Shanghai Liangxin Electrical Co., Ltd.

NDW2 Series of Air Circuit Breaker Manual

Project Name: NDW2F Series of Air Circuit Breaker

Project No.: P05022

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Version	Revision Reason/Content	Implementation Date	Prepared by	Reviewed by	Approved by
1	1. () and , punctual marks are corrected to the Chinese characters. Correct the description of the terms, such as undervoltage, loss of voltage, energy storage, horizontal extended and vertical extended wiring, correct LOGO, correct the typesetting, being basically consistent with the print version; 2. Add the altitude derating coefficient table (power frequency withstand voltage), correct the related technical parameter data; 3. Correct the electrical wiring diagram of circuit breaker, design and typeset the text part again, remove the separate controller interface diagram and related text; 4. Related content on NDW2-6300 is added; 5. A signal capacity of the signal output accessory is added, and the accessory drawing is updated. 6. Content on voltage-check closing device is added.	20200730	Zhang Ying Zhou Yongqian	Zhuang Yangyang Zuo Yaoguo Zhu Shenfeng	Zhang Xiangang
2	Check the contents, add and correct errors in the details	20200823	Zuo Yaoguo	Zhou Yongqian	Wang Qinshan

Contents

Chapter 1 Product Overview

Product overview

1.1 NDW2 series circuit breaker current frame size


NDW2-1600


NDW2-2000


NDW2-3200


NDW2-4000


NDW2-6300

1.2 NDW2 series circuit breaker rated current

Rated current (A) / Frame size level	200	400	630	800	1000	1250	1600	2000	2500	2900	3200	4000	5000	6300
NDW2-1600														
NDW2-2000														
NDW2-3200														
NDW2-4000														
NDW2-6300														

1.3 NDW2 series circuit breaker technical specifications

circuit breaker	NDW2-1600	NDW2-2000	NDW2-3200	NDW2-4000	NDW2-6300
Number of poles	3、4	3、4	3、4	3、4	3、4
Rated current In +40℃	200A～1600A	400A～2000A	2000A～3200A	800A～4000A	4000A～6300A
N-pole rated current	100%In	100%In	100%In	100%In	100%In
Rated operational voltage Ue	AC690V	AC690V	AC690V	AC1000V	AC690V
Rated limit short-circuit breaking capacity Icu (kA) Icu (AC415V) [1]	65kA	80kA	100kA	100kA	120kA
Rated operating short-circuit breaking capacity Ics (AC415V) [1]	55kA	80kA	85kA	100kA	120kA
Rated short-time withstand current Icw (AC415V) [1]s	42kA	66kA	85kA	85kA	100kA

Note: [1)] Product 4000 refers to AC400V.

1.4 Structure Design

■ Installation Mode

Fixed type

Drawout type

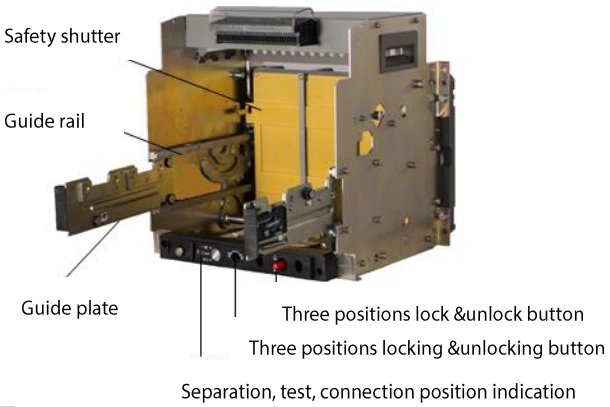
■ Brief Description of Structure and Indications

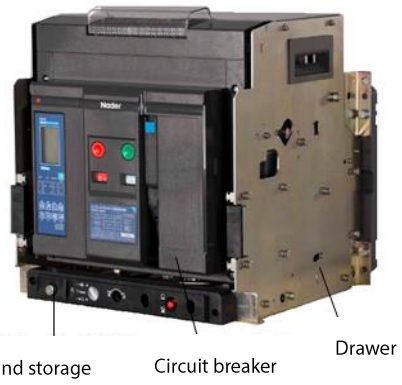
1. Reset button
3. Specification sign
3. Off-position Key Lock (Optional function)
4. Nader sign
5. Disconnection button
6. Closing button
7. Counter (optional function)
8. Energy releasing and storing indicator
9. Opening and closing indication
10. Nameplate
11. “Connection”, “Test”, “Separation” Position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

Note: 1 ~ 11 is fixed type, while 1 ~ 14 is drawout type.

■ Drawout Type Circuit Breaker Structure

Drawout type circuit breaker is composed of the circuit breaker 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.





1.5 Product Features

1.5.1The controllers are of full range and versatile

■ NWK31 or NWK21: conventional function, digital tube display, practical function and simplicity, adaptability to low-temperature places, and optional voltage measurement function;

■ NWK32 or NWK22: conventional function, LCD display, multiple and diversified functions, optional voltage and harmonic measurement and protection functions, applicable to high-end application scenarios, and more powerful if applied to intelligent systems

■ Measurement and protection: With current, voltage, frequency, phase sequence, power, power factor and harmonics measurement and protection functions

■ Current protection features: A variety of overload long-time delay protection, a variety of short circuit short-time delay protection, short circuit transient protection, earthing protection, neutral

Linear N-pole protection, current unbalance protection, MCR protection

■ Maintenance function: With fault record (8 times), historical current peak record, contact wear equivalent, query of operation times, clock function, self-diagnostic function, test function and fault display function

■ With a remote reset device, can realize remote recovery after fault tripping of the controller

1.5.2 Integrated communication network

NWK32 and NWK22 type controller can realize remote sensing, remote control, remote regulating and remote communication - "four remotes" data transmission function through communication interface Modbus protocol requirements.

1.5.3 Low temperature, plateau type circuit breaker

Low temperature, plateau type circuit breaker for used in special places can meet the use under the environment condition of plateau and low temperature below 40℃, is in line with the GB/T20645 Technical Requirements of the Plateau Low-voltage Apparatus under Special Circumstances, and has passed standard related test.

1.5.4 TH (thermal-humidity) type circuit breaker

The TH (thermal-humidity) type circuit breaker can meet the three-proofing requirements of moisture-proofing, mould-proofing and salt spray-proofing, and complies with JB/T834 Technical Requirements of Tropical Type Low-voltage Apparatus while having passed the following standard related tests:

- Thermal-humidity test: GB/T 2423.4-2008 Environmental Testing for Electric and Electronic Products. Part 2: Test Method Test Db: Alternating Thermal-humidity (12h + 12h Cycle);
- Mould growth test: GBT2423.16-2008 Environmental Testing for Electric and Electronic Products. Part 2: Test Method Test J and Guidelines: Mould
- Enclosure protection grade: GB/T 4208-2008 Enclosure Protection Grade (IP code).
- Salt spray test: GBT2423.17-2008 Environmental Testing for Electric and Electronic Products. Part 2: Test Method Test Ka: Salt spray

1.5.5 Convenient wiring mode

Either zero flashover or upper and lower wiring.

Connection mode: horizontal or vertical connection, elongated horizontal or vertical connection, L-shape connection, mixed connection, mixed and elongated connection

1.5.6 Efficient arc extinguishing and breaking

The design of the circuit breaker arc extinguishing chamber and contact system has a number of invention patents. It adopts the principle of air-blast and magnetic arc extinguishing, optimizes the arc extinguishing gate design, increases the driving force of arc, and improves the breaking ability of the product. In addition, it also designs and 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.

1.5.7 High electrical life and short time tolerance ability

The body design adopts high strength DMC material, and has high impact strength and insulating properties. The design of the double-contact structure improves the electric life of products; the optimized design of the mechanism realizes compensation to the contact pressure, and improves the product reliability and short circuit tolerance ability.

1.5.8 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.

1.6 Conforming Standards and Certification

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

GB/T 14048.1-2012 Low-voltage Switchgear and Control Equipment - Part 1: General Principles (IEC 60947-1:2001, MOD);

GB/T14048.2-2008 Low-voltage Switchgear and Control Equipment - Part 2: Circuit Breaker (IEC 60947-2:2006, IDT)

GB 14048.5-2008 Low-voltage Switchgear and Control Equipment - Part 5-1: Control Circuit Electrical Appliances and Switch Elements - Electromechanical Control Circuit Electrical Appliances (IEC 60947-5-1:2003, MOD)

GB/T 14092.3-2009 Environmental Condition for Machinery Products - High Altitude

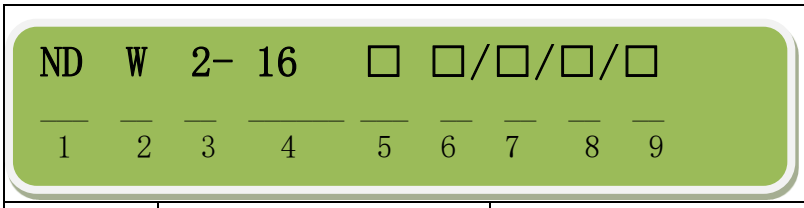
GB/T 19608.3-2004 Classification of Special Environmental Condition Part 3: Plateau

GB/T 20645-2006 Specific Environmental Condition - Technical Requirements of Low-voltage Apparatuses for Plateau

GB/T 20626.3-2006 Specific Environmental Condition - Electric and Electronic Products for Plateau - Part 3: Protection Requirement of Thunder and Lightning, Pollution, Condensation

NDW2 series of air circuit breaker has obtained China Compulsory Certification (CCC) for products.

1.7 Product Model



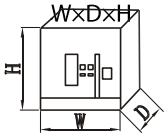
SN	SN name	NDW2
1	Enterprise code	Nader 牌低压电器
2	Product code	W: air circuit breaker
3	Design SN	2
4	Rated current of housing	16-1600、20-2000、32-3200、40-4000、63-6300
5	Breaking type	HU: High-voltage class (1000V), unmarked non high-voltage class
6	Installation mode	No mark for fixed type and C for drawout type
7	Rated current	02-200A, 04-400A, 06-630A, 08-800A, 10-1000A, 12-1250A, 16-1600A, 20-2000A, 25-2500A, 29-2900A, 32-3200A, 36-3600A, 40-4000A, 50-5000A, 63-6300A
8	Number of poles	3:3 poles; 4:4 poles; 5: 3 P+N;
9	Controller type	KM: M (Nixie tube display), applicable to NDW2-1600 KM: NWK21 (Nixie tube display), applicable to NDW2-2000/3200/4000/6300
		K3M: 3 M (LCD display), applicable to NDW2-1600 KM: NWK22 (LCD display), applicable to NDW2-2000/3200/4000/6300

Note: For the HU breaking type, serial 6 is behind serial 7, e.g.: NDW2-40HU/40C

Chapter 2 Technical Characteristics

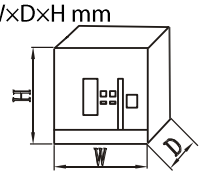
Technical Characteristics 2

2.1 NDW2-1600 Technical Specifications List

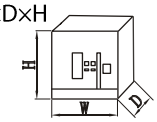
Circuit breaker model			NDW2-1600		
Rated current In	(A)		200, 400, 630	800, 1000	1250, 1600
N-pole rated current			100%In		
Rated operational voltage Ue			AC220V/230V/240V, AC380V/400V/415V, AC440V, AC660V/690V		
Rated frequency F			50/60Hz		
Rated insulation voltage Ui			1000V		
Rated impulse withstand voltage Uimp			12kV		
Number of poles			3、4		
Full break time (≤AC690V)			≤30ms		
Closing time			≤70ms		
Rated ultimate short circuit Breaking capacity Icu (effective value)		AC415V	65kA		
		AC690V	42kA		
Rated operating short circuit Breaking capacity Ics (effective value)		AC415V	55kA		
		AC690V	35kA		
Rated short circuit making capacity Icm (peak value)		AC415V	143kA		
		AC690V	88kA		
Rated short-time withstand current Icw (effective value) 1s		AC415V	42kA		
		AC690V	35kA		
Operating performance (times)	Electrical life	AC415V	10000	10000	10000
		AC690V	10000	10000 (800A) 7000 (1000A)	6000
		Operation frequency	20 times/hour		
	Mechanical life	Maintenance-free	15000		
		With maintenance	30000		
		Operation frequency	60 times/hour		
Installation mode			Fixed type, drawout type		
Wiring method of the main circuit			Horizontal wiring, vertical wiring, horizontal extended wiring, mixed wiring (upper horizontal and lower vertical), mixed wiring (upper vertical and lower horizontal)		
Outline dimension: 	Fixed type 3P		260mm×205.5mm×319.5mm		
	Fixed type 4P		330mm×205.5mm×319.5mm		
	Drawout type 3P		268.5mm×303.5mm×352mm		
	Drawout type 4P		338.5mm×303.5mm×352mm		
Weight	Fixed type 3P		20kg		21kg
	Fixed type 4P		24kg		26kg
	Drawout type 3P		40kg		42kg
	Drawout type 4P		50kg		52kg

Notes: 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.

2.2 NDW2-2000/3200 Technical Specifications List

<table>
<tr><td colspan="3">Circuit breaker model</td><td colspan="3">NDW2-2000</td><td colspan="2">NDW2-3200</td></tr>
<tr><td colspan="3">Rated current In (A)</td><td>400, 630, 800</td><td>1000, 1250, 1600</td><td>2000</td><td>2000, 2500</td><td>2900, 3200</td></tr>
<tr><td colspan="3">N-pole rated current</td><td colspan="5">100%In</td></tr>
<tr><td colspan="3">Rated operational voltage Ue</td><td colspan="5">AC220V/230V/240V, AC380V/400V/AC415V
AC440V/AC480V, AC660V/690V</td></tr>
<tr><td colspan="3">Rated frequency F</td><td colspan="5">50/60Hz</td></tr>
<tr><td colspan="3">Rated insulation voltage Ui</td><td colspan="5">1000V</td></tr>
<tr><td colspan="3">Rated impulse withstand voltage Uimp</td><td colspan="5">12kV</td></tr>
<tr><td colspan="3">Number of poles</td><td colspan="5">3、4</td></tr>
<tr><td colspan="3">Full break time (≤690V)</td><td colspan="5">≤30ms</td></tr>
<tr><td colspan="3">Closing time</td><td colspan="5">≤70ms</td></tr>
<tr><td colspan="2" rowspan="2">Rated limit short-circuit breaking capacity Icu (kA)
Icu (effective value)</td><td>AC415V</td><td colspan="3">80kA</td><td colspan="2">100kA</td></tr>
<tr><td>AC690V</td><td colspan="3">65kA</td><td colspan="2">80kA</td></tr>
<tr><td colspan="2" rowspan="2">Rated operating short-circuit breaking capacity
Ics (effective value)</td><td>AC415V</td><td colspan="3">80kA</td><td colspan="2">85kA</td></tr>
<tr><td>AC690V</td><td colspan="3">65kA</td><td colspan="2">65kA</td></tr>
<tr><td colspan="2" rowspan="2">Rated short circuit making capacity
Icm (peak value)</td><td>AC415V</td><td colspan="3">176 kA</td><td colspan="2">220kA</td></tr>
<tr><td>AC690V</td><td colspan="3">143 kA</td><td colspan="2">176kA</td></tr>
<tr><td colspan="2" rowspan="2">Rated short-time withstand current
Icw (effective value) 1s</td><td>AC415V</td><td colspan="3">66kA</td><td colspan="2">85kA</td></tr>
<tr><td>AC690V</td><td colspan="3">50kA</td><td colspan="2">55kA</td></tr>
<tr><td rowspan="5">Operation performance (times)</td><td rowspan="2">Electrical life</td><td>AC415V</td><td>15000</td><td>15000</td><td>11000</td><td>15000</td><td>12500 (2900A)
11000 (2500A)</td></tr>
<tr><td>AC690V</td><td>15000</td><td>15000 (1000-1250A)
8000 (1600A)</td><td>6000</td><td>15000 (2000A)
11000 (2500A)</td><td>6000</td></tr>
<tr><td colspan="2">Operation frequency</td><td colspan="3">(20 times/hour)</td><td colspan="2">(20 times/hour)</td></tr>
<tr><td rowspan="3">Mechanical life</td><td>Maintenance-free</td><td colspan="3">15000</td><td colspan="2">15000</td></tr>
<tr><td>With maintenance</td><td colspan="3">30000</td><td colspan="2">20000</td></tr>
<tr><td>Operation frequency</td><td colspan="3">60 times/hour</td><td colspan="2">60 times/hour</td></tr>
<tr><td colspan="3">Installation mode</td><td colspan="5">Fixed type, drawout type</td></tr>
<tr><td colspan="2" rowspan="2">Wiring method of the main circuit</td><td>Fixed type</td><td colspan="3">Horizontal wiring, horizontal extended wiring, “L” wiring</td><td colspan="2">Horizontal wiring, horizontal extended wiring</td></tr>
<tr><td>Drawout type</td><td colspan="3">Horizontal wiring, horizontal extended wiring, vertical wiring, “L” wiring</td><td colspan="2">Horizontal wiring, horizontal extended wiring, vertical wiring</td></tr>
<tr><td colspan="2" rowspan="4">Boundary dimension: W×D×H mm
  </td><td>Fixed 3P</td><td colspan="3">362mm×331mm×397mm</td><td colspan="2">422mm×302mm×397mm</td></tr>
<tr><td>Fixed 4P</td><td colspan="3">457mm×331mm×397mm</td><td colspan="2">537mm×302mm×397mm</td></tr>
<tr><td>Drawout 3P</td><td colspan="3">375mm×398mm×432mm</td><td colspan="2">435mm×398mm×432mm</td></tr>
<tr><td>Drawout 4P</td><td colspan="3">470mm×398mm×432mm</td><td colspan="2">550mm×398mm×432mm</td></tr>
<tr><td colspan="2" rowspan="4">Weight</td><td>Fixed 3P</td><td>39kg</td><td>40kg</td><td>41kg</td><td>46kg</td><td>56kg</td></tr>
<tr><td>Fixed 4P</td><td>48kg</td><td>49kg</td><td>50kg</td><td>58kg</td><td>68kg</td></tr>
<tr><td>Drawout 3P</td><td>68kg</td><td>70kg</td><td>71kg</td><td>92kg</td><td>96kg</td></tr>
<tr><td>Drawout 4P</td><td>86kg</td><td>88kg</td><td>91kg</td><td>108kg</td><td>118kg</td></tr>
<tr><td colspan="8">Note: ▲ represents this function is available</td></tr>
</table>

2.3 NDW2-4000/6300 Technical Specifications List

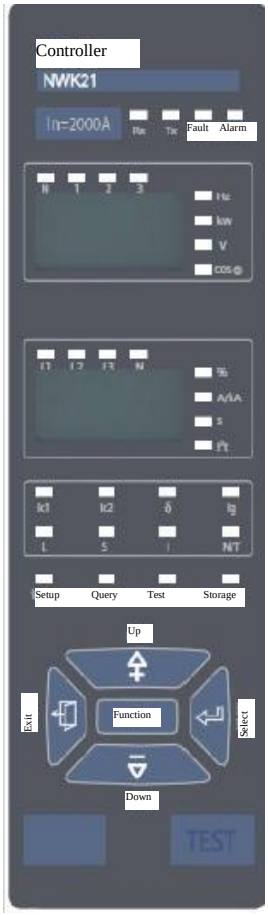
Circuit breaker model			NDW2-4000			NDW2-6300	
Rated current In (A)			800, 1000, 1250, 1600	2000, 2500	3200, 4000	4000, 5000, 6300	
N-pole rated current			100%In			100%In	
Rated operational voltage Ue			AC220V/230V/240V, AC380V/400V, AC415V, AC440V/480V, AC660V/690V, AC1000V			AC220V/230V/240V, AC380V/400V/415V, AC440V/480V, AC660V/690V	
Rated frequency f			50/60Hz				
Rated insulation voltage Ui			1000V				
Rated impulse withstand voltage Uimp			12kV				
Number of poles			3、4				
Full break time (≤AC690V)			≤30ms				
Closing time			≤70ms				
Rated ultimate short circuit Breaking capacity Icu (effective value)		AC400V	100kA			120kA	
		AC690V	75kA			85kA	
		AC1000V	50kA			/	
Rated operating short circuit Breaking capacity Ics (effective value)		AC400V	100kA			120kA	
		AC690V	75kA			85kA	
		AC1000V	50kA			/	
Rated short circuit making capacity Icm (peak value)		AC400V	220kA			264kA	
		AC690V	165kA			187kA	
		AC1000V	110kA			/	
Rated short-time withstand current Icw (effective value) 1s		AC400V	85kA			100kA	
		AC690V	75kA			85kA	
		AC1000V	50kA			/	
Operating performance (times)	Electrical life	AC415V	10000	8000	6000	3000	
		AC690V	10000	6000	3000	2000	
		AC1000V	2000	1000	500	/	
		Operation frequency	(20 times/hour)			(20 times/hour)	
	Mechanical life	Maintenance-free	10000			5000	
		With maintenance	15000			10000	
		Operation frequency	60 times/hour			60 times/hour	
Installation mode			Fixed type, drawout type			Fixed type, drawout type	
Wiring method of the main circuit			Horizontal wiring, vertical wiring, horizontal extended wiring,, vertical extended wiring			Horizontal wiring, vertical wiring, horizontal extended wiring, Vertical extended wiring, mixed wiring (upper horizontal and lower vertical), mixed wiring (upper vertical and lower horizontal), mixed and extended wiring (upper horizontal and lower vertical), mixed and extended wiring (upper vertical and lower horizontal)	
Outline dimension: W×D×H 	Fixed type 3P		428mm×300mm×393.5mm			428mm×300mm×393.5mm	
	Fixed type 4P		543mm×300mm×393.5mm			543mm×300mm×393.5mm	
	Drawout type 3P		435mm×403mm ×432mm （800A-2500A）	435mm×397.5mm×432mm （3200A-4000A）		809mmx401.5mmx475mm	
	Drawout type 4P		550mm×403mm ×432mm （800A-2500A）	550mm×397.5mm×432mm （3200A-4000A）		1039mmx401.5mmx475mm	
Weight	Fixed type 3P		59kg (08～25)	60kg (32～40)		125kg (40~50)	127kg (63)
	Fixed type 4P		70kg (08～25)	71.5kg (32～40)		167kg (40~50)	170kg (63)
	Drawout type 3P		97kg (08～25)	103kg (32～40)		193kg (40~50)	195kg (63)
	Drawout type 4P		114kg (08～25)	120kg (32～40)		257kg (40~50)	260kg (63)

Chapter 3 Controller

Controller 3

Controller is one of the main components of the circuit breaker, which can provide the function of protecting the overload, short circuit, grounding, current unbalance, overvoltage, undervoltage, voltage unbalance, overfrequency, underfrequency, reverse power and other failures, and realize reasonable operation of the power grid through the load monitoring, required value protection, regional interlocking and other functions. Controller has the function of measuring the current, voltage, power, frequency, electric energy, required value, harmonic 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.

3.1 Type of Controller

Model	NWK21/NWK31	NWK21（V）/NWK31（V）	NWK22 /NWK32 NWK22（V）/NWK32（V） NWK22（P）/NWK32（P）
Controller Pictures			

Note: NWK31 and NWK32 are applied to NDW2-1600, NWK21 and NWK22 are applied to NDW2-2000、NDW2-3200, NDW2-4000 and NDW2-6300.

3.2 Controller Functions

Functional items		NWK21 NWK31	NWK21/V NWK31/V	NWK22 NWK32	NWK22/V NWK32/V	NWK22/P NWK32/P
Display interface	Digital tube numbers and symbols display	√	√	—	—	—
	LCD panel symbols and graphics display in Chinese	—	—	√	√	√
保护功能	Overload long-time delay protection	√	√	√	√	√
	Overload thermal memory	√	√	√	√	√
	Overload pre-alarm/alarm output	√/▲	√/▲	√/▲	√/▲	√/▲
	Short circuit short-time delay protection	√	√	√	√	√
	Short-time delay thermal memory	√	√	√	√	√
	Short circuit instantaneous protection	√	√	√	√	√
	Ground protection (differential type)	√	√	√	√	√
	Grounding alarm/alarm output	√/▲	√/▲	√/▲	√/▲	√/▲
	Current leakage protection/alarm/alarm output	—	—	√/√/▲	√/√/▲	√/√/▲
	Neutral wire protection	√	√	√	√	√
	Current unbalance protection/alarm/alarm output	√/—/—	√/—/—	√/√/▲	√/√/▲	√/√/▲
	MCR	√	√	√	√	√
	Load monitoring/alarm/alarm output	▲/▲/▲	▲/▲/▲	√/√/▲	√/√/▲	√/√/▲
	Undervoltage protection /alarm/alarm output	—	—	—	√/√/▲	√/√/▲
	Overvoltage protection /alarm/alarm output	—	—	—	√/√/▲	√/√/▲
	Voltage unbalance protection/alarm/alarm output	—	—	—	√/√/▲	√/√/▲
	Phase sequence protection/alarm/alarm output	—	—	—	√/√/▲	√/√/▲
	Underfrequency protection/alarm/alarm output	—	—	—	√/√/▲	√/√/▲
	Overfrequency protection/alarm/alarm output	—	—	—	√/√/▲	√/√/▲
	Current required value protection/alarm/alarm output	—	—	—	√/√/▲	√/√/▲
	Reverse power protection/alarm/alarm output	—	—	—	—	√/√/▲
Measuring function	Current measurement (phase pole, N-pole, grounding)	√	√	√	√	√
	Voltage (phase voltage, circuit voltage, voltage unbalance rate)	—	√	—	√	√
	Phase sequence detection	—	—	—	√	√
	Frequency measurement	—	√	—	√	√
	Required value measurement (current)	—	—	—	√	√
	Required value measurement (power)	—	—	—	—	√
	Power measurement (active power, reactive power, apparent power)	—	√	—	—	√
	Power factor measurement	—	√	—	—	√
	Electric energy measurement (active electric energy, reactive electric energy, apparent electric energy)	—	—	—	—	√
	Harmonics measurement	—	—	—	—	√
Maintenance function	LED fault status indication	√	√	√	√	√
	Fault record (8 times) and query	√	√	√	√	√
	Displacement record	—	—	√	√	√
	Alarm history query	—	—	√	√	√
	Fault tripping signal output	√	√	√	√	√
	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	▲	▲	▲	▲	▲
	Communication	—	—	▲	▲	▲

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

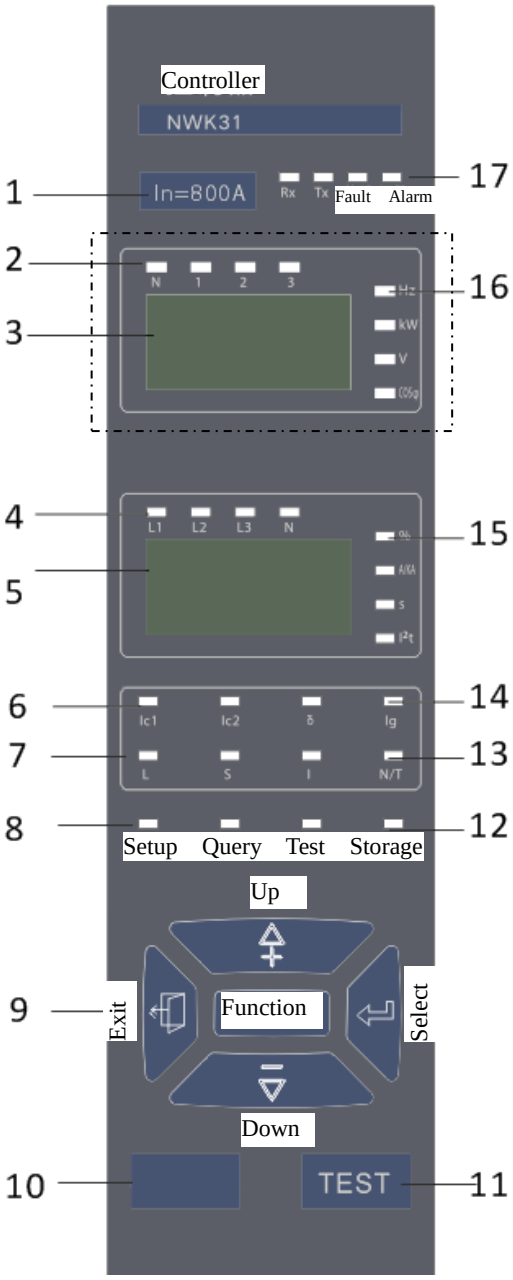
2. NWK21/V, NWK31/V, NWK22/V, NWK32/V, NWK22/P and NWK32/P controllers are only applicable to the rated voltage of 500Vand below;

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

3.3 Controller Panel Description

■ NWK21/NWK31 Controller

NWK21/ NWK31 Controller Panel Description

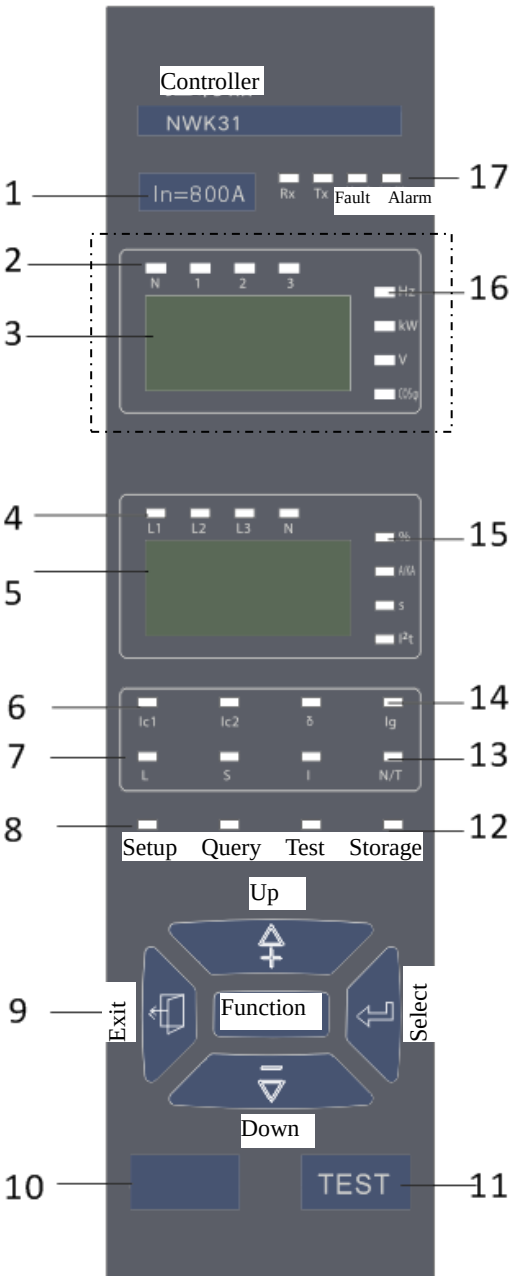


1. Rated current sign
2. N-phase and A, B, C phases voltage indicators in order
3. Three-phase voltage and frequency value display screen
4. Three-phase current, N-phase current indicators
5. Three-phase electric current display screen
6. Load monitoring signals 1 and 2 operation indicators
7. Long time delay and short time delay protection operation indicators
8. Setup, query indicators
9. 5 operation buttons
10. Unused temporarily
11. Test interface
12. Test, storage indicators
13. Instantaneous, N-phase current or self-diagnosis operation indicators
14. Grounding current protection working indicator
15. Unbalance rate, current, time and I2t (inverse time limit) indicators in order
16. Frequency, power, voltage and power factor indicators in order
17. Communication sending, receiving, fault and alarm indicators in order

Note: 1. The double-dot box is the controller with a voltage displaying function, and it is not displayed if there is no such voltage displaying function;
2. Tx, Rx is only used for internal testing in the company.

NWK22/NWK32 Controller

NWK22/ NWK32 Controller Panel



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)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 quickly; in case of an alarm, the red LED is always on.
5. Protection indicator (LED): The corresponding 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. "Set" button: switch to the parameter setting menu ("Right" button in the password entering interface).
7. "Measure" button: switch to the default measurement menu ("Left" button in the password entering interface).
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 the parameter.
10. “Exit” button: Exit the current option to the previous menu, or cancel the current parameter settings.
11. TEST test interface: Plugged into the portable power box or test unit.
12. “Select” 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.

