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PRODUCT SELECTION ALBUM | 2025

产品样册

科技创新·引领未来

SCIENTIFIC AND TECHNOLOGICAL INNOVATION LEADING THE FUTURE

WER-12

交流金属封闭绝缘环网开关设备

AC metal-enclosed insulated ring network switchgear

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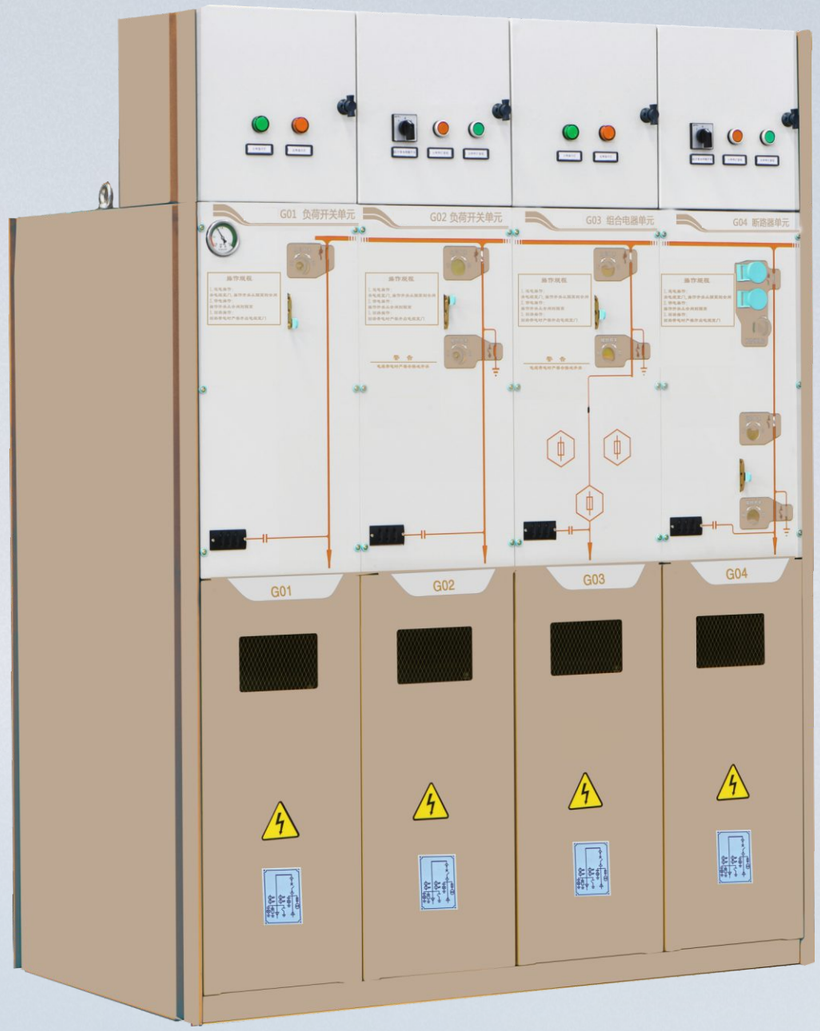

RING MAIN UNIT **SWITCHGEAR**

SF6气体全绝缘全封闭环网开关设备 +

Sf6 gas fully insulated and fully enclosed ring network switchgear

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产品概述 Product overview

WER系列气体全绝缘紧凑型环网柜是采用西班牙技术合作开发的新型高可靠SF6气体绝缘的中压开关设备，产品采用模块化设计，可根据不同设计方案任意排列，实现共箱式单元与扩展式单元完美结合，满足各种二次输配变电站对紧凑型开关柜灵活使用的需求。

WER系列开关设备是一个完全密封的系统，其所有带电部件及开关均封闭在不锈钢的壳体内，不受环境影响；具有运行可靠，保障安全，紧凑型结构设计、占用空间小，免维护、长寿命等特点。

产品已通过机械工业高压输配电设备质量检测中心型式试验认证，广泛用于小型二次配电站、箱式开闭所、工矿企业、机场、铁路、商业区、高层建筑、高速公路、地铁、隧道及自然条件较恶劣的场所领域。

WER series gas fully insulated compact ring network cabinet is a new type of high-reliability SF6 gas insulated medium voltage switchgear developed in cooperation with Spanish technology. The product adopts modular design and can be arranged arbitrarily according to different design schemes to realize the perfect combination of common box unit and extended single unit and meet the flexible use requirements of various secondary transmission and distribution substations for compact switchgear.

WER series switchgear is a completely sealed system, all its live parts and switches are enclosed in stainless steel shell, not affected by the environment; it has the features of reliable operation, safety guarantee, compact structure design, small space occupation, maintenance free, long life, etc.

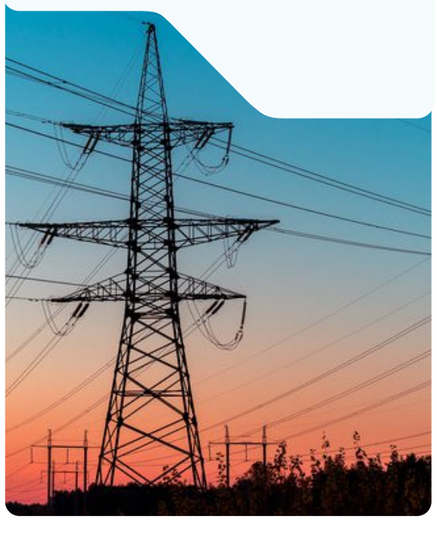
The products have passed the type test certification of high-voltage transmission and distribution equipment quality testing center in mechanical industry, and are widely used in small secondary distribution stations, box switching stations, industrial and mining enterprises, airports, railways, commercial areas, high-rise buildings, expressways, subways, tunnels and places with poor natural conditions.

产品型号 Product model

WER-□ /630- □ - □

- 开关型号（C、F、V等）Switch model (C, F, V, etc.)
- 额定短时耐受电流 Rated short - term withstand current
- 额定电流 Rated current
- 额定电压(12kV、24kV) The rated voltage (12kV、24kV)
- 企业型号 Enterprise model

备注：C:负荷开关单元；F:组合电器单元；V:断路器单元
Note: load switch unit; Combined electrical unit; Circuit breaker unit



执行标准 Executive standard

GB3804-2004 3.6kV~40.5kV高压交流负荷开关
GB1984-2014 高压交流断路器
GB16926-2009 高压交流负荷开关-熔断器组合电器
GB1985-2014 高压交流隔离开关和接地开关
GB3906-2006 3.6kV~40.5kV交流金属封闭开关设备和控制设备
GB/T11022-2011 高压开关设备和控制设备标准的共用技术要求
GB4208-2008 外壳防护等级（IP代码）
GB/T5582-1993 高压电力设备外绝缘污秽等级
GB9969.1-1998 工业产品使用说明书总则
DL/T404-2007 3.6kV~40.5kV交流金属封闭开关设备和控制设备
GB/T13384-2008 机电产品包装通用技术条件
GB191-2008 包装储运图示标志
GB311.1-2012 高压输配电设备的绝缘配合
GB3804-2004 3.6kV ~ 40.5kV high voltage AC load switch
GB1984-2014 High voltage alternating current circuit breaker
GB16926-2009 High voltage AC load switch - fuse combination
GB1985-2014 HV AC disconnector and earthing switch
GB3906-2006 3.6kV ~ 40.5kV AC metal enclosed switchgear and control equipment
GB/T11022-2011 Common technical requirements for high voltage switchgear and control equipment standards
GB4208-2008 Enclosure protection class (IP code)
GB/T5582-1993 Pollution level of external insulation of high voltage power equipment
GB9969.1-1998 General rules for use instructions of industrial products
DL/T404-2007 3.6kv-40.5kv AC metal enclosed switchgear and control equipment
GB/T13384-2008 General technical specifications for packaging of mechanical and electrical products
GB191-2008 Packaging, storage and transportation pictorial mark
GB311.1-2012 Insulation coordination of high voltage transmission and distribution equipment

使用环境 Environment of use

1.海拔高度:≤4000m（当设备运行在海拔高度1000m以上时请特别注明以便制造时对充气压力进行相应的补偿措施）。
2.环境温度：最高气温:+55°C ;最低气温:-40°C ; 24h内平均气温不超过35°C。
3.环境湿度：24h相对湿度平均不超过95% ;月相对湿度平均不超过90%。
4.安装环境:周围空气没有爆炸性和腐蚀性气体，安装场所无剧烈震动冲击，污秽级不超过GB/T5582中的Ⅲ级。
5.抗震烈度：9度。

产品概述 Product overview

1.Altitude: ≤ 4000m (when the equipment operates above 1000m above the altitude, please indicate specially for the purpose of compensating the inflation pressure during manufacturing).
2.Ambient temperature: maximum temperature: +55℃ ; minimum temperature: - 40 ℃; average temperature within 24 hours is not more than 35 ℃.
3.Environmental humidity: the average relative humidity within 24 hours shall not exceed 95%; the average monthly relative humidity shall not exceed 90%.
4.Installation environment: the surrounding air is free of explosive and corrosive gas, the installation site is free of violent vibration and impact, and the pollution level is not more than level Ⅲ in GB/T5582.
5.Seismic intensity: 9 degrees.

