

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

# NDM2L-250 Product Specification

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

|                  |       |      |       |
|------------------|-------|------|-------|
| Prepared by      | _____ | Date | _____ |
| Reviewed by      | _____ | Date | _____ |
| Countersigned by | _____ | Date | _____ |
|                  | _____ |      | _____ |
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|                  | _____ |      | _____ |
| Approved by      | _____ | Date | _____ |

| Revision History |                                                                                |                         |                  |                 |                 |
|------------------|--------------------------------------------------------------------------------|-------------------------|------------------|-----------------|-----------------|
| Version          | Revision Reason/Content                                                        | Implementat<br>ion Date | Prepared<br>by   | Reviewe<br>d by | Approve<br>d by |
| 0                | Newly added                                                                    | 20200805                | Wang<br>Hu       | Peng<br>Haorang | Hu Qi           |
| 1                | Update the product appearance picture<br>and product dimension outline drawing | 20210930                | Sun<br>Lanping   | Xu<br>Fuping    | Ding<br>Fei     |
| 2                | Add attachment information                                                     | 20221110                | Yang<br>rongrong | Xu<br>Fuping    | Ding fei        |
| 3                | Increase requirements for incoming lines<br>and voltage                        | 20240329                | Yang<br>rongrong | Xu<br>Fuping    | Ding fei        |
| 4                | Logo change                                                                    | 20260313                | Yang<br>rongrong | Xu<br>Fuping    | Ding fei        |
|                  |                                                                                |                         |                  |                 |                 |
|                  |                                                                                |                         |                  |                 |                 |
|                  |                                                                                |                         |                  |                 |                 |
|                  |                                                                                |                         |                  |                 |                 |
|                  |                                                                                |                         |                  |                 |                 |
|                  |                                                                                |                         |                  |                 |                 |
|                  |                                                                                |                         |                  |                 |                 |

## 1. Applicable Scope and Purpose of Circuit Breaker

The NDM2L-250 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 250A. With the overload, short circuit protection functions, the circuit breaker can protect lines and power equipment from damage. Meanwhile, they can deal with the personal safety, fire hazards and other potential risks caused due to long-term ground faults that can't be detected with the overcurrent protection function.

The circuit breaker has an isolating function with the corresponding symbol of  $\text{---}\diagup\diagdown\text{---}$ ;

Comply with standards: IEC60947-2, GB/T 14048.2.

Products comply with CCC、CE、TUV and CB certification.

Downline products can only be used in downline scenarios, and upline products can only be used in upline scenarios.

## 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<br>1 | M<br>2                                       | 2<br>3 | L -<br>4                                                                                         | <br>5 | <br>6 | <br>7 | /<br>8 | <br>9 | <br>10 | /<br>11 | <br>12 | <br>13 | <br>14 | <br>15 | <br>16 | <br>17 | <br>18 |
|---------|----------------------------------------------|--------|--------------------------------------------------------------------------------------------------|-------|-------|-------|--------|-------|--------|---------|--------|--------|--------|--------|--------|--------|--------|
| SN      | SN name                                      |        | NDM2L                                                                                            |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
| 1       | Enterprise code                              |        | ND: "Lazzen" low-voltage apparatus                                                               |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
| 2       | Product code                                 |        | M: Molded case circuit breaker (MCCB)                                                            |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
| 3       | Design SN                                    |        | 2                                                                                                |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
| 4       | Derived code of the series                   |        | L: Residual current protection                                                                   |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
| 5       | Shell frame level                            |        | 250                                                                                              |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
| 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                                                                                         |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
|         |                                              |        | XB: Non-time delay alarm tripping                                                                |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
|         |                                              |        | YB: Delay alarm tripping                                                                         |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
|         |                                              |        | XI: Non-time delay + alarm non-tripping                                                          |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
|         |                                              |        | YI: Delay + alarm non-tripping                                                                   |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
| 10      | Residual current release type                |        | 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 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    |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
| 16      | Rated current                                |        | See Table 2                                                                                      |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
| 17      | Cabling type                                 |        | No code: Normal product                                                                          |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
|         |                                              |        | P: Connection busbar                                                                             |       |       |       |        |       |        |         |        |        |        |        |        |        |        |
| 18      | 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                    |
|                                                                                                                                                                                                                                                                                      |                       | CS2-A/150: Circular eccentric hole rotary handle + shaft length 150mm               |
|                                                                                                                                                                                                                                                                                      |                       | CS2-A/200: Circular eccentric hole rotary handle + shaft length 200mm               |
|                                                                                                                                                                                                                                                                                      |                       | CS2-A/300: Circular eccentric hole rotary handle + shaft length 300mm               |
|                                                                                                                                                                                                                                                                                      |                       | CS2-A/350: Circular eccentric hole rotary handle + shaft length 350mm               |
|                                                                                                                                                                                                                                                                                      |                       | CS2-A/650: Circular eccentric hole rotary handle + shaft length 650mm               |
|                                                                                                                                                                                                                                                                                      |                       | CS2-F/150: Square eccentric hole rotary handle + shaft length 150mm                 |
|                                                                                                                                                                                                                                                                                      |                       | CS2-F/200: Square eccentric hole rotary handle + shaft length 200mm                 |
|                                                                                                                                                                                                                                                                                      |                       | CS2-F/300: Square eccentric hole rotary handle + shaft length 300mm                 |
|                                                                                                                                                                                                                                                                                      |                       | CS2-F/350: Square eccentric hole rotary handle + shaft length 350mm                 |
|                                                                                                                                                                                                                                                                                      |                       | CS2-F/650: Square eccentric hole rotary handle + shaft length 650mm                 |
|                                                                                                                                                                                                                                                                                      |                       | DC1 24V:Electric operation voltage DC24V                                            |
|                                                                                                                                                                                                                                                                                      |                       | DC1 110V: Electric operation voltage AC/DC110V                                      |
|                                                                                                                                                                                                                                                                                      |                       | DC1 220V: Electric operation voltage AC230V/DC220V                                  |
|                                                                                                                                                                                                                                                                                      |                       | DC1 380V: Electric operation voltage AC380/400/415V                                 |
|                                                                                                                                                                                                                                                                                      |                       | AC230V: Shunt release operation voltage AC220/230/240V                              |
|                                                                                                                                                                                                                                                                                      |                       | AC380V: Shunt release/ Under-voltage release operation voltage AC380V/AC400V/AC415V |
|                                                                                                                                                                                                                                                                                      |                       | DC24V：Shunt release operation voltage DC24V                                         |
|                                                                                                                                                                                                                                                                                      |                       | DC220V：Shunt release operation voltage DC220V                                       |
|                                                                                                                                                                                                                                                                                      |                       | Z: Terminal housing                                                                 |
| 19                                                                                                                                                                                                                                                                                   | Product wiring method | X: Lower input (customized special item number is required)                         |
|                                                                                                                                                                                                                                                                                      |                       | Upper input (default description does not reflect)                                  |
| 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、By default, leakage products can only be used with the incoming line. If you need the incoming line, you need to customize the special product number, and the N pole of the 4-pole product is an A-type product. Any operating condition is not allowed to use the incoming line. |                       |                                                                                     |

