Shanghai Liangxin Electrical Co., Ltd.

NDW3 Series of Air Circuit Breaker Manual

Project Name: NDW3 Series of Air Circuit Breaker

Project No.: P15041

Prepared by: Jia Jia

Date: 2021/05/20

Date: 2021/05/20 Revision History					
Version	Revision Reason/Content	Implementation Date	Prepared by	Reviewed by	Approved by
0	Newly increased document	20180401	Zhang Pengyu	He Chun	Zhang Xiangang Li Huimin
1	Modify the NDW3-6300 derating table Modify the NDW3-2500 derating table Modify the NDW3-1600, NDW3-2500, NDW3-4000 derating tables	20180509	Zhang Pengyu	He Chun	Zhang Xiangang Li Huimin
2	Modify the NDW3-1600 derating table Add installation direction for the external N-pole transformer Button lock is added to the order form Add two models of mechanical interlock All wiring diagram updated All terminal number definition table updated	20180810	Zhang Pengyu	He Chun	Zhang Xiangang Li Huimin
3	Correct error of the installation dimension figure of 3-2500	20190611	He Guibo	Zhang Ying	Yang Yuyong
4	Modify technical parameters of NDW3-2500HU and NDW3-4000HU	20190828	Xia Bijian	Wang Cheng, Zhang Hailing	Tang Rui
5	Modify technical parameters of NDW3-6300HU	20190919	Xia Bijian	Wang Cheng, Yin Jiacan	Tang Rui
6	(1) The technical parameters of NDW3-1600 products are improved; (2) Modification of derating coefficient and optimization of other content;	20200317	Jia Jia	Zuo Yaoguo	Yang Yuyong
7	Modify the rated insulation voltage of NDW3-2500/4000/6300HU (it has been changed to 1250V in the certificate)	20200516	Zhuang Yangyang	Zuo Yaoguo	Yang Yuyong
8	Add high altitude breaking capacity derating coefficient of P62	20200521	Zhuang Yangyang	Zuo Yaoguo	Yang Yuyong
9	Correct relevant dimensions and relevant terms Correct short time-delay characteristics and other relevant description of the controller Correct relevant description of no-voltage release Provide more information about relevant default setting and relevant description of customer wiring	20200730	Zhou Yongqian	Zhang Ying	Yang Yuyong
10	Correct mistakes	20200828	Zhuang Yangyang	Zhou Yongqian	Wang Qinshan
11	1.Add NDW3-1600 frame auxiliary contact（four normally open and four normally closed） relative contents； 2. Add NDW3-4000 frame auxiliary contact（six normally open and six normally closed） relative contents, NDW3-4000 four normally open and four	20210225	Zhang Fei, Jia Jia	Zhou Yongqian, Yang Xiuwen	Luo Guorui, Zhang Xiangang

	normally closed auxiliary contact remains the original terminal definition; 3. Add NDW2-2500/6300 frame auxiliary contact（four-group conversion and six-group conversion） relative contents; 4. Order specification add language type option.				
12	1. Correct NDW3-1600 product four-open and four-closed auxiliarycontact wiring number, changed to 47-62; 2. Correct temperature derating coefficient table NDW3-4000 frame 3200A and 4000A at +60℃, both changed to 3120A.	20210520	Jia Jia	Zhou Yongqian, Yang Xiuwen	Zhang Xiangang
13	1.Add NDW3-7500 frame; 2.Update photos of ACB and ETU 3. Correct mistakes	20210618	Wang Cheng	Huang Jianjun, Zhou Yongqian	Zhang Xiangang
14	1. Added 2500/6300XU series parameters; 2.1600 increase S-type breaking; 3. Delete the statement that the arc extinguishing chamber and the contact system have multiple patents; 4. The 1600 controller power module is built-in, and the installation size and secondary wiring diagram are changed; 5. The wiring bolts and the instruction manual are changed to optional accessories; 6. All frames cancel the 20# ground wire of the secondary circuit; 7. The power of the electric operating mechanism is changed from output power to input power;	20211018	Zhang wenlong Xu Youzhi	Zhu shengfeng Yin jiacan	Wang qinshan
15	1. Update the voltage and breaking capacity high altitude derating table 2; 2. Added 4000 frame 3600A rated current related parameters; 3. Added 4000XU parameters 4. Update the minimum electrical clearance distance of copper bars; 5. Update the safety distance between the circuit breaker and the cabinet Remove 2000/3200 frame electric power	20211112	Zhang wenlong Wang conghui Zhuang yangyang	Zhao peng	Yin jiacan
16	1. Update the relevant content of disconnected location lock 2. Increase the content of IP54 transparent cover	20220124	Niu li Xu youzhi Chen kai	Wang Cheng	Luo guorui

	3. Update the NDW3-1600 electrical wiring diagram and controller wiring diagram 4. Increase the content related to maintenance-type incentives Updated 2500 and above frame ATS wiring diagrams				
17	1.Update the bar chart 1.3 and add the breaking parameters of 4000XU 2.Modify 2500XU to have maintenance machinery life times of 15000 times	20220725	Wang conghui Zhu shengfeng	Zhao peng	Zhang ying

Contents

Chapter 1 Product Overview

Product overview 1

1.1 NDW3 product series


NDW3-1600


NDW3-2500


NDW3-4000

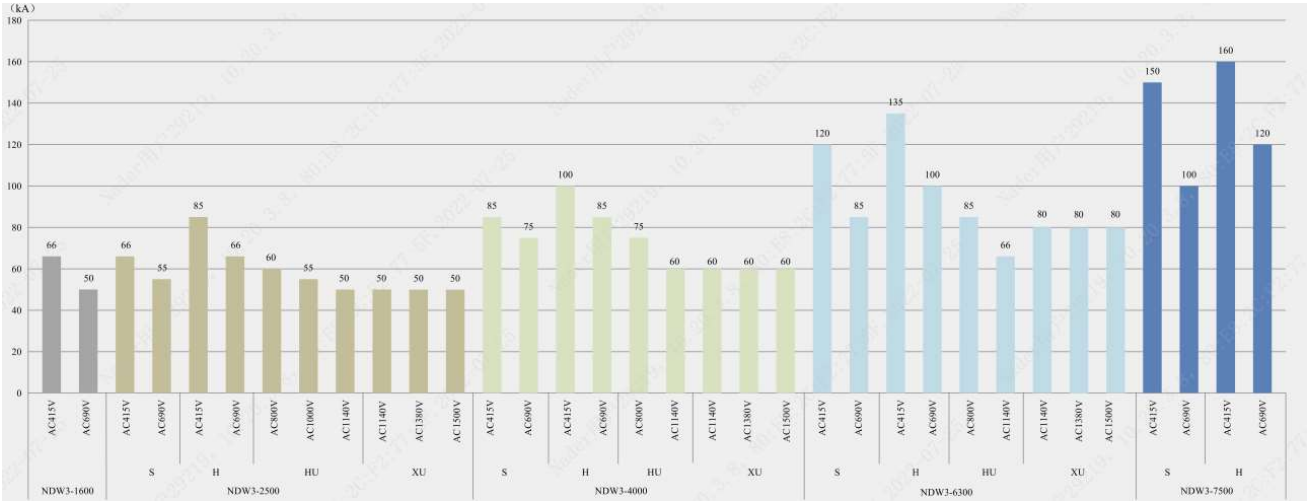

NDW3-6300


NDW3-7500

1.2 Rated current of NDW3 series of circuit breaker

额定电流(A) / 壳架等级	200	400	630	800	1000	1250	1600	2000	2500	3200	3600	4000	5000	6300	7500
NDW3-1600															
NDW3-2500															
NDW3-4000															
NDW3-6300															
NDW3-7500															

1.3 Breaking capacity and short-time withstand current of NDW3 circuit breaker



Note: 1) S means normal breaking, H high breaking, and HU high-voltage breaking. XU means extra high voltage breaking. NDW3-1600 only has one breaking capacity, which is not distinguished;

2) Icu＝Ics＝Icw for NDW3-2500, 4000, 6300. For details of NDW3-1600 breaking indicators, see NDW3-1600,NDW3-7500 technical parameter list.

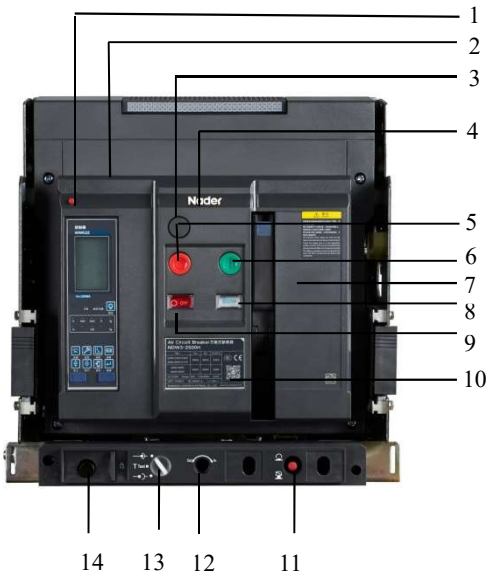
1.4 Structure Design

■ Installation Mode

Fixed type

Drawout type

■ Brief Description of Structure and Indications

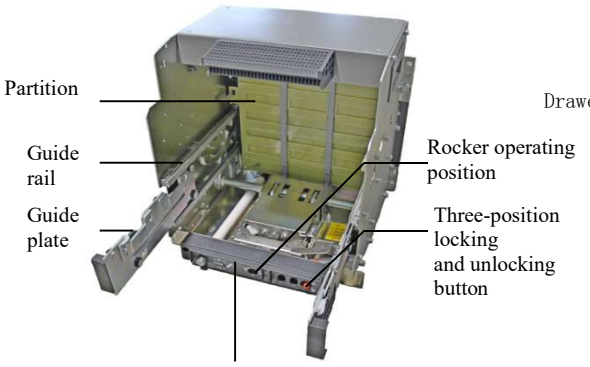


1. Reset button
2. Specification sign
3. Disconnected position key lock (Optional function)
4. Nader sign
5. Disconnection button
6. Closing button
7. Counter (optional function)
8. Energy releasing and storing indicator
9. Opening and closing indication
10. Nameplate
11. “Connection”, “Test”, “Separation”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

Note: 1 ~ 10 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.



◆ Drawout type circuit breaker "separation" position lock

When the drawout type circuit breaker is in the separation position, pull out the black lever below the drawer to lock. Then the circuit breaker body can only pull out the drawer seat, and cannot be shaken to the "test" or "connection" position. Padlock should be prepared by users, with the specification of 3mm~5mm(NDW3-1600) or 4mm~8mm(NDW3-2500/4000/6300/7500).

◆ Drawout type circuit breaker three-position lock

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

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

1.5 Product Features

1.5.1 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.
- Zero flashover

1.5.2 High electrical life and short time tolerance ability

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

1.5.3 The controllers are of full range and versatile

- ■ NWK21/NWK31 type controller - Digital tube display, practical function and simplicity, which can adapt to the low-temperature places with the optional voltage measurement function;
- NWK22/NWK32 type controller - LCD display, multiple and diversified functions, with optional voltage and harmonics measurement and protection functions. Applicable to high-end application places, and more powerful if applied to intelligent system;
- 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 line

N-pole protection, current unbalance protection, MCR making capacity 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, realize remote recovery (optional accessories) after fault tripping of the controller

1.5.4 Integrated communication network

The NWK22/NWK32 type controller can realize remote sensing, remote control, remote regulating and remote communication - "four remotes" data transmission function through the communication interface (to be used with the communication adapter and signal unit).

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

1.5.5 AC 1140V circuit breaker

The HU (AC1140V) type circuit breaker and XU (AC1140/1380/1500V) type circuit breaker are selected, which can be used in the power distribution system in special fields such as metallurgy, rail transportation, pipe gallery, energy saving and environmental protection.

1.5.6 Three-proofing 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: GB/T 2423.16-2008 Environmental Testing for Electric and Electronic Products. Part 2: Test Method Test J and Guidelines: Mould
- Salt spray test: GB/T 2423.18-2012 Environmental Testing Part 2: Test Method Test Kb: Salt spray, Alternating salt spray (Sodium chloride solution)
- Enclosure protection grade: GB/T 4208-2008 Enclosure Protection Grade (IP code)

1.5.7 Convenient wiring mode

- Upper and lower wiring of the main circuit is available;
- Connection mode.

Wiring mode		NDW3-1600	NDW3-2500	NDW3-4000	NDW3-6300		NDW3-7500		
					4000A 5000A	6300A	4000A 5000A	6300A	7500A
Conventional	■ Horizontal wiring	√	√	√	√	—	√	—	—
	■ Vertical wiring	√	√	√	√	√	√	√	—
Special	■ Horizontal extended wiring	—	√	√	√	—	√	—	—
	■ Vertical extended wiring	—	√	√	√	√	√	√	√

	■ Mixed wiring (upper horizontal, lower vertical) ■ Mixed wiring (upper vertical, lower horizontal)	√	√	—	√	—	√	—	—
	■ Mixed extended wiring (upper horizontal, lower vertical) ■ Mixed extended wiring (upper vertical, lower horizontal)	—	√	—	√	—	√	—	—

Note: Wiring method of NDW3-6300 with the rated current of 6300A only has two wiring modes: vertical wiring and vertical extended wiring. Wiring method of NDW3-7500 with the rated current of 7500A only has vertical extended wiring,, with the rated current of 6300A only has two wiring modes: vertical wiring and vertical extended wiring.

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 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 4207-2012 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 60947-1:2011, MOD)

GB/T 14048.2-2020 Low-voltage Switchgear and Control Equipment - Part 2: Low-voltage Circuit Breaker (IEC 60947-2:2019, IDT)

GB 14048.5-2017 Low-voltage Switchgear and Control Equipment - Part 5-1: Control Circuit Electrical Appliances and Switch Elements - Electromechanical Control Circuit Electrical Appliances (IEC 60947-5-1:2016, 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

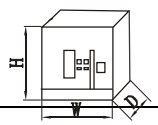
GB/T 20626.3-2006 Specific Environmental Condition – Electric and Electronic Products for Plateau - Part 3: Protection of Thunder and Lightning, Pollution, Condensation

NDW3 series of air circuit breaker has obtained China Compulsory Certification (CCC) for products.

Chapter 2 Technical Characteristics

Technical Characteristics 2

2.1 NDW3-1600 Technical Parameter List

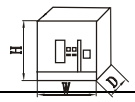
Circuit breaker model			NDW3-1600	
Rated current In (+40℃) (A)			200, 400, 630, 800, 1000, 1250, 1600	
N-pole rated current			100%In	
Rated working voltage Ue （V）			AC220/230/240, AC380/400/415, AC440/480, AC660/690	
Rated frequency f (Hz)			50/60	
Rated insulation voltage Ui (V)			1000	
Rated impulse withstand voltage Uimp (kV)			12	
Number of poles			3、4	
Full break time[Note 1] （ms）			＜25	
Closing time[Note 2] （ms）			＜60	
Rated limit short-circuit breaking capacity Icu (kA) Icu (effective value) (kA)		AC220V/230V/240V AC380V/400V/415V	66	
		AC440V/480V AC660V/690V	50	
Rated operating short-circuit breaking capacity Ics (effective value) (kA)		AC220V/230V/240V AC380V/400V/415V	66	
		AC440V/480V AC660V/690V	50	
Rated short circuit making capacity Icm (peak value) (kA)		AC220V/230V/240V AC380V/400V/415V	145	
		AC440V/480V AC660V/690V	105	
Rated short-time withstand current Icw (effective value) 1s (kA)		AC220V/230V/240V AC380V/400V/415V	55	
		AC440V/480V AC660V/690V	42	
Operating performance	Electrical life (times) Operation frequency (20 times/h)	AC220V/230V/240V AC380V/400V/415V	1000 (200A～630A), 8000 (800A～1250A), 6500 (1600A)	
		AC440V/480V AC660V/690V	8000 (200A～630A), 5000 (800A～1250A), 3000 (1600A)	
	Mechanical life (times) Operation frequency (60 times/h)	Maintenance-free	10000	
		With maintenance	30000	
Installation mode		Fixed type, drawout type		
Wiring method of the main circuit		Horizontal wiring, vertical wiring, mixed wiring (upper horizontal and lower vertical), mixed wiring (upper vertical and lower horizontal)		
Outline dimension: W×D×H mm 		Fixed type 3P	259×200.5×318	
		Fixed type 4P	329×200.5×318	
		Drawout type 3P	282×305×351.5	
		Drawout type 4P	352×305×351.5	
Weight (kg)		Fixed type 3P	22 (200A～630A)	23 (800A～1600A)
		Fixed type 4P	34 (200A～630A)	35 (800A～1600A)
		Drawout type 3P	43 (200A～630A)	44 (800A～1600A)
		Drawout type 4P	56 (200A～630A)	57 (800A～1600A)

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

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

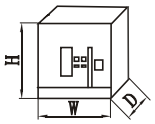
2.2 NDW3-2500 Technical Parameter List

Circuit breaker model			NDW3-2500			
Rated current In (+40℃)	(A)		630, 800, 1000, 1250, 1600, 2000, 2500			
North pole rated current			100%In			
Rated working voltage Ue	（V）		AC220/230/240, AC380/400/415, AC440/480, AC660/690, AC800, AC1000, AC1140,AC1380, AC1500			
Rated frequency f	(Hz)		50/60			
Rated insulation voltage Ui	(V)		1250,1800(XU Series)			
Rated impulse withstand voltage Uimp	(kV)		12, 18(XU Series)			
Number of poles			3,4			
Full break time	(ms)		≤30			
Closing time	(ms)		≤70			
Breaking type			S	H	HU	XU
Rated limit short-circuit breaking capacity Icu (kA) Icu (effective value) (kA)		AC220V/230V/240V AC380V/400V/415V	66	85	-	-
		AC440V/480V AC660V/690V	55	66	-	-
		AC800V	-	-	60	-
		AC1000V	-	-	55	-
		AC1140V	-	-	50	-
		AC1140V/1380V/1500V	-	-	-	50
Rated operating short-circuit breaking capacity Ics (effective value) (kA)		AC220V/230V/240V AC380V/400V/415V	66	85	-	-
		AC440V/480V AC660V/690V	55	66	-	-
		AC800V	-	-	60	-
		AC1000V	-	-	55	-
		AC1140V	-	-	50	-
		AC1140V/1380V/1500V	-	-	-	50
Rated short circuit making capacity Icm（peak value） （kA）		AC220V/230V/240V AC380V/400V/415V	145.2	187	-	
		AC440V/480V AC660V/690V	121	145.2	-	
		AC800V	-	-	132	
		AC1000V	-	-	121	
		AC1140V	-	-	110	
		AC1140V/1380V/1500V	-	-	-	110
Rated short-time withstand current Icw (effective value) 1s (kA)		AC220V/230V/240V AC380V/400V/415V	66	85	-	
		AC440V/480V AC660V/690V	55	66	-	
		AC800V	-	-	60	
		AC1000V	-	-	55	
		AC1140V	-	-	50	
		AC1140V/1380V/1500V	-	-	-	50
Operating performance	Electrical life (times) Operation frequency (20 times/hour)	AC220V/230V/240V AC380V/400V/415V	15000(630A~1250A), 11500(1600A~2000A), 11000(2500A)			
		AC440V/480V AC660V/690V	12500(630A~1250A), 10000(1600A~2000A), 8000(2500A)			
		AC800V	5000(630A~2000A), 4500(2500A)			
		AC1000V/1140V	3000(630A~2000A), 2000(2500A)			
		AC1380V/1500V	500(2500A)			
	Mechanical life (times) Operation frequency (60 times/h)	Maintenance-free	15000,10000(XU Series)			
		With maintenance	30000、15000（XU）			

Installation mode		Fixed type, drawout type	
Wiring method of the main circuit		Horizontal wiring, vertical wiring, horizontal extended wiring, vertical extended wiring, Mixed wiring (upper horizontal and lower vertical), mixed wiring (upper vertical and lower horizontal)	
Boundary dimension: W×D×H mm 	Fixed type 3P	368×309.5×394	
	Fixed type 4P	463×309.5×394	
	Drawout type 3P	375×400×432	
	Drawout type 4P	470×400×432	
Weight (kg)	Fixed type 3P	49.4 (630A～1250A)	50 (1600A～2500A)
	Fixed type 4P	61.5 (630A～1250A)	62.3 (1600A～2500A)
	Drawout type 3P	87.1 (630A～1250A)	87.4 (1600A～2500A)
	Drawout type 4P	106.2 (630A～1250A)	106.7 (1600A～2500A)

2.3 NDW3-4000 Technical Parameter List

Circuit breaker model		NDW3-4000			
Rated current In (+40℃) (A)		800, 1000, 1250, 1600, 2000, 2500, 3200, 3600, 4000			
North pole rated current		100%In			
Rated working voltage Ue (V)		AC220/230/240, AC380/400, AC415, AC440/480, AC660/690, AC800, AC1000/1140,AC1140, AC1380, AC1500			
Rated frequency f (Hz)		50/60			
Rated insulation voltage Ui (V)		1250,1800(XU Series)			
Rated impulse withstand voltage Uimp (kV)		12, 18(XU Series)			
Number of poles		3,4			
Full break time (ms)		≤30			
Closing time (ms)		≤70			
Breaking type		S	H	HU	XU
Rated limit short-circuit breaking capacity Icu (kA) Icu (effective value) (kA)	AC220V/230V/240V AC380V/400V	85	100	-	-
	AC415V、AC440V/480V AC660V/690V	75	85	-	-
	AC800V	-	-	75	-
	AC1000V/1140V	-	-	60	-
	AC1140V/1380V/1500V	-	-	-	60
Rated operating short-circuit breaking capacity Ics (effective value) (kA)	AC220V/230V/240V AC380V/400V	85	100	-	-
	AC415V、AC440V/480V AC660V/690V	75	85	-	-
	AC800V	-	-	75	-
	AC1000V/1140V	-	-	60	-
	AC1140V/1380V/1500V	-	-	-	60
Rated short circuit making capacity Icm (peak value) (kA)	AC220V/230V/240V AC380V/400V	187	220	-	-
	AC415V、AC440V/480V AC660V/690V	165	187	-	-
	AC800V	-	-	165	-
	AC1000V/1140V	-	-	132	-
	AC1140V/1380V/1500V	-	-	-	132
Rated short-time withstand current Icw (effective value) 1s (kA)	AC220V/230V/240V AC380V/400V	85	100	-	-
	AC415V、AC440V/480V AC660V/690V	75	85	-	-
	AC800V	-	-	75	-
	AC1000V/1140V	-	-	60	-
	AC1140V/1380V/1500V	-	-	-	60
Rated limited short-circuit curren Icc (RMS) 1s (kA) 1	AC220V/230V/240V AC380V/400V	85	100	-	-
	AC415V、AC440V/480V AC660V/690V	75	85	-	-
	AC800V	-	-	75	-

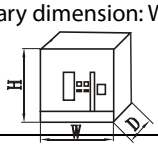
		AC1000V/1140V	-	-	60	-
		AC1140V/1380V/1500V	-	-	-	60
Operation performance	Electrical life (times) Operation frequency (20 times/hour)	AC220V/230V/240V AC380V/400V	10000(800A~1600A), 8000(2000A, 2500A),6000(3200A, 4000A))			
		AC415V, AC440V/480V AC660V/690V	10000(800A~1600A), 6000(2000A, 2500A), 3000(3200A, 4000A))			
		AC800V	2000(800A~1600A), 1000(2000A~4000A)			
		AC1000V/1140V	2000(800A~1600A), 1000(2000A, 2500A), 600(3200A, 4000A)			
	Electrical life (times) Operation frequency (20 times/hour)	AC1140V/AC/1380V/1500V(XU)	2000(800A~4000A)			
	Mechanicallife (times) Operation frequency (60 times/h)	Maintenance-free	10000,12000（XU）			
		With maintenance	15000			
Installation mode		Fixed type, drawout type				
Wiring method of the main circuit		Horizontal wiring, vertical wiring, extended horizontal wiring, extended vertical wiring				
Boundary dimension: W×D×H (mm) 		Fixed type 3P	428×300×393.5			
		Fixed type 4P	543×300×393.5			
		Drawout type 3P	435×403×432 (800A~2500A)	435×397.5×432（3200A~4000A）		
		Drawout type 4P	550×403×432 (800A~2500A)	550×397.5×432 （3200A~4000A）		
Weight (kg)		Fixed type 3P	59 (800A~2500A)	60 (3200A, 4000A)		
		Fixed type 4P	70 (800A~2500A)	71.5 (3200A, 4000A)		
		Drawout type 3P	97 (800A~2500A)	103 (3200A, 4000A)		
		Drawout type 4P	114 (800A~2500A)	120 (3200A, 4000A)		

1) The preset short-circuit current value that can be well tolerated during the operating time of the short-circuit protection appliance

2.4 NDW3-6300 Technical Parameter List

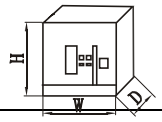
Circuit breaker model		NDW3-6300			
Rated current In (+40℃) (A)		4000, 5000, 6300			
N-pole rated current		100%In			
Rated working voltage Ue (V)		AC220/230/240, AC380/400/415, AC440/480, AC660/690, AC800, AC1000/1140, AC1380、AC1500			
Rated frequency f (Hz)		50/60			
Rated insulation voltage Ui (V)		1250,1800(XU Series)			
Rated impulse withstand voltage Uimp (kV)		12, 18(XU Series)			
Number of poles		3,4			
Full break time (ms)		≤30			
Closing time (ms)		≤70			
Breaking type		S	H	HU	XU
Rated limit short-circuit breaking capacity Icu (kA) Icu (effective value) (kA)	AC220V~415V	120	135	–	–
	AC440V/480V/660V/690V	85	100	–	–
	AC800V	–	–	85	–
	AC1000V/1140V	–	–	66	–
	AC1140V/1380V/1500V	–	–	–	80
Rated operating short-circuit breaking capacity Ics (effective value) (kA)	AC220V~415V	120	135	–	–
	AC440V/480V/660V/690V	85	100	–	–
	AC800V	–	–	85	–
	AC1000V/1140V	–	–	66	

	AC1140V/1380V/1500V	–	–	–	80
Rated short circuit making capacity Icm (peak value) (kA)	AC220V~415V	264	297	–	–
	AC440V/480V/660V/690V	187	220	–	–
	AC800V	–	–	187	–
	AC1000V/1140V	–	–	145. 2	
	AC1140V/1380V/1500V	–	–		176
Rated short-time withstand current Icw (effective value) 1s (kA)	AC220V~415V	120	135	–	–
	AC440V/480V/660V/690V	85	100	–	–
	AC800V	–	–	85	–
	AC1000V/1140V	–	–	66	–
	AC1140V/1380V/1500V	–	–	–	80

Operation performance	Electrical life (times) Operation frequency (20 times/h)	AC220V~415V	6000(4000A), 4000 (5000A), 2000 (6300A)	
		AC440V/480V/660V/690V	3500(4000A), 2500 (5000A), 1500 (6300A)	
		AC800V	3000(In=4000A), 1500 (In=5000A), 1000 (In=6300A)	
		AC1000V/1140V/1380V/1500V	2000(In=4000A), 1000 (In=5000A), 500 (In=6300A)	
	Mechanical life (times) Operation frequency (60 times/h)	Maintenance-free	7000(3P)	6500(4P)
		With maintenance	13000	
Installation mode			Fixed type, drawout type	
Wiring method of the main circuit			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 extended wiring (upper horizontal and lower vertical), Mixed extended wiring (upper vertical and lower horizontal)	
Boundary dimension: W×D×H mm 		Fixed type 3P	803×302.5×392	
		Fixed type 4P	1033×302.5×392	
		Drawout type 3P	809×401.5×475	
		Drawout type 4P	1039×401.5×475	
Weight (kg)		Fixed type 3P	125 (4000A, 5000A)	127 (6300A)
		Fixed type 4P	167 (4000A, 5000A)	170 (6300A)
		Drawout type 3P	193 (4000A, 5000A)	195 (6300A)
		Drawout type 4P	257 (4000A, 5000A)	260 (6300A)

2.5 NDW3-7500 Technical Parameter List

Circuit breaker model		NDW3-7500	
Rated current In (+40℃) (A)		4000、5000、6300、7500	
N-pole rated current		100%In	
Rated working voltage Ue （V）		AC220/230/240、AC380/400/415、AC440/480、AC660/690	
Rated frequency f (Hz)		50/60	
Rated insulation voltage Ui (V)		1000	
Rated impulse withstand voltage Uimp (kV)		12	
Number of poles		3、4	
Full break time（ms）		≤30	
Closing time (ms)		≤70	
Breaking type		S	H
Rated limit short-circuit breaking capacity Icu (kA) Icu (effective value) (kA)	AC220V~415V	150	160
	AC440V/480V/660V/690V	100	120

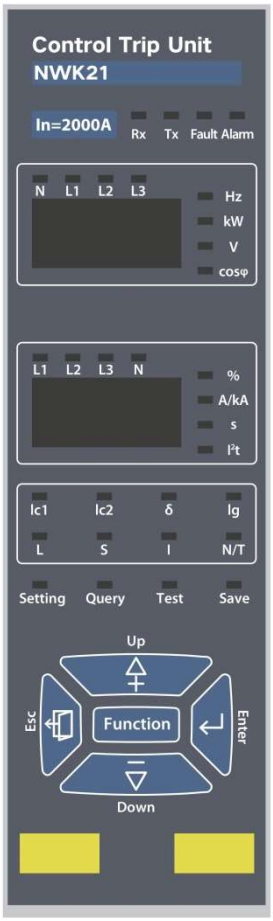
Rated operating short-circuit breaking capacity Ics (effective value) (kA)		AC220V~415V	150	160
		AC440V/480V/660V/690V	100	120
Rated short circuit making capacity Icm (peak value) (kA)		AC220V~415V	330	352
		AC440V/480V/660V/690V	220	264
Rated short-time withstand current Icw (effective value) 1s (kA)		AC220V~415V	150	150
		AC440V/480V/660V/690V	100	120
Operating performance	Electrical life (times) Operation frequency (10 times/h)	AC220V~415V	5000(4000A、5000A)、3000 (6300A)、2000（7500A）	
		AC440V/480V/660V/690V	3000(4000A、5000A)、2000 (6300A)、1500（7500A）	
	Mechanical life (times) Operation frequency (10 times/h)	Maintenance-free	6000	
		With maintenance	12000	
Installation mode		Fixed type, drawout type		
Wiring method of the main circuit		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 extended wiring (upper horizontal and lower vertical), Mixed extended wiring (upper vertical and lower horizontal) Note: with the rated current of 7500A only has vertical extended wiring,, with the rated current of 6300A only has two wiring modes: vertical wiring and vertical extended wiring		
Outline dimension: W×D×H mm 		Fixed type 3P	803x302.5x392	
		Fixed type 4P	1033x302.5x392	
		Drawout type 3P	809x401.5x475	
		Drawout type 4P	1039x401.5x475	
Weight (kg)		Fixed type 3P	125 (4000A, 5000A)	127 (6300A)
		Fixed type 4P	167 (4000A, 5000A)	170 (6300A)
		Drawout type 3P	193 (4000A, 5000A)	195 (6300A)
		Drawout type 4P	257 (4000A, 5000A)	260 (6300A)

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

<table>
<tr><td>Model</td><td>NWK21/NWK31</td><td>NWK21（V）/NWK31（V）</td><td>NWK22 /NWK32
NWK22（V）/NWK32（V）
NWK22（P）/NWK32（P）</td></tr>
<tr><td rowspan="2">Controller Pictures</td><td> 
</td><td> 
</td><td> 
</td></tr>
<tr><td colspan="3">NWK31 and NWK32 are applied to NDW3-1600, NWK21 and NWK22 are applied to NDW3-2500,NDW3-4000,NDW3-6300 and NDW3-7500</td></tr>
</table>

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	—	—	√	√	√
Protection function	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;

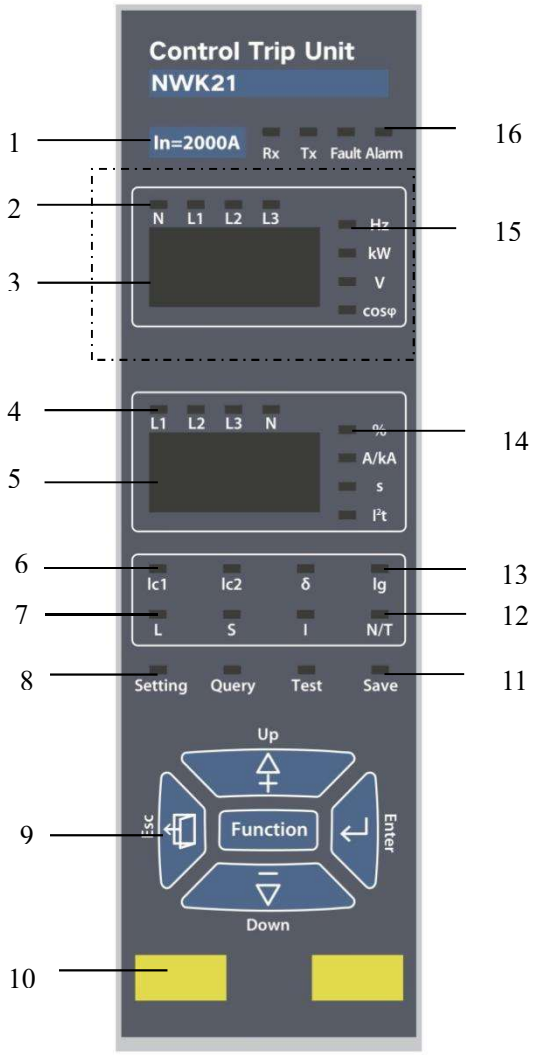
2. For the controller with “V” and “P” functions, the voltage module P2 is optional for the main circuit rated voltage AC500V and above;

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



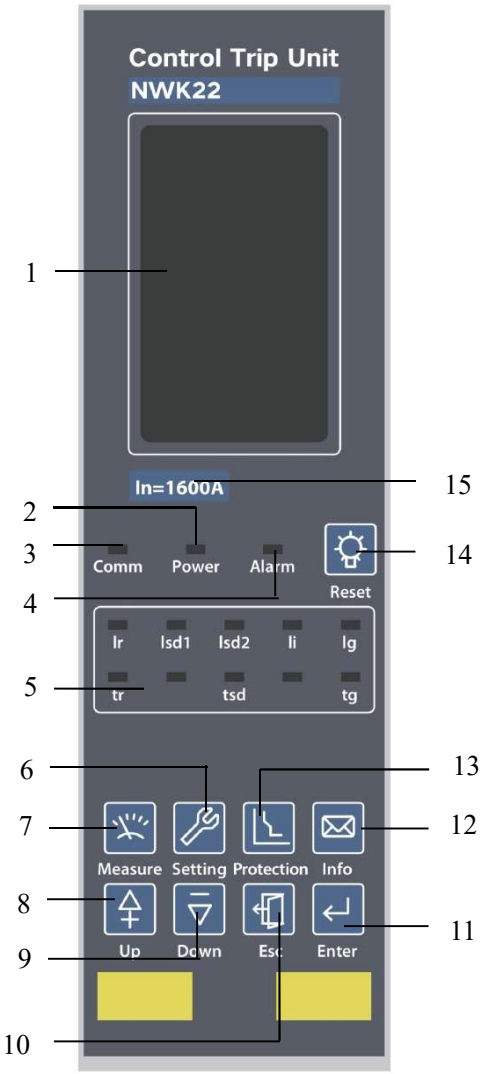
1. Rated current sign
2. N-phase and A, B, C phases voltage indicators in order
3. Three-phase voltage and frequency value display screen
4. Three-phase current, N-phase current indicators
5. Three-phase electric current display screen
6. Load monitoring signals 1 and 2 operation indicators
7. Long time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

Note: 1. 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 Description



1. LCD interface display
2. “Normal” indicator (LED): the green LED always flashes as long as the controller is turned on and works properly.
3. "Communication" indicator (LED): It flashes during the communication connection.
4. "Fault/Alarm" indicator (LED): During normal operation, LED is not on; in case of fault tripping, the red LED flashes 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. “Setting” button: Switch to the topic menu of parameter settings.
7. “Measurement” button: Switch to the default topic menu of measurement.
8. “Up” button: Move the menu content up on the current option, or incrementally change the parameters.
9. “Down” button: Move the menu content down on the current option, or decrementally
10. “Exit” button: Exit the current option to the previous menu
11. “Select” button: Go to the next menu pointed by the specified item, or select and store parameters.
12. “Information” button: Switch to the topic menu of history and maintenance.
13. “Protection” button: Switch to the topic menu of protection parameter settings.
14. Fault and alarm reset buttons.
15. 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	0.04	0.072	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	10I△n												

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 protection (Accuracy of ±10%) inherent absolute error: ±40 ms	Umin/return setting value	Tripping time
	＜0.9	Non-return
	≥1.1	Returns according to the set delay time
Undervoltage protection alarm DO output	The signal output is required to add a signal unit; set one DO of the signal unit as "undervoltage fault". Without the signal 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	Actual voltage unbalance rate/setting value	Tripping time
	≤0.9	Inaction (no alarm)

error: ±40 ms	≥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 action/alarm features (Accuracy of ±10%) inherent absolute error: ±40 ms	Reverse power value/Setting value	Tripping time
	≤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 setting	Alarm, tripping, regional interlocking, general, grounding interlocking, short circuit 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/leakagi ng alarm	Current unbalance fault	Grounding/current leakage fault	Grounding/leakagin g 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	$8I_r$	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%. NDW3-1600 frame controller input voltage of port 1 and 2 can only be DC24V, when clients require AC230V/AC400V/DC110V/DC220V, we must switch it to DC24V by external DC power source module, and it has been installed in factory; there is DC power source module transformation in internal controllers of NDW3-2500 and above frames. See the electric wiring diagram in Chapter 7.