产品特点 Features

1. 模块化设计

包括负荷开关单元（C）、负荷开关+熔断器组合电器单元（F）、断路器单元（V）、计量柜单元（M）、母线PT单元（PT）等，不同模块可任意组合形成环网柜。

2. 全绝缘全密封设计

WER系列开关设备的一次带电部分（主母线）和开关本体均密封在不锈钢板焊接而成的气箱当中，主回路通过气箱上安装的符合DIN47636标准的套管与外部连接，可通过全绝缘、全屏蔽全密封的可分离连接器与进出线电缆连接，气箱防护等级达到IP67，气箱内部不受外界环境影响，具备抗洪水和抗凝露功能。

3. 灵活扩展化设计

WER系列开关设备可通过各种标准单元模块组合成共箱式不可扩展的固定式环网开关设备（在同一个SF6绝缘气箱内，最多可做到6单元共箱），也可以将不同模块组合设计成可扩展单元，通过专用的全绝缘全屏蔽母线连接件，实现多形式的组合，达到全模块化，能够最大限度的满足不同地区、不同形式、不同客户的需要，提供多样化的供配电设计方案。

4. 安全可靠性高

一次带电部分和开关本体均密封在不锈钢气箱中，通过套管与外部连接，避免了直接接触带电体；设备具有可靠的压力释放装置和泄压通道，保证了故障发生时人身设备的安全；

拥有完善的机械联锁装置，可最大程度的防止误操作。

5. 自主研发的新型机构

拥有自主研发设计的弹簧操作机构，优化零部件，简化传动构造，使得机构整体更稳定，传动更加灵活，可扩展为智能化操控。联锁采用刚性连接，相对软连接更可靠。元件、微动开关及线路板，采用模块化集成方式，方便维护及检修。

1. Modular design
Including load switch unit ©, load switch + fuse combination electrical unit (F), circuit breaker unit (V), metering cabinet unit (M), busbar PT unit (PT), etc., different modules can be arbitrarily combined to form a ring network cabinet.
2.Fully insulated and fully sealed design
The live part (main busbar) of the WER series switchgear and the switch are sealed in a gas box welded from stainless steel. The main circuit is connected with the outside through the casing installed on the gas box in accordance with din47636 standard, and can be connected with the incoming and outgoing cables through the fully insulated, fully shielded and fully sealed separable connector. The protection level of the gas box reaches IP67, The inside of the air box is not affected by the external environment, and has the functions of flood resistance and condensation resistance.
3. Flexible and extended design
WER series switchgear can be combined into a common box type non-expandable fixed ring network switchgear through various standard unit modules (in the same SF6 insulated gas box, up to 6 units can be shared), or different modules can be combined. The combination is designed as an expandable unit. Through the special fully insulated and fully shielded busbar connectors, multiple forms of combination are achieved to realise full modularity, which can meet the needs of different regions, different forms, and different customers to the greatest extent, and provide diverse power supply and distribution design.
4.High safety and reliability
The primary electrified part and switch are sealed in the stainless steel gas box and connected with the outside through the casing, avoiding direct contact with the electrified body; The equipment has reliable pressure release device and pressure relief channel to ensure the safety of personnel and equipment in case of failure;Has the perfect mechanical interlock device, With perfect mechanical interlocking device, it can prevent misoperation to the greatest extent.
5.Self-developed new mechanism
It has independently developed and designed spring operating mechanism, optimized parts, simplified transmission structure, making the mechanism more stable, more flexible transmission, and can be expanded to intelligent control. Interlocking adopts rigid connection, which is more reliable than soft connection. Components, microswitch and circuit board adopt modular integration mode, which is convenient for maintenance and repair.

6. 先进的焊接密封技术

WER系列开关设备对动密封（开关操作轴）、气压表、高压套管、防爆阀等涉及弹性密封的元件，严格控制材料的强度、硬度、压缩变形等性能，通过一系列的试验、检测手段，保证密封性能。

■ 气箱制造精度高：采用国外先进技术，引进高精密激光切割机和数控冲、剪、折等设备保证气箱零件加工的尺寸精度，采用ABB焊接机器人，全自动焊接工艺保证焊接的效率高、气箱质量稳定，焊缝美观，防止气箱内气体的泄露和外部潮气的入侵，最大程度的保障了WER系列充气柜的性能稳定。

■ 元器件高质量的控制要求：动密封、密度表、高压套管等元器件都要采用氦质谱检漏仪和X光无损探测仪检测，相关绝缘件要经过局放检测，确保元器件的高质量，提高气箱的密封性能。

■ 完善的检漏技术：除元器件的质量控制外，气箱经装配、充气后，还要采取进一步的100%检漏。

■ 高标准的要求：气体年相对泄露率 < 0.05%，远高于国家标准规定的 <0.1%技术要求。

7. 自动化流水线

先进的自动化流水线以及完善的工业流程生产，确保生产效率，提高装配精度。

8. 出厂检验项目：

■ 产品装配检验
■ 氦质谱检漏检验
■ 耐压检验
■ 局部放电试验
■ 机械特性检验
■ 主回路电阻测量
■ Sf6气体水分含量测定
■ 外观检验

国家电网公司12kV SF6气体绝缘标准化定制环网柜
12kV SF6 gas insulation standard customized ring network cabinet of State Grid Corporation of China

6.Advanced welding sealing technology

WER series switch equipment strictly control the strength, hardness, compression and deformation of the material for dynamic seal (switch operating shaft), barometer, high-pressure bushing, explosion-proof valve and other components related to elastic seal, through a series of tests, testing means, to ensure the sealing performance.

■ high manufacturing accuracy of gas box: Advanced foreign technology is adopted, high-precision laser cutting machine and numerical control punching, cutting, folding and other equipment to ensure the dimensional accuracy of gas box parts processing, adopt ABB welding robot, fully automatic welding process to ensure high welding efficiency, stable gas box quality, beautiful weld. To prevent gas leakage in the gas box and invasion of external moisture, guarantee maximizely the stabilization of WER series gas box.

■ High-quality control requirements of components: dynamic seals, density meters, high-voltage bushings and other components must be tested by helium mass spectrometer leak detectors and X-ray non-destructive detectors, and related insulation parts must be subjected to partial discharge testing to ensure the high quality of the components, improving the sealing performance of the air box.

■ Complete leak detection technology: In addition to the quality control of components, after the gas tank is assembled and inflated, a further 100% leak detection is required.

■ High standard requirements: The annual relative leakage rate of gas is <0.05%, which is much higher than the national standard <0.1% technical requirements.

7.Automated assembly line

Advanced automated assembly line and perfect industrial proces ensure the production efficiency and improve assembly accuracy.

