Shanghai Liangxin Electrical Co., Ltd.

NDW3Z Series of DC Air Circuit Breaker

Product Specification

（IPD-ENG-DEV-T22 A1 2016-09-23）

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0	Newly increased document	20210329	Wang Wanlu	Zhao Peng	Zhang Xiangang
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3					

Contents

Chapter 1 Product Overview

NDW3Z product series

NDW3Z-2500

NDW3Z-4000

See Table 1 for the basic technical parameters of the NDW3Z-2500 product：

Table 1

Circuit breaker		NDW3Z-2500		
Number of poles in series		2P, 3P, 4P		
Rated current In (A)		800、 1000、 1250、 1600、2000、2500		
Rated working voltage Ue （V）		DC500V/750V (2P, 3P)、 DC1000V/1500V (4P)		
Rated limit short-circuit breaking capacity Icu（kA） Note 1		500V DC	3P	2P
			65	50
		750V DC	3P	2P
			55	40
		1000V DC (4P)	50	
		1500V DC (4P)	40	
Rated operating short-circuit breaking capacity Ics（kA） Note 1		100%Icu		
Rated short circuit making capacity Icm（kA） Note 1		100%Icu		
Rated short-time withstand current Icw（kA）/1s Note 1		100%Icu		
Controller	NWK20Z Controller	●		
	NWK22Z Controller	●		
Installation mode	Fixed type	●		
	Drawout type	●		

Note 1: The time constant is 15ms.

See Table 2 for the basic technical parameters of the NDW3Z-4000 product：

Table 2

Circuit breaker		NDW3Z-4000		
Number of poles in series		3P、4P		
Rated current In (A)		1600、2000、2500、3200、3600、4000		
Rated working voltage Ue （V）		DC500V/750V (3P)、DC1000V/1500V (4P)		
Rated ultimate short-circuit breaking capacity Icu（kA） Note 1		Ue	Breaking type Note 2	
			S	H
		500V DC(3P)	80	120
		750V DC(3P)	65	80
		1000V DC (4P)	55	75
		1500V DC (4P)	50	60
Rated service short-circuit breaking capacity Ics（kA） Note 1		100%Icu		
Rated short-circuit making capacity Icm（kA） Note 1		100%Icu		
Rated short-time withstand current Icw（kA）/1s Note 1		100%Icu		
Controller	NWK20Z Controller	●		
	NWK22Z Controller	●		
Installation method	Fixed type	●		
	Drawout type	●		

Note 1: The time constant is 15ms.

Note 2: S means Conventional breaking level, H means High breaking level.

Chapter 2 Product Features

2.1 Design Features

2.1.1 The controllers are of full range and versatile

- NWK20Z type controller: Knob-type display, intuitive and simple interface, practical functions, which can adapt to the low-temperature places (-40℃~-25℃ambient)
- NWK22Z type controller: LCD display, multiple and diversified functions, with optional voltage and power measurement and protection functions, applicable to high-end application places, and more powerful if applied to intelligent system
- Measurement and protection: With current, voltage, power measurement and protection functions
- Current protection features: Multi-curve long-time delay protection, multi-curve short-time delay inverse time-limit protection, short-time delay fixed time-limit protection, short circuit transient protection, MCR protection
- Maintenance function: LED fault status indication, fault record (30 times) and query, historical current value record, alarm history query, fault tripping signal output, self-diagnosis function, simulated tripping test function, contact wear equivalent (alarm) query, operation times query, clock function (LCD type)
- With a remote reset device, realize remote recovery (optional accessories) after fault tripping of the controller

2.1.2 Integrated communication network

The NWK22Z type controller can realize remote sensing, remote control, remote regulating and remote communication - “four remotes” data transmission function through the communication interface (to be used with the communication adapter and signal unit).

With the communication adapter, realize the conversion of DeviceNet and Profibus-DP protocols for data transmission.

2.1.3 Convenient wiring mode

Either zero flashover or upper and lower wiring.

Wiring mode: Horizontal wiring, vertical wiring

2.1.4 High breaking

The design of the circuit breaker arc extinguishing chamber and contact system has a number of invention patents. It adopts the principle of narrow-slit, air-blast and magnetic arc extinguishing, optimizes the shape and arrangement mode of the arc extinguishing gate, increases the driving force of arc, reduces the resistance of arc entering the arc extinguishing chamber and improves the breaking ability of the product so as to meet the reliable arc extinguishing with the voltage below DC1500V. In

addition, it also optimizes the time for acquiring signal and giving command by the controller, and can greatly shorten the time when there is a large fault current.

2.1.5 Long service life

The body design adopts high strength DMC material, and has extremely high impact strength and insulating properties. The design of the arcing contact structure improves the electrical life of products; the greatly optimized design of the contact system and operating mechanism realizes compensation to the contact pressure, and improves the product reliability and short time tolerance ability with more strength of the metal structure.

2.1.6 Small size

The same frame product has the smallest phase spacing and a built-in shunt, which is conducive to reducing the size of the complete cabinet and making the product more beautiful.

2.1.7 Critical current

The first non-polar frame circuit breaker, which meets the critical DC current load at home and abroad, realizes the reliable arc-extinguishing in the full-current range, and can meet the PV2-grade isolation requirements.

2.1.8 Temperature measurement

The built-in temperature sensor is directly installed in the connection point position to detect temperature, and displays the temperature of the monitoring point directly through the LCD-type controller interface.

2.1.9 Multiple safety protection devices

It has drawout type circuit breaker door interlocking, drawout type triolocation locking and unlocking device and disconnected position key lock, connection terminal protective cover, closing ready device and other protection devices.

2.1.10 Multiple applications

NDW3Z-2500 has authorized by China lassification Society and got the Certification of Type Approval，which can be used for the ship.

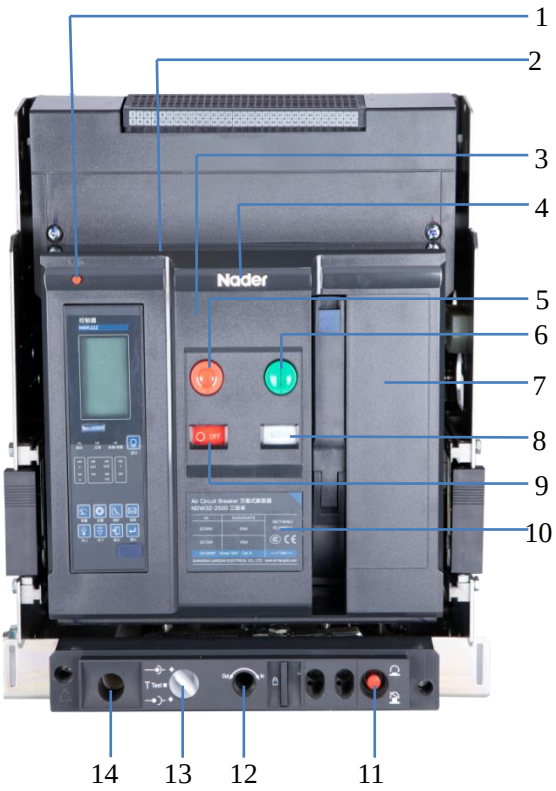
2.2 Structural features

2.2.1 Installation method

Fixed Type

Drawout Type

2.2.2 Brief description of structure and indications

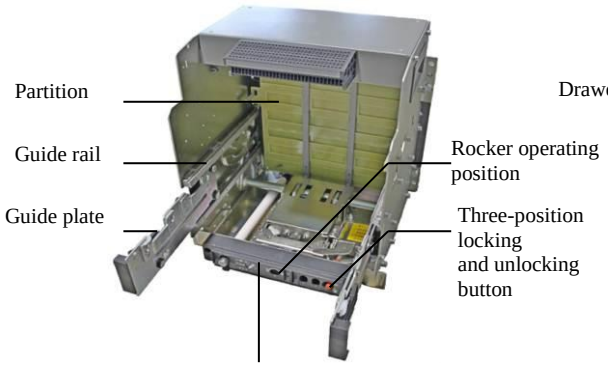


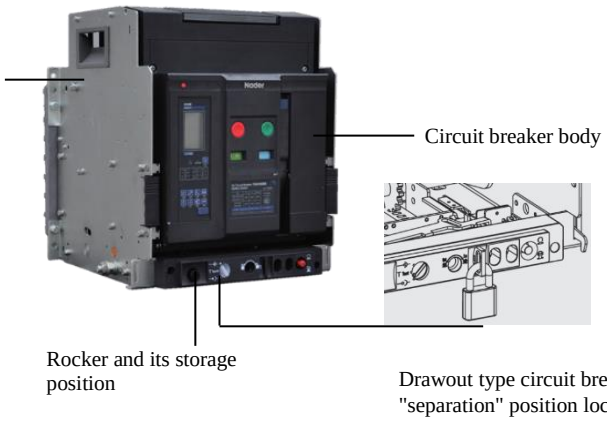
1. Reset button
2. Specification sign
3. Off-position key lock (optional function)
4. Nader sign
5. Disconnection button
6. Closing button
7. Counter (optional function)
8. Energy releasing and storing indicator
9. Opening and closing indication
10. Nameplate
11. “Connection”、“Test”、“Separation” position locking and unlocking device
12. Rocker operating position
13. “Connection”、“Test”、 “Separation” position indicator
14. Rocker and its storage position

Note: 1 ~ 10 is fixed type, while 1 ~ 14 is drawout type.

2.2.3 Drawout type circuit breaker structure

Drawout type circuit breaker is composed of the circuit breaker body and the drawer seat. The drawer seat has guide rails on both sides. There's guide plate on the guide rail. The circuit breaker itself is placed on the left and right guide plates. The drawout type circuit breaker connects to the main circuit by inserting the busbar on the circuit breaker into the bridge contact on the drawer seat.





◆ Drawout type circuit breaker "separation" position lock

At any position, when the rocker is not placed in the rocker working place, you can lock the rocker working place of draw-out circuit breaker through padlocks, and then the rocker cannot be inserted in the rocker working place, thus you cannot conduct the roll in or roll out operations. The padlock is prepared by users, and it is applicable to 1600 frame size draw-out products, with a lock beam diameter of 3mm to 5mm; and it is applicable to 2500 frame size and above draw-out products, with a lock beam diameter of 4mm to 8mm.

It is usually applied to the following occasions: When the draw-out product is in the separation place, and the rocker is not placed in the rocker working place, pull out the black pull rod at the bottom of drawer seat, and use the lock beam through the pull rod. Then you can only pull out the circuit breaker body and cannot roll it to “test” or “connection” places.

◆ Drawout type circuit breaker three-position lock（Standard configuration for drawer seat）

On the drawer seat, there’s “connection”, “test” and “separation” position status, which is indicated through an indicator.

When the rocker shakes, the circuit breaker will be locked respectively in these three positions, and unlocked only through the unlocking button (red).

2.3 Conforming Standards and Certification

GB14048.1-2012 Low-voltage Switchgear and Control Equipment - Part 1: General Principles (IEC 60947-1:2001, MOD)

GB14048.2-2020 Low-voltage Switchgear and Control Equipment - Part 2: Circuit Breaker (IEC 60947-2:2019, IDT)

GB/T 14048.7-2016 Low-voltage Switchgear and Control Equipment - Part 7-1: Ancillary Equipment - Terminal Blocks for Copper Conductors

GB/T 34581-2017 General Technical Requirements for Photovoltaic System DC Circuit Breakers

GB/T 2423.1-2008 Environmental Testing for Electric and Electronic Products - Part 2: Test Method Test A: Low Temperature

GB/T 2423.2-2008 Environmental Testing for Electric and Electronic Products - Part 2: Test Method Test B: High Temperature Test Method

GB/T 2423.4-2008 Environmental Testing for Electric and Electronic Products - Part 2: Test Method - Test Db: Alternating Thermal-humidity (12h + 12h Cycle)

GB/T 2423.18-2012 Environmental Testing for Electric and Electronic Products - Part 2: Test Method - Test Db: Alternating Thermal-humidity Salt Spray Test Product

GB/T 4207-2003 Methods for the Determination of the Proof and the Comparative Tracking Indices of Solid Insulating Materials

GB/T 4208-2008 Enclosure Protection Grade (IP Code)

GB/T26572-2016 Requirements of Concentration Limits for Certain Restricted Substances in Electrical and Electronic Products

GB/T4798.1-2005 Environmental Conditions Existing in the Application of Electric and Electronic Products - Part 1: Storage

GB/T4798.2-2008 Environmental Conditions Existing in the Application of Electric and Electronic Products - Part 1: Transportation

GB/T4857.5-1992 Package - Transportation Package - Drop Test Method

NDW3Z series DC air circuit breaker has obtained China Compulsory Certification (CCC) for products.

Chapter 3 Field of Application

The NDW3Z series DC air circuit breaker (hereinafter referred to as circuit breaker) can be applied to the distribution network with the rated DC current of 800A~4000A, the rated insulation voltage of DC1500V, the rated working voltage of DC500V/750V (2P in series, 3P in series) and DC1000V/1500V (4P in series), for distribution of electrical energy and protecting circuit and power equipment from overload, under-voltage, short circuit and harm of other faults; it also has a reliable isolating function. The circuit breaker has multiple protection functions. It can avoid unnecessary power failure while realizing highly accurate selective protection, and improve the reliability and security of the power supply system.

3.1 Working Environment

3.1.1 Ambient temperature

Applicable ambient temperature:

NWK22Z(LCD type): -25℃ ~ + 70℃, NWK20Z (knob type): -40℃ ~ + 70℃, the average temperature within 24 h shall not be more than +35℃.

If the environment temperature is higher than +40℃, the user needs to reduce the capacity, and the reduced capacity data is shown in Table 3.

Table 3

Ambient temperature		+40℃	+45℃	+50℃	+55℃	+60℃	+70℃
NDW3Z-2500	800A	800A	800A	800A	800A	800A	800A
	1000A	1000A	1000A	1000A	1000A	1000A	1000A
	1250A	1250A	1250A	1250A	1250A	1250A	1250A
	1600A	1600A	1600A	1600A	1600A	1600A	1600A
	2000A	2000A	2000A	2000A	2000A	2000A	2000A
	2500A	2500A	2500A	2500A	2350A	2200A	2100A
NDW3Z-4000	1600A	1600A	1600A	1600A	1600A	1600A	1600A
	2000A	2000A	2000A	2000A	2000A	2000A	2000A
	2500A	2500A	2500A	2500A	2500A	2500A	2500A
	3200A	3200A	3200A	3200A	3200A	3120A	2920A
	3600A	3600A	3600A	3560A	3400A	3120A	2920A
	4000A	4000A	3800A	3560A	3400A	3120A	2920A

Note: The above data is calculated according to the test and theory. The data represent only guidelines and recommendations.

3.1.2 Atmospheric environment conditions

When the ambient air temperature is +40℃, the relative humidity of atmosphere shall not be more than 50%. At low temperature, a higher relative humidity is allowed, for example, in case of +25℃, the relative humidity of atmosphere can be 90%. For condensation due to temperature change, dehumidification or corresponding measures should be taken.

3.1.3 Altitude

Altitude of the installation site shall not exceed 2,000 m.

If the altitude of the installation site is between 2,000 m to 5000m, it can be specially customized. For the working performance, refer to the correction value in the following table (Table4).

Table 4

Altitude	2000m	3000m	4000m	4500m	5000m
Power-frequency withstand voltage	3500V	3500V	3000V	2500V	2200V
Rated current	1.0In	0.93In	0.88In	0.85In	0.82In

3.2 Anti-corrosion Level

Salt mist: Severe Level 2

3.3 Pollution Level

Pollution level: Level 3

3.4 Shockproof Requirement

- ◆ The circuit breaker can ensure resistance to mechanical shock, and has passed the GB/T4798.3 standard test
- ◆ Amplitude: ±1.5mm (2Hz~9Hz)
- ◆ Constant acceleration: 5m/s^2 (9Hz~200Hz）
- ◆ Super strong shock may result in damage to the parts, and impact the reliable action of the circuit breaker

3.5 Electromagnetic Interference

The circuit breaker can resist the following electromagnetic interference:

- ◆ Overvoltage caused by electromagnetic interference
- ◆ Overvoltage due to aging of the distribution system or environmental interference
- ◆ Radio wave
- ◆ Electrostatic discharge

The circuit breaker has passed the electromagnetic compatibility (EMC) test stipulated by following standards:

- ◆ GB/T 14048.2-2020 Low-voltage Switchgear and Control Equipment - Part 2: Circuit Breaker - Appendix N

The above tests can ensure that the circuit breaker won't wrongly occur tripping.

3.6 Installation Conditions

With the vertical gradient of no more than 5°, the circuit breaker shall be installed under the environment condition without explosion danger, without conductive dust and without the possibility of corroding metal and damaging the insulation.

3.7 Installation Category

The circuit breaker's main circuit and undervoltage tripper coils, power transformer primary coil installation category is IV; the rest auxiliary circuit and control circuit installation category is III.

3.8 Protection Class

IP30 and IP40 (installed in a cubicle and equipped with protective doorframe)

3.9 Usage Category

Category B

3.10 Main Circuit Wiring Mode of the Circuit Breaker

Wiring method of the main circuit of the circuit breaker (Table 5), recommended use

Table 5

Frame size Inm (A)	Rated current In (A)	Bus Bars*per Terminal	
		Quantity	Size (mm)
2500	800	2	80×5
	1000	2	80×5
	1250	3	80×5
	1600	3	80×5
	2000	2	80×10
	2500	3	80×10
4000	1600	3	80×5
	2000	2	80×10
	2500	3	80×10
	3200	5	100×10
	3600	5	100×10
	4000	5	100×10

Note: 1. The Table indicates the bus bar specifications adopted when the circuit breaker is under the ambient environment temperature of +40℃ and the open wide installation under the heating condition meets the stipulation in GB14048.2. If the temperature is higher than +40℃, the quantity of copper bar should be increased, or the capacity should be reduced.

2. The above data is calculated according to the test and theory, and for reference only.

3. The maximum permissible temperature of the cencenter of copper bar's mouting holes is no more than+115℃.

4. The electrical gap of copper bar is ≥25mm with the altitude more than 5, 000m and relative humidity more than 90%; the electrical gap shall be adjusted according to the relevant standards.

3.11 Power Loss of the Incoming and Outgoing Lines of the Circuit Breaker

The power loss of the incoming and outgoing lines of the circuit breaker (ambient temperature +40℃) is as shown in Table 6:

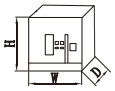
Table 6

Model	Power loss of the fixed type	Power loss of the drawout type
NDW3Z-2500	≤356 W	≤823W
NDW3Z-4000	⩽486.7W	⩽856.8W

Chapter 4 Technical Characteristics

4.1 NDW3Z-2500 Technical Parameters List

Table 7

Circuit breaker model		NDW3Z-2500		
Rated current In (+50℃) (A)		800, 1000, 1250, 1600, 2000, 2500		
Rated working voltage Ue (V)		DC500/750 (2P, 3P), DC1000/1500 (4P)		
Rated insulation voltage Ui (V)		1500		
Rated impulse withstand voltage Uimp (kV)		12		
Number of poles in series		2, 3, 4		
Full break time (ms)Note 1		≤30		
Closing time (ms)Note 2		≤70		
Rated ultimate short-circuit breaking capacity IcuNote 3 (kA)		500V DC	3P	2P
			65	50
		750V DC	3P	2P
			55	40
		1000V DC (4P)	50	
		1500V DC (4P)	40	
Rated service short-circuit breaking capacity IcsNote 3(kA)		100% Icu		
Rated short-circuit making capacity IcmNote 3 (kA)		100%Icu		
Rated short time withstand current Icw/1s Note 3(kA)		100% Icu		
Operating performance	Electrical life (times)	1500V DC（4P）	1000V DC（4P）	
	Operation frequency (20 times/h)	2000	7000	
	Mechanical life (times)	Maintenance-free	With maintenance	
	Operation frequency (60 times/h)	10000	15000	
Installation method		Fixed type, drawout type		
Wiring method of the main circuit		Horizontal wiring, vertical wiring		
Boundary dimension: W×D×H（mm） 	Fixed type 2P /3P	368×309.5×394		
	Fixed type 4P	463×309.5×394		
	Drawout type 2P /3P	375×400×432		
	Drawout type 4P	470×400×432		
Weight (kg)	Fixed type 2P	47.4 (800A～1250A)	48 (1600A～2500A)	
	Fixed type 3P	55 (800A~1250A)	55.6 (1600A～2500A)	
	Fixed type 4P	72.7 (800A～1250A)	73.5 (1600A～2500A)	
	Drawout type 2P	85.1 (800A～1250A)	85.4 (1600A～2500A)	
	Drawout type 3P	92.7 (800A～1250A)	93 (1600A～2500A)	
	Drawout type 4P	117.4 (800A～1250A)	117.9 (1600A～2500A)	

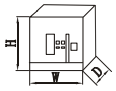
Note: 1. Full break time: Interval from the beginning of the circuit breaker disconnection to the end of the arcing time;

2. Closing time: Interval from the beginning of the circuit breaker closing to the end of the contact time for all pole contacts;

3. The time constant is 15ms.

4.2 NDW3Z-4000 Technical Parameters List

Table 8

<table>
<tr><td colspan="2">Circuit breaker model</td><td colspan="3">NDW3Z-4000</td></tr>
<tr><td colspan="2">Rated current In (+40℃) (A)</td><td colspan="3">1600、2000、2500、3200、3600、4000</td></tr>
<tr><td colspan="2">Rated working voltage Ue (V)</td><td colspan="3">DC500/750 (3P), DC1000/1500 (4P)</td></tr>
<tr><td colspan="2">Rated insulation voltage Ui (V)</td><td colspan="3">1500</td></tr>
<tr><td colspan="2">Rated impulse withstand voltage Uimp (kV)</td><td colspan="3">12</td></tr>
<tr><td colspan="2">Number of poles in series</td><td colspan="3">3、4</td></tr>
<tr><td colspan="2">Full break time (ms)Note 1</td><td colspan="3">≤30</td></tr>
<tr><td colspan="2">Closing time (ms)Note 2</td><td colspan="3">≤70</td></tr>
<tr><td colspan="2" rowspan="5">Rated ultimate short-circuit breaking capacity IcuNote 3 (kA)</td><td rowspan="2">Ue</td><td colspan="2">Breaking type</td></tr>
<tr><td>S</td><td>H</td></tr>
<tr><td>500V DC(3P)</td><td>80</td><td>120</td></tr>
<tr><td>750V DC(3P)</td><td>65</td><td>80</td></tr>
<tr><td>1000V DC (4P)</td><td>55</td><td>75</td></tr>
<tr><td>1500V DC (4P)</td><td>50</td><td>60</td></tr>
<tr><td colspan="2">Rated service short-circuit breaking capacity Ics Note 3(kA)</td><td colspan="3">100% Icu</td></tr>
<tr><td colspan="2">Rated short-circuit making capacity IcmNote 3 (kA)</td><td colspan="3">100%Icu</td></tr>
<tr><td colspan="2">Rated short time withstand current Icw/1s Note 3(kA)</td><td colspan="3">100% Icu</td></tr>
<tr><td rowspan="4">Operating performance</td><td rowspan="2">Electrical life (times)
Operation frequency (10 times/h)</td><td>1500V DC（4P）</td><td colspan="2">750V DC（3P）</td></tr>
<tr><td>2000</td><td colspan="2">10000</td></tr>
<tr><td rowspan="2">Mechanical life (times)
Operation frequency (60 times/h)</td><td>Maintenance-free</td><td colspan="2">With maintenance</td></tr>
<tr><td>13000</td><td colspan="2">15000</td></tr>
<tr><td colspan="2">Installation method</td><td colspan="3">Fixed type, drawout type</td></tr>
<tr><td colspan="2">Wiring method of the main circuit</td><td colspan="3">Horizontal wiring, vertical wiring</td></tr>
<tr><td colspan="2" rowspan="4">Boundary dimension: W×D×H（mm）
  </td><td>Fixed type 3P</td><td colspan="2">428×300×393.5</td></tr>
<tr><td>Fixed type 4P</td><td colspan="2">463×300×393.5</td></tr>
<tr><td>Drawout type3P</td><td colspan="2">435×401×432</td></tr>
<tr><td>Drawout type 4P</td><td colspan="2">550×401×432</td></tr>
<tr><td colspan="2" rowspan="4">Weight (kg)</td><td>Fixed type 3P</td><td>62 (1600A~2500A)</td><td>67.5 (3200A～4000A)</td></tr>
<tr><td>Fixed type 4P</td><td>80 (1600A～2500A)</td><td>89 (3200A～4000A)</td></tr>
<tr><td>Drawout type 3P</td><td>100 (1600A~2500A)</td><td>110.5 (3200A～4000A)</td></tr>
<tr><td>Drawout type 4P</td><td>124(1600A~2500A)</td><td>138.5 (3200A～4000A)</td></tr>
</table>

Note: 1. Full break time: Interval from the beginning of the circuit breaker disconnection to the end of the arcing time;

2. Closing time: Interval from the beginning of the circuit breaker closing to the end of the contact time for all pole contacts;

3. The time constant is 15ms.

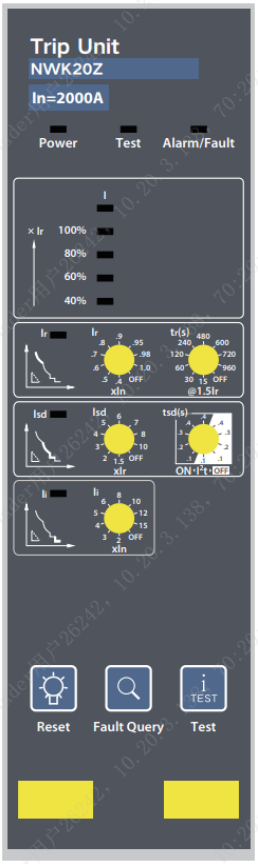
4.3 Controller

Controller is one of the main components of the circuit breaker, which can provide the function of protecting the overload, short circuit, overvoltage, undervoltage, and other failures, and realize reasonable operation of the power grid through the required value protection, regional interlocking and other functions. Controller has the function of measuring the current, voltage, power, electric energy, required value and other power grid parameters; and the function of recording the fault, alarm, operation, maximum historical current, contact wear and other operating maintenance parameters. When the power network is carrying on communication network, the controller can realize the remote sensing, remote communication, remote control and remote regulating at the remote terminal of the electric power automation network.

4.3.1 Type of controller

See Table9 for the type of controller:

Table 9

Controller type	Knob type	LCD type
Model	NWK20Z	NWK22Z
controller Pictures		

4.3.2 Controller functions

Table 10

Functional items		NWK20Z	NWK22Z	NWK22Z/V	NWK22Z/P
Display interface	LCD panel symbols and graphics display in Chinese	—	√	√	√
	Dial switch	√	—	—	—
Protection function	Overload long-time delay protection	Single	Multiple	Multiple	Multiple
	Overload thermal memory	√	√	√	√
	Overload pre-alarm/alarm output	—	√/▲	√/▲	√/▲
	Short circuit short-time delay protection	√	√	√	√
	Short-time delay thermal memory	√	√	√	√
	Short circuit instantaneous protection	√	√	√	√
	MCR	√	√	√	√
	Undervoltage protection /alarm/alarm output	—	—	√/√/▲	√/√/▲
	Overvoltage protection /alarm/alarm output	—	—	√/√/▲	√/√/▲
	Regional selective interlocking	—	▲	▲	▲
Measuring function	Current measurement	√	√	√	√
	Maximum current measurement	—	√	√	√
	Voltage	—	—	√	√
	Required value measurement (current)	—	—	√	√
	Required value measurement (power)	—	—	—	√
	Power measurement	—	—	—	√
	Electric energy measurement	—	—	—	√
Maintenance function	LED fault status indication	√	√	√	√
	Fault record and query	Once[Note 2]	30 times	30 times	30 times
	Alarm history query	—	√	√	√
	Self-diagnostic function	√	√	√	√
	Simulating tripping test function	√	√	√	√
	Contact wear equivalent (alarm) query	—	√	√	√
	Query of number of operations	—	√	√	√
	Clock function	—	√	√	√
Other	Remote reset of controller	▲	▲	▲	▲
	Signal unit	—	▲	▲	▲
	RS485 communication	▲	▲	▲	▲

Note: ①. "√" represents with this function, "▲" represents optional function for users, and "-" represents without this function;

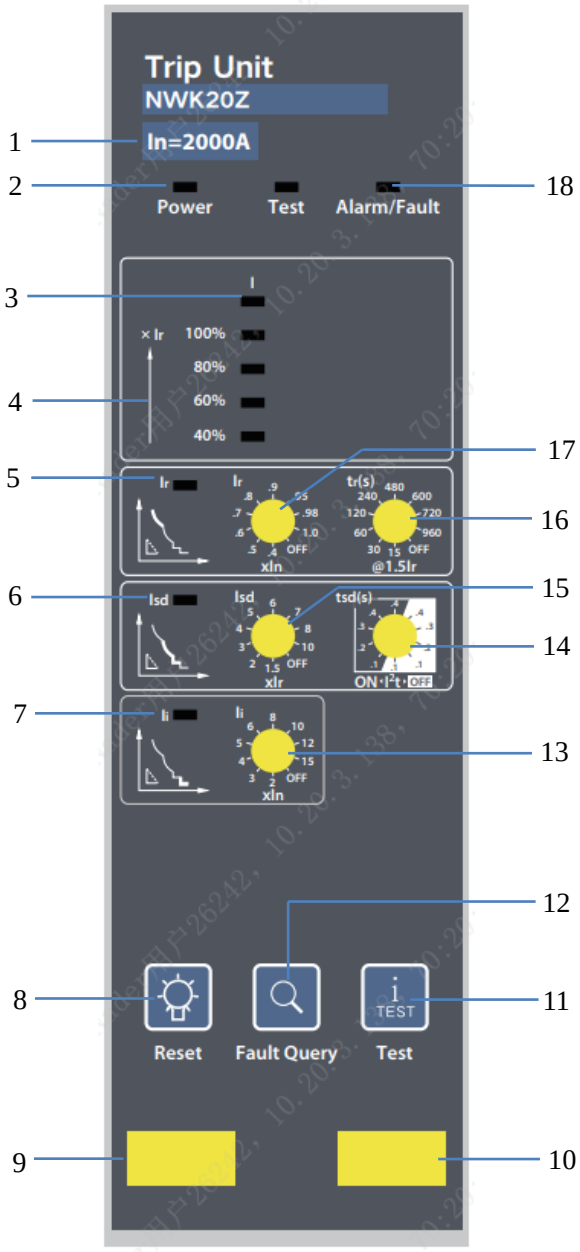
②. The controller with “V”and “P” functions is applicable for the main circuit rated voltage of DC500V and below;

③. The controller with “V” and “P” functions is optional for the conventional controller.

Note 2: Query through communication, 30 times

4.3.3 Introduction of controller

1) NWK20Z controller, as shown in Figure 1



1. Rated current sign
2. Normal operation indicator lamp and test indicator lamp in turn
3. Current overload indicator
4. Current indicator column
5. Long-time delay fault indicator lamp
6. Short-time delay fault indicator lamp
7. Snap action fault indicator lamp
8. "Reset" button
9. Reserved hole
10. Test interface
11. "Test" button
12. "Fault query" button
13. Snap action protection current setting knob
14. Short-time delay protection time setting knob
15. Short-time delay protection current setting knob
16. Long-time delay protection time setting knob
17. Long-time delay protection current setting knob
18. Fault/alarm indicator

Figure 1

2) NWK22Z type controller, as shown in Figure 2

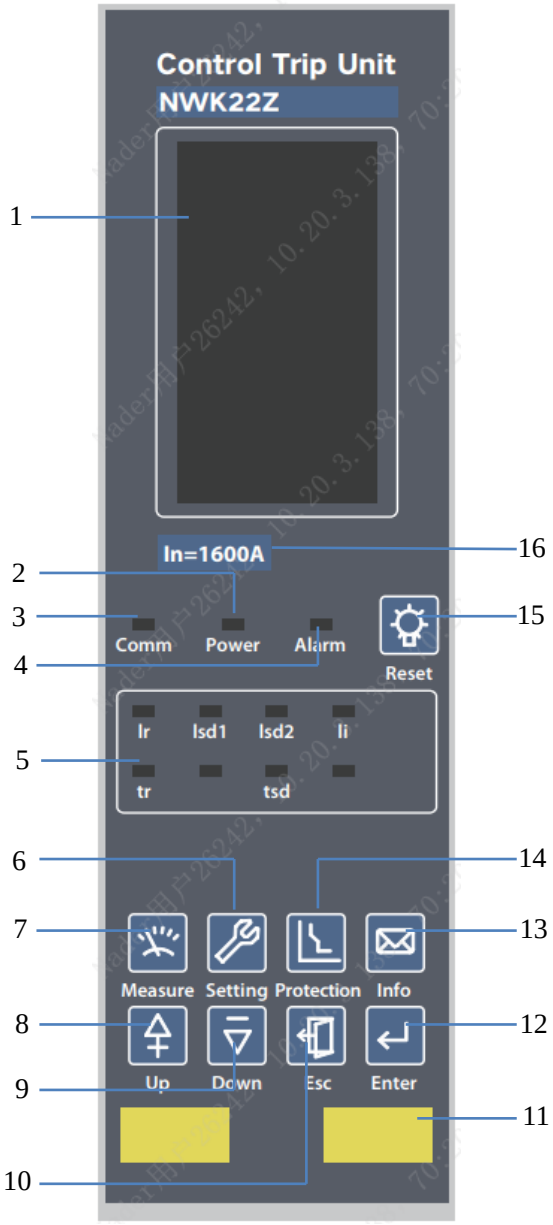


Figure 2

1. LCD interface display
2. “Normal” indicator (LED):the green LED always flashes as long as the controller is turned on and works properly.
3. ‘Communication’ indicator (LED): It flashes during the communication connection.
4. ‘Fault/Alarm’ indicator (LED): During normal operation, LED is not on;in case of fault tripping, the red LED flashes; in case of an alarm, the red LED is always on.
5. Protection indicator lights area(LED): The corresponding upper LED flashes respectively from left to right to indicate the fault type in case of fault disconnection; for the protection parameter settings, the LED is always on to indicate the currently selected items.
6. “Setting” button: Switch to the topic menu of parameter settings.
7. “Measurement” button: Switch to the default topic menu of measurement.
8. “Up” button: Move the menu content up on the current option, or incrementally change the parameters.
9. “Down” button: Move the menu content down on the current option, or decrementally change theparameters.
10. “Exit” button: Exit the current option to the previous menu, or cancel the current parameter settings.
11. “Test Port”: Plugged into the portable power box or test unit.
12. “OK” button: Go to the next menu pointed by the specified item, or select and store parameters.
13. “Information” function button: Switch to the topic menu of history and maintenance.
14. “Protection ” function button: Switch to the topic menu of protection parameter settings.
15. Fault and alarm reset buttons
16. Rated current sign

4.3.4 Setting values and protective features of the controller

Setting Values and Protective Features of Controller

Overload long time-delay protection NWK20Z&NWK22Z												
Current setting value Ir	(0.4~1.0 or 1.25[Note]) In or OFF (OFF-Function off) Note: 1.0In in case of the power distribution protection; 1.25In in case of the generation protection.											
3 types of protection curve	1） Standard power distribution protection I^2t: tr= 2.25Tr/ N^2(factory default) generator protection I^2t (F): tr = 2.25Tr / N^2 2) Express inverse time limit (power distribution protection) EI(G)： t= 1.25 Tr / (N^2-1) 3) High-voltage fuse compatible HV: t = 4.0625 Tr / (N^4-1) N= I/ Ir I—Fault current tr—Long time-delay action time Ir—Long time-delay setting current Tr—Long time-delay setting time Description: NWK20Z controller has only standard power distribution protection I^2t; NWK22Z controller provides 3 types of protection curves.											
Standard power distribution protection I^2t Time setting value T_R (@ 1.5 Ir)	NWK20Z: 15s, 30s, 60s, 120s, 240s, 480s, 600s, 720s, 960s, OFF (overload alarm non-tripping)											
	NWK22Z: 15s, 30s, 60s, 120s, 240s, 360s, 480s, 600s, 720s, 840s, 960s											
Tripping time tr (s) (Accuracy of ±10%)	1.5Ir	15	30	60	120	240	360	480	600	720	840	960
	2.0 Ir	8.44	16.88	33.75	67.5	135	202.5	270	337.5	405	472.5	540
	6.0 Ir	0.94	1.88	3.75	7.5	15	22.5	30	37.5	45	52.5	60
	7.2 Ir	0.65	1.30	2.60	5.21	10.4	15.6	20.8	26	31.3	36.5	41.7
Protection curve type	NWK22Z: See the table below for the overload long-time delay protection action delay time of C1~C16											
Protective features (accuracy of ±10%) Inherent absolute error ±40ms	Current (I/Ir)	Tripping time										
	≤1.05	> 2h Inaction										
	≥1.3 (power distribution protection)	< 1h Action										
	≥1.2	The action time is calculated according to three types of protection formula or curve queried.										
Thermal memory time	NWK20Z: 30min (ON) or OFF NWK22Z: Instantaneous, 10min, 20 min, 30 min, 45 min, 1h, 2h, 3h (instantaneous namely OFF)											
Overload pre-alarm NWK22Z												
Current setting value Ip	OFF+(0.75~1.05) Ir											
Overload pre-alarm output	The signal output is required to add a signal unit. Without the signal unit output, observe the controller display screen or read from the display indicator.											

