Shanghai Liangxin Electrical Co., Ltd.

NDM2L-400 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

1. Applicable Scope and Purpose of Circuit Breaker

The NDM2L-400 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 400A. With the overload, short circuit and undervoltage 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.

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	L: Residual current protection
5	Shell frame level	400
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
		XI: Non-time delay + alarm non-tripping
		YI: Delay + alarm non-tripping
10	Residual current release	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
		B: The N-pole isn't installed with an overcurrent release, but on-off
		C: The N-pole is installed with an overcurrent tripper, and on-off with
16	Rated current	See Table 2
17	Cabling type	No code: Normal product
		P: Connection busbar
		Z1: Rear-plate connection
		Z2H: Plug-in rear-plate connection
		Z2Q: Plug-in front-plate connection
		Z3H: Integrated plug-in rear-plate connection
		Z3Q: Integrated plug-in front-plate connection

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、 Lower inlet wire not allowed for the 4P Type A product.

Table 1: Comparison Table of Accessory Code:

Accessory code	Accessory name	NDM2L-400 3	NDM2L-400 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

<table>
<tr><td colspan="3">Model</td><td colspan="4">NDM2L-400</td></tr>
<tr><td colspan="3">Rated current of frame Inm (A)</td><td colspan="4">400</td></tr>
<tr><td colspan="3">Rated current In (A)</td><td colspan="4">225, 250, 315, 350, 400</td></tr>
<tr><td colspan="3">Rated insulation voltage Ui (AC V)</td><td colspan="4">1000</td></tr>
<tr><td colspan="3">Rated impulse withstand voltage Uimp (V)</td><td colspan="4">8000</td></tr>
<tr><td colspan="3">Rated working voltage Ue (AC V)</td><td colspan="4">380/400/415</td></tr>
<tr><td colspan="3">Utilization category</td><td colspan="4">A</td></tr>
<tr><td colspan="3">Number of poles</td><td colspan="2">3</td><td colspan="2">4</td></tr>
<tr><td colspan="3">Breaking capacity level</td><td>M</td><td>H</td><td colspan="2">/</td></tr>
<tr><td colspan="3">Rated limit short-circuit breaking capacity Icu (kA)</td><td>65</td><td>100</td><td colspan="2">65</td></tr>
<tr><td colspan="3">Rated operating short-circuit breaking capacity Ics (kA)</td><td>42</td><td>70</td><td colspan="2">42</td></tr>
<tr><td colspan="3">Rated residual short-circuit making and breaking capacity I△m(kA)</td><td colspan="4">0.25 Icu</td></tr>
<tr><td rowspan="4">Rated residual action current I△n(mA)</td><td rowspan="2">Non-time delay</td><td>Type AC</td><td colspan="4">Type V 30/300/500/1000</td></tr>
<tr><td>Type A</td><td colspan="4">Type V 30/300/500/1000</td></tr>
<tr><td rowspan="2">delay</td><td>Type AC</td><td colspan="4">Type V 300/500/1000</td></tr>
<tr><td>Type A</td><td colspan="4">Type V 300/500/1000</td></tr>
<tr><td colspan="3">Rated residual non-action current I△no(mA)</td><td colspan="4">0.5I△n</td></tr>
<tr><td rowspan="4">Residual current action time</td><td colspan="2">Residual current</td><td>I△n</td><td>2I△n</td><td>5I△n</td><td>10I△n</td></tr>
<tr><td>Non-time delay</td><td>Maximum breaking time (s)</td><td>0.2</td><td>0.1</td><td>0.04</td><td>0.04</td></tr>
<tr><td rowspan="2">delay</td><td>Maximum breaking time (s)</td><td>0.5, 1.15 2.15</td><td>0.35, 1 2</td><td>0.25, 0.9 1.9</td><td>0.25, 0.9 1.9</td></tr>
<tr><td>Limit non-driving time (s)</td><td>/</td><td>0.1, 0.5 1</td><td>/</td><td>/</td></tr>
<tr><td rowspan="3">Operating performance (times)</td><td colspan="2">Electrical life</td><td colspan="4">7500</td></tr>
<tr><td rowspan="2">Mechanical life</td><td>Maintainable free life</td><td colspan="4">10000</td></tr>
<tr><td>Maintainable life</td><td colspan="4">20000</td></tr>
</table>

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

Table 3 Selection of the NDM2L-400 Connecting Bus or Cable Cross-section Area

Rated current (A)	225	250	315, 350	400
Wire cross-section area (mm^2)	95	120	185	240

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 diameter (mm)	Torque (N·m)
NDM2L-400	M10	20
	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 of product temperature change							
NDM2L-400	Temperature (℃)	40	45	50	55	60	65	70
	Derating factor	1	0.981	0.962	0.942	0.922	0.901	0.879

