

ZHEJIANG PUTAI HIGH VOLTAGE ELECTRIC CO., LTD.

PUTAI

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Solutions covering the application and maintenance of
new energy and traditional power

PUTAI

**COMPLETE POWER TRANSMISSION
AND DISTRIBUTION SYSTEM**

ZHEJIANG PUTAI HIGH VOLTAGE ELECTRIC CO., LTD.



**MANUFACTURER OF
INSULATION COMPONENT**

ZHEJIANG PUTAI HIGH VOLTAGE ELECTRIC CO., LTD.

ABOUT PUTAI

Zhejiang Putai High Voltage Electric Co., Ltd., established in 2010 and formerly known as the Pugao Electrical Switch Factory in Yueqing City, is one of China's largest manufacturers of insulation components for high-voltage equipment. With a facility covering 18,000 square meters, the company is dedicated to technological innovation, product upgrading, and expanding its presence in both domestic and international markets.

Putai specializes in high-voltage electrical products supported by a complete and scientific quality management system. Its main offerings include high-voltage load switches, indoor and outdoor vacuum circuit breakers, disconnecting switches, cabinet accessories, and various insulation components. The company utilizes advanced insulation materials such as epoxy resin (APG process), silicone rubber, EPDM, nitrile rubber, PA, PC, ABS, DMC, and SMC. Key insulation products include embedded poles and bushings, widely used in modern high-voltage systems.

Recognized across the industry for its integrity, strength, and quality, Putai adheres to a win-win business philosophy, offering competitive pricing and outstanding service. The company emphasizes a people-oriented approach, actively cultivating talent and fostering a learning-based, innovative organizational culture.

As globalization reshapes the industry, Putai continues to lead through sustainable development, brand building, and international strategic initiatives. Committed to excellence and corporate responsibility, the company strives to become a globally recognized name in high-voltage electrical manufacturing, and warmly welcomes partners from around the world for collaboration and mutual success.

150 Annual output value exceeding million RMB

18,000 Covers an area of over square meters



TEST EQUIPMENT



GLOBAL MANUFACTURER OF HIGH-VOLTAGE INSULATION COMPONENTS & MATERIALS

- Multiple material options
- Customized rated voltage
- Low carbon and environmentally friendly
- Personalized design
- Benchmarking against IEC/UL

CERTIFICATE



OUR QUALITY COMMITMENT

- Material Sourcing: High-grade raw materials from trusted suppliers
- Testing: 100% In-house Dielectric & Thermal Performance Tests
- Standard: Products Designed to Meet IEC/ANSI Standards
- Traceability: Complete Batch Tracking and Leading Technical Support



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Photovoltaic transmission
and distribution series

PUTAI



220kV

And the following modular intelligent prefabricated cabin substation



Green
energy



Intelligent
power grid



Power grid
system



Industrial
electricity
consumption



Rail Transit



Safe and
reliable

220KV

and below modular intelligent prefabricated sub-stations

summary

Prefabricated cabins are outdoor intelligent substations based on the core concept of "standard distribution". The adoption of prefabricated cabin structures has become an important measure for the construction of secondary equipment carriers in intelligent substations. With the acceleration of the construction of smart grids, the speed of substation construction is relatively lagging behind. In order to accelerate the construction cycle of smart substations, State Grid Corporation of China has proposed a standard distribution type substation construction model, which achieves rapid promotion and practical application of smart substations (prefabricated cabins) through the scheme of "standardized design, factory processing, and prefabricated construction".

Prefabricated cabins are an important manifestation of new technologies, materials, and equipment applied in intelligent substations. They are composed of prefabricated cabins, secondary equipment cabinets (or racks), cabin auxiliary facilities, etc. They are manufactured, assembled, wired, debugged, and transported as a whole to the construction site, located on the installation foundation. The prefabricated cabin and its internal secondary equipment are integrated by the manufacturer to achieve factory processing, reduce on-site secondary wiring, decrease design, construction, commissioning, workload, simplify maintenance work, shorten construction period, and effectively support the rapid construction of the power grid.

Prefabricated cabins have the technical characteristics of standardization, modularization, and prefabrication. Manufacturers can customize specific sizes according to the actual needs of the equipment cabinet to adapt to the normal operation of the equipment.

Standardization refers to the reference of the size of prefabricated cabins to the size of standard containers and appropriate improvements, in order to make them as perfect and standardized as possible, in accordance with the adoption of equipment, and to achieve corresponding standardization in order to facilitate the normal operation of equipment more effectively;

Modularization refers to the division of prefabricated compartments into modules such as public equipment prefabricated compartments, interval equipment prefabricated compartments, AC/DC power prefabricated compartments, and battery prefabricated compartments based on the different functions of internal equipment. Different modular prefabricated cabins can be divided into several sub modules based on the voltage level;

Prefabrication refers to the factory prefabrication of the cabin structure, internal equipment installation, wiring between internal equipment, and cables and optical cables between internal equipment. And complete the installation, wiring, and debugging of all equipment in the factory, transport the prefabricated cabin and its internal equipment as a whole to the substation site, complete the positioning and power on, thereby improving on-site construction efficiency and achieving the goal of reducing the construction cycle of smart substations!

Product Features

Prefabricated cabins are outdoor intelligent substations based on the core concept of "standard distribution". The adoption of prefabricated cabin structures has become an important measure for the construction of secondary equipment carriers in intelligent substations. With the acceleration of the construction of smart grids, the speed of substation construction is relatively lagging behind. In order to accelerate the construction cycle of smart substations, State Grid Corporation of China has proposed a standard distribution type substation construction model, which achieves rapid promotion and practical application of smart substations (prefabricated cabins) through the scheme of "standardized design, factory processing, and prefabricated construction".

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Application scope

The product can not only be applied in urban central areas to solve the problem of difficult landing of conventional substations, but also widely used in traditional energy industries such as coal and oil, as well as new energy industries such as photovoltaics and wind power. Meanwhile, with its modular design, production, and transportation assembly mode, it is particularly suitable for places where road transportation is inconvenient, such as suburban and remote mountainous areas.

Environmental conditions for use

All equipment inside the cabinet should be moisture-proof, and the prefabricated compartment should have dehumidification function.

Altitude: <1000m

Annual average temperature: 23°C

Extreme maximum temperature: 39.9°C

Extreme minimum temperature: 8.6°C

Annual average rainfall: 1300

Annual average evaporation rate: /

Annual maximum snow thickness: /

Annual average relative humidity (%) : ≤ 75

Annual maximum frozen soil depth : ≤ 0.5m

Annual sunshine hours : /

Annual average number of thunderstorm days (d) : 37.6

Annual average number of strong wind days (d) : /

Pollution level : IV

Maximum wind speed : 25.3m/s

Basic intensity : VI linear measure

Installation location : outdoor

The structure of prefabricated cabins

1. The internal space and structure of the prefabricated cabin are composed of secondary equipment, air conditioning, lighting, fire protection, security, imaging and other equipment. At the same time, it is necessary to meet the work requirements of equipment operation and maintenance personnel. The interior of the cabin needs to be maintained, and fireproof and waterproof materials should be selected for decoration. Thermal insulation materials can be added between the decoration materials and the cabin walls to block sunlight and ensure the insulation function of the box. The lighting and air conditioning in the cabin can be implemented in different ways according to the needs. In order to effectively save costs, industrial air conditioning and exhaust systems are installed in the cabin, which can adjust the operating environment in real time. Due to the current unmanned mode, security, imaging, image monitoring, and fire alarm systems must also be installed inside the cabin; The wiring layout can be appropriately arranged according to the normal operation of the equipment.

2. Prefabricated cabin GIS composite electrical appliances and prefabricated cabin substations. Prefabricated cabin GIS composite electrical appliances include prefabricated boxes, incoming and outgoing line intervals, and segmented measurement and protection intervals. The incoming and outgoing line intervals include incoming line intervals and main transformer intervals; The incoming line interval includes the incoming cable terminal, isolation switch 1, and isolation switch 2.

3. Transformer one and circuit breaker one; The main transformer interval includes outgoing cable terminals and isolation switches; The segmented measurement and protection interval includes one busbar segmented interval and two measurement and protection intervals. The busbar segmented interval includes circuit breaker two, transformer two, and two isolation switches four. The measurement and protection interval includes transformer three and isolation switch five connected together; There is a segmented measurement and protection interval set between adjacent groups of incoming and outgoing lines. The incoming and outgoing line intervals, segmented measurement and protection intervals, and busbars form a linear structure. The incoming and outgoing line intervals, segmented measurement and protection intervals, and busbars are located in prefabricated boxes. The prefabricated secondary combination equipment cabin consists of cabin body, secondary equipment, air conditioning, lighting, fire protection, security, imaging and other equipment. All equipment in the cabin has completed relevant wiring and debugging work in the factory and is transported to the site as a whole or 2-3 individual units.

Solution

Using the world's most reliable electrical equipment, combined with the system integration technology of outdoor box type substation cabinets and the original prefabricated cabin manufacturing technology, the substation is divided into modules according to functions, and standardized design, factory production, and modular construction are carried out. Different modules are selected according to the different configurations of various substations to achieve a modular combination, which has the characteristics of small footprint, short construction period, high safety and reliability, and beautiful appearance. It completely overturns the traditional construction mode of substations and fully solves the problem of difficult landing of central substations in large and medium-sized cities.

Modular design, the entire station is divided into six types of delivery modules:

110kV prefabricated cabin GIS composite electrical module

10kV prefabricated cabin switch station module

Prefabricated cabin type secondary combination equipment module

Prefabricated cabin transformer module

10kV prefabricated cabin grounding transformer arc suppression coil

10kV prefabricated cabin reactive power compensation system

Compact substation layout:

Greatly reduce the footprint

Innovative three-dimensional layout of prefabricated cabins

110kV prefabricated cabin GIS composite electrical appliances are placed on the top to save space

Prefabricated 10kV switchgear and secondary combination equipment

prefabricated cabins are arranged in the shape of finished products below

Symmetrical arrangement of prefabricated cabin transformers

The fire escape is arranged between the three-dimensional substation and the transformer

Flexible modular construction can be carried out according to the terrain of the site

- ♦ The 10kV wiring method can be flexibly designed according to user needs, and a horizontal GIS combination electrical device has been jointly developed with Siemens, which is completely maintenance free;
- ♦ The 10kV system is segmented into single busbars and uses high-end and high-end fixed switchgear such as Siemens and ABB, which is completely maintenance free;
- ♦ Adopting a fixed compensation system, configure the grounding transformer arc suppression coil module according to the needs of station construction;
- ♦ Maintenance free, unmanned, intelligent management and control substation;
- ♦ Artistic appearance and harmonious coordination with urban environment;
- ♦ The prefabricated cabin adopts world advanced technologies such as double-layer steel plate foaming technology, six layer anti-corrosion technology, and bridge insulation, fully meeting the 60 year service life requirements of the main building of the substation;
- ♦ The patented micro positive pressure dust prevention technology, box insulation technology, and intelligent environmental control technology create a constant temperature, humidity, and dust-free operating environment for electrical equipment, surpassing traditional indoor substations;
- ♦ The external dimensions of each prefabricated cabin module adopt standardized modules to meet transportation requirements without exceeding the limit.



GGD
Photovoltaic grid-connected metering cabinet



Green energy



Intelligent power grid



Power grid system



Industrial electricity consumption



Rail Transit



Safe and reliable

Product Introduction

This product is mainly used in high-power photovoltaic grid connected power generation systems, connected in series between grid inverters (or AC combiner boxes) and the grid. The product has a series of protections such as grid low voltage, grid overvoltage, input lightning protection, system overcurrent, and grid isolation. The multifunctional meter display and fault status indication make the system operation status clear at a glance. The product has passed industry standards such as CCC certification, CE certification, and ISO9001 quality management system certification.

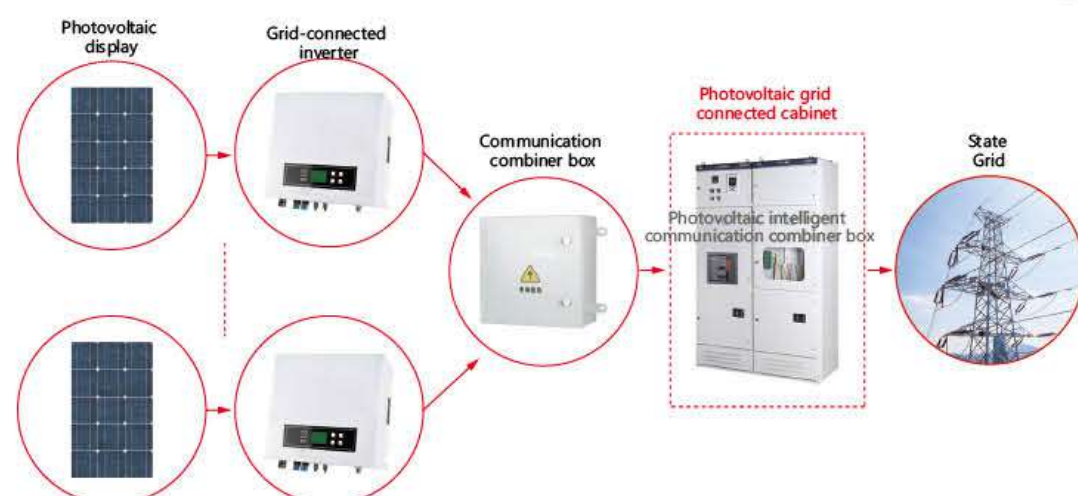
Main features:

- ◆ Reserve installation positions for metering meters and collectors;
- ◆ Visible window and lead seal for metering meters (anti-theft);
- ◆ The integrated design concept of the product ensures complete isolation between the power distribution and metering parts, reducing electromagnetic interference;
- ◆ Photovoltaic special plastic shell reclosing circuit breaker, with more reliable performance;
- ◆ Can be equipped with online power quality monitoring, anti islanding protection devices, fault disconnection devices, etc;
- ◆ Outdoor and indoor installation options are available, making installation more convenient;
- ◆ Support special requirements and customized functions.

Technical Parameter

PRODUCT MODEL	TGC100-500KN3P
Common string inverter power	5kw, 10kw, 15kw, 20kw, 25kw, 30kw, 40kw, 50kw, 60kw
Number of input channels for inverters	Route 1-8 (recommended to be equipped with an AC combiner box)
Number of grid connected output channels	1 Road
Grid connection requirements	Three phase grid connection
Grid connected voltage	380Vac
Switch brand (optional)	Delixi, Chint, Changshu ABB, schneider

Product Application System Diagram



Protection function

Short circuit protection	have
Lightning protection	Yes (nominal current: In: 20KA, I _{max} : 40KA, up ≤ 4KA)
Isolation protection (visual breakpoint)	Yes (knife switch/hand pull isolation switch)
Overvoltage and undervoltage protection	have
Automatic reclosing	have
Manual opening and closing of the panel	have
Optional features	1. Online power quality monitoring device; 2. Anti islanding protection device; 3. Fault disconnect device;

Grid switch

Residual current protector	1. When the power grid is cut off or the bias voltage is greater than 20%, it will automatically disconnect; 2. When the power grid returns to normal, it will automatically close; 3. Manual operation and automatic operation can be switched;
Changshu plastic shell reclosing	1. When the power grid is cut off or the bias voltage is greater than 20%, it will automatically trip (the delay trip time can be adjusted from 0 to 10 seconds); 2. When the power grid returns to normal, it will automatically close; 3. Manual operation and automatic operation can be switched;

Environmental suitability

Temperature and humidity	Working temperature: -25 to +60 °C; Storage temperature: -40 to +70 °C; Humidity: 0-90% without condensation; Non corrosive gas environment (if any, please specify)
Using altitude	≤3000M
Salt spray resistance	Standard salt spray test for 336 hours

General

Cabinet material	Cold rolled sheet spray coating, stainless steel
Application	Indoor type (customizable in appearance)
Cabinet type	Distribution compartment, metering compartment, transformer compartment, isolation switch compartment
Installation method	vertical
Cabinet size (depth * width * height)	600mm*800mm*2200mm
Reference weight	be pending



Photovoltaic transmission
and distribution series

PUTAI

BWX-20

Photovoltaic combined cage

PUTAI

Overview

The BWX-20 photovoltaic grid connected cage is an important power protection part suitable for photovoltaic string type power generation systems, which connects the string type inverter with the power grid system. The circuit protection part adopts photovoltaic grid connected circuit breakers and pull ring isolation switches, and adopts secondary lightning protection. The protection level is IP65, which meets the requirements of outdoor installation and is waterproof, dustproof, UV resistant, salt spray corrosion-resistant, etc. The internal structure of this product is simple and clear, with neat and reasonable wiring. High reliability and easy maintenance. Outdoor wall mounted installation can adapt to various harsh environments. In addition to standard materials and sizes, customization can be made according to user requirements.

Functional Features

Reliability

- Select photovoltaic dedicated grid connected circuit breakers;
- Choose a photovoltaic specific pull ring isolation switch for safer operation.

Strong adaptability

- IP65 protection level, waterproof, dustproof, and UV resistant;
- Strict high and low temperature testing, suitable for a wide range of regions;
- Easy installation, simplified system wiring, convenient wiring;
- The box is made of metal materials such as cold-rolled steel plates.

Electrical technical parameters

Product	BWX-3000	BWX-5000	BWX-10000
Maximum input voltage	275	275	460
Each input current	15	25	20
Rated working voltage Un	220	220	380
Voltage protection level Up	< 1.8kV		
Nominal universal capacity In	20kA		
Maximum current capacity Ima	40kA		
response time	25ns		
Temperature and humidity	Working temperature: -40 °C~+85 °C, humidity 95%, no condensation, no corrosive gas environment		
altitude	≤2500m		
Surge protection	SUPI-40 2P 20-40kA	SUPI-40 2P 20-40kA	SUPI-40 4P 20-40kA
Cabinet material	Engineering plastic		
Box protection level	IP65		
Protection level of cable joints	IP66		
Volume (width x height x depth)	219*200mm	219*200mm	381*230mm
	800*1000*200mm		



BWX-20

Photovoltaic combined cage



Green
energy



Intelligent
power grid



Power grid
system



Industrial
electricity
consumption



Rail Transit



Safe and
reliable



Photovoltaic transmission
and distribution series

PUTAI

PHOTOVOLTAIC DC CONFLUENCE BOX

PUTAI

Product Introduction

The BWX-20 photovoltaic grid connected combiner box combines the DC input of up to 24 photovoltaic cell module strings into one or multiple outputs, each with a fuse, and the outputs are equipped with lightning arresters and circuit breakers, greatly simplifying the input wiring of DC distribution cabinets and inverters. Provide lightning protection, short-circuit protection, and grounding protection. The combiner box is divided into two types: intelligent and non intelligent. The intelligent lightning protection combiner box is equipped with a combiner monitoring unit inside, which can monitor the input current of each photovoltaic cell string, summarize the output voltage, temperature inside the box, and the status of lightning protection devices, circuit breakers, etc.

The internal layout of the device is simple and clear, with neat and reasonable wiring. High reliability and easy maintenance. Outdoor wall mounted installation can adapt to various harsh environments. In addition to related core components, others can be customized according to user requirements.

Functional Features

- ♦ The protection level of the combiner box reaches IP65, with waterproof, dust-proof, rust proof, and salt spray resistant properties, meeting the requirements for outdoor installation;
- ♦ Can simultaneously connect up to 24 battery strings;
- ♦ The positive and negative poles of each battery string are equipped with photovoltaic specific fuses to protect the module string from faults. The fuse base and fuses are used together to reduce maintenance costs for owners and effectively protect the personal safety of maintenance personnel;
- ♦ The use of photovoltaic dedicated high-voltage lightning arrester can protect the positive and negative poles of the busbar after convergence, and the continuous working voltage (U_c) can reach 1000VDC;
- ♦ The power module inside the combiner box can be connected to a maximum photovoltaic voltage of 1000DCV;
- ♦ The measurement and control module of the combiner box adopts reliable Honeywell Hall elements (DC CT sensors) to collect, monitor, alarm, and locally locate the current and bus voltage of each photovoltaic string. It can also measure the temperature inside the combiner box, detect the status of lightning arresters and output circuit breakers, etc;
- ♦ The monitoring module inside the combiner box has digital display function, which can display the current, bus voltage, temperature inside the combiner box, status of circuit breakers and lightning arresters, system power, and equipment address of each component string on the device;
- ♦ Equipped with RS485/MODBUS-RTU serial communication;
- ♦ There is lightning protection for both external interfaces;
- ♦ Can receive parameter downloads from local monitoring devices for analysis and processing;
- ♦ The working power supply of the combiner box can be selected from external 220VAC/DC or the power supply provided by the combiner box itself. If the power supply is provided by the combiner box itself, there is no need for separate wiring for power supply on site;

Electrical technical parameters

Product Model	BWX-PV24	BWX-PV16	BWX-PV12	BWX-PV8
Number of input channels	17~24	13~16	8~12	Below Route 8
Maximum input voltage	1000Vdc			
Each input current	0~20a			
Maximum output current	250A	160A/200A	100A/125A/160A	100A以下
Enter waterproof terminal size	PG9/PG11/MC4			
Output waterproof terminal size	PG21~PG32	PG19~PG25	PG16~PG21	PG13.5~PG19
monitor module	Detect each current, bus voltage, circuit breaker status, mold inhibitor status, and box temperature (optional)			
Communication method/protocol	RS485 bus/standard MODBUS-RTU protocol			
Anti reverse function	Configure modular packaging anti reverse diode (optional)			
Temperature and humidity	Working temperature: -40~+85 °C, humidity 95%, no condensation, no corrosive gas environment			
altitude	≤4000m			
Monitoring module power consumption	Working hours ≤ 8W			
Auxiliary power supply	Auxiliary power supply: AC85V~265V/DC24V (± 10%)/DC200V~1000V			
Cabinet material	Hot dip galvanized steel sheet/stainless steel sheet/cold-rolled steel sheet/engineering plastics			
Protection level	IP65			
Volume (width x height x depth)	850*500*200mm	850*500*180mm	720*500*180mm	630*500*180mm
weight	10~35kg			



Photovoltaic DC confluence box



Green energy



Intelligent power grid



Power grid system



Industrial electricity consumption



Rail Transit



Safe and reliable



Photovoltaic transmission
and distribution series

PUTAI



BWX-20

Communication combiner box



Green
energy



Intelligent
power grid



Power grid
system



Industrial
electricity
consumption



Rail Transit



Safe and
reliable

BWX-20

Communication combiner box

PUTAI

Product Introduction

The BWX-20 photovoltaic grid connected combiner box combines the DC input of up to 24 photovoltaic cell module strings into one or multiple outputs, each with a fuse, and the outputs are equipped with lightning arresters and circuit breakers, greatly simplifying the input wiring of DC distribution cabinets and inverters. Provide lightning protection, short-circuit protection, and grounding protection. The combiner box is divided into two types: intelligent and non intelligent. The intelligent lightning protection combiner box is equipped with a combiner monitoring unit inside, which can monitor the input current of each photovoltaic cell string, summarize the output voltage, temperature inside the box, and the status of lightning protection devices, circuit breakers, etc.

The internal layout of the device is simple and clear, with neat and reasonable wiring. High reliability and easy maintenance. Outdoor wall mounted installation can adapt to various harsh environments. In addition to related core components, others can be customized according to user requirements.

Functional Features

- The protection level of the communication combiner box reaches IP65, which is a wall mounted sealed cabinet that can meet the requirements of outdoor installation;
- Meet the requirement of simultaneously connecting multiple string inverters, with each incoming line protected by a thermal magnetic circuit breaker, and rated voltage up to AC690V;
- The use of a dedicated high-voltage anti surge device can meet the overvoltage and anti surge protection between three phases, with a working voltage of AC480V or above;
- All busbars inside the box are connected using electroplated or purified busbars to reduce internal resistance and connection points;
- The output adopts circuit breakers, load isolation switches, or fuses.

Electrical technical parameters

Product Model	BWX-AC4	BWX-AC6	BWX-AC8
Number of input channels	1~4	5~6	7~8
Maximum input voltage	AC690		
Each input current	0~1000A		
Maximum output current	250A	400A	630A
Rated working voltage Un	480VAC		
Voltage protection level Up	≤3.2kV		
Nominal current capacity In (8/20 μs)	20kV (optional according to customer requirements)		
Maximum current capacity I _{max} (8/20 μs)	40kV (optional according to customer requirements)		
response time	IP65		
Temperature and humidity	Working temperature: -40~+85 °C, humidity 95%, no condensation, no corrosive gas environment		
altitude	≤4000m		
Cabinet material	Hot dip galvanized steel sheet/stainless steel sheet/cold-rolled steel sheet/engineering plastics		
Box body protection level	IP65		
Protection level of cable joints	IP66		
Volume (width x height x depth)	800*600*200mm	800*800*200mm	800*1000*200mm

B

Box type substation
series

PUTAI



YB □ -12

Outdoor Pre-installed Substation (European)



Green energy



Intelligent power grid



Power grid system



Industrial electricity consumption



Rail Transit



Safe and reliable

YB □ -12

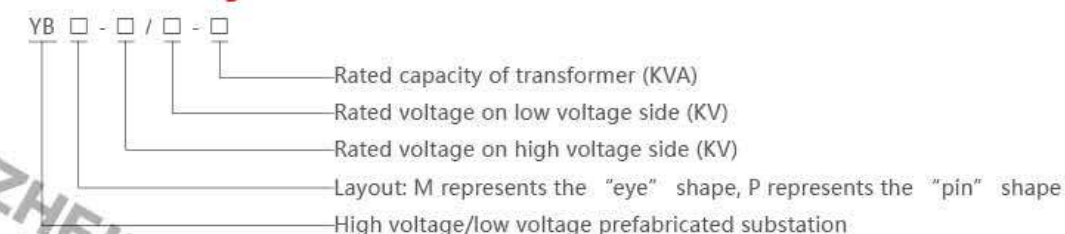
Outdoor Pre-installed Substation (European)

PUTAI

Overview

This product is widely used in urban power grid renovation, residential communities, high-rise buildings, industrial and mining areas, hotels, shopping malls, airports, railways, oil fields, docks, highways, and temporary electrical facilities both inside and outside the house.

Model Meaning



Function And Characteristic

- ♦ High voltage switchgear, transformers, and low-voltage switchgear are integrated into one, with strong completeness;
- ♦ Complete high and low voltage protection, safe and reliable operation, and simple maintenance;
- ♦ Small footprint, low investment, short production cycle, and convenient mobility;
- ♦ Flexible and diverse grounding schemes;
- ♦ Unique structure: The unique honeycomb structure double-layer (composite board) shell is firm, insulated, ventilated, aesthetically pleasing, and has a high level of protection. The shell materials include stainless steel alloy, aluminum alloy, cold-rolled plate, color steel plate, ceramic tile, wooden strip, new environmentally friendly materials, and surface watercolor painting options;
- ♦ Diverse types: universal, villa, compact, and various styles;
- ♦ The high-voltage ring main unit can be equipped with a network automation terminal (FTU) to achieve reliable detection of short circuits and single-phase grounding faults. It has the "four remote" function, which facilitates the upgrade of distribution network automation.

Normal Condition

- ♦ Altitude: $\leq 1000\text{m}$;
- ♦ Environmental temperature: $-25^{\circ}\text{C} \sim +40^{\circ}\text{C}$;
- ♦ Relative humidity: daily average not exceeding 95%, monthly average not exceeding 90%;
- ♦ Installation location: A place without fire, explosion hazards, conductive dust, corrosive chemical gases, and severe vibrations. If the above conditions are exceeded, users can negotiate with our company.

Transformer

The intelligent integrated substation adopts low loss, oil immersed, fully sealed S9, S10, S11 series transformers, or environmentally friendly dry-type transformers with resin insulation or NOMEX paper insulation. The bottom can be equipped with a small car, and the transformer can be easily accessed.

High voltage side

Intelligent integrated substations generally use load switch fuse combination electrical protection for high voltage. After one phase of the fuse is blown, the three phases are interlocked and tripped. The load switch can be selected from compressed air, vacuum, sulfur hexafluoride and other types, and can be equipped with an electric operating mechanism to achieve automation upgrade; The fuse is a high-voltage current limiting fuse with an impactor, which operates reliably and has a large breaking capacity. For transformers above 800kVA, vacuum circuit breakers such as ZN12, ZN28, VS1 can be used for protection.

Low-pressure side

The low-voltage side main switch adopts universal or intelligent circuit breakers for selective protection; The outgoing switch adopts a plastic shell switch, which is small in size, short in arcing, and can reach up to 30 circuits at most; Intelligent automatic tracking reactive power compensation device, with two switching modes for users to choose from: contactor and non-contact.

Execution standards

This product meets the following standards:

GB/T17467-1998 "High voltage/low voltage prefabricated substations"

DL/T537-93 "Technical Conditions for Ordering 6-35kV Box type Substation"

Technical parameters of load switch

Serial number	Name	Unit	FN12-12 load switch	FZM12-12 vacuum load switch
1	Rated voltage	kV	10	
2	Maximum working voltage	kV	12	
3	Rated frequency	Hz	50	
4	Rated current	A	630	
5	Rated breaking load current	A	630	
6	Thermal stability current (effective value)	kA/S	20/2	20/4
7	Dynamic stable current	kA	50	50
8	Short circuit closing current (peak value)	kA	50	50
9	Number of full load disconnections	order	20	10000
10	Mechanical lifespan	order	2000	10000
11	1-minute power frequency withstand voltage (phase to ground)	kV	42	42
12	Lightning impulse voltage (relative and to ground)	kV	75	75

Technical parameters of high-voltage fuses

Model		Rated voltage (KV)	Breaking current (A)	Breaking current (KA)	Rated current of melt (A)
UK model	Domestic models				
SDLXJ	XRNT-12	12	40	31.5	6.3,10,16,20,25,31.5,40
SFLXJ		12	100	31.5	50,63,71,80,100
SKLXJ		12	125	31.5	125

Water injection: determined by whether an impactor is installed, N is without a firing pin, and A is with a firing pin.

Technical parameters of low-voltage circuit breaker

Model	Release form	Rated current of release A	Switching ability KA (AC380V)
DW15-630	Thermoelectromagnetic or electronic type	315,400,630	40
DW15-1000		630,800,1000	50
DW15-1600		1600	50
DW15-2500		1600,2000,2500	60
CWI-2000	Thermoelectromagnetic or electronic type	630,800,1000,1250,1600,2000	65(80)
CWI-3200		2000,2500,3200	100

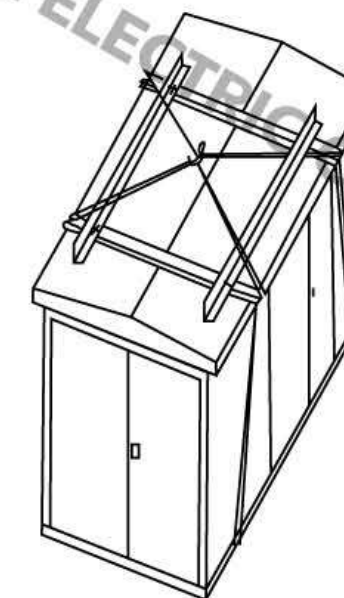
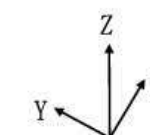
Note: (80) is a high breaking type.

Execution standards

In addition to the regulations required by the power department for installation, acceptance, handover testing, operation, and maintenance of intelligent integrated substations, the following matters should also be noted:

- Users should carefully inspect the goods according to relevant regulations when receiving them. For products that are not installed immediately, they should be stored in appropriate places according to normal usage conditions.
- The product should be lifted from the bottom using specialized lifting equipment.
- The product is horizontally placed on a pre made foundation, and then the gap between the product base and the foundation is sealed with cement mortar to prevent rainwater from entering the cable room. The high and low voltage cables are connected through the bottom sealing plate of the high and low voltage rooms.
- After the product is installed in place, reliable grounding should be done; The two main grounding terminals on the channel steel of the power station base, the neutral point and shell of the transformer, and the lower pile head of the lightning arrester should be grounded separately by the installation department. All grounding devices should share a set of grounding devices, with a grounding resistance of less than 4 ohms. There should be no less than 2 grounding leads from the grounding grid to this product.
- After installation or maintenance, the product should undergo the following inspections and tests before being put into operation:
 - Is the substation clean;
 - Is the operating mechanism flexible;
 - Whether the on/off of the main electrical appliances is flexible and reliable;
 - Is the electrical auxiliary contact reliably prepared for on/off;
 - Whether the meter and relay actions are accurate and correct;
 - Whether the changes and wiring polarity of instruments and transformers are correct;
 - Are all electrical installation nuts tightened and installed securely and reliably;
 - Whether the busbar connection is good, and whether the supporting insulators and clamps are installed reliably;
 - Whether the setting value of the electrical appliance meets the requirements and whether the specifications of the fuse core are correct;
 - Whether the contacts of the main circuit and auxiliary circuit meet the requirements of the electrical schematic diagram.

Note: (80) is a high breaking type.



Installation, use and maintenance

6. Repair

- (1) All components in the product are maintained according to their respective technical requirements;
- (2) If the selected transformer is oil immersed, oil sample analysis and inspection should be conducted at least once a year according to specifications;
- (3) After 20 times of on load or 2000 times of off load opening and closing operations, the high voltage side switchgear in operation should be checked for the condition of the contacts and the degree of loss of the arc extinguishing device. Any abnormalities should be promptly repaired or replaced.
- (4) The reason for the automatic tripping of low-voltage switchgear must be resolved before it can be put back into operation;
- (5) Lightning arresters should undergo a preventive test once a year before the arrival of thunderstorm season;

The product comes with a packing list, certificate of conformity, installation and use instructions, electrical wiring diagram, instructions for the main components and equipment used in this product, key operation tools, and spare parts provided according to the agreement.



Ordering Instructions

If the user places an order, they need to provide the following information:

- ◆ Requirements for substation model, capacity, quantity, color, external dimensions, and shell material;
- ◆ The model, performance, connection group, tap range, and impedance requirements of the transformer;
- ◆ Primary wiring scheme for high and low voltage sides, component models, specifications, and requirements;
- ◆ Transformer oil (25 #, 45 #, high ignition point oil);
- ◆ Requirements for the network configuration of box type substations for intelligent power management networks or property management;
- ◆ Environmental requirements for use.

Example of partial product outline drawings



B

Box type substation
series

PUTAI

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ZGS11-12

American preinstalled substation



Green energy



Intelligent power grid



Power grid system



Industrial electricity consumption



Rail Transit



Safe and reliable

ZGS11-12

American preassembled substation

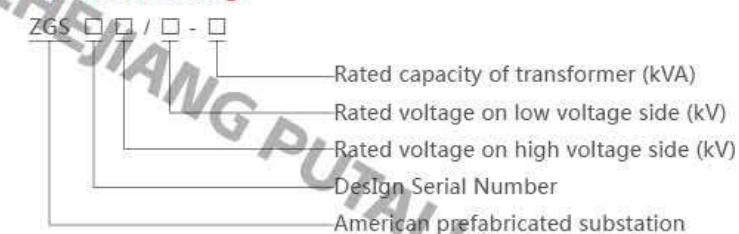
Overview

This product is developed by absorbing foreign technology and combining it with the actual situation in China. The entire product has the characteristics of small size, easy installation and maintenance, low noise, low loss, anti-theft, strong overload capacity, and full protection. Suitable for new residential areas, green belts, parks, stations, hotels, construction sites, airports, and other places.

The GS11-12 series American prefabricated substation is suitable for 10kV ring network power supply, dual power supply or terminal power supply systems, as a substation, metering, compensation control and protection device.

This product complies with the following standards: GB/T17467-1998 "High Voltage and Low Voltage Prefabricated Substations", DL/T537-93 "Technical Conditions for Ordering 6-35KV Box type Substations"

Model Meaning



Function and Features

- ♦ Fully insulated, fully sealed, maintenance free, and reliable to ensure personal safety;
- ♦ Compact structure, with a volume only 1/3-1/5 of the same capacity European transformer, and low height;
- ♦ A split box structure can be used to avoid contamination of oil in the transformer oil tank;
- ♦ The high-voltage side adopts dual fuse full range protection, greatly reducing costs;
- ♦ It can be used for ring network or terminal, and the cable head can be urgently plugged and unplugged when the load current is 200A;
- ♦ The box is made of honeycomb double layered composite board, which has the functions of insulation and heat dissipation;
- ♦ Install an electronic phase loss protector on the low voltage side, which can quickly disconnect the main switch when abnormal voltage occurs in the system;
- ♦ High voltage side oil immersed load switch or SF6 load switch, which can be electrically upgraded, laying the foundation for realizing distribution network automation;
- ♦ Adopt oil immersed S9 or S11 series transformers with better performance.

Conditions of Use

- ♦ Altitude not exceeding 1000m;
- ♦ Environmental temperature: -35 °C~+40 °C;
- ♦ Relative humidity: daily average not exceeding 95%, monthly average not exceeding 90%;
- ♦ Installation location: A place without fire, explosion hazards, chemical corrosive gases, and good ventilation, with a ground inclination angle of no more than 3 °.

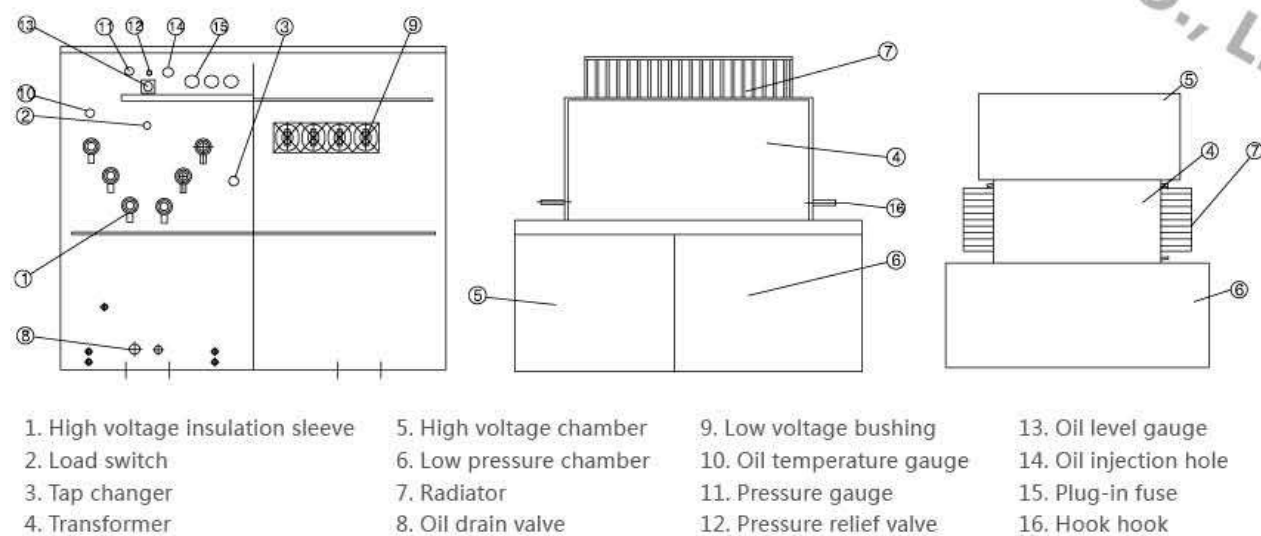
Main technical parameters

Serial Number	Name	Company	Parameter
1	Rated voltage	kV	10/4 (high/low voltage)
2	Maximum working voltage	kV	12 (High Voltage Side)
3	Rated frequency	Hz	50
4	Rated capacity	kVA	50-1600
5	1-minute power frequency withstand voltage	kV	35
6	lightning impulse voltage	kV	75
7	Cooling method		ONAN
8	High voltage backup fuse breaking current	kA	50
9	Plug in fuse for breaking current	kA	25
10	Ambient temperature	°C	-35~+40
11	Coil allows temperature rise	°C	65
12	No load voltage regulation		±5%±2x2.5%
13	Noise level	db	50
14	Protection grade		IP43

Box variable structure

The product box structure consists of three parts: high pressure interval, low pressure interval, and oil tank interval. The high-voltage interval includes high-voltage cable accessories, load switches, no-load tap changers, plug-in fuses, pressure relief valves, oil level gauges, oil temperature gauges, and oil drain valves. The low-voltage interval includes low-voltage bushings, low-voltage meters, circuit breakers, and capacitor compensation. The transformer winding and iron core, radiator, high-voltage load switch, and fuse are all located within the oil tank interval. According to the requirements of the plan, the transformer structure can be designed in a "V" or "W" shape, as shown in the following figure.

Figure 1: Prefabricated Substation Structure Diagram



Transportation, installation, and maintenance

♦ Transportation

1. The factory substation should be filled with 25 # (or 45 #) transformer oil according to the oil level gauge in the oil tank. During transportation and loading/unloading, it is not allowed to invert or flip, impact parts, or experience strong vibrations.
2. Special attention should be paid when lifting and shifting the substation. The lifting hook should be hooked onto the oil tank hook and lifted slowly to avoid damage to the surface paint of the substation caused by the steel wire rope, and even cause the center of gravity of the entire substation to shift, tilt, or fall.

♦ Installation

1. When installing the substation on site, attention should be paid to the protection of the paint on the surface of the cabinet. It is not allowed for the handle and insulation sleeve components of the pressure gauge, oil level gauge, thermometer, plug-in fuse to collide or crack, and the screws should not be loose.
2. Clean the dust and dirt on the outside of the substation, inside the cabinet door, and on the surface of the insulation sleeve.
3. Check whether the nameplate data and product qualification certificate of the substation match the purchase order, and check whether the documents and spare parts are missing according to the packing list.
4. The civil engineering diagram of the substation cable inlet and outlet is shown in the figure.

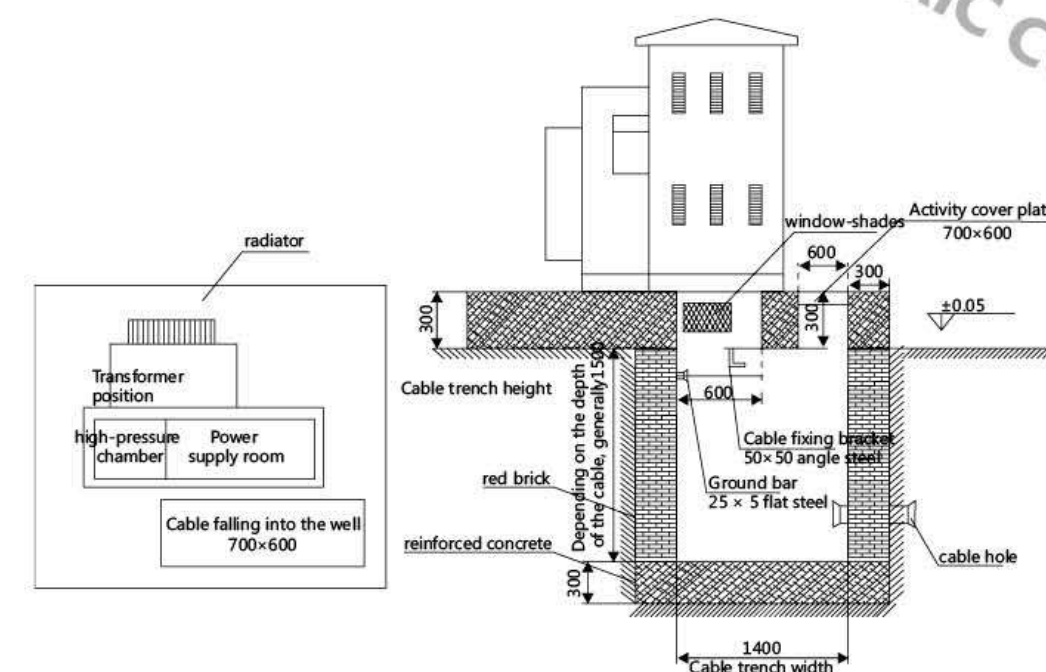
♦ Maintenance: The products that leave the factory have undergone strict assembly and adjustment, and do not need to be disassembled again during installation to avoid affecting performance. Maintenance is limited to the following situations:

1. Conduct transformer oil sampling analysis once a year;
2. If the oil level drops, it should be replenished in a timely manner. The grade of the oil should be the same as the oil in the tank;
3. After the fuse is blown, the cause should be identified, and when replacing the fuse core, attention should be paid to ensuring that its specifications and models are the same as the original specifications and models.

Civil engineering drawing of substation cable inlet and outlet lines

Technical requirements:

- ♦ For dimensions, please refer to the actual size of the combination;
- ♦ The concrete foundation should have a smooth surface, and the combined substation should be fixed to the foundation using pressure plates;
- ♦ The form of grounding bars and cable fixing brackets can be determined according to the actual situation;
- ♦ Cable fixing brackets and grounding bars should be pre embedded;
- ♦ The position of the cable holes for incoming and outgoing lines depends on the specific situation;
- ♦ After the installation of the combination transformer, there must be a gap of no less than 1.5m on the front of the switch to facilitate operation;
- ♦ The grounding grid can be made of 12 galvanized round steel or 40 × 4 galvanized flat copper, and the grounding resistance should meet the requirements of the power department.



