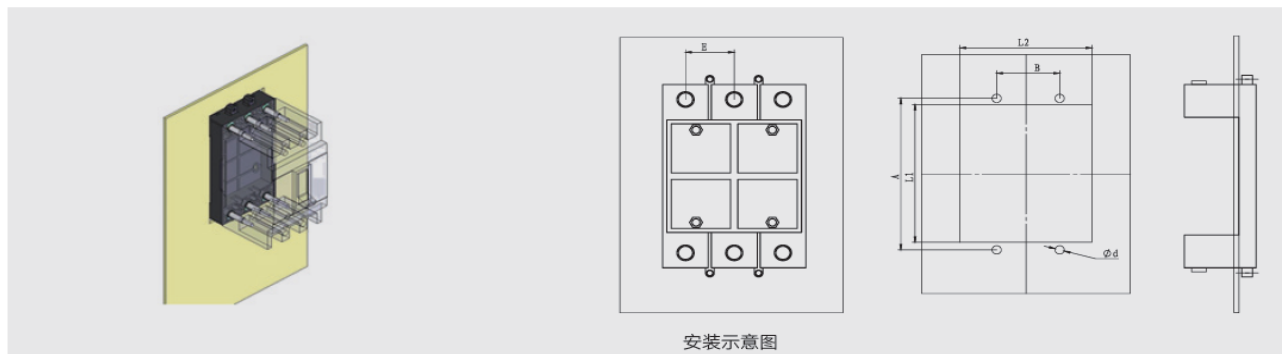
Model	A	B	L	L1	L2	d	C	D	E	H1	H2
NDM3-250	64	70	108	38	107	6.5	179	105	35	27	72

Note 1: When the product is 4-pole, the distance E increases for dimension D

Note 2: When the product is 4-pole, dimension B remains unchanged, Increase the distance E in the L2 direction by increasing the N phase direction;

Note3: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.3.2 Installation after large opening plate

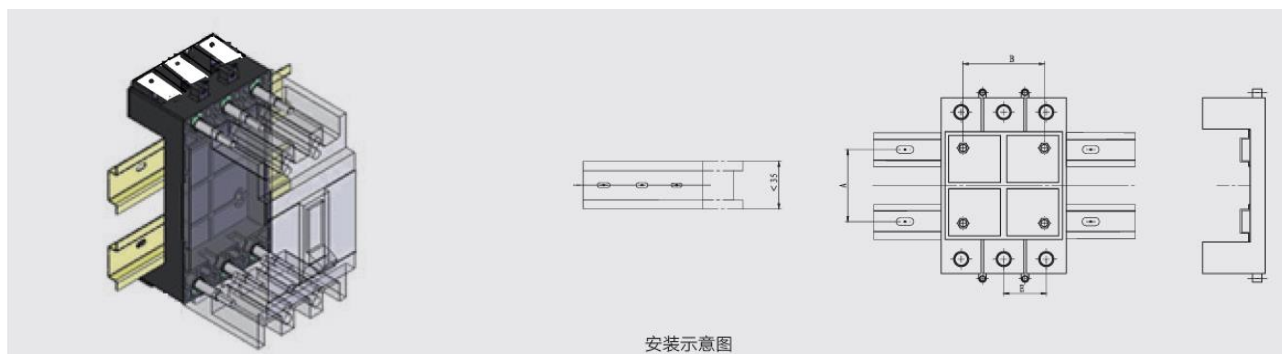


Model	A	B	L1	L2	d	E
NDM3-250	191	35	180	107	5	35

Note 1: When the product is 4-pole, dimension B、L2 increases the distance E;

2: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.3.3 Installation of rack type boards after installation



