Shanghai Liangxin Electrical Co., Ltd. (Nader)

(NDQ3-1600 Automatic Transfer Switching Equipment)

Product Specification

（IPD-ENG-DEV-T20A1 2022-12-01）

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Revision History					
Version	Revision Reason/Content	Implementation Date	Prepared by	Reviewed by	Approved by
0	Add	October 20, 2022	Zhang Huifeng	Cao Xuehu	Wang Jili
1	Modifying a Document Template	December 01, 2022	Zhang Huifeng	Cao Xuehu	Wang Jili

1. Applicable Scope and Purpose

The PC-grade NDQ3-1600 ATSE is applicable for sites with the AC voltage below 400V and the rated frequency of 50Hz/60Hz. 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. Product photo (for reference only)

NDQ3-1600 product photo

3. Specification and Model Description

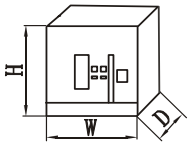
NDQ □- □ □ □/□ □ □ □
1 2 3 4 5 6 7 8 9 10

SN	SN Description	NDQ3-1600
1	Enterprise code	ND: "Nader" low-voltage equipment
2	Product code	Q: Automatic transfer switch equipment
3	Design SN	3
4	Rated current of frame	1600
5	Structure form	F-split type [1]
6	Rated working	400A，630A，800A，1000A，1250A，1600A

	current	
7	Number of poles	3-3P 4-4P
8	Control mode	R-Self-start and self-reset, S-Self-start but not self-reset [2]
9	Switch position	III-Three-stage
10	Controller type	N-N type, D-D type

Note 1: The split wire harness is 3 meters long; 2: The D type is self-start and self-reset by factory default, and other control methods can be adjusted on site by the customer.

4. Main Technical Parameters

Model & specifications		NDQ3-1600		
Rated current of housing (A)		1600		
Rated working voltage Ue (V)		AC380V/AC400V/AC415V		
Rated frequency f (Hz)		50/60		
Rated insulation voltage Ui (V)		AC1000V		
Rated impulse withstand voltage Uimp (kV)		12kV		
Rated limited short-circuit current Iq (kA)		130		
Rated short-time withstand current Icw(kA)		50kA/60ms,35kA/1s		
Rated short-circuit making capacity Icm (peak) (kA)		110		
Contact switching time (ms)		≤100		
Conversion action time (ms)		≤200		
Operating performance	Mechanical life (times)	10000		
	Electrical life (times)	6000		
Electrical equipment level		PC-special type		
Utilization category		AC-33B/AC-33iA		
Number of poles		3P 4P		
Control voltage (V)		230V		
Wiring mode		Behind the panel		
Switch position		Three-segment type		
Structure form		Split type		
Isolating and locking		√		
Operation mode		Auto switch and auto recover, auto switch and non-auto recover		
Power supply mode		Grid-grid, grid-generator		
Dimensions: W×H×D mm 	Number of poles 3P/4P	3P：555×381×313.5 4P：665×381×313.5		
Product certification		CCC	CQC	CB

4.1 Selection of the double-source connecting bus or cable cross-section area:

Table 1 Selection of the Connecting Bus or Cable Cross-section Area

Rated current	400	630	800	1000	1250	1600
Wire cross-	150*2	185*2	240*2	60*10	80*10	100*10

4.2 Tightening Torque of the Double-Source Terminal and Mounting Screw

Table 2 Tightening Torque of the Terminal and Mounting Screw

Model	Thread diameter (mm)	Torque (N·m)
NDQ3-1600	Terminal screw M12	70
	Mounting screw M10	40

4.3 Product weight

Table 3: Product weight

Model	Number of poles	Gross weight (Kg)	Net weight (Kg)
NDQ3-1600	3P	77	65
	4P	95	78

