Shanghai Liangxin Electrical Co., Ltd.

NDM5Z-1600 Product Specification

（IPD-ENG-DEV-T20 0 2014-04-01）

Product name: Molded Case Circuit Breaker (MCCB)

Product model: NDM5Z-1600

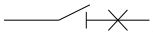
Date: 07.09.2019

Prepared by	YANG Wenxue	Date	2019-08-29
Reviewed by	ZHANG Ying	Date	2019-08-29
Approved by	WU Chunyan	Date	2019-08-29

Revision Record					
Version	Revision Reason/Content	Date	Prepared by	Reviewed by	Approved by
0	New addition	06.13.2019	YANG W.	ZHANG Y.	WU C.
1	Add Table 7-2	07.09.2019	YANG W.	ZHANG Y.	WU C.
2	Accessory	08.29.2019	YANG W.	ZHANG Y.	WU C.

1 Application range

NDM5Z-1600 molded case circuit breakers (referred to as circuit breakers), with rated insulation voltage of 1200V and rated working voltage DC500V (2P connect in series), DC600V(2P connect in series), DC750V(3P connect in series), DC750V (3P connect in series) and DC1000V (4P connect in series) and DC1200V (4P connect in series) can be applied in circuits of current (800A, 1000A, 1250A, 1500A*) to distribute power and to protect wirings and power suppliers from overload, short circuit and under-voltage protection (with under-voltage release).

The circuit breaker has an isolating function with the corresponding symbol of  .

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

2 Picture of product

3 Specifications and Model Description

ND M 5 Z – 1600 M □ / □ / □ □ □ □ □

- Accessories code：see table 1；
- Operation method：see note 1；
- Connection method ：See note 2;
- Installation method：See note3;
- Purpose code：TMDC see note 4;
- poles：see note 5;
- Rated current In(A):800,1000,1250,1500*
- Interruption level :M(mid-high)；
- Frame size Inm(A)：1600；
- MCCB for DC；
- Design SN；
- MCCB；
- Enterprise characteristic code

Note :1) operation method：handle ：null；rotary handle：“R”；electrical motor：“M”；

2) Connection method: front connection: null; extended front connection: ES; parallel rare connection：HZ1；vertical rare connection：CZ1；

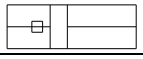
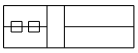
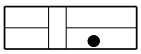
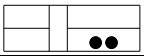
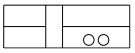
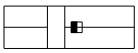
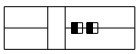
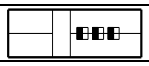
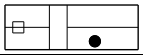
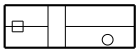
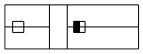
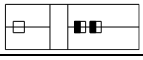
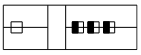
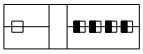
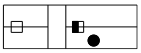
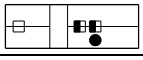
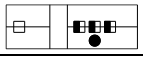
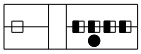
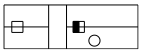
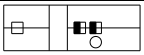
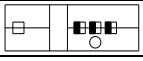
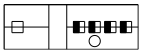
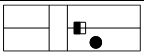
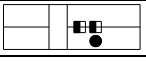
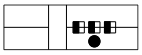
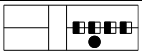
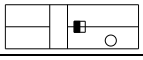
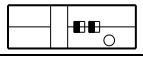
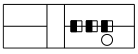
3) Installation method: fixed: null;

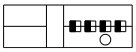
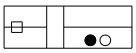
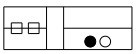
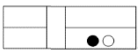
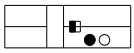
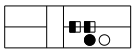
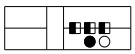
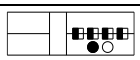
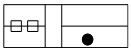
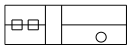
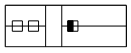
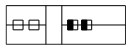
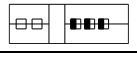
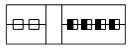
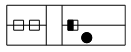
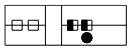
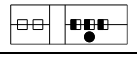
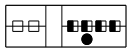
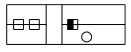
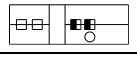
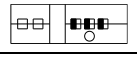
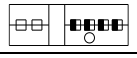
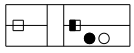
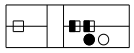
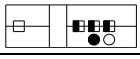
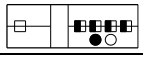
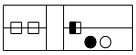
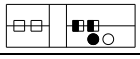
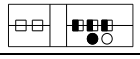
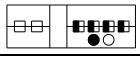
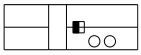
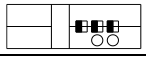
4) Purpose code: TMDC: Protection for direct current distribution

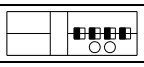
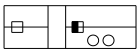
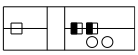
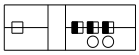
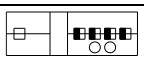
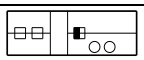
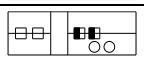
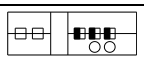
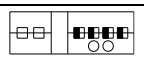
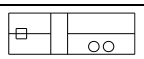
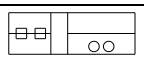
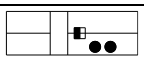
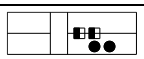
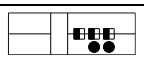
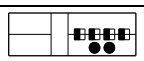
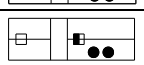
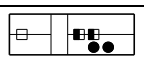
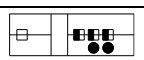
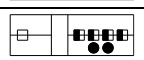
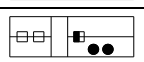
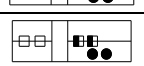
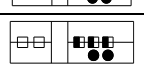
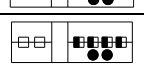
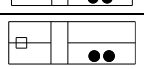
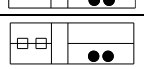
5) Poles:2:poles (3-pole appearance);3:3 poles;4:4 poles;

