

Shanghai Liangxin Electrical Co., Ltd.

NDW3 Series Universal Circuit Breaker Manual

(IPD-ENG-DEV-T20 A1 2016-09-23)

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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
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11	1. Add the content related to the four open and four	20210225	Zhang Fei	Zhou	Luo Guorui

	closed specifications for NDW3-1600 shell frame auxiliary contact; 2. Add the six open and six closed specifications for NDW3-4000 shell frame auxiliary contact, and delete the content related to five open and five closed specifications; NDW3-4000 four open and four closed auxiliary contacts maintain the original terminal number definition; 3. Add four-group conversion and six-group conversion specifications for NDW3-2500/6300 shell frame auxiliary contact, and delete the content related to five open and five closed specifications; 4. Add a language type option to the order specification.		Jia Jia	Yongqian Yang Xiuwen	Zhang Xiangang
12	1. Correct the line number of NDW3-1600 product four open and four closed auxiliary contact, and change it to 47-62; 2. Correct the rated current of 3200A and 4000A under NDW3-4000 shell frame at +60°C in the temperature derating coefficient table to 3120A. 3. Update the picture of exterior sign of the controller.	20210507	Jia Jia	Zhou Yongqian Yang Xiuwen	Zhang Xiangang
13	1. Add the content related to NDW3-7500 shell holder products; 2. Update product and controller pictures 3. Correct some textual descriptions	20210520	Wang Cheng	Huan Jianjun Zhou Yongqian	Zhang Xiangang
14	1. Add parameters of 2500/6300XU series; 2. Add S breaking for 1600; 3. Delete the statement that arc extinguishing chamber and contact system has a number of invention patents; 4. Change 1600 Controller power module built-in, installation dimensions and secondary wiring diagram; 5. Wiring bolts and instruction manuals are changed to optional accessories; 6. Cancel the secondary circuit 20# grounding wire from all shell frames; 7. The power of the electric operating mechanism is changed from output power to input power;	20211018	Zhang Wenlong Xu Youzhi	Zhu Shenfeng Yin Jiacan	Wang Qinshan
15	1. Update voltage and breaking capacity high altitude derating table 2; 2. Add 3600A rated current related parameters of 4000 shell frame; 3. Add 4000XU parameters; 4. Update the minimum electrical clearance distance for copper bars;	20211112	Zhang Wenlong Wang Conghui Zhuang Yangyang	Zhao Peng	Yin Jiacan

	5. Update safe distance between circuit breaker and cabinet; 6. Delete 2000/3200 shell frame electrical operating power.				
16	1. Update the content related to off-position locks 2. Add IP54 transparent cover content 3. Update NDW3-1600 electrical wiring diagram and controller wiring diagram 4. Add the content related to retention shunt release 5. Update ATS wiring diagram for 2500 and above shell frame	20220124	Niu Li Xu Youzhi Chen Kai	Wang Cheng	Luo Guorui
17	1. For NDW3-1600, delete S breaking, changed to conventional breaking, consistent with the latest samples	20220602	Huang Wenfang	Xu Youzhi	Wang Qinshan
18	1. Update 1.3 bar graph, add 4000XU breaking parameters 2. Modify the maintained mechanical life of 2500XU to 15,000 cycles	20220725	Wang Conghui	Zhao Peng	Zhang Ying
19	1. Expand the functions of the controller, and optimize the related functions of the controller 2. Change the parameters of "NDW3-4000 Technical Parameters List". 3. Update 6300 Shell Frame Fixed "Outline and Installation Dimensions" 4. Modify the logo 5. Increase the number of notes and fault records	20240429	Chen Fang Zhu Shenfeng Zhang Wenlong Huang chengxiu	Wang Qinshan	Luo Guorui
20	1.The fixed product eliminates the grounding screw and updates the picture. 2. Add installation size tolerance 3. Add 5.5 preventive maintenance.	20241126	HuangWen fang	Caigen Luotao Liuxinglei	Luo Guorui

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Product overview 1

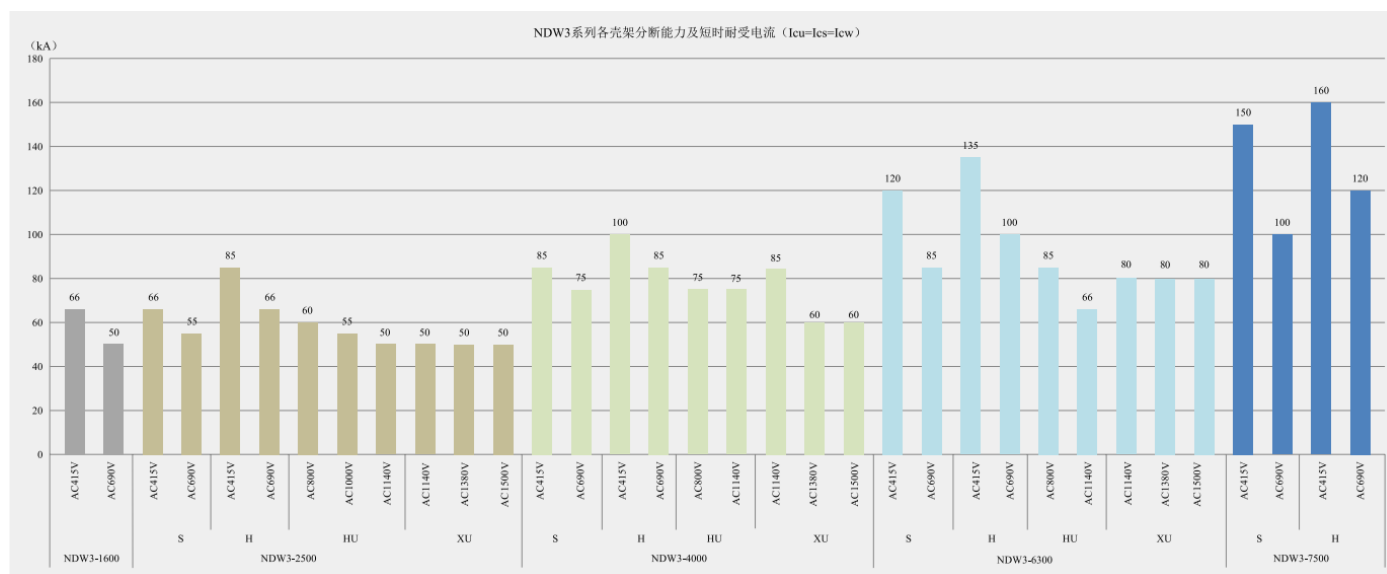
1.1 NDW3 product series



1.2 NDW3 Series Circuit Breaker Rated Current

Rated current (A) Shell frame level	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 Series Circuit Breaker



Note: 1) S-Conventional breaking, H-High breaking, HU-High voltage breaking, XU-Ultra-high voltage breaking. NDW3-1600 shell frame S indicates low breaking, and "Not marked" indicates conventional breaking.

2) $I_{cu} = I_{cs} = I_{cw}$ for NDW3-2500, 4000, 6300. For breaking indicators of NDW3-1600 and NDW3-7500, see the technical parameter list.

1.4 Structure Design

■ Installation Mode

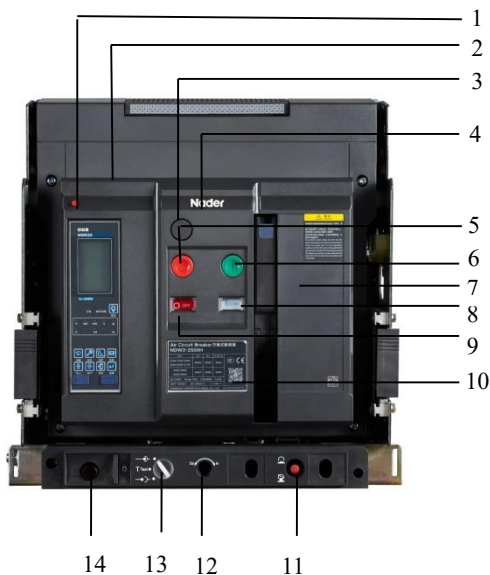


Fixed type



Drawout type

■ Brief Description of Structure and Indications

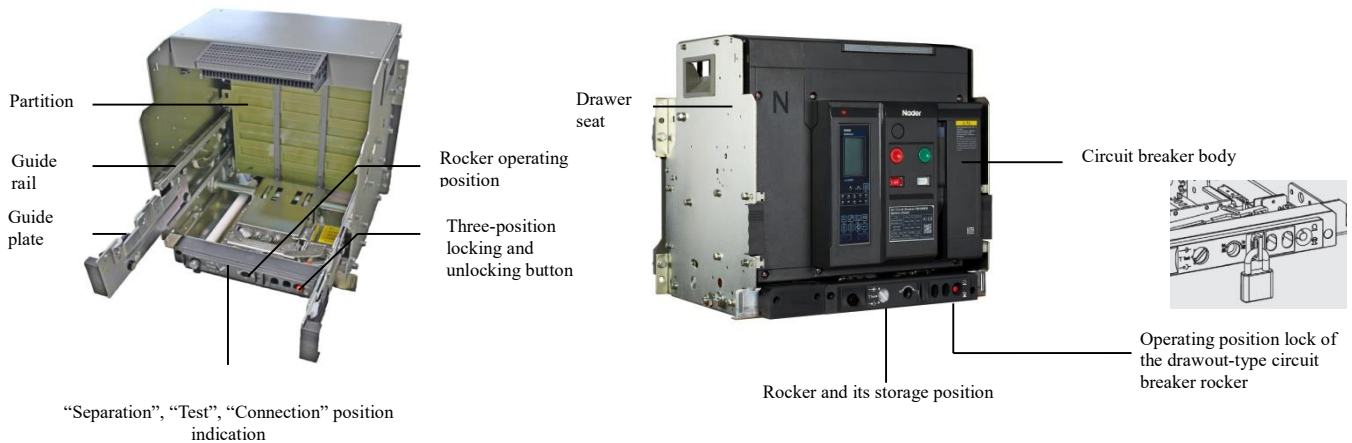


- | | |
|--|---|
| 1. Reset button | 9. Opening and closing indication |
| 2. Specification sign | 10. Nameplate |
| 3. Off-position key lock (Optional function) | 11. "Connection", "Test" and "Separation" Position locking and unlocking device |
| 4. Nader sign | 12. Rocker operating position |
| 5.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

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

■ Drawout Type Circuit Breaker Structure

Drawout type circuit breaker is composed of the circuit breaker and the drawer seat. The drawer seat has guide rails on both sides. There's guide plate on the guide rail. The circuit breaker body 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.



◆ Operating position lock of the drawout-type circuit breaker rocker (standard configuration on the drawer seat)

In any position, when the rocker is not placed in the operating position of the rocker, it can lock the operating position of the drawout-type circuit breaker through padlock. At this time, the rocker can't be normally inserted into the operating position of the rocker, so it can't perform the shake in or out operation. Padlock should be prepared by users. For 1600 shell frame drawout-type products, the diameter specification of lock beam is 3mm to 5mm while it is 4mm to 8mm for 2500 shell frame drawout-type products.

It is generally applied to the following scenarios: When the drawout type circuit breaker is in the separation position and the rocker isn't placed in the rocker operating position, pull out the black lever below the drawer seat and pass through the lever with the padlock beam. In this case, the circuit breaker body can only be pulled out the drawer seat, can cannot be rocked to the "test" or "connection" position.

◆ Drawout breaker triolocation lock (standard configuration on the drawer seat)

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 unlock button (red).

1.5 Product Features

1.5.1 Efficient arc extinguishing and breaking

- The arc extinguishing chamber and contact system of circuit breaker have been optimized, using the principle of air-blast 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 electric 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 Diverse types, enhanced functionality: The New Smarink X Series Controllers

- NWK21/NWK31 controller: Digital tube display, practical and simple function, suitable for low temperature places, and optional voltage measurement, communication, temperature measurement with contact, fault recording, demand measurement protection, data management, etc.
- NWK22/NWK32 type controller: LCD display, multiple and diversified functions, with optional voltage and harmonics measurement and protection functions, etc., 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, electric energy and temperature 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, ground protection, neutral line N-pole protection, current unbalance protection, MCR making capacity protection, dual protection, demand protection, etc.
- Maintenance function: With fault record (30 times), historical current peak record, contact wear equivalent, query of operation times, clock function, self-diagnostic function, test function, fault display function, health degree, fault recording, electric energy quality analysis, and other features
- With a remote reset device, realize remote recovery (optional accessories) after fault tripping of the controller

1.5.4 Integrated communication network

The 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, CAN and Profibus-DP protocols for data transmission. **Local/remote interconnection, Bluetooth/WIFI interconnection, NFC, etc. are supported; Modbus and DLT645 protocols are supported.**

1.5.5 AC high voltage circuit breaker

The HU (AC1140V) and XU (AC1140/1380/1500V) type circuit breakers 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 Thermal-humidity type circuit breaker

The TH (thermal-humidity) type circuit breaker can meet the 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:

- Damp heat test: GB/T 2423.4-2008 Environmental Testing for Electric and Electronic Products - Part 2: Test Method - Test Db: Damp Heat, Cyclic (12h + 12h Cycle)
- Mould growth test: GBT2423.16-2008 Environmental Testing for Electric and Electronic Products - Part 2: Test Method - Test J and Guidance: Mould Growth
- Salt spray test: GB/T 2423.18-2012 Environmental Testing. Part 2: Test Method Test Kb: Salt Spray, Alternating (Sodium Chloride Solution)
- Enclosure protection grade: GB/T 4208-2008 Enclosure Protection Grade (IP code).

1.5.7 Wind power, plateau type circuit breaker

On the basis of satisfying the requirements of thermal-humidity type circuit breaker, wind power, plateau type circuit breaker used in special places can be used under the environment condition of plateau and low temperature below 40°C, is in line with the GB/T20645 Technical Requirements of the Plateau Low-voltage Apparatus under Special Circumstances, and has passed standard related test.

1.5.8 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: The wiring of NDW3-6300 rated current 6300A is only vertical wiring and vertical extended wiring; the wiring of NDW3-7500 rated current 7500A is only vertical extended wiring, and the wiring of 6300A is only vertical wiring and vertical extended wiring.

1.5.9 Multiple safety protection device

It has drawout type circuit breaker door interlocking, drawout type three-position locking and unlocking device and off-position key lock, connection terminal protective cover and other protection devices.

1.6 Conforming Standards and Certification

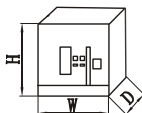
GB/T 2423.4-2008	Environmental Testing for Electric and Electronic Products - Part 2: Test Method - Test Db: Damp Heat, Cyclic (12h + 12h Cycle)
GB/T 4207-2012	Methods for the Determination of the Proof and the Comparative Tracking Indices of Solid Insulating Materials
GB/T 14048.1-2012	Low-voltage Switchgear and Control Equipment - Part 1: General Rules (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/T 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 20645-2021	Specific Environmental Condition - Technical Requirements of Low-voltage Apparatuses for Plateau
GB/T 20626.3-2006	Specific Environmental Condition - Electric and Electronic Products for Plateau - Part 3: Protection Requirement of Thunder and Lightning, Pollution, Condensation

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

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Technical Characteristics 2

2.1 NDW3-1600 Technical Parameter List

Circuit breaker model			NDW3-1600	
Rated current In (+40°C) (A)			200, 400, 630, 800, 1000, 1250, 1600	
N-pole rated current			100%In	
Rated operating 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 pole			3, 4	
Full break timeNote 1 (ms)			≤25	
Closing timeNote 2 (ms)			≤60	
Breaking type			Conventional	
Rated limit short-circuit breaking capacity 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 (30 times/h)	AC220V/230V/240V AC380V/400V/415V	10000 (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	20000	
Installation Mode		Fixed type, drawout type		
Wiring method of the main circuit		Horizontal connection, vertical connection, mixed connection (upper horizontal and lower vertical), mixed connection (upper vertical and lower horizontal)		
External dimensions: 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)

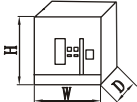
Note: 1. Full break time: Interval from the beginning of the circuit breaker disconnection to the end of the arcing time (the same below);

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).

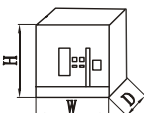
2.2 NDW3-2500 Technical Parameter List

Circuit breaker model		NDW3-2500			
Rated current In (+40°C) (A)		630, 800, 1000, 1250, 1600, 2000, 2500			
N-pole rated current		100%In			
Rated operating 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 type)			
Rated impulse withstand voltage Uimp (kV)		12, 18 (XU type)			
Number of poles pole		3, 4			
Full breaking time (ms)		≤30			
Closing time (ms)		≤70			
Breaking type		S	H	HU	XU
Rated limit short-circuit breaking capacity Icu (effective value) (kA)	AC220V~415V	66	85	-	-
	AC440V/480V/660V/690V	55	66	-	-
	AC800V	-	-	60	-
	AC1000V	-	-	55	-
	AC1140V	-	-	50	-
	AC1140V/1380V/1500V				50
Rated operating short-circuit breaking capacity Ics (effective value) (kA)	AC220V~415V	66	85	-	-
	AC440V/480V/660V/690V	55	66	-	-
	AC800V	-	-	60	-
	AC1000V	-	-	55	-
	AC1140V	-	-	50	-
	AC1140V/1380V/1500V				50
Rated short circuit making capacity Icm (peak value) (kA)	AC220V~415V	145.2	187	-	-
	AC440V/480V/660V/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~415V	66	85	-	-
	AC440V/480V/660V/690V	55	66	-	-
	AC800V	-	-	60	-
	AC1000V	-	-	55	-
	AC1140V	-	-	50	-
	AC1140V/1380V/1500V				50
Operating performance	Electrical life (times) Operation frequency (30 times/h)	AC220V~ 415V	15000(630A~1250A), 11500(1600A~2000A), 11000(2500A)		
		AC440V/480V/660V/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)		
		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, lower vertical), mixed wiring (upper vertical, lower horizontal), mixed extended wiring (upper horizontal, lower vertical), mixed extended wiring (upper vertical, lower horizontal)			
External dimensions: 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)

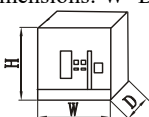
2.3 NDW3-4000 Technical Parameter List

Circuit breaker model			NDW3-4000			
Rated current In (+40°C) (A)			800, 1000, 1250, 1600, 2000, 2500, 3200, 3600, 4000			
N-pole rated current			100%In			
Rated operating voltage Ue (V)			AC220/230/240, AC380/400, AC415, AC440/480, AC660/690, AC800, AC1000, AC1140, AC1380V, AC1500			
Rated frequency F (Hz)			50/60			
Rated insulation voltage Ui (V)			1250, 1800 (XU type)			
Rated impulse withstand voltage Uimp (kV)			12, 18 (XU type)			
Number of poles pole			3, 4			
Full breaking time (ms)			≤30			
Closing time (ms)			≤70			
Breaking type			S	H	HU	XU
Rated limit short-circuit breaking capacity Icu (effective value) (kA)	AC220V~ 400V		85	100	-	-
	AC415V, AC440V/480V AC660V/690V		75	85	-	-
	AC800V/ AC1000V/1140V		-	-	75	-
	AC1140V		-	-	-	85
	AC1380V/1500V		-	-	-	60
Rated operating short-circuit breaking capacity Ics (effective value) kA	AC220V~ 400V		85	100	-	-
	AC415V, AC440V/480V AC660V/690V		75	85	-	-
	AC800V/ AC1000V/1140V		-	-	75	-
	AC1140V		-	-	-	85
	AC1380V/1500V		-	-	-	60
Rated short circuit making capacity Icm (peak value) (kA)	AC220V~ 400V		187	220	-	-
	AC415V, AC440V/480V AC660V/690V		165	187	-	-
	AC800V/ AC1000V/1140V		-	-	165	-
	AC1140V		-	-	-	187
	AC1380V/1500V		-	-	-	132
Rated short-time withstand current Icw (effective value) Is (kA)	AC220V~ 400V		85	100	-	-
	AC415V, AC440V/480V AC660V/690V		75	85	-	-
	AC800V/ AC1000V/1140V		-	-	75	-
	AC1140V		-	-	-	85
	AC1380V/1500V		-	-	-	60
Operate performance	Electrical life (times) Operation frequency (30 times/h)	AC220V~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(HU)	2000(800A~1600A), 1000(2000A, 2500A), 600(3200A, 4000A)			
	Electrical life (times) Operation frequency (10 times/h)	AC1140V/AC/1380V/1500 V(XU)	2000(800A~4000A)			
	Mechanical life (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, horizontal extended wiring, vertical extended wiring			
External dimensions: 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)	

2.4 NDW3-6300 Technical Parameter List

Circuit breaker model		NDW3-6300			
Rated current In (+40°C) (A)		4000, 5000, 6300			
N-pole rated current		100%In			
Rated operating 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 type)			
Rated impulse withstand voltage Uimp (kV)		12, 18 (XU type)			
Number of poles pole		3, 4			
Full breaking time (ms)		≤30			
Closing time (ms)		≤70			
Breaking type		S	H	HU	XU
Rated limit short-circuit breaking capacity 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
Operating performance	Electrical life (times) Operation frequency (10 times/h)	AC220V~415V	6000(4000A), 4000 (5000A), 2000 (6300A)		
		AC440V/480V/660V/690V	3500(4000A), 2500 (5000A), 1500 (6300A)		
		AC800V	3000(4000A), 1500(5000A), 1000(6300A)		
		AC1000V/1140V/1380V/1500V	2000(4000A), 1000 (5000A), 500 (6300A)		
	Mechanical life (times) Operation frequency (30 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, (only vertical for 6300A, vertical extended wiring)			
External dimensions: 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 operating 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 pole		3, 4		
Full breaking time (ms)		≤30		
Closing time (ms)		≤70		
Breaking type		S		H
Rated limit short-circuit breaking capacity 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)	AC220V~415V	5000(4000A, 5000A), 3000 (6300A), 2000 (7500A)	
	Operation frequency (10 times/h)	AC440V/480V/660V/690V	3000(4000A, 5000A), 2000 (6300A), 1500 (7500A)	
	Mechanical life (times)	Maintenance-free	6000	
	Operation frequency (30 times/h)	With maintenance	12000	
Installation type		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: The 7500A is wired with only vertical extended wiring, and the 6300A is wired with only vertical wiring and vertical extended wiring.		
External dimensions: 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) 132 (7500A)
		Fixed type 4P	167 (4000A, 5000A)	170 (6300A) 175 (7500A)
		Drawout type 3P	193 (4000A, 5000A)	195 (6300A) 200(7500A)
		Drawout type 4P	257 (4000A, 5000A)	260 (6300A) 265(7500A)

Note: 1. Closing time: The closing (or connecting) time is the time interval from the moment when the closing electromagnet is energized to the moment when all poles' contacts are in contact;

2. Separating time: The separating (or disconnecting) time is the time interval from the moment the shunt release is energized to the moment when all poles' arcing contacts are separated;

3. Reclosing time: The time interval from when the circuit breaker receives a tripping command to the moment when it receives a closing command again;

4. Make-break time: Interval from the beginning of the circuit breaker disconnection to the end of the arcing time;

5. Contact resistance: Contact resistance is the additional resistance that occurs when fixed and moving contacts come into contact with each other. Hua Yi Electric's HLY-200A loop resistance tester is used as the test equipment. Please refer to "HLY-200A Loop Resistance Tester User Manual" for the testing method.

6. Maintenance-free means that the product can continue to operate normally without repair or replacement of parts under the use environment specified in the specification.

7. Maintainable means that the product can continue to operate normally with replacement of parts under the use environment specified in the specification.

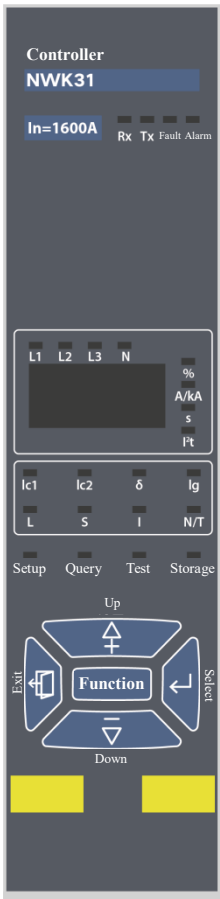
8. Unless otherwise noted in the above table, all parameters are measured in the laboratory environment (room temperature $25\pm 5^{\circ}\text{C}$, humidity controlled at: 30%-70%RH, dust-free, pollution-free, impact-free and vibration-free).

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3 Smarink X Controller

The Smarink X series controller is a newly developed circuit breaker control unit, which is one of the main components of the circuit breaker. It provides protection functions for overload, short circuit, grounding, current imbalance, overvoltage, undervoltage, voltage imbalance, overfrequency, underfrequency, reverse power, etc. Through functions such as load monitoring, demand value protection, and zone interlocking, it ensures the reliable operation of the power grid. 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 Types of Smarink X Controller

Model	NWK21/NWK31	NWK21 (V) /NWK31 (V) NWK21 (V1) /NWK31 (V1) NWK21 (P) /NWK31 (P)	NWK22/NWK32 NWK22 (V) /NWK32 (V) NWK22 (V1) /NWK32 (V1)	NWK22 (P) /NWK32 (P) NWK22 (P1) /NWK32 (P1) NWK22 (P2) /NWK32 (P2)
Controller Pictures				
NWK31 and NWK32 are applied to NDW3-1600, NWK21 and NWK22 are applied to NDW3-2500, NDW3-4000, NDW3-6300, and NDW3-7500				

3.2 Functions of Smarink X Controller

Functional items		NWK21 NWK31	NWK21/V NWK31/V	NWK21/V1 NWK31/V1	NWK21/P NWK31/P
Display interface	Digital tube numbers and symbols display	√	√	√	√
	LCD panel symbols and graphics display in Chinese	—	—	—	—
Protection function	Current protection	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	√	√	√
		Grounding alarm/alarm output	√/□	√/□	√/□
		Current leakage protection/alarm/alarm output	—	—	—
		Neutral wire protection	√	√	√
		Current unbalance protection/alarm/alarm output	√/—/—	√/—/—	√/—/—
		MCR	√	√	√
		HSISC	√	√	√
		Load monitoring/alarm/alarm output	▲/▲/□	▲/▲/□	▲/▲/□
		Current required value protection/alarm output	-/-/-	-/-/-	√/-/-
	Voltage protection	Undervoltage protection/alarm/alarm output	-/-/-	-/-/-	√/-/-
		Dual undervoltage protection/alarm/alarm output	-/-/-	-/-/-	-/-/-
		Overvoltage protection/alarm/alarm output	-/-/-	-/-/-	√/-/-
		Dual overvoltage protection/alarm/alarm output	-/-/-	-/-/-	-/-/-
		Voltage unbalance protection/alarm/alarm output	-/-/-	-/-/-	-/-/-
		Phase sequence protection/alarm/alarm output	-/-/-	-/-/-	-/-/-
	Frequency protection	Underfrequency protection/alarm/alarm output	-/-/-	-/-/-	-/-/-
		Dual underfrequency protection/alarm/alarm output	-/-/-	-/-/-	-/-/-
		Overfrequency protection/alarm/alarm output	-/-/-	-/-/-	-/-/-
		Dual overfrequency protection/alarm/alarm output	-/-/-	-/-/-	-/-/-
		Frequency change rate protection	—	—	—
	Power protection	Reverse power protection/alarm/alarm output	-/-/-	-/-/-	-/-/-
		Power factor alarm/alarm output	-/-	-/-	-/-
		Overpower protection/alarm/alarm output (active)	-/-/-	-/-/-	-/-/-
		Underpower protection/alarm/alarm output (active)	-/-/-	-/-/-	-/-/-
		Reverse power protection/alarm/alarm output (reactive)	-/-/-	-/-/-	-/-/-
		Overpower	-/-/-	-/-/-	-/-/-

		protection/alarm/alarm output (reactive)				
		Dual reverse power protection/alarm/alarm output (reactive power)	-/-/-	-/-/-	-/-/-	-/-/-
Temperature protection		Directional protection	—	—	—	—
		Contact temperature measurement alarm/trip/alarm output	-/-/-	-/-/-	√/√/-	√/√/-
		Controller temperature alarm/trip/alarm output	-/-/-	-/-/-	√/√/-	√/√/-
		Regional selective interlocking (ZSI)	—	—	—	—
Measuring function	Current	Current measurement (phase pole, N-pole, grounding)	√	√	√	√
		Required value measurement (current)	—	√	√	√
		Current heat capacity	√	√	√	√
	Voltage	Voltage (phase voltage, circuit voltage, voltage unbalance rate, average voltage)	—	√	√	√
		Phase sequence detection	—	√	√	√
		Frequency measurement	—	√	√	√
	Power	Required value measurement (power)	—	√	√	√
		Power measurement (active power, reactive power, apparent power)	—	√	√	√
		Power factor measurement	—	√	√	√
		Peak factor	—	—	—	—
	Electric energy	Active electric energy, reactive electric energy, apparent electric energy	—	—	—	√
		Forward active electric energy	—	—	—	-
		Reverse active electric energy	—	—	—	-
		Four-quadrant reactive	—	—	—	-
		Forward apparent electric energy	—	—	—	-
		Reverse apparent electric energy	—	—	—	-
		Electric energy pulse	—	—	—	-
		Electric energy curve	—	—	—	-
	Harmonic wave	Harmonics measurement	—	—	—	—
	Intelligent electric energy quality analysis	Waveform capture (communication reading)	—	—	—	—
		Average voltage per hour	—	—	—	—
		Short-time voltage interruption	—	—	—	—
		Voltage dips and swells	—	—	—	—
		Short-time impulse voltage	—	—	—	—
		Slow voltage dips and swells	—	—	—	—
		Daily extremes measurement (max./min. voltage/current/frequency/power/required current/required power/contact temperature)	—	—	—	—
	Temperature	Onboard temperature measurement	—	—	√	√
		Temperature curve	—	—	—	—
		Contact temperature measurement	—	—	√	√
Data management and diagnostics	Data management	Fault record (30 times) and query	√	√	√	√
		Dislocation record (switch on, off, reset)	▲ (Communication)	▲ (Communication)	√	√
		Alarm history query	—	—	—	—
		Query of number of operations	√	√	√	√
		Max. and min. historical current	—	—	—	—
		Max. and min. historical voltage	—	—	—	—
		Max. and min. frequency	—	—	—	—
		Max. and min. power	—	—	—	—

Intelligent communication		Peak required power	—	—	—	—
		Max. required current	—	—	—	—
		Electric energy quality analysis record	—	—	—	—
		Operation record	▲ (Communication)	▲ (Communication)	√	√
		Communication read frame machine number	—	—	—	√
	Diagnosis	Protection value change record	▲ (Communication)	▲ (Communication)	√	√
		Fault recording	—	—	—	√
		Clock function	▲ (Communication)	▲ (Communication)	√	√
		LED fault status indication	√	√	√	√
		Battery level alarm	▲	▲	√	√
		Controller fault trip signal output	√	√	√	√
		Self-diagnosis	√	√	√	√
		Contact wear equivalent (alarm) query	▲ (Communication)	√	√	√
	Health degree	Health degree/service life prediction	—	—	—	√
		Remaining life prediction	—	—	—	√
Intelligent communication	Intelligent communication	Modbus protocol address assignable	▲ (Communication)	▲ (Communication)	√	√
		One-click backup and recovery of protection parameters	▲ (Communication)	▲ (Communication)	√	√
Intelligent control	Intelligent control	Remote reset of controller	▲ (Communication) □	▲ (Communication) □	▲ (Communication) □	▲ (Communication) □
Intelligent measurement	High-precision metering	Current: ±0.5%	—	—	—	√
		Voltage: ±0.5%	—	—	—	√
		Power: 1s	—	—	—	√
		Power factor: 2%	—	—	—	√
		Electric energy: 1s	—	—	—	√
Intelligent interconnection	Communication mode	RS485 communication	▲ (Communication)	▲ (Communication)	√	√
		Bluetooth (standard by default)	—	—	—	√
		NFC	—	—	—	▲
		WiFi	—	—	—	▲
		NB-IoT	—	—	▲	▲
		Ethernet	—	—	▲	▲
	Communication protocol	Modbus RTU	▲ (Communication)	▲ (Communication)	√	√
		Modbus TCP	—	▲	▲	▲
		Profibus-DP	—	▲	▲	▲
		Devicenet	—	▲	▲	▲
		CAN	—	▲	▲	▲
		DL/T 645	—	▲	▲	▲

Notes:

1. "√" represents with this function, "▲" represents optional function for users, and "-" represents without this function. □: To be realized with optional signal unit;
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.