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ZGS11-12

American preassembled substation



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C

Open and close/junction
box series



XGW-12

Outdoor intelligent box opening and closing



Green energy



Intelligent power grid



Power grid system



Industrial electricity consumption



Rail Transit



Safe and reliable

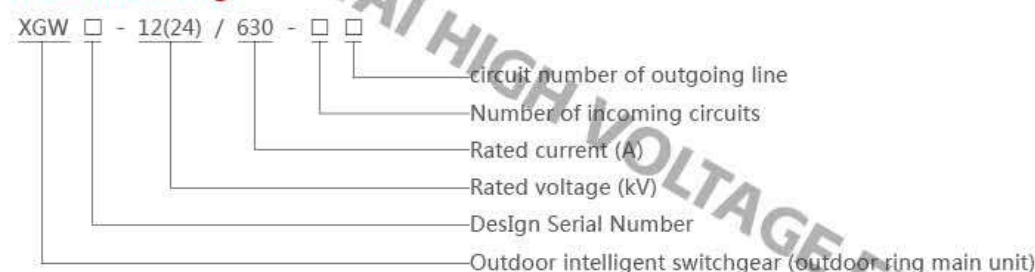
low-pressure side

With the continuous development and progress of society, China's urban power grid has undergone tremendous changes, and most cities have formed or are forming numerous areas with high electricity demand. The power supply from substations 12/24KV lines (or branch lines) to direct users in the past is no longer sufficient to meet the requirements of urban development. Therefore, a new power supply method has emerged, which supplies power to users through switching stations. However, with the intensification of urban density, some of the original civil construction type opening and closing stations have been restricted by land and urban planning. Therefore, a practical KBS-12 outdoor intelligent box type opening and closing station has emerged. This switchgear does not require civil construction and occupies a small area. Its configuration is very flexible and the power supply method is more reliable. The construction, installation, and commissioning time are greatly reduced, and the overall cost is lowered.

With the development of modern industry, the degree of automation and intelligence of electrical control equipment is increasing. Utilizing modern electronic technology, sensor technology, communication technology, and computer network technology to integrate monitoring, protection, control, and measurement of power equipment under normal and accident conditions, achieving good management, has become an inevitable trend and development direction.

The XGW-12 outdoor intelligent box type switching station integrates 12/24kV switchgear, circuit breakers, load switches, current and voltage transformers, 12/24kV power supply PT, switching station FTU, RTU, communication control terminal (CCU), 12/24kV metering and automatic meter reading, UPS power supply and indicator instruments into a movable, sealed and moisture-proof stainless steel box, thus achieving the integration and modular assembly of primary and secondary systems in urban distribution networks, shortening the construction period, and greatly improving the reliability of urban power grid operation.

Model Meaning



Technical standards that the product meets

This product meets the latest national standards, industry standards, and IEC standards. After consultation and agreement with the user, other higher performance standards can be used.

The relevant provisions contained in the following standards constitute the provisions of this technical specification by reference. All standards will be revised, and this technical specification should comply with the requirements of the latest versions of the following standards.

GB 16926-1997	AC High Voltage Load Switches - Fuse Combination Electrical Appliances
GB 3804-2004	3.6kV~40.5kV High Voltage AC Load Switches
GB 3906-2006	3.6kV~40.5kV AC Metal Enclosed Switchgear and Control Equipment
GB/T 11022-1999	Common Technical Requirements for High Voltage Switchgear and Control Equipment Standards
GB 4208-2008	Degrees of Protection Provided by Enclosures (IP Code)
IEC 420	High Voltage AC Load Switches - Combination of Fuses
IEC 298	AC metal enclosed switchgear and control equipment for voltages above 1kV and below 52kV
GB 1984-2003	High Voltage AC Circuit Breakers

Normal operating environment

- Altitude: ≤ 1000m;
- Environmental temperature: maximum environmental temperature +40 °C, minimum environmental temperature -25 °C, maximum daily temperature difference of 25 °C;
- Relative humidity: daily average ≤ 95%, monthly average ≤ 90%;
- Earthquake resistance: Ground horizontal acceleration of 0.2g and vertical acceleration of 0.1g act simultaneously. Adopting resonance, sine, and beat wave test methods, exciting 5 times with 5 waves each time and an interval of 2 seconds, with a safety factor of not less than 1.67;
- The installation site should be free of gas vapor, chemical deposits, dust, pollution, and other explosive and corrosive media that seriously affect the insulation of the load switch;
- Used in ungrounded systems and 10kV systems grounded through small resistors or arc suppression coils;

Note: If ordering this product exceeds the above conditions, please consult with our company.

Main technical parameters

Name	Company	technical requirement	
		Load switch cabinet	Combination electrical cabinet
Rated voltage	kV	12	
Rated frequency	Hz	50	
Rated current	A	630	200
Rated load breaking current	A	630	630
Rated short-time withstand current (effective value)	kA	20kA	
Rated short-circuit duration	s	3s	
Rated peak withstand current	kA	50 / 63	
Closed loop breaking current	A	630	
Rated cable-charging breaking current	A	25	
Rated no-load transformer breaking current	A	16	
Rated breaking transfer current	A	1750	
Expected short-circuit breaking current of fuse (effective value)	kA	63	
Short time withstand current/duration of grounding switch	kA	25kA/1s	
Rated current breaking times	order	≥ 200	
Mechanical life	order	≥ 2000	
Annual leakage rate of SF6 gas		Not exceeding 1%	
Rated insulation level	单位	Technical Parameter	
1-minute power frequency withstand voltage (Effective value)	between open contacts	kV	48
	alternate with	kV	42
	relatively	kV	42
Lightning impulse withstand voltage (Peak value)	between open contacts	kV	85
	alternate with	kV	75
	relatively	kV	75
Spring operating mechanism		Manual, can be upgraded to electric	
Operating Voltage		DC 48V/ ≥ 20 AC 220V	
External insulation creepage distance	V		
Non synchronous disconnection	mm/kV	Less than 5	
Non synchronous closing	ms	Less than 5	
Main circuit resistance	ms	Less than 140	
Cabinet shell protection level	uΩ	IP4X	

Structural and technical requirements

- The load switch in the box type switchgear adopts a three position SF6 load switch, and the electrical life of the SF6 load switch should meet the E3 level requirements; The electrical lifespan of the circuit breaker should meet the E2 level requirements.
- Anti condensation measures should be taken in air insulated switchgear such as PT cabinets and metering cabinets (with condensation controllers installed inside the cabinets), such as installing resistance heaters (with control switches).
- The relative pressure of SF6 in the gas package of the unit type SF6 ring main unit should not exceed 1.4 bar. The entire inflatable shell should meet the requirements of "closed pressure system" specified in IEC 60298, with an annual air leakage of no more than 1%, maintenance free for 30 years, and no need for re inflation. The pressure of the gas inside the SF6 chamber can be monitored through an SF6 pressure gauge.
- The rated current of the fuse should be matched with the load, and the fuse parameters are: rated voltage of 12kV, rated breaking current (effective value) of 63kA. The switch used for transformer protection should be able to both melt and trip, as well as easily achieve electric tripping.

5. The box type switchgear should have complete five prevention interlocking functions.

Through the control of the mechanism interlocking device, the operation fully achieves the following five prevention interlocking functions:

- ① Prevent accidental opening and closing of circuit breakers (load switches);
- ② Prevent load on/off isolating switches;
- ③ Prevent live hanging (closing) of grounding wires (grounding switches);
- ④ Prevent closing circuit breakers (load switches, isolating switches) with grounding wires (grounding switches);
- ⑤ Prevent accidental entry into electrified compartments.

6. Adopting a fully enclosed structure, the switchgear mainly consists of compartments such as gas chambers, cable chambers, and mechanism chambers (secondary chambers). The distance from the cable joint to the cable entry point (hole or fixing clamp) is $\geq 370\text{mm}$, and the inner sleeve and supporting insulation parts are made of epoxy resin material, with a creepage distance of $\geq 20\text{mm/kV}$. The interconnection adopts copper busbar, and the grounding busbar adopts copper busbar. The selection of cross-section should meet the requirements of GB3906.

7. Install a live indicator with electrical verification function on the panel of the mechanism box, which is easy to replace and can be connected to an external secondary phase analyzer.

8. The primary circuit simulation sign of the box type switchgear is clearly marked.

9. High voltage electrical components installed internally, such as SF6 load switches, circuit breakers, transformers, lightning arresters, etc., should have durable and clear nameplates installed in easily observable positions during operation or maintenance.

10. The opening and closing station is equipped with a secondary room or control box, which has a secondary circuit that matches the operating mechanism. It can be configured with a manual/electric operating mechanism and reserved with electric operation function, remote control and remote signaling interfaces to meet the needs of remote monitoring. It should also have a short circuit fault indicator to meet the requirements of phase to phase short circuit and single-phase fault grounding indication, and have switch output function. The terminals inside the ring main unit require the use of dust-proof and flame-retardant products. The secondary wire section of CT is a copper core with a cross-sectional area of 2.5 square millimeters, and a current testing box is installed in the circuit. The voltage and control wires have a cross-sectional area of 1.5 square millimeters with a copper core.

11. The lower cabinet door is equipped with an observation window and made of flame-retardant transparent material.

12. The installation and maintenance of cables in front of the cabinet where the box type switch is located can be installed against the wall.

13. The load switch adopts a three position structure, with intuitive position indication on the front panel. The grounding switch and load switch/isolation switch of the three position switch have separate operating handle sockets.

14. The structure of the box type switchgear has the function of preventing personal injury to operators in the event of internal faults and arcing: the compartments have metal partitions to prevent the expansion of accidents; The chamber has a pressure release area; There is a pressure relief plate at the rear of the cabinet.

15. The installation dimensions of load switches and operating mechanisms shall be uniform, and the same components, vulnerable parts, spare parts, and accessories shall be interchangeable.

16. The air chamber of the box type opening and closing station is welded with 3mm high-quality 304 stainless steel plate, and the cabinet body is made of aluminum zinc coated steel plate (except for ventilation, exhaust ports, and observation windows), with a steel plate thickness of not less than 2mm and sufficient mechanical and fire resistance strength.

All components of the live main circuit are installed in the air chamber, and the protection level of the air chamber should meet the requirements of IP67; The cabinet meets the requirements of IP4X.

18. The position of the lifting rings (one on each side) used for lifting should be set reasonably, and the switch equipment in the suspension should be kept horizontal. There should be no frictional contact between the lifting chain and any components to avoid scratching the surface coating of the box during the lifting process.

19. A dedicated grounding busbar should be installed along the entire length of all box type switch stations. If it is made of copper, its current density should not exceed 200A/mm^2 in the event of a specified grounding fault, but the minimum cross-section should not be less than 30mm^2 . The grounding conductor should be equipped with a fixed connection terminal connected to the grounding network and have a clear grounding mark. If the grounding conductor is not made of copper, it should also meet the peak withstand current and short-time withstand current requirements specified on the nameplate. The contact area of the shell grounding point should meet the requirements, and the diameter of the grounding screw should not be less than 12mm^2 . The grounding point should be marked with the word "grounding" or other grounding symbols.

20. The main busbar in the air chamber is made of copper material, and the cross-sectional area of the branch leads in the busbar segmented cabinet is the same as that of the main busbar; The outer surface of the main busbar and branch busbar (including connecting parts) should be insulated with organic materials, that is, there should be no exposed parts of the busbar in the busbar compartment and cable compartment (except for cable connection terminals).

Other requirements for SF6 load switch

- ① The arc extinguishing medium and insulation medium of the load switch are SF6 gas;
- ② Each independent SF6 gas chamber should generally be equipped with a device that can display the internal air pressure, which should be able to clearly display the pressure range for safe operation of the equipment.

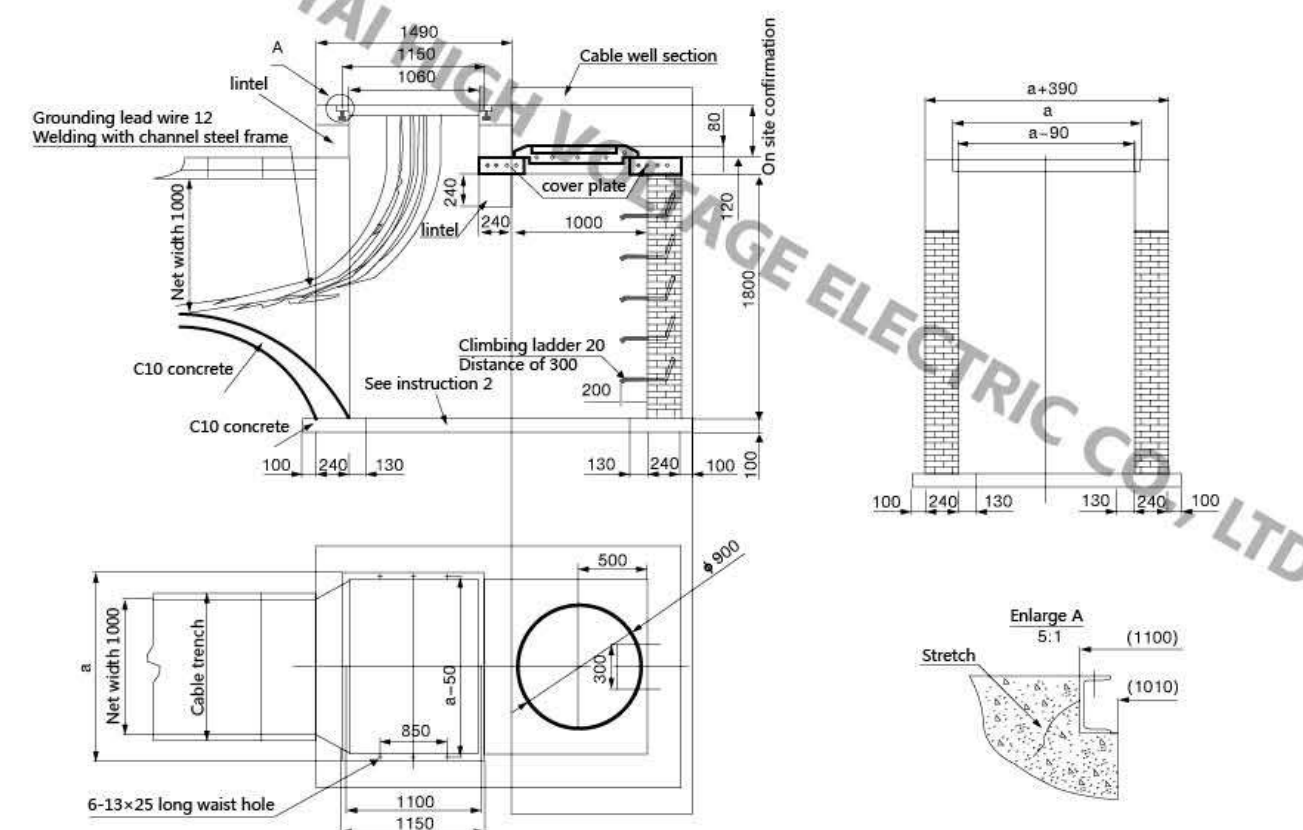
Installation foundation diagram (for reference)

Scheme	Outdoor intelligent switchgear (outdoor ring main unit)			
	01、05	02、06	03、07	04
a(mm)	1010	1400	1800	2200
b(mm)	900	1100	1100	1100
c(mm)	700	850	850	850

explain:

- The brick wall is constructed with M5 cement mortar, and the inside and outside of the ground are coated with 1:2.5 cement mortar;
- Waterproof treatment should be carried out when the bottom layer is below the groundwater level, otherwise seepage treatment should be carried out;
- The lintel is made of $\Phi 6$ steel bars and 20% concrete;
- After the processing and welding of the 8 # channel steel base. Perform anti-corrosion treatment (user determines anti-corrosion method)
- 8 # channel steel base is placed in the foundation slot and fixed with tension bars and concrete
- Users can choose not to make cable wells (within the dashed box) based on the specific situation of the construction site

Basic structure diagram



Ordering Instructions

The following information should be provided when placing an order:

- Product model name and order quantity, rated voltage, rated current;
- The model of the operating mechanism (K type, A type) should be specified with the operating voltage when using electric operation;
- The models and specifications of fuses that can be selected in combination electrical appliances;
- Name and quantity of spare parts (one for every five loads of the operating handle);
- Special requirements should be resolved through negotiation with the manufacturer.



Open and close/junction
box series

PUTAI



KBS-12

Outdoor box opening and closing room



Green
energy



Intelligent
power grid



Power grid
system



Industrial
electricity
consumption



Rail Transit



Safe and
reliable

KBS-12

Outdoor box opening and closing room

PUTAI

Purpose

Widely used in urban power grid renovation, residential communities, commercial centers and other densely populated areas.

Model Meaning

KBS - □ □ □ K □

Number of branch circuit switches, one switch can be omitted without writing

Branch circuit with switch

Number of branch circuits

Circuit number of outgoing line

Number of incoming circuits

Cable distribution box with switch

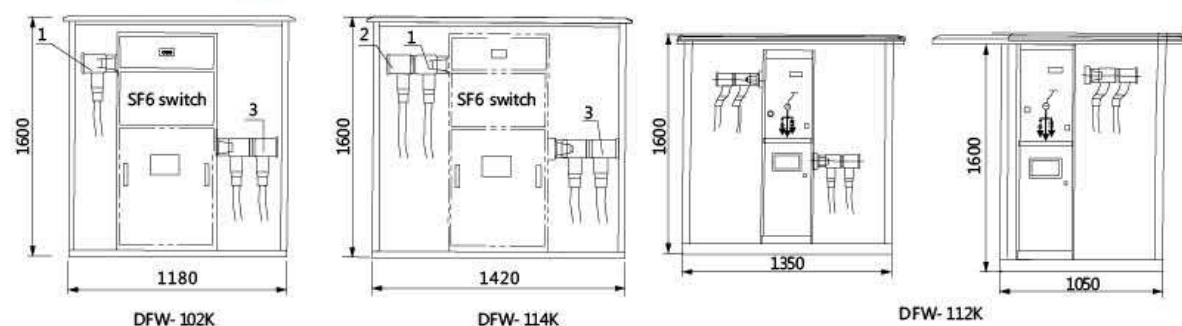
Functional Features

- ♦ Adopting prefabricated live touchable silicone rubber cable heads, fully sealed, fully insulated, maintenance free, and reliable to ensure personal safety;
- ♦ Compact structure, compact and beautiful appearance, double-layer box, with a service life of over 20 years;
- ♦ On the premise of not affecting the operation of the main network, achieve regional power outage maintenance and reduce the scope of power outages;
- ♦ Can be equipped with one or more SF6 load switches. The wiring methods are flexible and diverse, with a maximum of 8 branch outgoing lines;
- ♦ Optional lightning arresters, short-circuit fault indicators, current limiting fuses, etc., to meet various user requirements.

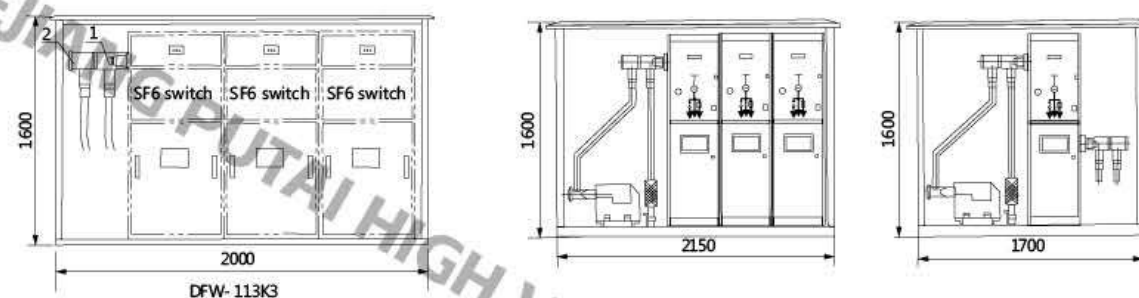
Main technical parameters

Serial Number	Name	Parameter
1	Rated voltage	12kV
2	Rated current	630A
3	Power frequency withstand voltage (phase to ground)	42kV/min
4	lightning impulse voltage	75kV
5	Rated breaking current	630A
6	Rated short-circuit opening and closing current (peak value)	50kA
7	Rated short-time withstand current	25kA/4S
8	Rated peak withstand current	50kA
9	Rated breaking capacitor current	45kA
10	Rated breaking inductance current	16A
11	Number of full load disconnections	>100
12	Number of mechanical operations for opening and closing the switch	2000

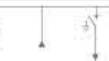
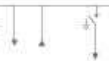
Outline schematic diagram



1. Incoming cable joint 2, outgoing cable joint 3, branch cable joint



Typical wiring scheme

Model	Line number description	Primary wiring diagram	Dimensions (length x width x height)
KBS-102K	One in two branches with one switch		1180×1050×1600
KBS-103K	One in three branches with one switch		1250×1050×1600
KBS-104K	One in four branches with one switch		1250×1050×1600
KBS-112K	One in, one out, two branches with one switch		1350×1050×1600
KBS-113K	One in, one out, three branches with one switch		1420×1050×1600
KBS-114K	One in, one out, four branches with one switch		1420×1050×1600
KBS-102K2	One in two branches with two switches		1350×1050×1600
KBS-112K2	One in, one out, two branches with two switches		1500×1050×1600
KBS-103K3	One in three branches with three switches		1850×1050×1600
KBS-113K3	One in, one out, three branches with three switches		2000×1050×1600

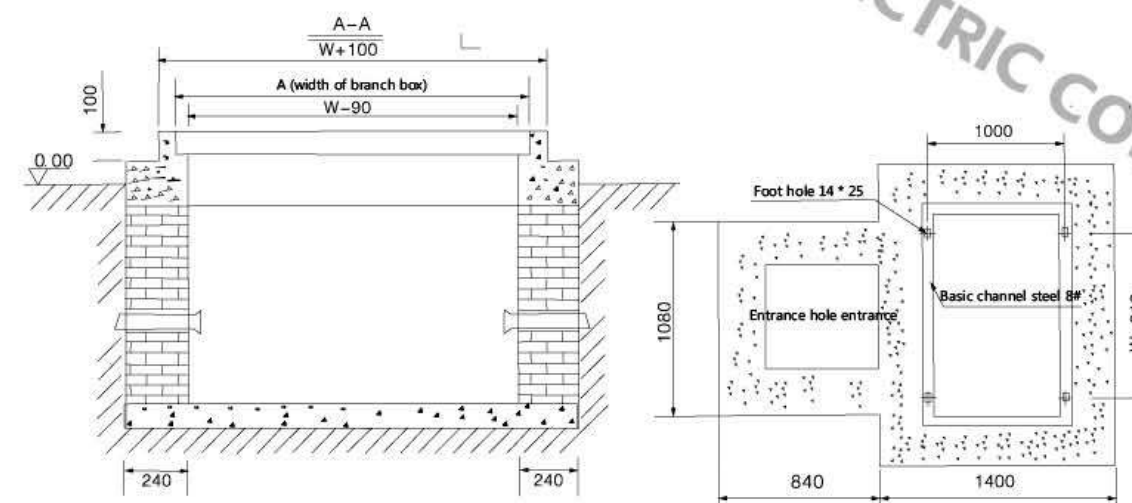
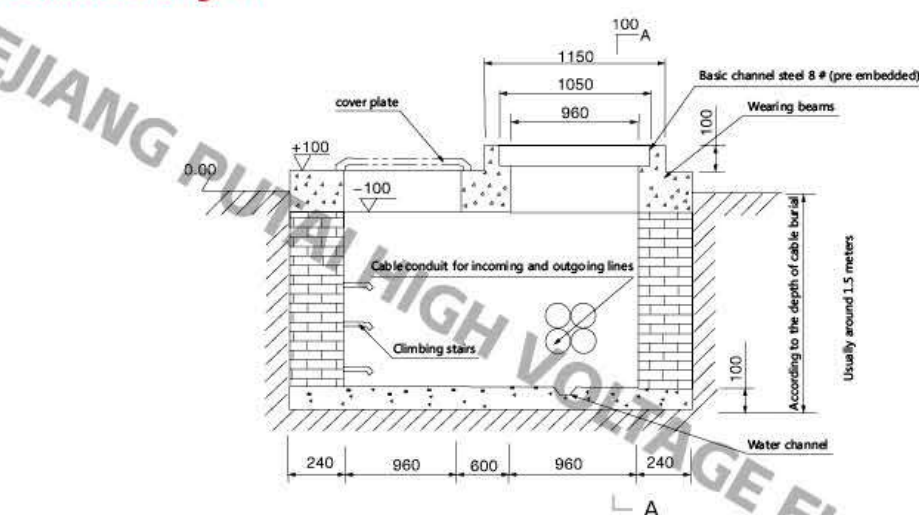
*Note: Users can choose lightning arresters, short-circuit fault indicators, fuses, etc.

Common cable connectors

Made of imported high-quality insulating rubber with fully automatic injection, both the inner and outer layers are semiconductor shielding layers, the inner layer is used to balance the internal electric field, and the outer shielding layer is grounded to protect the zero potential on the surface of the cable head. The inner layer at the lower end of the stress cone is in close contact with the semiconductor layer of the cable, and the outer semiconductor layer is in close contact with the outer semiconductor layer of the cable head, and is grounded through the grounding hole of the cable head. This not only solves the problem of electric field concentration at the cutting point of the outer shielding layer of the cable, but also keeps the outer shielding layer of the cable at zero potential, ensuring personal safety.

The touchable cable front connector is directly installed on the equipment casing, and can be connected to the touchable cable rear connector to form multiple outgoing lines. It can also be connected to lightning arresters to provide overvoltage protection for the power grid.

Basic structure diagram



Ordering Instructions

- ♦ If the product model and user have special requirements, a picture can be provided once;
- ♦ Standard cross-sections for incoming and outgoing cables as well as branch cables;
- ♦ The number of selected lightning arresters and short-circuit fault indicators;
- ♦ The material and color of the shell.



Open and close/junction
box series

PUTAI



DFW

European type cable junction box



Green
energy



Intelligent
power grid



Power grid
system



Industrial
electricity
consumption



Rail Transit



Safe and
reliable

DFW

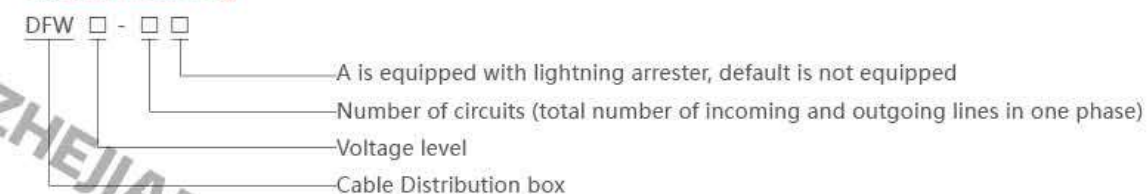
European type cable junction box

PUTAI

Overview

European style cable distribution box is a cable engineering equipment widely used in power distribution network systems in recent years. Its main features are bidirectional opening of doors, use of docking sleeves as connecting busbars, and significant advantages such as small length, clear cable arrangement, and no need for large-span crossing of three core cables. The cable connectors used comply with DIN47636 standard. Generally, bolt fixed cable joints with a rated current of 630A are used.

Model Meaning



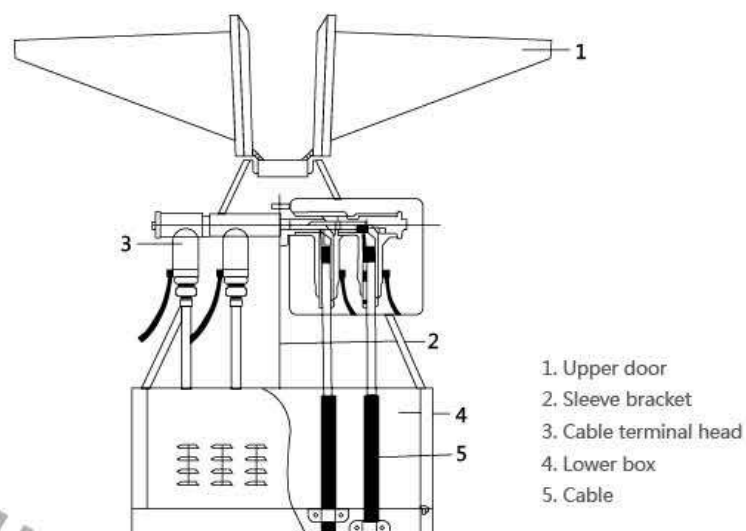
Normal operating environment

- Environmental temperature: maximum temperature: +40 °C, minimum temperature: -30 °C;
- Wind speed: equivalent to 34m/s (not greater than 700Pa);
- Humidity: The average daily relative humidity should not exceed 95%; The average monthly relative humidity is not greater than 95%;
- Seismic resistance: horizontal acceleration not exceeding 0.4m/s², vertical acceleration not exceeding 0.15m/s²;
- Installation site inclination: not more than 3 °
- Installation environment: The surrounding air should not be significantly polluted by corrosive, flammable gases, water vapor, etc., and the installation site should not experience severe vibrations.

When ordering this product beyond the above conditions, please consult with our company.

Technical Parameter

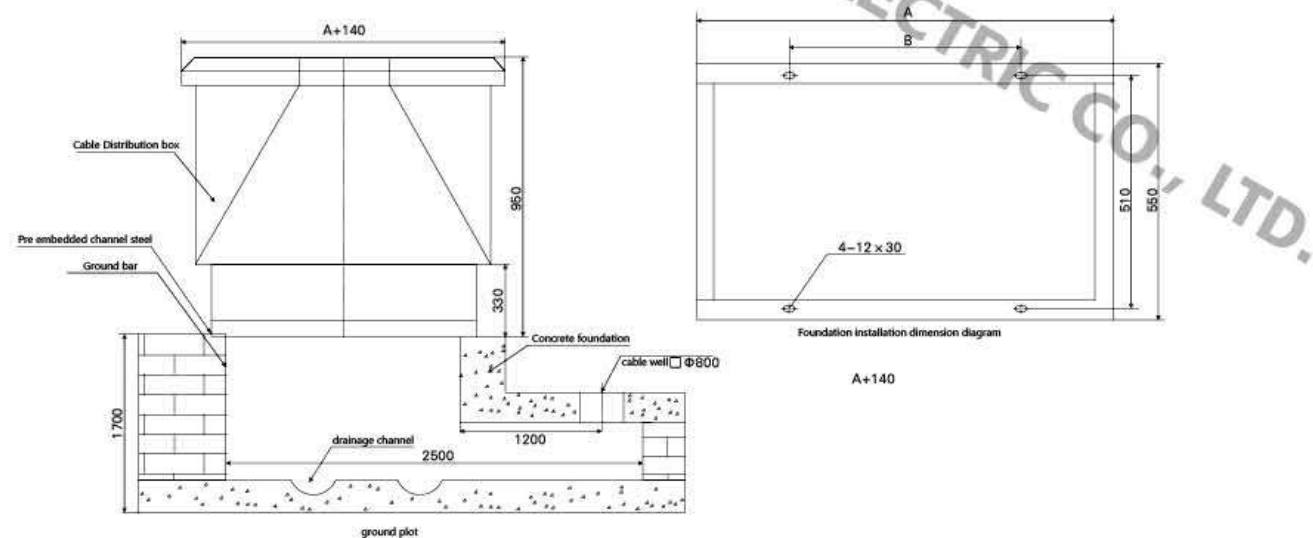
Rated voltage	12kV
Rated current	630A
Dynamic stable current	50kA/0.3s
Thermal stability current	20kA/3s
1-minute power frequency withstand voltage	42kV
15 minute DC withstand voltage	52kV
Lightning impulse withstand voltage	105kV
Box protection level	IP33



The DFW-12 series cable junction box is designed for outdoor use, with a fully sealed structure, full insulation, dust-proof, moisture-proof, flood resistant, corrosion-resistant, and strong environmental adaptability. The cabinet protection level reaches IP33. The cable joint bracket is made of stainless steel material, and the shell is made of stainless steel plate or cold rolled plate spray coating.

The cable joint bracket is located at the upper part of the junction box, used to support the conduit, which is used to fix the cable joint. If it is equipped with a lightning arrester, the arrester is installed at the end of the cable joint. In addition, short-circuit fault indicators and live displays are also installed in the distribution box. All live parts of the main circuit inside the box are insulated with prefabricated plug-in cable terminals. The cable partition is located at the bottom of the box, with cable fixing clips and grounding terminals. The box layout is reasonable, the volume is small, the structure is compact, the appearance is beautiful and generous, the installation is simple, and maintenance is free.

Foundation diagram of European cable junction box



Number of branches	2	3-4	5-6	7-8	9-12
A	550	850	1090	850	1090
B	550	550	550	650	650



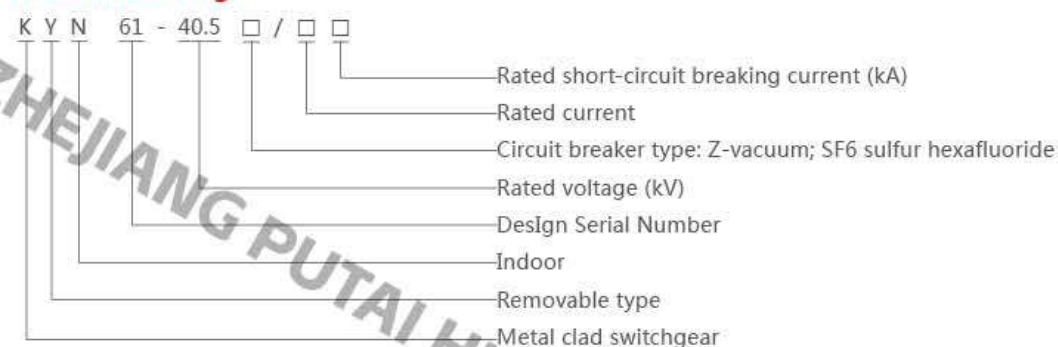
KYN61-40.5(Z) Armored removable AC metal-enclosed switchgear



Overview

KYN61-40.5 (Z) Armored Removable AC Metal Enclosed Switchgear (hereinafter referred to as the switchgear) is an indoor complete set of power distribution equipment with a three-phase current of 50Hz and a rated voltage of 40.5kV. As a power plant, substation, and industrial and mining enterprise that receives and distributes electrical energy, it plays a role in controlling, protecting, and monitoring circuits, and can also be used in places with frequent operations. This switchgear complies with standards such as GB/T1022-2999, GB 3906-2006, and DL/T 404-2007.

Model Meaning



Environmental conditions for use

- Environmental temperature: upper limit +40 °C, and the average value measured within 24 hours does not exceed 35 °C, lower limit -10 °C;
- Altitude: not exceeding 1000m above sea level;
- Relative humidity: daily average not exceeding 95%, monthly average not exceeding 90%;
- Earthquake intensity: not exceeding 8 degrees;
- Water vapor pressure: daily average not exceeding 2.2kPa, monthly average not exceeding 1.8kPa;
- Surrounding environment: A place without fire, explosion hazards, serious pollution, chemical corrosion, and severe vibration.

Main features

- The cabinet structure adopts an assembled type, and the circuit breaker adopts a handcart floor standing structure;
- Equipped with a brand new composite insulation vacuum circuit breaker, with the characteristics of good interchangeability and easy replacement;
- The handcart frame is equipped with a screw nut propulsion mechanism, which can easily move the handcart and prevent damage to the propulsion structure due to misoperation;
- All operations can be performed with the cabinet door closed;
- The interlocking between the main switch, handcart, and switch cabinet door adopts a mandatory mechanical locking method to meet the "five prevention" function;
- The cable room has ample space and can connect multiple cables;
- Quick grounding switch is used for grounding and closing short-circuit circuits;
- The protection level of the shell is IP3X, and when the handcart door is open, the protection level is IP2X;
- The product complies with GB 3906-2006, DL/T 404-2007, and adopts the international IEC-298 standard as a reference.

Technical Parameter

Main technical parameters of vacuum switchgear

Serial Number	Name	Unit	Numerical value
1	Rated voltage	kV	40.5
2	Rated current	A	1250 1600 2000
3	Rated frequency	Hz	50
4	Rated short-time withstand current	kA	20 25 31.5
5	Rated peak withstand current	kA	50 63 80
6	Rated power frequency withstand voltage	kV	95/1min
7	Rated lightning impulse withstand voltage	kV	185
8	Rated short-circuit duration	S	4
9	Protection grade		IP3X

Main technical parameters of vacuum circuit breaker

Serial Number	Name	Unit	Numerical value
1	Rated voltage	kV	40.5
2	Rated frequency	Hz	50
3	Rated power frequency withstand voltage	kV	95/1min
4	Rated lightning impulse withstand voltage	kV	185
5	Rated current	A	1250 1600 2000
6	Rated short-time withstand current	kA	20 25 31.5
7	Rated short circuit breaking current	kA	20 25 31.5
8	Rated peak withstand current	kA	50 63 80
9	Rated short-circuit duration	ms	4
10	Opening time	ms	30≤t≤60
11	Close time	ms	50≤t≤100
12	Rated short-circuit breaking current times	order	20
13	Mechanical life	order	10000

Main technical parameters of vacuum circuit breaker

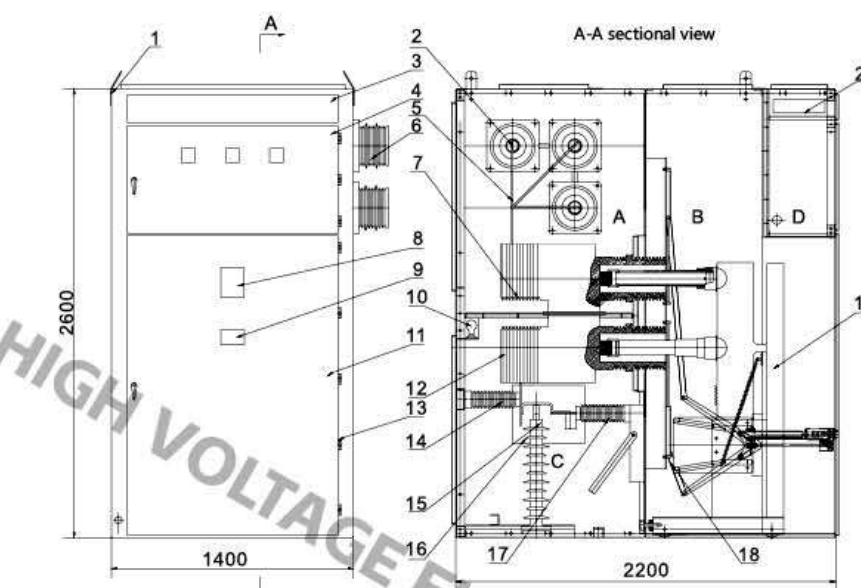
Name		Unit	Numerical value
Rated operating voltage	opening coil	V	DC220/110 AC220/110
	closing coil		
Rated operating current	opening coil	A	0.96(220 V) 1.05(110V)
	closing coil		
Energy storage motor power		W	230
Rated voltage of energy storage motor		V	DC220/110 AC220/110
Energy storage time		S	≤12

External dimensions

Height		2650
Width	Rated current 1600A and below	1400
Depth	Cable inlet and outlet lines	2870
	Overhead incoming and outgoing lines	2950

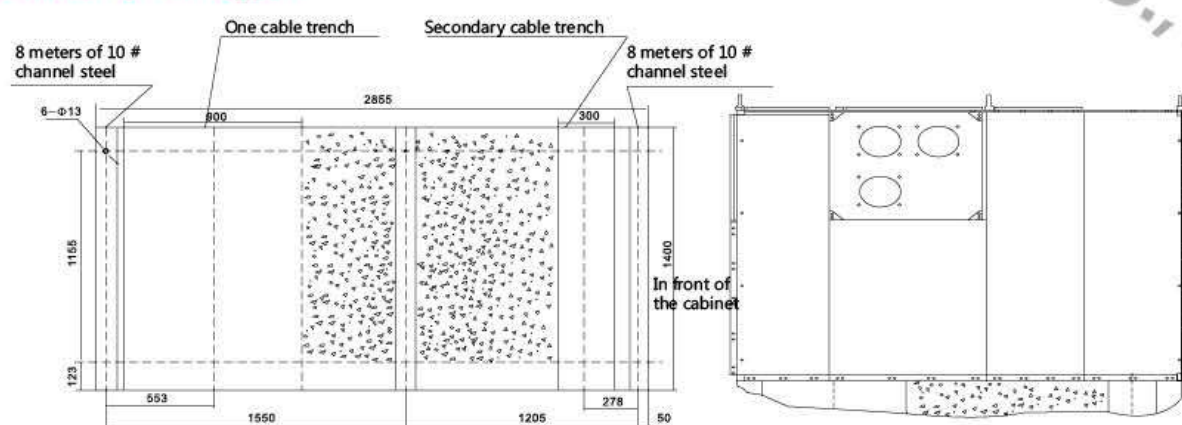
Model Meaning

- A. busbar compartment
- B. Handcart room
- C. Cable room
- D. Relay instrument room
- 1. Hanging ring
- 2. Main busbar
- 3. Small busbar room cover ring
- 4. Instrument room door
- 5. Branch busbar
- 6. Busbar bushing
- 7. Contact box
- 8. Simulated busbar coil
- 9. Nameplate
- 10. Lighting fixtures
- 11. Handcart compartment door
- 12. Current Transformer
- 13. Hinge
- 14. Insulators
- 15. Zinc oxide lightning arrester
- 16. Insulation partition
- 17. Grounding switch



- 18. Valve assembly
- 19. Vacuum circuit breaker handcart
- 20. Small busbar terminal room

Installation of switchgear



- ♦ Height of electrical room: $\geq 4500\text{mm}$;
- ♦ Distance from the back of the cabinet to the wall: $\geq 1500\text{mm}$;
- ♦ Flatness of infrastructure: $\leq 1\text{mm/m}^2$;
- ♦ The height of the foundation embedded channel steel above the ground shall not exceed 3mm;
- ♦ Can be fixed on the foundation by bolts or welding methods;
- ♦ The weight of the switchgear is about 1800kg;
- ♦ Width of switchgear operating corridor (single row): $\geq 3000\text{mm}$;
- ♦ Double row (face-to-face) $\geq 4000\text{mm}$.



KYN28A-12

Armored removable AC metal-enclosed switchgear



Green energy



Intelligent power grid



Power grid system



Industrial electricity consumption



Rail Transit



Safe and reliable

Overview

KYN □ -12 indoor AC metal armored mid mounted switchgear. It is suitable for three-phase AC power systems with a rated voltage of 12kV and a rated frequency of 50Hz, used for receiving and distributing electrical energy, and for controlling, protecting, and monitoring circuits.

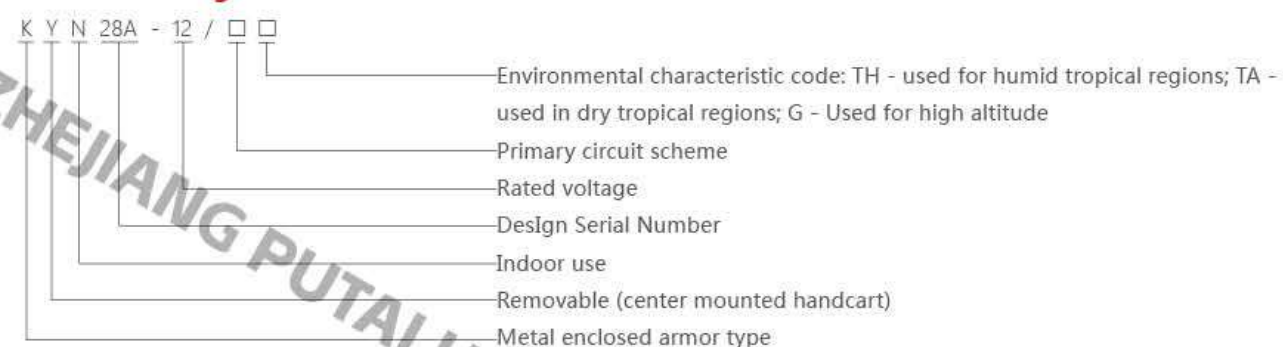
Compliant with standard: GB3906-2006 "3.6~40.5 kV AC Metal Enclosed Switchgear and Control Equipment"

GB11022-89 General Technical Conditions for High Voltage Switchgear

LEC298 (1990) "AC metal enclosed switchgear and control equipment with rated voltage above 1kV and below 50kV"

DL404-97 Technical Conditions for Ordering Indoor AC High Voltage Switchgear

Model Meaning



Environmental conditions for use

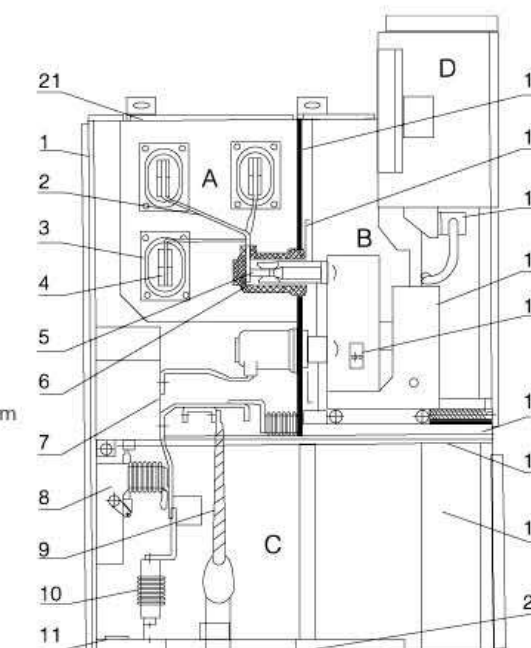
- Surrounding air temperature: maximum temperature of 40 °C, minimum temperature of -15 °C;
- Relative humidity: daily average not exceeding 95%, daily average water vapor pressure not exceeding 2.2Kpa, monthly average not exceeding 90%, monthly average water vapor pressure not exceeding 1.8Kpa;
- Altitude: 1000m and below;
- Earthquake intensity: not exceeding 8 degrees;
- The surrounding air should not be significantly polluted by corrosive or flammable gases, water vapor, etc;
- Places without frequent severe vibrations;
- When used under normal environmental conditions exceeding GB3906, the user and our company shall negotiate.

