Shanghai Liangxin Electrical Co., Ltd.

NDQ3-630 Series Automatic Transfer Switch Product Specification

(IPD-ENG-DEV-T20 A1 2022-11-22)

Prepared by	Zhang Huifeng	Date	22/11/2022
Reviewed by	Cao Xuehu	Date	22/11/2022
Countersigned by	Zhao Zhenxing	Date	22/11/2022
	Gao Xu		22/11/2022
Approved by	Wang Jili	Date	22/11/2022

Revision History					
Version	Revision Reason/Content	Implementation Date	Prepared by	Reviewed by	Approved by
11	Check of three books	22/11/2022	Zhang Huifeng	Cao Xuehu	Wang Jili

1. Applicable Scope and Purpose

The NDQ3-630 P-grade ATSE are applicable for sites with the AC voltage below AC380V.AC400V.AC415V and the rated frequency of 50Hz. This product complies with the GB14048.1-2012 and GB/T14048.11-2016 standards in accordance with Code for Fire Protection of High-rise Civil Buildings, Code of Design on Building, Design Guidelines on Emergency Lighting, Code for Electrical Design of Civil Buildings etc.

This product mainly applies to the compulsory level I load, which is widely used in important places that require the continuous power supply, such as fire protection, telecommunications, hospitals, hotels, urban rail transits, high-rise buildings, industrial assembly lines and TV stations. It adopts the network source, self-starting generator set and battery set as the main and standby power supplies.

2. Picture of the Product (The picture is for reference only; the specific kind prevail)

NDQ3 two-segment integral product

NDQ3 two-segment split product

NDQ3 three-segment integral product

NDQ3 three-segment split product

3. Specification and Model Description

ND Q 3 - □ □ □ / □ □ □ □

1 2 3 4 5 6 7 8 9 10

Table 1 Specification and Model Description

SN	SN Description	NDQ3
1	Enterprise code	ND Nader low-voltage apparatus
2	Product code	Q ATSE
3	Design SN	3
4	Rated current of frame	630
5	Structure form	Z- Integral type; F: Split type
6	Rated working current	500、630
7	Number of poles	3-3P 4-4P
8	Control mode	R: Automatic switching and automatic recovery mode; S: Automatic switching and non-automatic recovery mode; F: Grid - generator mode
9	Switch position (structure)	II: two-segment, III: three-segment
10	Controller type	Blank type [Note 1], N-type [Note 2], D-type, [Note 3]

Note 1: blank type means the integral or split type (only two segments).

Note 2: N-type represents three-segment type (for both integral and split types), and communication type needs the special contract review (only the integral type)

Note 3: D-type is limited to the split type (for both two segments and three segments), it is default with automatic change and automatic recovery in the factory setting, and the customer may set the control mode

4. Main technical parameters

Rated working voltage Ue: AC380V.AC400V.AC415V

Rated Frequency: 50Hz

Rated insulation voltage Ui: AC800V

Rated impulse withstand voltage Uimp: 8kV

Utilization category: AC-33B/AC-33iA

Short time withstand current Icw: 13kA/1s

Rated short circuit making capacity Icm: 26kA

Rated limited short-circuit current Iq: 120 kA

Contact switching time: two-segment type: ≤50ms three-segment type: ≤150ms

Switching action time: two-segment type: ≤130ms three-segment type: ≤400ms

Mechanical life: 15000 times

Electrical life: 2500 times

5. Functions of controller

Table 2 Controller Functions

Function		Blank, N (N-type controller)
Protection function	Overvoltage protection	√
	Undervoltage protection	√
	Open-phase protection	√
Node input/output	Fire protection signal input	√
	Common switch-on output	√
	Standby switch-on output	√
	Generator start output	√
	Communication port	N-type optional Note 1
Display (LED)	Common power supply	√
	Standby power supply	√
	Common closing	√
	Standby closing	√
	Automatic	√
	Fire (III)	√
Operation mode Select	Automatic switching and automatic recovery	▽Note 2
	Automatic switching without automatic recovery	▽
Adjustment of time delay	Tripping/transfer delay	0-30s
	Closing/return delay	0-30s
Voltage protection Threshold value	Undervoltage value	165±5V
	Overvoltage value	270±5V
	Automatic/manual	√

