Shanghai Liangxin Electrical Co., Ltd

Product Specification

（IPD-ENG-DEV-T20 A0 2014-04-01）

Product name: Molded Case Circuit Breaker (MCCB)

Product model: NDM5Z-400/630

Date: 2017-6-21

Issue	Juncheng Xu	Date	2017-6-21
Check	Wenxue Yang	Date	2017-6-21
Approve	Yinfang Huang	Date	2017-6-21

Nader 良信电器	Document name	Product Specification	Document No.	NDT2930223
	Product model and name	NDM5Z-400/630 Molded Case Circuit Breaker	Version	1
			Implementation date	2017-6-21

Revision History

Version	Revision Description	Revision Date	Revised By
0	Newly added	2016-10-10	Juncheng XU
1	Add “DC1500V” content and tightening torque	2017-6-21	Juncheng XU

Issue/Date	Juncheng Xu/20170621	Check/Date	Wenxue Yang/20170621	Approve/Date	Yinfang Hhuang/20170621

Doc. Code	NDT2930223	Version	1	Issue Date	20170621

1 Applicable scope and purpose

The NDM5Z-400/630 series of molded case circuit breakers (referred to as circuit breakers) have a rated insulation voltage of 1200V and apply to circuits with the rated working voltage of DC750V (3P in series), DC1000V (4P in series) and DC1200V (4P in series) and DC1500V (NDM5Z-400 4P in series) as well as the rated working current 250A, 320A, 400A(NDM5Z-400) and 400A,500A,630A(NDM5Z-630). The circuit breakers are used for distributing power while protect the overload, short circuit and under-voltage (with a under-voltage release) of lines and power units.

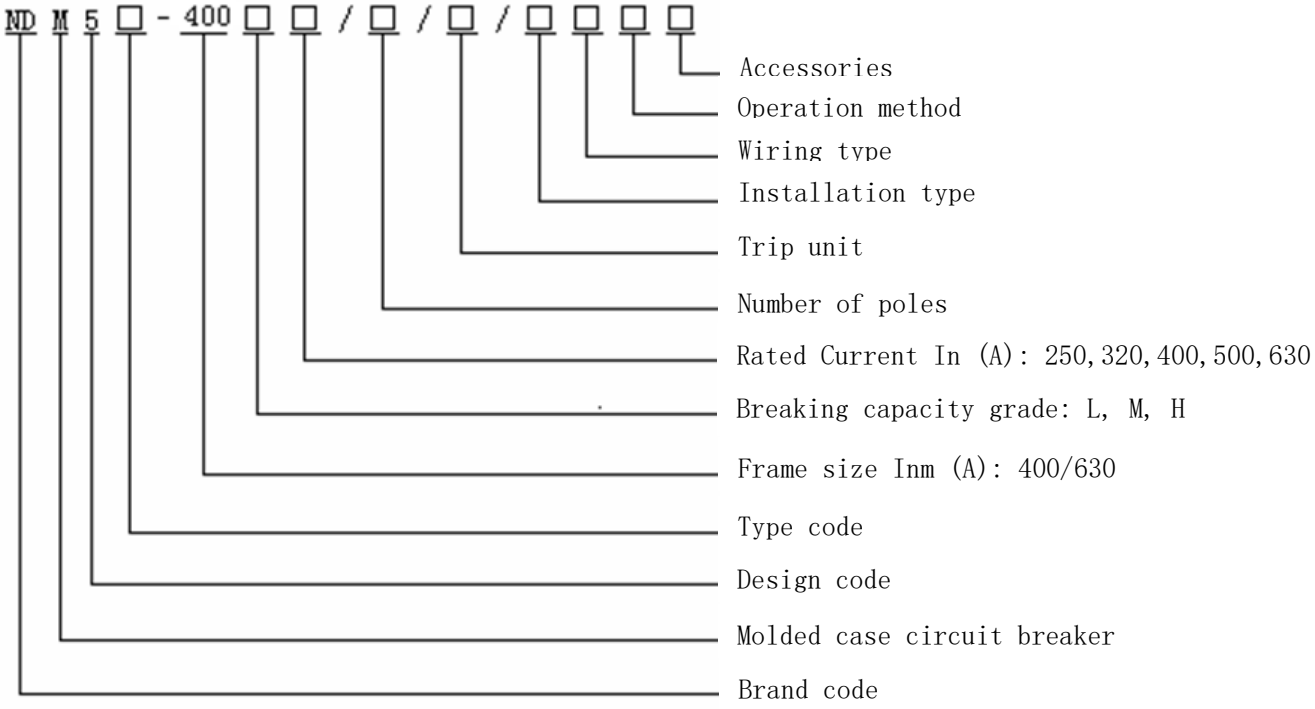
The circuit breaker has an isolating function with the corresponding symbol of  ;

Comply with standards: IEC60947-2, GB14048.2.