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

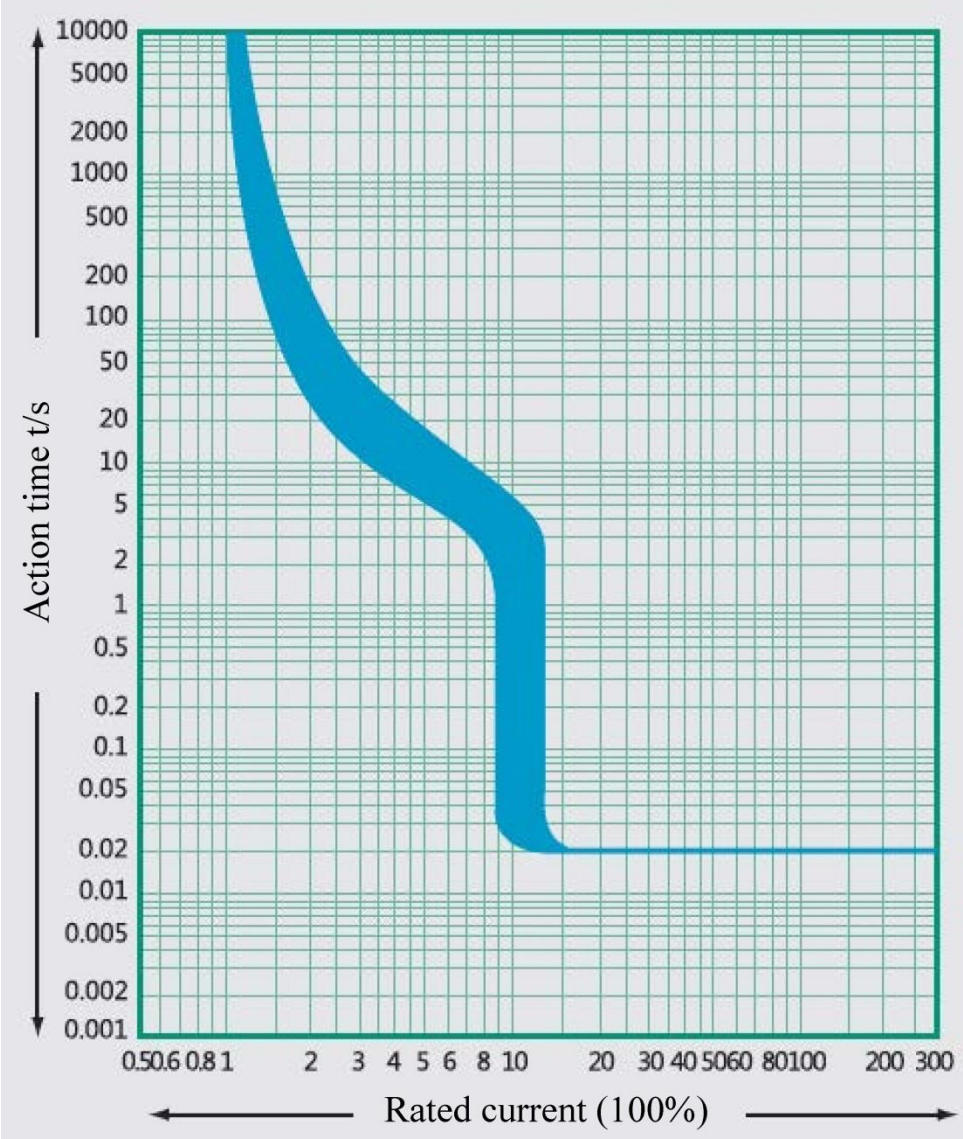
Table 6 High-altitude Derating Factor Table of Circuit Breaker

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

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.

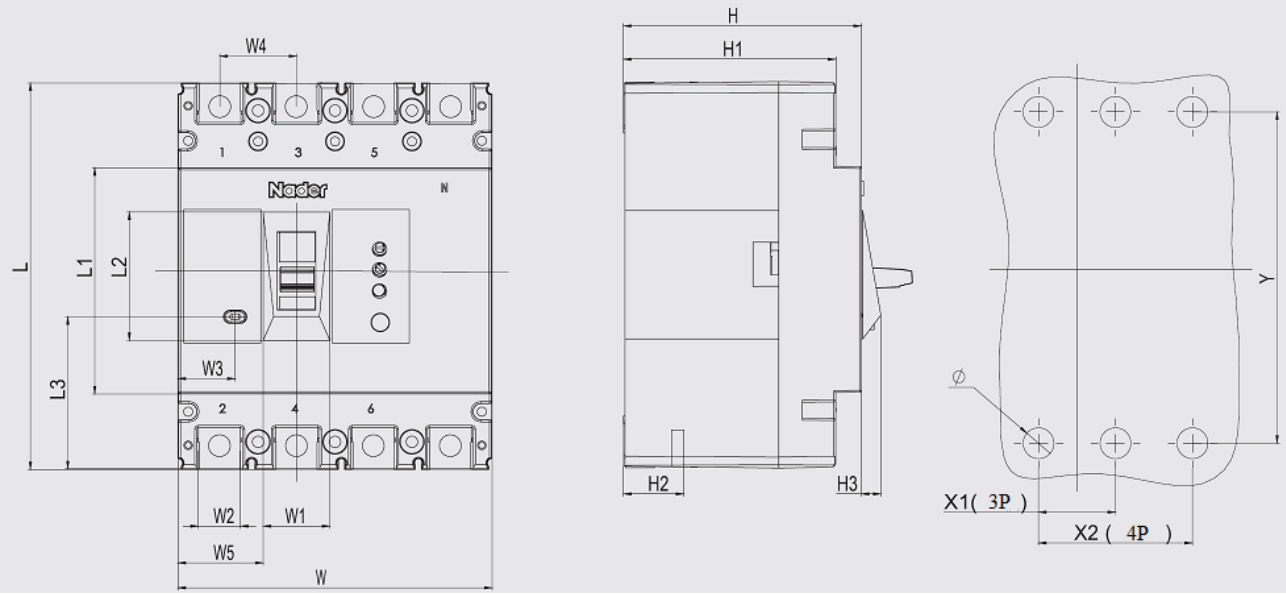
6. Short-circuit Overload Protection Characteristic Curve of Circuit Breaker



