

Shanghai Liangxin Electrical Co., Ltd.

NDM2L-125 Product Specification

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

Prepared by	_____	Date	_____
Reviewed by	_____	Date	_____
Countersigned by	_____	Date	_____
	_____		_____
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	_____		_____
	_____		_____
Approved by	_____	Date	_____

Revision History					
Version	Revision Reason/Content	Implementat ion Date	Prepared by	Reviewe d by	Approve d by
0	Newly added	20200805	Wang Hu	Peng Haorang	Hu Qi
1	Update the product appearance picture and product dimension outline drawing	20210930	Sun Lanping	Xiao Botao	Ding Fei
2	Add attachment information	20221023	Yang rongrong	Mei yang	Ding fei
3	Update the attachment package information; Add incoming line information	20240708	Yang rongrong	Xiao botao	Ding fei
4	Logo change	20260313	Yang rongrong	Xiao botao	Ding fei

1. Applicable Scope and Purpose of Circuit Breaker

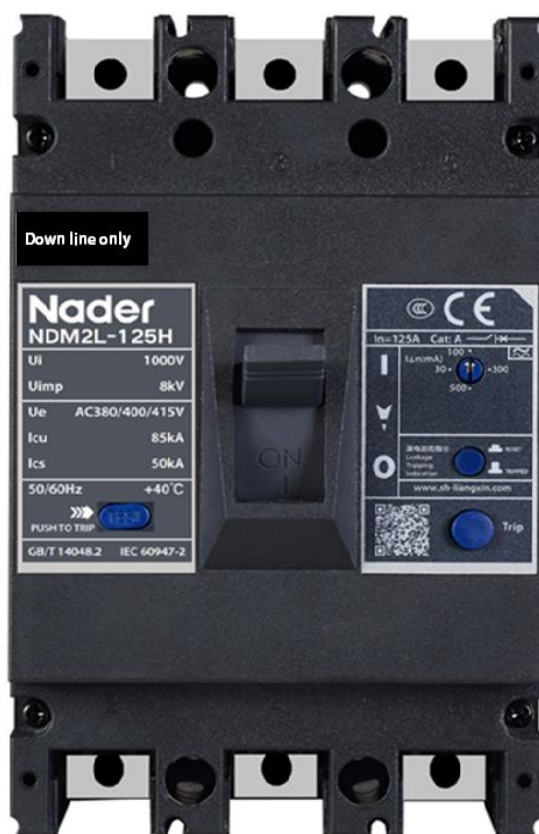
The NDM2L-125 molded case circuit breaker with the residual current protection (hereinafter referred to as circuit breaker) applies to infrequent switching of circuits with the AC 50/60Hz, the working voltage of AC415V and the working current up to 125A. With the overload, short circuit protection functions, 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 $\text{---} \diagup \diagdown \text{---}$; Comply with standards: IEC60947-2, GB/T 14048.2.

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

Downline products can only be used in downline scenarios, and upline products can only be used in upline scenarios.

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



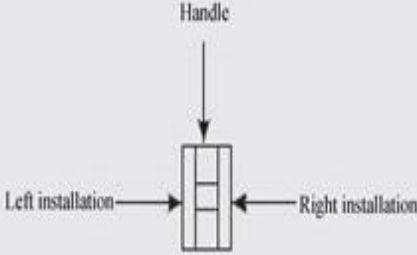
Picture of the Product

3. Specification and Model Description of Circuit Breaker

ND 1	M 2	2 3	L - 4	☐ 5	☐ 6	☐ / ☐ 7	☐ 8	☐ 9	☐ / ☐ 10	☐ 11	☐ 12	☐ 13	☐ 14	☐ 15	☐ 16	☐ 17	☐ 18	☐ 19
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		125															
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															
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															
18	Other type		CS1-A/150/200/300/350/650: Circular center hole rotary handle + shaft length 150/200/300/350/650mm															
			CS1-F/150/200/300/350/650: Square center hole rotary handle + shaft length 150/200/300/350/650mm															

