

Shanghai Liangxin Electrical Co., Ltd.
NDM5-250V Moulded Case Circuit Breaker
Product Specification

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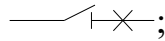
(IPD-ENG-DEV-T22 A1 2016-09-23)

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Revision information					
Version	Revised contents and reasons	Date	Prepared	Reviewed	Approved
0	Newly added; Add MS2 lock information	20231215	Yang rong rong	Xu juncheng	Ding Fei
1	Logo change	20241223	Yang rong rong	Huang Jinhua	Ding Fei

1、 Applicable Scope and Purpose

The NDM5-250V series of moulded case circuit breakers (referred to as circuit breakers) have a rated insulation voltage of 1140V and apply to circuits with the AC 50Hz/60Hz, the rated working voltage of AC800V、 AC1000V、 AC1140V and rated working current (63A, 80A, 100A, 125A, 160A, 200A, 250A). 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 as well as the infrequent starting, braking, overload and short circuit of motors.

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 the Product



Fig.1 3P Product

3、Specification and Model Description

ND	M	5 -	□	□	□	□	□	□	/ □	/ □	/ □	□	□	□
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
S.N.	Name of S.N.		NDM5											
1	Enterprise		ND: Lazzen low-voltage apparatus											
2	Product type code		M:Moulded case circuit breaker (MCCB)											
3	Design S.N.		5											
4	Enterprise		250											
5	Derived code of the series		V: High voltage											
6	Interrupting level		M: Breaking level code											
7	Reference temperature		Null: Normal temperature type											
			T: High temperature type											
8	Rated current		See Note 2											
9	Pole		3:3 poles											
10	Trip release code		TMF: Thermal magnetic fixed release											
			TMD: AC protection-thermo-magnetic distribution release											
11	Installation code+ Wiring method		Null: Stationary connector + front panel wiring											
12	Operation method		Null: directly handle operation											
			Z1A150:rotary handle with round center hole and square axis length 150											
			Z1A200:rotary handle with round center hole and square axis length 200											
			Z1A300:rotary handle with round center hole and square axis length 300											
			Z1A350:rotary handle with round center hole and square axis length 350											
			Z1A650:rotary handle with round center hole and square axis length 650											
			Z1F150:rotary handle with round square hole and square axis length 150											
			Z1F200:rotary handle with round square hole and square axis length 200											
			Z1F300:rotary handle with round square hole and square axis length 300											
			Z1F350:rotary handle with round square hole and square axis length 350											
			Z1F650:rotary handle with round square hole and square axis length 650											

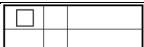
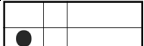
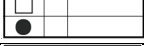
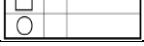
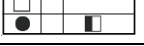
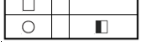
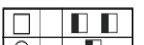
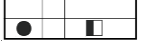
13	Accessory code	See table 1
14	Other codes	YG: Customer code
		MS2: MS2 lock

Note : TMD :(power distribution protection-thermal magnet-adjustable)

63A-125A: [thermo-adjustable (0.8-0.9-1.0) In, magnet-fixed];

160A-250A: [thermo-adjustable (0.8-0.9-1.0) In, magnet-adjustable (5-6-7-8-9-10) In]

Table 1 NDM5-250V

Accessory code	Accessory name	Installation position
None	None accessory	—
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	
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	
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Note:  Single auxiliary contact;  Alarm contact;  Shunt release  Under-voltage release

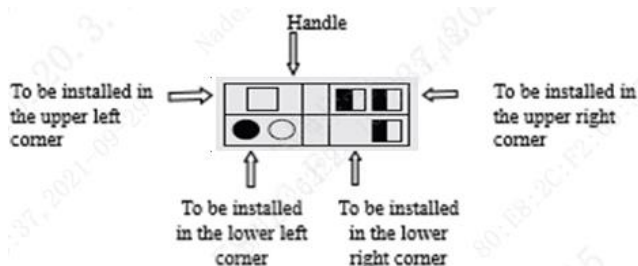
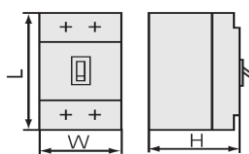


Fig.2 Attachment installation diagram

4 、 Main Technical Parameters

Table 2

Moled		NDM5-250V	
Frame current $I_{nm}(A)$		250	
Rated current $I_n(A)$		63,80,100, 125, 160, 200, 250	
Rated voltage $U_e (V)$		AC800, AC1000, AC1140	
Utilization category		A	
Rated impulse withstand voltage $U_{imp} (V)$		8000	
Rated insulation voltage $U_i (V)$		1140	
Power frequency withstand voltage (1min) (V)		3500	
Rated frequency(Hz)		50/60	
Pole		3	
Interrupting level		M	
Rated Ultimate breaking capacity $I_{cu} (kA)$	AC800V	50	
	AC1000V	30	
	AC1140V	12	
Rated Service breaking capacity $I_{cs} (kA)$	AC800V	35	
	AC1000V	15	
	AC1140V	12	
Life(times)	Mechanical life	Maintainable free life	15000
		Maintainable life	30000
	Electrical life	AC800V	1500
		AC1000V	1500

		AC1140V	1000
Boundary dimension		L(mm)	200
		W(mm)	105
		H(mm)	106.5
Flashover distance (mm)			50

Note: The overall dimension does not include the dimension of terminal cover.

4.1 Sectional area and applicable rated current adopted in wiring

Table 3 Wire parameters

Rated current (A)	63	80	100	125	160	200	250
Conductor area (mm ²)	16	25	35	50	70	95	120

4.2 Tightening torque of the circuit breaker terminal and mounting screw

Table 4 Tightening torque of the circuit breaker terminal and mounting screw

Model	Screw application	Thread specification	Torsional moment(N · m)
NDM5-250V	Wiring screw	M8	15
	Set screw	M5	2

4.3 Derating factor of temperature change for the circuit breaker

Table 5 Derating factor table of temperature change for the circuit breaker

Model	Derating factor of product temperature change							
NDM5-250V	Temperature (°C)	40	45	50	55	60	65	70
	Derating factor	1.0	1.0	1.0	0.93	0.88	0.86	0.83

Note: 1)When the operating ambient temperature is below + 50°C, the product can be used normally without derating capacity. and do not need to reduce capacity.

