

Shanghai Liangxin Electrical Co., Ltd.

NDM3Z-400 Product Specification

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

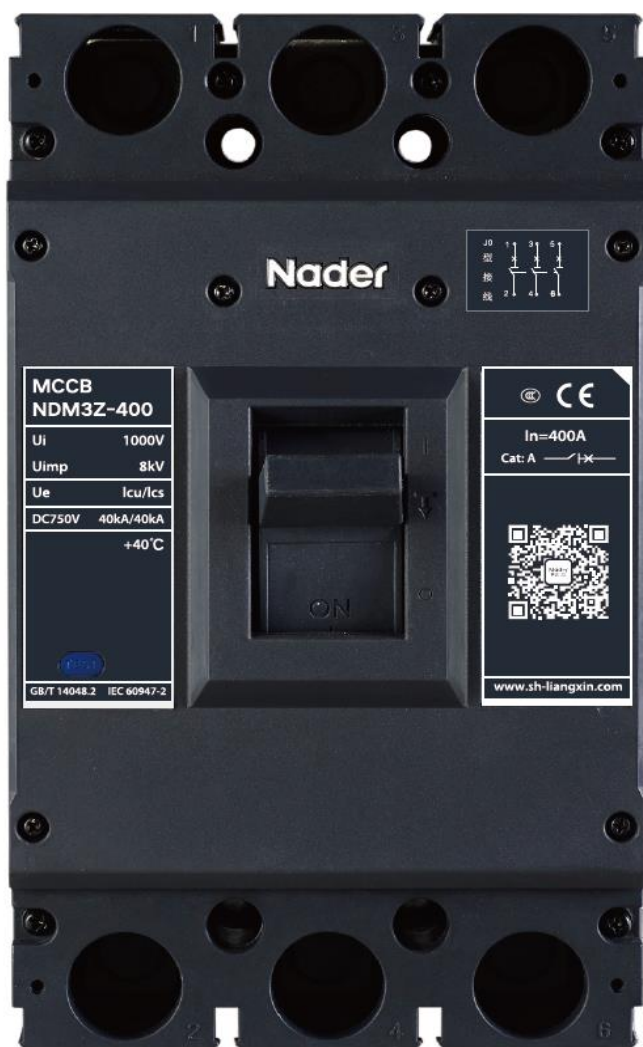
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Approved by	丁飞	Date	2021-09-30

Revision History					
Version	Revision Reason/Content	Implementati on Date	Prepared by	Reviewe d by	Approve d by
0	Newly added	6/9/2020	Jiang Wushan	Ding fei	Cao Jian
1	Update the product appearance picture and product dimension outline drawing	2021/09/30	Sun Lanping	Chen Xinming	Ding Fei

## 1. Applicable Scope and Purpose of Circuit Breaker

The NDM3Z-400 DC molded case circuit breaker (hereinafter referred to as circuit breaker) applies to the DC system application environment and the electric circuit with the working voltage to DC1000V and the working current of 400A. With the overload, short circuit and undervoltage protection functions, the circuit breaker can protect lines and power equipment from damage.