2 Picture of the product（Fig1）

Fig 1

3 Specification and model description



a) Number of poles:

3: 3 poles;

4: 4 poles;

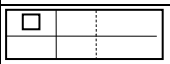
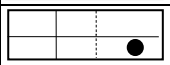
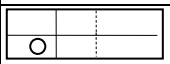
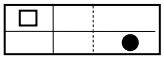
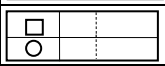
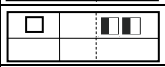
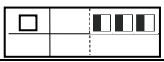
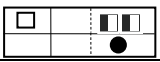
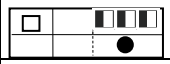
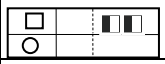
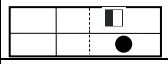
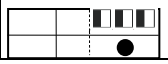
b) Release code: TMDC (DC thermo-magnetic distribution release)
[thermo-adjustable (0.8-0.9-1.0) In, magnet-adjustable (5-6-7-8-9-10) In];

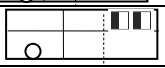
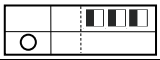
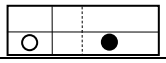
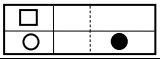
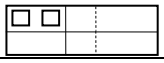
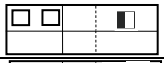
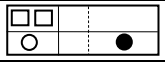
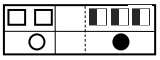
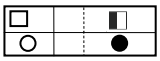
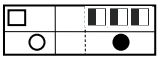
c) Installation mode: fixed type: no code; plug-in type: "P"; drawout: "W".

d) Wiring mode: front connection: no code; front extended connection: "ES"; rear screw connection: "R".

e) Operation mode: direct handle-operated: no code; rotation handle operated: "R"; motor-operated: "M"

Table 1

Accessory code	Accessory name	Installation position
		3P/4P
00	None	———
08	Alarm contact	
10	Shunt release	
30	Under-voltage release	
21	Single auxiliary contact	
61	Two sets of single auxiliary contacts	
23	Three 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	
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	
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	
41	Shunt release, single auxiliary contact	
11	Shunt release, two sets of single auxiliary contacts	
12	Shunt release, three 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	
50	Shunt release, Under-voltage release	
31	Alarm contact, Shunt release, Under-voltage release	
51	Shunt release, Under-voltage release, Single auxiliary contact	
52	Shunt release, Under-voltage release, two sets of single auxiliary contacts	
53	Shunt release, Under-voltage release, three sets of single auxiliary contacts	
98	Two sets of single alarm contact	
63	Two sets of single alarm contact, single auxiliary contact	
64	Two sets of single alarm contact, two sets of single auxiliary contacts	
65	Two sets of single alarm contact, three sets of single auxiliary contacts	
37	Two sets of single alarm contact, Shunt release, Under-voltage release	
39	Two sets of single alarm contact, Shunt release, Under-voltage release, single auxiliary contact	
55	Two sets of single alarm contact, Shunt release, Under-voltage release , two sets of single auxiliary contacts	
56	Two sets of single alarm contact, Shunt release, Under-voltage release , three sets of single auxiliary contacts	
32	Alarm contact, Shunt release, Under-voltage release, single auxiliary contact	
33	Alarm contact, Shunt release, Under-voltage release, two sets of single auxiliary contacts	
34	Alarm contact, Shunt release, Under-voltage release, three three sets of single auxiliary contacts	

4 **Main technical parameters** (table 2)

Table 2

Frame current Inm(A)	400	630
Rated current In (A)	250、320、400	400、500、630 (550)
Rated voltage Ue (V)	DC750、DC1000、DC1200、DC1500 (M5Z-400 ONLY)	
Rated impulse withstand voltage Uimp	8kV	
Rated insulation voltage Ui	1500V	1200V

Power frequency withstand voltage (1min)		4000V		
Rated ultimate breaking capacity Icu (kA)	Code	L	M	H
	DC750V (3P in series)	50	85	100
	DC1000V (4P in series)	50	85	100
	DC1200V (4P in series)	/	/	50
	DC1500V (M5Z-400 4P in series)	/	/	20
Rated running breaking capacity Ics(kA)		Ics=100%Icu		

Life	Mechanical life	20000 times		
	Electrical life	DC750V(3P in series)	3000 times	3000 times
		DC1000V (4P in series)	3000 times	3000 times
		DC1200V (4P in series)	2000 times	2000 times
		DC1500V (M5Z-400 4P in series)	1500 times	/

5 Normal working environment

a) Elevation：≤2000m；

b) Ambient air temperature: -35℃~+70℃; the average value within 24 hours doesn't exceed +35℃；

c) Class of pollution: 3；

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

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

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

6 Tripping characteristics

6.1 Tripping characteristics curve under normal environment (ambient air temperature: 40℃), Fig2：

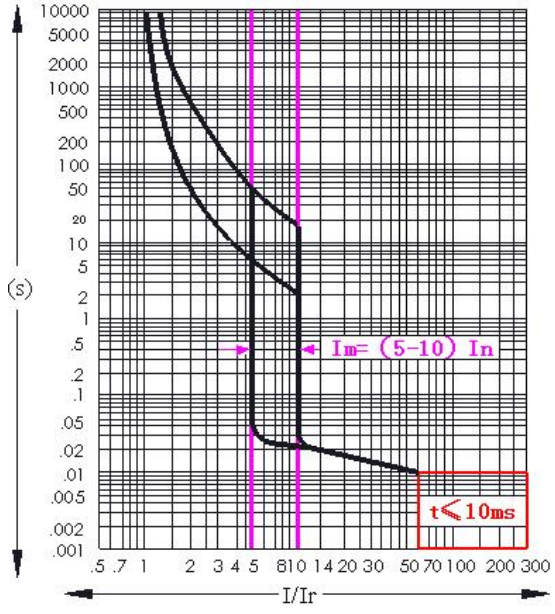


Fig 2

6.2 the tripping characteristics should be corrected due to small changes when the ambient air temperature varies (table 3)