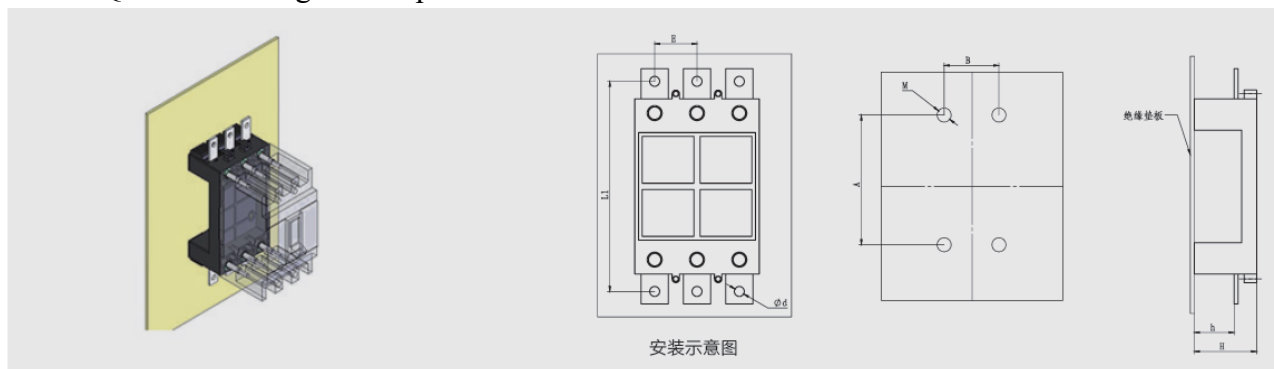
安装示意图

Model	A	B	E
NDM3-250	64	70	35

Note1: When the product is 4-pole, dimension B increases the distance E

Note2: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.4 Z3Q: 3P、4P Plug-in rear-plate connection



安装示意图

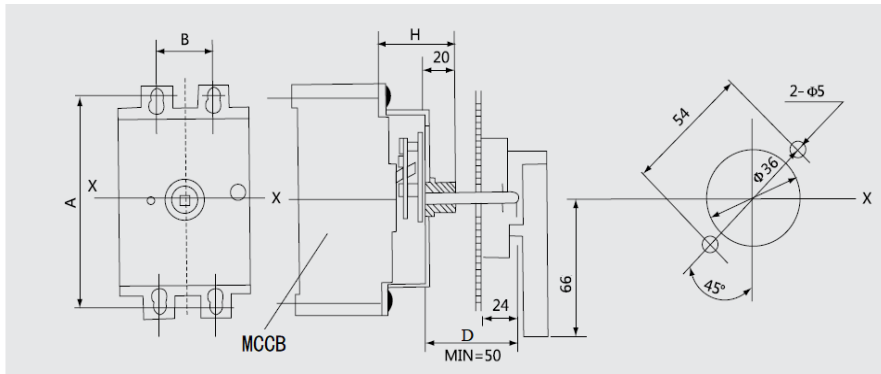
Model	A	B	L1	E	d	M	H	h
NDM3-250	150	35	223	35	8.5	M4	75	32

Warning: Insulation pads must be used for installation in front of the board;

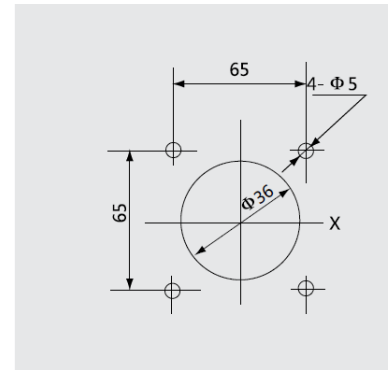
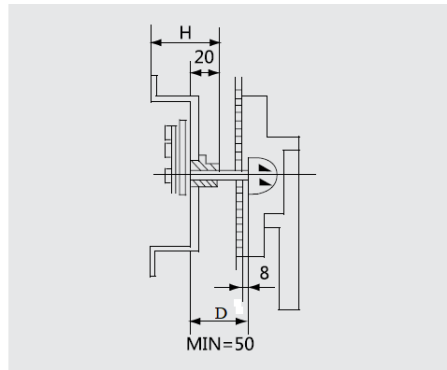
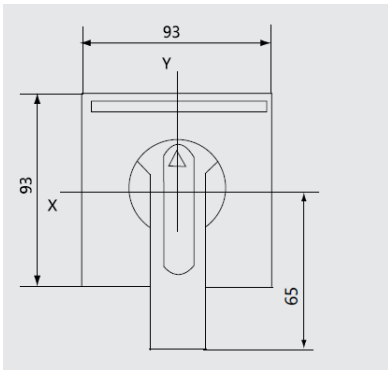
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.5 Manual operating mechanism

