

**Shanghai Liangxin Electrical Co., Ltd.**

**NDM3Z-630V 2P (DC1500V) Moulded case circuit breaker**

# Product Specification

(IPD-ENG-DEV-T22 A1 2016-09-23)

|             |       |      |       |
|-------------|-------|------|-------|
| Prepared    | _____ | Date | _____ |
| Reviewed    | _____ | Date | _____ |
| Countersign | _____ | Date | _____ |
|             | _____ |      | _____ |
|             | _____ |      | _____ |
|             | _____ |      | _____ |
|             | _____ |      | _____ |
| Approved    | _____ | Date | _____ |

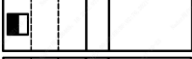
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### 3、Model and implication

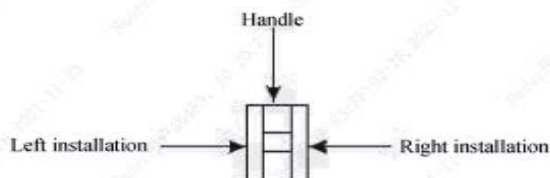
| <u>ND</u> | <u>M</u>                       | <u>3</u> | <u><input type="checkbox"/></u> | - | <u>630</u> | <u><input type="checkbox"/></u>                                                                                                                                                                                                                                                                                                                                                                                                      | <u><input type="checkbox"/></u> / <u><input type="checkbox"/></u> | <u><input type="checkbox"/></u> | <u><input type="checkbox"/></u> | <u><input type="checkbox"/></u> | <u><input type="checkbox"/></u> | <u><input type="checkbox"/></u> |
|-----------|--------------------------------|----------|---------------------------------|---|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| 1         | 2                              | 3        | 4                               | 5 | 6          | 7                                                                                                                                                                                                                                                                                                                                                                                                                                    | 8                                                                 | 9                               | 10                              | 11                              | 12                              | 13                              |
| S.N.      | Name of S.N.                   |          |                                 |   |            | NDM3Z                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                   |                                 |                                 |                                 |                                 |                                 |
| 1         | Enterprise characteristic code |          |                                 |   |            | ND: Nader low-voltage apparatus                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                   |                                 |                                 |                                 |                                 |                                 |
| 2         | Product type code              |          |                                 |   |            | M: Moulded case circuit breaker (MCCB)                                                                                                                                                                                                                                                                                                                                                                                               |                                                                   |                                 |                                 |                                 |                                 |                                 |
| 3         | Design S.N.                    |          |                                 |   |            | 3                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                   |                                 |                                 |                                 |                                 |                                 |
| 4         | Serial derived code            |          |                                 |   |            | Z: Thermomagnetic is adjustable                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                   |                                 |                                 |                                 |                                 |                                 |
| 5         | Current of the frame size      |          |                                 |   |            | 630                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                   |                                 |                                 |                                 |                                 |                                 |
| 6         | High voltage level code        |          |                                 |   |            | V                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                   |                                 |                                 |                                 |                                 |                                 |
| 7         | Operation mode                 |          |                                 |   |            | No code: directly handle operation                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                   |                                 |                                 |                                 |                                 |                                 |
|           |                                |          |                                 |   |            | Z: Rotary operation                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                   |                                 |                                 |                                 |                                 |                                 |
|           |                                |          |                                 |   |            | P: Motor operation                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                   |                                 |                                 |                                 |                                 |                                 |
| 8         | Pole                           |          |                                 |   |            | 2:2 poles                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                   |                                 |                                 |                                 |                                 |                                 |
| 9         | Trip release code              |          |                                 |   |            | 3: Complex tripper                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                   |                                 |                                 |                                 |                                 |                                 |
| 10        | Accessory code                 |          |                                 |   |            | See “Accessory code table”                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                   |                                 |                                 |                                 |                                 |                                 |
| 11        | Rated current                  |          |                                 |   |            | See “Main Technical Parameters”                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                   |                                 |                                 |                                 |                                 |                                 |
| 12        | Wiring method                  |          |                                 |   |            | No code: Normal product                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                   |                                 |                                 |                                 |                                 |                                 |
| 13        | Other code                     |          |                                 |   |            | CS2-A/150/200/300/350/650: Circular eccentric hole rotary handle + shaft length 150/200/300/350/650mm<br>CS2-F/150/200/300/350/650: Square eccentric hole rotary handle + shaft length 150/200/300/350/650mm<br>CS1-IP65/150/200/300/350/650: IP65 Square center hole rotary handle + shaft length 150/200/300/350/650mm<br><br>S: Extended handle<br><br>CZ: long Terminal cover<br><br>DB: Insulating base（standard configuration） |                                                                   |                                 |                                 |                                 |                                 |                                 |

**Table 1 Accessory Code table**

| Accessory code | Accessory name                          | Installation position                                                                 |
|----------------|-----------------------------------------|---------------------------------------------------------------------------------------|
| 00             | None                                    | _____                                                                                 |
| 08             | Alarm contact                           |  |
| 10             | Shunt release                           |  |
| 21             | Single auxiliary contact                |  |
| 41             | Shunt release, single auxiliary contact |  |

|    |                                                        |  |
|----|--------------------------------------------------------|--|
| 18 | Shunt release,alarm contact                            |  |
| 20 | two sets of single auxiliary contacts                  |  |
| 22 | Single auxiliary contact, alarm contact                |  |
| 42 | Shunt release, single auxiliary contact, alarm contact |  |

