Installation and Operation Manual

GreenPower

GPR6-12 Series

Air Insulated Switchgear

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GreenPower promotes environmental awareness, and aims to create unprecedented happiness and wealth for our investors, employees, clients and partners. By focusing in the mid-to-high voltage and low voltage eld, and professionally working on R&D, manufacturing, marketing and service of high-end green intelligent switchgears, equipments and products.GreenPower sets to become a well-respected global company in the power industry.

GreenPower, is jointly established by a number of state-owned excellent industrial electrical professional manufacturers, we committed to meet the procurement needs of clients. It is a professional procurement service provider with entity of industrial electrical.

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Innovative business philosophy, strong professional supply team, expert technical guidance, advanced Information network management platform, fast logistics, which makes GreenPower as your procurement expert by your side.

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It covering all aspects of distribution, logistics, warehousing, professional and technical engineering services, systems integration and complete sets of manufacturing. Stable business foundation for cooperation with customers and suppliers, and has established a good reputation to maintain its leading position in the market competition.

Human quests for transcendence, with transcendence we make progress, when the pursuit of unlimited become a belief, our dream began to realize.

Hard-working, dedicated GreenPower people, will be adhering to its past glory, beginners mind, let go sailing, to face the fierce competition in the future, and always help customers make the best choice, and strive to become the best and most reliable procurement service provider in the eld of industrial electrical.

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01 Product overview

The GPR6-12 series of the air insulated switchgear consists of two parts. The first part is the box-type fixed metal closed switchgear, and the second part is the air insulated load switchgear (or the half-insulated switchgear).

The GPR6-12 series of the air insulated switchgear is an intelligent ring network equipment that integrates high voltage switchgear, power distribution devices, and protection functions. It uses the leading international technology and technology, which has the characteristics of compact structure, flexible operation, safe and reliable operation. The GPR6-12 series of the air insulated switchgear is suitable for small and medium-sized power stations, industrial factories, commercial buildings and other places, providing a strong guarantee for the modern power system.

This switchgear is mainly used in 3, 6, and 10kV three-phase AC 50Hz systems to receive and distribute electric energy. It is especially suitable for frequent operations. Its bus system is a single bus (and can derive single-line bus bypass and Double busbar structure).

The main switch of the box-type fixed metal closed switchgear uses the GPVN-12 series of vacuum circuit breakers, equipped with the CT series spring operating mechanism, and the isolated switch uses GN30-12 rotating switch and GN19-12 large current isolated.

The main switch of the air insulated load switchgear is used by the main switch of the FLN or ABB-SFG high-quality SF_6 load switch. The cabinet structure is reasonable and compact, with small size and convenient installation. The operation is flexible and simple, the operation is safe, stable, and exempt, and is a high-quality and safe product. Widely used for 10kV power distribution system.

This switchgear meets the requirements of the national standard GB3906 "3.6 ~ 40.5kV AC metal closed switchgear" and international standard IEC298, and there are two "five-defense" locking functions proposed by them.

The GPR6-12 series of the air insulated switchgear has been tested through the National High Voltage Electrical Detection Center. The technical performance meets the IEC and GB standards. The quality of the product is excellent, the performance is stable and reliable, and it sells all over the country.

02 Product use environmental conditions

- Altitude: No more than 1000m;
- Ambient temperature: Maximum +40℃ , minimum -25℃ ;
- Relative humidity: The daily average value is not greater than 95%, and the monthly average value is not greater than 90%;
- Water steam pressure: The average usual value is not greater than 2.2×10^{-3}MPa, and the average monthly average is not more than 1.8×10^{-3}MPa;
- Earthquake intensity: No more than 8 degrees;
- Use in places without risk of fire, explosion, serious pollution, chemical corrosion and severe vibration.
- Note: When the actual usage environment conditions are inconsistent with the above conditions, the user is asked to negotiate with our company.

03 Product model and meaning

GP R 6 - □ □ / □ □ - □

- GP: Company code: GreenPower Electric
- R: Indoor fixed type
- 6: Design number
- □: Rated voltage (kV)
- □: Circuit breaker type
- □: Operating mechanism features: T: spring operation; D: electromagnetic operation
- □: Rated current (A)
- □: Rated thermal stability current (kA)

04 Technical parameters

Technical parameters of the switchgear

Item	Unit	Data				
Rated voltage	kV	3, 6, 10				
Maximum working voltage	kV	3.6, 7.2, 12				
Rated current	A	630~2500				
Maximum working current	A	630	1000	1000	2000	2500
Rated breaking current	kA	20		31.5		40
Rated thermal stable current	kA	20		31.5		40
Rated dynamic stable current	kA	50		80		100
Rated closing current	kA	50		80		100
Thermal stabilization time	s	4				
Protection level		IP2X				
Busbar system		Single busbar				
Operation method		Electromagnetic type, spring energy storage type				
Overall dimensions (Width × Depth × Height)	mm	900 × 1900 × 2200 (Below 1000A)				
Weight	kg					

Technical parameters of circuit breaker and operating mechanism

Item					GPVN-12 / 630-20 1250-31.5	GPVN-12 / 1250-20 2000-31.5 2500-31.5	GN30-12 / 1000-31.5 1250-31.5 1000-31.5 1250-31.5
Matching mechanism	DC Electromagnetic	Model			CD10-I	CD10-II	CD10-III
		Working voltage	Closing coil		110V, 220V		
			Opening coil		24V, 48V, 110V, 220V		
		Working current	Close	110V	196A	240A	294A
				220V	98A	120A	147A
			Open	24V	37A		
				48V	18.5A		
				110V	5A		
				220V	2.5A		
	Spring energy storage	Model			CT8-I	CT8-II	
		Working voltage	Energy storage motor		≂ 110, ≂ 220, ~ 380		
			Separation trip		≂ 110, ≂ 220, ~ 380, — 48		
			Voltage loss trip		~ 110(100), ~ 220, ~ 380		
		Energy storage time			⩾ 5s		
		Overcurrent trip			5A		
		Closing time			DC Electromagnetic ⩾ 0.20s, Spring energy storage ⩾ 0.15s		
		Opening time			⩾ 0.06s		

This switch is mainly a vacuum circuit breaker, and various plans for SF_6 circuit breakers are yet to be designed.

