Shanghai Liangxin Electrical Co., Ltd.

NDM3L-125 Product Specification

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

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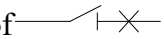
Revision History					
Version	Revision Reason/Content	Implementation Date	Prepared by	Reviewed by	Approved by
0	Newly added	5/8/2020	Wang Hu	Peng Haorang	Hu Qi
1	Update the product appearance picture and product dimension outline drawing	30/9/2021	Sun Lanping	Xiao Botao	Ding Fei
2	Add attachment information	11/11/2022	Yang rongrong	Mei yang	Ding Fei

1. Applicable Scope and Purpose of Circuit Breaker

The NDM3L-125 circuit breaker with the residual current protection (hereinafter referred to as circuit breaker) applies to the AC50/60Hz, the working voltage of AC415V and the working current up to 125A for infrequent switching as well as infrequent motor starting. 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	3	L - □	□ / □	□	□/ □	□	□	□	□	□	□	□
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

SN	SN name	NDM3L
1	Enterprise code	ND: “Nader” low-voltage apparatus
2	Product code	M: Molded case circuit breaker (MCCB)
3	Design SN	3
4	Derived code of the series	L: Residual current protection
5	Shell frame level	125
6	Operation mode	No code: Direct handle-operated mode
		P: Motor-operated
		Z: Rotary operation
7	Derived code of the function	A: Type A current leakage protection type
		AC: Type AC current leakage protection type
8	Delay type	X: Non-time delay
		Y: Delay
		XB: Non-time delay and alarm tripping
		YB: Delay and alarm tripping
		XI: Non-time delay and alarm non-tripping
		YI: Delay and alarm non-tripping
9	Type of residual current release	V:30mA,100mA,300mA,500mA,1000mA
10	Number of poles	3, 4
11	Release code	0: Release (none)
		2: Instantaneous tripper only
		3: Complex tripper
12	Accessory code	See Table 1
13	Application code	No code: Power distribution type
		2: Motor protection type
14	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
15	Rated current	See Table 2
16	Cabling type	No code: Normal product
		P: Connection busbar
17	Other type	CS1-A/150: Circular center hole rotary handle + shaft length 150mm
		CS1-A/200: Circular center hole rotary handle + shaft length 200mm
		CS1-A/300: Circular center hole rotary handle + shaft length 300mm
		CS1-A/350: Circular center hole rotary handle + shaft length 350mm

		CS1-A/650: Circular center hole rotary handle + shaft length 650mm
		CS1-F/150: Square center hole rotary handle + shaft length 150mm
		CS1-F/200: Square center hole rotary handle + shaft length 200mm
		CS1-F/300: Square center hole rotary handle + shaft length 300mm
		CS1-F/350: Square center hole rotary handle + shaft length 350mm
		CS1-F/650: Square center hole rotary handle + shaft length 650mm
		CS2-A/150: Circular eccentric hole rotary handle + shaft length 150mm
		CS2-A/200: Circular eccentric hole rotary handle + shaft length 200mm
		CS2-A/300: Circular eccentric hole rotary handle + shaft length 300mm
		CS2-A/350: Circular eccentric hole rotary handle + shaft length 350mm
		CS2-A/650: Circular eccentric hole rotary handle + shaft length 650mm
		CS2-F/150: Square eccentric hole rotary handle + shaft length 150mm
		CS2-F/200: Square eccentric hole rotary handle + shaft length 200mm
		CS2-F/300: Square eccentric hole rotary handle + shaft length 300mm
		CS2-F/350: Square eccentric hole rotary handle + shaft length 350mm
		CS2-F/650: Square eccentric hole rotary handle + shaft length 650mm
		DC1 24V:Electric operation voltage DC24V
		DC1 110V: Electric operation voltage AC/DC110V
		DC1 220V: Electric operation voltage AC230V/DC220V
		DC1 380V: Electric operation voltage AC380/400/415V
		AC230V: Shunt release operation voltage AC200V/AC230V
		AC380V: Shunt release/ Under-voltage release operation voltage AC380V/AC400V/AC415V
		DC24V：Shunt release operation voltage DC24V
		DC220V：Shunt release operation voltage DC220V
		Z: Terminal housing
		MS2：MS2 lock
Note: 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.		