3) To be powered by the test port

Rated voltage: DC24V, with an allowable error of ±5%. The panel power supply is used for separately testing the controller, rather than the working power supply.

■ 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;

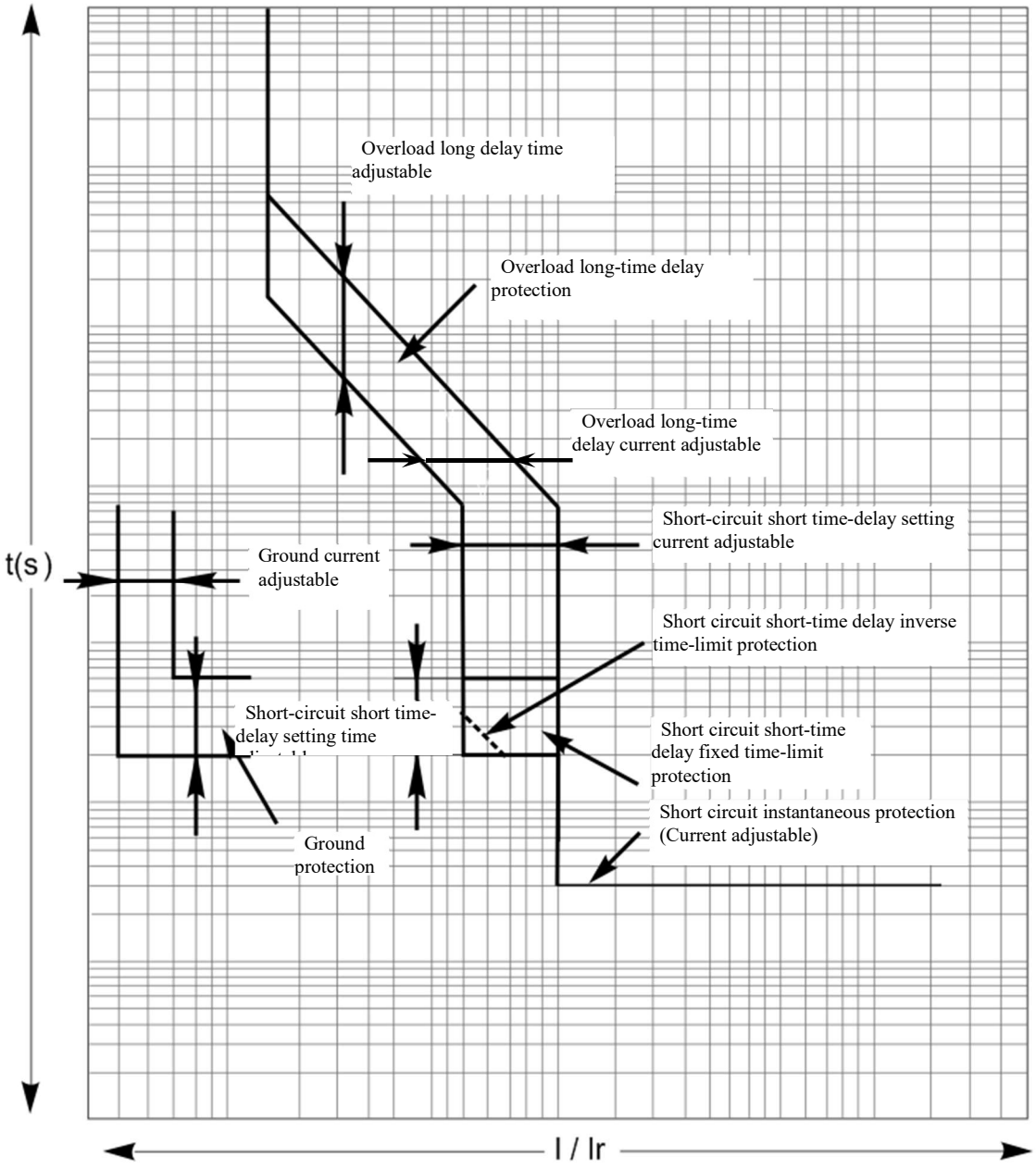
Auxiliary contact output of the circuit breaker status, contact capacity: 10A/AC250V.

3.6 Introduction of Controller Functions

For introduction of controller functions, see the controller maunals of NWK21, NWK31, NWK22 and NWK32.

3.7 Protection Characteristic Curve

See the figure below for the schematic diagram of 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

Accessories 4

4.1 Accessories list

Accessory category	Accessory name	Configuration	Installation method and type	Remarks
Electrical control accessories	Closed electromagnet	Standard configuration	Fixed type/drawout type	
	Shunt release/Maintained shunt release	Standard configuration	Fixed type/drawout type	Choose one of the two, the retention type is suitable for 2500/4000 frame
	Motor operating mechanism	Standard configuration	Fixed type/drawout type	
	Undervoltage release	Optional ordering for customers	Fixed type/drawout type	Either
	Loss of voltage release	Optional ordering for customers	Fixed type/drawout type	
	Remote reset electromagnet	Optional ordering for customers	Fixed type/drawout type	
Signal output accessories	Auxiliary switch	Standard configuration	Fixed type/drawout type	
	Closing ready signal output device	Optional ordering for customers	Fixed type/drawout type	
	Three-position status signal output device of the drawer seat	Optional ordering for customers	Drawout type	
	Secondary terminal	Standard configuration	Fixed type/drawout type	
Related accessories of controller	External N-pole transformer (rectangular, flexible type)	Optional ordering for customers	Fixed type/drawout type	
	External current leakage transformer	Optional ordering for customers	Fixed type/drawout type	Frame size level ≤2500A
	Power supply module NWDF1	Optional ordering for customers	Fixed type/drawout type	
	Relay module NWDF1-RM	Optional ordering for customers	Fixed type/drawout type	To be used with th power suppl module
	Communication adapter NWDF1-MD/MP	Optional ordering for customers	Fixed type/drawout type	
	Remotable I/O Module NWDF1-C8/S12/SC64/SCM423	Optional ordering for customers	Fixed type/drawout type	
	Outline and Installation Dimension Diagram of the Remote Intelligent I/O Module NWDF1-C8/S12/SC64/SCM423	Optional ordering for customers	Fixed type/drawout type	

	6-channel programmable output module NWDF1-C6	Optional ordering for customers	Fixed type/drawout type	
	Accessory monitoring unit NWDF1-AM	Optional ordering for customers	Fixed type/drawout type	
	Energy-storing signal communication module NWDF1-S1	Optional ordering for customers	Fixed type/drawout type	
	Voltage conversion module NWDF1-P2	Optional ordering for customers	Fixed type/drawout type	
Safety accessories	Phase partition	Standard configuration	Fixed type/drawout type	
	Counter	Optional ordering for customers	Drawout type	
	Door frame	Optional ordering for customers	Fixed type/drawout type	
	IP54 transparent cover	Customer optional order (single order)	Fixed type/drawer type	This accessory is equipped with a special door frame, which cannot be selected at the same time as the conventional door frame, and the size of the door opening of the two is different;
	Dustproof cover	Optional ordering for customers	Drawout type	
Lock and interlocking device	Off-position key lock	Optional ordering for customers	Fixed type/drawout type	
	Safety lock	Optional ordering for customers	Fixed type/drawout type	Only suitable for 2500 and above frames
	Button lock	Optional ordering for customers	Fixed type/drawout type	
	Door interlocking	Optional ordering for customers	Drawout type	
Power supply conversion system	Mechanical interlocking	Optional ordering for customers	Fixed type/drawout type	
	Power automatic transfer switches device (ATS)	Optional ordering for customers	Fixed type/drawout type	For the two-way power supply

4.2 Electrical Control Accessories

4.2.1

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. Power-on time >200ms.

◆ Technical Parameters of Closed Electromagnet

Power Consumption Table of Closed Electromagnet

Rated insulation voltage (Ui)	Rated control supply voltage (Us)	Instantaneous power	
		NDW3-1600	NDW3-2500, 4000, 6300,7500
400V	AC380V/AC400V 50/60Hz	380VA	620VA
	AC220V/AC230V 50/60Hz	330VA	500VA
	DC220V	330W	500W
	DC110V	270W	400W
	DC24V	156W	135W

4.2.2 Shunt release

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

◆ Action features of the shunt release

1) When the power supply voltage of the shunt release maintains at 70%~110% of the rated control supply voltage, operation of the shunt release can make the circuit breaker disconnect;

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

3) There is the control circuit inside to ensure the long-time energizing, which shall be >200ms. Do not connect to the auxiliary switch contact

of the circuit breaker in series. Power-on time >200ms.

◆ Technical Parameters of Shunt Release

Power Consumption Table of Shunt Release

Rated insulation voltage (Ui)	Rated control supply voltage (Us)	Instantaneous power	
		NDW3-1600	NDW3-2500、4000、6300、7500
400V	AC380V/AC400V 50/60Hz	380VA	620VA
	AC220V/AC230V 50/60Hz	330VA	500VA
	DC220V	330W	500W
	DC110V	270W	400W
	DC24V	156W	135W

4.2.3 Maintained shunt release

The maintained shunt release is mainly composed of coils, iron core components and electronic components, and can be operated remotely to disconnect the circuit breaker.

◆Maintaining shunt release operating characteristics

1) When the power supply voltage of the retentive shunt release is maintained between 70% and 110% of the rated control power supply voltage, operating the shunt release can make the circuit breaker disconnect.

2) When the applied voltage is 85% to 110% of the rated working voltage of the retentive shunt release, the retentive shunt release can ensure that the circuit breaker cannot be closed reliably.

3) The retentive shunt release is a long-term working system, and it needs an interval of more than 500ms to give a closing signal after a power failure.

4) Trigger time t > 200ms for each power-on.

5) The 1.3Us tolerance time is 9.5s without damage, and the 1.4Us tolerance time is 0.5s without damage.

◆Maintaining shunt release technical parameters

Retained shunt release power consumption table

Rated insulation voltage (Ui)	Rated control power supply voltage (Us)	Instantaneous power	Running power
400V	AC230V 50/60Hz	＜600VA	＜5VA
	DC220V	＜600W	＜5W

4.2.4 Motor operating mechanism

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

◆ Operation features

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

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

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

◆ Technical Parameters of Motor Operating Mechanism

Power Consumption Table of Motor Operating Mechanism

Rated insulation voltage (Ui)	Energy storage time	Rated control supply voltage (Us)	Power consumption			
			NDW3-1600	NDW3-2500	NDW3-4000	NDW3-6300,7500
400V	3s~5s	AC220V/AC230V AC380V/AC400V (50/60Hz)	90VA	110VA	110VA	180VA
		DC220V/DC110V	90W	110W	110W	180W

4.2.5 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.

◆ Undervoltage delayed release

The undervoltage delayed release sets the delay time of the release action through toggling the toggle switch on the undervoltage delayed device. The delay time is set as 0s, 1 s, 3 s, 5 s or instantaneous as required.

◆ Power Consumption Table of Undervoltage Release

Power Consumption Table of Undervoltage Release

Rated insulation voltage (Ui)	Rated operational voltage (Ue)	Operating power	
		NDW3-1600	NDW3-2500, 4000, 6300,7500
400V	AC220V/AC230V 50/60Hz	0.8VA	3.9VA
	AC380V/AC400V 50/60Hz	0.8VA	5.2VA
	DC220V	0.8W	3.9W
	DC110V	0.8W	3.9W
	DC24V	1.9W	1.55W

4.2.6Loss-of-voltage release

◆ Action features of the loss of voltage release

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

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

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

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

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

◆ Loss of voltage delayed release

The loss of voltage delayed release sets the delay time of the release action through toggling the toggle switch on the loss of voltage delayed device. Delay time: NDW3-1600/6300/7500: 0s～10s adjustable for clients (factory default setting value is 3s), and its step length is 1s; NDW3-2500/4000: 1s, 3s, 5s or instantaneous.

◆ Power Consumption of Loss of Voltage Release

Power Consumption Table of Loss of Voltage Release

Rated insulation voltage (Ui)	Rated operational voltage (Ue)	Operating power	
		NDW3-1600	NDW3-2500, 4000, 6300,7500
400V	AC220V(AC230V) 50Hz/60Hz	0.8VA	4VA
	AC380V(AC400V) 50Hz/60Hz	0.8VA	8VA

4.2.7 Remote reset electromagnet

This accessory is installed in the controller base. In case of fault tripping and troubleshooting of controller, the remote reset electromagnet can reset the reset button of the circuit breaker for the normal closing/opening operation of the circuit breaker

◆ Action features of remote reset electromagnet

1） When the power supply voltage of the remote reset electromagnet maintains at 85%~110% of the rated control supply voltage, operation of the shunt release can make the circuit breaker disconnect;

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

3) Power-on time >200ms.

◆ Technical Parameters of Remote Reset Electromagnet

Power Consumption Table of Remote Reset Electromagnet

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

4.3 Signal Output Accessories

4.3.1 Auxiliary switch

◆ The conventional thermal current of the auxiliary switch is 10A;

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

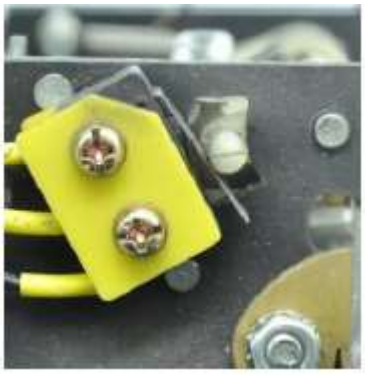
◆ Technical Parameters of Auxiliary Contact

Applicable frame size	NDW3-1600	NDW3-4000	NDW3-2500/6300/7500

Auxiliary contact form		■ Four groups switch ■ Six groups switch ■Four normally opened and four normally closed	■ Four groups switch ■ Four normally opened and four normally closed ■ Six groups switch ■ Six normally opened and six normally closed	■ Four normally opened and four normally closed ■ Four groups switch ■ Six groups switch ■ Six normally opened and six normally closed
Agreed thermal current Ith		10A		
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.

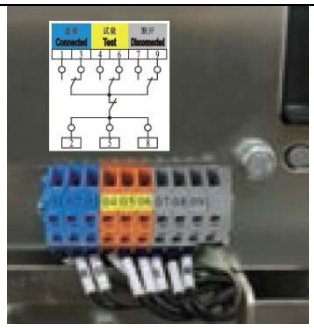


- Circuit breaker off state;
- Energy storage in place;
- No disconnection instruction;
- Undervoltage release closing in place;
- Controller fault tripping reset.

Table of Technical Parameters

Frame size	NDW3-1600、2500、4000、6300、7500
Breaking capacity	3A /AC250V
	5A /AC125V

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

Applicable frame size		NDW3-1600, NDW3-2500, NDW3-4000, NDW3-6300, NDW3-7500	
Breaking capacity	DC	125V	0.4A
	AC	250V	10A

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 14048.7-2016
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

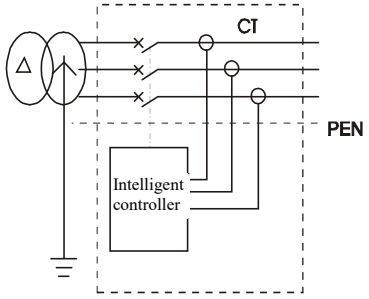
4.4 Related Accessories of Controller

4.4.1 External N-pole transformer

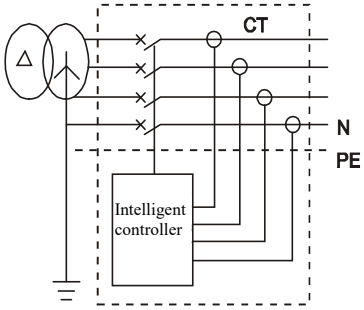
◆ Ground type

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:

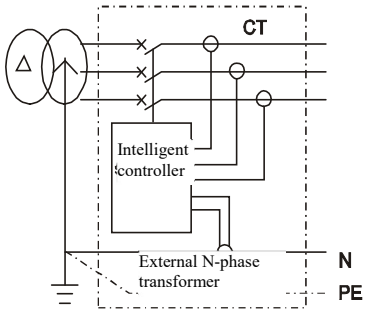
1) Electric circuit diagram of differential type (T)



3P

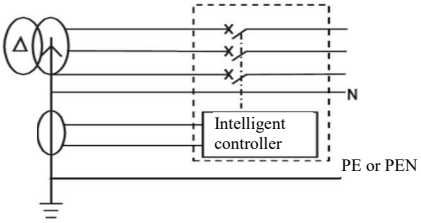


4P



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 mm	Applicable frame size
N1	62×21	1600
N2	102×32.5	1600, 2500
N3	122×52	2500, 4000, 6300
N4	262×102	4000, 6300, 7500

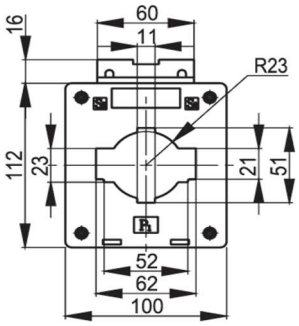
★ See the figure below for outline and installation dimensions of the rectangular transformer.

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

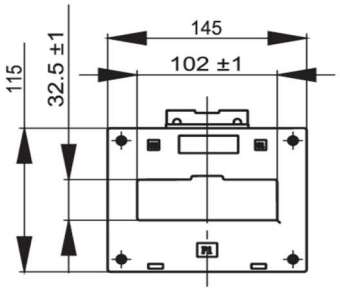
★ With conductors to be supplied by customers, it is recommended to use the shielded twisted pair (with the metal shield layer, 0.2~0.3mm^2, namely the AWG24/AWG22 conductor).

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.

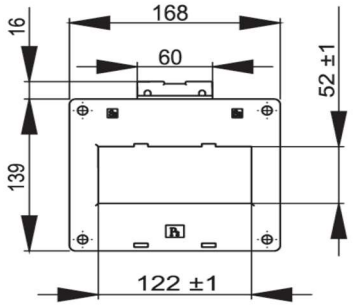
N1 external transformer



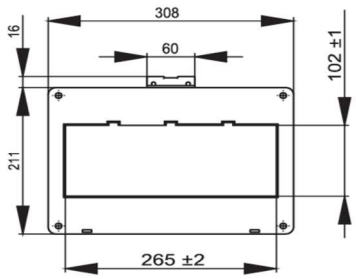
N2 external transformer



N3 external transformer

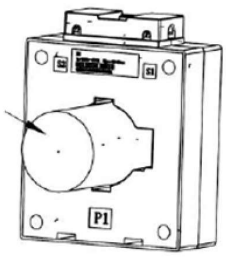


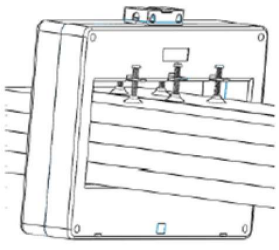
N4 external transformer



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





2） Flexible transformer

★ Flexible transformer code

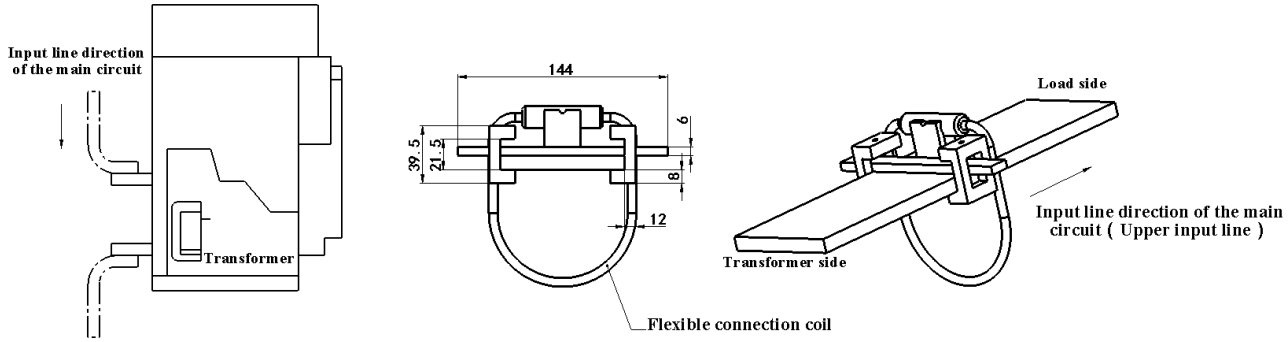
Transformer code	Soft cable circumference	Applicable current range
NR1	280mm	200A-800A
NR2	370mm	1000A-2000A
NR3	450mm	1000A-7500A

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

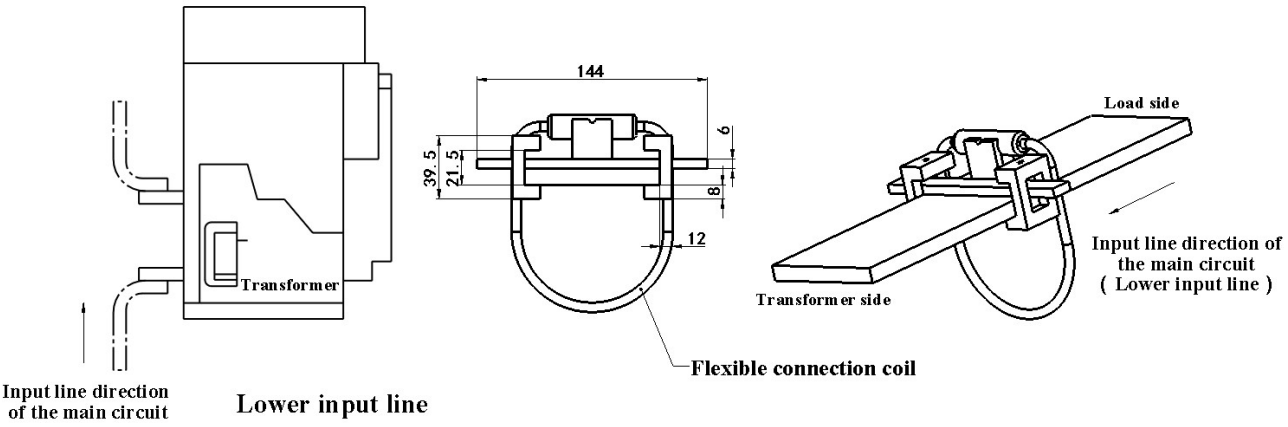
★ Pay attention to the direction for use: The inlet wire direction is shown in the figure.

★ 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

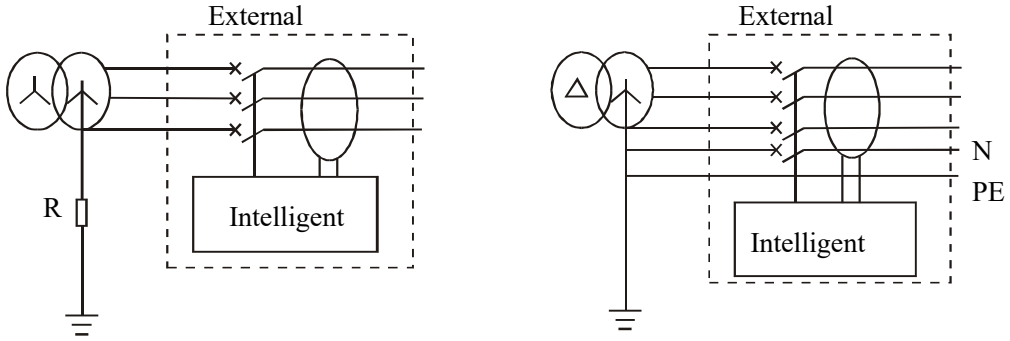


Lower input line

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).



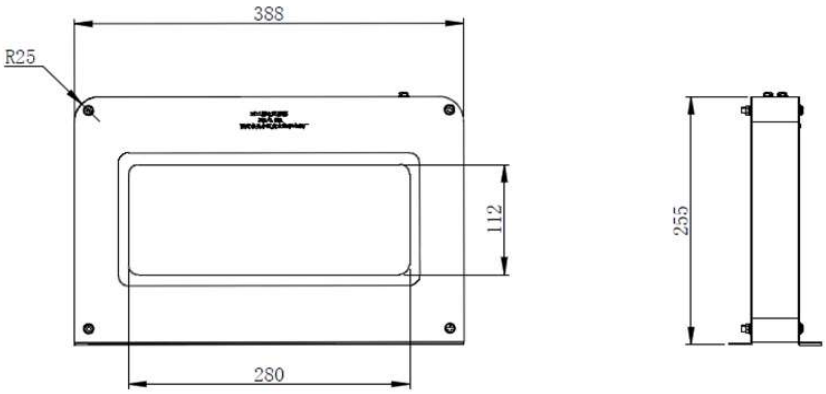
Schematic Diagram

◆ NDW3-1600 mode can pass through busbar while the NDW3-1600 and 2500 modes can pass through cable.

◆ The conductor shall be provided by the customer. It is recommended to use shielded double twisted wire (with metal shielding layer), 0.2 ~ 0.3mm^2 , i.e. awg24 / awg22 wire. It is recommended that the wire length shall not exceed 3 m, and the wire end shall be crimped with metal Y-type terminal, and the tightening torque shall be 1.2N. M.

◆ See the figure below for outline and installation dimensions of the external current leakage transformer.

◆ When installing the external current leakage transformer, there is no need in distinguishing directions.



Outline and Installation Dimension Diagram of the External Current Leakage Transformer

4.4.3 Power supply module NWDF1

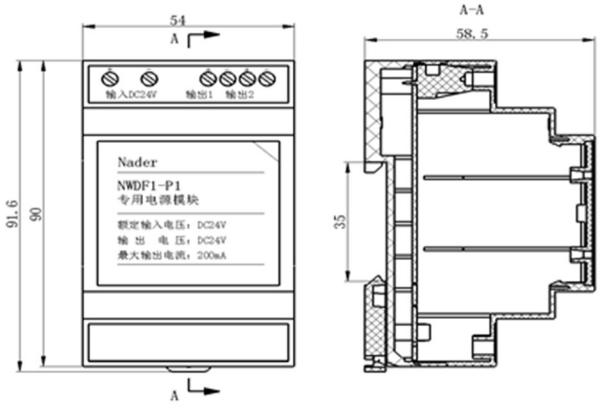
- Role: As the power source of relay module NWDF1-RM, the output voltage is DC24V;
- Type: See the table below

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

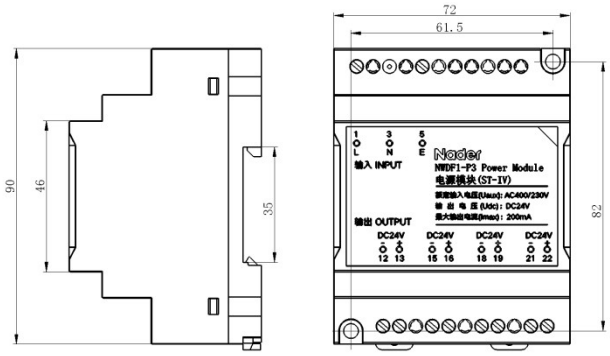
- Supply mode: Optional ordering by customers;

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.



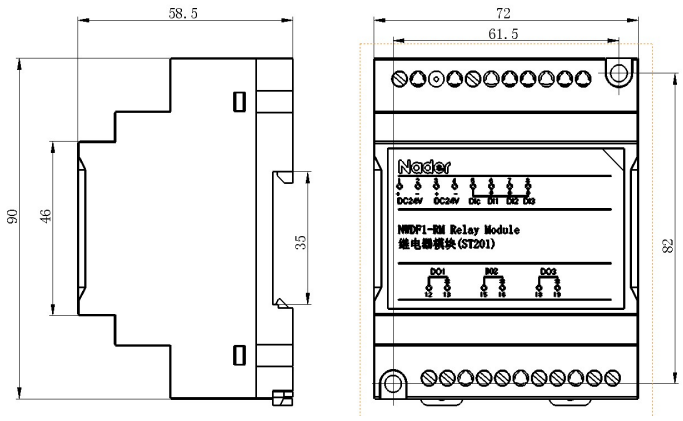
Outline and Installation Dimension Diagram of Power Supply Module NWDF1-P1



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

4.4.4

- 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 of Relay Module

4.4.5 Communication adapters NWDF1-MD, NWDF1-MP, NWDF1-ME and NWDF1-MC

- Type of communication adapters: NWDF1-MD, NWDF1-MP, NWDF1-ME and NWDF1-MC. It connects with the intelligent communication products with our ModBus RTU standard protocol interface to realize conversion of different protocols, thus making the intelligent communication products to achieve the remote communication, remote regulating, remote control and remote sensing functions on DeviceNet and ProfiBus DP.

1） NWDF1-MD(MDC-225) communication adapter realizes conversion from the ModBus-RTU protocol to the DeviceNet protocol;

2） NWDF1-MP(PM-127) communication adapter realizes conversion from the ModBus-RTU protocol to the Profibus DP protocol;

3） NWDF1-ME(ES-301A) communication adapter realizes conversion from the ModBus-RTU protocol to the Ethernet protocol;

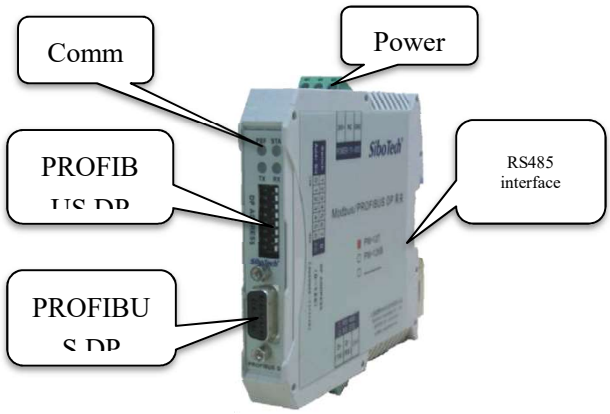
4） NWDF1-MC(NT50-CO-RS) communication adapter realizes conversion from the ModBus-RTU protocol to the CAN protocol;

5） See the attached manual of each accessory for the communication protocol.

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

- Appearance and function indication

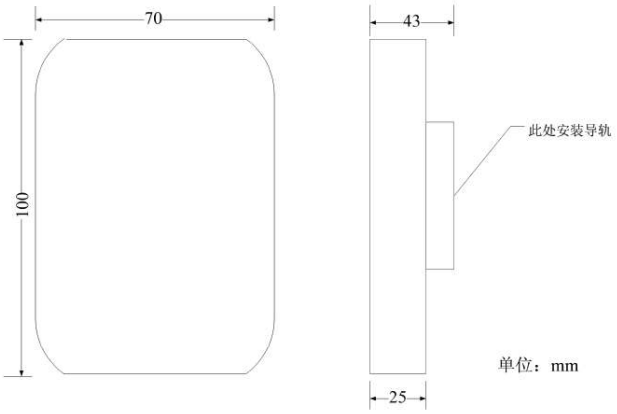
NWDF1-MD



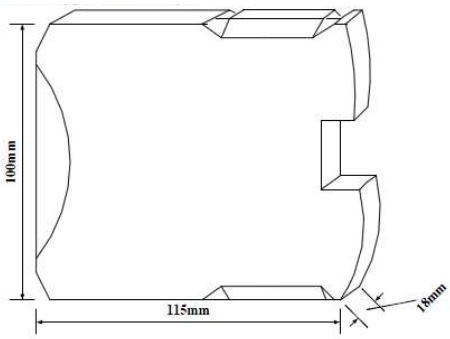
NWDF1-MP

1：按钮	1: Button
2：模块状态指示灯 MS	2: Module status indicator MS
3：网络状态指示灯 NS	3: Network status indicator NS
4：DeciceNet 地址显示 LED	4: DeviceNet address display LED

◆ See the figure below for outline and installation dimensions.

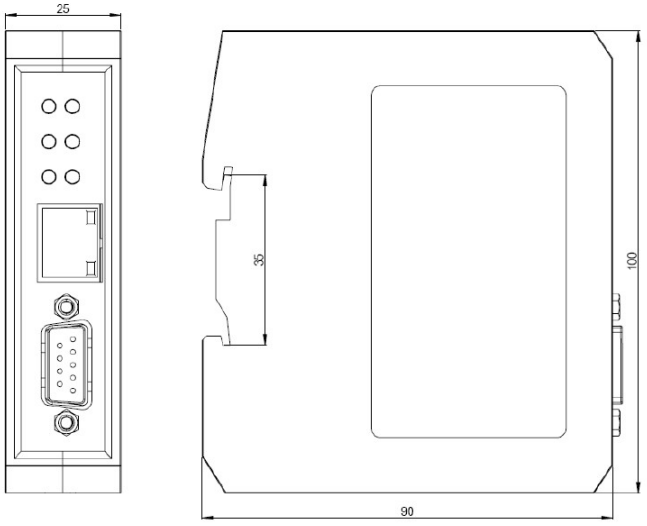


NWDF1-MD Outline and

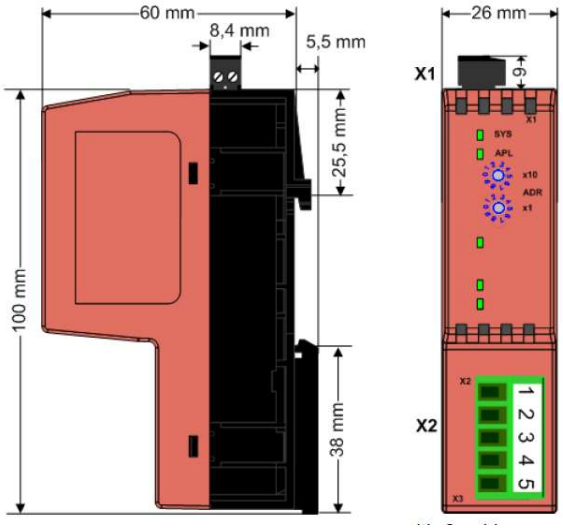


NWDF1-MP Outline and

此处安装导轨	Install the guide rail here
单位：mm	Unit: mm



NWDF1-ME Outline and
Installation Dimension Diagram



NWDF1-MC Outline and Installation Dimension Diagram

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

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

◆ After the module is energized, the power/status indicator will flash quickly (0.5s on/0.5s off) while the rest indicators will be constantly on for 1s and then enter into the working state. During this period, any input, output and communication are invalid. After normal startup, this module can realize the following functions: Setting the communication parameters by pressing the key (communication initialization button); detecting the current input, i.e. the analog input; detecting the digital input, i.e. the passive dry contact input; controlling the digital output, that is, self-holding output/pulse output.

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

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

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

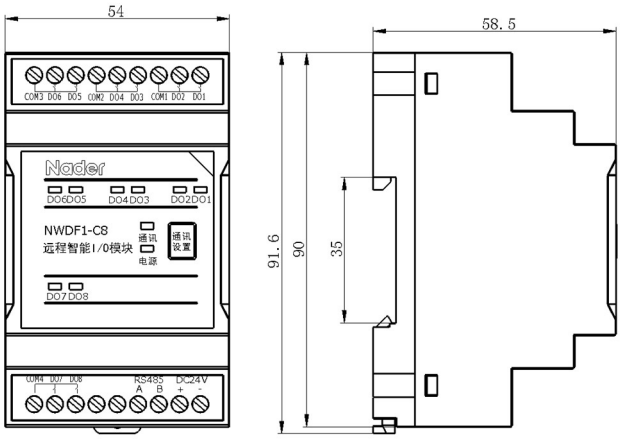
◆ NWDF1-SC64 features 6 switch inputs and 4 relay outputs, for monitoring its important status while controlling the circuit breaker.

◆ See the table below for general parameters

Working power supply	Nominal voltage	24VDC
	Allowable input range	18V~36VDC
	Isolation voltage	1000Vrms
	Reverse polarity effects	Does not work, but does not damage the module
	Voltage mismatch	Voltage above 40VDC may cause the permanent damage of the module
	Voltage sag	Sag for 10ms can still work without interruption
Communication	interface	Standard RS485, 2-wire, Modbus RTU
	Optional Modbus address	1～247
	Baud rate	1200/2400/4800/9600/19200/38400bps
	Parity bit	CRC check, without support for parity

	Isolation voltage	1000Vrms
	Maximum number of modules for a single bus	32
Protection class		IP20
Dimensions		91.6 x 54 x 58.5mm
Installation mode		Installed with two 35mm standard guide rails

- See the figure below for outline and installation dimensions.



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

4.4.7 6-channel programmable output module NWDF1-C6

- For the NDWF1-C6 programmable output module (installed with a 35mm standard guide rail), for the communication protocol details, see the NWDF1-C6 6-channel programmable expansion output module part in the NDT2920191 “Operation Manual of NWDF1 Series Frame Electrical Accessories”.
- For the communication protocol details of the programmable module, see the NWDF1-C6 6-channel programmable expansion output module part in the NDT2920191 “Operation Manual of NWDF1 Series Frame Electrical Accessories”.