		CS2-A/150/200/300/350/650: Circular eccentric hole rotary handle + shaft length 150/200/300/350/650mm
		CS2-F/150/200/300/350/650: Square eccentric hole rotary handle + shaft length 150/200/300/350/650mm
		CS1-IP65/150/200/300/350/650: Square center hole rotary handle + shaft length 150/200/300/350/650mm
		CS2-IP65/150/200/300/350/650: Square eccentric hole rotary handle + shaft length 150/200/300/350/650mm
		DC1 220V: Electric operation voltage AC/DC 220/230/240V
		DC24V: Shunt release operation voltage DC24V
		DC220V: Shunt release operation voltage DC220/230V
		AC220V: Shunt release operation voltage AC220/230V
		AC380V: Shunt release operation voltage AC380/400V
		Z:Terminal housing
19	Product wiring method	X: lower input (customized special item number is required)
		Upper input (default description does not reflect)
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. By default, leakage products can only be used with the incoming line. If you need the incoming line, you need to customize the special product number, and the N pole of the 4-pole product is an A-type product. Any operating condition is not allowed to use the incoming line.		

Table 1: Comparison Table of Accessory Code:

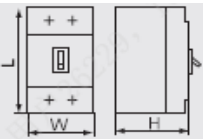
			Legend  Single auxiliary contact  Dual-auxiliary contact  Alarm contact  Shunt release  Under-voltage release  Auxiliary alarm contact (a single accessory features the auxiliary and alarm functions)	
Accessory code	Accessory name	Model	NDM2L-125	
			3	4
00	N/A		—	—
10	Shunt release			
20	Dual-auxiliary 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-125			
Rated current of frame Inm (A)			125			
Rated current In (A)			16, 20, 25, 32, 40, 50, 63, 80, 100, 125			
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 IΔm(kA)			0.25 Icu			
Rated residual action current IΔn(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 IΔno(mA)			0.5IΔn			
Residual current action time	Residual current		IΔn	2IΔn	5IΔn	10IΔn
	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)	150	150	150
			W(mm)	92	92	122
			H(mm)	92.5	92.5	92.5
Flashover distance(mm)			50			

Note1: 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-125 Connecting Bus or Cable Cross-section Area

Rated current (A)	16, 20	25	32	40, 50	63	80	100	125
Wire cross-section area (mm ²)	2.5	4	6	10	16	25	35	50

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-125	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-125	Temperature (°C)	40	45	50	55	60	65	70
	Derating factor	1	0.977	0.954	0.931	0.907	0.883	0.858

Note: 1) When the operating ambient temperature is below +40°C, 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 (V)	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