Table 3

Ambient air	Correction factor	
	NDM5Z-400	NDM5Z-630
-35°C	1.50	1.34
-30°C	1.45	1.30
-25°C	1.40	1.26
-20°C	1.36	1.23
-15°C	1.32	1.20
-10°C	1.28	1.17
-5°C	1.24	1.14
0°C	1.20	1.12
5°C	1.17	1.10
10°C	1.14	1.08
15°C	1.11	1.06
20°C	1.08	1.04
25°C	1.06	1.03
30°C	1.04	1.02
35°C	1.02	1.01
40°C	1.0	1.0
45°C	0.97	0.96
50°C	0.94	0.92
55°C	0.91	0.88
60°C	0.87	0.84
65°C	0.83	0.80
70°C	0.78	0.75

6.3 The tripping characteristics should be corrected due to small changes by considering the air insulation characteristics and cooling capacity with the ambient temperature of +40℃ and the altitude above 2,000m (by table4)

table 4

Altitude (m)	2000	3000	4000	5000
Power frequency withstand voltage(v)	4000	3000	2500	2000
Average insulation class (v)	1Ui	0.9Ui	0.8Ui	0.7Ui
Maximum working voltage (v)	1Ue	0.85Ue	0.75Ue	0.65Ue
Average working current (+40°C)	1In	0.94In	0.88In	0.81In

