Shanghai Liangxin Electrical Co., Ltd.

NDM3Z-250V Product Specification

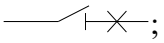
(IPD-ENG-DEV-T20 A1 2016-09-23)

Prepared by	杨荣荣	Date	2022-11-24
Reviewed by	徐富平	Date	2022-11-25
Countersigned by	孙兰萍	Date	2022-11-25
Approved by	丁飞	Date	2022-11-25

Revision History					
Version	Revision Reason/Content	Implementation Date	Prepared by	Reviewed by	Approved by
0	Newly added	2020/10/28	Sun Lanping	Xu Fu ping	Ding Fei
1	Update the product appearance picture and product dimension outline drawing	2021/09/30	Sun Lanping	Xu Fu ping	Ding Fei
2	Add attachment information	2022/11/23	Yang rongrong	Xu Fu ping	Ding fei
3	Add Electric operation（DC24V）information；logo change	2024/11/27	Yang rongrong	Xu Fu ping	Ding fei

1. Applicable Scope and Purpose of Circuit Breaker

The NDM3Z-250V DC molded case circuit breaker (hereinafter referred to as circuit breaker) applies to the DC system application environment and the electric circuit with the working voltage of DC1500V and the working current of 250A. 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

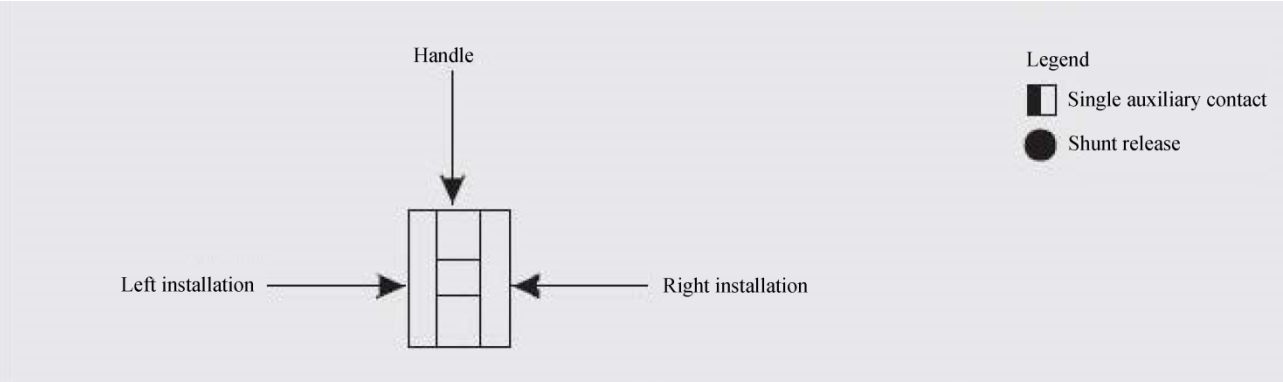
ND	M	3	Z	- 250	□	□ / □	□	□	□	□	□
1	2	3	4	5	6	7	8	9	10	11	12	13

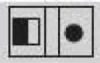
SN	SN name	NDM3Z
1	Enterprise code	ND: “Lazzen” low-voltage apparatus
2	Product code	M: Molded case circuit breaker (MCCB)
3	Design SN	3
4	Derived code of the series	Z: DC
5	Shell frame level	250
6	Derived code of	V: High voltage type
7	Breaking capacity level	No code: Direct handle-operated mode
		P: Motor-operated
		Z: Rotary operation
8	Number of poles	2, 3
9	Release code	0: Release (none)
		2: Instantaneous tripper only
		3: Complex tripper
10	Accessory code	See Table 1
11	Rated current	See Table 2
12	Cabling type	2P No code: Normal product
		3P No code: Normal product
13	Other code	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 220V: Electric operation voltage AC220V/DC220V
		DC1 24V: Shunt release operation voltage DC24V
		AC/DC220V: Shunt release operation voltage DC220V、AC220/230V
		AC380V: Shunt release operation voltage AC380/400/415V
		Z: Terminal housing
		MS2：MS2 lock

Note 1: NDM3Z-250V only 2P, no Electric operating mechanism、Manual operating mechanism.
2：NDM3Z-250V DC1500V It is recommended to select insulating base plate.

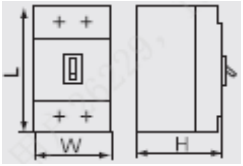
Table 1: Comparison Table of Accessory Code:



Accessory code	Accessory name	NDM3Z-250V 2	NDM3Z-250V 3
00	N/A	——	——
10	Shunt release		
21	Single auxiliary contact		
41	Shunt release, single auxiliary contact	——	

4. Main Technical Parameters of Circuit Breaker

Table 2 Main Technical Parameters of Circuit Breaker

Model				NDM3Z-250V	
Rated current of frame Inm (A)				250	
Rated current In (A)				125, 140, 160, 180, 200, 225, 250	
Rated insulation voltage Ui (AC V)				1500	
Rated impulse withstand voltage Uimp (V)				12000	
Power frequency withstand voltage U (1min) (V)				3820	
Utilization category				A	
Number of poles				2	3
Rated working voltage Ue (DC V)				1000	1500
Rated limit short-circuit breaking capacity Icu (kA)				20	20
Rated operating short-circuit breaking capacity Ics (kA)				16	16
Operating performance (times)	Electrical life			2000	
	Mechanical life	Maintainable free life		10000	
		Maintainable life		20000	
Boundary dimension			L (mm)	200	200
			W (mm)	90	135
			H (mm)	107	107
Flashover distance(mm)				50	

Note 1： The overall dimension does not include the dimension of terminal cover。

2: NDM3Z-250V DC1500V it is recommended to select insulating base plate.