Function Table of Wiring Mode and Terminal Definition

Model	Terminal code	Connection position	Input/output	Remarks
NWDF1-C6	AC230V	Power-supply AC220V input end	Input	Power-supply AC220V input, including neutral wire, live wire
	B	RS485 communication AB ports	Input/output	RS485 communication ports, do not reverse
	A			
	1	Relay output 1 NC contact	Output	Relay output 1 NC contact
	2	Relay output 1 NO contact	Output	Relay output 1 NO contact
	3	Relay output 1 public contact	Input	Relay output 1 public contact
	4	Relay output 2 NC contacts	Output	Relay output 2 NC contacts
	5	Relay output 2 NO contacts	Output	Relay output 2 NO contacts
	6	Relay output 2 public contacts	Input	Relay output 2 public contacts
	7	Relay output 3 NC contacts	Output	Relay output 3 NC contacts
	8	Relay output 3 NO contacts	Output	Relay output 3 NO contacts
	9	Relay output 3 public contacts	Input	Relay output 3 public contacts
	10	Relay output 4 NC contacts	Output	Relay output 4 NC contacts
	11	Relay output 4 NO contacts	Output	Relay output 4 NO contacts
	12	Relay output 4 public contacts	Input	Relay output 4 public contacts
	13	Relay output 5 NC contacts	Output	Relay output 5 NC contacts
	14	Relay output 5 NO contacts	Output	Relay output 5 NO contacts
	15	Relay output 5 public contacts	Input	Relay output 5 public contacts
	16	Relay output 6 NC contacts	Output	Relay output 6 NC contacts
	17	Relay output 6 NO contacts	Output	Relay output 6 NO contacts

	18	Relay output 6 public contacts	Input	Relay output 6 public contacts

Programmable Output Module Contact Type Table

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

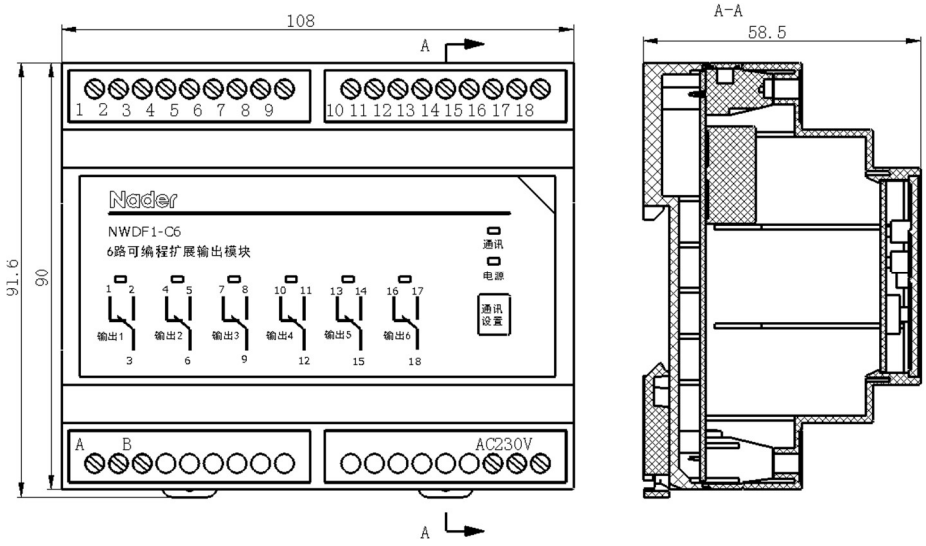
Time Setting Table of the Time Delayed Contact

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

Electric Parameters Table of the Programmable Module Relay Output

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

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



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

4.4.9 Accessory monitoring unit NWDF1-AM

- After installed with the accessory monitoring unit, the circuit breaker can perform the online monitoring of coil break for the shunt release, closing electromagnet, undervoltage release and energy storage motor, to ensure normal operation of the circuit breaker.
- For the communication protocol details, see the NWDF1-AM accessory monitoring module part in the NDT2920191 "Operation Manual of NWDF1 Series Frame Electrical Accessories".
- See the table below for technical parameters

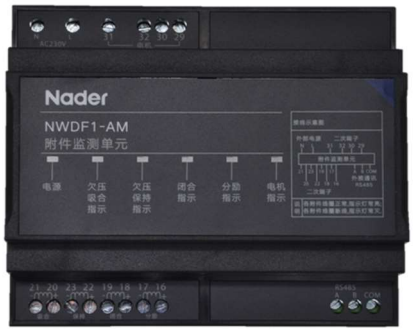
Working power supply	Nominal voltage	230VAC
	Allowable input range	180V~270VAC
	Isolation voltage	1000Vrms
	Reverse polarity effects	Without polarity effects
	Voltage mismatch	Voltage above 260VAC may cause the permanent damage of the module
	Voltage sag	Sag for 10ms can still work without interruption
Communication	interface	Standard RS485, 2-wire; Modbus RTU
	Optional modbus address	2~127
	Baud rate	9600
	Parity bit	CRC check, without support for parity
	Isolation voltage	1000Vrms
	Number of modules for a single bus	32
Protection class		IP20
Dimensions		90 × 72 × 58.5mm
Installation mode		Installed with a 35mm standard guide rail

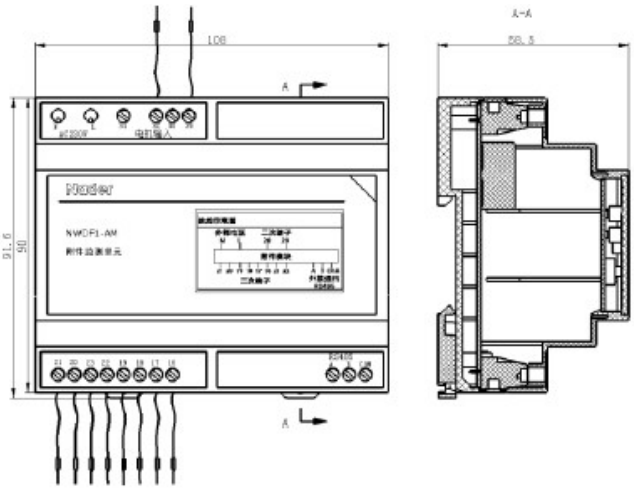
◆ Function Table of Wiring Mode and Terminal Definition

Model	Terminal code	Connection position	Port notes	Remarks
NWDF1-AM Accessory monitoring module	L	Power supply 230V	Power supply	Without positive and negative polarities
	N			
	A	RS485 A	Communication port	The terminal code is consistent with that of the communication module
	B	RS485 B	Communication port	The terminal code is consistent with that of the communication module
	COM	COM	Communication shied earthing	No wiring required
	29	Motor detection line	Motor coil break monitoring	The terminal code is the definition number of the body secondary terminal
	30	Motor detection line	Motor coil break monitoring	The terminal code is the definition number of the body secondary terminal
	31	Motor detection line	Motor coil break monitoring	The terminal code is the definition number of the body secondary terminal
	32	Motor detection line	Motor coil break monitoring	The terminal code is the definition number of the body secondary terminal
	16	Shunt+	Shunt coil break monitoring	The terminal code is the definition number of the body secondary terminal
	17	Shunt-	Shunt coil break monitoring	The terminal code is the definition

				number of the body secondary terminal
	18	Closing+	Closing coil break monitoring	The terminal code is the definition number of the body secondary terminal
	19	Closing-	Closing coil break monitoring	The terminal code is the definition number of the body secondary terminal
	20	Pull-in+	Pull-in coil break monitoring	The terminal code is the definition number of the body secondary terminal
	21	Pull-in-	Pull-in coil break monitoring	The terminal code is the definition number of the body secondary terminal
	22	Hold+	Hold coil break monitoring	The terminal code is the definition number of the body secondary terminal
	23	Hold-	Hold coil break monitoring	The terminal code is the definition number of the body secondary terminal

◆ See the figure below for outline and installation dimensions.





NWDF1-AMoutline and Installation Dimension Diagram

4.4.10 Energy-storing signal communication module NWDF1-S1

- Energy-storing signal communication module components can obtain the "Energy storage" or "Energy release" status information of the electric operating mechanism of the circuit breaker via the upper computer.

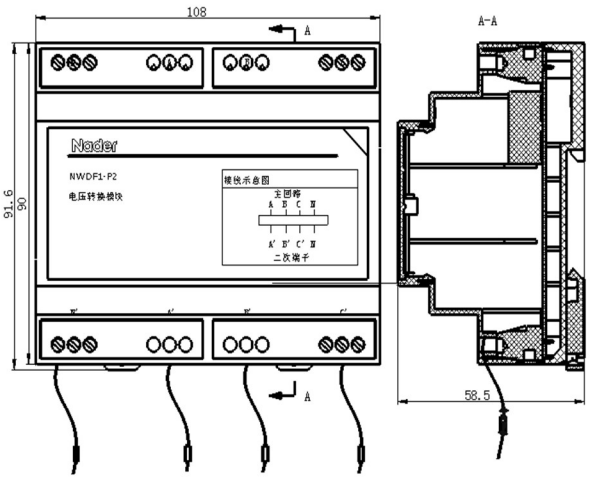
Outline and installation dimensions are the same with the outline and installation dimension diagram of the remote intelligent I/O module.

4.4.11 Voltage conversion module NWDF1-P2

- As the maximum rated input of the frame controller is AC500V in case of voltage detection, a voltage conversion module is required to reduce the voltage below AC500V when the input is greater than AC400V.
- See the table below for technical parameters:

Working power supply	Input voltage	690VAC~1200VAC
	Allowable input range	690VAC~1200VAC
Protection class		IP20
Dimensions		90 x 54 x 58.5mm/90×72×58.5
Installation mode		Installed with a 35mm standard guide rail

- See the figure below for outline and installation dimensions.



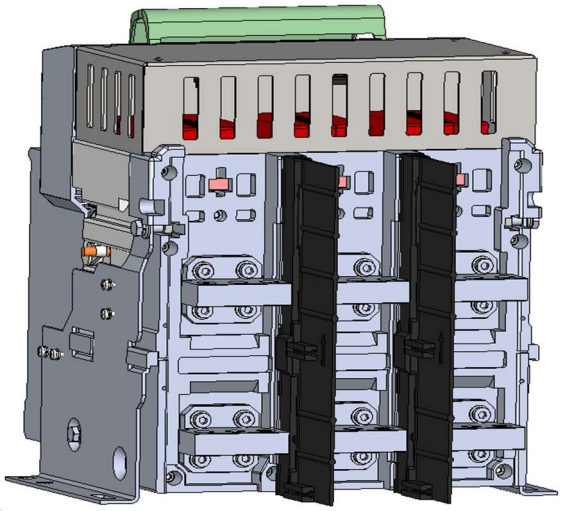
NWDF1-P2 Outline and Installation Dimension Diagram

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

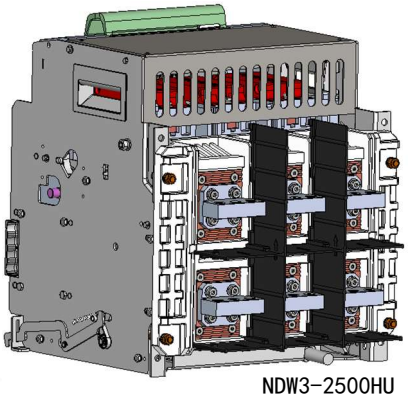


Fixed type appropriate holder

Phase partition

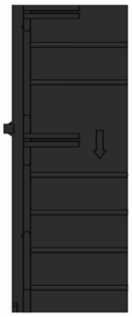
- HU type circuit breaker phase partition plate

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 and and between the incoming and outgoing ends so as to prevent the short circuit in case of the insulation breakdown and improve the power reliability.

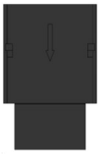


NDW3-2500HU

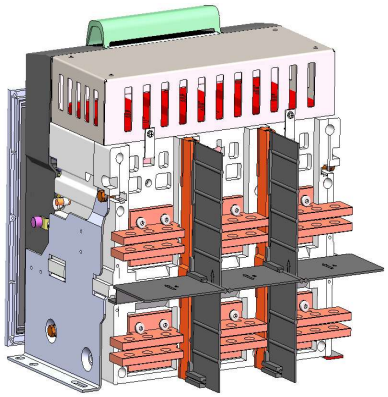
Fixed special bracket



Phase partition plate

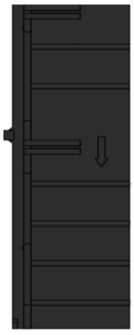


Inlet and outlet partition



NDW3-4000HU

Fixed special bracket



Phase partition plate

Inlet and outlet partition

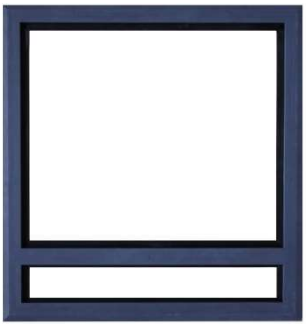
Note: NDW3-4000HU inlet and outlet spacers are installed with the words N, A, B and C when they are installed.

4.5.2 Counter

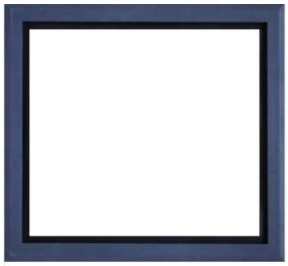
Counter is used to record the number of the "close-open" operation of the circuit breaker.

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

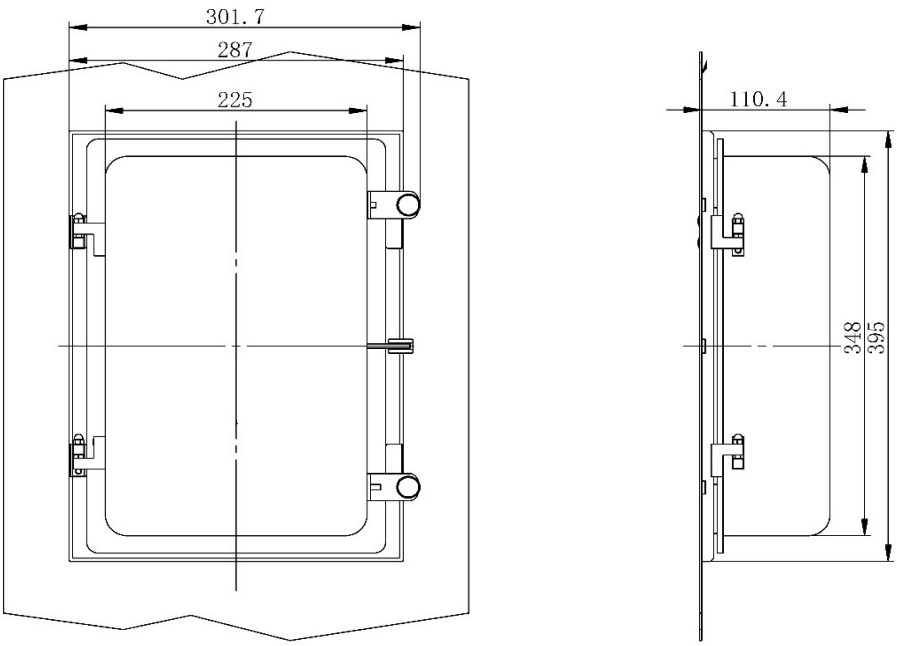
4.5.4 Dustproof cover

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

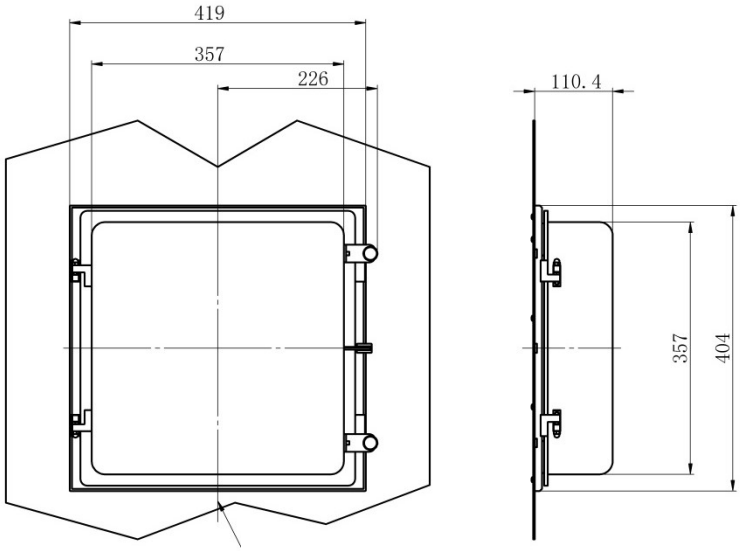
4.5.5 IP54 Dust Cover

The IP54 transparent cover is an accessory that can be installed on the cabinet door and can increase the protection level to IP54. The protective cover is assembled with a special door frame. If you choose this accessory, you do not need to choose a conventional door frame. The size of the opening of the cabinet door is different from that of the conventional door frame. For the opening size, please refer to the opening drawing of the cabinet door. The door frame and IP54 transparent cover are assembled and shipped. Customers can choose to open the door on the left or right, and assemble it directly on the cabinet door according to the instructions.

a. Dimensions of IP54 transparent cover of NDW3-1600 products



b. NDW3-2500/4000/6300/7500IP54 transparent cover dimensions



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,

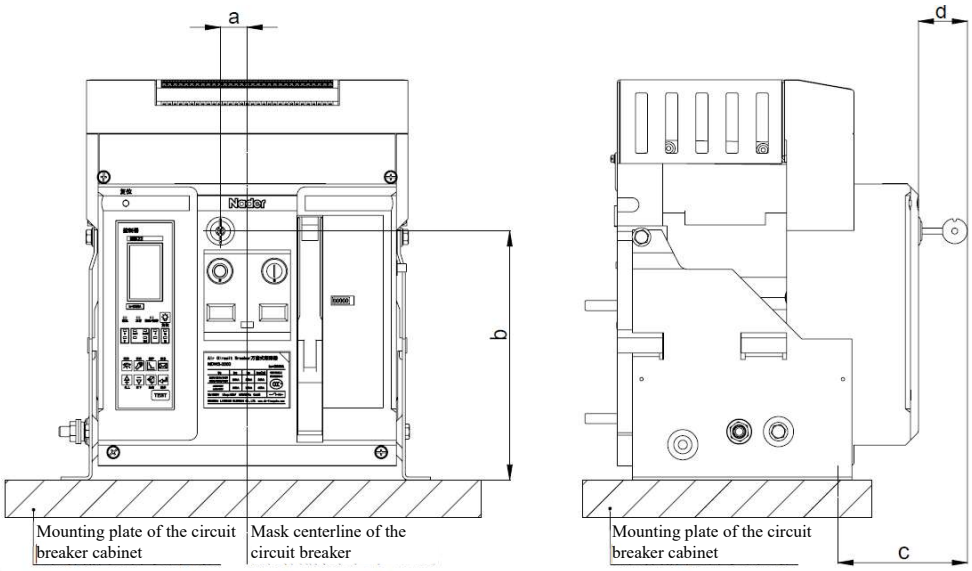
The circuit breaker cannot carry out closed operation, so as to prevent irregular operation. Model and type are shown in the table below.Our disconnect position lock can provide two types of direct operation (one-hand operation, which is also the default supply method) and manual pressure (two-hand operation), which can be checked in the order specification.

Models and types of off-position key locks

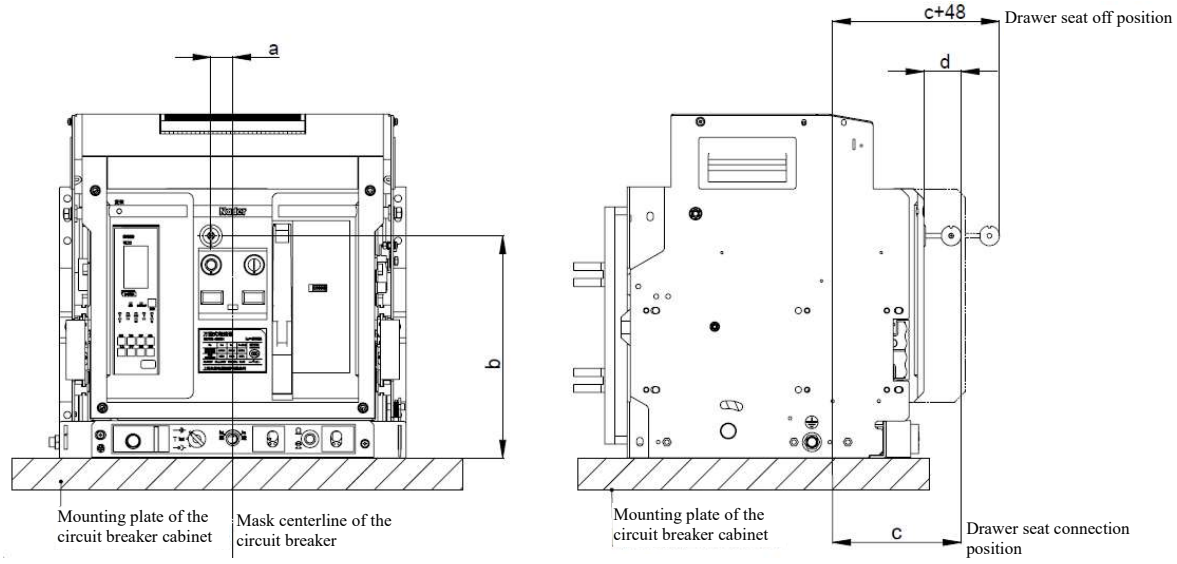
Model	Name	Number of circuit breakers	Number of keys
SF11	One lock one key	1	1
SF21	Two locks one key	2	1
SF31	Three locks one key	3	1
SF32	Three locks two keys	3	2
SF53	Five locks three keys	5	3

Remarks: 1. All frames can be interlocked. 2. For other special interlocking requirements, please contact our company for consultation.

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



Fixed type



Drawout type

Unit: mm

Model	a		b		c		d	
	Fixed type	Drawout type	Fixed type	Drawout type	Fixed type	Drawout type	Fixed type	Drawout type
NDW3-1600	17		220		124	104	32	
NDW3-2500 NDW3-4000	27		247		115	153	35	

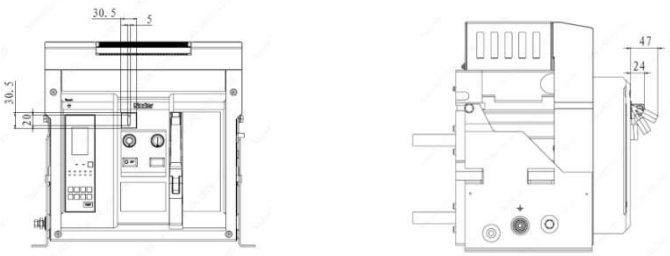
NDW3-6300 NDW3-7500					

4.6.2 Safety lock

When the handle of safety lock is put the padlock, the product can be locked in opening state, and the product cannot be closed. Only when all padlocks are unlocked can the product be closed. The proper diameter for anchor beam is 5mm when the padlocks range from one to three, or the proper diameter for anchor beam is 5mm when the padlocks range from one to two. Safety lock is only suitable for 2500 and above frames.

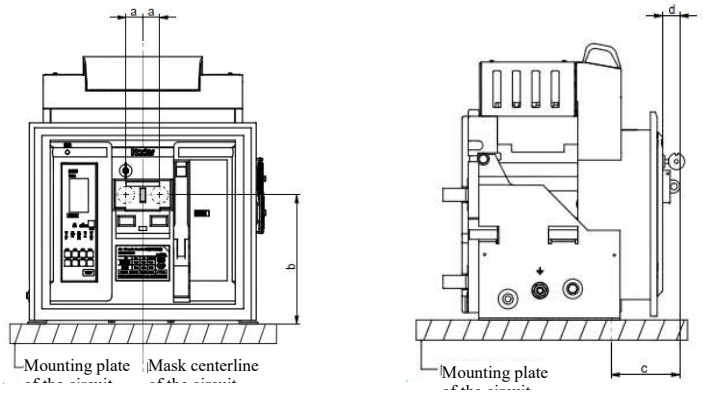
You can choose from safety lock and off-position key lock, and the two have the same installation center position. The size of safety lock can refer to off-position key lock.

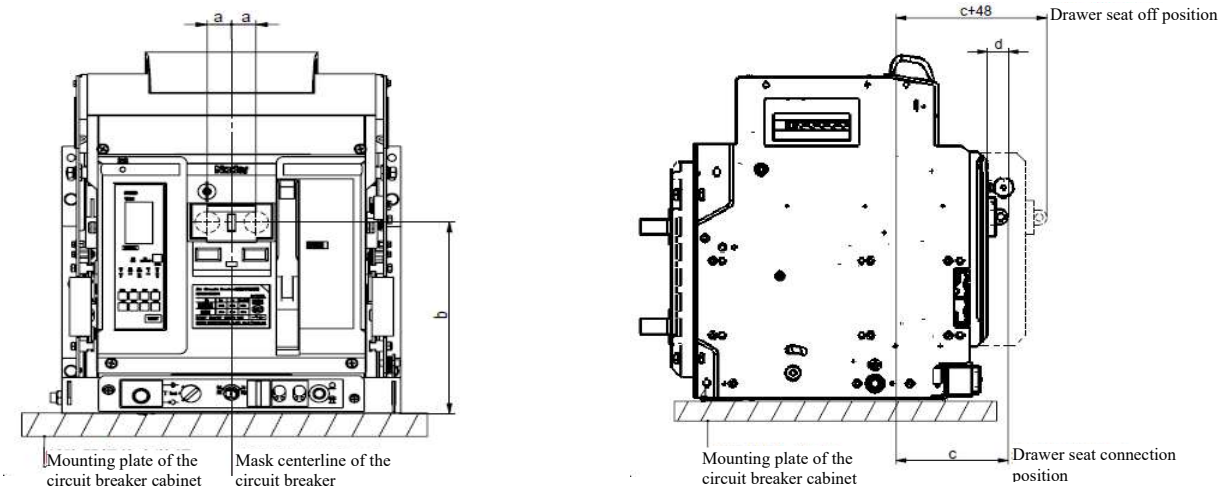
When choose safety lock, this accessory will be delivered to clients when the ACB is assembled. And because the safety lock is bulge on the mask, therefore, when installation people open power distribution cabinet, attention should be paid to the bulge size. This size diagram and data are shown below.



4.6.3 Button lock

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





Drawout type

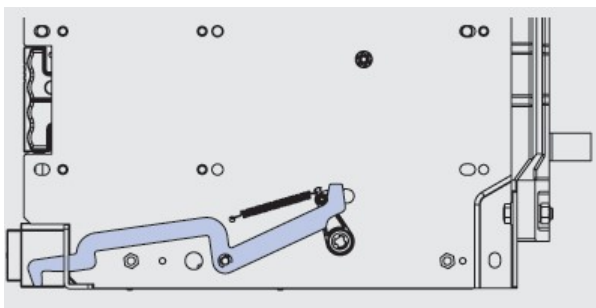
Unit: mm

Model	a		b		c		d	
	Fixed type	Drawout type	Fixed type	Drawout type	Fixed type	Drawout type	Fixed type	Drawout type
NDW3-1600	18		155	187.5	91.7	108.2	26.4	
NDW3-2500 NDW3-4000	27		204	243.7	106	143.8	26.4	
NDW3-6300 NDW3-7500	27		204	243.7	106	104.4	26.4	

4.6.4 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.



4.7 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.

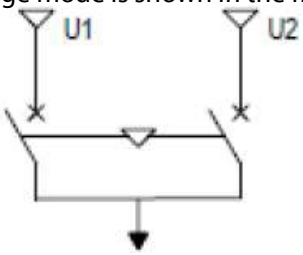
◆ Interlocking pattern selection is shown in the table below

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.



Breaks

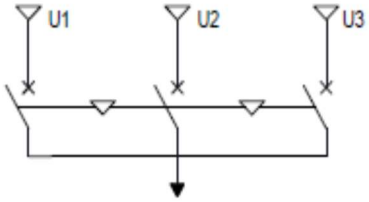
Status Table of Two Circuit

U1	U2
Close	Open
Shunt	Close
Shunt	Shunt

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

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

Status table of three circuit breakers (one for closing and two for opening)

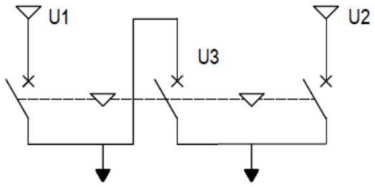


U1	U2	U3
Close	Open	Open
Shunt	Close	Open
Shunt	Open	Close
Shunt	Shunt	Shunt

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 Table 64.

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



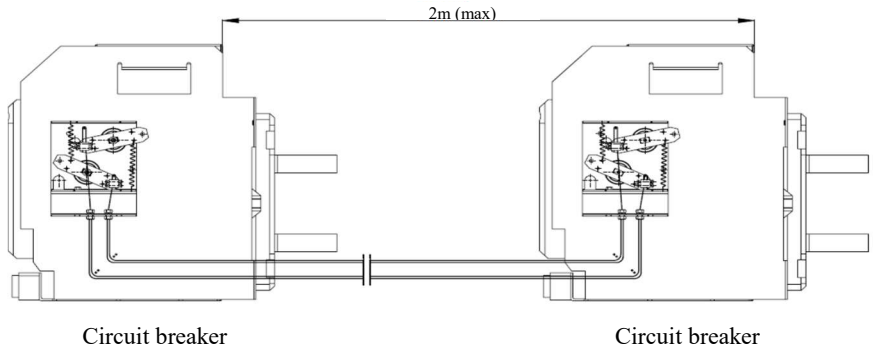
Status table of three circuit breakers (two for closing and one for opening)

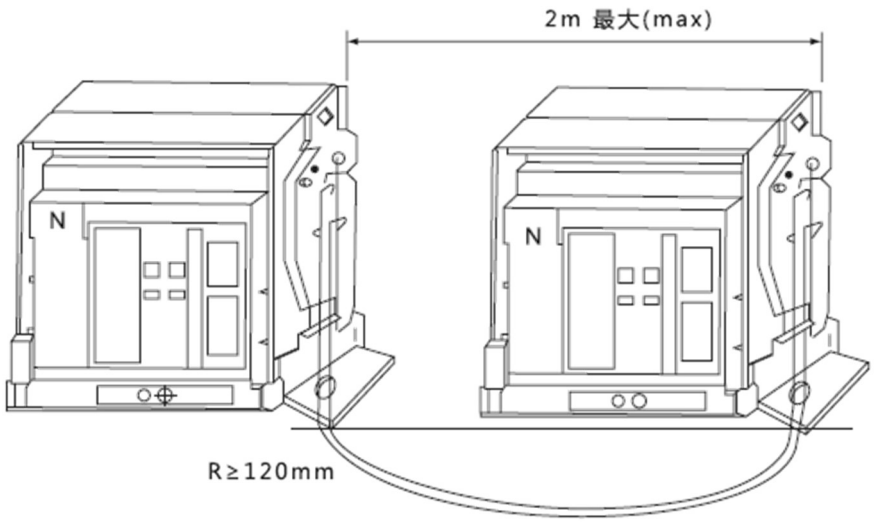
U1	U2	U3
Shunt	Open	Shunt
Close	Close	Open
Close	Open	Close
Open	Close	Close

◆ Type description

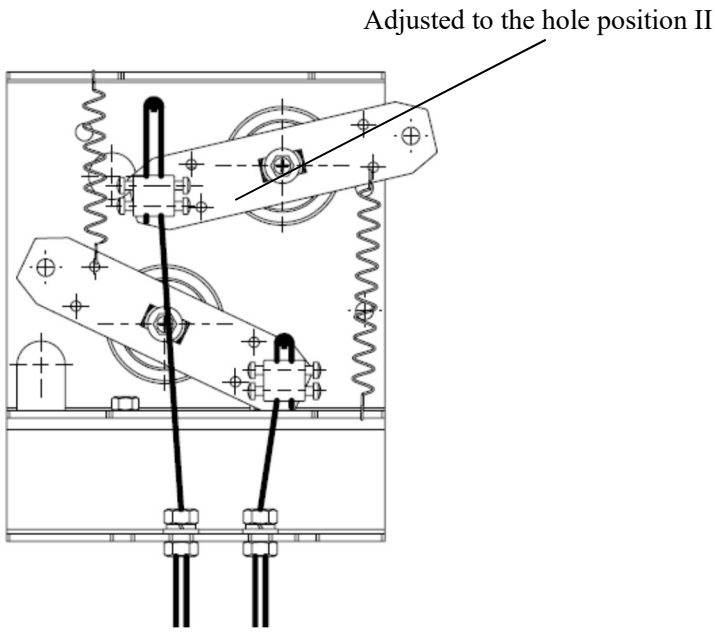
1) Two interlocking cables (one for closing and one for opening)

Installation Schematic Diagram:



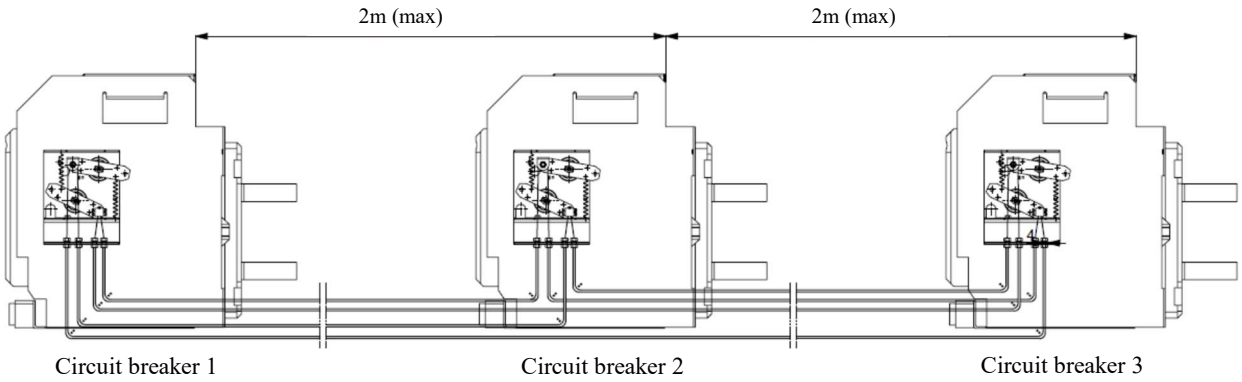


Adjustment schematic diagram:

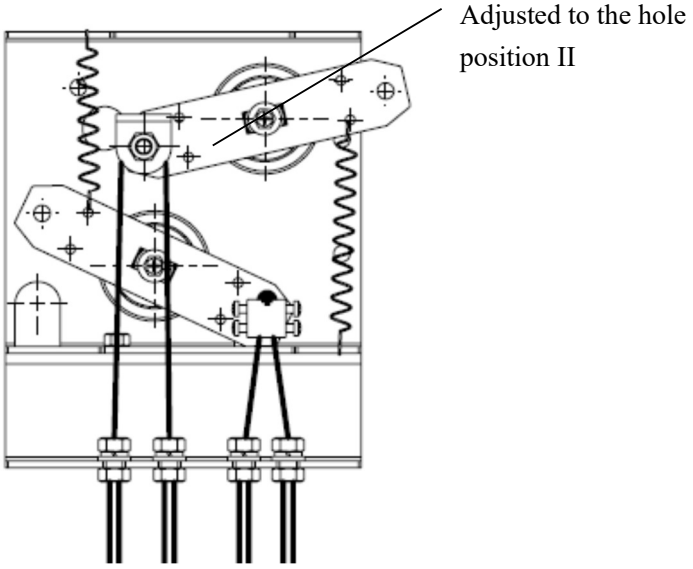


2) Three interlocking cables

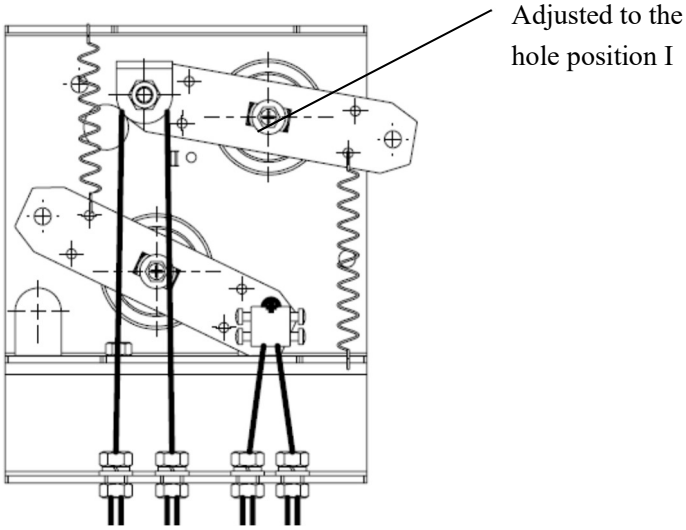
Installation schematic diagram:



Adjustment schematic diagram: One for closing and two for opening

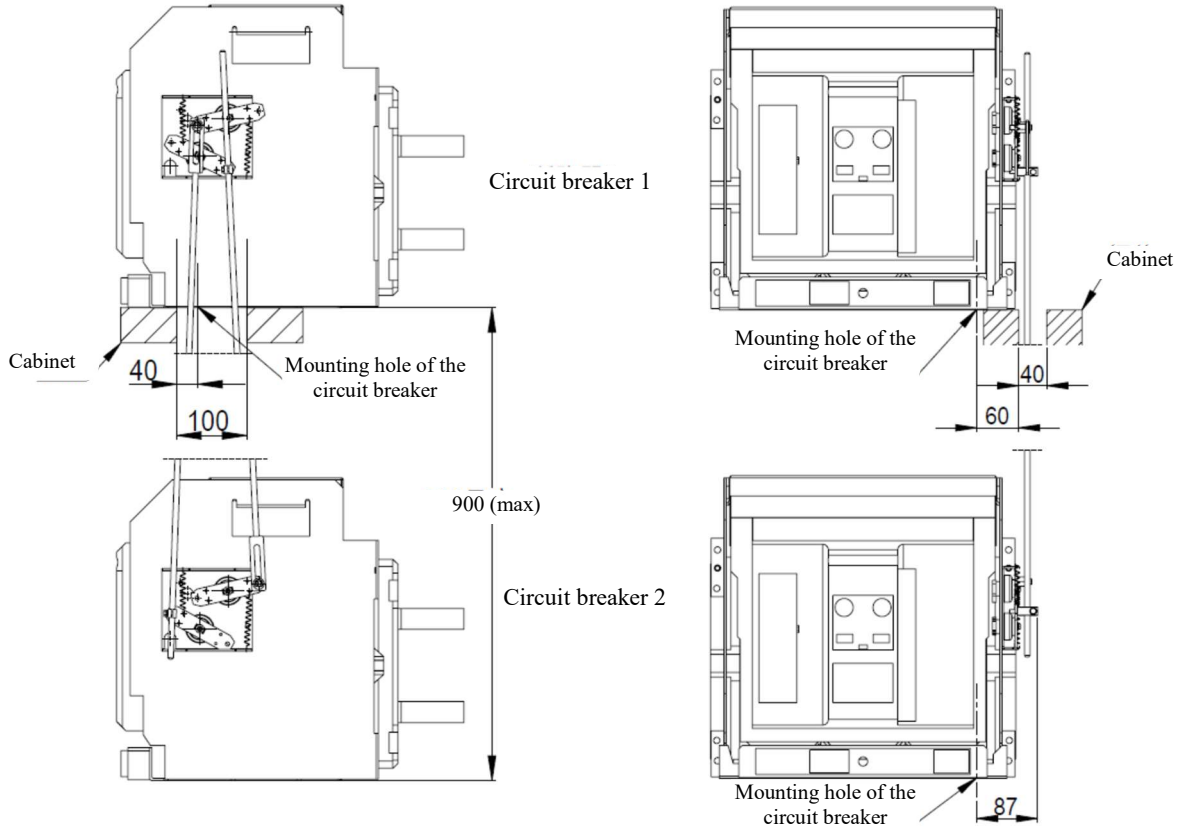


Adjustment schematic diagram:



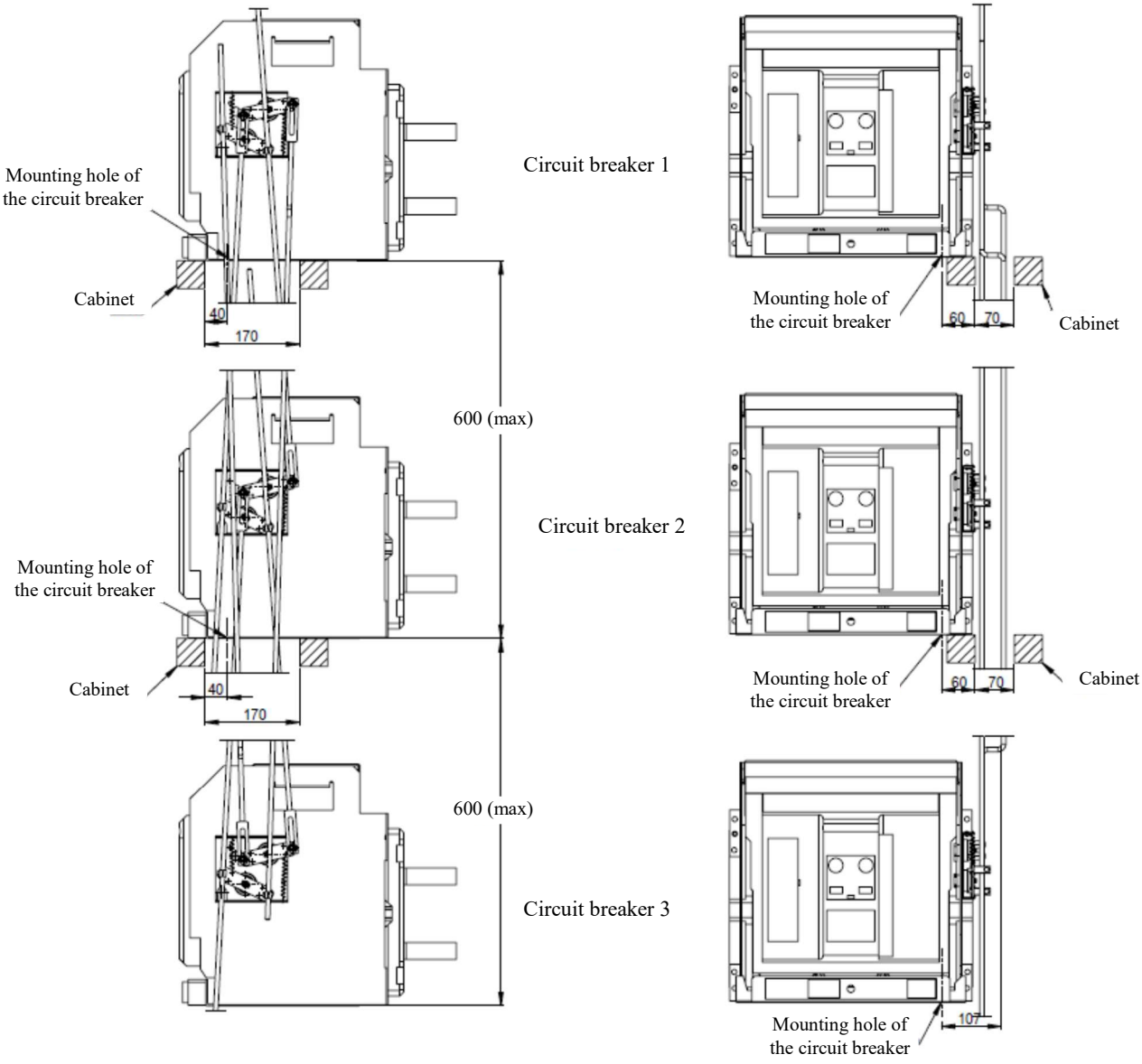
3) Two interlocking hard rods

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



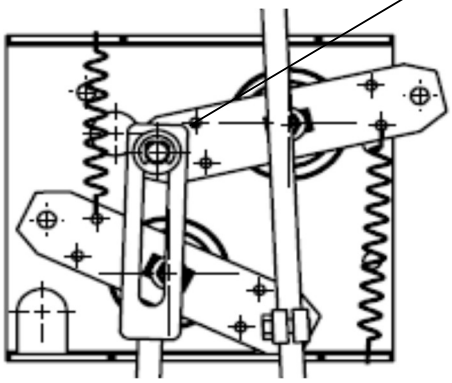
4) Three interlocking hard rods

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.