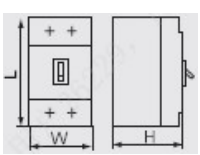
Table 1: Comparison Table of Accessory Code:

Accessory code	Accessory name	Installation Position / Model / Number of Poles: NDM3L-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.

4. Main Technical Parameters of Circuit Breaker

Table 2 Main Technical Parameters of Circuit Breaker

Model			NDM3L-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		
Rated limit short-circuit breaking capacity Icu (kA)			70	70		
Rated operating short-circuit breaking capacity Ics (kA)			50	50		
Rated residual short-circuit making and breaking capacity I△m(kA)			0.25Icu			
Rated residual action current I△n(mA)	Non-time delay	Type AC	30	30		
			100/300/500	100/300/500		
		Type A	/	30/100/300/500/1000		
	delay	Type AC	100/300/500	100/300/500		
		Type A	/	100/300/500/1000		
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	2000			
		Maintainable life	40000			
Boundary dimension		L (mm)	225	225		
		W (mm)	92	122		
		H (mm)	87	87		
Flashover distance(mm)			≤50			

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

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

Table 3 Selection of the NDM3L-125 Circuit Breaker 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)
NDM3L-125	M8	12
	M4	2.4

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 Table of Product Temperature							
NDM3L-125	Temperature (℃)	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℃, 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

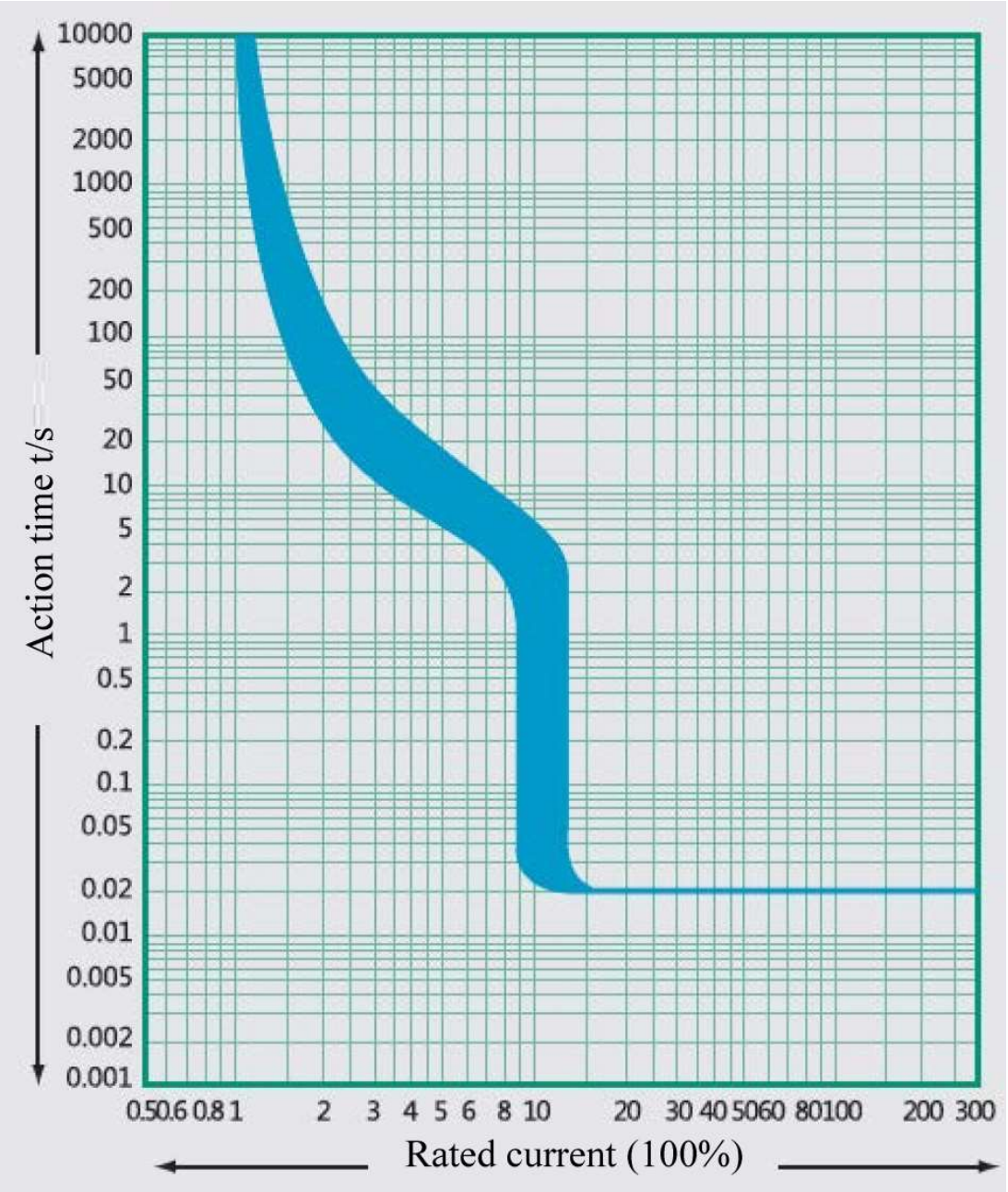
Table 7 Power loss coefficient table of circuit breaker

