

Shanghai Liangxin Electrical Co., Ltd.

P02107-NDM5G-1600 Molded Case Disconnecting Switch

Product Specification

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

Prepared by	刘晓庆	Date	2022-12-28
Reviewed by	杨文学	Date	2022-12-30
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Approved by	张颖	Date	2022-12-30

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	2022.12.28	Liu Xiaoqing	Yang Wenxue	Wang Zhongbin

1 Applicable scope and purpose

NDM5G-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 AC 1140V and rated working current 1600A, 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)


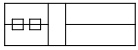



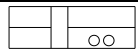
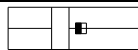


3 Specification and Model Description

<u>ND</u>	<u>M</u>	<u>5</u>	<u>G</u>	-	<u>□</u>	<u>□</u>	/	<u>□</u>	<u>□</u>	<u>□</u>
1	2	3	4		5	6	7	8	9	10
No.	SN name						NDM5G			
1	Enterprise code						ND: “Nader” low-voltage apparatus			

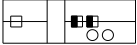
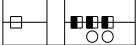
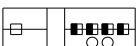

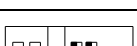
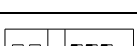
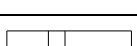
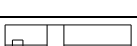
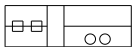



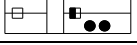
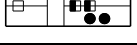
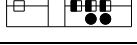

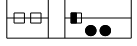
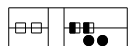
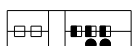

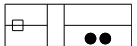
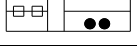

2	Product code	M: Molded case
3	Design SN	5
4	Derived code of the series	G: Disconnecting switch
5	Shell frame level	1600
6	Rated working current	800、1000、1250、1600
7	Level	3, 4
8	Operation mode	No: Direct handle-operated Z2A150: rotary handle for round eccentric hole + shaft length 150mm Z2A200: rotary 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
9	Accessory code	See Table 1
10	Special code	S: Extended handle

Table 1 Accessory Code

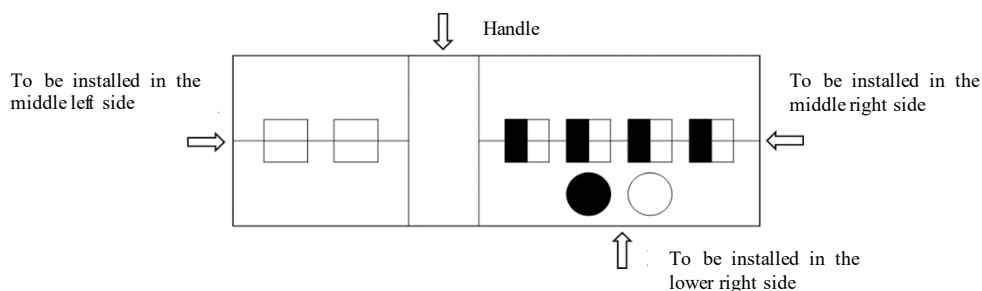
Accessory code	Accessory name	Installation position
00	None	—
08	One set of alarm contacts	
98	Two sets of single alarm contacts	
10	Shunt release	
K01	Two sets of shunt releases	
30	Under-voltage release	
A01	2 sets of Under-voltage release	
21	Single auxiliary contact	

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 release; ○ Under-voltage release



4 Main Technical Parameters

Table 2 Technical Parameters

Product Model		NDM5G-1600	
Rated working current I_e (A)		800、1000、1250、1600	
Rated voltage U_e (V)		AC380/400/415, AC660/690, AC1140	
Level		3, 4	
Utilization category		AC-23A (AC690V and below), AC-22A (1140V)	
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)		40	
Operating performance (times)	Mechanical life	Maintenance-free	10000
		With maintenance	20,000
	Electrical life	AC415V	1000
		AC690V	1000
		AC1140V	500
Outline Dimensions		L(mm)	268
		W(mm)	210(3P)/280(4P)
		H(mm)	152