7 Outline and installation dimensions

7. 1 External dimensions of products

7. 1. 1 External dimensions of front-plate connection products（fig 3）

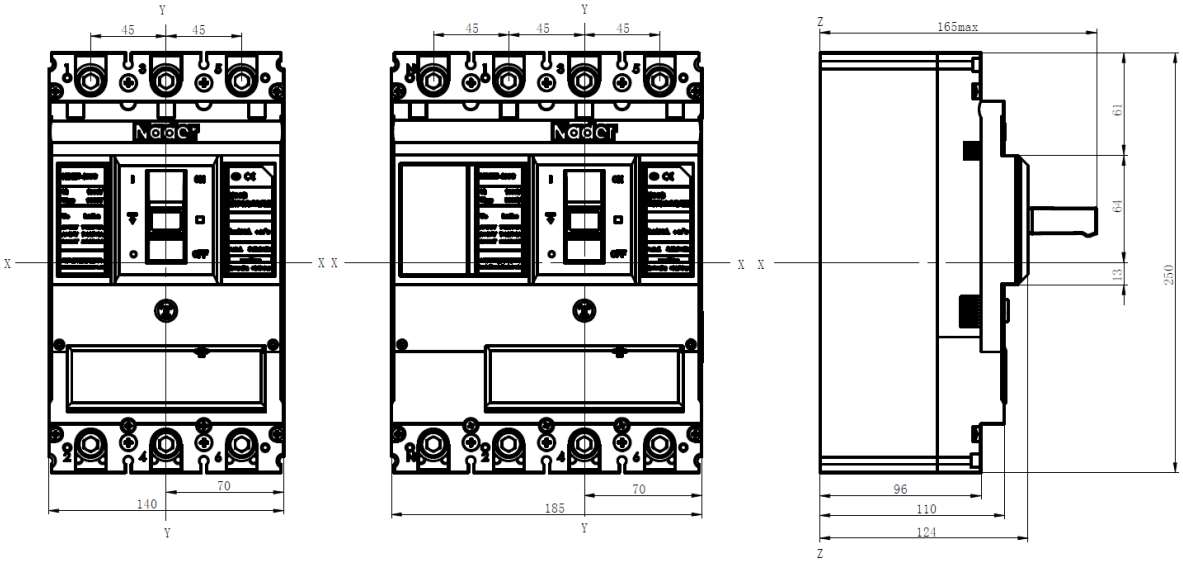
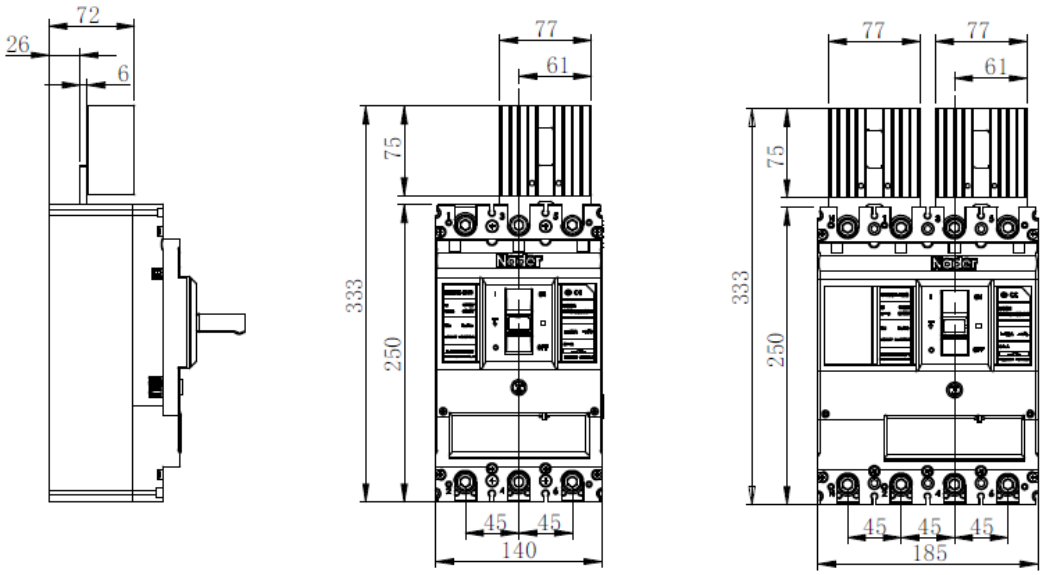
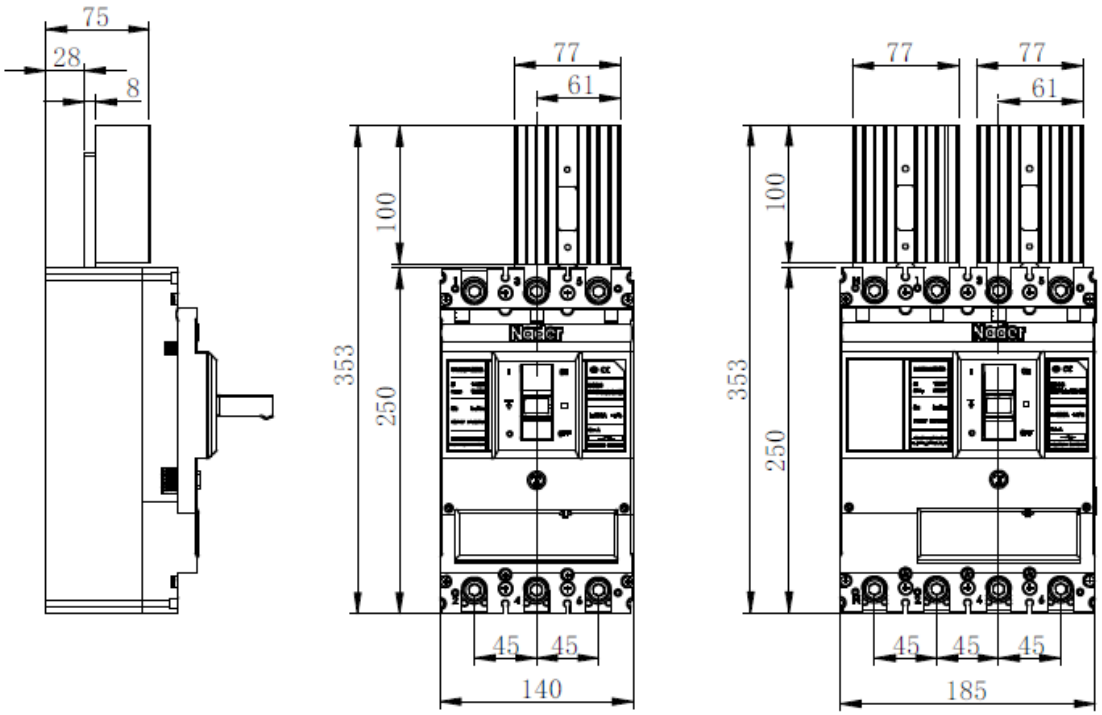


Fig 3

7. 1. 2 External dimensions of DC products installed with a "Short bus bar with a radiator"（fig 4）