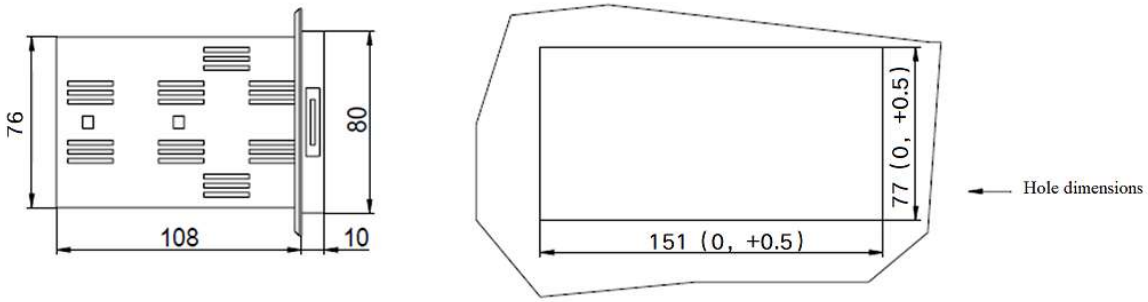
Adjustment schematic diagram:



4.7.2 Power Automatic Transfer Switches

Four-position switch state ★ Automatic switching; ★ 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 switching; ★ 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 selection range: AC187V, AC176V, AC165V, AC154V; ★ Overvoltage selection range: AC253V, AC264V, AC275V, AC286V; ★ Selection range of the tripping delay and closing delay: 0.5s, 2s, 5s, 10s

◆ See the figure below for outline and installation dimensions

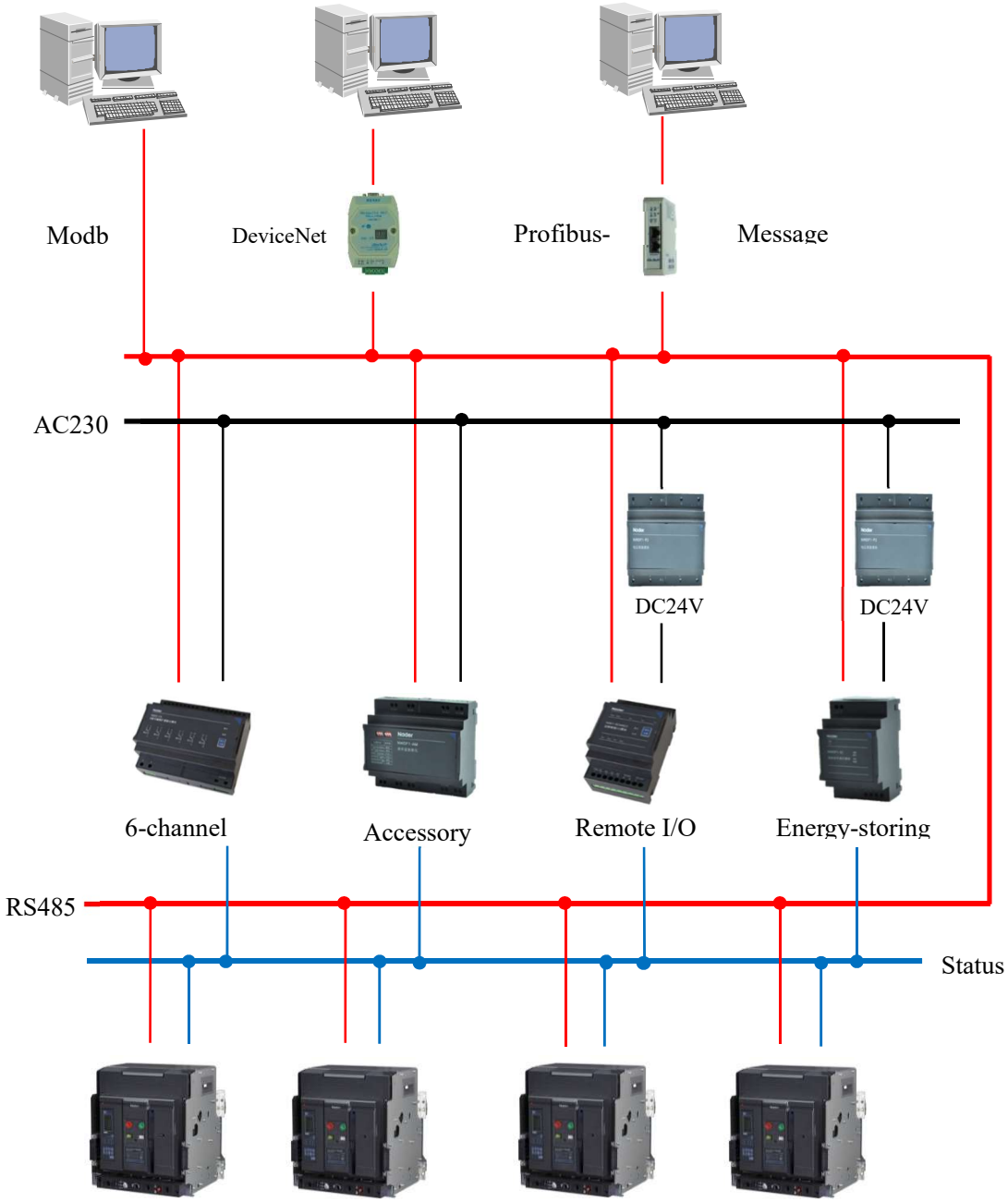


Note: Due to the Power Automatic Transfer Switches control device has overvoltage and undervoltage protection functions, in order to guarantee the consistency and reliability of the system protection, the air circuit breaker used for power supply automatic switching control device can't install undervoltage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

4.8 Communication System

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

■ Computer communication network



Note: 1. The red line represents the RS485 communication line, which is connected from the communication interface of controller; the black line represents the power supply line; the blue line represents the signal output line of the circuit breaker secondary terminal to output the circuit breaker status or control signal.

2. The message notification module needs to use a SIM card, which shall be prepared by users.

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

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

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

Chapter 5 Field of Application

Scope of application 5

The NDW3 air circuit breaker (hereinafter referred to as circuit breaker) can be applied to the distribution network with AC of 50 Hz / 60 Hz, rated current of 200A～7500A, rated insulation voltage of 1140V, rated operational voltage of AC220/230/240V, AC380/400/415V, AC440/480V, AC660/690V, AC800V, AC1000 and AC1140V AC1140V、AC1380V、AC1500Vfor distribution of electrical energy and protecting circuit and power equipment from overload, under-voltage, short circuit, single phase grounding and harm of other faults. It also has an isolating function 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 ambient temperature is -25℃ ~ + 70℃; the average within 24 h shall not be more than +35℃.

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

Ambient temperature		+40℃	45°C	-50°C	55°C	60°C	70°C
NDW3-1600	200A	200A	200A	200A	200A	200A	200A
	400A	400A	400A	400A	400A	400A	400A
	630A	630A	630A	630A	630A	630A	630A
	800A	800A	800A	800A	800A	800A	800A
	1000A	1000A	1000A	1000A	1000A	1000A	1000A
	1250A	1250A	1250A	1250A	1250A	1250A	1250A
	1600A	1600A	1600A	1600A	1600A	1600A	1520A
NDW3-2500	630A	630A	630A	630A	630A	630A	630A
	800A	800A	800A	800A	800A	800A	800A
	1000A	1000A	1000A	1000A	1000A	1000A	1000A
	1250A	1250A	1250A	1250A	1250A	1250A	1250A
	1600A	1600A	1600A	1600A	1600A	1600A	1600A
	2000A	2000A	2000A	2000A	2000A	1950A	1825A
	2500A	2500A	2375A	2225A	2125A	1950A	1825A
NDW3-4000	800A	800A	800A	800A	800A	800A	800A
	1000A	1000A	1000A	1000A	1000A	1000A	1000A
	1250A	1250A	1250A	1250A	1250A	1250A	1250A
	1600A	1600A	1600A	1600A	1600A	1600A	1600A

	2000A	2000A	2000A	2000A	2000A	2000A	2000A
	2500A	2500A	2500A	2500A	2500A	2500A	2500A
	3200A	3200A	3200A	3200A	3200A	3120A	2920A
	3600A	3600A	3600	3560A	3400A	3120A	2920A
	4000A	4000A	3800A	3560A	3400A	3120A	2920A
NDW3-6300	4000A	4000A	4000A	4000A	4000A	4000A	4000A
	5000A	5000A	5000A	5000A	5000A	4914A	4599A
	6300A	6300A	5985A	5607A	5355A	4914A	4599A
NDW3-7500	4000A	4000A	4000A	4000A	4000A	4000A	4000A
	5000A	5000A	5000A	5000A	5000A	4914A	4599A
	6300A	6300A	5985A	5607A	5355A	4914A	4599A
	7500A	7500A	7125A	6675A	6375A	5850A	5475A

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 High Altitude Derating Tables 1, 2 and 3.

Electric Current High-altitude Derating Table 1

Working current		Altitude			
Model	Rated current (A)	2000m	3000m	4000m	5000m
NDW3-1600	200~630	1.0In	1.0In	1.0In	1.0In
	800~1000	1.0In	1.0In	1.0In	1.0In
	1250~1600	1.0In	1.0In	0.97In	0.87In
NDW3-2500	630~1600	1.0In	1.0In	1.0In	1.0In
	2000~2500	1.0In	0.93In	0.88In	0.85In
NDW3-4000	800~2500	1.0In	1.0In	1.0In	1.0In
	3200	1.0In	1.0In	1.0In	1.0In
	3600	1.0In	0.93In	0.88In	0.82In
	4000	1.0In	0.93In	0.88In	0.82In
NDW3-6300	4000, 5000	1.0In	1.0In	1.0In	1.0In
	6300	1.0In	0.93In	0.88In	0.82In
NDW3-7500	4000、5000	1.0In	1.0In	1.0In	1.0In
	6300、7500	1.0In	0.93In	0.88In	0.82In

Voltage and breaking capacity high altitude derating table 2

Altitude m	2000	3000	4000	5000
Impulse withstand voltage Uimp (kV)	12	12	12	12
Rated insulation voltage Ui (V)	1250	1250	1140	1000
Rated insulation voltage(NDW3-7500) Ui (V)	1000	1000	900	800
Rated working voltage (V)	690	690	690	690
	1140	1140	1140	1000
Power frequency withstand voltage (V)	3500	3500	3500	3000
Breaking capacity derating factor	1.0	0.97	0.93	0.89

Note: This table does not include NDW3-1600. See Table 3 for the derating data of NDW3-1600.

1600 frame size voltage high altitude derating table 3

Altitude m	2000	3000	4000	5000
Impulse withstand voltage Uimp (kV)	12	11	10	8
Rated insulation voltage Ui (V)	1000	900	800	700
Rated working voltage (V)	690	690	620	550
Power frequency withstand voltage (V)	3500	3150	2500	2500

5.1.4 Anti-corrosion Level

Salt mist: Severe Level (3), passed GB/T 2423.18-2012 Environmental Testing for Electric and Electronic Products. Part II: Test Method Test Kb: Salt spray.

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 (2 -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 14048.2-2020 Low-voltage Switchgear and Control Equipment - Part 2: Circuit Breaker - Appendix F

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

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

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), IP54 (IP54 transparent cover assembly with special door frame, installed in the cabinet compartment)

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 frame Inm (A)	Rated working current In (A) 40℃	Copper bar specification	
		Dimension (mm)	Number
1600	200	20×5	1
	400	50×5	1
	630	40×5	2
	800	50×5	2
	1000	40×5	3
	1250	40×5	4
	1600	50×10	2
2500	630	80×5	1
	800, 1000	80×5	2
	1250	80×5	3
	1600	80×5	3
	2000	80×10	2
	2500	80×10	3

4000	800~1600	80×5	3
	2000	80×10	2
	2500	80×10	3
	3200, 4000	100×10	5
6300	4000	100×10	5
	5000, 6300	100×10	6
7500	4000	100×10	5
	5000、6300	100×10	6
	7500	120×10	8

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. Copper bar electrical clearance (rated working voltage ≥800V, electrical clearance ≥25mm; rated working voltage ≤690V, electrical clearance ≥15mm), the altitude exceeds 5000m, the relative humidity exceeds 90%, the electrical clearance should be based on GB/T 20645 7.1.1 The content of Table 1 has been adjusted.

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
NDW3-1600	≤123.5 W	≤331.5 W
NDW3-2500	≤356.8 W	≤823.4 W
NDW3-4000	≤486.7 W	≤856.8 W
NDW3-6300	≤787 W	≤1145 W
NDW3-7500	≤968 W	≤1480 W

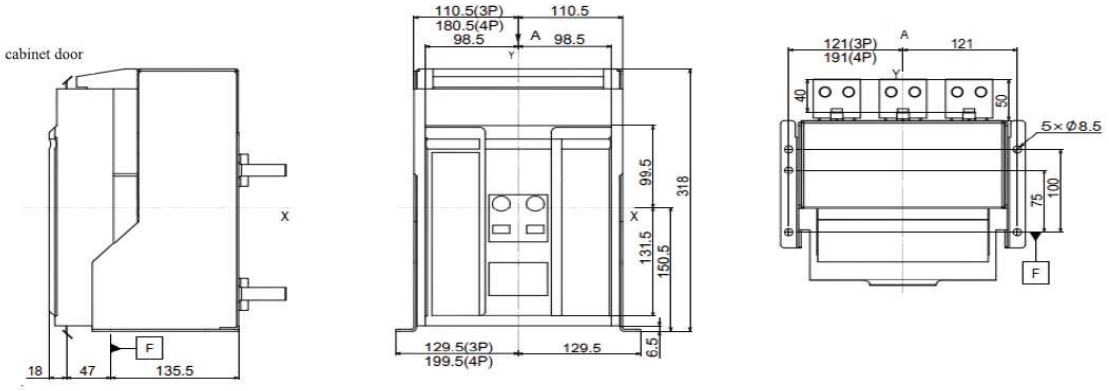
Chapter 6 Outline and Installation Dimensions

Outline and Installation Dimensions 6

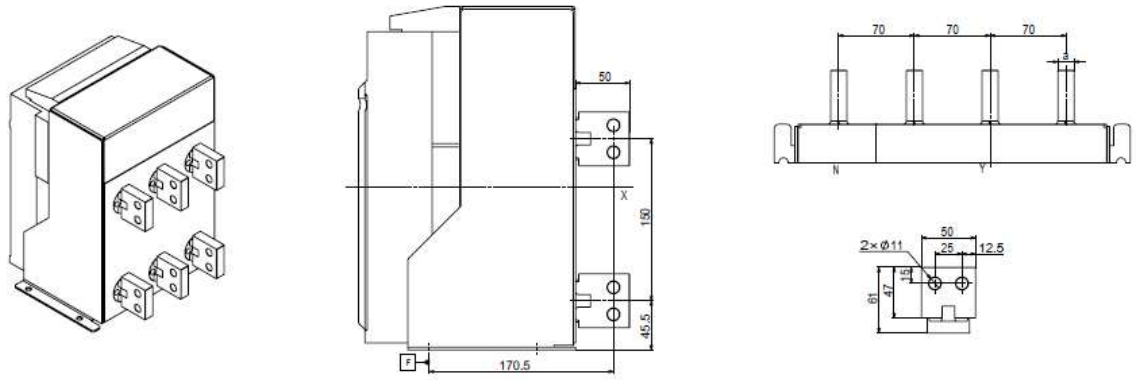
6.1 NDW3-1600

NDW3-1600 fixed type (unit: mm)

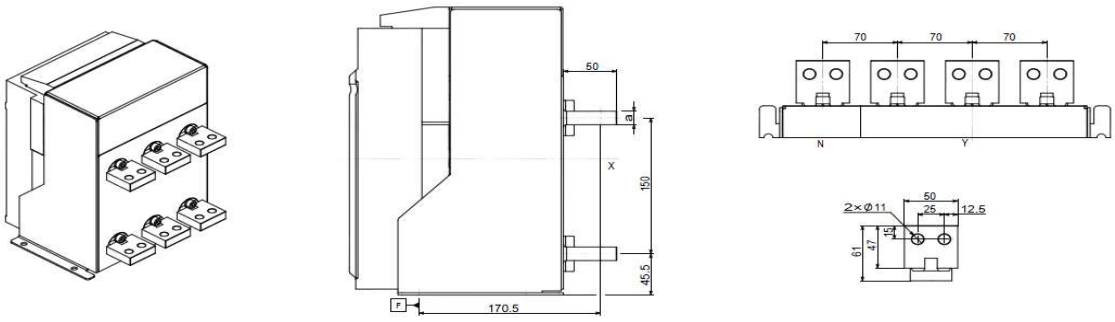
Dimensions **Fixed Details**



Horizontal Wiring **Detail**



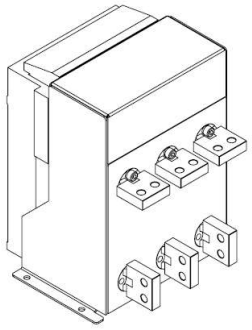
Vertical Wiring **Detail**

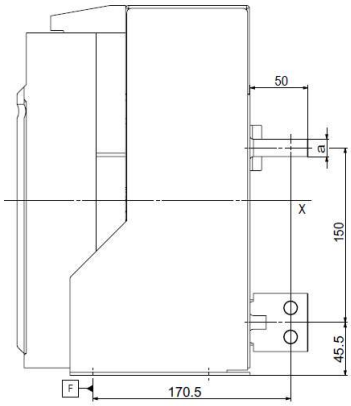


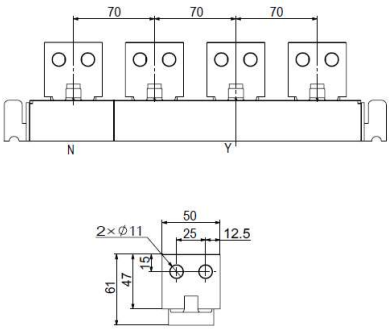
Rated current	Size of busbar a (mm)
200A, 400A, 630A	10
800A, 1000A, 1250A, 1600A	15

Note: For the 3-pole circuit breaker, X and Y are the symmetric axes of the front panel;

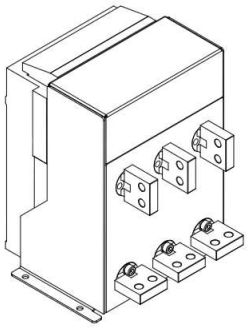
Mixed Wiring (Upper Horizontal, Lower Vertical) Detail

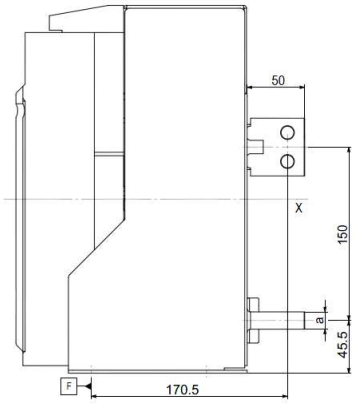


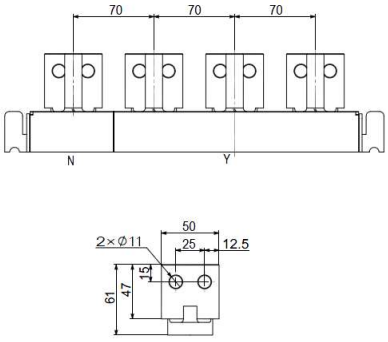




Mixed Wiring (Upper Vertical, Lower Horizontal) Detail





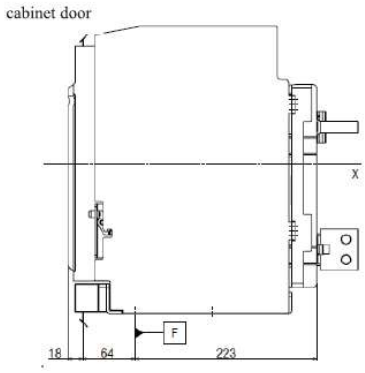


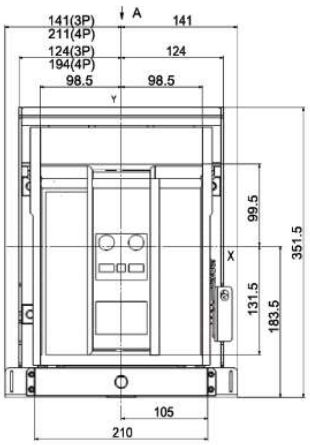
Note: For the 3-pole circuit breaker, X and Y are the symmetric axes of the front panel;

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

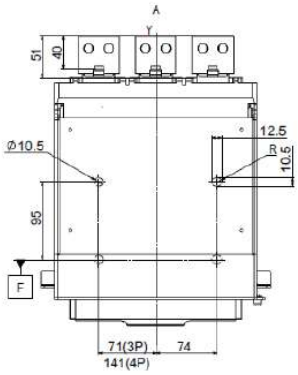
NDW3-1600 drawout type (unit: mm)

Dimensions

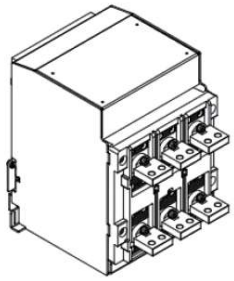


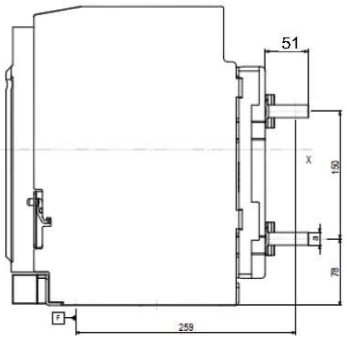


Fixed Details

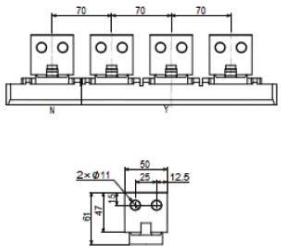


Horizontal Wiring

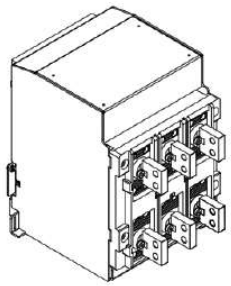


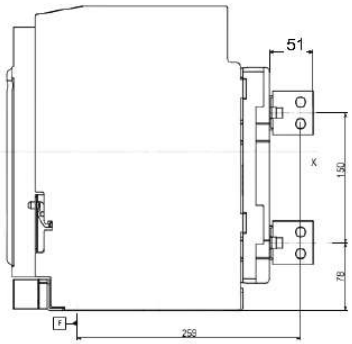


Detail

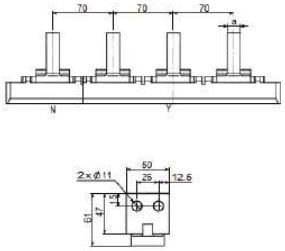


Vertical Wiring





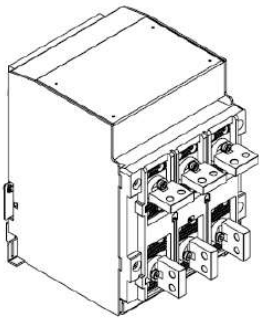
Detail

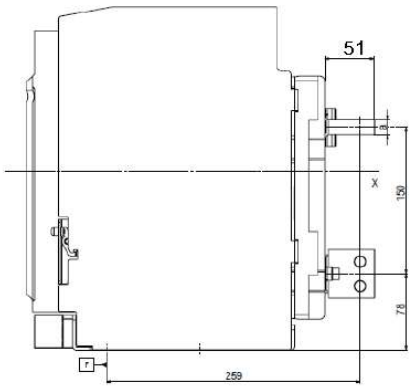


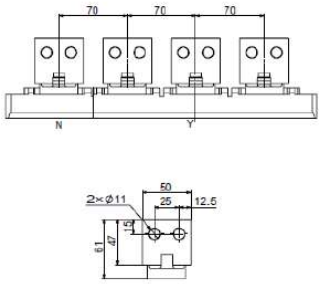
Note: For the 3-pole circuit breaker, X and Y are the symmetric axes of the front panel;

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

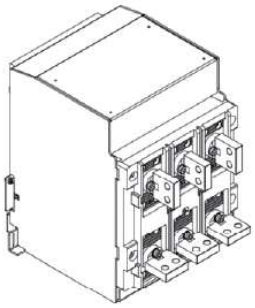
Mixed Wiring (Upper Horizontal, Lower Vertical) **Detail**

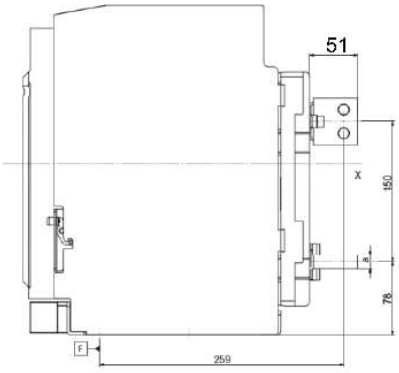


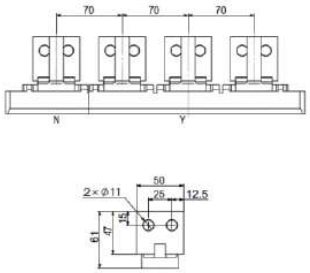




Mixed Wiring (Upper Vertical, Lower Horizontal) **Detail**







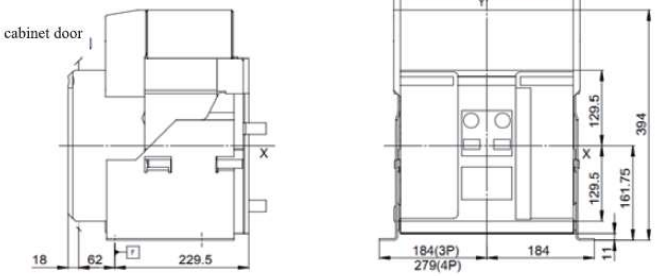
Note: For the 3-pole circuit breaker, X and Y are the symmetric axes of the front panel;

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

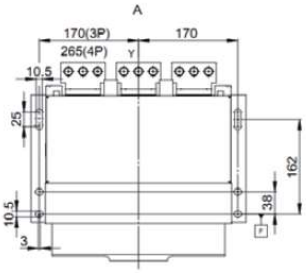
6.2 NDW3-2500

NDW3-2500 fixed type (unit: mm)

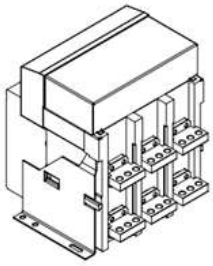
Dimensions

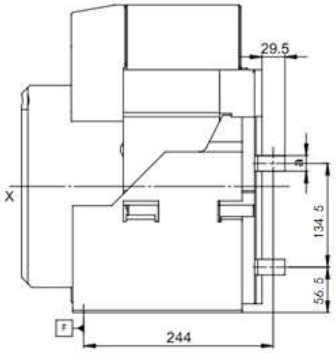


Fixed Details

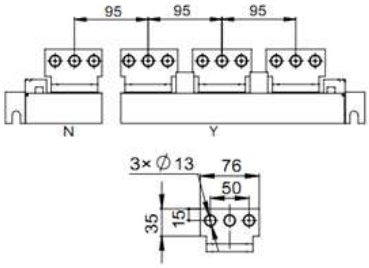


Horizontal Wiring

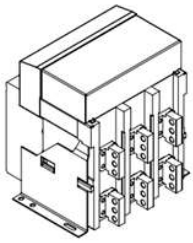


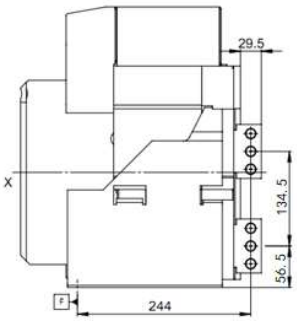


Detail

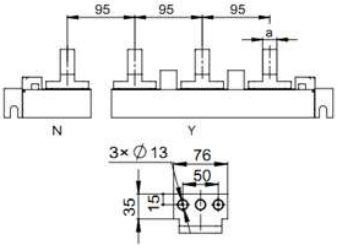


Vertical Wiring





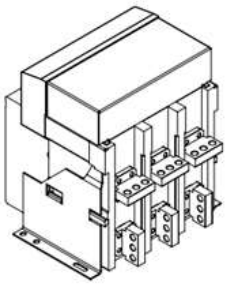
Detail

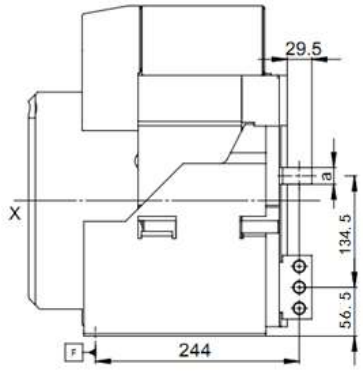


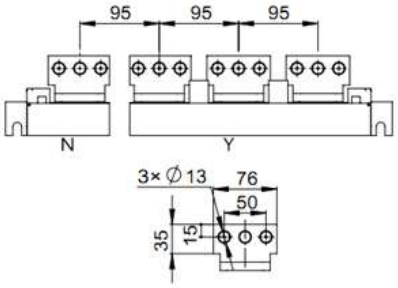
Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

Rated current	Size of busbar a (mm)
630A, 800A, 1000A, 1250A	15
1600A, 2000A, 2500A	20

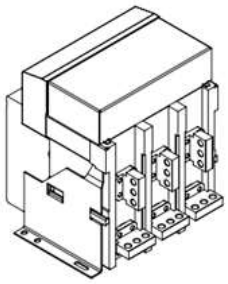
Mixed Wiring (Upper Horizontal, Lower Vertical) Detail

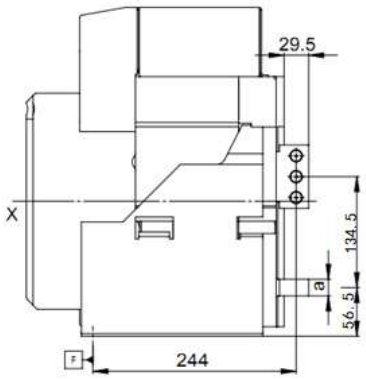


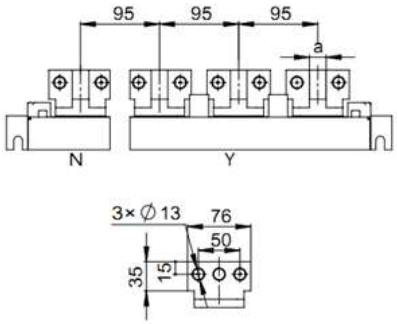




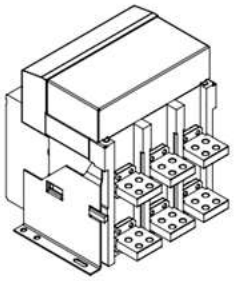
Mixed Wiring (Upper Vertical, Lower Horizontal) Detail

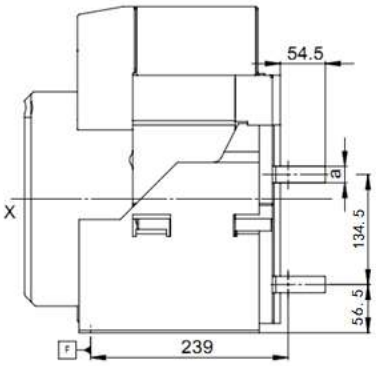


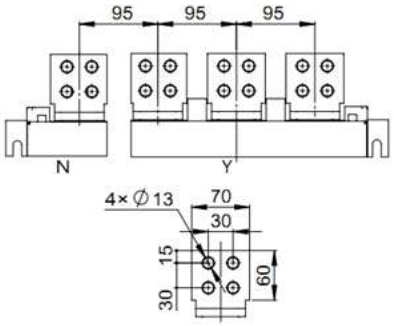




Horizontal extension wiring Detail



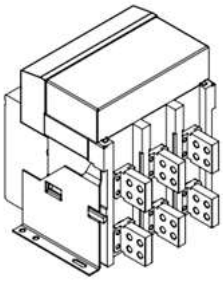


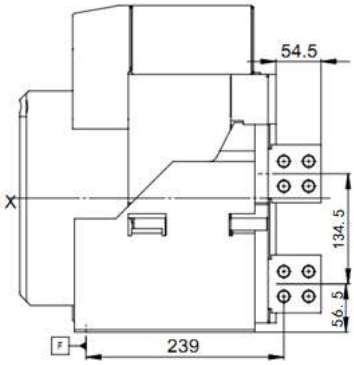


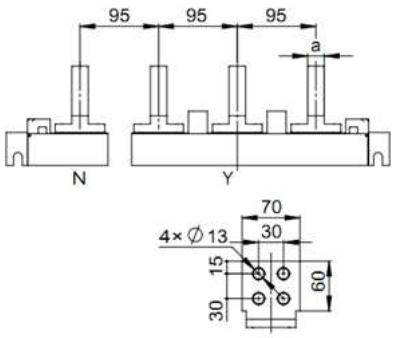
Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

