Shanghai Liangxin Electrical Co., Ltd.

(NDQ3H-400 Automatic Transfer Switching Equipment)

Product Specification

(IPD-ENG-DEV-T20 A1 2025-05-01)

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Revision History					
Version	Revision Reason/Content	Implementation Date	Prepared by	Reviewed by	Approved by
0	New addition	2017-03-06	Zhong Yunpan	Jia Jianping	Shi Wei
1	Change the product model from NDQ3A to NDQ3H	2017-04-20	Zhong Yunpan	Jia Jianping	Shi Wei
2	Change the parameters of life	2017-06-20	Zhong Yunpan	Jia Jianping	Shi Wei
3	Add controller functions	2017-06-28	Zhong Yunpan	Jia Jianping	Shi Wei
4	Add controller type D(LCD)	2018-10-10	Feng Daijun	Liu Qinglu	Shi Wei
5	Translation reproofed	2025-05-01	Zhong Linger	Cao Xuehu	Zhang Huifeng

1. Applicable Scope and Purpose

The PC-grade NDQ3H-125 ATSE is applicable for sites with the AC voltage below 400V and the rated frequency of 50Hz/60Hz. It complies with national standards: GB14048.1-2012, GB/T14048.11-2016, international standards: IEC60947-1, IEC609147-6-1. This product also complies with the 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 Pictures (For Reference Only)

Integral

Split

3. Specification and Model Description

ND	Q	3H				/				
1	2	3	4	5	6		7	8	9	10

Table 1 Specification and Model Description

SN	SN Description	NDQ3H
1	Enterprise code	ND Nader
2	Product code	Q ATSE
3	Design number	3H
4	Rated current of shell frame	400
5	Controller type	A: Basic type B: Advanced type C: Communication type D: Intelligent LCD type Empty: Pure mechanism
6	Rated operating current	315, 350, 400
7	Number of poles	2 - 2P, 3 - 3P, 4 - 4P, N3 - 4 poles with overlapped conversion of neutral line
8	Structural type [1]	Z-integral type, F-split type
9	Switch position	II- two-segment III- three-segment
10	Function features [2]	Non-marked - nil, SF - dual-position padlock

Notes: 1. If a manually-operated changeover switch of pure mechanical type is needed, the controller type should be blank and the structural type must be split.

2. SF-dual-position padlock is limited to III products only. Both integral and split types are available.

4. Main Technical Parameters

Table 2 Technical Parameters

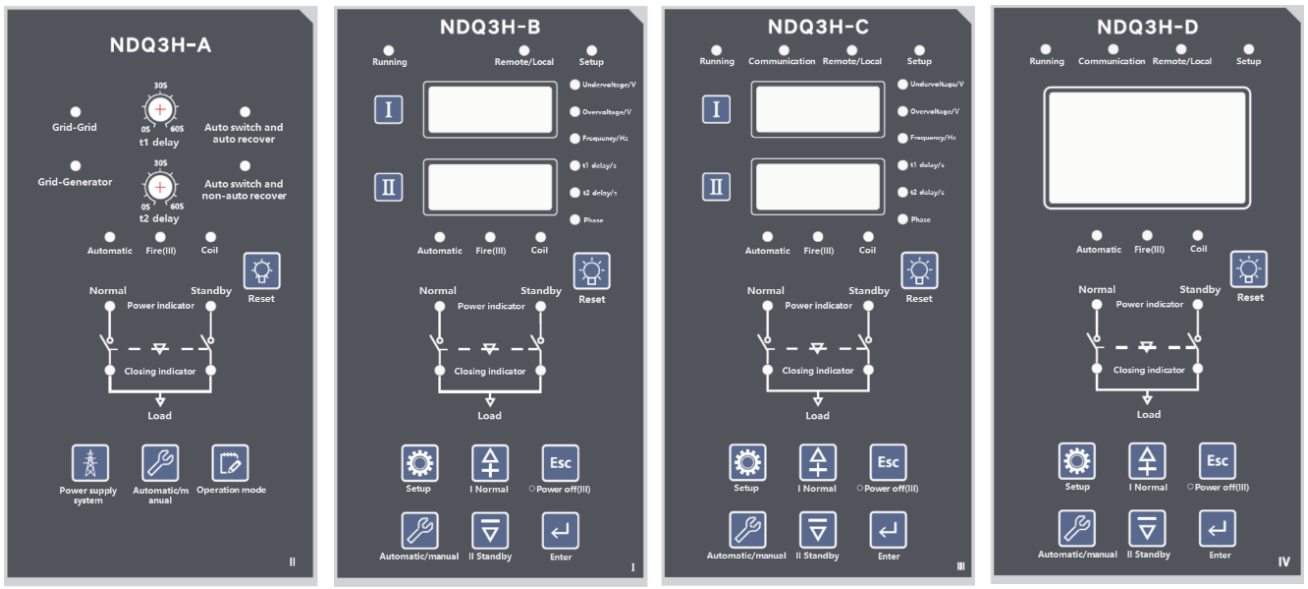
Rated operating voltage, Ue		AC230V(2P) AC400V(3P, 4P, N3)
Rated frequency, f		50/60Hz
Rated insulation voltage, Ui		AC800V
Rated impulse withstand voltage, Uimp		8kV
Utilization category		AC-33iA/AC-33B
Product protection class		IP30 (except terminals)
Rated short-circuit making capacity, Icm (peak value)		17kA
Rated short-time withstand current, Icw		10kA/30ms
Rated limiting short-circuit current, lq		120kA
Contact changeover time	Conventional type	II：≤75ms III：≤110ms
	Quick-changeover type [1]	II：≤50ms III：≤60ms
Switching action time	Conventional type	II：≤270ms III：≤300ms
	Quick-changeover type [1]	II：≤100ms III：≤100ms
Mechanical life		20000 times
Electrical life [2]		6000 times

