

Nader

Nader



As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

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NDW1G Series
Switch Disconnecter

NDW1G Series Switch Disconnecter

Summary

Application

NDW1G series Switch Disconnecter, of which rated insulation voltage is 1000V, rated operational voltage is AC 400V/690V or DC 1000V and rated current is from 400A to 6300A, is used in low-voltage power distribution network for making and breaking the main circuit and isolating.

Standards and Certificates

IEC 60947-3:2005, GB14048.3-2008; TÜV, CE, CCC, CB, DIN.



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NDW1G Series Switch Disconnecter

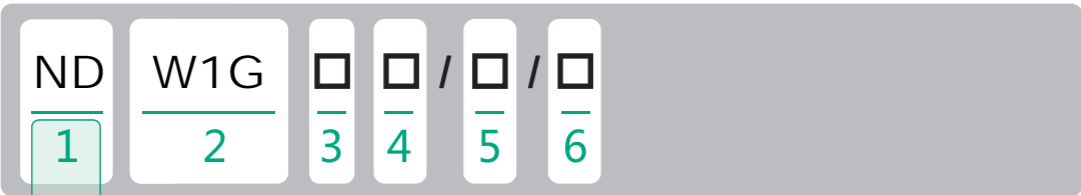


NDW1G-2000



NDW1G-3200 (w/o front cover)

Model and Implication



No.	Implication	NDW1G
1	Brand code	ND Nader
2	Product code	W1G means Switch Disconnecter
3	Frame size	2000A, 3200A, 6300A (The frame code are I , II , III respectively.)
4	Mounting type	No code: Fixed type; C: Drawout type
5	Rated current	Please refer to Main Specification table.
6	Number of poles	3, 4

Working Condition

- > Ambient temperature:-10°C~+70°C. The average temperature in 24 hours does not exceed 35°C.
- > Altitude: ≤ 2000m
- > Humidity: The relative humidity of the air does not exceed 50% at the temperature of +40°C. Higher relative humidity is permitted at lower temperature, such as 90% relative humidity at +20°C. Special measures are necessary in case of occasional condensation due to variations in temperature.
- > Pollution degree: 3
- > Installation category: IV for switch disconnecter of which the rated operational voltage is below AC 690V or DC 1000V. IV for under voltage release and primary coil of power transformer of which the rated operational voltage is AC 690V. III for other auxiliary circuits of which the rated operational voltage is AC 400V.
- > Installation condition: According to Installation Instruction. Vertical tilting angle should no more than 5°. Service place should be without explosive media, gas and dust which are corrosive and conductive.
- > Protection degree: IP30, IP40 (installing inside cubicle and with door frame).
- > Utilisation category: DC-22A, AC-23A.

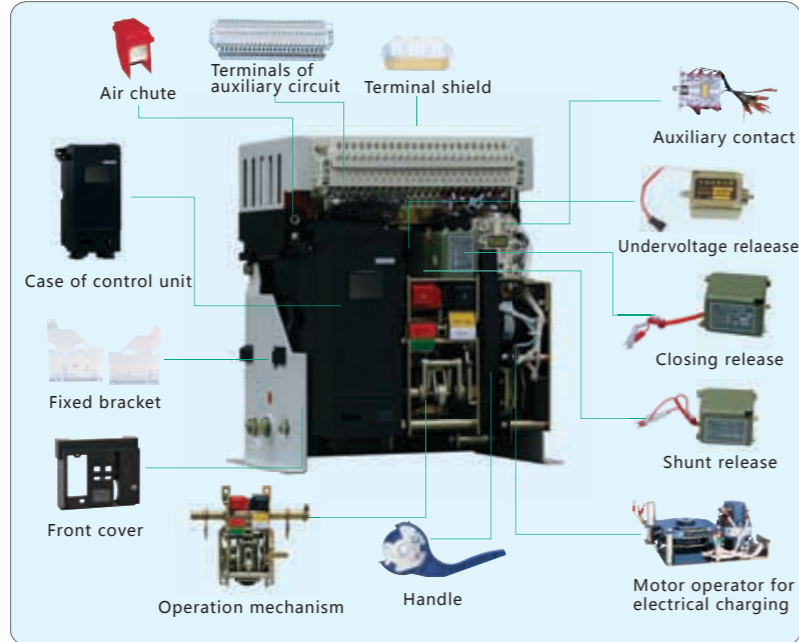
Product Features

- > High breaking capacity and zero arc.
- > Compact contacts system, separate arcing chamber, more reliable operation.
- > Various configuration of 3-pole, 4-pole, fixed type and drawout type, vertical wiring and horizontal wiring, mutil-choice.
- > Switch disconnecter can be supplied from both the top and the bottom.
- > Reliable interlock and insulation protection, high safety performance.
- > Module structure, extendable with various accessories.

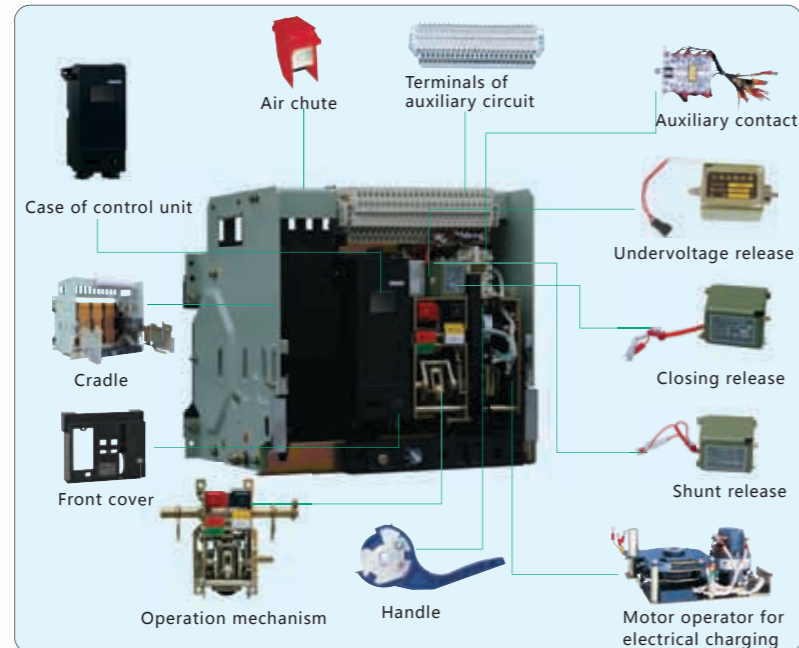
Technical Parameters and Performance

Product Structure

Fixed type



Drawout type



Main Specifications

Type	Frame I		Frame II		Frame III					
	NDW1G-2000		NDW1G-3200		NDW1G-6300					
Rated current (A)	400, 630, 800, 1000, 1250, 1600, 2000		2000, 2900, 2500, 3200	4000	4000, 5000, 6000					
Rated operational voltage (V) Ue	AC400/690, DC1000									
Rated insulation voltage (V) Ui	1000									
Number of poles	3, 4		3	3, 4						
Break time (ms)	≤ 30									
Closing time (ms)	≤ 60									
Rated short current making capacity (kA) Icm	AC400V	84	105	143						
	AC690V	50	65	85						
	DC1000V	50	65	85						
Rated service breaking capacity (kA) Ics	AC400V	50	65	75						
	AC690V	50	65	75						
	DC1000V	50	65	75						
Rated short-time withstand current (kA, 1s) Icw	400V	50	65	100						
	690V	40	50	75						
Endurance (times)	w/o maintenance	13500	10000	5000	5000					
	w/ maintenance	20000	20000	10000	10000					
Mounting type	Fixed type	▲			—					
	Drawout type	▲			▲					
Wiring type	Fixed type	Horizontal	Horizontal lengthen	L type vertical	Vertical	Horizontal	Horizontal lengthen	Vertical	Horizontal	Horizontal
	Drawout type	▲	▲	▲	▲	▲	▲	▲	▲	▲
Dimension (mm) W×D×H	Fixed type, 3P	362 × 323 × 402			422 × 323 × 402			—		—
	Fixed type, 4P	457 × 323 × 402			537 × 323 × 402			—		—
	Drawout type, 3P	375 × 421 × 432			435 × 421 × 432			550 × 494 × 432		930 × 450 × 492
	Drawout type, 4P	470 × 421 × 432			550 × 421 × 432			—		930 × 450 × 492
Weights (kg)	Fixed type, 3P	39	40	41	—	46	56	—	—	—
	Fixed type, 4P	48	49	50	—	58	68	—	—	—
	Drawout type, 3P	68	70	71	71	92	96	98	135.5	210
	Drawout type, 4P	86	88	91	91	108	118	124	—	210

Note : ▲ available function

Contact System

> The contact system of each phase is mounted insulating cabinet, with arc chute covered above. Contact system opens/closes via connecting bar linked with the main axis outside the insulation board. To reduce electromagnetic repulsion, moving contacts are aligned in parallel on contacts bracket with one end connected to the bus via flexible connection. When the switch disconnector closes, contacts bracket turns anticlockwise around the main axis together with the connecting bar. The moving contacts press the spring after touching the fixed contacts to generate enough force and guarantee a reliable contact.



