

YGH-12

Environmental Protection Gas Insulated Ring Main Unit Series



1. General

YGH-12 environmental protection gas insulated ring main unit series is a complete set of power distribution devices for 12kV, three-phase AC 50Hz, single busbar and single busbar segmented system. The product has the characteristics of simple structure, flexible operation, reliable interlocking, convenient installation, etc. It can provide satisfactory technical solutions for various application occasions and different users. The adoption of sensing technology and information technology, coupled with technical performance and simple and flexible configuration schemes, can meet the ever-changing needs of the market and are suitable for the requirements of grid intelligence.

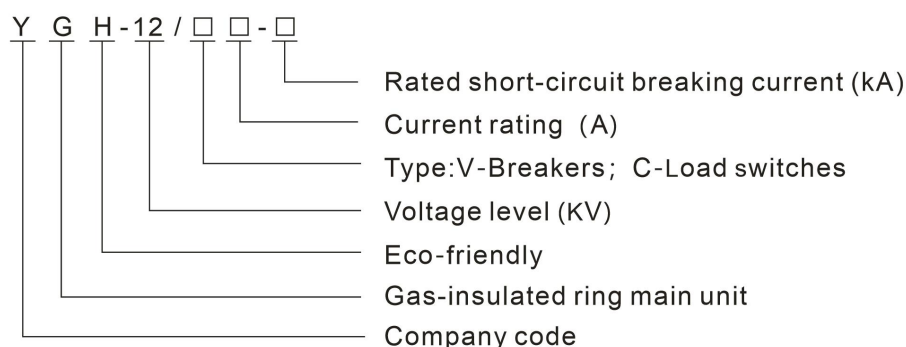
The YGH12 environmentally friendly gas-insulated ring main unit (RMU) series is suitable for industrial and civil cable ring networks and distribution network terminal projects. It is designed for receiving and distributing electrical energy. It is particularly well-suited for use in urban residential areas, small-scale substations, open/close stations, cable branching boxes, containerized substations, industrial and mining enterprises, shopping malls, airports, subways, wind power generation, sports stadiums, railways, tunnels, and other locations.

The YGH-12 series environmentally friendly gas-insulated ring main unit complies with relevant national standards and industry standards in the power sector. Its switches and main electrical components are integrated into modular units, and the interphase conductive components are enclosed in solid insulation. External wiring is done using shielded cable connectors, while the functional unit connections utilize shielded insulated busbars. These design features significantly enhance safety during operation.

The operating mechanism of the YGH-12 series employs a spring mechanism, providing a mechanical lifespan of over 10,000 operations. The operational data and equipment status can be remotely monitored, allowing for unmanned operation.

The YGH-12 series serves as a distribution device with certain performance capabilities.

2. Type designation



3.Features

- Environmental protection

The YGH-12 series environmentally friendly gas-insulated ring main unit is manufactured using non-toxic and harmless materials. It utilizes N₂ (nitrogen) or dry air as the insulating medium, reducing greenhouse gas emissions and achieving environmental objectives. During its usage, the YGH-12 series environmentally friendly gas-insulated ring main unit does not emit any toxic or harmful substances, ensuring its environmental friendliness. Additionally, the unit is designed to be recyclable and reusable, further enhancing its eco-friendliness.

- Wide range of application

The non-use of any toxic or harmful gases ensures the safety of the operating environment, whether it is in basements, tunnels, ships, or various indoor and outdoor environments. The interior of the high-pressure chamber can be filled with dry air or nitrogen, which is suitable for harsh conditions such as: high altitude, strong wind and sand, low temperature, severe cold, high environmental protection requirements, frequent operation sites, safe explosion-proof sites, high salt fog, and safe use under condensation conditions. Fully insulated and fully enclosed, it is suitable for the equipment to continue to operate after taking some cleaning and drying measures after a short period of water inflow.