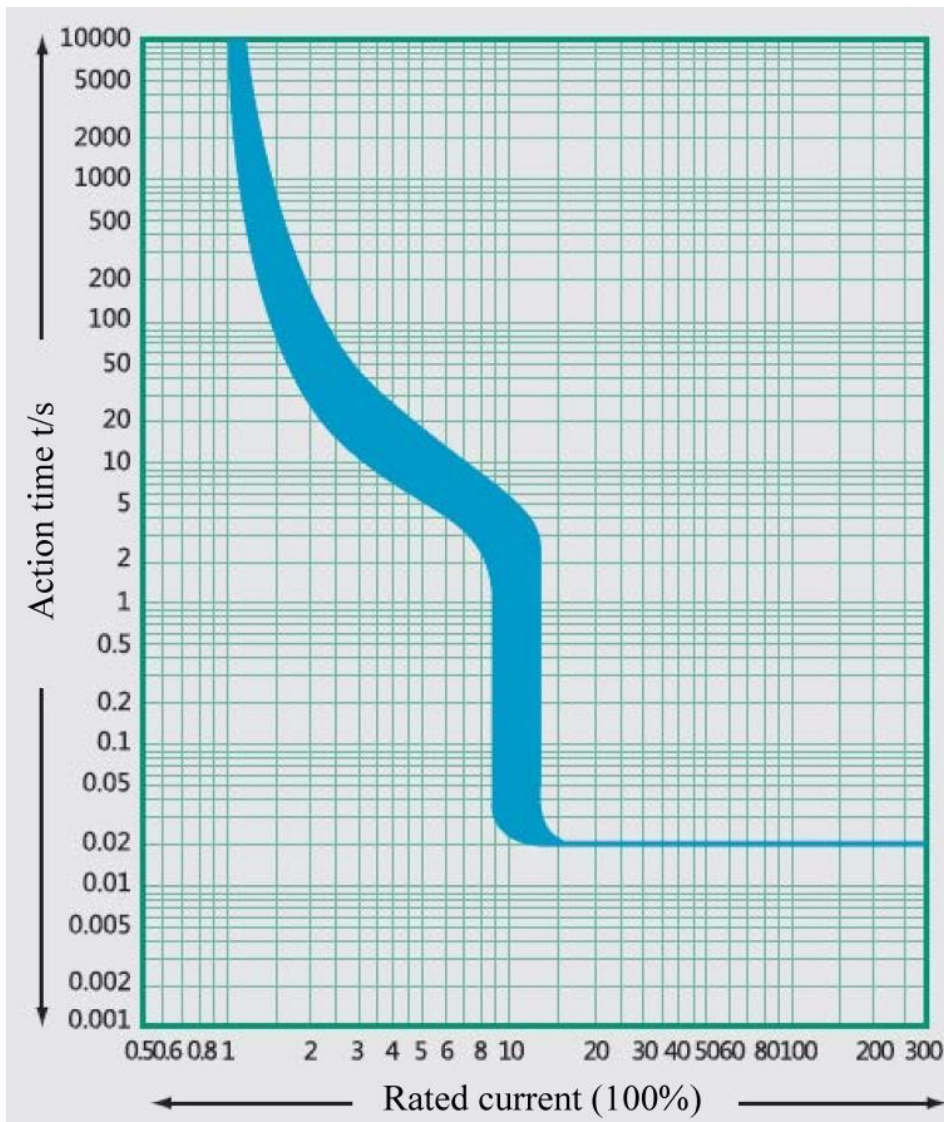
Table 7 Power loss coefficient table of circuit breaker

Model	Energizing current(A)	Total power loss(W)
		Wiring before and after board
NDM2L-125	125	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 $-35^{\circ}\text{C} \sim +70^{\circ}\text{C}$; the average within 24 h shall not be more than $+35^{\circ}\text{C}$. If the ambient temperature is higher than $+40^{\circ}\text{C}$, the user needs to reduce the capacity. See the "Derating Factor Table of Temperature Change for the Circuit Breaker" for the derating factor;
- 3) Its relative humidity at an ambient temperature of $+40^{\circ}\text{C}$ should not exceed 50%. A higher relative humidity is allowed at a lower temperature. For example, the relative humidity at 20°C can reach 90%; for frost due to temperature change, the corresponding measures should be taken;
- 4) The product can withstand the effects of wet air, salt mist, oil mist and mould;
- 5) The installation category of the 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.

