

© This brochure is made from recycled paper.

♻️ Design and specification subject to change without notice in accordance with our policy of continuous product improvement.

C MÜLLER

MEDIUM VOLTAGE CIRCUIT BREAKER



JGGYW3 Series

High voltage dedicated circuit breaker
for photovoltaic new energy

User Manual



JCN INDUSTRIA E COMÉRCIO LTDA
Estrada Manoel José do Nascimento, 820 - Cachoeirinha - RS
Fone: 51 3303 3040 - CEP: 94930-340

Add WeChat

 **Safety warning**

- ① The product is strictly prohibited from being installed in environments containing flammable and explosive gases or damp condensation, and it is strictly prohibited to operate the product with wet hands.
- ② The product is strictly prohibited from being installed in places where gas media can corrode metals and damage insulation.
- ③ When installing, maintaining, and maintaining products, professional personnel must be responsible and ensure that the circuit is powered off.
- ④ Children are strictly prohibited from playing with products or packaging.
- ⑤ After removing the packaging, the product should be checked for damage and the integrity of the accessories should be checked.
- ⑥ When installing the product, the wiring screws should be tightened, and the connecting copper bar must meet the standard cross-sectional area requirements. It is recommended to install the copper bar according to the recommended instructions in this manual.
- ⑦ Sufficient space and safe distance should be reserved around the installation of the product.
- ⑧ During product operation, it is strictly prohibited to touch conductive parts of the product.
- ⑨ Foreign objects should be prevented from falling into the product and the installation environment should be kept free of obvious dust. Excessive dust inside the protector can affect product performance and use.

> **Product overview**

The JYGW3HU series intelligent universal circuit breaker is suitable for distribution networks with AC 50Hz, rated working voltage 400V/690V/800V/1140V, rated working current 7500A and below. It is used to distribute electrical energy and protect lines and power equipment from overload, undervoltage, short circuit, grounding and other hazards. The circuit breaker adopts an intelligent controller with precise selective protection and multifunctional functions, with complete protection functions, especially suitable for distribution networks that need to improve power supply reliability and avoid unnecessary power outages. The 2H and 3H intelligent controllers are equipped with communication interfaces for easy connection to the field bus, and can achieve four remote functions: "telemetry", "remote adjustment", "remote control", and "remote communication", meeting the requirements of control automation. Configuring leakage transformers and corresponding intelligent controllers can achieve leakage protection. Circuit breakers with a rated working current of 1000A and below can also be used as overload, short circuit, undervoltage, and ground fault protection for motors in AC 50Hz, 400V networks. Under normal conditions, they can be used for infrequent starting of motors. The product has passed the "CQC" certification of the China Quality Certification Center.

> **Normal working and installation conditions**

- ◆ The circuit breaker can operate under ambient air temperatures ranging from -5°C to +40°C (see circuit breaker derating factor for temperatures greater than +40°C to +60°C);
- ◆ The altitude of the installation site shall not exceed 2000m (see the high-altitude derating coefficient of the circuit breaker for more than 2000m);
- ◆ The relative humidity of the air at the installation site shall not exceed 50% at a maximum temperature of +40°C; Higher relative humidity can be achieved at lower temperatures, such as up to 90% at 20°C
- ◆ Special measures should be taken for occasional condensation caused by temperature changes
- ◆ The pollution level is Level 3
- ◆ The installation category of the circuit breaker main circuit, undervoltage release coil, and power transformer primary coil is IV, while the installation category of other auxiliary circuits and control circuits is III
- ◆ Circuit breakers are suitable for electromagnetic environments
- ◆ The new circuit breaker should be installed according to the installation requirements of the user manual.
- ◆ The vertical inclination of the circuit breaker shall not exceed 5° The circuit breaker should be installed in a place free from explosion hazards, conductive dust, corrosive metals, and insulation damage; The circuit breaker is installed in the cabinet compartment and equipped with a door frame, with a protection level of IP54.

> **Quick Selection Table for Universal Circuit Breakers**

JGGY	W	3	-	□	HU	/	4	Intelligent controller	7500	Installation method	Connection	Optional accessories
Enterprise code	Air circuit breaker	Deslgn Serial Number	Inm=2500 Inm=4000 Inm=7500	High voltage level	3 pole 4 pole	Intelligent controller M intelligent type 3M LCD Standard 3H LCD communication type	200A, 400A, 630A, 800A, 1000A, 1250A, 1600A, 2000A, 2500A, 2900A, 3200A, 3600A, 4000A, 5000A, 6300A, 7500A	C Drawer style F Fixed	Horizontal Post Vertical leading Vertical Post	<ul style="list-style-type: none"> ◆ Button locking device ◆ Drawer type circuit breaker interphase partition ◆ Undervoltage release ◆ "Opening" locking device (key is a lock) ◆ Mechanical interlocking: <ul style="list-style-type: none"> ◆ Two or three circuit breakers are interlocked horizontally with steel cables, and two or three circuit breakers are interlocked vertically with connecting rods ◆ External neutral N current transformer ◆ DC power module 		

Explanation:
Standard configuration: The intelligent controller is M-type, and the auxiliary switch is composed of four sets of conversion contacts. The connection method is a horizontal rear intelligent controller, a shunt release, an undervoltage release, and a closing solenoid electric operating mechanism. The voltage value should be indicated.

> The circuit breaker meets the following standards

- ◆ The circuit breaker meets the following standards
- ◆ IEC60947-1 and GB/T14048.1 General Principles for Low Voltage Switchgear and Control Equipment
- ◆ IEC60947-2 and GB/T14048.2 Low voltage switchgear and control equipment Low voltage circuit breakers IEC60947-4-1 and GB/T14048.4 Low voltage switchgear and control equipment Electromechanical contactors and motor starters
- ◆ GB/T2421.1 Overview and Guidelines for Environmental Testing of Electrical and Electronic Products
- ◆ GB/T14597 Climatic Environmental Conditions for Electrical Products at Different Elevations

> Preparation before installation

Before installation, use a 500VDC megohmmeter to check the insulation resistance of the circuit breaker according to regulations. At an ambient temperature of 25C+5C and a relative humidity test of 50%~70%, the insulation resistance should not be less than 500MQ. The test location for insulation resistance is: when the circuit breaker is closed, between each phase and ground; When the circuit breaker is disconnected, between each phase and each pole.

◆ Circuit breaker structure

Serial number: Function name

1. Fault trip reset button
2. Opening position lock
3. Closing button (I)
4. Opening button (O)
5. Intelligent control unit
6. Indication of the main contact position of the circuit breaker: Closing 0: Opening
7. Circuit breaker closing indication
8. Circuit breaker energy storage/release indication
9. Manual energy storage handle
10. Technical parameters of circuit breaker
11. Rocker handle and storage hole (only applicable to drawer type)
12. Pull out "separate" position safety padlock
13. Circuit breaker "separation", "experiment", "connection" position indicator
14. Rocker working hole
15. Three position latch reset button
16. Slide rail (only applicable to pull-out type)
17. Control circuit wiring terminals (static)
18. Control circuit wiring terminals (dynamic)
19. Shunt release
20. Closing electromagnet
21. Auxiliary switch
22. Electric motor energy storage motor
23. Manual energy storage handle
24. Operating mechanism



> Main technical data and performance parameters

Model	JGGYW3-2500HU	JGGYW3-4000HU	JGGYW3-7500HU	
Rated current of shell frame level Inm (A)	2500	4000	7500	
Rated working current In (A)	400, 630, 800, 1000, 1250, 1600, 2000, 2500	2000, 2500, 2900, 3200, 3600, 4000	4000, 5000, 6300, 7500	
Rated working voltage Ue (A)	50Hz AC400V, 500V, 690V, 800V, 1140V	50Hz AC400V, 500V, 690V, 800V, 1140V	50Hz AC400V, 500V, 690V, 800V, 1140V	
Rated insulation voltage Ui (V)	1150V	1150V	1150V	
Rated impulse withstand voltage Uimp (kV)	12	12	12	
Power frequency withstand voltage U (V) 1min	50Hz 3500	50Hz 3500	50Hz 3500	
Poles	3P/4P	3P/4P	3P/4P	
Rated ultimate short-circuit breaking capacity Icu (kA)	AC400V	100	100	150
	AC690V	65	80	100
	AC800V AC1140V	50	50	65
Rated operating short-circuit breaking capacity Ics (kA)	AC400V	100	100	150
	AC690V	65	80	100
	AC800V AC1140V	50	50	65
Rated short time withstand current Icw/1s (kA)	AC400V	100	100	150
	AC690V	65	80	100
	AC800V AC1140V	50	50	65
Inherent opening time (ms)	23~32	23~32	23~32	
Closing time (ms)	50±10	50±10	50±10	
Arc distance (mm)	0	0	0	
Operational performance	Electrical life (times)	AC400/690V:7000/3000 AC800/1140V:2500/2000	AC400/690V:7000/2500 AC800/1140V:2000/1500	AC400/690V:2000/1500 AC800/1140V:1200/1000
	Mechanical life (times)	Maintenance free	15000	15000
With maintenance		15000	15000	15000

> Basic functions and optional functions of intelligent controllers



Digital display type

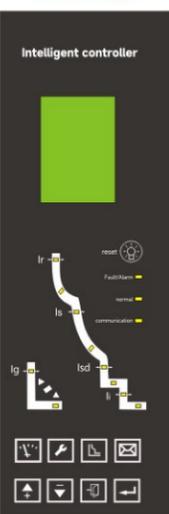
Basic function

- Overload long delay, short circuit short delay, short circuit instantaneous protection
- Functional testing
- Fault memory
- Thermal memory
- Self diagnosis
- Current measurement
- Fault status indication and numerical display
- Earth fault protection

Optional function

- Signal contact output
- MCR and over limit tripping
- Load monitoring
- Voltage measurement

3M/3H type



LCD display type

Basic function

- Overload long delay, short circuit short delay, short circuit instantaneous
- Functional testing
- Fault memory
- Thermal memory
- Self diagnosis
- Current measurement
- Fault status indication and numerical display
- Communication function (3H)
- Contact wear indicator (3H)
- Record of Operation Times (3H)
- Earth fault protection

Optional function

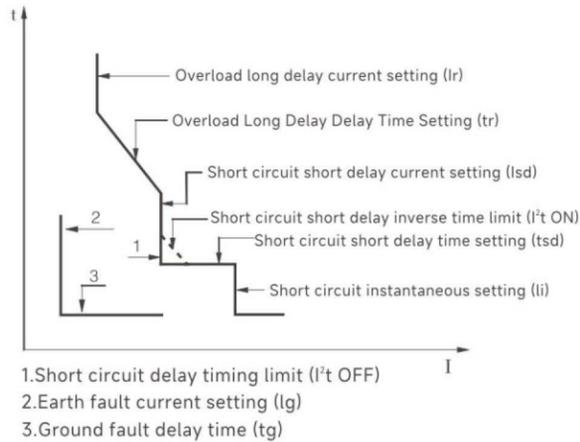
- Current imbalance protection
- Signal contact output
- Load monitoring
- MCR and over limit tripping
- power measurement
- Power factor measurement
- Electric energy measurement
- Regional interlocking
- Harmonic measurement
- Voltage protection
- Voltage measurement

> List of Intelligent Controller Functions

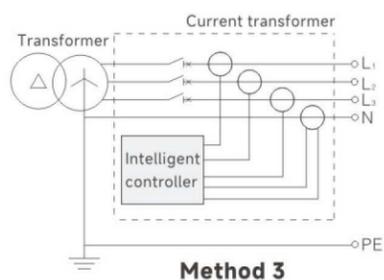
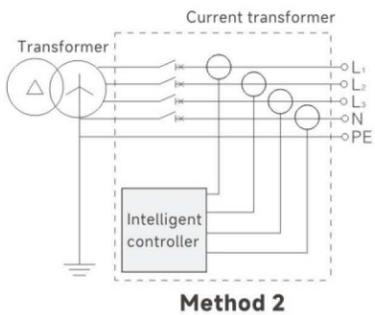
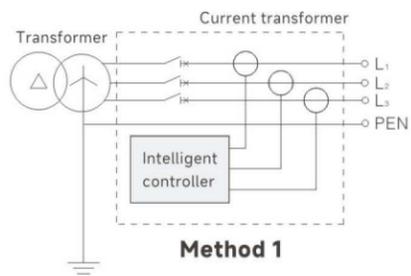
Controller model	M	3M	3H
Overload long delay protection	■	■	■
Short circuit short time delay protection	■	■	■
Short circuit instantaneous protection	■	■	■
Earth fault protection	■	■	■
Current imbalance protection	-	<input type="checkbox"/>	<input type="checkbox"/>
Functional testing	■	■	■
Fault memory	■	■	■
Signal contact output	<input type="checkbox"/>	<input type="checkbox"/>	■
Thermal memory	■	■	■
Self diagnosis	■	■	■
MCU working instructions	-	-	-
Current column display	-	-	-
Current measurement	■	■	■
MCR and over limit tripping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Load monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fault status indication and numerical display	■	■	■
Voltage measurement	<input type="checkbox"/>	<input type="checkbox"/>	■
Power factor measurement	-	<input type="checkbox"/>	■
power measurement	-	<input type="checkbox"/>	<input type="checkbox"/>
Electric energy measurement	-	<input type="checkbox"/>	<input type="checkbox"/>
Communication function	-	-	■
Contact wear indication	-	<input type="checkbox"/>	■
Regional interlocking	-	<input type="checkbox"/>	<input type="checkbox"/>
Harmonic measurement	-	<input type="checkbox"/>	<input type="checkbox"/>
Voltage protection	-	<input type="checkbox"/>	<input type="checkbox"/>
Record of operation times	-	<input type="checkbox"/>	■

Explanation: ■ represents basic functions; □ represents optional functions; - Indicates that this feature is not available.