Item	Unit	GPVN-12 / 630-20 1250-31.5	GPVN-12 / 1250-20 2000-31.5 2500-31.5	GN30-12 / 1000-31.5 1250-31.5 1000-31.5 1250-31.5
Rated voltage	kV	10		
Maximum working voltage	kV	12		
Rated frequency	Hz	50		
Rated current	A	1250	1250, 2000	2500
Rated breaking current (effective value)	kA	20	31.5	40
Rated closing current (peak value)	kA	50	80	100
Rated thermal stable current (effective value)	kA	20	31.5	40
Rated dynamic stable current (peak value)	kA	60	80	100
Thermal stabilization time	s	4		
Mechanical life	times	10000		
Rated short circuit breaking current breaking times	times	30		12
Arc extinguishing chamber vacuum degree	Pa	Not less than 6.6×10^{-2}		
Arc extinguishing time	ms	≤ 20		

Technical parameters of isolating switch

Item		Unit	GN30-12/400-12.5 GN30-12/400-12.5	GN30-12/630-20 GN30-12D/630-20	GPVN-12/2500-40 GPVN-12/3150-40
Rated voltage		kV	10		
Maximum working voltage		kV	12		
Rated current		A	400	630	1000
4s Rated thermal stable current		kA	12.5	20	31.5
Rated dynamic stable current		kA	31.5	50	80
Rated insulation level	1.2/50μs Lightning impulse withstand voltage	kV	75		
	1min Power frequency withstand voltage	kV	42		

Technical parameters of rotary isolating switch

Item			Unit	GN30-12/400-12.5 GN30-12/400-12.5	GN30-12/630-20 GN30-12D/630-20	GPVN-12/2500-40 GPVN-12/3150-40
Rated voltage			kV	10		
Maximum working voltage			kV	12		
Rated current			A	2000		3150
4s Rated thermal stable current			kA	40		50
Rated dynamic stable current			kA	100		125
Rated insulation level	Lightning impulse withstand voltage	Phase to phase, phase to earth	kV	75		
		Across open contacts		85		
	1min Power frequency withstand voltage	Phase to phase, phase to earth	kV	42		
		Across open contacts		53		

Technical parameters of earthing switch

The technical parameters of the earthing switch should be able to match the parameters of the corresponding isolating switch, so the dynamic and thermal stable current and contact pressure of the earthing switch are consistent with the corresponding isolating switch, but the distance between the earthing switch fractures is not less than 125mm.

Technical parameters of voltage monitoring device

Item	Unit	GSN_2-6	GSN_2-10
Rated voltage	kV	6	10
Maximum working voltage		7.2	12
Lightning impulse voltage		57	75
1min Power frequency withstand voltage		32	42
Minimum starting voltage of neon lamp (primary voltage)		3	5
Maximum starting voltage of neon lamp (primary voltage)		7.2	12
Neon lamp long operating life*	year	1	1
Partial discharge capacity (under 1.1Um and 1.1Um voltage)	PC	≯ 5	≯ 5

*Note: If the neon lamp operates intermittently, its lifespan shall not be less than 5 years.

LZZJ ☐ -10 Current transformer technical parameters

Rated primary current (A)	Secondary current (A)	Level	Rated output capacity (VA)	Rated thermal stable current (kA)	Duration (s)	Rated dynamic stable current (kA)
5	5	0.5	10	0.3	2	0.75
		B	15			
10	5	0.5	10	1	2	2.5
		B	15			
15	5	0.5	10	1.5	2	3.75
		B	15			
20	5	0.5	10	2	2	5
		B	15			
30	5	0.5	10	3	2	7
		B	15			
40	5	0.5	10	4	2	10
		B	15			
50	5	0.5	10	5	2	12.5
		B	15			
75	5	0.5	10	8	2	20
		B	15			
100	5	0.5	10	10	2	25
		B	15			
150	5	0.5	10	16	2	40
		B	15			
200	5	0.5	10	20	4	50
		B	15			
300	5	0.5	10	20	4	50
		B	15			
400	5	0.5	10	20	4	50
		B	15			
500	5	0.5	10	20	4	50
		B	15			
630	5	0.5	10	20	4	50
		B	15			
800	5	0.5	10	31.5	4	80
		B	15			
1000	5	0.5	10	31.5	4	80
		B	15			

GPVN-12 Vacuum circuit breaker adjustment parameters

Item	Unit	1000-20 1250-20	1000-25 1600-25	1250-31.5 2500-31.5	1600-40 3150-40
Contact spacing	mm	11 ± 1			
Contact stroke	mm	4 ± 1		4 ± 0.5	
Oil buffer buffer stroke	mm	0 10 -3			
Center distance between phases	mm	250			
Three-phase opening synchronicity	ms	≤ 2			
Closing contact spring time	ms	≤ 2			
Closing contact contact pressure	N	2000 ± 200		3100 ± 100	5000 ± 300
Average opening speed	m/s	1 ± 0.3		1.1 ± 0.2	
Average closing speed	m/s	0.55 ± 0.15		0.6 ± 0.2	
Phase conductive loop resistance	μΩ	≤ 40			
Wear allowed for static moving/fixed contact	mm	3			

Rotary isolating switch adjustment parameters

Item	Unit	GN30-12/400	GN30-12/630	GN30-12/1000 1250
Spring positive pressure	N	400 ± 40	400 ± 40	600 ± 60
Three-phase just closing positions are in the same period	mm	⩾ 3		
Three-phase just closing position deflection		⩾ 2		
Distance between main circuit conductor (high potential) and ground		⩽ 125		
Insulation distance between poles		⩽ 125		
Earthing knife spacing		⩽ 125		
Each phase loop resistance	μΩ	⩾ 75	⩾ 70	⩾ 45

High current isolating switch adjustment parameters

Item	Unit	GN19-12/2000	GN19-12/3150
Each phase loop resistance	μΩ	12.5	8
The three-phase just closing positions are periodic	mm	⩾ 3	
Three-phase just closing position deflection		⩾ 2	
Distance between main circuit conductor (high potential) and ground		⩽ 125	

