

Shanghai Liangxin Electrical Co., Ltd.

P02107-NDM5GZ-1600 Molded Case Disconnecting Switch

Product Specification

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

Prepared by	刘晓庆	Date	2024-04-28
Reviewed by	张君	Date	2024-04-30
Countersigned by	杨荣荣	Date	2024-04-30
Approved by	丁飞	Date	2024-04-30

Revision History					
Version	Revision Reason/Content	Implementati on Date	Prepared by	Reviewe d by	Approve d by
0	New addition	20220920	Yang Wenxue	Liu Xiaoqing	Wang Zhongbin
1	Add operation mode	2024.04.28	Liu Xiaoqing	Yang Wenxue	Wang Zhongbin

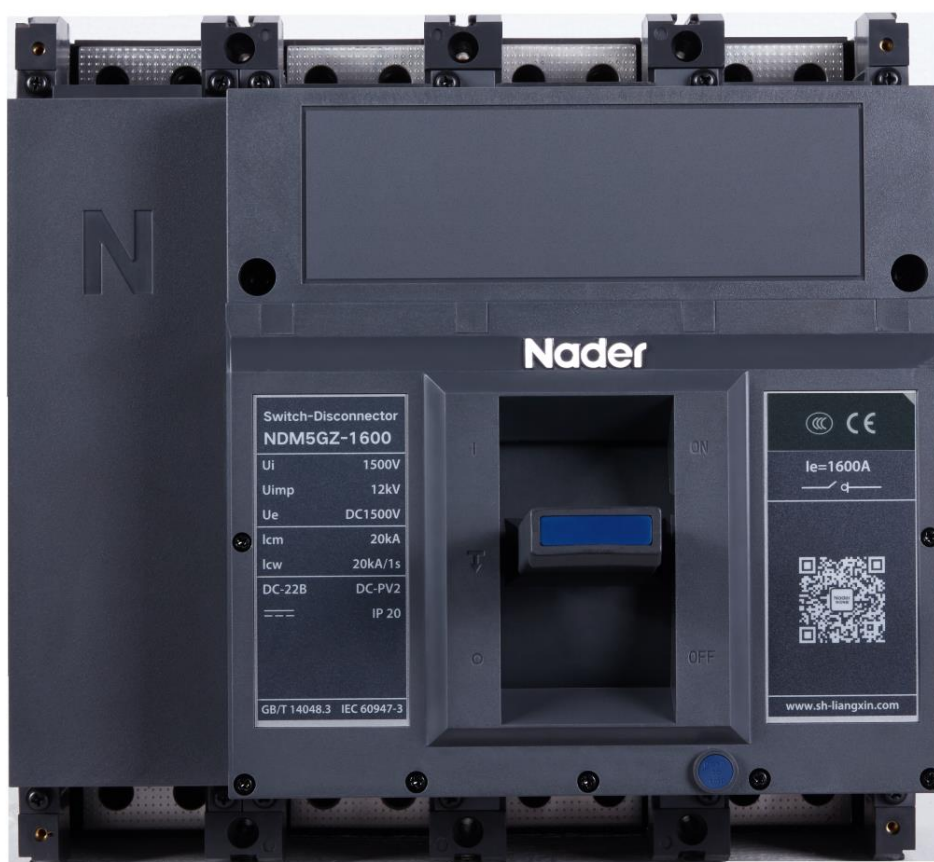
1 Applicable scope and purpose

NDM5GZ-1600 molded case disconnecting switch (short as “disconnecting switch” below), with the rated insulation voltage 1500V, applies to the power distribution circuit and motor circuit with the rated working voltage DC1500V and rated working current 1500A, and used as the power switch, disconnecting switch and emergency switch, and can also be used to connect and disconnect the motor. The product can also be used for infrequent connection and disconnection.

Comply with standards: IEC 60947-3, GB/T 14048.3.

The product complies CCC、CE、TUV、CB certification.

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



3 Specification and Model Description

<u>ND</u> 1	<u>M</u> 2	<u>5</u> 3	<u>G</u> 4	<u>Z</u> 5	-	<u>□</u> 6	/	<u>□</u> 7	/	<u>□</u> 8	/	<u>□</u> 9	/	<u>□</u> 10	<u>□</u> 11	<u>□</u> 12
No.	SN name					NDM5GZ										
1	Enterprise code					ND: “Nader”low-voltage apparatus										
2	Product code					M: Molded case										
3	Design SN					5										
4	Derived code of the series					G: Disconnecting switch										
5	Derived code of the series					Z: DC										

6	Shell frame level	1600
7	Rated working current	800、1000、1250、1500、1600*
8	Level	2(Three pole shape)、3、4
9	Operation mode	No: Direct handle-operated Z2A150: rotary handle for round eccentric hole + shaft length 150mm Z2A200: rotary handle for round eccentric hole + shaft length 200mm Z2A300: rotary handle for round eccentric hole + shaft length 300mm Z2A350: rotary handle for round eccentric hole + shaft length 350mm Z2A650: rotary handle for round eccentric hole + shaft length 650mm M02: electric operation DC24V M11: electric operation AC110V/DC110V M22: electric operation AC230V/DC220V M40: electric operation AC400V M02 short: electric operation DC24V M11 short: electric operation AC110V/DC110V M22 short: electric operation AC230V/DC220V M40 short: electric operation AC400V
10	Accessory cod	See Table 1
11	Special code	S:Extended handle
14	Special code	J0: without a short circuit board。
		J0DJ: with a short circuit board

Note*: in case of the shorted heat exhaust/radiator in the standard configuration, the rated current is 1500A, and the rated current of free wiring is 1600A.

Note 1: The NDM5GZ-

1600 comes standard with a shorting bar, denoted by J0DJ (model does not specify); J0 indicates no shorting bar.

Note 2: Default lengths for terminal screws are as follows: 800A: 30mm screws; 1000A/1250A: 35mm screws; 1500A/1600A: 40mm screws. For other terminal screw lengths, please refer to Table 11.

Note 3: For products with a rated current of 1600A, please contact the manufacturer directly.