5. Controller Functions

Table 4 Comparison of Controller Functions

Function description		N-type controller	Type D controller
Protection function	Overvoltage protection	√	√
	Undervoltage protection	√	√
	Open-phase protection	√	√
	Overfrequency protection	-	√
	Underfrequency protection	-	√
	Broadband protection	-	▽
	Phase sequence/phase protection	-	√
	Phase angle detection protection	-	√
	Wrong wiring alarm	√	√
Measuring function	Voltage value	-	√
	Frequency value	-	√
	Unbalancedness	-	√
Communication function	MODBUS-RTU protocol	√	√
Node input/output	Fire signal Input	√	√
	Common closing output	√	√
	Standby closing output	√	√
	Generator starting output	√	√
	Fault alarm output	√	√
	Communication port	√ (Optional)	√
	Remote switching control input	-	√

	Fault blocking [1]	-	√
	Programmable port output	-	√
Display	Common power supply (LED light)	√	√
	Standby power supply (LED light)	√	√
	Common closing (LED light)	√	√
	Standby closing (LED light)	√	√
	Automatic (LED light)	√	√
	Fault/Alarm (LED light)	-	√
	Running (LED light)	-	√
	Coil (LED light)	-	√
	Fire protection (Ⅲ) (LED light)	√	√
	Communication (LED light)	-	√
	Remote/Local (LED light)	-	√
	Phase voltage fault alarm information [2]	√	√
	Fault alarm information of wrong connection [2]	√	√
	Conversion failure fault alarm information [2]	√	√
	LCD screen	-	√
Power supply mode Select	Grid - grid [3]	√	√
	Grid-generator [3]	√	√
Operation mode Select	Auto switch and auto recover	√	√
	Auto switch and non-auto recover	√	√
Power priority	Conventional with priority	√	√
	Standby with priority	√	√
Delay adjustment	Opening/transfer delay (T1)	√	√
	Closing/Return Delay (T2)	√	√
	Generator cooling delay	-	√
	Generator startup delay	-	√
Voltage protection Threshold value	Undervoltage value	165V	(0.7~0.95)×230V adjustable
	Overpressure value	270V	(1.05~1.3)×230V adjustable
Keys	Automatic/Manual	√	√
	Ⅰ Common/△	√	√
	Setup	-	√
	Ⅱ standby/▽	√	√
	Reset	-	√
	○Power off (Ⅲ)/⮌	√	√
	OK	-	√
	Test	√	√(Confirm after selection by program)
Other	Remote switching function	-	√
	Rated frequency selection	-	√
	Buzzer	-	√
	Dual-split enable [4]	-	▽
	Overvoltage and undervoltage return difference	-	▽
	Generator auto-check	-	√
	Clear fault record	-	▽
	Clear operation history	-	▽
	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	-	▽
	Calibration voltage value	-	▽

"√" means only this function; "▽" means it can be adjusted within the company;

Note: [1] After fault blocking enable is activated, the No. 16 port O of the remote control input signal of the secondary terminal will be automatically switched from power off to the fault blocking signal and connected to the common terminal com, and fault blocking is enabled.

[2] Phase voltage fault alarm information of the N-type controller: for Common/standby overvoltage, the power indicator flashes at 5Hz; for Common/standby undervoltage, the power indicator flashes slowly at 1Hz; for Common/standby phase loss, the power indicator is normally off;

Fault alarm information of wrong wire connection: only detected at power on; when N wire is incorrectly connected, all indicators will flash quickly at 5Hz;

Transfer failure fault alarm information: Common closing and standby closing flash at 5Hz at the same time;

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

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

[4] After the double-split enable function is turned on, when the Common and standby power supply fail at the same time, the automatic transfer switch will switch to the double-split position; after the double-split enable function is turned off, when the Common and standby power supply fail at the same time, the controller will be kept at the current state.

6. Operating Conditions

6.1 Normal working conditions

Ambient temperature: -25℃- +70℃

Storage temperature: -55℃- +85℃

6.1.1 Ambient air temperature

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 is within 2000m, and if it is over 2000m, the capacity will be degraded.