> Overcurrent protection function



Long delay, short delay, instantaneous, grounding protection specificity



Overload long delay protection

Overload long delay inverse time protection, with adjustable setting current I_r ;
 The overload long delay time t_r is adjustable.

Short circuit short delay protection (can be turned off OFF)

Short circuit short delay inverse time protection (I^2t_{ON}), with adjustable setting current I_{sd} ;
 Short circuit short delay delay time t_{sa} adjustable

Short circuit instantaneous protection

Short circuit instantaneous (switchable OFF) sketch current I_i adjustable

Ground fault protection (switchable OFF)

Earth fault definite time or inverse time protection, with adjustable setting current I_G
 The delay time t_g is adjustable;
 After the delay time is OFF, only the alarm will not break.

Earth fault protection method:

Method 1: In the TN-C, TN-C-S, and TN-S distribution systems, JGGYW3HU three-pole circuit breakers are selected without the addition of an external neutral line N current transformer. The ground fault protection signal is taken as the vector sum of the three-phase current. The protection feature is fixed time or inverse time protection.

Method 2: JGGYW3HU four-pole circuit breaker is selected in the TN-S distribution system. The ground fault protection signal is taken as the sum of the three-phase current and N-phase current vectors. The protection feature is definite time or inverse time protection

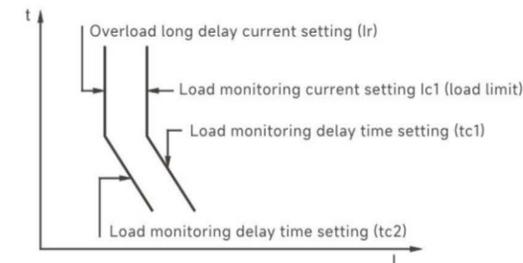
Method 3: JGGYW3HU three-pole circuit breaker is selected in the TN-S distribution system. The external neutral line N current transformer is used for ground fault protection (connected to the secondary circuit terminal 25 and 26), and the maximum distance between the installation location of the transformer and the circuit breaker is 2 meters. The ground fault protection signal is taken as the sum of the three-phase current and N-phase current vectors. The protection feature is fixed time or inverse time protection.

> Load monitoring function

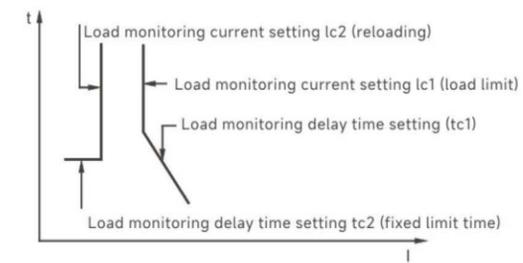
Used to monitor subordinate unimportant loads and ensure power supply to the main system;
 There are two options for load monitoring, and users can choose either one. The setting values of load monitoring current are I_{c1} and I_{c2} , generally $I_{c1} \geq I_{c2}$;

Method 1: It can control two lower level loads. When the operating current of the main circuit exceeds I_{c1} and I_{c2} successively, it will delay t_{c1} and t_{c2} respectively and send out contact signals. The controller will issue instructions to break the two controlled loads;

Method 2: Only control one lower level load. When the operating current of the main circuit exceeds I_{c1} , delay T_{c1} and send a contact signal. The controller sends a command to cut off this load. If the operating current of the main circuit is lower than I_{c2} and the duration is t_{c2} after cutting off this load, the controller can send another signal to command the disconnected load to be connected (reloaded) and restore the power supply to the load.



Action characteristics of two load limit setting values



A load limit, an action characteristic for reloading the set value

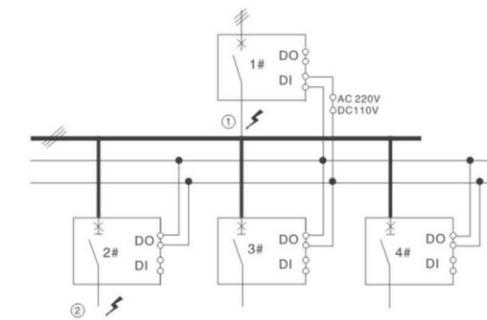
> Regional interlocking

Regional selective interlocking includes short-circuit interlocking and grounding interlocking. In the same power circuit of two or more circuit breakers with hierarchical connections:

When a short circuit or grounding fault occurs at the outlet side of the lower circuit breaker (2 #~4 # circuit breaker) (such as position ②), the lower circuit breaker trips and sends a regional or interlocking trip signal to the upper circuit breaker; The superior circuit breaker (1 # circuit breaker) receives a regional interlocking trip signal and delays according to the short-circuit or grounding protection settings. If the fault current during the delay process of the superior circuit breaker is eliminated, the protection returns and the superior circuit breaker does not operate; If the fault current of the tripping trip of the lower circuit breaker has not been eliminated. The superior circuit breaker acts according to the short-circuit or grounding protection settings to cut off the faulty line.

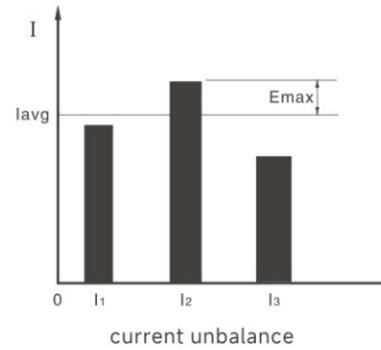
When a short circuit or ground fault occurs between the upper circuit breaker (1 # circuit breaker) and the lower circuit breaker (2 #~4 # circuit breakers) (such as position ①). The superior circuit breaker did not receive the regional interlocking signal, so it momentarily tripped and quickly cut off the faulty line.

Parameter settings:
 At least one DI of the superior circuit breaker is set for regional interlocking detection;
 At least one DO of the lower level circuit breaker is set as the regional interlocking signal output.



Regional interlocking schematic diagram

> **Current imbalance rate protection**



The current imbalance rate protection protects against phase failure and three-phase current imbalance, and performs protection actions based on the imbalance rate between three-phase currents.

Calculation method for imbalance rate:

$$I_{unbal} = \frac{|E_{max}|}{I_{avg}} \times 100\%$$

$$I_{avg} = \frac{I_1 + I_2 + I_3}{3}$$

E_{max} : Is the maximum difference between each phase current and I_{avg} .
 I_{avg} : Is the average effective value of the three-phase line current value.

> **Harmonic measurement**

The intelligent controller can measure the fundamental current, fundamental line voltage, fundamental phase voltage, fundamental power, as well as the odd wave current content (HRIH), harmonic wave voltage content (HRUH), total harmonic current distortion rate [THDi, thdi], and total harmonic voltage distortion rate [THDu, thdu] of 3-31 times

Harmonic Content (HR)

The ratio of the root mean square value of the h-th harmonic component to the root mean square value of the fundamental component in periodic traffic flow (expressed as a percentage)

The content of the h-th harmonic current is expressed in HRIh.

$$HRI_h = \frac{I_h}{I_{1-1}} \times 100\%$$

Note: In the formula, I_h represents the h-th harmonic current of phase A (root mean square value);
 The h-th harmonic voltage content is expressed in HRUn.

$$HRU_h = \frac{U_h}{U_{12-1}} \times 100\%$$

Note: In the formula, U_h represents the h-th harmonic line voltage of A-B phase

Total harmonic distortion rate (THD, THd)

The ratio (THD) of the harmonic content in periodic AC flow to the root mean square value of its fundamental component is expressed as a percentage.

$$THDi = \frac{\sqrt{\sum_{h=2}^{31} I_h^2}}{I_{1-1}} \times 100\%$$

$$THDu = \frac{\sqrt{\sum_{h=2}^{31} U_h^2}}{U_{1-1}} \times 100\%$$

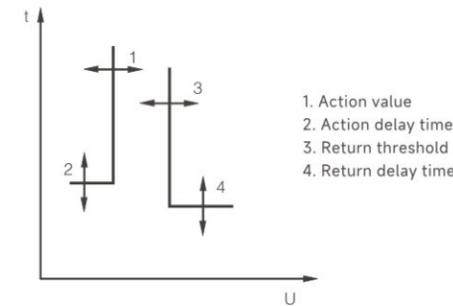
Note: In the formula, h is the h-th harmonic current of phase A (root mean square value); U_h is the h-th harmonic line voltage (root mean square value) between A-B phases. The ratio (thd) of the harmonic content in periodic traffic flow to the root mean square value of that periodic traffic flow is expressed as a percentage.

$$thdi = \frac{\sqrt{\sum_{h=2}^{31} I_h^2}}{I_{1-1}} \times 100\%$$

$$thdu = \frac{\sqrt{\sum_{h=2}^{31} U_h^2}}{U_{1-1}} \times 100\%$$

Note: In the formula, h is the h-th harmonic current of phase A (root mean square value); U_h is the h-th harmonic line voltage (root mean square value) between A-B phases.

> **Voltage protection**

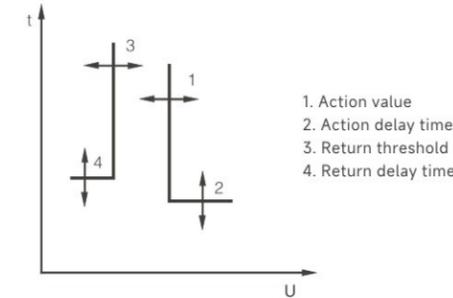


Undervoltage protection action principle

under voltage protection

The intelligent controller measures the true effective value of the primary circuit voltage. When all three line voltages are less than the set value, that is, when the maximum value of the three line voltages is less than the set value of the undervoltage protection, the undervoltage protection acts; When the maximum value of the three line voltages is greater than the return value, the alarm action returns.

Action characteristics: When the maximum voltage value is less than the action threshold (1), an alarm or trip delay is triggered, and the action delay time (2) will send out an alarm or trip signal for undervoltage fault action; When the maximum voltage value is greater than the return threshold (3), the return delay is activated. When the return delay time (4) expires, the alarm is removed and the undervoltage fault returns

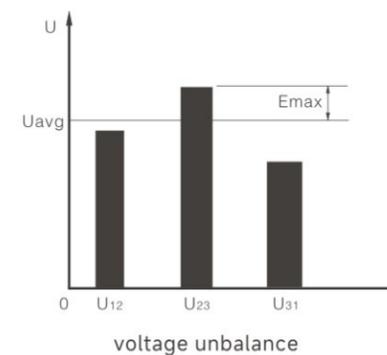
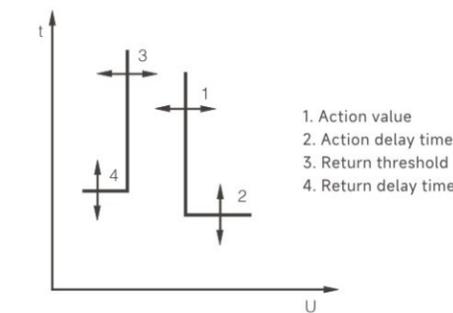


Overvoltage protection action principle

Overvoltage protection

The intelligent controller measures the true effective value of the primary circuit voltage. When all three line voltages are greater than the set value, that is, when the minimum value of the three line voltages is greater than the set value of the overvoltage protection, the overvoltage protection acts. When the three line voltages are less than the return value, the alarm action returns.

Action characteristics: When the minimum line voltage is greater than the action threshold (1), an alarm or trip delay will be triggered. When the action delay time (2) expires, an alarm or trip signal overvoltage fault will be triggered; When the execution mode is alarm, after the alarm action, the return delay is activated when the minimum line voltage is less than the return threshold (3). When the return delay time (4) expires, the alarm is removed and the overvoltage fault returns



Voltage imbalance rate protection

The voltage imbalance rate protection operates based on the imbalance rate between the three line voltages. The intelligent controller measures the voltage imbalance rate, and when the voltage imbalance rate is greater than the dynamic threshold protection action; When the imbalance rate of the power supply is less than the return value, the alarm action returns.

Action characteristics: When the voltage imbalance rate is greater than the action threshold (1), an alarm or trip delay will be triggered. When the action delay time (2) expires, an alarm or trip signal will be issued. The voltage imbalance rate fault will act; When the execution mode is alarm, after the alarm action, the return delay is activated when the voltage imbalance rate is less than the return threshold (3). When the return delay time (4) expires, the alarm is removed and the voltage imbalance rate fault returns.

Calculation method for voltage imbalance rate:

$$U_{unbal} = \frac{|E_{max}|}{U_{avg}} \times 100\%$$

E_{max} : The maximum difference between the line voltage and the average value.

$$U_{avg} = \frac{U_{12} + U_{23} + U_{31}}{3}$$

U_{avg} : The average value of the effective value and the effective value of the three-phase line voltage.