Short circuit short-time delay protection NWK20Z &NWK22Z			
NWK20Z			
Current setting value I_{sd}	(1.5~10) Ir or OFF (OFF-Function off)		
Time setting value T_{sd} (s)	0.1, 0.2, 0.3, 0.4		
I^2t	ON or OFF		
Protective features (accuracy of ±10%)	Current	Tripping time	
I^2t-ON	I_{sd} ≤I≤8Ir	(8Ir) 2× T_{sd}/I2inverse time-limit characteristic	
	I＞8Ir	T_{sd} fixed time limit characteristic	
I^2t-OFF	I≥ I_{sd}	T_{sd} fixed time limit characteristic	
Thermal memory time	15min (ON) or OFF (OFF-Function off)		
NWK22Z			
I_{sd1} inverse time-limit current setting value	(1.5~15) Ir or OFF (OFF-Function off)		
I_{sd2} fixed time-limit current setting value	(1.5~15) Ir or OFF (OFF-Function off)		
Fixed time-limit time setting value T_{sd} (s)	0.1~1.0		
Protective features (accuracy of ±10%)	Current (I/I_{sd1}or I/I_{sd2})		Tripping time
	≤0.9		Inaction
	≥1.1	Reverse time limit	The delay features of the short time delay inverse time limit are the same with those of the overload long time delay, but the time is 1/10 of the long time delay, and ≥T_{sd}
		Fixed time limit	T_{sd}
Thermal memory time	Instantaneous (Function off), 10min, 20 min, 30 min, 45min, 1h, 2h, 3h		

Continued: Setting Values and Protective Features of Controller

Short circuit instantaneous protection NWK20Z&NWK22Z		
Current setting value I_i	NWK20Z: (2.0~15) In or OFF (OFF-Function off) NWK22Z: (1.0~20) In or OFF (OFF-Function off)	
Protective features	Current (I/Ii)	Tripping time
	≤0.85	Inaction
	≥1.15	＜40ms Action

MCR protection NWK20Z&NWK22Z		
Current setting value IMCR	NWK20Z: 10In NWK22Z: (1.0~20) In (factory default as 10In)	
Protective features	Current (I/I_{MCR})	Tripping time
	≤0.8	Inaction
	≥1.1	＜30ms Action

The MCR provides the high-speed instantaneous protection, which is valid at the closing moment of the circuit breaker. When the circuit breaker is closed for 100ms, the MCR protection will be automatically cancelled.

Required current value protection/alarm NWK22Z		
Protection/alarm start setting value	(0.2~1.0) In	
Protection action delay time setting value (s)	15~1500	
Alarm action return setting value	0.2In～start value	
Alarm return delay time (s)	15~1500	
Protective features (accuracy of ±10%) Inherent absolute error: ±40ms	Multiple of current (Required current /setting value)	Tripping time
	≤0.9	Inaction (no alarm)
	≥1.1	Acts (or gives an alarm) according to the set delay time
Return features (accuracy of ±10%) Inherent absolute error: ±40ms	Multiple of current (Required current /setting value)	Tripping time
	≥1.1	Non-return
	≤0.9	Returns according to the set delay time
Required current value protection alarm DO output	The signal output is required to add a signal unit; set one DO of the signal unit as “Required value fault”. Without the signal unit output, observe the controller display screen or read from the display indicator.	
Protection execution mode	Alarm/tripping/close	

Undervoltage protection/alarm NWK22Z	
Protection/alarmstartsettingvalue	100~return value

V		
Protection action delay time setting value (s)	0.2~60	
Alarm action return setting value V	Start value～600	
Alarm return delay time (s)	0.2~60	
Undervoltage protection action /alarm features (Accuracy of ±10%) inherent absolute error: ±40 ms	Umin/action setting value	Tripping time
	＞1.1	Inaction (no alarm)
	≤0.9	Acts (or gives an alarm) according to the set delay time
Alarm return features of undervoltage protection (Accuracy of ±10%) inherent absolute error: ±40 ms	Umin/return setting value	Tripping time
	＜0.9	Non-return
	≥1.1	Returns according to the set delay time
Undervoltage protection alarm DO output	The signal output is required to add a signal unit; set one DO of the signal unit as “Undervoltage fault”. Without the signal unit output, observe the controller display screen or read from the display indicator.	
Execution mode	Alarm/tripping/close	
Overvoltage protection/alarm NWK22Z		
Protection/alarm start setting value V	Return value~1200	
Protection action delay time setting value (s)	0.2~60	
Alarm return setting value V	100~start value	
Alarm return delay time (s)	0.2~60	
Overvoltage protection/alarm action features (Accuracy of ±10%) Inherent absolute error: ±40ms	Umax/action setting value	Tripping time
	≤0.9	Inaction (no alarm)
	≥1.1	Acts (or gives an alarm) according to the set delay time
Overvoltage alarm return features (Accuracy of ±10%) inherent absolute error: ±40 ms	Umax/return setting value	Tripping time
	≥1.1	Non-return
	≤0.9	Returns according to the set delay time
Overvoltage protection alarm DO output	The signal output is required to add a signal unit; set one DO of the signal unit as “Overvoltage fault”. Without the signal unit output, observe the controller display screen or read from the display indicator.	

<table>
<tr><td colspan="3">Protection execution mode</td><td colspan="5">Alarm/tripping/close</td></tr>
<tr><td colspan="8">Signal unit NWK22Z</td></tr>
<tr><td rowspan="11">NWK22Z</td><td colspan="2">Type of signal unit</td><td colspan="2">Rated current</td><td colspan="3">Field of Application</td></tr>
<tr><td colspan="2">S1</td><td colspan="2">4DO (4 output contacts)</td><td colspan="3">Applicable to the regional interlocking (the bottom layer)</td></tr>
<tr><td colspan="2">S2</td><td colspan="2">3DO (3 output contacts) 1DI (1 input contact)</td><td colspan="3">It can be used for the regional interlocking</td></tr>
<tr><td colspan="2">S3</td><td colspan="2">2DO (2 output contacts) 2DI (2 input contacts)</td><td colspan="3">It can be used for the regional interlocking</td></tr>
<tr><td rowspan="2">DI</td><td>Function setting</td><td colspan="5">Alarm, tripping, regional interlocking, general, short circuit interlocking</td></tr>
<tr><td>Input form</td><td colspan="2">Normally opened</td><td colspan="3">Normally closed</td></tr>
<tr><td rowspan="3">DO</td><td>Function setting</td><td colspan="5">See the table below, “Parameter Settings of Switch Output (DO)”</td></tr>
<tr><td>Execution mode</td><td>Normally opened level</td><td>Normally closed level</td><td>Normally opened impulse</td><td colspan="2">Normally closed impulse</td></tr>
<tr><td>Impulse time</td><td colspan="2">N/A</td><td colspan="3">1~360s</td></tr>
<tr><td colspan="7">Parameter Settings of Switch Output (DO)</td></tr>
<tr><td colspan="2">General</td><td>Alarm</td><td>Fault tripping</td><td>Self-diagnosis alarm</td><td colspan="2">Transient fault</td></tr>
<tr><td colspan="2">Overvoltage fault</td><td>Overload pre-alarm</td><td>Overload fault</td><td>Short time delay fault</td><td colspan="2">On</td></tr>
<tr><td colspan="2">Off</td><td>Undervoltage fault</td><td>Required value fault</td><td>Regional interlocking</td><td colspan="2">Remote reset</td></tr>
<tr><td colspan="2">Required value out-of-limit</td><td>Alarm of operation times</td><td>Contact wear alarm</td><td></td><td colspan="2"></td></tr>
</table>

See the table below for the overload long-time delay protection action delay setting time and the corresponding multiple of current time：

Curve type	Fault Current	Delay time (s)															
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
I^2t	1.5×I_r	15.00	30.00	60.00	120.00	240.00	360.00	480.00	600.00	720.00	840.00	960.00					
	2×I_r	8.44	16.88	33.75	67.50	135.00	202.0	270.00	337.50	405.00	472.50	540.00					
	6×I_r	0.94	1.88	3.75	7.50	15.00	22.50	30.00	37.50	45.00	52.50	60.00					
	7.2×I_r	0.65	1.30	2.60	5.21	10.42	15.63	20.83	26.04	31.25	36.46	41.67					
EI (G)	1.5×I_r	8.00	12.80	19.20	32.00	48.00	64.00	80.00	108.0	144.00	224.00	320.00	480.00	640.00	800.00	960.00	1120.00
	2×I_r	3.33	5.33	8.00	13.33	20.00	26.67	33.33	45.00	60.00	93.33	133.33	200.0	266.67	333.33	400.00	466.67
	6×I_r	0.29	0.46	0.69	1.14	1.71	2.29	2.86	3.86	5.14	8.00	11.43	17.14	22.86	28.57	34.29	40.00
	7.2×I_r	0.20	0.31	0.47	0.79	1.18	1.57	1.97	2.26	3.54	5.51	7.87	11.80	15.74	19.67	23.60	27.54
EI (M)	1.5×I_r	6.22	9.96	14.90	24.90	37.30	49.80	62.20	84.00	112.00	174.00	249.00	373.00	498.00	622.00	747.00	871.00
	2×I_r	2.95	4.72	7.06	11.79	17.67	23.59	29.46	39.79	53.05	82.42	117.95	176.68	235.89	294.63	353.84	412.58
	6×I_r	0.28	0.45	0.68	1.13	1.69	2.26	2.82	3.81	5.08	7.89	11.30	16.92	22.59	28.22	33.89	39.52
	7.2×I_r	0.19	0.31	0.47	0.78	1.17	1.56	1.95	2.63	3.51	5.45	7.81	11.69	15.61	19.50	23.42	27.30
HV	1.5×I_r	2.46	3.94	5.90	9.85	14.80	19.70	24.60	33.20	44.30	68.90	98.50	147.00	197.00	246.00	295.00	344.00
	2×I_r	0.67	1.07	1.60	2.67	4.01	5.34	6.66	8.99	12.00	18.66	26.68	39.81	53.35	66.63	79.90	93.17
	6×I_r	0.01	0.01	0.02	0.03	0.05	0.06	0.08	0.10	0.14	0.22	0.31	0.46	0.62	0.77	0.93	1.08
	7.2×I_r	0.00	0.01	0.01	0.01	0.02	0.03	0.04	0.05	0.07	0.10	0.15	0.22	0.30	0.37	0.45	0.52

Controller factory setting

Protective features		Setting current	Setting time	Remarks
Overload long-time delay protection		1.0In	60s	Thermal memory ON
Short circuit short-time delay protection	NWK20Z	8Ir	0.2s	Definite time, I^2t-OFF
	NWK22Z	I_{sd1}-6Ir，I_{sd2}-8Ir	0.2s	I_{sd1}Inverse time lag, I_{sd2}Constant time lag
Short circuit instantaneous		10In	-	-

4.3.5 Working power supply of controller

■ The working power supply of the controller is powered by the auxiliary power supply. So please connect to the auxiliary power supply, or the controller cannot work.

Normal operating conditions of the controller: (85%~110%) Us.

AC power voltage (50/60Hz): AC230V, AC400V; the allowable error is ±15%.

DC power voltage: DC220V, DC110V, DC24V; the allowable error is ±5%.

■ To be powered by the test port

Rated voltage: DC24V, with an allowable error of ±5%

■ Rated power consumption of controller

Rated power consumption: ＜7W.

■ Contact capacity of the switch contact output

DO signal alarm output, contact capacity: 5A/AC250V;

fault tripping contact output, contact capacity: 10A/AC250V;

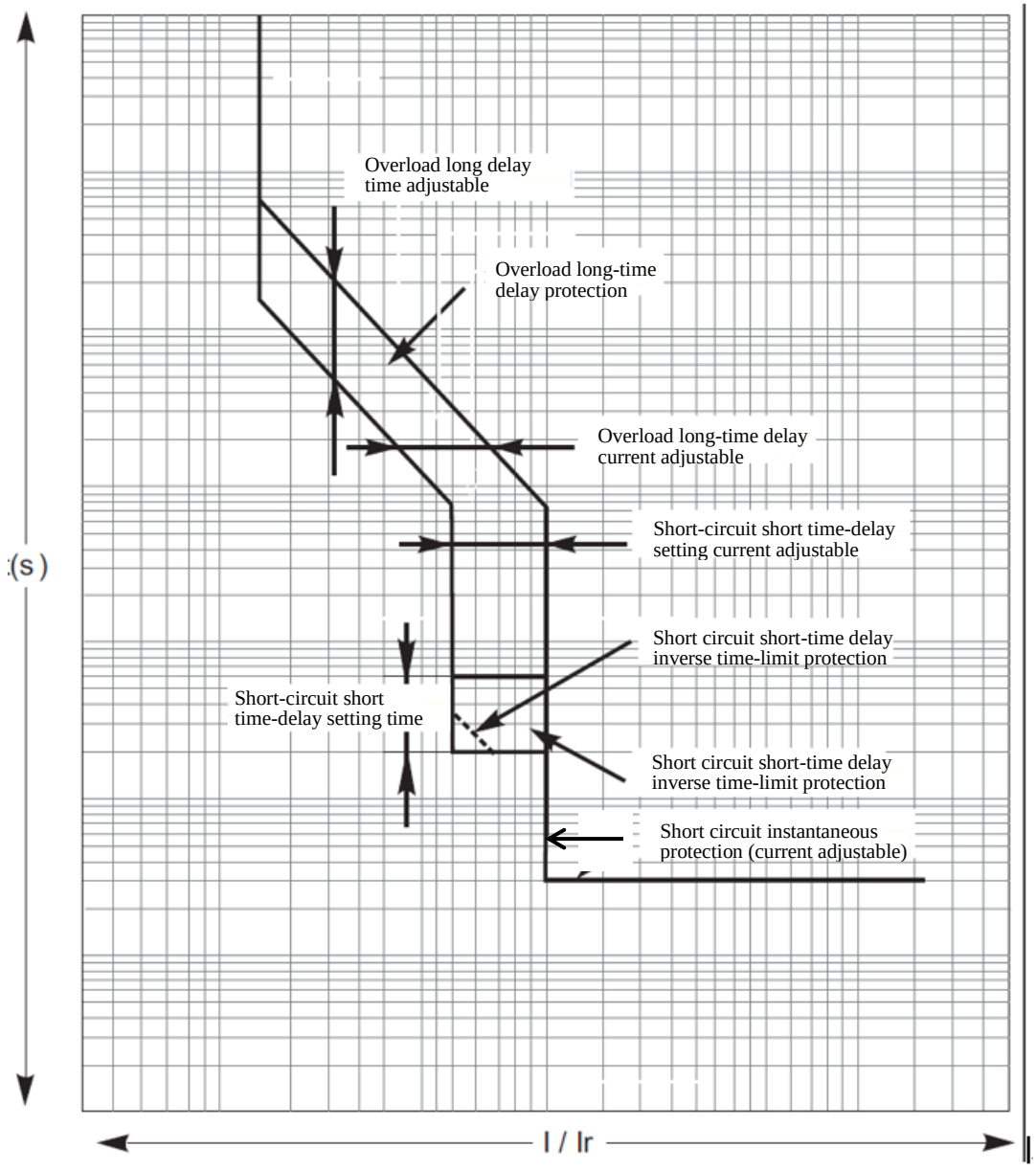
auxiliary contact output of the circuit breaker status, contact capacity: 10A/AC250V.

4.3.6 Introduction of controller functions

For introduction of controller functions, see the User Manual of NWK20Z Controller and User Manual of NWK22Z Controller.

4.4 Protection Characteristic Curve

See the figure below for the overload long time delay, short-circuit short time delay, short-circuit instantaneous protection curve.



For each protection characteristic curve of controller, see the User Manual of NWK20Z Controller and User Manual of NWK22Z Controller.

Chapter 5 Accessories

5.1 Accessories List

Accessory category	Accessory name	Configuration	Type of the installation structure	Remarks
Electrical control accessories	Closed electromagnet	Standard configuration	Fixed type/drawout type	
	Shunt release	Standard configuration	Fixed type/drawout type	
	Motor operating mechanism	Standard configuration	Fixed type/drawout type	
	Undervoltage release	Optional ordering for customers	Fixed type/drawout type	Either
	Loss of voltage release	Optional ordering for customers	Fixed type/drawout type	
	Remote reset electromagnet	Optional ordering for customers	Fixed type/drawout type	
Signal output accessories	Auxiliary switch	Standard configuration	Fixed type/drawout type	
	Closing ready signal output device	Optional ordering for customers	Fixed type/drawout type	
	Three-position status signal output device of the drawer seat	Optional ordering for customers	Drawout type	
	Secondary terminal	Standard configuration	Fixed type/drawout type	
Related accessories of controller	Power supply module NWDF1	Optional ordering for customers	Fixed type/drawout type	
	Relay module NWDF1-RM	Optional ordering for customers	Fixed type/drawout type	To be used with the power supply module
	Communication adapter NWDF1-MD/MP	Optional ordering for customers	Fixed type/drawout type	
	Outline and Installation	Optional	Fixed type/drawout	

	Dimension Diagram of the Remote Intelligent I/O Module NWDF1-C8/S12/SC64/SCM423	ordering for customers	type	
	6-channel programmable output module NWDF1-C6	Optional ordering for customers	Fixed type/drawout type	
	Accessory monitoring unit NWDF1-AM	Optional ordering for customers	Fixed type/drawout type	
	Energy-storing signal communication module NWDF1-S1	Optional ordering for customers	Fixed type/drawout type	
Safety accessories	Phase partition	Standard configuration	Fixed type/drawout type	
	Counter	Optional ordering for customers	Drawout type	
	Door frame	Optional ordering for customers	Fixed type/drawout type	
	Dustproof cover	Optional ordering for customers	Drawout type	
Lock and Interlocking Device	Off-position key lock	Optional ordering for customers	Fixed type/drawout type	
	Button lock	Optional ordering for customers	Fixed type/drawout type	
	Door interlocking	Optional ordering for customers	Drawout type	
Power supply conversion system	Mechanical interlocking	Optional ordering for customers	Fixed type/drawout type	

5.2 Electrical Control Accessories

5.2.1 Closed electromagnet

Closed electromagnet is mainly composed of coil, iron core component and electronic parts. In the condition of mechanism energy storage, as long as the closed electromagnet is energized, the circuit breaker can be closed.

◆ Action features of the closed electromagnet

1) When the power supply voltage of the closed electromagnet maintains at 85%~110% of the rated control supply voltage Us

, operation of the closed electromagnet can make reliable closing of the circuit breaker;

2) Closed electromagnet is the short-time duty-type;

3) There is the control circuit inside to ensure the long-time energizing, which shall be >200ms. The user cannot connect it with the auxiliary switch point of the circuit breaker in series.

◆ Technical Parameters of Closed Electromagnet

Power Consumption Table of Closed Electromagnet

Rated insulation voltage (Ui)	Rated control supply voltage (Us)	Instantaneous power
400V	AC380V/AC400V 50/60Hz	620VA
	AC220V/AC230V 50/60Hz	500VA
	DC220V	500W
	DC110V	400W
	DC24V	145W

5.2.2 Shunt release

Shunt release is mainly composed of coil, iron core component and electronic parts, and can disconnect the circuit breaker by remote operation.

◆ Action features of the shunt release

1) When the power supply voltage of the shunt release maintains at 70%~110% of the rated control supply voltage,

operation of the shunt release can make the circuit breaker disconnect;

2) Shunt release is the short-time duty-type;

3) There is the control circuit inside to ensure the long-time energizing, which shall be >200ms. The user cannot connect it with the auxiliary switch point of the circuit breaker in series.

◆ Technical Parameters of Shunt Release

Power Consumption Table of Shunt Release

Rated insulation voltage (Ui)	Rated control supply voltage (Us)	Instantaneous power
400V	AC380V/AC400V 50/60Hz	620VA
	AC220V/AC230V	500VA

	50/60Hz	
	DC220V	500W
	DC110V	400W
	DC24V	145W

5.2.3 Motor operating mechanism

The circuit breaker can only be closed after the motor operating mechanism make the circuit breaker to store energy in advance.

◆ Operation features

1) If the rated supply voltage of the motor operating mechanism is between 85%~110%, energy storage of the circuit breaker can be made in place.

2) The motor will close the power supply automatically and stop operation after it stores energy in place.

3) The motor operating mechanism can realize the automatic pre-energy storing.

◆ Technical Parameters of Motor Operating Mechanism

Power Consumption Table of Motor Operating Mechanism

Rated insulation voltage (Ui)	Energy storage time	Rated control supply voltage (Us)	Power consumption
400V	3s~5s	AC220V/AC230V AC380V/AC400V (50/60Hz)	110VA
		DC220V/DC110V/DC24V	110W

5.2.4 Undervoltage release

◆ Action features of the undervoltage release

1) When the applied voltage drops, even slowly drops to 35%~70% of the rated operational voltage, the undervoltage release will work to disconnect the circuit breaker;

2) When the applied voltage is less than 35% of the rated operational voltage of the undervoltage release,

the undervoltage release will make the circuit breaker cannot be closed;

3) When the applied voltage is 85%~110% of the rated operational voltage of the undervoltage release, the undervoltage release can be closed reliably to guarantee the reliable closing of the circuit breaker.

◆ Undervoltage release can be divided into two types (instantaneous release and delayed release), which is mainly composed of coil, iron core component and electronic parts.

◆ Undervoltage delayed release

The undervoltage delayed release sets the delay time of the release action through toggling the toggle switch on the undervoltage delayed device. The delay time is set as 1 s, 3 s, 5 s as required, and the factory default is 1 s.

◆ See the table below for the power consumption of under-voltage release.

Power Consumption Table of Undervoltage Release

Rated insulation voltage (Ui)	Rated operational voltage (Ue)	Operating power
400V	AC220V/AC230V 50/60Hz	3.9VA
	AC380V/AC400V 50/60Hz	5.2VA
	DC220V	3.9W
	DC110V	3.9W
	DC24V	3.5W

5.2.5 Loss-of-voltage release

◆ Action features of the loss of voltage release

1） When the applied voltage suddenly drops to 0~35% of the rated operational voltage, the loss of voltage will work to disconnect the circuit breaker;

2） When the applied voltage is less than 35% of the rated operational voltage of the loss of voltage release, the loss of voltage release will make the circuit breaker cannot be closed;

3) When the applied voltage is 85%~110% of the rated operational voltage of the loss of voltage release, the loss of voltage release can guarantee the reliable closing of the circuit breaker.

4) When the applied voltage drops no less than 35% of the rated operational voltage, the loss of voltage release can be closed to guarantee the reliable closing of the circuit breaker.

◆ The loss of voltage release can be divided into instantaneous release and delayed release, which is mainly composed of coil, iron core component and electronic parts.

◆ Loss of voltage delayed release

◆ The loss-of-voltage delayed release sets the delay time of the release action through toggling the toggle switch on the loss-of-voltage delayed device. The delay time is set as 1 s, 3 s, 5 s as required, and the factory default is 1 s.

Power Consumption Table of Loss of Voltage Release

Rated insulation voltage (Ui)	Rated operational voltage (Ue)	Operating power
400V	AC220V(AC230V)	4VA
	AC380V(AC400V)	8VA

5.2.6 Remote reset electromagnet

This accessory is installed in the controller base. In case of fault tripping and troubleshooting of controller, the remote

reset electromagnet can reset the reset button of the circuit breaker for the normal closing/opening operation of the circuit breaker

◆ Action features of remote reset electromagnet

1） When the power supply voltage of the remote reset electromagnet maintains at 85%~110% of the rated control supply voltage

, operation of the shunt release can make the circuit breaker disconnect;

2) Remote reset electromagnet is the short-time duty-type;

3) Power-on time >200ms.

◆ Technical Parameters of Remote Reset Electromagnet

Power Consumption Table of Remote Reset Electromagnet

Rated insulation voltage (Ui)	Rated control supply voltage (Us)	Instantaneous power
400V	AC220V/AC230V 50/60Hz	55VA
	DC220V	55W
	DC110V	50W
	DC24V	

5.3 Signal Output Accessories

5.3.1 Auxiliary switch

◆ The conventional thermal current of the auxiliary switch is 6 A;

◆ Auxiliary contact form: Four normally opened and four normally closed, five normally opened and five normally closed, six normally opened and six normally closed.

◆ Technical Parameters of Auxiliary Contact

Applicable frame size		NDW3Z-2500	NDW3Z-4000
Auxiliary contact form	Conventional	■ Four normally opened and four normally closed	■ Four groups switch
	Special	■ Five normally opened and five normally closed ■ Six normally opened and six normally closed	■ Four normally opened and four normally closed ■ Six groups switch
Agreed thermal current Ith		6A	
Minimum load		2mA/DC15V	

Breaking capacity	DC-12	5A/DC250V	0.3A/DC250V
	AC-12	10A/AC250V	10A/AC250V
	DC-13	1.2A/DC220V	0.2A/DC220V
	AC-15	3A/AC400V	3A/AC400V

5.3.2 Closing ready signal output device

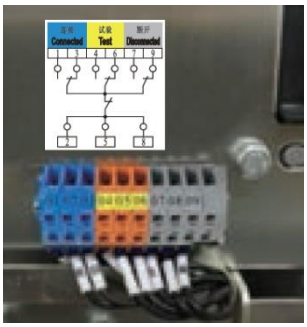
Closing ready signal output device of the circuit breaker is the output signal device that reflects the operating mechanism to achieve the closed state. It can output signals if it meets the following mechanical states. See the table below for technical parameters.

- Circuit breaker off state；
- Energy storage in place；
- No disconnection instruction；
- Undervoltage release 、Loss-of-voltage release（Optional Accessories）closing in place；
- The Reset button is reset after Controller fault tripping ；
- Off-position key lock (Mechanical Interlocking)is unlocked；
- Mechanical Interlocking (Interlocking Accessories) is unlocked。

Table of Technical Parameters

Breaking capacity	AC	250V	3A
		125V	5A

5.3.3 Position status signal output device of the drawer seat (on the drawer seat)



When the drawout type circuit breaker body is in the "Separation", "Test" and“Connection" positions of the drawer seat, the triolocation electric indication device can output the electrical status signal corresponding to the three positionswith the signal output terminal located on the left side of the drawer seat. 3 position signal contact is in series with the drawer seat's position locking signal contact. For shaking in or out operation, when the red button on the drawer seat pops out, 2# and 3# in the separation position will be connected,5# and 6# in the test position, and 8# and 9# in the off position will also be connected.

See the table below for technical parameters

Table of Technical Parameters

Breaking capacity	DC	125V	0.4A
	AC	250V	10A

5.3.4 Secondary wiring terminal

- For the number of secondary wiring terminal, there is a total of 62 groups (identical for the fixed type and drawout type);see Chapter 6 for the definition and its electrical wiring diagram of each terminal number.
- See the table below for parameters of the secondary wiring terminal

Item	Parameter
Connection mode	Clamping
Flame retardant rating, according to UL 94	V0
Pollution level	3
Voltage category	III
Material group	IIIa
Applicable connection standards	GB/T 14048.7-2006
Maximum load current	10A
Rated current	10A
Rated voltage	500V
Minimum cross section area of the rigid (flexible) conductor	0.5mm^2
Maximum cross section area of the rigid (flexible) conductor	1.5mm^2
Recommended striping length	（10±1）mm
Minimum test pull-force after the conductor connection	30N

5.4 Related Accessories of Controller

5.4.1 Power supply module NWDF1(ST-IV)

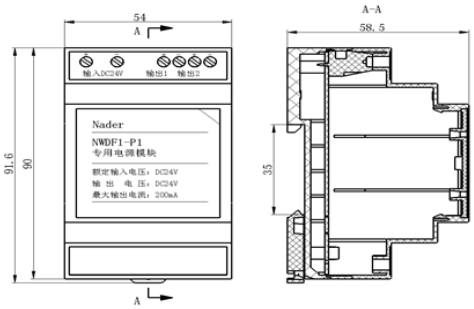
- Role: As the power source of relay module NWDF1-RM, the output voltage is DC24V;
- Type: See the table below

		NWDF1-P1	NWDF1-P3	NWDF1-P5
Working power supply	Nominal voltage	24 VDC	400/230VAC	220/110VDC
	Allowable input range	12-36 VDC	180VAC-430VAC	85VDC-265VDC
	Isolation voltage	1500Vrms	1500Vrms	1500Vrms
	Reverse polarity effects	With polarity effects	Without polarity effects	With polarity effects
Protection class		IP20	IP20	IP20
Dimension (mm)		90 x 54 x 58.5mm	90×72×58.5	90×72×58.5
Installation mode		Installed with a 35mm standard guide rail	1. 1. With a 35mm standard guide rail 2. Screw installation	1. 1. With a 35mm standard guide rail 2. Screw installation

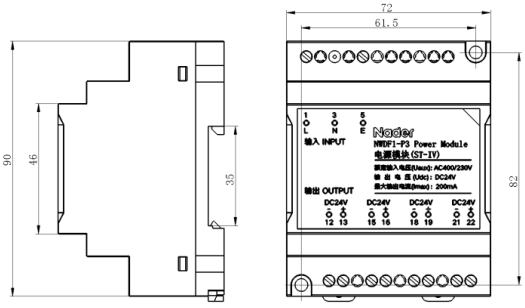
- Features: (85%~110%) the Us power supply module operates normally;
- Supply mode: Optional ordering by customers;

Users indicate the rated operational voltage and carry out installation by themselves. Pay attention to “+” and “-” polarities of wiring, which cannot be wrongly wired.

- See the figure below for outline and installation dimensions.



Outline and Installation Dimension Diagram of Power Supply Module NWDF1-P1

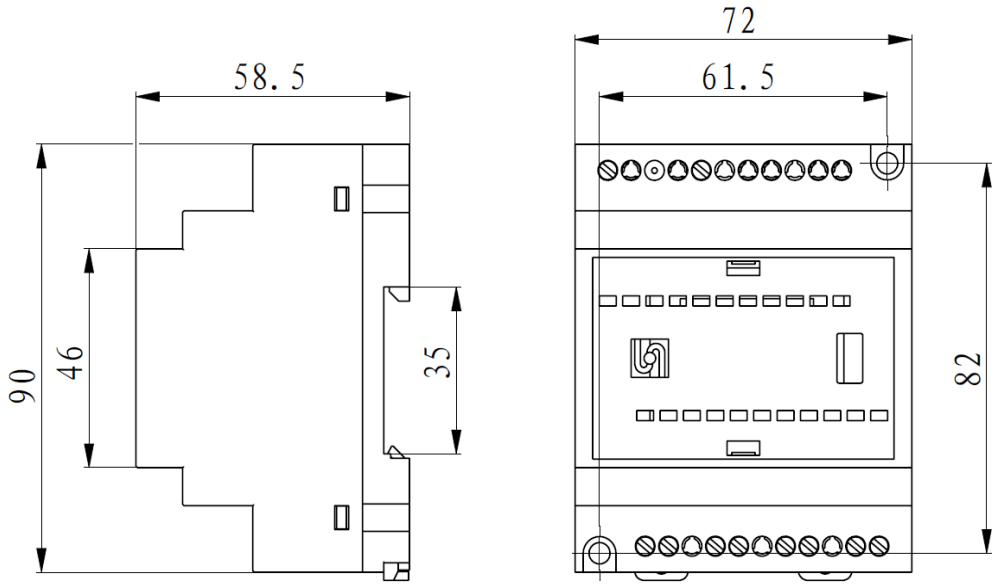


Outline and Installation Dimension Diagram of Power Supply Module NWDF1-P3/P5

5.4.2 Relay module NWDF1-RM（ST201）

- Function: Signal unit of controller is commonly used in fault alarm or indication, etc. When the circuit breakeris opened, closed or when the load capacity is larger, the control should be carried out after conversion through this module. Match withthe power supply module NWDF1 to achieve the "four remotes" function;

- Contact capacity: 10A/AC250V, 10A/DC24V;
- Appearance and installation: To be used with the controller power supply module ST-IV, see the installation diagram of relay module.