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
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)
NDM5G-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							
NDM5G-1600	Temperatu	40	45	50	55	60	65	70
	Derating	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	Maximum working voltage (V)	Power frequency withstand voltage (V)	Insulation voltage (V)
2000	1	1140	3500	1500
2500	1	1140	3500	1500
3000	0.98	1080	3150	1400
3500	0.97	1020	3000	1300
4000	0.95	950	2850	1200
4500	0.94	880	2700	1100
5000	0.93	810	2,500	1000

4.5 Power Consumption of Disconnecting Switch

Table 7 Single-phase Power Consumption of NDM5G-1600 Product Current Specifications

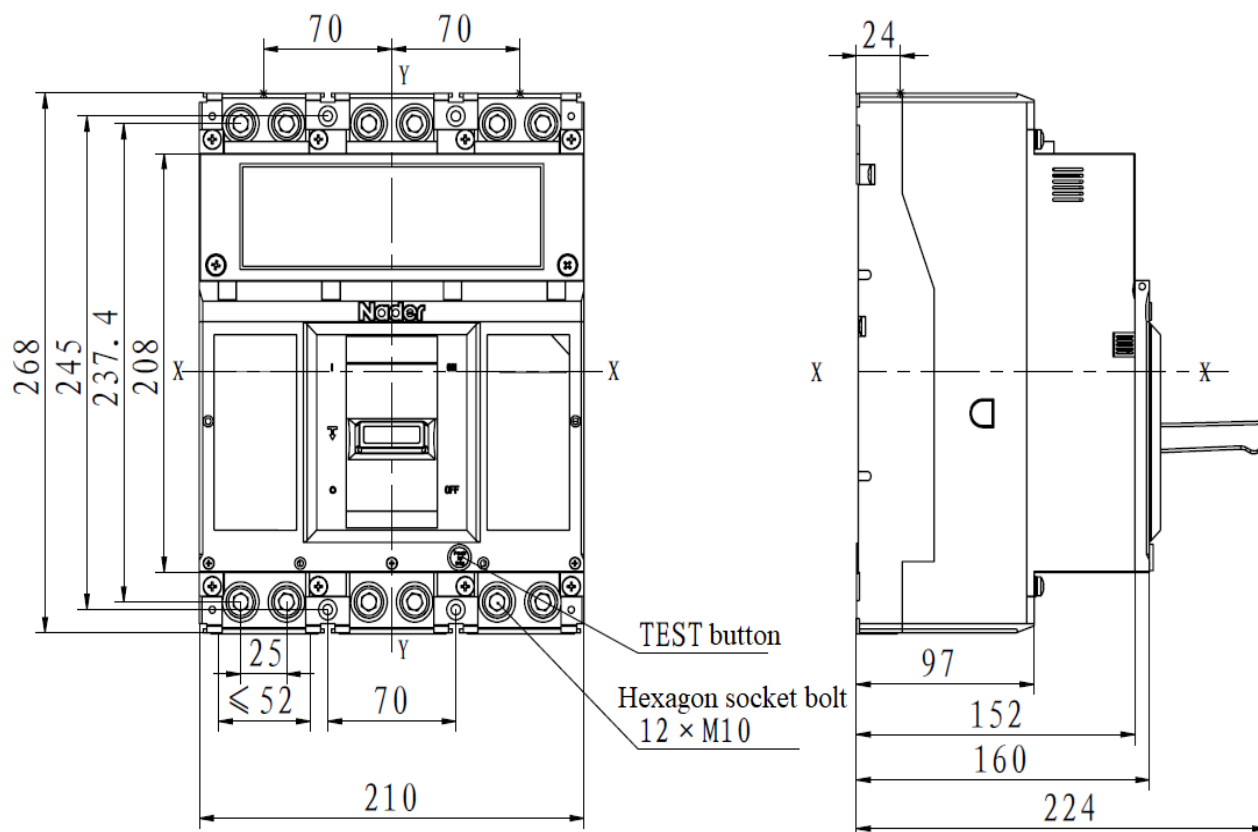
Product Model	Current specifications	Single-phase power consumption
NDM5G-1600	800A	13W
	1000A	20W
	1250A	31W
	1600A	56W
Note: The above data is the single-phase power consumption of the disconnecting switch measured at an ambient temperature of 40°C with the rated current.		

