

Shanghai Liangxin Electric Co., Ltd
(NDQ3-2000 automatic transfer switching appliance).

Product specifications

(IPD-ENG-DEV-T20A1 2024-06-04)

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Audit	Cao Xuehu	date	2025-06-18
Sign	Penson	date	2025-06-19
approve	Zhang Huifeng	date	2025-06-20

Revision record					
version	Reason/Content of the revision	Date of implementation	Produce r	Reviewe r	Approve r
0	New	2024-05-20	Zhang Huifeng	Zhong Ling'er	Wang Jili
1	Modify the storage temperature	2024-06-04	Zhang Huifeng	Zhong Ling'er	Wang Jili
2	Dual power standard upgrade	2025-06-16	Su Kaixing	Cao Xuehu	Zhang Huifeng

1. Scope of application and use

NDQ3-2000 PC-level automatic transfer switching appliance is suitable for places below AC 380V/400V/415V and rated frequency 50Hz/60Hz. It complies with GB/T14048.1-2023, GB/T14048.11-2024, IEC60947-6-1 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" and other standards.

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)



NDQ3-2000 N-type product image



NDQ3-2000 D-type

product picture

3. Description of specifications and models

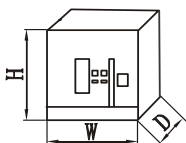
ND	Q	□	-	□	□	□/□	□	□	□
1	2	3	4	5	6	7	8	9	10
serial number	Serial number description		NDQ3-2000						
1	Enterprise code		ND: "LAZZEN" brand low-voltage electrical appliances						
2	Product code		Q: Automatic transfer switching appliances						
3	Design serial number		3						

4	Shell grade current rating	2000
5	Structural form	F-split 1
6	Rated working current	1600A, 2000A
7	Extreme number	3-3P 4-4P
8	Control mode	R-self-report and self-recovery、S-Self-investment without self-recovery ²
9	Switch position	III - Three-stage style
10	Controller type	Type N-N, type D-D

Note 1: The length of the split wiring harness is 3 meters; 2: Type D factory default self-investment and self-reset, other control methods can be adjusted by customers on site.

4. Main technical parameters

Model specifications		NDQ3-2000
Shell Grade Current Rating (A)		2000
Rated Operating Voltage U _e (V)		AC380V/AC400V/AC415V
Controller Voltage U _s (V)		AC220V/230V/240V
Rated frequency f (Hz)		50Hz/60Hz
Rated Insulation Voltage U _i (V)		AC1000V
Rated Shock Withstand Voltage U _{imp} (kV)		12kV
Rated Limiting Short Circuit Current I _q (kA)		120kA
Rated short-circuit connection capability I _{cm} /kA		1600A:67.2kA; 2000A:84kA
Rated for short-term withstand current I _{cw}		1600A: 32kA/60ms; 2000A: 40kA/60ms
Contact Changeover Time (ms)		≤100ms
Conversion Action Time (ms)		≤200ms
Operational performance	Electrical life	2000 (maintenance-free).
	Electrical life	6000 (Maintainable)

	Mechanical life	10000 (Maintainable)
Appliance level		PC level
Use categories		AC-33B
Extreme number		3P 4P
Wiring method		Horizontal wiring behind the board
Switch position		Three-stage format
Structural form		Split type, 3m wiring harness as standard
Isolation lock		√
Working mode		Self-report and self-recovery, Self-investment without self-recovery
Power mode		Grid-grid, grid-generator
Adjustable delay time		N:0-60s,D:0-6000s
Controller operating current		16A
Product certification		CCC CQC CB CE
Dimensions: W×H×D mm	Pole number 3P/4P	 3P: 572×381×332 4P: 682×381×332

4.1 Cross-sectional area selection of dual power connection bus or cable

Table 1 Selection of cross-sectional area for connecting busbars or cables

Rated Current	1600	2000
Cross-sectional	1200	1600

4.2 Double power terminal block and mounting screw tightening torque

Table 2 Tightening torque of terminal blocks and mounting screws

Model	Thread Specification (mm)		Torque torque (N • m)
NDQ3-2000	Mounting screw M10		25
	1600A	Terminal screw M10	25
	2000A	Terminal screw M12	40

4.3 Product weight

Table 3 Product weight

Model	Current specification	Extreme	Net Weight (Kg)	Gross Weight (Kg)
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NDQ3-2000	1600A	3P	51	66
		4P	63	77.5
	2000A	3P	57	68
		4P	70	82