Technical Parameter

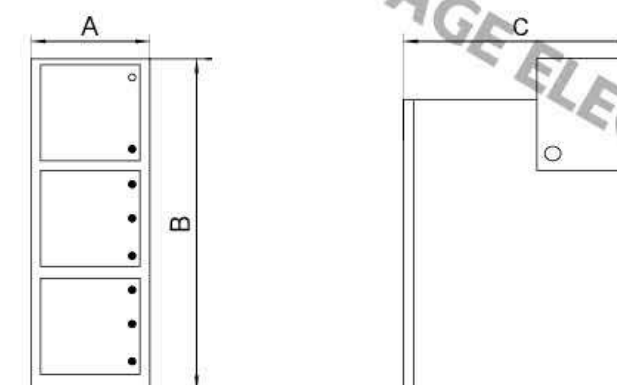
Project	Unit	Numerical value
Rated voltage	kV	3.6, 7.2, 12
Rated frequency	Hz	50
Rated current of circuit breaker	A	630, 1250, 1600, 2000, 2500, 3150
Rated current of switchgear	A	630, 1250, 1600, 2000, 2500, 3150
Rated short-time withstand current (4S)	kA	16, 20, 25, 31.5, 40, 50
Rated peak withstand current (peak)	kA	40, 50, 63, 80, 100, 125
Rated short circuit breaking current	kA	16, 20, 25, 31.5, 40, 50
Rated short-circuit closing current (peak)	kA	40, 50, 63, 80, 100, 125
Rated insulation level	1-minute power frequency withstand voltage	kV 24, 32, 42
	Lightning impulse withstand voltage	kV 40, 60, 75
Protection grade		The shell is IP4X, and the isolation room and circuit breaker room doors are IP2X when opened

Schematic diagram of switchgear mechanism

- A. Busbar room
B. Circuit breaker handcart room
C. Cable room
D. Relay instrument room
1. Shell
2. Branch busbar
3. Busbar bushing
4. Main busbar
5. Static contact
6. Static contact box
7. Current Transformer
8. Grounding switch
9. Cable
10. Lightning arrester
11. Grounding main busbar
12. Loading and unloading partition
13. Partition (valve)
14. Secondary plug
15. Circuit breaker handcart
16. Heating device
17. Horizontal partition
18. Grounding switch operating mechanism
19. Secondary wiring duct
20. Bottom plate
21. Pressure relief device



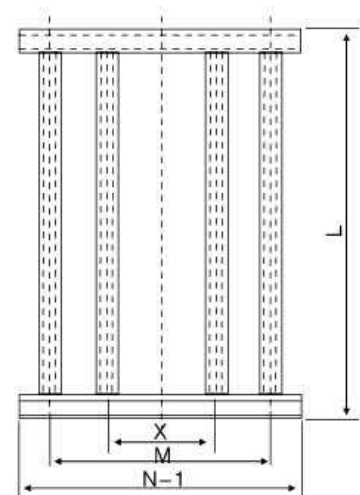
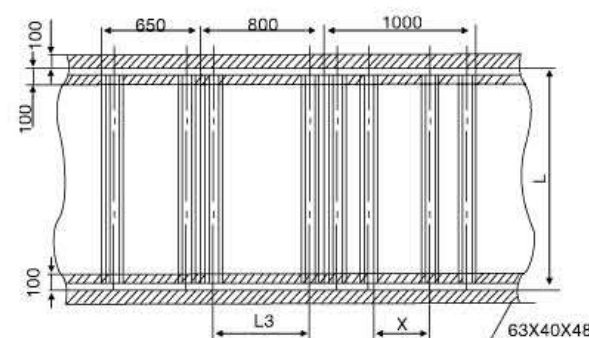
External dimensions



Technical Parameter

Height B		2300
Width A	The rated current of the branch busbar reaches 1250A, and the thermal stability current is 40kA	800
	The rated current of the branch busbar exceeds 1600A or above	1000
Depth C	Cable entry and exit mother	1500
	Overhead incoming and outgoing lines	1660

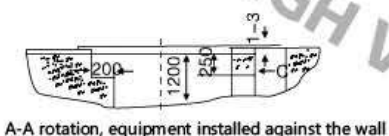
Installation size



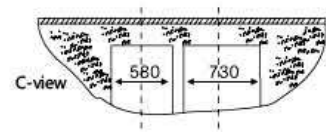
Installation diagram of switch equipment foundation



A-A rotation, equipment without wall mounted installation

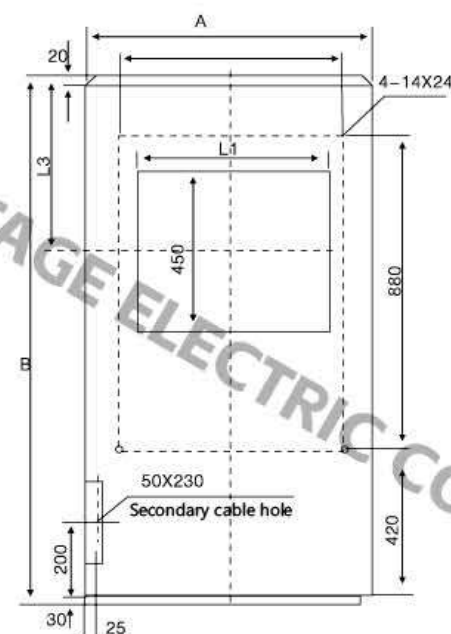


A-A rotation, equipment installed against the wall



C-view

Schematic diagram of switch equipment installation foundation



Installation diagram of switch equipment

Cabinet width A	Cabinet depth C	M	N	L	X
650	1500 cable	480	650	1450	
650	1660 aerial	480	650	1610	
800	1500 cable	630	800	1450	
800	1660 aerial	630	800	1610	
1000	1500 cable	830	1000	1450	
1000	1660 aerial	830	1000	1610	
★ 800	1500,1660	630	800	See the table below	400
★ 1000	1500,1660	830	1000	See the table below	400
★ 1200	1500,1660	830	1200	See the table below	550

Cabinet width B	L1	L2	L3
1500 cable	380	480	470
1660 empty shelf	380	480	630
1500 cable	530	630	470
1660 empty shelf	530	630	630
1500 cable	730	830	470
1660 empty shelf	730	830	630
Cabinet depth	L		
1500	1450		
1660	1610		



KYN550

Indoor armored removable AC metal-enclosed switchgear



Overview

KYN550 indoor armored movable AC metal enclosed switchgear (hereinafter referred to as KYN550 switchgear) is a complete set of distribution equipment applied to 12kV three-phase AC 50Hz single busbar and single busbar segmented systems under our company. KYN550 has the "five prevention" interlocking function of preventing loaded push-pull circuit breaker handcart, preventing accidental opening and closing of circuit breakers, preventing closing of circuit breakers when the grounding switch is in the closed position, preventing accidental entry into live compartments, and preventing accidental closing of grounding switches when live. It is equipped with indoor medium voltage solid sealed vacuum circuit breaker handcart and is a high-performance distribution equipment.

The size design of KYN550 saves a lot of distribution space for customers, mainly used in commercial and industrial buildings, real estate, data centers, and other industrial power grids with miniaturization needs for substations.

Standard

- This switchgear meets the requirements of standards such as IEC62271-200, GB13906, DL/T404, etc.
- The protection level of the KYN550 switchgear enclosure is IP4X. When the circuit breaker chamber door is opened and the handcart is moved away, the protection level is IP2X.

Environmental conditions for use

normal condition

- Surrounding air temperature: upper limit +40 °C, lower limit -25 °C;
- Altitude: The altitude of the equipment installation site shall not exceed 1000m;
- Environmental temperature: Daily average relative humidity not exceeding 95%, monthly average relative humidity not exceeding 90%;
- The seismic intensity shall not exceed 8 degrees;
- The surrounding air should not be significantly polluted by corrosive or flammable gases, water vapor, etc;
- No serious pollution or frequent severe vibration. The severity design under harsh conditions should meet Class 1 requirements.

Special work conditions

- When used under normal environmental conditions exceeding GB3906 and this technical specification, it shall be negotiated between the user and the manufacturer.

Green environmental protection



Safe and reliable



Intelligent manufacturing



All qualified



Special customized



Concise and compact



Technical parameters of switchgear

Serial Number	Name		Unit	Technical Parameter
1	Rated voltage		kV	12
2	Rated frequency		Hz	50
3	Rated power frequency withstand voltage (1min)		kV	42/48 (fracture surface)
4	Rated lightning impulse withstand voltage (value)		kV	75/85 (fracture)
5	Rated current		A	≤ 1250
6	Rated short-time withstand current (4s)		kA	1)≤ 31.5 ¹⁾
7	Rated peak withstand current (peak)		kA	≤ 80
8	Main circuit resistance		μΩ	2)≤ 100+CT ²⁾
9	Protection grade	casing	kV	IP4X
		The circuit breaker room door is open	kV	IP2X

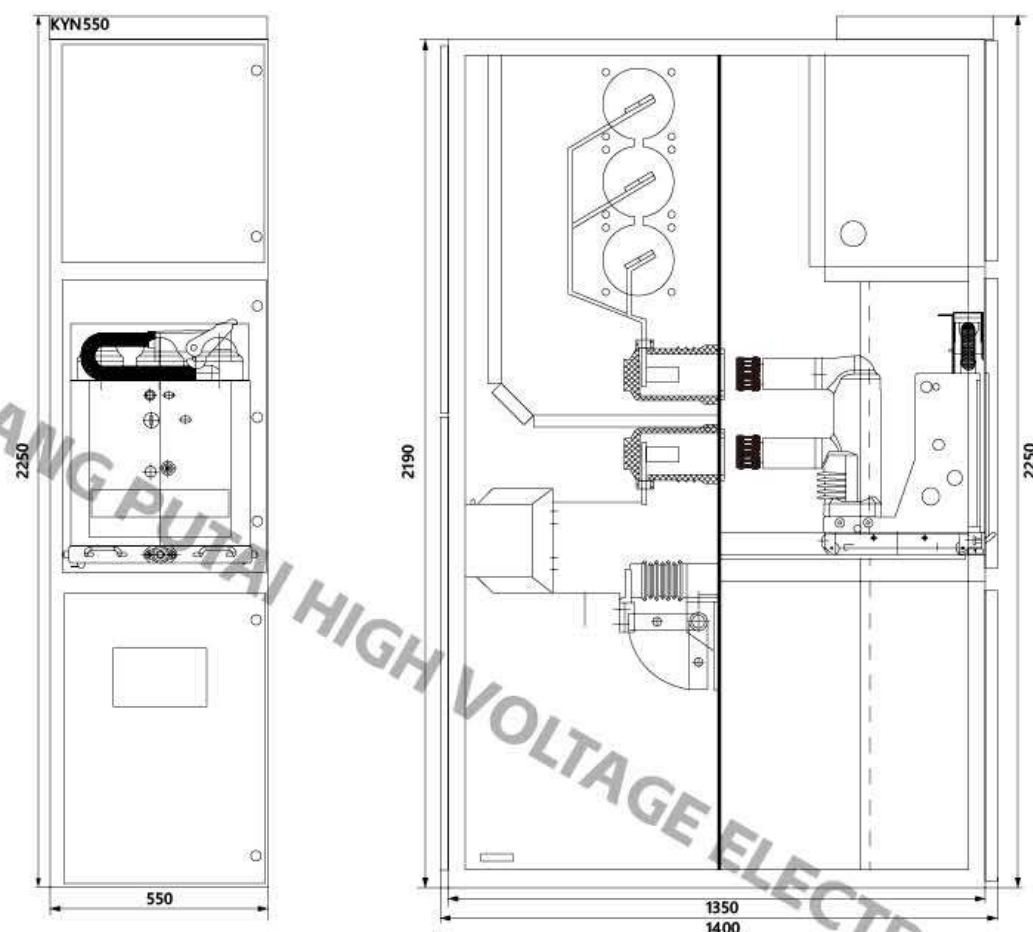
Note: 1) The rated short-time withstand current and rated peak withstand current of the current transformer are related to their transformation ratio, and specific confirmation is required when ordering.

2) DC resistor containing current transformer.

Technical parameters of switchgear

Serial Number	Name		Unit	Technical Parameter
1	Rated voltage		kV	12
2	Rated insulation level	Rated short-time power frequency withstand voltage (Imin)	kV	42
		Rated lightning impulse withstand voltage (peak)	kV	75
3	Rated frequency		Hz	50
4	Rated current		A	1250
5	Rated short circuit breaking current		kA	≤31.5
6	Rated short-time withstand current		kA	≤31.5
7	Rated peak withstand current		kA	≤80
8	Rated short-circuit closing current (peak)		kA	≤80
9	Rated cross phase ground breaking current		kA	27.4
10	Rated short-circuit current duration		s	4
11	Rated short-circuit current breaking times		order	30
12	Rated operating sequence		operation cycle	Automatic reclosing: opening -0.3s-closing -180s-closing
				Automatic reclosing: -0.3s open/close 15s open/close
				Non automatic reclosing: opening/closing 180s closing/opening 180s closing/opening
13	Mechanical life		order	20000

Product Outline Dimensional Drawing



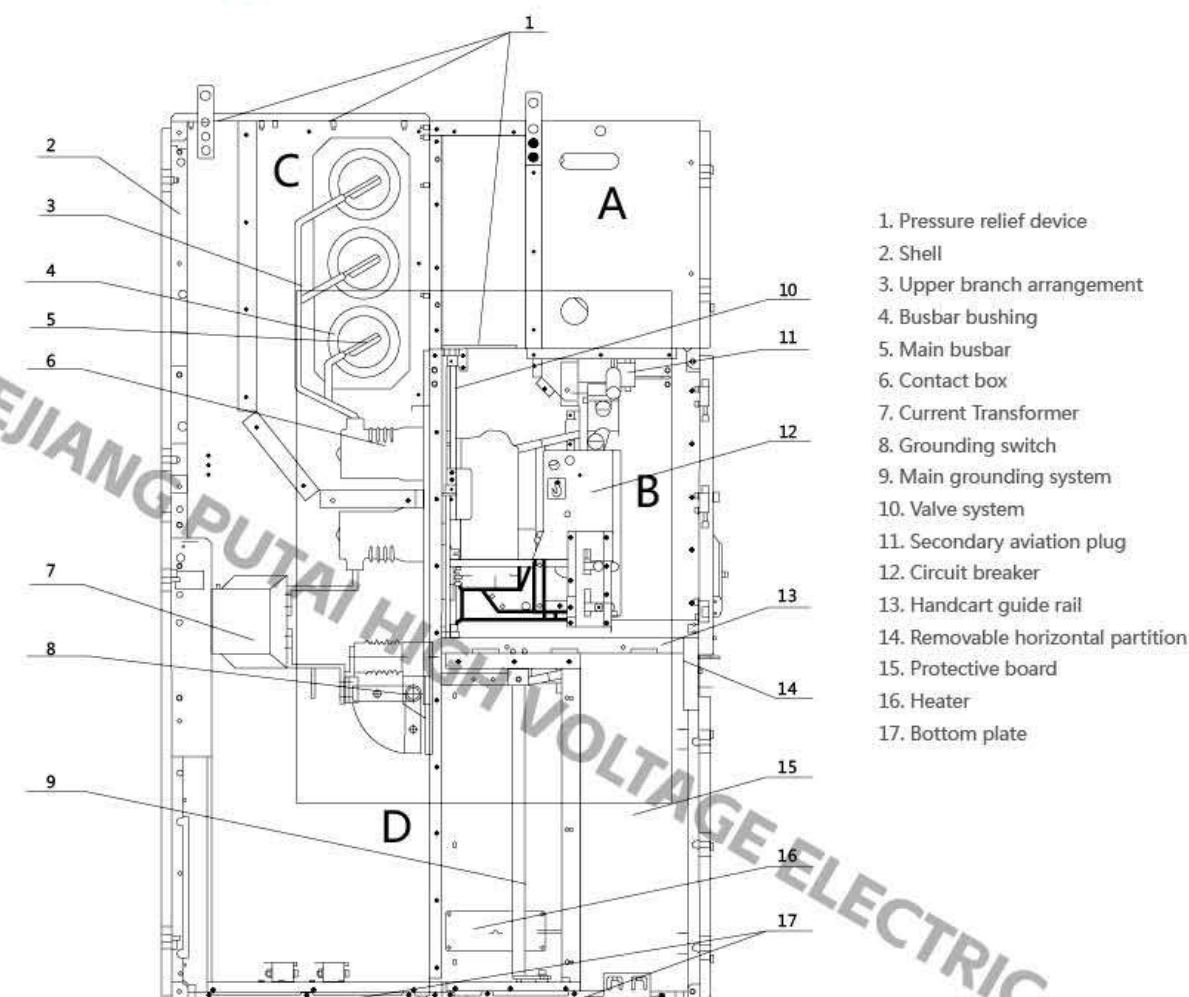
Dimensions and weight

Serial Number	Parameters (units)	Data
1	Width A (mm)	550
2	Height B (mm)	2250
3	Depth C (mm)	1400(1550)
4	Weight (Kg) (approximate value)	400-700

Cabinet introduction

The switchgear is designed according to the armored metal enclosed switchgear standards in GB3906 and IEC62271-200. The overall structure consists of two main parts: a cabinet and a centrally mounted withdrawable component (i.e. handcart). The cabinet is divided into four separate compartments, with overhead incoming and outgoing lines, cable outgoing lines, and other functional solutions. After being arranged and combined, it can become a power distribution device that meets user needs. This switchgear not only meets the user habits of domestic cabinet maintenance, but also provides the option of cabinet front maintenance. The design of cabinet front maintenance can be installed, debugged, and maintained from the front, so when used as a single busbar segmented system, it can be installed back-to-back or face-to-face. In addition to double arrangement, it can also be installed against the wall, further reducing the footprint. Improved the practicality, adaptability, and flexibility of switchgear, reducing investment costs while meeting safety performance requirements, and having a high cost-effectiveness.

Outline schematic diagram



Cabinet introduction

The shell of the switchgear is made of aluminum zinc coated steel plate with strong corrosion resistance, which is processed and bent by CNC machine to assemble the side plate. The special design of the side plate not only enables a 5mm air layer to be formed between adjacent cabinets when cabinets are spliced, but also reduces the impact of arc faults between cabinets; And it has strong rigidity. The cabinet adopts an assembled structure, connected by rivet nuts, high-strength bolts, and pop rivets. There is no need to open clearance holes between cabinets, which makes installation simple, appearance beautiful, and improves production efficiency. The instrument room is an independent unit that is completely separated from the high-voltage area of the switchgear and has earthquake and fire prevention functions. When the circuit breaker handcart is moved away, the valve automatically closes and the switchgear still maintains the protection level of IP2X. The door panel and terminal side sealing plate of the switchgear are made of cold-rolled steel plate, which has been purified and anti-corrosion treated, and then sprayed with plastic technology to make its surface resistant to impact and corrosion, ensuring its aesthetic appearance.

Handcart

The skeleton of the handcart is assembled from thin steel plates processed by CNC machine tools, and the handcart is insulated and coordinated with the cabinet body. The mechanism interlocking is safe, reliable, and flexible. According to their usage, handcarts can be divided into circuit breaker handcarts, voltage transformer handcarts, metering handcarts, isolation handcarts, etc. Various types of handcarts can be freely interchanged with each other in a modular and modular manner, with the same specifications of handcarts being 100% interchangeable. The handcart has a disconnection position, a testing position, and a working position inside the cabinet. Each position is equipped with a positioning device to ensure reliable interlocking. It must be operated according to the interlocking anti misoperation procedure. All types of handcarts are pushed forward and exited by shaking nuts and screws, and their operation is light and flexible, suitable for duty personnel to operate. When the handcart needs to move away from the cabinet, a dedicated transport vehicle can be used to easily extract it for various inspections and maintenance. Moreover, it adopts a mid mounted design, making the entire handcart small in size and extremely convenient for inspection and maintenance. The signal, protection, and control secondary wires between the switchgear and circuit breaker handcart are connected through a multi pin aviation plug.

Indoor armored removable AC metal-enclosed switchgear

Sealed circuit breaker

The solid sealed circuit breaker used in KYN550-12 has good insulation, moisture resistance, and anti condensation properties. The solid sealed vacuum circuit breaker embeds the vacuum arc extinguishing chamber and the conductive parts related to the circuit breaker into a solid insulation material such as epoxy resin, which is easy to cure, to form a pole. The entire pole of the circuit breaker becomes a whole component, with fewer detachable parts and higher reliability. It also turns the surface insulation into volume insulation, which reduces the impact of the environment and greatly improves the insulation strength compared to air insulation. It reduces the size of circuit breakers, which is beneficial for the miniaturization of switchgear.

Compartment

The main electrical components of the switchgear have their own independent compartments, namely: instrument room A, circuit breaker room B, busbar room C, and cable width D. The protection level between each compartment reaches IP2X; Except for the instrument room, the other three high-pressure chambers each have their own pressure relief channels.

Instrument Room A

The relay instrument room can be equipped with relay protection components, instruments, live monitoring indicators, and secondary equipment with special requirements. The control circuit is laid in a sufficiently spacious trunking with a metal cover plate, which can isolate the secondary line from the high-voltage room. The left cable tray is reserved for controlling the routing and extraction of small wires, while the small wires inside the switchgear are laid on the right side. If necessary, small busbar crossing holes can be left on the top plate of the relay instrument room for easy construction. When wiring, the top cover plate of the instrument room can be flipped over for installation of small busbars.

Working principle of circuit breaker handcart

When the handcart is transported into the cabinet circuit breaker room, it can be reliably locked in the test position; The cabinet position display light shows its location. And only after the safety lock, can the propulsion mechanism be shaken to push the handcart to the working position. After the handcart reaches the working position, the handle cannot be moved, and the seat position indicator light will display its position. The mechanical interlocking of the handcart can reliably ensure that the circuit breaker can only be closed when the handcart is in the working or testing position; And the circuit breaker can only move when the handcart is in the open state. Can achieve door closing operation.

Circuit breaker B

Tracks are installed on both sides of the compartment for the handcart to slide from the isolation/testing position to the working position inside the cabinet. When the handcart moves from the disconnected/test position to the working position, the valves on the upper and lower static contact boxes are linked with the handcart and automatically open at the same time; When moving in the opposite direction, the valve automatically closes until the handcart returns to a certain position and completely covers the static contact box, forming effective isolation. At the same time, the upper and lower valves are linked, and during maintenance, the valve on the live side can be locked to ensure that maintenance personnel do not touch the live body. When the circuit breaker room door is closed, the handcart can also be operated. By visiting the observation window, one can observe the position, on/off display, and energy storage status of the handcart in the compartment.

Busbar room C

The main busbar is a single unit spliced and interconnected, fixed by branch busbars and static contact boxes. The main busbar and connecting busbar have a D-shaped or rectangular cross-section. When used for high current loads, double busbars are assembled together. The supporting busbar is connected to the static contact box and the main busbar through bolts, without the need for any other support. The main busbar and branch busbar are covered with heat shrink sleeves, and the overlap is ensured by a flame-retardant T-shaped insulation cover to ensure reliable composite insulation. The adjacent cabinet busbars are fixed with through wall sleeves.

Cable room D

The current transformer is installed on the back wall of the cable room, and the grounding switch is installed on the fixed plate of the contact box, which can avoid twisting and deformation of the grounding switch during operation. The cable room has a large space and can connect multiple cables. The cable connection height is high and easy to install.



Circuit breaker handcart



Circuit breaker room



Busbar compartment



GTXGN-12

Intelligent solid insulated ring main unit



Green energy



Intelligent power grid



Power grid system



Industrial electricity consumption



Rail Transit



Safe and reliable

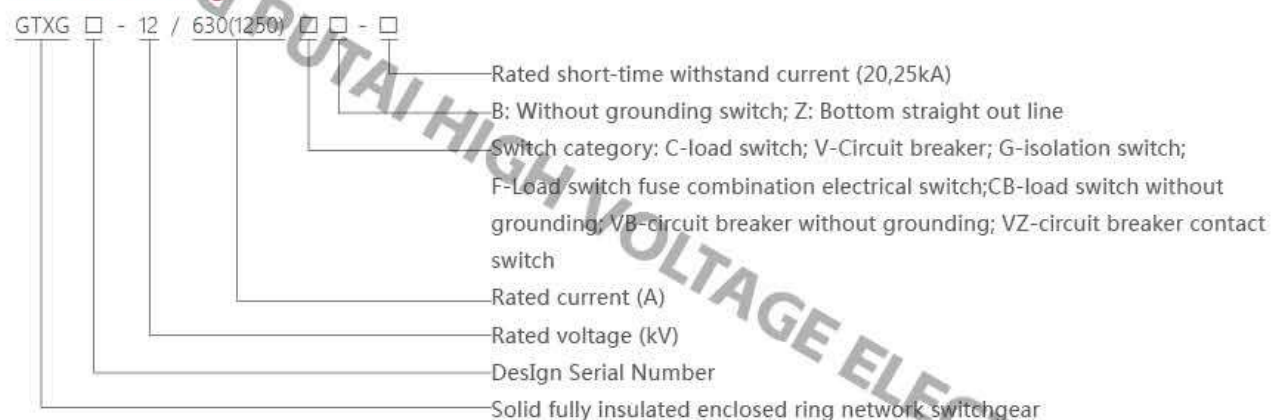
Overview

The GTXGN-12 series solid insulated enclosed ring network switchgear is a type of solid insulated vacuum switchgear that is fully insulated, fully sealed, and maintenance free. All high-voltage live parts are cast with epoxy resin material with excellent insulation performance, organically combining the vacuum arc extinguishing chamber, main electrical circuit, insulation support, etc. into a whole, and the functional units are connected through fully insulated solid busbar. Therefore, the entire switchgear is not affected by the external environment, ensuring the reliability of equipment operation and the safety of operators.

This ring main unit has the characteristics of simple structure, flexible operation, reliable interlocking, and easy installation. It is suitable for 50Hz, 12 kV power systems and widely used in industrial and civil cable ring networks and distribution network terminal projects. It is used for the reception and distribution of electrical energy, especially for urban residential distribution, small substations, switch stations, cable branch boxes, box type substations, industrial and mining enterprises, shopping malls, airports, subways, wind power generation, hospitals, sports stadiums, railways, tunnels and other places.

Due to its advantages of full insulation, full sealing, and full shielding, this product is particularly suitable for use in harsh environments such as high altitude, high temperature, humid heat, severe cold, and severe pollution.

Model Meaning



Classification

According to the type of switch, it is divided into load switch with grounding assembly (referred to as C module), load switch without grounding assembly (referred to as CB module), circuit breaker with grounding assembly (referred to as V module), circuit breaker without grounding assembly (referred to as VB module), circuit breaker interconnection switch (referred to as VZ module), load switch+fuse combination switch assembly (referred to as F module), and isolation switch assembly (referred to as G module).

Conditions of Use

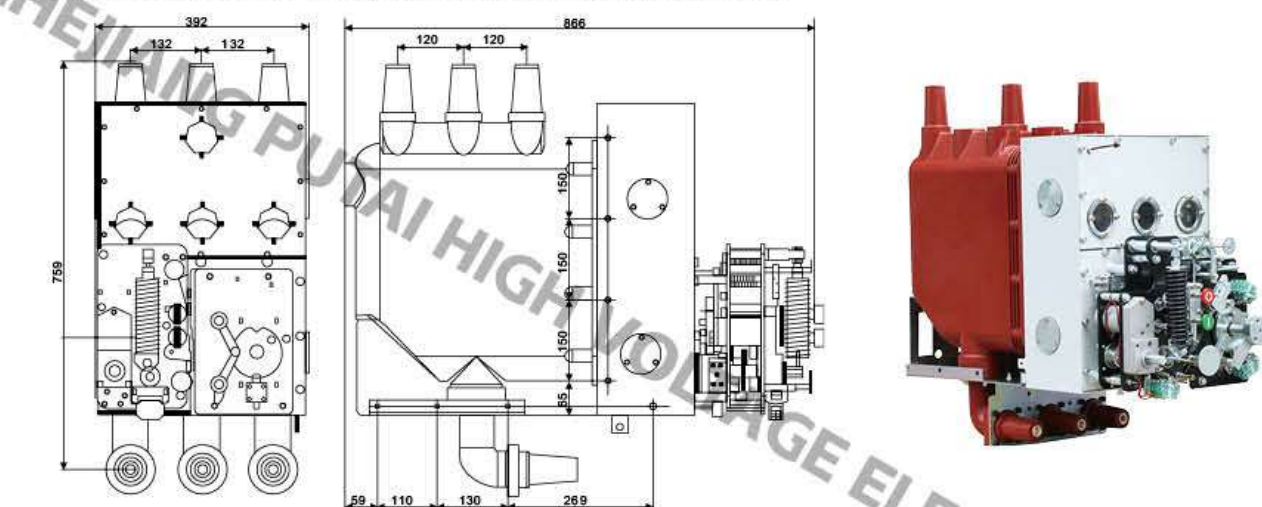
- Environmental temperature: -45 °C~+45 °C;
- Humidity: Maximum average relative humidity, daily average ≤ 95%, monthly average ≤ 90%;
- Altitude: ≤ 4000 meters;
- Seismic resistance: 8 degrees;
- Protection level: IP67 for live body sealing, IP67 for fuse barrel, IP4X for switchgear enclosure.

Application area

- Low temperature and cold regions: Without SF6 gas application, there is no need to consider the low-temperature operation of SF6 gas, and it can still operate normally at -45 °C.
- High altitude areas: There is no need to consider the impact of high-altitude atmospheric pressure on insulation performance.
- Strong wind and sand areas: The safety protection level of the solid insulated ring main unit is IP67, and the control circuit room adopts special treatment to ensure long-term operation in strong wind and sand areas.
- Coastal humid areas: Epoxy resin sealing, moisture resistance, salt spray corrosion resistance, ensuring long-term use in coastal areas.
- Areas with high environmental protection requirements: The impact of SF6 gas on atmospheric warming has been highly valued. Solid ring main units have eliminated SF6 gas, which has no pollution or harm to the environment and human life.
- In the smart grid, due to the fact that both the main switch and the isolation switch can be electrically operated, our company's developed intelligent controller can be selected to remotely control, telemetry, and communicate with the switchgear and substation site. This allows for both decentralized control and convenient centralized control.

Product structure and working principle

The structure of the solid insulated ring main unit movement is shown in the diagram



Structural characteristics of solid insulated ring main unit movement

1. Vacuum arc extinguishing chamber

Vacuum circuit breakers have the ability to interrupt short-circuit currents and are used for overload and short-circuit protection of circuits and electrical equipment. Due to its small contact distance, short arc time, slight burn when the contact breaks the fault current, low required operating energy, and fast action, it also has the advantages of small size, light weight, low maintenance workload, fire and explosion prevention, and low operating noise. It is an ideal circuit breaker to replace oil circuit breakers and SF6 circuit breakers, and is widely used in high-frequency heating and distribution systems in industries such as power, metallurgy, and communication. The vacuum arc extinguishing chamber used in circuit breakers is a key component and the heart of vacuum circuit breakers, which basically determines the main performance of the circuit breaker.

2. Solid insulation system

The solid sealed pole formed by APG technology encapsulates the current carrying conductors such as the vacuum arc extinguishing chamber and the upper and lower outlet sockets as a whole. The isolation switch is installed in the cavity of the solid sealed pole, so that solid insulation is the main insulation method for phase to phase insulation. Single phase insulated busbar design to avoid serious faults such as phase to phase and ground faults. Bus expandable design enables unlimited expansion of functional units.

3. Three position knife switch

All switch cabinets are equipped with three position knife switches. The three position knife switch and the main switch are built into the fixed sealed pole. Three phase linkage, operable to achieve three positions: work/isolation/grounding. Mechanical interlocking is adopted with the main switch, and the three position knife switch can only operate when the main switch is in the open position. In addition, the working and grounding positions of the three position mechanism can also be interlocked. When the knife switch is in the working position, the grounding side hole is locked; When the knife switch is in the grounding position, the working side hole is locked.

4. Operating mechanism

The operating mechanism of the circuit breaker is a spring operated mechanism, which has the characteristics of simple structure, reliable action, small size, and maintenance free. The closing power can be adjusted up and down according to user requirements. The mechanism can manually store energy, manually close, manually open, or electrically store energy and electrically open/close, making it convenient for users to operate.

The three station knife switch operating mechanism adopts a mid spring design, which can quickly open and close, and has the function of breaking and closing a certain load current. In addition to manual operation, the three station mechanism can also be operated electrically, and can achieve intelligent remote control isolation and grounding, greatly facilitating user use.

Structural characteristics of solid insulated ring main unit

Solid insulated ring main unit is a small GIS switchgear with the following structure:

- The high-voltage load switch and high-voltage live parts are sealed in a gas free epoxy resin insulated sleeve shell, with a vacuum arc extinguishing chamber for reliable arc extinguishing due to its small size. The load switch is equipped with a grounding switch, which has three positions for closing, opening, and grounding. It also has a grounding knife and an isolation knife function.
- It can accommodate 1-5 load switch units or 1-5 circuit breaker units. Each unit is led out through three high-voltage conduits, making cable connections convenient.
- The sealed box is made of imported materials, and strict sealing measures are taken at the connection of the operating mechanism and the high-pressure sleeve, resulting in good performance.
- The high-voltage bushing and high-voltage insulation cylinder are made of imported epoxy resin using APG technology. The insulation cylinder and high-voltage bushing are assembled through a tight fit of silicone rubber sleeve, which has a good sealing effect.
- Each circuit is equipped with independent operating mechanisms, which are installed in front of the cabinet and have various mechanical interlocking functions.
- The load switch and grounding switch are equipped with spring operated mechanisms. The load switch can be manually or electrically operated, while the grounding switch not only serves as a grounding device but also as an isolation device, and can only be manually operated.
- The circuit breaker is equipped with a permanent magnet operating mechanism, which can be electrically closed or manually opened, but cannot be manually closed. Circuit breakers can also be equipped with spring mechanisms, which can be manual or electric, with reserved interfaces for distribution automation.
- There is a visual window on the panel of the ring main unit, which can directly observe the opening and closing status of the isolation knife fracture.
- Each ring main unit is composed of three separate insulation cylinders arranged in parallel, which is easy to install and replace. The biggest advantage is that it avoids phase to phase discharge.

Characteristics of Solid Insulated Fully Enclosed Ring Main Unit

- The main components of a solid insulated fully enclosed ring main unit are an insulation cylinder and a vacuum arc extinguishing chamber.
- The solid insulation material adopts imported epoxy resin with a thickness of not less than 10mm, which has strong corrosion resistance and high insulation ability. The internal space is greater than 150mm, and the phases are separated separately and connected together through a base plate mounting bracket. The combination is flexible, the structure is simple and reasonable, and the appearance is beautiful.
- There are no fasteners on the surface of the box for disassembly, which provides good anti-theft performance. The box has an IP33 protection level and good rainproof performance.
- The top cover is equipped with ventilation openings, with the air inlet located at the bottom of the box and a dust filter. The air outlet is located at the top of the object and hidden under the eaves to form a bottom-up air convection, providing good insulation and ventilation effects for the box. The top cover is also equipped with a drainage angle at a certain angle.
- The box has a sealed floor with cable inlet to prevent moisture from entering the box from the cable trench.
- The door is sealed with a sealing strip, and the door lock is a rainproof structure. When the door is opened, the limited position lever makes it easy to fix the door.
- The switch inside the box is a solid insulation fully sealed structure, which does not require a heater. The cable head can be divided into touchable and non touchable types according to user requirements, and is not afraid of water immersion.
- The color of the box is generally military green.

Operating mechanism and operation

- The load switches and grounding switches in the ring network unit are equipped with independent spring operated mechanisms, which are installed on the front panel of the cabinet and can be manually or electrically operated. There are two operation holes on each channel of the panel, which respectively operate the load switch and the grounding switch. The vacuum circuit breaker is equipped with an integrated permanent magnet operating mechanism and a spring operating mechanism.
- Operating instructions for load switch
 - Power transmission operation

First, close the isolation grounding switch: insert the operating handle into the grounding operation hole (when the isolation knife is in the grounding closing state), rotate counterclockwise to disconnect the grounding, and then insert the operating handle into the isolation operation hole, rotate counterclockwise to close the isolation knife.

Close the load switch again: Insert the operating handle into the main switch operating hole, rotate counterclockwise for about 2 turns, and the main switch will close.
 - Power outage operation

First, disconnect the load switch: turn the disconnect knob counterclockwise to disconnect the switch.

Separate the isolation and grounding switch: Insert the operating handle into the isolation mechanism operating hole, rotate clockwise to separate the isolation knife, and then insert the operating handle into the grounding operating hole, rotate clockwise to close the grounding.
- Circuit breaker operation instructions
- Mechanical interlocking: There is mechanical interlocking between load switches, circuit breakers, and grounding switches. When the load switch and circuit breaker are in the closed state, the grounding switch cannot be opened or closed; The grounding switch is in the closed state, and the load switch and circuit breaker cannot be opened or closed.
- Installation and replacement of fuses
 - Close the grounding switch first.
 - Lift the operating handle with force and rotate it counterclockwise to make the pin go out of the slot
 - Install the firing pin mechanism into the fuse barrel, keep the pin in the slot, rotate clockwise to make the operating handle parallel to the panel, and then press down on the handle with force.
 - The load switch can only be opened when it is grounded.

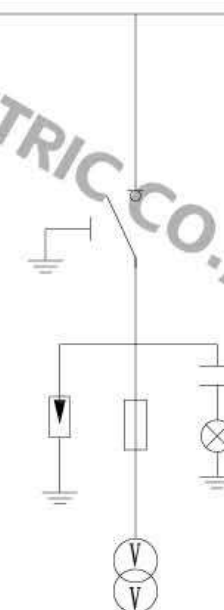
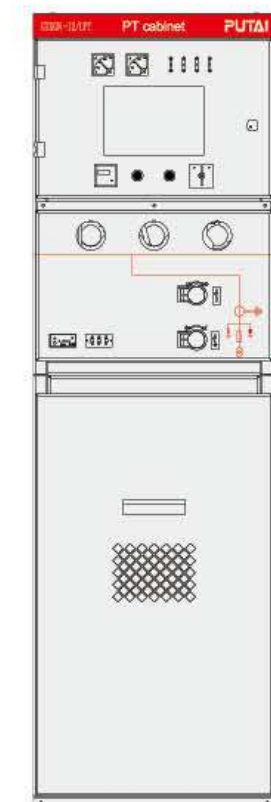
PT cabinet with load switch (fully insulated type)

Standard configuration

- ◆ 630A insulated busbar
- ◆ Load grounding switch
- ◆ Load grounding switch operating mechanism
- ◆ Load/grounding switch
- ◆ The outlet sleeve is located at the front horizontal position, with a 630A front cable head
- ◆ The live indicator is integrated with the nuclear phase hole and complies with the ISO61958 standard
- ◆ Solid insulation voltage transformer
- ◆ Elbow joint (with cable)
- ◆ Voltage transformer protection fuse
- ◆ Grounding busbar
- ◆ Meet the five prevention interlocking requirements

Optional configuration

- ◆ Heater
- ◆ Voltage meter



GTXGN-12 Intelligent Solid Insulation Ring Main Unit

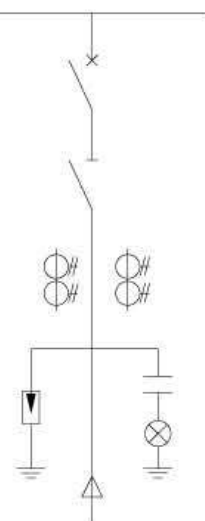
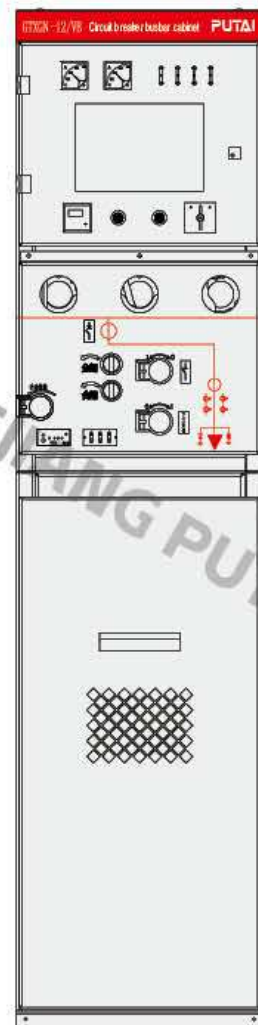
circuit breaker cabinet

Standard configuration

- ♦ 630, 1250A insulated busbar
- ♦ Vacuum circuit breaker
- ♦ Operating mechanism of vacuum circuit breaker
- ♦ Isolation/grounding switch
- ♦ Isolation/grounding switch operating mechanism
- ♦ Mechanical interlocking of circuit breakers and grounding switches
- ♦ Circuit breakers and grounding switches have independent position displays
- ♦ The outlet sleeve is located at the front horizontal position and connected to the cable head in front
- ♦ The live indicator is integrated with the nuclear phase hole and complies with the ISO61958 standard
- ♦ Grounding busbar
- ♦ Microcomputer protection device
- ♦ Meet the five prevention interlocking requirements

Optional configuration

- ♦ Auxiliary contact points
- ♦ Program lock
- ♦ Heater
- ♦ Rear connected lightning arrester
- ♦ Rear cable head
- ♦ Incoming live grounding interlock
- ♦ Ground fault indicator
- ♦ Sleeve type current transformer and ammeter, active power meter, reactive power meter



GTXGN-12 Intelligent Solid Insulation Ring Main Unit

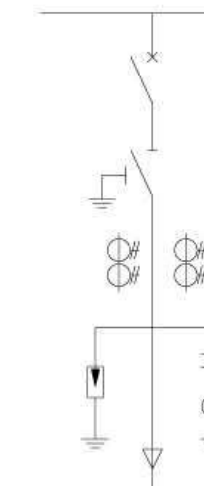
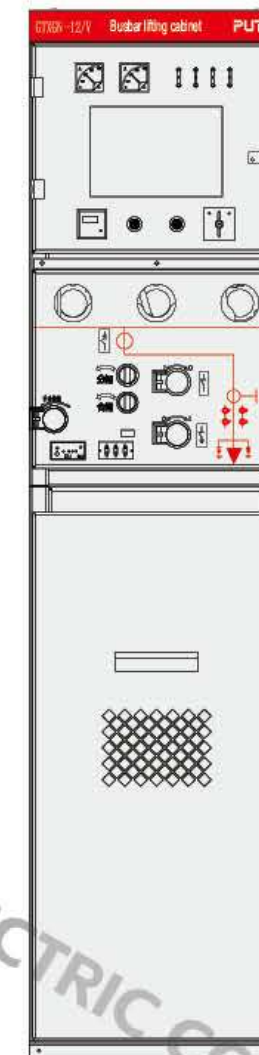
circuit breaker cabinet

Standard configuration

- ♦ 630, 1250A insulated busbar
- ♦ Vacuum circuit breaker
- ♦ Operating mechanism of vacuum circuit breaker
- ♦ Isolation/grounding switch
- ♦ Isolation/grounding switch operating mechanism
- ♦ Mechanical interlocking of circuit breakers and grounding switches
- ♦ Circuit breakers and grounding switches have independent position displays
- ♦ The outlet sleeve is located at the front horizontal position and connected to the cable head in front
- ♦ The live indicator is integrated with the nuclear phase hole and complies with the ISO61958 standard
- ♦ Grounding busbar
- ♦ Microcomputer protection device
- ♦ Meet the five prevention interlocking requirements

Optional configuration

- ♦ Auxiliary contact points
- ♦ Program lock
- ♦ Heater
- ♦ Rear connected lightning arrester
- ♦ Rear cable head
- ♦ Incoming live grounding interlock
- ♦ Ground fault indicator
- ♦ Sleeve type current transformer and ammeter, active power meter, reactive power meter



GTXGN-12 Intelligent Solid Insulation Ring Main Unit

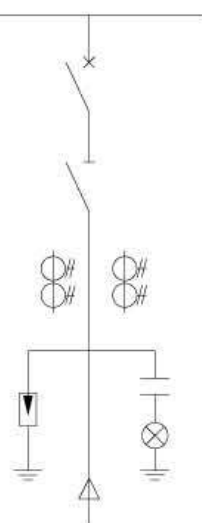
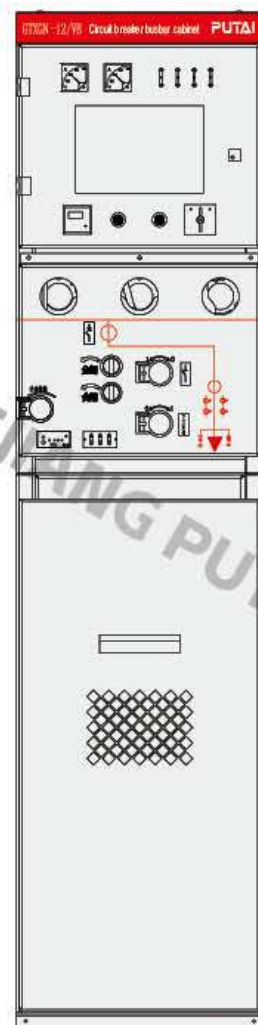
Circuit breaker busbar cabinet