*：Maximum working current for 3P product is 1440A; same for 4P is 1250A

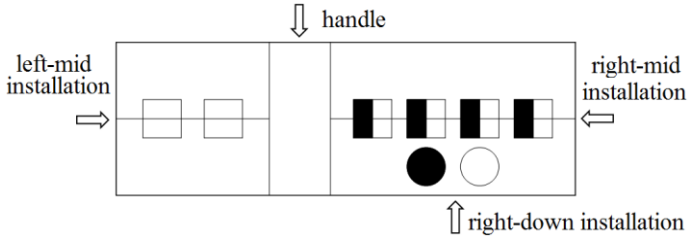
Table 1

Code	Accessory	Installation 2P、3P、4P
00	None	—
08	One set of alarm contacts	
98	Two sets of alarm contacts	
10	Shunt release	
K01	Two sets of shunt releases	
30	Under-voltage release	
A01	Two sets of under-voltage releases	
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 release, two sets of single auxiliary contacts, alarm contact	
81	Under-voltage release, three sets of single auxiliary contacts, alarm contact	
82	Under-voltage release, four sets of single auxiliary contacts, alarm contact	
41	Shunt release, single auxiliary contact	
11	Shunt release, two sets of single auxiliary contacts	
12	Shunt release, two 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 release, single auxiliary contact, two sets of single alarm contacts	
80	Under-voltage release, two sets of single auxiliary contacts, two sets of single alarm contacts	
83	Under-voltage release, three sets of single auxiliary contacts, two sets of single alarm contacts	
84	Under-voltage release, four sets of single auxiliary contacts, 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)

Table 2

Model	NDM5Z-1600M		
Poles	2	3	4
Rated working voltage Ue (V)	DC500V、DC600V	DC750V	DC1000V、DC1200V
Rated current In (A)	800、1000、1250、1500	800、1000、1250、1500*	800、1000、1250
Rated insulation voltage Ui (V)	1200		
Power frequency withstand voltage (V)	3500		
Rated impulse withstand voltage Uimp (kV)	12		
Icu（kA） (DC500V)	70	/	/
Ics（kA） (DC500V)	70	/	/
Icu（kA） (DC600V)	35	/	/
Ics（kA） (DC600V)	35	/	/
Icu（kA） (DC750V)	/	70	/
Ics（kA） (DC750V)	/	70	/
Icu（kA） (DC1000V)	/	/	70
Ics（kA） (DC1000V)	/	/	70
Icu（kA） (DC1200V)	/	/	35
Ics（kA） (DC1200V)	/	/	35
Utilization category	A		
Endurance without current (cycles)	10000		6000
DC500V Endurance with current (cycles)	1000	/	/
DC600V Endurance with current (cycles)	1000	/	/
DC750V Endurance with current (cycles)	/	1000	/
DC1000V Endurance with current (cycles)	/	/	1000
DC1200V Endurance with current (cycles)	/	/	500
Release type	Heat-magnet		
External dimension (L×W×H)	268×210×152		268×280×152
Installation dimension	245×70		245×140
Weight（kg）	12	15	18

5. Normal Working Environment

a) Altitude: ≤2000m;

b) Ambient temperature: -35℃~+70℃;

c) Pollution level: 3;

d) Storage environment: -40℃~+75℃;

e) Installation category: main circuit and under-voltage release: installation category Ⅲ; auxiliary circuit and control circuit: installation category Ⅱ;

f) The product can withstand the effects of wet air, salt mist and oil mist;

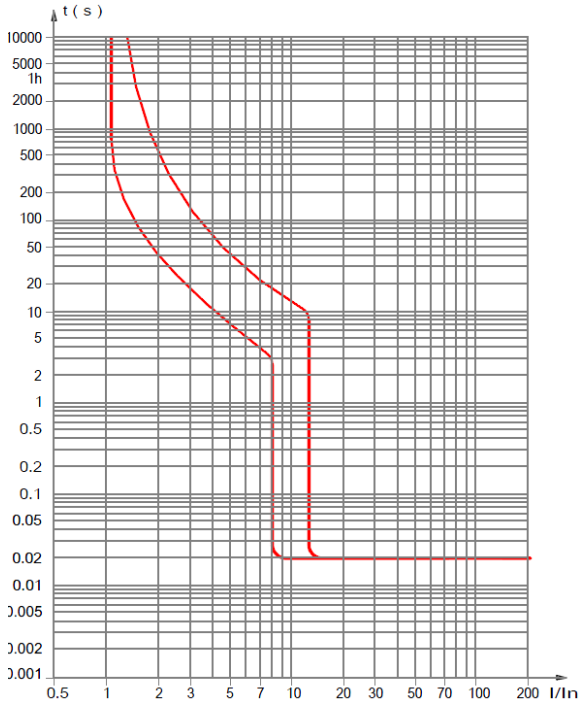
g) The vertical gradient is no more than 5°;

h) The product can be disposed in places that are free from explosive media, media corrosive to metal, insulation damaging gas, and conductive dust;