Table 1: Comparison Table of Accessory Code:

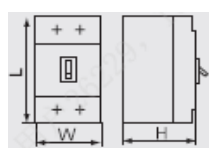
|                |                                                  |       | <p>Legend</p> <ul style="list-style-type: none"> <li> Single auxiliary contact</li> <li> Dual-auxiliary contact</li> <li> Alarm contact</li> <li> Shunt release</li> <li> Under-voltage release</li> <li> Auxiliary alarm contact (a single accessory features the auxiliary and alarm functions)</li> </ul> |   |
|----------------|--------------------------------------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| Accessory code | Accessory name                                   | Model | NDM2L-250                                                                                                                                                                                                                                                                                                    |   |
|                |                                                  |       | 3                                                                                                                                                                                                                                                                                                            | 4 |
| 00             | N/A                                              |       |                                                                                                                                                                                                                                                                                                              |   |
| 10             | Shunt release                                    |       |                                                                                                                                                                                                                                                                                                              |   |
| 20             | Dual-auxiliary contact                           |       |                                                                                                                                                                                                                                                                                                              |   |
| 21             | Single auxiliary contact                         |       |                                                                                                                                                                                                                                                                                                              |   |
| 30             | Under-voltage release                            |       |                                                                                                                                                                                                                                                                                                              |   |
| 40             | Shunt release, dual-auxiliary contact            |       |                                                                                                                                                                                                                                                                                                              |   |
| 41             | Shunt release, single auxiliary contact          |       |                                                                                                                                                                                                                                                                                                              |   |
| 60             | Two sets of dual-auxiliary contacts              |       |                                                                                                                                                                                                                                                                                                              |   |
| 61             | Two sets of single auxiliary contacts            |       |                                                                                                                                                                                                                                                                                                              |   |
| 62             | Dual-auxiliary contact, single auxiliary contact |       |                                                                                                                                                                                                                                                                                                              |   |
| 70             | Under-voltage release, dual-auxiliary contact    |       |                                                                                                                                                                                                                                                                                                              |   |
| 71             | Under-voltage release, single auxiliary contact  |       |                                                                                                                                                                                                                                                                                                              |   |
| 08             | Alarm contact                                    |       |                                                                                                                                                                                                                                                                                                              |   |
| 28             | Dual-auxiliary contact, alarm contact            |       |                                                                                                                                                                                                                                                                                                              |   |
| 58             | Auxiliary alarm contact                          |       |                                                                                                                                                                                                                                                                                                              |   |
| 68             | Dual-auxiliary contact, auxiliary alarm contact  |       |                                                                                                                                                                                                                                                                                                              |   |

Note: The 3P product can only be available with the left-installed single accessory with the accessory code as 10, 20, 21, 30, 08, 58;