Functional items		NWK22 NWK32	NWK22/V NWK32/V	NWK22/V1 NWK32/V1	NWK22/P NWK32/P	NWK22/P1 NWK32/P1	NWK22/P2 NWK32/P2
Display interface	Digital tube numbers and symbols	—	—	—	—	—	—

Protection function		display					
		LCD panel symbols and graphics display in Chinese	√	√	√	√	√
	Current protection	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)	√	√	√	√	√
		Ground alarm/alarm output (ground leakage either way)	√/□	√/□	√/□	√/□	√/□
		Current leakage protection/alarm/alarm output (ground leakage either way)	√/□	√/□	√/□	√/□	√/□
		Neutral wire protection	√	√	√	√	√
		Current unbalance protection/alarm/alarm output	√/□	√/□	√/□	√/□	√/□
		MCR	√	√	√	√	√
		HSISC	√	√	√	√	√
		Load monitoring/alarm/alarm output	▲/▲/□	▲/▲/□	▲/▲/□	▲/▲/□	▲/▲/□
		Current required value protection/alarm output	—	√/□	√/□	√/□	√/□
	Voltage protection	Undervoltage protection/alarm/alarm output	—	√/√/□	√/√/□	√/√/□	√/√/□
		Dual undervoltage protection/alarm/alarm output	—	—	—	▲/▲/□	▲/▲/□
		Overvoltage protection/alarm/alarm output	—	√/√/□	√/√/□	√/√/□	√/√/□
		Dual overvoltage protection/alarm/alarm output	—	—	—	▲/▲/□	▲/▲/□
		Voltage unbalance protection /alarm/alarm output	—	√/√/□	√/√/□	√/√/□	√/√/□
		Phase sequence protection/alarm/alarm output	—	√/√/□	√/√/□	√/√/□	√/√/□
	Frequency protection	Underfrequency protection/alarm/alarm output	—	√/√/□	√/√/□	√/√/□	√/√/□
		Dual underfrequency protection/alarm/alarm output	—	—	—	▲/▲/□	▲/▲/□
		Overfrequency protection/alarm/alarm output	—	√/√/□	√/√/□	√/√/□	√/√/□
		Dual overfrequency protection/alarm/alarm output	—	—	—	▲/▲/□	▲/▲/□
		Frequency change rate protection	—	√/√/□	√/√/□	√/√/□	√/√/□
	Power protection	Reverse power protection/alarm/alarm output	—	—	—	√/√/□	√/√/□
		Power factor alarm/alarm output	—	—	—	√/√/□	√/√/□
		Overpower protection/alarm/alarm output (active)	—	—	—	√/√/□	√/√/□
		Underpower protection/alarm/alarm output (active)	—	—	—	√/√/□	√/√/□
		Reverse power protection/alarm/alarm output (reactive)	—	—	—	√/√/□	√/√/□
		Overpower protection/alarm/alarm output (reactive)	—	—	—	√/√/□	√/√/□
		Dual reverse power	—	—	—	▲/▲/□	▲/▲/□

		protection/alarm/alarm output (active)						
		Directional protection	—	—	—	√/√/□	√/√/□	√/√/□
	Temperature protection	Contact temperature measurement alarm/trip/alarm output	—	—	▲/▲/□	▲/▲/□	√/√/□	√/√/□
		Controller temperature alarm/trip/alarm output	—	—	▲/▲/□	▲/▲/□	√/√/□	√/√/□
		Regional selective interlocking (ZSI)	▲/□	▲/□	▲/□	▲/□	▲/□	▲/□
Measuring function	Current	Current measurement (phase pole, N-pole, grounding)	√	√	√	√	√	√
		Required value measurement (current)	—	√	√	√	√	√
		Current heat capacity	√	√	√	√	√	√
	Voltage	Voltage (phase voltage, circuit voltage, voltage unbalance rate)	—	√	√	√	√	√
		Phase sequence detection	—	√	√	√	√	√
		Frequency measurement	—	√	√	√	√	√
	Power	Required value measurement (power)	—	—	—	√	√	√
		Power measurement (active power, reactive power, apparent power)	—	—	—	√	√	√
		Power factor measurement	—	—	—	√	√	√
		Peak factor (communication to be selected)	—	√	√	√	√	√
	Electric energy	Active electric energy, reactive electric energy, apparent electric energy	—	—	—	√	√	√
		Forward active electric energy	—	—	—	√	√	√
		Reverse active electric energy	—	—	—	√	√	√
		Four-quadrant reactive	—	—	—	√	√	√
		Forward apparent electric energy	—	—	—	√	√	√
		Reverse apparent electric energy	—	—	—	√	√	√
		Electric energy pulse	—	—	—	√	√	√
		Electric energy curve	—	—	—	√	√	√
	Harmonic wave	Harmonics measurement	—	—	—	√	√	√
	Intelligent electric energy quality analysis (communication required)	Waveform capture (communication reading)	—	—	—	—	—	√
		Average voltage per hour	—	—	—	—	—	√
		Short-time voltage interruption	—	—	—	—	—	√
		Voltage dips and swells	—	—	—	—	—	√
		Short-time impulse voltage	—	—	—	—	—	√
		Slow voltage dips and swells	—	—	—	—	—	√
		Daily extremes measurement (max./min. voltage/current/frequency/power/required current/required power/contact temperature/temperature and humidity)	—	—	—	—	—	√
	Temperature	Onboard temperature measurement	—	—	▲	▲	√	√
		Temperature curve	—	—	▲	▲	√	√
		Contact temperature measurement	—	—	▲	▲	√	√
Data management and diagnostics	Data management	Fault record (30 times) and query	√	√	√	√	√	√
		Dislocation record (switch on, off, reset)	√	√	√	√	√	√
		Alarm history query	√	√	√	√	√	√
		Query of number of operations	√	√	√	√	√	√
		Max. and min. historical current	—	—	—	—	√	√
		Max. and min. historical voltage	—	—	—	—	√	√

		Max. and min. frequency	—	—	—	—	√	√
		Max. and min. power	—	—	—	—	√	√
		Peak required power	—	—	—	—	√	√
		Max. required current	—	—	—	—	√	√
		Electric energy quality analysis record	—	—	—	—	√	√
		Operation record	▲ (Communication)	▲ (Communication)	√	√	√	√
		Communication read frame machine number	—	—	—	—	√	√
		Protection value change record	—	—	—	—	√	√
		Average voltage per hour	—	▲ (Communication)	√	√	√	√
	Diagnosis	Fault recording	—	—	√	√	√	√
		Clock function	√	√	√	√	√	√
		LED fault status indication	√	√	√	√	√	√
		Battery level alarm	√	√	√	√	√	√
		Controller fault trip signal output	□	□	□	□	□	□
		Self-diagnosis	√	√	√	√	√	√
	Health degree	Contact wear equivalent (alarm) query	√	√	√	√	√	√
		Health degree/service life prediction	—	—	—	—	√	√
		Remaining life prediction	—	—	—	—	√	√
Intelligent control	Intelligent control	Remote reset of controller	▲ (Communication) □	▲ (Communication) □	▲ (Communication) □	▲ (Communication) □	▲ (Communication) □	▲ (Communication) □
Intelligent communication	Intelligent communication	Modbus protocol address assignable	√	√	√	√	√	√
		One-click backup and recovery of protection parameters	√	√	√	√	√	√
Intelligent measurement	High-precision metering	Current: ±0.5%	—	—	—	—	√	√
		Voltage: ±0.5%	—	—	—	—	√	√
		Power: 1s	—	—	—	—	√	√
		Power factor: 2%	—	—	—	—	√	√
		Electric energy: 1s	—	—	—	—	√	√
Intelligent interconnection	Communication mode	RS485 communication	▲ (Communication)	▲ (Communication)	√	√	√	√
		Bluetooth (standard by default)	—	—	—	—	—	▲
		NFC	—	—	—	—	—	▲
		WiFi	—	—	—	—	—	▲
		NB-IoT	—	▲	▲	▲	▲	▲
		Ethernet	—	▲	▲	▲	▲	▲
	Communication protocol	Modbus RTU	▲ (Communication)	▲ (Communication)	√	√	√	√
		Modbus TCP	—	▲	▲	▲	▲	▲
		Profibus-DP	—	▲	▲	▲	▲	▲
		Devicenet	—	▲	▲	▲	▲	▲
		CAN	—	▲	▲	▲	▲	▲
		DL/T 645	—	▲	▲	▲	▲	▲

Notes:

1. "√" represents with this function, "▲" represents optional function for users, and "-" represents without this function. □: To be realized with optional signal unit;

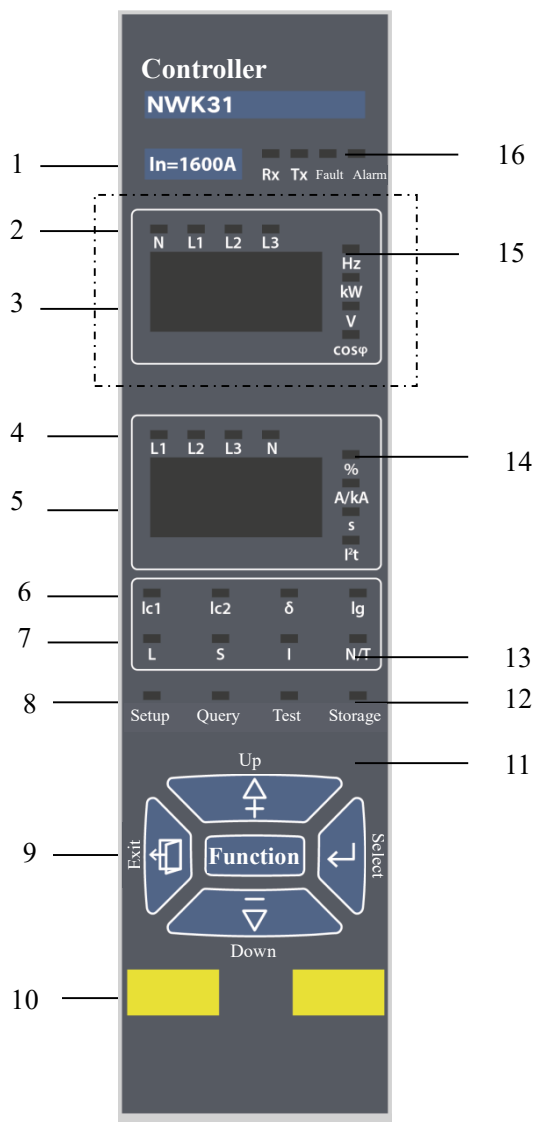
2. For the controller with "V" and "P" functions, the voltage module P2 is optional for the main circuit rated voltage AC500V and above;

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

3.3 Layout of Smarink X Controller

■ NWK21/NWK31 Type Controller

NWK21/ NWK31 Controller Panel Description



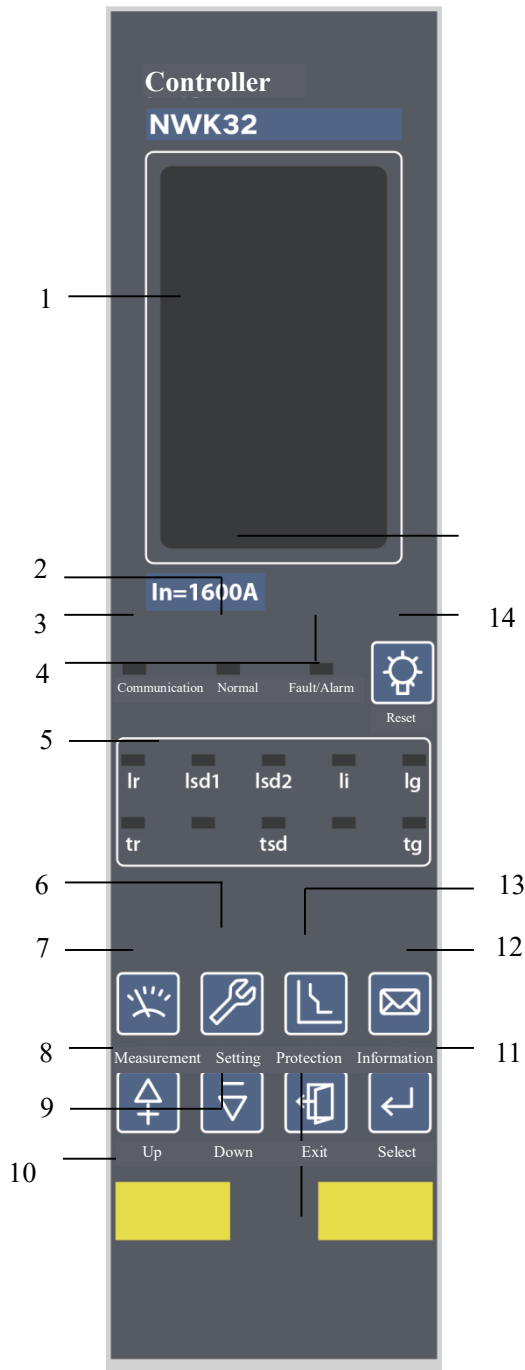
1. Rated current
2. N-phase and A-, B-, and C-phase voltage indicators in order
3. Three-phase voltage and frequency value display screen
4. Three-phase current, N-phase current indicators, etc.
5. Three-phase electric current display screen, etc.
6. Load monitoring signals 1 and 2 operation indicators
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 and Rx are for internal testing only.

■ NWK22/NWK32 Type Controller

NWK22/ NWK32 Controller Panel



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

3.4 Setting Values and Protection Characteristics of Smarink X 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 distribution protection I²t: tr = 2.25 Tr/N² (factory default) Standard generator protection I²t (F): tr = 2.25 Tr/N² 2) Extra fast inverse time (power distribution protection) EI(G): tr= 1.25 Tr/ (N² -1) (3) Extra fast inverse time (motor protection) EI (M): tr = 1.3974 Tr × Ln [N² / (N² -1.15)] 4) High-voltage fuse compatible HV: tr = 4.0625 Tr/(N⁴ -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 2 t; NWK22/NWK32 controller provides 4 types of protection curves.										
Standard power distribution protection I 2 t		NWK21/NWK31: 15s, 30s, 60s, 120s, 240s, 480s										
Time setting valve tR (@1.5 Ir)		NWK22/NWK32: 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 feature (Accuracy ±10%) Inherent absolute error: ±40ms		Current (I/Ir)					Tripping time					
		≤1.05					> 2h Inaction					
		≥1.3 (power distribution protection)					< 1h Action					
		≥1.2 (motor 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 (namely function OFF), 10min, 20 min, 30 min, 45 min, 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 feature (Accuracy ±10%)	Current	Tripping time
I²t-ON	I _{sd} ≤I≤8Ir	(8Ir) 2 × T sd /I 2 inverse time-limit characteristic
	I>8Ir	T sd definite time limit characteristic
I²t-OFF	I≥ I _{sd}	T sd definite time limit characteristic
Thermal memory time	15min (ON) or OFF (OFF - function off) Factory setting, not adjustable after leaving the factory	
NWK22/NWK32		
I sd1 inverse time limit current setting value	(1.5~15) Ir or OFF (OFF-Function off)	
I sd2 fixed-time current setting value	(1.5~15) Ir or OFF (OFF-Function off)	
Time setting value T sd (s) of definite time limit	0.1~1.0	
Protective feature (Accuracy ±10%) Inherent absolute error: ±40ms	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 longtime delay, and ≥T sd
	Definite time limit	T _{sd}
Thermal memory time	Instantaneous (namely function off), 10 min, 20 min, 30 min, 45 min, 1h, 2h, 3h	

Continued: Setting Values and Protection Characteristics of Smarink X Controller

Short-circuit instantaneous protection NWK21/NWK31 & NWK22/NWK32		
Current setting value I_i	(1.0~20) I_n or OFF (OFF - function off)	
Protective feature (Accuracy $\pm 10\%$)	Current (I/I_i)	Tripping time
	≤ 0.85	Inaction
	≥ 1.15	<40ms Action
MCR protection NWK21/NWK31 & NWK22/NWK32		
Current setting value I_{MCR}	(1.0~20) I_n or OFF (Factory default 10 I_n) Factory setting, not adjustable after leaving the factory	
Protective feature (Accuracy $\pm 10\%$)	Current (I/I_{MCR})	Tripping time
	≤ 0.8	Inaction
	≥ 1.1	<30ms Action
The MCR provides the high-speed instantaneous protection, which is valid at the closing moment of the circuit breaker. When the circuit breaker is closed after 100ms, MCR protection will be canceled automatically.		
Ground protection/alarm NWK21/NWK31		
Protection type	Differential type (T), ground current type (W), with the latter as the optional function	
Current setting value I_g	(0.2~1.0) I_n or OFF (OFF - function off)	

Time setting value T g (s)	0.1~0.4 definite time limit	
Protective feature (Accuracy ±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 g	(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 item is set
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
	≤0.9	Inaction (no alarm)
	≥1.0	For action (or alarm), see the action time as the inverse or definite time limitNote
Returnable features (accuracy of ±10%)	≥1.0	Non-return
Inherent absolute error: ±40ms	≤0.9	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”. If there is no signal unit 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 wire protection NWK21/NWK31 & NWK22/NWK32		
Neutral wire protection setting value	NWK21/NWK31 controller: 50%In, 100%In or OFF; NWK21/NWK31 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 Protection Characteristics of Smarink X Controller

Current leakage protection/alarm (namely the residual current protection, applicable for the shell frame level 2500A and below)
NWK22/NWK32

Current setting value IΔn (A)	0.5~30.0 or OFF (OFF - function off)	
Action delay time TΔn (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 TΔnb (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/IΔn)	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							
(Accuracy of ±10%) Tripping time t(s)	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	
	IΔn	0.04	0.36	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	
	2IΔn	0.04	0.18	0.25	0.5	0.75	1	1.25	1.5	1.75	2	2.25	2.5	
	5IΔn	0.04	0.072	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	
	10IΔn													
Current leakage alarm output			The signal output is required to add a signal unit; set one DO of the signal unit as “Current leakage alarm”. If there is no signal unit 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 feature (Accuracy ±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 unbalanced alarm”. If there is no signal unit output, observe the controller display screen or read from the display indicator.											
Execution mode			Alarm/tripping/close											

Continued: Setting Values and Protection Characteristics of Smarink X Controller

Required current value protection/alarm NWK22/NWK32		
Protection/alarm start setting value	(0.2~1.0) In	
Protective 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 feature (Accuracy $\pm 10\%$)	Multiple of current (required)	Tripping time

Inherent absolute error: $\pm 40\text{ms}$	current/setting value)	
	≤ 0.9	Inaction (no alarm)
	≥ 1.1	Acts (or gives an alarm) according to the set delay time
Return features (accuracy of $\pm 10\%$)	Multiple of current (required current/setting value)	Tripping time
Inherent absolute error: $\pm 40\text{ms}$	≥ 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	
	Un load I	Current mode 1	0.2~1.0Ir		20~80%Tr	
		Current way 2				
		Power mode 1	200kW~10000kW		10s~3600s	
		Power mode 2				
	Un load II	Current mode 1	0.2~1.0Ir		20~80%Tr	
		Current way 2	0.2Ir~unload I		10s~600s	
		Power mode 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”. If there is no signal unit output, observe the controller display screen or read from the display indicator.
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Undervoltage protection/alarm NWK22/NWK32

Protection/alarm start setting value V	100~return value
Protective 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 $\pm 10\%$) inherent absolute error: ± 40	Umin/action setting value	Tripping time
	> 1.1	Inaction (no alarm)

ms	≤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”. If there is no signal unit output, observe the controller display screen or read from the display indicator.	
Execution mode	Alarm/tripping/close	
Overvoltage protection/alarm NWK22/NWK32		
Protection/alarm start setting value V	Return value ~ 1200	
Protective 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”. If there is no signal unit 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%	
Protective action delay time setting value (s)	0.2~60	
Protection action return setting value	2%~ start value	
Protection return delay time (s)	0.2~60	
Action features of voltage unbalance protection/alarm (Accuracy of ±10%) inherent absolute error: ±40 ms	Actual voltage unbalance rate/setting value	Tripping time
	≤0.9	Inaction (no alarm)
	≥1.1	Acts (or gives an alarm) according to the set delay time
Alarm action features of voltage unbalance protection (Accuracy of ±10%) inherent absolute error: ±40 ms	Actual voltage unbalance rate/setting value	Tripping time
	≥1.1	Non-return
	≤0.9	Returns according to the set delay time
Voltage unbalance protection alarm DO output	The signal output is required to add a signal unit; set one DO of the signal unit as “U unbalanced alarm” output. If there is no signal unit output, observe the controller display screen or read from the display indicator.	
Execution mode	Alarm/tripping/close	

Continued: Setting Values and Protection Characteristics of Smarink X 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". If there is no signal unit 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	
Protective 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. If there is no signal unit 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”. If there is no signal unit output, observe the controller display screen or read from the display indicator.	
Execution mode		Alarm/tripping/close	
Signal unit NWK21/NWK31 & NWK22/NWK32			
NWK21/NWK31	DO output	General functions	Optional Load Monitoring Functions
	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 Protection Characteristics of Smarink X Controller

Signal unit NWK21/NWK31 &NWK22/NWK32						
NWK22/NWK32	Type of signal unit		Rated current		Field of Application	
	S1		4DO (4 output contacts)		Regional interlocking between circuit breakers	
	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	Normally opened impulse	Normally closed impulse
		Impulse time	None		1~360s	
	Parameter Settings of Switch Output (DO)					
	General		Alarm	Fault tripping	Self-diagnosis alarm	Load monitoring 1
	Load monitoring 2		Overload pre-alarm	Overload fault	Short time delay fault	Transient fault
	Grounding/current leakage fault		Grounding/current leakage alarm	Current unbalance fault	Middle-phase fault	Undervoltage fault
	Overvoltage fault		Voltage unbalance fault	Underfrequency fault	Overfrequency fault	Required value fault
	Reverse power fault		Regional interlocking	Remote closing	Remote opening	Phase sequence fault
	MCR fault		Grounding interlocking	Short circuit interlocking	A-phase required value fault	B-phase required value fault
	C-phase required value fault		N-phase required value fault	Required value out-of-limit	Alarm of operation times	Contact wear alarm
	Remote reset		Internal overtemperature	Contact overtemperature	Power factor alarm	Frequency change
	Open-phase fault		Underpower alarm	Over-active power	Over-reactive power	Power direction

Continued table: Setting Parameters of Underpower Protection/Alarm

Parameter name	Setting range	Setting step length	Remarks
Protection start setting value	5～500kW	1kW	
Protection action delay time setting value	0.2～20s	0.1s	
Alarm action return setting value	5kW～start value	1kW	Only when the execution mode is "alarm", this setting value is available (the return value should be greater than or equal to the start value)
Alarm return delay time	1.0～360s	0.1s	
Alarm DO output	Set one DO of the signal unit as "power fault" output. (If this item has not been set, the alarm information can be read from the controller display screen, without contact output.)		
Execution mode	Alarm/tripping/close		

Continued table: Over-active power protection

Parameter name	Setting range	Remarks
----------------	---------------	---------

Over-active power		
Protection alarm DO output	Set one DO of the signal unit as "over-active power fault". (This is not required. If this item has not been set, the alarm information can be read from the controller display screen, without contact output;)	
Execution mode	Alarm/tripping/close	

Continued table: Over-reactive power protection

Parameter name	Setting range	Remarks
Over-reactive power protection		
Protection alarm DO output	Set one DO of the signal unit as "over-reactive power fault". (This is not required. If this item has not been set, the alarm information can be read from the controller display screen, without contact output;)	
Execution mode	Alarm/tripping/close	

Continued table: Controller temperature protection

Parameter name	Setting range	Remarks
Controller temperature protection	50°C~85°C	
Protection alarm DO output	Set one DO of the signal unit as "controller temperature fault". (This is not required. If this item has not been set, the alarm information can be read from the controller display screen, without contact output;)	
Execution mode	Alarm/tripping/close	

Continued table: Contact temperature protection/alarm

Parameter name	Setting range	Remarks
Contact temperature protection	70°C~130°C	
Protection alarm DO output	Set one DO of the signal unit as "contact temperature fault". (This is not required. If this item has not been set, the alarm information can be read from the controller display screen, without contact output;)	
Execution mode	Alarm/tripping/close	

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

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

Factory Setting of Smarink X Controller

Protective features	Setting current	Setting time	Remarks
Overload long-time delay protection	1.0I _n	60s	Thermal memory ON
Short circuit	NWK21/NWK31	8I _r	Definite time limit, I 2 t-OFF

short-time delay protection	NWK22/NWK32	$I_{sd1}-6I_r$, $I_{sd2}-8I_r$	0.2s	I sd1 inverse time limit, I sd2 fixed time limit
Short circuit instantaneous protection		$10I_n$	-	-
Neutral wire protection		$100\%I_n$	-	-
Ground protection		$0.5I_n$	0.2s	This function is off in default for 3P, and this value is on in default for 4P; users can open it as needed for the 3P product
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 $0.4I_n$ and $0.2I_n$ respectively. When the rated current is $\leq 400A$, the primary current single-phase and three-phase of the main circuit are no less than $1.0I_n$ and $0.6I_n$ 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% to 110%) U_s .

AC power supply voltage (50/60Hz): AC230V, AC400V, allowable error $\pm 15\%$.

DC power voltage: DC220V, DC110V, DC24V; the allowable error is $\pm 15\%$.

For NDW3-1600 shell frame controller, pins 1 and 2 can only accept DC24V input. When AC230V/AC400V/DC110V/DC220V is required by users, an external DC power module with the voltage converted to DC24V must be provided, which has been installed at the factory; for NDW3-2500 and above shell frame controllers, there is an internal DC power module for conversion. See the electric wiring diagram in Chapter 7.

3) To be powered by the test port

Rated voltage: DC24V, with an allowable error of $\pm 5\%$. 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;

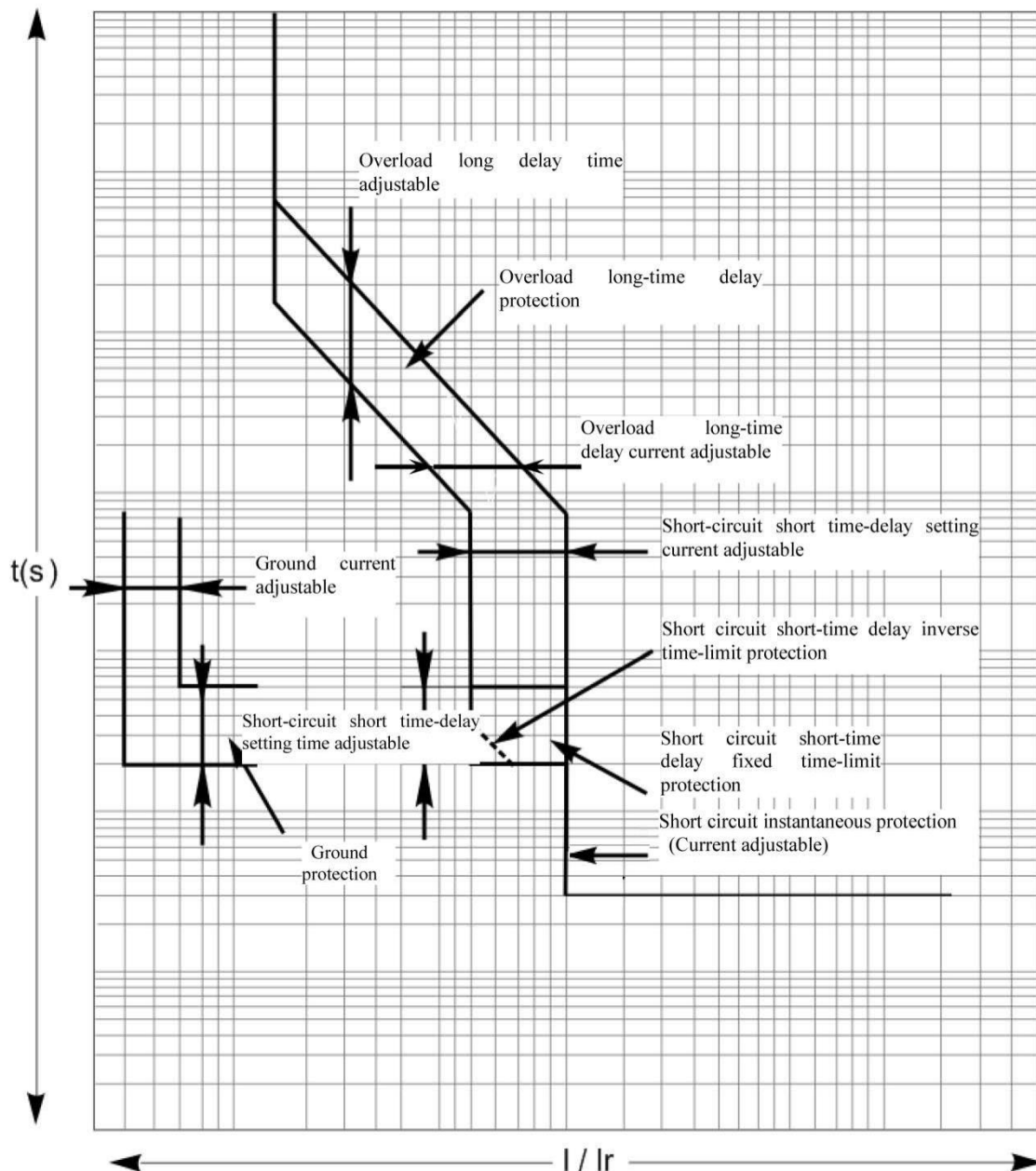
Circuit breaker status auxiliary contact output, contact capacity: 10A/AC250V.

3.6 Introduction of Controller Functions

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

3.7 Protection Characteristic Curve

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



For each protection characteristic curve of controller, see the User Manual of NWK21 and NWK31 Controller and User Manual of NWK22 and NWK 32 Controller

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4.1 Accessory List

Accessory category	Accessory name	Configuration	Installation method and type	Remarks
Electrical control accessories	Closed electromagnet	Standard configuration	Fixed type/drawout type	
	Shunt release/retention shunt release	Standard configuration	Fixed type/drawout type	Either. Retention type applicable to 2500/4000 shell frame
	Motor operating mechanism	Standard configuration	Fixed type/drawout type	
	Undervoltage release	Optional ordering for customers	Fixed type/drawout type	Either
	No-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	For 2500 shell frame and below only
	Power supply module NWDF1	Optional ordering for customers	Fixed type/drawout type	
	Relay module NWDF1-RM	Optional ordering for customers	Fixed type/drawout type	To be used with the power supply module
	Communication adapter NWDF1-MD/MP	Optional ordering for customers	Fixed type/drawout type	
	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	Fixed type/drawout type	

		customers		
Safety accessories	Phase partition	Standard configuration	Fixed type/drawout type	
	Counter	Optional ordering for customers	Drawout type	
	Doorframe	Optional ordering for customers	Fixed type/drawout type	
	Dust cover	Optional ordering for customers	Drawout type	
	IP54 transparent cover	Optional ordering for customers (single order)	Fixed type/drawout type	This accessory comes with a special door frame, which cannot be selected at the same time as the regular door frame, as they have different sizes of door openings;
	Operating manual	Optional ordering for customers	Fixed type/drawout type	
	Connection bolt	Optional ordering for customers	Fixed type/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	For 2500 shell frame and above only
	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	
	Automatic Transfer Switching Equipment	Optional ordering for customers	Fixed type/drawout type	For the two-way power supply

4.2 Electrical Control Accessories

Note: Unless otherwise noted, the calibration parameters of the following accessories are all measured in the laboratory environment (room temperature $25\pm 5^{\circ}\text{C}$, humidity controlled at: 30%-70%RH, dust-free, pollution-free, impact-free and vibration-free).

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 U_s

, 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 $>200\text{ms}$. Users shall not connect the auxiliary switch contact of the circuit breaker in series.

◆ Technical Parameters of Closed Electromagnet

Power Consumption Table of Closed Electromagnet

Rated insulation voltage (U_i)	Rated control supply voltage (U_s)	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	200W	145W

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 $>200\text{ms}$. Do not connect to the auxiliary switch contact of the circuit breaker in series.

◆ Technical Parameters of Shunt Release



Power Consumption Table of Shunt Release

Rated insulation voltage (Ui)	Rated control supply voltage (Us)	Instantaneous power	
		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	200W	145W

4.2.3 Retention shunt release

Retention 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 retention shunt release

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

2) When the applied voltage is 85%~110% of the rated operating voltage of the retention shunt release, the retention shunt release can guarantee the circuit breaker reliable without closing.

3) The retention shunt release is the long-term duty type, which can send closing signal with an interval of more than 500ms after power failure.

4) Each power-on trigger time $t > 200\text{ms}$.

5) 1.3Us withstand time is 9.5s without damage, 1.4Us withstand time is 0.5s without damage.

◆ Technical parameters of retention shunt release

Power Consumption Table of Retention Shunt Release

Rated insulation voltage (Ui)	Rated control supply voltage (Us)	Instantaneous power	Operating 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)			400V				
Energy storage time			3s~5s				
Rated operating voltage (Us)			AC380V	AC220V	DC220V	DC110V	DC24V
Apparent power (Input power)	1600 shell frame	Transient	760VA	680VA	770VA	710VA	340VA
		Steady state	230VA	180VA	290VA	220VA	220VA
	2500 shell frame	Transient	720VA	680VA	720VA	680VA	310VA
		Steady state	190VA	170VA	220VA	170VA	190VA
	4000 shell frame	Transient	950V	920VA	970VA	780VA	/
		Steady state	150VA	240VA	180VA	190VA	/
	6300 shell frame	Transient	1330VA	1250VA	1430VA	1210VA	/
		Steady state	300VA	310VA	220VA	220VA	/
Active power (Output power)	1600 shell frame		90W				
	2500 shell frame		110W				
	Applicable to 3200, 4000 shell frames		110W				
	6300 shell frame		180W				

◆ Remarks:

◆ Apparent power is the input power that drives the operation of the electric operating mechanism.

◆ Active power is the output power of the electric operating mechanism during its operation.

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 operating voltage,

the undervoltage release will work to disconnect the circuit breaker;

2) When the applied voltage is less than 35% of the rated operating voltage of the undervoltage release, the undervoltage release will make the circuit breaker unable to be closed;

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

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

◆ Undervoltage delayed release

The undervoltage delayed release sets the delay time of the release action through toggling the toggle switch on the undervoltage delayed device. The delay time is set as

1 s, 3 s, 5 s as required, and instantaneous.

◆ Power Consumption Table of Undervoltage Release

Power Consumption Table of Undervoltage Release

Rated insulation	Rated operating voltage (Ue)	Operating power
------------------	------------------------------	-----------------



voltage (Ui)		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	3.5W

4.2.6 No-voltage release

◆ Action features of the no-voltage release

- 1) When the applied voltage suddenly drops to 0~35% of the rated operating voltage,

will work to disconnect the circuit breaker;

- 2) When the applied voltage is less than 30% of the rated operating voltage of the no-voltage release.

will make the circuit breaker cannot be closed;

- 3) When the applied voltage is 85%~110% of the rated operating voltage of the no-voltage release, the no-voltage release can guarantee the reliable closing of the circuit breaker.

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

◆ The no-voltage release can be divided into instantaneous release and delayed release, which is mainly composed of coil, iron core component and electronic parts.

◆ No-voltage delayed release

The no-voltage delayed release sets the delay time of the release action by toggling the toggle switch on the loss of voltage delayed device. For NDW3-1600/6300/7500, the delay time can be set by the user within the range of 0s to 10s (factory setting is 3s) in steps of 1s; for NDW3-2500/4000, the delay times are 1s, 3s, 5s and instantaneous.

◆ Power Consumption of No-voltage Release

Power Consumption Table of No-voltage Release

Rated insulation voltage (Ui)	Rated operating 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 conversion, six groups conversion, four normally opened and four normally closed, six normally opened and six normally closed.



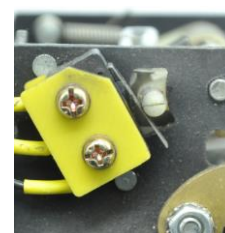
◆ Technical Parameters of Auxiliary Contact

Applicable shell frame		NDW3-1600	NDW3-4000	NDW3-2500/6300/7500
Auxiliary contact form		■ Four groups conversion ■ Six groups switch ■ Four normally open and four normally closed	■ Four groups switch ■ Four normally open and four normally closed ■ Six groups switch ■ Six normally opened and six normally closed	■ Four normally open and four normally closed ■ Four groups conversion ■ Six normally opened and six normally closed ■ Six groups switch
Agreed thermal current I th		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 all of the following mechanical states. See the table below for technical parameters.

- ◆ Circuit breaker off state;
- ◆ Energy storage in place;



- ◆ No disconnection instruction;
- ◆ Under-voltage release, no-voltage release (optional accessories) maintain the pull-in state;
- ◆ Rest of the reset button after the controller fault tripping;
- ◆ Off-position key lock (interlocking accessory) not interlocked;
- ◆ Mechanical interlocking (interlocking accessory) not interlocked.

Table of Technical Parameters

Applicable shell frame	NDW3-1600, 2500, 4000, 6300, 7500
Breaking capacity	3A /AC250V
	5A /AC125V

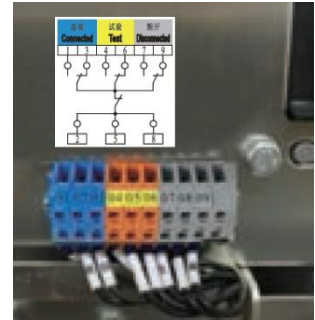
4.3.3 Position status signal output device of the drawer seat (on the drawer seat)

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.

The three-position signal contact is in series with the position locking signal contact of the drawer seat. For shaking in or out operation, when the red button on the drawer seat pops out, 2# and 3# in the connected 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.

Applicable shell frame	NDW3-1600, NDW3-2500, NDW3-4000, NDW3-6300, NDW3-7500
Breaking capacity	0.4A/DC125V
	10A/AC250V



4.3.4 Secondary wiring terminal

For the number of secondary wiring terminal, there is a total of 62 groups (identical for the fixed type and drawout type).



See the table below for parameters of the secondary wiring terminal

Project	parameters
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

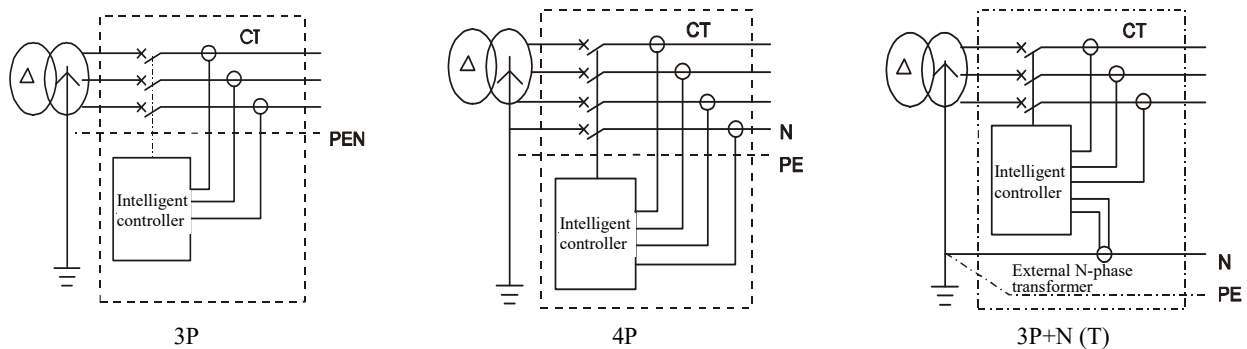
4.4 Accessories for Smarink X Controller

4.4.1 External N-pole transformer

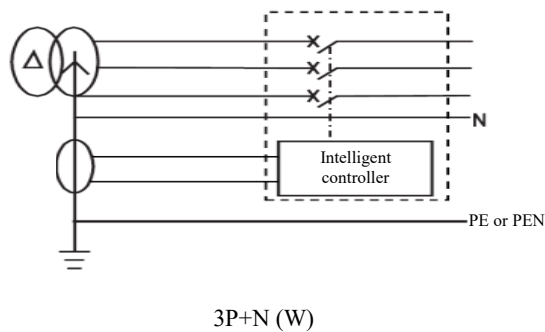
◆ Ground type

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)



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



◆ Transformer type

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

1) Rectangular transformer

★ Rectangular transformer code

Transformer code	Hole dimensions mm	Applicable shell frame
------------------	--------------------	------------------------

N1	62×21	1600
N2	102×32.5	1600, 2500
N3	122×52	2500, 4000, 6300, 7500
N4	262×102	2500, 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.