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) 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 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.

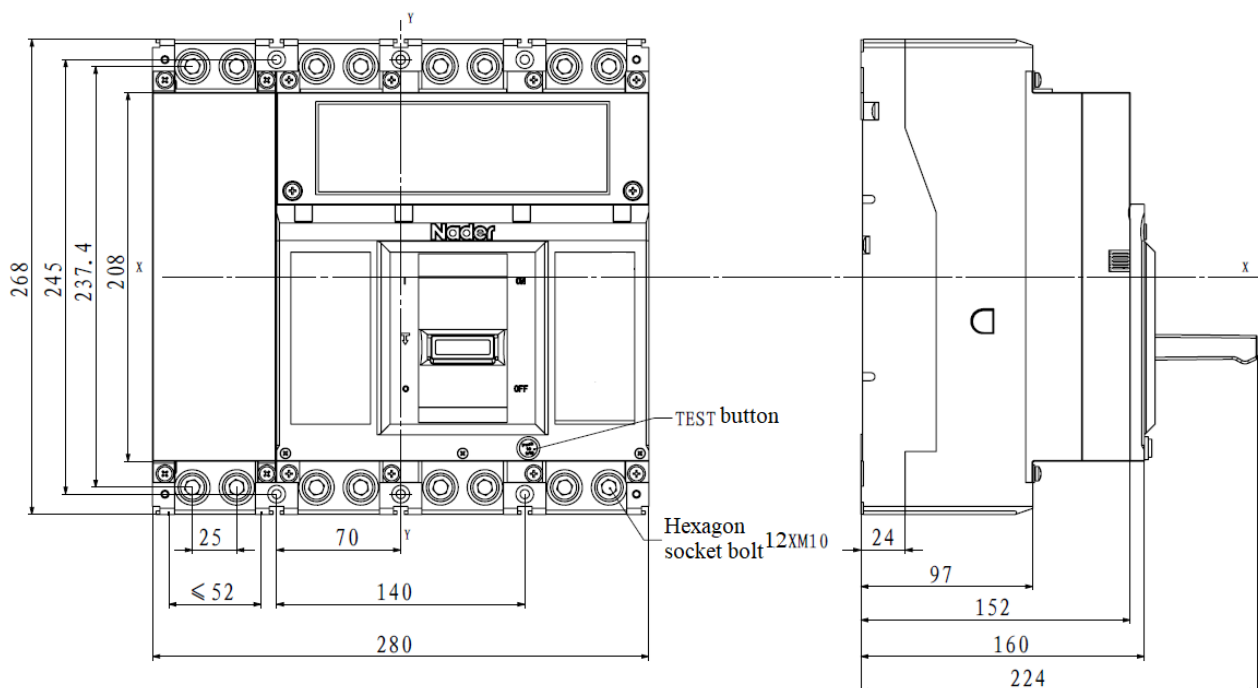
6 Product outline and installation dimensions