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



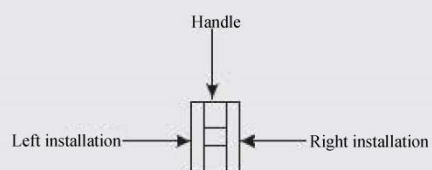
Picture of the Product

### 3. Specification and Model Description of Circuit Breaker

<u>ND</u> 1	<u>M</u> 2	<u>3</u> 3	<u>Z</u> - <u>400</u> 4 5	<u>□</u> 6	<u>□</u> 7	<u>□</u> / <u>□</u> 8 9	<u>□</u> 10	<u>□</u> 11	<u>□</u> 12	<u>□</u> 13
SN	SN name		NDM3Z							
1	Enterprise code		ND: "Nader" low-voltage apparatus							
2	Product code		M: Molded case circuit breaker (MCCB)							
3	Design SN		3							
4	Derived code of		Z: DC							
5	Shell frame level		400							
6	Derived code of		No code: Conventional type							
7	Breaking		No code: Normal product							
8	Operation mode		No code: Direct handle-operated mode							
			P: Motor-operated							
			Z: Rotation handle							
9	Number of poles		2, 3, 4							
10	Release code		0: Release (none)							
			2: Instantaneous tripper only							
			3: Complex tripper							
11	Accessory code		See Table 1							
12	Rated current		See Table 2							
13	Cabling type		2P No code: Normal product							
			3P No code: Normal product, J0							
			4P: J0, J1, J2, J3							

Table 1: Comparison Table of Accessory Code:

Accessory code		Accessory name	Model		
			2	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, dual-auxiliary contact				
71	Under-voltage release, single 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				



## 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)

#### 4. Main Technical Parameters of Circuit Breaker

Table 2 Main Technical Parameters of Circuit Breaker

Model	NDM3Z-400			
Rated current of frame Inm (A)	400			
Rated current In (A)	225, 250, 315, 350, 400			
Rated insulation voltage Ui (AC V)	1000			
Rated impulse withstand voltage Uimp (V)	8000			
Power frequency withstand voltage U (1min) (V)	3500			
Utilization category	A			
Number of poles	2	3	4	
Rated working voltage Ue (DC V)	500	690	750	1000
Rated limit short-circuit breaking capacity Icu (kA)	35	8	40	40
Rated operating short-circuit breaking capacity Ics (kA)	35	8	40	40
Operating performance (times)	Electrical life		1000	
	Mechanical life	Maintainable free life	5000	
		Maintainable life	10000	

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

Table 3 Selection of the NDM3Z-400 Connecting Bus or Cable Cross-section Area

Rated current (A)	225	250	315/350	400
Wire cross-section area (mm <sup>2</sup> )	95	120	185	240

#### 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 diameter (mm)	Torque (N·m)
NDM3Z-400	M10	20
	M6	6

#### 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							
NDM3Z-400	Temperature (°C)	40	45	50	55	60	65	70
	Derating factor	1	1	1	0.93	0.91	0.89	0.85

Note: 1) When the operating ambient temperature is below 50°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