3.4 Setting Values and Protective Features of Controller

Setting Values and Protective Features of Controller

Overload long time-delay protection NWK21/NWK31 &NWK22/NWK32												
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.										
4 types of protection curve		1） Standard power distribution protection I^2t： tr= 2.25 Tr/ N^2(factory default) Standard generator protection I^2t（F）： tr = 2.25 Tr/ N^2 2) Express inverse time limit (power distribution protection) EI(G): tr= 1.25 Tr/（N^2-1） 3) Express inverse time limit (motor protection) EI(M): tr = 1.3974 Tr×Ln[N^2/（N^2-1.15）] 4) High-voltage fuse compatible HV: tr = 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: NWK21/NWK31 controller has only standard power distribution protection I^2t; NWK22/NWK32 controller provides 4 types of protection curves.										
Standard power distribution protection I^2t.Time setting value Tr (@1.5 Ir)		NWK21/NWK31: 15s, 30s, 60s, 120s, 240s, 480s										
		NWK22/NWK3: 15s, 30s, 60s, 120s, 240s, 360s, 480s, 600s, 720s, 840s, 960s										
Tripping timetr（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		NWK22/NWK32: See the table below for the overload long-time delay protection action delay time of C1~C16										
Protective features (accuracy of ±10%)		Current (I/Ir)				Tripping time						
		≤1.05				> 2h Inaction						
		≥1.3 (power distribution protection)				< 1h Action						
		≥1.2 (generator protection)				< 1h Action						
		≥1.2 Ir				The action time is calculated according to four types of protection formula or curve queried						
Thermal memory time		NWK21/NWK31: 30min (ON) or OFF NWK22/NWK32: Instantaneous (function off), 10min, 20 min, 30 min, 45min, 1h, 2h, 3h Description: 1. The auxiliary power supply of controller features the thermal memory function; turn off the auxiliary power supply to clear the thermal memory; 2. Setting OFF, it is possible to turn off the thermal memory function.										
Overload pre-alarm NWK21/NWK31 &NWK22/NWK32												
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 output, observe the controller display screen or read from the display indicator.										

Short-circuit short time-delay protection NWK21/NWK31 &NWK22/NWK32			
NWK21/NWK31			
Current setting value I_{sd}	(1.5～15) Ir or OFF (OFF-Function off)		
Time setting value T_{sd} (s)	0.1, 0.2, 0.3, 0.4		
I2t	ON or OFF		
Protective features (accuracy of ±10%)	Current		Tripping time
I2t-ON	I_{sd} ≤I≤8Ir		(8Ir) ^{2}× T_{sd}/I^2inverse time-limit characteristic
	I＞8Ir		T_{sd} fixed time limit characteristic
I2t-OFF	I≥ I_{sd}		T_{sd} fixed time limit characteristic
Thermal memory time	15min (ON) or OFF (OFF-Function off)		
NWK22/NWK32			
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	Tsd
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 NWK21/NWK31 &NWK22/NWK32		
Current setting value I_i	(1.0～20)Inor OFF (OFF-Function off)	
Protective features (accuracy of ±10%)	Current (I/Ii)	Tripping time
	≤0.85	Inaction
	≥1.15	＜40ms Action
MCR protection NWK21/NWK31 &NWK22/NWK32		
Current setting value I_{MCR}	（1.0～20）In or OFF (factory default as 10In)	
Protective features (accuracy of ±10%)	**Current (I/I_{MCR})**	Tripping time
	≤0.8	Inaction
	≥1.1	＜30ms
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.		
Ground protection/alarm NWK21/NWK31		
Protection type	Differential type (T), ground current type (W), with the latter as the optional function	
Current setting value Ig	(0.2~1.0) In or OFF (OFF-Function off)	
Time setting value T_g （s）	0.1～0.4 Fixed time limit	
Protective features (accuracy of ±10%) Inherent absolute error: ±40ms	**Current (I/I_g)**	Tripping time
	≤0.8	Inaction (no alarm)
	≥1.0	For action (or alarm), see the time setting value
Grounding alarm output	The signal output is required to add a signal unit. Without the signal output, observe the controller display screen or read from the display indicator.	
Ground protection/alarm NWK22/NWK32		
Current setting value I_{gb}	(0.2~1.0) In or OFF (OFF-Function off)	
Action /alarm time setting value T_g （s）	0.1～1.0	
Alarm return current setting value	(0.2~1.0) In	Only when the execution mode is “alarm”, this setting is available
Alarm return time setting value (s)	0.1～1.0	
Protective/alarm features (accuracy of ±10%) Inherent absolute error: ±40ms	**Current (I/I_g)**	Tripping time
	≤0.8	Inaction (no alarm)
	≥1.0	For action (or alarm), see the action time as the inverse or definite time limit[Note]
Returnable features (accuracy of ±10%) Inherent absolute error: ±40ms	≥1.0	Non-return
	≤0.8	For alarm, see the alarm return time setting value

Grounding alarm output	The signal output is required to add a signal unit; set one DO of the signal unit as "grounding alarm". Without the signal output, observe the controller display screen or read from the display indicator.

Note: For details of the reverse and definite time limit, see the User Manual of NWK22 and NWK32 Controller,with the definite time limit as T_g

Neutral line protection NWK21/NWK31 &NWK22/NWK32

Neutral wire protection setting value	NWK21/NWK31 controller:50%In, 100%In or OFF; NWK22/NWK32 controller: 50%In, 100%In, 160%In, 200%In or OFF. OFF— Turn off N-phase protection function
Protective features	Same-phase pole overload long time-delay protection, short-circuit short time-delay protection, short-circuit instantaneous protection, ground protection

Continued: Setting Values and Protective Features of Controller

Current leakage protection/alarm (namely the residual current protection) NWK22/NWK32

Current setting value I△n （A）	0.5~30.0 or OFF (OFF-Function off)											
Action delay time T△n (s)	Instantaneous, 0.06, 0.08, 0.17, 0.25, 0.33, 0.42, 0.5, 0.5 , 0.67, 0.75 , 0.83											
Alarm delay time T△n (s)	0.1～1.0											
Alarm return current setting value (A)	0.5～30.0											
Alarm return delay time (s)	0.1～1.0											
Protective action/alarm features (accuracy of ±10%) Inherent absolute error: ±40ms	**Current (I/I△n)**	Tripping time										
	＜0.8	Inaction (no alarm)										
	≥1.0	Action (see the data below) or alarm (see the alarm delay time)										
Alarm return features (accuracy of ±10%) Inherent absolute error: ±40ms	≥1.0	Non-return										
	≤0.9	For alarm, see the alarm return delay time										
Tripping time t(s) (Accuracy of ±10%)	Setting time	Instantaneous	0.06	0.08	0.17	0.25	0.33	0.42	0.5	0.58	0.67	0.75	0.83
	I△n	0.04	0.36	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5
	2I△n	0.04	0.18	0.25	0.5	0.75	1	1.25	1.5	1.75	2	2.25	2.5
	5I△n 10I△n	0.04	0.072	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Current leakage alarm output	The signal output is required to add a signal unit; set one DO of the signal unit as "current leakage fault". Without the signal output, observe the controller display screen or read from the display indicator.											

Current unbalance protection/alarm NWK21/NWK31 &NWK22/NWK32

NWK21/NWK31	Current unbalance setting value δ	(40%~100%) + OFF (OFF-Function off)
	Action delay time $t_δ$(s)	0.1～1.0

NWK22/NWK32	Protection/alarm start setting value	5%～60%	
	Action/alarm delay time (s)	0.1～40.0	
	Alarm action return setting value	5%～start value	Only when the execution mode is "alarm", this setting is available
	Alarm return delay time (s)	10～200	
Protective features (accuracy of ±10%) Inherent absolute error: ±40ms	Actual current unbalance rate/setting value	Tripping time	
	≤0.9	Inaction (no alarm)	
	≥1.1	Acts (or gives an alarm) according to the set delay time	
Protective return features (accuracy of ±10%) Inherent absolute error: ±40ms	Actual current unbalance rate/setting value	Tripping time	
	≥1.1	Non-return	
	≤0.9	Returns according to the alarm return delay time	
Current unbalance protection alarm DO output	The signal output is required to add a signal unit; set one DO of the signal unit as I unbalance alarm. Without the signal output, observe the controller display screen or read from the display indicator.		
Execution mode	Alarm/tripping/close		

Continued: Setting Values and Protective Features of Controller

Required current value protection/alarm	NWK22/NWK32	
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 curren/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 curren/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 output, observe the controller display screen or read from the	

		display indicator.			
Protection execution mode		Alarm/tripping/close			
Load monitoring function NWK21/NWK31 &NWK22/NWK32					
NWK21/NWK31	Operation mode		Current setting	Time setting	
	Current way 1	Ic1	(0.2~1.0) In+OFF	Tc1	15s, 30s, 60s, 120s, 240s, 480s
		Ic2		Tc2	
	Current way 2	Ic1		Tc1	
		Ic2		Tc2	60s, 120s, 240, 480s
	Off (OFF)				
	Thermal memory	30min (ON), OFF			
NWK22/NWK32	Operation mode		Current/power setting	Time setting	
	Unload Ⅰ	Current way 1	0.2~1.0Ir	20～80%Tr	
		Current mode 2			
		Power way 1	200kW~10000kW	10s~3600s	
		Power mode 2			
	Unload Ⅱ	Current way 1	0.2~1.0Ir	20～80%Tr	
		Current mode 2	0.2Ir～unloading Ⅰ	10s~600s	
		Power way 1	200kW~10000kW	10s~3600s	
		Power mode 2	100kW～unloading Ⅰ		
	Off (OFF)				
Load monitoring alarm DO output		The signal output is required to add a signal unit; set one DO of the signal unit as "load monitoring 1", another as "load monitoring 2". Without the signal output, observe the controller display screen or read from the display indicator.			
Undervoltage protection/alarm NWK22/NWK32					
Protection/alarm start setting value V		100~return value			
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			
Continued: Setting Values and Protective Features of Controller					
Undervoltage protection/alarm NWK22/NWK32					
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		Umin/return setting value		Tripping time	

protection (Accuracy of ±10%) inherent absolute error: ±40 ms	＜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 output, observe the controller display screen or read from the display indicator.	
Execution mode	Alarm/tripping/close	
Undervoltage protection/alarm NWK22/NWK32		
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	
Undervoltage protection/alarm action features (Accuracy of ±10%) Inherent absolute error: ±40ms	Umin/action setting value	Tripping time
	≤0.9	Inaction (no alarm)
	≥1.1	Acts (or gives an alarm) according to the set delay time
Undervoltage alarm return features (Accuracy of ±10%) inherent absolute error: ±40 ms	Umin/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 output, observe the controller display screen or read from the display indicator.	
Protection execution mode	Alarm/tripping/close	
Voltage unbalance protection/alarm NWK22/NWK32		
Protection/alarm start setting value	2%～30%	
Protection action delay time setting value (s)	0.2~60	
Protection action return setting value	2%～start value	
Protection return delay time (s)	0.2~60	
Action features of voltage unbalance protection/alarm (Accuracy of ±10%) inherent absolute error: ±40 ms	Actual voltage unbalance rate/setting value	Tripping time
	≤0.9	Inaction (no alarm)
	≥1.1	Acts (or gives an alarm) according to the set

		delay time
Alarm action features of voltage unbalance protection (Accuracy of ±10%) inherent absolute error: ±40 ms	Actual voltage unbalance rate/setting value	Tripping time
	≥1.1	Non-return
	≤0.9	Returns according to the set delay time
Voltage unbalance protection alarm DO output	The signal output is required to add a signal unit; set one DO of the signal unit as "U unbalance alarm" output. Without the signal output, observe the controller display screen or read from the display indicator.	
Execution mode	Alarm/tripping/close	
Continued: Setting Values and Protective Features of Controller		
Underfrequency, overfrequency protection/alarm NWK22/NWK32		
Underfrequency	Protection/alarm start setting value (Hz)	45.0～return value
	Action delay time setting value (s)	0.2～5.0
	Alarm action return setting value (Hz)	Start value~65.0
	Alarm return delay time (s)	0.2~36.0 (the return value must be greater than or equal to the start value)
Overfrequency	Protection/alarm start setting (Hz)	Return value~65.0
	Action delay time setting value (s)	0.2～5.0
	Alarm return setting value (Hz)	45.0～start value
	Alarm return delay time (s)	0.2~36.0 (the return value must be greater than or equal to the start value)
Underfrequency, overfrequency protection alarm DO output	The signal output is required to add a signal unit; set one DO of the signal unit as “underfrequency fault” or "overfrequency fault". Without the signal output, observe the controller display screen or read from the display indicator.	
Execution mode	Alarm/tripping/close	
Reverse power protection/alarm NWK22/NWK32		
Protection/alarm start setting value (kW)	5～500	
Protection action delay time setting value (s)	0.2～20	
Alarm return setting value (kW)	5~start value	
Alarm return delay time (s)	1.0～360 (the return value must be greater than or equal to the start value)	
Reverse power protection	Reverse power value/Setting	Tripping time

action/alarm features (Accuracy of ±10%) inherent absolute error: ±40 ms	value	
	≤0.9	Inaction (no alarm)
	≥1.1	Acts (or gives an alarm) according to the set delay time
Reverse power protection/alarm return features (Accuracy of ±10%) inherent absolute error: ±40 ms	Reverse power value/Setting value	Tripping time
	≥1.1	Non-return
	≤0.9	Returns according to the set delay time
Reverse power protection alarm DO output	The signal output is required to add a signal unit; set one DO of the signal unit as "reverse power fault" output. Without the signal output, observe the controller display screen or read from the display indicator.	
Execution mode	Alarm/tripping/close	
Phase sequence protection/alarm NWK22/NWK32		
Setting range of action phase sequence	Δφ: A, B, C / Δφ: A, C, B	
Phase sequence protection alarm DO output	The signal output is required to add a signal unit; set one DO of the signal unit as "phase sequence protection/alarm fault". Without the signal output, observe the controller display screen or read from the display indicator.	
Execution mode	Alarm/tripping/close	
Signal unit NWK21/NWK31 &NWK22/NWK32		

	DO output	General functions	Optional load monitoring functions
NWK21/NWK31	DO1	Overload pre-alarm output	Load monitoring 1
	DO2	Grounding pre-alarm output	Load monitoring 2
	DO3	Fault tripping output	Fault tripping output
	DO4	Short circuit instantaneous action output	Short circuit instantaneous action output

Continued: Setting Values and Protective Features of Controller

Signal unit NWK21/NWK31 &NWK22/NWK32

	Type of signal unit		**Rated current**	Field of Application
NWK22/NWK32	S1		4DO (4 output contacts)	No regional interlocking
	S2		3DO (3 output contacts) 1DI (1 input contact)	Regional interlocking between air circuit breakers
	S3		2DO (2 output contacts) 2DI (2 input contacts)	Regional interlocking between air circuit breakers
	DI	Function	Alarm, tripping, regional interlocking, general, grounding interlocking, short circuit	

	setting	interlocking			
	Input form	Normally open		Normally closed	
DO	Function setting	See the table below, "Parameter Settings of Switch Output (DO)"			
	Execution mode	Normally opened level	Normally closed level	Execution mode	Normally opened level
	Impulse time	N/A		1~360s	

Parameter Settings of Switch Output (DO)				
General	Alarm	Fault tripping	General	Alarm
Load monitoring 2	Overload pre-alarm	Overload fault	Load monitoring 2	Overload pre-alarm
Grounding/current leakage fault	Grounding/leakaging alarm	Current unbalance fault	Grounding/current leakage fault	Grounding/leakaging alarm
Overvoltage fault	Voltage unbalance fault	Underfrequency fault	Overvoltage fault	Voltage unbalance fault
Reverse power fault	Regional interlocking	Remote On	Reverse power fault	Regional interlocking
MCR fault	Ground interlocking	Short circuit interlocking	MCR fault	Ground interlocking
C-phase required value fault	N-phase required value fault	Required value out-of-limit	C-phase required value fault	N-phase required value fault
Remote reset	Temperature alarm	—	Remote reset	Temperature alarm

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
I2t	1.5×Ir	15.00	30.00	60.00	120.00	240.00	360.00	480.00	600.00	720.00	840.00	960.00					
	2×Ir	8.44	16.88	33.75	67.50	135.00	202.0	270.00	337.50	405.00	472.50	540.00					
	6×Ir	0.94	1.88	3.75	7.50	15.00	22.50	30.00	37.50	45.00	52.50	60.00					
	7.2×Ir	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×Ir	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×Ir	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×Ir	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×Ir	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×Ir	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×Ir	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×Ir	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×Ir	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×Ir	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×Ir	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×Ir	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×Ir	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	NWK21/NWK31	8Ir	0.2s	Definite time, I2t-OFF
	NWK22/NWK32	I_{sd1}-6Ir，I_{sd2}-8Ir	0.2s	I_{sd1}Inverse time lag, I_{sd2}Constant time lag
Short circuit instantaneous		10In	-	-
Neutral wire protection		100%In	-	-
Ground protection		0.5In	0.2s	3P products usually close this function as a default, and 4P opens it as a default; clients of 3P products can open the function according to their requirements
Current unbalance protection		OFF	-	Users can open it as needed

3.5 Working Power Supply of Controller

■ The working power supply of controller is provided by the transformer and auxiliary power supply. To ensure reliable operation and breaking of small current in case of failure, please adopt the following 1), 2) Dual-power supply mode, as below

1) To be powered by the power supply CT

Normal operating conditions of the controller: the primary current single-phase and three-phase are no less than 0.4In and 0.2In respectively. When the rated current is ≤400A, the primary current single-phase and three-phase of the main circuit are no less than 1.0In and 0.6In respectively. Otherwise, it must be powered by the auxiliary power supply.

2) To be powered by the auxiliary power supply

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 ±15%.

3) Test port power supply

Rated voltage: DC24V, allowable error ±5%. Panel power supply, used for independent test of the controller, not for normal operation

■ Rated power consumption of controller

Rated power consumption: ＜7W.

■ Contact capacity of controller

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

Fault tripping contact output, contact capacity: AC250V/16A;

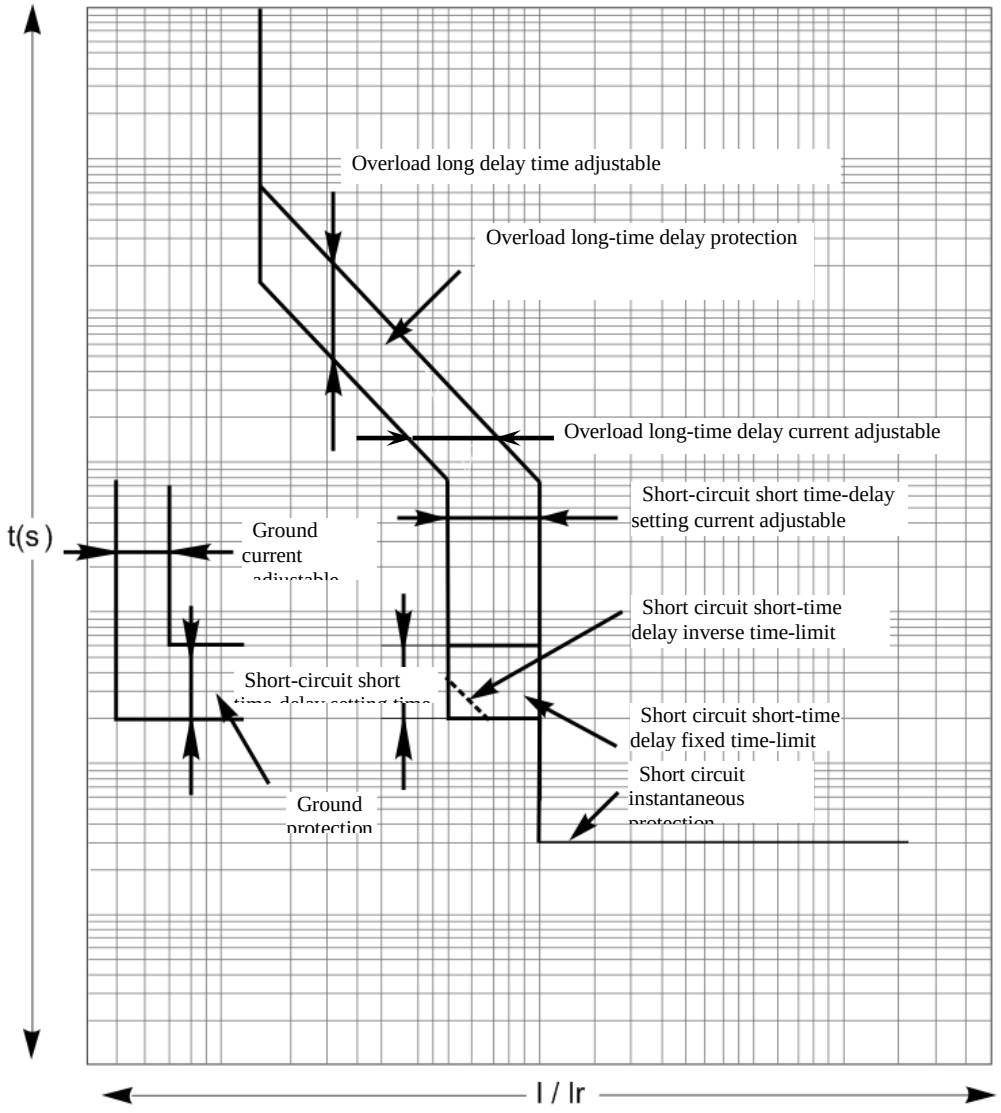
Auxiliary contact output of the circuit breaker status, contact capacity: 10A/AC250V.

3.6 Introduction of Controller Functions

For introduction of controller functions, see the *User Manual of NWK21 and NWK31 Controller* and *User Manual of NWK22 and NWK32 Controller.*

3.7 Protection Characteristic Curve

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



For details of each protective characteristic curve of the contoller, please see the controller manual NWK21, NWK31 and NWK22, NWK32

Chapter 4 Accessories

Accesories 4

4.1 Accessory List

Accessory name	For what kind of circuit breakers	Supply mode
Controller power supply module	Fixed type/drawout type	Optional supply (standard configuration of the controller voltage is AC for shell 1600)
Relay module	Fixed type/drawout type	Optional supply, matched with the power supply module
Off-position key lock	Fixed type/drawout type	Optional ordering for customers
Door interlocking	Drawout type	Optional ordering for customers
Circuit breaker triolocation locking device	Drawout type	Standard configuration
Auxiliary switch	Fixed type/drawout type	Standard configuration
Closed electromagnet	Fixed type/drawout type	Standard configuration
Shunt release	Fixed type/drawout type	Standard configuration
Motor operating mechanism	Fixed type/drawout type	Standard configuration
Phase partition	Fixed type/drawout type	Optional ordering for customers (Shell 4000 is standard.)
Closing ready signal output device	Fixed type/drawout type	Optional ordering for customers
Under-voltage release/loss of voltage release	Fixed type/drawout type	Optional ordering for customers
Voltage-check closing device	Fixed type/drawout type	Optional ordering for customers
Counter	Fixed type/drawout type	Optional ordering for customers
Door frame	Fixed type/drawout type	Optional ordering for customers
Dustproof cover	Fixed type/drawout type	Optional ordering for customers
Mechanical interlocking	Fixed type/drawout type	Optional supply (without this accessory in the fixed type product 1600)
Power Automatic Transfer Switches device	Fixed type/drawout type	Optional supply (without this accessory in the fixed type product 1600)

4.2 Electrical Control Accessories

4.2.1 Closed electromagnet（Standard configuration）

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	
		1600 frame size	2000 frame size and above
400V	AC380V/AC400V 50/60Hz	380VA	620VA
	AC220V/AC230V 50/60Hz	330VA	500VA
	DC220V	330W	500W
	DC110V	270W	400W
	DC24V	200W	145W

4.2.2 Shunt release（Standard configuration）

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	
		1600 frame size	2000 frame size and above
400V	AC380V/AC400V 50/60Hz	380VA	620VA
	AC220V/AC230V 50/60Hz	330VA	500VA
	DC220V	330W	500W
	DC110V	270W	400W
	DC24V	200W	145W

4.2.3 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)	Operating power			
			1600 frame size	2000 frame size	3200/4000 frame size	6300 frame size
400V	3s~5s	AC220V/AC230V AC380V/AC400V (50/60Hz）	90W	85W (3P), 110W (4P)	110W	150W
		DC220V/DC110V				
		DC24V				

4.2.4 Undervoltage release

◆ Action features of the undervoltage release

1) When the applied voltage drops, even slowly drops to 70%~35% 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. The undervoltage delayed release sets the delay duration of the release action through toggling the toggle switch on the undervoltage delayed device. The delay duration can be set to 1 s, 3 s, 5 s as required, and the factory default setting is 1 s.

◆ See the table below for the power consumption of undervoltage release

Power Consumption Table of Undervoltage Release

Rated insulation voltage (Ui)	Frequency (f)	Rated operational voltage (Ue)	Operating power	
			1600 frame size	2000 frame size and above
400V	50/60Hz	AC380V(AC400V)	0.8W	5.2W
		AC220V(AC230V)	0.8W	3.9W
		DC220V	0.8W	3.9W
		DC110V	0.8W	3.9W
		DC24V	1.2W	3.5W

4.2.5 Loss-of-voltage release

◆ Action features of the loss of voltage release

1） When the applied voltage suddenly drops to 35~10% 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
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. NDW2-1600/
Dalay duration of 6300 can be set to an integer value from 1 s to 10 s, and the step length is 1s while delay duration of NDW2-2000/3200/4000 can be set to 1 s, 3 s, or 5 s. See the table below for the power consumption of loss of voltage release.

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

Power Consumption Table of Loss of Voltage Release

Rated insulation voltage (Ui)	Frequency (f)	Rated operational voltage Ue	Operating power	
			1600/6300 frame size	2000/3200/4000 frame size
400V	50Hz/60Hz	AC220V (AC230V)	1.75W	0.8W
		AC380V (AC400V)	1.35W	0.8W

4.3 Signal Output Accessories

4.3.1 Auxiliary switch

- The conventional thermal current of the auxiliary switch is 6 A;
- Auxiliary contact form: Four groups switch, six groups switch, 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

Table of Technical Parameters

Applicable frame size		1600 frame size	4000 frame size	2000/3200/6300
Auxiliary contact form	Conventional	■ Four groups switch	■ Four groups switch	■ Four normally opened and four normally closed
	Special	■ Six groups switch	■ Four normally opened and four normally closed ■ Six groups switch	■ Five normally opened and five normally closed ■ Six normally opened and six normally closed
Agreed thermal current Ith		6A		
Minimum load		2mA/DC15V		
Breaking capacity	DC-12	0.3A/DC250V	0.3A/DC250V	5A/DC250V
	AC-12	10A/AC250V	10A/AC250V	10A/AC250V
	DC-13	0.2A/DC220V	0.2A/DC220V	1.2A/DC220V
	AC-15	0.29A/AC400V	3A/AC400V	3A/AC400V

4.3.2 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 closing in place;
- Controller fault tripping reset.
- Draw-out type circuity breaker is in the “test” or “connection” position
- Open position lock（interlocking accessory）not closed
- Mechanical interlock（interlocking accessory）not closed

Table of Technical Parameters

Breaking capacity	1600 frame size	2000/3200/4000/6300 frame size
	1A /AC250V	3A /AC250V

4.3.3 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 positions with 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

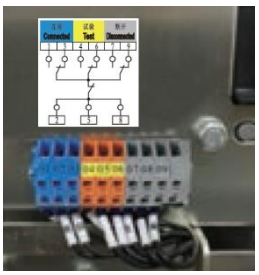


Table of Technical Parameters

Breaking capacity	0.4A/DC125V
	10A/AC250V

4.3.4 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 8 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 ± 1mm
Minimum test pull-force after the conductor connection	30N

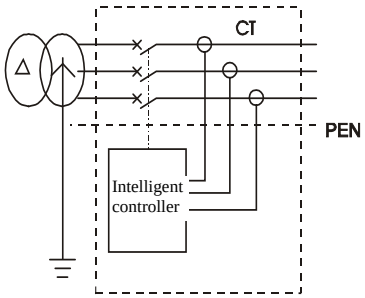
4.4 Related Accessories of Controller

4.4.1 External N-pole transformer

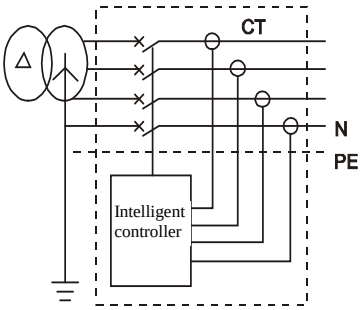
- Ground type

The 3P+N system can be formed by using a 3P circuit breaker and an external N-phase transformer. It can measure data on the grounding cable via an external N-pole transformer to realize the ground protection of the differential type (T) or the ground current type (W). The electric circuit diagram is shown as below:

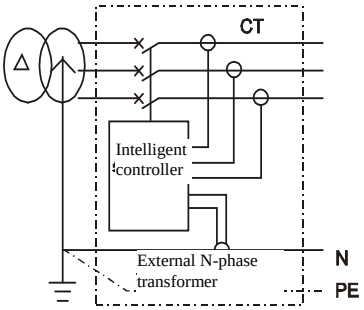
1) Electric circuit diagram of differential type (T)



3P

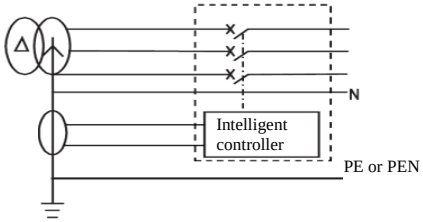


4P



3P+N (T)

2) Electric circuit diagram of ground current type (W)



3P+N (W)

◆ Transformer type

For rectangular and flexible-type transformers, users can select the frame size current (or N-pole current) and dimensions.

1） Rectangular transformer

★ Rectangular transformer code

Transformer code	Hole dimensions	Configured with fixing accessories	Applicable frame size
N1	62×21	1 set	1600
N2	102×32.5	1 set	1600, 2000
N3	122×52	2 sets	2000, 3200, 4000, 6300
N4	262×102	3 sets	3200, 4000, 6300

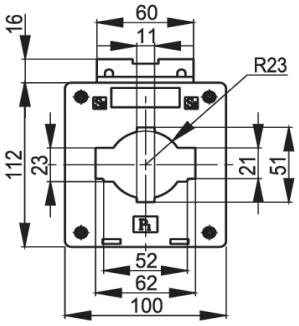
★ See the figure below for outline and installation dimensions of the rectangular transformer.

★ Pay attention to the direction for use: The busbar current flows from the P1 terminal and flows out from the P2 terminal.

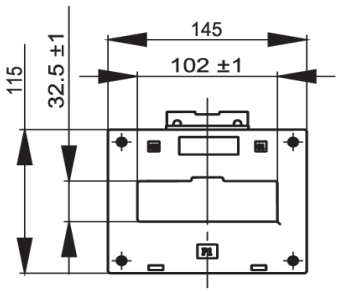
★ With conductors to be supplied by customers, it is recommended to use the shielded twisted pair (with the metal shield layer, 0.2~0.3mm^2, namely the AWG24/AWG22 conductor).

The recommended conductor length is no more than 3 meters for connection of Y-type terminals at the wire end, with a tightening torque of 1.2N.m.

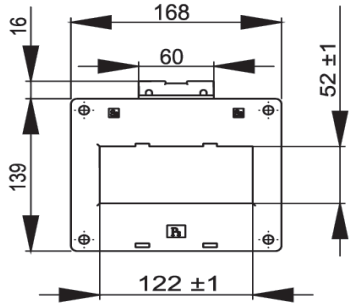
N1 external transformer



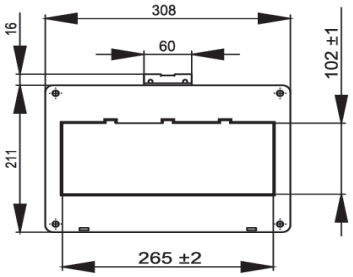
N2 external transformer



N3 external transformer

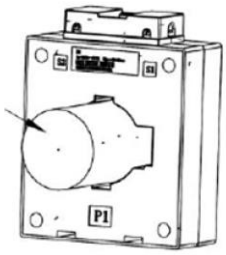


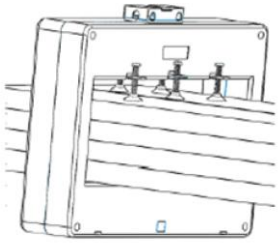
N4 external transformer



Outline and Installation Dimension Diagram of the N-pole Transformer

The busbar current enters from the P1 terminal and flows out from the P2 terminal





Flexible transformer

★ Flexible transformer code

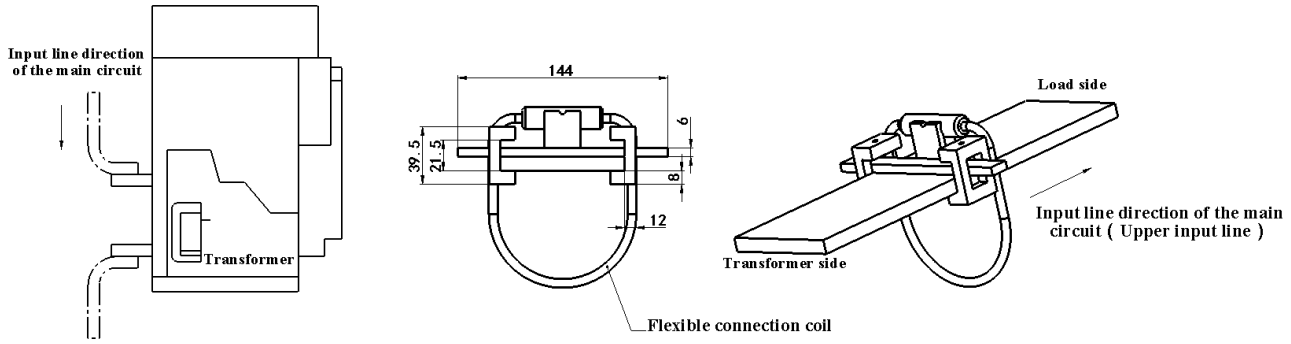
Transformer code	Soft cable circumference	Applicable current range
NR1	280mm	200A-800A
NR2	370mm	1000A-2000A
NR3	450mm	1000A-6300A

★ See the figure below for outline and installation dimensions of the flexible transformer.