Notes: [1] The quick-changeover type should be noted when placing an order if it is required.

[2] Maximum expected maintainable value.

5. Controller Model and Function

5.1 Controller model



Type A **Type B** **Type C** **Type D**

5.2 Controller functions

Table 3 Detailed controller functions

Function description		Type A controller	Type B controller	Type C controller	Type D controller
Protection function	Overvoltage protection	√	√	√	√
	Undervoltage protection	√	√	√	√
	Open-phase protection	√	√	√	√
	Overfrequency protection	-	√	√	√
	Underfrequency protection	-	√	√	√
	Broadband protection	-	▽	▽	▽
	DC component detection (broken zero line detection)	-	▽	▽	▽
	DC input protection	√	√	√	√
	Phase sequence/phase protection	-	√	√	√
	Wrong wiring alarm	√	√	√	√
Measuring function	Voltage value	-	√	√	√
	Frequency value	-	√	√	√
	Variable frequency sampling	√	√	√	√
	Unbalancedness	-	√	√	√
Communication function	MODBUS-RTU protocol	-	-	√	√
Short-circuit fault locking	short-circuit failure to operate	-	▽	▽	▽
Node input/output	Fire signal Input	√	√	√	√
	Normal closing output	√	√	√	√
	Standby closing output	√	√	√	√
	Generator starting output	√	√	√	√
	Fault alarm output	√	√	√	√
	Communication port	-	-	√	√
	Remote switching control input	-	√	√	√
	Programmable port output	Generator/unload	√	√	√
Display	Normal power indicator (LED)	√	√	√	√

	Standby power indicator (LED)	√	√	√	√
	Normal closing indicator (LED)	√	√	√	√
	Standby closing indicator (LED)	√	√	√	√
	Automatic (LED) [1]	√	√	√	√
	Setup (LED)	-	√	√	-
	Fault (LED)	-	-	-	√
	Running (LED)	-	√	√	√
	Coil (LED)	√	√	√	√
	Fire (III) (LED)	√	√	√	√
	Communication (LED)	-	-	√	√
	Frequency (LED)	-	√	√	-
	Remote/Local (LED)	-	√	√	√
	Phase (LED)	-	√	√	-
	Undervoltage (LED)	-	√	√	-
	Overvoltage (LED)	-	√	√	-
	Auto switch and auto recover (LED)	√	-	-	-
	Auto switch and non-auto recover (LED)	√	-	-	-
	Grid - Grid (LED)	√	-	-	-
	Grid - Generator (LED)	√	-	-	-
	Phase voltage fault warning message [2]	-	√	√	√
	7-segment digital tube	-	√	√	-
	LCD screen	-	-	-	√
Power supply mode selection	Grid - Grid [3]	√	√	√	√
	Grid - Generator	√	√	√	√
Operation mode selection	Auto switch and auto recover	√	√	√	√
	Auto switch and non-auto recover (as mutual backup)	√	√	√	√

