Shanghai Liangxin Electrical Co., Ltd.

NDM2(X)-125 Product Specification

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

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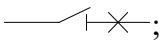
Revision History					
Version	Revision Reason/Content	Implementation Date	Prepared by	Reviewed by	Approved by
0	Newly added	20200805	Wang Hu	Peng Haorang	Hu Qi
1	Update the product appearance picture and product dimension outline drawing	20200930	Sun Lanping	Xiao Botao	Ding Fei
2	Add attachment information	20221023	Yang rongrong	Mei yang	Ding fei

1. Applicable Scope and Purpose of Circuit Breaker

The NDM2(X)-125 molded case circuit breaker (hereinafter referred to as circuit breaker) applies to infrequent switching of circuits with the 50/60Hz, the working voltage of AC690V and working current of 125A 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.

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	(X)-	125	□	□ / □	□	□	□	□	□	□
1	2	3	4	5	6	7	8	9	10	11	12	13	14

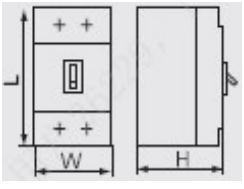
SN	SN name	NDM2
1	Enterprise code	ND: “Nader” low-voltage apparatus
2	Product code	M: Molded case circuit breaker (MCCB)
3	Design SN	2
4	Series derived code	X: Small shell frame AC
5	Shell frame level	125
6	Breaking capacity level	C: Basic type
		L: Standard type
		M: Relatively high breaking type
		H: High breaking type
7	Operation mode	No code: Direct handle-operated mode
		P: Motor-operated(excluding NDM2X-125)
		Z: Rotation handle(excluding NDM2X-125)
8	Number of poles	2(only NDM2X-125)，3, 4
9	Release code	0: Release (none)
		2: Instantaneous tripper only
		3: Complex tripper
10	Accessory code	See Table 1
11	Application code	No code: Power distribution type
		2: Protection motor type
12	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
13	Rated current	See Table 2
14	Cabling type	No code: Normal product
		P: Connection busbar
		Z1: Rear-plate connection(excluding NDM2X-125)
		Z2H: Plug-in rear-plate connection(excluding NDM2X-125)
		Z2Q: Plug-in front-plate connection(excluding NDM2X-125)
		Z3H: Integrated plug-in rear-plate connection(excluding NDM2X-125)
		Z3Q: Integrated plug-in front-plate connection(excluding NDM2X-125)

Table 1: Comparison Table of Accessory Code:

Accessory code	Accessory name	Installation Position / Model / Number of poles: NDM2-125		NDM2X-125
		3	4	2
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			—
50	Shunt release, under-voltage release			—
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			
18	Shunt release, alarm contact			—
28	Dual-auxiliary contact, alarm contact			—
38	Under-voltage release, alarm contact			—
48	Shunt release, auxiliary alarm contact			—
58	Auxiliary alarm contact			
68	Dual-auxiliary contact, auxiliary alarm contact			—
78	Under-voltage release, auxiliary alarm contact			—

4. Main Technical Parameters of Circuit Breaker

Table 2 Main Technical Parameters of Circuit Breaker

Model			NDM2-125					NDM2X-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, 500, 550, 660/690					380/400/415
Power frequency withstand voltage U (1min) (V)			3500					
Utilization category			A					
Number of poles			3				4	2
Breaking capacity level			C	L	M	H	/	/
Rated limit short-circuit breaking capacity Icu (kA)	AC380/400/415V		25	36	52.5	85	52.5	35
	AC500V		/	25	/	/	/	/
	AC550V		/	20	40	/	/	/
	AC660/690V		/	/	20	/	/	/
Rated operating short-circuit breaking capacity Ics (kA)	AC380/400/415V		18.75	27	38	63.75	38	26.25
	AC500V		/	25	/	/	/	/
	AC550V		/	20	40	/	/	/
	AC660/690V		/	/	15	/	/	/
Operating performance (times)	Electrical life		8000					
	Mechanical life	Maintainable free life	20000					
		Maintainable life	40000					
Boundary dimension		L(mm)	150	150	150	150	150	150
		W(mm)	92	92	92	92	122	64
		H(mm)	69	69	87.5	87.5	87.5	69
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 NDM2(X)-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	4.0	6.0	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)
NDM2(X)-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 of product temperature change							
NDM2-125	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	Maximum working voltage（V）	Power frequency withstand voltage (V)	Isolation voltage(V)
2000	1	690	3500	1000
2500	1	690	3500	1000
3000	0.98	620	3150	900
3500	0.97	580	3000	850
4000	0.95	550	2800	810
4500	0.94	520	2650	770
5000	0.93	500	2500	730

