

Shanghai Liangxin Electric Co., Ltd

NDQ3-125 Series Automatic Transfer  
Switch

Product Specifications

(IPD-ENG-DEV-T20 A1 2024-08-09)

|         |               |      |            |
|---------|---------------|------|------------|
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## 1. Scope of application and use

NDQ3-125 PC-level automatic transfer switching appliance is suitable for AC AC220V/AC230V/AC240V (2P), AC380V/AC400V/AC415V (3P, 4P) or below, and the rated frequency is 50Hz. It complies with the GB14048.1-2023 and GB/T14048.11-2024 standards, as well as the "Fire Protection Code for High-rise Civil Buildings", "Fire Protection Code for Building Design", "Emergency Lighting Design Guidelines", "Electrical Design Code for Civil Buildings", etc.

This product is mainly used for the first-class load stipulated by the state, and is widely used in fire protection, post and telecommunications, hospitals, hotels, urban rail transit, high-rise buildings, industrial assembly lines, television stations and other important places that require continuous power supply. The main and standby power sources can be grid power supplies, self-starting generator sets, battery packs, etc.

## 2. Product pictures (for reference only, subject to the actual product)



NDQ3 two-stage overall NDQ3 two-stage split NDQ3 three-segment overall NDQ3 three-stage split

## 3. Description of specifications and models

ND Q 3 -    /

1 2 3 4 5 6 7 8 9 10

Table 1 Specifications and models

| serial number | Serial number description   | NDQ3                                                                                                     |
|---------------|-----------------------------|----------------------------------------------------------------------------------------------------------|
| 1             | Enterprise code             | ND Nader brand low voltage appliances                                                                    |
| 2             | Product code                | Q Automatic transfer switching appliances                                                                |
| 3             | Design serial number        | 3                                                                                                        |
| 4             | Shell grade current rating  | 125                                                                                                      |
| 5             | Structural form             | Z-monolithic F-split                                                                                     |
| 6             | Rated working current       | 16、20、25、32、40、50、63、80、100、125                                                                          |
| 7             | Extreme number              | 2-2P 3-3P 4-4P                                                                                           |
| 8             | Control mode                | R - self-throwing self-reset, S - self-throwing non-self-resetting, F - grid generator <sup>Note 4</sup> |
| 9             | Switch position (structure) | II-two-stage, III-three-stage                                                                            |
| 10            | Controller type             | Blank Type <sup>Note 1</sup> , N Type <sup>Note 2</sup> , Type D, <sup>Note 3</sup>                      |

Note 1: Blank products only have II segment type (the whole split is available), only the integral type can be optional communication, and special contract review is required;

Note 2: N-type products only have III segment type (there are whole splits), only the integral type can be added communication type, and special contract review is required;

Note 3: Type D is only available in split type (there are two and three stages), and the factory defaults

to self-investment and self-investment, and customers can set the control method by themselves

Note 4: N-type products can only choose R and S type products, and F-generator products do not need to be equipped with generator instructions as standard

#### 4. Main technical parameters

Rated working voltage  $U_e$ : AC220V/AC230V/AC240V(2P)、AC380/400/415V (3P、4P)