NDM5Z-400

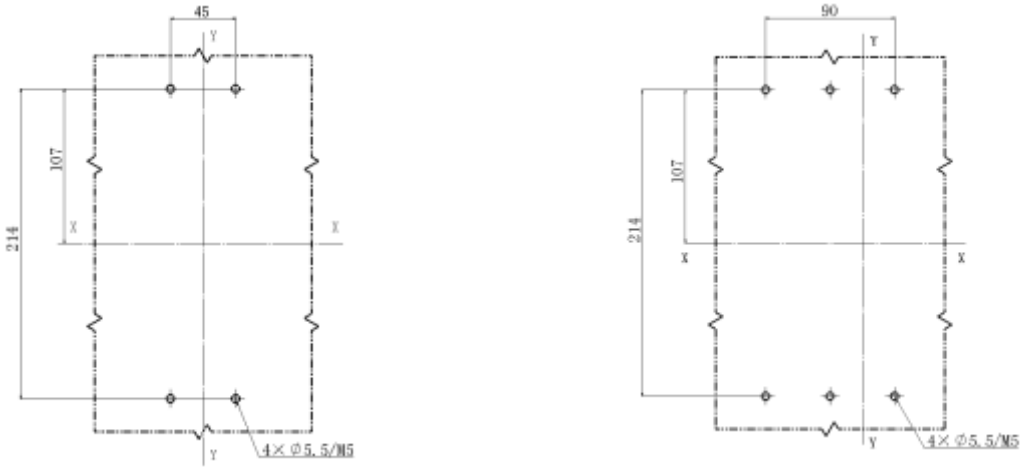


NDM5Z-630

Fig 4

7.2 Product installation dimensions

Installed on the baseplate（fig5）



3P Mounting Hole

4P Mounting Hole

Fig 5

8 Installation mode

The product allowable installation mode is shown as the figure below.（fig6）

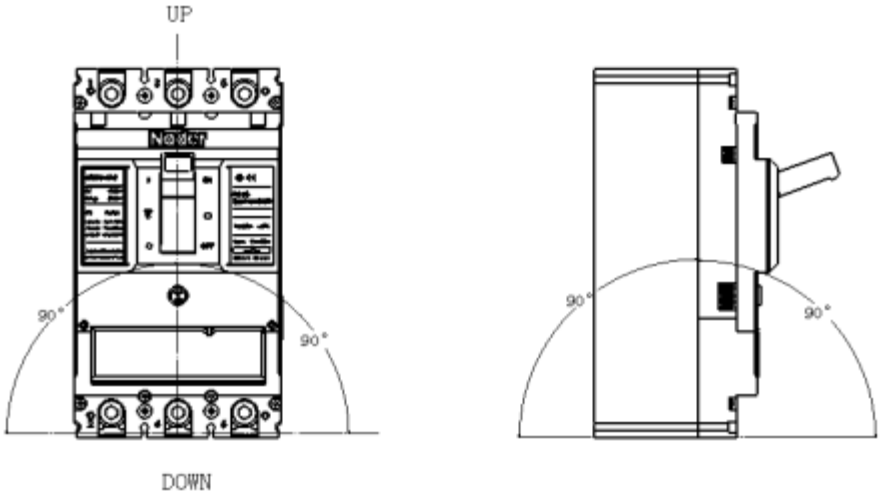


Fig 6

9 **Reference section of the connecting wire**（table 5）

Table 5

Current Rating（A）	250	320	400	500	630
Wire cross-section area（mm^2）	120	185	240	2×150	2×185
Copper busbar（quantity×size）	/	/	/	2×30mm×5mm	2×40mm×5mm

Tightening torque value of the terminal screw M10: Tightening torque 20N.m

10 **Connection capacity**（fig7）

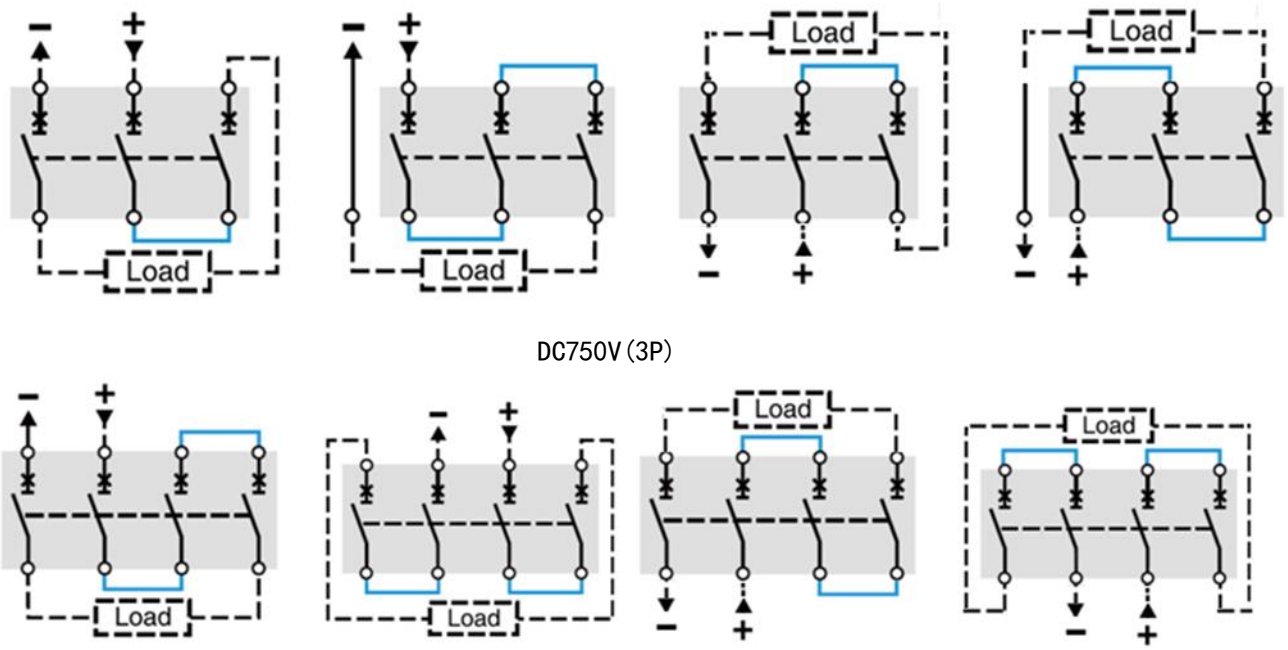


Fig 7

11 Operation instructions for accessories

11.1 Rated parameters of the auxiliary contact（Table6、fig8）

Table 6

Accessory name	Accessory spec	voltage (V)/ Conventional thermal current (Ith)		
Aux contacts	F1/M5-160	AC250V/10A	AC400V/3A	DC220V/0.2A