05 Box-type fixed metal closed switchgear product shape and structure

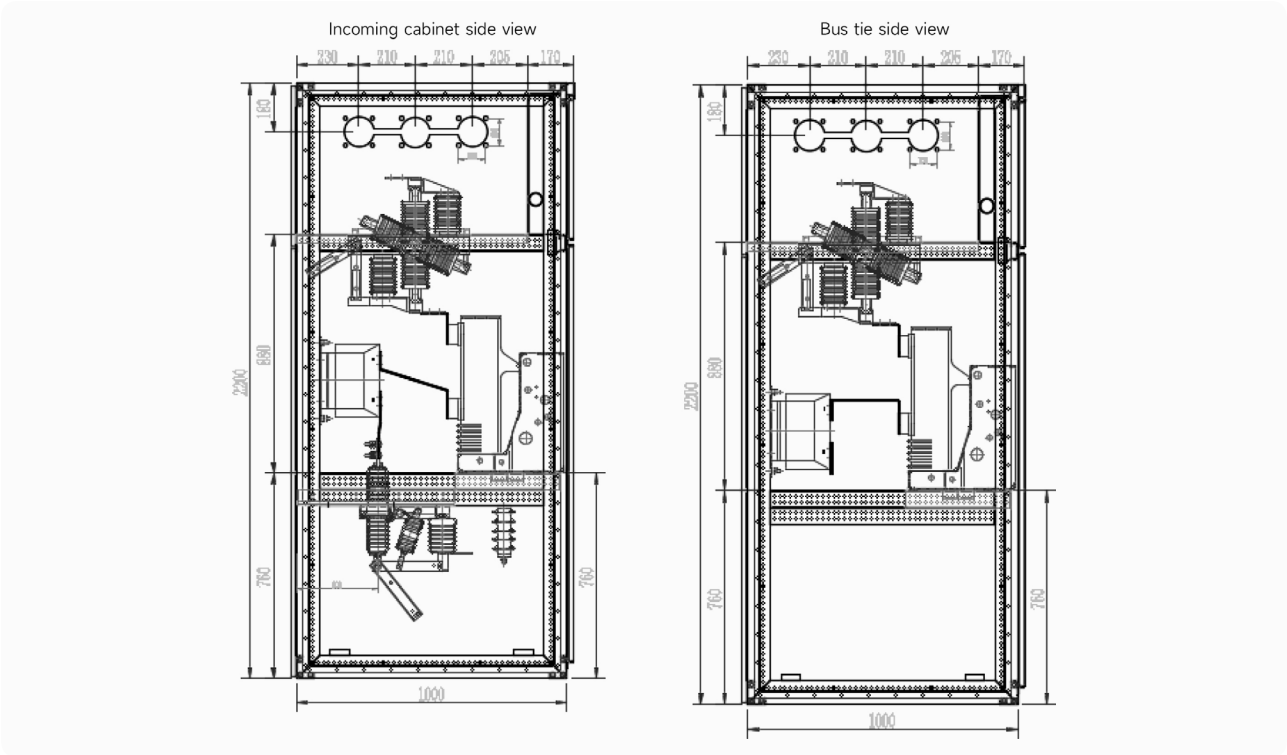


Figure 1 Outline drawing of switchgear

Characteristics of the box-type fixed metal closed switchgear

This switchgear has a metal closed box structure, and the cabinet frame is welded by angle steel. The cabinet is divided into a circuit breaker room, a busbar room, a cable room, and a relay room. Rooms are separated by steel plates.

The circuit breaker room is in the lower part of the cabinet. The transmission of the circuit breaker is connected by the pull rod and the operating mechanism; the lower bus terminal of the circuit breaker is connected to the current transformer, the current transformer is connected to the terminal block of the lower isolation switch, and the upper terminal block of the circuit breaker is connected to the upper terminal block. The terminal block of the isolating switch is connected, and the circuit breaker chamber is also equipped with a pressure release channel. If an internal arc occurs, the gas can release the pressure through the exhaust channel.

The busbar room is in the upper rear part of the cabinet. In order to reduce the height of the cabinet, the busbars are arranged in stars and supported by porcelain insulators with a bending strength of 7350N. The busbars are connected to the upper isolation switch terminals.

The cable room is behind the lower part of the cabinet. The supporting insulators in the cable room can be equipped with monitoring devices, and the cables are fixed on the brackets. When the main junction line is a contact scheme, this room is the contact cable room.

The operating mechanism of the circuit breaker is installed on the left side of the front, and above it is the operating and interlocking mechanism of the isolating switch.

The switchgear is maintained on both sides. The front is for maintenance of the secondary components of the relay room, maintenance of the operating mechanism, mechanical interlocking and transmission parts, and maintenance of circuit breakers. The back is for maintenance of the main busbar and cable terminals. The circuit breaker room and cable room are equipped with indicator.

There is a earthing copper busbar parallel to the width of the cabinet under the front door, with a cross-section of $4\times40mm^2$

Mechanical interlocking: to prevent the on-load opening and closing isolating switch; to prevent mistaken opening and closing of the circuit breaker; to prevent mistaken entry into the live interval; to prevent the live closing of the earthing switch; to prevent the closing of the earthing knife.

The switchgear adopts corresponding mechanical interlocking. The action principle of mechanical interlocking is as follows:

- Power outage operation (operation → maintenance)

  The switchgear is in the working position, that is, the upper and lower isolating switches, the circuit breaker is in the closed state, the front and rear doors are closed and locked, and are in live operation. At this time, the small handle is in the working position.

  First disconnect the circuit breaker, and then push the small handle to the "section locking" position. At this time, the circuit breaker cannot be closed. Insert the operating handle into the isolation hole, pull it from top to bottom, and pull it to the lower isolation opening position. Take off the handle, insert it into the upper isolation operating hole, pull it from top to bottom, and pull it to the upper isolation opening position. Then take off the operating handle, insert it into the earthing switch operating hole, and push it from bottom to upward. The earthing switch is closed. position, at this time, the small handle can be moved to the "inspection" position, the front door can be opened first, and the back-door key can be taken out to open the back door. After the power outage operation is completed, the maintenance personnel can maintain and inspect the circuit breaker and cable room.

- Delivery operation (maintenance → operation)

  If the maintenance is completed and power needs to be supplied, the operating procedures are as follows: close the back door and lock it, take out the key and close the front door, and move the small handle from the maintenance position to the breaking and locking position. At this time, the front door is locked and the circuit breaker cannot be closed. , insert the operating handle into the operating hole of the earthing switch, pull it from top to bottom, so that the earthing switch is in the opening position, take off the operating handle and insert it into the operating hole of the upper isolation switch, push it from bottom to upward, so that the upper isolation switch is in the closing position. In the switching position, remove the operating handle, insert it into the operating hole of the lower isolation, push it from bottom to upward, so that the lower isolation is in the closing position, take out the operating handle, and move the small handle to the working position, then the circuit breaker can be closed.

06 Installation, adjustment and maintenance

Installation

The dynamic load generated by the vacuum circuit breaker when the gate is divided, and the upward and downward is about 7840N. This data provides the basic stress when the design basis is provided.

The foundation of the switchgear should be flat. If there are special requirements, the manufacturer should be informed and the drawings confirmed.

Installation program and precautions:

- Place the switchgear in order on the foundation, adjust the straightness, verticality, and levelness of the switchgear, and then use M12; Bolt or use spot welding method to fasten the switchgear to the foundation channel steel;
- Use M12×30 bolts for cabinet to cabinet connections;
- Install the main busbar, open the top cover plate of the busbar compartment for installation, tighten the top cover plate after installation, and connect the busbar with a flat and free contact surface. If there is any dirt, it should be removed and coated with neutral Vaseline oil;
- Install the cable once, and after the cable head is made, fix the cable head on the bracket. The contact surface between the cable and the busbar should be flat, and the contact surface should be coated with neutral Vaseline oil before connection and tightening. After the cable construction is completed, the cable room and cable trench should be sealed with partitions;
- Connect the indirect earthing busbar of the e-connection cabinet to form a whole along the arrangement direction of the switchgear. Check whether there is any omission in the working earthing and protective earthing, whether the earthing circuit is connected and conductive, and the working earthing resistance should not exceed 1000μΩ, the protective earthing resistance should not exceed 4Ω.
- Install the secondary circuit cable, which runs through the bottom on the left side of the mechanism, enters the relay room along the side wall, and is connected to the corresponding terminal block. During construction, pay attention to the cable number, and the terminal number should not be missed or misplaced. After the secondary cable construction is completed, be sure not to forget to cover the cable holes.