Rated frequency: 50Hz

Rated insulation voltage  $U_i$ : AC800V

Rated impact withstand voltage  $U_{imp}$ : 8kV

Rated short-term withstand current  $I_{cw}$ : 10kA/30ms

Using categories:AC-33B/AC-33iA

Rated short-circuit connection capability  $I_{cm}$ : 17kA

Rated Limiting Short Circuit Current  $I_q$ : 120 kA

Contact Changeover Time: Two-Stage:  $\leq 50$  ms Three-Stage:  $\leq 150$  ms

Conversion Action Time: Two-stage:  $\leq 130$  ms Three-stage:  $\leq 400$ ms

Mechanical life (maintenance value): 20000 times

Electrical life (maintenance value): 6000 times

#### 5. Controller function

Table 2 Controller functions

| function            |                                       | Blank type, N type                                                                |
|---------------------|---------------------------------------|-----------------------------------------------------------------------------------|
| Protection function | Overvoltage protection                | √                                                                                 |
|                     | Undervoltage protection               | √                                                                                 |
|                     | Cut off the phase protection          | √                                                                                 |
| Node input/output   | Fire signal input                     | √                                                                                 |
|                     | Commonly used closing output          | √                                                                                 |
|                     | Backup closing output                 | √                                                                                 |
|                     | Generator start output                | √                                                                                 |
|                     | Communication ports                   | N-type integral type is optional, and blank type integral type is optional Note 1 |
| Display (LED)       | Common power supply                   | √                                                                                 |
|                     | Backup power                          | √                                                                                 |
|                     | Commonly used closing                 | √                                                                                 |
|                     | Spare closing                         | √                                                                                 |
|                     | automatic                             | √                                                                                 |
|                     | Fire Protection (III)                 | √                                                                                 |
| Working mode choose | self-report and self-recovery         | ▽Note 2                                                                           |
|                     | Self-investment without self-recovery | ▽                                                                                 |

|                              |                        |        |
|------------------------------|------------------------|--------|
| Delay adjustment             | Split/changeover delay | 0-30s  |
|                              | Closing/Return Delay   | 0-30s  |
| Voltage protection threshold | Undervoltage value     | 165±5V |
|                              | Overvoltage value      | 270±5V |
| keystroke                    | Self/Manual            | √      |
|                              | I is commonly used     | √      |
|                              | II. Backup             | √      |
|                              | OPower                 | √      |

| function               |                                 | D-type controller |
|------------------------|---------------------------------|-------------------|
| Protection function    | Overvoltage protection          | √                 |
|                        | Undervoltage protection         | √                 |
|                        | Cut off the phase protection    | √                 |
|                        | Over frequency protection       | √                 |
|                        | Under-frequency protection      | √                 |
|                        | Phase Sequence/Phase Protection | √                 |
|                        | Wrong line alarm                | √                 |
| Measurement function   | Voltage value                   | √                 |
|                        | Frequency value                 | √                 |
|                        | Imbalance                       | √                 |
| Communication function | MODBUS-RTU protocol             | √                 |
| Node input/output      | Fire signal input               | √                 |
|                        | Commonly used closing output    | √                 |
|                        | Backup closing output           | √                 |
|                        | Generator start output          | √                 |
|                        | Fault alarm output              | √                 |
|                        | Communication ports             | √                 |
|                        | Remote switch control input     | √                 |
| display                | Programmable port output        | √                 |
|                        | Common Power Supplies (LEDs)    | √                 |
|                        | Backup Power Supply (LED)       | √                 |
|                        | Common Closing (LED)            | √                 |
|                        | Backup Closing (LED)            | √                 |

|                               |                                       |                                   |
|-------------------------------|---------------------------------------|-----------------------------------|
|                               | Automatic (LED)                       | ✓                                 |
|                               | Fault (LED)                           | ✓                                 |
|                               | Operation (LED)                       | ✓                                 |
|                               | Coil (LED)                            | ✓                                 |
|                               | Fire Protection (III)<br>(LED)        | ✓                                 |
|                               | Communication (LED)                   | ✓                                 |
|                               | Remote/Local (LED)                    | ✓                                 |
|                               | LCD screen                            | ✓                                 |
| Power supply method selection | Power grid - power grid               | ✓                                 |
|                               | Power grid - generator                | ✓                                 |
| Working mode selection        | self-report and self-recovery         | ✓ [1]                             |
|                               | Self-investment without self-recovery | ✓ [1]                             |
| Delay adjustment              | Split/changeover delay                | ✓                                 |
|                               | Closing/Return Delay                  | ✓                                 |
|                               | Delay adjustment of the chiller       | ✓                                 |
|                               | Generator start delay                 | ✓                                 |
| Voltage protection threshold  | Undervoltage value                    | 187V (0.7~0.85) × 230V adjustable |
|                               | Overvoltage value                     | 264V (1.05~1.3) × 230V adjustable |
| keystroke                     | Self/Manual                           | ✓                                 |
|                               | I commonly used/△                     | ✓                                 |
|                               | Set up                                | ✓                                 |
|                               | II. Spare/▽                           | ✓                                 |
|                               | reposition                            | ✓                                 |
|                               | Power Loss / Esc                      | ✓                                 |
|                               | Confirm                               | ✓                                 |
| other                         | Remote switching function             | ✓                                 |
|                               | Rated frequency selection             | ✓                                 |
|                               | Wide frequency detection              | ✓                                 |
|                               | buzzer                                | ✓                                 |
|                               | Adjustable power priority             | ✓                                 |
|                               | III/II optional features              | ▽                                 |
|                               | Pole switch                           | ▽                                 |
|                               | Communication function                | ▽                                 |
|                               | Double Enable[2]                      | ▽                                 |
|                               | Excess and underpressure recovery     | ▽                                 |
|                               | Action log                            | ✓                                 |
|                               | Fault logging                         | ✓                                 |
|                               | Clear fault logs                      | ▽                                 |