8. Factory inspection items:

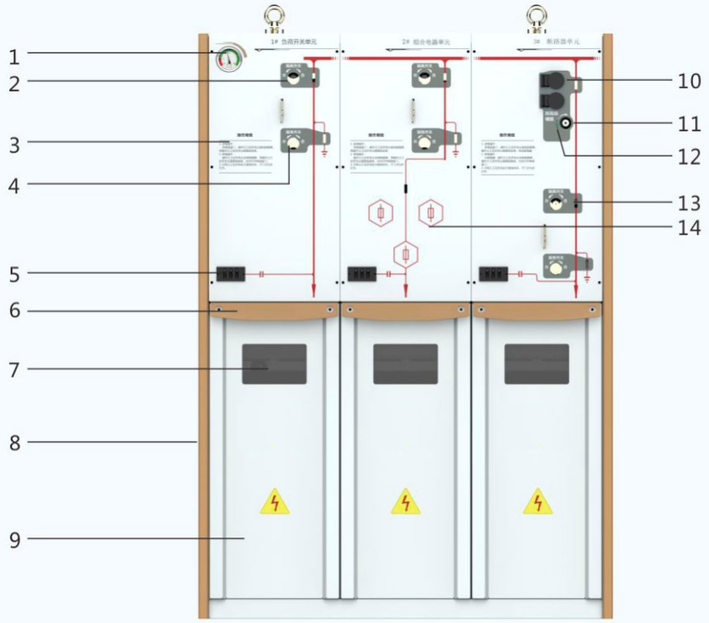
■ Product assembly inspection
■ Helium Mass Leak Detection
■ Withstand voltage test
■ Partial discharge test
■ Mechanical characteristics inspection
■ Main loop resistance measurement
■ Determination of moisture content in SF6 gas
■ Appearance inspection

技术参数 Technical parameters

SF6 环网柜主要技术参数表 Main technical parameters of SF6 ring network cabinet

序号 Number	项目 Project		单位 Unit	负荷开关单元 Load switch unit	组合电器单元 Combined electrical unit	断路器单元 Circuit breaker unit
1	额定电压 Rated voltage		kV	12/24	12/24	12/24
2	额定频率 Rated frequency		Hz	50	50	50
3	额定电流 Rated current		A	630	125（取决于熔断器电流） Depends on fuse current	630
4	额定绝缘水平 Rated insulation level	1min 工频耐压 1min power frequency withstand voltage — 相间、对地 Interphase、phase-to-ground voltage	kV	42/65	42/65	42/65
		1min 工频耐压 1min power frequency withstand voltage — 断口 Between open contacts		48/79	48/79	48/79
		1min 工频耐压 1min power frequency withstand voltage — 控制和辅助回路 Control and auxiliary circuits		2/2	2/2	2/2
		雷电冲击耐压 Lightning impulse withstand voltage — 相间、对地 Interphase、phase-to-ground voltage		75/125	75/125	75/125
		雷电冲击耐压 Lightning impulse withstand voltage — 断口 Between open contacts		85/145	85/145	85/145
5	额定短时耐受电流 Rated short-time withstand current		kA/s	20/4	——	25/4
6	额定峰值耐受电流 Rated peak withstand current		kA	50	——	63
7	额定短路关合电流 Rated short-circuit closing current		kA	50	受限于高压熔断器 Limited to high-voltage fuses	63
8	额定短路开断电流 Rated short-circuit breaking current		kA	——	受限于高压熔断器 Limited to high-voltage fuses	25
9	额定转移电流 Rated transfer current		A	——	1700/1400	——
10	额定有功负载开断电流 Breaking current of rated active load		A	630	——	——
11	额定闭环开断电流 Rated closed-loop breaking current		A	630	——	630
12	机械寿命 Mechanical life	负荷开关/断路器 Load switch / breaker	次 Times	5000	5000	10000
		隔离/接地开关 Isolation / grounding switch		3000	3000	3000
13	回路电阻 Loop resistance		μΩ	≤150	——	≤200
14	额定充气压力（20℃时表压） Rated inflation pressure (gauge pressure at 20 ℃)		MPa	0.04	0.04	0.04
15	气体年相对泄露率 Relative annual leakage rate of gas		%	≤0.05	≤0.05	≤0.05
16	IP防护等级 IP protection level	柜体 Cabinet		IP4X	IP4X	IP4X
		气箱 Air box		IP67	IP67	IP67
17	燃弧试验 Arc test		kA/s	20/1	20/1	20/1

Product structure 产品结构



1.SF6气体密度表

WER系列开关设备每个气箱均配备一个密度表，密度值不受环境温度变化，是20℃时的相应压力值，若密度表指示位置处于红色区域，表示气体压力偏低，处于绿色区域，表示气体压力正常（额定表面值为1.4bar）；

2.负荷开关操作孔

采用WER系列开关设备配备的机构操作手柄，通过负荷开关操作孔可对负荷开关进行合、分闸操作；

3.操作说明

相应开关单元指示面板上印有开关操作说明，保证开关送电、断电操作正确，提高安全性能；

4.接地开关操作孔

采用WER系列开关设备配备的机构操作手柄，通过接地开关操作孔可对接地开关进行合、分闸操作；

5.带电显示器

带电显示器连接套管，指示灯可显示套管处一次回路是否带电；

6.电缆室门（门把手）

在正确操作开关，回路处于接地状态下，方可打开下柜门；

7.观察窗

WER系列开关设备每个单元电缆室门均配有观察窗，可在不开启柜门的情况下，观察到电缆室内电缆及互感器等实时情况；

8.泄压室

泄压阀位于气箱底部，泄压室与电缆室之间有金属板隔开，若气箱内压力过高时，泄压阀中的防爆膜可破裂，以释放压力；

9.电缆室

电缆室内通过符合DIN47636标准的套管，通过全绝缘、全密封可分离连接器（电缆接头）与进出线电缆连接；

10.合分闸按钮

断路器机构储能到位后，通过合分闸按钮可对断路器开关进行合、分闸操作；

11.断路器机构储能操作孔

采用WER系列开关设备配备的机构操作手柄，通过储能操作孔可对断路器机构进行储能操作；

12.储能指示窗

13.隔离开关操作孔

采用WER系列开关设备配备的机构操作手柄，通过隔离开关操作孔可对隔离开关进行合、分闸操作；

14.熔断器室

熔断器安装在由环氧树脂浇注的熔丝筒中，从柜体正面可方便更换。

SF6气体全绝缘全封闭环网开关设备

产品结构 Product structure

1.SF6 gas density meter

Each air box of the WER series switchgear is equipped with a density meter. The density value is not affected the change of ambient temperature and is the corresponding pressure value at 20℃. If the density indicator indicates a position in the red area, it means that the gas pressure is low and it is in the green area , indicating that the gas pressure is normal (rated surface value is 1.4 bar);

2.Load switch operation hole

Using the mechanical operating handle of the WER series of switchgear equipment, the load switch can be closed and opened through the load switch operation hole;

3.Operating instructions

The corresponding switch unit's instruction panel is printed with the switch operation instructions to ensure that the power is turned on and off, and the safety performance is improved;

4.Operating hole of the grounding switch

The mechanical operating handle equipped with WER series switchgear can be used to close and open the ground switch through the ground switch operating hole.

5.Charged display

The chargede display is connected to the bushing, and the light of indicator can show whether the primary loop at the bushing is live.

6.Cable room door (Doorknob)

When the switch is operated correctly and the loop is grounded, the cabinet door can be opened.

7.Observation room

WER series switchgear each unit of cable room door is equipped with observation window, which can observe the real-time situation of cables and mutual inductors in the cable room without opening the cabinet door.

8.Pressure chamber

The pressure relief valve is located at the bottom of the air box. The pressure relief chamber and the cable chamber are separated by metal plates. If the pressure in the air box is too high, the explosion-proof film in the pressure relief valve can be broken to release the pressure.

9.Cable room

The cable room is connected to the incoming and outgoing cables through a fully-insulated, fully-sealed, separable connector (cable connector) through a sleeve that complies with DIN47636 standard;

10.Close button

When the circuit breaker mechanism has stored energy in place, the circuit breaker switch can be closed and opened by pressing the close button.

11.Energy storage operating hole of circuit breaker mechanism

Adopt the mechanical and operating handle provided by WER series switch equipment, and the energy storage operation of the circuit breaker mechanism can be performed through the energy storage operation hole;

12.Energy storage indicator window

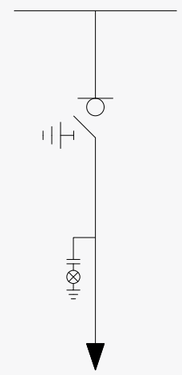
13.Operating hole of the isolator switch

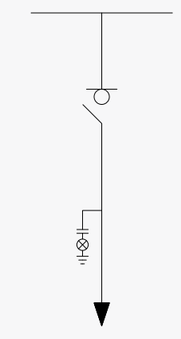
The operating handle of the mechanism provided by the WER series switchgear is used to close and open the isolating switch through the isolating switch operating hole;

14.Fuse room

The fuse is installed in the fuse pot poured by epoxy resin, which can be easily replaced from the front of the cabinet.