2)The above derating factors are measured under the rated current of the shell frame.

4.4 High altitude derating factor of circuit breaker

Table 6 Altitude drop correction factor

Altitude (m)	Working current correction coefficient	Maximum operating voltage(V)	Power frequency withstand voltage (V)	Average insulation class (V)
2000	1	1140	3500	1140
2500	1	1140	3500	1140

3000	0.98	1140	3150	1140
3500	0.97	1140	3000	1140
4000	0.95	1140	2800	1140
4500	0.94	1112	2650	1112
5000	0.93	1083	2500	1083

4.5 Power consumption of circuit breaker

Table 7 NDM5-250V Product current specification single phase power consumption able

Model	Current specification	Single phase power consumption (W)
		Front panel wiring
NDM5-250V	250A	21.8
Note: The above data are the single-phase loss measured under the rated current of the circuit breaker when the ring temperature is 40℃。		

5、 Normal Working Environment of Circuit Breaker

- 1) The altitude of the installation site doesn't exceed 2,500m. See the "High-altitude Derating Factor Table of Circuit Breaker" for the derating factor at the altitude;
- 2) The ambient temperature is -35℃ ~ + 70℃; the average within 24 h shall not be more than +35℃. If the ambient temperature is higher than +50℃, the user needs to reduce the capacity. See the "Derating Factor Table of Temperature Change for the Circuit Breaker" for the derating factor;
- 3) Its relative humidity at an ambient temperature of +40℃ should not exceed 50%. A higher relative humidity is allowed at a lower temperature. For example, the relative humidity at 20℃ can reach 90%; for frost due to temperature change, the corresponding measures should be taken;
- 4) The product can withstand the effects of wet air, salt mist, oil mist and mould;
- 5) The installation category of the circuit breaker connected to the main loop is: Category III (power distribution and control level), The installation category of the circuit breaker not connected to the main loop is: Category II (load level);
- 6) The pollution level is Level 3;
- 7) Degree of protection : IP 20;

- 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 、 Tripping Characteristics

