

Shanghai Liangxin Electrical Co., Ltd.

P02094-NDM3L-800
Product Specification

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

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Revision History					
Version	Revision Reason/Content	Implementat ion Date	Prepared by	Reviewe d by	Approve d by
0	New addition	20210901	Yang Wenxue	Zhang Ying	Wu Yali
1	Delete specifications and Model description No. 17	20211008	Yang Wenxue	Zhang Ying	Wu Yali
2	Add attachment information	20221226	Yang rongrong	Zhang jun	Ding Fei

1. Applicable Scope and Purpose of Circuit Breaker

The NDM3L-800 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 800A 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 $\text{---} \diagup \diagdown \text{---}$;

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 1	M 2	3 3	L - 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				800											
6	Operation mode				No code: Direct handle-operated mode											
					P: Motor-operated											
					Z: Rotary operation											
7	Derived code of the function				AC: Type AC current leakage protection type											
					A: Type A current leakage protection type											
8	Delay type				XY: Non-time delay、Delay											
					XYI: Non-time delay、Delay alarm non-tripping											
9	Type of residual current release				V: 30mA、100mA、300mA、500mA、1000mA											
					W:1A、3A、10A、30A											
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											
					D: The N-pole is installed with an overcurrent tripper, but always connected											
15	Rated current				See Table 2											
16	Cabling type				No code: Normal product											
					P: Connection busbar											
					Z1: Rear-plate connection											
					Z2H: Plug-in rear-plate connection											
					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
	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/ Under-voltage release operation voltage AC220/230V
	AC380V: Shunt release/ Under-voltage release operation voltage AC380V/AC400V/AC415V
	DC24V: Shunt release operation voltage DC24V
	DC220V: Shunt release operation voltage DC220V
	MS2: MS2 lock
	J: Mechanical interlocking
	Z: Terminal housing
	S: Heating handle
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.	

Note: 30mA residual current gear does not have the function of "leakage alarm and no trip".

Table 1: Comparison Table of Accessory Code:

Accessory code		Accessory name	Model	NDM3L-630	
				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-800			
Rated current of frame I_{nm} (A)			800			
Rated current I_n (A)			500, 630,700,800			
Rated insulation voltage U_i (AC V)			1000			
Rated impulse withstand voltage U_{imp} (V)			8000			
Rated working voltage U_e (AC V)			380/400/415			
Utilization category			A			
Number of poles			3、4			
Rated limit short-circuit breaking capacity I_{cu} (kA)			70			
Rated operating short-circuit breaking capacity I_{cs} (kA)			70			
Rated residual short-circuit making and breaking capacity $I_{\Delta m}$ (kA)			0.25 I_{cu}			
Rated residual action current $I_{\Delta n}$ (mA)	Non-time delay、delay	Type A	V: 30/100/300/500/1000			
			W: 1A/3A/10A/30A			
		Type AC	V: 30/100/300/500/1000			
			W: 1A/3A/10A/30A			
Rated residual non-action current $I_{\Delta no}$ (mA)			0.5 $I_{\Delta n}$			
Residual current action time	Residual current		$I_{\Delta n}$	$2I_{\Delta n}$	$5I_{\Delta n}$	$10I_{\Delta n}$
	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		7500			
	Mechanical life	Without maintenance	10000			
		With maintenance	20000			
Boundary dimension			L(mm)	280		280
			W(mm)	210		280
			H(mm)	113.5		113.5
Flashover distance(mm)			≤100			

Note: When the rated residual operating current is 30mA, only non-delay type is available, 30mA residual current gear does not have the function of "leakage alarm and no trip".

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

Table 3 Selection of the NDM3L-800 Circuit Breaker Connecting Bus or Cable Cross-section Area

Rated current (A)	Cable section		Copper bar size	
	Quantity	Cross-section area (mm ²)	Quantity	Cross-section area (mm ²)
500	2	150	2	30×5
630	2	185	2	40×5
700	2	240	2	50×5
800	2	240	2	50×5

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-800	M12	28
	M6	6

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-800	Temperature (°C)	40	45	50	55	60	65	70
	Derating factor	1	0.979	0.958	0.937	0.915	0.893	0.871