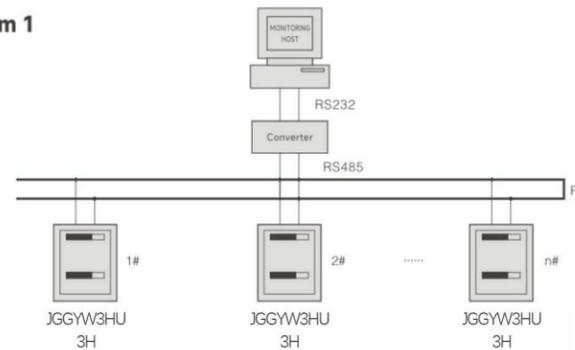
> **Communicate**

The remote "four remote" function of the circuit breaker can be achieved through the communication port. Namely, "remote control", "remote communication", "remote adjustment", and "telemetry".

The communication protocol uses Modbus RTU, Profibus DP, or Device mode, with a standard RS-485 interface. The baud rate and communication address can be set through a programmer. The maximum distance per line is 1.5km, and a line can simultaneously connect 250 communication circuit breakers. The communication line is a twisted pair shielded wire, and the communication distance can be extended by installing a relay.

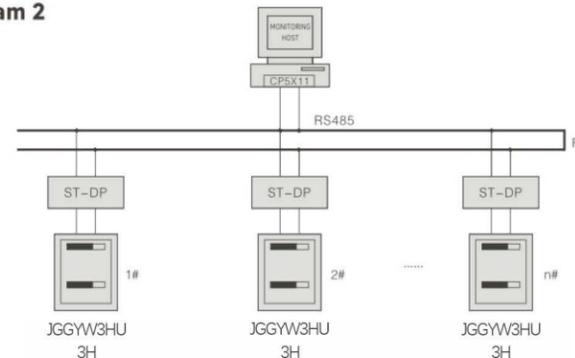
Communication Network Connection Diagram 1

Apply Modbus-RTU protocol



Communication Network Connection Diagram 2

Apply Profibus-DP protocol



ST-DP is a communication module, and the main station card is CP5X11Rt from SIEMENS company. The network terminal resistance is generally 120 Ω

> **Contact wear indication**

The intelligent controller panel can display the current contact wear status. The factory display value of the controller is 100%, indicating that the contact is not worn. When the display value drops to 60%, an alarm signal is issued to remind users to take maintenance measures in a timely manner. After the contact is replaced, it can be restored to the initial wear value by setting.

> **Self diagnosis**

When the intelligent controller microprocessor malfunctions or the ambient temperature around the microprocessor exceeds 80 °C+5 °C, an alarm signal is immediately issued.

> **MCR and HSISC protection**

MCR function: During the closing process of the circuit breaker or during the initialization of the controller during power on, if a short circuit short delay fault occurs, it can immediately switch to instantaneous opening.

HSISC function: When the short-circuit current of the circuit breaker exceeds a certain limit during normal operation, the controller sends a signal to break the circuit breaker. This function is not affected by the instantaneous short-circuit protection setting value.

Switching on/off and over limit tripping protection		
Making and breaking	Motor threshold	15kA~100kA (in steps of 1kA)
	Default setting value	50kA (In not greater than 2000A) 60kA (In greater than 2000A)
Over limit tripping	Motor threshold	15kA~100kA (in steps of 1kA)
	Default setting value	65KA (JGGYW3-2500), 80KA (JGGYW3-4000、JGGYW3-7500)

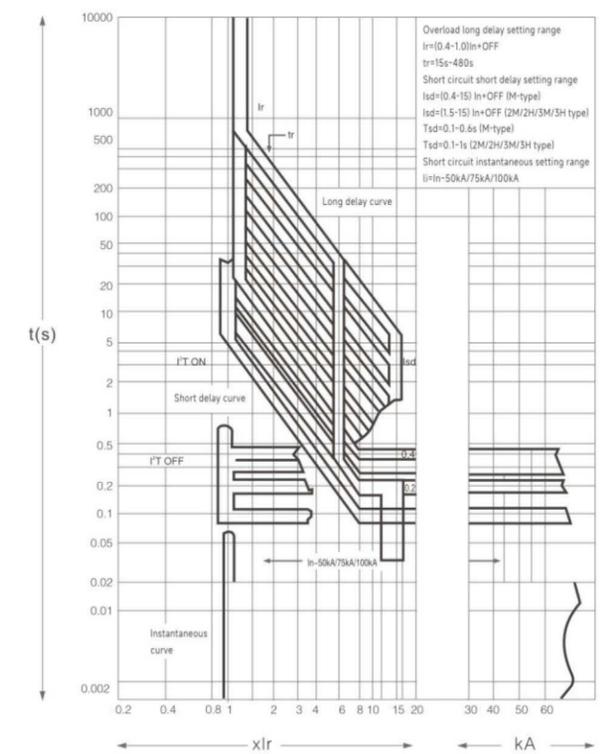
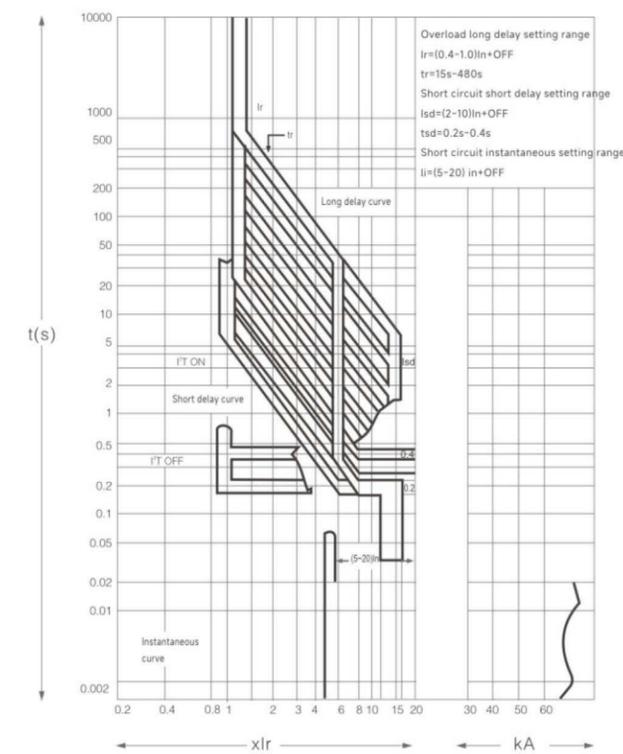
> **Fault memory function**

After the circuit breaker encounters a fault and breaks, the intelligent controller can display the fault category, fault phase, fault current value, and breaking action time value.

> **Signal contact output**

The controller has a signal contact output adjustable function, and the specific signal output can be contacted by our company.

Contact default settings				
	Contact 1	Contact 2	Contact 3	Contact 4
M、3M	Load monitoring 1	Load monitoring 2	Self diagnostic fault alarm	Fault tripping
3H	Load monitoring 1	Load monitoring 2	Remote opening	Remote closing



> **Overload long delay protection**

Setting current I _r adjustment range		M, 3M, 3H	(0.4~1.0) xI _n +OFF (adjusted according to 1A gradient)					
Action time tolerance 15%	Current	Action time						
	≤1.05I _r	No action within 2 hours						
	≥1.3I _r	Action within 1 hour						
	1.5I _r	Setting time T _r (s)	15	30	60	120	240	480
	2.0I _r	Action time T _r (s)	8.4	16.9	33.8	67.5	135	270
7.2I _r	Action time T _r (s)	0.65	1.3	2.6	5.2	10	21	
Thermal memory function		30min+OFF (power off can be eliminated)						
N-phase overload and overcurrent characteristics		100% I _n or 50% I _n (applicable to 3P+N or 4P products)						

> **Short circuit short time delay protection**

Setting current I _{sd} adjustment range		M	(0.4-15) xI _n +OFF (adjusted according to 1A gradient)				
		3M, 3H	(1.5-15) xI _n +OFF (adjusted according to 1A gradient)				
The current tolerance is ± 10%, Action time tolerance ± 15%	current	Action time					
	I > I _{sd} , I ≤ 8I _r	Inverse time $T=(8I_r)^2 \times t_{sd}/I^2$ - actual current					
	>I _{sd} , I > 8I _r , or I > I _{sd} I < 8I _r inverse time limit OFF	Timing limit setting time t _{sd} (s)	0.1	0.2	0.3	0.4	0.5
		Returnable time (s)	0.06	0.16	0.26	0.35	0.44
	Definite time delay	Timing limit setting time t _{sd} (s)	0.1~1s (level difference 0.1s)+OFF (fixed time limit closed, inverse time limit open)				
	Inverse time characteristic	Curve rate	The curve is the same as the overload long delay curve, and the curve speed is 10 times faster than the overload long delay curve				
Thermal memory function		15min+OFF (power off can be eliminated)					

> **Short circuit instantaneous protection**

Setting current I _i adjustment range	M, 3M, 3H	I _n -50kA+OFF (NLDW3-1600/2500) I _n -75KA+OFF (NLDW3-4000/7500)

> **Earth fault protection**

Setting current I _g adjustment range (A)		M, 3M, 3H	(0.2~1.0) xI _n +OFF (where M/2H has a minimum of 100A)	
The current tolerance is ± 10%, Action time tolerance ± 15%	M	Definite time limit	Setting time T _g (s)	0.1~1s (0.1-1s level difference 0.1s)
	3M, 3H	Definite time limit	Setting time T _g (s)	0.1~1s (0.1-1s level difference 0.1s)

> **Load monitoring**

Method 1	Setting current I _{c1} , I _{c2} adjustment range (A)	(0.2~1.0) xI _n +OFF
	Delay characteristics t _{c1} , t _{c2} (S)	t _{c1} =(0.2~0.8) xtr, t _{c2} (0.2~0.8) xtr
Method 2	Setting current I _{c1} , I _{c2} adjustment range (A)	(0.2~1.0) I _n +OFF
	Delay characteristics t _{c1} , t _{c2} (S)	T _{c1} =(0.2~0.8) xtr Timing limit t _{c2} =60s

> **Voltage imbalance protection**

Motor threshold	2%-30% (level difference 1%)	
Action delay time (s)	0.2~60 (level difference 1%)	
Return threshold (when working in "alarm" mode)	2% -30% (level difference of 1%) not greater than the action threshold	
Return delay time (s) (when working in "alarm" mode)	0.2~60 (level difference 1%)	
Alarm contact output	Optional	
Action characteristics	Actual voltage imbalance/set value	Agreed tripping time
	<0.9	Inaction
	≥1.1	Timed action
Note: Delay tolerance 10%		

> **Under voltage protection**

Action threshold (V)	100- Return threshold (step size 1)	
Action delay time (s)	0.2~60 (in steps of 0.1)	
Return threshold (v)	Action threshold~1200 (step size 1)	
Return delay time (s)	0.2~60 (in steps of 0.1)	
Action or alarm characteristics	Actual voltage imbalance/set value	Agreed tripping or alarm time
	<0.9	Definite time action or alarm, contact (optional) output
	≥1.1	No action or alarm, no contact output
Note: Delay tolerance ±10%		

> **Current imbalance protection**

Unbalance rate δ adjustment overall range	40%-100%+OFF
Action or alarm characteristics	$\leq 0.9 \delta$, Inaction
	$< 1.1 \delta$, Delay action
Delay time (s)	0.1-1.0s+OFF (OFF: only alarm without action, level difference 0.1s)

> **Overvoltage protection**

Action threshold (v)	Return threshold-1200 (step size 1)	
Action delay time (s)	0.2-60 (in steps of 0.1)	
Return threshold (v)	100>Action threshold (step size 1)	
Return delay time (s)	0.2-60 (in steps of 0.1)	
Action or alarm characteristics	Voltage multiple ($U_{max}/$ action threshold)	Agreed tripping or alarm time
	< 0.9	No action or alarm, no contact (optional) output
	≥ 1.1	Definite time action or alarm, contact (optional) output
Note: Delay tolerance 10%		

> **Leakage protection**

Action current $I \Delta n$ (A)	0.5-30 (level difference 0.1A)	
Delay time $T \Delta n$ (s)	0-0.83	
Action characteristics	Current multiple $I/I \Delta n$	Agreed tripping time
	< 0.8	Inaction
	≥ 1.0	Timed action
Note: Delay tolerance 10%		

> **Leakage protection action delay**

Setting time(s)	0.06	0.08	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.83	Instantaneous
fault current	Maximum disconnection time (s)											
$I \Delta n$	0.36	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	0.04
$2I \Delta n$	0.18	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	0.04
$5I \Delta n$	0.072	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	0.04
$10I \Delta n$												

> **There are no special requirements from the user, and the intelligent controller is set as follows**

Overload long delay protection	I_r	$1I_n$
	t_r	60s
Short circuit short time delay protection	I_{sd}	$6I_n$
	t_{sd}	0.4s
Short circuit instantaneous protection	I_i	$10I_n$
Earth fault protection	I_g	0.8 I_n or 1200A (whichever is the minimum)
Load monitoring	I_{c1}	$1I_n$
	I_{c2}	$1I_n$

Single-phase grounding leakage protection refers to metal grounding protection with a fault current of several hundred amperes or more, generally used in neutral directly grounded systems. The controller has two different protection methods, one is the difference type (T). The controller provides protection based on the vector sum of three-phase current and neutral pole current, which can be divided into three forms: 3PT, 4PT, and (3P+N), as shown in Figure 3, Figure 4, and Figure 5. The other type is the ground current type (W), where the controller directly takes an additional current transformer output current signal between the neutral point of the main power supply and the ground for protection. The neutral pole transformer or current transformer is added between the N-line and P-level of the inductor.