6.1 External dimensions of three-pole plate front connection products



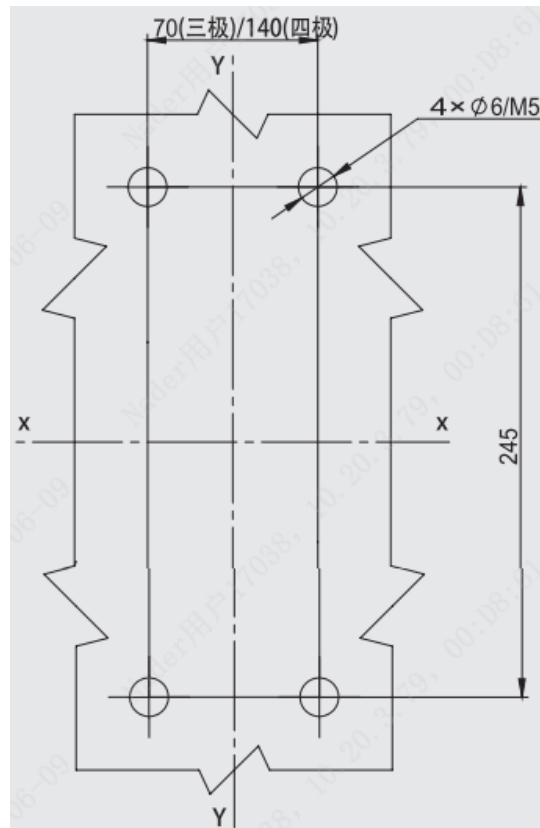
Note: The tolerance grade not being indicated shall be as per GB/T 1804-c