Power priority	Normal with priority	▽	▽	▽	√
	Standby with priority	▽	▽	▽	√
Delay adjustment	Opening/transfer delay (t1)	0~60s adjustable	0~6000s adjustable	0~6000s adjustable	0~6000s adjustable
	Closing/Return Delay (t2)	0~60s adjustable	0~6000s adjustable	0~6000s adjustable	0~6000s adjustable
	Generator stop Delay	-	0~6000s adjustable	0~6000s adjustable	0~6000s adjustable
	Generator startup delay	▽	0~6000s adjustable	0~6000s adjustable	0~6000s adjustable
Voltage protection Threshold	Undervoltage value	187V	(0.7~0.95)×230V adjustable		
	Overvoltage value	264V	(1.05~1.3)×230V adjustable		
Keys	Automatic/manual	√	√	√	√
	I Normal/△	-	√	√	√
	Setup	-	√	√	√
	II Standby/▽	-	√	√	√
	Reset	√	√	√	√
	○Power Off (III)/Esc	-	√	√	√
	Enter	-	√	√	√
	Power supply system	√	-	-	-
	Operation mode	√	-	-	-
Other	Remote switching function	-	√	√	√
	Rated frequency selection	-	√	√	√
	Buzzer	√	√	√	√
	III/II optional function	▽	▽	▽	▽
	Two-pole switch	-	▽	▽	▽
	Dual-Split Enable [3]	-	-	-	▽
	Overvoltage and undervoltage return difference	-	-	-	▽
	Generator automatic inspection	-	-	√	√
	Clear fault record	-	-	-	▽
	Clear operation history	-	-	-	▽
	Normal A-phase voltage coefficient	-	-	-	▽

	Normal B-phase voltage coefficient	-	-	-	▽
	Normal C-phase voltage coefficient	-	-	-	▽
	Standby A-phase voltage coefficient	-	-	-	▽
	Standby B-phase voltage coefficient	-	-	-	▽
	Standby C-phase voltage coefficient	-	-	-	▽
	Calibrate voltage value	-	-	-	▽

"√" indicates that the function is available; "▽" indicates that it is adjustable inside the company; "-" indicates that the function is not available.

Notes:

[1]: If choosing III-segment product with SF-dual-split position padlock, the automatic LED light on the controller will be red with 5Hz fast flash after pulling out the padlock handle.

[2]: The type-B controller provides the phase voltage alarm information, type-C provides the communication query of phase voltage alarm information, and type-D provides the communication query and panel display phase voltage alarm information.

[3]: When the type-A controller is chosen with "grid-generator" as the power supply mode, the controller automatically detects whether the frequency of the standby power source (generator) reaches the normal operating range of 45 Hz to 55 Hz.

[4]: If the dual-split enable function is turned on, when the standard and standby power supply fail at the same time, the automatic transfer switch will switch to the dual-split position. If the dual-split enable function is turned off, when the normal 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

6.1.1 Ambient air temperature

The upper limit of the ambient air temperature does not exceed +70°C and the lower limit does not fall below -25°C.

6.1.2 Altitude

The altitude of the installation site does not exceed 2000m, it should be reduced capacity to use in case of being over 2000m, with the details in the altitude reduction coefficient table.

Table 4 Altitude reduction table

Project	Symbols	Unit	Parameters			
Altitude	H	m	≤2000	3000	4000	5000
Rated operating voltage	Ue	V	400	400	400	400
Power frequency withstand voltage	/	V	3500	3150	2500	2100
Rated current	In	A	1.0In	0.96In	0.93In	0.90In

6.1.3 Atmospheric conditions

- Humidity: when the highest temperature is +40°C, 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.

● Class of pollution: 3.

6.2 Installation conditions

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

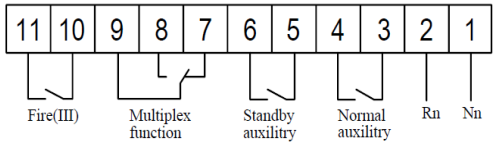
● The product should be installed in places that are free from explosive media, media corrosive to metal, insulation damaging gas, and conductive dust.