Installation Diagram of Relay Module

5.4.3 Communication adapter NWDF1-MD/MP

- The communication adapter can be divided into the following types: NWDF1-MD and NWDF1-MP. It connects with the intelligent communication products with our ModBus RTU standard protocol interface to realize conversion of different protocols, thus making the intelligent communication products to achieve the remote communication, remote regulating, remote control and remote sensing functions on DeviceNet and ProfiBus DP.

1） NWDF1-MD communication adapter realizes conversion from the ModBus-RTU protocol to the DeviceNet protocol;

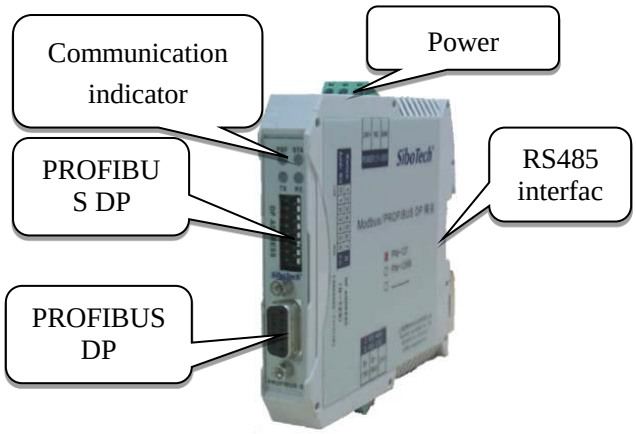
2） NWDF1-MP communication adapter realizes conversion from the ModBus-RTU protocol to the Profibus DP protocol;

3） For function introduction details of each communication protocol adapter, see the DeviceNet Adapter Product Manual and ProfiBus DP Gateway Product Manual.

4） NWDF1-MD and NWDF1-MP only support communication for a single device.

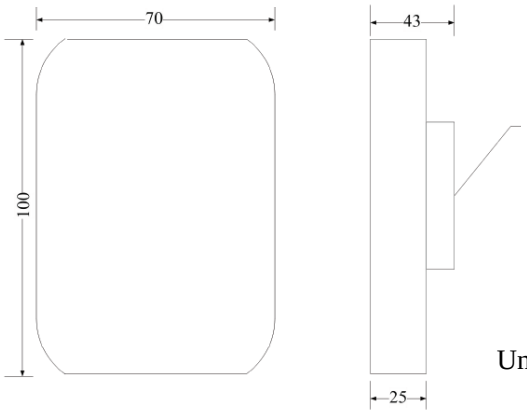
- Appearance and function indication

NWDF1-MD

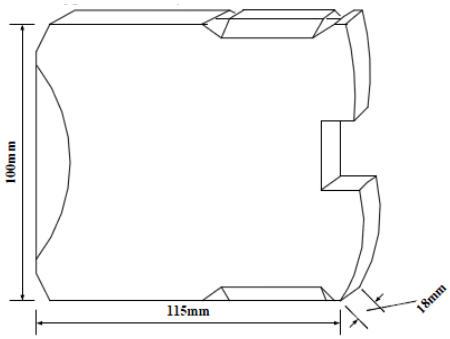


NWDF1-MP

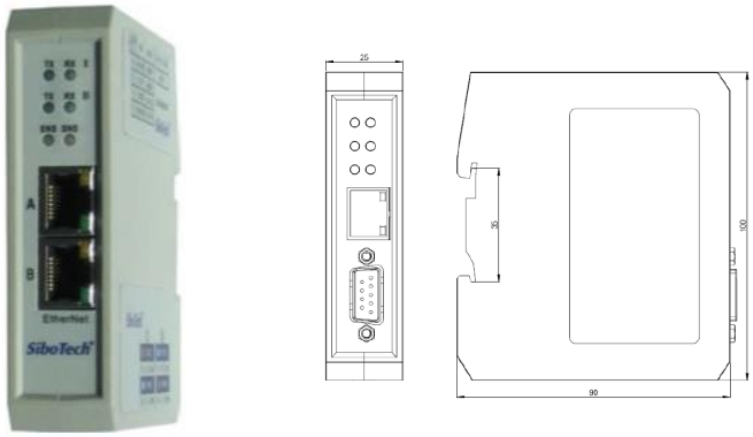
◆ See the figure below for outline and installation dimensions.



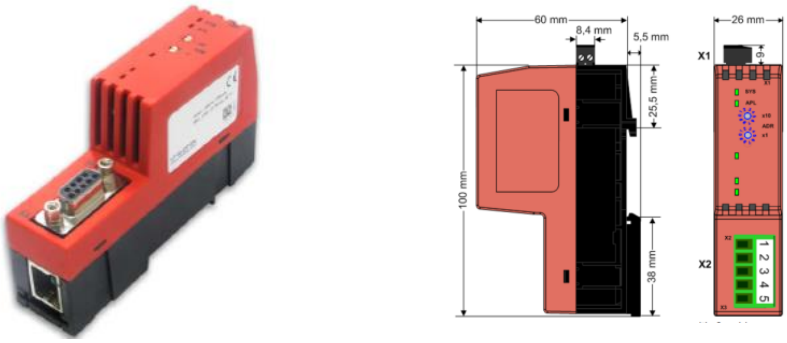
NWDF1-MD Outline and Installation Dimension



NWDF1-MP Outline and Installation Dimension



NWDF1-ME outline and installation dimension Diagram



NWDF1-MC Outline and Installation Dimension Diagram

5.4.4 Temperature measurement

◆ With a PT100 thermal sensor (cord length: 1.5m) for temperature measurement, it is directly installed in the connection point position to detect the on-line temperature, transfer the detected temperature to the controller and displays the temperature of the detection point through the controller interface.

5.4.5 Remote intelligent I/O module NWDF1-C8/S12/SC64/SCM423

◆ The remote intelligent I/O module is a simple, practical and reliable monitoring communication module (installed with a 35mm standard guide rail), which enables the remote communication, remote control and remote measurement of the system via the standard RS485 interface and ModBus-RTU protocol. When using a non-communication circuit breaker, users can monitor the corresponding power distribution circuit via the module. Users can remotely monitor the circuit current, circuit breaker on-off status, fault status and other important information.

◆ NWDF1-SCM423 features 4 common-side switch inputs, 2 relay outputs and 3 5A current inputs. Users can know the 3-phase current and 4-channel switch of the feeder line (such as: switch on-off status, fault status, etc.) via it combined with inputs & outputs of the circuit breaker and the standard current transformer in the line

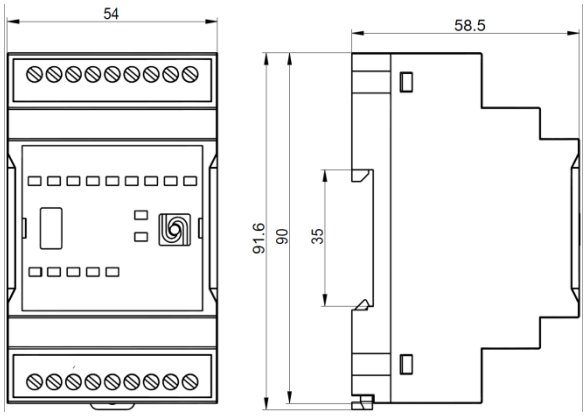
.

◆ NWDF1-S12 features 12 common-side switch inputs. Users can learn the on-off status up to 12 circuit breakers or the on-off status and fault status of 6 circuit breakers.

◆ NWDF1-C8 has 4 groups of 8 relay outputs, for controlling the on-off status of 4 circuit breakers.

NWDF1-SC64 features 6 switch inputs and 4 relay outputs, for monitoring its important status while controlling the circuit breaker.

◆ See the figure below for outline and installation dimensions.



Outline and Installation Dimension Diagram
of Remote Intelligent I/O Module

5.4.6 6-channel programmable output module NWDF1-C6

- For the NDWF1-C6 programmable output module (installed with a 35mm standard guide rail),

see “Programmable Output Module Item Table” for the programmable content; see “Programmable Output Module Contact Type Table” for the contact type,

wherein the time setting of the time delayed contact is shown in “Time Setting Table of the Time Delayed Contact”;

see “Electric Parameter Item Table of the Programmable Output Module Relay” for the electrical parameters of the programmable module relay output

with the operating performance with electricity as 100,000 times.

Electrical Parameter Item Table of the Programmable Output Module Relay

No.	Function		Remarks
A	Ir0	Overload pre-alarm	Overload pre-alarm and current unload
B	ILC1	Current unload 1	
C	ILC2	Current unload 2	
D	Ir1	Long time delay tripping alarm	Current protection alarm
E	Ir2	Short time delay tripping alarm	
F	Ir3	Instantaneous tripping alarm	
K	Memory failure	Memory failure alarm	Internal fault alarm
L	Internal accessories failure	Internal accessories failure alarm	
M	I1max	Action alarm of the maximum required current	Current protection alarm
N	I2max	Action alarm of the maximum required current	

O	I3max	Action alarm of the maximum required current	
Q	Umin	Low voltage action alarm	Voltage protection alarm
R	Umax	Overvoltage action alarm	

Programmable Output Module Contact Type Table

Non-locking contact	In case the alarm triggered by fault isn't eliminated, the contact holds action
Locking contact	The contact holds action until reset (reset menu)
Time delay contact	The contact holds action within the adjustable time delay or is reset (reset menu)

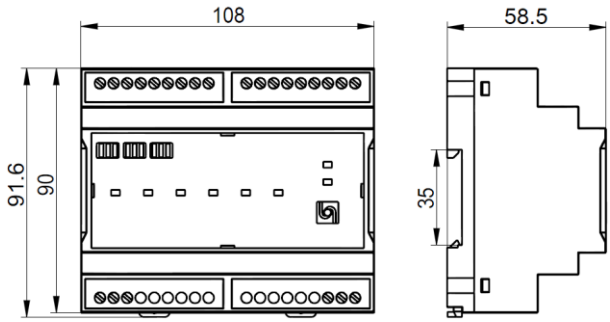
Time Setting Table of the Time Delayed Contact

Item	Scope	Step	Accuracy
Delay time of the delay time contact	1s-360s	1s	±10%

Electrical Parameters Table of the Programmable Module Relay Output

Rated working voltage Ue/V		Agreed thermal current Ith/A	Rated working current Ie/A	Rated control capacity
AC	230	5 (2-channel programmable output module is 1A)	AC-15: 5(2-channel programmable output module is 1A)	1200VA (2-channel programmable output module is 230VA)
	400		AC-15: 3	1200VA
DC	220		DC-13: 0.15	50W
	110		DC-13: 0.4	

◆ See the figure for outline and installation dimensions of 6-channel programmable output module.

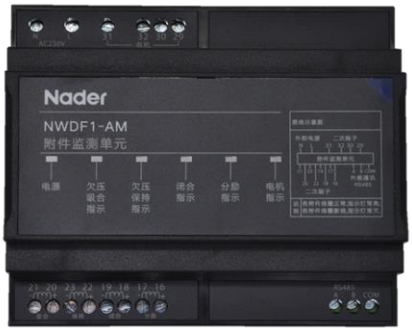


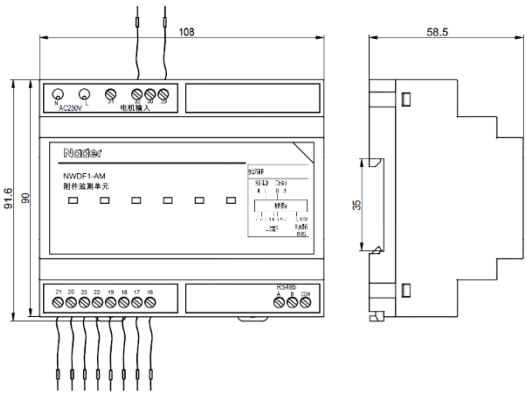
Outline and Installation Dimension Diagram of 6-channel Programmable Output Module

5.4.7 Accessory monitoring unit NWDF1-AM

◆ After installed with the accessory monitoring unit, the circuit breaker can perform the online monitoring of coil break for the shunt release, closing electromagnet, undervoltage release and energy storage motor, to ensure normal operation of the circuit breaker.

- See the figure below for outline and installation dimensions.





NDF1-AM Outline and Installation

5.4.8 Energy-storing signal communication module NWDF1-S1

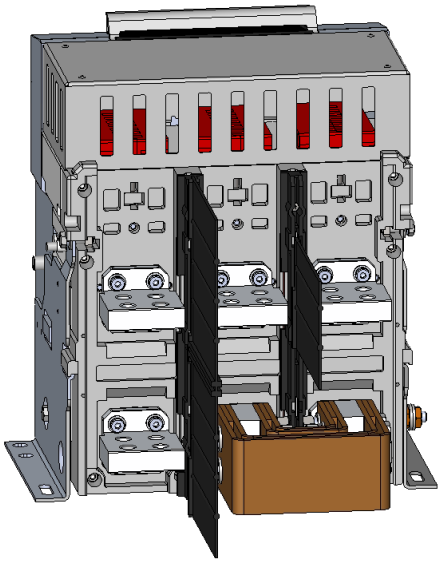
- Energy-storing signal communication module components can obtain

the “Energy storage” or “Energy release” status information of the electric operating mechanism of the circuit breaker via the upper computer. Outline and installation dimensions are the same with the outline and installation dimension diagram of the remote intelligent I/O module.

5.5 Safety Accessories

5.5.1 Phase partition

Divided into fixed type and drawout type, the phase partition is installed in the groove of the bottom plate bracket for the fixed type while the drawout type is installed in the groove pf the drawer seat baseplate, used to increase the insulation strength between breakpoints of the main circuit so as to prevent the short circuit in case of the insulation breakdown and improve the power reliability.



Support (fixed type)

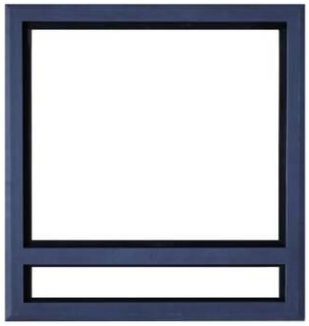
Phase partition

5.5.2 Counter

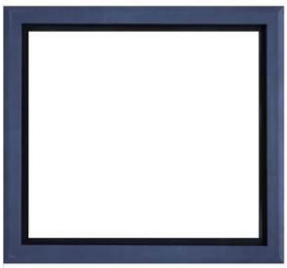
Counter is used to record the number of the "close-open" operation of the circuit breaker.

5.5.3 Doorframe

Divided into fixed type and drawout type, it is mainly placed on the door of the cubicle for sealing effect, and can make the protection level of the circuit breaker reaches IP40. It is beautiful and practical.



Drawout type



Fixed type

5.5.4 Dustproof cover

Installed on the beam of the wiring terminal, it can prevent dust and other debris falling into the terminal of the wiring terminal, leading to poor contact. It is an optional accessory.

5.6 Lock and Interlocking Device

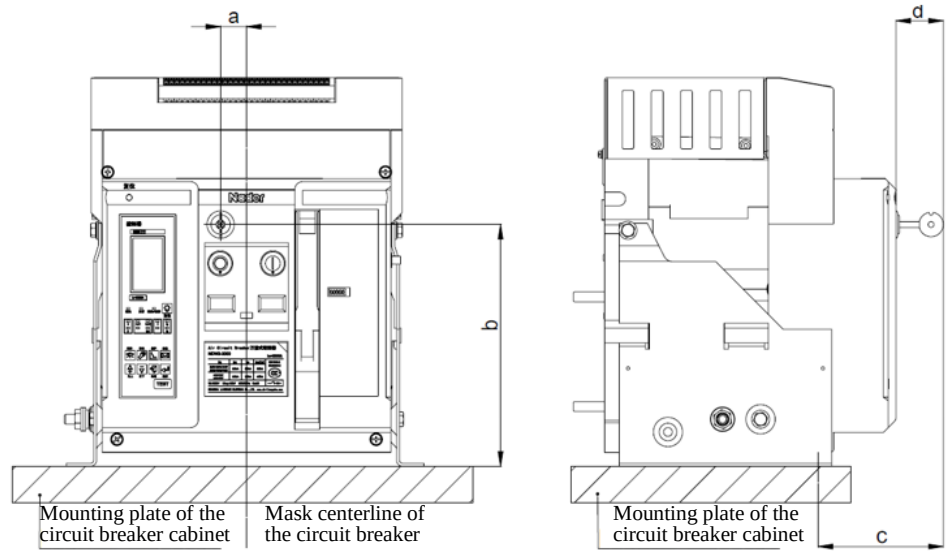
5.6.1 Off-position key lock (on the circuit breaker)

◆ This key lock is locked on the manually disconnected position of the circuit breaker. When the key is anticlockwise locked and pulled out,
The circuit breaker cannot carry out closed operation, so as to prevent irregular operation. Model and type are shown in the table below.

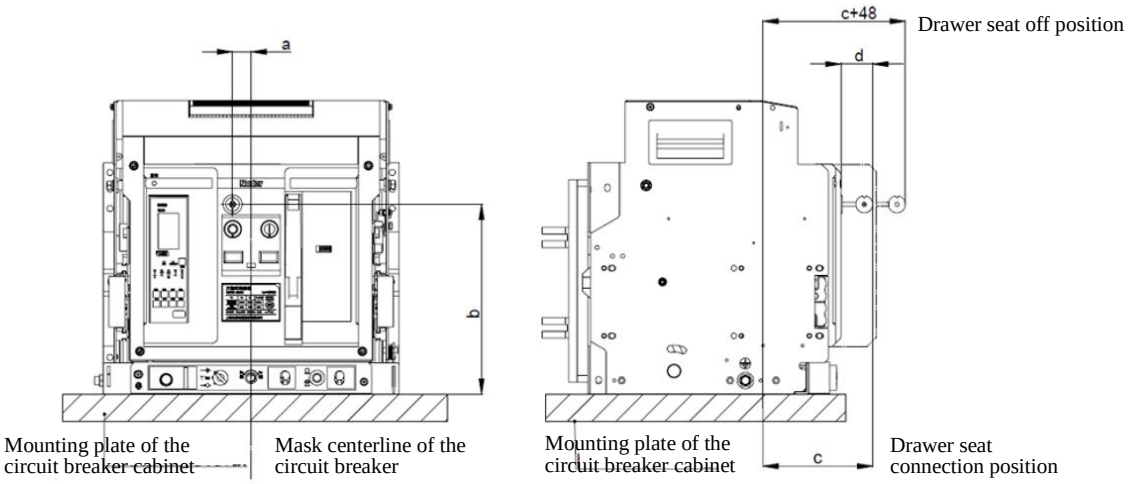
Models and types of Off-position key locks

Model	Name	Number of circuit breakers	Number of keys
SF11	One lock one key	1	1
SF21	Two locks one key	2	1
SF31	Three locks one key	3	1
SF32	Three locks two keys	3	2
SF53	Five locks three keys	5	3

◆ When the off-position lock is optionally selected, this accessory is sent to the user after being assembled with the circuit breaker. As the off-position lock protrudes out of the circuit breaker mask, the installer shall pay attention to the protruding dimension when opening the power distribution cabinet door. This dimension diagram and data are as follows.



Fixed type



Drawout type

Unit:

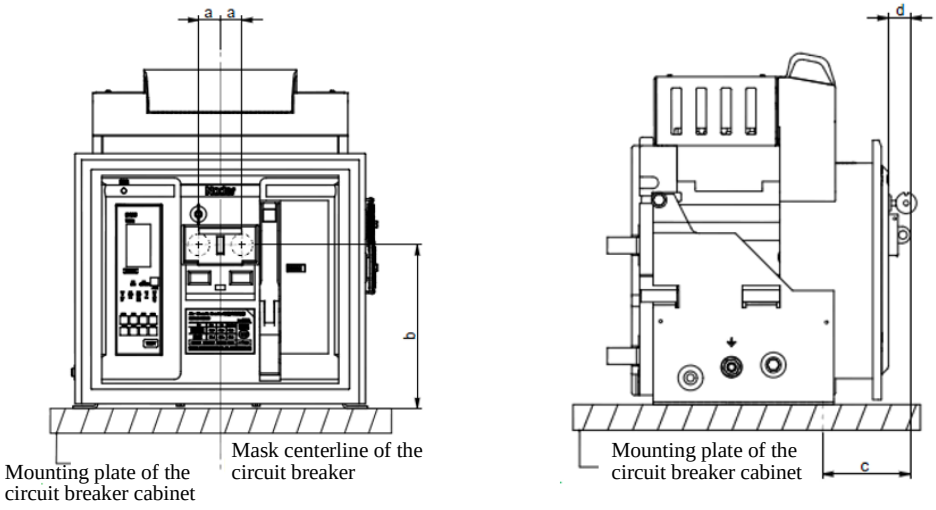
mm

Model	a		b		c		d	
	Fixed type	Drawout type	Fixed type	Drawout type	Fixed type	Drawout type	Fixed type	Drawout type
NDW3Z-2500 NDW3Z-4000	27		243	282.7	115	153	35	

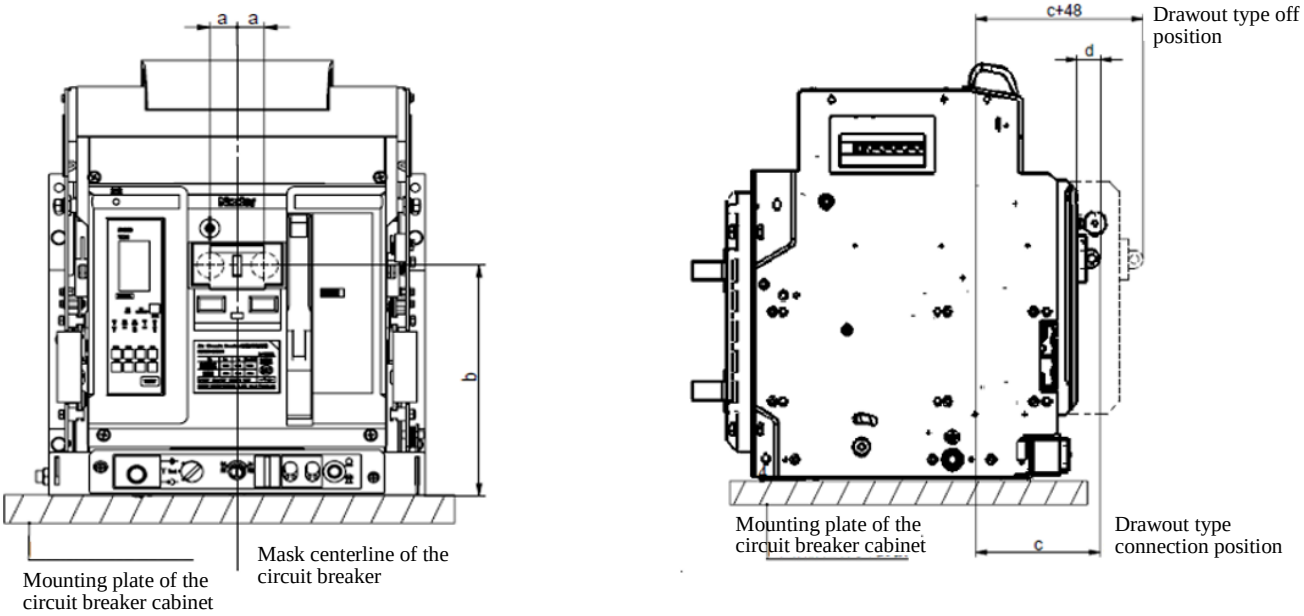
5.6.2 Button lock

- To be used with a padlock, it is used to prevent non-staff from illegally operating the opening/closing button (padlock should be prepared by users).
- When the off-position lock is optionally selected, this accessory is sent to the user after being assembled with the circuit breaker. As the off-position lock protrudes out of the circuit breaker cover, the installer shall pay attention to the protruding dimension when opening the power distribution cabinet door.

This dimension diagram and data are as follows.



Fixed type



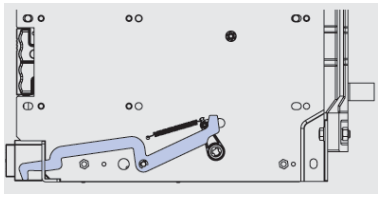
Drawout type

Unit: mm

Model	a		b		c		d	
	Fixed type	Drawout type	Fixed type	Drawout type	Fixed type	Drawout type	Fixed type	Drawout type
NDW3Z-2500 NDW3Z-4000	27		204	243.7	106	143.8	26.4	

5.6.3 Door interlock (on the drawer seat)

Installed on the right or the left side of the drawer seat. When the drawout type circuit breaker is in the separation position, It can avoid opening of the cubicle door.



5.7 Mechanical Interlocking of Power Supply Conversion System

- Mechanical interlocking mechanism can be used for interlocking of the drawout circuit breaker and the fixed circuit breaker;
- Interlocking mechanism shall be installed by users. First, demount the nut for connecting the rear part of the interlocking device with four combination screws;

then, fix the interlocking mechanism on the right-side plate of the circuit breaker with four combination screws;

- Interlocking pattern selection is shown in the table below

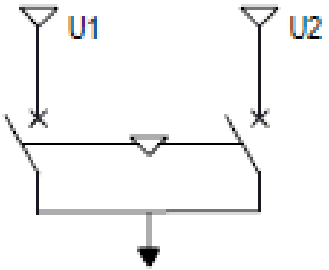
Selection mode	Code	Type	Number of circuit breakers
1	SR11	Two sets of cables, one for closing and one for opening	2
2	SR12	Three sets of cables, one for closing and two for opening	3
3	SR21	Three sets of cables, two for closing and one for opening	3
4	SY11	Two sets of hard rods, one for closing and one for opening	2
5	SY12	Three sets of hard rods, one for closing and two for opening	3

- Circuit breaker can be applicable to the following power supply state interlocking

1) Two circuit breakers (one for closing and one for opening

Usage mode is shown in the figure below, while interlocking action state is shown in the figure below.

Status Table of Two Circuit Breaks

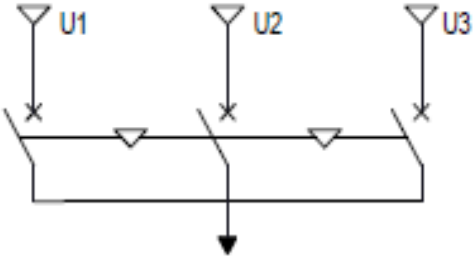


U1	U2
Close	Shunt
Shunt	Close
Shunt	Open

2) Three circuit breakers (one for closing and two for opening)

Usage mode is shown in the figure below, while interlocking action state is shown in the figure below.

Status Table of Three Circuit Breakers (One for Closing and Two for Opening)

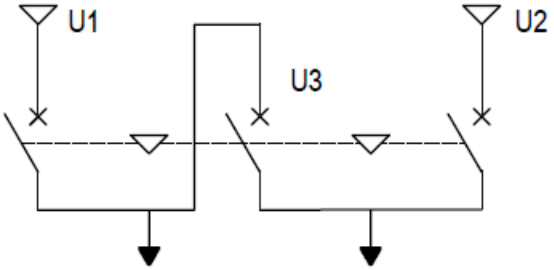


U1	U2	U3
Close	Open	Shunt
Shunt	Close	Open
Shunt	Shunt	Close
Shunt	Shunt	Open

3） Three circuit breakers (two for closing and one for opening)

Usage mode is shown in the figure below, while interlocking action state is shown in Table 64.

Status Table of Three Circuit Breakers (One for Closing and Two for Opening)

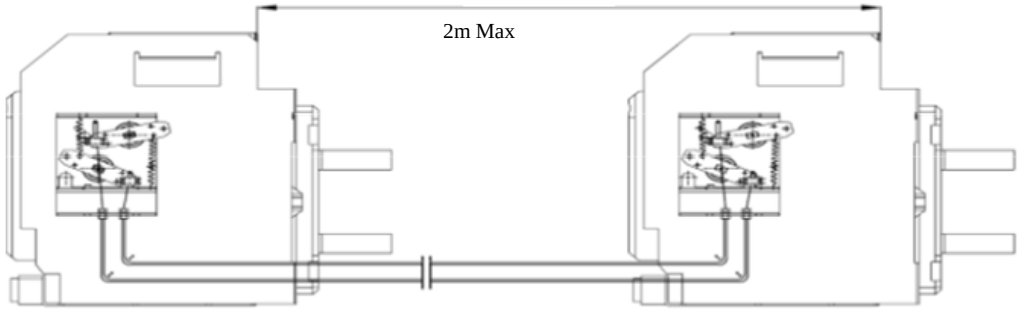


U1	U2	U3
Open	Open	Open
Close	Close	Shunt
Close	Shunt	Close
Open	Close	Close

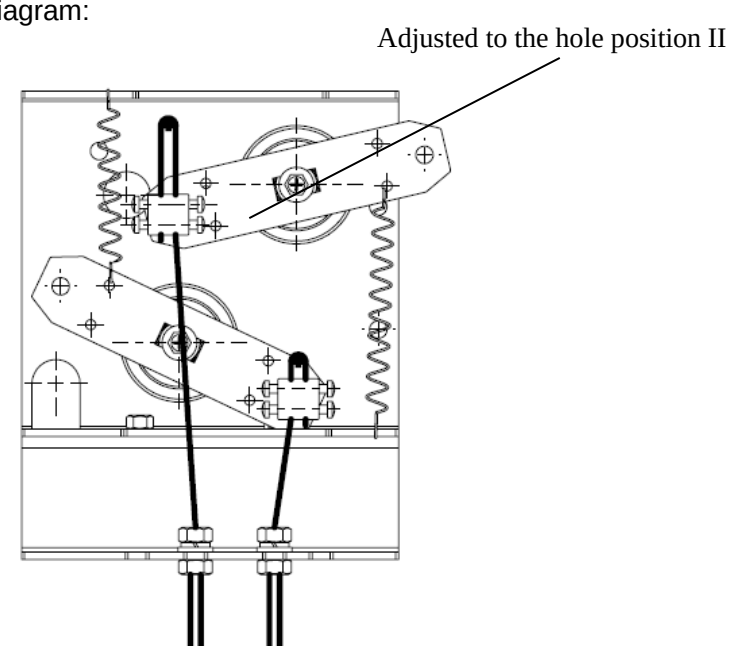
◆ Type description

1) Two interlocking cables (one for closing and one for opening)

Installation schematic diagram:

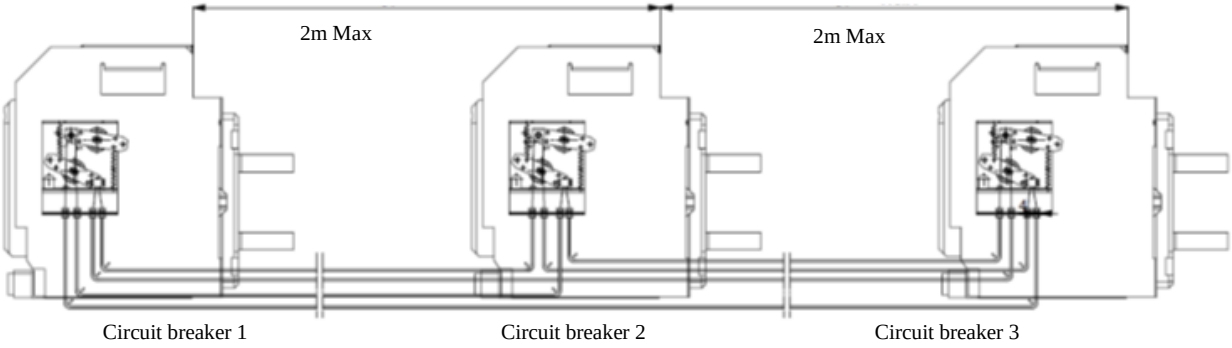


Adjustment schematic diagram:

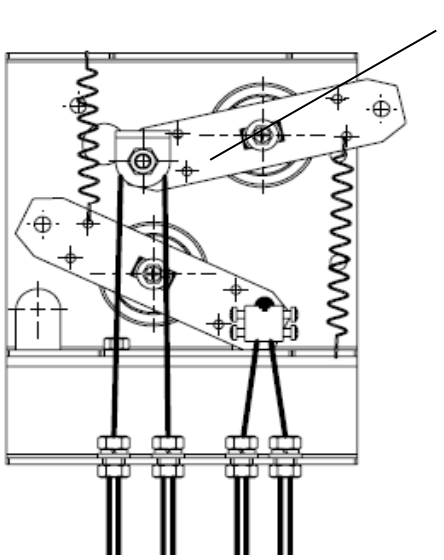


2) Three interlocking cables

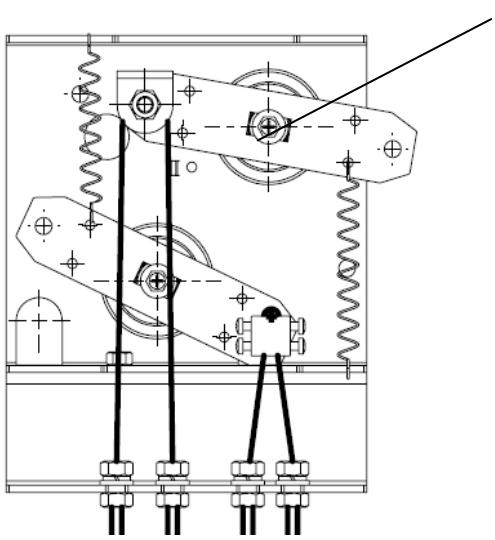
Installation schematic diagram:



Adjustment schematic diagram: One for closing and two for opening

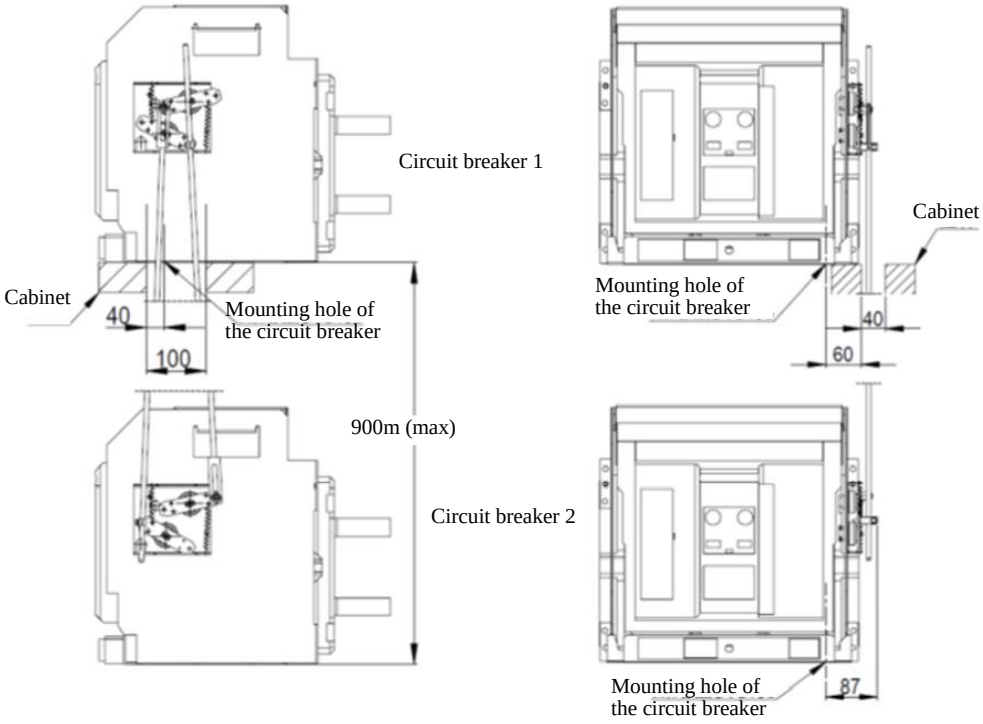


Adjustment schematic diagram: Two for closing and one for opening



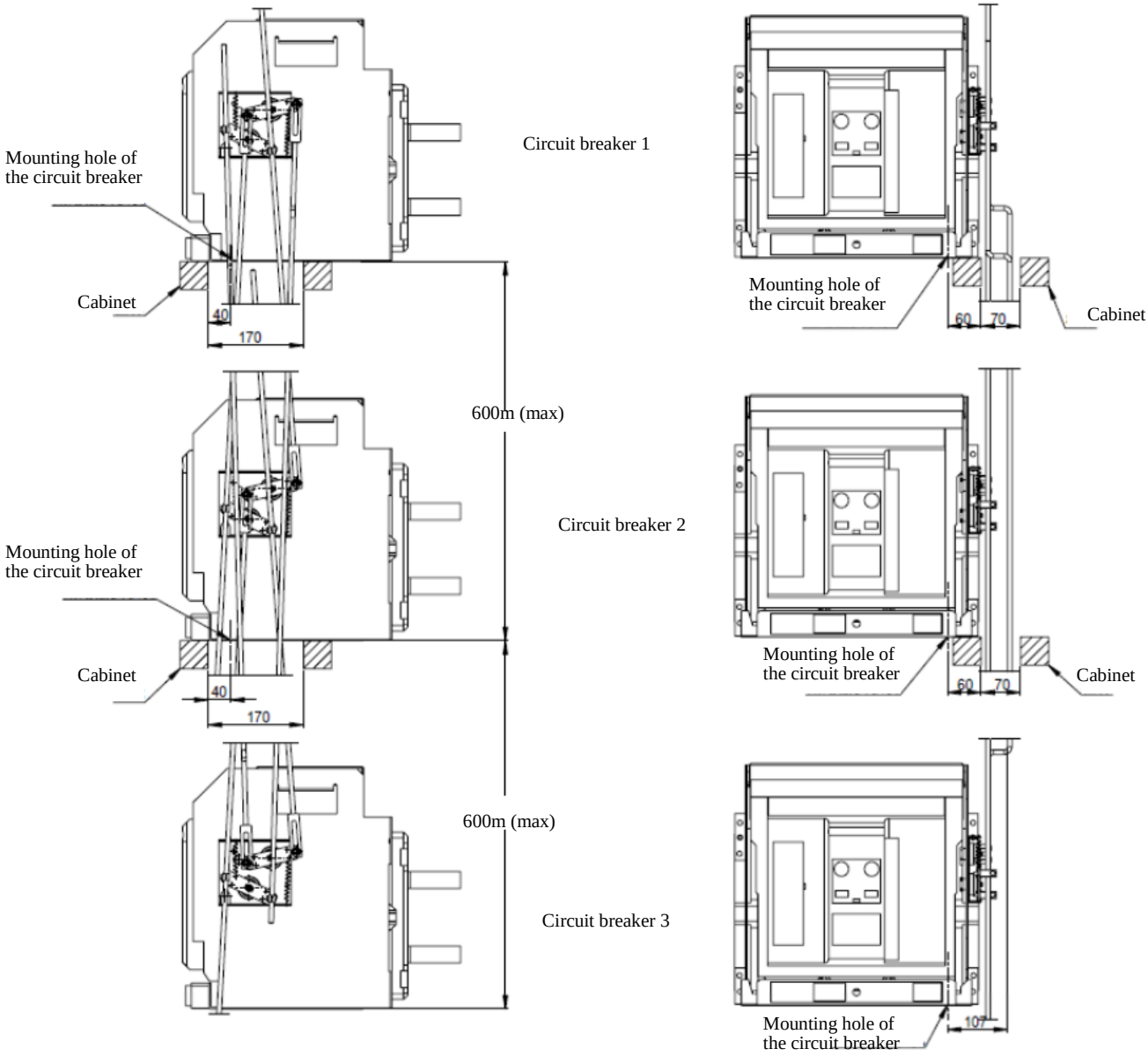
3) Two interlocking hard rods

Installation schematic diagram: (One for closing and one for opening)



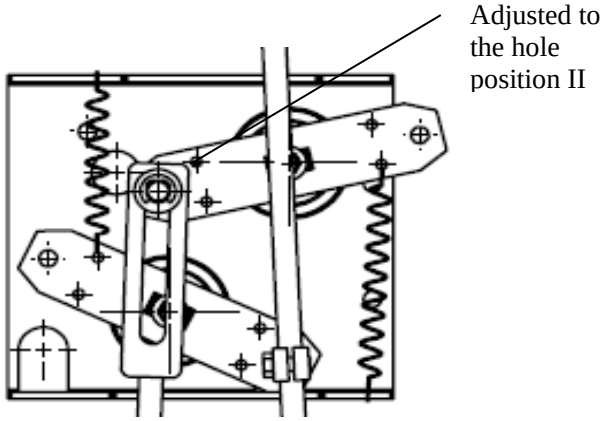
4) Three interlocking hard rods

Installation schematic diagram: (One for closing and two for opening)



Note: During the process of assembly adjustment, the overlong part of the connecting rod can be appropriately eliminated.

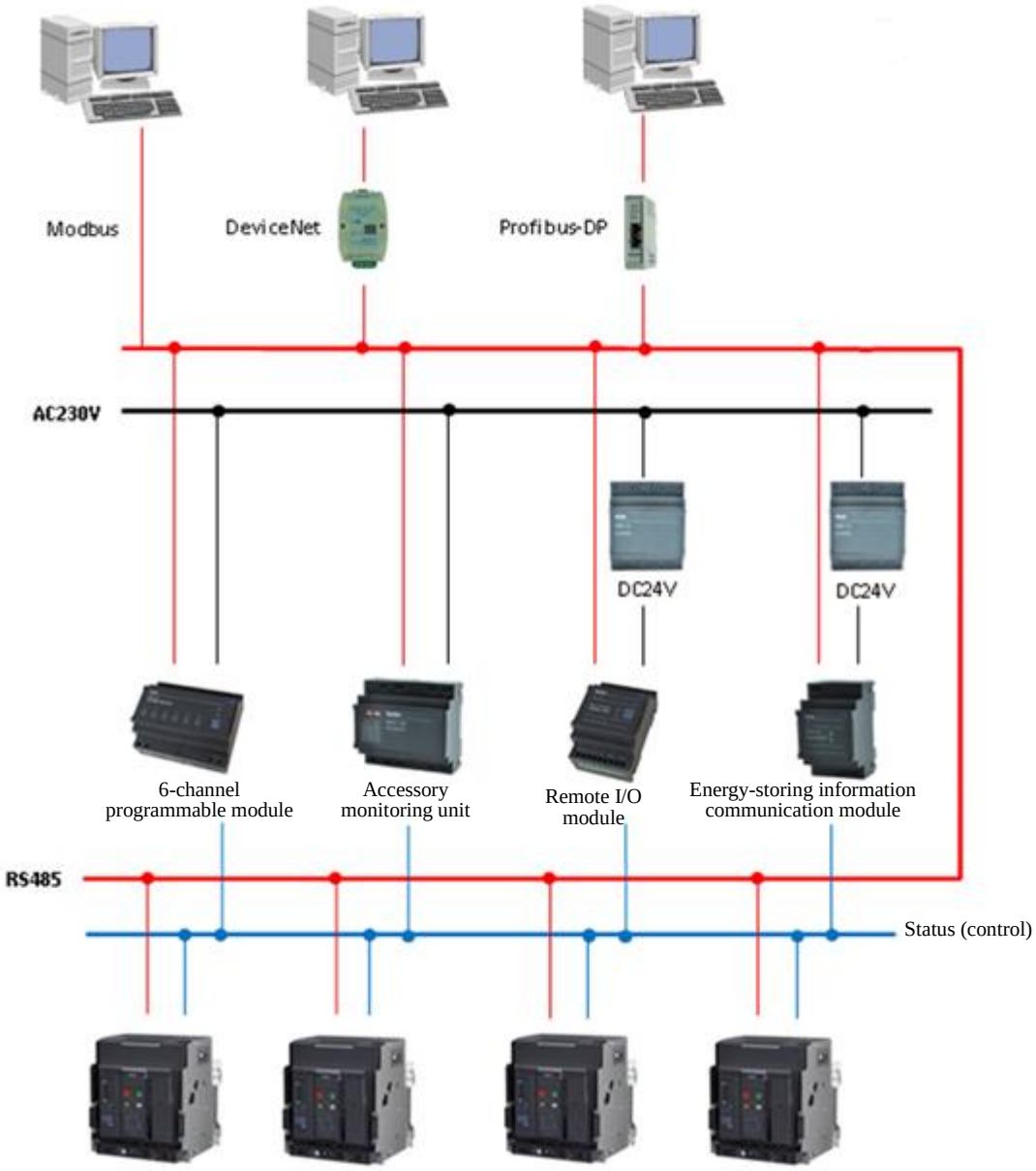
Adjustment schematic diagram:



5.8 Communication System

The controller with the communication function can realize four remotes data transmission function, i.e., “remote metering, remote control, remote adjustment and remote communication”, through the communication port according to the stipulated agreement requirements. Communication port output uses photoelectric isolation, and is suitable for strong electrical interference environment. The Modbus communication protocol is built in the controller, and does not need additional conversion module.

■ Computer communication network



Note: The red line represents the RS485 communication line, which is connected from the communication interface of controller; the black line represents the power supply line; the blue line represents the signal output line of the circuit breaker secondary terminal to output the circuit breaker status or control signal.

With the Modbus-RTU mode, connect to the computer system via the conversion interface of RS485/RS232 and twisted shielded wire line from the controller RS485 interface, or connect the RS485 signal interface of circuit breaker via the serial port server or communication manager, and then connect with computer via the Ethernet interface (RJ45 interface). Related communication parameters of Modbus-RTU are shown in the table below.

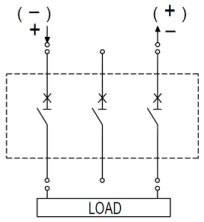
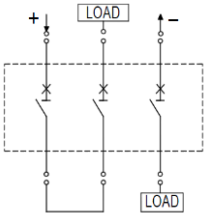
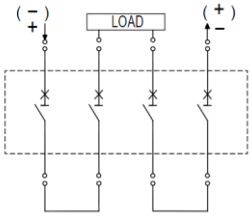
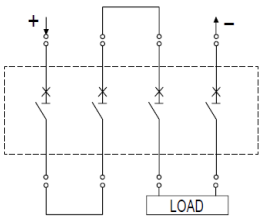
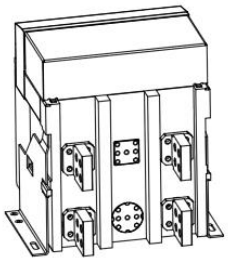
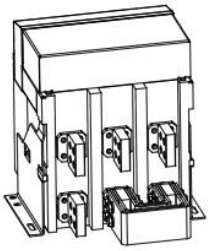
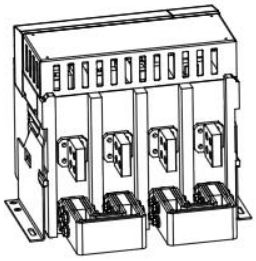
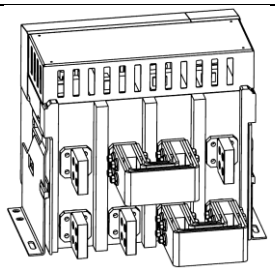
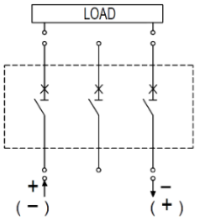
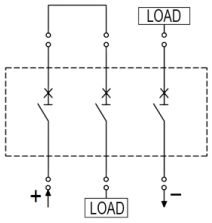
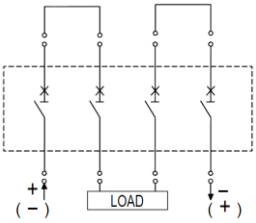
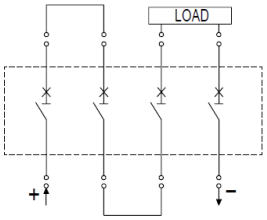
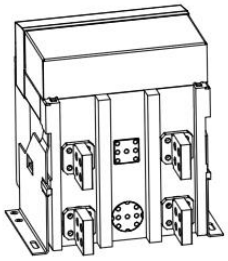
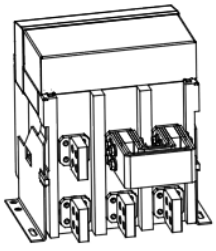
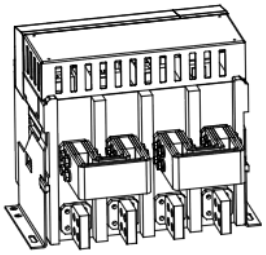
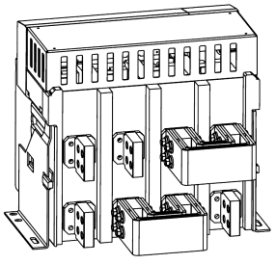
Communication protocol	Modbus
Communication address	0~255
Baud rate (bit/s)	9.6k, 19.2k, 38.4k, 115.2k
Distance (to be extended with a repeater)	1200m

With the communication network, the same line can connect up to 32 communication circuit breakers (16 drawout circuit breakers) at the same time.

Chapter 6 Wiring Mode, Outline and Installation Dimensions

6.1 Wiring mode

For the wiring mode, see the table below:

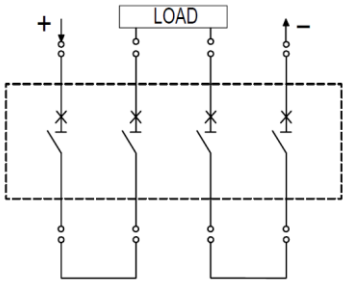
Number of poles in series / Wiring position	2P Note1	3P	4P	
Power supply from upper terminals	 Front view	 Front view	 Front view	 Front view Note2
	 3D rear view	 3D rear view	 3D rear view	 3D rear view Note2
Power supply from lower terminals	 Front view	 Front view	 Front view	 Front view Note2
	 3D rear view	 3D rear view	 3D rear view	 3D rear view Note2

Note1:Only suitable for NDW3Z-2500;

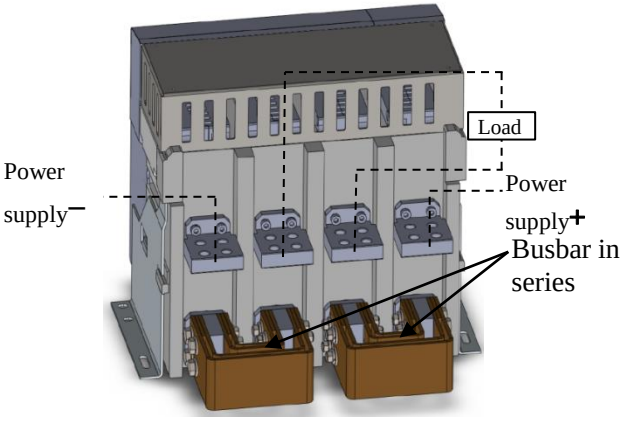
Note2: The 4P negative earthing system in series need to use this connection method to ensure positive pole of the power supply connects to 3 groups of contact in series.

Examples of wiring mode:

Power supply from upper terminals of 4P in series

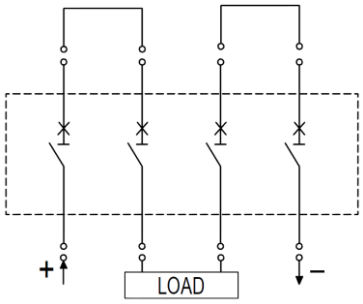


Front View

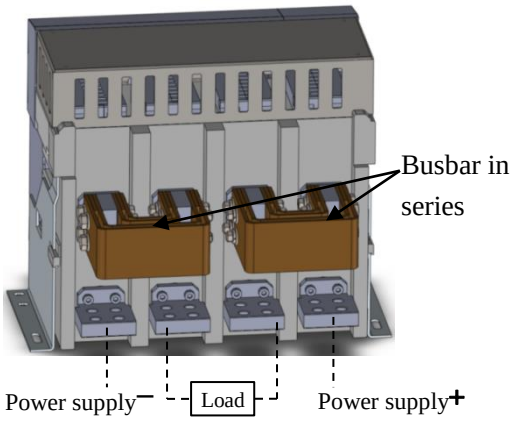


3D Rear View

Power supply from lower terminals of 4P in series

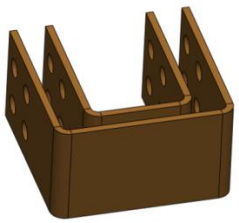
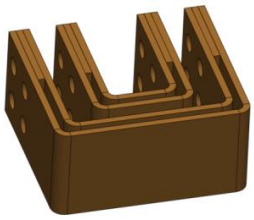
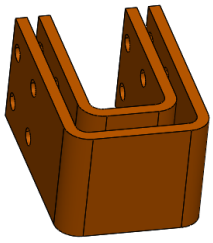
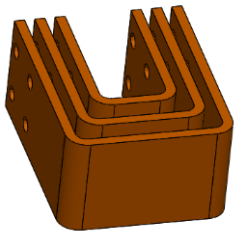


Front View

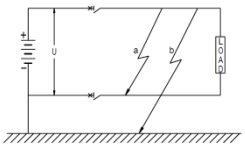
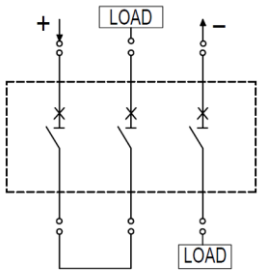
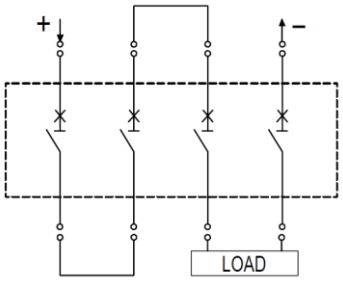


3D Rear View

See the table below for the configuration of the busbars in series

Model	Rated current	Busbar in series
NDW3Z-2500	800A, 1000A, 1250A	
	1600A, 2000A, 2500A	
NDW3Z-4000	1600A、2000A、2500A	
	3200A、3600A、4000A	

The rated limit short-circuit breaking capacity (Icu) is selected according to the system type

Negative pole grounding system[Note]									
									
Rated voltage (Ue)		≤DC 500V		≤DC 750V		≤DC 500V		≤DC 750V	
Fault type		a	b	a	b	a	b	a	b
Pole number affected by the fault		3	2	3	2	4	3	4	3
I_{cu}		kA							
NDW3Z-2500		65	50	55	40	65	65	55	55
NDW3Z-400	S	80	55	65	50	80	80	65	65
0	H	120	80	80	55	120	120	80	80

Note: The 4P in series need to ensure positive pole of the power supply connects to 3 groups of contact in series.

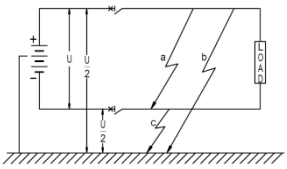
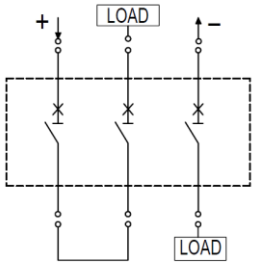
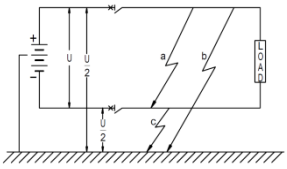
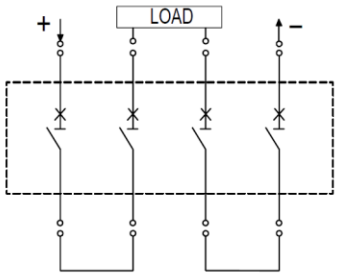
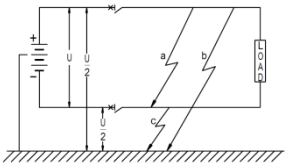
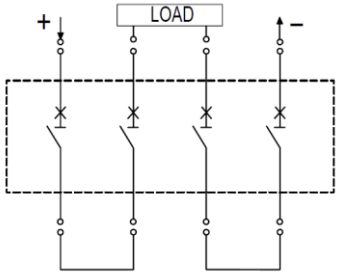
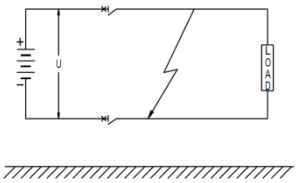
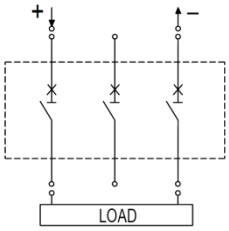
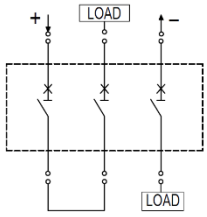
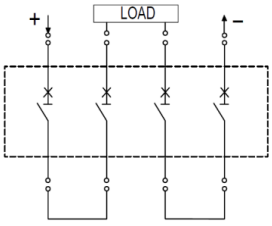
Neutral point grounding system							
							
Rated voltage (Ue)		≤DC 500V			≤DC 750V		
Fault type		a	b	c	a	b	c
Pole number affected by the fault		3	2	1	3	2	1
Voltage affected by the fault		U	1/2U	1/2U	U	1/2U	1/2U
I_{cu}		kA					
NDW3Z-2500		65	65	50	55	55	40
NDW3Z-400	S	80	80	55	65	65	50
0	H	120	120	80	80	80	60
Neutral point grounding system							
							
Rated voltage (Ue)		≤DC 500V			≤DC 750V		
Fault type		a	b	c	a	b	c
Pole number affected by the fault		4	2	2	4	2	2
Voltage affected by the fault		U	1/2U	1/2U	U	1/2U	1/2U
I_{cu}		kA					
NDW3Z-2500		65			55		
NDW3Z-400	S	80			65		
0	H	120			80		

Table Continued

Neutral point grounding system							
							
Rated voltage (Ue)		≤DC 1000V			≤DC 1500V		
Fault type		a	b	c	a	b	c
Pole number affected by the fault		4	2	2	4	2	2
Voltage affected by the fault		U	1/2U	1/2U	U	1/2U	1/2U
I_{cu}		kA					
NDW3Z-2500		50			40		
NDW3Z-4000	S	55			50		
	H	75			60		

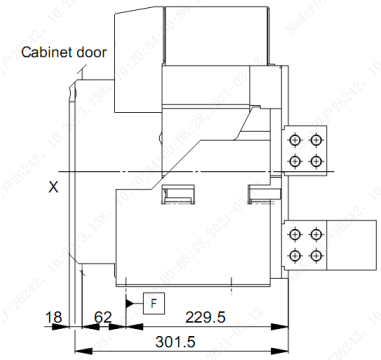
Insulation system							
							
Rated voltage (Ue)		≤DC 500V	≤DC 750V	≤DC 500V	≤DC 750V	≤DC 1000V	≤DC 1500V
Pole number affected by the fault		2	2	3	3	4	4
I_{cu}		kA					
NDW3Z-2500		50	40	65	55	50	40
NDW3Z-4000	S	/	/	80	65	55	50
	H	/	/	120	80	75	60

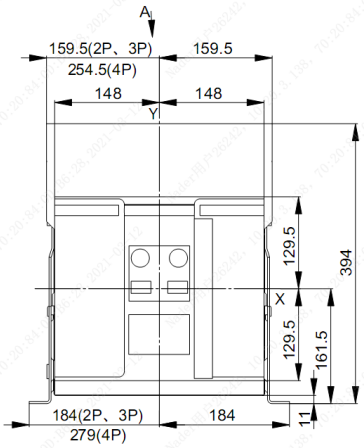
6.2 Outline and Installation Dimensions

6.2.1 NDW3Z-2500 Outline and Installation Dimensions

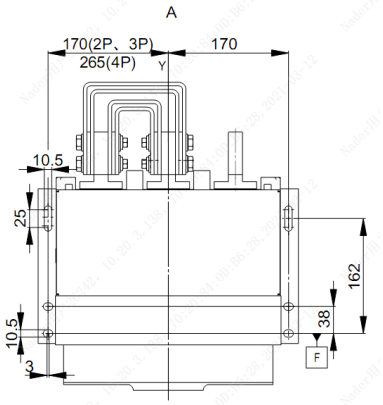
NDW3Z-2500 Fixed-type Outline and Installation Dimensions (Unit: mm)

Dimensions



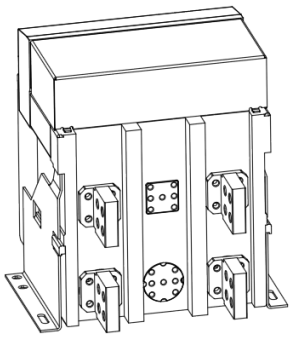


Fixed Details

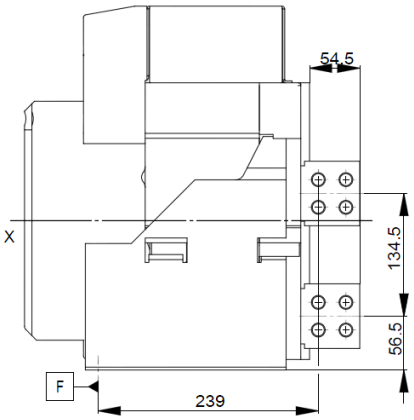


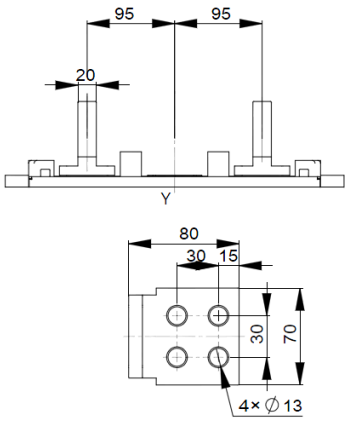
Vertical wiring of 2P in series

(Power supply from upper or lower terminals)



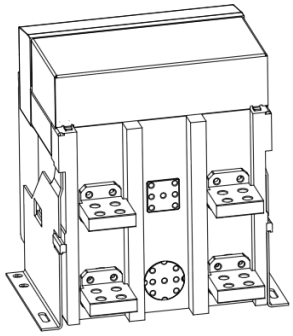
Detail

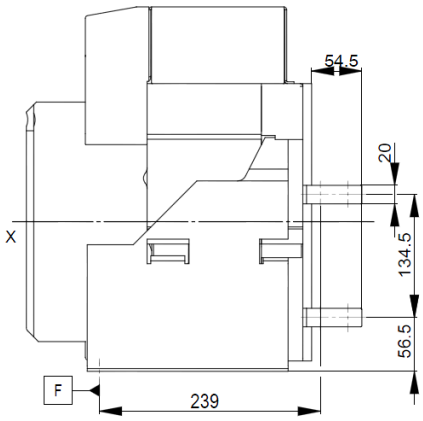


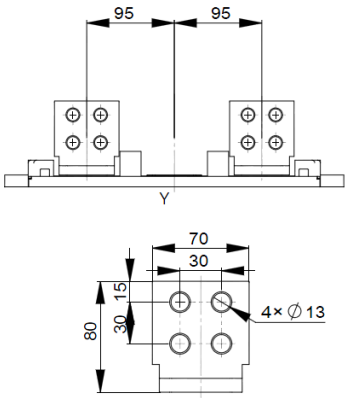


Horizontal wiring of 2P in series

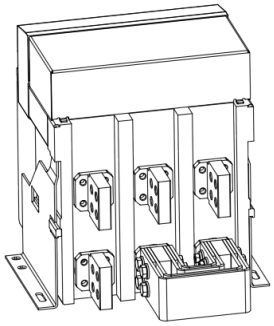
(Power supply from upper or lower terminals) Detail

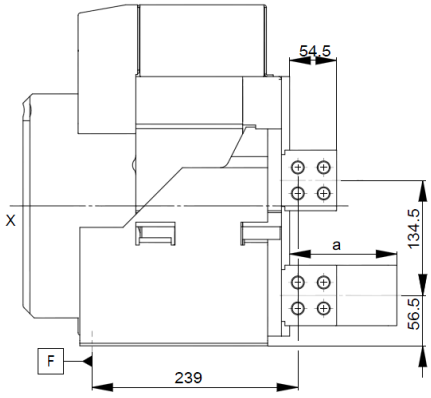


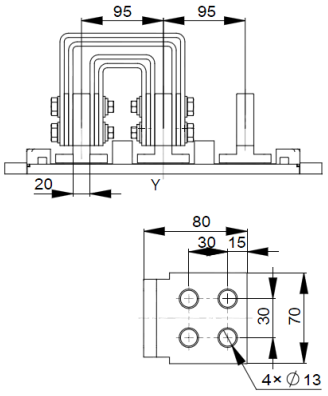




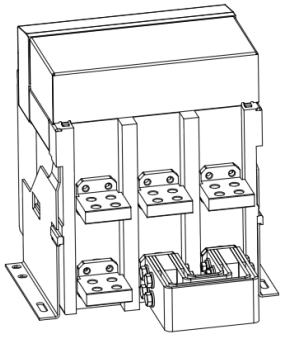
Power supply from Vertical upper terminals of 3P in series Detail

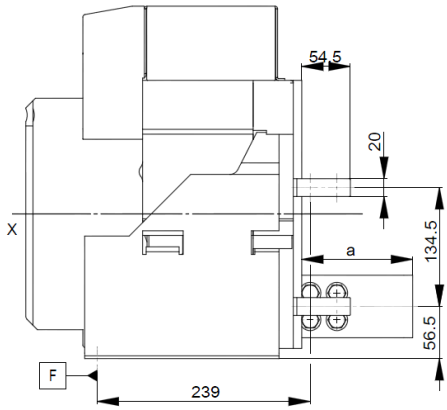


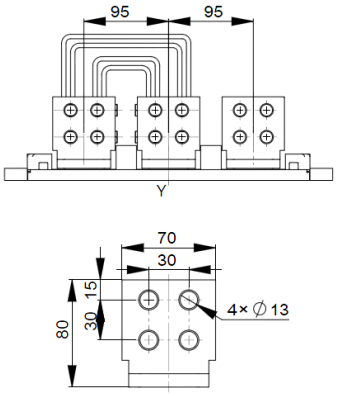




Power supply from Horizontal upper terminals of 3P in series Detail

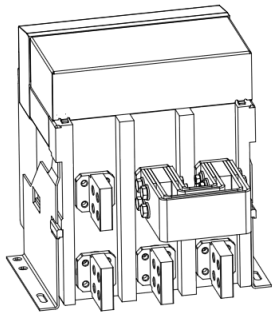


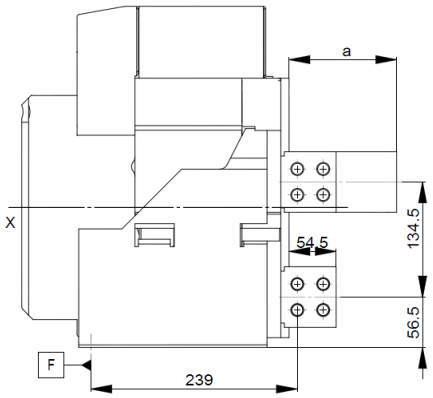




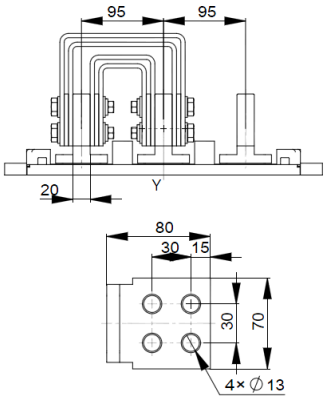
Rated current	Dimension a (mm)
800A, 1000A, 1250A	114.5
1600A, 2000A, 2500A	124.5

