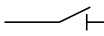
1. Applicable Scope and Purpose of Circuit Breaker

The NDM2L-250 molded case circuit breaker with the residual current protection (hereinafter referred to as circuit breaker) applies to infrequent switching of circuits with the AC 50/60Hz, the working voltage of AC415V and the working current up to 250A. With the overload, short circuit and under-voltage protection functions, the circuit breaker can protect lines and power equipment from damage. Meanwhile, they can deal with the personal safety, fire hazards and other potential risks caused due to long-term ground faults that can't be detected with the overcurrent protection function.

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

Comply with standards: IEC60947-2, GB/T 14048.2.

Products comply with CCC、CE、TUV and CB certification.

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

Picture of the Product

3 Specification and Model Description of Circuit Breaker

ND M 2 L -□ □ □ / □ □ □ / □ □ □ □ □ □ □ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
SN	SN name	NDM2L
1	Enterprise code	ND: “Nader” low-voltage apparatus
2	Product code	M: Molded case circuit breaker (MCCB)
3	Design SN	2
4	Derived code of the series	L: Residual current protection
5	Shell frame level	250
6	Breaking capacity level	M: Relatively high breaking type
		H: High breaking type
7	Operation mode	No code: Direct handle-operated mode
		P: Motor-operated
		Z: Rotary operation
8	Derived code of the function	No code: Type AC current leakage protection type
		A: Type A current leakage protection type
9	Delay type	X: Non-time delay
		Y: Delay
		XB: Non-time delay alarm tripping
		YB: Delay alarm tripping
		XI: Non-time delay + alarm non-tripping
		YI: Delay + alarm non-tripping
10	Residual current release type	V: Type V residual current release
11	Number of poles	3, 4
12	Release code	3: Complex tripper
13	Accessory code	See Table 1
14	Application code	No code: Power distribution type
15	N-pole (neutral pole) type of the 4P product	A: The N-pole isn't installed with an overcurrent release, but always connected
		B: The N-pole isn't installed with an overcurrent release, but on-off with the other three poles
		C: The N-pole is installed with an overcurrent tripper, and on-off with the other three poles
16	Rated current	See Table 2
17	Cabling type	No code: Normal product
		P: Connection busbar

Note:

1、 When the operation mode is electric operation or manual operation, the residual action current gear, residual current action time gear, and leakage indication button can't be adjusted;

2、 Offline entry is not allowed. If offline entry is required, special products must be customized.

Table 1: Comparison Table of Accessory Code:

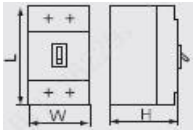
Accessory code	Accessory name	NDM2L-250	
Installation Position / Model / Number of poles		3	4
00	N/A	—	
10	Shunt release		
20	Dual-auxiliary contact		
21	Single auxiliary contact		
30	Under-voltage release		
40	Shunt release, dual-auxiliary contact		
41	Shunt release, single auxiliary contact		
60	Two sets of dual-auxiliary contacts		
61	Two sets of single auxiliary contacts		
62	Dual-auxiliary contact, single auxiliary contact		
70	Under-voltage release, dual-auxiliary contact		
71	Under-voltage release, single auxiliary contact		
08	Alarm contact		
28	Dual-auxiliary contact, alarm contact		
58	Auxiliary alarm contact		
68	Dual-auxiliary contact, auxiliary alarm contact		

Note: The 3P product can only be available with the left-installed single accessory with the accessory code as 10, 20, 21, 30, 08, 58;

For two accessories provided with 4P, the alarm non-tripping function can’t be selected simultaneously.