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

Table 3 Selection of the NDM3Z-250V Connecting Bus or Cable Cross-section Area

Rated current (A)	125, 140	160	180, 200, 225	250
Wire cross-section area (mm^2)	50	70	95	120

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 specifications	Torque (N·m)
NDM3Z-250V	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							
NDM3Z-250V	Temperature (℃)	40	45	50	55	60	65	70
	Derating factor	1	1	1	0.95	0.93	0.91	0.88

Note: 1) When the operating ambient temperature is below 50℃, 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 current correction coefficient(V)	Power frequency withstand voltage correction coefficient(V)	Isolation voltage correction coefficient(V)
2000	1	1	1	1
2500	1	1	1	1
3000	0. 98	1	1	1
3500	0. 95	1	1	1
4000	0. 93	1	1	1
4500	0. 91	1	1	1
5000	0. 89	1	1	1

4.5 Power loss coefficient of circuit breaker

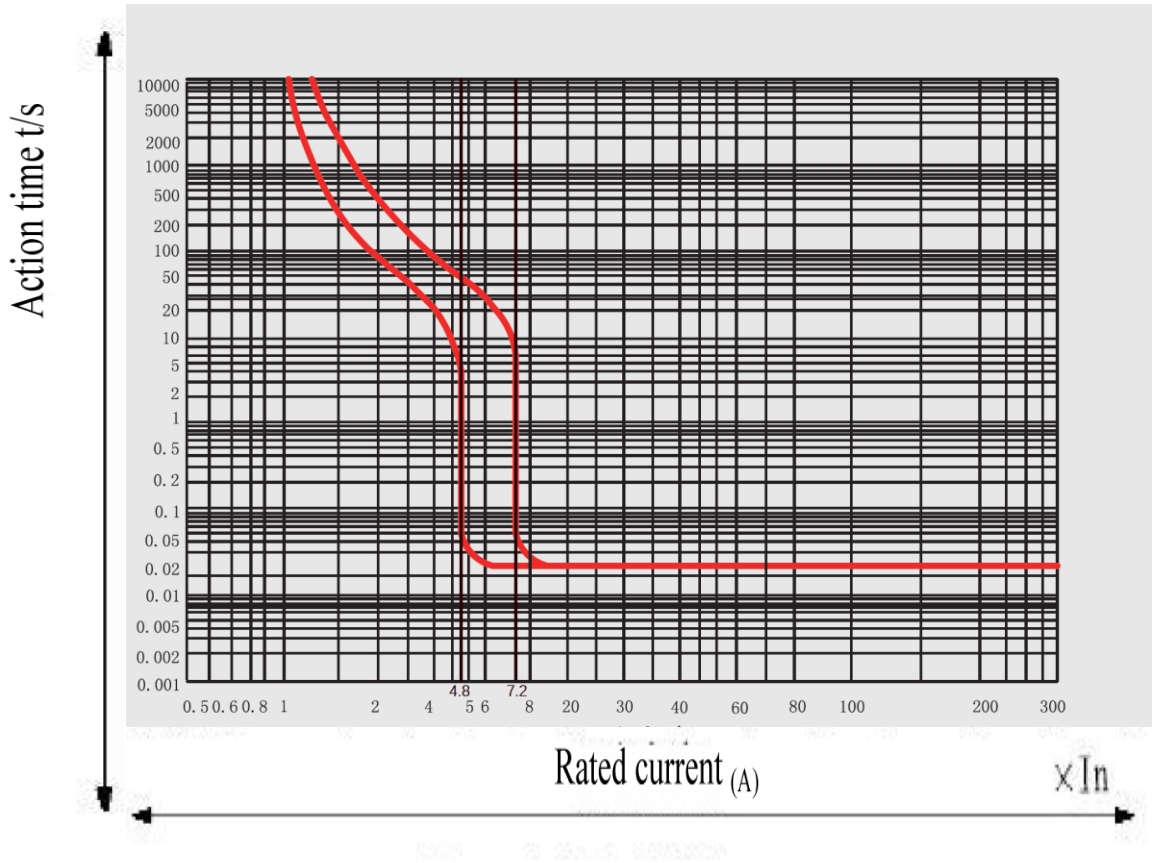
Table 7 Power loss coefficient table of circuit breaker

Model	Energizing current(A)	Total power loss(W)
NDM3Z-250V	250	43. 75

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 +50℃, 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

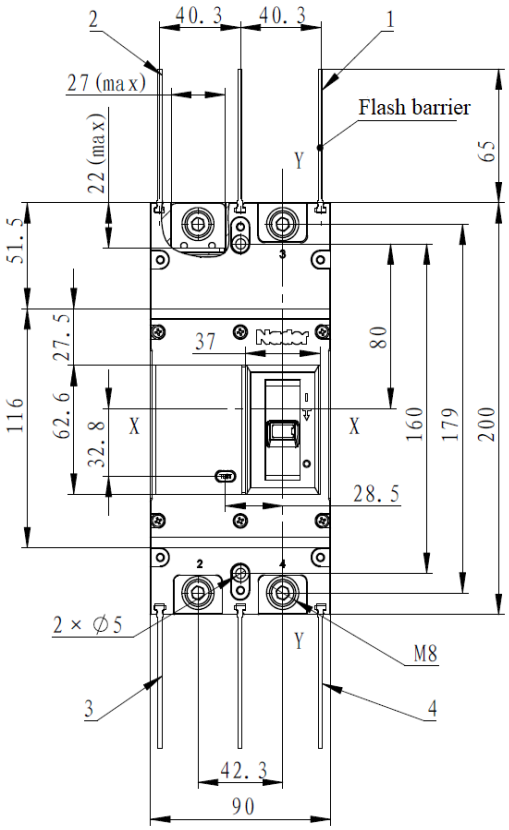


Time/Current Characteristic Curve

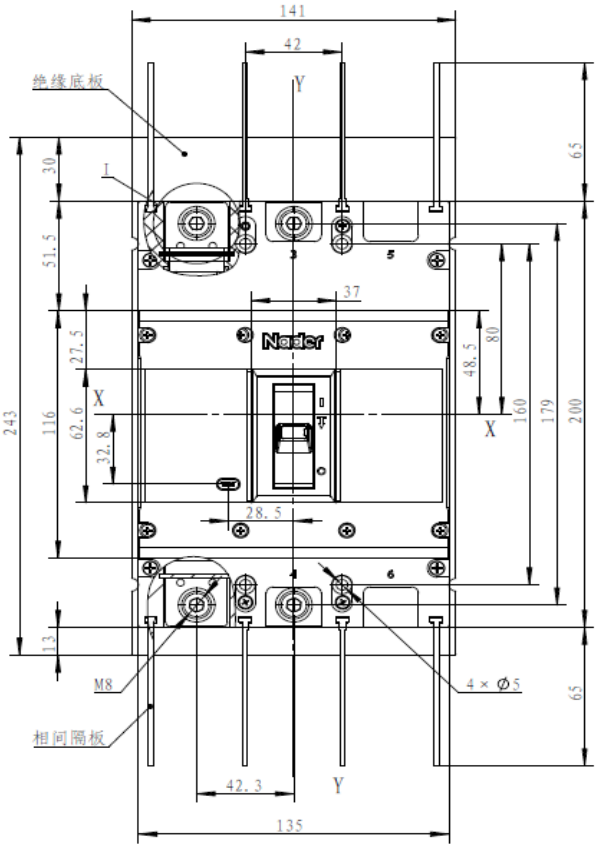
7. Outline, Mounting Hole Dimensions and Safety Distance of Circuit Breaker