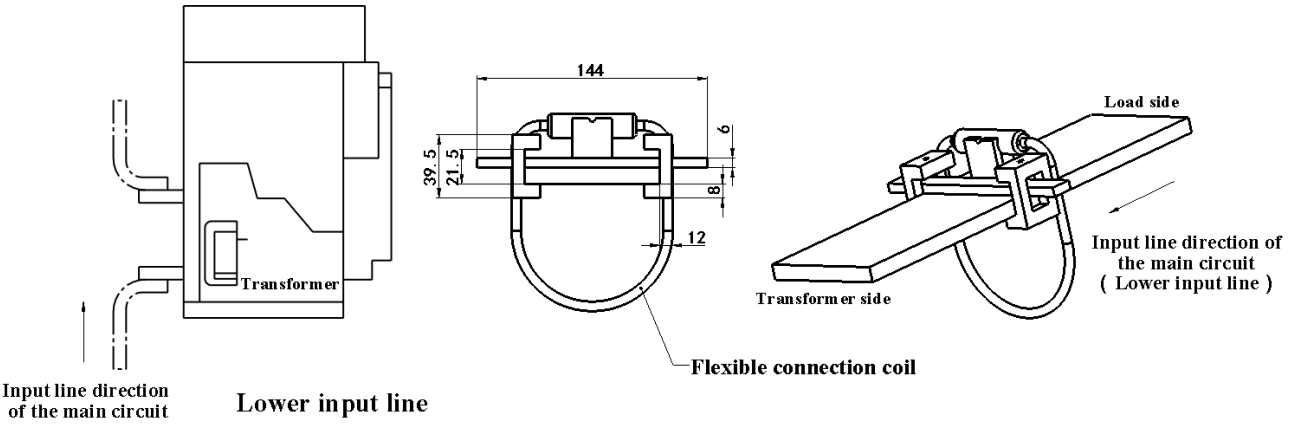
★ Pay attention to the direction for use: The inlet wire direction is shown in the figure.

★ Install the flexible transformer on the busbar as shown in the figure, and connect the transformer conduction to the secondary circuit: Red to No. 25 and green to No. 26.

Standard configuration of the conductor is 3m.



Upper input line

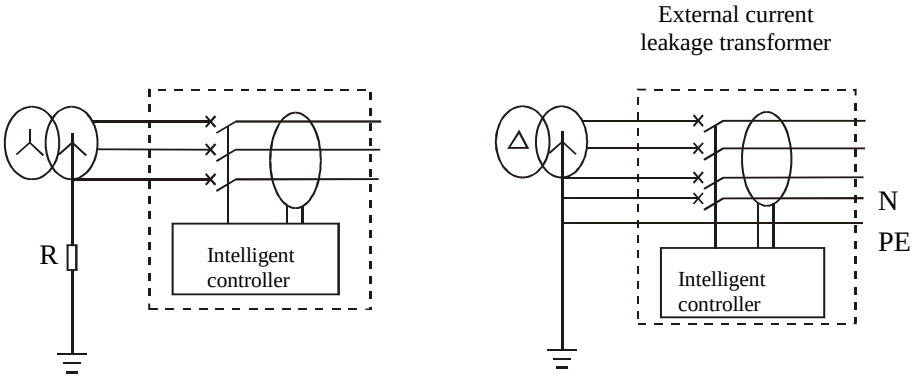


Lower input line

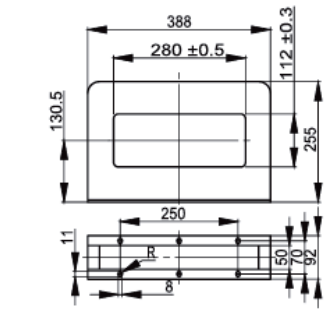
4.4.2 External leakage transformer

◆ When the grounding protection mode is aftercurrent protection (E) type, an external current leakage transformer is required. The controller judges action via the output signal of the external current leakage transformer.

◆ See the diagram for current leakage protection (3P and 4P systems).



Schematic Diagram of Current Leakage



External Dimension Diagram

★ Connect the transformer terminals with No. 25 and 26 terminals of the frame secondary circuit with conductors; (it is not necessary to distinguish the positive and negative polarities)

★ Conductors shall be prepared by customers with the recommended length no more than 3m.

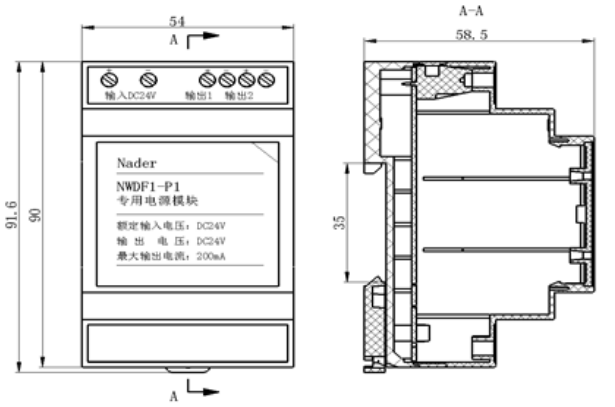
4.4.3 Power supply module NWDF1

◆ Role: As the power source of relay module NWDF1-RM, the output voltage is DC24V;

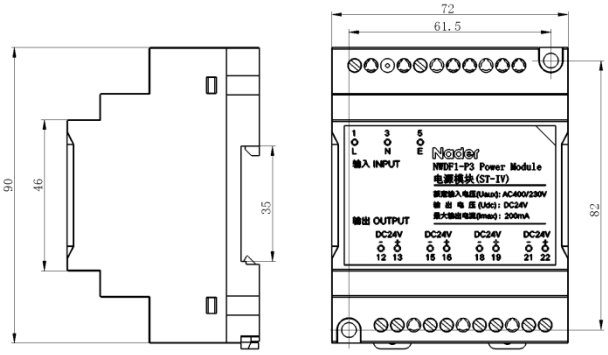
◆ Type: See the table below

		NWDF1-P1	NWDF1-P3	NWDF1-P5
Power	Rated Voltage	24 VDC	400/230VAC	220/110VDC
	Acceptable Voltage	12-36 VDC	180VAC-430VAC	85VDC-265VDC
	Isolation voltage	1500Vrms	1500Vrms	1500Vrms
	Polarity reversal	Yes	No	No
Protection level		IP20	IP20	IP20
size（mm）		90 x 54 x 58.5mm	90×72×58.5	90×72×58.5
Installation method		Use 35mm standard DIN rail installation	1、Use 35mm standard DIN rail installation 2、Screw installation	1、Use 35mm standard DIN rail installation 2、Screw installation

- Features: (85%~110%) the Us power supply module operates normally;
- Installation mode: Using 35 mm standard guide or direct fixation;
- 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

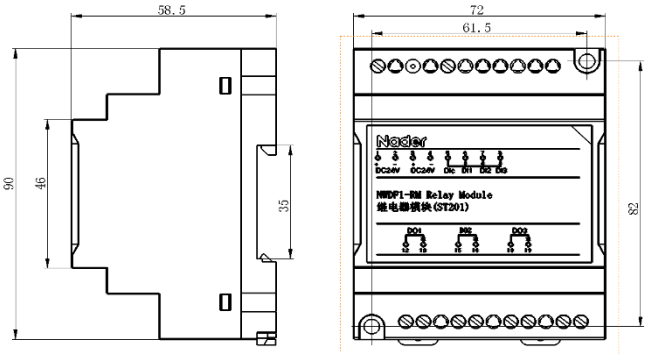
4.4.4 Relay module NWDF1-RM (ST201)

- Function: Signal unit of controller is commonly used in fault alarm or indication, etc. When the circuit breaker

is opened, closed or when the load capacity is larger, the control should be carried out after conversion through this module. Match with

the 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.



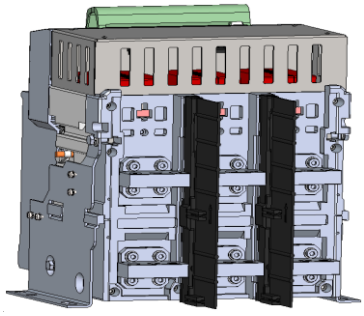
Installation Diagram

4.5 Safety Accessories

4.5.1 Phase partition

Divided into fixed type and drawout type, the phase partition is installed in the groove between all the phase bus bars, used to increase the insulation strength between phases of the main circuit so as to prevent the short circuit in case of the insulation breakdown and improve the power reliability.

- Conventional phase partition



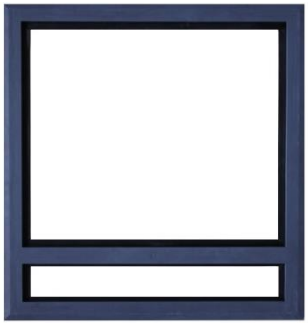
Phase partition and

4.5.2 Counter

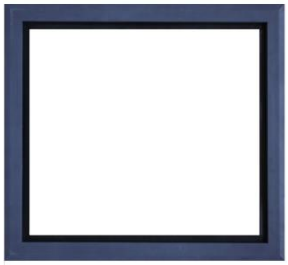
Counter is used to record the number of the "close-open" operation of the circuit breaker.

4.5.3 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

4.5.4 Dustproof cover

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

4.6 Lock and Interlocking Device

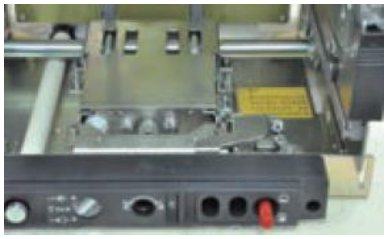
4.6.1 Off-position key lock (on the circuit breaker)

◆ 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

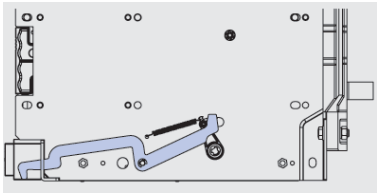
4.6.2 Drawout triolocation lock (standard configuration on the drawer seat)



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

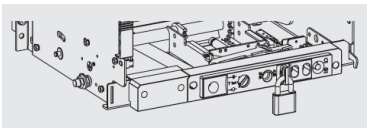
When the handle is operated, the main body of the circuit breaker will be pulled to and locked at the three positions above,
then the locked state can be released by the releasing button (red)

4.6.3 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.

4.6.4 Drawout type circuit breaker "separation" position lock (on the drawer seat)



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 2000 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.

4.7 Power Supply Conversion System

4.7.1 Mechanical interlocking

- 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

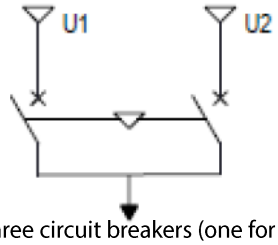
Selection mode	Code	Type	Number of circuit breakers
1	SR11	Two sets of cables, one for closing and one for opening	2
2	SR12	Three sets of cables, one for closing and two for opening	3
3	SR21	Three sets of cables, two for closing and one for opening	3
4	SY11	Two sets of hard rods, one for closing and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

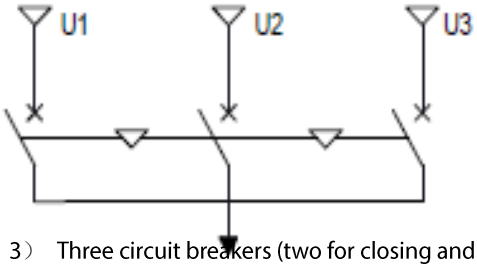
Status Table of Two Circuit Breaks



U1	U2
Close	Open
Shunt	Close
Shunt	Open

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

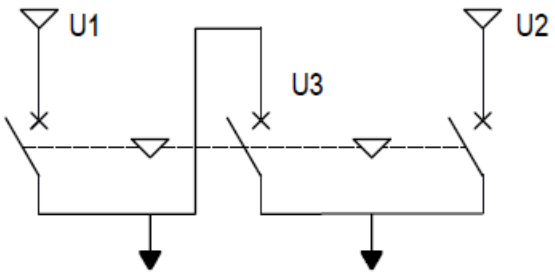
Usage mode is shown in the figure below, while interlocking action state is shown in the figure below. Status Table of Three Circuit Breakers (One for Closing and Two for Opening)



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

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 the figure below. Status Table of Three Circuit Breakers (One for Closing and Two for Opening)

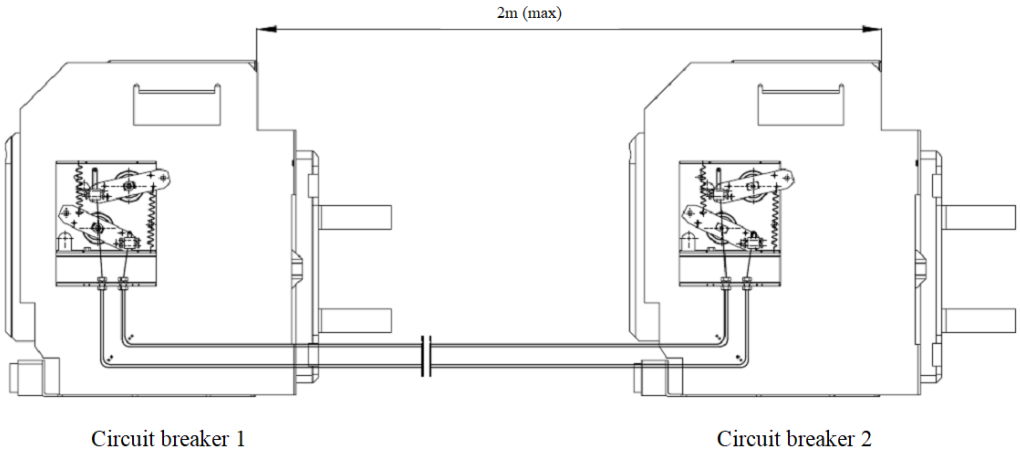


U1	U2	U3
Shunt	Shunt	Shunt
Close	Close	Open
Close	Open	Close
Shunt	Close	Close

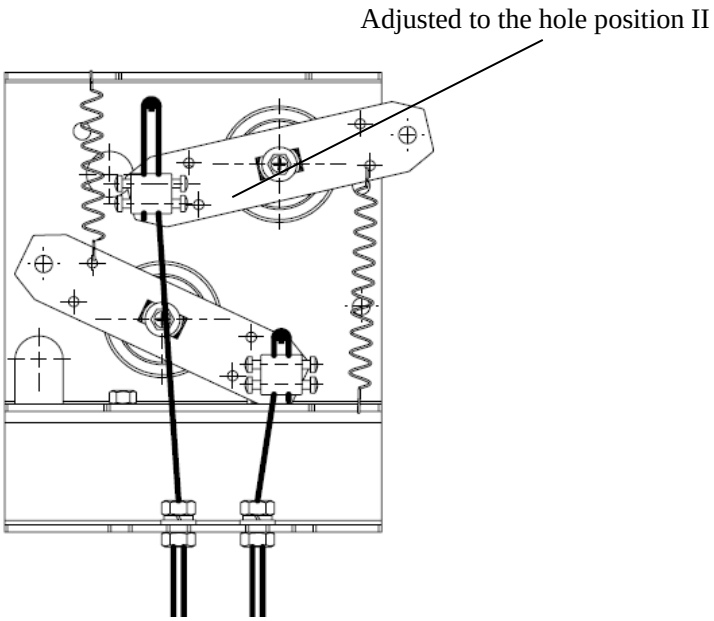
◆ Type description

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

Installation Schematic Diagram:

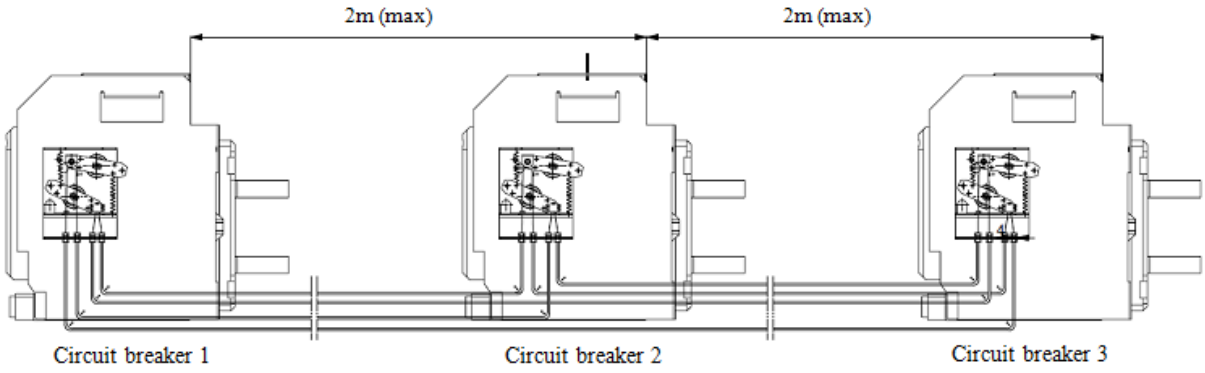


Adjustment schematic diagram:

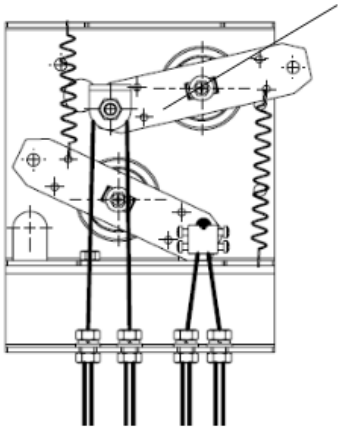


2) Three interlocking cables

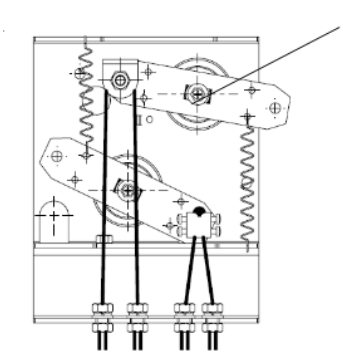
Installation schematic diagram:



Adjustment schematic diagram: One for closing and two for opening

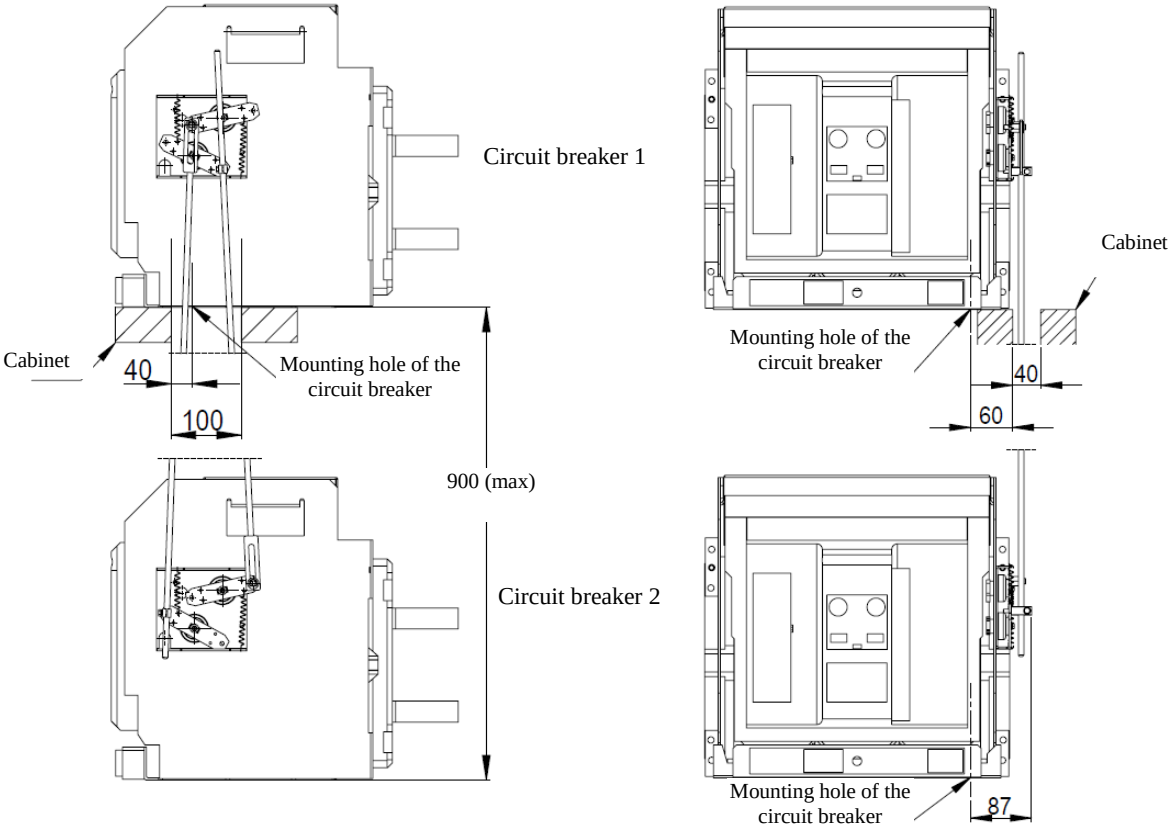


Adjustment schematic diagram: Two for closing and one for opening



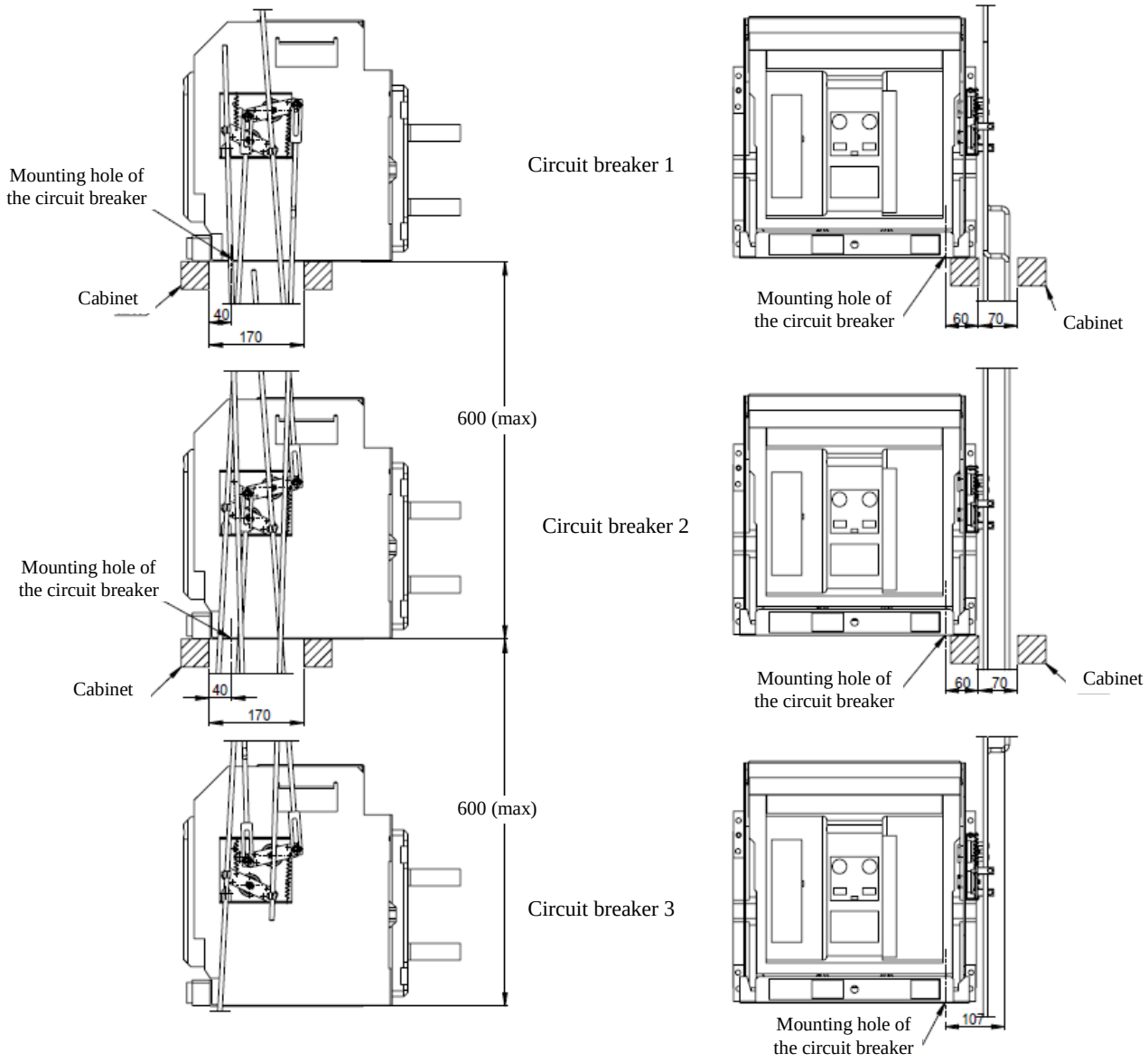
3) Two interlocking hard rods

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



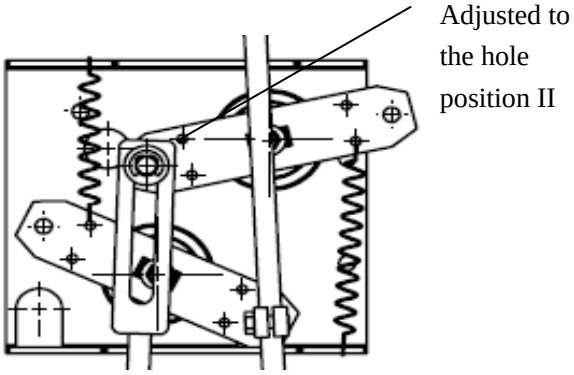
4) Three interlocking hard rods

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.

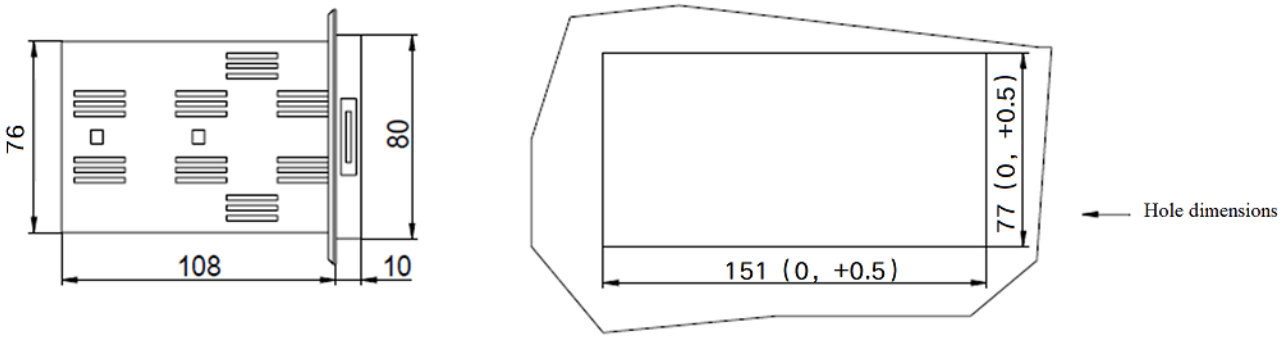
Adjustment schematic diagram:



4.7.2 Power Automatic Transfer Switches Device

Four-position switch state ★ Automatic Transfer Switches; ★ Forced with "common" power supply; ★ Forced with "standby" power supply; ★ Double-open state (both "common" power supply and "standby" power supply are disconnected).	**Automatic operation** ★ Monitor the "common" power supply and Automatic Transfer Switches; ★ Generator set start control; ★ Generator set close control; ★ Unloading and restoring the non-priority load; ★ Alarm control in case of abnormality of the "standby" power supply.
Indication state ★ Display the power supply state of the power supply system; ★ Display the closing and opening state of the air circuit breaker; ★ Display the energy storage state of the air circuit breaker mechanism.	**Function** ★ Closing delay and opening delay can be adjustable by section; ★ Overvoltage and undervoltage protection can be adjustable by section; ★ Mode of the control function is optional (R, S, F); ★ Manual control and automatic control are adjustable.
Selection of power supply ★ Rated control supply voltage Us: 220V~240V 50/60Hz; ★ Rated current In: 200A~6300A optional.	**Threshold value** ★ Undervoltage steps: AC187V, AC176V, AC165V, AC154V; ★ overvoltage steps: AC253V, AC264V, AC275V, AC286V; ★ switch-off time delay and switch-in time delay steps: 0.5s, 2s, 5s, 10s.

◆ See the figure below for outline and installation dimensions



Note: Due to the power Automatic Transfer Switches control device has overvoltage and undervoltage protection functions, in order to guarantee the consistency and reliability of the system protection, the air circuit breaker used for power supply Automatic Transfer Switches control device can't install undervoltage release, and the power Automatic Transfer Switches control device and the mechanical interlocking (two interlocking) shall be used together.

4.8 Voltage-check closing device

4.8.1 Scope of application and usage

Voltage-check products for NWJY1 is applicable to electrical systems where rated voltage is AC230V or AC400V. This type of products is used to trip its controlled circuit breaker when the power supply voltage of this breaker is below the set threshold value, and reclose the circuit breaker when the power supply voltage is restored above the set threshold value.

4.1 Specifications and Model Description

Voltage-check closing device model description table

Model and Description		
N W JY 1 — 230 / □ 1 2 3 4 5 6		
SN	SN name	Code
1	Enterprise code	N Nader low-voltage apparatus
2	Product code	W Accessory code of the frame product
3	Function code	JY voltage-check function accessory code
4	Design code	1
5	Derived code	Rated voltage of 230: AC230V; Rated voltage of 400: AC400V
6	Harness	0 means there is no optional circuit group and 1 means there is optional circuit group.