6.2 External dimensions of four-pole plate front connection products



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

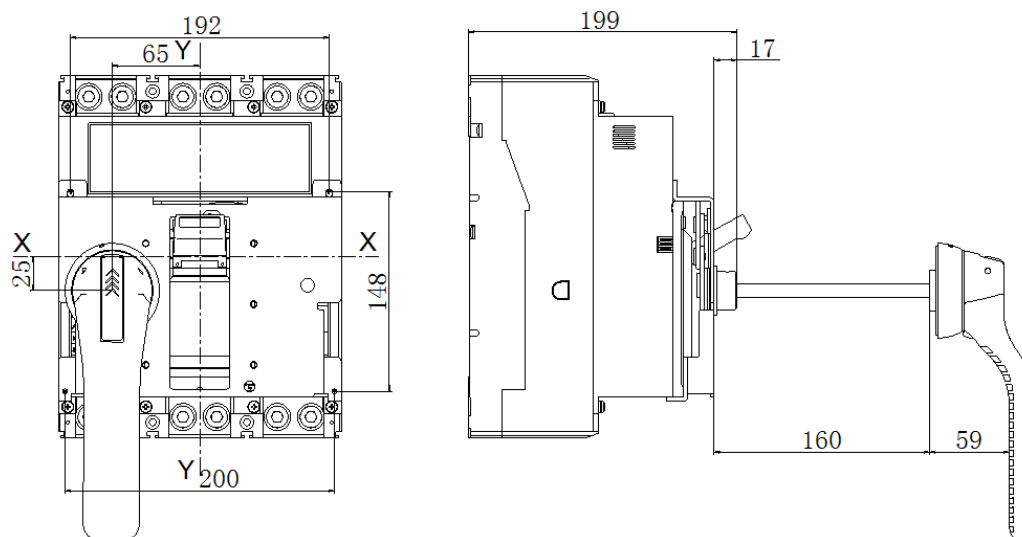
6.3 Product installation dimensions



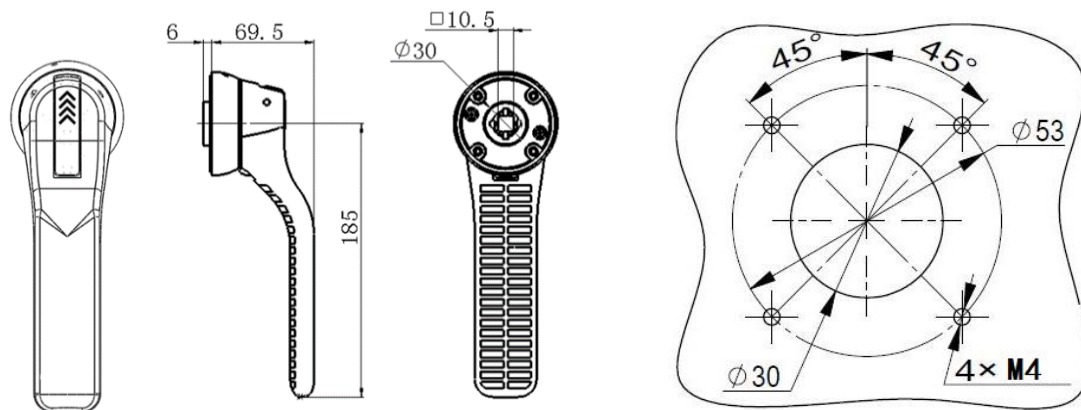
Note: The tolerance grade not being indicated shall be as per GB/T 1804-c

6.4 Operating mechanism of the rotation handle

Manual operation—the handle mounting hole diagram and external dimension diagram of manual operation are shown as below:



External Dimension Diagram of Manual Operation



Handle Mounting Hole Diagram

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

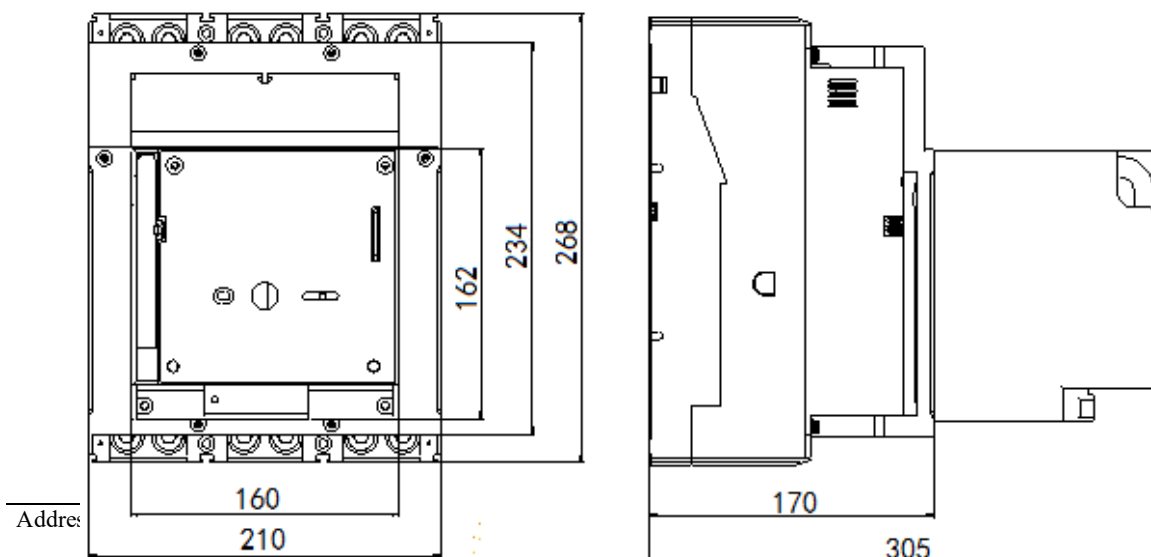
6.5 Electric operating mechanism

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.

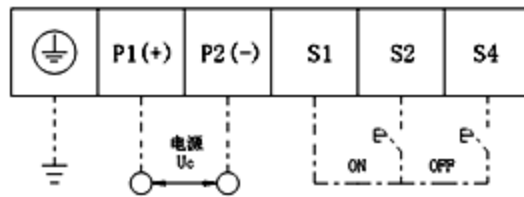
6.5.1 General electric operating-disconnecting switch and its electric operating mechanism after installation dimensions:



Address:

9

Fax:



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;