Rated current	Size of busbar a (mm)
630A, 800A, 1000A, 1250A	15
1600A, 2000A, 2500A	20

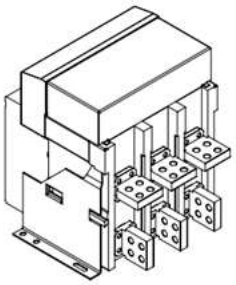
Vertical extension wiring **Detail**

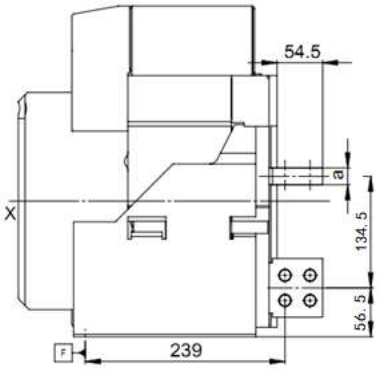


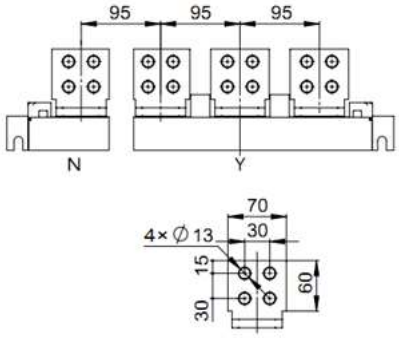




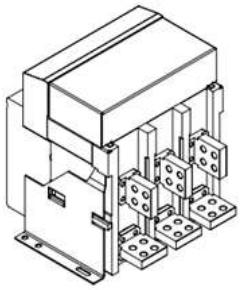
Mixed Wiring (Upper Horizontal, Lower Vertical) Detail

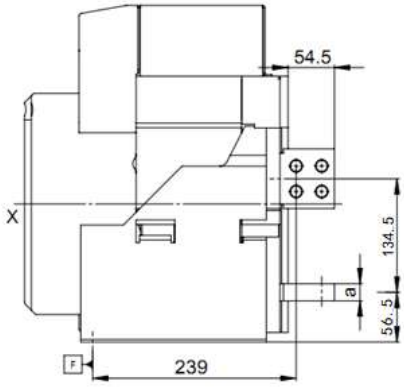


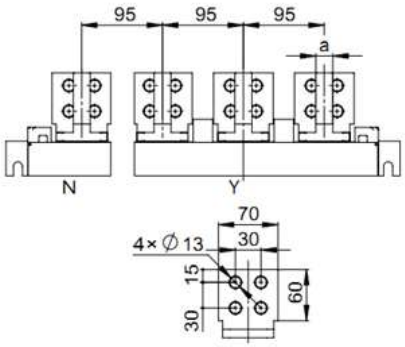




Mixed Wiring (Upper Vertical, Lower Horizontal) Detail





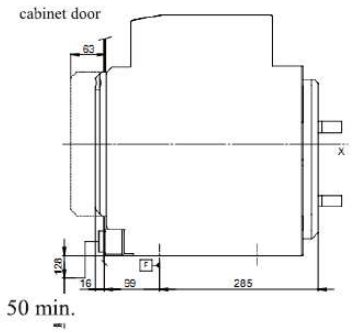


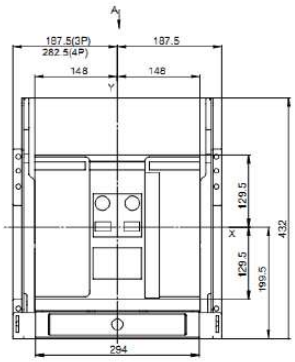
Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

Rated current	Size of busbar a (mm)
630A, 800A, 1000A, 1250A	15
1600A, 2000A, 2500A	20

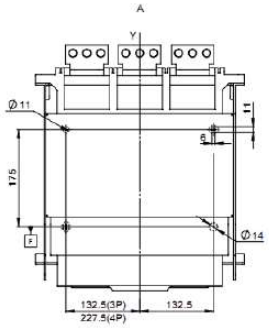
NDW3-2500 drawout type

Dimensions

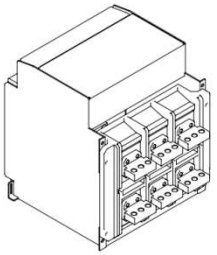


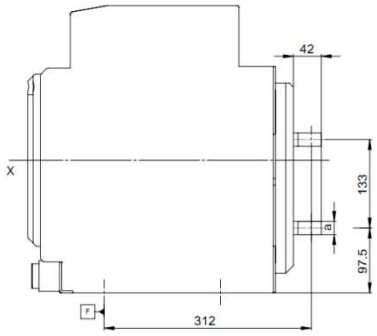


Fixed Details

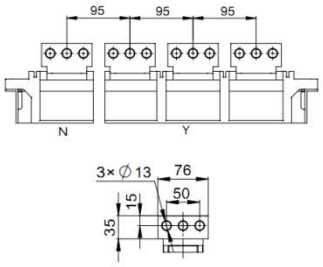


Horizontal Wiring

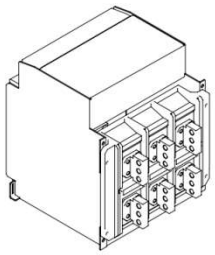


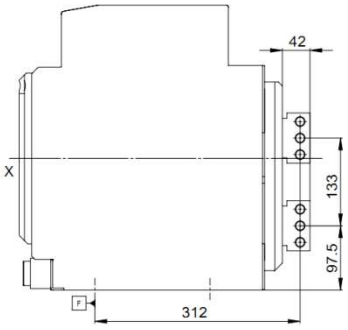


Detail

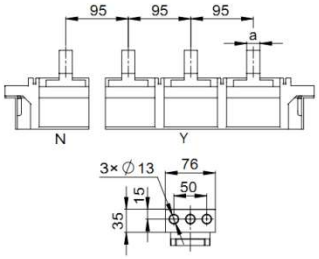


Vertical Wiring





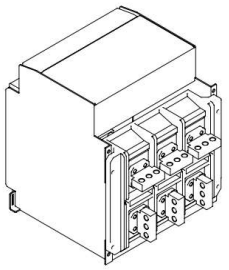
Detail

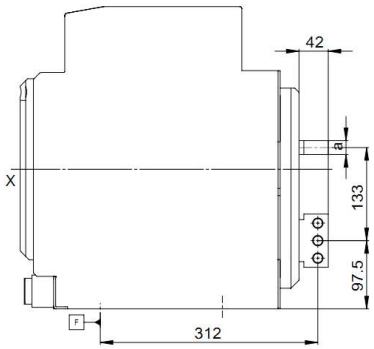


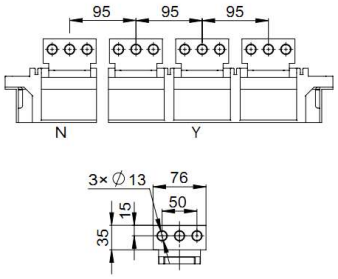
Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

Rated current	Size of busbar a (mm)
630A, 800A, 1000A, 1250A	15
1600A, 2000A, 2500A	20

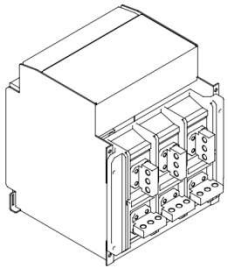
Mixed Wiring (Upper Horizontal, Lower Vertical) **Detail**

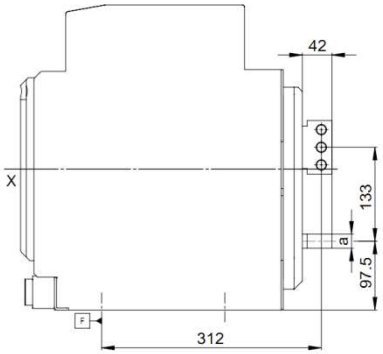


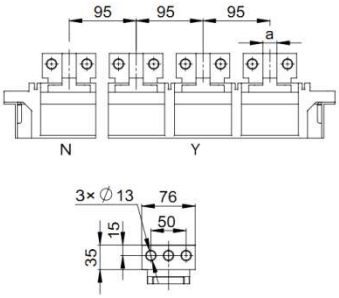




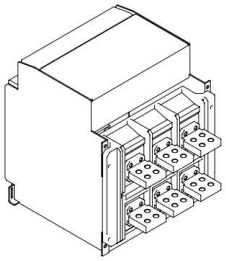
Mixed Wiring (Upper Vertical, Lower Horizontal) Detail

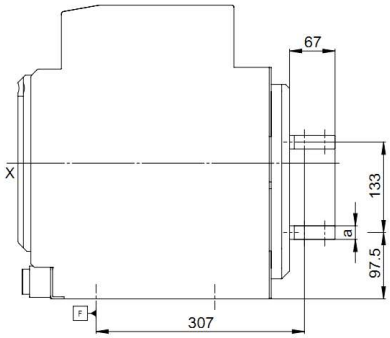


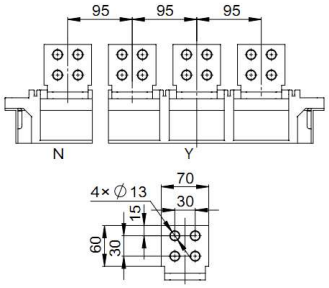




Horizontal extension wiring **Detail**



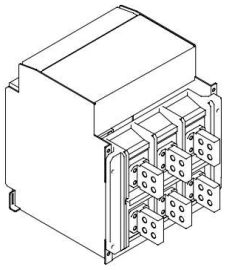


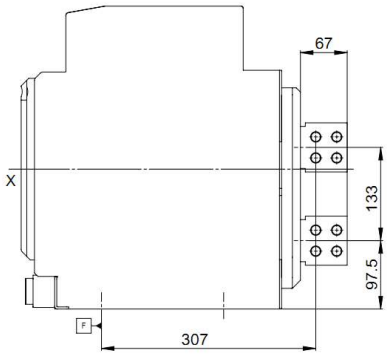


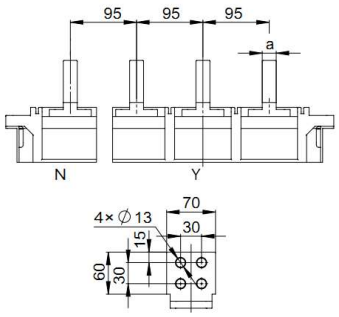
Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

Rated current	Size of busbar a (mm)
630A, 800A, 1000A, 1250A	15
1600A, 2000A, 2500A	20

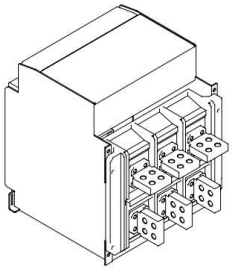
Vertical extension wiring **Detail**

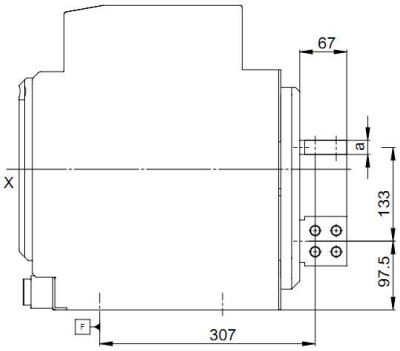


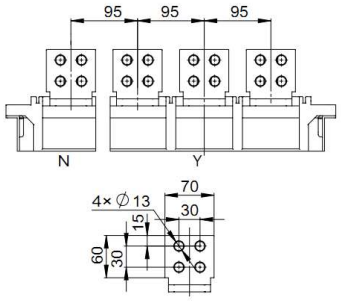




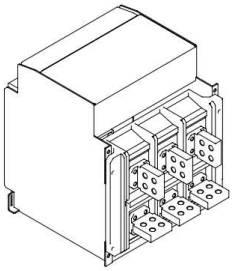
Mixed Wiring (Upper Horizontal, Lower Vertical) Detail

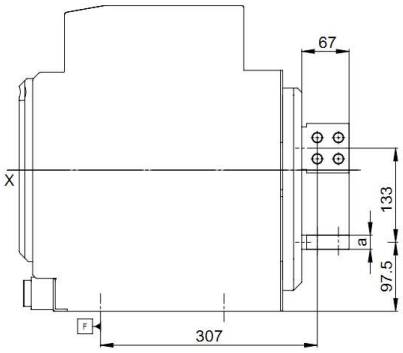


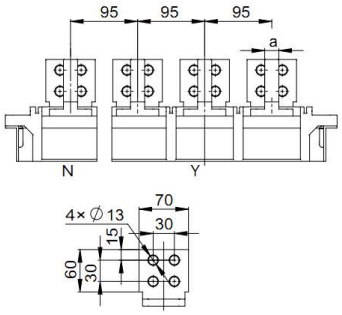




Mixed Wiring (Upper Vertical, Lower Horizontal) Detail







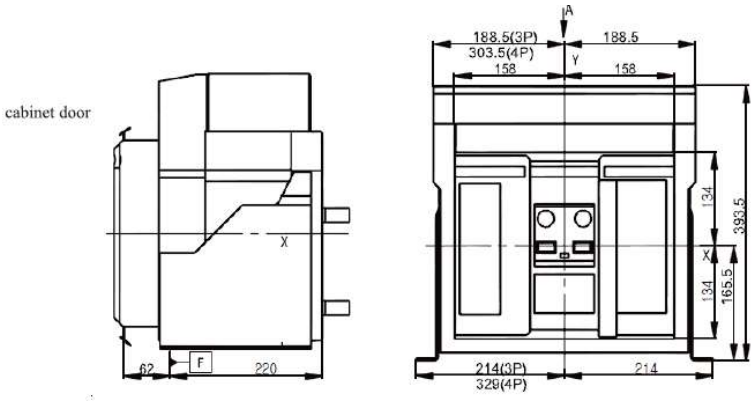
Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

Rated current	Size of busbar a (mm)
630A, 800A, 1000A, 1250A	15
1600A, 2000A, 2500A	20

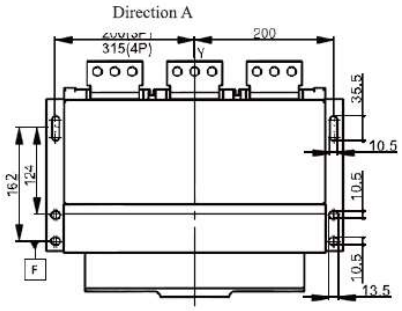
6.3 NDW3-4000

NDW3-4000 fixed type (unit: mm)

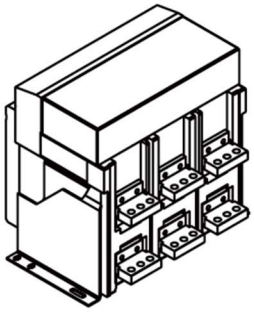
Dimensions

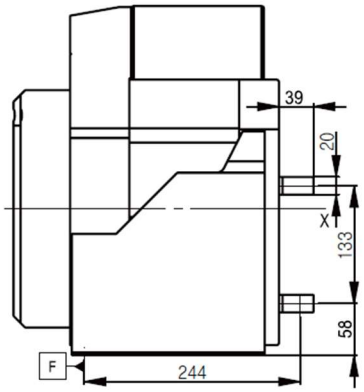


Fixed Details

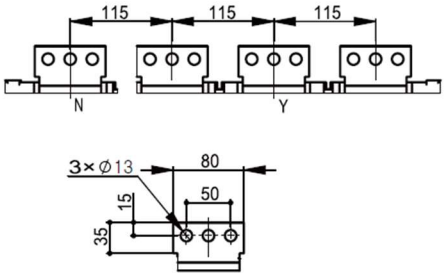


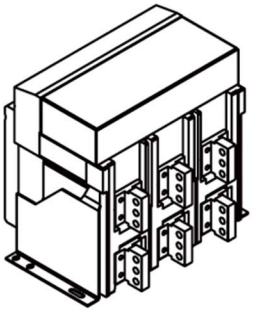
800A-2500A horizontal and vertical wiring

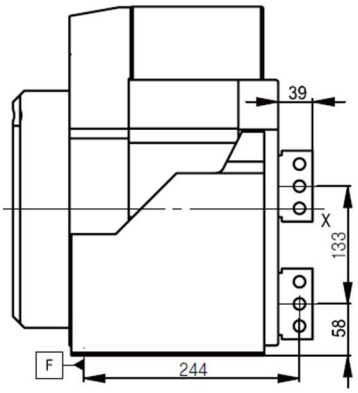


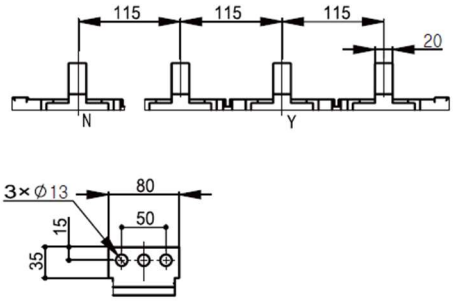


Detail



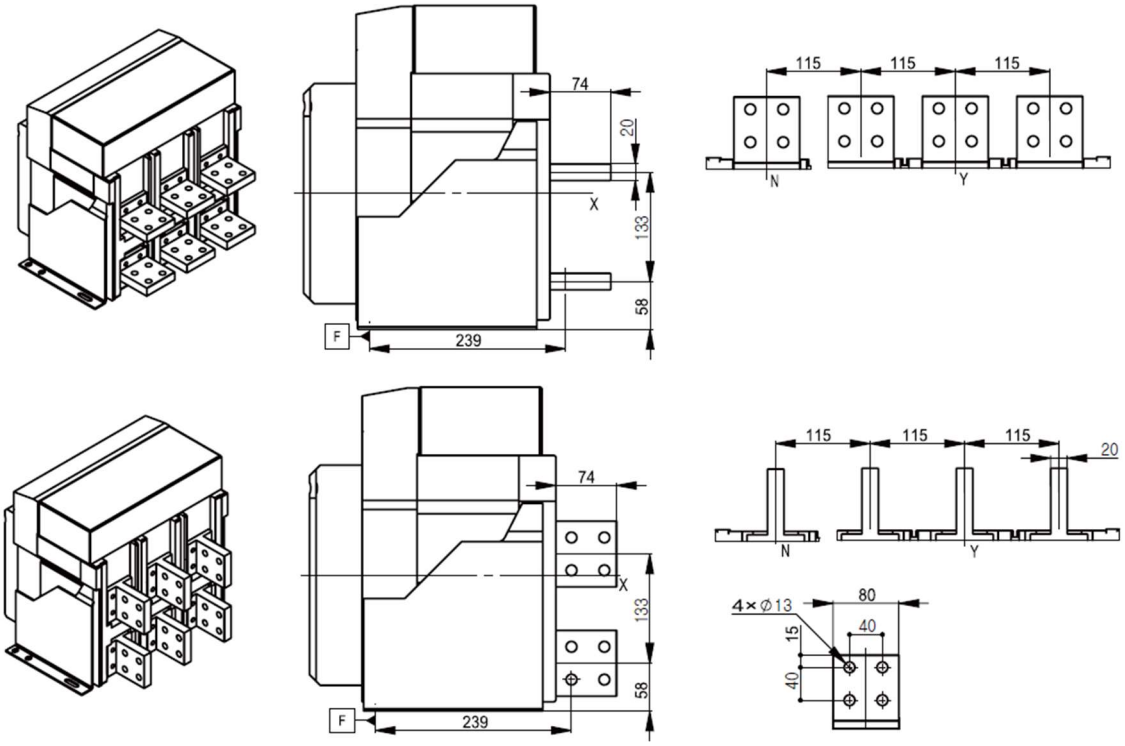




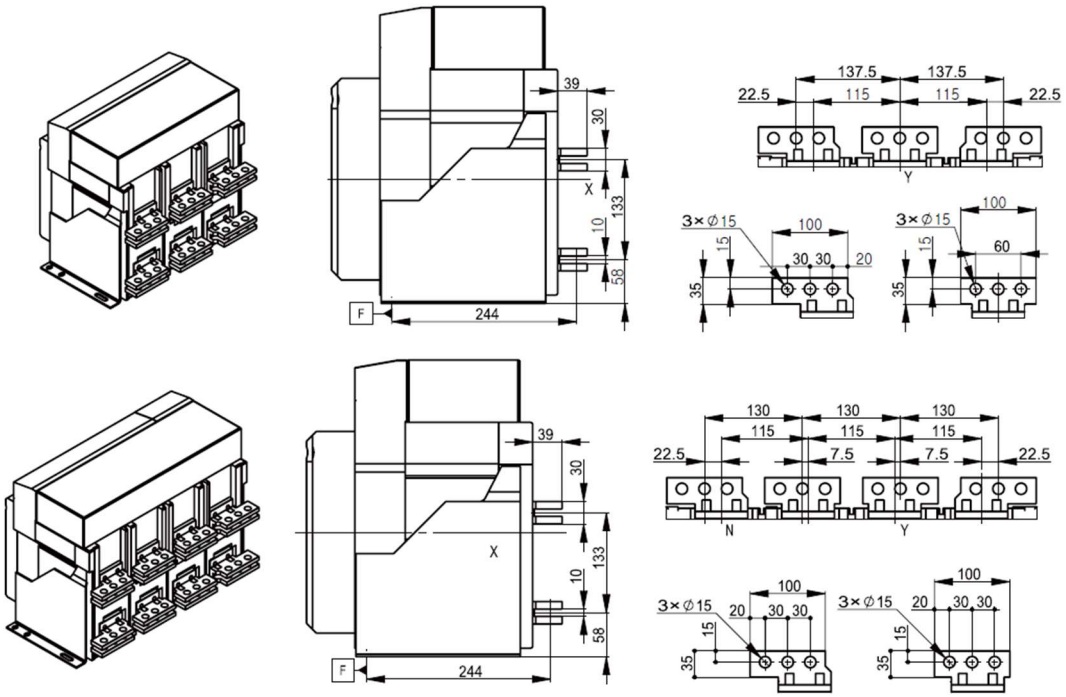


Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

1600A-2500A horizontal and vertical extended wiring **Detail**

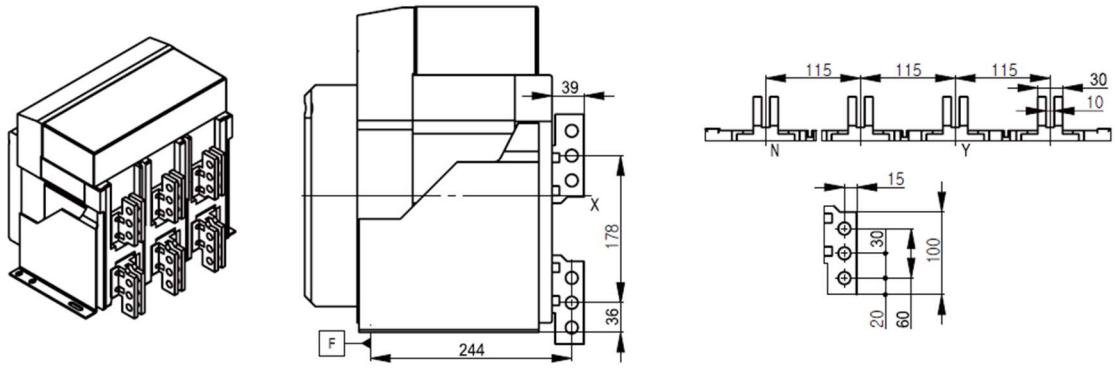


3200A-4000A horizontal wiring **Detail**

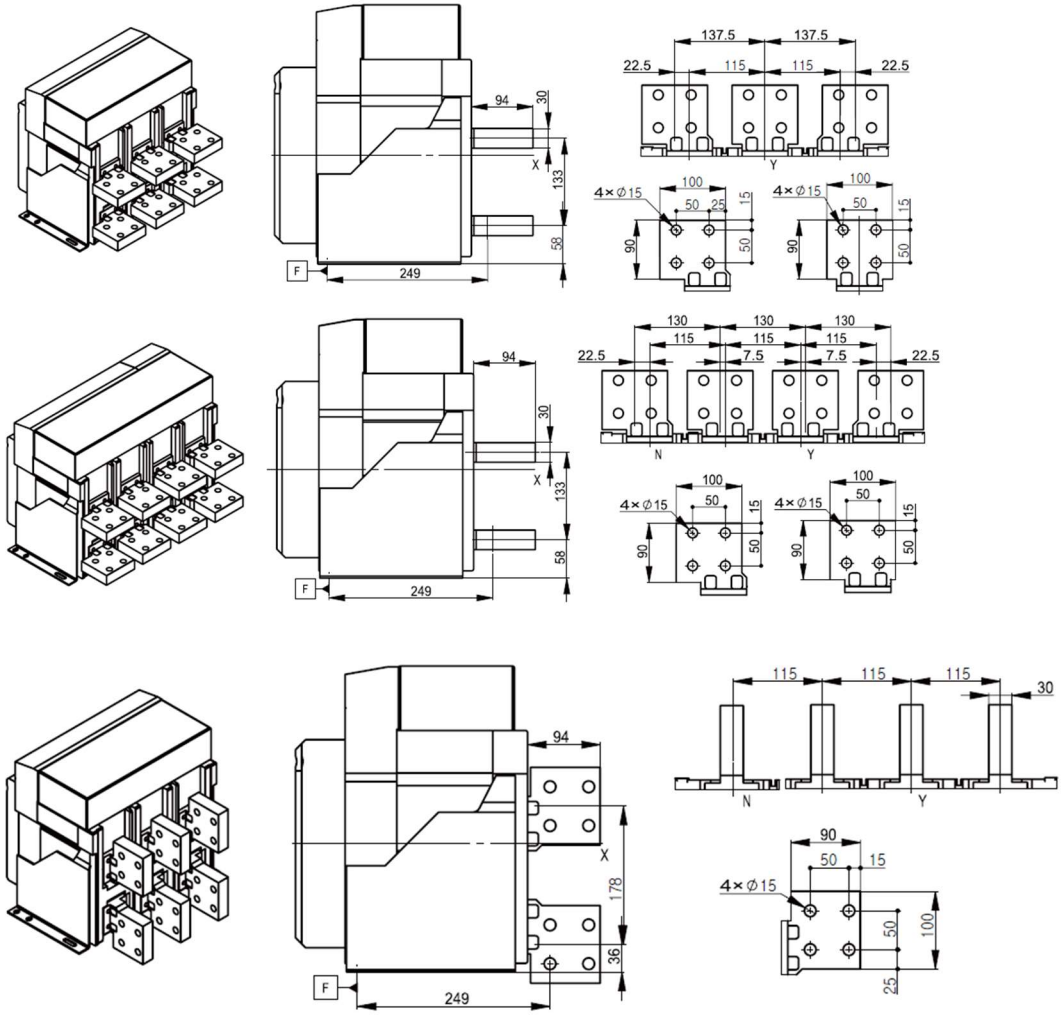


Note: X and Y axes are the symmetric axes of the front mask

3200A-4000A vertical wiring **Detail**



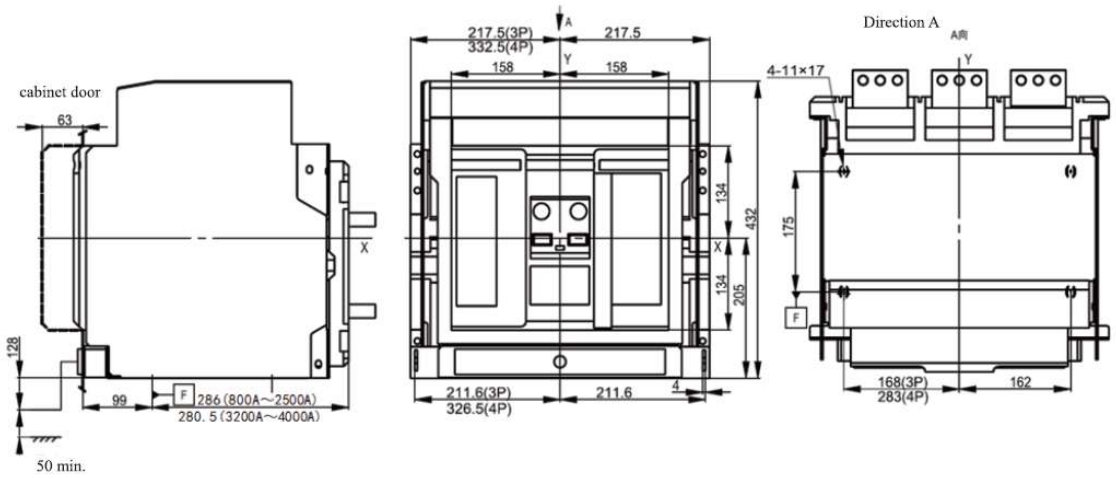
3200A-4000A horizontal extended and vertical extended wiring **Detail**



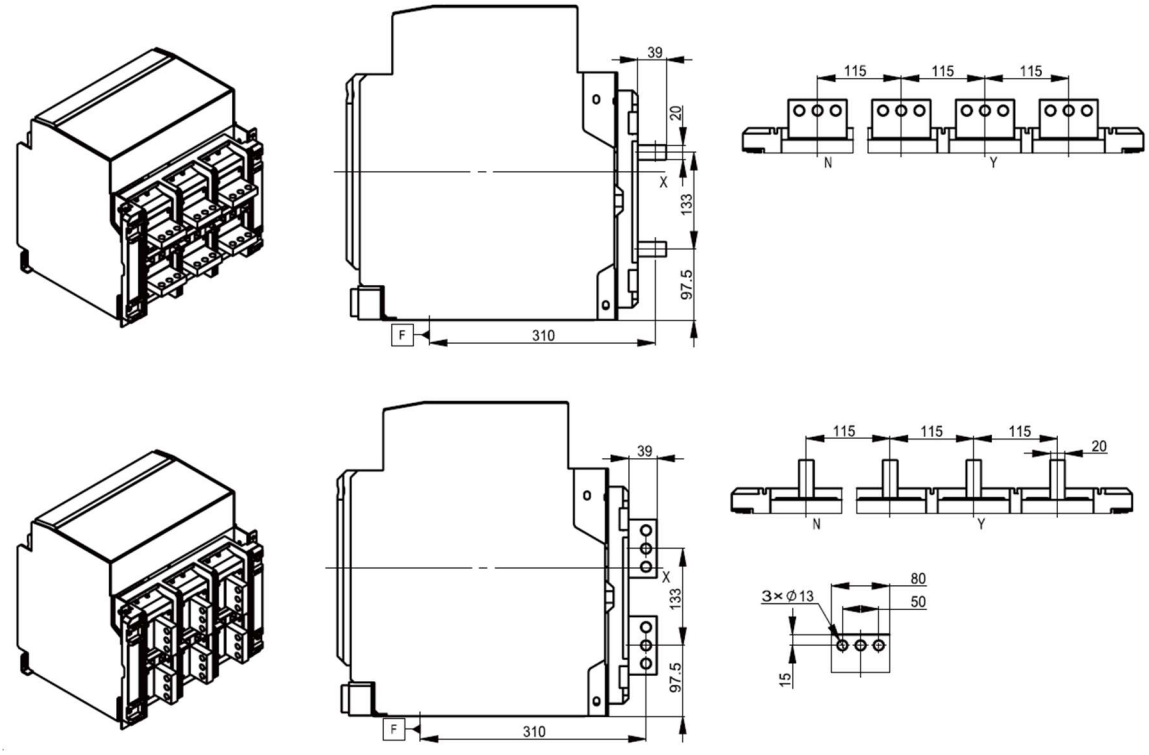
Note: X and Y axes are the symmetric axes of the front mask