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

|                                                                               |                                                                                     |                            |                                        |                 |                  |                  |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------|----------------------------------------|-----------------|------------------|------------------|
| Model                                                                         |                                                                                     |                            | NDM2L-250                              |                 |                  |                  |
| Rated current of frame $I_{nm}$ (A)                                           |                                                                                     |                            | 250                                    |                 |                  |                  |
| Rated current $I_n$ (A)                                                       |                                                                                     |                            | 100, 125, 140, 160, 180, 200, 225, 250 |                 |                  |                  |
| Rated insulation voltage $U_i$ (AC V)                                         |                                                                                     |                            | 1000                                   |                 |                  |                  |
| Rated impulse withstand voltage $U_{imp}$ (V)                                 |                                                                                     |                            | 8000                                   |                 |                  |                  |
| Rated working voltage $U_e$ (AC V)                                            |                                                                                     |                            | 380/400/415                            |                 |                  |                  |
| Utilization category                                                          |                                                                                     |                            | A                                      |                 |                  |                  |
| Number of poles                                                               |                                                                                     |                            | 3                                      |                 | 4                |                  |
| Breaking capacity level                                                       |                                                                                     |                            | M                                      | H               | /                |                  |
| Rated limit short-circuit breaking capacity $I_{cu}$ (kA)                     |                                                                                     |                            | 52.5                                   | 85              | 52.5             |                  |
| Rated operating short-circuit breaking capacity $I_{cs}$ (kA)                 |                                                                                     |                            | 35                                     | 50              | 35               |                  |
| Rated residual short-circuit making and breaking capacity $I_{\Delta m}$ (kA) |                                                                                     |                            | 0.25 $I_{cu}$                          |                 |                  |                  |
| Rated residual action current $I_{\Delta n}$ (mA)                             | Non-time delay                                                                      | Type AC                    | Type V 30/100/300/500                  |                 |                  |                  |
|                                                                               |                                                                                     | Type A                     | Type V 30/100/300/500                  |                 |                  |                  |
|                                                                               | delay                                                                               | Type AC                    | Type V 100/300/500                     |                 |                  |                  |
|                                                                               |                                                                                     | Type A                     | Type V 100/300/500                     |                 |                  |                  |
| Rated residual non-action current $I_{\Delta no}$ (mA)                        |                                                                                     |                            | 0.5 $I_{\Delta n}$                     |                 |                  |                  |
| Residual current action time                                                  | Residual current                                                                    |                            | $I_{\Delta n}$                         | $2I_{\Delta n}$ | $5I_{\Delta n}$  | $10I_{\Delta n}$ |
|                                                                               | Non-time delay                                                                      | Maximum breaking time (s)  | 0.2                                    | 0.1             | 0.04             | 0.04             |
|                                                                               | delay                                                                               | Maximum breaking time (s)  | 0.5, 1.15<br>2.15                      | 0.35, 1<br>2    | 0.25, 0.9<br>1.9 | 0.25, 0.9<br>1.9 |
|                                                                               |                                                                                     | Limit non-driving time (s) | /                                      | 0.1, 0.5<br>1   | /                | /                |
| Operating performance (times)                                                 | Electrical life                                                                     |                            | 8000                                   |                 |                  |                  |
|                                                                               | Mechanical life                                                                     | Maintainable free life     | 20000                                  |                 |                  |                  |
|                                                                               |                                                                                     | Maintainable life          | 40000                                  |                 |                  |                  |
| Boundary dimension                                                            |  |                            | L(mm)                                  | 165             | 165              | 165              |
|                                                                               |                                                                                     |                            | W(mm)                                  | 107             | 107              | 142              |
|                                                                               |                                                                                     |                            | H(mm)                                  | 90.5            | 90.5             | 90.5             |
| Flashover distance(mm)                                                        |                                                                                     |                            | ≤50                                    |                 |                  |                  |

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

2. According to the standard, the maximum rated working voltage  $AC415V * 1.05 * 1.05=457.5V$

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

Table 3 Selection of the NDM2L-250 Connecting Bus or Cable Cross-section Area

| Rated current (A)                          | 100 | 125, 140 | 160 | 180, 200, 225 | 250 |
|--------------------------------------------|-----|----------|-----|---------------|-----|
| Wire cross-section area (mm <sup>2</sup> ) | 35  | 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 specification | Torque (N·m) |
|-----------|----------------------|--------------|
| NDM2L-250 | 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 |    |       |       |       |       |       |       |
|-----------|-----------------------------------------------|----|-------|-------|-------|-------|-------|-------|
| NDM2L-250 | Temperature (°C)                              | 40 | 45    | 50    | 55    | 60    | 65    | 70    |
|           | Derating factor                               | 1  | 0.982 | 0.963 | 0.944 | 0.924 | 0.904 | 0.882 |

Note: 1) When the operating ambient temperature is below +40°C, the product can be used normally without derating capacity.

2) The above derating factors are measured at the frame current.

4.4 High-altitude derating factor of the circuit breaker

Table 6 High-altitude Derating Factor Table of Circuit Breaker

| Elevation (m) | Working current correction coefficient | Power frequency withstand voltage correction coefficient | Isolation voltage correction coefficient (V) |
|---------------|----------------------------------------|----------------------------------------------------------|----------------------------------------------|
| 2000          | 1                                      | 3500                                                     | 1000                                         |
| 2500          | 1                                      | 3500                                                     | 1000                                         |
| 3000          | 0.98                                   | 3150                                                     | 900                                          |
| 3500          | 0.97                                   | 3000                                                     | 850                                          |
| 4000          | 0.95                                   | 2800                                                     | 810                                          |
| 4500          | 0.94                                   | 2650                                                     | 770                                          |
| 5000          | 0.93                                   | 2500                                                     | 730                                          |