Note: Single auxiliary contact; Alarm contact; Shunt release



## 4、Main technical parameters

**Table 2 Main Technical Parameters**

| Model                                                        |                 | NDM3Z-630V                            |       |
|--------------------------------------------------------------|-----------------|---------------------------------------|-------|
| Shell frame grade rated current $I_{nm}$ (A)                 |                 | 630                                   |       |
| Rated current $I_n$ (A)                                      |                 | 400、450、500、630                       |       |
| Rated insulation voltage $U_i$ (V)                           |                 | 1600                                  |       |
| Rated impulse withstand voltage $U_{imp}$ (kV)               |                 | 12                                    |       |
| Power frequency withstand voltage (1min) (V)                 |                 | 3820                                  |       |
| Usage category                                               |                 | A                                     |       |
| Pole                                                         |                 | 2                                     |       |
| Rated voltage $U_e$ DC(V)                                    |                 | 1500                                  |       |
| Rated Ultimate Short-circuit breaking capacity $I_{cu}$ (kA) |                 | 25 ( $\tau=5ms$ ) /15 ( $\tau=10ms$ ) |       |
| Rated Service Short-circuit breaking capacity $I_{cs}$ (kA)  |                 | 25 ( $\tau=5ms$ ) /15 ( $\tau=10ms$ ) |       |
| Life (times)                                                 | Electrical life |                                       | 1000  |
|                                                              | Mechanical life | Maintenance-free                      | 7000  |
|                                                              |                 | Maintainable life                     | 14000 |
| Boundary dimension<br>                                       | L (mm)          |                                       | 250   |
|                                                              | W (mm)          |                                       | 96    |
|                                                              | H (mm)          |                                       | 135   |
| Flashover distance(mm)                                       |                 | 0 (With terminal cover)               |       |

|               |                             |
|---------------|-----------------------------|
|               | 65 (Without terminal cover) |
| Wiring method | Front-Panel                 |

#### 4.1 Selection of cross-sectional area of circuit breaker connecting bus and cable:

**Table 3 NDM3Z-630V Selection of cross-sectional area of connecting bus and cable**

| Rated current (A) | Conductor area(mm <sup>2</sup> ) |     | Copper bar size (mm <sup>2</sup> ) |      |
|-------------------|----------------------------------|-----|------------------------------------|------|
|                   | Quantity                         | Ara | Quantity                           | Size |
| 400               | 1                                | 240 | /                                  | /    |
| 450/500           | 2                                | 150 | 2                                  | 30×5 |
| 630               | 2                                | 185 | 2                                  | 40×5 |

#### 4.2 Torque value of tightening circuit breaker wiring terminal and mounting screw:

**Table 4 Torque value between circuit breaker wiring terminal and mounting screw**

| Current of the frame size | Thread specification | Torque values (N·m) |
|---------------------------|----------------------|---------------------|
| NDM3Z-630V                | M10                  | 20                  |
|                           | M5                   | 4                   |

#### 4.3 Drop capacity coefficient of circuit breaker temperature change

**Table 5 Circuit breaker temperature variation drop capacity coefficient table**

| Model | Correction factor |    |    |    |      |      |      |      |
|-------|-------------------|----|----|----|------|------|------|------|
| 630   | Temperature (°C)  | 40 | 45 | 50 | 55   | 60   | 65   | 70   |
|       | Correction factor | 1  | 1  | 1  | 0.92 | 0.90 | 0.89 | 0.83 |

Note: 1). When the ambient temperature is below 50℃, the product can be used normally, but the volume can not be reduced.

2). The above reduction coefficients are measured at the maximum rated current of the shell frame.

#### 4.4 High altitude drop capacity coefficient of circuit breaker

**Table 6 High altitude drop capacity coefficient of circuit breaker**

| Altitude (m)                                                 | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 |
|--------------------------------------------------------------|------|------|------|------|------|------|------|
| Working current correction coefficient                       | 1    | 1    | 0.98 | 0.95 | 0.93 | 0.91 | 0.89 |
| Maximum working current correction coefficient (V)           | 1    | 1    | 1    | 1    | 1    | 1    | 1    |
| Power frequency withstand voltage correction coefficient (V) | 1    | 1    | 1    | 1    | 1    | 1    | 1    |

|                                              |   |   |   |   |   |   |   |
|----------------------------------------------|---|---|---|---|---|---|---|
| Isolation voltage correction coefficient (V) | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
|----------------------------------------------|---|---|---|---|---|---|---|

Note: When the altitude exceeds 2500m, the electrical performance of the circuit breaker shall be modified according to Table above. When the altitude is above 3000m, insulation board G shall be installed between the circuit breaker and the metal mounting plate.

## 5、Working conditions

1) The altitude of the installation site is no more than 2500 m, and the high-altitude capacitance drop coefficient is shown in "Table of High-Altitude Capacitance Drop coefficient of Circuit breaker";

2) Ambient temperature  $-35^{\circ}\text{C} \sim +70^{\circ}\text{C}$ ; The average value of 24h does not exceed  $+35^{\circ}\text{C}$ . When the ambient temperature is higher than  $+40^{\circ}\text{C}$ , the user needs to use the capacity drop, and the capacity drop coefficient is shown in the table "Circuit breaker Temperature change Capacity drop coefficient";

3) When the ambient temperature is  $+40^{\circ}\text{C}$ , the relative humidity should not exceed 50%. Relatively low temperature can have high humidity, such as: when  $20^{\circ}\text{C}$ , the relative humidity can reach 90%; Corresponding measures should be taken for frost caused by temperature change;

4) The product can withstand the influence of moist air, salt mist, oil mist and mold;

5) for the installation of the main loop of the circuit breaker connected to category: III class (grade distribution and control level), the main loop of the circuit breaker is not connected to the installation of the categories are: II class (load);

6) Pollution level: Level 3;