Operation Mechanism

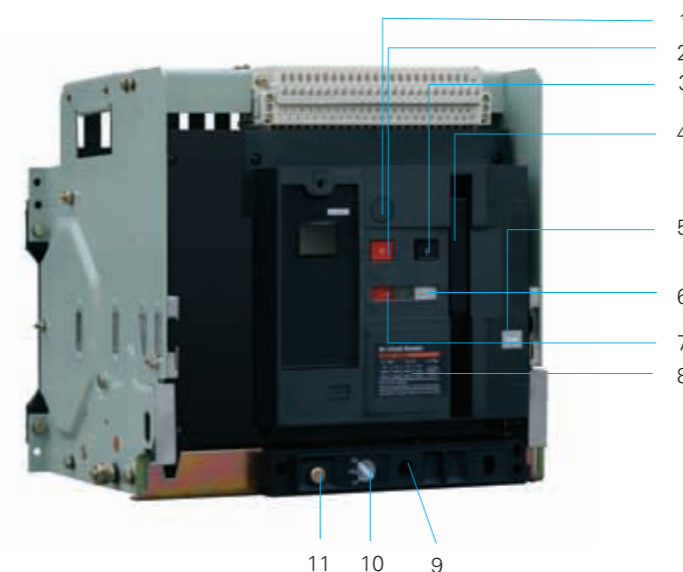
> The switch disconnector has both manual and motor operation mode. The closing speed is independent to manual or motor operation speed because of spring energy storage.

The switch disconnector has three operation positions:

- Energy charging: Manual or motor operation.
- Closing: Press closing push-button or press customer equipped button which is connected to closing release to close the contacts.
- Opening: Press opening push-button (or receive tripping signals due to undervoltage, shunt release) to make the switch disconnector open.



Front Face Indication



- "Open" position key lock
- Opening push-button
- Closing push-button
- Handle
- Brand logo
- Energy storing mechanism status indicator
- Main contact position indicator
- Nameplate
- Racking handle working position
- Function position indicator "connected", "test" and "disconnected"
- Racking handle and its storage

Drawout Switch Disconnecter

The drawout switch disconnecter is comprised of switch disconnecter itself and cradle. There are rails on both two side of cradle, with which slideable guide brackets are equipped. Drawout switch disconnecter connects the main circuit by plugging the bus on the moving part into the bridge shape contacts in the fixed part.

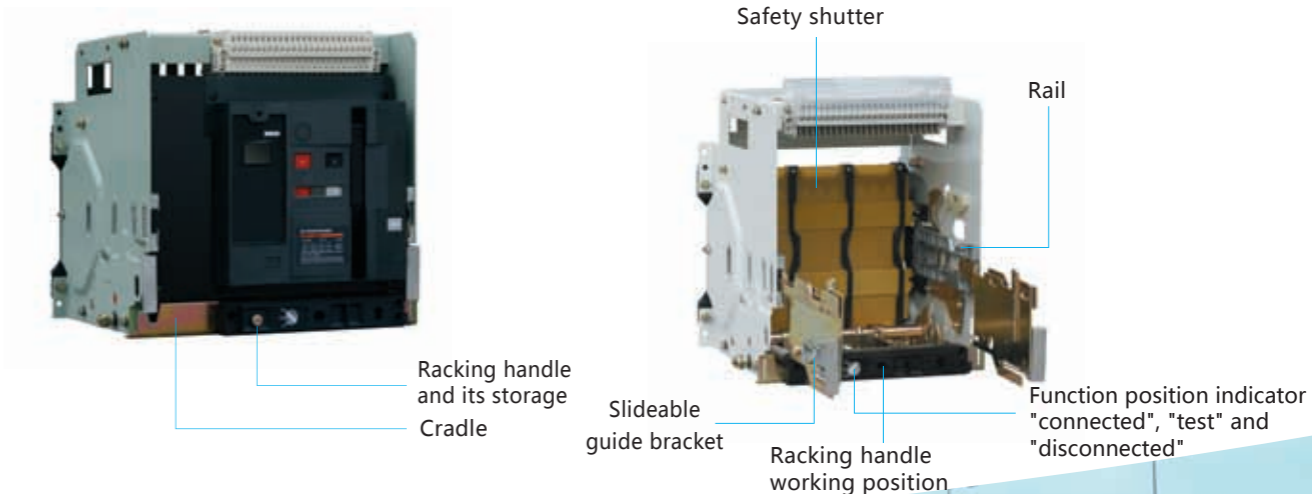
Three working positions can be adjusted by turning the racking handle at the bottom of the cradle (position indication beside the racking handle).

"connected" position: Both main circuit and auxiliary circuit are making.

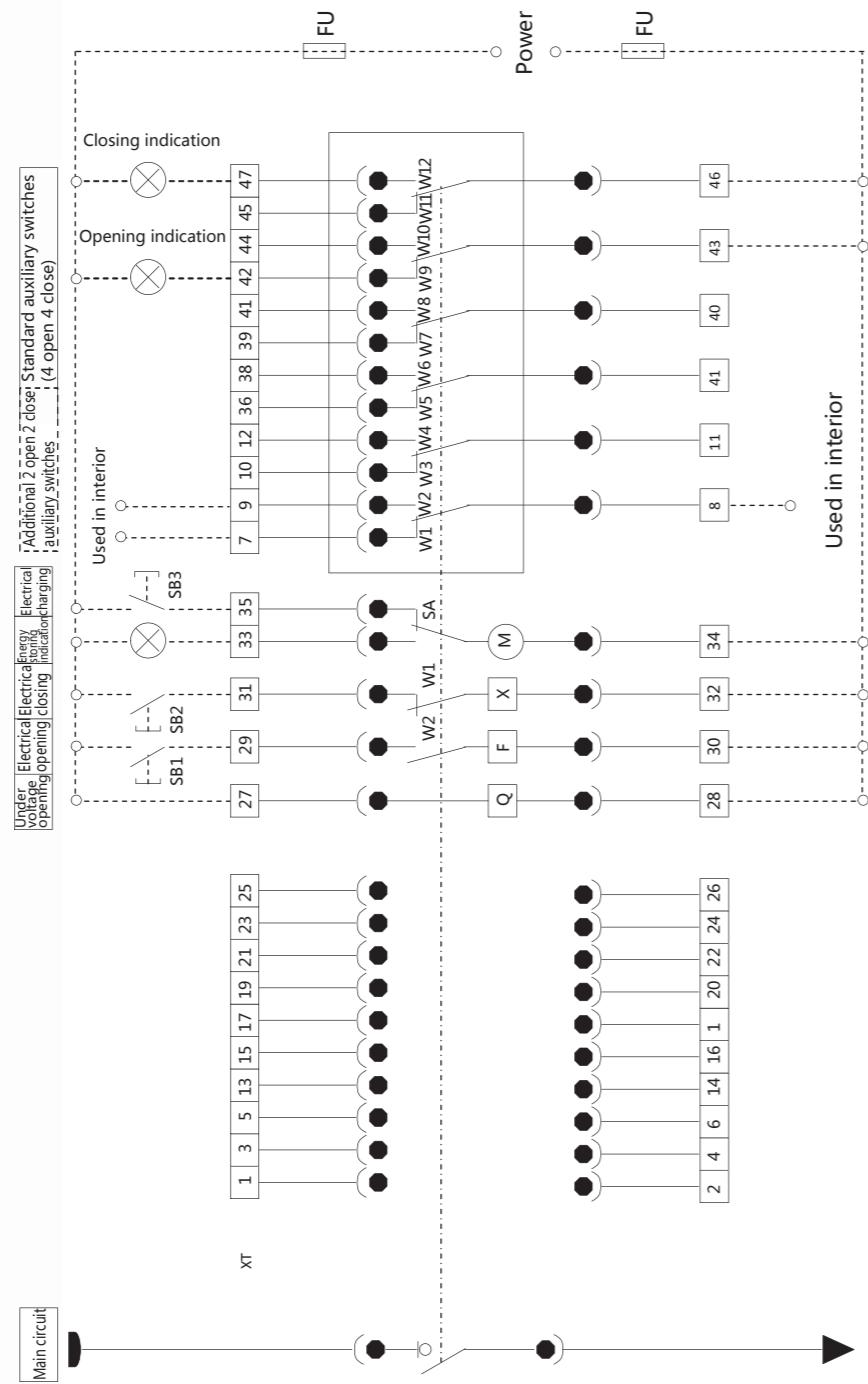
"test" position: Main circuit is breaking, auxiliary circuit is making. Necessary test operation can be carried out.

"disconnected" position: Both main circuit and auxiliary circuit are breaking. The switch disconnecter itself can be drawn out in this position.

Drawout switch disconnecter has interlock mechanism. The switch disconnecter can only be closed in "connected" position and "test" position.



Wiring Diagram for Auxiliary Circuit



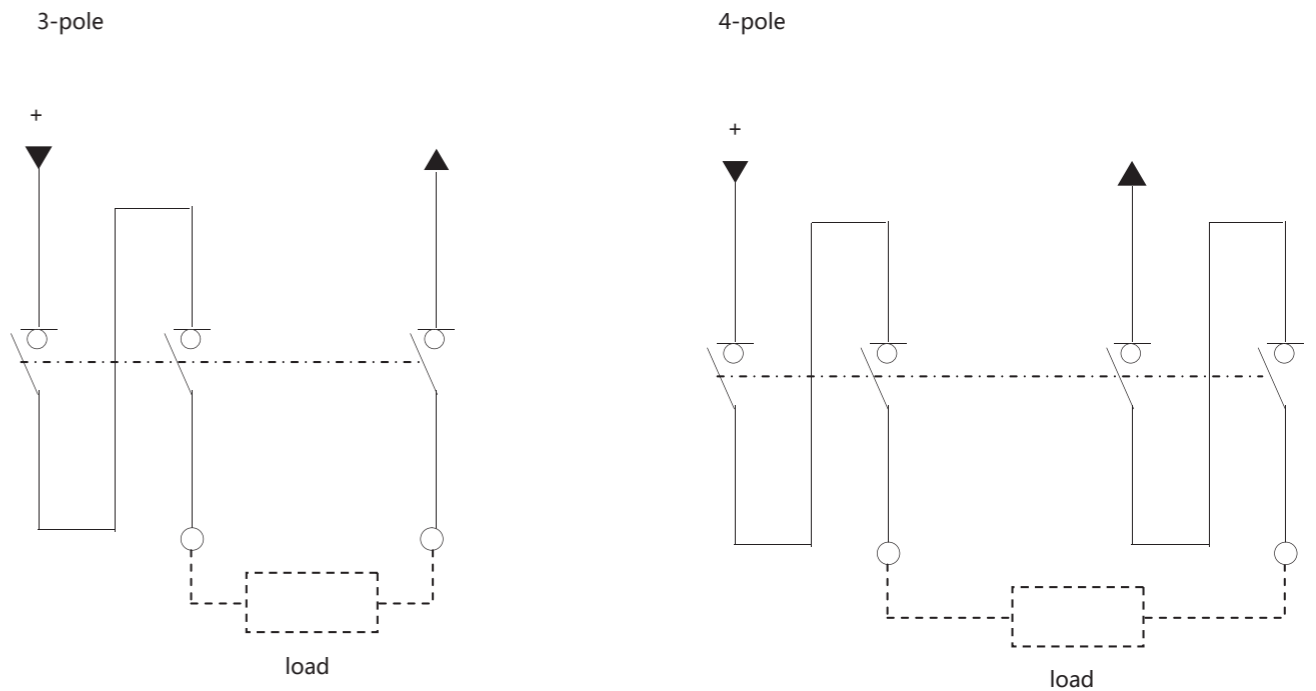
SB1 - Shunt button (supplied by user); SB2 - Closing button (supplied by user); SB3 - Motor energy storing button (supplied by user); F - Shunt release (accessory); X - Closing release (accessory); Q - Undervoltage release (accessory); M - Motor for electrical charging (accessory); SA - Motor limit switch; XT - User wiring No.;