4.8.3 Major technical specifications

Voltage-check closing device technical specifications list

Model and classification	Voltage-check closing device
Use temperature	-40°C~+70°C
operating voltage	AC230V/AC400V 50Hz
Starting power	AC230V: 340W AC400V: 490W
Operating power	AC230V/400V: 5W
Under-voltage action value range	If the power supply voltage is reduced by 20% to 70% Ue (The allowable error should be no greater than 5%), the under-voltage release is released when the delay duration is reached, and the switch is on. If the power supply voltage slowly rises to 85% Ue (The allowable error should be no greater than 2%), the under-voltage release is sucked in, and the switch is off according to the set duration.
Closing voltage	It can be set as 85%Ue, 90%Ue, 95%Ue, 100%Ue and OFF
Closing delay	1s,2s,3s,4s,5s,6s,7s,8s,9s,10s
Undervoltage delay	0s,1s,2s,3s,4s,5s,6s,7s,8s,10s

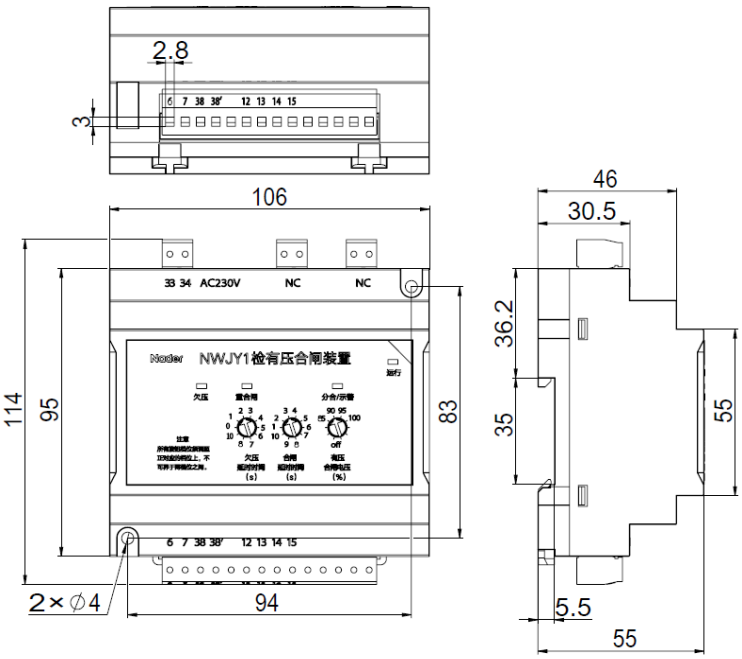
4.8.4 Working environment

Environmental requirements	Description of the specific parameters
Operating ambient temperature	The operating ambient temperature is -40℃~+ 70℃; the average within 24 h shall not be more than +35℃.
Pollution degree	Pollution level: Level 3
Protection class	IP30
Electromagnetic compatibility should be in accordance with the following	standards: 1. GB/T 14048.2-2008 Low-voltage Switchgear and Control Equipment - Part 2: Circuit Breaker - Appendix N 2. GB/T 17626.2-2006 Electromagnetic compatibility (EMC) - Testing and measurement techniques - Electrostatic discharge immunity test 3.GB/T 17626.3-2006 Electromagnetic compatibility (EMC) - Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test 4. GB/T 17626.4-2008 Electromagnetic compatibility (EMC) - Testing and measurement techniques - Electrical fast transient/burst immunity test 5. GB/T 17626.2-2006 Electromagnetic compatibility (EMC) - Testing and measurement techniques - Surge immunity test 6.GB/T 17626.6-2008 Electromagnetic compatibility - Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields 7.Q GDW 1973-2013 Test Code for Low-Voltage Circuit-Breaker for Distributed Grid-Connected PV Station

4.8.5 Outline drawing, installation diagram and electric schematic diagram

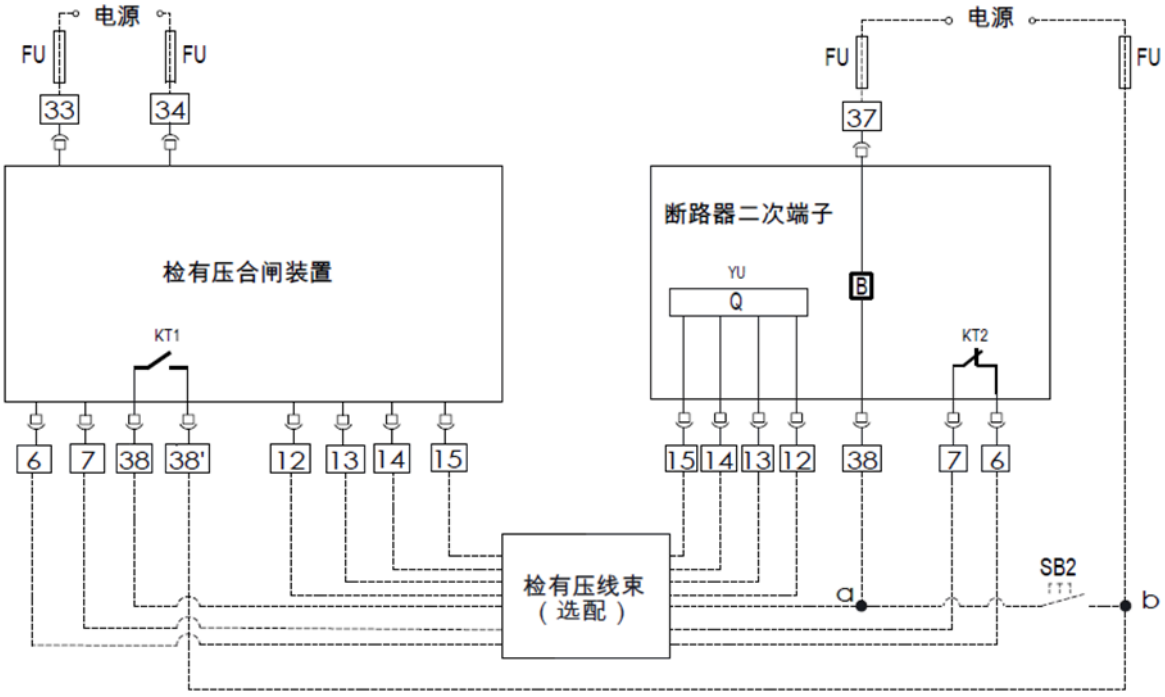
Outline drawing

installation diagram



Power supply

Electrical wiring diag



1) 6, 7 - The voltage-check closing device needs to monitor the status of the circuit breaker or disconnect the contact output function with the circuit breaker. Please note that voltage-check module 6 and 7 need to connect to the passive normally-closed contact of the circuit breaker;
2) 12 & 13 and 14 & 15 - Select one of the dedicated under-voltage release controlled by the voltage-check closing device, dedicated photovoltaic under-voltage (no-voltage) release (adjustable within 0-10s) and signal unit function;
3) 33, 34 - The customer may connect to the power supply for voltage-check closing device or that for normal under-voltage release based on the actual need (but only AC220V/230V and AC380V/AC400V are allowed);
4) 37, 38 - When the voltage-check closing device function is selected, the power supply of the closed electromagnet is 37 and 38. Rotate the closing voltage knob of the voltage-check closing device to non-OFF position, the closed electromagnet will be automatically controlled by the voltage-check closing device; connecting to wire a-b is not recommended;

5) To separately and manually control the closed electromagnet, rotate the closing voltage knob of the voltage-check closing device to OFF position, and wire a-b (including SB2) needs to be connected;
6) If the voltage-check closing device is not selected, the power supply of the closed electromagnet is still 37 and 38, and the wire should be connected according to the electrical wiring diagram of the air circuit breaker;
7) 6, 7, 12, 13, 14, 15 and 38 are connected to wire number of the secondary terminal via a wiring harness;
8) Dotted lines are connected by users, while solid lines are within the product. (Note: the electrical wiring diagram of NDW2-1600 is the same as that of NDW2/NDW2F-2000/3200/4000 except that contact 6 and 7 in item 1 and 5 are changed to contact 7 and 8.)

4.8.6 Rotary switch setting description

Threshold voltage for reclosing: Voltage of voltage-check closing device can be set to 85%, 90%, 95%, 100% or OFF. When voltage of voltage-check closing device is set to 85%, 90%, 95% or 100%, the circuit breaker can be reclosed. When voltage of voltage-check closing device is set to OFF, the reclosing function is unavailable.
Under-voltage delay duration: When a voltage-check product detects a power supply voltage less than the set threshold under-voltage value, a countdown starts. When the countdown duration is 0 s, the voltage-ckeck product sends a signal indicating an under-voltage tripping. In the countdown of under-voltage duration, if the power supply voltage rises above the threshold value, the countdown is restored. Before sending an under-voltage release signal, the circuit breaker is in not tripped. If the circuit breaker is tripped within 300 ms upon the sending of the under-voltage signal, the tripping is successful. Reclosing is allowed when the power supply voltage is restored.
Time delay for close: When the reclosing threshold value of a voltage-check product is set to a non-OFF value, previously a voltage-check product sends a under-voltage tripping signal, currently the circuit breaker is tripped, and the period when the power supply voltage is above the reclosing threshold voltage value is longer than time delay for close, a reclosing signal is sent. If the indicator indicating that the circuit breaker is tripped disappears with 300 ms upon sending of the signal, the closing is successful.

4.8.7 LED indicator status description

Normal running indicator: When a voltage-check product is running properly, the indicator blinks at 1 Hz.
Under-voltage indicator: When the power supply voltage is in the under-voltage status, the indicator is steady on; When the power supply voltage is normal, the indicator is steady off; When the product is in the time-delay period of under-voltage tripping or circuit breaker closing delay, the indicator blinks at long intervals.
Reclosing indicator: When a circuit breaker is reclosed, this indicator is on, and when the reclosing of a circuit breaker is complete, this indicator is off.
Closing/Fault indicator: When rotary switches of under-voltage delay, closing delay and threshold value closing are faulty, this indicator blinks. When a circuit breaker is tripped, this indicator is steady off. When a circuit breaker closing is unsuccessful, this indicator blinks at short intervals.

4.8.8 Installation method

Installation mode: Using horizontal or vertical 35 mm standard guide or direct fixation;

Chapter 5 Field of Application

Scope of application 5

The NDW2 series of air circuit breakers (hereinafter referred to as circuit breakers) can be applied to the distribution network with the AC 50Hz/60Hz, the rated current of 200A~6300A, the rated insulation voltage of 1000 V, the rated working voltage of AC220V/230V/240V, AC380V/400V/415V, AC440V/480V, AC660V/690V. NDW2-4000 can also be applied to the distribution network with the rated working voltage of AC1000V for distribution of electrical energy and protecting circuit and power equipment from overload, under-voltage, short circuit, single phase grounding and harm of other faults, and can also be used as isolation switch at the same time. The circuit breaker has multiple protection functions. It can avoid unnecessary sudden power failure while realizing highly accurate selective protection, and improve the reliability and security of the power supply system.

5.1 Working Environment

5.1.1 Ambient temperature

Applicable environment temperature is -25℃ ~ + 70℃, the average within 24 h shall not be more than +35℃.

The circuit breaker with the ambient temperature below -25℃~-40℃ can be specially customized. If the ambient temperature is higher than +40℃, the user needs to reduce the capacity. The reduced capacity coefficient is shown in the following table.

Ambient temperature		+40°C	+45°C	+50°C	+55°C	+60°C	+70°C
NDW2-1600	200A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	400A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	630A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	800A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	0.97 In
	1000A	1.0 In	1.0 In	0.95 In	0.89 In	0.85 In	0.78 In
	1250A	1.0 In	1.0 In	1.0 In	0.95 In	0.89 In	0.85 In
	1600A	1.0 In	0.95 In	0.89 In	0.85 In	0.78 In	0.73 In
NDW2-2000	400A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	630A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	800A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	1000A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	1250A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	1600A	1.0 In	1.0 In	1.0 In	1.0 In	0.97 In	0.94 In
	2000A	1.0 In	0.98 In	0.95 In	0.90 In	0.88 In	0.80 In
NDW2-3200	2000A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	2500A	1.0 In	1.0 In	1.0 In	1.0 In	0.95 In	0.90 In
	2900A	1.0 In	1.0 In	1.0 In	1.0 In	0.97 In	0.95 In
	3200A	1.0 In	1.0 In	1.0 In	0.97 In	0.95 In	0.90 In
NDW2-4000	800A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	1000A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	1250A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	1600A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	2000A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	2500A	1.0 In	1.0 In	1.0 In	1.0 In	0.95 In	0.90 In
	3200A	1.0 In	1.0 In	1.0 In	1.0 In	0.95 In	0.90 In
	4000A	1.0 In	0.95 In	0.89 In	0.85 In	0.78 In	0.73 In
NDW2-6300	4000A	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In	1.0 In
	5000A	1.0 In	1.0 In	1.0 In	1.0 In	0.98 In	0.92 In
	6300A	1.0 In	0.95 In	0.89 In	0.85 In	0.78 In	0.73 In

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

5.1.2 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 +20℃, the relative humidity of atmosphere can be 90%. For condensation due to temperature change, dehumidification or corresponding measures should be taken.

5.1.3 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 5,000 m, it can be specially customized. For the working performance, refer to the high-altitude derating table 1 and table 2.

Tab. 1 Altitude derating coefficient table (power frequency withstand voltage)

Altitude	Rated working voltage		Power frequency withstand voltage
2000m	690V	1000V(1)	3500V
3000m	590V	850V(1)	3150V
4000m	520V	750V(1)	2500V
5000m	460V	660V(1)	2200V

Note: (1) is applicable to NDW2-4000 whose rated voltage is AC1000V.

Tab. 2 High-altitude Derating Coefficient (Current)

Working current		Altitude			
Model	Rated current (A)	2000m	3000m	4000m	5000m
NDW2-1600	200-630	1.0 In	1.0 In	1.0 In	1.0 In
	800-1000	1.0 In	1.0 In	0.97 In	0.87 In
	1250-1600	1.0 In	1.0 In	0.97 In	0.87 In
NDW2-2000	400-800	1.0 In	1.0 In	1.0 In	1.0 In
	1000-1600	1.0 In	1.0 In	1.0 In	1.0 In
	2000	1.0 In	1.0 In	0.97 In	0.87 In
NDW2-3200	2000-2500	1.0 In	1.0 In	1.0 In	1.0 In
	2900-3200	1.0 In	0.83 In	0.80 In	0.75 In
NDW2-4000	800-2500	1.0 In	1.0 In	1.0 In	1.0 In
	3200	1.0 In	1.0 In	1.0 In	1.0 In
	4000	1.0 In	0.93 In	0.88 In	0.82 In
NDW2-6300	4000	1.0 In	1.0 In	1.0 In	1.0 In
	5000	1.0 In	1.0 In	1.0 In	1.0 In
	6300	1.0 In	0.93 In	0.88 In	0.82 In

5.1.4 Anti-corrosion Level

Salt mist: Severe Level 2

5.1.5 Pollution level

Pollution level: Level 3

5.1.6 Shockproof requirements

◆ The circuit breaker can ensure resistance to electromagnetic or mechanical shock, and has passed the GB/T 4798.3 standard test.

◆ Amplitude:±1.5mm (2Hz -9Hz)

◆ Constant acceleration: 5 m/s^2 (9~200 Hz)

◆ Super strong shock may result in damage to the parts, and impact the reliable action of the circuit breaker

5.1.7 Electromagnetic interference

1) 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

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

◆ GB/T 14048.2-2008 Low-voltage Switchgear and Control Equipment - Part 2: Circuit Breaker - Appendix F

◆ GB/T 14048.2-2008 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.

5.2 Installation conditions

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

5.2.1 Installation type

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

5.2.2 Protection level

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

5.2.3 Utilization category

Category B

5.3 Main Circuit Wiring of the Circuit Breaker

Main Circuit Wiring of the Circuit Breaker

Rated current of housing	Rated current In (A) +40℃	Copper bar specification	
		Dimensions	Number

Inm (A)			
1600	200, 400, 630	40mm×5mm	2
	800	50mm×5mm	2
	1000	60mm×5mm	2
	1250	60mm×5mm	3
	1600	60mm×10mm	2
2000	400, 630	60mm×5mm	2
	800	60mm×5mm	2
	1000	60mm×5mm	2
	1250	60mm×10mm	2
	1600	60mm×10mm	2
	2000	60mm×10mm	3
3200	2000	100mm×5mm	3
	2500	100mm×10mm	2
	2900	100mm×10mm	3
	3200	100mm×10mm	4
4000	800~1600	80mm×5mm	3
	2000	80mm×10mm	2
	2500	80mm×10mm	3
	3200, 4000	100mm×10mm	5
6300	4000	100mm×10mm	5
	5000, 6300	100mm×10mm	6

Note: 1. The table indicates the copper bar specifications adopted when the circuit breaker is under the ambient temperature of +40℃ and the open wide installation under the heating condition meets the stipulation in GB/T 14048.2. 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 copper bar is no more than +110℃.

4. The electrical gap of copper bar is ≥15mm with the altitude more than 5, 000m and relative humidity more than 90%; the electrical gap shall be adjusted according to the content of 7.1.1 Table 1 in GB/T 20645.

5.4 The power loss of the incoming and outgoing lines of the circuit breaker (ambient temperature +40°C)

The power loss of the incoming and outgoing lines of the circuit breaker

Model	Power loss of the fixed type	Power loss of the drawout type
NDW2-1600	≤150 W	≤400 W
NDW2-2000	≤208 W	≤380 W
NDW2-3200/4000	≤650 W	≤900 W
NDW2-6300	≤787 W	≤1145 W

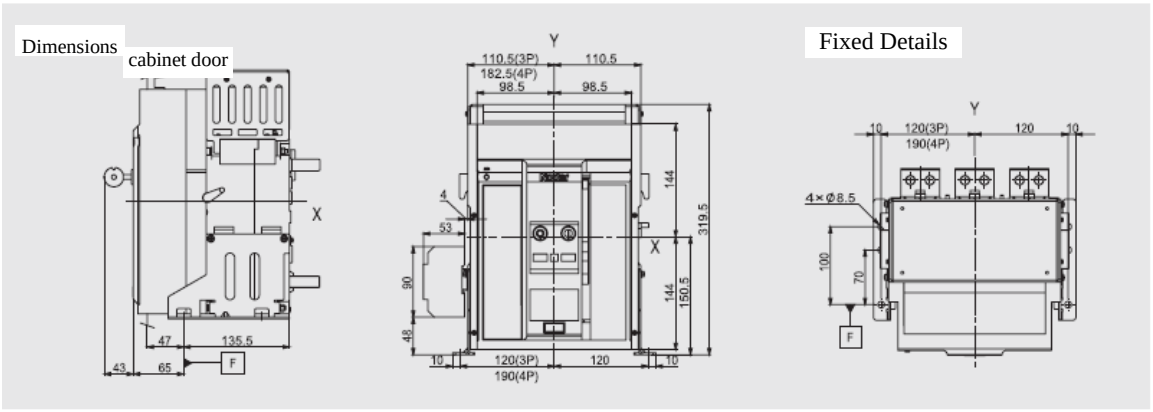
Note: The above power loss value is measured when the test current In (maximum rated current of the circuit breaker) is used for 8 hours and the main circuit temperature rise is steady. The test method is in accordance with that specified in G.2 in Appendix G of GB/T14048.2.

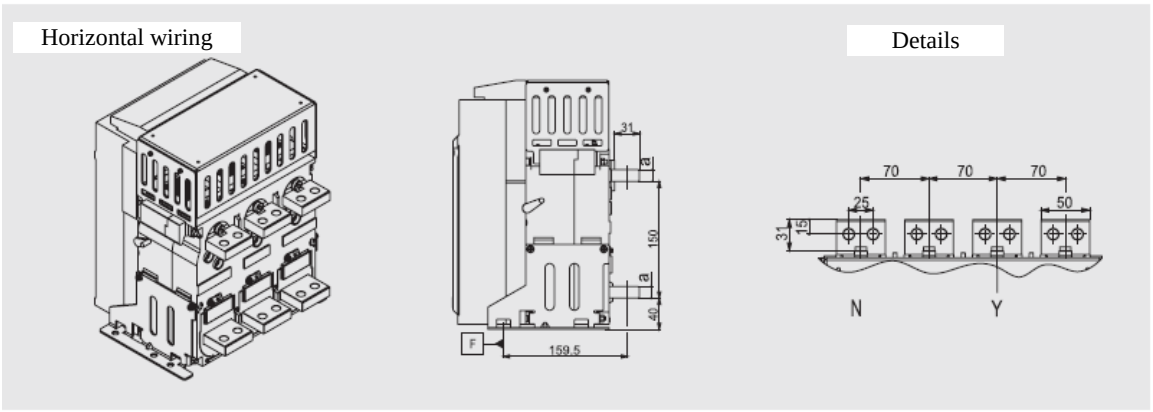
Chapter 6 Outline and Installation Dimensions

Outline and Installation Dimension 6

6.1 NDW2-1600

NDW2-1600 fixed type (unit: mm)



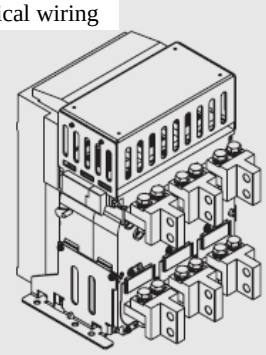


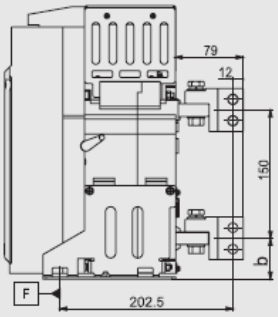
Note: the circuit breaker's X and Y are symmetric axes of the front mask

Connection bolt between bus and terminal	Torque applied with a flat washer (N.m)
M10	45

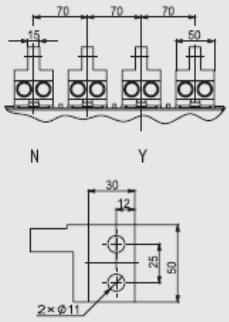
Rated current	Size of busbar a (mm)
200A, 400A, 630A, 800A,1000A	10
1250A, 1600A	15

Vertical wiring



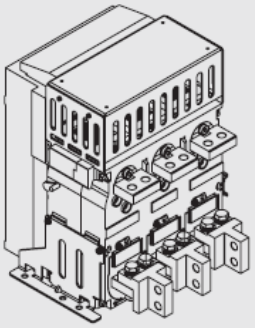


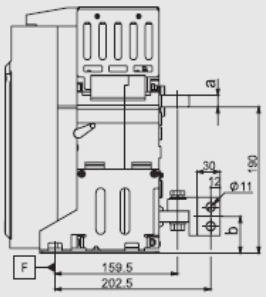
Fixed Details



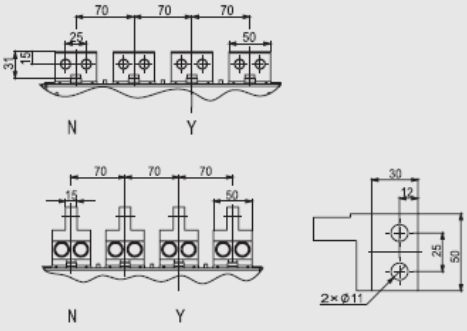
Rated current	b Dimension (mm)
200A, 400A, 630A, 800A,1000A	42.5
1250A, 1600A	47.5

Upper horizontal and lower vertical wiring



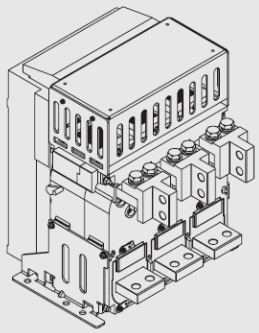


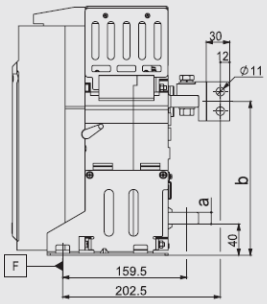
Details



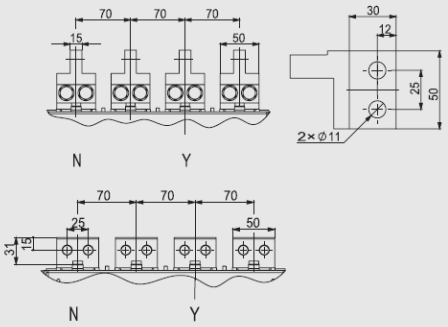
Rated current	Size of busbar a (mm)	b Dimension (mm)
200A, 400A, 630A, 800A,1000A	10	42.5
1250A, 1600A	15	47.5

Upper vertical and lower horizontal wiring



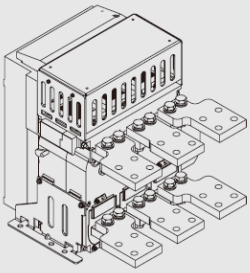


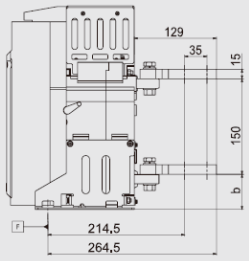
Fixed Details



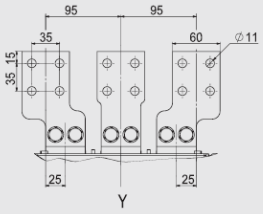
Rated current	Size of busbar a (mm)	b Dimension (mm)
200A, 400A, 630A, 800A,1000A	10	192.5
1250A, 1600A	15	197.5

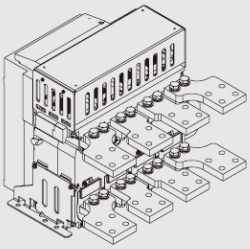
Horizontal extended wiring

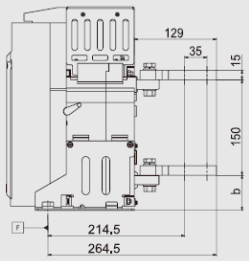


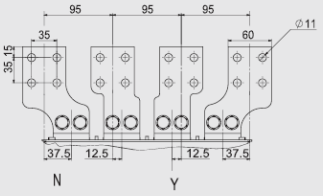


详图



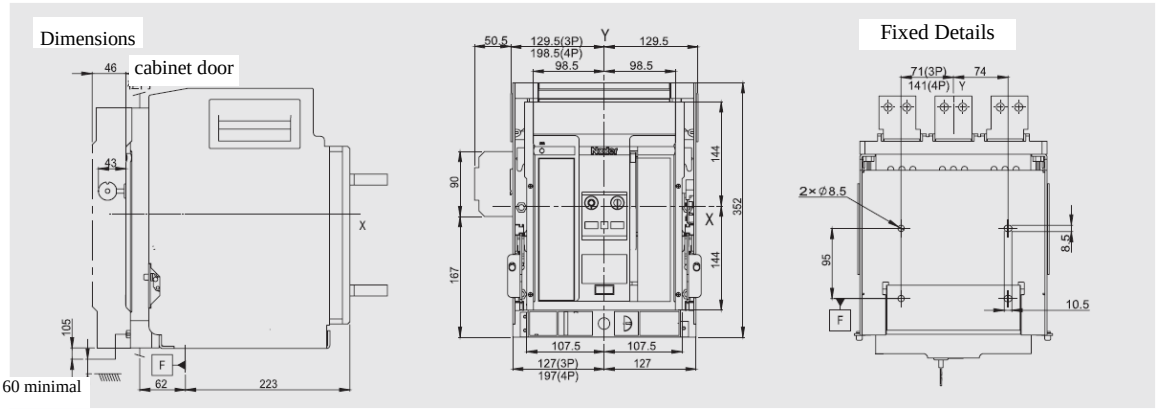


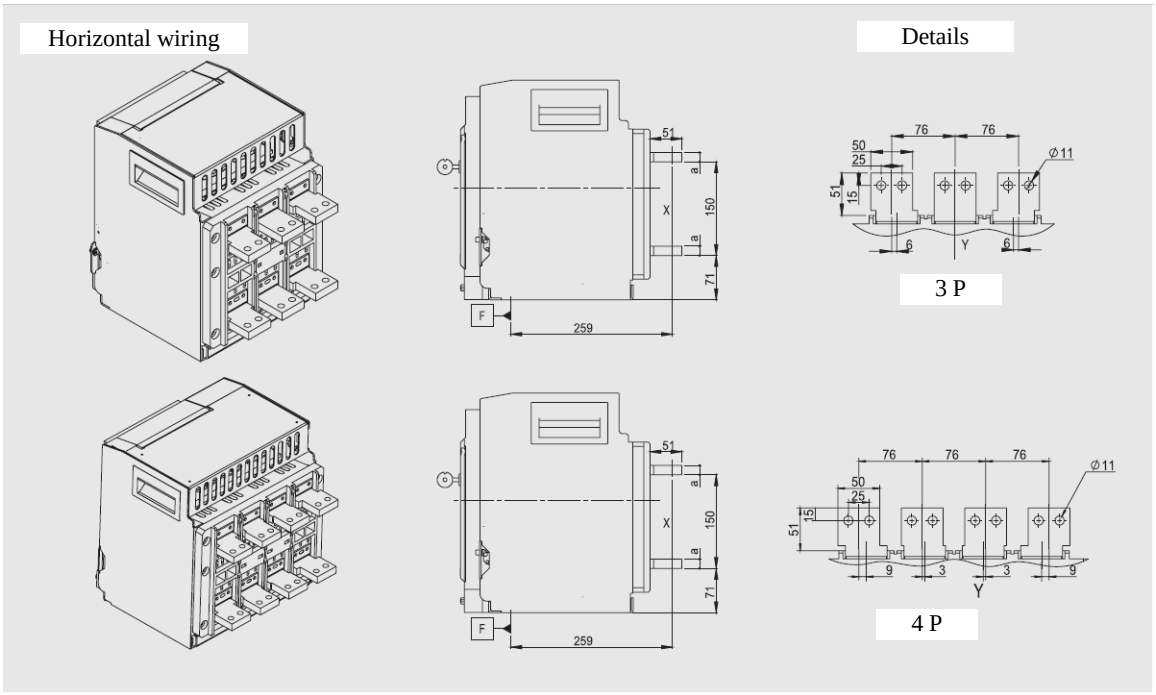




Rated current	b Dimension (mm)
200A, 400A, 630A, 800A,1000A	50
1250A, 1600A	50

NDW2-1600 drawout type (unit: mm)



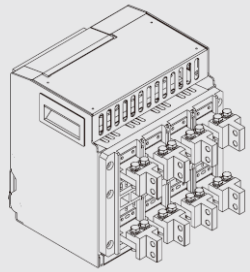


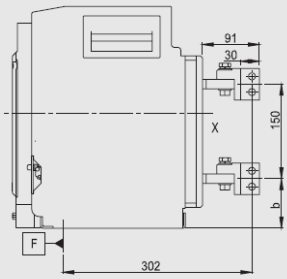
Note: the circuit breaker's X and Y are symmetric axes of the front mask

Connection bolt between bus and terminal	Torque applied with a flat washer (N.m)
M10	45

Rated current	Size of busbar a (mm)
200A, 400A, 630A, 800A,1000A	10
1250A, 1600A	15

Vertical wiring





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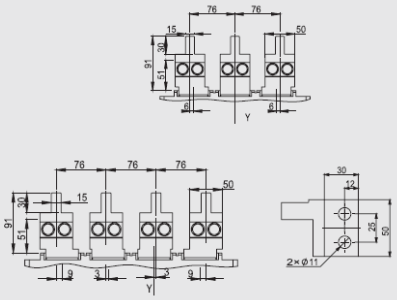
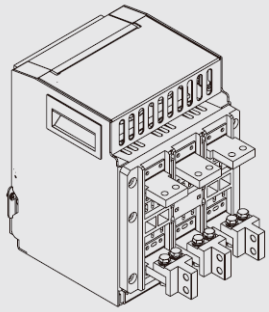
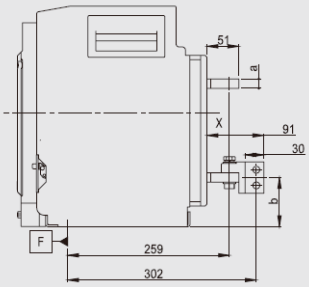
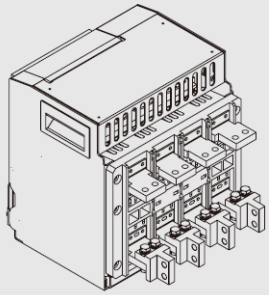
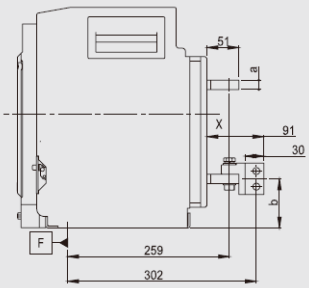