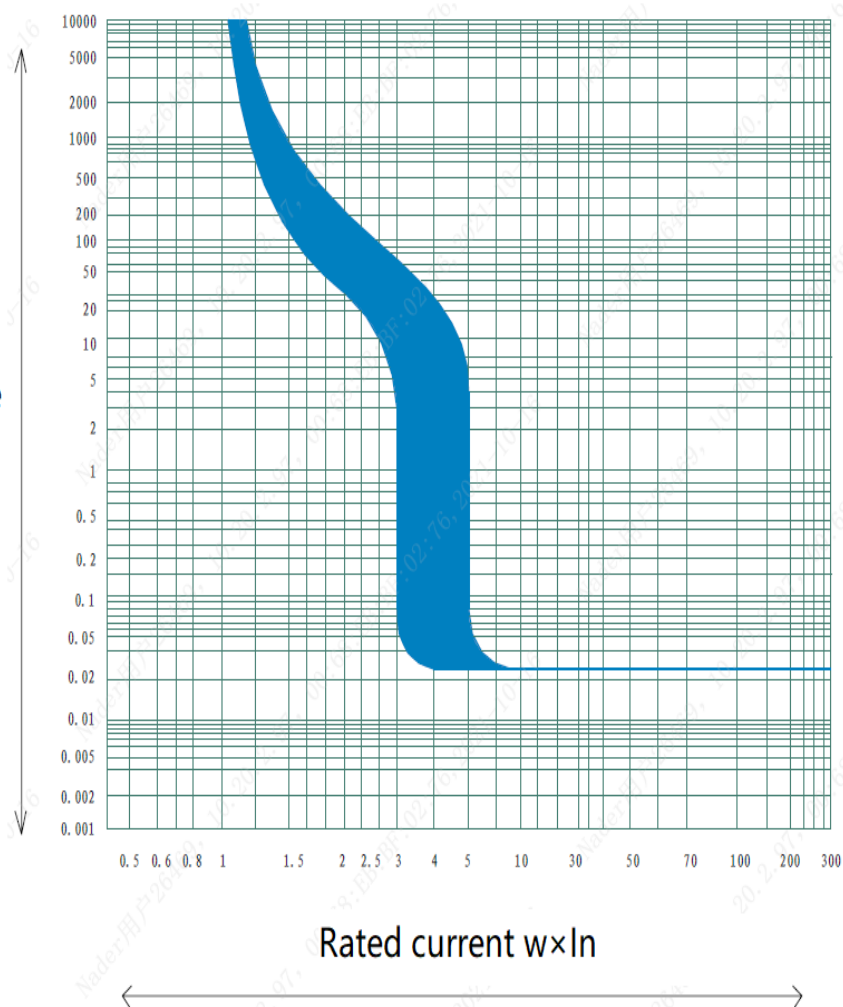
7) Protection level: IP20;

8) The product shall be installed in a medium without explosion risk, and the medium shall be free of gas and conductive dust sufficient to corrode the metal and destroy the insulation, and shall be avoided to be used in places invaded by rain and snow;

9) When the user's conditions of use are more severe than those mentioned above, he/she shall consult with the manufacturer.

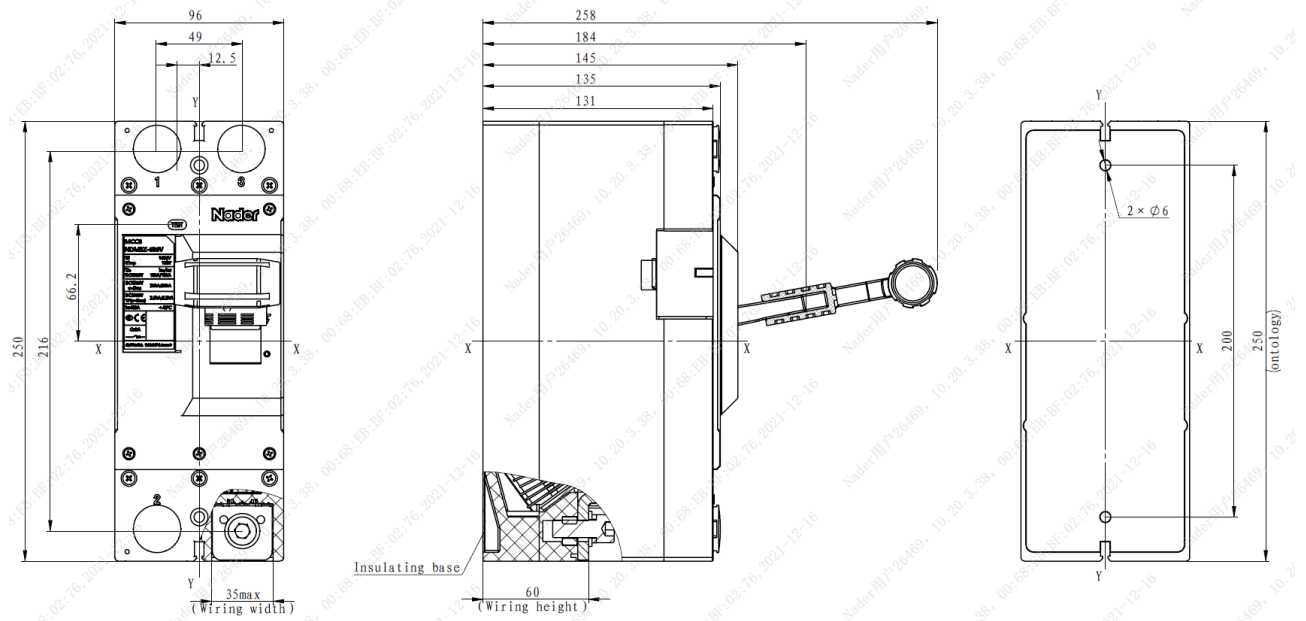
## 6、Circuit breaker short circuit overload protection characteristic curve

The action time  
T (S)