FU - Fuse (supplied by user);

W1~W2 -used in electrical interlock between shunt release and closing release, which can also be used by customers when customers choose 6 NO + 6 NC auxiliary switches without choosing shunt release and closing release.

Note: 1. Dashed parts should be connected by user.
 2. Please connect the corresponding power voltage according to different rated operation voltage Q, F, X, M.
 3. Indication lamp for closing, opening and energy storing is supplied by user.

Wiring Diagram for Connecting Bus



Accessory

Electrical Accessory

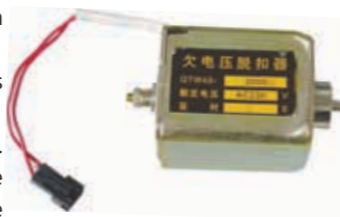
Electrical Parameters of Accessory

Accessory Name	Parameter Symbol	Rated Operational Voltage (V)		Power Consumption		
		AC (50Hz)	DC	AC (50Hz)	DC	
Undervoltage release	Ue	220(230)	-	24VA	-	
		380(400)	-	36VA	-	
Shunt release		220(230)	110	24VA	24W	
		380(400)	220	36VA	24W	
Closing release		220(230)	110	24VA	24W	
		380(400)	220	36VA	24W	
Motor operator	for NDW1G-2000	Us	220(230)	110	85VA	85W
			380(400)	220		
	for NDW1G-3200 (4000)		220(230)	110	110VA	110W
			380(400)	220		
for NDW1G-6300		220(230)	110	150VA	150W	
		380(400)	220			
Auxiliary switch		220(230)	110	300VA	60W	
		380(400)	220			



Undervoltage Release

- ① Operating characteristics of undervoltage release
 - a. When the voltage is between 35% and 70% of rated control voltage, undervoltage release should trip the switch disconnecter.
 - b. When the voltage is under 35% of rated control voltage, undervoltage release should prevent the switch disconnecter from closing.
 - c. Switch disconnecter closing is possible only if the voltage is between 85%-110% of rated control voltage.
- ② Undervoltage release mainly consists of coil, iron core and PCB. There are two kinds: instantaneous undervoltage release and time delayed undervoltage release which can adjust the delayed time through the switch in undervoltage release device. The setting value of delayed time is 1s, 3s, 5s.



Electric Output Node on Working Positions

Apply for drawout type switch disconnecter. It can send out different electric signal when the switch disconnecter in different working positions (disconnected, test, connected). In such way, it monitors the switch disconnecter remotely.

Shunt Release

- ① Operating characteristics of shunt release
 - a. When the power voltage of shunt release is between 70% and 110% of the rated control voltage (Us), operating shunt release can trip the switch disconnecter.
 - b. Working hours of shunt release is short-time duty.
- ② Shunt release mainly consists of coil and iron core. It can remotely trip the switch disconnecter.



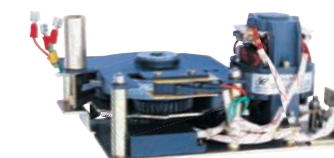
Closing Release

- ① Operating characteristics of closing release
 - a. When the power voltage of closing release is between 85%-110% of the rated control voltage (Us), operating closing release can make the switch disconnecter close reliably.
 - b. Working hours of closing release is short-time duty.
- ② Closing release mainly consists of coil and iron core. Under energy storing status, it can close the switch disconnecter if it is electrified.



Motor Operator for Electrical Charging

- ① Electrical energy storing of switch disconnecter is done by motor operator.
- ② Operating Characteristic:
 - When the voltage is between 85%- 110% of the power voltage, motor operator should keep the switch disconnecter store energy.



Auxiliary Switch

- 1. Conventional thermal current of auxiliary contact is 6A;
- 2. Auxiliary contact type: 4 NO contacts and 4 NC contacts (6 NO contacts and 6 NC contacts is available for special ordering)

Switch Disconnecter Situation	Close "1"	Open "0"
Normal open auxiliary switch	1	0
Normal close auxiliary switch	0	1

Type	NO	NC
Basic type	4	4
Special type	6	6

Note: a. In the condition of special ordering, a pair of NO contacts will be accessed to prevent shunt release and closing release from long-time electrification. (The external NO contacts available for user will be reduced.)
 b. Please consult with the manufacturer for special requests.



Mechanical Accessory

Interlock Outfit

- > A specific adaptation fixture for mechanical interlock should be installed on the right side of each switch disconnector.
- > When one of switch disconnector has been closed, the other will not be closed.
- > The interlocked devices may be fixed or drawout.
- > The interlock outfit will be installed by the customer. (Please refer to the Operation Manual.)
- > The maximum horizontal distance between the fixing planes is 2m for cable interlock.
- > The maximum vertical distance between the fixing planes is 0.9 for connecting rods interlock.
- > The minimum radius of cable curvature is 120mm for cable interlocking system.

Available Mechanical Interlock Type

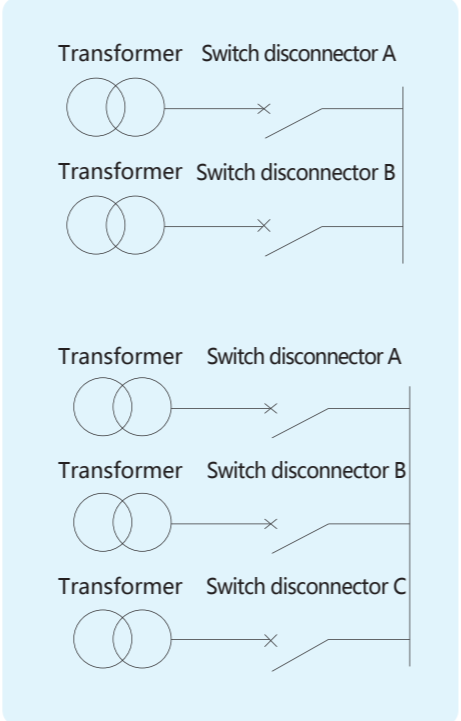
Interlock Type	Between Two Switch Disconnectors		Among Three Switch Disconnectors	
	Horizontal	Vertical	Horizontal	Vertical
Cable interlock	√	√	√	√
Connecting rods interlock	x	√	x	√

Typical Application of Mechanical Interlock

Interlock between two switch disconnectors

Replacement power supply (Switch disconnector B)	Normal power supply (Switch disconnector A)
0	0
0	1
1	0