★ The conductor shall be provided by the customer. It is recommended to use the shielded twisted pair (with the metal shielding layer, 0.2~0.3mm² i.e. AWG24/AWG22 cable).

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.

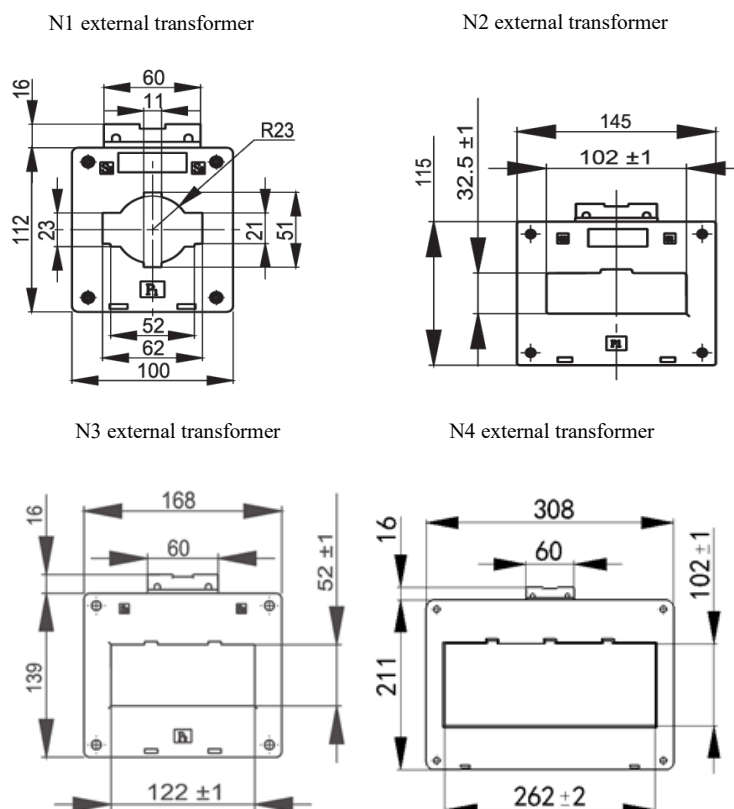


Figure for outline and installation dimensions of the N-pole transformer

Flexible transformer

★ Flexible transformer code

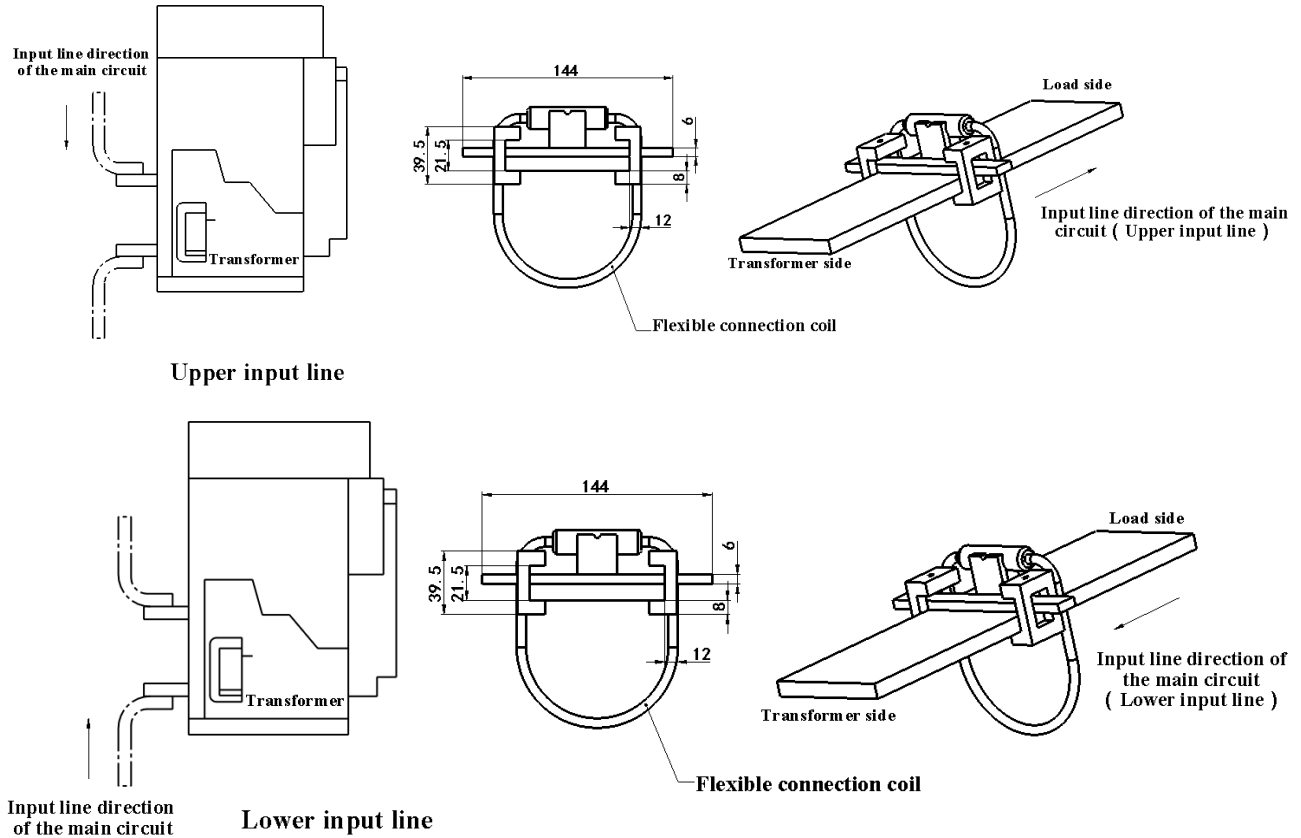
Transformer code	Soft cable circumference	Applicable current range
NR1	280mm	200A-800A
NR2	370mm	1000A-2000A
NR3	450mm	1000A-7500A

★ 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.

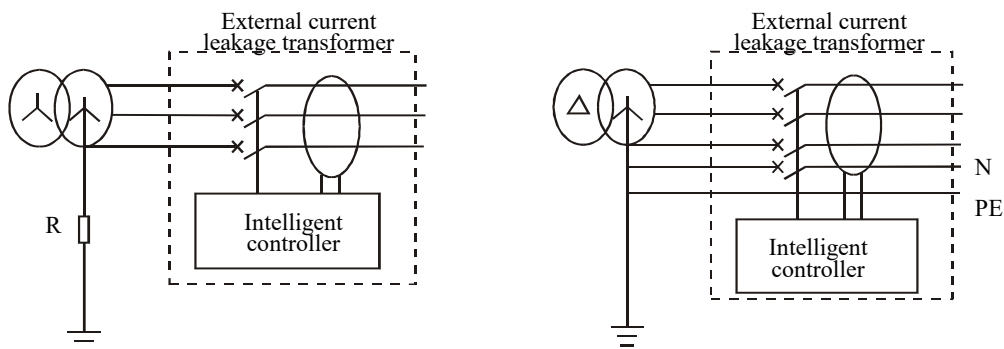
Standard configuration of the conductor is 3m.



4.4.2 External leakage transformer

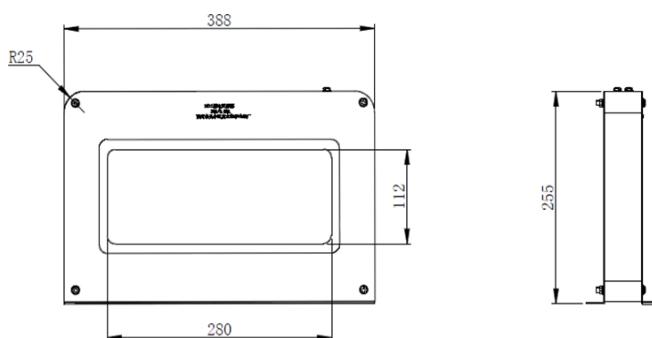
When the grounding protection mode is aftercurrent protection (E) type, an external current leakage transformer is required. The controller judges action via the output signal of the external current leakage transformer.

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



Schematic Diagram of Current Leakage Protection

- ◆ 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 the shielded twisted pair (with metal shielding layer, 0.2~0.3mm², i.e. AWG24/AWG22 cable). 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.
- ☐ 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 (ST-1V)

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

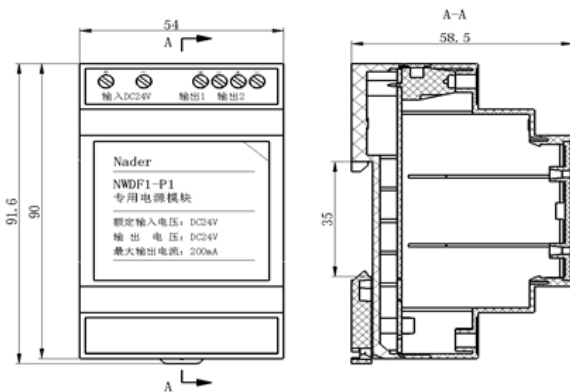


		NWDF1-P1	NWDF1-P3	NWDF1-P5
Working power supply	Nominal voltage	24 VDC	400/230VAC	220/110VDC
	Allowable input range	12-36 VDC	180VAC-430VAC	85VDC-265VDC
	Isolation voltage	1500Vrms	1500Vrms	1500Vrms
	Reverse polarity effects	With polarity effects	Without polarity effects	With polarity effects
Protection class		IP20	IP20	IP20
Dimensions (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

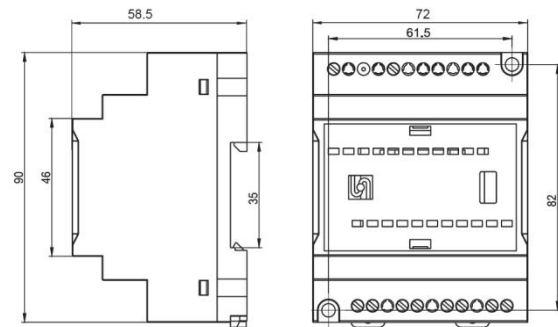
- ◆ Supply mode: Optional ordering by customers;

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

- ◆ See the figure below for outline and installation dimensions.



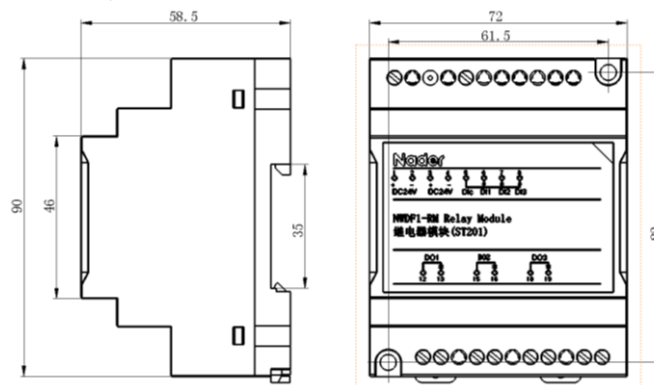
Outline and Installation Dimension Diagram of Power Supply Module NWDF1-P1



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

4.4.4 Relay module NWDF1-RM (ST-201)

- ◆ 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

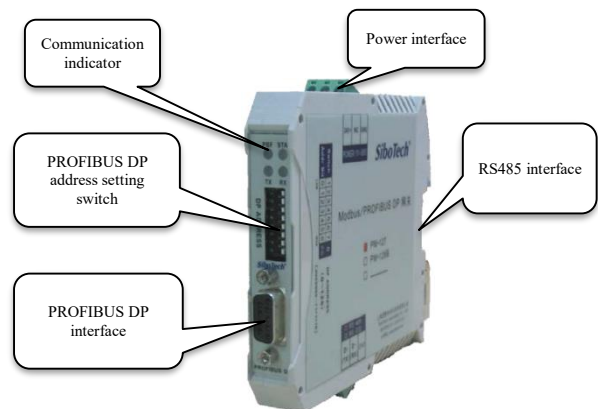
products to achieve the remote communication, remote regulating, remote control and remote sensing functions on DeviceNet and ProfiBus DP.

- 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

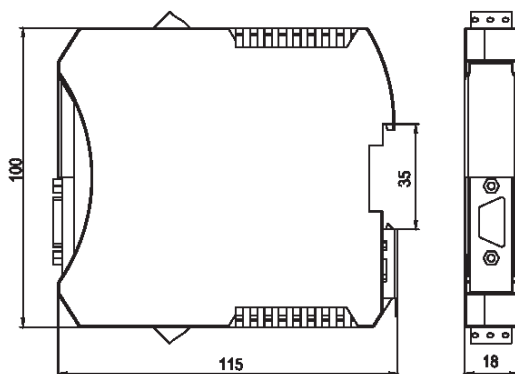


NWDF1-MD

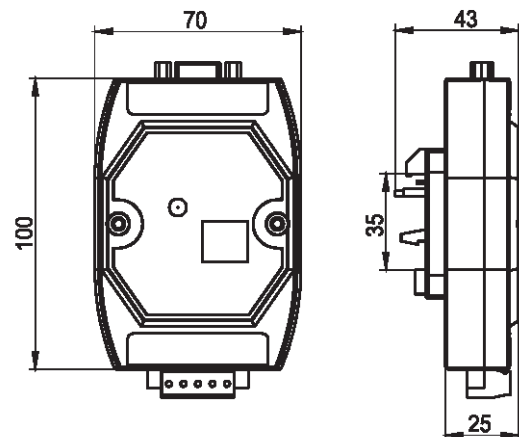


NWDF1-MP

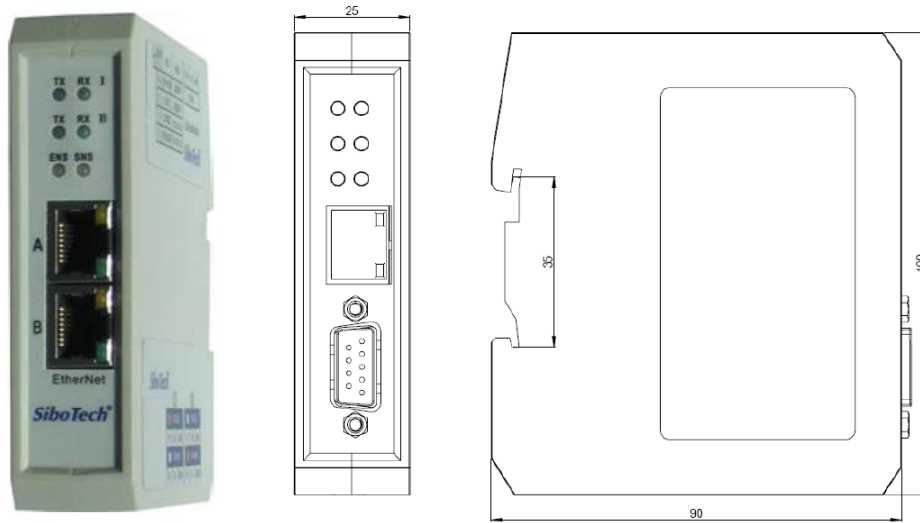
◆ See the figure below for outline and installation dimensions



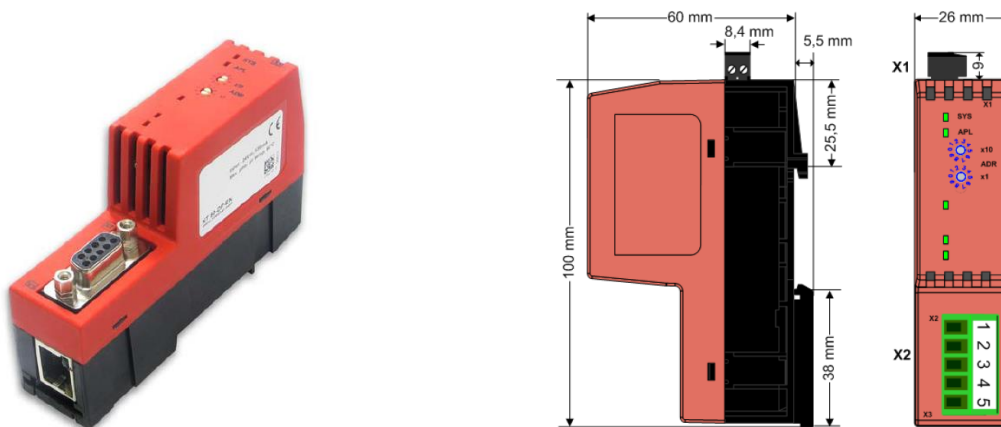
NWDF1-MD Outline and Installation Dimension Diagram



NWDF1-MP Outline and Installation Dimension Diagram



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.

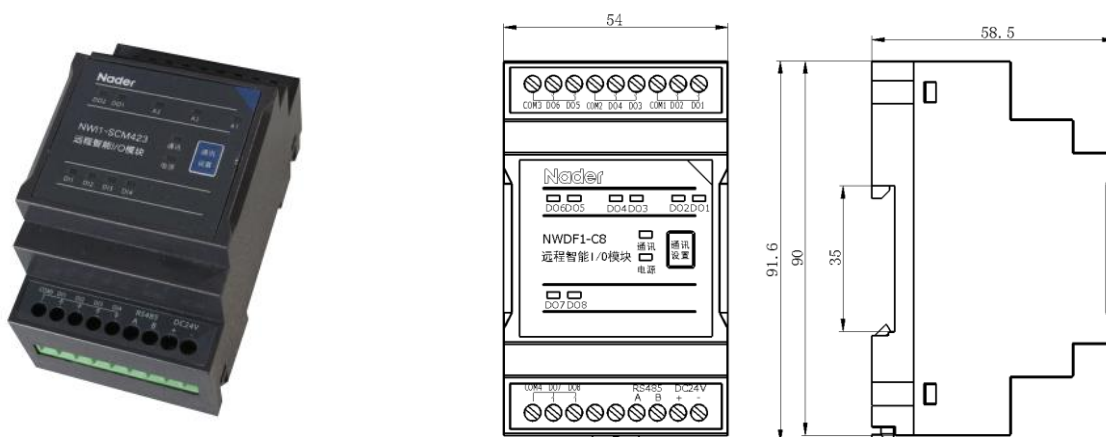
◆ NWDF1-C8 has 4 groups of 8 relay outputs, for controlling the on-off status of 4 circuit breakers.

◆ 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, parity check not supported
	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

- ◆ NDWF1-C6 Programmable Output Module (with 35mm labeled rail mounting). 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)

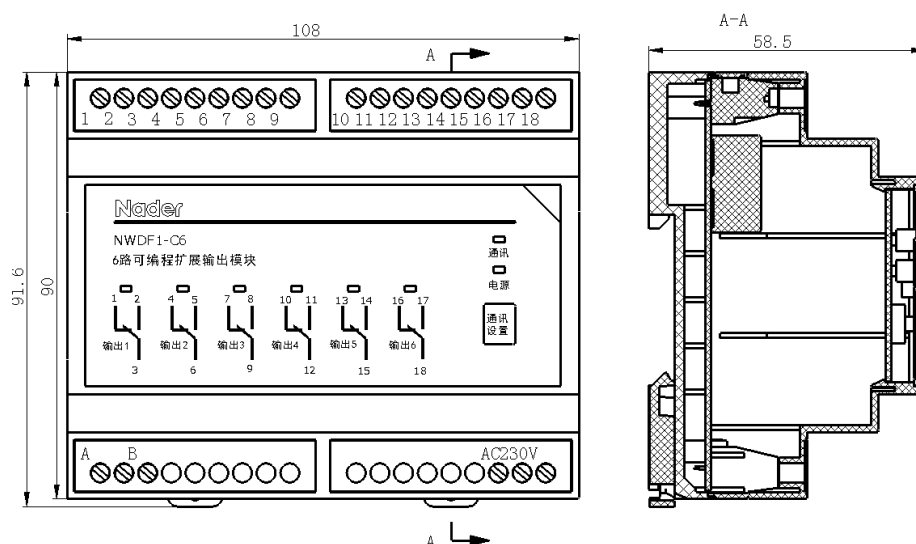
Time Setting Table of the Time Delayed Contact

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

Electric Parameters Table of the Programmable Module Relay Output

Rated operating voltage Ue/V		Agreed thermal current Ith/A	Rated operating current Ie/A	Rated control capacity
AC	230	5 (2-channel programmable output module 1A)	AC-15: 5(2-channel programmable output module is 1A)	1200VA (230VA for 2-channel programmable output module)
	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

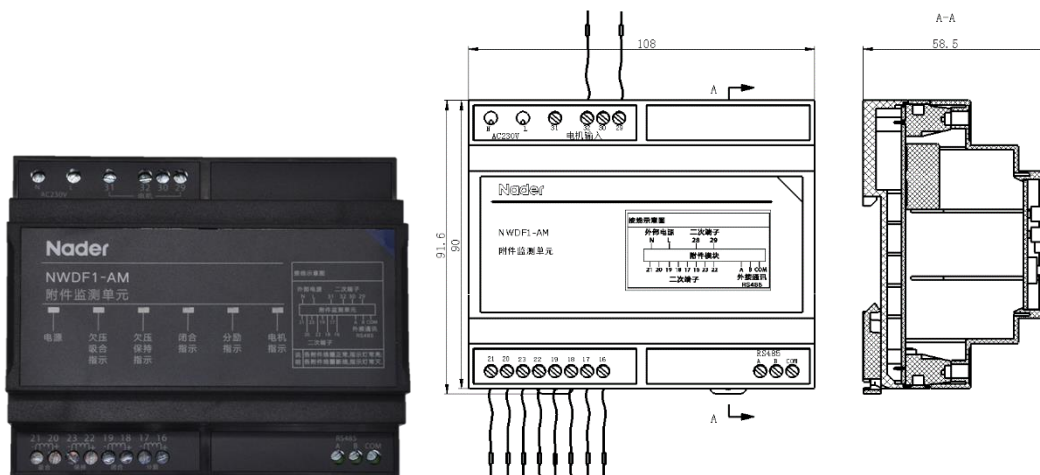
Working power supply	Nominal voltage	230VAC
	Allowable input range	180V~270VAC
	Isolation voltage	1000Vrms
	Reverse polarity effects	Without polarity effects
	Voltage mismatch	Voltage above 260VAC may cause the permanent damage of the module
	Voltage sag	Sag for 10ms can still work without interruption
Communication	interface	Standard RS485, 2-wire; Modbus RTU
	Optional modbus address	2~127
	Baud rate	9600
	Parity bit	CRC check, parity check not supported
	Isolation voltage	1000Vrms
	Number of modules for a single bus	32
Protection class		IP20
Dimensions		90 x 72 x 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 shield 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-AM outline 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.



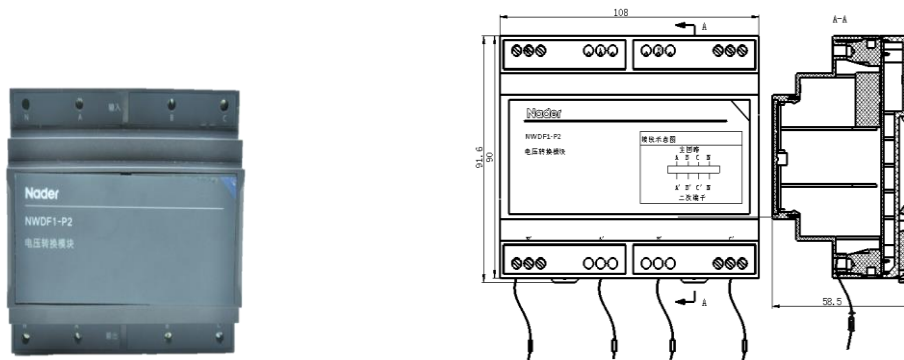
4.4.11 Voltage conversion module NWDF1-P2

- ◆ 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 AC400V when the input is greater than AC500V.

- ◆ 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.



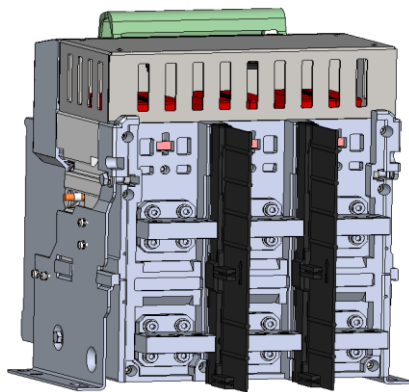
NWDF1-P2 Outline and Installation Dimension Diagram

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 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.

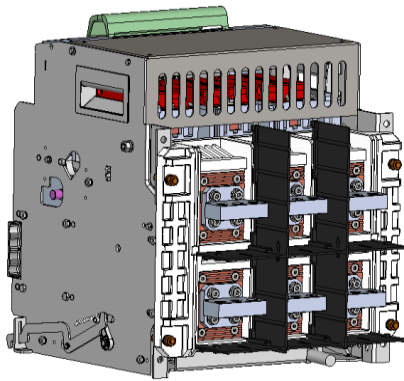
- ◆ Conventional phase partition



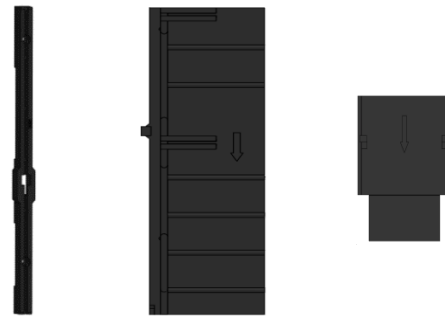
Fixed type appropriate holder
Phase partition

- ◆ HU type circuit breaker phase partition

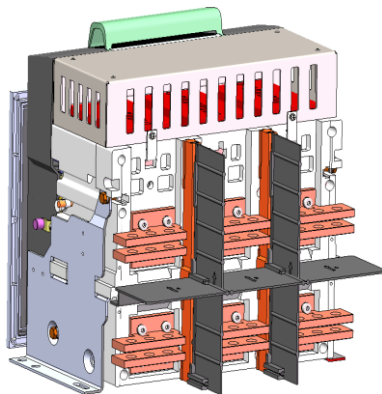
Divided into fixed type and drawout type, the phase partition is installed in the groove between all the phase bus bars, used to increase the insulation strength between phases of the main circuit and and between the incoming and outgoing ends so as to prevent the short circuit in case of the insulation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



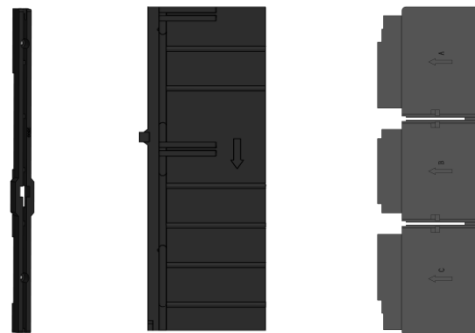
NDW3-2500HU



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.

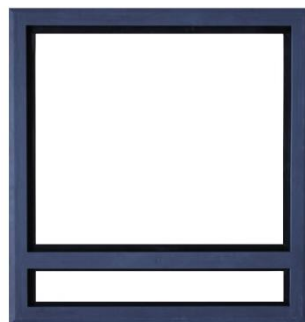
4.5.2 Counter

Counter is used to record the number of the "close-open" operation of the disconnecting switch.

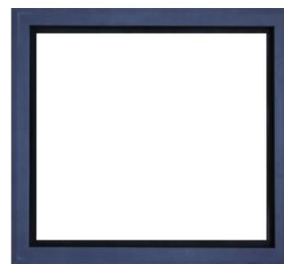


4.5.3 Doorframe

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 reach IP40. It is beautiful and practical.



Drawout type



Fixed type

4.5.4 Dust cover

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

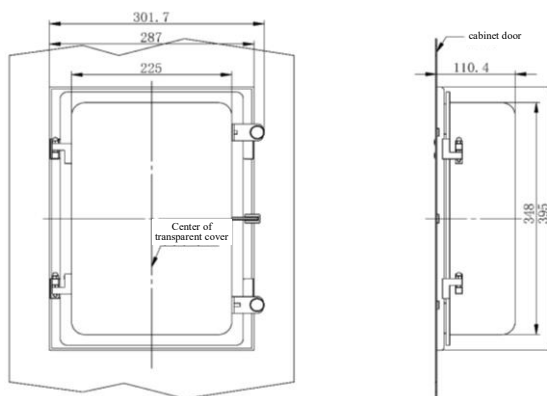


4.5.5 IP54 dust cover

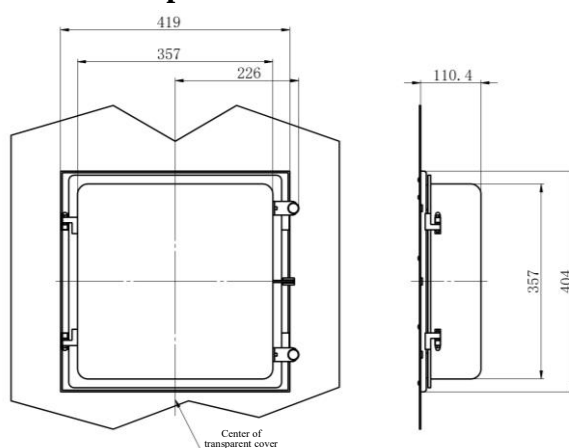
The IP54 transparent cover is an accessory that can be mounted on the cabinet door to increase the protection rating to IP54. The protective cover is supplied with a special door frame assembly. Selecting this accessory eliminates the need to select a conventional door frame. The hole dimensions for the cabinet door are different from those of the conventional door frame; refer to the cabinet door hole diagram for specific dimensions. The door frame and IP54 transparent cover are pre-assembled for shipment. Customers can choose either a left or right opening door. Installation is simple, following the instructions provided, directly onto the cabinet door.



a. External dimensions of IP54 transparent cover of NDW3-1600 product



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



4.6 Lock and Interlocking Device

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

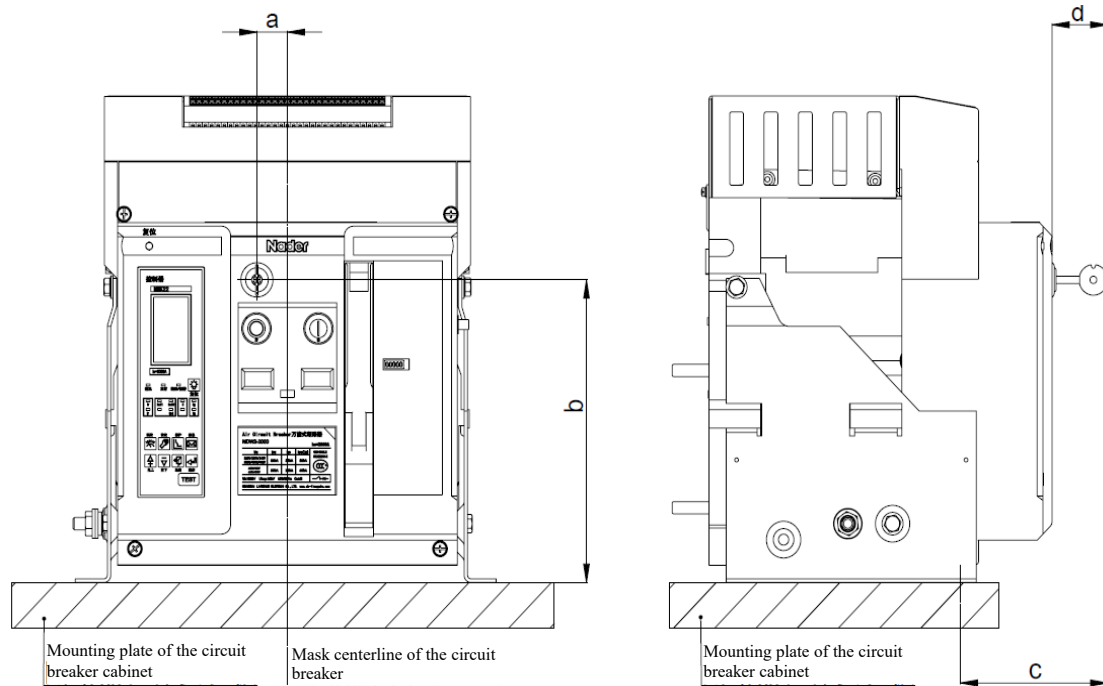
- ◆ This off-position key lock is used to lock the circuit breaker on the disconnected position. When the key is anticlockwise locked and pulled out, the circuit breaker cannot carry out closed operation, so as to prevent irregular operation. Model and type are shown in the table below. Our disconnect location locks are available as direct operated (one-handed operation, which is also the default delivery method) and hand-pressure operated (two-handed operation). These two types can be checked in the order specification.



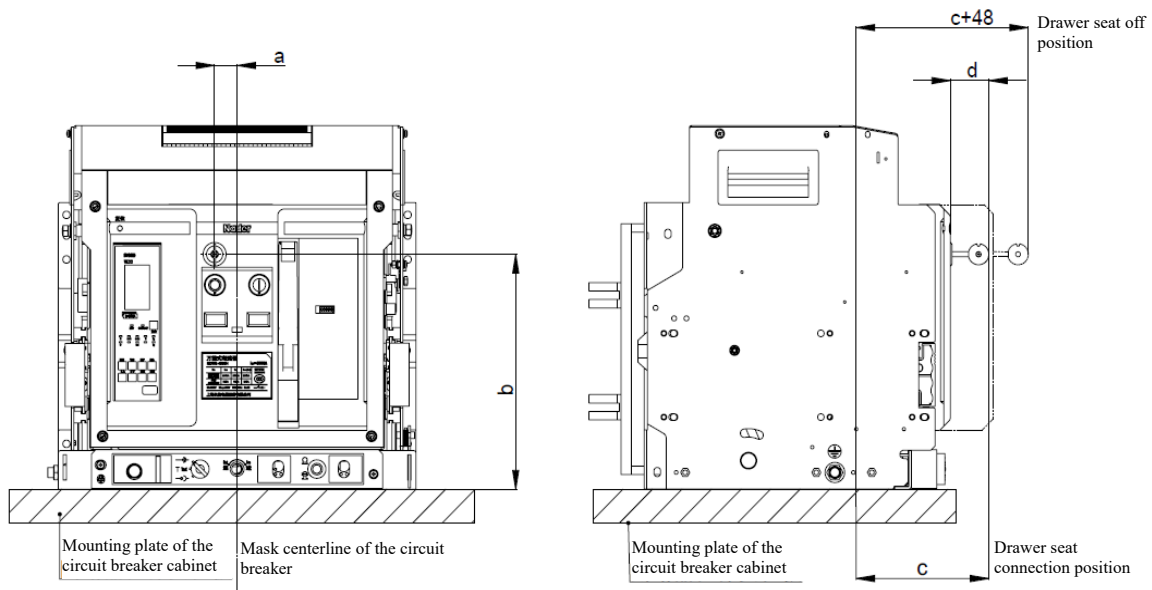
Model and Type Table of Off-position Key Lock

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 shell frames can be interlocked. 2. For other special interlocking requirements, please contact us for advice.			

- ◆ When the off-position key lock is optionally selected, this accessory is sent to the user after being assembled with the circuit breaker. As the off-position key 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

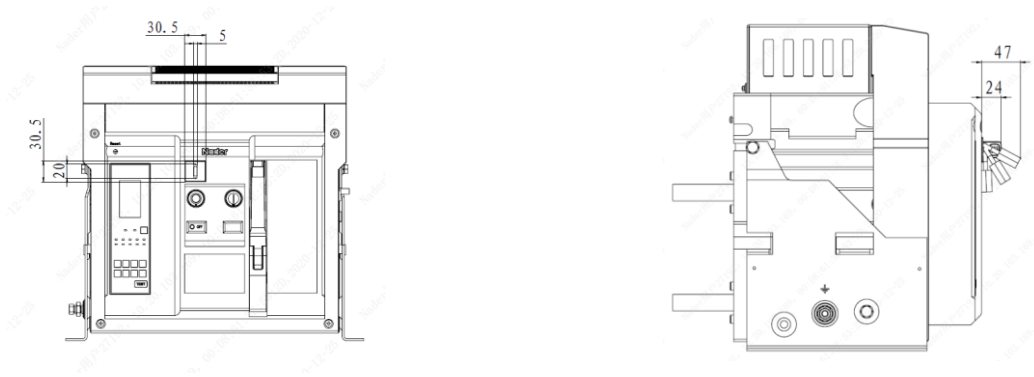
Model & specifications	a		b		c		D	
	Fixed type	Drawout type	Fixed type	Drawout type	Fixed type	Drawout type	Fixed type	Drawout type
NDW3-1600	17		220		124	104	32	
NDW3-2500	27		247		115	153	35	
NDW3-4000								
NDW3-6300								
NDW3-7500								

4.6.2 Button lock

After the handle of the safety lock is hung with a padlock, the product will be locked in separating state and cannot be closed. The product can only be closed when all the padlocks have been unlocked and removed. 1-3 padlocks with a diameter of 5mm or 1-2 padlocks with a diameter of 6mm can be used to lock beams. Safety locks are only available to 2500 shell frame and above.