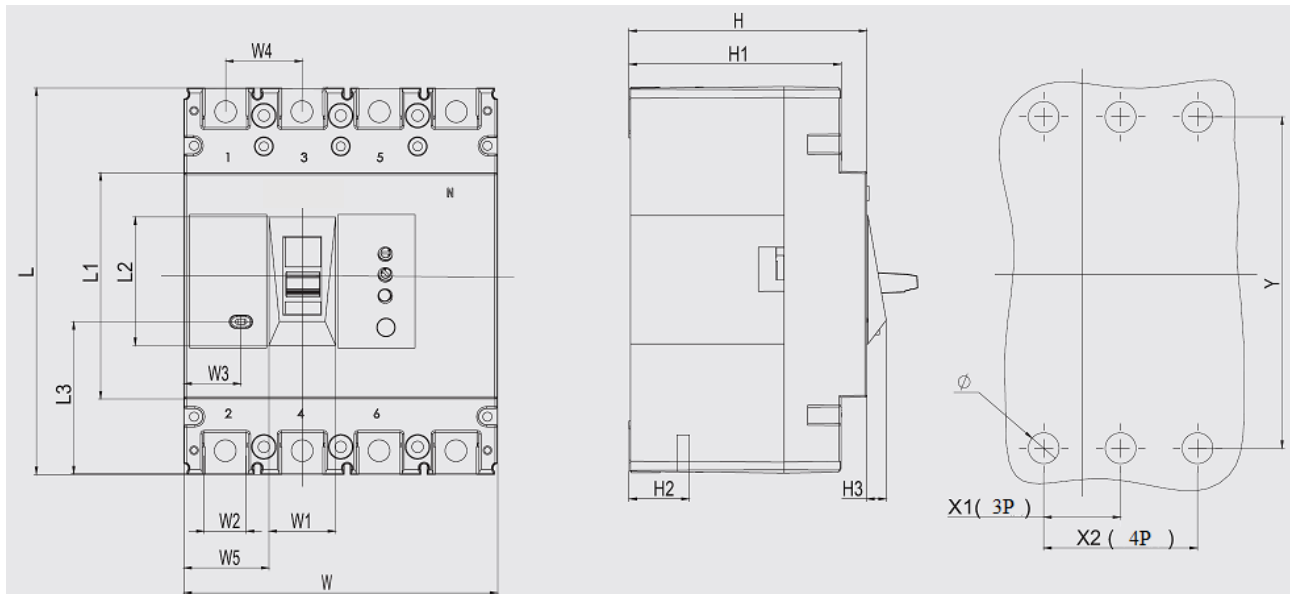
6. Short-circuit Overload Protection Characteristic Curve of Circuit Breaker



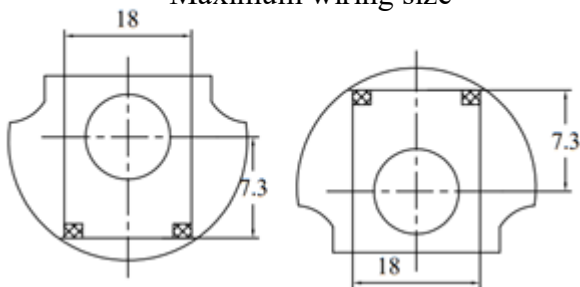
Time/Current Characteristic Curve

7. Outline and Mounting Hole Dimensions of Circuit Breaker

7.1 Outline and mounting hole dimensions of circuit breaker



Maximum wiring size

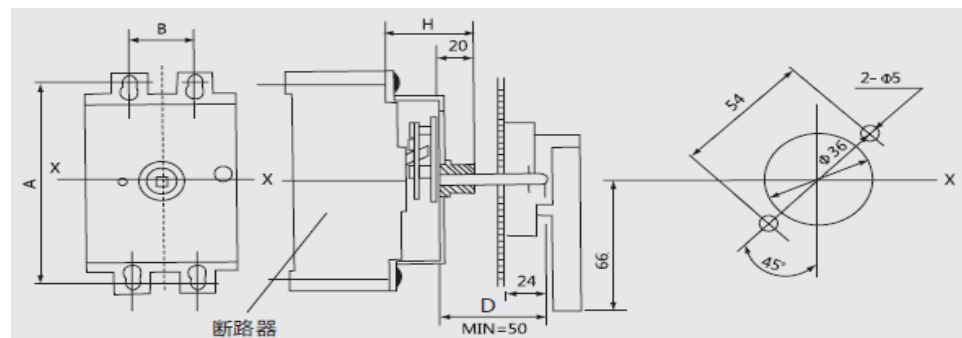


Product model	L	L1	L2	L3	W		W1	W2	W3	W4	W5	H	H1	H2	H3	Y	X1	X2	Φ
					3P	4P													
NDM2L-125	150	88	50	59	92	122	26	18	22	30	33	92.5	82.5	29	7.5	129	30	60	4.5