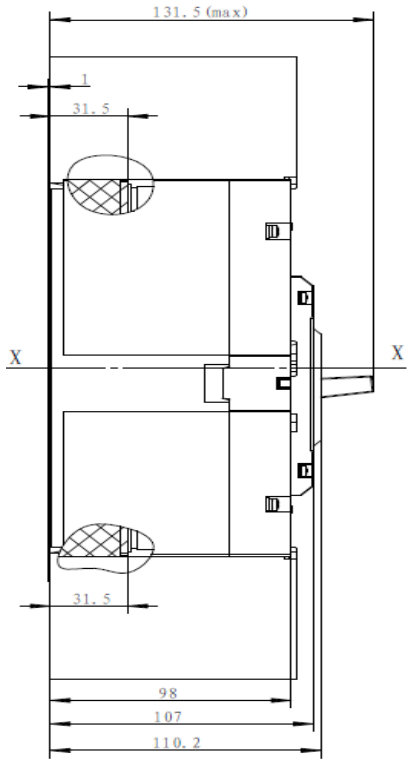
7.1 Outline and mounting hole dimensions of circuit breaker (Unit: mm)

2P

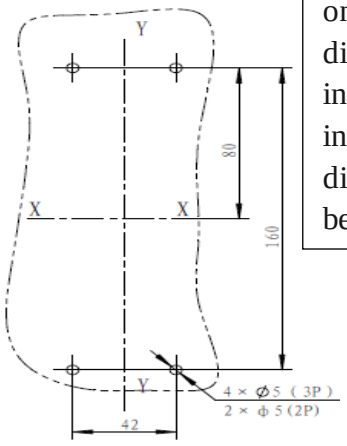


3P



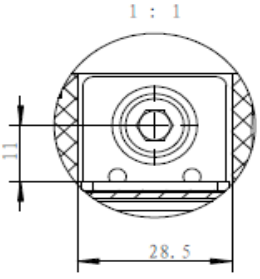


安装开孔尺寸图



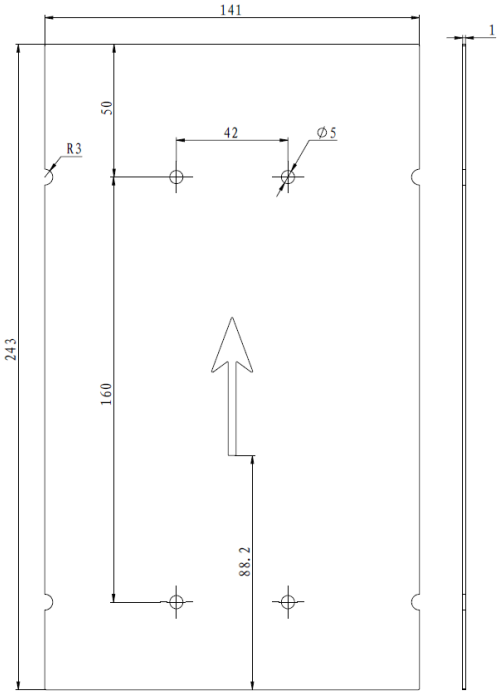
Note: When this product is used for non side-by-side installation, only two (2P) and four (3P) diaphragms need to be inserted in the middle. If side-by-side installation is required, diaphragms 1, 2, 3 and 4 need to be inserted.

最大接线尺寸



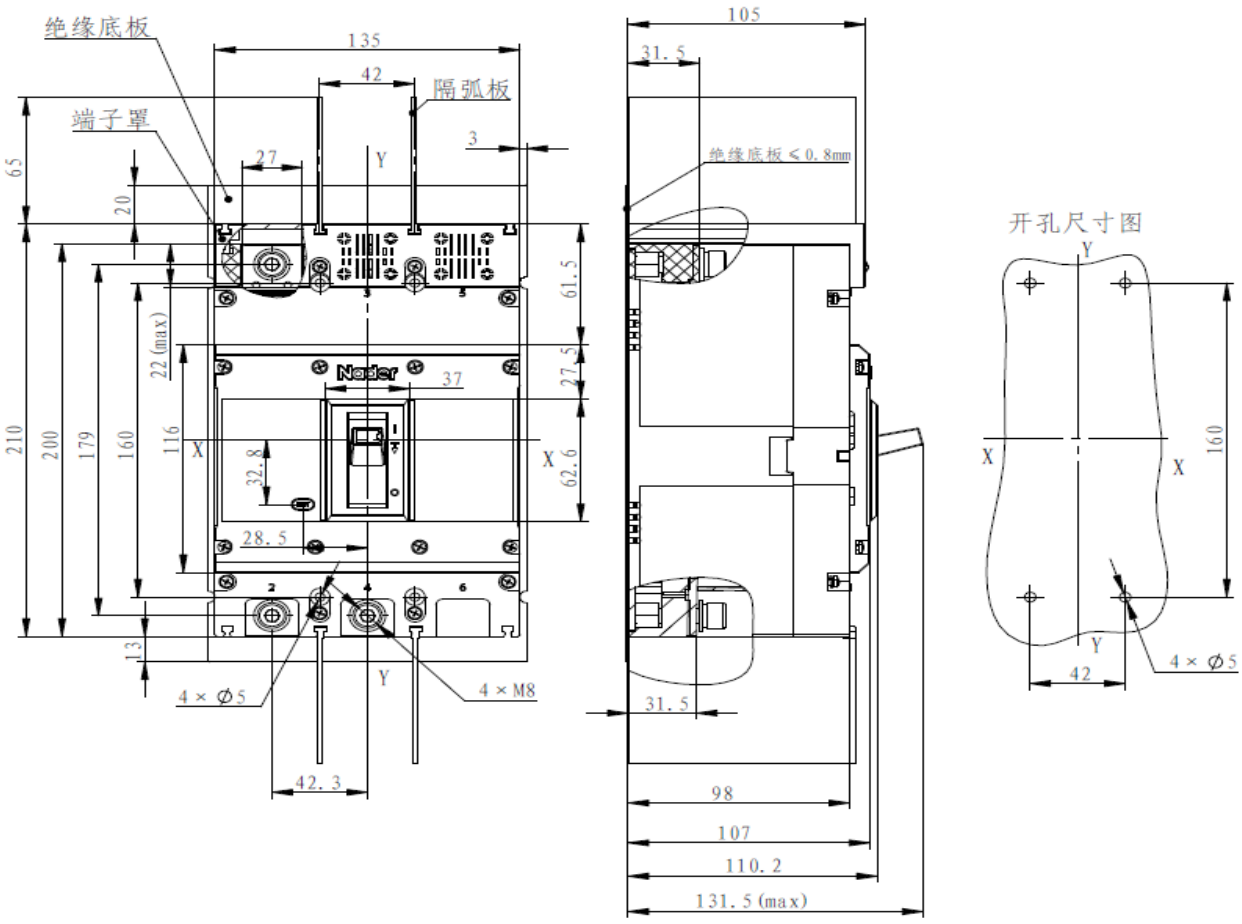
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.2 Insulating base plate (optional) (Unit: mm)