Acceptance testing and preparation for operation

Acceptance test items:

- Check the model and specifications of the electrical components installed in the cabinet according to the ordering information to ensure they match;
- Check if the fasteners are loose, and tighten them if any are found to be loose;
- Check the connection of the busbar for tight contact. If there is any poor contact, it should be repaired;
- Manually operate the isolation switch, circuit breaker, mechanical interlocking program, etc. 3-5 times, which should be flexible without jamming, and the action should be accurate with no errors in the program;
- Check the mechanical characteristics of circuit breakers and isolating switches to ensure they meet their own specified requirements;
- Check whether the secondary wiring meets the requirements of the drawing, and conduct action tests on the secondary circuit under different electrical conditions of the main circuit, which should meet the requirements of the secondary wiring diagram;
- Measurement of main circuit resistance. Due to the multiple schemes of this switchgear, various resistances are yet to be determined. The measurement positions are tentatively determined as circuit breakers and electrical connection terminals. The circuit breakers should not exceed their standard specified values, and the electrical connection terminals should not exceed 1μΩ, the measurement method adopts the DC voltage drop method, with a 100A DC current applied to measure its voltage drop;
- The secondary circuit insulation strength test shall be conducted between the conductor and the casing, with an AC frequency of 50Hz and a voltage of 220V applied for 1 minute. There shall be no breakdown or discharge phenomenon. There are electronic components in the secondary circuit, and the test voltage shall be agreed upon by the manufacturer and the user;
- The main circuit power frequency insulation voltage experiment is conducted by applying AC 50Hz between phases and phases. According to the rated voltage of the switchgear, according to the GB311.1 value of 85%, there should be no breakdown or flashover phenomenon for 1 minute.

Preparation work for operation:

- Lubricating oil should be injected into the active parts where oil is needed;
- Connect control, signal, lighting and other power sources;
- When the isolation switch, circuit breaker, etc. are in the open state, power is supplied to the main busbar, and the incoming circuit breaker cabinet is closed;
- Close the isolation switch of the switchgear with voltage transformers and check if the voltmeter is correct. If it is correct, continue with the next step;
- Close the isolation switch of the lightning arrester, station transformer, and related auxiliary appliances to put them into operation;
- Close the circuit breaker of the feeder cabinet once and check if the ammeter is correct.

Maintenance and overhaul

After the switchgear is put into operation, the monitoring and maintenance work is as follows:

- Observing the main busbar and the busbar at the electrical connection, if any overheating or discoloration of the busbar is found, maintenance should be carried out;
- Observe whether the lighting, control, and signal power supply are supplying power normally.

Regular maintenance, carried out on time according to operating regulations, and the maintenance content is as follows:

- Clean the dust from all parts, especially the insulation surface;
- Repair the program lock and mechanical interlock, maintain flexible and reliable actions, and ensure the program is correct;
- Perform maintenance and debugging according to the regulations for circuit breakers, isolation switches, operating mechanisms, and other electrical appliances;
- Check the contact parts of the electrical appliances for good contact conditions, check the earthing circuit, and maintain continuous connection;
- Tighten all screws and pins.

The maintenance of switchgear includes troubleshooting and regular maintenance. Troubleshooting is to prevent the operation of faults and prevent the expansion of accidents. When a fault is found or is determined to be about to occur, the faulty part should be repaired immediately to promptly eliminate the fault.

Operation, acceptance, and storage of products

- The product can only be packaged and shipped after passing the factory inspection. When packaging, the product is fixed on the bottom row with screws. During transportation, it should only be placed upright and not inverted, overturned, rolled over, or dropped.
- Inspect the entire machine, accessories, etc. according to the product packing list.
- Storage
  - Before installation, the product should be stored in its original packaging in the warehouse. If it cannot be stored in the warehouse, it should be protected from rain and moisture;
  - Do not disassemble electrical components and parts at will.

07 Air insulated load switchgear appearance and structure

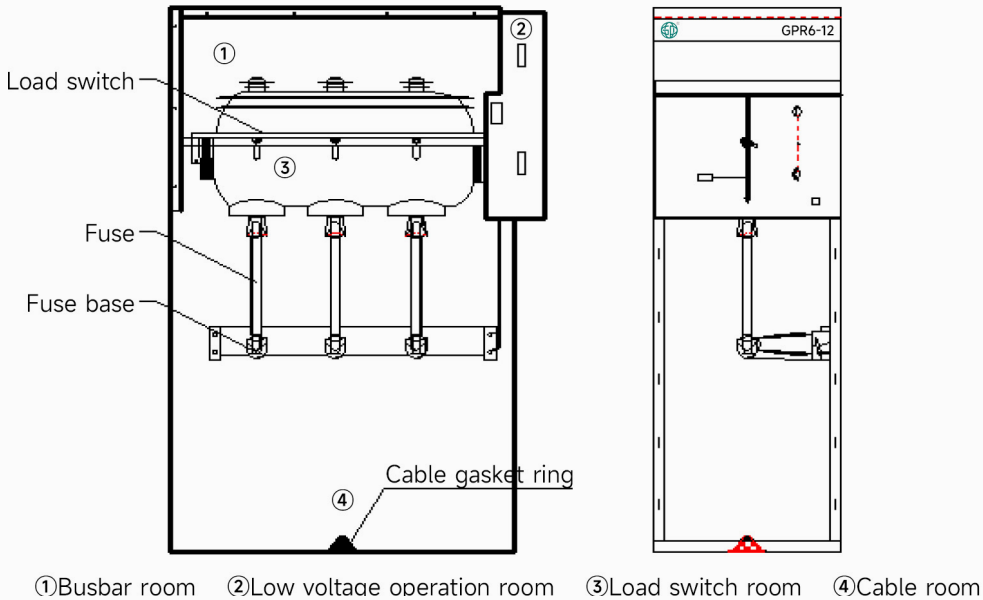


Figure 2 GPR6-12 Outgoing cabinet outline diagram

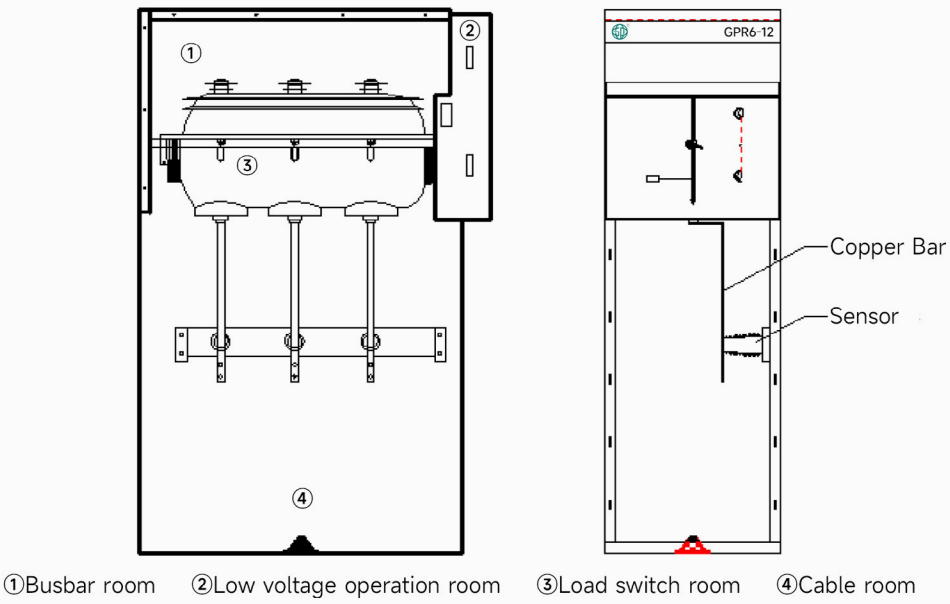


Figure 3 GPR6-12 Incoming cabinet outline diagram

Structural characteristics of air insulated load switchgear

The outer shell is made of 2.0mm aluminum zinc coated plate or high-quality carbon cold-rolled steel plate (unless otherwise specified by the customer), and is sprayed with plastic after acid pickling and passivation treatment. Beautiful appearance, strong corrosion resistance, compact and reasonable structure, small volume, and very convenient combination. The frame is divided into four compartments, and the rear panel is designed with two pressure release ports. Easy to install: can be freely combined, expanded, and assembled according to various design requirements, fast and simple, installation is very convenient, and occupies a small area.