Table 1 Accessory Code

Accessory code	Accessory name	Installation position
00	None	—
08	One set of alarm contacts	
98	Two sets of single alarm contacts	
10	Shunt release	
K01	Two sets of shunt releases	
30	Under-voltage release	
A01	Two sets of Under-voltage release	
21	Single auxiliary contact	
61	Two sets of single auxiliary contacts	
23	Three sets of single auxiliary contacts	
24	Four sets of single auxiliary contacts	
18	Shunt release, alarm contact	
38	Under-voltage release, alarm contact	
22	Single auxiliary contact, alarm contact	
88	Two sets of single auxiliary contacts, alarm contact	
26	Three sets of single auxiliary contacts, alarm contact	
25	Four sets of single auxiliary contacts, alarm contact	
42	Shunt release, single auxiliary contact, alarm contact	
44	Shunt release, two sets of single auxiliary contacts, alarm contact	
46	Shunt release, three sets of single auxiliary contacts, alarm contact	
14	Shunt release, four sets of single auxiliary contacts, alarm contact	
75	Under-voltage release, single auxiliary contact, alarm contact	
77	Under-voltage releases, 2 sets of single auxiliary contact, alarm contact	
81	Under-voltage releases, 3 sets of single auxiliary contact, alarm contact	
82	Under-voltage releases, 4 sets of single auxiliary contact, alarm contact	
41	Shunt release, single auxiliary contact	
11	Shunt release, two sets of single auxiliary contacts	
12	Shunt release, three sets of single auxiliary contacts	
13	Shunt release, four sets of single auxiliary contacts	
71	Under-voltage release, single auxiliary contact	
72	Under-voltage release, two sets of single auxiliary contacts	
73	Under-voltage release, three sets of single auxiliary contacts	
74	Under-voltage release, four sets of single auxiliary contacts	
31	Under-voltage release, shunt release, alarm contact	

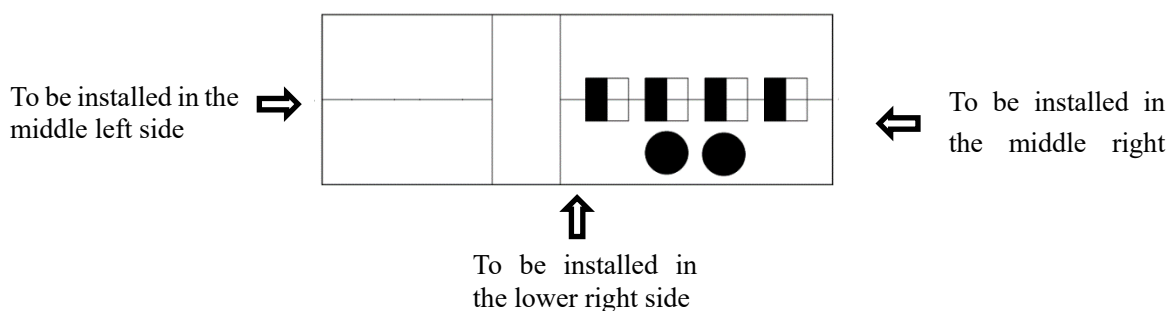
37	Under-voltage release, shunt release, two sets of single alarm contacts	
50	Under-voltage release, shunt release	
51	Under-voltage release, shunt release, single auxiliary contact	
52	Under-voltage release, shunt release, two sets of single auxiliary contacts	
53	Under-voltage release, shunt release, three sets of single auxiliary contacts	
54	Under-voltage release, shunt release, four sets of single auxiliary contacts	
19	Shunt release, two sets of single alarm contacts	
79	Under-voltage release, two sets of single alarm contacts	
63	Single auxiliary contact, two sets of single alarm contacts	
64	Two sets of single auxiliary contacts, two sets of single alarm contacts	
65	Three sets of single auxiliary contacts, two sets of single alarm contacts	
66	Four sets of single auxiliary contacts, two sets of single alarm contacts	
43	Shunt release, single auxiliary contact, two sets of single alarm contacts	
45	Shunt release, two sets of single auxiliary contacts, two sets of single alarm contacts	
47	Shunt release, three sets of single auxiliary contacts, two sets of single alarm contacts	
15	Shunt release, four sets of single auxiliary contacts, two sets of single alarm contacts	
76	Under-voltage releases, single auxiliary contact, two sets of single alarm contacts	
80	Under-voltage releases, two sets of single auxiliary contact, two sets of single alarm contacts	
83	Under-voltage releases, three sets of single auxiliary contacts, two sets of single alarm contacts	
84	Under-voltage releases, four sets of single auxiliary contact, two sets of single alarm contacts	
32	Under-voltage release, shunt release, single auxiliary contact, alarm contact	
33	Under-voltage release, shunt release, two sets of single auxiliary contacts, alarm contact	
34	Under-voltage release, shunt release, three sets of single auxiliary contacts, alarm contact	
35	Under-voltage release, shunt release, four sets of single auxiliary contacts, alarm contact	
39	Under-voltage release, shunt release, single auxiliary contact, two sets of single alarm contacts	
55	Under-voltage release, shunt release, two sets of single auxiliary contacts, two sets of single alarm contacts	
56	Under-voltage release, shunt release, three sets of single auxiliary contacts, two sets of single alarm contacts	
36	Under-voltage release, shunt release, four sets of single auxiliary contacts, two sets of single alarm contacts	
A02	Two sets of under-voltage releases, single auxiliary contact	