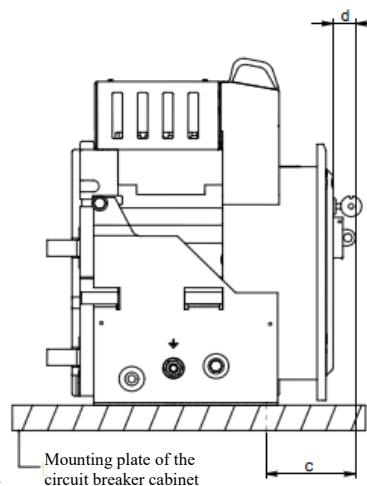
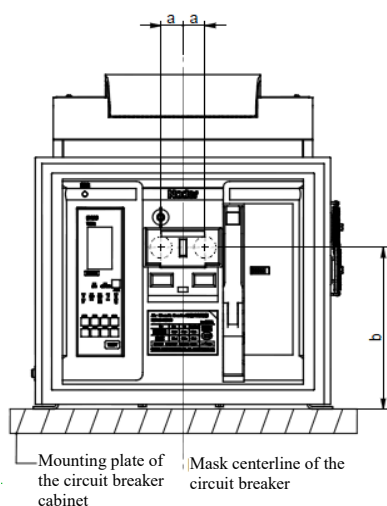
Either the safety lock or the off-position key lock function can be selected. They are installed at the same central position. For the position size of the safety lock, see the size of off-position key lock.

When the safety lock is optionally selected, this accessory is sent to the user after being assembled with the circuit breaker. As the safety 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.

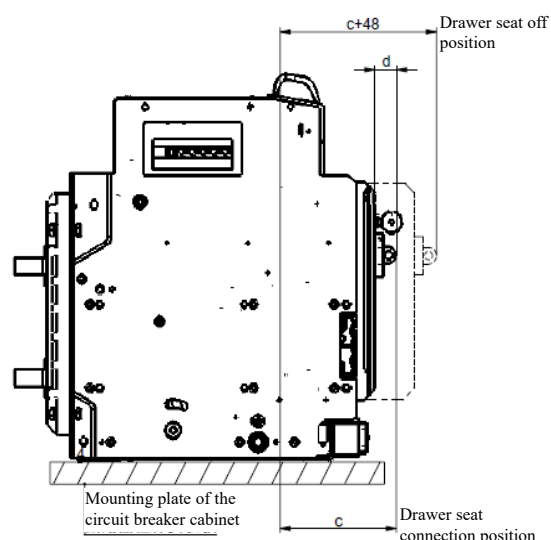
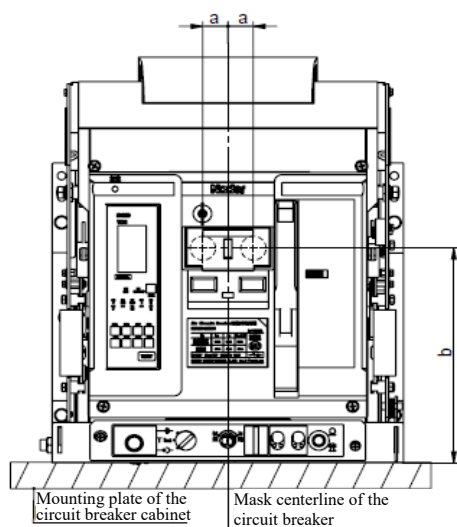


4.6.3 Button lock

- ◆ 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 key lock is optionally selected, this accessory is sent to the user after being assembled with the circuit breaker. As the button 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



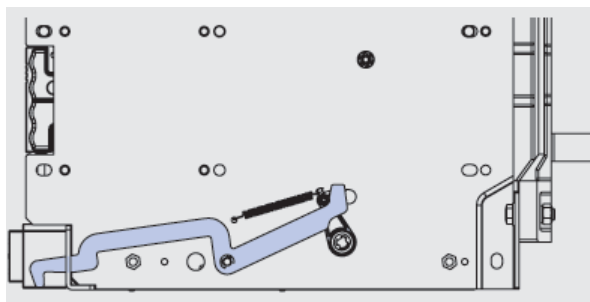
Drawout type

Unit: mm

Model & specifications	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	27		204	243.7	106	143.8	26.4	
NDW3-4000	27		204	243.7	106	104.4	26.4	
NDW3-6300	27		204	243.7	106	104.4	26.4	
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.

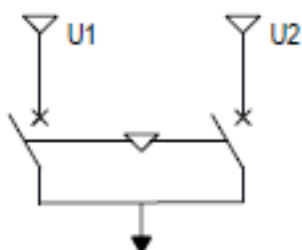
Selection mode	Code	Type	Number of circuit breakers
1	SR11	Two sets of cables, one for closing and one for opening	2
2	SR12	Three sets of cables, one for closing and two for opening	3
3	SR21	Three sets of cables, two for closing and one for opening	3
4	SY11	Two sets of hard rods, one for closing and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

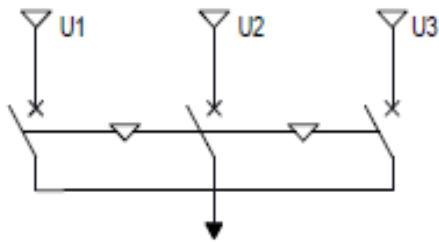


Status Table of Two Circuit Breaks

U1	U2
Closed	Open
Open	Closed
Open	Open

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

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

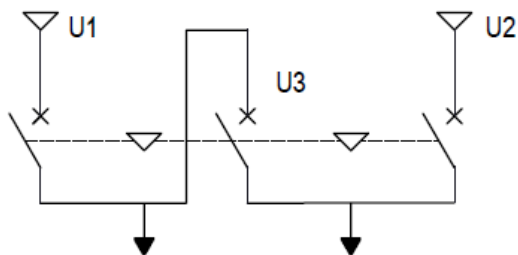


Status Table of Three Circuit Breakers (One for Closing and Two for Opening)

U1	U2	U3
Closed	Open	Open
Open	Closed	Open
Open	Open	Closed
Open	Open	Open

3) Three circuit breakers (Two for Closing and One for Opening)

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



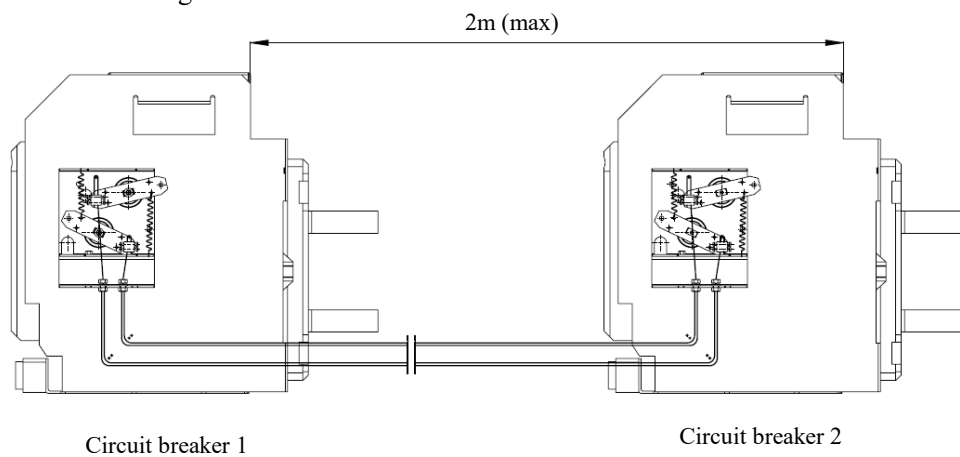
Status Table of Three Circuit Breakers (Two for Closing and One for Opening)

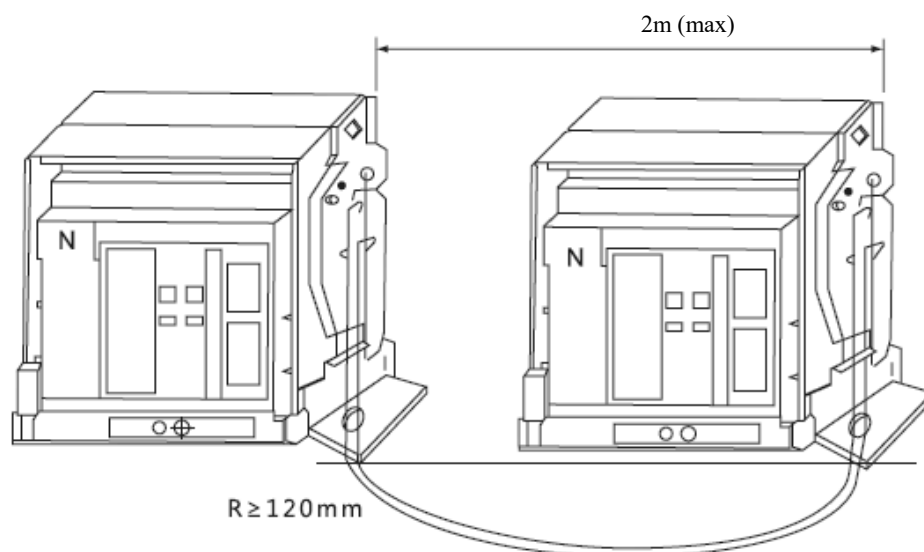
U1	U2	U3
Open	Open	Open
Closed	Closed	Open
Closed	Open	Closed
Open	Closed	Closed

◆ Type description

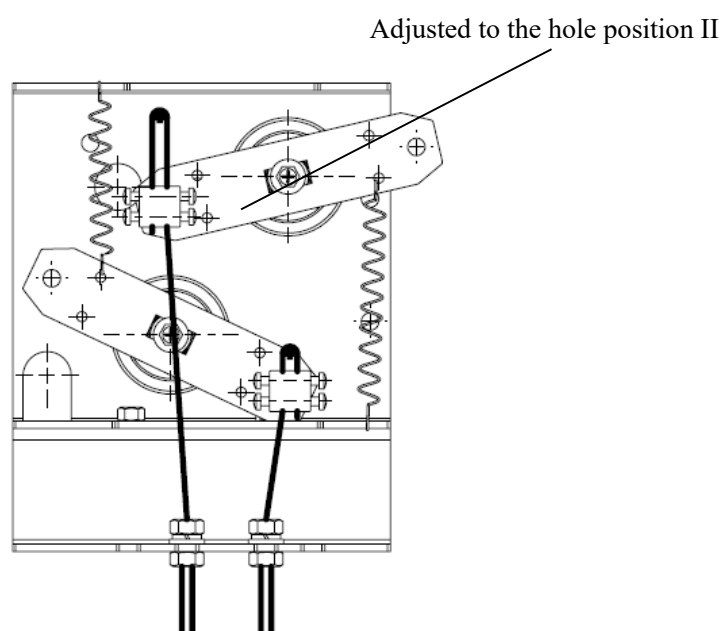
1) Two interlocking cables (one for closing and one for opening)

Installation schematic diagram:



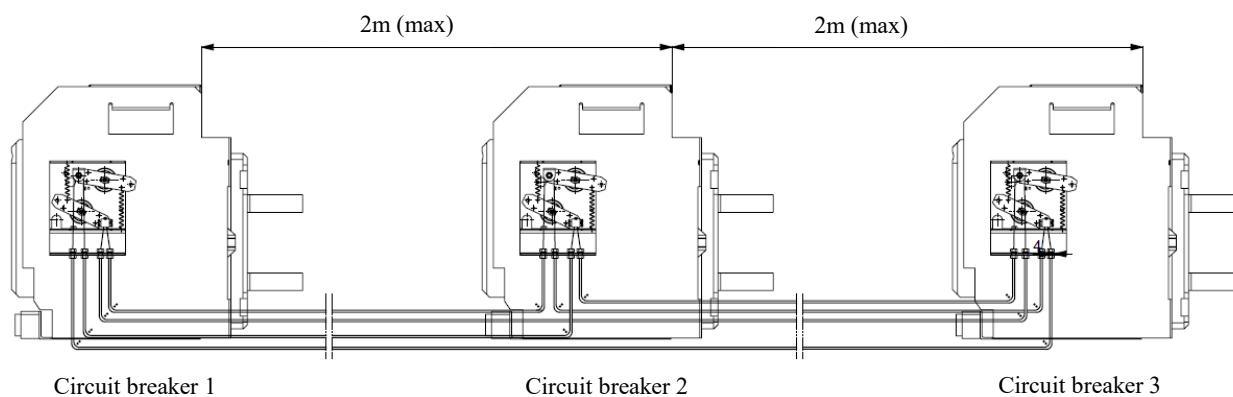


Adjustment schematic diagram:

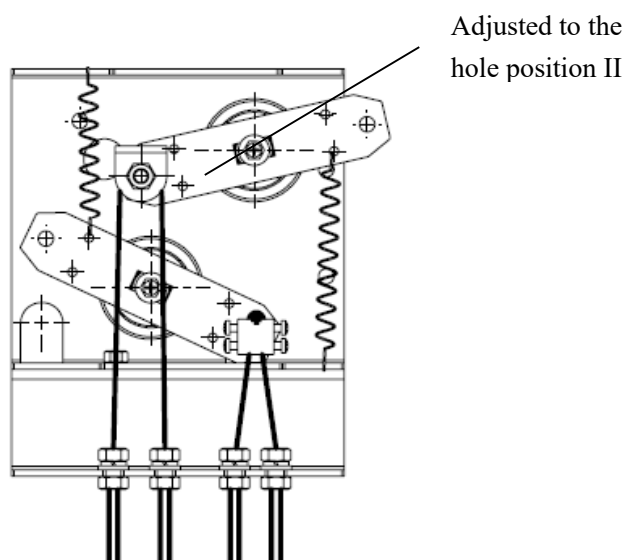


2) Three interlocking cables

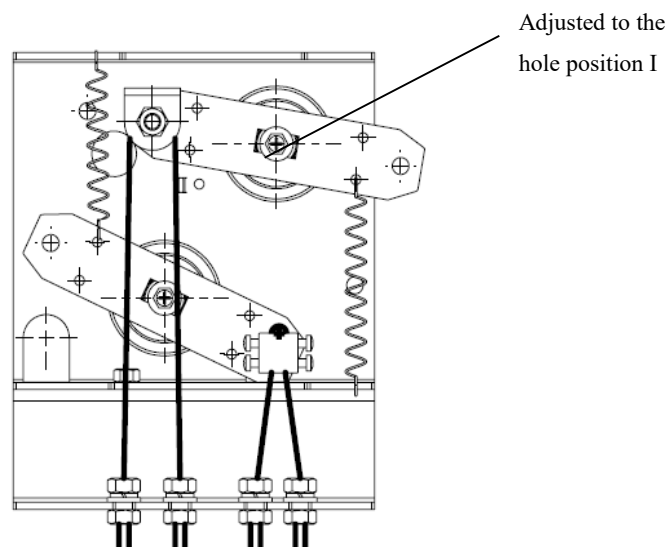
Installation schematic diagram:



Adjustment schematic diagram: One for closing and two for opening

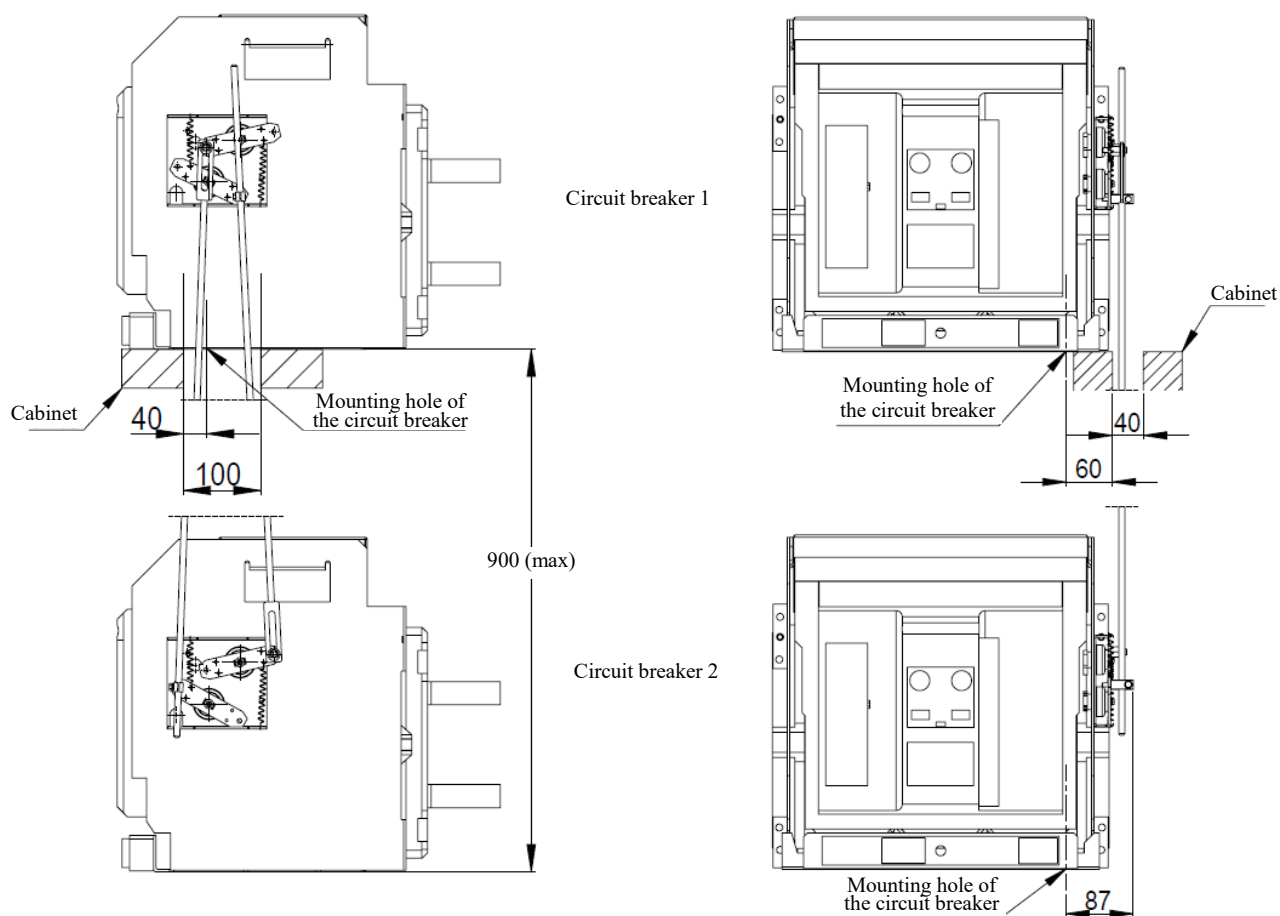


Adjustment schematic diagram: Two for closing and one for opening



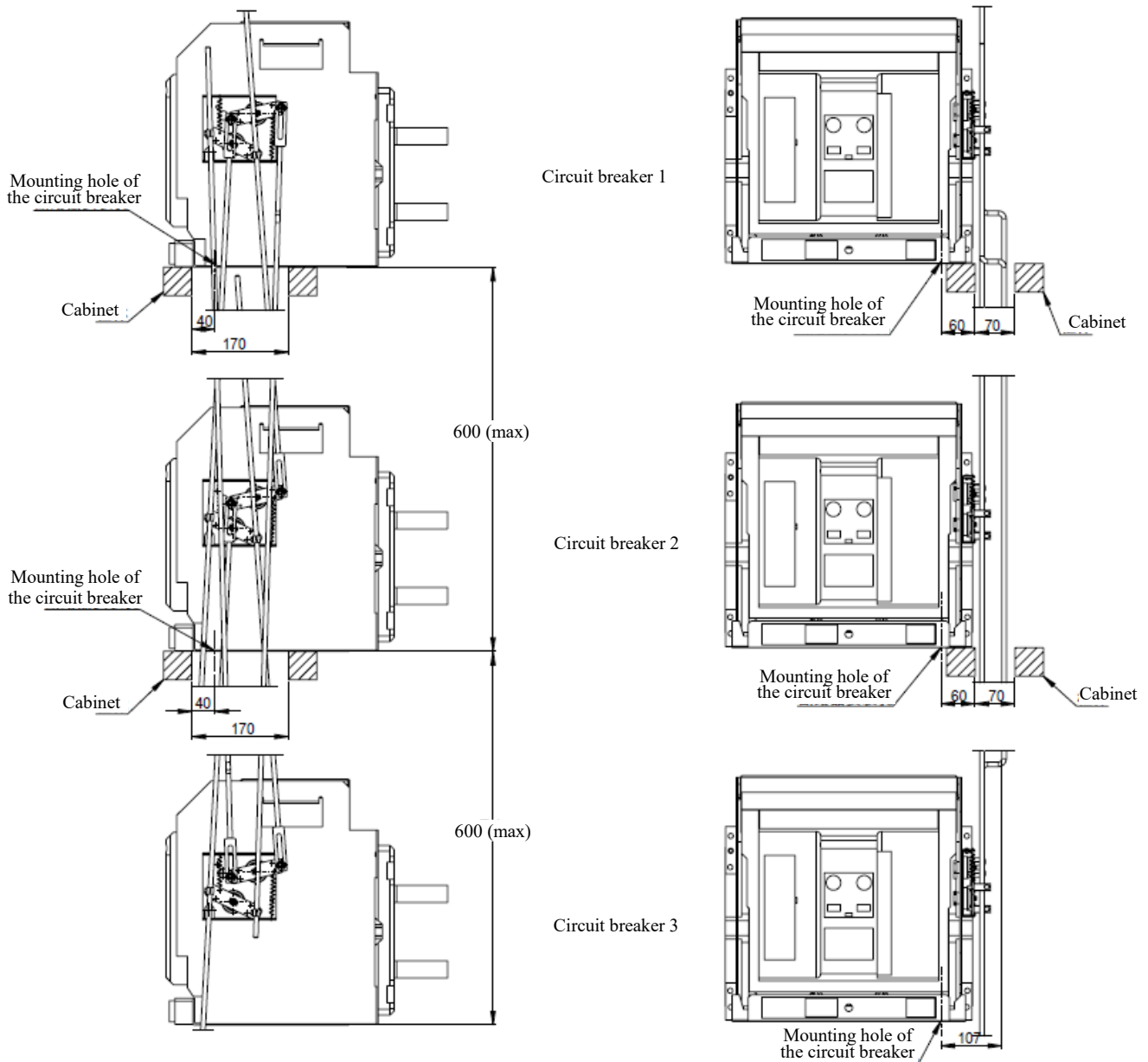
3) Two interlocking hard rods

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



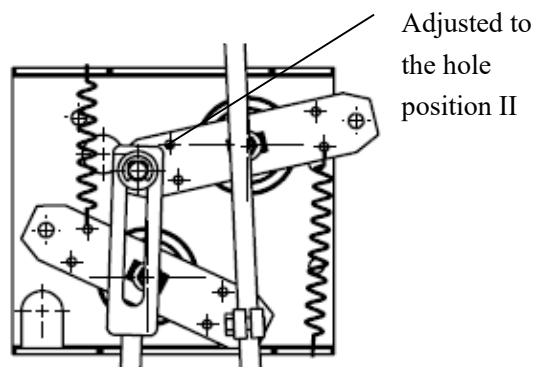
4) Three interlocking hard rods

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



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

Adjustment schematic diagram:

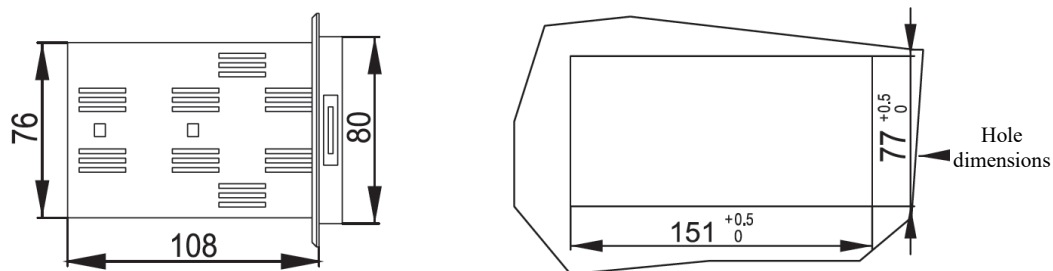


4.7.2 Automatic transfer switching equipment



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 is adjustable.
Selection of Power Supply ★ Rated control supply voltage U_s: 220V~240V 50/60Hz; ★ Rated current I_n: 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

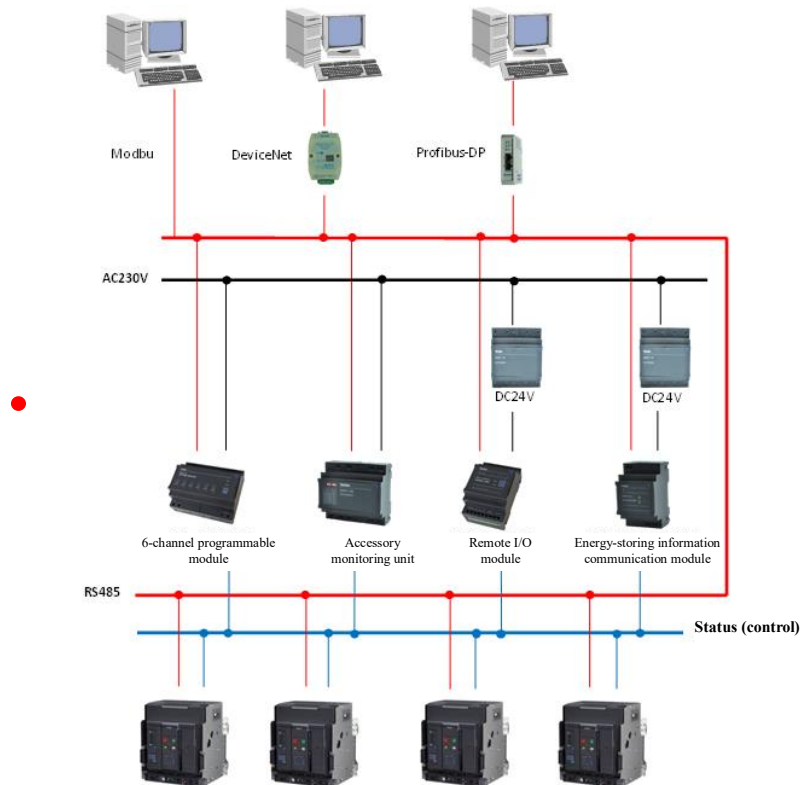


Note: Due to the automatic transfer switching equipment has overvoltage and undervoltage protection functions, in order to guarantee the consistency and reliability of the system protection, the air circuit breaker used for automatic transfer switching equipment can't install undervoltage release, and the automatic transfer switching equipment 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. The 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.

In Modbus-RTU mode, the controller's RS485 interface can be connected to the computer system using shielded twisted pair via the conversion interface of RS485/RS232, or connected to the RS485 signal interface of the circuit breaker through the serial server or communication manager, and then connected to the computer through 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.

4.9 Photovoltaic Check Voltage Closing Device

Application Scope and Purpose

The NWJY1 voltage check product is applicable to electric systems with the rated voltage of AC230V or AC400V. It is used to make the undervoltage release of the controlled circuit breaker tripped within the set time when the control supply voltage is lower than the set undervoltage value, and automatically reclosed within the set time when the control supply voltage is restored to the set threshold voltage.

NWFB1 models and explanation

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

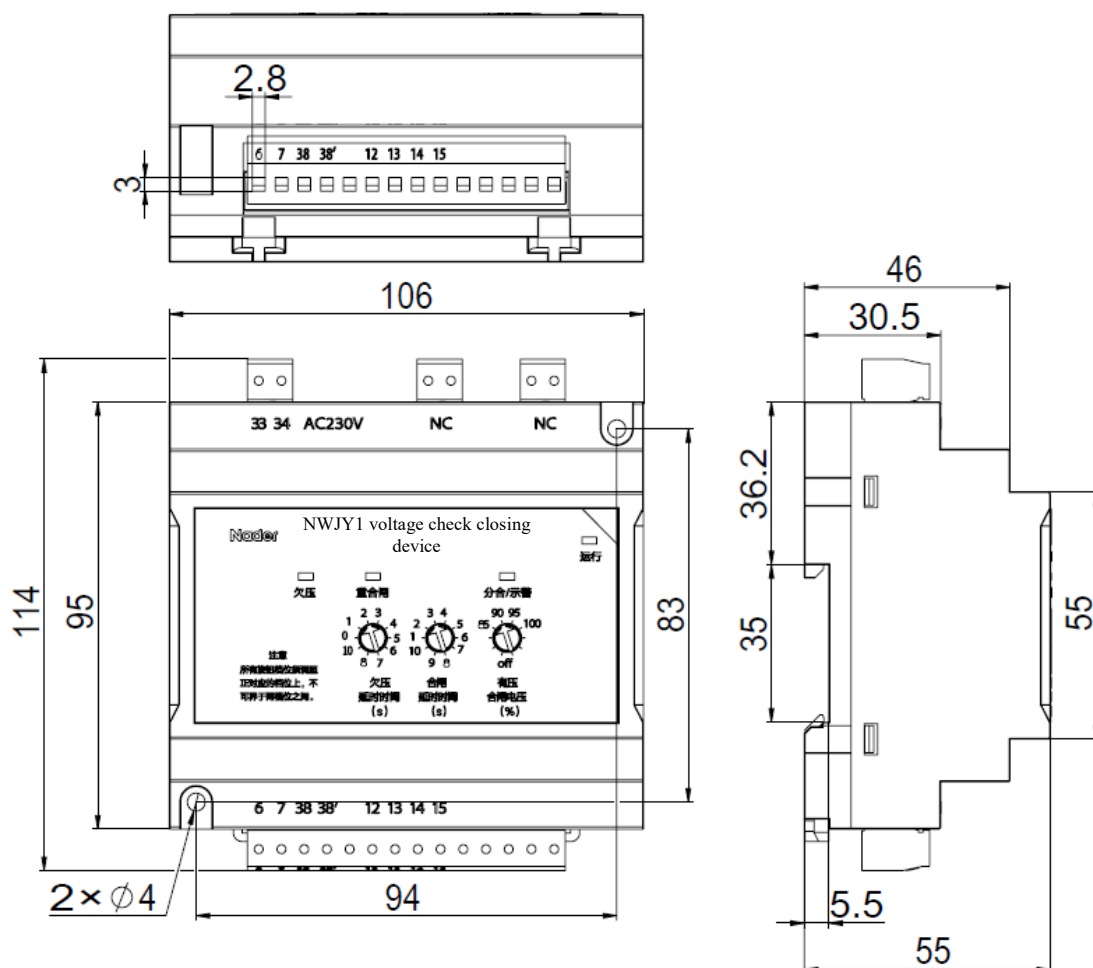


NWJY1 technical parameters

Model classification	Photovoltaic voltage-check closing device
Operating temperature	-40°C~+70°C
Operating voltage	AC230V/AC400V 50Hz
Starting power	AC230V: 340W AC400V: 490W
Operating power	AC230V/400V: 5W
Action voltage range of the undervoltage release	When the control supply voltage drops to 20%~70%Ue (voltage allowable error no more than 5%), the undervoltage release is released according to the set delay time, and the product opens. When the control supply voltage slowly rises to 85%Ue (voltage allowable error of 2%), the undervoltage release pulls in and the product closes at the set time.
Closing voltage	Set to 85%Ue, 90%Ue, 95%Ue, 100%Ue, OFF

Closing delay	1s, 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s
Undervoltage delay	0s, 1s, 2s, 3s, 4s, 5s, 6s, 7s, 8s, 10s
Undervoltage release power-on time	Above the pulse time 200ms of undervoltage release

NWJY1 External and Installation Dimensions



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<u>5.1 Working Environment</u>	83
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<u>5.4 The power loss of the incoming and outgoing lines of the circuit breaker</u>	87
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Field of Application

The NDW3 universal 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 AC1000/1250/1800V, rated operating voltage of AC220/230/240V, AC380/400/415V, AC440/480V, AC660/690V, AC800V, AC1000, AC1140V, AC1380V, AC1500V for distribution of electrical energy and protecting circuit and power equipment from overload, under-voltage, short circuit, single phase grounding and harm of other faults. 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 environment temperature is $-25^{\circ}\text{C} \sim +70^{\circ}\text{C}$, the average within 24 h shall not be more than $+35^{\circ}\text{C}$.

The circuit breaker with the ambient temperature below $-40^{\circ}\text{C} \sim -25^{\circ}\text{C}$ can be specially customized. If the ambient temperature is higher than $+40^{\circ}\text{C}$, the user needs to reduce the capacity. The reduced capacity coefficient is shown in the following table.

Ambient temperature		+40°C	+45°C	+50°C	+55°C	+60°C	+70°C
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
NDW3-4000	2500A	2500A	2375A	2225A	2125A	1950A	1825A
	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
NDW3-6300	3600A	3600A	3600	3560A	3400A	3120A	2920A
	4000A	4000A	3800A	3560A	3400A	3120A	2920A
	4000A	4000A	4000A	4000A	4000A	4000A	4000A
	5000A	5000A	5000A	5000A	5000A	4914A	4599A
NDW3-7500	6300A	6300A	5985A	5607A	5355A	4914A	4599A
	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°C, 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°C, 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 2,000m to 5,000m, 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

Operating 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 U _{imp} (kV)	12		12	12	12
Impulse withstand voltage U _{imp} (XU series) (kV)	18		18	18	15
Rated insulation voltage U _i (V)	1250		1250	1140	1000
Rated insulation voltage U _i (XU series) (V)	1800		1700	1500	1140
Rated insulation voltage U _i (NDW3-7500) (V)	1000		1000	900	800
Rated operating voltage (V)	Conventional	690	690	690	690
	HU	1140	1140	1140	1000
	XU	1500	1500	1500	1140
Power frequency withstand voltage (V)		3500	3500	3500	3000
	XU	5600	4900	4300	3800
Derating factor of the breaking capacity	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 shell frame 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 operating voltage (V)	690	690	620	550
Power frequency withstand voltage (V)	3500	3150	2500	2500

5.1.4 Anti-corrosion Level

Salt mist: GB2423.18 Severe Level 3

Having passed GB/T 2423.18-2012 Environmental Testing. Part 2: Test Method Test Kb: Salt spray, alternating (sodium chloride solution).

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: $\pm 1.5\text{mm}$ (2Hz -9Hz)

☑ Constant acceleration: 5 m/s² (9Hz -200Hz)

☑ 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 test (EMC) specified in the following standards

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

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

The above test can ensure that the circuit breaker does not trip by mistake.

5.2 Installation conditions

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

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, IP40 (mounted in cabinet compartment with protective door frame), IP54 (IP54 transparent cover assembly with special door frame, mounted in 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 operating current In (A) 40°C	Copper bar specification	
		Dimensions (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°C and the open wide installation under the heating condition meets the stipulation in GB/T 14048.2. If the temperature is higher than +40°C, 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°C.
4. Electrical clearance of copper row (rated operating voltage $\geq 800\text{V}$, electrical clearance $\geq 25\text{mm}$; rated operating voltage $\leq 690\text{V}$, electrical clearance $\geq 15\text{mm}$, and when the altitude is more than 5000m and the relative humidity

exceeds 90%, the electrical clearance should be adjusted in accordance with the contents of Table 1 of 7.1.1 in GB/T 20645)

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

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

5.5 Preventive maintenance

Preventive maintenance refers to the regular inspection according to predetermined standards in order to lower the probability of system operation failures or performance degradation.

■ Regular maintenance

The technical department will provide maintenance suggestions for each product. Appropriate inspection procedures can ensure the system delivery components maintain normal operating conditions within the predetermined service cycle. Users can carry out such inspections within the cycle specified herein.

■ Conditional maintenance

Conditional maintenance can reduce the recommended regularly maintenance operations (lowering them to the required minimum level instead of completely replacing them), and thus reduce the equipment downtime caused by regularly scheduled maintenance operations each year.