6.1 Tripping characteristics curve under normal environment (ambient air temperature: +50°C)

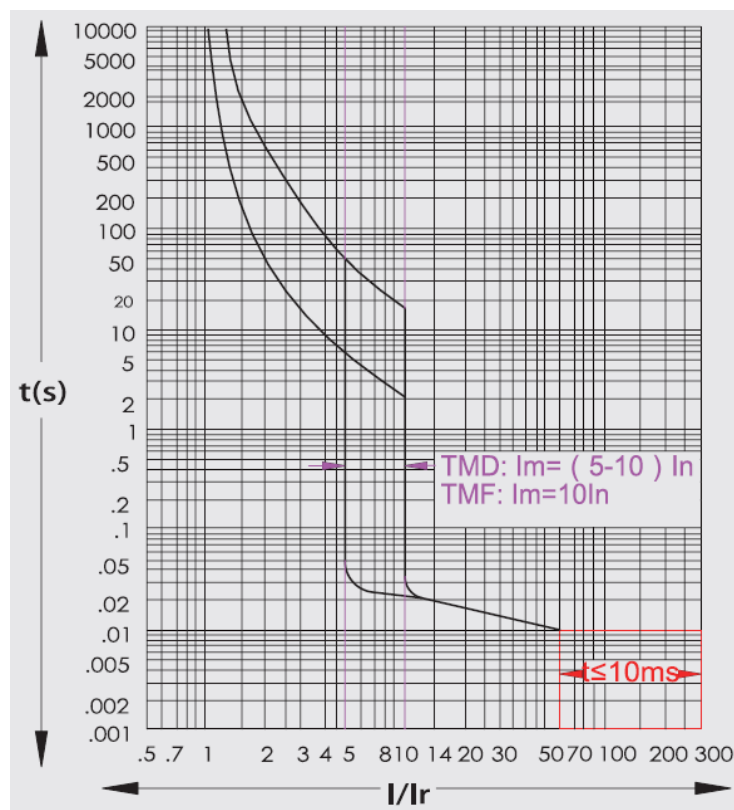


Fig.3 NDM5-250V Distribution protection

6.2 Current limiting and permissive characteristic curve

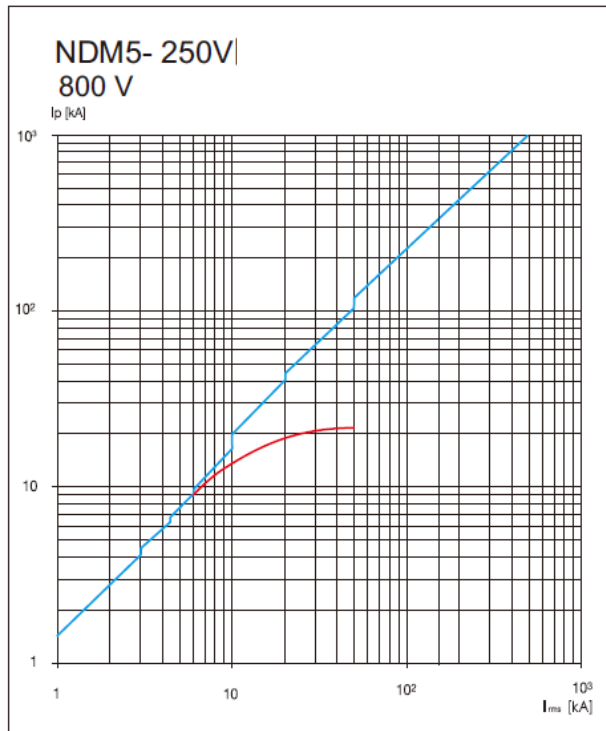


Fig.4 Current limiting characteristic curve chart

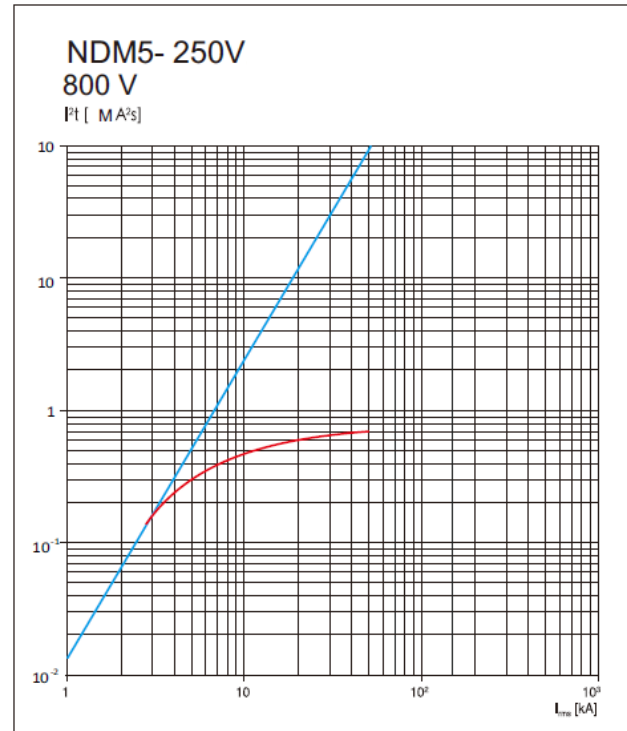


Fig.5 Permissive characteristic curve chart

7、Controller operation description and function introduction

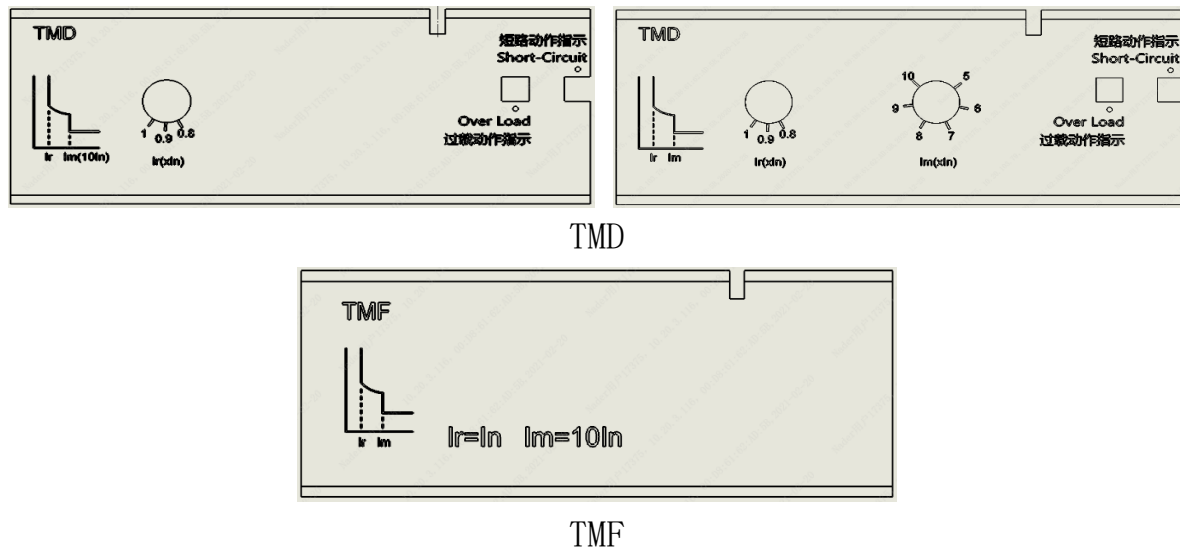