"1" means the switch disconnector close;
"0" means the switch disconnector open

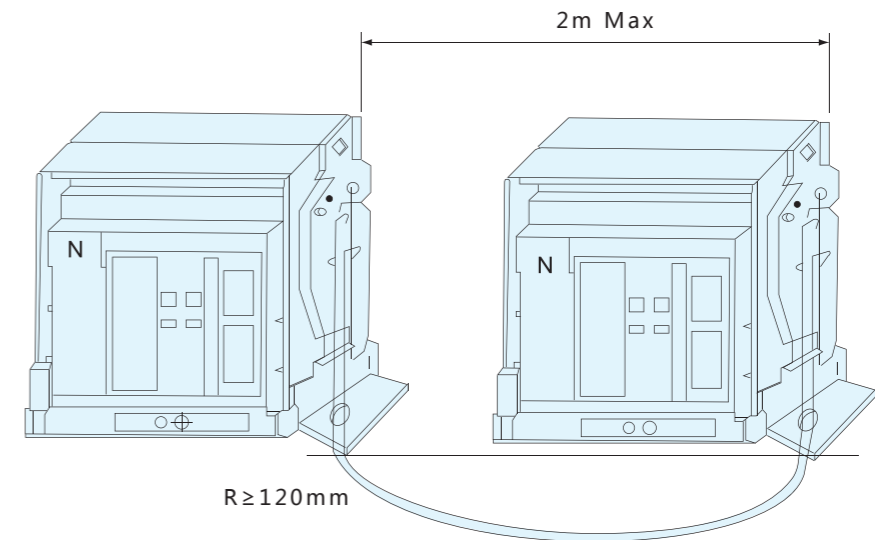
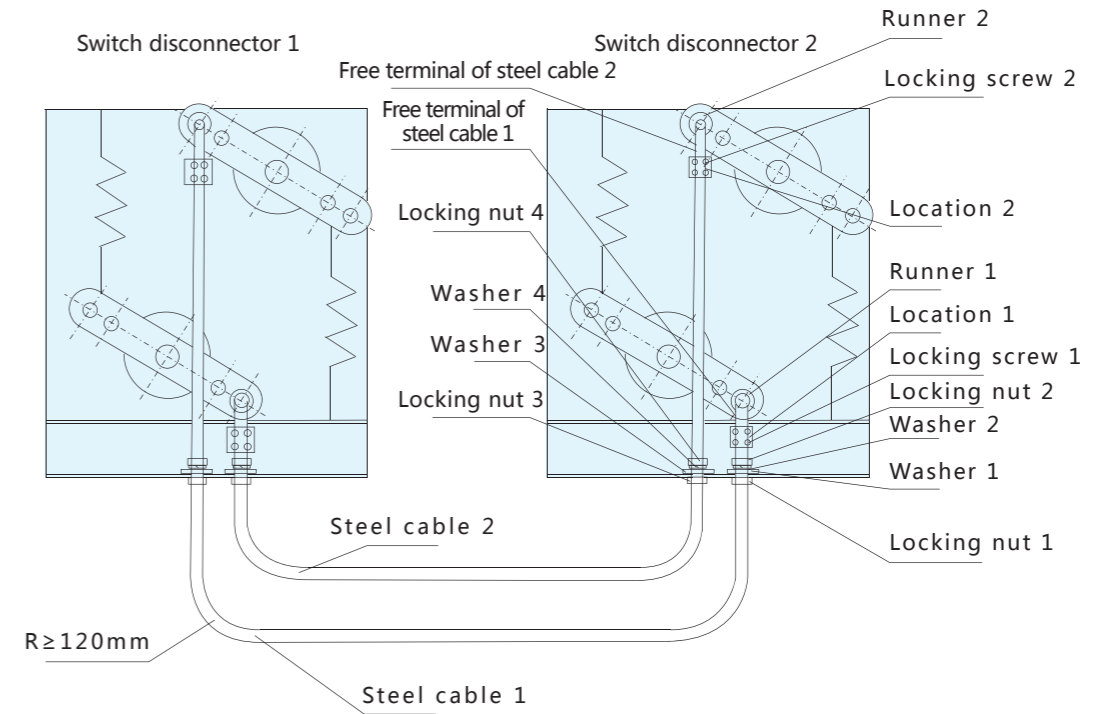


The interlock among three switch disconnector (only one switch disconnector is permitted to closing)

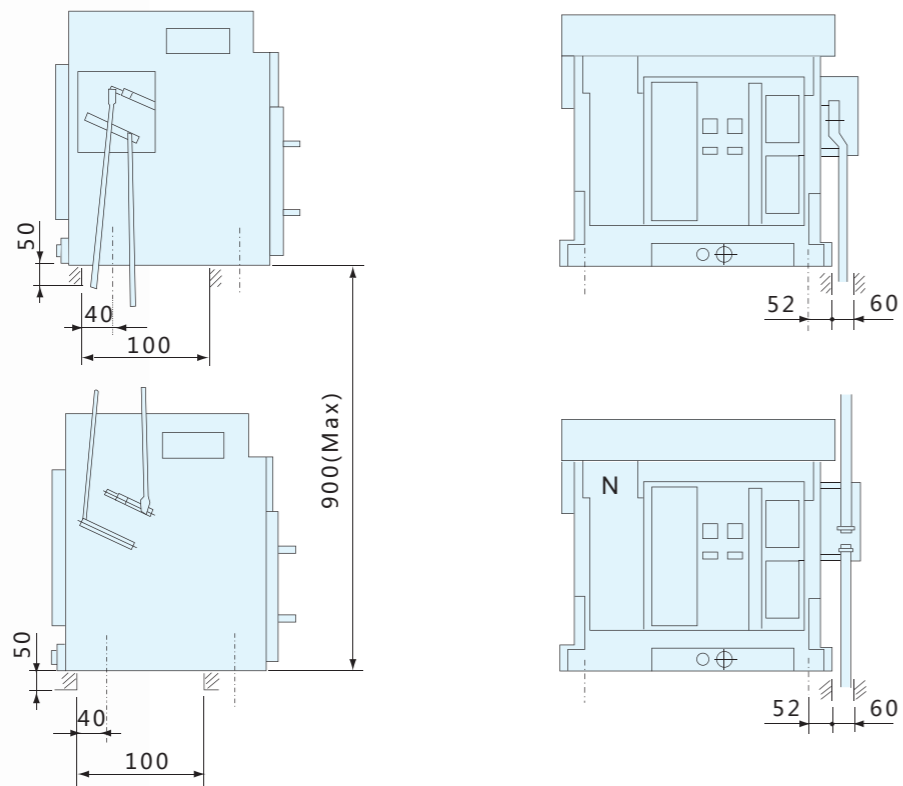
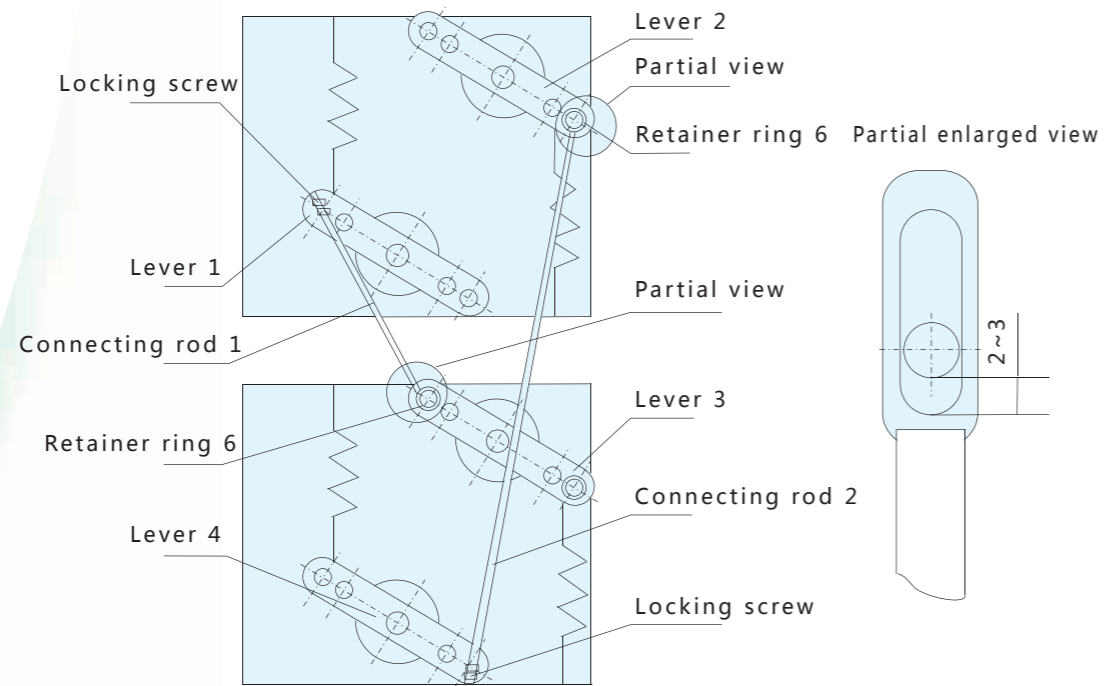
Replacement power supply (Switch disconnector C)	Replacement power supply (Switch disconnector B)	Normal power supply (Switch disconnector A)
0	0	0
0	0	1
0	1	0
1	0	0

"1" means the switch disconnector close;
"0" means the switch disconnector open

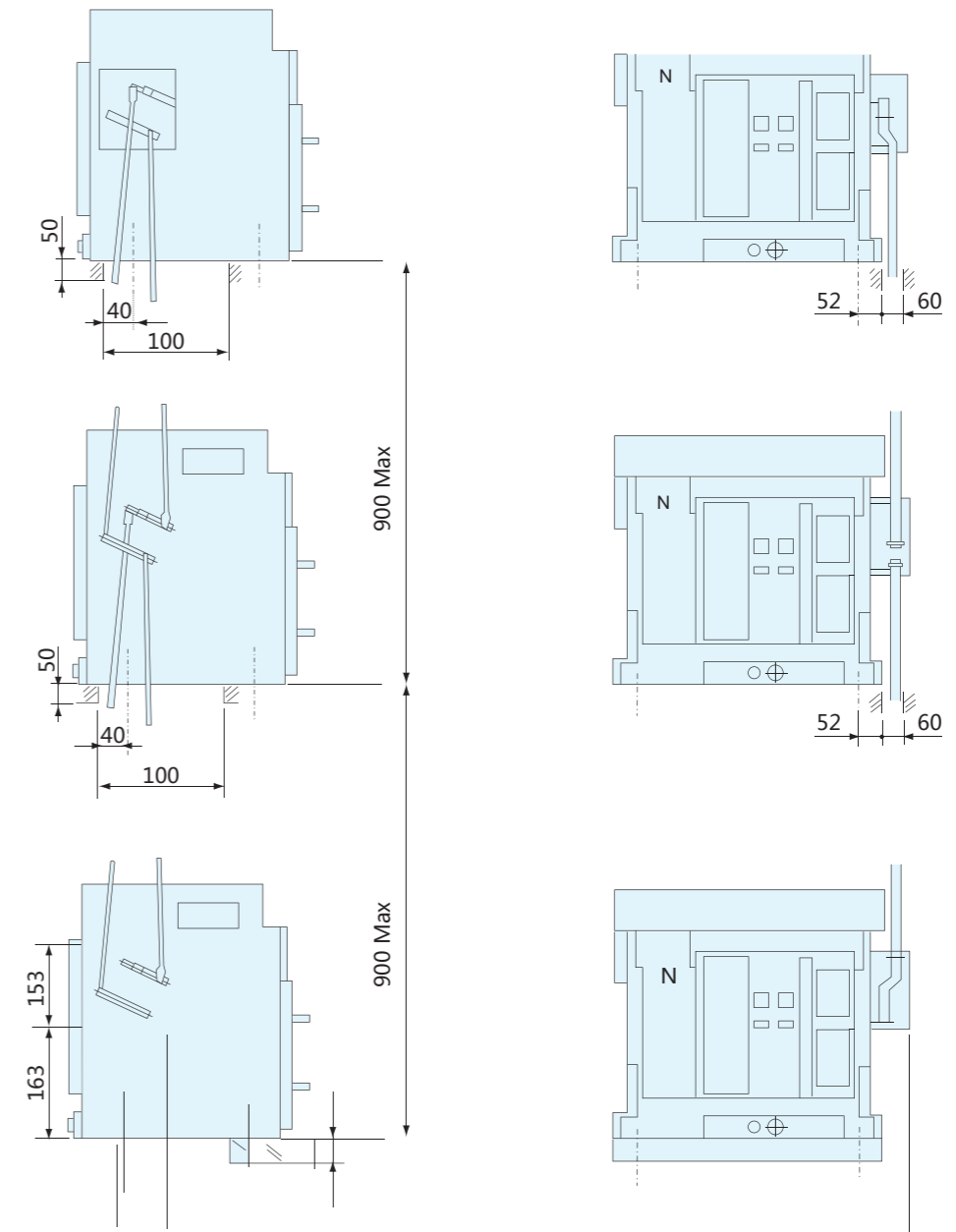
Connection Diagram of Cable Interlocking Between Two Switch Disconnector