NDW3-4000 drawout type

Dimensions **Fixed Details**

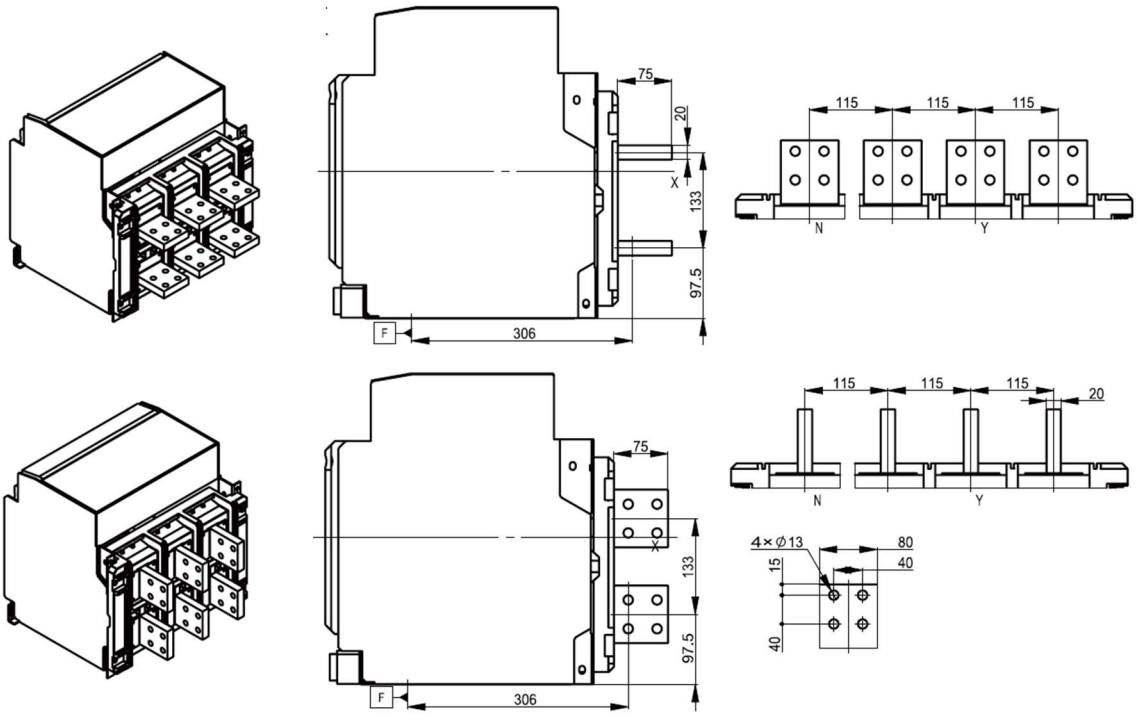


800A-2500A horizontal and vertical wiring **Detail**

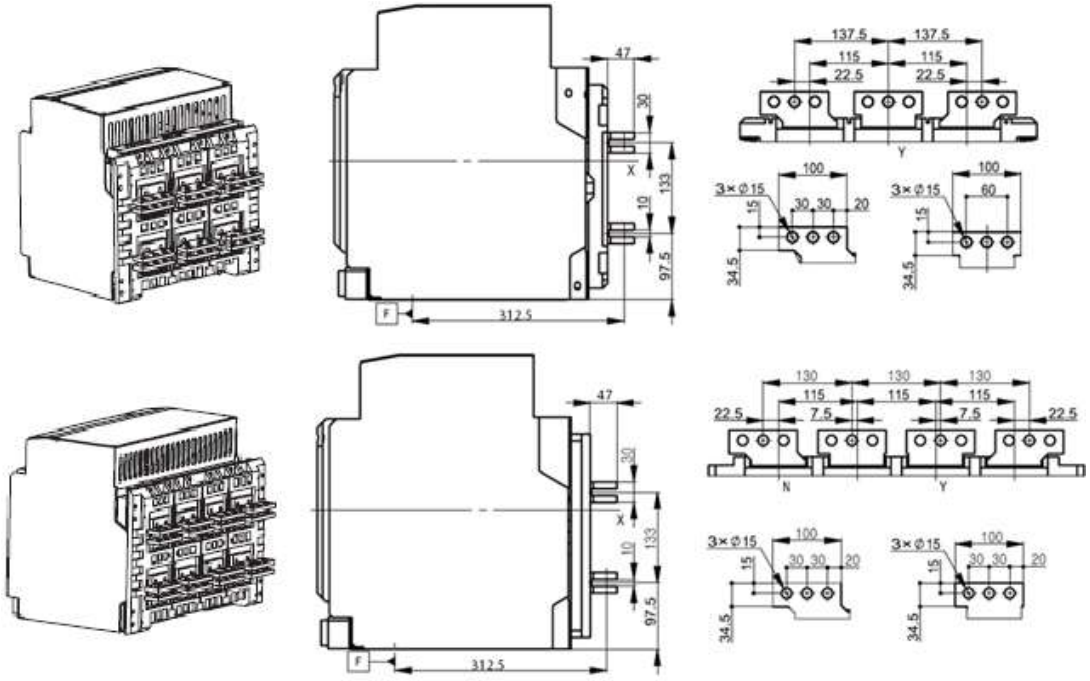


Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

1600A-2500A horizontal and vertical extended wiring **Detail**

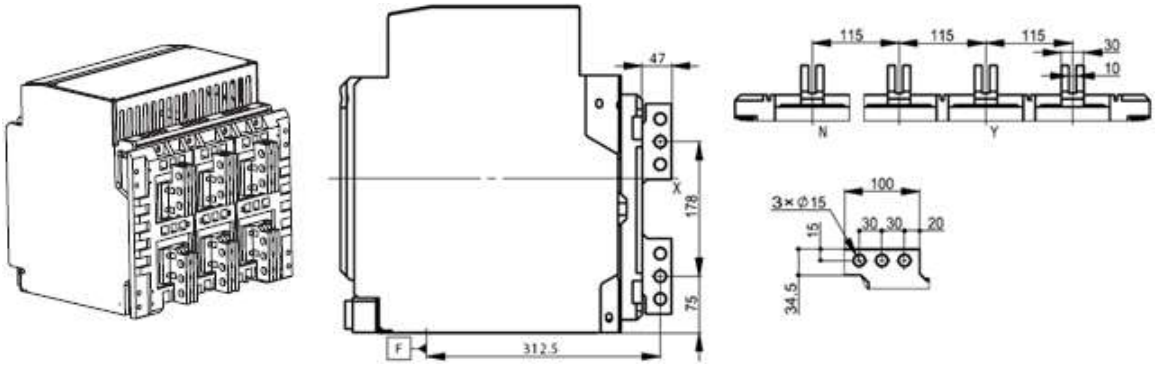


3200A-4000A horizontal wiring **Detail**

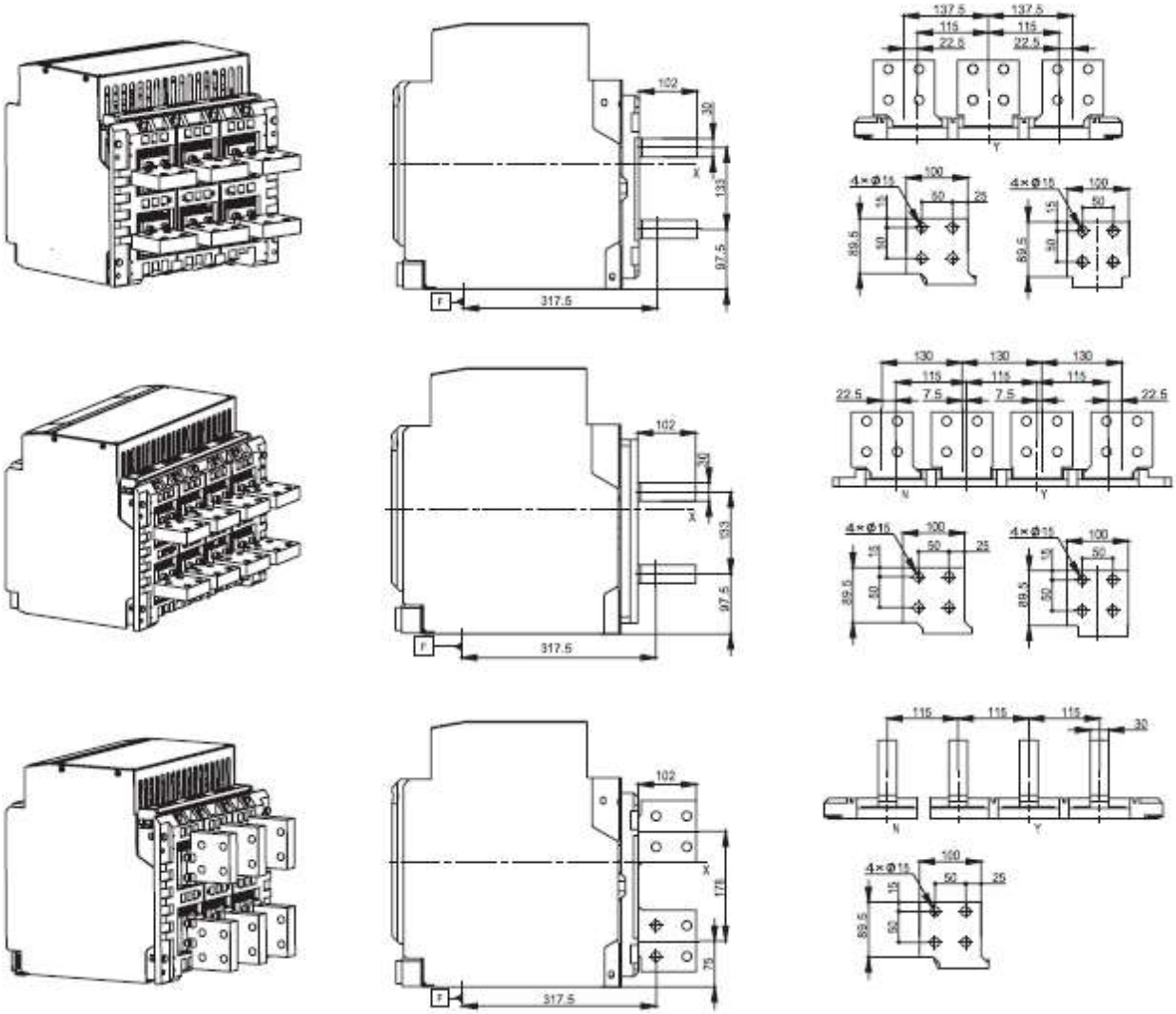


Note: X and Y axes are the symmetric axes of the front mask

3200A-4000A vertical wiring **Detail**



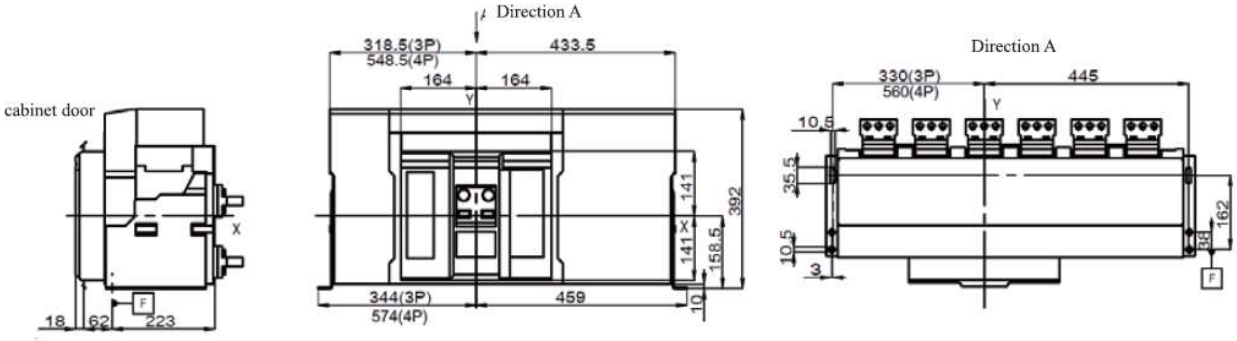
3200A-4000 horizontal and vertical extended wiring **Detail**



6.4 NDW3-6300

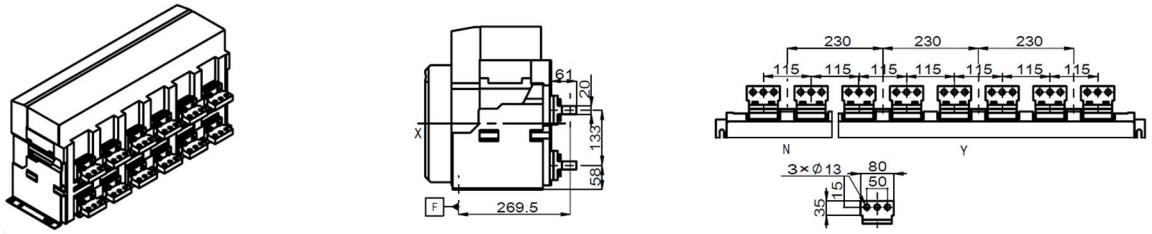
NDW3-6300 fixed type (unit: mm)

Dimensions **Fixed Details**

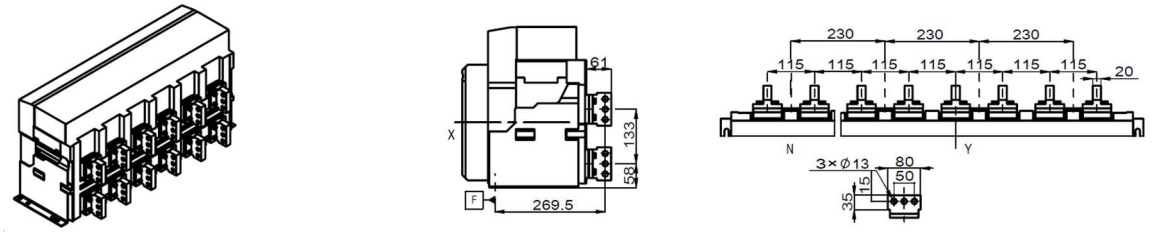


4000A-5000A horizontal, vertical, mixed wiring

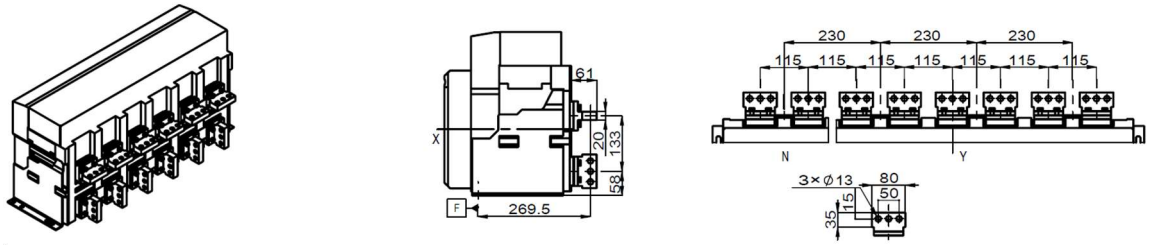
Horizontal Wiring **Detail**



Vertical Wiring **Detail**

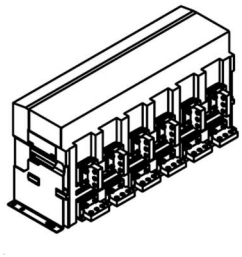


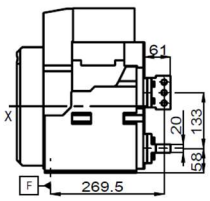
Mixed Wiring (Upper Horizontal, Lower Vertical) Detail

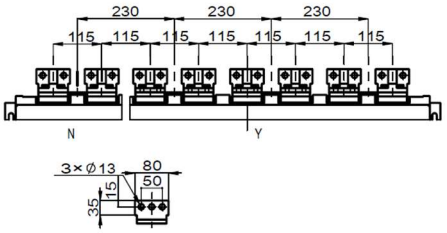


Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

Mixed Wiring (Upper Vertical, Lower Horizontal) Detail

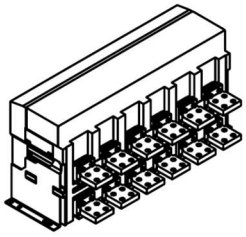


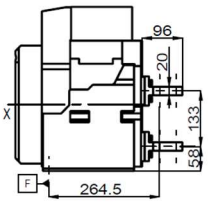


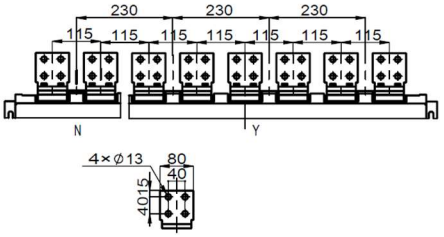


4000A-5000A horizontal extended, vertical extended, mixed extended wiring

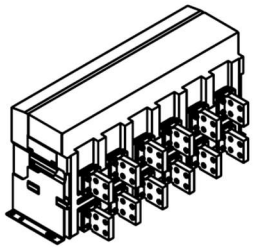
Horizontal extension wiring **Detail**

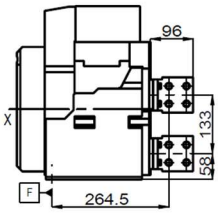


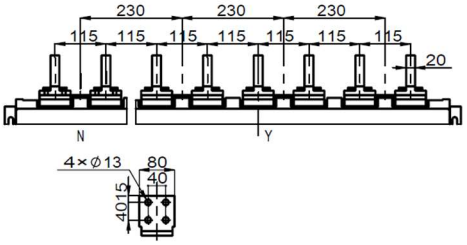




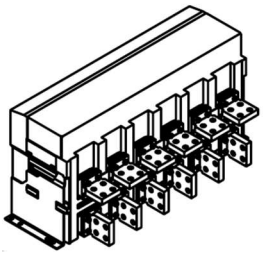
Vertical extension wiring **Detail**

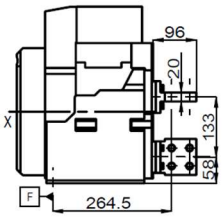


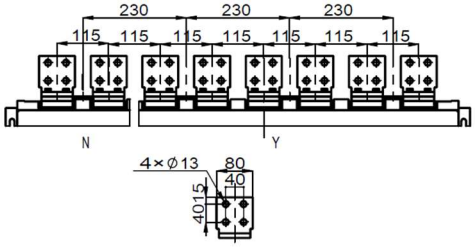




Mixed Wiring (Upper Horizontal, Lower Vertical) Detail

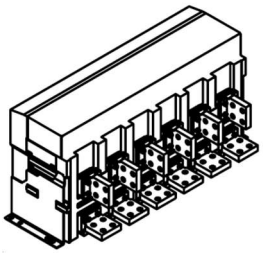


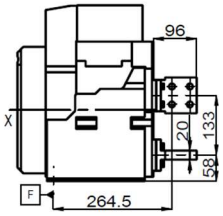


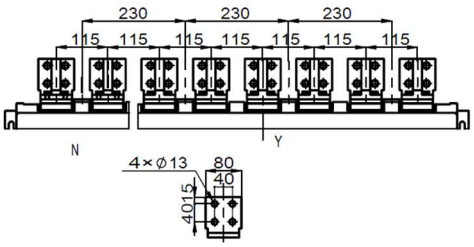


Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

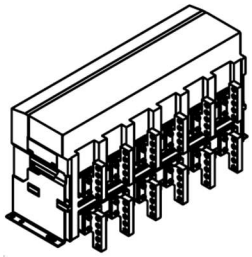
Mixed Wiring (Upper Vertical, Lower Horizontal) Detail



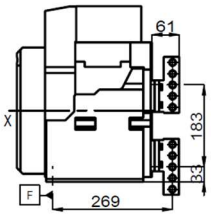


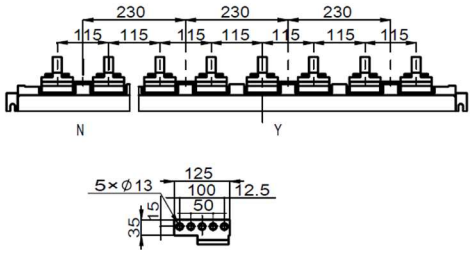


6300A vertical wiring

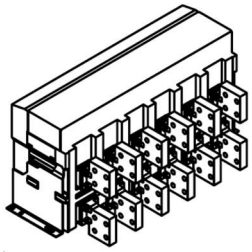


Detail

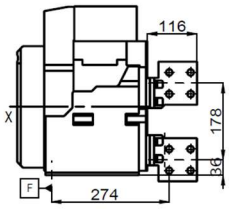


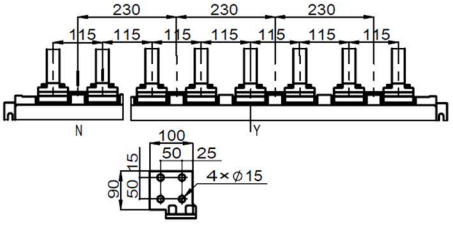


6300A vertical extended wiring



Detail

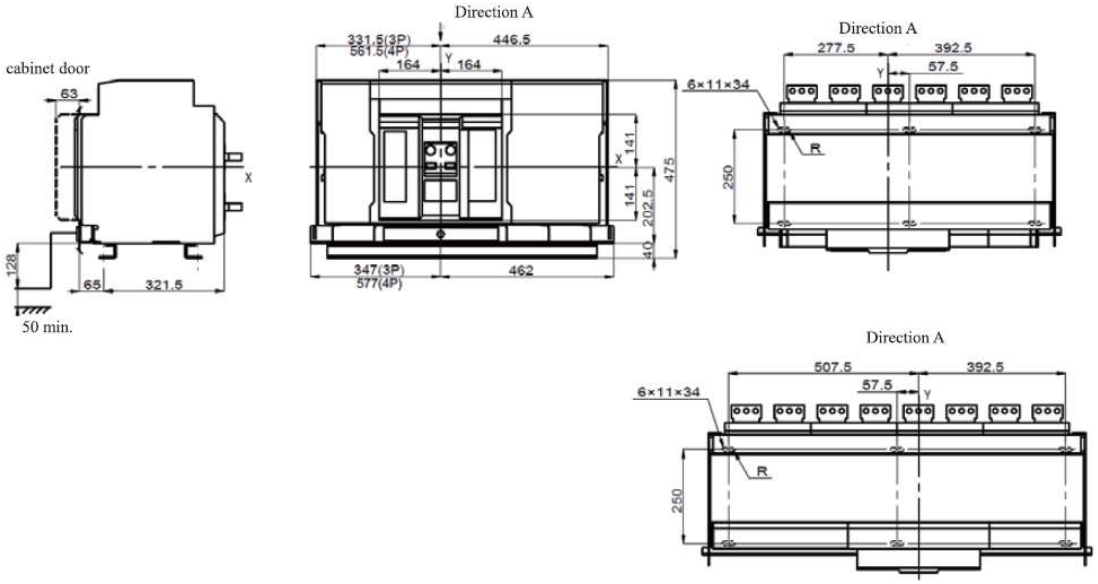




Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

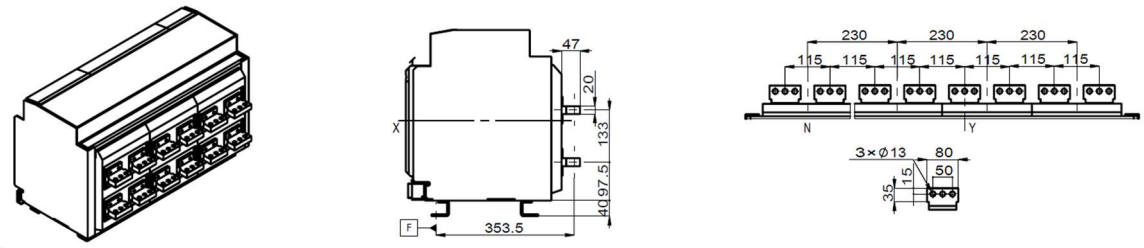
NDW3-6300 drawout type

Dimensions **Fixed Details**

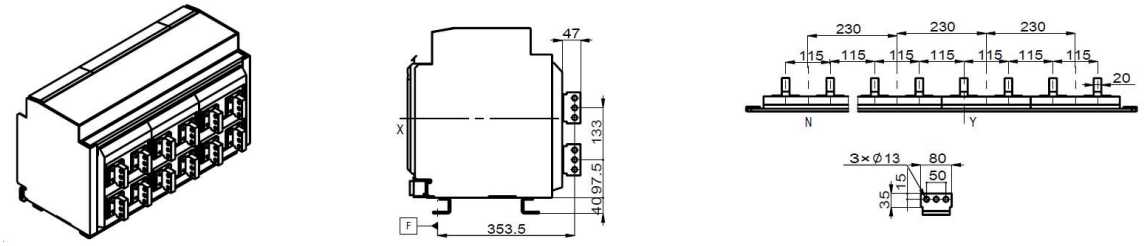


4000A-5000A horizontal, vertical, mixed wiring

Horizontal Wiring **Detail**

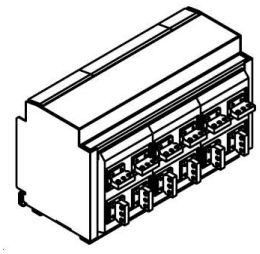


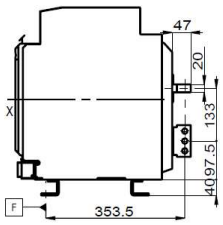
Vertical Wiring **Detail**

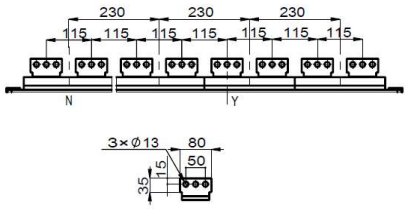


Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

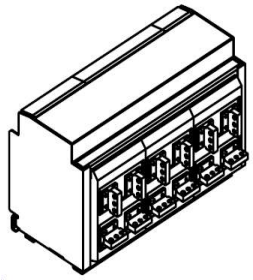
Mixed Wiring (Upper Horizontal, Lower Vertical) Detail

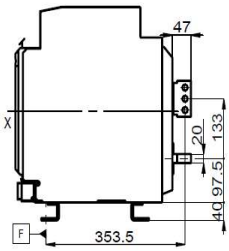


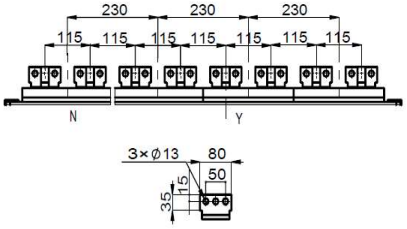




Mixed Wiring (Upper Vertical, Lower Horizontal) Detail

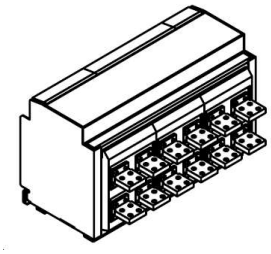


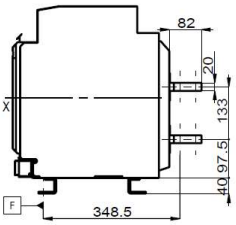


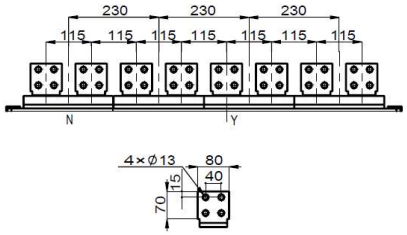


4000A-5000A horizontal extended, vertical extended, mixed extended wiring

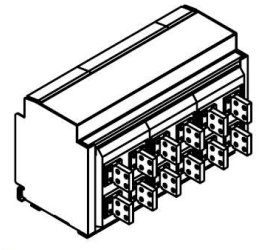
Horizontal extension wiring Detail

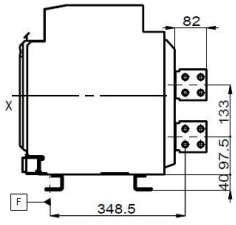


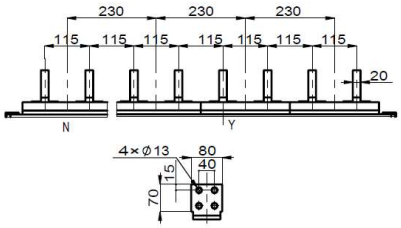




Vertical extension wiring Detail

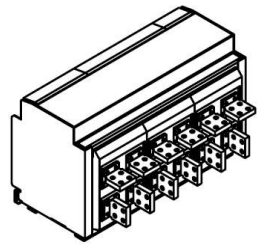


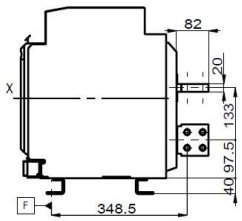


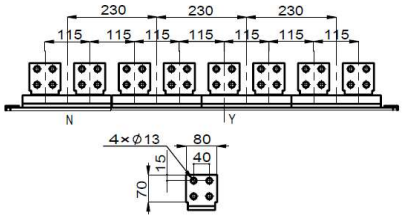


Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

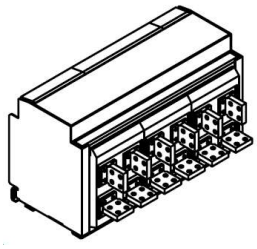
Mixed Wiring (Upper Horizontal, Lower Vertical) Detail

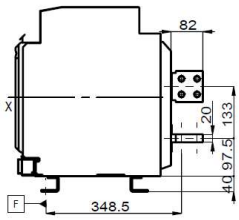


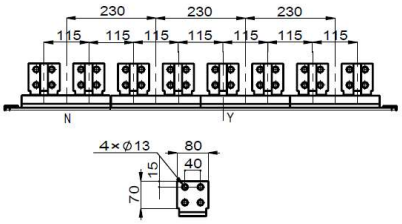




Mixed Wiring (Upper Vertical, Lower Horizontal) Detail

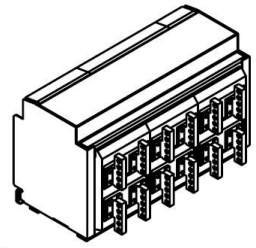


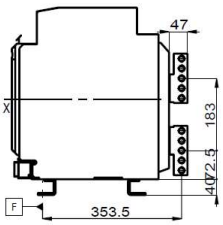


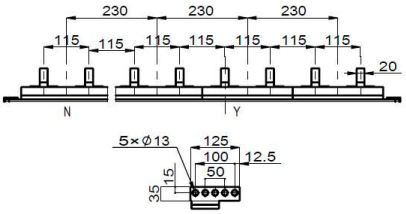


6300A vertical wiring

Detail

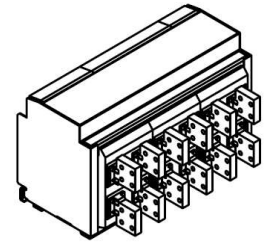


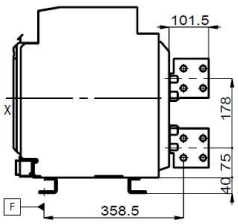


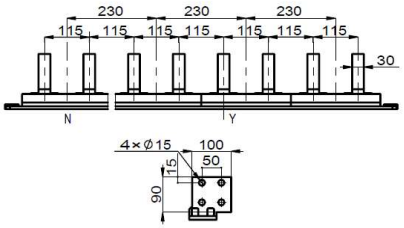


6300A extended vertical wiring

Detail





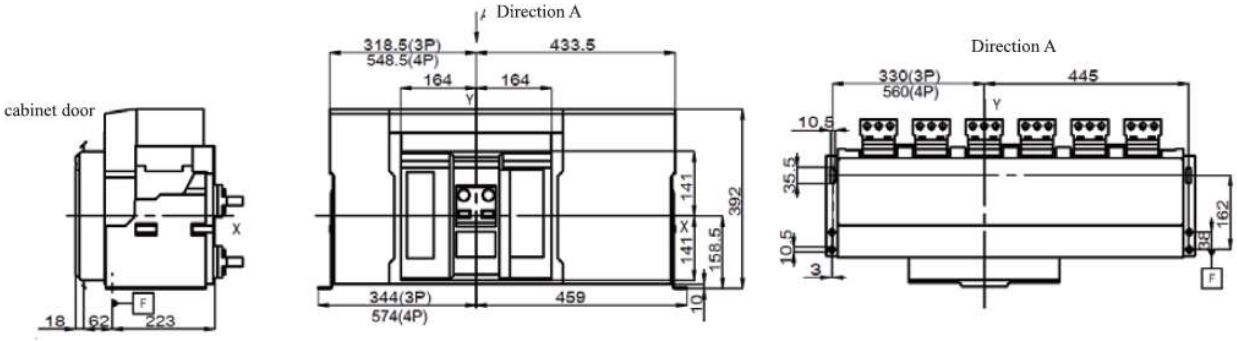


Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

6.5 NDW3-7500

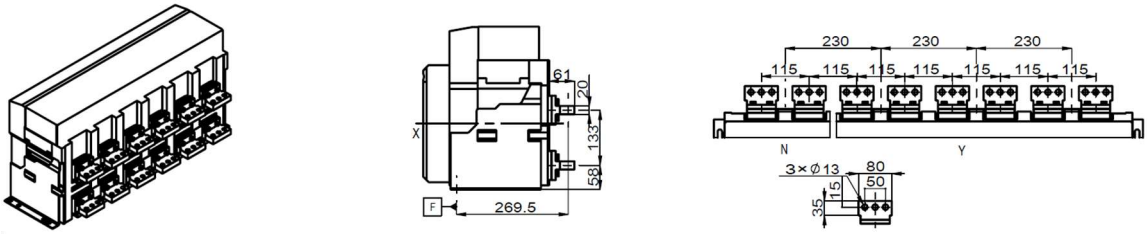
NDW3-7500 fixed type (unit: mm)

Dimensions **Fixed Details**

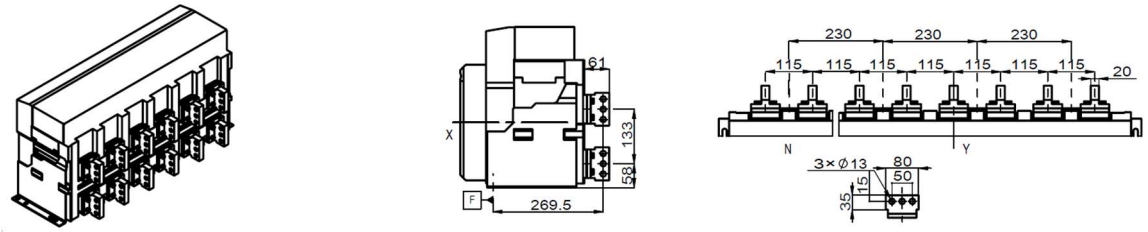


4000A-5000A horizontal, vertical, mixed wiring

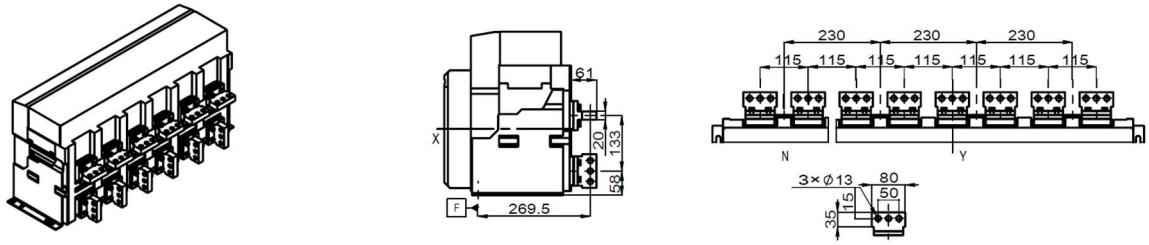
Horizontal Wiring **Detail**



Vertical Wiring **Detail**

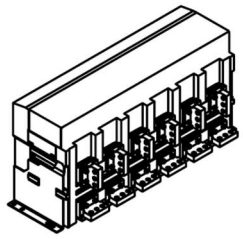


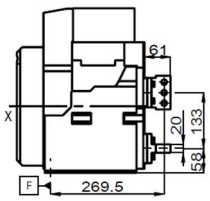
Mixed Wiring (Upper Horizontal, Lower Vertical) **Detail**

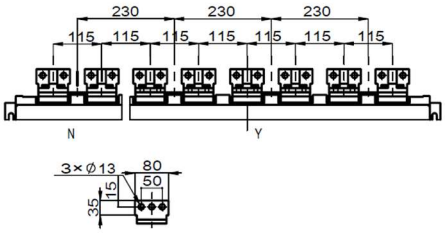


Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

Mixed Wiring (Upper Vertical, Lower Horizontal) **Detail**

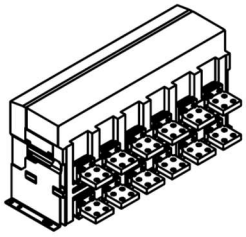


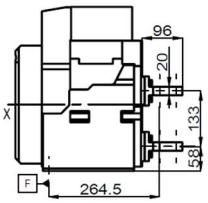


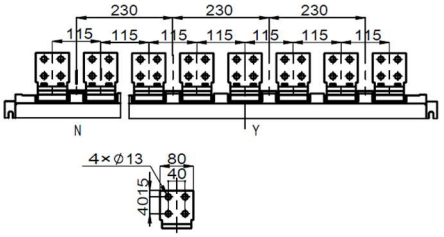


4000A-5000A horizontal extended, vertical extended, mixed extended wiring

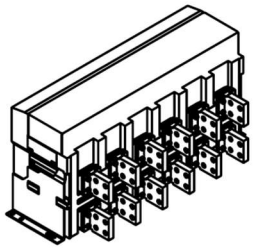
Horizontal extension wiring **Detail**

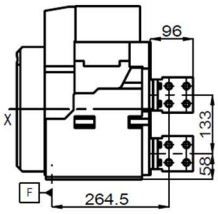


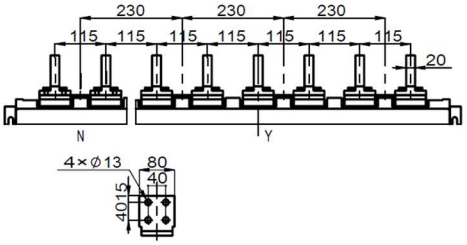




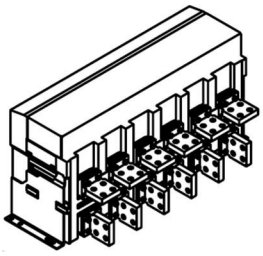
Vertical extension wiring **Detail**

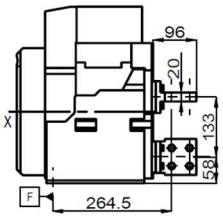


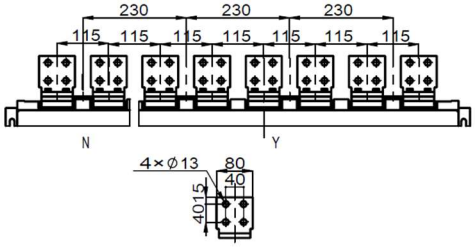




Mixed Wiring (Upper Horizontal, Lower Vertical) **Detail**

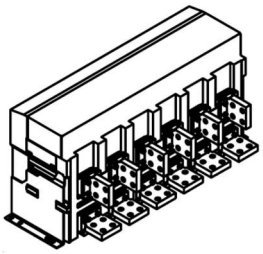


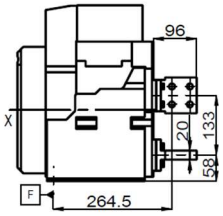


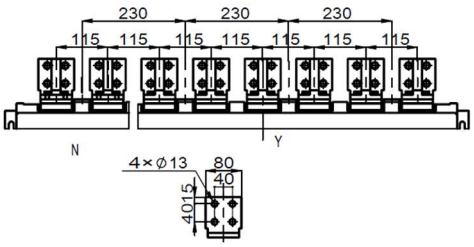


Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

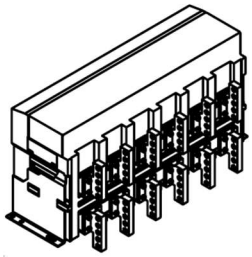
Mixed Wiring (Upper Vertical, Lower Horizontal) **Detail**

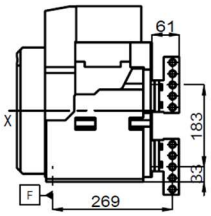


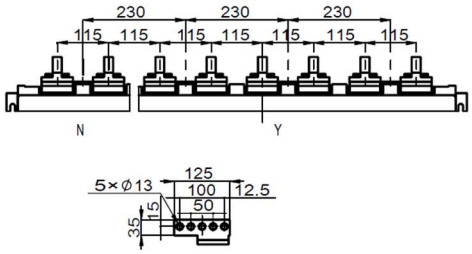




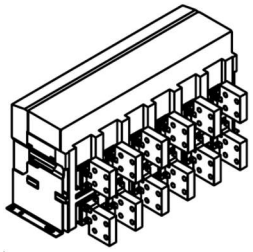
6300A vertical wiring **Detail**

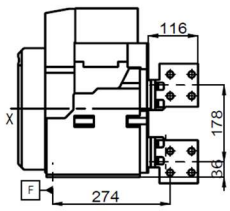


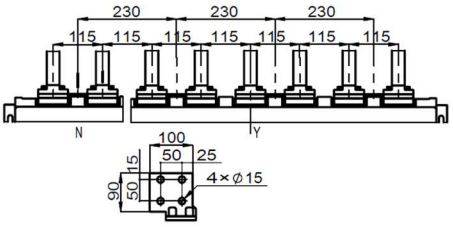




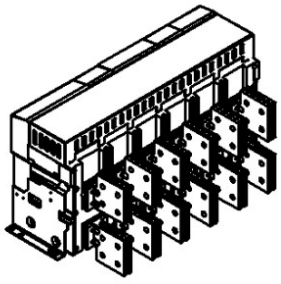
6300A vertical extended wiring **Detail**