4. Main Technical Parameters of Circuit Breaker

Table 2 Main Technical Parameters of Circuit Breaker

Model			NDM2L-250			
Rated current of frame Inm (A)			250			
Rated current In (A)			100, 125, 140, 160, 180, 200, 225, 250			
Rated insulation voltage Ui (AC V)			1000			
Rated impulse withstand voltage Uimp (V)			8000			
Rated working voltage Ue (AC V)			380/400/415			
Utilization category			A			
Number of poles			3		4	
Breaking capacity level			M	H	/	
Rated limit short-circuit breaking capacity Icu (kA)			52.5	85	52.5	
Rated operating short-circuit breaking capacity Ics (kA)			35	50	35	
Rated residual short-circuit making and breaking capacity I△m(kA)			0.25 Icu			
Rated residual action current I△n(mA)	Non-time delay	Type AC	Type V 30/100/300/500			
		Type A	Type V 30/100/300/500			
	delay	Type AC	Type V 100/300/500			
		Type A	Type V 100/300/500			
Rated residual non-action current I△no(mA)			0.5I△n			
Residual current action time	Residual current		I△n	2I△n	5I△n	10I△n
	Non-time delay	Maximum breaking time (s)	0.2	0.1	0.04	0.04
	delay	Maximum breaking time (s)	0.5, 1.15 2.15	0.35, 1 2	0.25, 0.9 1.9	0.25, 0.9 1.9
		Limit non-driving time (s)	/	0.1, 0.5 1	/	/
Operating performance (times)	Electrical life		8000			
	Mechanical life	Maintainable free life	20000			
		Maintainable life	40000			
Boundary dimension		L(mm)	165	165	165	
		W(mm)	107	107	142	
		H(mm)	90.5	90.5	90.5	
Flashover distance(mm)			⩽50			

Note：1.The overall dimension does not include the dimension of terminal cover。

2. According to the standard, the maximum rated working voltage AC415V * 1.05 * 1.05=457.5V

4.1 Selection of the circuit breaker connecting bus or cable cross-section area:

Table 3 Selection of the NDM2L-250 Connecting Bus or Cable Cross-section Area

Rated current (A)	100	125, 140	160	180, 200, 225	250
Wire cross-section area (mm^2)	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	Thread specification	Torque (N·m)
NDM2L-250	M8	12
	M4	1.5

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							
NDM2L-250	Temperature (℃)	40	45	50	55	60	65	70
	Derating factor	1	0.982	0.963	0.944	0.924	0.904	0.882

Note: 1) When the operating ambient temperature is below + 40℃, the product can be used normally without derating capacity.

2) The above derating factors are measured at the frame current.

4.4 High-altitude derating factor of the circuit breaker

Table 6 High-altitude Derating Factor Table of Circuit Breaker

Elevation (m)	Working current correction coefficient	Power frequency withstand voltage correction coefficient	Isolation voltage correction coefficient (V)
2000	1	3500	1000
2500	1	3500	1000
3000	0.98	3150	900
3500	0.97	3000	850
4000	0.95	2800	810
4500	0.94	2650	770
5000	0.93	2500	730