A07	Two sets of under-voltage releases, two sets of single auxiliary contacts	
A08	Two sets of under-voltage releases, three sets of single auxiliary contacts	
A09	Two sets of under-voltage releases, four sets of single auxiliary contacts	
A10	Two sets of under-voltage releases, single auxiliary contact, alarm contact	
A12	Two sets of under-voltage releases, two sets of single auxiliary contacts, alarm contact	
A14	Two sets of under-voltage releases, three sets of single auxiliary contacts, alarm contact	
A16	Two sets of under-voltage releases, four sets of single auxiliary contacts, alarm contact	
A11	Two sets of under-voltage releases, single auxiliary contact, two sets of single alarm contacts	
A13	Two sets of under-voltage releases, two sets of single auxiliary contacts, two sets of single alarm contacts	
A15	Two sets of under-voltage releases, three sets of single auxiliary contacts, two sets of single alarm contacts	
A17	Two sets of under-voltage releases, four sets of single auxiliary contacts, two sets of single alarm contacts	
A05	Two sets of under-voltage releases, alarm contact	
A06	Two sets of under-voltage releases, two sets of single alarm contacts	
K04	Two sets of shunt releases, single auxiliary contact	
K06	Two sets of shunt releases, two sets of single auxiliary contacts	
K07	Two sets of shunt releases, three sets of single auxiliary contacts	
K08	Two sets of shunt releases, four sets of single auxiliary contacts	
K12	Two sets of shunt releases, single auxiliary contact, alarm contact	
K09	Two sets of shunt releases, two sets of single auxiliary contacts, alarm contact	
K10	Two sets of shunt releases, three sets of single auxiliary contacts, alarm contact	
K11	Two sets of shunt releases, four sets of single auxiliary contacts, alarm contact	
K13	Two sets of shunt releases, single auxiliary contact, two sets of single alarm contacts	
K14	Two sets of shunt releases, two sets of single auxiliary contacts, two sets of single alarm contacts	
K15	Two sets of shunt releases, three sets of single auxiliary contacts, two sets of single alarm contacts	
K16	Two sets of shunt releases, four sets of single auxiliary contacts, two sets of single alarm contacts	
K02	Two sets of shunt releases, alarm contact	
K05	Two sets of shunt releases, two sets of single alarm contacts	

Note: ■ Single auxiliary contact; □ alarm contact; ● shunt releases ○ under-voltage release

Handle





4 Main Technical Parameters

Table 2 Technical Parameters

Product Model		NDM5GZ-1600		
Rated working current I_e (A)		800、1000、1250、1500、1600*		
Rated voltage U_e (V)		DC750	DC1000	DC1500
Level		2(Three pole shape)	3	4
Utilization category		DC-22B、DC-PV2		
Rated impulse withstand voltage U_{imp} (V)		12000		
Rated insulation voltage U_i (V)		1500		
Rated short-time withstand current I_{cw} (kA)		20/1s		
Rated short circuit making capacity I_{cm} (kA)		20		
Operating performance (times)	Mechanical life (maintenance-free)	10000		
	Mechanical life (with maintenance)	20000		
	Electrical life	500		
Outline Dimensions		L(mm)	268	
		W(mm)	210(2P、3P)/280(4P)	
		H(mm)	152	

Note*: in case of the shorted heat exhaust/radiator in the standard configuration, the rated current is 1500A, and the rated current of free wiring is 1600A。

4.1 Selection of the section area for the wiring bus of the disconnecting switch:

Table 3 Selection of the section area for the wiring bus of the disconnecting switch

Rated current (A)	Copper busbar	
	Dimension (mm ²)	Quantity
800	50×5	2
1000	50×6	2
1250	50×8	2

1500、1600	50×10	2
-----------	-------	---

4.2 Tightening torque of the disconnecting switch terminal and mounting screw

Table 4 Tightening torque of the disconnecting switch terminal and mounting screw

Model	Use of screw	Thread specification	Torque (N·m)
NDM5GZ-1600	Wiring screw	M10	20
	Mounting screws	M5	4

4.3 Derating factor of temperature change for the circuit breaker

Table 5 Derating Factor Table of Temperature Change for the disconnecting switch

Model	Derating factor of product temperature change							
NDM5GZ-1600	Temperature (°C)	40	45	50	55	60	65	70
	Derating factor	1	0.98	0.95	0.92	0.88	0.84	0.8

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

4.4 High-altitude derating factor for the disconnecting switch

Table 6 Altitude Derating Factor Table for the disconnecting switch

Altitude (m)	Correction factor of the working current	Correction factor of the maximum working voltage	Correction factor of the power frequency withstand voltage	Correction factor of the insulation voltage
2000	1	1	1	1
2500	1In	1	1	1
3000	0.98In	1	1	1
3500	0.95In	1	1	1
4000	0.93In	1	1	1
4500	0.91In	1	1	1
5000	0.89In	1	1	1

4.5 Power Consumption of Disconnecting Switch

Table 7 Single-phase Power Consumption of NDM5GZ-1600 Product Current Specifications

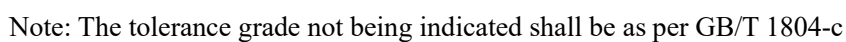
Product Model	Current specifications	Single-phase power consumption
NDM5GZ-1600	800A	13W
	1000A	20W
	1250A	31W
	1500A	50W
	1600A	56W
Note: The above data is the single-phase power consumption of the disconnecting switch measured at an ambient temperature of 40°C with the rated current.		