- Maintenance-free

Apart from the operating mechanism, the YGH-12 series environmentally friendly gas-insulated ring main unit is in a fully sealed state. The high-voltage switch part is completely sealed, eliminating the need for cleaning and maintenance. This reduces operational and maintenance costs.

Switchgear has a high level of automation, and its online monitoring capabilities provide real-time notifications of equipment operating conditions to users. This enhances the automation of the distribution network, reduces manual operation costs, and lowers production costs for power companies.

- High security

The switchgear system features a comprehensive interlocking system and clearly visible three-phase isolation distances to prevent accidents caused by misoperations. By eliminating the use of SF₆ gas and strengthening the interphase isolation structure, risks of expansion or explosion accidents due to interphase or multiple circuit short circuits are minimized. The switchgear incorporates a vacuum arc-extinguishing chamber with explosion-proof and environmentally friendly gas insulation, enhancing the protective performance of the switch. Additionally, the switchgear utilizes sealed pole-pair designs for further protection.

- Easy to operate

The isolation switch and grounding switch are equipped with a single operating handle, eliminating the need for identification and concerns about misoperations. When the circuit breaker is in

operation, the operating handles of the isolation switch and grounding switch are unable to be operated, simplifying the operation process and eliminating the need for complex technical training. This design ensures that the operation is extremely straightforward and minimizes the chances of operational errors.

- The sealed pole-pair is formed using the epoxy resin APG (Automatic Pressure Gelation) process, providing excellent electrical and mechanical performance. It is a critical component and an essential part of the switch, serving both as an insulation element and a load-bearing component. It meets technical requirements for heat resistance, cold resistance, crack resistance, high mechanical strength, and good insulation strength.

- The switchgear features a single cabinet structure and utilizes universal insulated busbars and cable connectors produced by professional cable accessory manufacturers. This allows for on-site assembly of the switchgear and provides the flexibility to expand as needed, eliminating the inconvenience of transporting and installing multiple grouped cabinets. Additionally, if required, combination cabinets can also be provided according to specific requirements.

- Single cabinet structure, using general insulated busbars and cable connectors produced by professional cable accessory manufacturers. The switchgear can be combined on site, and can be expanded at will, to avoid the inconvenience of transportation and installation caused by multiple groups of combined cabinets. Of course, combined cabinets can also be provided upon request.

- Clearly visible real isolating break

- The whole series of products are designed in a unified manner, providing various cabinet types (circuit breaker, load switch, PT, busbar, busbar connection, etc.) required by users, and the shape and geometric dimensions are the same.

- The switch cabinet has intelligent interfaces and sensor installation positions, which can meet the requirements of the smart grid after the configuration of intelligent equipment.

- The main busbar adopts standard silicon rubber dry busbar.

- The disconnecter adopts three-working position disconnecter, which is installed on the busbar side.

- Replace SF6 load switch ring main unit.

4. Technical data

Circuit Breaker Switchgear			
Items		Unit	Values
Rated voltage		kV	12
Rated frequency		Hz	50
Rated insulation level	1min power frequency withstand voltage	To earth, phase-to-phase	42
		Across isolating distance	48
	Lightning impulse withstand voltage (peak)	To earth, phase-to-phase	75
		Across isolating distance	85
	Auxiliary/control circuit 1min power frequency withstand voltage (to earth)		
Rated current		A	630
Rated short time withstand current (RMS)	Main circuit/earth switch	kA	25/4s
	Grounding connection circuit		21.7/4s
Rated short time withstand current (peak)	Main circuit/earth switch		63
	Grounding connection circuit		54.5
Rated short circuit breaking current and number		kA/ times	25/30
Rated short circuit making current (peak)		kA	63
Rated cable charging breaking current		A	25
Rated operating sequence of circuit breaker			O-0.3s-CO -180s-CO
Mechanical life	Circuit breaker/disconnector	times	10000/3000
Protection degree	Sealed gas tank		IP67
	Switchgear enclosure		IP4X
Gas pressure	Gas rated fill level (20°C, gauge pressure)	Mpa	0.02
	Gas min. fill level (20°C, gauge pressure)		0
Sealing performance	Annual leakage rate	%/year	≤0.05