Fig.6 Release adjustment gear chart

8 、 Product outline and installation dimensions

8.1 External dimensions of products

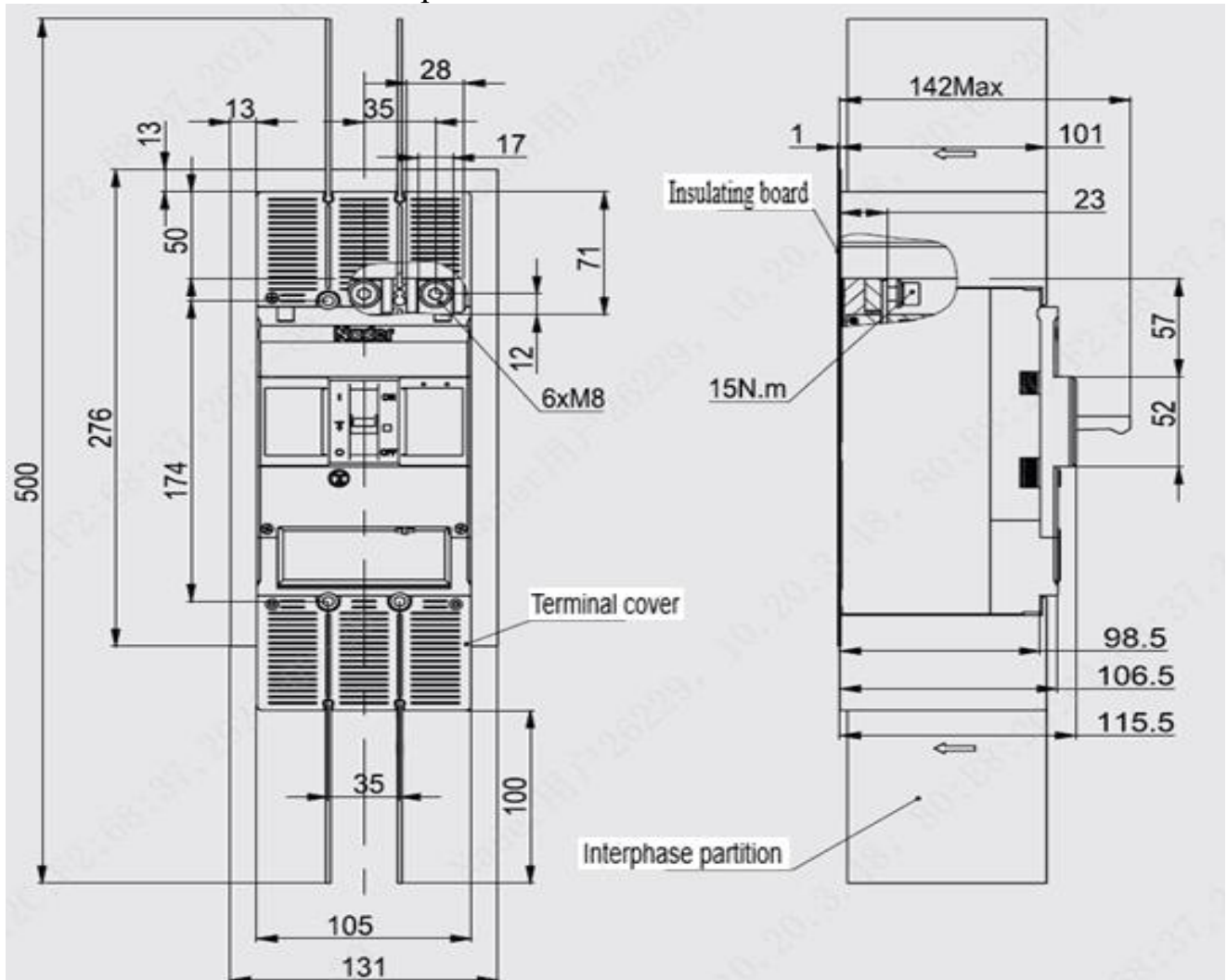


Fig.7 Size of terminal cover

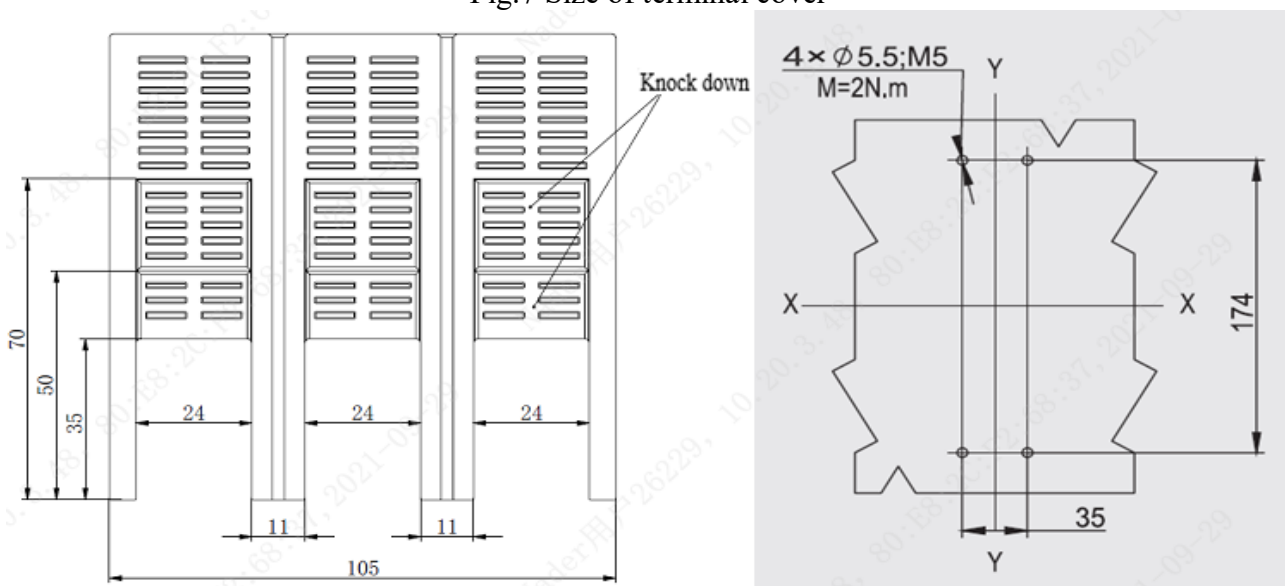


Fig.8 Terminal cover size

Note: Unmarked tolerance level should follow GB/T 1804-c.

8.2 Rotary handle operating mechanism

Manual operation-the schematic diagram of handle installation and opening and the outline dimension diagram of manual operation are shown below respectively:

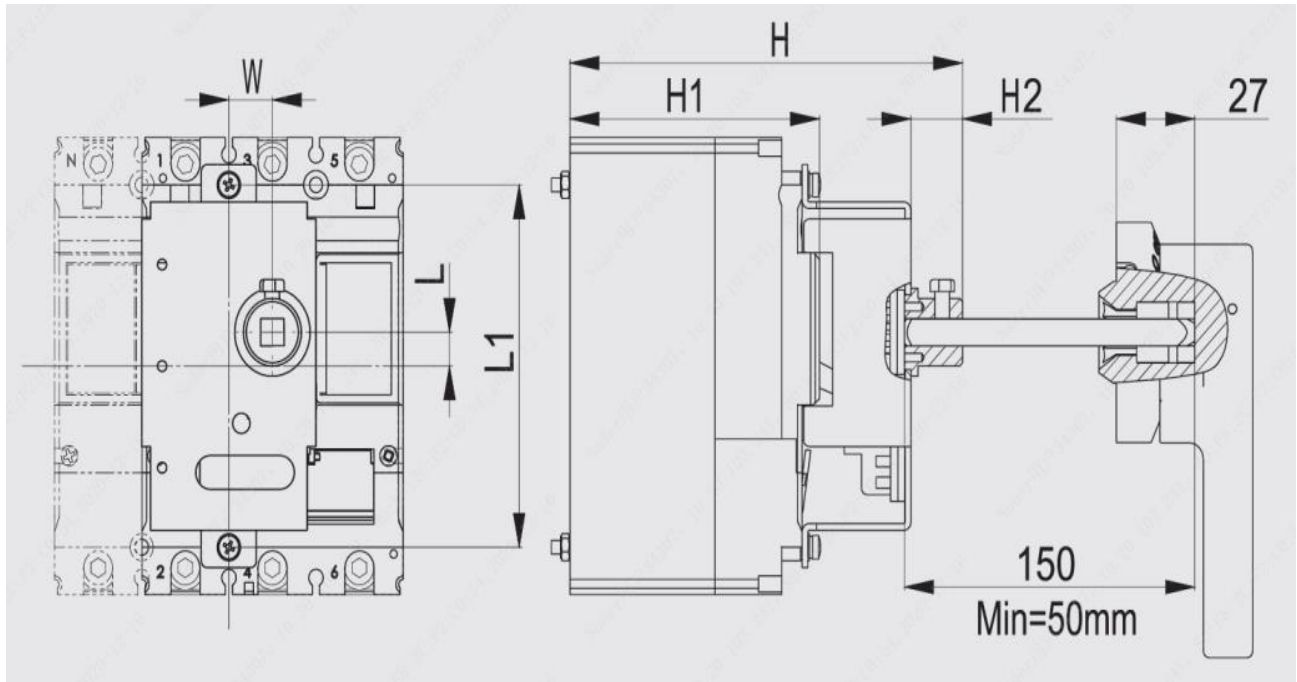


Fig. 9 Installation drawing of rotary handle operating mechanism

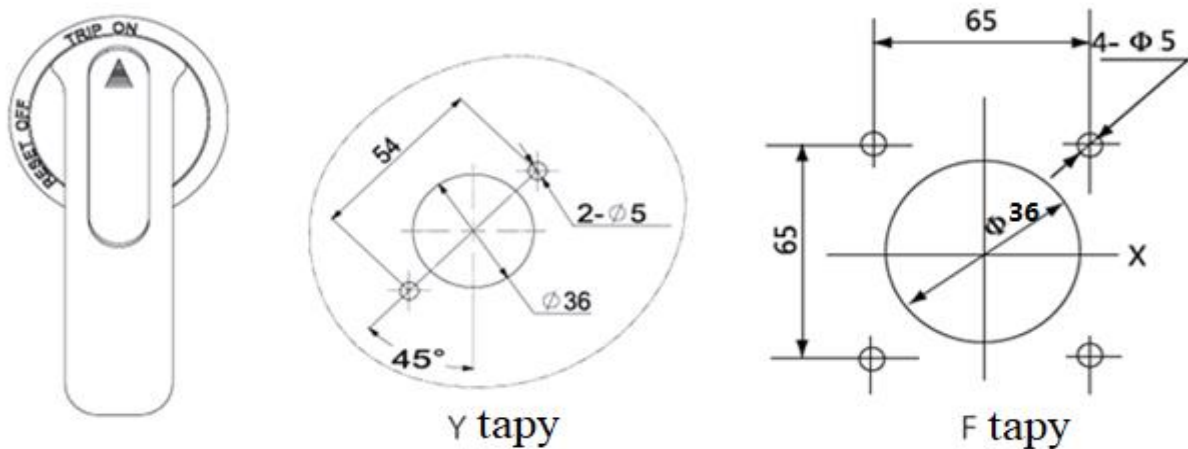


Fig.10 Installation opening diagram of rotary handle

Note:1) During manual operation, it shall rotate 180° clockwise, and counterclockwise operation is prohibited.

2) Unmarked tolerance level should follow GB/T 1804-c.

Table 8 Overall dimensions of mechanical interlocking mechanism and circuit breaker after installation

Model	W	L	L1	H	H1	H2	Square shaft specification
NDM5-250V	17.5	13	174	171.5	115.5	20	8×8

8.3 Copper bar in front of board or copper cable with wiring terminal

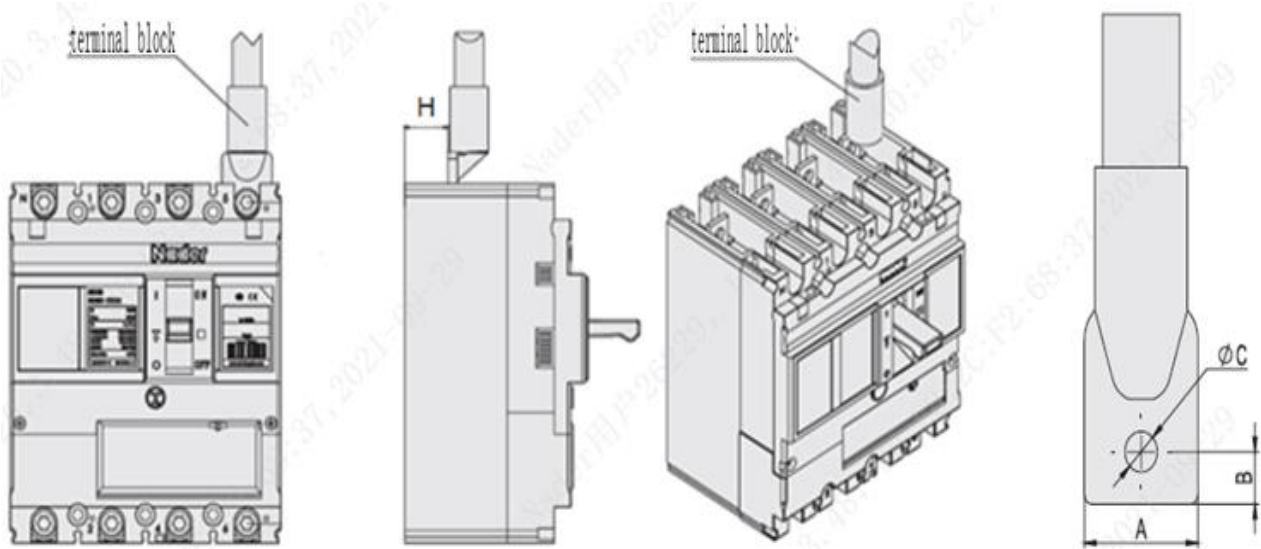


Fig.11 Connection diagram of copper bar in front of board or copper cable with wiring terminal

Table 9 Connection size of copper bar in front of board or copper cable with wiring terminal

Model	A (mm)	B (mm)	Φ C (mm)	H (mm)
NDM5-250V	26	12	8.4	23

Note: Unmarked tolerance level should follow GB/T 1804-c.