|  |                                              |   |
|--|----------------------------------------------|---|
|  | Clear the action log                         | ▽ |
|  | A phase voltage coefficient is commonly used | ▽ |
|  | Commonly used B phase voltage coefficient    | ▽ |
|  | Commonly used C phase voltage coefficient    | ▽ |
|  | Standby A phase voltage coefficient          | ▽ |
|  | Standby B phase voltage coefficient          | ▽ |
|  | Standby C phase voltage coefficient          | ▽ |
|  | Calibrate the voltage value                  | ▽ |

**Note 1: The communication function of N-type and blank integral products needs to go through special contract review, and the split type has no communication function. The D-type split type has communication function.**

Note 2: "√" means with this function; "▽" means that the company can be adjusted internally;

Note: The split blank, N and D controller connection harnesses are: 1.8 meters and 3 meters respectively (3 meters need to go through special contract review)

[1]: When the power supply mode is selected as "grid-grid", self-throwing and self-recovering can be selected, and when the power supply mode is "grid-generator", self-throwing and self-recovering can be selected

## 6. Working conditions

### 6.1 Normal Conditions of Use

Ambient temperature: -25° C- +70° C

Storage temperature: -55° C- +85° C

#### 6.1.1 Altitude

The altitude of the installation site does not exceed 2000m.

#### 6.1.2 Altitude reduction worksheet

Table 3 Altitude reduction worksheet

| project                            | symbol | unit | parameter |        |        |        |
|------------------------------------|--------|------|-----------|--------|--------|--------|
| altitude                           | H      | m    | ≤2000     | 3000   | 4000   | 5000   |
| Rated operating voltage            | EU     | V    | 415       | 415    | 415    | 415    |
| Power frequency withstand pressure | /      | V    | 100%      | 90%    | 75%    | 60%    |
| Insulation voltage                 | Ui     | V    | 100%      | 90%    | 80%    | 60%    |
| Rated current                      | In     | A    | 1.0In     | 0.96In | 0.93In | 0.90In |

### 6.1.3 Atmospheric conditions

#### 6.1.3.1 Relative humidity

At a maximum temperature of +40° C, the relative humidity of the air does not exceed 50%, and at lower temperatures a higher relative humidity can be allowed, e.g. up to 90% at +20° C. Special measures should be taken against occasional condensation due to temperature changes.

#### 6.1.3.2 Pollution level: Level 3

### 6.2 Installation Conditions

6.2.1 The product is installed vertically, and the inclination of the mounting surface and the vertical surface is  $\leq \pm 22.5^\circ$

Horizontal installation

6.2.2 It should be installed in a non-explosive medium, and there should be no gas or conductive dust sufficient to corrode the metal and damage the insulation.