4.5 Power loss coefficient of circuit breaker

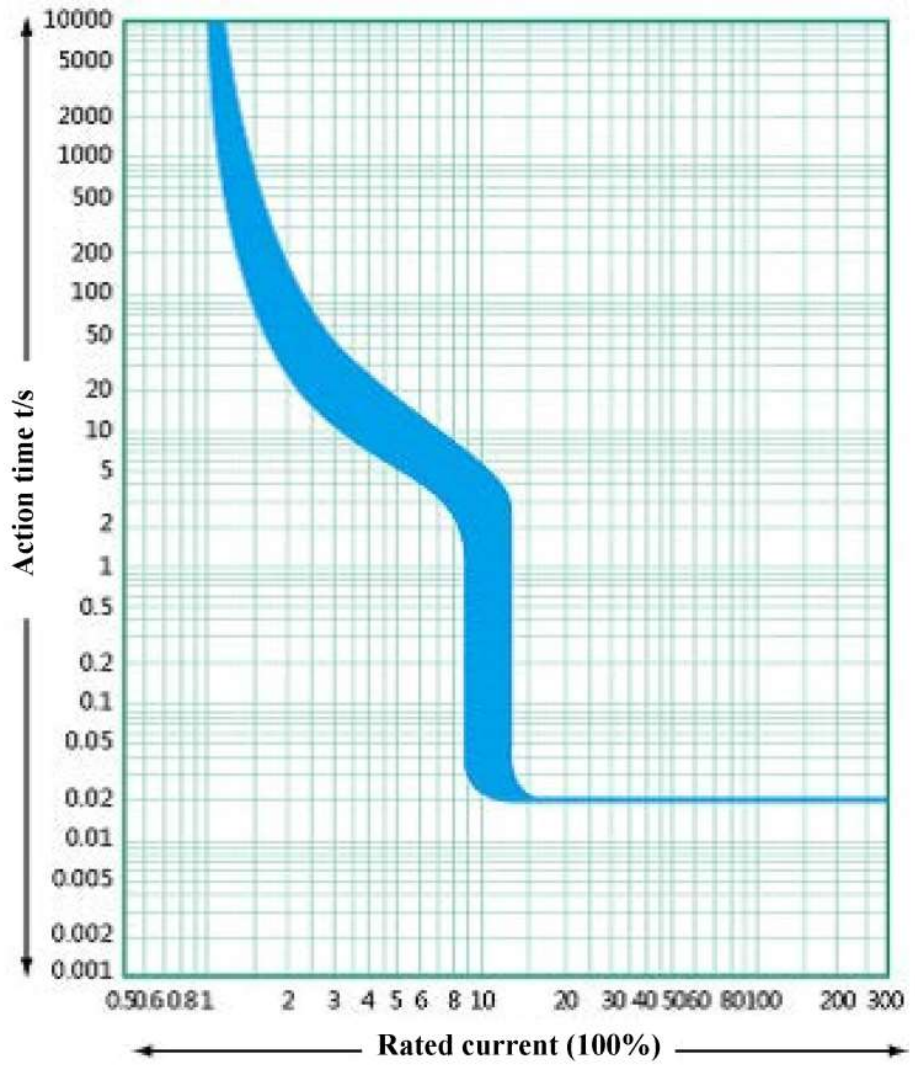
Table 7 Power loss coefficient table of circuit breaker

Model	Energizing current(A)	Total power loss(W)		
		Wiring before and after board	Plug in board front wiring	Plug in bear board wiring
NDM2-125 Direct heating type(16-25A)	25	40	42	45
NDM2-125 Mesothermal type(32-100A)	100	35	37	40
NDM2-125 Mesothermal type(32-100A)	125	39	42	43