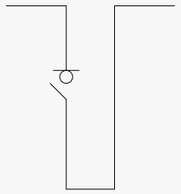
Basic unit schedule 基本单元方案

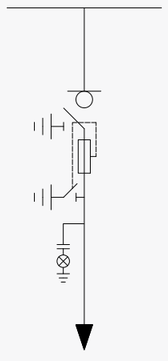
方案 Program	型号 Model	功能 Function	标准配置 Standard configuration	可选配置 Optional configuration
	C单元 C unit	带接地开关的负荷开关单元,也称三工位负荷开关单元，即负荷开关有合闸--分闸--接地三个工作状态，主要应用于环网电缆线路进出线的连接、控制、分支等。 The load switch unit with grounding switch, also known as the three-station load switch unit, that is, the load switch has three working states: closing, opening and grounding. It is mainly used for the connection, control and branch of the incoming and outgoing lines of the ring cable line.	■630A母线 630A busbar ■三工位负荷开关 Three-position load switch ■手动操作机构 Two-position load switch ■出线套管为感应式高压传感器 Manual operating mechanism Outlet sleeve is an inductive high pressure sensor ■挂锁装置 Padlock device ■密度表 Density table ■接地母排 Grounding busbar ■柜体 Cabinet ■电缆连接套管 Cable connection sleeve ■操作手柄 Operating handle	■电动操作机构 Electric operating mechanism ■短路及接地故障指示器 Short circuit and ground fault indicators ■钥匙机械互锁装置 Key mechanical interlock ■进线接地带电闭锁装置 Incoming grounding live-locking device ■可分离连接器（电缆接头） Detachable connector (cable connector) ■避雷器 Lightning arrester ■预留扩展套管 Reserved expansion sleeve ■扩展母线 Expansion busbar ■环形电流互感器及表计 Ring current transformer and meter

方案 Program	型号 Model	功能 Function	标准配置 Standard configuration	可选配置 Optional configuration
	CJ单元 CJ unit	不带接地开关的负荷开关单元，也称两工位负荷开关单元，即负荷开关有合闸--分闸两个工作状态，主要应用于环网电缆线路进出线的连接、控制、分支等。 The load switch unit without grounding switch, also known as the two-station load switch unit, that is, the load switch has two working states of closing - opening, mainly used for the connection, control, branch, etc.	■630A母线 630A busbar ■两工位负荷开关 Two-position load switch ■手动操作机构 Two-position load switch ■出线套管为感应式高压传感器 Manual operating mechanism Outlet sleeve is an inductive high pressure sensor ■挂锁装置 Padlock device ■密度表 Density table ■接地母排 Grounding busbar ■柜体 Cabinet ■电缆连接套管 Cable connection sleeve ■操作手柄 Operating handle	■电动操作机构 Electric operating mechanism ■短路及接地故障指示器 Short circuit and ground fault indicators ■钥匙机械互锁装置 Key mechanical interlock ■可分离连接器（电缆接头） Detachable connector (cable connector) ■避雷器 Lightning arrester ■预留扩展套管 Reserved expansion sleeve ■扩展母线 Expansion busbar ■环形电流互感器及表计 Ring current transformer and meter

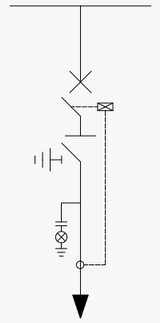
SF6气体全绝缘全封闭环网开关设备

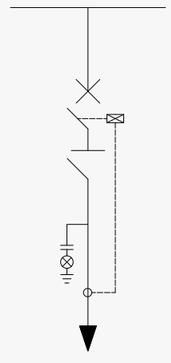
基本单元方案 Basic unit schedule

方案 Program	型号 Model	功能 Function	标准配置 Standard configuration	可选配置 Optional configuration
	SI单元 SI unit	两工位母线分段负荷开关单元，该负荷开关采用两工位负荷开关单元。 Two-station busbar sectional load switch unit, which adopts two-station load switch unit.	■630A母线 630A busbar ■两工位负荷开关 Two-position load switch ■手动操作机构 Two-position load switch ■出线套管为感应式高压传感器 Manual operating mechanism Outlet sleeve is an inductive high pressure sensor ■挂锁装置 Padlock device ■密度表 Density table ■接地母排 Grounding busbar ■柜体 Cabinet ■电缆连接套管 Cable connection sleeve ■操作手柄 Operating handle	■电动操作机构 Electric operating mechanism ■钥匙机械互锁装置 Key mechanical interlock ■预留扩展套管 Reserved expansion sleeve ■扩展母线 Expansion busbar ■电流互感器及表计 Current transformer and meter

方案 Program	型号 Model	功能 Function	标准配置 Standard configuration	可选配置 Optional configuration
	F单元 F unit	组合电器单元，即负荷开关+熔断器组合电器单元，主要用于中小型配电变压器的控制和保护。 Combined electrical unit, that is, load switch + fuse combined electrical unit, mainly used for the control and protection of small and medium-sized distribution transformers.	■630A母线 630A busbar ■三工位负荷开关/熔断器用接地开关 Three-position load switch/special earthing switch for fuse ■手动操作机构 Two-position load switch ■出线套管为感应式高压传感器 Manual operating mechanism Outlet sleeve is an inductive high pressure sensor ■挂锁装置 Padlock device ■密度表 Density table ■接地母排 Grounding busbar ■柜体 Cabinet ■电缆连接套管 Cable connection sleeve ■操作手柄 Operating handle	■电动操作机构 Electric operating mechanism ■短路及接地故障指示器 Short circuit and ground fault indicators ■钥匙机械互锁装置 Key mechanical interlock ■可分离连接器（电缆接头） Detachable connector (cable connector) ■避雷器 Lightning arrester ■预留扩展套管 Reserved expansion sleeve ■扩展母线 Expansion busbar ■环形电流互感器及表计 Ring current transformer and meter ■高压限流熔断器 High-voltage current-limiting fuse

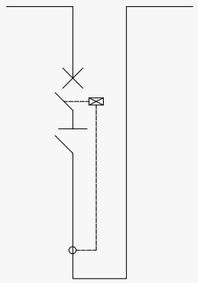
Basic unit schedule 基本单元方案

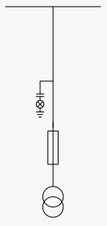
方案 Program	型号 Model	功能 Function	标准配置 Standard configuration	可选配置 Optional configuration
	V单元 V unit	断路器单元，即真空开关单元，采用真空断路器+三工位隔离式开关组合方式，主要应用于电缆线路连接、分支、控制等，真空开关与隔离开关之间设置可靠的机械联锁，防止误操作，确保由断路器开断和关合负载电流。 Circuit breaker unit, namely vacuum switch unit, adopts the vacuum circuit breaker + three-station load isolating switch combination. It is mainly used for cable line connection, branching, control, etc., and a reliable mechanical connection is set between the vacuum switch and the disconnect switch which can prevent misoperation and ensure that the load current is turned on and off by the circuit breaker.	■630A母线 630A busbar ■真空开关 Vacuum switch ■真空开关电动操作机构 Electric operating mechanism of vacuum switch ■三工位隔离开关 Three-station isolating switch ■三工位隔离开关手动操作机构 Manual operating mechanism of three-station isolating switch ■出线套管为感应式高压传感器 Manual operating mechanism Outlet sleeve is an inductive high pressure sensor ■挂锁装置 Padlock device ■密度表 Density table ■接地母排 Grounding busbar ■柜体 Cabinet ■电缆连接套管 Cable connection sleeve ■保护专用电流互感器 Special current transformer for protection ■继电保护装置 Relay protection device ■操作手柄 Operating handle	■短路及接地故障指示器 Short circuit and ground fault indicators ■进线接地带电闭锁装置 Incoming grounding live-locking device ■钥匙机械互锁装置 Key mechanical interlock ■可分离连接器（电缆接头） Detachable connector (cable connector) ■避雷器 Lightning arrester ■预留扩展套管 Reserved expansion sleeve ■扩展母线 Expansion busbar ■环形电流互感器及表计 Ring current transformer and meter