4.5 Power loss coefficient of circuit breaker

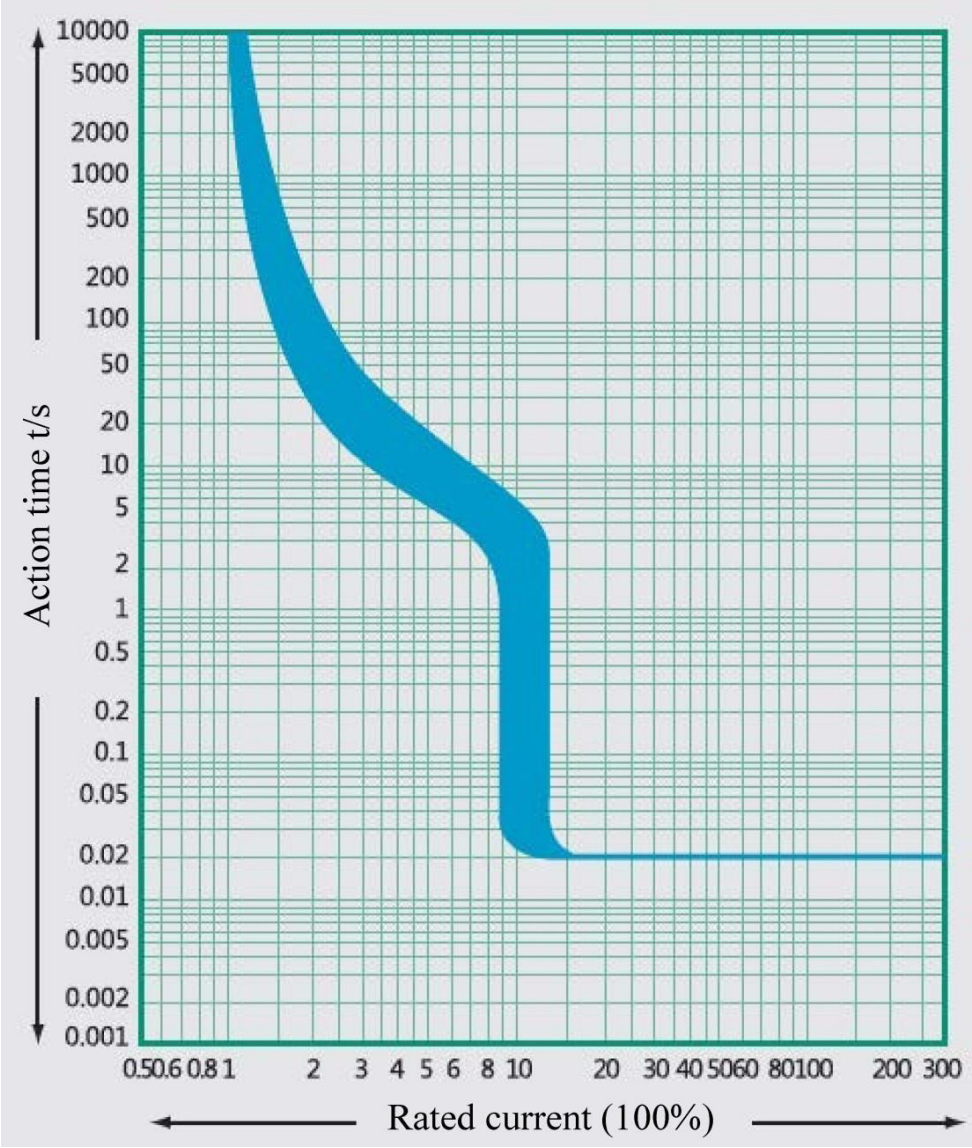
Table 7 Power loss coefficient table of circuit breaker

Model	Energizing current(A)	Total power loss(W)
		Wiring before and after board
NDM2L-250	250	67

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 +40℃, 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) 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;
8) In case of stricter user conditions than the above description, negotiate with the manufacturer.