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

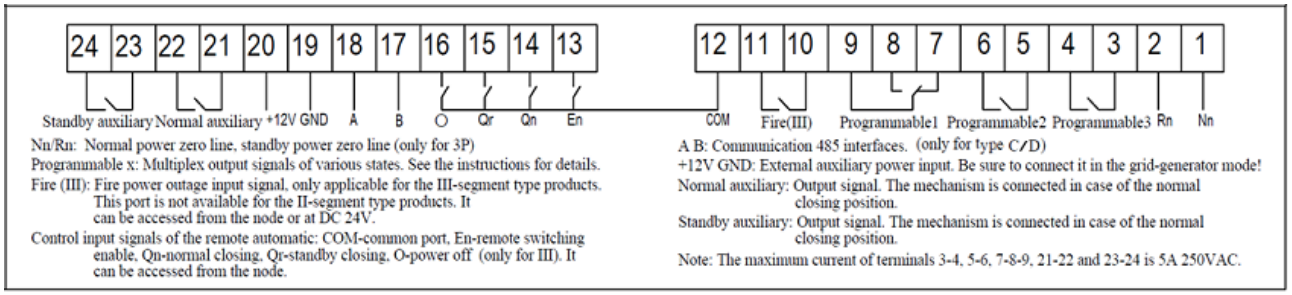
7. Definition of External Interfaces

7.1 Definition of Secondary Output Terminals for Type A Controllers

Nn / Rn : Normal power zero line, standby power zero line (only for 3P)
Normal auxiliary : Output signal. The mechanism is connected in case of the normal closing position.
Standby auxiliary : Output signal. The mechanism is connected in case of the standby closing position.
Multiplex function: Output signal. In the grid-grid mode, it gives fault alarms of mechanism switchover, position feedback and error wiring. In case of no fault, 7 and 9 are connected; otherwise, 8 and 9 are connected. In the grid-generator mode, it starts the generator or unloads the load. In case of no signal output, 8 and 9 are connected; otherwise, 7 and 9 are connected.
Fire (III) : Fire power outage input signal, only applicable for the III-segment type products. This port is not available for the II-segment type products. It can be accessed from the node or at DC 24V.
Note : The maximum current of terminals 3-4, 5-6 and 7-8-9 is 5A 250VAC.



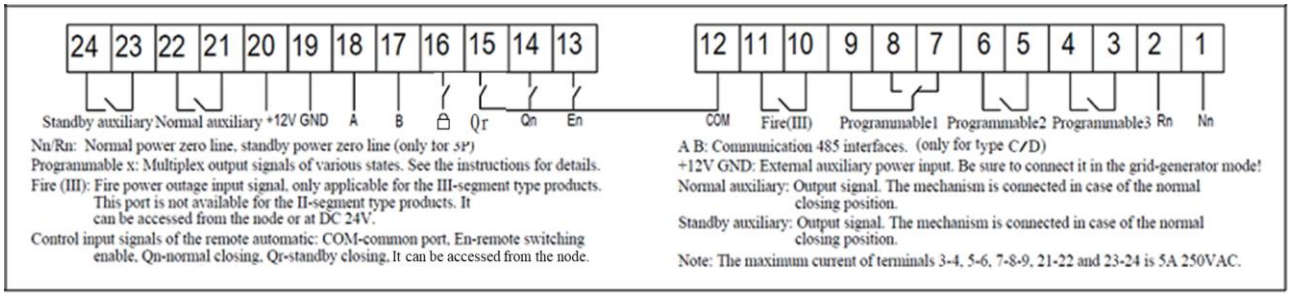
7.2 Definition of secondary output terminals for Type B, C and D controllers (conventional)



Nn/Rn: Normal power zero line, standby power zero line (only for 3P)
Programmable x: Multiplex output signals of various states. See the instructions for details.
Fire (III): Fire power outage input signal, only applicable for the III-segment type products. This port is not available for the II-segment type products. It can be accessed from the node or at DC 24V.
Control input signals of the remote automatic: COM-common port, En-remote switching enable, Qn-normal closing, Qr-standby closing, O-power off (only for III). It can be accessed from the node.

A B: Communication 485 interfaces. (only for type C/D)
+12V GND: External auxiliary power input. Be sure to connect it in the grid-generator mode!
Normal auxiliary: Output signal. The mechanism is connected in case of the normal closing position.
Standby auxiliary: Output signal. The mechanism is connected in case of the normal closing position.
Note: The maximum current of terminals 3-4, 5-6, 7-8-9, 21-22 and 23-24 is 5A 250VAC.