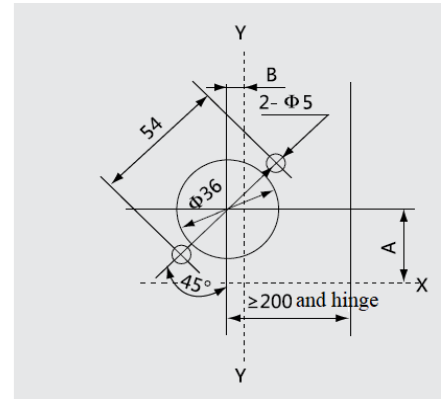
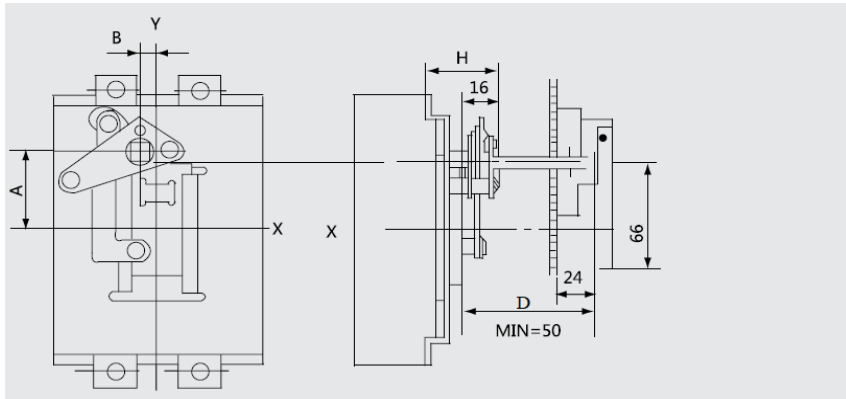
7.5.1 Manual operating mechanism and CS1-A handle



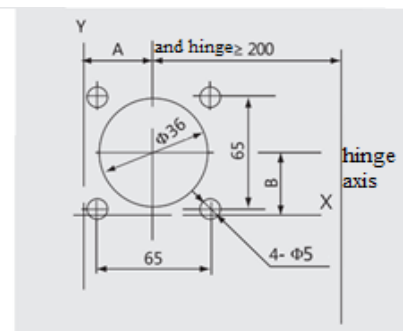
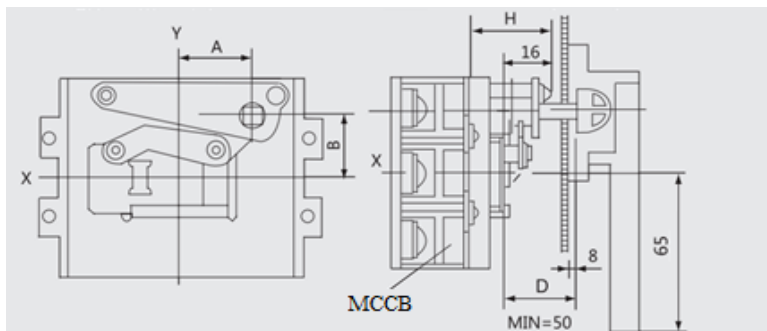
7.5.2 Manual operating mechanism and CS1-F handle



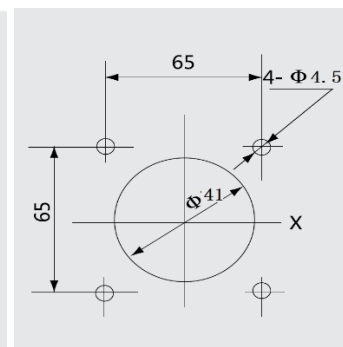
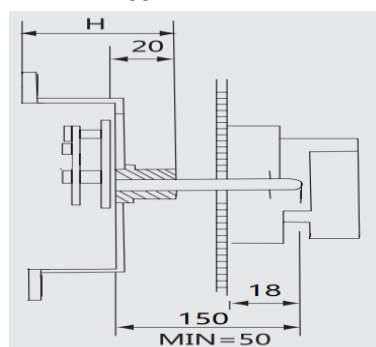
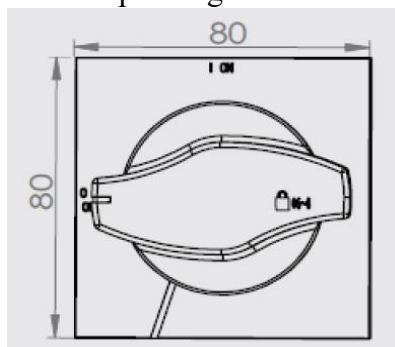
7.5.3 Manual operating mechanism and CS2-A handle