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

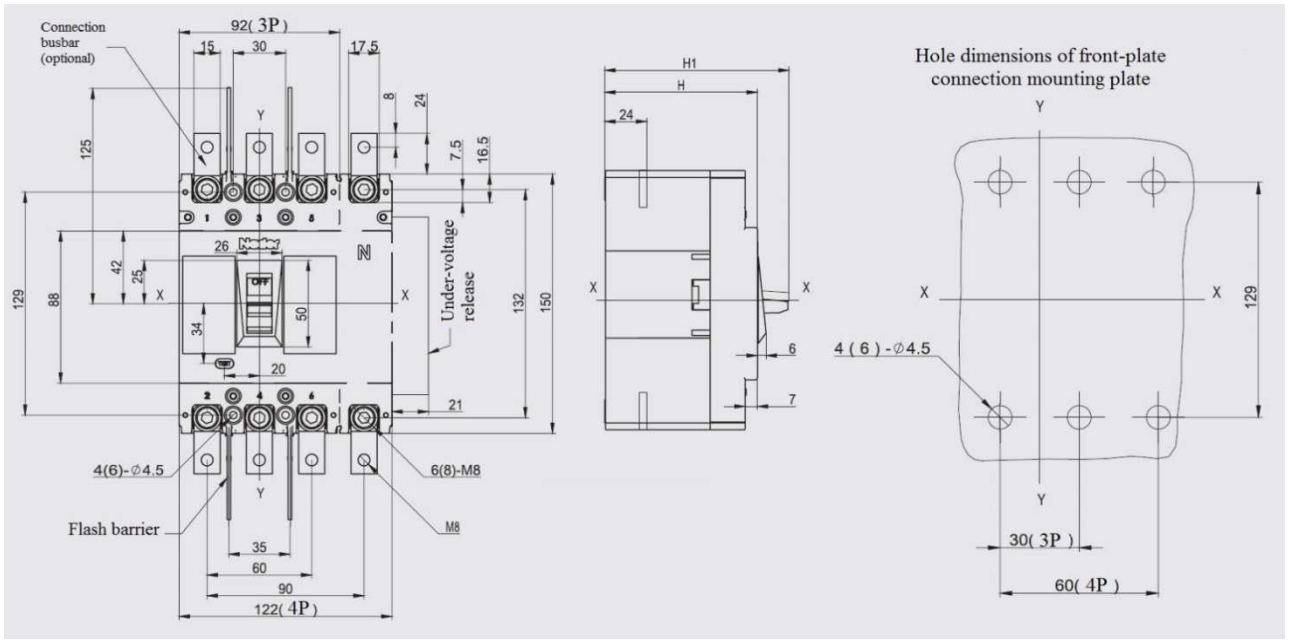


Time/Current Characteristic Curve

7. Outline, Mounting Hole Dimensions and Safety Distance of Circuit Breaker

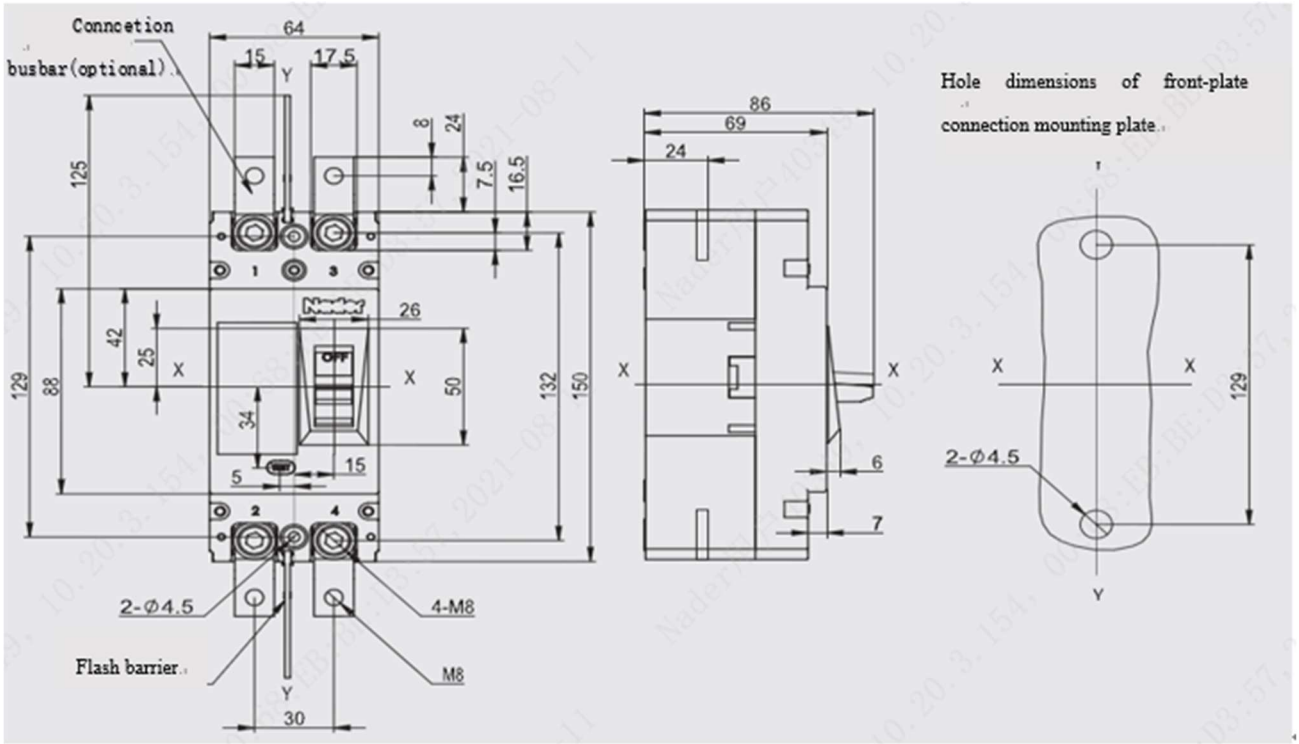
7.1 Outline and mounting hole dimensions of circuit breaker (Unit: mm)

NDM2-125:



Model	H	H1
NDM2-125C、L	69	86
NDM2-125M、H	87.5	104
NDM2-125 4P		

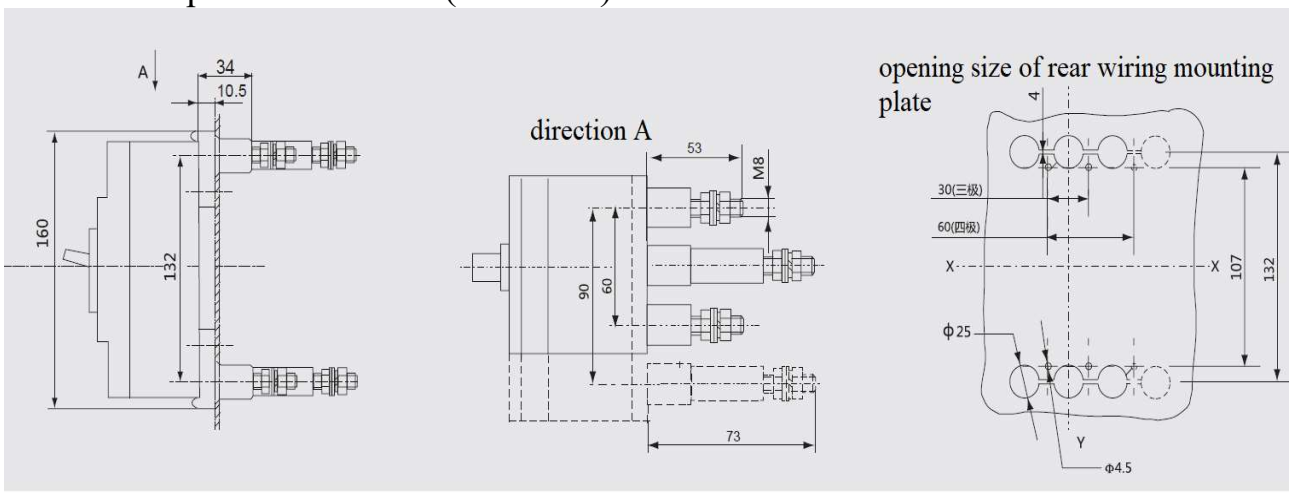
NDM2X-125：



Note 1: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

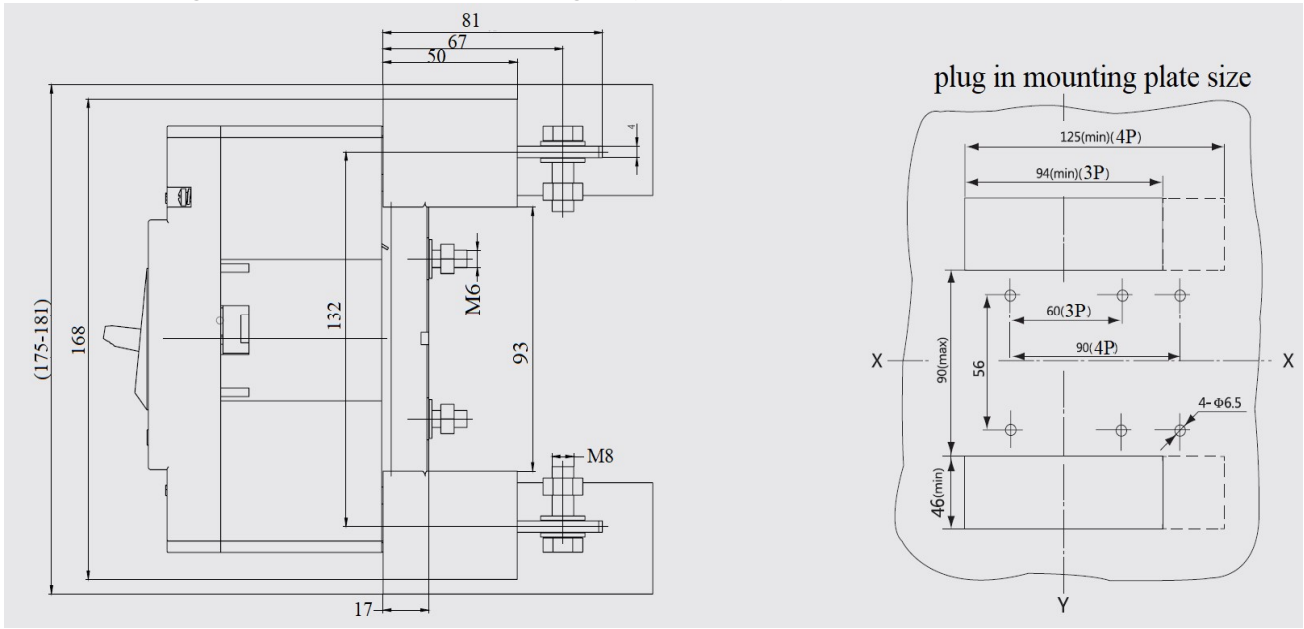
2:NDM2X-125 only conventional wiring and connection bar wiring.