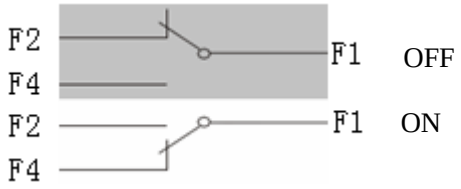


Fig 8

11.2 Rated parameters of the alarm contact（Table7、fig9）

Table 7

Accessory name	Accessory spec	voltage (V)/ Conventional thermal current (Ith)	
Alarm contact	BJ1-11/M5-16	AC250V/3A	DC220V/0.2A

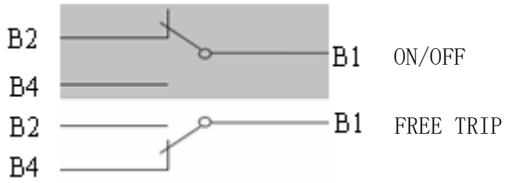


Fig 9

11.3 Undervoltage release & Shunt Release

11.3.1 Product picture (fig 10)

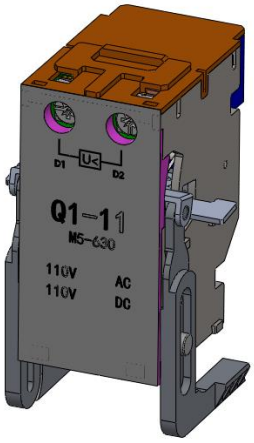


Fig 10

11.3.2 Specification and model description (Table 8)

Table 8

□ 1 □ □ / NDM5-630

1 2 3 4 5

Num	description	
1	Function code	FT：shunt release； Q：undervoltage release；
2	Design code	1
3	Voltage spec	Shunt Release：02:24V；04:48V；11:110V；23:230V； Undervoltage release：11:110V；23:230V；38:380V；
4	Voltage category	D: direct-current；A: alternating current；T: general；
5	Product spec	NDM5-630

11.3.3 Main technical parameters

Table 9

Product code	shunt release				undervoltage release		
Product spec	FT1-02D/M5-630	FT1-04D/M5-630	FT1-11T/M5-630	FT1-23T/M5-630	Q1-11T/M5-630	Q1-22T/M5-630	Q1-38A/M5-630
Rated voltage	DC 24V	DC 48V	AC/DC 110V	AC230V/DC250V	AC/DC 110V	AC230V/DC250V	AC 400V
Transient power	11W	11W	25W	52W	——	——	——
Maintain power	——	——	——	——	0.4W	1.8W	2.3W

Undervoltage release (table 9、fig 11)

When voltage reduce to 35%～70% range of rated voltage, UVT trips; when voltage is lower than 35% of rated voltage, UVT prevents the breaker from closing; when voltage is higher than 85% of rated voltage, the breaker reliably closes.

Fig 11

shunt Release (table 9、fig 12)

The control voltage of Shunt release should be in the range 70%~110% rated control voltage, and that can make the breaker reliably trip.

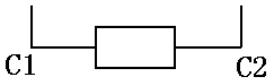


Fig 12

11.3.4 Standard Working Condition

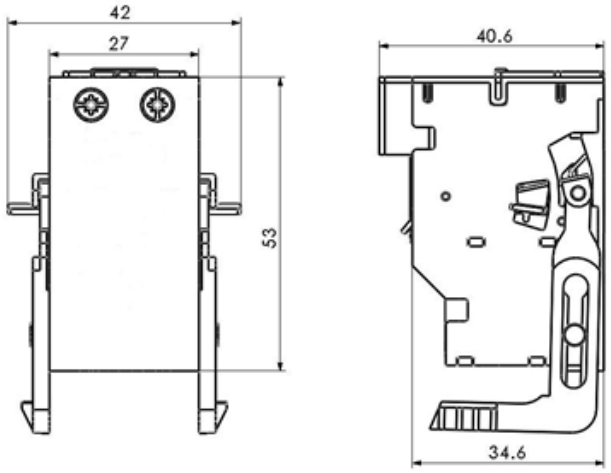
a) Elevation：≤2000m；

b) Ambient temperature：-35℃~+70℃；

c) Pollution level 3;

d) Storage：-40℃~+75℃;