Upper horizontal and lower vertical wiring









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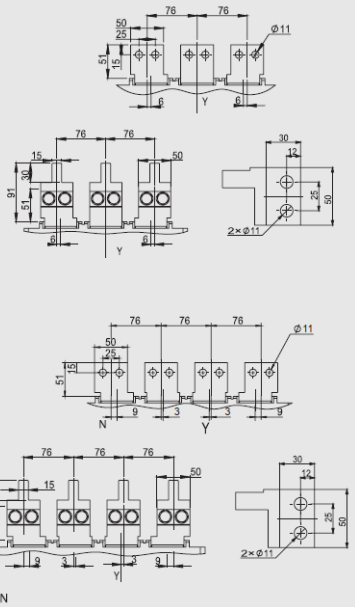
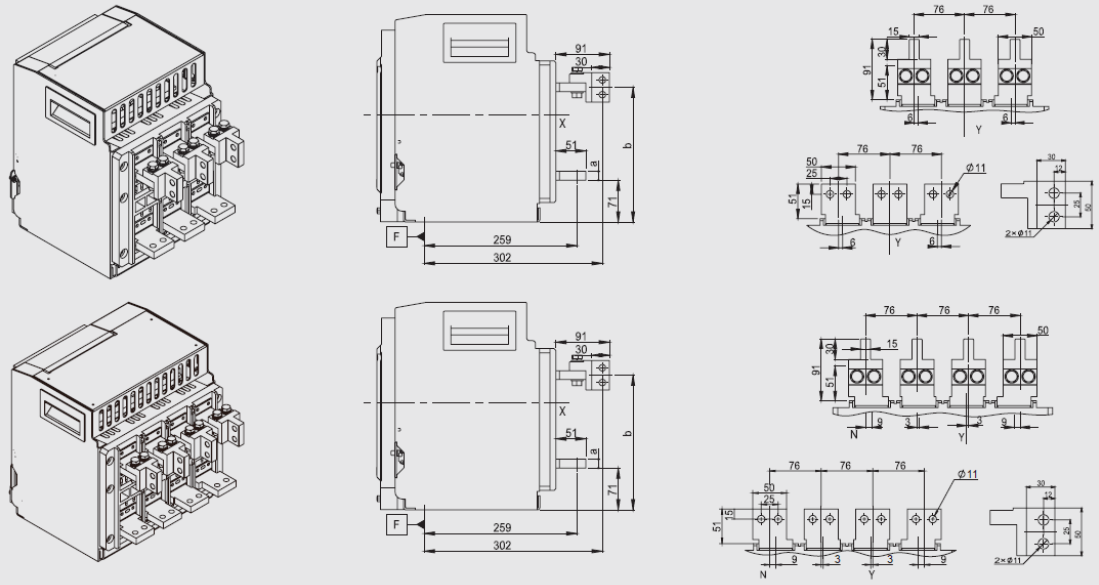


Note: the circuit breaker's X and Y are symmetric axes of the front mask

Rated current	Size of busbar a (mm)	b Dimension (mm)
200A, 400A, 630A, 800A,1000A	10	73.5
1250A, 1600A	15	78.5

Upper vertical and lower horizontal wiring

Details

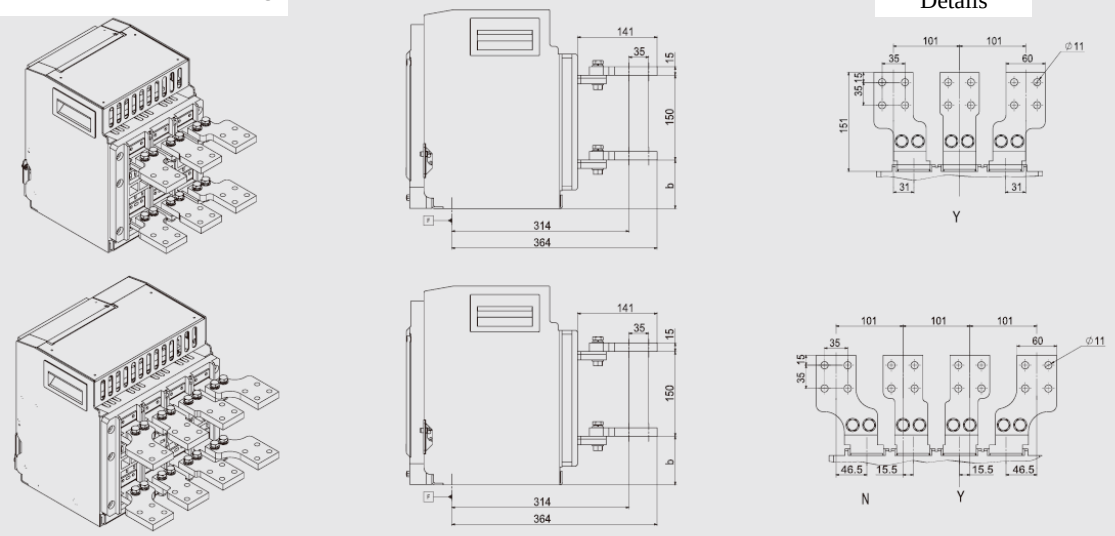


Note: the circuit breaker's X and Y are symmetric axes of the front mask

Rated current	Size of busbar a (mm)	b Dimension (mm)
200A, 400A, 630A, 800A,1000A	10	223.5
1250A, 1600A	15	228.5

Horizontal extended wiring

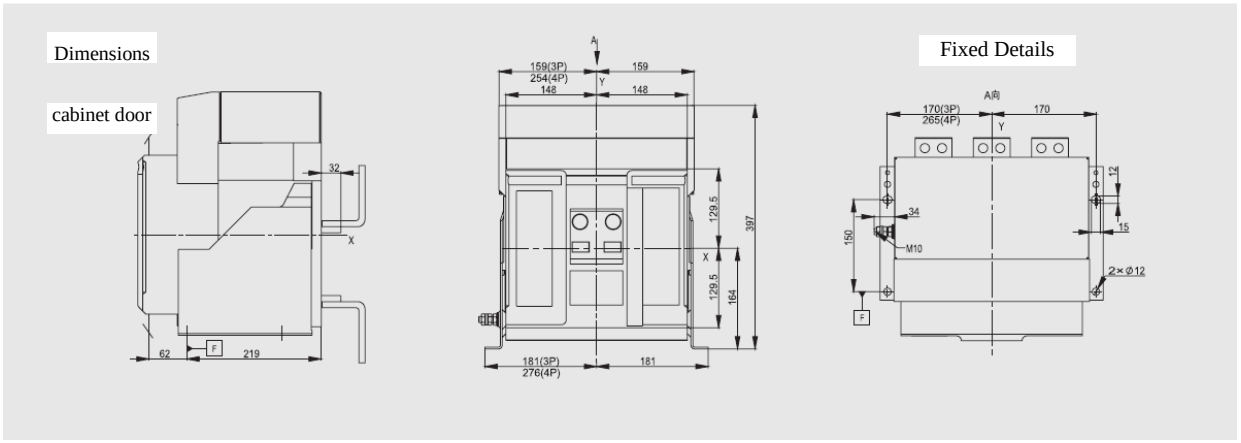
Details

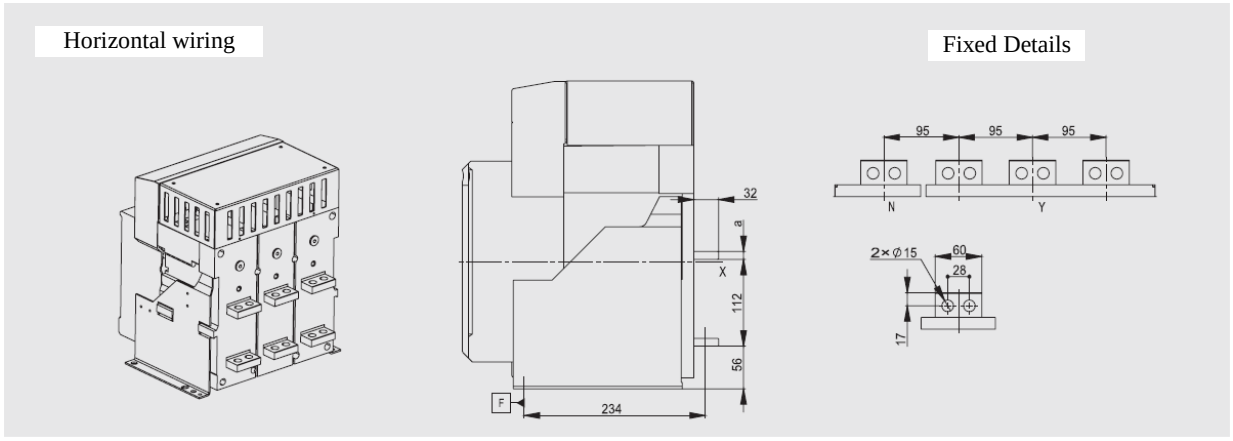


Rated current	b Dimension (mm)
200A, 400A, 630A, 800A,1000A	81
1250A, 1600A	86

6.2 NDW2-2000

NDW2-2000 fixed type wiring



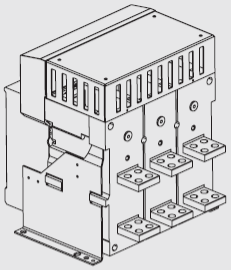


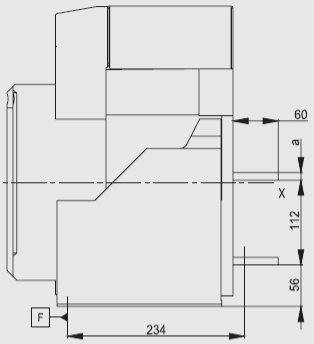
Note: the circuit breaker's X and Y are symmetric axes of the front mask

Connection bolt between bus and terminal	Torque applied with a flat washer (N.m)
M12	60

Rated current	Size of busbar a (mm)
400A, 630A, 800A	10
1000A, 1250A, 1600A	15
2000A	20

Horizontal extended wiring





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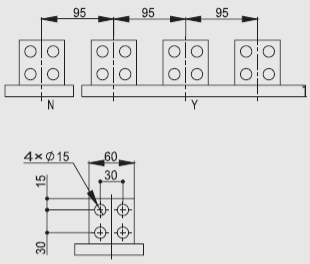
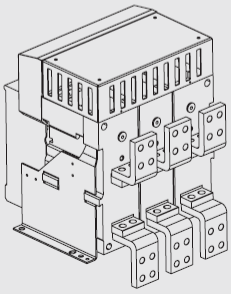
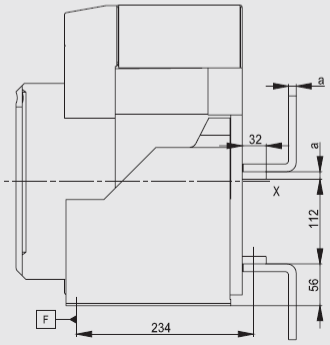


L-type wiring





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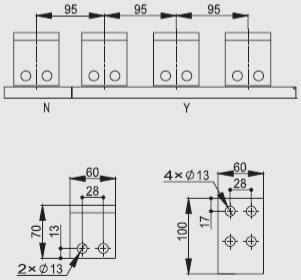


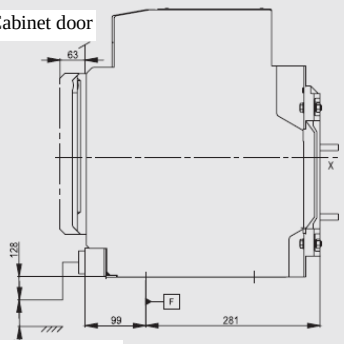
Note: the circuit breaker's X and Y are symmetric axes of the front mask

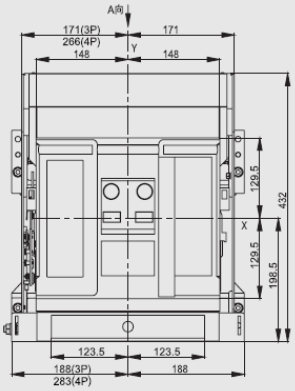
Rated current	Size of busbar a (mm)
400A, 630A, 800A	10
1000A, 1250A, 1600A	15
2000A	20

NDW2-2000 drawout type

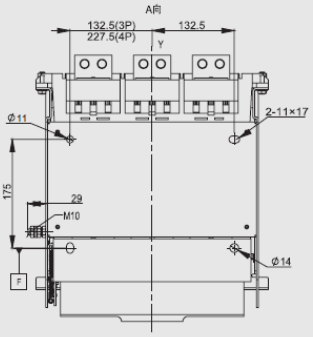
Dimensions

Cabinet door



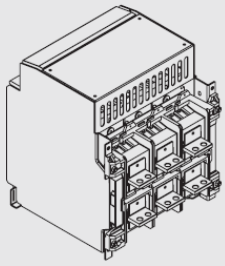


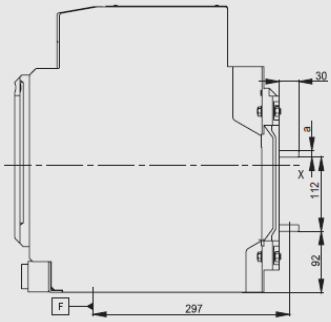
Fixed Details



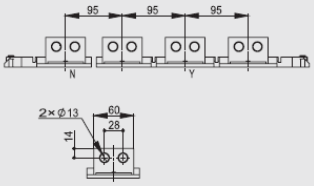
50 minimal

Horizontal wiring

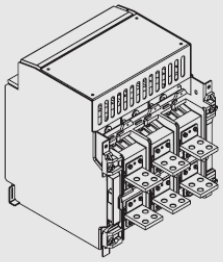


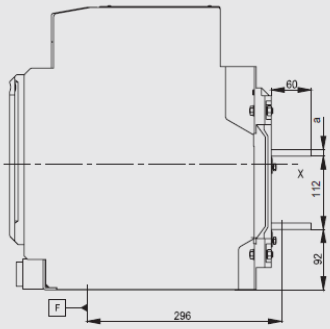


Details

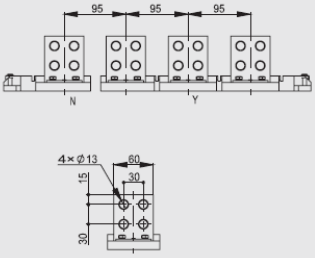


Horizontal extended wiring





Details

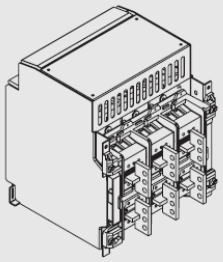


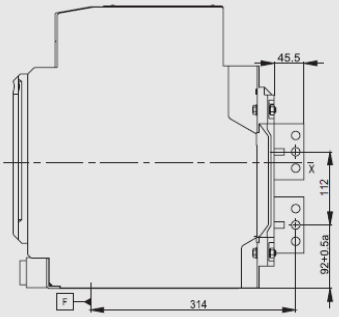
Note: the circuit breaker's X and Y are symmetric axes of the front mask

Connection bolt between bus and terminal	Torque applied with a flat washer (N.m)
M12	60

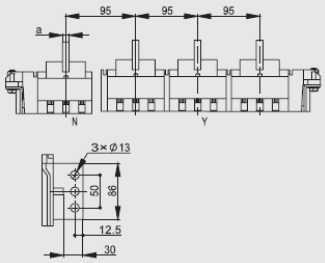
Rated current	Size of busbar a (mm)
400A, 630A, 800A	10
1000A, 1250A, 1600A	15
2000A	20

Vertical wiring

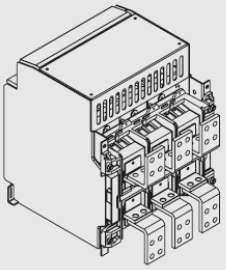


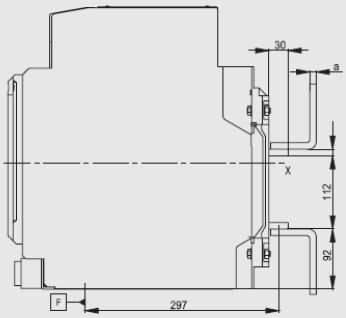


Details

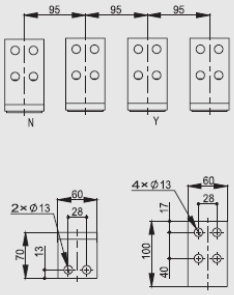


L-type wiring





Details



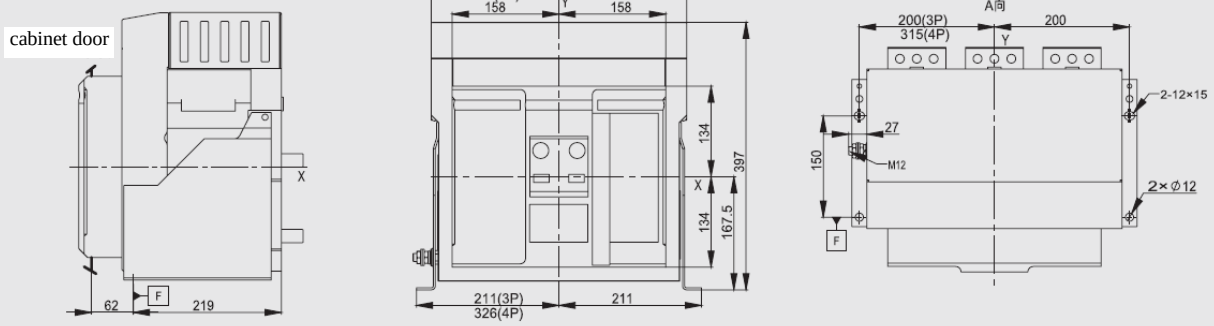
Note: the circuit breaker's X and Y are symmetric axes of the front mask

Rated current	Size of busbar a (mm)
400A, 630A, 800A	10
1000A, 1250A, 1600A	15
2000A	20

6.3 NDW2-3200

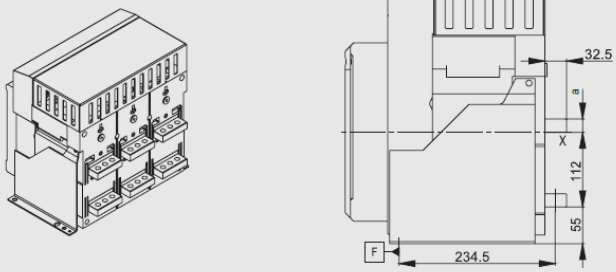
NDW2-3200 fixed type

Dimensions

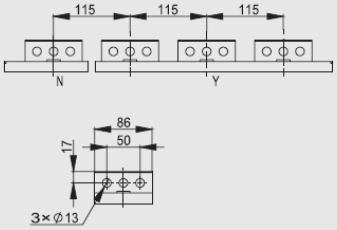


Fixed Details

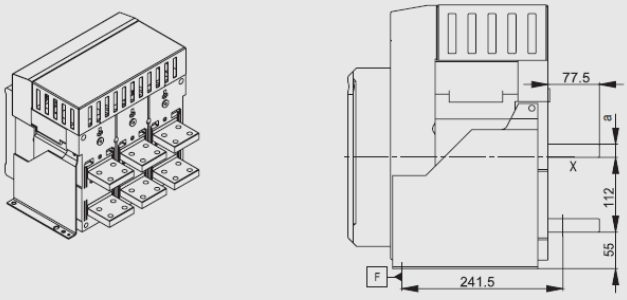
Horizontal wiring



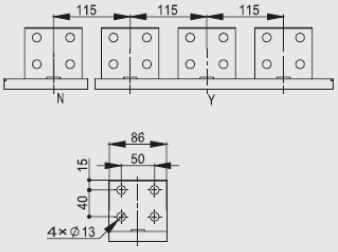
Details



Horizontal extended wiring



Details

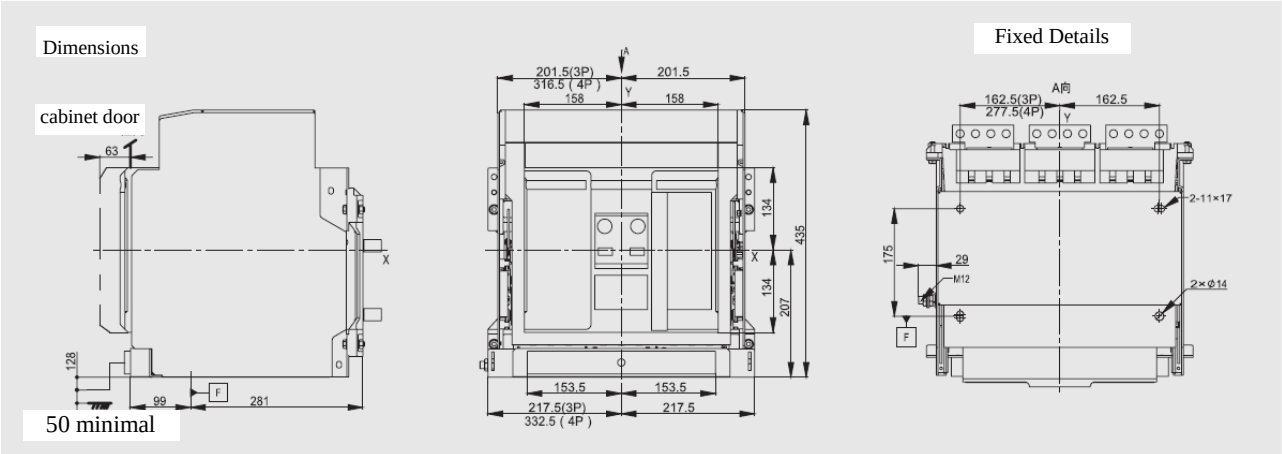


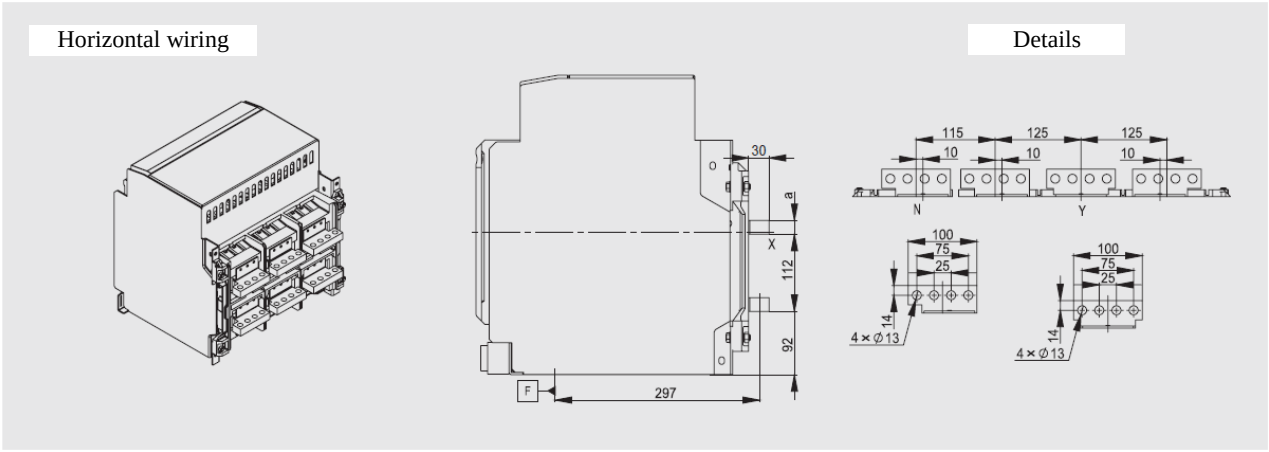
Note: the circuit breaker's X and Y are symmetric axes of the front mask

Connection bolt between bus and terminal	Torque applied with a flat washer (N.m)
M12	60

Rated current	Size of busbar a (mm)
2000A,2500A	20
2900A, 3200A	30

NDW2-3200 drawout type



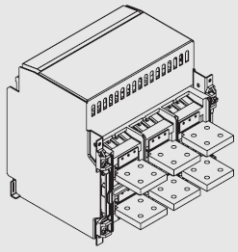


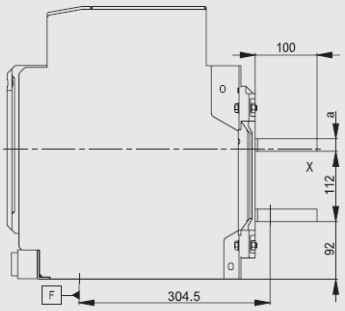
Note: the circuit breaker's X and Y are symmetric axes of the front mask

Connection bolt between bus and terminal	Torque applied with a flat washer (N.m)
M12	60

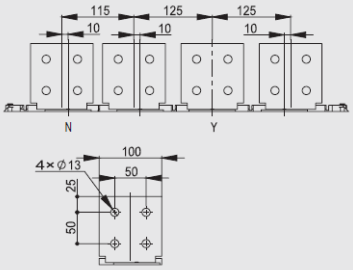
Rated current	Size of busbar a (mm)
2000A,2500A	20
2900A, 3200A	30

Horizontal extended wiring

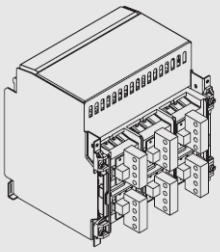


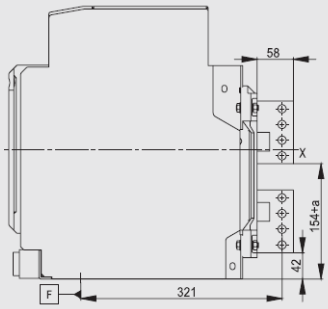


Fixed Details

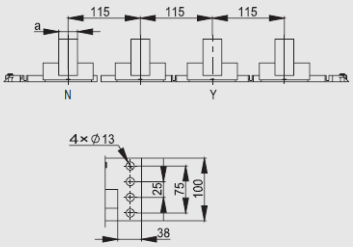


Vertical wiring





Details

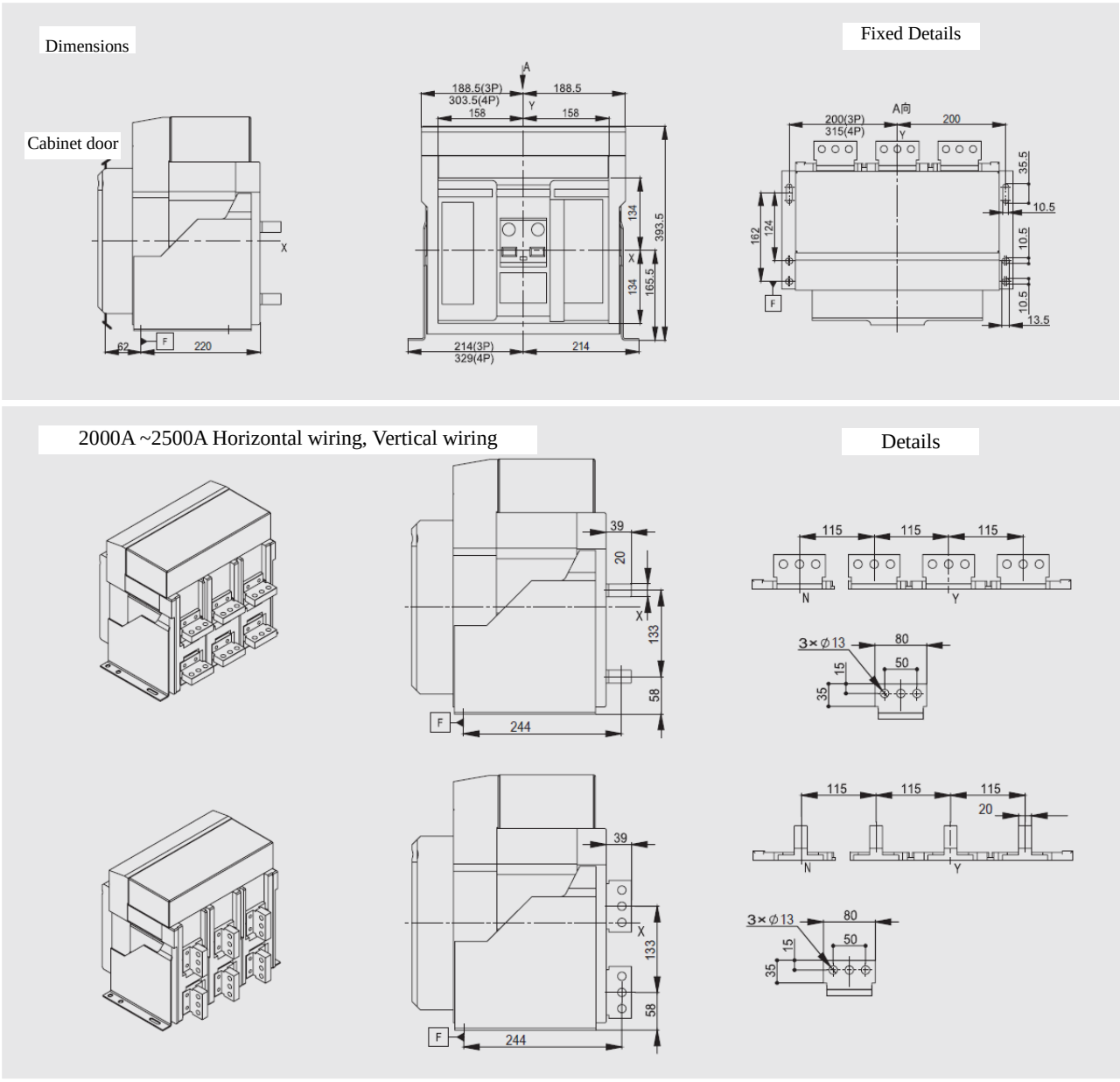


Note: the circuit breaker's X and Y are symmetric axes of the front mask

Rated current	Size of busbar a (mm)
2000A,2500A	20
2900A, 3200A	30

6.4 NDW2-4000

NDW2-4000 fixed type

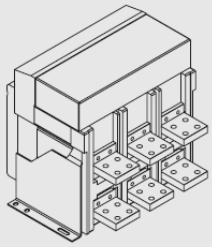


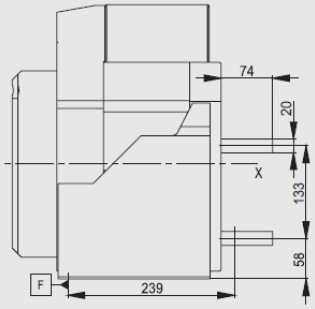
Note: the circuit breaker's X and Y are symmetric axes of the front mask

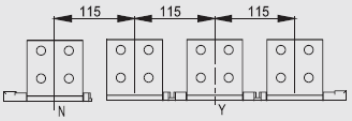
Connection bolt between bus and terminal	Torque applied with a flat washer (N.m)
M12(2000~2500A)	60
M14(3200~4000A)	97

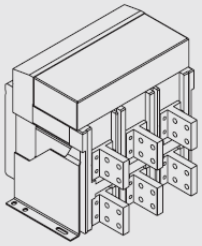
2000A-2500A horizontal extended, vertical extended wiring

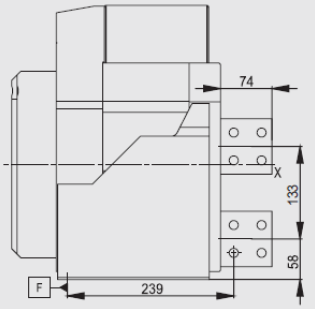
Details

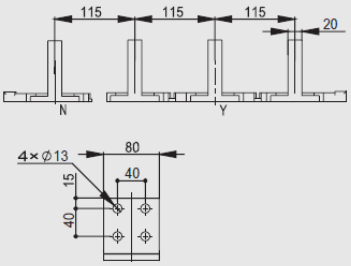






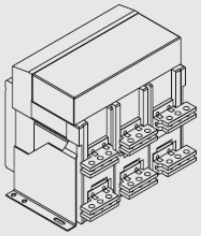


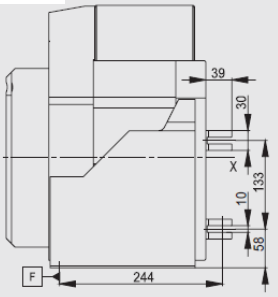


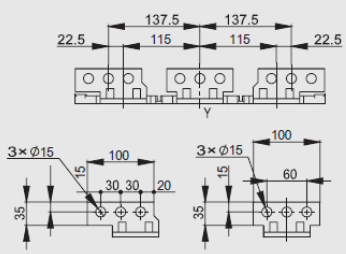


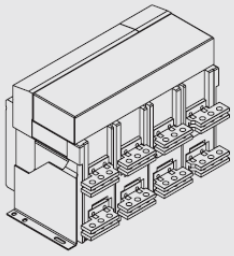
3200A-4000A horizontal wiring

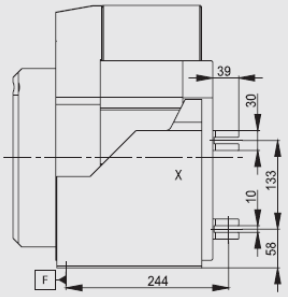
Details

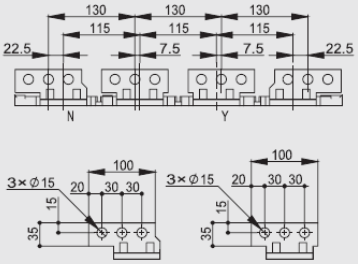






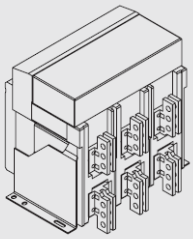


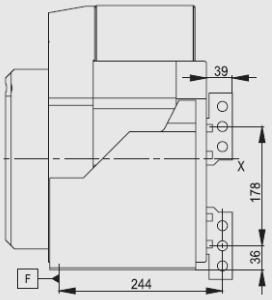




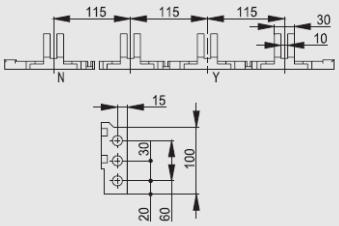
Note: the circuit breaker's X and Y are symmetric axes of the front mask