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

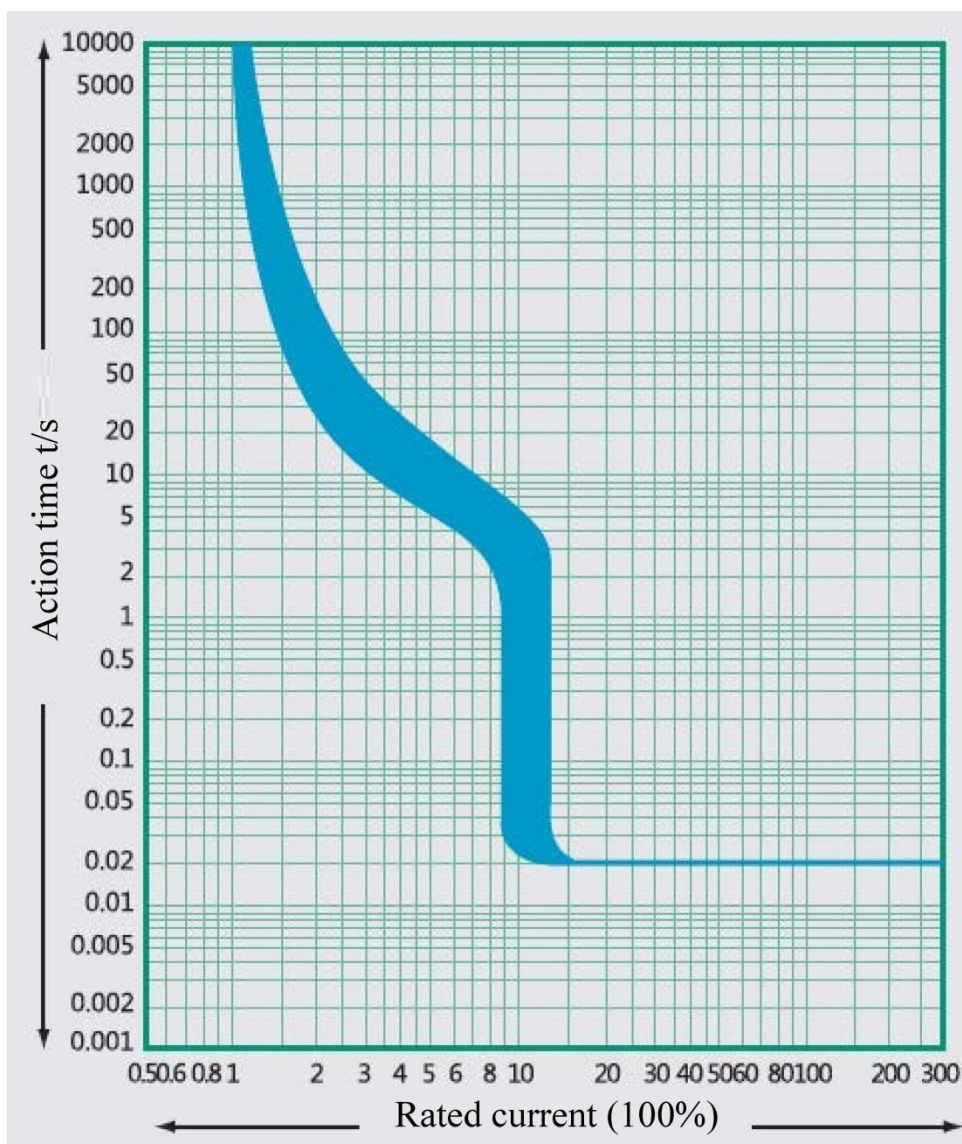
Table 7 Power loss coefficient table of circuit breaker

Model	Energizing current(A)	Total power loss(W)
		Wiring before and after board
NDM3L-800	800	192

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) Level of protection : IP20;
- 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.