方案 Program	型号 Model	功能 Function	标准配置 Standard configuration	可选配置 Optional configuration
	Vj单元 Vj unit	不带接地的断路器单元，采用真空断路器+两工位隔离开关组合方式，除不带接地外，其他功能同V单元一致。 Circuit breaker unit without grounding switch, using vacuum circuit breaker + two-position isolating switch combination, without grounding switch, other functions are the same as V unit.	■630A母线 630A busbar ■真空开关 Vacuum switch ■真空开关电动操作机构 Electric operating mechanism of vacuum switch ■两工位隔离开关 Two-station isolating switch ■两工位隔离开关手动操作机构 Manual operating mechanism of two-station isolating switch ■出线套管为感应式高压传感器 Manual operating mechanism Outlet sleeve is an inductive high pressure sensor ■挂锁装置 Padlock device ■密度表 Density table ■接地母排 Grounding busbar ■柜体 Cabinet ■电缆连接套管 Cable connection sleeve ■保护专用电流互感器 Special current transformer for protection ■继电保护装置 Relay protection device ■操作手柄 Operating handle	■短路及接地故障指示器 Short circuit and ground fault indicators ■可分离连接器（电缆接头） Detachable connector (cable connector) ■钥匙机械互锁装置 Key mechanical interlock ■避雷器 Lightning arrester ■预留扩展套管 Reserved expansion sleeve ■扩展母线 Expansion busbar ■环形电流互感器及表计 Ring current transformer and meter

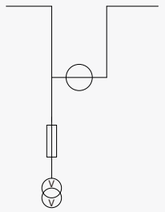
基本单元方案 Basic unit schedule

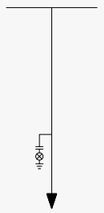
Basic unit schedule 基本单元方案

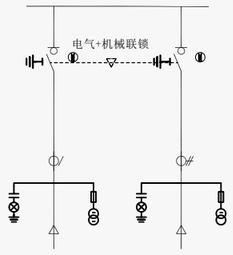
方案 Program	型号 Model	功能 Function	标准配置 Standard configuration	可选配置 Optional configuration
	SV单元 SV unit	采用真空断路器+两工位隔离开关分段单元，不带接地开关，主要用于母线分段。 It adopts vacuum circuit breaker + two-station isolating switch segment unit without grounding switch. It is mainly used for busbar segmentation.	■630A母线 630A busbar ■真空开关 Vacuum switch ■真空开关电动操作机构 Electric operating mechanism of vacuum switch ■两工位隔离开关 Two-station isolating switch ■两工位隔离开关手动操作机构 Manual operating mechanism of two-station isolating switch ■出线套管为感应式高压传感器 Manual operating mechanism Outlet sleeve is an inductive high pressure sensor ■挂锁装置 Padlock device ■密度表 Density table ■接地母排 Grounding busbar ■柜体 Cabinet ■电缆连接套管 Cable connection sleeve ■保护专用电流互感器 Special current transformer for protection ■继电保护装置 Relay protection device ■操作手柄 Operating handle	■预留扩展套管 Reserved expansion sleeve ■扩展母线 Expansion busbar

方案 Program	型号 Model	功能 Function	标准配置 Standard configuration	可选配置 Optional configuration
	PT单元 PT unit	母线PT单元，全绝缘、全密封结构电压互感器单元，利用全绝缘、全屏蔽可分离连接器与电压互感器连接。 Busbar PT unit, fully insulated, fully sealed structure voltage transformer unit, using fully insulated, fully shielded detachable connector to connect with the voltage transformer.	■可分离连接器（电缆接头） Detachable connector (cable connector) ■电压互感器 PT ■保护熔断器 Protective fuse ■出线套管为感应式高压传感器 Manual operating mechanism Outlet sleeve is an inductive high pressure sensor ■接地母排 Grounding busbar ■柜体 Cabinet	■表计 Meter ■电源模块 Power module ■蓄电池组 Battery pack

基本单元方案 Basic unit schedule

方案 Program	型号 Model	功能 Function	标准配置 Standard configuration	可选配置 Optional configuration
	M单元 M unit	计量柜单元，可根据需求更换不同变比的电流互感器。 A measuring cabinet unit, which can be replaced with current transformers with different transformation ratios according to demand.	■630A母线 630A busbar ■电流互感器（两台） 2CT ■电压互感器（两台） 2PT ■保护PT的熔断器 Protective fuse for PT ■接地母排 Grounding busbar ■柜体 Cabinet	■表计 Meter

方案 Program	型号 Model	功能 Function	标准配置 Standard configuration	可选配置 Optional configuration
	D单元 D unit	电缆馈线单元，不带开关，可方便实现进出线扩展或者避雷器的连接。。 Cable feeder unit without switch, which can facilitate the extension of the incoming and outgoing lines or the connection of the arrester.	■630A母线 630A busbar ■密度表 Density table ■出线套管为感应式高压传感器 Manual operating mechanism Outlet sleeve is an inductive high pressure sensor ■接地母排 Grounding busbar ■柜体 Cabinet ■电缆连接套管 Cable connection sleeve	■短路及接地故障指示器 Short circuit and ground fault indicators ■可分离连接器（电缆接头） Detachable connector (cable connector) ■避雷器 Lightning arrester ■预留扩展套管 Reserved expansion sleeve ■扩展母线 Expansion busbar ■环形电流互感器及表计 Ring current transformer and meter

方案 Program	型号 Model	功能 Function	标准配置 Standard configuration	可选配置 Optional configuration
	NSM单元 NSM unit	两台负荷开关采用可靠的电气及机械联锁，通过微机装置实现双电源备自投，主要应用于双路电源进线侧的控制。 The two load switches adopt reliable electrical and mechanical interlocking, and the standby automatic switching of double power supply is realized by microcomputer device, which is mainly used for the control of the incoming side of dual power supply.	■630A母线 630A busbar ■三工位负荷开关 Three-position load switch ■电动操作机构 Electric operating mechanism ■出线套管为感应式高压传感器 Manual operating mechanism Outlet sleeve is an inductive high pressure sensor ■挂锁装置 Padlock device ■密度表 Density table ■接地母排 Grounding busbar ■柜体 Cabinet ■电缆连接套管 Cable connection sleeve ■操作手柄 Operating handle ■进线采样PT、CT Incoming line sampling PT、CT ■继电保护装置 Relay protection device	■短路及接地故障指示器 Short circuit and ground fault indicators ■进线接地带电闭锁装置 Incoming grounding live-locking device ■可分离连接器（电缆接头） Detachable connector (cable connector) ■避雷器 Lightning arrester ■预留扩展套管 Reserved expansion sleeve ■扩展母线 Expansion busbar ■环形电流互感器及表计 Ring current transformer and meter

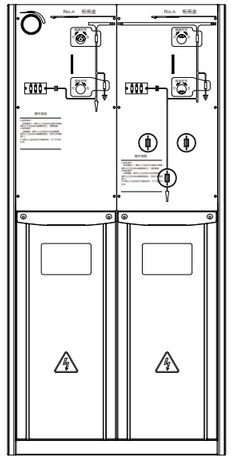
组合单元方案 Combination unit scheme

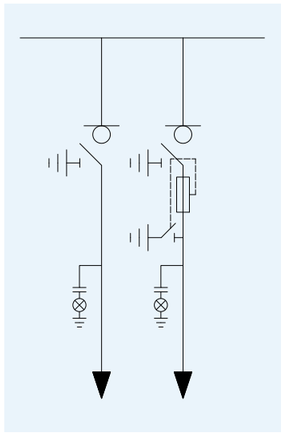
组合单元方案 Combination unit scheme

WER开关系列的组合方案中每个单独的型号开关单元配置参见基本单元方案中的标准配置和可选配置，每个共箱组合配置一个密度表，一把操作手柄。

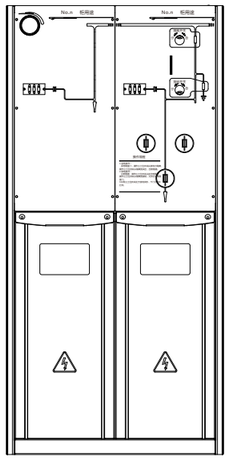
Refer to the standard configuration and optional configuration in the basic unit scheme for the configuration of each individual model switch unit in the combination scheme of WER switch series , each common box combination is equipped with a density table and an operation handle.