Standard configuration

- 30A, 1250A insulated busbar
- Vacuum circuit breaker
- Operating mechanism of vacuum circuit breaker
- Isolation/grounding switch
- Isolation/grounding switch operating mechanism
- Mechanical interlocking of circuit breakers and grounding switches
- Circuit breakers and grounding switches have independent position displays
- The outlet sleeve is located at the front horizontal position, and the front cable head (with cable) is connected
- The live indicator is integrated with the nuclear phase hole and complies with the ISO61958 standard
- Grounding busbar
- Microcomputer protection device
- Meet the five prevention interlocking requirements

Optional configuration

- Auxiliary contact points
- Program lock
- Heater
- Rear connected lightning arrester
- Rear cable head
- Incoming live grounding interlock
- Ground fault indicator
- Sleeve type current transformer and ammeter, active power meter, reactive power meter



GTXGN-12 Intelligent Solid Insulation Ring Main Unit

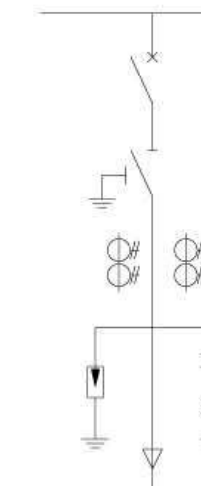
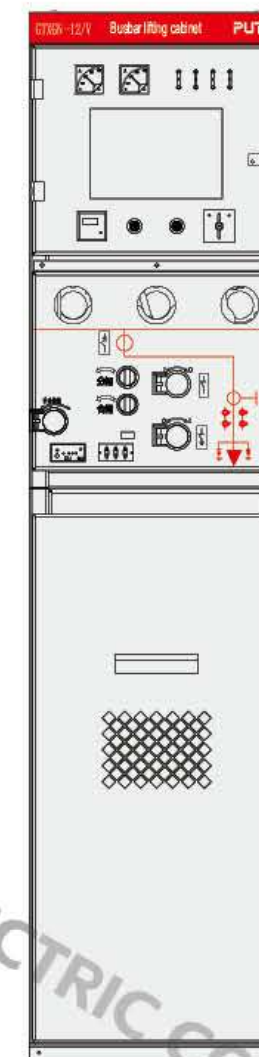
Lift the cabinet

Standard configuration

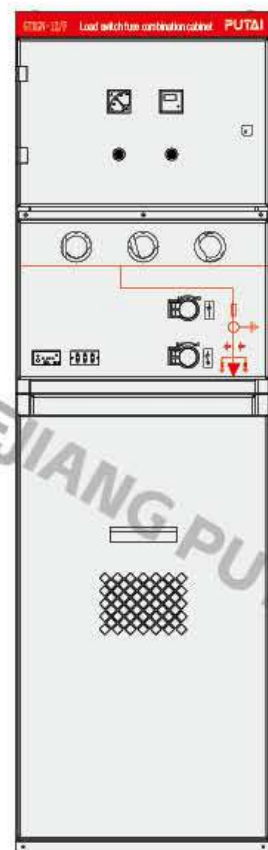
- 30A, 1250A insulated busbar
- The outlet sleeve is located at the front horizontal position, and the front cable head (with cable) is connected
- The live indicator is integrated with the nuclear phase hole and complies with the ISO61958 standard
- Grounding busbar

Optional configuration

- Heater
- Rear connected lightning arrester
- Rear cable head
- Ground fault indicator
- Sleeve type current transformer and ammeter, active power meter, reactive power meter



GTXGN-12 Intelligent Solid Insulation Ring Main Unit



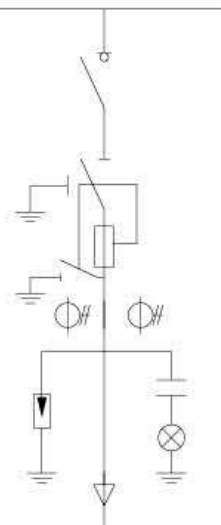
Load switch fuse combination electrical cabinet

Standard configuration

- ♦ 630A insulated busbar
- ♦ Vacuum load switch
- ♦ Vacuum load switch operating mechanism
- ♦ Isolation/grounding switch
- ♦ Isolation/grounding switch operating mechanism
- ♦ Mechanical interlocking of load switch and grounding switch
- ♦ The load switch and grounding switch have independent position display
- ♦ The outlet sleeve is located at the front and connected to the cable head in front
- ♦ The live indicator is integrated with the nuclear phase hole and complies with the ISO61958 standard
- ♦ Horizontal placement of fuse barrel
- ♦ Fuse
- ♦ Grounding busbar
- ♦ Meet the five prevention interlocking requirements
- ♦ Auxiliary grounding device

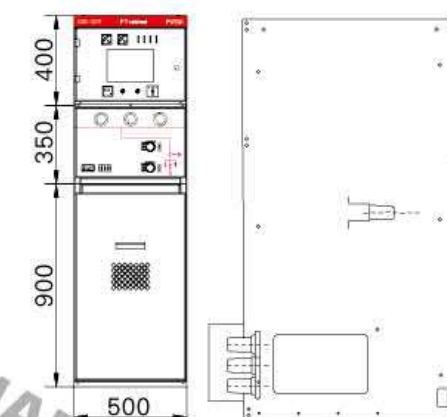
Optional configuration

- ♦ Load switch operating mechanism energy storage electric motor
- ♦ Opening coil
- ♦ Closing coil
- ♦ Auxiliary contact points
- ♦ Program lock
- ♦ Heater
- ♦ Rear connected lightning arrester
- ♦ Rear cable head
- ♦ Incoming live grounding interlock
- ♦ Ground fault indicator
- ♦ Sleeve type current transformer and ammeter, active power meter, reactive power meter

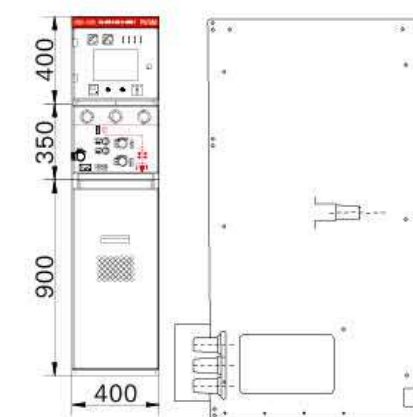


GTXGN-12 Intelligent Solid Insulation Ring Main Unit

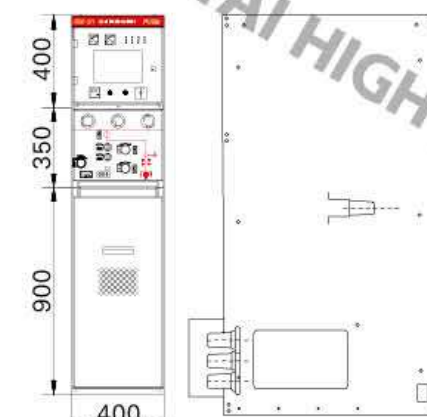
External dimensions



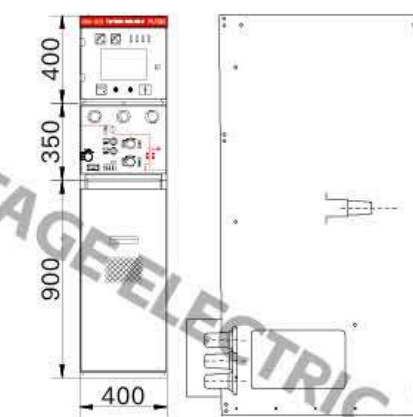
500*950*1650
PT cabinet with load switch



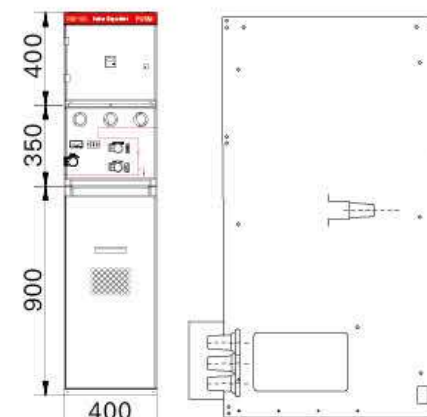
400*950*1650
circuit breaker cabinet



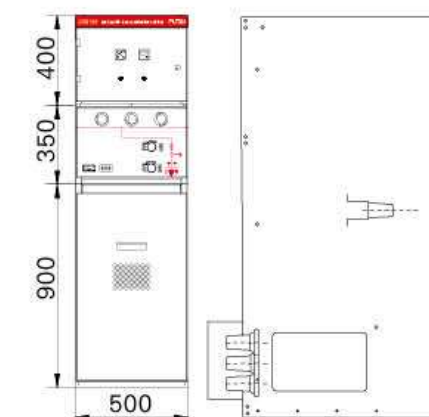
400*950*1650
circuit breaker cabinet



400*950*1650
Circuit breaker busbar cabinet

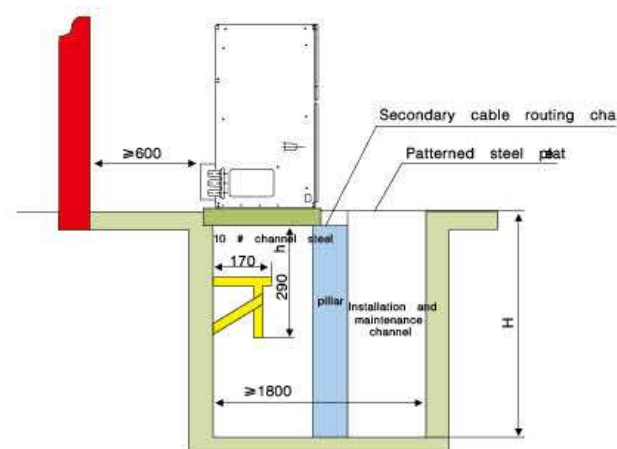
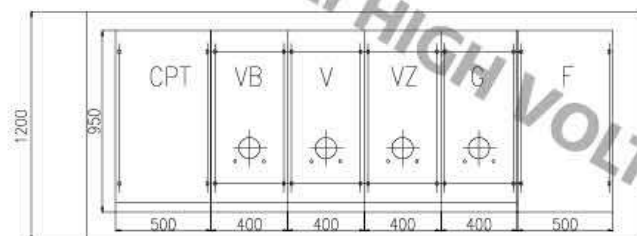
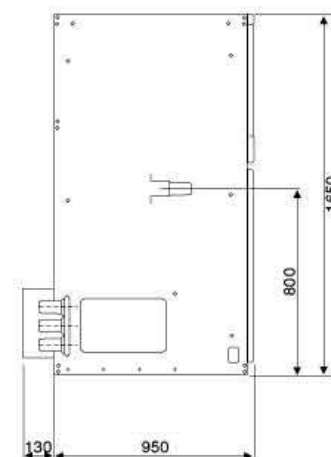
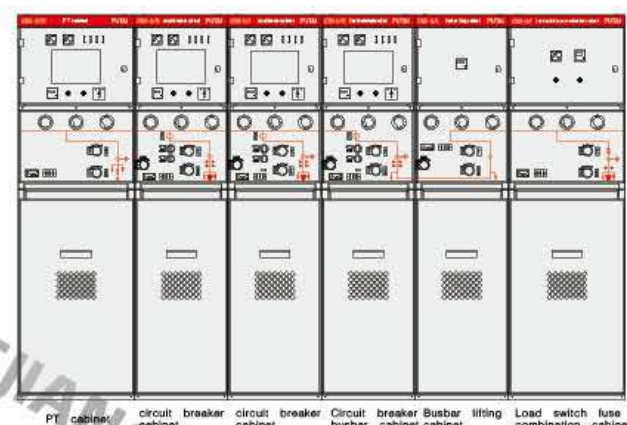


400*950*1650
Rusbair lifting cabinet



500*950*1650
Load switch fuse combination cabinet

Drawing



Note:

1. The bottom of the concrete cushion layer should be compacted with plain soil;
2. If the total length of the switchgear does not exceed 2 meters, no pillars need to be added. However, if the total length of the switchgear exceeds 2 meters, pillars need to be added every 2 meters of span;
3. The space of ≥ 600 space behind the cabinet in the picture is the pressure relief channel of the switchgear, so protective barriers need to be added at both ends of the back of a group of switchgear cabinets;
4. The H in the figure is determined based on the maximum cable bending radius.



SRM □ -12

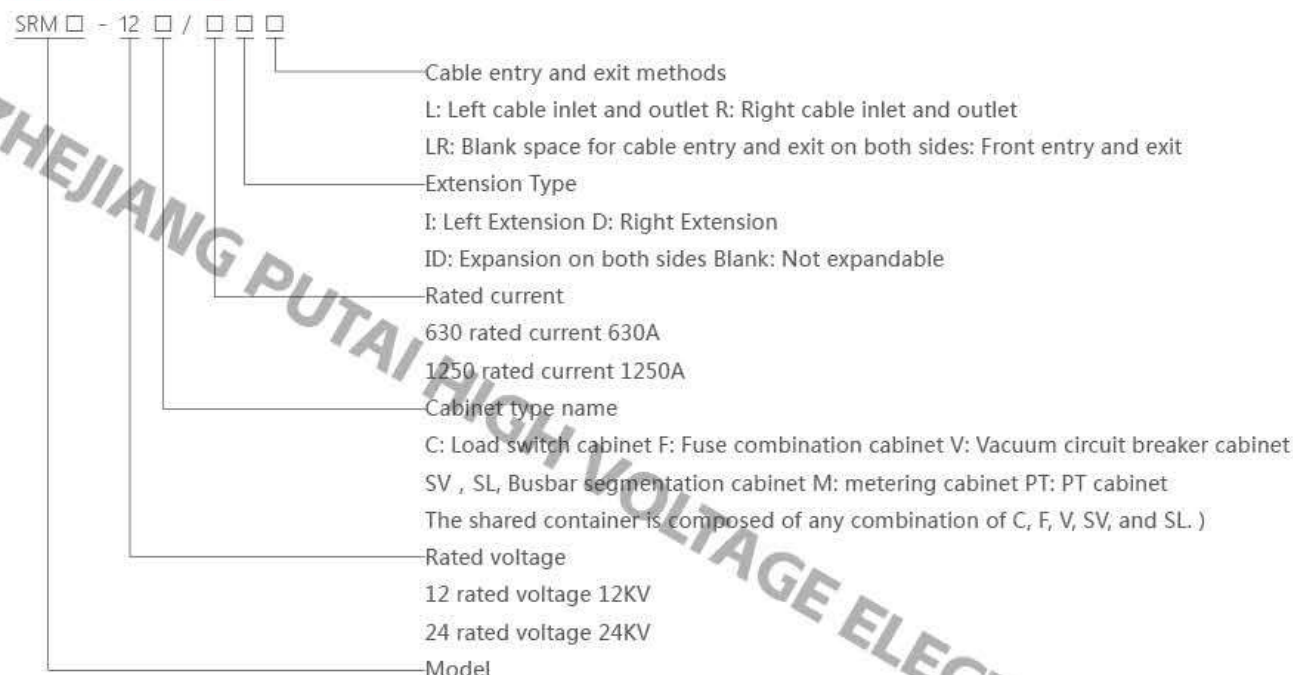
Fully enclosed and fully insulated inflatable ring network switchgear



Overview

The SRM □ -12 fully enclosed, fully insulated, inflatable ring network switchgear is a completely sealed system, with its charged components and switches enclosed within a stainless steel body. The entire switch device is not affected by external environmental conditions, ensuring operational reliability and personal safety. By selecting expandable busbars, any combination can be achieved to achieve full modularity. The expansion of busbar safety insulation and shielding ensures reliability and safety. SRM □ -12 fully insulated inflatable ring network switchgear can also provide TV based automation solutions, forming the concept of intelligent switches and greatly reducing on-site installation and commissioning workload.

Model Meaning



Main features of the product

◆ Operational safety

We can provide users with special security protection through the following security measures:

- Integrated three station load switch
 - Circuit breakers use load switches instead of isolation switches for greater safety and reliability
 - One side fully enclosed design provides protection against external contact
 - Mechanical interlocking that meets the five prevention requirements
 - Live display can provide live indication for incoming and outgoing lines
- ◆ Reliable operation
- Fully enclosed design, all 10KV switches and busbar live parts are sealed in a 3mm stainless steel welded gas box; Equipped with silicone rubber cable plugs to achieve full insulation and sealing of cable heads, thus avoiding external environmental influences such as dust, moisture, and small animals
 - Spring energy storage operating mechanism, can be operated manually or electrically
 - Panel simulation line diagram provides switch position indication
 - The cabinet is made of galvanized sheet metal, with surface electrostatic spraying to enhance corrosion resistance
 - Safe pressure range of SF6 gas inside the pressure gauge monitoring box

◆ Economy

- Maintenance free
- Highly reliable
- The service life can reach 30 years

◆ Flexible plan

- Multiple entry methods, capable of achieving left, right, up, or forward lines
- Multiple combination methods, allowing for arbitrary combinations between units
- By using insulated busbars, it is possible to achieve front and rear parallel cabinets or left and right parallel cabinets
- Flexible design scheme

Widely applicable

- The feeder line has a large capacity and occupies a small area, suitable for various application needs

Design Description

◆ Technical specifications

The SRM □ -12 fully enclosed and insulated inflatable ring main switch equipment is installed on a galvanized sheet frame, with the switch unit inside an SF6 gas box made of corrosion-resistant and non-magnetic 3mm thick stainless steel plate.

SF6 gas tank is a "sealed pressure system" that can operate for 30 years under normal working conditions. The pressure of SF6 gas during normal operation is 0.15~0.4 bar. The gas box is equipped with a pressure release device, which ensures that gas can be released from the bottom or rear when the pressure is too high.

◆ Switching unit

The load switch adopts a coaxial rotating double break method, which cooperates with the sliding plate through the same operating hole for kinetic operation. Therefore, the switch can only be in one of the three states of "closing, opening, and grounding" at any time, completely avoiding misoperation.

◆ Operating mechanism

The operating mechanism of the switch is installed at the front of the air box and has undergone special processing to prevent rust and corrosion. It is convenient for manual operation and maintenance and easy to achieve electric operation.

Performance indicators

◆ SF6 gas pressure	Absolute pressure of 1.4 bar at 20 °C			
Annual gas leakage rate	0.2% per year	◆ Normal operating environment conditions		
protection grade	IP67	maximum temperature	40℃	
Thickness of stainless steel in the air chamber	3.0mm	minimum temperature	-40℃	
		Maximum average relative humidity	≤95%	
		altitude	≤2000米	
◆ Busbar		◆ Meet the standards		
Busbar inside the switchgear	400mm²Cu	GB/T11022	GB3906	GB1985
Grounding busbar of switchgear	150mm²Cu	GB16926	GB38041	GB1984
		GB3309		
◆ Color		IEC60056	IEC60129	IEC60265
Front panel of switchgear	RAL7012	IEC60298	IEC60420	IEC60694
Side panel and cable compartment front cover plate	RAL7035			

Main technical parameters

Model		C module	F module	V module		CB module	
		Composite switch	GIS	Vacuum Switch	Isolation/grounding switch	Vacuum Circuit Breaker	Isolation/grounding switch
Rated voltage	kV	12	12	12	12	12	12
Rated frequency	Hz	50	50	50	50	50	50
Power frequency withstand voltage (phase to phase/port)	kV	42/48	42/48	42/48	42/48	42/48	42/48
Lightning impulse withstand voltage	kV	75/85	75/85	75/85	75/85	75/85	75/85
Rated current	A	630	Note ¹⁾	630		1250/630	
Rated closed loop breaking current	A	630					
Rated cable-charging breaking current	A	135/135					
Rated short-circuit closing current (peak)	A	50	80				
Rated peak withstand current	kA	50					
Rated short-time withstand current	kA/3s	20					
Rated short circuit breaking current	kA		31.5	20		25	
Rated transfer current	A		1750				
Maximum current of equipped fuse	A	-	125				
loop resistance	-n	≤300	≤600				
Mechanical life	Order	5000	3000	5000	2000	5000	5000

Note: 1) Depends on the rated current of the fuse

Panel schematic diagram

- ① SF₆ pressure gauge
- ② Electric display
- ③ Closing and opening position indication
- ④ Grounding position indication
- ⑤ Load switch operation hole
- ⑥ Grounding switch operating hole
- ⑦ Switch operation position selection skateboard



Close

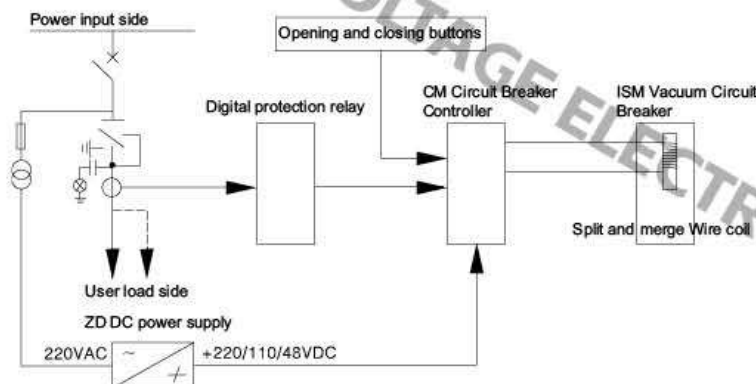


Opening



Grounding

Product principle diagram



Transformer/Line Protection

SRM□-12 fully enclosed, fully insulated, inflatable ring network switchgear provides two types of transformer protection: load switch fuse combination device and circuit breaker with microcomputer comprehensive protection device protection.

Use load switch fuse combination electrical module

The combination of current limiting high-voltage fuses and load switches for transformer protection. The fuse compartment will be installed behind a separate, locked enclosure located at the front of the unit. The load switch uses a spring energy storage mechanism, which can be triggered by a fuse striker.

In order to facilitate the replacement of fuses. You can use the operating handle to remove the end cover of the fuse chamber. The pre installed tripping mechanism of the fuse ensures the waterproof performance of the entire system.

A cable room that truly meets the needs

The cable connection room has a large space, and the conduit is designed in a standard style to achieve compatibility with all European standard cable plugs.

Under normal circumstances, each load switch unit can be connected to 1-3 outgoing lines, while special design units can be connected to 4-6 outgoing lines.

The vacuum circuit breaker unit can connect 1-2 outgoing lines.

Pressure relief device

The pressure release device is separated from the cable room by a metal plate. If the pressure inside the gas box is too high, the explosion-proof diaphragm inside the device will rupture to release the pressure.

• Cable connection

The selection of international standard universal specification conduit complies with DIN47636 standard and American standard, making it easy for users to choose the corresponding cable accessories. T-shaped front and rear cable plugs are used for connection, with a stepped and sturdy structure using European style bolts. The connection between the front plug and the sleeve is made using M16 bolts.

• Lightning arrester connection

The load switch unit can be equipped with a T-shaped rear plug-in silicone rubber fully sealed metal zinc oxide lightning arrester.

When there are many cable circuits and space is not enough, a π-shaped rear plug-in lightning arrester can be used.

• Interlocking mechanism

The interlocking mechanism inside the switch can effectively prevent misoperation. And ensure that the cable room can only be accessed when the switch is in the "grounded" state, and can be locked in different states with a visible lock.

• Auxiliary switch

Load switches and grounding switches can be equipped with auxiliary switches that can synchronously reflect the position status of the switches as needed.

• Fuse

SRM□-12 fully enclosed and insulated inflatable ring network switchgear can be replaced directly and conveniently. The fuse is placed inside the insulation tube, which is located at

The metal gas box of SF₆ has the following advantages:

The fuse cover and sealing device are located at the weakest part of the electric field

• No conductive substance can attach to the fuse component

Partial protection in SF₆ gas

The fuse cover does not require additional insulation

The spring energy storage operating mechanism and linkage tripping device ensure that the three-phase load switch automatically disconnects when any phase fuse is blown.

• Switch test

SRM□-12 fully enclosed and insulated inflatable ring network switchgear has passed the testing of the Electrical Equipment Quality Inspection and Testing Center of the Ministry of Electric Power Industry, and the product meets the following main standards:

GB/T11022, IEC 60694, IEC 60265, IEC 60420, IEC 60056, IEC60298, IEC 60129.

• Usage conditions

SRM□-12 fully enclosed, fully insulated, inflatable ring network switchgear is suitable for use in the temperature range of -40 °C to +50 °C. The 12kV charged body is located inside the SF₆ sealed gas box, and the silicone rubber hand plug realizes the connection between the cable and the switch, forming a fully insulated and fully sealed structure. The entire system is not affected by environmental factors such as moisture, dust, corrosive gases, etc. The SF₆ gas box is made of stainless steel material, ensuring that the switch is maintenance free and has a long service life.

• Surface protection

The frame of the ring main unit is made of galvanized sheet and coated with electrostatic spray on the surface to prevent corrosion. The front operation panel of the cabinet has an electrostatic spray coating.

Standard coating:

- Operation screen RAL1003 (signal yellow)
- Electrical room door RAL7035 (white)
- Switch side panel RAL7035 (white)



Pressure relief device



Operating mechanism



Cable connection room



Fully enclosed and fully insulated inflatable ring network switchgear

Attachment

Vacuum circuit breaker unit: V

♦ Voltage Transformer

SRM □ -12 fully enclosed and insulated inflatable ring network switchgear can be equipped with 10kV fully enclosed voltage transformers as needed to meet the requirements of distribution network automation. Can be used to provide voltage signals for metering/measurement and power supply for switch electric operating mechanisms.

- Single/three-phase can be selected as needed
- Transformation ratio: 10/0.1/0.22kV
- Accuracy (AC100V): Level 0.2 or Level 0.5

♦ Dedicated parallel cabinet busbar

Fully insulated and fully sealed structure

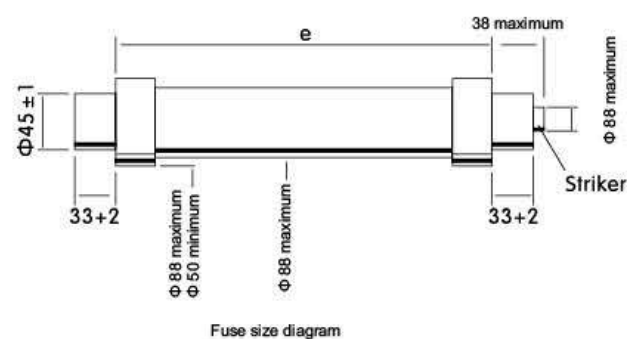
♦ Fuse

Users can configure according to their own needs, or our company can recommend and provide configurations based on applicable standards. Our company recommends using HVHRC fuses, which are backup fuses with temperature protection devices to prevent equipment damage caused by abnormal overheating inside the fuse barrel. Please indicate the rated capacity, working voltage, and rated current of the transformer and fuse when ordering.

♦ Protection relays WIM1, WIC1

Adopting the digital self powered multifunctional time overcurrent protection relay from SEG company in Germany. Compact design, strong adaptability, meets VDE requirements -0435-303, IEC255, VDE0843

- No need for external power supply
- Built in security protection operation mode
- Wide setting range and simple operation steps
- Using microprocessors to process signals and achieve high-precision parameter measurement
- Adopting an internal self-test (watchdog) design, the operation is reliable
- Protection function optional
- Fixed time overcurrent protection (DMT)
- Inverse time overcurrent protection (IDMT)
- Inverse time curve options:
General inverse time limit
Very inverse time limit
Extreme inverse time limit



Fully enclosed and fully insulated inflatable ring network switchgear

Common attachment styles



♦ Auxiliary contact point

All load switches and grounding switches can be equipped with auxiliary contacts indicating the position of the switch, installed inside the operating mechanism.

♦ Remote control and telemetry unit

SRM □ -12 fully enclosed and insulated inflatable ring network switchgear can be equipped with an integrated remote monitoring unit, and this prefabricated product can be assembled in the factory.

♦ Electric display

The incoming and outgoing conduit of the switch unit is equipped with a capacitive voltage indicator device. Each live display also has a three-phase voltage core phase lead out point, and a core phase transformer can be configured for core phase.

♦ Short circuit/ground fault indicator

For the convenience of fault diagnosis, the switch unit can be equipped with a short circuit/ground fault indicator.

♦ Cable connection

SRM □ -12 fully enclosed, fully insulated, inflatable ring network switchgear is equipped with DIN 47636 standard conduit. The cable room compartment door is interlocked with the grounding switch. Different switch wiring units can be selected based on the number of outgoing circuits.

♦ Pressure indicator instrument

SRM □ -12 fully enclosed, fully insulated, inflatable ring network switchgear is equipped with SF6 gas pressure gauges

♦ Keylock

SRM □ -12 fully enclosed, fully insulated, inflatable ring network switchgear can be configured with key locks for load switches and grounding switches.

♦ Padlock

SRM □ -12 fully enclosed and insulated inflatable ring network switchgear can be equipped with padlocks to prevent non staff operations.

♦ Secondary line chamber/instrument box

SRM □ -12 fully enclosed, fully insulated, inflatable ring network switchgear can be equipped with secondary chambers/instrument boxes for installing secondary accessories and instruments.

♦ Lightning arrester

The SRM □ -12 fully enclosed, fully insulated, inflatable ring network switchgear is equipped with a configurable T-shaped silicone rubber plug type metal oxide zinc arrester.

♦ Continuous operating voltage 13.6KV

♦ U1mA DC reference voltage $\geq 25kV$

♦ $0.75U_{1mA}$ DC leakage current $< 50 \mu A$

♦ Separable connector

T-shaped front and rear plugs, PT elbow type plugs, can be installed with plug-in metal oxide zinc arrester π -shaped plugs while completing cable connections.

♦ Current Transformer

SRM □ -12 fully enclosed, fully insulated, inflatable ring network switchgear can be equipped with through type current transformers as needed for metering/measurement.

♦ Secondary output 5A

♦ Accuracy level 0.2 or 0.5

♦ The circuit breaker unit adopts a built-in CT:

♦ Epoxy resin casting

♦ Moisture proof design for secondary lead wires

♦ Sleeve installation

Non extended standard module

Fifteen standard combinations of SRM □ -12 fully enclosed, fully insulated, and inflatable ring network switchgear are provided, with each module having the following configurations

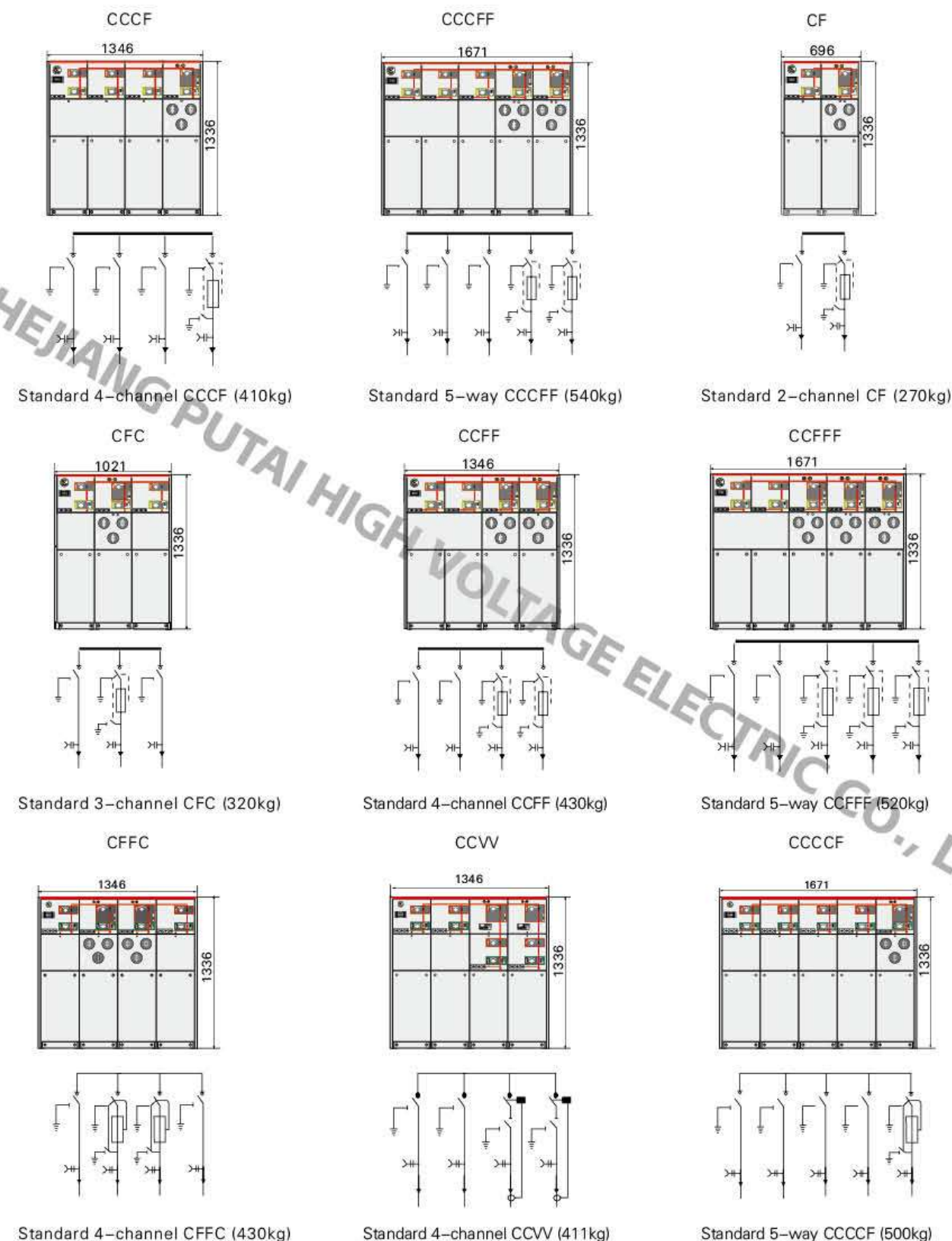
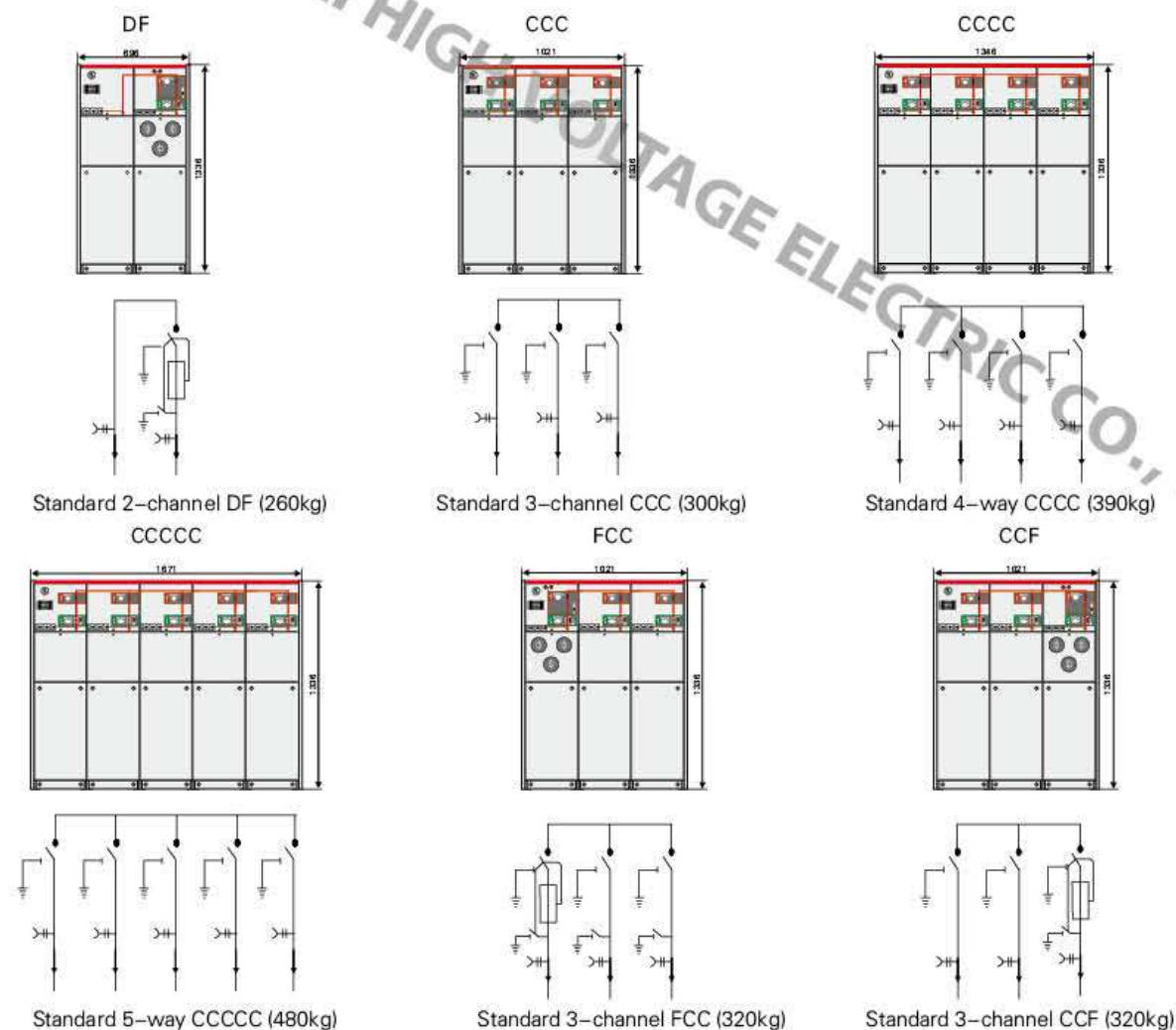
- ◆ D cabinet - lifting module
- ◇ Standard configuration features in "Cable Connection Module without Grounding Knife"
- ◆ C cabinet - load switch module
- ◇ Standard configuration features in the "load switch module"
- ◆ F cabinet load switch fuse combination electrical module
- ◇ Standard configuration characteristics in the "load switch fuse combination electrical module"
- ◆ V cabinet - vacuum switch module
- ◇ Standard configuration features in the "vacuum switch module"

Configuration

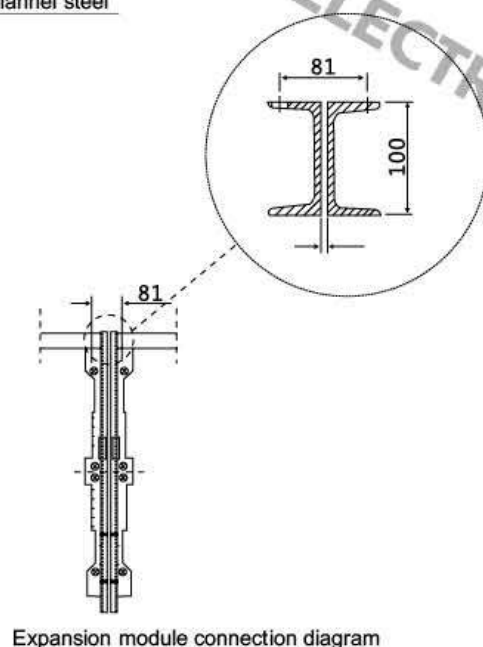
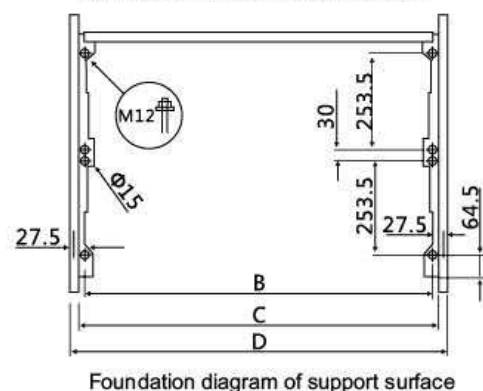
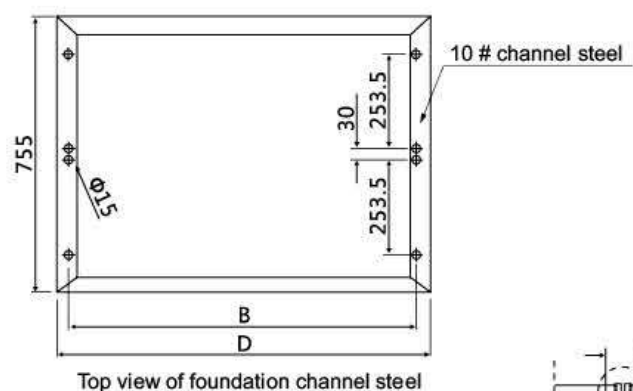
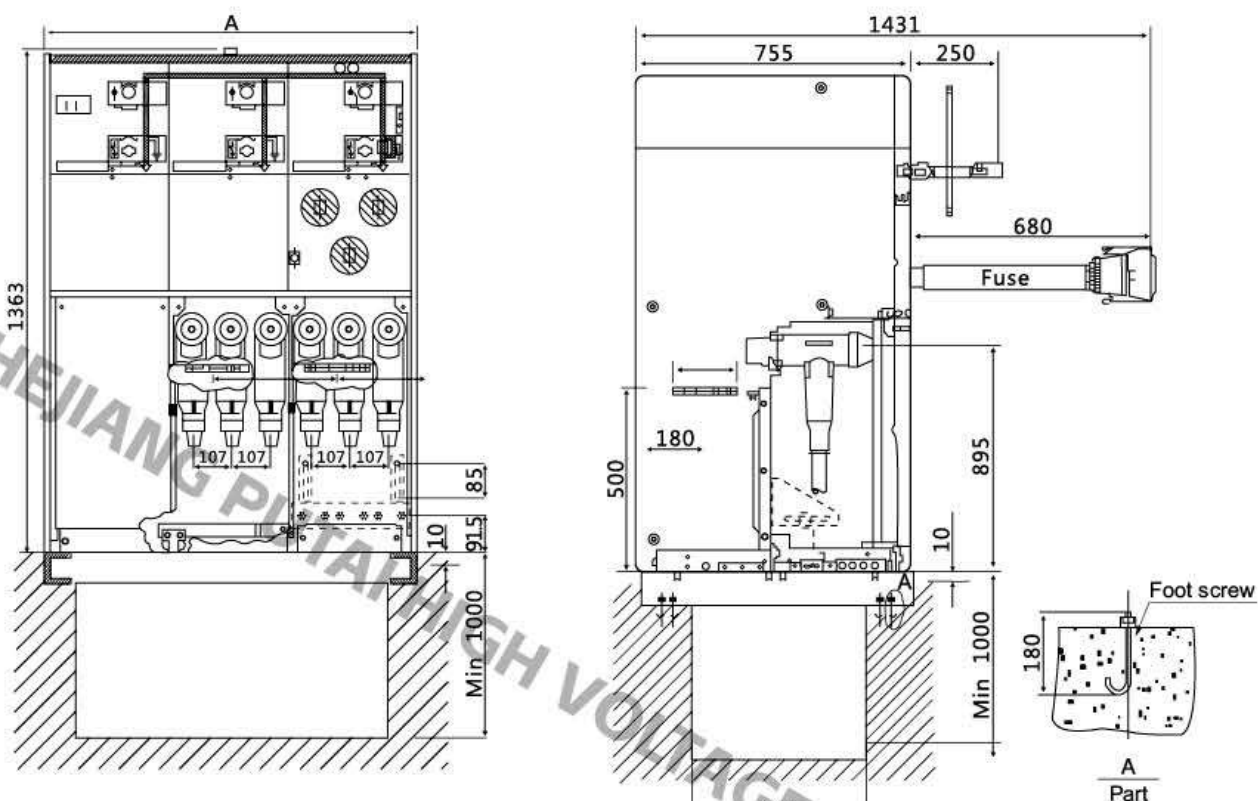
- ◆ Capacitive voltage indicator for incoming conduit
- ◆ Install a SF6 density pressure gauge in each gas chamber to monitor its density
- ◆ Lifting ears used for hoisting
- ◆ Operating handle

Optional

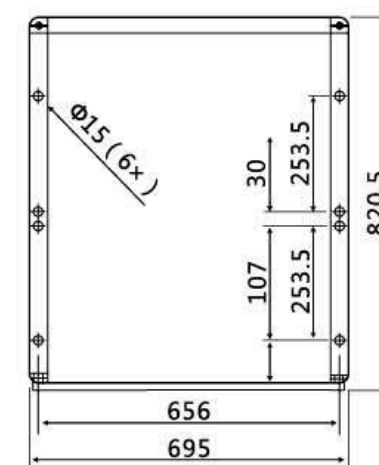
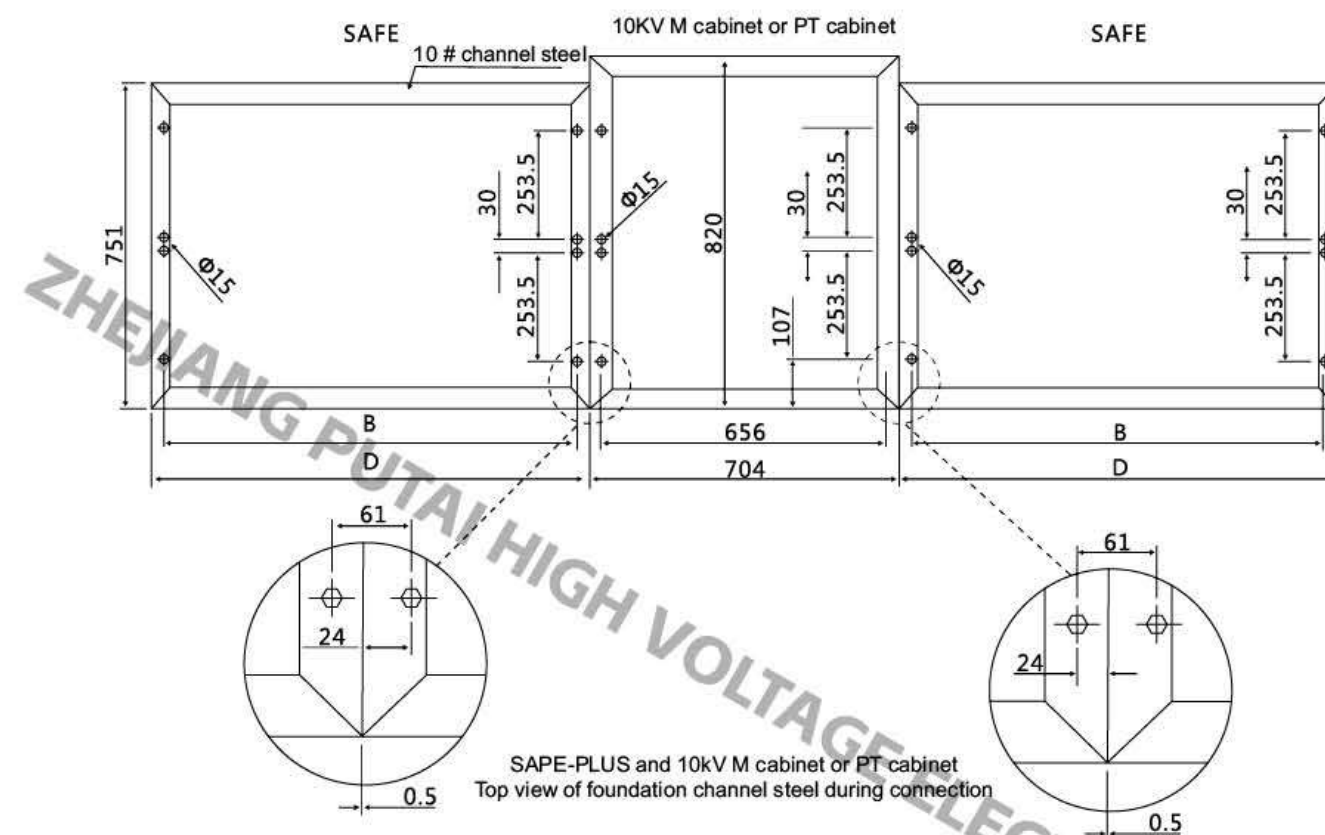
- ◆ Electric operating mechanism
- ◆ Cable short circuit and ground fault indicator
- ◆ Current transformers and meters
- ◆ Remote monitoring



SRM □ -12 Inflatable Cabinet Structure and Dimensions



SRM □ -12 Inflatable Cabinet Structure and Dimensions



Installation diagram of 10kV M cabinet or PT cabinet bottom plate
Foundation diagram for connecting the 10kVM cabinet or PT cabinet of the expansion module

D

High voltage switchgear series

PUTAI



HBG-12

Environmentally friendly air-insulated AC metal-enclosed switchgear



Green energy



Intelligent power grid



Power grid system



Industrial electricity consumption



Rail Transit



Safe and reliable

HBG-12

Environmentally friendly air-insulated AC metal-enclosed switchgear

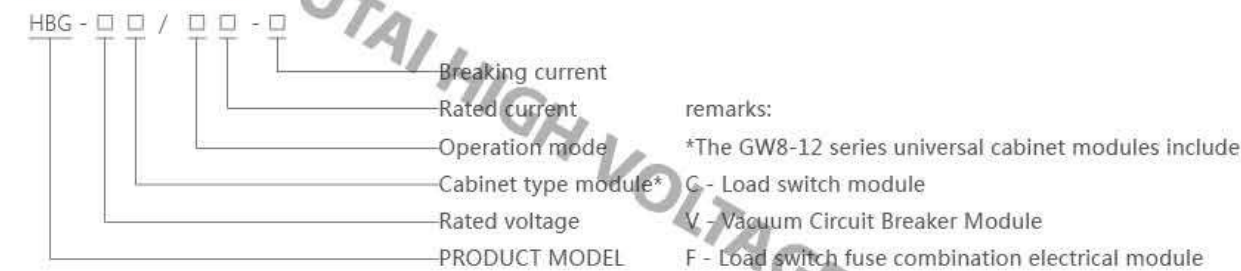
PUTAI

Overview

The HBG-12 series environmentally friendly gas insulated metal enclosed switchgear is a distribution switchgear that uses a vacuum arc extinguishing chamber for arc extinguishing. The environmentally friendly gas is the main insulation medium, with a small amount of solid insulation support, and the main circuit is not sealed. During normal operation, it has zero gauge pressure or slightly positive pressure (the air pressure of the gas box is $\leq 0.02\text{MPa}$), and the relative to ground and phase to phase insulation capabilities meet the requirements of air insulation under zero gauge pressure.