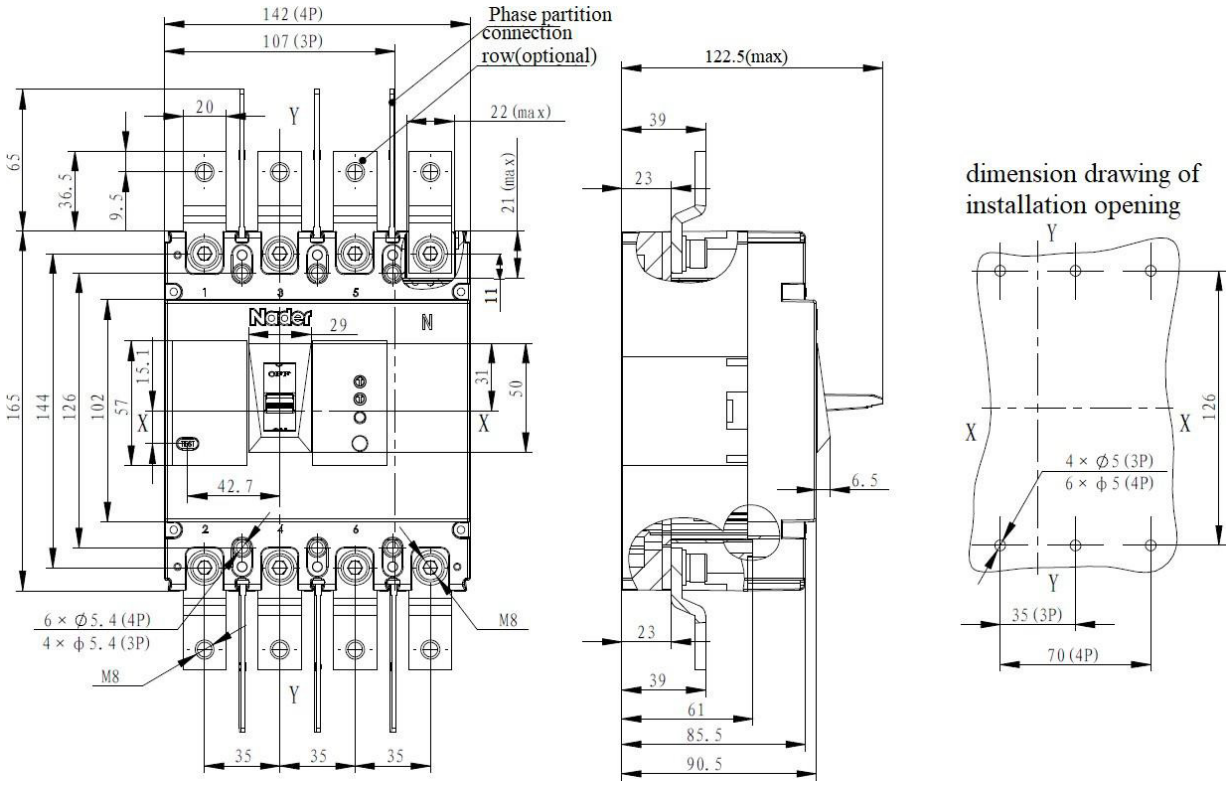
6. Short-circuit Overload Protection Characteristic Curve of Circuit Breaker



Time/Current Characteristic Curve

7. Outline and Mounting Hole Dimensions of Circuit Breaker

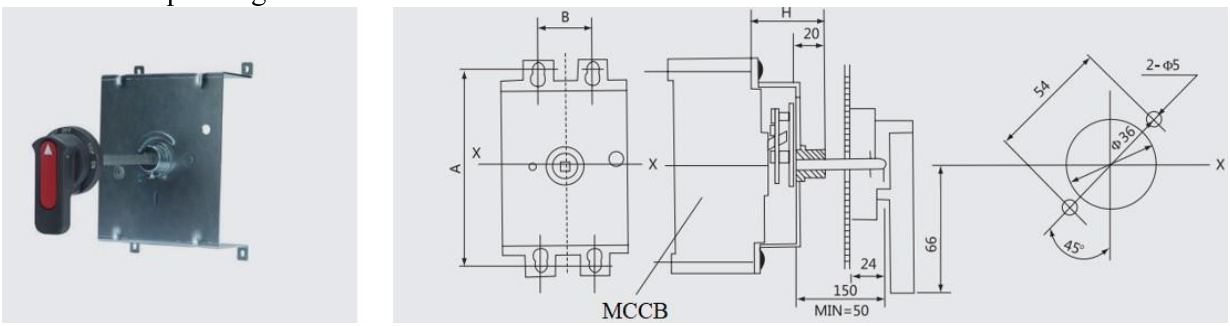
7.1 Outline and mounting hole dimensions of circuit breaker