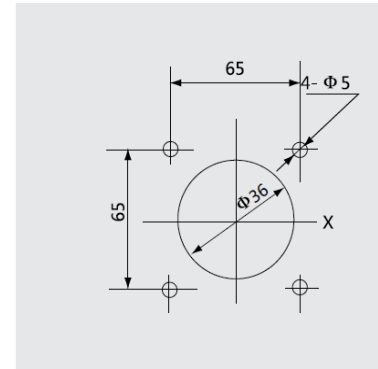
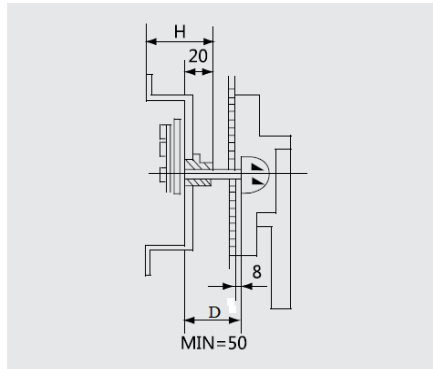
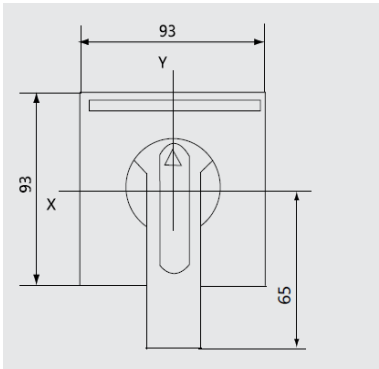
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.2 Manual operating mechanism

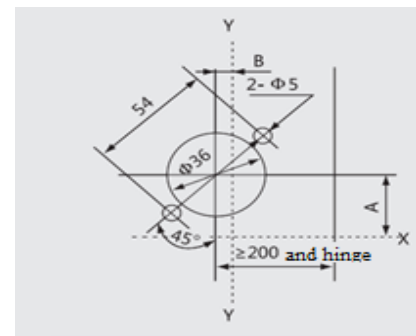
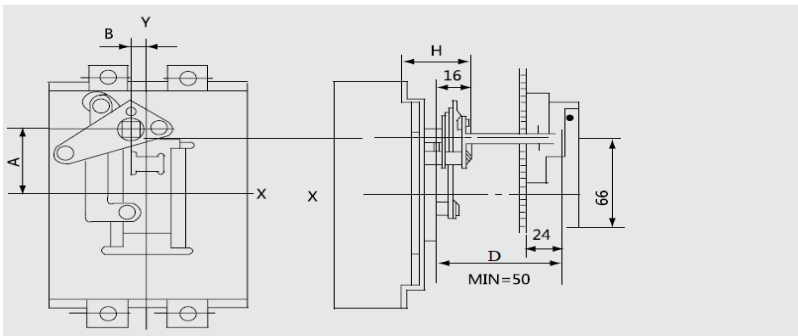
7.2.1 Manual operating mechanism and CS1-A handle



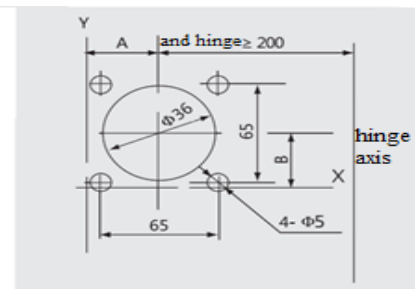
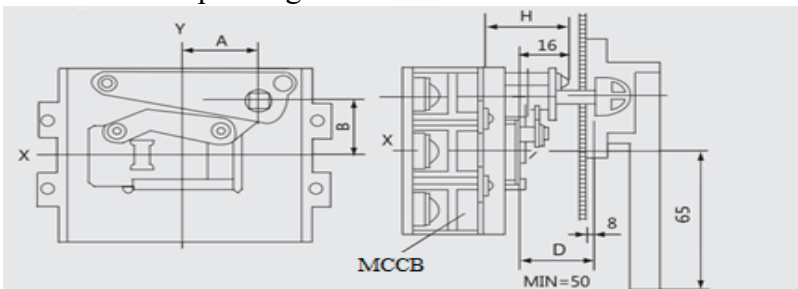
7.2.2 Manual operating mechanism and CS1-F handle