8.4 Safety spacing

8.4.1 Insulation requirement between phases

a. Cable

Naked metal at cable lug must be insulated with interphase partition

b. Busbar (see picture below for size of insulated cover)

Stright bar: insulation covers all around

curved bar: Insulation covers to 100mm long to the curve.

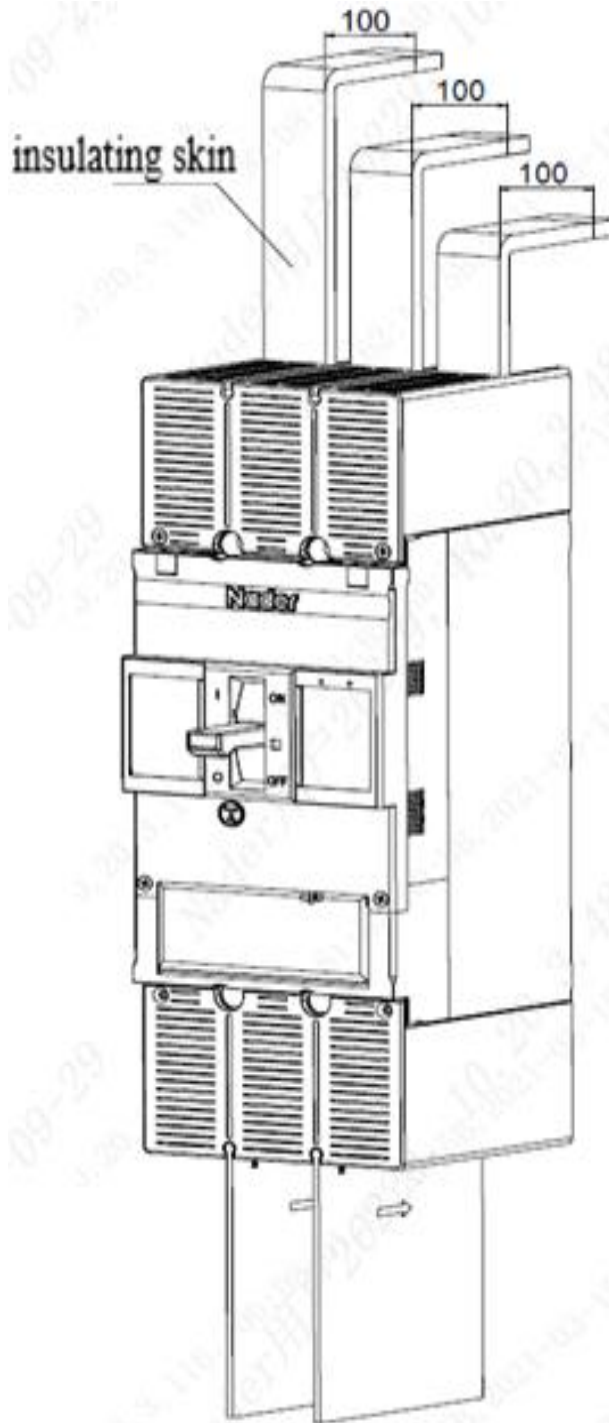


Fig.12 Size of insulated cover

Note: 1. Copper bar can be directly connected to the products. If aluminum bars are applied, extended Copper bars must be used to reach out of the terminal shell and then connect to the aluminum bar. Plus, connection parts of the aluminum are suggested to plate with tin. Use partitions to insulate the bars after connection. (If aluminum bars are intended to be applied, please contact us. we will provide two more partitions for insulation.)

2. Partitions are not allowed to be pressed between bars.

3. The picture above is only for identifying the sizes of insulation cover. There is no requirement of bar connection method here.

4. Unmarked tolerance level should follow GB/T 1804-c.

8.4.2 Distance requirement of installation in cabinet

See the figure below for the minimum safety distance of the circuit breaker from the top, bottom, side and adjacent products during installation.

