

Shanghai Liangxin Electrical Co., Ltd.

# NDM3-160 Product Specification

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

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2020.08.05  
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Revision History					
Version	Revision Reason/Content	Implementati on Date	Prepared by	Reviewe d by	Approve d by



## 1. Applicable Scope and Purpose of Circuit Breaker

The NDM3-160 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 160A as well as infrequent motor starting. 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

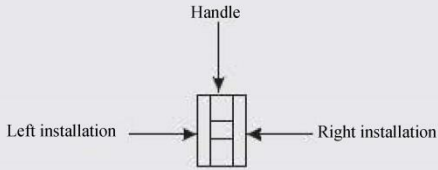


































### 3. Specification and Model Description of Circuit Breaker

ND	M	3	-	160			/							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
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		160											
5	Breaking capacity level		C: Basic type											
			L: Standard type											
			M: Relatively high 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 tripper only											
			3: Complex tripper											
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	Rated current		See Table 2											
13	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											
14	Other codes		DL: Dedicated for electric power											
			Codes of internal and external accessories: Such as manual operation: CS1-A, electric operation: DC1 220V, shunt: AC230V, undervoltage: DC220V											

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Table 1: Comparison Table of Accessory Code:

			<b>Legend</b>  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)	
Accessory code	Accessory name	Model	Number of poles	
			3	4
00	N/A	NDM3-160	—	—
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		—	—

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

Table 2 Main Technical Parameters of Circuit Breaker

Model		NDM3-160			
Rated current of frame Inm (A)		160			
Rated current In (A)		125, 140, 160			
Rated insulation voltage Ui (AC V)		1000			
Rated impulse withstand voltage Uimp (V)		8000			
Rated working voltage Ue (AC V)		380/400/415, 660/690			
Power frequency withstand voltage U (1min) (V)		3500			
Utilization category		A			
Number of poles		3			4
Breaking capacity level		C	L	M	/
Rated limit short-circuit breaking capacity Icu (kA)	AC380/400/415V	40	50	70	70
	AC660/690V	/	/	20	20
Rated operating short-circuit breaking capacity Ics (kA)	AC380/400/415V	30	40	50	50
	AC660/690V	/	/	10	10
Operating performance (times)	Electrical life	8000			
	Mechanical life	20000			



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

Table 3 Selection of the NDM3-160 Connecting Bus or Cable Cross-section Area

Rated current (A)	125	140	160
Wire cross-section area (mm <sup>2</sup> )	50	50	70

## 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)
NDM3-160	M8	12
	M4	2.4

## 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							
NDM3-160	Temperature (°C)	40	45	50	55	60	65	70
	Derating factor	1	0.977	0.954	0.931	0.907	0.883	0.858

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

Altitude (km)	Correction factor of the working current	Correction factor of the working voltage	Correction factor of the power frequency withstand voltage
2	In	Ue	U
2.5	In	Ue	U
3	0.980In	0.87Ue	0.909U
3.5	0.972In	0.846Ue	0.858U
4	0.963In	0.813Ue	0.820U
4.5	0.951In	0.781Ue	0.784U
5	0.938In	0.743Ue	0.752U