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

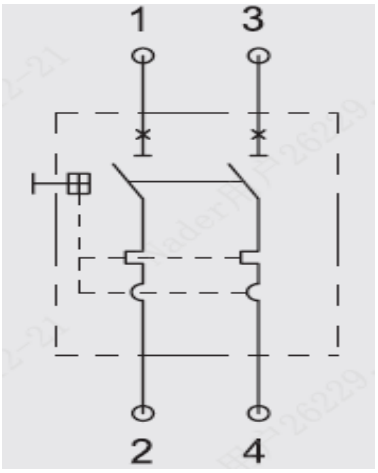
7.3 带端子罩和绝缘底板的外形尺寸（选配）（单位：mm）



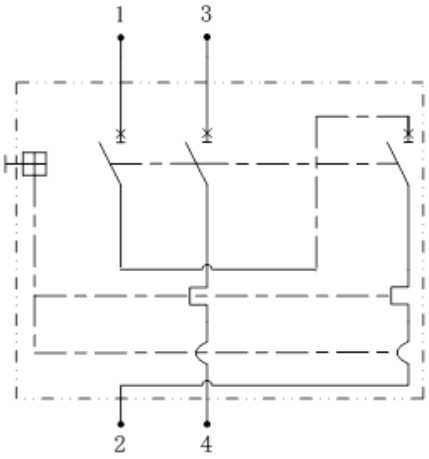
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.4 Wiring Diagram of Circuit Breaker

2P



3P



7.5 Safe mounting distance of circuit breaker

Table 8 Insulation Distance Mounted in the Metal Cabinet (Unit: mm)

Model	A	B	C	D	E	F
NDM3Z-250V	65	30	20	25	3	13

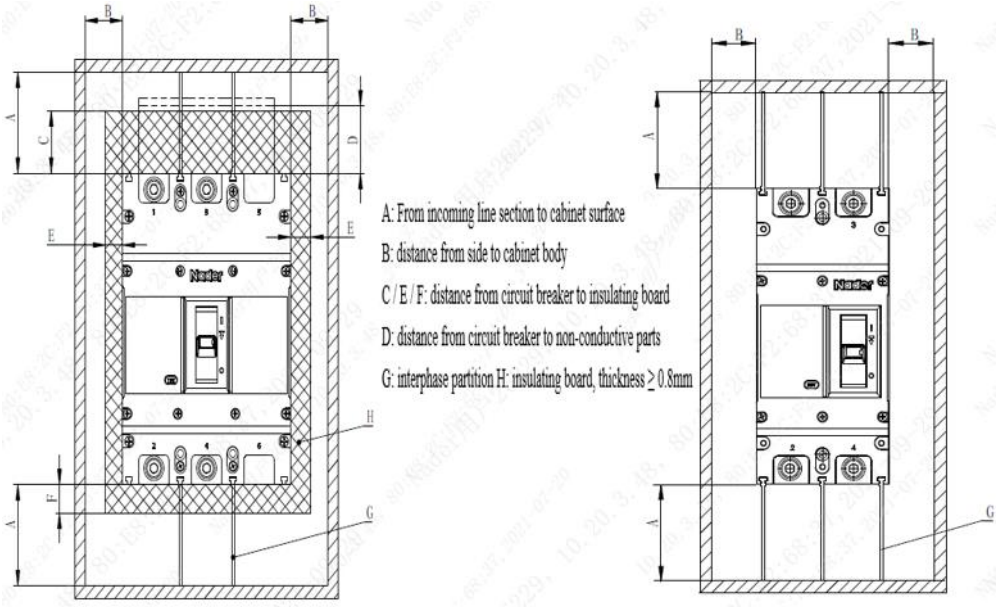


Table 9 Minimum Center Distance between Rowed Circuit Breakers (Unit: mm)

Model	I Center distance			
	2 poles	3 poles	2 poles	3 poles
NDM3Z-250V	90	135	135	190

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.