7.5.4 Manual operating mechanism and CS2-F handle



7.5.4 Manual operating mechanism and CS1-IP65 handle



7.6.6 Manual operating mechanism and CS2-IP65 handle

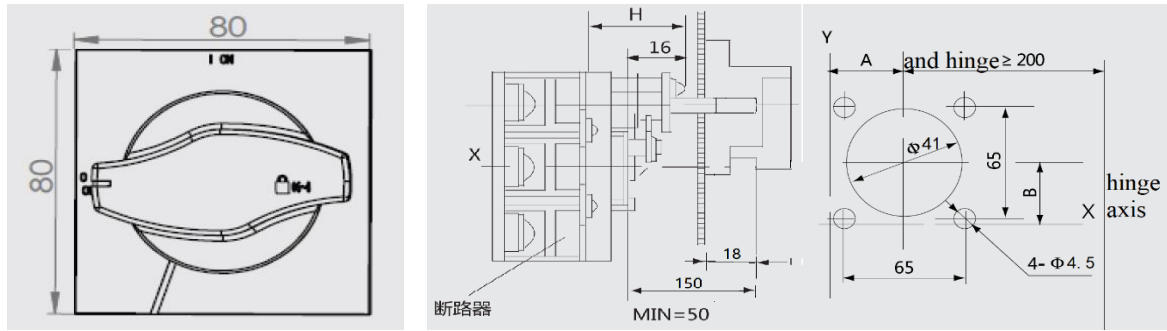


Table 8 Installation dimension of manual operating mechanism (Unit: mm)

Manual operation type	Model	Installation dimension of manual operating mechanism			Installation mode
		H	A	B(3/4P)	
CS1	NDM3-250	55	143	35	Vertical installation
CS2	NDM3-250	48	35	31	

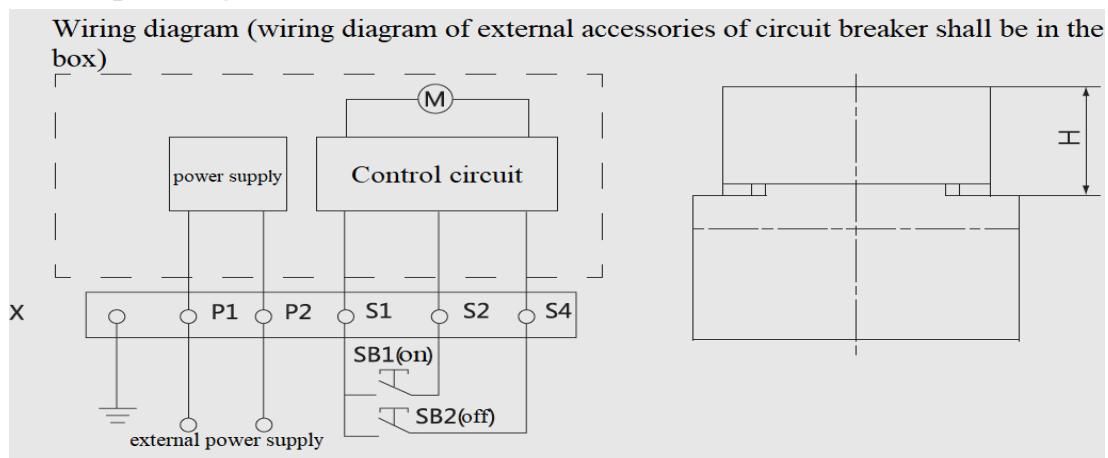
Note: 1) A type is round handle, F type is square handle;

2) The length of A-type handle is 66mm and that of F-type handle is 65mm;

3) The D dimension in the drawing is 150mm by default, and the customizable length is 200 / 300 / 350 / 650mm;

4) The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.6 Electric operating mechanism



Symbol description: SB1、SB2: Operation button (provided by the customer)