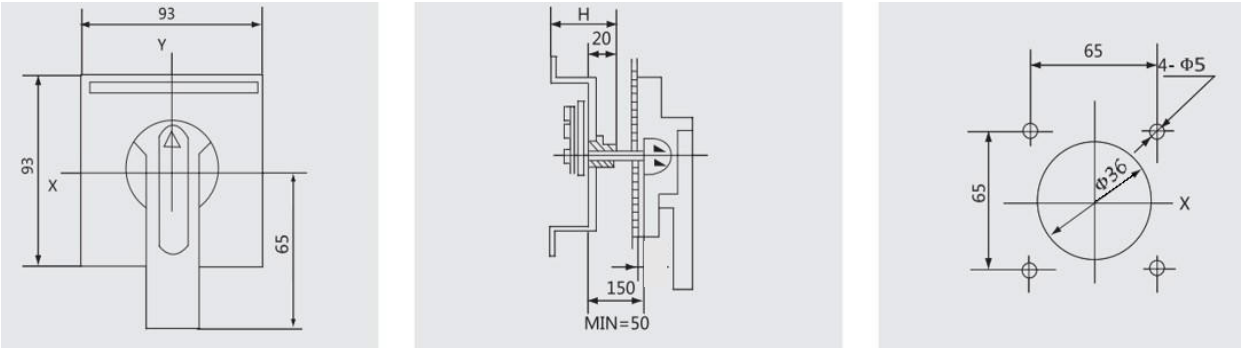
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.2 Manual operating mechanism

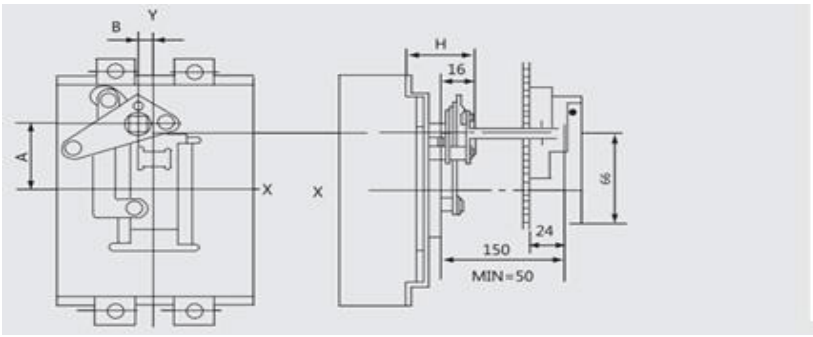
7.2.1 Manual operating mechanism and CS1-A handle

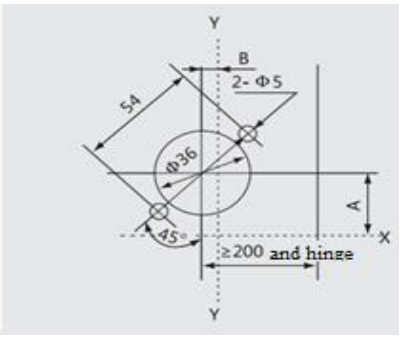


7.2.2 Manual operating mechanism and CS1-F handle

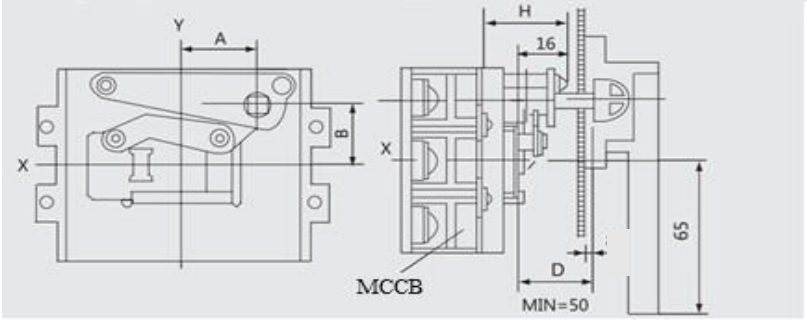


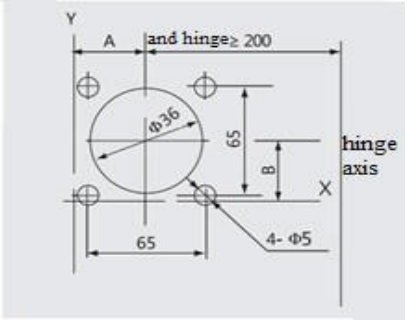
7.2.3 Manual operating mechanism and CS2-A handle