5 Normal Working Environment

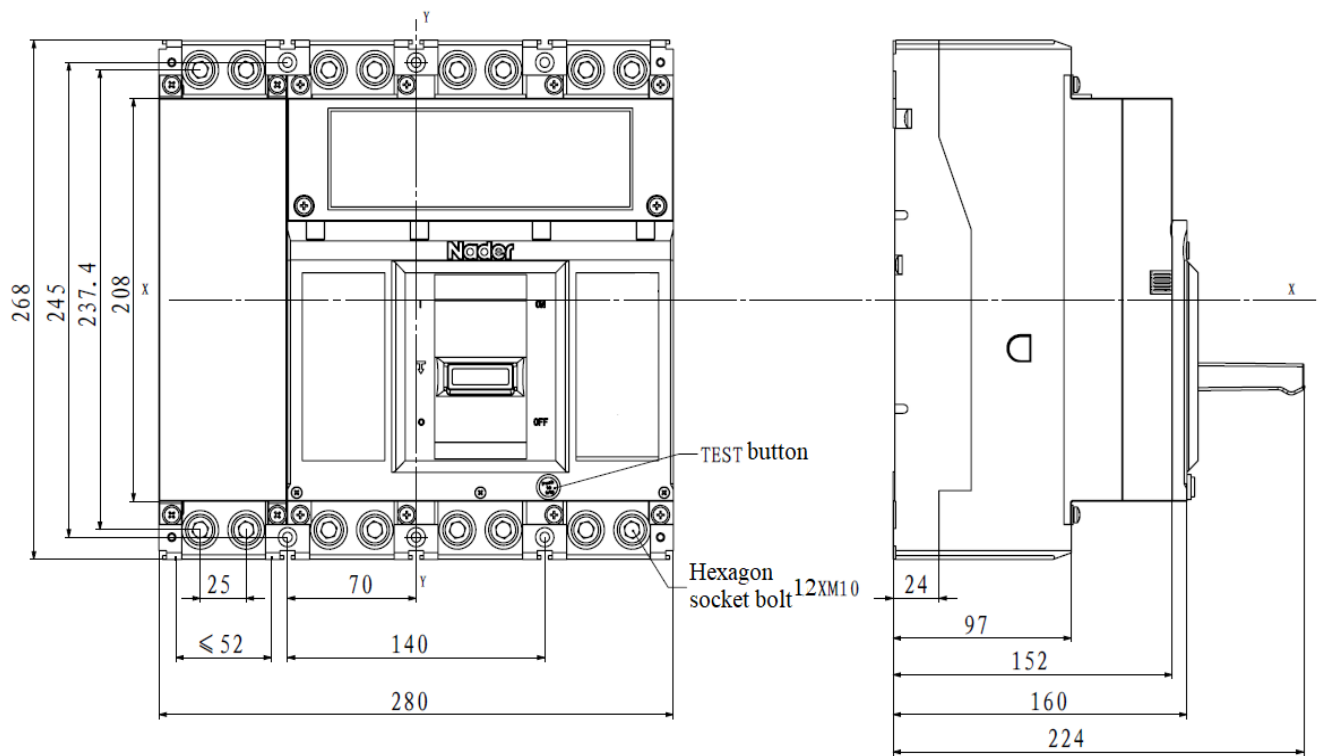
- 1) The altitude of the installation site doesn't exceed 2,500m. See the "High-altitude Derating Factor Table of Disconnecting Switch" for the derating factor at the altitude;
- 2) The ambient temperature is $-35^{\circ}\text{C} \sim +70^{\circ}\text{C}$; the average within 24 h shall not be more than $+35^{\circ}\text{C}$. 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 Disconnecting Switch" for the derating factor;
- 3) The relative humidity should no more than 50%, when the ambient temperature is 40°C . Somehow relatively high humidity is acceptable if the temperature is relatively low. For instance, 90% humidity is acceptable when temperature is 20°C . Actions should be taken to deal with the condensation result from the temperature changes.
- 4) The product can withstand the effects of wet air, salt mist, oil mist and mould.
- 5) The installation category of the disconnecting switch connected to the main loop is: Category III (power distribution and control level), The installation category of the disconnecting switch not connected to the main loop is: Category II (load level);
- 6) Class of pollution: 3;
- 7) Protection class: IP20;
- 8) 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;
- 9) In case of stricter user conditions than the above description, negotiate with the manufacturer.

6 Product outline and installation dimensions

6.1 Dimensions of secondary products

[illegible]

6.3 External dimensions of quadrupole products



Note: The tolerance grade not being indicated shall be as per GB/T 1804-c

6.4 Increase the external size of cooling accessories

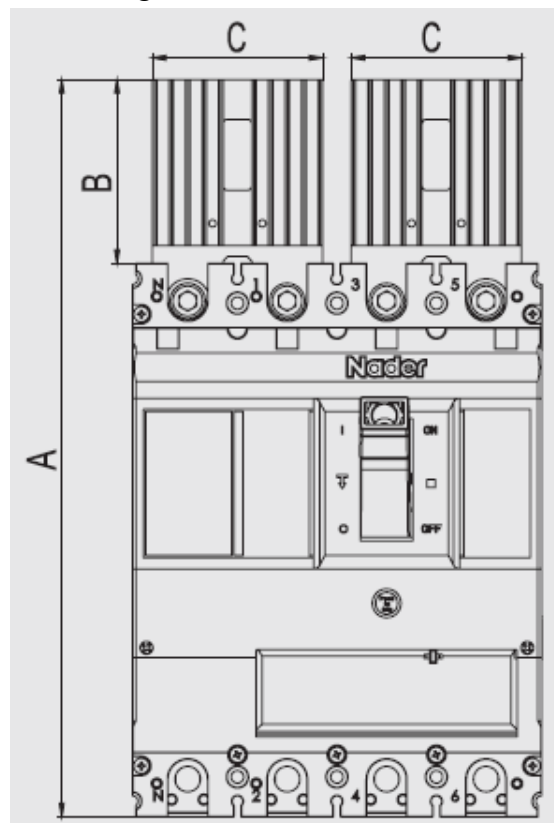
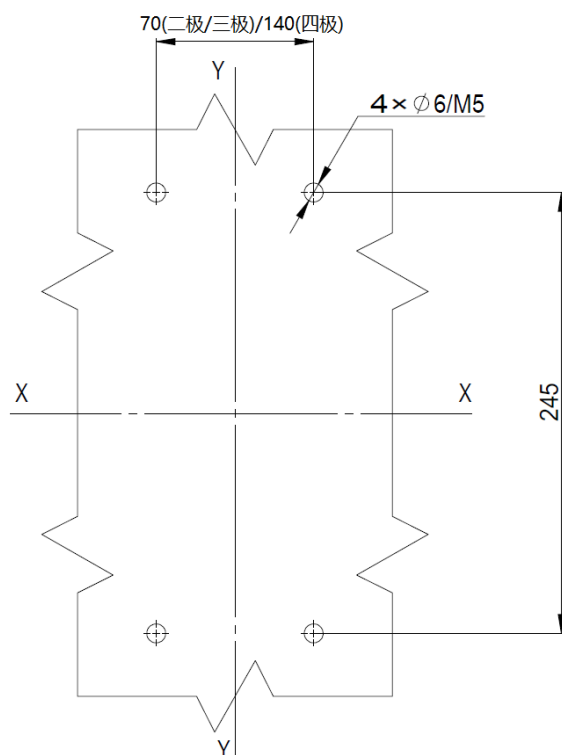