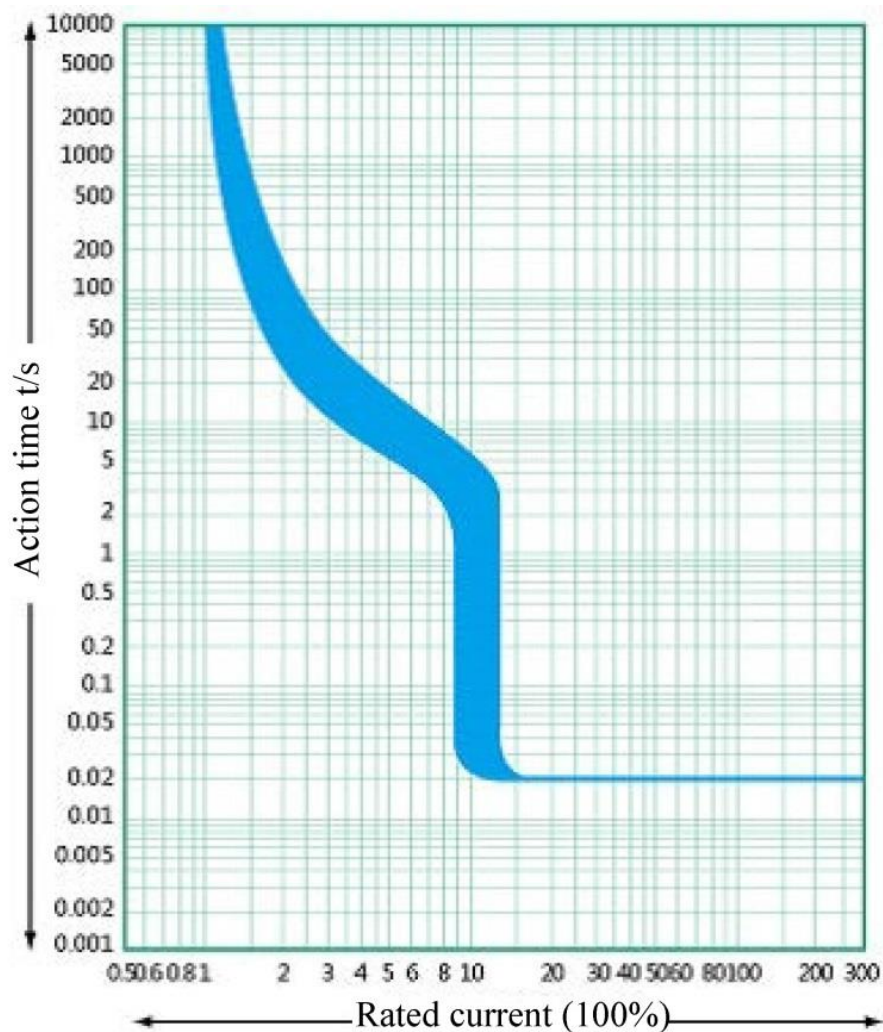
Elevation (m)	Working current correction coefficient	Maximum working current correction coefficient (V)	Power frequency withstand voltage correction coefficient (V)	Isolation voltage correction coefficient (V)
2000	1	1	1	1
2500	1	1	1	1
3000	0.98	1	1	1
3500	0.95	1	1	1
4000	0.93	1	1	1
4500	0.91	1	1	1
5000	0.89	1	1	1

## 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  $+50^{\circ}\text{C}$ , 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  $20^{\circ}\text{C}$  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