11.3.5 Outline and installation dimensions (fig 13)



11.4 external accessories

11.4.1 Specification and model description

plug-in type & drawout type：

□ 1 — □ □ / M5-630

1 2 3 4 5

Num	description	
1	Function code	CR: plug-in type；CC: drawout type；
2	Design code	1
3	Connecting position	Q: front connection:；H: rear connection
4	Connecting condition	1: horizontal connection；2: vertical connection
5	Product spec	NDM5-630

rear connection：

□ 1 / M5-630

1 2 3

Num	description	

1	Function code	BH: rear connection;
2	Design code	1
5	Product spec	NDM5-630

motor operation:

□ 1 — □ / M5-630

1 2 3 4

Num	description	
1	Function code	DC：motor operation;
2	Design code	1
3	Voltage spec	02:24V；11:110V；22:220V；38:400V
4	Product spec	NDM5-630

handle operation:

□ 1 — □ / M5-630

1 2 3 4

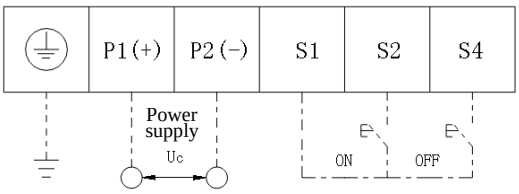
Num	description	
1	Function code	SC: handle operation
2	Design code	1
3	handle category	Y: circular；F: square（high protection）
4	Product spec	NDM5-630

11.4.2 Main technical parameters

motor operation:

rated control circuit voltage (V)	work current	motor power	connecting capability	signal keep time
DC24V	6A	35W	10～22AWG	100ms+
AC110/DC110	0.8A			
AC230/DC220	0.8A			

connect mode



11.4.3 Normal working environment

a) Elevation：≤2000m；

b) Ambient air temperature：-35℃~+70℃；

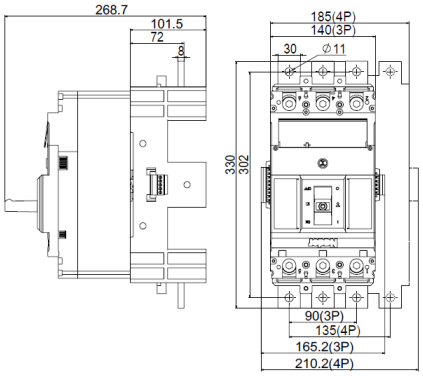
c) Class of pollution 3；

d) storage environment：-40℃~+75℃；

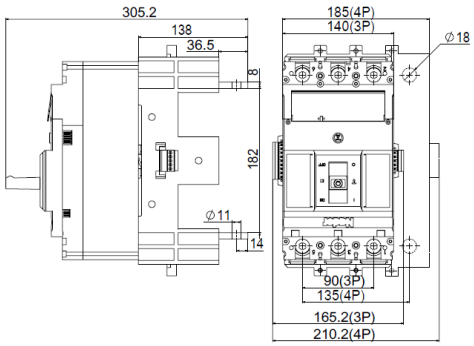
11.4.4 Outline and installation dimensions