X: Terminal block P1、P2: External power supply

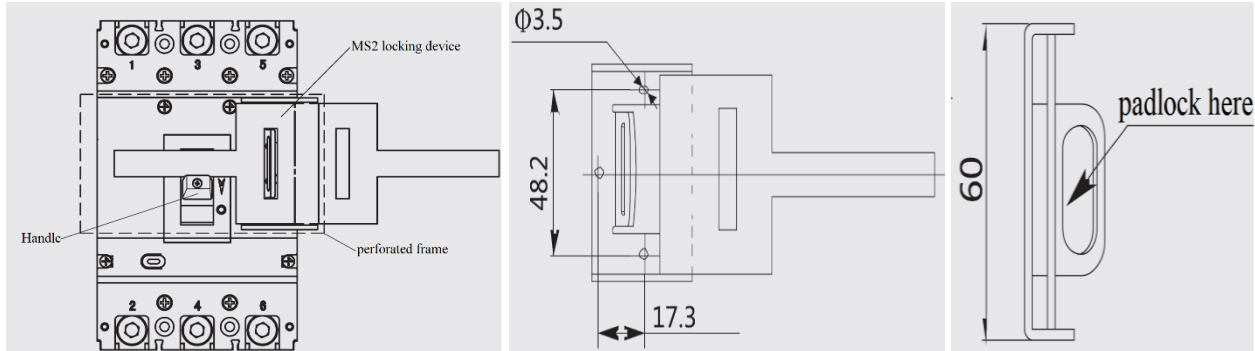
Voltage specification: AC110V、AC230V、AC380V、DC24V、DC110V、DC220V

Table 9 Main technical parameters of electric operating mechanism

Equipped with Circuit breaker	Electric power(W)				service life / time	Operating mechanism height H(mm)
	AC/DC220V	AC/DC110V	AC380V	DC24V		
NDM3-250	180	180	350	80	20000	92

7.7 MS2 locking device

MS2 is a split locking device (i.e. the device is installed on the left or right side of the circuit breaker cover, and the default is installed on the right side if there are no special requirements). It is used for NDM3 series products to prevent manual closing and opening (the dotted line part is the circuit breaker part).



Installation diagram of MS2 lock mechanism (Unit: mm)

Note 1: After MS2 accessories are selected, other internal and external accessories cannot be installed on the same side;

Note 2: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.8 Mechanical interlocking

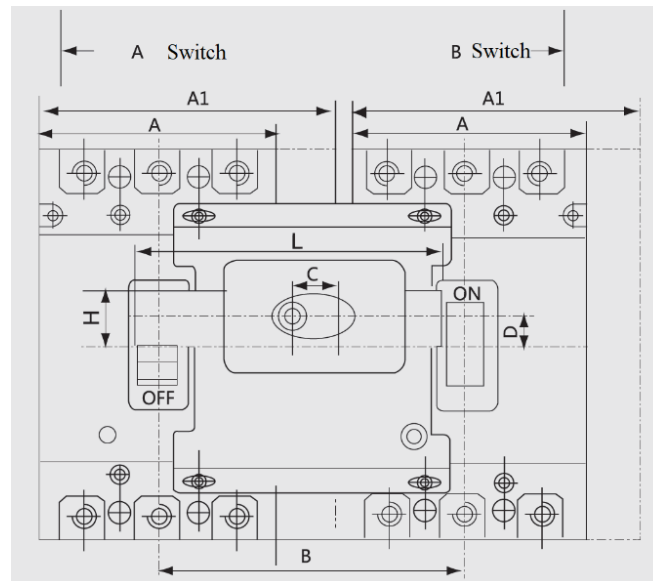


Table 10 Installation dimension of mechanical interlocking (Unit: mm)

Model	A	A1	B	C	D	L	H
NDM3-250	107	/	132	44	16.5	136	22
NDM3-250(4P)	/	142	173	44	16.5	165	22

Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.9 Safe mounting distance of circuit breaker

Table 11 Insulation Distance Mounted in the Metal Cabinet (Unit: mm)

Mounting distance	A (inlet wire end to the cabinet face)		B (distance from side to the cabinet face)	C (outlet wire end to the cabinet face)
Model	With a terminal cover	Without a terminal cover		
NDM3-250	25	65	30	30

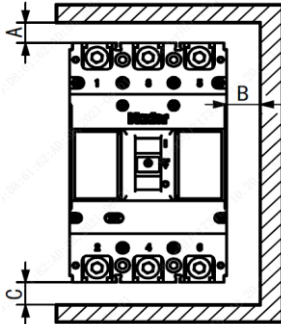


Table 12 Minimum Center Distance between Rowed Circuit Breakers (Unit: mm)

Model	Width of circuit breaker		I Center distance	
	3 poles	4 poles	3 poles	4 poles
NDM3-250	107	142	137	172

Note: Check the connected busbar or cable during rowing or stacking of the circuit breaker to ensure that the air insulation distance won't be reduced.