4.5 Power loss coefficient of circuit breaker

Table 7 Power loss coefficient table of circuit breaker

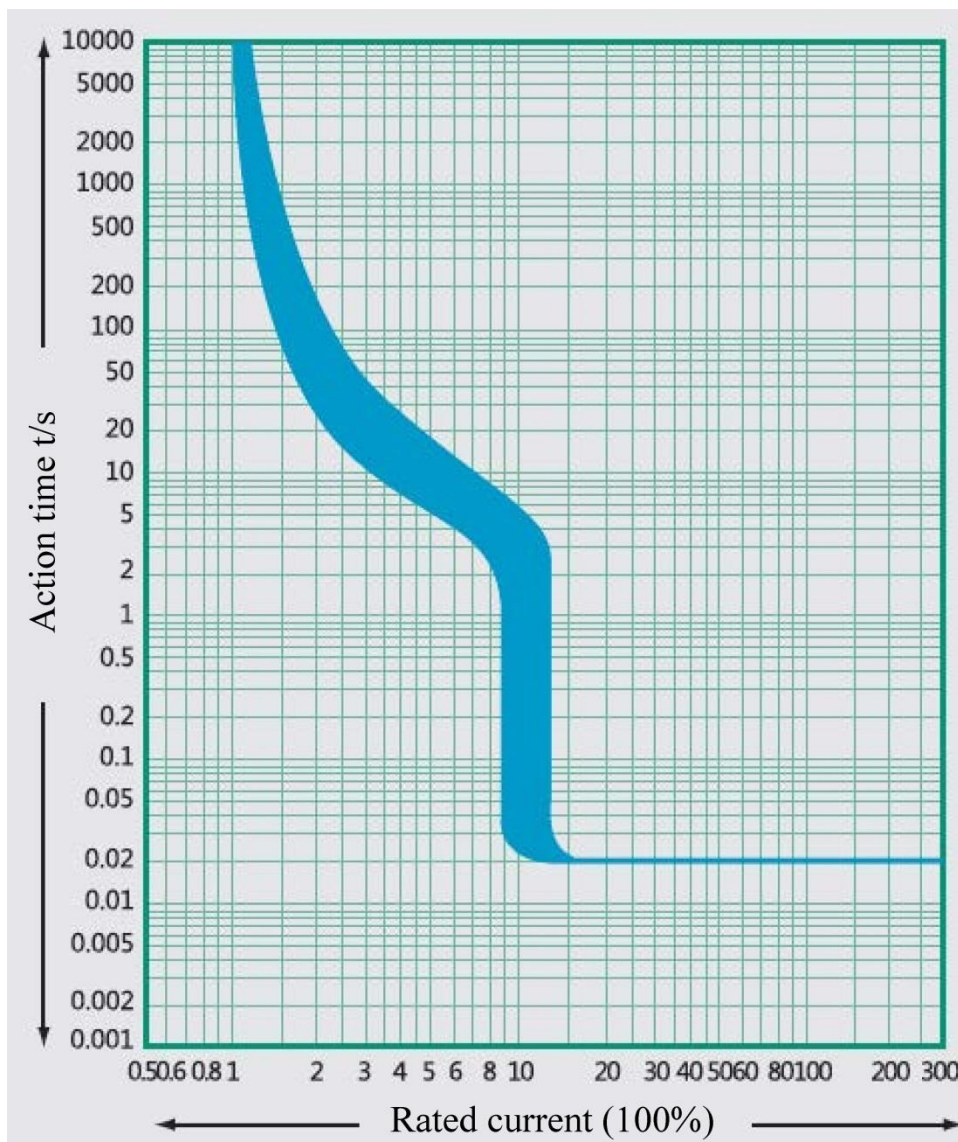
| Model     | Energizing current(A) | Total power loss(W)           |
|-----------|-----------------------|-------------------------------|
|           |                       | Wiring before and after board |
| NDM2L-250 | 250                   | 67                            |



## 5. Normal Working Environment of Circuit Breaker

- 1) The altitude of the installation site doesn't exceed 2,500m. See the "High-altitude Derating Factor Table of Circuit Breaker" for the derating factor at the altitude;
- 2) The ambient temperature is  $-35^{\circ}\text{C} \sim +70^{\circ}\text{C}$ ; the average within 24 h shall not be more than  $+35^{\circ}\text{C}$ . If the ambient temperature is higher than  $+40^{\circ}\text{C}$ , the user needs to reduce the capacity. See the "Derating Factor Table of Temperature Change for the Circuit Breaker" for the derating factor;
- 3) Its relative humidity at an ambient temperature of  $+40^{\circ}\text{C}$  should not exceed 50%. A higher relative humidity is allowed at a lower temperature. For example, the relative humidity at  $20^{\circ}\text{C}$  can reach 90%; for frost due to temperature change, the corresponding measures should be taken;
- 4) The product can withstand the effects of wet air, salt mist, oil mist and mould;
- 5) The installation category of the circuit breaker connected to the main loop is: Category III (power distribution and control level), The installation category of the circuit breaker not connected to the main loop is: Category II (load level);
- 6) The pollution level is Level 3;
- 7) 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.

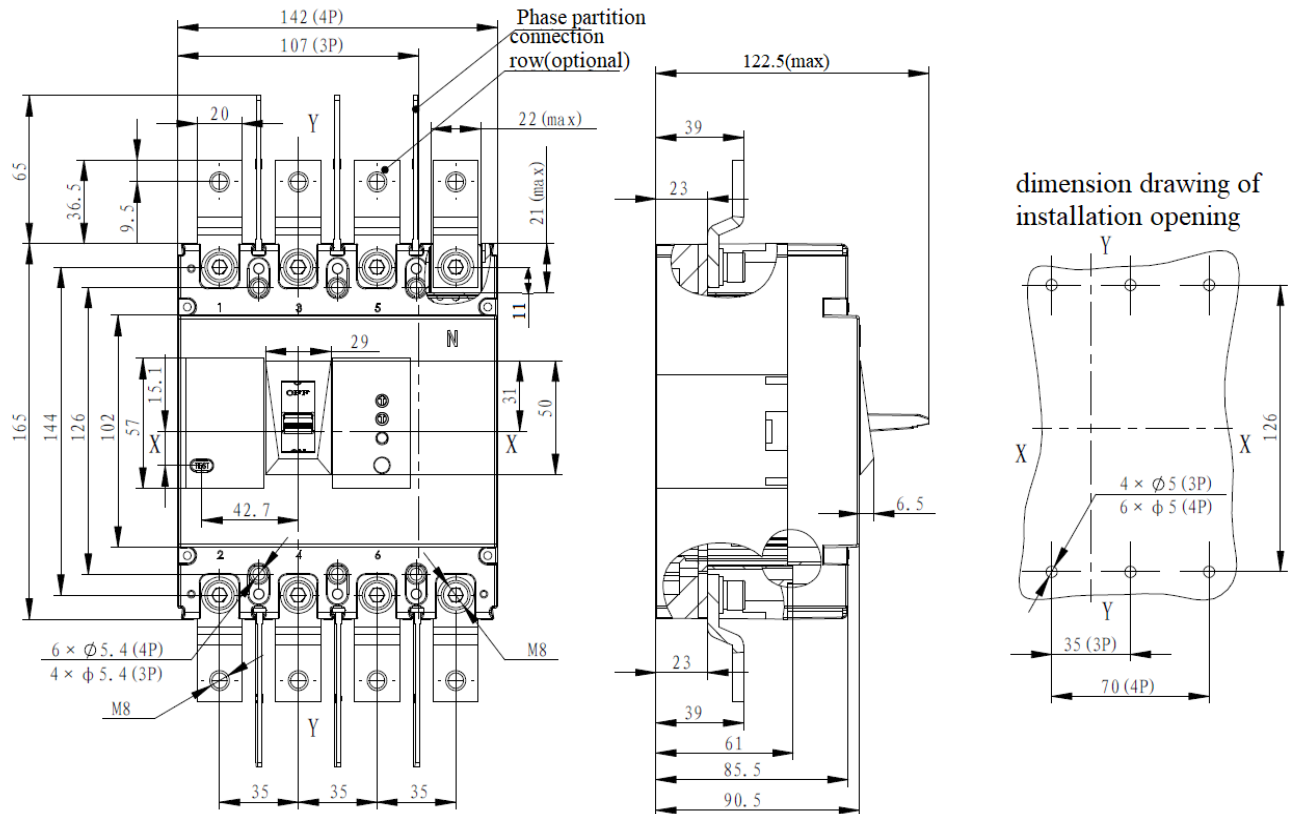
## 6. Short-circuit Overload Protection Characteristic Curve of Circuit Breaker