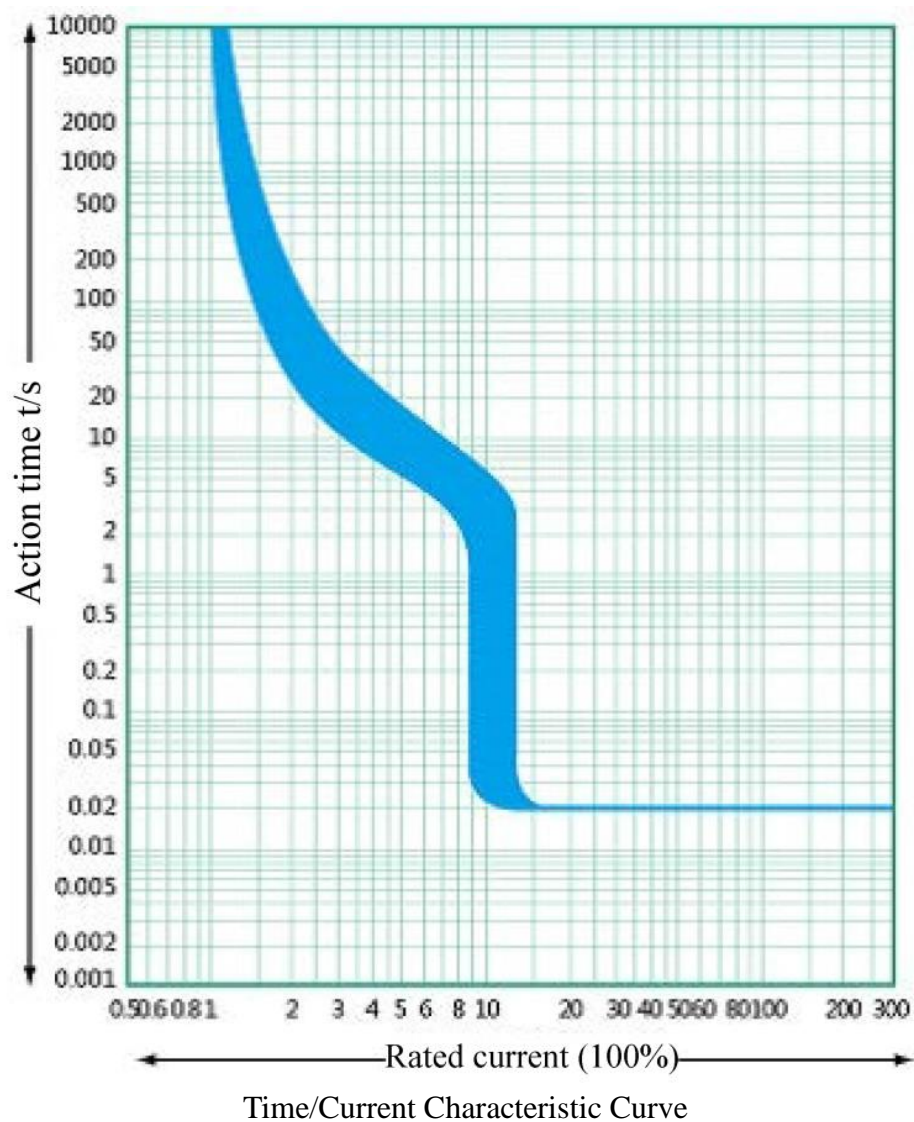
## 5. Normal Working Environment of Circuit Breaker

- 1) The altitude of the installation site doesn't exceed 2,000m. 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  $20^{\circ}\text{C}$  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