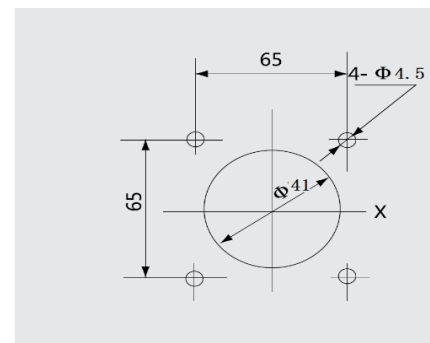
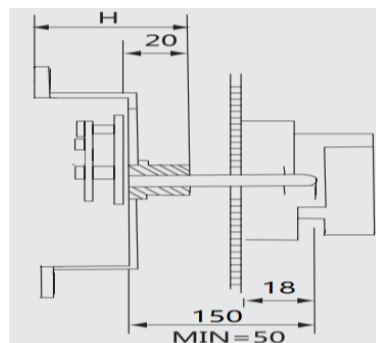
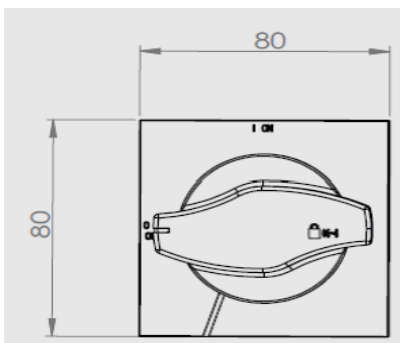
7.2.3 Manual operating mechanism and CS2-A handle



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

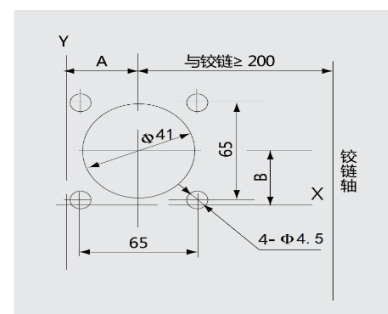
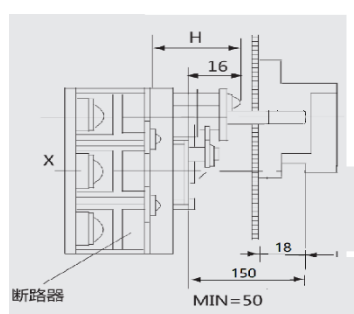
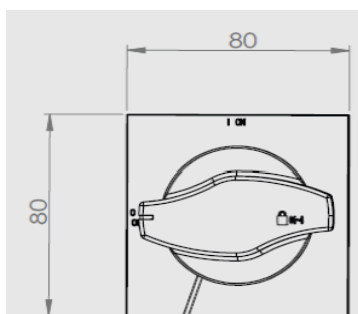


Table 8 Installation dimension of manual operating mechanism (Unit: mm)

Manual operation type	Model	Installation dimension of manual operating mechanism			Installation mode
		H	A	B(3/4P)	
CS1	NDM2L-125	69	104	30	Vertical installation
CS2	NDM2L-125	46	35	11.5	