7.2 Z1 Pear plate installation (Unit: mm)



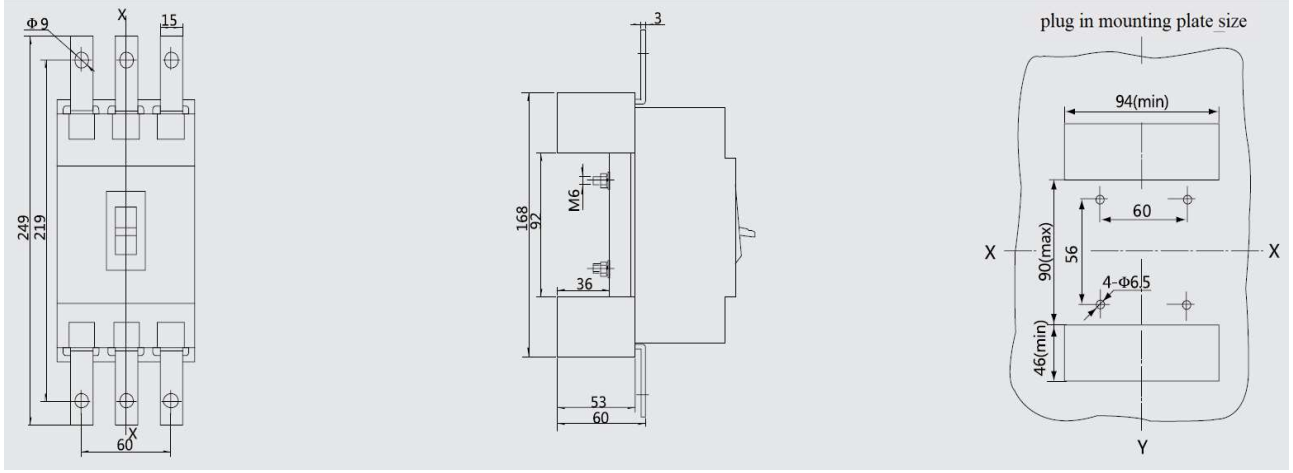
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.3 Z2H Plug in board（rear mounting）(Unit: mm)



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

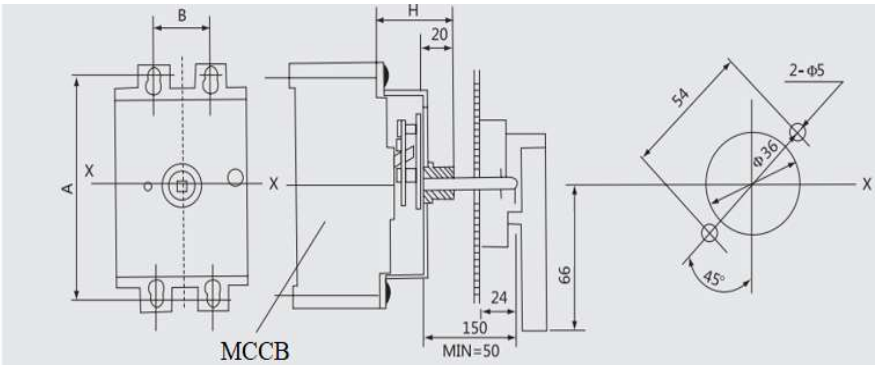
7.4 Z2Q Plug in board front installation (Unit: mm)



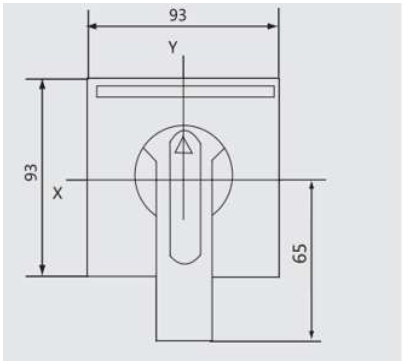
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

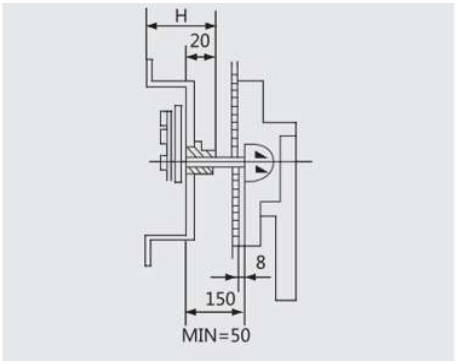
7.5 Manual operating mechanism (excluding NDM2X-125)