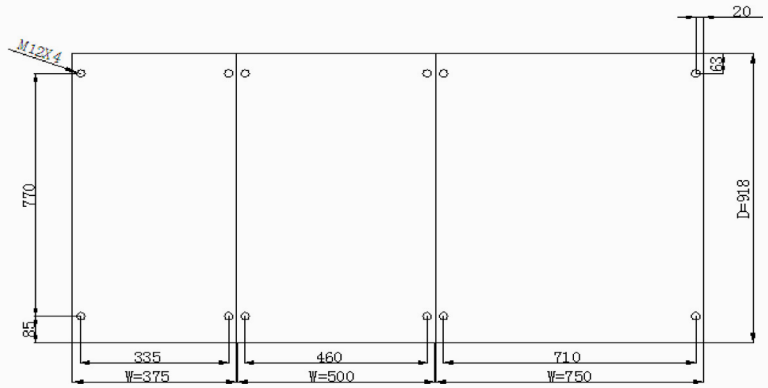
08 Installation, adjustment and maintenance

Cabinet unboxing inspection

- Open the packaging box, follow the packing list, check if the product accessories and accompanying technical documents are complete, and check if the product is damaged during transportation and storage.
- After comprehensive inspection, conduct 5 opening and closing operation tests.

Basic preparation and cabinet disassembly

Prepare the foundation and pour the channel steel base according to the selected cabinet. The basic dimensions of cabinets with widths of 375, 500, and 750 are as follows.

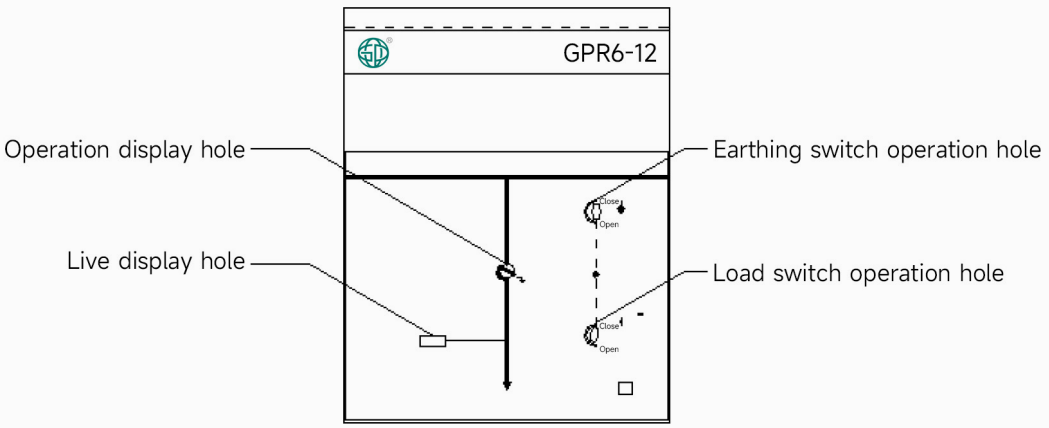


Box positioning and fixation

After checking the level and flatness of the poured channel steel base, wait for the concrete to solidify for 24 hours before placing the box in position and fixing it with M12×20 screws and screw holes on the steel base.

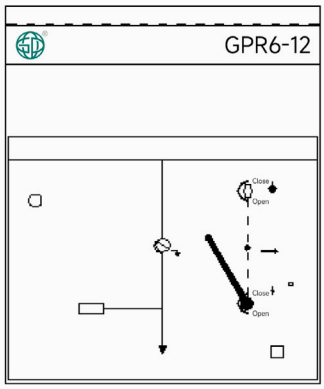
Operation

This high voltage ring main unit is designed for the safety of personal equipment and is equipped with relevant mechanical interlocks. Operators must be familiar with the operating principles before operation.

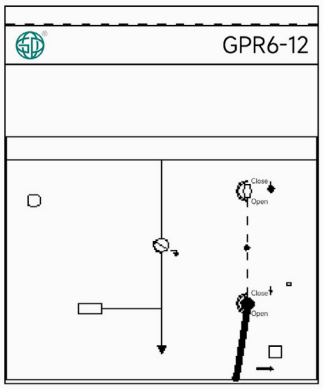


Operating principles and mechanical interlocking:

- After the load switch is closed: the earthing is in the disconnected state and cannot be operated. The lower door cannot be opened.



Schematic diagram of closing operation



Schematic diagram of opening operation

- After the load switch is disconnected, it is possible to perform earthing on/off operations. After earthing, the lower door can only be opened and closed.
- Opening the lower door allows access to the lower output and feeder cables of the load switch, as well as the earthing switch. Caution must be exercised when working without electricity.

Attention: Before starting work, it is necessary to ensure that the load switch is in a earthed state. When entering the busbar room, it is necessary to confirm that the incoming switch has been disconnected and the incoming indicator light has been turned off!

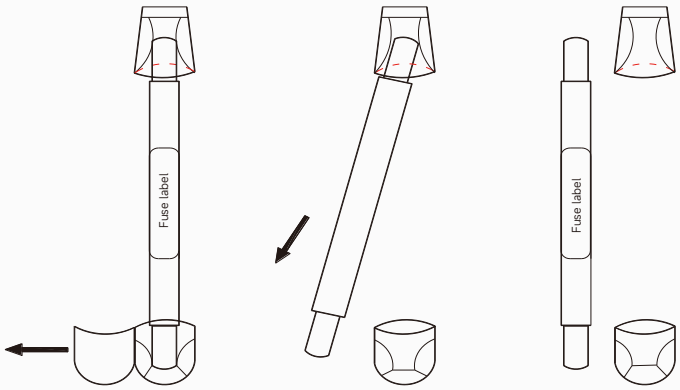
Electric operation configuration

- When installing, assemble the operating mechanism with electric mechanism. The installation procedure is the same as that of ordinary mechanisms.
- Assemble the electrical control components according to the secondary principle wiring diagram and connect the secondary wires.
- Before operating the switch, check the voltage and polarity of the operating power supply. Power can be supplied only after they are correct.
- Press the closing button to close the switch.
- Press the opening button to open the switch.