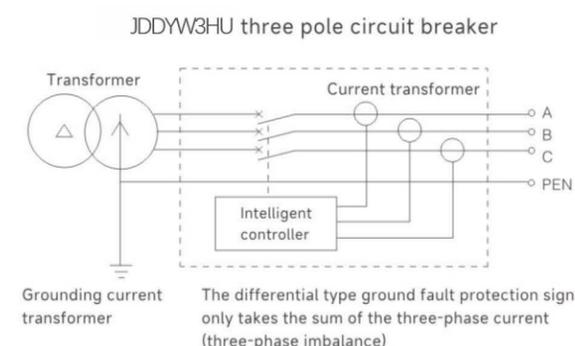


Figure 3 3PT grounding difference type

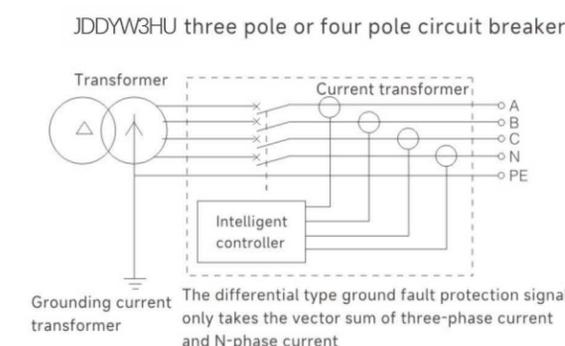


Figure 4 4PT grounding difference type

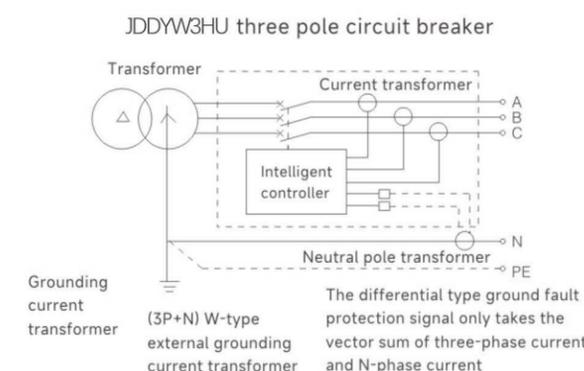


Figure 5 (3P+N) T grounding difference type

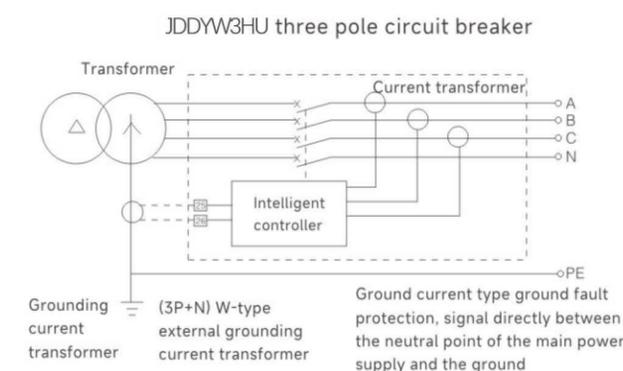


Figure 6 Grounding Current Type

Leakage protection mainly takes signals through zero sequence transformers, which have high flexibility and are suitable for grounding protection of several ampere high resistance grounding systems, as well as direct grounding systems. Generally, only an alarm is given without tripping, and the circuit breaker can also be disconnected when needed. The connection method is shown in Figure 7 and Figure 8. In addition, there are two types of load circuit (ZCT) or transformer grounding wire (ZT).

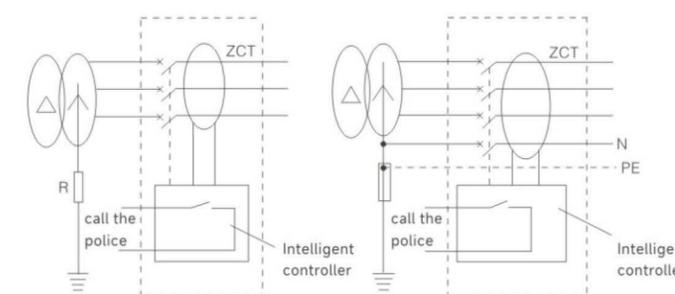


Figure 7 Electrical load circuit type

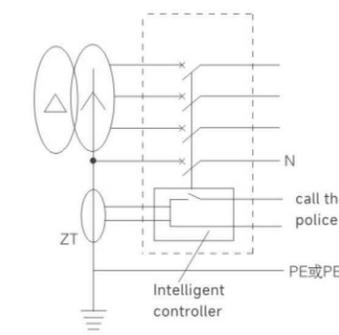


Figure 8 Grounding Line of Leakage Transformer

> Power consumption (ambient temperature+40°C)

Power consumption is the total loss measured when the circuit breaker passes through the rated current I_{nm} of the frame level.

Model	Power dissipation(W)	
	Fixed	Drawer style
JGGYW3-2500HU	240	360
JGGYW3-4000HU	600	800
JGGYW3-7500HU	920	1220

> Derating factor

The following table shows the ability of the circuit breaker to continuously carry current under the working environment temperature and the heating conditions specified in GB/T14048.2.

Surrounding working environment temperature	+40°C	+45°C	+50°C	+55°C	+60°C
Continuous current carrying capacity	$I_{nm}=2500A$	1 I_{nm}	0.97 I_{nm}	0.91 I_{nm}	0.82 I_{nm}
	$I_{nm}=4000A$	1 I_{nm}	0.96 I_{nm}	0.90 I_{nm}	0.80 I_{nm}
	$I_{nm}=7500A$	1 I_{nm}	0.95 I_{nm}	0.89 I_{nm}	0.78 I_{nm}

If the altitude exceeds 2000m in the applicable working environment, the power frequency withstand voltage can be corrected according to the following table.

Altitude (m)	2000	3000	4000	5000
Power frequency withstand voltage (V)	3500	3150	2500	2000
Operating current correction factor	1	0.93	0.88	0.82
Correction coefficient for short-circuit breaking capacity	1	0.83	0.71	0.63

> Copper bar specifications

Rated current of shell bracket level I_{nm} (A)	Rated current I_n (A)	Copper bar specifications	
		Root	Size (mm×mm)
2500	630	2	60×5
	800	2	60×5
	1000	2	60×8
	1250	2	80×5
	1600	3	80×5
	2000	4	80×5
4000	2500	5	80×5
	2000	2	100×5
	2500	3	100×8
	2900	3	100×10
	3200	4	100×8
	3600	4	100×10
7500	3900	5	100×10
	4000	5	100×10
	4000	5	100×10
	5000	7	100×10
7500	6300	8	100×10
	7500	10	100×10

The specifications in the table refer to the copper bar specifications used when the circuit breaker is installed in an open environment with a maximum ambient temperature of 40C and meets the heating conditions specified in GB/T14048.2.

> Electrical accessories

Undervoltage release device, undervoltage release device

Note: In thunderstorm prone areas or power grids with unstable power supply voltage, it is recommended to use a release with a delay to prevent the circuit breaker from tripping due to a short-term voltage drop. The delay time is generally 0.3s, 0.5s, 0.7s, 1s, 3s, and 5s, which can be chosen by users



Rated working voltage U_e (V)	AC400	AC230
Undervoltage release action voltage (V)	(0.35~0.7) U_e	
Action voltage of voltage loss release (V)	≤0.35 U_e	
Undervoltage reliable closing voltage (V)	(0.85~1.1) U_e	
Under voltage reliable unable to close electrical energy (V)	≤0.35 U_e	
Power dissipation	12VA	

Shunt release

Can be remotely operated to disconnect the circuit breaker

Rated control power supply voltage U_e (V)	AC400	AC230	DC220
Action voltage	(0.85~1.1) U_e		
Instantaneous current (A)	1.2	1	
Closing time (ms)	50ms ± 10ms		

Closed electromagnet

After the energy storage is completed, closing the electromagnet can instantly release the energy stored by the operating mechanism, causing the circuit breaker to quickly close.



Rated control power supply voltage U_e (V)	AC400	AC230	DC220
Action voltage	(0.85~1.1) U_e		
Instantaneous current (A)	1.2	1	
Closing time (ms)	50ms ± 10ms		

AUXILIARY switch

Rated working voltage U_e (V)	Agreed heating current I_{th} (A)	Rated control capacity
AC400	6	300VA
AC230		
DC220		

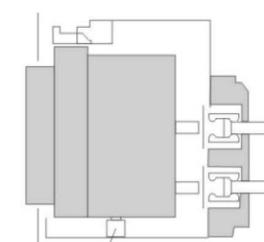
The standard type of auxiliary switch is 4 normally open and 4 normally closed conversion contacts



Rated voltage U_e	Rated heating current I_{th} (A)	
	AC 50Hz	AC250V
	AC380V	1
DC	DC220V	0.3
Utilization category	AC-15、AC-12	
	DC-12	

“Three Positions” Wiring diagram

Separate	Test	Connect
02 ○ 03 ○ 01	05 ○ 06 ○ 07	08 ○ 09 ○ 07



three position switch

Three position switch

The three position switch is mainly suitable for drawer type circuit breakers. Indication of separation, testing, and connection status;

The separation position is equipped with one normally open and one normally closed contact; The test position is equipped with one normally open and one normally closed contact; The connection position is configured with one normally open and one normally closed contact;

> Electric operating mechanism

The circuit breaker has the functions of motor energy storage and automatic energy re storage (the circuit breaker can also store energy manually)

Shell frame level	2500	4000
Action voltage (V)	230/400	
power	85W	110W
Energy storage time (s)	< 7s	

Power module

Input power supply: AC230V/AC400V/DC110V/DC220V (optional);

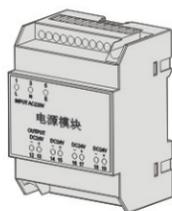
When using grounding protection, communication, thermal memory functions, or requiring the circuit breaker to maintain input and output signals in the open state, an auxiliary power supply must be equipped.

When selecting a DC type intelligent controller, the DC power supply must be converted to DC24V through the DC power module and then provided to the intelligent controller

ST201 Relay Expansion Module

The working power supply of the relay expansion module is DC24V, which is provided by the ST-IV power module.

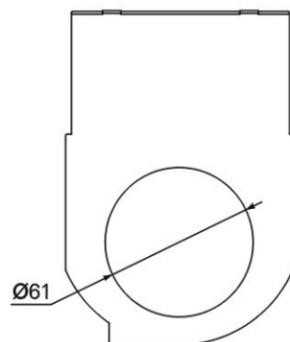
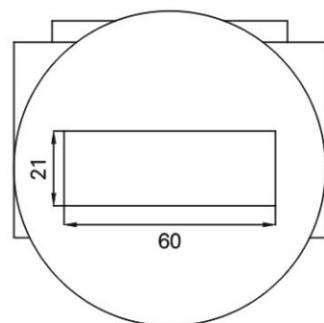
The DO/DI signal unit output by the controller is generally used for fault alarm or indication. When used for the opening and closing of the controller or when the load capacity is large, the DO/DI control signal sent by the controller needs to be amplified through the ST201 relay module. The ST201 contact capacity is: AC250V, 10A; DC28V, 10A. The appearance and installation dimensions are consistent with the ST-IV power module.



> External neutral line (N-phase) transformer (T)

When used in a (3P+N) distribution system with a three pole circuit breaker (in which case the intelligent controller unit should choose IU4.0 type), the installation point distance on the neutral line N should be up to 2m.

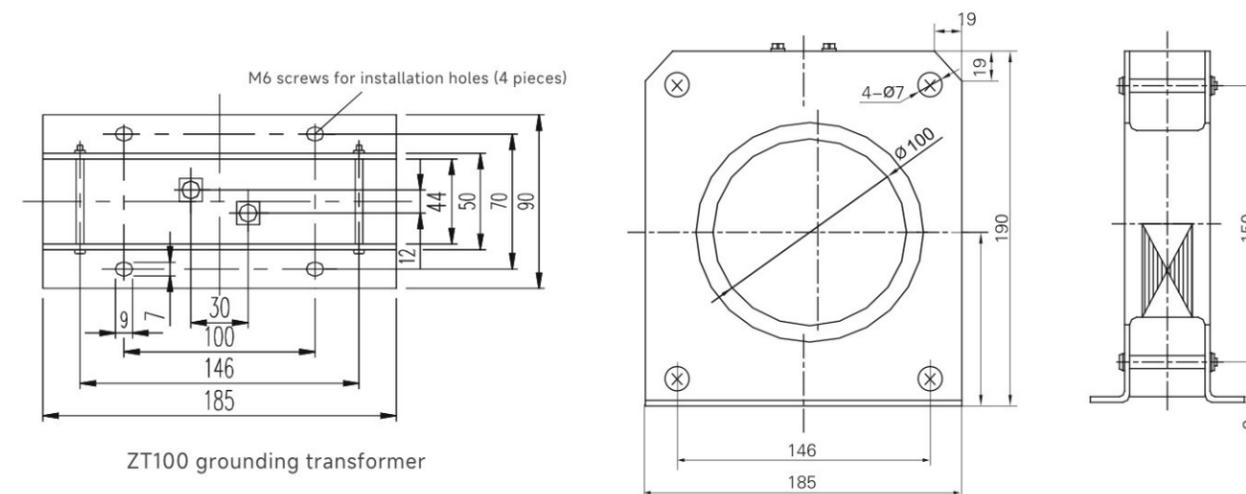
The three specifications are as follows:



If the N-phase busbar is too wide and the existing external N-phase transformer cannot meet the requirements, our company can also provide flexible transformers, which can be connected to 100mm or more wide busbar.