7.3 Definition of secondary output terminals for Type B, C and D controllers (short-circuit fault lockout, and supply with special evaluation)



Nn/Rn: Normal power zero line, standby power zero line (only for 3P)
Programmable x: Multiplex output signals of various states. See the instructions for details.
Fire (III): Fire power outage input signal, only applicable for the III-segment type products. This port is not available for the II-segment type products. It can be accessed from the node or at DC 24V.
Control input signals of the remote automatic: COM-common port, En-remote switching enable, Qn-normal closing, Qr-standby closing. It can be accessed from the node.

A B: Communication 485 interfaces. (only for type C/D)
+12V GND: External auxiliary power input. Be sure to connect it in the grid-generator mode!
Normal auxiliary: Output signal. The mechanism is connected in case of the normal closing position.
Standby auxiliary: Output signal. The mechanism is connected in case of the normal closing position.
Note: The maximum current of terminals 3-4, 5-6, 7-8-9, 21-22 and 23-24 is 5A 250VAC.

Note: 12 and 16 represent short-circuit fault locking signals, with passive access of dry contact, being long-pass valid, and the

product will refuse to move upon receiving the signal.

7.4 Functions of programmable port output

Table 5 Programmable port definition

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	

Note: In "Grid-generator", programmable output 1 is fixed as generator/unloading.

8. Outline and Installation Dimensions of the products

8.1 External Dimensions and Mounting Dimensions of Integral Switches

The external dimensions and mounting dimensions parameters of the integral switch are shown in Figure 1 and Table 6.

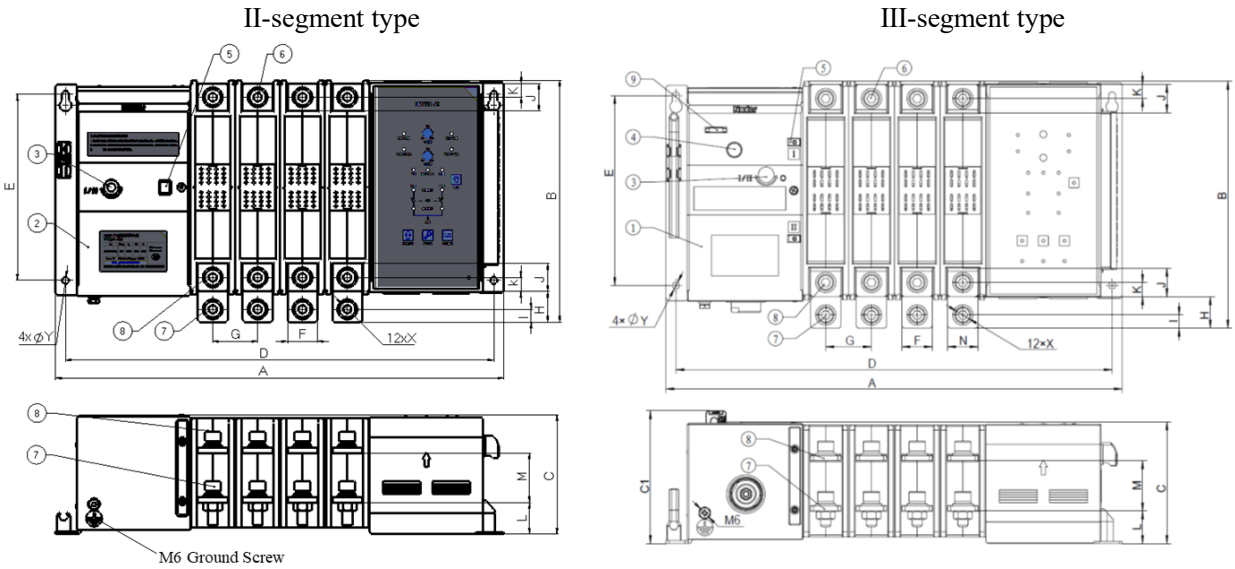


Fig. 1 External Dimensions and Installation Dimensions of the Integral Switch

①III-segment switch body ②II-segment switch body ③Manual rotation axis ④III-segment guide button ⑤Switch position indicator plate ⑥Main line connection terminal on the common power supply side ⑦Main line connection terminal on the load side ⑧Main line terminal on the backup power supply side ⑨Padlock handle (for III SF dual-split position padlock products only, pull-up padlock, **not available for conventional products**)