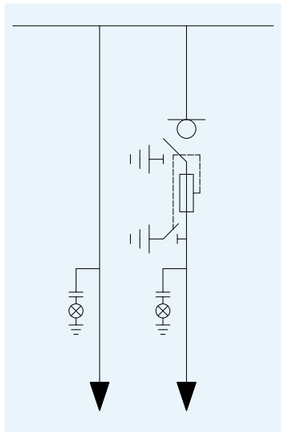
两单元共箱方案 Scheme of two units in one box





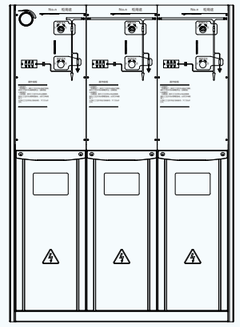
CF

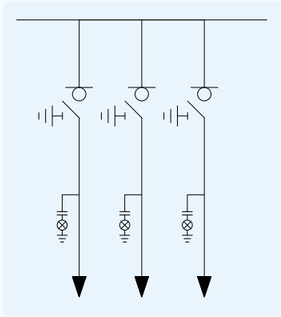




DF

三单元共箱方案 Scheme of three units in one box





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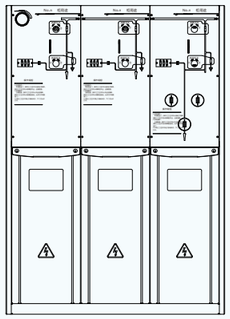

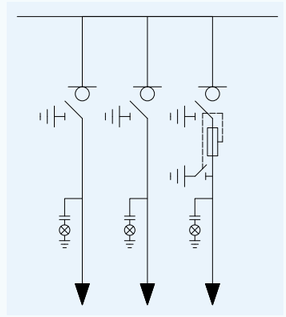

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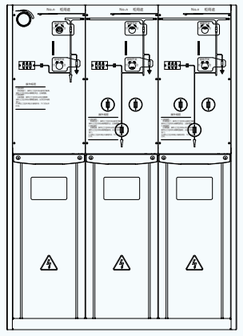

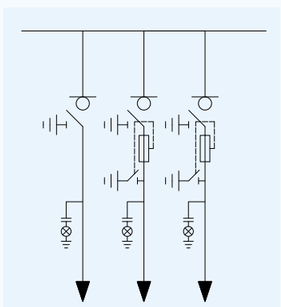

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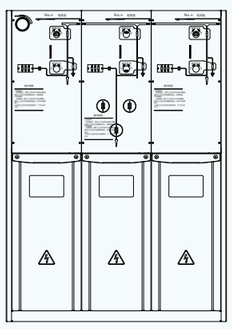

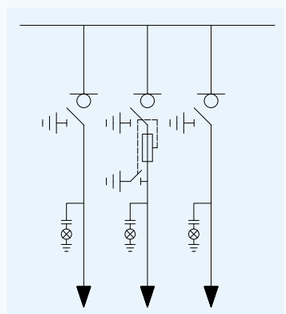

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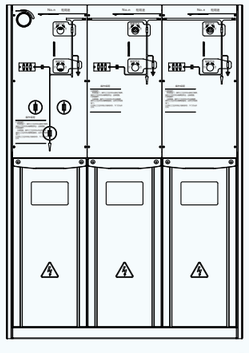
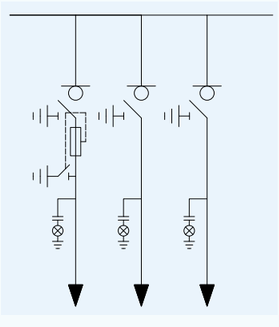
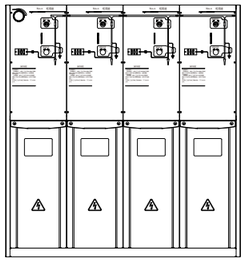
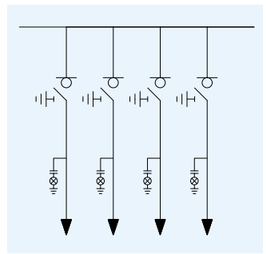




FCC

四单元共箱方案 Scheme of four units in one box

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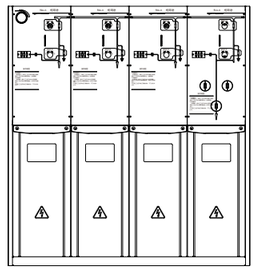
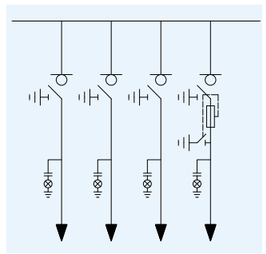

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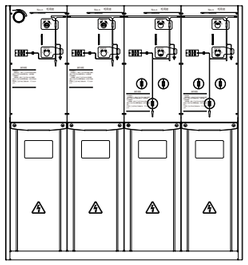
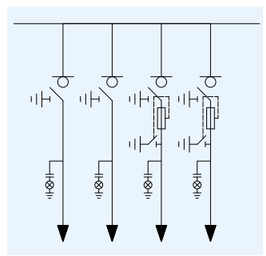

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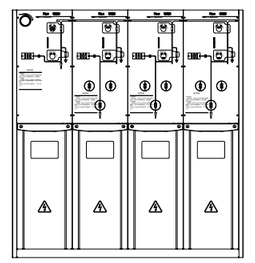
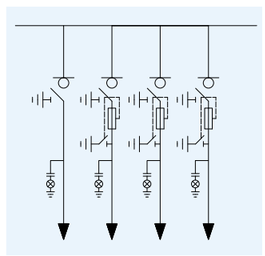

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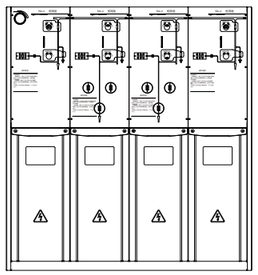
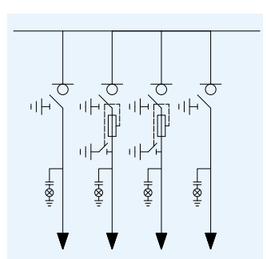

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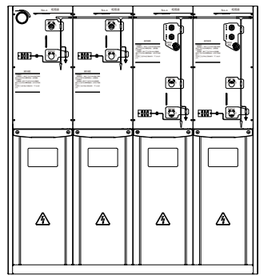
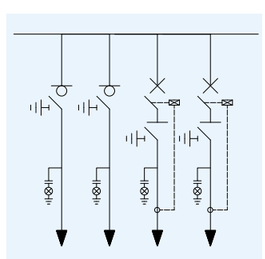

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外形尺寸 Overall dimension

12千伏标准整柜外形尺寸宽（W）×深(D)×高(H)，W（见下表）×773×1450 mm(不带仪表箱)：

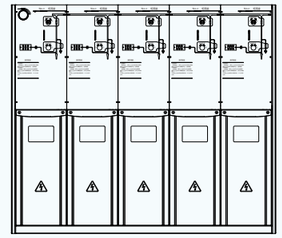
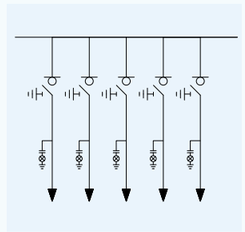
Overall dimensions of 12kV standard whole cabinet: width (W) × depth (D) × height (H), W (refer to table below) × 773 × 1450mm (without instrument box)

共箱单元数 Number of all units	1	2	3	4	5	6
W（mm）	375	700	1025	1350	1675	2000

最多6个共箱，每增加一个单元间隔宽度为325mm。如带仪表箱根据需要配置不同高度仪表箱。

Up to 6 units in one box, each additional unit interval width is 325mm, and if equipped with an instrument box, configure a different height instrument box as needed.