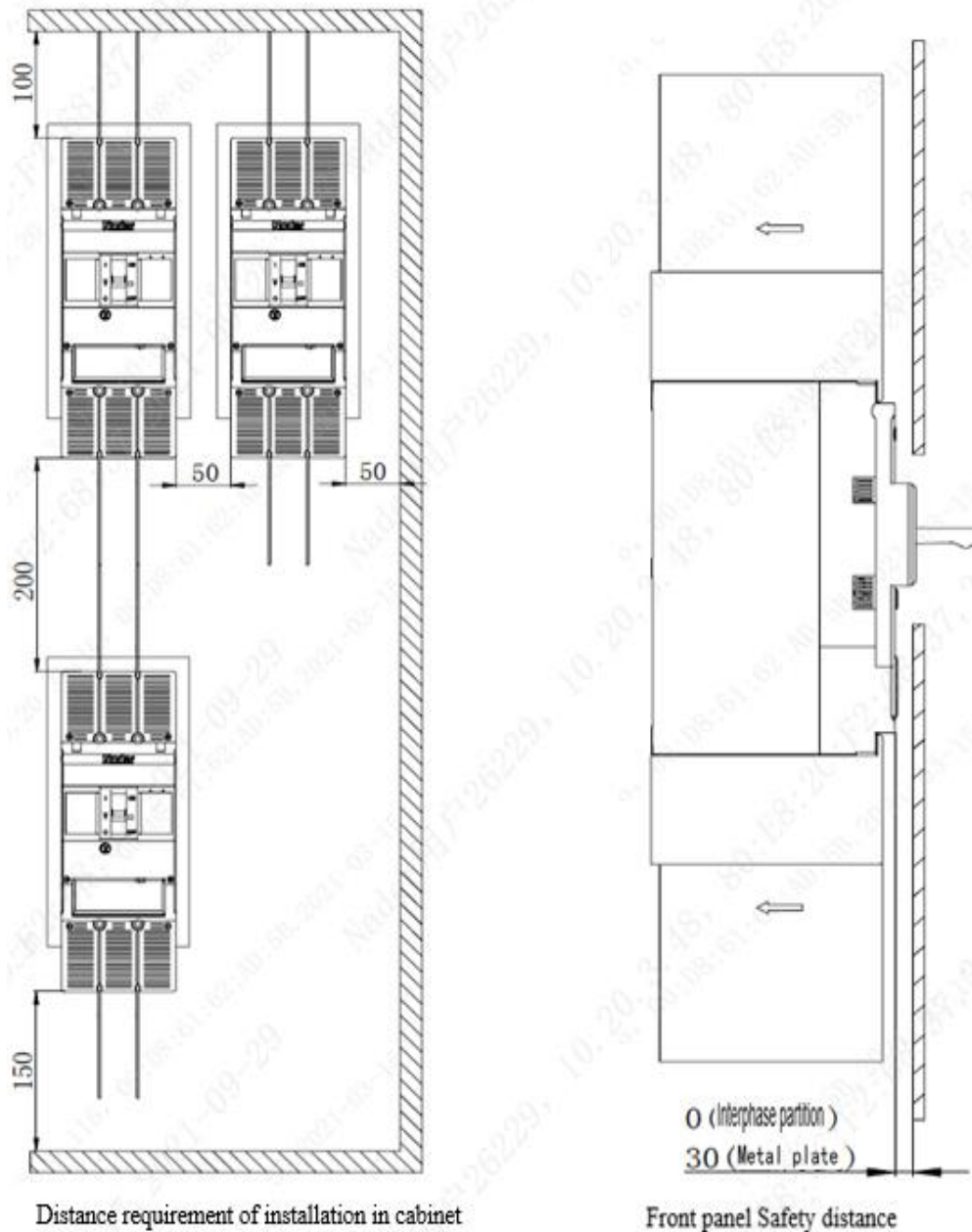


Fig.13 Safety distance of front panel

8.5 Wiring diagram of circuit breaker

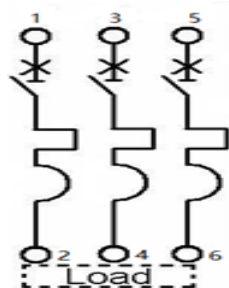


Fig.14 Main circuit wiring mode of AC products

9、Operation instructions for accessories

9.1 Under-voltage release

When the power voltage drops to the range (35%~70%) of the under-voltage release, the release can break the circuit breaker reliably; when the power voltage is 35% lower than the rated working voltage of the under-voltage release, the release can prevent closing of the circuit breaker; when the power voltage is 85% higher than the rated working voltage of the under-voltage release, the release can guarantee reliable closing of the circuit breaker.

Table 10 Voltage specifications of the under-voltage release: AC230V/DC250V.

Accessory name	voltage release			Tightening torque value of wiring screw
Voltage specifications (V)	AC110/DC110	AC230/DC250	AC400	
Maintain power consumption (W)	0.5	1.0	1.5	
Code name	Q11	Q22	Q40	1.2N. m

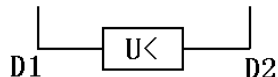


Fig.15 Working diagram of under-voltage release

9.2 Shunt release

When the external voltage of the shunt release is between 70% and 110% of the rated control power voltage.

Table 11 Rated parameters of the shunt release

Accessory name	Shunt release				Tightening torque value of wiring screw
Voltage specifications (V)	AC24/DC24	AC48/DC48	AC110/DC110	AC230/DC250	
Power waste(W)	20	13	8	19	
Code name	FT02	FT04	FT11	FT22	1.2N. m

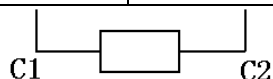


Fig.16 Working diagram of shunt release

Working principle of the shunt release: a single pulse action. If another action is required, the

shunt release can only be operated after being off, reset and energized.

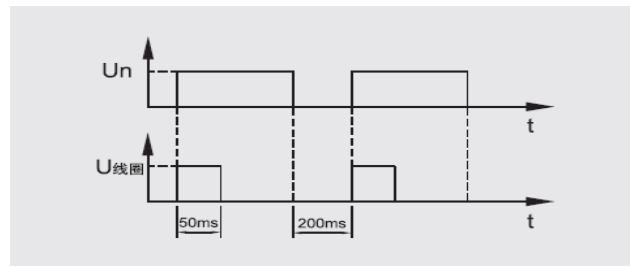
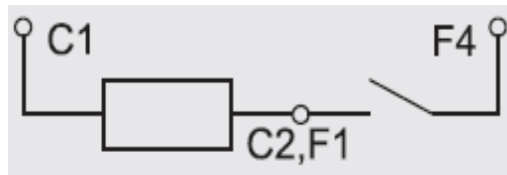


Fig.17 Working principle diagram of shunt tripper

If the circuit breaker cannot be closed normally due to long-term power on, an auxiliary contact can be connected in series as shown in the figure.



9.3 Rated parameters of the auxiliary contact

Table 12 Rated parameters of the auxiliary contact

Accessory name		Auxiliary contact(conventional)	Auxiliary contact(Low power consumption)
Voltage specifications (V)/conventional (Ith)		AC250V/10A、AC400V/3A、DC220V/0.2A	DC30V/0.1A
Wiring diagram	On, off		
	Free tripping		
Internal resistance		30mΩ	50mΩ

Note1: If need DC30V/0.1A Auxiliary contact, please explain when ordering.