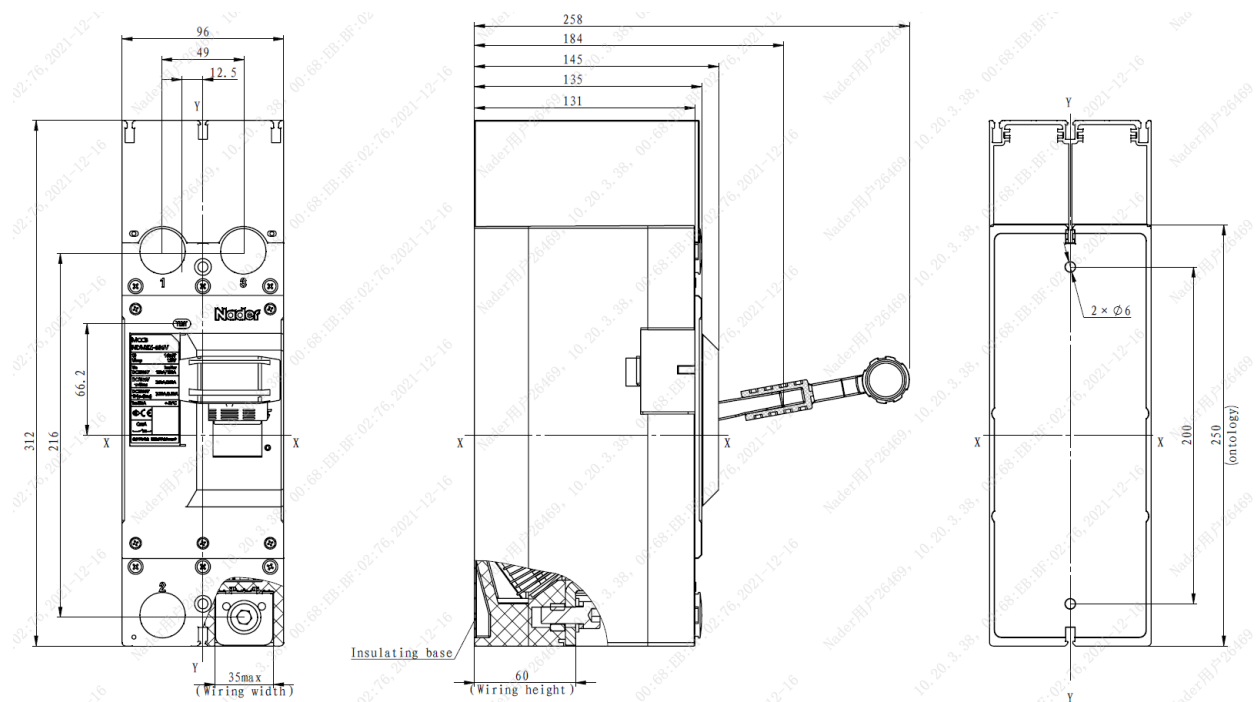


## 7、Shape、size of mounting hole and safe distance

### 7.1 External Dimensions of Products

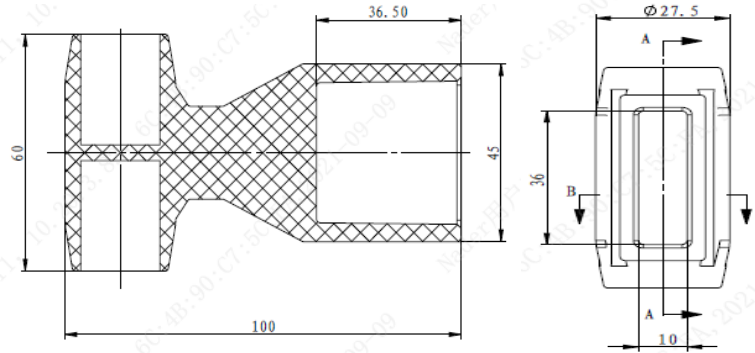


Product dimensions for without terminal cover



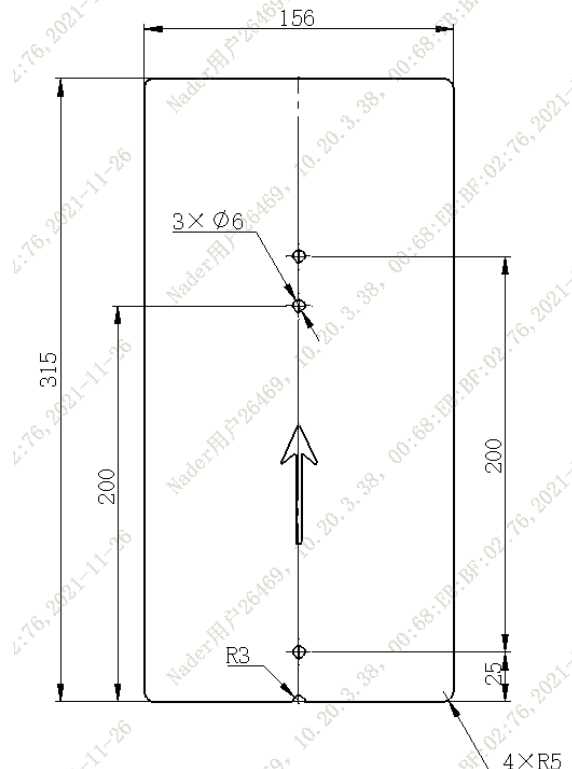
Product dimensions for with terminal cover

## 7.2 Extended handle dimensions



Outline dimensions of the lengthened handle

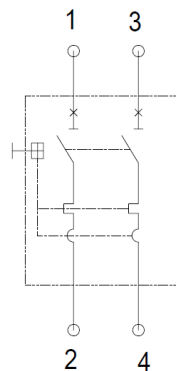
## 7.3 Insulating base dimensions



Outline dimensions of the Insulating base

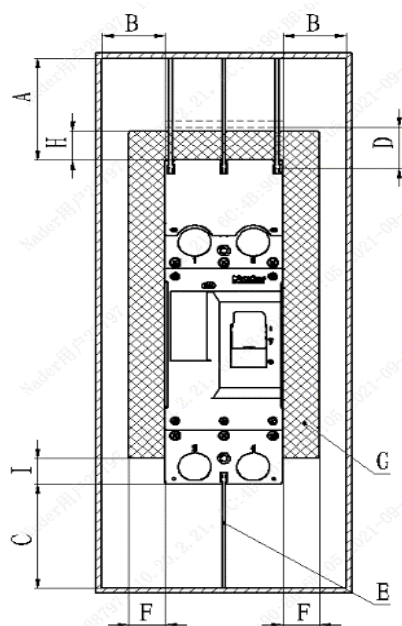
Note: Unmarked tolerance class is in accordance with GB/T 1804-C (Linear dimensions 0.5~3, tolerance:  $\pm 0.2$ ; 3~6, tolerance:  $\pm 0.3$ ; 6~30, tolerance:  $\pm 0.5$ ; 30~120, tolerance:  $\pm 0.8$ ; 120~400, tolerance:  $\pm 1.2$ ).