Preventive maintenance includes testing, measurement, and maintenance and repairs according to specially designed technical plans. It can lower the probability of equipment failure and reduce the wear and tear on machinery during operation.

a) Environmental Type, Table 1

Environmental type	Range of conditions
Normal environment	Temperature: Average temperature outside the switch cabinet <25℃ Load: <80% (In) (24-hour operation per day) Harmonic: Harmonic current per phase <30% (In) Relative humidity: <70% Pollution level: III

	Salt-spray environment: None Dust: Low, equipment protected by a switch with filter or ventilated IP54 enclosure Vibration: None
Special environment	Temperature: Average temperature outside the switch cabinet -40°C-70°C Load: >80% (In) (8-hour or 24-hour operation per day) Relative humidity: >80% Pollution level: Salt-spray environment: III Dust: High, equipment unprotected. Vibration: Continuous vibration between 0.2 and 0.5g

b) Table of Preventive Maintenance, Table 2

Maintenance operation	Time interval	
	Normal environment	Special environment
Level 1 maintenance	One year or operate 10,000 times	Six months or operate 5,000 times
Level 2 maintenance	One year	Six months

For the specific maintenance content, please refer to the Maintenance Manual for NDW Series of Universal Circuit Breaker.

<u>Outline and Installation Dimensions 6</u>	90
<u>6.1 NDW3-1600</u>	90
<u>6.2 NDW3-2500</u>	94
<u>6.3 NDW3-4000</u>	100
<u>6.4 NDW3-6300</u>	106
<u>6.5 NDW3-7500</u>	112
<u>6.6 Circuit Breaker Cabinet Door Open Hole and Installation Pitch</u>	118
a. <u>Hole dimensions of cabinet door without IP54 transparent cover</u>	118
b. <u>Hole dimensions of cabinet door with IP54 transparent cover</u>	120
<u>6.7 Safety Notes for Circuit Breaker Installation</u>	121

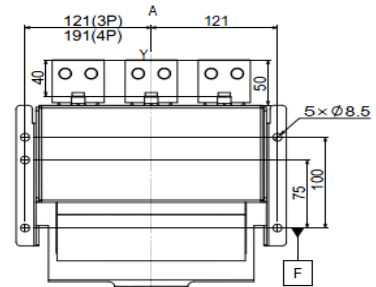
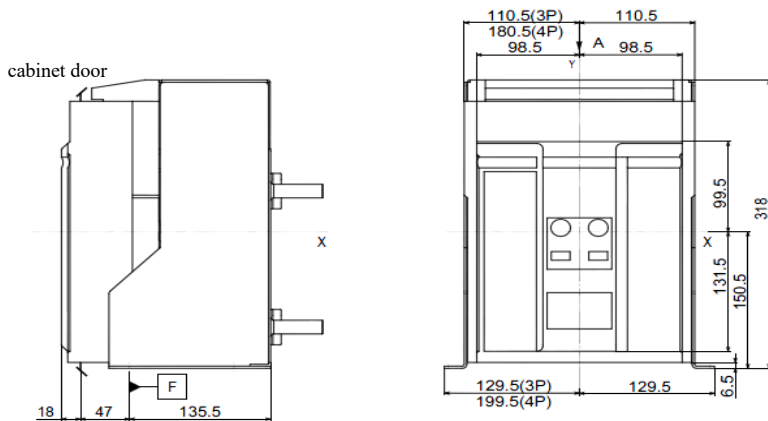
Outline and Installation Dimensions 6

6.1 NDW3-1600

NDW3-1600 Fixed type (unit: mm)

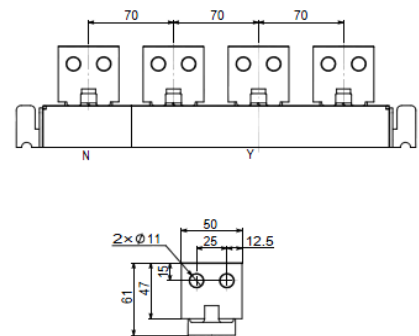
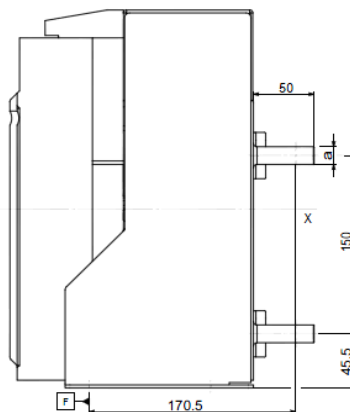
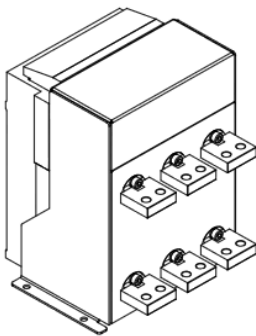
Dimensions

Fixed Details



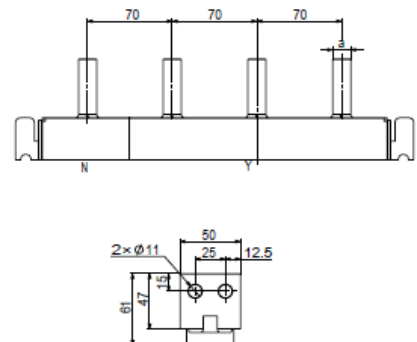
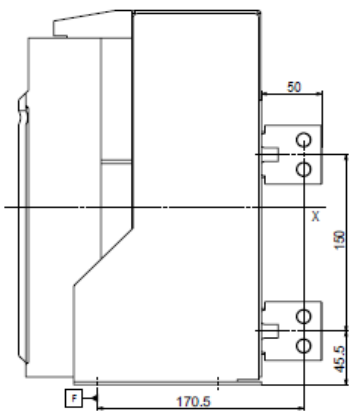
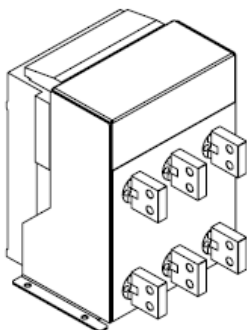
Horizontal Wiring

Detail

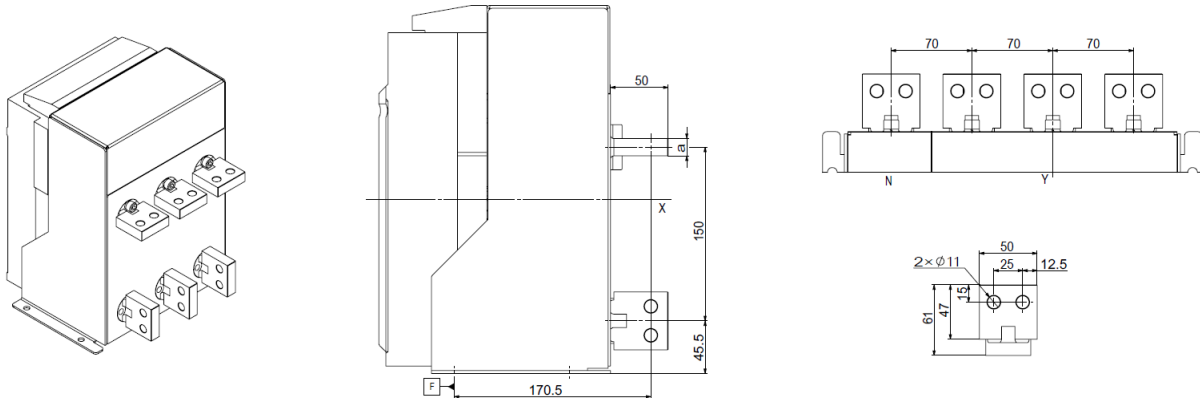
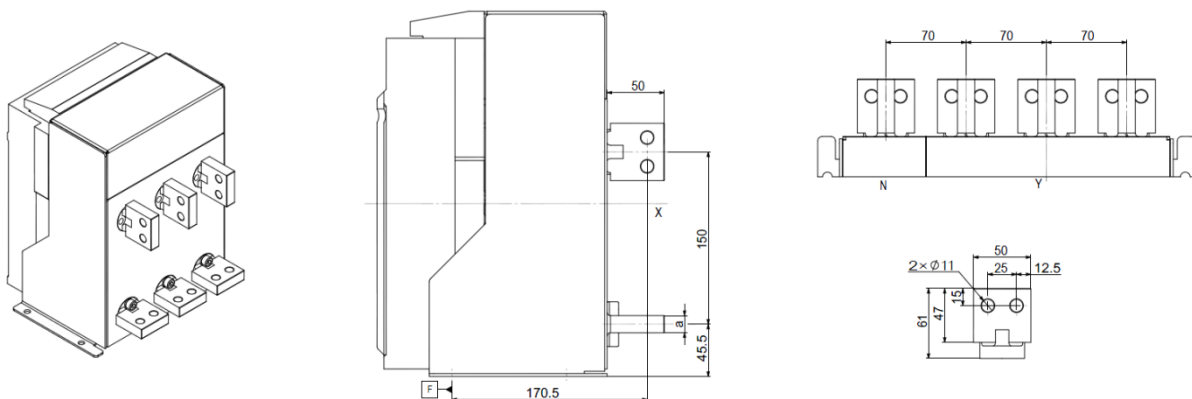


Vertical Wiring

Detail



Rated current	Dimensions of bus 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


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

Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$

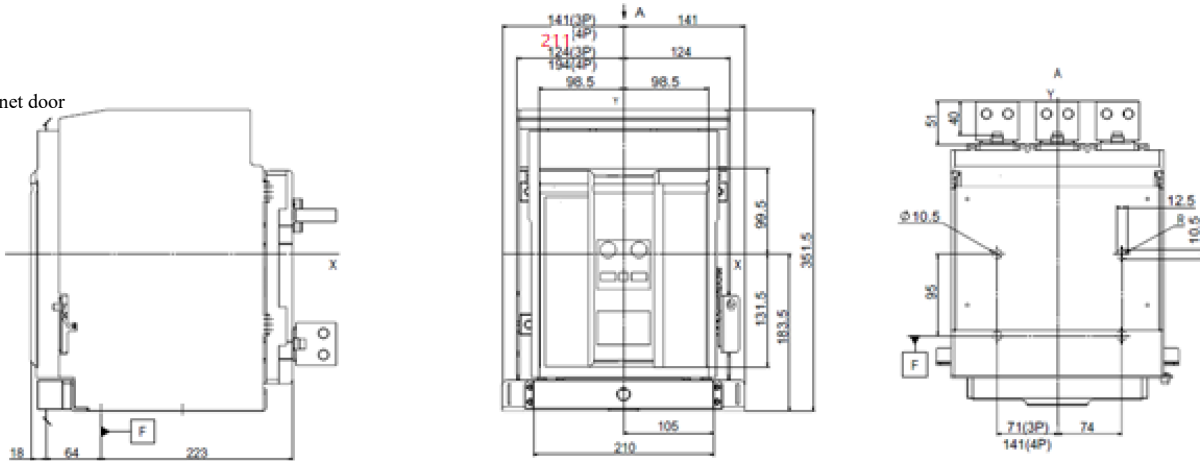
2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

NDW3-1600 drawout type (unit: mm)

Dimensions

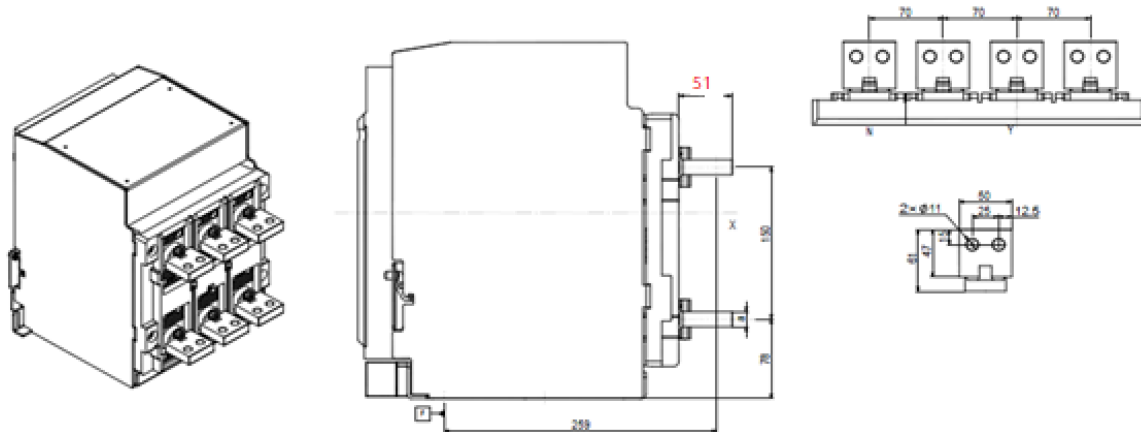
Fixed Details

cabinet door



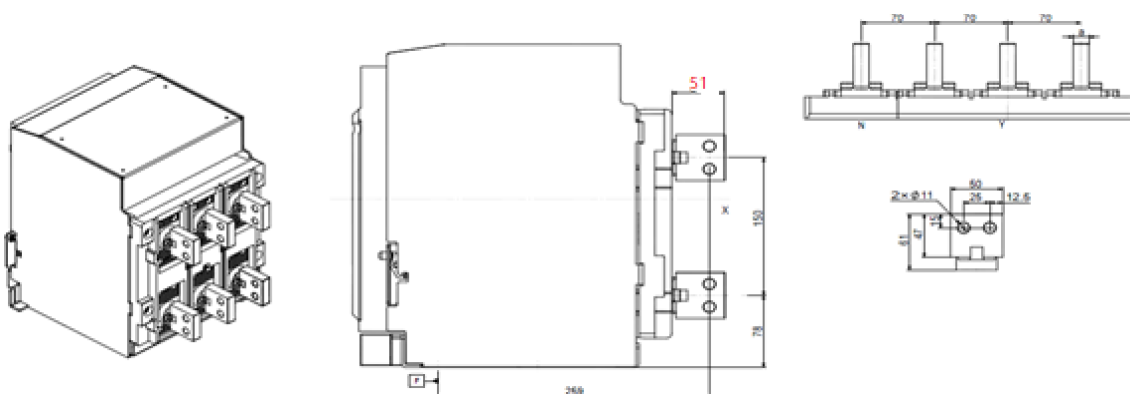
Horizontal Wiring

Detail



Vertical Wiring

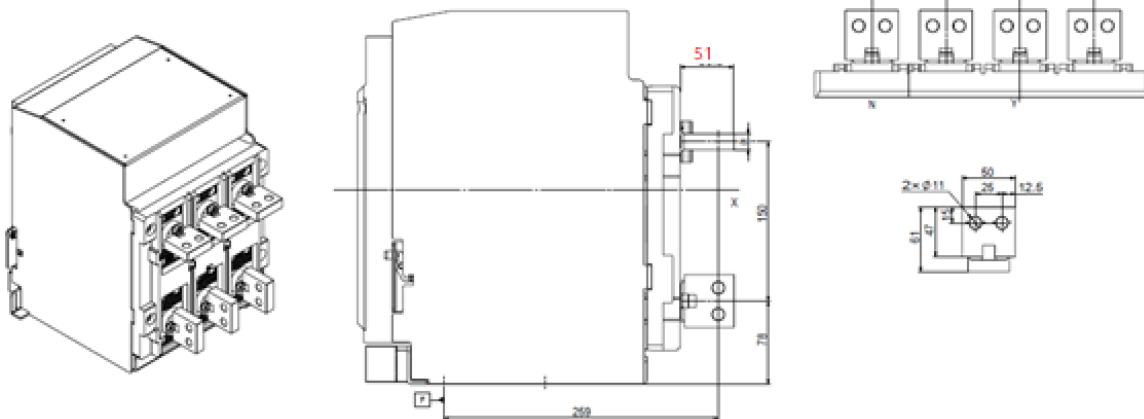
Detail



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

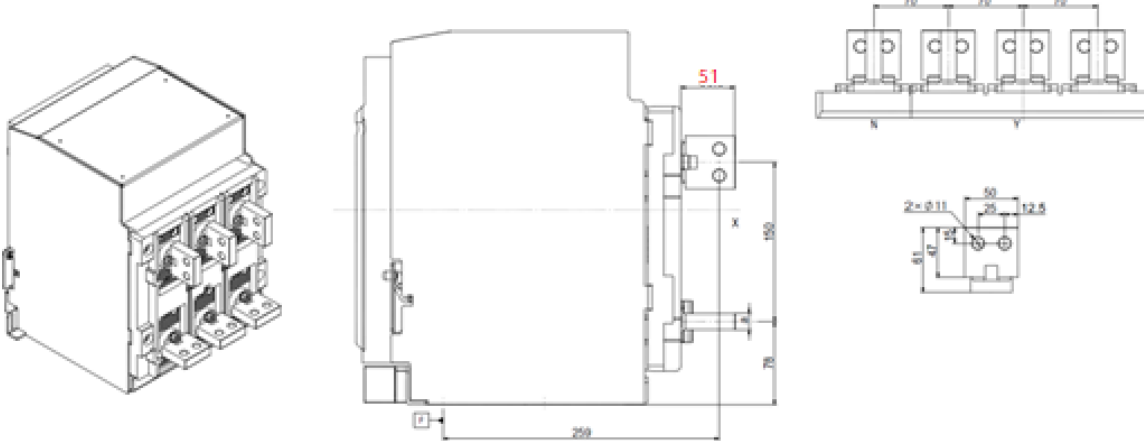
Mixed Wiring (Upper Horizontal, Lower Vertical)

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	Dimensions of bus a (mm)
200A, 400A, 630A	10
800A, 1000A, 1250A, 1600A	15

Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$

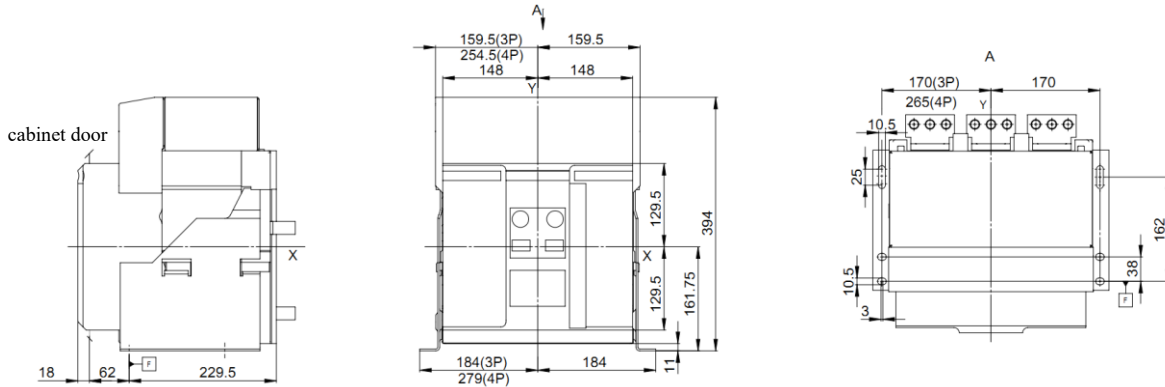
2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

6.2 NDW3-2500

NDW3-2500 fixed type (unit: mm)

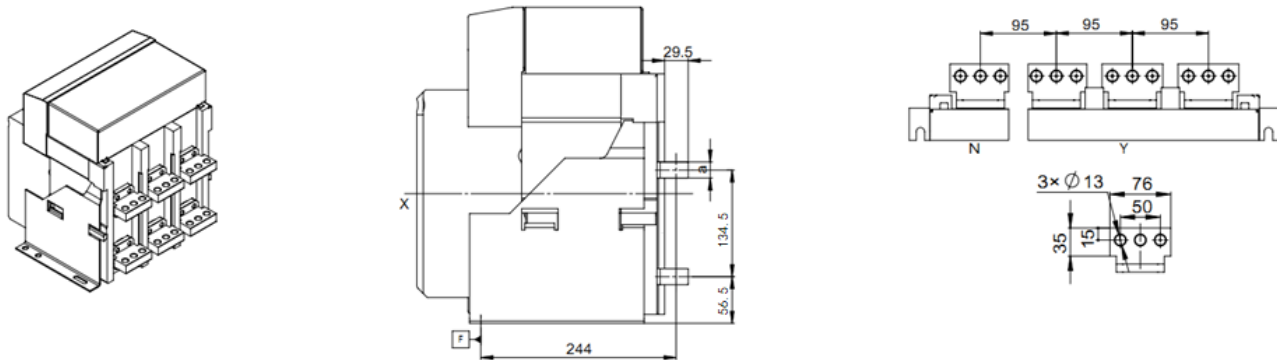
Dimensions

Fixed Details



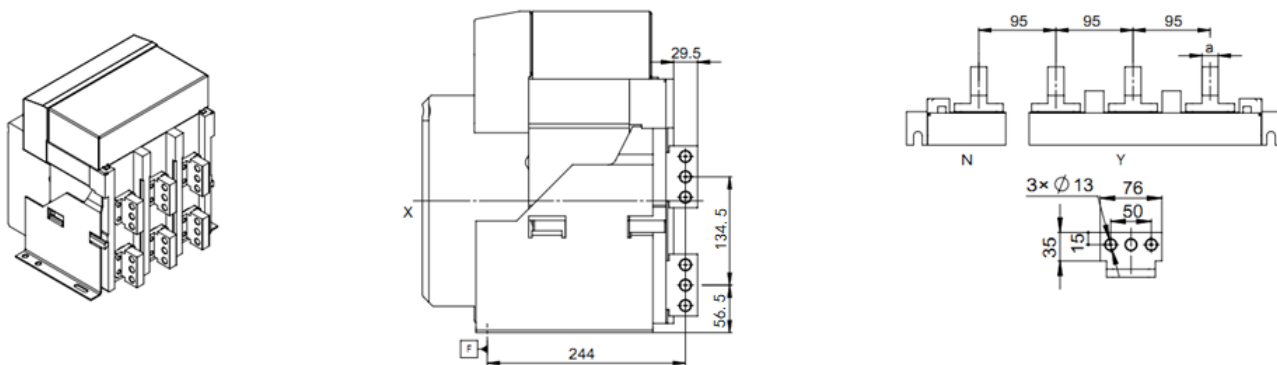
Horizontal Wiring

Detail



Vertical Wiring

Detail

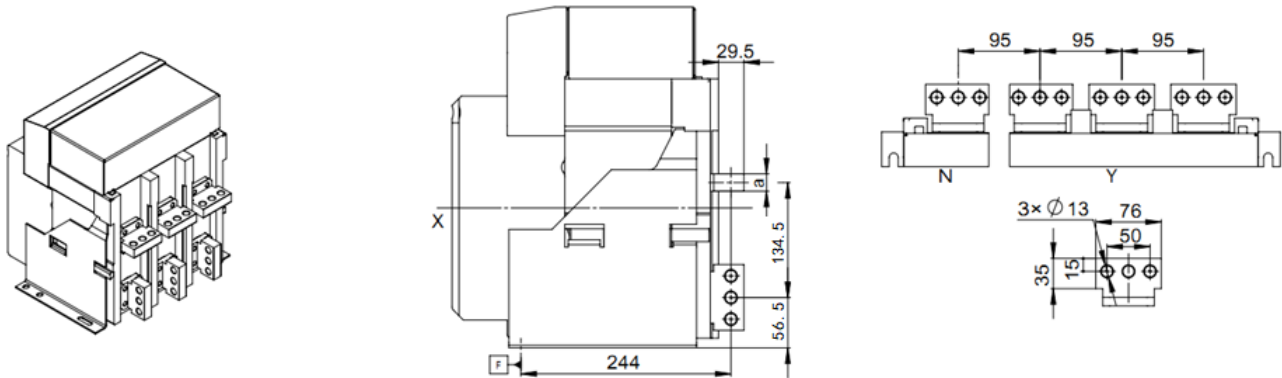
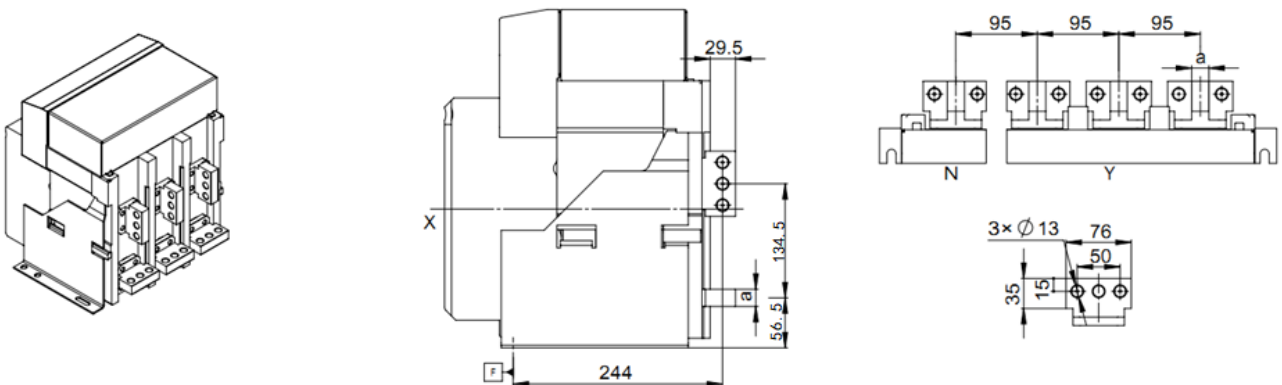
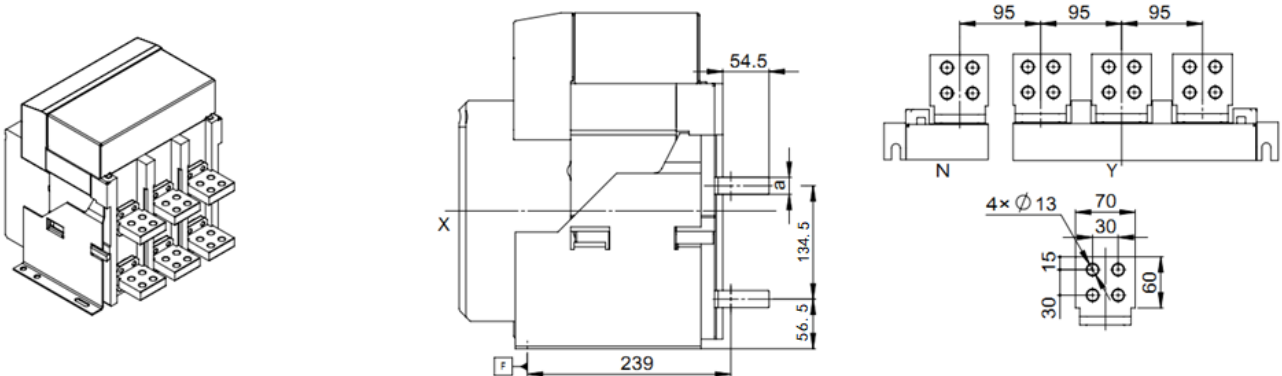


Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

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

Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$

2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

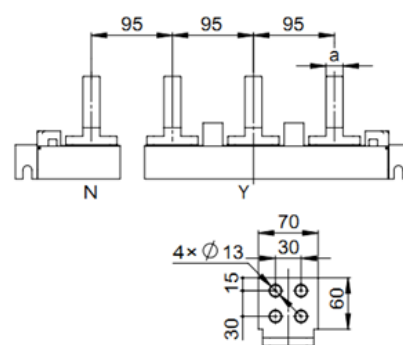
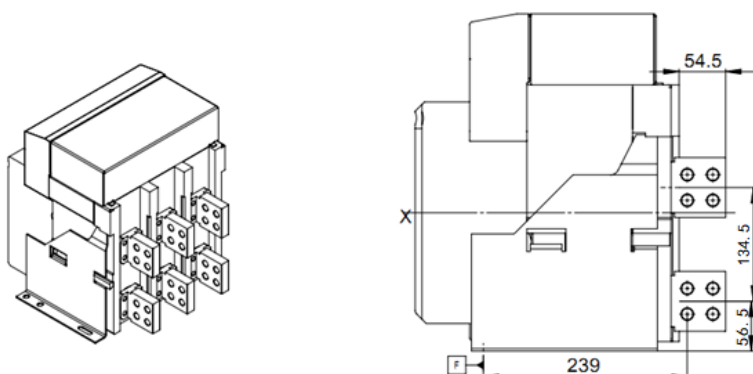
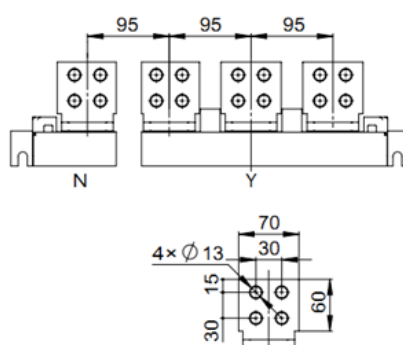
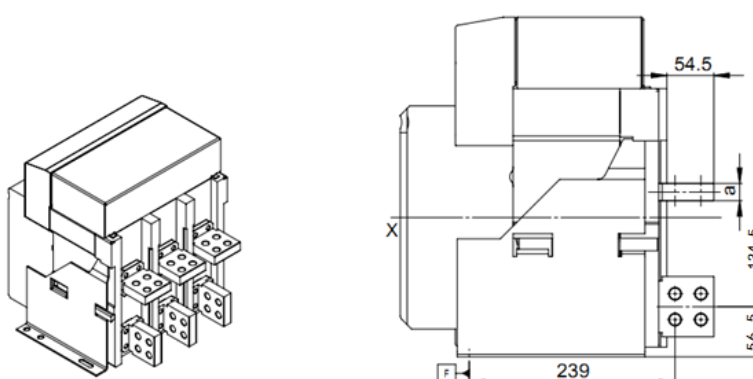
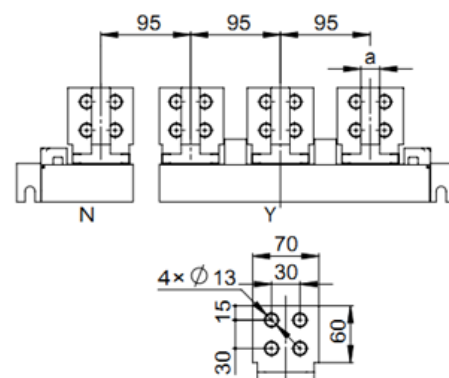
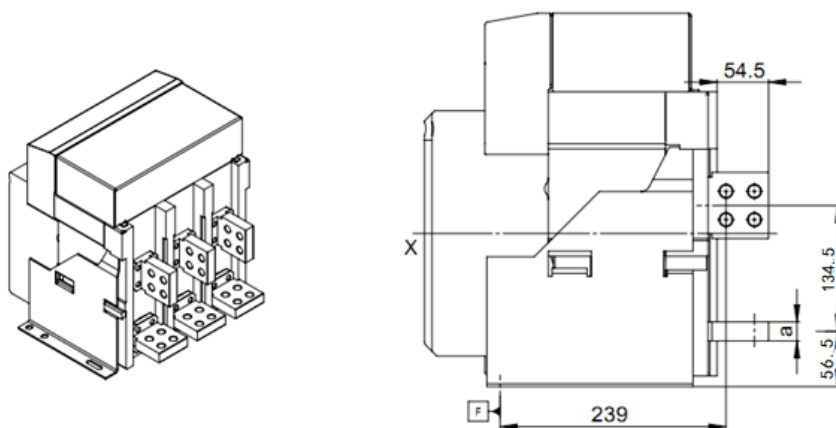
Mixed Wiring (Upper Horizontal, Lower Vertical)
Detail

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	Dimensions of bus a (mm)
630A, 800A, 1000A, 1250A	15
1600A, 2000A, 2500A	20

Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$

2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

Vertical extension wiring
Detail

Mixed extended wiring (upper horizontal, lower vertical)
Detail

Mixed extended wiring (upper vertical, lower horizontal)
Detail


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

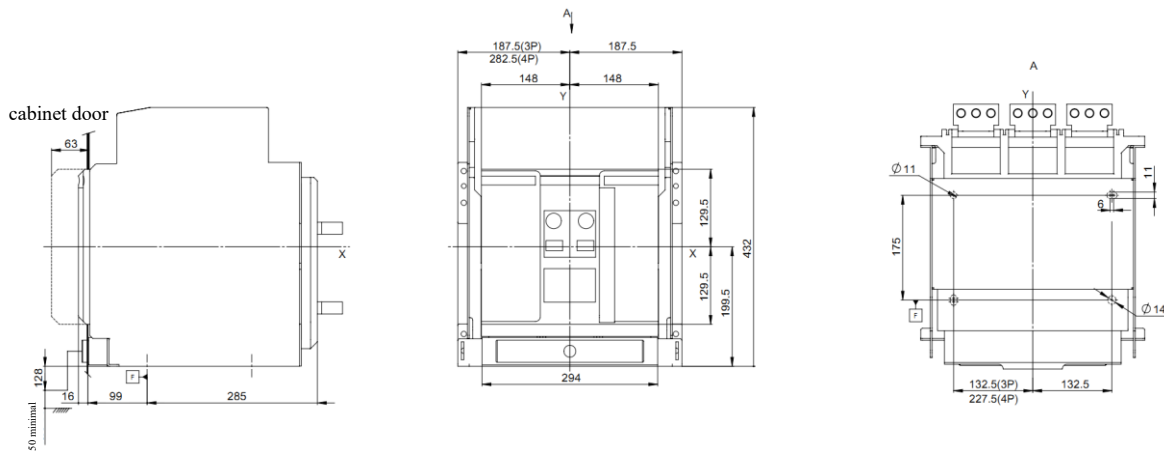
Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$

2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

NDW3-2500 drawout type (unit: mm)