6.2.3 It should be installed in a place where there is no rain or snow.

## 7. Wiring diagram and secondary terminal interface definition

### 7.1 Wiring diagram

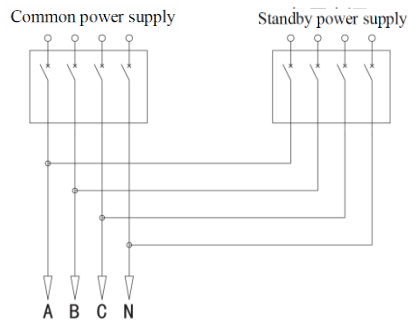


Fig.1 Schematic diagram of four-pole product wiring

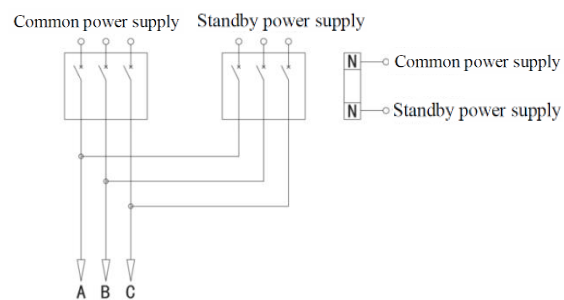


Fig.2 Schematic diagram of three-pole product wiring

### 7.2 Definition of Secondary Terminal Interface

#### 7.2.1 Description of the integral secondary terminal of the II section

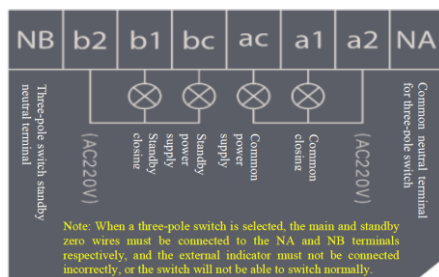


Fig.3 Schematic diagram of R/S secondary terminal wiring of Section II

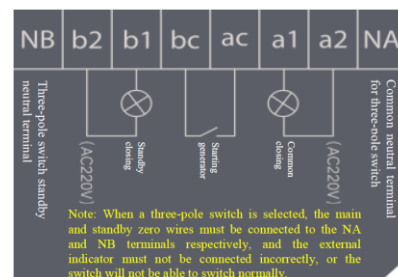


Fig.4 Schematic diagram of wiring of Secondary Terminal F of Section II

- ac, a1, a2 are the active node voltage 220V, which represent the common power indicator light and the common closing indicator respectively;
- bc, b1, b2 are the active node voltage of 220V, which means the backup power indicator and the standby closing indicator respectively;
- NA and NB are the commonly used neutral terminals of the 3 poles and the spare neutral terminals of the 3 poles, respectively.



- ac and bc are the starting terminals of F-type generators, which are used to start the generator;

7.2.2 Description of the auxiliary terminal block of the blank type with communication type (only the blank type with this interface)



Fig.5 Blank type overall with communication type auxiliary wiring

- 1 and 2 are passive alarm output signals, which are used as power supply abnormal alarm output indications. There is no delay in connecting and disconnecting contacts. Function: When the product I is prioritized, the I-way power supply status is used as the basis for judgment, the I-circuit power supply is normal 1 and 2 are disconnected, and the I-channel power supply is abnormal 1 and 2 are on. If the product has priority, the power supply status of the II is used as the basis for determination, the power supply of II is normal 1,2 is disconnected, and the power supply of the II power supply is abnormal 1,2 is turned on;
- 5, 6, 7 are RS485 communication ports;
- NC is an empty node;

7.2.3 Description of secondary terminals of N-type overall products

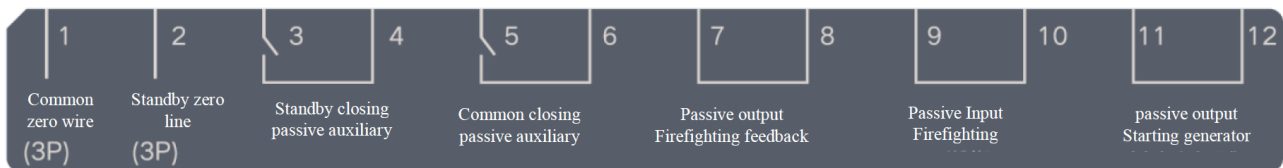


Fig.6 Schematic diagram of the wiring of the secondary terminal block of the N-type overall product

- 1 and 2 are the neutral wire wiring of 3P products respectively (Note: 3P products must be connected to the neutral wire, otherwise the product will not work normally)
  - 3 and 4, 5 and 6 are the commonly used closing and standby closing position indications of the product respectively (Note: This terminal is a passive node, and the maximum access current at the terminal is 3A AC250V).
  - 9,10 fire signal input terminal, which is a passive input node, which cannot be connected to the power supply, and only needs to be shorted to trigger the fire double split of the product
  - 7,8 When the product is in fire condition, the terminal will output a passive closure signal
  - 11 and 12 terminals are generator start and unload signal terminals, and 11 and 12 are closed after 5s delay when the common power supply is abnormal and the backup generator is out of power
- 7.2.4 Description of the Auxiliary Terminal Block of N-type integral communication type (only the N-type integral communication type has this interface).