Model	Energizing current(A)	Total power loss(W)
		Wiring before and after board
NDM3L-125 Direct heating type (16-25A)	25	40
NDM3L-125 Mesothermal (32-125A)	125	39

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.

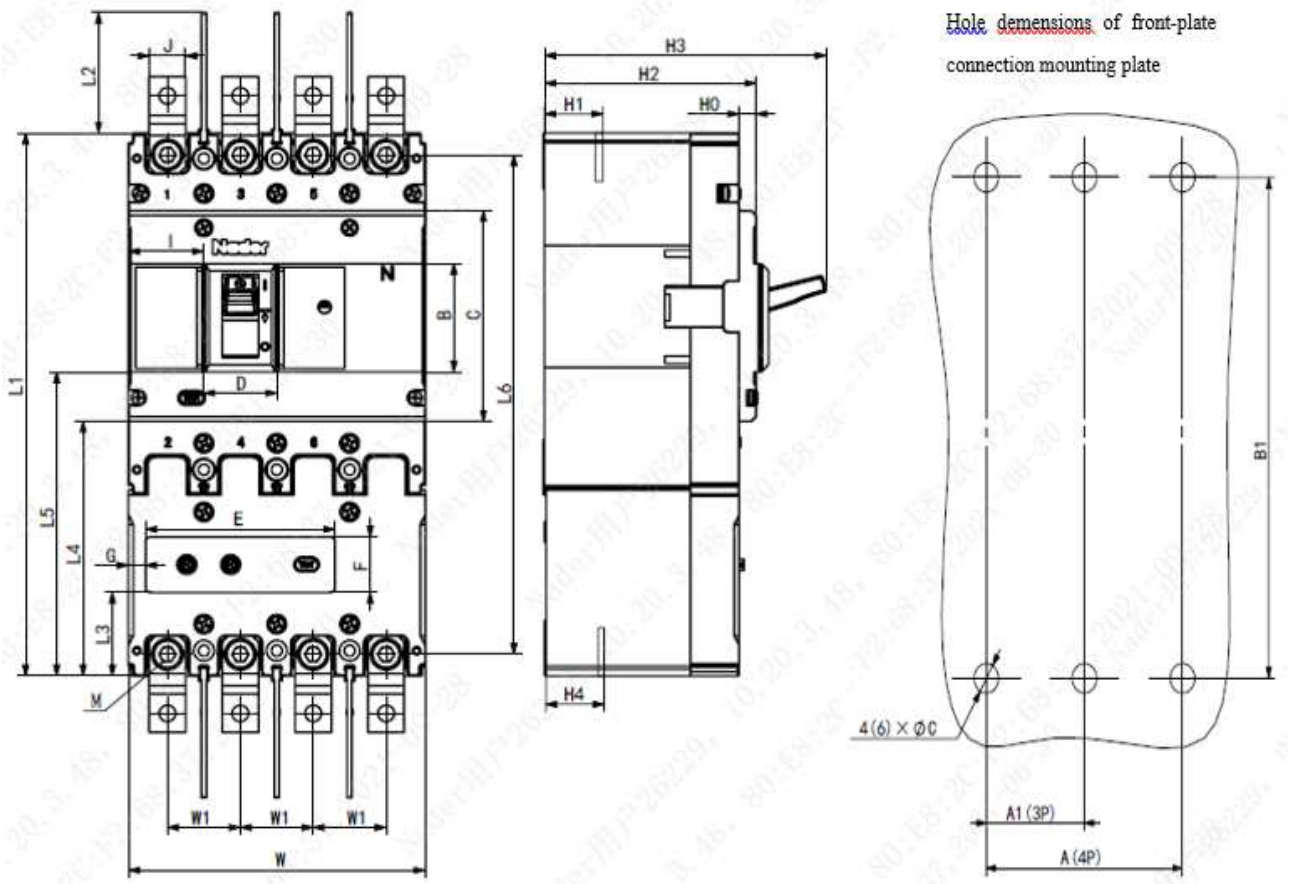
6. Short-circuit Overload Protection Characteristic Curve of Circuit Breaker