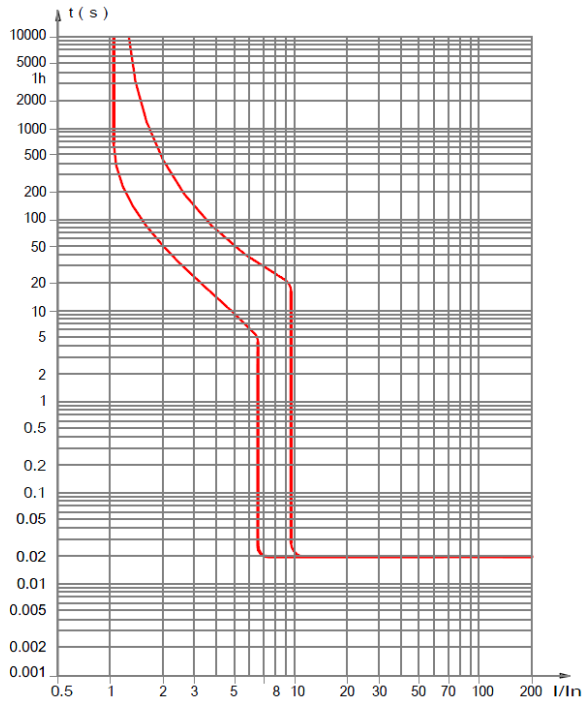
I) The product should be installed free from snow and rain.

6. Tripping Characteristics

6.1 Tripping characteristic curve of NDM5Z-1600 under normal environment (ambient air temperature: 40℃), see the picture below:



800A,1000A



1250A,1500A

6.2 The tripping characteristics should be adjusted due to changes when the ambient air temperature varies (see Table 3 for the correction factor)

Table 3

Ambient air temperature	40	45	50	55	60	65	70
Correction factor	1	0.97	0.94	0.85	0.83	0.81	0.75

note： 1 The data above is derived from the test results and theories. The data are only for guidance and recommendations.

6.3 The tripping characteristics should be adjusted according to air insulation characteristics and cooling capacity at +40℃ ambient temperature and the altitude above 2,000m (See Table 4)

Table 4

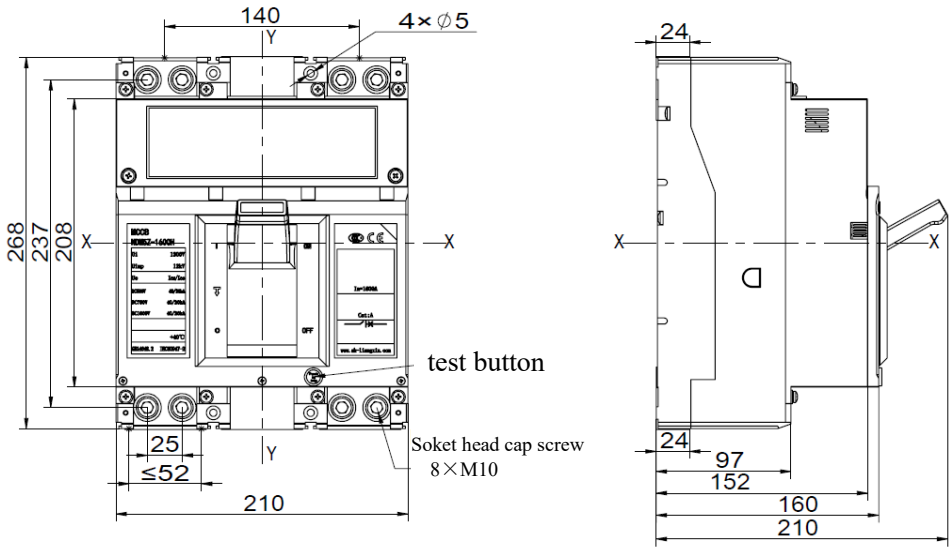
Altitude （m）	2000	3000	4000	5000
Power frequency withstand voltage（V）	3500	3150	2700	2200
Average insulation class（V）	1200	1080	930	800
Maximum working voltage（V）	1200	1080	930	800
Correction factor of the working current（+40℃）	1	0.98	0.95	0.92

7 Installation Method

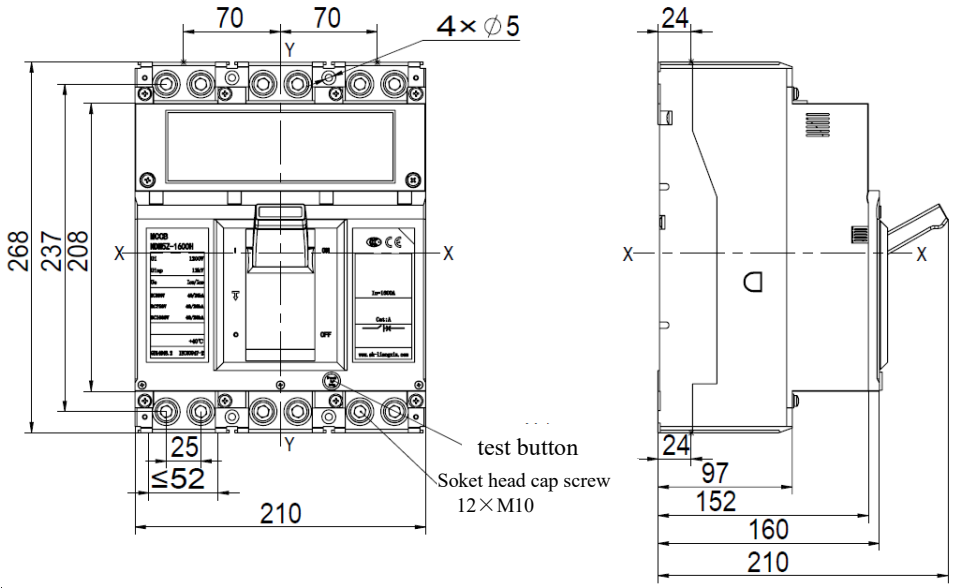
Circuit breakers can be installed either vertically or horizontally.