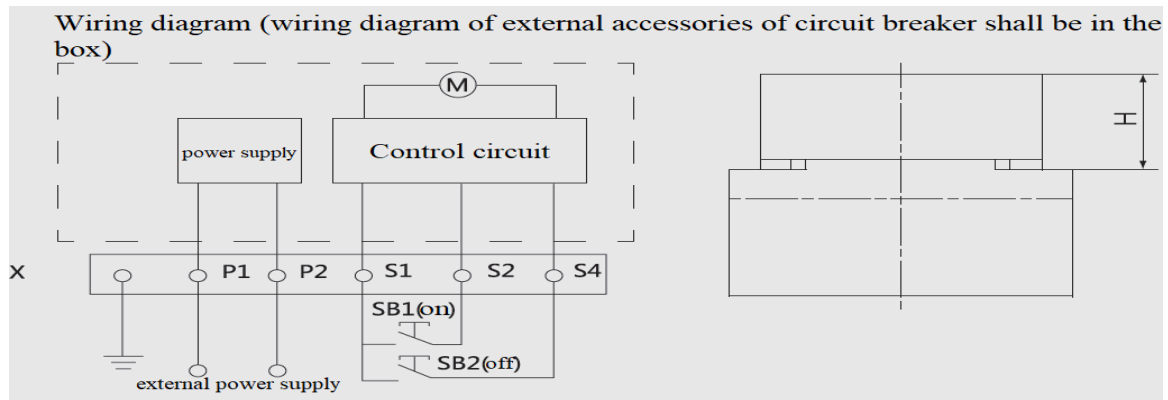
Note:1) A type is round handle, F type is square handle;

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、AC230V、AC400V、DC24V、DC110V、DC220V

Table 9 Main technical parameters of electric operating mechanism

Equipped with circuit breaker	Electric power(W)	service life / time	Operating mechanism height H(mm)
	AC/DC220V		
NDM2L-125	180	20000	93.5

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-125	25	65	30	30

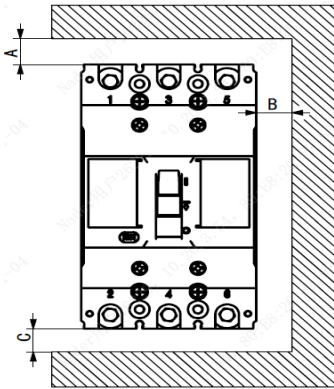


Table 11 Minimum Center Distance between Rowed Circuit Breakers (Unit: mm)

Model	Width of circuit breaker		I Center distance	
	3 poles	4 poles	3 poles	4 poles
NDM2L-125	92	122	122	152

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.

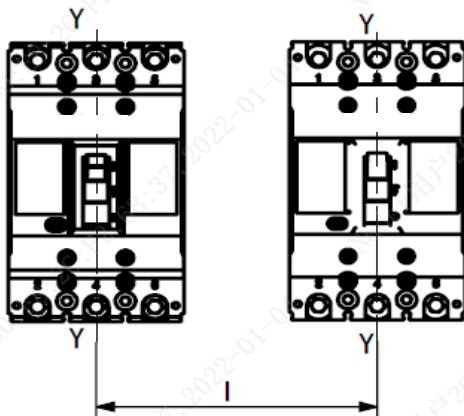


Table 12 Minimum Distance between Stacked Circuit Breakers (Unit: mm)

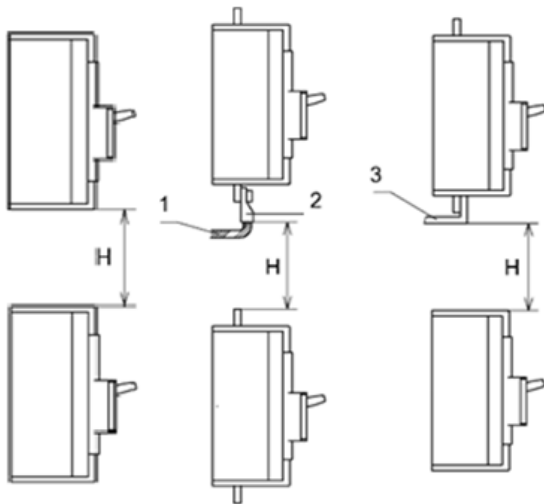
Model	H (distance of circuit breaker from bottom)	
	With a terminal cover	Without a terminal cover
NDM2L-125	90	91