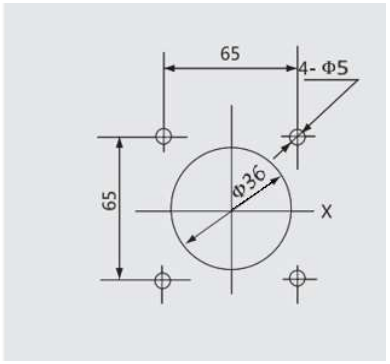
7.5.1 Electric operating mechanism and CS1-A handle



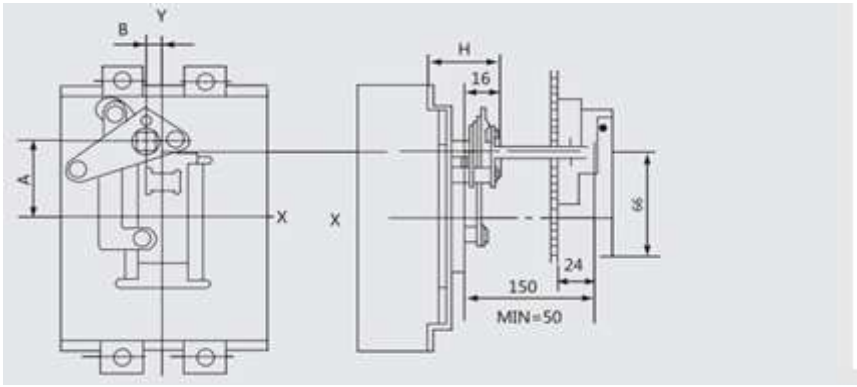
7.5.2 Electric operating mechanism and CS1-F handle

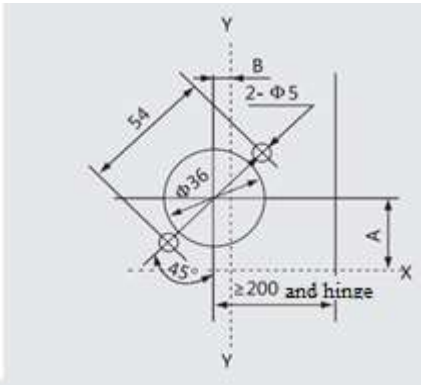




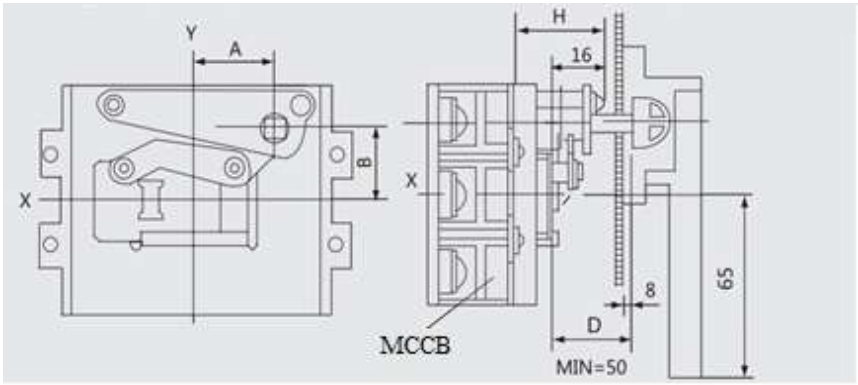


7.5.3 Electric operating mechanism and CS2-A handle





7.5.4 Electric operating mechanism and CS2-F handle



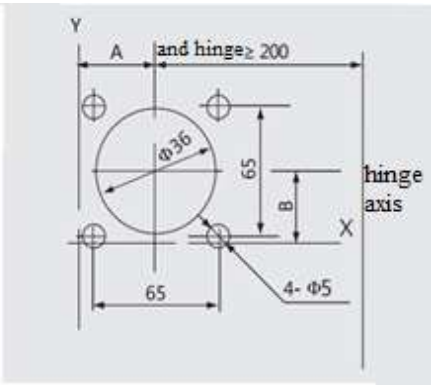


Table 8 Installation dimension of manual operating mechanism (Unit: mm)

Manual operation type	Model	Installation dimension of manual operating mechanism			Installation mode
		H	A	B(3/4P)	
CS1	NDM2-125 C/L/M/H	49	104	30	Vertical installation
CS2	NDM2-125 C/L/M/H	46	35	11.5	