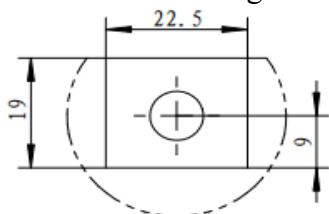
Time/Current Characteristic Curve

## 7. Outline and Mounting Hole Dimensions of Circuit Breaker

### 7.1 Outline and mounting hole dimensions of circuit breaker



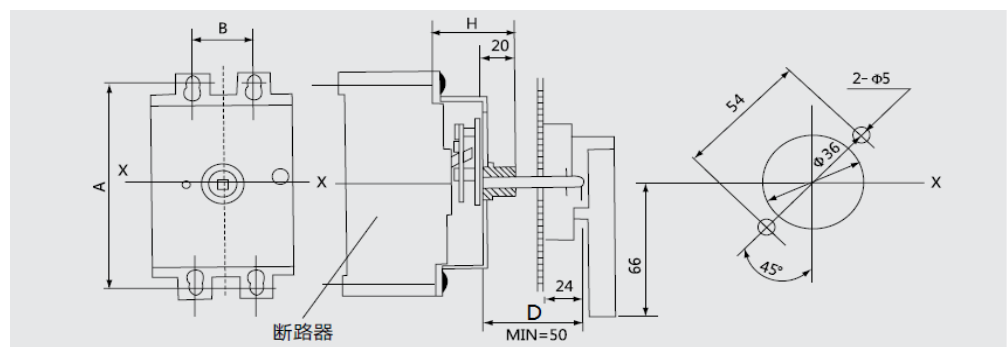
Maximum wiring size



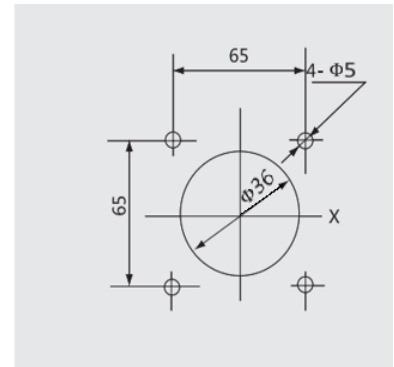
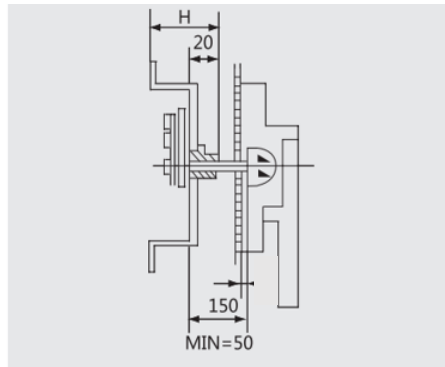
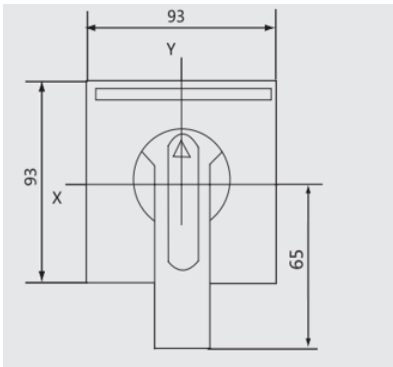
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

### 7.2 Manual operating mechanism

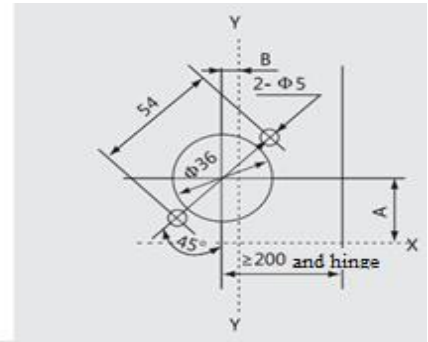
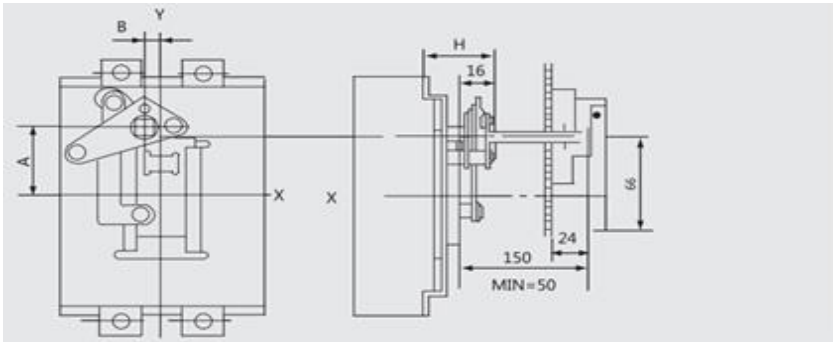
#### 7.2.1 Manual operating mechanism and CS1-A handle