Keys	I common	√
	II standby	√
	○Power off	√

Function		D-type controller
Protection function	Overvoltage protection	√
	Undervoltage protection	√
	Open-phase protection	√
	Overfrequency protection	√
	Under-frequency protection	√
	Phase sequence/phase protection	√
	Incorrect wiring warning	√
Measuring function	Voltage value	√
	Frequency value	√
	Unbalancedness	√
Communication function	MODBUS-RTU protocol	√
Node input/output	Fire protection signal input	√
	Common switch-on output	√
	Standby switch-on output	√
	Generator start output	√
	Fault alarm output	√
	Communication port	√
	Remote switch control input	√
	Programmable port output	√
Display	Common power supply (LED)	√
	Standby power supply (LED)	√
	Common closing (LED)	√
	Standby closing (LED)	√
	Automatic (LED)	√
	Fault (LED)	√
	Operation (LED)	√
	Coil (LED)	√
	Fire (III) (LED)	√
	Communication (LED)	√
	Remote/local (LED)	√
	LCD	√
Selection of the power supply mode	Power grid - power grid	√
	Power grid - generator	√

Work pattern selection	Automatic switching and automatic recovery	√[1]
	Automatic switching without automatic recovery	√[1]
Adjustment of time delay	Tripping/transfer delay	√
	Closing/return delay	√
	Cold-machine delay adjustment	√
	Generator start delay	√
Threshold value of voltage protection	Undervoltage value	187V (0.7～0.85)×230V adjustable
	Overvoltage value	264V (1.05～1.3)×230V adjustable
Keys	Automatic/manual	√
	I common/□	√
	Setup	√
	II standby/□	√
	Reset	√
	□Power off/ Esc	√
	OK	√
Other	Remote switching function	√
	Rated frequency selection	√
	Wide-frequency detection	√
	Buzzer	√
	Power priority adjustable	√
	III/II optional function	▽
	Bipolar switch	▽
	Communication function	▽
	Double-splitting enable [2]	▽
	Overvoltage and undervoltage return difference	▽
	Action record	√
	Fault record	√
	Clearing of fault record	▽
	Clearing of action record	▽
	Common A-phase voltage coefficient	▽
	Common B-phase voltage coefficient	▽
	Common C-phase voltage coefficient	▽
	Standby A-phase voltage coefficient	▽
	Standby B-phase voltage coefficient	▽
	Standby C-phase voltage coefficient	▽
	Calibrated voltage value	▽

Note 1: the communication function for N-type integral product shall be subject to special contract review, split blank type does not have the communication function, and D-type split product has the communication function.

Note 2: "√" indicates that the function is available; "□" indicates that it is adjustable inside the company;

Note: the wiring harnesses for split blank type and D-type controller are: 1.8m and 3m respectively (3m subject to special

contract review)

[1]: When "Grid-Grid" is selected as the power supply mode, selection of the automatic switching and automatic recovery, and automatic switching without automatic recovery is available; if "Grid-Generator" is selected as the power supply mode, the selection of automatic switching and automatic recovery, and automatic switching without automatic recovery is invalid, and the it is automatically set as automatic switching and automatic recovery.

6. Working conditions

6.1 Normal conditions of use

Operating ambient temperature: -25℃~+70℃

Storage temperature: -55℃- +85℃

The upper and lower limit value of the ambient air temperature is no more than +70℃ and no less than -25℃ respectively, while the average value within 24 hours doesn't exceed +35℃. In case the temperature is above 55℃, consider reducing the capacity for use.

6.1.2 Altitude

The altitude of the installation site doesn't exceed 2,000m.

6.1.3 Altitude derating table

Item	Symbols	Unit	parameter			
Altitude	H	m	≤2000	3000	4000	5000
Rated working voltage	Ue	V	415	415	415	415
Power frequency withstand voltage	/	V	100%	90%	75%	60%
Isolation voltage	Ui	V	100%	90%	80%	60%
Rated current	In	A	1.0In	0.96In	0.93In	0.90In

6.1. 4 Operating Relative humidity

When the highest air temperature is 45℃, the relative humidity of the air shall not be more than 95%

6.1.5 Pollution level: 3

6.2 Installation Conditions

For vertical installation of the product, the gradient between the installation surface and the vertical plane is no more than ±22.5°

Horizontal Installation

6.2.2 The product should be installed in places that are free from explosive media, media corrosive to metal, insulation damaging gas, and conductive dust.