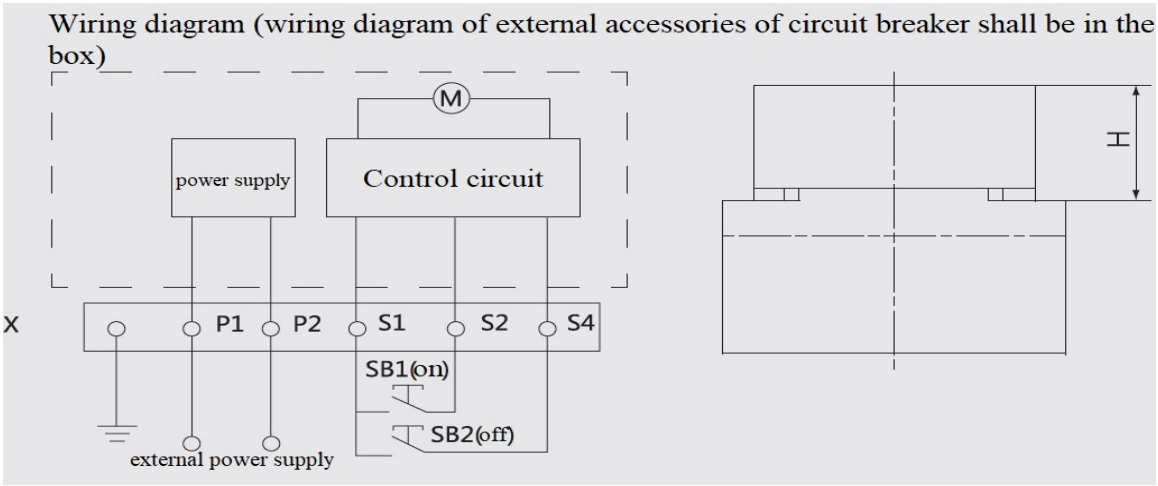
Note:1) A type is round handle, F type is square handle;

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.

7.6 Electric operating mechanism (excluding NDM2X-125)



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)
		AC230V	AC/DC110V	AC400V	DC24V		
NDM2-125	≤0.5	≤180	≤180	≤35	80	20000	90

7.7 Mechanical interlocking (excluding NDM2X-125)

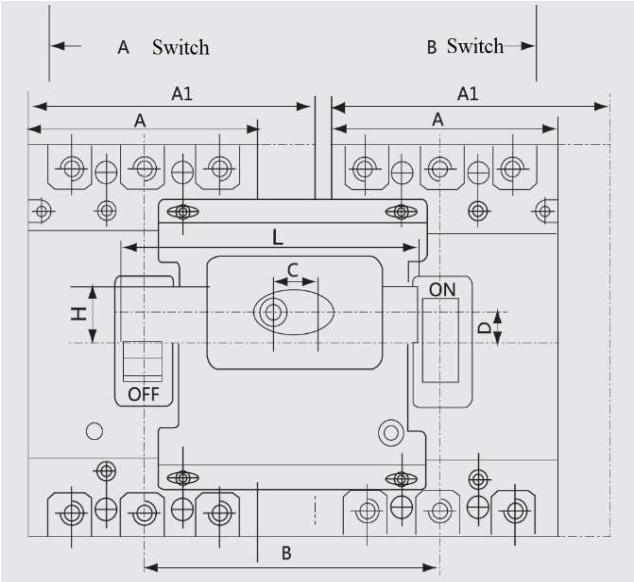


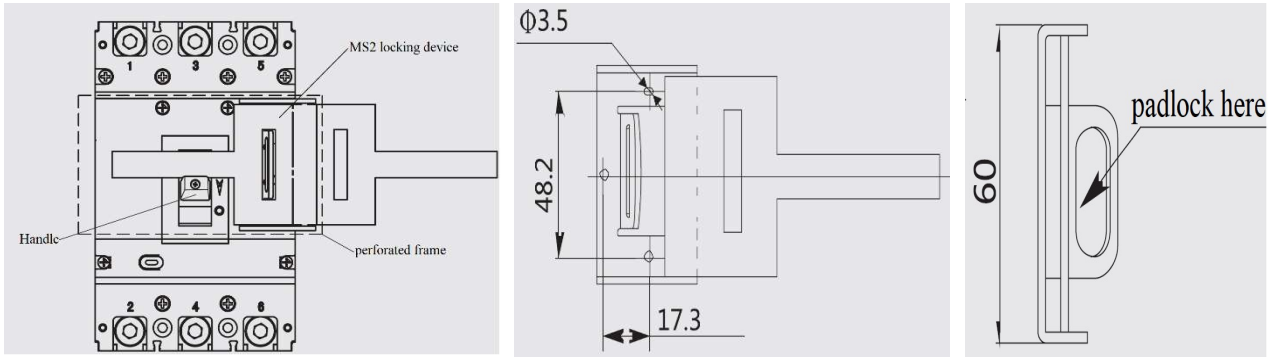
Table 10 Installation dimension of mechanical interlocking (Unit: mm)

Model	A	A1	B	C	D	L	H
NDM2-125(C/L/M/H)	92	--	120	45	10	136	22
NDM2-125（4P)	--	122	152	45	10	166	22

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

7.8 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 NDM2 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；

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

7.9 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		
NDM2(X)-125	25	65	30	30

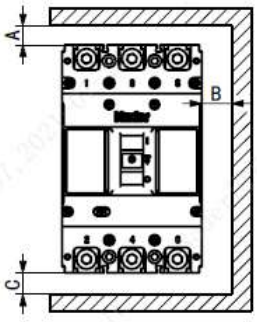


Table 12 Minimum Center Distance between Rowed Circuit Breakers (Unit: mm)

Model	Width of circuit breaker			I Center distance		
	2 poles	3 poles	4 poles	2 poles	3 poles	4 poles
NDM2-125	/	92	122	/	122	152
NDM2X-125	64	/	/	108	/	/

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.