5. Controller function

5.1 Controller display and button function

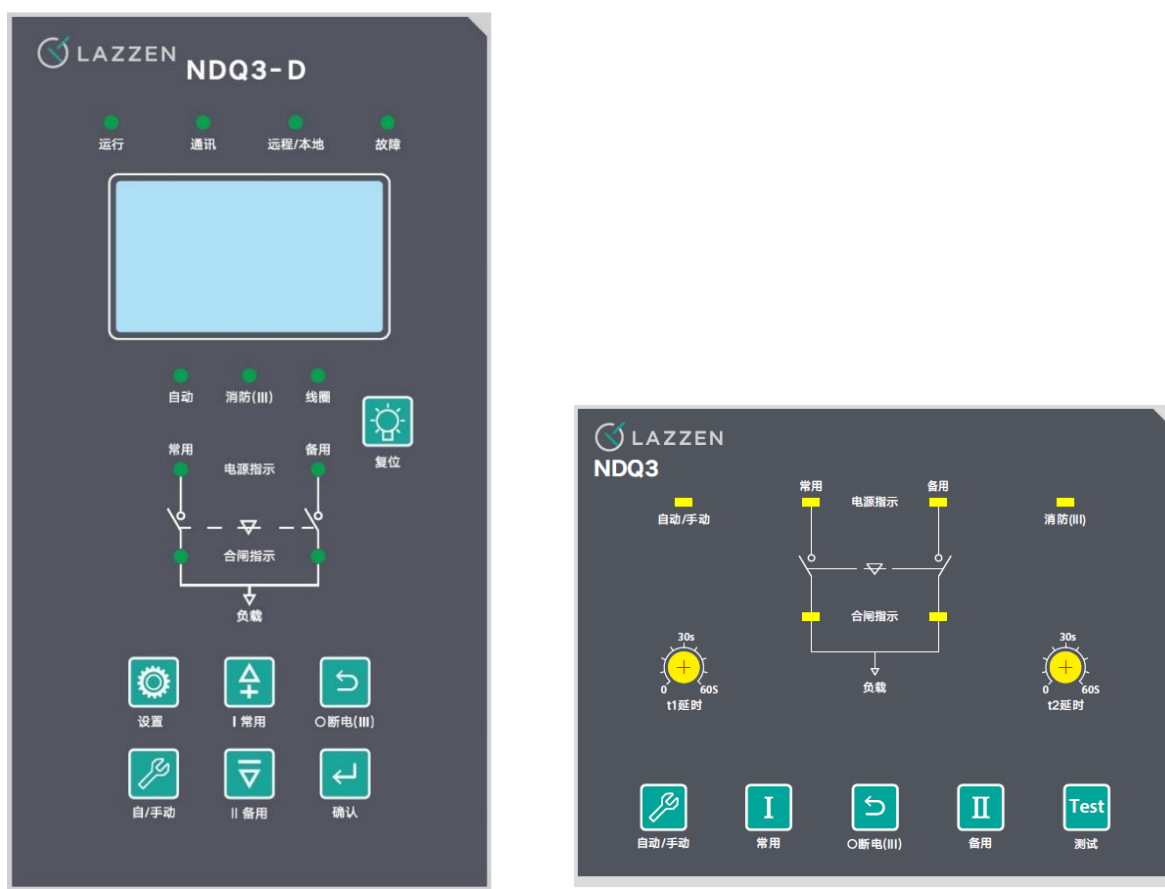


Fig. 1 Schematic diagram of D-type and N-type controller panels

5.2 Controller display, adjustment knob and button functions

Table 4 Controller display and button menu

Feature name		Function description
display	Automatic/manual	Red LED, automatic mode "always on", manual mode "always on", 1Hz slow flash indicates that the conversion process is running a delay action, and 5Hz flash indicates that the product structure is in the padlock state.
	Firefighting	Red LED, when the fire signal is input, the LED is "always on", the fire signal is withdrawn, the LED is "always off"