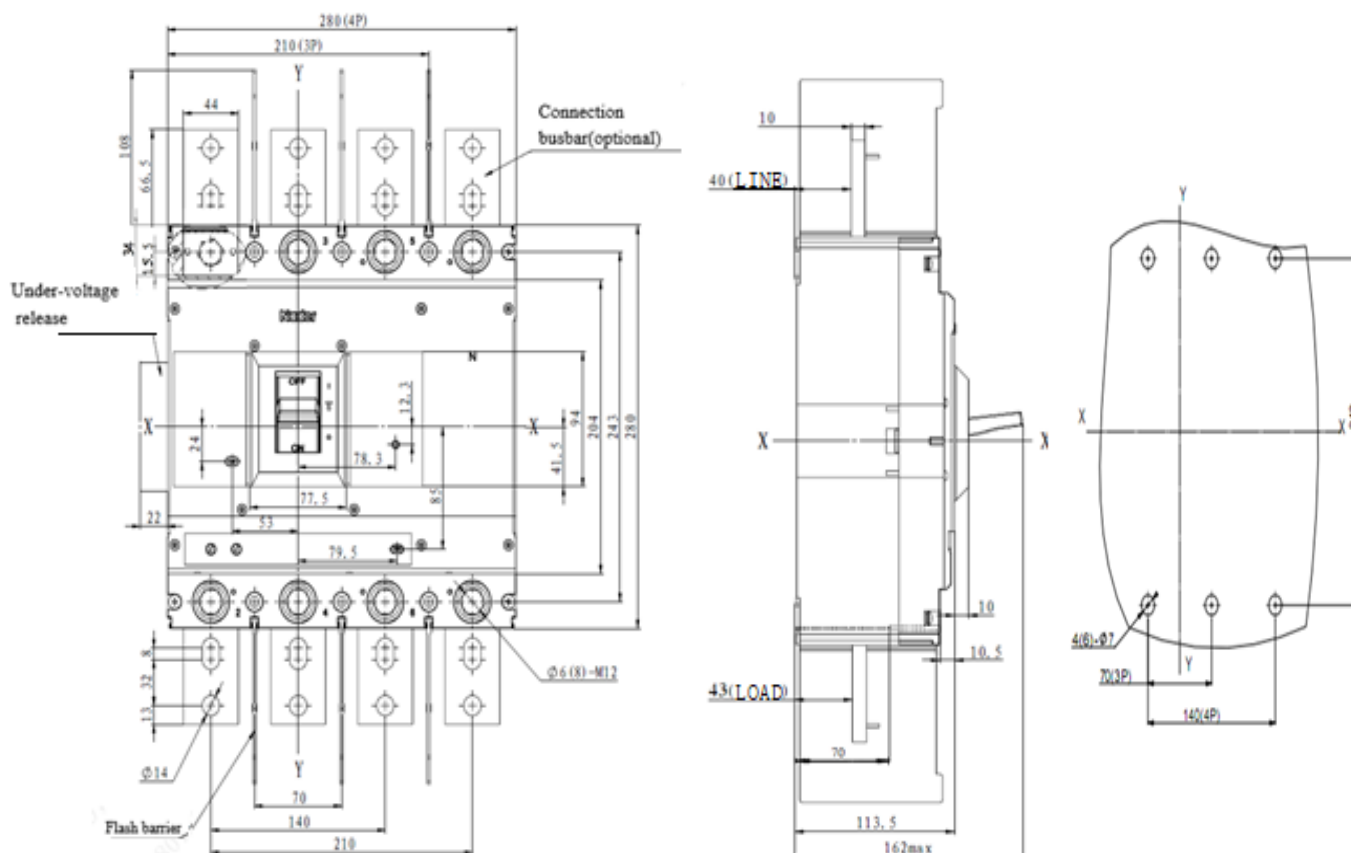
6. Short-circuit Overload Protection Characteristic Curve of Circuit Breaker



Time/Current Characteristic Curve

7. Outline and Mounting Hole Dimensions of Circuit Breaker

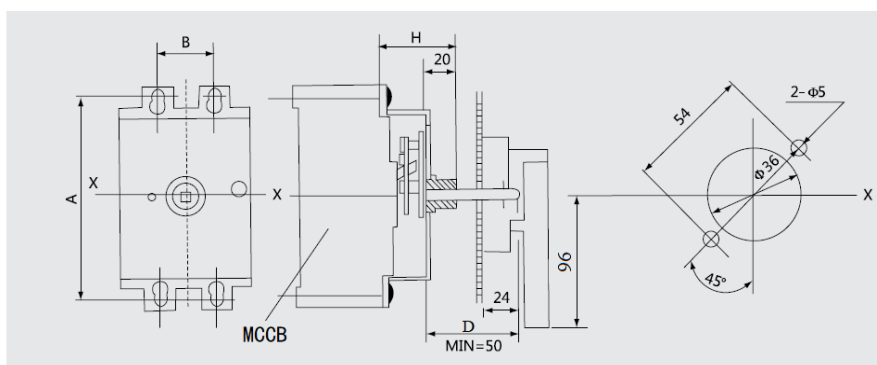
7.1 Outline and mounting hole dimensions of circuit breaker