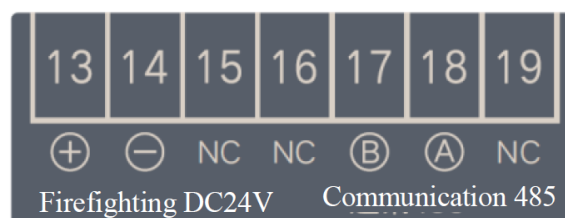


Fig.7 Diagram of N-type overall auxiliary terminal block with communication

- 13 and 14 are DC24V fire input interfaces, pay attention to positive and negative when wiring.
- 17 and 18 are communication 485 interfaces, if you need communication protocol, please call our company's 400 technical support hotline to request the electronic version of the communication protocol
- NC is an empty node

## 7.2.5

### Type D controller secondary terminal block

In the case of "Grid-Generator", programmable output port 1 is fixed as a generator/offload.

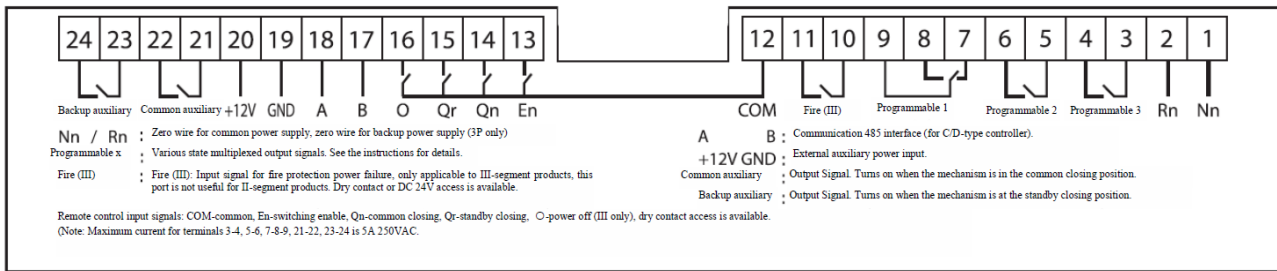


Fig.8 Schematic diagram of the wiring of the secondary terminal block of the D-type controller

Table 4 Programmable port definitions of D-type controllers

| 0           | 1                      | 2                                        | 3                                      | 4                         | 5                                   | 6                               | 7                        |
|-------------|------------------------|------------------------------------------|----------------------------------------|---------------------------|-------------------------------------|---------------------------------|--------------------------|
| Fault alarm | Grid alarm             | Common power supply alarm                | Backup power alarm                     | Commonly used closing     | Spare closing                       | Generator/unloading             | Input signal error alarm |
| 8           | 9                      | 10                                       | 11                                     | 12                        | 13                                  | 14                              |                          |
| Fire alarm  | Common frequency alarm | Commonly used phase sequence/bi-t alarms | Commonly used voltage imbalance alarms | Alternate frequency alarm | Alternate phase sequence/bi-t alarm | Standby voltage imbalance alarm |                          |

## 7.2.6 Description of the secondary terminal block of the blank type II segment split product

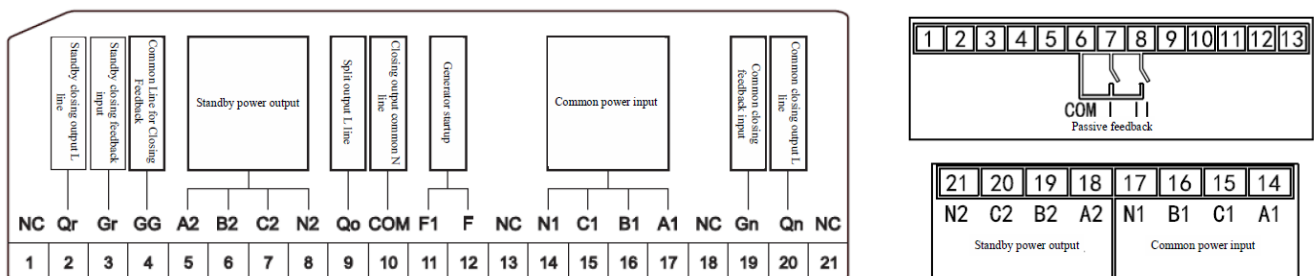


Fig.9 Schematic diagram of secondary terminal of blank II-segment split controller