	(III)	after the fire signal is reset by pressing the button, and the LED is "always off" when there is no fire signal input.
	coil	Red LED, when the coil working voltage is higher than 175V, the LED is "solid", when the coil voltage is lower than 170V, the LED flashes at 1Hz. (Type D only)
	Common power supply	Red LED indicates the status of the common power supply, and under normal conditions, the common power supply is "solid". The arbitrary phase break indicator is off, the overvoltage or overfrequency indicator flashes at 5HZ frequency, and the undervoltage or underfrequency indicator flashes at 1HZ frequency.
	Backup power	A red LED indicates the backup power status, and the normal backup power supply is "solid". The arbitrary phase break indicator is off, the overvoltage or overfrequency indicator flashes at 5HZ frequency, and the undervoltage or underfrequency indicator flashes at 1HZ frequency.
	Commonly used split/close	Green LED, indicating the opening and closing status of the common position, closing the common position, LED "solid on", common position opening, LED "always off".
	Spare split/close	Green LED, indicating the status of the standby bit opening and closing, the standby bit is closed, the LED is "solid", the standby position is open, and the LED is "always off".
	run	Green LED, LED-1Hz flashing when the controller is running the program normally, and "always off" when entering the setting state. (Type D only)
	communication	When the green LED, communication is established, and there is communication data transmission, the LED flashes according to the data transmission and reception situation, and the LED is 20ms pulse flashing when a data packet is successfully received or sent out, otherwise the LED will always be extinguished.
	Remote/On-Premises	Red LED, when the controller is in remote mode, the LED is "always on", when the LED is in local mode, the LED is "flashing", and when the remote communication is controlled, the LED is "flashing". (Type D only)
	fault	"Fault" (for type D) red LED, when there is a fault, the LED is "always on", otherwise it is "always off"
	LCD screen	It is used to display setting parameters, measurement parameters, etc. (Type D only)
Adjustment knob	T1 delay (Opening delay)	The N-type controller adopts knob adjustment, with a range of 0->60s.
	T2 delay (Closing delay)	The N-type controller adopts knob adjustment, with a range of 0->60s.
keystroke	Reset button	Press this key to perform a hardware reset and the controller to restart. (Type D only)

	Settings button	In normal operation, press this key to enter the settings menu.
	Auto/Manual buttons	Press this key to switch the controller's operating mode from "Auto" mode or "Manual" mode.
	I. Commonly used / $\triangle$ button	For the multiplexing key, in manual mode, press this button, and the dual power supply will force the I. common closing; In the setting state, press this key to set the parameter to increase.
	II. Spare / ∇ button	For the multiplexing key, in manual mode, press this button, and the dual power supply will force the II. standby closing; In the setting state, press this key to set the parameter reduction.
	○Power off (III.)/Esc button	It is a multiplex key In the manual state of the D-type controller III. section, press this key to force the mechanism to cut off until the power is off. II. In the manual state of the segment type, pressing this key is invalid, and in the setting state, it returns and exits as a menu. In the manual state of the N-type controller, press this key to force the switch until the power is off. This button is effective when the buttons are combined, and the combination buttons are detailed in the setting operation of the N-type controller.
	Return (II.) button	It is valid when the key is combined, but pressing this button alone is not effective.
	I. Commonly used	In manual mode, press this button to force the dual power supply to I.
	II. Backup	In manual mode, press this button to force the dual power supply to close the door to II.
	TEST button	The controller is in automatic mode, the common power supply and backup power supply are normal and the switch is in the closing position of the common power supply, press the test button, and the switch completes a "I.-○-II.-○-I." operation cycle; When the common power supply is normal, the backup power supply is abnormal and the switch is in the closed position of the common power supply, press the test button, the controller will send out a generator start signal (if equipped with a generator start-stop module), if the backup power supply reaches the normal state within 60s, the switch will complete a "I.-○-II.-○-I." operation cycle; If the power supply II is still not working properly after 60s, it cannot be converted and the test function is exited.
	Confirm the button	Valid in the setting state, press this key to confirm the current setting parameter and save this parameter to EEPROM (memory).