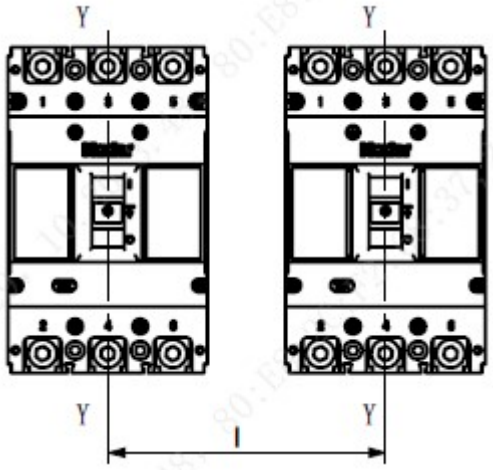


Table 13 Minimum Center Distance between Stacked Circuit Breakers (Unit: mm)

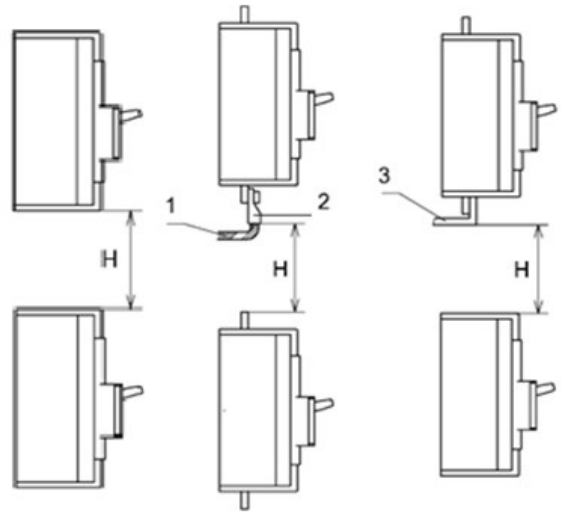
Model	H (distance of circuit breaker from bottom)	
	With a terminal cover	Without a terminal cover
NDM2(X)-125	90	91

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 (excluding NDM2X-125)

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
NDM2-125	0.6	0.6	2	2

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。

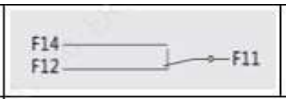
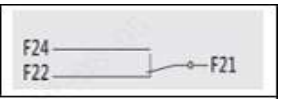
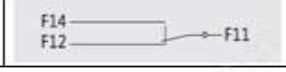
8.2 Shunt release

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 15 Voltage Specifications and Power Consumption of shunt release

Model	Shunt release	DC24V	AC230V	DC220V	AC400V
NDM2(X)-125	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 16 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

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

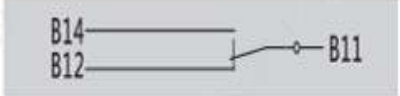
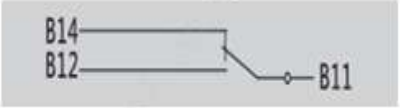
The circuit breaker is in the position of "opening" and "closing"	
The circuit breaker is in the position of "free tripping"	

Table 19 Current parameters of alarm contact

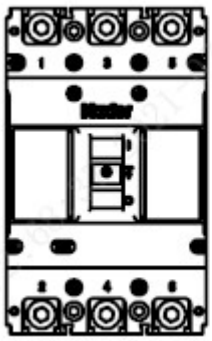
Category	Frame current (A)	Conventional thermal current Ith(A)	Rated working current Ie(A)	
			AC400V	DC220V
Alarm contact	125	3	0.3	0.15

Note：Shunt release, auxiliary contact and alarm contact wiring standard wire length is 0.7m, if you have special needs, you can customize the line length to 1、2、4m。

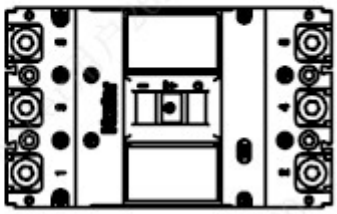
9. Installation Direction of Circuit Breaker

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	2P Quantity/Set	3P Quantity/Set	4P Quantity/Set
1	Cross small pan-head screw	M4×45	2	4	6
2	Hexagon nut	M4	2	4	6
3	Spring washer	4	2	4	6
4	Plain washer	4	2	4	6

5	Phase partition	——	2	4	6
6	Hexagon socket cylindrical head combination	M8X20	4	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.