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

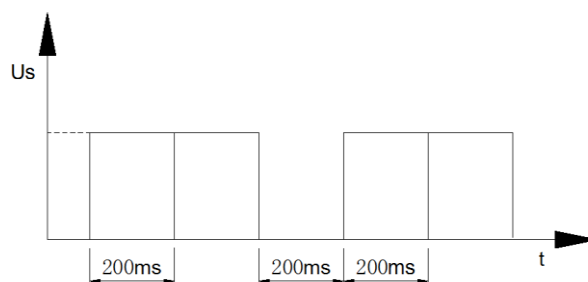
8.1 Shunt release

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

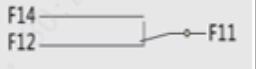
Model	Shunt release	DC24V	AC230V	DC220V	AC380V
NDM2L-125	Instantaneous current value(A)	6.8	0.5	0.3	0.4
	Power waste (W)	164.5	115	76.2	155.6

Note: The working principle of shunt release device: there is a coil inside the shunt release device, which can only work for a short time, and the shunt action is a single pulse action (it is recommended that the power supply time is greater than 200ms). Shunt trip power (received signal) to the product trip time is $\leq 200\text{ms}$, it is recommended to use 500ms-1s pulse power supply, Pulse count not exceeding three times.



Working principle diagram of shunt trip device

8.2 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 "		

8.2.1 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	125	3	1.5	0.15
Minimum load: 5V/160mA				

8.2.2 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

8.2.3 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

8.3 Alarm contact

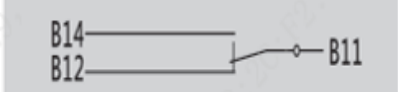
The circuit breaker is in the position of "opening" and "closing"	
The circuit breaker is in the position of "free tripping"	

Table 18 Current parameters of alarm contact

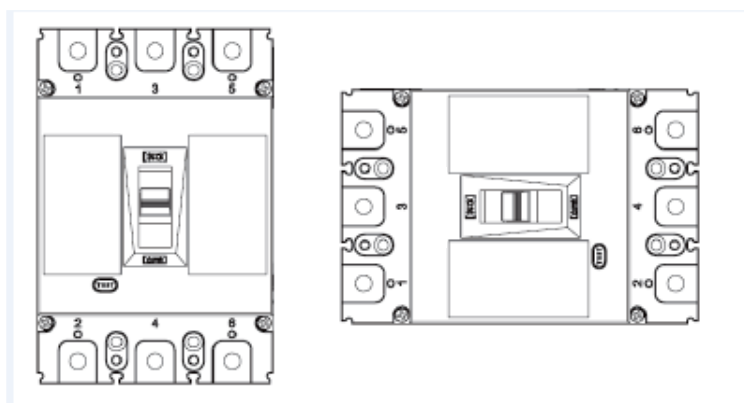
Category	Frame current (A)	Conventional thermal current Ith(A)	Rated working current Ie(A)	
			AC400V	DC220V
Alarm contact	125	3	0.3	0.15

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 $\pm 22.5^\circ$.

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 $-40^\circ\text{C} \sim +75^\circ\text{C}$. No acidic alkaline or other corrosive gas exists in the ambient air in the warehouse. Under the conditions above, the storage period shall be no more than three years since the manufacturing date.

11. Circuit breaker factory accessories list

SN	Name	Specification	3P Quantity/Set	4P Quantity/Set
1	Cross small pan-head screw	M4×40	4	4
2	Hexagon nut	M4	4	4

3	Plain washer	4	4	4
4	Phase partition	——	4	6
5	Combination wiring screw	M8X22	6	8
6	CBR	NDM2L-125	1	1

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.