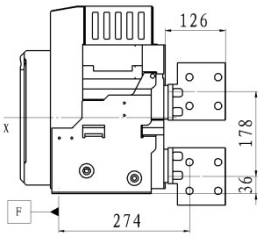


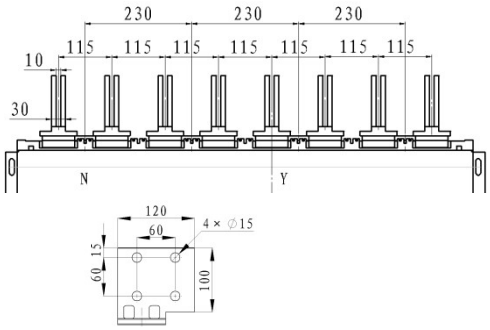




7500A vertical extended wiring **Detail**



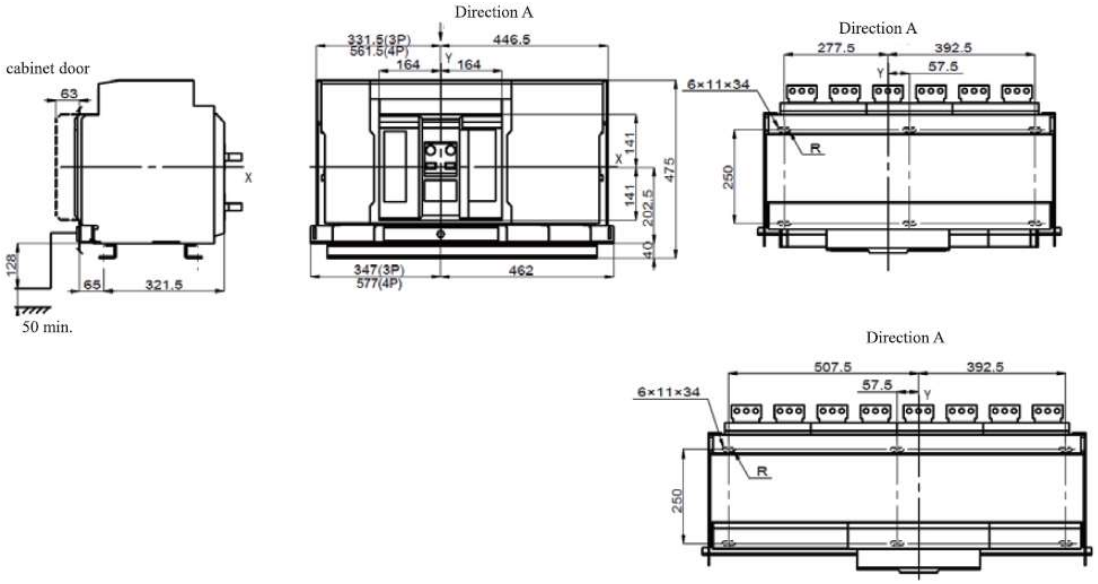




Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

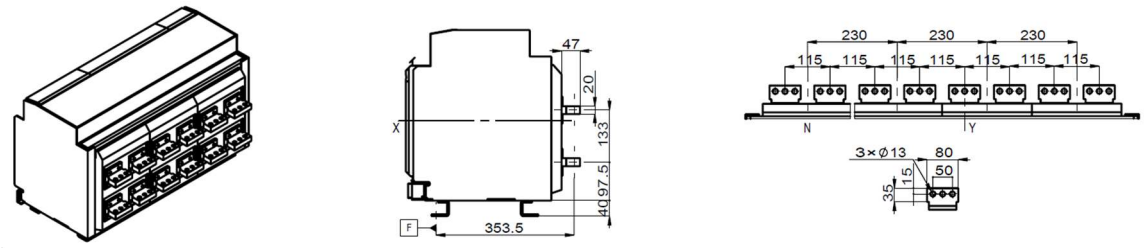
NDW3-7500 drawout type

Dimensions **Fixed Details**

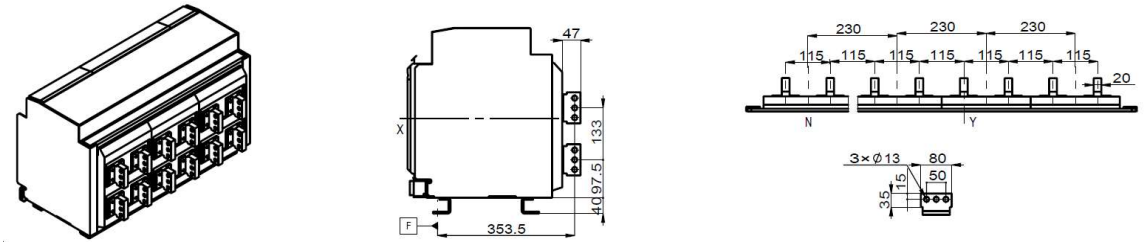


4000A-5000A horizontal, vertical, mixed wiring

Horizontal Wiring **Detail**

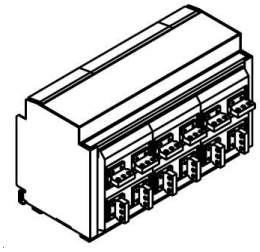


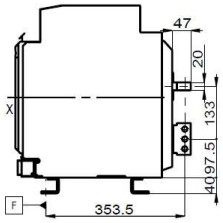
Vertical Wiring **Detail**

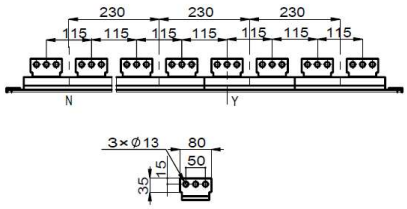


Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

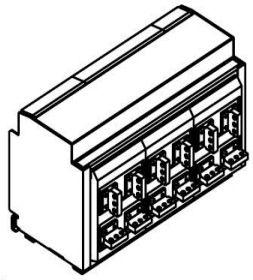
Mixed Wiring (Upper Horizontal, Lower Vertical) Detail

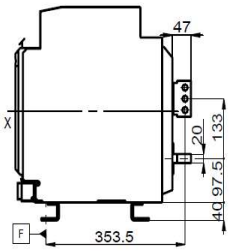


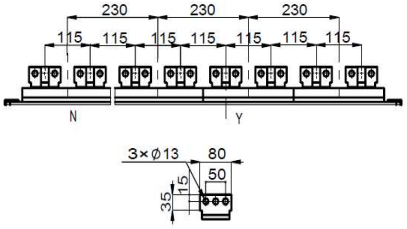




Mixed Wiring (Upper Vertical, Lower Horizontal) Detail

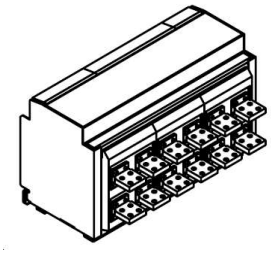


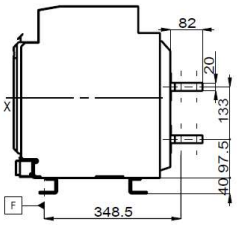


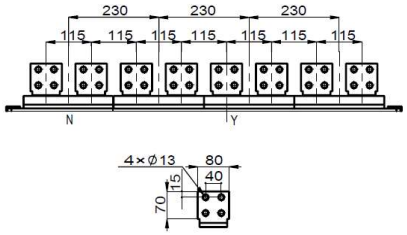


4000A-5000A horizontal extended, vertical extended, mixed extended wiring

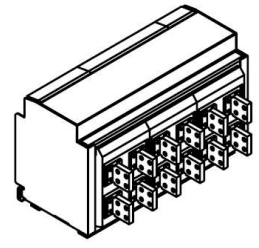
Horizontal extension wiring Detail

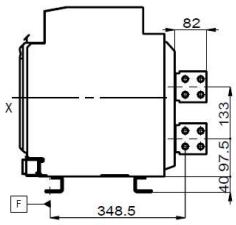


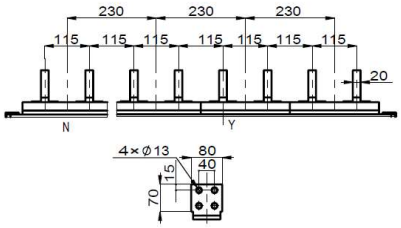




Vertical extension wiring Detail

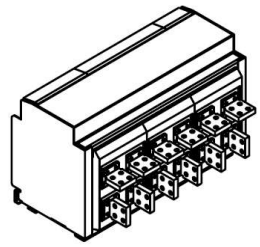


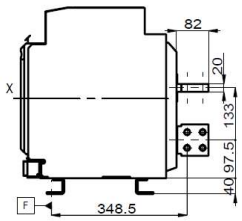


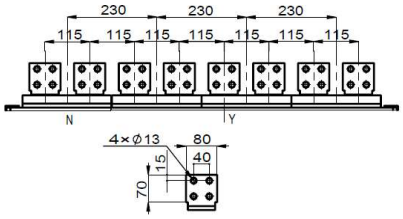


Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

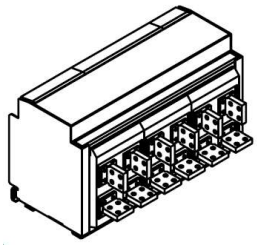
Mixed Wiring (Upper Horizontal, Lower Vertical) Detail

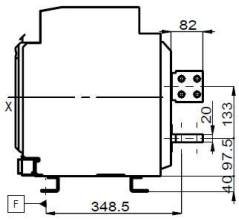


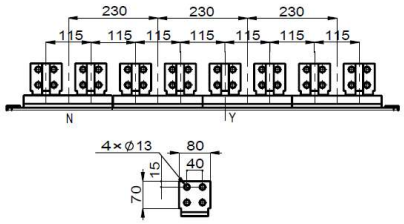




Mixed Wiring (Upper Vertical, Lower Horizontal) Detail

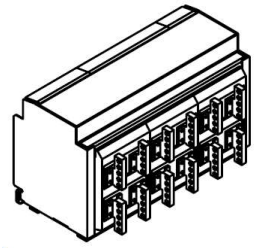


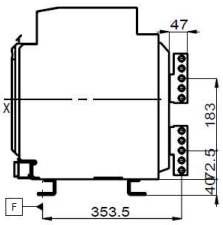


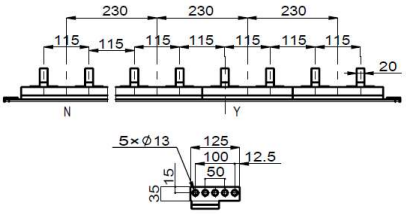


6300A vertical wiring

Detail

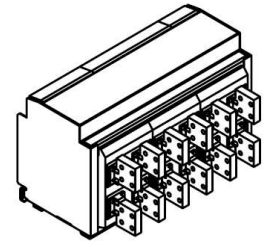


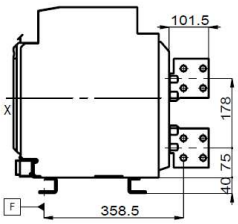


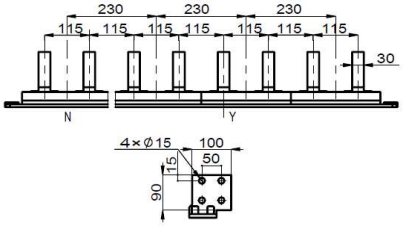


6300A extended vertical wiring

Detail







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

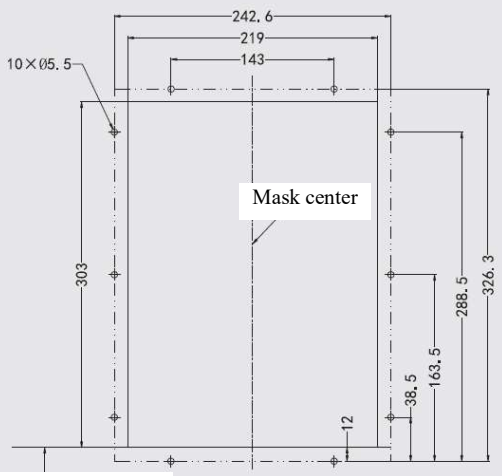
6.6 The Circuit Breaker Cabinet Door Open Hole and the Installation Pitch

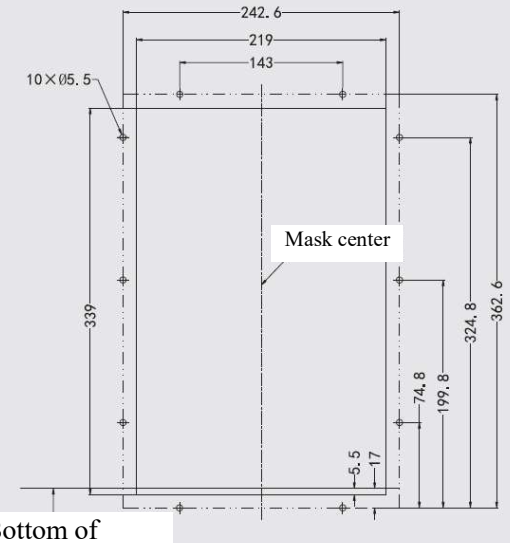
The Circuit Breaker Cabinet door open hole and installation pitch (unit: mm)

Whether the IP54 transparent cover is optional, the opening size and installation hole distance of the cabinet door are different, and the holes are opened according to the following dimensions according to different situations

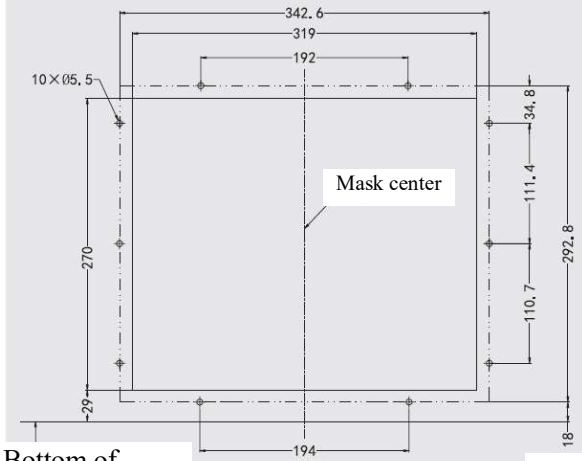
a. Cabinet door opening size without IP54 transparent cover

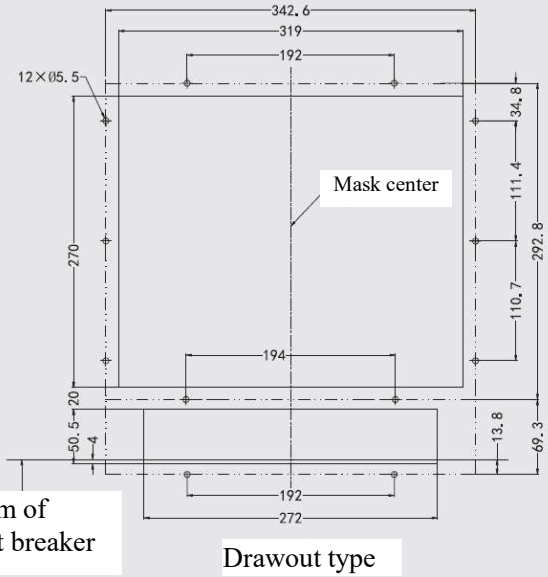
Hole dimensions of NDW3-1600 door frame



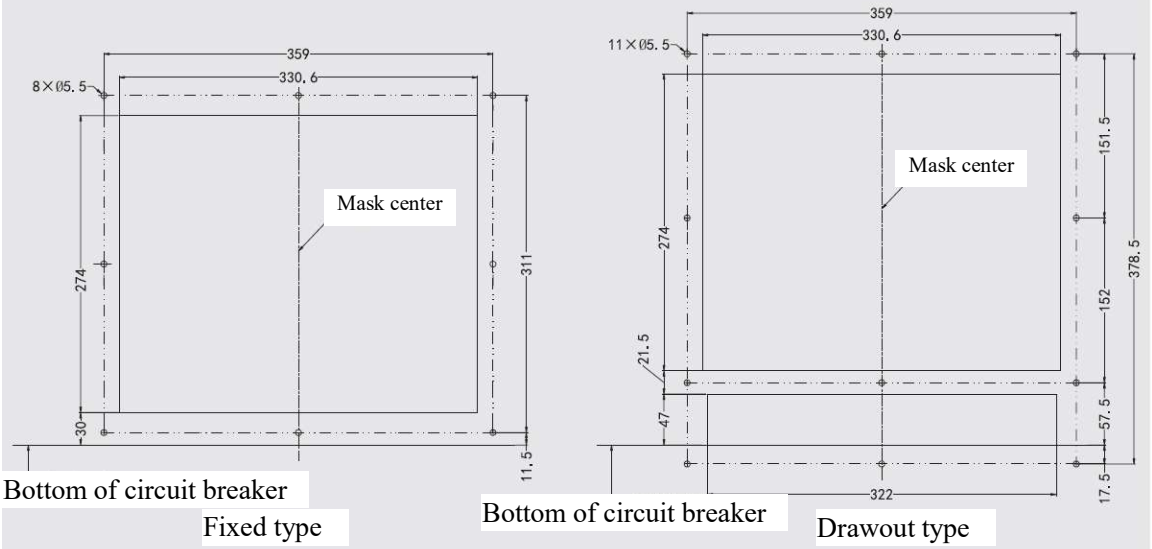


Hole dimensions of NDW3-2500 door frame

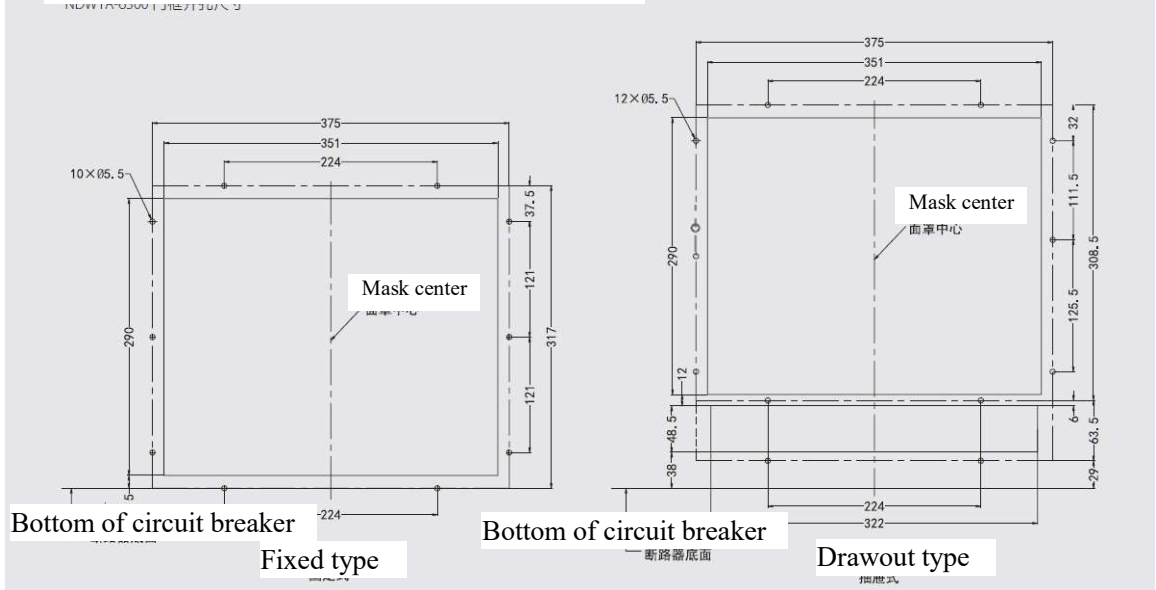




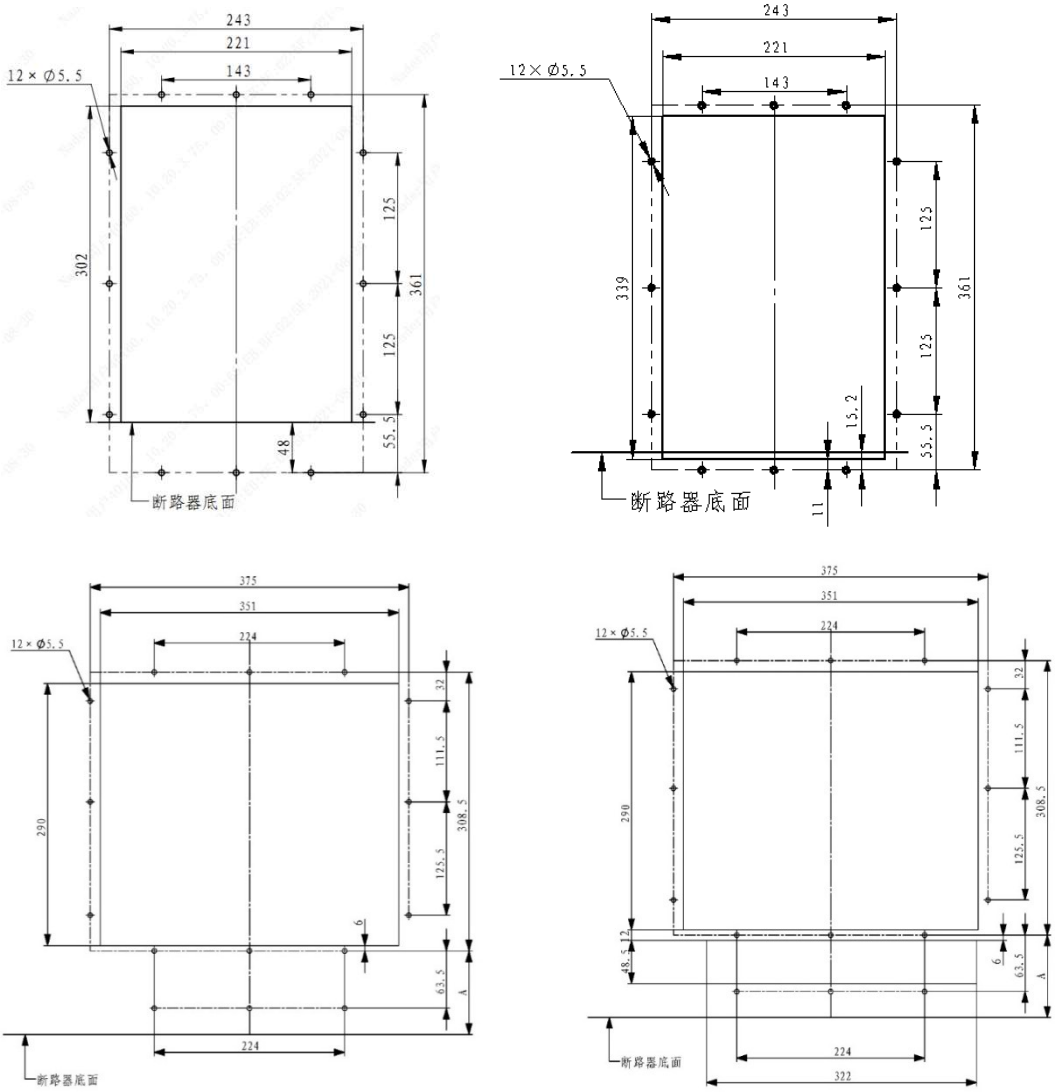
Hole dimensions of NDW3-4000 door frame



Hole dimensions of NDW3-6300 door frame



b. Cabinet door opening size with IP54 transparent cover



Fixed Type

Drawout Type

6.7 Circuit Breaker Installation Notes

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

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

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

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

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

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

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

★ 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.

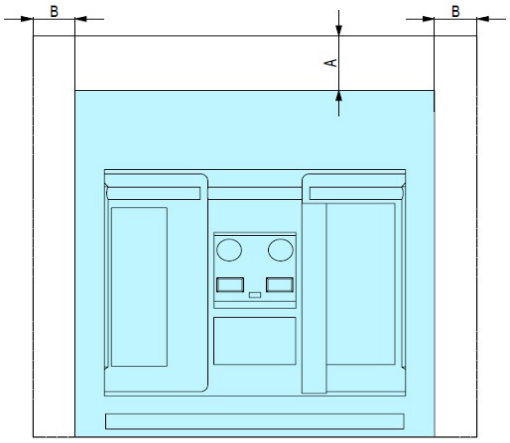
★ Installation screws of the circuit breaker is shown in the table below

Installation Screws of the Circuit Breaker

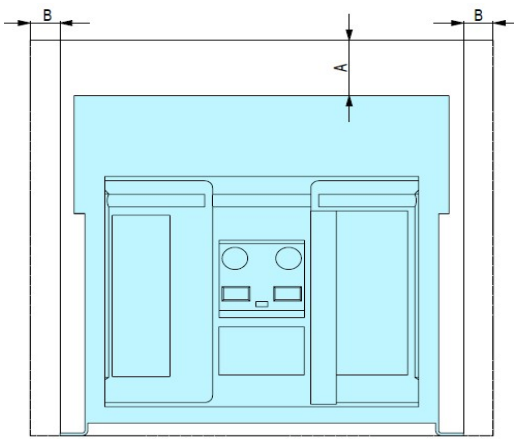
circuit breaker		Connection conditions between bus and terminal
NDW3-1600		M10 bolt, level 8.8, with contact washer, tightening torque 45N.m
NDW3-2500		M12 bolt, level 8.8, with contact washer, tightening torque 60N.m
NDW3-4000	800-2500A	M12 bolt, level 8.8, with contact washer, tightening torque 60N.m
	3200-4000A	M14 bolt, level 8.8, with contact washer, tightening torque 97N.m
NDW3-6300	Vrtical extended l wiring	M14 bolt, level 8.8, with contact washer, tightening torque 97N.m
NDW3-7500	Other wiring means	M12 bolt, level 8.8, with contact washer, tightening torque 60N.m

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

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



Drawout circuit breaker



Fixed circuit breaker

Unit: mm

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

Installation mode of the circuit breaker	to insulator(≥)				to the live part			
	C	D	E	F	C	D	E	F
Drawout type	0	0	0	0	0	60	60	60
Fixed type	0	0	0	0	0	60	60	60

Note: 1. The safety distance of the fixed circuit breaker should consider the space required to remove the arc extinguishing chamber of 150mm;
2. If a dust cover is added, the height space for installation and rotation of the dust cover should be considered to be 70mm;
3. If the distance to the live body cannot meet the requirements in the table, insulation measures should be added between the circuit breaker and the live body.

Chapter 7 Electrical Wiring Diagram

Electrical Wiring Diagram 7

7.1 NDW3-1600 Electrical Wiring Diagram and Terminal Number Definition

NDW3-1600 Full-function Wiring Diagram

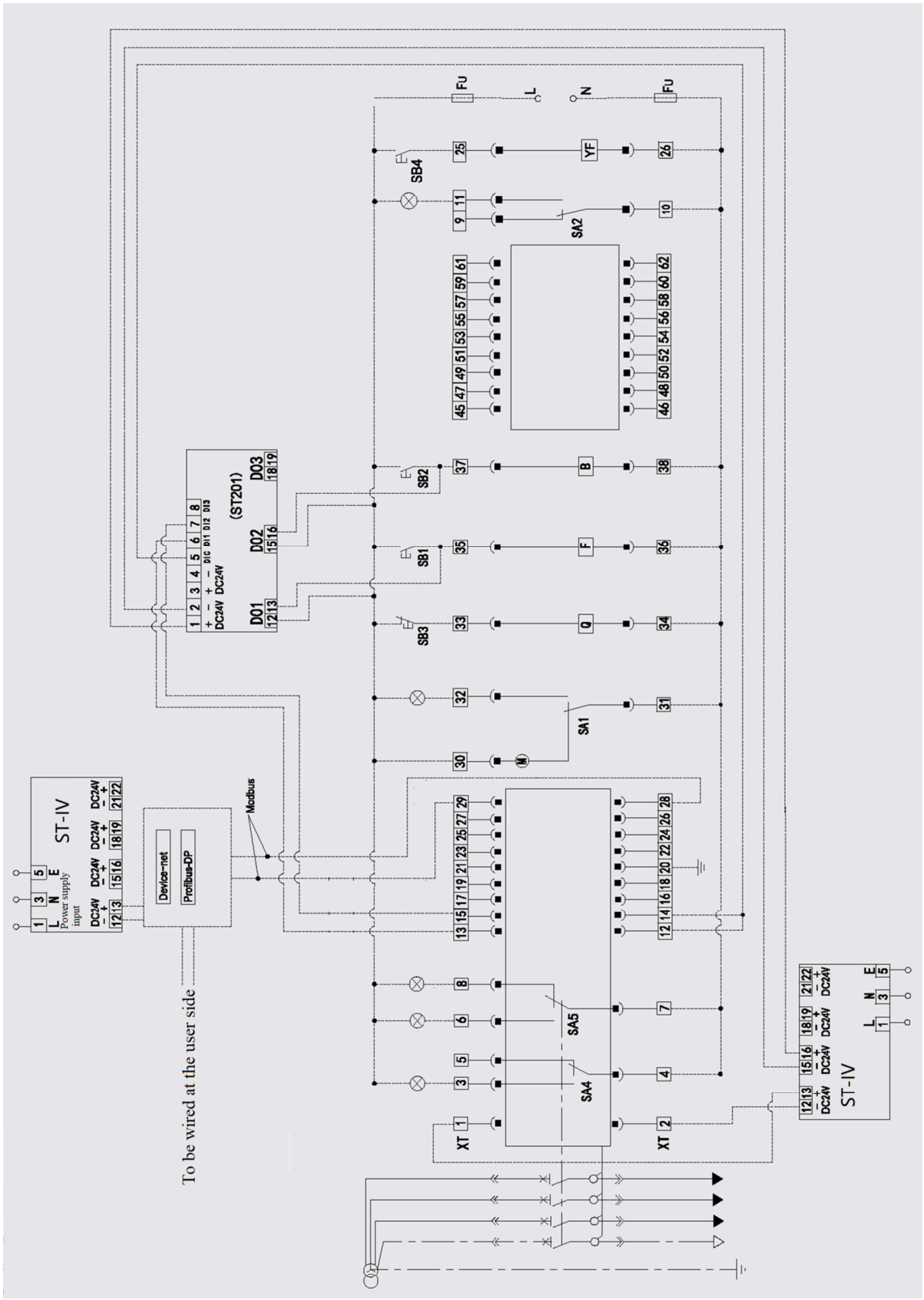
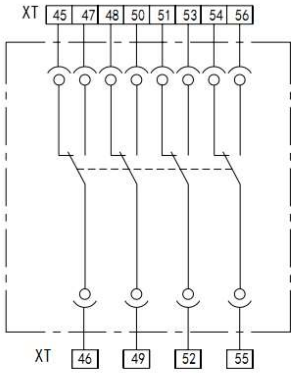
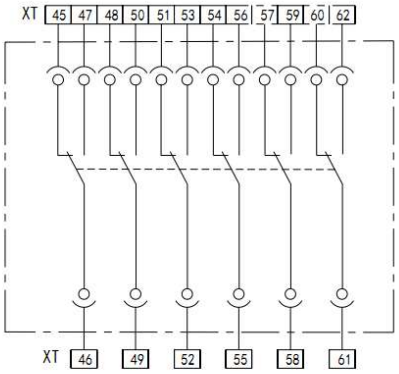


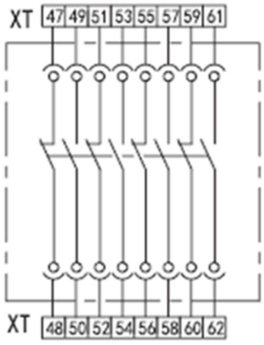
Figure 1: NDW3-1600 Auxiliary Wiring Diagram



4 Switchover



6 Switchover

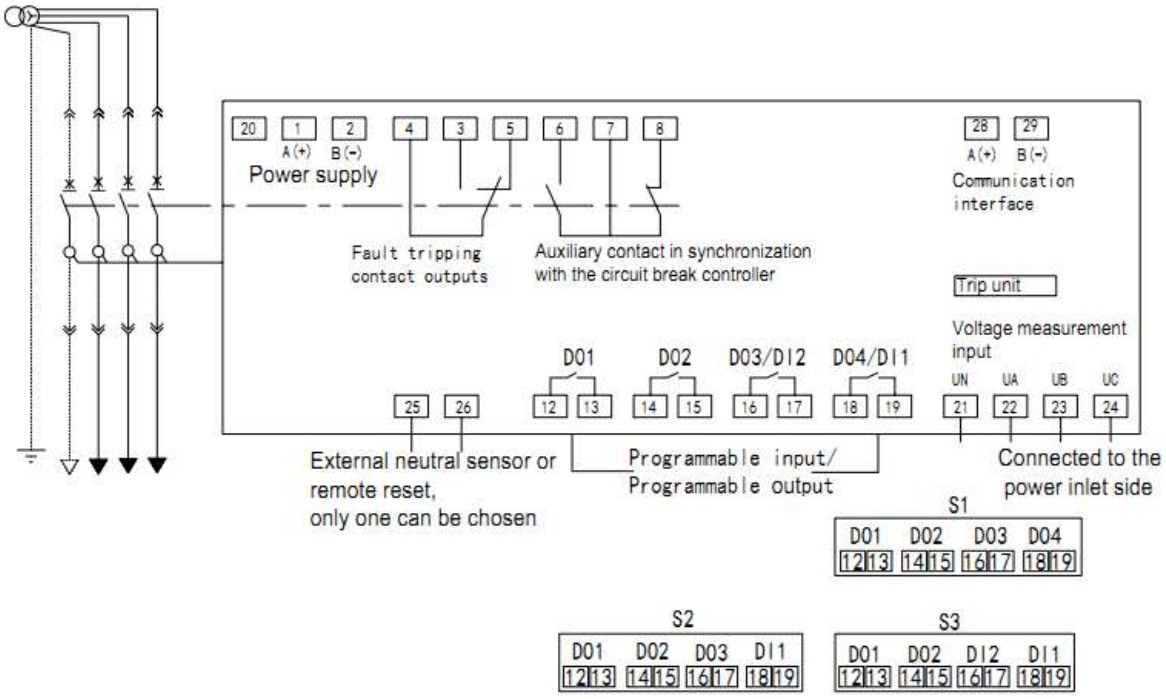


Four-normally-open and four-normally closed

NDW3-1600 Breaking capacity of Auxiliary

Breaking capacity	DC-12	0.3A/DC250V
	AC-12	10A/AC250V
	DC-13	0.2A/DC220V
	AC-15	0.29A/AC400V

Figure 2: Input/Output Interface of NDW3-1600 Controller



Definition Table of NDW3-1600 Terminal Number

	Wiring terminal line number																																								
Function	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	45~62	Remarks
Working power supply	■	■																																								Power shall be supplied by the power module, and the module has been installed on the left side of the circuit breaker
Fault tripping indication contact			■	■	■																																					4# common terminal, contact capacity: 10A/AC250V
Opening and closing indication contact						■	■	■																																		7# common terminal, contact capacity: 10A/AC250V
Closing ready electric indicator									■	■	■																															10# common terminal, contact capacity: 5A/AC125V, 3A/AC250V
Four groups of optional signal unit outputs												■	■	■	■	■	■	■	■																							D0 contact capacity: 0.5A/AC110V, 5A/AC250V D1 signal input voltage: DC110V~DC130V or AC110V~AC250V
Shunt output with break monitoring																■	■																									
Closing output with break monitoring																		■	■																							
Grounding wire of controller																				■																						
Voltage signal input ends (N, A, B, C)																					■	■	■	■																		When connected to the three-phase three-wire system of N-phase, A-phase, B-phase and C-phase, 21# and 23# are short-connected and then connected to phase B
Under-voltage release break monitoring output																				■	■	■	■																			
N-pole transformer output (3P+N)																									■	■																
Output end of electric leakage transformer																									■	■																
Remote reset function input end																									■	■																
Energy-storing signal unit output																								■			■															
Communication interface																												■	■													
Motor break monitoring output																													■	■	■	■										
Electric energy storage and energy storage indicator																														■	■	■										
Undervoltage release																																	■	■								
Loss of voltage release												■	■	■	■																											Power access to external control modules 33# and 34#
Shunt release																																			■	■						
Closed electromagnet																																					■	■				
Connecting terminals of auxiliary switch																																									■	

SB1 - Shunt button (to be prepared by users) SB2 - Close button (to be prepared by users)

SB3 - Undervoltage disconnection button (to be prepared by users) SB4 - Remote reset button (to be prepared by users)

SA1 - Motor travel switch SA2 - Closing ready travel switch

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

XT - Secondary terminal F - Shunt release

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

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

M - Energy storage motor

Note:

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

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

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

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

5. 25#、26#——Select one from N pole transformer output（3P+N），leakage transformer output and remote reset input. 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. The secondary terminal wiring is only suitable for the 0.5~1.5mm2 multi-strand soft wire or hard wire with the soft wire recommended; pay attention to adopt the appropriate conductor;

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

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

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

7.2 NDW3-2500/4000/6300/7500Electric Wiring Diagram and Terminal Number Definition

NDW3-2500, NDW3-6300,NDW3-7500 full-function wiring diagram

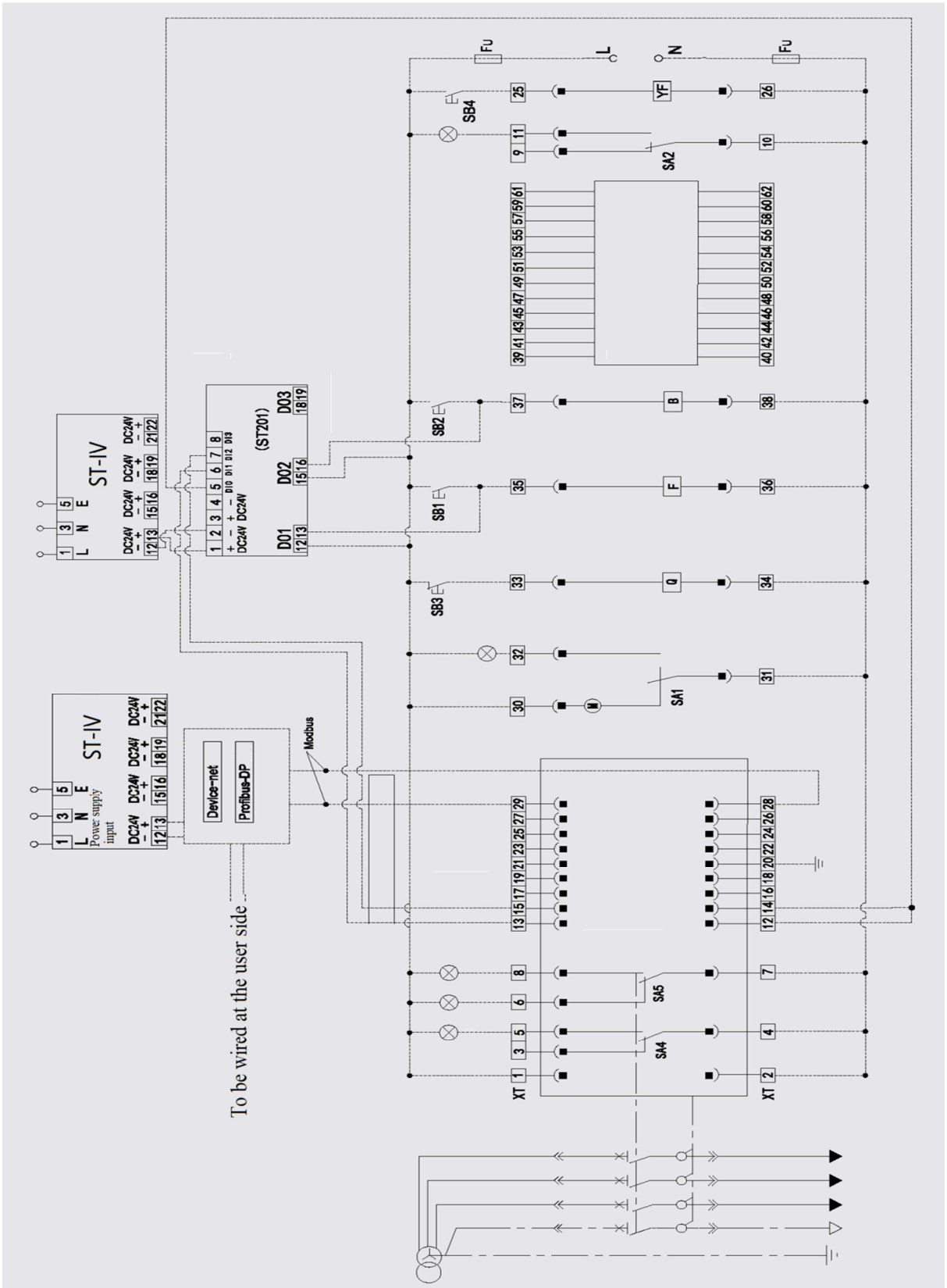
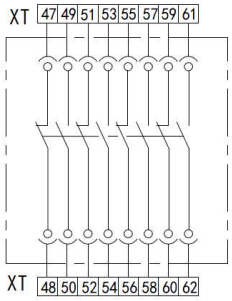
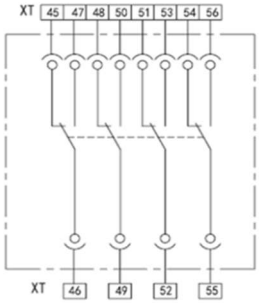