6.2.3 The product should be installed free from snow and rain.

7. Wiring diagram and definition for the interface of the secondary terminal

7.1 Wiring Diagram

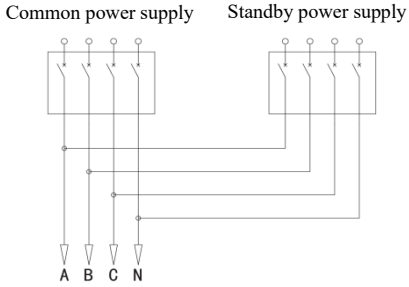


Fig. 1 4P Product Wiring Diagram

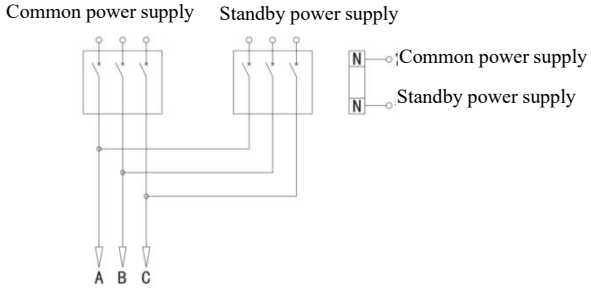


Fig. 2 3P Product Wiring Diagram

7.2 Definition for the interface of the secondary terminal

7.2.1 Description of secondary terminal for two-segment integral product

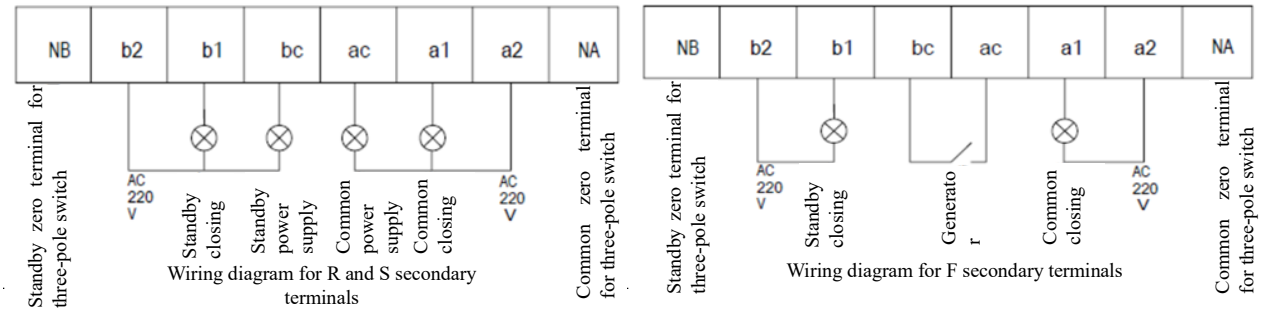


Fig. 3 Secondary Terminal Wiring Diagram for two-segment integral product

●ac, a1 and a2 are the nodes with the voltage of 220V, representing common power supply indicator lamp, and common closing indicator lamp respectively;

●bc, b1 and b2 are the nodes with the voltage of 220V, representing standby power supply indicator lamp, and standby closing indicator lamp respectively;

●NA and NB are three-pole common zero wiring terminal and 3-pole standby zero wiring terminal respectively;

●ac and bc are F-type generator starting terminal to start the generator;