Table 6 Outline and Mounting Dimensions of Integral Switch

Number of poles	External Dimensions (mm)				Installation Dimensions (mm)			Other dimension (mm)									
	Length A	Width B	Height C	C1	Length D	Width E	Φ Y	F	G	H	I	J	K	L	M	X	N
2P	359.5	243	120	130.7	339.5	187	7	30	45	31	13	28	14	31.8	49.8	Φ10.5	30
3P	404.5	243	120	130.7	384.5	187	7	30	45	31	13	28	14	31.8	49.8	Φ10.5	30
4P	449.5	243	120	130.7	429.5	187	7	30	45	31	13	28	14	31.8	49.8	Φ10.5	30
N3	449.5	243	120	130.7	429.5	187	7	30	45	31	13	28	14	31.8	49.8	Φ10.5	30

Notes: 1. C1 is the height of the padlock after pulling out the padlock for III-segment SF dual-split position padlock products, **regular III products and II products are not available**;

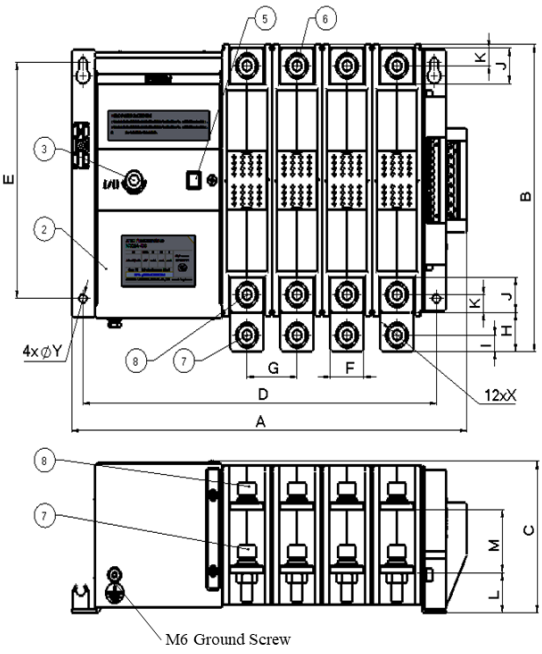
2. For outline and installation dimensions, the limit deviation not indicated with the tolerance dimensions shall follow the regulations of GB/T 1804-C;

3. Type N3 products have an X dimension of 3×M8 for the N phase, and M6 for the regular.

8.2 External dimensions and mounting dimensions of split switches

See Fig. 2 for the outline of the split switching mechanism body; see Table 7 for parameters of the external dimensions and installation dimensions of the mechanism body; see Fig. 3 for the dimensions of Type A/B/C/D split controllers.

II-segment type



III-segment type

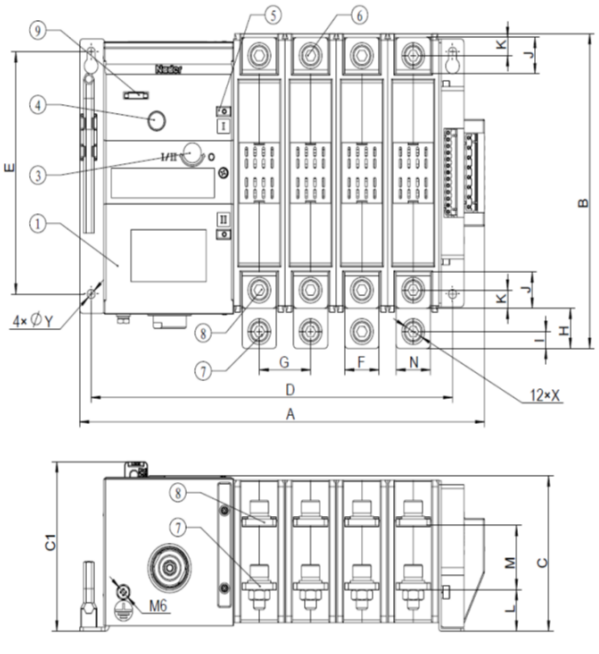


Fig. 2 External dimensions and mounting dimensions of the split switching mechanism body

①III-segment switch body ②II-segment switch body ③Manual rotation axis ④III-segment guide button
⑤Switch position indicator plate ⑥Main line connection terminal on the common power supply side
⑦Main line connection terminal on the load side ⑧Main line terminal on the backup power supply side
⑨Padlock handle (for III SF dual-split position padlock products only, pull-up padlock, **not available for conventional products**)