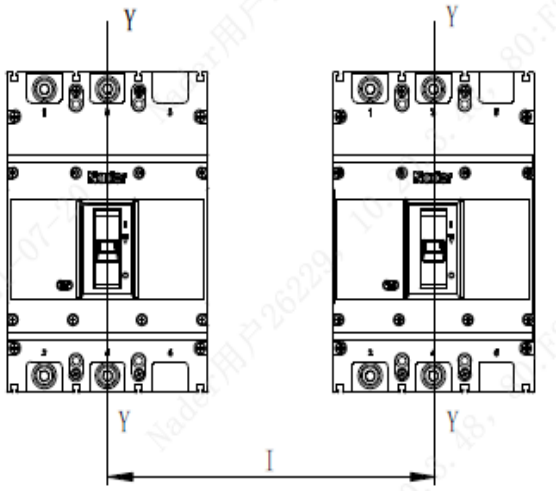


Table 10 Minimum Center Distance between Stacked Circuit Breakers (Unit: mm)

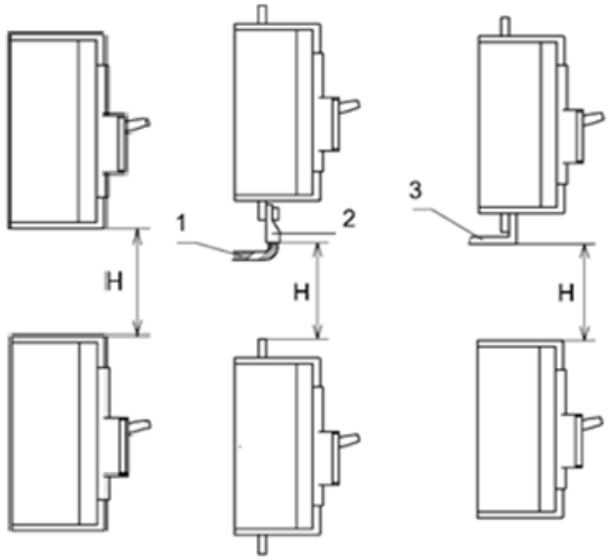
Model	H (distance of circuit breaker from bottom)	
	With a terminal cover	Without a terminal cover
NDM3Z-250V	50	93

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

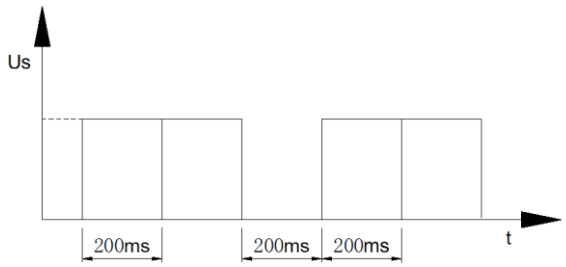
8.1 Shunt release

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 11 Voltage Specifications and Power Consumption of shunt release

Model	Shunt release	DC24V	AC230V	DC220V	AC380V
NDM3Z-250V	Instantaneous current value(A)	6. 8	0. 44	0. 24	0. 43
	Power waste (W)	164. 5	96. 8	52. 6	173. 9

Note: The working principle of the shunt release: There is a coil inside the shunt release, which can only operate for a short time. The shunt action is a single pulse action (it is recommended to power on for more than 200ms). The time from powering on the shunt release (receiving signal) to product release is ≤200ms, and it is recommended to use a 500ms-1 pulse power supply， Pulse count not exceeding three times。



Working principle of the shunt release

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 12 Current parameters of auxiliary contact

Category	Frame current (A)	Conventional thermal current Ith (A)	Rated working current Ie(A)	
			AC400V	DC220V
Auxiliary contact	250	3	1.5	0.15
Note :minimum applicable load: 5V，1mA.				

8.2.2 Electrical life of auxiliary contact

Table 13 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

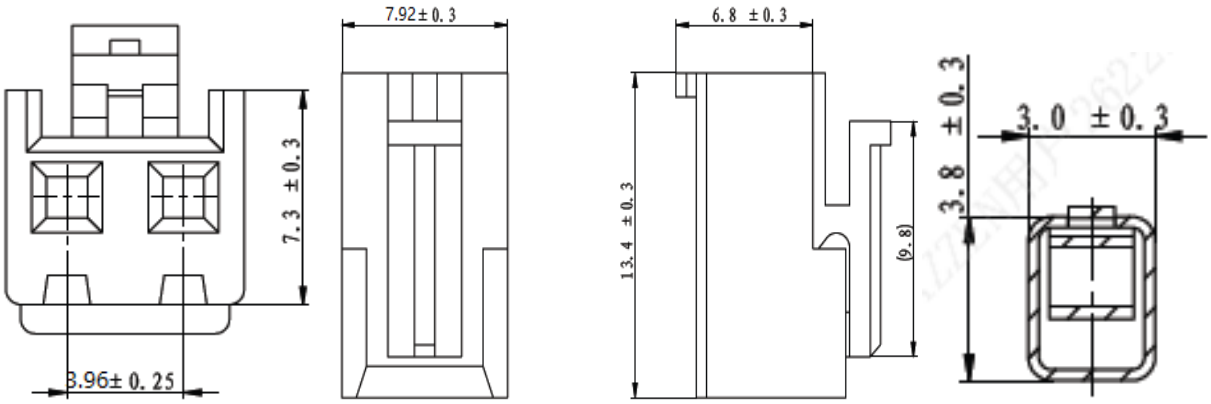
8.2.3 Making and breaking capacity of auxiliary contact

Table 14 Making and breaking capacity of auxiliary contact

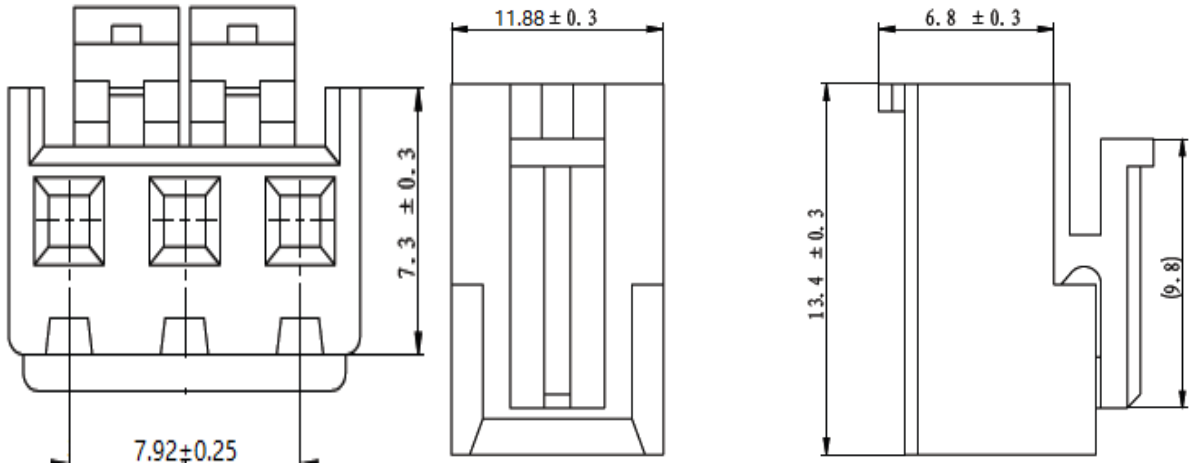
Ues category	On			Off			Times	Frequency	Power on time
	I/Ie	U/Ue	cosφ	I/Ie	U/Ue	cosφ			
AC-15	10	1.1	0.3	10	1.1	0.3	10	360	≥0.05s
DC-13	1.1	1.1	6Pe	1.1	1.1	6Pe			≥T0.95ms