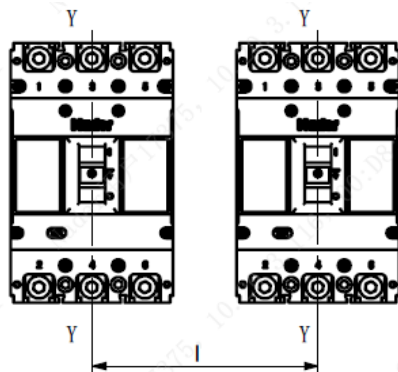


Table 13 Minimum Distance between Stacked Circuit Breakers (Unit: mm)

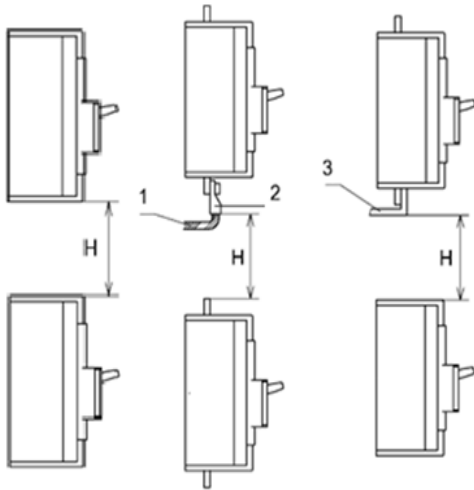
Model	H (distance of circuit breaker from bottom)	
	With a terminal cover	Without a terminal cover
NDM3-250	90	93

Note: 1) Insulated cable

2) Cable terminal

3) Connection without insulation

Requirements: Check whether the terminal cover or phase partition is assembled properly before products are energized.



8、 Attachment function description

8.1 Under-voltage release

When the power voltage drops to the range (35%~70%) of the under-voltage release, the release can break the Circuit breaker reliably; when the power voltage is 35% lower than the rated working voltage of the under-voltage release, the release can prevent closing of the Circuit breaker; when the power voltage is 85% higher than the rated working voltage of the under-voltage release, the release can guarantee reliable closing of the Circuit breaker.

Table 14 Voltage Specifications and Power Consumption of Under-voltage Release

Model	Instantaneous current value(A)		Power waste (W)	
	AC380V	AC230V	AC380V	AC230V
NDM3-250	0.01	0.006	0.3	0.3

Note: The under-voltage release must be energized before the Circuit breaker can be switched on and closed again, otherwise the Circuit breaker will be damaged。

8.2 Shunt release

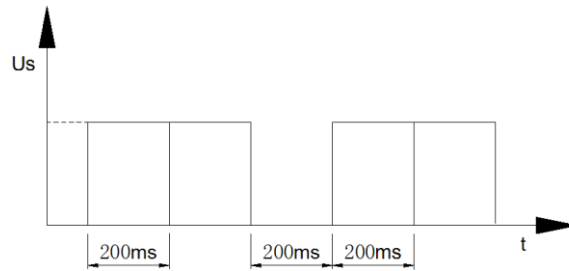
When the external voltage of the shunt release is between 70% and 110% of the rated control power voltage, the release can break the Circuit breaker reliably.

Table 15 Voltage Specifications and Power Consumption of shunt release

Model	Shunt release	DC24V	AC230V	DC220V	AC380V
NDM3-250	Instantaneous current value(A)	4	0.25	0.24	0.43
	Power waste (W)	97.6	57.5	52.6	173.9

Note: The working principle of shunt release device: there is a coil inside the shunt release device, which can only work for a short time, and the shunt action is a single pulse action (it is recommended that the power supply time

is greater than 200ms). Shunt trip power (received signal) to the product trip time is $\leq 200\text{ms}$, it is recommended to use 500ms-1s pulse power supply.