5.3 Controller Functions

Table 5 Controller function comparison

Function description:		N-type controller	D-type controller
Protection function	Overvoltage protection	✓	✓
	Undervoltage protection	✓	✓
	Cut off the phase protection	✓	✓
	Over frequency protection	–	✓
	Under-frequency protection	–	✓
	Broadband protection	–	▽
	Phase Sequence/Phase Protection	–	✓
	Phase angle detection 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	–	✓
	Fault locking ^[1]	–	✓
	Programmable port output	–	✓
display	Common power supply (LED light)	✓	✓
	Backup power (LED light)	✓	✓
	Common closing (LED light)	✓	✓
	Spare closing (LED light)	✓	✓
	Automatic (LED light)	✓	✓
	Fault/Alarm (LED Light)	–	✓
	Operation (LED light)	–	✓
	Coil (LED light)	–	✓

	Fire Protection (III.) (LED Light)	✓	✓
	Communication (LED light)	—	✓
	Remote/Local (LED Light)	—	✓
	Phase voltage fault alarm information ^[2]	✓	✓
	Fault connection fault alarm information ^[2]	✓	✓
	Failure Conversion Alarm Information ^[2]	✓	✓
	LCD screen	—	✓
Power supply mode choose	Power grid – power grid ^[3]	✓	✓
	Power grid – generator ^[3]	✓	✓
Working mode choose	self-report and self-recovery	✓	✓
	Self-investment without self-recovery	✓	✓
Power first	Common use first	✓	✓
	Spare priority	✓	✓
Delay adjustment	Split/Conversion Delay (T1)	✓	✓
	Closing/Return Delay (T2)	✓	✓
	Generator cooling delay	—	✓
	Generator start delay	—	✓
Voltage protection threshold	Undervoltage value	165V	$(0.7 \sim 0.95) \times 230V$ adjustable
	Overvoltage value	270V	$(1.05 \sim 1.3) \times 230V$ adjustable
keystroke	Automatic/manual	✓	✓
	I. Commonly used/ $\triangle$	✓	✓
	Set up	—	✓
	II. Spare/ ∇	✓	✓
	reposition	—	✓
	Power Loss (III)/	✓	✓
	Confirm	—	✓
	Test	✓	✓ (confirmed after selection through the
other	Remote switching function	—	✓
	Rated frequency selection	—	✓
	buzzer	—	✓
	Double enable ^[4]	—	∇
	Excess and underpressure	—	∇

Automatic inspection of generators	—	✓
Clear fault logs	—	▽
Clear the operation 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	—	▽

"✓" means only this function; "▽" means that the customer is adjustable;

Note: [1] After the fault lock is opened, the remote control input signal of the secondary terminal block port 16 0 is automatically switched to a fault locking signal from power off, and the public terminal com conducts, the fault locking takes effect, and the factory defaults to shut down.

[2] In the N-type controller, the phase voltage fault alarm information: common/standby overvoltage, corresponding to the power indicator flashing at 5Hz; Common/standby undervoltage, corresponding to the power indicator 1Hz slow flash; Common/standby phase absence, corresponding power indicator light is always off;

Fault alarm information for wrong wire: only power-on detection, N line is wrongly connected, all indicator lights flash at 5Hz;

Conversion failure fault alarm information: 5Hz flash flash at the same time for common closing and standby closing;

The D-type controller can provide communication query and display various fault alarm information on the panel.

[3] The power supply mode of the N-type controller does not need to be selected, and the default is a common public system (suitable for grid-grid, grid-generator).

[4] After the double enable function is turned on, the automatic transfer switch switches to the double position when the standing power supply fails at the same time. After the dual use function is turned off, the controller maintains the current state when the standing power supply fails at the same time.

6. Working conditions

6.1 Normal Conditions of Use

Ambient temperature: -25° C~+70° C

Storage temperature: -40°C~+85° C

6.1.1 Ambient air temperature

The upper limit of ambient air temperature does not exceed +70° C, the lower limit is not less than -25° C, and the 24-hour average does not exceed +35° C. When it is higher than 55° C, volume reduction should be considered.

Table 6 Temperature reduction coefficient

Model	The temperature corresponds to the volume reduction coefficient of the product				
NDQ3-2000	Temperature (° C)	55	60	65	70
	Volume reduction coefficient	1.0	0.96	0.93	0.92

6.1.2 Altitude

The altitude of the installation site does not exceed 2000m, and more than 2000m needs to be reduced for use.

Table 7 Altitude degradation coefficient

project	symbol	unit	parameter			
altitude	H	m	≤2000	3000	4000	5000
Rated operating voltage	EU	V	400	400	400	400
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 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 ATSE can be installed vertically or horizontally in the cabinet, and special requirements must be specially ordered.