Power supply from vertical lower terminals of 3P in series

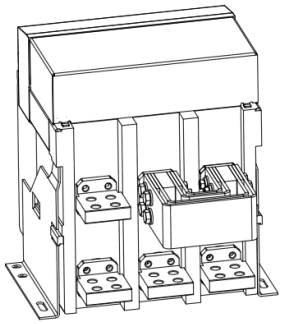


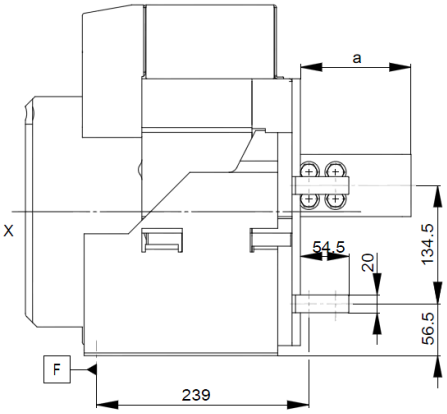


Detail

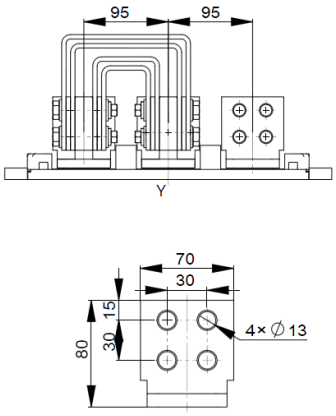


Power supply from horizontal lower terminals of 3P in series

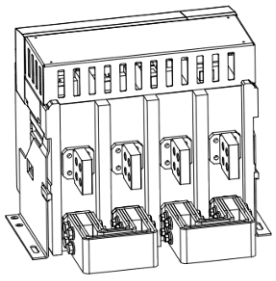


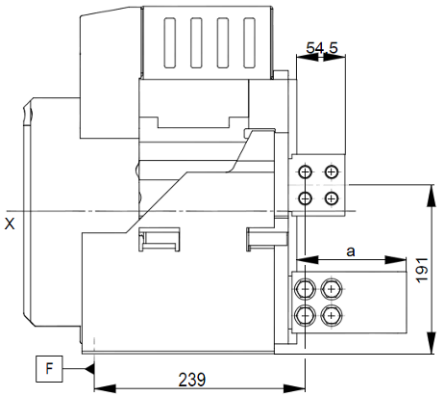


Detail

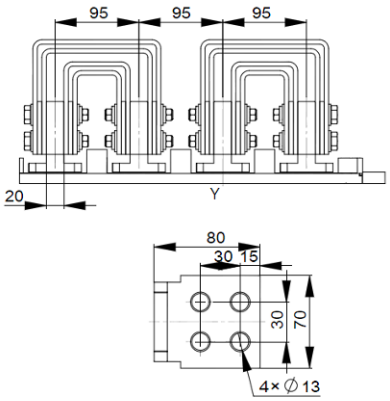


Power supply from vertical upper terminals of 4P in series



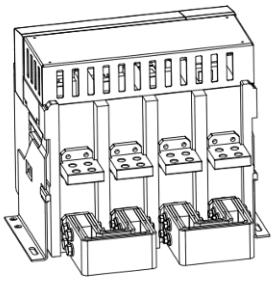


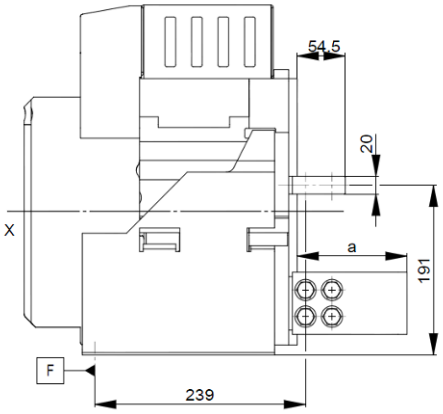
Detail



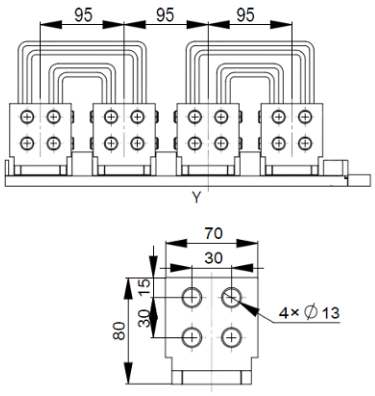
Rated current	Dimension a (mm)
800A, 1000A, 1250A	114.5
1600A, 2000A, 2500A	124.5

Power supply from horizontal upper terminals of 4P in series

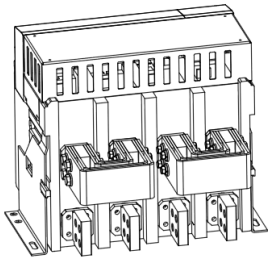


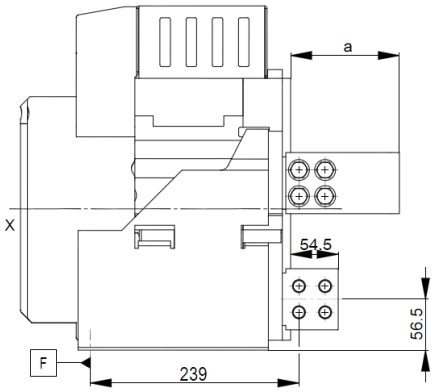


Detail

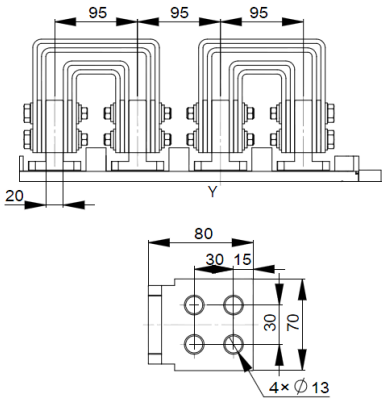


Power supply from vertical lower terminals of 4P in series

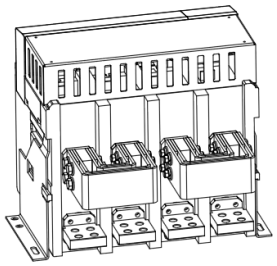


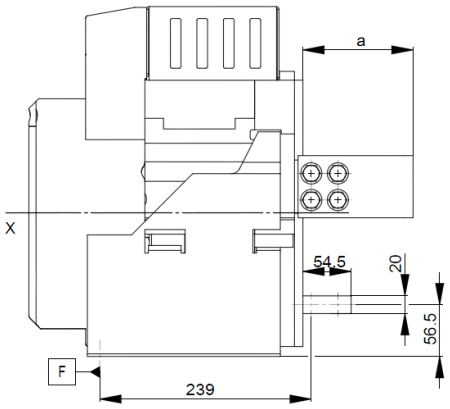


Detail

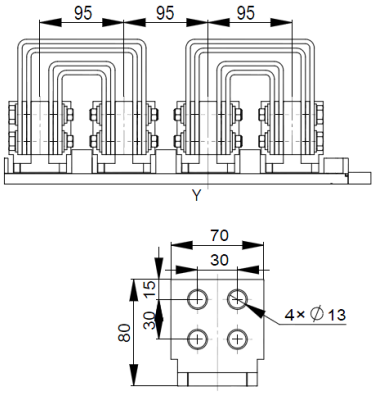


Power supply from horizontal lower terminals of 4P in series



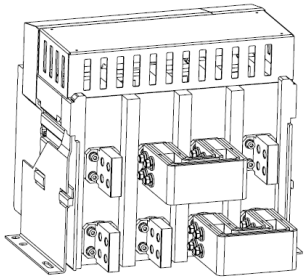


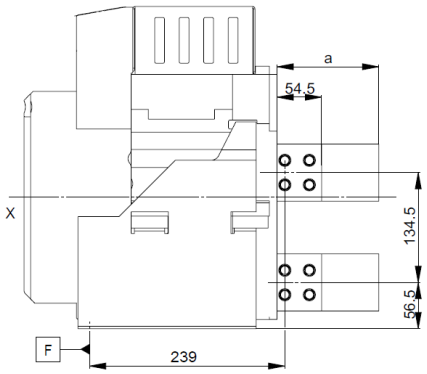
Detail



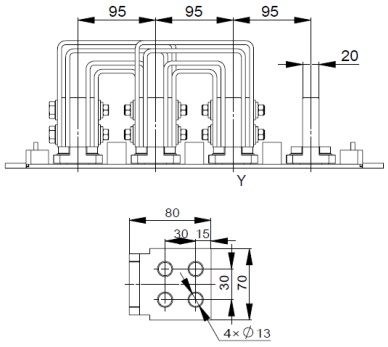
Rated current	Dimension a (mm)
800A, 1000A, 1250A	114.5
1600A, 2000A, 2500A	124.5

Special Power supply from vertical upper terminals of 4P in series

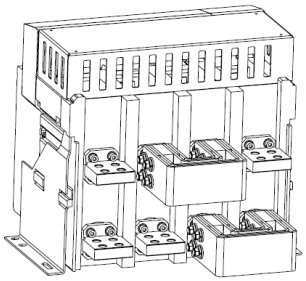


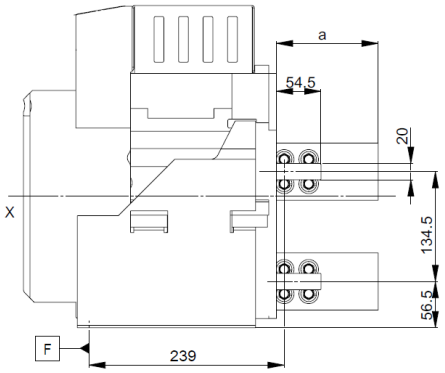


Detail

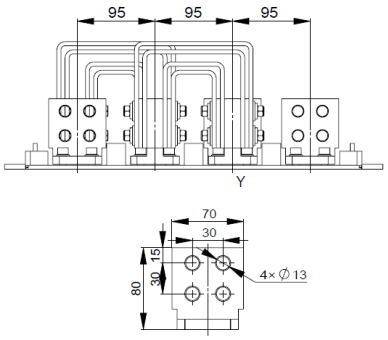


Special Power supply from horizontal upper terminals of 4P in series

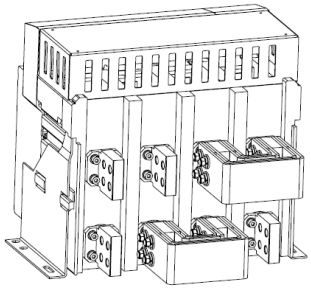


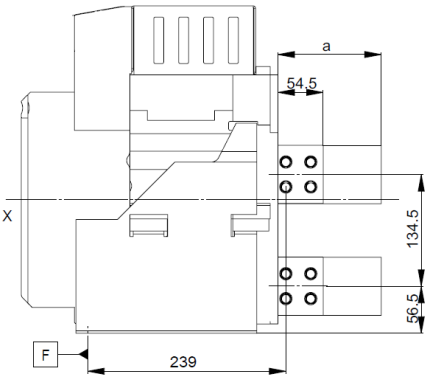


Detail

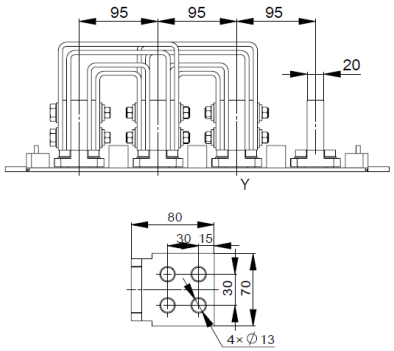


Special Power supply from vertical lower terminals of 4P in series



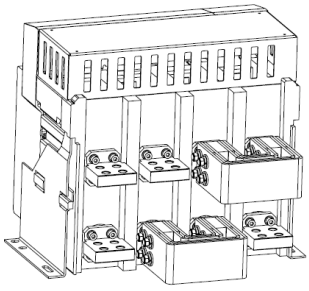


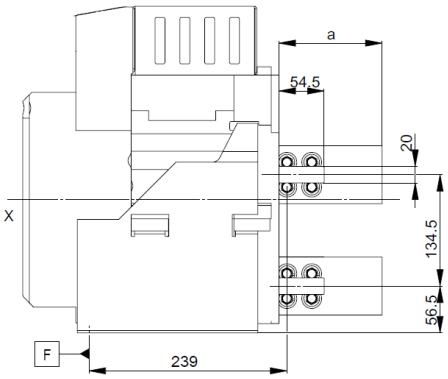
Detail



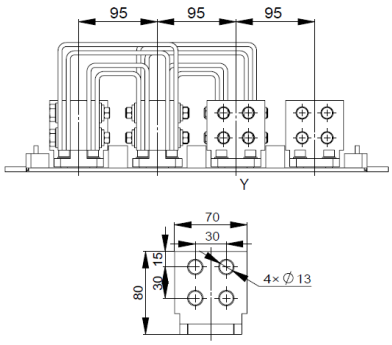
Rated current	Dimension a (mm)
800A, 1000A, 1250A	114.5
1600A, 2000A, 2500A	124.5

Special Power supply from horizontal lower terminals of 4P in series





Detail



Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

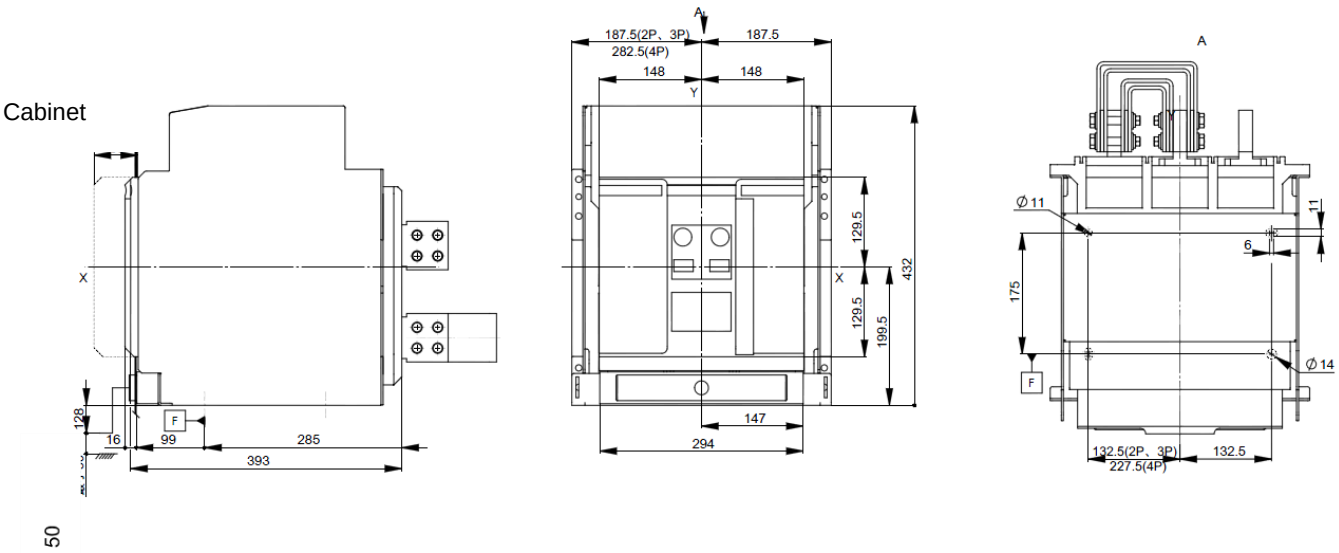
Rated current	Dimension a (mm)
800A, 1000A, 1250A	114.5
1600A, 2000A, 2500A	124.5

NDW3Z-2500 Drawout-type Outline and Installation Dimensions (Unit: mm)

Dimensions

Fixed Details

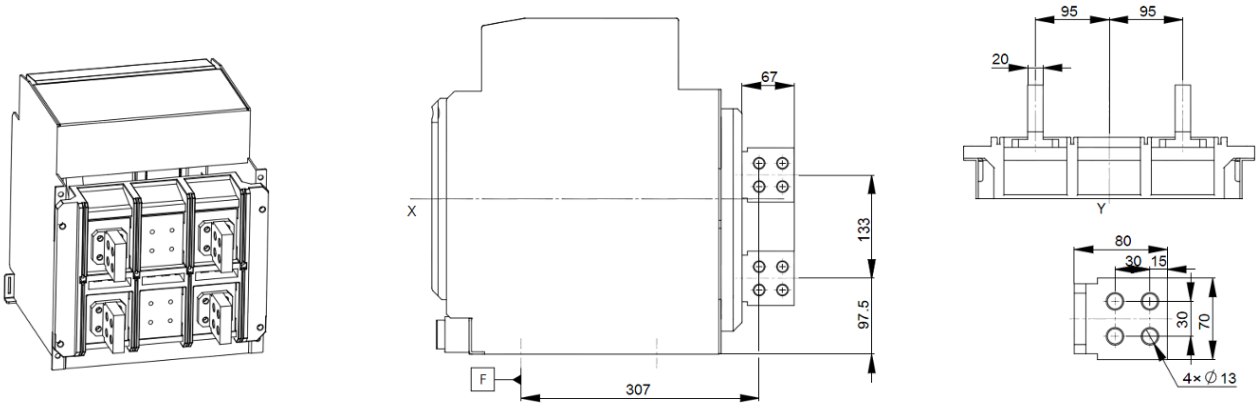
Cabinet



Vertical wiring of 2P in series

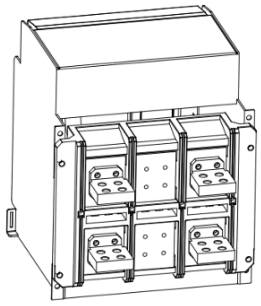
(Power supply from upper or lower terminals)

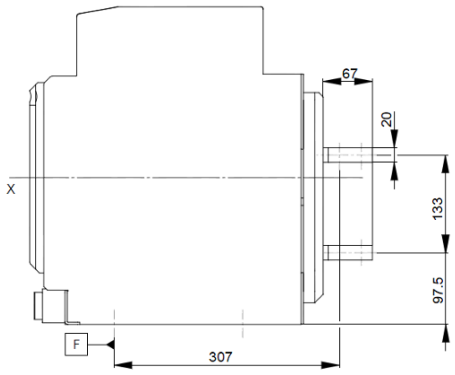
Detail

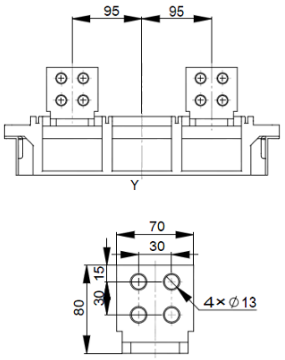


Horizontal wiring of 2P in series

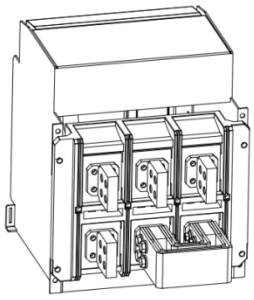
(Power supply from upper or lower terminals) Detail

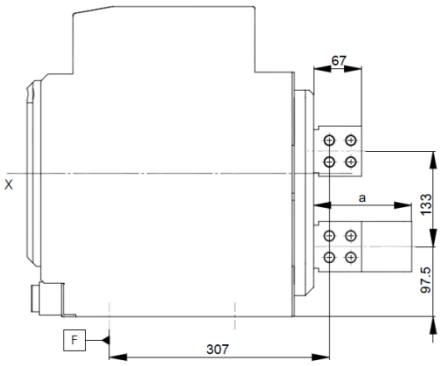


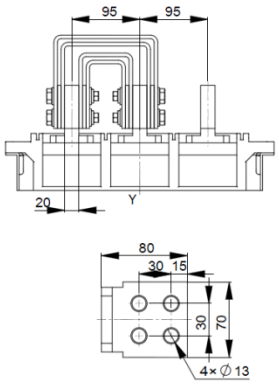




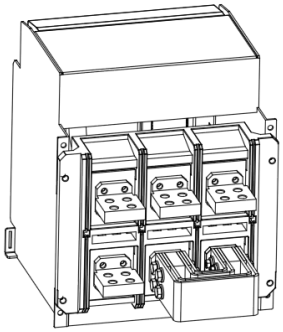
Power supply from vertical upper terminals of 3P in series Detail

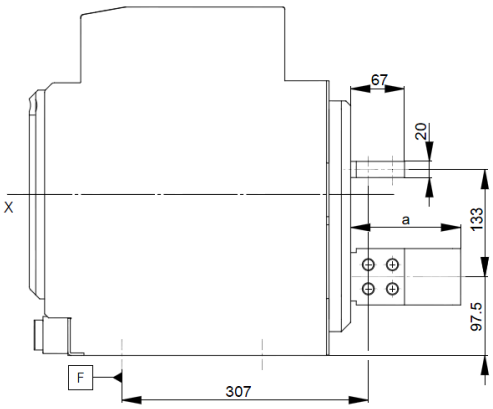


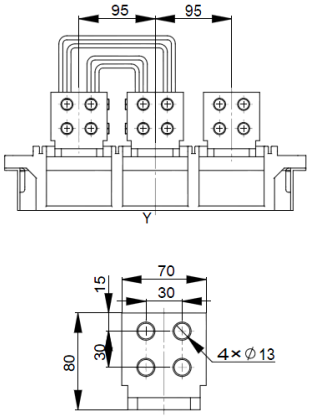




Power supply from horizontal upper terminals of 3P in series Detail



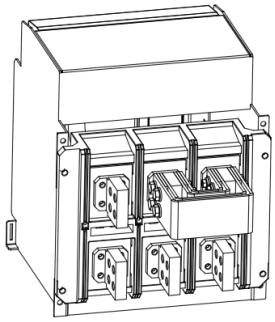




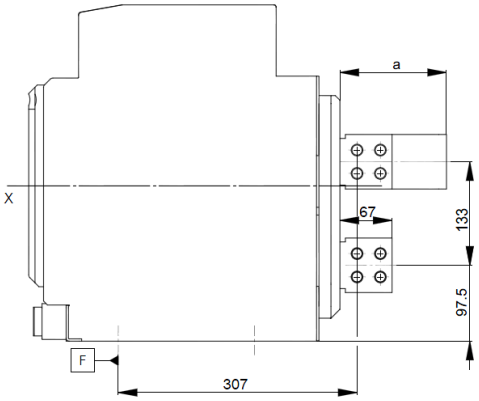
Rated current	Dimension a (mm)
800A, 1000A, 1250A	127

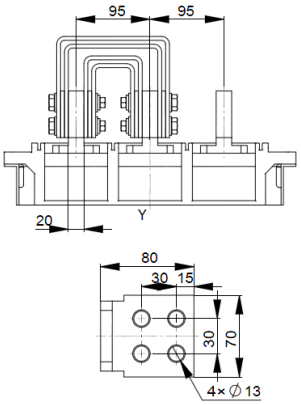
1600A, 2000A, 2500A	137

Power supply from vertical lower terminals of 3P in series

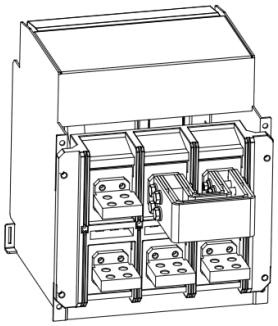


Detail

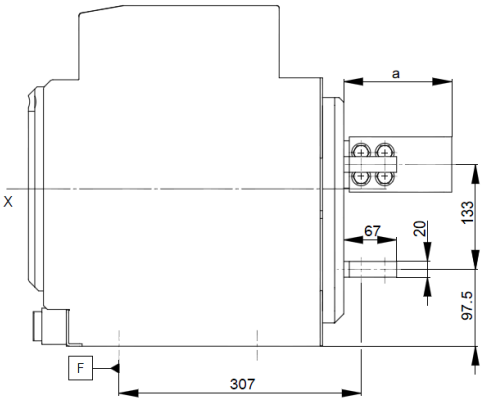


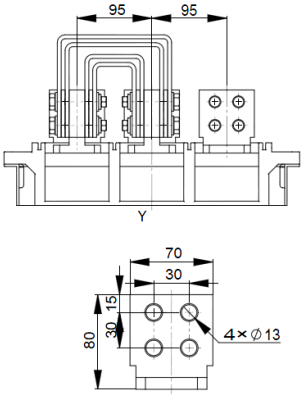


Power supply from horizontal lower terminals of 3P in series

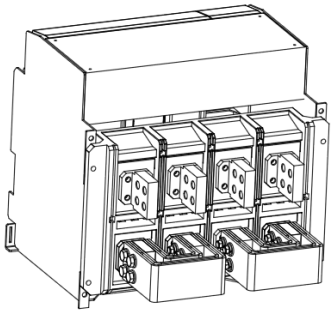


Detail

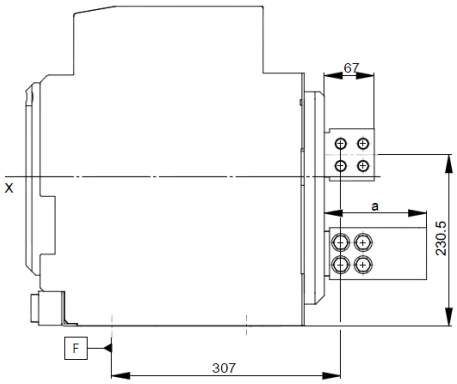


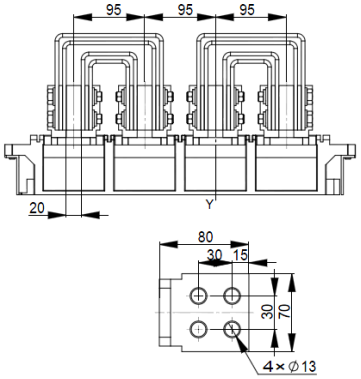


Power supply from vertical upper terminals of 4P in series



Detail

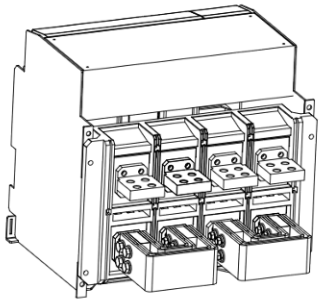


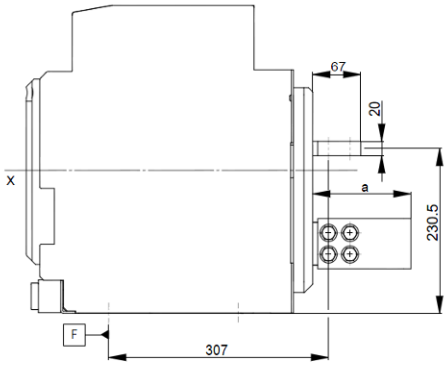


Rated current	Dimension a (mm)
800A, 1000A, 1250A	127

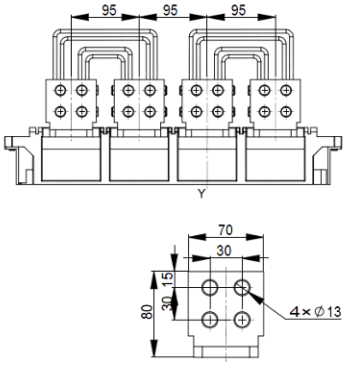
1600A, 2000A, 2500A	137

Power supply from horizontal upper terminals of 4P in series

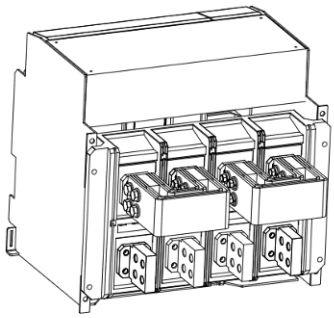


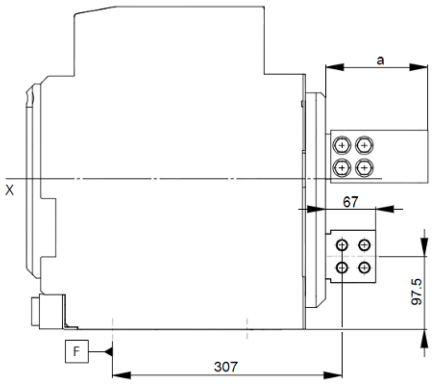


Detail

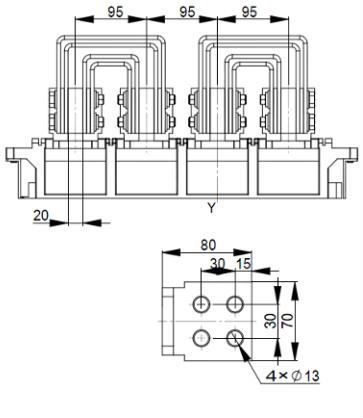


Power supply from vertical lower terminals of 4P in series

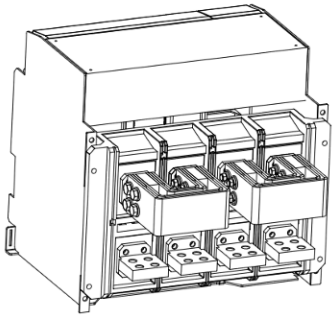


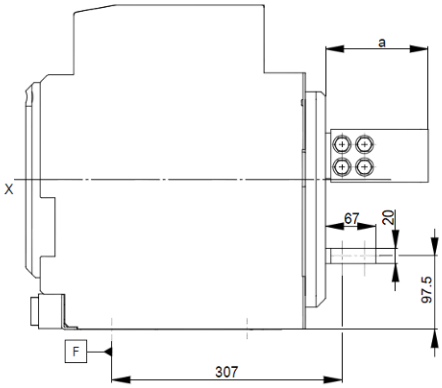


Detail

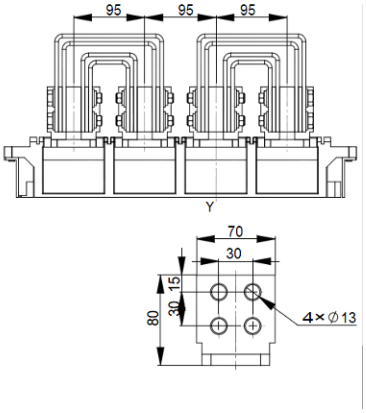


Power supply from horizontal lower terminals of 4P in series





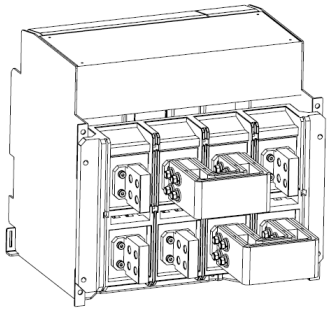
Detail

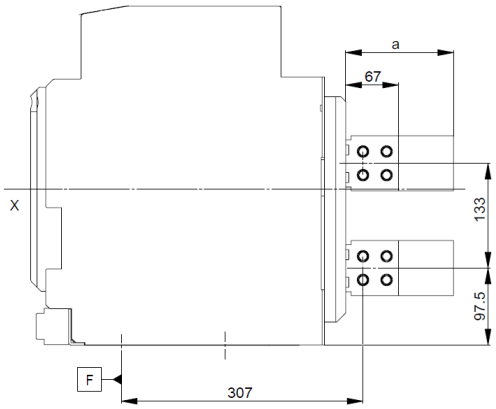


Rated current	Dimension a (mm)

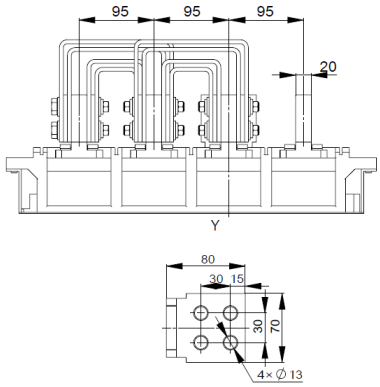
800A, 1000A, 1250A	127
1600A, 2000A, 2500A	137

Special Power supply from vertical upper terminals of 4P in series

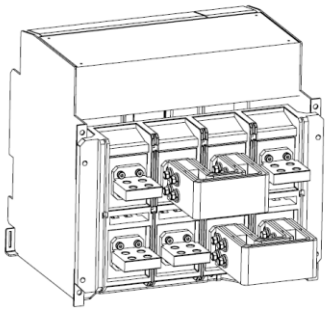


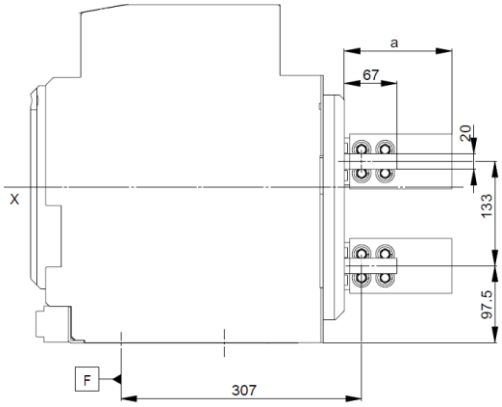


Detail

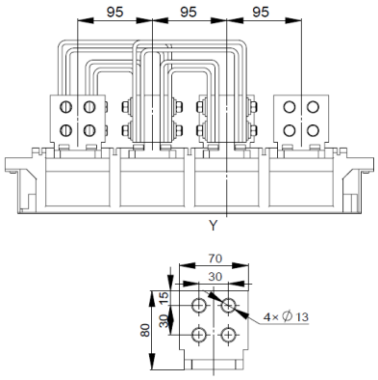


Special Power supply from horizontal upper terminals of 4P in series

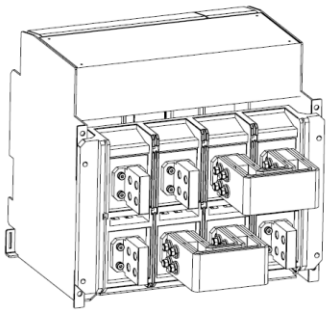


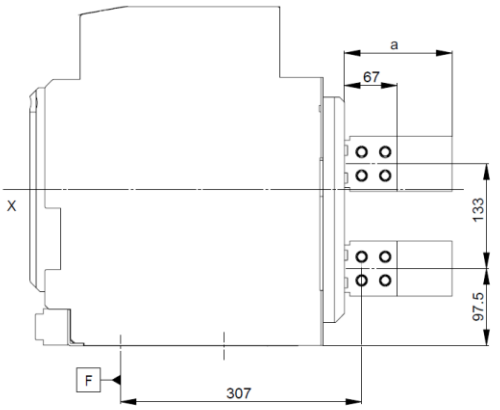


Detail

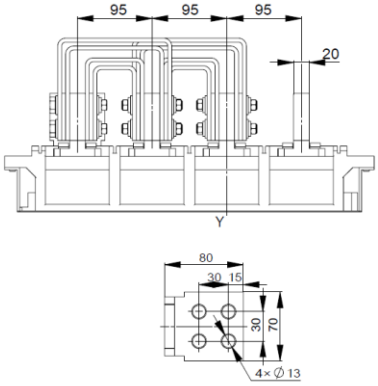


Special Power supply from vertical lower terminals of 4P in series



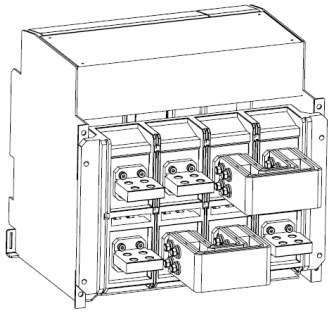


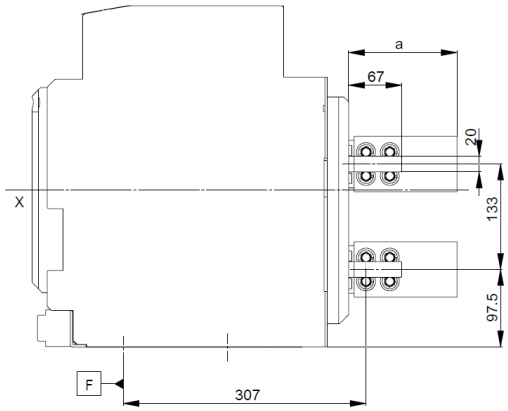
Detail



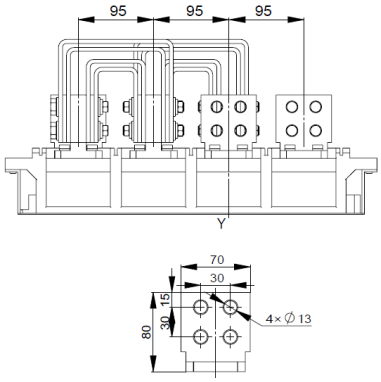
Rated current	Dimension a (mm)
800A, 1000A, 1250A	127
1600A, 2000A, 2500A	137