Environmentally friendly gas insulated metal enclosed switchgear is the most commonly used three-phase AC intelligent environmentally friendly gas insulated cabinet, and is widely used in various complete sets of switchgear. With the concentration of the domestic population, the power market must be matched, and the demand for environmentally friendly gas insulated switchgear will also increase with the development of the market; The market potential still needs to be developed. At the same time, due to the integration of multiple functions such as data collection and control, data processing and storage, online monitoring of switchgear, and advanced analysis, the product intelligently monitors and manages the distribution network online, ensuring that it operates in a safe, reliable, high-quality, and efficient optimal state. It realizes remote monitoring, control, and management of the power system distribution network, meeting the needs of power grid optimization, electricity safety, energy management, and energy conservation and consumption reduction; The system can be widely applied in intelligent power distribution fields such as transportation, factories, hospitals, schools, buildings, residential communities, and commercial office buildings.

Model Meaning



Execution standards

The design and production of HBG-12 comply with the following standards:

GB 3906-2006	3.6kV~40.5kV AC enclosed metal switchgear and control equipment
GB/T 11022-2011	Common Technical Requirements for High Voltage Switchgear and Control Equipment Standards
GB 1984-2014	High Voltage AC Circuit Breakers
GB 1985-2015	High voltage AC isolating switches and grounding switches
GB 3804-2004	3.6kV~40.5kV High Voltage AC Load Switches
GB 16926-2009	AC High Voltage Load Switches - Fuse Combination Electrical Appliances
GB 311.1-2012	Insulation Coordination for High Voltage Transmission and Transformation Equipment
IEC298	AC metal enclosed switchgear and control equipment with rated voltage above 1kV to 72.5kV (inclusive)

Normal environmental conditions for use

♦ Environmental temperature

Maximum temperature: $+40\text{ }^{\circ}\text{C}$

Minimum temperature: $-25\text{ }^{\circ}\text{C}$

24-hour average temperature: $\leq 35\text{ }^{\circ}\text{C}$

♦ Environmental humidity

Maximum average relative humidity: 24-hour average $\leq 95\%$, monthly average $\leq 90\%$

Altitude: ≤ 1500 meters (conventional type, under standard inflation pressure), >1500 meters requires special instructions

♦ Special conditions

For special operating conditions beyond the normal usage environment, please consult with our company in advance.

Application types of products

Main functional units:

- ♦ Unit D: Cable Connection Unit
- ♦ Unit C: Load switch unit
- ♦ V Unit: Vacuum Circuit Breaker Unit
- ♦ M/PT unit: metering and PT unit
- ♦ PTC unit: PT unit with three position switch
- ♦ Each functional unit can have an independent air box or a shared air box.
- ♦ Different gas boxes are connected through the top expansion busbar.

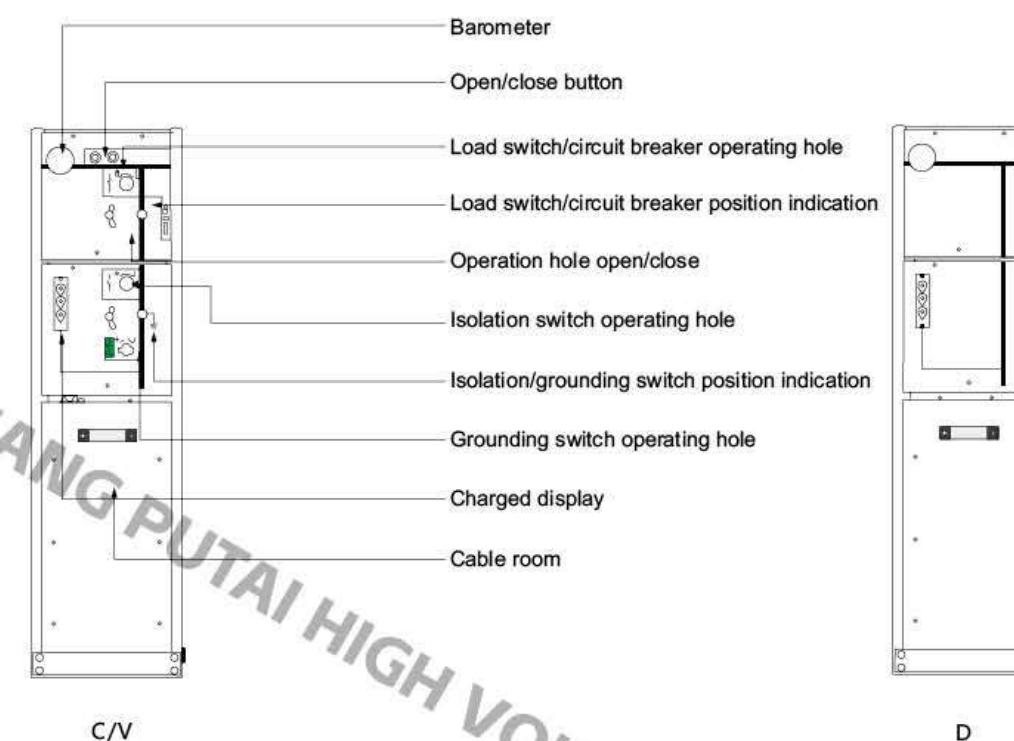
Structural characteristics

- ♦ All live parts are sealed in an air box, which is welded with stainless steel and filled with dry air at 1.4 bar. The protection level of the air box reaches IP67.
- ♦ The pressure gauge installed in the gas box can monitor the gas pressure inside the box in real time.
- ♦ An explosion-proof membrane is installed at the bottom of the gas box. When an internal fault causes a pressure increase, the explosion-proof membrane will burst and release the internal pressure. And release the gas towards the rear to prevent injury to the operators in front of the cabinet.
- ♦ The switchgear has passed the internal arcing test, IAC- AFLR /20kA, 1s.

Main technical parameters

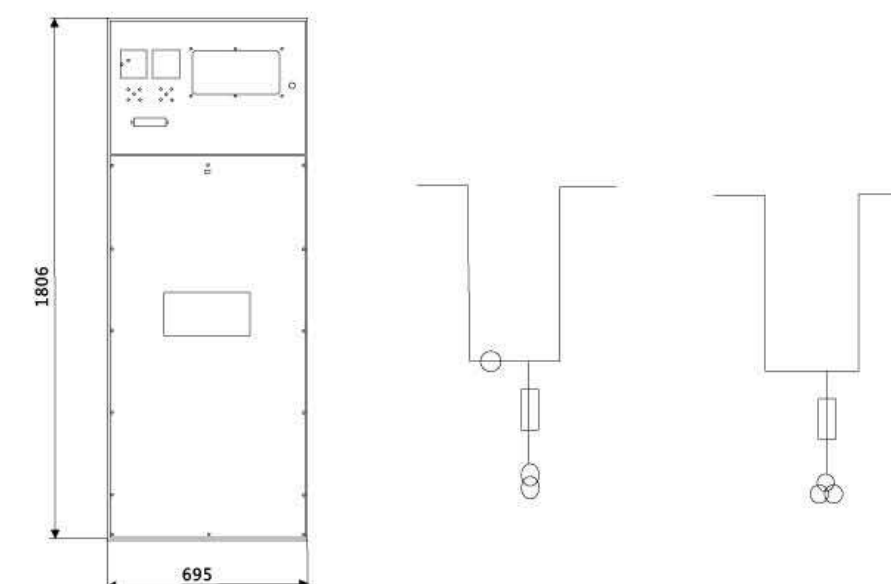
Unit	Project	C module	F module	V module	
		Load switch	GIS	Vacuum Circuit Breaker	Isolation/grounding switch
1	Rated voltage kV		12		
2	1-minute power frequency withstand voltage kV		42/48		
3	Lightning impulse withstand voltage kV		75/48		
4	Rated current A	630	125*	630	630
5	Breaking Capacity				
	Closed loop breaking current A	630w			
	Cable charging interruption current A	135			
	5% active load breaking current A	31.5			
	Grounding fault breaking current A	200			
	Short circuit breaking current kA		31.5*	25	
6	Rated transfer current A		1500		
7	Select the maximum current A of the fuse		125		
8	Short circuit closing current kA	63	80*	25	
9	Short time withstand current kA	25		25	
10	Short circuit duration s	4		4	4
11	Mechanical lifespan times	5000	5000	10000	3000
12	Gas pressure MPa	0.025 (20°C)			
13	Annual leakage rate	≤0.05%			
14	Arc extinguishing method	Vacuum arc extinguishing			
15	protection grade	IP67/3X (air box/housing)			

Operation interface

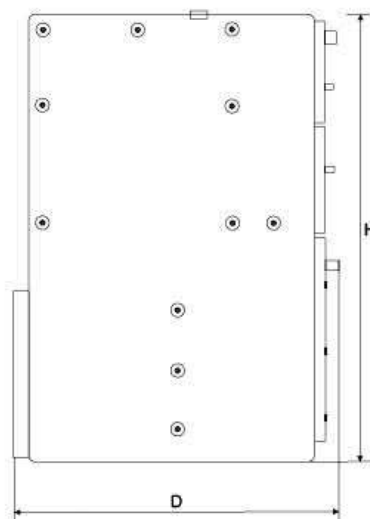
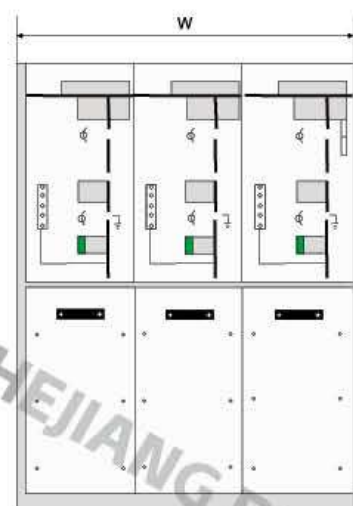


Pt and metering cabinet unit

- ♦ Air insulated switchgear.
- ♦ The voltage transformer is equipped with fuse protection. Optional 2 or 3 voltage transformers; 2 or 3 current transformers.
- ♦ The connection method between the measuring cabinet and the switchgear: top extended busbar connection;
- ♦ The connection method between PT cabinet and switchgear: top extended busbar connection;



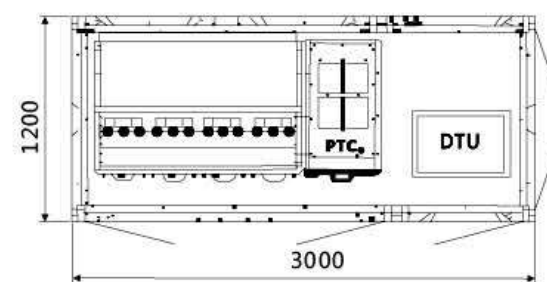
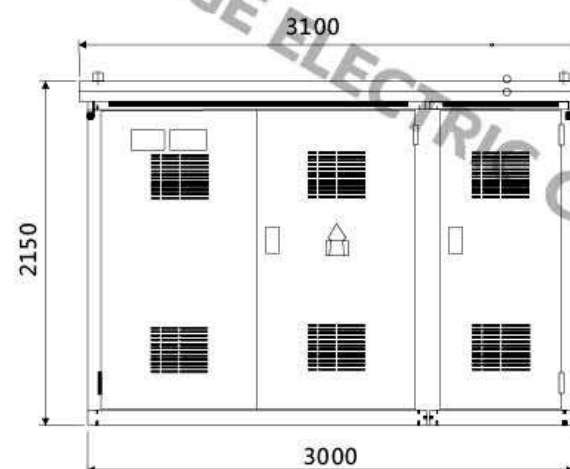
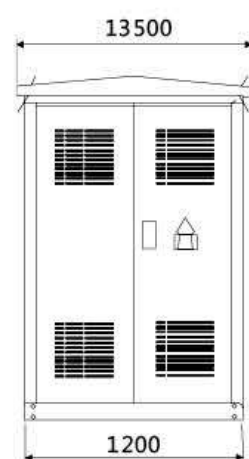
External dimensions



	W(mm)	H(mm)	D(mm)
1-way	371	1336	850 (935)
2-way	696		
3-way	1021		
4-way	1346		
5-way	1671		

Outdoor switchgear scheme

- ♦ Outdoor rooms can be equipped with metal or cement shells.
- ♦ The specific dimensions need to be arranged according to the cabinet combination.



XGN66-12(Z)

Box-type fixed closed switchgear



Overview

XGN66-12 (Z) type fixed enclosed switchgear (hereinafter referred to as switchgear) is a complete set of high-voltage electrical products produced by our company, which meets the requirements of the national standard GB3906 "3-35kV AC Metal Enclosed Switchgear", the Ministry of Electric Power DLT404 "Technical Conditions for Ordering Indoor AC High Voltage Switchgear", and the international standard IEC60298 "Requirements for AC Metal Enclosed Switchgear and Control Equipment above 1kV and below 52kV".

This product has absorbed excellent foreign technology and is small in size, only 50% of the volume of a regular switchgear; Circuit breakers have high reliability and good performance; The "five prevention" interlocking mechanism has advantages such as reliability and simplicity. The switchgear is an indoor assembled set of 3.6, 7.2, 12kV three-phase AC 50Hz single busbar segmented units, used for receiving and distributing electrical energy. And it has functions such as controlling, protecting, and monitoring circuits, and can be used in various types of power plants, substations, industrial and mining enterprises, high-rise buildings, etc. It can also be combined with ring main units and applied in switch stations.

Model Meaning



Structural characteristics

- ♦ The cabinet is made of high-quality angle steel welded together.
- ♦ The circuit breaker room is located in the lower part of the cabinet, making installation, debugging, and maintenance convenient; Equipped with ZN63A (VS1-12) circuit breaker as standard, and equipped with pressure release channel to ensure personal safety.
- ♦ Adopting advanced and reliable rotary isolation switches, it can safely enter the circuit breaker room for maintenance when the main busbar is live.
- ♦ The full cabinet protection level is IP2X.
- ♦ Equipped with a reliable mandatory mechanical locking device, it can easily and effectively meet the "five prevention" requirements.
- ♦ Have a reliable grounding system.
- ♦ The door is equipped with an observation window, which can clearly observe the working status of the components inside the cabinet.
- ♦ The operating mechanism adopts JSXGN locking mechanism for XGN2-12 cabinet, which is simple, reliable, convenient and practical.
- ♦ The incoming and outgoing cables are located below the front of the cabinet bottom, making it convenient for users to connect.

Normal environmental conditions for use

- ♦ The altitude shall not exceed 1000m.
- ♦ Environmental temperature: -25 °C~+40 °C, with an average temperature not exceeding +35 °C within 24 hours.
- ♦ The horizontal inclination shall not exceed 3 °.
- ♦ The seismic intensity shall not exceed 8 degrees.
- ♦ No places with severe vibration, impact, or explosion hazards.

Main technical parameters

1. Main technical parameters and component models of switchgear

Serial Number	Project	Unit	Technical Parameter
1	Rated voltage	kV	3.6, 7.2, 12
2	Rated power frequency withstand voltage	kV	Same as ground: 42; Fracture surface: 45
3	Rated lightning impulse withstand voltage	kV	Same as ground: 75; Fracture surface: 85
4	Rated frequency	Hz	50
5	Rated current	A	630, 1250
6	Rated short-circuit breaking current (peak)	kA	20, 25, 31.5
7	Rated short-circuit closing current (peak)	kA	50, 63, 80
8	Rated dynamic stability current (peak value)	kA	50, 63, 80
9	Lightning thermal stability current 4S (effective value)	kA	20, 25, 31.5
10	Protection grade		IP2X
11	Dimensions (Width X Depth X Height)	mm	900×1000×2300
12	Weight	kg	600

2. Main technical parameters of XGN63-12 vacuum circuit breaker

Serial Number	Project	Unit	Technical Parameter
1	Rated voltage	kV	12
2	Rated current	A	630, 1250
3	Rated short circuit breaking current	kA	20, 25, 31.5
4	Rated short-circuit closing current	kA	50, 63, 80
5	Rated short-time withstand current (4S effective value)	kA	20, 25, 31.5
6	Rated peak withstand current (peak)	kA	50, 63, 80
7	Mechanical life	Order	10000
8	Rated short-time breaking current breaking times	Order	50
9	Rated operating sequence		Fen -0.3S-HeFen-180S-HeFen
10	Clearance between open contacts	mm	11±1
11	Contact stroke of contacts	mm	4±0.5
12	Interphase center distance	mm	210
13	Opening speed	m/s	1.2±0.2
14	Closing speed	m/s	0.6±0.2
15	Opening time	ms	≤60
16	Close time	ms	≤75
17	Three phase opening synchronicity	ms	≤2
18	Closing bounce	ms	≤2
19	loop resistance	μΩ	≤45
20	Accumulated allowable wear thickness of contacts	mm	3

3. The technical parameters of other electrical components can be found in their respective user manuals.

4. The solution for the rated current of the switchgear greater than 1600A must be negotiated and resolved with our company.

External dimensions of switchgear

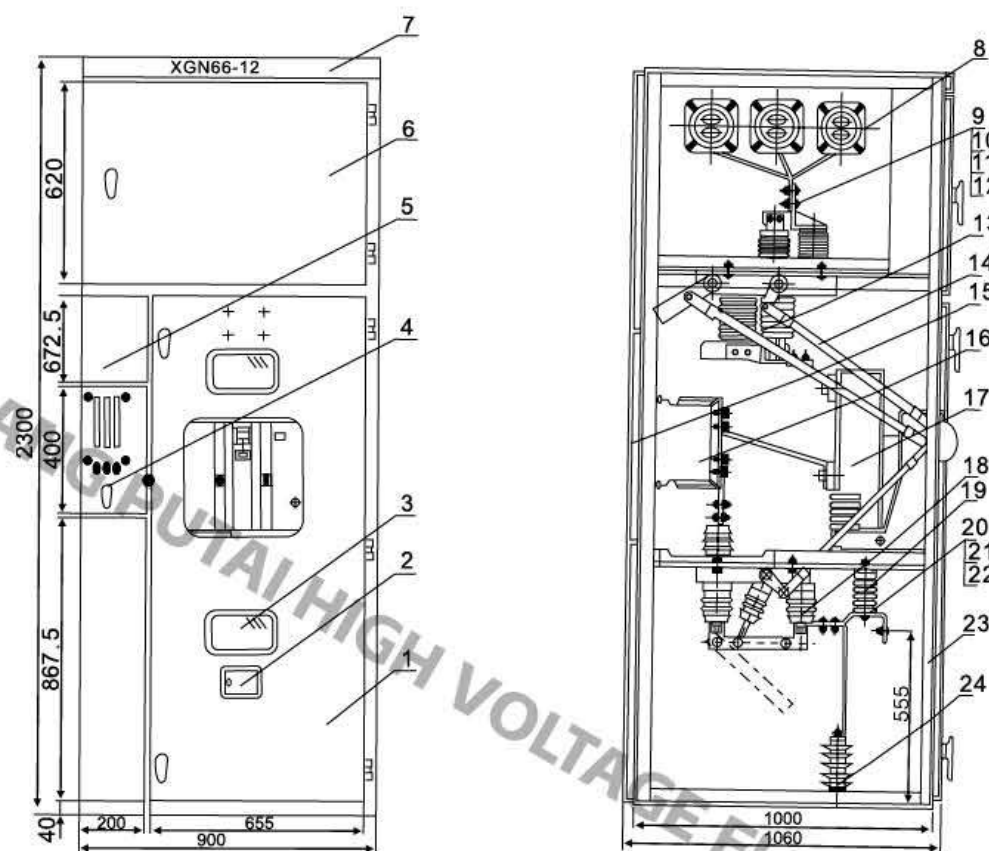


Figure 1: Schematic diagram of switchgear layout

- | | | | |
|------------------------|--------------------------------|----------------------------|------------------------|
| 1. Cabinet door | 7. Eyebrow brow | 13. Isolation switch | 19. Sensors |
| 2. Lighting fixtures | 8. Busbar through wall conduit | 14. Pull rod | 20. Bolt |
| 3. Observation window | 9. Bolt | 15. Rear sealing plate | 21. Gasket |
| 4. Operating mechanism | 10. Gasket | 16. Current Transformer | 22. Gasket |
| 5. Small door panel | 11. Gasket | 17. Vacuum circuit breaker | 23. Skeleton |
| 6. Instrument door | 12. Nut | 18. Isolation switch | 24. Lightning arrester |

Put into operation

Before operation, the following checks and debugging should be carried out.

- Check whether the model and specifications of the electrical components installed in the cabinet match the order requirements; Check if the fasteners are loose; Check if the primary and secondary wiring is correct; Operate the isolation switch and connect it. Ground switches, circuit breakers, and mechanical interlocks should be flexible and free of jamming 3-5 times, and the interlocks should meet the "five prevention" requirements. Then, lubricating grease should be added to the moving parts of the machinery.
- Check the insulation level and circuit resistance of the switchgear, as well as the mechanical characteristics of the circuit breaker, according to the instructions and factory test report. The test results should be consistent or similar to the factory test report.
- Set the electrical parameters on relays or microcomputer measurement and control devices.
- Follow the instructions to perform power on/off operations.

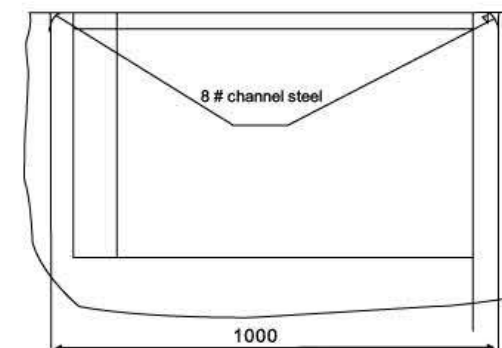
Maintenance and overhaul

Users should regularly maintain and inspect the switchgear, including:

- Clean up dust from all parts, especially the accumulated dust on the surface of insulation components;
- Check the moving parts of the machinery, regularly add lubricating grease to keep them flexible and reliable in operation;
- Check whether the electrical contact parts are in good contact, whether there is overheating, and whether the grounding circuit is conductive;
- Regularly check whether the fasteners are tightened.
- Users should generally conduct troubleshooting with the assistance of professionals. For minor adjustments and faults, users should refer to this manual and the respective manuals for the main components for self maintenance.

Install

- Refer to the following diagram for the installation foundation. The protrusion of the foundation steel should be within 1-3mm, and the unevenness should not exceed 1.5mm per meter. The overall length should not exceed 5mm.
- Place the switchgear in order on the foundation, adjust the installation position, and then fix it with M12 bolts or spot welding method. Tighten the cabinets with M8 bolts.
- Remove the cover plate and install the main busbar and primary power supply. The terminal contact surface should be cleaned and coated with neutral Vaseline. After installation, seal the cable hole.
- Connect the indirect grounding busbar of the cabinet, so that it is integrated along the direction of the switchgear arrangement. Check whether there are any omissions in the working grounding and protective grounding, whether the grounding circuit is connected and conductive. The working grounding resistance should not exceed $1000 \mu\Omega$, and the protective grounding resistance should not exceed 4Ω .
- Install secondary cables, which are introduced from the bottom of the cabinet and enter the low-voltage chamber along the measuring wall, and are then tapped onto the terminal block; Alternatively, the low-voltage chamber can be introduced from the secondary busbar on the top of the cabinet, and the cable holes can be sealed after installation.
- Clean the dust and debris inside the cabinet.



The depth of the cable trench is determined based on the bending radius of the cable

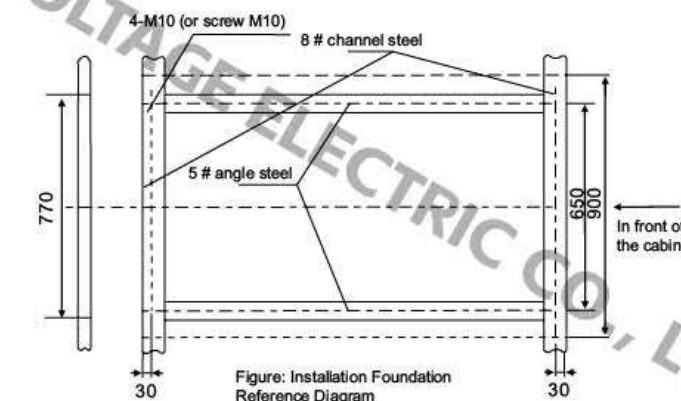


Figure: Installation Foundation Reference Diagram

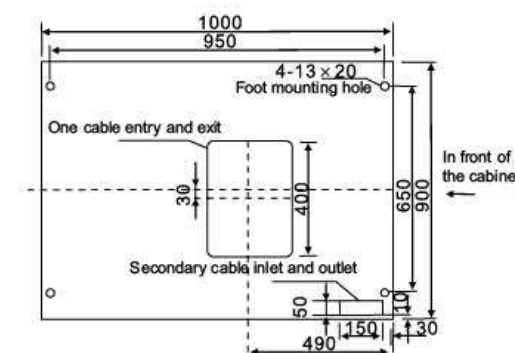


Image: Bottom plate layout diagram

D

High voltage switchgear series

PUTAI



HXGN17-12

Box-type fixed metal-enclosed switchgear



Green energy



Intelligent power grid



Power grid system



Industrial electricity consumption



Rail Transit



Safe and reliable

HXGN17-12

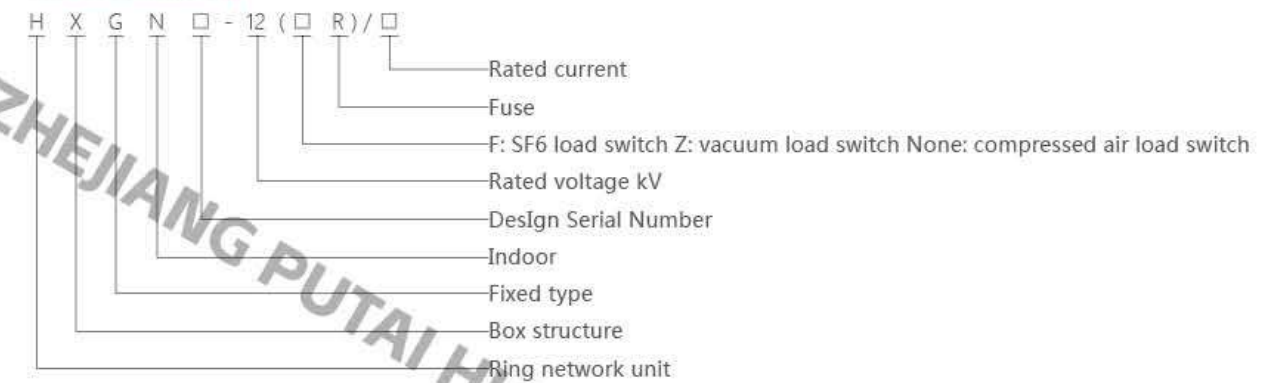
Box-type fixed metal-enclosed switchgear

PUTAI

Overview

HXGN17-12 box type fixed metal enclosed switchgear (referred to as ring main unit) is a complete set of AC high voltage equipment with a rated voltage of 12kV and a rated frequency of 50Hz. It is mainly used for AC ring networks, terminal distribution networks, and industrial electrical equipment, and is suitable for receiving, distributing, and protecting electrical energy. It is also suitable for installation in box type substations. Complies with GB3906 "3.6~40.5 AC Metal Enclosed Switchgear and Control Equipment" and meets the requirements of the international standard IEC298 "AC Metal Enclosed Switchgear and Control Equipment". And it has the "five prevention" interlocking function.

Model Meaning



Conditions of Use

- Surrounding air temperature: -15 °C to +40 °C;
- Altitude: 1000m and below;
- Humidity conditions: The daily average value should not exceed 95%, and the daily average water vapor pressure should not exceed 2.2kPa; The monthly average value shall not exceed 90%, and the monthly average value of water vapor pressure shall not exceed 1.8kPa.
- Earthquake intensity: not exceeding 8 degrees;
- Places without obvious pollution such as corrosive or flammable gases.

Note: When the above normal usage conditions are exceeded, users can negotiate with our company.

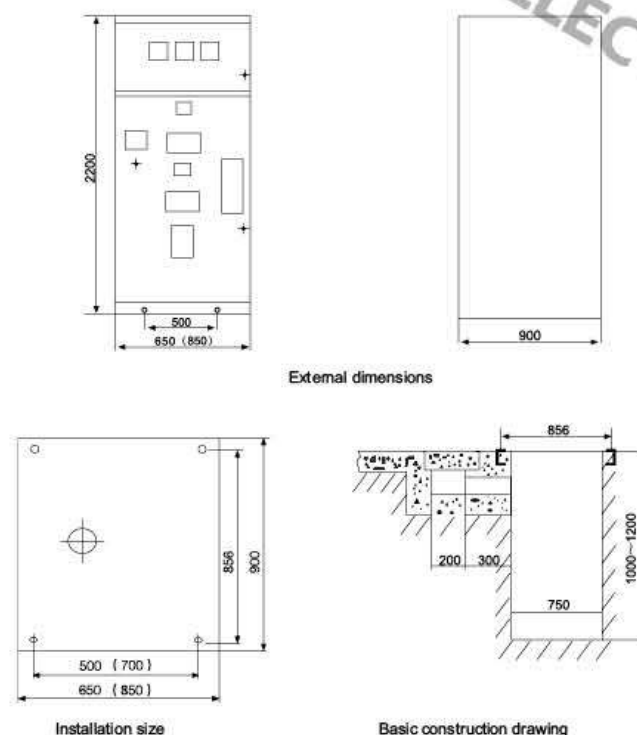
Structural characteristics

- Adopting a fully assembled structure, it is lightweight and aesthetically pleasing, and can be installed in any combination, making it easy to expand and extend infinitely.
- It can be equipped with FN12-12 compressed air load switch and combination device, as well as FZN25-12 vacuum load switch and combination device. Small size, maintenance free, three-phase linkage structure, with there are obvious isolation fractures.
- Load switches and combination devices have flexible installation methods, which can be installed on the left and right sides, front mounted, or inverted (FZN25 cannot be inverted).
- It can be operated manually and electrically, and has remote control function.
- Equipped with complete and reliable mechanical linkage and interlocking devices, fully achieving the "five prevention" function.
 - When the load switch is closed, the grounding switch cannot be closed and the front door cannot be opened;
 - When the load switch is opened, the grounding switch can be closed. When the grounding switch is closed, the front door can be opened;
 - When the grounding switch is closed, the load switch cannot be closed, and the front door panel can be opened;
 - When the grounding switch is opened, the load switch can be opened and closed, but the front door panel cannot be opened;
 - When the cable enters the power line, regardless of whether the load switch is in the closed or open position, the electromagnetic lock controls the front door panel to prevent it from opening. (Except for emergency unlocking with a dedicated key).
- The load switch adopts a linked protective insulation valve or transparent insulation cover to shield the live contacts and ensure personal safety.
- Adopting front operation maintenance and reliable wall installation.
- The front door is equipped with an observation window, which can clearly observe the working condition of the components inside the cabinet.

Main technical parameters

Project	Unit	FN12-12	FZN25-25
Rated voltage		12	
1-minute power frequency withstand voltage	kV	Ground and phase 42; Isolation fracture 48	
Lightning impulse voltage (peak value)		Ground and phase 75; Isolation fracture 85	
Load switch	Rated frequency	Hz	50
	Rated current	A	630
	Electrical life under rated current	order	Not less than 100
	Disconnect the capacity of the no-load transformer	kVA	1250
	Rated thermal stability electrical appliance	kA/S	20/4; Grounding switch 20/2
	Rated dynamic stability current (peak value)	kA	50
	Rated short-circuit closing current (peak)	kA	50
GIS	Fuse rated current	A	125
	Rated transfer current	A	870
	Rated short circuit breaking current	kA	20
	Equipped with fuse model		S□LAJ—12
Mechanical life	order	2000 10000	
1 minute power frequency withstand voltage of auxiliary circuit	kV	2	
Working voltage of electric operating mechanism	V	AC/DC 220; one hundred and ten	
protection grade		IP2X	

Mounting Dimension



Operation and deployment

Check whether the model and specifications of the electrical components installed in the cabinet match the order requirements; Check if the fasteners are loose; Check if the primary and secondary wiring is correct; Operate the load switch, grounding switch, and mechanical interlock 3-5 times, ensuring flexibility and no jamming. The interlock should meet the "five prevention" requirements, and then add lubricating grease to the mechanical moving parts.

Check the insulation level, circuit resistance, and mechanical characteristics of the load switch of the switchgear according to the instructions and factory test report. The test results should be consistent or similar to the factory test report.

Power transmission operation: Only when the cabinet door is closed and locked, and the grounding switch is operated to the "open" position, can the load switch be operated to the closed position (if there is no grounding switch, the interlocking mechanism should be set to the "open" position).

Power outage operation: The grounding switch can only be closed when the load switch is in the isolated position after being disconnected. The cabinet door can only be opened when the grounding switch is in the closed position (if there is no grounding switch, the interlocking mechanism should be set to the "closed" position).

Note: When conducting maintenance on the incoming cabinet, the incoming power supply should be cut off, the load switch should be disconnected, and the live display on the cabinet should be checked at the same time. After confirming that there is no power, the cabinet door should be opened and the grounding wire should be hung for maintenance.

maintenance and overhaul

- Users should regularly maintain and inspect the switchgear, usually once every six months or a year;
- Clean up dust from all parts, especially the accumulated dust on the surface of insulation components;
- Check the moving parts of the machinery, regularly add lubricating grease to keep them flexible and reliable in operation;
- Check whether the electrical contact parts are in good contact, whether there is overheating, and whether the grounding circuit is conductive;
- Check if the fasteners are securely fastened.
- During the maintenance of the incoming cabinet, the upper power supply should be cut off first. After disconnecting the load switch, check the live display, confirm that there is no power, open the door and hang the grounding wire for maintenance.
- When the fuse melts in a short circuit, regardless of whether one or two fuses are blown, all three must be replaced.
- The main component parameters are inspected and maintained according to their instructions.

Factory data and attachments

Our company provides the following documents and attachments when supplying goods

- Shipping List
- Product qualification certificate and factory test report
- User Manual
- Regarding electrical drawings
- Main component manual
- Cabinet door keys, operating handles, and spare parts specified in the contract.

Ordering Instructions

The following technical information should be provided when placing an order:

- Main wiring scheme number, purpose, single line system diagram, rated voltage, rated current, rated short-circuit breaking current, distribution room layout plan, and switchgear layout diagram, etc;
- Requirements for control, measurement, and protection functions of switchgear, as well as requirements and schematic diagrams for other locking and automatic devices;
- The model, specifications, and quantity of the main electrical components inside the switchgear;
- When the switchgear is used in special environmental conditions, detailed instructions should be provided when ordering;
- Other special requirements must be explained and negotiated in writing before placing an order.

D

High voltage switchgear series

PUTAI



XGN15-12

Box-type fixed AC metal-enclosed switchgear



Green energy



Intelligent power grid



Power grid system



Industrial electricity consumption



Rail Transit



Safe and reliable

XGN15-12

Box-type fixed AC metal-enclosed switchgear

PUTAI

Overview

The XGN15-12 type modular AC metal enclosed ring network switchgear (hereinafter referred to as the ring network cabinet) is a high-voltage electrical product designed and produced by us in accordance with the requirements of domestic rural and urban power grid transformation. All technical performance indicators comply with IEC62271-200:2003 and GB3906 standards.

The main switch, operating mechanism, and components of the ring main unit are made of ABB original parts or domestically assembled SFL-12/24 switchgear using imported components. ABB original HAD/US SF6 can also be installed according to user needs. Circuit breaker or VD4-S vacuum circuit breaker. Its operation modes are divided into manual and electric.

The cabinet is processed by CNC machine and riveted, with a protection level of IP3X, and has reliable mechanical interlocking and anti mis-operation functions. This product has significant features such as small size, light weight, beautiful appearance, easy operation, long life, high parameters, no pollution, and minimal maintenance.

XGN15-12 type modular AC metal enclosed ring network switchgear is suitable for use in 50Hz, 12kV power networks for the reception and distribution of electrical energy.

Model Meaning



Conditions of Use

- Altitude: $\leq 1000\text{m}$ (if there are special requirements, please specify them when ordering. Currently, there are 6 groups operating at an altitude of 5200m).
- Environmental temperature: $-35^{\circ}\text{C}+45^{\circ}\text{C}$, maximum daily average temperature difference $\leq 25^{\circ}\text{C}$.
- The average daily relative humidity should not exceed 95%, and the average monthly relative humidity should not exceed 90%.
- Seismic resistance: 8 degrees.
- Places with severe vibrations and impacts, as well as no fire, chemical corrosion, or explosion hazards.

Execution standards

- GB 3906-2006 "3.6 kV to 40.5 kV AC Metal Enclosed Switchgear and Control Equipment"
- IEC 60298-1990 "AC Metal Enclosed Switchgear and Control Equipment with Rated Voltage from 1kV to 52kV and Below"
- GB/T 11022-2011 "Common Technical Requirements for High Voltage Switchgear and Control Equipment Standards"

Main technical parameters

Project	Unit	Parameter
Rated voltage	kV	12
Rated frequency	Hz	50
Rated current of main busbar/maximum rated current of fuse	A	630,125
Rated short-time withstand current of main circuit and grounding circuit	kA/s	20,3
Rated peak withstand current of main circuit and grounding circuit	kA	50
Rated short-circuit closing current of main circuit and grounding circuit	kA	50
Number of full capacity on-off cycles of load switch	Order	100
Circuit breaker breaking current	kA	31,5,40
Rated closed loop breaking current	A	630
Rated transfer current	A	1600
Mechanical life	Order	2000
1-minute power frequency withstand voltage (peak) time, ground/isolation fracture	kV	42,48
Lightning impulse withstand voltage (peak value) phase to phase, ground/isolation fracture	kV	75,85
Secondary circuit 1-minute power frequency withstand voltage	kV	2
Protection grade		IP3X

Function and characteristic

Cabinet structure

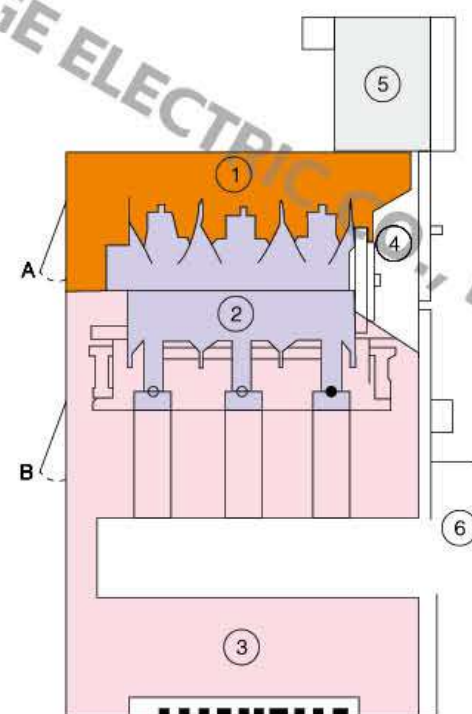
♦ The ring network cabinet is made of 2mm thick aluminum zinc coated plate (or cold-rolled plate after spray coating) and riveted. There are two pressure release holes at the back of the cabinet, one for the cable room and the other for the load switch/busbar room. This structure can maximize the reliability of personal installation and equipment operation.

♦ Each interval chamber

1. Busbar room: The busbar room is located at the top of the cabinet and is connected to adjacent switchgear.
2. The load switch is an independent unit filled with SF6 gas inside.
3. Cable room: Approximately 75% of the space is used for cable connections, fuses, grounding switches, and CT and PT installations.
4. Mechanism chamber and interlocking: The chamber includes operating mechanisms and mechanism interlocks, as well as position indicators, auxiliary contacts, trip coils, live displays, and interlocks.
5. Relay box: The relay box is located at the top of the cabinet and is optional. The small chamber is used to install special devices such as instruments, relays, and motor units.
6. Circuit breaker room: A circuit breaker can be placed below the load switch.

♦ Pressure release

1. The pressure release above is used to release the gas pressure generated during internal arc accidents in the busbar and load switch room.
2. The following pressure release is used to release the gas pressure generated during an arc accident inside the cable compartment.