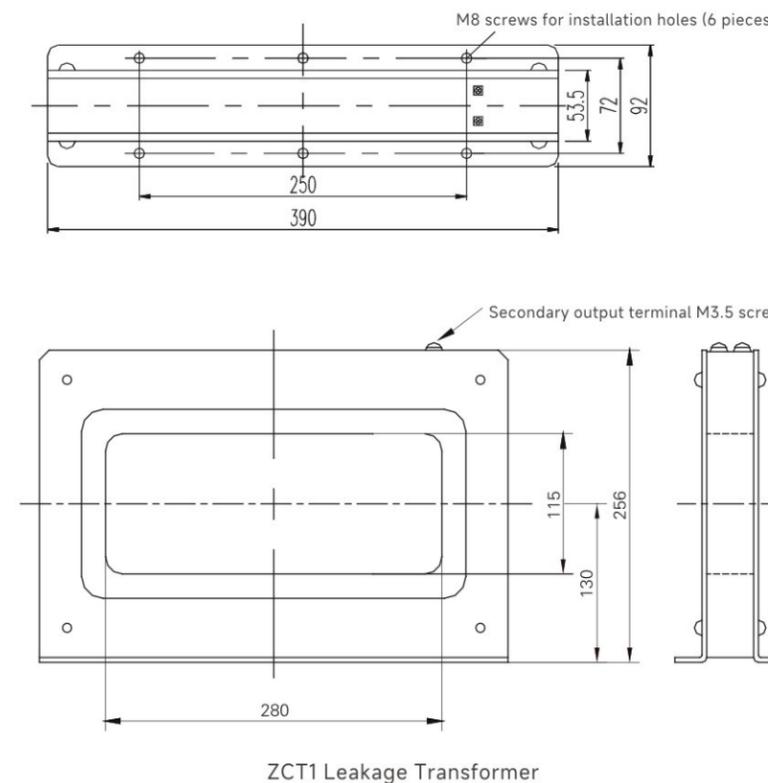
> External grounding current transformer

The controller is used when the grounding protection is ground current protection (W), and the external grounding current transformer is ZT100 transformer. The transformation ratio is: the rated current of the controller is 1A (below 3200A), and the rated current of the controller is 5A (3200A and above).



> External zero sequence leakage transformer

The controller is used when the grounding protection is leakage protection (E), and the external zero sequence leakage transformer is ZCT1 transformer, with a transformation ratio of 30A/20mA.



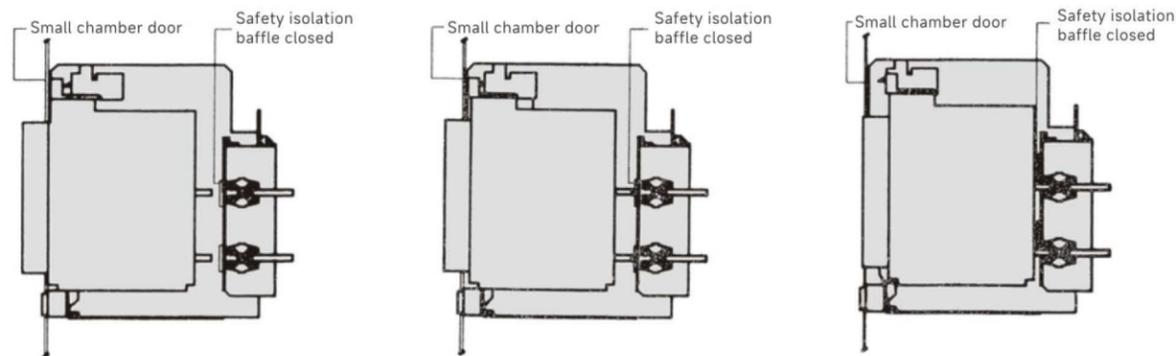
Electrical indication device for drawer seat position

When the drawer type circuit breaker body and drawer seat are respectively in three positions of "separation", "test", and "connection", the electrical indicator devices at these three positions can output electrical status signals corresponding to these three positions, and the device is installed in the drawer.

> Characteristic

Rated working voltage Ue (V)	230
Agreed heating current Ithe (A)	10
Rated working current Ie (A)	1.5

Separation position status Test position status Connection position status

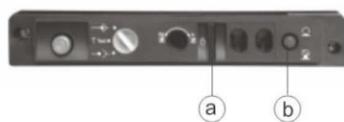


The main circuit and auxiliary circuit are all disconnected, and the safety baffle is closed

The main circuit is disconnected, the auxiliary circuit is connected, and the safety baffle is closed. Necessary tests can be carried out

Both the main circuit and auxiliary circuit are connected, and the safety baffle is opened

> Circuit breaker drawer seat connection, testing, and separation device



A padlock device (provided by the padlock user)
User drawer locking "separation" or "test" or "connection" position;
Interlocking and unlocking devices for circuit breaker separation, testing, and connection positions.

Used for automatic search and locking of forward and backward hand cranking handles;
The positions of "separation", "test", and "connection" should avoid malfunctions caused by operators not operating the handle properly.

Lock position release

After the red interlocking device pops up in the locked position, if you want to operate the handle again, you must first press the red interlocking device before operating the hand crank handle.

Interphase partition

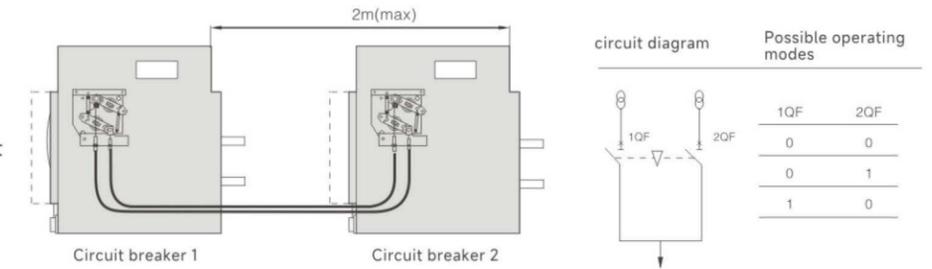
Vertically installed between the terminal blocks of the fixed part of the drawer type circuit breaker, to strengthen the insulation strength of the busbar connection and prevent arc from spreading inside the circuit breaker.

Three locks and two keys

The three lock two key mechanical interlocking is designed specifically for three non adjacent circuit breakers. When two circuit breakers need to be closed, first insert the key into the lock holes of the two circuit breakers, and press and hold the opening button to rotate clockwise. At this point, the circuit breaker can be closed, but the key cannot be removed. If the key is removed, the circuit breaker needs to be opened, the opening button needs to be pressed, and the key needs to be turned counterclockwise and taken out. At this point, the circuit breaker will not be able to close.

Mechanical interlocking

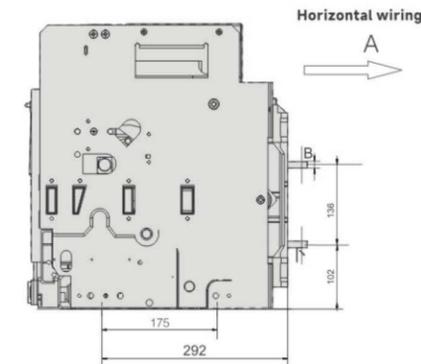
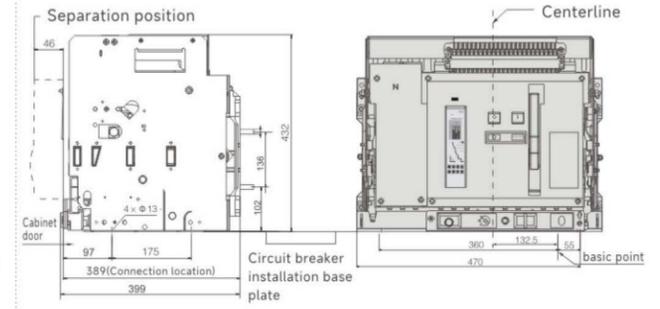
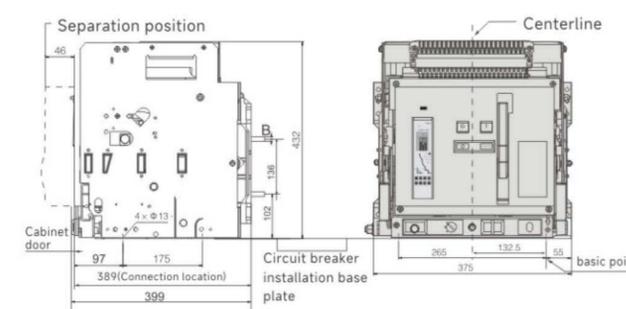
Interlocking of two flat circuit breakers with steel cables or interlocking of two stacked circuit breakers with connecting rods



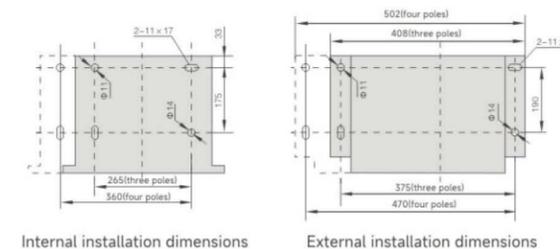
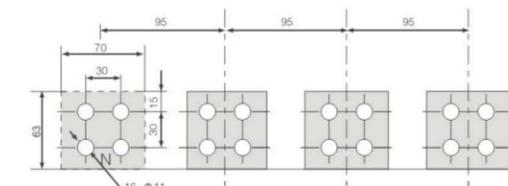
> JGGYW3-2500HU Outline and Installation Dimension Drawing

JGGYW3-2500HU Drawer type circuit breaker (3 poles)

JGGYW3-2500HU Drawer type circuit breaker (4 poles)

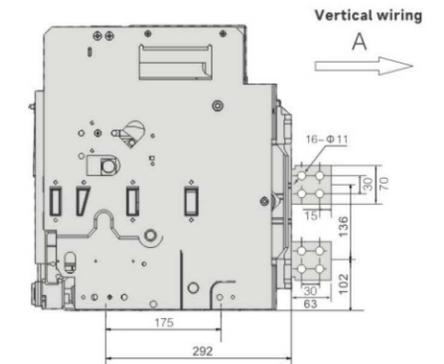


Standard horizontal wiring

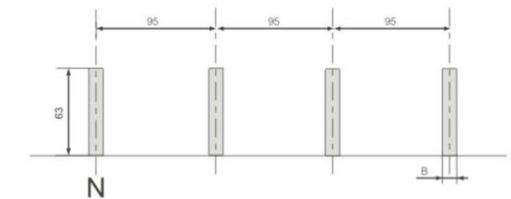


Internal installation dimensions

External installation dimensions



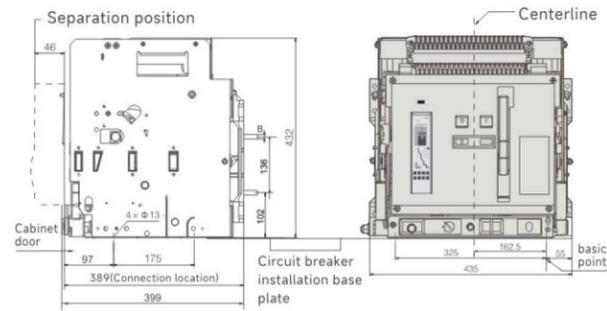
Vertical wiring



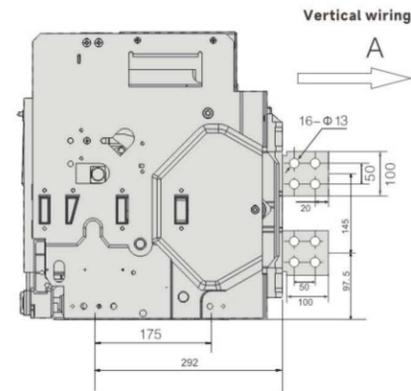
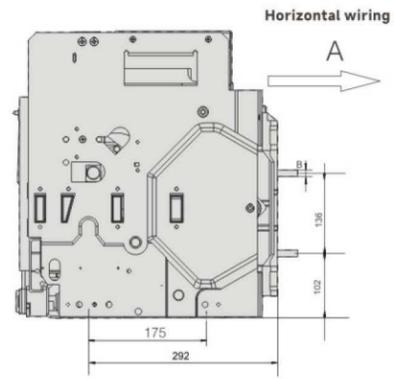
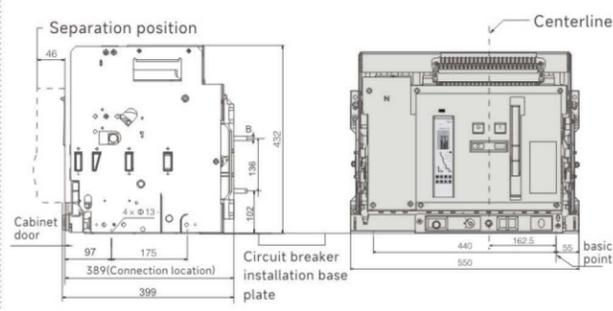
Rated current (A)	Dimension B (mm)
630~800	10
1000~1600	15
2000~2500	20