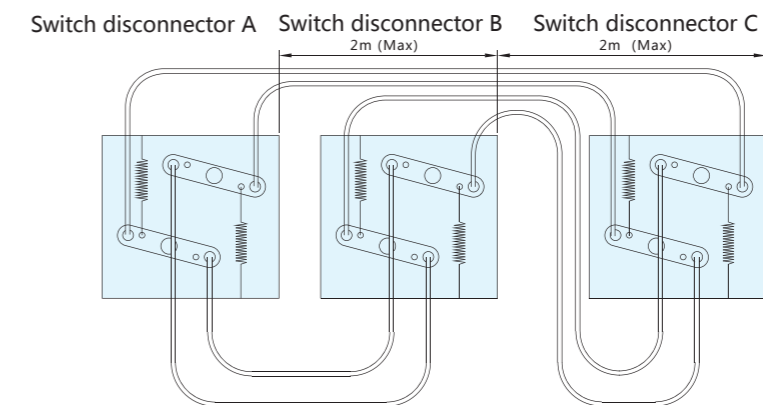
Connection Diagram of Connection Rods Interlocking Between Two Switch Disconnectors



Connection Diagram of Connecting Rods Interlocking Among Three Switch Disconnectors



Connection Diagram of Cable Interlocking Among Three Switch Disconnectors



"Disconnected" Position Key Lock

Switch disconnector will not closed if "disconnected" position key lock has been locked.

We can supply various usage types:

One Switch disconnector with independent key and lock (Lock the switch disconnector in "disconnected" position to prevent illegal operation.)

Two switch disconnector equipped with the same locks respectively and one key (They can be manually interlocked to switch between two grids. When A grid supplies power, B grid will open. When B grid supplies power, A grid will open.)

Replacement power supply (Switch disconnector B)	Normal power supply (Switch disconnector A)
0	0
0	1
1	0

"1" means switch disconnector is closing;
"0" means switch disconnector is opening.

Three switch disconnectors equipped with the same locks respectively and one key. (They can be manually interlocked to switch among grids and make sure that only one of the three switch disconnectors can be closed.)

Replacement power supply (Switch disconnector C)	Replacement power supply (Switch disconnector B)	Normal power supply (Switch disconnector A)
0	0	0
0	0	1
0	1	0
1	0	0

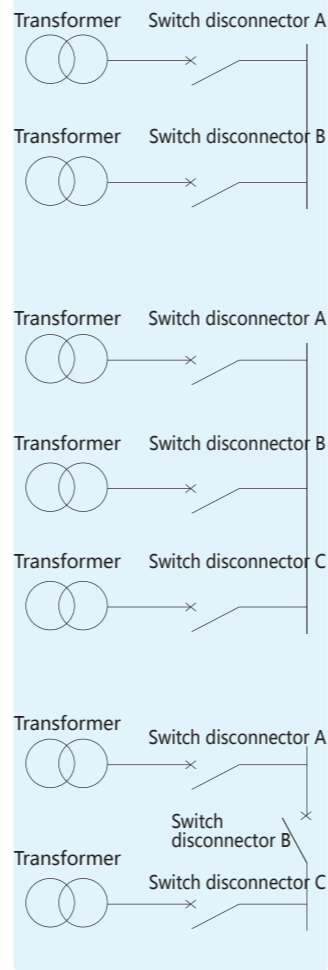
"1" means switch disconnector is closing;
"0" means switch disconnector is opening.

Three switch disconnectors equipped with the same locks respectively and two same keys. (They can be used for two incoming lines and one circuit connected with bus, to make sure only two of the three switch disconnectors can be closed.)

Power supply 1 (Switch disconnector A)	Circuit connected with bus (Switch disconnector B)	Power supply 2 (Switch disconnector C)
0	0	0
0	1	1
1	0	1
1	1	0

"1" means switch disconnector is closing; "0" means switch disconnector is opening.

Five switch disconnectors equipped with the same locks respectively and three same keys. (To make sure Max. three of the five switch disconnectors are closed.)

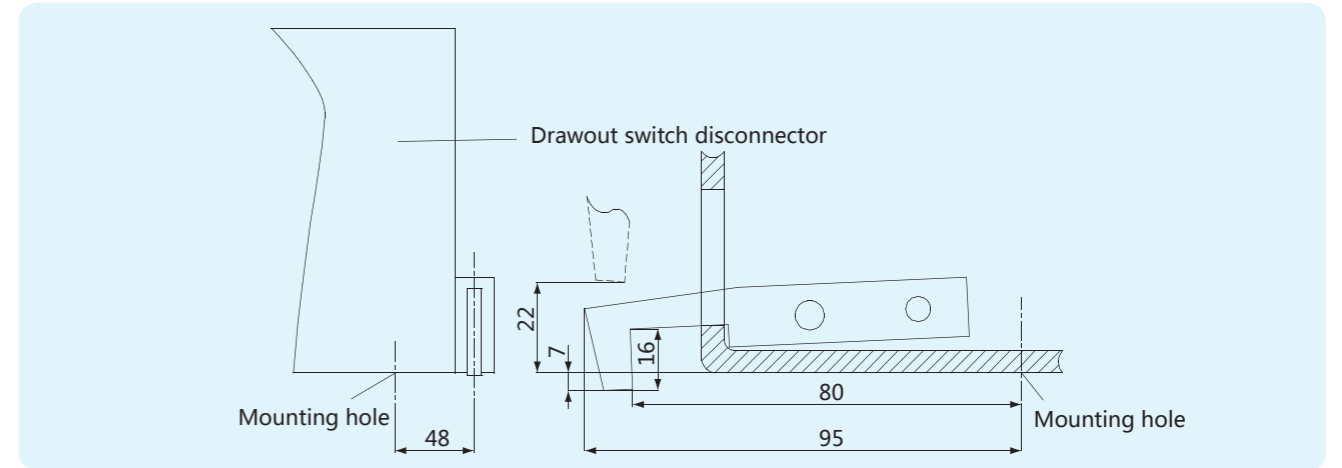


Door Interlock

Door interlock is installed on switch disconnector to avoid the door of cubicle from opening when drawout switch disconnector is not in "disconnected" position.

The door interlock is usually installed on the right side of switch disconnector.

Left side installation is also allowed.



Doorframe

Installed on the door of cubicle to seal switch disconnector and make the protection degree of switch disconnector reach IP40.



Terminal Shield

Fixed firmly in the bar of cradle to prevent the dust and analogue falling into terminals of auxiliary circuit, which will cause poor contact.



Interphase Barriers

Used to increase insulating strength between phase and phase of main circuit to improve insulation capacity.



Push-button Locking Device

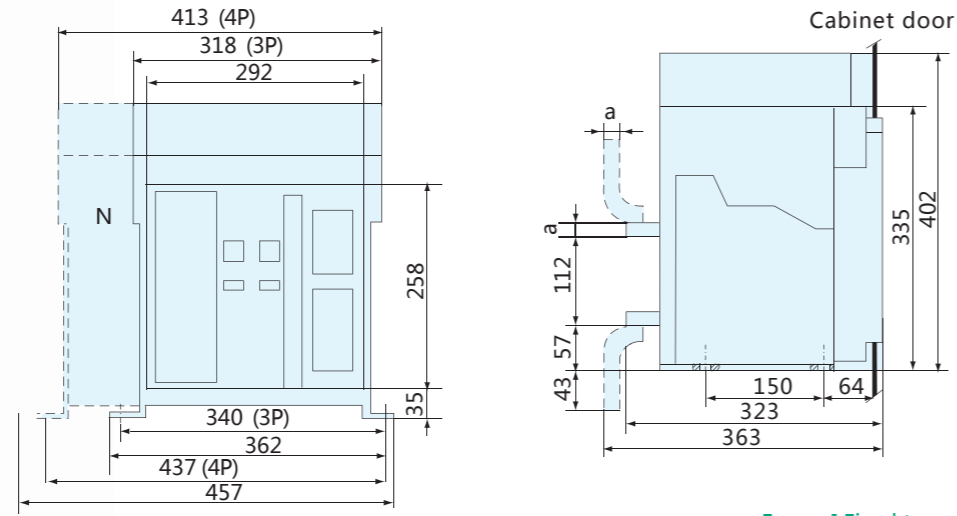
Used with padlock to prevent non-staff from operating opening push-button or closing push-button.