## 7.4 Wiring Method



Wiring Diagram for NDM3Z-630V 2P

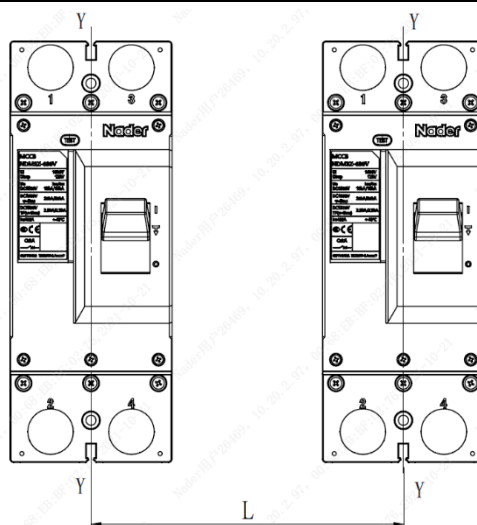
## 7.5 Safe distance for circuit breaker installation



- A: Terminal cover end to cabinet surface  
 B: Distance from side to cabinet  
 C: Distance from the outgoing end to the cabinet surface  
 D: To non-conductive parts  
 E: Alternating partitions  
 F/H/I: circuit breaker to edge of insulating base plate  
 G: Insulation board thickness  $\geq 0.8\text{mm}$

**Table 7 Safety distance parameter table for installation in metal cabinet (unit: mm)**

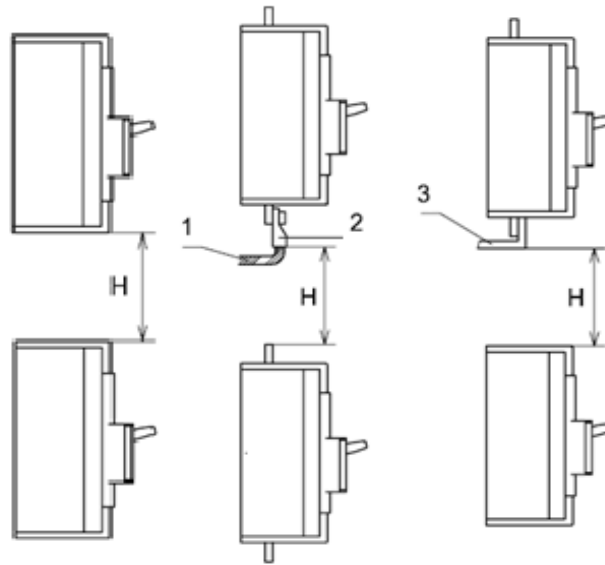
| Model      | A (With terminal cover) | A ( Without terminal cover ) | B  | C  | D  | F  | H  | I  |
|------------|-------------------------|------------------------------|----|----|----|----|----|----|
| NDM3Z-630V | 35                      | 120                          | 50 | 50 | 35 | 30 | 30 | 25 |



**Table 8 Minimum center distance parameter list between circuit breaker rows (unit: mm)**

| Model      | L (Center distance of circuit breakers installed side by side) |
|------------|----------------------------------------------------------------|
|            | 2P                                                             |
| NDM3Z-630V | 126                                                            |

Note: When the circuit breakers are stacked or stacked, check the connecting bus or cable to ensure that the air insulation distance will not be reduced.



**Table 9 Parameters of minimum center distance between stacking circuit breakers (unit: mm)**

| Model      | H (Stacking circuit breaker up and down distance) |
|------------|---------------------------------------------------|
|            | With terminal cover                               |
| NDM3Z-630V | 150                                               |

Note: 1. 1 in the figure above is an insulated cable; 2 is the cable terminal; 3 is connection-no insulation;

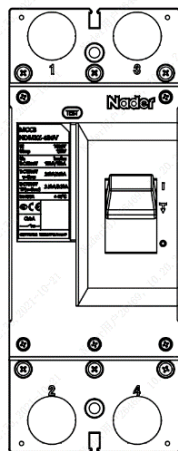
2. Please check that the terminal cover and phase partition are in place before the product is powered on.

The product can be mounted either horizontally or vertically.

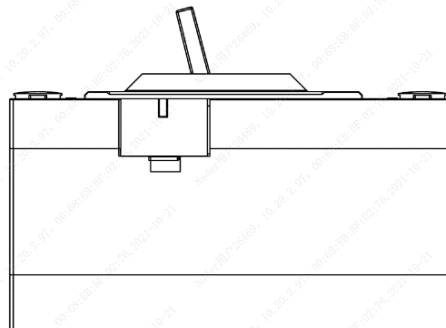
## 8、Installation method

The product is installed vertically (vertical installation), the inclination of the installation surface and the vertical plane is  $\leq \pm 22.5^\circ$ .

The product is installed horizontally (cross installation).



Vertical installation



Horizontal installation

## 9、Packaging and storage

Minimum packing quantity of 1 / box, packaged products, at ambient temperature of  $-40^{\circ}\text{C} \sim +75^{\circ}\text{C}$ , should be stored in a warehouse with air circulation and relative humidity not greater than 80%. A storehouse where ambient air is free of acid, alkaline, or other corrosive gases. Under the above conditions, the storage period shall not exceed 3 years from the production date.

## 10、Environment

| SN | Name                                  | Specifications | Quantity/Set(2P) |
|----|---------------------------------------|----------------|------------------|
| 1  | Cross small pan-head screw            | M5×130         | 2                |
| 2  | Plain washer                          | M5             | 2                |
| 3  | Interphase baffle (arc divider)       | ——             | 2                |
| 4  | Plug                                  | ——             | 4                |
| 5  | Insulating base                       | ——             | 1                |
| 6  | Extended handle                       | ——             | 1 (optional)     |
| 7  | Terminal cover                        | ——             | 1 (optional)     |
| 8  | Terminal cover mounting screw (black) | ST2.9×8        | 1 (optional)     |
| 9  | Terminal screw                        | M10×30         | 4                |

Note: If insulation bottom plate is selected, insulation work should be done at the corresponding position of the bottom surface of the circuit breaker installation.