Load Switch Switchgear			
Items		Unit	Values
Rated voltage		kV	12
Rated frequency		Hz	50
Rated insulation level	1min power frequency withstand voltage	To earth, phase-to-phase	42
		Across isolating distance	48
	Lightning impulse withstand voltage (peak)	To earth, phase-to-phase	75
		Across isolating distance	85
	Auxiliary/control circuit 1min power frequency withstand voltage (to earth)		
Rated current		A	630
Rated short time withstand current (RMS)	Main circuit/earth switch	kA	25/4s
	Grounding connection circuit		21.7/4s
Rated short time withstand current (peak)	Main circuit/earth switch		63
	Grounding connection circuit		54.5
Rated short circuit making current (peak)	Load switch/earth switch	kA	63
Rated active load breaking current		A	630
Rated closed loop breaking current		A	630
5% rated active load breaking current		A	31.5
Rated cable charging breaking current		A	10
Rated active load breaking number		A	100
Grounding fault current breaking		A/times	31.5/10
Circuit and cable charging current breaking under grounding fault condition		A/times	17.4/10
Mechanical life	Load switch/earth switch	times	10000/3000
Protection degree	Sealed gas tank		IP67
	Switchgear enclosure		IP4X
Gas pressure	Gas rated fill level (20°C, gauge pressure)	Mpa	0.02
	Gas min. fill level (20°C, gauge pressure)		0
Sealing performance	Annual leakage rate	%/year	≤0.05

5. Standards

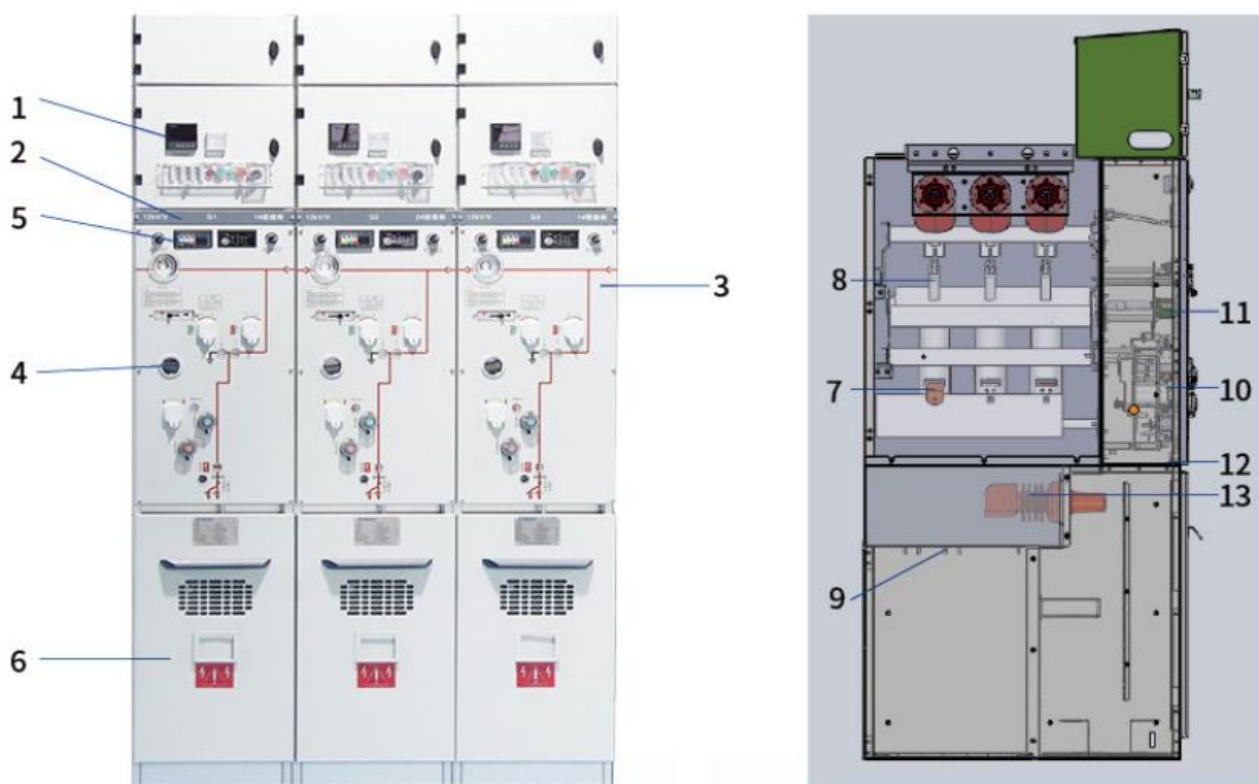
- GB/T11022 Common specifications for high-voltage alternating-current switchgear and controlgear
- GB/T3906 Alternating-current metal-enclosed switchgear and controlgear for rated voltages above 3.6 kV and up to and including 40.5 kV
- GB/T1985 High-voltage alternating-current disconnectors and earthing switches
- GB/T3804 High-voltage alternating current switches for rated voltage above 3.6 kV and less than 40.5 kV
- GB/T1984 High-voltage alternating-current circuit-breakers
- GB/T4208 Degrees of protection provide by enclosure (IP code)
- GB/T7354 High-voltage test techniques—Partial discharge measurements
- GB/T311.1 Insulation co-ordination - Part 1: Definitions, principles and rules