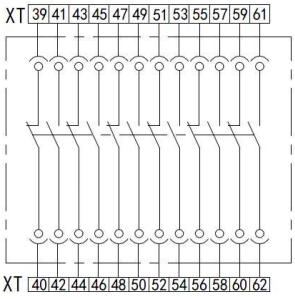
Figure 1: NDW3-2500/4000/6300/7500 Auxiliary Wiring Diagram



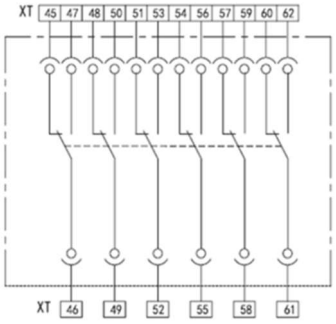
Four normally opened and four normally closed



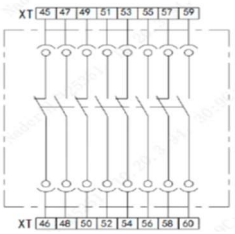
Four-group conversion



Six normally opened and six normally closed



Six-group conversion

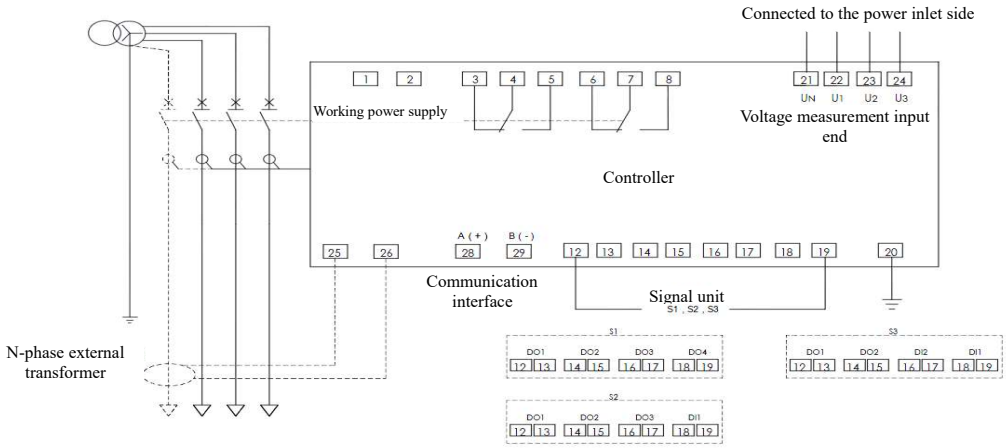


Four normally opened and four normally closed (for NDW3-4000)

NDW3-2500/6300 Breaking capacity of Auxiliary

Product frame		NDW3-2500/6300/7500	NDW3-4000
Breaking capacity	DC-12	5A/DC250V	0.3A/DC250V
	AC-12	10A/AC250V	10A/AC250V
	DC-13	1.2A/DC220V	0.2A/DC220V
	AC-15	3A/AC400V	3A/AC400V

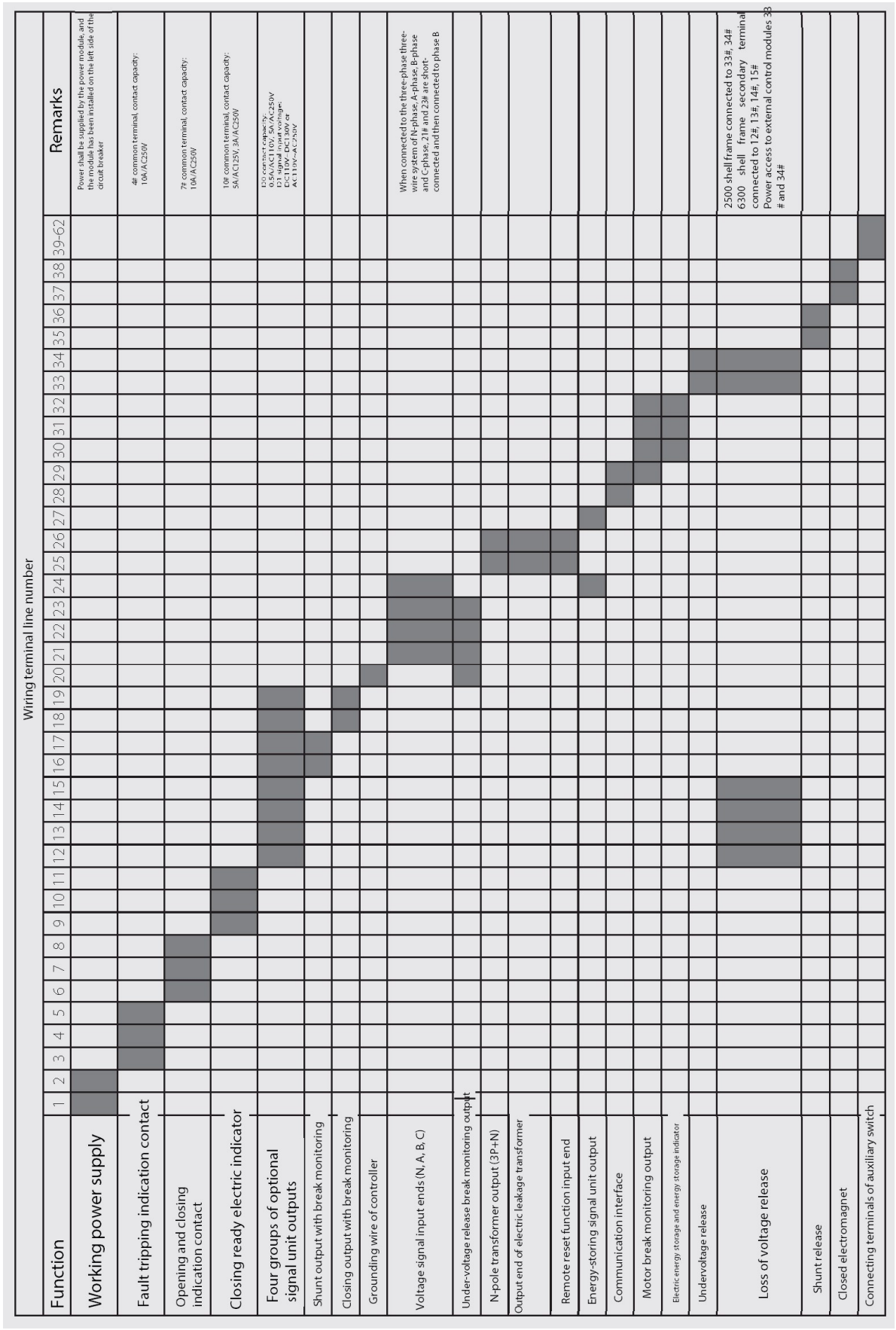
Figure 2: NDW3-2500, NDW3-4000, NDW3-6300,NDW3-7500 controller input and output interfaces



12, 13 - Signal contact 1, contact capacity: AC250V/5A; DC110V/0.5 A, optional function; It cannot be selected at the same time as the function of checking pressure closing device;

14, 15 - Signal contact 2, contact capacity: AC250V/5A; DC110V/0.5 A, optional function; It cannot be selected at the same time as the function of checking pressure closing device.

NDW3-2500, NDW3-4000, NDW3-6300,NDW3-7500 terminal number definition table



SB1 - Shunt button (to be prepared by users) SB2 - Close button (to be prepared by users)

SB3 - Undervoltage disconnection button (to be prepared by users) SB4 - Remote reset button (to be prepared by users)

SA1 - Motor travel switch SA2 - Closing ready travel switch

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

XT - Secondary terminal F - Shunt release

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

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

M - Energy storage motor

Note:

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

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

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

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

5. 25#、26#——Select one from N pole transformer output（3P+N）， leakage transformer output and remote reset input. 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. The secondary terminal wiring is only suitable for the 0.5~1.5mm^2 multi-strand soft wire or hard wire with the soft wire recommended; pay attention to adopt the appropriate conductor;

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

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

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

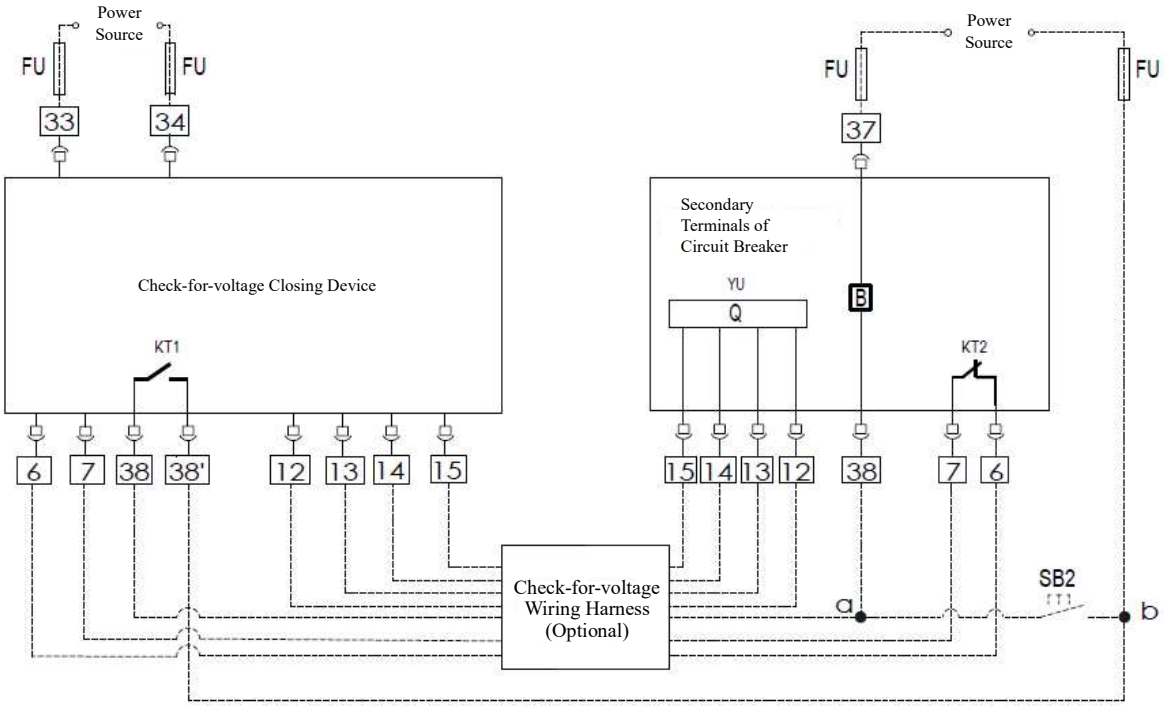
Auxiliary switch contacts;

10. When the voltage closing device is selected, the electrical wiring diagram of the closing electromagnet and the undervoltage release controlled by the voltage station is shown in the attached drawing, i.e. electrical wiring diagram of voltage closing device;

11. The voltage-check closing device is a special accessory for NDW3-2500.

12. The wiring terminals number of NDW3-4000 product four normally open and four normally closed auxiliary contacts is 45~60.

7.3 Electrical wiring diagram of voltage-check closing device



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;

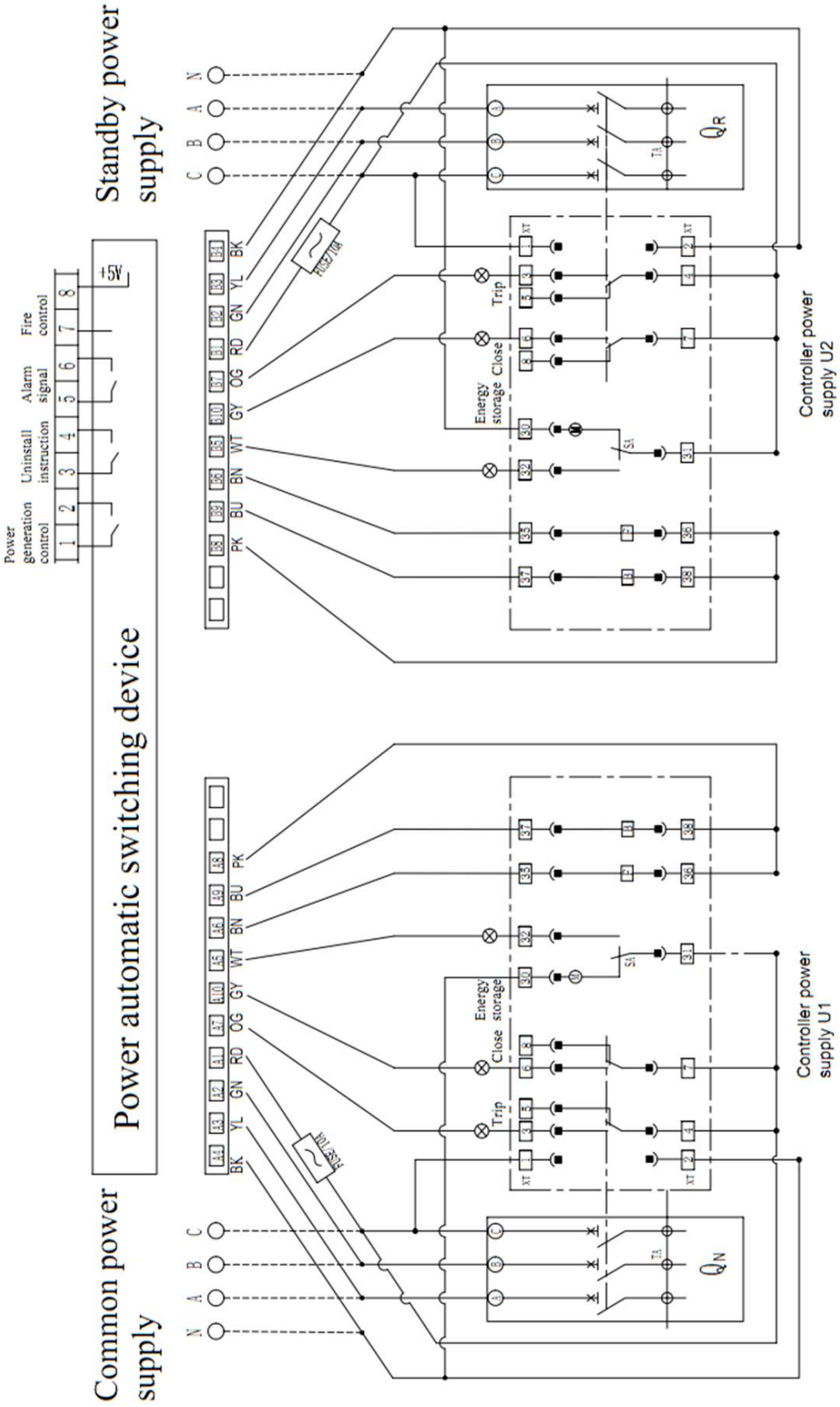
6) If the voltage-check closing device is not selected, the power supply of the closed electromagnet is still 37 and 38, and the wire should be connected according to the electrical wiring diagram of the air circuit breaker;

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.

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

7.4.1 Wiring Diagram of NDW3-1600 Power Automatic Transfer Switches Device



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

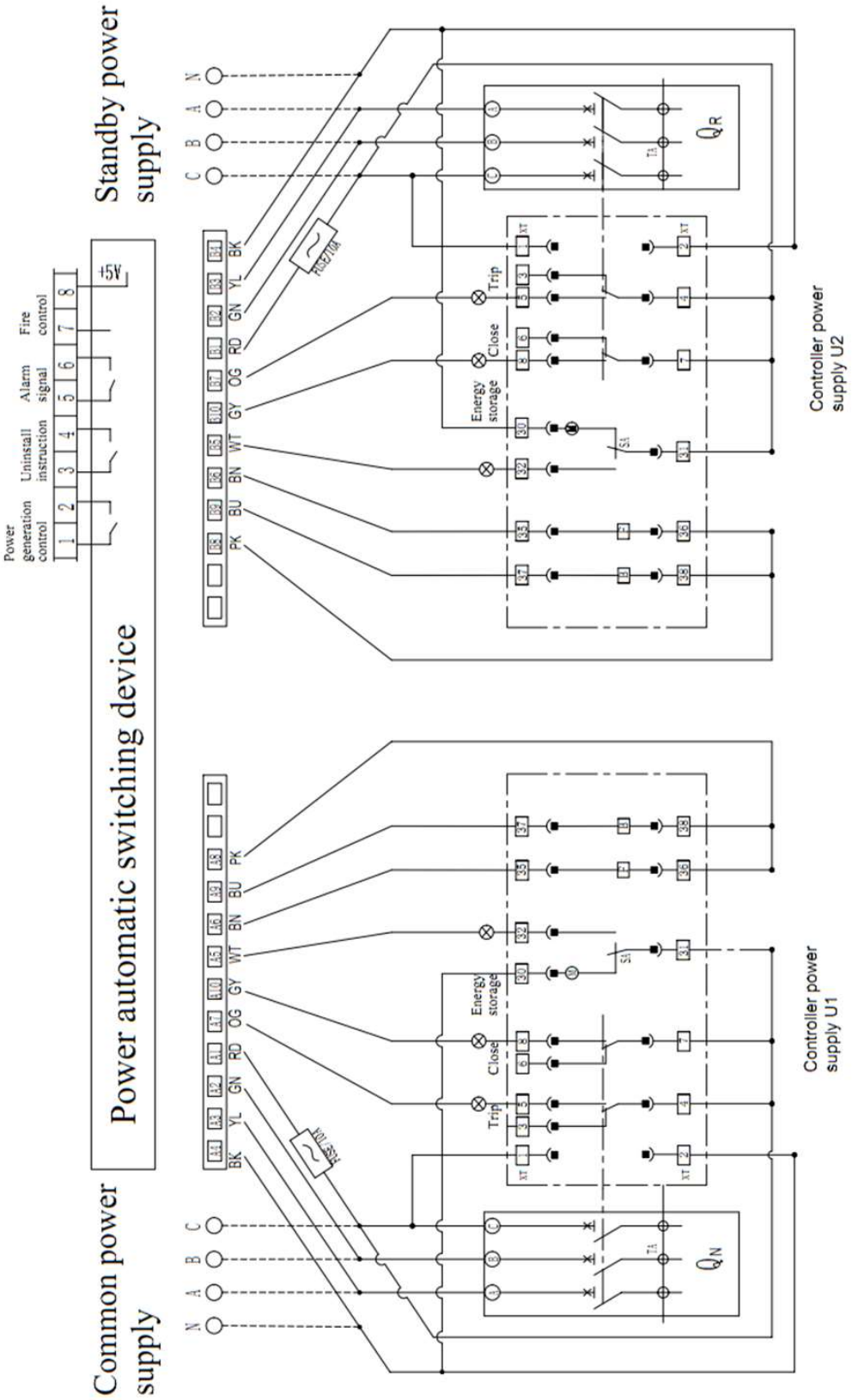
SA - Motor travel switch

F - Shunt tripper

B - Closed electromagnet

Q - Undervoltage tripper.

7.4.2 Wiring diagram of the Power Automatic Transfer Switches device of NDW3-2500 & NDW3-4000 & NDW3-6300&NDW3-7500



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

Circuit Breaker Model Explanation and Encoding Rules

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

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

SN	Name	Specification, type code	Description
1	Enterprise code	brand low-voltage electrical appliance	
2	Product code	Air circuit breaker	
3	Design SN	3	
4	Shell frame level	16-1600, 25-2500, 40-4000, 63-6300, , 75-7500	
5	Breaking type	S-Conventional breaking level, H-High breaking level, HU-High voltage level, XU-Ultra High Voltage Rating	NDW3-1600 is only available with one breaking type, which is not to write in default
6	Rated current	02-200A, 04-400A, 06-630A, 08-800A, 10-1000A, 12-1250A, 16-1600A, 20-2000A, 25-2500A, 32-3200A, 36-3600A, 40-4000A, 50-5000A, 63-6300A, 75-7500A	
7	Installation mode	Non-marked - fixed type, C - drawout type	
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-NWK21/NWK31 (AC380V/AC400V), KM2-NWK21/NWK31 (AC220V/AC230V),	NWK31 and NWK32 are applicable to NDW3-1600

		KM3-NWK21/NWK31 (DC220V), KM4-NWK21/NWK31 (DC110V), KM5-NWK21/NWK31 (DC24V)	controllers while NWK21 and NWK22 are applicable to the rest
		KY1-NWK22/NWK32 (AC380V/AC400V), KY2-NWK22/NWK32 (AC220V/AC230V), KY3-NWK22/NWK32 (DC220V), KY4-NWK22/NWK32 (DC110V), KY5-NWK22/NWK32 (DC24V)	

10	Controller Optional function	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; NWK21/NWK31 controller only has S1-4DO; 2. Z1 is not available with the NDW3-1600 remote reset function; 3. Choose one from the communication functions of "H", "MP", "MD"; 4. For the controller with "V" and "P" functions, the voltage module P2 is optional for the main circuit rated voltage above AC500V. 5. Signal unit and voltage detection unit cannot be selected at the same time.
		Communication function: H (Modbus protocol) MP (Profibus-DP protocol) MD (Devicenet protocol)		
		Signal unit: S1- 4DO S2- 3DO, 1DI S3-2DO, 2DI		
		Remote reset function: Z1(AC380V/AC400V), Z2(AC220V/AC230V), Z3(DC220V), Z4(DC110V), Z5DC(24V)		
		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 NDW3-1600	
		N2 - External N-phase transformer (102*32.5)	Applicable to NDW3-1600/2500	
		N3 - External N-phase transformer (122*52)	Applicable to NDW3-2500/4000/6300/7500	
		N4 - External N-phase transformer (262*102)	Applicable to NDW3-2500/4000/6300/7500	
		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-7500A	
		Protection form of current leakage: E-type (including the external current leakage transformer)		
		Contact wear equivalent, operation times query (NWK21/31 optional): J		
11	Electric energy storage mechanism	D1-AC380V/AC400V,D2-AC220V/AC230V,D3-DC220V,D4-DC110V, D5-DC24V		1.6300/7500 frame has no DC24V 2. When choosing 2500/4000 shell frame, choose one of the shunt release and the holding type shunt release
12	Shunt release/ Maintained type Shunt Release	F1-AC380V/AC400V, F2-AC220V/AC230V,F3-DC220V, F4-DC110V, F5-DC24V		
		F6-AC230V/DC220V (maintained type) Applicable: 2500/4000 shell frame		
13	Closed electromagnet	B1-AC380V/AC400V,B2-AC220V/AC230V,B3-DC220V,B4-DC110V, B5-DC24V		
14	Under-voltage release/no-voltage release/voltage-check closing device	Under-voltage release: 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. To be selected during ordering; this shall be omitted if without this accessory 3. The special under-voltage release and closed electromagnet controlled by the voltage-check closing device are internal accessories, while the voltage-check closing controller module is the external accessory (applicable
		Loss of voltage release: S1-AC380V/AC400V, S2-AC220V/AC230V		
		Voltage-check release: S1-AC380V/AC400V, S2-AC220V/AC230V		
15	Under-voltage release/loss of voltage release Delay time/voltage-check harness	Conventional undervoltage delay: 0-Instantaneous, 1-1s delay, 3-3s delay, 5-5s delay		
		NDW3-1600/6300/7500 voltage loss delay: 0s～10s user adjustable (factory default setting is 3s), the step length is 1s;		
		NDW3-2500/4000 voltage loss delay: 0-Instantaneous, 1-1s delay, 3-3s delay, 5-5s delay		
		NDW3-2500 voltage-check harness: 0 - with harness, 1 - without harness		

16	Auxiliary contact	A4-Four-group conversion, A6-Six-group conversion, A44-Four normally opened and four normally closed	Applicable to NDW3-1600
		A4-Four-group conversion, A6-Six-group conversion A44-Four normally opened and four normally closed, A66 -Six normally opened and six normally closed	Applicable to NDW3-2500,NDW3-4000, NDW3-6300,NDW3-7500
17	Internal Accessories	BX - Closing ready signal output unit	This shall be omitted if without this accessory
		JS - Counter functional unit	
		CM1 - Drawout type (with the right side of the door interlock); CM2 - Drawout type (with the left side of the door interlock)	
		CX - Drawer seat three-position signal output	
18	External accessories	M - Doorframe	1. Power supply module, relay module, external current leakage transformer, programmable output module, message module, communication adapter and N-pole external transformer should be used with the controller; 2. Carry out the sequence arrangement according to the table, with "/" for separation; 3. The accessory monitoring unit can't be selected with the communication function, signal unit and controller with "V" and "P" functions simultaneously; 4. The energy-storing signal communication module component can't be selected with the controller with "V" and "P" functions simultaneously.
		F - Dust cover	
		R - Relay module	
		NWDF1 Power supply module P1-DC24V P3-AC380V/AC400V,AC220V/AC230V P5-DC220V,DC110V	
		S - Button lock	
		BC - Programmable output module (6-channel)	
		IO1 - Remote I/O module C8 IO2 - Remote I/O module S12 IO3 - Remote I/O module SC64 IO4 - Remote I/O module SCM423	
		AM - Accessory monitoring unit	
		P2 - Voltage conversion module	
		TC - Energy-storing signal communication module component	
19	Wiring mode	Not marked - Horizontal wiring, J1 - Horizontal extended wiring, J3 Vertical wiring, J4 - Vertical extended wiring J5 - Mixed wiring (upper horizontal, lower vertical), J6 - Mixed wiring (upper vertical, lower horizontal) J7 - Mixed extended wiring (upper horizontal and lower vertical), J8 - Mixed extended wiring (upper vertical and lower horizontal)	NDW3-6300/7500 with the rated current of 6300A only has two wiring modes: Vertical wiring and vertical extended wiring, with the rated current of 7500A only has vertical extended wiring
20	Product usage type	Not marked- Conventional, TH- Wet heat, FD- Windpower, Plateau	
21	Special notes	Customer's special requirements	
22	Rated working voltage	Not-marked - AC690V and below, KV4-AC800V, KV5-AC1000V, KV6-AC1140V， KV7-1380V，KV8-1500V	
23	Language type	Not-marked-Chinese； Y-English； ZY-Chinese & English	1,Only NWK22/32 controllers have Chinese-English switch function 2,Chinese and English prodcuts use Chinese-English lables except controller nameplate.

Continued:

Interlocking Piece Model Explanation and Encoding Rules

Key lock	SF11 - key lock device (one lock and one key), SF21 - key lock device (two locks and one key), SF31 - key lock device (three locks and one key), SF32 - key lock device (three locks and two keys), SF53 - key lock device (five locks and three keys)	1. Select one from five key locks; 2. The NDWPG-1600 frame can be interlocked with other frames
Mechanical interlocking	SR11 - Mechanical interlocking device (two sets of steel cables, one for closing and one for opening) SR12 - Mechanical interlocking device (three sets of steel cables, one for closing and two for opening) SR21 - Mechanical interlocking device (three sets of steel cables, two for closing and one for opening) SY11 - Mechanical interlocking device (two sets of hard rods, one for closing and one for opening) SY12 - Mechanical interlocking device (three sets of hard rods, one for close and two for open)	1. Select one from five mechanical interlocks; 2. SR21 and SR12 are only suitable for NDW3-2500 and above shell frame;
Power automatic switching device	ATS-R/S/F (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

Circuit Breaker Ordering Notes (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	Shell frame level	□ NDW3-1600 □ NDW3-2500 □ NDW3-4000 □ NDW3-6300 □ NDW3-7500		
	Installation mode	□ Fixed type □ C - Drawout type		
	Rated current (A)	NDW3-1600: □200 □400 □630 □800 □1000 □1250 □1600 NDW3-2500: □630 □800 □1000 □1250 □1600 □2000 □2500 NDW3-4000: □800 □1000 □1250 □1600 □2000 □2500 □3200 □4000 □3600 NDW3-6300: □4000 □5000 □6300 NDW3-7500: □4000 □5000 □6300 □7500		
	Breaking type	□ S-standard breaking (below AC690V) □ H-high breaking (below AC690V) □ HU-high voltage breaking (AC800V) □ HU-High voltage breaking (AC1000V) □ HU-High voltage breaking (AC1140V) □ XU-Ultra High Voltage Breaking (AC1140V) □ XU-Ultra High Voltage Breaking (AC1380V) □ XU-Ultra High Voltage Breaking (AC1500V) Note: These options are not distinguished with NDW3-1600, no selection required. There are not S or H breaking type with NDW3-7500.		
	Number of poles	□3 (3-pole) □4 (4-pole) □ 5 (3P+N)		
	Wiring mode	NDW3-1600	□ Horizontal wiring (standard configuration) □ J3 - Vertical wiring □ J5 - Mixed wiring (upper horizontal and lower vertical) □ J6 - Mixed wiring (upper vertical and lower horizontal)	
		NDW3-2500	□ Horizontal wiring (standard configuration) □ J1 - Horizontal extended wiring □ J3 - Vertical wiring □ J4 - Vertical extended wiring □ J5 - Mixed wiring (upper horizontal, lower vertical) □ J6 - Mixed wiring (upper vertical, lower horizontal)	
		NDW3-4000	□ Horizontal wiring (standard configuration) □ J1 - Horizontal extended wiring □ J3 - Vertical wiring □ J4 - Vertical extended wiring	
		NDW3-6300	□ 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 only Vertical wiring, Vertical extended wiring.	
		NDW3-7500	☒ 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, only Vertical wiring, Vertical extended wiring In=7500A, only Vertical extended wiring	
	Product type	☒ Not marked - Conventional (standard) ☒ TH- hot and damp ☒ FD- Windpower, plateau		
	Controller model	NDW3-1600	□ KM-NWK31 (digital screen) □ KY-NWK32 (LCD)	

Controller parameters		NDW3-2500/4000/6300/7500	□ 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 measurement and protection type □ P - Harmonic measurement and protection type Note: 1.P is only available for NWK22/32 LCD type, and neither V nor P can be selected simultaneously with the accessory detection unit 2. For the AC500V and above, select the V - voltage measurement and protection type while the P2-voltage conversion module is optional		
	Communication functions	□ Modbus □ Profibus □ DeviceNet Note: It can't be selected with the accessory monitoring unit simultaneously		
	Signal unit	□ S1-4DO □ S2-3DO, 1DI □ S3-2DO, 2DI Note: It can't be selected with the accessory monitoring unit simultaneously		
	Remote reset	□Z1(AC380V/AC400V) □Z2(AC220V/AC230V) □Z3(DC220V) □Z4(DC110V) □Z5(DC24V) Note: NDW3-1600 without Z1		
	External transformer	3P+N required: □ N1 □ N2 □ N3 □ N4 □ NR1 □ NR2 □ NR3		E type: □ E
	Grounding mode	□ T type (default) □ W type Note: 3P+N needs to be added with an external transformer		□ E type
	Contact wear equivalent	□ J-Contact wear equivalent (NWK21/31 optional)		
Required accessories	Electric operating mechanism	□ D1(AC380V/AC400V) □ D2(AC220V/AC230V) □ D3(DC220V) □ D4(DC110V) □ D5(DC24V)		
	Shunt release/ Maintained type Shunt Release	□F1(AC380V/AC400V) □F2(AC220V/AC230V) □F3(DC220V) □ F4(DC110V) □ F5(DC24V) ☐F6-AC230V/DC220V (maintaining type) Applicable: 2500/4000 frame size		When choosing the 2500/4000 frame, choose one of the shunt release and the maintained shunt
	Closed electromagnet	□B1(AC380V/AC400V) □B2(AC220V/AC230V) □B3(DC220V) □B4(DC110V) □ B5(DC24V)		
Optional accessories	Under-voltage release	Voltage specifications	□ Q1(AC380V/AC400V) □ Q2(AC220V/AC230V) □ Q3(DC220V) □ Q4(DC110V) □ Q5(DC24V)	
		Delay time	Delay: □ 0-Instantaneous (0s) □ 1 (1s delay) ☑ 3 (3s delay) □ 5 (5s delay)	
	Loss of voltage release	Voltage	□ S1(AC380V/AC400V) □ S2(AC220V/AC230V)	
		Delay time	NDW3-1600/6300/7500	□0s-10s adjustable by users Note: The factory default setting is 3s, with a step of 1s
			NDW3-2500/4000	□ 1 (1s delay) □ 3 (3s delay) □ 5 (5s delay)
		□ J1(AC380V/AC400V) □ J2(AC220V/AC230V) Note: Applicable to NDW3-2500		

	Voltage-check closing device	Is there any wiring harness: □ 0 (no) □ 1 (yes)	
	Auxiliary contact	NDW3-1600	□A4-Four-group switching □ A6-Six-group switching □ A44-Four normally opened and four normally closed
		NDW3-2500/4000/6300/7500	□A4-Four-group switching □ A6-Six-group switching □ A44-Four normally opened and four normally closed □ A66-Six normally opened and six normally closed
	Closing ready	□ BX - Closing ready signal output unit	
	Counter	□ JS - Counter	
	Drawer seat door interlock	□ CM1 - Right side of the door interlock	□ CM2 - Left side of the door interlock
	Position indication	□ CX - Drawer seat three-position signal output	
	Door frame	□ M Doorframe	
	Dust cover	□ F Dust cover	
	IP54 transparent cover	Operation method: ☐ TL-left door ☐ TR-transparent cover right door	Frame size: ☐1: 1600A ☐2: 2500A and above
		Note: The order is placed separately, including the special door frame. If you choose this accessory, the regular door frame is not selected, and the opening size of the two door frames is different.	
	Relay module	□ R Relay module	
	Power Supply Module	□P1-DC24V □P3-AC380C/AC400V,AC220V/AC230V □P5-DC220V,DC110V	
	Safety lock	□ A Safety lock Note: Applicable to NDW3-2500,NDW3-4000,NDW3-6300,NDW3-7500.Select one from safety lock and off-position key lock	
	Button lock	□ S Button lock	
	Programmable module	□ BC Programmable output module (6-channel)	
	Remote I/O module	□ IO1 remote I/O module C8 □ IO2 remote I/O module S12 □ IO3 remote I/O module SC64 □ IO4 remote I/O module SCM423 Note: To be used with the optional power supply module	
	Accessory monitoring unit	□ AM - Accessory monitoring unit Note: It can't be selected with the communication function, signal unit and controller with "V" and "P" functions simultaneously	
	Voltage conversion module	□ P2 - Voltage conversion module	
	Energy-storing signal communication	□ TC - Energy-storing signal communication module component Note: It can't be selected with the controller with "V" and "P" functions simultaneously	
Interlocking accessories	Off-position lock	Operation method: ☐ Direct operation (one-hand operation, default) ☐ Manual pressure (two-hand operation)	□ 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
		Note: 1. All frames can be interlocked; 2. Please consult our company for other special interlocks.	

<table>
<tr><td rowspan="3"></td><td rowspan="2">Mechanical interlocking</td><td>Cable type</td><td>□ SR11 - Two groups, one for closing and one for opening □ SR12 - Three groups, one for closing and two for opening
□ SR21 - Three groups, two for closing and one for opening</td><td rowspan="2">Note: SR21 and SR12 are only suitable for NDW3-2500 and above frame size.</td></tr>
<tr><td>Hard rod type</td><td>□ SY11- Two groups, one for closing and one for opening □ SY12-Three groups, one for closing and two for opening</td></tr>
<tr><td>Power supply automatic switching device</td><td colspan="3">□ ATS-R type □ ATS-S type □ ATS-F type
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.</td></tr>
<tr><td colspan="2">Language type</td><td colspan="3">☐ Not-marked-Chinese（standard configuration） ☐ Y-English
☐ ZY-Chinese-English（Only NWK22/32 controller have Chinese-English switch function）</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 colspan="2">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="3">Other requirements:</td></tr>
<tr><td colspan="5">Note: 1. In case of no special requirements, the current and time setting value of controller shall be set according to the factory setting;
2. If you have special requirements, please indicate in the special requirements column.</td></tr>
</table>