Install fuses for the outgoing cabinet

- Open the lower fuse holder and push the fuse into the upper fuse holder. (See figure below)
- Push the fuse into the lower fuse holder. (See figure below)
- Close the fuse holder and rotate the fuse to make the label face forward. (See figure below)

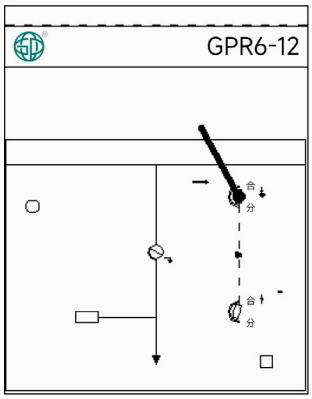
Note: Do not hold the middle part of the fuse.



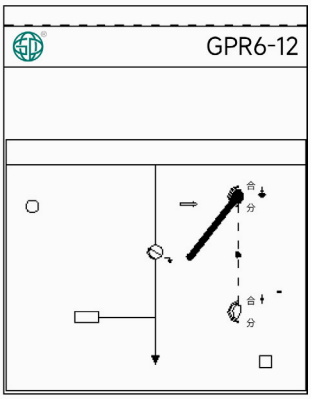
The return operation sequence is: close the door — disconnect the earthing switch — close the load switch. In the earthed state, the load switch cannot be closed.

Operation program

- The load switch is used to connect or disconnect the circuit (provided by the manufacturer), and operates in the specified position according to the direction indicated in the simulation diagram on the operation board.
- Be cautious when using the earthing station for maintenance or prolonged power outages. Before operation, ensure that the load switch is in the disconnected state!



Schematic diagram of earthing closing operation



Schematic diagram of earthing opening operation

Preparation instructions

Inspection before power on

Before powering on, check if the fuse is correctly installed by opening the lower door. Check if the lower fuse holder is fully closed and if the interlocking mechanism is reliably connected. The operation test before power on, input the medium voltage cable for power on. If conditions permit, conduct a withstand test. The power frequency withstand voltage test can be conducted by guiding the wire from the conductive rod. The power frequency withstand voltage value is 42kV/min without the cable.

Attention: Before pressure testing, it is necessary to remove the leads of the charged display to prevent burning out the display.

Preparation instructions

Inspection before power on

Before powering on, check if the fuse is correctly installed by opening the lower door. Check if the lower fuse holder is fully closed and if the interlocking mechanism is reliably connected. The operation test before power on, input the medium voltage cable for power on. If conditions permit, conduct a withstand test. The power frequency withstand voltage test can be conducted by guiding the wire from the conductive rod. The power frequency withstand voltage value is 42kV/min without the cable.

Attention: Before pressure testing, it is necessary to remove the leads of the charged display to prevent burning out the display.

Line-up

Connection of cabinet cable room

There are four 11×20mm holes on both sides of the 1635mm high cabinet at the cable room for the connection of the 8.6 parallel cabinet. The side panels of the 1885mm high cabinet have five holes in front and back, which are used for connecting the cabinets inside the cable room. The hole on the right-side panel is straight, while the hole on the left side panel is horizontal. Therefore, small installation differences are allowed. Connect with a 10.5 cone washer, M101×20 bolts, and M10 nuts, with a fixed bolt torque of 10Nm.

Connection of cabinet low voltage room

The connection of the low voltage room in the cabinet is made through three cabinet assembly holes at the front and rear of the low voltage chamber side panel, using M16×12 thin head self-tapping screws. The locking torque is 5Nm.

Busbar room

The busbar room is covered by a top plate, which is locked with screws from both the front and back directions. Six screws are used for a 375mm wide cabinet, and eight screws are used for a 500mm wide cabinet. Open the top plate to access the busbar compartment. Be careful not to move the top plate of the switchgear end cabinet.

Attention: The warning signal on the top panel of the cabinet indicates a danger of high voltage under the top panel.

Connection of busbar

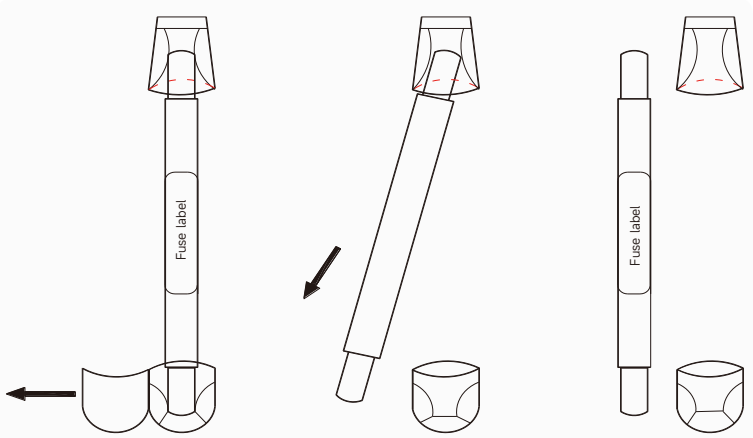
When installing the busbar, it is installed at the upper end of the SFG load switch. A copper wall gasket with the same thickness as the busbar is placed above the busbar. In the right end cabinet, the busbar connection uses a 10.5 spring washer and an M10×40 hexagonal bolt. The connecting torque is 35N. Just tighten it.

Maintenance of switchgear

- **Preventive maintenance:** In areas free of conductive dust or chemical corrosion, the box can operate without maintenance for twelve years. Working under harsh working conditions (corrosive environments, temperatures below -25 ℃ or above 55 ℃ , etc.).
- **Troubleshooting:** When replacing the fuse, the switch must be in a earthed state. As long as one of the fuses burns out, it is necessary to replace them all.

Replacement method:

- Open the lower fuse holder and pull the fuse away from it. (As shown on the right)
- Pull down the fuse diagonally until it is detached from the upper fuse holder, and remove the fuse from the cabinet. (As shown on the right)
- Close the upper and lower fuse holders, intermittently remove the fuse until all are removed. (As shown on the right)



Troubleshooting

The voltage indicator light does not light up	Check if the input cable has power
	Check the voltage indicator components
	Check if the switch is closed
	Check if the fuse is installed properly
The earthing switch cannot rotate	Check if the switch is disconnected
The switch cannot rotate	Check if the earthing switch is disconnected

09 Random files

- Product qualification certificate
- Installation and usage instructions
- Secondary installation wiring diagram
- Packing list

10 Vulnerable parts, accessories, and spare parts

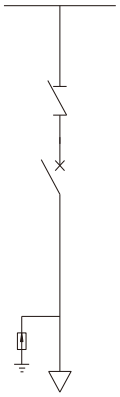
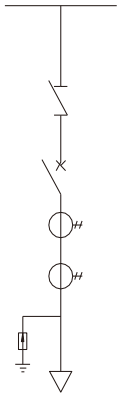
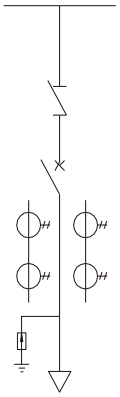
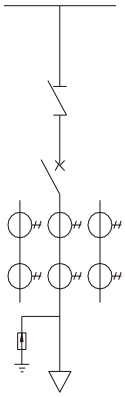
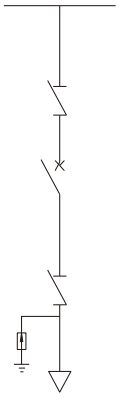
- There should be vulnerable parts for electrical appliances such as circuit breakers.
- The vulnerable parts of the switchgear shall be determined through negotiation between the user and the manufacturer.
- The types of accessories and spare parts for the switchgear are listed in the table, and users can order them from the manufacturer.