plug-in type

1）front horizontal connection

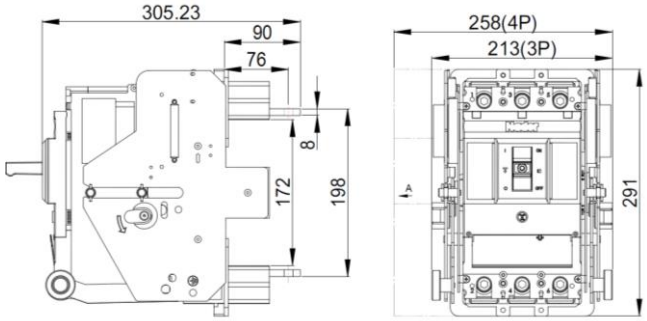


2）rear horizontal connection

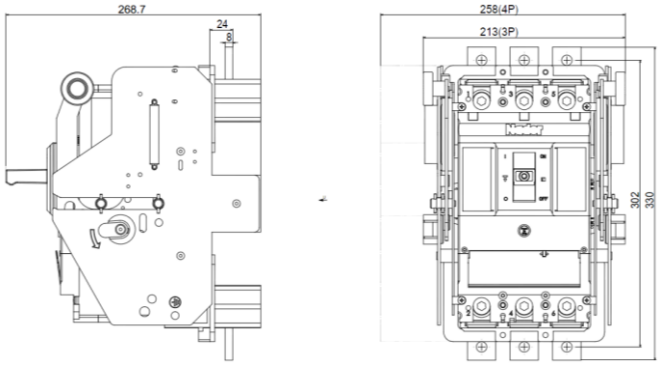


drawout type

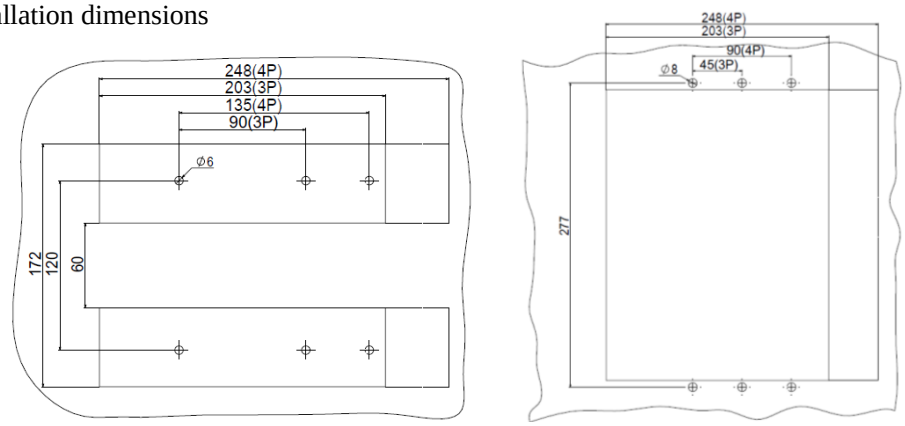
1） front horizontal connection



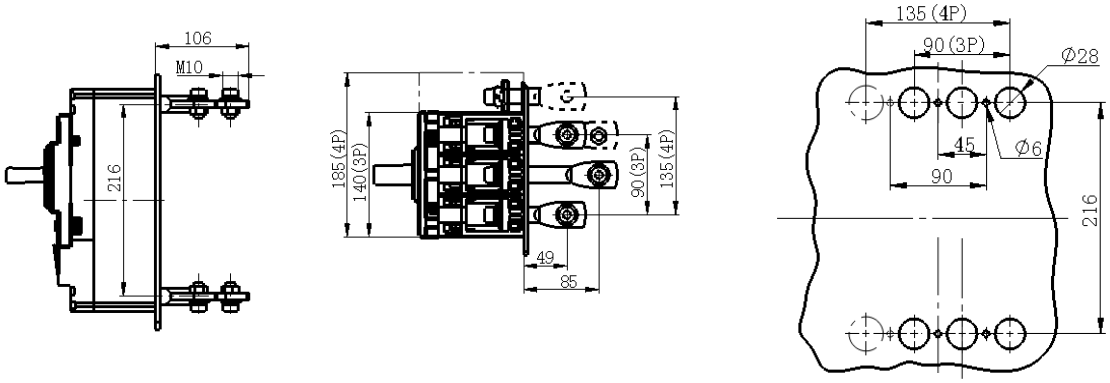
2）rear horizontal connection



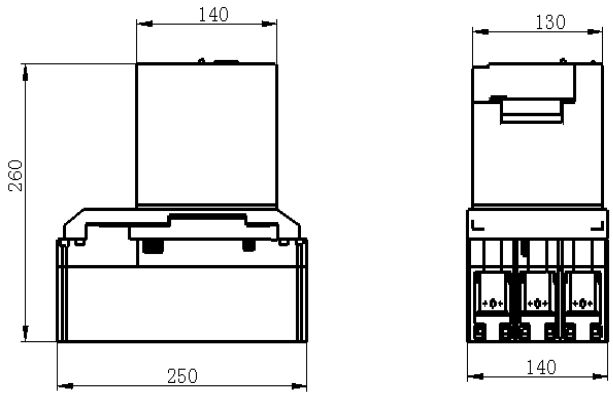
3）Product installation dimensions



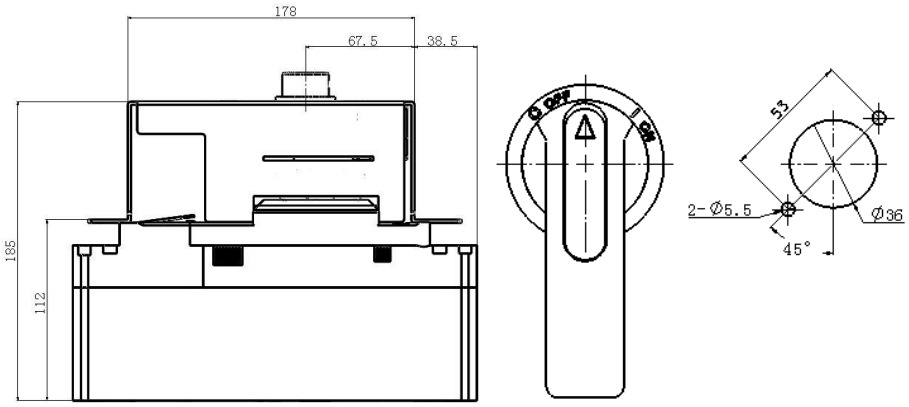
Rear connection：



motor operation：



handle operation



12 Packaging and storage

Minimum packaging quantity: 1 piece/box. The packaged products should be stored in a warehouse without acidic, alkali or other corrosive gas in the surrounding air.

Users shall obey the storage and use conditions. In case of product damage or abnormal use due to manufacturing quality issues within 18 months from the date of factory delivery, the factory shall be responsible for free maintenance or replacement.

13 List of product accessories (table 10)

Table 10

SN	Name	Specifications	Quantity/Set	
			3P	4P
1	Cross small pan-head screw(s)	M5×110	4	4
2.	Plain washer	5	4	4
3	Spring washer	5	4	4
4	Hexagon nut(s)	M5	4	4
5	Partition	——	4	6

14 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 circuit breaker, 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;