> JGGYW3-4000HU Outline and Installation Dimension Drawing

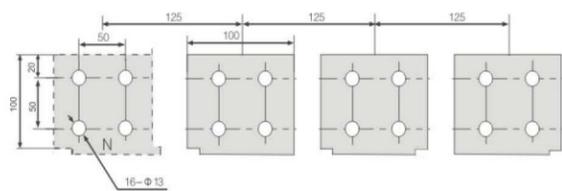
JGGYW3-4000HU Drawer circuit breaker (3 poles)



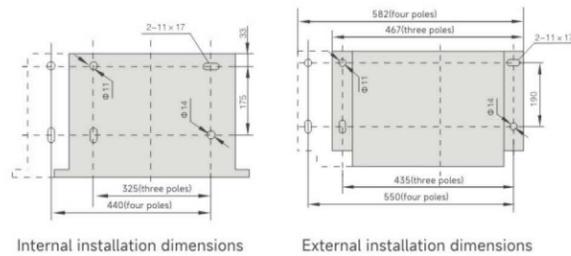
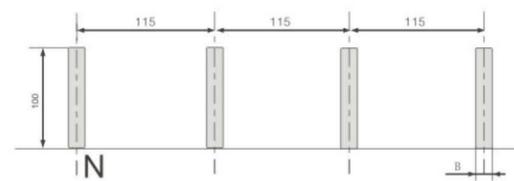
JGGYW3-4000HU Drawer circuit breaker (4 poles)



Standard horizontal wiring



Vertical wiring

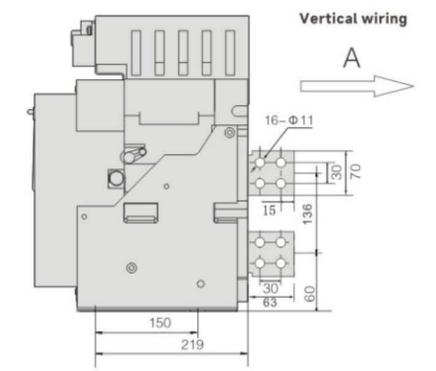
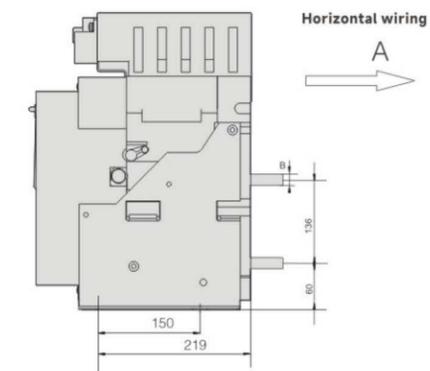
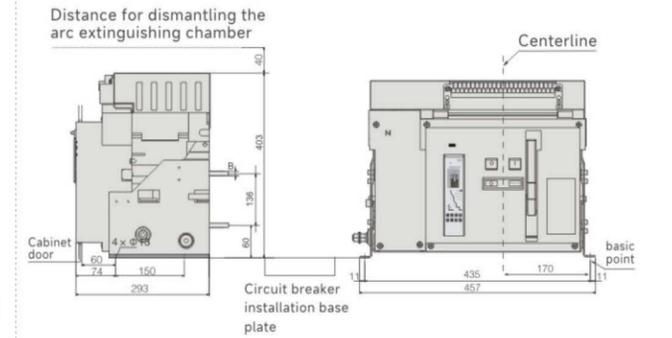
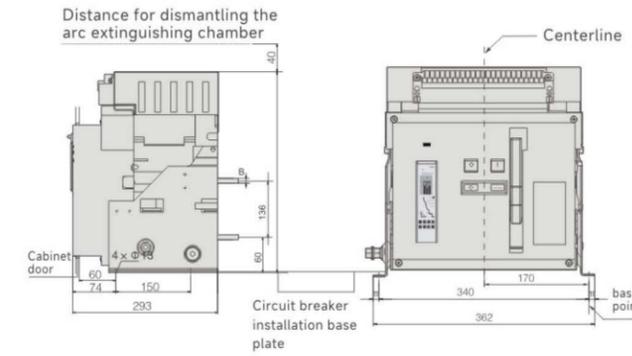


Rated current (A)	Dimension B (mm)
2000, 2500	20
2900, 3200	
3600, 4000	

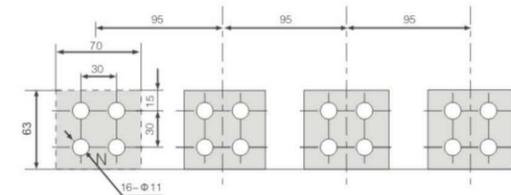
> JGGYW3-2500HU Outline and Installation Dimension Drawing

JGGYW3-2500HU Drawer type circuit breaker (3 poles)

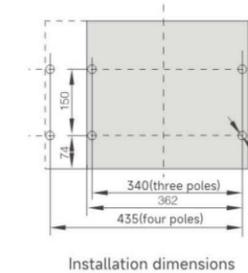
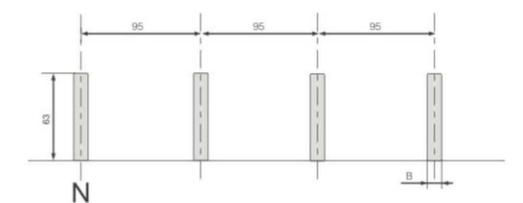
JGGYW3-2500HU Drawer type circuit breaker (4 poles)



Standard horizontal wiring



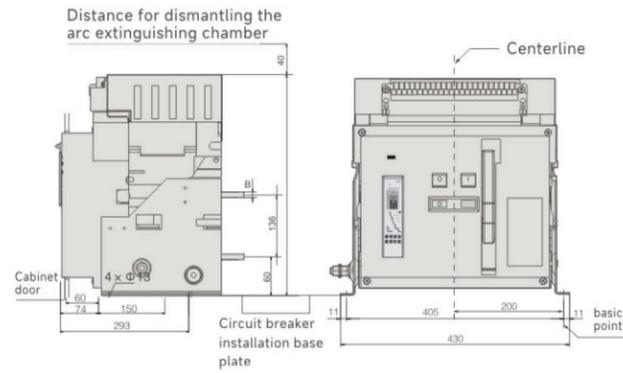
Vertical wiring



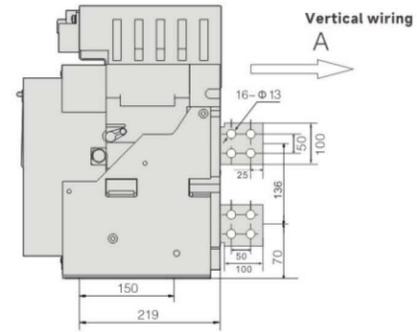
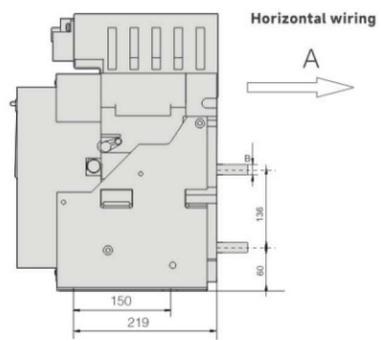
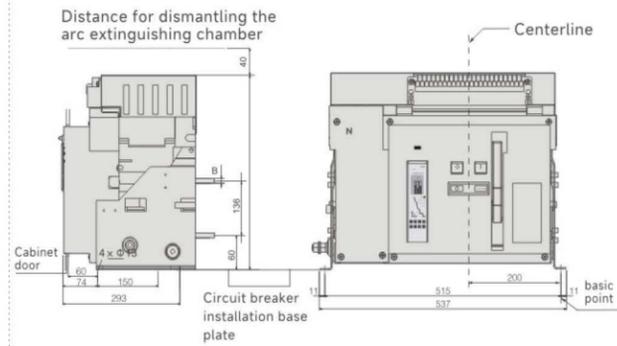
Rated current (A)	Dimension B (mm)
630~800	10
1000~1600	15
2000~2500	20

> JGGYW3-4000HU Outline and Installation Dimension Drawing

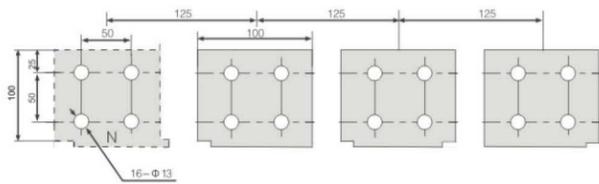
JGGYW3-4000HU Fixed type circuit breaker (3 poles)



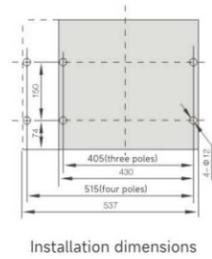
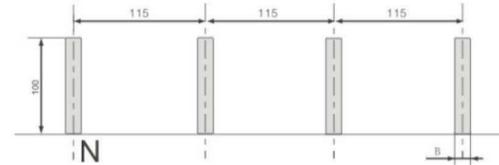
JGGYW3-4000HU Fixed type circuit breaker (4 poles)



Standard horizontal wiring



Vertical wiring

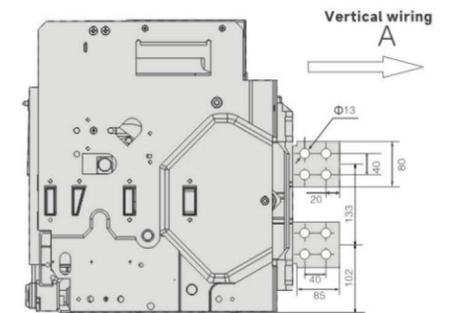
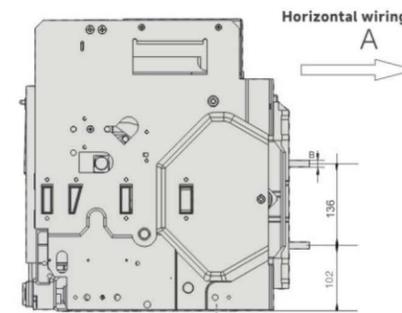
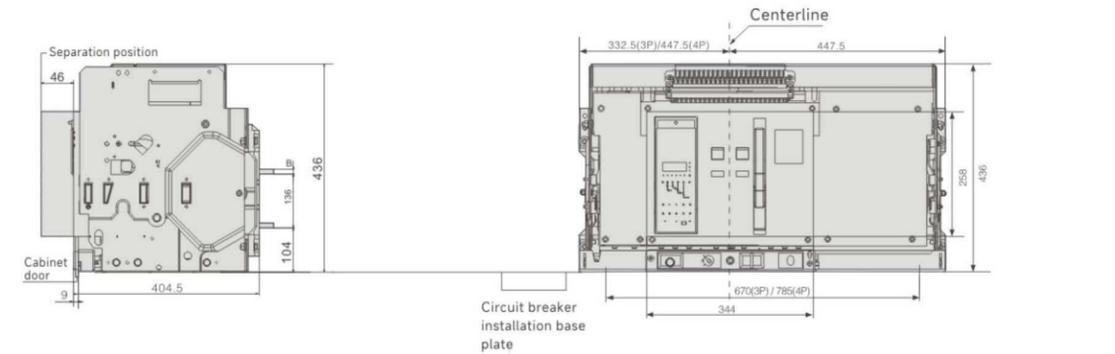


Installation dimensions

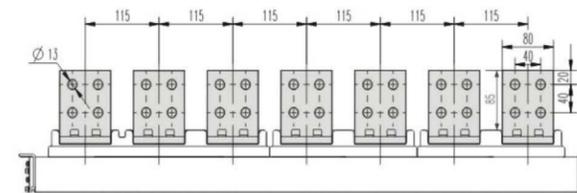
Rated current (A)	Dimension B (mm)
2000, 2500	20
2900, 3200	
3600, 4000	

> JGGYW3-7500HU Outline and Installation Dimension Drawing

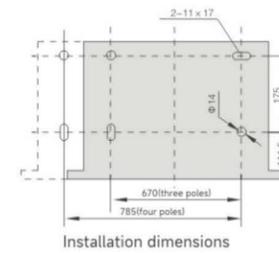
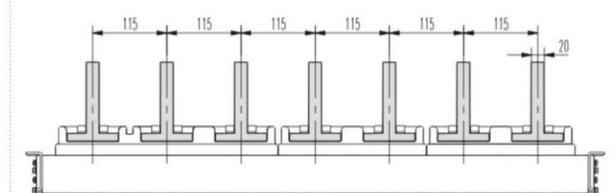
JGGYW3-7500HU Drawer type circuit breaker (3 poles/4 poles 4000A, 5000A)