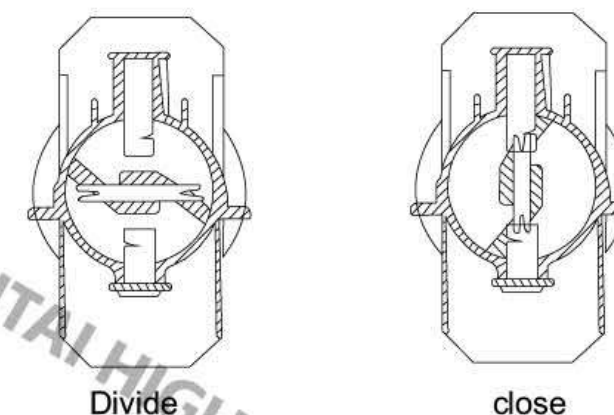
♦ FL type load switch (ABB original parts)

The SFL type load switch is a double break, rotating type dynamic contact that uses SF6 gas as the arc extinguishing medium. The dynamic and static contacts are placed in a reinforced structure molded epoxy resin shell. At the output end of the operating shaft is a transparent thermo-formed plastic end cap, through which the state can be observed.

After each switch is filled with SF6 gas at a pressure of 1.4 bar, it is permanently sealed (SFL means "permanently sealed"), and a helium detector can be used to check for gas leakage.

The vertical or horizontal installation of switches is not limited. In a modular cabinet, a typical installation method is to place a steel partition between the cable room and the busbar room and install it horizontally. This installation method seals the switch housing inside a grounded steel plate and isolates the busbar from the cable joint to meet the strictest safety requirements for operation and maintenance.

If an internal arc occurs and there is a weak structural point at the rear of the casing, it will be flushed open, directing the arc gas out of the switch. Subsequently, the arc discharge valve on the cabinet will be flushed open and directing the overpressure gas outside the cabinet.



♦ Optional equipment: Auxiliary contacts 2 normally closed 2 normally open+expansion 2 normally open 2 normally closed shunt release coils for SFL with mechanism A.

♦ Select switch SFL12/17.5 IVDP575305R1 for K mechanism; SFL24K IVDP575304R1

♦ Select switch SFL12/17.5 IVDP575303R1 for mechanism A; SFL24A IVDP575302R1

♦ VD4-S vacuum circuit breaker (ABB original parts)

The VD4-S vacuum circuit breaker is designed specifically for unit switchgear, and its breaking capacity is sufficient to handle various states, including normal operation of switching equipment or branch networks, as well as breaking short circuits in special situations.

Vacuum circuit breakers are particularly suitable for networks that operate frequently within the operating current range. The VD4-S vacuum circuit breaker is equipped with a spring operated mechanism with a reclosing function (opening -0.3s-closing -180s-closing), and its action is reliable with a long service life. The entire circuit breaker consists of three vacuum switch bubbles, with a resin insulated cylinder on the outside and a vertical structure.

The extinguishing of the arc is the result of the forced displacement of the arc caused by the spiral groove of the extinguishing contact. Due to the minimum static vacuum degree inside the switch insulation cylinder being 10-4 to 10-8 bar, high insulation strength can be achieved even though there is relatively little gap between the switch contacts. The arc extinguishes at the first zero point of the short-circuit current.

Due to the small gap between the contacts and the high conductivity of the metal gas plasma region at the arc pressure drop, coupled with the short arc ignition time, the arc energy is extremely low, which is beneficial for extending the life of the contacts and even the entire switch.

Standard equipment:

- Manual operation
- Electric operation
- Auxiliary contact 2 normally open 2 normally closed
- Position contact of shunt trip strip
- Excitation closing coil

Circuit breaker model:

- VD4 1206-20S
- VD4 1706
- VD4 2406

Optional equipment:

- SS or PR512 overcurrent relay
- Low voltage release device
- Interlocking coil

♦ HAD/US SF6 circuit breaker (ABB original parts)

The HAD/US SF6 circuit breaker is designed specifically for ring main switchgear, with a breaking capacity sufficient to handle various states, including normal switching equipment or branch network operations, as well as breaking short circuits in special circumstances. The new generation HAD has the latest SF6 breaking technology, coupled with a simple structure that requires very little operating energy. Such a simple energy storage operating mechanism has the characteristic of long mechanical life. The use of a spring operated mechanism for circuit breakers can achieve automatic reclosing operation.

The special structure of the opening and closing part of the switch can provide an extraordinary guarantee for extending the electrical life.

The switch is made into a separate independent column structure and placed vertically. The switch adopts the principle of self energy blowing arc, which uses the energy of the arc itself to extinguish the arc. When the circuit breaker is opened, an arc is generated between the moving and stationary contacts in the arc extinguishing chamber. The high temperature and ionization efficiency generated by the arc cause the SF6 gas pressure to rise rapidly in the arc extinguishing chamber. As the pressure increases and the arcing contacts gradually separate, the gas is forcefully sprayed out of the arc extinguishing chamber through the nozzle, causing the arc to become sparse, cooled, and blocked, and preventing reignition. Therefore, the switch moving part only requires a small amount of energy, which further enhances the reliability of long-term operation.

SFL Technical Data

Rated voltage	kV	12	17.5	24
Impulse withstand voltage	kV	75	95	125
One minute power frequency withstand voltage	kV	28	38	50
Rated current	A	630	630	630
Closing capacity	kA	50	50	40
Thermal stability current	kA/S	20,3	-	-
Breaking capacity	kVA	1600	-	-
Maximum fuse	A	125	-	-
Polar distance	mm	210	210	210

VD4-S Technical Data

Rated voltage	kV	12	17.5	24
Impulse withstand voltage	kV	75	95	125
Power-frequency withstand voltage	kV	28	38	50
Rated current	A	630	630	630
Thermal stability current	kA	20,3	-	-
Polar distance	kA/S	210	210	210

♦ This switch has many advantages:

- The duration of arc ignition is short, and the insulation strength in the arc extinguishing chamber recovers quickly.
- Ensure safety and reliability even in the most demanding environments.
- Can disconnect low value inductive and capacitive currents.
- The operating mechanism is simple, capable of quick opening and closing, and has a long mechanical lifespan.
- Reduced the wear and tear of contacts and arc extinguishing chambers, thereby extending their electrical lifespan.
- Allow for multiple operations, but with minimal maintenance workload.
- Lightweight structure, compact, and stable.

Standard equipment: electric operation/manual operation/auxiliary contacts (2 normally open and 2 normally closed)/shunt trip, gas pressure control with position contacts/shunt closing coils/signal contacts

Optional equipment: S5 solid overcurrent relay/PR511-PR512 overcurrent relay/low voltage release/interlocking strong coil/HAD120625/HAD120520/HAD170620/HAD170616

♦ Type K and A operating structures (ABB original parts)

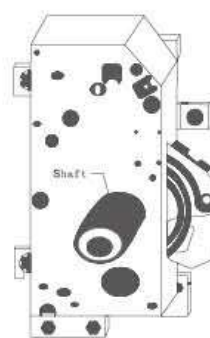
This organization is used to operate load switches and load switches with fuses

a. K-type mechanism: K-type mechanism is a single spring mechanism used for load switch opening and closing operations. The opening and closing of the switch is achieved through spring energy storage through dead points. K-type mechanisms can choose motors to achieve electric operation.

b. A-type mechanism: A-type mechanism with dual spring mechanism, one of which is used for switch closing and the other for switch opening. Before closing the switch with the closing spring, it should be placed in the energy storage state. After the closing operation, the opening will automatically be placed in the energy storage state. So it can be tripped manually, with shunt trip coils or fuse firing pins.



K organization



A organization

Reference Table for Fuse Selection

work voltage KV	Rated capacity of transformer															
	50	75	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000
	Fuse selection (nominal value in amperes)															
3	25	25	40	40	63	63	63	80	100	100	160					
5	16	16	25	25	40	40	63	63	63	80	100	100	160			
6	16	10	25	25	25	40	40	63	63	63	80	100	100	160		
10	10	10	16	16	25	25	25	40	40	63	63	63	80	100	100	
12	10	10	16	16	16	25	25	25	40	40	63	63	63	80	100	
15	10	10	16	16	16	16	25	25	25	40	40	63	63	63	100	
20	10	10	10	10	16	16	16	25	25	25	40	40	63	63	63	80
24	10	10	10	10	16	16	16	15	25	25	20	40	40	63	63	63

♦ SFL-12/24 type switchgear

The main components of SFL12/24 switchgear are imported original parts. The switchgear is a double break, three position, rotating moving contact with SF6 gas as the arc extinguishing medium. The moving contact is placed in a reinforced structure of die cast epoxy resin housing. Each switch is permanently sealed when filled with SF6 gas at a pressure of 0.4 bars, and can be checked for gas leakage using a helium detector. The switch can be installed vertically or horizontally without limitation. The typical installation method in the ring main unit is to place a steel plate between the cable room and the busbar room and install it horizontally. This installation method isolates the busbar from the cable joint to meet the strictest safety requirements for operation and maintenance.

If an internal arc occurs and there is a structural weakness at the rear of the shell, it will be blown open. Subsequently, the arc discharge valve on the cabinet opens and directs the overpressure airflow outside the cabinet.

Optional equipment - Auxiliary contacts 2 normally closed 2 normally open+expansion 2 normally open 2 normally closed - Split trip coil supply with SFL mechanism A

Rated voltage	kV	12	17.5	24
Impulse withstand voltage	kV	75	95	125
One minute power frequency withstand voltage		42	55	65
Rated current	A	630	630	630
Closing capacity	kA	50	50	40
Thermal stability current	kA/S	20/3	-	-
Breaking capacity	kVA	1700	-	-
Maximum fuse	A	125	-	-
polar distance	mm	210	210	210

a. Dual function mechanism: K-type - switch function

Independently perform opening and closing operations using an operating lever or motor

Auxiliary contacts - switch (20+2C)/switch (20+3C) and grounding switch (10+1C)

b. Grounding switch function

The energy for independently performing opening and closing operations using an operating lever is provided by a compression spring, which, when released, quickly closes or opens the contacts.

Mechanical indication - mechanical display/motor selection for fuse melting in components/AC220V/DC220V

c. Dual function operating mechanism: Type A - switch function

Independently perform opening and closing operations using an operating lever or motor, with the operating energy provided by a compression spring. After the spring is released, the contact is closed. Use the button (O) or trip unit to independently perform opening and closing operations.

Auxiliary contacts - switch (20+2C) and grounding switch (10+1C)/switch for motor selection (1C) and grounding switch (10+1C)/fuse burnout (1C)/mechanical indication/trip/shunt trip/undervoltage/motor selection

Interlock

The switchgear has the following interlocks:

When the load switch is in the closed position, the grounding switch operation is locked;

When the grounding switch is in the closed position, the load switch operation is locked;

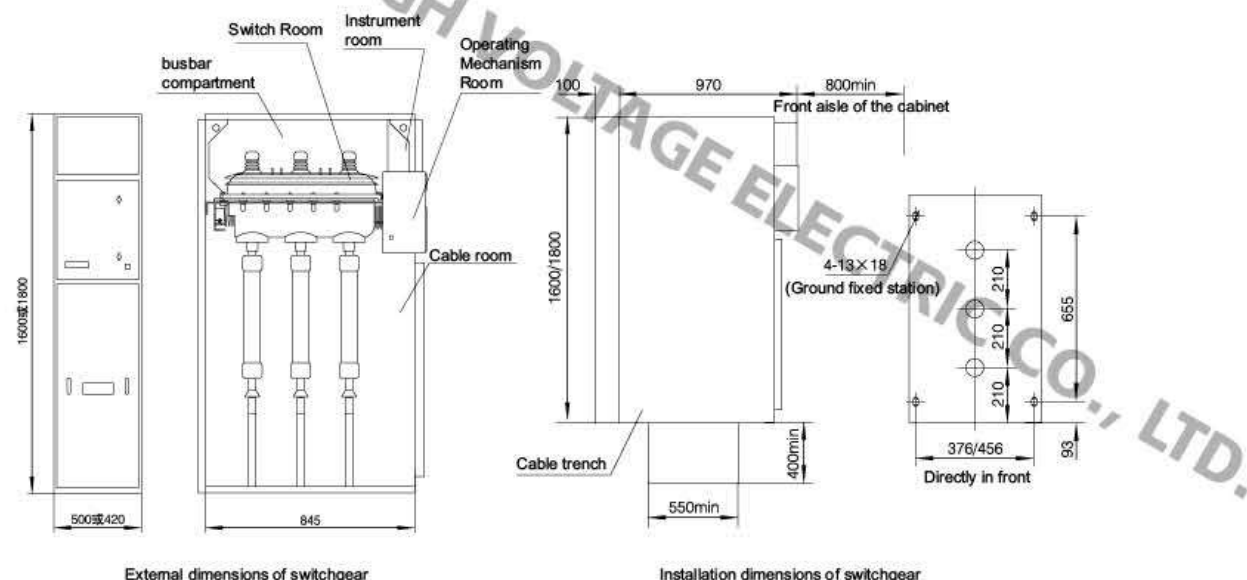
3. Only when the grounding switch is closed, is it allowed to open the front door of the ring main unit. In other cases, the front door is locked.

Operate

For switch equipment with load distribution switches, a dedicated operating handle is used to operate the switch equipment on the front. The operating mechanism has two operating holes on the front, with the upper part being the grounding switch operating hole and the lower part being the load switch operating hole. When operating, rotating the handle clockwise is the direction for closing the switch, and rotating counterclockwise is the direction for opening the switch. Electric opening and closing devices can also be installed for remote control operation. (Note: Sometimes the load switch does not come with a grounding switch, and the grounding switch operation hole is used as a cabinet door unlock).

For the switchgear of the combined electrical appliances, the operation sequence is the same as the above except for the manual disconnection button used for load switch opening operation. The lower grounding switch installed separately in the combination electrical cabinet is connected to the upper grounding switch through a connecting rod for simultaneous opening and closing. Release the residual small current on the fuse holder when closing to improve the safety when replacing the fuse.

Appearance and installation dimensions



External dimensions			
Serial Number	Name	Unit	Numerical value
1	Circuit breaker cabinet width	mm	750
2	Other cabinet widths	mm	375,500
3	High	mm	1600,1850
4	Deep	mm	980,900
5	Relay box height	mm	450



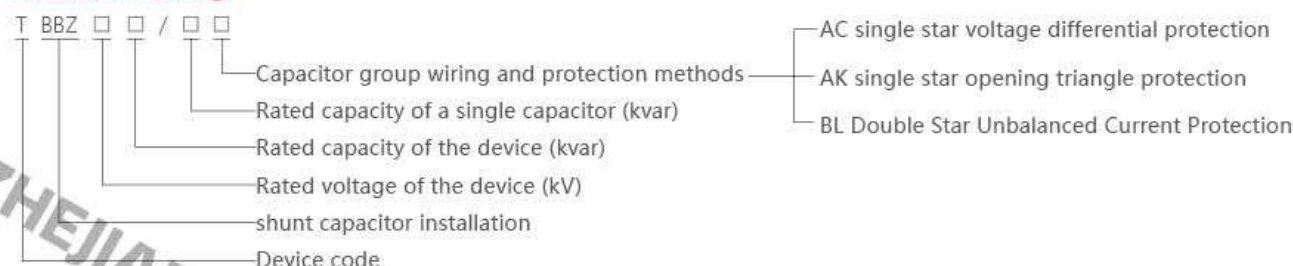
TBBZ High voltage reactive power automatic compensation device



Overview

TBBZ high-voltage reactive power compensation cabinet is suitable for AC 50HZ, three-phase 10kV power series, used to improve power factor and adjust network voltage, thereby increasing active output of power supply equipment and reducing line losses. This device is of indoor (outdoor) type.

Model Meaning



Main Technical Data

- The rated working voltage is 10kV and can operate for a long time at 1.1 times the rated voltage.
- The device can operate continuously at rated frequency, rated sine voltage, and current without transition state, with a root mean square value not exceeding 1.3Un.
- The device is equipped with overcurrent, overvoltage, undervoltage and other protections for system faults.
- The device provides protection against internal faults in capacitors. In addition to single unit fuse protection, different relay protections are also provided depending on the main wiring form.
- The device design and processing comply with GB50227-2995 "Design Specification for Parallel Capacitor Devices" and JB711-1993 "High Voltage Parallel Capacitor Devices".

Structure Introduction

The structure of this device is divided into two types: cabinet type and assembly type. Assembly type can be divided into sheet type and fully disassembled type. The cabinet structure is first installed in the factory, and then the components are removed, numbered, and transported to the site for assembly according to the drawings. From an indoor perspective, the film style is mainly convenient for transportation. Fully detachable for outdoor use, mainly convenient for hot-dip galvanizing.

This device is mainly composed of a reactor cabinet, a discharge cabinet, and a capacitor cabinet.

• Reactor cabinet

The main function of the reactor cabinet is to limit the inrush current during closing and suppress harmonics. When limiting the inrush current during closing, the reactor $X_L = (0.1 \sim 1)\% X_C$; When suppressing harmonics of more than 5 times, $X_L = (5 \sim 6)\% X_C$; When suppressing harmonics of three or more times, $X_L = (12 \sim 13)\% X_C$.

• Discharge cabinet

It mainly consists of discharge coils or voltage transformers, zinc oxide lightning arresters, and grounding isolating switches. The discharge coil is connected in parallel with the capacitor bank. When the power supply of the capacitor bank is disconnected, its discharge performance reduces the residual voltage on the capacitor bank from the peak rated voltage to below 50V within 5 seconds. Metal zinc oxide lightning arrester is used to limit the operating overvoltage caused by switching capacitor banks. The grounding isolation switch is used for grounding the busbar during power outage maintenance. The above configuration can be adjusted according to user requirements. If the wiring method of the circuit is double star, the capacitor cabinet should be double row or double-layer structure, and a current transformer should be installed inside the cabinet.

• Capacitor cabinet

The capacitor cabinet is mainly composed of fuses and capacitors. When the internal breakdown of the capacitor reaches 50%~70%, the fuse melts and the faulty capacitor is disconnected from the power circuit, preventing the expansion of the accident.

• Modular parallel capacitor device

This device mainly combines integrated capacitors, discharge coils, lightning arresters, grounding switches, reactors, etc. Collective capacitors are individual capacitors with internal fuses installed in a fully insulated enclosure, which is equipped with pressure relief valves and temperature controllers with alarm and trip contacts. It has the advantages of small footprint, easy installation, and convenient operation and maintenance.

Layout of capacitor device

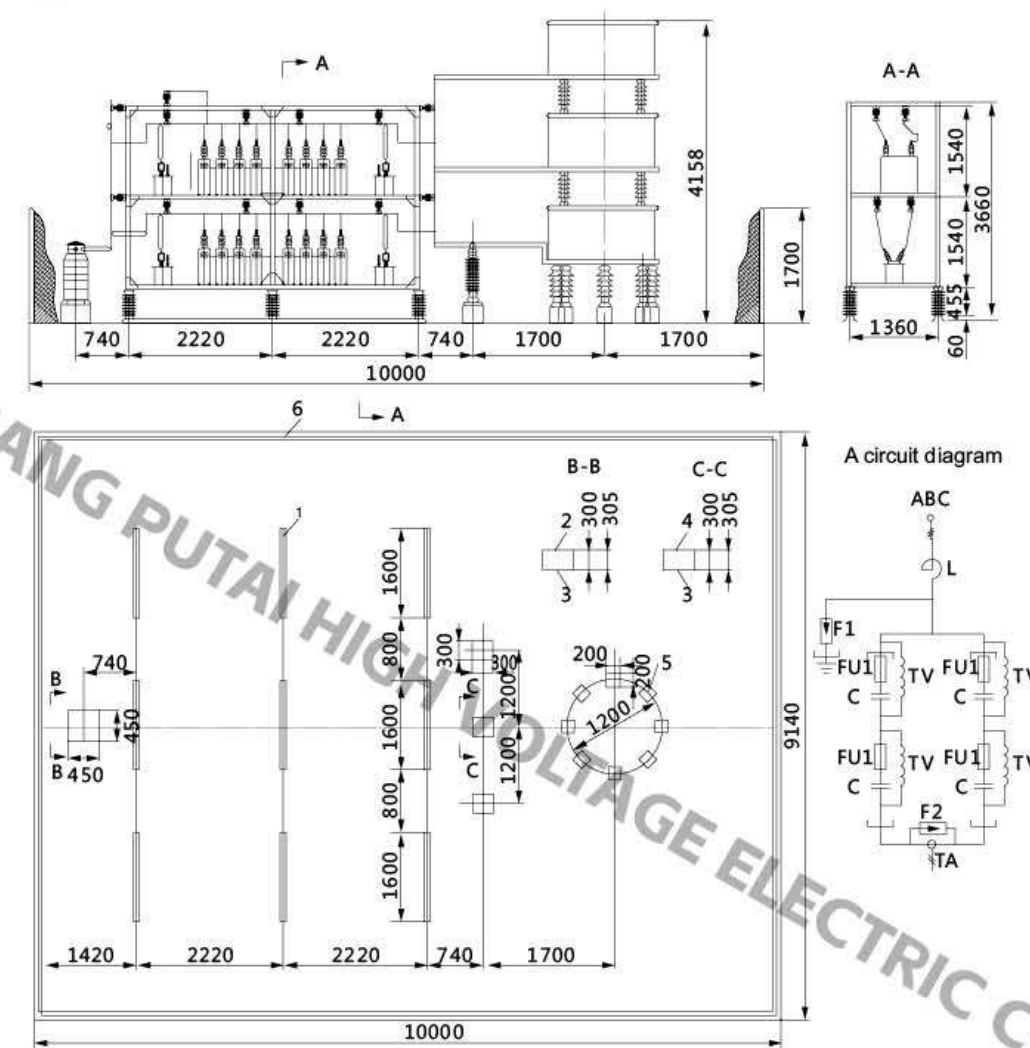


Figure 1 Layout of capacitor device

- 6- Pre embed 10 # slag steel and bent hook with the opening facing downwards;
- 4 pre embedded steel plates and hooks;
- Concrete stirrups;
- Pre embedded steel plates and hooks;
- Pre embedded steel plates and hooks are evenly distributed around the circumference.

Note:

- This diagram reflects the relationship between basic dimensions and should be designed and constructed according to the actual situation.
- All embedded parts must be slightly above the ground for welding purposes.
- Design according to different welding, wiring, and other methods.

Ordering Instructions

- System capacity (kVA) and main wiring scheme, system load situation and working mode.
- Harmonic frequency, voltage and current content of each harmonic (manufacturers can measure on behalf of users).
- System power factor, compensated power factor, and total compensation capacity (manufacturers can design on behalf of users).
- Installation site plan, installation method, and device inlet and outlet wiring method.
- Requirements for cabinet size and color.



Low voltage switchgear series

PUTAI



GDF Fixed partition switchgear



GDF Fixed partition switchgear

PUTAI

Overview

GDF fixed partition switchgear is suitable for three-phase AC 50, 60HZ, rated voltage 660V, rated current 2500A and below three-phase four wire and three-phase five wire power systems, used for receiving and distributing electrical energy. Widely used in power distribution centers PC and motor control centers MCC for power plants, substations, factories, mines, and high-rise buildings.

Operating environment conditions

- ◆ Indoor use;
- ◆ Altitude not exceeding 2000m;
- ◆ The maximum ambient temperature shall not exceed +40 °C, the minimum ambient temperature shall not be lower than -5 °C (indoor), and not lower than -10 °C (outdoor);
- ◆ Maximum daily temperature difference: 15 °C -25 °C;
- ◆ Relative humidity: 90% (25 °C), 50% (40 °C);
- ◆ It should be installed in a place without severe vibration and impact, with a seismic intensity of ≤ 8 degrees, and an installation inclination not exceeding 5 °C;
- ◆ A place without dust, corrosive gases, or rainwater intrusion.

Design reference standards

IEC 60439 Low voltage switchgear and control gear assemblies
IEC 144 Protection level of enclosures for low-voltage switchgear and control equipment
IEC 157-1 Low Voltage Circuit Breakers
IEC 269 Low Voltage Fuses
IEC 298 rated voltage 1-72 Control equipment for 5KV AC metal enclosed switchgear
IEC 73 indicator lights and button colors
IEC 86 Basic Environmental Testing
GB 7251 Low Voltage Switchgear and Control Equipment
GB 997 Electrical Structure Installation Form
GB 49421 Protection level of electrical equipment
JB/T 9661 Low voltage withdrawable switchgear

Electrical performance

Project	Parameter
Rated insulation voltage	AC660V
Rated operational voltage	AC380V
Rated current of horizontal busbar	2500A
Rated current of vertical busbar	1250A and below
Control the maximum capacity of the motor	320KV
Rated frequency	50HZ
Rated power frequency withstand voltage (1min)	2500V
Secondary power frequency withstand voltage (1min)	1500V
Degrees of protection provided by enclosure	IP30
Dimensions (mm)	Width 600 (800, 1000) X Depth 1000 (800) X Height 2200 Installation fixed space effective height 1760mm unit chamber height 220 440 660mm

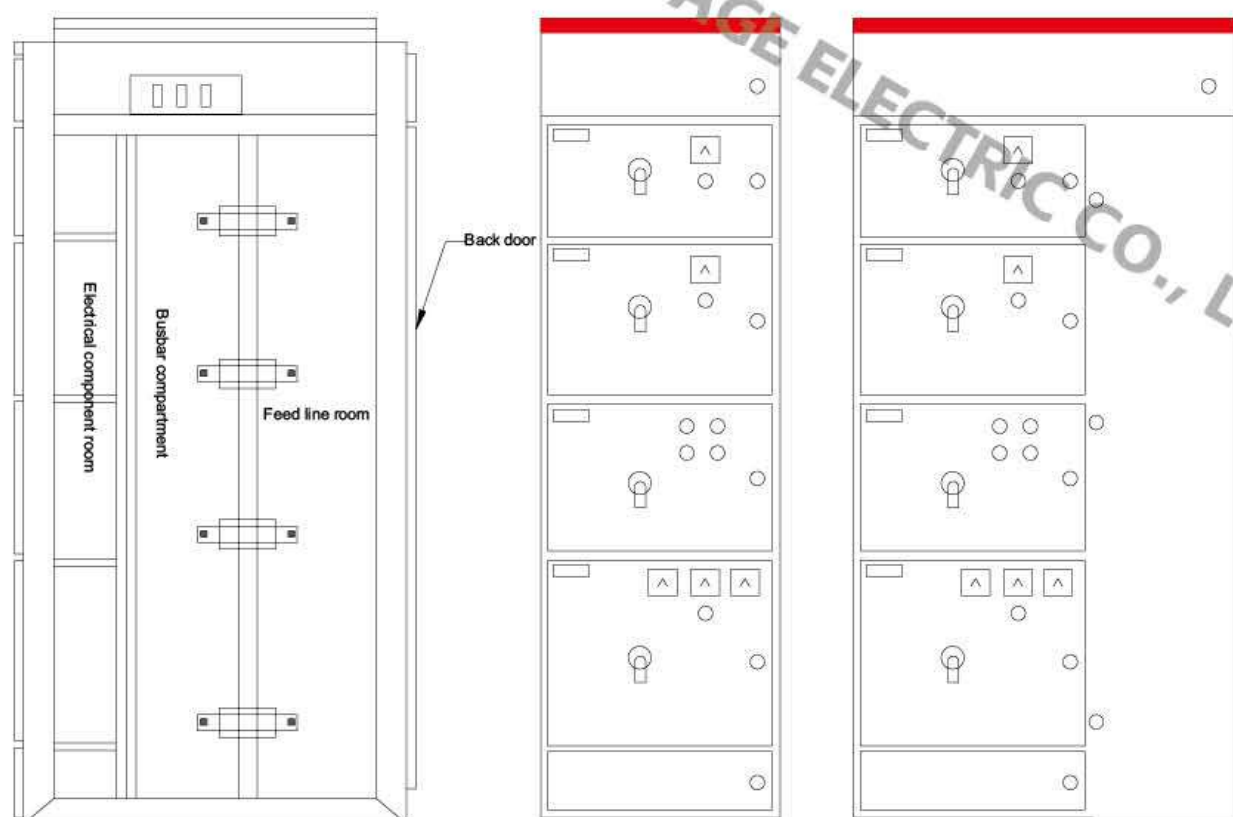
Test

- The type test has passed the complete set of test items: temperature test, dielectric strength, short-circuit strength, protection circuit continuity, functional unit interchangeability, functional unit mechanical life, interlocking mechanism life
- Electrical gap arc distance and interval distance, protection level, insulation busbar test.
- Factory test items: general inspection, mechanical and electrical operation test, dielectric strength test, protection circuit continuity check, functional unit interchangeability check.
- The GDF switchgear can only hang a certificate of conformity after passing the factory test.

Package

- According to the layout provided by the demand side, it is generally packaged as a single unit.
- All goods are packaged using national or professional standard protection measures, making the packaging suitable for long-distance transportation, moisture-proof, shockproof, rust proof, and ensuring the safe and undamaged delivery of goods to the site.
- Both the front and back sides of the packaging box are marked with the equipment name, model, specifications, weight, project number, drawing number, origin, destination, recipient, and other information for users to easily locate.
- The lifting points of the packaging box are clearly marked.
- Our company sends personnel to participate in the unpacking inspection to ensure that the quantity of equipment matches the packing list.
- The packaging box can only be unpacked after it is transported to the installation site of the switchgear, ensuring that the appearance of the switchgear is intact.

Product Structure Diagram



GGD
AC low voltage distribution cabinet



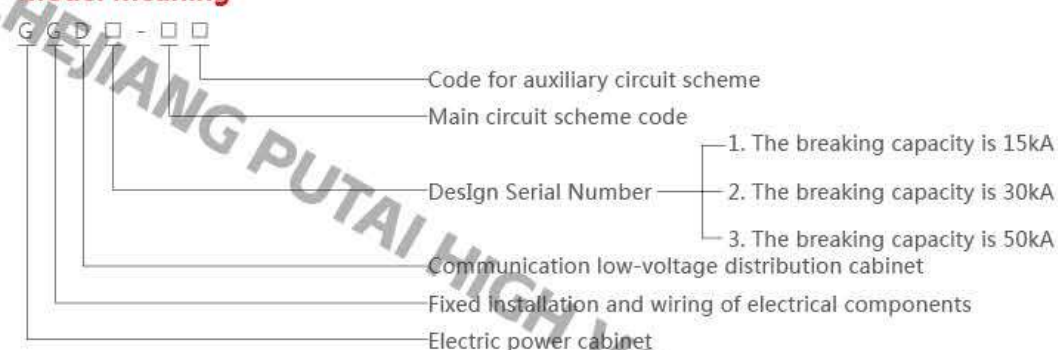
Overview

The GGD type AC low-voltage distribution cabinet is suitable for AC 50Hz, rated working voltage of 380V, and rated working current up to 3150A distribution systems for power plants, substations, factories, mines, and other power users. It is used for power conversion, distribution, and control of electrical energy for power, lighting, and distribution equipment.

The GGD type AC low-voltage distribution cabinet is a new type of low-voltage distribution cabinet designed based on the requirements of the competent authorities of the Ministry of Energy, power users, and design departments, in accordance with the principles of safety, economy, rationality, and reliability. The product has the characteristics of high breaking capacity, good dynamic and thermal stability, flexible electrical scheme, convenient combination, series, strong practicality, novel structure, and protection level. It can be used as a replacement product for low-voltage switchgear.

The GGD type AC low-voltage distribution cabinet complies with standards such as IEC 439 "Low voltage switchgear and control equipment" and GB 7251 "Low voltage switchgear".

Model Meaning



Environmental conditions for use

- The ambient air temperature shall not exceed +40 °C, not be lower than -5 °C, and the average temperature within 24 hours shall not exceed +35 °C;
- For indoor installation and use, the altitude of the usage location shall not exceed 2000m;
- The relative humidity of the surrounding air should not exceed 50% at a maximum temperature of +40 °C, and larger relative temperatures should be allowed at lower temperatures (such as 90% at +20 °C), taking into account the temperature;
- The change in degree may occasionally produce condensation effects;
- The inclination angle between the equipment and the vertical plane during installation shall not exceed 5 °;
- The equipment should be installed in places without severe vibration and impact, as well as in places where electrical components are not susceptible to corrosion;
- When users have special requirements, they can negotiate with the manufacturer to resolve them.

Electrical performance

Basic electrical parameters						
Model	Rated voltage (V)	Rated current (A)		Rated short-circuit breaking current (KA)	Rated short-time withstand current (1s) (kA)	Rated peak withstand current (kA)
GGD1	380	A	1000	15	15	30
		B	630(630)			
		C	400			
GGD2	380	A	1500(1600)	30	30	63
		B	1000			
		C	600			
GGD3	380	A	3150	50	50	105
		B	2500			
		C	2000			

Overview

♦ Main circuit scheme

The main circuit design of GGD cabinet includes 129 schemes and a total of 298 specifications (excluding schemes and specifications derived from functional changes of auxiliary circuits and changes in control voltage).

Among them: 49 schemes and 123 specifications of GGD1 type

GGD2 model with 53 schemes and 107 specifications

GGD3 model with 27 schemes and 68 specifications

The main circuit scheme was selected based on the opinions of the design and usage departments, and additional schemes were added to meet the needs of the power plant. Rated current up to 3150A, suitable for distribution transformers with 2000kVA and below. In addition, GGJ1 and GGJ2 capacitor compensation cabinets were designed to meet the needs of reactive power compensation, with 4 main circuit schemes and a total of 12 specifications.

♦ Auxiliary circuit scheme

The design of auxiliary circuit is divided into two parts: power supply scheme and power plant scheme. There is enough space in GGD cabinet to install secondary components. At the same time, a special LMZ3D current transformer has been developed to meet the needs of power plants and special users when attaching relay protection.

♦ Main busbar

Considering the price ratio and the feasibility of replacing copper with aluminum, single aluminum busbar can be used when the rated current is 1500A or below, and double copper busbar can be used when the rated current is greater than 1500A. The manufacturer shall manufacture a prototype according to this regulation and pass the type test. Of course, the manufacturer can also replace the aluminum busbar with copper busbar of the same current carrying capacity according to the user's requirements. The overlapping surfaces of the busbar are treated with tin coating technology.

♦ Selection of electrical components

GGD cabinets mainly use advanced electrical components that can be mass-produced domestically. At the same time, based on the principles of economy and rationality, some available old products such as DZ10D and DZ20 are retained while fully considering feasibility, and obsolete products are not selected.

The HD13BX and HS13BX rotary operated knife switches are specialized components designed to meet the unique structural needs of GGD cabinets. They change the operating mode of the mechanism and retain the advantages of old products, making them a practical new type of electrical component.

When the design department selects new electrical components with better performance and more advanced technology according to user needs, the GGD cabinet has good installation flexibility and generally does not cause manufacturing and installation difficulties due to updating electrical components.

To further improve the dynamic stability of the main circuit, a ZMJ type combined busbar clamp and insulation support for GGD cabinet were designed. The busbar clamp is made of high-strength and high flame retardant PPO alloy material thermoplastic molding, with high insulation strength, good self extinguishing performance, and unique structure. It can be easily combined into a single busbar clamp or a double busbar clamp by adjusting the block type spacer. The insulation support is a sleeve type molded structure with low cost and high strength, which solves the problem of insufficient creepage distance in old products.

Structural characteristics

The cabinet body of GGD type AC low-voltage distribution cabinet adopts the form of a universal cabinet, and the frame is assembled by local welding of 8MF cold-formed steel. The frame parts and special supporting parts are supplied by designated steel production factories to ensure the accuracy and quality of the cabinet body. The components of the universal cabinet are designed according to the modular principle and have 20 installation holes. The high universal coefficient enables factories to achieve pre production, shortening the production cycle and improving work efficiency.

The design of GGD cabinets fully considers the heat dissipation issues during cabinet operation. There are different numbers of heat dissipation slots on both ends of the cabinet. When the electrical components inside the cabinet heat up, the hot air rises and is discharged through the upper slot, while the cold air is continuously replenished into the cabinet through the lower slot, forming a natural ventilation channel from bottom to top in the sealed cabinet, achieving the purpose of heat dissipation.

According to the requirements of modern industrial product design, the GGD cabinet adopts the golden ratio method to design the cabinet body shape and the division dimensions of each part, making the whole cabinet beautiful and elegant, with a new look.

The cabinet door is connected to the frame with a pivot type movable hinge, which is easy to install and disassemble. The folded edge of the door is embedded with a mountain shaped rubber strip. When closing the door, the strip between the door and the frame has a certain compression stroke, which can prevent direct collision between the door and the cabinet, and also improve the protection level of the door.

The instrument door equipped with electrical components is connected to the frame with multiple strands of soft copper wire, and the installation parts inside the cabinet are connected to the frame with rolling screws, forming a complete grounding protection system for the entire cabinet.

The cabinet is coated with polyester orange baked paint, which has strong adhesion and good texture. The entire cabinet has a matte color tone, avoiding glare effects and creating a comfortable visual environment for the on duty personnel.

The top cover of the cabinet can be removed when needed to facilitate the assembly and adjustment of the main busbar on site. The four corners of the cabinet top are equipped with lifting rings for lifting and shipping.

The protection level of the cabinet is IP30, and users can also choose between IP20-IP40 according to the requirements of the usage environment.

Installment and use

After the product arrives at the receiving location, the packaging should first be checked for completeness and damage. If any problems are found, relevant departments should be notified in a timely manner to investigate the cause. For products that are not installed immediately, they should be placed in appropriate locations according to the regulations of normal usage conditions.

• Product installation

The installation of the product should be carried out according to the installation diagram (see Figure 2), and the foundation channel steel and bolts should be provided by the user. When installing the main busbar with tin plating, the overlapping surface should be repaired flat, cleaned, coated with neutral Vaseline or other measures, and then firmly bolted.

After installation, the product needs to undergo the following inspections and tests before being put into operation

1. Check whether the cabinet's topcoat has peeled off, whether the cabinet is dry and clean.
2. Whether the operating mechanism of electrical components is flexible, and there should be no jamming or excessive operating force.
3. Whether the on/off of the main and auxiliary contacts of the main electrical appliances is reliable and accurate.
4. Whether the instrument indication and the transformation ratio and polarity of the transformer are correct.
5. Whether the busbar connection is good, and whether the insulation support, installation parts, and accessories are installed firmly and reliably.
6. Whether the auxiliary contacts meet the requirements, whether the specifications of the fuse core of the fuse are correct, whether the setting value of the relay meets the design requirements, and whether the action is reliable and accurate.
7. Whether the contacts of the circuit meet the requirements of the electrical schematic.
8. Whether the protection circuit system meets the requirements.
9. Use a 500 volt megohmmeter to measure the insulation resistance value, which should not be less than 1M Ω .

• Precautions for use

1. This product is not installed against the wall, single-sided (front), double-sided door maintenance low-voltage distribution cabinet. The maintenance channel and cabinet door of the product must be entered or opened by qualified professionals for operation, inspection, and maintenance.
2. Air circuit breakers, after multiple cycles of closing and opening, may cause local burns to the main contacts and produce carbon as a substance, increasing the contact resistance. Regular maintenance and repair of air circuit breakers should be carried out according to their instructions.

Product completeness

Our company provides the following documents and attachments when supplying:

- Packing list
- Product Qualification Certificate
- User Manual
- Factory test report
- Regarding electrical drawings

The cabinet door key, operating handle, and spare parts specified in the contract.

Ordering Instructions

When placing an order, the user should provide:

- Main circuit distribution system diagram and layout plan, rated working voltage, rated working current, protection device setting current, and necessary technical parameters.
- Indicate the specifications of the incoming and outgoing cables.
- The model, specifications, and quantity of the main electrical components inside the switchgear.
- If a bus bridge or bus duct is required between switch cabinets or incoming cabinets, specific requirements such as span and ground height should be specified.
- When the switchgear is used in special environmental conditions, detailed instructions should be provided when ordering.
- Surface color and other specific requirements for switchgear.

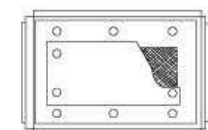
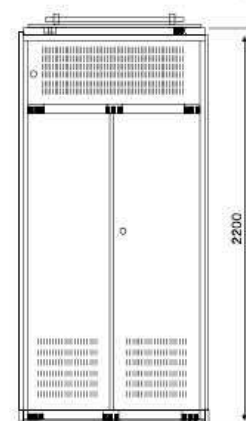
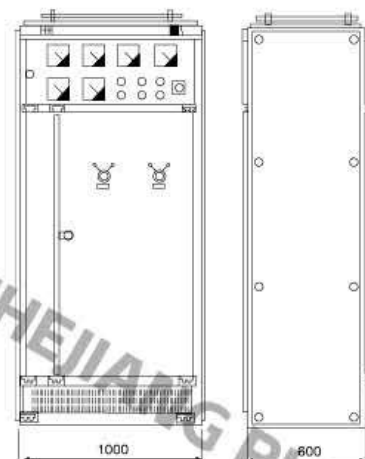


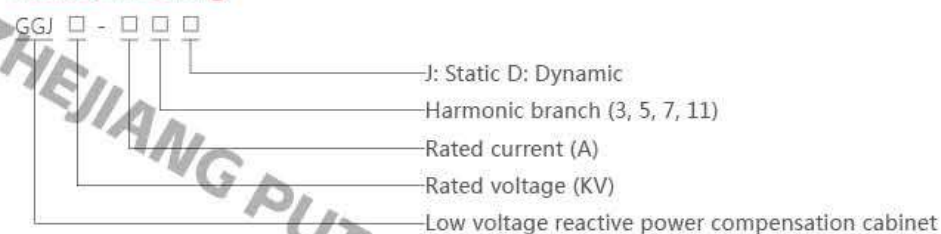
图1 外形示意图



Overview

The GGJ low-voltage reactive power compensation cabinet is specially designed for the actual situation of the power grid. It adopts intelligent control technology, which effectively solves the problem of automatic switching of parallel capacitors for reactive power compensation under harmonic conditions. On the other hand, it can filter out harmonics according to users' actual requirements, clean the power grid environment, reduce losses, and eliminate harmonic hazards; And provide capacitive reactive power to the system to improve power factor. Can be used in power distribution systems for industries such as electricity, metallurgy, petrochemicals, industrial and mining enterprises, construction, and machinery.

Model Meaning



Conditions of Use

- ◆ Poster height: 2000mm
- ◆ Environmental humidity: -25~50 °C
- ◆ Relative humidity: 90% at 20 °C
- ◆ The installation site is free of flammable and explosive materials, corrosive gases, and conductive dust.
- ◆ No severe vibrations or bumps, installation inclination not exceeding 5 degrees

Structure Introduction

- ◆ Voltage zero crossing switching compensation device, achieving no inrush current, no impact, and can frequently and quickly switch capacitors,
- ◆ Fast response speed, fast tracking of reactive power changes in system load, real-time dynamic or static response switching.
- ◆ Adopting automatic/manual switching device for capacitors, it can be operated frequently to improve compensation fineness.
- ◆ The top of the cabinet is equipped with a cooling fan, which is controlled by a temperature control switch to adjust the temperature inside the cabinet in a timely manner.
- ◆ Complete protection functions: including short circuit, overload, overvoltage, undervoltage, and phase loss protection, easy to set.