Table 7: High-altitude capacity degrading

Project	Symbols	Unit	parameters			
Altitude	H	m	≤2000	3000	4000	5000
Rated working voltage	Ue	V	400	400	400	400
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

6.1.3 Atmospheric conditions

6.1.3.1 Humidity

When the highest temperature is +40℃, the relative humidity of air should not exceed 50%; a high relative humidity is allowed under a low temperature, e.g.90% under 20℃. Special measures should be taken to address occasional condensing due to temperature fluctuation.

6.1.3.2 Class of pollution: 3

6.2 Installation conditions

6.2.1 ATSE can be installed vertically or horizontally within the cabinet; special orders are required upon special requests.

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 of external ports

7.1 Wiring Diagram

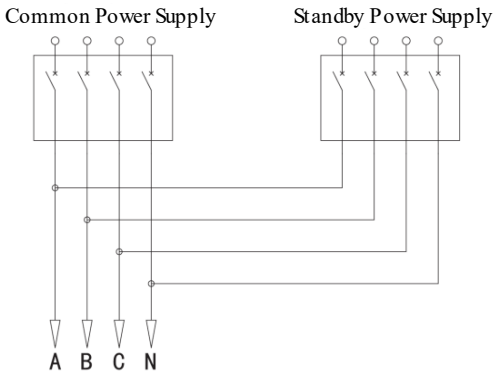


Figure 1 Wiring diagram of 4P product

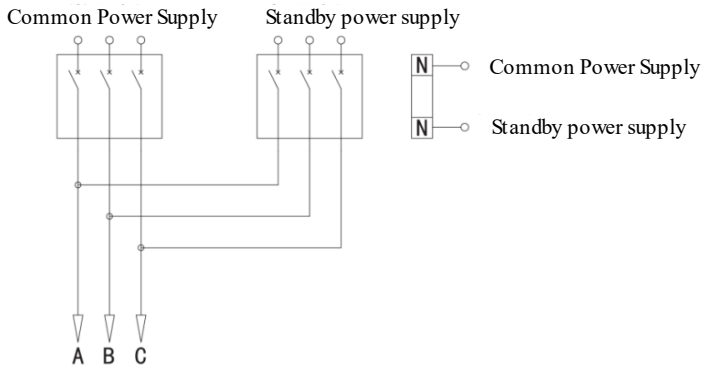
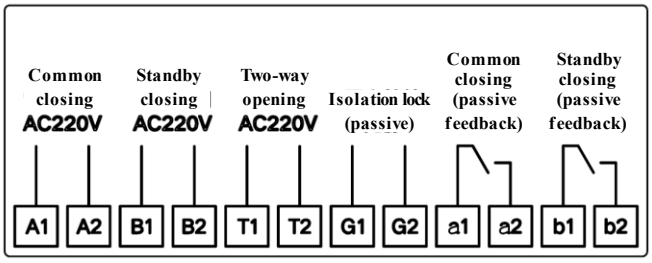
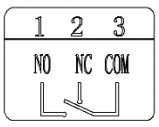


Figure 2 Wiring diagram of 3P product

7.2 Port definition

7.2.1 Description of product terminals





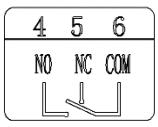


Figure: 3 Schematic diagram of the secondary wiring of the product

●A1, A2: Common closing signal input (AC-220V);

●B1, B2: Standby closing signal input (AC-220V);

●T1, T2: Two-way opening signal input (AC-220V);

●G1, G2: Isolation padlock signal output (passive switching point);

a1, a2: Common closing signal output (passive switching point);

●b1-b2: Standby closing signal output (passive switching point)

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

1~3, 4~6: One pair of passive output signals is reserved for Common and standby each (contact capacity: 15A/AC250V)