Special Power supply from horizontal lower terminals of 4P in series





Detail



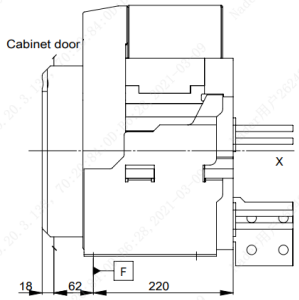
Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

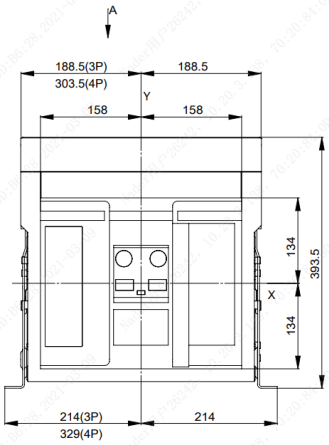
Rated current	Dimension a (mm)
800A, 1000A, 1250A	127
1600A, 2000A, 2500A	137

6. 2. 2 **NDW3Z-4000 Outline and Installation Dimensions**

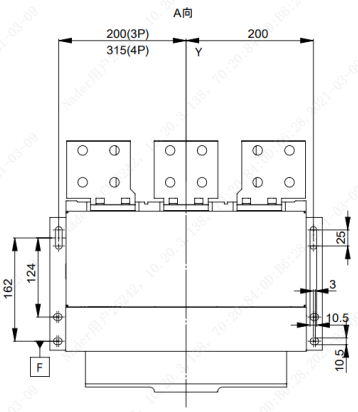
NDW3Z-4000 Fixed-type Outline and Installation Dimensions (Unit: mm)

Dimensions

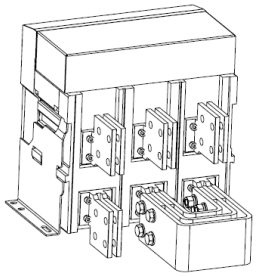


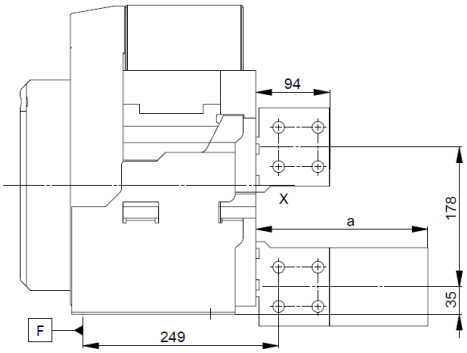


Fixed Details



Power supply from Vertical upper terminals of 3P in series





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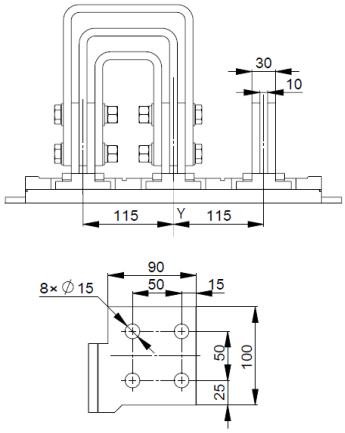
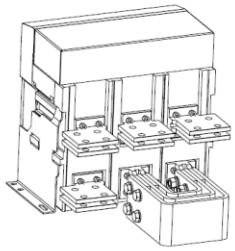
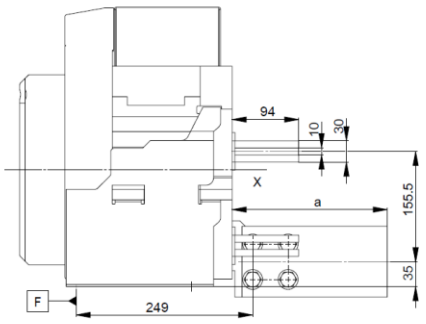


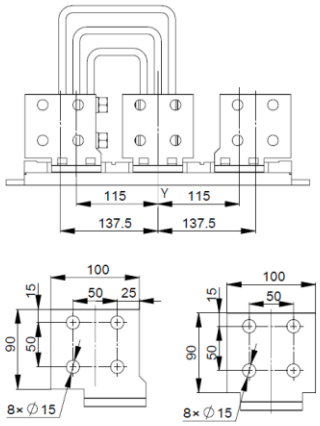
Rated current	Dimension a (mm)
1600A, 2000A, 2500A	189
3200A, 3600A, 4000A	219

Power supply from Horizontal upper terminals of 3P in series

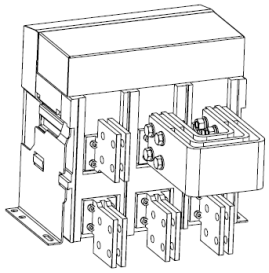


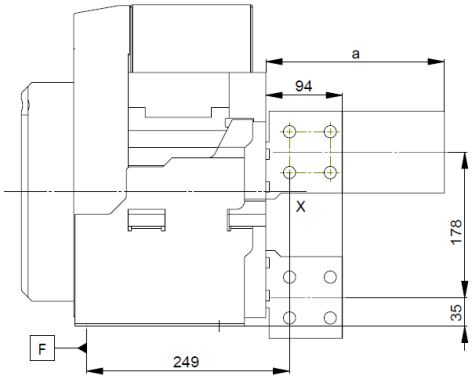


Detail

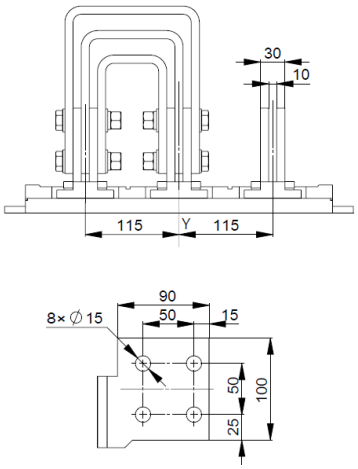


Power supply from vertical lower terminals of 3P in series

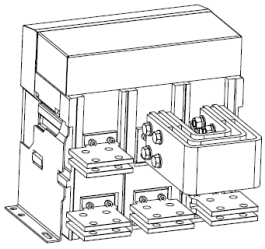


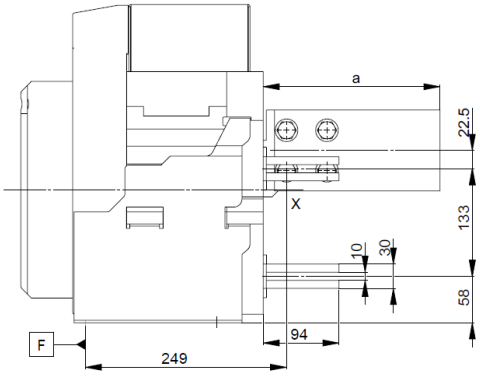


Detail

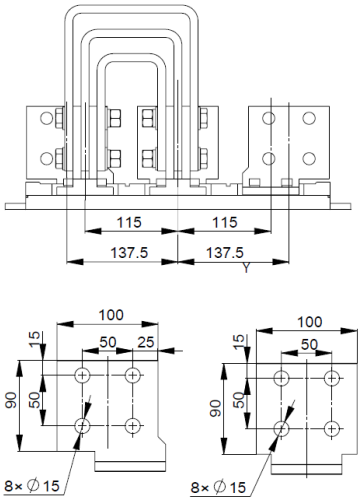


Power supply from horizontal lower terminals of 3P in series



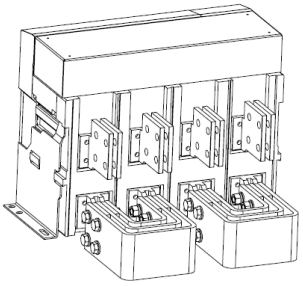


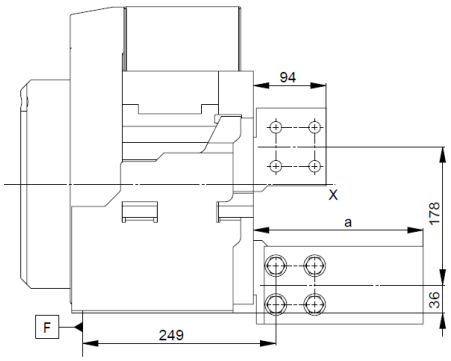
Detail



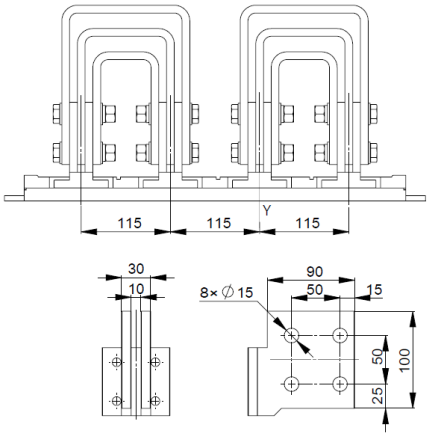
Rated current	Dimension a (mm)
1600A, 2000A, 2500A	189
3200A, 3600A, 4000A	219

Power supply from vertical upper terminals of 4P in series

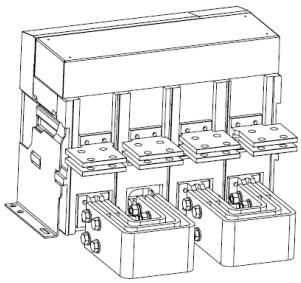


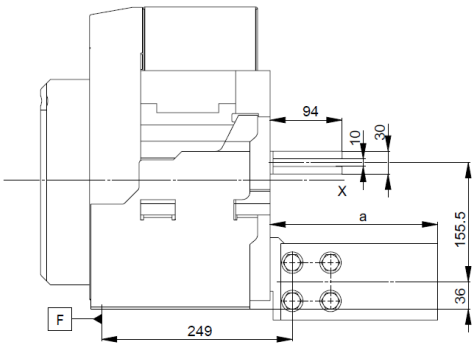


Detail

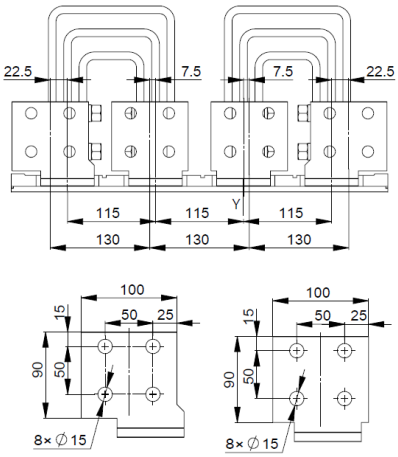


Power supply from horizontal upper terminals of 4P in series

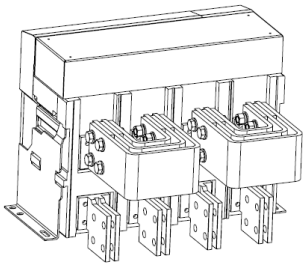


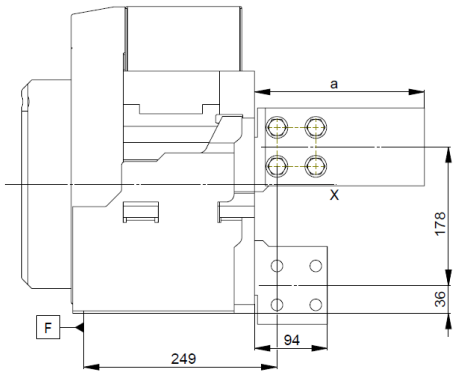


Detail

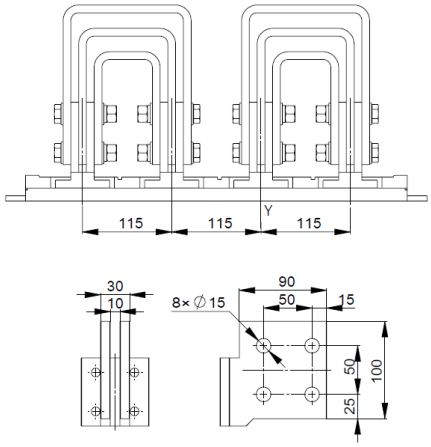


Power supply from vertical lower terminals of 4P in series



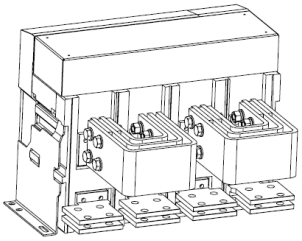


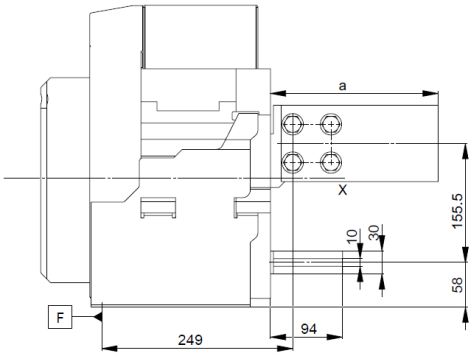
Detail



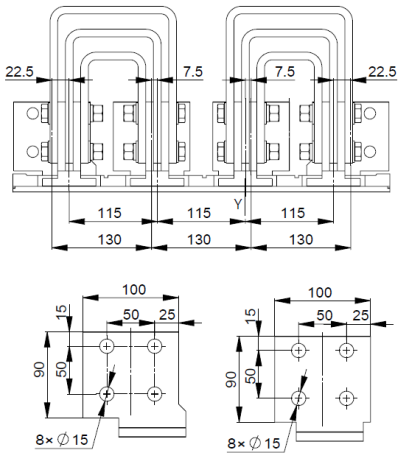
Rated current	Dimension a (mm)
1600A, 2000A, 2500A	189
3200A, 3600A, 4000A	219

Power supply from horizontal lower terminals of 4P in series

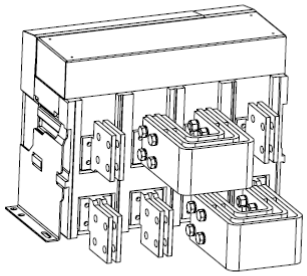


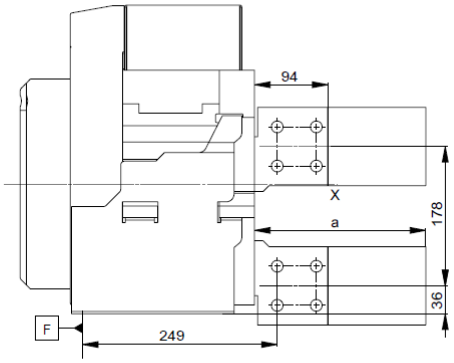


Detail

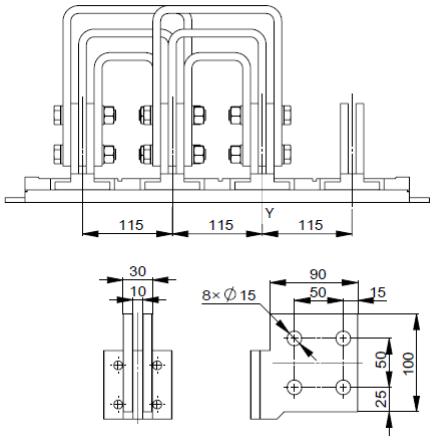


Special Power supply from vertical upper terminals of 4P in series

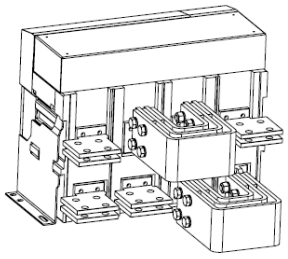


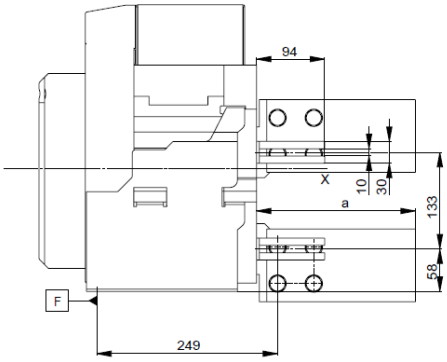


Detail

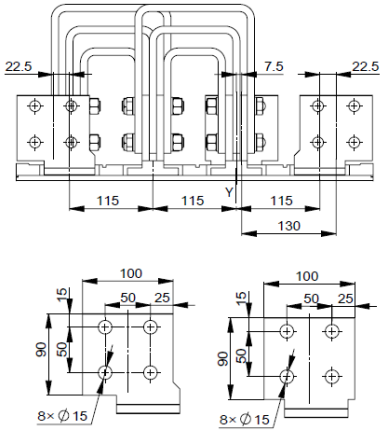


Special Power supply from horizontal upper terminals of 4P in series



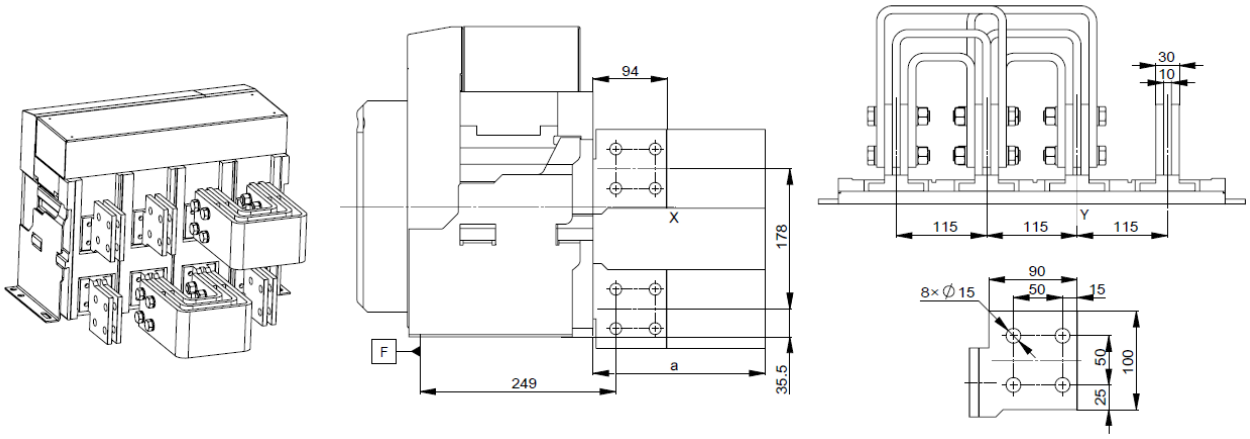


Detail

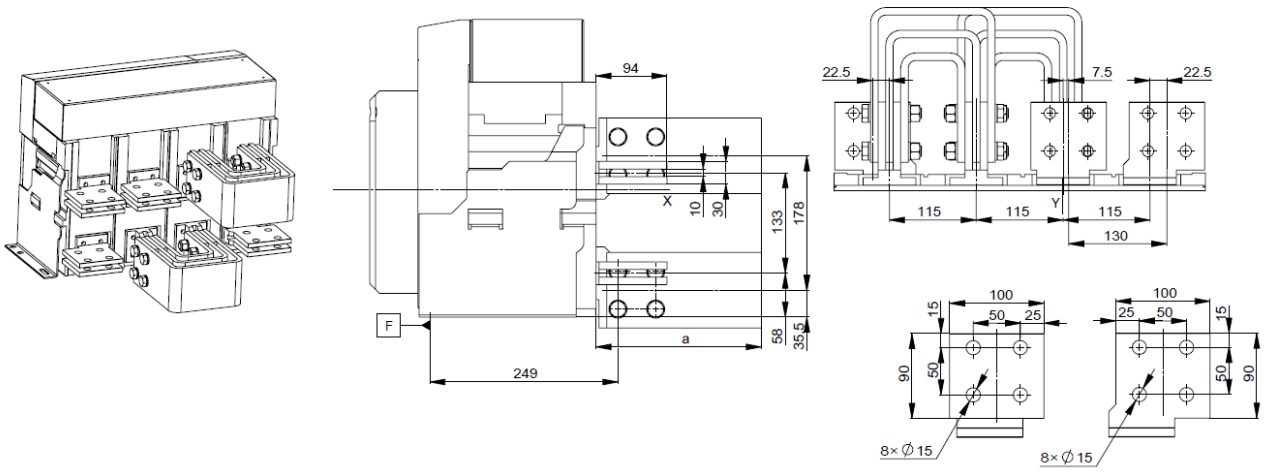


Rated current	Dimension a (mm)
1600A, 2000A, 2500A	189
3200A, 3600A, 4000A	219

Special Power supply from vertical lower terminals of 4P in series Detail



Special Power supply from horizontal lower terminals of 4P in series Detail

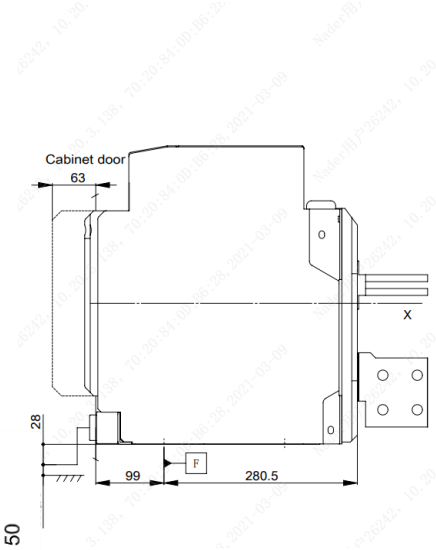


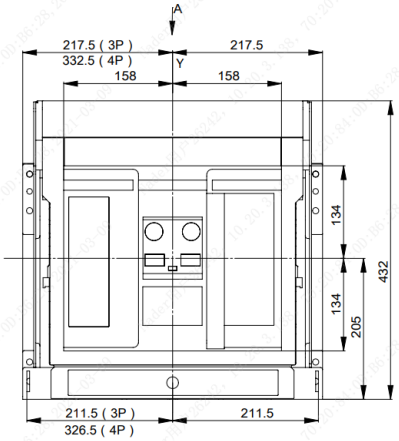
Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

Rated current	Dimension a (mm)
1600A, 2000A, 2500A	189
3200A, 3600A, 4000A	219

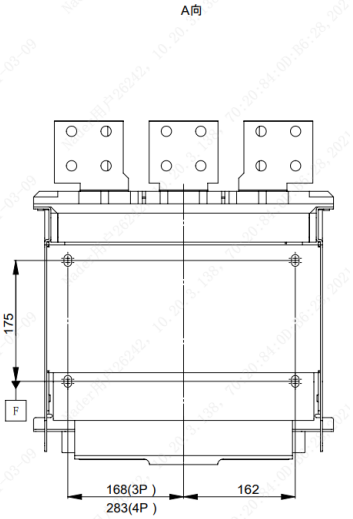
NDW3Z-4000 Drawout-type Outline and Installation Dimensions (Unit: mm)

Dimensions

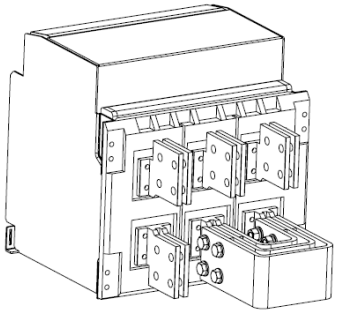


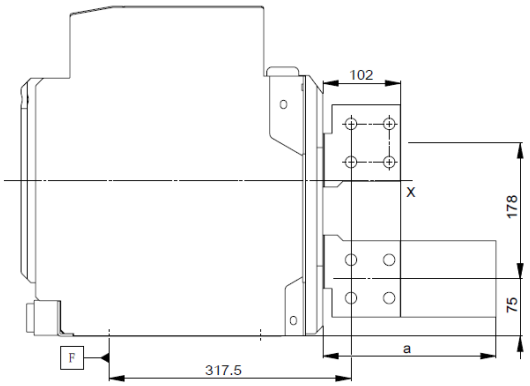


Fixed Details

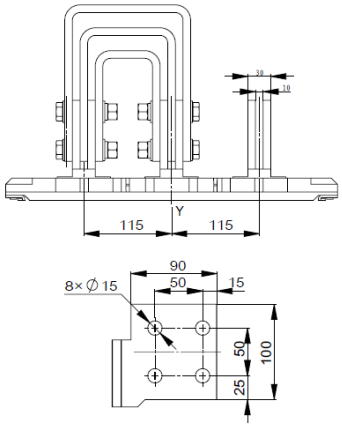


Power supply from vertical upper terminals of 3P in series



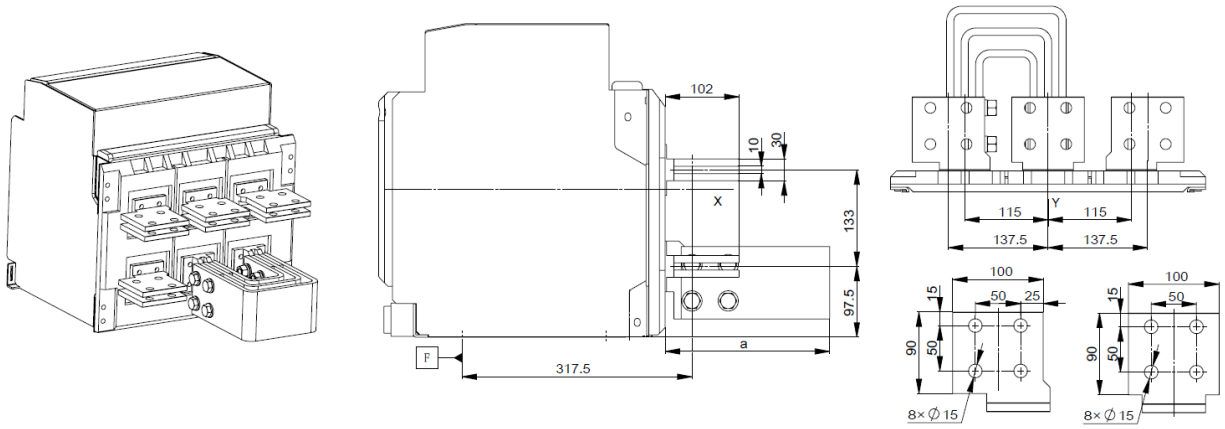


Detail

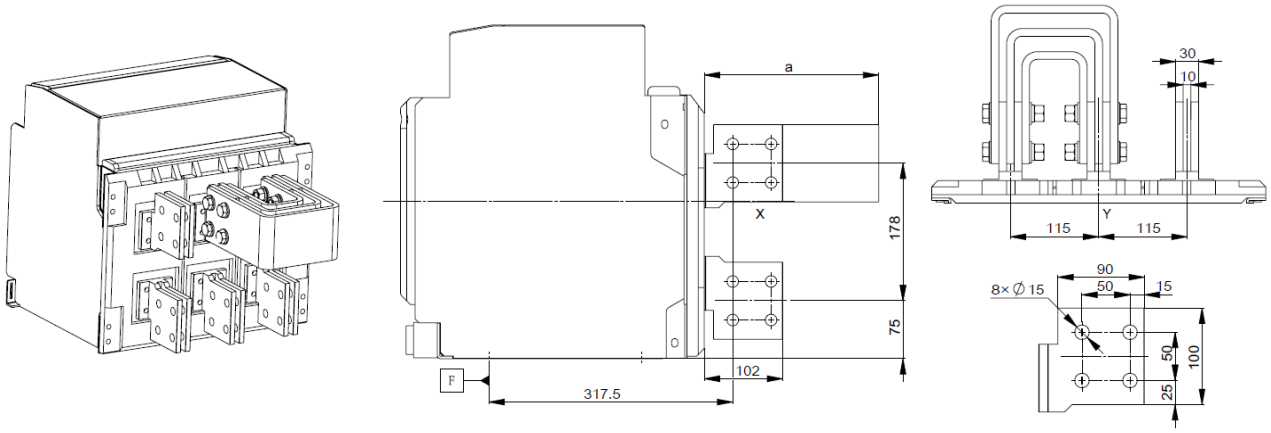


Rated current	Dimension a (mm)
1600A、2000A、2500A	197
3200A、3600A、4000A	227

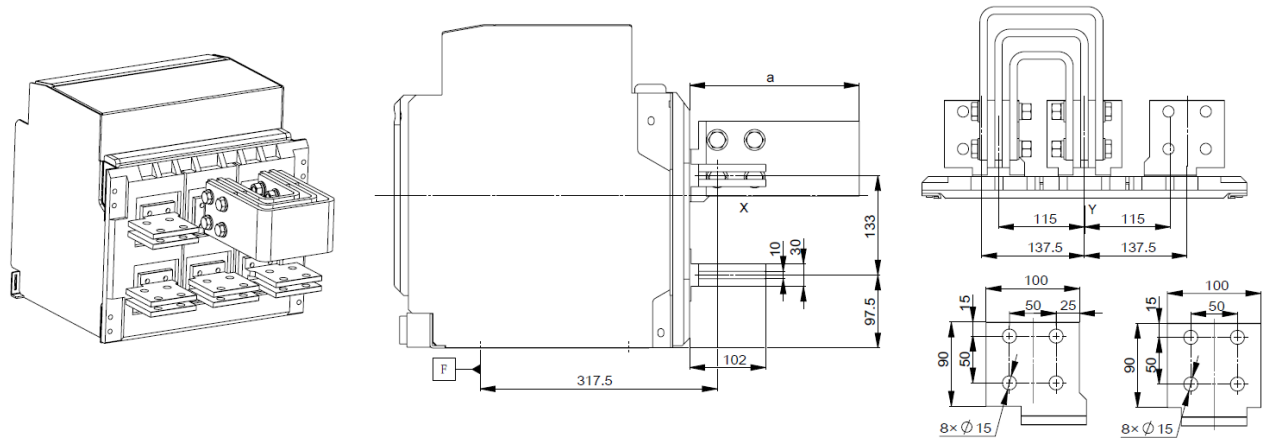
Power supply from horizontal upper terminals of 3P in series Detail



Power supply from vertical lower terminals of 3P in series Detail



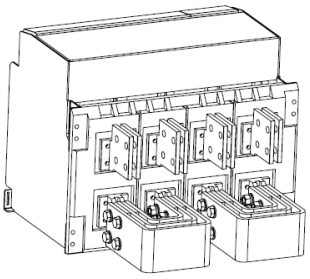
Power supply from horizontal lower terminals of 3P in series Detail