Time/Current Characteristic Curve

7. Outline and Mounting Hole Dimensions of Circuit Breaker

7.1 Outline and mounting hole dimensions of circuit breaker



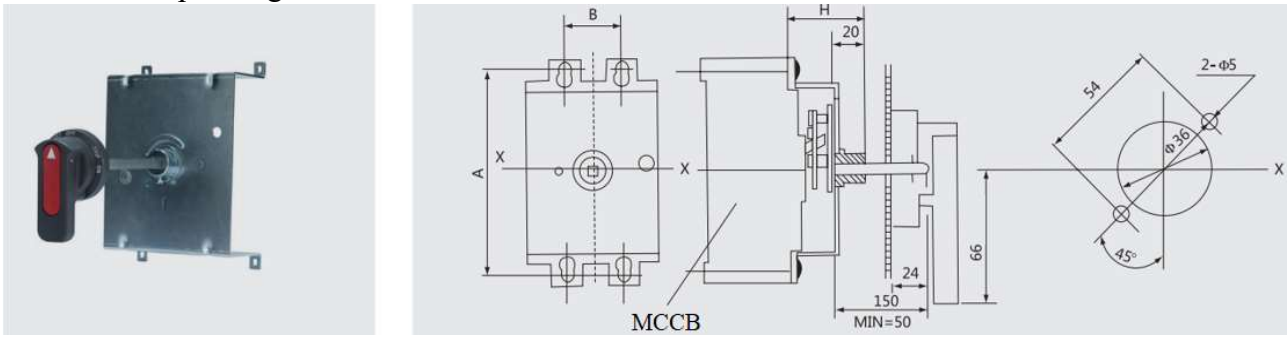
Model	Overall dimensions																		
	L1	W 3P	W 4P	L2	M	H1	H2	H3	H4	A	B1	Ø	A1	L3	W1	J	L4	L5	L6	H0
NDM3L-125	225	92	122	50	8	24	87	118	-	60	204	4.5	30	34.7	30	15	105.5	126	207.5	7

Model	B	C	D	E	F	I	G
NDM3L-125	45	87.5	31	78	23	30.7	7

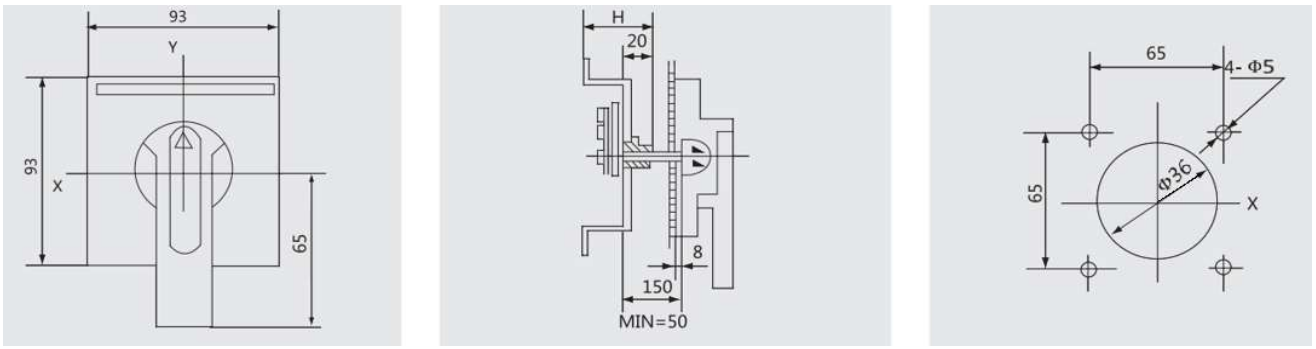
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.2 Manual operating mechanism