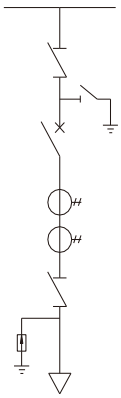
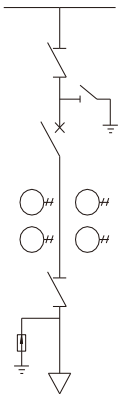
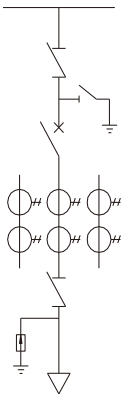
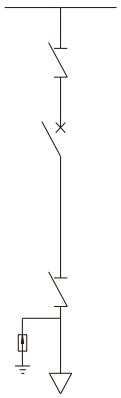
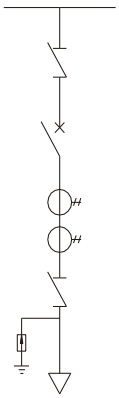
11 Ordering notice

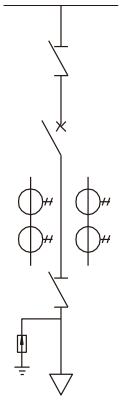
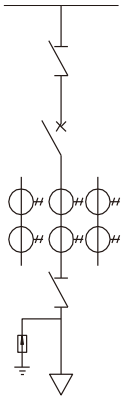
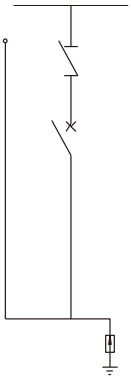
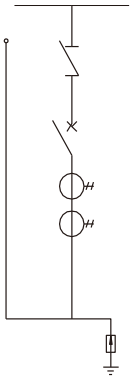
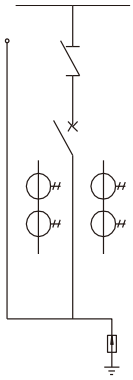
When placing an order, the user needs to provide the following information:

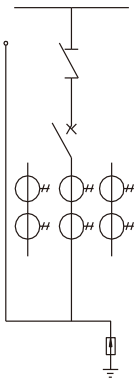
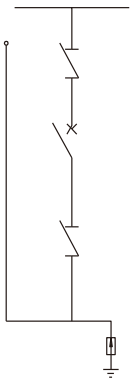
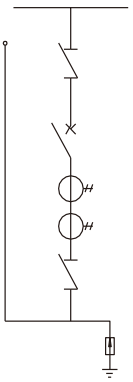
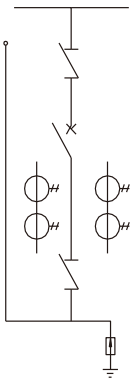
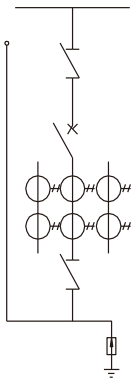
- Main wiring scheme number and single line system diagram, arrangement diagram.
- Secondary circuit wiring schematic diagram, terminal arrangement diagram, if there is no terminal arrangement diagram, follow the manufacturer's regulations.
- The model, specifications, and quantity of electrical components inside the switchgear.
- The material and specifications of the main busbar and branch busbar, otherwise they shall be supplied according to the manufacturer's regulations.
- The use of switchgear in special environmental conditions should be proposed during ordering.
- When attachments and spare parts are needed, their types and quantities should be specified.

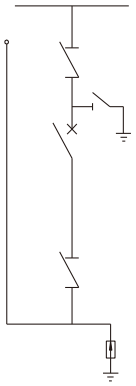
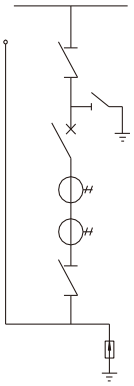
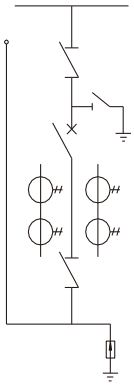
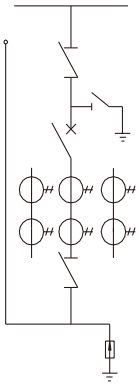
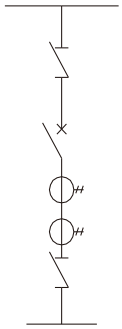
12 Main wiring scheme

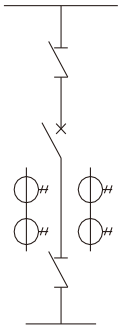
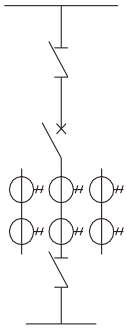
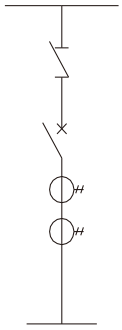
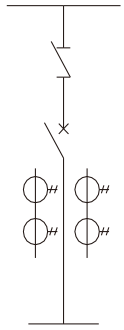
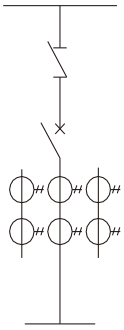
Scheme number		001	002	003	004	005
Main wiring diagram						
Major equipment	Rotary isolation switch GN30-10	1	1	1	1	1
	Current transformer LZZJ-10		1	2	3	
	Vacuum circuit breaker GPVN-10	1	1	1	1	1
	Operating mechanism CD10 or CT8	1	1	1	1	1
	Zinc oxide arrester	3	3	3	3	3
Maximum working current (A)		630, 1000				
Remark		Cable outgoing				

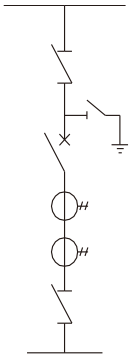
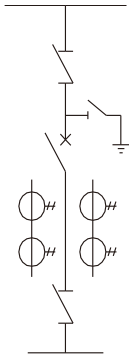
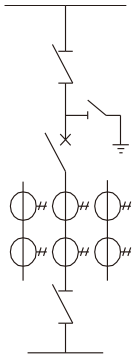
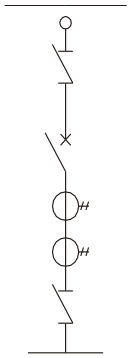
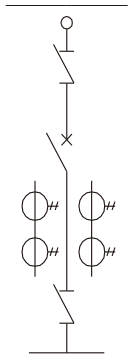
Scheme number		006	007	008	009	010
Main wiring diagram						
Major equipment	Rotary isolation switch GN30-10	1	1	1	2	2
	Current transformer LZZJ-10	1	2	3		1
	Vacuum circuit breaker GPVN-10	1	1	1	1	1
	Operating mechanism CD10 or CT8	1	1	1	1	1
	Rotary isolation switch GN30-10D	1	1	1	1	
	Zinc oxide arrester	3	3	3	3	3
Maximum working current (A)		630, 1000				
Remark		Cable outgoing				