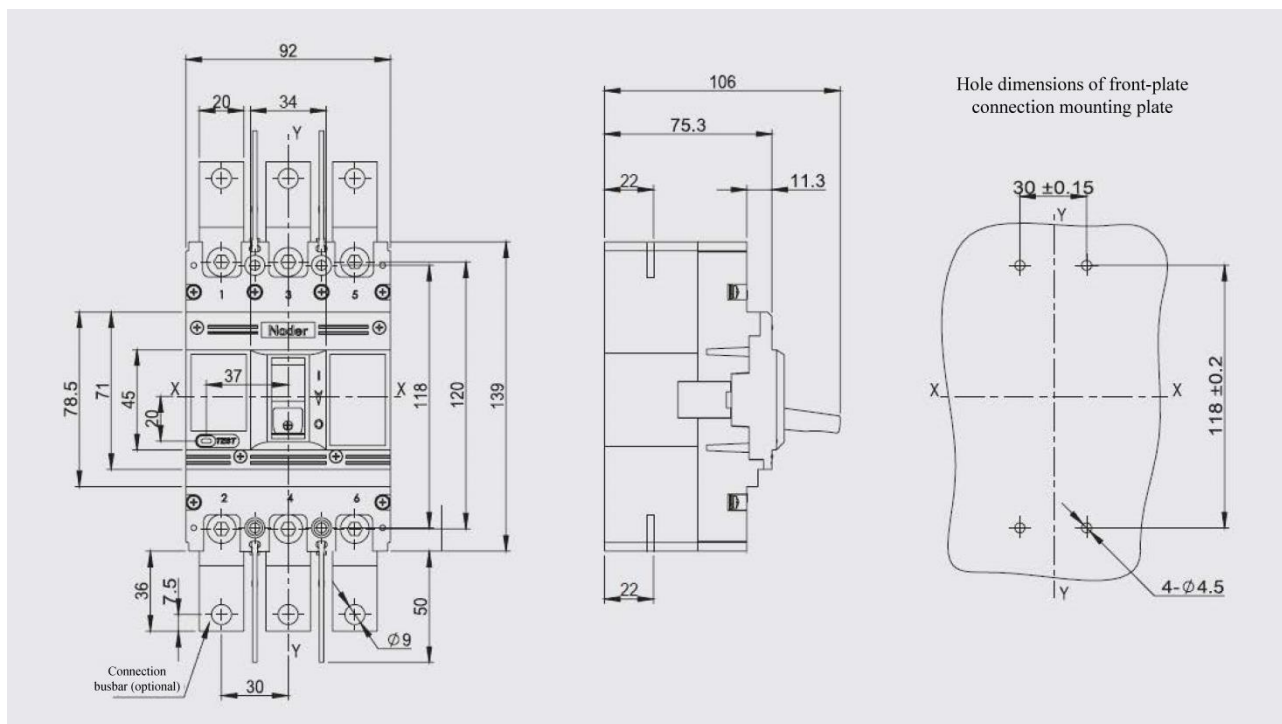


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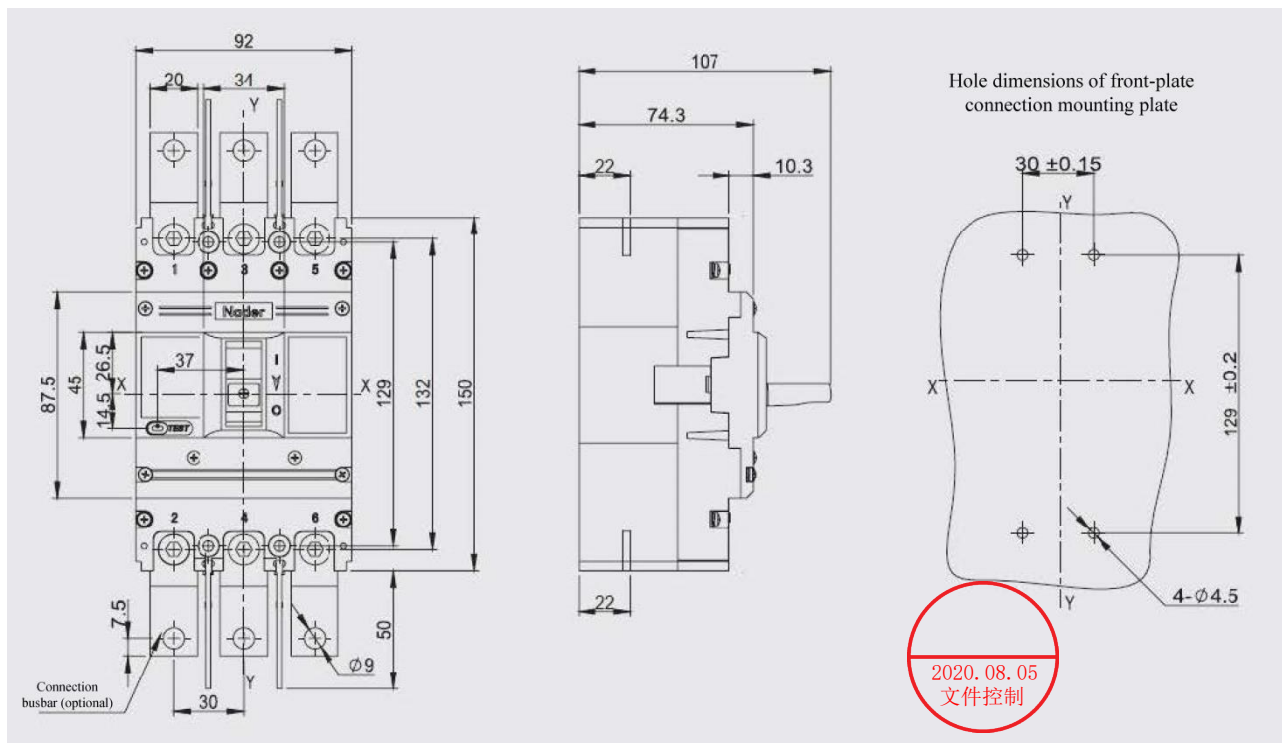
## 7. Outline and Mounting Hole Dimensions of Circuit Breaker