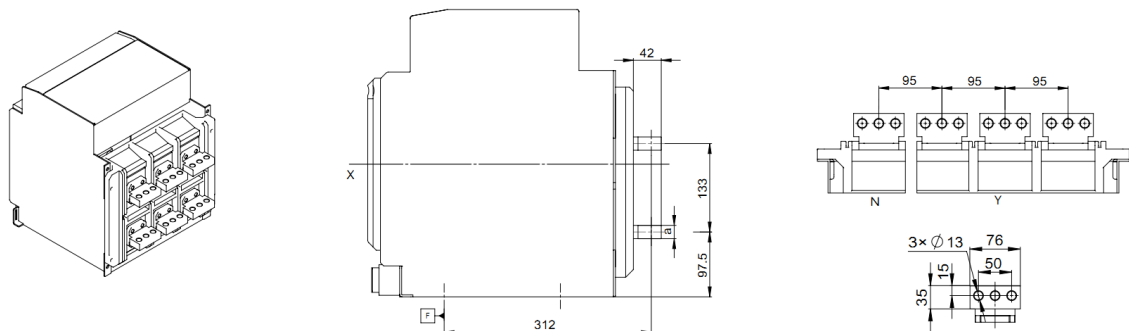
Dimensions

Fixed Details



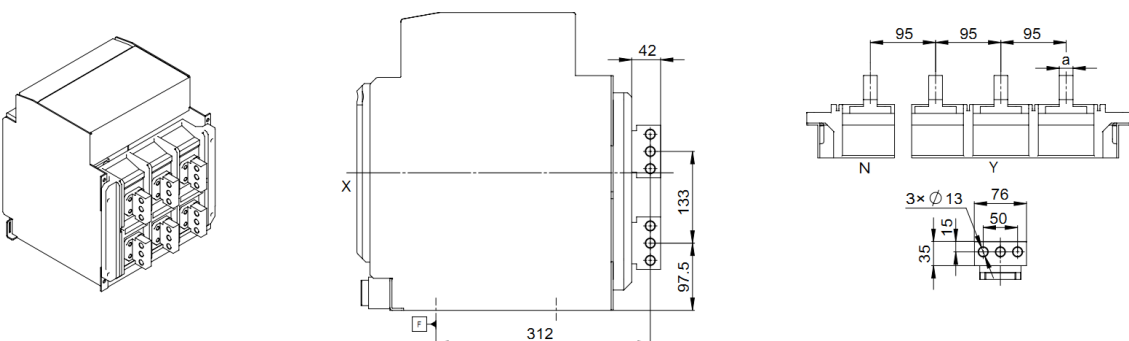
Horizontal Wiring

Detail



Vertical Wiring

Detail

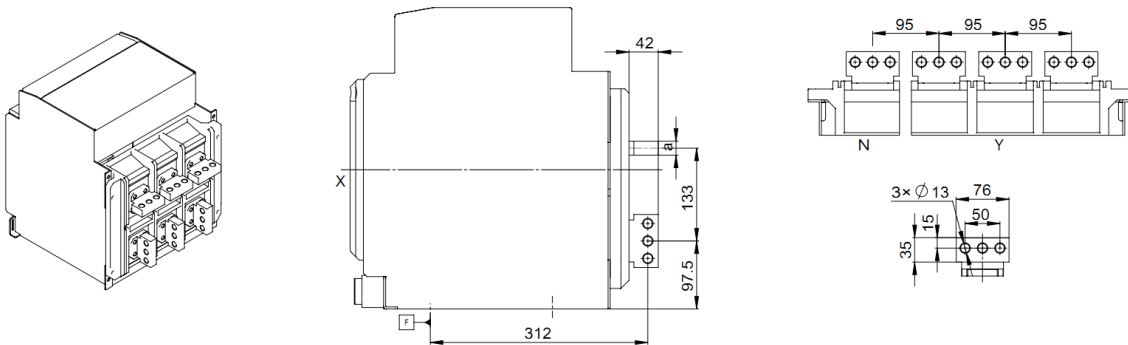
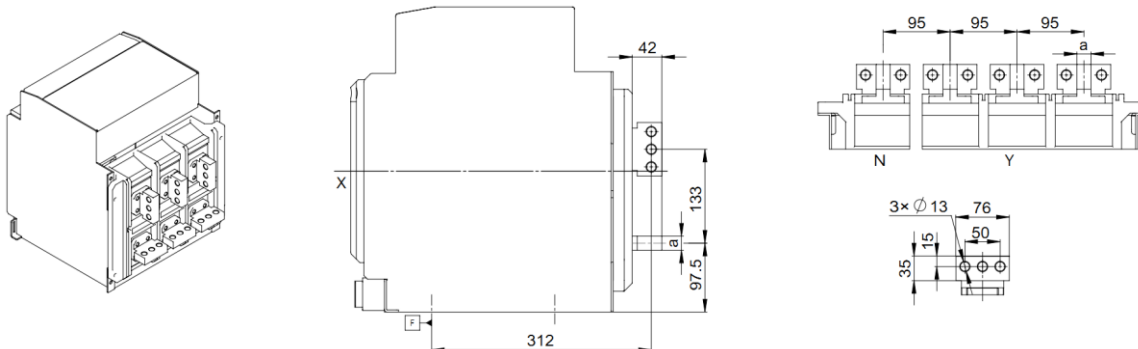
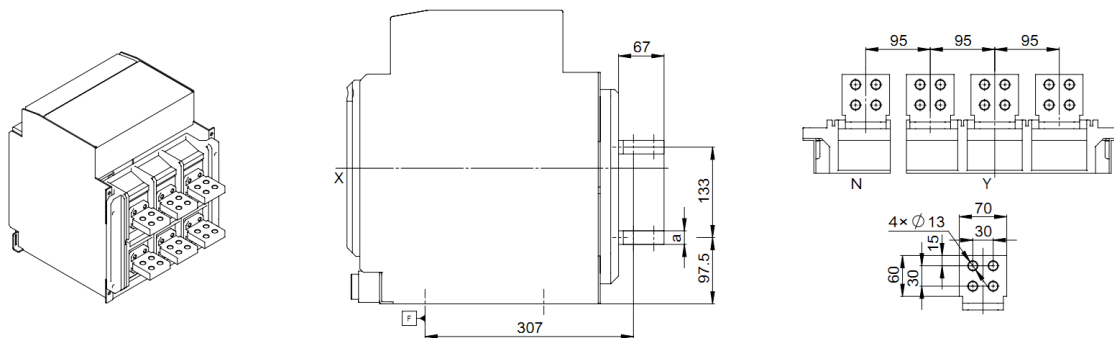


Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

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

Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$

2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

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;

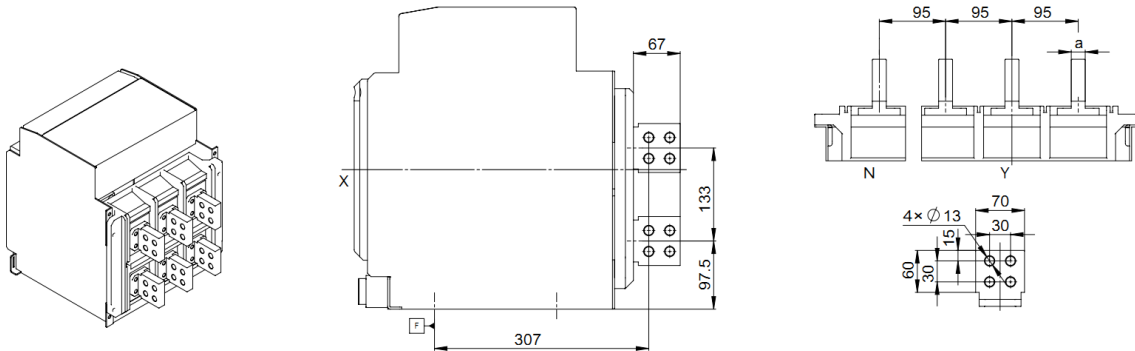
Rated current	Dimensions of bus a (mm)
630A, 800A, 1000A, 1250A	15
1600A, 2000A, 2500A	20

Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$

2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

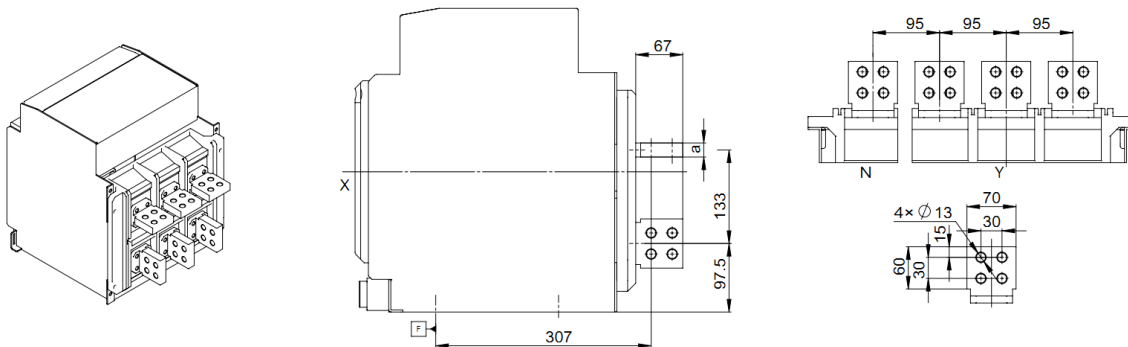
Vertical extension wiring

Detail



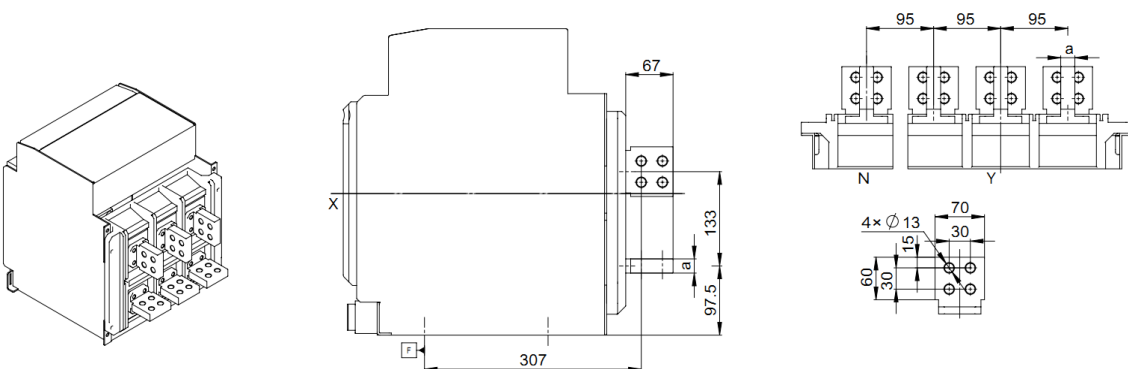
Mixed extended wiring (upper horizontal, lower vertical)

Detail



Mixed extended wiring (upper vertical, lower horizontal)

Detail



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

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

Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$

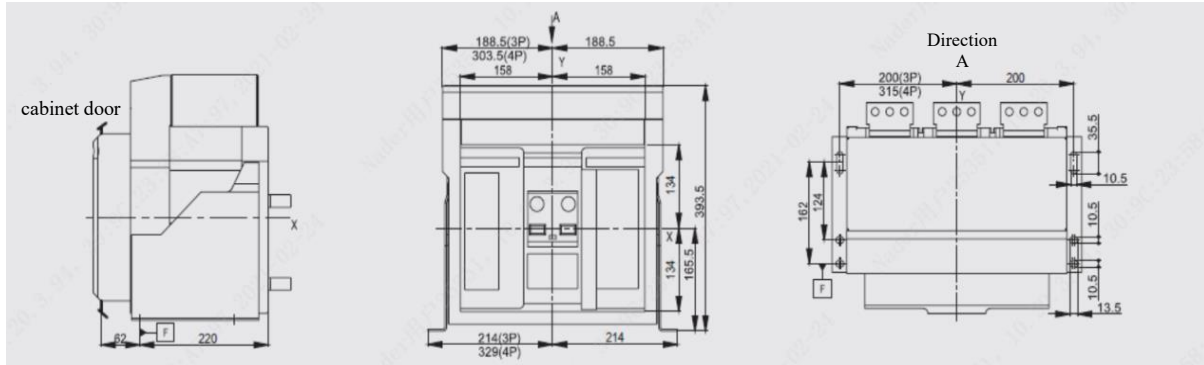
2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

6.3 NDW3-4000

NDW3-4000 fixed type (unit: mm)

Dimensions

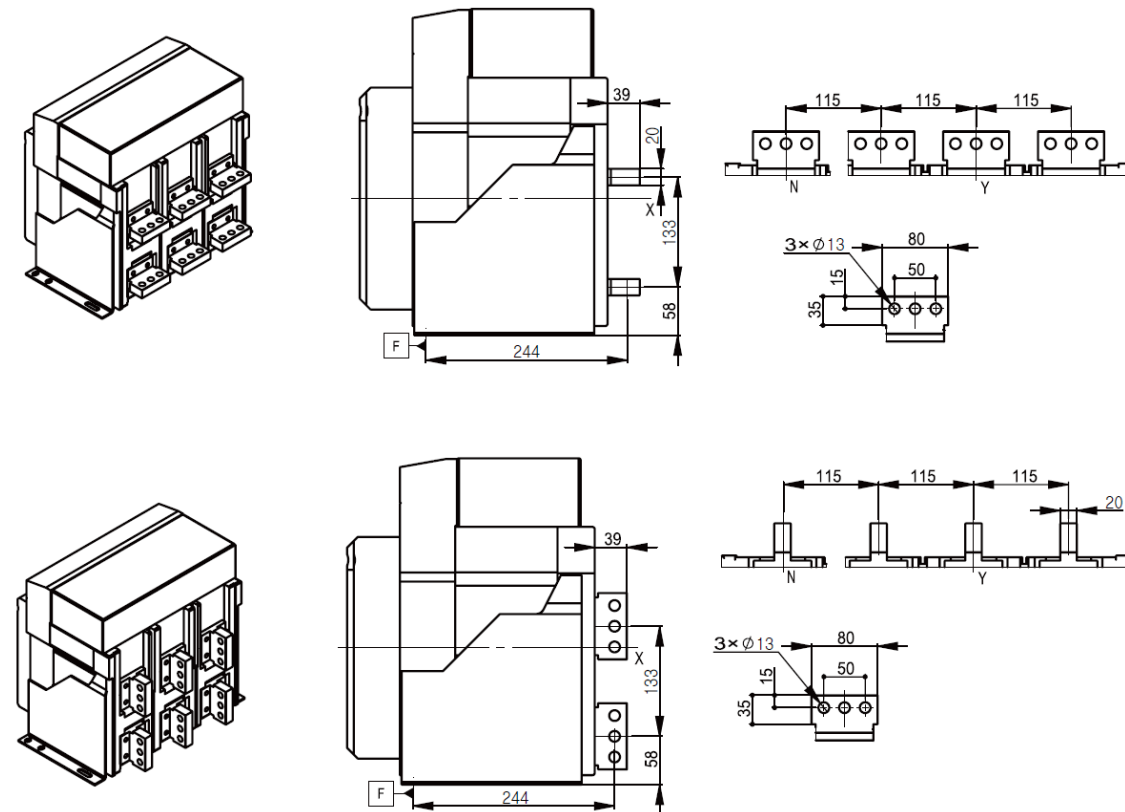
Fixed Details



800A-2500A horizontal and vertical wiring

Detail

800A-2500A horizontal and vertical wiring Detail



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

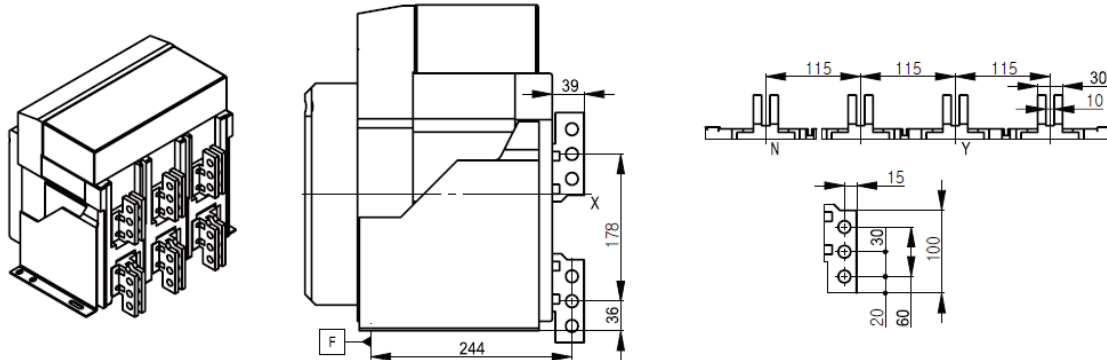
Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$

2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

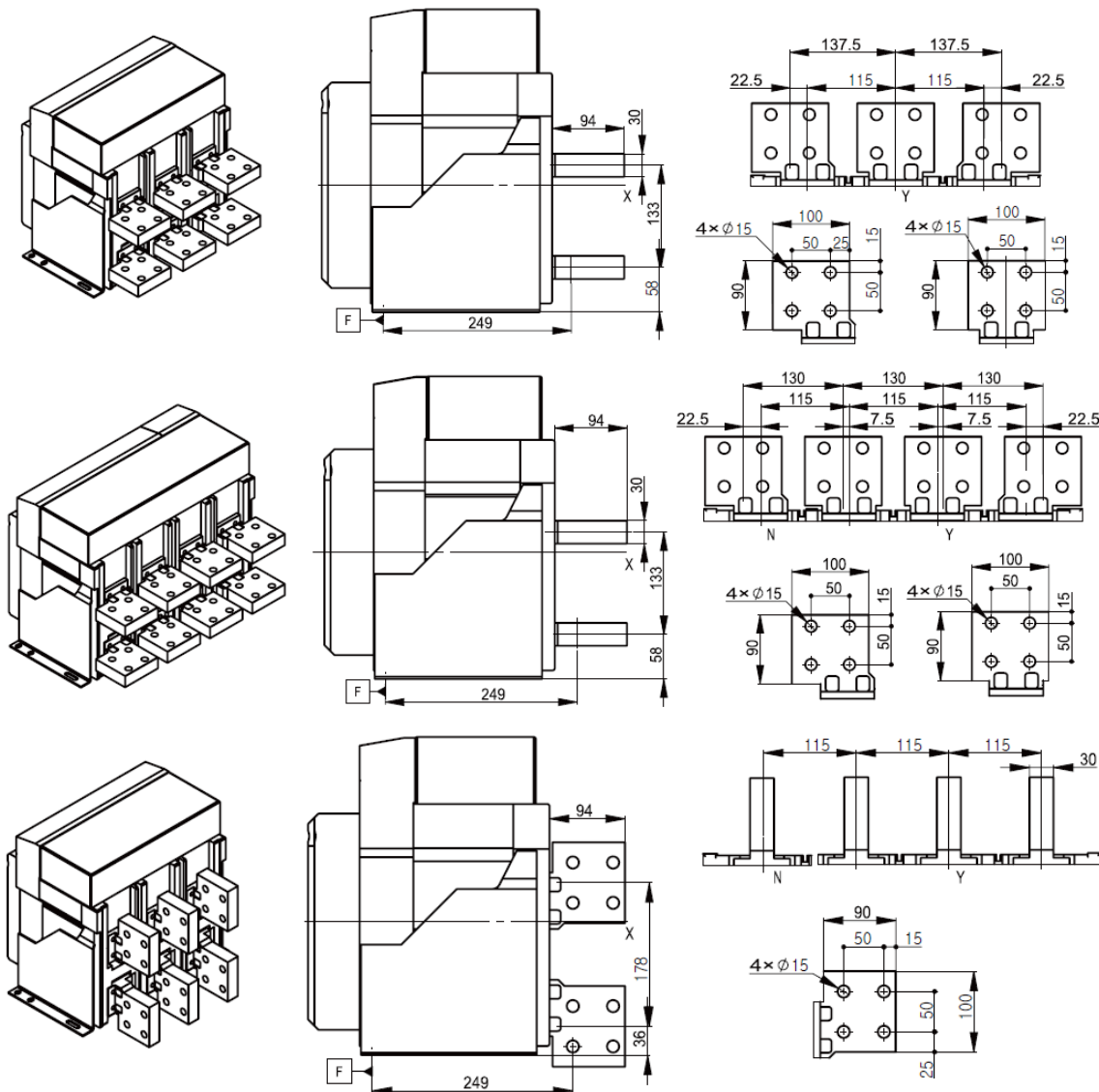
3200A-4000A vertical wiring

Detail



3200A-4000A horizontal extended and vertical extended wiring

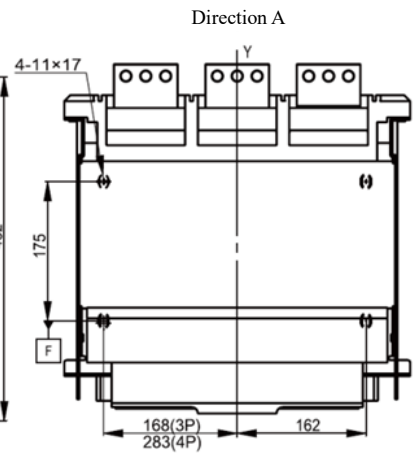
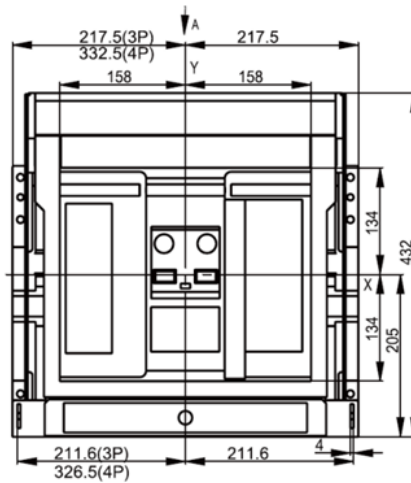
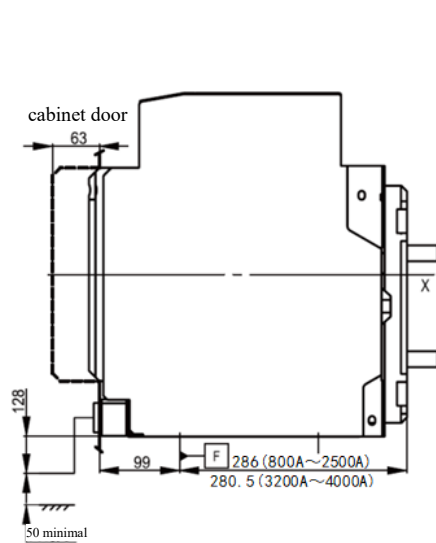
Detail



Note: X and Y axes are the symmetric axes of the front cover;

NDW3-4000 drawout type (unit: mm)

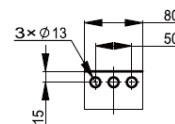
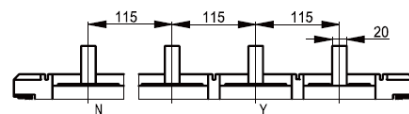
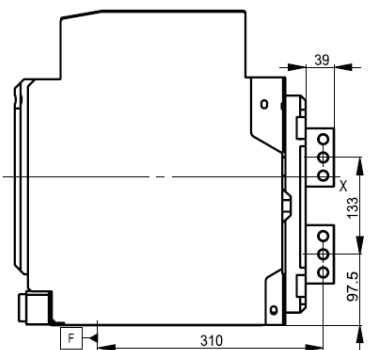
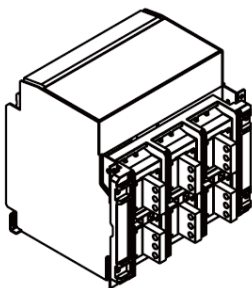
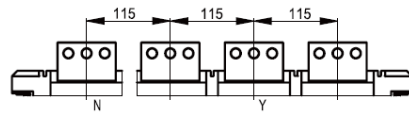
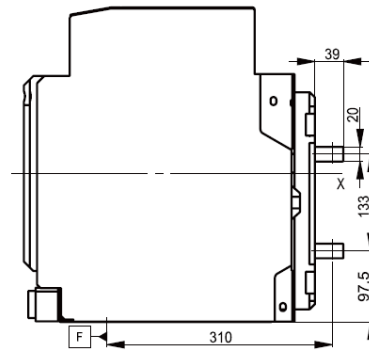
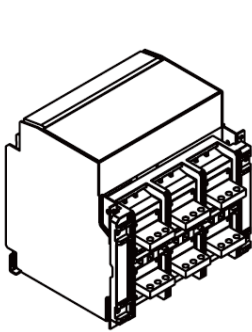
Dimensions



Fixed Details

800A-2500A horizontal and vertical wiring

Detail

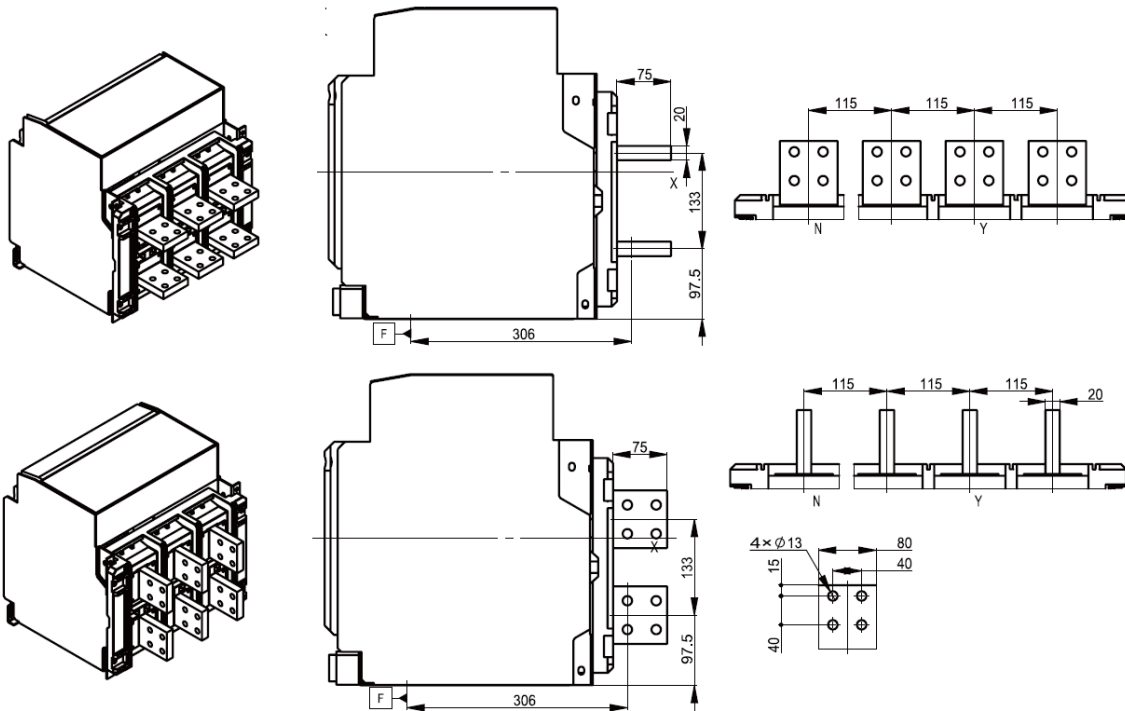


Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$

2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

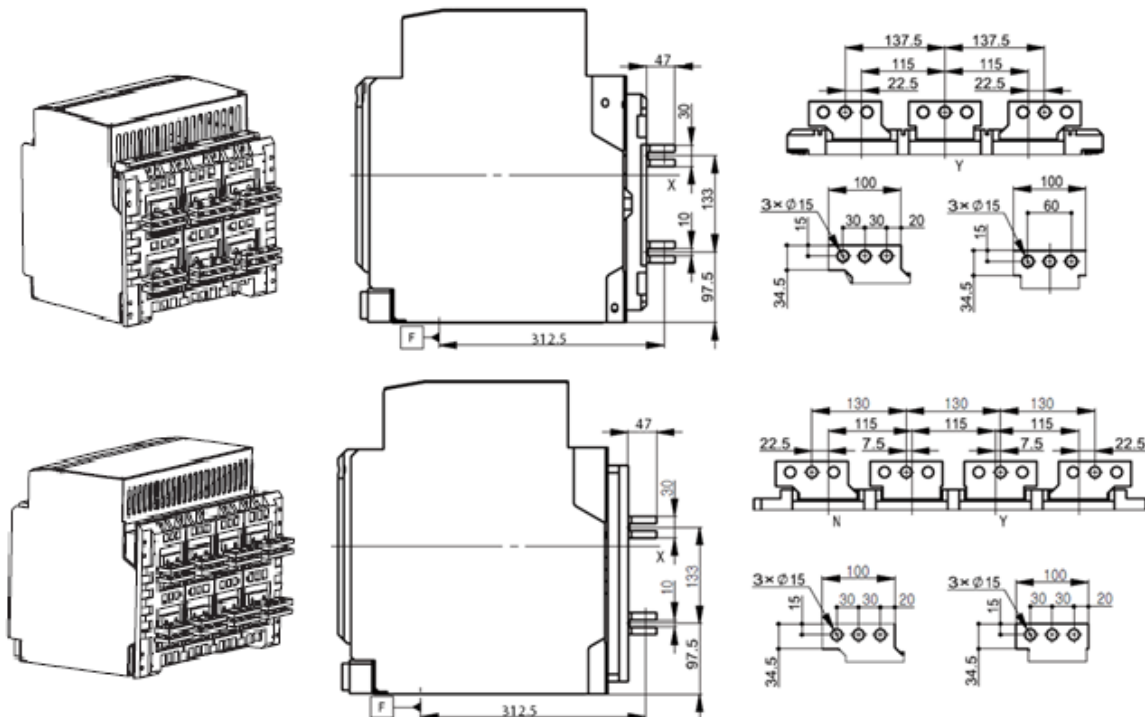
1600A-2500A horizontal and vertical extended wiring

Detail



3200A-4000A horizontal wiring

Detail



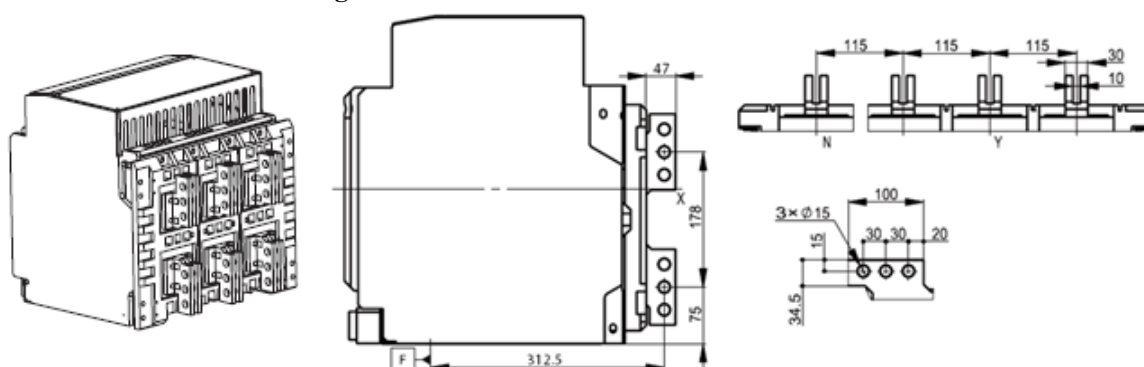
Note: X and Y axes are the symmetric axes of the front cover;

Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$

2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

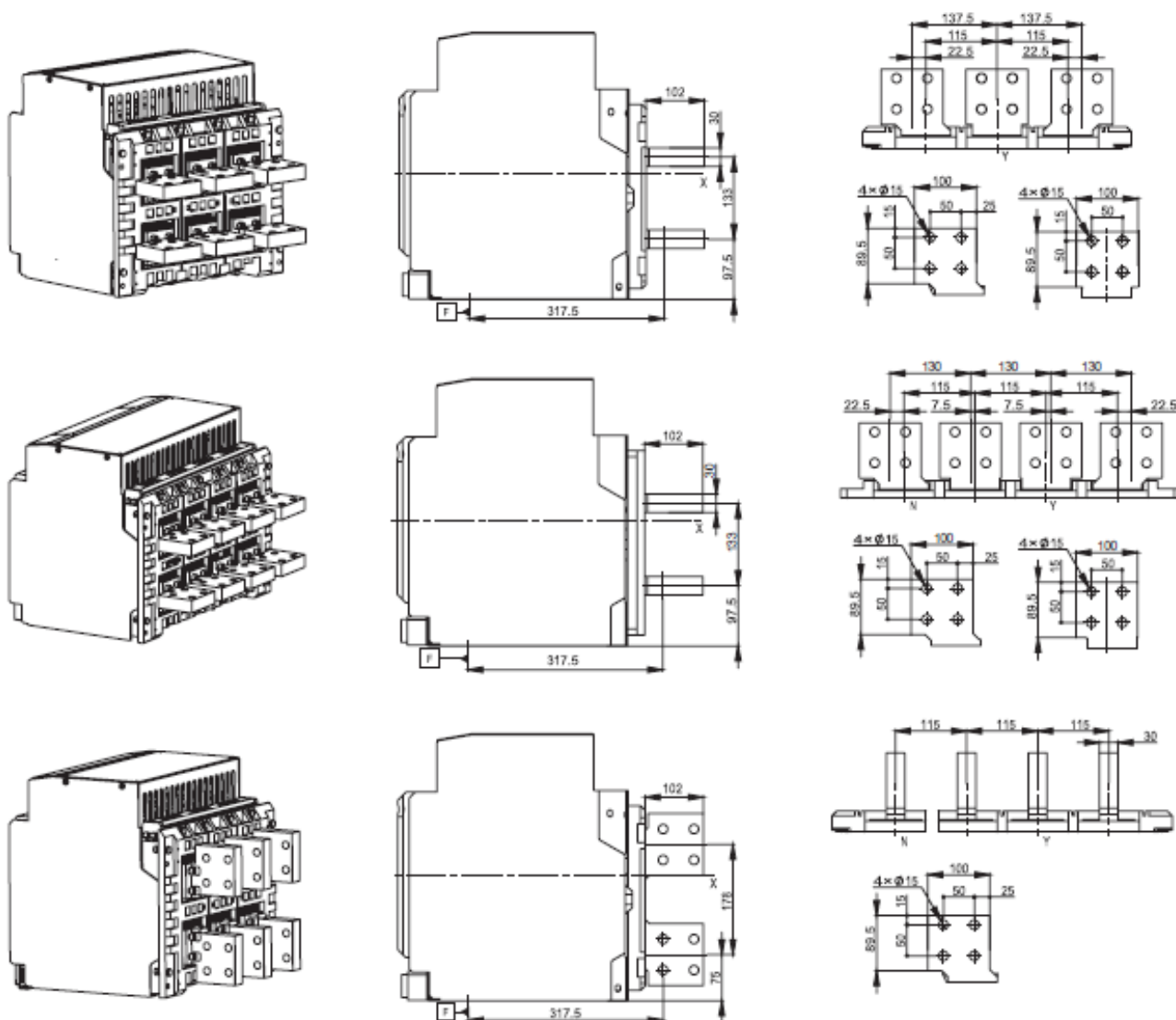
3200A-4000A vertical wiring

Detail



3200A-4000A horizontal extended and vertical extended wiring

Detail



Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$

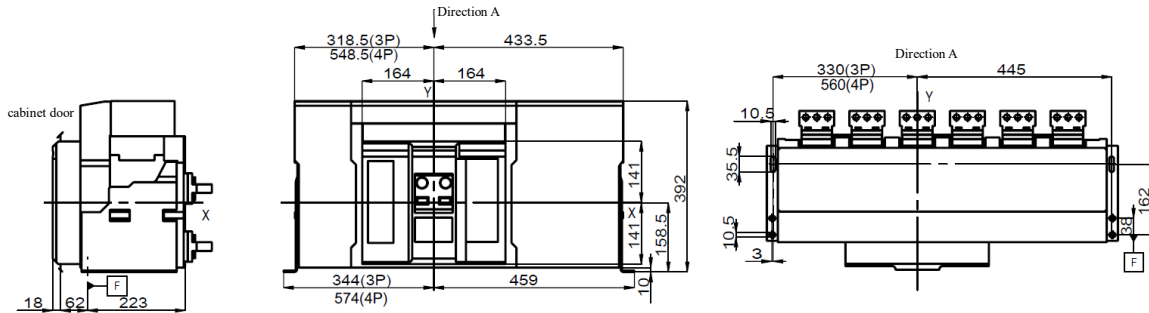
2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

6.5 NDW3-7500

NDW3-7500 fixed type (unit: mm)

Dimensions

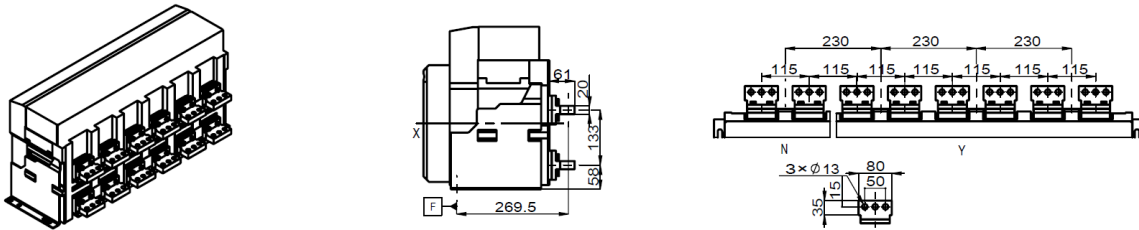
Fixed Details



4000A-5000A horizontal, vertical and mixed wiring

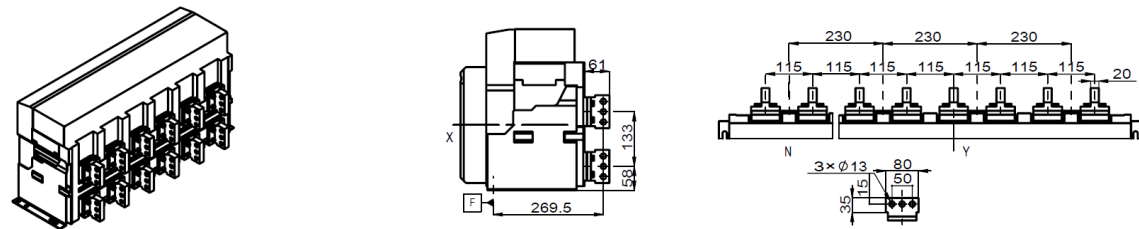
Horizontal Wiring

Detail



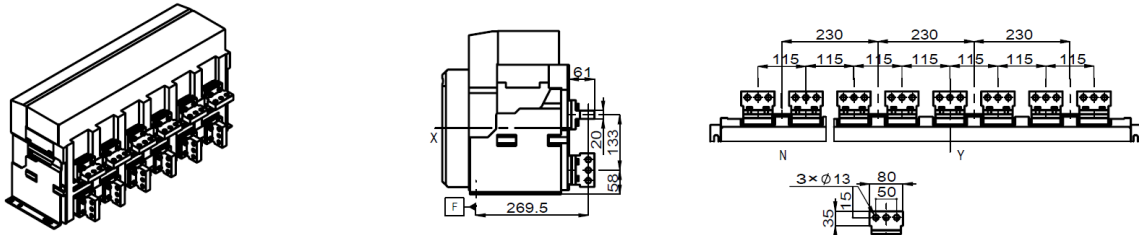
Vertical Wiring

Detail



Mixed Wiring (Upper Horizontal, Lower Vertical)