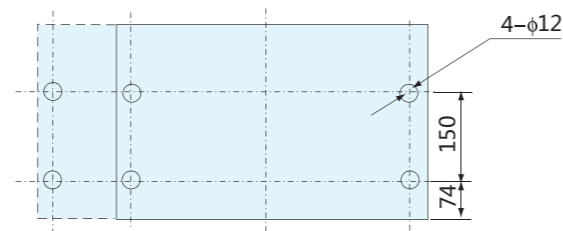
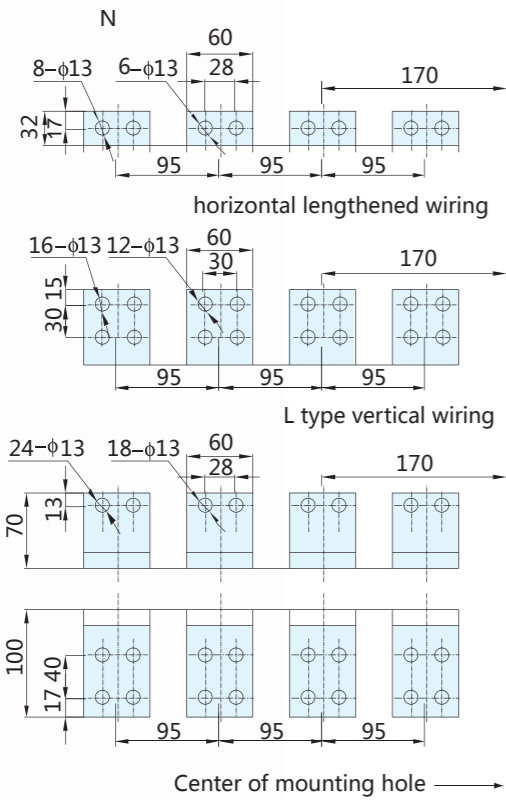
Dimension

Dimension of Fixed Switch Disconnecter

NDW1G-2000

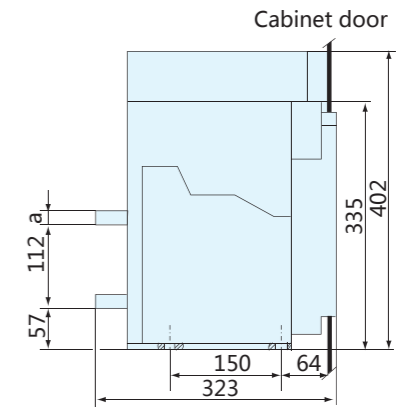
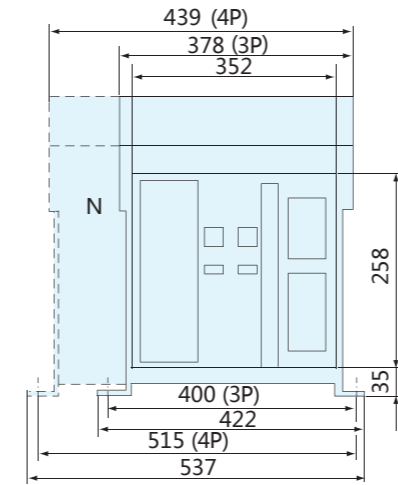


Frame I Fixed type

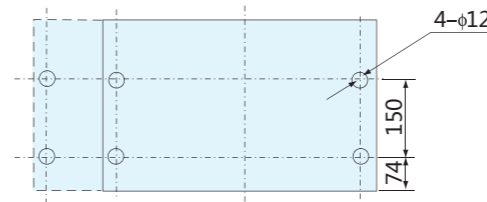


mm	
In(A)	a
630-800	10
1000-1600	15
2000	20

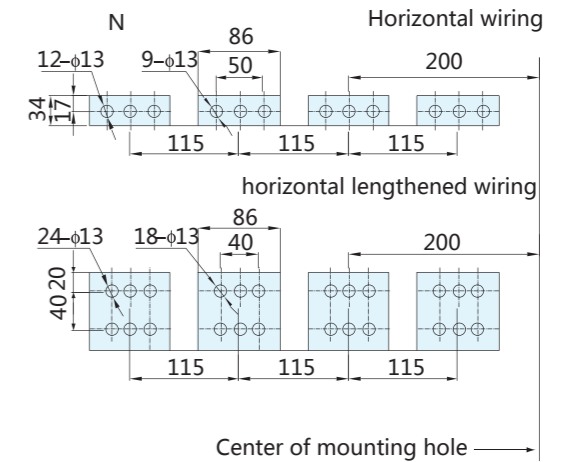
NDW1G-3200



Frame II Fixed type

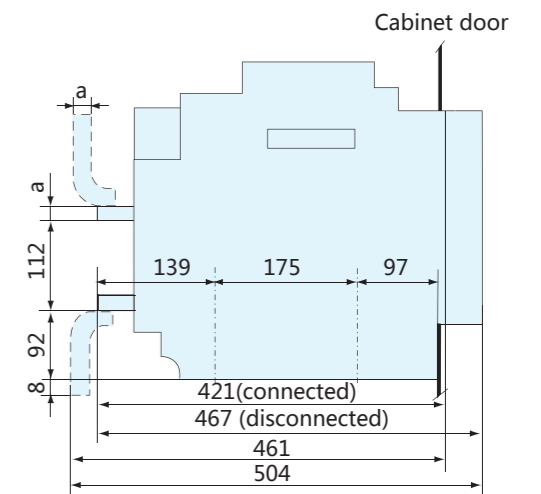
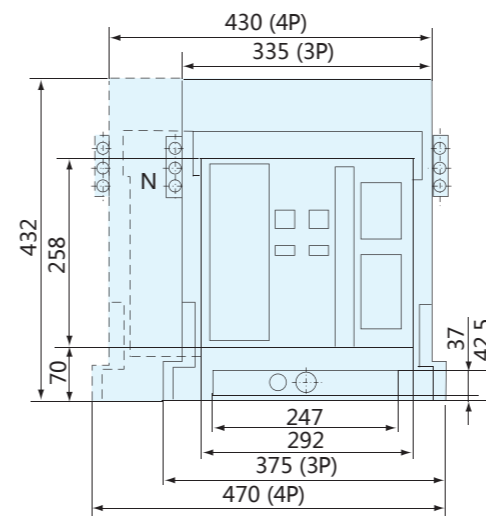