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

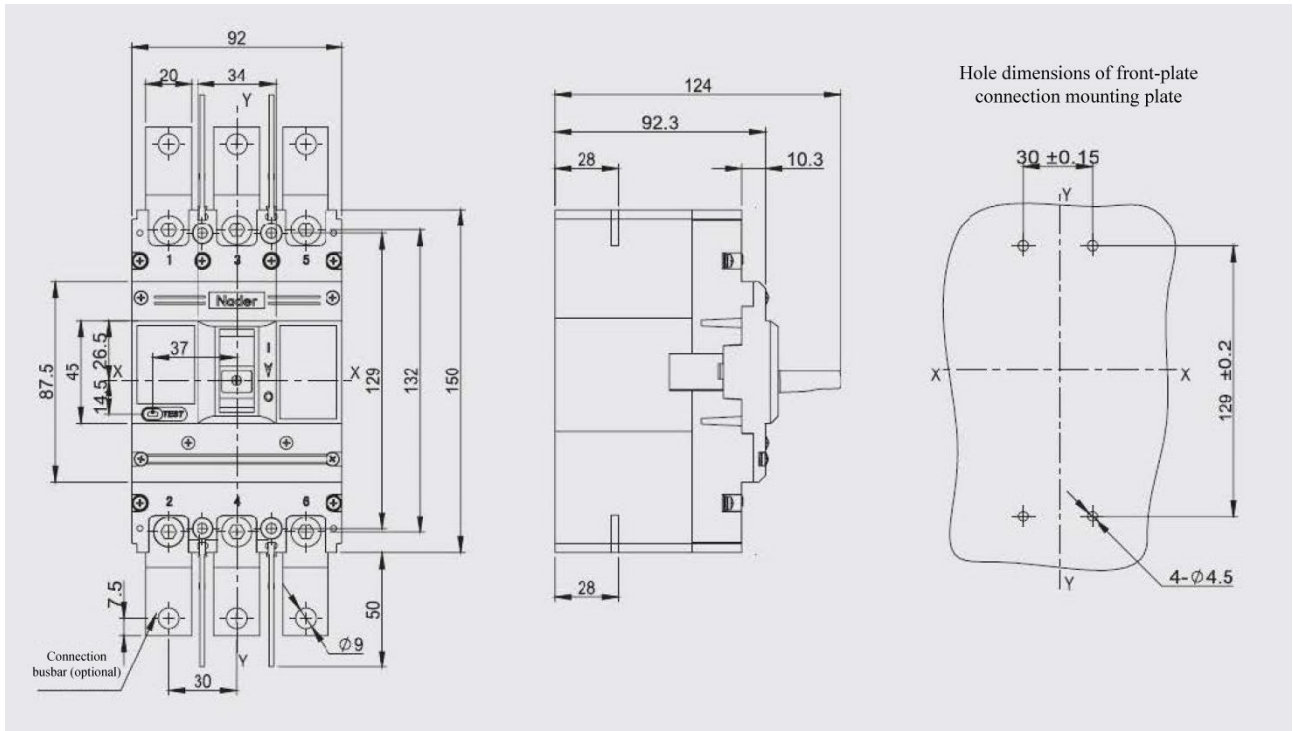
NDM3-160C:



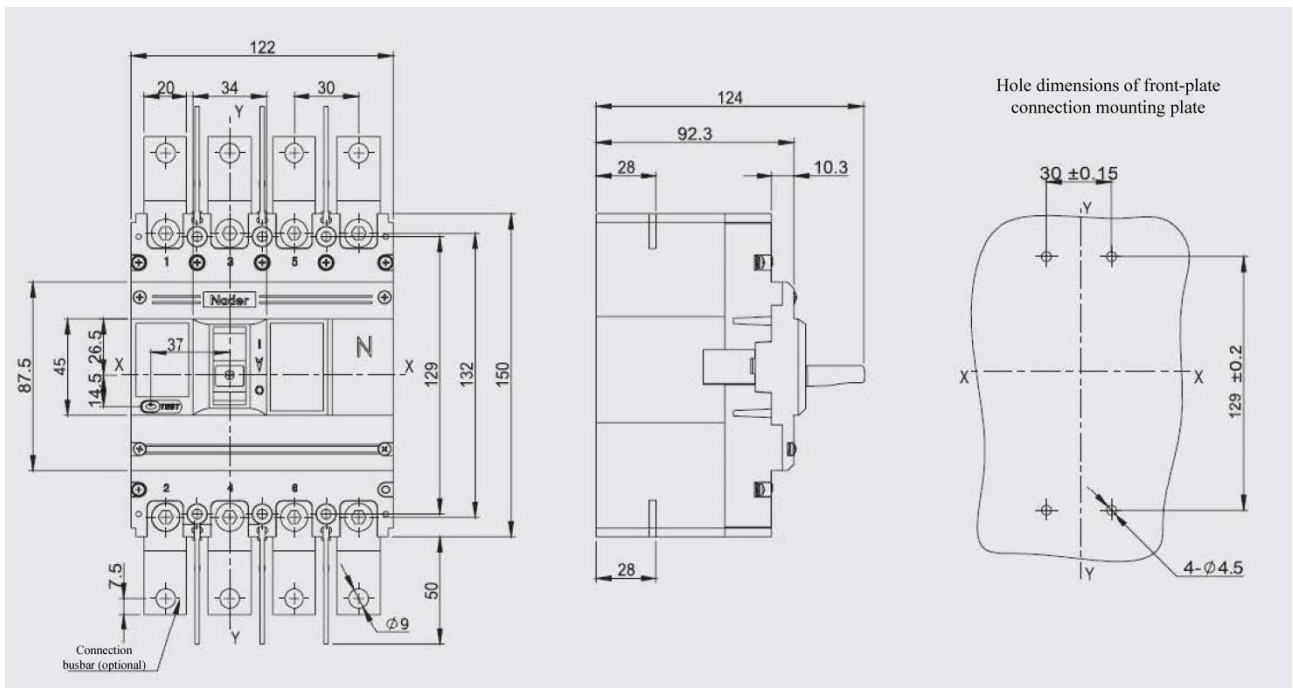
NDM3-160L:



NDM3-160M:



NDM3-160 4P:



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

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## 7.2 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		
NDM3-160	25	65	30	30

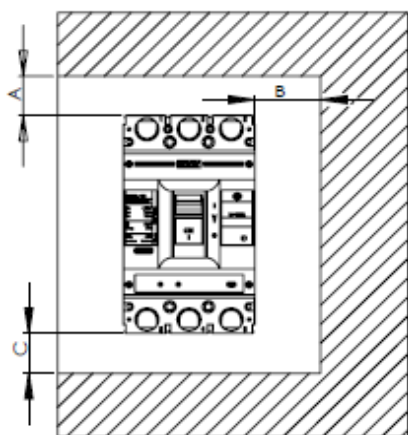


Table 8 Minimum Center Distance between Rowed Circuit Breakers (Unit: mm)

Model	Width of circuit breaker		I Center distance	
	3 poles	4 poles	3 poles	4 poles
NDM3-160	92	122	122	152

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.

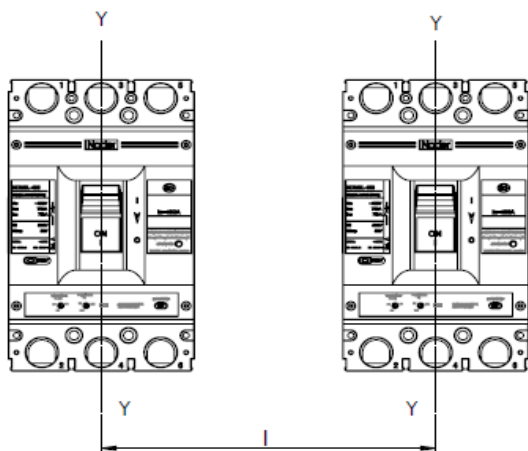


Table 9 Minimum Distance between Stacked Circuit Breakers (Unit: mm)

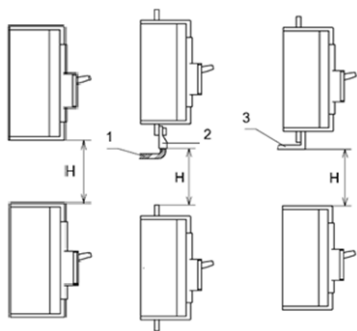
Model	H (distance of circuit breaker from bottom)	
	With a terminal cover	Without a terminal cover
NDM3-160	90	91

Note: 1) Bare cable connection

2) Cable insulating connection

3) Connection without insulation

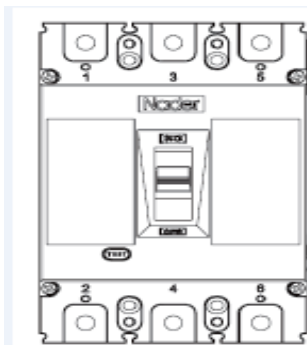
Requirements: Check whether the terminal cover or phase partition is assembled properly before products are energized.



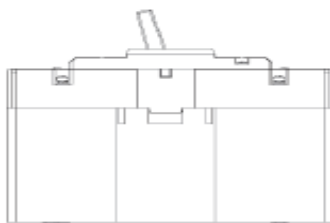
## 8. Installation Direction of Circuit Breaker

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 Accessory List of Circuit Breaker

SN	Name	Specification	3P (Type C/L) Quantity/Set	3P (Type M) Quantity/Set	4P Quantity/Set
1	Cross small pan-head screw	M4×65	4	——	——
2	Cross small pan-head screw	M4×85	——	4	6
3	Hexagon nut	M4	4	4	6
4	Spring washer	4	4	4	6
5	Plain washer	4	4	4	6
6	Phase partition	——	4	4	6



## 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.



“The storage life is three years”

Record number: LX4.203R-14B