五单元共箱方案 Scheme of five units in one box

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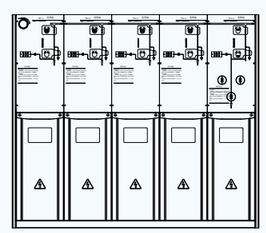
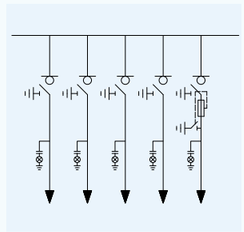

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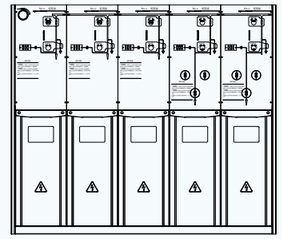
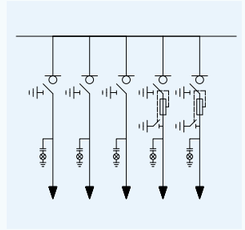

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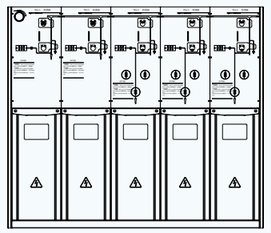
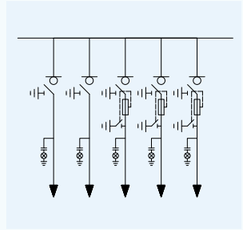

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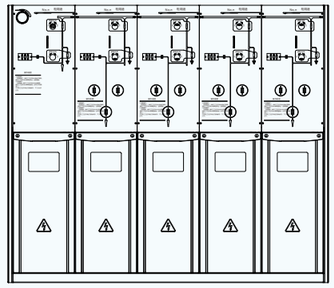
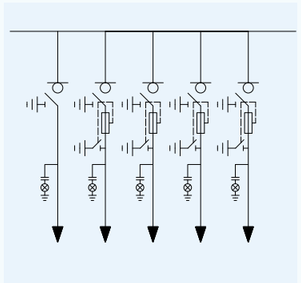

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外形尺寸 Overall dimension

24千伏标准整柜外形尺寸宽（W）×深(D)×高(H)，W（见下表）×773×1600 mm(不带仪表箱)：

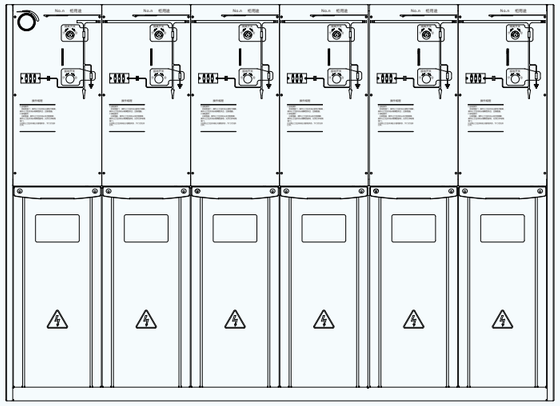
Overall dimensions of 24kV standard whole cabinet: width (W) × depth (D) × height (H), W (refer to table below) × 773 × 1450mm (without instrument box)

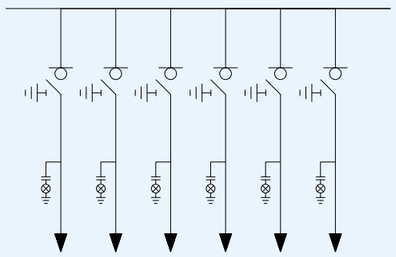
共箱单元数 Number of all units	1	2	3	4	5
W（mm）	445	840	1235	1630	2025

最多5个共箱，每增加一个单元间隔宽度为395mm。如带仪表箱根据需要配置不同高度仪表箱。

Up to 5 units in one box, each additional unit interval width is 395mm, and if equipped with an instrument box, configure a different height instrument box as needed.

六单元共箱方案 Scheme of six units in one box





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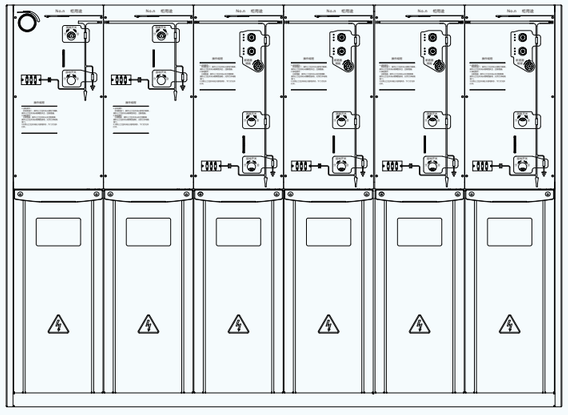

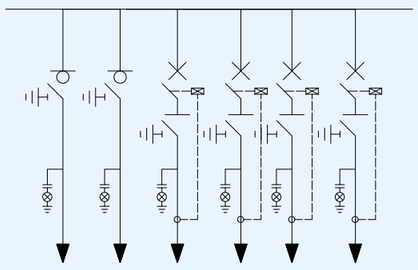

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充气柜配套件 Inflatable cabinet accessories

WRV-12（V） 充气柜断路器本体

WRV-12（V）真空断路器为WER充气柜专用真空断路器，开关采用夹板式结构，具有开断性能可靠、使用寿命长、免维护及安装方便等优点。

WRV-12（V）真空断路器主要应用于我司WER-□/630-V型充气柜或用于其它相似类型的SF6充气柜，作为充气柜主要元件，承担主体功能，具有分合额定电流、负载电流；关合和开断短路电流等性能。

WRV-12（V）inflatable cabinet circuit breaker body

WRV-12（V）vacuum circuit breaker is a special vacuum circuit breaker for WER inflatable cabinet. The switch adopts a splint structure, which has the advantages of reliable breaking performance, long service life, maintenance-free and easy installation.

The WRV-12（V） vacuum circuit breaker is mainly used in our company's WER-□ / 630-V type gas cabinet or other similar types SF6 gas cabinets. As the main component of the gas cabinet, it bears the main function and has the performance of separating and connecting rated current, load current, closing and breaking short-circuit current, etc.

WRV-12（C）负荷开关

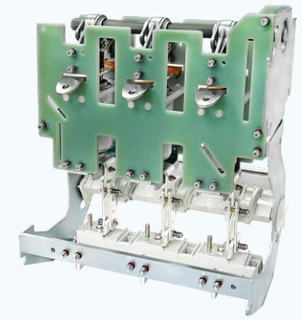
WRV-12（C）系列负荷开关是专门为WER 充气柜设计开发，开关以旋转式动触头（刀片式）结构为主，采用灭弧栅灭弧，性能可靠，具备很好的绝缘性能。该系列包括三工位和二工位负荷开关，产品性能符合GB1985-2004《高压交流隔离开关和接地开关》E3-M2级隔离开关的标准。

WRV-12（C） 负荷开关主要应用于我司WER-□/630-C型充气柜或用于其它相似类型的SF6充气柜，作为充气柜主要元件，承担主体功能，具有分合额定电流、负载电流及关合短路电流等性能。

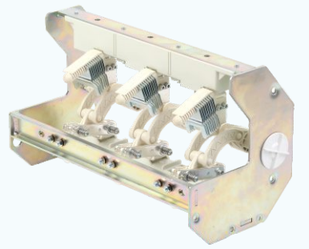
WRV-12（C） load switch

WRV-12（C） series load switch is specially designed and developed for WER gas-filled cabinet. The switch is mainly a rotary moving contact (blade type) structure. It uses an arc-extinguishing grid to extinguish the arc. It has reliable performance and good insulation performance. This serie includes three-position and two-position load switches. The performance of the product meets standards of GB1985-2004 "High Voltage AC Isolating Switch and Grounding Switch" E3-M2 class isolating switch.

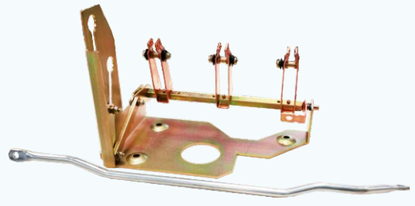
WRV-12（C） load switch is mainly used in our WER-□ / 630-C inflatable cabinet or other similar types of SF6 inflatable cabinets. As the main component of the inflatable cabinet, it assumes the main function and has the performance of separating and connecting rated current, load current, closing and breaking short-circuit current, etc.