Working principle diagram of shunt trip device

8.3 Auxiliary contact

The circuit breaker is in the "open" and "free tripping" positions	Dual-auxiliary contact	F14 F12	F11	F24 F22	F21
	Single auxiliary contact	F14 F12	F11		
the circuit breaker is in the "close" position	"close" to "open"、" open " to " close "				

8.3.1 Current parameters of auxiliary contact

Table 15 Current parameters of auxiliary contact

Category	Frame current (A)	Conventional thermal current Ith (A)	Rated working current Ie(A)	
			DC220V(DC-13)	AC400V(AC-15)
Auxiliary contact	250	3	0.15	0.3
Note :minimum applicable load: 5V, 1mA.				

8.3.2 Electrical life of auxiliary contact

Table 16 Electrical life of auxiliary contact

Ues category	On			Off			Times	Frequency	Power on time
	I/Ie	U/Ue	cosφ	I/Ie	U/Ue	cosφ			
AC-15	10	1	0.3	1	1	0.3	6050	360	$\geq 0.05\text{s}$
DC-13	1	1	6Pe	1	1	6Pe			$\geq T0.95\text{ms}$

8.3.3 Making and breaking capacity of auxiliary contact

Table 17 Making and breaking capacity of auxiliary contact

Ues category	On			Off			Times	Frequency	Power on time
	I/Ie	U/Ue	cosφ	I/Ie	U/Ue	cosφ			
AC-15	10	1.1	0.3	10	1.1	0.3	10	360	$\geq 0.05\text{s}$
DC-13	1.1	1.1	6Pe	1.1	1.1	6Pe			$\geq T0.95\text{ms}$

8.4 Alarm contact

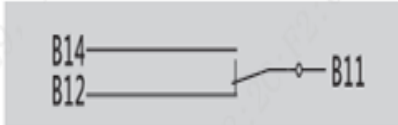
The circuit breaker is in the position of "opening" and "closing"	
The circuit breaker is in the position of "free tripping"	

Table 18 Current parameters of alarm contact

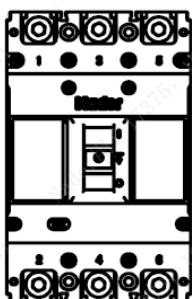
Category	Frame current (A)	Conventional thermal current Ith(A)	Rated working current Ie(A)	
			AC400V	DC220V
Alarm contact	250	3	0.3	0.15

Note: Shunt release, auxiliary contact and alarm contact Wiring standard wire length is 0.7m, 1m、2m、4m can be customized according to demand.

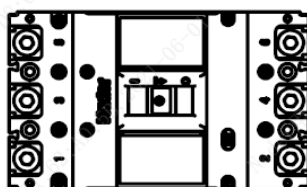
9. Installation Direction of Circuit Breaker

For vertical installation of the product, the gradient between the installation surface and the vertical plane is no more than $\pm 22.5^\circ$.

Horizontal installation of the product.



Vertical Installation



Horizontal Installation

10. Packaging and Storage of Circuit Breaker

Minimum packaging quantity: 1 piece/box. The packaged products should be stored in a warehouse with the air ventilation and the relative humidity no more than 80% when the ambient temperature is $-40^\circ\text{C} \sim +75^\circ\text{C}$. No acidic alkaline or other corrosive gas exists in the ambient air in the warehouse. Under the above conditions, the storage period shall be no more than three years since the manufacturing date.

11. Installation Accessory List of Circuit Breaker

SN	Name	Specification	3P Quantity/Set	4P Quantity/Set
1	Cross small pan-head screw	M4×45	4	4
2	Hexagon nut	M4	4	4
3	Plain washer	4	4	4
4	Phase partition	—	4	6
5	Hexagon head combination bolt	M8×22	6	8

12. Circuit Breaker Notes

- 1) Various characteristics and accessories of the circuit breaker are set in the factory. The circuit breaker, tripping unit or other accessories can only be adjusted, installed and maintained by the trained or qualified professionals according to the parameter requirements of the line design;
- 2) Ensure that the power supply is off before installing or removing any device;
- 3) The circuit breaker handle can be located in three positions, indicating three states: on, off and free tripping. When the handle is in the free tripping position, pull the handle in the off direction when the circuit breaker is connected and on.