Technical Parameter

- ◆ Rated voltage: 400V, 660V, 1000V
- ◆ Rated frequency: 50Hz
- ◆ Rated capacity: 30-1000var
- ◆ Operating voltage range: 0.8-1.1 Un
- ◆ Capacitor wiring method: Y or Δ
- ◆ Measurement error: Voltage: ± 0.5%, Current: ± 1%, Reactive power: ± 1%
- ◆ Switching method: Automatic switching based on harmonic voltage or power factor
- ◆ Switching delay: adjustable from 0-999s

Calculation and determination of required capacitance for on-site compensation of electric motors

tanΦ1	Before compensation	To obtain the required COS Φ 2 per kilowatt load, the required kilovolt capacity of the capacitor is required										
	cosΦ1	cosΦ2 = 0.7	cosΦ2 = 0.75	cosΦ2 = 0.8	cosΦ2 = 0.82	cosΦ2 = 0.85	cosΦ2 = 0.87	cosΦ2 = 0.9	cosΦ2 = 0.92	cosΦ2 = 0.95	cosΦ2 = 0.97	cosΦ2 = 1.00
4.9	0.2	3.88	4.02	4.15	4.2	4.28	4.33	4.41	4.47	4.57	4.65	4.9
3.87	0.25	2.85	2.99	3.12	3.17	3.25	3.31	3.39	3.45	3.54	3.62	3.87
3.18	0.3	2.16	2.3	2.43	2.48	2.56	2.61	2.7	2.75	2.85	2.93	3.18
2.68	0.35	1.66	1.79	1.93	1.98	2.06	2.11	2.19	2.25	2.35	2.43	2.68
2.29	0.4	1.27	1.41	1.54	1.59	1.67	1.72	1.81	1.87	1.96	2.04	2.29
2.16	0.42	1.14	1.28	1.41	1.46	1.54	1.59	1.68	1.74	1.83	1.91	2.16
2.04	0.44	1.02	1.16	1.29	1.34	1.42	1.47	1.56	1.62	1.71	1.79	2.04
1.93	0.46	0.91	1.05	1.18	1.23	1.31	1.36	1.45	1.5	1.6	1.68	1.93
1.83	0.48	0.81	0.95	1.08	1.13	1.21	1.26	1.34	1.4	1.5	1.58	1.83
1.73	0.5	0.71	0.85	0.98	1.03	1.11	1.17	1.25	1.31	1.4	1.48	1.73
1.64	0.52	0.62	0.76	0.89	0.94	1.02	1.08	1.16	1.22	1.31	1.39	1.64
1.56	0.54	0.54	0.68	0.81	0.86	0.94	0.99	1.07	1.13	1.23	1.31	1.56
1.48	0.56	0.46	0.6	0.73	0.78	0.86	0.91	1	1.05	1.15	1.23	1.48
1.4	0.58	0.38	0.52	0.65	0.71	0.78	0.84	0.92	0.98	1.08	1.15	1.4
1.33	0.6	0.31	0.45	0.58	0.64	0.71	0.77	0.85	0.91	1	1.08	1.33
1.27	0.62	0.25	0.38	0.52	0.57	0.65	0.7	0.78	0.84	0.94	1.01	1.27
1.2	0.64	0.18	0.32	0.45	0.5	0.58	0.63	0.72	0.77	0.87	0.95	1.2
1.14	0.66	0.12	0.26	0.39	0.44	0.52	0.57	0.65	0.71	0.81	0.89	1.14
1.08	0.68	0.06	0.2	0.33	0.38	0.46	0.51	0.59	0.65	0.75	0.83	1.08
1.02	0.7		0.14	0.27	0.32	0.4	0.45	0.54	0.59	0.69	0.77	1.02
0.96	0.72		0.08	0.21	0.27	0.34	0.4	0.48	0.54	0.63	0.71	0.96
0.91	0.74		0.03	0.16	0.21	0.29	0.34	0.42	0.48	0.58	0.66	0.91
0.86	0.76			0.11	0.16	0.24	0.29	0.37	0.43	0.53	0.6	0.86
0.8	0.78			0.05	0.1	0.18	0.24	0.32	0.38	0.47	0.55	0.8
0.75	0.8				0.05	0.13	0.18	0.27	0.32	0.42	0.5	0.75
0.7	0.82					0.08	0.13	0.21	0.27	0.37	0.45	0.7
0.65	0.84					0.03	0.08	0.16	0.22	0.32	0.4	0.65
0.59	0.86						0.03	0.11	0.17	0.26	0.34	0.59
0.84	0.88							0.06	0.11	0.21	0.29	0.54
0.48	0.9								0.06	0.16	0.23	0.48
0.48	0.92									0.1	0.18	0.43
0.36	0.94									0.03	0.11	0.36
0.29	0.96										0.01	0.29
0.2	0.98											0.2

Common Configuration Table

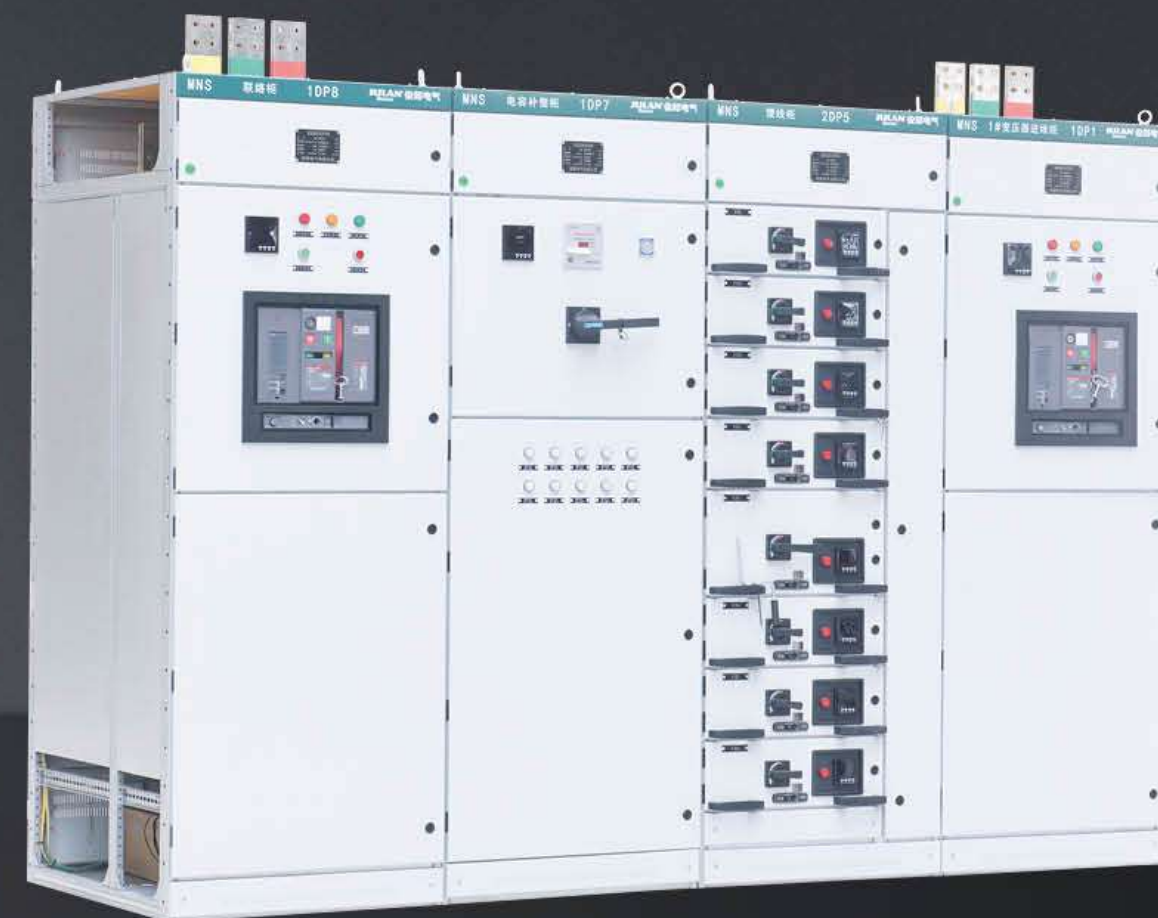
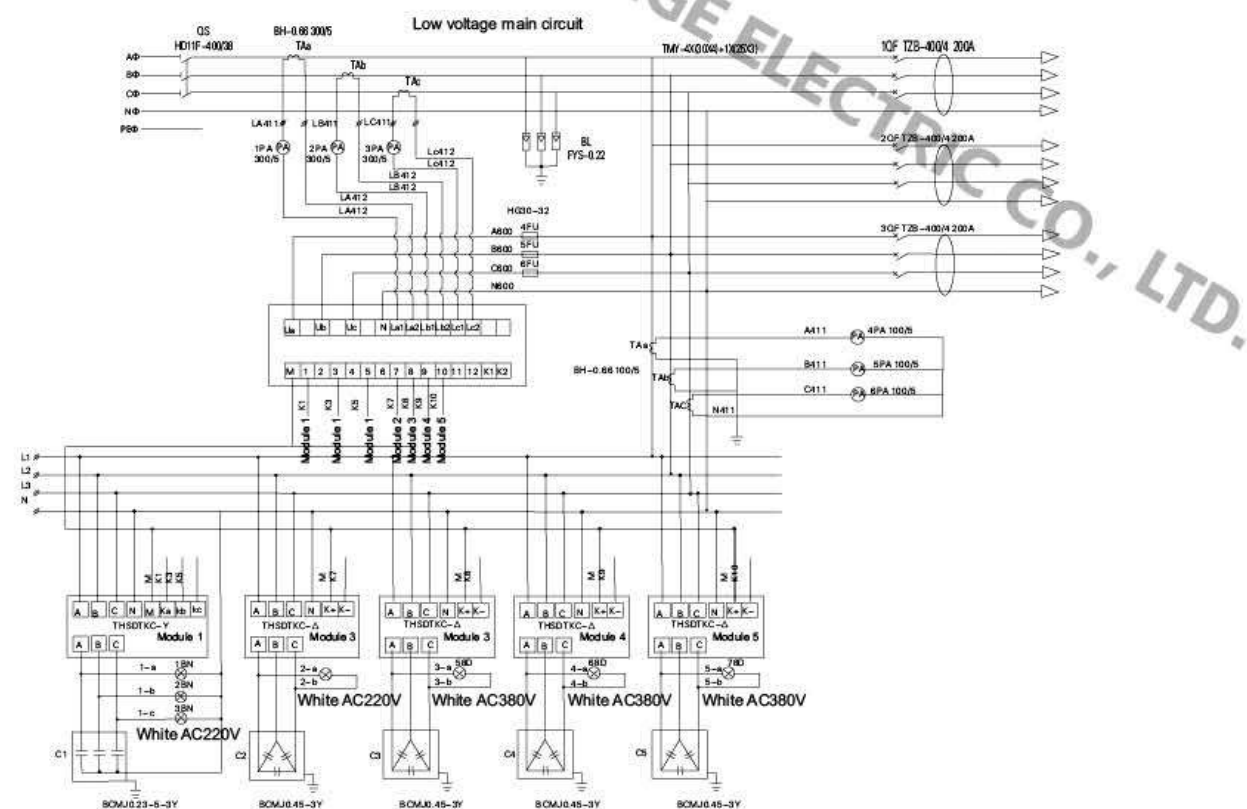
Option 1: Joint selection and matching

Capacitive con- tactor	Capacitor switching com- posite switch	Self-healing par- allel capacitor
CJ19-25	XXFK-Δ-16KVA	BSMJ0.4-1-3
CJ19-25	XXFK-Δ-16KVA	BSMJ0.4-2-3
CJ19-25	XXFK-Δ-16KVA	BSMJ0.4-3-3
CJ19-25	XXFK-Δ-16KVA	BSMJ0.4-5-3
CJ19-25	XXFK-Δ-16KVA	BSMJ0.4-6-3
CJ19-25	XXFK-Δ-16KVA	BSMJ0.4-7.5-3
CJ19-25	XXFK-Δ-16KVA	BSMJ0.4-8-3
CJ19-25	XXFK-Δ-16KVA	BSMJ0.4-10-3
CJ19-25	XXFK-Δ-16KVA	BSMJ0.4-12-3
CJ19-32	XXFK-Δ-16KVA	BSMJ0.4-14-3
CJ19-32	XXFK-Δ-16KVA	BSMJ0.4-15-3
CJ19-32	XXFK-Δ-16KVA	BSMJ0.4-16-3
CJ19-43	XXFK-Δ-20KVA	BSMJ0.4-18-3
CJ19-43	XXFK-Δ-20KVA	BSMJ0.4-20-3
CJ19-63	XXFK-Δ-30KVA	BSMJ0.4-25-3
CJ19-63	XXFK-Δ-30KVA	BSMJ0.4-30-3
CJ19-95		BSMJ0.4-40-3
CJ19-95		BSMJ0.4-50-3

Option 2: Additional Allocation and Matching

Capacitive con- tactor	Capacitor switching com- posite switch	Self-healing par- allel capacitor
CJ19-25	XXFK-Y-7.5KVAX3	BSMJ0.25-1-3Y
CJ19-25	XXFK-Y-7.5KVAX3	BSMJ0.25-2-3Y
CJ19-25	XXFK-Y-7.5KVAX3	BSMJ0.25-3-3Y
CJ19-25	XXFK-Y-7.5KVAX3	BSMJ0.25-4-3Y
CJ19-25	XXFK-Y-7.5KVAX3	BSMJ0.25-5-3Y
CJ19-25	XXFK-Y-7.5KVAX3	BSMJ0.25-6-3Y
CJ19-25	XXFK-Y-7.5KVAX3	BSMJ0.25-7-3Y
CJ19-25	XXFK-Y-10KVAX3	BSMJ0.25-8-3Y
CJ19-25	XXFK-Y-10KVAX3	BSMJ0.25-10-3Y
CJ19-25	XXFK-Y-12KVAX3	BSMJ0.25-12-3Y

Reference plan



MNS
Low-voltage withdrawable switchgear



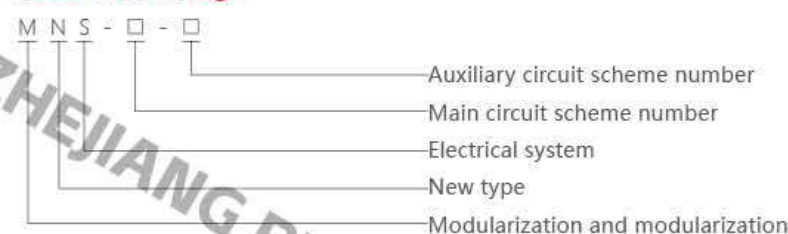
Overview

The MNS type low-voltage withdrawable switchgear (hereinafter referred to as the switchgear) is composed of standardized and integrated series modules, and the drawers have reliable mechanical interlocking devices, making it safer and more reliable for users to use.

This switchgear is suitable for three-phase five wire power supply systems with AC 50 (60) Hz, rated working voltage of 400V, 660V, rated current of 5000A and below. It can be used in power plants, substations, industrial and mining enterprises, buildings, hotels, airports, docks, and communication centers such as broadcasting and television to control power generation, transmission and distribution, energy conversion, and energy consumption equipment. The main busbar is compensated for reactive power through a capacitor compensation cabinet.

Compliant with national standards: GB7251.1 "Low voltage switchgear" IEC60439 "Low voltage switchgear and control equipment"

Model Meaning



Environmental conditions for use

- The ambient air temperature shall not exceed +40 °C, not be lower than -5 °C, and the average temperature within 24 hours shall not exceed +35 °C.
 - Atmospheric conditions: The air is clean, and the relative humidity does not exceed 50% at a maximum temperature of +40 °C. Higher relative humidity is allowed at lower temperatures, such as 90% at +20 °C, but
 - Temperature changes should be taken into account, as condensation may occur accidentally.
 - The altitude shall not exceed 2000m.
 - This device is suitable for transportation and storage at temperatures ranging from -25 °C to +55 °C, and can reach +70 °C in a short period of time (not exceeding 24 hours). It is installed at these extreme temperatures
 - The device should not suffer any irreparable damage and should be able to function normally under normal conditions.
- If the above usage conditions cannot be met, it should be resolved through negotiation between the user and the manufacturer.
- When this device is used on offshore oil drilling platforms and nuclear power plants, a separate technical agreement should be signed.

Main technical parameters

Serial Number	Project		GB7251.1-2005 Low Voltage Switchgear and Control Equipment (TTA) IEC60439 "Low Voltage Switchgear and Control Equipment"
1	Overvoltage category		IV III
2	Pollution degree		3
3	Rated working voltage (Ue) (V)		400/660
4	Rated insulation voltage (Ui) (V)		660/1000
5	Rated frequency (Hz)		50(60)
6	Horizontal busbar	Rated current	≤ 5000A
7		Rated short-time withstand current (Icw) (kA)	50,65,80 (Is effective value)
8		Rated peak withstand current (Ipk) (kA)	105140176 (maximum value of 0. Is)
9	Vertical busbar	Rated maximum working current	≤ 1000A
10		Rated short-time withstand current	50kA
11		Rated peak withstand current	105kA
12	Degrees of protection provided by enclosure		IP30 IP40 (Special instructions)

Installment and use

After the product arrives at the receiving location, the packaging should first be checked for completeness and damage. If any problems are found, the relevant departments of the contract should be notified in a timely manner to keep business records, jointly analyze the reasons, and handle the visa and aftermath.

For products that are not installed immediately, they should be placed in appropriate locations and properly stored according to normal usage conditions and temporary electrical equipment storage regulations.

- The installation of the product should be carried out according to the installation diagram 5. The basic channel steel and bolts used for bolt fixation shall be provided by the user. When connecting the main busbar, if there are surface issues due to transportation, storage, etc When it is uneven, it needs to be leveled before connecting and fastening.
- When the equipment is installed separately or in a row, its verticality, as well as the unevenness of the cabinet surface and the deviation of the gaps between cabinets, should comply with the provisions of Table 1.
- Inspection and testing of products before installation and operation.

- Check whether the cabinet surface paint or other covering materials (such as spray paint) are damaged, whether the cabinet is dry and clean, and whether the installation screws of each part are loose.
- Whether the operating mechanism of electrical components is flexible, and there should be no jamming or excessive operating force.
- Whether the on/off of the main electrical appliances is reliable and accurate.
- Drawers or pull-out mechanisms should be flexible, lightweight, and free from jamming and collision.
- The centerline of the moving and stationary contacts of drawers or pull-out structures should be consistent, and the contacts should be tightly in contact. The insertion depth of the main and auxiliary contacts should meet the requirements. Mechanical or electrical interlocking devices should operate Correct, both locking and unlocking should be reliable.
- Drawers with identical primary scheme, secondary principle, and drawer size should be easily interchangeable without any jamming or collision.
- When replacing the fuse core of the fuse, it should meet the requirements of the engineering design.
- The setting value of protection should be correctly adjusted according to the actual load.
- The insulation resistance value measured with a 1000V megohmmeter shall not be less than 10M Ω.
- The connection of each busbar should be good, and the insulation support, installation parts, and other accessories should be installed firmly and reliably.

Precautions for use

- The equipment is a low-voltage distribution cabinet that is not installed against the wall, operated from the front, and maintained on both sides. The maintenance channel and cabinet door of the cabinet must be entered or opened by qualified professionals for operation Inspection and maintenance.
 - After connecting the cables, the bottom of the switchgear should be sealed to prevent small animals from crawling into the cabinet and causing short circuit accidents.
 - Air circuit breakers and molded case circuit breakers, after multiple opening and closing, especially after short-circuit opening and closing, may cause local burns to the contacts and produce carbon based substances, increasing the contact resistance. Therefore, they should be disconnected according to the circuit breaker
- Perform maintenance and inspection on the user manual of the road device.
- After installation and maintenance, it is necessary to strictly check the isolation status between each compartment and functional unit to ensure good functional separation of the device and prevent the expansion of faults.

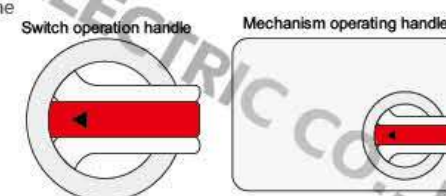
Operation of drawers

a. Operation of 8E/2 drawer and 8E/4 drawer

The 8E/2 and 8E/4 drawers of the MNS cabinet are equipped with dedicated operating mechanisms, which enable the opening, closing, and testing of switches within a 360 ° rotation range through the operating handle installed on the drawer panel Isolation and locking functions. The operating mechanism is also equipped with a micro switch for electrical locking.

- Working position: The main switch is closed, the main circuit and control circuit are both connected, and the functional unit is locked.
- Opening position: The main switch is opened, the control circuit is connected, and the functional unit is locked.
- Test position: The main switch is opened, the main circuit is disconnected, the control circuit is connected, and the functional unit is locked.
- Pull out position: Both the main circuit and control circuit are disconnected. The drawer can be pulled out or pushed in.
- Isolation position: Pull out the drawer by 30mm. Both the main and control circuits are isolated and disconnected, and the drawer is locked.
- After pressing the joystick inward, it can be turned from the "O" position to the "I" position.
- The operating handle can be padlocked at three positions: main switch opening, testing, and isolation. As a safety guarantee, up to three locks can be added.
- Working process: The drawer can only be pushed in and out when it is pulled out from position "↑↓". After the drawer is pushed in, the operating handle is rotated counterclockwise 45 ° to pull out the drawer by 30mm and reach the "↖↗" isolation position. After pulling out the drawer from position "↑↓", rotate the operating handle clockwise by 45 ° to reach the test position, and then rotate it clockwise by 45 ° to reach the "O" position of the main switch. Press the operating handle inward by 6mm and rotate it clockwise by 90 ° to close the switch. If you want to exit, operate in reverse order.

Function diagram of 8E, 16E, 24E operation switches



⬇ Working position: The mechanism is locked, and the main switch (isolating switch and molded case circuit breaker) can be operated (through the switch operating handle). After the main switch is opened, the mechanism operating handle can be turned to the test position.

⬆ Test position: The main switch is opened, the control circuit is connected, and the functional unit is locked.

⬆ Pull out position: The main switch is opened, and both the main circuit and control circuit are disconnected. The drawer can be pulled out or pushed in.

⬆ Isolation position: The component is pulled out 30mm, the main and secondary circuits are disconnected, and the mechanism is mechanically interlocked and locked.

Position of the switch operating handle:

Note: The switch operation handle can only be operated when the mechanism operation handle is in the "⬇" position and the mechanism releases the mechanical lock of the main switch. When the switch handle is in the closed position, the mechanism operation handle cannot be operated.

Working process: When the switch operating handle is in the "0" position, the mechanism operating handle is in the "⬆" position, and the drawer can be pulled out and pushed in. After the drawer is pushed in, turn the mechanism operating handle counterclockwise by 45°, pull out the drawer by 30mm, and reach the "⬆" isolation position. Push the drawer into the "⬆" extraction position and rotate the mechanism operating handle clockwise 45° to reach the "⬆" test position. Then rotate it clockwise 45° to reach the "⬇" working position. At this point, rotate the switch operating handle clockwise 90° to close the main switch. If you need to exit, do the opposite in sequence.

7.6 Unlocking device

There is a plastic small cover on the bottom right corner of the drawer panel of 8E and above, which is the unlocking mechanism of the door: when the drawer is in the "⬇" working position, if you want to open the door, first disconnect the switch, then pull out the small cover, and then insert a small screwdriver into the hole and move the lock buckle downwards to open the door. After closing the door, be sure to cover the plastic small cover, otherwise it will damage the original protection level.

Appearance and installation dimensions

The installation of MNS series switchgear is a non wall mounted vertical installation, with the cabinet's outgoing cable trench at the back. For ease of maintenance, the distance from the back to the wall is usually 800-1200mm, and the distance from the front for installation is shown in Figure 5.

Cabinet width (D)	Cabinet depth (W)	Cabinet height (H)
600, 800, 1000	800, 1000	2200

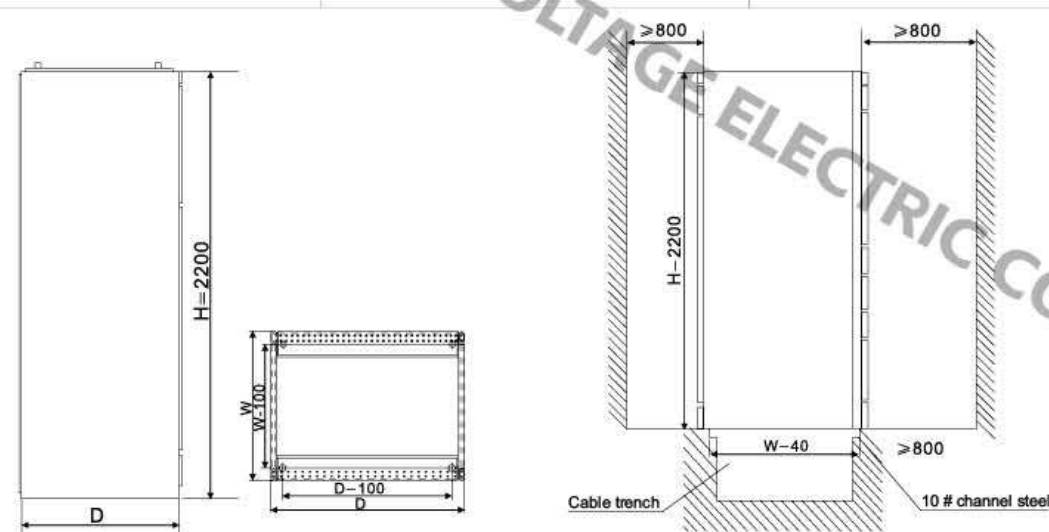


Figure 4 Schematic diagram of appearance

Figure 5 Installation Diagram

Factory data and attachments

The manufacturer shall provide the following documents and attachments when supplying

- Shipping List
- Product qualification certificate and factory test report
- User Manual
- Regarding electrical drawings
- Main component manual
- Cabinet door keys, operating handles, and spare parts specified in the contract.

Ordering Instructions

When placing an order, the user should provide:

- Main circuit distribution system diagram and layout plan, rated working voltage, rated working current, protection device setting current, and necessary technical parameters.
- Indicate the specifications of the incoming and outgoing cables.
- The model, specifications, and quantity of the main electrical components inside the switchgear.
- If a bus bridge or bus duct is required between switch cabinets or incoming cabinets, specific requirements such as span and ground height should be specified.
- When the switchgear is used in special environmental conditions, detailed instructions should be provided when ordering.
- Surface color and other specific requirements for switchgear.



GCK
Low-voltage withdrawable switchgear



Overview

GCK low-voltage withdrawable switchgear is suitable for use in power plants, metallurgy and steel rolling, petrochemicals, light industry and textiles, ports and terminals, buildings, hotels and other places as an AC three-phase four wire or five wire system, voltage 380V, 660V, frequency 50Hz, rated current 5000A and below power supply system for distribution and centralized control of electric motors.

GCK is an advanced low-voltage switchgear that has undergone comprehensive type testing and obtained CCC certification. It is assembled and designed to meet the following standards:

International standard IEC60439.1-1992 "Low voltage switchgear and control gear assemblies"

Model Meaning



Environmental conditions for use

- ♦ The ambient air temperature should not exceed +40 °C, not be lower than -5 °C, and the average temperature within 24 hours should not exceed +35 °C;
 - ♦ The relative temperature should not exceed 50% at a maximum temperature of +40 °C, and higher relative temperatures are allowed at lower temperatures, such as 90% at +20 °C;
 - ♦ Clean air, no corrosive or explosive gases, no conductive or insulating dust;
- In situations where there is no significant shaking or impact vibration, it should be installed vertically with an inclination of no more than 5 degrees;
- ♦ Altitude not exceeding 2000 meters;
 - ♦ The switchgear is suitable for transportation and storage at temperatures ranging from -25 °C to +55 °C, and within a short period of time (not exceeding 24 hours), it should not exceed +70 °C;
 - ♦ When users cannot meet the above conditions, they should negotiate with the manufacturer.

Main technical functions

- ♦ Rated insulation voltage 660V/1000V
- ♦ Rated working voltage 400V/660V
- ♦ Rated operating voltage of auxiliary circuit: AC 380V, 220V, DC 110V, 220V
- ♦ Rated current of busbar: 1000A, 1250A, 1600A, 2000A, 2500A, 3200A, 4000A, 5000A
- ♦ Rated short-time withstand current of busbar: 50kA, 80kA (effective value) for 1 second
- ♦ Rated peak withstand current of busbar: 105kA/0.1s, 140kA/0.1s, 176kA/0.1s
- ♦ Rated current of branch busbar: 630A, 1000A, 1250A, 1600A
- ♦ Rated short-time withstand current of branch busbar: 30kA, 50kA (effective value) for 1 second
- ♦ Rated peak withstand current of branch busbar: 63kA, 105kA/0.1s
- ♦ Shell protection level: IP30, IP40
- ♦ Busbar settings: three-phase four wire system, three-phase five wire system
- ♦ Operation mode: local, remote, automatic

Classification of switchgear

- ♦ Power receiving cabinet
- ♦ Busbar connection cabinet
- ♦ Feeding cabinet
- ♦ Motor control cabinet
- ♦ Power switching cabinet
- ♦ Power factor compensation cabinet

Structural characteristics

The basic cabinet frame of GCK is a combination assembly structure, and all structural components of the cabinet frame are galvanized, sprayed, and connected to each other by screws to form the basic cabinet frame. After adding doors, baffles, partitions, drawers, installation brackets, busbars, and electrical components as needed, they are assembled into a complete control center cabinet. The structure of this cabinet has the following characteristics:

♦ Cabinet rack

The cabinet frame is assembled using C-shaped profiles, and the cabinet frame parts and specialized matching parts are supplied by our company to ensure the accuracy and quality of the cabinet body.

- The molding dimensions, opening dimensions, and equipment spacing of the components are modularized (modulus E=20mm, the same below).
 - The internal structural components are treated with galvanizing.
 - The top cover of the cabinet is detachable, and the four corners of the cabinet top are equipped with lifting rings for lifting and shipping.
 - The cabinet rack is divided into three mutually isolated sections: busbar room, functional unit room, and cable room, which can prevent the spread of accidents.
- ### ♦ Functional unit (drawer section)
- The height module of the drawer unit is 200mm, divided into five size series: 1/2 unit, 1 unit, 1.5 unit, 2 unit, and 3 unit. The rated current of the unit circuit is 630A or below. (Outside)
As shown in the figure above.
 - Each MCC cabinet can accommodate up to 9 drawers with 1 unit or 18 drawers with 1/2 unit.
 - The operating mechanism is mechanically interlocked with the drawer, and the drawer cannot be pulled out when the main switch is in the closed position.
 - The operating mechanism of the drawer can be locked in the closed or open position with a padlock, allowing for safe maintenance of electrical equipment.
 - The back of the functional unit has a main circuit inlet and outlet plug and an auxiliary circuit secondary plug.
 - The functional unit compartments are separated by metal partitions.
 - The drawer unit adopts a rotating pushing mechanism with three position function, which is easy and reliable to operate.
 - The GCK drawer pushing mechanism adopts a spiral trajectory to move along the positioning piece, realizing the pushing and pulling out of the functional unit. During the pushing and pulling out process of the functional unit, it realizes three position display and mechanical operation
- Interlocking and equipped with micro switches, electrical interlocking can be performed at the test position.

Installment and use

After the product arrives at the receiving location, the packaging should first be inspected for completeness and damage. If any problems are found, the relevant departments of the contract should be notified in a timely manner to keep business records, jointly analyze the reasons, and handle the visa and aftermath.

For products that are not installed immediately, they should be placed in appropriate locations and properly stored according to normal usage conditions and temporary electrical equipment storage regulations.

- ♦ The installation of the product should be carried out according to the installation diagram. The basic channel steel and bolts used for bolt fixation shall be provided by the user. When connecting the main busbar, if the surface is uneven due to transportation, storage, or other reasons, it needs to be leveled before connecting and fastening.
- ♦ When the equipment is installed separately or in a row, its verticality, as well as the unevenness of the cabinet surface and the deviation of the gaps between cabinets, should comply with the provisions of Table 1.

Serial Number	Name		Allowable deviation (mm)
1	Verticality		3.3
2	Level	Top of adjacent cabinets	2
		Top of the cabinet in a row	5
3	Unevenness	Adjacent cabinet edges	1
		Beside the cabinet in a row	5
4	Cabinet seam		2

♦ Inspection and testing of products before installation and operation.

- Check whether the cabinet surface paint or other covering materials (such as spray paint) are damaged, whether the cabinet is dry and clean, and whether the installation screws of each part are loose.
- Whether the operating mechanism of electrical components is flexible, and there should be no jamming or excessive operating force.
- Whether the on/off of the main electrical appliances is reliable and accurate.
- Drawers or pull-out mechanisms should be flexible, lightweight, and free from jamming and collision.
- The centerline of the moving and stationary contacts of drawers or pull-out structures should be consistent, and the contacts should be tightly in contact. The insertion depth of the main and auxiliary contacts should meet the requirements. Mechanical or electrical interlocking devices should operate correctly and lock or release reliably.
- Drawers with identical primary scheme, secondary principle, and drawer size should be easily interchangeable without any jamming or collision.
- When replacing the fuse core of the fuse, it should meet the requirements of the engineering design.
- The setting value of protection should be correctly adjusted according to the actual load.
- The insulation resistance value measured with a 1000V megohmmeter shall not be less than 10M Ω.

J. The connection of each busbar should be good, and the insulation support, installation parts, and other accessories should be installed firmly and reliably.

◆ Precautions for use

a. The equipment is a low-voltage distribution cabinet that is not installed against the wall, operated from the front, and maintained on both sides. The maintenance channel and cabinet door of the cabinet must be entered or opened by qualified professionals for operation, inspection, and maintenance.

b. After connecting the cables, the bottom of the switchgear should be sealed to prevent small animals from crawling into the cabinet and causing short circuit accidents.

c. Air circuit breakers and molded case circuit breakers, after multiple opening and closing, especially after short-circuit opening and closing, may cause local burns and carbon substances to the contacts, increasing the contact resistance. Maintenance and repair should be carried out according to the instructions of the circuit breaker.

d. After installation and maintenance, it is necessary to strictly inspect the isolation status between each compartment and functional unit to ensure good functional separation of the device and prevent the expansion of faults.

◆ Operation of drawers

a. Operation of 1/2 unit drawer

The operating mechanism of this drawer consists of a rotating part, a pivot shaft, a lock buckle, etc., and has functions of opening and closing switches, testing, isolation, and locking. The operating mechanism is also equipped with a micro switch for electrical locking purposes.

Working position: The main switch is closed, the main circuit and control circuit are both connected, and the functional unit is locked.

Opening position: The main switch is opened, the control circuit is connected, and the functional unit is locked.

Test position: The main switch is opened, the main circuit is disconnected, the control circuit is connected, and the functional unit is locked.

Isolation position: Pull out the drawer by 30mm. Both the main and control circuits are isolated and disconnected, and the drawer is locked.

Pull out position: Both the main circuit and control circuit are disconnected, and the drawer can be pulled out freely.

After pressing down the joystick by 6mm, it can be turned from the (O) position to the (I) position.

Working process: The drawer can only be pushed in or pulled out when it is in the extraction position (↑↓). After rotating counterclockwise by 45°, the drawer can automatically reach the isolation position when pulled out (↖). Rotate clockwise 45° to reach the test position (↗). Rotate clockwise 45° again to reach the switch disconnect position (O). Press down the handle by 6mm and turn it clockwise by 90° to close the switch. If you need to exit, operate in reverse order.

If necessary, padlocks can be added to the main switch's opening, testing, and isolation positions on the operating handle as safety protection.

b. Operation of drawers for units 1 and above

Experiment: Open the main switch, disconnect the main circuit, connect the control circuit, and lock the functional unit.

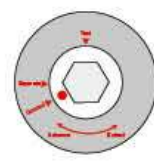
Separation: The main switch opens, the main circuit is disconnected, the control circuit is disconnected, and the drawer can be pulled out at will.

Connection: The main circuit plug-in and control circuit plug-in can be connected for opening and closing, and the functional unit can be locked.

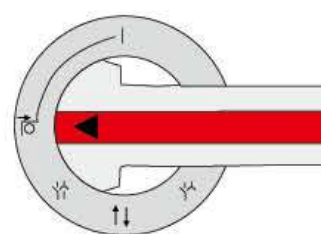
I: Circuit breaker closing; O: The circuit breaker opens.



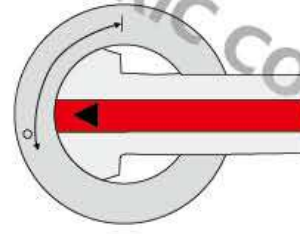
Hexagonal operating handle



JFW



Operation diagram of 1/2 unit drawer



Operating handle

Diagram of drawer operation for unit 1 and above

Operating instructions: Adjust the drawer pushing mechanism to the "separation" position, use the "hexagonal operating handle" to rotate clockwise to the "connection" position, rotate the operating handle clockwise by 90°, and close the circuit breaker; The opening operation sequence is opposite to the previous one.

Note: 1. The propulsion mechanism cannot close the circuit breaker when in the test position and separation position.

When the switch is in the closed position, the propulsion mechanism cannot be operated.

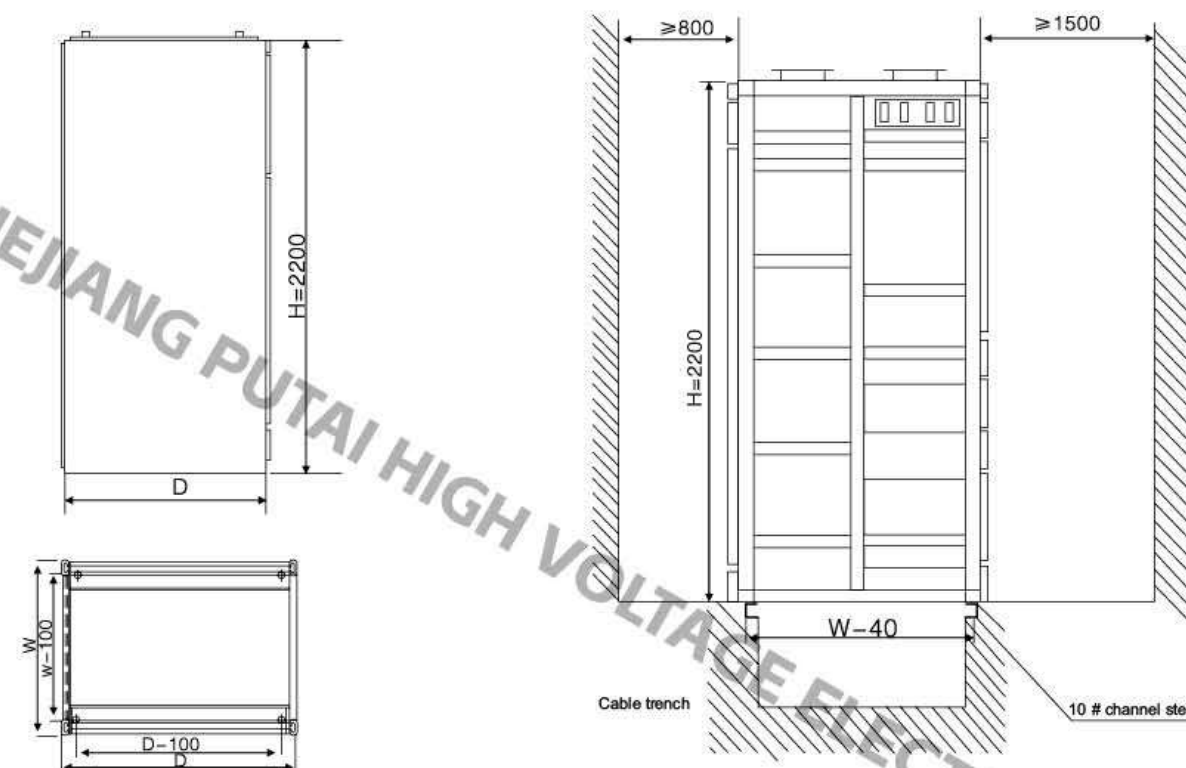
◆ Unlock the mechanism

There is a circular hole in the lower right corner of drawers 1 and above, which is the unlocking mechanism of the drawer door. When the drawer pushing mechanism is in the connecting position and the switch handle is in the "tTO" position, first pull out the small cover, insert a small screwdriver into the hole and move the lock buckle downwards to open the door. After closing the door, be sure to cover the plastic small cover, otherwise it will damage the original protection level.

Appearance and installation dimensions

The external dimensions are shown in the table below

The installation of GCK series switchgear is a non wall mounted vertical installation, with the cabinet's outgoing cable trench at the back. For ease of maintenance, the distance from the back to the wall is usually 800-1200mm, and the distance from the front for installation is shown in the following figure.



Cabinet width (D)	Cabinet depth (W)	Cabinet height (H)
600, 800, 1000	800, 1000	2200

Ordering Instructions

The order contract includes the following contents:

- ◆ The full range of product models includes the main circuit scheme number and the auxiliary circuit scheme number
- ◆ Main Circuit System Combination Sequence Diagram
- ◆ Electrical schematic diagram of auxiliary circuit
- ◆ List of components inside the cabinet
- ◆ Setting parameters such as voltage, current, and time in the circuit
- ◆ Other special requirements that do not comply with the normal use of the product



Low voltage switchgear series

PUTAI



GCS

Low-voltage withdrawable switchgear



Green energy



Intelligent power grid



Power grid system



Industrial electricity consumption



Rail Transit



Safe and reliable

GCS

Low-voltage withdrawable switchgear

PUTAI

Overview

GCS type low-voltage withdrawable switchgear is suitable for distribution systems in industries such as power plants, petroleum, chemical, metallurgical, textile, and high-rise buildings. In places with high automation levels such as large power plants and petrochemical systems that require computer interfaces, this low-voltage complete distribution device is used for power distribution, motor centralized control, and reactive power compensation in power generation and supply systems with three-phase AC frequency of 50 (60) Hz, rated operating voltage of 400V, 660V, and rated current of 5000A or below.

The design of the device complies with the following standards:

IEC439-1 "Low voltage switchgear and control equipment" Gb7251 "Low voltage switchgear"

Model Meaning



Environmental conditions for use

- ♦ The ambient air temperature shall not exceed +40 °C and shall not be lower than -5 °C. The average temperature within 24 hours shall not exceed +35 °C. Exceeding time. Need to operate with reduced capacity according to the actual situation;
- ♦ For indoor use, the altitude of the usage location shall not exceed 2000m;
- ♦ The relative humidity of the surrounding air should not exceed 50% at a maximum temperature of +40 °C, and larger relative humidity is allowed at lower temperatures, such as 90% at +20 °C. It should be considered that condensation may occur due to temperature changes;
- ♦ When installing the device, the inclination with respect to the vertical plane shall not exceed 5 °, and the entire cabinet row shall be relatively flat (in accordance with GBJ 232-82 standard);
- ♦ The device should be installed without severe vibration; Places where there is insufficient drainage or damage to electrical components to prevent undue corrosion;
- ♦ When users have special requirements, they can negotiate with the manufacturer to resolve them

Main technical parameters

Rated voltage of main circuit (V)		Communication 380 (400), (660)
Rated voltage of auxiliary circuit (V)		AC 220, 380 (400) DC 110, 220
Rated frequency (Hz)		50(60)
Rated insulation voltage (V)		660(1000)
Rated current (A)	Horizontal busbar	≤4000
	Vertical busbar (MCC)	1000
Rated short-time withstand current of busbar (kA, 1 s)		50,80
Rated peak withstand current of busbar (kA/0.1s)		105,176
Power frequency test voltage (V/1 min)	Main circuit	2500
	Auxiliary circuit	1760
A bus or bus bar	Three-phase four-wire system	A.B.C.PE.N
	Three-phase five-wire system	A.B.C.PE.N
Protection grade		IP30,IP40

♦ Main circuit scheme

The main circuit scheme of GCS cabinet consists of 3 sets of 118 specifications, excluding schemes and specifications derived from changes in control and protection of auxiliary circuits. Including the needs of power generation, supply, and other power users, the rated working current is 5000 A, suitable for selection of distribution transformers with 2500 kVA and below.

In addition, a capacitor compensation cabinet was designed to meet the needs of improving power factor for power supply and consumption, and a reactor cabinet was designed to meet the needs of comprehensive investment.

♦ Auxiliary circuit scheme

The GCS auxiliary circuit diagram book has a total of 120 auxiliary circuit schemes, divided into two volumes. The first volume of "AC Operation Part" has a total of 63 schemes, while the second volume of "DC Operation Part" has a total of 57 schemes.

The auxiliary circuit scheme for the DC operation part is mainly used for low-voltage plant (station) systems in power plant substations. Suitable for low-voltage plant systems, working (standby) power supply incoming lines, power supply feeders, and motor feeders of units with capacities of 200 MW and below and 300 MW and above.

The auxiliary solution for communication and operation is mainly used for the low-voltage system of substations in factories, mines, enterprises, and high-rise buildings. There are 6 combination schemes suitable for dual power operation control. And it is equipped with control circuits such as operation electrical interlocking backup white throw and self recovery, which can be directly used in engineering design.

A complete cabinet consisting of drawer units, with DC 220V or 110V for controlling power supply and AC 380V or 220V for controlling power supply. The 220V control power supply is sourced from the public control power supply provided by the dedicated control transformer in this cabinet. The public control power supply uses an ungrounded method to control the transformer, leaving a 24V power supply for use when weak current signal lights are required.

The installation location of the electricity meter, the method of introducing voltage signals, and other installation and usage requirements are detailed in the "Compilation Instructions" of the auxiliary circuit diagram.

♦ Main busbar

To improve the dynamic and thermal stability of the busbar and improve the temperature rise of the contact surface, all equipment adopts T M Y-T 2 series hard copper bars. The copper bars are made of full-length tin plated or full-length silver plated copper busbars can be selected.

a. The horizontal busbar and vertical busbar are installed in the busbar isolation room inside the cabinet.

b. The neutral grounding busbar adopts hard copper bars. Connect the horizontal neutral grounding wire (P E N) or the grounding+neutral wire (P E+N).

♦ Selection of electrical components

GCS cabinet mainly adopts electrical components with advanced technology and high performance stability index value, which can be mass produced domestically with imported technology.

a. Main switch

For power supply incoming and feeder switches of 630 A and above, the DW45 series is the main choice, and DW48 series, A E series, 3 W E or M E series can also be selected. If necessary, imported M series or F series can also be selected.

b. For feeders and motor control switches below 630A, plastic shell switches such as TG series, CM1 series, N M series, CDM series, TG30 series, etc. are mainly selected.

f. In order to improve the dynamic stability of the main circuit, GCS series dedicated combination busbar clamps and insulation supports have been designed, which are made of high-strength and flame-retardant synthetic materials thermoplastic molding, with high insulation strength, good self extinguishing performance, and unique structure.

g. To reduce the temperature rise of the partition board, connectors, and cable heads of the functional units, GCS cabinet specific adapters have been designed with large capacity and reduced temperature rise.

h. When the design department selects new electrical components with better performance and more advanced technology according to user needs, the GCS series cabinet has good universality and will not cause manufacturing and installation difficulties due to updating electrical components.