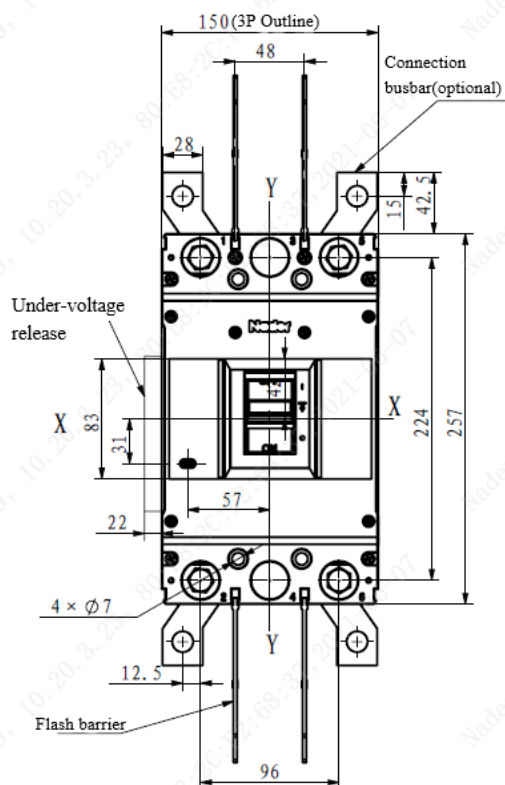


Time/Current Characteristic Curve

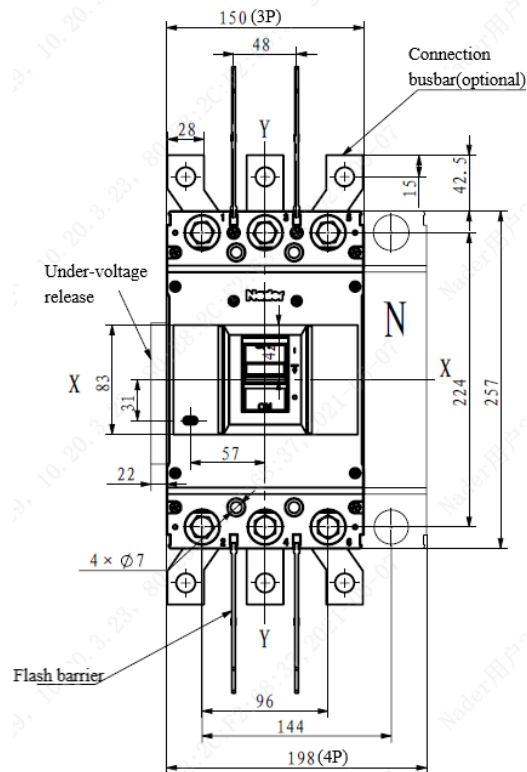
## 7. Outline, Mounting Hole Dimensions and Safety Distance of Circuit Breaker