Time/Current Characteristic Curve

7. Outline and Mounting Hole Dimensions of Circuit Breaker

7.1 Outline and mounting hole dimensions of circuit breaker



Product model	L	L1	L2	L3	W		W1	W2	W3	W4	W5	H	H1	H2	H3	Y	X1	X2	Φ
					3P	4P													
NDM2L-400	257	175	88	97	150	198	64	32.5	17.5	48	43	107	97.5	38.5	6.5	194	44	94	7

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

7.2 Safe mounting distance of circuit breaker

Table 7 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-400	25	120	35	35

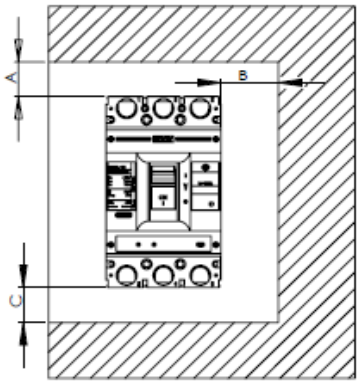


Table 8 Minimum Center Distance between Rowed Circuit Breakers (Unit: mm)

Model	Width of circuit breaker		I Center distance	
	3 poles	4 poles	3 poles	4 poles
NDM2L-400	150	198	190	238

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.

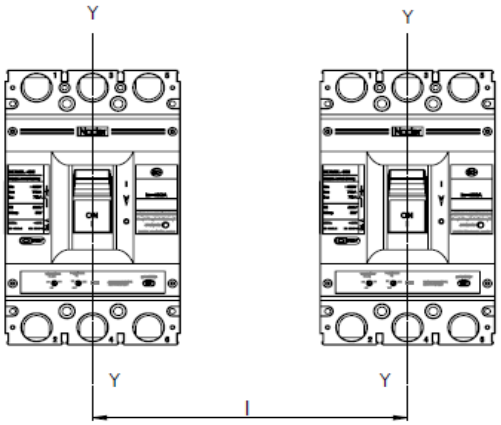


Table 9 Minimum Distance between Stacked Circuit Breakers (Unit: mm)

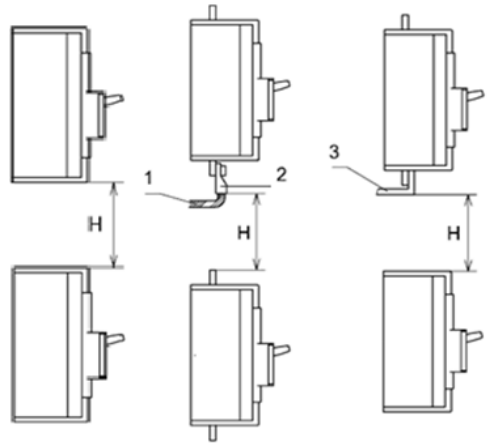
Model	H (distance of circuit breaker from bottom)	
	With a terminal cover	Without a terminal cover
NDM2L-400	155	155

Note: 1) Bare cable connection

2) Cable insulating connection

3) Connection without insulation

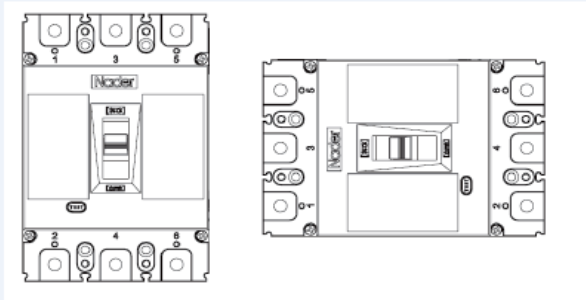
Requirements: Check whether the terminal cover or phase partition is assembled properly before products are energized.



8. 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

9. 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.

10. Installation Direction of Circuit Breaker

SN	Name	Specification	3P Quantity/Set	4P Quantity/Set
1	Cross small pan-head screw	M6×70	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	Plug	——	6	8

11. 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.