Size	2200			
Tall				
Wide	400	600	800	1000
Deep	800、1000	800、1000	600、800、1000	600、800、1000

Serial Number	Name		Allowable deviation (mm)
1	verticality		3.3
2	Level	Top of adjacent cabinets	2
		Top of the cabinet in a row	5
3	Unevenness	Adjacent cabinet edges	1
		Beside the cabinet in a row	5
4	Cabinet seam		2

Installment and use

After the product arrives at the receiving location, the packaging should first be checked for completeness and damage. If any problems are found, the relevant departments of the contract should be notified in a timely manner to keep business records, jointly analyze the reasons, and handle the visa and aftermath.

For products that are not installed immediately, they should be placed in appropriate locations and properly stored according to normal usage conditions and temporary electrical equipment storage regulations.

♦ The installation of the product should be carried out according to the installation diagram (see Figure 1 and Table 4). The basic channel steel and bolts used for bolt fixation shall be provided by the user. When connecting the main busbar, if the surface is uneven due to transportation, storage, or other reasons, it needs to be leveled before connecting and fastening.

♦ When the equipment is installed separately or in a row, its verticality, as well as the unevenness of the cabinet surface and the deviation of the gaps between cabinets, should comply with the provisions of Table 3.

♦ Inspection and testing before product installation and operation

a. Check whether the cabinet surface paint or other covering materials (such as spray paint) are damaged, and whether the cabinet is dry and clean.

b. Whether the operating mechanism of electrical components is flexible, and there should be no jamming or excessive operating force.

c. Whether the on/off of the main electrical appliances is reliable and accurate.

d. Drawers or pull-out mechanisms should be flexible, lightweight, and free from jamming and collision.

e. The centerline of the moving and stationary contacts of drawers or pull-out structures should be consistent, and the contacts should be tightly in contact. The insertion depth of the main and auxiliary contacts should meet the requirements. Mechanical or electrical interlocking devices should operate correctly and lock or release reliably.

f. Drawers with identical primary scheme, secondary principle, and drawer size should be easily interchangeable without any jamming or collision.

h. When replacing the fuse core of the fuse, it should meet the requirements of the engineering design.

i. The setting value of protection should be correctly adjusted according to the actual load.

j. The insulation resistance value measured with a 1000V megohmmeter shall not be less than 10M Ω.

k. The connection of each busbar should be good, and the insulation support, installation parts, and other accessories should be installed firmly and reliably.

6.4 Precautions for use

a. The equipment is a low-voltage distribution cabinet that is not installed against the wall, operated from the front, and maintained on both sides. The maintenance channel and cabinet door of the cabinet must be entered or opened by qualified professionals for operation, inspection, and maintenance.

b. Air circuit breakers and molded case circuit breakers, after multiple opening and closing, especially after short-circuit opening and closing, may cause local burns and carbon substances to the contacts, increasing the contact resistance. Maintenance and repair should be carried out according to the instructions of the circuit breaker.

C. After installation and maintenance, it is necessary to strictly inspect the isolation status between each compartment and functional unit to ensure good functional separation of the device and prevent the expansion of faults.

♦ Operation of drawers

a. Operation of 1/2 drawer

The operating mechanism of this drawer consists of a rotating part, a pivot shaft, a lock buckle, etc., and has functions of opening and closing switches, testing, isolation, and locking. The operating mechanism is also equipped with a micro switch for electrical locking.

Working position: The main switch is closed, the main circuit and control circuit are both connected, and the functional unit is locked.

Opening position: The main switch is opened, the control circuit is connected, and the functional unit is locked.

Test position: The main switch is opened, the main circuit is disconnected, the control circuit is connected, and the functional unit is locked.

Isolation position: Pull out the drawer by 30mm. Both the main and control circuits are isolated and disconnected, and the drawer is locked.

Pull out position: Both the main circuit and control circuit are disconnected, and the drawer can be pulled out freely.

Press the operating handle inward by 6mm before turning from position (O) to position (I).

Working process: The drawer can only be pushed in or pulled out when it is in the extraction position (↑↓). After rotating counterclockwise by 45°, the drawer can automatically reach the isolation position when pulled out (↖↗). Rotate clockwise 45° to reach the test position (↖↗).

Rotate clockwise 45° again to reach the switch disconnect position (O). Press the handle inward by 6mm and turn it clockwise by 90° to close the switch. If you want to exit, operate in reverse order.

If necessary, padlocks can be added to the main switch's opening, testing, and isolation positions on the operating handle as safety protection.

b. Operation of drawers for units 1 and above

The operating mechanism of this drawer consists of a rotating shaft, cylindrical cam, clutch gear plate, shaft pin compression spring, shift fork, etc. By operating the handle to rotate the cylindrical cam, the drawer can be inserted and pulled, and it also has the functions of opening, closing, testing, isolation, and locking the switch.

Working position: The main switch is closed, the main circuit and control circuit are both connected, and the functional unit is locked.

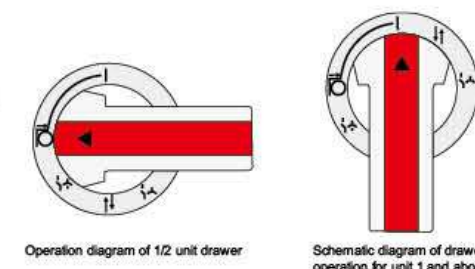
Opening position: The main switch is opened, the control circuit is connected, and the functional unit is determined.

Test position: The main switch is opened, the main circuit is disconnected, the control circuit is connected, and the functional unit is locked.

Isolation position: Pull out the drawer by 30mm. Both the main and control circuits are isolated and disconnected, and the drawer is locked.

Pull out position: Both the main circuit and control circuit are disconnected, and the drawer can be pulled out freely.

Press the joystick inward by 9mm before turning from the (O) position to the (I) position.



Operation diagram of 1/2 unit drawer

Schematic diagram of drawer operation for unit 1 and above

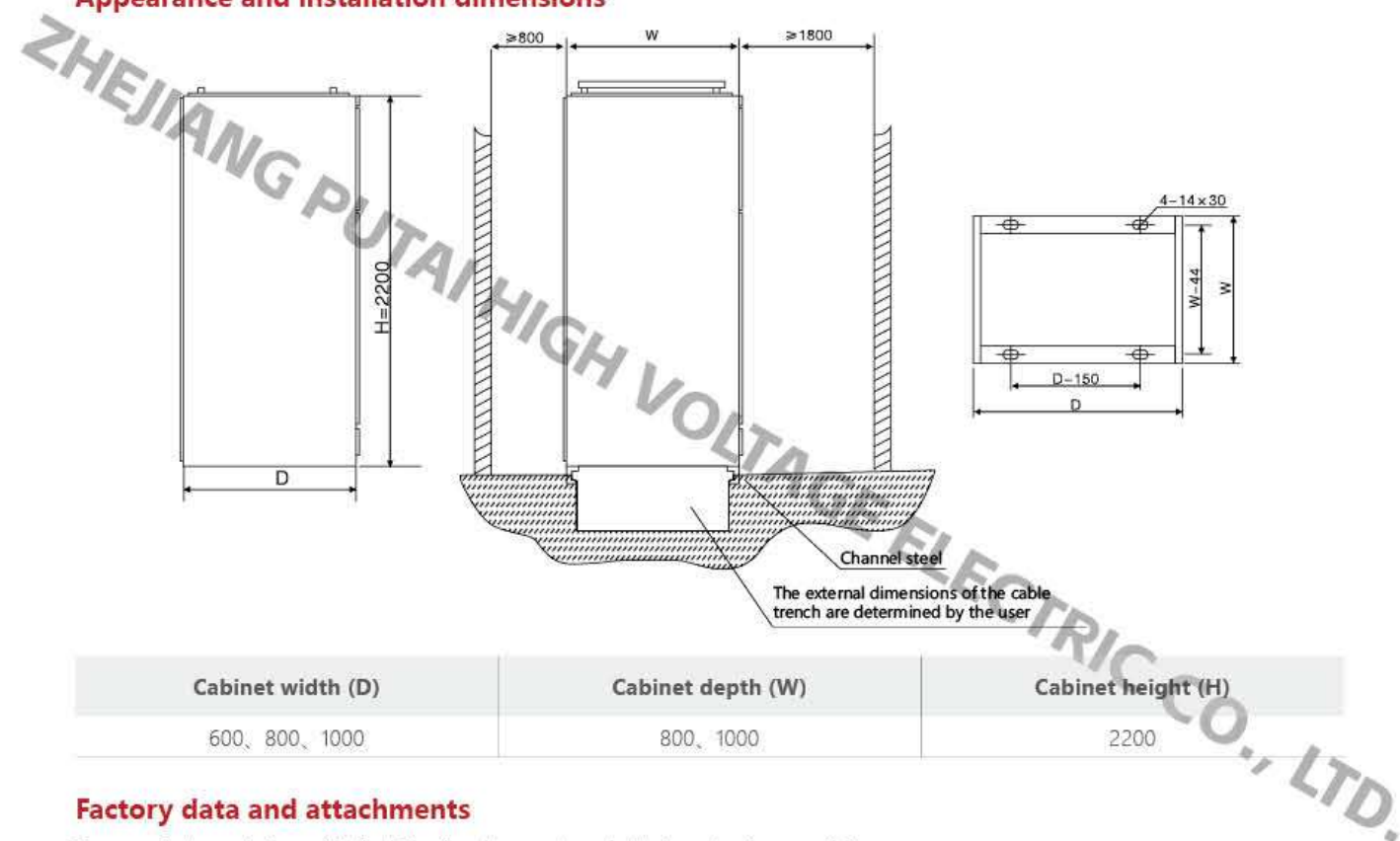
Working process: When the drawer is in the extraction position (↑↓), it can only be rotated in or out. Rotate the operating handle clockwise by 30° to reach the isolation position (↖↗), then clockwise by 180° to reach the test position (↙↘), and continue to rotate clockwise by 30° to reach the switch disconnection position (○). Press the handle inward by 9mm and rotate clockwise by 90° to close the main switch. If you need to exit, operate in reverse order.

If necessary, padlocks can be added to the main switch' s opening, testing, and isolation positions on the operating handle as safety protection.

• Unlock the mechanism

There is a red plastic button in the lower right corner of drawers 1 and above, which is the unlocking mechanism. When the operating mechanism malfunctions, needs maintenance, or needs to be opened, press the red plastic button down to open the door when the operating handle is in the "○" position.

Appearance and installation dimensions



Factory data and attachments

The manufacturer shall provide the following documents and attachments when supplying

- Shipping List
- Product qualification certificate and factory test report
- User Manual
- Regarding electrical drawings
- Main component manual
- Cabinet door keys, operating handles, and spare parts specified in the contract.

Ordering Instructions

When placing an order, the user should provide:

- Main circuit distribution system diagram and layout plan, rated working voltage, rated working current, protection device setting current, and necessary technical parameters.
- Indicate the specifications of the incoming and outgoing cables.
- The model, specifications, and quantity of the main electrical components inside the switchgear.
- If a bus bridge or bus duct is required between switch cabinets or incoming cabinets, specific requirements such as span and ground height should be specified.
- When the switchgear is used in special environmental conditions, detailed instructions should be provided when ordering.
- Surface color and other specific requirements for switchgear.



XL-21
Power distribution cabinet



Overview

XL-21 power distribution cabinet is used for power or lighting distribution in power plants and industrial and mining enterprises, in three-phase AC below 500V, three-phase three wire, three-phase four wire, three-phase five wire and other distribution systems. It is installed against the wall indoors, operated in front of the screen, and maintained in front of the screen; The box is a fully enclosed structure, assembled from C or 8MF profiles. The box adopts a new type of rotary load isolation switch, which can be operated with load. The front door is equipped with voltage and current indicator instruments, as well as main control components such as signal lights, buttons, and conversion switches. This distribution box adopts newly designed components, which are compact in structure, aesthetically pleasing in appearance, and easy to maintain. Multiple wiring schemes are available for users to choose from.

Model Meaning



Environmental conditions for use

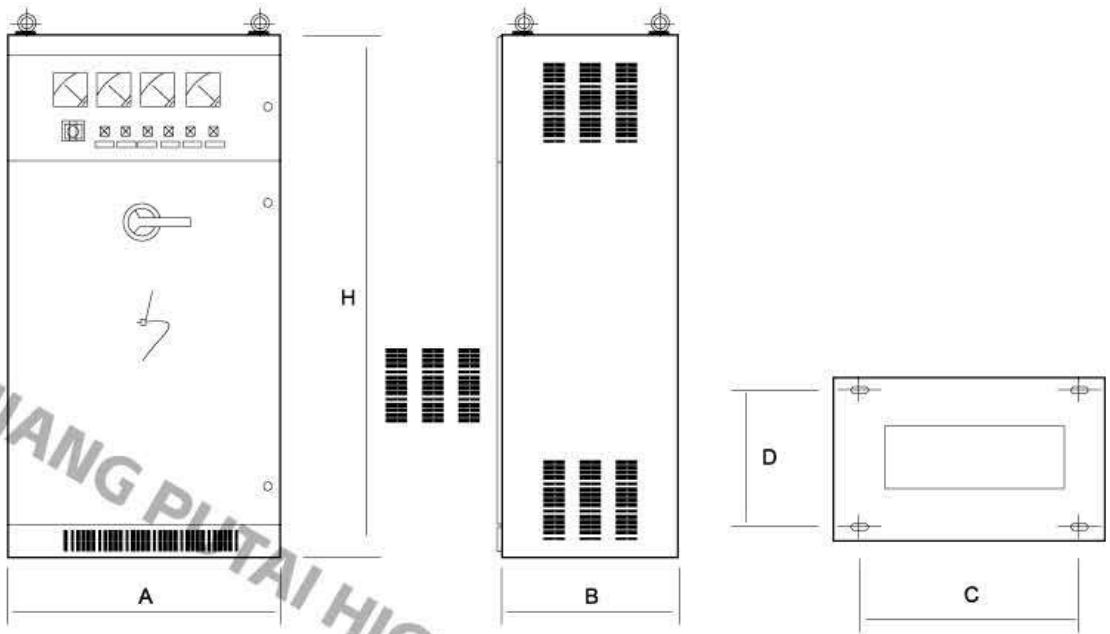
- Environmental temperature: -5 °C~+40 °C, and the average temperature within 24 hours does not exceed +35 °C.
- Altitude: not exceeding 2000m.
- Relative humidity: not exceeding 50% when the ambient air temperature is +40 °C; At lower temperatures, there can be higher relative humidity (e.g. 90% at +20 °C), allowing for moderate condensation due to temperature changes.
- The inclination angle between the equipment and the vertical plane during installation should not exceed 5 °.
- The equipment should be installed in a place without severe vibration, impact, and corrosion.

Note: If the above conditions are exceeded, you can negotiate with our company.

Technical Parameter

Name	Unit	Data
Rated voltage of main circuit	V	AC:380
Rated voltage of auxiliary circuit	V	AC:220,380
Rated frequency	Hz	50
Rated insulation voltage	V	660
Rated current	A	≤800A

Box shape and installation dimensions



Outline and Installation Dimensional Drawing of XL-21 Power Distribution Cabinet

A	B	C	D	H
800 (600) optional	500 (400) optional	650(450)	450(350)	1800 (1600) optional

Ordering Instructions

- All product models (including main circuit scheme number and auxiliary circuit scheme number).
- Main circuit system diagram, cabinet layout plan.
- Electrical schematic diagram of auxiliary circuit.
- List of components inside the cabinet (specifications of the main busbar).
- Cabinet color, (if not required, supply in light camel gray) box size.
- Other special requirements that do not meet the normal usage conditions of the product.



PUTAI

Low voltage switchgear series



JP

Integrated distribution box



Green energy



Intelligent power grid



Power grid system



Industrial electricity consumption



Rail Transit



Safe and reliable

JP

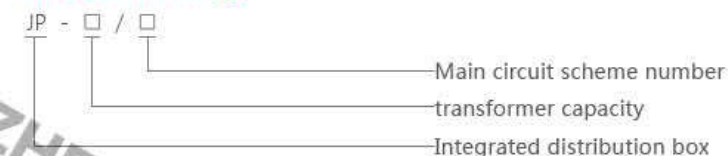
Integrated distribution box

PUTAI

Overview

JP comprehensive distribution box is an outdoor comprehensive distribution device that integrates multiple functions such as metering, outgoing lines, and reactive power compensation; Integrate protection functions such as short circuit, overload, overvoltage, and leakage; Small in size, beautiful in appearance, economical and practical, installed on the transformer pole of the household supplement column, it is a new generation ideal distribution product for urban and rural power grid renovation.

Model Meaning



Environmental conditions for use

- Environmental temperature: -25°C - $+40^{\circ}\text{C}$;
- Relative air temperature: daily average not exceeding 90%, monthly average not exceeding 90%;
- Altitude: not exceeding 1000m;
- Installed in a place without severe vibration and impact, and without corrosive gases.

Note: If the above conditions are exceeded, you can negotiate with our company.

Structural characteristics

The box structure is separate and horizontal, and the outer shell is made of 2mm high-quality stainless steel plate bent through multiple folding processes (or made of honeycomb structured stainless steel double layered composite plate, which has flame retardant, environmental protection, thermal insulation, anti condensation and other properties). Special stainless steel welding technology is used, and the overall strength of the box is high after forming, with a smooth surface like a mirror and no weld marks left; The internal installation beams (plates) are treated with hot-dip galvanizing technology to ensure that they will not rust for twenty years; The front and rear doors of the box are easy for users to operate and maintain. The doors are surrounded by high elasticity and anti-aging sealing strips, and each door is equipped with two types of locks: light and dark. The exposed lock is equipped with an anti blocking and anti rust rain cover; Measurement room fully enclosed with lead sealing device; The side of the box is equipped with a rainproof and foreign object proof inlet cable conduit, with ventilation holes and cable outlet holes punched at the bottom, and ventilation ducts and wire mesh at the top. It has the functions of waterproofing, rust prevention, dust prevention, and foreign object prevention, with a protection level of IP54.

Main technical parameters

Serial Number	Name	Unit	Parameter
1	Transformer capacity	kVA	30-400
2	Rated operational voltage	V	AC400
3	Auxiliary circuit operating voltage	V	AC220, AC380
4	Rated frequency	Hz	50
5	Rated current	A	≤ 630
6	Rated landing point action current	A	30-300 adjustable
7	Protection grade		IP44

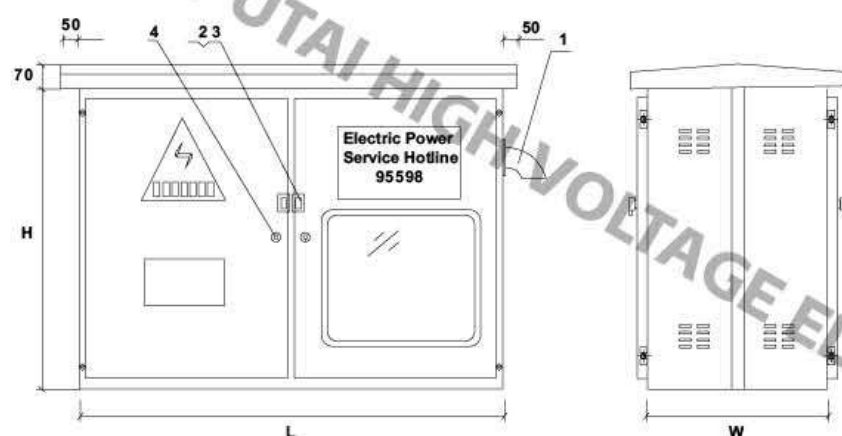
Main circuit scheme diagram

Note: For knife switches or knife melting switches, models can be selected from HD11 F, HR5, HR6 and other series;

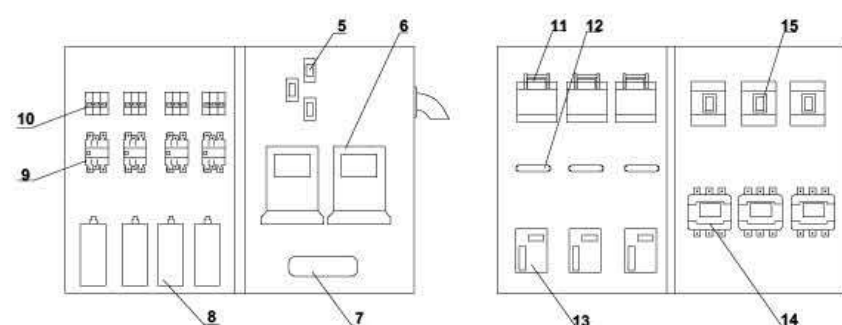
- For fuses, models can be selected from series such as DZ20, CM1, NS, C45, DZ47, etc;
- For AC contactors, models can be selected from CJ20, B series, CJX2, CJ19 (switching electric melting) and other series;
- For zero sequence transformer leakage relay, models can be selected from JD, LLJ and other series;
- Current transformer, models available include LMZ1-0.5, LMK-0.66 and other series;
- For lightning arresters, models such as FYS and Y3W can be selected;
- For electric melters, models such as BSMJ and BCMJ can be selected;
- For automatic compensation controllers, models such as JKL and JKG can be selected;

Schematic diagram of box structure

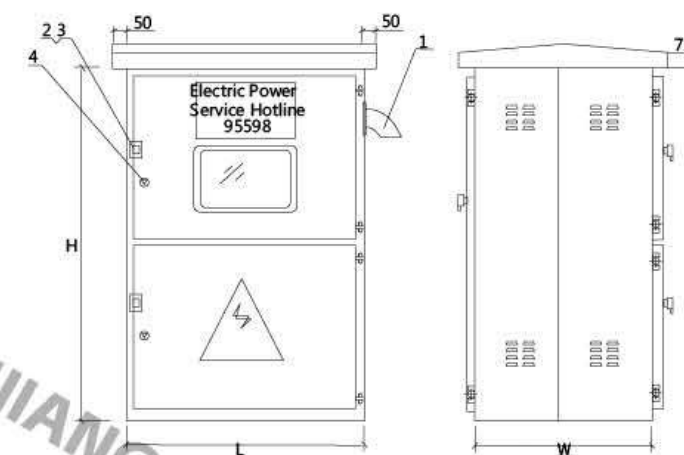
Dimensions of horizontal box body



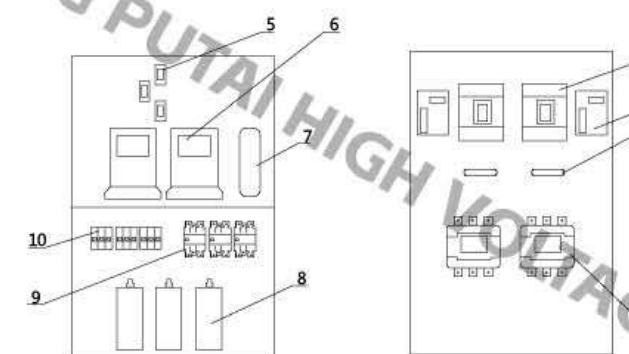
- Incoming cable conduit
- Door lock (open lock)
- Door lock rainproof box
- Door lock (concealed lock)
- Current Transformer
- Meter
- Junction box
- Capacitor
- Switching capacitor contactor
- Miniature circuit breaker
- Isolation switch
- Zero sequence transformer
- Residual current circuit breaker
- Outgoing AC contactor
- Outgoing air switch



Dimensions of vertical box body



- Incoming cable conduit
- Door lock (open lock)
- Door lock rainproof box
- Door lock (concealed lock)
- Current Transformer
- Meter
- Junction box
- Capacitor
- Switching capacitor contactor
- Miniature circuit breaker
- Isolation switch
- Zero sequence transformer
- Residual current circuit breaker
- Outgoing AC contactor
- Outgoing air switch



Box dimensions

Dimensions of horizontal box body

Transformer capacity	Scheme number	L	W	H
30-100KVA	01,06	800	450	700
30-250KVA	02,04,07,09	900	500	700
100-400KVA	03,05,08,10	1100	600	800

Note: The above dimensions are for reference only

Dimensions of vertical box body

Transformer capacity	Scheme number	L	W	H
30-100KVA	01,06	600	450	1000
30-250KVA	02,04,07,09	700	500	1000
100-400KVA	03,05,08,10	800	600	1100

Note: The above dimensions are for reference only



PUTAI

Low voltage switchgear series



JXF

Wall-mounted low-voltage power control box



Green energy



Intelligent power grid



Power grid system



Industrial electricity consumption



Rail Transit



Safe and reliable

JXF

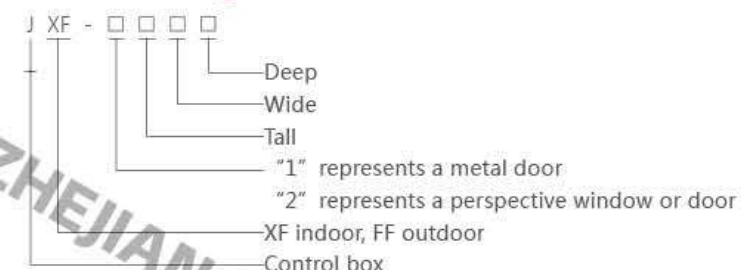
Wall-mounted low-voltage power control box

PUTAI

Overview

JXF wall mounted low-voltage power control box is suitable for three-phase three wire, three-phase four wire, and three-phase five wire systems with 50Hz, 500V and below, and load current not exceeding 250A. It controls the distribution system, provides leakage protection, and provides overload, short circuit, phase loss protection and various controls for motors. This box has a reasonable design, small size, beautiful appearance, safe and reliable use, and is widely used in metallurgy, petrochemicals, medical and health, aviation, residential areas, shopping malls, schools, and urban renovation.

Model Meaning



Usage environment and conditions

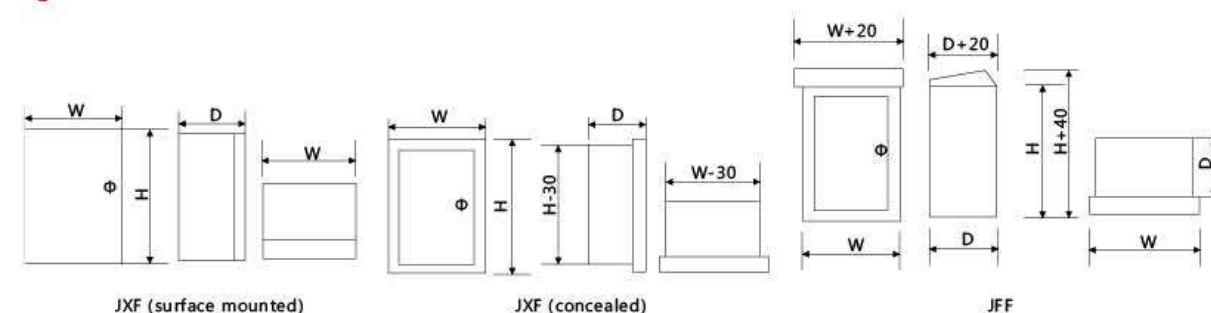
- ♦ Altitude not exceeding 2000m;
- ♦ The ambient air temperature should not exceed +40 °C and should not be lower than -25 °C;
- ♦ At +20 °C, the monthly average relative humidity of the air should not exceed 40%;
- ♦ Places without severe vibration and impact;
- ♦ There are no explosive hazardous areas, and there are no gases or conductive dust in the medium that can corrode metals or damage insulation.

Technical Parameter

Specifications	High H	Width W	Deep D	Thickness of iron sheet	Structural characteristics
2520/14	250	200	140	1.2	JXF is available in both exposed and concealed types, while JFF comes in two types: metal doors and perspective window doors. The door panels are covered with sealed rubber strips to prevent rainwater from seeping in. The box is equipped with upper and lower inlet and outlet holes, as well as an installation base. The inlet and outlet holes have been equipped with sealing plates at the factory, and the door opening angle is 90°.
3025/14	300	250	140		
3025/18	300	250	180		
3030/14	300	300	140		
3030/18	300	300	180		
4030/14	400	300	140		
4030/20	400	300	200		
5040/14	500	400	140		
5040/20	500	400	200		
5040/23	500	400	230		
6040/14	600	400	140	1.5	JXF and JFF1 each have 25 specifications, while JFF2 has 18 specifications.
6040/20	600	400	200		
6040/23	600	400	230		
6050/14	600	500	140		
6050/20	600	500	200		
6050/23	600	500	230		
7050/16	700	500	160		
7050/20	700	500	200		
7050/23	700	500	230		
8060/20	800	600	200		
8060/23	800	600	230		
8060/25	800	600	250		
10080/20	1000	800	200		
10080/25	1000	800	250		
10080/30	1000	800	300		

Note: The cabinet size can be determined according to the drawing requirements provided by the customer.

Usage environment and conditions





Low voltage switchgear series

PUTAI



DBX FRP meter box



DBX FRP meter box

PUTAI

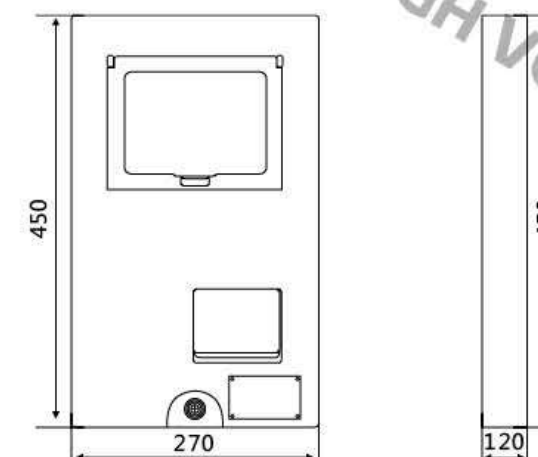
Overview

JP comprehensive distribution box is an outdoor comprehensive distribution device that integrates multiple functions such as metering, outgoing lines, and reactive power compensation; Integrate protection functions such as short circuit, overload, overvoltage, and leakage; Small in size, beautiful in appearance, economical and practical, installed on the transformer pole of the household supplement column, it is a new generation ideal distribution product for urban and rural power grid renovation.

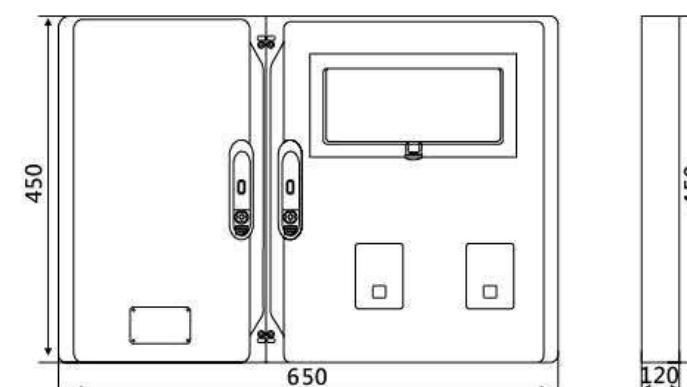
Environmental conditions for use

- >The ambient temperature is -5°C to $+40^{\circ}\text{C}$, and the average temperature within 24 hours is not higher than $+35^{\circ}\text{C}$;
- >Altitude of 2000m and below should be specified when placing an order;
- >The relative temperature should not exceed 50°C at a maximum temperature of $+40^{\circ}\text{C}$, and there should be a relatively high relative humidity at lower temperatures (90% at $+20^{\circ}\text{C}$), taking into account the impact of occasional condensation caused by temperature changes;
- >During equipment installation, the vertical and tilt angles should not exceed 5° ;
- >The equipment should be installed in a place without severe movement impact, and in a place where electrical components are not exposed to corrosion.

Installation and Dimensional Drawing



Main configuration (for reference only)
This plan is a sample, and the ordering configuration can be explained separately;
Two level 63A isolating switches and miniature circuit breakers can be installed in front of the meter;
The watch can be equipped with a 2-level 63A miniature circuit breaker and a residual current circuit breaker;
The energy meter can accommodate all copper and aluminum wires below 16mm^2 .



Main configuration (for reference only)
This plan is a sample, and the ordering configuration can be explained separately;
The meter can be equipped with a 2-level 100A molded case circuit breaker, a 2-level 63A isolating switch, and a distribution box;
The watch can be equipped with a 2-level 63A miniature circuit breaker;
The energy meter can accommodate all copper and aluminum wires below 16mm^2 .
The meter box can accommodate Type II collectors.



PUTAI

Low voltage switchgear series



PZ30

Low voltage integrated distribution box



PZ30

Low voltage integrated distribution box

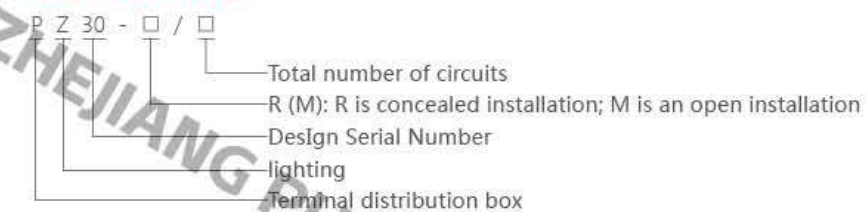
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Overview

The PZ30 lighting distribution box is suitable for single-phase and three-phase circuits with a frequency of 50HZ, a rated voltage of 500V and below, and a load current not exceeding 100A. It is used for power and lighting, motor control, and overload, leakage, and short circuit protection of the circuit. This box has a reasonable design, small volume, beautiful appearance, safe and reliable use, and can be applied to factories, buildings, residences, shopping malls and other places.

This product complies with GB7251.3 "Low voltage switchgear and control equipment, Part 3: Special requirements for distribution boards for low voltage switchgear and control equipment that non professionals can enter the site".

Model Meaning

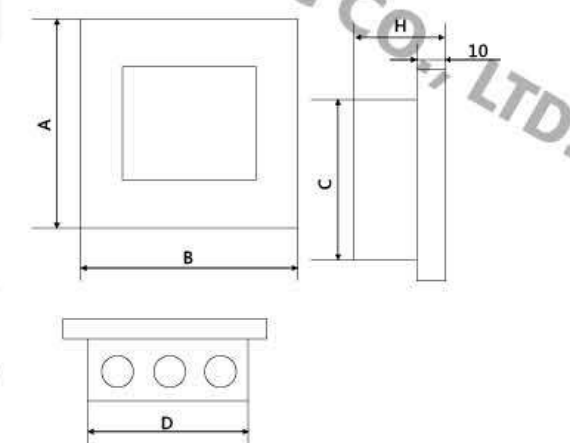


Usage environment and conditions

- Altitude not exceeding 2000m;
- The ambient air temperature does not exceed 40 °C. Not lower than -25 °C;
- At+20 °C, the monthly average relative temperature of the atmosphere should not exceed 90%
- Places without severe vibration and impact;
- There is no explosive hazardous area, and there is no gas or conductive dust in the medium that can corrode metals and damage insulation.

Appearance and installation dimensions

Total number of circuits	A	B	C	D	H	Notes
4	175	165	155	135	80	Single Row
6	230	200	205	175	90	
10	300	300	265	265	90	
12	300	335	265	300	90	
15	300	390	265	355	90	
18	300	445	265	410	90	
20	500	300	465	265	90	Double row
24	500	335	465	300	90	
30	500	390	465	355	90	
36	500	445	465	410	90	
45	600	390	585	355	90	Three rows





Transformer
series

PUTAI



S13-M

Fully sealed oil-immersed power transformer



Green
energy



Intelligent
power grid



Power grid
system



Industrial
electricity
consumption



Rail Transit



Safe and
reliable

S13-M

Fully sealed oil-immersed power transformer

PUTAI

Overview

With the continuous development of China's economic construction, the improvement of people's living standards, the increase in electricity load, and the increase in transformer equipment have led to high energy consumption and increased noise, seriously polluting the urban environment. Therefore, countries around the world are calling for and working to reduce energy consumption and improve the urban environment. Compared with the S9 and S11 types currently used in urban power grid construction, the S13-M fully sealed oil immersed transformer has an average reduction of 50% and 30% in no-load losses, and a noise level reduction of 5-8 dB.

Model Meaning



Scope of use

The S13-M fully sealed oil immersed transformer is suitable for three-phase 50Hz, 10kV voltage level distribution systems, used for industrial and agricultural power distribution, power and lighting. Especially beneficial for reducing noise, improving environmental quality, and lowering electricity operating costs in cities.

Transformer product standards

GB 1094.1-2013	GB 1094.2-2013	JB/T 10088-2004
GB 1094.3-2016	GB 1094.5-2008	JB/T 3837-2010
GB/T 6451-2015	GB/T 7595-2008	

Transformer usage conditions

- ♦ Altitude: not exceeding 1000m;
- ♦ Environmental temperature: maximum temperature+40 °C, average temperature of the hottest month+30 °C, maximum annual average temperature+20 °C, minimum outdoor temperature -25 °C.

Note: If ordering this product exceeds the above conditions, please consult with our company.

Special operating conditions for transformers

- ♦ Altitude: exceeding 1000m;
- ♦ Environmental temperature: maximum temperature+40 °C, minimum temperature -45 °C (detailed instructions for ordering);

Note: If ordering this product exceeds the above conditions, please consult with our company.

Structural characteristics

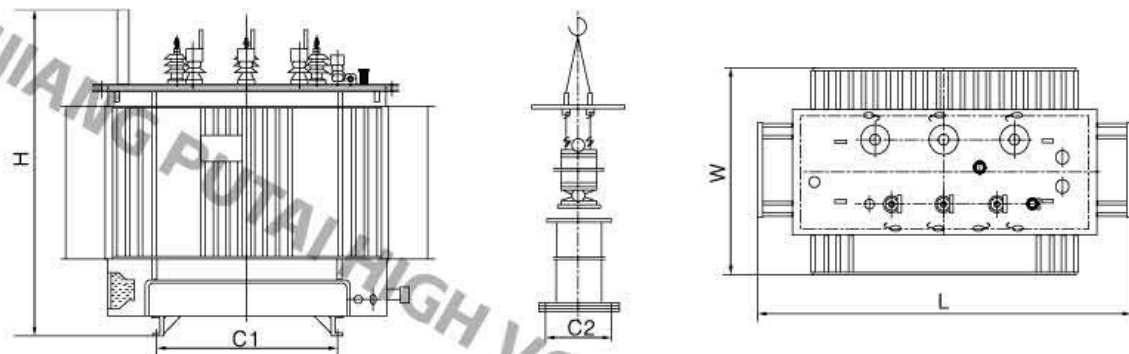
The main idea of overall layout design is to summarize the design experience of S9 and S11 models, prioritize product reliability, and ensure that it meets the requirements of electrical performance, mechanical strength, and heat dissipation capacity of the product.

- ♦ The iron core adopts a laminated structure of 23ZH100 high magnetic conductivity silicon steel sheets.
- ♦ Both high and low voltage coils are wound in a cylindrical shape.
- ♦ The body and final assembly structure both adopt the mature S9 product structure.
- ♦ The fuel tank and heat dissipation components adopt rectangular corrugated fuel tanks, and fixed or detachable expansion type plate radiator fuel tanks can be selected for 2000 kVA and 2500 kVA according to user requirements.
- ♦ Mature components of S9 and S11 products are selected for the components.

Structural characteristics

- The main idea of overall layout design is to summarize the design experience of S9 and S11 models, prioritize product reliability, and ensure that it meets the requirements of electrical performance, mechanical strength, and heat dissipation capacity of the product.
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 - ♦ Mature components of S9 and S11 products are selected for the components.

Appearance and installation dimensions



S13-M-30~2000/10 Transformer Appearance and Installation Dimensions

Dimensions of 10kV S13-M series oil immersed distribution transformer					
Rated capacity(kVA)	Appearance and installation dimensions (mm)				
	A	B	C	D	H
30	750	643	974	400	400
50	795	493	1013	400	400
63	800	665	1050	400	400
80	840	680	1075	400	400
100	775	690	1100	550	550
125	1260	900	1045	550	550
160	1090	720	1140	550	550
200	1180	780	1155	550	550
250	1175	750	1180	550	550
315	1315	890	1240	660	660
400	1330	910	1280	660	660
500	1390	930	1340	660	660
630	1545	1030	1410	820	820
800	1570	1020	1535	820	820
1000	1800	1250	1430	820	820
1250	1910	1130	1650	820	820
1600	2010	1220	1740	820	820
2000	2120	1280	1780	820	820
2500	2450	1280	2720	1070	1070

Ordering Instructions

When placing an order, the product model, rated capacity, high and low voltage ratings, high voltage tap range, number of phases, frequency, and connection group number should be provided.



SC(B)13
Type epoxy resin cast dry-type transformer

- Green energy
- Intelligent power grid
- Power grid system
- Industrial electricity consumption
- Rail Transit
- Safe and reliable

Overview

This product has a wide range of applications, especially suitable for use in places with high fire safety requirements, such as mines, oil fields, subways, power plants, schools, hospitals, commercial centers, high-rise buildings, and all indoor configuration systems.

Model Meaning



Structure characteristics

♦ Iron core

The transformer core adopts high magnetic conductivity and high-quality grain oriented cold-rolled silicon steel sheets, with 45 ° fully inclined multi-stage joints. The core adopts a special pull plate structure, and the core columns are tied with insulation tape. The surface of the core is coated with special resin to prevent moisture and rust, effectively reducing no-load loss, no-load current, and core noise, and achieving international advanced performance; Safe, fire-resistant, pollution-free, can be directly installed in the load center. Easy maintenance free installation and low overall operating costs.

Good moisture resistance, can operate normally at 100% humidity, and can be put into operation without pre drying after shutdown.

Low loss, low partial discharge, low noise, strong heat dissipation ability.

Equipped with a comprehensive temperature protection control system, it provides reliable assurance for the safe operation of transformers.

High reliability: According to operational research on products that have already been put into operation, the reliability indicators of the products have reached the international advanced level.

♦ Foil coil

The low-voltage winding is made of a whole copper foil, along with F-grade turn insulation, wound on a dedicated low-voltage foil winding machine. The foil coil effectively solves the prominent problems of high short-circuit stress, unbalanced ampere turns, poor heat dissipation, winding helix angle, and unstable manual welding quality in low voltage and high current coil winding products. At the same time, our company's winding ends are sealed with resin, cured and formed to prevent moisture and dirt.

♦ Temperature control device

The transformer adopts BWDK series signal thermometer, and the temperature measuring element is buried in the upper half of the low-voltage coil, which can automatically detect and display the working humidity of each three-phase coil in a cyclic manner. And it has over temperature alarm and trip function.

Normal condition

♦ Installation height: altitude not exceeding 1000m;

♦ The waveform of the power supply voltage is similar to a sine wave;

♦ Symmetry of multiphase power supply voltage: The power supply voltage connected to the multiphase transformer should be approximately symmetrical.

♦ Environmental temperature: maximum temperature+40 °C

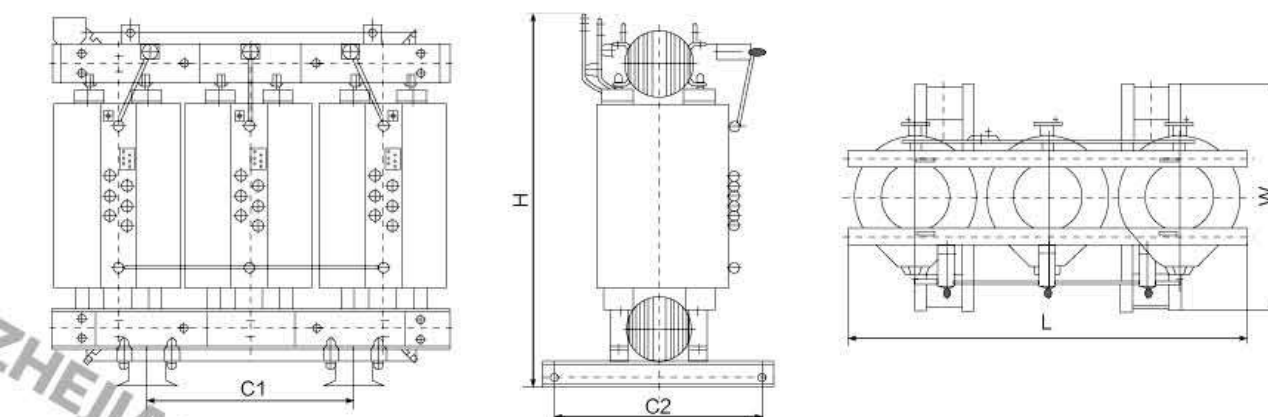
Maximum daily average temperature+30 °C

The highest annual average temperature is+20 °C

Minimum temperature -30 °C (applicable to indoor transformers)

ZHEJIANG PUTAI HIGH VOLTAGE ELECTRIC CO., LTD.

Overview



Rated capacity(kVA)	Appearance and installation dimensions (mm)				
	L	W	H	C1	C2
30	600	425	630	300	350
50	640	495	760	300	350
80	930	525	850	450	660
100	970	525	890	450	660
125	990	530	930	450	660
160	1080	670	960	550	660
200	1120	670	1020	660	660
250	1160	780	1105	660	660
315	1190	780	1165	660	660
400	1280	780	1190	660	660
500	1325	785	1130	660	660
630	1400	790	1230	660	660
800	1470	795	1270	820	820
1000	1510	950	1370	820	820
1250	1610	950	1525	820	820
1600	1690	960	1690	820	820
2000	1755	960	1750	820	820
2500	1850	960	1830	1070	1070

Ordering Instructions

When placing an order, the product model, rated capacity, high and low voltage ratings, high voltage tap range, number of phases, frequency, and connection group number should be provided.