7.2. 2 Description of secondary terminal for N-type integral product

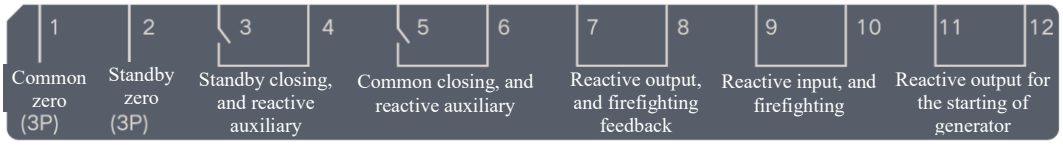


Fig. 4 Secondary Terminal Wiring Diagram of N-type Integral Product

● 1, 2 are used as the neutral line terminals of the 3P product respectively (note: The 3P product must be connected to the neutral line to avoid improper operation of the product)
● 3 and 4, 5 and 6 are the position indications of common closing and standby closing respectively (note: this terminal is the reactive node with the maximum access current in the wiring end being 3A AC250V).
● 9, 10 fire signal input terminals are used as passive input nodes, eliminating the external power supply (only the short-circuit connection is required for triggering the product's fire dual-tripping)
● When the product is in the fire status, 7, 8 terminals will output the passive closing signal
● 11, 12 terminals are used as starting and unloading signal terminals of the generator; when the common power supply is abnormal with power-off of the standby generator, 11 and 12 are closed after 5s delay

7.2.4 Description of N-type integral product with communication auxiliary wiring terminal (only the N-type integral communication product is provided with the interface)

Fig. 5 Diagram of N-type integral product with communication auxiliary wiring terminal

● 13 and 14 are used as DC24V fire input interfaces; pay attention to the positive and negative poles during wiring.
● 17 and 18 are used as communication 485 interfaces; for the electronic communication protocol, please call the 400 technical support hotline of our company
● NC is the empty node