3200A-4000A vertical wiring

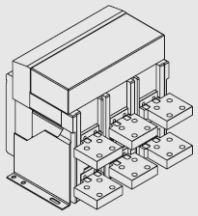


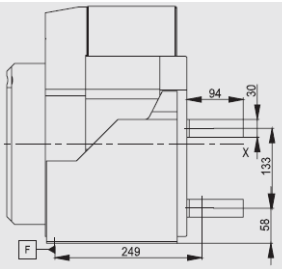


Details

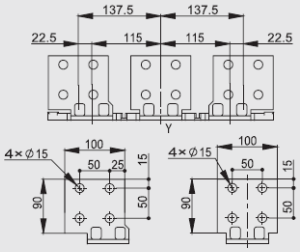


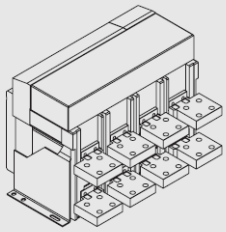
3200A-4000A horizontal extended and vertical extended wiring

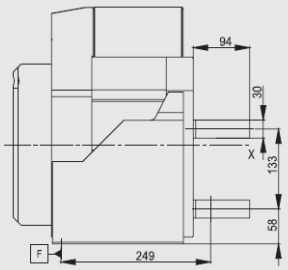


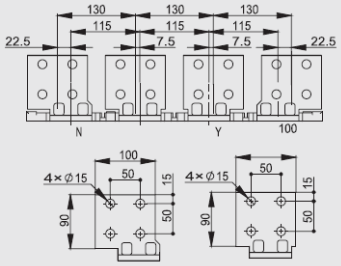


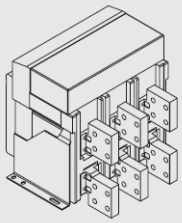
Details

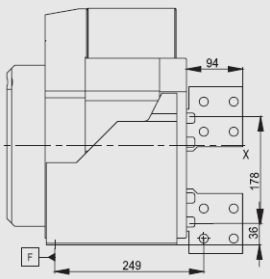


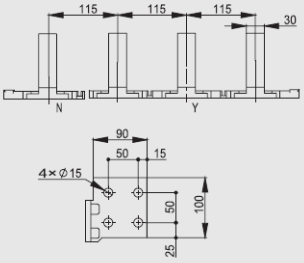






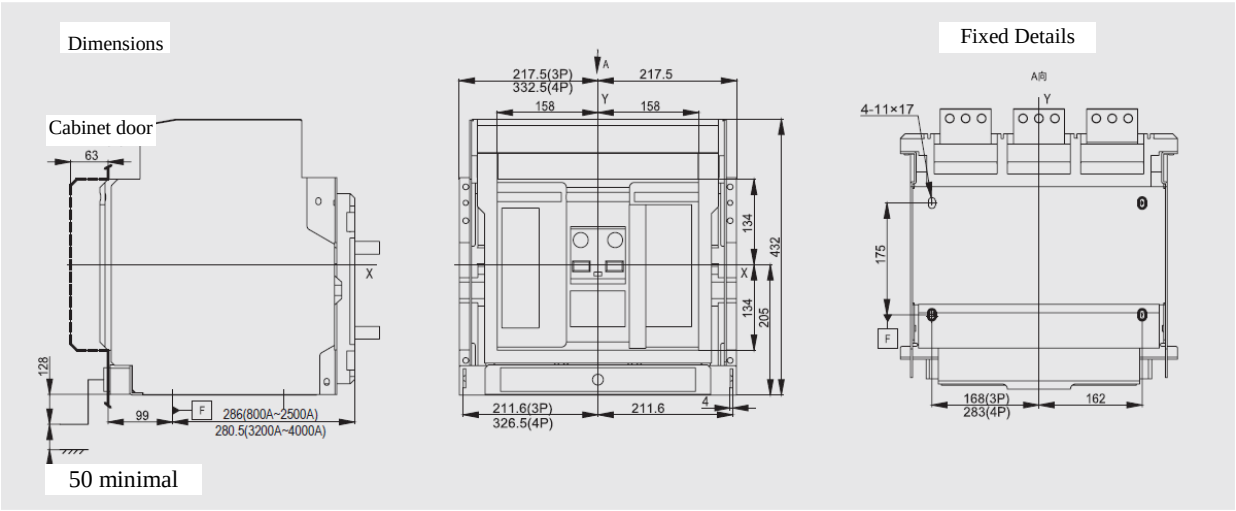


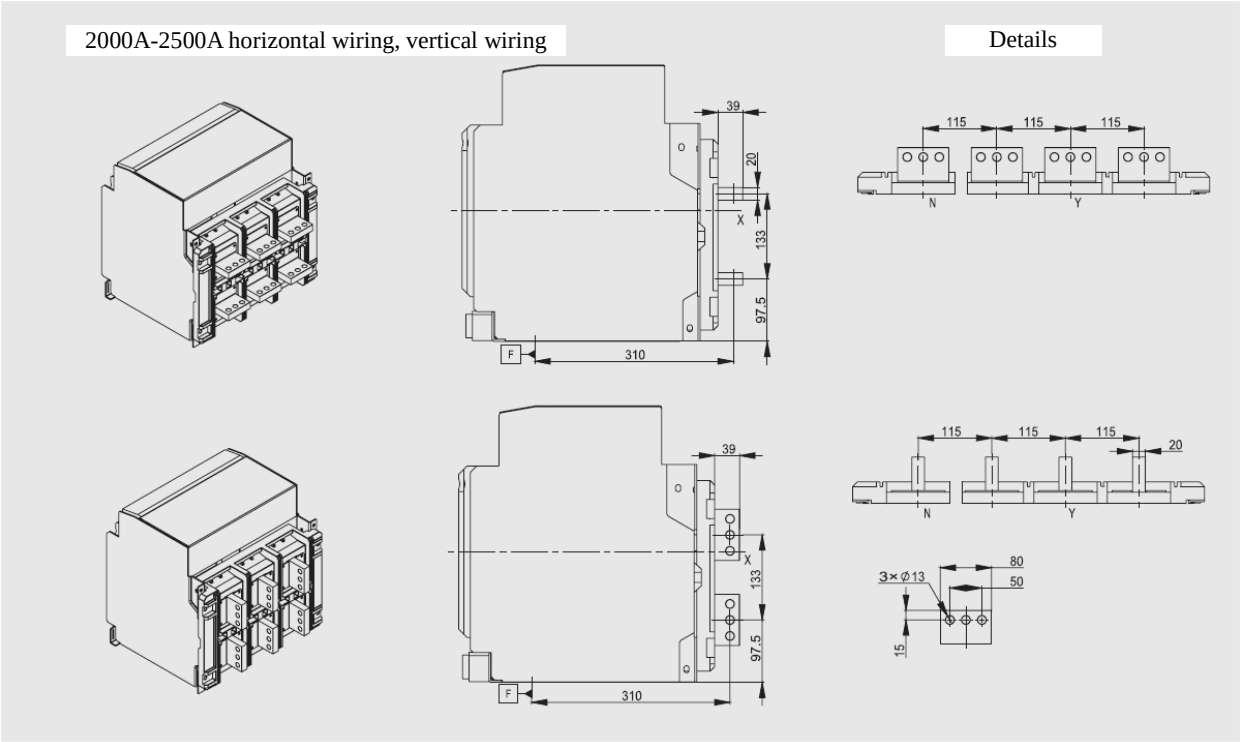




Note: the circuit breaker's X and Y are symmetric axes of the front mask

NDW2-4000 drawout type



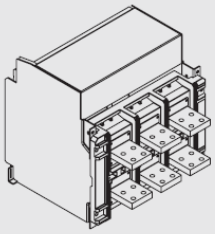


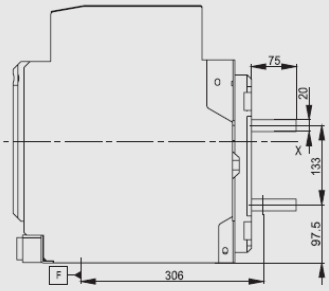
Note: the circuit breaker's X and Y are symmetric axes of the front mask

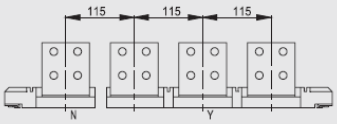
Connection bolt between bus and terminal	Torque applied with a flat washer (N.m)
M12(2000~2500A)	60
M14(3200~4000A)	97

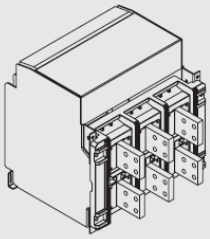
2000A-2500A horizontal extended wiring, vertical extended wiring

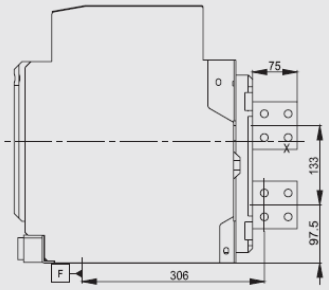
Details

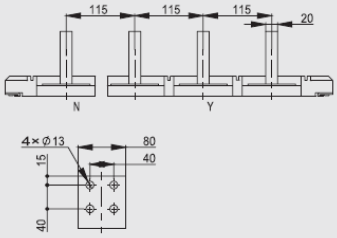






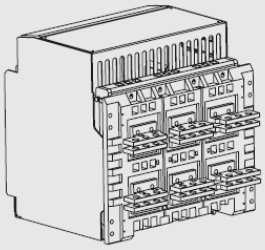


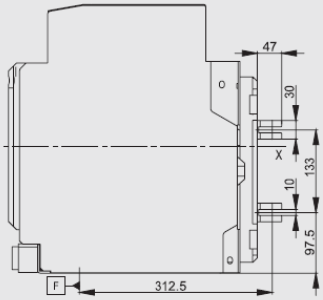


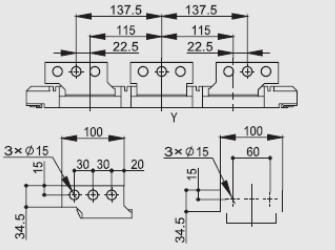


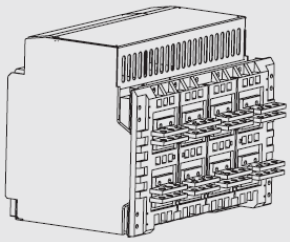
3200A-4000A horizontal wiring

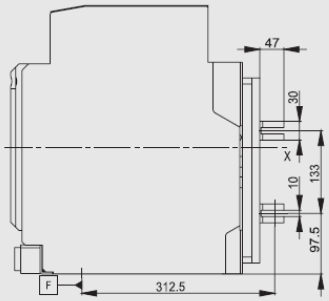
Details

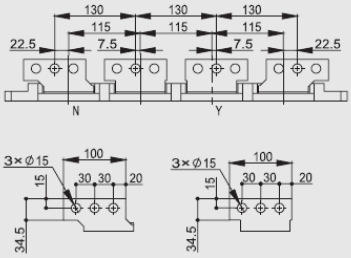






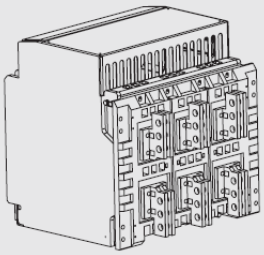


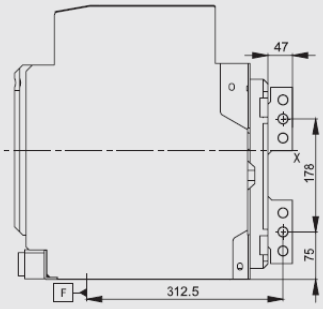




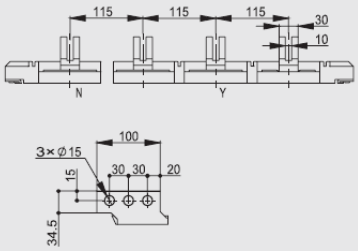
Note: the circuit breaker's X and Y are symmetric axes of the front mask

3200A-4000A vertical wiring

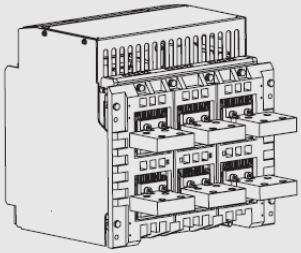


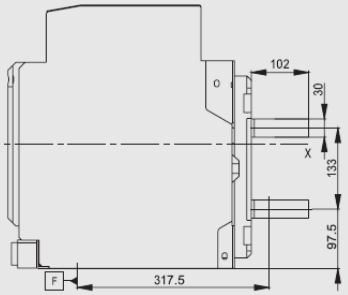


Details

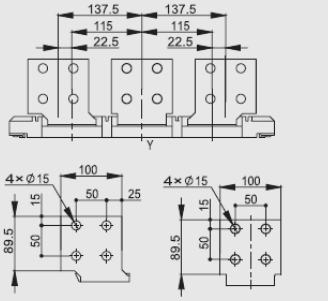


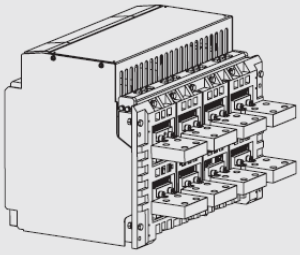
3200A-4000A horizontal extended wiring, vertical extended wiring

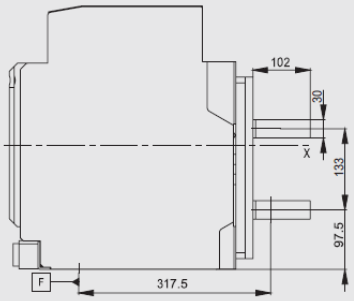


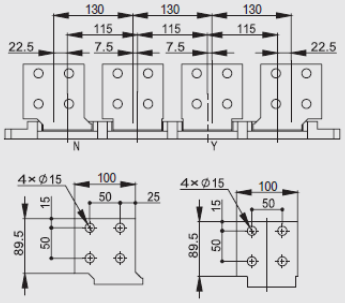


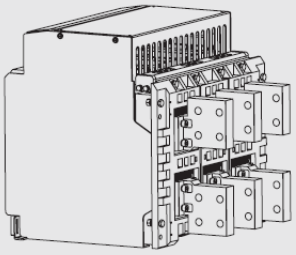
Details

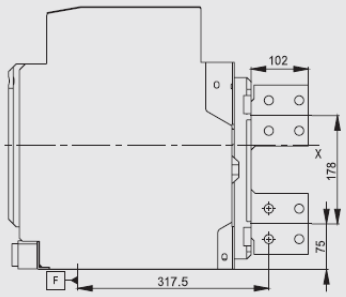


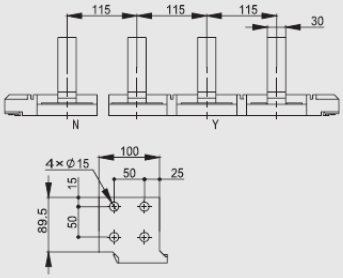










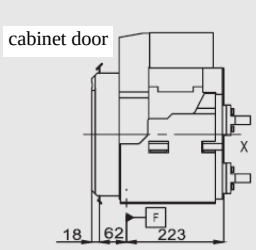


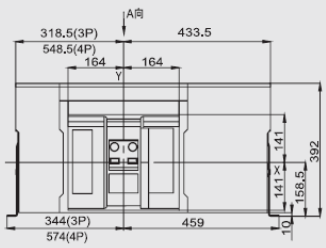
Note: the circuit breaker's X and Y are symmetric axes of the front mask

6.5 NDW2-6300

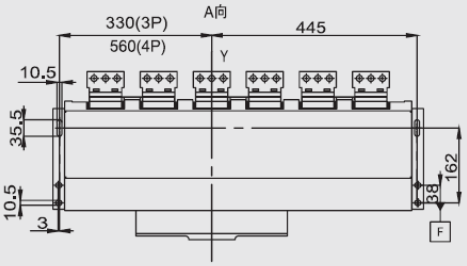
NDW2-6300 fixed type (unit: mm)

Dimensions



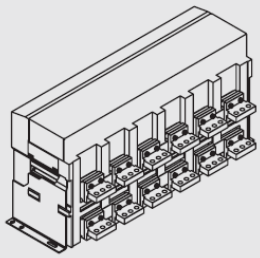


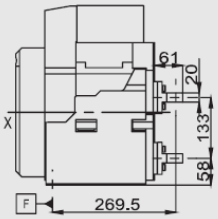
Fixed Details



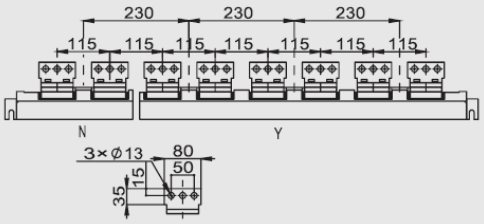
4000A-5000A Horizontal, Vertical and Mixed Wiring

Horizontal wiring

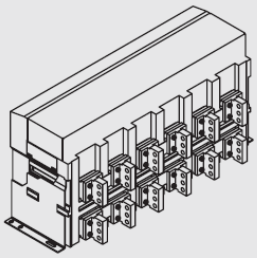


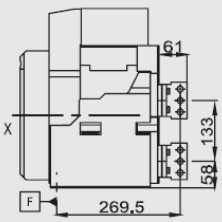


Details

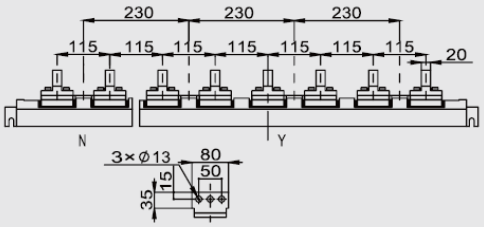


Vertical wiring



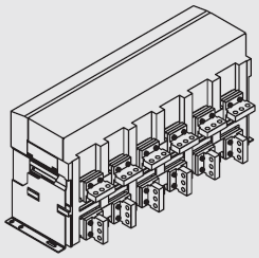


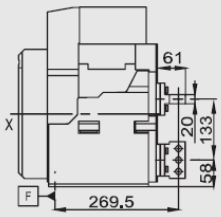
Details



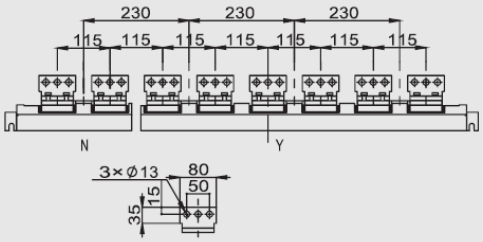
Note: the circuit breaker's X and Y are symmetric axes of the front mask

Mixing wiring (upper horizontal and lower vertical)

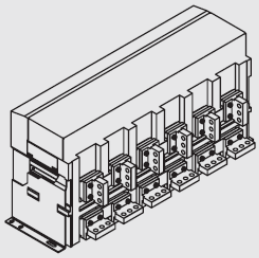


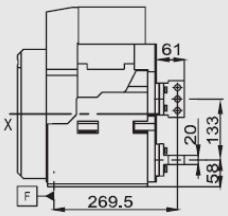


Details

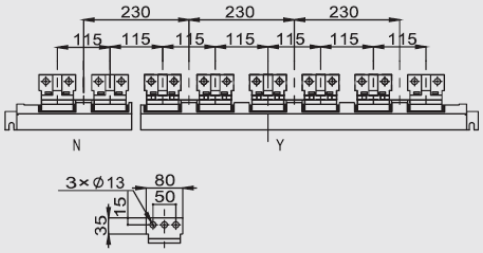


Mixing wiring (upper vertical and lower horizontal)



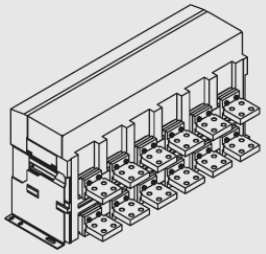


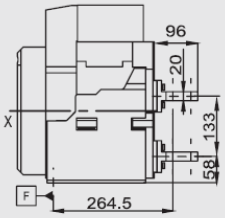
Details



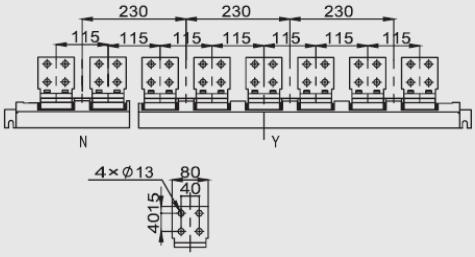
4000A-5000A Horizontal Extended, Vertical Extended and Mixed Extended Wiring

Horizontal extended wiring



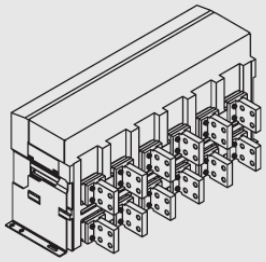


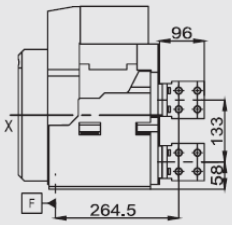
Details



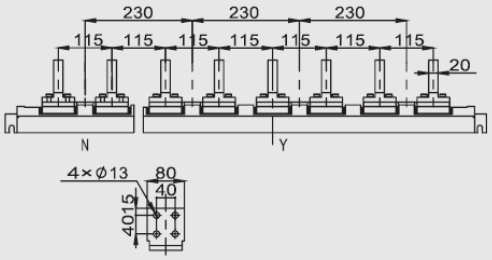
Note: the circuit breaker's X and Y are symmetric axes of the front mask

Vertical extended wiring

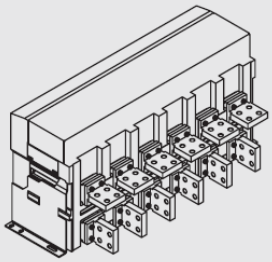


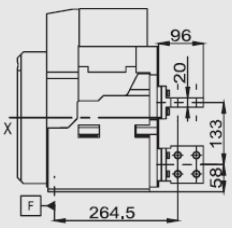


Details

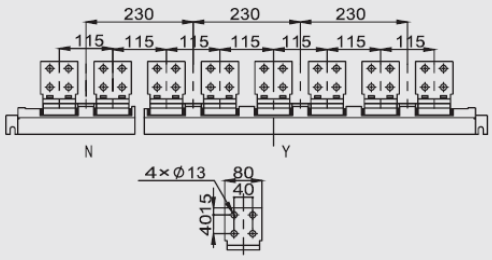


Mixed extended wiring (upper horizontal, lower vertical)

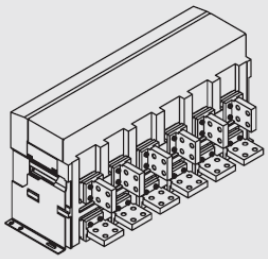


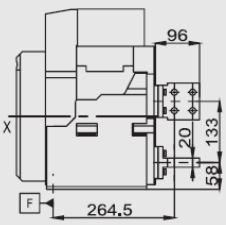


Details

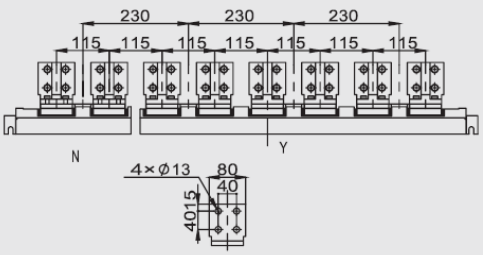


Mixed extended wiring (upper vertical, lower horizontal)





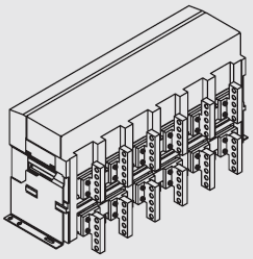
Details

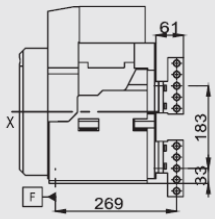


Note: the circuit breaker's X and Y are symmetric axes of the front mask

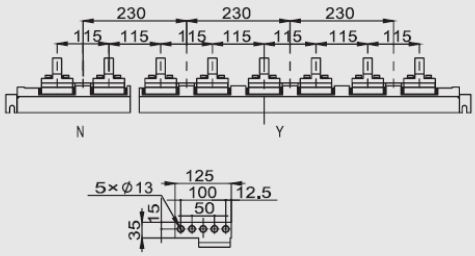
6300A vertical wiring and vertical extended wiring

6300A vertical wiring



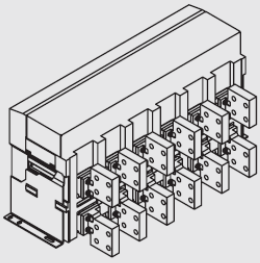


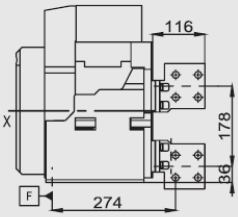
Details



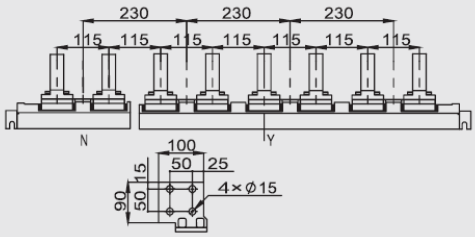
Note: the circuit breaker's X and Y are symmetric axes of the front mask

6300A vertical extended wiring



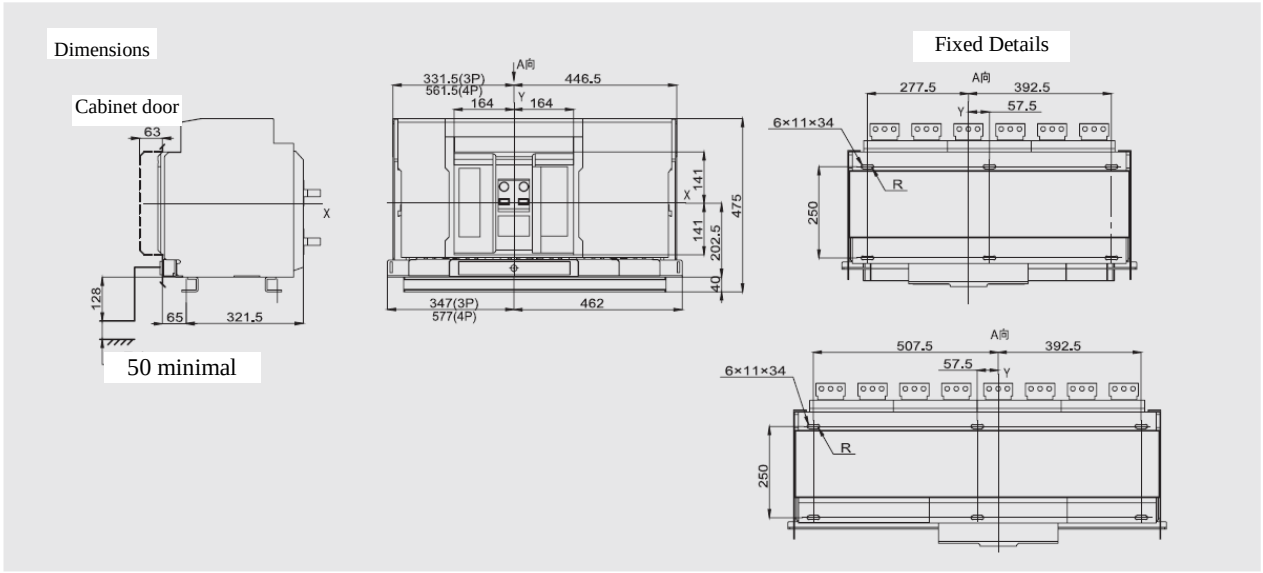


Details

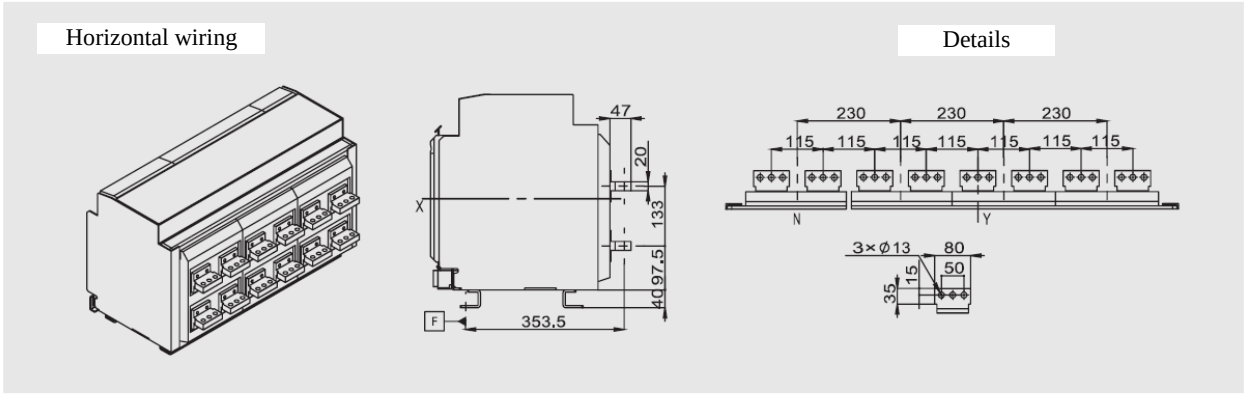


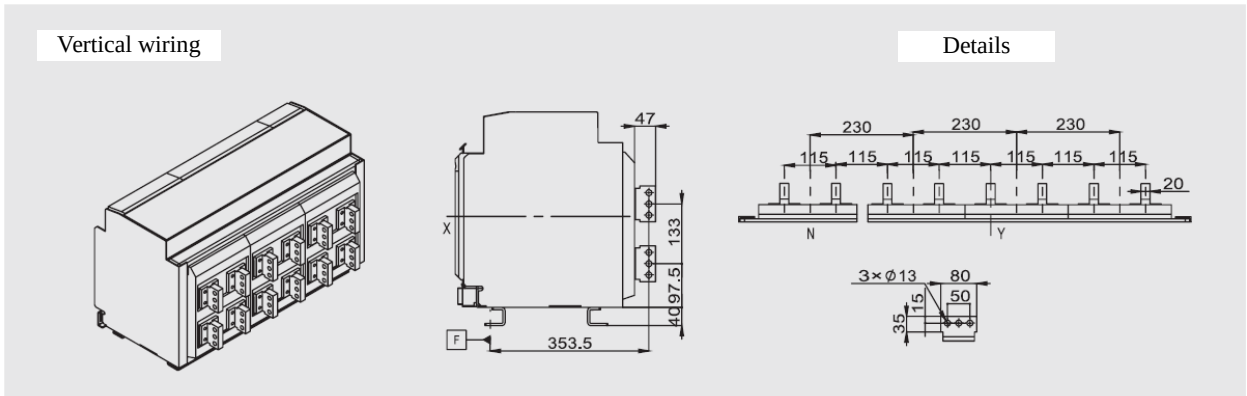
Note: the circuit breaker's X and Y are symmetric axes of the front mask

NDW2-6300 drawout type (unit: mm)



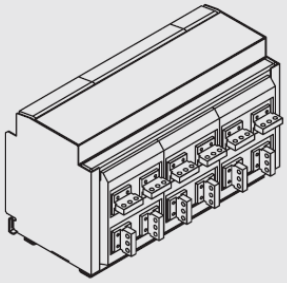
4000A-5000A horizontal, vertical, mixed wiring

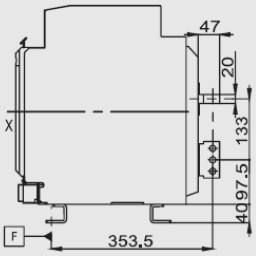




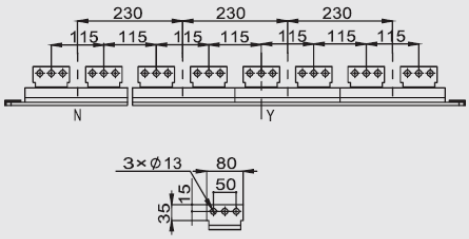
Note: the circuit breaker's X and Y are symmetric axes of the front mask

Mixing wiring (upper horizontal and lower vertical)