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

8.3 Attachment connector (KR3961) dimensions (optional)



Auxiliary connector terminal dimensions (optional)



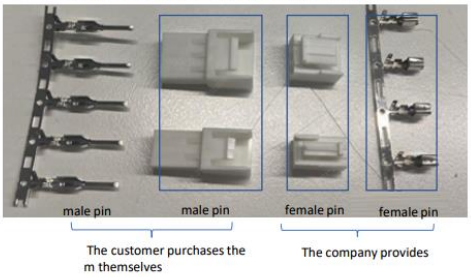
Auxiliary connector terminal dimensions (optional)

KR3961 connector - corresponding foreman material code

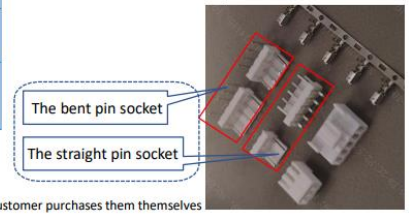
name	poles	material code (The company provides)	Corresponding male material code (line-to-line, customer purchase)	corresponding male material code (line-to-board, customer purchase)	
				straight needle	curved needle
socket	2	A3961O00249P60	JXAP1693-02-2P	C3961VD00229P630	C3961RD00229P630
	3	A3961O00349P60	JXAP1693-02-3P	C3961VD00329P630	C3961RD00329P630
	5	A3961O00549P60	JXAP1693-02-5P	C3961VD00529P630	C3961RD00529P630
	6	A3961O00649P60	JXAP1693-02-6P	C3961VD00629P630	C3961RD00629P630
	8	A3961O00849P60	JXAP1693-02-8P	C3961VD00829P630	C3961RD00829P630
pin	/	B3961OT2AA200	JXAP1693-02-T	/	/

Note: When choosing the line-to-line connection method, the customer needs to simultaneously purchase the plug and the pin.

The various components of the line-to-line connector



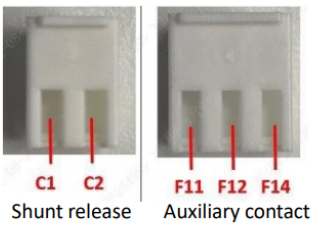
The various components of the line-to-board connector



Machine line number layout

NO.	poles	Accessory type	1st place	2nd place	3rd place	4th place	5th place	6th place	7th place	8th place
1	2P	Shunt release	C1	C2	/					
		Under-voltage release	D1	D2	/					
2	3P	Auxiliary contact	F11	F12	F14	/				
		Alarm contact	B11	B12	B14	/				
3	5P	Shunt release +Auxiliary contact	C1	C2	F11	F12	F14	/		
		Shunt release +Alarm contact	C1	C2	B11	B12	B14	/		
		Under-voltage release +Auxiliary contact	D1	D2	F11	F12	F14	/		
		Under-voltage release +Alarm contact	D1	D2	B11	B12	B14	/		
4	6P	Dual-Auxiliary contact	F11	F12	F14	F21	F22	F24	/	
		Auxiliary alarm contact	F11	F12	F14	B11	B12	B14	/	
5	8P	Shunt release +Dual-Auxiliary contact	C1	C2	F11	F12	F14	F21	F22	F24
		Shunt release +Auxiliary alarm contact	C1	C2	F11	F12	F14	B11	B12	B14
		Under-voltage release +Dual-Auxiliary contact	D1	D2	F11	F12	F14	F21	F22	F24
		Under-voltage release +Auxiliary alarm contact	D1	D2	F11	F12	F14	B11	B12	B14

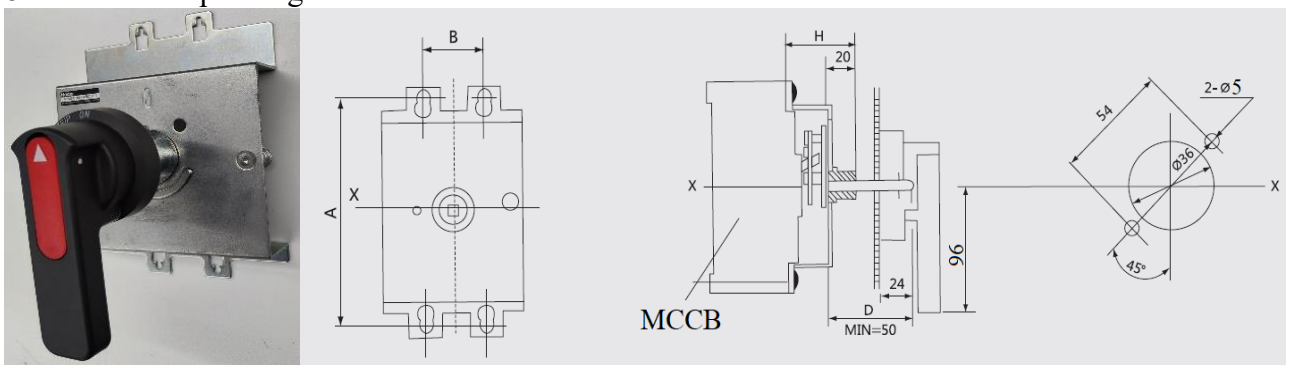
Accessory connector line number layout table