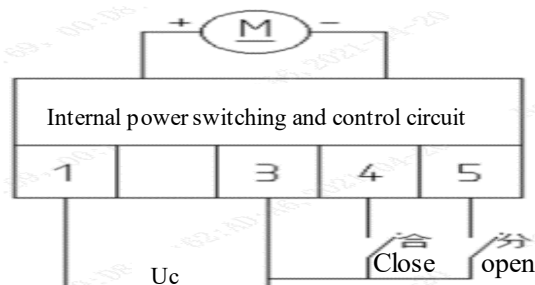
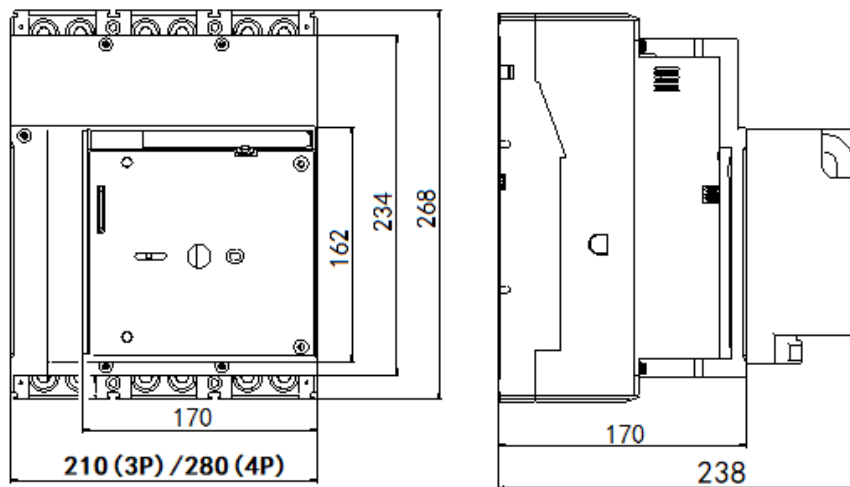
2) Do not connect P1 and P2 to S1, S2, and S4.

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

Table 8 Voltage specification and power of electric operation

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

6.5.2 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.

Table 9 Voltage specifications and power of the electric operation

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

6.6 Thickness of the wiring copper bar and screw length

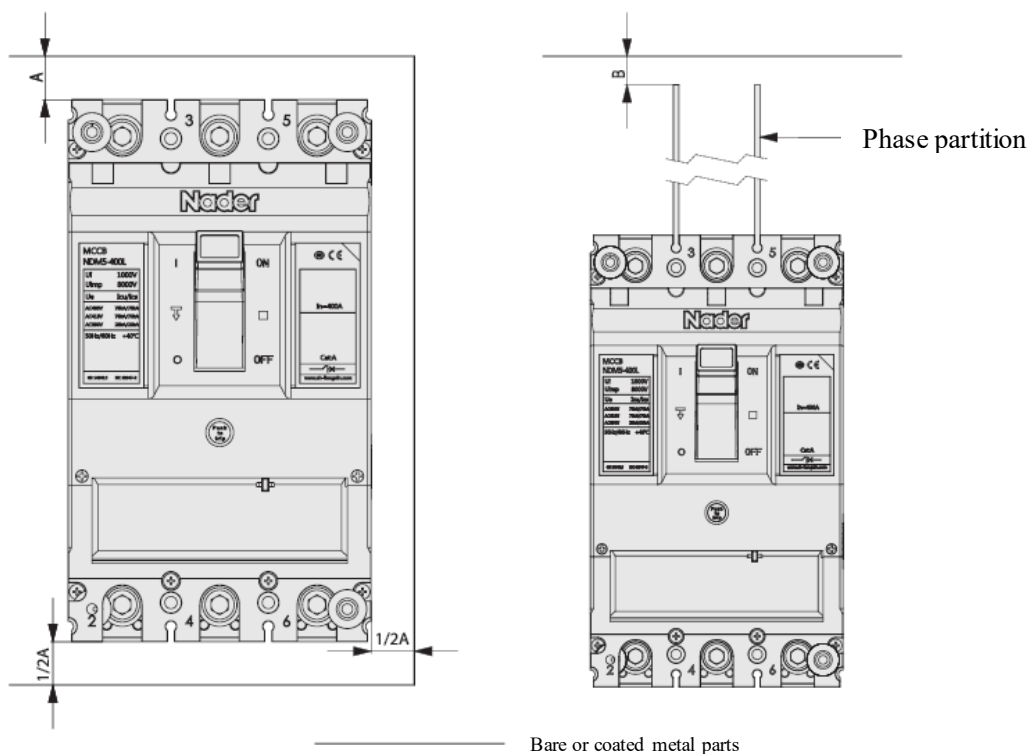
Table 10 Thickness of the wiring copper bar and screw length