Table 8 Product dimensions

Model	A (mm)	B (mm)	C (mm)
NDM5GZ-1600	354	86	120

Note: The tolerance grade not being indicated shall be as per GB/T 1804-c

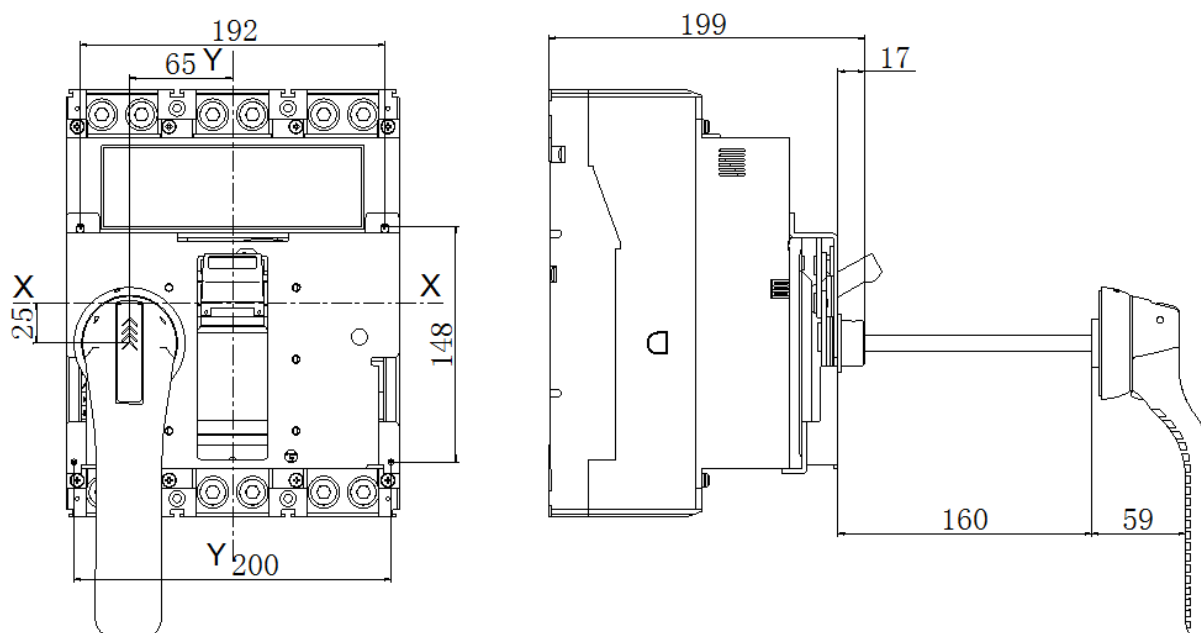
6.5 Product installation dimensions



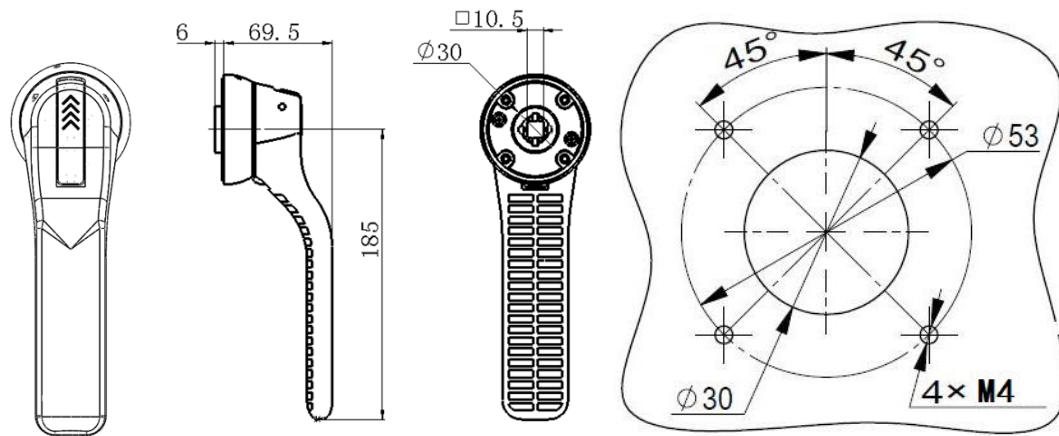
Note: The tolerance grade not being indicated shall be as per GB/T 1804-c

6.6 Rotate handle operating mechanism

Handwork-Handle mounting holes and handwork dimensions are as follows:



Hand operation outline dimension drawing



Schematic diagram of opening for handle installation

Note: The tolerance grade not being indicated shall be as per GB/T 1804-c

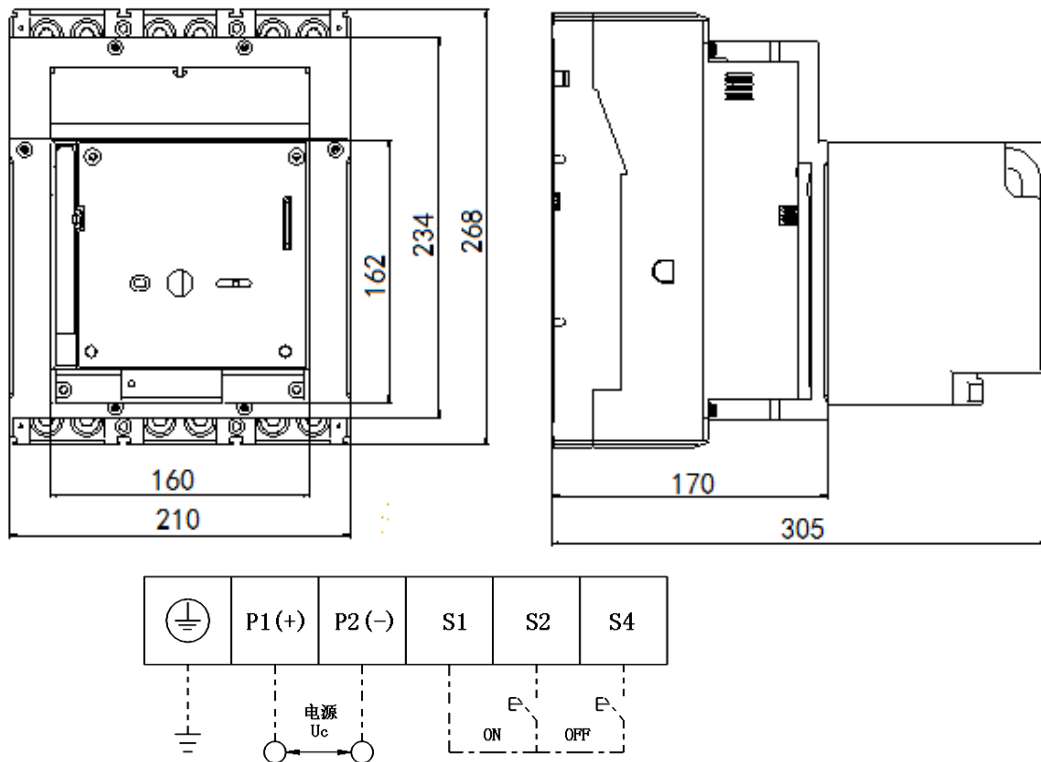
6.7 Electric operating mechanism

When the external voltage of the electric operating mechanism is between 85% and 110% of the rated control power voltage, the release can break the disconnecting switch reliably.