6. Use conditions

- Temperature: -25~+45°C;
- Maximum temperature: (24h average) +35°C;
- Average relative humidity (24h): ≤95%;
- Altitude: ≤1500m;
- Seismic ability: 8 degrees;
- Protection degree: IP67 for live body sealing, IP4X for switchgear enclosure;
- The surrounding air should not be obviously polluted by corrosive flammable gas, water vapor, etc.;
- Places without frequent violent vibration, and the severity design meets various requirements under severe conditions;

7.Product structure

●Overall structure



1.Low voltage instrument room

3.Control room

5.Live display monitor

7.Vacuum circuit breaker/load switch

9.Pressure relief device

11.Three-position mechanism

13.Cable penetration wall sleeve

2.Brow

4.Observation tube

6.Cable room

8.Three-position isolation/grounding switch

10.Switching mechanism

12.Five-protection interlock mechanism

8. Configurations

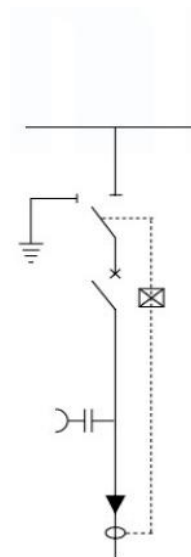
Standard Module - Vacuum Circuit Breaker Unit V

■ Standard Configuration and Features:

- ◆ 630A busbar
- ◆ Vacuum circuit breaker
- ◆ Motorized operating mechanism for vacuum switch
- ◆ Three-position isolation switch
- ◆ Manual operating mechanism for three-position isolation switch
- ◆ Position indicators for vacuum switch and three-position isolation switch
- ◆ Cable connection sleeve
- ◆ Capacitive voltage indicator with live display sleeve
- ◆ Pressure gauge
- ◆ Locking device
- ◆ Cabinet
- ◆ Ground busbar
- ◆ Operating handle
- ◆ Current transformer (for protection only)
- ◆ Digital relay protection device

■ Optional Configuration and Features:

- ◇ Short circuit and ground fault indicators
- ◇ Detachable connector (cable connector)
- ◇ Lightning arrester
- ◇ Incoming line live/ground locking device
- ◇ Key mechanical interlocking device
- ◇ Toroidal current transformer and meter