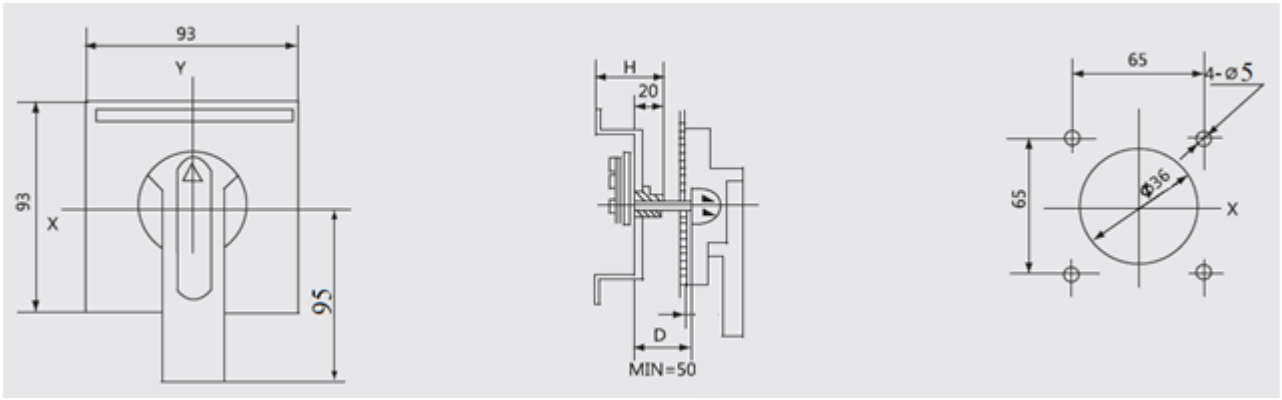
Example

8.4 Manual operating mechanism

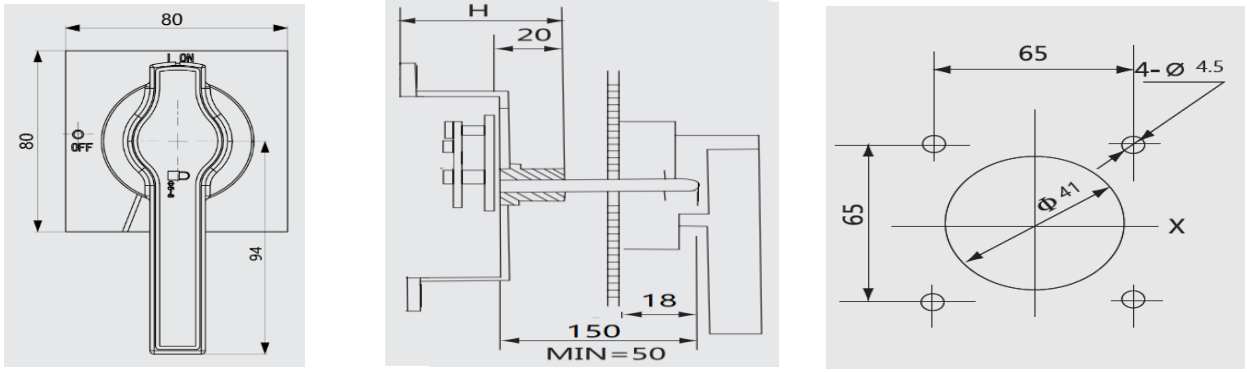
8.4.1 Electric operating mechanism and CS1-A handle



8.4.2 Electric operating mechanism and CS1-F handle



8. 4. 3 Electric operating mechanism and CS1-IP65 handle



8. 4. 3 Electric operating mechanism and CS1-IP65short handle

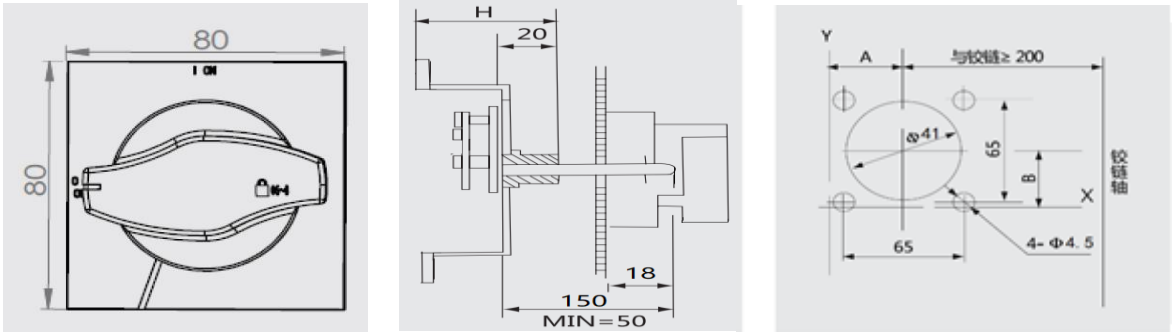


Table 15 Installation dimension of manual operating mechanism (Unit: mm)

	Model	Installation dimension of manual operating mechanism	Installation mode

Manual operation type		H	A	B(3P)	
CS1	NDM3Z-250V	58	179	42	Vertical installation

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

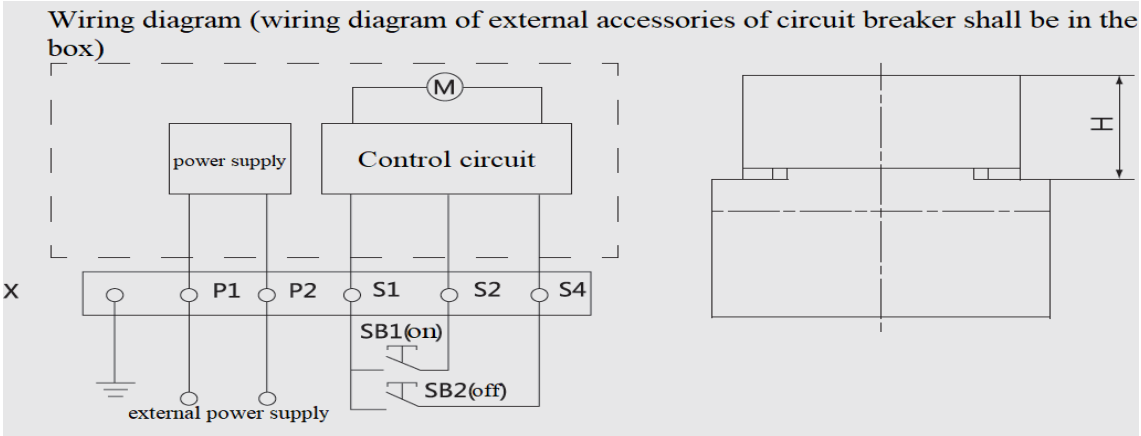
2) The length of A-type handle is 66mm and that of F-type handle is 65mm;

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.