7.2.2 Illustration of user's ports for NDQ3-1600 controller

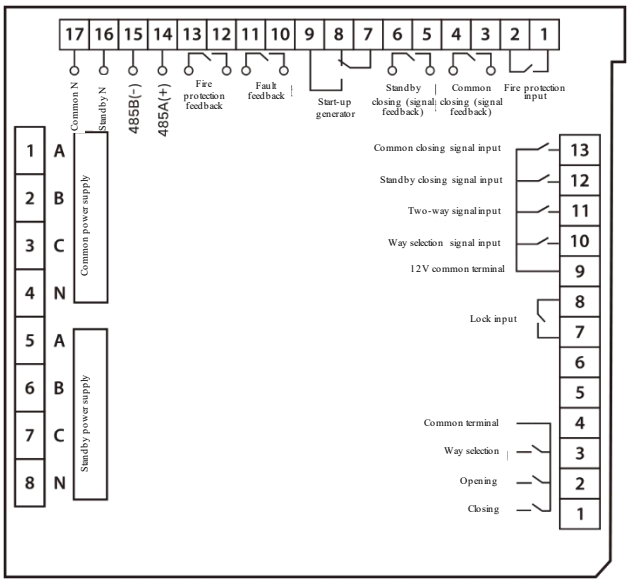


Figure 4: Illustration of user's ports for N-type controller

● 1, 2 fire signal input terminals are used as passive input nodes, which cannot be connected to the power supply, as they can trigger fire production dual-opening only if short circuited;

3 and 4, 5 and 6 are the position indication of the Common closing and standby closing of the product respectively (Note: these terminals are passive nodes, and the maximum access current is 3A AC250V);

7, 8, and 9 are generator start and unload signal terminals, when the Common power supply is normal, 7 and 8 are disconnected, and 7 and 9 are connected; when the Common power supply changes from normal to abnormal, 7 and 8 are connected and 9 are disconnected after a delay of 30S. After the Common power supply is normalized, 7 and 8 are disconnected and 7 and 9 are connected after a time delay of 30S;

●10,11 fault feedback, when product transfer fails, these terminals will output a passive closing signal;

● When the product is in the fire status, 12, 13 terminals will output the passive closing signal

●14,15 are communication 485 ports, if you need communication protocol, please call our 400 technical support hotline;

● 16, 1 are the neutral wire terminals of the 3P product (the 3P product must be connected to the neutral wire, or the product cannot work normally).

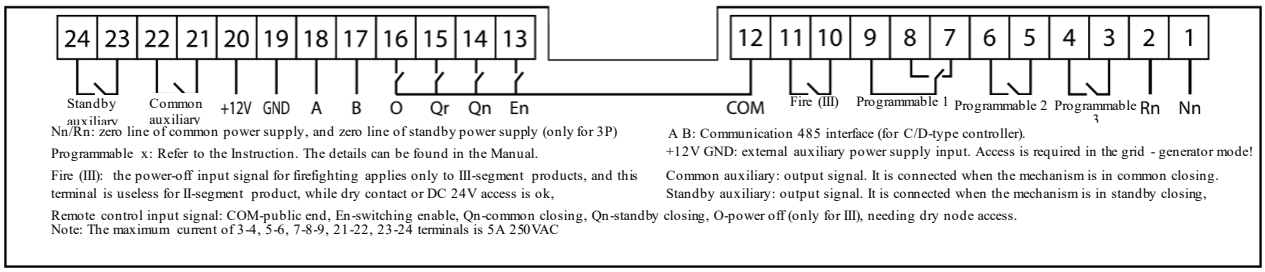


Figure 5: Illustration of user's ports for N-type controller

Table 6: Definition of programmable port for D-type controller

0	1	2	3	4	5	6	7
Fault alarm	Grid alarm	Common power supply Alarm	Standby power supply Alarm	Common closing	Standby closing	Generator/ unload	Input signal error alarm
8	9	10	11	12	13	14	

Fire alarm	Common frequency Alarm	Common phase sequence/phase alarm	Common voltage unbalance alarm	Standby frequency Alarm	Standby phase sequence/phase alarm	Standby voltage unbalance alarm	

In "Grid-generator", the programmable output port 1 is fixed as generator/unloading.