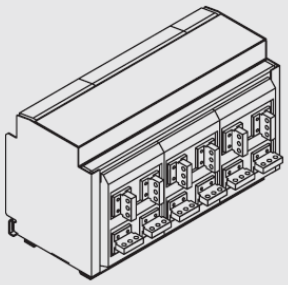


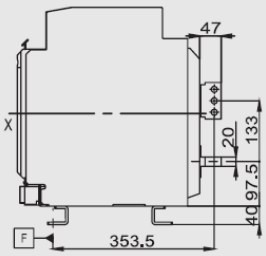


Details



Mixing wiring (upper vertical and lower horizontal)





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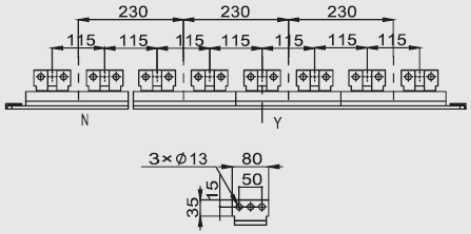
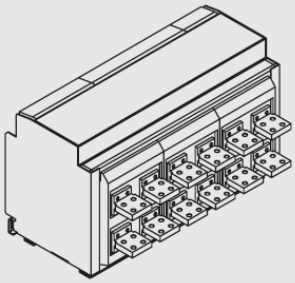
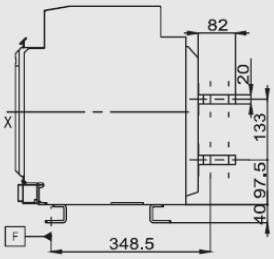


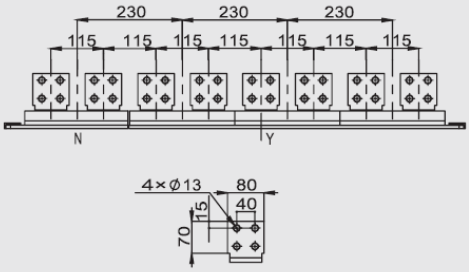
4000A-5000A horizontal extended, vertical extended, mixed extended wiring

Horizontal extended wiring



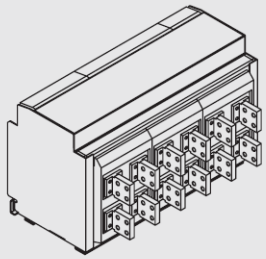


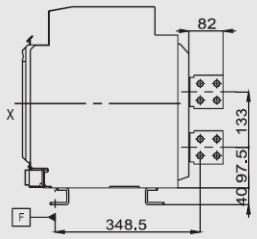
Details



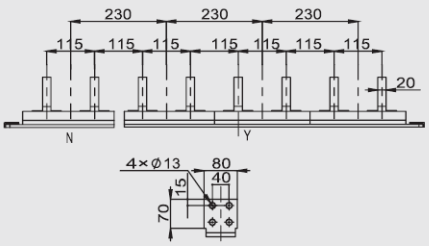
Note: the circuit breaker's X and Y are symmetric axes of the front mask

Vertical extended wiring

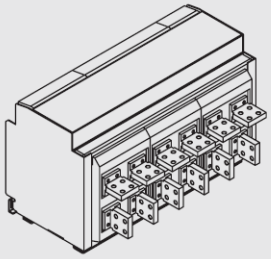


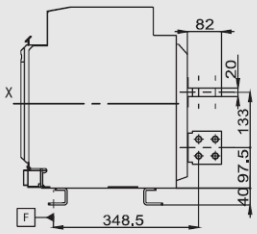


Details

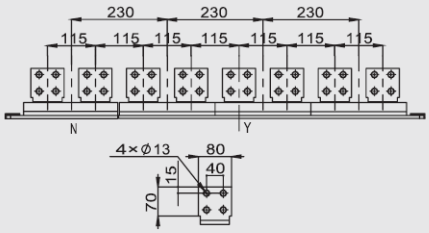


Mixed extended wiring (upper horizontal, lower vertical)

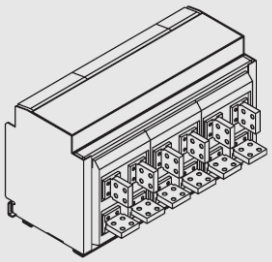


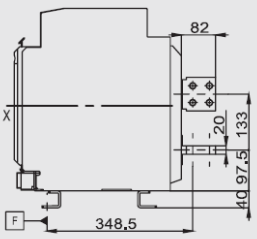


Details

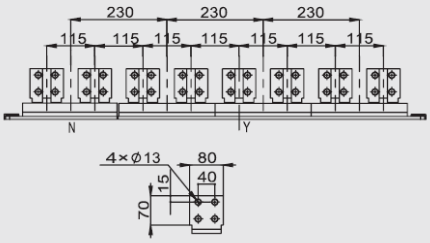


Mixed extended wiring (upper vertical, lower horizontal)





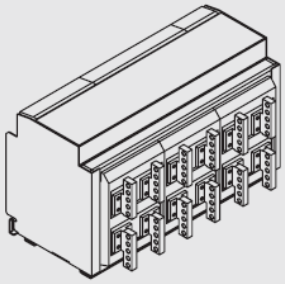
Details

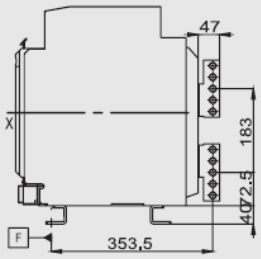


Note: the circuit breaker's X and Y are symmetric axes of the front mask

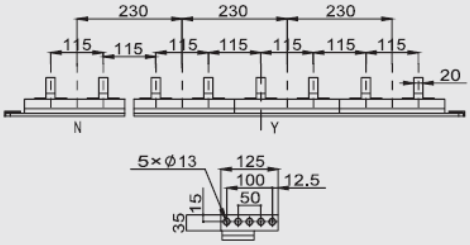
6300A vertical wiring and vertical extended wiring

6300A vertical wiring



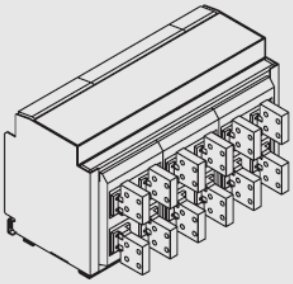


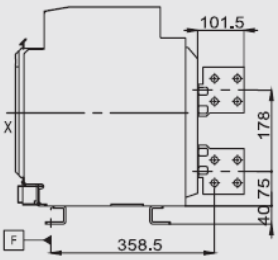
Details



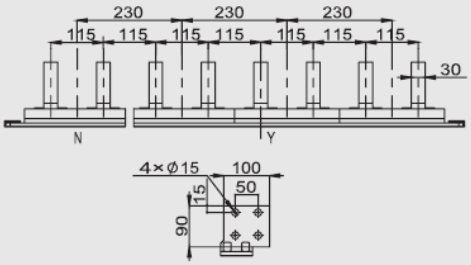
Note: the circuit breaker's X and Y are symmetric axes of the front mask

6300A vertical extended wiring





Details



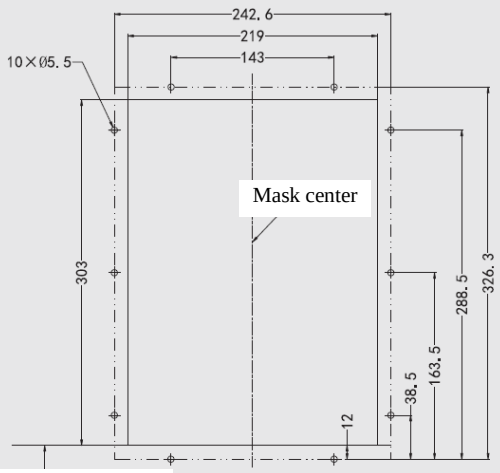
Note: the circuit breaker's X and Y are symmetric axes of the front mask

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

circuit breaker		Connection conditions between bus and terminal
NDW2-1600		M10 bolt, level 8.8, with contact washer, tightening torque 45N.m
NDW2-2000		M12 bolt, level 8.8, with contact washer, tightening torque 60N.m
NDW2-3200		M12 bolt, level 8.8, with contact washer, tightening torque 60N.m
NDW2-4000	800-2500A	M12 bolt, level 8.8, with contact washer, tightening torque 60N.m
	3200-4000A	M14 bolt, level 8.8, with contact washer, tightening torque 97N.m
NDW2-6300	4000-6300A	M12 bolt, level 8.8, with contact washer, tightening torque 60N.m
	6300A vertical extended wiring	M14 bolt, level 8.8, with contact washer, tightening torque 97N.m

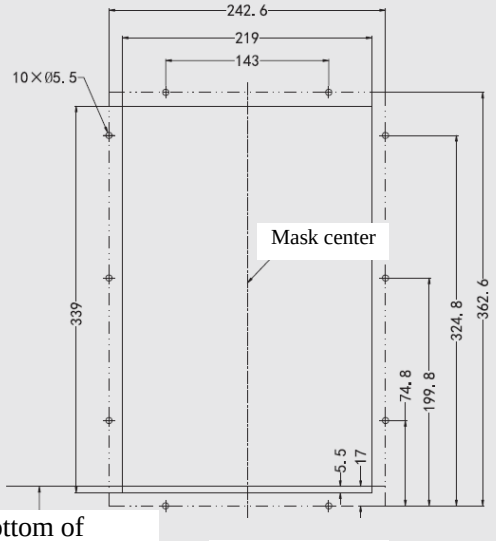
6.6 The Circuit Breaker Cabinet Door Open Hole and the Installation Pitch

Hole dimensions of NDW2-1600 door frame



Bottom of circuit breaker

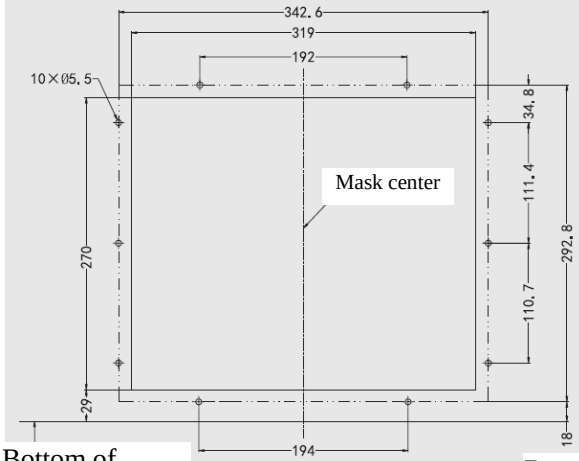
Fixed type



Bottom of circuit breaker

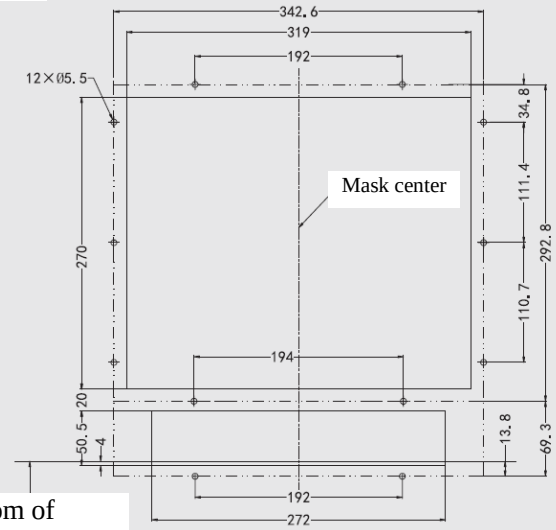
Drawout type

Hole dimensions of NDW2-2000 door frame



Bottom of circuit breaker

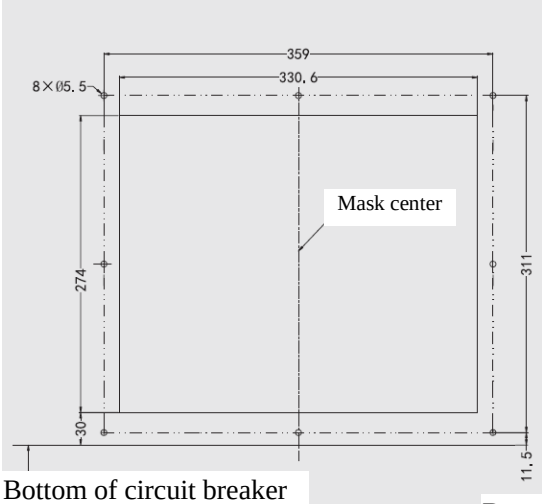
Fixed type



Bottom of circuit breaker

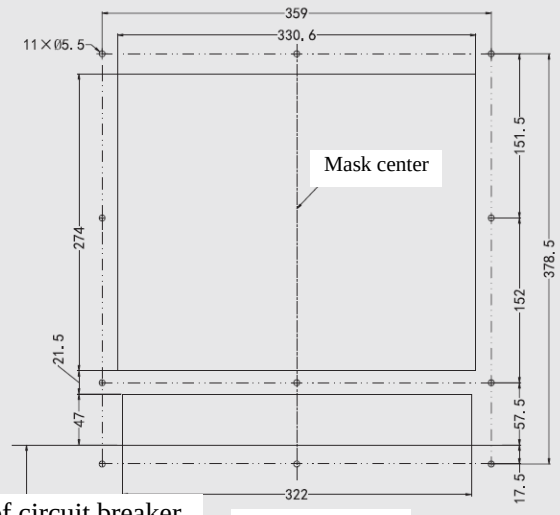
Drawout type

Hole dimensions of NDW2-3200/4000 door frame



Bottom of circuit breaker

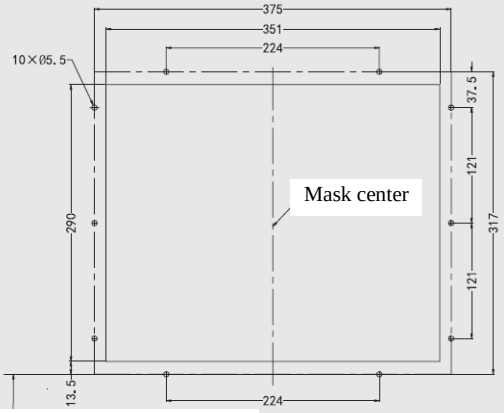
Fixed type



Bottom of circuit breaker

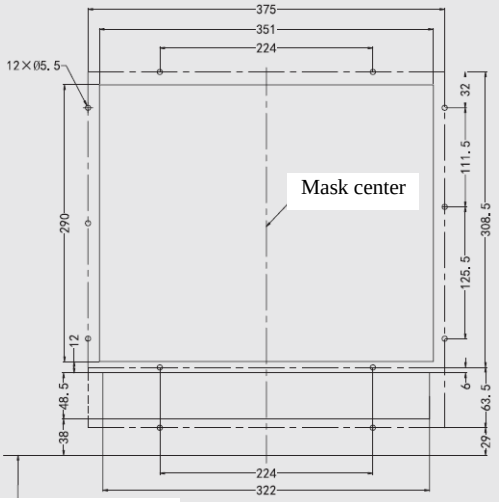
Drawout type

Hole dimensions of NDW2-6300 door frame



Bottom of circuit breaker

Fixed type



Bottom of circuit breaker

Drawout type

6.7 Safety Notes for Circuit Breaker Installation

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 10 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.

★ Conduct reliable grounding protection when installing the circuit breaker. The grounding place of the circuit breaker has an obvious grounding symbol.

★ 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.

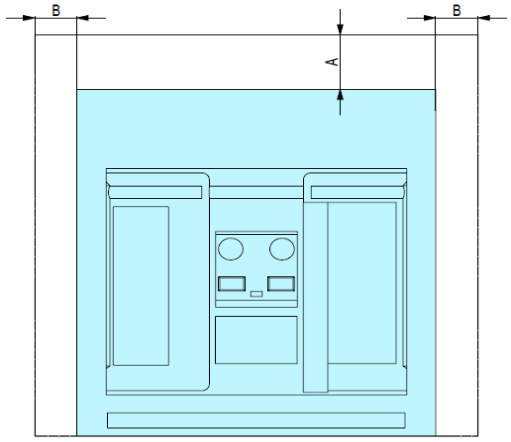
★ Pressing (or powering on) the closing button after the energy storage of the motor, the circuit breaker will close.

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

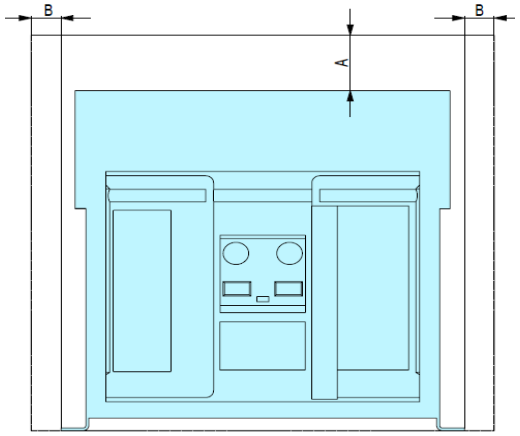
★ For manual storage of energy, pull the handle on the front panel up and down, when a "click" sound can be heard after seven times; the panel shows "storage of energy", and the storage of energy ends. At this point, if there's undervoltage tripping, power on it (no need if without undervoltage tripping),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

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 table below.



Drawout circuit breaker



Fixed circuit breaker

Unit: mm

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.

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

Chapter 7 Electrical Wiring Diagram

Electrical Wiring Diagram 7

The user shall pay special attention in design of electrical diagram:

Secondary terminal number/function	3#、4#、5#	6#、7#、8#	Remote reset	Loss of voltage release	Auxiliary switch	41、42、43、44
NDW2-1600	4# and 5# connected	7# and 8# connected	25#、26#	12#～15#	45#～62#	It may be defined by the user
NDW2-2000/3200	4# and 3# connected	7# and 6# connected	25#、26#	33#、34#	39#～62#	/
NDW2-4000	4# and 3# connected	7# and 6# connected	39#、40#	33#、34#	45#～62#	It may be defined by the user
NDW2-6300	4# and 3# connected	7# and 6# connected	25#、26#	12#～15#	39#～62#	/

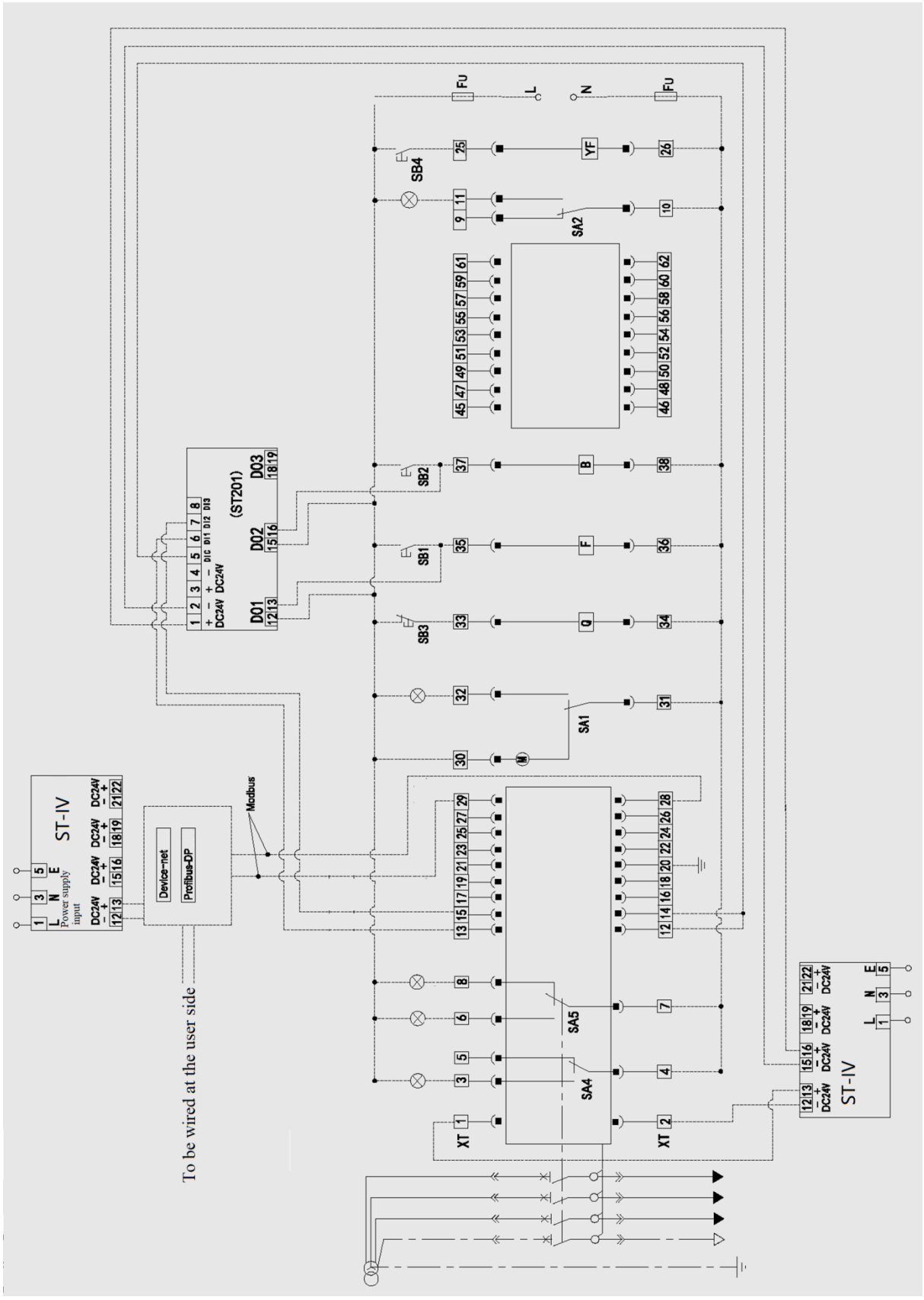
Note:

1. The 3#~8# in the above table is the status of no fault and in case of being open.

2. NDW2-1600/6300 voltage loss release consists of an actuating module and a control module Control module. It shall be installed outside the circuit breaker, and the power is connected into the controller module. The controller module terminal number 12#~15# correspond to the wiring of the secondary terminal number 12#~15# of the circuit breaker.

7.1 NDW2-1600 Electrical Wiring Diagram and Terminal Number Definition

■ NDW2-1600 (full-function wiring diagram)



1#, 2#: Working power supply, 1# is positive pole and 2# is negative pole in case of DC power supply
(Power shall be supplied by the power module, and the module has been installed on the left side of the circuit breaker)
3#, 4#, 5#: Fault tripping contact output, contact capacity of 10A/AC250V
6#, 7#, 8#: Opening and closing contact output, contact capacity of 10A/AC250V
9#, 10#, 11# - Closing ready electric indication
12#, 13#: S1/S2/S3 signal unit DO output signal or no-voltage release
14#, 15#: S1/S2/S3 signal unit DO output signal or no-voltage release
16#, 17#: S1/S2 signal unit DO output signal or S3 signal unit DI input signal
18#, 19#: S1 signal unit DO output signal or S2/S3 signal unit DI input signal

When 12#- 19# output the signal to the signal unit DO/DI, DO contact capacity: 0.5A/ DC110V,
5A/AC250V; DI signal input voltage: DC110V ~ DC130V or AC110V ~ AC250V.

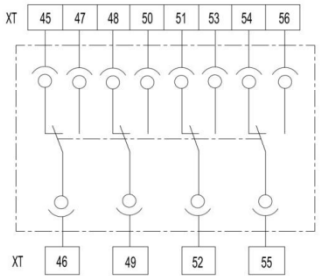
20#: Grounding wire of controller
21#, 22#, 23# and 24#: voltage signal input end (N, A, B and C respectively)
When the power distribution system is the three-phase and three-wire system, 21# is shorted with 23#, and the connected with phase B
25#, 26#: N-phase transformer output end or electric leakage transformer output end or Remote reset
27# - Communication shielding ground wire
28#, 29# - Communication interface, 28# for red (A), and 29# for green (B)
30#, 31#, 32#: Electric energy storage and energy storage indicators
33#, 34#: Under-voltage tripper
35#, 36#: Shunt tripper
37#, 38#: Closed electromagnet
41#, 42#, 43#, 44# - customized by users
45#~56#: Auxiliary contact (4 groups of switch)
45#~62#: Auxiliary contact (6 groups of switch)

SB1: Shunt button (to be prepared by users)
SB2: Close button (to be prepared by users)
SB3: Undervoltage tripper 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

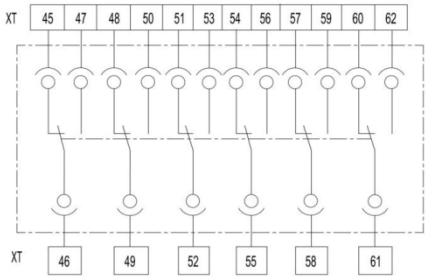
XT: Secondary terminal
M: Energy storage motor
F: Shunt release
B: Closed electromagnet
Q: Under-voltage release
YF: Remote reset
Fu: Fuse (to be prepared by users)

Note:

1) Current state of the circuit breaker is de-energized, disconnected, and 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) If aftercurrent protection or communication function is additionally selected, in order to ensure the controller reliably operates,
1# and 2# need to connect to the auxiliary power supply.
5) If earth current type ground protection or leakage protection is additionally selected, but external transformer is not connected, then terminal 25# and 26# should be short connected.
6) Secondary terminal may connect to wires of 0.5mm²(20AWG - 1.5mm²(16AWG.
7) There are control circuits within the shunt release and closed electromagnet, which can be energized for more than 200ms. The user cannot connect it with the auxiliary switch point of the circuit breaker in series.



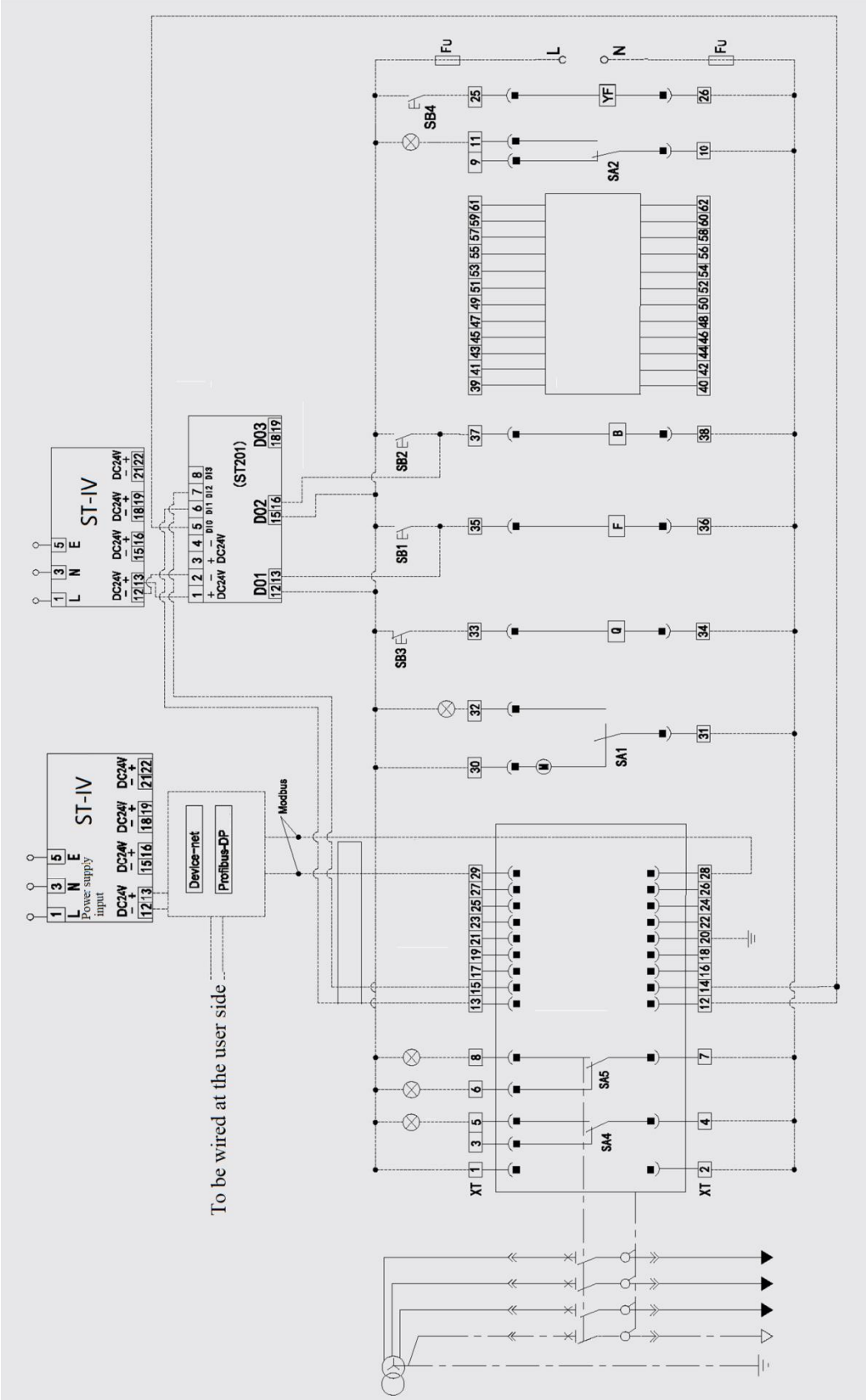
4 groups of switch



6 groups of switch

7.2 NDW2-2000/3200/6300 Electric Wiring Diagram and Terminal Number Definition

- NDW2-2000, NDW2-3200, NDW2-6300 (full-function wiring diagram)



1#, 2#: Working power supply, 1# is positive pole and 2# is negative pole in case of DC power supply
(There is the built-in power transfer module, where the power supply is connected with 1# and 2#)
3#, 4#, 5#: Fault tripping contact output, contact capacity of 10A/AC250V
6#, 7#, 8#: Opening and closing contact output, contact capacity of 10A/AC250V
9#, 10# and 11#: the electrical indication for the closing ready, and only 6300 Frame size lacks 9#
12#, 13#: S1/S2/S3 signal unit DO output signal or no-voltage release
14#, 15#: S1/S2/S3 signal unit DO output signal or no-voltage release
16#, 17#: S1/S2 signal unit DO output signal or S3 signal unit DI input signal
18#, 19#: S1 signal unit DO output signal or S2/S3 signal unit DI input signal

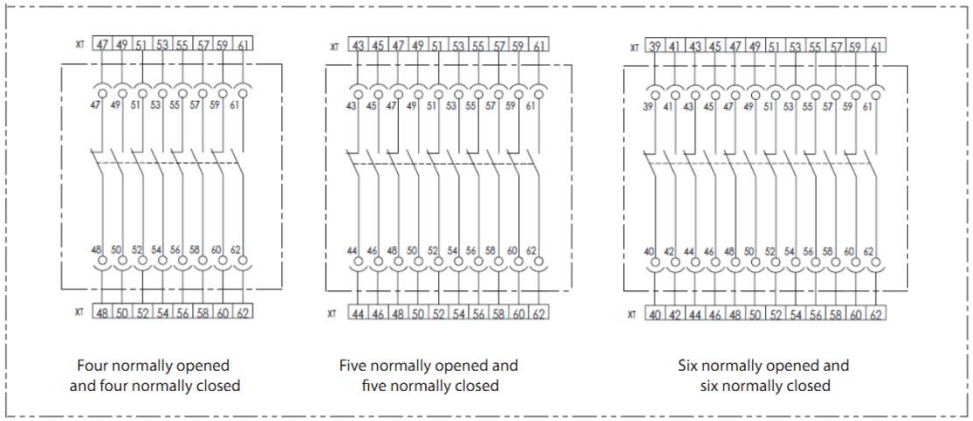
When 12#- 19# output the signal to the signal unit DO/DI, DO contact capacity: 0.5A/ DC110V,
5A/AC250V; DI signal input voltage: DC110V ~ DC130V or AC110V ~ AC250V.