Detail



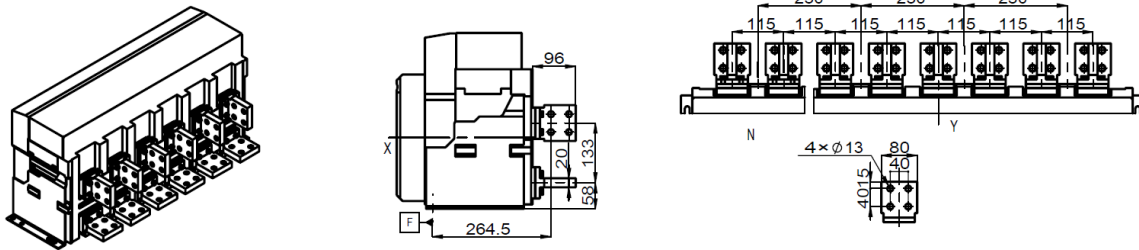
Note: For the circuit breaker, X and Y are the symmetric axes of the front cover;

Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$

2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

Mixed Wiring (Upper Vertical, Lower Horizontal)

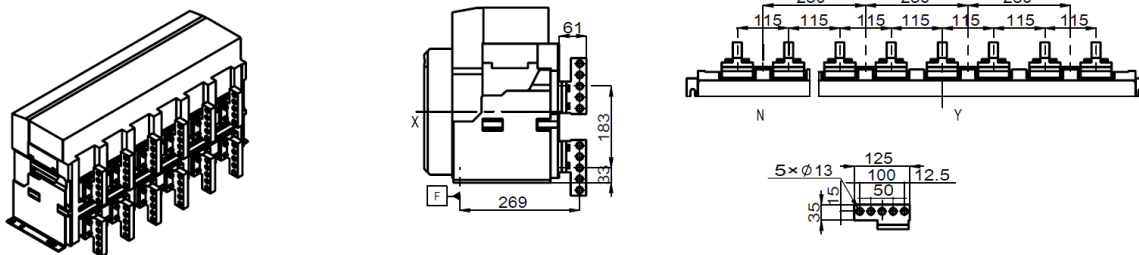
Detail



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

6300A vertical wiring

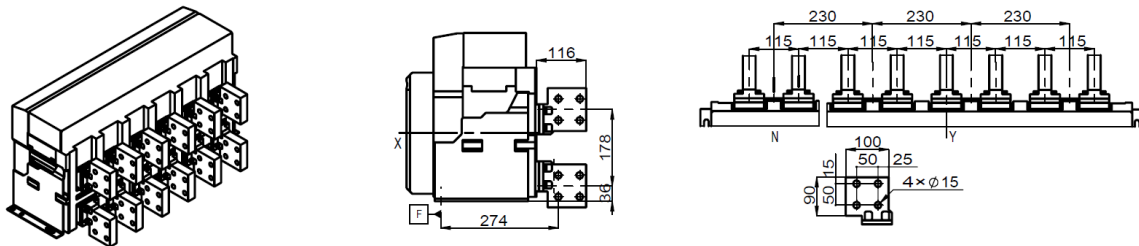
Detail



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

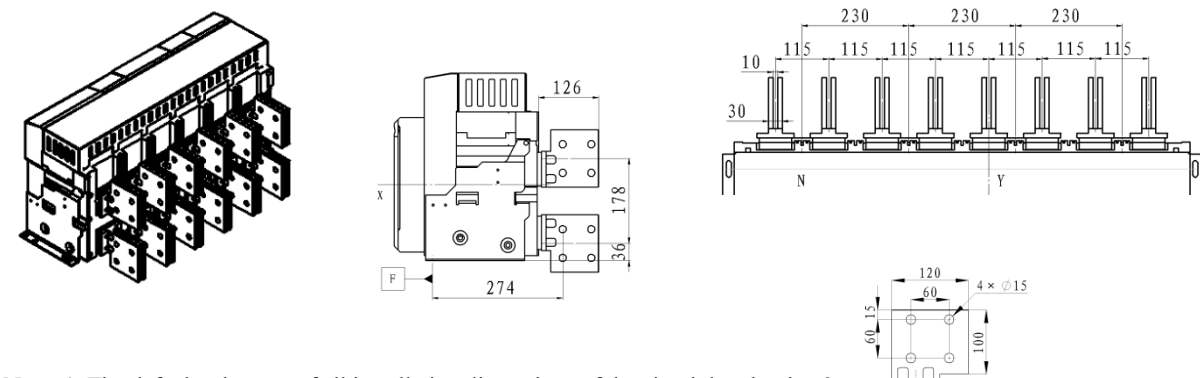
6300A extended vertical wiring

Detail



7500A Extended vertical wiring

Detail



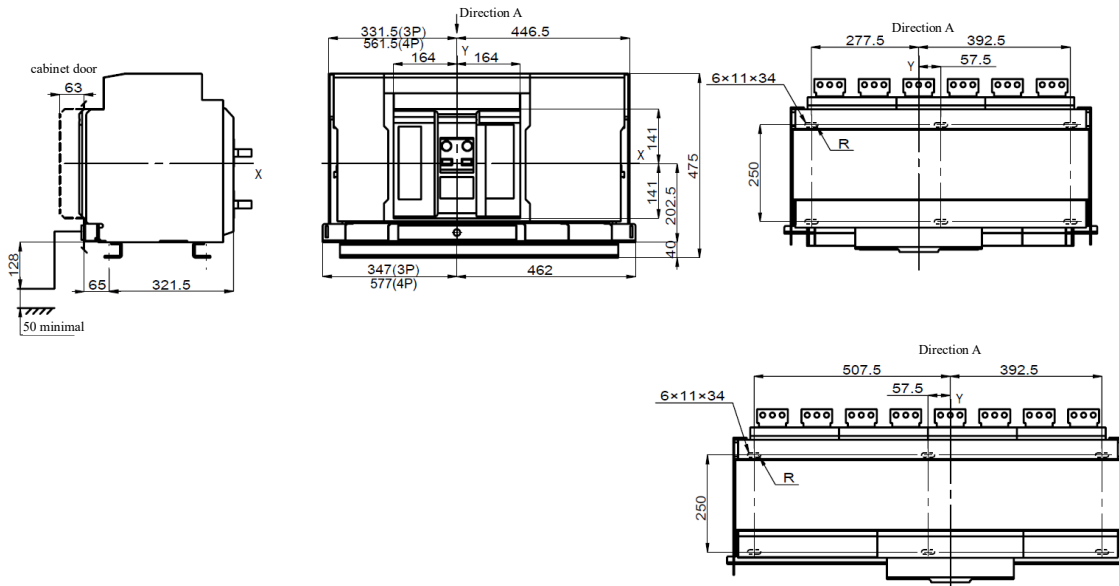
Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$.

2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

NDW3-7500 drawout type (unit: mm)

Dimensions

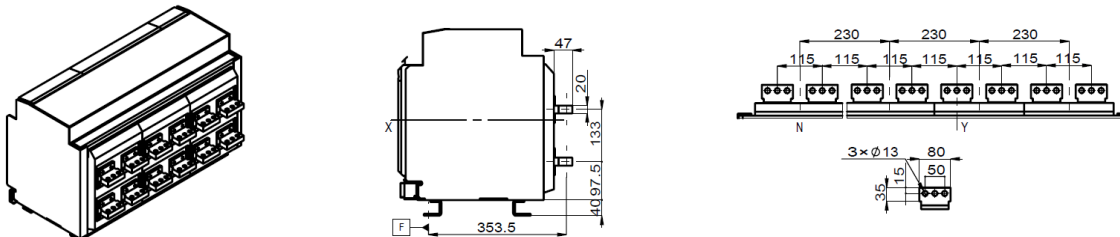
Fixed Details



4000A-5000A horizontal, vertical and mixed wiring

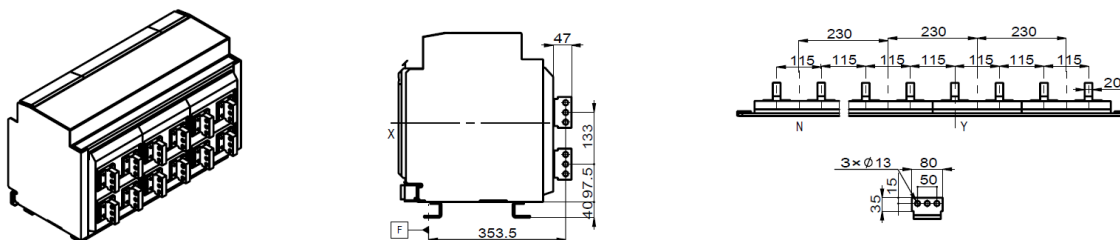
Horizontal Wiring

Detail



Vertical Wiring

Detail



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

Note: 1. The default tolerance of all installation dimensions of the circuit breaker is $\pm 3\text{mm}$

2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

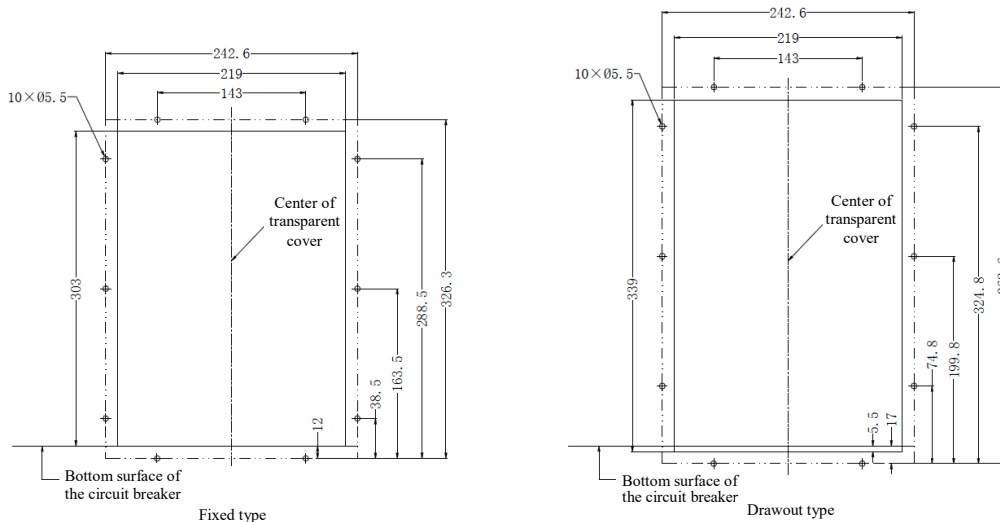
2. The circuit breaker and mounting surface dimensions need to be measured against a flat plane. (When measurements are taken directly against the wooden bottom bracket of the circuit breaker package, the results will be biased due to the deformation of the wooden bottom bracket.)

6.6 Circuit Breaker Cabinet Door Open Hole and Installation Pitch

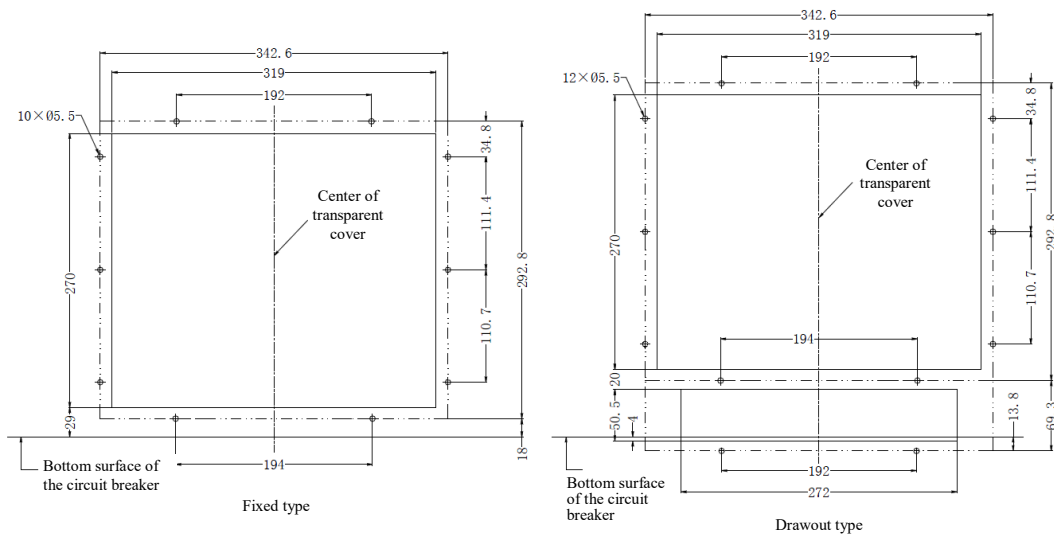
Depending on whether to select the IP54 transparent cover, the cabinet door hole dimensions and installation hole spacing will differ. Refer to the dimensions below for cutting the hole based on specific requirements.

a. Hole dimensions of cabinet door without IP54 transparent cover

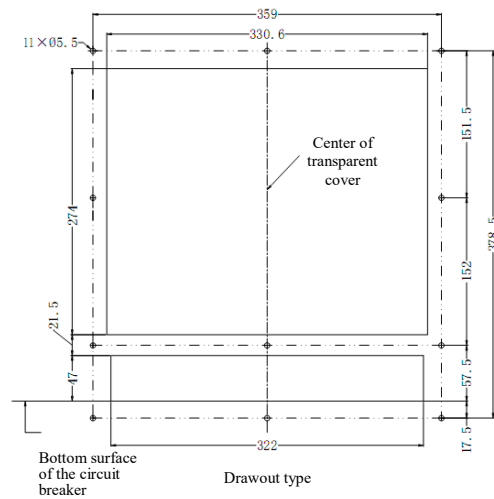
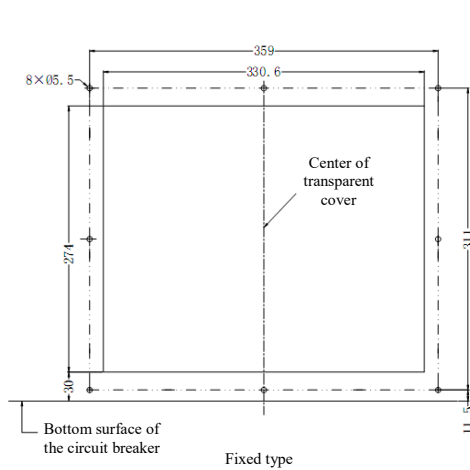
Hole dimensions of NDW3-1600 door frame (unit: mm) without IP54 transparent cover



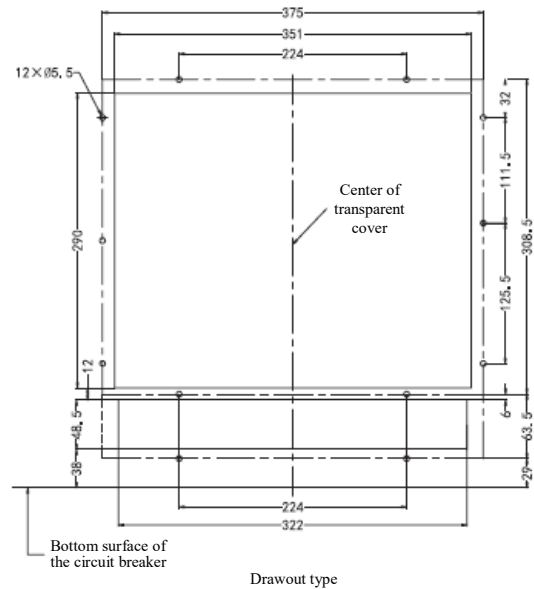
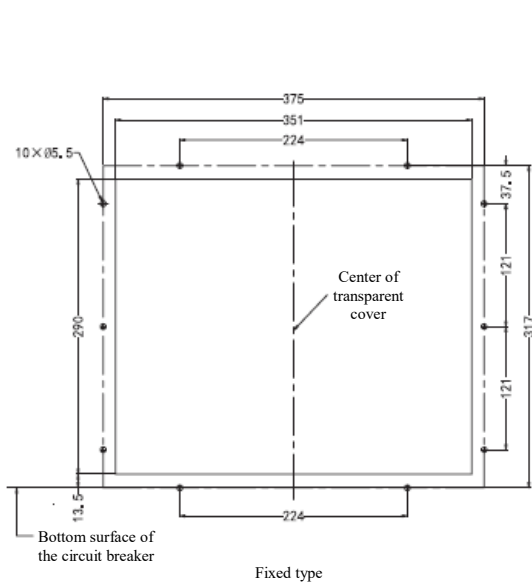
Hole dimensions of NDW3-2500 door frame (unit: mm) without IP54 transparent cover



Hole dimensions of NDW3-4000 door frame (unit: mm) without IP54 transparent cover

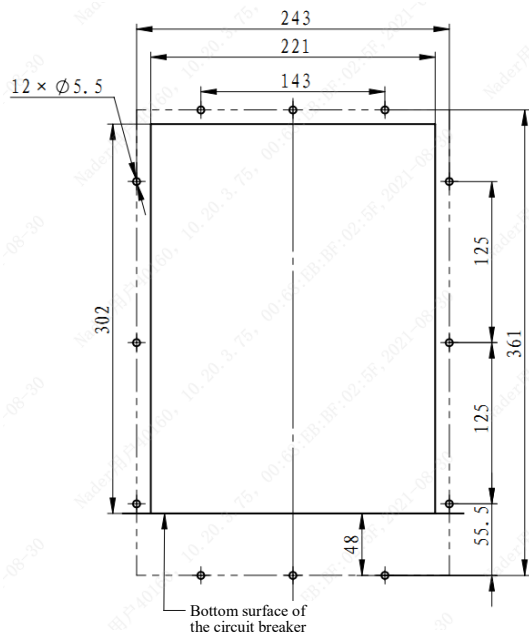


Hole dimensions of NDW3-6300/NDW3-7500 door frame (unit: mm) without IP54 transparent cover

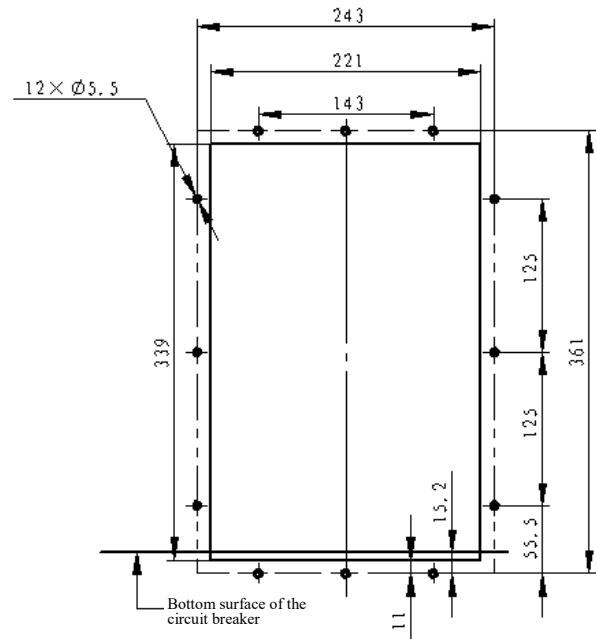


b. Hole dimensions of cabinet door with IP54 transparent cover

Hole dimensions of NDW3-1600 door frame (unit: mm) with IP54 transparent cover

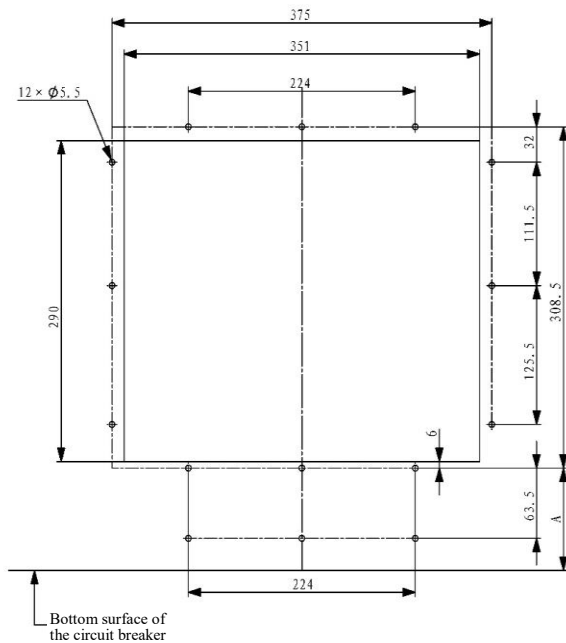


Fixed type

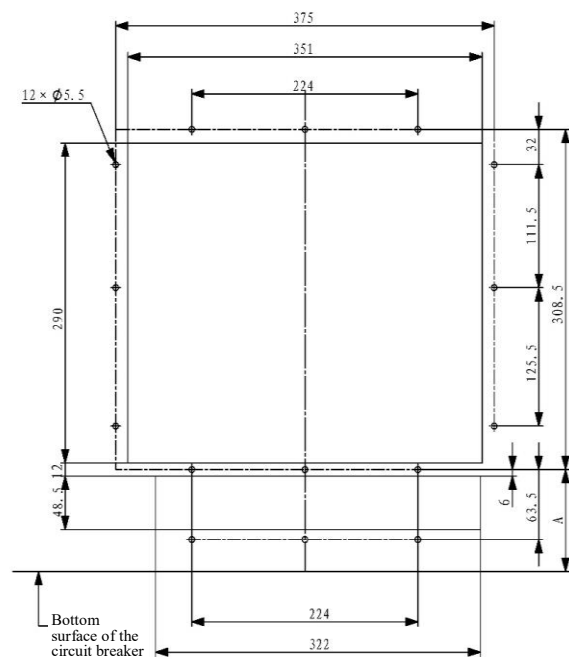


Drawout type

Hole dimensions of NDW3-2500/4000/6300/7500 door frame (unit: mm) with IP54 transparent cover



Fixed type



Drawout type

Shell frame current (A)	NDW3-2500		NDW3-4000		NDW3-6300,NDW3-7500	
Installation Mode	Fixed type	Drawout type	Fixed type	Drawout type	Fixed type	Drawout type
A (mm)	20.15	55.65	14.9	53.4	8.5	92.5

6.7 Safety Notes for Circuit Breaker Installation

To ensure the safety of you and the electric 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 $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$, 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 operating 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

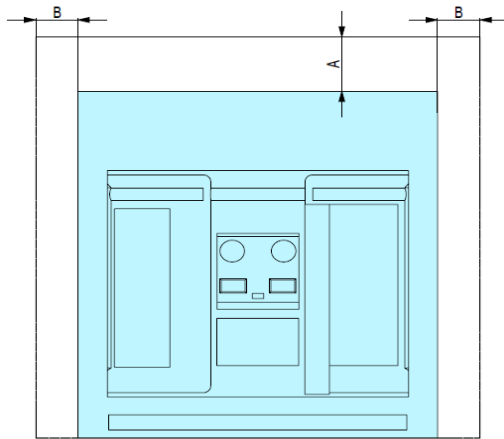
Installation Screws of the Circuit Breaker

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

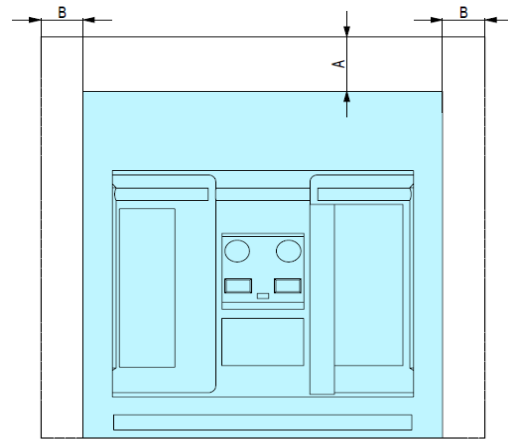
	3200-4000A	M14 bolt, level 8.8, with contact washer, tightening torque 97N.m
NDW3-6300	Vertical extended wiring	M14 bolt, level 8.8, with contact washer, tightening torque 97N.m
NDW3-7500	Other wiring methods	M12 bolt, level 8.8, with contact washer, tightening torque 60N.m

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

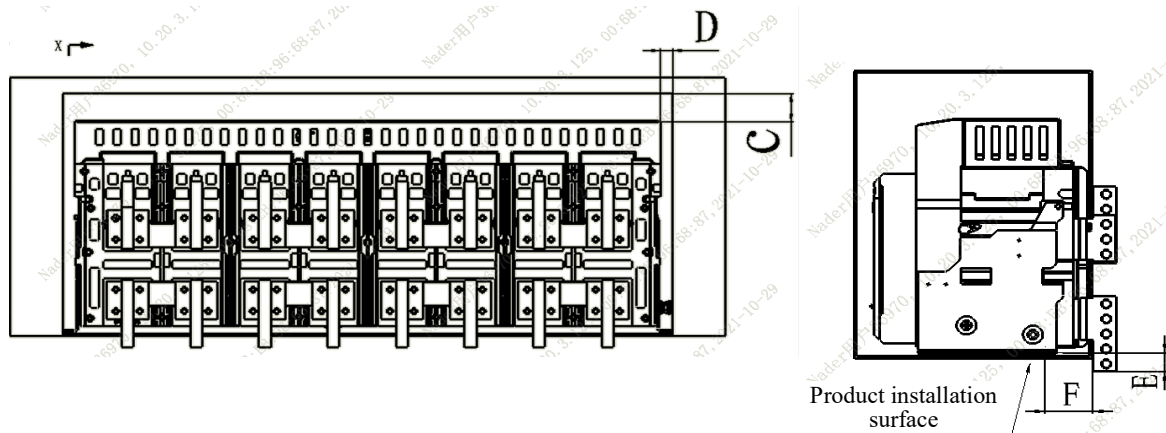


Fixed circuit breaker

Unit: mm

Safe Distance between Circuit Breaker and Cabinet

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



Safe Distance between Circuit Breaker and Cabinet

Installation mode of the circuit breaker	To the insulator ($\geq$)				To the live part ($\geq$)			
	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. 150 mm space needed for removing the arc-extinguishing chamber should be considered for the safe spacing of the fixed type circuit breaker;

2. If dust cover is added, height space of 70 mm for installation and rotating of the dust cover should be considered;
3. If the distance from the live body cannot meet the requirements in the table, insulation measures need to be taken between the circuit breaker and the live body.

Electrical Wiring Diagram 7	125
7.1 NDW3-1600 Full-function Wiring Diagram (power module removed)	125
7.2 NDW3-2500/4000/6300/7500 full-function wiring diagram (remove #20 ground wire)	129

Electrical Wiring Diagram 7

7.1 NDW3-1600 Full-function Wiring Diagram (power module removed)

Precautions for users when designing the electrical engineering diagram:

Number/function of secondary terminal	3# □ 4# □ 5#	6# □ 7# □ 8#	No-voltage release	Auxiliary switch	39#~44#
NDW2-1600	4# and 5# are on	7# and 8# on	12#~15#	45#~62#	User-defined
NDW2-2000/3200/4000	4# and 3# on	7# and 6# on	33#~34#	39#~62#	/
NDW2-6300	4# and 3# on	7# and 6# on	12#~15#	39#~62#	/

Note: 1. 3#~8# in the above table show the states in case of no fault and opening for the circuit breaker.

2. NDW2-1600/6300's loss of voltage release can be divided into the execution module and control module. The control module shall be

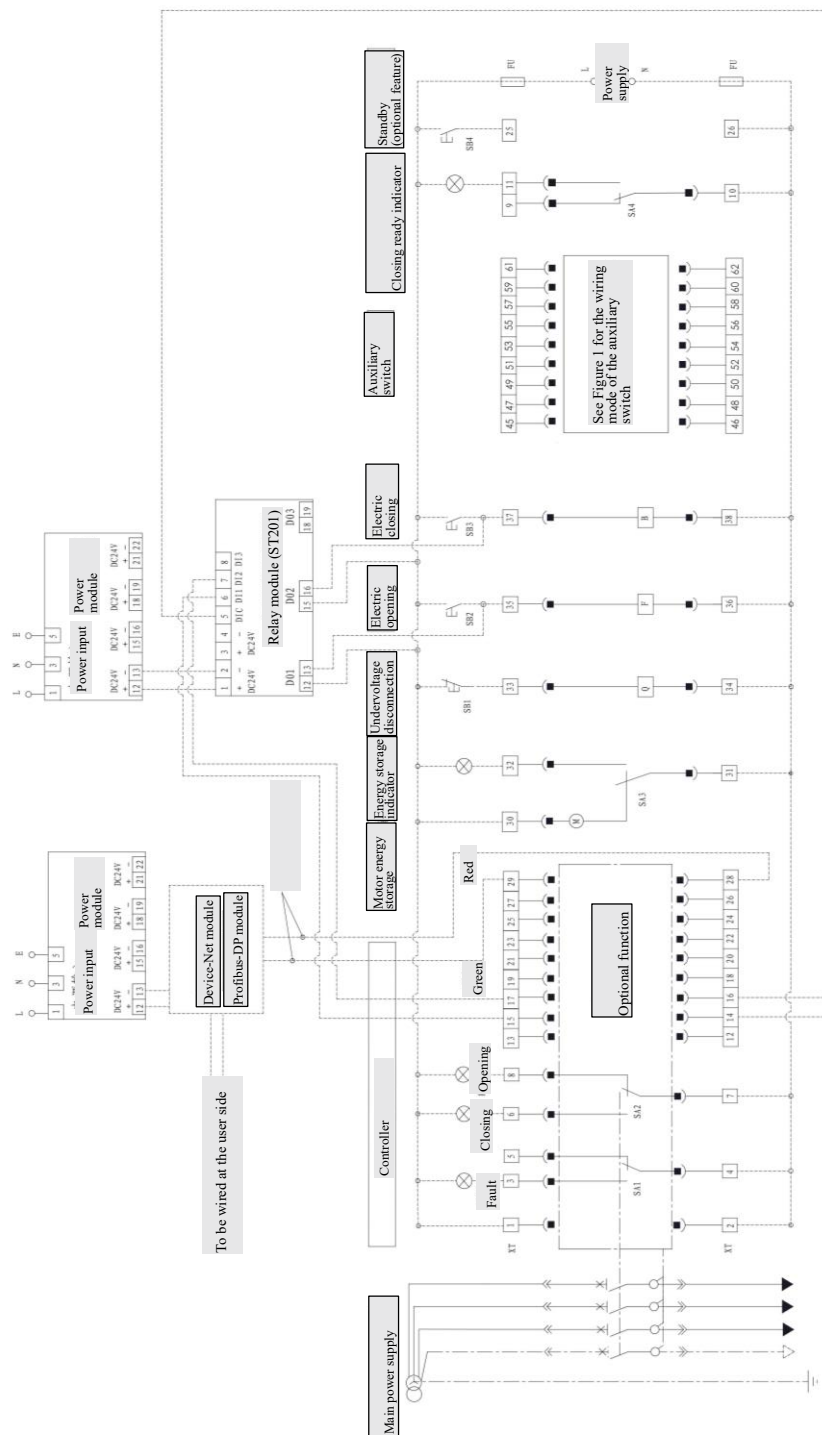
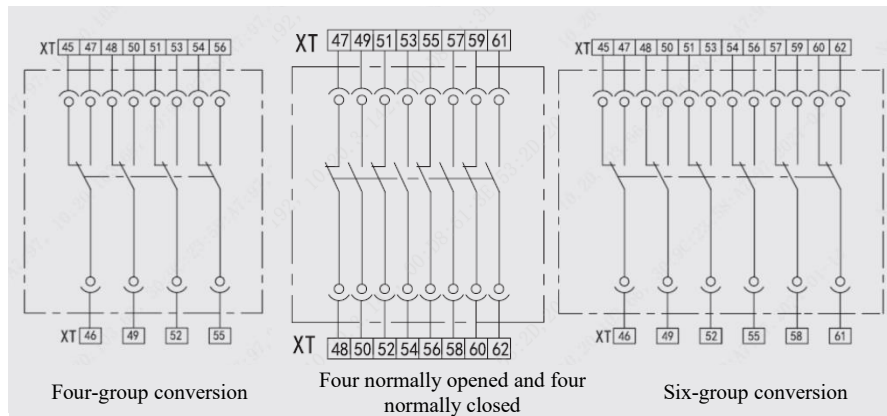


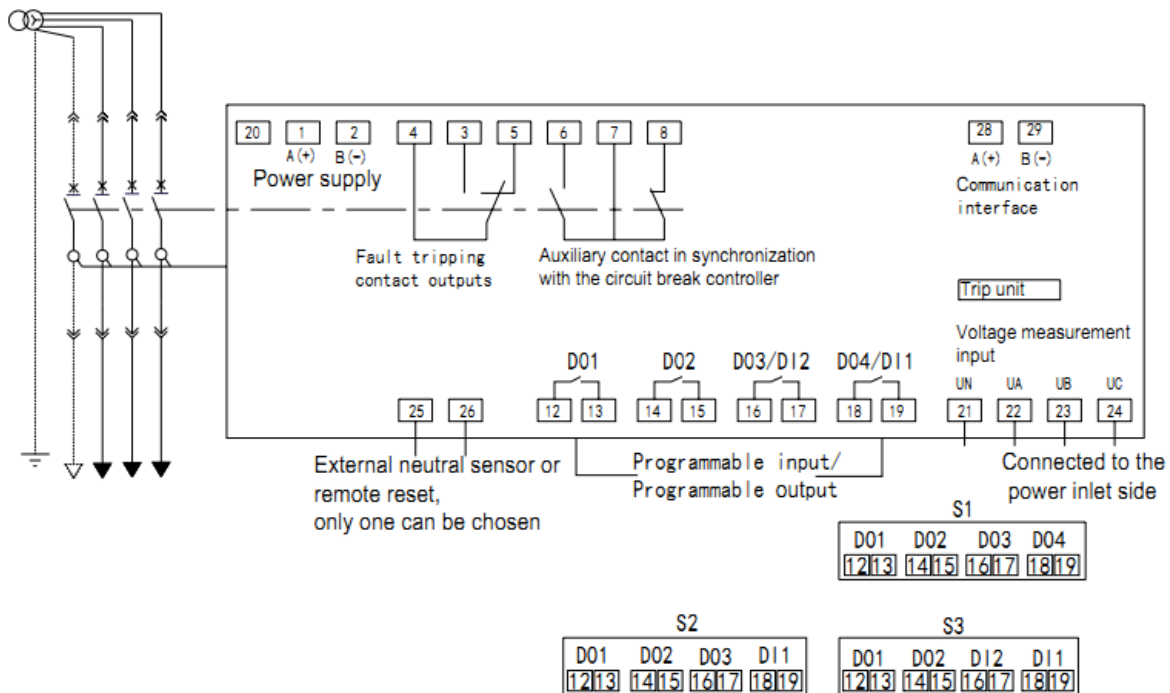
Figure 1: NDW3-1600 Auxiliary Wiring Diagram



Breaking capacity of NDW3-1600 auxiliary contacts:

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 (remove 20# wire)



Definition Table of NDW3-1600 Terminal Number (#20 grounding wire cancelled)

Function	Wiring terminal line number																				Remarks
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
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/AC150V
Four groups of optional signal unit outputs																					DO contact capacity: 0.5A/AC110V, 3A/AC250V DI signal input voltage: DC110V-DC130V or AC110V-AC250V
Shunt output with break monitoring																					
Closing output with break monitoring																					
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 module, 33# and 34#
Shunt release																					
Closed electromagnet																					
Connecting terminals of auxiliary switch																					

SB1 - Undervoltage release button (to be prepared by users)	SB2 - Shunt button (to be prepared by users)
SB3 - Close button (to be prepared by users)	SB4 - Remote reset button (to be selected/to be prepared by users)
SA1 - Fault tripping travel switch	SA2 - Opening and closing indicating travel switch
SA3 - Energy storage motor travel switch	SA4 - Closing ready 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	

Notes:

1. The current state of the circuit breaker is de-energized, disconnected, connected, no energy stored;
2. The status indicator, button switch and communication equipment shall be prepared by users, and the dashed part shall be wired by users;
3. If the rated operating voltages of Q, F, B, M and controller are not the same, please connect to the rated voltage of control power supply.
4. To guarantee reliable operation of controller, 1# and 2# shall be connected to the auxiliary power supply;
- 5, 25#, 26# - N-pole transformer output end (3P+N), leakage transformer output end, or remote reset function input end can be chosen. If the ground current type protection or current leakage protection is optional without connecting to the external transformer, then it shall be short connected to terminals 25# and 26#;
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.