### 7.1 Outline and mounting hole dimensions of circuit breaker

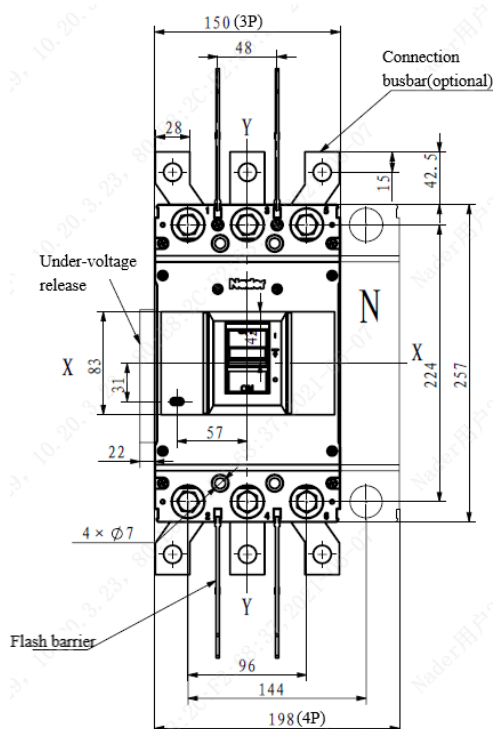
2P

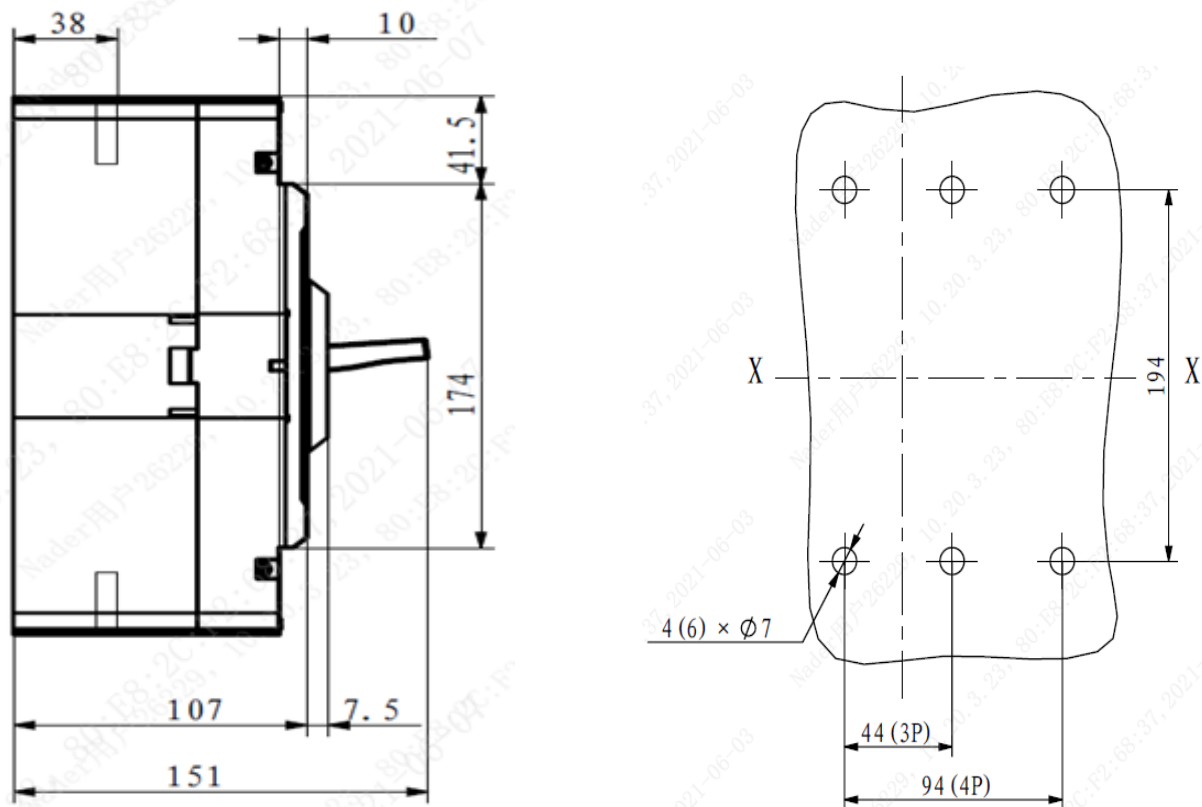


3P



4P

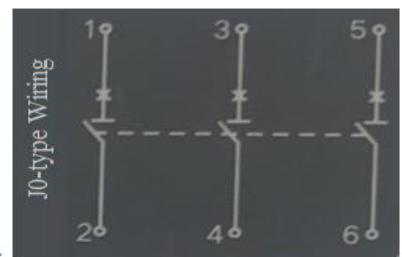
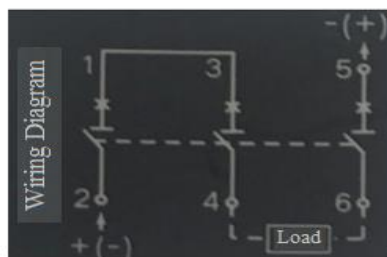




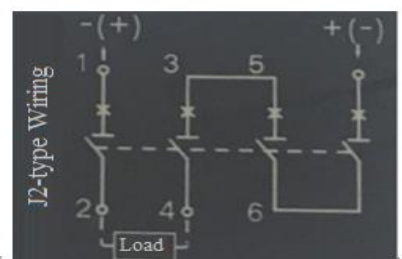
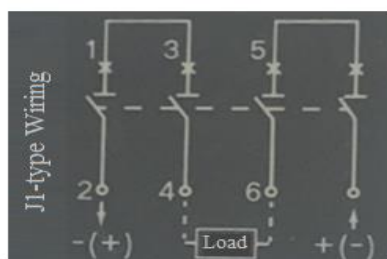
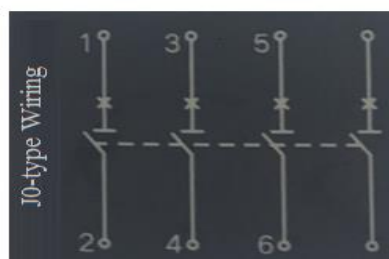
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

## 7.2 Wiring Diagram of Circuit Breaker

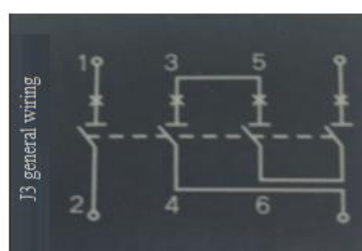
2P ..... 3P Normal Wiring ..... 3P J0



4P J0 ..... 4P J1 ..... 4P J2



4P J3



## 7.3 Safe mounting distance of circuit breaker

Table 7 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		
NDM3Z-400	25	120	35	35

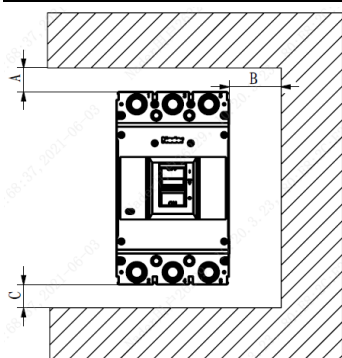


Table 8 Minimum Center Distance between Rowed Circuit Breakers (Unit: mm)

Model	Width of circuit breaker		I Center distance	
	2/3 poles	4 poles	2/3 poles	4 poles
NDM3Z-400	150	198	190	238

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.