Standard horizontal wiring



Vertical wiring

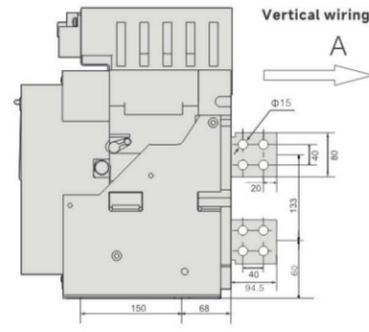
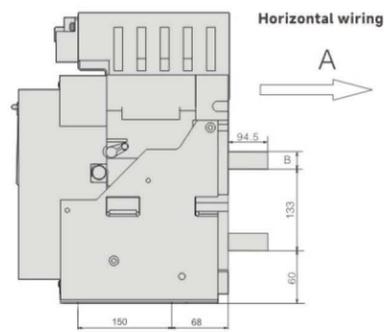
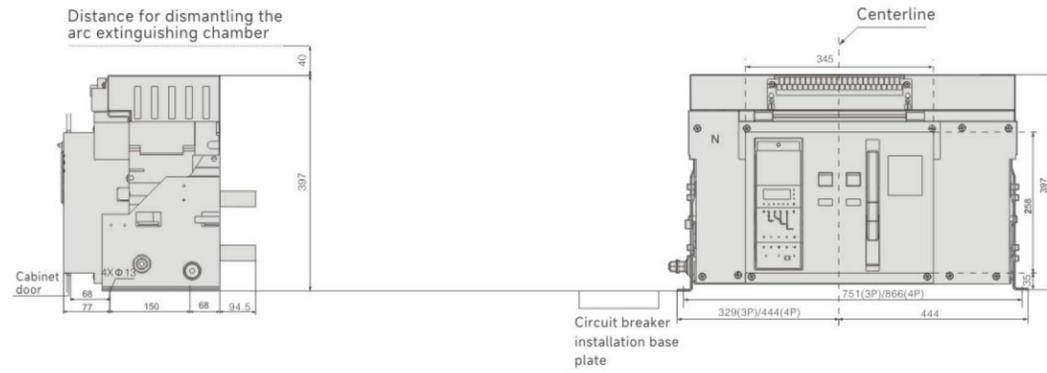


Installation dimensions

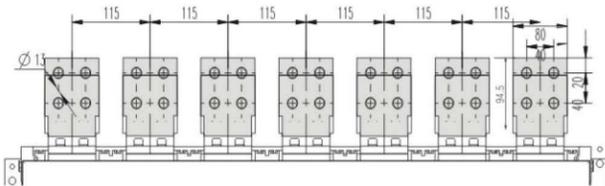
Rated current (A)	Dimension B (mm)
4000	20
5000	

> JGGYW3-7500HU Outline and Installation Dimension Drawing

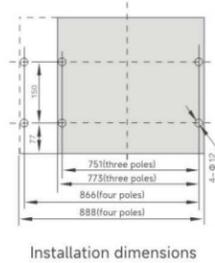
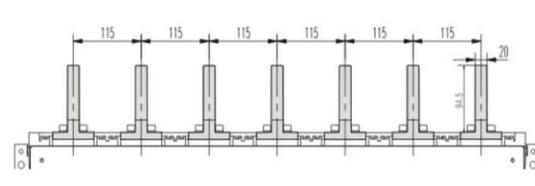
JGGYW3-7500HU Fixed type circuit breaker (3 poles/4 poles 4000A, 5000A)



Standard horizontal wiring



Vertical wiring

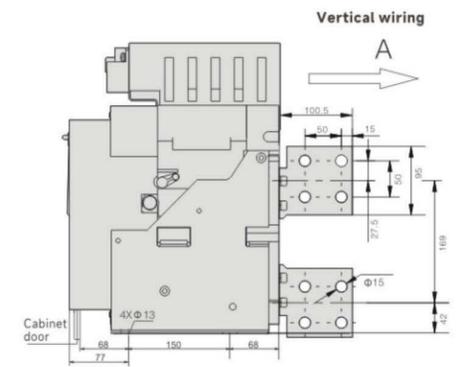
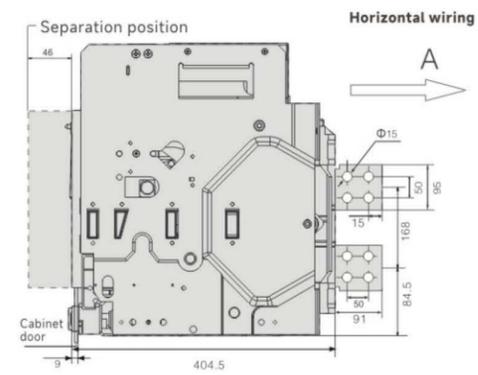
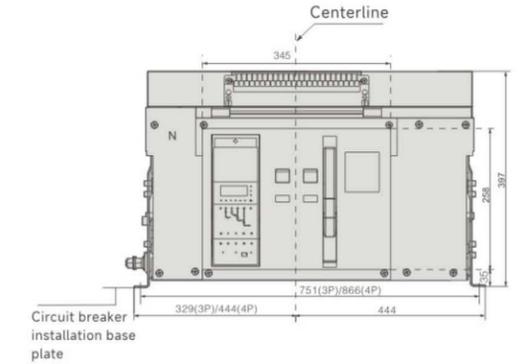
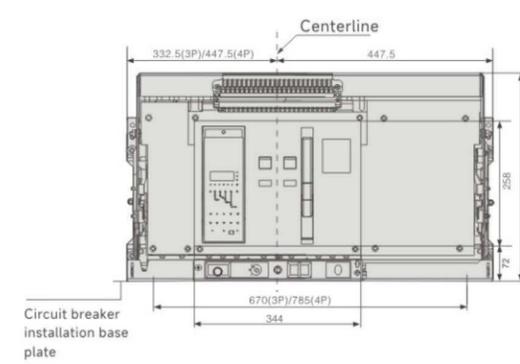


Rated current (A)	Dimension B (mm)
4000	20
5000	

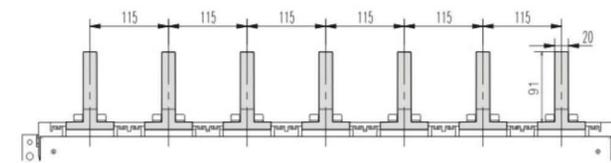
> JGGYW3-7500HU Outline and Installation Dimension Drawing

JGGYW3-7500HU Drawer type circuit breaker (3 poles/4 poles 6300A)

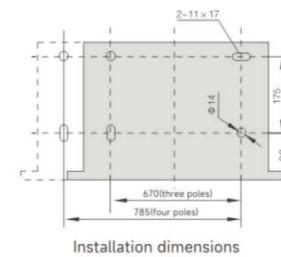
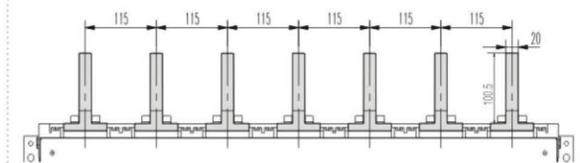
JGGYW3-7500HU Fixed type circuit breaker (3 poles/4 poles 6300A)



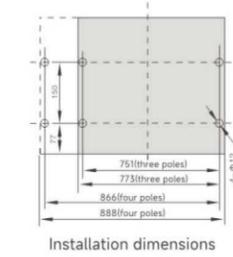
Standard horizontal wiring



Vertical wiring



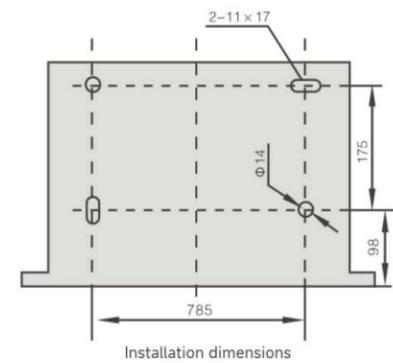
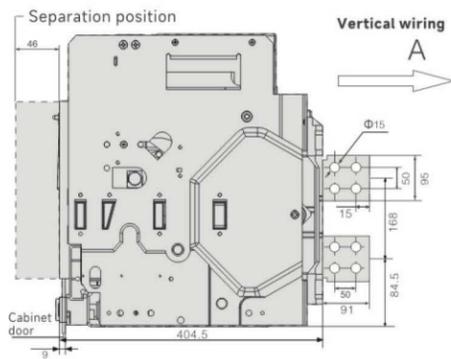
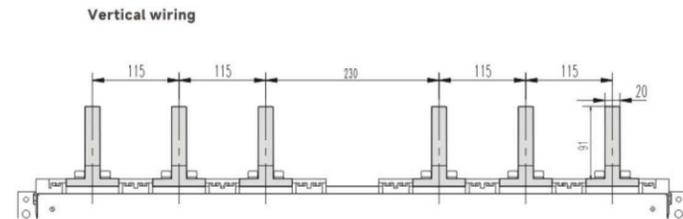
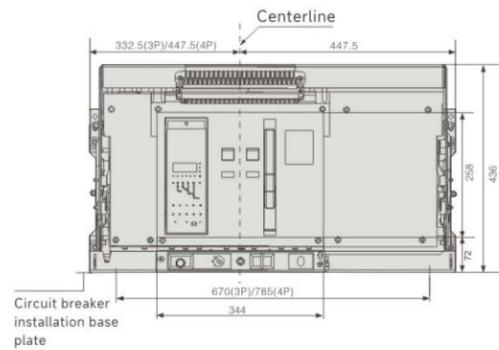
Rated current (A)	Dimension B (mm)
6300A	20



Rated current (A)	Dimension B (mm)
6300A	20

> JGGYW3-7500HU Outline and Installation Dimension Drawing

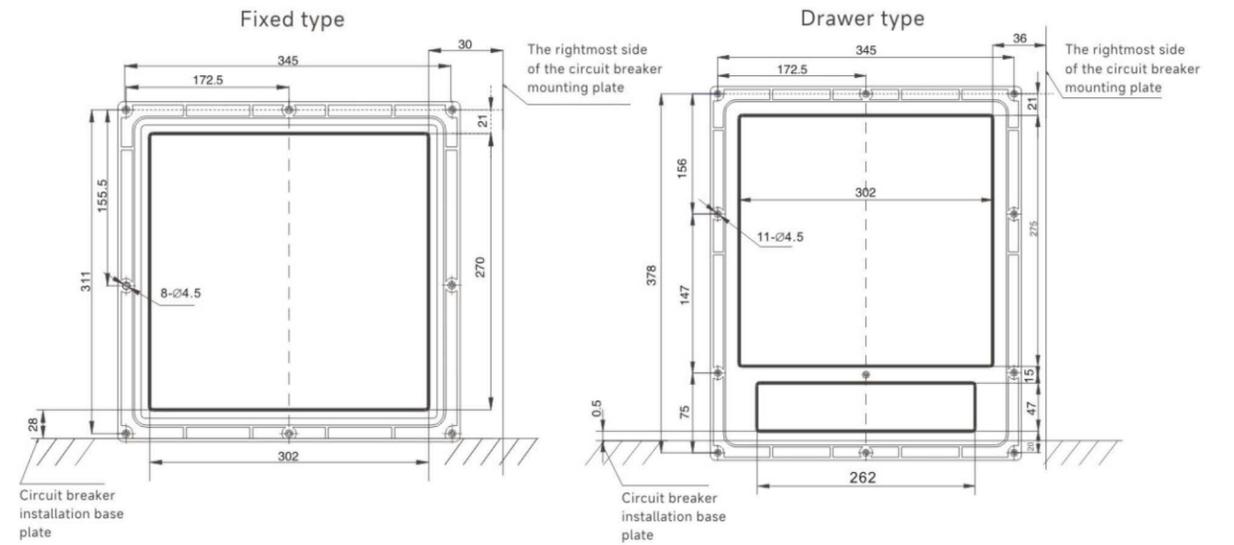
JGGYW3-7500HU Drawer type circuit breaker(7500A)



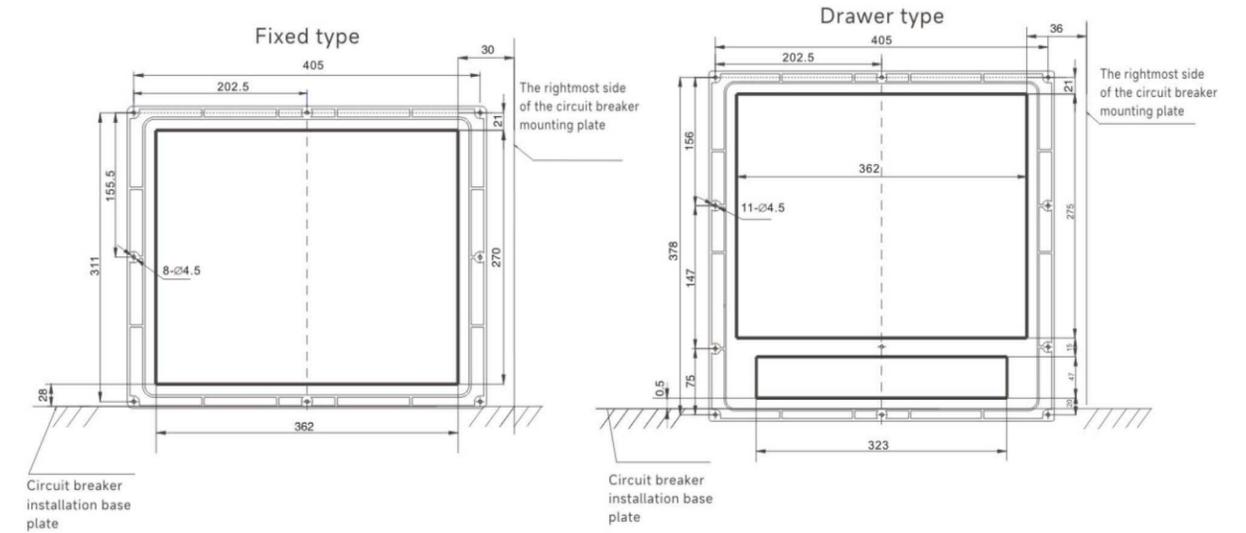
Rated current (A)	Dimension B (mm)
7500A	20

> Door frame size and installation hole spacing

JGGYW3-2500HU (630A~2500A three pole, four pole)