8 Products Configuration and Installation Dimension

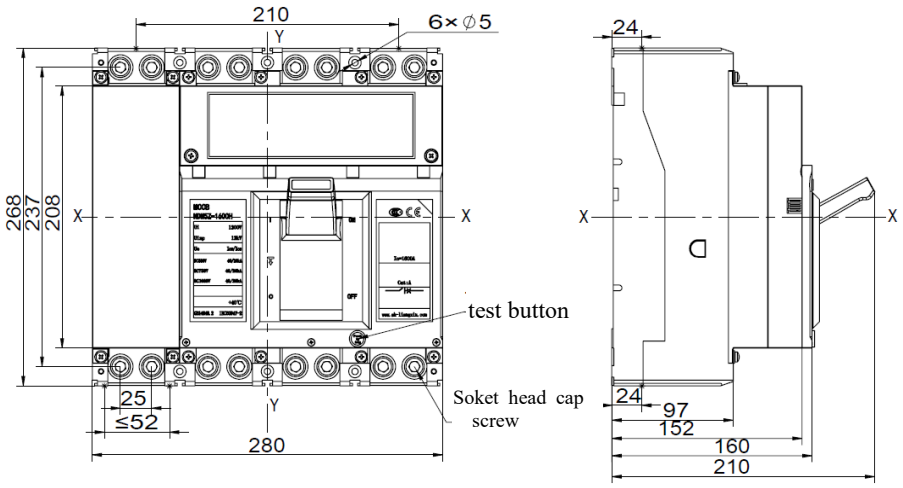
8.1 Boundary dimension of 3 poles front connection product



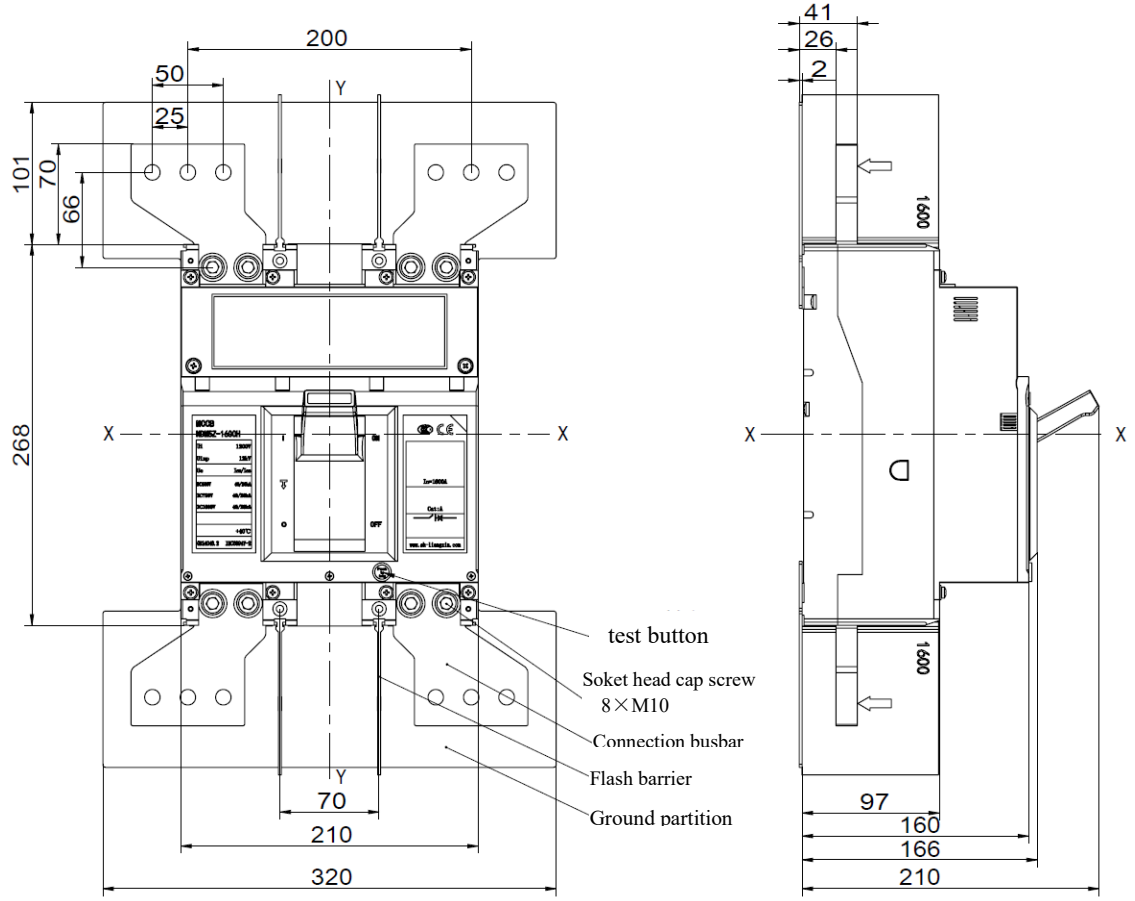
8.2 Boundary dimension of 3 poles front connection product