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. Shape structure and wiring

7.1 Explanatory diagram of the external structure

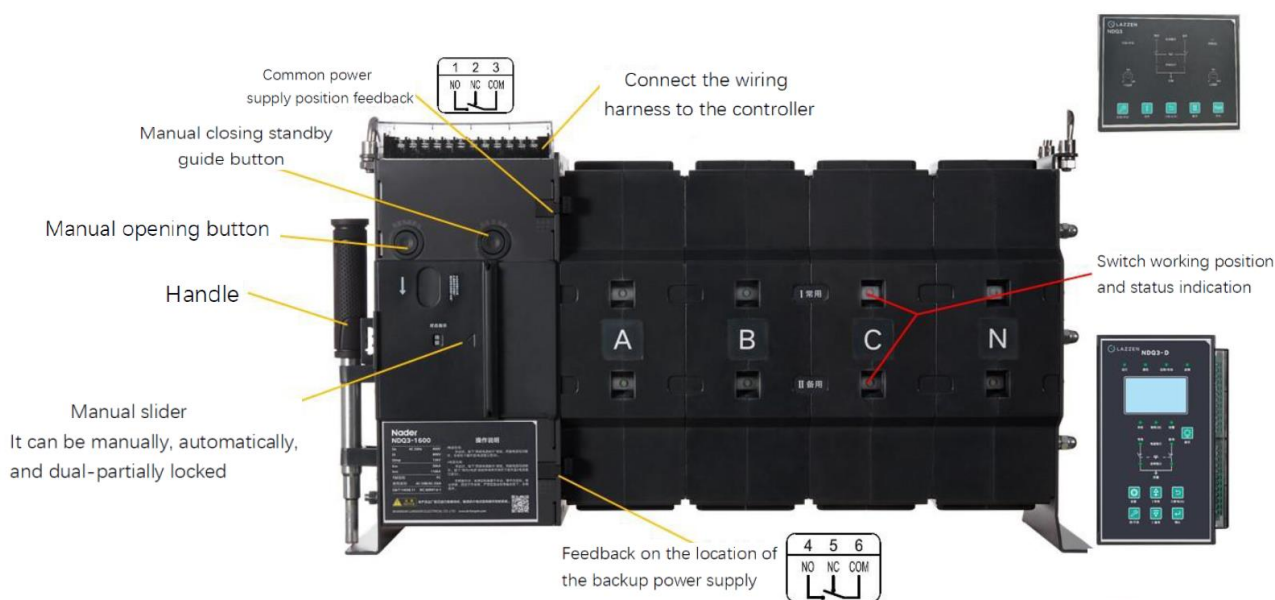


Fig.2 Schematic diagram of the product shape structure

7.2 Wiring diagram

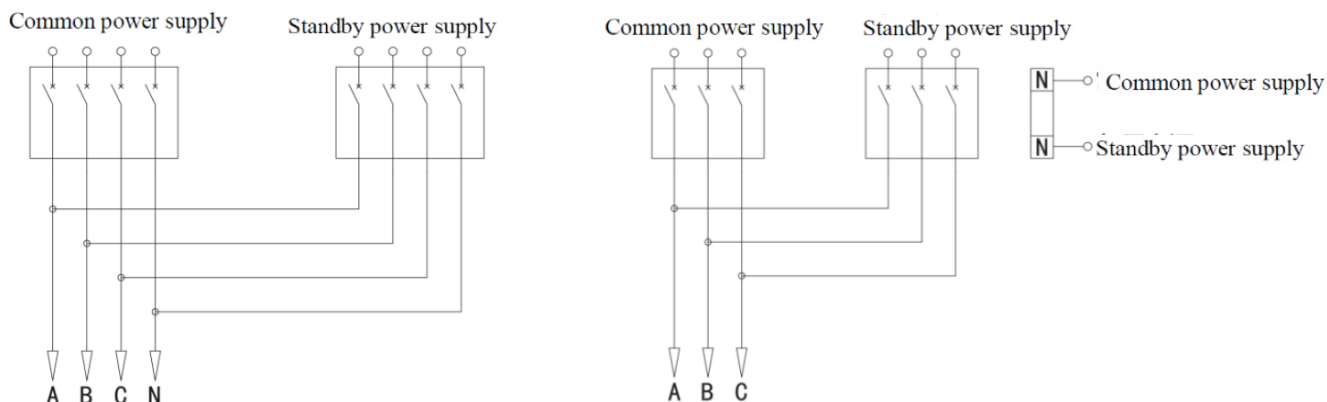


Fig.3 Schematic diagram of four-pole product wiring Fig.4 Schematic diagram of three-pole product wiring