8. Outline and Installation Dimensions

8.1 NDQ3-1600 3P product appearance and installation dimensions

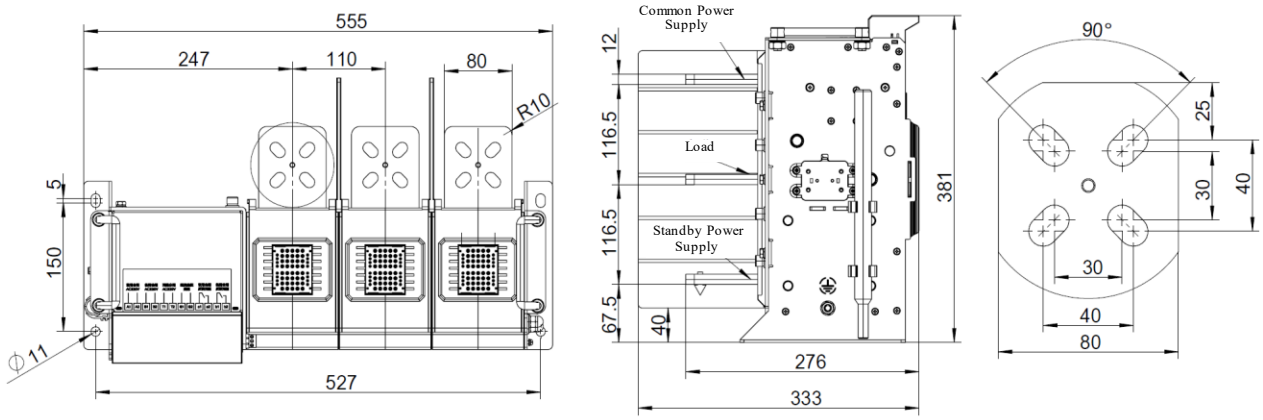


Figure 6: 3P product appearance and installation dimensions

8.2 NDQ3-1600 4P product appearance and installation dimensions

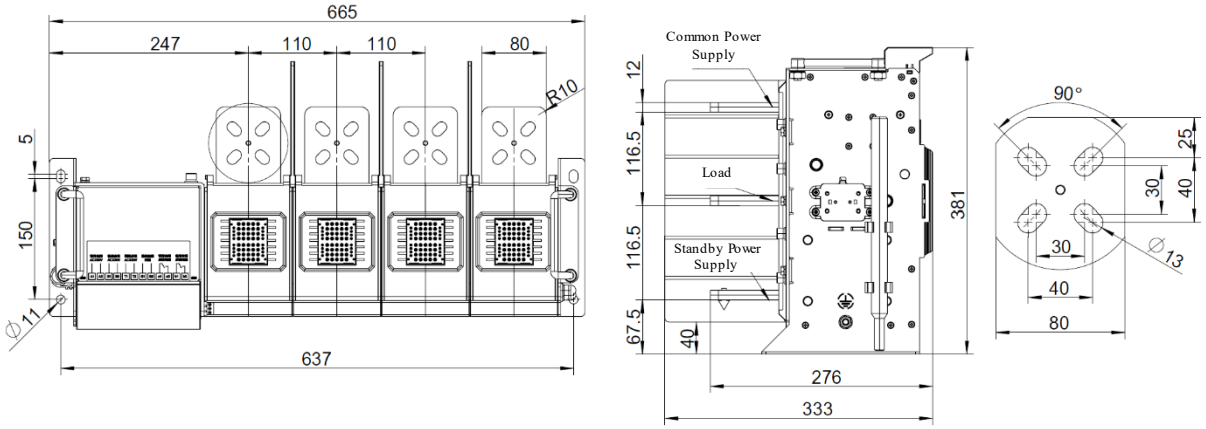


Figure 7: 4P product appearance and installation dimensions

8.3 Controller appearance and installation dimensions

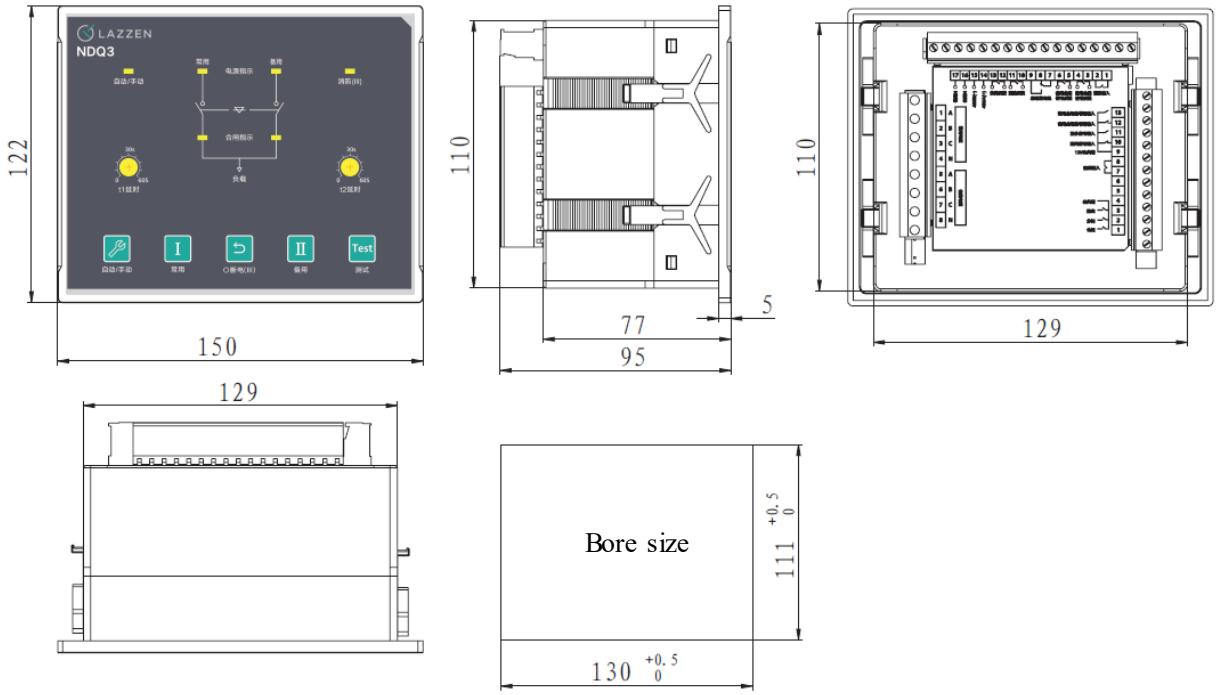


Figure 8: Installation dimension drawing of N-type controller

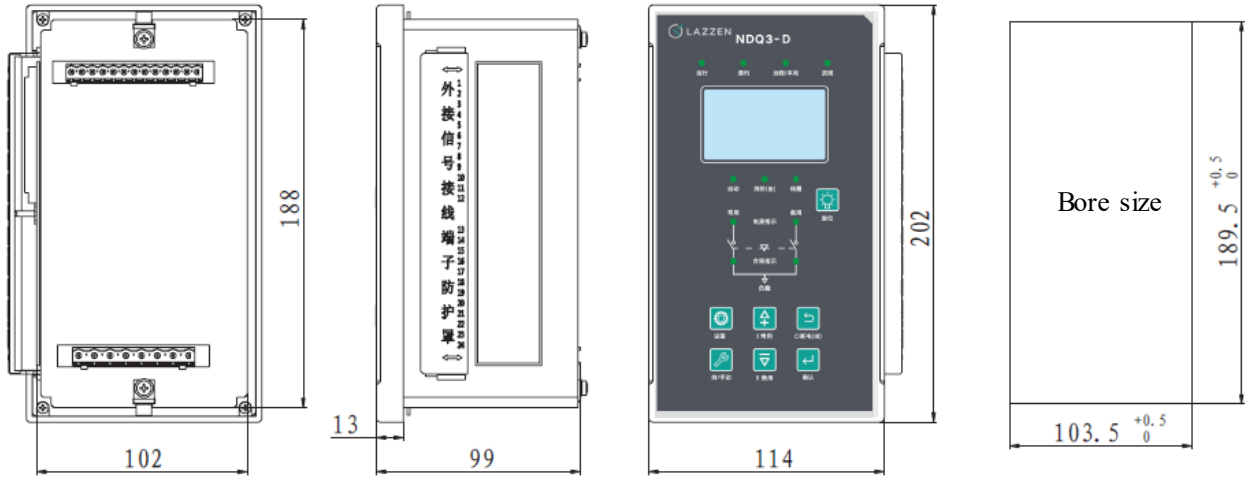


Figure 9: Installation dimension drawing of D-type controller

9. Installation and Use

The main body of the product is installed vertically or horizontally in the cabinet, and the maximum slope with the vertical installation plane is about ±22.5°.

9.2 Controller installation

Step 1: place Type N/D split controller (by removing the transparent cover above the secondary terminal) into the hole of cubicle door panel and insert two buckles into the slot of the controller to make it fixed onto the door panel;

Step 2: Connect the switch body with the connecting cable of the controller and handle the harness as shown in Figure 17.

9.3 Controller replacement

Step 1: remove the cable connecting with the switch body.

Step 2: remove the buckles for fixing the controller, replace the old controller with a new controller and install the buckles in place.

Step 3: connect the connecting cable of the controller onto the switch body and handle the harness.

9. 4 Manual operation instructions

Warning! As it is not so easy to master the force, speed and angle of the manual operation, improper manual operation will affect the switch performance. Therefore, try to use the controller for operation at the electricity load. Note the following points if manual operation is really necessary:

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

The operator wears complete protective equipment.

The operator confirms that the product mechanism is normal and the special handle is in good condition.

The operator confirms that the operating power source has been disconnected.

The operator confirms that the load is lighter, and that the load line and the power line are free from faults.

9.5 Manual operation steps

〇Power-off operation: press "two-way power off" shown on the cover, and the position indicator windows of I and II will both indicate "〇".

Ⅰ Common start method: press "two-way power off" shown on the cover, the position indicator windows of Ⅰ and Ⅱ will both indicate "〇 ", then push the sliding plate of the cover, set the status indicator window to "manual", insert the handle, rotate down, release the handle after it reaches the correct position, and the switch I position indicator window will change from O to I.

Ⅱ Standby input method: press the "two-way power off" button shown on the face cover, and the position indicator windows of I and Ⅱ both indicate "〇", then push the face cover slide plate, set the status indicator window to "manual", insert the handle, press down and hold the "Guiding II Power Supply" on the panel, rotate down, release the handle after it reaches the correct position, and the switch I position indicator window will change from 〇 to I.

10. Packaging and Storage

The product is protected in a waterproof plastic bag and packed in a special box. The applicable transportation and storage temperature range of the product is from -25℃ to +75℃. 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.

11. Accessories list

Table 7: List of accessories

SN	Name	Specification	Quantity
1	Flash barrier	--	3P:2; 4P:3

2	Manual special handle	--	1
3	Hexagon head bolts	M12*40	3P：36；4P：48
4	Flat pad	φ12	3P：36；4P：48
5	Spring pad	φ12	3P：36；4P：48
6	Nut	M12	3P：36；4P：48

12. Precautions

1. The 3P product controller must be connected to the zero line;

2. The switch shall be correctly installed. Before installation, check whether the nameplate contents meet the requirements, and confirm that the switch is in the OFF status;

3. 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.

4. 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.

5. In the wiring of the switches, it is required to finish the wiring strictly according to the marks, and the neutral wire of the three-pole products shall be connected to the neutral terminal. Carry out the wiring for the linked action of firefighting and generator control according to the actual situation, and finally confirm that the product is in good earthing;

6. The isolating lock can be pulled out only when the product remains in the middle position, and when "it is pulled out", the controller is inoperable, and the handle is also inoperable.

7. Regularly carry out the conversion test (preferably every three months), to confirm that the product is in normal operation. Regularly remove the dust on the surface of the shell, and keep good insulation. Switches not used for a long time shall be protected from moisture and dust. Before use, they shall be manually or automatically commissioned, and only the normal switches can only be put into operation.

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