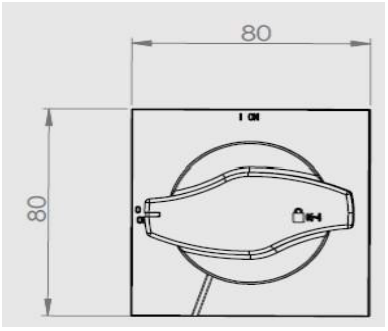


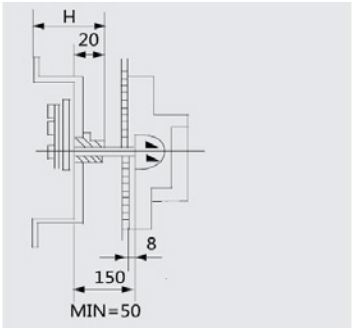
7.2.4 Manual operating mechanism and CS2-F handle

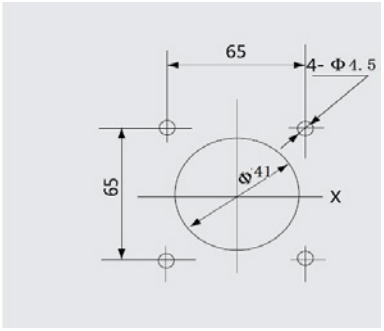




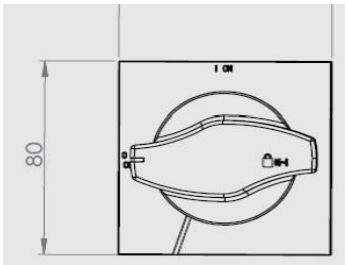
7.2.5 CS1-IP65 handle installation opening diagram

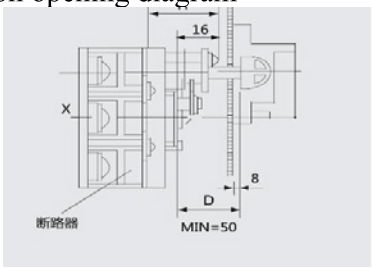






7.2.6 CS2-IP65 handle installation opening diagram





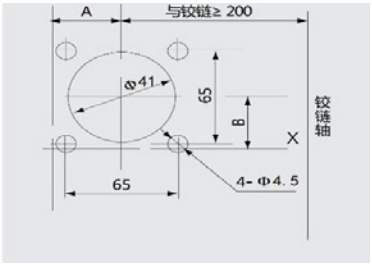


Table 8 Installation dimension of Manual operating mechanism (Unit: mm)

Manual operation type	Model	Installation dimension of manual operating mechanism			Installation mode
		H	A	B(3/4P)	
CS1	NDM2L-250	69	104	30	Vertical installation
CS2	NDM2L-250	46	35	11.5	

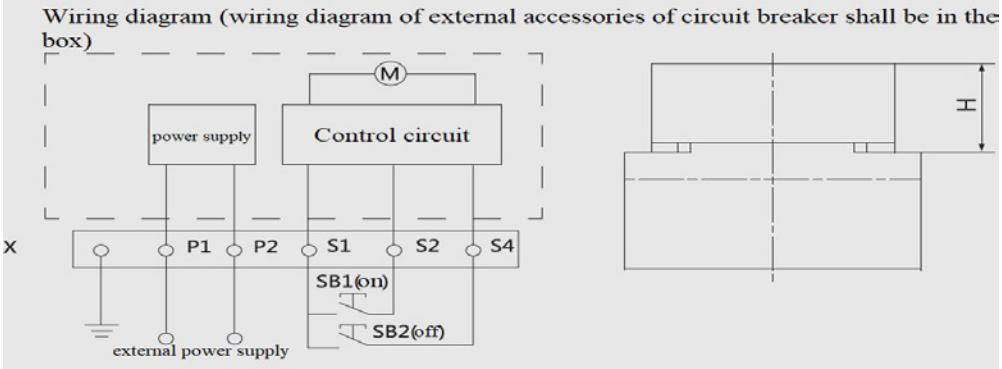
Note:1) A type is round handle, F type is square handle;

2) The length of A-type handle is 66mm and that of F-type handle is 65mm;