Fig.10 Schematic diagram of blank II-segment split body terminal

●No. 6, No. 7, No. 8 are passive feedback terminals, No. 6 is the common terminal, No. 7 is the commonly used closing indicator signal, No. 8 is the standby closing indicator signal (on the terminal of this node), the maximum access current is 3A, and the voltage is AC250V;

●11 and 12 (F1, F) are the generator start signal output terminals, F and F1 are disconnected when the common power supply is normal, and F and F1 are closed after a delay of 3 seconds when the common power supply is abnormal and the standby generator is out of power (this node is on the back of the controller);

●3P products require users to connect the N wire to the controller, the N wire of the common power supply is connected to terminal 14, and the N wire of the backup power supply is connected to terminal 8 (this node is on the back of the controller);

●Except for the above terminals, the rest of the terminals have been occupied, and customers do not need to connect the rest of the wires, just plug the terminals into the controller according to the color.

●Except for the above terminals, the rest of the terminals have been occupied, and the customer does not

### 7.2.7 Description of the secondary terminal block of N-type III segment split products

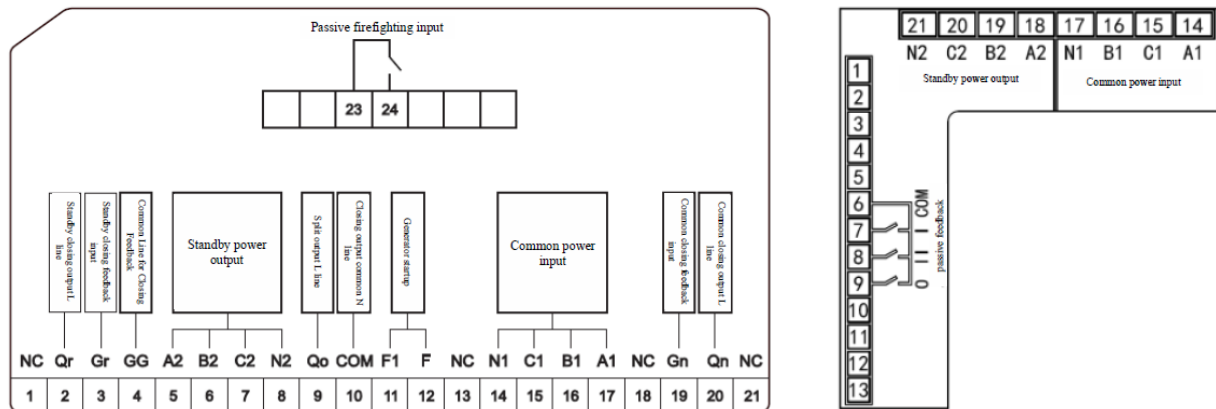


Fig.12 Schematic diagram of N-type III-segment split body terminal

Note: All products with fire protection function need to confirm that the fire signal is dismissed when restoring, and resume by manually pressing the hand/automatic button.

## 8. Product shape and installation size

### 8.1 Shape and installation size of two-stage products

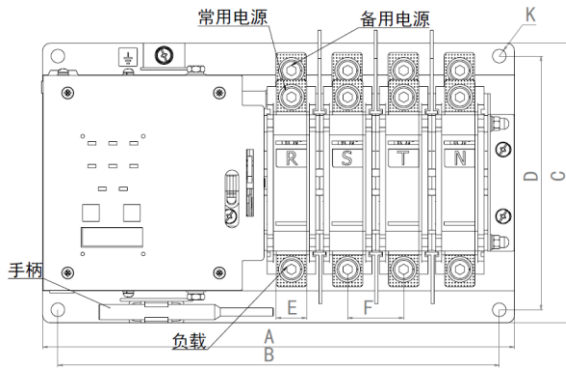


Fig.13 Overall outline diagram of blank type II segment

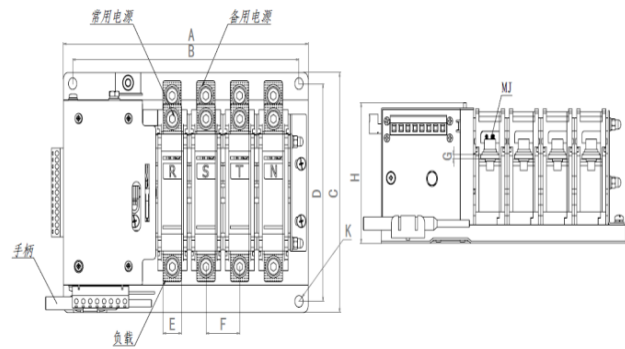


Fig.14 Outline diagram of blank type II segment split body (including type D split body).