The case in electric operation is equipped with “automatic/manual” valve, and attached with the operation tag. When the valve is situated in the “Automatic” position, electric operation may start after activating the electric control terminal of electric operation. When the valve is situated in the “Manual” position, manual operation may start after inserting the manual handle. In electric operation at this moment, the electric control terminal is disconnected. In manual operation, the rotating angle shall be up to about 180°, so that the inching switch inside can be correctly positioned, to make preparation for subsequent electric operation. (In case of less than 180°, after the original manual breaking, it is required to be open and then closed in electric operation, while after the original manual closing, it is required to be closed and then open in electric operation).

Electric operation has the locking function. In case of electric operation in the automatic position, the locking plate on the upper right of the electric operation may be pulled out for locking. Then the manual and electric operations are disabled.

6.7.1 General electric operating-disconnecting switch and its electric operating mechanism after installation dimensions:



Schematic diagram of electrical operation wiring

Notes: 1) For manual operation, operate it 180° in the clockwise direction while operation in the counterclockwise direction is prohibited;

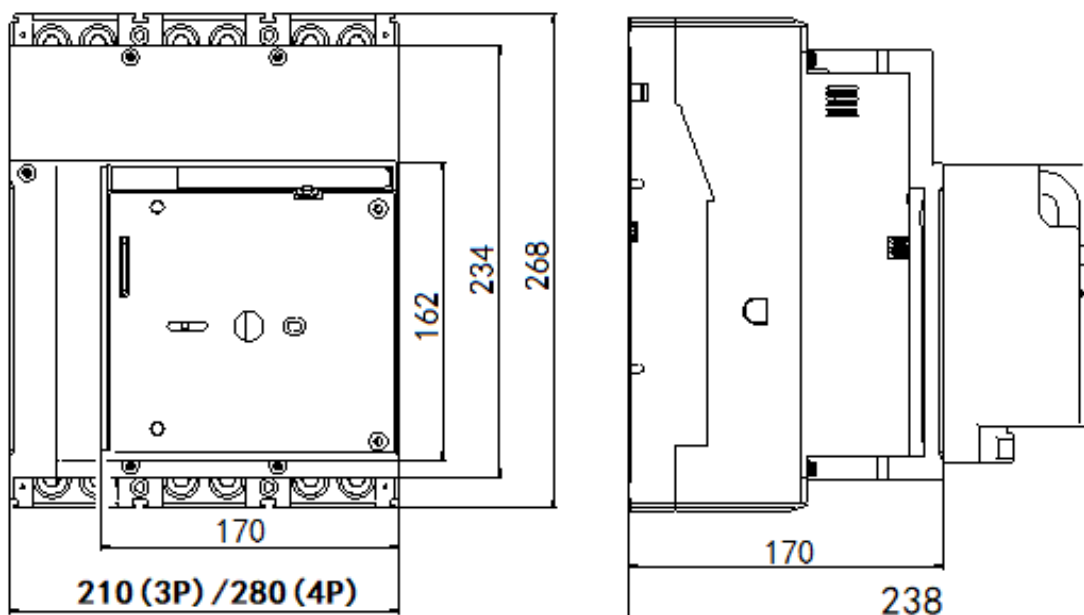
2) Do not connect P1 and P2 to S1, S2, and S4.

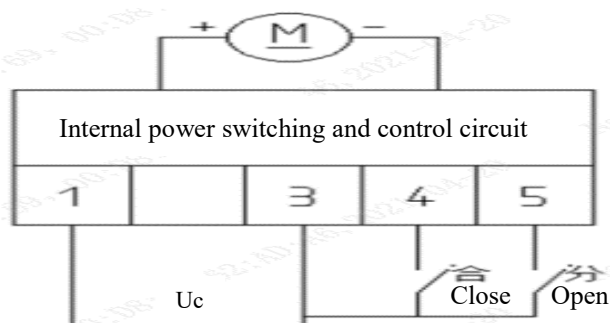
3) The tolerance not being indicated shall be as per the standard GB/T 1804-c.

Table 9 Voltage specification and power of electric operation

Accessory	Electric operation			
Voltage specification	DC24V	AC110V/DC110V	AC230V/DC220V	AC400V
Power	240W	400W	400W	400W

6.7.2 Dimensions of high electric operating-isolating switch and its electric operating mechanism after installation:





Wiring diagram for electric operation

Notes: 1) For manual operation, operate it 180° in the clockwise direction while operation in the counterclockwise direction is prohibited;

2) In the electric operation wiring, 1 (positive pole), 3 (negative pole) are power wires, 3 is public wire, 3 and 4 are closed, 3 and 5 are open;

3) In electric operation, the signal time required for normal switching is more than 500ms, and the acting time for opening and closing is 3s;

4) In electric operation, the opening and closing instructions can be output continuously;

5) The tolerance not being indicated shall be as per the standard GB/T 1804-c.

6) The service life of electric operation is 10000 times.

Table 10 Voltage specifications and power of the electric operation

Accessory	Electric operation			
Voltage specification	DC24V	AC110V/DC110V	AC230V/DC220V	AC400V
Power	240W	200W	200W	200W

6.8 Thickness of the wiring copper bar and screw length

Table 11 Thickness of the wiring copper bar and screw length

No.	Thickness of the wiring copper bar (mm)	Hexagon screw length (mm)
1	6、8	M10X30
2	10、12	M10X35
3	15	M10X40
4	20	M10X45

Note: The hexagon screw length shall be indicated when ordering.

6.9 Safety spacing

See the figure below for the minimum safety distance (see Table 12) of the disconnecting switch from the top, bottom, side and front panel during installation.