3) The D dimension in the drawing is 150mm by default, and the customizable length is 200 / 300 / 350 / 650mm;

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

7.3 Electric operating mechanism



Symbol description: SB1、SB2: Operation button (provided by the customer)

X: Terminal block P1、P2：External power supply

Voltage specification: AC110V、AC220V、AC400V、DC24V、DC110V、DC220V

Table 9 Main technical parameters of electric operating mechanism

Equipped with circuit breaker	Action current(A)	Electric power(W)				service life / time	Operating mechanism height H(mm)
		AC/DC230V	AC/DC110V	AC380V	DC24V		
NDM2L-125	≤0.5	≤180	≤180	≤350	80	20000	92

7.4 Safe mounting distance of circuit breaker

Table 10 Insulation Distance Mounted in the Metal Cabinet (Unit: mm)

Mounting distance	A (inlet wire end to the cabinet face)		B (distance from side to the cabinet face)	C (outlet wire end to the cabinet face)
Model	With a terminal cover	Without a terminal cover		
NDM2L-250	25	65	30	30

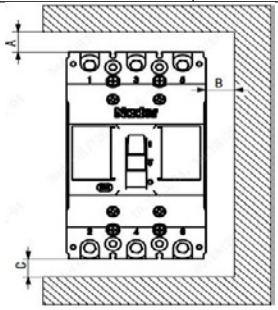


Table 11 Minimum Center Distance between Rowed Circuit Breakers (Unit: mm)

Model	Width of circuit breaker		I Center distance	
	3 poles	4 poles	3 poles	4 poles
NDM2L-250	107	142	137	172

Note: Check the connected busbar or cable during rowing or stacking of the circuit breaker to ensure that the air insulation distance won't be reduced.

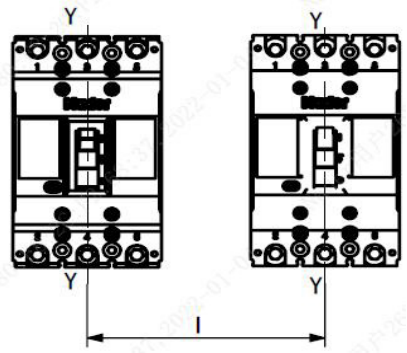


Table 12 Minimum Distance between Stacked Circuit Breakers (Unit: mm)

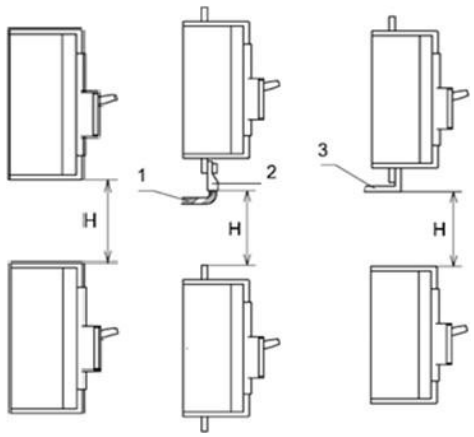
Model	H (distance of circuit breaker from bottom)	
	With a terminal cover	Without a terminal cover
NDM2L-250	90	93

Note: 1) Insulated cable

2) Cable terminal

3) Connection without insulation

Requirements: Check whether the terminal cover or phase partition is assembled properly before products are energized.



8、Attachment function description

8.1 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 13 Voltage Specifications and Power Consumption of Under-voltage Release

Model	Instantaneous current value(A)		Power waste (W)	
	AC380V	AC230V	AC380V	AC230V
NDM2L-250	0.01	0.006	1.1	0.66

Note： The under-voltage release must be energized before the circuit breaker can be switched on and closed again, otherwise the circuit breaker will be damaged。

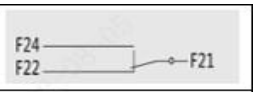
8.2 Shunt release

When the external voltage of the shunt release is between 70% and 110% of the rated control power voltage, the release can break the circuit breaker reliably.