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 Electric operating mechanism and CS1-A handle



7.2.2 Electric operating mechanism and CS1-F handle

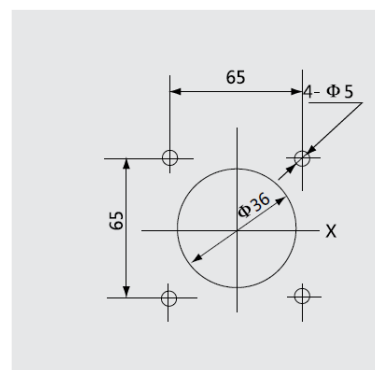
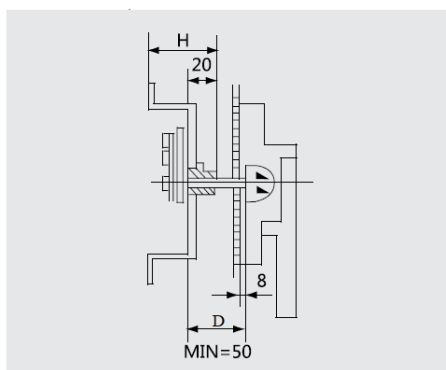
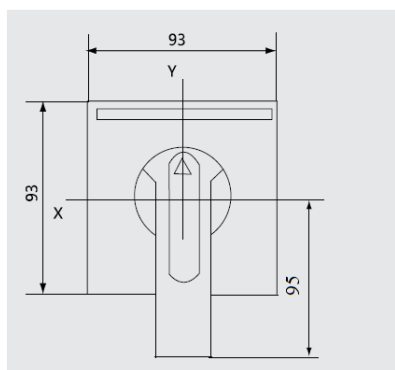


Table 8 Installation mode of electric operating mechanism

Manual operation type	Model	Installation dimension of manual operating mechanism				Installation mode
		H	A	B		
				3P	4P	
CS1	NDM3L-800	82	200	198	268	Vertical installation

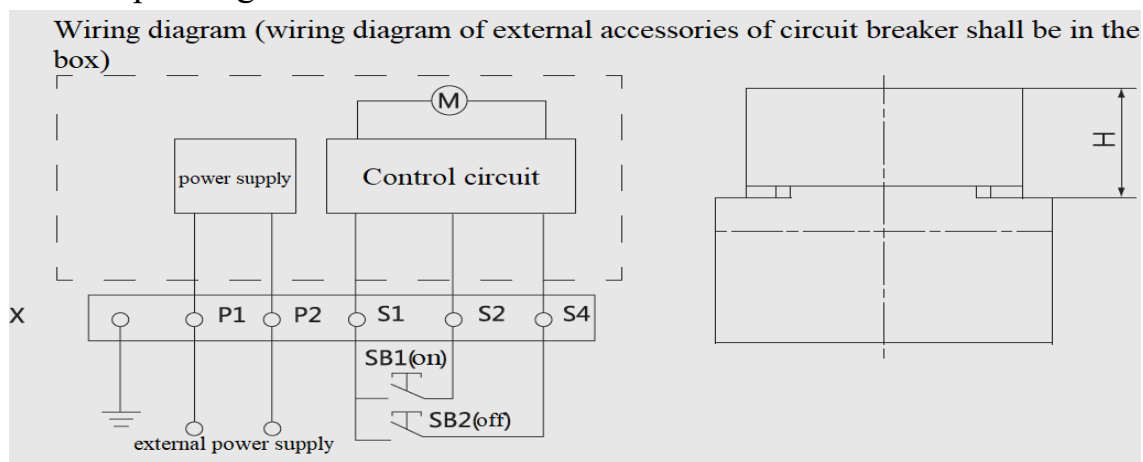
Note :1)Type A is round handle, type F is square handle;

2) The length of A-type handle is 96mm and that of F-type handle is 95mm;