No.	Thickness of the wiring copper bar (mm)	Hexagon screw length (mm)
1	6、8	M10 X 30
2	10、12	M10 X 35
3	15	M10 X 40
4	20	M10 X 40

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

6.7 Safety spacing

See the figure below for the minimum safety distance (see Table 10) of the disconnecting switch from the top, bottom, side and front panel during installation.



Front panel and product spacing

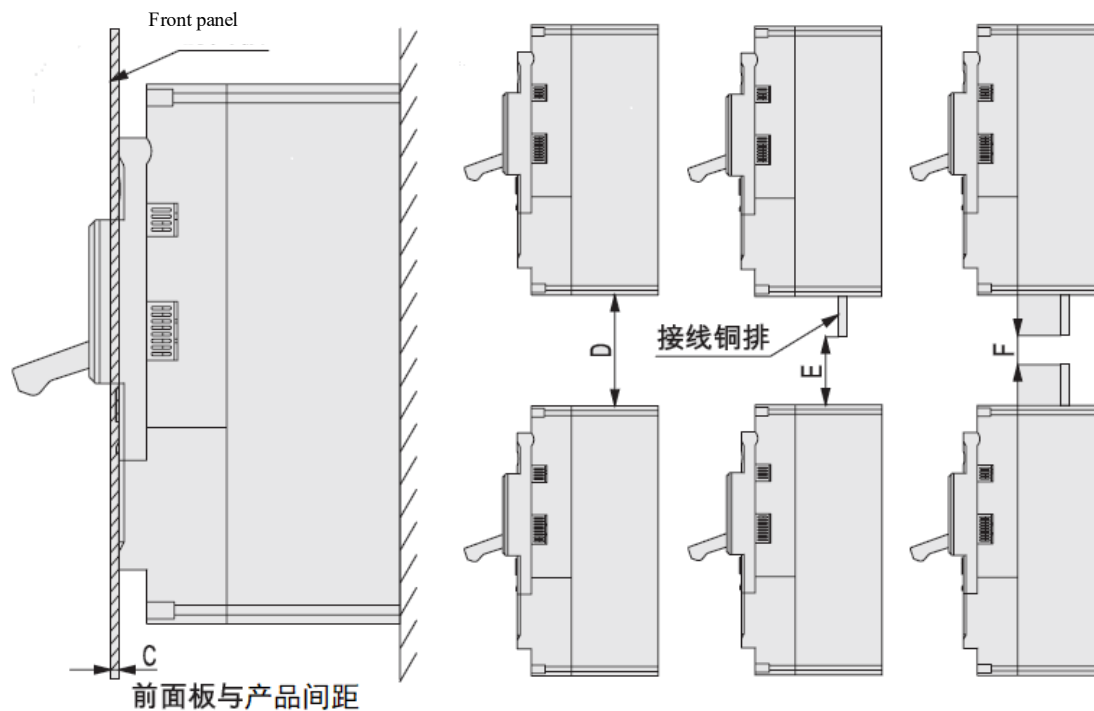


Table 11 Minimum safety distance in installation (unit: mm)