7.3 Port Definitions

7.3.1 Product body terminal description

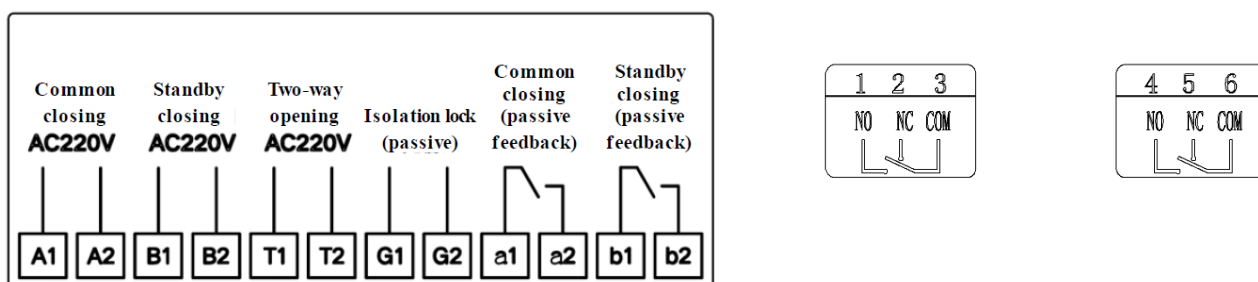


Fig.5 Schematic diagram of the wiring of the secondary terminal block of the product

- A1, A2: Commonly used closing signal input (AC-220V);
- B1, B2: Alternate closing signal input (AC-220V);
- T1, T2: Two switch signal inputs (AC-220V);
- G1, G2: isolated padlock signal output (passive opening and closing point);
- A1, A2: Commonly used closing signal output (passive opening and closing point);
- B1-B2: Backup closing signal output (passive opening and closing point)

The above contact points have been connected to the wiring harness from the factory, and the customer does not need to wire it.

- 1~3, 4~6: Regular and standby each set of passive output signal (front of the body, contact capacity: 15A/AC250V)

7.2.2 NDQ3-2000 Controller User Port Description Diagram

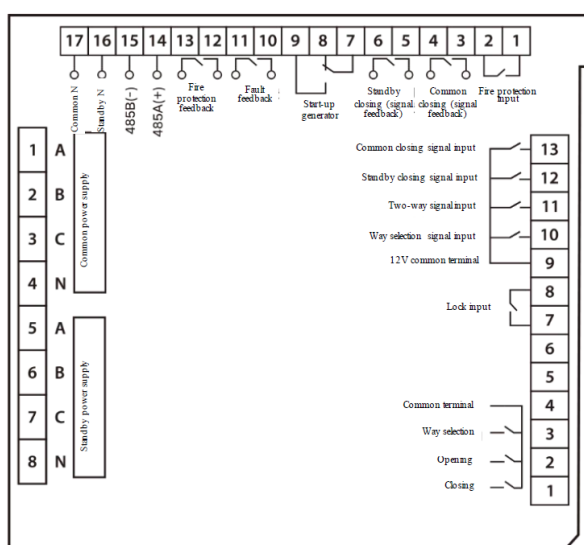
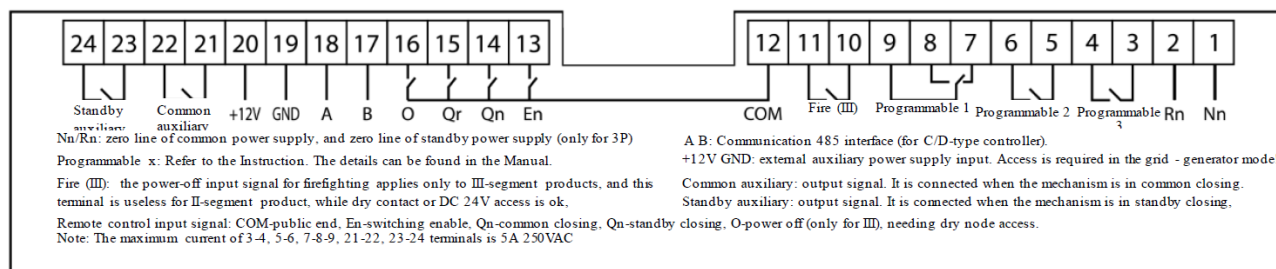