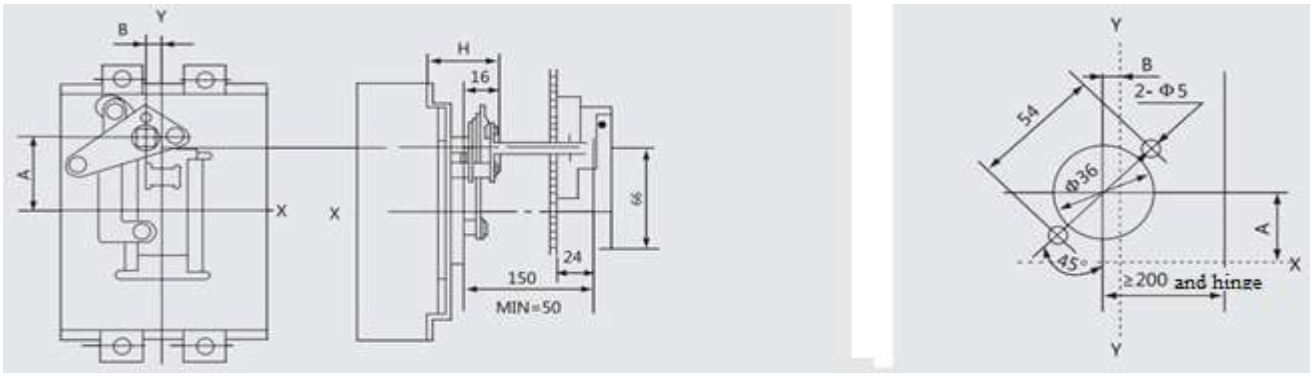
7.2.1 Electric operating mechanism and CS1-A handle



7.2.2 Electric operating mechanism and CS1-F handle



7.2.3 Electric operating mechanism and CS2-A handle



7.2.4 Electric operating mechanism and CS2-F handle

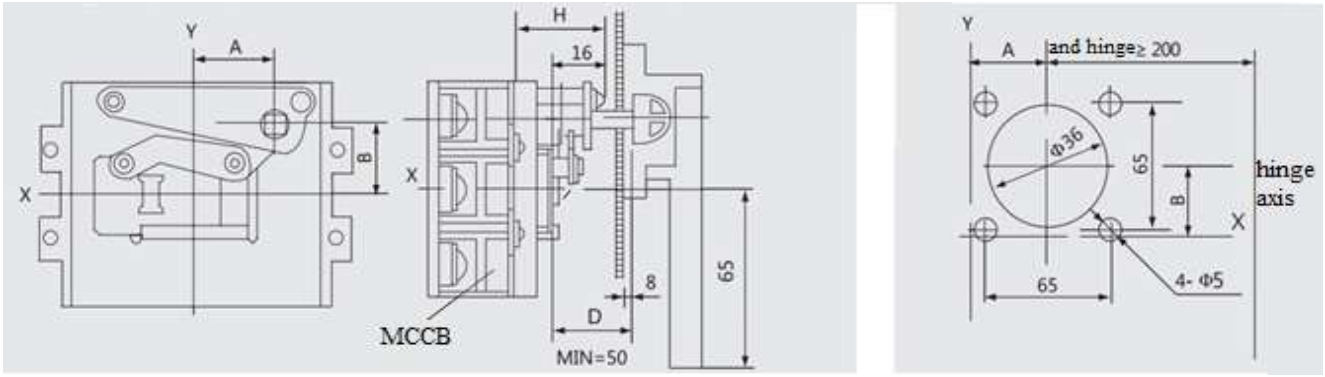


Table 8 Installation mode of electric operating mechanism (Unit: mm)