7.2.5 Secondary wiring terminal connection of D-type controller

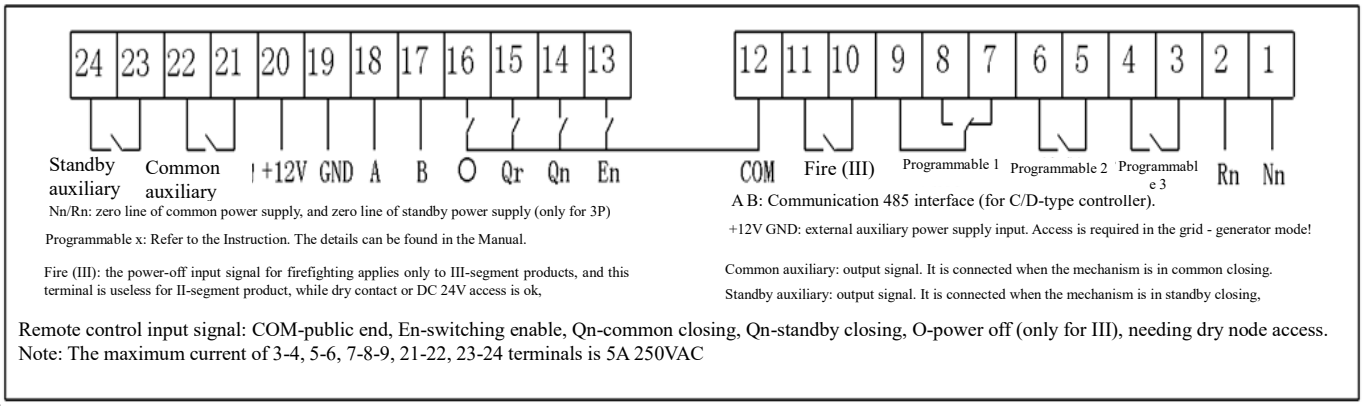


Fig. 6 Secondary Terminal Wiring Diagram for D-type controller

6.7 Description of secondary terminal forII blank-type split product

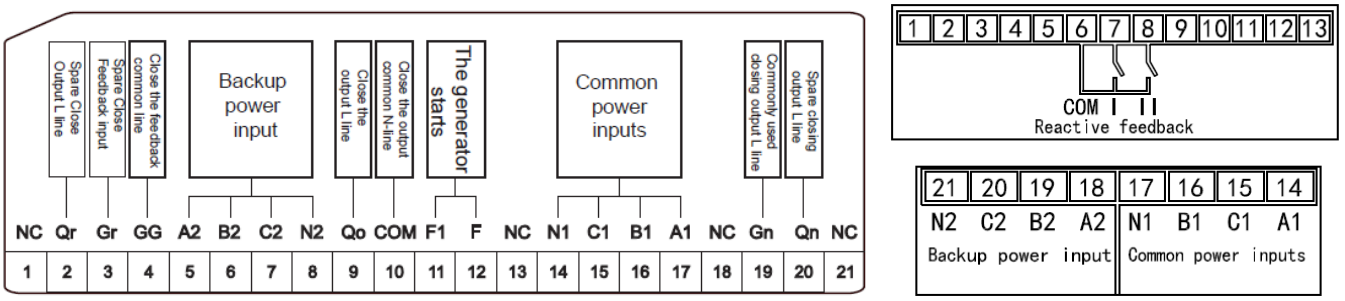


Fig. 7 Schematics for secondary terminal for II blank-type split product

- Terminal 6 is the public end
- Terminal 7 gives the indication signal for common closing
- Terminal 8 gives the indication signal for standby closing signal
- F and F1 are used as starting signal output terminals of the generator. F and F1 are disconnected with normal common power supply. When the common power supply is abnormal with power-off of the standby generator, F and F1 are closed after 3s delay. (This node is on the back of controller)
- In addition to the above terminals, the rest of the terminals are occupied, customers do not need to connect the rest of the wires, according to the color of the terminal can be plugged into the controller.