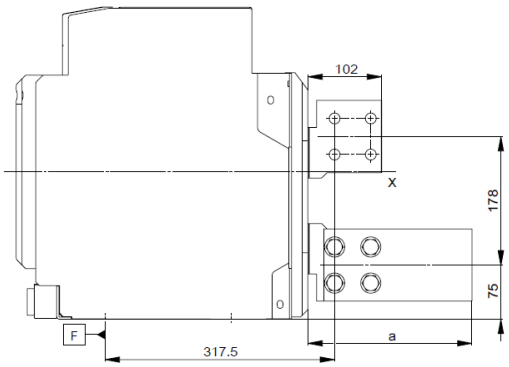


Rated current	Dimension a (mm)
1600A、2000A、2500A	197

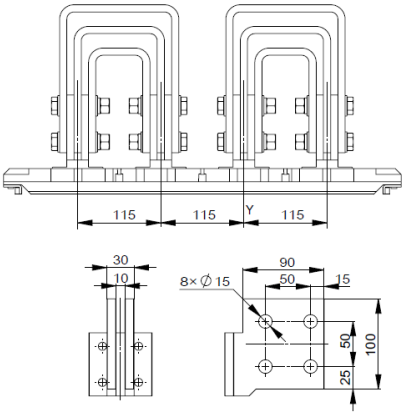
3200A、3600A、4000A	227

Power supply from vertical upper terminals of 4P in series

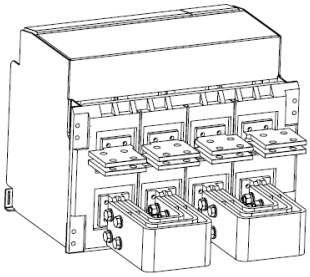


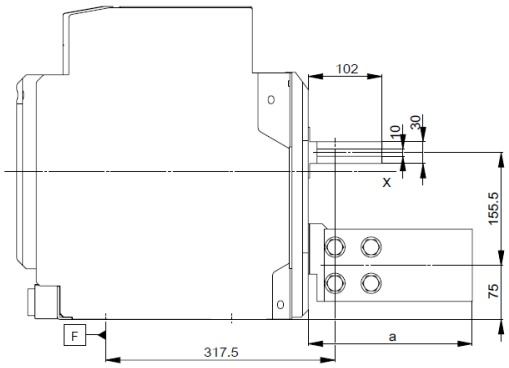


Detail

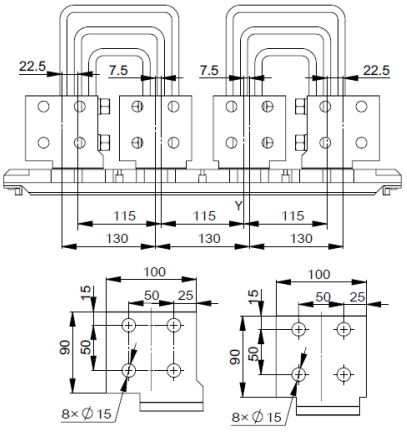


Power supply from horizontal upper terminals of 4P in series



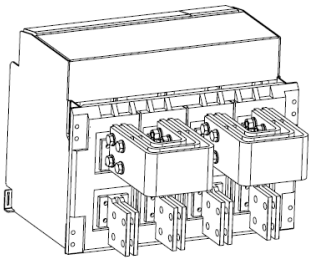


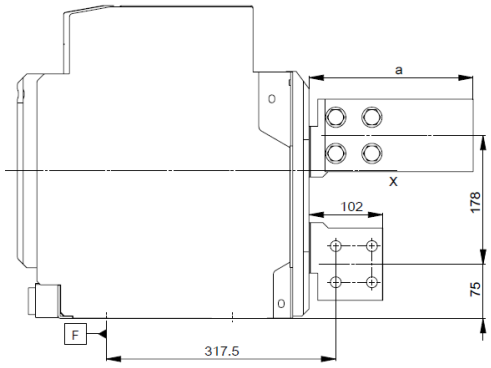
Detail



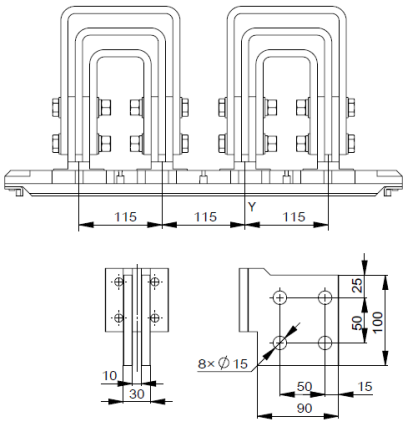
Rated current	Dimension a (mm)
1600A、2000A、2500A	197
3200A、3600A、4000A	227

Power supply from vertical lower terminals of 4P in series

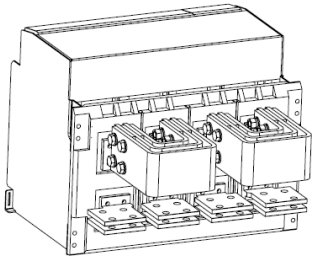


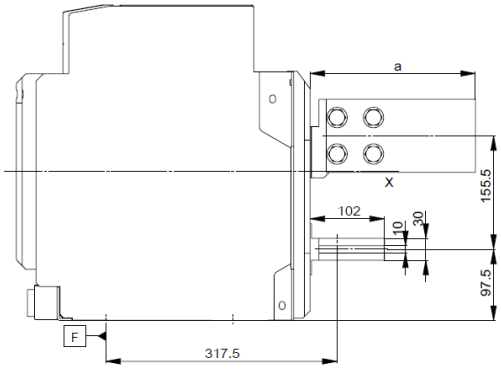


Detail

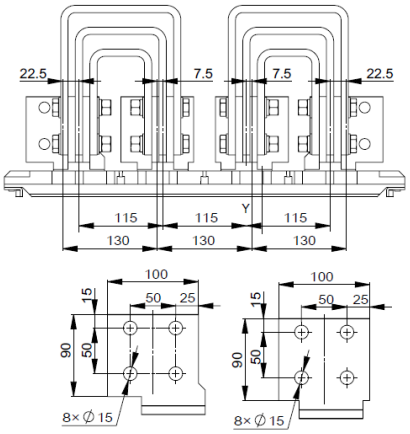


Power supply from horizontal lower terminals of 4P in series



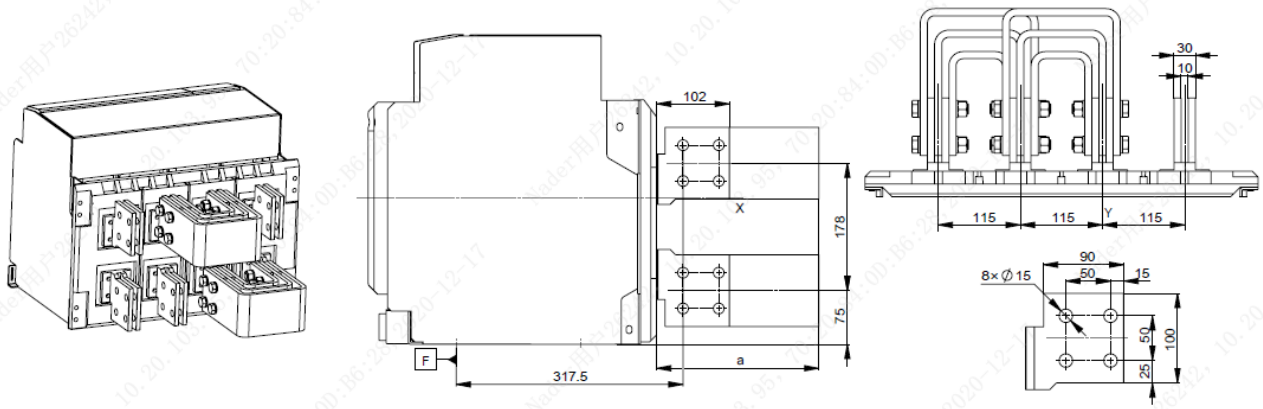


Detail

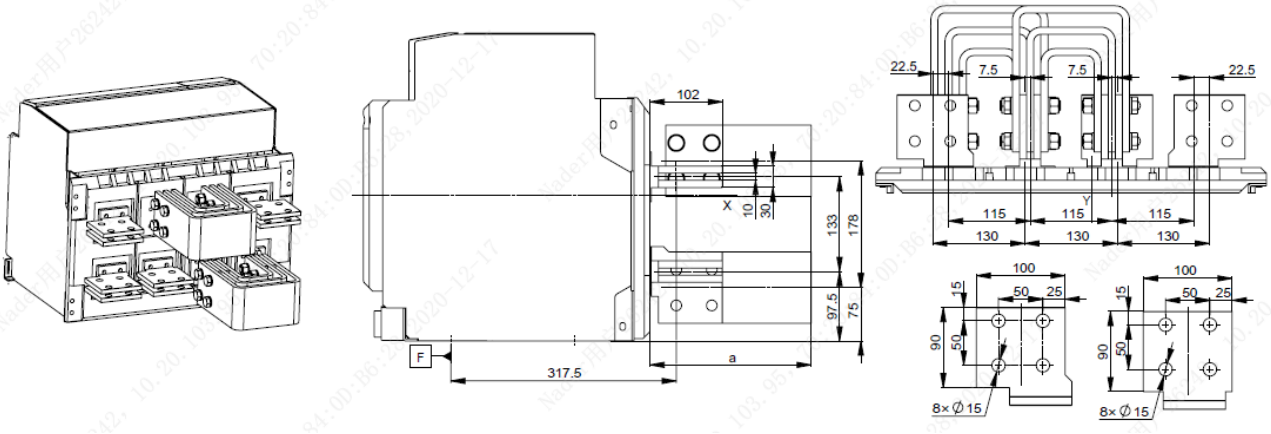


Rated current	Dimension a (mm)
1600A、2000A、2500A	197
3200A、3600A、4000A	227

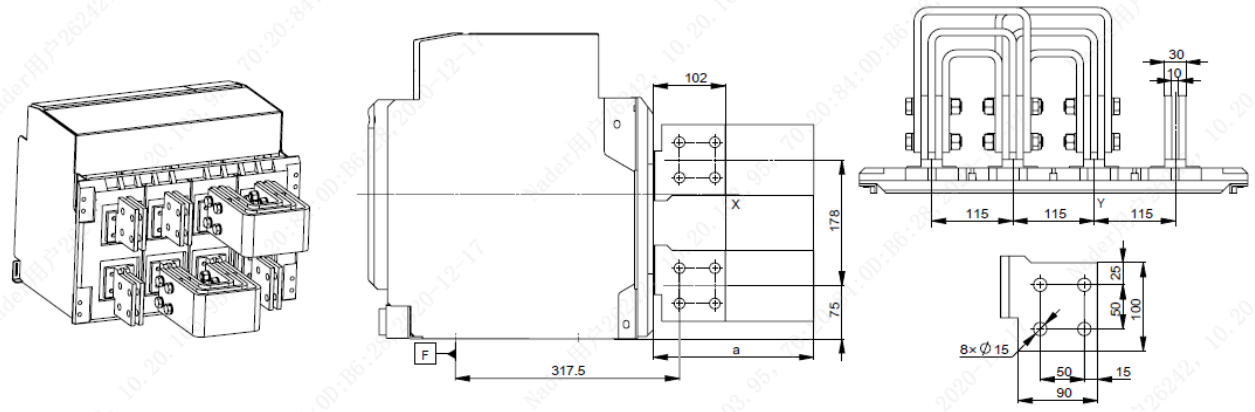
Special Power supply from vertical upper terminals of 4P in series Detail



Special Power supply from horizontal upper terminals of 4P in series Detail

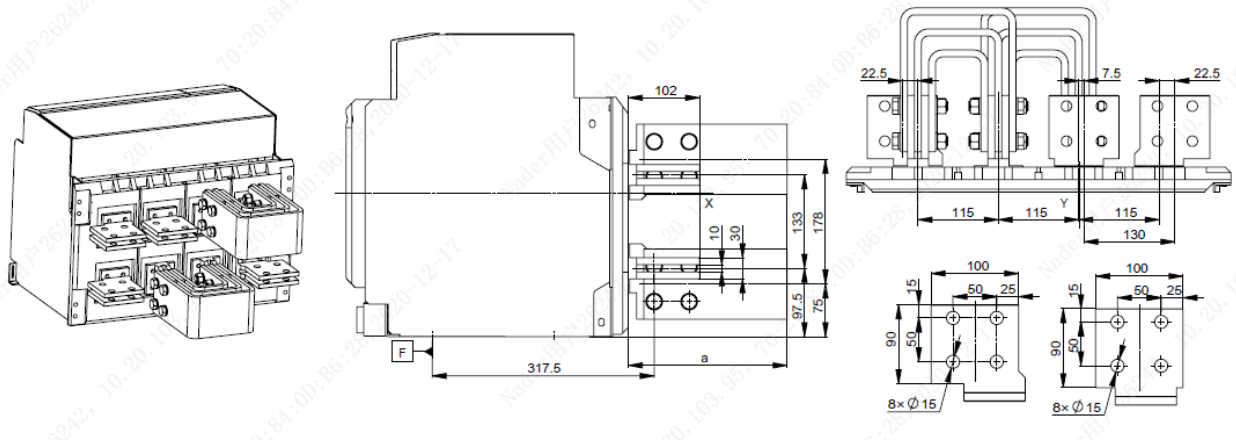


Special Power supply from vertical lower terminals of 4P in series Detail



Rated current	Dimension a (mm)
1600A、2000A、2500A	197
3200A、3600A、4000A	227

Special Power supply from horizontal lower terminals of 4P in series Detail

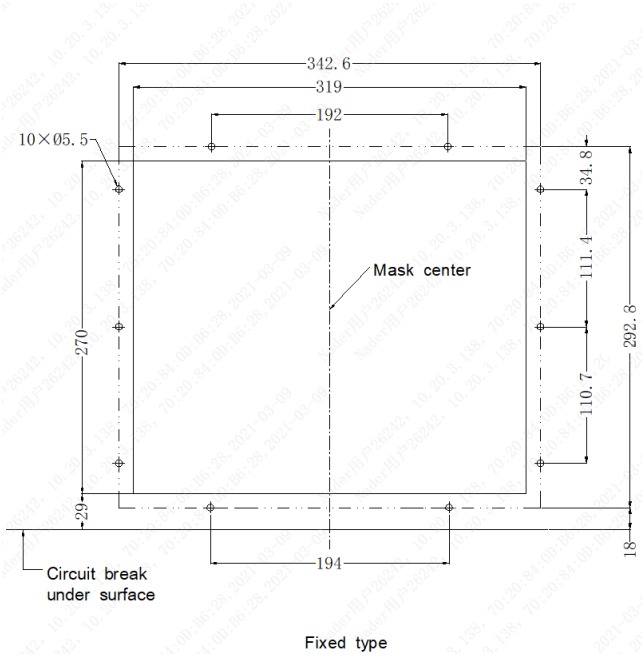


Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

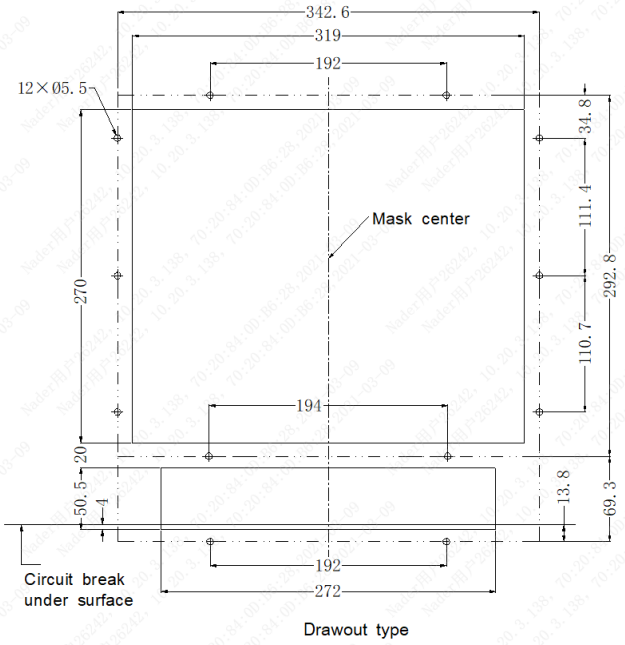
Rated current	Dimension a (mm)
1600A、2000A、2500A	197
3200A、3600A、4000A	227

6.3 The Circuit Breaker Cabinet Door Open Hole and the Installation Pitch (mm)

Hole dimensions of NDW3Z-2500 door frame

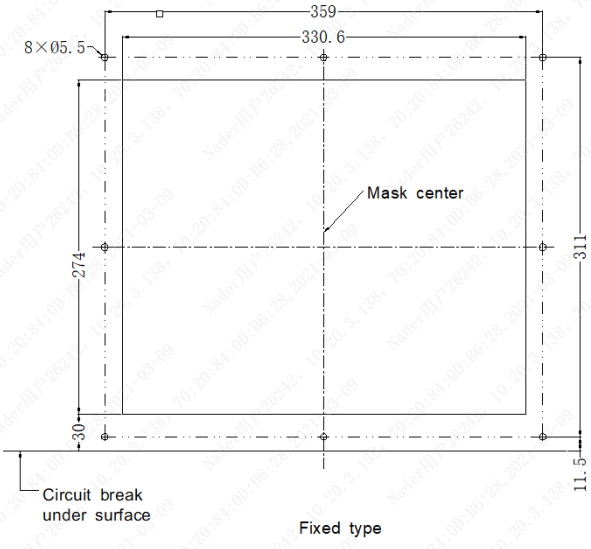


Fixed type

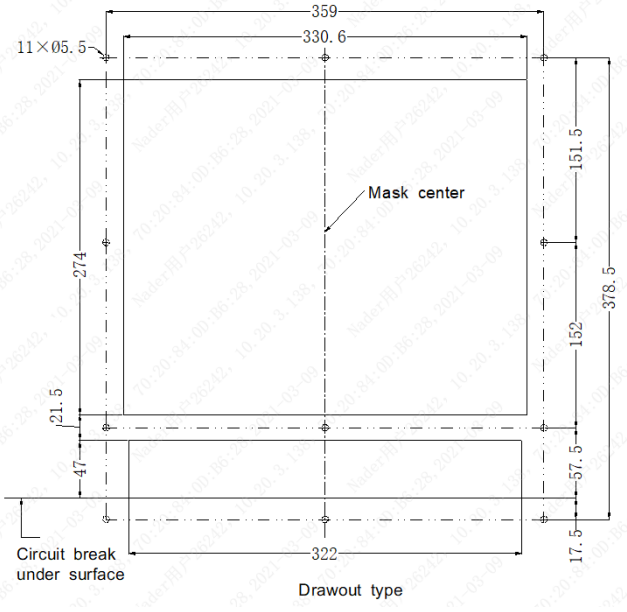


Drawout type

Hole dimensions of NDW3Z-4000 door frame



Fixed type



Drawout type

Circuit Breaker Installation Notes

To ensure your safety and the safety of electrical equipment, before put the circuit breaker into operation, users must:

★ Carefully read the Operation Manual before installation and use of the circuit breaker.

★ Check whether the specification of the circuit breaker is in line with the requirements before installation.

★ Install the circuit breaker under the environment condition without explosion danger, conductive dust or the possibility of corroding metal and damaging the insulation.

★ Measure the insulation resistance of the circuit breaker with a 1000V megohmmeter before installation of the circuit breaker. When the surrounding medium temperature is 20℃±5℃, the relative humidity 50%-70% should not be less than 20 mge; otherwise it needs to be dried, and it can be used until the insulation resistance meets the requirements.

★ Prevent foreign matters from falling into the circuit breaker when installing the circuit breaker.

★ Ensure the circuit breaker is flat without additional mechanical stress when installing the conductive busbar.

★ Carry out wiring of the control circuit according to the wiring diagram when installing the circuit breaker; check whether the working voltage of the undervoltage, shunt, closing electromagnet, motor, controller and related parts conforms to the actual voltage, and then carry out the secondary circuit energizing. In case of drawout circuit breaker, the circuit breaker should be shaken into the test position, then the undervoltage release will close and then the circuit breaker can be closed.

★ Pressing (or powering on) the closing button after the energy storage of the motor, the circuit breaker will close.

★ Pressing (or powering on) the opening button, the circuit breaker will open.

★ For manual storage of energy, pull the handle on the front panel up and down, when a "click" sound can be heard after seven times; the panel shows "storage of energy", and the storage of energy ends. At this point, if there's undervoltage tripping, power on it (no need if without undervoltage tripping), then carry out closing operation.

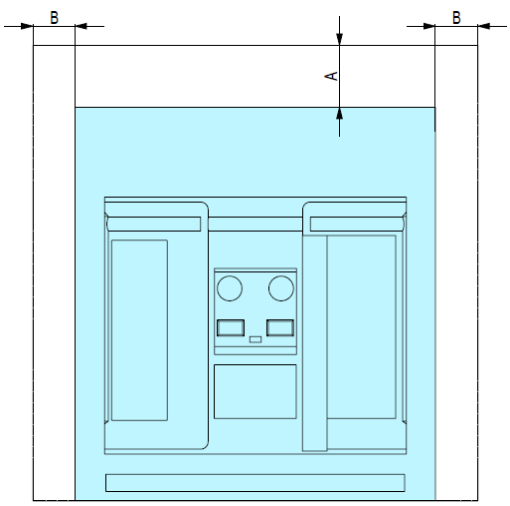
★ Installation screws of the circuit breaker is shown in the table below

Installation Screws of the Circuit Breaker

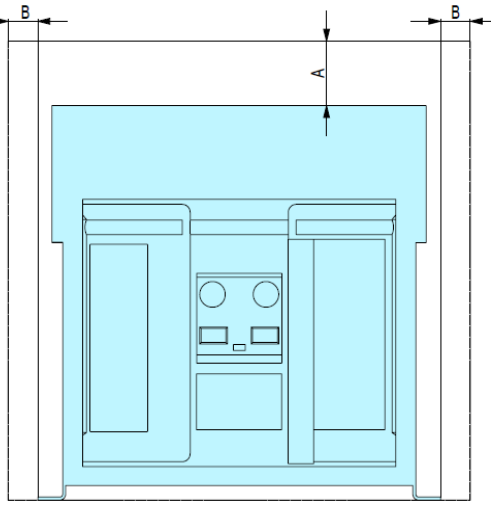
circuit breaker	Connection conditions between bus and terminal
NDW3Z-2500	M12 bolt, level 8.8, with contact washer, tightening torque 60N.m
NDW3z-4000	M14 bolt, level 8.8, with contact washer, tightening torque 97N.m

The circuit breaker is installed in the cabinet, the safe distance between the circuit breaker and the cabinet

When users install the circuit breaker into the cabinet, the safe distance between the circuit breaker and the cabinet is shown in the figure below, and the installation dimensions are shown in the tables below.



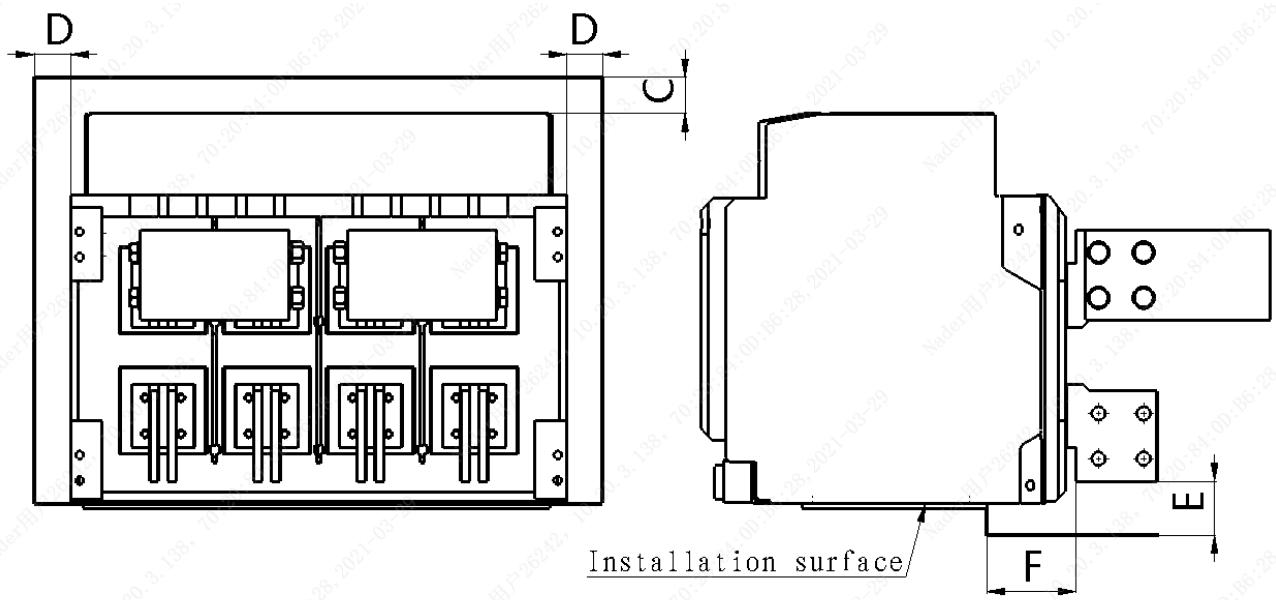
Front view of drawout circuit breaker



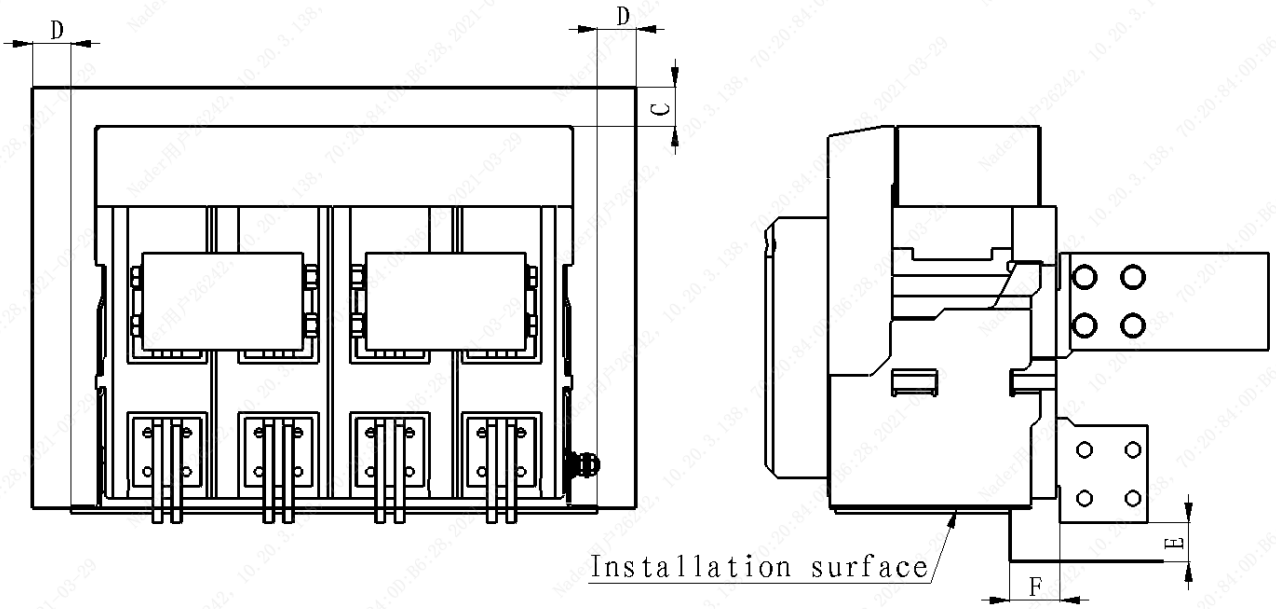
Front view of fixed circuit breaker

Safe distance between the circuit breaker and the cabinet Unit: mm

Installation mode of the circuit breaker	To the insulator		To the live part	
	A	B	A	B
Drawout type	0	0	60	60
Fixed type	0	0	60	60



Rear and side view of drawout circuit breaker



Rear and side view of drawout circuit breaker

Safe distance between the circuit breaker and the cabinet Unit: mm

Installation mode of the circuit breaker	To the insulator				To the live part			
	C	D	E	F	C	D	E	F
Drawout type	0	0	0	0	60	60	60	60
Fixed type	0	0	0	0	60	60	60	60

Note: 1. 150 mm space needed for removing the arc-extinguishing chamber should be considered for the safe spacing of the fixed type circuit breaker;

2. If dustproof cover is added, height space of 70 mm for installation and rotating of the dustproof cover should be considered.

3.If distance to the live part can't meet requirement in the table，insulation measures should be adapted between circuit break and the live part.

6.4 Electrical Wiring Diagram

NDW3Z-2500 Full-function Wiring Diagram

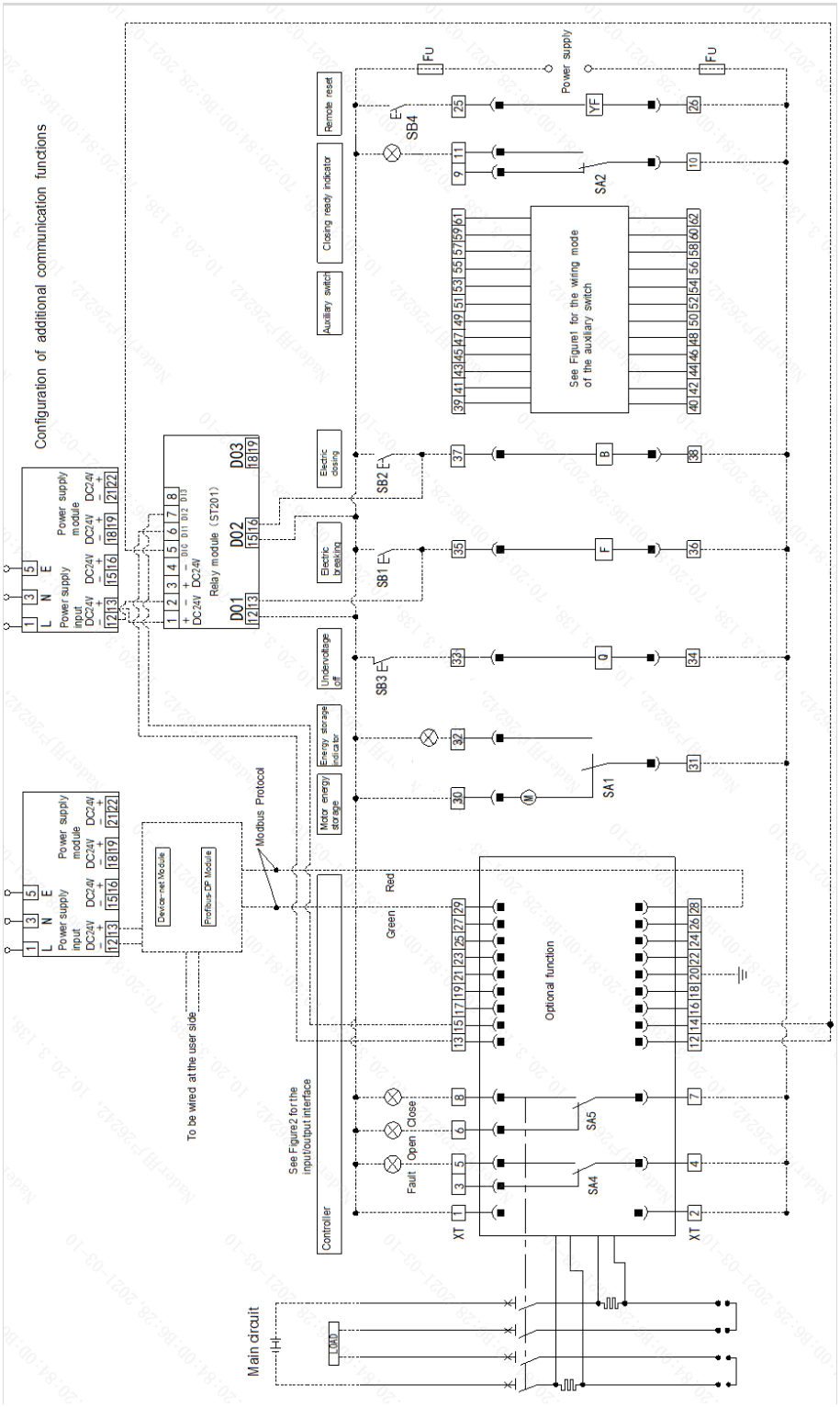
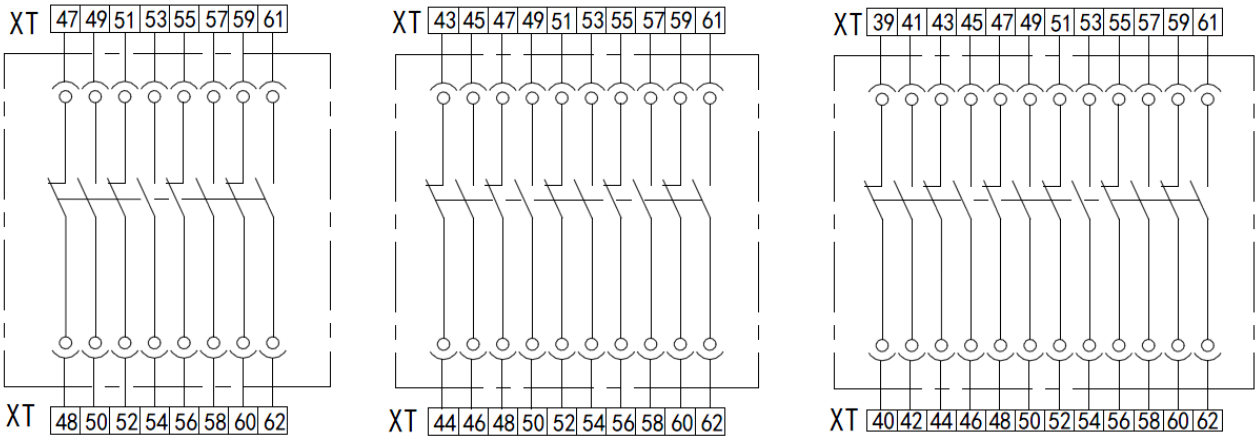


Figure 1: NDW3Z-2500 Auxiliary Wiring Diagram

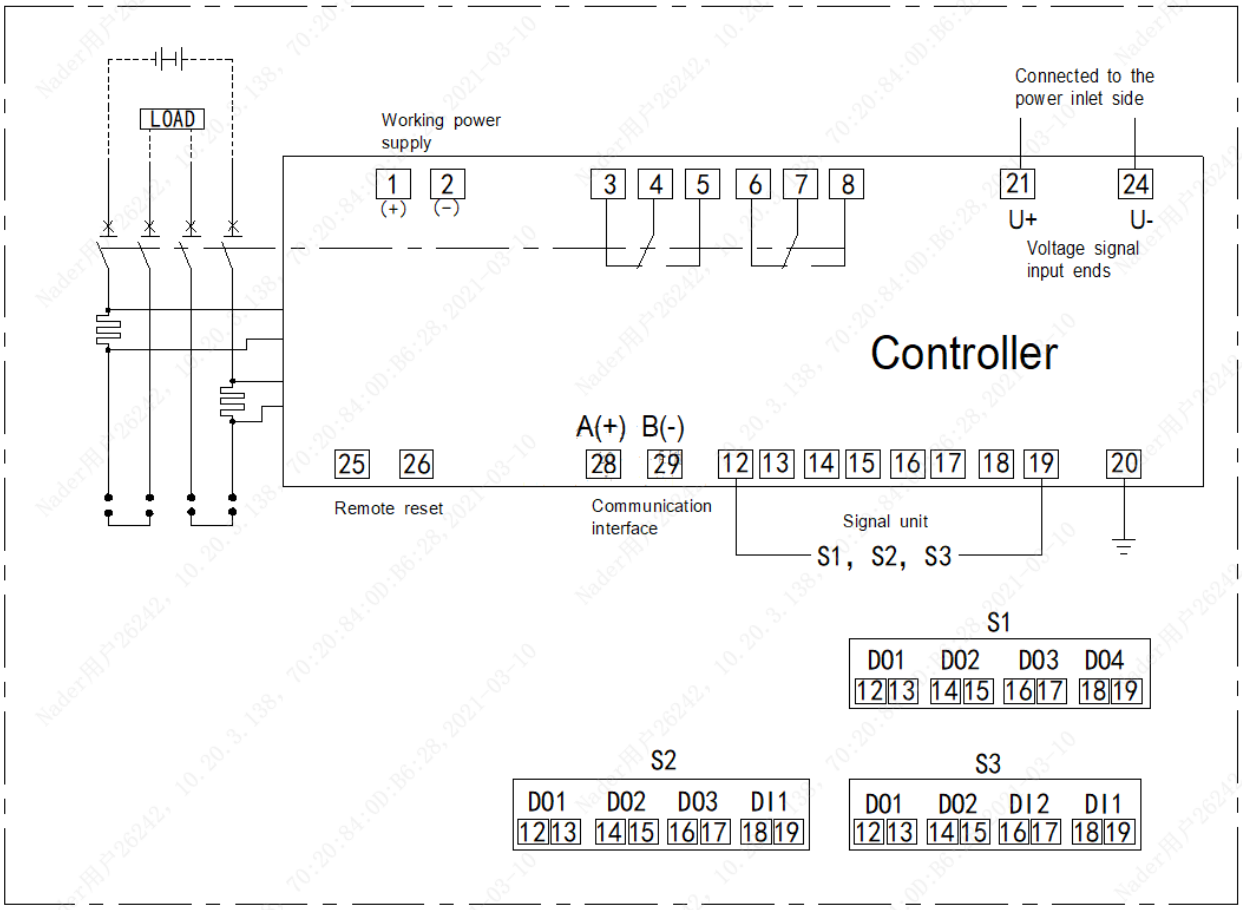


Four normally opened and four normally closed

Five normally opened and five normally closed

Six normally opened and six normally closed

Figure 2: Input/Output Interface of NDW3Z-2500 Controller



Definition Table of NDW3Z-2500 Terminal Number

Function	Wiring terminal line number: 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39~62	Remarks
Working power supply	■	■																																						Users only need to connect the power supply to the input end of the power supply module
Fault tripping indication contact			■	■	■																																			4# public end, contact capacity: AC250V/16A
Opening and closing indication contact						■	■	■																																7# public end, contact capacity: AC250V/16A
Closing ready electric indicator									■	■	■																													10# public end, contact capacity: AC250V/5A、AC250V/3A
Four groups of optional signal unit outputs												■	■	■	■	■	■	■																						Contact capacity AC250V/5A、DC110V/0.5A
Shunt output with break monitoring																■	■																							
Closing output with break monitoring																		■	■																					
Grounding wire of controller																				■																				
Voltage signal input ends （U+、U-）																					■			■																
Under-voltage release break monitoring output																				■	■	■	■																	
Remote reset function input end																									■	■														
Energy-storing signal unit output																								■			■													
Communication interface																												■	■											
Motor break monitoring output																													■	■	■	■								
Electric energy storage break monitoring output																														■	■	■								
Under-voltage release																																	■	■						
Loss of voltage release																																	■	■						
Shunt release																																			■	■				
Closed electromagnet																																					■	■		
Connecting terminals of auxiliary switch																																							■	Contact capacity AC380V/16A、DC250V/5A

Add: No.2000, South Shen Jiang Rd. Pudong District, Shanghai, 201315, PRC Tel:(021)68586699 Fax:(021)23025796

SB1 - Shunt button (to be prepared by users)

SB2 - Close button (to be prepared by users)

SB3 - Undervoltage disconnection button (to be prepared by users)

SB4 - Remote reset button (to be prepared by users)

SA1 - Motor travel switch SA2 - Closing ready travel switch

SA4 - Fault tripping travel switch SA5 - Opening and closing indicating travel switch

XT - Secondary terminal F - Shunt release

B - Closed electromagnet

Q - Undervoltage release or loss of voltage release (instantaneous or delayed)

YF - Remote reset FU - Fuse (to be prepared by users)

M - Energy storage motor

Note:

1. The current state of the circuit breaker is de-energized, disconnected, connected, no energy stored;

2. Status indicator light, button switch and communication equipment are provided by users, and the dashed part shall be wired by users;

3. if the rated working voltages of Q, F, B, M and controller are not the same, please connect to the rated voltage of control power supply;

4. In order to ensure the reliable operation of the controller, 1# and 2# need to be connected to auxiliary power;

5. The secondary terminal wiring is only suitable for the（0.5~1.5）mm^2 multi-strand soft wire or hard wire with the soft wire recommended; pay attention to adopt the appropriate conductor;

6. All the signal units are passive signals; users can choose S1, S2, S3 modes as required;

7. The user needs to select the signal unit to achieve the "four remotes" function, while the power supply module and relay module are optional.