## 11、Accessory list and installation

### 11.1 Rated Parameters of the Shunt release

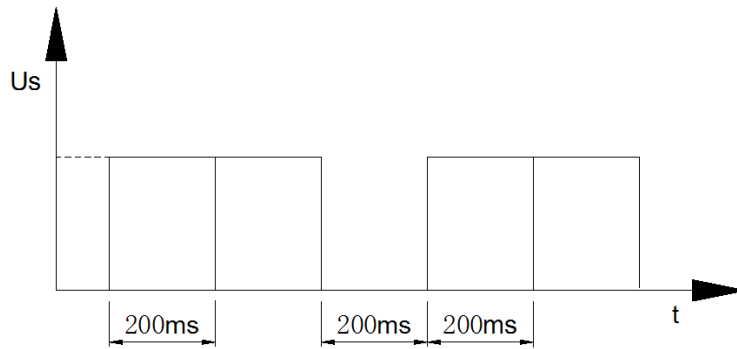
When the external voltage of the shunt release is between 70% and 110% of the rated control power voltage, the release can break the circuit breaker reliably.

Voltage specifications and power consumption of shunt tripper (see Table 10)

**Table 10 Rated Parameters of the Shunt Release**

| Voltage specifications (V)  | DC24V  | DC 220V | AC 220V | AC380V |
|-----------------------------|--------|---------|---------|--------|
| Keeping power consumption/W | 6. 8   | 0. 76   | 0. 76   | 0. 28  |
| Power waste (W)             | 164. 5 | 176. 3  | 176. 3  | 176. 3 |

Working principle of the Shunt release: single pulse action (recommended power on time > 200ms). The time between shunt release (receiving signal) and product release is 100ms.



If long-term power supply is required so that the circuit breaker cannot be closed normally, one auxiliary contact can be connected in series as shown in the figure below.



## 11.2 Rated Parameters of the Auxiliary Contact

**Table 11 Parameter of Auxiliary Contact**

| Accessory name                                |                    | Auxiliary contact (conventional) | Auxiliary contact (Low power consumption) |
|-----------------------------------------------|--------------------|----------------------------------|-------------------------------------------|
| Voltage specifications (V)/conventional (Ith) |                    | AC250V/10A、AC400V/3A、DC220V/0.2A | DC30V/0.1A                                |
| Wiring diagram                                | off, Free tripping |                                  |                                           |
|                                               | On                 |                                  |                                           |
| Internal resistance                           |                    | <30mΩ                            | <50mΩ                                     |

Note 1): If need DC30V/0.1A auxiliary contact, please explain when ordering.

2): The first auxiliary harness is identified as F11 (red), F12 (white), F14 (yellow).

## 11.3 Rated Parameters of the Alarm Contact

**Table 12 Parameter of Alarm contact**

| Accessory name                                |               | Alarm contact (conventional)     | Alarm contact (Low power consumption) |
|-----------------------------------------------|---------------|----------------------------------|---------------------------------------|
| Voltage specifications (V)/conventional (Ith) |               | AC250V/10A、AC400V/3A、DC220V/0.2A | DC30V/0.1A                            |
| Wiring diagram                                | On, off       |                                  |                                       |
|                                               | Free tripping |                                  |                                       |
| Internal resistance                           |               | <30mΩ                            | <50mΩ                                 |

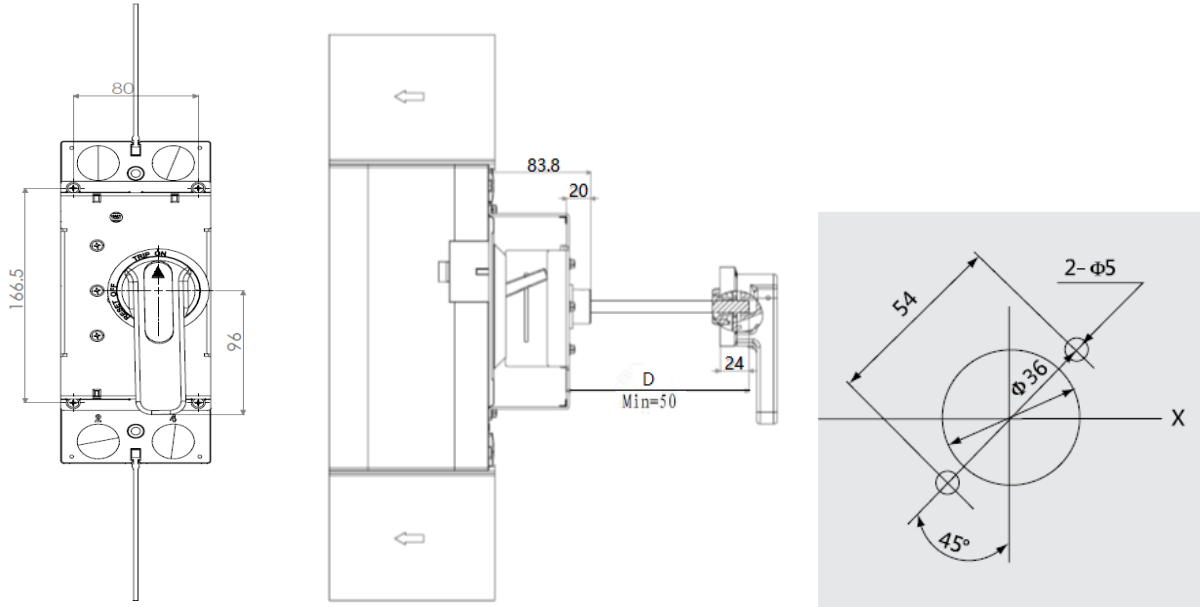
Note1): If need DC30V/0.1A alarm contact, please explain when ordering.

2) The first alarm harness is identified as B11 (red), B12 (white), B14 (yellow).