断路器开关本体
Breaker switch body



负荷开关
Load switch



下接地开关
Lower earthing switch

新型操动机构 New operating mechanism

电力部门根据长期的运行统计分析，在中高压开关设备的各种故障原因中，不同地区、不同开关类型、不同电压等级中，因为操作机构造成的故障达到30%~70%的比例，因此，操动机构的可靠性成为了SF6环网开关设备技术水平高低的重要指标。

WER开关柜引进国外先进技术，生产性能稳定的弹簧操动机构。操动机构包含机械模块和电动模块，电动模块由预先连接的导线和电路板组成，可方便选择对手动操动机构进行电动升级，以及对电路板的更换、检修和维护，具有以下特点：

■ 自主研发，稳定的弹簧操动机构。

■ 采用夹板式结构，计算机优化传动系统，效率高，寿命长，稳定性好。

■ 手动模块+电动模块+预留二次接口，方便手动机构升级电动和二次线路检修维护及扩展。

■ 168h盐雾试验，高防腐，环境适应性好。

■ 完善的五防机械刚性联锁+电气辅助联锁，安全可靠，最大限度防止误操。

■ 传动输出稳定，与市场主流充气柜开关参数完美匹配。

■ 体积小，安装方便，完全适配各种标准化SF6柜型。

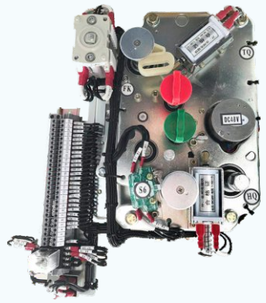
According to the long-term operation statistical analysis of the power department, among the various failure causes of medium and high voltage switchgear, in different regions, different switch types and different voltage levels, the failure caused by the operating mechanism reaches the proportion of 30% to 70%. The reliability of the operating mechanism has become an important indicator of the technical level of SF6 ring network switch equipment.

The WER switchgear introduces advanced foreign technology and produces a spring operating mechanism with stable performance. The operating mechanism includes a mechanical module and an electric module. The electric module is composed of pre-connected wires and a circuit board. It can easily select the electric upgrade of the manual operating mechanism, as well as the replacement, inspection and maintenance of the circuit board. It has the following characteristics:

■ independently developed and stable spring operating mechanism.

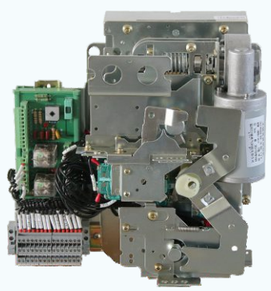
■ adopt splint structure, optimized transmission system and electronic with high efficiency, long service life and good stability.

■ manual module + electric module + reserved secondary interface, convenient for manual mechanism upgrade electric and secondary line maintenance and expansion.



V柜操动机构
V cabinet operating mechanism

F柜操动机构
F cabinet operating mechanism



C柜操动机构
C cabinet operating mechanism

■ 168 h salt spray test, high corrosion resistance, good environmental adaptability.

■ perfect five prevention mechanical rigid interlocking + electrical auxiliary interlocking, safe and reliable, to prevent misoperation to the maximum extent.

■ stable transmission output, perfect match with the main gas charging cabinet switch parameters in the market.

■ small size, easy installation, fully suitable for various standardized SF6 cabinet types.

辅助附件 Auxiliary accessories

1.电动模块

WER系列开关设备中，负荷开关单元和负荷开关+熔断器组合电器单元中，标准配置为手动操作机构，断路器单元的标准配置为电动主机构+手动隔离三工位机构，根据不同用户的需求中，可选配电动操作机构，增加电动模块。

1. Electric module

In the WER series switchgear, the standard configuration of the electrical combined unit of load switch and fuse is the manual operation mechanism, and the standard configuration of the circuit breaker unit is the electric main mechanism + manual isolation three station mechanism, and in accordance with the demand of different users, an electric operating mechanism can be selected to add an electric module.

直流电机主要技术参数表 DC motor main technical parameters table

型号 Model	功率 Power	转速 Rotating speed
220VDC	40W	13r/min
110VDC	40W	13r/min
48VDC	40W	13r/min
24VDC	40W	13r/min

2.密度表

为保证运行安全，WER系列开关设备中每个气箱单元装有一个密度表，能检测出符合技术要求的气体压力，可选配带接点密度继电器，实现低气压报警功能。

2. Density table

In order to ensure the safety of operation, each gas box unit of WER series switchgear is equipped with a density meter, which can detect the gas pressure that meets the technical requirements. It can be optionally equipped with a contact density relay to realize the low pressure alarm function.

电动模块
Electric module

密度表
Density table

短路及接地故障指示器
Short circuit and ground fault indicator

微动开关
Microswitch

3.短路和接地故障指示

为了便于故障定位，电缆开关模块可以装备短路/ 接地故障指示器，进行简单的故障检测。

3.Short circuit and ground fault indication

To facilitate fault location, the cable switch module can be equipped with a short-circuit / ground fault indicator for simple fault detection.

4.辅助接点

辅助接点通过微动开关的触头位置状态的改变，用来指示功能单元或辅助部件的状态改变，作为状态控制和监视信号，是电气回路中的重要元件。 WER系列系列开关各功能单元可根据不用的需求，配置相应的辅助接点。

4. Auxiliary contact

The auxiliary contact changes the state of the contact position of the micro switch to indicate the state change of the functional unit or auxiliary component. As a state controlling and monitoring signal, it is an important element in the electrical circuit. The functional units of WER series switches can be configured with corresponding auxiliary contacts according to different needs.

辅助触点的接点容量 Contact capacity of auxiliary contacts

型号 Model	额定电流 Rated current	额定电压 Rated voltage
AC12	22A	380VAC
AC15	6A	380VAC
DC12	5A	250VDC

5.联锁装置

WER系列开关设备中，断路器开关与隔离开关，隔离开关与接地开关，负荷开关与接地开关之间均配置有可靠的联锁装置，接地开关与电缆室门之间也配置有可靠的联锁装置，只有在接地开关合闸时，电缆室门才能打开，接地开关分闸时，电缆室门不能打开，可有效的防止操作人员带电打开电缆室门进行更换熔断器、安装电缆及其他维护。

WER系列开关可选配进线带电接地闭锁装置，当进线电缆带电时，装置将闭锁接地开关操作孔，此时，操作手柄不能插入接地开关操作孔进行操作，防止误操作发生，保证人身和设备安全。

5.Interlocking device

In the WER series switchgear, between the circuit breaker switch and the isolating switch, the isolating switch and the grounding switch, the load switch and the ground switch are all equipped with a reliable interlock device, and the grounding switch and the door of the cable compartment are also equipped with a reliable interlock. The device can only open the door of the cable compartment when the grounding switch is closed. The door of the cable compartment cannot be opened when the grounding switch is opened, which can effectively prevent the operator from opening the door of the cable compartment to replace the fuse, install the cable and other maintenance in a live state.

The WER series switch can be equipped with an incoming live grounding blocking device. When the incoming cable is live, the device will block the operating hole of the grounding switch. At this time, the operation handle cannot be inserted into the operating hole of the grounding switch to prevent misoperation and ensure the safety of the person and the equipment.

6.底座

WER系列开关设备可以安装在单独的底座上。该底座的设计在两端和后面都预留了电缆出入口，可方便作为户内环网柜使用时地基的安装。

6.base

WER series switchgear can be installed on a separate base. The design of the base has reserved cable access at both ends and back, which is convenient for the installation of the foundation when the indoor ring network cabinet is used.

7.二次线小室/低压箱

SE3系列开关设备可配置二次线小室/低压箱，可安装在开关柜正面顶部，用于安装控制、监测、指示元件（如电流表，合分闸按钮、到位指示）等。

7.Secondary line chamber / LV box

Se3 series switchgear can be equipped with secondary line chamber / low-voltage box, which can be installed on the top of the front of the switchgear, for the installation of control, monitoring, indicating elements (such as ammeter, closing and opening buttons, in place indication), etc.

8.分支母线

引进先进设备，标准化自主生产，按照功能分为组合电器柜、负荷开关柜及断路器柜分支母线，开孔尺寸有Φ13×15及Φ13×18。

9.出线扇形触头

10.动配合

8.Branch busbar

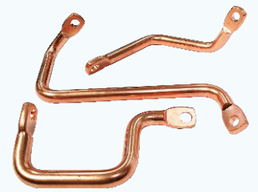
Introduce advanced equipment and standardize independent production. According to the function, it can be divided into combined electrical cabinet, load switch cabinet and branch bus of circuit breaker cabinet, with sizes of Φ 13x15 and Φ 13x18.

9.Outgoing flabellate contact

10.loose fit

组合电器柜分支母线
Branch busbar of combined electrical cabinet

负荷开关柜分支母线
Branch busbar of load switch cabinet



断路器柜分支母线
Branch busbar of circuit breaker cabinet

出线扇形触头
Outgoing flabellate contact

动配合
Loose fit