Auxiliary switch contacts.

10. Please contact us for special order if weak signal detection is used for DO contact.

7.2 NDW3-2500/4000/6300/7500 full-function wiring diagram (remove #20 ground wire)

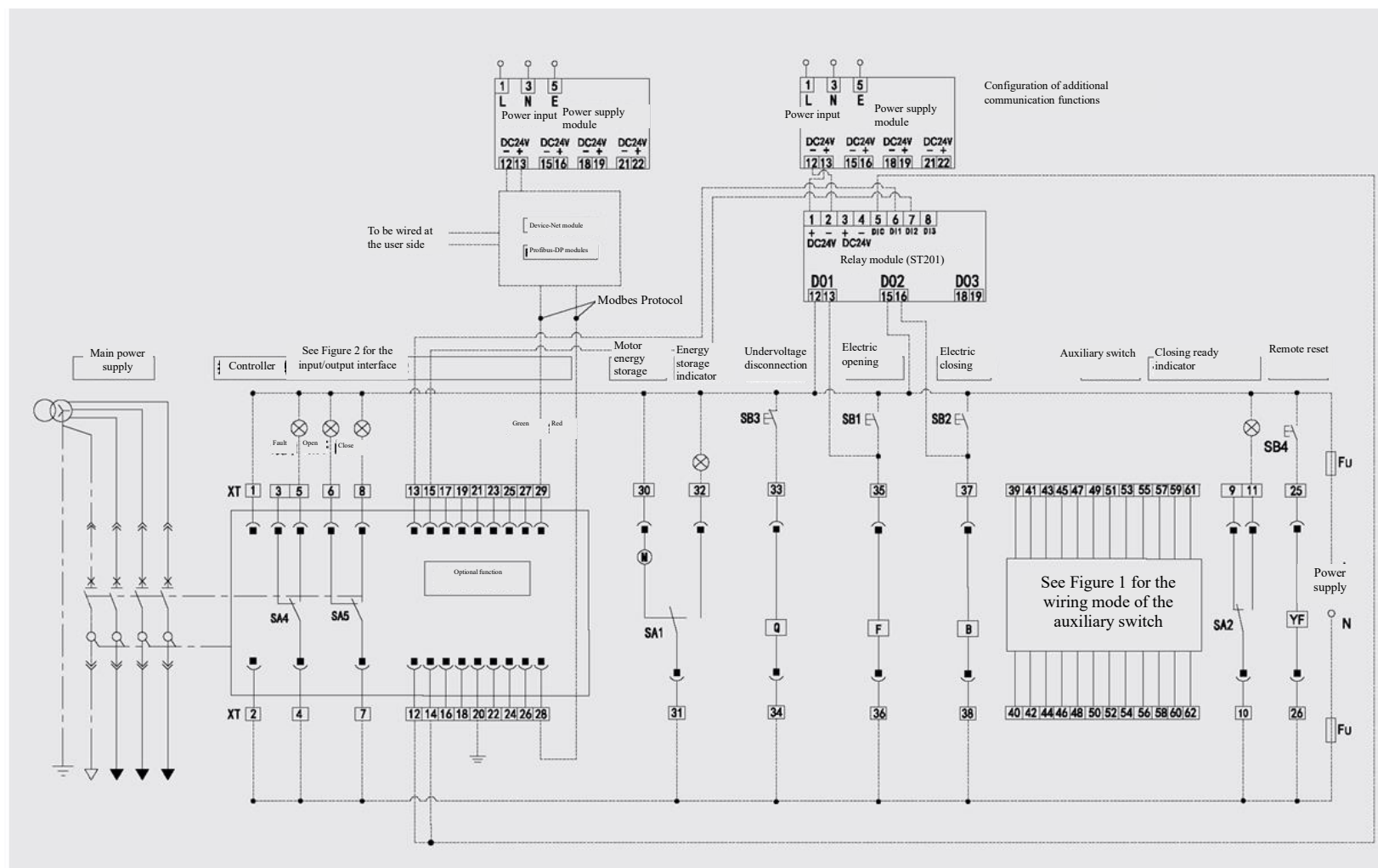
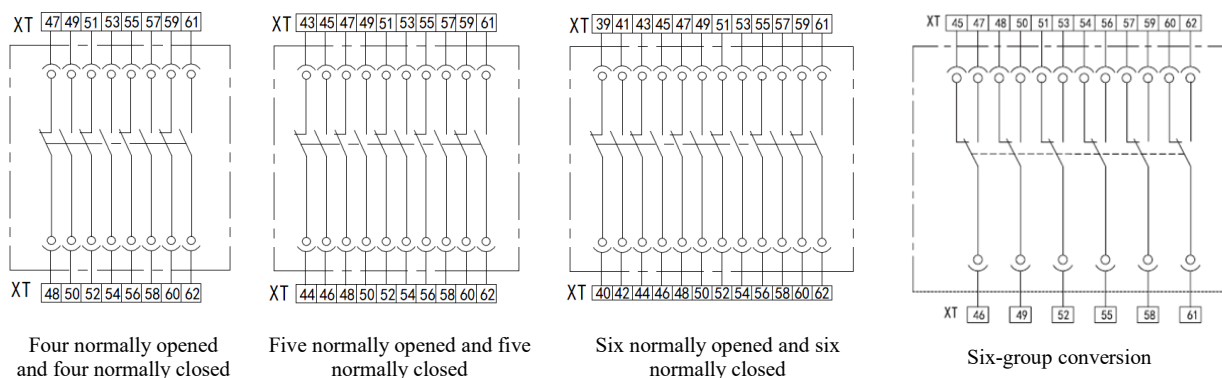
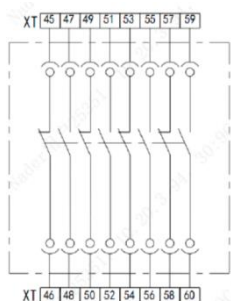


Figure 1: NDW3-2500/4000/6300/7500 Auxiliary Wiring Diagram



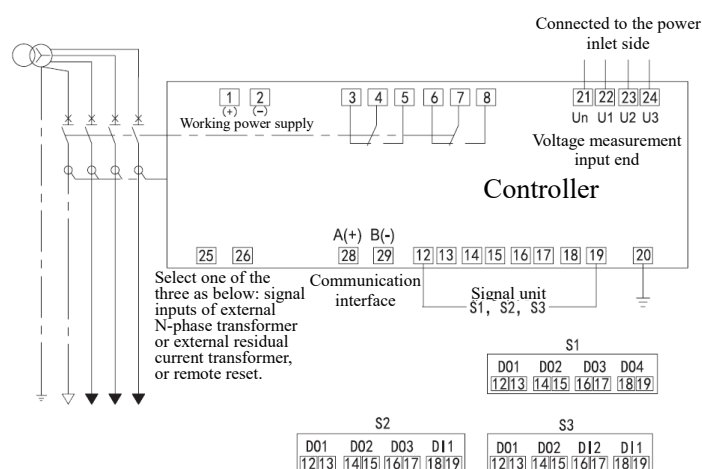
(applicable to NDW3-2500/6300/7500)



Breaking capacity of NDW3-2500/4000/6300/7500 auxiliary contacts:

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

Figure 2: Input/Output Interfaces of NDW3-2500, NDW3-4000, NDW3-6300, NDW3-7500 Controller



12, 13 - Signal contact 1, contact capacity: AC250V/5A; DC110V/0.5 A, optional function; it cannot be selected when the function of voltage check closing device is selected;

14, 15 - Signal contact 2, contact capacity: AC250V/5A; DC110V/0.5 A, optional function; it cannot be selected when the function of voltage check closing device is selected.

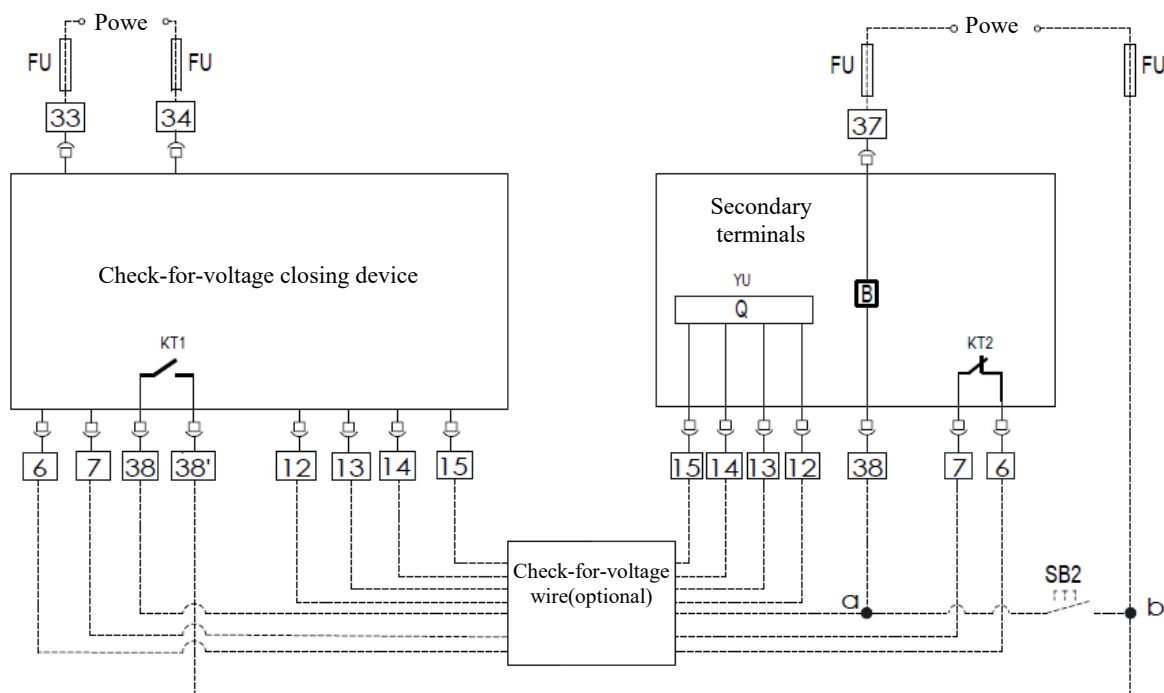
Address: No. 2000, South Shenjiang Road, Pudong New Area, Shanghai Post code: 201315 Tel.: (021) 68586699 Fax: (021) 23025796
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SB1 - Shunt button (to be prepared by users)	SB2 - Close button (to be prepared by users)
SB3 - Undervoltage disconnection 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	

Notes:

1. The current state of the circuit breaker is de-energized, disconnected, connected, no energy stored;
2. The status indicator, button switch and communication equipment shall be prepared by users, and the dashed part shall be wired by users;
3. If the rated operating voltages of Q, F, B, M and controller are not the same, please connect to the rated voltage of control power supply.
4. To guarantee reliable operation of controller, 1# and 2# shall be connected to the auxiliary power supply;
5. 25#, 26# - N-pole transformer output end (3P+N), leakage transformer output end, or remote reset function input end can be chosen. If the ground current type protection or current leakage protection is optional without connecting to the external transformer, then it shall be short connected to terminals 25# and 26#;
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. With the control circuit inside the shunt release and closed electromagnet, they can be energized for a long time, with the power-on time > 200ms. Users shall not connect the auxiliary switch contact of the circuit breaker in series;
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 the special accessory for NDW3-2500.
12. The terminal numbers of the four opened and four closed auxiliary contacts for the NDW3-4000 products are 45~60.
13. Please contact us for special order if weak signal detection is used for DO contact.

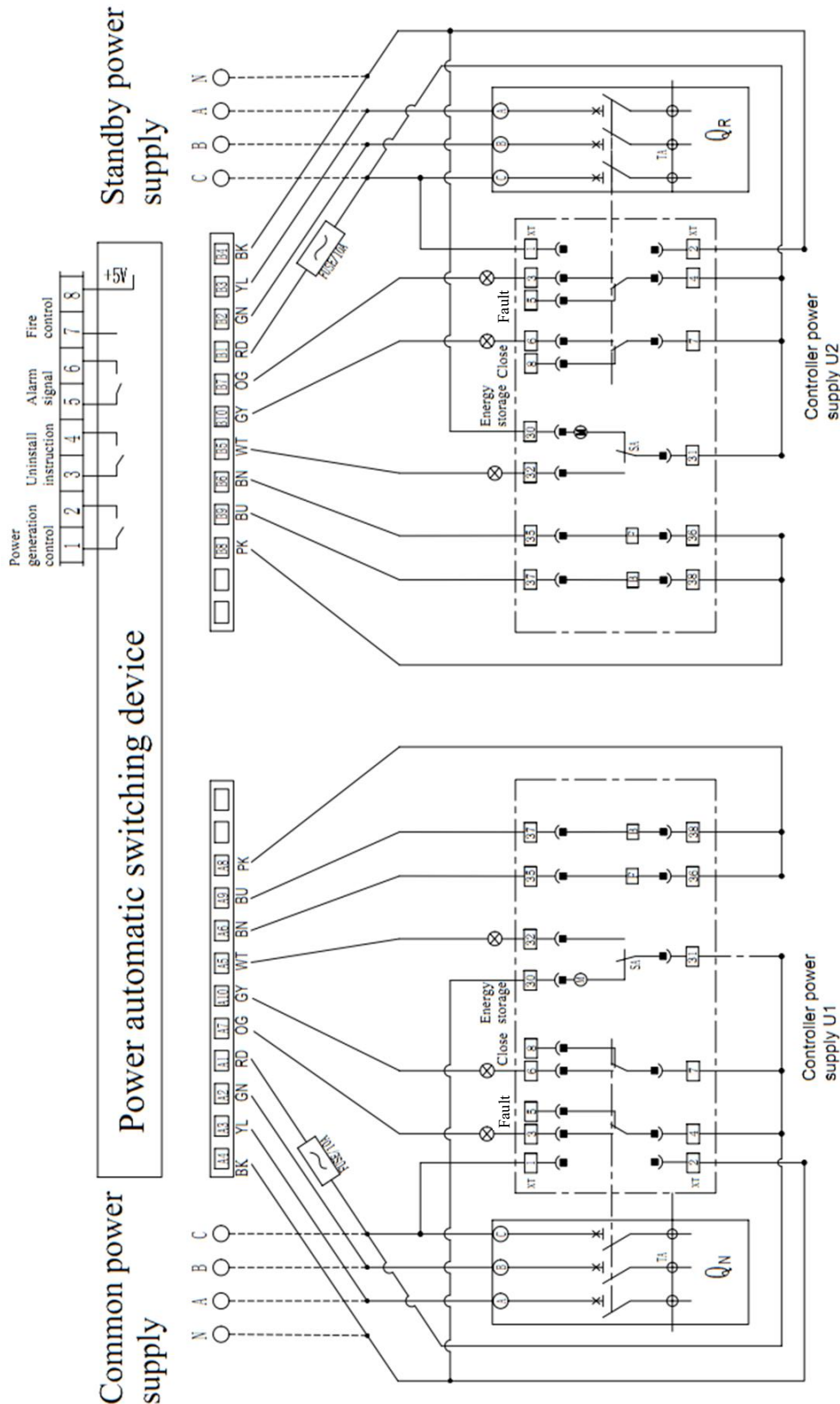
7.3 Electrical Wiring Diagram of Voltage-check Closing Device



- 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 undervoltage release controlled by the voltage check closing device, dedicated photovoltaic undervoltage (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, the wire should be connected according to the electrical wiring diagram of the universal 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 Switching Device (ATS)

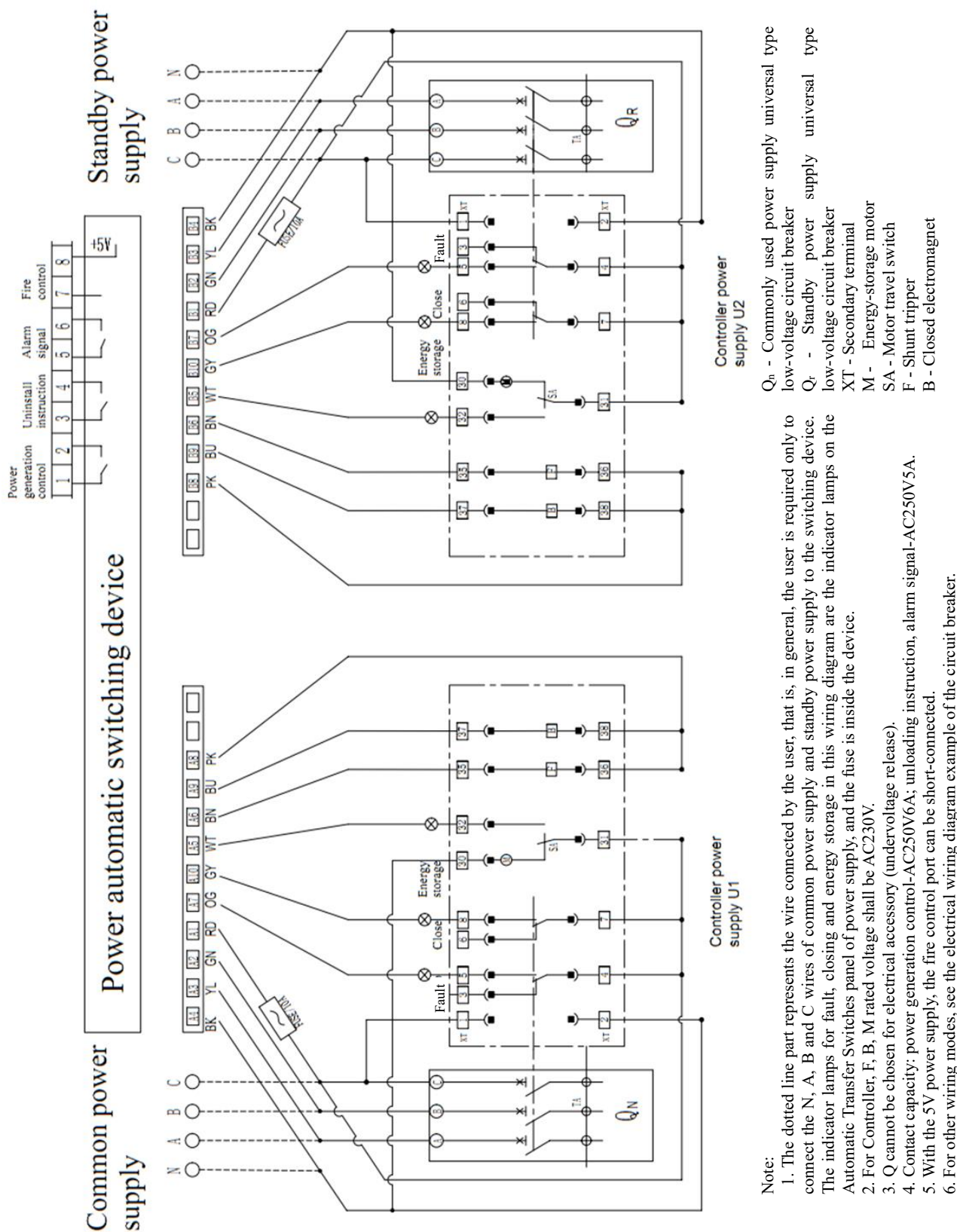
7.4.1 Wiring Diagram of NDW3-1600 Automatic Transfer Switching Equipment



- 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.
- Q_n - Commonly used power supply universal type low-voltage circuit breaker
Q_r - 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

7.4.2 Wiring diagram of NDW3-2500, NDW3-4000, NDW3-6300 and NDW3-7500 Automatic Transfer

Switching Equipment



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Ordering type selection specification 8

8.1 NDW3 Series of 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	Nader 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 level	NDW3-1600 is only available with one breaking type, which is not shown by 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	Not marked - fixed type, C - drawout type	
8	Number of poles	3-3 poles, 4-4 poles, 5-3P+N	3P+N: 3P products are provided with N-phase external transformers
9	Smarink X Controller	KM1-NWK21/NWK31 (AC380V/AC400V), KM2-NWK21/NWK31 (AC220V/AC230V), KM3-NWK21/NWK31 (DC220V), KM4-NWK21/NWK31 (DC110V), KM5-NWK21/NWK31 (DC24V) KY1-NWK22/NWK32 (AC380V/AC400V), KY2-NWK22/NWK32 (AC220V/AC230V), KY3-NWK22/NWK32 (DC220V), KY4-NWK22/NWK32 (DC110V), KY5-NWK22/NWK32 (DC24V)	NWK31 and NWK32 are applicable to NDW3-1600 controllers while NWK21 and NWK22 are applicable to the rest

Continued:

10	Smarink X Controller Optional function	Protection type: Not marked - Conventional type V - Voltage type V1 - Voltage communication type P - Harmonic measurement and protection type P1 - Metering type P2 - Intelligent power quality type	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", "C", "DLA" and "DL2"; 4. For controllers with protection type V and above, the voltage module P2 is optional for the main circuit rated voltage AC500V and above; 5. Either signal unit or voltage-check closing device. 6. The default communication mode is RS485 7. "M" function is only optional for controller protection type V1/P/P1/P2 (including digital and LCD) 8. Either Bluetooth or WIFI; only controller protection type P2 is optional (LCD) 9. Optional DL/T645 communication protocol function needs to be specially customized.
		Communication mode: Not marked - RS485	
		Communication function: H (Modbus Protocol) ☐ MP (Profibus-DP Protocol) ☐ MD (DeviceNet Protocol) C- CAN DL1-DL/T 645 (CSG) DL2-DL/T 645 (State Grid)	
		Signal unit: S1- 4DO S2- 3DO, 1DI S3-2DO, 2DI	
		Remote reset function: Z1(AC380V/AC400V), Z2(AC220V/AC230V), Z3 (DC220V), Z4 (DC110V), Z5 (DC24V)	
		M - Temperature measurement and protection (including contact and controller temperature measurement and protection)	
		Controller communication mode: L- Bluetooth F-WIFI LN-Bluetooth+NFC FN-WIFI+NFC	
		3P+N grounding mode (optional for the external N-pole transformer): T - Differential type (not shown by default) W - Ground current type	
		N1 - External N-phase transformer (62*21)	
		N2 - External N-phase transformer (102*32.5)	
		N3 - External N-phase transformer (122*52)	
		N4 - External N-phase transformer (262*102)	
		NR1 - External flexible transformer (280mm)	
		NR2 - External flexible transformer (370mm)	
		NR3 - External flexible transformer (450mm)	
		Protection form of current leakage: E-type (including the external residual current 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. No DC24V specification for 6300/7500 shell frame
12	Shunt release/retention shunt release	F1-AC380V/AC400V, F2-AC220V/AC230V, F3-DC220V, F4-DC110V, F5-DC24V	2. Either shunt release or retention shunt release can be chosen when 2500/4000 shell frame is selected
		F6-AC220V/DC220V (retention type) Applicable to 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	Undervoltage release: Q1-AC380V/AC400V, Q2-AC220V/AC230V, Q3-DC220V, Q4-DC110V, Q5-DC24V	1. One out three of the under-voltage release, No-voltage release and voltage-check closing device 2. To be selected during ordering; this shall be omitted if without this accessory 3. The dedicated under-voltage release and closing electromagnet controlled by the voltage check closing device are internal accessories,
		No-voltage release: S1-AC380V/AC400V, S2-AC220V/AC230V	
		Voltage-check closing device: 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 No-voltage delay: 0s~10s, adjustable by users (factory default 3s), step length 1s;	
		NDW3-2500/4000 No-voltage delay: 0-Instantaneous, 1-1s delay, 3-3s delay, 5-5s delay	
		0 - Without harness, 1 - With harness	

			though the voltage check closing controller module is an external accessory (applicable to NDW3-2500).
16	Auxiliary contact	A4 - Four groups conversion, A6 - Six groups conversion, A44 - Four opened and four closed A4 - Four groups conversion, A6 - Six groups conversion, A44 - Four opened and four closed, A66- Six opened and six closed	Applicable to NDW3-1600 Applicable NDW3-2500/4000/6300/7500
17	Internal Accessories	BX - Closing ready signal output unit JS - Counter functional unit CM1-Drawout type (with door interlock on the right); CM2-Drawout type (with door interlock on the left) CX - Drawer seat three-position signal output	This shall be omitted if without this accessory

Continued:

18	External accessories	M - Doorframe F - Dust cover R-NWDF1-RM relay module (ST201) NDWF1 power supply module P1-DC24V P3-AC380V/AC400V, AC220V/AC230V P5-DC220V, DC110V A-Safety lock 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 NB-IoT I-Ethernet TC - Energy-storing signal communication module component L- Connection bolt Z - Installation & Operating Instructions and Controller Manual	1. Power supply module, relay module, external leakage transformer, programmable output module, communication adapter, N-pole external transformer need to 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; 5. Select either safety lock or off-position key lock; 6. NWDF1-RM relay module (ST201), contact capacity suitable for AC250V and DC24V.
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: The rated current of 6300A only has two wiring modes: Vertical wiring and vertical extended wiring; 7500A only has vertical extended wiring.
20	Product usage type	Not marked - Conventional, TH - Thermal and humidity, FD - Wind power, plateau	
21	Special notes	Customer’s special requirements	
22	Rated operating 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 and English	1. Only NWK22/32 controller features

			Chinese/English switching 2. Chinese-English labels are used for Chinese and Chinese-English products except for the controller nameplate.
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Interlocking Accessory Model Explanation and Encoding Rules

Off-position 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. NDW3-1600 shell frame can be interlocked with other shell 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 two for opening) SY11-Mechanical interlocking device (two sets of hard levers, one for closing and one for opening) SY12-Mechanical interlocking device (three sets of hard levers, one for closing and two for opening)	1. Select one from five mechanical interlocks 2. SR21 and SR12 are only suitable for NDW3-2500 and above shell frame;
Automatic transfer switching equipment	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;

8.2 Order Specifications

(Please fill in numbers in _____, and check ☒ in ☐. For details, please refer to the instruction manual)

User unit		Number of units ordered:		Date of ordering:	
Shell frame level		☐ NDW3-1600 ☐ NDW3-2500 ☐ NDW3-4000 ☐ NDW3-6300 ☐ NDW3-7500			
Installation Mode		☐ Fixed type ☐ C-drawout type			
Basic parameters	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 ☐ 3600 ☐ 4000 NDW3-6300: ☐ 4000 ☐ 5000 ☐ 6300 NDW3-7500: ☐ 4000 ☐ 5000 ☐ 6300 ☐ 7500			
		Breaking type ☐ S-Conventional breaking (AC690V and below) ☐ H-High breaking (AC690V and below) ☐ 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; only S and H breaking for 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, lower vertical) ☐ J6 - Mixed wiring (upper vertical, 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) ☐ J7 - Mixed extended wiring (upper horizontal, lower vertical) ☐ J8 - Mixed extended 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 configuration) ☐ J1 - Horizontal extended wiring ☐ J3- Vertical wiring (In=6300A standard configuration) ☐ 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 has two wiring modes: Vertical wiring and vertical extended wiring. NDW3-7500 ☐ Horizontal wiring (In≤5000A standard configuration) ☐ J1 - Horizontal extended wiring ☐ J3- Vertical wiring (In=6300A standard configuration) ☐ 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 has two wiring modes: Vertical wiring and vertical extended wiring; 7500A only has vertical extended wiring			
		Product type ☐ Not marked - Conventional (standard configuration) ☐ TH - Thermal and humidity ☐ FD - Wind power, plateau			
Meter code control or parameters	Controller model	NDW3-1600 NDW3-2500/4000/6300/7500	☐ KM-NWK31 (digital screen) ☐ KM-NWK21 (digital screen)		
	Controller voltage	☐ 1(AC380V/400V) ☐ 2(AC220V/AC230V) ☐ 3(DC220V) ☐ 4(DC110V) ☐ 5(DC24V)			
	Protection type	☐ Normal type (standard) ☐ Voltage type (V) ☐ Voltage communication type (V1 type) ☐ Harmonic measurement and protection type (P type)	Standard type Voltage measurement Communication + voltage protection + temperature measurement Power Measurement + Fault Recording + Data Management + High Accuracy	Note: 1. For the AC500V and above, select the V/V1/P/P1/P2-type controller while the P2-voltage conversion module is optional	
		Temperature measurement, protection	☐ M - Contact temperature measurement/onboard		Note: Protection type V1/P is standard;
		Communication mode	☐ L - Bluetooth ☐ F-WIFI ☐ LN-Bluetooth+NFC ☐ FN-WIFI+NFC		Note: Protection type P is optional; either Bluetooth or WIFI; Note: Protection type P is optional; Note: Protection type P is optional;
			Other		☐ X2-Current unloading (signaling unit required)
	Communication function		Communication mode: ☐ Not marked - RS485 Communication protocol:		

		☐ H (Modbus Protocol) ☐ MP (Profibus-DP Protocol) MD (Devicenet Protocol) ☐ C-CAN ☐ DL1-DL/T645 (CSG) ☐ DL2-DL/T645 (State Grid) Note: It can't be selected with the accessory monitoring unit simultaneously Optional DL/T645 communication protocol function needs to be specially customized.			
	Signal element	☐ 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 series has no Z1			
	External transformer	3P+N required: ☐ N1 ☐ N2 ☐ N3 ☐ N4 ☐ NR1 ☐ NR2 ☐ NR3		☐ E type	
	Grounding mode	☐ T type (default) ☐ W type Note: 3P+N needs to be added with an external transformer			
	Contact wear equivalent	☐ J-Contact wear equivalent (NWK21/31 optional)			
LCD Controller Parameters	Controller model	NDW3-1600 NDW3-2500/4000/6300/7500		☐ KY-NWK32 (LCD) ☐ KY-NWK22 (LCD)	
	Controller voltage	☐ 1(AC380V/400V) ☐ 2(AC220V/AC230V) ☐ 3(DC220V) ☐ 4(DC110V) ☐ 5(DC24V)			
	Protection type	☐ Normal type (standard)	Standard type		Note: Neither V nor P can be selected with the accessory monitoring unit simultaneously 2. For the AC500V and above, select the V/V1/P/P1/P2-type controller while the P2-voltage conversion module is optional
		☐ Voltage type (V)	Voltage protection		
		☐ Voltage communication type (V1 type)	Communication + Fault Recording		
		☐ Harmonic measurement and protection type (P type)	Power Protection + Power Measurement + Harmonics		
		☐ Metering type (P1 type)	Healthiness + Data Management + High Accuracy		
		☐ Intelligent power quality type (P2 type)	Power Quality + Dual Protection + Bluetooth		
	Communication	Communication mode: ☐ Not marked - RS485 Communication protocol: ☐ H (Modbus Protocol) ☐ MP (Profibus-DP Protocol) MD (Devicenet Protocol) ☐ C-CAN ☐ DL1-DL/T645 (CSG) ☐ DL2-DL/T645 (State Grid) Note: It can't be selected with the accessory monitoring unit simultaneously Optional DL/T645 communication protocol function needs to be specially customized.			
		Temperature measurement, protection	☐ M Contact temperature measurement/onboard	Note: Protection types V1 and P are optional; P1/P2 are standard;	
	Controller Communication mode	☐ L - Bluetooth ☐ F-WIFI	Note: Protection type P2 type is optional; either Bluetooth or WIFI;		
		☐ LN-Bluetooth+NFC	Note: Protection type P2 is optional;		
		☐ FN-WIFI+NFC	Note: Protection type P2 is optional;		
	Signal element	☐ 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 series has no Z1			
	External transformer	3P+N required: ☐ N1 ☐ N2 ☐ N3 ☐ N4 ☐ NR1 ☐ NR2 ☐ NR3		☐ E type	
	Grounding mode	☐ T type (default) ☐ W type Note: 3P+N needs to be added with an external transformer			
Contact wear equivalent	☐ J-Contact wear equivalent (NWK21/31 optional)				
	Other	☐ X - Regional selective interlocking (ZSI) ☐ X1 - Overload reclosing (signal unit required) ☐ X2 - Current unloading (signal unit required)			
Required accessories	Electric operating mechanism	☐ D1(AC380V/AC400V) ☐ D2(AC220V/AC230V) ☐ D3(DC220V) ☐ D4(DC110V) ☐ D5(DC24V)			
	Shunt release/retention shunt release	☐ F1(AC380V/AC400V) ☐ F2(AC220V/AC230V) ☐ F3(DC220V) ☐ F4(DC110V) ☐ F5(DC24V)		Either shunt release or retention shunt release can be chosen when 2500/4000 shell frame is selected	
		F6 (AC230V/DC220V) retention type Applicable to 2500/4000 shell frame			
	Closed electromagnet	☐ B1(AC380V/AC400V) ☐ B2(AC220V/AC230V) ☐ B3(DC220V) ☐ B4(DC110V) ☐ B5(DC24V)			

Optional accessories	Undervoltage release	Voltage specifications	☐ Q1(AC380V/AC400V) ☐ Q2(AC220V/AC230V) ☐ Q3(DC220V) ☐ Q4(DC110V) ☐ Q5(DC24V)
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Accessories		delay time	☐ 0-Instantaneous (0s) Delay: ☐ 1 (1s delay) ☐ 3 (3s delay) ☐ 5 (5s delay)		
	No-voltage release	Voltage specifications	☐ 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	☐ 0-Instantaneous (0s) ☐ 1 (1s delay) ☐ 3 (3s delay) ☐ 5 (5s delay)		
Voltage-check closing device	☐ J1(AC380V/AC400V) ☐ J2(AC220V/AC230V) Note: Applicable to NDW3-2500				
Auxiliary contact	Is there any wiring harness: ☐ 0 (no) ☐ 1 (yes)				
	NDW3-1600	☐ A4 - Four groups conversion ☐ A6 - Six groups conversion ☐ A44 - Four normally closed and four normally opened			
	NDW3-2500/4000/6300/7500	☐ Four-group conversion(standard configuration) ☐ A6 - six-group conversion ☐ 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				
Doorframe	☐ M Door frame				
Dust cover	☐ F Dust cover				
IP54 transparent cover	Operation mode: ☐ TL - To left ☐ TR - To right		Body type: ☐ 1:1600 shell frame ☐ 2: 2500 and above shell frames		
	Note: Separate order for purchase, including special door frame; the regular door frame will not be chosen if this accessory is selected; the two frames require different opening dimensions				
Relay module	☐ R-NWDF1-RM relay module (ST201); contact capacity suitable for AC250V and DC24V				
Power supply module	☐ P1-DC24V ☐ P3-AC380V/AC400V, AC220V/AC230V ☐ P5-DC220V/110V				
Optional accessories for communication	☐ NB-NB-IoT Note: Protection type V1/P/P1/P2 are optional; external accessories;				
	☐ I-Ethernet Note: Protection type V1/P/P1/P2 are optional; external accessories;				
Safety lock	☐ A safety lock Note: Safety locks are only available for 2500 and above shell frames, and are an option with the 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				
Operating manual	☐ Z - Installation & Operating Instructions and Controller Manual				
Connection bolt	☐ L- Connection bolt				
Net locking accessories	Off-position key lock	Operation mode: ☐ Direct operation (one-handed operation, default) ☐ Hand-pressed (two-handed 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 shell frames can be interlocked with each other; 2. Please consult us for other special interlocking.			
	Mechanical interlocking	Cable type	☐ SY11 - Two groups, one for closing and one for opening ☐ SY12 - Three groups, one for closing and two for opening ☐ SR21 - Three groups, two for closing and one for opening		Note: SR21 and SR12 are only applicable to the NDW3-2500 shell frame and above.
		Hard rod type	☐ SY11 - Two groups, one for closing and one for opening ☐ SY12 - Three groups, one for closing and two for opening		
Automatic	☐ ATS-R type ☐ ATS-S type ☐ ATS-F type				

	transfer switching equipment	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 operating voltage of AC220V.	
Language type		☐ Not marked - Chinese (standard configuration) ☐ Y - English ☐ ZY - Chinese and English (Only NWK22/32 controller features Chinese/English switching)	
Special requirements	As special requirements, NWK21/NWK31 must be set before the factory delivery: Overload long time-delay setting current A Setting time s Short-circuit short time-delay setting current ___A Setting time ___s Short-circuit instantaneous setting current A Ground protection setting current A Setting time s		As special requirements, NWK22/NWK32 must be set before the factory delivery: Overload long time-delay setting current A Setting time s Setting current of short-circuit short time-delay inverse time limit A Short-circuit short time-delay fixed-time-limit setting current ___A Setting time ___s Short-circuit instantaneous setting current A Ground protection setting current A Setting time s
	Other requirements:		
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.			