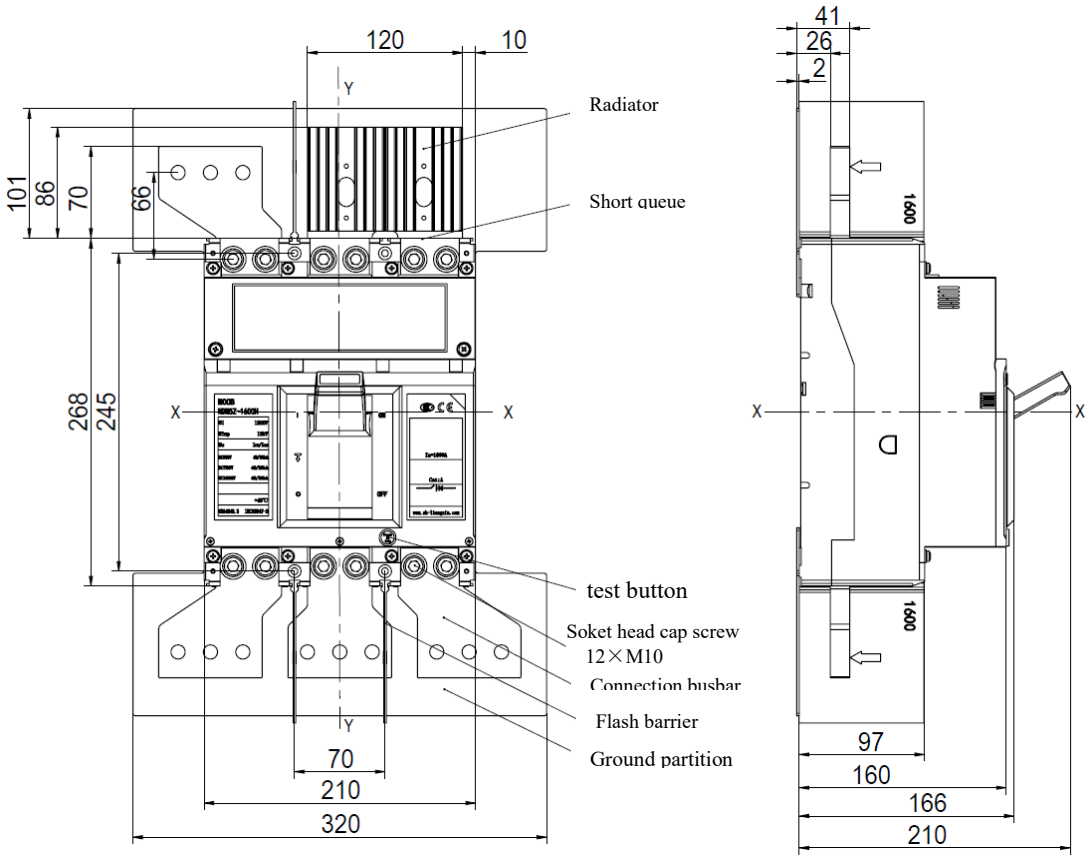
8.3 Boundary dimension of 4 poles front connection product



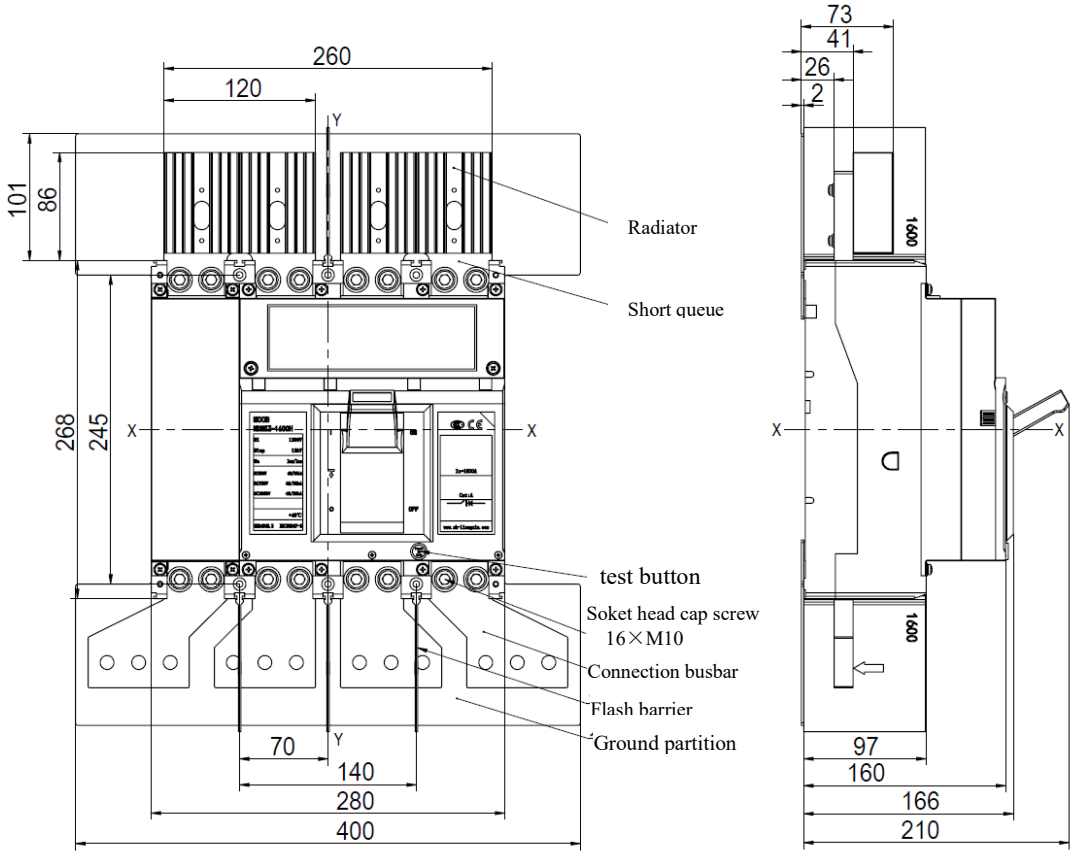
8.4 Boundary dimension of 2 poles front connection product with extended busbars