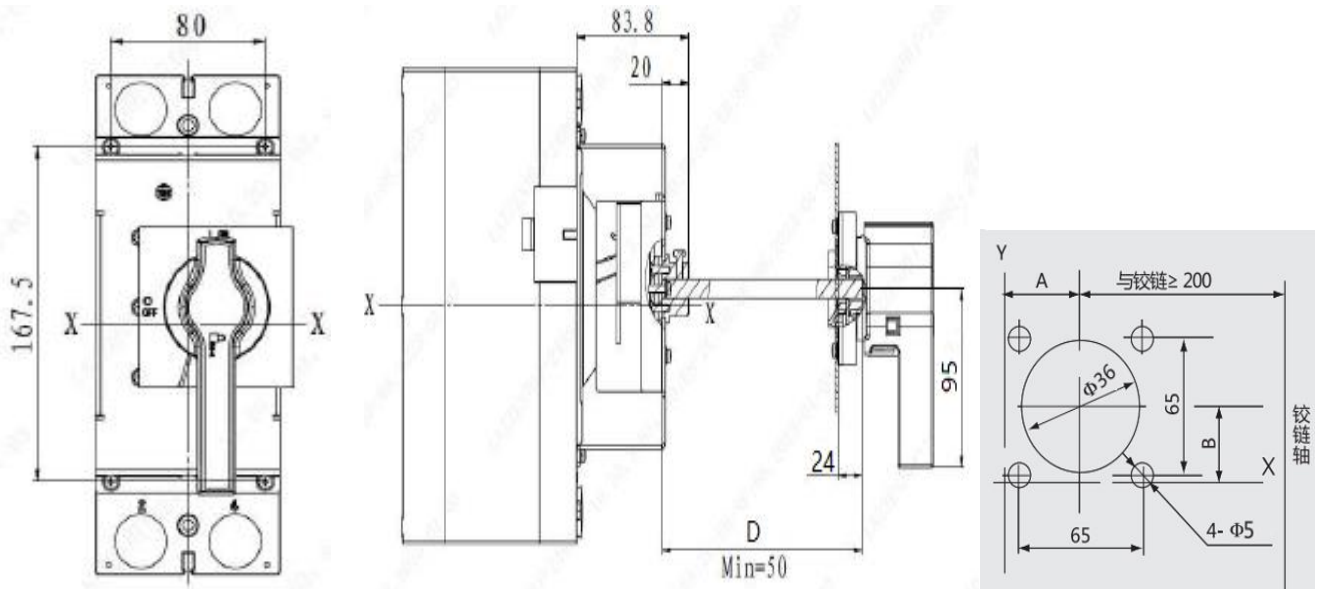
**Shunt Release、Auxiliary contact、Alarm contact , the standard wiring line is 0.7m long ,1m、2m、4m can be customized according to requirements.**

## 11.4 Manual operating mechanism

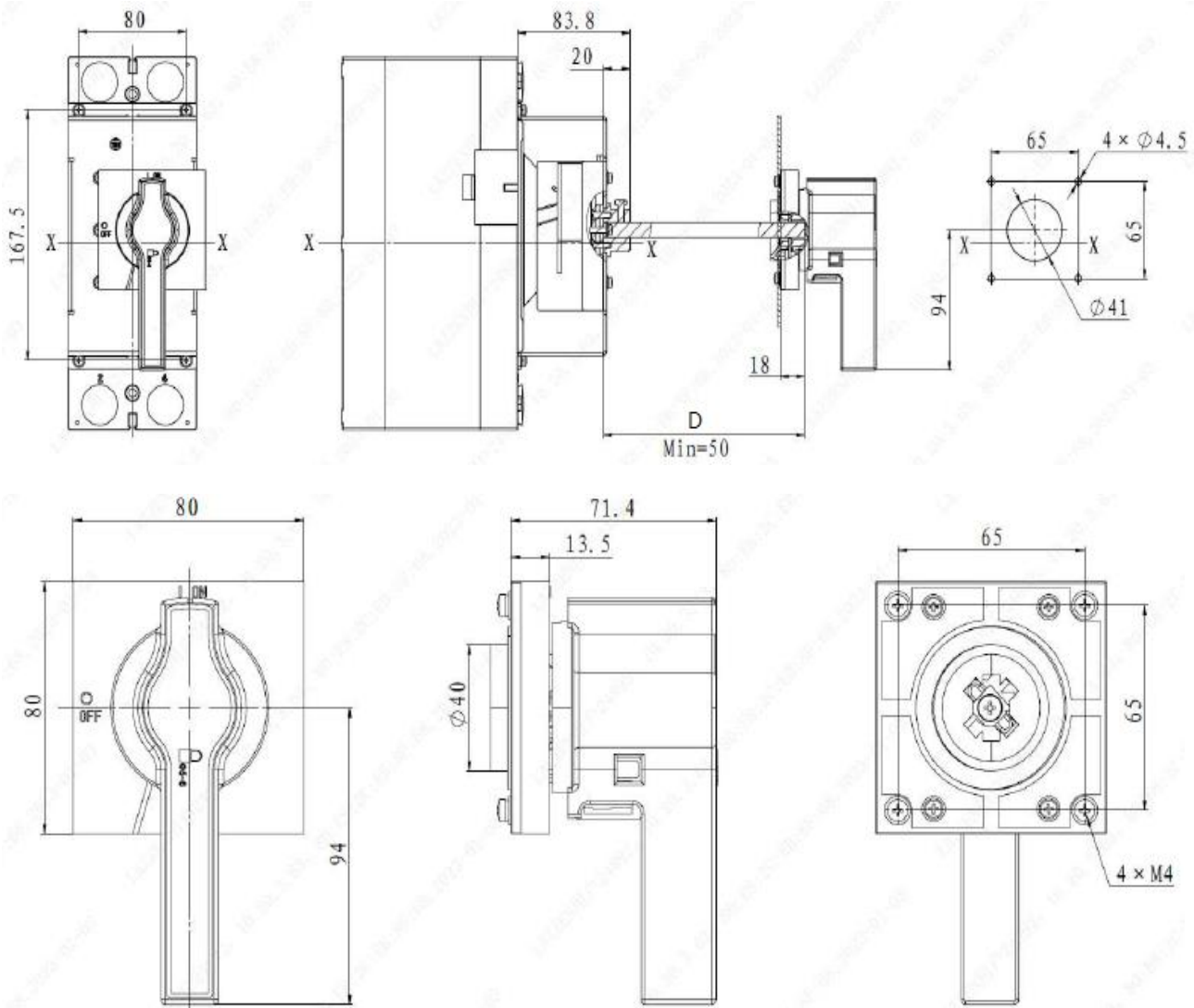
### 11.4.1 Manual operating mechanism and CS2-A handle