Model	Gap A	Gap B	Gap C	Gap D	Gap E	Gap F
NDM5G-1600	≥ 100	≥ 0	≥ 0	≥ 180	≥ 100	≥ 40

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

7. Accessories Function Description

7.1 Under-voltage release

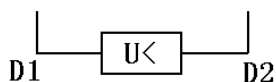
When the power voltage is reduced to 35%~70% of the rated working voltage of the undervoltage release, the undervoltage release can guarantee the reliable separation of the circuit breaker;

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

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

Table 12 Voltage specifications and power consumption of the undervoltage 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



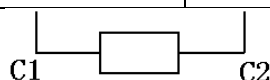
Wiring Diagram of the Under-voltage Release

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.

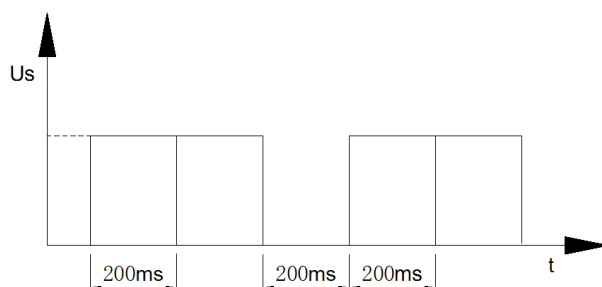
Table 13 Voltage specifications and power consumption of the shunt release

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 14 Rated parameters of the auxiliary contact

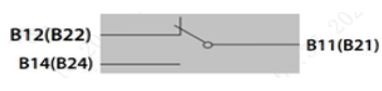

Accessory name		Auxiliary contact(Conventional)	Auxiliary contact(Low power consumption)
Voltage specifications/conventional thermal current (Ith)		AC250V/10A、AC400V/3A、DC220V/0.2A	DC30V/10mA
Wiring diagram	Opening		
	Closing		
Internal resistance		<30mΩ	<50mΩ

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 15 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.

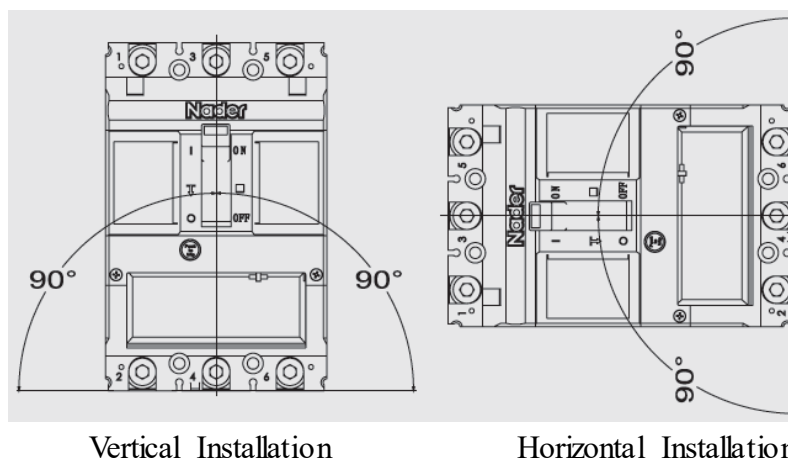
The first alarm harness is identified as B11 (red), B12 (white), B14 (yellow), and the second auxiliary harness is identified as B21 (red), B22 (white), B24(yellow), and so on. At most two groups of alarms are installed.

The standard wire length of the undervoltage release, shunt release, auxiliary contact and alarm 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.



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 16 Accessory Kit Checklist

No.	Name	Specification	3P Quantity/Set	4P Quantity/Set
1	Cross small pan-head screw	M5×100	4	4
2	Hexagon nut	M5	4	4
3	Spring washer	5	4	4
4	Plain washer	5	4	4
5	Phase partition	——	4	6
6	Ground partition	——	2	2

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, tripping unit or 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.