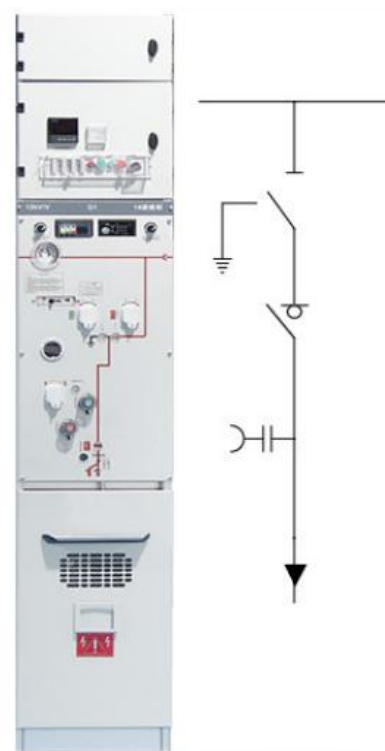


Standard Module - Load Switch Unit C**■ Standard Configuration and Features:**

- ◆ 630A busbar
- ◆ Vacuum load switch
- ◆ Manual operating mechanism for vacuum load switch
- ◆ Three-position isolation switch
- ◆ Manual operating mechanism for three-position isolation switch
- ◆ Position indicators for load switch and three-position isolation switch
- ◆ Cable connection sleeve
- ◆ Capacitive voltage indicator with live display sleeve
- ◆ Pressure gauge
- ◆ Locking device
- ◆ Cabinet
- ◆ Ground busbar
- ◆ Operating handle

■ Optional Configuration and Features:

- ◇ Electric operating mechanism for vacuum load switch
- ◇ Short circuit and ground fault indicators
- ◇ Detachable connector (cable connector)
- ◇ Lightning arrester
- ◇ Incoming line live/ground locking device
- ◇ Key mechanical interlocking device
- ◇ Toroidal current transformer and meter



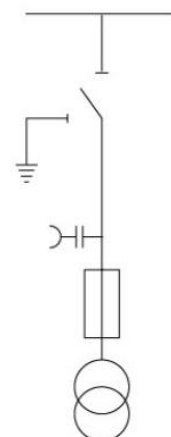
Standard Module - Voltage Transformer Unit PT

■ Standard Configuration and Features

- ◆ 2 current transformers
- ◆ Fuses to protect PT
- ◆ 1 voltmeter with transfer switch
- ◆ Capacitive voltage indicator with live display sleeve
- ◆ Cabinet
- ◆ Pressure gauge

■ Optional Configuration and Features

- ◇ 3 voltage transformers
- ◇ Lightning arrester
- ◇ Three-position isolation switch
- ◇ Manual operating mechanism for three-position isolation switch



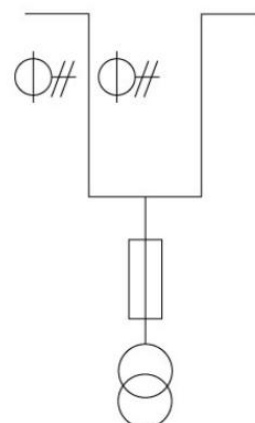
Standard Module - Metering Module M

■ Standard Configuration and Features

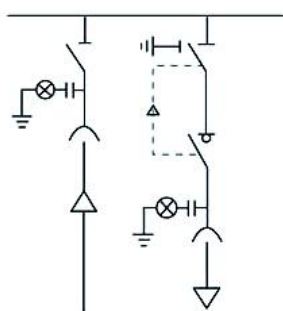
- ◆ 630A busbar
- ◆ 2 voltage transformers
- ◆ 2 current transformers
- ◆ Fuses to protect PT
- ◆ Capacitive voltage indicator with live display sleeve
- ◆ Cabinet