Manual operation type	Model	Installation dimension of manual operating mechanism				Installation mode
		H	A	B		
				3P	4P	
CS1	NDM3L-125	54	104	30		Vertical installation
CS2	NDM3L-125	46	35	11.5		

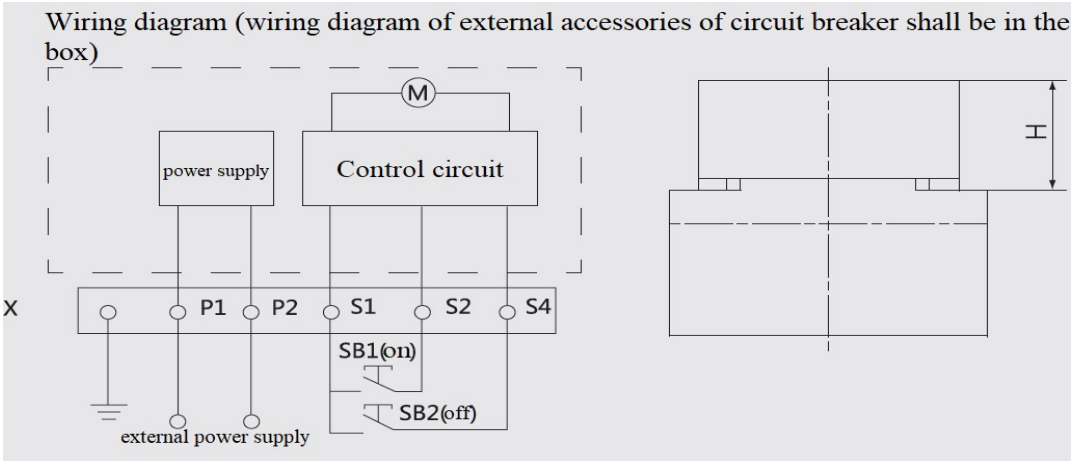
Note :1)Type A is round handle, type F is square handle;

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

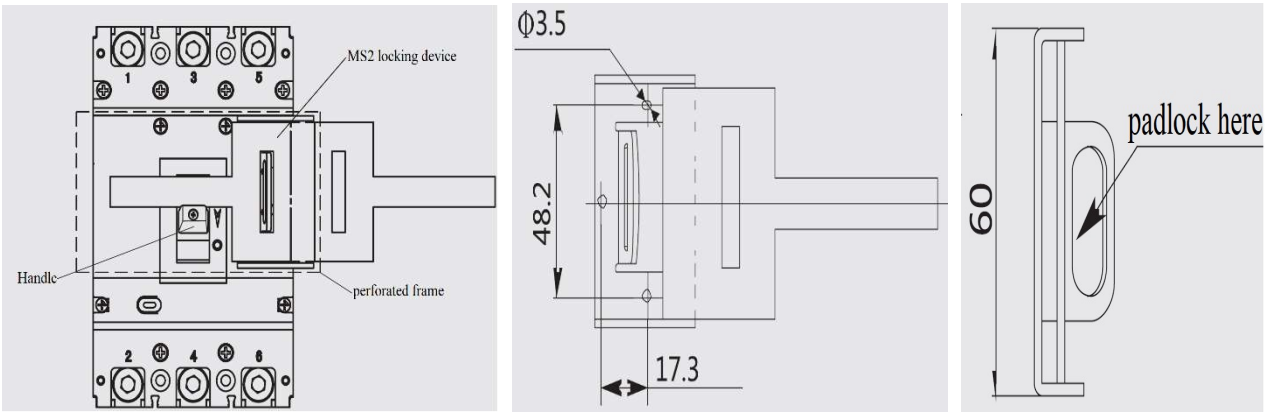
Voltage specification: AC110V、AC220V、AC400V、DC24V、DC110V、DC220V

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/DC220 V	AC/DC110 V	AC400 V	DC24 V		
NDM3L-125	≤0.5	≤180	≤180	≤350	80	20000	90

7.4 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 ndm3L series products to prevent manual closing and opening (the dotted line part is the circuit breaker part).