8. There is a control circuit inside the shunt release and closing electromagnet, which can be powered on for a long time, and the power-on time is more than 200ms. Users should not connect them in series with the circuit breaker itself Auxiliary switch contacts.

NDW3Z-4000 Full-function Wiring Diagram

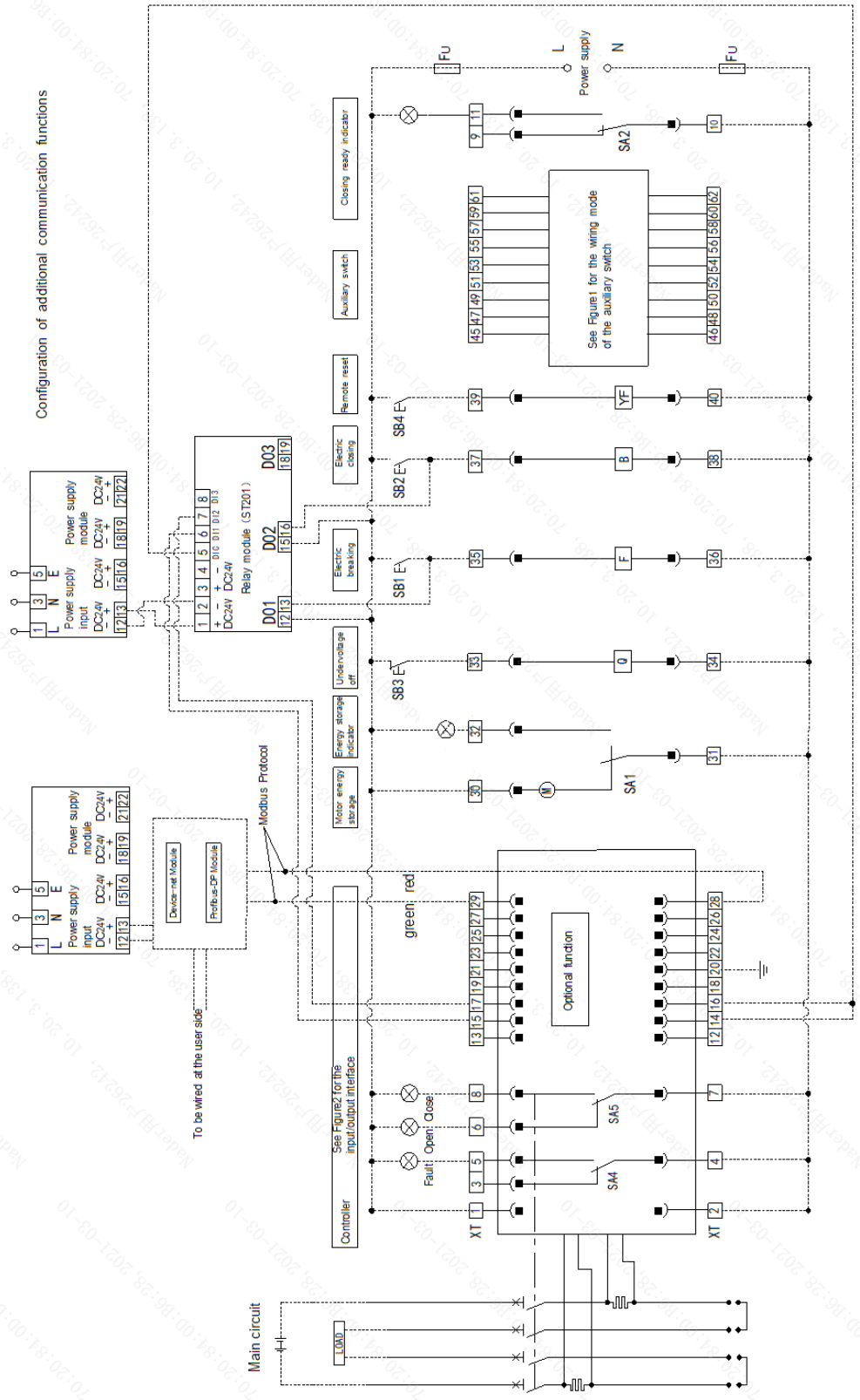


Figure 1: NDW3Z-4000 Auxiliary Wiring Diagram

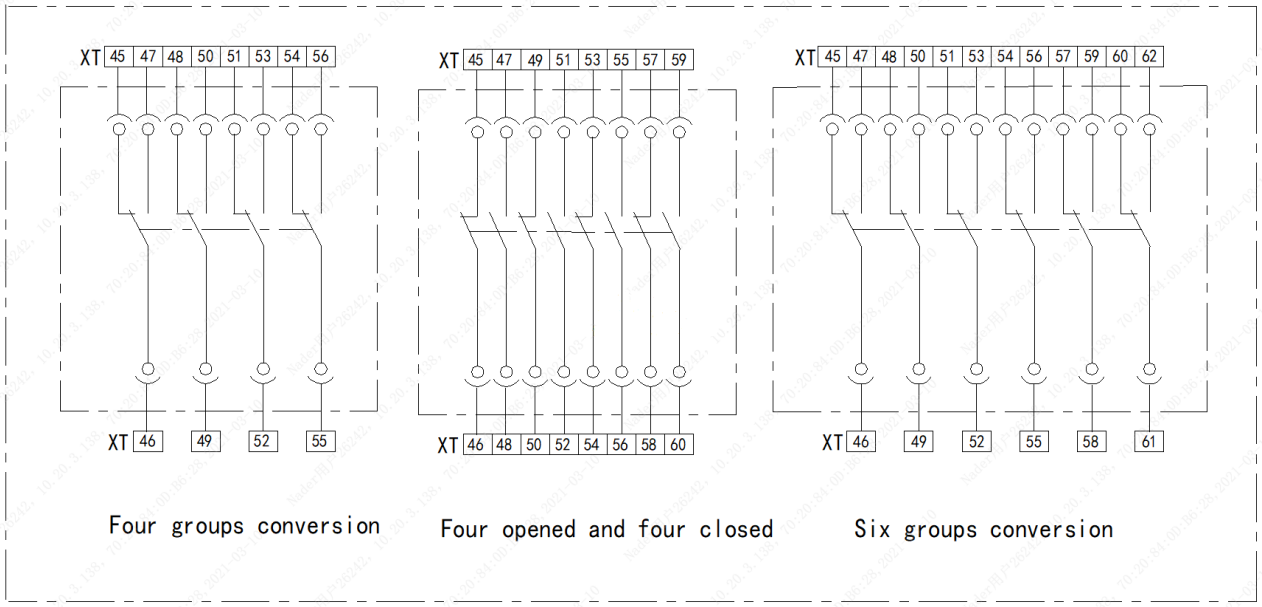
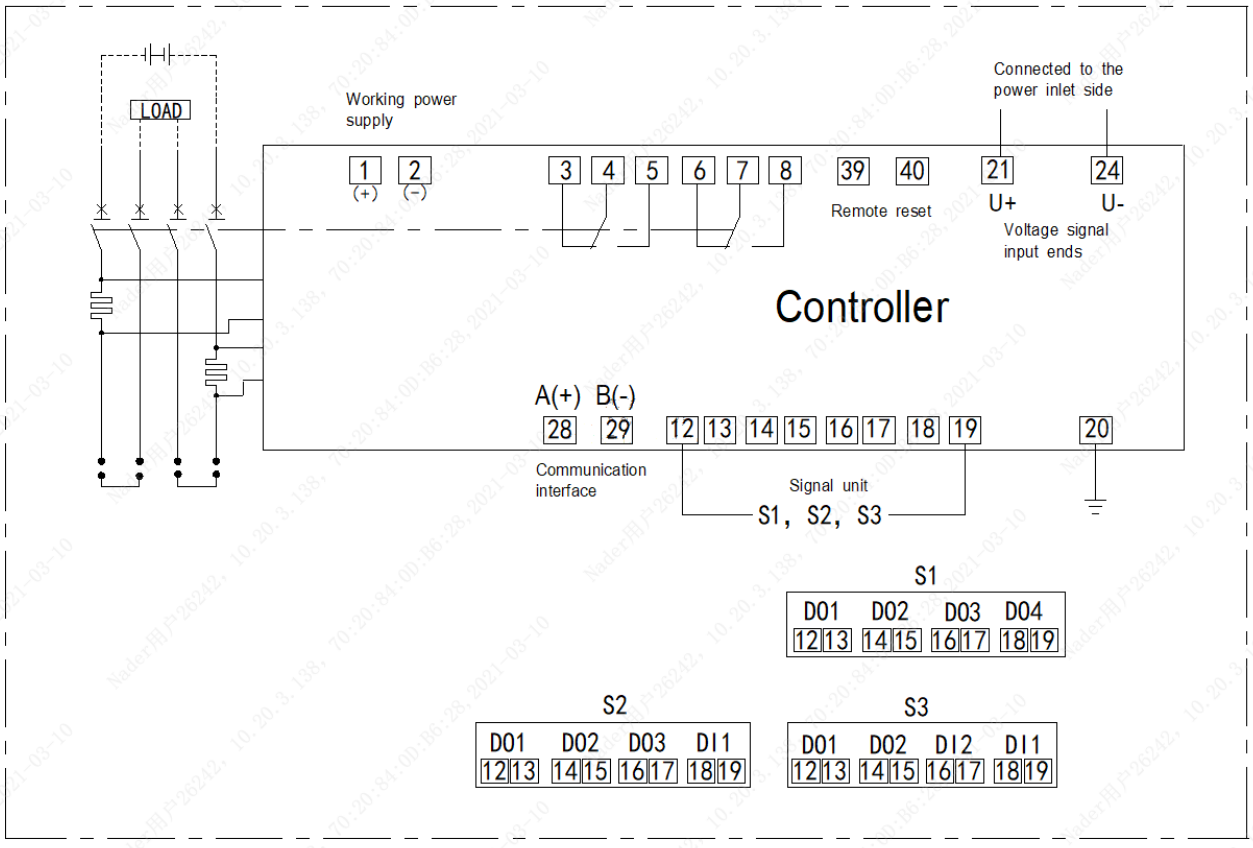
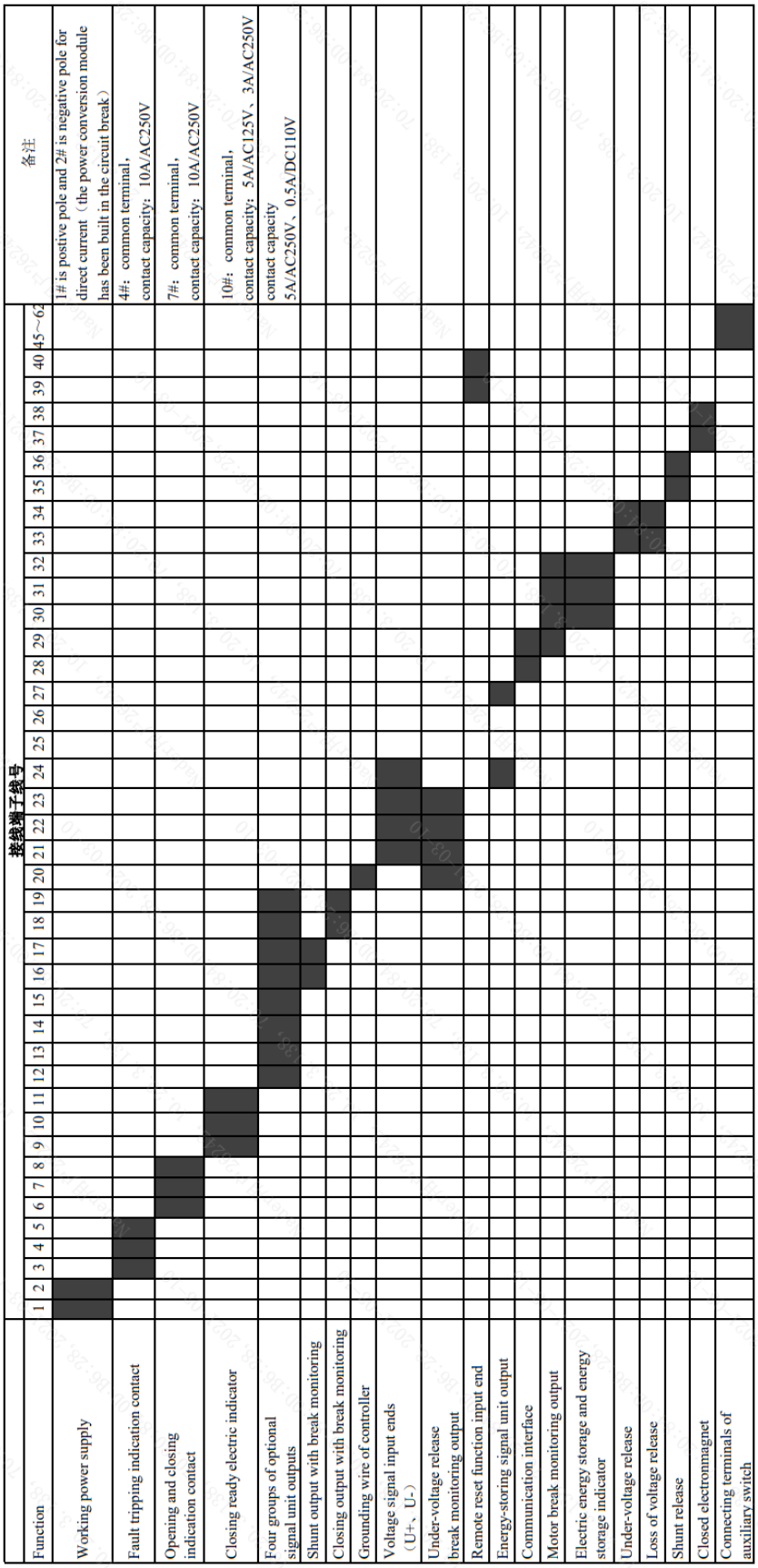


Figure 2: Input/Output Interface of NDW3Z-4000 Controller



Definition Table of NDW3Z-4000 Terminal Number



Function	接线端子线号 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	45~62	备注
Working power supply	■	■																																									1# is postive pole and 2# is negative pole for direct current（the power conversion module has been built in the circuit break）
Fault tripping indication contact				■	■																																					4#：common terminal，contact capacity：10A/AC250V
Opening and closing indication contact						■	■	■																																			7#：common terminal，contact capacity：10A/AC250V
Closing ready electric indicator									■	■	■																																10#：common terminal，contact capacity：5A/AC125V、3A/AC250V
Four groups of optional signal unit outputs												■	■	■	■	■	■	■																								contact capacity 5A/AC250V、0.5A/DC110V
Shunt output with break monitoring																■	■																										
Closing output with break monitoring																		■	■																								
Grounding wire of controller																				■																							
Voltage signal input ends（U+、U-）																					■	■	■	■																		
Under-voltage release break monitoring output																			■	■			■																			
Remote reset function input end																																							■	■		
Energy-storing signal unit output																								■			■															
Communication interface																												■	■													
Motor break monitoring output																														■	■	■										
Electric energy storage and energy storage indicator																														■	■	■	■									
Under-voltage release																																	■	■								
Loss of voltage release																																	■	■								
Shunt release																																			■	■						
Closed electronmagnet																																					■	■				
Connecting terminals of auxiliary switch																																									■	

SB1 - Shunt button (to be prepared by users)

SB2 - Close button (to be prepared by users)

SB3 - Undervoltage disconnection button (to be prepared by users)

SB4 - Remote reset button (to be prepared by users)

SA1 - Motor travel switch SA2 - Closing ready travel switch

SA4 - Fault tripping travel switch SA5 - Opening and closing indicating travel switch

XT - Secondary terminal F - Shunt release

B - Closed electromagnet

Q - Undervoltage release or loss of voltage release (instantaneous or delayed)

YF - Remote reset FU - Fuse (to be prepared by users)

M - Energy storage motor

Note:

1. The current state of the circuit breaker is de-energized, disconnected, connected, no energy stored;

2. Status indicator light, button switch and communication equipment are provided by users, and the dashed part shall be wired by users;

3. if the rated working voltages of Q, F, B, M and controller are not the same, please connect to the rated voltage of control power supply;

4. In order to ensure the reliable operation of the controller, 1# and 2# need to be connected to auxiliary power;

5. The secondary terminal wiring is only suitable for the（0.5~1.5）mm^2 multi-strand soft wire or hard wire with the soft wire recommended; pay attention to adopt the appropriate conductor;

6. All the signal units are passive signals; users can choose S1, S2, S3 modes as required;

7. The user needs to select the signal unit to achieve the "four remotes" function, while the power supply module and relay module are optional.

8. There is a control circuit inside the shunt release and closing electromagnet, which can be powered on for a long time, and the power-on time is more than 200ms. Users should not connect them in series with the circuit breaker itself Auxiliary switch contacts.

Ordering Type Selection Specification

Circuit Breaker Model Explanation and Encoding Rules

ND W 3Z-□ □/□/□/□/□/□ □/□ □ □ □ □ □/□/□/□/□/□

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

SN	Name	Specification, type code	Description
1	Enterprise code	brand low-voltage electrical appliance	
2	Product code	W - Air circuit breaker	
3	Design code	3Z	For DC system
4	Frame size	25-2500A，40-4000A	
5	Breaking type	S-Conventional breaking level, H-High breaking level	NDW3Z-2500 is only available with one breaking type, which is not to write in default
6	Rated current	08-800A、10-1000A、12-1250A 、16-1600A、20-2000A、25-2500A、32-3200A、36-3600A、40-4000A	
7	Installation structure	Non-marked - fixed type, C - drawout type	
8	Rated voltage	5-500VDC, 7-750VDC, 10-1000VDC, 15-1500VDC	
9	Number of poles in series	2-2P in series, 3-3P in series, 4-4P in series	2P in series is applicable to NDW3Z-2500
10	Controller	KX1-NWK20Z(AC380V/AC400V), KX2- NWK20Z (AC220V/AC230V), KX3-NWK20Z(DC220V), KX4-NWK20Z(DC110V), KX5-NWK20Z(DC24V) KY1-NWK22Z(AC380V/AC400V), KY2-NWK22Z(AC220V/AC230V), KY3-NWK22Z(DC220V), KY4-NWK22Z(DC110V), KY5-NWK22Z(DC24V)	
11	Optional functions of controller	Protection type: Not-standard - conventional type, V - voltage measurement and protection, P - power measurement and protection Communication function: H (Modbus protocol) MP (Profibus-DP protocol) MD (Devicenet protocol) Signal unit(NWK22Z optional): S1- 4DO; S2- 3DO, 1DI; S3-2DO, 2DI; Remote reset function: Z1(A380A/AC400V), Z2(AC220V/AC230V), Z3(DC220V), Z4(DC110V), Z5(DC24V)	1. This shall be omitted if the controller has no optional function; 2. Choose one from the communication functions of “H”, “MP” and “MD”; 3. The protection type “V” and “P” are NWK22Z optional, which are applicable for the main circuit rated voltage of DC500V and below.

		Contact wear equivalent, operation times query (NWK22Z optional): J	
12	Electric energy storage mechanism	D1-AC380V/AC400V, D2-AC220V/AC230V, D3-DC220V, D4-DC110V, D5-DC24V	
13	Shunt release	F1-AC380V/AC400V, F2-AC220V/AC230V, F3-DC220V, F4-DC110V, F5-DC24V	
14	Closed electromagnet	B1-AC380V/AC400V, B2-AC220V/AC230V, B3-DC220V, B4-DC110V, B5-DC24V	
15	Under-voltage release/ Loss of voltage release Voltage specifications	Under-voltage release :Q1-AC380V/AC400V, Q2-AC220V/AC230V, Q3-DC220V, Q4-DC110V, Q5-DC24V	1. Under-voltage release or alternative loss of voltage release;
		Loss of voltage releaseVoltage: S1-AC380V/AC400V, S2-AC220V/AC230V	
16	Undervoltage release/ Loss of voltage release delay time	Conventional undervoltage: 0-Instantaneous, 1-1s delay, 3-3s delay, 5-5s delay	2. To be selected during ordering; this shall be omitted if without this accessory
		Loss of voltage: 1-1s delay, 3-3s delay, 5-5s delay	
17	Auxiliary contact	Not marked - Four opened and four closed, A55 - Five opened and five closed, A66 - Six opened and six closed	Applicable to NDW3Z-2500
		Not-marked - Four groups conversion, A6 - Six groups conversion, A44 - Four opened and four closed	Applicable to NDW3Z-4000
18	Internal Accessories	BX - Closing ready signal output unit	This shall be omitted if without this accessory
		JS - Counter functional unit	
		CM1 - Drawout type with the right side of the door interlock, CM2 - Drawout type with the left side of the door interlock	
		CX - Drawout three-position signal output	
		Off-position key lock: SF11, SF21, SF31, SF32, SF53	
19	External accessories	Mechanical interlocking: SR11, SR12, SR21, SY11, SY12	1. Power supply module, relay module, programmable output module and communication adapter should be used with the controller; 2. Carry out the sequence arrangement according to the table, with “/” for separation; 3. The accessory monitoring unit can’t be selected
		M - Doorframe	
		F - Dustproof cover	
		R - Relay module	
		NWDF1(ST-IV)Power supply module： P1—DC24V P3—AC380V/AC400V、AC220/AC230V P5—DC220V、DC110V	
		S - Button lock	
		BC - Programmable output module (6-channel)	
		IO1 - Remote I/O module C8	
		IO2 - Remote I/O module S12	
		IO3 - Remote I/O module SC64	
		IO4 - Remote I/O module SCM423	
		AM - Accessory monitoring unit	

		TC - Energy-storing signal communication module component	with the communication function, signal unit and controller with “V” and “P” functions simultaneously; 4. The energy-storing signal communication module component can’t be selected with the controller with “V” and “P” functions simultaneously.
20	Wiring mode	JCS – Power supply from Vertical upper terminals、 JSS - Power supply from Horizontal upper terminals、 JCX - Power supply from Vertical lower terminals、 JSX - Power supply from Horizontal lower terminals、 JT1- - Special Power supply from Vertical upper terminals JT2 - Special Power supply from Horizontal upper terminals, JT3 - Power supply from Vertical lower terminals, JT4 - Power supply from Horizontal lower terminals.	
21	Product usage type	Not-marked - Conventional, TH - Thermal and humidity, CCS-Marine(only NDW3Z-2500 optional)	
22	Special notes	Customer’s special requirements	

Interlocking Piece Model Explanation and Encoding Rules

Key lock	SF11 - key lock device (one lock and one key), SF21 - key lock device (two locks and one key), SF31 - key lock device (three locks and one key), SF32 - key lock device (three locks and two keys), SF53 - key lock device (five locks and three keys)	1. Select one from five key locks; 2. Select one from five mechanical interlocks.
Mechanical interlocking	SR11 - Mechanical interlocking device (two sets of steel cables, one for closing and one for opening) SR12 - Mechanical interlocking device (three sets of steel cables, one for closing and two for opening) SR21 - Mechanical interlocking device (three sets of steel cables, two for closing and one for opening) SY11 - Mechanical interlocking device (two sets of hard rods, one for closing and one for opening) SY12 - Mechanical interlocking device (three sets of hard rods, one for closing and two for opening)	

Ordering specification

(Please fill in numbers in_____, and check √ in □. Related contents can be found in the Manual)

User unit			Number of units ordered:	Date of ordering:
Basic parameters	Frame size level	□ NDW3Z-2500 □ NDW3Z-4000		
	Rated current (A)	□800 □1000 □1250 □1600 □2000 □2500 □3200 □3600 □4000		
	Breaking type	□ S-Conventional breaking □ H-High breaking Note: These options are not distinguished with NDW3Z-2500, no selection required.		
	Rated working voltage	□DC500V □DC 750V □DC1000V □DC1500V Note: DC500V and DC750V are 2P or 3P in series; DC1000V and DC1500V are 4P in series		
	Number of poles in series	□ 2(2P in series,only NDW3Z-2500 optional) □ 3(3P in series) □ 4(4P in series)		
	Installation mode	□ Fixed type □ C drawout type		
	Wiring mode	□JCS – Power supply from Vertical upper terminals， □JSS - Power supply from Horizontal upper terminals， □JCX - Power supply from Vertical lower terminals， □JSX - Power supply from Horizontal lower terminals， □JT1- Special Power supply from Vertical upper terminals， □JT2 - Special Power supply from Horizontal upper terminals, □JT3 - Special Power supply from Vertical lower terminals, □JT4 - Special Power supply from Horizontal lower terminals.		
Controller parameters	Controller model	□ KX(NWK20Z/knob type) □KY(NWK22Z/LCD) Note: The operating temperature of NWK20Z is -40℃~+70℃, the operating temperature of NWK22Z is -25℃~+70℃		
	Controller voltage	□ 1(AC380V/400V) □ 2(AC220V/AC230V) □ 3(DC220V) □ 4(DC110V) □ 5(DC24V)		
	Protection type	□ Conventional type (standard configuration) □ V - Voltage measurement and protection type □ P - Power measurement and protection type Note: The NWK22Z LCD type is optional for V and P, which can't be selected with the accessory monitoring unit simultaneously; the voltage module is optional when the main circuit voltage is greater than 500V		
	Communication function	□H（Modbus） □ MP（Profibus-DP） □MD（Devicenet） Note: It can't be selected with the accessory monitoring unit simultaneously		
	Signal unit	□ S1-4DO □ S2-3DO, 1DI □ S3-2DO, 2DI Note: It can't be selected with the accessory monitoring unit simultaneously, NWK22Z optional		
	Remote reset	□ Z1(AC380V/AC400V) □ Z2(AC220V/AC230V) □ Z3(DC220V) □ Z4(DC110V) □ Z5(DC24V)		
	Contact equivalent	□J: Contact wear equivalent, operation times query Note: NWK22Z optional		
Required accessories	Electric operating mechanism	□ D1(AC380V/AC400V) □ D2(AC220V/AC230V) □ D3(DC220V) □ D4(DC110V) □ D5(DC24V)		

	Shunt release		□ F1(AC380V/AC400V) □ F2(AC220V/AC230V) □F3(DC220V) □ F4(DC110V) □ F5(DC24V)
	Closed electromagnet		□ B1(AC380V/AC400V) □ B2(AC220V/AC230V) □ B3(DC220V) □ B4(DC110V) □ B5(DC24V)
Optional accessories	Undervoltage release	Voltage Specification	□ Q1(AC380V/AC400V) □ Q2(AC220V/AC230V) □ Q3(DC220V) □ Q4(DC110V) □ Q5(DC24V)
		Delay Time	□ 0-Instantaneous (0s) Delay: □ 1 (1s delay) □ 3 (3s delay) □ 5 (5s delay)
	Loss of voltage release	Voltage Specification	□ S1(AC380V/AC400V) □ S2(AC220V/AC230V)
		Delay Time	□ 1 (1s delay) □ 3 (3s delay) □ 5 (5s delay)
	Auxiliary contact	NDW3Z-2500	□ four normally opened and four normally closed(standard configuration) □ A55 - five normally opened and five normally closed □ A66 - six normally opened and six normally closed
		NDW3Z-4000	□Four groups conversion (standard configuration), □A6 - Six groups conversion, □A44 - Four opened and four closed
	Closing ready		□ BX - Closing ready signal output unit
	Counter		□JS - Counter
	Drawer seat door interlock		□ CM1 - Right side of the door interlock □ CM2 - Left side of the door interlock
	Position indication		□ CX - Drawer seat three-position signal output
	Door frame		□ M Door frame
	Dustproof cover		□ F Dustproof cover
	Relay module		□ R Relay module
	Power Supply Module		□ P1-DC24V □ P3-AC380V/AC400V、AC220V/AC230V □ P5-DC220V、DC110V
	Button lock		□ S Button lock
	Programmable output module		□ BC Programmable output module (6-channel)
	Remote I/O module		□ IO1 remote I/O module C8 □ IO2 remote I/O module S12 □ IO3 remote I/O module SC64 □ IO4 - Remote I/O module SCM423 Note: To be used with the optional power supply module
	Accessory monitoring unit		□ AM - Accessory monitoring unit Note: It can't be selected with the communication function, signal unit and controller with "V" and "P" functions simultaneously
	Energy-storing communication module		□ TC - Energy-storing signal communication module component Note: It can't be selected with the controller with "V" and "P" functions simultaneously

<table>
<tr><td rowspan="4">Interlocking accessories</td><td colspan="2">Off-position lock</td><td colspan="2">□ SF11-One lock one key □ SF21-Two locks one key
□ SF31-Three locks one key
□ SF32-Three locks two keys □ SF53-Five locks three keys</td></tr>
<tr><td rowspan="2">Mechanical interlocking</td><td>Cable type</td><td colspan="2">□ SR11-Two groups, one for closing and one for opening
□ SR12-Three groups, one for closing and two for opening
□ SR21-Three groups, two for closing and one for opening</td></tr>
<tr><td>Hard rod type</td><td colspan="2">□ SY11 - Two groups, one for closing and one for opening
□ SY12-Three groups, one for closing and two for opening</td></tr>
<tr><td colspan="3">Special usage occasions</td><td colspan="2">□TH-damp and hot □CCS-Marine(only NDW3Z-2500 optional)</td></tr>
<tr><td colspan="3" rowspan="2">Special requirements</td><td>Factory setting of the special requirements (NWK20Z):
Overload and long-time delay current____A time____s
Short-circuit short-time delay current____A time____s
Short circuit instantaneous current____A</td><td>Factory setting of the special requirements (NWK22Z):
Overload and long-time delay current____A time____s
Short-circuit short-time delay and reverse time-lag current____A
Short-circuit short-time delay and constant time-lag current____A time____s
Short circuit instantaneous current____A</td></tr>
<tr><td colspan="2">Other requirements:</td></tr>
<tr><td colspan="5">Note: 1. In case of no special requirements, the current and time setting value of controller shall be set according to the factory setting;
2. If you have special requirements, please indicate in the special requirements column.</td></tr>
</table>