■ Optional Configuration and Features

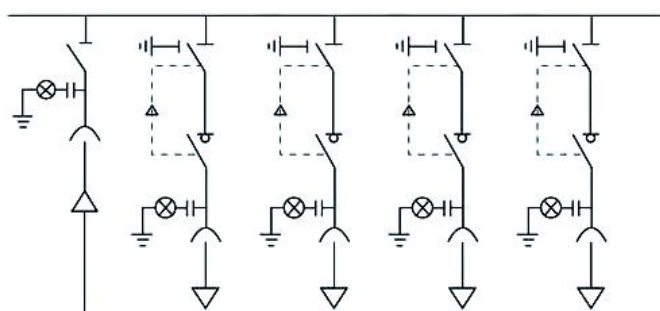
- ◇ 1 transfer switch
- ◇ 1 voltmeter
- ◇ 1/2/3 ammeters
- ◇ 1 active energy meter
- ◇ 1 reactive energy meter



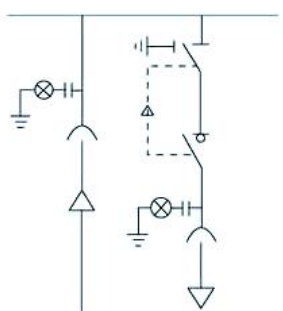
9. Typical plan combination



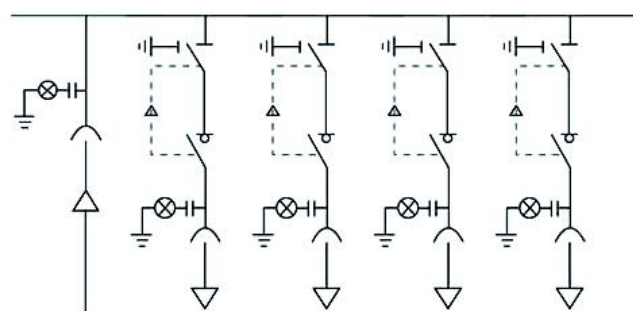
D2+C



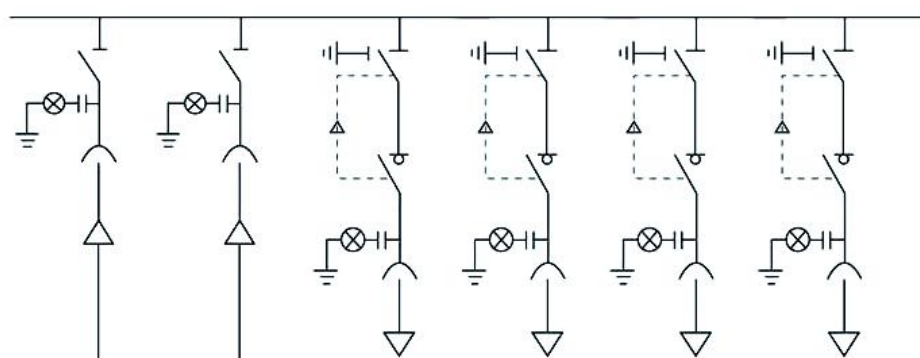
D2+C+C+C+C



D1+C

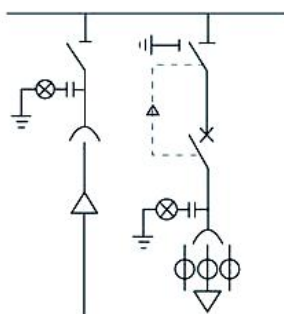


D1+C+C+C+C

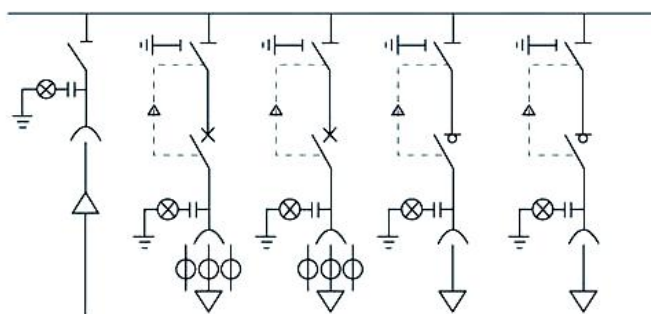


D2+D2+C+C+C+C

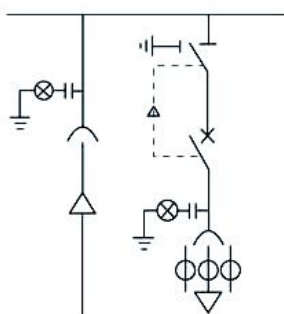
Note: The above typical combination reference scheme can be combined according to user needs.