Installation diagram of MS2 lock mechanism (Unit: mm)

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

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

7.5 Mechanical interlocking

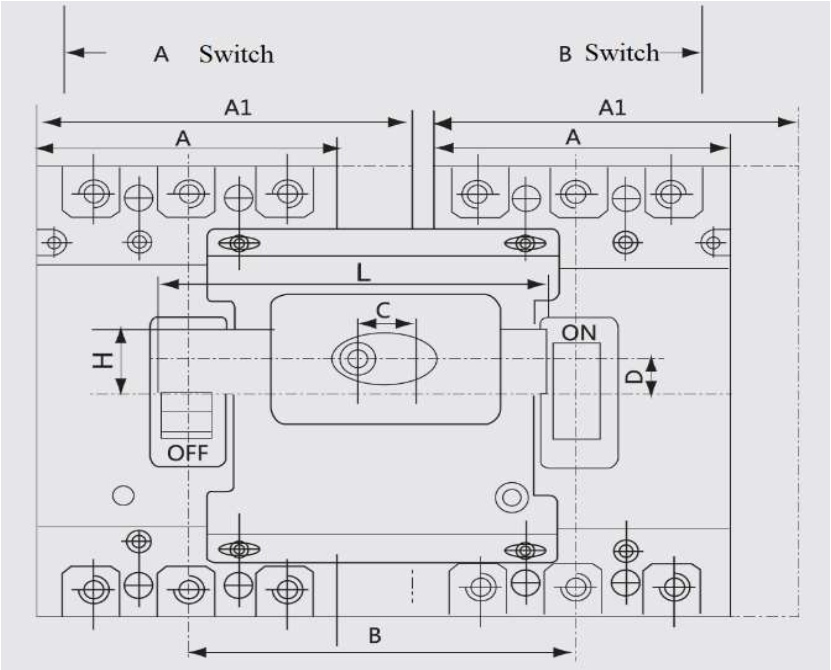


Table 10 Installation dimension of mechanical interlocking (Unit: mm)

Model	A	A1	B	C	D	L	H
NDM3L-125	92	/	120	45	10	136	22
NDM3L-125（4P)	/	122	152	45	10	166	22

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

7.6 Safe mounting distance of circuit breaker

Table 11 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		
NDM3L-125	25	65	30	30

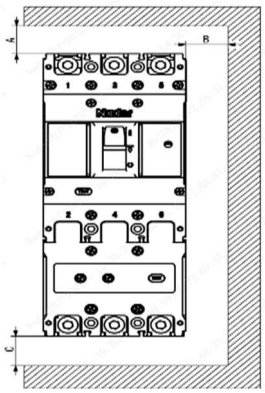


Table 12 Minimum Center Distance between Rowed Circuit Breakers (Unit: mm)

Model	Width of circuit breaker		I Center distance	
	3 poles	4 poles	3 poles	4 poles
NDM3L-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.

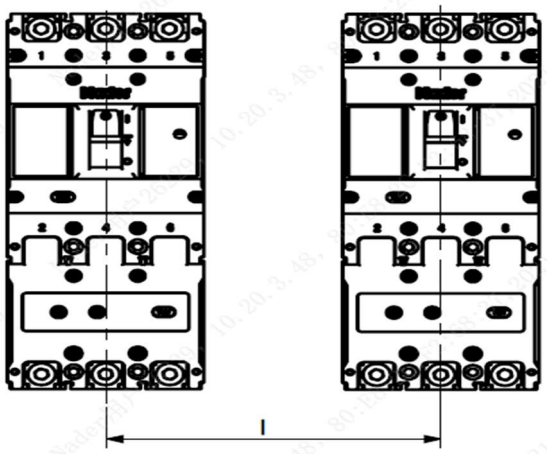


Table 13 Minimum Distance between Stacked Circuit Breakers (Unit: mm)