8.5 Boundary dimension of 3 poles front connection product with extended busbars



8.6 Boundary dimension of 4 poles front connection product with extended busbars



8.7 Installation dimension for 3 poles and 4 poles products

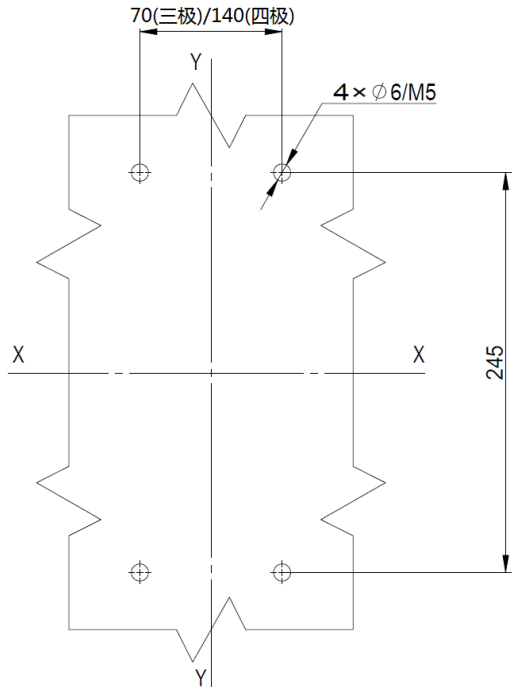


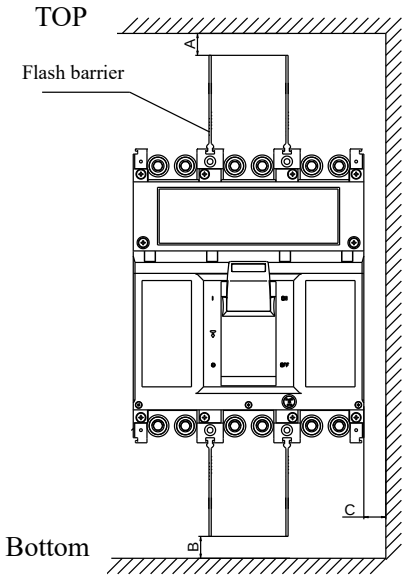
Table 13 connection screw size

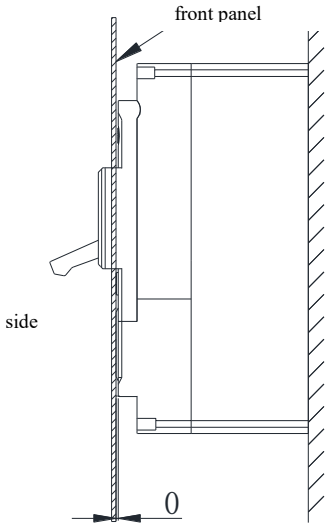
Code	Busbar thickness (mm)	Hexagon socket screw length(mm)
1	6、8	M10X30
2	10、12	M10X35
3	15	M10X40
Note: the length of hexagon socket screw need to be noticed when the orders are placed.		

Note: The crosspoint between X-X and Y-Y is the center of the 3-P and 4-P circuit breaker, as shown in the figure

8.8 Safety Clearance

When installed, the least safety clearance for top, bottom, flank side should accord to table 14 See picture below





Clearance between front panel and MCCB

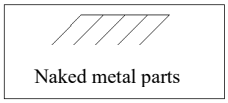


Table 6

NDM5Z-1600	With Inter-phase barrier			With arcing-proof barrier		
	A	B	C	A	B	C
	0	0	35	25	25	35

Note; unit of front panel connection (standard with inter-phase barrier) is millimeter

9 Packaging and Storage

Minimum packaging quantity: 1 piece/box. The packaged products should be stored in a warehouse with the

ambient temperature of -40℃~+75℃ and the corresponding relative humidity below 80% without acidic, alkali or other corrosive gas in the surrounding air. Under the conditions above, the storage period shall be no more than 18 months since the manufacturing date.

10 Connection Method

10.1 Busbar dimension

10.1.1 Boundary dimension front connection product (see table 7-1)

Table 7-1

Rated current (A)	800	1000	1250	1500
Busbar dimension： width×thickness （mm）	50×5	50×6	50×8	50×10
Number of busbar	2	2	2	2

10.1.2 Boundary dimension front connection product with extended busbars(see table 7-2)

Table 7-2

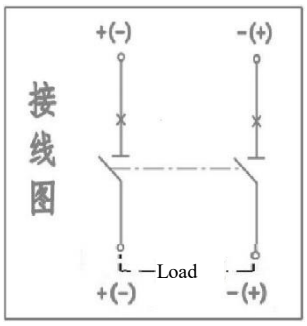
Rated current (A)	800	1000	1250	1500
Busbar dimension： width×thickness （mm）	80×6	80×8	80×5	80×6
Number of busbar	1	1	2	2

10.2 Torque standard for connection screws and installation screw (see table 8)

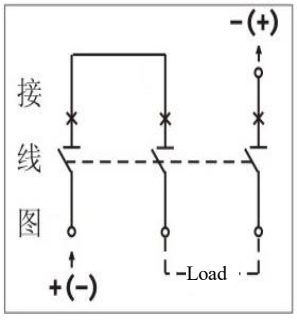
Table 8

Connection screw M10 tightening torque （N•m）	20
Installation screw M10 tightening torque （N•m）	4

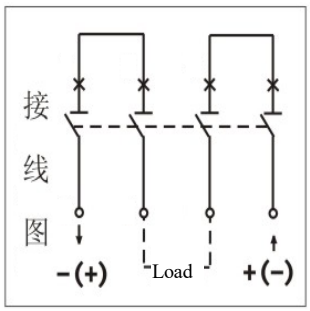
11 Wring diagram (see picture below)



DC500V(2P) or DC600V(2P)



DC750V(3P)



DC1000V(4P) or DC1200V(4P)

12 Accessory

12.1 under-voltage release

When voltage of power supply decreases to 35% to 70% of the rated of working under-voltage release, the under-voltage release can trip the MCCB reliably. When voltage of power supply decreases below its 35%, the under-voltage release can prevent the MCCB from closing operation. When voltage of power supply keeps above its 85%, the under-voltage release can guarantee the MCCB close reliably.