mm	
In(A)	a
2000, 2500	20
2900, 3200	30

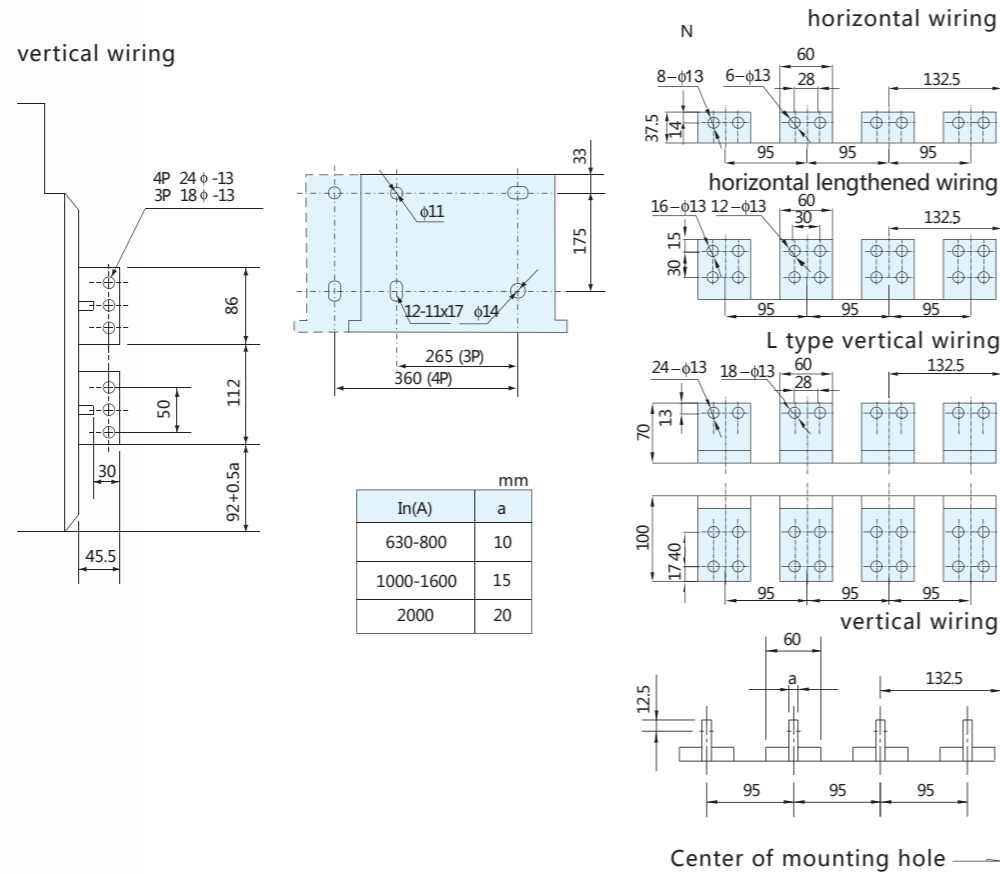


Dimension of Drawout Switch Disconnecter

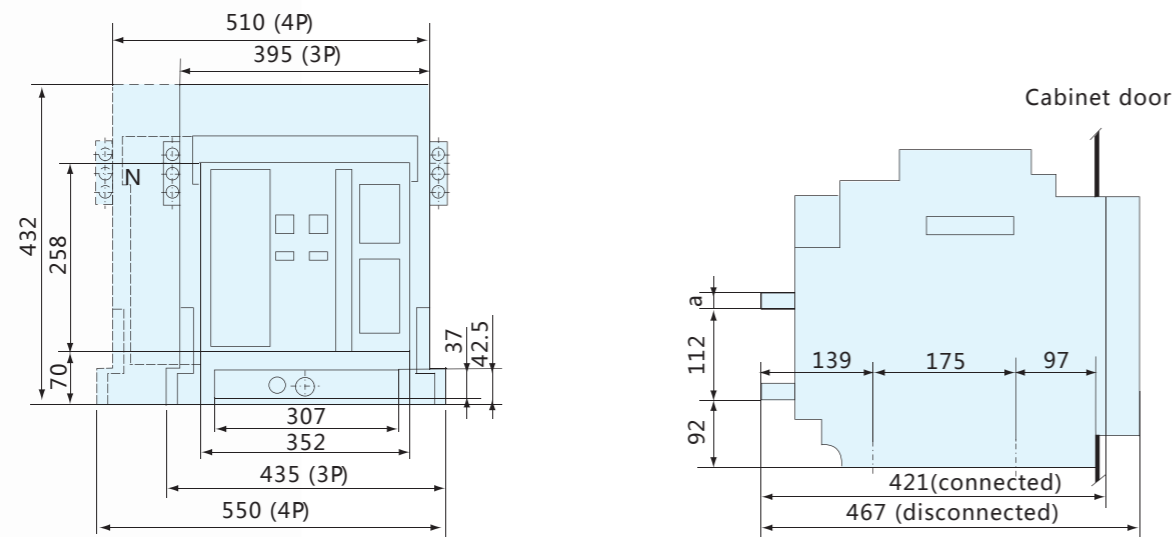
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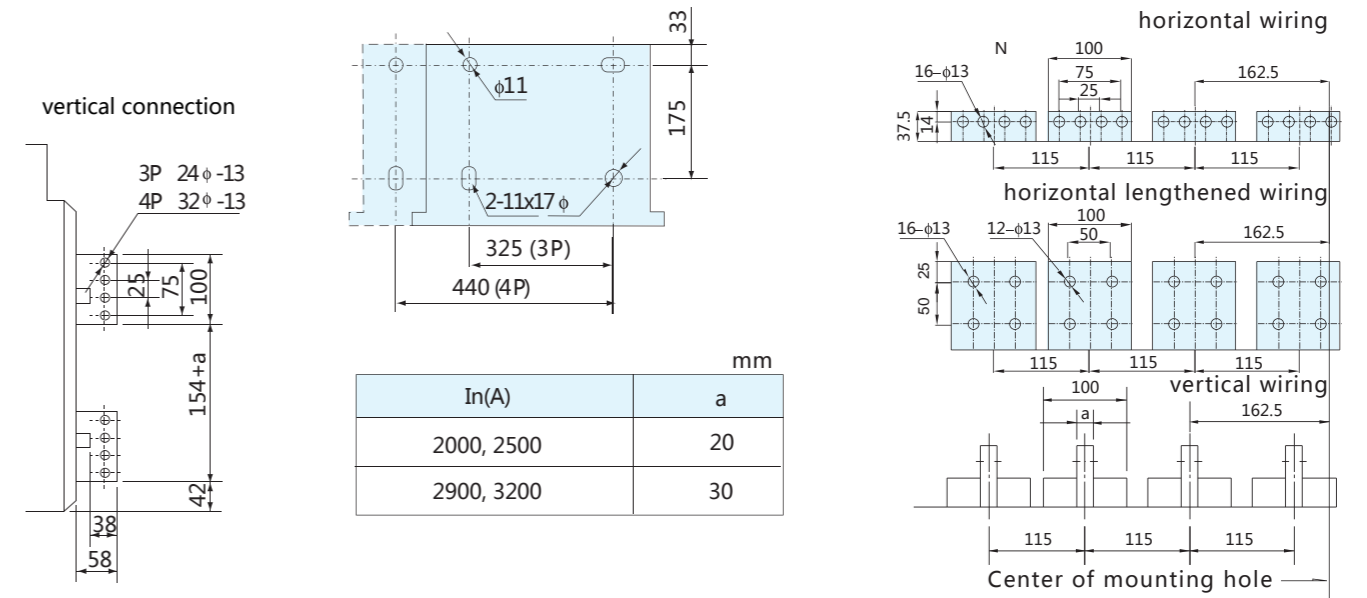
Frame I Drawout type



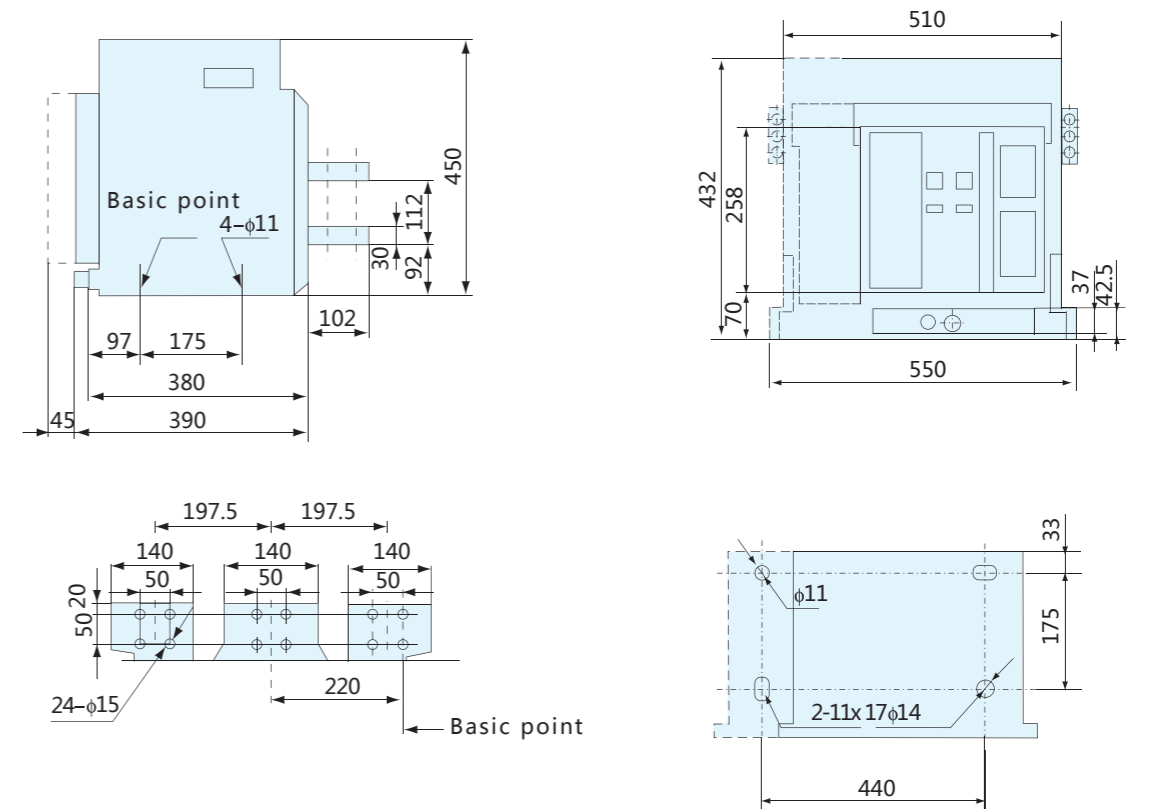
NDW1G-3200



Frame II Drawout type

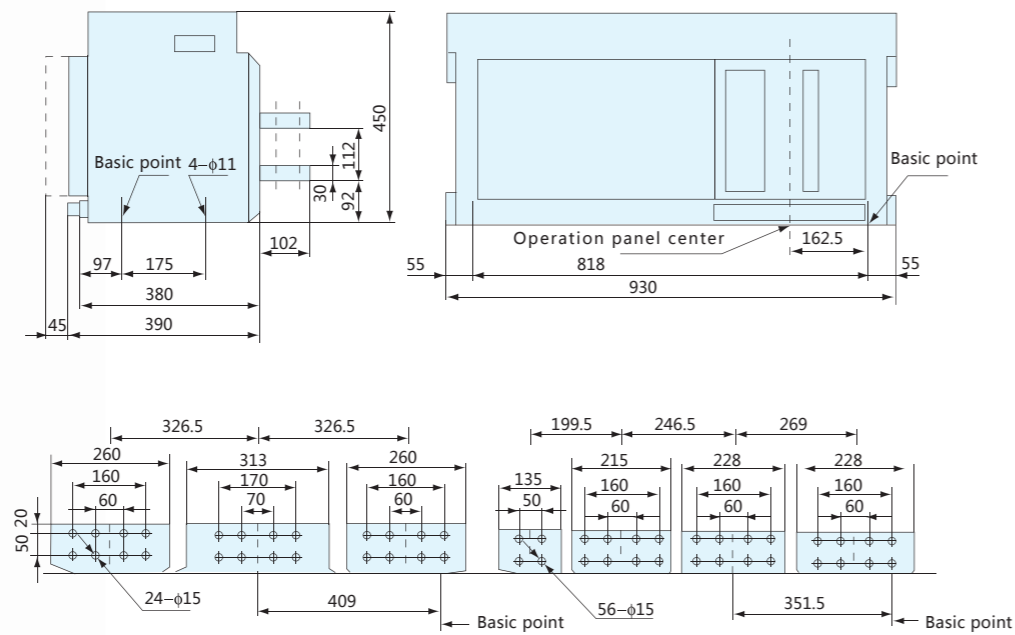


NDW1G-3200 (4000A, 3P drawout type)