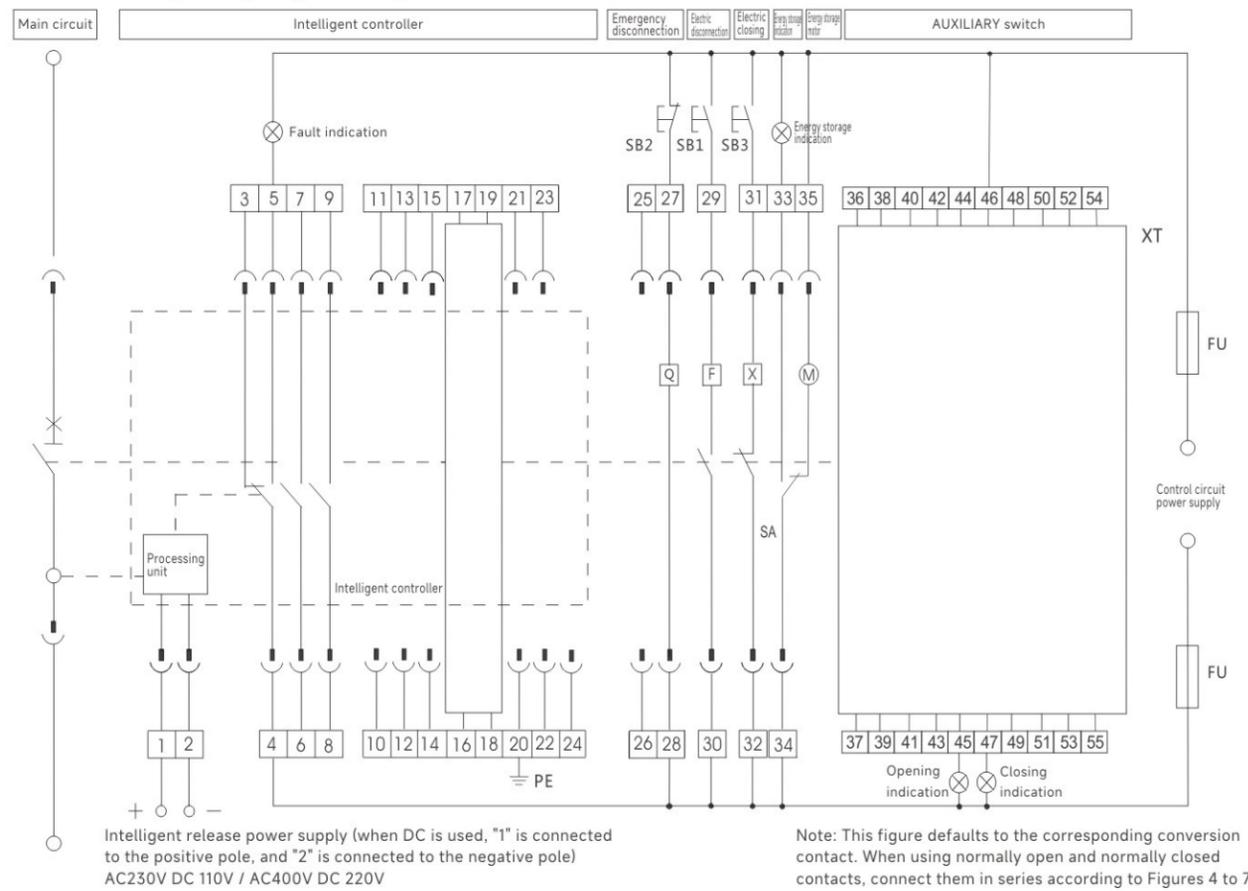


JGGYW3-4000HU (2000A~4000A three pole, four pole)
 JGGYW3-7500HU (4000A~7500A three pole, four pole)



> Mechanical accessories

M、3M Secondary Wiring Diagram of Type I Controller



- 1 # and 2 #: Controller auxiliary power supply, with 1 # as the positive pole when the power supply is DC
 - 3 #, 4 #, 5 #: Fault trip contact output, 4 # is a common point
 - 6 #-9 #: Two sets of auxiliary contact opening points are commonly used (according to Figure 3 when customizing six sets of conversion contacts, and according to Figure 7 when customizing six normally open and six normally closed contacts)
 - 10 #, 11 #: Empty
 - 12 #, 13 #: Load 1 alarm signal output
 - 14 #, 15 #: Load 2 alarm signal output
 - 16 #-19 #: Empty
 - 20 #: Protective ground wire
 - 21 #-24 #: Empty
 - 25 #, 26 #: External transformer signal input terminal (blank when not available)
 - 27 #, 28 #: Undervoltage release power supply (Q)
 - 29 #, 30 #: Shunt release power supply (F)
 - 31 #, 32 #: Close the electromagnetic power supply (X)
 - 33 #, 34 #: Energy storage indication
 - 34 # 35 #: Energy storage motor power supply
- SB1 excitation button, SB2 emergency opening button, SB3 closing button
XT wiring terminal, SA travel switch, FU fuse (6A)
Note:
1. 33 # must be connected in series with the indicator light before connecting to the power supply, otherwise it will cause a short circuit in the circuit.
2. A button can be connected in series between 35 # and the power supply for manual pre energy storage.
3. The buttons, indicator lights, and fuses in the picture need to be provided by the user.
4. The status of the wiring diagram refers to the circuit breaker opening, no energy storage, and the reset button not popping up.

Figure 1: Four sets of conversion contacts (default configuration)

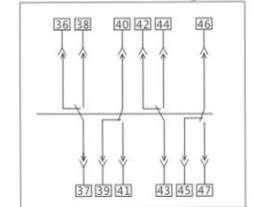


Figure 2 Five sets of conversion contacts (customized as needed)

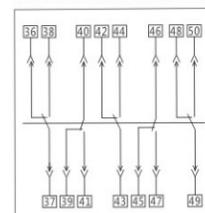


Figure 3 Six sets of conversion contacts (customized as needed)

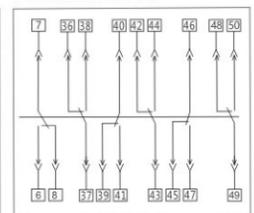


Figure 4 Three normally open and three normally closed contacts

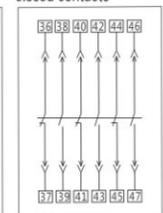


Figure 5 Four normally open and four normally closed contacts

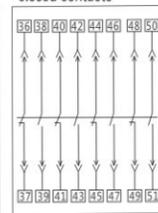


Figure 5 Four normally open and four normally closed contacts

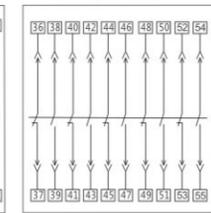
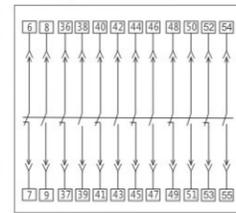
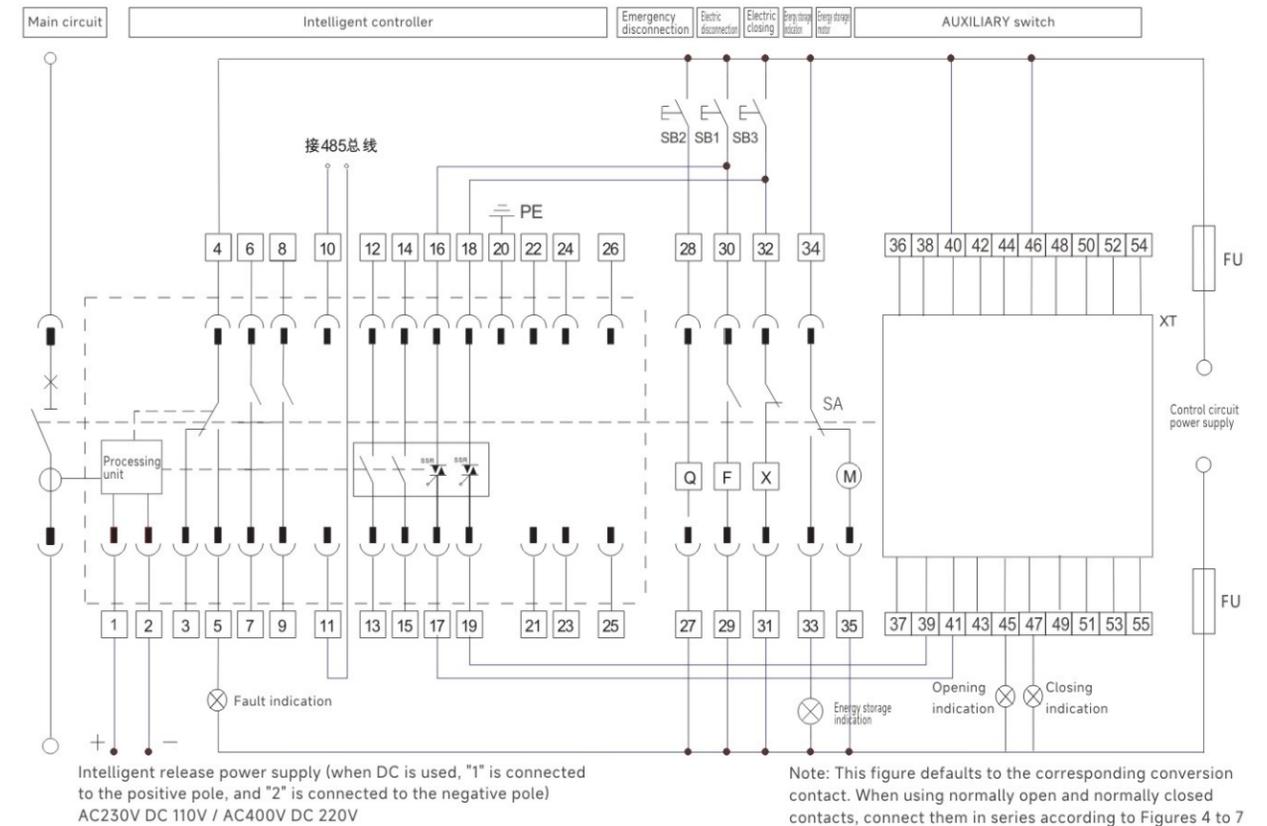


Figure 7 Six normally open and six normally closed contacts



H Secondary Wiring Diagram of Type I Controller



- 1 # and 2 #: Controller auxiliary power supply, with 1 # as the positive pole when the power supply is DC
 - 3 #, 4 #, 5 #: Fault tripping contact output, 4 # is a common point
 - 6 #-9 #: Two sets of auxiliary contact opening points are commonly used (according to Figure 3 when customizing six sets of conversion contacts, and according to Figure 7 when customizing six normally open and six normally closed contacts: RS485 communication interface A and B ends
 - 10 # and 11 # when customizing six normally open and six normally closed contacts: RS485 communication interface A and B ends
 - 12, 13 #: Load 1 alarm signal output
 - 14, 15 #: Load 2 alarm signal output
 - 16, 17 #: Remote opening control output (D03 bidirectional silicon controlled pure electromagnetic coil)
 - 18 #, 19 #: Remote closing control output (D04 bidirectional silicon controlled pure electromagnetic coil)
 - 20 #: Protective ground wire
 - 21 #: N-phase voltage signal input
 - 22 #: A-phase voltage signal input
 - 23 #: B-phase voltage signal input
 - 24 #: C-phase voltage signal input
 - 25 #, 26 #: External transformer signal input terminal (blank when not available)
 - 27 #, 28 #: Undervoltage release power supply (Q)
 - 29 #, 30 #: Shunt release power supply (F)
 - 31 #, 32 #: Close the electromagnetic power supply (X)
 - 33 #, 34 #: Energy storage indication
 - 34 #, 35 #: Energy storage motor power supply
- SB1 excitation button, SB2 emergency opening button, SB3 closing button
XT wiring terminal, SA travel switch, FU fuse (6A)
Note:
1. 33 # must be connected in series with the indicator light before connecting to the power supply, otherwise it will cause a short circuit in the circuit.
2. A button can be connected in series between 35 # and the power supply for manual pre energy storage.
3. The buttons, indicator lights, and fuses in the picture need to be provided by the user.
4. The status of the wiring diagram refers to the circuit breaker opening, no energy storage, and the reset button not popping up.

Figure 1: Four sets of conversion contacts (default configuration)

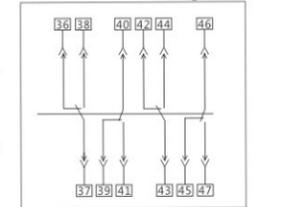


Figure 2 Five sets of conversion contacts (customized as needed)

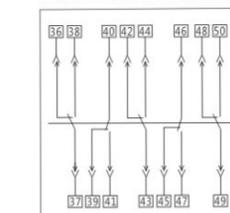


Figure 3 Six sets of conversion contacts (customized as needed)

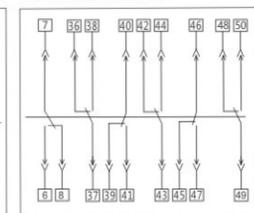


Figure 5 Four normally open and four normally closed contacts

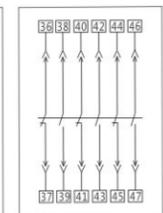


Figure 5 Four normally open and four normally closed contacts

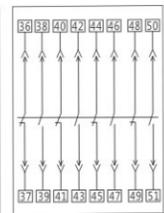


Figure 7 Six normally open and six normally closed contacts