6.8 Description of secondary terminal for N-type split product

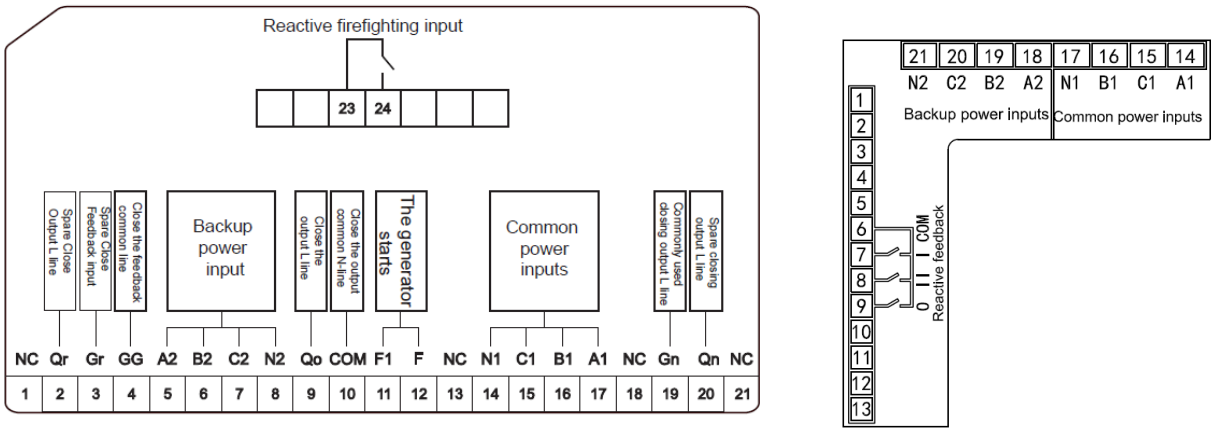


Fig. 8 Schematics for secondary terminal for N-type split product

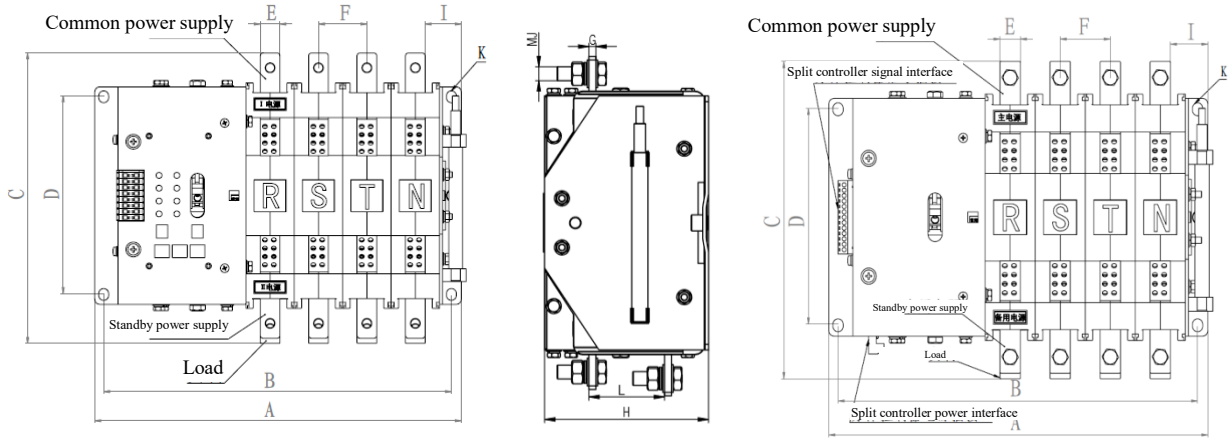
- Terminal 6 is the public end
- Terminal 7 gives the indication signal for common closing
- Terminal 8 gives the indication signal for standby closing signal
- Terminal 9 represents the dual signal output

The above nodes are reactive nodes, and the maximum access current of the wiring end is 3A AC250V

- Terminals 23 and 24 give the reactive firefighting input signals (this node is on the back of controller)
- F and F1 are used as starting signal output terminals of the generator. F and F1 are disconnected with normal common power supply. When the common power supply is abnormal with power-off of the standby generator, F and F1 are closed after 3s delay. (This node is on the back of controller)
- In addition to the above terminals, the rest of the terminals are occupied, customers do not need to connect the rest of the wires, according to the color of the terminal can be plugged into the controller.

8. Outline and installation dimensions

8.1 Outline and installation dimensions of the two-segment type product



Outline diagram for two-segment integral product Outline diagram for two-segment split product

Figure 9 Outline and Installation Dimension Diagram of the Two-Segment Integral and Split Products

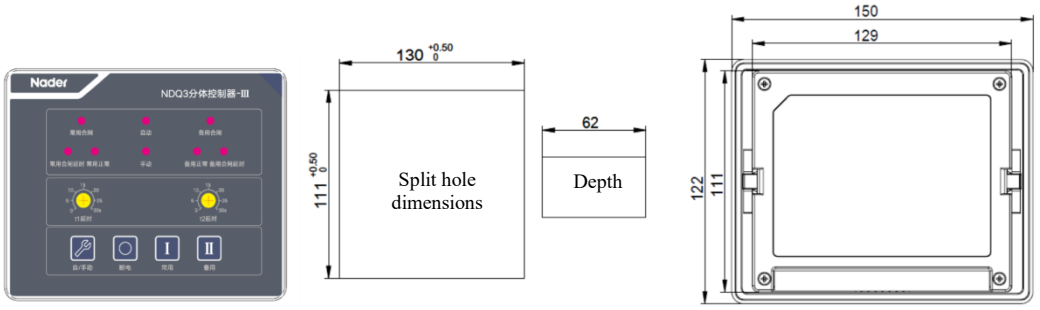


Figure 10 Outline and Mounting Hole Dimension Diagram of the N-type/Blank Split-type Controller