8.4 Electric operating mechanism

8.4.1 Electric operating mechanism（AC/DC220V）



Symbol description: SB1、SB2: Operation button (provided by the customer)

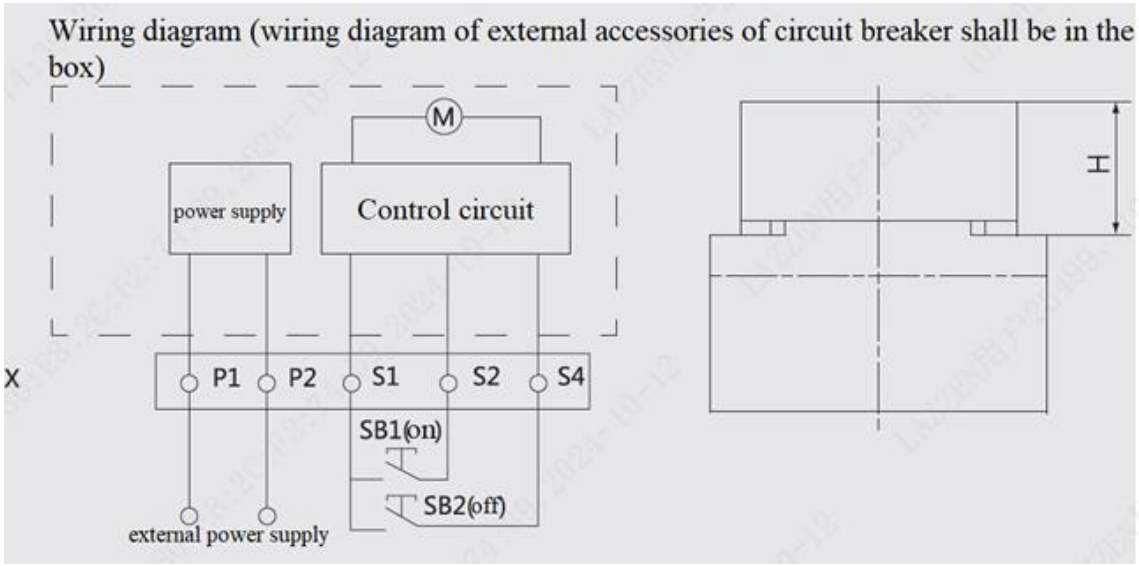
X: Terminal block P1、P2：External power supply

Voltage specification: AC220V

Table 16 Main technical parameters of electric operating mechanism

Equipped with circuit breaker	Electric power(W)	service life / time	Operating mechanism height H(mm)
	AC/DC220V		
NDM3Z-250V	180	10000	93.5

8.4.2 Electric operating mechanism（DC24V）



Symbol description: SB1、SB2: Operation button (provided by the customer)

X: Terminal block P1、P2：External power supply

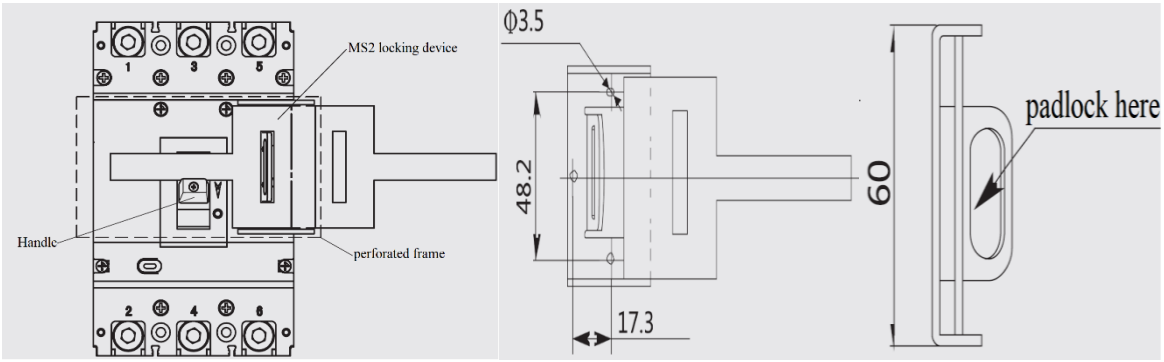
Voltage specification: DC24V

Table 17 Main technical parameters of electric operating mechanism（DC24V）

Equipped with circuit breaker	Starting peak current(A)	Running power (W)	service life (time)	Operating mechanism heightH(mm)
NDM3Z-250V	≤4.5	30	20000	86

8.5 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 NDM3Z 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)

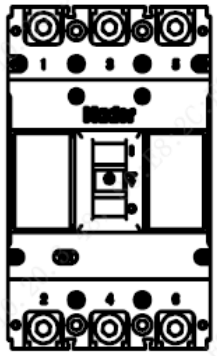
Note 1：After MS2 accessories are selected, other internal and external accessories cannot be installed on the same side；

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

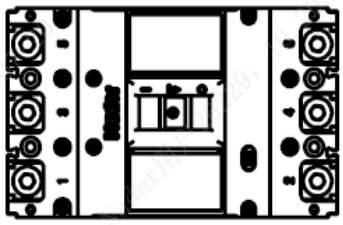
9. Installation Direction of Circuit Breaker

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

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	2P Quantity/Set	3P Quantity/Set
1	Cross small pan-head screw	M4×45	2	4
2	Hexagon nut	M4	2	4
3	Spring washer	4	2	4
4	Plain washer	4	2	4
5	Phase partition	——	6	8

7	Hexagon head combination bolt	M8×22	4	6
7	Insulating base plate	——	/	1
8	Terminal housing (optional)	——	/	1
9	Combination screws （(optional)）	M3.5×37.5	/	2

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.