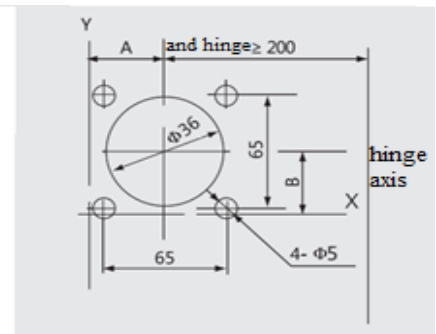
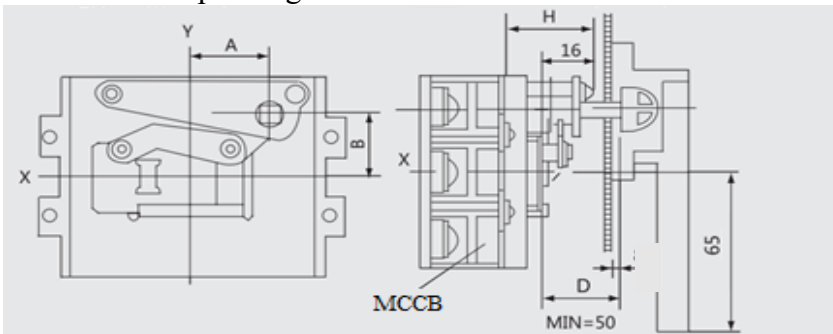
#### 7.2.2 Manual operating mechanism and CS1-F handle



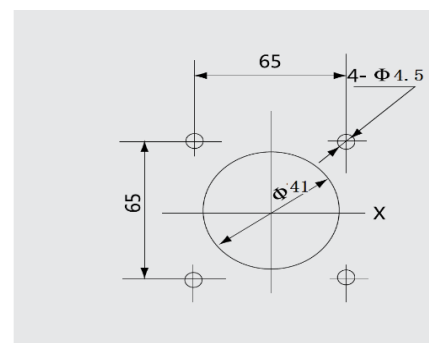
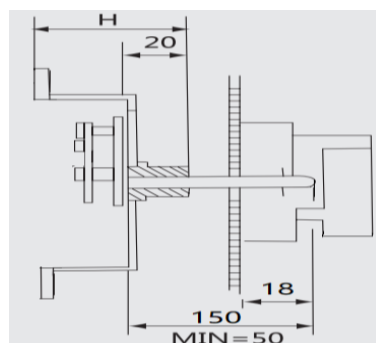
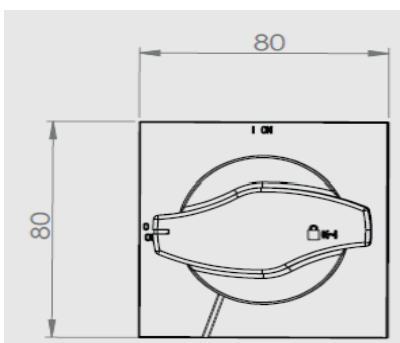
7.2.3 Manual operating mechanism and CS2-A handle



7.2.4 Manual operating mechanism and CS2-F handle



7.2.5 CS1-IP65 handle installation opening diagram



7.2.6 CS2-IP65 handle installation opening diagram

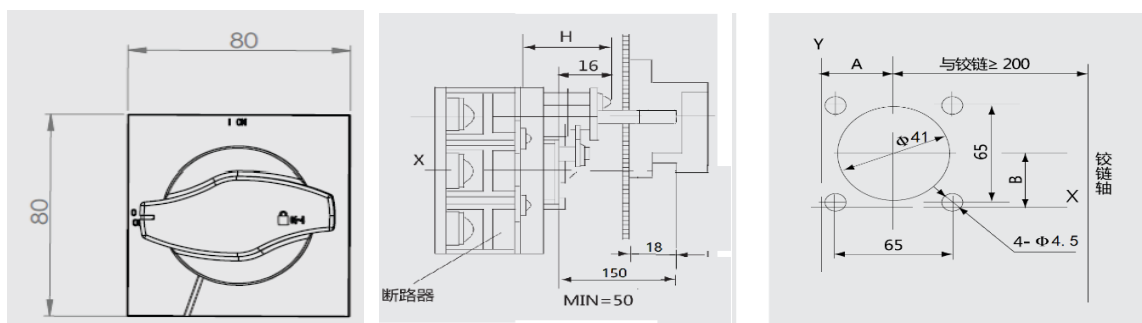


Table 8 Installation dimension of Manual operating mechanism (Unit: mm)

| Manual operation type | Model     | Installation dimension of manual operating mechanism |     |         | Installation mode     |
|-----------------------|-----------|------------------------------------------------------|-----|---------|-----------------------|
|                       |           | H                                                    | A   | B(3/4P) |                       |
| CS1                   | NDM2L-250 | 55                                                   | 143 | 35      | Vertical installation |
| CS2                   | NDM2L-250 | 48                                                   | 35  | 31      |                       |