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

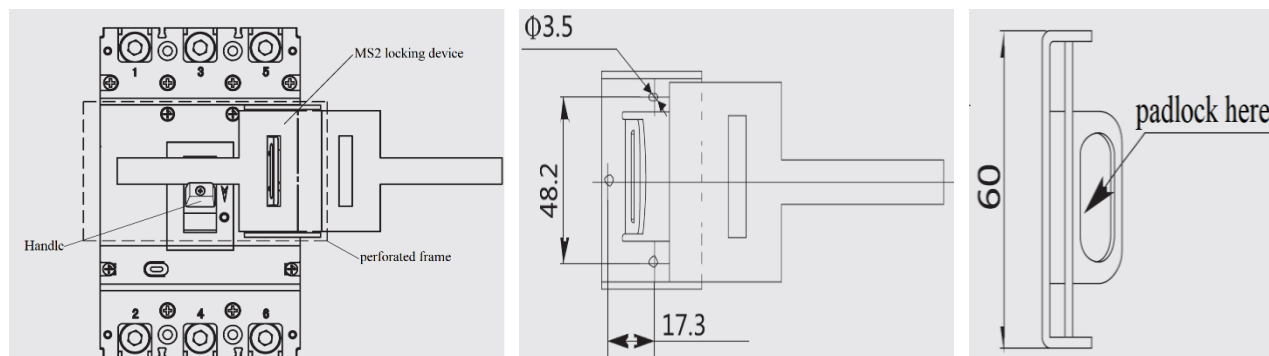
Voltage specification: AC110V、AC220V、AC400V、DC24V、DC110V、DC220V

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/DC220V	AC/DC110V	AC380V	DC24V		
NDM3L-800	≤2	≤350	≤250	≤600	160	10000	149

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

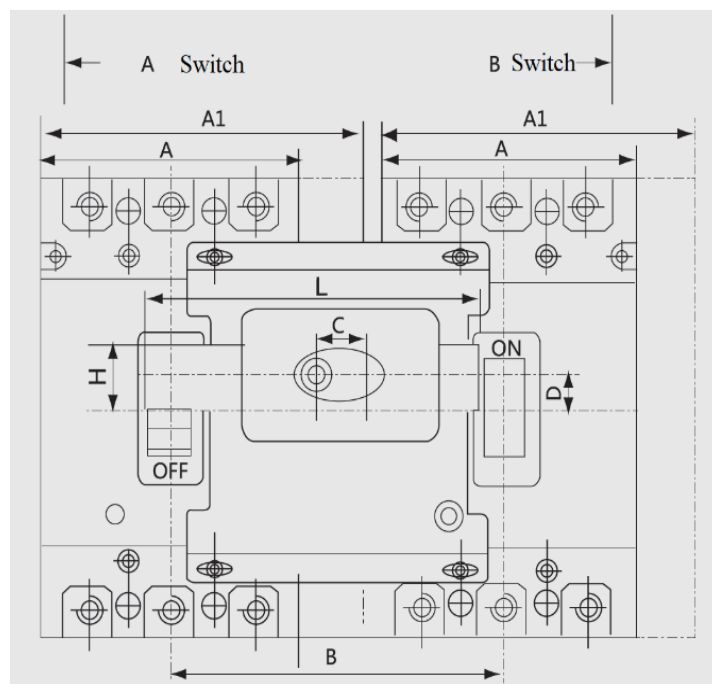


Table 10 Installation dimension of mechanical interlocking (Unit: mm)

Model	A	A1	B	C	D	L	H
NDM3L-800	210	/	243	58	20	240	30
NDM3L-800 (4P)	/	240	292	58	20	320	30

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

Mounting	A (inlet wire end to the cabinet)		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-800	25	120	35	35

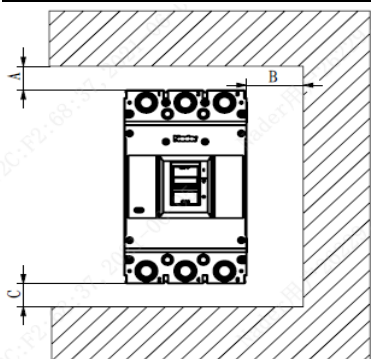


Table 8 Minimum Center Distance between Rowed Circuit Breakers (Unit: mm)

Model	Width of circuit breaker		I Center distance	
	3 poles	4 poles	3 poles	4 poles
NDM3L-800	210	280	250	320

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.