Fig.6 User port description of N-type controller

- 1-2 Fire signal input terminal, which is a passive input node, this terminal cannot be connected to the power supply, and only a short connection can trigger the fire double split of the product;
- 3-4, 5-6 are the commonly used closing of the product, and the position indication of the standby closing (Note: this terminal is a passive node, and the maximum access current at the terminal is 3A AC250V);
- 7-8-9 terminals are generator start and unload signal terminals, when the common power supply is normal, 7 and 8 are disconnected, and 7 and 9 are on; The common power supply changes from normal to abnormal, and after a delay of 30S, 7 and 8 are turned on, and 7 and 9 are disconnected. After the common power supply returns to normal, 7 and 8 are disconnected after 30S, and 7 and 9 are turned on;
- 10-11 Fault feedback, when the product conversion fails, the terminal will output a passive closure signal;
- 12-13 When the product is in fire protection state, the terminal will output a passive closure signal;
- 14-15 is the communication 485 interface, if you need communication protocol, please call our company's 400 technical support hotline;
- 16-17 Neutral terminal block of 3P products (3P products must be connected to the neutral wire, otherwise the product will not work normally).



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

Fig.7 User port description of the D-type controller

Table 8 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/bit alarms	Commonly used voltage imbalance alarms	Alternate frequency alarm	Alternate phase sequence/bit alarm	Standby voltage imbalance alarm	

8. Product shape and installation size

8.1 NDQ3-2000 product shape and installation size

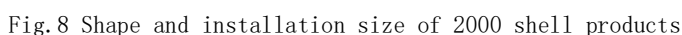


Fig.9 Installation dimensions of N-type controller

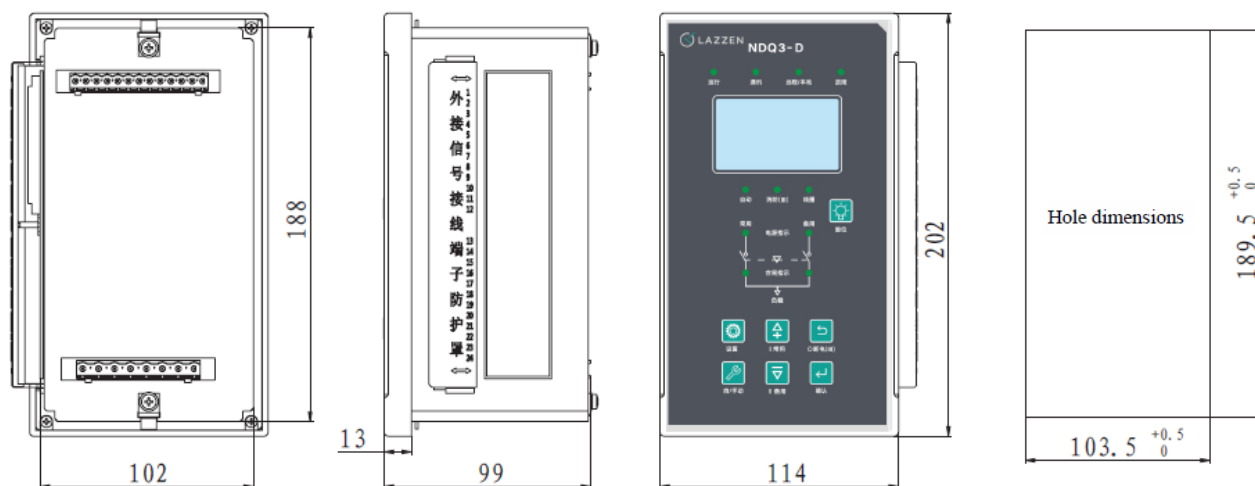


Fig.10 Installation dimension diagram of D-type controller

9. Installation and use

9.1 The product body is fixed and installed vertically or horizontally in the cabinet, and the maximum inclination from the vertical surface of the installation is $\pm 22.5^\circ$.

9.2 Controller Installation

Step 1: Place the N-type/D-type split controller (the transparent cover above the secondary terminal needs to be removed) at the opening on the cabinet door panel, insert the two buckles into the slot of the controller, so that the controller is fixed on the door panel;

Step 2: As shown in Figure 17, connect the controller's connection cable to the switch body, and arrange the wiring harness.

9.3 Controller Replacement

Step 1: Unplug the connecting cable that connects the switch body.

Step 2: Remove the buckle that holds the controller, remove the old controller, replace it with a new controller, and install the buckle.