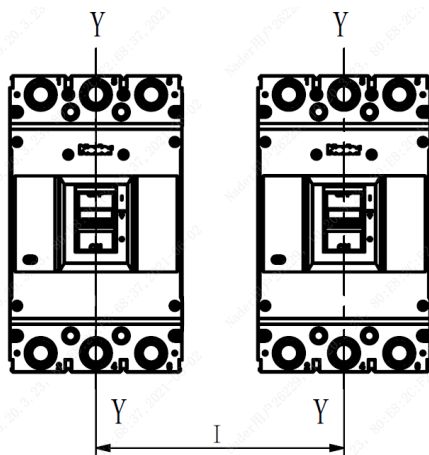


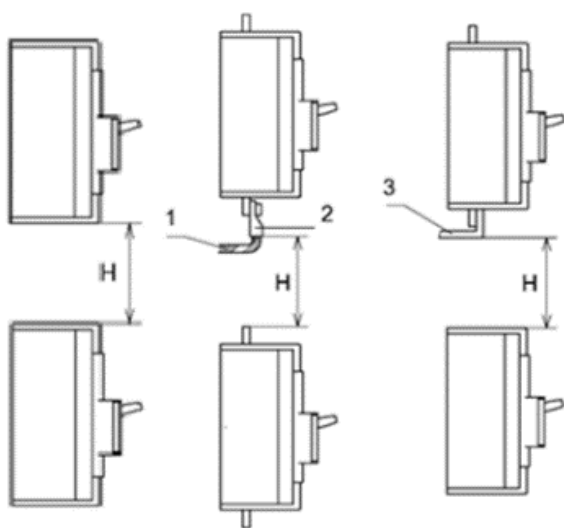
Table 9 Minimum Center Distance between Stacked Circuit Breakers (Unit: mm)

Model	H (distance of circuit breaker from bottom)	
	With a terminal cover	Without a terminal cover
NDM3Z-400	155	155

- Note: 1) Bare cable connection  
 2) Cable insulating connection  
 3) Connection without insulation

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

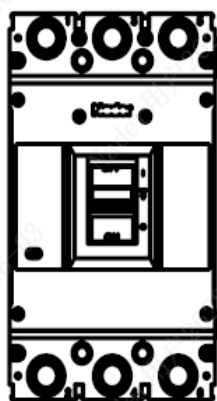
Model	H (distance of circuit breaker from bottom)	
	With a terminal cover	Without a terminal cover
NDM3Z-400	155	155



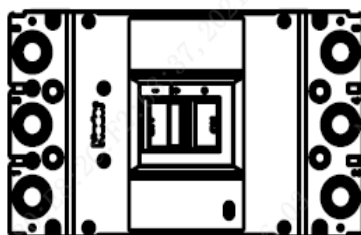
## 8. Installation Direction of Circuit Breaker

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

## 9. 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 conditions above, the storage period shall be no more than three years since the manufacturing date.

## 10. Installation Direction of Circuit Breaker

SN	Name	Specification	2/3P Quantity/Set	4P Quantity/Set	
				J0	J1/J2/J3
1	Cross small pan-head screw	M6×70	4	6	6
2	Hexagon nut	M6	4	6	6
3	Spring washer	6	4	6	6
4	Plain washer	6	8	12	12
5	Phase partition	——	4	6	4
6	Plug	——	6	8	8

## 11. 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.