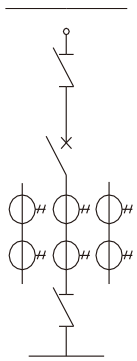
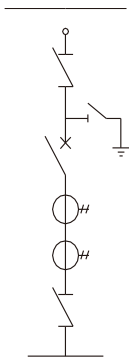
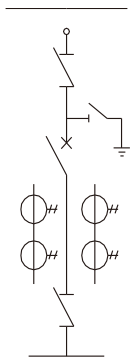
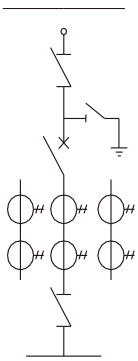
Scheme number		011	012	013	014	015
Main wiring diagram						
Major equipment	Rotary isolation switch GN30-10D					
	Current transformer LZZJ-10	2	3		1	2
	Vacuum circuit breaker GPVN-10	1	1	1	1	1
	Operating mechanism CD10 or CT8	1	1	1	1	1
	Rotary isolation switch GN30-10	2	2	1	1	1
	Zinc oxide arrester	3	3	3	3	3
Maximum working current (A)		630, 1000				
Remark		Cable incoming and outgoing		Overhead outgoing		

Scheme number		016	017	018	019	020
Main wiring diagram						
Major equipment	Rotary isolation switch GN30-10	1	2	2	2	2
	Current transformer LZZJ-10	3		1	2	3
	Vacuum circuit breaker GPVN-10	1	1	1	1	1
	Operating mechanism CD10 or CT8	1	1	1	1	1
	Zinc oxide arrester	3	3	3	3	3
Maximum working current (A)		630, 1000				
Remark		Overhead outgoing	Overhead incoming and outgoing			

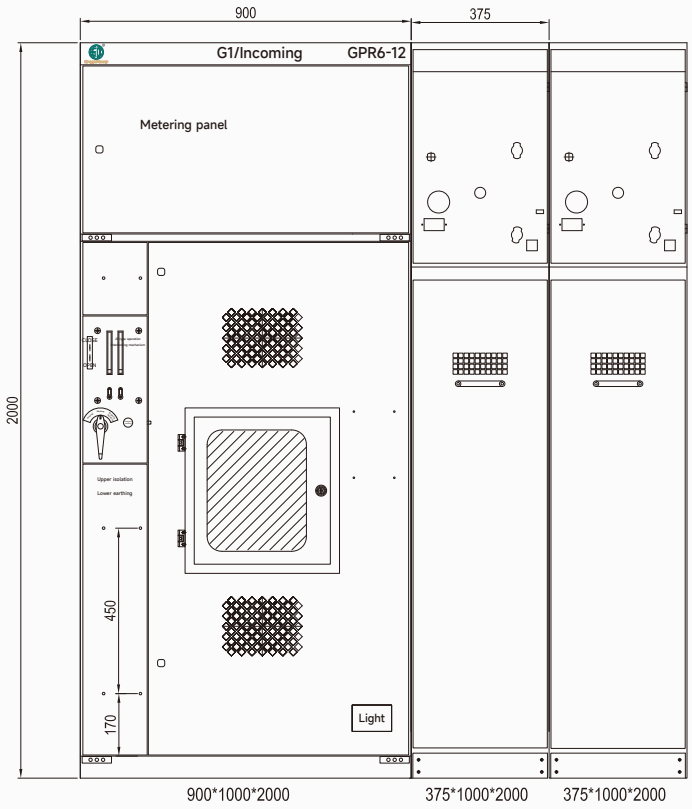
Scheme number		021	022	023	024	025
Main wiring diagram						
Major equipment	Rotary isolation switch GN30-10D	1	1	1	1	
	Current transformer LZZJ-10		1	2	3	1
	Vacuum circuit breaker GPVN-10	1	1	1	1	1
	Operating mechanism CD10 or CT8	1	1	1	1	1
	Rotary isolation switch GN30-10	1	1	1	1	2
	Zinc oxide arrester	3	3	3	3	
Maximum working current (A)		630, 1000				
Remark						

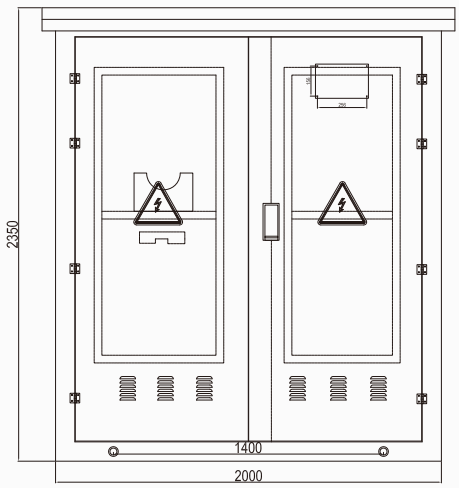
Scheme number		026	027	028	029	030
Main wiring diagram						
Major equipment	Rotary isolation switch GN30-10	2	2	1	1	1
	Current transformer LZZJ-10	3	3	1	1	1
	Vacuum circuit breaker GPVN-10	1	1	1	1	1
	Operating mechanism CD10 or CT8	1	1	1	1	1
Maximum working current (A)		630, 1000				
Remark						

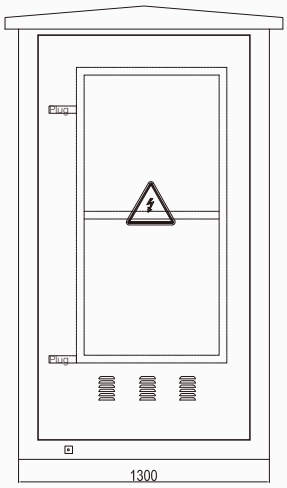
Scheme number		031	032	033	034	035
Main wiring diagram						
Major equipment	Rotary isolation switch GN30-10D	1	1	1		
	Current transformer LZZJ-10	1	2	3	1	2
	Vacuum circuit breaker GPVN-10	1	1	1	1	1
	Operating mechanism CD10 or CT8	1	1	1	1	1
	Rotary isolation switch GN30-10	1	1	1	2	2
Maximum working current (A)		630, 1000				
Remark						

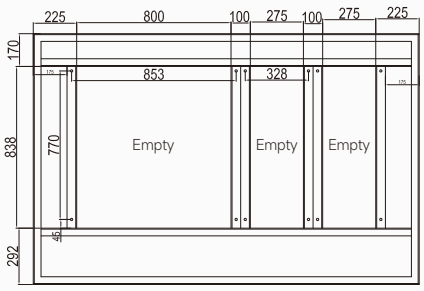
Scheme number		036	037	038	039	
Main wiring diagram						
Major equipment	Rotary isolation switch GN30-10D	1	1	1	1	
	Current transformer LZZJ-10	3	1	2	3	
	Vacuum circuit breaker GPVN-10	1	1	1	1	
	Operating mechanism CD10 or CT8	1	1	1	1	
	Rotary isolation switch GN30-10	2	1	1	1	
Maximum working current (A)		630, 1000				
Remark						

13 Outdoor box-type substation installation diagram (example)









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Professional Power Equipment Provider

The data and illustrations are not binding.
We reserve the right to make modifications following technical developments to the products.

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