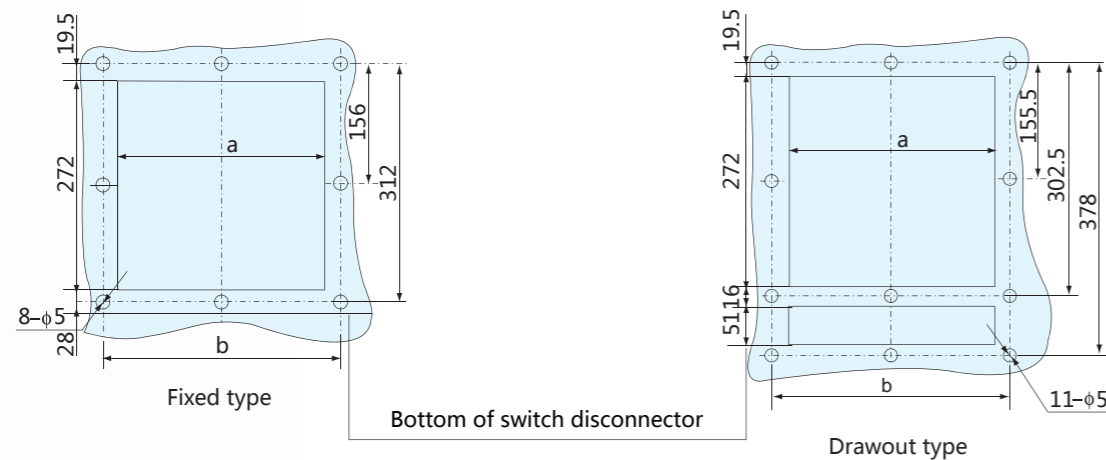


NDW1G-6300 (4000A, 5000A, 6300A)

Drawout type (3/4 poles)



Aperture of Cabinet Door and Installing Holes Diameter

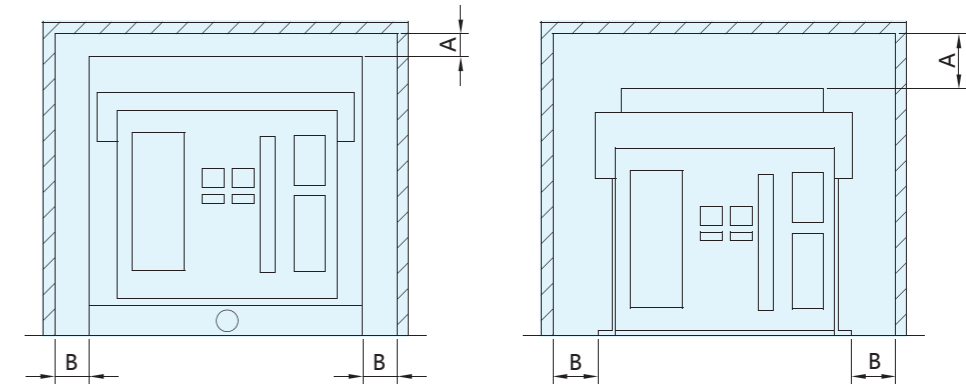


Type	a	b
NDW1G-2000	306	345
NDW1G-3200(4000)	366	405
NDW1G-6300	366	405

mm

Operating Instruction

Safe Distance



Drawable type (3P/4P)

Fixed type (3P/4P)

Installation Structure	To Insulator		To Metal Object	
	A	B	A	B
Drawout type	0	0	0	0
Fixed type	70	30	170	70

Sectional Area of Connecting Bus and Cable

Copper Cable

Rated Current (A)	Number of Conductors	Wire Size (mm ²)
≤400	×1	240
≤630	□	185
≤800	□	240

Copper connecting bus

Rated Current (A)	Number of Conductors	Copper Bar Size (mm×mm)
≤630	2	40×5
≤800	2	50×5
≤1000	2	60×5
≤1250	2	80×5
≤1600	2	100×5
≤2000	3	100×5
≤2500	4	100×5
≤3200	3	100×10
≤4000	4	100×10
≤6300	4	100×15

Note: Hereby the number of conducts means the busbar number connected to each phase bus.

Derating Coefficient

Temperature Derating Coefficient

Ambient Temperature		+40°C	+45°C	+50°C	+55°C	+60°C
Allowed continuous working current	NDW1G-2000	1In	0.95In	0.9In	0.85In	0.80In
	NDW1G-3200(4000)	1In	0.92In	0.86In	0.81In	0.74In
	NDW1G-6300	1In	0.93In	0.87In	0.81In	0.75In

Altitude Derating Coefficient

Altitude	2000	3000	4000	5000
Power-frequency withstand voltage	3500	3150	2500	2000
Revised current correction factor	1	0.93	0.88	0.82
Short-circuit breaking capacity correction factor	1	0.83	0.71	0.63

Installation Notice

- > For the safety of operators and electrical equipments, please do as following before switch disconnecter is put into operation:
- > Carefully read the Operation Manual before installing and using switch disconnecter.
- > Switch disconnecter should be used under normal working conditions.
- > Check whether the specifications of switch disconnecter meet the usage requirements before installation.
- > Measure the insulation resistance by megger with rated 500V. It should be no less than 10M under the conditions of the ambient temperature of 20°C (±5°C) and the relative humidity from 50%-70%. Otherwise it need to be dried until the insulation resistance reach the aforementioned requirement.
- > Please make sure that there is no conductive foreign material falling into switch disconnecter during installation.
- > The conductive bus connected with switch disconnecter should be in order and without additional mechanical stress during wiring.
- > When installing, it is necessary to provide reliable ground protection to switch disconnecter. There should be obvious grounding sign in grounding point. Safety distance should be strictly observed for fixed type switch disconnecter.
- > Before energizing main circuit, it is necessary to check switch disconnecter as following steps to make sure everything is normal:
 - a. Carefully check whether there is any foreign material falling into switch disconnecter. Clear up foreign material if there is. Switch disconnecter should be kept clean.
 - b. Wire auxiliary circuit according to relative electrical diagram well. Check whether operation voltage of undervoltage release, shunt release, closing release, motor and associated parts is consistent with actual power voltage. Then electrify the auxiliary circuit. For drawout switch disconnecter, the switch disconnecter itself should be in "test" position. Then it can be closed when making undervoltage release closing.
 - c. After motor stores energy, press closing push-button (manual operation or motor operation), switch disconnecter should be closed.
 - d. Press opening push-button (manual operation or motor operation), switch disconnecter should open.
 - e. When energy storing manually, trigger the handle in front panel up and down for seven times. Then sound "Kada" can be heard. The panel will indicate "Energy storing". Then after electrify undervoltage release, closing operation can be carried out (manual operation or motor operation). Only passing aforementioned tests, switch disconnecter can be put into operation.

Product Maintenance

- > Each rotational parts should be injected lubricating oil periodically during usage.
- > Clear the dust periodically to keep the good insulation of switch disconnecter.
- > Check the main contact system periodically. Especially take the following steps to check the main contact system after breaking due to short-circuit:
 1. Whether arc chute is in good condition?
 2. Whether contact performance is well?
 3. Whether fasteners of each linkage parts are tight?
- > During the process of installation, adjustment and operation, there may be misuse or simple mechanical failure. The following methods may help you to solve some simple operating problems. If the problem still exist, please contact with us and we will send our technician for the repair service on site.

Fault Analysis and Trouble Shooting

Item No.	Troubles	The Possible Causes	The Trouble Shooting Method
1	Tripping	Action of undervoltage release	<ol style="list-style-type: none"> 1. If the voltage of undervoltage loop is less than 85%Ue (Rated operation voltage of undervoltage release), please find out and eliminate the fault. 2. If the voltage of undervoltage loop is no less than 85%Ue, please contact us to replace the undervoltage release.
2	Switch disconnecter can not be closed	The undervoltage release can not pull in.	<ol style="list-style-type: none"> 1. If the voltage of undervoltage loop is less than 85%Ue (Rated operation voltage of undervoltage release), please find out and eliminate the fault. 2. If the voltage of undervoltage loop is no less than 85%Ue, please contact us to replace the undervoltage release.
		Contact problem of auxiliary circuit of drawout switch disconnecter	<ol style="list-style-type: none"> 1. Turn the drawout switch disconnecter into the "connected" position (hearing "KaKa" twice) and watch the "connected" signal on functional position indicator on the cradle. 2. Check whether the auxiliary circuit is connected.
		The switch disconnecter does not store energy.	<ol style="list-style-type: none"> 1. If the voltage of motor loop is less than 85%Us (Rated operation voltage of motor), please find out and eliminate the fault. 2. If the voltage of motor loop is no less than 85%Us, please contact us to replace the motor for electrical charging. 3. Using the manual operation for electrical charging to make sure the switch disconnecter works. 4. If there is any problem about manual energy storing, please contact us for repair.
3	Switch disconnecter can not open.	Mechanical fault of switch disconnecter	Check the operating mechanism. Please contact us if it is jammed.
		Shunt release does not work.	<ol style="list-style-type: none"> 1. Check whether the operation voltage of shunt release is no less than 70% Us. 2. If Us is in the normal range, please contact us to replace the shunt release.
4	Switch disconnecter can not store energy.	Mechanical fault of switch disconnecter	Refer to the "Switch disconnecter does not store energy" part in Item No. 2.
5	The handle of drawout switch disconnecter can not insert.	There is padlock or key lock in "disconnected" position.	Remove the padlock, open the "disconnected" position key lock.
6	The handle has inserted but can't drive switch disconnecter.	The switch disconnecter itself does not in the right position.	Push the switch disconnecter and rail into the end.
7	Switch disconnecter is not in "disconnected" position completely.	The racking handle has not been draw out.	Draw out the racking handle.
		The switch-disconnecter is not in the disconnected position completely.	Rack the switch disconnecter to the "disconnected" position completely.
8	Switch disconnecter is not in "connected" position completely.	There is "jumping over teeth" or foreign material falling into cradle and blocking the racking mechanism, or ect. faults.	Check and clean the foreign material. If still fail after that, please contact us.
		Switch disconnecter itself does not match the frame size of cradle.	Choose the same frame size cradle as switch disconnecter.