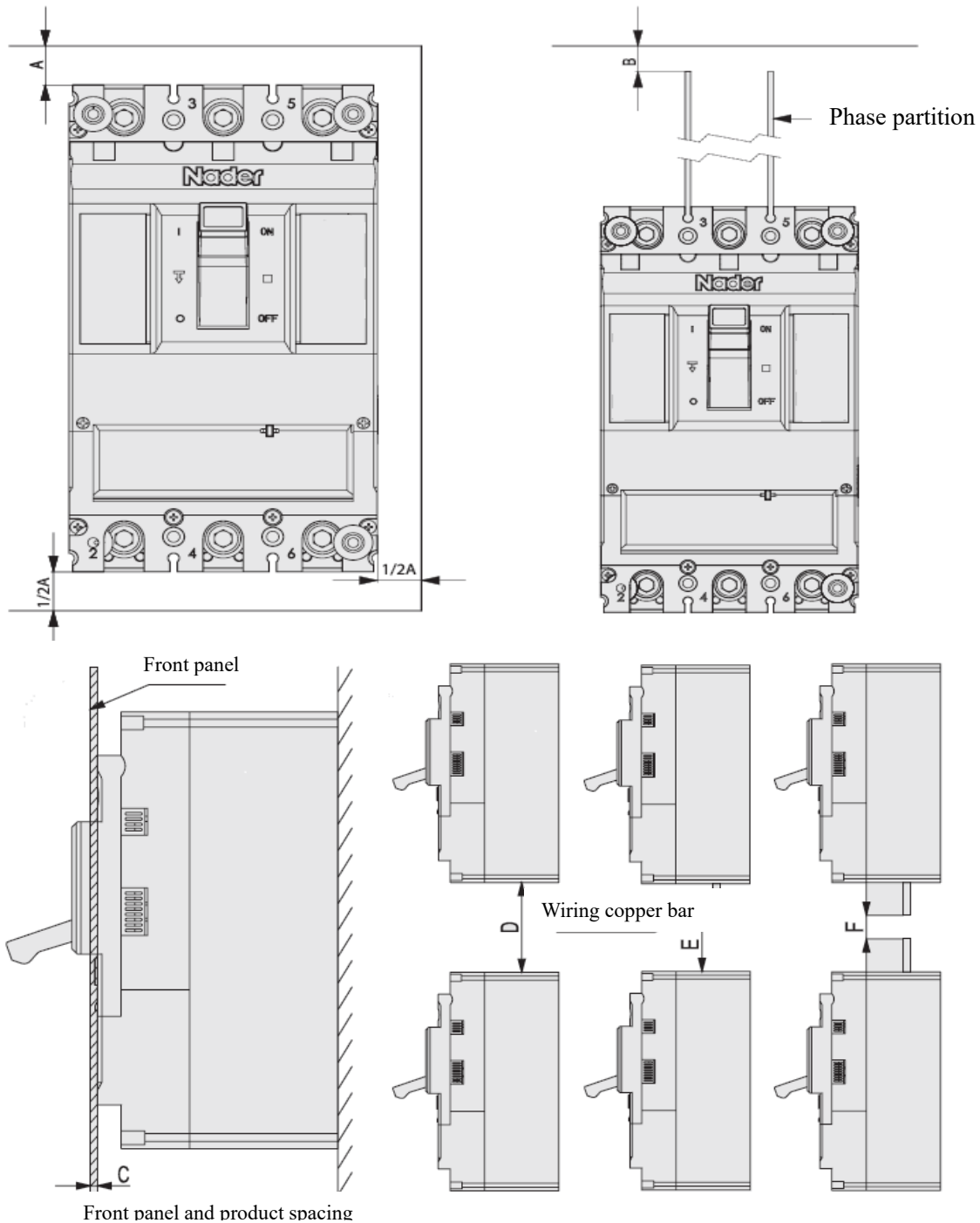
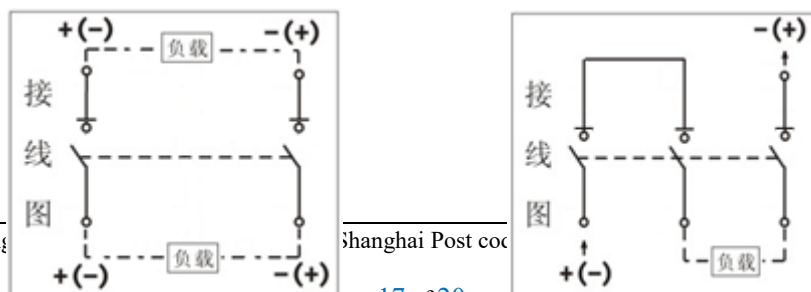


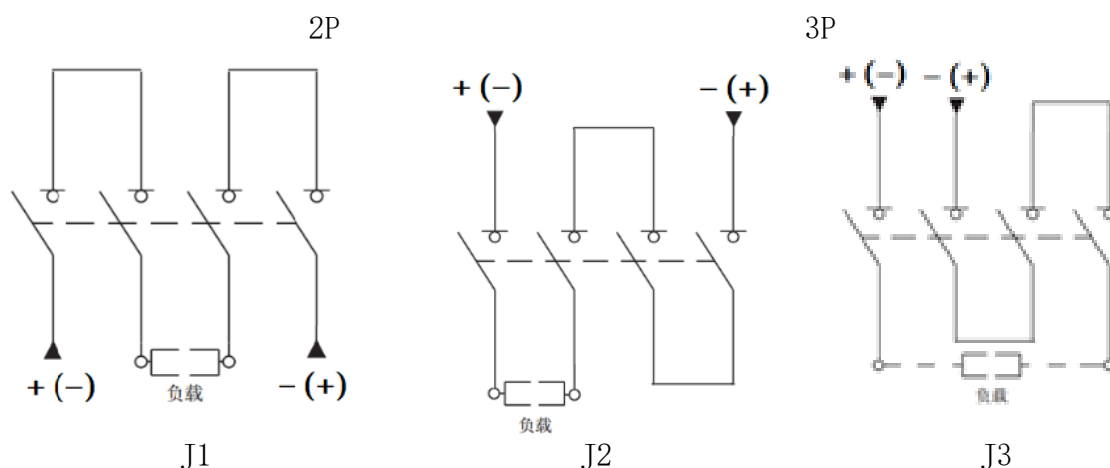
Table 12 Minimum safety distance in installation (unit: mm)

Model	Gap A	Gap B	Gap C	Gap D	Gap E	Gap F
NDM5GZ-1600	≥100	≥0	≥0	≥180	≥100	≥40

Note: The tolerance not being indicated shall be as per GB/T 1804-c.