Voltage specification and power dissipation of under-voltage release (see table 9)

Table 9

Accessory	under-voltage release		
Voltage specification（V）	AC/DC 110V	AC/DC 230V	AC/DC 400V
Maintaining dissipation (W)	7	8	10
Instantaneous dissipation (W)	230	500	270

12.2 shunt trip release

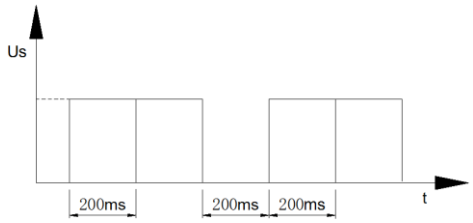
When the voltage applied to the shunt trip release is between 70%~110% of the rated voltage, the circuit breaker can be tripped reliably.

The specification and power dissipation see table 10

table10

Accessory	Shunt release		
Voltage specification（V）	AC/DC 24V	AC/DC 110V	AC/DC 230V
Maintaining dissipation (W)	3.5	3.5	3.5
Instantaneous dissipation (W)	240	230	300

Principal of shunt release: single pulse reaction (energized time recommended to be longer than 200ms). If a second action is needed, shunt release should energize after deenerging and re-latching (interval time recommended to be longer than 200ms). The time between shunt release energized (receiving signal) to product tripped is 100ms



12.3 The nominal parameter of auxiliary contact (see table 11)

Table 11

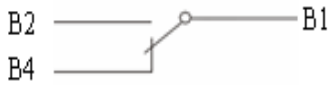
Accessory		auxiliary contact
Voltage specification (V)/conventional heating current (Ith)		AC250V/10A、AC400V/3A、DC220V/0.2A、 AC24V/10mA
Wiring diagram	Open	
	Close	
Internal resistance		＜30mΩ

Note; if AC24V/10mA auxiliary contact is needed, it should be noticed in the order.

12.4 the nominal parameter of alarm contact (see table 12)

Table 12

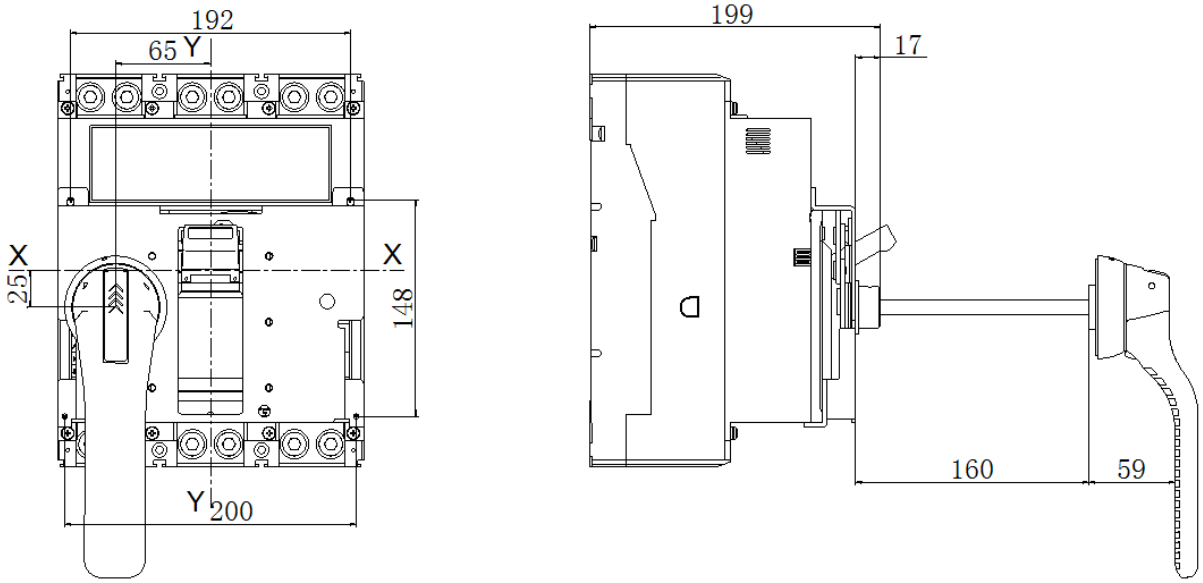
Accessory	Alarm contact
Voltage specification (V)/conventional heating current (Ith)	AC250V/10A、AC400V/3A、DC220V/0.2A