Step 3: Connect the connecting cable of the controller to the switch body and arrange the wiring harness.

9.4 Manual Operation Instructions

Warn! Because the force, speed, and angle of manual operation are not easy to master, and improper manual operation will affect the switching performance of the product, so when the power is on and loaded, try to use the controller for operation, and when manual operation is really required, please pay attention to the following points:

The operator has experience in manual operation and is familiar with manual procedures.

The operator wears complete protective equipment.

The operator confirms that the product mechanism is normal and the special handle is intact.

The operator determines that the operating power supply is disconnected.

The operator determines that the load is light, and that the load and power line are fault-free.

9.5 Manual Procedure

○Power-off operation: Press the "two power disconnect" button shown on the face cover, and the I. and II. position indicator windows are indicated "○".

I. Common input methods: press, the "two power disconnect" buttons shown on the face cover, the I. and II. position indicator windows are indicated "○", then push the cover slide, the status indicator window is placed in "manual", insert the handle, rotate down, release the handle after it is in place, and the switch I position indicator window changes from O to I.

II. Spare input method: press, the "two power supply disconnect" button shown on the face cover, I and II. position indicator windows are indicated "○", push the cover slide plate, the status indicator window is placed in "manual", insert the handle, press the "guide II power supply" button shown on the face cover and hold, rotate down, release the handle after it is in place, and the switch II position indicator window changes○ from I.

Note: Manual operation is prohibited in automatic or padlock states.

10. Packaging and storage

The product is covered with a waterproof plastic bag and packed in a special box. The product packaging is suitable for transportation and storage temperatures in a dry environment with a temperature range of $-25^{\circ}\text{C} \sim +70^{\circ}\text{C}$, rainproof, moistureproof, and moistureproof. During transportation, the product shall not be subjected to strong bumps, vibrations, collisions, and prevent rain and snow.

11. List of attachments

Table 9 List of annexes

Shell frame	Rated current	serial number	name	specification	quantity
NDQ3-2000	1600A	1	Arc plate	--	3P:2; 4P:3
		2	Manual dedicated handle	--	1
		3	Hex head bolts	M10*40	3P: 27, 4P: 36
		4	Flat pad	$\phi 10$	3P: 27, 4P: 36
		5	Bullet pad	$\phi 10$	3P: 27, 4P: 36
		6	nut	M10	3P: 27, 4P: 36
	2000A	1	Arc plate	--	3P:2; 4P:3
		2	Manual dedicated	--	1

			handle		
		3	Hex head bolts	M12*40	3P: 36, 4P: 48
		4	Flat pad	F12	3P: 36, 4P: 48
		5	Bullet pad	F12	3P: 36, 4P: 48
		6	nut	M12	3P: 36, 4P: 48

12. Precautions

1. 3P product controllers must be connected to the neutral wire;
2. The switch should be installed correctly, check whether the nameplate content meets the requirements before installation, and confirm that the switch is disconnected;
3. This product can work reliably at 85% U_e ~110% U_e voltage. When the product is installed and wired, the inlet and outlet ends and N poles should be strictly distinguished, and the neutral wire should not be shared;
4. It is strictly forbidden to use this product under conditions beyond normal use conditions, such as continuous water vapor or condensation without corresponding precautions, combustible or corrosive dust, no SCPD coordination or expected short-circuit current beyond the range, voltage over high or too low, current exceeding the rated current, and altitude at high altitude;
5. When wiring the switch, the wiring should be strictly according to the wiring sign, and the neutral wire should be connected to the neutral terminal for the three-pole product.
According to the actual situation, the wiring of fire linkage and power generation control is carried out, and finally the product is well grounded;
6. The isolation lock can only be locked when the middle position of the product is required, and the controller cannot be operated when the padlock is not operated, and the handle

cannot be operated;

7. Please conduct conversion tests regularly (recommended every three months) to confirm that the product is working properly. Regularly dispose of dust on the surface of the housing to maintain good insulation. Pay attention to moisture and dust proof for switches that are not used for a long time, and debug them manually or automatically before use, and the switches can only be put into operation normally.

- ★ This product has been insulated before leaving the factory, the wrong dielectric test will destroy the control system, it is strictly forbidden to bring ATS to do dielectric test;
- ★ If the customer needs to use a megaohmmeter to test the insulation of the electrical system during use, please remove the controller cable for testing.