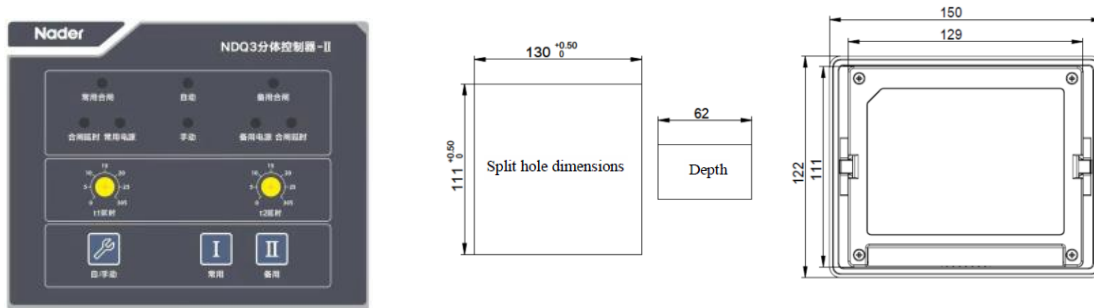


Fig.15 Shape and size of split controller in N/blank type II section

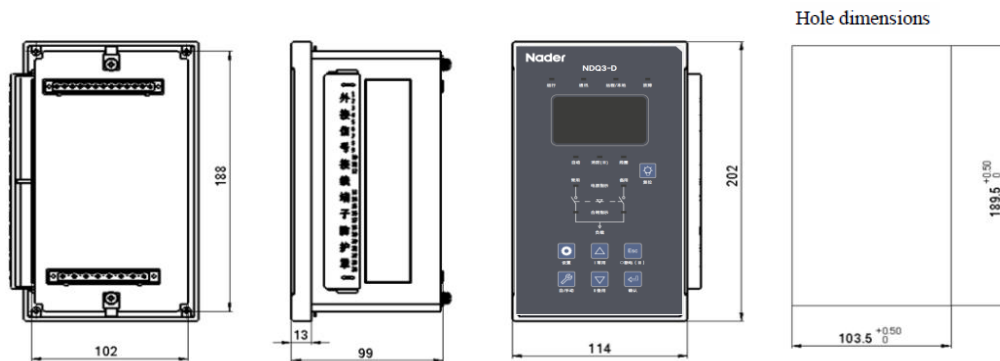


Fig.16 Installation dimensions of D-type controller

Table 5 Overall/split shape and installation dimensions of two-stage products

| Model                     |    | Overall Dimensions (mm) |           |           | Mounting Size (mm) |       |    | Other Dimensions (mm) |    |   |    |
|---------------------------|----|-------------------------|-----------|-----------|--------------------|-------|----|-----------------------|----|---|----|
|                           |    | Long<br>A               | Wide<br>C | High<br>H | Long<br>B          | Wider | ΦK | And                   | F  | G | MJ |
| NDQ3-125<br>Two-<br>stage | 2P | 237                     | 184       | 108       | 217                | 167   | 9  | 20                    | 37 | 3 | 8  |
|                           | 3P | 274                     | 184       | 108       | 254                | 167   | 9  | 20                    | 37 | 3 | 8  |
|                           | 4P | 311                     | 184       | 108       | 291                | 167   | 9  | 20                    | 37 | 3 | 8  |
| NDQ3-125<br>Two-<br>stage | 2P | 192                     | 184       | 108       | 172                | 167   | 9  | 20                    | 37 | 3 | 8  |
|                           | 3P | 228                     | 184       | 108       | 208                | 167   | 9  | 20                    | 37 | 3 | 8  |
|                           | 4P | 265                     | 184       | 108       | 245                | 167   | 9  | 20                    | 37 | 3 | 8  |