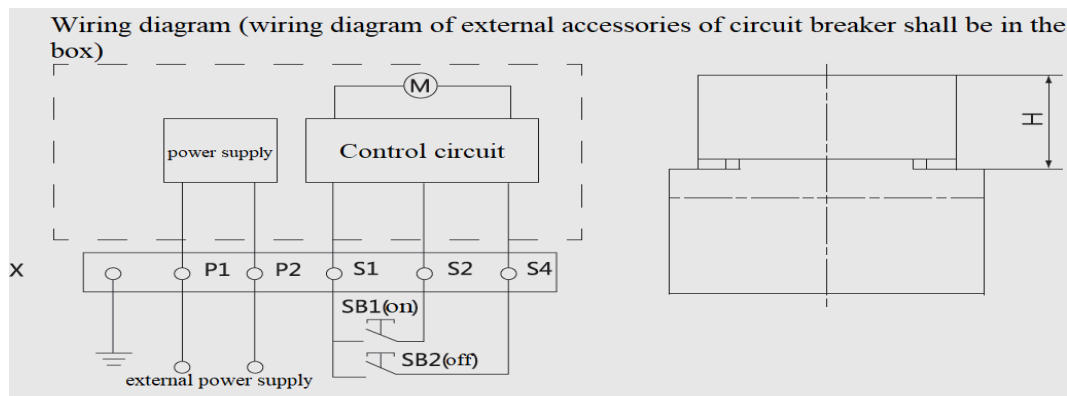
Note:1) A type is round handle, F type is square handle;

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.

### 7.3 Electric operating mechanism



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

X: Terminal block P1、P2: External power supply

Voltage specification: AC110V、AC230V、AC400V、DC24V、DC110V、DC220V

Table 9 Main technical parameters of electric operating mechanism

| Equipped with circuit breaker | Electric power(W) | service life / time | Operating mechanism height H(mm) |
|-------------------------------|-------------------|---------------------|----------------------------------|
|                               | AC/DC230V         |                     |                                  |
| NDM2L-125                     | 180               | 20000               | 92                               |

### 7.4 Safe mounting distance of circuit breaker

Table 10 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-250         | 25                                     | 65                       | 30                                         | 30                                      |

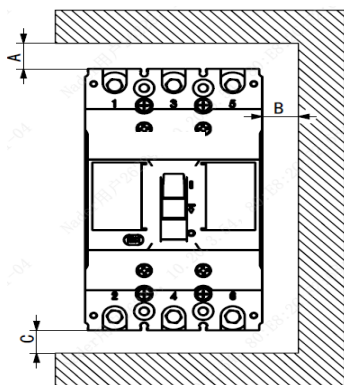


Table 11 Minimum Center Distance between Rowed Circuit Breakers (Unit: mm)

| Model     | Width of circuit breaker |         | I Center distance |         |
|-----------|--------------------------|---------|-------------------|---------|
|           | 3 poles                  | 4 poles | 3 poles           | 4 poles |
| NDM2L-250 | 107                      | 142     | 137               | 172     |

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.

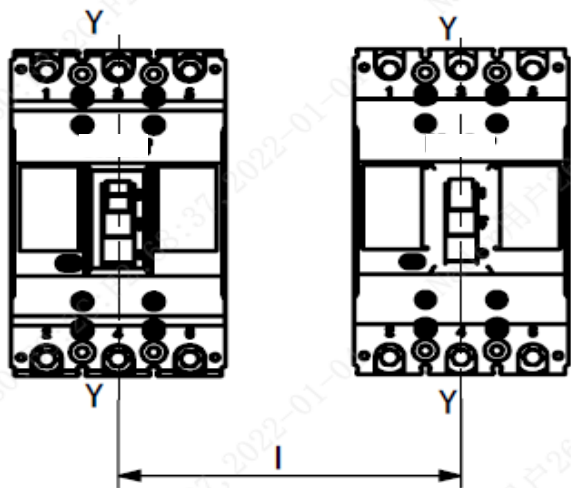


Table 12 Minimum Distance between Stacked Circuit Breakers (Unit: mm)

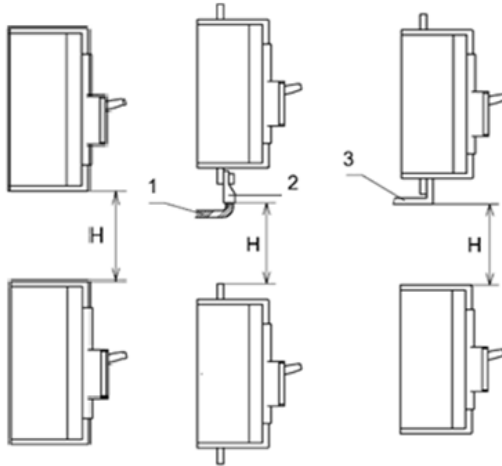
| Model     | H (distance of circuit breaker from bottom) |                          |
|-----------|---------------------------------------------|--------------------------|
|           | With a terminal cover                       | Without a terminal cover |
| NDM2L-250 | 90                                          | 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 Under-voltage release

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 13 Voltage Specifications and Power Consumption of Under-voltage Release

| Model     | Instantaneous current value(A) |        | Power waste (W) |        |
|-----------|--------------------------------|--------|-----------------|--------|
|           | AC380V                         | AC230V | AC380V          | AC230V |
| NDM2L-250 | 0.01                           | 0.006  | 1.1             | 0.66   |

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.