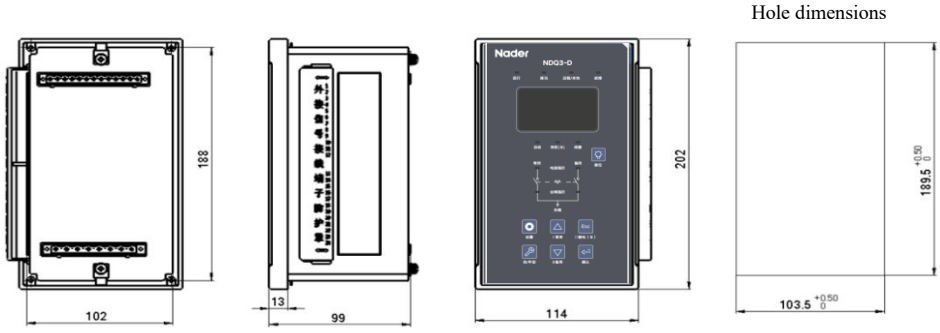


Figure 11 Installation Dimension Diagram of D-type Controller

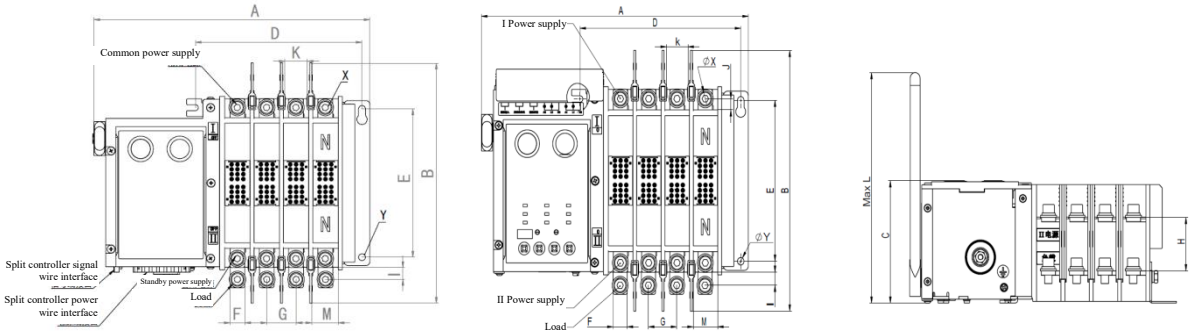
Table 11 Outline and Installation Dimensions of the Two-segment Integral/Split-type Product

Model		External Dimensions (mm)			Installation Dimensions (mm)							
		Length A	Width C	Height H	Length B	Width D	ΦK	E	F	G	MJ	L
NDQ3-630 Two-segment Integral type/ split type	3P	352	294	143	332	200	10	35	59	6	12	65.5
	4P	412	294	143	392	200	10	35	59	6	12	65.5

Note: The limit deviation not indicated with the tolerance dimensions for the outline and installation dimensions is as per GB/T 1804-v.

Note: B is the 3-segment integral product dimension while B1 is the 3-segment split mechanism dimension; the limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-C

8.3 N Outline and installation dimensions of N-type integral and split products



Outline diagram of split product Outline diagram of integral product

Figure 12 Outline and installation dimensions of N-type integral and split products

Table 4 Outline and installation dimensions of N-type integral and split products

Model	External Dimensions (mm)			Installation Dimensions (mm)			Other dimension (mm)								
	Length A	Width B	Height C	Length D	Width E	Mounting hole Y	F	G	H	I	J	K	M	X	L

NDQ3-400	3P	357	437	137	230	200	φ9	40	62	61	14	27	60	48	M12x35	222
Three-level	4P	419	437	137	292	200	φ9	40	62	61	14	27	60	48	M12x35	222

9. Packaging and Storage

Products covered with a waterproof plastic bag shall be packaged with special wooden cases, which are fixed in the case with screws and provided with manuals and certificates. The applicable transportation and storage temperature range of the product is from -55℃ to +85℃. Keep the products dry during transportation, which shall not be affected by strong turbulence, vibration and impact as well as be free from snow and rain.

10. List of Accessories and Installation

Table 5 Accessories List

No.	Name	Specification	Quantity
1	Flash barrier	--	3P:4; 4P:6
2	Manual special handle	--	1

11. Precautions

□ This product can operate reliably at the voltage range of 85%Ue~110%Ue. During installation and wiring of the product, strictly distinguish the incoming, outgoing line end and N-pole, and do not share the neutral line.

□ It is prohibited to use this product beyond the normal working conditions, such as the continuous water vapor or condensation without corresponding precautions, flammable or corrosive dust without SCPD cooperation or expected short-circuit current beyond the scope, ultra-high or ultra-low voltage, current beyond the rated value and ultra-high attitude.

□ Perform operation with the special handle supplied with products for manual switching.

□ For disconnection of the protective apparatus due to the line or load fault, first carry out troubleshooting and then energize the load.

□ During the product use, perform regularly (such as operation every three months) general inspection and switch the power supply once manually or automatically to check whether the product is normal.

★This product is subject to the insulation before the factory delivery, incorrect dielectric test will damage the control system, and the dielectric test with ATS is prohibited.