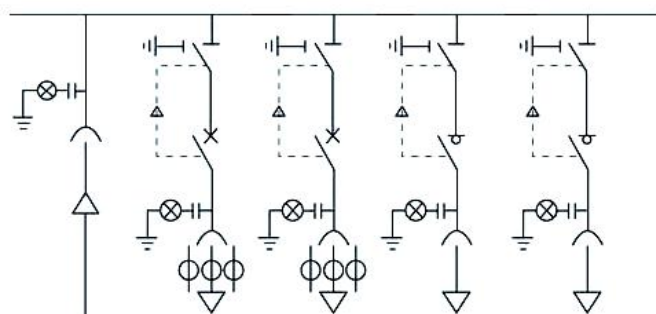
D2+V



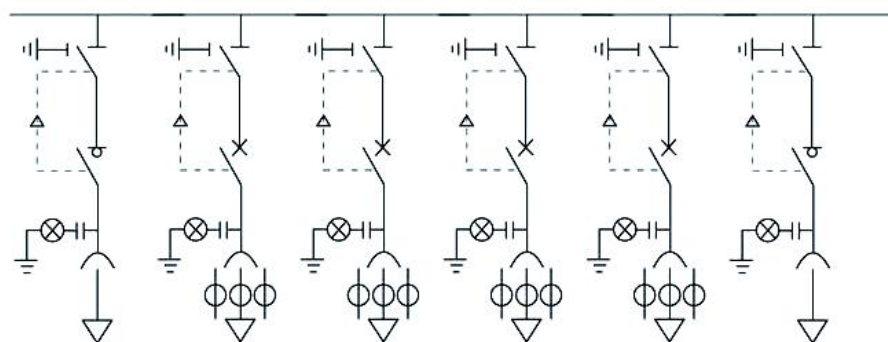
D2+V+V+C+C



D1+V



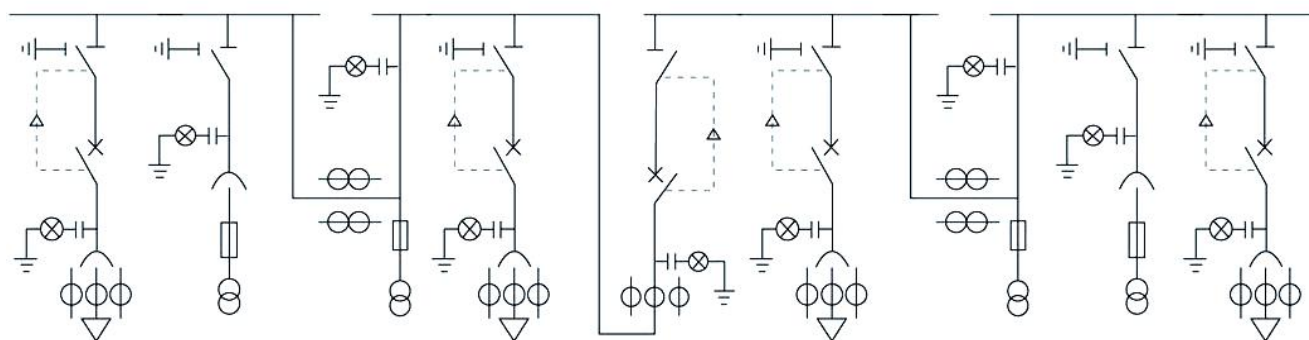
D1+V+V+C+C



C+V+V+V+V+C

Note: The above typical combination reference scheme can be combined according to user needs.