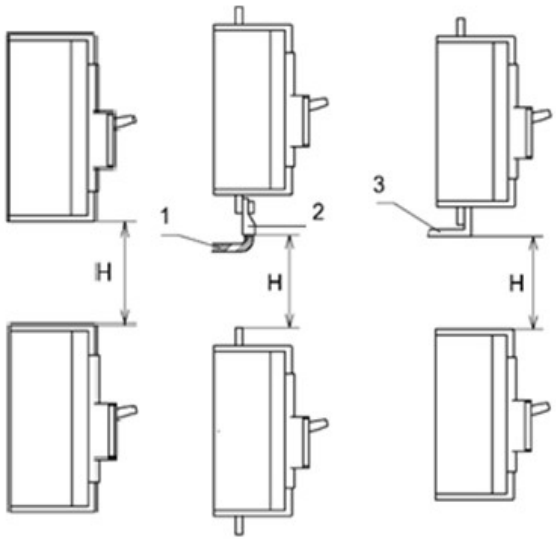
Model	H (distance of circuit breaker from bottom)	
	With a terminal cover	Without a terminal cover
NDM3L-125	90	91

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 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 14 Voltage Specifications and Power Consumption of Under-voltage Release

Model	Instantaneous current value（A）		Power waste (W)	
	AC400V	AC230V	AC400V	AC230V
NDM3L-125	0.01	0.006	0.3	0.3

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.

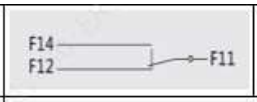
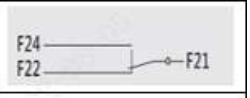
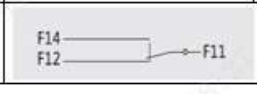
8.2 Shunt release

When impressed voltage of shunt tripper is between 70% and 110% of rated control power voltage, the breaker can be reliably broken.

Table 15 Voltage Specifications and Power Consumption of shunt release

Model	Shunt release	DC24V	AC230V	DC220V	AC400V
NDM3L-125	Instantaneous current value(A)	4	0.25	0.24	0.43
	Power waste (W)	97.6	57.5	52.6	173.9

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 16 Current parameters of auxiliary contact

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

8.3.2 Electrical life of auxiliary contact

Table 17 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 18 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

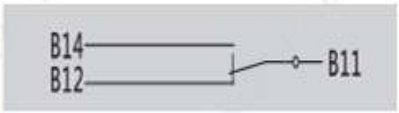
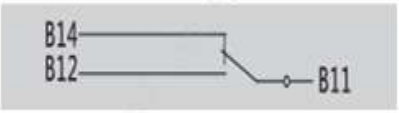
The circuit breaker is in the position of "opening" and "closing"	
The circuit breaker is in the position of "free tripping"	

Table 19 Current parameters of alarm contact

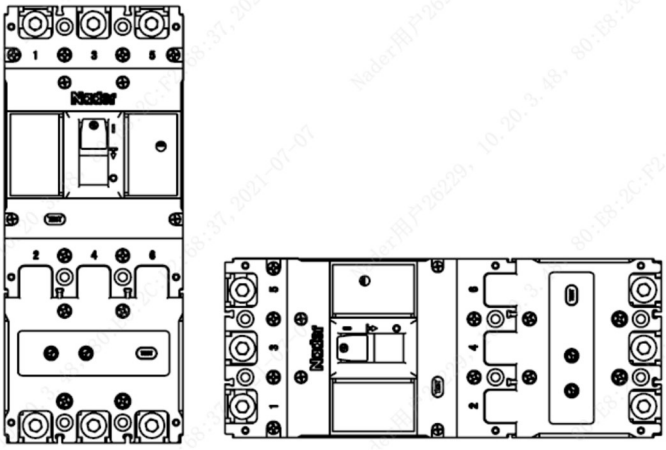
Category	Frame current (A)	Conventional thermal current Ith(A)	Rated working current Ie(A)	
			AC400V	DC220V
Alarm contact	125	3	0.3	0.15

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 ±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 Accessory List of Circuit Breaker

SN	Name	Specification	3P Quantity/Set	4P Quantity/Set
1	Cross small pan-head screw	M4×45	4	6
2	Hexagon nut	M4	4	6
3	Spring washer	4	4	6
4	Plain washer	4	4	6
5	Phase partition	——	4	6
6	Hexagon socket cylindrical head combination	M8×20	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.