20#: Grounding wire of controller
21#, 22#, 23# and 24#: voltage signal input end (N, A, B and C respectively)
When the power distribution system is the three-phase and three-wire system, 21# is shorted with 23#, and the connected with phase B
25#, 26#: N-phase transformer output end or electric leakage transformer output end or remote rest input end is connected
27# - Communication shielding ground wire
28#, 29# - Communication interface, 28# for red (A), and 29# for green (B)
30#, 31#, 32#: Electric energy storage and energy storage indicators
33#, 34#: Under-voltage tripper
35#, 36#: Shunt tripper
37#, 38#: Closed electromagnet
47#- 62#: Auxiliary contact (4 normally open, 4 normally closed)
43#~62#: Auxiliary contact (5 always open, 5 always closed)
39#~62#: Auxiliary contact (6 always open, 6 always closed)

SB1: Shunt button (to be prepared by users)
SB2: Close button (to be prepared by users)
SB3: Undervoltage tripper 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
M: Energy storage motor
F: Shunt release
B: Closed electromagnet
Q: Under-voltage release
YF: Remote reset
Fu: Fuse (to be prepared by users)

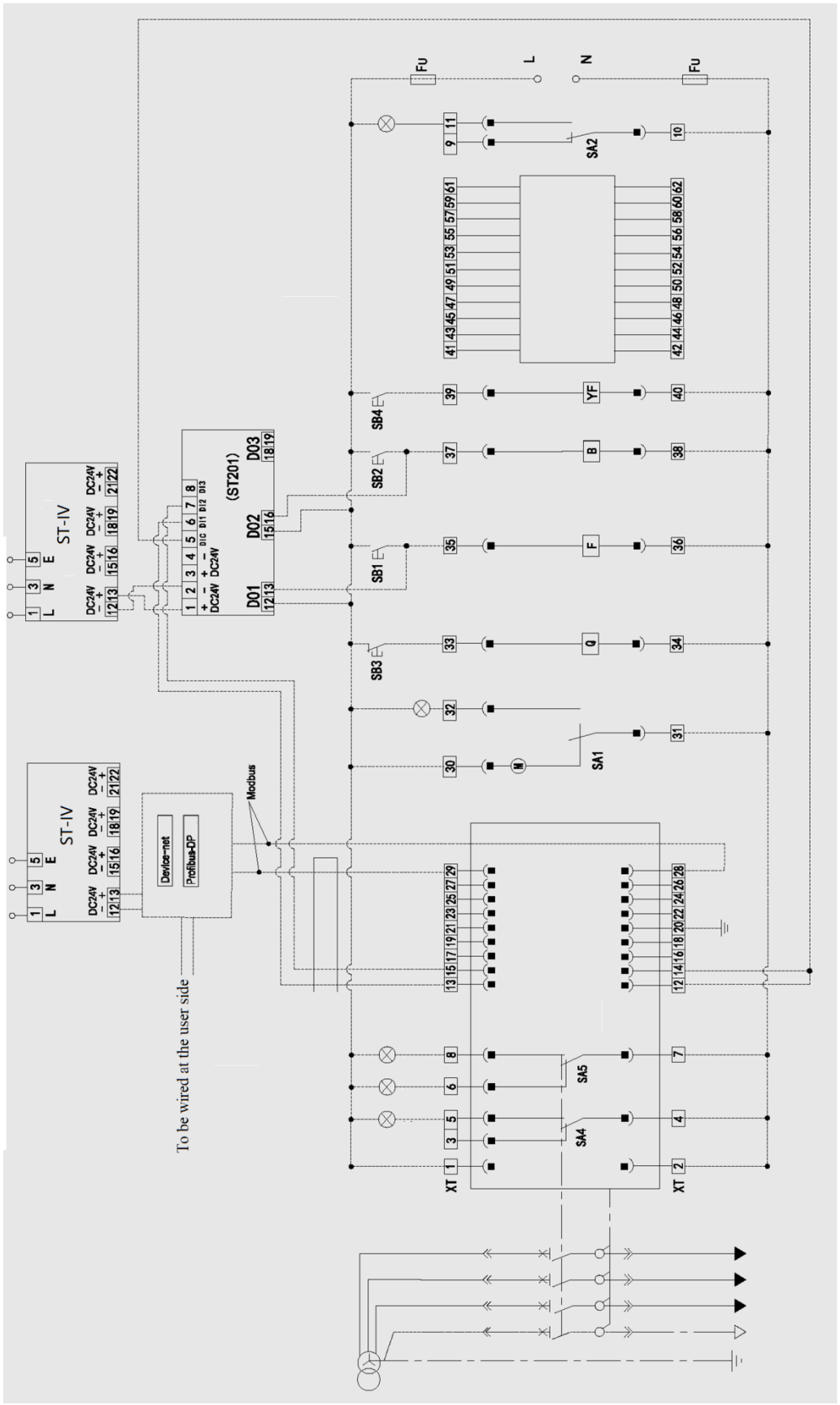
Note:
1) Current state of the circuit breaker is de-energized, disconnected, and no energy stored.
2) Status indicator light, button switch and communication equipment are provided by users, and the dashed part shall be
wired by users.
3) if the rated working voltages of Q, F, B, M and controller are not the same, please connect to the rated voltage of control
power supply.
4) If aftercurrent protection or communication function is additionally selected, in order to ensure the controller reliably operates,
1# and 2# need to connect to the auxiliary power supply.
5) If earth current type ground protection or leakage protection is additionally selected, but external transformer is not connected, then terminal 25# and 26# should be short connected.
6) Secondary terminal may connect to wires of 0.5mm²(20AWG - 1.5mm²(16AWG.
7) There are control circuits within the shunt release and closed electromagnet, which can be energized for more than 200ms. The user cannot connect it with the auxiliary switch point of the circuit breaker in series.



Four normally opened and four normally closed
Five normally opened and five normally closed
Six normally opened and six normally closed

7.3 NDW2-4000 Electrical Wiring Diagram and Terminal Number Definition

- NDW2-4000 (full-function wiring diagram)



1#, 2#: Working power supply, 1# is positive pole and 2# is negative pole in case of DC power supply
(There is the built-in power transfer module, where the power supply is connected with 1# and 2#)
3#, 4#, 5#: Fault tripping contact output, contact capacity of 10A/AC250V
6#, 7#, 8#: Opening and closing contact output, contact capacity of 10A/AC250V
9#, 10#, 11# - Closing ready electric indication
12#, 13#: S1/S2/S3 signal unit DO outputs signal
14#, 15#: S1/S2/S3 signal unit DO outputs signal
16#, 17#: S1/S2 signal unit DO output signal or S3 signal unit DI input signal
18#, 19#: S1 signal unit DO output signal or S2/S3 signal unit DI input signal

When 12#- 19# output the signal to the signal unit DO/DI, DO contact capacity: 0.5A/ DC110V,
5A/AC250V; DI signal input voltage: DC110V ~ DC130V or AC110V ~ AC250V.

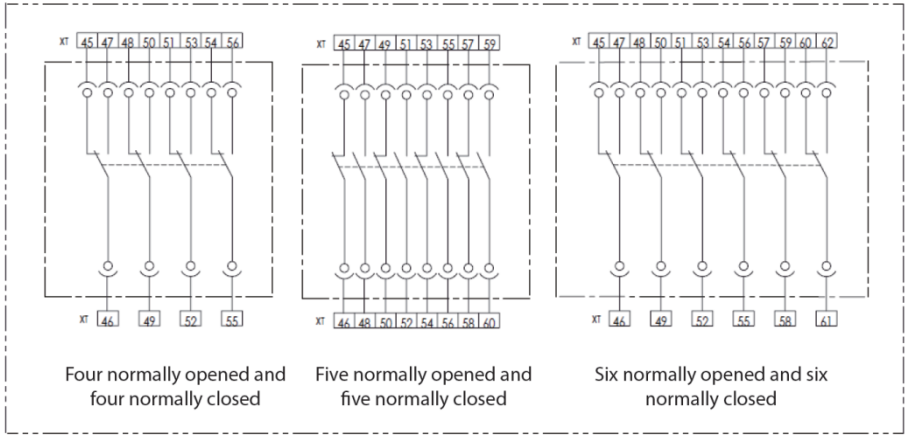
20#: Grounding wire of controller
21#, 22#, 23# and 24#: voltage signal input end (N, A, B and C respectively)
When the power distribution system is the three-phase and three-wire system, 21# is shorted with 23#, and the connected with phase B
25#, 26#: N-phase transformer output end or electric leakage transformer output end
27# - Communication shielding ground wire
28#, 29# - Communication interface, 28# for red (A), and 29# for green (B)
30#, 31#, 32#: Electric energy storage and energy storage indicators
33#, 34#: Under-voltage tripper
35#, 36#: Shunt tripper
37#, 38#: Closed electromagnet
39#, 40# - Remote reset
41#, 42#, 43#, 44# - customized by users
45#~56#: Auxiliary contact (4 groups of switch)
45#~60#: Auxiliary contact (4 always open, 4 always closed)
45#~62#: Auxiliary contact (6 groups of switch)

SB1: Shunt button (to be prepared by users)
SB2: Close button (to be prepared by users)
SB3: Undervoltage tripper 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

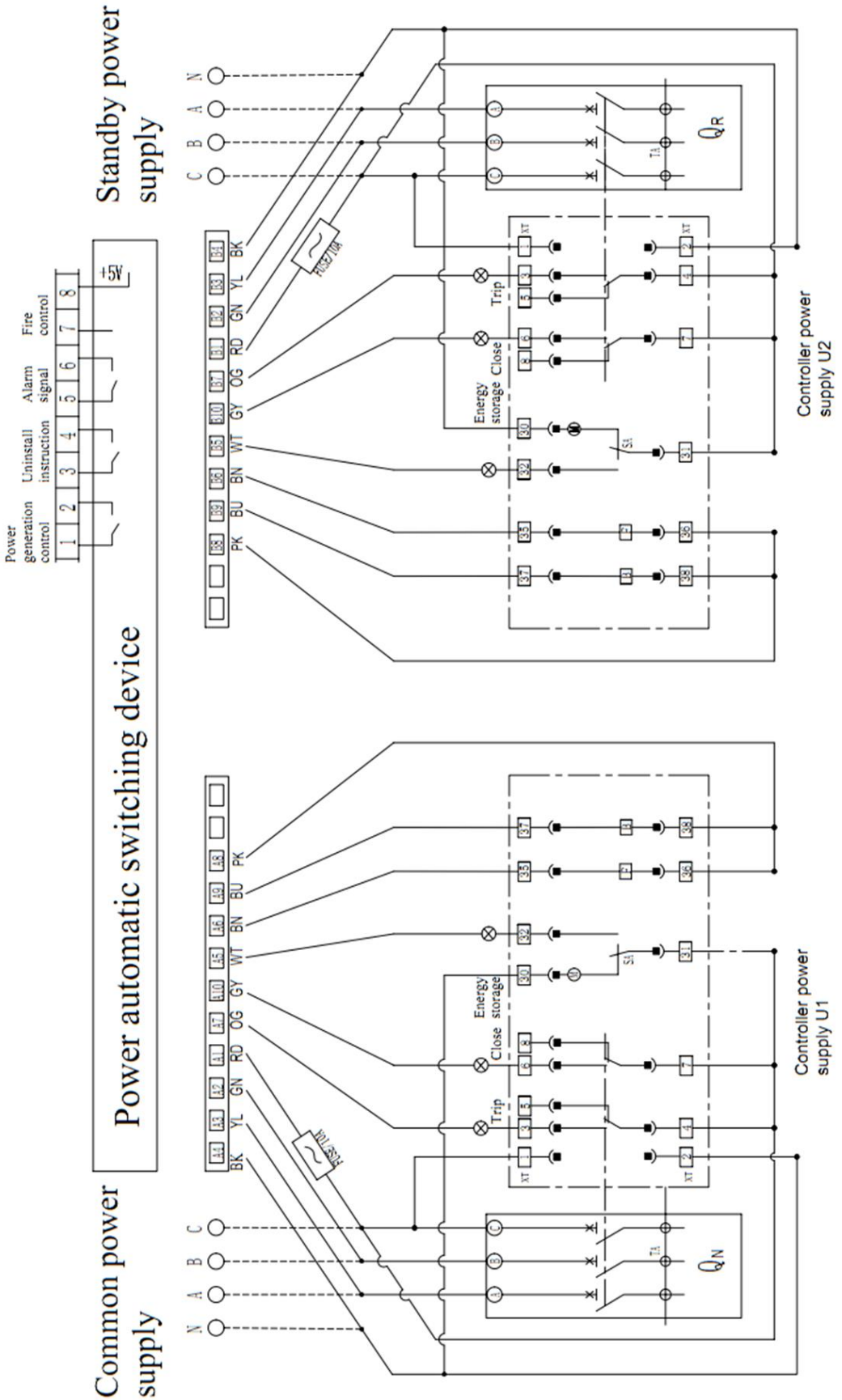
XT: Secondary terminal
M: Energy storage motor
F: Shunt release
B: Closed electromagnet
Q: Under-voltage release
YF: Remote reset
Fu: Fuse (to be prepared by users)

Note:

1) Current state of the circuit breaker is de-energized, disconnected, and 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) If aftercurrent protection or communication function is additionally selected, in order to ensure the controller reliably operates,
1# and 2# need to connect to the auxiliary power supply.
5) If earth current type ground protection or leakage protection is additionally selected, but external transformer is not connected, then terminal 25# and 26# should be short connected.
6) Secondary terminal may connect to wires of 0.5mm²20AWG - 1.5mm²16AWG.
7) There are control circuits within the shunt release and closed electromagnet, which can be energized for more than 200ms. The user cannot connect it with the auxiliary switch point of the circuit breaker in series.



7.4 NDW2-1600 Wiring Diagram of the Power Automatic Transfer Switches Device (ATS)



Note:

1. The dotted line part represents the wire connected by the user, that is, in general, the user is required only to connect the N, A, B and C wires of common power supply and standby power supply to the switching device. The indicator lamps for fault, closing and energy storage in this wiring diagram are the indicator lamps on the Automatic Transfer Switches panel of power supply, and the fuse is inside the device.

2. For Controller, F, B, M rated voltage shall be AC230V.

3. Q cannot be chosen for electrical accessory (undervoltage release).

4. Contact capacity: power generation control-AC250V6A; unloading instruction, alarm signal-AC250V5A.

5. With the 5V power supply, the fire control port can be short-connected.

6. For other wiring modes, see the electrical wiring diagram example of the circuit breaker.

QN - Commonly used power supply universal type low-voltage circuit breaker

QR - Standby power supply universal type low-voltage circuit breaker

XT - Secondary terminal

M - Energy-storage motor

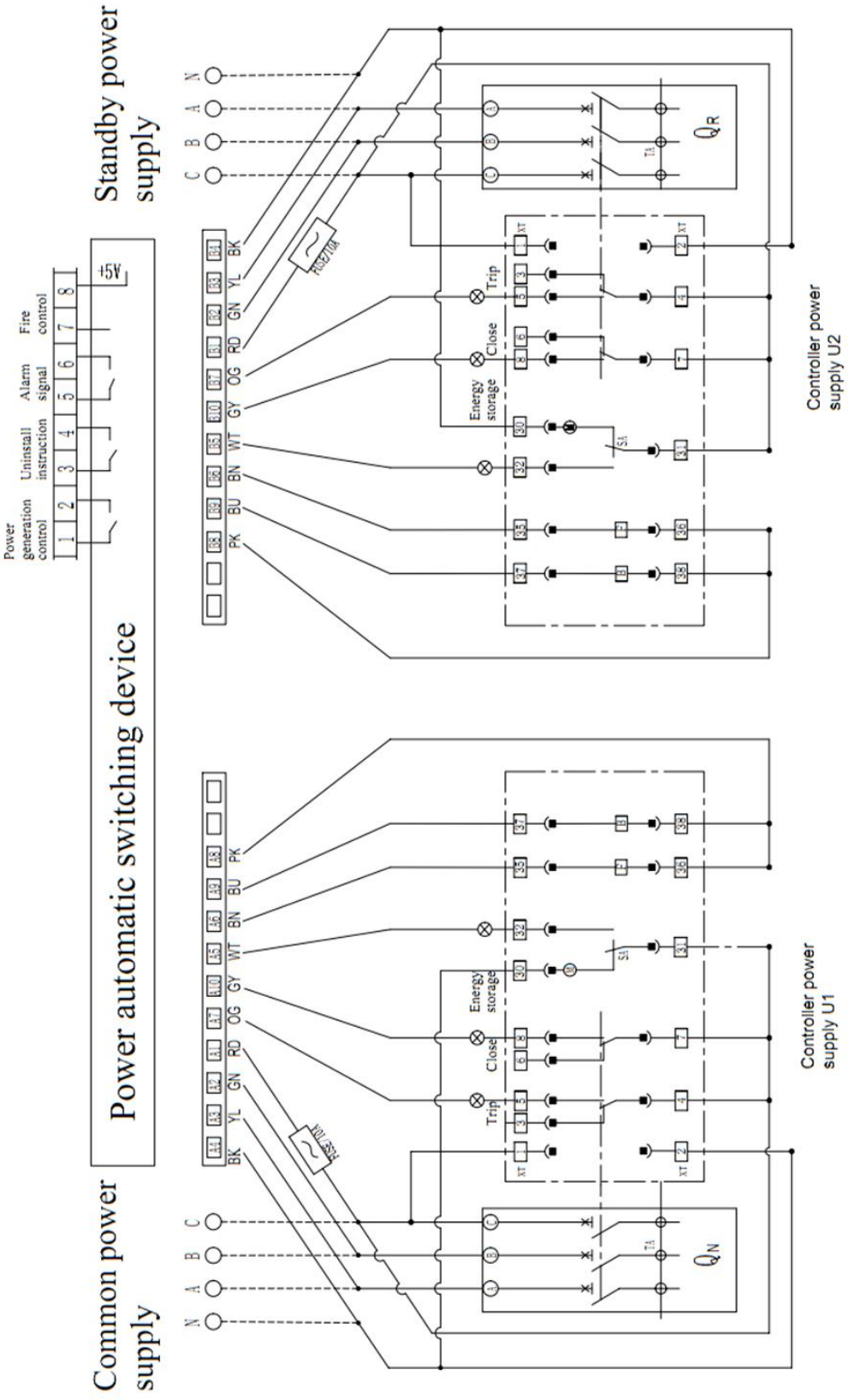
SA - Motor travel switch

F - Shunt tripper

B - Closed electromagnet

Q - Undervoltage tripper.

7.5 Wiring diagram of the NDW2-2000/3200/4000/6300 power Automatic Transfer Switches device (ATS)



Note:

1. The dotted line part represents the wire connected by the user, that is, in general, the user is required only to connect the N, A, B and C wires of common power supply and standby power supply to the switching device. The indicator lamps for fault, closing and energy storage in this wiring diagram are the indicator lamps on the Automatic Transfer Switches panel of power supply, and the fuse is inside the device.

2. For Controller, F, B, M rated voltage shall be AC230V.

3. Q cannot be chosen for electrical accessory (undervoltage release).

4. Contact capacity: power generation control-AC250V6A; unloading instruction, alarm signal-AC250V5A.

5. With the 5V power supply, the fire control port can be short-connected.

6. For other wiring modes, see the electrical wiring diagram example of the circuit breaker.

QN - Commonly used power supply universal type low-voltage circuit breaker

QR - Standby power supply universal type low-voltage circuit breaker

XT - Secondary terminal

M - Energy-storage motor

SA - Motor travel switch

F - Shunt tripper

B - Closed electromagnet

Q - Undervoltage tripper.

Chapter 8 Ordering Type Selection Specification

Ordering type selection specification 8

8.1 NDW2 Series of Circuit Breaker Model Explanation and Encoding Rules

ND W 2- □ □ □ □/□/□ □/□ □ □ □ □ □/□ □/□/□/□
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

SN	Name	Specification, type code		Description
1	Enterprise code	Nader 牌低压电器		
2	Product code	W: air circuit breaker		
3	Design code	2		
4	Frame size level current	16-1600, 20-2000, 32-3200, 40-4000, 63-6300		
5	Breaking type	HU: High-voltage class (1000V), not mark: not high-voltage class		
6	Installation mode	Non-marked - fixed type, C - drawout type		
7	Rated current	02-200A, 04-400A, 06-630A, 08-800A, 10-1000A, 12-1250A, 16-1600A, 20-2000A, 25-2500A, 29-2900A, 32-3200A, 40-4000A, 50-5000A, 63-6300A		
8	Number of poles	3-3 poles, 4-4 poles, 5-3P+N		3P+N: 3P products are added with N-phase external transformers
9	Controller	KM1-NWK31 (AC380V/AC400V), KM2-NWK31 (AC220V/AC230V), KM3-NWK31 (DC220V), KM4-NWK31 (DC110V), KM5-NWK31 (AC24V/DC24V)		Applicable to 1600 frame size
		KY1-NWK32 (AC380V/AC400V), KY2-NWK32 (AC220V/AC230V), KY3-NWK32 (DC220V), KY4-NWK32 (DC110V), KY5-NWK32 (AC24V/DC24V)		
		KM1-NWK21 (AC380V/AC400V), KM2-NWK21 (AC220V/AC230V), KM3-NWK21 (DC220V), KM4-NWK21 (DC110V), KM5-NWK21 (AC24V/DC24V)		Applicable to frame size 2000, 3200, 4000 and 6300
		KY1-NWK22 (AC380V/AC400V), KY2-NWK22 (AC220V/AC230V), KY3-NWK22 (DC220V), KY4-NWK22 (DC110V), KY5-NWK22 (AC24V/DC24V)		
10	Additional functions of the controller	Protection type: Not-standard - conventional type, V - voltage measurement and protection, P - harmonic measurement and protection		1. This shall be omitted if the controller has no optional function 2. V and P are only applicable to the main circuit with the rated voltage of 500V and below, and P has only NWK22 and 32 for choice 3. NWK21/31 only has S1- 4DO 4. The signal unit, voltage-check switch-in device and the photovoltaic under voltage release are not optional at the same time
		Communication function: H (communication protocol: Modbus), MP (Profibus-DP), MD (Devicenet)		
		Signal unit: S1- 4DO; S2- 3DO, 1DI; S3-2DO, 2DI		
		Remote reset function: Z1 (A380A/AC400V), Z2 (AC220V/AC230V), Z3 (DC220V), Z4(DC110V), Z5 (DC24V)		
		3P+N grounding mode (optional for the external N-pole transformer): T - Differential type (not to write in default) W - Ground current type		
		N1 - External N-phase transformer (62*21)	Applicable to 1600 frame size	
		N2 - External N-phase transformer (102*32.5)	Applicable to 1600, 2000 frame size	
		N3 - External N-phase transformer (122*52)	Applicable to 2000, 3200, 4000, 6300 frame size	
		N4 - External N-phase transformer (262*102)	Applicable to 3200, 4000, 6300 frame size	
		NR1 - External flexible transformer (280mm)	Applicable to 200A-800A	
		NR2 - External flexible transformer (370mm)	Applicable to 1000A-2000A	
		NR3 - External flexible transformer (450mm)	Applicable to 1000A-6300A	
		Protection form of current leakage: E-type (including the external current leakage transformer)		
		Contact wear equivalent, operation times query (NWK21/NWK31 optional): J		
11	Electric energy	D1-AC380V/AC400V, D2-AC220V/AC230V, D3-DC220V, D4-DC110VD5-DC24V		

	storage mechanism			
12	Shunt release	F1-AC380V/AC400V, F2-AC220V/AC230V, F3-DC220V, F4-DC110V, F5-DC24V		
13	Closed electromagnet	B1-AC380V/AC400V, B2-AC220V/AC230V, B3-DC220V, B4-DC110V, B5-DC24V		
14	Internal Accessories	Under-voltage release /no-voltage release/ voltage-check switch-in device	Q1-AC380V/AC400V, Q2-AC220V/AC230V, Q3-DC220V, Q4-DC110V, Q5-DC24V	1. Under-voltage release, no-voltage release or voltage-check switch device 2. This shall be omitted if without this accessory
			S1-AC380V/AC400V, S2-AC220V/AC230V	
			Y1-AC380V/AC400V, Y2-AC220V/AC230V	
15		Under-voltage/ no-voltage release delay/voltage-check wiring harness contained or not	Conventional undervoltage: 0-Instantaneous, 1-1s delay, 3-3s delay, 5-5s delay	
			Loss of voltage: 1-1s delay, 3-3s delay, 5-5s delay	Applicable to 2000, 3200, 4000 frame size
			Voltage loss: 1s-10s, step length 1s	Applicable to 1600, 6300 frame size
			0-There is no wiring harness, 1-There is wiring harness	
16		Auxiliary contact	Not-marked - four groups conversion, A6 - six groups conversion	Applicable to 1600 frame size
			Not-marked - four-group conversion, A6 - six-group conversion, A44 - four normally opened and four normally closed	Applicable to 4000 frame size
			Not marked: four normally on and four normally off, A55- five normally on and five normally off A66-Six normally opened and six normally closed	Applicable to 2000, 3200, 6300 frame size
17		BX - Closing ready signal output unit		This shall be omitted if without the accessory
		JS- counter function unit (without this function in shell 1600)		
		CM1 - Drawout type (with the right side of the door interlock), CM2 - Drawout type (with the left side of the door interlock)		
		CX - Drawer seat three-position signal output		
18	External accessories	M - Doorframe		ST-IV power supply module and ST201 relay module should be used with the controller
		G - Phase partition (standard configuration for 4000 frame size)		
		F - Dustproof cover		
		ST201 - relay module		
		P-NWDF1(ST-IV) power supply module		
		S - Button lock		
		P2- Power transfer module		
19	Wiring mode	Not-marked-horizontal wiring, J1-horizontal extended wiring、J2-L wiring, J3-vertical wiring, J4-vertical extended wiring, J5-mixed wiring (upper horizontal and lower vertical), J6-mixed wiring (upper vertical and lower horizontal), J7-mixed extended wiring (upper horizontal and lower vertical), J8-mixed extended wiring (upper vertical and lower horizontal)		NDW2-6300 with the rated current of 6300A only has two wiring modes: Vertical wiring and vertical extended wiring.
20	Product usage type	Not marked- Conventional; TH- Wet heat; GD- Plateau, low temperature		
21	Special notes	Customer's special requirements		

Interlocking Piece Model Explanation and Encoding Rules

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 3. 1600 frame size does not support the interlocking mode with two for

SR11 - Mechanical interlocking device (two sets of steel cables, one for close and one for open) SR12 - Mechanical interlocking device (three sets of steel cables, one for close and two for open) SR21 - Mechanical interlocking device (three sets of steel cables, two for close and one for open) SY11 - Mechanical interlocking device (two sets of hard rods, one for close and one for open) SY12 - Mechanical interlocking device (three sets of hard rods, one for close and two for open)	closing and one for opening 4. 1600 frame size cannot be interlocked with other frame sizes 5. This accessory is not available in the shell 1600 fixed type product
ATS-R/S/F automatic power switch device (R: Auto switch and auto recover; S: Auto switch and non-auto recover; F: Mains - Generator)	It is standard with a mechanical interlock with the type selected by customers, This accessory is not available in the shell 1600 fixed type product

8.2 Ordering Specifications

(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	□ NDW2-1600 □ NDW2-2000 □ NDW2-3200 □ NDW2-4000 □ NDW2-6300			
	Installation mode	□ Fixed type	□ C Drawout type		
	Rated current (A)	□ 200 □ 400 □ 630 □ 800 □ 1000 □ 1250 □ 1600 □ 2000 □ 2500 □ 2900 □ 3200 □ 4000 □ 5000 □ 6300			
	Number of poles	□ 3 (3 poles)	□ 4 (4 poles)	□ 5 (3P+N)	
	Wiring mode	1600 frame size	□ Horizontal wiring (standard configuration) □ J1 Horizontal extended wiring □ J3 Vertical wiring □ J5 - Mixed wiring (upper horizontal, lower vertical), □ J6 - Mixed wiring (upper vertical, lower horizontal)		
		2000 frame size	□ Horizontal wiring (standard) □ J1 Horizontal extended wiring □ J2 L-type wiring □ J3 vertical wiring		
		3200 frame size	□ Horizontal wiring (standard configuration) □ J1 Horizontal extended wiring □ J3 vertical wiring		
		4000 frame size	□ Horizontal wiring □ J1 Horizontal extended wiring □ J3 vertical wiring □ J4 Vertical extended wiring		
		6300 frame size	□ Horizontal wiring (In≤5000A standard) □ J1-Horizontal extended wiring □ J3- Vertical wiring (In=6300A standard) □ J4-Vertical extended wiring J5 - Mixed wiring (upper horizontal, lower vertical), J6 - Mixed wiring (upper vertical, lower horizontal) □ J7-mixed extended wiring (upper horizontal, lower vertical) □ J8-Mixed extended wiring (upper vertical, lower horizontal) Note: In=6300A Horizontal wiring, horizontal extended wiring.		
	Product type	□ Not marked - Conventional (standard)	□ TH- Wet heat	□ GD- Plateau, low temperature	
Controller parameters	Controller model	1600 frame size	□ KM-NWK31 (LCD)	□ KY-NWK32 (LCD)	
		2000/3200/4000/ 6300 frame size	□ KM-NWK21 (digital screen)	□ KY-NWK22 (LCD)	
	Controller voltage	□ 1(AC380V/400V)	□ 2(AC220V/AC230V)	□ 3(DC220V)	
		□ 4(DC110V)	□ 5(DC24V)		
	Protection type	□ Conventional type (standard configuration) □ V-voltage measuring and protection type (NWK21/NWK31 only have the measuring function) □ P-harmonic measuring and protection type (NWK22/NWK32 are only optional)			
	Communication function	□ Modbus	□ Profibus	□ DeviceNet	
	Signal unit	□ S1-4DO	□ S2-3DO, 1DI	□ S3-2DO, 2DI	

	Remote reset	□ Z1 (AC380V/AC400V0 □ Z2 (AC220V/AC230V) □ Z3 (DC220V) □ Z4 (DC110V) □ Z5 (DC24V)	
	External transformer	3P+N required: □ N1 □ N2 □ N3 □ N4 □ NR1 □ NR2 □ NR3	□ E type (Standard configuration with electric leakage transformer)
	Grounding mode	□ T type (default) □ W type (3P+N needs to be added with an external transformer)	
	Contact wear equivalent	□ J-Contact wear equivalent (NWK21/NWK31 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	□ Q1（AC380V/AC400V） □ Q2（AC220V/AC230V） □ Q3（DC220V） □ Q4（DC110V） □ Q5（DC24V）	
		□ 0-Instantaneous (0s) Delay: □ 1 (1s delay) □ 3 (3s delay) □ 5 (5s delay)	
	Loss of voltage release	□ S1（AC380V/AC400V） □ S2（AC220V/AC230V）	
		2000/3200/4000 frame size: □ 1 (1s delay) □ 3 (3s delay) □ 5 (5s delay)	
		1600/6300 frame size: Delay: □ 1 (1s delay) □ 2 (2s delay) □ 3 (3s delay) □ 4 (4s delay) □ 5 (5s delay) □ 6 (6s delay) □ 7 (7s delay) □ 8 (8s delay) □ 9 (9s delay) □ 10 (10s delay)	
	Voltage-check closing device	□ J1 (AC380V/AC400V) □ J2 (AC220V/AC230V)	
		Is there any wiring harness: □ 0 (no) □ 1 (yes)	
	Auxiliary contact	1600 frame size: □ Four-group switching (standard configuration) □ A6- Six-group switching	
		4000 frame size: □ Four-group switching (standard configuration) □ A6-six-group switching □ A44-four normally opened and four normally closed	
		Above 2000: □ 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	
Optional accessories	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 Doorframe	
	Phase partition	□ G Phase partition (4000 standard configuration)	
	Dustproof cover	□ F Dustproof cover	
	Relay module	□ R-ST201 relay module	
	Power module	□ P1-DC24V □ P3-AC380V/AC400V、AC220V/230V □ P5-DC220V、DC110V	
	Button lock	□ S Button lock	
	Power Transfer Module	□ P2- Power Transfer Module	
Interlocking accessories	Off-position lock	□ 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	
	Mechanical interlocking	Cable type: □ 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 (SR21 is not available for 1600 frame size)	
		Cable rope length □ 2m (standard configuration) □ 3m	
		Hard rod type: □ SY11- Two groups, one for closing and one for opening □ SY12-Three groups, one for closing and two for opening	
		Remarks: This accessory is not available in the fixed type 1600	
	Power supply automatic	□ ATS-R type □ ATS-S type □ ATS-F type	
		Controller conductor length □ 2m (standard configuration) □ 3m □ 2m in	

<table>
<tr><td rowspan="2"></td><td rowspan="2">switching device</td><td colspan="2">normal use, 5m for standby</td></tr>
<tr><td colspan="2">Note: 1. Please select a type if mechanical interlocking is standard, 2. There's no need to select undervoltage release if undervoltage protection is included; 3. The electrical accessories must select the working voltage of AC220V; 4. 1600 fixed type is not provided with this accessory.</td></tr>
<tr><td colspan="2" rowspan="2">Special requirements</td><td>As special requirements, NWK21/NWK31 must be set before the factory delivery:
Overload and long-time delay current____A time____s
Short-circuit short-time delay current____A time____s
Short circuit instantaneous current____A
Grounding fault current____A time____s</td><td>As special requirements, NWK22/NWK32 must be set before the factory delivery:
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
Grounding fault current____A time____s</td></tr>
<tr><td colspan="2">Other requirements:</td></tr>
<tr><td colspan="4">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>