Table 14 Voltage Specifications and Power Consumption of shunt release

Model	Shunt release	DC24V	AC230V	DC220V	AC380V
NDM2L-250	Instantaneous current value(A)	6.8	0.5	0.3	0.4
	Power waste (W)	164.5	115	76.2	155.6

8.3 Auxiliary contact

The circuit breaker is in the "open" and "free tripping" positions	Dual-auxiliary contact		
	Single auxiliary contact		
the circuit breaker is in the "close" position	"close" to "open"、" open " to " close "		

8.3.1 Current parameters of auxiliary contact

Table 15 Current parameters of auxiliary contact

Category	Frame current (A)	Conventional thermal current Ith (A)	Rated working current Ie(A)	
			AC400V	DC220V
Auxiliary contact	250	3	1.5	0.15
Note :minimum applicable load: 5V，1mA.				

8.3.2 Electrical life of auxiliary contact

Table 16 Electrical life of auxiliary contact

Ues category	On			Off			Times	Frequency	Power on time
	I/Ie	U/Ue	cosφ	I/Ie	U/Ue	cosφ			
AC-15	10	1	0.3	1	1	0.3	6050	360	⩾0.05s
DC-13	1	1	6Pe	1	1	6Pe			⩾T0.95ms

8.3.3 Making and breaking capacity of auxiliary contact

Table 17 Making and breaking capacity of auxiliary contact

Ues category	On			Off			Times	Frequency	Power on time
	I/Ie	U/Ue	cosφ	I/Ie	U/Ue	cosφ			
AC-15	10	1.1	0.3	10	1.1	0.3	10	360	⩾0.05s
DC-13	1.1	1.1	6Pe	1.1	1.1	6Pe			⩾T0.95ms

8.4 Alarm contact

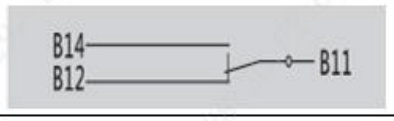
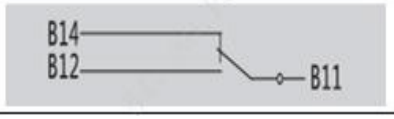
The circuit breaker is in the position of "opening" and "closing"	
The circuit breaker is in the position of "free tripping"	

Table 18 Current parameters of alarm contact

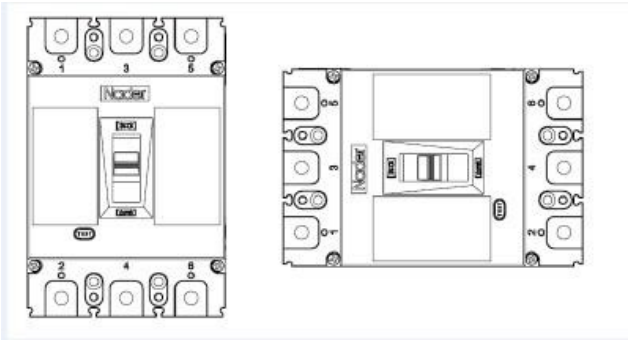
Category	Frame current (A)	Conventional thermal current Ith(A)	Rated working current Ie(A)	
			AC400V	DC220V
Alarm contact	250	3	0.3	0.15

Note：Shunt release, auxiliary contact and alarm contact wiring standard wire length is 0.7m, 1m、2m、4m can be customized according to demand。

9. 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 ±22.5°.

Horizontal installation of the product.



Vertical Installation Horizontal Installation

10. Packaging and Storage of Circuit Breaker

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℃~+75℃. No acidic alkaline or other corrosive gas exists in the ambient air in the warehouse. Under the conditions above, the storage period shall be no more than three years since the manufacturing date.

11. Installation Direction of Circuit Breaker

SN	Name	Specification	3P Quantity/Set	4P Quantity/Set
1	Cross small pan-head screw	M4×75	4	4
2	Hexagon nut	M4	4	4
3	Spring washer	4	4	4
4	Plain washer	4	8	8
5	Phase partition	——	4	6
6	Hexagon socket cylindrical head combination	M8X22	6	8

12. 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.