10. Double power supply single busbar segment plan

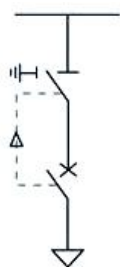


V+PTi+M+V+VL+V+M+PTi+V

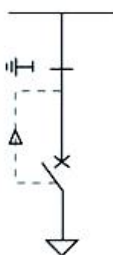
Note: The above typical combination reference scheme can be combined according to user needs.

11. Switch operation instructions

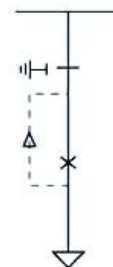
Switch position conditions and interlocks



Earth switch is opened
 Disconnector is opened
 Circuit breaker (load switch) is opened
 Note: Now the circuit breaker (load switch) can be opened or closed



Earth switch is opened
 Disconnector is closed
 Circuit breaker (load switch) is opened
 Note: Now the circuit breaker (load switch) can be opened or closed, the earth switch cannot be closed



Earth switch is opened
 Disconnector is closed
 Circuit breaker (load switch) is closed
 Note: Now the disconnector cannot be opened, the earth switch cannot be closed

12. Operation procedures

Power transmission: Hanging up (close) the lower door → open the circuit breaker (load switch) → open the earth switch → close the disconnector → close the circuit breaker (load switch) → power transmission completed.

Power failure: Open the circuit breaker (load switch) → open the disconnector → close the earth switch → close the circuit breaker (load switch) → unloading (open) the lower door → power failure completed.

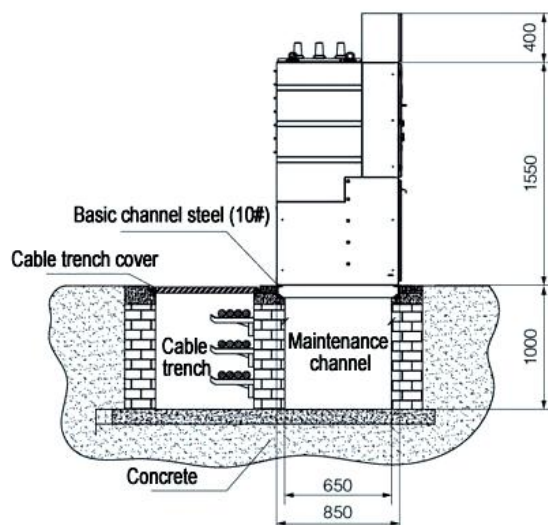
13. Installation instructions

Foundation and overall dimensions(mm)

This product should be installed on the pre-buried channel steel of the concrete platform, and the platform should be enough to bear the total weight of the equipment.

Note:

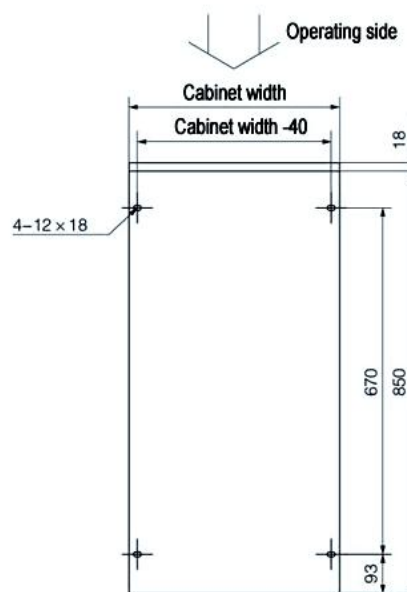
The basic channel steel for secondary pouring is reversed, and the roughness is not more than 1mm. The switchgear is fixed on the basic channel steel. The basic load of the welding switchgear is 500-700kg/unit.



Foundation plan

14. Switchgear and installation dimensions(mm)

Switchgear height 1550mm
(without independent instrument room)
If need an independent instrument room,
the switchgear height is 1950mm.
Standard configuration cabinet depth is 850mm.



Switchgear bottom plan