Wiring diagram	Open/close	
	Free trip	
Internal resistance		＜30mΩ

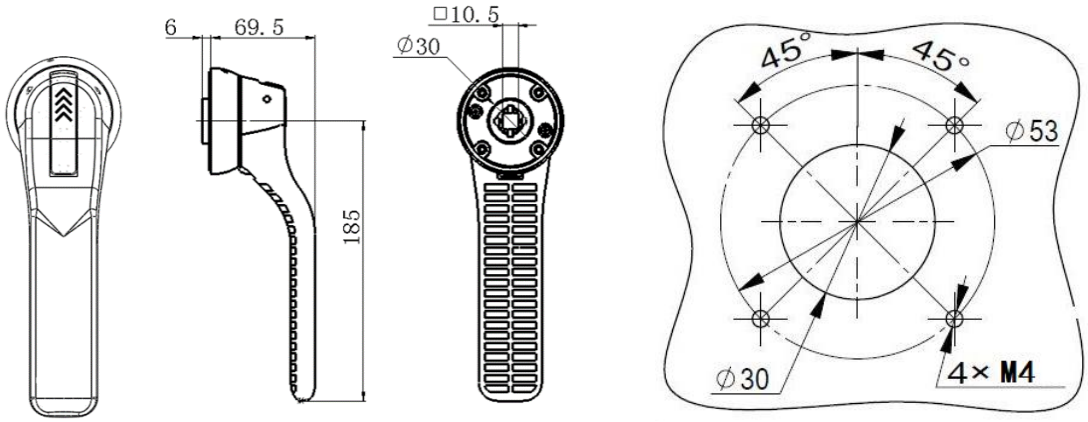
Note: the standard wiring length of under-voltage, shunt release and auxiliary contact is 0.7m. if any increasing or decreasing is need, please specify.

12.5 Rotary handle operation mechanism：

Trepanning schematics of manual operation-handle installation and external dimensions of manual operation mechanism are shown as below.



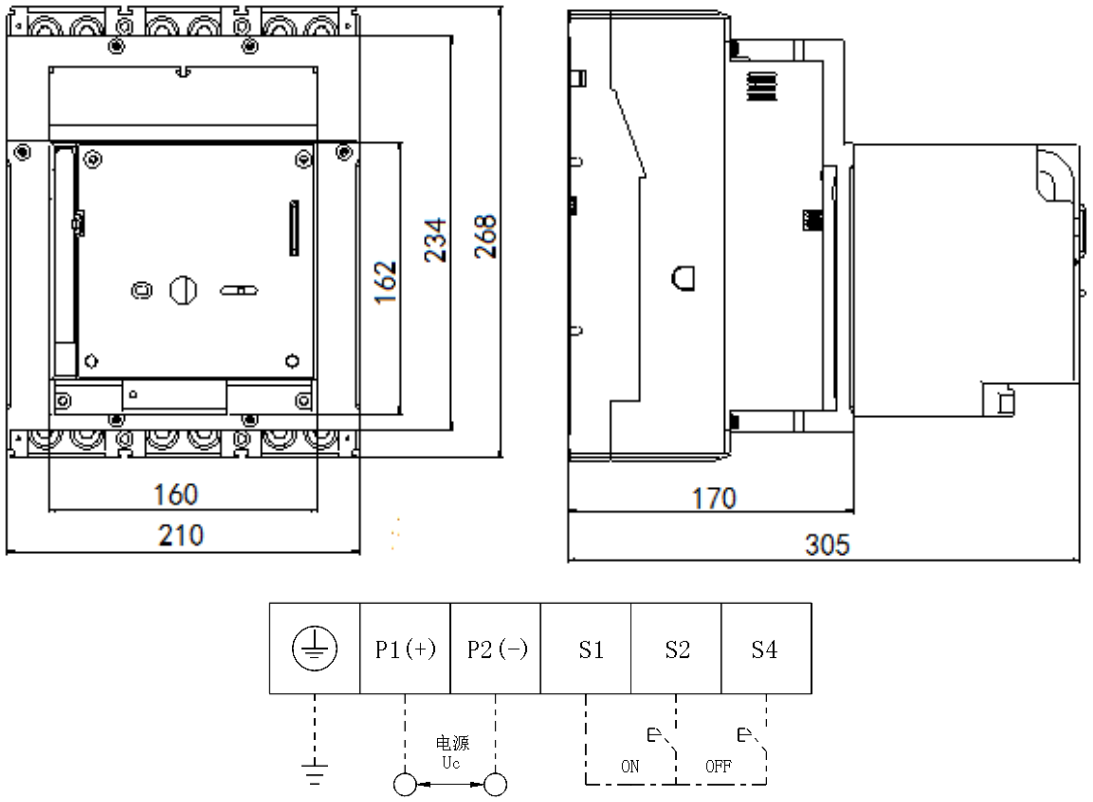
External dimensions of manual operation mechanism



Trepanning schematics of manual operation-handle

12.6 motor operation mechanism

The external dimensions of motor-circuit breaker and its motor operation mechanism after installation is shown as below, parameter see table 12.



Note; manual operation should turn 180° clockwise, MUST NOT OPERATE CUNTERCLOCKWISE. MUST NOT CONNECT P1,P2 WITH S2, S4.

Table 12

Accessory	Motor operation mechanism			
Power specification	DC24V	AC110V/DC110V	AC230V/DC220V	AC400V
Power dissipation	80W	400W	400W	400W

13 Environmental Compliance

Comply with the requirements of ROSH order.

14 List of Accessories and Installation

This product is packaged in cartons with a single unit per carton and covered with EPE for protection, which contains a circuit breaker, accessories, phase partition, product manual, warranty card, etc. see table 13.

Table 13

Series Number	Name	Specification	Quantity
1	Cross small pan-head screw	M5×110	4
2	Plain washer	5	4
3	Spring washer	5	4
4	Hexagon nut	M5	4
5	Short queue	——	0（2P）、1（3P）、2（4P）
6	Phase partition	——	4(2/3P)、6(4P)
7	Ground partition	——	2

15 Precautions

a) The performance parameters of this specification are suitable for only normal conditions. For special requirements, formal confirmation is needed before placing the equipment into use re-adjusting parameters;

b) The circuit breaker, tripping unit or other accessories can only be installed and maintained by the trained or qualified professionals;

c) MUST ensure that the power supply is off before installing or removing any device.