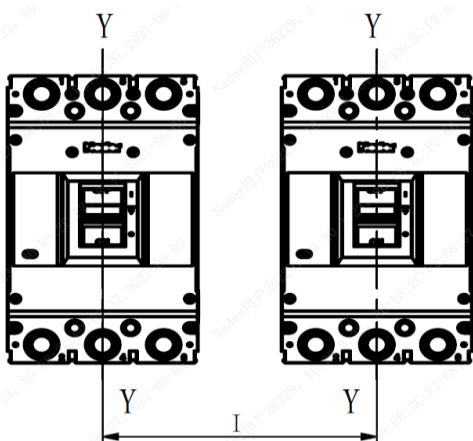


Table 9 Minimum Distance between Stacked Circuit Breakers (Unit: mm)

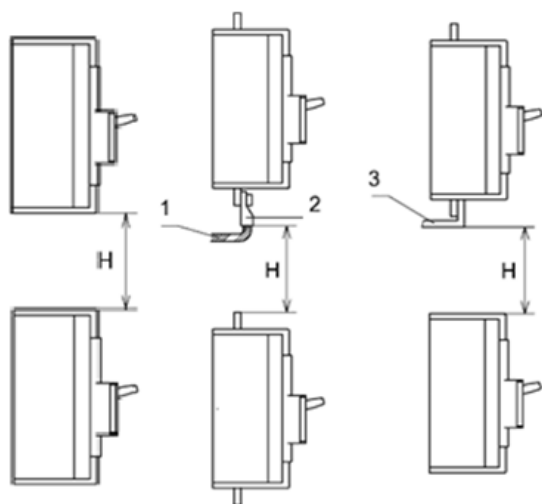
Model	H (distance of circuit breaker from bottom)	
	With a terminal cover	Without a terminal cover
NDM3L-800	155	155

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、Accessories Function Description

8.1 Under-voltage release

When the power voltage is reduced to 35%~70% of the rated working voltage of the under-voltage release, the under-voltage release can guarantee the reliable separation of the circuit breaker;

When the power voltage is less than 35% of the rated working voltage of the under-voltage release, under-voltage release can prevent the circuit breaker from being closed;

When the power voltage is higher than 85% of the rated working voltage of the under-voltage release, the under-voltage release can guarantee the reliable closing of the circuit breaker.

Table 10 Voltage specifications and power consumption of the under-voltage release

Model	Instantaneous current value(A)		Power waste (W)			
			Pull in power consumption		maintain power consumption	
	AC230V	AC380V	AC230V	AC380V	AC230V	AC380V
NDM3L-800	0.8	0.5	190	223	0.8	0.9

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 11 Voltage specifications and power consumption of the shunt release

Model	Shunt release	DC24V	AC230V	DC220V	AC380V
NDM3L-800	Instantaneous current value(A)	6.8	0.76	0.48	0.28
	Power waste (W)	164.5	176.3	105	112

8.3 Rated parameters of the 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 "	

Table 12 Rated parameters of the auxiliary contact

model	conventional thermal current (Ith) (A)	Rated working current (A)	
		AC400V (AC-15)	DC220V (DC-13)
NDM3L-800	3	1.5	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 Rated parameters of the alarm contact

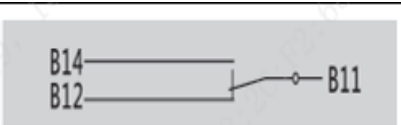
The circuit breaker is in the position of "opening" and "closing"	
The circuit breaker is in the position of "free tripping"	

Table 13 Rated parameters of the alarm contact

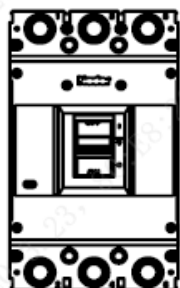
model	conventional thermal current (Ith) (A)	Rated working current (A)	
		AC400V	DC220V
NDM3L-800	3	0.4	0.15

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

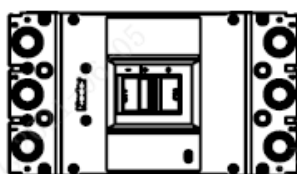
9. Installation Direction of Circuit Breaker

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. Installation Direction of Circuit Breaker

SN	Name	Specification	3P Quantity/Set	4P Quantity/Set
1	Cross small pan-head screw	M6×95	4	6
2	Hexagon nut	M6	4	6
3	Spring washer	6	4	6
4	Plain washer	6	8	12
5	Phase partition	——	4	6
6	Hexagon head combination bolt	M12×40	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.