## 8.2 Overall split shape and installation size of N-type products

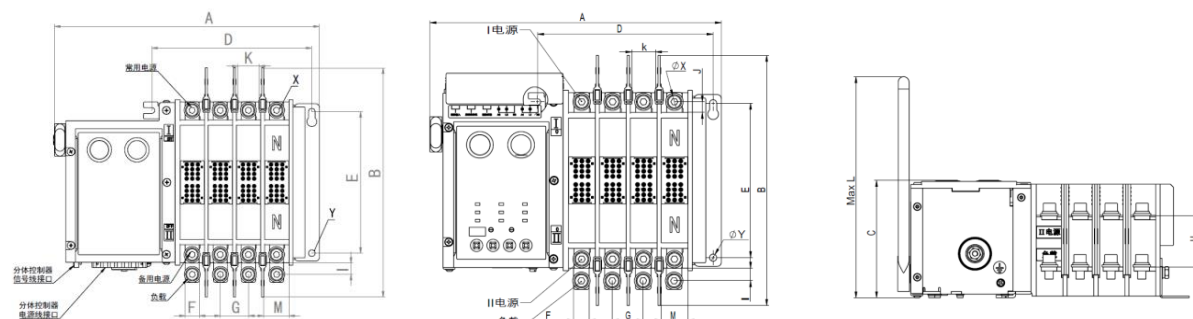


Fig.17 Overall split shape and installation size of N-type product

Table 6 Overall/split shape and installation dimensions of N-type products

| Model              |    | Overall Dimensions (mm) |           |           | Mounting Size (mm) |        |                    | Other Dimensions (mm) |    |      |      |      |    |    |       |     |
|--------------------|----|-------------------------|-----------|-----------|--------------------|--------|--------------------|-----------------------|----|------|------|------|----|----|-------|-----|
|                    |    | Long<br>g A             | Wide<br>B | High<br>C | Long<br>D          | Wide E | Mounting<br>hole Y | F                     | G  | H    | I    | J    | K  | M  | X     | L   |
| NDQ3-125 N<br>type | 2P | 223                     | 245       | 115       | 111                | 151    | φ 7                | 15                    | 30 | 50.5 | 12.5 | 10.5 | 23 | 26 | M8x16 | 216 |
|                    | 3P | 252                     | 245       | 115       | 141                | 151    | φ 7                | 15                    | 30 | 50.5 | 12.5 | 10.5 | 23 | 26 | M8x16 | 216 |
|                    | 4P | 283                     | 245       | 115       | 171                | 151    | φ 7                | 15                    | 30 | 50.5 | 12.5 | 10.5 | 23 | 26 | M8x16 | 216 |

### 8.3 Tighten the torque of the wiring screw

Table 7 Tightening torque of terminal screws

|                                                |                 |                      |
|------------------------------------------------|-----------------|----------------------|
| Model                                          | Thread diameter | Torque Torque (N. m) |
| NDQ3-125                                       | M8              | ≤ 12                 |
| Controller secondary terminal<br>wiring screws | M3              | ≤1                   |

## 9. Packaging and storage

The product is covered with a waterproof plastic bag and packed in a special box. The product is suitable for transportation and storage temperatures in the range of  $-55^{\circ}\text{C} \sim +85^{\circ}\text{C}$ . During transportation, the product should pay attention to moisture prevention, should not be subjected to strong bumps, vibrations, collisions, and prevent rain and snow.

## 10. Accessory list and installation

Table 8 List of annexes

| serial number | name                    | specification | quantity   |
|---------------|-------------------------|---------------|------------|
| 1             | Arc plate               | --            | 3P:4; 4P:6 |
| 2             | Manual dedicated handle | --            | 1          |

## 11. Precautions

- ★ This product can work reliably at 85% $U_e$ ~110% $U_e$  voltage. When installing wiring of the product, the inlet and outlet ends and the N pole should be strictly distinguished, and the neutral wire should not be shared.
- ★ It is strictly forbidden to use this product outside of normal use conditions, such as continuous water vapor or condensation without corresponding precautions, combustible or corrosive dust, no SCPD or expected short-circuit current out of range, voltage over or below voltage, current exceeding rated current, altitude at high altitude, etc.
- ★ When manually converting, use the dedicated handle provided with the product.
- ★ If the protective appliance is disconnected due to a line or load failure, the fault should be eliminated first and then the load should be energized.
- ★ The product should be checked periodically (such as every three months of operation) during use, and the power supply should be changed manually or automatically once to check whether the product is normal.
- ★ This product has been insulated before leaving the factory, and the wrong **dielectric test will destroy the control system, and it is strictly forbidden to do dielectric test with ATS.**