2: 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 three groups of auxiliary harness are installed.

9.4 Rated parameters of the alarm contact

Table 13 Rated parameters of the alarm contact

Accessory name		Alarm contact(conventional)	Alarm contact(Low power consumption)
Voltage specifications (V)/conventional (Ith)		AC250V/10A、AC400V/3A、DC220V/0.2A	DC30V/0.1A
Wiring diagram	On, off		
	Free tripping		
Internal resistance		30mΩ	50mΩ

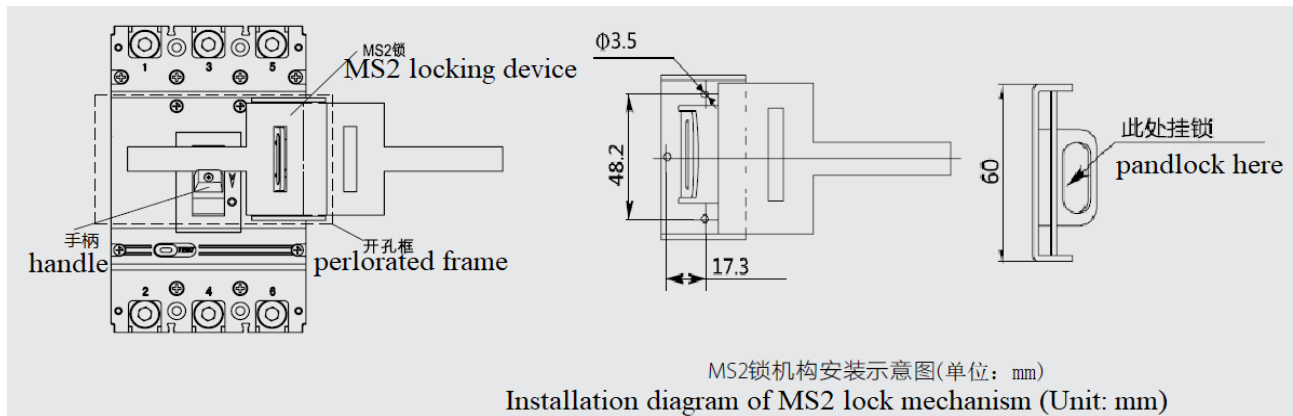
Note1: If need DC30V/0.1A Auxiliary contact, please explain when ordering.

2: The first alarm harness is identified as B11 (red), B12 (white), B14 (yellow)。

Under-voltage release、Shunt Release、Auxiliary contact、Alarm contact , the standard wiring line is 0.7mlong , 1m、2m、4m can be customized according to requirements.

9.5 MS2 locking device

MS2 is a split locking device (i.e. the device is installed on the left or right side of the circuit breaker cover, and the default is installed on the right side if there are no special requirements). It is used for NDM5 series products to prevent manual closing and opening operations(the dotted line part is the circuit breaker part).

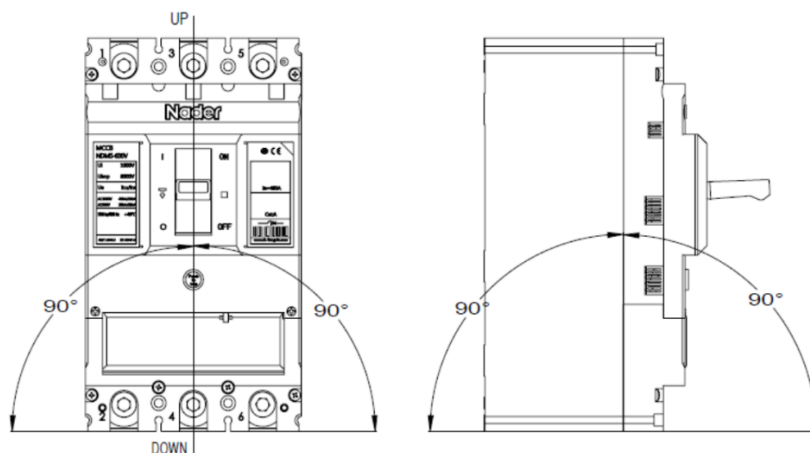


Note 1: After MS2 accessories are selected, other internal and external accessories cannot be installed on the same side;

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

10、 Installation direction of circuit breaker

For vertical installation of the product, the gradient between the installation surface and the vertical plane is no more than $\pm 22.5^\circ$.



Vertical installation
Fig. 18 Mounting method of product

11、 Packaging and Storage

Minimum packaging quantity: 1 piece/box. The packaged products should be stored in a warehouse with the ambient temperature of $-40^{\circ}\text{C}\sim 75^{\circ}\text{C}$ and 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 36 months since the manufacturing date.

12、Environment

The environment that comply with RoHS instruction.

13、List of accessories and installation

Table 14 Accessories list form

SN	Name	Specification	Quantity/Set
1	Cross small pan-head screw	M5×100	4
2	Hexagon nut	M5	4
3	Spring washer	5	4
4	Plain washer	5	4
5	Interphase partition	——	4
6	Insulated floor	——	1
7	Terminal cover	——	6
8	Tapping screw	ST2.9×7	4
9	Terminal screw	M8×22	6
10	MCCB	NDM5-250V	1

14、Circuit breaker notes

- 1) Various characteristics and accessories of the circuit breaker are set in the factory. The circuit breaker, tripping unit or other accessories can only be adjusted, installed and maintained by the trained or qualified professionals according to the parameter requirements of the line design;
- 2) Ensure that the power supply is off before installing or removing any device;
- 3) The circuit breaker handle can be located in three positions, indicating three states: on, off and free tripping. When the handle is in the free tripping position, pull the handle in the off direction when the circuit breaker is connected and on.