6.10 Main Circuit Wiring Mode of DC Products





7. Accessories Function Description

7.1 Under-voltage release

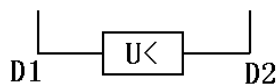
When the power voltage is reduced to 35%~70% of the rated working voltage of the under-voltage release, the under-voltage release can guarantee the reliable separation of the circuit breaker;

When the power voltage is less than 35% of the rated working voltage of the under-voltage release, under-voltage release can prevent the circuit breaker from being closed;

When the power voltage is higher than 85% of the rated working voltage of the under-voltage release, the under-voltage release can guarantee the reliable closing of the circuit breaker.

Table 13 Voltage specifications and power consumption of the under-voltage release

Accessory name	Under-voltage release		
Voltage specifications (V)	AC/DC110	AC/DC230	AC400
Retention power consumption (W)	7	8	10
Instantaneous power consumption (W)	230	500	270
Code	Q11	Q22	Q40



Wiring Diagram of the Under-voltage Release

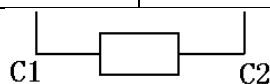
7.2 Shunt release

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 14 Voltage specifications and power consumption of the shunt release

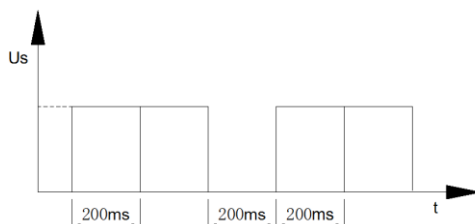
Accessory name	Shunt release		
Voltage specifications (V)	DC24	AC/DC110	AC/DC230
Retention power consumption (W)	3.5	3.5	3.5

Instantaneous power consumption (W)	240	230	300
Code	FT02	FT11	FT22



Wiring Diagram of the Shunt Release

Note: Working principle of the shunt release: a single pulse action (the suggested power-on time above 200ms). If another action is required, the shunt release can only be operated after being off ((the suggested interval time above 200ms)), reset and energized. The time from power on of the shunt release (receiving signal) to product tripping is 100ms.



Working principle of the shunt release

7.3 Rated parameters of the auxiliary contact

Table 15 Rated parameters of the auxiliary contact

Accessory name		Auxiliary contact(Conventional)	Auxiliary contact(Low power consumption)
Voltage specifications/conventional thermal current (Ith)		AC250V/10A、AC400V/3A、DC220V/0.2A	DC30V/10mA
Wiring diagram	Opening		
	Closing		
Internal resistance		<30mΩ	<50mΩ

Note: For the DC30V/10mA auxiliary contact, please indicate it when ordering.

The first auxiliary harness is identified as F11 (red), F12 (white), F14 (yellow), and the second auxiliary harness is identified as F21 (red), F22(white), F24 (yellow), and so on. At most four groups of auxiliary harness are installed.

7.4 Rated parameters of the alarm contact

Table 16 Rated parameters of the alarm contact

Accessory name		Alarm contact(Conventional)	Alarm contact(Low power consumption)
Voltage specifications/conventional thermal current (Ith)		AC250V/10A、AC400V/3A、DC220V/0.2A	DC30V/10mA
Wiring diagram	On, off		
	Free tripping		
Internal resistance		<30mΩ	<50mΩ

Note: For the DC30V/10mA auxiliary contact, please indicate it when ordering.

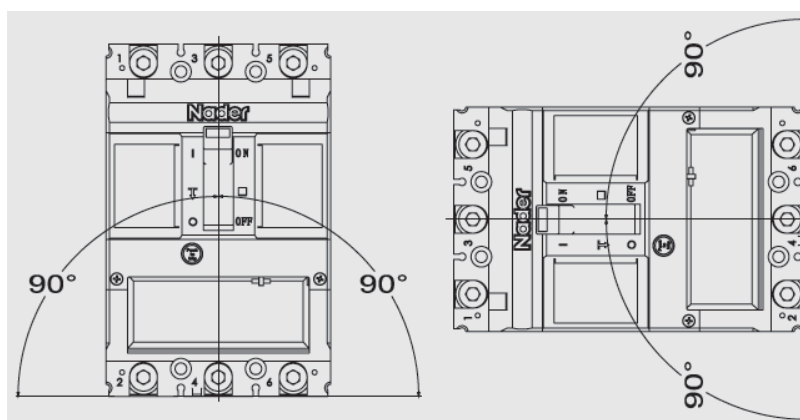
The first alarm harness is identified as B11 (red), B12 (white), B14 (yellow), and the second auxiliary harness is identified as B21 (red), B22 (white), B24 (yellow), and so on. At most two groups of alarms are installed.

The standard wire length of the shunt release and auxiliary contact wiring is 0.7m, and may be ordered as needed.

8. Installation direction

For vertical installation of the product, the gradient between the installation surface and the vertical plane is no more than $\pm 5^\circ$.

Horizontal installation of the product.



Vertical Installation

Horizontal Installation

9. Packaging and Storage

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 36 months since the manufacturing date.

10. Environmental Compliance

The product complies with the RoHS standards

11. List of accessories and installation

Table 17 Accessory Kit Checklist

No.	Name	Specification	2P Quantity/Set	3P Quantity/Set	4P Quantity/Set
1	Cross small pan-head screw	M5×100	4	4	4
2	Hexagon nut	M5	4	4	4
3	Spring washer	5	4	4	4

4	Plain washer	5	4	4	4
5	Phase partition	——	4	4	4
6	Ground partition	——	2	2	2
7	Short block	——	/	1	2
8	Terminal screw	See table 11*	8	12	16

Note: Refer to Table 11 for the thickness of the copper bar and the length of the screw for the wiring screws.

12. Precautions

- 1) The performance parameters of this specification are suitable for normal conditions. For special requirements, put the equipment into use after consulting the company with formal confirmation and re-adjusting parameters by the company;
- 2) The disconnecting switch, other accessories can only be installed and maintained by the trained or qualified professionals;
- 3) Ensure that the power supply is off before installing or removing any device.