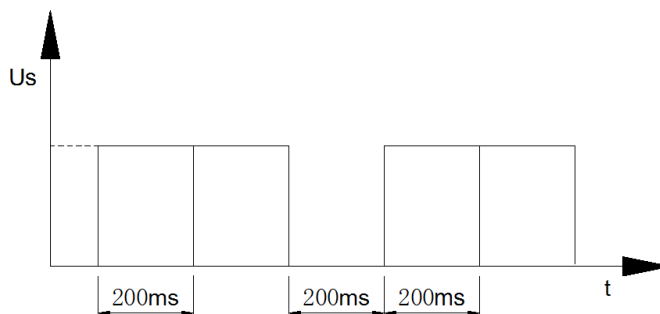
Table 14 Voltage Specifications and Power Consumption of shunt release

| Model     | Shunt release                  | DC24V | AC230V | DC220V | AC380V |
|-----------|--------------------------------|-------|--------|--------|--------|
| NDM2L-250 | Instantaneous current value(A) | 6.8   | 0.5    | 0.3    | 0.4    |



|  |                 |       |     |      |       |
|--|-----------------|-------|-----|------|-------|
|  | Power waste (W) | 164.5 | 115 | 76.2 | 155.6 |
|--|-----------------|-------|-----|------|-------|

Note: The working principle of the shunt release is that there is a coil inside the shunt release, which can only work for a short time. The shunt action is a single pulse action (recommended to be powered on for more than 200ms). The time from energizing the shunt release (receiving signal) to product tripping is  $\leq 200\text{ms}$ . It is recommended to use a 500ms-1s pulse power supply, Pulse count not exceeding three times.



Working principle diagram of shunt release

### 8.3 Auxiliary contact

|                                                                    |                                         |            |     |            |     |
|--------------------------------------------------------------------|-----------------------------------------|------------|-----|------------|-----|
| The circuit breaker is in the "open" and "free tripping" positions | Dual-auxiliary contact                  | F14<br>F12 | F11 | F24<br>F22 | F21 |
|                                                                    | Single auxiliary contact                | F14<br>F12 | F11 |            |     |
| the circuit breaker is in the "close" position                     | "close" to "open"、" open " to " close " |            |     |            |     |

#### 8.3.1 Current parameters of auxiliary contact

Table 15 Current parameters of auxiliary contact

| Category                                  | Frame current (A) | Conventional thermal current I <sub>th</sub> (A) | Rated working current I <sub>e</sub> (A) |        |
|-------------------------------------------|-------------------|--------------------------------------------------|------------------------------------------|--------|
|                                           |                   |                                                  | AC400V                                   | DC220V |
| Auxiliary contact                         | 250               | 3                                                | 1.5                                      | 0.15   |
| Note :minimum applicable load: 5V, 160mA. |                   |                                                  |                                          |        |

#### 8.3.2 Electrical life of auxiliary contact

Table 16 Electrical life of auxiliary contact

| U <sub>es</sub><br>category | On               |                  |      | Off              |                  |      | Times | Frequency | Power on time |
|-----------------------------|------------------|------------------|------|------------------|------------------|------|-------|-----------|---------------|
|                             | I/I <sub>e</sub> | U/U <sub>e</sub> | cosφ | I/I <sub>e</sub> | U/U <sub>e</sub> | 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 17 Making and breaking capacity of auxiliary contact



| Ues<br>category | On   |      |      | Off  |      |      | Times | Frequency | Power on<br>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       | $\geq 0.05s$     |
| DC-13           | 1.1  | 1.1  | 6Pe  | 1.1  | 1.1  | 6Pe  |       |           | $\geq T0.95ms$   |

## 8.4 Alarm contact

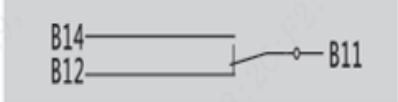
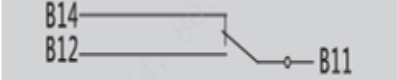
|                                                                   |                                                                                    |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------|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

Table 18 Current parameters of alarm contact

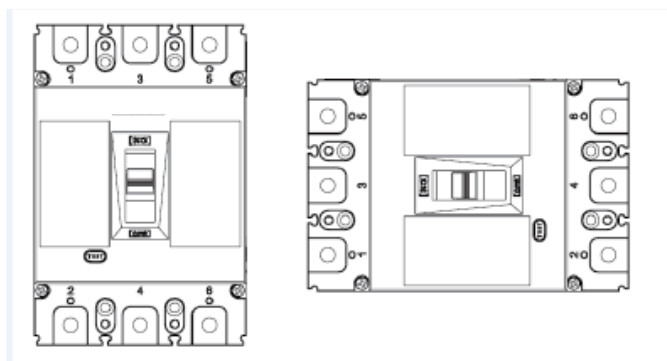
| Category      | Frame current (A) | Conventional thermal<br>current Ith(A) | Rated working current Ie(A) |        |
|---------------|-------------------|----------------------------------------|-----------------------------|--------|
|               |                   |                                        | AC400V                      | DC220V |
| Alarm contact | 250               | 3                                      | 0.3                         | 0.15   |

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

## 9. Installation Direction of Circuit Breaker

For vertical installation of the product, the gradient between the installation surface and the vertical plane is no more than  $\pm 22.5^\circ$ .

Horizontal installation of the product.



Vertical Installation

Horizontal Installation

## 10. Packaging and Storage of Circuit Breaker

Minimum packaging quantity: 1 piece/box. The packaged products should be stored in a

warehouse with the air ventilation and the relative humidity no more than 80% when the ambient temperature is  $-40^{\circ}\text{C}\sim+75^{\circ}\text{C}$ . No acidic alkaline or other corrosive gas exists in the ambient air in the warehouse. Under the conditions above, the storage period shall be no more than three years since the manufacturing date.

## 11. Installation Direction of Circuit Breaker

| SN | Name                       | Specification | 3P Quantity/Set | 4P Quantity/Set |
|----|----------------------------|---------------|-----------------|-----------------|
| 1  | Cross small pan-head screw | M4×75         | 4               | 4               |
| 2  | Hexagon nut                | M4            | 4               | 4               |
| 3  | Plain washer               | 4             | 4               | 4               |
| 4  | Phase partition            | ——            | 4               | 6               |
| 5  | Combination wiring screw   | M8X22         | 6               | 8               |
| 6  | MCCB                       | NDM2L-250     | 1               | 1               |

## 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.