Table 7 Outline and mounting dimensions of the split switching mechanism body

Number of poles	External Dimensions (mm)				Installation Dimensions (mm)			Other dimension (mm)									
	Length A	Width B	Height C	C1	Length D	Width E	Φ Y	F	G	H	I	J	K	L	M	X	N
2P	265	243	120	130.7	228	187	7	30	45	31	13	28	14	31.8	49.8	Φ10.5	30
3P	310	243	120	130.7	273	187	7	30	45	31	13	28	14	31.8	49.8	Φ10.5	30
4P	355	243	120	130.7	318	187	7	30	45	31	13	28	14	31.8	49.8	Φ10.5	30
N3	355	243	120	130.7	318	187	7	30	45	31	13	28	14	31.8	49.8	Φ10.5	30

Notes: 1. C1 is the height of the padlock after pulling out the padlock for III-segment SF dual-split position padlock products, **regular III products and II products are not available**;

2. For outline and installation dimensions, the limit deviation not indicated with the tolerance dimensions shall follow the regulations of GB/T 1804-C;

3. Type N3 products have an X dimension of 3×M8 for the N phase, and M6 for the regular.

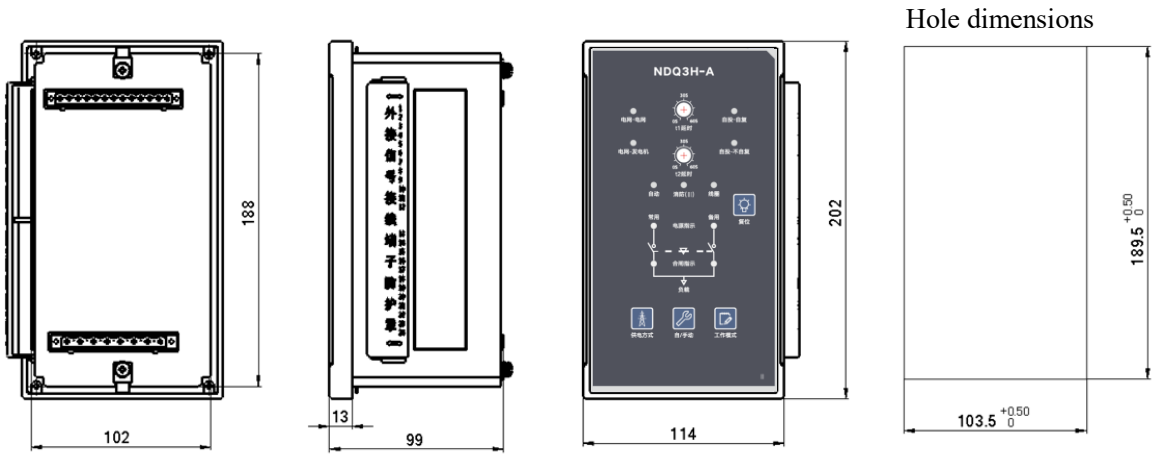


Fig. 3 Dimensions of Type A/B/C/D Split Controller

Note: The dimensions for Type A, B, C and D split controllers are the same, so only a size chart is attached here; the limit deviation of the unannotated tolerance dimensions is implemented according to GB/T 1804-C.

9. Installation Mode

The product is installed vertically and fixedly in the cabinet bearing the maximum slope with the vertical installation plane about ±22.5°.

For the installation and wiring torque details of the products, see the Table 8 below.

Table 8 Tightening torque of connection terminal screws

SN	Name	Specification	Torque (N.m)
1	Mounting screws	M6	4
2	Wiring screw	M10	10
3	Secondary connection terminal screw of the controller	M2.5	0.6

10. Packaging and Storage

The product is covered with a waterproof plastic bag, lined with pearl cotton and put into a special packing box. The applicable transportation and storage temperature range of the product is from -55°C to +85°C. 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. List of Accessories and Installation

Table 9 Accessories List

SN	Name	Specification	Quantity
1	Cross hexagon head combination screw(s)	M6×16	4
2	Hexagon nut	M6	4
3	Terminal partition plate	--	2P:2; 3P:4; 4P/N3:6
4	Manual special handle	--	1

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

★ If the customer needs to carry out the insulation test of the electrical system with a megohmmeter or the like during use, the following scheme is available:

- **Remove all incoming and outgoing wires from this product to electrically isolate this product in the system;**
- **Only test the insulation to ground at each location, while the zero and PE wires must not be common;**
- **If the product is a split-type controller, the controller cable can be removed for testing.**