### 11.4.2 Manual operating mechanism and CS2-F handle



### 11.4.3 Manual operating mechanism and CS2-IP65 handle



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

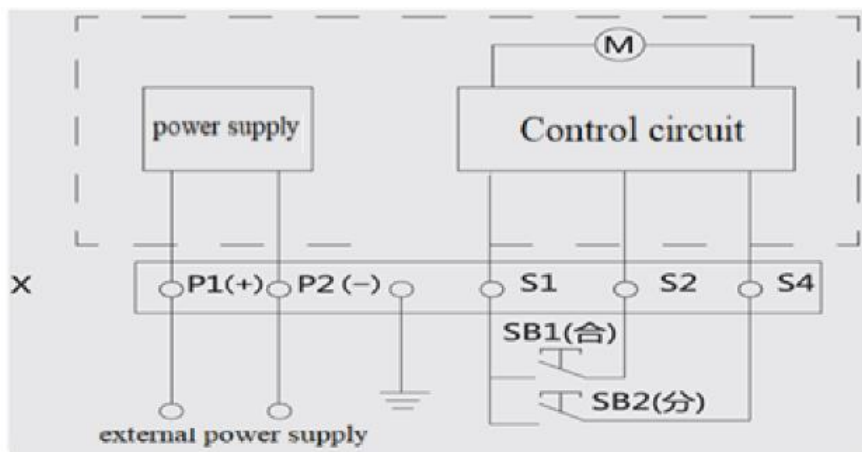
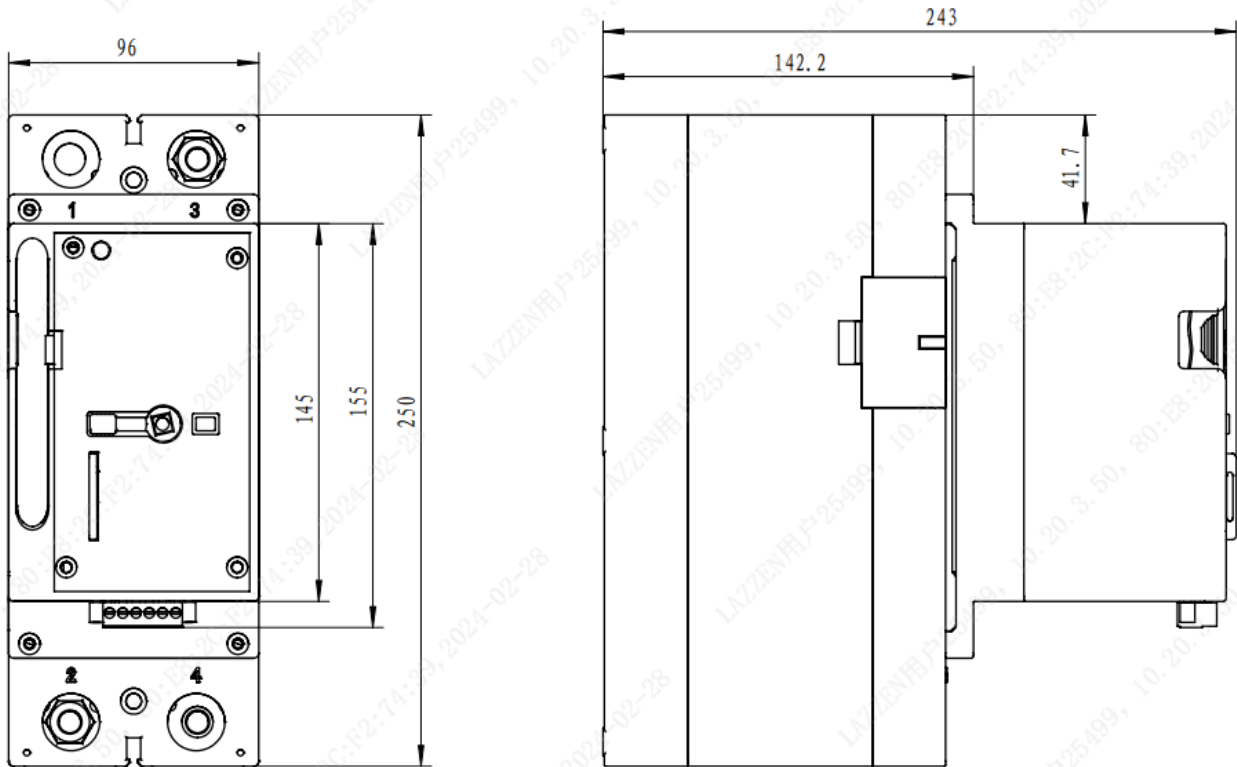
2) The length of A-type handle is 96mm and that of F-type handle is 95mm;

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.

## 11.5 Electric operating mechanism

Electric operation-overall dimension of circuit breaker and its electric operating mechanism after installation:



Electric operation Wiring diagram

Symbol description:

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

X: Terminal block

P1、P2: External power supply

Note: 1) During manual operation, 180° shall be operated clockwise, and counterclockwise operation is prohibited

2) P1 and P2 shall not be connected with S1 and S2 and S4 during electric operation wiring

3) Unmarked tolerance level should follow GB/T 1804-c.

**Table 13 Main technical parameters of electric operating mechanism**

| Equipped with<br>Circuit breaker | Action current(A) |          | Electric power ( W ) |            | service life / time |
|----------------------------------|-------------------|----------|----------------------|------------|---------------------|
|                                  | AC230V/DC220V     | DC24V    | AC230V/DC220V        | DC24V      |                     |
| NDM3Z-630V                       | $\leq 1$          | $\leq 2$ | $\leq 300$           | $\leq 100$ | 15000               |

## 12、Notices

1) All characteristics and accessories of circuit breaker shall be set by the manufacturer. Only trained or certified professionals can adjust, install and maintain the circuit breaker, trip unit or other accessories according to the line design parameters;

2) Ensure that the power supply is in the off state before installing or removing any device;

3) The circuit breaker handle can be in three positions, indicating three states of closure, disconnection and free trip respectively. When the handle is in the position of free trip, the handle should be pulled in the direction of disconnection. At this time, the circuit breaker can be repressed before closing.